

Internet of Radio Light mmWave Modules and Antennas

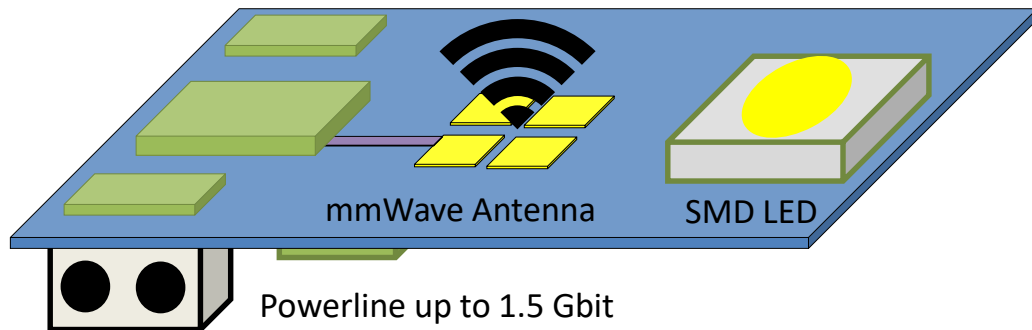
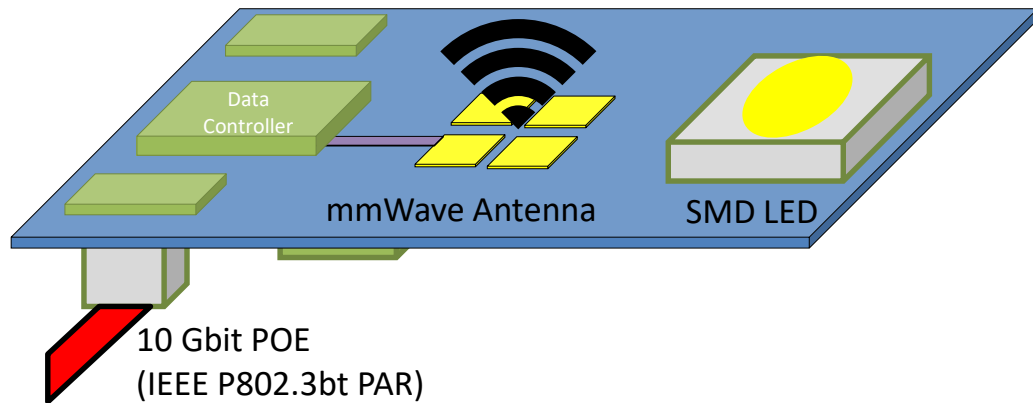
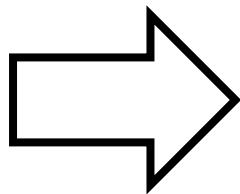
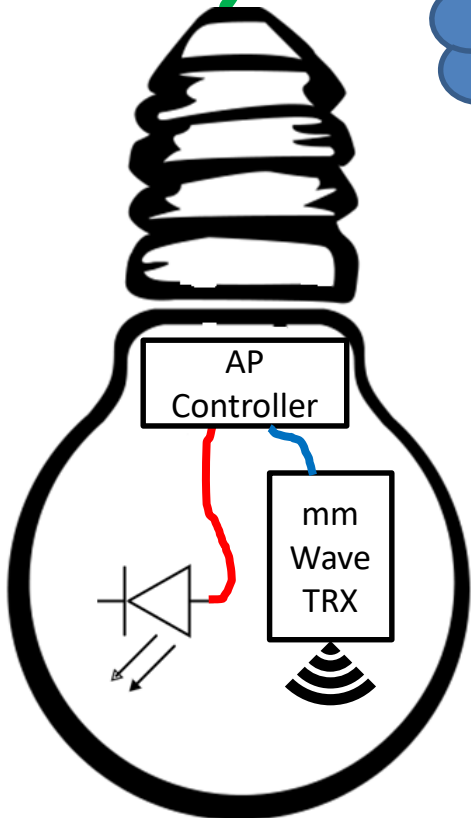
Robert Müller

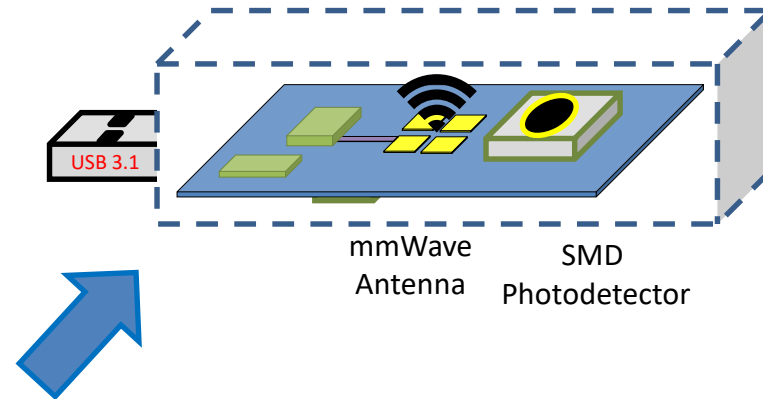
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- System Overview AP and UE
- Requirements for the mmWave Design
- Challenges for the IoRL mmWave System
- Ultra-Wide-Band Converters
- Multi-Channel Transceiver
- 5G Broadband mmWave Antennas
- Low-Cost Ultra-Wide-Band Dual Pol Antenna

IoRL Network





Requirements

- ✓ Full 5G mmWave frequency range support (24 - 40 GHz)
- ✓ IF bandwidth larger than 1 GHz
- ✓ Compatible with all base band units that are used in IoRL
- ✓ Common 10 MHz system clock support
- ✓ Multi-Channel support for every RLH (dual pol TX and RX channels at Access Point)
- ✓ Low Cost System
- ✓ Small Dimensions

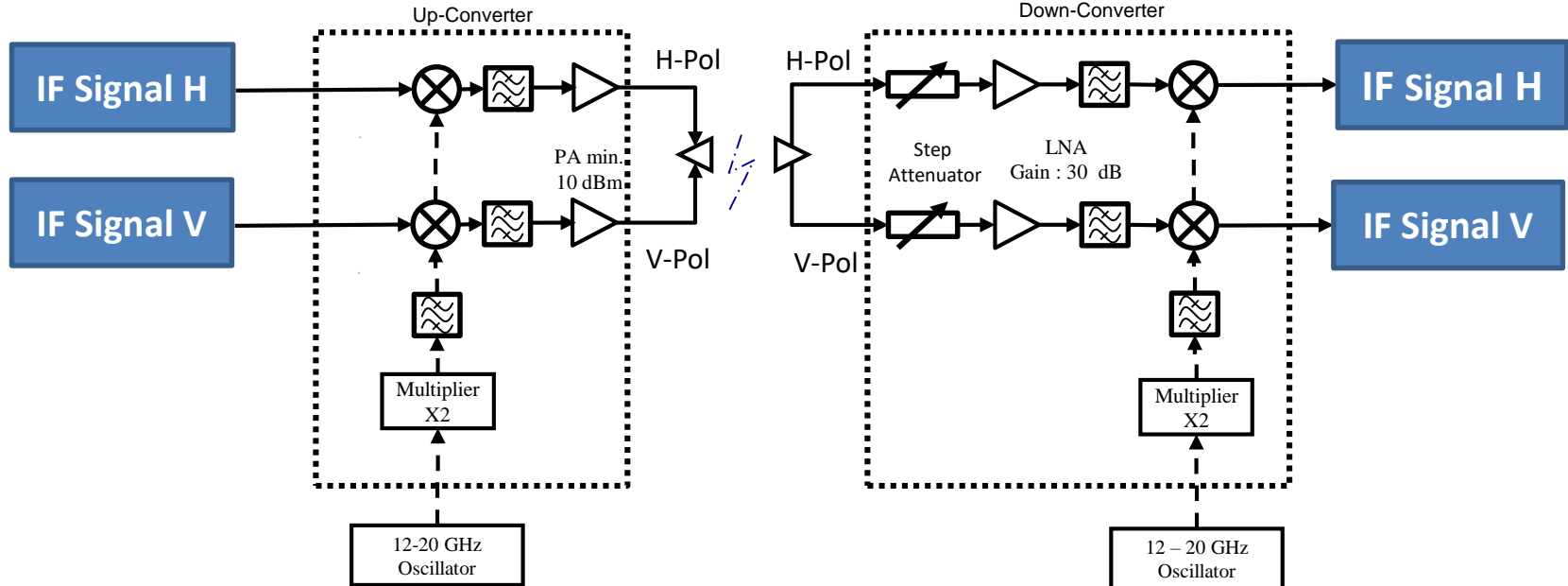
Challenges

- !! Chips in the mmWave range are expensive
- !! Standard mmWave antennas are expensive
- !! More than 10 Modules required for the AP and UE
- !! Cost for the full mmWave system should be less than 1000 € per module

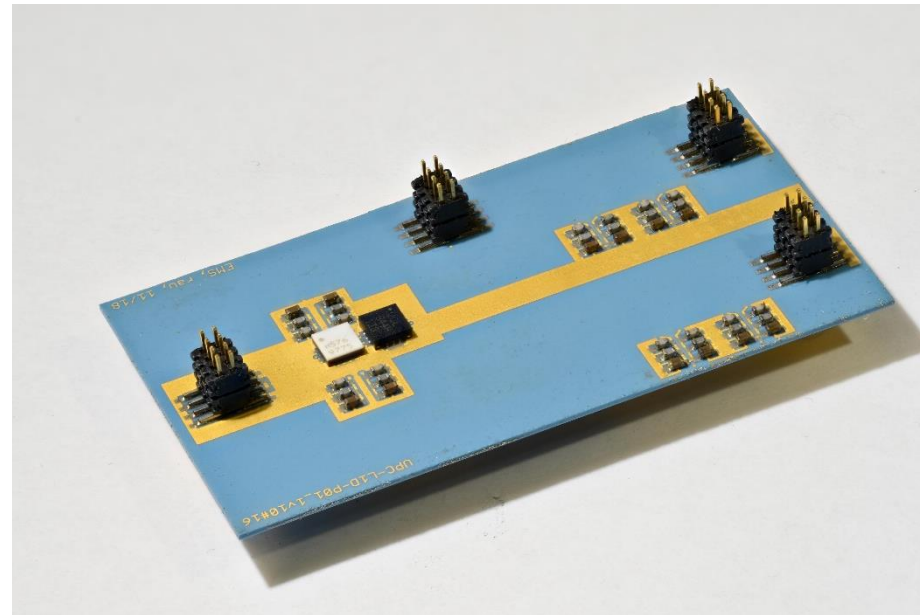
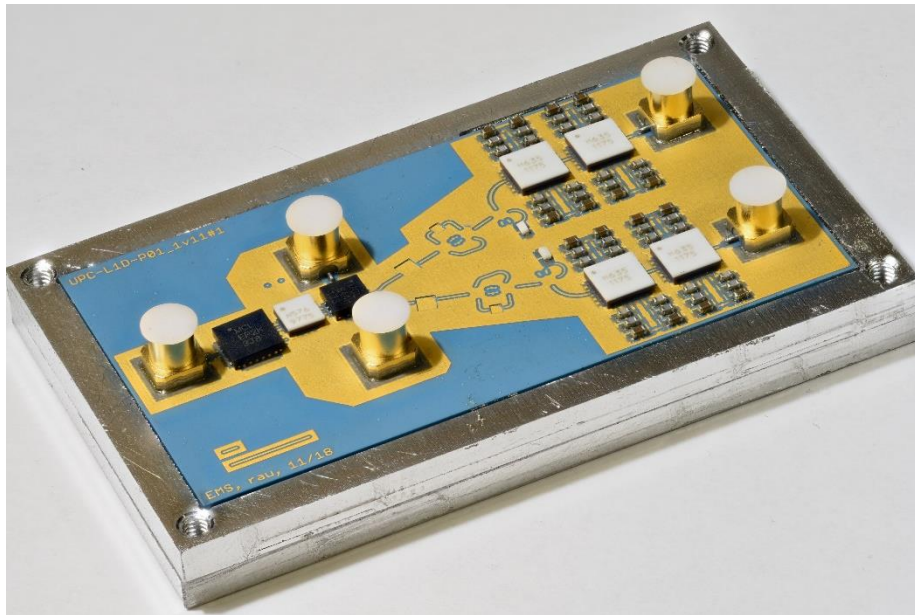
Technical Data:

- Frequency Range 24 – 43 GHz
- IF Bandwidth > 10 GHz
- Pout > 20 dBm

- 30 dB Gain Control
- LO range 12 – 20 GHz
- 30 dB LNA Gain
- 2 Channels at TX and RX



Ultra-Wide-Band Converters



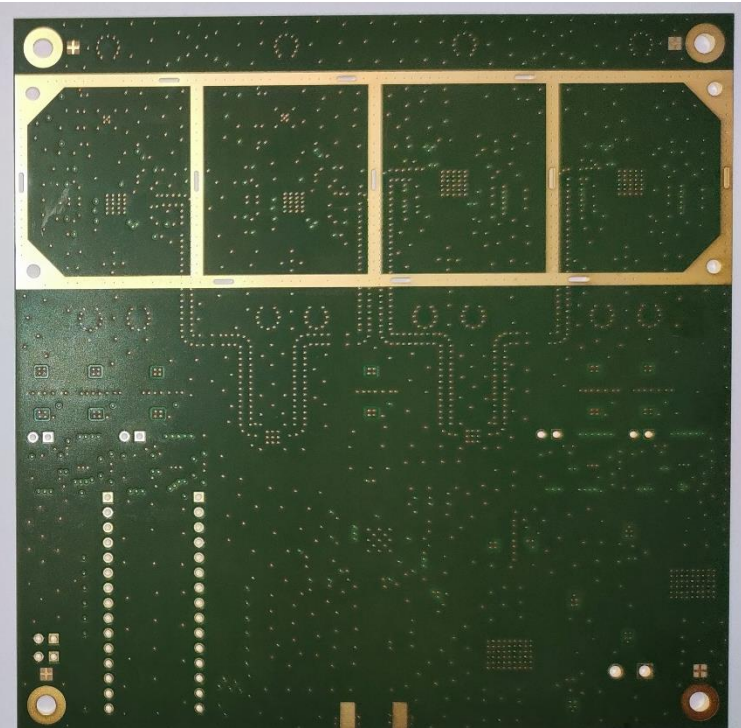
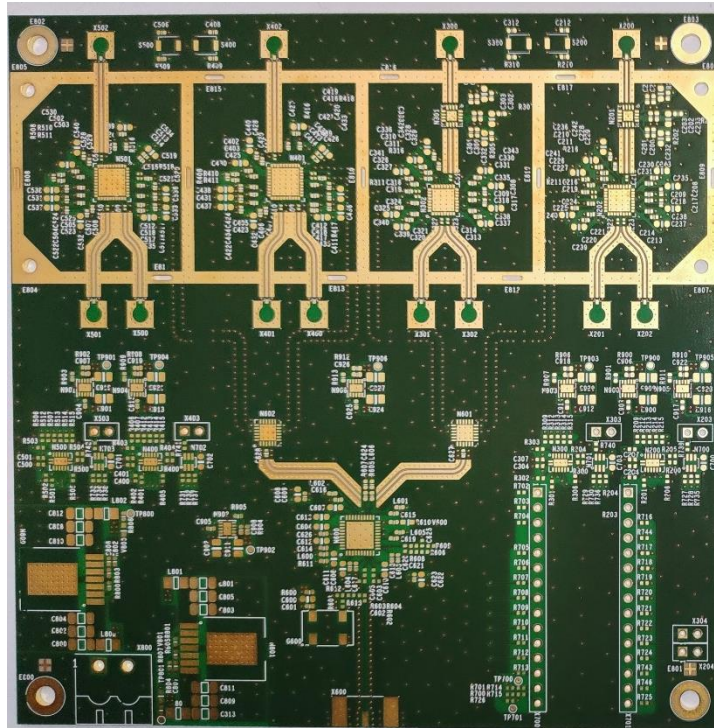
Dimensions:

- 55 x 30 mm

Technology:

- LTCC 9K7 RF Material

Compact mmWave Systems for IoRL

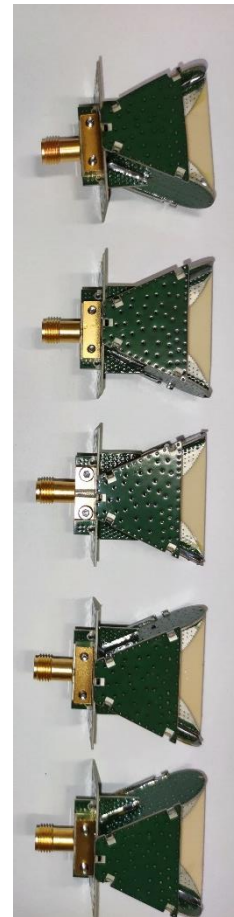
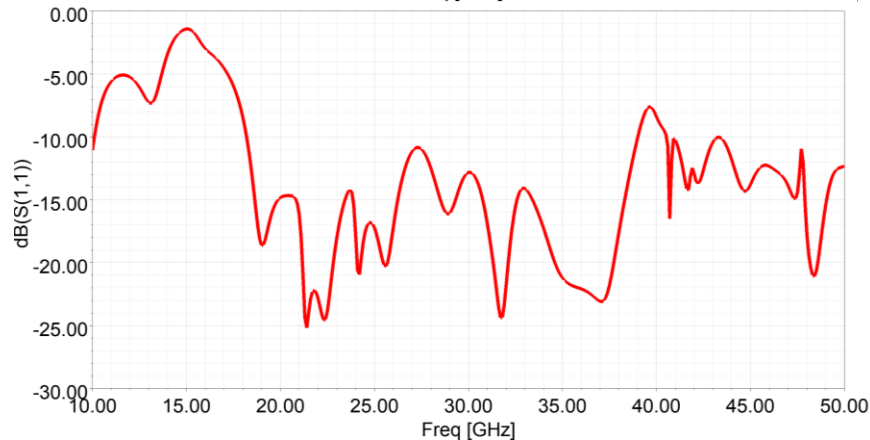
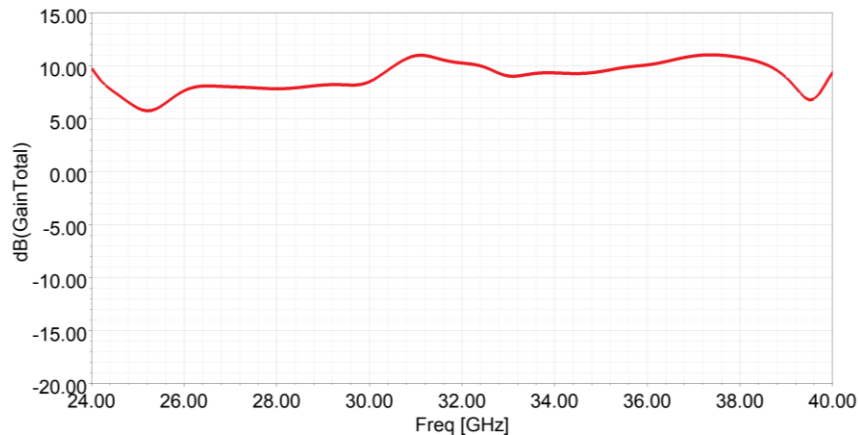


Technology:

- IS620i

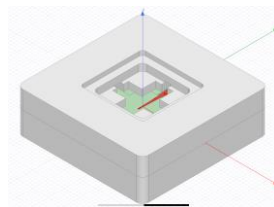
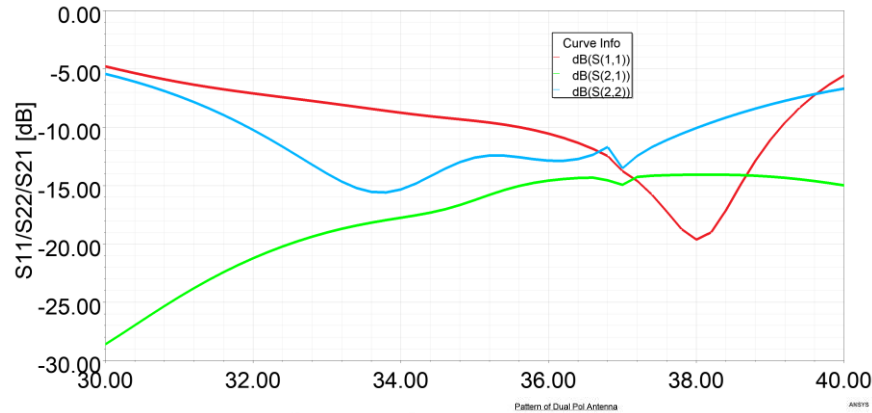
Technical Data:

- Frequency Range 18 – 50 GHz
- Average Gain 8 dBi
- 60° HPBW
- Dimensions: 43 x 32x 17.5 mm
- Overall cost less than 40 €

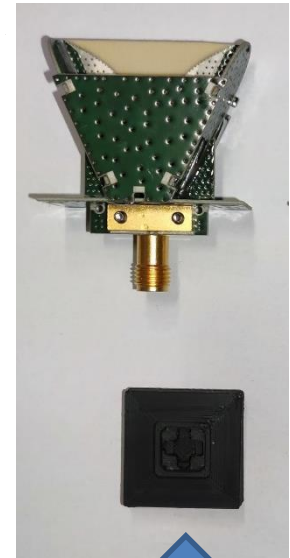
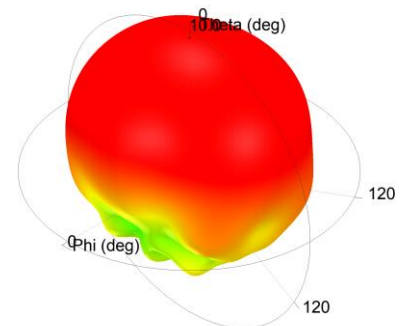
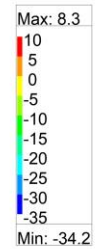


Technical Data:

- 10 dB Frequency Range 36-40 GHz
- Average Gain 8 dBi
- 60° HPBW
- Dimensions: 20 x 20 x 6.5 mm
- Overall cost including 100 mm connecting cable is less than 100 €
- Under using of mini SMP connector instead of direct soldering of coaxial cable at the antenna the bandwidth can be extended to a range of 26-40 GHz
 - Cost incl. mini-SMP and 100 mm connection cable is around 200 €



Freq = 26GHz



New dual Pol Antenna

Acknowledgement and disclaimer

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- ❑ This presentation reflects the author's view, only, and the Commission is not responsible for any use that may be made of the information provided.

Thank you for your attention

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