

A Hybrid VNA Frequency Extender for 670 GHz Portable Automotive Radar Applications

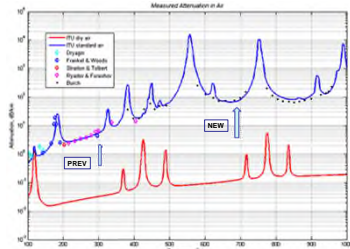
David R Vizard
VivaTech TeraHertz SAS, Nice, France

VivaTech TeraHertz SAS est spécialisée dans le conseil, l'assistance, la fabrication de produits pour des entreprises notamment en matière d'ingénierie, de design, de projet et plus précisément en matière de haute technologie de l'information et de la communication. VivaTech a conçu et développé des composants, sous-systèmes ou systèmes couvrant des fréquences dans la gamme de 50 à 1 THz pour les demandes particulières de nos clients

Hybrid 670 GHz TX / RX hardware Development

- The potential of the Low THz spectrum for high resolution imaging applications such as automotive radar is now apparent.
- Experiments require compact and portable equipment which may be achieved by extending the operation of current battery powered vector network analyzers.
- The development of a novel hybrid 670 GHz VNA based frequency extender is described including state of art performance data.

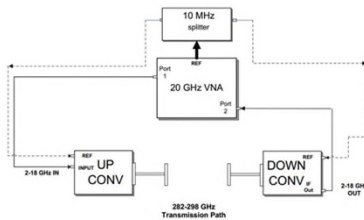
New Work at 654 – 672 GHz: objective higher resolution



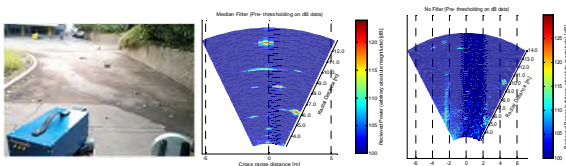
Previous Work: Development of 300 GHz VNA Compact Portable Radar



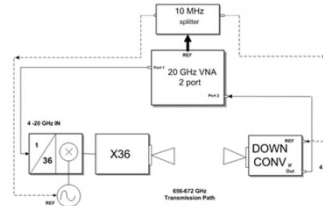
Configuration of 282 – 298 GHz VNA Compact Portable Radar



Images of Calibrated Road Scenes, Various Resolutions

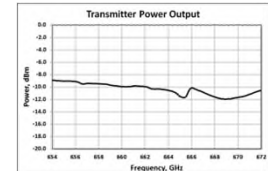


Hybrid 670 GHz VNA Radar Extender

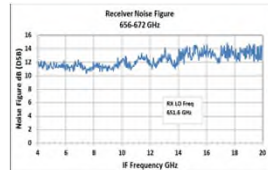


- Linear Up Converter: power limitations
- Hybrid approach: 10 - 20 dB more power

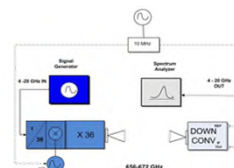
670 GHz Transmitter Module



670 GHz Receiver Module



670 GHz End to End Testing



SUMMARIES

- A 670 GHz portable VNA based radar front end has been developed
- Transmit power of -10dBm achieved with a novel hybrid approach
- Receiver noise figure of < 14 dB achieved
- Future work will use 670 GHz radar imaging in automotive scenarios
- Propagation experiments @ 670 GHz will be conducted