EE Department

Cellular Project

إبراهيم المؤقت

0180796

System Information

- Coverage Area: Jordan University.
- Number of cells: 9 Cells.
- Cells 1 and 6 each have 2 sectors, the rest of the cells each have 3 sectors.
- Antenna Model: 65deg, 17dBi, 6Tilt, 1800MHz.
- System frequency: 1800MHz.
- Propagation model loss type: WLL.
- For all sites (support height: 20m and support type: Building roof).
- Sector 1 channel:512, Color code: Purple.
- Sector 2 channel:513, Color code: Green.
- Sector 3 channel:514, Color code: Blue.
- EDGE properties (Coding scheme configuration: EGPRS 1800).
- GSM properties (Codec Configuration: Adaptive Multi-Rate).
- TRX Type: BCCH, Frequency domain: GSM 1800, C/I threshold=12dB.
- Pt=20w (13dB)
- GSM for Orange (MNC:77, MCC:416 and for LAN: 52102)

Data collected

These data are collected from JuSite4 (Cell ID:1358, LAC:52102, MNC:77, MCC:416).

Distance (d in meter)	Power Received (Pr in dBm)
214	-51
244	-51
264	-51
272	-53
286	-53
420	-63
401	-63
351	-61
340	-63
319	-57
322	-57
233	-51
203	-51
189	-51
373	-63

Calculations

$Loss=L_{free}+L_{feeder}+10YLog_{10}(d)$

Where L_{free} equals to:

$L_{free}=20\ Log_{10}(\frac{4\pi}{\lambda})$

Assume L_{feeder} =5dB

$P_r=P_t+G_t+G_r-Loss$

For example lets take Jusite4 at d=291m and P_r=-63dBm

First convert P_r from dBm to dB so P_r=-93dB

We know from antenna specification that G_t=17dBi

P_t=20w (13dB)

Assume G_r =0

Applying these values to P_r equation we get:

-93=13+17+0-Loss

Loss=123dB

Then find $L_{free}=20\ Log_{10}(\frac{4\pi}{(300x10^6)/(1800x10^6)})$=37.54dB

Now apply the calculated values to Loss equation to find Y

$123=37.54+5+10YLog_{10}(291)$

We get Y=3.26

Now applying the same technique to the rest of values:

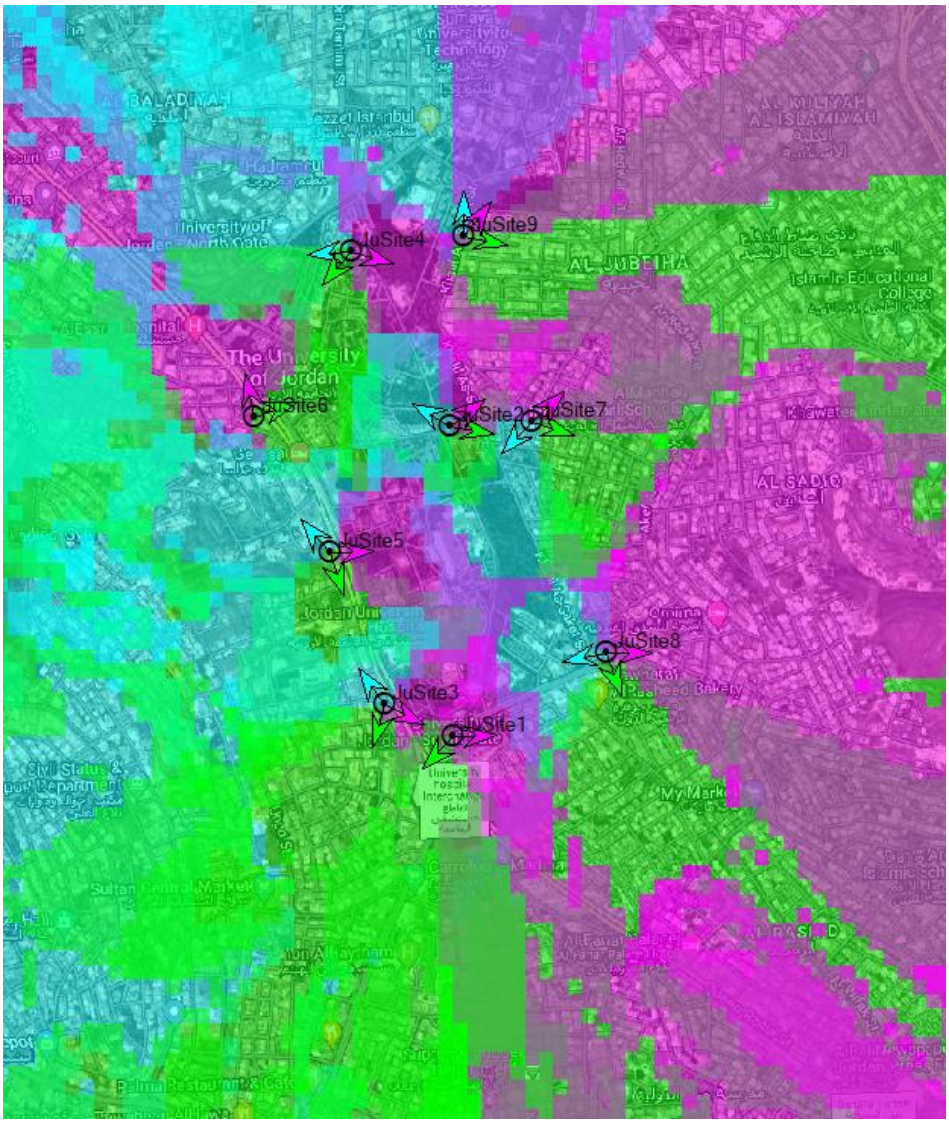
Distance (d in meter)	Power Received (Pr in dBm)	Propagation Constant(Y)
291	-63	**3.26**
244	-51	**2.86**
264	-51	**2.82**
272	-53	**2.89**
286	-53	**2.86**
420	-63	**3.06**

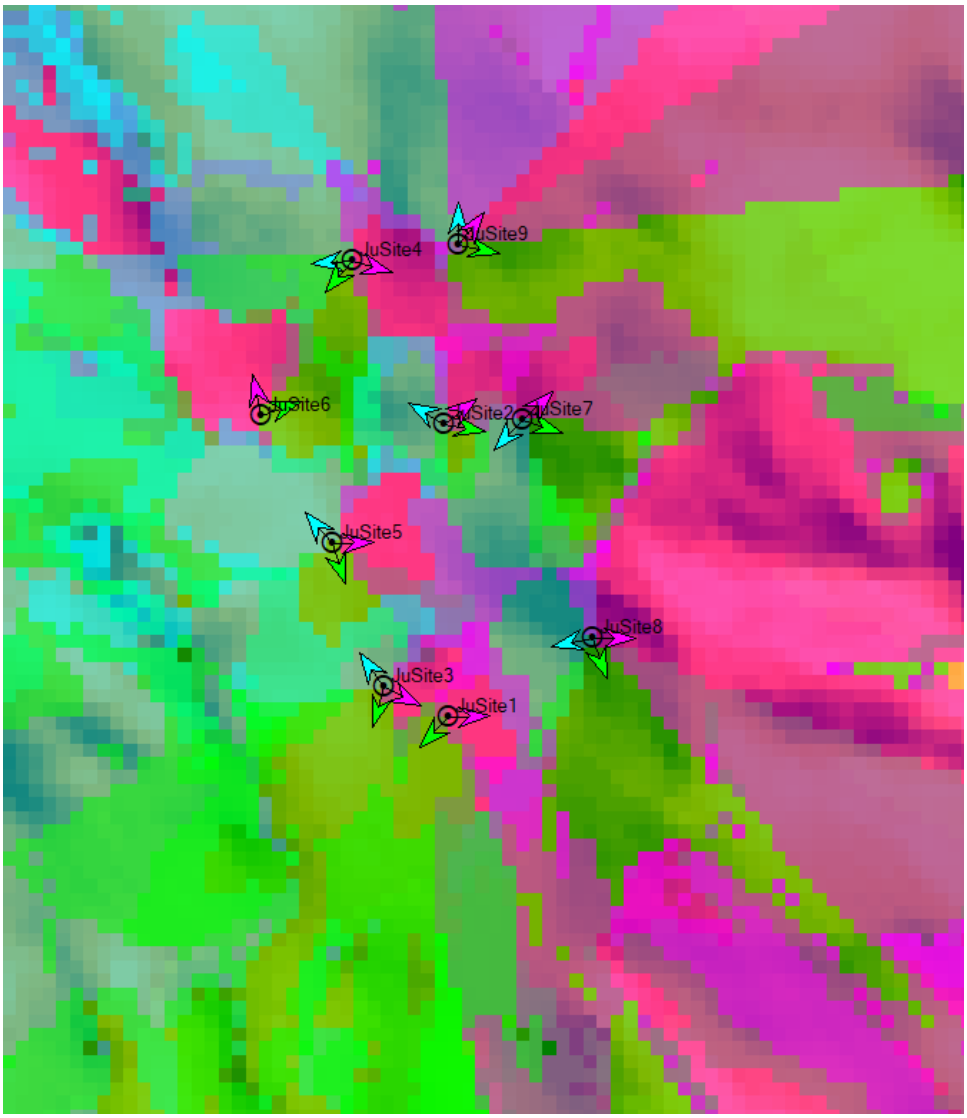
401	-63	**3.09**
351	-61	**3.08**
340	-63	**3.17**
319	-57	**2.97**
322	-57	**2.96**
233	-51	**2.89**
203	-51	**2.96**
189	-51	**3**
373	-63	**3.12**

Average Y=2.9993

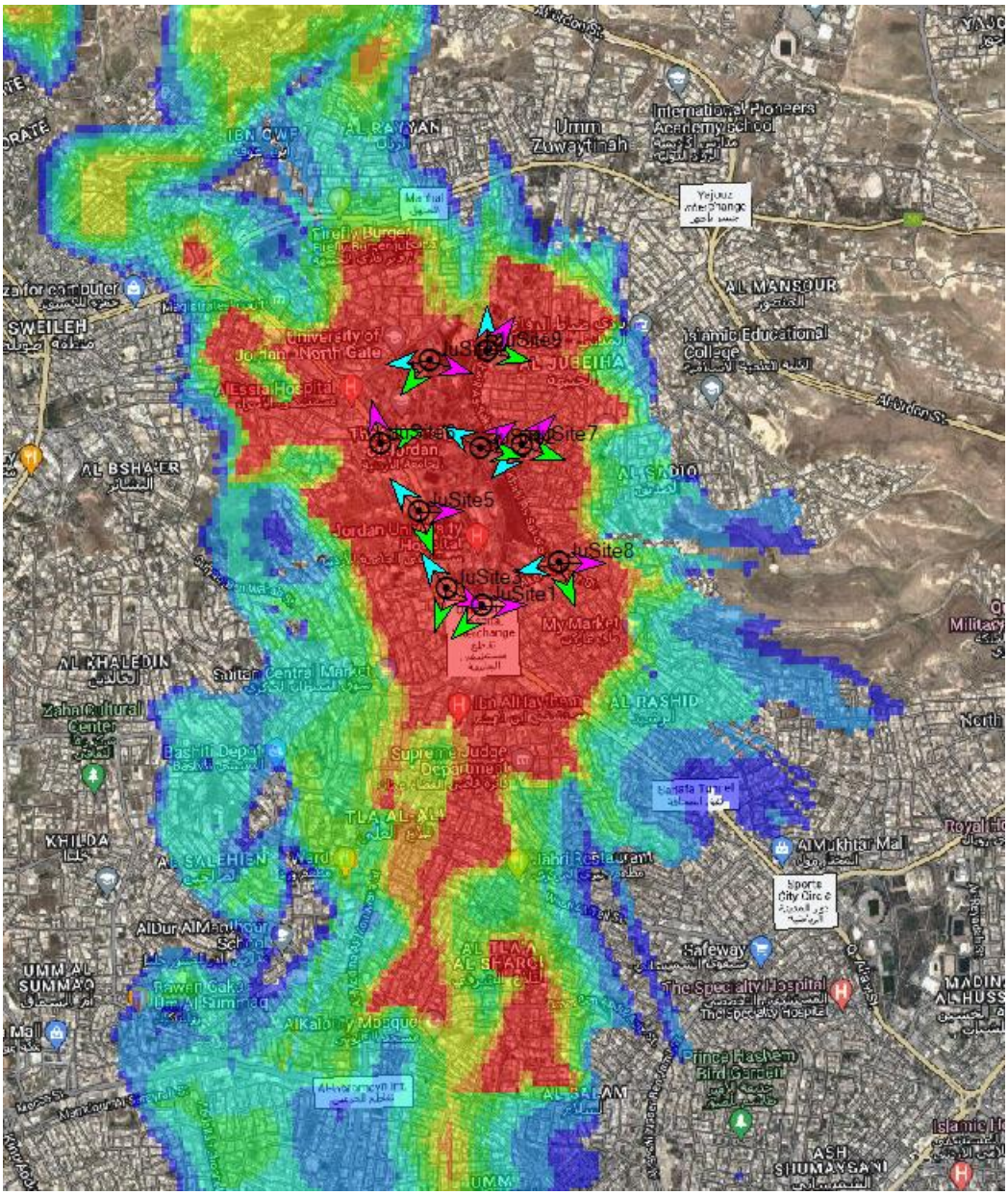
Predictions and Simulations

Coverage by transmitter(DL):

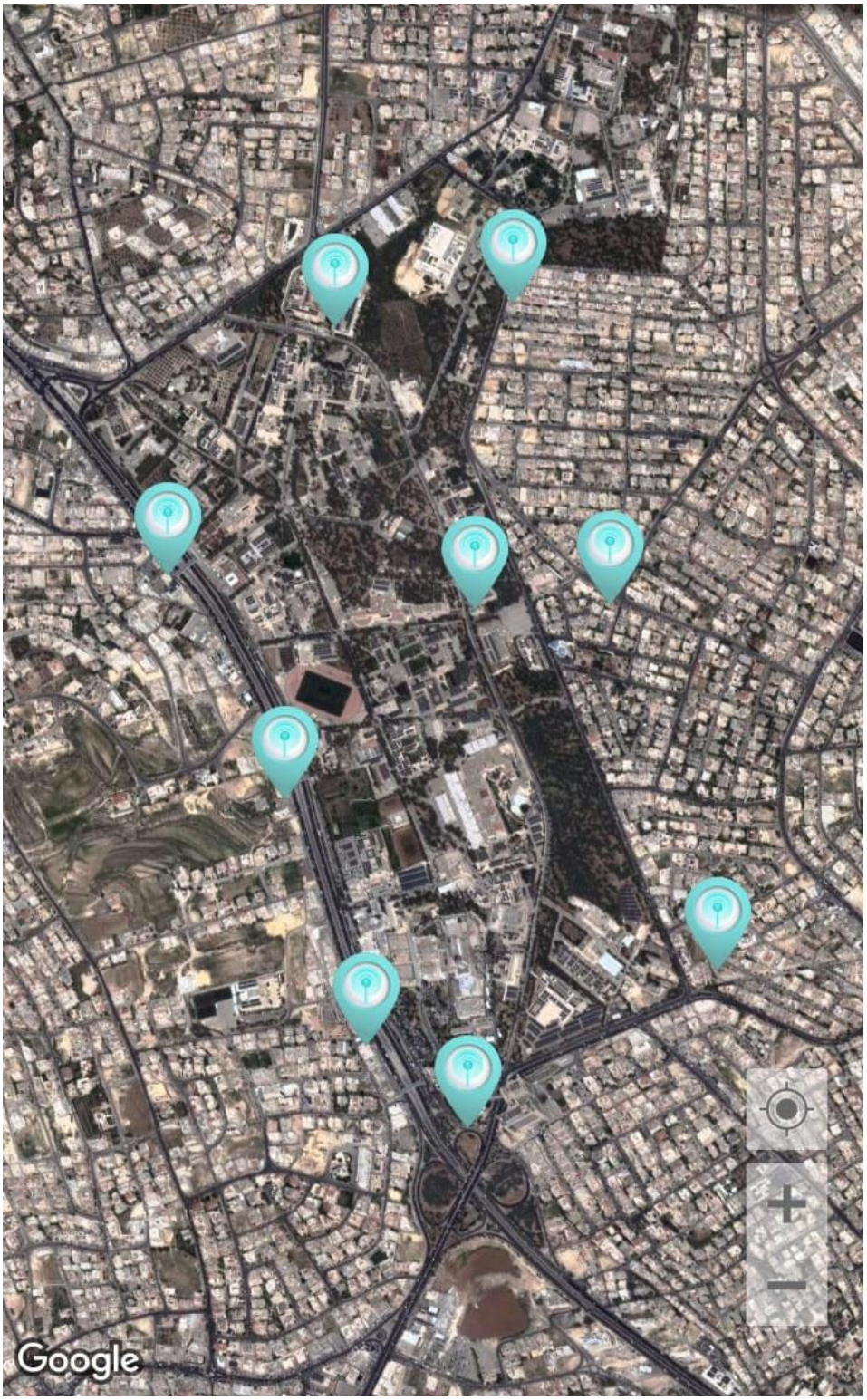



JuSite9
JuSite4
JuSite6
JuSite2
JuSite7
JuSite5
JuSite8
JuSite3
JuSite1

Coverage by signal level(DL):



Cells Locations



Cell 1 (JuSite1)

Cell ID:2191, LAC:52102, MNC:77, MCC:416, 2 sectors

Location: above king hussein cancer center, close to Jordan university South Gate Entrance

Cell 2 (JuSite2)

Cell ID:17067, LAC:52102, MNC:77, MCC:416, 3 sectors

Location: Above information Technology Center

Cell 3 (JuSite3)

Cell ID:2109, LAC:52102, MNC:77, MCC:416, 3 sectors

Location: close to Total gas station

Cell 4 (JuSite4)

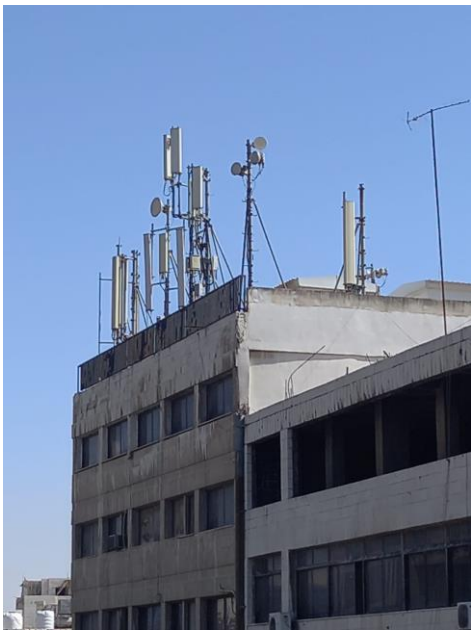
Cell ID:1358, LAC:52102, MNC:77, MCC:416, 3 sectors

Location: Faculty of education

Cell 5 (JuSite5)

Cell ID:3357, LAC:52102, MNC:77, MCC:416, 3 sectors

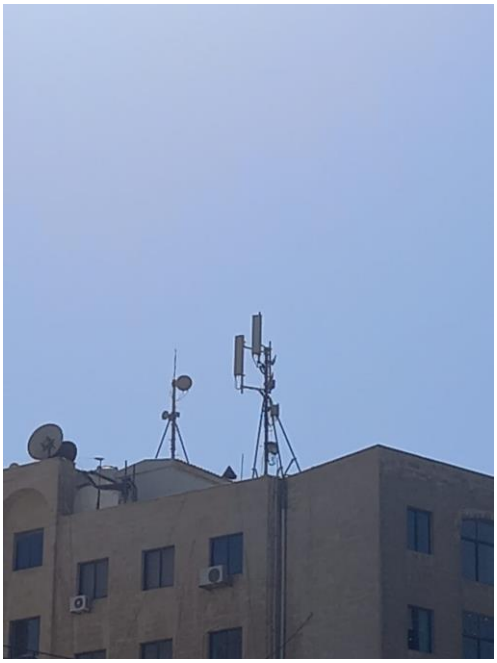
Location: close to Graduate studies of the university of Jordan building



Cell 6 (JuSite6)

Cell ID:1100, LAC:52102, MNC:77, MCC:416, 2 sectors

Location: close to Mcdonald's in queen rania st, Opposite to the main university gate



Cell 7 (JuSite7)

Cell ID:1357, LAC:52102, MNC:77, MCC:416, 3 sectors

Location: close to Engineering gate and close to Jordan University Housing

Cell 8 (JuSite8)

Cell ID:33211, LAC:52102, MNC:77, MCC:416, 3 sectors

Location: Above “Excelencia” Hotel close to faculty of arts

Cell 9 (JuSite9)

Cell ID:1359, LAC:52102, MNC:77, MCC:416, 3 sectors

Location: behind female student housing