

Applying SDR in Mobile Base Stations

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Talking to the future

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Agenda

- ***Motivation and requirements from the market***
- Technological challenges for SDR application
- The SDR solution in ZTE mobile base stations
- Achievements and success

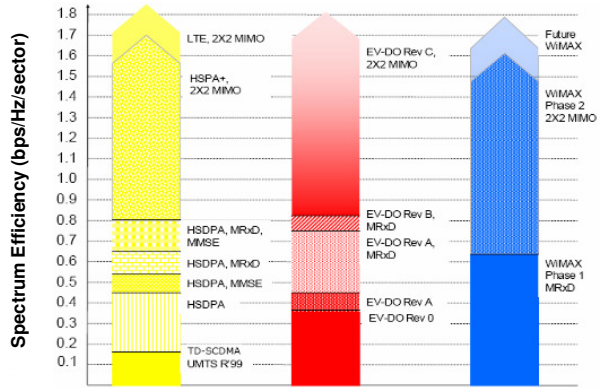
Co-existence of Multi-frequency Bands

- 700 MHz
- 850 MHz
- 900 MHz
- 1800 MHz
- 1900 MHz
- 2.1 GHz
- 2.3 GHz
- 2.6 GHz
- 3.5 GHz
- ...

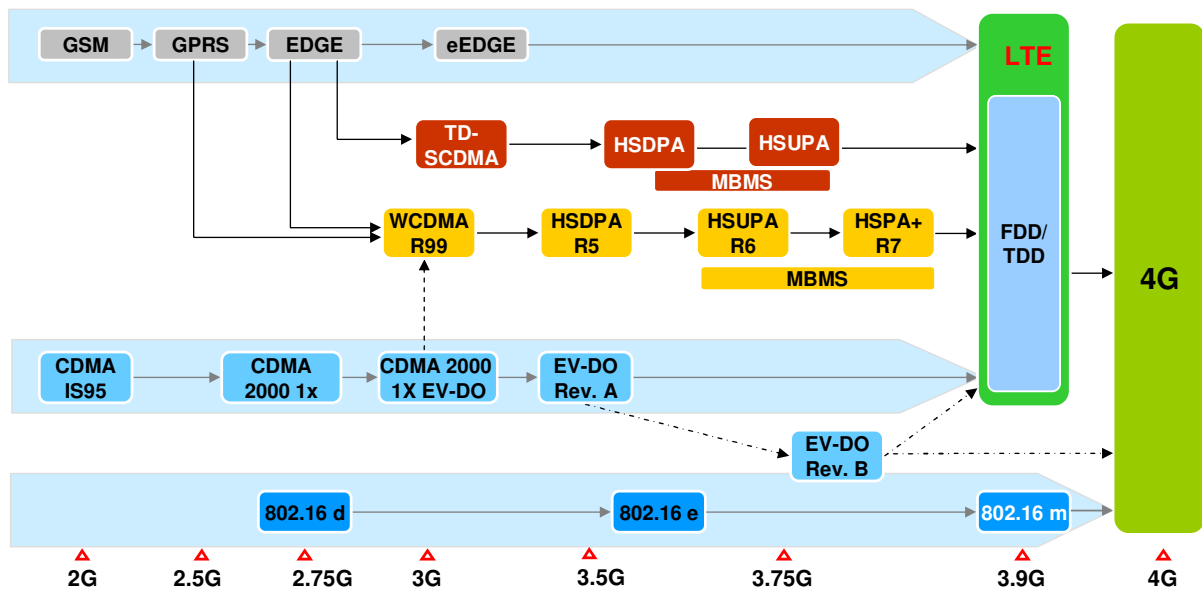
Increased user traffic leads to



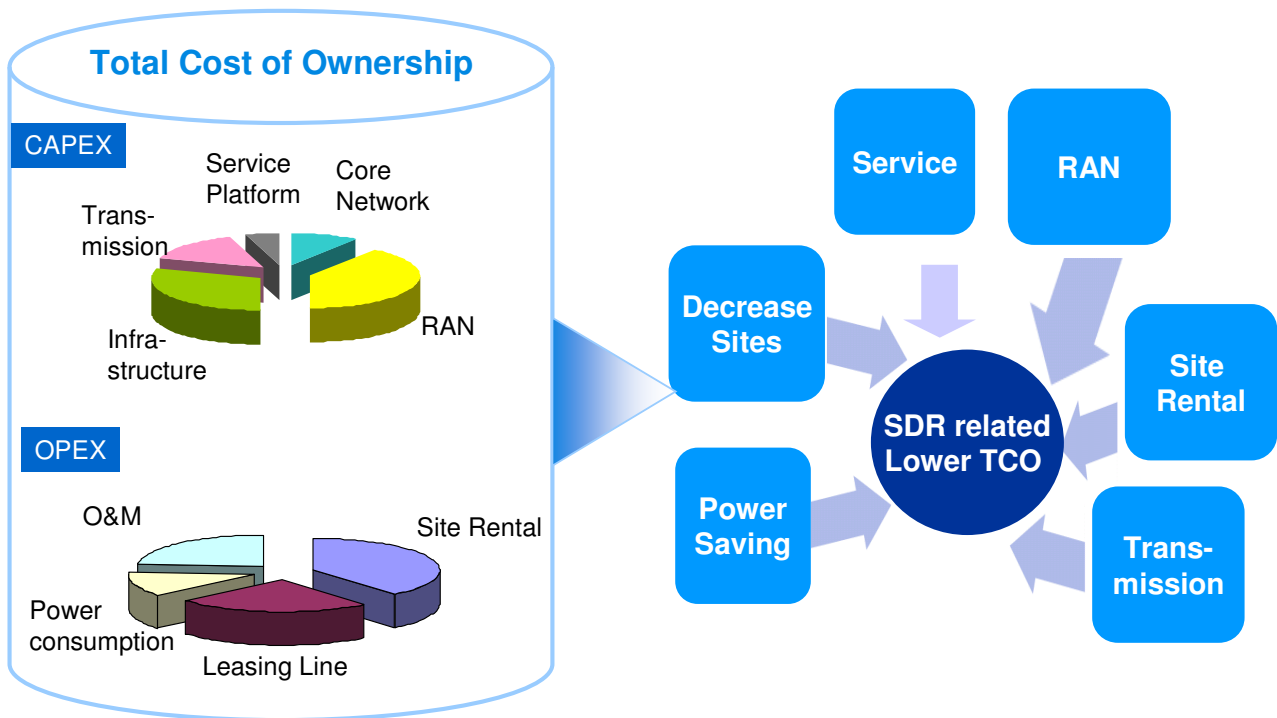
- Operators to get more frequency bands
- To increase the spectrum efficiency



Co-existence of Multiple Standards



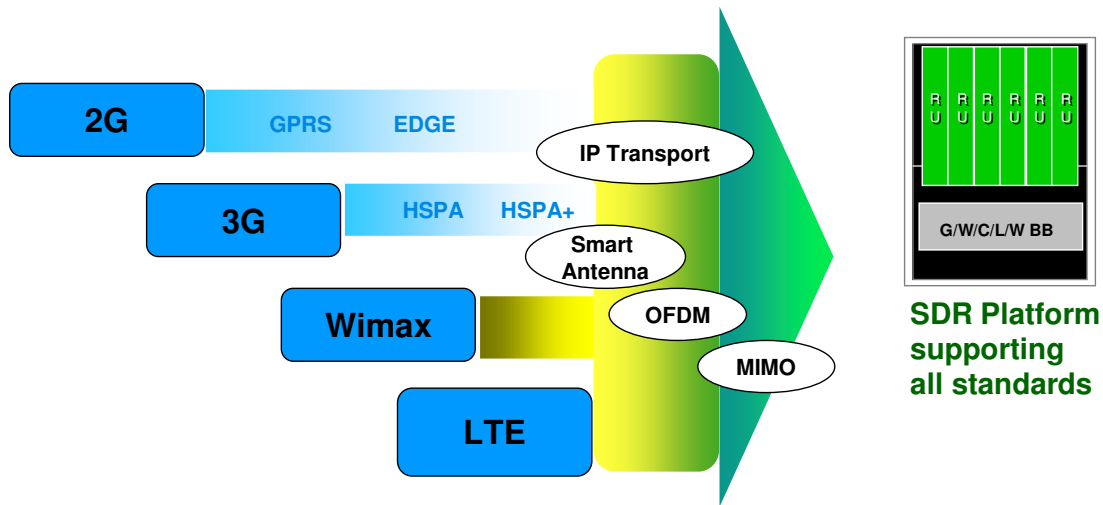
Pressure on Operators to reduce the TCO



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Technological Challenges for SDR Applications



■ SDR accommodating:

- Standards for 2G/3G/4G
- All IP, Smart Antenna, OFDM, MIMO

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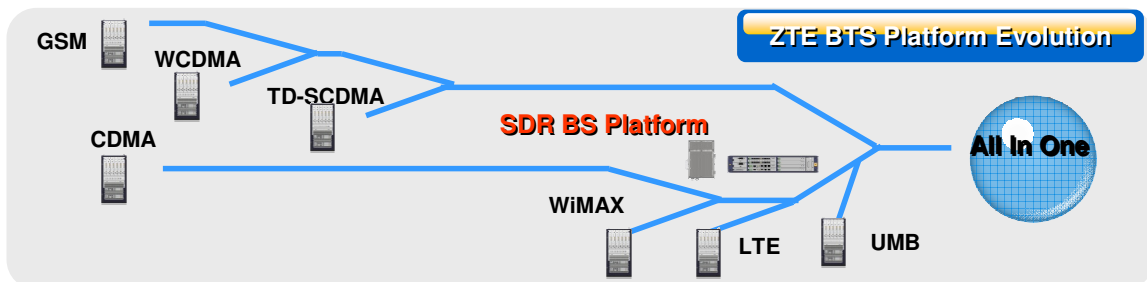
ZTE SDR Platform started in 2007

ZTE is a member of SDR FORUM, started early research in SDR

- RF technology: CFR+ DPD (Doherty)
- ◆ High efficiency amplifier
- ◆ Broad bandwidth
- ◆ Supporting multi-standards



- BP slots supports WCDMA, GSM, CDMA, WiMAX, TD-SCDMA
- Re-use concept for power, main control, interface CPRI
- Achieved:
 - ◆ Multiple standards
 - ◆ Multiple frequency bands
 - ◆ Small unified module for Macro, Micro and Pico base stations
 - ◆ High interface capacity (10G*12+1G*12)
 - ◆ Flexibility in multi-tile, multi-size and multi-shelf)



ZTE SDR Solution

One Cabinet Base Station



Distributed Base Station

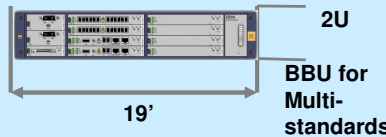
RF Unit



RRU supports multi-standards on the same frequency band

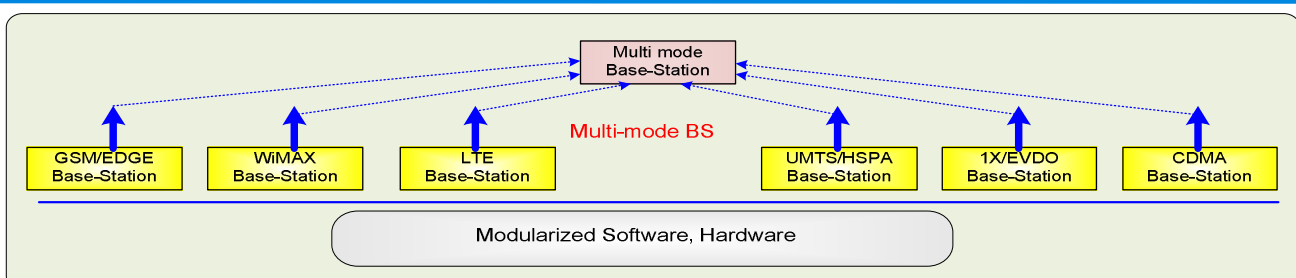
Optical Fiber

Base Band Unit

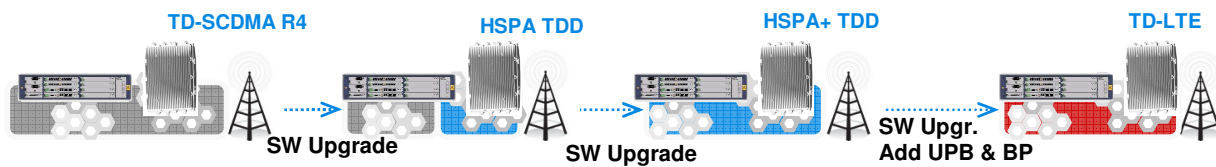
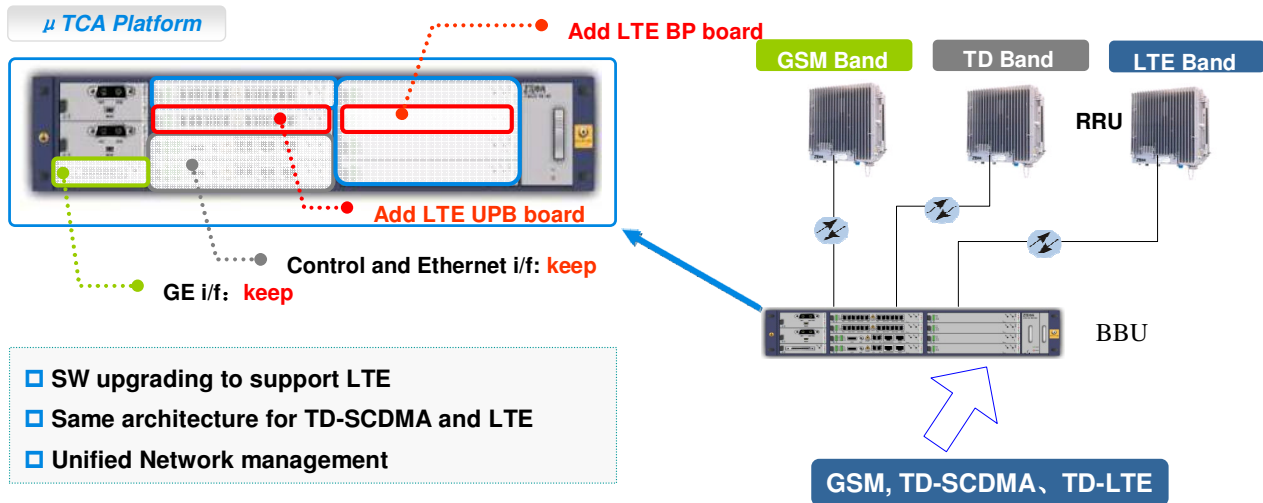


Advantages

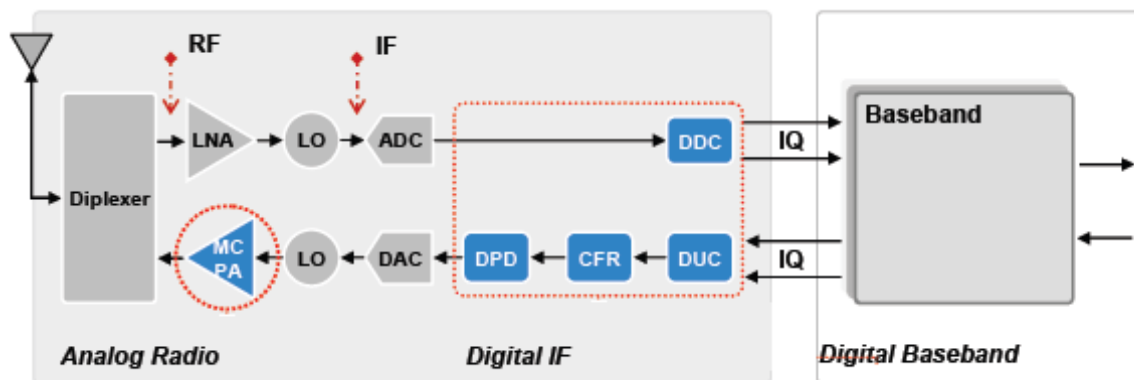
- Easy capacity increase
- Smooth evolution
- Low TCO
- Compact structure



BBU Platform Supports Multi-standards



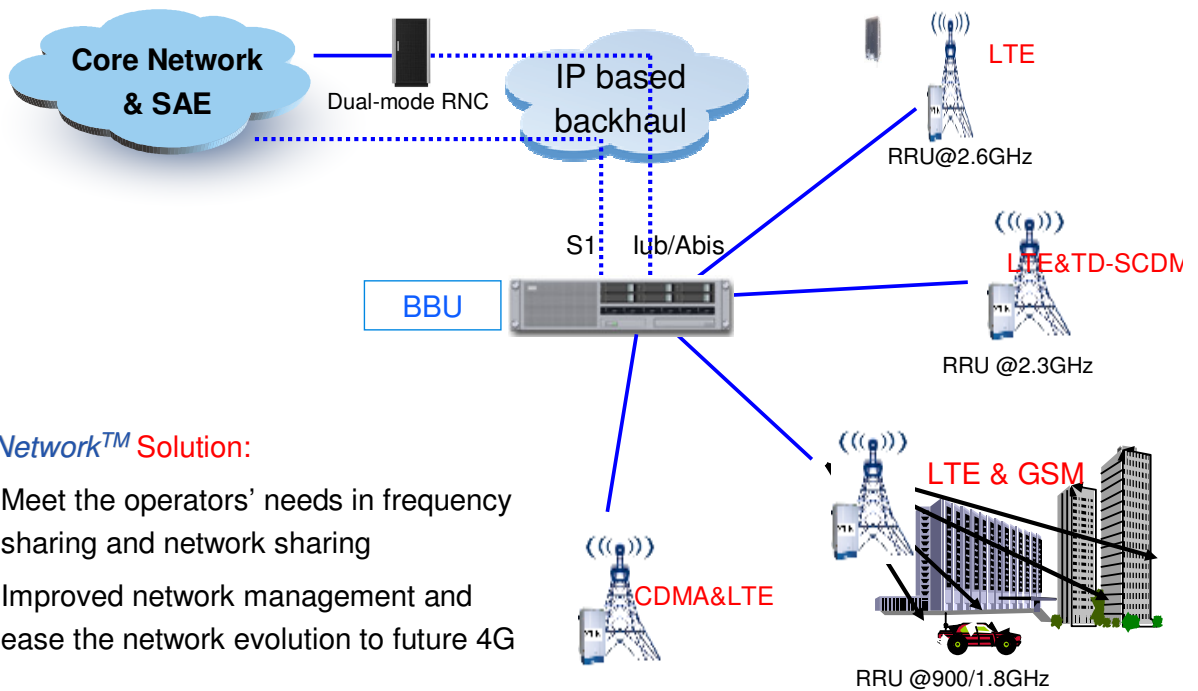
ZTE's SDR Implementation Structure



Frequency selective

Frequency independent

ZTE's SDR Base Station Supporting Multi-standards

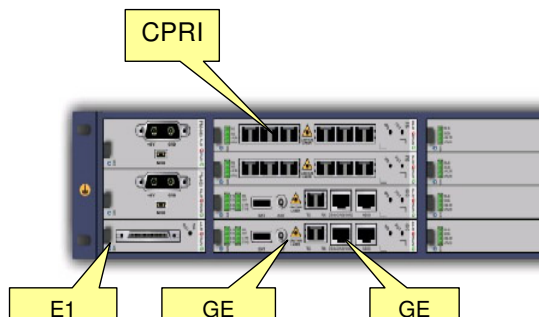


OneNetwork™ Solution:

- Meet the operators' needs in frequency sharing and network sharing
- Improved network management and ease the network evolution to future 4G

Decreasing TCO in Transmission

Standardized interfaces enable large scale application and decrease cost



Synchronization via Ethernet

Flexible connection via standard i/f for expansion across regions

- ▣ High speed interface
 - SRIO
- ▣ BB - RF interface
 - CPRI standard
 - Support distributed mode
 - Flexible installation, easier to acquire sites
 - Improve the quality of network planning
- ▣ Transmission interface
 - Support Ethernet (2*FE/GE)
 - 10/100/1000M Electrical
 - 1000M Optical
 - Support PacketOver E1/T1 , 16*E1/T1
 - Support STM-1

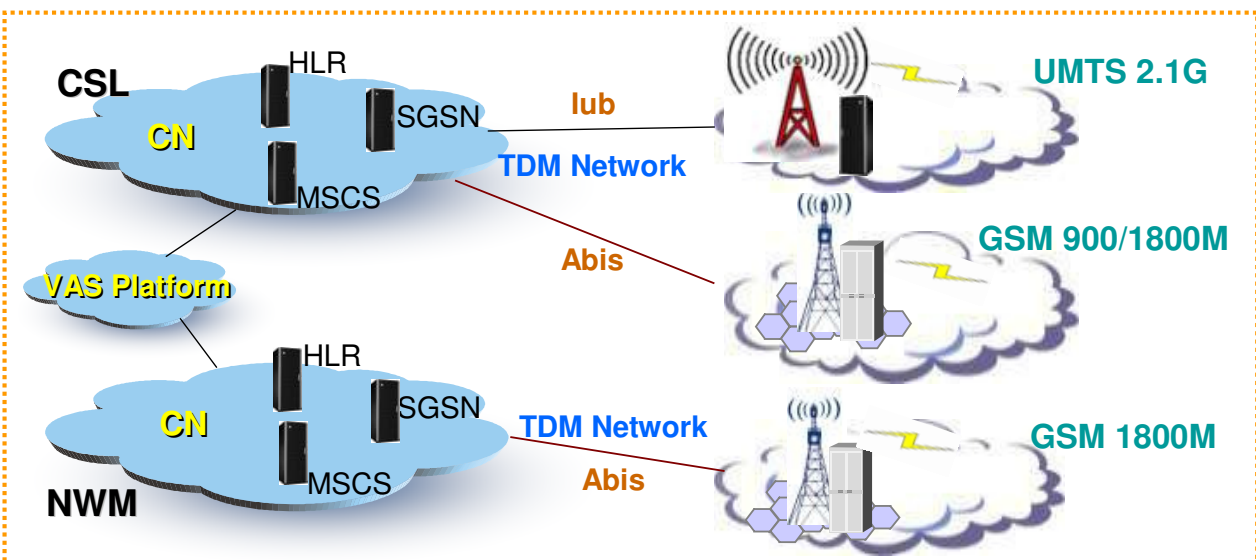
Decreased CAPEX and OPEX

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Hong Kong CSL Network Structure 2008

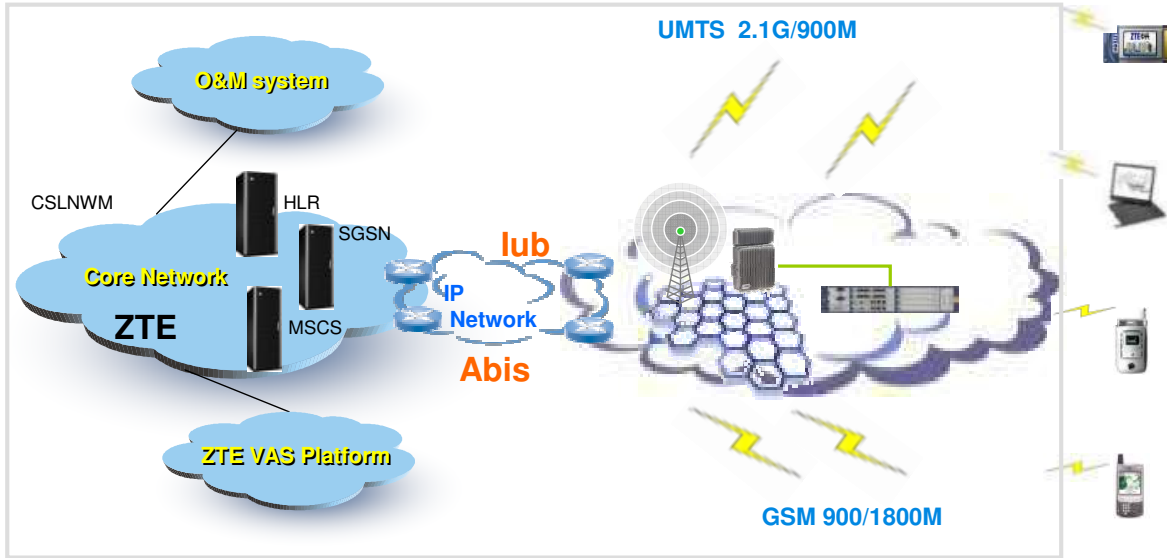


- Over 2000 sites with 3 sets of equipments
- 3 separate RAN layers
- 2 separate CN networks
- 3 separate O&M systems
- Separate transmission network

5 Switching Centers:
12 RNC/47 BSC/8CS/6 PS/4HLR

Large-scale & Complex

ZTE One Network Solution for Hong Kong CSL

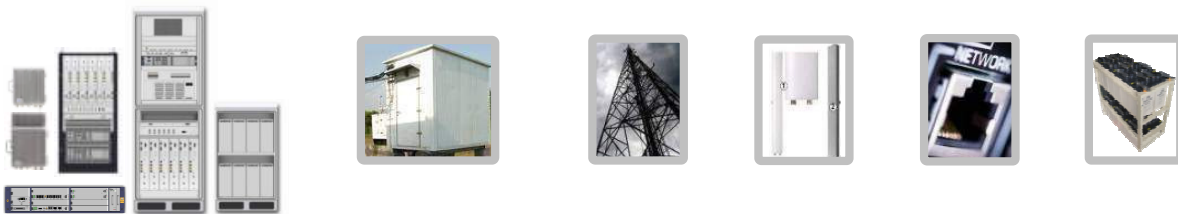


- 1 site, 1 set of equipments for multi-mode/band
- 1 consolidated CN network for 2G/3G
- 1 consolidated O&M system for 2G/3G
- All-IP transmission, 1 link/ 1site

Efficiency & Simplicity

CSL Network TCO Saving - Before and After

ZTE SDR Series Node Bs Family



| Index | Before | After | Remark | Saved % |
|--------------|----------------|---------------|------------------------------------|---------|
| Antenna pole | 8,674 | 3,465 | | 60.1% |
| BTS rack | 5,019 | 1,500 | BBU in power rack, 1/2 size | 70.1% |
| E1 | 7,679 | - | | - |
| FE | - | 1,500 | Include future expansion | 90 % |
| Power | Over 4KW | 1.98KW | Include new additional 900MHz UMTS | 50.5% |
| MSCs rack | 8 (3.1M Subs) | 4 (6.4M Subs) | | 75% |
| SGSN rack | 6 (0.79M Subs) | 4 (6.4M Subs) | | 90% |
| HLR rack | 8 (3.5M Subs) | 2 (7.7M Subs) | | 12% |

Over 200,000 SDR Base Stations by ZTE

November 16, 2009

The screenshot shows the ZTE website interface. At the top left is the 'LteWorld' logo. To its right is a 'Login/Regi' link. Below the logo is a navigation bar with links for HOME, TRAINING, RESOURCES, EVENTS, MAPS, FEMTOCELL, and ABOUT. A secondary navigation bar contains 'LTE Training' and 'Become an LTE Expert eLearning - Classroom'. The main content area features a news article titled 'ZTE SDR Base Station Records over 200,000 Volume Shipment'. The article's date, 'November 16, 2009', is circled in red. To the right of the article is a vertical list of supported technologies: GSM (GSM, EDGE), UMTS (WCDMA, HSPA, HSPA+), CDMA2000, TD-SCDMA, FDD LTE, WiMAX, and TDD LTE.

Home » ZTE SDR Base Station Records over 200,000 Volume Shipment

ZTE SDR Base Station Records over 200,000 Volume Shipment

November 16, 2009 | ZTE Corporation (ZTE) (H share stock code: 0763.HK / A share stock code: 000063.SZ), a leading global provider of telecommunications equipment and network solutions, today announced that its Software Defined Radio (SDR) base stations have recorded a total volume shipment of over 200,000 units as of October 2009. It took the company almost one year to achieve the first 100,000 SDR units shipped by April 2009, and only six months to ship the second 100,000. The fast growth showcases global operators' recognition and favor of ZTE as a leading provider of SDR base stations, helping them meet the rapid market needs.

ZTE is the world's first equipment manufacturer to roll out its SDR base station platform, taking the lead in commercial deployment. With its SDR platform, ZTE's variety of multi-band and multi-standard wireless communications systems can be implemented with SDR technology, including GSM, UMTS, CDMA2000, TD-SCDMA, FDD LTE, WiMAX and TDD LTE, all on the same hardware platform to realize co-existence and a smooth evolution between GSM/UMTS dual-mode, GSM/UMTS/LTE multi-mode and CDMA/LTE dual mode, thus reducing operators' TCO.

3G networks utilizing ZTE SDR base stations are being constructed across China, including a TD-SCDMA network (China Mobile), WCDMA network (China Unicom) and CDMA2000 network (China Telecom). In third party testing on China Unicom's WCDMA network conducted recently in 77 cities, ZTE's SDR solution achieved the highest ideal network ratio of 71.4% among the testing vendors.

In September this year, ZTE and CSL, the largest mobile operator in Hong Kong, jointly released an LTE commercial test network. Based on ZTE's SDR base station platform, CSL successfully built GSM/UMTS/HSPA+/LTE multi-mode networks with a maximum download rate of 127.552Mbps and a mobile download rate of 43.9Mbps. Through its proven track record, ZTE is recognized as a reliable and innovative supplier for global operators and equipment providers in the area of SDR base stations.

Average:
☆☆☆☆☆

- GSM (GSM, EDGE)
- UMTS (WCDMA, HSPA, HSPA+)
- CDMA2000
- TD-SCDMA
- FDD LTE
- WiMAX
- TDD LTE

Thanks!

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