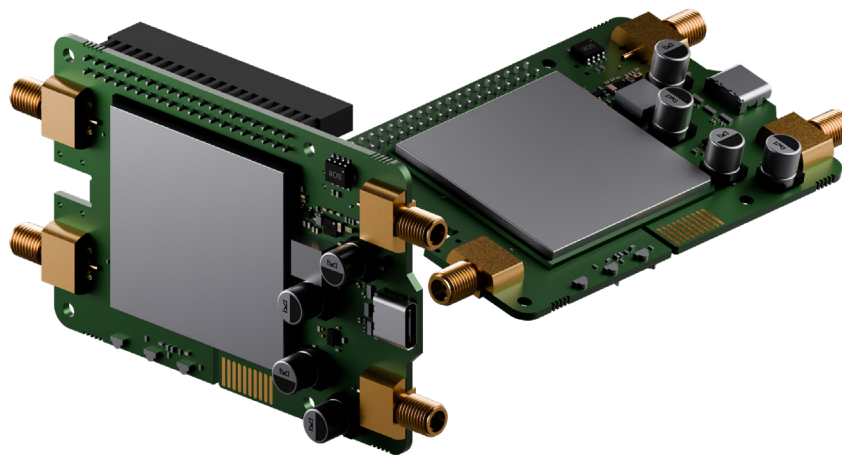# CALYX

Embedded Cellular Raspberry Pi HAT+

Industrial & automation

Energy & utilities

Smart city

Enterprise

Retail

OPTIMAL FORM FACTOR

Mount seamlessly on Raspberry Pi 4/5

GPIO MODEM CONTROL

Wake, reset, and manage the modem via Pi pins

PCM ENHANCED AUDIO

Enable clean, low-latency audio transfer

VERSATILE CONNECTIVITY

Choose the right option: 4G Cat 4, 5G Redcap, or full-fledge 5G

Mobile

	Calyx 4G / EBD021
Mobile module	4G LTE-FDD (Cat 4) – 75Mbps DL, 50Mbps UL; LTE-TDD (Cat 4) – 65Mbps DL, 35Mbps UL; DC-HSPA+ – 42Mbps DL, 5.76Mbps UL; 3G – 384 kbps DL, 384 kbps UL, 2G EDGE – 236.8 kbps DL, 236.8 kbps UL, 2G GPRS – 85.6 kbps DL, 85.6 kbps UL
3GPP Release	Release 9
	Calyx 5G / EBD050
Mobile module	5G Sub-6Ghz SA/NSA 2.4/3.4Gbps DL (4x4 MIMO), 900/550 Mbps UL (2x2); 4G LTE Cat 19 up to 1.6 Gbps DL/ 200 Mbps UL; 3G up to 42 DL/ 5.76 UL Mbps
3GPP Release	Release 16
	Calyx 5G Red Cap / EBD070
Mobile module	5G Sub-6Ghz SA 223 Mbps DL/123 Mbps UL; 4G LTE (Cat 4) up to 195 Mbps DL/105 Mbps UL
3GPP Release	Release 17

USB

	Calyx 4G / EBD021; Calyx 5G Red Cap / EBD070
Data rate	USB 2.0
	Calyx 5G / EBD050
Data rate	USB 3.0

40-pin GPIO header

PWR_KEY	Modem turn on/off. Digital Input, 0 - 3.3 V logic level, active High, to activate use pulse (≥500 ms)
Modem reset	Resets the modem. Digital Input, 0 - 3.3 V logic level, active High
PCM	Digital Interface, 0 - 3.3 V logic level
Modem wakeup	Wake up modem from a sleep mode. Digital Input, 0 - 3.3 V logic level, active High - Calyx 4G / EBD021; Digital Input, 0 - 3.3 V logic level, active Low - Calyx 5G / EBD050; Calyx 5G Red Cap / EBD070

Power

USB type C	5 VDC
40-pin GPIO header	On a 40-pin header, 5 VDC and 3.3 VDC

Physical Interfaces

Status LEDs	1 x Power, NET IND, NET STAT
SIM	1 x SIM slot (Nano SIM - 4FF), push-pull
Power	On a 40-pin header/USB power
USB	USB Type-C receptacle
Calyx 4G / EBD021; Calyx 5G Red Cap / EBD070	
Antennas	2 x SMA for Mobile
Calyx 5G / EBD050	
Antennas	4 x SMA for Mobile

Physical Specification

Weight	57 g
Mounting options	With included mounting kit
Calyx 4G / EBD021; Calyx 5G Red Cap / EBD070	
Dimensions (W x H x D)	56 x 23.11 x 95.48 mm
Calyx 5G / EBD050	
Dimensions (W x H x D)	56 x 23.11 x 100.8 mm

Operating Environment

Operating temperature	-40 °C to 75 °C

Regulatory & Type Approvals

Calyx 4G / EBD021; Calyx 5G / EBD050	
Regulatory	CE, UKCA, EAC, UCRF, RCM, CB, WEEE
Calyx 5G Red Cap / EBD070	
Regulatory	CE, UKCA, EAC, UCRF, FCC, ISED (IC), RCM, CB, WEEE

EMC Emissions & Immunity

	Calyx 4G / EBD021
Standards	EN 55032:2015+ A11:2020 + A1:2020 EN 55035:2017+A11:2020 EN 61000-3-3:2013+A1:2019+A2:2021 EN IEC 61000-3-2:2019+A1:2021+A2:2024 EN 301 489-1 V2.2.3 EN 301 489-17 V3.3.1 EN 301 489-52 V1.2.1
	Calyx 5G / EBD050
Standards	EN 55032:2015+ A11:2020 + A1:2020 EN 55035:2017+A11:2020 EN 61000-3-3:2013+A1:2019+A2:2021 EN IEC 61000-3-2:2019+A1:2021+A2:2024 EN 301 489-1 V2.2.3 EN 301 489-3 V2.3.2 EN 301 489-17 V3.3.1 EN 301 489-19 V2.2.1 EN 301 489-52 V1.2.1
	Calyx 5G Red Cap / EBD070
Standards	EN 55032:2015+ A11:2020 + A1:2020 EN 55035:2017+A11:2020 EN 61000-3-3:2013+A1:2019+A2:2021 EN IEC 61000-3-2:2019+A1:2021+A2:2024 EN 301 489-1 V2.2.3 EN 301 489-17 V3.3.1 EN 301 489-19 V2.2.1 EN 301 489-52 V1.2.1 47 CFR Part 15, Subpart B

RF

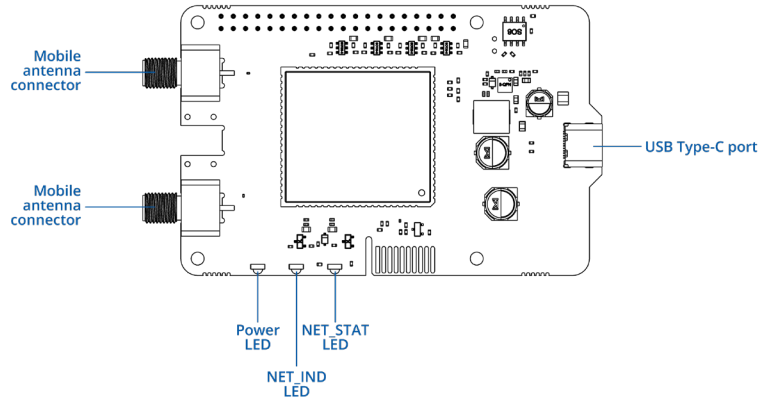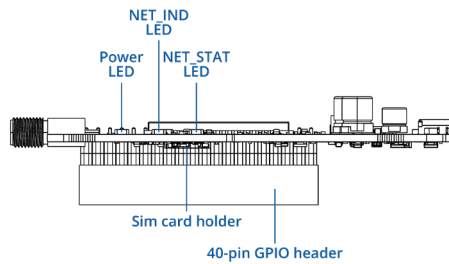|	Calyx 4G / EBD021; Calyx 5G / EBD050
Standards	EN 301 908-1 V15.2.1 EN 301 908-2 V13.1.1 EN 301 908-13 V13.2.1 EN 301 908-25 V15.1.1
	Calyx 5G Red Cap / EBD070
Standards	EN 301 908-1 V15.2.1 EN 301 908-13 V13.2.1 EN 301 908-25 V15.1.1

Safety

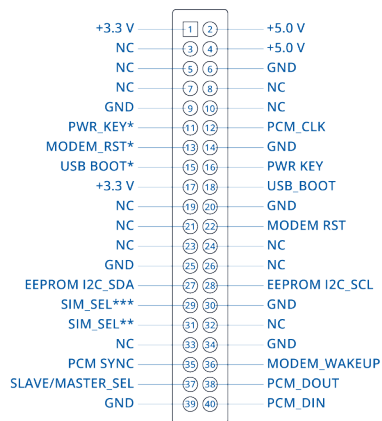|	
Standards	**CE:** EN IEC 62311:2020 **RCM:** AS/NZS 62368.1:2022 **CB:** EN IEC 62368-1:2020+A11:2020

EBD021 & EBD070 Hardware

TOP VIEW

- Mobile antenna connector
- Mobile antenna connector
- USB Type-C port
- Power LED
- NET_IND LED
- NET_STAT LED

LEFT VIEW

- NET_IND LED
- Power LED
- NET_STAT LED
- Sim card holder
- 40-pin GPIO header

GPIO Connector Pinout

TOP VIEW

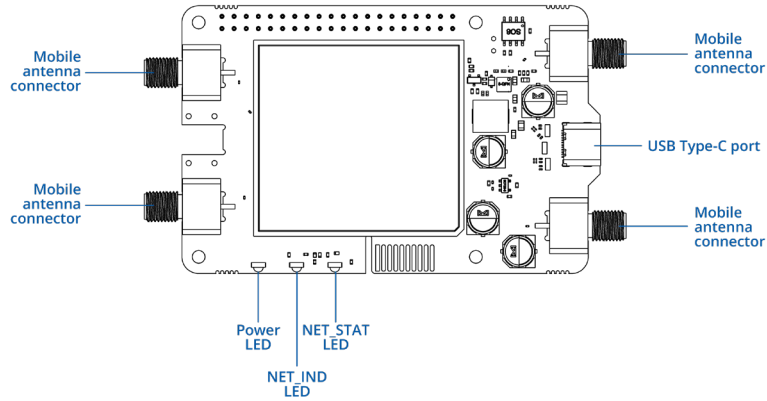|		
+3.3 V	1 2	+5.0 V
NC	3 4	+5.0 V
NC	5 6	GND
NC	7 8	NC
GND	9 10	NC
PWR_KEY*	11 12	PCM_CLK
MODEM_RST*	13 14	GND
USB BOOT*	15 16	PWR KEY
+3.3 V	17 18	USB_BOOT
NC	19 20	GND
NC	21 22	MODEM RST
NC	23 24	NC
GND	25 26	NC
EEPROM I2C_SDA	27 28	EEPROM I2C_SCL
SIM_SEL***	29 30	GND
SIM_SEL**	31 32	NC
NC	33 34	GND
PCM SYNC	35 36	MODEM_WAKEUP
SLAVE/MASTER_SEL	37 38	PCM_DOUT
GND	39 40	PCM_DIN

NC - Not Connected
* Alternative pin (with a different assembly)
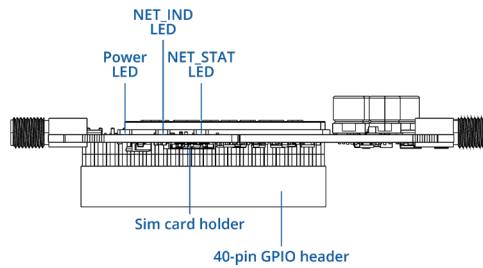** Only in EBD021 with eSIM variant
*** Alternative pin (with a different assembly), only in EBD021 with eSIM variant
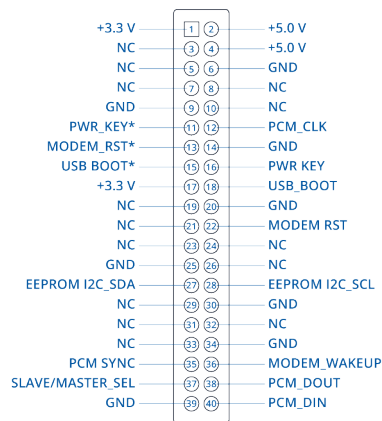
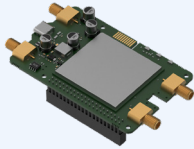## EBD050 Hardware

TOP VIEW

Mobile antenna connector

Mobile antenna connector

Mobile antenna connector

USB Type-C port

Mobile antenna connector

Power LED

NET_IND LED

NET_STAT LED

LEFT VIEW

NET_IND LED

Power LED

NET_STAT LED

Sim card holder

40-pin GPIO header

GPIO Connector Pinout

TOP VIEW

+3.3 V	1	2	+5.0 V
NC	3	4	+5.0 V
NC	5	6	GND
NC	7	8	NC
GND	9	10	NC
PWR_KEY*	11	12	PCM_CLK
MODEM_RST*	13	14	GND
USB BOOT*	15	16	PWR KEY
+3.3 V	17	18	USB_BOOT
NC	19	20	GND
NC	21	22	MODEM RST
NC	23	24	NC
GND	25	26	NC
EEPROM I2C_SDA	27	28	EEPROM I2C_SCL
NC	29	30	GND
NC	31	32	NC
NC	33	34	GND
PCM SYNC	35	36	MODEM_WAKEUP
SLAVE/MASTER_SEL	37	38	PCM_DOUT
GND	39	40	PCM_DIN

NC - Not Connected
* Alternative pin (with a different assembly)

Ordering

Standard package*

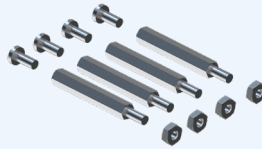|		
CALYX	**QUICK START GUIDE**	**PCB CONNECTOR**
USB TYPE-C TO USB TYPE-A CABLE	**FASTENERS KIT**	
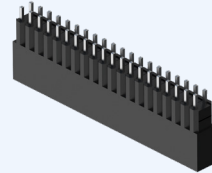
*Standard package contents may differ based on standard order codes.

For more information on all available packaging options – please contact us directly.

Classification codes

HS Code: 851762

HTS: 8517.62.00

Available versions

|		
EBD021 **0******* EMEA[1], Thailand, Australia, New Zealand **Calyx 4G / EBD021**	**4G (LTE-FDD):** B1, B3, B5, B7, B8, B20, B28 **4G (LTE-TDD):** B38, B40, B41 **3G:** B1, B8 **2G:** B3, B8	EBD021000000 / Standard package without PSU
EBD050 **0******* EMEA[1], APAC, Brazil **Calyx 5G / EBD050**	**5G NR(SA/NSA):** n1, n3, n5, n7, n8, n20, n28, n38, n40, n41, n71, n75, n76, n77, n78 **4G (LTE-FDD):** B1, B3, B5, B7, B8, B20, B28, B32, B71 **4G (LTE-TDD):** B38, B40, B41, B42, B43 **3G:** B1, B5, B8	EBD050000000 / Standard package without PSU
EBD050 **1******* North America **Calyx 5G / EBD050**	**5G NR NSA:** n2, n5, n7, n12, n13, n14, n25, n26, n29, n30, n38, n41, n48, n66, n70, n71, n77, n78 **5G NR SA:** n2, n5, n7, n12, n13, n14, n25, n26, n29, n30, n38, n41, n48, n66, n70, n71, n77, n78 **4G (LTE-FDD):** B2, B4, B5, B7, B12, B13, B14, B17, B25, B26, B29, B30, B66, B71 **4G (LTE-TDD):** B38, B41, B42, B43, B48	EBD050100000 / Standard package without PSU
EBD070 **0******* Global[1] **Calyx 5G Red Cap / EBD070**	**5G NR SA:** n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n30, n38, n40, n41, n48, n66, n70, n71, n77, n78, n79 **4G (LTE-FDD):** B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B30, B66, B70, B71 **4G (LTE-TDD):** B34, B38, B39, B40, B41, B42, B43, B48	EBD070000000 / Standard package without PSU

Calyx spatial measurements

Available versions

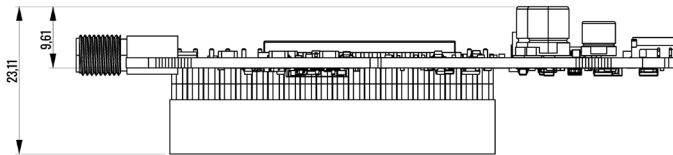|	
EBD021 EBD070 device measurements	56 x 23.11 x 95.48 mm
EBD050 device measurements	56 x 23.11 x 108 mm
Box (W x H x D):	102 x 31 x 102 mm

EBD021 & EBD070

TOP VIEW

The figure below depicts the measurements of device and its components as seen from the top:
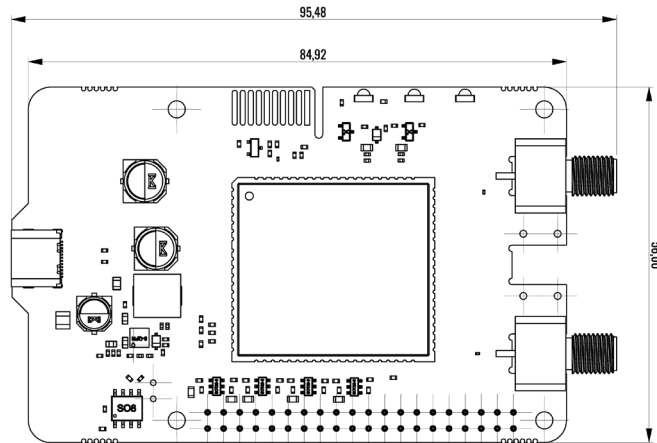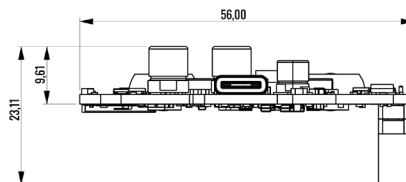
LEFT VIEW

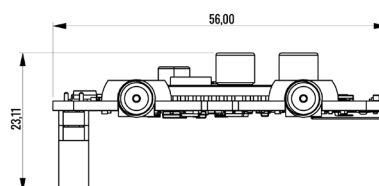The figure below depicts the measurements of device and its components as seen from the left side:

FRONT VIEW

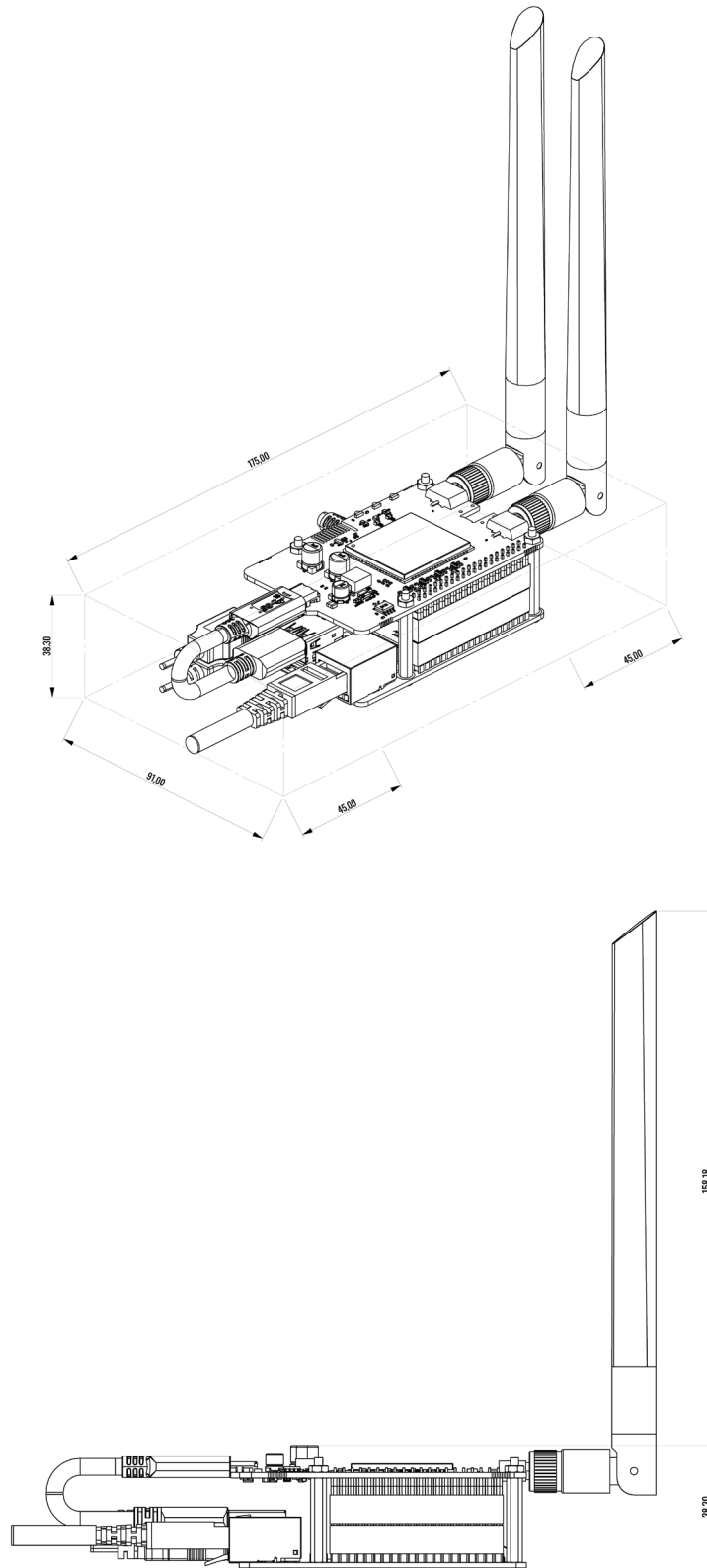The figure below depicts the measurements of device and its components as seen from the front side:

REAR VIEW

The figure below depicts the measurements of device and its components as seen from the rear side:

EBD021

MOUNTING SPACE REQUIREMENTS

The figure below depicts an approximation of the device's dimensions when cables and antennas are attached:
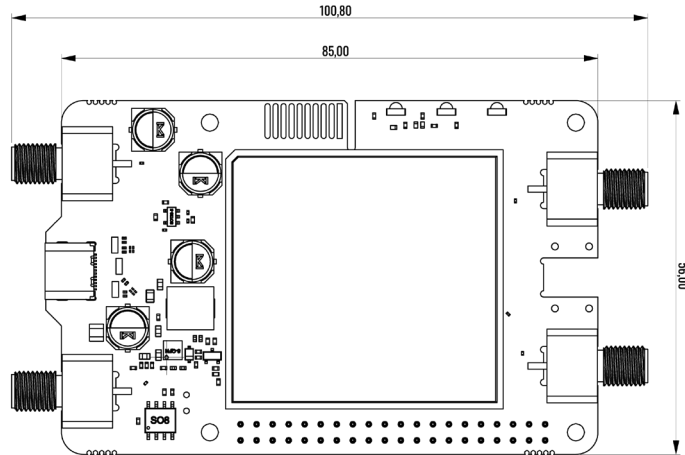
EBD070

MOUNTING SPACE REQUIREMENTS

The figure below depicts an approximation of the device's dimensions when cables and antennas are attached:
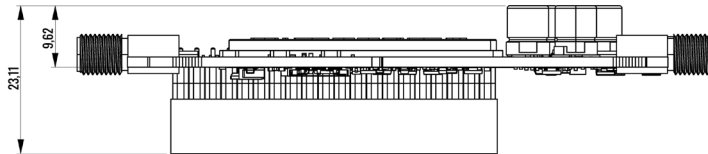
EBD050

TOP VIEW

The figure below depicts the measurements of device and its components as seen from the top:
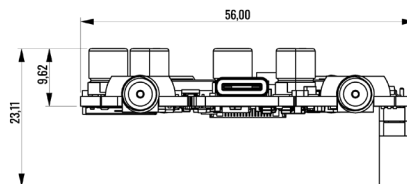
LEFT VIEW

The figure below depicts the measurements of device and its components as seen from the left side:
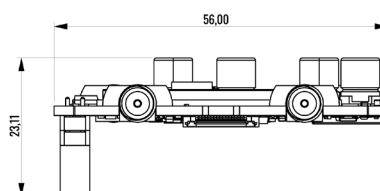
FRONT VIEW

The figure below depicts the measurements of device and its components as seen from the front side:

REAR VIEW

The figure below depicts the measurements of device and its components as seen from the rear side:

Specifications and information given in this document are subject to change by UAB TELTONIKA NETWORKS without prior notice.

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MOUNTING SPACE REQUIREMENTS

The figure below depicts an approximation of the device's dimensions when cables and antennas are attached: