MODUL 4 **INTRODUCTION TO ATOLL**

1. TUIUAN

- a. Mehasiswa mampu mengoperasikan tool atau software RF planning Atoll
- b. Mahasiswa mengetahui beberapa parameter yang diperlukan untuk dikonfigurasi pada RF planning
- c. Mahasiswa mampu menyelesaikan permasalahan RF planning untuk jaringan 4G LTE

2. DASAR TEORI

2.1 RF Planning 4G LTE menggunakan Atoll

Atoll merupakan software radio planning yang menyediakan beberapa fitur yang komperhensif dan terpadu sehingga memungkinkan user untuk membuat suatu proyek perencanaan microwave ataupun perencanaan radio dalam satu aplikasi. Proses tahapan perencanaan jaringan 4G LTE seperti terlihat pada tabel di bawah ini.

| | Tabel 1. Proses RF plant | ling menggunakan Atoli |
|----|---------------------------------------|---|
| | Proses S | Simulasi |
| 1. | Membuat sebuah proyek simulasi | |
| 2. | Memasukkan maps-set sistem koordinat | |
| | | Untuk site yang sudah ada, langsung copy dan paste parameter-parameter site nya |
| 3. | Memasukkan parameter site | Untuk site-site baru, parameter default |
| | | diatur secara otomatis namun masih perlu |
| | | konfigurasi lanjut |
| 4. | Memasukkan atau import antena eNode | 3 dan terminal |
| 5. | Mengatur parameter network | Mengatur pita frekuensi atau frequency band |
| 6. | Mengatur tabel transmitter | |
| 7 | Mongotur noromotor dari norongkat | Mengatur peralatan feeder |
| /. | aNodoR | Mengatur peralatan eNodeB |
| | endued | Mengatur peralatan pengguna |
| 8. | Mengatur parameter global transmitter | |
| 9. | Mengatur parameter clutter classes | |

| Tabel 1. Pros | es RF plar | ining menggi | ınakan | Atoll |
|---------------|------------|--------------|--------|-------|
|---------------|------------|--------------|--------|-------|

Dari trainer-kit pertama ini akan dihasilkan beberapa kegiatan praktikum sebagai berikut :

- a. Mengatur koordinat sistem
- b. Informasi geografis \rightarrow import peta

11. Mengatur parameter untuk prediksi

- c. Konfigurasi parameter antena
- d. Konfigurasi jaringan meliputi konfigurasi frekuensi, konfigurasi cell LTE, konfigurasi MIMO
- e. Konfigurasi perangkat jaringan meliputi konfigurasi TMA, konfigurasi feeder, konfigurasi eNodeB
- f. Konfigurasi model propagasi
- g. Coverage prediction
- h. Alokasi neighbours
- i. Menampilkan hasil RF planning pada google earth

10. Mengatur parameter dari beberapa model propagasi

Salah satu contoh hasil RF planning 4G LTE menggunakan Atoll seperti gambar di bawah ini



Gambar 1. Hasil RF planning 4G LTE menggunakan Atoll

Hasil RF planning akan menganalisa coverage berdasarkan transmitter dan berdasarkan level sinyal. Selain itu juga hasil planning ditampilkan pada google earth.

3. Peralatan Yang Digunakan

- a. Laptop/PC
- b. Software RF Planning Atoll
- c. Software google earth

4. Langkah Percobaan

A. Membuat project baru

1. Ekstrak installer Atoll portable dan jalankan, dengan tampilan awal program seperti di bawah ini



2. Buat project LTE baru, pilih File>New>From a Document Template

| | File | Edit | View | Documer | nt To | ools | Wind | DW | Help | | | |
|-----------------|------|-------|------|---|--|----------|--------|-------|---------------|---|-------|----------|
| | | New | | | 野 | From | a Doci | umen | t Templat | e | | Ctrl+N |
| | | Open | | Ctrl+O | 0 | From | an Exi | sting | Database | | Ctrl+ | -Shift+N |
| Sehingga muncul | tam | pilan | pro | ject tei | mpl | ate | dan | pili | ih LTE | 3 | | |
| 00 | | • | • • | Project Ter | nplates | | | • | ? | × | | |
| | | | | 3GPP Mu 3GPP2 M Backhaul CDMA200 GSM GPR LTE | Iti-RAT ulti-RAT 00 1xRTT 25 EDGE | T 1xEV-E | DO | | OK Cancel | | | |
| | | | | Microway TD-SCDM UMTS HS Wi-Fi WIMAX 8 | re Radio IA PA 02.16e | o Links | | | | | | |
| | | | | | | | | | | | | |

Pada project template LTE terdapat 3 bagian utama yaitu : Explorer windows, Event viewer dan Map window

3. Proses selanjutnya adalah setting project area yaitu menentukan koordinat dengan cara pilih **Document>Properties**. Pada tab **Coordinates** → **Projection** pilih *WGS* 84/UTM zone 49S dengan pilihan Find in pilih *WGS84 UTM zones*

| d in: | WG5841 | ITM zones | | | | - | OK |
|------------|--------------|------------|-----------|-----------|------------------|---|------------|
| lame | | Projection | Datum | Ellipsoid | Region | * | Gancel |
| WGS 84/U | JTM zone 44S | UTM zone | WGS 84 | WGS 84 | 78deg East to 84 | | Properties |
| WGS 84/U | JTM zone 455 | UTM zone | WGS 84 | WGS 84 | 84deg East to 90 | | |
| WGS 84/L | JTM zone 465 | UTM zone | WGS 84 | WGS 84 | 90deg East to 96 | | New |
| WGS 84/U | JTM zone 47S | UTM zone | WGS 84 | WGS 84 | 96deg East to 10 | | Add to |
| WGS 84/U | JTM zone 48S | UTM zone | WGS 84 | WGS 84 | 102deg East to 1 | | favourites |
| WGS 84 / U | JTM zone 495 | UTM zone | WGS 84 | WGS 84 | 108deg East to 1 | | |
| WGS 84/L | JTM zone 505 | UTM zone | WGS 84 | WGS 84 | 114deg East to 1 | | |
| WGS 84/U | JTM zone 51S | UTM zone | WGS 84 | WGS 84 | 120deg East to 1 | | |
| WGS 84/U | JTM zone 52S | UTM zone | WGS 84 | WGS 84 | 126deg East to 1 | | |
| WGS 84/U | JTM zone 535 | UTM zone | WGS 84 | WGS 84 | 132deg East to 1 | | |
| WGS 84/L | JTM zone 545 | UTM zone | WGS 84 | WGS 84 | 138deg East to 1 | | |
| WICE 84 /1 | 922 anne MTI | ITTM more | 111/05 94 | 14/05 RA | 1ddden Fart In 1 | Ŧ | |

4. Pada bagian **Display use** pilih *WGS* 84 yang terletak pada bagian atas

| nd in: | WGS84 L | ITM zones | | | | • | OK |
|---------------|--------------|------------|---------|-----------|------------------|---|------------|
| lame | | Projection | Datum | Ellipsoid | Region | - | Gancel |
| WGS 84/U | JTM zone 446 | UTM zone | WGS 84 | WGS 84 | 79deg East to 84 | 1 | Properties |
| WGS 84 / U | JTM zone 455 | UTM zone | WGS 84 | WGS 84 | 84deg East to 90 | | |
| WGS 84 / U | JTM zone 465 | UTM zone | WGS 84 | WGS 84 | 90deg East to 96 | | New |
| WGS 84 / U | JTM zone 475 | UTM zone | WGS 84 | WGS 84 | 96deg East to 10 | 1 | add to |
| WGS 84 / L | JTM zone 485 | UTM zone | WG5 84 | WGS 84 | 102deg East to 1 | | favourites |
| WGS 84 / I | JTM zone 495 | UTM zone | | WGS 84 | 108deg East to 1 | | |
| WGS 84 / L | JTM zone 505 | UTM zone | WG5.84 | WGS 84 | 114deg East to 1 | | |
| WGS 84 / L | JTM zone 515 | UTM zone | WGS 84 | WGS 84 | 120deg East to 1 | | |
| WGS 84 / U | JTM zone 52S | UTM zone | WGS 84 | WGS 84 | 126deg East to 1 | | |
| WGS 84/U | JTM zone 53S | UTM zone | WGS 84 | WGS 84 | 132deg East to 1 | | |
| WGS 84 / L | JTM zone 545 | UTM zone | WGS 84 | WGS 84 | 138deg East to 1 | | |
| El unos na Ji | 222 anne MTI | 100M 200A | M/00.94 | 0.020 8.4 | 144dan Eart In 1 | ÷ | |

sedangkan pada **Degree format** pilih **-xx.xxxx**. Pilihan projection tergantung letak atau daerah yang kita gunakan.

| operties | | | | -7 |
|-------------|----------------|--|-------------|----|
| Coordinates | Units | Project | | |
| Coordinate | e system | s for Document | | |
| Projection | V | NGS 84 / UTM z | one 495 | - |
| | Di El Pr | atum: WGS 84 lipsoid: WGS 84 ojection: | UTM zone | |
| Display: | V | NG\$ 84 | | |
| | Di El Pr | atum: WGS 84 lipsoid: WGS 84 ojection: | Long./Lat. | |
| | De | egree <u>f</u> ormat: | -101.300000 | - |
| | | | | |
| | | | | |

B. Memasukkan data peta

1. Untuk memasukkan data peta pilih **File>Import**>pilih data peta (pada percobaan ini masuk pada folder **Map Jawa** dan pilih kedua file).

| ector Import | | ? 💌 |
|--|--|-----------------|
| mport <u>t</u> o: | | |
| 🐌 Geo | | • |
| Embed in <u>d</u> ocument | | Advanced |
| Coordinate system | | |
| The document coordinate system is: | | |
| WGS 84 / UTM zone 495 | | |
| If the imported <u>file</u> coordinate system one hereafter. File contents will be au | is different, then sel tomatically converte | ect the correct |
| WGS 84 / UTM zone 49S | | Change |
| Fields to be imported | | |
| | ▼ as: | Value 👻 |
| Import | Cancel | |

Pastikan Coordinate system menggunakan WGS 84/UTM zone 49S. kemudian pilih **Import** sehingga muncul peta seperti dibawah ini



2. Untuk menampilkan *peta 3D* digunakan 3 parameter diantaranya *Clutter, Heights* dan *Vector*. Data clutter dimasukkan dengan cara pilih **File>Import>**pilih folder **Data Clutter>Index>Clutter Classes**.



Sehingga tampilan peta berubah menjadi seperti ini



Untuk memasukkan data ketinggian pada peta pilih **File>Import>Data Clutter>Height>Index>Altitudes** _____

| Data Type | -?- X - |
|-------------------------|----------------|
| Altitudes | ОК |
| Clutter Heights | |
| Clutter Classes | Cancel |
| Traffic | |
| Vectors | |
| 🗇 Text data | |
| 🗇 Image | |
| Radio Antennas | |
| Microwave Link Antennas | |
| Embed | |

Tampilan peta berubah menjadi seperti di bawah ini



Selanjutnya memasukkan data vector dengan cara pilih **File>Import>Data Clutter>Vector>Index>Vectors**

Data Type D C C Altitudes OK Cutter Heights Cancel Cutter Classes Cancel Traffic Mectors Test data Image Radio Antennas Microware Link Antennas Embed

Apabila muncul halaman Vector Import, pilih Import

C. Memasukkan LTE Parameter

LTE parameter terdiri dari *site, transmitter* dan *cell*. Pada percobaan ini kita menggunakan data LTE Parameter sebuah operator yang telah tersimpan di dalam database. Data-data ini akan kita import ke dalam sistim yang akan kita buat.

- 1. Parameter site digunakan untuk menentukan posisi site.
- 2. Untuk memasukkan data site klik kanan bagian **Site>Open Table**

| | | Netwo | rk | џ > | × | Map | | |
|-----------------------------|-----------|--------------|---------------------|----------------|---|--------------------------|--------------|---|
| | | ····· 🗸 | <mark>р сано</mark> | New | | } | | |
| | | ···· V | 2 1 📾 | Open Table | | | | |
| | | v | 📕 🖁 🖆 | Properties | | | | |
| | | | 📄 s 🔒 | Lock Positions | | | | |
| Map: Document1 Sites: Docum | ent1 × | | | | | | | |
| | 🖬 🖬 🍞 🙀 🗛 | Z+ III I | | E X X B I 🗛 🗛 | | | | |
| Name | Longitude | Latitude | Altitude (m) | Comments | 5 | Support Height (m) | Support Type | Max S1 interface throughput (DL) (kbps) |
| é | | | | | | | | |

3. Klik icon *Import>*pilih folder **Data Import>Site>Import**

| Configur | ation file: | 1 | | | Save | Logd |
|------------|-------------|--------------|-----------------|--------------|-----------------------|-------------|
| oordinate | system: | WG\$ 84 | | | | |
| st data ro | w: | 2 👘 | Decimal symbol: | . • fie | i <u>d</u> separator: | <tab></tab> |
| ield mapp | ing: | | | | | |
| Source | Name | Longitude | Latitude | Altitude (m) | Comments | Support H |
| Destinati | Name | Longitude | Latitude | Altitude (m) | Comments | Support H |
| 2 | Site 115 | 110.37763547 | -7.808482269 | [143] | | 50 |
| 5 | Site 117 | 110.34965518 | -7.785058637 | [190] | | 50 |
| 4 | Site113 | 110.34836618 | -7.803409117 | [141] | | 50 |
| 5 | 500114 | 110.36712609 | -7.776636933 | [152] | | 50 |
| 0 | 3000110 | 110.36740357 | .7.791,908519 | [149] | | 10 |
| 0 | 2006119 | 110.38443742 | -7-790139047 | [130] | | 30 |
| 8 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
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| 16 | | | | | | |
| 16 | | | | | | |

| 🖪 📑 🖆 🗟 🗖 🖬 🖉 🕅 🖪 | 🖥 🖬 🍞 🏹 🛔 | ⊼+ Ini ≣ | | B I 🖪 🖪 | | | |
|-------------------|--------------|---------------------|-----------------|-----------|--------------------------|-------------------------|---|
| Name | Longitude | Latitude | Altitude (m) | Comments | Support Height (m) | Support Type | Max S1 interface throughput (DL) (kbps) |
| Site 115 | 110.37763547 | -7.80848226 | [143] | | 50 | <undefined></undefined> | 950,000 |
| Site 117 | 110.34965518 | -7.78505863 | [150] | | 50 | <undefined></undefined> | 950,000 |
| Site113 | 110.34836618 | -7.80340911 | [141] | | 50 | <undefined></undefined> | 950,000 |
| Site114 | 110.36712609 | -7.77663693 | [152] | | 50 | <undefined></undefined> | 950,000 |
| Site116 | 110.36740337 | -7.79130851 | [149] | | 50 | <undefined></undefined> | 950,000 |
| Site118 | 110.38443742 | -7.79013964 | [150] | | 50 | <undefined></undefined> | 950,000 |
| e | | | | | | | |

4. Apabila saat import muncul error maka perlu dilakukan setting regional pada control panel. Cara setting regional yaitu pilih Control Panel>Region and Language>pada tab Format pilih Additional settings.

| 😚 Region and Language | | |
|-----------------------|---|-------|
| Formats Location Key | boards and Languages Administrative | |
| Eormat: | | |
| English (United State | 3) | - |
| Date and time form | ats | |
| Short date: | M/d/yyyy | • |
| Long date: | dddd, MMMM dd, yyyy | * |
| Short time: | himm tt | * |
| Long time: | h:mm:ss tt | |
| First day of week | Sunday | |
| What does the nota | tion mean? | |
| Examples | | |
| Short date: | 9/29/2015 | |
| Long date: | Tuesday, September 29, 2015 | |
| Short time: | 10:55 AM | |
| Long times | 10:55:19 AM | |
| | Additional setting | 15 |
| Go online to learn ab | out changing languages and regional formats | |
| | OK Cancel | jeely |

Pada bagian Number pastikan

- Decimal symbol : .
- Digit grouping symbol : ,
- List separator : ,
- Measurement system : U.S

| Currency Time Date | | |
|---|------------------------|-------|
| Positive: 123,456,789.00 | Negative: -123,456,789 | .00 |
| Decimal symbol: | I | • |
| No. of digits after decimal: | 2 | • |
| Digit grouping symbol: | | • |
| Digit grouping: | 123,456,789 | |
| Negative sign symbol: | - | - |
| Negative number format: | -1.1 | |
| Disglay leading zeros: | 0.7 | • |
| List separator: | | • |
| Measurement system: | U.S. | • |
| Standard digits: | 0123456789 | - |
| Use native digits: | Never | • |
| Click Reset to restore the system def numbers, currency, time, and date. | ault settings for | Beset |

Sedangkan saat tidak muncul error saat import site maka setting regional tidak perlu dilakukan.

5. Untuk import data transmitter dilakukan dengan cara klik kanan **Transmitter>Open Tabel**

| 🔈 - 📝 📄 Sites | 106.0 |
|----------------|-------------------------|
| Transmitters | • |
| 🔽 📄 Predicti 🏠 | New |
| 🔽 🚞 ACP - At 👝 | Anthone Terrorithmen |
| 🔽 📄 Simulati 🔺 | Activate fransmitters |
| 🔽 🚞 Subscrit 🔐 | Deactivate Transmitters |
| Interferenc | Onen Table |
| 📖 📄 📄 Hexago 🖽 | Open Table |
| 🛛 🔽 CW Mea 🖆 | Properties |

6. Klik icon *Import>*pilih transmitter>Import

| Configur | ation file: | | | | Save | Logd |
|------------|-------------|-------------|-----------------|--------|------------------|-------------|
| Coordinate | e system: | WGS 84 | | | | |
| st data ro | w | 2 🗘 | Decimal symbol: | . • | Field separator: | <tab></tab> |
| ield mapo | ina: | | | | | |
| Source | Site | Transmitter | Active | DX (m) | DY (m) | Polarica |
| Destinati | Site | Transmitter | Active | DX (m) | DY (m) | Potarica |
| 2 | Site 115 | Site 115 1 | TRUE | 0 | 0 | V |
| 3 | Site 115 | Site 115_2 | TRUE | 0 | 0 | V |
| 4 | Site 115 | Site 115_3 | TRUE | 0 | 0 | V |
| 5 | Site 117 | Site 117_1 | TRUE | 0 | 0 | V |
| 6 | Site 117 | Site 117_2 | TRUE | 0 | 0 | V |
| 7 | Site 117 | Site 117_3 | TRUE | 0 | 0 | v |
| 8 | Site113 | Site113_1 | TRUE | 0 | 0 | v |
| 9 | Site113 | Site113_2 | TRUE | 0 | 0 | v |
| 10 | Site113 | Site113_3 | TRUE | 0 | 0 | v |
| 11 | Site114 | Site114_1 | TRUE | 0 | 0 | V |
| 12 | Site114 | Site114_2 | TRUE | 0 | 0 | V |
| 13 | Site114 | Site114_3 | TRUE | 0 | 0 | v |
| 14 | Site116 | Site116_1 | TRUE | 0 | 0 | V |
| 15 | Site116 | Site116_2 | TRUE | 0 | 0 | V |
| 16 | Site116 | Site116_3 | TRUE | 0 | 0 | v |
| | Site118 | Site118 1 | TRUE | 0 | 0 | V |
| 17 | 211118880 | | | | | |

7. Selanjutnya memasukkan data cell, klik kanan transmitter>Cell>Open Table

| D-V Sites | arr | . <u>-</u> | 206.0 | |
|--------------|--|------------|-------|------------|
| - 🖉 🐚 Prec 😭 | New | | | |
| ACF Sim | Activate Transmitters Deactivate Transmitters | | | |
| Interfe | Open Table Properties Rename | | | in in |
| p - 🖓 🖿 Link | Cells | | | Open Table |
| | Remote Antennas Remeaters | | : | Details |

8. Klik icon **Import>Cell>Import**

| Configur | ation file: | 1 | | | Save | Logd | |
|----------------------------|--------------------------------|-------------|-----------------|-----------------|----------------|-------------|---|
| | | | | | | | |
| cordinat | e system: | WG5 84 | | | | | |
| | | | | | | | |
| st data ro | NAC . | 2 😨 | Decimal symbol: | - • Pa | rig separator: | <tab></tab> | |
| ield maps | ing | | | | | | |
| Source | Name | Transmitter | Max Power (dB | Frequency Band | Channel Numb | Traffic Los | ï |
| Destinati | Name | Transmitter | Max Power (dB) | Frequency Band | Channel Numbe | Traffic Loa | ï |
| 2 | Site 115_1 (0) | Site 115_1 | 43 | E-UTRA Band 3 - | 1425 | 100 | 1 |
| 1 | Site 115_2 (0) | Site 115_2 | 43 | E-UTRA Band 3 - | 1275 | 100 | |
| 4 | Site 115_3 (0) | Site 115_3 | 43 | E-UTRA Band 3 - | 1725 | 100 | |
| 5 | Site 117_1 (0) | Site 117_1 | 43 | E-UTRA Band 3 - | 1425 | 100 | |
| 6 | Site 117_2 (0) | Site 117_2 | 43 | E-UTRA Band 3 - | 1275 | 100 | |
| 7 | Site 117_3 (0) | Site 117_3 | 43 | E-UTRA Band 3 - | 1725 | 100 | |
| 8 | Site113_1 (0) | Site113_1 | 43 | E-UTRA Band 3 - | 1875 | 100 | |
| 9 | Site113_2 (0) | Site113_2 | 43 | E-UTRA Band 3 - | 1575 | 100 | |
| 10 | Site113_3 (0) | Site113_3 | 43 | E-UTRA Band 3 - | 1275 | 100 | |
| 11 | Site114_1 (0) | Site114_1 | 43 | E-UTRA Band 3 - | 1425 | 100 | |
| 12 | Site114 2 (0) | Site114.2 | 43 | E-UTRA Band 3 - | 1875 | 100 | |
| | Site114 3 (0) | Site114 3 | 43 | E-UTRA Band 3 - | 1725 | 100 | |
| 13 | Site116_1 (0) | Site116_1 | 43 | E-UTRA Band 3 - | 1425 | 100 | |
| 13 | Site116_2 (0) | Site116_2 | 43 | E-UTRA Band 3 - | 1575 | 100 | |
| 13 14 15 | | Citatité 9 | 43 | E-UTRA Band 3 - | 1875 | 100 | |
| 13 14 15 16 | Site116_3 (0) | 3718 A & W | | | | 100 | |
| 13 14 15 16 17 | Site116_3 (0) Site118_1 (0) | Site110_1 | 43 | E-UTRA Band 3 - | 1275 | 2000 | |

Sehingga pada peta muncul seperti pada gambar di bawah ini. Ini adalah peta BTS-BTS LTE di wilayah Jogyakarta.



9. Agar tampilan site lebih besar gunakan icon zoom, selain itu juga agar site terletak pada bagian tengah pilih salah satu Site pada folder Site, klik kanan dan pilih *Centre in Map Window*



Sehingga tampilannya berubah menjadi



Untuk merubah tampilan site, klik kanan pada **Transmitter>Properties>**pilih tab **Display>**pada bagian Display type pilih **Automatics**. Pada bagian symbol rubah tampilan symbol. Pilih **Apply>OK**



Tampilan berubah menjadi



D. Penggunaan Prediction

Prediction digunakan untuk menganalisa /memprediksi parameter-parameter yang dihasilkan oleh site, seperti coverage area, daerah overlapping, Analisa sinyal efektif dan beberapa parameter lainnya. Untuk mengaktifkan menu Prediction ini, langkahnya sebagai berikut:

1. Klik kanan pada folder Prediction>New Prediction



2. Pilih Coverage by Transmitter(DL)

| Standard Predictions | | OK |
|---|---|----------------------------|
| Coverage by Transmitter (DL) Coverage by Signal Level (DL) | | Cancel |
| Overlapping Zones (DL) Effective Signal Analysis (DL) | | Delete |
| Effective Signal Analysis (UL) Coverage by C/(I=N) (evel (DL) Coverage by C/(I=N) (evel (UL) Service Area Analysis (DL) Service Area Analysis (UL) Effective Service Area Analysis (UL) | E | Calculate |
| | | Customised Predictions. |
| Coverage by Throughput (DL) Coverage by Throughput (UL) | | |
| Coverage by Quality Indicator (DL) Coverage by Quality Indicator (UL) Coll Identifier Colligion Tener (DL) | + | |

3. Kemudian klik *Calculate*, maka akan dihasilkan tampilannya seperti di bawah ini



4. Untuk menganalisa *power transmitter* di sebuah tempat, gunakan icon *point analysis* (lihat di menu atas bentuk lingkaran merah). Hasil dari analisa menggunakan point analysis terdapat informasi level dB terhadapat perubahan jarak (distance).



5. Selanjutnya buat prediction baru lagi yaitu *coverage by signal level*, dengan cara klik kanan **Predictions>New Prediction>Coverage by Signal Level**.



6. Dengan cara yang sama menggunakan point analysis untuk menganalisa coverage by level signal untuk salah satu site.



- 7. Sebagai tugas laporan sementara buat prediction untuk *Coverage by Throughtput (DL)*
- 8. Tampilan prediction dapat juga disajikan dalam bentuk histogram. Klik kanan pada pada prediction Coverage by Level Signal dan pilih Histogram.

