DIGITAL MOBILE RADIO ASSOCIATION

State-of-the-art of ETSI DMR Tier III Standard

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The DMR Association

About

The DMR Association is a global organization whose purpose is to help grow the DMR market by removing barriers to interoperability and supporting innovation and adoption of the standard via the creation of new devices and services.

Mission

To ensure that LMR buyers of today's digital radio technology gain ongoing value through the competition and choice derived from an open, multi-vendor value chain.

Activities

- Interoperability certification of DMR products
- Development of enhanced features
- Feedback to ETSI
- Information & Promotion

Facts and Figures

Founded in 2005

- 2006 decision to adopt the AMBE+2 Vocoder
- 2009 Technical Working Group and a Marketing Working Group established
- 2011 Incorporated in the UK as limited company
- Three categories of Membership
  - Category 1 Equipment Manufacturers
  - Category 2 Application Developers, Test Equipment Manufacturers, Systems Integrators & Test Houses
  - Category 3 Users, Regulators & Operators
- Today the DMR Association counts over 150 Members, including over 60 manufacturers

For more information: www.dmrassociation.org

ETSI DMR Standard Parts

- ETSI TS 102 361-1 DMR Air Interface Protocol
- ETSI TS 102 361-2 DMR Voice and Generic Services
- ETSI TS 102 361-3 DMR Data Protocol
- ETSI TS 102 361-4 DMR Trunking Protocol

- ETSI TR 102 398 DMR General System Design

Can be freely downloaded from the ETSI or DMR Association websites:

www.etsi.org

www.dmrassociation.org

DMR Tier I: Unlicensed

- Products for license-free use in the 446 MHz band.

DMR Tier II: Conventional

- Licensed conventional radio systems operating in PMR frequency bands 30 to 1000 MHz. Targeted at users who need smooth migration from analog with existing spectrum & licensing, spectral efficiency, advanced voice features and integrated IP data services in licensed bands.

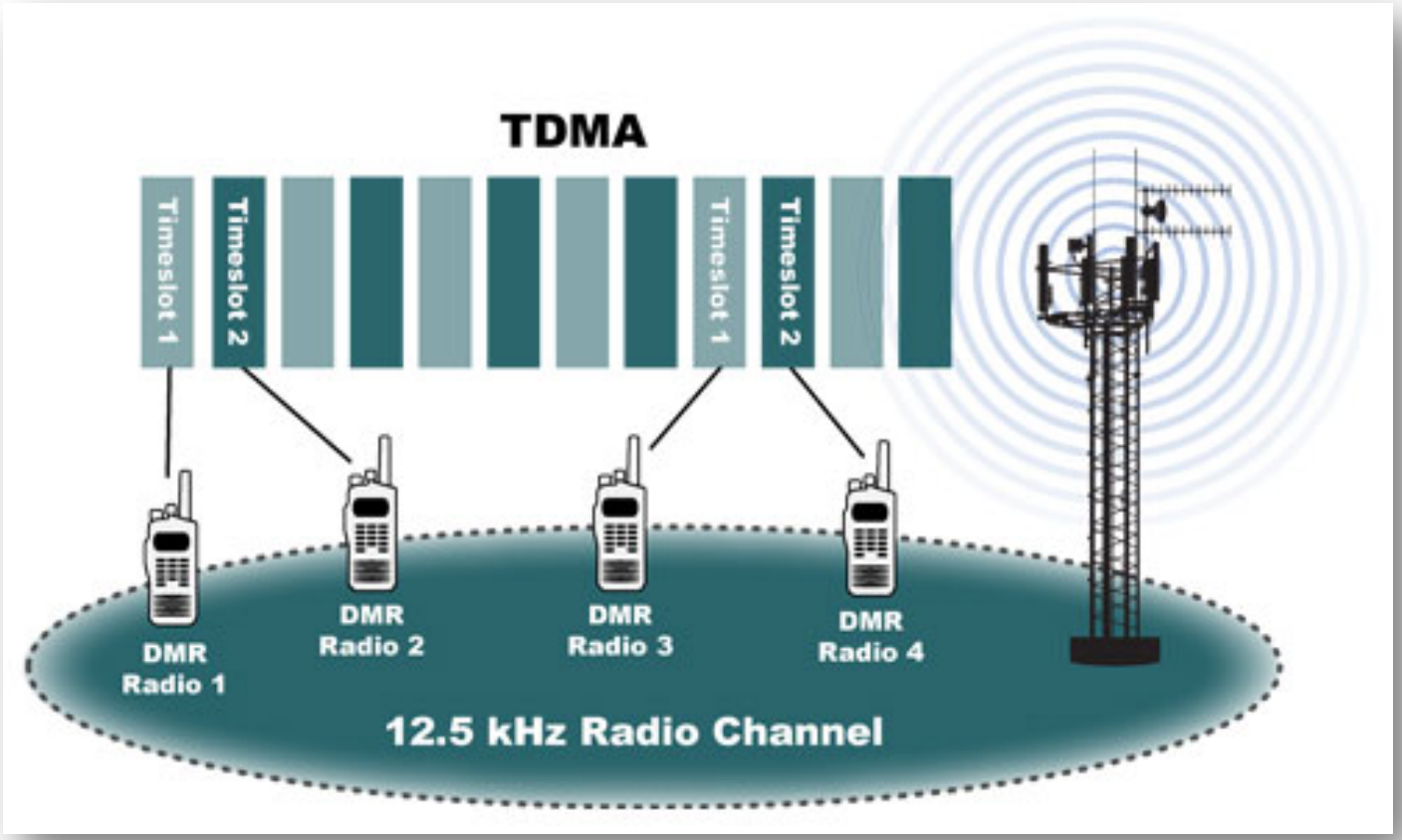
DMR Tier III: Trunked

- Trunking operation in frequency bands 30 to 1000 MHz. The ETSI Tier III standard is derived from MPT1327 and is based on Tier II building blocks and features with plenty of additional added-value features.

DMR Overview

- 12.5 kHz channel
- 9.6 kbps gross bit rate
- 4FSK modulation (constant envelope)
- 2 slot TDMA channel => 6,25 kHz equivalent channel
- Built around a 30ms slot structure
- 50% duty cycle slot structure allows forward and reverse transmission on a time division basis
- Transmission can be used either for voice, data or generic signalling
- Frequency bands 30 to 1000 MHz
- Low cost, low complexity
- Great range: same or better link budget then analogue
- Conventional (Tier II), Trunking (Tier III), Simulcast

DMR 2 Slot TDMA



DMR Tier III Features

Current Standard

- ETSI TS 102 361-1 V2.5.1 (2017-10) DMR Air Interface Protocol
- ETSI TS 102 361-2 V2.4.1 (2017-10) DMR voice and generic services and facilities
- ETSI TS 102 361-3 V1.3.1 (2017-10) DMR Data Protocol
- ETSI TS 102 361-4 V1.9.2 (2018-04) DMR Trunking Protocol

- ETSI TR 102 398 V1.4.1 (2018-11) DMR General System Design

DMR Tier III Features

Basic Features

- Mobile Station (MS) Access control and management using a Control Channel and a random access protocol
- MS Location within the system radio coverage by Radio Site Identification and Registration
- Control Channel hunting
- System acquisition Authorization – MS and BaseStation (BS) Authentication
- Message Trunking
- Transmission Trunking
- Quasi-Transmission Trunking
- Aligned and Offset Timing
- A Unified Data Transport (UDT) mechanism to support the Short Data Service, the Supplementary User Data service and extended addresses through Gateways
- Broadcast of system parameters to MS
- Reverse Channel
- Dedicated and Non-Dedicated Control Channel
- Second Control Channel

DMR Tier III Features

Voice Features

- Talkgroup Call
- OACSU (Off Air Call Set Up) Individual Call
- FOACSU (Full Off Air Call Set Up) Individual Call
- Late Entry
- Priority and Emergency Call
- All MS Call
- Broadcast Call
- Gateway Calls (PSTN, PABX, Dispatch) Half- and Full-Duplex
- Full-Duplex MS to MS Call

Generic Data Features

- Protected data with ½ rate, ¾ rate and rate 1 (unprotected) FEC acknowledged and unacknowledged
- Control Signalling Block (CSBK/MBC)
- Unified Data Transfer (UDT) Short Data Message service
- Packet Data service: IP over DMR + UDP/IP header compression
- Unified Single Block Data

NOTE: they are all building blocks for User Data Features

User Data Features

- Text Messaging over UDT
- Text Messaging over UDP/IP
- Location Messaging over UDT
- Location Messaging over UDP/IP – LIP Positioning
- Voice associated inband data features (Positioning and Talker Alias)
- Unified Single Block Data Polling – LIP Positioning
- Generic IP data
- Full-Duplex MS to MS Packet Data Call

DMR Tier III Features

Supplementary Features

- Common Dialling Plan
- Talker Identification
- Radio Check
- Short Data Polling
- Status Delivery
- Status Polling
- MS Stun and Revive
- MS Kill
- Answer Call
- Cancel Call
- Call Diversion
- Ambient Listening

DMR Tier III Features

Supplementary Features (continuation)

- Channel Authorisation
- Supplementary User Data Transfer
- Network System Announcements
- Emergency Alarm
- Emergency Pre-emption
- PTT De-key
- Transmit Interrupt
- MS Dynamic Power Control
- Group Subscription/Attachment
- Dynamic Group Number Assignment
- Trunk Station Control Channel Alternate Slot management

DMR Tier III Features

Further Features

- Database queries
- SCADA
- Air Interface and End-to End Encryption
- Possibility of implementing specific encryption algorithms
- Application Interface Specification (AIS)
- Flexibility to introduce new and/or proprietary features

Thank you!

For more info:
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https://dmrassociation.org