On the development of antenna-system pair with rotational freedom for non-contact data communication.

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Introduction
Two antenna designs are proposed for non-contact data communication. The first design is a pair of 2.4GHz loop antennas, and the second design is a pair of 60GHz dielectric-rod antennas. Both can support the rotation around its axis. The typical bridged distance is few millimeters. The proposed designs are suitable for point-to-point data communication such as in the rotary joint and board-to-board interconnection.

2.4GHz Loop Antenna
- Diameter is 4mm (i.e. < λ/10).
- Supporting one-directional communication.
- Employing matching circuits.
- Differential feed lines.
- Circuit simulation & modular-based modeling:
  - Good agreement between simulation and measurement.
  - Using minimum fine tuning, especially the resistor value.
  - Typical bridged distance is few millimeters.

60GHz Dielectric-Rod Antenna
- Supporting full-duplex by means of dual-circular polarization.
- Patch connected to hybrid coupler microstrip.

Reference