ALTHEN
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GATEWAY BM-Z
Technical Manual

Further information can be found at
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Specification

Model

BM-Z	Beam Gateway with integrated on-Gateway data and device management software

Mechanical

Dimension	160mm x 100mm x 80mm
Weight	1kg
Material	Die-cast aluminium

Main CPU/Peripherals

CPU	Broadcom BCM2837B0 quad-core A54 (ARMv8) 64-bit @ 1.4GHz Raspberry Pi 3A+
FCC ID	2ABCB-RPI3AP
Memory	512MB LPDDR2 SDRAM
Storage	Industrial-grade microSD Card with 16GB (13 GB usable)
On-board sensors	Internal temperature sensor (accuracy ±2°C)
RTC	Internal RTC ±3.5ppm 0°C to +60°C External RTC ±2ppm 0°C to +40°C (Powered by CR3032)

Software and Firmware

Firmware	Long-range low-power mesh networking firmware
Software	On-Gateway data and device management software

Low-power MCU/Peripherals

MCU	Ultra-low power Arm® Cortex®-M3 48MHz 32-bit CPU
Memory	128KB flash, 20KB ultra-low-leakage SRAM
Clock	High-precision RTC self-compensated in temperature (10ppm from -40°C to +80°C)
On-board sensors	Temperature sensor (range: -40°C to +80°C, resolution: 0.01°C, accuracy: ±1.8°C) Barometer sensor (range: 300 to 1100hPa, resolution: 0.18Pa, accuracy: ±1.7hPa)
External flash	8MB

Interfaces

Display/Keyboard	LEDs	SYS - System status indication NET - Cellular status indication RF - MESH status indication WF -WiFi status indication
	Buttons	WIFI - to toggle onboard WiFi SHUTDOWN - to do a complete shutdown of the Gateway
USB device port	USB 2.0 full speed (Micro B connector) 5V	
IDC10 connector	Only for firmware programming	
Nerwork interfaces	Integrated 3G/4G Modem & Antenna (LTE, HSDPA, EDGE, GPRS) quad-band Ethernet over USB 2.0 Wi-Fi interface on 2.4GHz	
GPS	GNSS High Sensitivity GPS module (excluding antenna)	

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RG & Mesh Specifications

Radio band	ISM Band 863 - 870MHz, 902 - 928MHz
Transmit power	Up to 1 W (30 dBm)
Modulation	2-GFSK
Certifications	FCC: 2AT8M-TM-V3X0 IC: 27349-TMV3X0 CE/RED Anatel (Brazil) MoC (Israel)
Antenna	¼ λ stub antenna with SMA connector
Link data speed	50 kbps bitrate
Data security	AES128 encrypted end-to-end data
Hops	Up to 12
Network size	Up to 50 Nodes
Range*	Line-of-sight: Up to 5km Urban: Up to 1km Below ground: Up to 500m

*Ranges are based on a transmission power of 30dbm. Actual transmission distances may vary depending on deployment conditions.

Cellular Modem

FCC ID	XMR201903EG25G
Transimission power	23dBm ± 2dB

Cellular Bands

LTE	Band 1 (2100) Band 2 (1900 PCS) Band 3 (1800+) Band 4 (1700/2100 AWS-1) Band 5 (850) Band 7 (2600) Band 8 (900) Band 12 (700 ac) Band 13 (700 c) Band 18 (800 lower) Band 19 (800 upper) Band 20 (800 DD) Band 25 (1900+) Band 26 (850+) Band 28 (700 APT) Band 38 (TD 2600) Band 39 (TD 1900+) Band 40 (TD 2300) Band 41 (TD 2600+)	LTE FDD: Max 150Mbps (DL) - Max 50Mbps (UL) LTE TDD: Max 130Mbps (DL) - Max 35Mbps (UL)
WCDMA	Band 1 (2100) Band 2 (1900 PCS) Band 4 (1700/2100 AWS-1) Band 5 (850) Band 6 (850 Japan) Band 8 (900) Band 19 (800 upper)	DC-HSDPA: Max 42Mbps (DL) HSUPA: Max 5.7Mbps (UL) WCDMA: Max 384Kbps (DL) - Max 384Kbps (UL)
GSM	B2 (1900 PCS) B3 (1800 dcs) B5 (850) B8 (900)	EDGE: Max 296Kbps (DL) Max 236.8Kbps (UL) GPRS: Max 107Kbps (DL) Max 85.6Kbps (UL)

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WiFi Module

Model	In-built WiFi module on Raspberry Pi 3A+
FFC ID	2ABCB-RPI3AP
WiFi bands	2.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN
Transission frequency and power	2.4GHz/5GHz Max power: 30mW

Protection

Circuit protection	Reverse supply protection

System Power Requirements

Supply voltage	12VDC @ 3A Nominal Max: 24VDC Min: 11VDC
Internal non-rechargeable batteries	1 x D-Cell Li-SOCl2 3.6V nominal voltage as backup power Recommended capacity 19Ah
Typical current drain	250mA typical operating current
Max current drain	3A

	Solar Panel Output Voltage	Solar Panel Peak Output Current	Rated Power Generation (6hrs peak sun)	Battery Type	Battery Capacity (21hrs standby operation)	Maximum Charging Current
External solar panel	12V /24V	3A @12V / 1.5A@24V	80W minimum	12V / 24V lead-acid battery	18Ah minimum	2A or check battery specs on recomm. value

Environmental conditions

Operating temperature	-40°C to +80°C
Protection	IP67

Mounting Brackets/Plates

BM-Z-BKLG	Vertical/pole mounting bracket with mounting screws

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External view

BM-Z

with our **BM-Z-BKLG** vertical/pole mounting bracket for vertical or pole mounting

BM-Z

Inner view

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