テラヘルツ波の情報通信応用に関する調査検討会

海外の研究開発動向

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大阪大学大学院
基礎工学研究科

1　ドイツ
TCL*(THz Commun. Lab.)&PTB

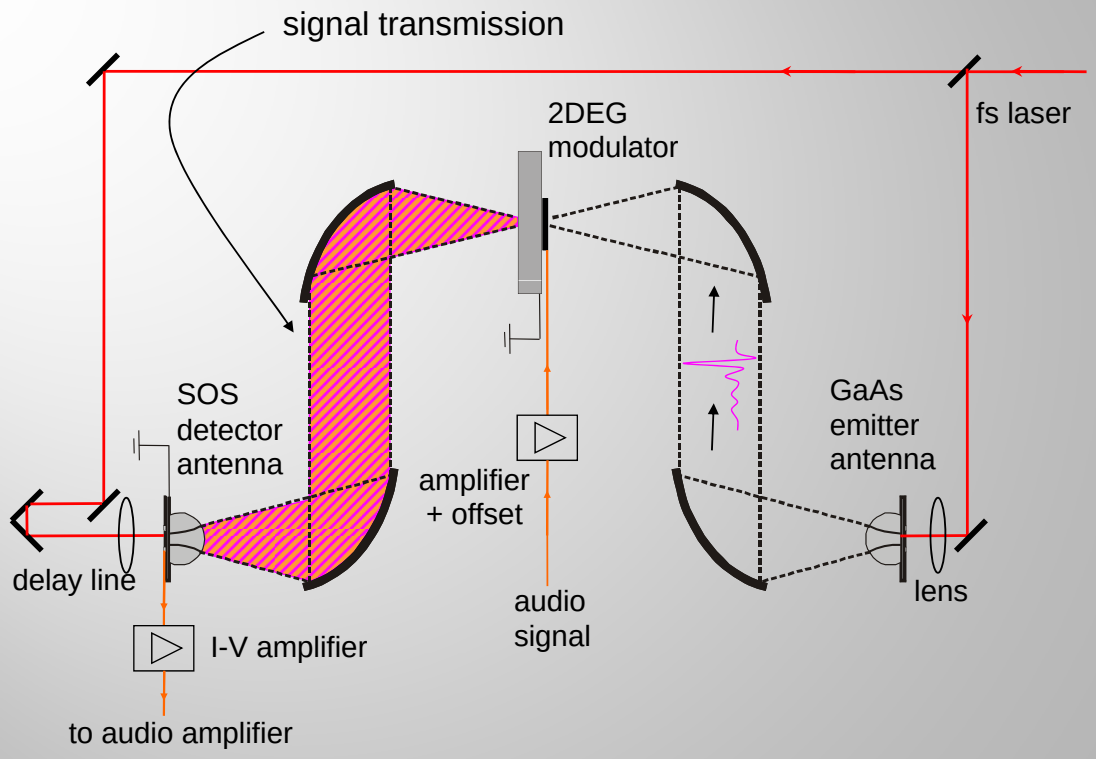
2　フランス
IEMN

3　米国
BMI: Battelle Memorial Institute

4　その他

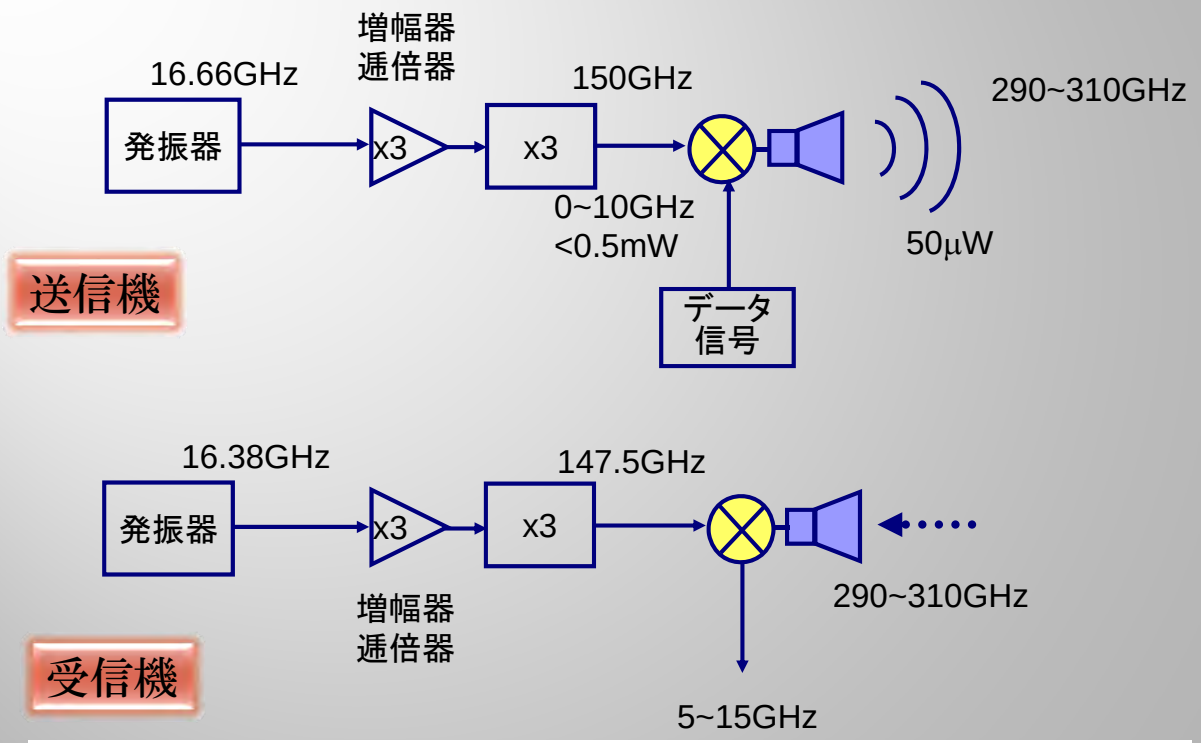
*TCL:Technical University of Braunschweigに設置

テラヘルツパルス波を使った最初の実験:TCL



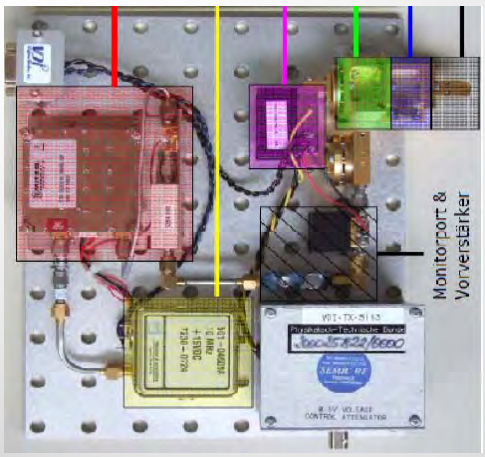
T. Kleine-Ostmann et al., “Audio signal transmission over THz communication channel using semiconductor modulator”, Electron. Lett. **40**, 124-126 (2004).

市販のTHz部品モジュールによる300GHz無線:TCL



C. Jastrow, K. Münter, R. Piesiewicz, T. Kürner, M. Koch and T. Kleine-Ostmann, 300 GHz Transmission System, Electron. Lett. **44**, 213-214 (2008).

300GHz無線モジュール: TCL

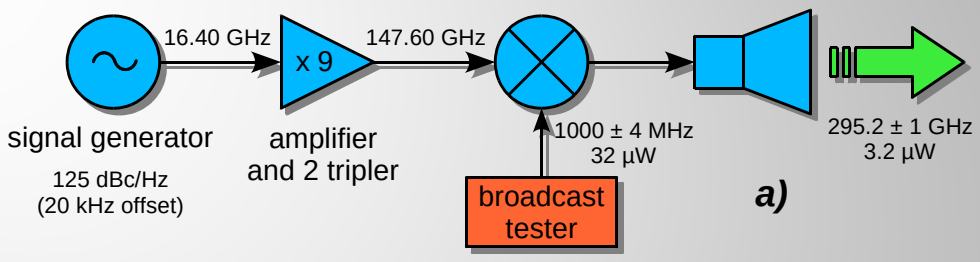


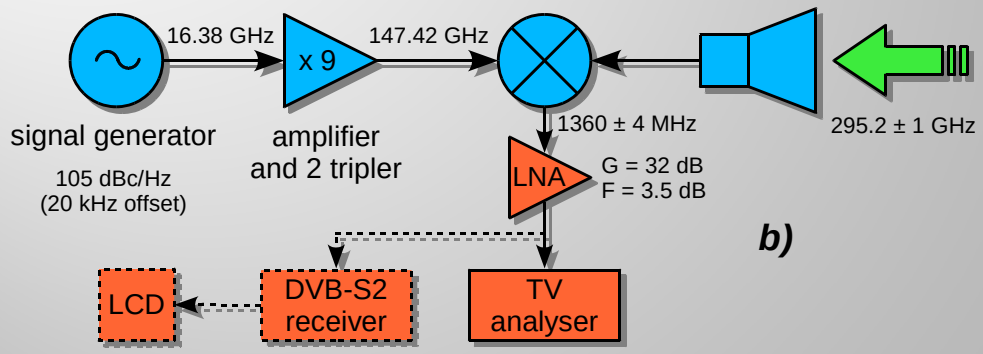
送信機

受信機

C. Jastrow et al., Tech. Dig. IRMMW-THz 2008, M3A3.1342; Demonstration of analog video transmission

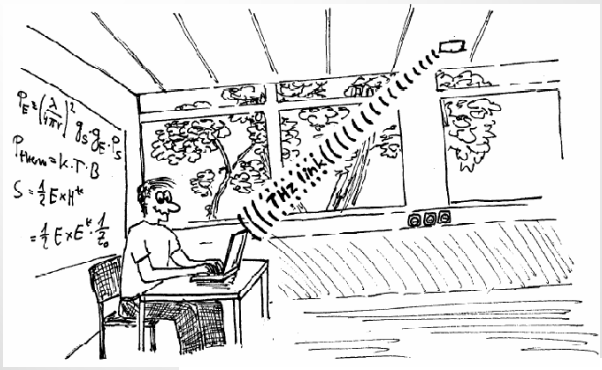
300GHz無線によるディジタル伝送:TCL

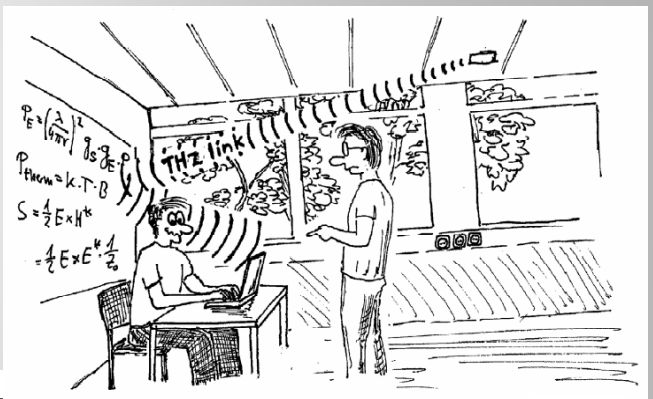




C. Jastrow, S. Priebe, B. Spitschan, J. Hartmann, M. Jacob, T. Kürner, T. Schrader and T. Kleine-Ostmann, Wireless digital data transmission at 300 GHz, Electron. Lett. **46**, 661-663 (2010).

300GHz無線の利用イメージ:TCL





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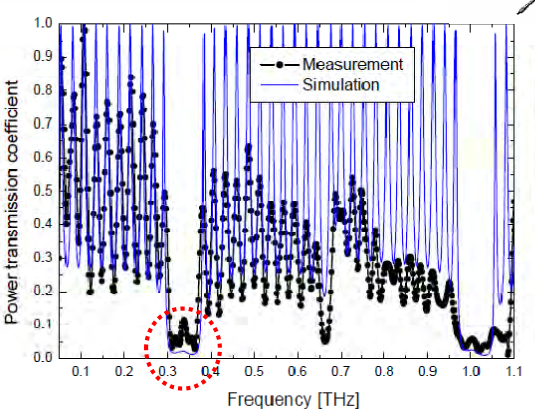
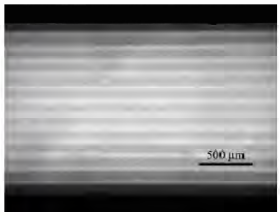
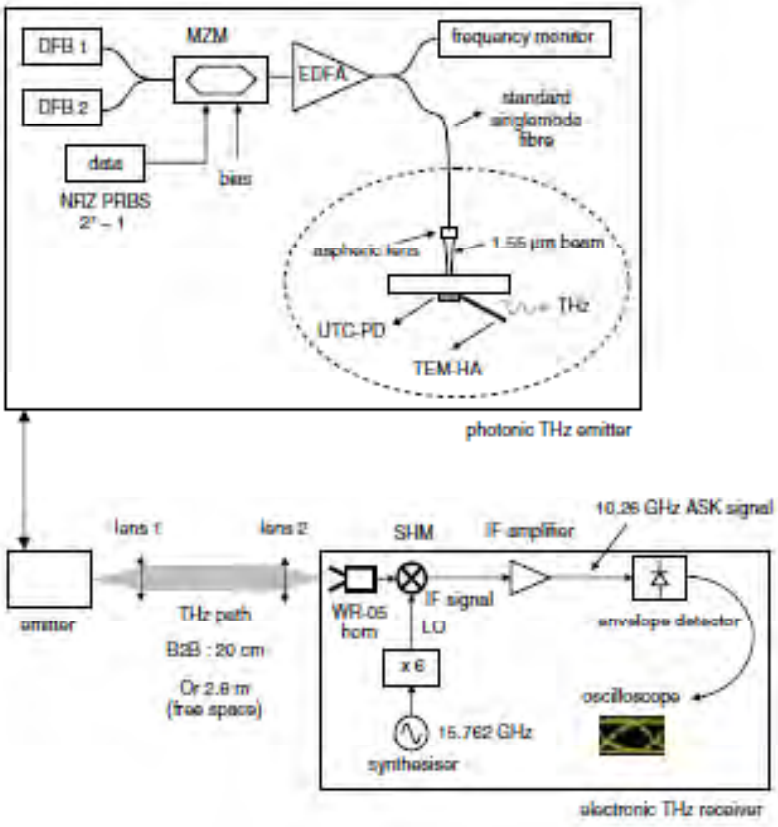


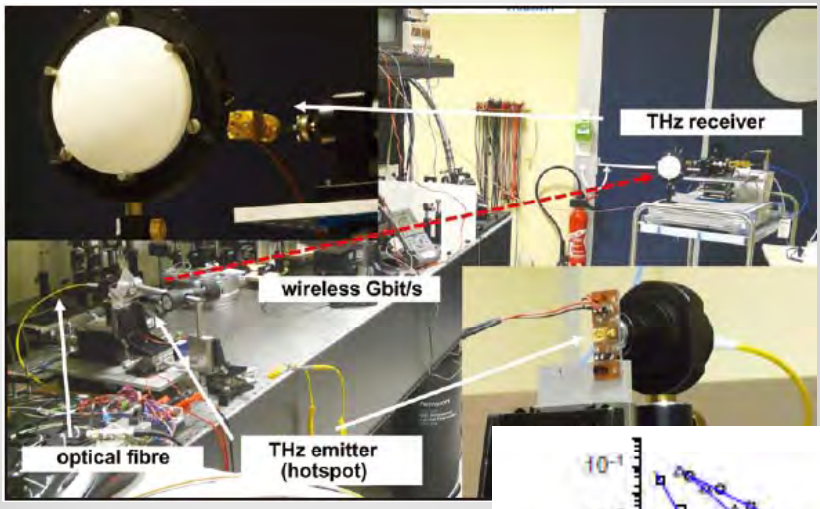


Wall paper

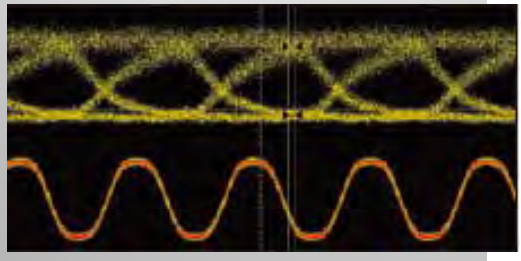
Terahertz Communications Lab
(Technical University of Braunschweig)

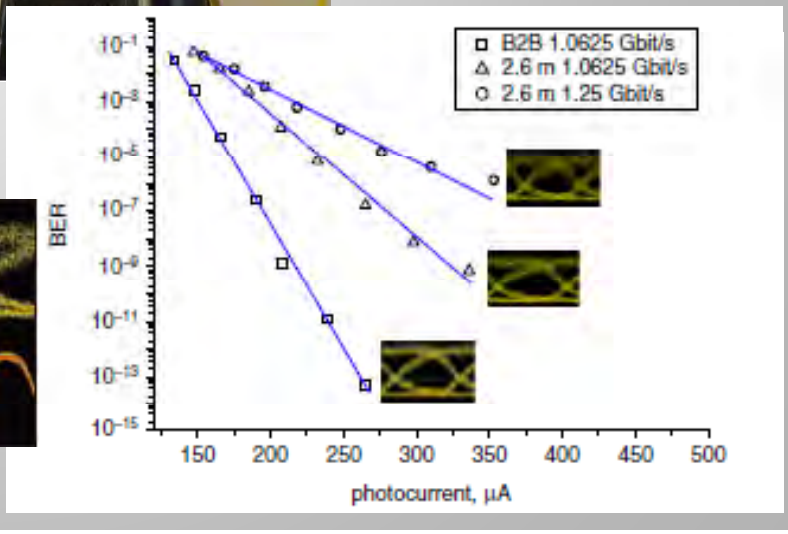
200GHz無線: IEMN



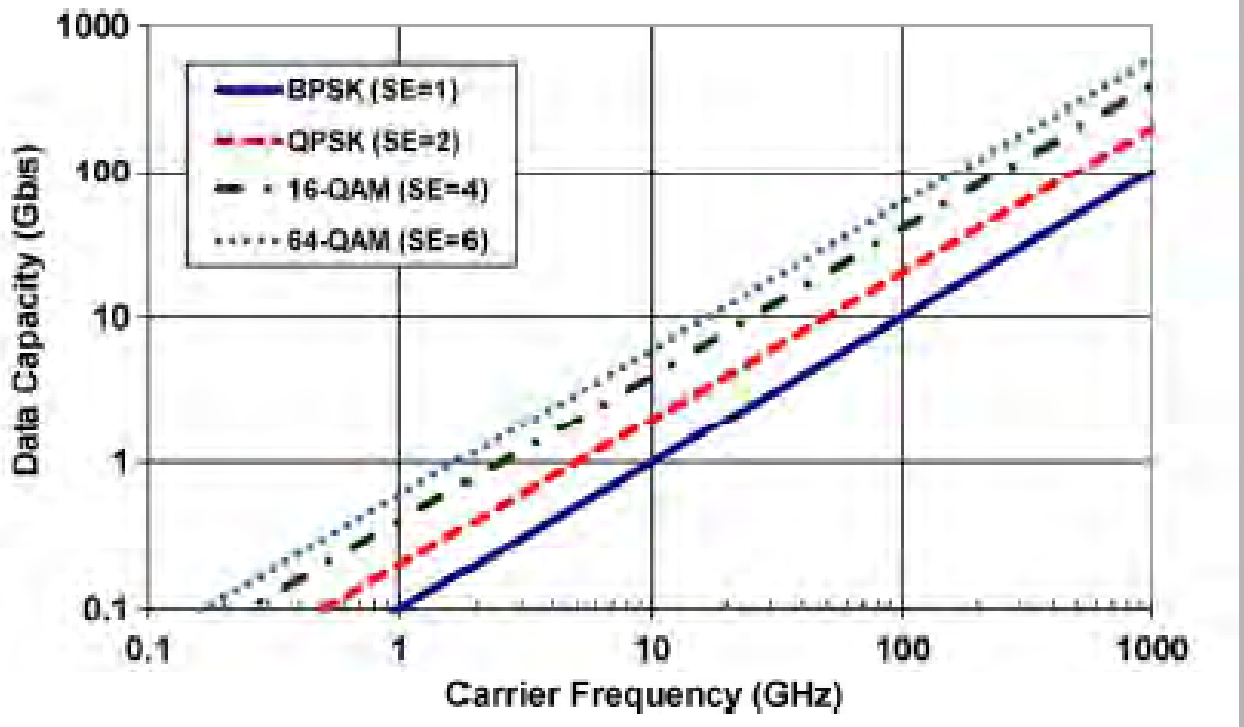


G. Ducournau et al., Optically power supplied Gbit/s wireless hotspot using 1.55 μm THz photomixer and heterodyne detection at 200 GHz, Electron. Lett., 16th September 2010 Vol. 46 No. 19.

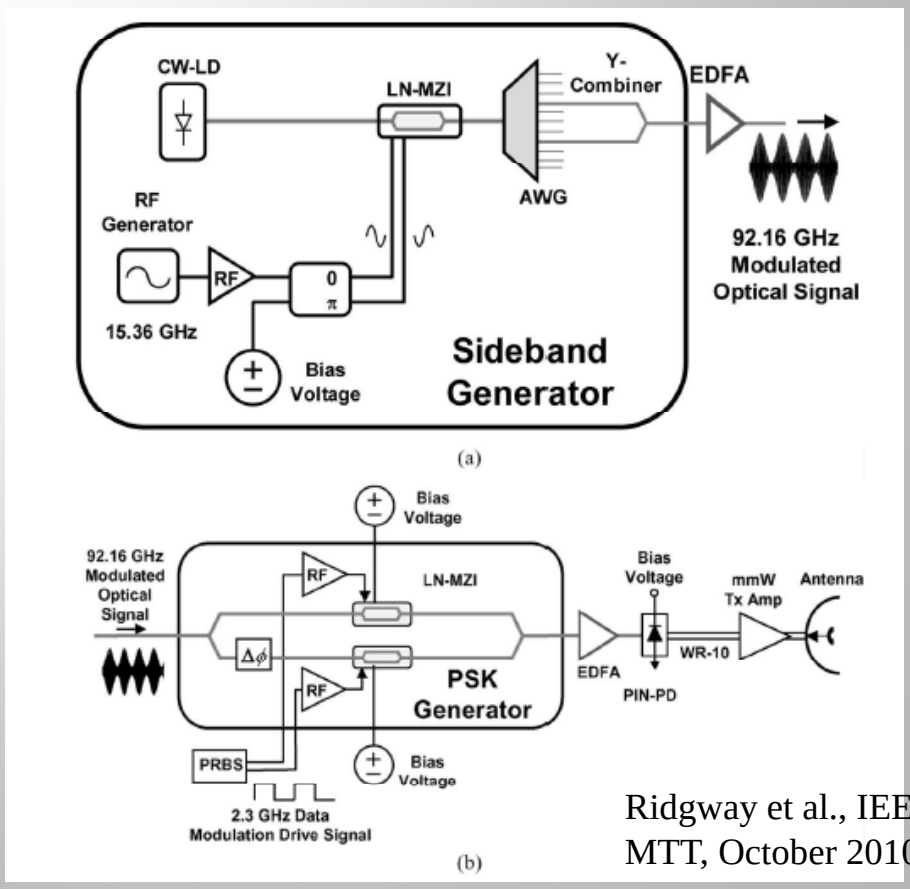




92GHz無線多値変調: BMI



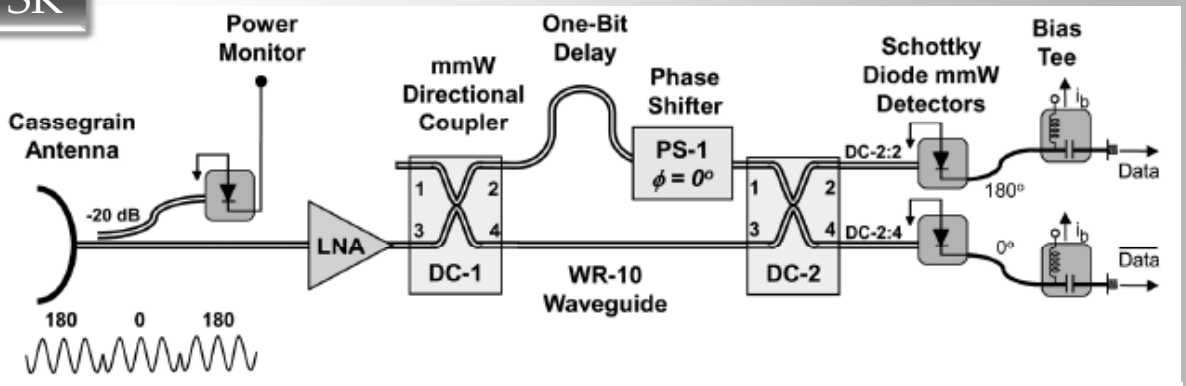
92GHz送信機: BMI



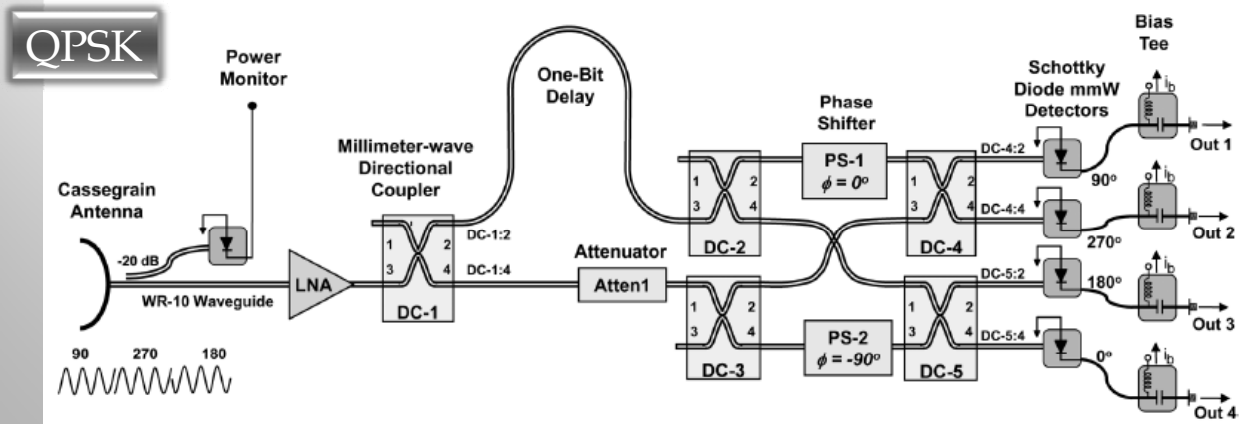
Ridgway et al., IEEE Trans. MTT, October 2010.

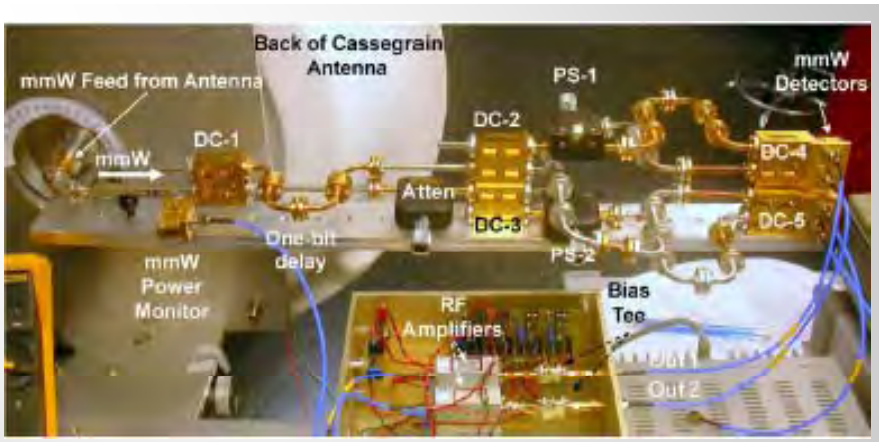
92GHz受信機: BMI

BPSK



QPSK





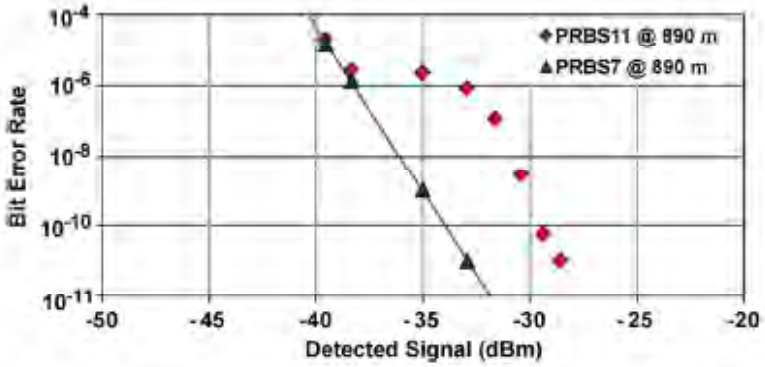
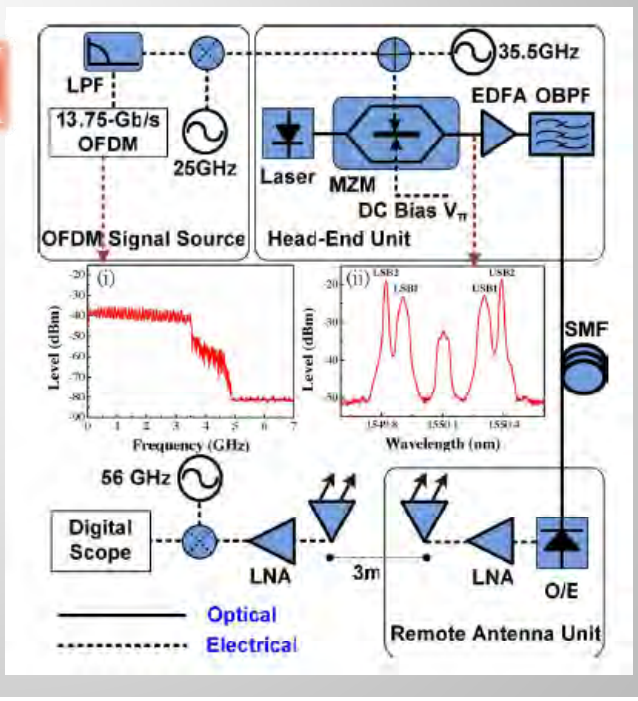


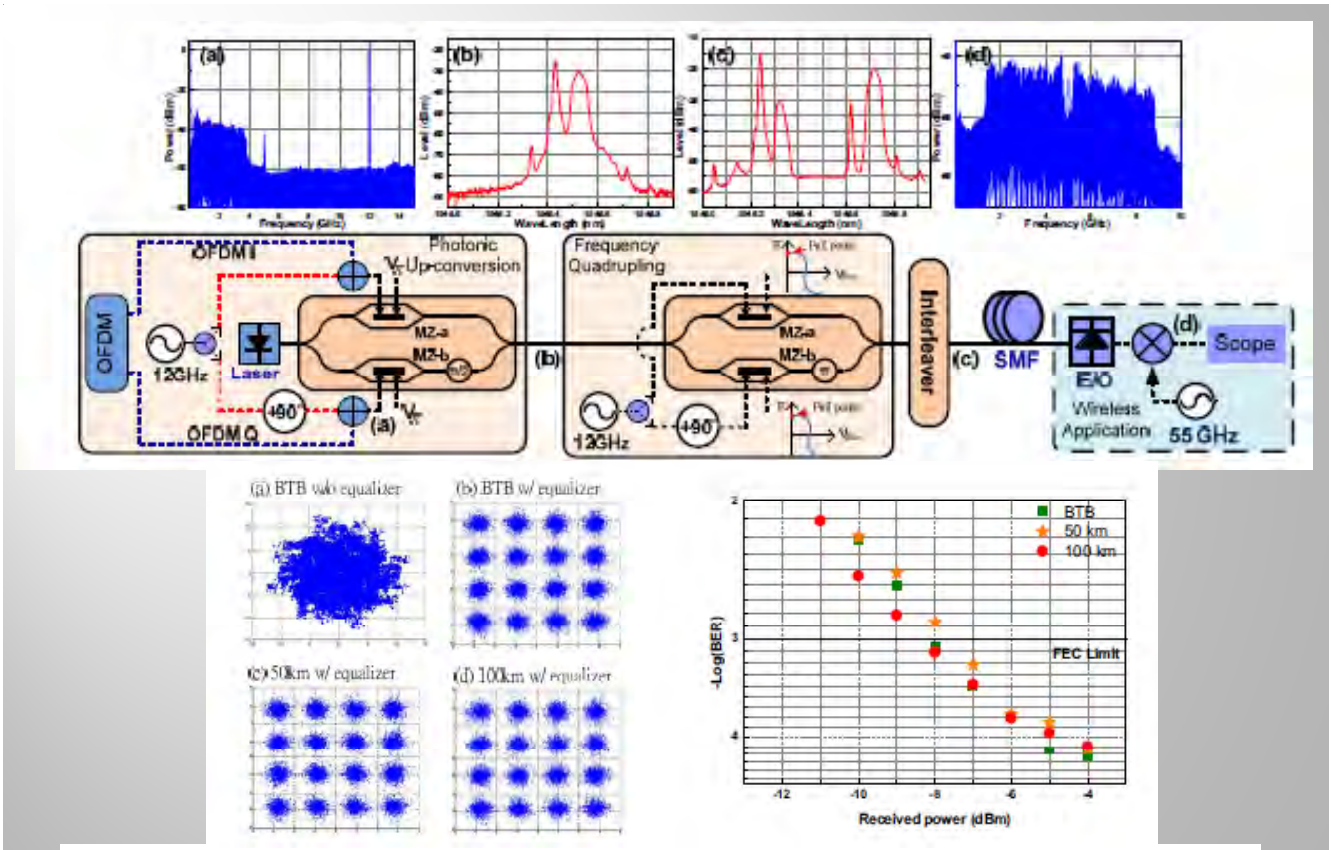
Fig. 13. Bit error rate as a function of received power for a DPSK modulation scheme at 2.3 Gb/s on a 92.16 GHz carrier. At a propagation distance of 890 m a mmW attenuator was used to simulate additional distance. The line in the figure represents an exponential fit to the PRBS7 data.

60GHz多值化技術

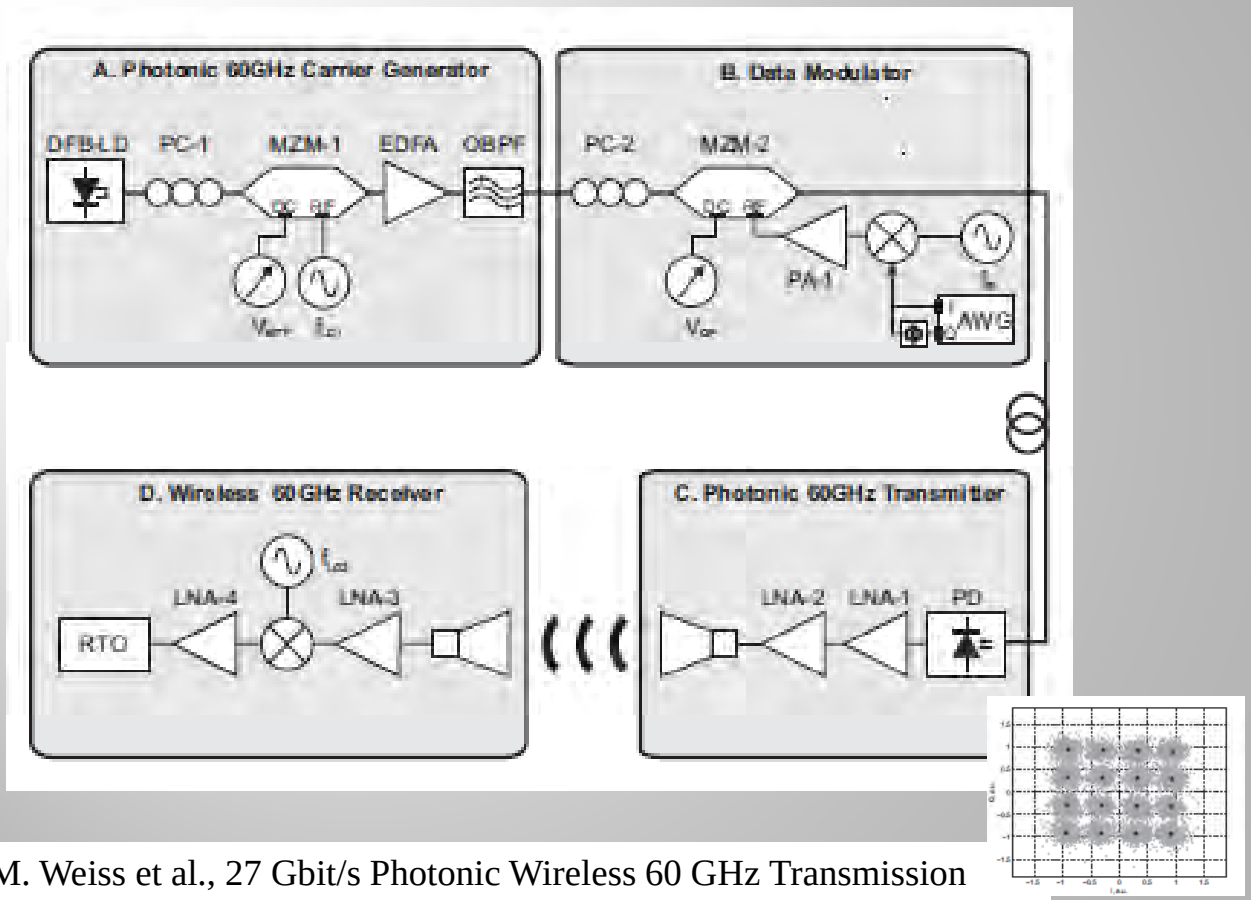
QPSK-OFDM



Wen-Jr Jiang et al., Simple 14-Gb/s Short-Range Radio-Over-Fiber System Employing a Single-Electrode MZM for 60-GHz Wireless Applications Jounalof Lightwave Tech., VOL. 28, NO. 16, AUGUST 15, 2238, 2010.



Chun-Ting Lin et al 28-Gb/s 16-QAM OFDM Radio-over-Fiber System Within 7-GHz License-Free Band at 60 GHz Employing All-Optical Up-conversion, OSA/CLEO/IQEC 2009.



M. Weiss et al., 27 Gbit/s Photonic Wireless 60 GHz Transmission System using 16-QAM OFDM, MWP2009.