

AY : 2023_24
CLASS : BE E&TC
SUBJECT : Mobile Computing

Sem. : II
DATE :
EXPT. No. : 06

TITLE: HANDOVER MECHANISM

OBJECTIVE: Demonstrate handover mechanism and record the performance parameters like SNR for call drop scenario

SOFTWARE USED: Operating System: Windows 7
Software: Java Version 6
Mozilla Firefox: version: 47.0.1
or
Compatible mode for above specification

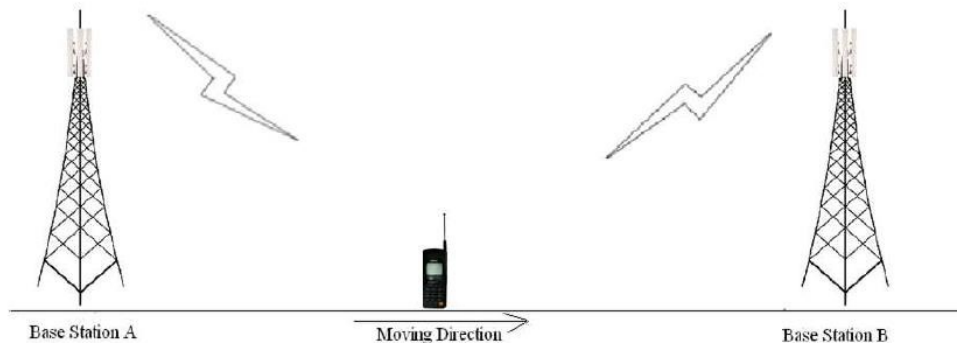
Link to download software:

<https://drive.google.com/uc?id=0B9mNeu43jUIdckFYVTlnenpJRGs&export=download>

THEORY:

Handoff

Consider the figure below Initially say the mobile M is quite close to the base station A and hence receives signal strength from A $P_{Arx} > P_{Brx}$. As the mobile moves away from the base station A and goes towards B then the signal strength from A keeps falling (pathloss increases). Let there be a minimum sensibility level P_{0rx0} for the mobile, i.e. if the signal from the B.S. to which the mobile is connected falls below P_{0rx0} then the call drops. In order to prevent call drop the mobile monitors receive signal strength from the neighboring 3-6 BS. These neighboring 3-6 BS also monitor Rx signal strength from the MS.



The mobile should get connected to BS which has the highest signal strength. However, if the MS continuously attaches itself to the BS with instantaneous highest signal strength then the h/o rate may be very high in some condition.

Thus, Hysteresis's condition is used for h. If $P_{Trx} (T = \text{target BS}) > P_{hrx} h_{\text{-max}}$ (higher h/o threshold) and $P_{crx} (c = \text{current BS}) < P_{hrx} h_{\text{-min}}$ (minimum h/o threshold) then execute h/o to BST from BS. Thus, it is threshold impeditive to study in part of the handoff process.

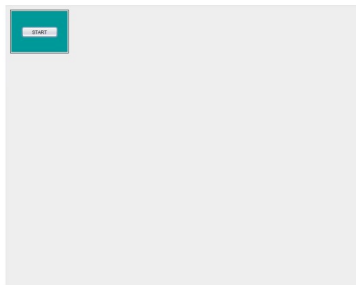
$$\Delta\gamma = P_{hrx} - P_{lrx} \Delta = h$$

A successful handoff is one where the call gets continued without call drop or in other words the h occurs before h/o P_{crx} becomes $< P_{0rx} < 0$. If $P_{crx} < P_{0rx} < 0$ then call drop event occurs. One would like to minimize the no of handoff events as well as minimize call drop probability. The experiment provides opportunity to study the inherent of these three parameters on h/o.

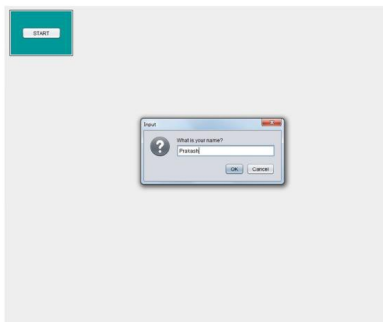
Further the averaging window for calculating P_{Trx} and P_{crx} also plays a role in the process. In the experiment small scale fading is not considered and hence the averaging considered only shadowing. The impact of small scale fading and shadowing on h/o can be studied theoretically.

Follow the instructions given below to perform the experiments.

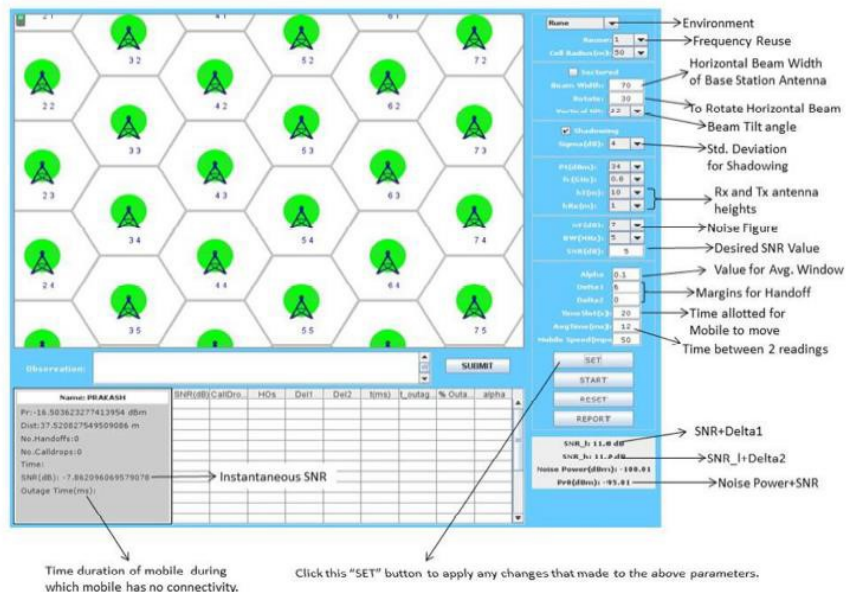
Step1: Click on START button to start experiment



Step2: Enter your name then click OK button.



Step3: Select the parameters (e.g.: Reuse, Environment, Beamwidth, Carrier frequency etc.)



Environment

Frequency Reuse

Horizontal Beam Width of Base Station Antenna

To Rotate Horizontal Beam

Beam Tilt angle

Std. Deviation for Shadowing

Rx and Tx antenna heights

Noise Figure

Desired SNR Value

Value for Avg. Window

Margins for Handoff

Time allotted for Mobile to move

Time between 2 readings

Instantaneous SNR

Click this "SET" button to apply any changes that made to the above parameters.

Time duration of mobile during which mobile has no connectivity.

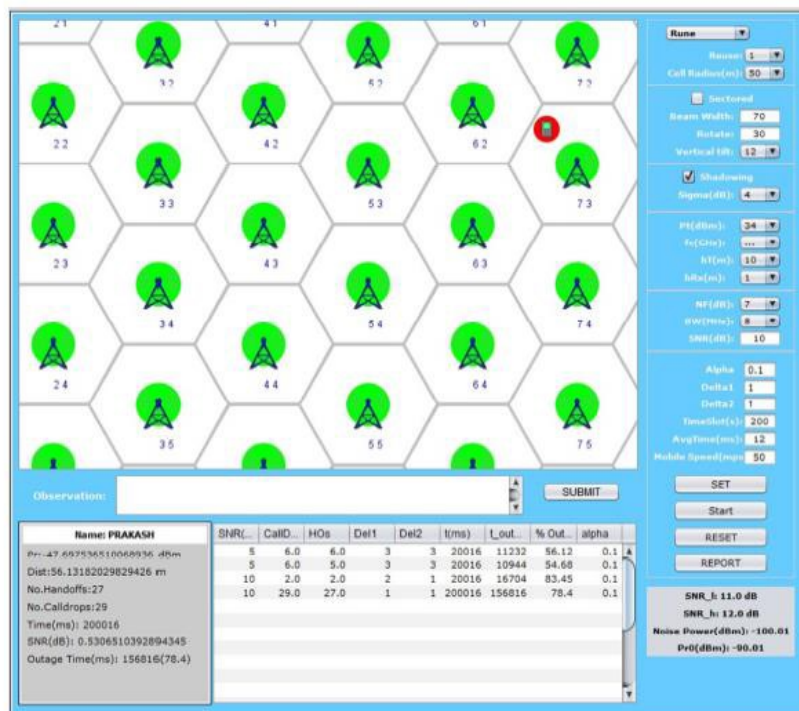
SNR_b: 11.0 dB

SNR_i: 11.0 dB

Noise Power(dBm): -100.01

Prb(dBm): -93.81

Step4: Click on START button and observe No. of Call Drops and No. of Handoffs.



Observation:

Submit

Name: PRAKASH	SNR _b	CallID	HOs	Del1	Del2	t/ms	L_out	% Out	alpha
Pr: 47.697936510060936 dBm	5	6.0	6.0	3	3	20016	11232	56.12	0.1
Dist: 56.13182029829426 m	5	6.0	5.0	3	3	20016	10944	54.68	0.1
No.Handoffs: 27	10	2.0	2.0	2	1	20016	16704	83.45	0.1
Time(ms): 200016	10	29.0	27.0	1	1	200016	156816	78.4	0.1
SNR(dB): 0.5306510392894345									
Outage Time(ms): 156816(78.4)									

SNR_b: 11.0 dB

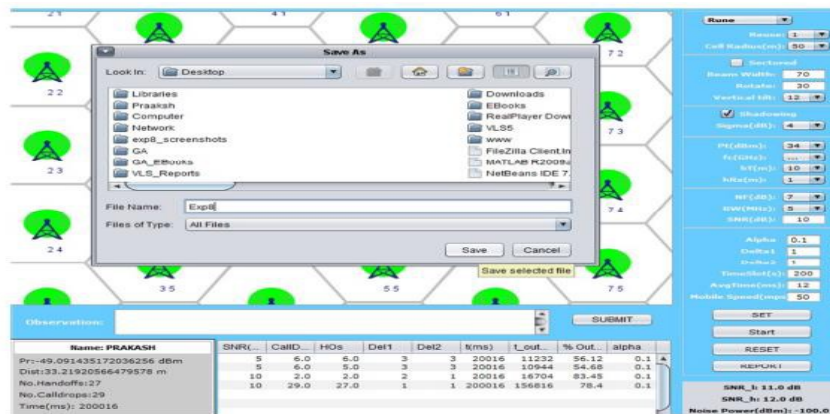
SNR_i: 12.0 dB

Noise Power(dBm): -100.01

Prb(dBm): -90.01

Step5: Enter your observation in the OBSERVATION box and Click on SUBMIT button.

Step6: Finally, click on REPORT to generate PDF report of the experiment.



Step7: After PDF report generation you will get following message.



Step8: PDF report will appear like this.

Fading Channels & Mobile Communications
 IIT Kharagpur
 Date: 22 Feb 2013

Exp 8: Handoff
 Name: PRAKASH

Input Parameters									
Pseudo 1 Model Run					Pseudo 34				
f _c (GHz): 0.8					Beam Width(deg): 70				
Rotator(deg): 30					Cell Radius(m): 50				
hT(m): 10					hR(m): 1				
Signal(dB): 4					Vertical Tilt(deg): 12				
SNR(dB): 10					Noise Power(dBm): -100.01				
Noise Figure(dB): 7					Time Slot(s): 200				
PseudoBm: 40.01									

Exp. Results									
SNR	No. CallID	No. Hand off	Del1	Del2	Reading Time(ms)	Output Power(mW)	% Outage	Alpha	
5.0	5.0	5.0	3.0	3.0	20016.0	11232.0	56.12	0.1	
5.0	5.0	5.0	3.0	3.0	20016.0	10964.0	54.68	0.1	
10.0	2.0	2.0	2.0	1.0	20016.0	16704.0	83.45	0.1	
10.0	20.0	27.0	1.0	1.0	20016.0	156816.0	78.4	0.1	

Observation
 Observation not entered

(Signature of PRAKASH)
 (Signature of Faculty)

Step9: To redo experiment click on RESET button.



RESULT

Observation Table:

Specify reuse and record the data for first two readings.

Keeping reuse = 3, specify mobile speed as 50 and 100 and record the data for further two readings.

Tabulate all the records as given in below Table.

Sr. No.	Reuse	Mobile Speed	No. of Handoff	Outage	Outage Percentage
1	1				
2	3				
3	3	50			
4	3	100			

CONCLUSION:

SIGNATURE

REFERENCES:

1. "Mobile Communications" – Jochen Schiller