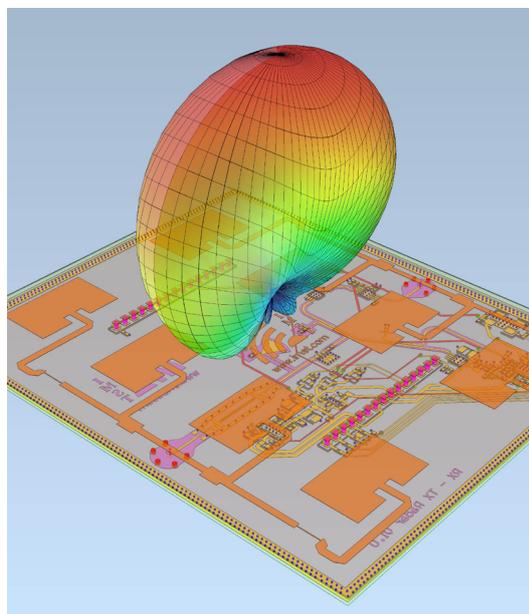
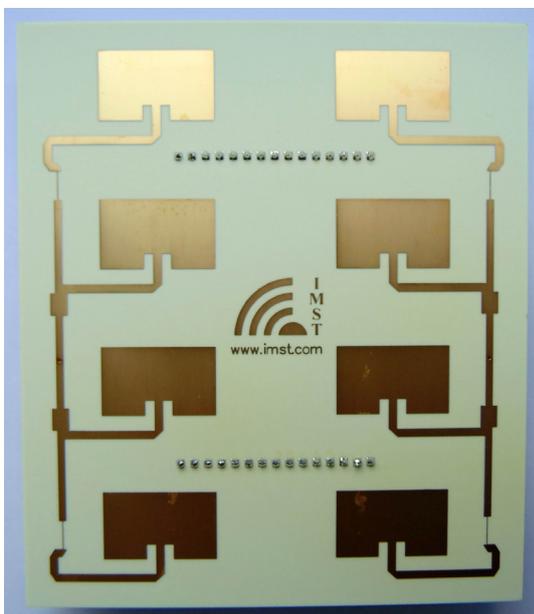


RADAR APPLICATION NOTE

DISTANCE MEASUREMENTS WITH 5.8 GHz FMCW RADAR



5.8 GHz FMCW radar module with separate transmit and receive antennas

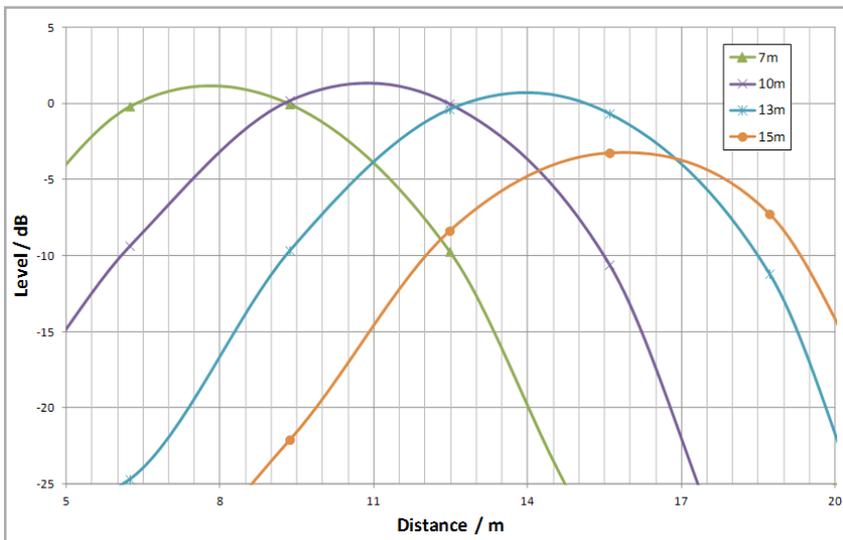
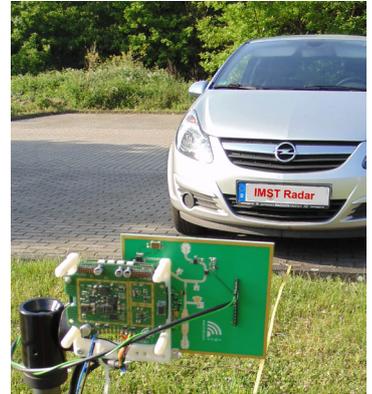
OVERVIEW

With the 5.8 GHz FMCW radar module a low-cost radar solution has been developed to serve a number of applications within a huge market for distance measurement tasks in this ISM-band frequency range. Especially for countries where the 24 GHz band is not available, this radar is a nice alternative. The module features internal antennas with a 3 dB beam-width of 30° and 70° and a directivity of 12 dBi. The 5.8 GHz RF frontend circuit is designed on the backside of the antenna substrate. IMST applies its baseband and interface boards for FMCW mode operation, digital signal processing and USB interface to a standard PC. This is exactly the same control electronics which is also used for the 24 GHz radar modules.

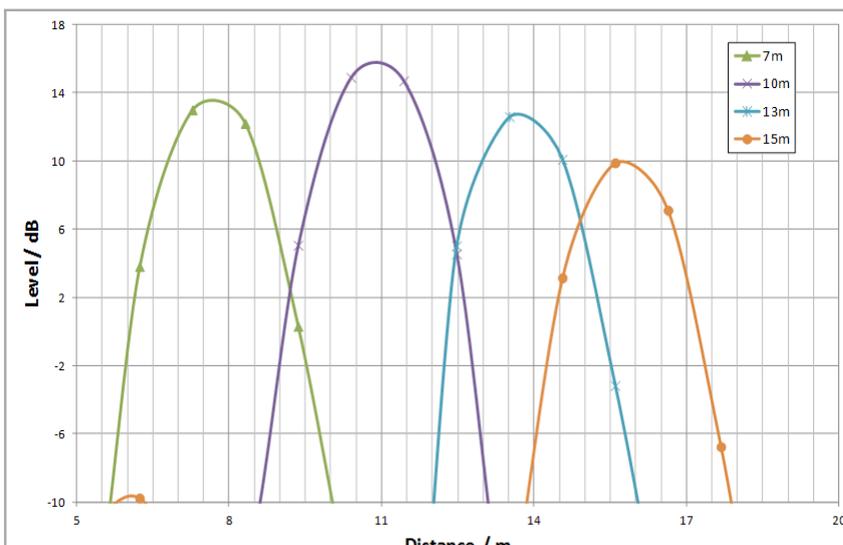
As an example close range detection of a moving car is shown. The available ISM-band bandwidth of 50 MHz already provides sufficient results for a crash detection alarm for instance. Moreover, the 5.8 GHz FMCW radar module is capable to cover a bandwidth even up to 215 MHz. In a closed environment (e.g. mining) this advantage can be used to further increase the accuracy for distance measurements. With a ramp time of 1 ms medium sized obstacles with slow and medium velocity can be detected perfectly. The output power of the radar frontend is set to 19.5 dBm EIRP to fulfill the European regulations of the ISM-band standard.

TECHNICAL DATA

The two diagrams show distance measurements to a car up to 15 meters. A higher range is possible. The first tests have been made with 50 MHz bandwidth. The maximum of each curve represents the distance to the car. For the second test campaign the bandwidth has been increased to 150 MHz FMCW mode so that sharper curves can be measured, which results into an increasing resolution accuracy.



Radar results of a car in different distances with 50 MHz bandwidth.



Radar results of a car in different distances with 150 MHz bandwidth.



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