EFR32 Multi-protocol USB Dongle

The CSB04PA1x-USB family is the latest generation of plug-and-play IoT USB dongles from MMB Networks. Based on the EFR32 multi-protocol SoC from Silicon Labs, these dongles are drop-in Zigbee 3.0, Thread and BLE 5.0 solutions. Each one comes pre-loaded with MMB's RapidConnect firmware — enabling any device with a USB port to easily support the mandatory wireless features required to interoperate with other Home, Building, and Industrial IoT automation products.

In addition to RapidConnect's Serial Protocol, MMB has a full- featured Java library to simplify integration. All USB sticks include additional serial flash, allowing for the support of OTA firmware updates. Your product can be field upgraded to add new features or support the latest Zigbee, Thread or BLE standards.

Simple Path to Market

Better Performance

Developer Friendly

CONTENTS:

1. General Information

Note that some of the specifications refer to either the "EFR32MG13" chip or the "Module". Specifications cited as EFR32 are taken from the EFR32MG13 datasheet (this should also be noted where referred to). Module means measurements taken with our production module.

2. Supported Operating Systems

- Windows XP SP3 or above
- Windows Vista
- Windows 7
- Windows 8
- MAC OS-X
- Linux*

Drivers for these systems are available on the MMB Networks website. The bridge chip is a CP2104 with Vendor ID 0x10C4 and Product ID 0x88A4.

* The Linux kernels listed here (plus all future kernels) include native support for the USB Stick. For questions about compatibility with earlier versions, please contact MMB Networks.

Kernel Version	Build
3.0.88	longterm
3.2.50	longterm
3.4.55	longterm
3.10.4	longterm
3.11-rc3	stable
3.12-rc1	mainline

3. Memory

RAM (kB)	On-Chip Flash (kB)	Serial Flash (MB)
64	512	2

4. USB Connector Pinout

Module Pad	Function
1	VCC
2	D-
3	D+
4	GND
5	NC
6	NC
7	NC
8	NC
9	NC

5. Electrical Specifications

5.1 | Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply Voltage (VCC)	0	3.6	V
Voltage on any GPIO	-0.3	VCC + 0.3	V
Ambient Operating Temperature	-40	85	°C
Storage Temperature	-50	150	°C

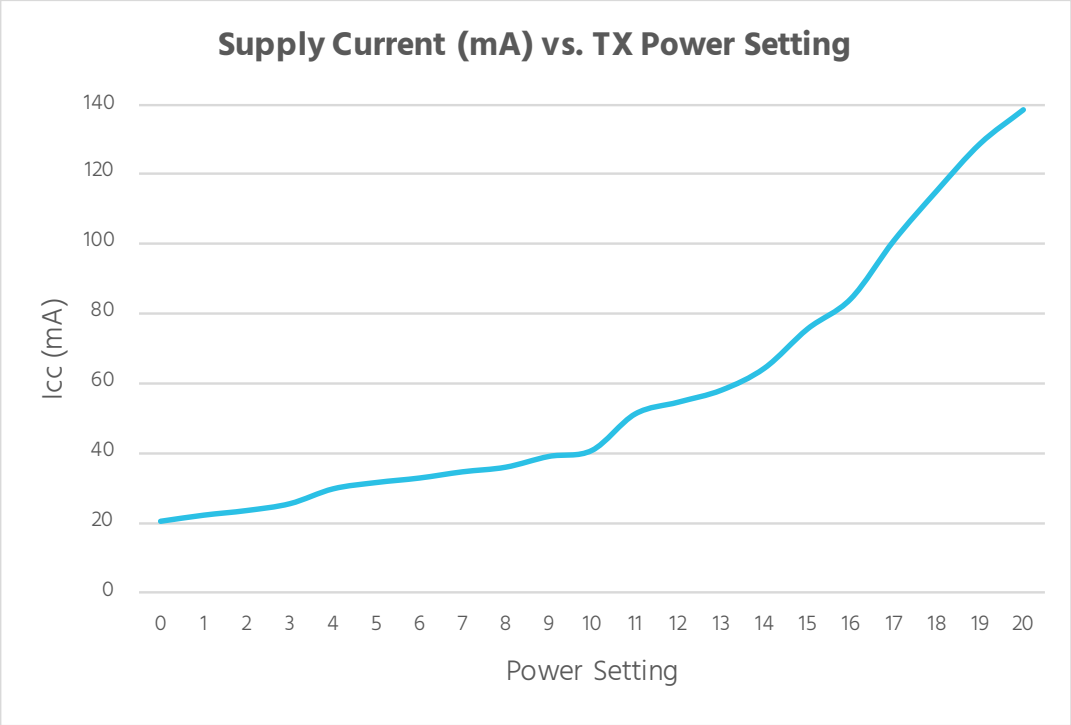
5.2 | Recommended Operating Conditions

Parameter	Minimum	Typical	Maximum	Units
Supply Voltage (VCC)	2.0	3.3	3.6	V
Temperature Range	-40		85	°C

5.3 | DC Electrical Characteristics

Parameter	Test Condition	Min	Typical	Max	Units
TX Current	At 25 °C, VCC = 3.3v, normal mode, 19 dBm		138	156	mA
	At 25 °C, VCC = 3.3v, normal mode, 10 dBm		48	57	mA
RX Current	At 25 °C, VCC = 3.3v, normal mode, 2.4 GHz, CPU running		13.7	14.8	mA
Deep Sleep Current	At 25 °C, VCC = 3.3v, shutdown mode. Full RAM retention and RTCC running from LFXO (EM2 mode)		2.1	3	µA

5.3.1 | Typical Transmit Performance Curves (Supply Current vs. Tx Power Setting)



6. RF Specifications

6.1 | Receive Specifications

Note: The Typical number indicates one standard deviation above the mean, measured at room temperature (25°C). The Min and Max numbers were measured over process corners at room temperature.

Parameter	Test Condition	Min	Typical	Max	Units
Frequency range		2400		2483.5	MHz
Sensitivity - Zigbee and Thread	1% PER, 20 byte packet defined by IEEE 802.15.4-2003		-102.7	-100	dBm
Sensitivity - Bluetooth Low Energy	0.1% BER. Signal is reference signal[1], bit rate=1Mbps		-94	-86	dBm
	0.1% BER. Signal is reference signal[1], bit rate=2Mbps		-91	-86	dBm

Notes:

1. Reference signal is BLE 2GFSK, Modulation index = 0.5, BT = 0.5, payload = 37 bytes PRBS9, frequency accuracy better than 1 ppm.

6.2 | Transmit Specifications

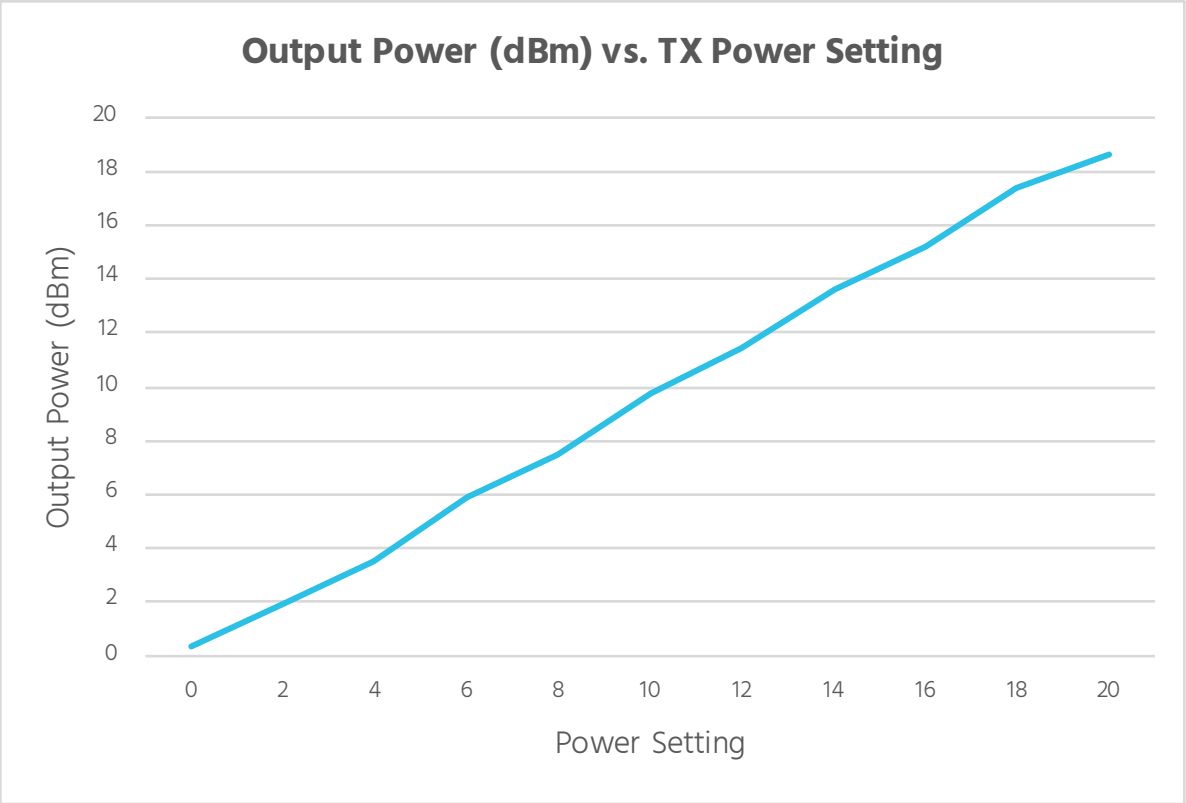
6.2.1 | FCC Power Table

Parameter	Test Condition	Min	Typical	Max	Units
802.15.4 output power at highest power setting, general limit[1]	CSB04PA10	18	19.2		dBm
	CSB04PA11	8.6	10.2		dBm
802.15.4 Channel 26 output power	CSB04PA10	13.6	14.9		dBm
	CSB04PA11	8.8	10.1		dBm
BLE output power at highest power setting in connected mode, general limit[1,2]	CSB04PA10	18	19.2		dBm
	CSB04PA11	8.6	10.2		dBm
BLE output power at highest power setting in advertising mode	CSB04PA10	18	19.2		dBm
	CSB04PA11	8.6	10.2		dBm

Notes:

1. RF Channel 26 operates at reduced power level as required for regulatory compliance. See Section 10 for more information.
2. BLE channels 33, 34, 35, and 36 operate with additional rate-dependent power backoff to comply with FCC limits. The maximum power backoff is 11.2 dB for channel 36 at 2Mbps.

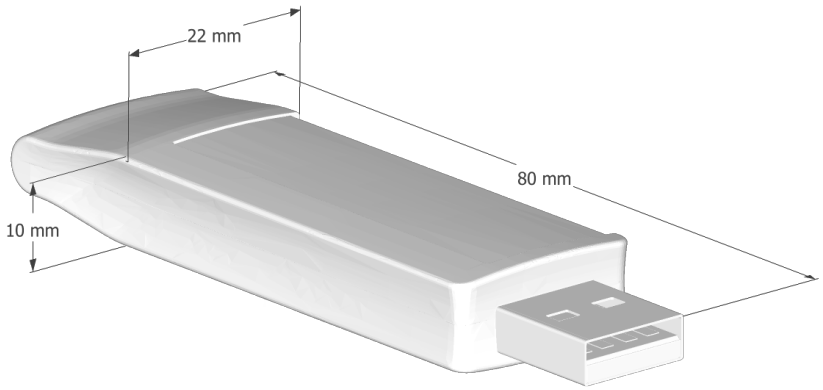
6.2.3 | Typical Transmit Performance Curves (Output Power vs. Tx Power Setting)



Note: The graph above is for the PA10 variant. For the PA11 module, the maximum output power is limited to 10.5 dBm.

7. Physical Dimensions

7.1 | Physical Dimensions



Dimension	Distance
Length	80 mm
Width	22 mm
Height	10 mm

8. On-board Serial Flash

In order to support OTA Firmware Upgrades, the CSB04PA1x-USB contains on-board serial flash. It uses the MX25R1635FZUIL0 2MB.

9. LFXO Crystal

In order to save power, and support Bluetooth communication in various sleep modes, the CSB04PA1x USB dongle contains an external LFXO with part number TFE202P32K7680R.

10. Regulatory Approvals

In progress.

11. Revision History

Revision	Date	Comments
1.1	2019/08/23	Rebranded material
0.1	2019/05/13	Initial draft

12. Ordering Information

Hardware SKU	Regulatory	Status
CSB04PA10-USB-N	FCC/IC	In Production
CSB04PA11-USB-N	FCC/IC	In Production

Notes:
The above table provides the HW SKU which forms the first part of the complete part number. The complete part number takes the format: CSB04PA1x-USB-r-zzz. Where r is the regulatory region (N=North America), and zzz represents a three digit programming code.

Contact your local MMB sales representative to determine the correct programming code for your application.