Technical Article

Long-range Sub-1 GHz Connectivity in the Real World

Are you looking to connect devices to the Internet of Things (IoT) at a distance greater than 25 km? Or even 100 km?

Then you are probably going to want to add Sub-1 GHz technology to your product to achieve this connection. The combination of long range, low power, software flexibility and operation on a less crowded spectrum make Sub-1 GHz technology ideal for these long-range IoT applications.

TI's Sub-1 GHz solutions, for operation in 169 MHz, 315 MHz, 433 MHz, 470MHz, 500 MHz, 868 MHz, 915 MHz and 920 MHz ISM bands, provide the longest real-world RF range with a proven distance greater than 100 km. With long distance, another requirement that is needed is robustness. Our Sub-1 GHz narrowband products provide the distance and robustness to meet any developer's needs for networks with the lowest power. This means the devices have the ability to transmit at a longer range, at the lowest power consumption, through concrete and cities without interruption from other sources.

To learn more about narrowband, long-range Sub-1 GHz technology read our three-part blog series on *Electronic Design* which covers different applications where narrowband is the de facto standard:

1. Why did Europe choose narrowband for long-range smart gas meters?
2. Why should you use long range narrowband in a smoke detector?
3. How long range narrowband can improve efficiency in agriculture

Additional resources related to Sub-1 GHz technology:

- Why Sub-1 GHz technology? Watch this video.
- Read our long-range, narrowband RF communication white paper
- Learn how Sub-1 GHz technology is diversifying the IoT in this white paper
- Watch these videos that demonstrate the range of narrowband technology:
  - Range test of CC1120 sub-1 GHz performance line
  - CC112x range test in Cape Town, can you go farther than 25k
  - More than 100 km range with no data loss using long range narrowband

Looking to get started with Sub-1 GHz, check out the below products and reference designs:

- CC1120 RF transceiver
- CC1200 RF transceiver
- CC1125 RF transceiver
- CC1190 range extender
- SimpleLink™ CC1310 wireless MCU or CC1312R wireless MCU

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