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References

[1] The drivers to LTE, Motorola
[2] Long Term Evolution (LTE): Roadmap, Motorola
[4] Long Term Evolution (LTE): Air Interface, Motorola
Executive Summary

This document is intended to discuss Motorola approaches for migrating GSM networks to offer LTE services, leveraging Motorola’s LTE portfolio that represents an evolution of the highly regarded WiMAX network solutions.

Motorola already has LTE trial plans in place and is conducting eUTRAN/EPC trials from 2008 through mid-2009. Motorola’s commercial LTE release (Release 1) will occur in the fourth quarter of 2009. The second commercial release (Release 2) is currently targeted to mid 2010 with Release 3 currently targeted in the fourth quarter of 2010. Follow-on releases generally will occur every six months as Motorola continues to enhance the products and implement value-added customer features. Motorola Multi-Carrier GSM (MC-GSM) products known as CTU4/RCTU4 in this paper are LTE hardware capable. This enables operators to deploy GSM initially, and at a later stage, to upgrade the equipment to deliver LTE services leveraging the existing sites and ancillaries. Motorola has conducted MC-GSM demos with a number of our GSM customers. As the longstanding carrier grade GSM supplier, Motorola’s new flexible radio designs, competitive GSM product portfolio, highly skilled field support and optimisation expertise will further offer competitive edge to our customers.

Motorola’s extensive expertise in mobile broadband innovation, including OFDM technologies and collapsed IP architectures, along with our commitment to Media Mobility collectively make Motorola’s LTE/EPC solution best in class. Motorola’s LTE portfolio represents an evolution of the highly regarded WiMAX network solutions that Motorola has brought to market in 2007 and 2008. As a result, Motorola’s initial LTE offerings will be more mature than those offered by other equipment providers.

Motorola has always been an innovator and pioneer in the mobile telecommunications industry, and is extremely active in the development of LTE standards. We are proud to be the top contributor in LTE standards RAN 1, the leading contributor in RAN 2 and a top 3 contributor to EPC 1 & 2 standards in addition to the extensive engagement in NGMN and LSTI. Furthermore, Motorola continues to push for a flat RAN architecture based upon the Internet Protocol, which results in all of the radio-specific functions controlled by the eNodeB with separated control and user plane functions in the packet core. The flat RAN architecture results in significantly lower capital (CAPEX) and operational (OPEX) expenditures for our customers.

Motorola would welcome further discussion on our vision in offering Mobile broadband services.
A Dynamic Industry and Technology Evolution

The wireless industry has seen consistent growth in the demand for both voice and data services over the past several years. The number of mobile telephone subscribers, as well as the usage, has grown considerably. The operators have been upgrading their networks with advanced technologies in order to deploy both high-quality voice services and innovative data services. Service providers and equipment vendors are driving innovations with the latest wireless technologies to improve the efficiency of spectrum used, getting more capacity out of a given spectral bandwidth.

The recent increase of mobile data usage and the emergence of new applications such as MMOG (Multimedia Online Gaming), mobile TV, Web 2.0 & Streaming Contents have motivated the 3rd Generation Partnership Project (3GPP) to introduce Long-Term Evolution (LTE). LTE is the latest standard in the mobile network technology tree that encompasses the previously defined GSM/EDGE and UMTS/HSPA standards, accounting for over 86% of all mobile subscribers worldwide. LTE will ensure 3GPP's competitive edge over other cellular and mobile broadband technologies; however, it does not preclude the use of LTE in conjunction with other cellular technologies, e.g. 3GPP2, WiMAX and other non-3GPP technologies.

The 3GPP market is currently served by two technologies: GSM (with GPRS, EDGE, and Evolved EDGE) and UMTS (with HSDPA, HSUPA, and HSPA+). The evolution and key technical aspects of these technologies are summarized below:

<table>
<thead>
<tr>
<th>Technology</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSM</td>
<td>A voice-centric FDD TDM based mobile architecture using an 8-timeslot 200 kHz carrier structure. Core network based on ISDN with mobility enhancements.</td>
</tr>
<tr>
<td>GPRS</td>
<td>Introduces a packet overlay to GSM. GSM air-interface timeslots carry shared packet data channels. GPRS added to the existing GSM RAN equipment via the PCU and a standardized Gb interface using frame-relay. Separate packet core network from CS, with optional coordination of mobility between the CS &amp; PS domains.</td>
</tr>
<tr>
<td>EDGE</td>
<td>High-speed enhancement to GPRS timeslots.</td>
</tr>
<tr>
<td>E-EDGE</td>
<td>Proposed higher-speed enhancement to EDGE.</td>
</tr>
<tr>
<td>UMTS (R99)</td>
<td>The network technology based on a FDD wideband-CDMA on a 5 MHz carrier. Separate network to GSM, with efficient handover between GSM and UMTS. Supports CS and PS services via dynamic dedicated channels to each terminal. Core network equipment may be an upgrade from GSM. Uses ATM and now IP transmission. The split of responsibilities between RAN and core at the Iu interface is different to GSM's A/Gb interface.</td>
</tr>
<tr>
<td>HSDPA/ HSUPA</td>
<td>Adds new high-speed packet shared packet channels to the existing R99 UMTS system, and works within the R99 frequencies. Shared channels do not use soft-handover, and air-interface management functions for these channels moved from RNC to NodeB.</td>
</tr>
<tr>
<td>HSPA+</td>
<td>Enhancement of HSDPA/HSUPA to exploit available radio technologies as well as the option of ‘flattening’ the existing complex architecture.</td>
</tr>
</tbody>
</table>
The Importance of GSM

GSM has been a tremendously successful technology and has an unsurpassed installed base of infrastructure and subscribers. Figures from the GSM Association show that, as of 4Q 2007, GSM has more than 86% of the global wireless market and over 3 billion subscribers by 1 April 2008 worldwide as shown in Figure 1. Leveraging GSM subscriber base, spectrum, coverage, and network infrastructure already in place will ensure that GSM operations continue to be profitable.

GSM will remain for a considerable time serving many customers, supporting roamers, and providing coverage while eventually migrating to LTE. Given the availability of low cost GSM handsets with longer battery lifetimes in the mass market, GSM will remain an attractive option for emerging and developing markets where the consumer needs are to be economically addressed. Motorola has been very active in GERAN standards body that governs the development of standards for GSM. GERAN is currently following an aggressive path of feature development for GSM that will enable ultra low cost voice connectivity. This has two consequences: firstly, it allows GSM to be deployed in ever more remote and lower cost markets; and secondly, it will eventually allow the ultra low cost voice everywhere via GSM and the lowest cost per bit if the platform is upgraded to LTE.

A positive experience for subscribers is essential as they migrate from GSM to LTE. With a well planned seamless network strategy, it is possible to offer basic services such as voice and SMS on both GSM and LTE networks. A service that is initially launched on GSM can be made accessible on LTE. Legacy GSM subscribers using certain types of service will be able to maintain the same service; however, the quality of service will improve when using a multimode LTE capable handset.

Leapfrogging UMTS

Universal Mobile Telecommunications System (UMTS) is 3GPP Release 99 standards for 3G mobile communication systems, which provide a range of multimedia services. It has evolved from its initial format through the developments such as HSDPA (High Speed Downlink Packet Access) and HSUPA (High Speed Uplink Packet Access) to provide higher data bandwidth.
Almost 7 years from the launch of the first fully commercialized operation, UMTS networks are now deployed in 91 countries. With approximately 345 GSM/EDGE networks commitments in 158 countries, there are a significant number of GSM operators that have not deployed 3G services and may choose to skip UMTS and deploy LTE directly. LTE is expected to substantially improve end-user throughputs, spectral efficiency (see Figure 2 and Figure 3), and sector capacity as well as reduced user plane latency. An integrated GSM and LTE network will deliver a significantly improved user experience and much lower cost voice services at the same time.

LTE will further reduce the overall cost per MB, increase network capability to support more sophisticated applications, and enable more price sensitive markets to achieve the economics necessary to realize a positive business case for broadband data services. LTE spectrum bandwidth flexibility (ranging from 1.4MHz to 20MHz) means it offers the GSM operators a practical solution for progressively re-farming their GSM spectrum. In comparison, UMTS with its fixed 5MHz bandwidth allocation is much more difficult.

UMTS/HSPA is here today. HSPA+ will be available in 2009. LTE will also be commercially available at the end of 2009 with operators’ live commercial LTE operations at the beginning of 2010. Some GSM operators have now chosen to invest their CAPEX on OFDMA based LTE instead of UMTS when migrating from GSM.

Seamlessly Connected Network
A seamlessly connected network provides service transparency across various access networks, enhancing the user experience. It protects investments, adds flexibility, and increases efficiency.

The 4th generation of wireless systems will provide users with easy access to voice, data and multimedia services. The migration from GSM to LTE involves a major change in networking technology, moving
fundamentally from a circuit switch network to all-IP technologies that involve new approach in planning a network and new technical challenges. The seamless LTE migration from GSM will also draw upon Motorola commercial deployment and network planning experience in both IP packet networks such as WiMAX and our extensive experience in IP technologies for voice-centric use in public safety domain.

Integrating GSM and LTE technologies into a single combined network allows operators to provide LTE subscribers with ubiquitous access to all of an operator’s existing voice, data and multi-media services as well as with access to new LTE services in those areas where LTE coverage is available. When moving out of the LTE coverage area, the LTE subscribers are switched from LTE to the ubiquitous GSM/GPRS/EDGE network. In an integrated GSM and LTE network that fully supports the Release 8 standards, this change of access networks is automatic and seamless so that the subscribers are unaware of the change.

The seamlessly connected network provides service transparency. Users are not always cognizant of the actual technologies involved in delivering high-quality services, but are aware of the high quality and extensive range of services they receive. Initially users may expect the fastest service in higher density urban areas but understand that the extension of these services will tied to the ability to maintain coverage and the tradeoffs in performance that may exist. However, since Motorola can essentially align the RF grids for LTE and GSM at 900/1800 MHz, enabling operators to provide similar coverage, re-use existing GSM sites and ancillaries. Motorola radio planning capabilities allow operators to gradually deploy LTE services in even the most remote areas.

The flexible seamlessly connected network employs the different technologies to provide the capacity needed to deliver the same kind of services to subscribers and selects the best technology or a combination of technologies to meet subscribers’ needs during any given session. It allows an operator to offer the best quality of service for voice, data and multimedia, in the most cost effective and resource efficient manner. GSM operators that deploy LTE and evolve to a seamless network will be able to differentiate services based on the type of service while enabling market segmentation. LTE handsets will be multi-mode terminals capable of handling GSM and LTE. Users will be able to access services from both networks while the multimode handsets will provide users with seamless services.

**Flexible Deployments**

One of the advantages of LTE is that it can coexist with GSM and its flexible spectrum bandwidths give an option for operators to progressively re-farm the GSM spectrum for LTE services. The GSM frequency bands are a substantial part of an operator’s total spectrum assets and the optimal utilization of these for both LTE and GSM will be a critical success factor.

The 900 MHz band is not only the most ubiquitous and the most harmonized worldwide wireless telecommunication spectrum band available today but also has the benefit of increased coverage. Compared to deployments at higher frequencies, the 900 MHz band also offers reduced network deployment costs, making it a highly strategic spectrum band. Many operators also have GSM allocations in the 1800 MHz band, and it also provides the advantage of ubiquity. With the bandwidth flexibility (ranging from 1.4MHz to 20MHz), LTE can take advantage of the deployment with not only the wider bandwidths (e.g. >10MHz) but also the smaller bandwidths (less than 5MHz) to utilize the unused spectrum. For example, in Europe, more than 87% of the operators own 900/1800 MHz spectrum with less than 5MHz and approximately 44% of the operators own 1800 MHz spectrum with bandwidth more than 10MHz. There is no UMTS currently deployed in 1800 MHz band. Therefore, many operators are evaluating the potential for deploying LTE in these bands.

UMTS can only be deployed once a full 5 MHz of spectrum is freed up, whereas LTE that can be deployed in bandwidths as small as 1.4 MHz provides good initial deployment scalability as it can be literally “squeezed” into freed-up GSM spectrum and subsequently increase as additional bandwidth becomes available. For these reasons, some operators are considering migration of GSM spectrum for LTE use when LTE becomes commercially available at the end of 2009.

Although UMTS has been extensively deployed in the 2.1 GHz core band, there are many developing markets that have not yet fully licensed the entire 2.1 GHz allocation. The practice of technology-neutral licensing of broadband wireless technologies in 2.1 GHz band also has the potential to facilitate LTE technology adoption.
Starting in 2008, as much as 140 MHz of IMT2000 FDD expansion spectrum will be allocated in Europe; 2500-2570 MHz for uplink and 2620-2690 MHz for downlink. It is likely that LTE will be deployed in the FDD portion of this band. In addition, this band offers a unique opportunity for the deployment of LTE in maximum spectrum bandwidth by providing channels of up to 20 MHz with a single LTE radio as opposed to 4 HSPA radios to provide a maximum economic efficiency.

In summary it is very likely that initial LTE services in 3GPP market will be deployed in 900MHz band for coverage in rural locations, and 1800 MHz and 2.6 GHz for capacity. There is a good business case for LTE in the 1800 MHz band since a significant amount of spectrum bandwidth in this band is underutilized. In addition, 1800 MHz can provide better propagation than 2.6GHz.

Maximize Existing Assets

Site acquisition costs, backhaul costs, and operating costs have been recognized as the three key issues driving the business case of deploying LTE as shown in Figure 4. In some countries, it is very difficult to make significant changes to a site without needing to heavily involve local government and municipal authorities. Therefore, not having to replace BTS is a key element whereas replacing a radio is not so problematic.

- **Cost categories offer varying impact to the operator’s financials**
- **CAPEX comprising only 20% of TCO**

![Figure 4. 4G Network Cost Categories](image)

Operators can leverage existing investments by reusing equipment for their LTE networks. Shared resources, including power, site re-use and open interfaces can offer a cost efficient network solution. Both capital expenditure (CAPEX) and operating expenditure (OPEX) savings can be realized when evolving from a GSM only network to a seamless GSM/LTE one.

CAPEX: The radio access network is one of the most expensive parts of a wireless network and offers significant opportunity for potential savings. Coexistence of GSM and LTE provides opportunities to share sites due to the small equipment footprint while supporting the capability to share expensive backhaul facilities. Co-location of Motorola-only equipment on a site increases the potential for savings thanks to
Motorola’s LTE solutions that are designed to coexist with Motorola’s GSM solutions. Motorola’s solution will align the RF grids for LTE and GSM at 900MHz/1800MHz and thus make co-location much more practical.

OPEX: In addition to our power efficient product designs such as advanced PA techniques to reduce OPEX, Motorola has also recognized and indeed contributed to the 3GPP recognition that the role of the EMS in LTE is significantly diminished. The multiplicity of IP based services requires that the primary Operations focus is at the NMS. This is essential in order to ensure that the Operator has immediate access to all of the elements making up the end to end Network infrastructure.

The Motorola EMS solution therefore focuses on the essential tasks that are not easily duplicated at the NMS. The support of the 3GPP North Bound Interface means that all of the primary Operations tasks can be managed centrally. Major configuration changes, and software downloads would still typically be managed through the LTE EMS.

Motorola’s support of SON (Self Organizing Networks) is an important enabler for this change in focus. The eNode B has integrated intelligence supporting the 3GPP defined Standardized SON use cases, including the necessary metrics for the support of centralized SON.

Motorola already has an established name in bulk optimization solutions for GSM, CDMA and iDEN technologies, and significant experience in OFDM from WiMAX deployments.

Managing the network from the NMS not only provides the Operator with an end to end view of performance, but also significantly reduces the O&M workload by not having to provide 24/7 support at the EMS. These cost savings are both enabled and further enhanced by Motorola’s SON implementation.

Motorola GSM Migration to LTE Approaches

Figure 5 shows a network with Motorola Horizon II BTS supporting both 2G/2.5G GSM access, and a dual access Horizon II BTS supporting GSM and LTE access. It also shows an LTE overlay network consisting of single band Motorola eNodeB. The Motorola LTE EPC network components (MME, SGW, PDN-GW) seamlessly integrate into the existing GSM infrastructure over standard interfaces.

Motorola Solution of Migrating GSM to LTE

For operators with installed GSM infrastructure, Motorola plans to provide a migration path based on the Motorola GSM Horizon II BTS to support both GSM and LTE access functionality in a single base station. The Horizon II operating in the 900/1800 band supports a smooth migration to LTE. For operators with additional spectrum, Motorola can also provide a complete LTE overlay network to work in conjunction with the installed GSM base.

Motorola has introduced a new GSM radio platform that is based on Multi-Carrier Power Amplifier (MCPA) and Baseband Unit (BBU) technology. This modified radio architecture will split the baseband & RF functions (traditionally in the same unit) into two physically separate modules that are connected on optical fiber. This change means that the Horizon II platforms will have much greater flexibility to support new system architectures like LTE.
Figure 5. Motorola GSM to LTE Migration Network Architecture

- Maximize Site re-use – Frequency re-farming
- Minimize Footprint – Re-use existing cabinet / Power
- Maximize Tower utilization – Re-use feeders + Re-use/replace Antennas

Digital Baseband

RF options

- Horizon II Macro Cabinets
- Add LTE BCUIII

- RRU Remote RF for all LTE spectrum
- CTU4 - Horizon II embedded radio
  - LTE re-farming GSM spectrum
  - 900 MHz & 1800 MHz

- MC-GSM
  - LTE Ready via Software upgrade

Figure 6. Motorola’s GSM to LTE Migration Solution
The new GSM radio module supports the RF functions, and is ‘LTE-ready’. It will be available in two discrete form-factors to suit different network needs.

The first form factor is a plug-in module known as CTU4 for the Horizon II BTS range. This product will be suited to established customer networks, and can be used on existing sites with zero or minimal site re-engineering. The product will have significantly reduced power consumption compared to the existing radio platforms.

The second form factor is a Remote Radio Unit (RRU) known as RCTU4. This product will be particularly suitable for Greenfield GSM deployments or major system expansions, allowing operators to achieve a minimum Total Cost of Ownership (TCO) with no compromise in performance.

The radio elements connect to the BBU by a fiber interface. The GSM BBU function is optimally integrated into the cabinet as a mezzanine card on the Site Controller card for GSM use, the integrated GSM BBU solution will be available when the new radio platform is launched in 2009. Subsequent migration to LTE can be achieved using a separate 19” rack-mount LTE BCUIII fitted in the cabinet stacking bracket to minimize the impact of GSM operations.

The new radio architecture outlined above is the pivotal factor in providing a smooth migration from GSM to LTE. While there is still more detailed work to be done in relation to LTE specifications, our experience with MCPA architectures and WiMAX deployments allows us to make reliable assumptions about the basic migration scenarios.

A migration to LTE in the 900/1800 band would entail:

- Hardware upgrade of the radio modem by adding the rack mounted LTE BCUIII.
- Firmware upgrade to the radio PA.
- Provision of an IP connection from the radio modem to link into the Evolved Packet Core (EPC).
- No changes to feeders, antennas or other site ancillary equipment.
- No other changes to BTS cabinet (apart from BBU upgrade indicated in Figure 6).

Motorola’s sophisticated technical solutions for LTE will allow a high degree of commercial flexibility when setting the strategy for LTE. It allows existing 900 MHz and/or 1800 MHz spectrum to be re-farmed for LTE (if appropriate) or for Motorola RRU products in other LTE specified bands to be simultaneously supported on the Horizon II platform alongside the legacy GSM deployments. If it is necessary to lease fixed-capacity facilities (e.g. E1 links) for backhaul, it can be extremely expensive to provide the bandwidth needed to support the peak eNodeB air-interface capacity for this deployment scenario. To address this issue, Motorola wireless backhaul provides a competitive and flexible operator-owned solution for backhauling GSM and LTE together and driving down backhaul costs significantly. Although Motorola product portfolio offers the upgrade options via 3GPP R7 one tunnel solution for our customers with Motorola existing 2G/3G packet core already deployed in the field, Motorola strongly recommend overlaying evolved packet core in order to seamlessly introduce new mobile broadband services using LTE while maintaining the same level of the existing 2G/3G services. Motorola’s EPC implementation separates the control and bearer plane via separate physical platforms for the MME and SGW/PDN-GW functions.

This separation of platforms provides a number of benefits to the operators, including the following:

- Allows independently targeting capacity and equipment growth to the control or bearer plane functions.
- Allows platform hardware matched to function, i.e. use of ATCA for control plane and IP routing platform for bearer plane.
- The MME function is not built on a legacy SGSN platform. This eliminates the concern of running a new technology on legacy packet core node that has been optimised for 2G/3G operations and may have limited capacity and expandability when applied to EUTRAN/EPC deployments.
Motorola E2E LTE Solution Overview

If operators wish to overlay LTE services or the capacity of current GSM/UMTS networks is fully utilized, Motorola also provides the LTE overlay solutions as briefly described in this section. Please refer to the white papers in the reference section for further details.

Motorola eNodeB Product Overview

The Motorola LTE wireless broadband technology delivers simultaneous improvement in key performance attributes while providing OPEX improvements to reduce the service providers’ cost of ownership.

The modular design provides scalable cost effective expansion for capacity and enhanced network coverage. The eNodeB architecture consists of two building blocks – Baseband control unit (BCU) and RF Unit (RRU). Each RRU is connected to the BCU via a fiber connection supporting flexible deployment scenarios as required by LTE service providers globally. These include traditional frame based, remote radio units, and tower top deployments. The base station supports a modular architecture that separates the baseband/digital subsystem and the RF subsystem, for supporting various deployment scenarios.

Reduced Power Consumption/Power Amplifier Efficiency

The Motorola LTE eNodeB provides superior power efficiency to reduce the service providers OPEX. These techniques leverage Motorola’s RF heritage to deliver superior power amplifier technology. Our LTE Multi-Carrier Power Amplifier (MCPA) employs next generation Digital Pre-Distortion and Crest Factor Reduction techniques to improve efficiency and increase output power. Motorola advanced PA technologies enable the eNodeB to significantly improve power consumption over conventional PA technology.

Remote Radio Units

The deployment of Remote Radio Units (RRU) that connect via lossless fiber links to the BCU dramatically reduces costs associated with site acquisition and site lease, offering more rapid and more scaleable network deployment. In addition, RRU offers improved cell size by reducing received signal lost in cables down the tower and reduced OPEX with lower power installations.

These components are designed to be outdoor/winterized mechanics and are located in close proximity to the antenna connector to reduce feeder loss and thus power requirements of the component. In addition, deploying remote radio units close to the antenna further reduces the output power requirements of PA while delivering equivalent forward link power effectively reducing energy consumption.

Traditional Frame Based Transceivers

Transmit and Receiver RF components that are designed to be co-located with the digital/baseband processing units. The transceivers are designed to operate indoors and require sufficient power to overcome reduce feeder loss and address extended coverage scenarios.

Motorola Evolved Packet Core (EPC) Product Overview

In addition to radio access network migration solutions and overlay offerings, Motorola also provide evolved packet core and end to end ecosystem as briefly introduced in this section. For details, please refer to the white paper [4] in the references.

Motorola’s MME is a robust, highly scalable control plane processing engine based on ATCA technology responsible for control plane processing. The platform technology is highly available and field proven in Motorola highly regarded WiMAX solution. Motorola will support a pooled MME architecture to add another level of availability as well as seamless and easy system expansion. By separating the MME from the bearer platforms (S-GW, PDN-GW), the MME can be strategically located to serve a greater geographic area, providing opportunities to amortize the capacity needs within the system.
Both the Serving Gateway and PDN Gateway products are based on a common platform. They may be deployed separately or combined depending on the network configuration. The platform itself is optimized for broadband networks. Today’s cellular data networks support limited data throughput per subscriber, and the applications are primarily non-real-time. LTE is a wireless broadband network and the business models that make LTE attractive require high average throughput per subscriber. The Gateway platforms support high data throughputs, complex QoS, and other advanced features that are typically found in wireline broadband networks today. Motorola’s Gateway products are designed to support these features in a cost effective fashion that will fully utilize the LTE air interface.

Motorola End to End Ecosystem

The Motorola ecosystem includes end to end systems supporting multiple radio access types beyond EUTRAN/EPC. This portfolio offers a “one stop shop” to our customers:

1. Multi-media Converged Core with a rich set of applications, including Location Based Services, Video Blogging, On Demand Media Services, Push To eXperience and Multi Party Gaming.

2. Comprehensive Family of Fixed and Mobile Devices for 3GPP, 3GPP2 and non-3GPP/3GPP2 (WiFi, WiMAX)

3. Integrated Policy Management across multiple access technologies.

4. Network planning and optimization services for 3GPP, 3GPP2 and non-3GPP/3GPP2 networks (WiFi and WiMAX)

5. Service Orchestration, Service Brokers and Service Creation Environments using Service Delivery Platforms

6. OFDM based Backhaul – Solution specially designed for WiMAX and LTE networks with up to 300Mbps line of sight and non line of sights in both licensed and unlicensed spectrum

7. Rich media solutions giving the operators the ability to converge broadcasting, video on demand, innovative applications & advertisements solutions into their LTE offering

8. World Class Device Management Solutions: Based on the Motorola (Netopia) NBBS platform, Motorola’s solution includes remote provisioning, remote diagnostics, aligning TR-069 and OMA, across both fixed and wireless access technologies via a single easy to use Graphical User Interface (GUI).

9. Service Delivery / Integration - Motorola’s (Leapstone) platform is optimized for content aggregation, service creation, transactional purchases, billing / OSS, multi-media applications and web portals.

Conclusion

LTE is another indicator of Motorola’s commitment to continued development and delivery of market leading solutions. Motorola has always kept and continues to keep Operators and the requirements of their customers at the forefront of technology development. Motorola GSM/LTE solutions are specifically designed to address the challenging needs of Operators in an increasingly competitive market. To these ends, products must be future capable in order to upgrade with a minimum effort and maximize the potential return on investment.
Operators will benefit from the availability of migrating from Motorola GSM to LTE:

- Reduced cost per bit delivered
- Increased network capacity for mass market wireless broadband
- Maximize site re-use to reduce CAPEX
- Ability to deliver an improved end-user experience
- Ability to compete with other high-performance alternative technologies.

Subscribers will benefit from:

- Increased data rates in both downlink and uplink
- Continuous GSM level of services and coverage
- Improved experience through reduced latency and “always-on” services
- Exciting new applications
- Increased network capability to run more applications and more capacity
- Increased talk-times and more cost effective tariffs if VoIP is used.

Motorola’s broad GSM/LTE portfolio offers a complete suite that Operators are likely to need to bring wireless data services to market quickly and profitably. The support for a range of global operating frequencies, amongst many other features, has been leveraged into focused solutions, with each one aiming at maximizing opportunities for increased usage and revenues.

Motorola LTE solutions leverage our extensive expertise in OFDM technologies - first demonstrating OFDM at speeds of up to 300 Mbps back in 2004, our leadership in IEEE 802.16e WiMAX, vast expertise in collapsed IP architecture and our leadership in LTE standards. Furthermore, Motorola’s leadership in home and video solutions, leading backhaul solutions and experience in deploying OFDM mobile broadband networks means that Motorola brings a compelling LTE end-to-end ecosystem while offering a smooth migration path for both 3GPP and 3GPP2 service providers, traditional wire-line service providers and new entrants.

For more information on LTE & GSM migration to LTE, please contact your Motorola representative.