

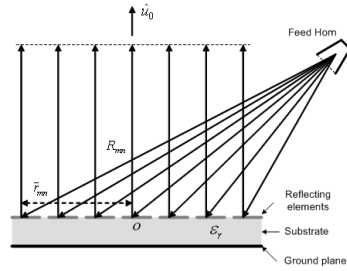
電波環境を改善するためのリフレクタレー技術

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Acknowledgement

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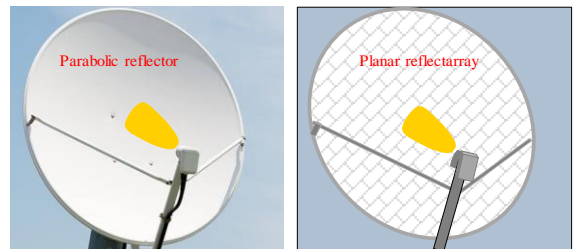


本研究開発は総務省「電波資源拡大のための研究開発」のうち、「超高速移動通信システムの実現に向けた要素技術の研究開発」(H21-25年)として実施されました。



Reflectarray for Near-field Use

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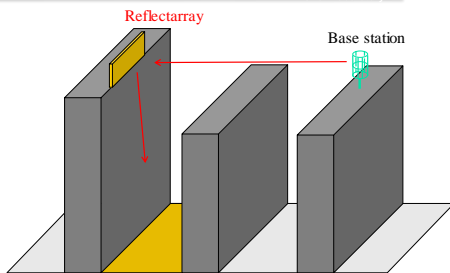


Typical reflectarray concept



Research Background

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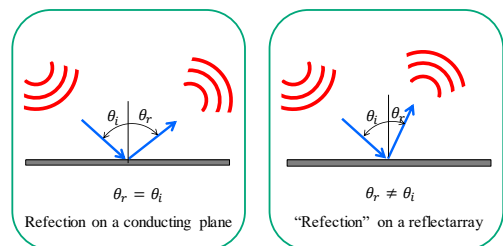


Reflectarray (RA) which is mounted vertically on the roof of building, can be a passive reflector.



Reflectarray for Far-field Use

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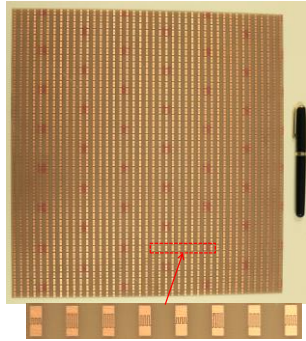


Typical reflectarray concept



Geometry of Reflectarray (One example)

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Measurement in Ishigaki

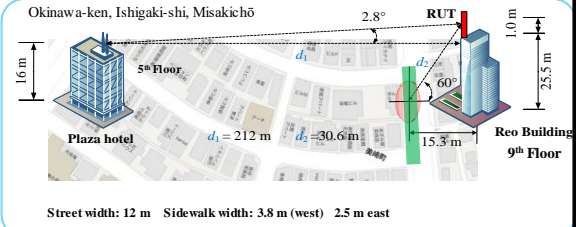
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Reflectarray: 9th Floor Of Reo building.

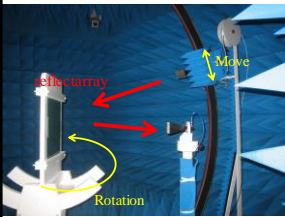
Fixed antenna: 5th Floor Of Plaza hotel.

Mobile antenna: car moving along the street in front of Reo building

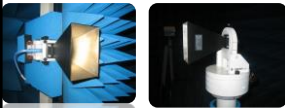


Reflectarray Measurement in Chamber

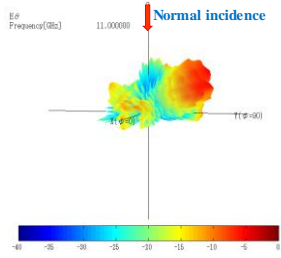
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3-D Bi-Static RCS Measurement



CERNEX CRA75101520 (10 GHz to 15 GHz)



Measurement Parameters

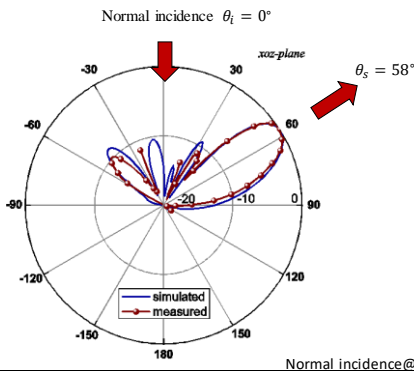
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Measurement System	RUSK Sounder System
Radio Frequency	11 GHz (100 MHz)
Multiplexing scheme	OFDM (T.X, 81 carriers)
Modulation scheme	No
Transmitted Power	27 dBm
Received Noise power	-120 dBm/Hz
Transmitting antenna	Sleeve Dipole Antenna Array (8V)
Receiving antenna	Patch Array (SH, Pol.-matched)
Reflectarray	4 × 2 × (42 × 44-element) RA(V)
Propagation environment	None-Line-of-Sight (NLOS)
Distance d_1 between RA and R.X	200 m (7333.32)
Distance d_2 between RA and T.X	31.2 m + d_c (1144λ + d_c)
Sample rate	10 points per second

Measurement Results

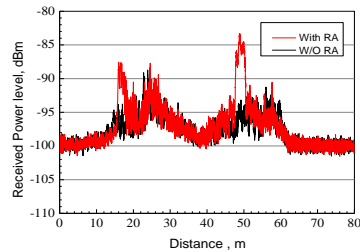
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Normal incidence@12GHz.

Received Power Level

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Scattered field measurement area

- Mobile Antenna: MPA (H, Pol.-matched)
- Main beam coverage: 4-5m.

陳研究室の関連研究

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- ビーム形成**
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- トランスミッタアレイ**
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S. Liu, and Q. Chen, "A Wideband, Multifunctional Reflect-Transmit-Array Antenna with Polarization-Dependent Operation," *IEEE Transactions on Antennas and Propagation*, pp. 1-1, 2020. DOI:

今後の研究

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進化したリフレクタアレイ インテリジェント・リフレクト・サーフェス

総務省「令和3年度から新たに実施する電波資源拡大のための研究開発」の研究開発課題「基地局端末間の協調による動的ネットワーク制御に関する研究開発」

「高周波数帯IRSの制御技術」

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