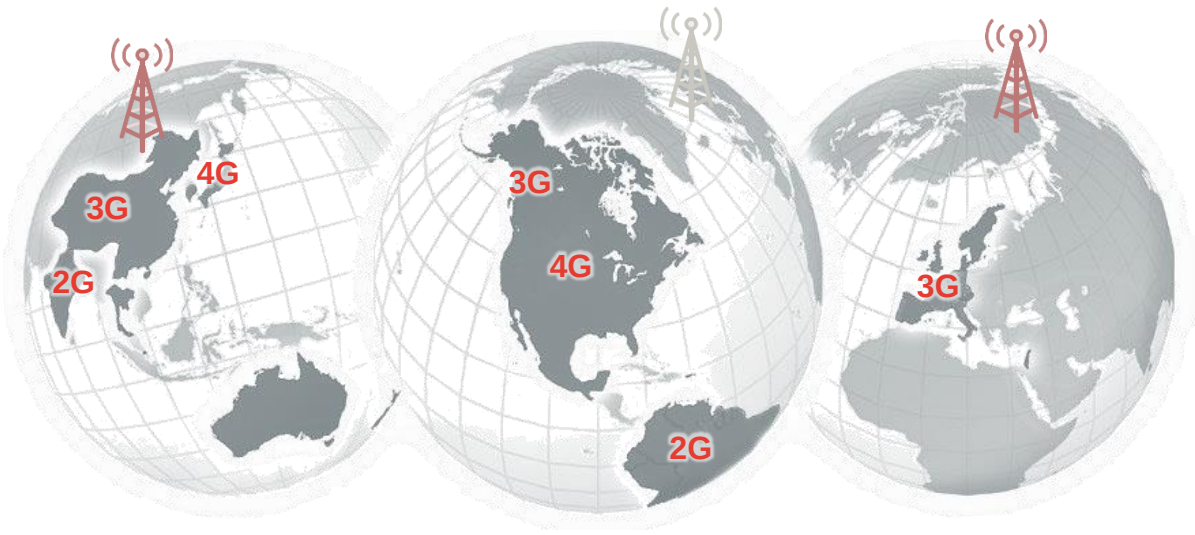
Planning a scalable long-term wireless strategy

While operators in many markets will continue to invest in maintaining and upgrading 2G networks for the foreseeable future, operators in other markets have already begun to cap existing 2G services and are transitioning to 3G and 4G technologies.



For companies with global deployments, there is no single right answer. The best option, focus on solutions that allow for reuse of development, testing, and certification efforts in multiple markets and operator networks, regardless of wireless access technology.

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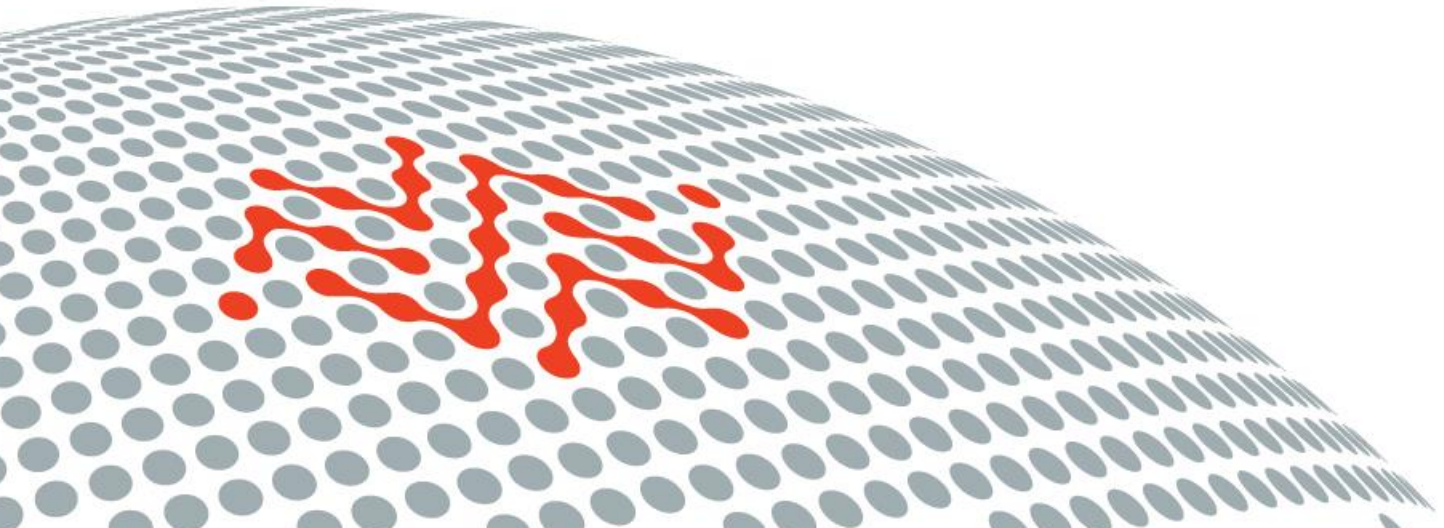
PART ONE

Strengths and weaknesses of 2G, 3G, and 4G technologies



UNDERSTANDING WHERE 2G FITS

There are several varieties for GSM and CDMA networks, including GPRS and EDGE that range from 56Kbps to several hundred Kbps.

STRENGTH: mature, proven, widely deployed, and very inexpensive compared to 3G and 4G LTE.

WEAKNESS: lower bandwidth and latency as well as the threat of discontinued service in the future in certain markets.

IDEAL FOR: 2G services are more than adequate for many M2M applications such as smart meters, personal healthcare devices, industrial equipment, vending machines, and other types of devices that transmit a very small amount of data.

THINGS TO CONSIDER

! Many M2M applications – especially large metering, home security, and industrial applications – have products that are expected to last in the field for 10 or 15 years. Given the massive cost of upgrading devices in the field, companies may want to consider migrating to 3G or 4G today, even if they do not need the additional bandwidth.

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UNDERSTANDING WHERE 3G FITS

GSM and CDMA networks offer higher-bandwidth, lower latency cellular broadband ranging from 200Kbps to several Mbps..

STRENGTH: proven, reliable, widely deployed, greater longevity compared to 2G, and relatively inexpensive compared to 4G LTE.

WEAKNESS: substantially lower bandwidth and latency compared to 4G LTE.

IDEAL FOR: remote or mobile network connectivity, point-of-sale or ATM terminals, digital signage and mobile emergency services are all well suited to 3G networks.

THINGS TO CONSIDER

As the IoT space evolves, and more products are monitored and controlled remotely, companies can take advantage of all this data to offer new services and transform their business models. For this reason, companies may want to consider migrating to 4G today, to enable future bandwidth requirements associated with new service offerings.

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UNDERSTANDING WHERE 4G FITS

Services advertised as "4G" today encompass several different technologies, including 4G HSPA+ and 4G LTE that range from 100Mpbs to 1Gbps.

STRENGTH: offer substantially higher data rates, more efficient, better penetration into buildings, and a fraction of the latency of previous 2G and 3G technologies.

WEAKNESS: less wide spread and much higher cost compared to 2G and 3G.

IDEAL FOR: demanding video surveillance, info entertainment, and mission-critical networking applications.

THINGS TO CONSIDER

In addition to speed, responsiveness, and performance to support applications that were never possible before, 4G LTE can provide a superior-quality user experience compared to previous-generation 2G and 3G technologies. Companies developing M2M solutions must weigh those benefits against the higher costs and added complexity of LTE products that must support additional frequency bands.

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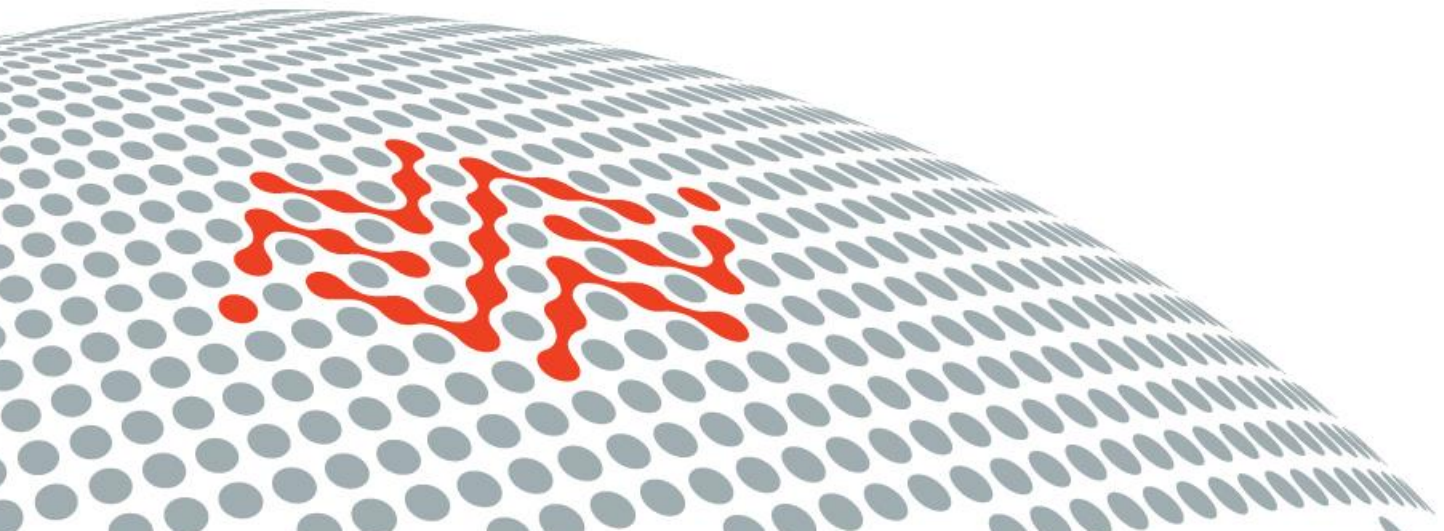
PART TWO

Considerations for scaling from 2G to 3G or 4G LTE



THE GLOBAL 2G MARKET LANDSCAPE

Globally, 2G networks are still going strong, supporting millions of customers and M2M devices – and likely will continue doing so for many years. However, it is clear that 2G services have reached a transition point in certain markets.

1. Europe, Latin America, Russia, the Middle East, Africa and Asia continue to see investment and expansion of their 2G networks with no sign of slowing down anytime soon. But there will come a time at some point in the future when companies need to begin thinking about scaling beyond 2G-exclusive products.

2. North America, Australia, South Korea and Japan have already capped 2G services and begun re-farming that wireless spectrum, and the GSMA reports that most advanced LTE operators in the United States and Australia will have entirely migrated their 2G-only connection bases to 3G or 4G by 2020.

! Companies developing IoT and M2M applications, especially those building solutions for longer-term deployments, need to evaluate whether or not it makes sense to begin migrating from 2G to 3G or 4G LTE.

WHEN DOES IT MAKE SENSE TO BEGIN PLANNING TO SUPPORT NEWER 3G AND 4G SERVICES?

For many companies, especially in European, Latin American, Asian, African, and Middle East markets, it makes good business sense to continue using 2G technology today while it is still widely available and inexpensive. However, now is the time to be designing new systems with scalability in mind.

Selecting wireless technology with pin-to-pin compatibility among 2G, 3G and 4G modules is a must, so when you do need to upgrade from 2G services in the future, you can simply replace the wireless module rather than designing a whole new system.

- EXAMPLE: deploying M2M applications that may not need 3G data rates or latency, but do need to be operational in the field for 10-15 years.

- EXAMPLE: deploying M2M applications in multiple markets that require different cellular technologies (2G, 3G, or 4G) with one single printed circuit board (PCB) and hardware footprint for all customers, and a single R&D and testing effort.

LET BACKWARD COMPATIBILITY WORK IN YOUR FAVOR

Most 3G devices are designed to fall back to 2G service if 3G is not available, they can operate on both 2G and 3G networks. As a result, companies can take the approach of using a 3G module in their devices today, even when deployed over a 2G network.

This provides greater long-term flexibility, especially in regions that are actively moving low-bandwidth M2M customers to 3G, as businesses can switch from 2G to 3G in the future without having to upgrade hardware in the field. Effectively, it allows companies to sidestep the question of 2G versus 3G entirely, since their solution will support both.

The same is true for 4G LTE with devices falling back on older 3G and 2G technology if the service is temporarily down or unavailable in a given market area.

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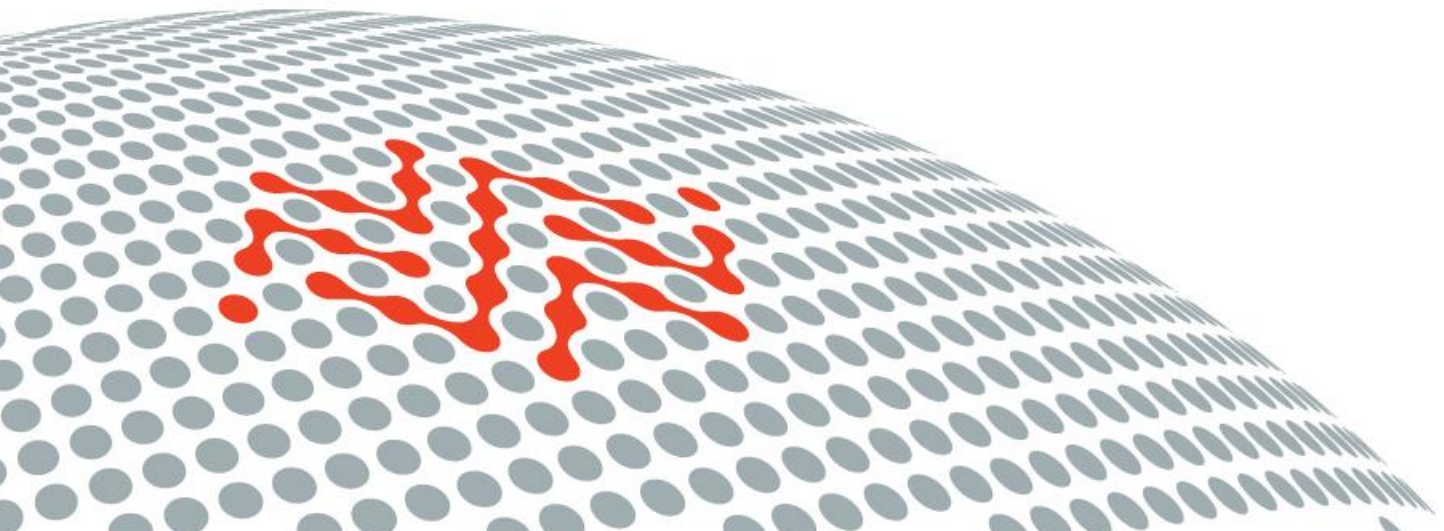
PART THREE

Considerations to future-proof products and solutions



HARDWARE CRITERIA FOR SELECTING THE RIGHT WIRELESS TECHNOLOGY

1. **Pre-certified modules**: to streamline development, expedite operator certification and reduce time-to-market, use pre-certified modules. For international deployments, seek out vendors that can offer pre-certified modules for multiple networks and markets. This not only speeds the development process, it suggests a wireless partner with deep knowledge of various carrier networks and cellular markets.

2. **Form factor options**: in order to simplify product design and reduce development costs and timelines, companies should look for embedded module solutions that use the same form factor across 2G, 3G and 4G networks. These solutions will enable them to address many different markets more cost-effectively, and easily migrate solutions in the future between technologies.

3. **Industrial specifications**: Look for modules that can support demanding M2M applications and provide long life spans, even in harsh outdoor conditions. Options should include modules that meet industrial-grade specifications for extreme environmental conditions of shock, corrosion, temperature (-40C to +85C), vibration and humidity.

4. **Support for hardware best practices**: Seek out the highest-quality, smallest form-factor cellular modules, designed according to accepted industry best practices, across 2G, 3G and 4G technologies. This includes sound RF and antenna design to assure reliable connectivity and performance, efficient power management and proper design for heat dissipation.

SOFTWARE CRITERIA FOR SELECTING THE RIGHT WIRELESS TECHNOLOGY

5. **Flexibility and/or portability**: Look for partners that offer advanced software development frameworks, with the ability to run sophisticated applications in the wireless module itself. A well-designed software framework should be based on standard development languages and provide easy-to-use development tools. It should also offer the possibility of software reuse when migrating to a new technology, allowing businesses in some cases to design an application once for a 2G solution and port it to a new 3G, multi-mode or 4G LTE module when they upgrade in the future.

6. **Upgradability**: Choose cellular modules like the HL series that offer secure firmware upgrades over-the-air (OTA) to assure that products always have the latest features and capabilities, without having to physically touch deployed devices. Cellular modules should support patch updates rather than requiring the device to replace the entire firmware package for each update (which can represent a huge cost savings for large-scale deployments).

DEPLOYMENT CRITERIA FOR SELECTING THE RIGHT WIRELESS TECHNOLOGY

7. **Fast development and certification**: Choose wireless ecosystem partners that can provide assistance through every stage in the process of developing an M2M solution, including design, field testing, certification and beyond.

8. **M2M management platform**: To simplify the deployment and ongoing operation of their application, companies should seek out partners that have extensive experience remotely managing hundreds of thousands – if not millions – of M2M devices in the field. M2M management platforms should include:

    - Comprehensive firmware OTA management solutions to address the full lifecycle of devices deployed in the field
    - Remote configuration and management tools to set or change parameters and remotely troubleshoot potential connectivity issues
    - Cloud-based service delivery to simplify adoption, reduce costs, and ensure that the latest security standards are implemented
    - An operations portal to monitor M2M devices and automatically send alerts when problems are detected
    - Application programming interfaces (APIs) to link data from the M2M management platform with an organization's back-end applications and user interfaces

HOW SIERRA WIRELESS CAN HELP

The choices that OEMS and enterprises make when selecting wireless ecosystem partners can make a major difference in their ability to develop scalable long-term solutions and transition to new cellular technologies.

With more than 80 million modules deployed and number one M2M market share globally (source: ABI), Sierra Wireless is uniquely positioned to help customers deploy their products over any cellular network in any market with expert guidance and solutions that support a seamless migration path.

Sierra Wireless has also developed certification laboratories, as well as cellular and OTA management testing equipment, to support pre-certification efforts and provide expert certification resources to customers. This level of support is especially important as companies migrate to newer 4G LTE services.

In addition to this development and certification support, Sierra Wireless provides:

- Pre-certified modules for cellular networks in virtually every market
- Continuity within product lines and cellular standards, making it easier and less expensive to evolve M2M solutions
- Solutions using a single form factor and development process across all wireless technologies and markets
- Fully integrated application frameworks designed specifically for M2M, which provide native support for advanced application and communication capabilities and enhanced software portability when migrating from 2G, 3G and 4G LTE in the future
- Comprehensive OTA firmware capabilities to cost-effectively manage and update thousands or millions of deployed devices
- Cloud platform to simply connect the enterprise with big data storage and rich aggregated data APIs that transform machine data into actionable information and a single data store to integrate seamlessly with multiple backend systems, web and mobile applications.
- More than a decade of leadership in M2M and over 20 years of experience in wireless technology

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Want to learn more?

sierrawireless.com/**HLseries**

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Sierra Wireless is the global leader in machine-to-machine (M2M) devices and cloud services, delivering intelligent wireless solutions that simplify the connected world. Our solutions are **simple**, **scalable**, and **secure**, and enable customers to get their connected products and services to market faster.

For further company and product information, please visit **www.sierrawireless.com**.