



FLORIDA DEPARTMENT OF MANAGEMENT SERVICES

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# The Florida Emergency Medical Services Communications Plan

Volume 1 - Sixth Edition



Rick Scott, Governor  
Erin Rock, Secretary

## **MEMORANDUM**

**TO:** Florida Emergency Medical Communications Plan, Volume 1 Recipients

**FROM:** Heath Beach, Director, Division of Telecommunications

**DATE:** Aug. 31, 2018

**SUBJECT:** Florida Emergency Medical Services Communications Plan, Volume 1, Sixth Edition

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The Florida Emergency Medical Services Communications Plan, Volume 1, has been revised as the Sixth Edition and is now available online at the following link:

[http://www.dms.myflorida.com/business\\_operations/telecommunications/radio\\_communications\\_services/radio\\_communications\\_plans](http://www.dms.myflorida.com/business_operations/telecommunications/radio_communications_services/radio_communications_plans)

This edition includes revisions, updates, clarifications, and new text. Specifically, the changes include the following:

- New section 2.11 – Telecommunicator Emergency Response Taskforce;
- Revised section 3.13 – Back-Up Communications;
- New section 4.2.2 – Nuisance Interference;
- Updated Table 4-2 – Channel Allotment Principles;
- Revised section 4.2.3 to address free-standing emergency departments;
- New section 5.4.2, 5.5.2, and 5.6.4 on hospital emergency departments;
- Updated Table 5-1 on specific MED channel assignments;
- New section 6.2 – Project 25 Radio ID Numbering;
- Revised section 6.10.1.D – Project 25 Digital Operating Parameters;
- Updated Appendix A – Functional Relationships with Plans and Committees;
- New Appendix D – EMS Triangle of Communications; and
- Revised Appendix G – Glossary of Communications Terms.

This edition is being made available to all organizations and individuals identified per section 1.3 of the plan. To ensure that you receive future revisions for Volume I and Volume II, please verify that the name and email address on file with the Florida Department of Health Bureau of Emergency Medical Services is correct.

Special thanks are extended to personnel in the DMS Division of Telecommunications, the Bureau of Emergency Medical Services, the EMS Communications Committee, and the Agency

Volume 1 Recipients

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For Health Care Administration (AHCA), as well as others that provided input toward this revision. This plan is intended to meet the expectations of Emergency Medical Services (EMS) agencies on a statewide basis.

If you have any comments or questions regarding these revisions, please contact Steve Welsh, Bureau of Public Safety Communications Manager, at 850-922-7505 or via email at [steve.welsh@dms.myflorida.com](mailto:steve.welsh@dms.myflorida.com).

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## **1.0 INTRODUCTION**

### **1.1 Executive Summary**

In accordance with section 401.015, Florida Statutes, the Department of Management Services (DMS) Division of Telecommunications (DivTel Bureau of Public Safety) is responsible “to develop a statewide system of regional emergency medical telecommunications.” In 1975, the first Emergency Medical Services (EMS) Communications Plan (plan) was implemented and the approval system necessary to fulfill these statutory obligations was established. In conjunction with federal funding made available from 1973 through 1981 by Congress through the EMS Systems Act, the first plan enabled implementation of many EMS radio systems throughout Florida in the Ultra High Frequency (UHF) radio frequency band.

Changes in technological approaches and changes in EMS operational needs, along with experience gained over the years, have necessitated EMS Communications Plan revisions. Section 401.024, Florida Statutes, provides that “no emergency medical telecommunications system shall be established or present systems expanded without prior approval of the Department of Management Services.”

By means of this plan and funding made available through the state EMS Grants Program, new directions and enhancements in the statewide EMS telecommunications system have been established. To maintain these improvements, each user of this plan is encouraged to send questions and comments on any matter that this plan does or should contain to the following:

EMS Communications  
Bureau of Public Safety  
Division of Telecommunications  
4030 Esplanade Way  
Tallahassee, FL 32399-0950  
Phone: 850-922-7505  
FAX: 850-488-9837

This plan is organized into two volumes. Volume 1 contains administrative and regulatory information needed by EMS managers. Concepts and goals specific to EMS communications within Florida are outlined along with an overview of Federal Communications Commission (FCC) rules and guidelines for obtaining licensing and EMS communications equipment approval. Radio frequencies, frequency coordination requirements, and the Florida Region 9 Plan for Public Safety Radio Communications are also described.

Volume 2 is intended to be carried as a standard reference field manual (hard- or soft-copy) on all vehicles. It provides detailed radio frequency allocations for EMS agencies and hospitals, pertinent FCC rules, and recommended operating practices. Basic radio theory with information on public safety radio bands and EMS communications is provided. Additionally, interstate allocations for adjacent counties in Georgia and Alabama and the geographic coordinates for hospitals within Florida are included.

Functional relationships between this plan and other plans are depicted in [Appendix A](#). Resources and other activities are also depicted in [Appendix A](#). The purpose of depicting functional relationships between plans, resources, and other activities is to show how they contribute to the Statewide Communications Interoperability Plan (SCIP) for Florida and to the National Emergency Communications Plan (NECP) for the U.S.

Throughout the development of this plan, new editions have been kept as short and as straightforward as possible. This approach should improve the usefulness of this plan and facilitate future revisions. The statewide requirements on EMS communications systems and equipment have been limited to the minimum level necessary to ensure the effectiveness of essential modes of EMS communications.

The preparation, publication, and distribution of this plan have been in cooperation with the Department of Health's Bureau of Emergency Medical Services. This mutual effort has been and will continue to be highly successful in improving EMS throughout Florida.

Many individuals both within and outside the DivTel Bureau of Public Safety—particularly the EMS Communications Committee—are recognized for contributing their time, effort, and ideas toward making this plan a meaningful and useful document. It is only through such interaction and exchange of ideas on a continual basis that this plan will serve to satisfy the original legislative intent "that a statewide system of regional emergency medical telecommunications be developed whereby maximum use of existing radio channels is achieved to more effectively and rapidly provide emergency medical service to the general population."<sup>1</sup>

## **1.2 Legislative Background**

DivTel is authorized to plan and coordinate all telecommunications services for state agencies and political subdivisions, as specified in section 282.702, Florida Statutes. DivTel provides Florida's agencies with an integrated, effective, and efficient statewide telecommunications system. Since the inception of the DivTel Bureau of Public Safety in 1970, it has received additional responsibilities and authority related to public safety telecommunications at the local level.

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<sup>1</sup> Section 401.013, Florida Statutes.

In 1973, the Florida Legislature enacted Chapter 401, Part I, Florida Statutes, the EMS Telecommunications Act, relating to emergency medical service telecommunications to include the following: providing for the establishment and regulation of EMS telecommunications; mandating the DivTel Bureau of Public Safety to formulate and implement a plan encompassing each medical service entity within the state; and listing those items to be included in such a plan. Like section 282.7101, Florida Statutes, this statute requires the DivTel Bureau of Public Safety's approval prior to the implementation of new communications systems or the expansion of existing systems.

In 1992, the Florida Legislature amended Chapter 395 (Hospital Licensing and Regulation), which specifically addresses EMS communications at licensed hospitals with an emergency department. The requirements of section 395.1031, Florida Statutes, and the DivTel Bureau of Public Safety's authority therein are consistent with that specified under Chapter 401, Part I, Florida Statutes, the EMS Telecommunications Act.

In 1974, the Florida Legislature enacted the Florida Emergency Telephone Act. The act states that "it is the intent of the legislature to establish and implement a cohesive statewide emergency telephone number 911 plan." This EMS Communications Plan does not include, other than conceptually, provisions for the 911 "citizen access" portion of emergency medical services operations.

### **1.3 Plan Revision Procedure**

A major goal in the development and distribution of this plan has been to establish an effective revision procedure to ensure that all necessary information and requirements regarding EMS communications are promptly made available to affected EMS organizations. This section defines the revision transmittal procedure and formatting style for both new and revised pages.

Copies of Volumes I and II are made available to each EMS agency licensed by the Department of Health's Bureau of Emergency Medical Services. They are also made available to each hospital licensed by the Agency for Health Care Administration with an emergency department. Additionally, other public safety agencies and radio vendors affecting EMS may also obtain a copy.

#### **1.3.1 Revision Transmittal Procedure**

New or revised information to both Volumes 1 and 2 are prepared by the DivTel Bureau of Public Safety. Each new edition of either volume is accompanied by a revision memorandum defining the essence of the revisions.

### **1.3.2 Revision Format**

- A. Cover Page: With any revision to either volume, the cover page is replaced with a new page showing the latest edition number.
- B. Revised Pages: Text that has been substantively modified in the revised edition is identified in the revision memorandum and identified with a vertical bar (" | ") in the left margin on each page. Non-substantive changes, punctuation, upper or lowercase, etc., are not tracked with the vertical bar.

**END OF SECTION 1**

## 2.0 ADMINISTRATIVE INFORMATION

### 2.1 Division of Telecommunications (DivTel Bureau of Public Safety)

DivTel is organized into several bureaus that encompass a multitude of disciplines associated with the telecommunications systems throughout Florida. Some examples of these responsibilities are to oversee activities related to the statewide communications system (SUNCOM), directory assistance, telephone services invoicing, the 911 emergency telephone number system, wire line data communications, and publication of the State of Florida Telephone Directory (411). Other areas within the DivTel Bureau of Public Safety are primarily involved with activities related to land mobile, microwave, satellite radio systems, and radio frequency coordination.

Specifically with respect to EMS communications, the DivTel Bureau of Public Safety is responsible for regulatory direction and communications engineering services to county, municipal, and non-government EMS organizations. Per Chapter 401, Part I, Florida Statutes, the DivTel Bureau of Public Safety's responsibilities encompass the following wide range of activities:

- A. Communications Planning: Closely related to communication system analysis, planning services include formal planning on state, regional, county, municipal, and non-government levels. Within the planning framework, engineering and operational system requirements are defined and translated into present and future equipment and system needs.
- B. Radio Frequency Coordination and Licensing Assistance: Assistance in the preparation of radio frequency coordination forms and FCC license applications may be provided.

Timely requests for project assistance in the above areas, or for any other information or assistance that the DivTel Bureau of Public Safety may provide should be directed to the following:

EMS Communications  
Bureau of Public Safety  
Division of Telecommunications  
4030 Esplanade Way, Suite 135  
Tallahassee, FL 32399-0950  
Phone 850-922-7505  
FAX 850-488-9837

Requests for assistance may also be submitted via email to [steve.welsh@dms.myflorida.com](mailto:steve.welsh@dms.myflorida.com).

## **2.2 Federal Communications Commission**

### **2.2.1 General**

All non-federal government radio telecommunications systems in the U.S. are subject to the rules and regulations of the Federal Communications Commission (FCC). Such radio communications are allowed under FCC rules and regulations, Title 47, Code of Federal Regulations, Private Land Mobile Radio Services (PLMR) Public Safety Radio Pool. In the event of inconsistencies between this plan and the FCC rules, the rules take precedence.

### **2.2.2 History**

The FCC Report and Order of Private Radio Docket No. 91-72, effective April 2, 1993, created the Emergency Medical Radio Service (EMRS). With that action, EMS became clearly separate and independent of Special Emergency Radio Service eligibles. In summary, "this action was taken to re-address the adverse consequences on public health and safety resulting from current crowding on emergency medical channels. The rule changes established a discrete radio service category dedicated strictly to eligibles providing basic or advanced life support services on an ongoing basis and thereby ensure the reliability of emergency medical communications. In this Report and Order, we establish the EMRS as a new Public Safety Radio Service under the FCC Rules."

The FCC Report and Order of Private Radio Docket No. 92-235, effective Aug. 18, 1995, affected the 150-170 MHz VHF band and the 421-430, 450-470, and 470-512 MHz UHF bands. It established a new channeling plan, provided technical flexibility, mandated consolidation, and suggested an initial framework for PLMR services.<sup>2</sup>

This rule-making essentially affected all PLMR services in the FCC rules. Further rulemaking<sup>3</sup> as contained in FCC Report and Order 03-34 continues.

### **2.2.3 Radio Frequencies for EMS Communications Eligibility**

Current FCC rules clearly distinguish between EMS communications and other medical and administrative health care communications. Per FCC rule 90.20(a)(1)(iii), eligible users of radio frequency spectrum allocated by the FCC for EMS include the following:

"Persons or entities engaged in the provision of basic or advanced life support services on an ongoing basis are eligible. . .to operate stations for transmission of communications essential for the delivery or rendition of emergency medical services for the provisions of basic or advanced life support."

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<sup>2</sup> Summary of FCC Report & Order, PR Docket No. 92-235, Federal Register, July 19, 1995, pg. 37152.

<sup>3</sup> Adopted Second Report and Order and Second Further Notice of Proposed Rulemaking. (Docket No. 99-87). Action by: the Commission. Adopted: 02/12/2003 by R&O. (FCC No. 03-34). Implementation of Sections 309(J) and 337 of the Communications Act of 1934 as amended; Promotion of Spectrum Efficient Technologies on certain Part 90 Frequencies.

## 2.2.4 Emergency Medical Radio Service Frequencies

For EMS, there are several VHF high band frequencies, 220 MHz frequencies, and UHF band frequencies. Many of these frequencies are restricted for specific uses such as crew alert paging, intersystem use, medical coordination, and vehicle coordination or are shared with other public safety eligibles. While there are no 700 MHz and 800 MHz frequencies specifically allocated to EMS, all EMS eligibles may license 700 MHz and 800 MHz frequencies allocated for public safety eligibles. Refer to current FCC rules for actual channels, uses, and limitations for each frequency band.

## 2.2.5 UHF Radio Equipment Channelization Requirements

- A. Base Station Facilities: Under FCC rules, all radio base stations operating on MED channels are no longer required to be equipped to operate more than one channel each. Although these frequency pairs are assigned and/or licensed in a block (MED-1 to MED-102) for shared operation, Florida's EMS Communications Plan (plan) establishes the specific channel requirements per tables listed under "Florida Countywide MED Channel & CTCSS Allotments"<sup>4</sup> and "Specific MED Channel Assignments for Florida Acute Care Facilities."
- B. Mobile and Portable Equipment: Under FCC rules, mobile and portable radios operating on the MED channels must be both wired and equipped for operation on each of the MED channels. However, portable radios operating with a maximum power output of 2.5 watts are exempt from this multi-channel requirement, but portable radios must have MED-8 Statewide Medical Coordination (SMC) and Statewide Scene Coordination (SSC) channels as a minimum.
- C. Paging and Crew Alerting: The secondary, one-way paging frequencies for EMS are assignable only to organizations eligible under FCC rules for the transmission of one-way tone and/or voice paging messages that are necessary for the rendition of medical services.

## 2.2.6 Radio Frequency Coordination and Licensing

All requests for radio frequency coordination and licensing must be directed to an FCC-certified frequency coordinator. All EMS applicants must obtain approval of eligibility determination from the Div/Tel Bureau of Public Safety. This must be included with the application submitted to the FCC-certified frequency coordinator for EMS frequencies. Historically, EMS applicants submitted their applications to the International Municipal Signal Association/International Association of Fire Chiefs (IMSA/IAFC), but FCC rule changes opened up opportunities for other FCC-certified frequency coordinators. Contact information for FCC-certified frequency coordinators may be found at the [Public Safety and Homeland Security Bureau's website](#).

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<sup>4</sup> CTCSS stands for continuous tone-coded squelch system.

Frequency coordination usually requires a coordination fee. Contact the appropriate coordinating organization to determine the current processing requirements and fee schedule prior to submitting applications.

### **2.2.7 Copy of FCC Rules**

Licenses are required to have a current copy of the FCC's land mobile rules governing the radio service in which authorization is granted. By signing FCC 601 form, the applicant certifies to have access to a current copy of the applicable radio service's rules. Rules for the Part 90 Private Land Mobile Radio Services are contained in a volume entitled "Code of Federal Regulations, Title 47, Part 80 to END," published after Oct. 1 of each year. [Part 90 of these FCC rules](#) is available online.

## **2.3 Emergency Communications E911 State Plan**

The Division of Telecommunications maintains responsibility for coordinating and updating the Emergency Communications E911 State Plan. The Division of Telecommunications is guided by sections 365.171-175, Florida Statutes, the original state of Florida Emergency Telephone Number 911 Plan and precedent established over the years since the 911 statute was originally passed in 1974.

## **2.4 Florida – Region 9 Plan for 800 MHz Public Safety Radio Communications**

The FCC has established a National Public Safety Plan that specifies requirements governing the public safety eligibles' use of the new 806-809/851-854 MHz band. The National Public Safety Plan was developed to satisfy the two broad objectives of interoperability between communications systems and efficient use of the spectrum. The National Public Safety Plan became effective on Feb. 16, 1988, and established local planning regions for all parts of the U.S., Puerto Rico, and the U.S. Virgin Islands. The state of Florida is Region 9.

The [Florida - Region 9 Plan for Public Safety Radio Communications](#) (Florida - Region 9 800 MHz Plan) was subsequently prepared by the Florida region and sub-region plan committees, which represent a cross-section of public safety communications interests throughout Florida. The first Florida - Region 9 800 MHz Plan was adopted by the FCC on May 10, 1990. A copy of the [Florida - Region 9 800 MHz Plan](#) is available at the following link:

[http://www.dms.myflorida.com/media/cits\\_media/ent\\_public\\_sfty\\_media/public\\_sfty\\_radio\\_media/comm\\_plan\\_media/radio\\_communication\\_plans/florida\\_region\\_9\\_plan\\_for\\_public\\_safety\\_radio\\_communications](http://www.dms.myflorida.com/media/cits_media/ent_public_sfty_media/public_sfty_radio_media/comm_plan_media/radio_communication_plans/florida_region_9_plan_for_public_safety_radio_communications)

The Florida - Region 9 800 MHz Plan contains procedures and criteria for the selection and assignment of, applications for, and utilization and protection of the 806-809/851-854 MHz frequencies. It specifies explicit channel allotments for planned and projected use throughout Florida. A major component of the Florida - Region 9 800 MHz Plan establishes implementation and use requirements for the five 800 MHz national mutual aid channels.

## 2.5 Florida – Region 9 Plan for 700 MHz Public Safety Radio Communications

The FCC has established rules and regulations governing the public safety eligibles' use of the new 764-776/794-806 MHz band. This frequency band was divided for generally three different uses – General Use, Interoperable Use, and State Use. Specifically for the “General Use” channels, the [Florida - Region 9 700 MHz Plan](#) was subsequently prepared by the Florida Region Committee, which represents a cross-section of public safety communications interests throughout Florida. The first plan was adopted by the FCC on April 20, 2009. A copy of the [Florida - Region 9 700 MHz Plan](#) is available at the following link:

<http://caprad.org/NlectcRm/Plans/Region09/Region%209%20Plan%20final%20v6%201-30-08.pdf>

This plan contains procedures and criteria for the selection and assignment of, applications for, as well as utilization and protection of, General Use channels. It specifies explicit channel allotments for planned and projected use throughout Florida.

## 2.6 Florida 700 MHz Public Safety Interoperability Channel Plan

The FCC has established rules and regulations governing the public safety eligibles' use of the new 764-776/794-806 MHz band. This frequency band was divided for generally three different uses – General Use, Interoperable Use and State Use. Specifically for the “Interoperability Use” channels, the [Florida 700 MHz Public Safety Interoperability Channel Plan](#) was subsequently prepared by the DivTel Bureau of Public Safety. This plan represents a cross-section of public safety communications interests throughout Florida. The first edition of the plan was completed on Nov. 23, 2010. A copy of this plan is available at the following link:

<http://dms.myflorida.com/index.php/content/download/72526/432829/version/4/file/700+IO+Plan+Final+V3+05+-+First+Edition+w-DMS+wrap.pdf>

This plan “serves to define the method of administration and oversight for the Interoperability Tactical channels, National Interoperability Calling channels, and the Low Speed Data Interoperability channels designated for use by public safety entities in the 700 MHz frequency band within Florida.”

## 2.7 Florida Ambulance Deployment Standard Operating Procedure

“The purpose of this [Standard Operating Procedure \(SOP\)](#) is to establish a mechanism for State ESF8 to marshal and deploy ground and air emergency medical services (EMS) assets during disaster response.”<sup>5</sup> It addresses communications expectations for EMS, with a section specifically addressing communications (see sections 5.C and 5.E and Attachments A, B, C, and D of this SOP).

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<sup>5</sup> Florida Ambulance Deployment Standard Operating Procedure, version 1.2, March 14, 2012, pg. 1 of 16.

This SOP is available at the following link:

[http://www.floridahealth.gov/%5C/programs-and-services/emergency-preparedness-and-response/disaster-response-resources/\\_documents/\\_esf8documents/ambulance-deploy-sop2012.pdf](http://www.floridahealth.gov/%5C/programs-and-services/emergency-preparedness-and-response/disaster-response-resources/_documents/_esf8documents/ambulance-deploy-sop2012.pdf)

## **2.8 Florida Public Health and Medical Communications Plan**

This plan “will provide the means by which public health and medical resources can be accessed, mobilized, managed, and coordinated in both normal and adverse/disaster situation.” It “is used to guide and direct the communications between all responders of the Public Health and State ESF8 response systems and local ESF8 response systems following a man-made or natural disaster.”<sup>6</sup> MED-82 is specifically referenced by this plan for county health departments, in addition to its primary use per the FCC’s Part 90 rules.

## **2.9 Florida Mutual Aid Channel (MA-FLA)**

Florida has established specific requirements governing the use of the 854.6375/809.6375 MHz channel (named MA-FLA). This makes available to eligible agencies a public safety mutual aid channel authorized for use during situations requiring interservice communications necessary toward safeguarding life, or property within Florida. Refer to [Appendix B](#).

## **2.10 CASM, NIMS, SAFECOM Interoperability Continuum, SCIP, NIFOG, and FIFOG**

The EMS Communications Plan makes reference to CASM, NIMS, SAFECOM, Interoperability Continuum, SCIP, NIFOG, and FIFOG.

### **2.10.1 Communications Assets Survey and Mapping (CASM)**

The Communications Assets Survey and Mapping tool is a resource to identify communications interoperability between different agencies and disciplines in Florida and its adjacent counties. The information provided in CASM is a result of agencies contributing their radio system information—local, state, and federal. It is managed in Florida by regional and state administrators and accepted by the Florida Domestic Security Oversight Council as “Florida’s collection repository.”<sup>7</sup> CASM is available on the Public Safety Technical Assistance Tools webpage:

<https://www.dhs.gov/public-safety-software-tools>

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<sup>6</sup> Florida Public Health and Medical Communications Plan, version 1.0, June 2009, pg. 4.

<sup>7</sup> Domestic Security Oversight Council’s June 11, 2013 meeting.

### **2.10.1 National Incident Management System (NIMS)**

Florida has adopted the use of the NIMS into all facets of its operations. This includes training, exercising, mobilizing, deploying, and recovering all communications resources. Public safety personnel are expected to complete Incident Command System (ICS) and NIMS training as part of their training regimen.

### **2.10.2 SAFECOM**

SAFECOM was established in 2001 to coordinate various federal initiatives. It is under the Department of Homeland Security's Office of Emergency Communications and Office for Interoperability and Compatibility. SAFECOM "relies heavily on local and state emergency response practitioners for input and guidance as it works to define and implement solutions for the interoperability challenge."<sup>8</sup>

The SAFECOM Statement of Requirements (SoR) envisions public safety communications operations as taking place in a networking environment capable of operating as a system-of-systems. Such a system-of-systems would satisfy the requirements of public safety agencies for communication systems by providing increased functionality, improved efficiency, and built-in interoperability. As envisioned, wireless devices, local networks, regional networks, and wide area networks would be able to work together to pass information back and forth seamlessly. The SoR concept is described in more detail in section 7.0, Concepts of Mobile Data Communications.

### **2.10.3 SAFECOM Interoperability Continuum**

The SAFECOM Interoperability Continuum is a tool developed by the Department of Homeland Security and is designed to assist emergency response agencies and policymakers to plan and implement interoperability solutions for data and voice communications. This tool identifies five critical success elements that must be addressed to achieve an interoperability solution. The requisite success elements include the following: governance, standard operating procedures (SOPs), technology, training and exercise, and usage of interoperable communications. Jurisdictions across the nation can use the Interoperability Continuum to track progress in strengthening interoperable communications. Additional information on the [Interoperability Continuum](#) is available at the following link:

[http://www.dhs.gov/sites/default/files/publications/interoperability\\_continuum\\_brochure\\_2.pdf](http://www.dhs.gov/sites/default/files/publications/interoperability_continuum_brochure_2.pdf).

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<sup>8</sup> See "Governance" at <http://www.dhs.gov/governance>.

#### **2.10.4 Florida’s Statewide Communications Interoperability Plan (SCIP)**

Florida’s Statewide Communications Interoperability Plan documents the existing communications resources, plans and information needed to efficiently implement interoperability communications solutions for state and local agencies. For additional information, contact Greg Holcomb 352-343-9491 or email at [GHolcomb@lakecountyfl.gov](mailto:GHolcomb@lakecountyfl.gov), or Cindy Cast 305-596-8607 or email at [cindy@miamidade.gov](mailto:cindy@miamidade.gov). Both individuals are SCIP points of contact.

#### **2.10.5 National Interoperability Filed Operations Guide (NIFOG)**

The [National Interoperability Field Operations Guide](#) “is a technical reference for emergency communications planning for radio technicians responsible for radios used in disaster response.”<sup>9</sup> It is maintained by the U.S. Department of Homeland Security’s Office of Emergency Communications. The latest version of the NIFOG is available at the following link:

<https://www.dhs.gov/publication/fog-documents>

It provides “a pocket-sized listing of land mobile radio (LMR) frequencies that are often used in disasters or other incidents where radio interoperability is required and other information useful to emergency communicators.”<sup>10</sup>

#### **2.10.6 Florida Incident Field Operation Guide (FIFOG)**

The [Florida Incident Field Operations Guide](#) is an all-hazard approach to incident management and is a cooperative effort by Florida’s emergency management agencies. It is maintained by the State Fire Marshal. The 2012 edition can be found at the following link:

<http://www.floridadisaster.org/FOG/FLFOG.pdf>

An appendix in the FIFOG includes communications information, both general and specific to various public safety disciplines.

### **2.11 Telecommunicator Emergency Response Taskforce (TERT)**

The “TERT is the concept of communications-specific mutual aid between PSAPs to provide trained PSAP personnel during emergency situations.”<sup>11</sup> Additional information about TERT can be found in the [APCO/NENA ANS 1.105.2-2015](#) or newer approved standard.

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<sup>9</sup> National Interoperability Field Operations Guide, ver. 1.6.1, Introduction page.

<sup>10</sup> National Interoperability Field Operations Guide, ver. 1.6.1, pg. 1.

<sup>11</sup> [APCO/NENA ANS 1.105.2-2015](#)

## 2.12 Communications Approvals

### 2.12.1 General

Section 401.024, Florida Statutes, requires that "...no emergency medical services telecommunications system shall be established or present systems expanded without prior approval from the Department of Management Services." This requirement applies to all EMS telecommunications systems, regardless of funding source. All requests for approval must be submitted in writing to:

EMS Communications – Bureau of Public Safety  
Division of Telecommunications  
4030 Esplanade Way, Suite 135  
Tallahassee, Florida 32399-0950

### 2.12.2 Submittal Requirements

All submittals for approval must comply with the following requirements:

- A. Professional Engineering: Each submittal to establish or expand services that involves engineering as defined by subsection 471.005(7), Florida Statutes, must demonstrate that such engineering has been accomplished by a registered individual or firm certified to practice engineering within Florida (pursuant to Chapter 471, Florida Statutes).
- B. Exemption to Chapter 471: If the individual or firm claims exemption to Chapter 471, Florida Statutes, as specified in section 2.12.2(A), an alternative to demonstrating professional engineering may be as follows:
  - 1. A performance bond required from the individual or firm; and/or
  - 2. An acceptance test procedure to demonstrate system expectations.

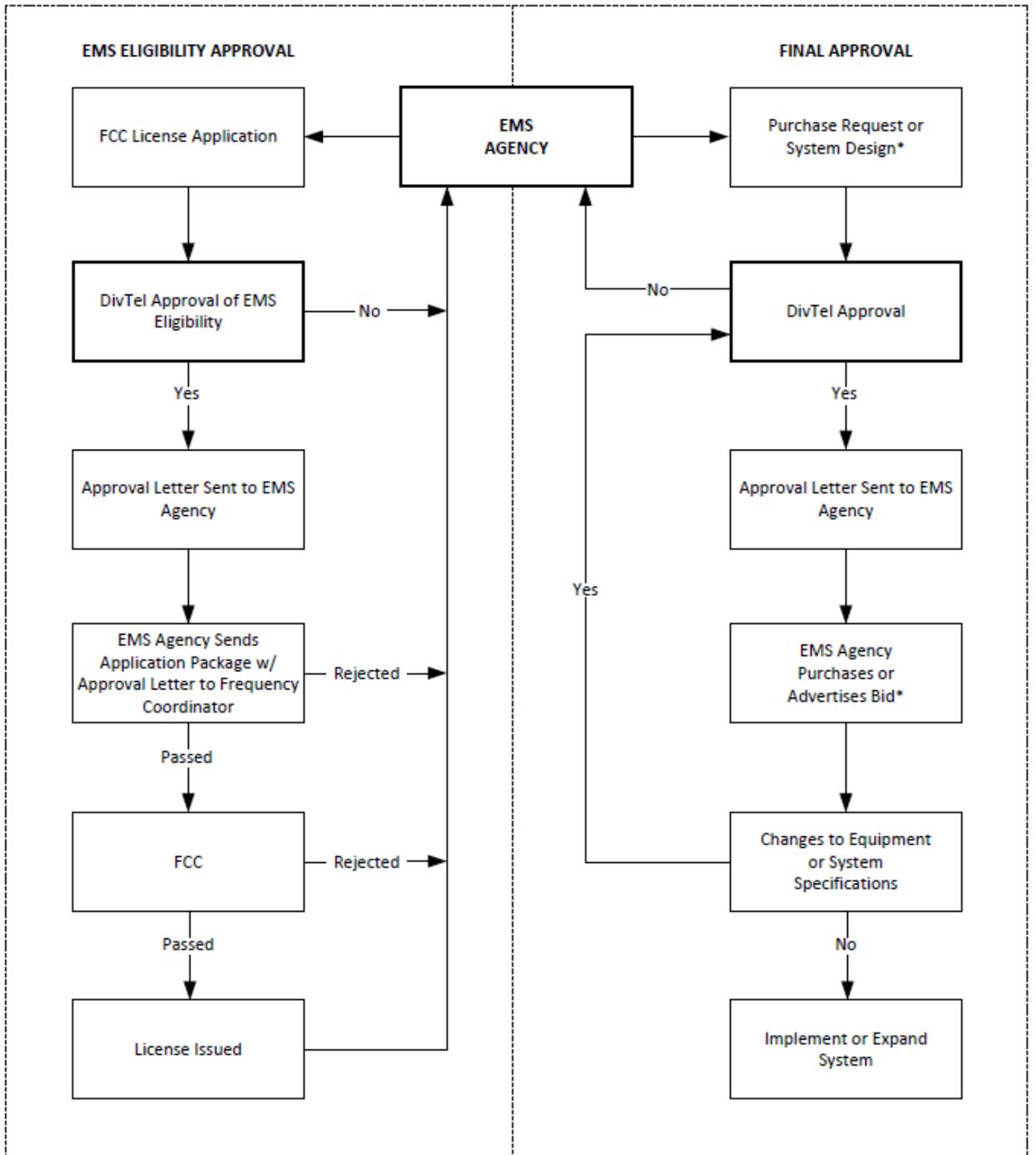
In the event of mobile and/or portable equipment needing to be purchased for use on an existing system, a statement from the requestor may be included with the submittal attesting that the expected coverage reliability is already being met by that existing system for associated Vehicle Dispatch and Response (VDR), Local Medical Coordination (LMC), County Medical Coordination (CMC), and/or Statewide Medical Coordination (SMC) communications throughout the requestor's operational area.

- C. Complete Description: Each submittal must include a complete description of the proposed communications system compliant with section 5 and/or equipment compliant with section 6, including the following:
  - 1. Type of equipment (mobile, portable, base station, antenna tower, control console, switching matrix, telemetry, etc.).
  - 2. Frequency band, number of channels, channel frequencies, and channel descriptions (for example, type of talkgroups, VDR, LMC, mutual aid).

3. Location of equipment.
  4. System diagram (if fixed station equipment is proposed).
  5. Transmitter power output, antenna height, antenna type/directivity, and coverage reliability contour(s) per section 5.2.
  6. Special options (for example, tone-controlled squelch, channel scan, selective call, telemetry).
  7. Line item budget delineating equipment quantities and unit pricing.
  8. Any other information or documentation the requesting organization deems pertinent to the project.
- D. Statement of Need: A statement as to how the proposed system and/or equipment will benefit the proposing organization and the intended recipients of EMS care. The statement should indicate if the communications project will be integrated into an existing system of EMS communications. If an existing system is involved, indicate expected improvements and enhancements.
- E. Copies of or Applications for FCC Licenses: Copies of FCC licenses or applications, or an indication of commitment to apply, which indicate whether the project requires radio frequency coordination, license modifications, or FCC rule waivers. All EMS applicants must obtain an approval letter of eligibility from the DivTel Bureau of Public Safety that must be included with the application submitted to the FCC-certified frequency coordinator for EMS frequencies. Allow at least 10 work days for the DivTel Bureau of Public Safety to process the approval letter of eligibility. Figure 1 depicts how this approval fits in the radio station license process.

### **2.12.3 Approval Procedure**

- A. Final Approval: Implementation of new, or expansion of existing telecommunications systems, regardless of whether purchased with grant funds or not, require a written final approval prior to a commitment to purchase. Final approval for EMS Grants Program projects must occur after the date of grant award. A commitment to purchase is considered to be a purchase order or award of a contract to purchase. It is in the best interest of each agency to obtain final approval prior to commencing formal or binding competitive processes such as an Invitation to Bid or Request for Proposal. Allow at least 30 work days for the DivTel Bureau of Public Safety to process the final approval request. Figure 1 depicts how this final approval fits in the implementation or expansion process.
- B. Additional Quantities: Once an organization receives final approval, procurement of additional quantities of either mobile radio equipment, handheld portable radio equipment, paging receivers, and associated accessories do not require subsequent approval. Additional quantities are permitted as long as it is for the same equipment and as long as the purchase occurs within a year of final approval. However, each county or matching grant requires a separate and associated final approval.



\*Assistance from DivTel may be requested.

**Figure 1 – DivTel Bureau of Public Safety Approval Process**

**END OF SECTION 2**

## **3.0 DESIGN CRITERIA FOR EMS COMMUNICATIONS**

### **3.1 General**

An EMS communications system must provide the means by which emergency medical resources can be accessed, mobilized, managed, and coordinated in both normal and adverse situations. Therefore, an EMS communications system must employ sufficient communications paths and operational capabilities among all participants to facilitate the functional EMS communications designs described in the remainder of this section.

### **3.2 Citizen Access**

The EMS communications system must have the ability to receive and process any incoming requests that report emergencies and/or require emergency medical assistance. Individual citizens should have the ability to summon help rapidly in an emergency situation, whether for medical, police, fire, rescue, or other emergency needs. Local, statewide, and national uniformity is required to fully enable this concept.

Florida's [Emergency Communications E911 State Plan](#) has provided for a cohesive statewide emergency telephone number 911 system to provide citizens with this rapid direct access to public safety agencies, with an objective of reducing the response time to situations requiring law enforcement, fire, medical, rescue, and other emergency services. This plan was developed in response to the Florida Emergency Telephone Act of 1974.

### **3.3 Vehicle Dispatch and Response (VDR)**

On notification of need for emergency medical assistance, the communications system must provide a VDR talkgroup or channel enabling prompt dispatch of all required EMS vehicles to the location of the emergency. The communications system must enable dispatchers to communicate with responding vehicles while en route to the scene, while at the scene, while en route to hospital emergency department facilities, and during their return to availability for further assignment.

#### **3.3.1 Automatic Vehicle Location (AVL)**

Automatic Vehicle Location systems provide real-time geographic location of vehicles to ensure the nearest available vehicle is dispatched to the scene of an incident. These systems display vehicle positions to dispatchers on either tabular and/or graphic displays as well as providing the information necessary to a Computer-Aided Dispatch (CAD) program when utilized in a system status management structure. Consequently, these capabilities are considered an integral component of VDR systems.

### **3.3.2 Crew Alert Paging**

Some EMS communications systems may require direct alerting of EMS personnel either individually or in groups. This can be accomplished through the use of either a monitor or paging receiver or by means of portable radios with selective call capability. This concept is limited only to such alert paging required to facilitate the immediate response and action of personnel resulting from a request for emergency medical services.

## **3.4 Local Medical Coordination (LMC)**

The EMS communications system must provide EMS field personnel with an LMC talkgroup or channel permitting the exchange of vital information between EMS licensed providers, emergency departments, and/or medical directors. The LMC talkgroup or channel must have the capability to provide communications to emergency department personnel from at least a 5-mile radius of the emergency department facility from an EMS transport unit enroute.

### **3.4.1 Geographically Assigned Hospital LMC**

To meet the demands associated with isolated critical situations, mass casualty incidents (MCIs) and to provide at least a virtual stand-alone radio system, hospitals are assigned a specific talkgroup or channel. This geographically-assigned hospital LMC talkgroup/channel must have the capability to provide communications to emergency department personnel from at least a 5-mile radius of the emergency department facility from an EMS transport unit enroute. The UHF MED channels are geographically-assigned to each hospital for LMC is shown in Table 5-1.

## **3.5 Countywide Medical Coordination (CMC)**

The EMS communications system within a county should provide a CMC communications talkgroup or channel to enable communication between EMS field personnel, hospital emergency departments, and dispatch center personnel. Such a communications talkgroup or channel would be used during isolated critical situations or MCIs where prolonged use of the VDR or LMC talkgroup or channel would not be feasible because of normal and/or other VDR or LMC communications traffic. Use of a CMC talkgroup or channel must be temporary, ideally limited to the duration of such situations.

UHF MED channels are geographically assigned to each county for CMC and are shown in Table 4-2.

### **3.6 Statewide Medical Coordination (SMC)**

The EMS communications system must provide an SMC mutual aid communications channel to enable dispatch and response between EMS field personnel, hospital emergency departments, and dispatch centers during situations in which a vehicle is out of its prime area and unable to access the VDR, LMC, or CMC talkgroup or channel of that area and in isolated critical situations and MCIs during which prolonged use of the VDR, LMC, or CMC talkgroup or channel would not be feasible because of other communications traffic. Use of the SMC channel must be temporary, ideally limited to the duration of such situations.

In addition to LMC capability, CMC capability, or both, the EMS communications system must provide an SMC mutual aid communications channel to enable medical coordination between EMS field personnel and emergency department personnel. This is for situations in which a vehicle is out of its prime area and unable to access an emergency department using the LMC, CMC, or both talkgroups or channels of that area. This is also for isolated critical situations or MCIs during which prolonged use of the LMC or CMC talkgroup or channel would not be feasible because other LMC or CMC communications traffic. Such uses of the SMC channel must be limited to the temporary duration of such situations.

MED-8 is specifically assigned for SMC communications using radio equipment in the UHF band. Radio equipment in the 700 MHz and 800 MHz bands have interoperability and mutual aid channels available for SMC communications when assigned for such use on a real-time basis by the communications center controlling those channels.

### **3.7 Trunked Radio Systems**

EMS communications systems may migrate to trunked radio systems that will shift VDR, LMC, and CMC communications to a standards-based radio infrastructure and, to some extent, SMC.<sup>12</sup> Radio systems approved for this technology will meet agency requirements for VDR, LMC, and CMC communications.

### **3.8 Local Scene Coordination (LSC)**

The EMS communications system should have the capability for mobile and portable radios of the same local area to communicate directly unit-to-unit while on the scene of an emergency. The LSC talkgroup or channel must be a mobile-only talkgroup, or the talk-around channel assigned with the CMC talkgroup or channel for that county. MED channels geographically-assigned may provide this capability. All MED channels used for LSC must use a CTCSS of 167.9 Hz. The 700 MHz and 800 MHz bands have interoperability and mutual aid channels available for this capability when assigned for such use on a real-time basis by the communications center controlling those channels.

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<sup>12</sup> In the event of an SMC talkgroup on a trunked radio system, MED-8 must still be patched to the SMC talkgroup as needed or continuously.

### **3.9 Statewide-Scene Coordination (SSC)**

The EMS communications system should have the capability for mobile and portable radios from different local areas to communicate directly unit-to-unit. The SSC channel within Florida is the talk-around channel associated with MED-8. Talk-around on other mutual aid channels is governed by the respective communications plan for direct, unit-to-unit radio communications (such as, 700 MHz interoperability and 800 MHz mutual aid channels). The 700 MHz and 800 MHz bands have interoperability and mutual aid channels available for this capability when assigned for such use on a real-time basis by the communications center controlling those channels.

### **3.10 Medical Resource Coordination (MRC)**

The EMS communications system must provide a direct wireless coordination of EMS resources between hospitals, providers, and dispatch centers. Telephone lines between dispatch centers can be used for resource coordination during normal operations; however, radio communications are needed following hurricanes, tornadoes, floods, fires, etc., when telephone systems and cellular systems are inoperative. Typical MRC communications must be provided by the SMC MED-8 system unless otherwise approved by the DivTel Bureau of Public Safety.

### **3.11 Biomedical Telemetry**

Biomedical telemetry is the process of transmitting a patient's biological functions for use by emergency department personnel. Requirements for biomedical telemetry are subject to the determination of the provider's medical director in accordance with the administrative rules of the Florida Department of Health.

### **3.12 Interagency/Mutual Aid Coordination**

Medical emergencies often involve the response of other public safety services, most commonly police and fire. Interagency communication is needed to support daily EMS operations and mutual aid agreements for the cooperative action of all emergency response units during disaster situations and at those times when the county Emergency Operations Center (EOC) is involved. Although the various public safety agencies may operate on different radio frequencies, interagency radio communications can be provided by use of mechanisms such as radio or voice over internet protocols (like the Florida Interoperability Network), radio frequency control stations, cross-band operations, and interservice use of common radio frequencies. Telephone lines between dispatch centers can be used for interagency coordination during normal operations; however, radio communications are needed when telephone systems and cell systems

are inoperative. Table 4-1 provides a list of wide-area and statewide interservice and/or mutual aid frequencies currently in use.

The Florida Interoperability Network (FIN) offers an alternative for interagency/mutual aid coordination. FIN can patch disparate radio systems and allow for cross-band, interagency communications. FIN can be referred to as an Extended Area Network (EAN). The EAN is addressed with other terms in section 7.2, SAFECOM Statement of Requirements.

### **3.13 Back-Up Communications**

Back-up communications enables an overall improvement in system reliability through redundancy or the provision of alternate means. With regard to EMS, the concept of backup communications is applied to base station or other fixed radio equipment to enable:

- A. VDR communications to continue despite outage of the primary VDR radio base station.
- B. LMC communications to continue despite outage of the primary LMC radio base station.
- C. CMC communications to continue despite outage of a primary CMC radio base station.
- D. SMC communications to continue despite outage of a primary SMC radio base station.
- E. MRC communications to continue despite outage of a primary MRC radio base station.

### **3.14 Telephone Interconnection**

Telephone interconnection is required. The system must provide the ability for EMS personnel to exchange information directly with sources located outside their EMS communications system and at diverse locations only accessible via the public switched telephone network.

**END OF SECTION 3**

## **4.0 FREQUENCY PLAN**

### **4.1 Background**

Prior to EMS frequencies becoming part of the Public Safety Radio Pool in Title 47 Code of Federal Regulations, (47 CFR) section 90.20, the FCC created the Emergency Medical Radio Service (EMRS) out of the Special Emergency Radio Service (SERS). Effective April 2, 1993, FCC rules designated International Municipal Signal Association/International Association of Fire Chiefs (IMSA/IAFC) as the certified frequency coordinator for EMRS. In the Report & Order of PR Docket No. 91-72, the FCC states that the IMSA/IAFC is expected "to verify that all applicants are compatible with existing regional and local emergency medical plans." Later, the FCC opened up the same opportunity for other FCC-certified frequency coordinators in addition to IMSA/IAFC.

It is apparent that any successful local or state radio frequency planning effort must be consistent with the FCC-certified coordinating organization procedures. The Division of Telecommunications will maintain liaison with the certified coordinators toward the mutual goal of effective and efficient use of the radio spectrum by EMS agencies within Florida.

### **4.2 Channel Allotment Principles**

Within the domain of the PLMR services, 47 CFR, and the limits of FM radio technology, there are two basic approaches to the assignment of radio channels consistent with the principles of spectrum efficiency and effectiveness. They are the Geographic Allotment method and the Real-Time Allotment method. Of these, the Geographic Allotment method is simpler and less costly to implement, particularly for small systems in less frequency-congested areas. The Real-Time method results in considerable improvement in spectrum efficiency and freedom from harmful interference in more congested areas.

Spectrum efficiency is the extent to which radio traffic occupies radio channels over a large geographic area. Greater spectrum efficiency demands that channel bandwidth be minimized, that channels be re-assigned as closely as possible, and that traffic loading on each channel be maximized. Application of this principle is of critical importance in most areas of Florida.

Spectrum effectiveness, on the other hand, is the extent to which the necessary channel is available when and where needed and is free from harmful interference. The fundamental goal in any radio channel allotment scheme is, therefore, to achieve the necessary effectiveness, while maintaining the greatest efficiency.

### 4.2.1 Harmful Interference

For the MED channels addressed in this plan, two types of harmful interference are defined below – co-channel and adjacent channel.

Harmful interference happens when undesired signals from one system prevent or interrupt communications with another radio communications system. In an EMS communications system, harmful interference can result in life-threatening delays in response to calls for assistance.

#### A. Co-channel Interference

For the purposes of engineering analysis in frequencies below 470 MHz, harmful interference is defined as an undesired received signal having greater than 5 percent probability of exceeding a power level of 12 dB (6 dB in base-to-base situations) less than a desired analog signal power level, when the desired analog signal has a 95 percent probability of achieving a power level required to produce either 20 dB quieting, 17 dB SINAD or digital 5 percent bit error rate (BER).

Channel allocation principles and interference criteria in the 470 MHz, 700 MHz, and 806 MHz frequency bands are governed by FCC rules and other Florida-specific plans, such as the following:

- [806 MHz channels](#)
- [700 MHz Interoperable Use channels](#)
- [700 MHz General Use channels](#)
- 700 MHz State Use channels

#### B. Adjacent-Channel Interference

Adjacent-channel interference is defined as harmful when a desired 95 percent reliability signal is degraded by an undesired 5 percent reliability adjacent channel signal by more than the criteria established by TIA/EIA standards. Channel assignments are based on an analytical showing of no harmful interference. Adjacent-channel interference is not normally considered in other frequency bands except for the criteria established in the [Florida - Region 9 Plan for 700 MHz Public Safety Radio Communications](#), [Florida - Region 9 Plan for 800 MHz Public Safety Radio Communications](#), and [Florida's 700 MHz Public Safety Interoperability Channel Plan](#).

### 4.2.2 Nuisance Interference

Nuisance interference is the reception of signals from another system that does not cause harmful interference, but is annoying to the users of the system receiving it. This level of interference can be eliminated by utilizing a continuous tone-coded squelch system (CTCSS), digital coded squelch system (DCS) or network access codes (NAC), which are available in most new equipment today.

### **4.2.3 Geographic Allotment**

Geographic Allotment is the assignment of a channel such that a licensee has generally full-time and exclusive use of that channel within an agreed geographic area. Once assigned, the channel is dedicated to that user and is not available for others even when the channel is not in use. In practice, channel-sharing agreements, or primary/alternate schemes will further improve channel efficiency in such a system, but it will be only to a limited extent. As channel loading for any user increases, the benefits of channel-sharing and alternate channel agreements decrease.

The Geographic Allotment method is both successful and practical in those areas where the radio traffic is either sufficiently low and where the available frequency spectrum satisfies all user needs within a "channel re-use distance" of roughly 70 miles. Within Florida, application of the Geographic Allotment concept presents special difficulties since the majority of the state, from the panhandle through the peninsula, is scarcely more, and often less, than 100 miles in width.

Free-standing emergency departments (FSEDs) operating under a parent hospital will be assigned the same MED channel as used by the parent hospital ED for local medical coordination (LMC) for pre-hospital radio communications from EMS Providers on scene or en route to the ED. This will maintain MED channels available for other hospital EDs in need of an assignment, particularly for areas with a limited number or no MED channels available

The Geographic Allotment method is normally applied on all VHF channels and 700/800 MHz conventional, non-trunked channels. The 450-470 MHz UHF frequency band utilizes both Geographic and Real-Time Allotment in the case of EMS communications.

### **4.2.4 Real-Time Allotment**

Real-Time Allotment is the process through which each available radio channel is assigned to a particular communications path by the dispatch center, mobile/base link, on an as-needed incident-by-incident basis, and such that the same channel may be assigned to many different users at different times, all within the same geographic area. The Real-Time Allotment method requires that each mobile radio and the base station system be capable of transmitting and receiving on all of the radio channels to be allocated.

In practice, mobile radios are normally equipped with all necessary channels, while fixed control points operate via direct control, wireline or other link through a central base station facility, which is also equipped to transmit and receive on all necessary channels. A fundamental requirement for fully successful operation of a Real-Time Allotment system is that the reliable radio coverage area of each base station channel be very nearly the same.

The trunking concept is similar to Real-Time Allotment in that channel assignments vary with respect to time rather than with respect to geography. However, computer-controlled trunking systems still require approximately 70-mile minimum separation between independent systems using the same frequencies.

The Real-Time Allotment method may be applied to MED channels 1 through 7 and 12 through 72.<sup>13</sup>

### **4.3 Vehicle Dispatch and Response Channels**

#### **4.3.1 Ground Vehicle Communications**

Radio frequencies for which the applicant is eligible under FCC rules/limitation that meet the requirements of this plan may be used for VDR communications with EMS ground vehicles. This includes VHF high band frequencies (150-160 MHz), 220 MHz band frequencies, UHF band frequencies (450-460 MHz), 700 MHz band frequencies, and the 800 MHz band frequencies.

The use of MED channels 9, 92, 10, or 102 for VDR must be in accordance with the statewide allotment plan for these frequencies. Currently approved frequency and CTCSS tone allotments of MED channels 9, 92, 10, or 102 are shown on Table 4-2, Florida MED Channel Allotments.

The use of any MED channels 1 through 7 and 12 through 72 for VDR must also be in accordance with the statewide allotment plan, and such allotments are subject to no harmful interference to LMC and/or CMC operations on these channels. MED-8 must not be used for primary VDR communications except to satisfy the SMC and/or backup requirements defined in section 5.

#### **4.3.2 Air Ambulance Communications**

Communications for aeromedical services may utilize certain radio frequencies within the Aviation Services of FCC rules Part 87, Aeronautical Enroute and Aeronautical Fixed Stations. The scope for aeronautical enroute stations is limited to the necessities of safety and primary operation of the aircraft. Sub-part I does not allow for medical communications. These channels are associated with air-traffic control centers, airport control towers, and “Unicom” communications systems. By design, these radio systems are limited in the communications coverage capabilities they would provide for low-flying rotor wing aircraft. Given the limitations associated with these radio frequencies by rule and/or design, their use by prehospital for flight following is not recommended.

Frequencies within the applicable PLMR services of 47 CFR Part 90 may be utilized for air ambulance dispatch, response, and/or medical coordination on a secondary basis to land-based systems. Licensing for implementation or expansion of air ambulance communications on any frequencies within the FCC’s Public Safety Radio Pool requires prior approval by the DivTel Bureau of Public Safety.

DivTel has established specific radio frequency allotments for both “Air Primary” and “Air Secondary” within Florida for aeromedical dispatch and response communications. Rotor wing

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<sup>13</sup> MED channel sequences 1, 2, 3 ... 7 and 12, 22, 32 ... 72 are referenced for specific planning, implementation and operational use.

aircraft that are licensed for prehospital will be assigned a specific UHF pair within the 453/458 MHz band as Air Primary for VDR. Rotor wing aircraft, which provide inter-facility transports only, will be licensed in the VHF band

All licensed rotor wing aircraft and dispatch centers within Florida must have the ability to communicate on the Air Secondary frequency 155.340 MHz, CTCSS 167.9 Hz (transmit and receive).<sup>14</sup> This provides continued flight-following with the aircraft while medical crews utilize their EMS radio to provide medical reports (LMC, CMC or SMC). Additionally, this Air Secondary frequency provides a statewide radio system for MCI coordination with aircraft that would necessitate communications with the various aircraft, dispatch centers, and/or landing zone management. Further, this frequency can provide EMS helicopter personnel with continued safety of flight situations in which a vehicle is out of its prime area and unable to access its dispatch center. Such use of the Air Secondary channel will be limited to the temporary duration of such situations unless otherwise approved in writing by the DivTel Bureau of Public Safety.

#### **4.4 Local Medical Coordination (LMC) Channels**

The primary requirements of this plan are for every EMS permitted vehicle to have the capability for two-way radio communications with a higher level of medical care. Specifically, this capability exists for radio communications should the EMT/firefighter/paramedic need to deviate from established medical protocols and/or request additional medical assistance from the medical director, hospital or both. Accordingly, every hospital emergency department must have the capability to reliably communicate to at least a 5-mile radius of its facility on the LMC channel approved or assigned by the DivTel Bureau of Public Safety in accordance with section 5 of this plan.

MED-82, MED-9, MED-92, MED-10, and MED-102 are not for LMC. MED-8 may be used to satisfy the SMC and/or backup requirements defined in section 5 of this plan.

#### **4.5 Countywide Medical Coordination (CMC) Channels**

MED channels 1 through 7 and 12 through 72 may be used for CMC communications for both ground and air ambulance vehicles. Use of these channels must be in accordance with the statewide allotment plan. Approved frequency and CTCSS tone allotments for MED channels 1 through 7 and 12 through 72 are shown on Table 4-2, Florida MED Channel Allotments. The use of any radio frequencies other than MED channels 1 through 7 and 12 through 72 for CMC communications must be approved by the DivTel Bureau of Public Safety.

MED-82, MED-9, MED-92, MED-10, and MED-102 are not for CMC. MED-8 may be used to satisfy the SMC and/or backup requirements defined in section 5 of this plan.

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<sup>14</sup> Transmit and receive with 167.9 Hz avoids nuisance communications from open squelch (no CTCSS) or regional CTCSS assignments for Medical Resource Coordination (MRC).

If the CMC channel to be implemented or expanded would cause harmful interference to or from a primary LMC channel of another user, the DivTel Bureau of Public Safety will analyze the MED channel allotments of all affected systems and establish an appropriate plan that may require the reconfiguration of existing systems.

#### **4.6 Statewide Medical Coordination (SMC) Channel**

MED-8 (463.175 MHz base transmit, 468.175 MHz base receive, with CTCSS of 167.9 Hz) will be used for primary SMC in permitted vehicles with UHF radio equipment during times the vehicles are used outside their normal operating area and when VDR, LMC, or CMC talkgroups or other channels are not available. MED-8 was segregated in this plan and established as the only UHF MED channel for SMC. The capabilities of the SMC channel are designed to provide two objectives within the EMS community.

1. Primarily, every licensed EMS transport with UHF radio equipment, regardless of other frequencies radio systems employed within a region, could communicate with a hospital in any region if necessary.
2. Additionally, EMS systems in Florida have established MED-8 SMC capabilities within their communications/dispatch centers to provide assistance for out-of-region EMS units with UHF radio equipment while in transit through the region and backup to the EMS VDR channel.

MED-8 has been established to maintain UHF radio communications with emergency departments, EMS dispatch centers, and/or other EMS communications systems throughout Florida while transporting patients. The intent of this plan is to establish a common EMS communications system, which would provide the EMT or paramedic with UHF radio equipment the ability to communicate within a county or municipality regardless of that region's primary communications infrastructure.

Mutual aid channels identified for public safety use (particularly 700 MHz and 800 MHz) may be used in accordance with their respective communications plan and during times when the vehicles are used outside their normal operating area and VDR, LMC, or CMC talkgroups or other channels are not available.

##### **4.6.1 SMC (MED-8) System Standard**

- A. Design Specifications: This plan provides for a statewide system for selective activation of regional MED-8 repeater stations and selective addressing of local emergency departments and county EMS dispatch centers to satisfy the SMC requirements of this plan. The end user accomplishes all necessary selective signaling. Other than the initiating party and the receiving party, no additional human intervention is necessary to establish or maintain two-way radio communications via this selective addressing system.

The signaling aspects of this plan anticipate the use of dual-tone multi-frequency (DTMF) for selective access to repeaters and selective addressing of individual stations. The DTMF format is an industry standard tone scheme used for audio signaling and control purposes. The DTMF format is compatible with the original AT&T “Touch-Tone®” system initially used in telephone systems.

The overall architecture of the proposed MED-8 statewide radio system provides for extended-range, vehicle-to-base communication by virtue of at least one wide-area SMC repeater in each county. Note that all SMC repeaters employ an identical MED-8 frequency pair and CTCSS tone in accordance with this plan regardless of their geographic separation. Consequently, it is essential that all MED-8 repeaters must remain in the repeat disable mode unless actually being used to relay a communication between two radio stations. Otherwise, it is likely that nearby repeaters will interfere with one another and disrupt or altogether prevent radio communications.

Another feature of the radio system is the ability to operate within normal range limits, even if repeaters are not available because of equipment failure, severe weather, or other reasons. This capability applies to both mobile and radio frequency control stations and is typically known as repeater talk-around (i.e., Statewide Scene Coordination, or SSC). When operating in talk-around mode, the DTMF signaling aspects of the system are fully preserved, but it will be subject to the native range of the radios involved in any particular exchange. If extended talk-around range is required for any particular hospital or dispatch facility, consideration should be given for use of an omni-directional antenna for the MED-8 control station, rather than the directional antenna typically provided.

- B. Procedures: For MED-8 communications in fictitious Paradise County, county code 68, a mobile radio user would activate the appropriate regional MED-8 repeater by sending DTMF codes “6,” “8,” and “1,” designating the primary repeater in county 68, immediately followed by a “\*” repeat-enable code if required. Once the repeater is activated, the mobile user would address the desired control station and these signals would be re-transmitted and heard by all monitoring MED-8 control stations. If necessary, a DTMF regenerator could be installed in the repeater station to improve the purity of the re-transmitted tones.

In this example, the mobile unit would transmit selective address “6827” to activate the specific control station decoder at the emergency department of county hospital A. Upon receiving DTMF sequence, the control station at the hospital would decode the selective address, repeat-enable, and the staff could hear the subsequent voice call. If desired, the decoder could also activate some type of attention-getting device to ensure that the emergency department staff is made aware of an incoming call. Once the staff answers the radio call, the radio exchange will continue until completed, at which time the staff could manually reset the decoder or the decoder could be set to reset automatically after a pre-determined time-out period. At the same time, the mobile unit crew would deactivate the primary repeater by sending DTMF codes “6,” “8,” and “1,” followed by a “#” repeat-disable code if required. The repeater would then revert to the repeat-disable mode and monitor for any subsequent calls.

NOTE: Should a regional repeater be out-of-service, the same basic selective addressing procedures would apply to mobile and control station radios after first switching to the repeater talk-around, simplex, mode of operation, then announce operation is in the talk-around mode in order for each end to communicate.

Each regional MED-8 repeater station will be equipped with a DTMF decoder set to respond to at least two groups of DTMF tones and an optional internal DTMF re-generator.

- C. Regional DTMF Addresses: Each county is assigned a unique two-digit county code (example: 68). Each county repeater will be assigned a related three-digit address (example: 681). Each control station will be assigned a unique four-digit selective address, subordinate to the county code (example: 6815).

This scheme allows for up to 99 counties, up to nine repeaters per county and up to 98 uniquely addressed control stations per county. In addition, all DTMF decoders will respond to a two-digit code (00) as a statewide all-call address and a four-digit common address with a countywide call (99). An example for fictitious Paradise County would be 6899, a unique four-digit individual address. After the first two digits that designate the county code, the third and fourth digits use the scheme shown in the following table:

1 – 9	County Repeaters (x9)
10 – 29	EMS Dispatch Centers (x20)
30 – 59	Hospital Emergency Rooms (x30)
60 – 69	Others (x10)
70 – 98	Reserve (x29)

The following list of primary DTMF addresses was derived from an alphabetical list of Florida counties. Federal facilities follow after the list of counties.

01 Alachua	19 Franklin	37 Leon	55 St. Johns
02 Baker	20 Gadsden	38 Levy	56 St. Lucie
03 Bay	21 Gilchrist	39 Liberty	57 Santa Rosa
04 Bradford	22 Glades	40 Madison	58 Sarasota
05 Brevard	23 Gulf	41 Manatee	59 Seminole
06 Broward	24 Hamilton	42 Marion	60 Sumter
07 Calhoun	25 Hardee	43 Martin	61 Suwannee
08 Charlotte	26 Hendry	44 Monroe	62 Taylor
09 Citrus	27 Hernando	45 Nassau	63 Union
10 Clay	28 Highlands	46 Okaloosa	64 Volusia
11 Collier	29 Hillsborough	47 Okeechobee	65 Wakulla
12 Columbia	30 Holmes	48 Orange	66 Walton
13 Dade	31 Indian River	49 Osceola	67 Washington
14 Desoto	32 Jackson	50 Palm Beach	70 Kennedy Space Center
15 Dixie	33 Jefferson	51 Pasco	71 Pensacola Naval Air Station
16 Duval	34 Lafayette	52 Pinellas	72 Tyndall Air Force Base
17 Escambia	35 Lake	53 Polk	73 MacDill Air Force Base
18 Flagler	36 Lee	54 Putnam	74 Patrick Air Force Base
			75 Jacksonville Naval Air Station
99 Countywide All Call Suffix			
00 Statewide All Call Suffix			

- D. In-County DTMF Addresses: Each county is responsible for assigning DTMF codes to repeaters and control stations within their respective area in strict accordance with the addressing scheme noted in this plan. The following is an example addressing scheme for fictitious Paradise County (county code 68):

NORTH (primary) MED-8 repeater access – 681  
SOUTH (secondary) MED-8 repeater access – 682  
Countywide ALL-CALL code – 6899  
County EMS dispatch center – 6801  
Hospital A – 6830  
Hospital B – 6834  
Hospital C – 6838  
Hospital D – 6842  
Hospital J – 6859  
City A EMS dispatch center – 6810  
City B EMS dispatch center – 6811  
County Emergency Management/EOC – 6860  
Private ambulance dispatch center – 6819

NOTE: In this example that the first two digits are always 68 (the county code), while the next two digits can be assigned within the prescribed range for dispatch or hospitals. It must result in a number that is not assigned to any other station within the county.

- E. Equipment Considerations:

1. **Mobile Units**: All mobile radios with the MED-8 channel are capable of operation on this system standard. Additional programming may be required to add talk-around capability. DTMF replacement microphones are readily available from numerous sources and can be attached to most mobile radios with little difficulty.
2. **Repeaters**: DTMF decoding and regenerating devices are generally available and can be attached to most MED-8 repeater stations by local technicians.
3. **Hospitals or Dispatch Centers**: If a hospital or dispatch center has a separate MED-8 station, it may be possible to convert it to the new configuration. However, medical facilities that operate primary or backup repeater stations that function on one or more of the standard MED channels may prefer to leave that equipment undisturbed. Rather than attempting to integrate the new MED-8 functionality into existing radio equipment, it may be more cost effective to purchase a UHF RF control station with built-in DTMF signaling, specifically configured for remote control and talk-around.
4. **DTMF Devices**: As noted above, the necessary DTMF functionality could be incorporated into the RF control station. Alternatively, a separate customized remote control device with DTMF encode and decode capabilities could be utilized in concert with a standard RF control station.

## **4.7 Medical Resource Coordination (MRC) Channels**

Historically, two primary channels for Medical Resource Coordination within Florida have been on MED-8 (transmit and receive on 463.175 MHz with CTCSS of 167.9 Hz) and on VMED28 (transmit and receive on 155.340 MHz with no CTCSS).<sup>15</sup> Each of these channels is used for MRC communications in parts of Florida and each has advantages and disadvantages depending on both geographic location and technical considerations.

In northern Florida, MED-8 is generally used because of other uses of 155.340 MHz within Georgia and Alabama. MED-8 is used in many other parts of Florida where 155.340 MHz is in use for land-mobile communications.

In some areas, 155.340 MHz is used where MED-8 point-to-point use has been determined unfeasible. In some of the more congested areas of Florida, neither channel is in use because of interference. In other cases, it is simply the lack of a wireless MRC communications system. Microwave, 700 MHz, and 800 MHz communications systems may qualify as the MRC channel for a geographic region.

The establishment of a cohesive network of MRC communications systems within Florida is a goal of the DivTel Bureau of Public Safety. Until such a plan is established, the implementation or expansion of MRC communications systems will be determined on a case-by-case basis.

## **4.8 Interservice/Mutual Aid Channels**

Radio channels for interservice and mutual aid operations may be utilized within the provisions of 47 CFR Part 90, Operating Requirements. The portions of those rules applicable to EMS organizations are summarized in section 4.8.1 below. Contingent on eligibility or licensee concurrence, specific wide-area and statewide channels may be used for Interservice/Mutual Aid. Such operations are discussed in section 4.8.2.

### **4.8.1 FCC Rules**

The FCC rules relating to interservice and mutual aid communications can be classified into the following general rules for base station communications and mobile unit communications:

A. General rules are established for:

1. Interstation communications in 47 CFR 90.417(a) & (b).
2. Civil Defense communications in 47 CFR 90.411.

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<sup>15</sup> Assignment of a regional CTCSS for VMED28 will be considered by DMS DivTel's Bureau of Public Safety for approval on a case-by-case basis.

B. Base station communications rules are established for:

1. Frequencies below 450 MHz in 47 CFR 90.419(a).
2. Frequencies above 450 MHz in 47 CFR 90.419(b).

C. Mobile unit communications: Mobile unit communications are established in 47 CFR 90.421 for the operation of mobile units in vehicles not under the control of the licensee. Arrangements for such use are normally made by means of written agreement between the licensee and user. Refer to the sharing agreement example in [Appendix C](#). The written agreement should be on the agency's letterhead granting the sharing agreement and should include the following:

1. State the quantity of mobile, or portable radios covered in the agreement.
2. State the call sign, frequency(ies), maximum power output associated with the written agreement, and other technical parameters authorized on the granting agency's radio station license.
3. State the written agreement applies to operations in cooperation and coordination with the activities of the licensee per 47 CFR 90.421.
4. State the granting agency's reserved right to effectively eliminate the possibility of unauthorized operation that ultimately could result in terminating the written agreement.

Overall, 47 CFR 90.421 does not specifically provide for interservice mobile operation by emergency medical eligibles on frequencies utilized for fire, highway maintenance, or forestry-conservation or any non-public safety agencies. However, 47 CFR 90.421(c) provides a general rule regarding mobile unit communications such that "frequencies assigned to licensees in the Private Land Mobile Radio Services may be installed in the facilities of those who assist the licensee in emergencies and with whom the licensee must communicate in situations involving imminent safety to life or property."

#### **4.8.2 Florida UHF MED Channel Allocations**

Within FCC rules 47 CFR 90, many frequencies may be used for interservice and mutual aid operations on a local basis by EMS organizations consistent with the FCC limitations summarized in section 4.8.1. On a wide-area or statewide basis, however, only a small number of channels are available for such use and are listed in Table 4-1.

The use of these or any other frequencies for interservice or mutual aid communications for which the user is not directly eligible, must be in accordance with the applicable FCC rules.

**Table 4-1 – Wide-Area and Statewide Interagency/Mutual aid Frequencies**

<b>FREQUENCY Base TX/RX (MHz)</b>	<b>ANS Standard<sup>16</sup> Name</b>	<b>CTCSS- Hz/ NAC<sup>17</sup></b>	<b>RADIO SVC</b>	<b>PRIMARY USE</b>	<b>AREA</b>
154.950/154.950	n/a	None	PW	Law Enforcement Emergency	Wide-Area
460.275/465.275	n/a	None	PW	Law Enforcement Emergency	Wide-Area
155.370/155.370	n/a	None	PW	Law Enforcement Intercity	Statewide
154.265/154.265	VFIRE22	None	PW	Fire Mutual aid "Red" (Mobile/Portable Only)	Statewide
154.280/154.280	VFIRE21	None	PW	Fire Mutual aid "White" (Base and Mobile)	Statewide
154.295/154.295	VFIRE23	None	PW	Fire Mutual aid "Blue" (Mobile/Portable Only)	Statewide
155.340/155.340	VMED28	None/ Regional	PW	Medical Resource Coordination	Statewide
155.340/155.340	VMED28	167.9	PW	Air Secondary-EMS Air Transport	Statewide
463.175/468.175	MED-8	167.9	PW	Statewide Medical Coordination-MED-8	Statewide
463.1875/468.1875	MED-82	various	PW	ESF 8 Medical Coordination – MED-82	Statewide
769.24375/799.24375	7CALL50	NAC \$293	SG/SY	National Public Safety Interoperability Calling Channel <sup>18</sup>	Nationwide
769.74375/799.74375	7TAC55	NAC \$293	SG/SY	National Public Safety Interoperability Tactical Channel	Nationwide
770.24375/800.24375	7TAC56	NAC \$293	SG/SY	National Public Safety Interoperability Tactical Channel	Nationwide
770.99375/800.99375	7GTAC57	NAC \$293	SG/SY	National Public Safety Interoperability Tactical Channel	Nationwide
773.25625/803.25625	7CALL70	NAC \$293	SG/SY	National Public Safety Interoperability Calling Channel	Nationwide
773.75625/803.75625	7TAC75	NAC \$293	SG/SY	National Public Safety Interoperability Tactical Channel	Nationwide
774.25625/804.25625	7TAC76	NAC \$293	SG/SY	National Public Safety Interoperability Tactical Channel	Nationwide
774.85625/804.85625	7GTAC77	NAC \$293	SG/SY	National Public Safety Interoperability Tactical Channel	Nationwide
854.6375/809.6375	n/a	210.7	GE	Public Safety Mutual Aid (MA-FLA) FCC Channel 256 <sup>19</sup>	Statewide

<sup>16</sup> [APCO/NPSTC ANS 1.104.2-2017](#) naming standard.

<sup>17</sup> NAC – Network Access Code.

<sup>18</sup> See section 2.6.

<sup>19</sup> See Section 2.9.

<b>FREQUENCY Base TX/RX (MHz)</b>	<b>ANS Standard<sup>16</sup> Name</b>	<b>CTCSS- Hz/ NAC<sup>17</sup></b>	<b>RADIO SVC</b>	<b><u>PRIMARY USE</u></b>	<b><u>AREA</u></b>
851.0125/806.0125	8CALL90	156.7	GE	National Public Safety Mutual Aid Calling FCC Channel 01 <sup>20</sup>	Nationwide
851.5125/806.5125	8TAC91	156.7	GE	National Public Safety Mutual Aid Tactical FCC Channel 39	Nationwide
852.0125/807.0125	8TAC92	156.7	GE	National Public Safety Mutual Aid Tactical FCC Channel 77	Nationwide
852.5125/807.5125	8TAC93	156.7	GE	National Public Safety Mutual Aid Tactical FCC Channel 115	Nationwide
853.0125/808.0125	8TAC94	156.7	GE	National Public Safety Mutual Aid Tactical FCC Channel 153	Nationwide

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<sup>20</sup> See Section 2.4.

**Table 4-2 – Florida Countywide MED Channel & CTCSS Allotments for CMC and VDR**

MED Channel	CMC							VDR			
	1	2	3	4	5	6	7	9	92	10	102
COUNTY- Identifier	CTCSS (Hz)										
Alachua-ALC			118.8					118.8			
Baker-BAC	156.7										
Bay-BAO						167.9			167.9		
Bradford-BRD		94.8									
Brevard-BRV						127.3					
Broward-BRW					173.8					173.8	
Calhoun-CLN				156.7							
Charlotte-CHA			167.9					167.9			
Citrus-CIR			167.9					167.9			
Clay-CLY					167.9						
Collier-COL							192.8	162.2			
Columbia-CLA							131.8				
Dade-MDC		210.7		210.7		210.7		203.5			
Desoto-DEU							131.8				
Dixie-DIX							118.8				
Duval-DVL						146.2				146.2	
Escambia-ESC		110.9						136.5		110.9	
Flagler-FLR						136.5					
Franklin-FRN			156.7								
Gadsden-GAD						203.5		203.5			
Gilchrist-GIL										94.8	
Glades-GLA											
Gulf-GLF		167.9								167.9	
Hamilton-HLN		210.7									
Hardee-HAR					127.3						
Hendry-HEN							107.3				
Hernando-HER				146.2							
Highlands-HIG	123.0									123.0	
Hillsborough-HIC							127.3			110.9	
Holmes-HMS			167.9								
Indian River-IRC				118.8						118.8	
Jackson-JAC					146.2						
Jefferson-JEF										156.7	
Lafayette-LAF											

MED Channel	CMC							VDR			
	1	2	3	4	5	6	7	9	92	10	102
COUNTY-STATE Identifier	CTCSS (Hz)										
Lake-LKC			32-192.8					94.8 (CMC)	192.8		
Lee-LEE				110.9						110.9	
Leon-LEO		156.7						156.7			
Levy-LVY					127.3						
Liberty-LBE							156.7				
Madison-MAD			146.2								
Manatee-MNT				167.9							
Marion-MAO										127.3	
Martin-MTC							146.2			146.2	
Monroe-MON							156.7				
Nassau-NAS		136.7									
Okaloosa-OKA	156.7	156.7									
Okeechobee-OKC						167.9					
Orange-ORA							156.7			156.7	
Osceola-OSC				114.8						114.8	
Palm Beach-PBC	127.3		127.3	127.3				127.3			
Pasco-PSC				110.9							
Pinellas-PIN			203.5					203.5			
Polk-POL			103.5					103.5		203.5	
Putnam-PUT				167.9				103.5			
St. Johns-SAJ		167.9									
St. Lucie-SLU	136.5										
Santa Rosa-SRC	136.5										
Sarasota-SAR						6-110.9					
Seminole-SEM		110.9									
Sumter-SUM							72-192.8		192.8		
Suwannee-SUW						156.7					
Taylor-TAY	118.8										
Union-UNC		94.8									
Volusia-VOL	136.5							136.5			
Wakulla-WAK					156.7						
Walton-WTN				167.9							
Washington-WSN		146.2									

**END OF SECTION 4**

## 5.0 SYSTEM REQUIREMENTS

### 5.1 General

The principal requirement of the EMS Communications Plan is for every permitted vehicle<sup>21</sup> (including interfacility transport vehicles) within their respective region (i.e., countywide) to have the capability for two-way radio communications with 1) its dispatch center, 2) with a higher level of medical care for medical control, and 3) with other vehicles. These three capabilities make up what is referred to as the EMS triangle of communications (EMS dispatch centers, EMS facilities, and EMS providers). Without comprehensively completing the EMS triangle of communications throughout the region, EMS communications within the region is compromised. *Deviation from completing a single EMS triangle of communications by just one agency in the region may require a second set of system requirements,<sup>22</sup> effectively creating a second and unwanted equipment purchase by all EMS agencies in the region.* Regionalizing EMS communications on a per-county basis avoids unnecessary radio equipment, particularly for every permitted vehicle, while minimizing costs for EMS dispatch centers, EMS medical care facilities, and counties in general.

The radio communications capability for medical control exists to facilitate the EMT/firefighter/paramedic needing to deviate from established medical protocols, request additional medical assistance from the medical director and/or hospital, or announce patient information and estimated time of arrival.

Requirements defined in the following sections are the requirements by which EMS communications approval or disapproval is determined for implementation of new EMS communications systems or for expansion of existing systems. They relate only to system level attributes of communications systems. Requirements for individual equipment items are defined in section 6, Equipment Requirements.

These system requirements make reference to specific EMS communications system concepts defined in section 3.

System configurations not explicitly included in the following sections will be approved on a case-by-case basis by the DivTel Bureau of Public Safety. Migrating from a statewide concept to a regional concept may require case-by-case considerations for each EMS agency within that respective region to avoid temporary compromise to existing radio communications capability making up the EMS triangle of communications. See Appendix D for a diagram of the EMS triangle of communications.

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<sup>21</sup> Permitted vehicles are authorized by the Department of Health per [section 401.25, Florida Statutes](#) and [rules 64J-1.002, and 64J-1.003, Florida Administrative Code](#).

<sup>22</sup> One agency with only UHF MED channel capability amidst an established 800 MHz EMS triangle of communications would require a second system for UHF radio communications.

System requirements are subject to change by the DivTel Bureau of Public Safety. Be certain to review all applicable system requirements prior to submitting a request for approval.

## **5.2 Communications Coverage Contour**

### **5.2.1 Communications Reliability**

“Reliable communications” is defined as having been engineered for a 95 percent probability of communications at the defined coverage contour, or 98.3 percent probability of communications. This applies to the defined coverage area, based on a received analog signal level of either 20 dB quieting or 17 dB SINAD, or a received digital signal at 5 percent bit error rate (BER) for the worst case of either talk-out (base to mobile) or talk-back (mobile to base). The defined contour of reliable radio coverage shall normally be the boundary of the operating area for which the provider routinely operates unless the DivTel Bureau of Public Safety has approved a different boundary for a particular system. This provides for reliable communications at 95 percent of the locations along the contour, 95 percent of the time. The probability improves as the associated radio transmitter/receiver site is approached, thus achieving a 98.3 percent probability across the area within the contour.

The coverage contour shall be the normal calculated coverage contour approved by the DivTel Bureau of Public Safety for stations established for primary use of VDR and/or LMC. Stations may have a lesser coverage contour as approved by DivTel’s Bureau of Public Safety when serving only as a backup to the primary station, SMC and/or CMC.

### **5.2.2 VDR Channels**

VDR communications is the responsibility of an EMS agency. As such, each EMS agency has the sole responsibility and/or liability to dispatch emergency response vehicles rapidly.

Issues regarding the ability of an agency to meet the specifications associated with VDR communications are determined based on section 5.2.1, Communications Reliability.

Each base and/or repeater station facility established for primary operation on VDR channels should be designed to enable reliable communications for mobile radio equipment. Should primary communications for portable radio equipment be required, the system should be designed to enable reliable communications from the driver’s position inside the vehicle.

### **5.2.3 LMC Channels**

Similar to VDR above, LMC communications is the responsibility of an EMS agency. As such, each EMS agency has the sole responsibility and/or liability to communicate with emergency response vehicles.

Issues regarding the ability of an agency to meet the specifications associated with LMC communications are determined based on section 5.2.1, Communications Reliability.

At a minimum, each base and/or repeater station facility established for primary operation on LMC channels should be designed to enable reliable communications for mobile radio equipment with front and rear control. Should primary communications for portable radio equipment be required, the system should be designed to enable reliable communications from inside the patient compartment.

#### **5.2.4 SMC and/or CMC Channels**

Each base or repeater station facility established for primary operation on the SMC and/or the CMC channel must be designed to enable reliable communications for mobile radio equipment with front (backup to VDR) and rear (backup to LMC) control. The defined area of reliable radio coverage shall be such that

- A. For counties having only one primary SMC and/or CMC station, the area is the boundary of the county for which each station operates.
- B. For counties having more than one primary SMC and/or CMC station, each station must provide coverage such that the aggregate is contiguous and reliable within the boundary of the county.

#### **5.2.5 Radio Frequency Control Stations**

Communications reliability for radio frequency (RF) control stations must be engineered for 99 percent probability of wireless communications point-to-point. This probability is based on a received analog signal level of either 20 dB quieting or 17 dB SINAD, or a received digital signal at 5 percent BER for the worst case of either talk-out (Base to RF control station) or talk-back (RF control to base station). If extended talk-around range is required for any particular hospital or dispatch facility, consideration may be given for use of an omni-directional antenna for the MED-8 SMC and/or CMC control station, rather than the directional antenna typically utilized.

#### **5.2.6 Automatic Vehicle Location Channel**

Each base station facility established for primary operation on an automatic vehicle location (AVL) system for system status management must be designed to enable reliable communications for radio equipment in permitted vehicles.

## **5.3 Vehicle Dispatch and Response (VDR)**

### **5.3.1 VDR Radio Station Facilities**

Every EMS vehicle dispatch facility must have the capability to reliably communicate on each VDR channel approved for that facility and must be configured to enable continuous reception of all local mobile VDR transmissions on each of those channels.

The local VDR channel must be a different channel than the LMC, CMC, and SMC channel(s), unless specifically approved by DivTel’s Bureau of Public Safety.

### **5.3.2 Radios in EMS Vehicles**

Every permitted EMS and recognized first responder<sup>23</sup> vehicle must be equipped for reliable communications on at least one local VDR channel, as well as the VDR channel(s) of each facility from which it is regularly dispatched or to which it regularly responds.

### **5.3.3 Automatic Vehicle Location**

Automatic vehicle location systems utilized in a system status management configuration, intended to reduce EMS response times, must include a statement attesting the polling/update rate will not exceed the capacity of the primary functions of the radio communications system. This statement is in addition to the submittal requirements of section 2.11.2 of this plan. The AVL system must demonstrate location accuracy of 100 meters (or better) and comply with the minimum mobile radio requirements of section 6.1.

## **5.4 Local Medical Coordination (LMC)**

### **5.4.1 LMC Base Station Repeater Facilities**

Per Chapter 395, Florida Statutes, “Each licensed hospital with an emergency department must be capable of communicating by two-way radio with all... basic life support service vehicles and advanced life support service...” Every hospital emergency department must have the capability to reliably communicate to at least a 5-mile radius of its facility on the LMC channel approved or assigned by DivTel’s Bureau of Public Safety. This may be satisfied throughout the region by a UHF channel on a geographic allotment basis or on a real-time allocation basis, or by another frequency band approved by the DivTel Bureau of Public Safety.

EMS communications systems may migrate to trunked radio systems that will shift LMC communications to a [Project 25](#)<sup>24</sup> standardized radio infrastructure. Radio systems that employ this technology must meet those agencies’ requirements for LMC communications that provide

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<sup>23</sup> For first responders—only if the "Memorandum of Understanding" between the EMS provider and the first responder requires or implies two-way radio communications to occur between the EMS provider and the first responder.

<sup>24</sup> Project 25 (P25) represents the suite of standards for digital land mobile radio services.

EMS field personnel with a communications system that permits the exchange of vital information between EMS agencies, emergency departments, and/or medical directors.

#### **5.4.2 LMC Portable Radios in Hospital Emergency Departments**

Portable (handheld) radios may be utilized in hospital emergency departments for LMC communications where the LMC base station repeater facilities provide in-building, portable communications reliability, consistent with section 5.2.1.

#### **5.4.3 LMC Mobile Radios in Permitted Vehicles**

Every permitted transport vehicle utilizing UHF mobile radios must provide the capability for reliable two-way communications on the MED channels (and CTCSS) designated for each hospital emergency department in the routine area of vehicle operation. MED channels (and CTCSS) may be programmed in each mobile radio for non-routine hospital emergency departments in order to complete the mobile radio programming per FCC rules.

Permitted transport vehicles approved for another frequency band of operation must utilize the mutual aid channel identified equivalent to the intent of SMC. For instance, in the 800 MHz frequency band, there are multiple mutual aid channels available that can be used for EMS communications.

*In an effort to clarify any misunderstanding regarding UHF MED-8 radio requirements, this requirement remains for EMS permitted transport vehicles within each region where the EMS triangle of communications is comprised of UHF radio systems.*

### **5.5 County Medical Coordination (CMC)**

#### **5.5.1 CMC Base Station Repeater Facilities**

Every EMS dispatch center and hospital emergency department must have the capability to reliably communicate on each CMC channel approved for that dispatch center or emergency department. Each base station repeater must be configured to enable continuous reception of all local mobile CMC transmissions on each of those channels.

The local CMC channel must be a different channel than the VDR, LMC, and SMC channel(s), unless specifically approved by the DivTel Bureau of Public Safety.

#### **5.5.2 CMC Portable Radios in Hospital Emergency Departments**

Portable (handheld) radios may be utilized in hospital emergency departments for CMC communications where the CMC base station repeater facilities provide in-building, portable communications reliability, consistent with section 5.2.1.

### 5.5.3 CMC Mobile Radios in EMS Vehicles

Every permitted EMS and recognized first responder<sup>25</sup> vehicle must be equipped for reliable communications on at least one local CMC channel, as well as the CMC channel(s) of each facility from which it is regularly dispatched or to which it regularly responds.

## 5.6 Statewide Medical Coordination (SMC)

The procedure described in section 4.6.1 provides for a statewide system for selective activation of regional MED-8 SMC repeater stations, selective addressing of local emergency departments and county EMS dispatch centers to satisfy the SMC and/or MRC requirements of this plan. The selective addressing system accomplishes all necessary DTMF signaling. Other than the initiating party and the receiving party, no other intervention is necessary to establish or maintain two-way radio communication via this addressing system. These signaling aspects of this plan must utilize DTMF for selective access to repeaters and selective addressing of individual stations.

It is essential that all MED-8 repeaters remain in the repeat-disable mode unless actually being used to relay a communication between two radio stations. Otherwise, nearby repeaters will interfere with one another and disrupt, or altogether prevent, any associated radio communications. ***In the event of a power interruption, the fixed (mobile-relay) station repeater should return to the state it was in immediately prior to the interruption. If the repeater is not capable of returning to state it was in immediately prior to the interruption, it must return to service in repeat disabled mode.***

An automatic inactivity timer must be implemented to force the repeater to deactivate after 180 minutes of no repeater activity.

The selective addressing and/or inactivity timer may be disabled during ongoing, large-scale events or at the request of the incident commander at the scene. It must only be applied to the specific station(s) for the incident area and must be returned to normal functionality as soon as possible.

### 5.6.1 DTMF Signaling Requirements

Each MED-8 capable mobile radio must be equipped with a DTMF encoder microphone.

Each regional MED-8 repeater station must be equipped with a DTMF decoder, set to respond to at least two groups of DTMF tones.

Each MED-8 control station must be equipped with a DTMF decoder, set to respond to the assigned sequences of DTMF tones, as well as a DTMF encoder keypad for addressing other SMC stations. The necessary DTMF functionality must be incorporated into the radio frequency

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<sup>25</sup> Ibid.

(RF) control station itself. Alternatively, a separate customized remote control device with DTMF encode and decode capabilities can be utilized in concert with a standard RF control station.

Both control stations and mobile radios must have repeater-talk-around, simplex capabilities.

Each county must install at least one wide-area coverage MED-8 repeater, which must be kept in the repeat-disabled mode by default, but it can be changed via the appropriate over-the-air DTMF tone sequence.

Additional MED-8 repeaters may be installed to provide adequate mobile communications access throughout the particular coverage area.

Each county has been assigned a unique two-digit county code per section 4.6.1(C). Using the related codes in that section, each regional repeater must be assigned its three-digit address, and each control station must be assigned its unique four-digit address.

### **5.6.2 UHF Mobile Radio Standard Configurations**

All mobile radios shall be configured in a standardized configuration. In determining which UHF channels to include in such a statewide configuration and the applicable standardized naming convention, DivTel's Bureau of Public Safety will consider the following:

- A. Federal regulations relating to radio licensing 47 CFR 90.20(d)(66): The FCC regulations mandate that mobile radios and portable radios greater than 2.5 watts must be wired and equipped for operation on all authorized MED channels at 12.5 kHz, hence the minimum channel requirements in section 6, Equipment Requirements. [Appendix E](#) provides a MED channel worksheet to aid in planning radio programming.
- B. Intended usage patterns: To expand the availability of simplex frequencies for statewide scene coordination (SSC), this plan has established mobile talk-around capability on all the 12.5 kHz-wide MED channels, except for MED-9 and MED-10.
- C. Equipment capabilities: Mobile radios configured with the required number of channels and the capability of selectable talk-around allow EMS vehicles to communicate with virtually any other EMS vehicle. Therefore, every EMS mobile UHF radio should be capable of DTMF encoding and talk-around operation. Since radios have numerous channels, single-button activation is the preferred approach for talk-around implementation. This avoids having to duplicate all or most of the mobile MED channel frequencies into additional channel positions for talk-around operation. Single-button talk-around becomes even more important as additional UHF base stations are added in congested areas.

### **5.6.3 SMC Base Station Repeater Facilities**

Every region must have at least one MED-8 SMC repeater base station (463.175 MHz transmit, 468.175 MHz receive, CTCSS 167.9 Hz) to provide reliable communications between EMS mobile radios and RF control stations throughout the region.

Per Chapter 395, Florida Statutes, “The hospital’s radio system must be capable of interfacing with municipal mutual aid channels designated by the Department of Management Services and the Federal Communications Commission.” Every hospital emergency department must have the capability to communicate with similarly equipped radios within a 5-mile radius of its facility on the MED-8, SMC channel. This can be via direct control of a repeater base station (463.175 MHz transmit/468.175 MHz receive, CTCSS of 167.9 Hz), or via direct control of an RF control station (468.175 MHz transmit/463.175 MHz receive, CTCSS of 167.9 Hz) in accordance with section 5.2.4.

Every EMS dispatch center has the responsibility to monitor the MED-8 SMC channel continuously, 24-hours a day. Every EMS dispatch center must have primary and direct control of the MED-8 SMC repeater base stations in its region. If primary SMC communications is enabled via wireline control, then the hospital and/or dispatch center must implement a backup communications capability. The backup function can be either a repeater base station, or RF control station. However, it must allow the hospital and/or dispatch center to communicate if the primary SMC implementation is down.

### **5.6.4 SMC Portable Radios in Hospital Emergency Departments**

Portable (handheld) radios may be utilized in hospital emergency departments for SMC communications where the SMC base station repeater facilities provide in-building, portable communications reliability, consistent with section 5.2.1.

### **5.6.5 SMC Mobile Radios in Permitted Vehicles**

Every permitted transport vehicle utilizing UHF mobile radios must provide the capability for reliable two-way communications on the MED-8, SMC channel, 468.175 MHz transmit/463.175 MHz receive, CTCSS of 167.9 Hz. Mobile radio equipment shall be the minimum requirement for SMC communications.

Permitted transport vehicles approved for another frequency band of operation must utilize the mutual aid channel identified equivalent to the intent of SMC. For instance, in the 800 MHz frequency band, there are multiple mutual aid channels available that can be used for EMS communications.

*In an effort to clarify any misunderstanding regarding UHF MED-8 radio requirements, this requirement remains for EMS permitted transport vehicles within each region where the EMS triangle of communications is comprised of UHF radio systems.*

## **5.7 Radios in Permitted Vehicles**

### **5.7.1 Permitted Transport Vehicles**

Every permitted transport vehicle must be equipped with a radio that can access each VDR, LMC, CMC and SMC channel (or equivalent). The system must enable reliable communications with each respective dispatch center and each hospital emergency department in the county. A dash-mount radio accessible from the front (driver) and rear (patient) compartment may be used in lieu of separate front and rear control heads.

Radios must use the standard naming convention for each MED channel and for each mutual aid channel per ANS standard described in Table 4-1.

### **5.7.2 Permitted Non-Transport Vehicles**

A requirement of this plan is that every permitted non-transport vehicle has the capability for two-way radio communications with a higher level of medical care. Specifically, this capability shall exist for radio communications should the firefighter/paramedic need to deviate from established medical protocols and/or request additional medical assistance from the medical director and/or hospital. If an EMS agency has established medical control via a public safety trunked radio system per section 5.4.3, that agency has met the requirements for medical control.

*In an effort to clarify any misunderstanding regarding UHF MED-8 radio requirements, this requirement remains for EMS permitted transport vehicles within each region where the EMS triangle of communications is comprised of UHF radio systems.*

## **5.8 Medical Resource Coordination (MRC)**

Every hospital emergency department and dispatch center must have MRC equipment configured to enable continuous, 24-hour reception of the MRC channel of the home region. The dispatch center must have a system dedicated to MRC communication and the system must have a backup communications capability. The backup function can be either a repeater base station, or RF control station. However, it must allow the dispatch center to communicate if the primary MRC system is down.

## **5.9 Crew Alert Paging**

Where implemented to alert EMS personnel as a primary component of the EMS VDR system, a crew alert paging system may be established on any channel consistent with FCC rules. The crew alert paging cannot be approved for the LMC, CMC SMC, or MRC channels.

## **5.10 Telephone Interconnection**

Use of cellular telephones does not meet requirements of this plan. Their use is considered supplementary, but cellular telephones can be used where EMS field personnel are not able to use their radio to connect with the public switched telephone network.

The use of telephone interconnections does not meet the requirements for Local Medical Coordination outlined in section 5.4.

## **5.11 Biomedical Telemetry**

The use of cellular telephones does not meet requirements of this plan. Their use is considered supplementary, but cellular telephones can be used where a medical director has established the requirement for transmission of biomedical telemetry and existing communication systems are not capable of transmission of biomedical telemetry.

## **5.12 Radio Frequency Control Stations**

Radio frequency control stations (FCC station class FX1) are not approved for use on FCC designated MED channels unless approved by the DivTel Bureau of Public Safety. Approval is based on an acceptable submittal of all of the following:

- A. A showing of need (such as a MED-8 SMC radio system with DTMF implemented).
- B. A showing that alternative solutions within existing plans and rules are not in the best interest of public safety and welfare.
- C. An engineering study showing no harmful interference to existing systems. Harmful interference for this study is defined in section 4.2.1 of this plan. The study can exclude MED-8 SMC radio systems in its interference review.

All approvals for operation of radio frequency control stations on MED channels have the stipulation that the *approval is continually contingent upon no substantiated complaints of interference to either present or future systems*. Upon the confirmation of any such complaints, operation of such radio frequency control stations must be modified to mitigate the harmful interference or cease operations.

## **5.13 MED Channel Frequencies**

As a result of the FCC ruling regarding narrowband applications, MED channel numbers 1 through 102 are prescribed by FCC rules, as corresponding to the following radio transmit frequencies in MHz:

NOTE: The 6.25 kHz channels (MED-11, 13, 21, 23, 31, 33, etc.) are not be utilized at this time. The 12.5 kHz channels (MED-1, 12, 2, 22, 3, 32, etc.) are **bolded** for easy reference below.

<u>MED CHANNEL</u>	<u>FREQUENCY (Base &amp; Mobile)</u>	<u>FREQUENCY (Mobile Only)</u>	<u>MED CHANNEL</u>	<u>FREQUENCY (Base &amp; Mobile)</u>	<u>FREQUENCY (Mobile Only)</u>
<b>1</b>	<b>463.000</b>	<b>468.000</b>	<b>6</b>	<b>463.125</b>	<b>468.125</b>
11	463.00625		61	463.13125	
<b>12</b>	<b>463.0125</b>	<b>468.0125</b>	<b>62</b>	<b>463.1375</b>	<b>468.1375</b>
13	463.01875		63	463.1437	
<b>2</b>	<b>463.025</b>	<b>468.025</b>	<b>7</b>	<b>463.150</b>	<b>468.150</b>
21	463.03125		71	463.15625	
<b>22</b>	<b>463.0375</b>	<b>468.0375</b>	<b>72</b>	<b>463.1625</b>	<b>468.1625</b>
23	463.04375		73	463.16875	
<b>3</b>	<b>463.050</b>	<b>468.050</b>	<b>8</b>	<b>463.175</b>	<b>468.175</b>
31	463.05625		81	463.18125	
<b>32</b>	<b>463.0625</b>	<b>468.0625</b>	<b>82</b>	<b>463.1875</b>	<b>468.1875</b>
33	463.06875		83	463.19375	
<b>4</b>	<b>463.075</b>	<b>468.075</b>	<b>9</b>	<b>462.950</b>	<b>467.950</b>
41	463.08125		91	462.95625	
<b>42</b>	<b>463.0875</b>	<b>468.0875</b>	<b>92</b>	<b>462.9625</b>	<b>467.9625</b>
43	463.09375		93	462.96875	
<b>5</b>	<b>463.100</b>	<b>468.100</b>	<b>10</b>	<b>462.975</b>	<b>467.975</b>
51	463.10625		101	462.98125	
<b>52</b>	<b>463.1125</b>	<b>468.1125</b>	<b>102</b>	<b>462.9875</b>	<b>467.9875</b>
53	463.11875		103	462.99375	

### 5.14 Continuous Tone-Coded Squelch System Frequencies

Continuous tone-coded squelch systems (CTCSS) provide a reduction of nuisance interference in FM radio systems by incorporating a sub-audible tone onto the radio carrier information such that only a similarly equipped radio receiver will open its squelch circuit to receive the transmission. Systems equipped with CTCSS eliminate much interference from distant sources, but CTCSS by itself cannot prevent undesired FM capture from occurring as a result of nearby simultaneous co-channel transmissions. The TIA/EIA Standard 603 designates CTCSS frequencies. Volume II of the EMS communications plan contains a table that is a portion of those CTCSS frequencies above 90 Hz and below 211 Hz that are approved for EMS radio communications in Florida.

**Table 5-1 – Specific MED Channel Assignments for Florida Acute Care Facilities**

<b>FACILITY NAME</b>	<b>STREET ADDRESS</b>	<b>CITY, STATE</b>	<b>COUNTY</b>	<b>CMC</b>	<b>LMC</b>
North Florida Regional Medical Center	6500 Newberry Road	Gainesville, FL	Alachua	3-118.8	42-118.8
North Florida Regional Medical Center	12311 W Newberry Road	Newberry, FL	Alachua	3-118.8	22-118.8
North Florida Regional Medical Center	4388 NW 53 <sup>rd</sup> Avenue	Gainesville, FL	Alachua	3-118.8	22-123.0
Shands at Springhill	8475 NW 39 <sup>th</sup> Avenue	Gainesville, FL	Alachua	3-118.8	32-118.8
Shands Hospital at University of Florida	1600 SW Archer Road	Gainesville, FL	Alachua	3-118.8	62-118.8

FACILITY NAME	STREET ADDRESS	CITY, STATE	COUNTY	CMC	LMC
UF Health Shands Emergency Dept. Kanapaha	7405 SW Archer Road	Gainesville, FL	Alachua	3-118.8	12-118.8
Ed Fraser Memorial Hospital	159 N Third Street	Maccleenny, FL	Baker	1-156.7	12-156.7
Bay Medical Center	615 N Bonita Avenue	Panama City, FL	Bay	6-167.9	12-167.9
Gulf Coast Medical Center	449 West 23rd Street	Panama City, FL	Bay	6-167.9	52-167.9
Tyndall AFB	340 Magnolia Circle	Tyndall AFB, FL	Bay	6-167.9	42-127.3
Shands at Starke	922 East Call Street	Starke, FL	Bradford	2- 94.8	72- 94.8
Cape Canaveral Hospital	701 W Cocoa Beach Causeway	Cocoa Beach, FL	Brevard	6-127.3	22-173.8
Holmes Regional Medical Center	1350 S Hickory Street	Melbourne, FL	Brevard	6-127.3	52-131.8
Kennedy Space Center (KSC)	Bldg M6-495 corner of 2 <sup>nd</sup> & C	Kennedy Space Center, FL	Brevard	6-127.3	62-146.2
Palm Bay Community Hospital	1425 Malabar Road, NE	Melbourne, FL	Brevard	6-127.3	12-173.8
Parrish Medical Center	951 N Washington Avenue	Titusville, FL	Brevard	6-127.3	42-127.3
Wuesthoff Medical Center/Melbourne	250 N Wickham Road	Melbourne, FL	Brevard	6-127.3	72-146.2
Wuesthoff Memorial Hospital	110 Longwood Avenue	Rockledge, FL	Brevard	6-127.3	32-146.2
Broward General Medical Center	1600 S Andrews Avenue	Fort Lauderdale, FL	Broward	5-173.8	72-173.8
Cleveland Clinic Hospital	3100 Weston Road	Weston, FL	Broward	5-173.8	72-107.2
Coral Springs Medical Center	3000 Coral Hills Drive	Coral Springs, FL	Broward	5-173.8	52-192.8
Florida Medical Emergency Center	10230 State Road 84	Davie, FL	Broward	5-173.8	32-173.8
Florida Medical Center	5000 West Oakland Park Blvd.	Lauderdale Lakes, FL	Broward	5-173.8	52-110.9
Hollywood Memorial Center	3600 Washington Street	Hollywood, FL	Broward	5-173.8	22-107.2
Holy Cross Hospital, Inc.	4725 N Federal Highway	Fort Lauderdale, FL	Broward	5-173.8	72-192.8
Imperial Point Medical Center	6401 N Federal Highway	Fort Lauderdale, FL	Broward	5-173.8	72-156.7
Memorial Hospital Miramar	1901 S.W. 172 <sup>nd</sup> Ave	Miramar, FL	Broward	5-173.8	12-127.3
Memorial Hospital Pembroke	7800 Sheridan Street	Pembroke Pines, FL	Broward	5-173.8	22-103.5
Memorial Hospital West	703 N Flamingo Road	Pembroke Pines, FL	Broward	5-173.8	62-123.0
Memorial Regional Hospital	3501 Johnson Street	Hollywood, FL	Broward	5-173.8	52-103.5
North Broward Medical Center	201 East Sample Road	Pompano Beach, FL	Broward	5-173.8	72-103.5
Northwest Medical Center	2801 N State Road 7	Margate, FL	Broward	5-173.8	22-110.9
Plantation General Hospital	401 NW 42nd Avenue	Plantation FL	Broward	5-173.8	52-107.2
University Hospital and Medical Center	7201 N University Drive	Tamarac, FL	Broward	5-173.8	22-192.8
Westside Regional Medical Center.	8201 W Broward Blvd	Plantation, FL	Broward	5-173.8	52-173.8
West Boca Medical Center	4890 State Road 7	Coconut Creek, FL	Broward	5-173.8	42-173.8
Calhoun Liberty Hospital	20370 NE Burns Avenue	Blountstown, FL	Calhoun	4-156.7	42-156.7
Bayfront Health Port Charlotte	2500 Harbour Blvd.	Port Charlotte, FL	Charlotte	3-167.9	52-167.9
Bayfront Health Punta Gorda	809 E Marion Avenue	Punta Gorda, FL	Charlotte	3-167.9	62-167.9
Fawcett Memorial Hospital	21298 Olean Blvd.	Port Charlotte, FL	Charlotte	3-167.9	72-167.9
Citrus Memorial Hospital	502 Highland Blvd.	Inverness, FL	Citrus	3-167.9	12-167.9
Seven Rivers Community Hospital	6201 N Suncoast Blvd.	Crystal River, FL	Citrus	3-167.9	72-167.9
Orange Park Medical Center	2001 Kingsley Avenue	Orange Park, FL	Clay	5-167.9	12-167.9
Baptist Clay Medical Campus	1771 Baptist Clay Drive	Fleming Island, FL	Clay	5-167.9	62-167.9
St. Vincent's Hospital	1760 St. Vincent's Way	Middleburg, FL	Clay	5-167.9	3-167.9
Physicians Reg. Pine Ridge	6101 Pine Ridge Rd	Naples, FL	Collier	7-192.8	12-192.8
Naples Community Hospital	350 7th Street	North Naples, FL	Collier	7-192.8	22-192.8
North Collier Hospital	11190 Health park Blvd	Naples, FL	Collier	7-192.8	32-192.8
Physicians Reg. Collier	8300 Collier Blvd	Naples, FL	Collier	7-192.8	42-192.8
Lake City Medical Center	340 NW Commerce Blvd. L	Lake City, FL	Columbia	7-131.8	52-131.8
Shands at Lake Shore	560 E Franklin Street	Lake City, FL	Columbia	7-131.8	72-131.8
Lake City Veterans Hospital	619 S Marion Ave	Lake City, FL	Columbia	7-131.8	42-131.8
Aventura Hospital and Medical Center	20900 Biscayne Blvd	Aventura, FL	Dade	2-210.7	12-107.2
Baptist Hospital of Miami	8900 North Kendall Drive	Miami, FL	Dade	6-210.7	32-167.9

FACILITY NAME	STREET ADDRESS	CITY, STATE	COUNTY	CMC	LMC
University of Miami	1400 NW 12th Avenue	Miami, FL	Dade	4-210.7	3-114.8
Coral Gables Hospital	3100 Douglas Road	Coral Gables, FL	Dade	4-210.7	62-123.0
Healthsouth Doctors' Hospital	5000 University Drive	Coral Gables, FL	Dade	6-210.7	22-131.8
Hialeah Hospital	651 East 25th Street	Hialeah, FL	Dade	2-210.7	72-141.3
Homestead Hospital	975 Baptist Way	Homestead, FL	Dade	6-210.7	12-151.4
Jackson Memorial Hospital	1611 NW. 12th Avenue	Miami, FL	Dade	4-210.7	42-162.2
Jackson South Community Hospital	9333 SW. 152nd Street	Miami, FL	Dade	2-210.7	1-173.8
Kendall Reg. Medical Center	11750 Bird Road	Miami, FL	Dade	6-210.7	1-186.2
Larkin Community Hospital	7031 SW 62nd Avenue	South Miami, FL	Dade	6-210.7	3-203.5
Mercy Hospital Inc.	3663 South Miami Avenue	Miami, FL	Dade	4-210.7	5-103.5
Miami Children's Hospital	3100 SW 62nd Avenue	Miami, FL	Dade	4-210.7	7-110.9
Mount Sinai Medical Center	4300 Alton Road	Miami Beach, FL	Dade	2-210.7	32-127.3
Mount Sinai ED - Aventura	28452845 Aventura Blvd	Aventura, FL	Dade	2-210.7	32-131.8
North Shore Medical Center	1100 NW 95th Street	Miami, FL	Dade	2-210.7	52-146.2
Palm Springs General Hospital	1475 West 49th Street	Hialeah, FL	Dade	2-210.7	12-156.7
Palmetto General Hospital	2001 W 68th Street	Hialeah, FL	Dade	2-210.7	22-192.8
Pan American Hospital	5959 NW 7th Street	Miami, FL	Dade	4-210.7	52-107.2
Jackson N. Medical Center	160 NW 170th Street	North Miami Beach, FL	Dade	2-210.7	62-114.8
South Miami Hospital	6200 S.W. 73rd Street	South Miami, FL	Dade	6-210.7	72-123.0
Veterans Hospital	1201 NW 16th St	Miami, FL	Dade	4-210.7	12-131.8
South Shore Hospital and Medical Center	630 Alton Road	Miami Beach, FL	Dade	4-210.7	72-192.8
Desoto Memorial Hospital	900 North Robert Avenue	Arcadia, FL	Desoto	7-131.8	72-131.8
No Hospital facilities	n/a	n/a	Dixie	n/a	n/a
Baptist Medical Center	800 Prudential Drive	Jacksonville, FL	Duval	6-146.2	32-151.4
Baptist Medical Center/Beaches	1350 13th Avenue South	Jacksonville Beach, FL	Duval	6-146.2	42-162.2
Baptist Medical Center North	4401 Dunn Ave	Jacksonville, FL	Duval	6-146.2	42-173.8
Baptist Medical Center South	14550 St. Augustine Road	Jacksonville, FL	Duval	6-146.2	62-173.8
Baptist Medical at Town Center	4085 Town Center Blvd.	Jacksonville, FL	Duval	6-146.2	62-173.8
Memorial Hospital Jacksonville	3625 University Blvd South	Jacksonville, FL	Duval	6-146.2	52-186.2
Memorial Emergency Center – Atlantic	11850 Atlantic Boulevard	Jacksonville, FL	Duval	6-146.2	3-186.2
Memorial Emergency Center – Mandarin	10910 San Jose Blvd.	Jacksonville, FL	Duval	6-146.2	3-186.2
Naval Air Station (NAS) JAX Medical Center	NAS Jax	Jacksonville, FL	Duval	6-146.2	7-203.5
Orange Park Medical Center	6477 103 <sup>rd</sup> Street	Jacksonville, FL	Duval	6-146.2	42-146.2
Saint Vincent's Hospital	4201 Belfort Road	Jacksonville, FL	Duval	6-146.2	72-103.5
Saint Vincent's Medical Center	1800 Barrs Street	Jacksonville, FL	Duval	6-146.2	22-110.9
UF Health Jacksonville	655 West 8th Street	Jacksonville, FL	Duval	6-146.2	4-127.3
UF Health Jacksonville North	15255 Max Leggett Pkwy	Jacksonville, FL	Duval	6-146.2	5-186.2
Wolfsan's/Baptist Children's Hospital	4901 Richard Street	Jacksonville, FL	Duval	6-146.2	12-136.5
Baptist Hospital	1000 West Moreno Street	Pensacola, FL	Escambia	2-110.9	72-110.9
Medical Clinic NAS Pensacola	NAS Pensacola	Pensacola, FL	Escambia	2-110.9	12-110.9
Sacred Heart Hospital	5151 N 9th Avenue	Pensacola, FL	Escambia	2-110.9	32-110.9
West Florida Hospital	8383 North Davis Highway	Pensacola, FL	Escambia	2-110.9	62-110.9
Florida Hospital/Flagler	60 Memorial Medical Parkway	Palm Coast, FL	Flagler	6-136.5	62-136.5
George E. Weems Memorial Hospital	135 Avenue G	Apalachicola, FL	Franklin	3-156.7	72-156.7
Gadsden Community Hospital	90 East US Highway	Quincy, FL	Gadsden	6-203.5	12-203.5
No hospital emergency room facilities	n/a	n/a	Gilchrist	n/a	n/a
No hospital emergency room facilities	n/a	n/a	Glades	n/a	n/a
Sacred Heart Hospital on the Gulf	3801 E. Hwy 98	Port St. Joe, FL	Gulf	2-167.9	32-167.9
Trinity Community Hospital	506 NW 4th Street	Jasper, FL	Hamilton	2-210.7	52-210.7

FACILITY NAME	STREET ADDRESS	CITY, STATE	COUNTY	CMC	LMC
Florida Hospital/Wauchula	533 West Carlton Street	Wauchula, FL	Hardee	5-127.3	12-127.3
Hendry Regional Medical Center	500 West Sugarland Highway	Clewiston, FL	Hendry	7-107.3	22-107.3
Bayfront Health Brooksville	17240 Cortez Blvd..	Brooksville, FL	Hernando	4-146.2	32-146.2
Oak Hill Hospital	11375 Cortez Blvd.	Spring Hill, FL	Hernando	4-146.2	12-146.2
Bayfront Spring Hill Regional Hospital	10461 Quality Drive	Spring Hill, FL	Hernando	4-146.2	72-146.2
Florida Hospital Heartland Medical Center	4200 Sun 'N Lake Blvd	Sebring, FL	Highlands	1-123.0	22-123.0
Florida Hospital Heartland-Lake Placid	1210 US 27 North	Lake Placid, FL	Highlands	1-123.0	72-123.0
Highlands Regional Medical Center	3600 S Highlands Avenue	Sebring, FL	Highlands	1-123.0	62-123.0
Brandon Regional Hospital	119 Oakfield Drive	Brandon, FL	Hillsborough	7-127.3	1-127.3
H. Lee Moffitt Cancer Ctr/Research Institute Hospital	12902 Magnolia Drive	Tampa, FL	Hillsborough	7-127.3	3-127.3
Kindred Hospital-Bay Area/Tampa	4555 S Manhattan Avenue	Tampa, FL	Hillsborough	7-127.3	4-127.3
Kindred Hospital/Central Tampa	4801 N Howard Avenue	Tampa, FL	Hillsborough	7-127.3	42-127.3
Memorial Hospital/Tampa	2901 Swann Avenue	Tampa, FL	Hillsborough	7-127.3	5-127.3
Saint Joseph's Hospital	3001 Martin Luther King Blvd	Tampa, FL	Hillsborough	7-127.3	2-127.3
Saint Joseph's Hospital, South	6901 Simmons Loop Road	Riverview, FL	Hillsborough	7-127.3	52-146.2
South Bay Hospital	4016 State Road 674	Sun City Center, FL	Hillsborough	7-127.3	12-127.3
South Florida Baptist Hospital	301 N Alexander Street	Plant City, FL	Hillsborough	7-127.3	52-127.3
Tampa General Hospital The	1 Tampa General Cir	Tampa, FL	Hillsborough	7-127.3	72-127.3
Tampa Community Hospital	6001 Webb Road	Tampa, FL	Hillsborough	7-127.3	62-127.3
University Community Hospital	3100 E Fletcher Avenue	Tampa, FL	Hillsborough	7-127.3	12-127.3
University Community Hospital/Carrollwood	7171 North Dale Mabry	Tampa, FL	Hillsborough	7-127.3	6-127.3
Doctor's Memorial Hospital/Bonifay	401 East Byrd	Bonifay, FL	Holmes	3-167.9	22-167.9
Indian River Memorial Hospital	1000 36th Street	Vero Beach, FL	Indian River	4-118.8	42-118.8
Sebastian River Medical Center	13695 US Highway 1	Sebastian, FL	Indian River	4-118.8	72-118.8
Campbellton/Graceville Hospital	5429 College Drive	Graceville, FL	Jackson	5-146.2	12-146.2
Jackson Hospital	4250 Hospital Drive	Marianna, FL	Jackson	5-146.2	52-146.2
No hospital emergency room facilities	n/a	n/a	Jefferson	n/a	n/a
No hospital emergency room facilities	n/a	n/a	Lafayette	n/a	n/a
Florida Hospital Waterman	1000 Waterman Way	Tavares, FL	Lake	32-192.8	12-192.8
Leesburg Regional Medical Center	600 East Dixie Avenue	Leesburg, FL	Lake	32-192.8	22-192.8
South Lake Hospital	1099 Citrus Tower Blvd	Clermont, FL	Lake	32-192.8	62-192.8
Cape Coral Hospital	636 Del Prado Blvd	Cape Coral, FL	Lee	4-110.9	32-110.9
Gulf Coast Hospital	13681 Doctor's Way	Fort Myers, FL	Lee	4-110.9	62-110.9
Healthpark Medical Ctr	9981 Healthpark Circle	Fort Myers, FL	Lee	4-110.9	3-110.9
Lee Memorial Hospital	2776 Cleveland Avenue	Fort Myers, FL	Lee	4-110.9	42-110.9
Lehigh Regional Medical Center	1500 Lee Blvd	Lehigh Acres, FL	Lee	4-110.9	52-110.9
Southwest Florida Regional Medical Center	2727 Winkler Avenue	Fort Myers, FL	Lee	4-110.9	6-110.9
Capital Regional Medical Center	2626 Capital Medical Blvd	Tallahassee, FL	Leon	2-156.7	42-156.7
Tallahassee Memorial Hospital	1300 Miccosukee Road	Tallahassee, FL	Leon	2-156.7	22-156.7
Tallahassee Memorial Emergency Center	1206 Metropolitan Blvd.	Tallahassee, FL	Leon	2-156.7	TBD
Regional Gen. Hospital-Williston	125 SW 7th Street	Williston, FL	Levy	5-127.3	52-127.3
No hospital emergency room facilities	n/a	n/a	Liberty	n/a	n/a
Madison County Memorial Hospital	224 NW Crane Ave	Madison, FL	Madison	3-146.2	32-146.2
Blake Medical Center	2020 59th Street West	Bradenton, FL	Manatee	4-167.9	42-167.9
Lakewood Ranch Medical Center	8330 Lakewood Ranch Blvd.	Bradenton, FL	Manatee	4-167.9	TBD
Manatee Memorial Hospital	206 2nd Street E	Bradenton, FL	Manatee	4-167.9	22-167.9
Munroe Regional Medical Center	1500 SW 1 <sup>st</sup> Ave	Ocala, FL	Marion		12-127.3
Ocala Regional Medical Center	1431 SW 1st Avenue	Ocala, FL	Marion		32-127.3

FACILITY NAME	STREET ADDRESS	CITY, STATE	COUNTY	CMC	LMC
West Marion Community Hospital	4600 SW 46th Court	Ocala, FL	Marion		22-127.3
TimberRidge Medical Center	9521 SW State 200	Ocala, FL	Marion		62-127.3
Martin Memorial Hospital South	2100 SE Salerno Blvd	Stuart, FL	Martin	7-146.2	42-146.2
Martin Memorial Medical Center	200 SE Hospital Avenue	Stuart, FL	Martin	7-146.2	72-146.2
Fishermen's Hospital	3301 Overseas Highway	Marathon, FL	Monroe	7-156.7	n/a
Lower Keys Medical Center	5900 College Road	Key West, FL	Monroe	7-156.7	n/a
Mariners Hospital	91500 Overseas Highway	Tavernier, FL	Monroe	7-156.7	n/a
Baptist Medical Center/Nassau	1250 South 18th Street	Fernandina Beach, FL	Nassau	2-136.7	32-136.5
Destin Emergency Care Center	996 Airport Road	Destin	Okaloosa	1 or 2-156.7	TBD
Eglin Air Force Base	Air Force Sys Cmd Reg Hosp	Valparaiso, FL	Okaloosa	1 or 2-156.7	32-156.7
Fort Walton Beach Medical Center	1000 Mar-Walt Drive	Fort Walton Beach, FL	Okaloosa	1 or 2-156.7	52-156.7
North Okaloosa Medical Center	151 Redstone Avenue SE	Crestview, FL	Okaloosa	1 or 2-156.7	22-156.7
Twin Cities Hospital	2190 Highway 85 North	Niceville, FL	Okaloosa	1 or 2-156.7	72-156.7
Raulerson Hospital	1796 Highway 441 North	Okeechobee, FL	Okeechobee	6-167.9	72-167.9
Arnold Palmer Hospital (NO E/R)	92 West Miller Street	Orlando, FL	Orange	7-156.7	12-107.2
Nemours Children's Hospital - Orlando	13535 Nemours Parkway	Orlando, FL	Orange	7-156.7	6-156.7
Florida Hospital	601 East Rollins	Orlando, FL	Orange	7-156.7	22-123.0
Florida Hospital/Apopka	201 North Park Avenue	Apopka, FL	Orange	7-156.7	52-131.8
Florida Hospital/East Orlando	7727 Lake Underhill Road	Orlando, FL	Orange	7-156.7	42-141.3
Health Central	10000 West Colonial Drive	Ocoee, FL	Orange	7-156.7	52-151.4
Orlando Regional Medical Center	1414 Kuhl Avenue	Orlando, FL	Orange	7-156.7	72-173.8
Dr. Phillips Hospital	9400 Turkey Lake Road	Orlando, FL	Orange	7-156.7	32-186.2
Florida Hospital/Winter Park	200 N Lakemont Avenue	Winter Park, FL	Orange	7-156.7	62-123.0
Orlando Health	52 W. Underwood St.	Winter Park, FL	Orange	7-156.7	TBD
VA Hospital - Orlando	13800 Veterans Way	Orlando, FL	Orange	7-156.7	1-156.7
Florida Hospital/Winter Park	2000 Flower Avenue	Winter Garden, FL	Orange	7-156.7	42-156.7
Hunter Creek ER	12100 S. John Young Parkway	Orlando, FL	Orange	7-156.7	2-156.7
Winnie Palmer Hospital	83 W. Miller St.	Orlando, FL	Orange	7-156.7	TBD
Florida Hospital/Celebration Health	400 Celebration Place	Celebration, FL	Osceola	4-114.8	22-114.8
Florida Hospital/Kissimmee	2450 N Orange Blossom Trail	Kissimmee, FL	Osceola	4-114.8	5-114.8
Osceola Regional Medical Center	700 W Oak Street	Kissimmee, FL	Osceola	4-114.8	52-114.8
Poinciana Medical Center	325 Cypress PKWY	Kissimmee, FL	Osceola	4-114.8	2-114.8
St Cloud Hospital	2906 17th Street	Saint Cloud, FL	Osceola	4-114.8	42-114.8
Bethesda West Hospital	9655 Boynton Beach Blvd.	Boynton Beach, FL	Palm Beach	3-127.3	32-114.8
Bethesda Memorial Hospital	2815 S Seacrest Blvd	Boynton Beach, FL	Palm Beach	3-127.3	5-114.8
Boca Raton Community Hospital	800 Meadows Road	Boca Raton, FL	Palm Beach	3-127.3	12-131.8
West Palm Hospital	2201 45th Street	West Palm Beach, FL	Palm Beach	1-127.3	42-151.4
Delray Medical Center	5352 Linton Blvd	Delray Beach, FL	Palm Beach	3-127.3	6-173.8
Emergency Care at JFK	4797 PGA Blvd	Delray Beach Gardens, FL	Palm Beach	3-127.3	TBD
Lakeside Regional	39200 Hooker Hwy	Belle Glade, FL	Palm Beach	4-127.3	52-203.5
Emergency CTR Lake Worth	6250 Lantanta Road	Lake Worth, FL	Palm Beach	3-127.3	TBD
Good Samaritan Medical Center	1309 North Flagler Drive	West Palm Beach, FL	Palm Beach	1-127.3	62-103.5
JFK Medical Center	5301 S Congress Avenue	Atlantis, FL	Palm Beach	3-127.3	22-146.2
JFK ER Medical Center	10921 S. Jog Road	Boynton Beach, FL	Palm Beach	3-127.3	TBD
Jupiter Medical Center	1210 South Old Dixie Highway	Jupiter, FL	Palm Beach	1-127.3	22-210.7
Palm Beach Gardens Medical Center	3360 Burns Road	Palm Beach Gardens, FL	Palm Beach	1-127.3	32-107.2

FACILITY NAME	STREET ADDRESS	CITY, STATE	COUNTY	CMC	LMC
Palms West Hospital	13001 State Road 80	Loxahatchee, FL	Palm Beach	44-127.3	12-123.0
Saint Mary Hospital	901 45th Street	West Palm Beach, FL	Palm Beach	11-127.3	52-141.3
US Veterans Hospital	7305 North Military Trail	West Palm Beach, FL	Palm Beach	1-127.3	7-162.2
Wellington Regional Medical Center	10101 Forest Hill Blvd	West Palm Beach, FL	Palm Beach	4-127.3	2-186.2
West Boca Medical Center	21644 State Road 7	Boca Raton, FL	Palm Beach	3-127.3	7-192.8
Pasco Regional Medical Center	13100 Fort King Road	Dade City, FL	Pasco	4-110.9	42-103.5
Community Hospital	5637 Marine Parkway	New Port Richey, FL	Pasco	4-110.9	32-127.3
Florida Hospital Zephyrhills	7050 Gall Blvd	Zephyrhills, FL	Pasco	4-110.9	42-136.5
Morton Plant North Bay Hospital	6600 Madison Street	New Port Richey, FL	Pasco	4-110.9	22-146.2
Regional Medical Center/Bayonet Point	14000 Fivay Road	Hudson, FL	Pasco	4-110.9	12-156.7
Medical Center of Trinity	9330 State Road 54	Trinity, FL	Pasco	4-110.9	52-127.3
Florida Hospital, Wesley Chapel	2600 Bruce B Downs Blvd	Wesley Chapel, FL	Pasco	4-110.9	62-127.3
All Children's Hospital	501 Sixth Street South	Saint Petersburg, FL	Pinellas	3-203.5	1-203.5
Bayfront Medical Center	701 Sixth Street South	Saint Petersburg, FL	Pinellas	3-203.5	7-203.5
Edward White Hospital	2323 9th Avenue North	Saint Petersburg, FL	Pinellas	3-203.5	5-203.5
Helen Ellis Memorial Hospital	1395 South Pinellas Avenue	Tarpon Springs, FL	Pinellas	3-203.5	4-203.5
Kindred Hospital/Bay Area-St Petersburg	3030 6th Street South	Saint Petersburg, FL	Pinellas	3-203.5	22-203.5
Largo Medical Center	201 14th Street, SW	Largo, FL	Pinellas	3-203.5	6-203.5
Largo Medical Center	2339 Gulf to Bay Blvd	Clearwater	Pinellas	3-203.5	5-203.5
Mease Hospital/Dunedin	601 Main Street	Dunedin, FL	Pinellas	3-203.5	52-203.5
Mease Hospital Countryside	3231 McMullen Booth Road	Safety Harbor, FL	Pinellas	3-203.5	32-203.5
Morton Plant Hospital	300 Pinellas Street	Clearwater, FL	Pinellas	3-203.5	72-203.5
Northside Hospital	6000 49th Street North	Saint Petersburg, FL	Pinellas	3-203.5	62-203.5
Palms/Pasadena Hospital	1501 Pasadena Avenue South	Saint Petersburg, FL	Pinellas	3-203.5	42-203.5
Saint Anthony's Hospital	1200 7th Avenue North	Saint Petersburg, FL	Pinellas	3-203.5	12-123.0
St Petersburg General Hospital	6500 38th Avenue North	Saint Petersburg, FL	Pinellas	3-203.5	2-203.5
Largo Medical CTR Indian Rocks	2025 Indian Rocks Road	Largo, FL	Pinellas	3-203.5	12-203.5
Bartow Memorial Hospital	2200 Osprey Blvd	Bartow, FL	Polk	3-103.5	72-103.5
Heart of Florida Regional Medical Center	40100 U S Highway 27 North	Davenport, FL	Polk	3-103.5	7-103.5
Lake Wales Medical Center	410 South 11th Street	Lake Wales, FL	Polk	3-103.5	32-103.5
Lakeland Regional Medical Center	1324 Lakeland Hills Blvd	Lakeland, FL	Polk	3-103.5	52-103.5
Winter Haven Hospital	200 Avenue F Northeast	Winter Haven, FL	Polk	3-103.5	42-103.5
Winter Haven Women's Hospital	101 Avenue O, Southeast	Winter Haven, FL	Polk	3-103.5	62-167.9
Putnam Community Medical Center	611 Zeagler Dr.	Palatka, FL	Putnam	4-167.9	42-167.9
Gulf Breeze Hospital	1110 Gulf Breeze Parkway	Gulf Breeze, FL	Santa Rosa	1-136.5	42-110.9
Jay Hospital	14114 South Alabama Street	Jay, FL	Santa Rosa	1-136.5	22-136.5
Santa Rosa Medical Center	6002 Berryhill Road	Milton, FL	Santa Rosa	1-136.5	32-136.5
Venice Reg. Med Center	540 The Rialto	Venice, FL	Sarasota	6-110.9	12-110.9
Doctors Hospital/Sarasota	5731 Bee Ridge Road	Sarasota, FL	Sarasota	6-110.9	42-110.9
Englewood Community Hospital	700 Medical Blvd	Englewood, FL	Sarasota	6-110.9	52-110.9
Sarasota Memorial Hospital	1700 S Tamiami Trail	Sarasota, FL	Sarasota	6-110.9	1-110.9
Sarasota Memorial ER North Port	2345 Bobcat Village C. Rd	North Port, FL	Sarasota	6-110.9	TBD
Central Florida Regional Hospital	1401 W Seminole Blvd	Sanford, FL	Seminole	2-110.9	32-110.9
Florida Hospital-Altamonte	601 East Altamonte Drive	Altamonte Springs, FL	Seminole	2-110.9	22-110.9
Florida Hospital ER Lake Mary	950 Rinehart Road	Lake Mary, FL	Seminole	2-110.9	3-110.9
South Seminole Hospital	555 W State Road 434	Longwood, FL	Seminole	2-110.9	52-110.9
Central Florida Regional Hospital, Oviedo ER	8300 Red Bug Lake Road	Oviedo, FL	Seminole	2-110.9	5-110.9
Flagler Hospital	400 Health Park Blvd	Saint Augustine, FL	St Johns	2-167.9	32-167.9
Memorial Emergency Care Center	42 Doctors Village Drive	St. Johns, FL	St. Johns	2-167.9	52-167.9
Lawnwood Regional Medical Center	1700 S. 23rd Street	Fort Pierce, FL	St Lucie	1-136.5	12-136.5

<b>FACILITY NAME</b>	<b>STREET ADDRESS</b>	<b>CITY, STATE</b>	<b>COUNTY</b>	<b>CMC</b>	<b>LMC</b>
Saint Lucie Medical Center	1800 SE Tiffany Avenue	Port Saint Lucie, FL	St Lucie	1-136.5	62-136.5
Saint Lucie Medical Center	3275 SW Darwin Blvd	Port Saint Lucie, FL	St Lucie	1-136.5	TBD
Tradition Medical Center	10000 SW Innovation Way	Port Saint Lucie, FL	St Lucie	1-136.5	TBD
Martin Memorial Emerg Center St Lucie	1095 NW St Lucie Blvd	Port Saint Lucie, FL	St Lucie	1-136.5	TBD
Villages Regional Hospital	1451 El Camino Real	The Villages, FL	Sumter	72-192.8	52-192.8
Shands of Live Oak	1100 SW 11th Street	Live Oak, FL	Suwannee	6-156.7	72-156.7
Doctors' Memorial Hospital Inc.	333 N Byron Butler PKWY	Perry, FL	Taylor	1-118.8	12-118.8
Ramadan Hand Institute/Lake Butler Hospital	850 East Main Street	Lake Butler, FL	Union	2-94.8	32-94.8
Bert Fish Medical Center	401 Palmetto Street	New Smyrna Beach, FL	Volusia	1-136.5	22-136.5
Florida Hospital/Oceanside	264 South Atlantic Avenue	Ormond Beach, FL	Volusia	1-136.5	42-136.5
Florida Hospital/Ormond Memorial	875 Sterthaus Avenue	Ormond Beach, FL	Volusia	1-136.5	52-136.5
Florida Hospital/Deland	701 W Plymouth Avenue	Deland, FL	Volusia	1-136.5	2-136.5
Florida Hospital Fish Memorial	1055 Saxon Blvd	Orange City, FL	Volusia	1-136.5	4-136.5
Halifax Medical Center	303 N Clyde Morris Blvd	Daytona Beach, FL	Volusia	1-136.5	5-136.5
Halifax Medical Center Port Orange	1041 Dunlaw Ave	Port Orange, FL	Volusia	1-136.5	72-136.5
No hospital emergency room facilities	n/a	n/a	Wakulla	n/a	n/a
Healthmark Regional Medical Center	4413 US Highway 331 S	Defuniak Springs, FL	Walton	4-167.9	1-167.9
Sacred Heart Hospital	7800 US 98 West	San Destin, FL	Walton	4-167.9	12-167.9
Northwest Florida Community Hospital	1360 Brickyard Road	Chipley, FL	Washington	2-146.2	22-146.2

**END OF SECTION 5**

## **6.0 EQUIPMENT REQUIREMENTS**

### **6.1 Minimum Performance Standards**

The minimum performance standards defined in the following sections are the standards by which approval is determined for individual equipment items for use within EMS communications systems. These minimum performance standards apply to analog or digital (Project 25), conventional or trunked that is type-accepted for narrowband operational bandwidths (700/800 MHz digital/Project 25 radios, and 470 MHz or below), and wideband and/or narrowband for 700/800 MHz analog radios.

These standards have been developed by the DivTel Bureau of Public Safety through research, engineering modeling and analysis of communications equipment parameters that affect radio coverage, interference, audio quality, channel capacity and environmental performance. Development of these standards has been with the objectives of ensuring that radio equipment used for EMS communications is competitively available, enables necessary system performance, and achieves certain technical standards necessary to spectrum effectiveness and efficiency within the overall radio environment in Florida.

Radio equipment must meet or exceed the following standards and test procedures as of the date of this revision.

#### **6.1.1 TIA/EIA Standards**

This plan takes precedence over specifications in TIA/EIA-603D and TIA-102.

##### Telecommunications/Electronics Industries Association Standards

TIA/EIA-603 Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

TIA-102 Project 25 System and Standards

Equipment not explicitly included in the following sections will be approved on a case-by-case basis by the DivTel Bureau of Public Safety.

#### **6.1.2 Military Standards**

MIL-STD-810

The transmitter/receiver unit for mobile, portable, and vehicular repeater radio equipment shall meet or exceed MIL-STD-810E, 810F or 810G utilizing the following test methods and procedures:

<u>E</u>	<u>F</u>	<u>G</u>	
506.3	506.4	506.5	Rain, Procedure I, (blowing rain)
509.3	509.4	509.5	Salt Fog, Procedure I (aggravated screening)
510.3	510.4	510.5	Sand and Dust, Procedure I (blowing dust)
514.4	514.5	514.6	Vibration, Procedure I, Category 1 (3 Axes) or 4 (truck/trailer)
516.4	516.5	516.6	Shock, Procedure I, (functional)
501.3	501.4	501.5	High Temperature, Procedure II
507.3	507.4	507.5	Humidity, Procedure I (induced and natural)

## 6.2 Project 25 Radio ID Numbering

Each subscriber radio (mobile, portable or control station) operating on a Project 25 (P25) trunked radio systems shall be assigned and utilize an individual identification number (commonly called Logical ID or Unit ID) per Florida’s Statewide P25 Radio Identification (ID) Plan approved by the State Working Group, Executive Committee on Sept. 24, 2015.

For more information on the P25 ID plan, contact your regional domestic security task force representative for communications. The list of contacts can be found at the following link:

[https://www.dms.myflorida.com/business\\_operations/telecommunications/radio\\_communications\\_services/florida\\_interoperability\\_network\\_fin/regional\\_domestic\\_security\\_task\\_force\\_communications](https://www.dms.myflorida.com/business_operations/telecommunications/radio_communications_services/florida_interoperability_network_fin/regional_domestic_security_task_force_communications)

## 6.3 Base/Repeater Station Radios – Analog

### MINIMUM PERFORMANCE STANDARDS Analog Base/Repeater Station Equipment

#### 6.3.1 Transmitter Parameters

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>800</u> 25 kHz
Power Output (Watts) <sup>26</sup>	60	50	75
FM Hum and Noise (dB)	45	45	45
Continuous Duty Cycle	Yes	Yes	Yes

<sup>26</sup> Transmitter power output is a minimum standard unless demonstrated otherwise by system engineering and/or FCC rules.

### 6.3.2 Receiver Parameters

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>800</u> 25 kHz
Usable Sensitivity, 12 dB SINAD (uV)	.35	.35	.35
Adjacent Channel Selectivity (dB)	80	70	75
Intermodulation Spurious Response Attenuation (dB)	75	75	75
Spurious Response Attenuation (dB)	100	100	90

### 6.4 Mobile Radios – Analog

Mobile radios must be state-of-the-art, and all RF frequencies and CTCSS tones must be generated electronically (synthesized).

#### **MINIMUM PERFORMANCE STANDARDS** **Analog Mobile Radio Equipment**

#### 6.4.1 Transmitter Parameters

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>800</u> 25 kHz
Number of Channels	A/N <sup>27</sup>	32 <sup>28</sup>	15 <sup>29</sup>
Frequency Spread (MHz)	24	20	18
Power Output (Watts) <sup>30</sup>	50	50	35
FM Hum and Noise (dB)	44	39	40

<sup>27</sup> A/N – as needed.

<sup>28</sup> The 32-channel requirement is for UHF portable radios equipped with any of the first 16 MED channels, plus talk-around; otherwise as needed.

<sup>29</sup> This requirement allows for VDR, LMC, CMC, SMC, and/or applicable mobile-only talkgroups/channels and applicable mutual aid channel(s), plus talk-around; otherwise, as needed.

<sup>30</sup> Transmitter power output is a minimum standard unless demonstrated otherwise by system engineering (for VDR, LMC CMC and SMC) and/or FCC rules.

## 6.4.2 Receiver Parameters

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>800</u> 25 kHz
Number of Channels	A/N <sup>31</sup>	32 <sup>32</sup>	15 <sup>33</sup>
Frequency Spread	A/N	20	18
Usable Sensitivity, 12 dB SINAD (uV)	.35	.35	.25
Adjacent Channel Selectivity (dB)	63	65	75
Intermodulation Spurious Response Attenuation (dB)	75	75	75
Spurious Response Attenuation (dB)	75	75	75
Audio Power Output (Watts)	10	10	10
Audio Distortion (%)	5	5	5

## 6.5 Portable Radios – Analog

Portable radios must be state-of-the-art. All RF frequencies and CTCSS tones must be generated electronically (synthesized). Portable radios must be equipped with a battery of sufficient capacity to provide a 5 percent transmit, 5 percent receive and 90 percent standby (5/5/90) duty cycle over at least an 8-hour period.

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<sup>31</sup> A/N – as needed.

<sup>32</sup> The 32-channel requirement is for UHF mobile radio equipped with any of the first 16 MED channels, plus talk-around; otherwise, as needed.

<sup>33</sup> This requirement allows for a minimum VDR, LMC, CMC, SMC, and/or applicable mobile-only talkgroups/channels and applicable mutual aid channel(s), plus talk-around; otherwise, as needed.

**MINIMUM PERFORMANCE STANDARDS**  
**Analog Portable Radio Equipment**

**6.5.1 Transmitter Parameters**

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>800</u> 25 kHz
Number of Channels	A/N <sup>34</sup>	32 <sup>35</sup>	A/N
Frequency Separation (MHz)	24	20	18
Power Output (Watts) <sup>36</sup>	4	4	3
FM Hum and Noise (dB)	34	38	40

**6.5.2 Receiver Parameters**

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>800</u> 25 kHz
Number of Channels	A/N <sup>37</sup>	32 <sup>38</sup>	A/N
Frequency Spread	24	20	18
Usable Sensitivity, 12 dB SINAD (uV)	.35	.35	.35
Adjacent Channel Selectivity (dB)	63	60	70 <sup>39</sup>
Intermodulation Spurious Response Attenuation (dB)	70	70	70
Spurious Response Attenuation (dB)	70	70	70
Audio Power Output (Watts)	0.5	0.5	0.5
Audio Distortion (%)	5	5	5

<sup>34</sup> A/N – as needed.

<sup>35</sup> This requirement allows for VDR, LMC, CMC, SMC and/or applicable mobile-only talkgroup/channels and applicable mutual aid channel(s) plus talk-around; otherwise, as needed.

<sup>36</sup> Transmitter power output is a minimum standard unless demonstrated otherwise by system engineering (for VDR, LMC, CMC and SMC) and/or FCC rules.

<sup>37</sup> A/N – as needed.

<sup>38</sup> This requirement allows for VDR, LMC, CMC, SMC and/or applicable mobile-only talkgroup/channels and applicable mutual aid channel(s) plus talk-around; otherwise, as needed.

<sup>39</sup> -65 dB @ 25 kHz (mutual-aid channels exempted) -20 dB @ 12.5 KHz.

## 6.6 Base/Repeater Station Radios – P25 Digital

Base/repeater station radio equipment must be state-of-the-art. All RF frequencies must be generated electronically (synthesized) and must comply with Project 25 digital standards.

### **MINIMUM PERFORMANCE STANDARDS** **Digital Base/Repeater Station Equipment**

#### 6.6.1 Transmitter Parameters

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>700/800</u> 12.5 kHz
Power Output (Watts) <sup>40</sup>	100	100	100
FM Hum and Noise (dB)	40	40	49
Continuous Duty Cycle	Yes	Yes	Yes

#### 6.6.2 Receiver Parameters

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>700/800</u> 12.5 kHz
Digital Sensitivity, 5% BER (uV)	.35	.35	.28
Adjacent Channel Selectivity (dB)	60	60	60
Intermodulation Spurious Response Attenuation (dB)	80	80	77/80
Spurious Response Attenuation (dB)	90	80	90

## 6.7 Mobile Radios – P25 Digital

Mobile radio equipment must be state-of-the-art. All RF frequencies must be generated electronically (synthesized) and must comply with Project 25 digital standards.

### **MINIMUM PERFORMANCE STANDARDS** **Digital Mobile Radio Equipment**

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<sup>40</sup> Transmitter power output is a minimum standard unless demonstrated otherwise by system engineering and/or Federal Communications Commission (FCC) rules.

### 6.7.1 Transmitter Parameters

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>700/800</u> 12.5 kHz
Number of Channels <sup>41</sup>	A/N <sup>42</sup>	32	19
Frequency Spread (MHz)	24	20	24/18
Power Output (Watts) <sup>43</sup>	40	40	34
FM Hum and Noise (dB)	39	39	34

### 6.7.2 Receiver Parameters

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>700/800</u> 12.5 kHz
Number of Channels <sup>44</sup>	A/N <sup>45</sup>	32	15
Frequency Spread (MHz)	24	20	24/18
Digital Sensitivity, 5% BER (uV)	.30	.35	.35
Adjacent Channel Selectivity (dB)	60	60	60
Intermodulation Spurious Response Attenuation (dB)	75	75	75
Spurious Response Attenuation (dB)	80	80	75
Audio Power Output (Watts)	10	10	10
Audio Distortion (%)	3	3	3

## 6.8 Portable Radios – P25 Digital

Portable radio equipment must be state-of-the-art. All RF frequencies must be generated electronically (synthesized) and must comply with Project 25 digital standards. Portable radio

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<sup>41</sup> This requirement allows for VDR, LMC, CMC, SMC, and/or applicable mobile-only talkgroup/channels and applicable Mutual Aid channels, plus talk-around; otherwise, as needed. The 32-channel requirement is for UHF mobile radios equipped with any of the first 16 MED channels, plus talk-around; otherwise as needed.

<sup>42</sup> A/N – as needed.

<sup>43</sup> Transmitter power output is a minimum standard unless demonstrated otherwise by system engineering and/or FCC rules.

<sup>44</sup> This requirement allows for VDR, LMC, CMC, SMC, and/or applicable mobile-only talkgroup/channels and applicable Mutual Aid channels, plus talk-around; otherwise, as needed. The 32-channel requirement is for UHF mobile radios equipped with any of the first 16 MED channels, plus talk-around; otherwise, as needed.

<sup>45</sup> A/N – as needed.

equipment must be equipped with a battery of sufficient capacity to provide a 5 percent transmit, 5 percent receive and 90 percent standby (5/5/90) duty cycle over at least an 8-hour period.

**MINIMUM PERFORMANCE STANDARDS**  
**Digital Portable Radio Equipment**

**6.8.1 Transmitter Parameters**

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>700/800</u> 12.5 kHz
Number of Channels <sup>46</sup>	A/N <sup>47</sup>	32	15
Frequency Spread (MHz)	A/N	20	24/18
Power Output (Watts) <sup>48</sup>	4	4	3
FM Hum and Noise (dB)	39	39	35

**6.8.2 Receiver Parameters**

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>700/800</u> 12.5 kHz
Number of Channels <sup>49</sup>	A/N	32	15
Frequency Spread (MHz)	A/N <sup>50</sup>	20	24/18
Digital Sensitivity 5% BER (uV)	.25	.32	.25
Adjacent Channel Selectivity (dB)	60	60	60
Intermodulation Spurious Response Attenuation (dB)	73	70	72
Spurious Response Attenuation (dB)	70	70	72
Audio Power Output (Watts)	.5	.5	.5
Audio Distortion (%)	3	3	3

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<sup>46</sup> This requirement allows for VDR, LMC, CMC, SMC, and/or applicable mobile-only talkgroup/channels and applicable Mutual Aid channels, plus talk-around; otherwise, as needed. The 32-channel requirement is for UHF mobile radios equipped with any of the first 16 MED channels, plus talk-around and digital and analog operation for SMC, otherwise, as needed.

<sup>47</sup> A/N – as needed

<sup>48</sup> Transmitter power output is a minimum standard unless demonstrated otherwise by system engineering and/or FCC rules.

<sup>49</sup> This requirement allows for VDR, LMC, CMC, SMC, and/or applicable mobile-only talkgroup/channels and applicable Mutual Aid channels, plus talk-around; otherwise, as needed. The 32-channel requirement is for UHF mobile radios equipped with any of the first 16 MED channels, plus talk-around; and digital and analog operation for SMC, otherwise as needed.

<sup>50</sup> A/N – as needed.

## 6.9 Radio Frequency Control Stations – P25 Digital

Radio frequency (RF) control station equipment must be state-of-the-art. All RF frequencies must be generated electronically (synthesized) and must comply with Project 25 digital standards.

### MINIMUM PERFORMANCE STANDARDS RF Control Station Equipment

#### 6.9.1 Transmitter Parameters

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>700/800</u> 12.5 kHz
Number of Channels <sup>51</sup>	A/N <sup>52</sup>	32	19
Frequency Spread (MHz)	24	20	24/18
Power Output (Watts) <sup>53</sup>	40	40	19/30
FM Hum and Noise (dB)	39	39	34

#### 6.9.2 Receiver Parameters

	<u>VHF-HB</u> 12.5 kHz	<u>UHF</u> 12.5 kHz	<u>700/800</u> 12.5 kHz
Number of Channels <sup>54</sup>	A/N <sup>55</sup>	32	15
Frequency Spread (MHz)	24	20	24/18
Digital Sensitivity, 5% BER (uV)	.30	.35	.35
Adjacent Channel Selectivity (dB)	60	60	60
Intermodulation Spurious Response Attenuation (dB)	75	75	75
Spurious Response Attenuation (dB)	80	80	75
Audio Power Output (Watts)	5	5	5
Audio Distortion (%)	5	5	5

<sup>51</sup> This requirement allows for VDR, LMC, CMC, SMC, and/or applicable mobile-only talkgroup/channels and applicable Mutual Aid channels, plus talk-around; otherwise, as needed. The 32-channel requirement is for UHF mobile radios equipped with any of the first 16 MED channels, plus talk-around; otherwise, as needed.

<sup>52</sup> A/N – as needed

<sup>53</sup> Transmitter power output is a minimum standard unless demonstrated otherwise by system engineering and/or FCC rules.

<sup>54</sup> This requirement allows for VDR, LMC, CMC, SMC, and/or applicable mobile-only talkgroup/channels and applicable Mutual Aid channels, plus talk-around; otherwise, as needed. The 32-channel requirement is for UHF mobile radios equipped with any of the first 16 MED channels, plus talk-around; otherwise, as needed.

<sup>55</sup> A/N – as needed

## 6.10 Mobile/Portable Channelization

### 6.10.1 UHF Band

- A. FCC Requirements: FCC rule requires all portable radios must be wired and equipped to transmit and receive on the frequency pairs MED-1 through MED-8 and MED-12 through MED-82 when the radios exceed 2.5 watts transmitter power output.<sup>56</sup>
- B. MED-8 Statewide Medical Coordination (SMC) Channel: All UHF EMS mobile and portable radios must be configured with frequencies 468.175 MHz transmit, 463.175 MHz receive, CTCSS of 167.9 Hz. Digital radios must use Project 25 NAC \$293 (identified equivalent to CTCSS of 167.9 Hz). This frequency pair is designated as MED-8 by the FCC and is utilized throughout Florida as the SMC channel, and must include analog operation in addition to the Project 25 digital programming for this equipment until MED-8 is completely migrated to Project 25 digital operation statewide.
- C. MED-8 Statewide-Scene Coordination (SSC) Channel: A MED-8 talk-around channel must be incorporated into all UHF mobile radios, and all portable radios having transmitter power output exceeding 2.5 watts. This simplex channel, operating as 463.175 MHz transmit and receive, CTCSS of 167.9 Hz, provides intra- and inter-agency scene of action communications on a statewide basis. Digital radios must use Project 25 NAC \$293 (identified equivalent to CTCSS of 167.9 Hz), and must include analog operation in addition to the Project 25 digital programming for this equipment until MED-8 is completely migrated to Project 25 digital operation statewide.
- D. Project 25 (P25) Digital Operating Parameters: Common channel access parameters for MED-8, digital operation must utilize the default values provided in every radio regardless of manufacturer. Any common channel access parameters not provided must be programmed accordingly. These parameters include the following:
  - a. P25 Network Access Code – \$293 (default value)
  - b. P25 Manufacturers ID – \$00 (default value)
  - c. P25 Designation ID – \$FFFF (designates everyone)
  - d. P25 Talkgroup ID – \$00001 (default value)
  - e. P25 Message Indicator \$00000000000000000000 (unencrypted)
  - f. P25 Key ID – \$0000 (default value)
  - g. P25 Algorithm ID – \$80 (unencrypted)

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<sup>56</sup> See FCC Rule, subparagraph 90.20(d)(66)(iii), 90.20(d)(66)(iv), and 90.20(d)(66)(v).

### **6.10.2 800 MHz Band**

Mobile and portable radio equipment operating in the 800 MHz band must be equipped with the National Public Safety Calling channel with analog operation in the duplex mode. Each radio must also be equipped with the four National Public Safety Tactical channels for analog operation in both the duplex and talk-around mode per the [Florida - Region 9 Plan for Public Safety Radio Communications](#).

Additionally, the radio equipment may be equipped with the Florida Public Safety Mutual Aid channel, 854.6375 MHz transmit, 809.6375 MHz receive and statewide CTCSS of 210.7 Hz, for analog operation in both the duplex and talk-around mode. See [Appendix B](#).

### **6.10.3 700 MHz Band**

Mobile and portable radio equipment operating in the 700 MHz band must be equipped with the two interoperability National Public Safety Calling channels operating in the duplex mode. Each radio must also be equipped with the six interoperability National Public Safety Tactical channels for both duplex and talk-around digital operation per the [700 MHz Public Safety Interoperability Channel Plan](#).

**END OF SECTION 6**

## 7.0 CONCEPTS OF MOBILE DATA COMMUNICATIONS

### 7.1 General

While voice communications are the primary means of coordinating EMS activities, mobile data systems (MDS) can operate in a secondary or adjunct role. Subject to bandwidth constraints, EMS agencies may operate mobile data systems over current voice networks, such as 150, 450, 700 and 800 MHz frequency bands. A mobile data system is a packet-switched or Internet Protocol (IP) network as outlined in this section. Mobile data systems provide a means for EMS personnel to instantly access local, state, and national databases, locator mapping and record management.

### 7.2 SAFECOM Statement of Requirements.

Department of Homeland Security's SAFECOM program published a Statement of Requirements (SoR) for public safety communications interoperability. This SoR defines future requirements for crucial voice and data communications in day-to-day, task force and mutual aid operations.

The SoR includes references to Extended Area Networks, Jurisdictional Area Networks, Incident Area Networks, and Personal Area Networks.

- Personal Area Networks (PANs) permit wireless data sharing among public safety communications devices and sensors attached to an individual. Examples of data to be shared are information on the location, environment, and physical condition of that individual. Bluetooth is an example of one wireless PAN technology. In the voice radio field, talk-around channels and vehicular repeaters are examples of voice PAN technologies. From a technology perspective, the PAN aligns with current industry technology that utilizes the Bluetooth short-range wireless connectivity standard.
- Incident Area Networks (IANs) are temporary network infrastructures brought to the scene of an incident or otherwise configured for an incident. The wireless technologies that are likely to implement a component of an IAN system include IEEE 802.11 wireless local area networks and wireless ad hoc networking. The IAN is also applicable to transportable radio systems such as the EDICS,<sup>57</sup> EDWARDS<sup>58</sup> or MARC<sup>59</sup> units.
- Jurisdictional Area Networks (JANs) are permanent network infrastructures in particular cities or areas. They are dedicated to public safety communications, and

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<sup>57</sup> EDICS – Emergency Deployable Interoperable Communications System

<sup>58</sup> EDWARDS – Emergency Deployable Wide-Area Remote Data System

<sup>59</sup> MARC – Mutual aid Radio Cache

are capable of connecting to larger area networks. The wireless technologies that are likely to implement a component of JAN include IEEE 802.16e mobile broadband wireless networking and mesh networking technologies. The JAN is also applicable to radio systems such as the Statewide Law Enforcement Radio System, county or city radio systems, and nationwide radio systems.

- Extended Area Networks (EANs) consist of regional, state, and national network resources, particularly those dedicated to public safety communications. The EAN is also applicable to the Florida Interoperability Network because it connects jurisdictional systems.

Wireless data technologies have progressed through second-generation to third-generation digital standards and now transitioning into Long-Term Evolution (LTE) standards and FirstNet.

### **7.3 Mobile Data Communication Coverage Reliability**

If an agency is building its own mobile data system, it is recommended that the minimum system be engineered at 90 percent area coverage reliability for -116 dBm at 5 percent BER. If the agency is not building its own MDS, it is prudent to check the coverage area of the MDS service provider for acceptable coverage reliability before subscribing to the network.

### **7.4 Mobile Data Security**

Because mobile data security is evolving, EMS agencies should integrate the latest developments in security technology. The approved encryption algorithms are Data Encryption Standard (DES), Triple DES and Advanced Encryption Standard (AES). AES is recommended, and any encryption method should be at least 128 bits. Mobile data security must also include the latest processes for network access, authentication, and authorization.

### **7.5 Mobile Data Computer Minimum Recommended Specifications**

Although an off-the-shelf mobile computer will work, a ruggedized mobile data computer (MDC) is recommended for EMS. The ruggedized MDC should be in compliance with RS-374/EIA 204 or Military Standard-810G standards for salt, fog, temperature, dust, sand, rain, vibration, humidity, and shock based on the following test methods and procedures:

- Rain, Procedure I (blowing rain)
- Salt Fog, Procedure I (aggravated screening)
- Sand and Dust, Procedure I (blowing dust)
- Vibration, Procedure I, Category 1 (3 Axles) or 4 (truck/trailer)
- Shock, Procedure I (functional)

## **7.6 Wireless Local Area Network Technologies & Standards**

### **7.6.1 General**

The wireless local area network (WLAN) should comply with the latest minimum requirements of the Institute of Electrical and Electronic Engineers (IEEE) 802.11, which is the standard for WLANs. The future holds Long-Term Evolution (LTE) as a potential public safety interoperable communications standard.

### **7.6.2 Overview of Technologies**

As newer 802.11 and LTE standards are adopted, the new standard should be backward compatible with the standard currently used by the EMS agency. For planning purposes as standards change and these new standards are adopted, components in extended WLANs may have to be replaced.

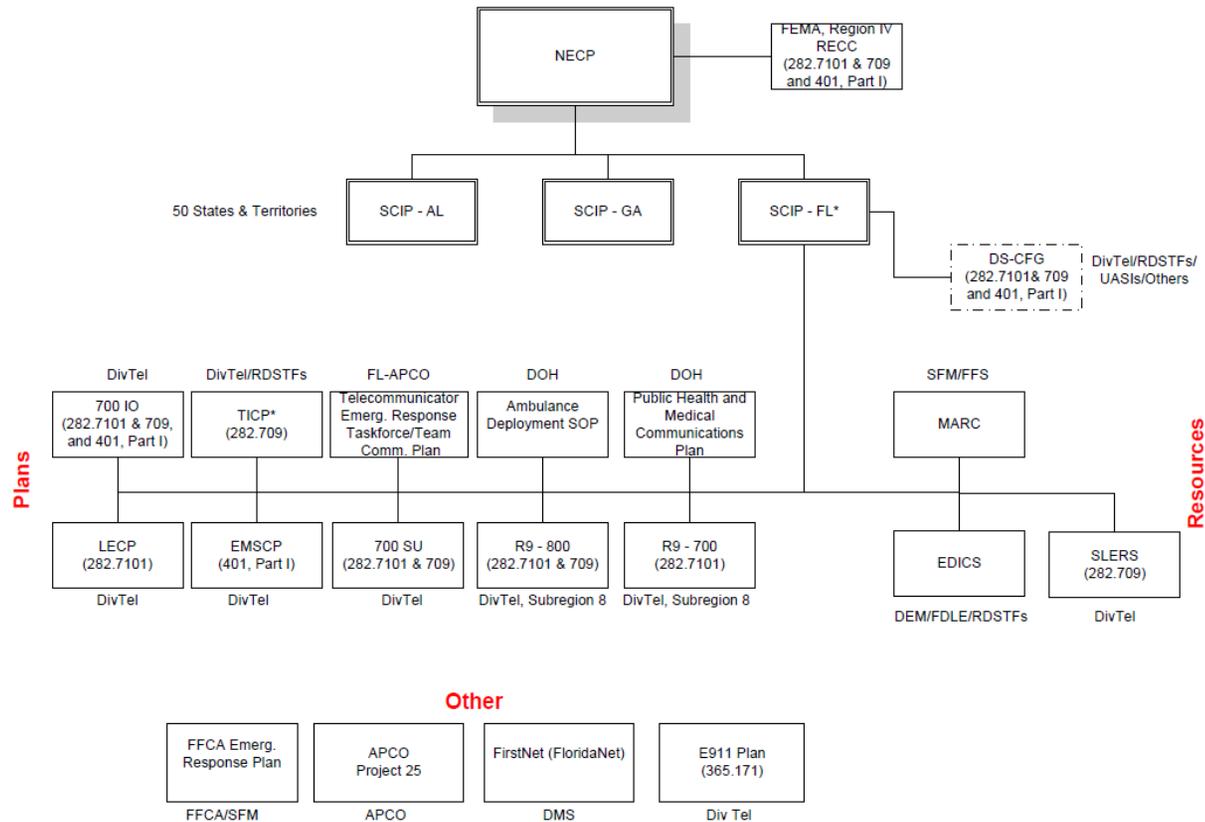
Long-Term Evolution technology is the latest technology offering public safety agencies may utilize as an option for interoperable mobile data communications. A migration plan will be necessary to promote a smooth transition from 802.11-based technology to LTE technology. The plan should minimize or avoid potential negative impacts to response times and patient care.

It is envisioned that the public safety radio communications system will transition from proprietary radio systems to P25 radio systems and eventually to an LTE communications system once mission-critical push-to-talk (mcPTT) has been demonstrated for public safety. Long-Term Evolution planning considerations include: ruggedized mobile and portable terminal equipment (Military Standard 810G); emergency medical service communications coverage reliability for mobiles and portables; interoperable broadband networks; licensure of radio frequency; hardened base repeater sites; end-to-end encrypted voice; and multi-year budgetary and transition plan from existing system to P25 and/or LTE.

**END OF SECTION 7**

## APPENDIX A – FUNCTIONAL RELATIONSHIPS WITH PLANS AND COMMITTEES

The chart below shows the functional relationship between this plan and other plans. It also references various committees associated with various plans for interoperable communications. For brevity, see [Appendix F](#) for a description of each acronym and abbreviation used in this chart.



Rev. 2017-06-21

\*Protected from public records act per Chapter 119, F.S.

**END OF APPENDIX A**

## **APPENDIX B – STATE AGENCIES AND LOCAL EMS POLICIES**

Communications policies contained within this appendix include:

1. Public Safety Mutual Aid Channel (MA-FLA)
2. Minimizing Risk of Obsolescence for Radio Equipment
3. Radio Equipment Replacement Policy
4. Radio Frequency Buy Out Policy
5. Capitol Building Rooftop Antenna Policy
6. New and Existing State-Owned Facilities Rooftop Antenna Policy

## **1.0 PUBLIC SAFETY MUTUAL AID CHANNEL (MA-FLA)**

The State of Florida, through an application filed by the Department of Management Services (the department), holds authorization from the Federal Communications Commission (FCC) to utilize the radio frequencies 854.6375/809.6375 MHz as a mutual aid channel in the public safety radio service. This makes available to eligible public safety agencies an interservice radio channel authorized for use during situations requiring interagency communications. This channel is referred to as Mutual Aid-Florida or MA-FLA, the label specified as the common display abbreviation. Applicants that meet the eligibility requirements for frequencies in the public safety radio pool, specified in 47 CFR Part 90, may apply to license stations on this channel.

### **A. APPLICATION PROCEDURES**

Applications for mobile-relay stations, mobile stations, or both, must be submitted to the department. Applications must include the required eligibility materials along with sufficient detail showing that the technical and operational standards defined below have been met.

Following a favorable determination by the department, a letter of concurrence will be prepared and attached as an exhibit to the application. A copy of the state of Florida's waiver of FCC General Category Freeze (DA 97-1631) should also be attached to the application. A copy is located on the FCC's website:

<http://www.fcc.gov/Bureaus/Wireless/Orders/1997/da971631.txt>

The entire application will then be returned to the requesting agency for submission to the appropriate FCC-certified frequency coordinating organization for further processing, as specified by FCC rules.

### **B. TECHNICAL STANDARDS**

#### **(1) System Configuration**

Fixed stations are to be configured for mobile-relay operation, such that the repeater function (repeat enable/disable) may be enabled or disabled from the associated supervisory control point. Fixed station transmitters must operate on 854.6375 MHz. Fixed station receivers must operate on 809.6375 MHz for mobile relay purposes.

All mutual aid repeaters must default to the repeat disable mode upon power up. Should an agency use the mutual aid repeater for an operation, the repeater must be disabled after the operation. The agency must also call the repeater's Network Control Center (NCC) and advise them that the repeater is in the disabled mode. In addition, mutual aid repeaters must be programmed to automatically reset to non-repeat if not used for three hours after last push to talk (PTT), and must be

standardized to a two-second hang time after the mobile or portable radio input signal is removed.

Vehicular mobile units and hand-held portable units are to be configured for repeater operation on one channel (809.6375 MHz transmit, 854.6375 MHz receive) and for direct talk-around operation on a second channel (854.6375 MHz transmit and receive). These channels may be in addition to any other trunked or conventional 800 MHz channels available in the same unit.

For each fixed station established, one supervisory control point must be designated by the department. A control point may be designated as supervisory for multiple fixed stations. Each supervisory control point, in addition to having the control functions of associated non-supervisory control points, must have an override function, enabling supervisory control of the repeat enable/disable function of supervised fixed stations.

Supervisory control points must be staffed 24 hours per day, year-round, and must have means for immediate contact with law enforcement, fire, and emergency medical services agencies in the coverage area of the station controlled.

Radio frequency control stations transmitting on 809.6375 MHz must not be authorized for supervisory control points. Radio frequency control stations for non-supervisory control points will be granted upon an exhibition of need.

Any supervisory or non-supervisory control points may alternatively operate via either local or remote (leased) wireline links, or on radio frequencies that may be authorized for such use.

(2) **Communications Coverage Plan**

The intent of the coverage plan is to establish, on a zone-by-zone basis, statewide coverage for vehicular-mobile units and urban-metropolitan area coverage for hand-held portable units.

Communications reliability for system design purposes is defined as having been engineered for a 95 percent probability of communications at the defined coverage contour (or 98.3% probability of communications over the defined coverage area). This is based on a received signal level of either 20 dB quieting or 17 dB SINAD (TIA/EIA), or digital 5 percent BER for the worst case of either talk-out (base to mobile) or talk-back (mobile to base).

A radio zone for vehicular mobile units is defined to be one county unless otherwise approved by the department. A radio zone for hand-held portable units is defined to be a specific urban metropolitan area, as agreed to by the department.

Any application submitted to the department for authorization of a fixed (mobile-relay) station must include detailed plans for the establishment of either a countywide vehicular mobile system or an urban-metropolitan area hand-held portable system, or both. Such applications must also define the radio frequency control station communications paths to be established with agencies in adjacent counties and/or metropolitan areas.

**(3) Minimum Performance Standards**

As mentioned in section 6.1 of the plan, the minimum performance standards defined for new equipment in the following sections are the standards by which the department approval will be determined for individual equipment for use within the communications systems.

Equipment not explicitly included in the following sections will be approved on a case-by-case basis by the department.

**C. OPERATIONAL STANDARDS**

**(1) Control Requirements**

During times of emergency, communications protocol and procedures for use of the channel must be coordinated with the Florida Division of Emergency Management (FDEM).

Any eligible entity may apply for and be granted authorization to operate a parallel control point for purposes of remotely controlling any existing fixed station regardless of ownership or licensee responsible for the equipment comprising a station on the MA-FLA channel. This applies where a showing of need has been demonstrated to the department. No owner or licensee of a fixed station has claim to exclusive rights to the control of a fixed station on the MA-FLA channel.

The supervisory control point must normally maintain the associated fixed (mobile-relay) station in repeat-disabled mode. The supervisory control point will affect the repeat-enable mode only upon the specific request of a mobile (vehicular or hand-held) or radio frequency control station user. Upon completion of mobile-relay communications, the fixed station must be switched to the repeat-disabled mode.

Should a local MA-FLA radio repeater site be established within the coverage of the proposed wide-area MA-FLA system, the local agency must acknowledge the wide-area MA-FLA coverage and that the local system enhances the wide-area MA-FLA channel.

(2) **Usage Requirements**

Usage of the MA-FLA channel is limited to situations in which radio communications between otherwise separate entities is essential for safeguarding life, health, or property within Florida. Regardless of the ownership or licensee responsibility of the equipment comprising a station on this channel, use of this channel will be available on a non-exclusive basis to any eligible entity. No owner or licensee has claim to exclusive use of a fixed station on this channel. It is the department's policy to continue to use and specify the standards and criteria listed above for the design and implementations of public safety mutual aid channels.

**2.0 MINIMIZING RISK OF OBSOLESCENCE FOR RADIO EQUIPMENT**

The department will consider purchases of new radio equipment and may recommend equipment with additional capacity and/or features beyond what is immediately necessary to minimize the economic risk of obsolescence for the purchased equipment, in the event additional capacity and/or features are later required. At a minimum, the department will consider the following recommendations for the purchase of new equipment.

**A. Mobile and Portable Radios**

One additional blank channel in each radio is recommended for every 10 channels programmed.

**B. Frequency/Tone Synthesis**

Electronic generation of RF frequencies and CTCSS tones (synthesized) are recommended to be able to change RF frequencies and/or CTCSS tones simply and inexpensively.

**C. Control Consoles**

One additional blank channel port and control-module space is recommended for every three equipped channels.

**D. Paging Encoders**

Universal format paging encoders are to include a digital numeric format with reserve capacity for system expansion.

**E. Antenna Towers**

All antenna towers, either new or existing, are to be certified by a Professional Engineer licensed by the state of Florida to conform to the current EIA/TIA wind speed survivability requirements. Certification letters should be submitted with the radio system

approval request. All towers must be inspected annually for corrosion and feedline/waveguide damage. If required by the Federal Aviation Administration (FAA)/FCC, tower lighting operation must also be part of the tower certification.

**(1) Distributed Loads**

The minimum recommended design load capacity is one square foot of flat-plate equivalent area per 10 feet of tower height. This loading is to be distributed in five square-foot (nominal) increments centered at 25-foot intervals, beginning at the tower top. This loading represents normal land-mobile antenna loads. Two additional five square-foot equivalent loads, in addition to the planned loading, should be considered for growth capacity. This spare capacity should be designed at a minimum of 66 percent and 75 percent of the tower height. For each of these antenna loads, there will be an associated transmission line with required mounting hardware from the tower base to the antenna load point. The transmission line will be 1- 5/8" diameter, Andrew type LDF7-50A, or 7/8" diameter, Andrew type LDF5-50A, or equivalent.

**(2) Concentrated Loads**

In addition to the distributed loads, growth capacity for two eight-foot diameter solid microwave antennas is recommended for towers exceeding 150 feet in height. These loads should be positioned within the top 30 percent of the tower. For these antenna loads, there will be an associated transmission line with required mounting hardware from the tower base to the antenna load point. The transmission line will be elliptical wave-guide equivalent to Andrew type EW63 series, or Andrew type LDF7-50A 1-5/8" diameter coaxial cable.

**(3) Roof-Top Installation**

All roof-top installations are to be certified by a Professional Engineer licensed by the state of Florida to conform to the current EIA\TIA wind speed survivability of the buildings location. Certification letters should be submitted with the radio system approval request. All installations are to conform to FCC exposure rules found on the FCC's webpage:

<http://www.fcc.gov/encyclopedia/radio-frequency-safety>

**(4) Equipment Shelters**

Equipment shelters should have sufficient spare space, air conditioning, power service, uninterruptible power supply and communications cable conduits for two additional Electrical Industries Association standard ([EIA 310-E](#)) equipment racks requiring 5 kW total power and 17,000 British Thermal Units (BTU) per hour of cooling (2.5 kW and 8,500 BTU/hour, per rack). Emergency power generators should be sized for a minimum of 10 percent excess continuous kilovolt-ampere

(kVA) capacity over planned loads, including start-up capacity for rotating equipment.

**(5) Buried Transmission Lines and Control Cables**

Metallic or polyvinyl chloride raceway should be used for mechanical protection. It is recommended that at least one spare raceway be provided with capacity for two lines/cables of equal size to those initially installed. A nylon pull cord should be left in place for future use.

**F. Microwave and Other Carrier Facilities**

Where possible, the department recommends sharing the use of carrier facilities with other agencies, including the procurement by an agency of additional capacity for the present and future needs of other agencies.

**(1) Digital versus Analog Microwave**

Digital microwave will be chosen for design, unless otherwise justified.

**(i) Cable Right-of-Way**

Normally, not relinquishing present or potential government owned or leased right-of-way is recommended. Where there is cable right-of-way that can support a planned carrier facility, the cost effectiveness of fiber optics versus other cable systems will be considered. When cost estimates are comparable, fiber-optic cable will be chosen for design. When proven to be in the best interest of the agency, right-of-way may be shared in return for the use of transmission facilities.

**(ii) System Signal Level Design Margins**

Microwave systems will be designed for a minimum bit error rate of  $10^{-6}$  and/or a two-way path availability of at least 99.999 percent per year. Fiber optics and RF-carrier cable systems must have a minimum of 1 dB/mile design margin to allow for future splices and taps. Fiber optics and RF-carrier cable systems must have an additional 5 dB design margin for system aging.

**G. Communications Control Centers**

Communications control centers (dispatch rooms) will be sized from actual floor plan drawings, showing all required consoles with chair space and all other required furniture and equipment. In the event this information is not available, there should be an

allowance for a range of 100 to 120 square feet for each position. Allocation includes room for chair movement and access to the console electronics.

The department recommends that new radio communications equipment or facilities be purchased with additional capacity and/or features to minimize obsolescence. With the universal utilization of computers, monitors, along with modular furniture, are recommended for their potential to save space and add to the overall efficiency of the dispatch environment.

**H. Communications Equipment Life Cycle**

Communications equipment should be in an environmentally-controlled facility unless the equipment is rated for outside operations. This supports the radio equipment replacement policy in the next section.

**3.0 RADIO EQUIPMENT REPLACEMENT POLICY**

The department has established guidelines for the replacement of communications equipment. Specific situations that warrant equipment replacement (with proper maintenance) are listed below:

- A. Equipment and corresponding ages are listed below. Note that the equipment does not have to have been in continuous use for it to reach its replacement age.

Type of Equipment	Age (Years)
Mobile Radios	8
Portable Radios	6
Base and Control Station Radios	10
Transmitter Combiners	10
Antennas and Transmission Lines	
Within 10 miles of bodies of saltwater	10
Other locations	12
Antenna Towers	
Within 10 miles of bodies of saltwater	15
Other locations	20
Antenna Tower Lighting Systems	10
Control Consoles	10
Logging Recorders	10

Type of Equipment	Age (Years)
Instant Recall Recorders	6
Prefabricated Equipment Shelters	15
Standby Emergency Power Generators	
Within 10 miles of bodies of saltwater	8
Other locations	12
Microwave Equipment	15

- B.** Based on an investigation by the department or a written statement of need from an agency, the department may recommend an earlier than normal replacement schedule in situations where equipment is damaged, abnormally worn, or technically obsolete.
- C.** The department recognizes that adequate preventative maintenance programs will extend the usable life of equipment beyond the time schedules above and therefore encourages agencies to develop and implement such programs. In such cases, longer replacement schedules will be considered.
- D.** For large systems, phased replacement schedules may be necessary for economic reasons. The department will consider earlier replacement schedules for a portion of the system equipment such that the last equipment to be replaced will not be older than three years beyond the normal replacement schedule.

#### **4.0 RADIO FREQUENCY BUY-OUT POLICY**

When an agency needs to implement a new radio system or to expand an existing one, in certain situations, the shortage of available radio channels may preclude a straightforward implementation or expansion. In those situations, the most economical alternative may be the relocation of an existing radio user from one channel to another to free up a channel for the agency planning to implement or expand. When feasible, the department will support such an arrangement and may recommend that the agency purchase new radio equipment for the user being relocated, in exchange for the user's current radio channels and radio equipment.

#### **5.0 CAPITOL BUILDING ROOFTOP ANTENNA POLICY**

To maintain the aesthetic beauty of the State Capitol Building and the Div/Tel Bureau of Public Safety's responsibility to minimize radio interference between users, the number of antennas on the Capitol rooftop is limited to those currently authorized and in place. Additional antennas

permitted on the State Capitol Building will be assigned for state agency use only. The DMS Division of Real Estate and Management and DivTel Bureau of Public Safety must approve configuration changes to radio hardware associated with rooftop antennas.

## **6.0 ROOFTOP ANTENNA POLICY ON NEW AND EXISTING STATE-OWNED FACILITIES**

To minimize radio interference between users, the number of antennas on state-owned building rooftops is normally limited to three. These antennas are normally attached to the antenna mounting supports provided as part of the building. Antennas required on state-owned buildings are normally assigned for state agency use only and must be approved by the DMS Division of Real Estate and Management and DivTel Bureau of Public Safety.

**END OF APPENDIX B**

## APPENDIX C – EXAMPLE OF A WRITTEN SHARING AGREEMENT

\_\_\_\_\_ (grantor) authorizes \_\_\_\_\_  
(grantee) to operate \_\_\_\_\_ (quantity) mobile (or portable) radios. Such operation  
must be per the following parameters.

<u>Call Sign</u>	<u>Frequency(ies)</u>	<u>Max. Power</u>	<u>Other Technical Parameters</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

(Use additional attachments as necessary for more frequencies/channels)

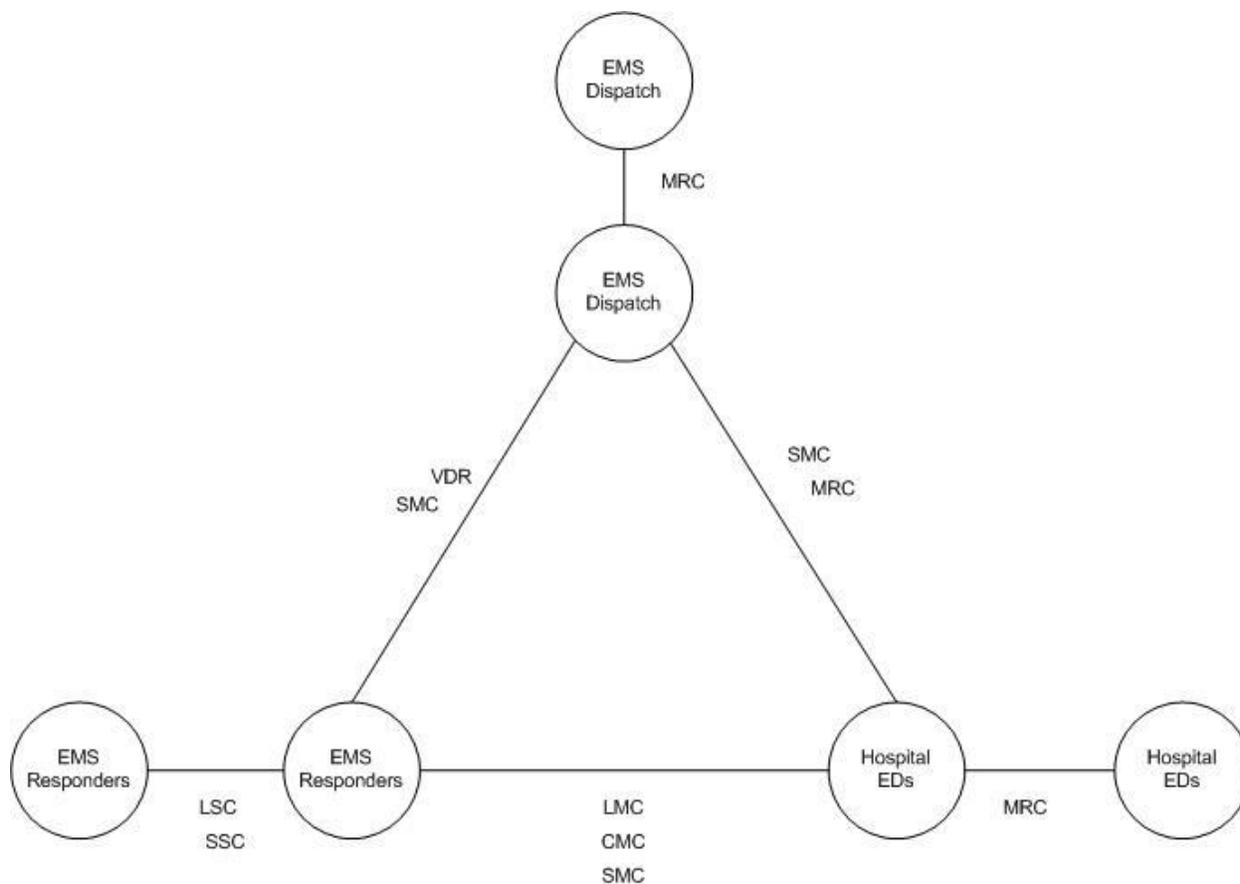
This written agreement applies to operations in cooperation and coordination with activities of the licensee per FCC Rule section 90.421. Furthermore, grantor reserves the right to effectively eliminate the possibility of unauthorized operation that ultimately could result in terminating this written agreement.

\_\_\_\_\_ (authorized signor)  
\_\_\_\_\_ (typed signor's name)  
\_\_\_\_\_ (authorizing agency)  
\_\_\_\_\_ (date)

**END OF APPENDIX C**

## APPENDIX D – EMS Triangle of Communications

The following diagram shows the various communications paths addressed in this plan for EMS radio communications between EMS dispatch, EMS responders, and hospital emergency departments (EDs) and establishes EMS triangle of communications referenced in section 5.1 of this plan.



VDR – Vehicle Dispatch and Response  
 LMC – Local Medical Coordination  
 CMC – County Medical Coordination  
 SMC – Statewide Medical Coordination  
 LSC – Local Scene Coordination  
 SSC – Statewide Scene Coordination  
 MRC – Medical Resource Coordination

**END OF APPENDIX D**

## APPENDIX E – SUBSCRIBER UNIT CHANNEL PLAN

MED Channel	CTCSS (Hz)	Channel Name (Description)	Use
MED-1			
MED-2			
MED-3			
MED-4			
MED-5			
MED-6			
MED-7			
MED-8 (w/selective addressing)	167.9	MED8-SMC	All EMS Agencies (Statewide Medical Coordination)
MED-9		MED9-VDR	_____ (Vehicle Dispatch and Response)
MED-10		MED10-VDR	_____ (Vehicle Dispatch and Response)
MED-12			
MED-22			
MED-32			
MED-42			
MED-52			
MED-62			
MED-72			
MED-82		MED82-____-____	_____ County Health Dept. (Local Health & Medical)
MED92		MED92-VDR	_____ (Vehicle Dispatch and Response)
MED102		MED102-VDR	_____ (Vehicle Dispatch and Response)
MED-1 talk-around (Direct)	167.9	MED1-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-2 talk-around (Direct)	167.9	MED2-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-3 talk-around (Direct)	167.9	MED3-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-4 talk-around (Direct)	167.9	MED4-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-5 talk-around (Direct)	167.9	MED5-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-6 talk-around (Direct)	167.9	MED6-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-7 talk-around (Direct)	167.9	MED7-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-8 talk-around (Direct)	167.9	MED8-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-9 talk-around (Direct)		MED9-VDR-D	Talk-around (Vehicle Dispatch and Response)
MED-10 talk-around (Direct)		MED10-VDR-D	Talk-around (Vehicle Dispatch and Response)
MED-12 talk-around (Direct)	167.9	MED12-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-22 talk-around (Direct)	167.9	MED22-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-32 talk-around (Direct)	167.9	MED32-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-42 talk-around (Direct)	167.9	MED42-SSC	All EMS Agencies (Statewide Scene Coordination)

<b>MED Channel</b>	<b>CTCSS (Hz)</b>	<b>Channel Name (Description)</b>	<b>Use</b>
MED-52 talk-around (Direct)	167.9	MED52-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-62 talk-around (Direct)	167.9	MED62-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-72 talk-around (Direct)	167.9	MED72-SSC	All EMS Agencies (Statewide Scene Coordination)
MED-82 talk-around (Direct)	167.9	MED82-SSC)	All EMS Agencies (Statewide Scene Coordination)
MED-92 talk-around (Direct)		MED92-VDR-D	Talk-around (Vehicle Dispatch and Response)
MED-102 talk-around (Direct)		MED102-VDR-D	Talk-around (Vehicle Dispatch and Response)

Refer to Table 5-1 – Specific MED Channel Assignments for Florida Acute Care Facilities in the EMS Communications Plan, Volume 1 and to Volume 2 of the same plan for other specific MED channel assignments.

**END OF APPENDIX E**

## **APPENDIX F – ACRONYMS FOR EMERGENCY MEDICAL SERVICES COMMUNICATIONS**

The following list of acronyms provides a sample of those used in communications technology and engineering. For the purpose of this plan, any acronyms that may coincide with medical or other meanings shall be understood to represent the communications aspect herein. For example, Rx and Tx represent prescription and treatment, respectively, in terms of medical meanings, but RX and TX represent receive and transmit, respectively, in terms of communications references.

### **- A -**

AAT – above average terrain  
AC – alternating current  
AGL – above ground level  
AL – Alabama  
ALI – automatic location identification  
ALS – advanced life support  
AMSL – above mean sea level  
APCO – Associated Public-Safety Communications Officials-International, Inc.  
ASTM – ASTM, formerly the American Society of Testing and Materials  
AVL – automatic vehicle location

### **- B -**

BER – bit error rate  
BLS – basic life support  
BPS – bits per second

### **- C -**

CAD – computer-aided dispatch  
CFG – communications focus group  
CTCSS – continuous tone-coded squelch system

### **- D -**

dB – decibel  
dBm – decibel referenced to one milliwatt  
dBv – decibel referenced to one volt  
dBw – decibel referenced to one watt  
DC – direct current  
DOH – Department of Health  
DS – domestic security  
DTMF – dual-tone multi-frequency (touch tone)

### **- E -**

EAN – extended area network  
EDICS – emergency deployable interoperable communications system  
EIA – electronics industries association

EMS – emergency medical services  
EMSCP – emergency medical services communications plan  
EMT – emergency medical technician  
EOC – emergency operations center  
ERP – effective radiated power  
ESF8 – emergency support function 8  
ETA – estimated time of arrival

**- F -**

FAA – Federal Aviation Administration  
FAR – Federal Aviation Regulation  
FCC – U.S. Federal Communications Commission  
FDEM – Florida Division of Emergency Management  
FDLE – Florida Department of Law Enforcement  
FEMA – Federal Emergency Management Agency  
FFC – Florida Forest Service  
FFCA – Florida Fire Chiefs Association  
FL – Florida  
FM – frequency modulation

**- G -**

GA – Georgia  
GHz – gigahertz (1000 MHz)  
GPS – global positioning satellite, global positioning system

**- H -**

HAAT – height above average terrain  
HEAR – hospital emergency administrative radio (Motorola trademark)  
HSMV – Highway Safety and Motor Vehicles  
Hz – hertz (cycles per second)

**- I -**

IAFC – International Association of Fire Chiefs  
IACP – International Association of Chiefs of Police  
IAN – incident area network  
IEEE – Institute of Electrical and Electronics Engineers  
IMSA – International Municipal Signal Association  
IO - Interoperability

**- J -**

JAN – jurisdictional area network

**- K -**

kbps – kilobits per second  
kHz – kilohertz

- L -

LECP – Law Enforcement Communication Plan  
LMR – land mobile radio  
LOS – line of sight or loss of signal

- M -

MARC – mutual aid radio cache  
MSL – mean sea level  
MHz – megahertz

- N -

NECP – National Emergency Communications Plan  
NTIA – National Telecommunications & Information Administration

- O -

- P -

PAN – personal area network  
PSAP – public safety answering point  
PTT – press to transmit, or push to talk

- Q -

- R -

R9 – Region 9  
RCU – remote control unit  
RDSTF – Regional Domestic Security Task Force  
RECC – Regional Emergency Communications Committee  
RF – radio frequency  
RX – receive

- S -

SCIP – Statewide Communications Interoperability Plan  
SFM – State Fire Marshall  
SLERS – statewide law enforcement radio system  
SOP – standard operating procedure  
SU – state use

- T -

TIA – Telecommunication Industry Association  
TICP – Tactical Interoperable Communications Plan  
TX – transmit

- U -

UASI – urban area security initiative  
UHF – ultra high frequency (300-3000 MHz)  
UPS – uninterruptable power supply

- V -

V – volts  
VAC – volts, alternating current  
VDC – volts, direct current  
VHF – very high frequency (30 - 300 MHz)  
VSWR – voltage standing wave ratio

- W -

- X -

- Y -

- Z -

**END OF APPENDIX F**

## APPENDIX G – GLOSSARY OF COMMUNICATIONS TERMS

This glossary provide definitions commonly used in communications technology and engineering. They have been abridged specifically for EMS communications aspects of this plan.

- A -

**Alphabet, phonetic:** A method of passing alphabetic information over a poor communication path with word substitution for letters. A widely accepted phonetic alphabet is: Alfa; Bravo; Charlie; Delta; Echo; Foxtrot; Golf; Hotel; India; Juliett; Kilo; Lima; Mike; November; Oscar; Papa; Quebec; Romeo; Sierra; Tango; Uniform; Victor; Whiskey; X-ray; Yankee; Zulu.

**Analog:** Physical representation of information such that the representation bears an exact relationship to the original information. Pertaining to data in the form of continuously variable physical qualities.

**Analog Communication:** System of telecommunications used to transmit information other than voice that is sometimes used in telemetry.

**Antenna:** A system of wires or electrical conductors employed for reception or transmission of radio waves. Specifically, a radiator that couples the transmission line or lead-in to space for transmission or reception of electromagnetic radio waves. It changes electrical currents into electromagnetic radio waves and vice versa.

**Antenna Gain:** The effectiveness of a directional antenna expressed as the ratio of the power of a directional antenna to the power of the isotropic antenna to produce the same field strength in the same direction.

**Antenna, isotropic:** A hypothetical, lossless antenna having equal radiation intensity in all directions. (ANSI/IEEE Std. 100-1988)

**Attenuation:** The decrease in amplitude of a signal during its transmission from one point to another. It may be expressed as a ratio or, by extension of the term, in decibels.

**Attenuator:** A device for reducing the energy of a wave without introducing distortion. Also called a pad, gain control, level adjustor, volume control, etc.

**Audible signal:** A buzzer, bell, or other audible sound device that indicates an incoming call.

**Audio:** Pertaining to frequencies corresponding to normally audible sound waves. These frequencies range from 15 to 20,000 hertz.

**Automatic number identification (ANI):** Equipment for recording the calling party's number without operator intervention.

- B -

**Back bone:** A point-to-point wireless communications system utilizing several fixed stations.

**Back-to-back repeater:** A repeater consisting of a receiver and transmitter with the output of the receiver connected directly to the input of the transmitter.

**Band (radio frequency):** A range of frequencies between two definite limits. By international agreement, the radio spectrum is divided into nine bands. For example, the very high frequency (VHF) band extends from 30 MHz to 300 MHz.

**Bandwidth:** (1) The width of a band of frequencies used for a particular purpose. (2) The range of frequencies within which a performance characteristic of a device is above specified limits. For filters, attenuators and amplifiers these limits are generally taken to be 3 dB, half-power, below the average level.

**Base station:** A station (FCC station class FB, FB2, FBT or FB2T) at a specified site authorized to communicate with mobile stations. (based on 47 CFR 90.7).

**base-to-mobile communications:** Two-way radio communications between a fixed radio stations (base) and a mobile station. Typically, base-to-mobile communications is referred to as talk-out. Talk-in represents mobile-to-base.

**Baud:** A term used to define the operating speed of a printing telegraph or data system. It is the total number of discrete conditions or signal events per second.

**Beam:** A configuration of radiated energy whose rays are sharply directional and parallel.

**Biomedical telemetry (biotelemetry):** The technique of monitoring or measuring vital biological parameters and transmitting data to a receiving point at a remote location.

**Bit:** A unit of digital information (abbreviation of "Binary digit").

**BER:** Bit error rate is the percentage of error bits relative to the total number of bits received in a transmission. Bit error rates that are too high may indicate that a slower data rate may actually speed overall transmission time.

**Busy indicator:** An indicator provided at a control point to indicate the in use condition of a circuit or channel.

- C -

**Cable:** One or more insulated or non-insulated wires used to conduct electrical current or impulses. Grouped insulated wires are called a multi-conductor cable.

**Calibrate:** (1) to adjust a measuring device so that it reads correctly. (2) To determine error by comparison with a known standard.

**Call, all:** The alerting of all decoder equipped units in a system by the transmission of a single coded signal.

**Call, group:** The alerting of subdivided selective call groups by function, type of vehicle, location, etc. by sending a single coded signal.

**Call, individual:** The alerting of a specific coded decoder unit by sending a single coded signal.

**Call sign:** Federal Communications Commission assigned identifying letters and numbers used for identification of a radio station, transmitter, or transmission.

**Capture effect:** An effect occurring in FM reception when the stronger of two stations on the same frequency suppresses the weaker station.

**Carrier frequency:** The frequency of an unmodulated electromagnetic wave produced by the transmitter.

**Cellular radio:** A commercially available mobile or portable radio telephone service.

**Channel, point-to-point:** A radio channel used for radio communications between two definite fixed stations.

**Channel, radio:** An assigned band of radio frequencies of sufficient width to permit its use for radio communication. The necessary width of a channel depends on the type of transmission and the tolerance for the frequency of emission.

**Channelization:** The assignment of circuits to channels and the arrangement of those channels into groups.

**Code dialing:** A method of signaling or encoding and decoding address codes by the use of standard telephone dial.

**Command and control center (dispatch center):** A system which is responsible for establishing communications channels and identifying the necessary equipment and facilities to permit immediate management and control of an EMS patient. This operation must provide access and availability to public safety resources essential to the effective and efficient EMS management of the immediate EMS problem.

**Communications:** The transmission of information from one point to another by means of electromagnetic waves (ANSI/IEEE Std. 100-1988). Also, see Telecommunications.

**Communications subsystems:** Comprises those resources and arrangements for notifying the EMS system of an emergency, for mobilizing and dispatching resources, for exchanging

information, for remote monitoring of vital indicators and for the radio transmission of treatment procedures and directions.

**Communications system:** A collection of individual communication networks, transmission system, relay stations, control and base stations, capable of interconnection and inter-operations that are designed for form an integral whole. The individual components must serve a common purpose, be technically compatible, employ common procedures, respond to control and operate in unison.

**Console:** A cabinet housing electronic circuitry normally used in controlling other equipment such as transmitters and receivers installed at a remote location.

**Continuous duty:** (1) An unending transmission. (2) Operating 100 percent of the time. (3) EIA - full load output under the manufacturer's normal loading conditions for this class of service for twenty-four hours.

**Continuous tone-coded squelch system (CTCSS):** A system wherein radio receiver(s) are equipped with a tone-responsive device which allows audio signals to appear at the receiver audio output only when a carrier modulated with a specific tone is received. The tone must be continuously present for continuous audio output. CTCSS functions are sometimes referred to by various trade names such as private line or PL (Motorola Communications & Electronics), channel guard or CG (General Electric Mobile Radio Department), or Quiet Channel (RCA).

**Control console:** A desk-mounted, enclosed piece of equipment which contains a number of controls or circuits used to operate a radio station.

**Control head:** A device with appropriate controls, microphone, volume, squelch, on/off, etc., generally mounted in a vehicle, from which control of the radio or mobile unit is performed.

**Control, local:** A control system packaged with the control unit (hard wired) wired directly to the base station.

**Control point:** A position from which a radio system is controlled and supervised.

**Control, remote:** A control scheme for a radio system where all control functions are performed remotely via telephone lines or other transmission media.

**Control Station:** An operational fixed station (FCC station class FX1 or FX1T), the transmissions of which are used to control automatically the emissions or operation of another radio station at a specified location. (based on 47 CFR 90.7)

**Coordination, frequency:** The cooperative selection and allocation of radio frequencies such that all systems can operate with minimum interference.

**Coverage area:** In a radio communications system, the geographic area where reliable communications exist; usually expressed in terms of square miles surrounding a fixed radio station.

**Coverage contour:** In a radio communications system, the boundary at which reliable communications exist; usually expressed in terms of miles extending readily from a fixed radio station.

**Coverage tests, radio:** Tests performed on the system to verify radio communications within the required or predicted service area for the reliability specified by the purchaser. The tests are based upon measurements taken within a number of grids representing the service areas with at least one measurement per grid and at additional locations specified within each grid (such as, in building portable coverage, as applicable).

**Cut over:** To transfer from one system to another.

**Cycle:** One complete reversal of an alternating current, including a rise to the maximum level in one direction and a return to zero. The number of cycles occurring in one second is the frequency of the current. The word cycle is commonly used to mean cycles per second (now call hertz).

- D -

**Decibel (dB):** A unit that expresses the level of power value relative to a reference power value. Specifically, the level of power value  $P$  relative to a reference value  $P_R$  in decibels is defined as  $10 \log (P/P_R)$ .

**Decoding:** The conversion and recognition by the addressed (receiving) unit of numerical address codes that have been transmitted through a communications system.

**Dedicated telephone line:** A telephone wire pair, originating at one point and terminating at another point, operating in a closed circuit. Also called Private Line or RT circuit.

**Digital:** Data represented in discrete, discontinuous form, as contrasted with analog data represented in continuous form.

**Digital dial code:** A signaling technique generally used in EMS VHF radio systems to bypass a receiver CTCSS system.

**Direct:** In terms of communications circuits, means a dedicated, instant method of communications. A dial telephone is not direct, a radio or ring down line are direct.

**Direct leased land lines:** Dedicated or designated point-to-point wire circuits (telephone) used in transmitting voice or data communications. See: dedicated telephone line.

**Directional antenna:** An antenna which radiates radio waves more effectively in some directions than in others.

**Directivity:** The value of the directive gain of an antenna in the direction of its maximum value.

**Dispatch:** The process of receiving a request for emergency medical assistance and the act of sending an EMS vehicle or air ambulance in response to each such request.

**Dispatch center:** A location where coordination of resources is facilitated through radio communications.

**Dispatch point:** A position from which a radio system is used, but not a supervision or control point. Dispatch points are not usually listed on a station radio license.

**Distortion:** Unfaithful reproduction of audio or video signals as a result of change occurring in the wave form of the original signal, somewhere in the course of its transmission or reception. The lower the percentage of distortion, the more distortion free the system is and the more intelligible the message.

**Diversity:** A method of radio transmission and/or reception which counteracts the effects of fading by combining several signals all bearing the same information.

**Doctor-interrupt:** The ability of a physician or hospital-based communicator to interrupt the voice or telemetry transmission from a radio in the field.

**Dual-tone, multi-frequency (DTMF):** The simultaneous generation of two audio tones generally compatible to AT&T's standard "Touch-Tone" Frequencies. Used for control or signaling purposes. A method of sending numerical information from an encoder by sending specific pairs of audio tones for each digit.

**Duplex:** Pertaining to a simultaneous two-way independent transmission in both directions.

**Duplexed/multiplexed telemetry unit:** A radio device capable of simultaneous transmission and reception and concurrent transmission of both voice and electrocardiogram (ECC or EKG) information.

**Duplexer:** A device that is used in radio equipment to provide simultaneous transmit and receive capabilities on a single antenna.

**Duplex operation:** (a) the operation of transmitting and receiving apparatus at one location in conjunction with associated transmitting and receiving equipment at another location; the process of transmission and reception being concurrent. (b) the operation utilizing two radio-frequency channels, one for each direction of transmission, in such a manner that intelligence may be transmitted concurrently in both directions. For comparison see Simplex operation.

- E -

**EACOM:** Emergency and Administrative Communications for hospitals established by General Electric Mobile Radio. A VHF radio system operating on standard frequencies with a selective calling system between stations. The system is similar to Motorola Communications HEAR radio system.

**Effective radiated power (ERP):** The calculated power output from an antenna system which incorporates all the gains and losses in the antenna system. Effective radiated power is calculated as follows: (1) convert power output of transmitter to dB referenced to one watt (dBw); (2) subtract all transmission line losses including losses in equipment between the transmitter and antenna (filter, diplexers, circulators, duplexers, etc.) expressed in dB; (3) add the antenna's power gain (expressed in dB reference to half-wave dipole; and (4) convert the results into watts.

**Emergency call:** A call that requires immediate action.

**Emergency operations center (EOC):** (1) a secure, protected facility designed and equipped for the use of community officials to manage response of a community in time of emergency. (2) A dispatch designed and operated by a community or within a geographic area for a combination of emergency resources, such as police, fire and EMS.

**EMS region:** The geographic area (such as, countywide area) served by a given EMS system.

**Encoding:** The conversion of numerical address codes, such as telephone number or message codes, into a format of tone or on-off pulses of audio tones for transmission over a communications system, usually for individual or group addressing, such as for paging or selective calling.

- F -

**Facility, communications:** A communications facility is anything used or available for use in the furnishing of communications service.

**Fade margin:** The number of decibels of attenuation which can be added to a specified radio frequency propagation path before the signal-to-noise ratio of the channel falls below a specified minimum.

**Fading:** The variation of radio field strength caused by a gradual change in the transmission medium.

**FCC Part 90, 47 CFR:** The part of Federal Communications Commission (FCC), Title 47 of the Code of Federal Regulations (47 CFR) that affects most EMS communications.

**Federal Communications Commission (FCC):** A board of five commissioners appointed by the President under the Communications Act of 1934 to formulate rules and regulations and to

authorize use of radio communications. The FCC regulates communications in the U.S. by radio or wireline, including television, telephone, radio facsimile and cable systems.

**Field strength:** The strength of an electric, magnetic or electromagnetic field. Electromagnetic (radio) field strength is expressed in microvolts per meter or millivolts per meter.

**First responder, EMS-recognized:** Any individual or organized group that has a valid memorandum of understanding between themselves and an EMS licensee within the same jurisdictional area.

**Fixed relay station:** An operational fixed station established for the automatic retransmission of radio communications received from either one or more fixed stations or from a combination of fixed and mobile stations and directed to a specified location.

**Fixed service:** A service or radio communication between specified fixed points. Fixed station - (1) a radio which is not mobile; (2) a station which is permanently installed; (3) a base station in a mobile radio system.

**FM transmitter:** A radio transmitter that emits or radiates a frequency modulated wave.

**Folded dipole:** A receiving or transmitting antenna composed of two parallel dipoles, connected at the ends. The connection to the receiver or transmitter is made at the center of one of the poles.

**Frequency:** The number of cycles, repetitions, or oscillations of a periodic process completed during a unit of time. The frequency of waves in the electromagnetic spectrum (radio waves) is designated in hertz (Hz), kilohertz (kHz or 1000 Hz). One hertz is equivalent to one cycle per second.

**Frequency band:** A continuous range of frequencies extending between two limiting frequencies. Such as: 25-50 MHz (VHF-low band), 150-174 MHz (VHF-high band), 450-512 and 890-960 MHz (UHF band).

**Frequency deviation:** Frequency deviation of an FM signal is the change in the carrier frequency produced by the modulating signal. The frequency deviation is proportional to the instantaneous amplitude of the modulating signal.

**Frequency modulation (FM):** A method of modulating a carrier-frequency signal by causing the frequency to vary above and below the unmodulated value in accordance with the intelligence signal to be transmitted. The amount of deviation in frequency above and below the resting frequency is at each instant proportional to the amplitude of the intelligence signal being transmitted. The number of complete deviations per second above and below the resting frequency corresponds at each instant to the frequency of the intelligence signal being transmitted.

**Frequency response:** The transmission loss or gain of a system, measured over the useful bandwidths, compared to the loss or gain at some reference frequency (generally 1000 Hz).

**Frequency separation:** The frequency displacement between a receive frequency and transmit frequency to insure that the signal-to-interference ratio does not fall below a specified value in order to function satisfactorily.

**Full-duplex operation:** A method of operation of a radio system which provides simultaneous two-way communications between two points. In EMS radio systems, provides for mutual interrupt capabilities between the field technician and the physician or medical direction at a hospital location.

- G -

**Gain, of an antenna:** The effectiveness of a directional antenna in a particular direction, compared against a standard (usually an isotropic antenna). The ratio of standard antenna power to the directional antenna power that will produce the same field strength in the desired direction.

**Generator, standby power:** A device that develops electrical voltage from mechanical energy. An AC electrical power source held in reserve and used to supply the necessary AC power when commercial power fails.

**Geographical assignment:** The assignment and use of communications channels on a dedicated use basis within a given geographical area.

**Gigahertz (GHz):** One billion hertz or 1,000 MHz.

**Guard band:** A narrow band of frequencies provided between adjacent channels in certain portions of the radio spectrum to prevent interference between stations.

- H -

**Half-duplex operation:** Operation of a duplex system arranged to permit operation in either direction, but not in both directions simultaneously.

**Half-wave dipole antenna:** A straight, ungrounded antenna having an electrical length equal to half the wave length of the signal being transmitted or received. Mounted vertically, it has a donut-shaped pattern, circular in the horizontal plane.

**Hand microphone:** A microphone designed to be held in the hand. Sometimes called a "palm" microphone.

**Handset:** A device similar to a telephone handset used in place of a hand microphone.

**Harmful interference:** Any emission, radiation, or induction which endangers the functioning of a radio service or seriously degrades, obstructs, or repeatedly interrupts a radio communication service.

**Hospital Emergency Administrative Radio (HEAR):** Motorola Communications and Electronics trade name for a system of VHF radio systems.

**Hertz (Hz):** International unit of frequency, which replaced "cycles-per-second".

**High band, VHF:** A portion of the radio frequency spectrum from 150 to 174 MHz in which two-way radio operates.

**Hum:** Audio frequency interference which is at the frequency of the power supply or its harmonics.

- I -

**Image:** One of the two groups of sidebands generated in the process of modulation, so called because one is the reverse (mirror image) of the other with respect to operating frequency.

**Insertion loss:** The loss introduced when a device or line section is interposed between two elements of a circuit.

**Interface:** A concept involving the specification of the interconnection between two pieces of equipment or systems. The specification includes the type, quantity and function of the interconnection circuits and the type and form of the signals to be interchanged via these circuits.

**Interference:** Interference in a signal transmission path is either extraneous power which tends to interfere with the reception of the desired signals or the distribution of signals which results in loss of signal or distortion of information.

**Intermittent duty cycle:** A duty cycle of 1 minute on, 4 minutes off, or 20 percent per Electronic Industries Association (EIA).

**Intermodulation:** The combination of two signals beating together to form a third unusable signal which interferes with reception of the desired signal. In a radio receiver the method of expressing in dB below the desired signal, the receiver's rejection of the unwanted signal to its acceptance of correct signals.

- J -

- K -

**Kilo:** A prefix meaning 1,000.

**Kilohertz (kHz):** Equal to 1,000 cycles per second. Replaces the term kilocycle.

- L -

**Land line:** A generic term which refers to the public-switched telephone system.

**Land-mobile:** An abbreviation for land to mobile communications such as between base stations and mobile radios, or from mobile radio to mobile radio.

**Land Mobile Radio Service:** A mobile radio service defined by the Federal Communications Commission - FCC Rules part 90.

**Leased wire line:** A pair of wires or a circuit, usually leased or rented from a telephone company, designed for exclusive use between two fixed points for various communication control functions.

**Life cycle:** A test performed on a material device to determine the length of time before failure.

**Life, service:** The life expectancy under normal conditions of use.

**Line:** A transmission line or power line. A system of one or more wires.

**Line of sight:** An unobstructed path between two points. Radio waves at those frequencies where signals travel in a straight line and are not reflected by the ionosphere.

**Link:** The portions of a radio relay system between adjacent radio stations.

**Load:** (1) A device that receives power from a transmission system. (2) The amount of electric power drawn by an electric or electronic device.

**Loss:** A decrease in power suffered by a signal as it is transmitted from one point to another, usually expressed in decibels. Energy dissipated without accomplishing useful work.

**Loss, path:** The reduction or attenuation of signal strength that occurs between the transmitted signal strength and the received signal strength.

**Low band, VHF:** A section of the radio frequency spectrum from 25-50 MHz in which mobile radio equipment is licensed to operate.

- M -

**Medical control:** Directions and advice provided from a centrally designated medical facility staffed by appropriate EMS personnel, operating under medical physician supervision, supplying professional support through radio or telephonic communication for on-site and transit, basic and advanced life support services given by field personnel such as EMTs or Paramedics.

**Medical emergency:** An unforeseen event affecting an individual in such a manner that a need for immediate medical care (physiological or psychological) is created.

**Microwave:** A term applied to radio waves in the frequency range of 1,000 MHz and upward. Microwave radio generally performs the same functions as telephone cables and may be used for radio remote control purposes.

**Mobile:** Term used to describe equipment designed for vehicular installation.

**Mobile command unit:** Temporary dispatch center.

**Mobile relay station:** A fixed station established for the automatic retransmission of mobile service radio communications which originate on the transmitting frequency of the mobile stations and which are retransmitted on the receiving frequency of the mobile stations.

**Mobile repeater station:** A mobile station (FCC station class MO3) in the mobile service authorized to retransmit automatically on a mobile service frequency communications originated by hand-held or portable units or by other mobile or base stations directed to such hand-carried units. (based on 47 CFR 90.7)

**Mobile service:** A service of radio communication between mobile and land stations, or between mobile stations.

**Mobile station:** A station in the mobile service (FCC station class MO) intended to be used while in motion or during halts at unspecified points. This includes hand-carried transmitters (i.e. portable radios). (based on 47 CFR 90.7).

**Mobile-to-base communications:** Two-way radio communications between a mobile station (or control station) and a fixed radio stations (base). Typically, mobile-to-base communications is referred to as talk-in (or talk-back). Talk-out represents base-to-mobile.

**Mobile transmitter:** A radio transmitter designed for installation in a vehicle, vessel, or aircraft and normally operated while in motion.

**Mobile unit:** A two-way radio equipped vehicle or person. Also, sometimes the two-way radio itself, when associated with a vehicle or person.

**Modulate:** To vary the amplitude (AM), frequency (FM), or phase (PM) of a high frequency wave or carrier in step with amplitude variations of another wave (the modulating wave). The carrier is usually a sine wave while the modulating wave is often a complex voice or EKG signal.

**Modulator:** The electronic circuit that combines the modulating wave with the carrier wave. In radio transmitters the audio-frequency stage which mates the audio signal with the carrier signal. In EKG telemetry, the circuit that combines the amplified EKG signal with the subcarrier (audio) signal for transmission by radio or telephone.

**Multicoupler, receiver:** A device which permits several radio receivers to use the same antenna. Usually a broadband amplifier with several output ports.

**Multi-jurisdictional system:** A system covering more than one political boundary or agency.

**Multipath:** The propagation phenomenon which results in signals reaching a radio receiving antenna by two or more paths usually resulting in a degradation of the original signal.

**Multiplex:** Transmitting two or more signals over the same medium. In EKG telemetry equipment, the ability to transmit EKG signals and voice signals concurrently over the same transmitter.

**Multi-tone:** A method of signaling that involves two or more tone signals produced simultaneously or sequentially.

**Mute:** To silence or reduce sound level.

- N -

**Network:** An orderly arrangement of stations interconnected through communications channels in order to form a coordinated entity.

**Nine-one-one (E911):** A three digit emergency telephone number accepted and promulgated nationally and by Florida Statutes as the statewide emergency telephone number.

**Noise:** Interference characterized by undesirable random voltages caused by an internal circuit defect or from some external source. Any extraneous signal tending to interfere with the proper and easy perception of those signals, which are intended to be received.

**Noise blanker:** A device used in mobile radio applications which senses the presence of undesired noise on the desired channel and causes the desired signal to be interrupted for the time period that the undesired noise signal is present. The time period is controlled and measured in milliseconds so that the interruption of the desired signal is not audible.

**Noise level:** Volume of noise usually expressed in decibels.

- O -

**Omnidirectional:** Equally effective in all directions.

**Outage:** A disruption of communications from any cause, whether planned or accidental.

**Overload:** A load greater than a device is designed to handle.

- P -

**Paging:** A one-way communications service from a base station to mobile or fixed receivers that provides selective signaling or information transfer by such means as tone, tone-voice, tactile, optical readout, etc.

**Passive repeater:** A device intentionally interposed in a microwave transmission path to redirect or reflect energy.

**Patch:** A means of connecting one system to another. A patch may be between radio systems, or radio to telephone, as in a radio/phone patch.

**Path, signal:** The route by which intelligence is conveyed from transmitter to receiver or through a circuit.

**Personal radio:** A small portable radio intended to be carried by hand or on the person of the user.

**Phone patch:** An interconnection between radio and telephone communications circuits which permits direct voice interchange between telephone lines and radio system.

**Portable:** An easily transportable radio.

**Propagation, electromagnetic:** The travel of electromagnetic waves through a medium, or the travel of a sudden electric disturbance along a transmission line. Also called wave propagation.

**Public safety agency:** A functional division of a public agency which provides firefighting, police, ambulance, emergency medical or other emergency services.

**Push-to-talk or press-to-talk (PTT):** In radio or telephone systems, that method of communication over a speech circuit in which transmission occurs from only one station at a time, the talker being required to keep a switch operated while he is talking. The keying button used to operate a radiotelephone transmitter.

- Q -

**Quarter-wave antenna:** An antenna electrically equal to one-fourth of the wavelength of the signal to be transmitted or received.

**Quieting:** Reduction of system noise.

- R -

**Rack mounting:** A method of mounting equipment in which metal panels supporting the equipment are attached to pre-drilled steel channel rails or racks. The dimensions of the panels, the spacing of the rails and the size of the mounting screws are standardized.

**Radio:** The transmission and reception of signals by means of electromagnetic waves without a connecting wire.

**Radio-frequency power:** The power associated with any signal consisting of electromagnetic radiation which is used for telecommunications.

**Radio interference:** Undesired disturbance of radio reception. Man-made interference is generated by electric devices, with the resulting interference signals either being radiated through space as electromagnetic waves or traveling over power lines or other conducting media. Radio interference is also due to natural sources such as atmospheric phenomena such as lightning. Radio transmitters themselves may additionally interfere with each other.

**Radio network:** A number of radio stations, fixed and mobile, in a given geographical area which are jointly administered or which communicate with each other by sharing the same radio channel or channels.

**Radio receiver:** An instrument which amplifies radio frequency signals, separates the intelligence signal from the radio frequency carrier, amplifies the intelligence signal additionally and converts the intelligence signal to its original form.

**Radio relay system (radio relay):** A point-to-point radio transmission system in which the signals are received and retransmitted by one or more intermediate radio stations.

**Radio station:** A complete assemblage of equipment for radio transmission or reception, or both.

**Radio transmitter:** A radio-frequency power source which generates radio waves for transmission through space.

**Range:** Distance over which a radio signal can be transmitted for effective reception or the distance at which a usable signal can be received.

**Receiver:** An electronic device used to detect and amplify transmitted radio signals.

**Receiver, paging:** A small, light, pocket sized receiver used for alerting individuals when they are away from their normal communication instruments.

**Regional EMS system:** An emergency medical service area (trade, catchment, market, patient flow, geographic or governmental) that provides essentially all of the definitive emergency medical care for all emergencies and for the most critically ill and injured patients within the area.

**Relay:** Transmission forwarded through an intermediate station.

**Relay station:** Radio stations that rebroadcast a signal the instant they are received, so that the signal can be passed on to another station outside the range of the originating transmitter.

**Reliability:** The ability of an item to perform a required function under stated conditions for a stated period of time.

**Remote base station:** A base station located away from the operating console, to take advantage of improved coverage offered by a better geographical location.

**Remote control:** The operation of a device from a distance either electrically or by radio waves.

**Remote control equipment:** The apparatus used for performing monitoring, controlling, supervisory control, or a combination of these functions at a distance by electrical means.

**Repeater:** A combination of apparatus for receiving either one-way or two-way communication signals and delivering corresponding signals which are either amplified or reshaped or both.

**Repeater station:** An operational fixed station established for the automatic re-transmission of radio communications received from any station in the mobile service.

**Repeater station, re-modulating:** A microwave repeater station in which the signal is demodulated to the original baseband frequencies and re-injected onto the modulator for transmission to the distant station.

- S -

**Selective call:** A system for alerting individual or groups of stations by means of coded signals.

**Selectivity:** The ability to select one particular signal from other signals at nearby frequencies. This specification is important in urban areas where radio spectrum congestion exists. The more negative the dB rating, the better the specification.

**Sensitivity:** The characteristic of a radio receiver which determines the minimum input signal strength required for a given signal output. In FM, sensitivity is the signal level required to produce a given ratio of signal to noise. The more sensitive a receiver is, the weaker the signal it can receive.

**Signal:** The form of a radio wave in relation to the frequency serving to convey intelligence in communication.

**Signal-to-noise ratio:** The ratio of the intensity of the desired signal to that of the undesired noise signal, usually expressed in decibels.

**Signal strength:** A measure of the field intensity caused by a radio transmitter at a particular location within its operating range. Usually expressed as microvolts, or millivolts of signal.

**Simplex:** (1) single frequency operation whereby all base stations and mobiles operate on one common frequency. (2) Operation on two different frequencies in a system that can communicate

in two directions, but not simultaneously, such as when a base station and a mobile radio operate on reversed pairs of frequencies without duplexing.

**Simplex channel:** A communication channel providing transmission in one direction only at any given time. For comparison, see duplex channel entry.

**Simplex operation:** A method of radio operation in which communication between two stations takes place in only one direction at a time. This includes ordinary transmit-receive operation, press-to-talk operation, voice-operated transmit, and other forms of manual or automatic switching from transmit to receive. Also called simplex.

**SINAD:** The ratio of signal plus noise, plus distortion to the noise, plus distortion; expressed in decibels. An EIA standard method of measuring receiver sensitivity. Essentially a measure of radio frequency signal strength that will result in a readable signal.

**Spectrum:** A continuous range of frequencies arranged in order of wavelength or frequency within which waves have some common characteristics, such as audio spectrum, radio spectrum, etc. The entire range of electromagnetic radiation extending from the longest known radio waves to the shortest known cosmic rays.

**Spurious response:** The response of a radio receiver to an undesired frequency.

**Squelch:** A circuit function that acts to suppress the audio output of a receiver when noise power exceeding a predetermined level is present.

**Squelch, carrier:** A squelch system that responds to the presence of an RF carrier signal.

**Squelch circuit:** A circuit that reduces or lowers the noise that would otherwise be heard in a radio receiver between transmissions.

**Statewide EMS system:** A network of EMS systems integrated and coordinated at the state level.

**Station, radio:** A fixed installation or mobile unit that is equipped to transmit and receive radio signals.

. - T -

**Telemetry:** The sensing and measuring of information at some remote location and transmitting the data to a convenient location to be read and recorded.

**Telephone line:** A telephone line from a telephone company's central office that is connected to key or non-key telephone equipment.

**Tone:** An audio or carrier of controlled amplitude and frequency used in a selective signaling system or for equipment control purposes.

**Tone-controlled squelch:** A system whereby a superimposed tone is transmitted with the radio carrier to protect against nuisance type interference.

**Touch pad:** A method of signaling or encoding and decoding address codes by the use of a simple numerical push button keyboard.

**Tower, antenna:** A tall antenna support structure used to support one or more antennas or when an antenna must be mounted high above the ground or other support formation such as a building.

**Transceiver:** The combination of radio transmitting and receiving equipment in a common housing, usually for portable or mobile use and employing common circuit components for both transmitting and receiving.

**Transmission line:** A waveguide, coaxial line, or other system of conductors used to transfer signal energy efficiently from one location to another. In communications systems, it's the coaxial line between the base station and the antenna.

**Transmitter:** Apparatus for the production and modulation of radio frequency energy for the purpose of radio communication.

**Two-way radio:** A radio that is able to transmit and receive.

**Two-wire operation:** Uses a single pair (two wires) for both transmitting and receiving.

- U -

**Ultra High Frequency (UHF):** Frequencies between 300 and 3000 MHz.

**Unmodulated:** Without modulation; the radio frequency carrier signal alone as it exists during phases in conversations.

- V -

**Vehicular repeater station:** A mobile station in the mobile services authorized to retransmit automatically on a mobile service frequency or communications originated by hand-carried portable units or by other mobile or base stations directed to such hand-carried units.

**Vertical antenna:** A vertical steel tower, rod, or shaft used as an antenna.

**Very High Frequency (VHF):** Frequencies between 30 and 300 MHz.

**Voice:** Referring to the sounds uttered by human beings.

**Voice grade:** A communications circuit which is nominally 300 to 3000 hertz.

**Volume:** The strength of loudness.

- W -

**Watt:** The unit of power.

**Wavelength:** The distance measured along the direction of propagation between two points that are in phase on adjacent waves. A wavelength is the distance traveled by a wave in the time of one cycle. Electromagnetic waves include both light and radio waves and travel in space at approximately 300,000,000 meters per second. To determine the exact length of a wave, divide 300,000,000 meters by the frequency in hertz.

**Wave, radio:** An electromagnetic wave which travels through space at the speed of light.

- X -

- Y -

- Z -

**END OF APPENDIX G**

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