CASAMBI

Considerations for selecting the network mode – an application note

Technical summary

Different network modes can be selected when creating a network. Network mode affects communication speed, range, and recommended device density in the network. This document describes the considerations for network mode selection. As a rule, the network size should always be kept as small as possible for the best latency of the network. Also, Long Range network modes should be used only when the physical installation requires long-distance communication.

The chosen network Mode affects network data capabilities and the optimum number of devices supported for reliable operation. Since projects have unique requirements, specific limits are not possible to provide. For example, using sensors in a network uses more data than only using switches. Closed loop daylight control will use more data than Open loop control. Obtaining D4i data from DALI drivers in a Casambi network uses significant network data resources.

The concept of Bluetooth range is explained on the Bluetooth SIG, Inc. website: Understanding Bluetooth Range | Bluetooth® Technology Website. For range calculations and considerations, it is important to know that Long Range is a capability of the BLE 5 specification that is now available in all new variants of existing Casambi CBUs (having LR in the product name) and also the CBM-003. Casambi Long Range products have a transmit power of +8 dBm, instead of +4dBm as offered by the earlier CBUs and CBM-002.

Casambi network speed and relative range per mode

Mode	Network speed	Relative Range Outdoor % *	Relative Range Indoor % *	Notes
Better Performance	2Mbit/s	70%	85%	Ideal for maximum network size with a increased amount of data moving across the network.
Balanced	1Mbit/s	100%	100%	Ideal for networks containing up to 125 nodes with moderate data traffic intensity.
Long Range	0.5Mbit/s	180%	125%	Ideal for networks containing up to 60 nodes with low data traffic in the network.

** Indicative values, real-life applications may have variables affecting the communication range of the products*

Please note: Only long-range-capable devices can be placed in Casambi networks set for Long Range modes, where the hardware capability can be activated. In other words, every single Casambi and Casambi Ready unit within a network must support long-range to use Long Range mode. Networks that are set to 'Balanced' or 'Better Performance' modes and contain both long-range and non-long-range devices can benefit from increased transmission power - which is configurable in the network settings.

Network modes available for a Casambi network

Better performance

The Better Performance mode has a slightly reduced range compared to the Balanced mode, but the communication speed in Better Performance mode is doubled up to 2Mbps allowing for superior data capabilities. This is the default mode for Evolution and Classic networks.

Data capabilities: Best data capability for Sensor and Energy monitoring data.

Recommended number of nodes: up to 250 with a moderate amount of data in the network.

Balanced

The Balanced mode offers a good range between units with a communication speed of 1 Mbps.

Data capabilities: Good data capabilities for Sensor and Energy monitoring data.

Recommended number of nodes: Up to 125

The following Long Range network mode is suitable for special use cases where communication is needed across very long distances. However, it is important to note that long-range modes can create their own limitation in throughput – for example when data services are required. Therefore, we recommend using Long Range mode for networks in which unit and data amounts are very low and network structures do not involve very complicated programming. Classic firmware version does not support all Long Range network features, for Long Range networks Evolution is recommended.

Long Range

Long Range Optimum mode offers a superior communication range between units with sufficient data capabilities at a communication speed of 0,512Mbps.

Data capabilities: Sufficient data capabilities for sensor data, limited for energy monitoring purposes.

Recommended number of nodes: up to 60