



Why appropriate technology is more important than data transfer speed

The very purpose of Remote Monitoring and Control equipment is to provide monitoring and control of Remote equipment. It is very often most advantageous to deploy such equipment in remote areas (Farm Equipment, Water Pumping Stations, Tidal Monitoring, Railway Trackside Equipment etc) where mobile phone network coverage is typically poor. The more difficult the equipment is to reach by person, the larger the advantage of a remote monitoring and control service and the greater the likelihood of poor phone network coverage at the location.

Asset monitoring and tracking are also impacted by the need to send and receive data in areas of poor mobile phone network coverage. A farmer fitting a tracking device to his tractor to protect against the growing trend in theft of farm equipment will require reliable data in rural areas, typically with poor mobile phone coverage. Even a vehicle driving through a city will face coverage issues due to tall buildings, underpasses and multi-story car parks for example.

When mobile phone operators deploy their network infrastructure, best coverage is centred around the most populated areas leaving areas of low population with poor or no coverage from the network. However, it is not only rural areas that can suffer from poor service. As with all radio based systems, the mobile phone network may be affected by a number of local factors, such as building materials, tree cover and weather conditions. This results in areas of poor coverage even within areas of high population density.

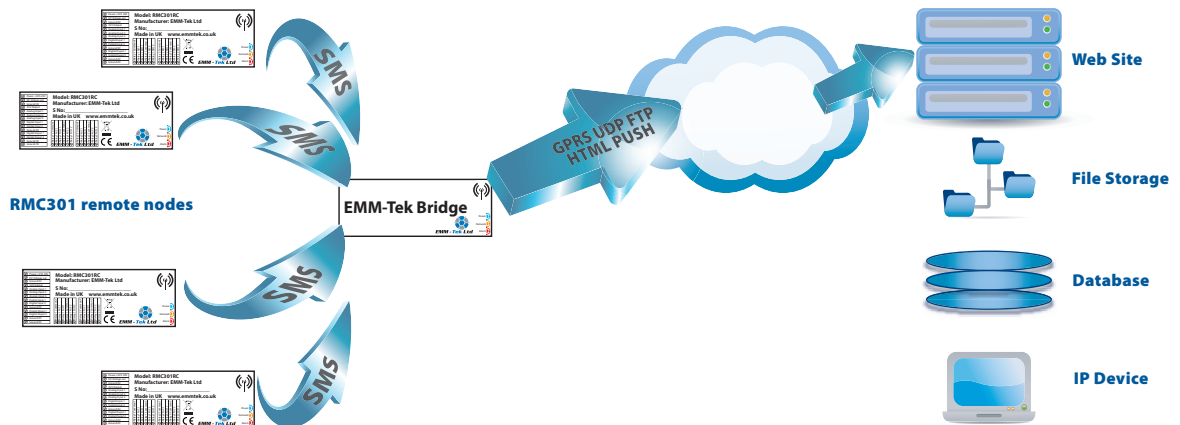
Many of the UK mobile phone operators claim greater than 99% coverage of the UK so it seems that much of what is discussed above is irrelevant for most of the UK. Closer examination is required. The coverage specified by mobile operators is graded, typically; Excellent, Very Good, Good, Moderate, and Low. The stated 99% coverage relates to even the lowest signal strength availability in a given area and does not mean that all services are available in 99% of UK locations. We all know from experience that in an 'Excellent' or 'Very Good' signal area, all of our mobile phone services; Data (internet), Speech (regular voice calls) and SMS (text messaging) are available. As the signal strength and quality deteriorate, Data services become unreliable and then fail, followed by loss of capability to make voice calls. Even under the poorest of signal conditions, when all other services have failed, it is still often possible to send and receive SMS messages.

Some data is available from the network providers and GSM module manufacturers which we have combined with some of our own measurements and observations to provide an approximate signal level necessary for GPRS, Voice and SMS communications:

- SMS: +csq 5 (-103dBm)
- Voice: +csq 10 (-93dBm)
- Data: +csq 20 (-73dBm)

In practice SMS transmission can still be successful with a signal strength 20dBm to 30dBm LOWER than that required for GPRS connection. Ultimately it is the quality of the signal that determines successful data delivery but the signal levels above are representative of our field measurements.

SMS is not without its weaknesses. Small packet sizes, a larger cost per byte of data transmitted and a greater difficulty with integrating the data into other IT infrastructure (databases, web pages etc) for example. The issue of packet size and cost can often be addressed by careful planning of the data and frequency of delivery. The second issue of integrating the data into other IT systems can be addressed by deployment of an EMM-Tek BRIDGE as shown in the scheme below:





Summary:

While SMS may be an old, slow data exchange mechanism with limited bandwidth it does offer the most robust form of data exchange from the mobile phone network infrastructure. This can provide significant advantages in poor service areas and presents the best chance of data being delivered to its target. GPRS does have its place, with obvious advantage where large amounts of data must be moved and the ease of which that data can be delivered to other IT systems (FTP, UDP, HTTP PUSH & GET). Even then, SMS can be a useful fallback data mechanism especially when used with the EMM-Tek Bridge product to provide data translation from SMS to GPRS with a bridge located at a site of excellent mobile phone coverage.

EMM-Tek will be pleased to assist with the issues of retrieving your data or control of equipment in poor or unknown signal conditions. Good planning and the correct use of GPRS / SMS services are essential to the success of your data and control network. We do not promote SMS over GPRS, we have solutions for both services. Each protocol has merits and weaknesses and when deployed correctly provide the most reliable data and control mechanism.