

1 CUS-01138 REVB: COMPACT UHF SENSOR

The antenna is constructed in a double-sided printed circuit board. The antenna is a planar patch antenna by design. The radiating surface and the ground plane is made from conductive copper whereas the dielectric substrate used is FR-4 (fiber glass epoxy). The antenna bears a white-coloured solder mask. The antenna's radiating side is distinguished by marking as shown in Fig.5. The antenna's part number and QC are displayed on the PCB's rear side (see Fig.6).



Fig.5 – PCB antenna (front side)



Fig.6 – PCB antenna (rear side)

Operation:

The antenna design is a planar $\frac{1}{4}$ wave patch antenna with shorted edges. The radiating patch is fed by a microstrip line which is excited by the RG-316 cable. The patch antenna is linearly polarized along the long edge of the PCB.

The antenna operates between 902 and 928 MHz frequencies. The antenna's ground plane is referenced to the coaxial cable's ground shield. The radiating patch is grounded through the conductive vias. The electrostatic discharge will be grounded through the coaxial cable's ground.

2 CABLE STRAIN RELIEF

The RG-316 cable is soldered onto the antenna's back is adhered using the adhesive TECBOND-342. It is a synthetic polymer based hot-melt adhesive. This adhesive provides the strain relief for the coaxial cable. The glue is approximately a 0.6 x 0.4-inch blob and is applied using hot-gun while manufacturing. The glue can handle 2.2 lbs pull force. Glue can handle cable axial pull, radial pull, turn and twist. RF testing will happen after the glue is applied.

3 SPECIFICATIONS AND DELIVERABLES

Physical Specifications:

| | |
|----------------------------------|------------------------------------|
| Dimensions (L x W x D): | 2.20-inch x 0.91-inch x 0.067 inch |
| Weight: | 15 grams |
| Radome Material: | No Radome Included |
| Environmental Rating: | IP54 |
| Operating / Storage Temperature: | -22°F to 158 °F |
| Cable type / length: | RG-316 / 23 inches |
| Connector type: | SMA Male – Plug* |

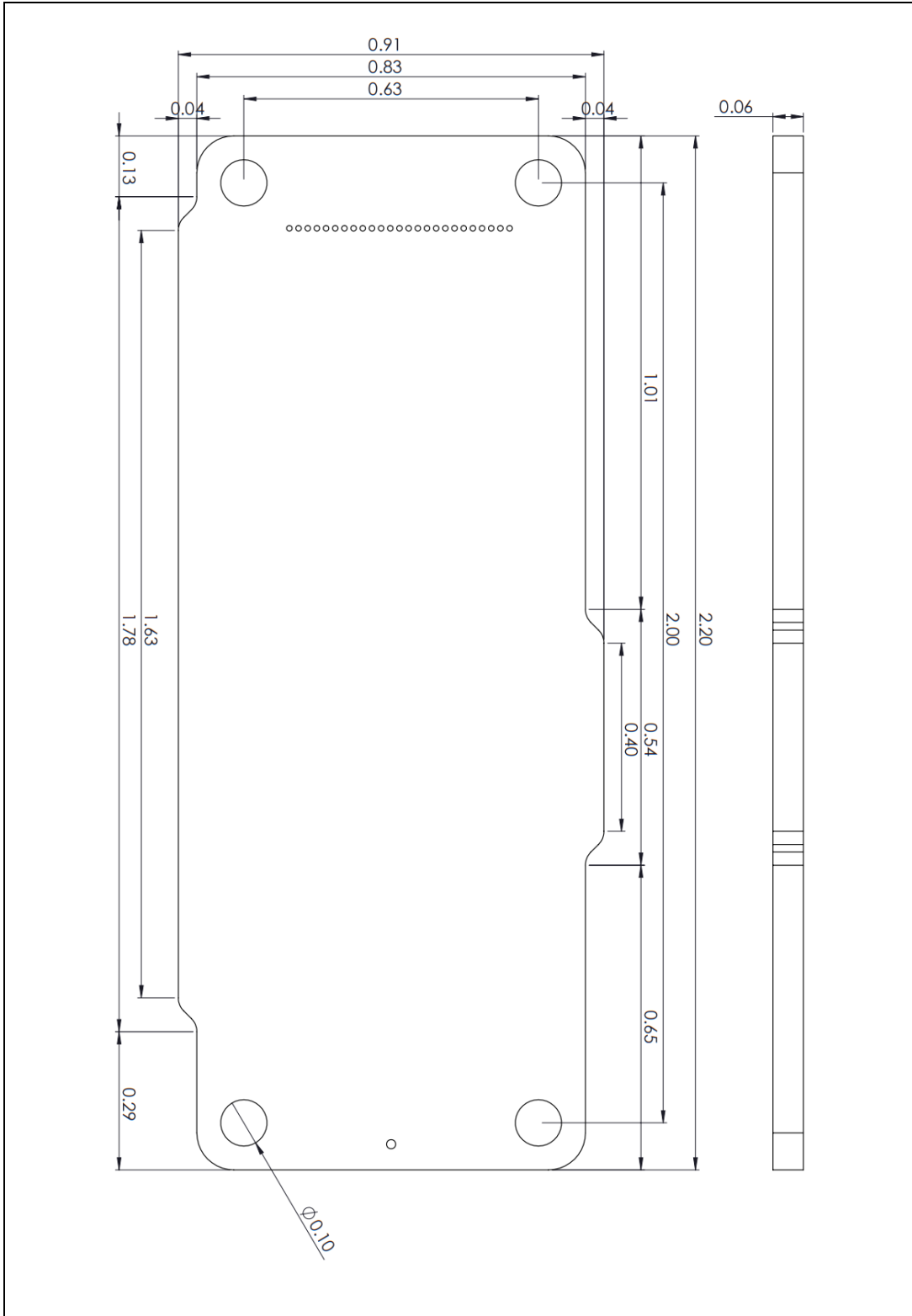
*SMA Male Plug:

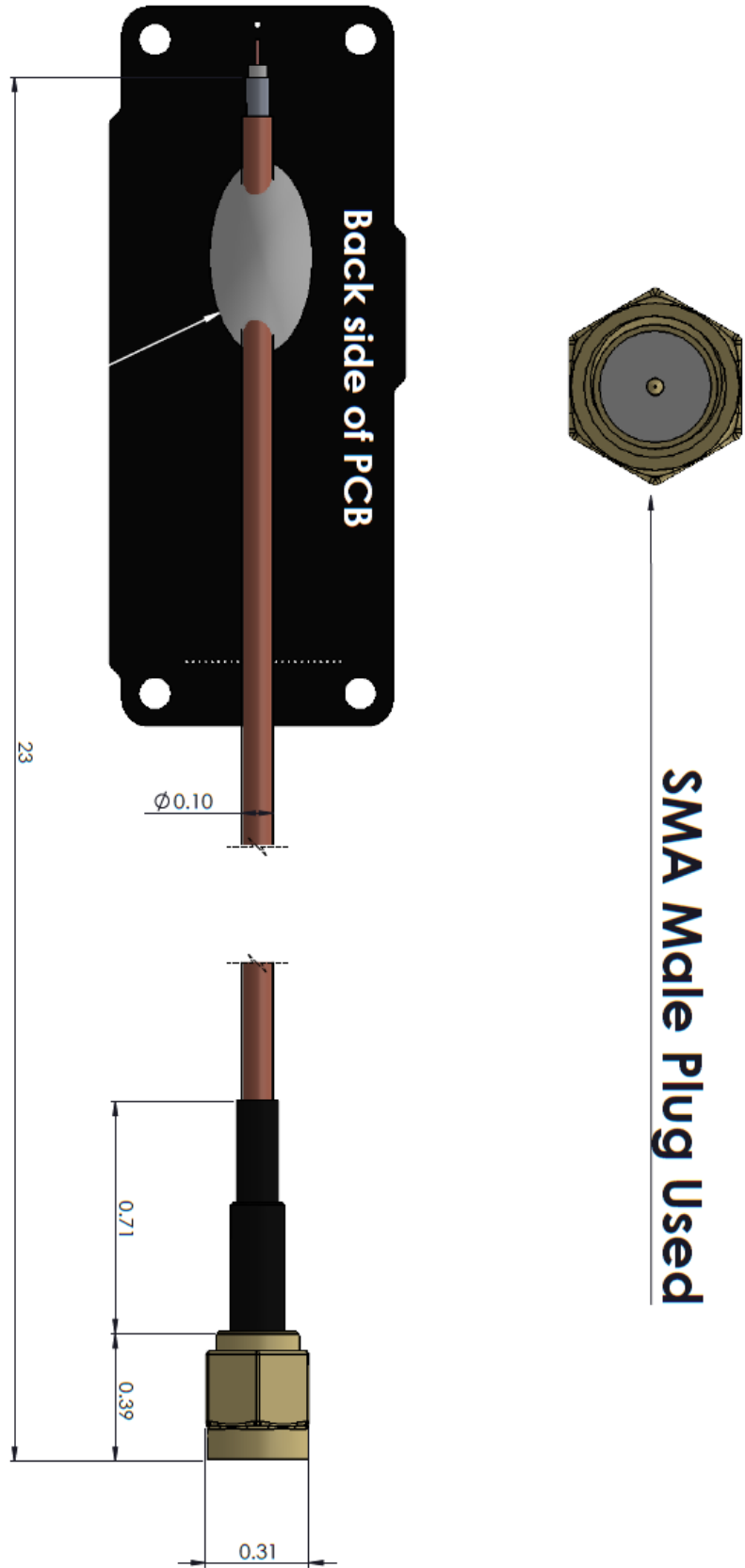


Electrical Specifications:

| | |
|-------------------------|----------------------------|
| Frequency Range: | 902-928 MHz |
| Polarization: | Linear |
| Far-field Gain: | -18 dBi Typical |
| Target Read Distance: | 1-inch nominal, 3-inch max |
| VSWR: | 2.5 typical |
| Nominal Impedance: | 50 Ω |
| Anti-static protection: | Yes |
| Maximum Input Power: | 3 W |

4 PARTS AND ENGINEERING DRAWING





5 DECLARATION OF ROHS CONFORMITY

Times-7 Research Limited, 29 Railway Avenue, Lower Hutt, New Zealand has designed and assembled this antenna using components sourced from its suppliers. The ROHS certification of its suppliers has been examined and based on these certifications, the following declaration is made.

The product: **CUS-01138 RevB** is in conformity with the EU Directive 2011/65/EU for the restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS).

No lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr+ 6), Polybrominated Biphenyl (PBB), or Polybrominated Diphenyl Ether (PBDE) is intentionally added to the following parts;

1. PCB Antenna
2. RF Cable
3. TECBOND-342 Glue
4. Solders and other misc. parts

Any trace impurities of the RoHS substances in the parts are below the RoHS specified levels.

| Substances | Threshold Level |
|--------------------------------------|-----------------|
| Lead (Pb) | 0.1% or 1000 |
| Mercury (Hg) | 0.1% or 1000 |
| Cadmium (Cd) | 0.01% or 100 |
| Hexavalent Chromium (Cr+ 6) | 0.1% or 1000 |
| Polybrominated Biphenyl (PBB) | 0.1% or 1000 |
| Polybrominated Diphenyl Ether (PBDE) | 0.1% or 1000 |

Place / Date:

Lower Hutt / 31 January 2018
Production Engineer, Times-7 Research Ltd



Robby Lopez

Place / Date:

Lower Hutt / 31 January 2018
Operations Manager, Times-7 Research Ltd



Paul Roling

6 DECLARATION OF FCC CONFORMITY


Times-7 Research Limited, 29 Railway Avenue, Lower Hutt, New Zealand declares the product: **CUS-01138 RevB** is in conformity with the EPC Gen2 RFID regulations in the United States ^[1] region as explained below,

| Parameters | FCC Regulation Requirements | Antenna's Specification |
|------------------------|---|---|
| Frequency of operation | 902 to 928 MHz | Antenna is tuned for 902 to 928 MHz operation |
| Power | 4 Watts (36.0206 dBm) EIRP (Effective Isotropic Radiated Power) | EIRP = $P_T - L_C + G_a$ (dBm) Where, P_T = RFID reader's transmit power (dBm), L_C = Cable losses between the antenna & the reader output (dB) and G_a = Antenna's Gain (dBi). The UHF RFID Dental Antenna Prototype's Gain = -16 dBi For a 30 dBm reader output and 0.5 dB cable loss, EIRP = 13.5 dBm or 0.0224 Watts For a 33 dBm reader output and 0.0 dB cable loss, EIRP = 17.0 dBm or 0.0501 Watts |
| Technique | FHSS (Frequency Hop Spread Spectrum) | Not Applicable / Exempt. FHSS technique is deployed within the RFID reader. |

Place / Date:

Lower Hutt / 31 January 2018

Parthiban



Prabakar
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^[1] UHF Regulations: https://www.gs1.org/docs/epc/uhf_regulations.pdf