

Tech Talks LIVE Schedule – Presentation will begin shortly

tech **t**alks

Wireless Connectivity Tech Talks



3月31日，星期三	聚焦Silicon Labs的到达角(AoA)解决方案 Zoom in on Silicon Labs Angle of Arrival (AoA) Solution
4月30日，星期五	探索超低功耗 Wi-Fi 解决方案 RS9116W Discover the Ultra-low-power Wi-Fi Solution RS9116W
5月18日，星期二	使用蓝牙 Xpress 模块加速蓝牙开发 Speed up Bluetooth Development with Bluetooth Xpress Modules

Recording and slides will be posted to:
www.silabs.com/training



We will begin in

3:00



WELCOME

使用蓝牙 Xpress 模块加速蓝牙开发
Speed up Bluetooth Development with
Bluetooth Xpress Modules

梅汉忠 (Chung Mui), 中国华南区高级应用工程师



Agenda

- Bluetooth Xpress Module Overview
- Bluetooth Xpress Applications
- Xpress Mobile Framework Speeds App Development
- OTA firmware update through Xpress framework
- Throughput Test Results
- I2C Temperature Sensor + BGX Commander App Demo Video
- Antenna Robustness Video
- Benefit Summary
- Q&A

Bluetooth Xpress Module Overview

- **Zero programming**
 - Custom Bluetooth 5.2 service for data streaming
 - Xpress command APIs (so-called AT commands)
- **Bluetooth LE**
 - Bluetooth 5.2 certified
 - 1M, 2M (2x speed), and LE coded long range PHY (4x range)
 - LE Secure connections and privacy
 - Operates in either central or peripheral role
- **Interfaces**
 - UART-to-Bluetooth data interface
 - I2C master
 - Additional pins for connection state control
 - Configurable BLE performance, GPIO and status LEDs
 - Secure OTA and serial updates
- **Mobile app libraries (Xpress Framework)**
 - BGX Commander (mobile app) available for iOS and Android
 - Source code libraries simplify BGX connectivity (Xpress Framework)

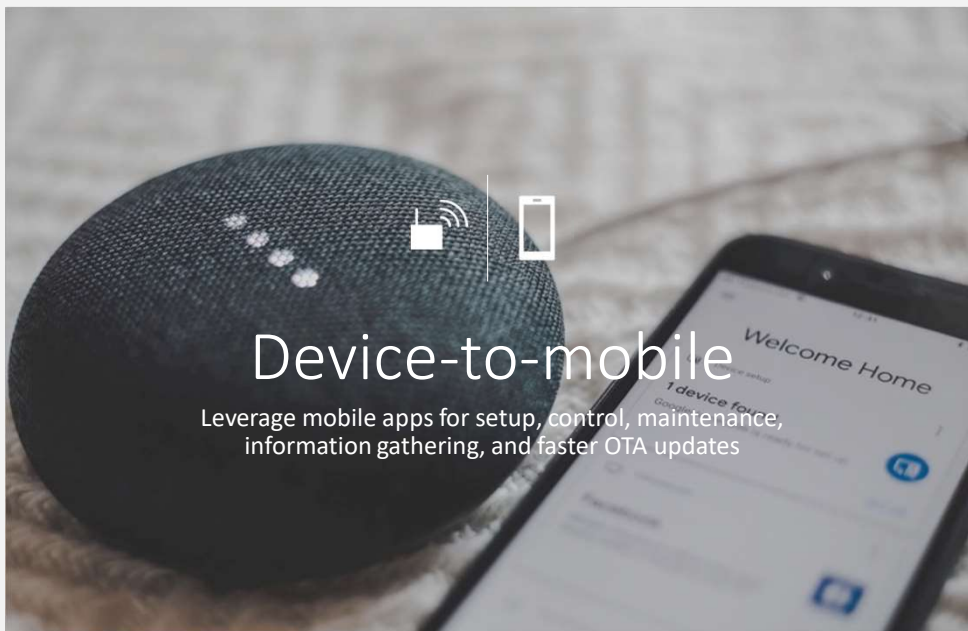


BGX220P (PCB module)

BGX220S (SiP module)

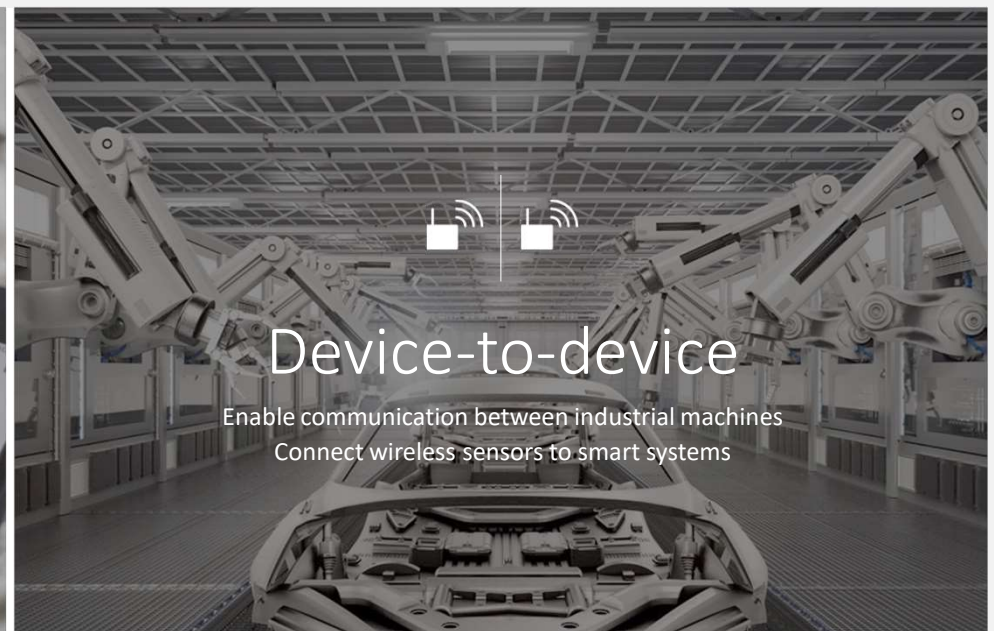
	BGX220P (PCB module)	BGX220S (SiP module)
Protocols	Bluetooth 5.2	Bluetooth 5.2
EFR32 SoC	Serial 2 BG22 SoC	Serial 2 BG22 SoC
Antenna	Built-in	Built-in or RF pin
Max TX power	+8 dBm	+6 dBm
Sensitivity (1M)	-98 dBm	-98 dBm
GPIO	Max. 8 with I2C master	Max. 8 with I2C master
Operating Voltage	1.8V – 3.8V	1.8V – 3.8V
Operating Temp.	-40 to +105C	-40 to +105C
Dimensions W x L x H	13.0 x 15.0 x 2.2 mm	6 x 6 x 1.3 mm
Certifications	BT, CE, FCC, ISSED, Japan & S-Korea	BT, CE, FCC, ISSED, Japan & S-Korea

Bluetooth Xpress Applications



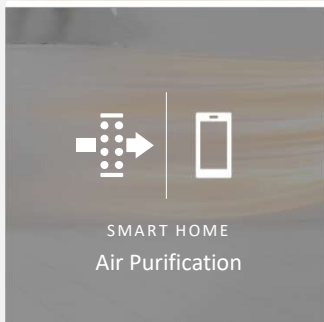
Device-to-mobile

Leverage mobile apps for setup, control, maintenance, information gathering, and faster OTA updates



Device-to-device

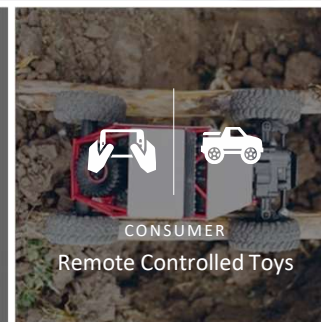
Enable communication between industrial machines
Connect wireless sensors to smart systems



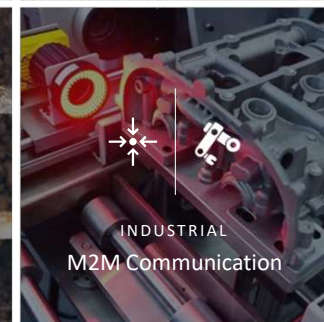
SMART HOME
Air Purification



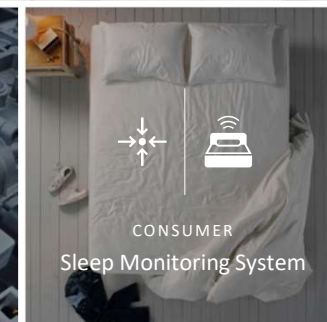
COMMERCIAL
Vending Machine with BLE Maintenance Interface



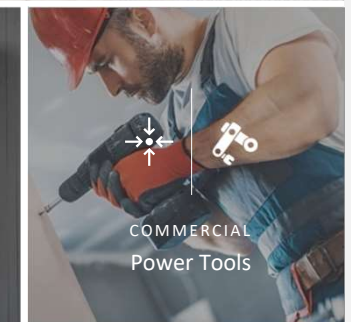
CONSUMER
Remote Controlled Toys



INDUSTRIAL
M2M Communication

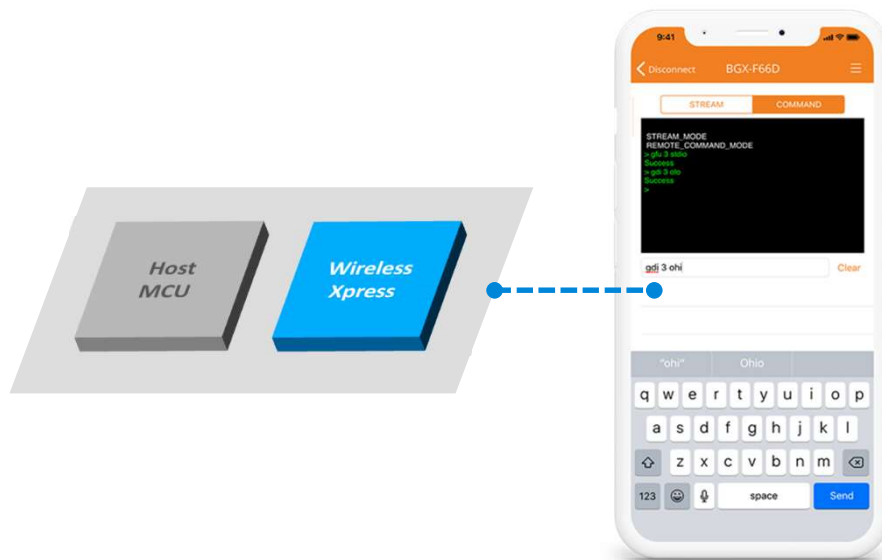


CONSUMER
Sleep Monitoring System



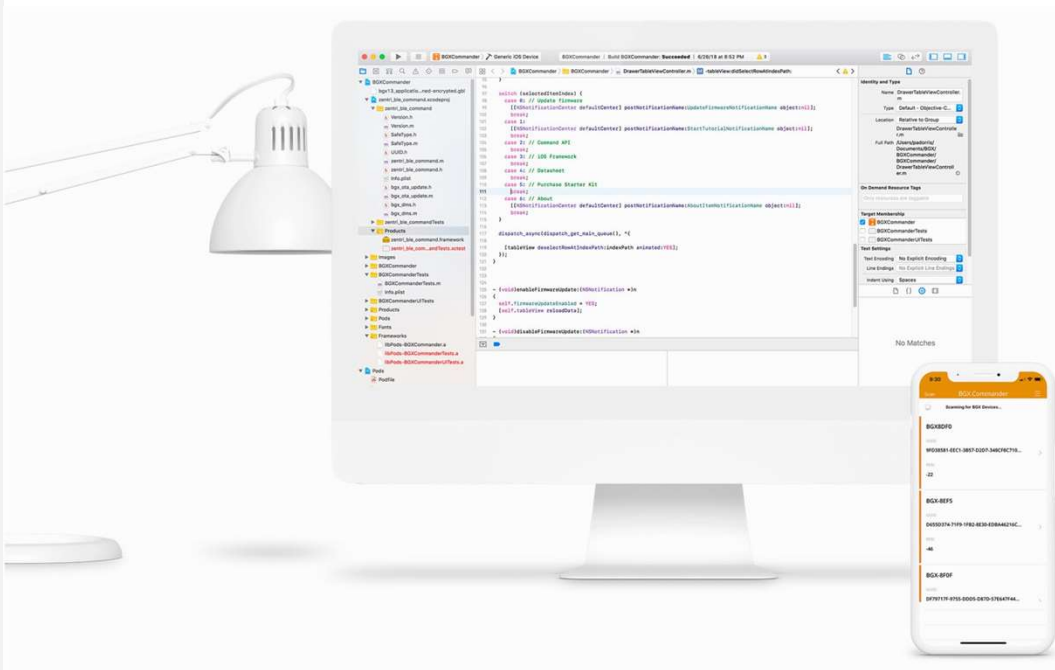
COMMERCIAL
Power Tools

Simplifying Device-to-Mobile Connectivity



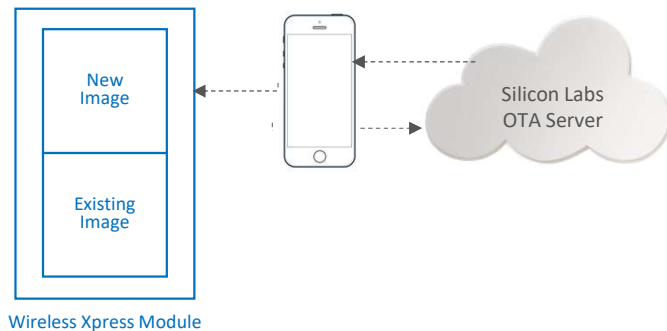
- Streamline low-level BLE through BGX
 - BGX220 handles advertising and connection
 - Optional control I/O and command interface
- Speed mobile app development
 - Xpress mobile framework for iOS and Android
 - Simple API to handle connection and communication

Xpress Mobile Framework Speeds App Development



- Available for iOS and Android
- Mobile framework API includes:
 - **Connect:** `connect () / disconnect ()`
 - **Write:** `writeData ()`
 - **Read:** `dataReadDelegate ()`
 - **Modify port pins:** `writeCommand ()`
- APIs for over-the-air updates
- Supports Xpress interface I2C read/write commands
- BGX Commander app available now for iOS and Android
- <https://docs.silabs.com/gecko-os/1/bgxhost/framework/latest/index>

OTA firmware update through Xpress framework



Wireless Xpress Module

How simple and easy?

- Firmware is stored in Silicon Labs' Over-the-Air (OTA) servers
- Xpress framework provides dedicated OTA APIs
- Mobile APP connect Xpress devices to the OTA server
- Xpress command APIs enable communication with OTA servers to pull firmware images to Xpress devices
- Xpress devices only run signed and encrypted firmware images
- <https://docs.silabs.com/gecko-os/1/bgxhost/framework/latest/sdk/android/api-index#getting-started>

Throughput Test Results

Test cases

- BGX-to-BGX
- Android-to-BGX
- iOS-to-BGX

Phy (Physical Layer)

- 2M Phy: high data rate, shorter range
- 1M Phy: normal data rate, normal range
- Coded Phy (S=2), low data rate, longer range
- Coded Phy (S=8), lowest data rate, longest range

Test conditions

- Connection Interval
 - MTU (Maximum Transmission Unit) size
 - Data pack length
 - Write mode: ACK/no ACK flow control
 - RF signal quality and interference
 -etc
- <https://docs.silabs.com/gecko-os/1/bgx/latest/throughput>

BGX-to-BGX

Both the Central and Peripheral are BGX13 devices.

Table 1.1. BGX-to-BGX: BLE Connection Interval = 30 ms (b1 c i = 24)

Phy	Throughput
2 Mbps	935 kbit/s
1 Mbps	550 kbit/s
Coded (S=2)	191 kbit/s
Coded (S=8)	27 kbit/s

Android-to-BGX

The Central is an Android mobile device and the Peripheral is a BGX13.

Table 2.1. Android-to-BGX: BLE Connection Interval = 15 ms (b1 c i = 12)

Phy	Direction	Throughput
2 Mbps	BGX-to-Android	1175 kbit/s
2 Mbps	Android-to-BGX	610 kbit/s
1 Mbps	BGX-to-Android	391 kbit/s
1 Mbps	Android-to-BGX	215 kbit/s

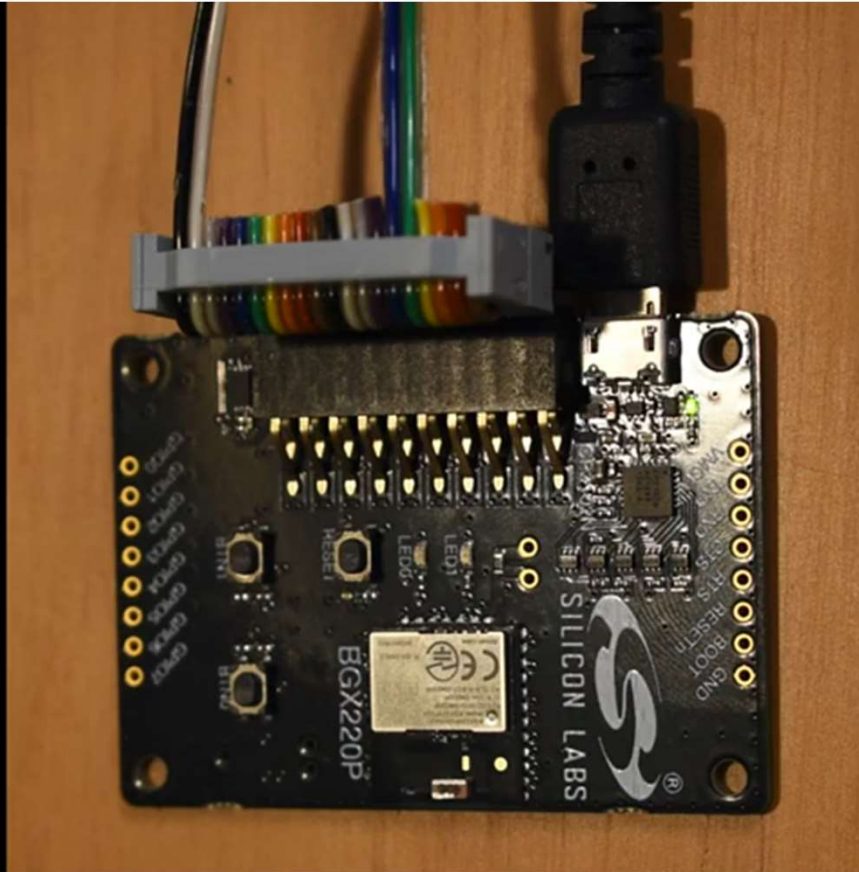
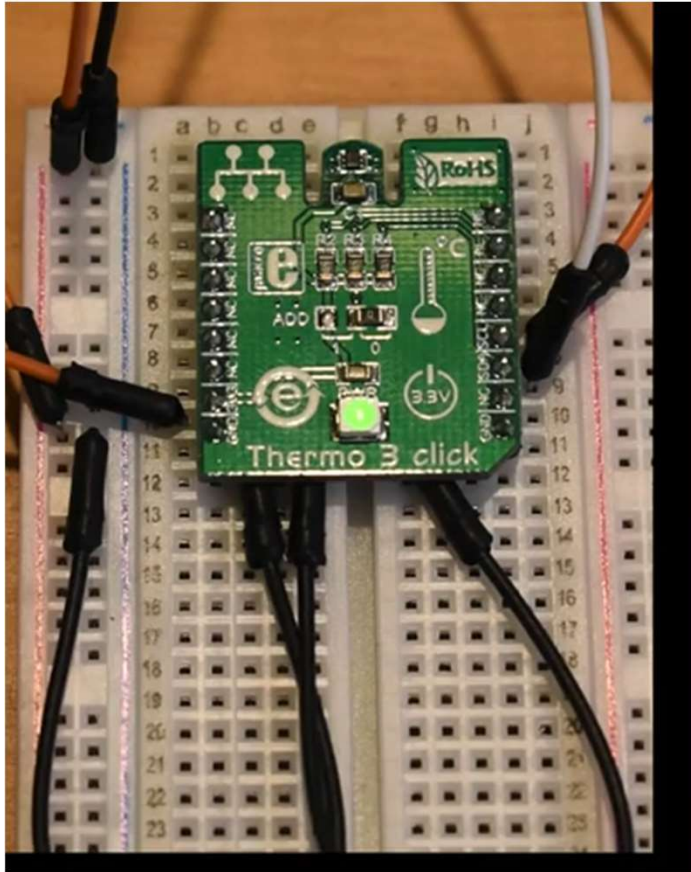
iOS-to-BGX

The Central is an iOS mobile device and the Peripheral is a BGX13.

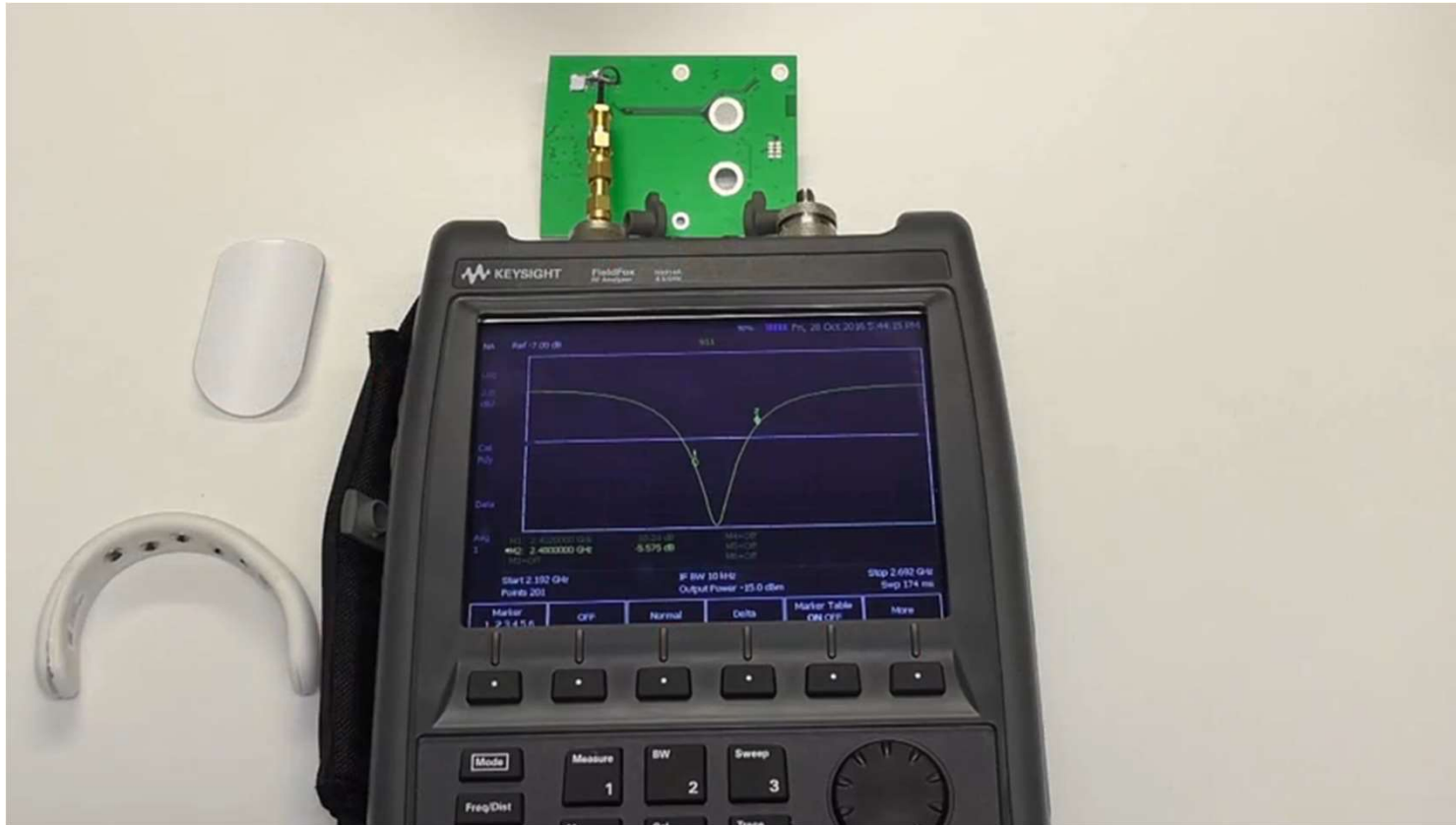
Table 3.1. iOS-to-BGX: BLE Connection Interval = 15 ms (b1 c i = 12)

Phy	Direction	Throughput
2 Mbps	BGX-to-iOS	488 kbit/s
2 Mbps	iOS-to-BGX	385 kbit/s

I2C Temperature Sensor + BGX Commander App Demo Video



Antenna Robustness Video



Benefit Summary

- **Xpress framework for iOS and Android**

- Abstract low-level mobile OS core Bluetooth APIs become a few easy-to-use APIs
- Same framework APIs for iOS and Android

- **Infrastructure and security for OTA FW updates**

- With a framework APIs, secure (signed and encrypted) FW updated pulled from Silicon Lab's clouds

- **High performance and robust on-module chip antenna**

- High antenna radiation efficiency: -1dB for BGM220P (PCB module) and -2dB for BGM220S (SiP module)
- Low antenna detune with nearby objects

- **I2C master interface + GPOs**

- Extend the host's GPOs
- I2C master for EEPROMs, ADCs, DACs, sensors, ...etc



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Q&A

微信公众号



官方微博



中文社区





tech talks

THANK YOU

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