3GPP TSG RAN Rel-18 Workshop
Electronic Meeting, June 28th – July 2nd 2021

RWS210497

Enhanced Support for FWA

Section 4.1

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Motivation

- NR could support Fixed Wireless Access.
- 4096QAM increases the FWA throughput performance.
- In this contribution we present the FWA capability when using 4kQAM for a specific LOS scenario based on above the roof antennas.

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Performance

Use case

- UMa, LOS scenarios, above the roof CPE antenna

Performance:

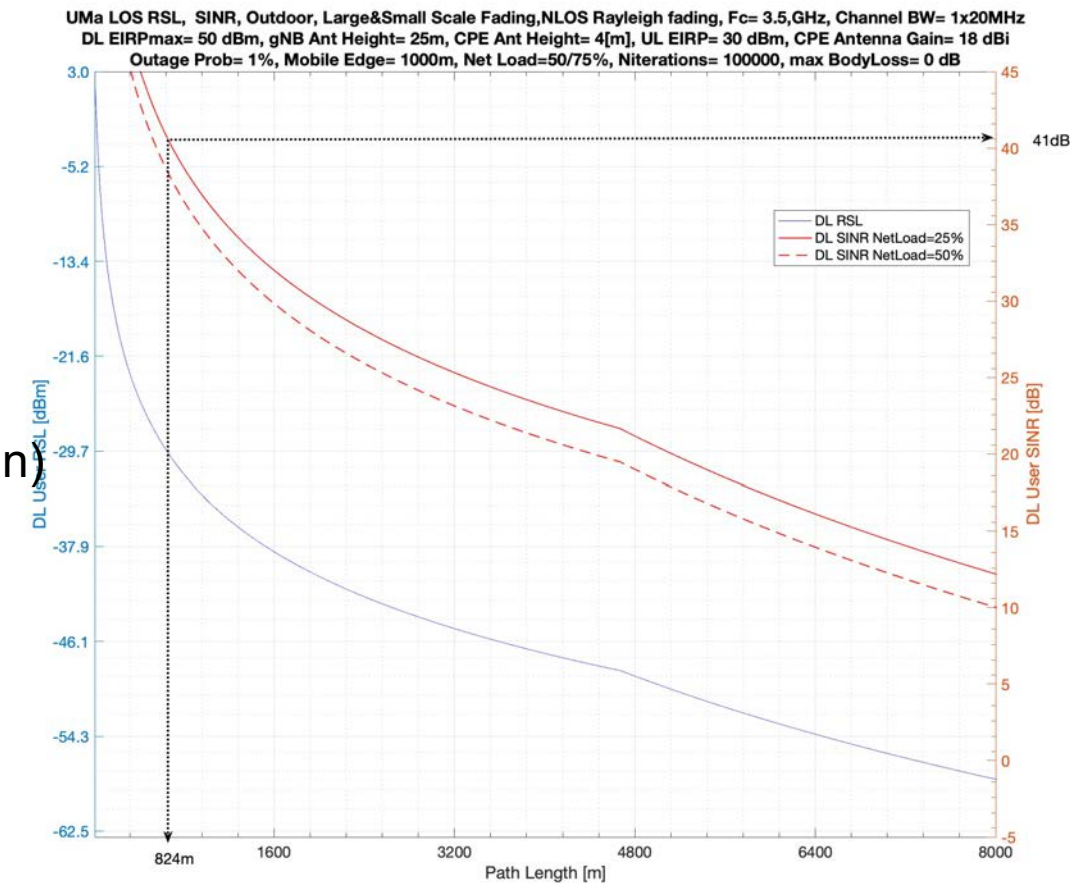
- SNR(0.89QAM4096)=41 dB*
- User Throughput: 67Mbps
  - 12 active users/cell
  - 4 users/sector
  - FCC specifies maxEIRPrms(band n77)=72dBm/10MHz (urban)

Further study should investigate:

- Lower SINR support
- Lower PAPR

NR 4096QAM increases the FWA LOS capacity:

- 20% increase vs 1kQAM
- 50% vs. 256QAM
- Updates NR capability in line with 802.11ax



* DOCSIS 3.1/4.0 SINR (0.89QAM4096)

System: NetLoad=25/50%, Outage=1%, Max BodyLoss=0dB, Niter=1e5, topology: FR3; MobEdge=1000m (availability 95%, handset 3dBi antenna gain, NLOS (TS38.901), Rx SINR=-1dB, , Network model: 19 cells honeycomb,
Cell: gNB: max EIRPrms=50dBm, Ant Height=25m, AntGain=19.6dBi, CPE: UL EIRP=30dBm, Ant Gain=18dBi (steering antenna array)); Ant Height=4m; TDD: 12:1:1, Beams/sector: 4, CPE NF=6dB; Active Users/beam: 1 (SISO)
PHY: Ch BW=20MHz, Carrier Aggregation: x1, TDD: 12:1:1, SCS=30kHz, PRB=51, Slots/subframe=2, Subframe/frame=10, Frames/s=100, PDCCH=2syms/slot, DMRS=1sym/slot; Baseband Oversampling: x4
Propagation: 3GPP TR38.901, UMa, LOS Small scale fading: Rice (K=12), Large Scale Fading sigma: 4dB

Supporting Information

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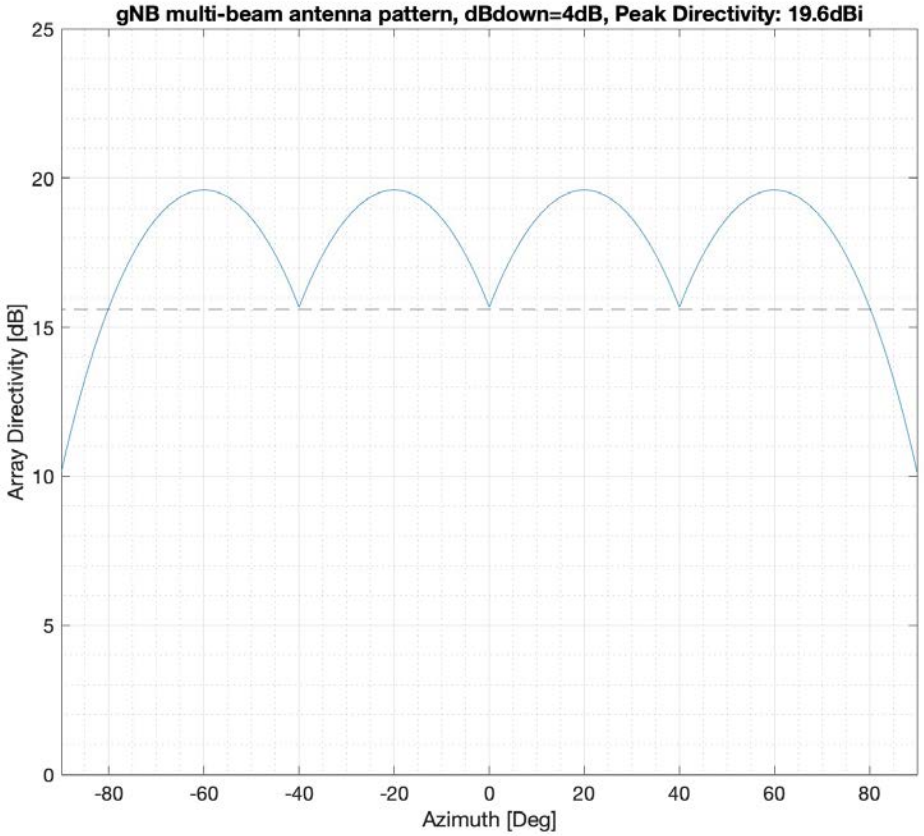
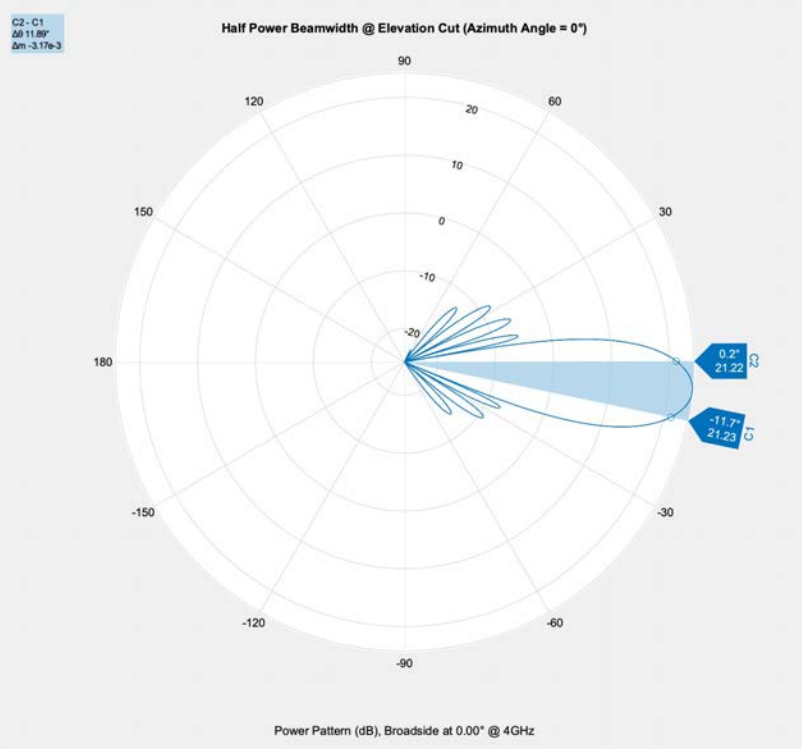
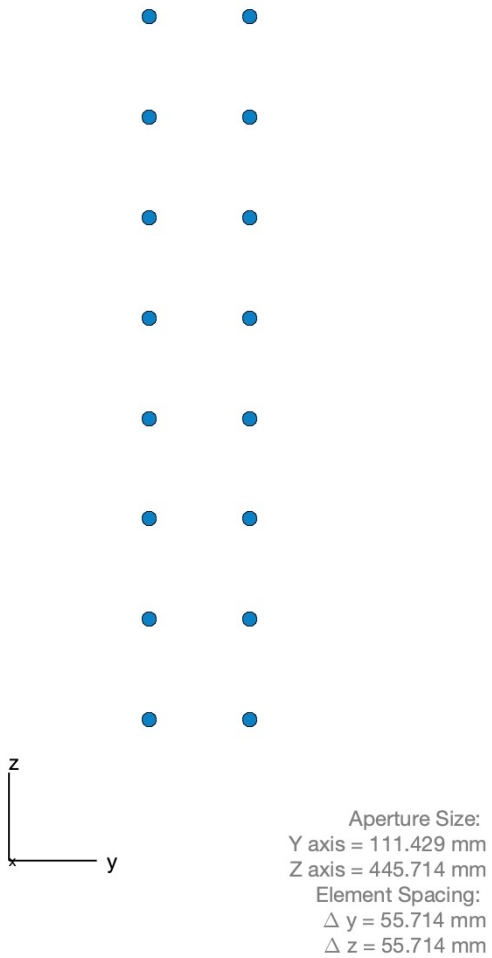
gNB Antenna Array (fc=3.5GHz)







Subarray geometry

gNB Multi-beam Antenna Arrays

- 4 beams generated by 4 subarrays (8x2 Antenna Elements)
- AE: cosine element (H, V 2.7cosine power)
- AE spacing: 0.65λ x 0.65 λ
- Elevation Tilt (azimuth cut: 0 deg): -6deg
- Peak Directivity: 19.6dBi

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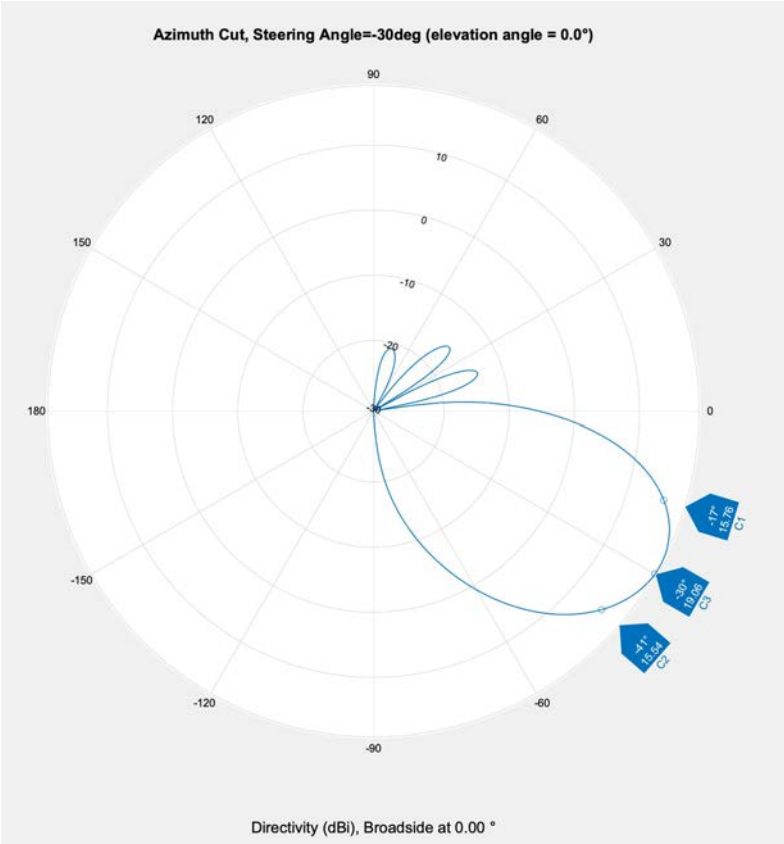
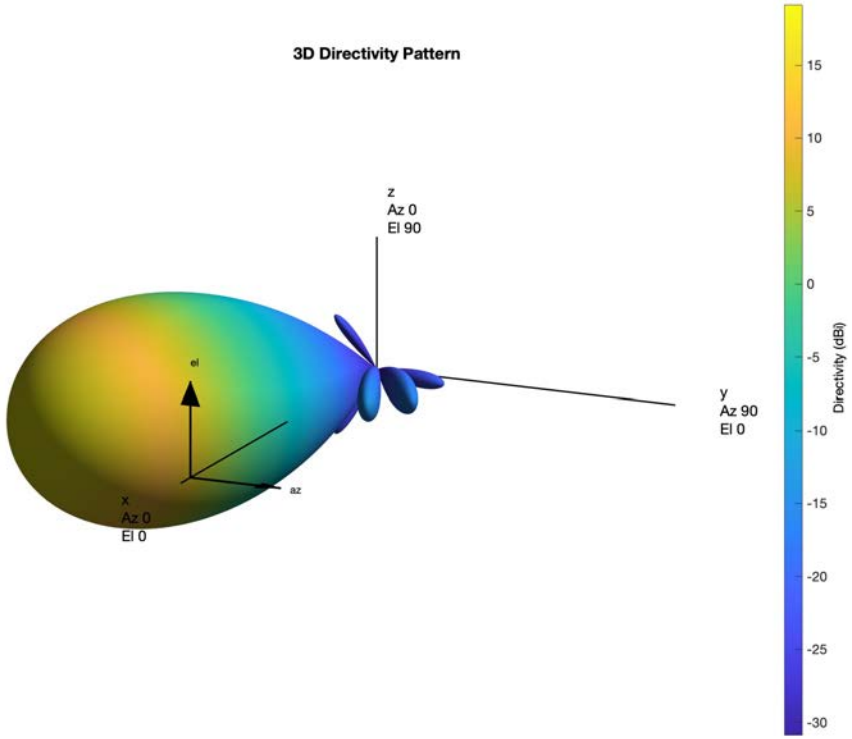
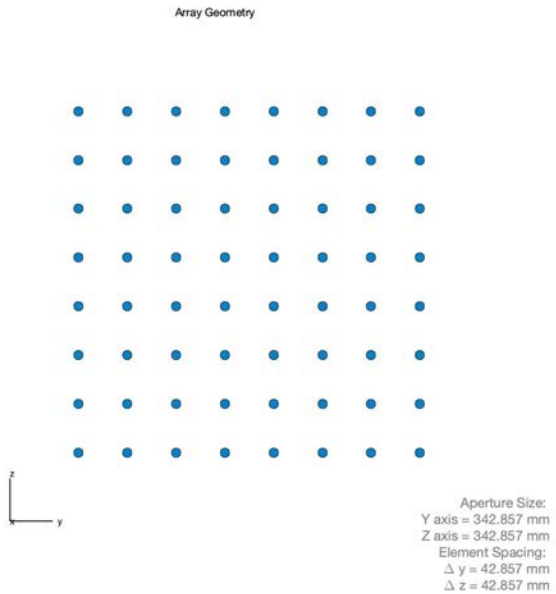
CPE Antenna Array







Array geometry

gNB Multi-beam Antenna Arrays

- 8x8 array
- AE: cosine element (H, V 1.0cosine power)
- AE spacing: 0.5λ x 0.5 λ
- Elevation Tilt (azimuth cut: 0 deg): 0deg
- Peak Directivity: 19dBi

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Invent the Future

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