

IoT infrastructure 2020: LPWA communication channels offered by Endrich and FIBOCOM

Zoltan Kiss
Export manager at
Endrich Bauelemente Vertriebs GmbH

Narrow Band IoT Communication Modules

Data transfer for IoT can utilize many ways of communication technologies, here we discuss one major area, it is the GSM based solution, an overview is shown on picture 1.

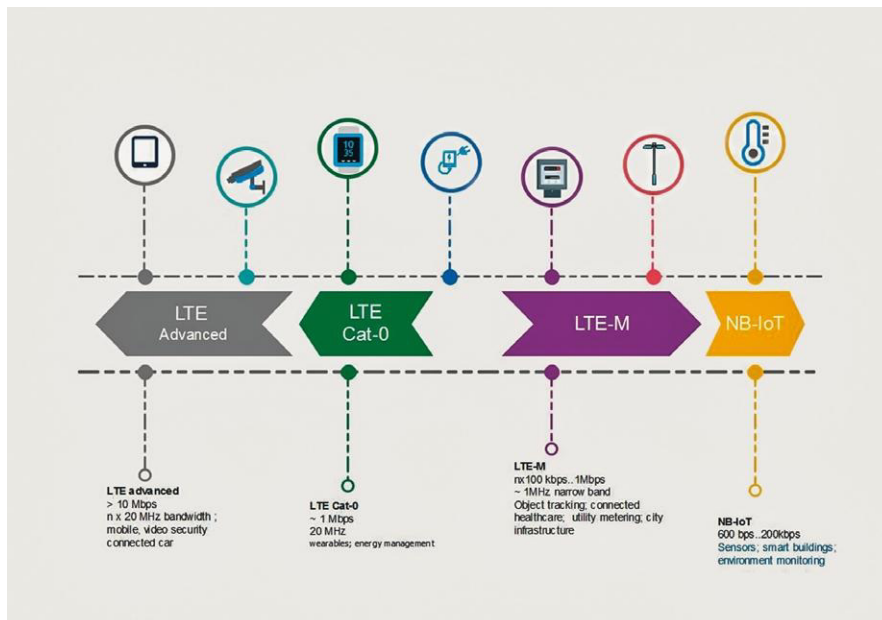
Today most the GSM based IoT applications (security and fire alarms, etc.) use the 2G network, however, there is a technological limitation in this technology on the number of devices connected to the same cell, and also the 2G network shut down is expected soon, so other LPWA technologies have come to focus. One of the popular solution is the NB-IoT (narrow band IoT) standard, which is an extension of the current LTE technology as well as the LTE-M (Long Term Evolution for Machines), LTE-CAT-M1 which has specially been developed for M2M applications requiring higher data rate. The later has much higher bandwidth and requires more complex radio modules.

The benefits and keywords of NB-IoT are coverage, long battery lifetime, small device cost, best indoor penetration.

Cellular networks, so the LTE used by NB-IoT, have excellent coverage in urban area, however, the IoT endpoints with the sensors are often installed deep inside buildings, even in basements, where the traditional GSM (2G) modules needs high current – especially when the data link is build up - to overcome the weak radio reception conditions. The NB-IoT technology provides higher energy density which can penetrate deeper into the interior of buildings, and in case of extreme difficult reception conditions the re-establishing of the data link becomes possible. The price of the good penetration is the low data rate. NB-IoT fits to applications where small datagrams are to be sent with long intervals, it is featured by minimal energy supply intake, thus extended battery life.

The usual GPRS/UMTS/LTE (2G/3G/4G) modules have many features and services which are not necessary for IoT devices, like voice communication, SMS service and broadband Internet access. Skipping those features results simpler hardware, cheaper module and lower power consumption.

1: Feasible IoT tasks realized by GSM based data transfer technology



3: Fibocom MA510 NB-IoT LTE-M and 2G LPWA modem

The installation environment should be carefully checked before deciding to use NB-IoT technology:

- Do the coverage conditions allow the use of the technology? (Is there coverage, and enough signal reception at the location of the sensor installation?)
- Check the required data communication profile, how often and what quantity of data have to be uploaded or downloaded (commands and updates)?
- Calculate the energy supply requirements, check battery lifetime based on required current pulses by the working cycles of the device and the applied Lithium battery capacity and discharge characteristics. When large dis-

charge pulses are expected (cell search, repeated data link connection) and there are long idle intervals between transmit actions, it may be necessary to back up the battery with a parallel super pulse capacitor, which can quickly supply a large pulse of energy for the module until the depassivation process of the lithium battery lasts.

The factors above often lead to compromise, either lowering battery life expectations or selecting a larger capacity, longer lasting battery type.

Fibocom NB-IoT modules

The above's underline the current market trend toward the large increase of the number IoT devices and the demand of connecting all those device make the NB-IoT technology unavoidable in next few years. Leading GSM providers have recognized the trend and introducing NB-IoT services after one another. Endrich based on her traditions is supporting the trend from component side arm in arm with the suppliers represented.

The MA510 and N510 modules of Fibocom are the most popular NB-IoT modems Endrich offers for the market today.

The brand-new Qualcomm MDM9205 based MA510-GL LPWA module variation connects to combinations of LTE Cat.M1, LTE Cat.NB2 and EGPRS networks, and supports global positioning (GNSS) via GPS / GLONASS / BeiDou / Galileo satellite systems. The modems are featured by low power consumption and utilize the good indoor reception of the narrow band IoT technology, thus can be used deep inside a building. The extreme competitive pricing matches the industrial requirements and paves the way for urban or agriculture applications as well. The module is a perfect device for low power applications requiring small amount of data transfer and allowing lower transfer time like device tracking, industrial data collection and control, security systems, smart homes and smart metering. Fibocom's other LPWA device is the MediaTek MT2625DP chipset based N510 NB-IoT only module, it can provide the longest battery lifetime and the lowest cost solution for such application as smart metering, city light control, smart parking, smart home and agriculture or fire alarms where the main requirement is power saving – even to the level when a single primary battery can survive the entire life time of the device – pairs with small and infrequent data transfer and minimum cost.

endrich
components of life

Zoltan Kiss

Sales manager - Eastern Europe
e-mail: z.kiss@endrich.com