

DMR Trunking Pro

Hytera Open Standard DMR Trunking Portfolio



- ETSI DMR Open Standard Technology
- IP Based Digital Trunked System Infrastructure
- Versatile Services & Expandable Systems



Overview

Hytera DMR Tier III Trunking, developed from the ETSI DMR open standard, is an IP based Digital Trunked Platform specifically designed to provide mission critical voice, data, dispatching and management capacity across wide geographical areas. With an all-IP architecture and centralized networking, the solution utilizes infrastructure with modular design of system components in order to deliver high spectrum efficiency, fast access, advanced Security, wide coverage, flexible networking, affordable infrastructure and low maintenance costs. Because of its strong scalability, Hytera DMR III solutions support networks of different topologies, including regional networks such as single-site network, or multiple-site nationwide networks.



Advantages of DMR Technology

1. Digital Voice, Superior Anti-interference and Voice Quality

The digital voice compression technology of DMR terminals provides better noise reduction and preserves voice quality over a greater range than analog, especially at coverage edges, thanks to the application of narrowband encoder/decoder and digital correction technology. The digital process could filter noise and rebuild signal from degraded transmission, so that users can get better communication quality and wider coverage.

2. Improved Spectrum Efficiency, Double Channel Capacity

DMR two-slot TDMA technology reserves 12.5KHz bandwidth, and divides it into 2 alternate time slots, therefore one 12.5KHz channel could support 2 synchronized or individual calls. Each slot can operate as an individual communication channel and has equivalent bandwidth (6.25e KHz), while this 12.5KHz is still able to interconnect with other analog 12.5KHz channels.

DMR is fully compatible with already authorized PMR frequencies, so that users can get twice the channel capacity without re-configuration or buying additional frequencies.

While the first time-slot is working, the second time-slot can, in a TDMA system, be used for data transmission such as text messaging or location data in parallel with voice call, which is very useful in dispatch systems that provide both voice and visual transmission. The enhanced data capability is becoming more and more important to facilitate large amount of data transmission. Future developments of the two-slot TDMA application include temporarily integrating two time slots to double data transmission speed, and using two time slots at the same time in order to enable full-duplex call.

3. Large Coverage, Low Networking Cost

DMR Technology uses nonlinear amplifiers resulting in larger coverage and added technical advantages: In comparison with other digital technologies, the coverage of the base station is improved up to a 3:1 ratio with high operating efficiency and optimized power consumption.

4. Save Investment on Infrastructure

Another advantage of the DMR TDMA approach is that you get two channels with one repeater, one antenna, and a simple duplexer. Compared to FDMA solutions, two-slot TDMA allows you to achieve 6.25e KHz efficiency while minimizing investments on repeaters and combiner. FDMA requires a repeater for each channel, plus additional combiner and frequencies, and there's a notable loss in signal quality and coverage when combiner is used in this way.

DMR gets two stable channels with only one repeater, and does not require additional repeater or combiner, thereby investment of users on infrastructure will be greatly reduced, and the networking solutions can also be simplified.

5. More Power Saving, Battery Life Extended

Two-slot TDMA offers a optimized solution. Since an individual call uses only one of the two timeslots, it requires only half of the transmitter's activity and power consumption. The two timeslots are in use alternatively, so that the transmitter is idle half of the time. For example, in a typical duty cycle of 5 percent transmitting, 5 percent receiving, and 90 percent standby, the transmit time accounts for a high proportion of the drain on the battery. By cutting the effective transmit time in half, two-slot TDMA can enable up to 40 percent improvement in talk time in comparison with analog radios. Because of the total power consumption of every call has been reduced, working time of the battery is extended and charging time interval becomes longer. Modern digital equipment also has sleep and power management features, which could also extend the battery life.

6. Reliable Encryption Technology

Enhanced Communication Privacy. Voice communications are easily monitored on analog channel. However, the signal could not be monitored when DMR digital technology is applied, unless signaling or ID (16,776,415 in total) is matched, thus the confidentiality of your communication is ensured.

7. Smooth Migration from Analog System & Terminal

A DMR system uses constant envelope modulation similar to an MPT system, and both the terminal and system use nonlinear power amplifier, which makes it easier for MPT and DMR systems and terminals to adopt a multimode design. The DMR standard has inherited technical features of MPT, and provides a smooth migration from analog MPT systems.

DMR is compatible with both analog and digital systems. Analog and digital users could operate and be interoperable with each other in one network. DMR mobile terminals have the same coding rule, operation method and user habit with analog ones. Common application will not be impacted during the transition from analog to digital. The smooth transition includes three parts: spectrum, system and conventional terminal.

8. Enriched Dispatch Function

In addition to basic voice services such as individual call and group call, and basic data services such as SMS and status information, DMR has abundant dispatch functions which could meet dispatching requirements of public security, public utility, and many other industries, and set rules for various dispatching services:

9. Scalable Data Applications for Increased ROI

Featured by full digitization and IP soft-switch, DMR equipment obtains excellent scalability. DMR provides not only digital talkback function from end to end, but also data services including positioning, text message, telemetry, data transmission, radio controlling, etc. Furthermore, it provides rich secondary development interfaces for customers by proper plan and design of system software and hardware infrastructure. Users could tailor the system according to specific needs, and explore more application services by secondary development. With increasing demand on data and voice communication, the above functions and features would greatly enrich data applications of the system; therefore achieve higher return on investment (ROI).

DMR Trunking Pro

Base Station

System Components

- 1 Channel Unit (CHU)
- 2 Base Station Control Unit (BSCU)
- 3 Power Supply Unit (PSU)
- 4 Fan Unit (FAU)
- 5 Divider Unit (DIU)
- 6 Router
- 7 Combiner Unit (COM)

Innovative Design

The system has a semi-centralized networking and modular design for fail-soft and enhanced reliability

The redundancy backup mechanism is employed to retain the integrity of some key devices, for example, base station controller redundancy and main control channel backup, as well as link backup for network elements

- Blade architecture to facilitate O&M and enhance cooling efficiency.
- Triple RX diversity technology to offset the impact of multipath fading and increase dynamic receiving sensitivity.
- Modularized design to tailor functions as required.
- The product incorporates combined control mechanism (distributed and centralized), modularized design and fault-tolerant capability to significantly enhance reliability and efficiency.
- The redundancy mechanism is employed for key devices such as the base station controller unit (hot standby), trunking channel unit, power supply unit, link, etc.
- Programmable functions via software, providing the capability of long-term technology development.



Carrier Grade Reliability

- Combined control mechanism (distributed and centralized), modular design and multi-level fault-tolerant capability for enhanced reliability and efficiency
- Redundancy capability for key hardware components such as base station control unit, trunking main control channel and power supply unit.
- MSO supports geographic redundancy. When one site fails, the other site can take over its services immediately.

Versatile Services

- **Mobility Management**
Registration/deregistration, handover/roaming, group registration/deregistration, and authentication.
- **Voice Services**
Individual call, group call, emergency call, all call, dispatcher call, etc.
- **Data Services**
SMS, GPS short data polling, status message, emergency alarm.
- **Flexible Secondary Development**
Provide a wide range of interfaces for secondary development, enabling users to re-engineer the system as required and develop more data applications via API.
- **Various Supplementary Services**
Offer various supplementary services, including late entry, user level, ambient listening, discreet listening, talk-group hunt, forced disconnect / forced connect-override, stun / revive, kill, dynamic group number assignment, record, remote monitor, end-to-end encryption, include call.
- **Strong Interoperability**
Support intercommunication with PSTN/ PABX, MPT system, DMR conventional system.



Flexible Networking

- The IP-based architecture enables flexible networking and low bandwidth requirements for the system backhaul network.
- The all-IP infrastructure allows devices to be deployed anywhere in the network, which facilitates the add and removal of network nodes, increases networking flexibility and reduces equipment room costs;
- Support multiple link modes (IP and E1) and network topologies (tree, star, etc.).

System Management

- The SNMP capability allows remote monitoring and management of system components over the extended IP Network.
- The Client / Server structure ensures good networking and expanding capabilities
- The network management system (NMS) can provide centralized management over the IP network elements, and support remote upgrading for smooth capacity expansion



Trunk Pro Mobile Switch Office (MSO)

The DMR Network is scalable from a single site with one base station to a wide area network with multiple MSOs.

The MSO consists of central controller, service switching device, media translating unit, network management device and gateway. As the processing center, it is responsible for intercommunication and information exchange among the network elements in the system, realizing call control and media data exchange between base stations or between systems and providing versatile services such as mobility management, authentication, dispatch, network management and intercommunication.

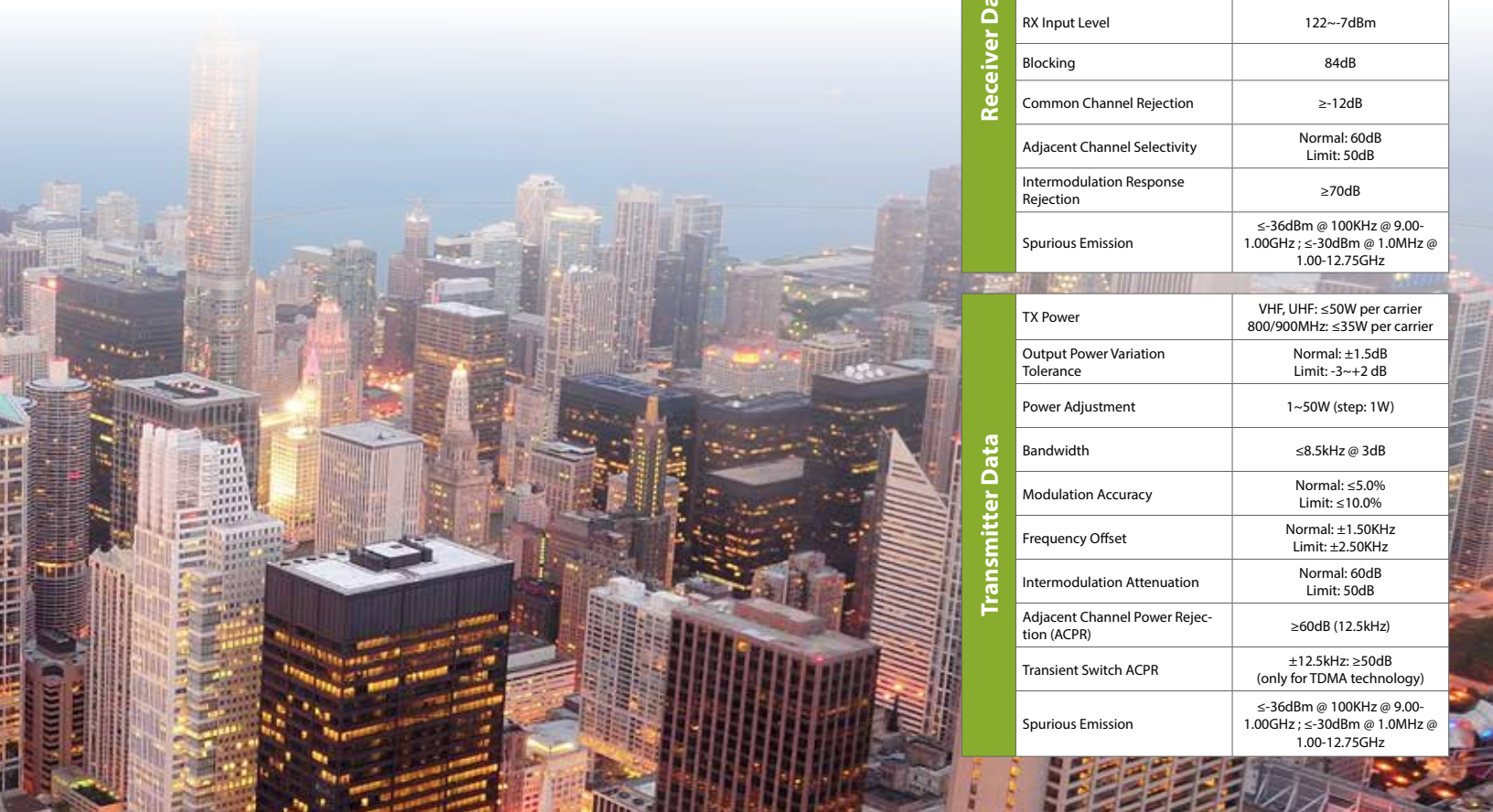
- One MSO will support up to 100 base stations and 800 carriers.
- A single base station will support up to 16 carriers.
- One MSO will support up to 5000 group calls.
- One MSO will support 32 dispatcher stations, 64 network management clients.

General	Frequency Range	VHF: 136-174MHz ; UHF: 350-400MHz ; 400-470MHz ; 450-520MHz; 806-825MHz; 851-870MHz/896-902MHz; 935-941MHz
	Carrier Spacing	Cavity Combiner: ≥250KHz; Wideband Combiner: ≥25KHz (only for less than 4 carriers)
	Multi-Access Method	FDMA/TDMA
	Duplex Spacing	VHF: 5.3MHz UHF: 10MHz; 800/900: 45MHz 39MHz
	Modulation	4FSK (index: 0.27)
	Transmission Rate	9.6 kbps
	Full Load Power Consumption	≤1200W (4-carrier) ≤2400W (8-carrier)
	Operating Temperature	-22°F ~ +140°F
	Storage Temperature	-40° F ~ +185° F
	Dimensions (HxWxD) (with casters)	23.6 x 23.6 x 56.3 in (4-carrier) 23.6 x 27.6 x 78.7 in (8-carrier)
	Weight (fully configured)	485 lbs (4-carrier) 772 lbs (8-carrier)
	Mean Time between System Failures (MTBF)	100,000 hours

I/O Port	RF RX/TX Port	Four-way, N-Female
	Synchronous Port	GPS, N-Female
	Port to MSO	E1: BNC-Female/DB9-Female ; Ethernet: RJ-45
	Local Maintenance Port	RS232/Ethernet
	Power Supply Port	AC: 100~240V (50~60Hz) DC: -48V (optional)

Receiver Data	Static	≤-119dBm @ BER5% (no diversity) ; ≤-122dBm @ BER5% (diversity) ; ≤-116dBm @ BER1%
	Dynamic (no diversity, attenuated by 8km/hr and 100km/hr)	-106dBm @ BER5% (no diversity) -112dBm @ BER5% (diversity)
	Rx Path	3 RX paths per CHU, allowing the base station to receive up to third order diversities
	RX Input Level	122~-7dBm
	Blocking	84dB
	Common Channel Rejection	≥-12dB
	Adjacent Channel Selectivity	Normal: 60dB Limit: 50dB
	Intermodulation Response Rejection	≥70dB
Spurious Emission	≤-36dBm @ 100KHz @ 9.00-1.00GHz ; ≤-30dBm @ 1.0MHz @ 1.00-12.75GHz	

Transmitter Data	TX Power	VHF, UHF: ≤50W per carrier 800/900MHz: ≤35W per carrier
	Output Power Variation Tolerance	Normal: ±1.5dB Limit: -3~+2 dB
	Power Adjustment	1~50W (step: 1W)
	Bandwidth	≤8.5kHz @ 3dB
	Modulation Accuracy	Normal: ≤5.0% Limit: ≤10.0%
	Frequency Offset	Normal: ±1.50KHz Limit: ±2.50KHz
	Intermodulation Attenuation	Normal: 60dB Limit: 50dB
	Adjacent Channel Power Rejection (ACPR)	≥60dB (12.5kHz)
	Transient Switch ACPR	±12.5kHz: ≥50dB (only for TDMA technology)
	Spurious Emission	≤-36dBm @ 100KHz @ 9.00-1.00GHz ; ≤-30dBm @ 1.0MHz @ 1.00-12.75GHz





20KHz / 25KHz will not be available on new equipment in the U.S. after January 1st, 2011
Hytera reserves the right to change product designs or specifications at any time. If you have any questions regarding the accuracy of this information please contact your local sales representative or Hytera directly. Some System options and features are not available to all markets.

Hytera and Hytera are registered trademarks of Hytera Co., Ltd. © 2015 Hytera Co., Ltd. All rights reserved.



Hytera America

Address: 3315 Commerce Parkway
Miramar, Florida 33025, USA
Tel: 800-845-1230 **Fax:** 954-846-1672
http://www.hytera.us



Contract Holder
Contract GS-35F-0958A