



DMR Trunking Technology White Paper

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1 Summary

Digital Mobile Radio (DMR) is a digital communications standard issued by ETSI which sets out a digital radio specification for professional, commercial and private radio users in April 2005. In practice, DMR manufacturers have focused on building products for the professional and commercial markets for both licensed conventional mode operation (known as DMR Tier II) and licensed trunking mode operation (known as DMR Tier III).

DMR is a two slot Time-Division Multiple Access (TDMA) system offering low cost and flexible digital voice and data solutions, and adopts a well established 4FSK modulation scheme. The TDMA implementation in DMR offers a spectrum-efficiency of 6.25 kHz per channel while also providing the ability to deliver the advanced features that professional users need.

The DMR standard is designed to operate within 12.5kHz channel spacing used in licensed land mobile frequency bands around the world so making users migrate from analog to digital seamlessly. Today, products designed to DMR are sold all over the world and a wide group of leading manufacturers are producing or have declared an intention to produce DMR products, offering users a various selection of suppliers.

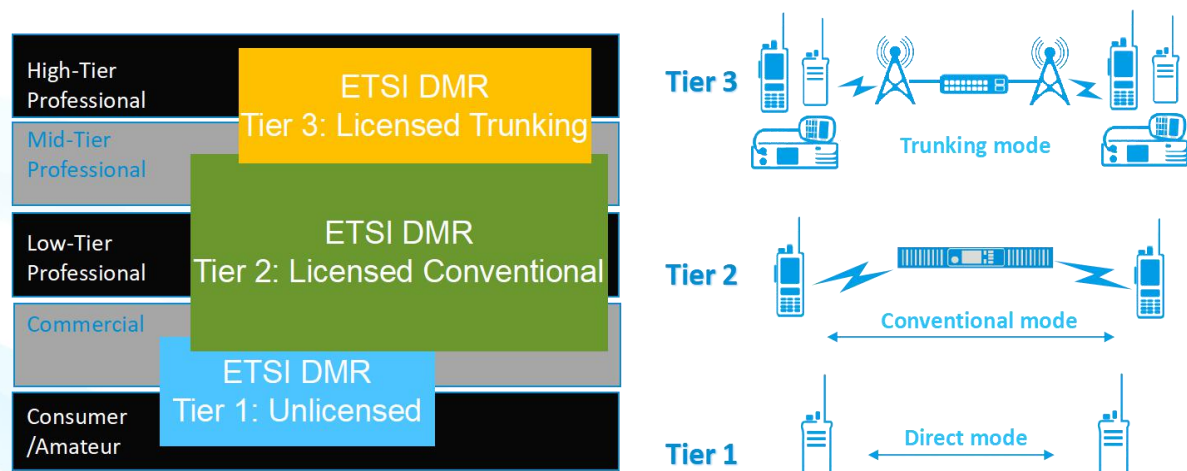


Figure 1-1 DMR Standard Division

The DMR standard divides devices into three tiers: Tier I, Tier II, and Tier III. Tier-I devices refer to unlicensed DMR devices that work in line-of-sight communications mode. Tier-II devices refer to licensed DMR devices that work in direct or repeater mode, namely conventional devices. Tier-III devices refer to licensed trunking devices that use central controllers for communications control. Caltta's DMR products include Tier-II conventional

and Tier-III trunking products.

DMR is one of the world's most important professional technology standards in digital mobile communications. DMR conventional products are designed to replace analog devices, and DMR trunking products are designed to replace analog MPT trunking systems.

1.1 Current Status of Global Private Networks

With radio communications technologies developing towards digital communications technologies, trunking communications systems have evolved from the first-generation FDMA analog trunking technology to the second-generation TDMA and CDMA digital trunking technologies. Analog private networks have been available in the world for dozens of years, with poor call quality and without data services. However, users need private network communication systems with better call quality and various data applications. Therefore, it is time for the migration of global analog systems to digital systems.

1.2 Trunking Standards

A trunking radio system is a digital two-way radio system that uses a digital control channel to automatically assign frequency channels to group and users. In a traditional half-duplex Land Mobile Radio (LMR) system a group of users (a "talkgroup") with two-way radios communicate over a single shared radio channel, with one user speaking at a time. These systems typically have access to multiple channels, so multiple groups in the same area can communicate at the same time. In a conventional (non-trunking) system, channel selection is done manually; before use the group must decide on which channel to use, and manually switch all the radios to that channel. This is an inefficient use of scarce radio channel resources, because the group users must have exclusive use of their channel regardless of how little transmission they are doing. There is also nothing to prevent multiple groups in the same area from choosing the same channel, causing conflicts.

A trunking radio system is an advanced alternative in which the channel selection process is done automatically. Trunking system is a more automated and complex radio system, but provides the benefits of less user intervention to operate the radio and greater spectral efficiency with large numbers of users. Instead of assigning a radio channel to one particular

user group at a time, users are instead assigned to a logical grouping, a "talkgroup". When any user in that group wishes to speak with another user in the talkgroup, a vacant radio channel is found automatically by the system and the conversation takes place on that channel. Many unrelated conversations can occur on a channel, making use of the otherwise idle time between conversations.

Currently, there are main trunking protocols and standards such as TETRA, P25, PDT and DMR. TETRA, as a professional mobile communication system based on digital TDMA technologies, is an open system with unified standards designed and formulated by ETSI to meet the needs of professional sectors in Europe for mobile communications. P25 originates from the US APCO P25 system, which is designed for using voice functions for emergency tasks in the United States. PDT is the digital trunking communication standard with independent China intellectual property rights, and meets the needs of China public security and police. DMR is the standard developed by ETSI to meet the needs of utilities, industry, and commerce as well as public security.



Figure 1-2 Use Map of Digital Trunking Standards

Table 1-1 Comparison of Different Standards

Standard	PDT	TETRA	P25	DMR
Multi-Access Technology	TDMA	TDMA	FDMA	TDMA
Channel Bandwidth	12.5 kHz/2 channels	25 kHz/4 channels	12.5 kHz/channel	12.5 kHz/2 channels
Data Rate	9.6 kbps	7.2 kbps	9.6 kbps	9.6 kbps

Compatibility with Analog Systems	Yes	No	Yes	Yes
Large Area Coverage	Yes	No	Yes	Yes
Public Security Applications	Yes	Yes	Yes	Yes
Standards	China	Europe	United States	ETSI
Recommended by the Ministry of Public Security	Yes	No	No	No

With the development of DMR technologies worldwide, DMR technologies have been used in the global private network market, and will gain more and more market share in Public Safety, Utilities and Commercial industries in the future.

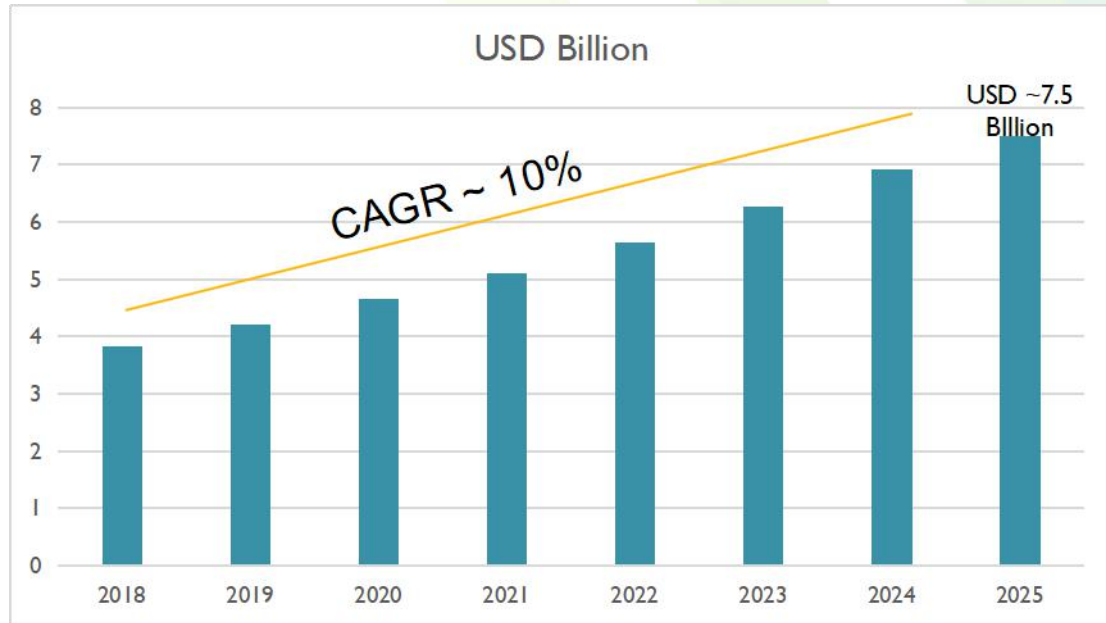
1.3 DMR Market Position

DMR has been adopted worldwide as an international standard for narrowband digital communications. With two-slot 12.5 kHz TDMA, 4FSK modulation, and digital voice compression technologies, DMR features high voice quality, high spectral efficiency, large area coverage, interference resistance, high power efficiency, digital and analog compatibility, and a variety of services. It supports smooth migration from analog to digital trunking systems with cost efficiency, high security, large coverage region and expandability. In addition, DMR can also be applied to industry users, such as Large enterprises, Public institutions, Law enforcement authorities, Oil & Gas companies, Forestry, Ports, Airports, Railways, Utilities, Customs, Hotels, Property management companies and Major events.

The Global Market for DMR is estimated to grow at a significant rate during the forecast period from 2019 to 2025. The geographic analysis of the DMR market has been conducted for North America, Europe, Asia-Pacific, the Middle East & Africa, and Central & South America. As per MRFR (Market Research Future Reports) analysis, the North American region has dominated the global market in 2018 and is estimated to maintain its dominance throughout the forecast period. Also, the presence of key players have accelerated the penetration of DMR across the region. On the other hand, the market in Asia-Pacific is expected to experience the fastest growth during the forecast period 2019–2025. Factors such as the increasing instances of criminal activities and the need for efficient security

systems are expected to propel the growth of the DMR market in this region.

Table 1-2 Digital Mobile Radio (DMR) Market Growth



Source: MRFR Analysis

2 DMR Technical Advantages

2.1 High Quality Digital Voice

Digital voice processing reduces the impact of environmental noise on call quality, allowing users to make much clearer calls, and can be used for complicated and frequent changing work scenarios.

DMR radios use advanced digital voice coding and channel coding technologies to better suppress noise and interference, and provide better voice communication quality than analog technologies, especially at the edge of coverage.

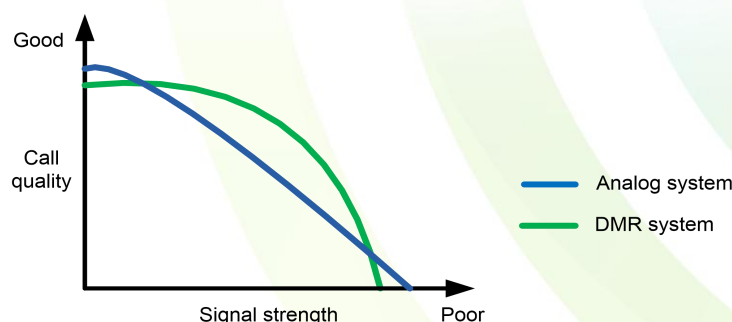


Figure 2-1 Voice Quality Comparison between DMR and Analog Systems

2.2 High Spectral and Power Efficiency, and Large System Capacity

The frequencies used by DMR are fully compatible with those of the existing analog systems. With two-slot TDMA technology, DMR allows a single carrier of 12.5 kHz bandwidth to support two independent calls, with each time slot occupying 6.25 kHz bandwidth. DMR spectral efficiency is four times as much as an analog system with 25 kHz bandwidth, greatly increasing system capacity.

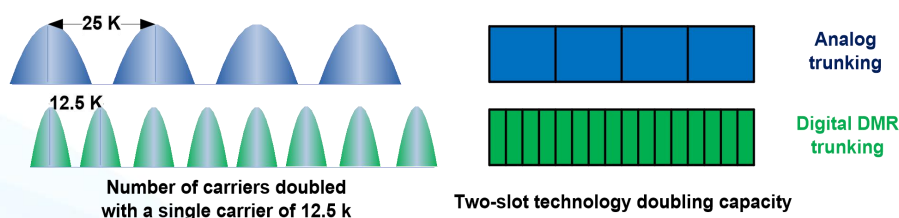


Figure 2-2 Spectral Efficiency Comparison between DMR and Analog Trunking Systems

The radio transmitter consumes a large amount of battery power during transmission. DMR radio uses only one time slot to realize an independent call, leaving the other time slot in idle status, therefore the radio is idle half of the time. The two-slot technology reduces transmit duration in half, and saves battery consumption by 40%, effectively extending standby time of DMR radios. In addition, DMR radios work for a longer time with less times of recharging, thus increasing the battery life.

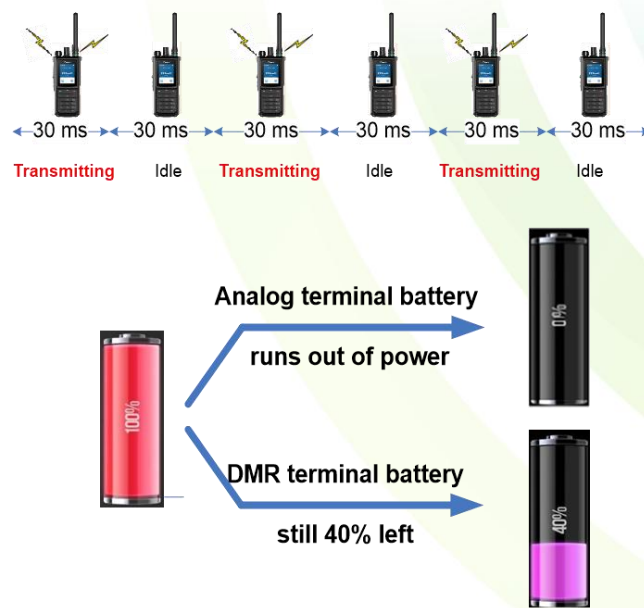


Figure 2-3 Power-Efficiency of DMR Two-slot Technology

2.3 Secure and Reliable Encryption Technology

DMR supports secure voice and data encryption technologies, including authentication, link encryption, and end-to-end encryption.

Authentication provides necessary security mechanisms for DMR systems, it can be enabled as per user requirements. Link encryption protects the security of data transmitted between communication nodes. The data is encrypted at the sender end and decrypted at the receiver end of a transmission link. End-to-end encryption encrypts voice data on the sending MS and decrypts voice data on the receiving MS. No plain-text voice data appears on any intermediate node, and the system is not involved in key management.

The DMR system provides different secure encryption solutions to meet the information security needs of different users.

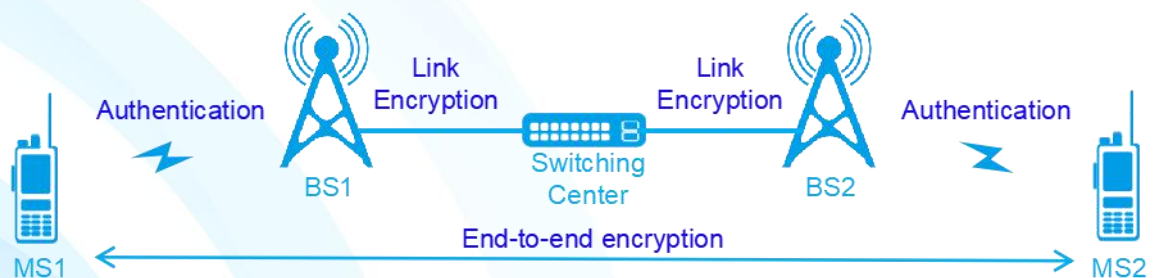


Figure 2-4 Security Solutions of DMR System

2.4 Smooth Migration from Analog to Digital to Protect Investment

The DMR system can be upgraded smoothly from analog to digital system, effectively protecting customer investment. DMR system can interconnect with existing analog radio systems, enabling smooth migration from analog MPT system to DMR trunking system. Moreover, DMR system uses the frequency bands, equipment rooms, RF antennas and feeders, and other infrastructure of the existing analog system, enabling smooth migration to digital system.

Analog MPT system can be upgraded to digital DMR system smoothly in phases. During smooth transition from analog MPT systems to hybrid MPT & DMR system, the existing equipment in the analog MPT system can be reused, including analog system equipment and analog radios, the frequency bands can be reserved. Newly added digital devices include DMR system equipment and digital radios.

During smooth transition from hybrid MPT & DMR system to fully digital system, the power supplies, RF antennas and feeders, and other infrastructure of the hybrid system can be reused, the existing analog radios should be replaced by digital radios, and the existing analog system equipment should be replaced by DMR system equipment, completing the analog to digital migration.

2.5 Large Area Coverage with Low Construction Costs

DMR supports large area coverage, and covers a target area with fewer base stations (usually a quarter of TETRA base stations), reducing infrastructure costs. The radius of large area coverage is three times as that of an ordinary cell, greatly improving spectral efficiency. In addition, large area coverage provides trunking coverage of a city with fewer base stations, significantly reducing network complexity, effectively improving network availability, and saving enormous infrastructure investment and O&M costs for network construction. Meanwhile, the price of DMR trunking radios is more cost-effective compared with radios of other LMR technologies such as TETRA.

3.2 DMR Trunking Base Station

DMR trunking base stations implement call access, channel management, and signal modulation and demodulation. SDR based DMR base station consists of separated BBUs and RRUs. Being small in size and light in weight, DMR base station can be wall-mounted or pole-mounted, only requiring very small space.

DMR base stations have sound clock solutions, and support the GPS, Beidou and GLONASS clocks, super regions and simulcast solutions.

DMR base stations support both digital and analog systems, and are compatible with the analog radios in existing networks.

The design of DMR base stations takes system security and stability into full consideration, and guarantees ongoing calls in case of active-standby failover. DMR base stations support active-standby backup of control channels, and can immediately switch to the standby control channel to ensure normal system operation in case failure or interference occurs on the active control channel. DMR base stations also support core network redundancy, and can switch to the standby core network for normal operation in case the active core network has faults. In addition, DMR base stations support fallback mechanisms. Once all links with the core network are faulty, the base station will enter the fallback mode, and continue to provide group call, single call, and other trunking services.

3.3 DMR Trunking Core Network

The DMR trunking core network (also known as switching center) is the central control point of trunking services. It has the following advantages:

- The DMR core network supports open interface, and supports secondary development by customer.
- The DMR core network provides high availability and supports backup and redundancy.
- Highly integrated system of core network elements including PTT Dispatch Server, PTT Home Register, Dispatcher Agent Server, Operation & Maintenance Module, Intergrated Network Management System, Media Record Server and Unified Gateway.
- High performance network processor.

3.4 DMR Unified Gateway

As a bridge between different communications systems, unified gateway converts the packet format on the control and media planes, so that different trunking systems can properly communicate with each other, perfectly integrating multiple trunking systems. Currently, the interoperability between DMR, MPT, PSTN, PABX, LTE trunking and other systems has been implemented.

A unified gateway has the following features:

- ✓ The control plane supports adaptation of SIP, and pSIP protocol.
- ✓ The media plane supports conversion between AMR, EVRC, AMBE, NVOC, and PCM formats.
- ✓ Supports interoperability between DMR trunking and other narrowband trunking systems.
- ✓ Supports interoperability between DMR trunking and broadband trunking systems.
- ✓ Supports interoperability between DMR trunking and PoC systems.
- ✓ Supports interoperability between DMR trunking and MPT systems.
- ✓ Supports interoperability between DMR trunking and PSTN systems.

3.5 DMR Trunking System Advantages

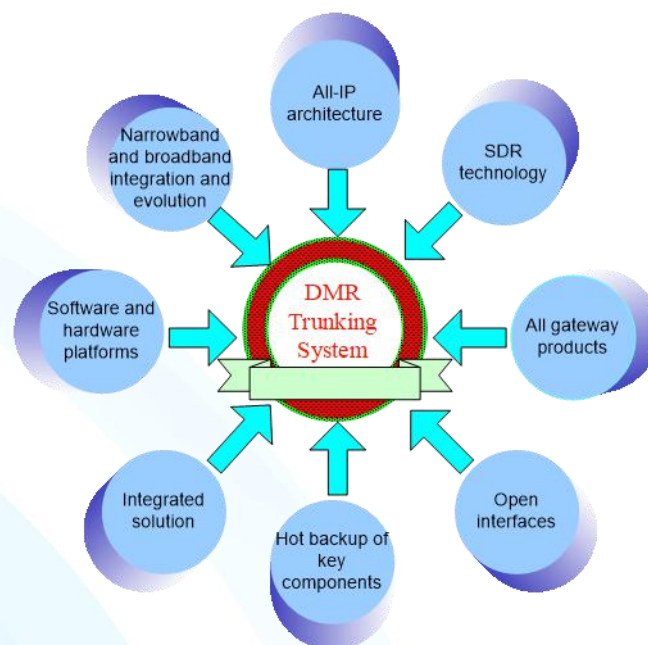


Figure 3-2 DMR Trunking System Advantage of Caltta

- Cutting-Edge SDR Technologies

Caltta DMR trunking base station uses advanced SDR technologies, and its air interface protocols and functions can be upgraded through software upgrade rather than hardware replacement, which is helpful in building multi-mode, multi-frequency and multi-function radio communication networks.

- **Mature Software and Hardware Platforms**
The software and hardware platforms are mature and commercially available.
- **Broader Coverage**
The BBU and RRU separation architecture greatly reduces the loss caused by feeders, thereby providing broader coverage.
- **High Availability**
Caltta DMR products support backup and redundancy, effectively reducing the impact of unexpected events on the system. In addition, software control channel backup, fallback and other functions are implemented through software to improve system availability.
- **Interconnection Capability**
Caltta DMR products can support interconnection with analog trunking, PSTN, and other systems.
- **Open Application Development Interfaces**
Caltta DMR products provide secondary development interfaces, so that customers can perform secondary development as needed to provide more application services and gain higher returns on investment.
- **Integrated Solutions**
Caltta DMR is capable of providing integrated solutions for different application scenarios, including trunking solutions, simulcast solutions, emergency communications solutions, and mixed network solutions, which are used for public security, logistics industries and transportation.
- **MPT User Compatibility Solutions**
DMR base stations support both DMR and MPT systems. In new DMR networks, MPT carriers can be configured to protect the existing MPT radios and interoperate with DMR radios through hybrid networking. In the regions where DMR base stations are temporarily unavailable, MPT gateways can be used for hybrid networking and interconnection between MPT and DMR users.
- **Advanced Radio Broadband Integration and Evolution Solutions**

Caltta boasts broadband trunking products based on LTE, provides hybrid networking and integrated dispatch of DMR trunking and LTE trunking, and can implement smooth evolution to LTE systems.

Hybrid networking achieves broad coverage through large area DMR sites, and provides broadband access in hot spots through LTE sites. Unified dispatch systems and service platforms are provided for both DMR and LTE users.

Based on the existing SDR platform, DMR base station can be upgraded to LTE eNodeB by replacing RF components and through software upgrade.

4 Technical Solution

4.1 Multiple-Carrier Solution

Caltta SDR DMR Trunking Base Station Solution uses the Multiple Carrier Power Amplifier (MCPA) technology, proprietary algorithms based on DPD + Doherty amplifier technologies, and dynamic matching technologies in DMR systems, to support high efficiency broadband RF and replace traditional narrowband analog amplifiers (power amplifier efficiency reaches 50%, and power consumption saves 45%).

The key to the MCPA technology is that signals are first combined in digital Intermediate Frequencies (IFs), and outputted through efficient broadband amplifiers, which means that a physical module can be configured for multiple logical radio sub-carriers without using combiners. This will undoubtedly help base stations develop towards higher integration, greater capacity, and lower power consumption, greatly reducing operating costs.

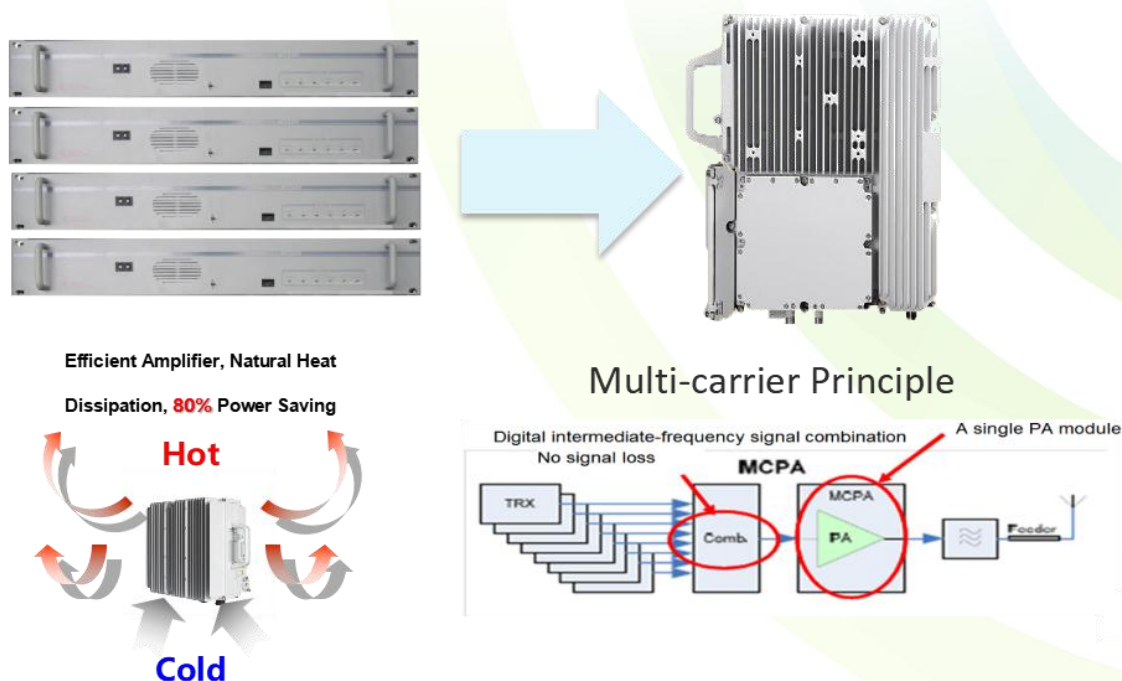


Figure 4-1 Multi-carrier Base Station

4.2 Super Broad Region Coverage Solution

Caltta DMR base station uses distributed BBU and RRU architecture, the RRU can be connected to BBUs or cascaded to other RRUs through optical fibers. Based on this feature, multiple RRUs can be controlled by a BBU, and transmit data on the same carrier simultaneously. In this way, the areas covered by all RRUs construct a super broad region. The optical fiber between an RRU and a BBU can be as long as 40 km, and therefore the coverage diameter of a super broad region with a BBU in the center can reach 80 km.

Compared with a traditional coverage region involving a single RRU, the carrier coverage area of a super broad region solution is expanded several times to reduce blind areas, lower handover probability, prevent users from call drop, and improve call performance.

The installation locations of RRUs can be selected flexibly depending on the terrain, to form super broad coverage region like strip, square or other terrain.

Super broad region coverage solutions are suitable for the scenarios with low user traffic, high mobility, and high requirements for call performance, such as subways, highways, and railways. These solutions can also be used to reduce blind areas indoors or at the corners, and implement seamless coverage by adding RRUs.

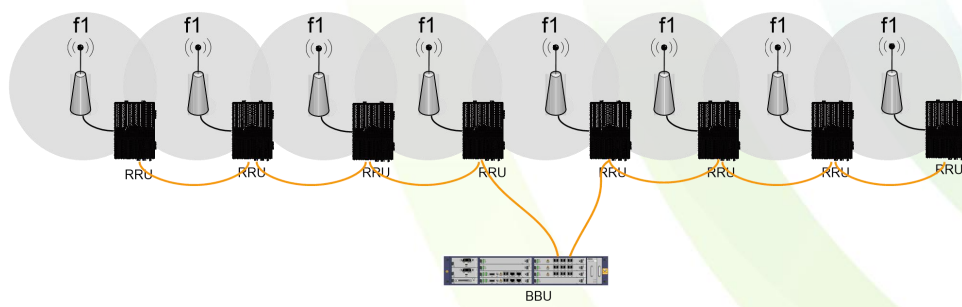


Figure 4-2 Super Broad Region Coverage (Strip)

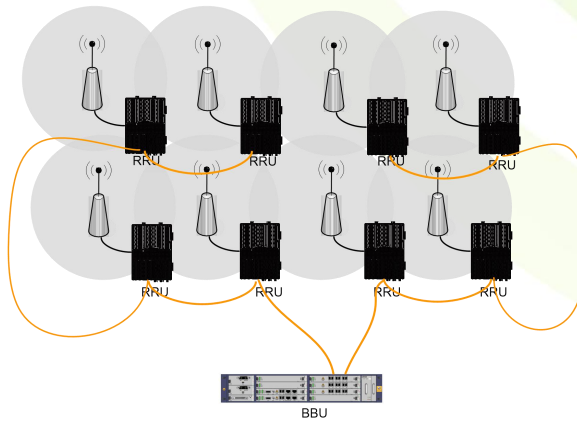


Figure 4-3 Super Broad Region Coverage (Square)

4.3 Simulcast Networking Solution

In simulcast network consists of simulcast master base station, simulcast slave base stations and links. Multiple base stations are connected through data networks, each base station covers a certain area, thus super broad coverage can be achieved by multiple simulcast base stations, thereby increasing trunking network coverage, and improving communication quality. Simulcast solution is suitable for super large coverage areas, low density, deficient spectrum resources, and high requirements for call quality.

Both simulcast and super broad region solutions aim to expand coverage area, reduce handover and avoid call drop for users, and improve call quality in the coverage area. The coverage area of simulcast is determined flexibly by the locations of RRUs. However, there are still differences. Users can choose different solutions as needed or combine solutions flexibly according to coverage and base station distribution. In simulcast coverage area, multiple base stations and multiple RRUs in a station can transmit data at the same frequency.

Table 4-1 Comparison between Super Broad Region and Simulcast

	Super Broad Region	Simulcast
Number of Stations	Single station	Multiple stations
Transmission Requirements	High. Remote bare fibers are needed.	Low. Local short-distance fibers are needed.
Diameter of Coverage	80 km, with 8 cascaded RRUs at most.	No limits theoretically.
Capacity	4 carriers for 7 group calls.	16 carriers for 31 group calls.

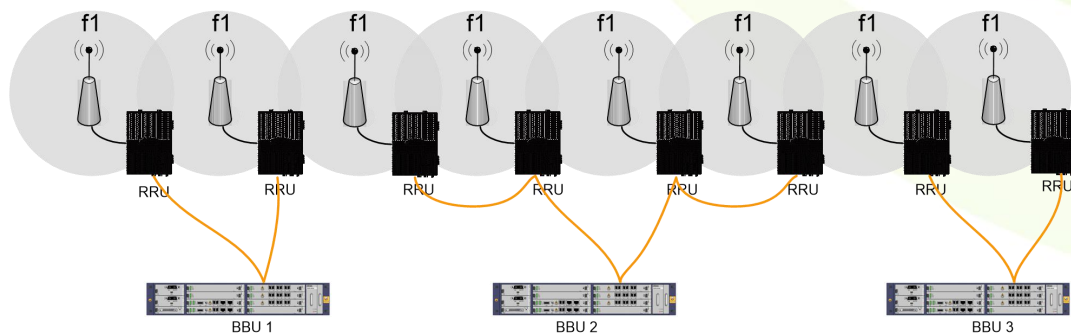


Figure 4-4 Hybrid Networking Solution of Simulcast and Super Broad Region

4.4 Digital and Analog Compatible System

Caltta base station supports both DMR and analog (MPT1327) systems, one base station supports up to eight DMR carriers and eight analog carriers. The RRUs of DMR carriers and analog carriers have identical hardware, and analog carriers can be changed to DMR carriers through software configuration.

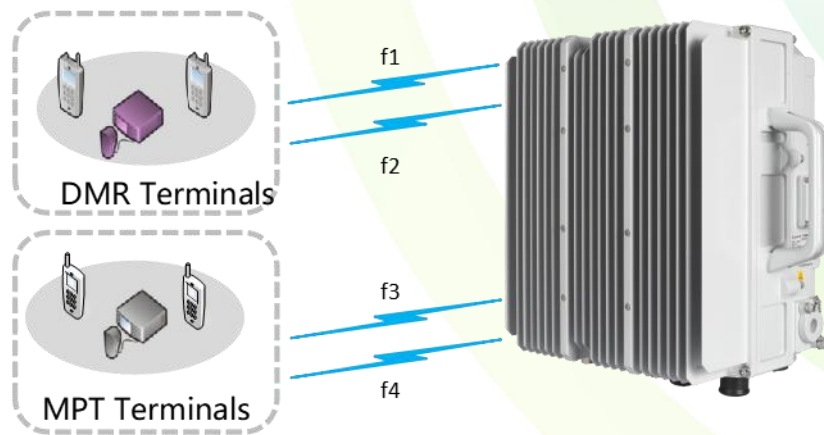


Figure 4-5 Analog Compatible, Smooth Evolution

For new DMR projects involving a large number of analog radios in the existing networks, Caltta base station can support both digital and analog systems to guarantee normal operation of analog radios and allow mixed grouping and dispatch of new DMR users, protecting customer investment.

5 DMR Trunking Products

5.1 BS8700 Base Station

5.1.1 Over view of BS8700

The DMR ZXSDR BS8700 is based on Caltta advanced SDR platform, and uses an architecture of separated BBU and RRU to adapt to customers' low-cost policy for long term evolution.

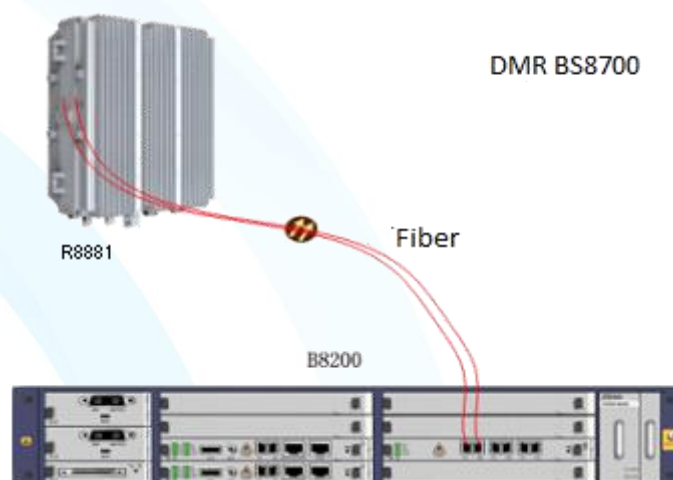


Figure 5-1 DMR BS8700 Overall External View

A DMR ZXSDR BS8700 distributed BS consists of a B8200 BBU and an R8881 S4000



Figure 5-2 DMR ZXSDR B8200 External View



Figure 5-3 DMR ZXSDR R8881 S4000 External View

5.1.2 Features

- World-leading SDR architecture

The wireless RF system can be completely reconfigured. It can support new standards or multiple standards through software upgrades, so it can provide new wireless technologies, and provide better services for customers.

- Broader coverage

The baseband and RF separation architecture greatly reduces the loss caused by devices and feeders, thereby providing greater coverage.

- Multiple carriers

The BS8700 supports up to 16 carriers.

- Smooth migration to 4G

Based on the SDR architecture, the BS8700 can smoothly evolve from 2G to 4G.

- Flexible networking

The BS8700 supports RRU star and chain networks to meet deployment in different scenarios.

- High Reliability

Both BBU main boards and BS control channel support active and standby deployment, which greatly improves the reliability and robustness of the wireless base station.

- Fail-soft mode

A BS can automatically detect the status of the link to the core network. If the BS detects that the link is in abnormal status, it automatically operates in fail-soft mode and notifies relevant mobile terminals.

In the fail-soft mode, the BS can still provide basic services such as registration, private call, group call, emergency call, SMS, and status message.

- High environmental adaptability

The BS8700 has a small size, is lightweight, and uses the plug and play design mode, making it more adaptable to narrow spaces. It can be installed independently, on a wall, or on a pole.

5.2 DMR Trunking Core Network (System Server) eTC 220

The DMR Trunking System Server ZXTS eTC 220 dispatch subsystem is an important part of the trunking communication system. The subsystem consists of PTT Dispatch Server (PDS), PTT Home Register (PHR), Dispatch Agent Server (DAS), Operation & Maintenance Module (OMM), Integrated Network Management System (iNMS), Media Record Server (MRS) and unified Gateway (uGW).



Figure 5-4 External View of DMR ZXTS eTC 220

5.2.1 Interfaces and Protocols Supported by the Caltta Trunking DMR System

The following figure shows the network interfaces of the Caltta DMR Trunking system.

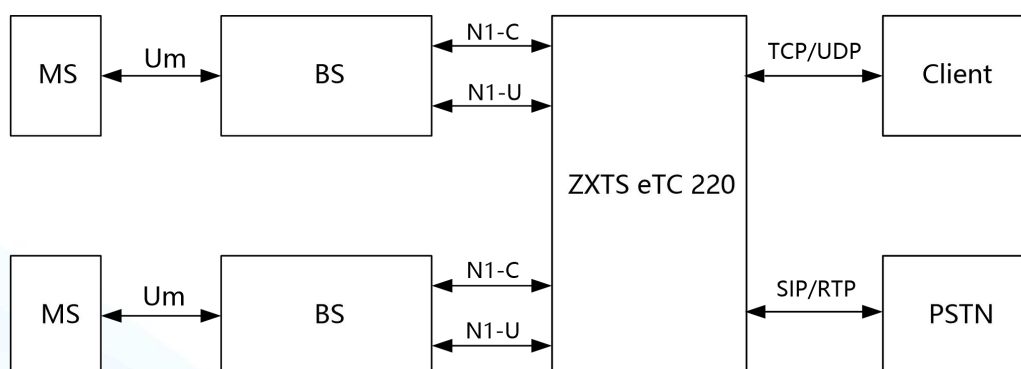


Figure 5-5 Network Interfaces of the Caltta Trunking DMR System

5.2.2 Features

The eTC220 has the following characteristics:

- Open Interface: Support open interface and secondary development by customer.
- High Reliability: Provide high availability and support backup and redundancy, which means two sets of core network servers can be configured in active-standby mode. Once the active server fails, services are automatically switched over to the standby server so that the trunking services can still operate properly.
- High Integration: The compact 2U server integrates all functions such as trunking control,

dispatch, network management, unified gateway, recording, etc., there is no need to deploy additional servers, which reduces the overall CAPEX and OPEX.

- High performance network processor provides fast service processing.

5.3 PH790 Portable Radio

5.3.1 Appearance of PH790



Figure 5-6 Appearance of PH790

5.3.2 Features

- Supports DMR Digital Trunking

PH790 Provides high quality voice service. It strictly meets the requirement of critical communication and responses the call of professional users anywhere and anytime. DMR dual slot provides double channel capacity, thus easing the shortage of frequency.

- Compatible With Both Digital and Analog Standards

PH790 Can be used under the use's existing analog network, and has better applicability, which supports smooth upgrade of network.

- Loud And Clear Sound

Through carefully optimized audio design, the PH790 combined with excellent audio encoder, it provides loud and clear sound.

- Large Capacity Battery

With 2000mAh battery and power saving of DMR, battery life is long enough for critical communication.

- Excellent Man-Machine Interface Design

Based on professional user habits, deeply customized MMI is developed. It helps the professional users to operate radio more comfortably.

- Rich Services

Besides voice and data service, it provides various customized services to help professional users to handle different types of tasks.

- Higher Safety

The digital standard and deeply customized OS provides high safety. Professional users are able to use hardware encryption card to encrypt voice and achieve higher safety performance.

- Reliable Quality

Meets IP67 standard, and is suitable for outdoor work. Shock, vibration, solar radiation and other indexes meets the Mil-STD-810. It qualifies for all kinds of severe working environment.

5.4 PM790 Mobile Radio

5.4.1 Appearance of PM790



Figure 5-7 Appearance of PM790

5.4.2 Features

- Supports DMR Digital Trunking

Provides high quality voice service. It strictly meets the requirement of critical communication and responds the call of professional users anywhere and anytime. DMR dual slot provides double channel capacity, thus easing the shortage of frequency.

- Compatible With Both Digital and Analog Standards

Can be used under the user's exiting analog network, and has better applicability, which supports smooth upgrade of network.

- Loud And Clear Sound

Through elaborate audio design, the PH790 combined with excellent audio encoder, it provides loud and clear sound.

- Various External Interface

Using external interfaces, users are able to avail many different functions. It provides audio port, serial port, local voice broadcast, GPIO and so on.

- Excellent Man-Machine Interface Design

Based on professional user habits, deeply customized MMI is developed. It helps the professional users to operate radio more comfortably.

- Rich AT instructions

Using AT instructions, users can control and integrate the mobile radio.

- Excellent Man-Machine Interface Design

Based on professional user habits, deeply customized MMI is developed. It helps the professional users to operate radio more comfortably.

- Higher Safety

The digital standard and deeply customized OS provides high safety. Professional users are able to use hardware encryption card to encrypt voice and achieve higher safety performance.

- Reliable Quality

Meets IP54 standard, and is suitable for outdoor work. Shock, vibration, solar radiation and other indexes meets the Mil-STD-810. It qualifies for all kinds of severe working environment.

6 Acronyms

Acronym	Full Name
4FSK	Four-level Frequency Shift Keying
BS	Base Station
BBU	Base Band processing Unit
CDMA	Code Division Multiple Access
DMR	Digital Mobile Radio
ETSI	European Telecommunication Standards Institute
FDMA	Frequency Division Multiple Access
GPS	Global Positioning System
GSM	Global System for Mobile Communications
LMR	Land Mobile Radio
LMT	Local Maintenance Terminal
LTE	Long Term Evolution
MPT	Ministry of Public Telecommunication
MS	Mobile Station
PABX	Private Automatic Branch eXchange

PDS	PTT Dispatch Server
PDT	Professional Digital Trunking
PoC	Push-to-talk over Cellular
PSTN	Public Switched Telephone Network
PTT	Press To Talk
RRU	Remote Radio Unit
SDR	Software Defined Radio
TDMA	Time Division Multiple Access

About Caltta

Caltta Technologies Co., Ltd (a subsidiary of ZTE) is a leading provider of integrated professional trunking communication solutions. Our company is committed to delivering value to customers by providing innovative solutions and Converging All to Talk. With more than 700 experienced professionals and over 300 trunking technology patents, Caltta is capable of providing DMR, CDMA GOTA, LTE and POC complete ranges of PTT end-to-end products and solutions, which have been accepted and deployed in more than 40 countries and regions globally, delivering satisfactory products and services to customers from various fields such as government affairs, public safety, transportation, energy, utilities, etc.



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