Training

Product + Service

2G + 3G + 4G Network
RF Planning
RF Optimization
Drivetest
Project Preparation
Company Profile

PT Floatway Systems

Didirikan: 2010
Produk: Instrumentation Product, Customized Solution and Training
Customer: PT Telkom Indonesia, PT Axis Telekom, PT INTI, PT Dharma Electrindo Manufacturing, PT Banshu Electric Indonesia, PT. Cipta Mandiri Wirasakti, PT Mac Sarana Djaya, PT Nexwave, PT Lintas Teknologi
Our Customer

- Mitratel
- AXIS
- Lintas Media Telekomunikasi
- Pinnacle Learning Center
- HUAWEI
- NexWave
- INITI
- Tower Bersama Group
- Telkom Indonesia
- Indosat Ooredoo
- Lintas Teknologi
- Ceria
- PT. Graha Fatta
- PT. MAC SARANA DJAYA
- Universitas Indonesia
- Universitas Mercu Buana
- Udayana
- Akatel
- Atma Jawa
Training Success Story

2G RF Planning and Optimization Training – Training for 34 RF Engineer at PT. Nexwave

Training & Certification Program for Drivetester Engineer – 3, 10, 17, 24 December 2011 – Training and certification for 50 Drivetester Engineer PT. Lintas Media Telekomunikasi
Training Success Story


Drivetest Optimization Training – Training untuk 10 Engineer PT. Telkom Indonesia, 5 – 8 November 2012 di Fave Hotel Kemang Jakarta
Training Success Story

Resources Strategic Plan Workshop for RF Planning and Optimization Services – Workshop untuk 10 MSC Manager PT. Telkom Indonesia, 19 – 20 Desember 2012 di Hotel Ibis Slipi Jakarta

2G RF Planning for Network Optimization – Training for 10 Engineer PT. Telkom Indonesia, 4, 5 & 6 February 2013 at Hotel Paragon Hotel Jakarta
Training Success Story

3G RF Planning for Network Optimization – Training for 10 Engineer PT. Telkom Indonesia, 26, 27 & 28 Februari 2013 at Learning Center Academy V Telkom Surabaya

4G LTE RF Design Training – Training for 8 Engineer PT. Industri Telekomunikasi Indonesia (PT Inti), 29 & 30 May 2013 at PT Inti Bandung
Training Success Story

2G/3G Drivetest Engineer – Training for 5 lecturer at Akademi Telkom Jakarta, 3 – 5 July 2013 at Akatel Jakarta

4G RF Planning & Optimization – Training for 15 engineer from PT Axis Telekom Indonesia, 8 – 10 November 2013 at Midtown Hotel Surabaya
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Resource Strategic Plan for Optimization Project (PTFS 0001)
Training Description
This training presents how to offer Network Optimization Services from commercial point of view, how to scope and price services. The offered network optimization service is the composition of activities, which will ensure the ongoing monitoring of the network performance, the analysis of problem areas, the definition and planning of immediate actions, the determination and reporting of dependencies for further growth and the introduction of new services and features in order to increase and stabilize the network performance under the circumstances of a fast growing network. Pricing structure depends on market and competitor situation.

Training Objectives
At the end of this workshop, participant will be able to:
• Identify to structure the roles and responsibility of project team member
• Define the key elements needed to measure and report on project scope, schedule and activity cost
• Identify the resource needs of the project and develop a cost baseline
• Scope of work of network optimization service in general
• Project risk and how to convert into nominal value
• KPI overview and impact of costing
Training Duration : 2 Days

Syllabus:
Network Optimization – Basis
- Short overview on service portfolio
- Organization and Resources, Strategies
- Roles and responsibility of project team member

Process
- Project Scope, Content and Deliverables
- Detailed Service Items

Costing Guidelines
- Elements of cost calculation for projects
- Cost types associated with the service

Cost Calculation Methods
Service specific tools

Case Studies
Project Simulation
- 2G & 3G Drivetest Simulation
- RF Planning Simulation

Costing in Actual Project
- Share of Responsibility
- Convert Project Risk to nominal value
- KPI overview and impact of costing

Pricing Strategy Overview
Case Studies
2G + 3G
Drivetest Optimization
(PDFS 0002)
Training Description
This training presents drivetest methodology and reporting both in 2G and 3G networks. Explain about drivetest Key Performance Indicator and how to improve drivetest KPI with analysis and solution.

Training Objectives
At the end of this workshop, participant will be able to:
• Understand drive test methodology and reporting
• Understand drive test 2G and 3G Drivetext KPI
• Be able to make drivetest performance report
• Be able to make performance analysis and solution for drivetest improvement
2G + 3G Drivetest Optimization

Training Duration : 2 Days
Training Syllabus

2G & 3G Drivetest And Methodology
- Introduction to RF Engineering
- 2G Introduction
- 3G Introduction
- 2G & 3G Comparison
- Drivetest Preparation with TEMS Investigation
- 2G Drivetest KPI (Rx Level, Rx Qual, SQI, CSSR, CCSR, HOSR, Throughput)
- 3G Drivetest KPI (RSCP, Ec/No, CSSR, CCSR, HOSR, Throughput)
- Update supporting data (SNT, cell file)
- Reporting with Map Info

Drivetest Practice (Outdoor and Indoor) & Drivetest Reporting

2G & 3G Drivetest Analysis and Study Case
- 2G Coverage Problem
- 2G Quality Problem
- 3G Coverage Problem
- 3G Quality Problem
- Drivetest for Special Issue & Special Purpose
2G RF Planning + Optimization (PTFS 0003)
2G RF Planning + Optimization

Training Description
This training presents detail process in 2G RF Planning especially in frequency management, channel also capacity planning. This training also presents about mobility concept in 2G networks, power control and optimization process flow chart.

Training Objectives
At the end of this workshop, participant will be able to:
• Participants can explain detail process in RF planning
• Participants understand the concept of frequency management and causes of frequency interference in GSM
• Participants understand channel and capacity planning in GSM
• Understanding the characteristics of the antenna in cellular communication
• Understand the concept of mobility in GSM networks (cell selection, reselection and handover)
• Participants can explain in detail process of RF Optimization & Optimization KPIs
• Participants understand Worst Performing Cells (WPC) concept and identified WPC in the network
• Participants understand optimization process flow chart
• Participants understand Discontinuous Transmission, Frame, Multiframe, Burst, Timing Advance, Cell Reselection, Power Control and Handover
• Participants able to audit and tuning Cell Reselection parameter, Handover parameter and Power Control parameter for network improvement
2G RF Planning + Optimization

Training Duration : 2 Days
Training Syllabus

2G RF Planning
- Step by step 2G RF Planning Process
- Link Budget
- Propagation Model
- dB Review
- dBm Review
- GSM Frequency Allocation
- Frequency Planning Rules
- Co-channel & Adjacent Channel
- Interference
- Frequency Hopping Strategy
- Traffic Engineering in GSM
- TCH and SDCCH Channel Dimensioning

2G RF Optimization
- 2G RF Optimization Process
- Key Performance Indicator
- Accessibility, Retainability & integrity Performance Optimization
3G RF Planning + Optimization

(PTFS 0004)
3G RF Planning + Optimization

Training Description
This training presents detail process in 3G RF Planning especially in scrambling code planning and capacity that impact on 3G network congestion. This training also presents about mobility concept in 3G networks including intersystem cell reselection and handover to 2G network. Optimization KPI and parameters also explained in final session.

Training Objectives
At the end of this workshop, participant will be able to:
• Participants can explain detail process in 3G RF planning
• Participants can understand scrambling code planning on UMTS
• Participants understand concept of multi carrier and multilayer in WCDMA
• Participants can understand power, code and channel capacity in UMTS
• Understanding the characteristics of the antenna in cellular communication
• Understand the concept of mobility in GSM networks (cell selection, reselection and handover)
• Participants can explain in detail process of RF Optimization & Optimization KPIs
• Participants can prepare hourly, daily and weekly KPI
• Participants understand optimization process flow chart
• Participants understand Admission Control, Cell Reselection, SHO, ISHO/IRAT Handover and Multi Carrier Strategy
• Participants able to audit and tuning Cell Reselection parameter, Handover parameter and Power Control parameter for network improvement
3G RF Planning + Optimization

Training Duration : 2 Days

Training Syllabus

3G RF Planning
- RF Planning Review
- 3G/WCDMA Introduction
- 3G/WCDMA Frequency Allocation
- 2G (GSM) VS 3G WCDMA
- Coverage VS Capacity
- Capacity Planning : Code
- Capacity Planning : Power
- Capacity Planning : Channel Element
- Architecture & Hardware
- Cell Reselection & Handover
- Scrambling Code Planning
- Channel Type
- HSDPA Introduction
- Dual Carrier Strategy

3G RF Optimization
- 2G RF Optimization Process
- Key Performance Indicator
- Accessibility, Retainability & integrity Performance Optimization
Visual Basic Application for RF Engineer

Training Description
Skills in data processing and automation is an essential value-added which greatly facilitates the work of RF Optimization Engineers. These skills provide flexibility and create ample time for more in-depth analysis of their work. This training provides practical guidelines to utilize VBA that is embedded in a widely popular MS Office application to enable faster data processing and presentation. Training materials are specifically tailored to meet the demand in RF optimization working environment. Training will be conducted by instructor which has extensive experience in VBA-based tools development that are suited for telecommunication projects.

Training Objectives
At the end of this workshop, participant will be able to:
• Participants understand about VBA principles in Microsoft Excel and Microsoft Access
• Participants understand Macro Basic and Internet Help
• Participants get used with Excel and Access
• Participants know how to Querying Data From MS Access
• Participants be able to collect measurement data in Access and Excel (Macro)
• Participants be able to create simple report template, Create a PivotTable (Macro), Create a PivotChart (Macro), and then Export Chart to Power Point (Macro)
Visual Basic Application for RF Engineer

Training Duration : 2 Days

Training Syllabus

- VBA Introduction in Excel and Access
- Access and Excel Basic
- Macro Basic and Internet Help
- **First Case**: Querying data from MS Access
- **Second Case**: Collecting measurement data in Access and Excel (Macro)
- **Third Case**: Create simple report template
- **Fourth Case**: Create a PivotTable (Macro)
- **Fifth Case**: Create a PivotChart (Macro)
- **Sixth Case**: Export Chart to Power Point (Macro)
- Self-case implementation (bring your own data and make one of the case that presented in the first day)
Map Basic

(PTFS 0006)
Map Basic

Training Description
This training provides practical guidelines to utilize Map Basic to create data and visualization in Map Info. Training materials are specifically tailored to meet the demand in RF optimization working environment. Training will be conducted by instructor which has extensive experience in Map Basic-based tools that are suited for telecommunication projects.

Training Objectives
• Participants able to know about Map Basic Tools
• Participants able to create cell sector on MapInfo
• Participants able to create dominant area with voronoi
• Participants able to create Automatic BSC/RNC border with voronoi
• Participants understand how to reading external data: text, csv, mdb file and MySQL database
• Participants understand about GSM Frequency Checker.
• Participants able to crate a thematic KPI on dominant area
• Participants understand about Adjacencies visualization on MapInfo
• Participants able to create Automatic Neighbor plan with distance and Theta consideration
• Participants able to know about Missing Neighbor detection based on Geographical and Interference Matrix.
• Participants understand about Timing Advance and PRACH delay visualization on MapInfo
• Participants understand about Downtilt calculator visualization
Map Basic

Training Duration : 2 Days

Syllabus :
- **Map Basic Introduction**
- **1st Case**: Create cell sector on MapInfo
- **2nd Case**: Create dominant area with voronoi
- **3rd Case**: Automatic BSC/RNC border with voronoi
- **4th Case**: Reading external data: text, csv, mdb file and MySQL database
- **5th Case**: GSM Frequency Checker.
- **6th Case**: Thematic KPI on dominant area
- **7th Case**: Adjacencies visualization on MapInfo
- **8th Case**: Automatic Neighbor plan with distance and Theta consideration
- **9th Case**: Missing Neighbor detection based on Geographical and Interference Matrix.
- **10th Case**: Timing Advance and PRACH delay visualization on MapInfo
- **11th Case**: Downtilt calculator visualization
Network Optimization Training

2G & 3G Network Multivendor Study Case

(PTFS 0007)
Network Optimization Training
2G & 3G Network + Multivendor + Study Case

Training Description
This training suitable for drivetest engineer, drivetest analyst, OSS engineer, RF engineer and junior PLO engineer who want to know deep understanding about optimization activity and technique. Detail process to formulated Key Performance Indicator, the differences between vendor, and how to achieve that KPI are explained in this training.

Training Objectives
At the end of this workshop, participant will be able to:
- Understand about Key Performance Indicator (KPI)
- Understand KPI Formula Mapping
- Participants know how to calculate Quality Of Service (QoS)
- Participants understand and know about Message Flow
- Understand about Performance Counter
- Participants understand and know about Optimization Flow and Optimization Parameter
- Understand and know about Parameter Mapping
Network Optimization Training

2G & 3G Network + Multivendor + Study Case

Training Duration : 2 Days

Training Syllabus

- Key Performance Indicator (KPI)
- KPI Formula Mapping
- Performance Indicator
- QoS (Quality of Service)
- Message Flow
- Performance Counter
- Optimization Flow
- Optimization Parameter
- Parameter Mapping
4G LTE Basic Principles
(PTFS 0008)
4G LTE Basic Principles

Training Description

This training explain basic principles of LTE Air Interface, From mathematics equation to OFDMA, SC-FDMA and Digital Modulation. It will also explain detail concept about LTE Physical Layer.

Training Objectives
At the end of this workshop, participant will be able to:
• Understand basic principles of LTE Air Interface
• Understand Basic Mathematics for Telecommunication Engineer
• Understand Radio Channel Characteristics
• Understand about LTE Advanced and LTE Physical Layer
• Understand the concept about Digital Modulation
• Understand the concept about OFDM

Training Duration : 1 Days

Syllabus
• Basic Mathematics for Telecommunication Engineer
• LTE Advanced
• Radio Channel Characteristics
• LTE Physical Layer
• Digital Modulation
• OFDM (Orthogonal Frequency Division Multiplexing)
4G LTE Interworking & Interconnection (PTFS 0009)
4G Interworking & Interconnection

Training Description

The major focus of this course is the interworking between LTE with 2G, 3G, CDMA, 1xEV-DO and also with non 3GPP technology. The course begins with a brief overview of 2G, 3G, CDMA, LTE, Wifi architectures and requirements for interworking. The building blocks that support interworking between LTE and 2G, 3G, CDMA and also with non 3GPP technology are discussed in detail, including the new interfaces, hybrid device capabilities, and radio/core mechanism. Different interworking/mobility scenarios are listed and detail message flows are given.
Training Objectives

At the end of this workshop, participant will be able to:

• Participants understand LTE Network Architecture
• Participants understand LTE Interworking with GSM (2G), UMTS (3G), CDMA, 1xEV-DO, and with non 3GPP technology (Wi-Fi)
• Participants understand about cell selection and cell reselection flow between cellular technologies
• Participants understand how paging operation works
• Participants understand about IMS Network Architecture
• Understanding End-to-end signaling and traffic flow
• Understanding about VoIP and IMS Protocols
• Understanding about IMS - PSTN interworking
• Participants understand Voice Support in LTE (CS Fallback, VoLTE, SR-VCC (Single Radio Voice Call Continuity) and Support for SMS)
• Participants understand about Handover in LTE and how it works.
4G Interworking & Interconnection

Training Duration : 2 Days

Syllabus :

LTE NETWORK ARCHITECTURE
- System Architecture Evolution (SAE)
- Network Architecture and Interfaces
- SAE nodes (e.g. HSS, MME, S-GW, P-GW, PCRF) and functions

LTE INTERWORKING
- Interworking with GSM (2G)
- Interworking with UMTS (3G)
- Interworking with CDMA
- Interworking with 1xEV-DO
- Interworking with non 3GPP technology (Wifi)
- Deployment Considerations

LTE IDLE MOBILITY
- Cell Selection
- Cell Reselection with GSM (2G)
- Cell Reselection with UMTS (3G)
- Cell Reselection with CDMA
- Cell Reselection with 1xEV-DO
- Tracking and Routing Area Update
- Paging Operation

IMS IN LTE NETWORKS
- IMS Network Architecture
- End-to-end signalling and traffic flow
- VoIP and IMS Protocols
- IMS - PSTN interworking
4G Interworking & Interconnection

Syllabus:

VOICE SUPPORT IN LTE
- CS-Fallback
- VoLTE
- SR-VCC (Single Radio Voice Call Continuity)
- Support for SMS

LTE HANOVER
- X2-based handover
- S1-based handover
- Inter-RAT handover with GSM (2G)
- Inter-RAT handover with UMTS (3G)
- Inter-RAT handover with CDMA
- Inter-RAT handover with 1xEV-DO
- Seamless Mobility with non 3GPP technology (Wifi)
4G RF Planning + Optimization
(PTFS 0010)
Training Description
This training presents difference between 2G, 3G and 4G, network architecture in LTE 4G and concept about OFDMA and SC-FDMA. In planning session it will explained about coverage and capacity planning depends on your LTE RF deployment criteria. In Optimization session it will presents about RF Configuration Parameters, Drivetest in LTE, Key Performance Indicator and Self Optimization Networks.

Training Objectives
At the end of this workshop, participant will be able to:
• Define the difference between 2G, 3G and 4G.
• Understand the network architecture in LTE 4G
• Understand the concept of OFDMA and SC-FDMA
• Calculate the data rate on the LTE network in a variety of network configurations
• Understand planning on 4G LTE network coverage
• Understand the planning capacity on its 4G LTE network
• Able to grasp the concept of deployment in future 4G networks.
• Understand the configuration of RF parameters on LTE network
• Understand Drivetest measurement and analysis of the LTE network coverage
• Understand Key Performance Indicators on LTE network
• Understand the features LTE network
4G RF Planning + Optimization

Training Duration : 3 Days

Syllabus :
Radio Cellular Technology
- Radio Cellular Technology
- Network Architecture
- Cellular Frequency Allocation

OFDMA
- OFDM and OFDMA
- LTE Downlink
- OFDMA time-frequency multiplexing
- LTE Spectrum Flexibility
- LTE Frame Structure type 1 (FDD), downlink
- LTE Frame Structure type 2 (TDD)

SC-FDMA
- Introduction to SC-FDMA and UL Frame Structure
- How to generate SC-FDMA?
- How does SC-FDMA signal look like?
- SC-FDMA Signal Generation
- SC-FDMA PAPR
- SC-FDMA Parameterization

Peak Capacity of LTE
- MIMO Antenna
- Review On Data Rate
- Overhead
- Overhead Estimation (2 x 2)
- Overhead Estimation (4 x 4)

LTE Mobility
- Handover
- LTE Interworking with 2G/3G
- LTE Interworking with CDMA2000

Radio Cellular Planning
- Cellular System Planning Cycle
- Planning Objectives
- Traffic Forecasting
- Coverage Threshold
- Site Configuration
4G RF Planning + Optimization

Syllabus:

Coverage Planning
- UL Link Budget & Parameters
- DL Link Budget & Parameters
- Propagation Model
- Cell Radius
- Nominal Planning

Capacity Planning
- Number of user
- User density
- Services and type
- Penetration: building, vehicular, pedestrian
- BHCA and call duration
- OBQ
- Site calculation

Deployment Planning
- Design Criteria
- RF Design - RAN
- Core Design
- LTE Deployment Scenario

RF Configuration Parameters
- PCI Planning
- PRACH Planning

RF Operational Parameters
- Cell Search Parameter
- Handover in LTE networks
- Power Control Overview

Drivetest and Coverage Analysis
- TD-LTE & FD-LTE
- Reference Signal Received Power (RSRP)
- Signal to Noise & Interference Ratio (SINR)

KPI in LTE Network
- Accessibility, Retainability & Mobility

LTE Feature Performance
- Beamforming
- IRC
- Comparison Static ICIC and Dynamic ICIC
- Self Optimization Network: AMR
- Self Optimization Network: CSFB
4G RF Design with Atoll (PTFS 0011)
Training Description
This training presents how to design 4G LTE network with Atoll Planning tool. Perform network, create and calibrate propagation models, and also allocate RF configuration parameters like PCI, neighbours, Antenna parameters, Transmitters parameters, Cell parameters, MIMO Settings, Settings ICIC for LTE networks in Planning tool.

Training Objectives
At the end of this workshop, participant will be able to:
• Prepare the necessary data for designing LTE network
• Perform network modeling LTE (Antenna parameters, Transmitters parameters, Cell parameters, MIMO Settings, Settings ICIC)
• Create and calibrate propagation models for LTE networks
• Allocate neighbor, features, frequency and PCI in LTE networks
• Perform simulation modeling of traffic in LTE networks
• Perform a pre-analysis of interference in the 4G LTE network
4G RF Design with Atoll

Training Duration : 2 Days

Syllabus :
Coverage Dimensioning
- DL Link Budget & Parameters
- Operating Band
- Channel Bandwidth
- Transmitter: eNodeB
- Receiver: UE
- UL Link Budget & Parameters
- Transmitter – Handset Receiver Examples

Capacity Dimensioning
- Number of user
- User density
- Services and type
- Penetration : building, vehicular, pedestrian
- BHCA and call duration
- OBQ
- Site calculation

Data Preparation for LTE Design
- Import of heights map
- Import of clutter map
- Import of vector map
- Setting a coordinate system
- Network data setting
- Import of the Sites table

Modelling an LTE Network
- Antenna parameters setting
- Transmitters parameters setting
- Cells parameters setting
- MIMO Settings
- ICIC Settings
- Smart Antenna Settings
- Propagation model
- SPM propagation model
- Set the propagation model for each transmitter
- Automatic calibration of the Cost-Hata model
- Set the propagation model for each transmitter
4G RF Design with Atoll

Syllabus:

LTE Predictions
- Setting the Computation Zone
- Propagation and prediction studies calculation
- Best server prediction
- Coverage by Signal Level prediction
- Overlapping Zones prediction

Neighbour, Frequency & Physical Cell ID Allocation
- Automatic Neighbours Allocation
- Automatically Allocation Feature
- Automatic Frequency Allocation
- Automatic PCI Allocation

Point Analysis function
- Profile
- Reception
- Interference
- Details
- Other prediction studies

Traffic model Simulation
- Services
- Mobility types
- Terminals
- User profile environments
- User profile densities
- Sector traffic map
- User density traffic map (no of ser/km)
- Subscriber list
4G LTE Drivetest with Genex Probe

(PTFS 0012)
4G LTE Drivetest with Genex Probe

Training Description

This course teaches how to monitor performance of the LTE Radio Access Network with Drivetest. It talks about the Key Performance Indicators (KPI) that should be used in Drivetest. In this course students will be introduced to Drivetest tools and methodology for cluster and single site verification. They will be guided through LTE drivetest data collecting, reporting and analysis.

Training Objectives

1. Participants understand Drivetest measurement and analysis of the LTE network coverage.
2. Participants able to conduct LTE Drivetest both on Single site verification test and also cluster drive test.
3. Participants able to create final report for Single site reporting and cluster drive test Reporting.
4G LTE Drivetest with Genex Probe

Training Duration : 2 Days

Syllabus :
LTE Drive test Basic knowledge
- Drive test Tools Introduction
- Onsite hardware Introduction
- LTE Drive test RF Parameter

LTE Drive test step & Procedure
- Accessibility test
- Retainability test
- Throughput test
- Test plan creation

LTE Drive test on field (Practice)
- Single site verification test
- Cluster drive test

LTE Drive test reporting
- Single site Reporting
- Cluster drive test Reporting

LTE Drive test analysis
- Radio Quality Measurement
- RSSI
- RSRP
- RSSI and RSRP interaction
- RSRQ
- RSRQ and RSRP interaction
Fiber Optic

(PTFS 0013)
Fiber Optic

Training Description

First of all this training will presents structure and characteristics of Fiber Optics. Furthermore it will explain type of fiber optic cable, type of components and accessories in Fiber Communication Systems. This training also explain about safety procedures when working with fiber optics. In practical session, participants will be able doing optical fiber splicing, measure optical fiber connection with OPM and OTDR and knowing types and problems in fiber connection.

Training Objectives

1. Participants understand structure and characteristics of Fiber Optics.
2. Participants understand type of components and accessories in Fiber Communication Systems.
3. Participants able to define type of fiber optic cable.
4. Participants able to implement safety procedures when working with fiber optics.
5. Participants understand types and problems in fiber connection.
6. Participants able doing optical fiber splicing.
7. Participants able to measure optical fiber connection with OPM and OTDR.
Fiber Optic

Training Duration : 2 Days

Syllabus :

Introduction to Fiber Optics
- Structure of Optical Fiber
- Light Propagation in Optical Fibers
- Characteristics of Fiber Optics

Components and Accessories Optical in Fiber Communication Systems
- Light Source
- Photodetector
- Optical Accessories

Type of Fiber Optic Cable
- Types of cables based structure
- The cable type is based on its use
- Optical Cable Specifications

Implementation of Safety Procedures with Fiber Optics
- Cause of the Accident Working with Fiber Optics
- Safety Procedure on optical fiber splicing
- Safety Procedure in measurements activity
- Safety at work at the top of the pile

Optical Fiber Splicing
- Various connection
- Problems in the optical fiber connection
- The optical fiber splicing procedure

Measurement of Optical Fiber
- Calculating the link budget in optical fiber communication systems
- Optical Power Meter
- OTDR

Communication Systems Optical Fiber Splicing Practice
- Fussion splice
- Use of Fussion Splice

Optical Fiber Measurement Practice
- The use of OPM
- The use of OTDR
Fiber To The Home (FTTH) (PTFS 0014)
Fiber To The Home (FTTH)

Training Description

In FTTH Session first it will explain about FTTH application. Calculate link Budget in FTTH. It also explain types of connectors, termination and splitting techniques in FTTH. Participants will understand TX and RX in FTTH in simple logic, understand differences between GPON and GEPON and understand multiple IP Services over FTTH. In practical session Participants will able to settings multiple devices over FTTH.

Training Objectives

1. Participants understand and know FTTH Application
2. Participants able to calculate link Budget in FTTH.
3. Participants understand termination and splitting techniques.
4. Participants understand various types of connectors in FTTH.
5. Participants understand TX and RX in FTTH in simple logic.
6. Participants understand differences between GPON and GEPON.
7. Participants understand multiple IP Services over FTTH.
8. Participants able to settings multiple devices over FTTH
Fiber To The Home (FTTH)

Training Duration : 2 Days

Syllabus :
Introduction to FTTH
- What is FTTH
- FTTH Application

FTTH Link Budget
- Splitter Attenuation
- FO Link Budget in the application of FTTH

Termination Techniques
- Connectorized
- Splicing
- Which one is chosen?

Splitting Techniques
- Centralized Splitting
- Distributed Splitting
- Examples of cases and design for High Rise Building and residential.

Connectors in FTTH
- UPC SC
- SC APC
- Manual Connectors

FTTH Transmission
- TX and RX in FTTH in simple logic

Optical Networks
- Gigabit-capable Passive Optical Networks (GPON)
- Gigabit Ethernet PON (EPON or GEPON)
- IPTV

IP Services over FTTH
- Triple play
- Multiple play

CWDM
- What is CWDM (Coarse Wavelength Division Multiplexing)
- CWDM Application

Demo Play 1
- Multiple Devices over FTTH

Demo Play 2
- Settings on Multiple Devices over FTTH
Transmission Design with Pathloss (PTFS 0015)
Transmission Design with Pathloss

Training Description

This training will give the participant to plan microwave point-to-point links using software planning tool Pathloss, Including ability to analyze data from path surveys, create respective profile data and decide upon antenna heights, calculate Performance and Availability percentages of the link and optimize them with respect to the ITU-R objectives as well as cost-effectiveness.

Training Objectives
At the end of this workshop, participant will be able to:
- Understand the complete configuration of Pathloss program
- Understanding microwave network designing concept
- Simulation microwave transmission network effects
- Get informational knowledge how microwave transmission caters throughput requirements of different types of traffic
- Understand the planning activities of microwave network
Training Design with Pathloss

Training Duration: 2 Days

Syllabus:
Transmission Planning Process
- Master Planning
- Detail Planning

Transmission Product Knowledge
- Huawei
- Ericsson
- Alcatel
- NEC
- ZTE
- Sagem
- Hariss

Digital Hierarchies – PDH and SDH
- Plesiochronous Digital Hierarchy (PDH)
- Synchronous Digital Hierarchy (SDH)
- Asynchronous Transfer Mode (ATM)

Fundamentals of Transmission
- Modulations
- Multiple Access Schemes

Line of Sight Transmission
- Free space loss
- Effect of terrain
- Reflection and diffraction
- Fresnel Zones and path profiles
- Clearance requirements
Transmission Design with Pathloss

Syllabus:
Radio Propagation Phenomena
- Refraction
- Earth curvature
- Rain attenuation
- Fading
- Reflection
- Diffraction

Diversity
- Space
- Frequency
- Polarization
- Diversity combining and improvements over non-diversity systems

Link Design
- Site selection, mapping, path profile generation and analysis
- Reflection point analysis
- Microwave link budget
- Frequency planning

Pathloss Basis
- Installation
- Antenna and radio module
- Terrain module
- Antenna height module

Pathloss Options and Settings
- Diffraction module
- Multipath module
- Reflection module

Pathloss Design Links
- Network module
- Reporting
- Frequency assignment
- Interference calculation
- Network design
2G & 3G Network Capacity Optimization
Radio, Transport & Core Network
(PTFS 0016)
2G & 3G Network Capacity Optimization

Radio, Transport & Core Network

Training Description
Capacity is the most issue in Network Planning and Optimization activities. Capacity problem impact Network KPI mostly in accessibility, give contribution in retainability degradation (ex. increasing drops) and integrity degradation (ex. low throughput). This training will give detail explanation to design capacity both in 2G & 3G networks in three main area : Radio, Transport and Core Network, also explain strategy to handle future traffic increment and traffic mobility.

Training Objectives
At the end of this workshop, participant will be able to:
- Participant understand about Traffic Theory
- Understand and know how to calculate QoS and GOS
- Understanding Busy Hour and Busy Day Concept
- Participant understand about Utilization and Occupancy Concept
- Participant understand about 2G and 3G Radio Capacity & Dimensioning
- Understand about Transport Capacity & Dimensioning
- Understand about Core Capacity Management
2G & 3G Network Capacity Optimization

Radio, Transport & Core Network

Training Duration : 2 Days

Syllabus:

Traffic Theory
Erlang B & Erlang C
QoS and GOS
Utilization and Occupancy Concept
Busy Hour and Busy Day Concept

Radio Capacity Management
2G Radio Capacity & Dimensioning :
- Control Channel
- Traffic Channel
- TCH Channel
- SDCCH Channel
- PDCH Channel for GPRS/EDGE
- PCH Load and LAC Dimensioning
- BSC Load

3G Radio Capacity & Dimensioning :
- Power
- Channel Element
- Code
- RNC Load

Transport Capacity & Dimensioning :
- Abis Dimensioning
- Iub, IuCS, IuPS and Iur
- Abis over IP and IP Transport
2G & 3G Network Capacity Optimization
Radio, Transport & Core Network

Syllabus:
Core Capacity Management

- **CS Core Network Dimensioning**
  - Average Circuit Group (CGR) Utilization
  - Signalling Link Load
  - VLR Load
  - HLR Load

- **PS Core Network Dimensioning**
  - SGSN Load
  - GGSN Load
  - Inter-GSN Traffic
  - DNS Load
  - DHCP Load
  - Firewall Load
  - Border Gateway Load
  - Charging Gateway Load
  - Core LAN Switch Load

Traffic Prediction and Forecasting
Capacity Overload Handling & Mitigation Plan
IEEE Distinguished Lecturer

This program collaborate with IEEE to invite international speakers who are professionals in their field to provide a seminar in Indonesia. This program dedicated for University and also for Company

Program Advantage:
- Speaker transportation cost borne by IEEE
- Free speaker fee, even university or company is prohibited to give a fee to speaker
- University or Company that invite the international speaker only bear the cost for transportation and accomodation while speaker stay in Indonesia

Advantage for Participants:
- Participant will get a huge exposure about technology development from other country
- Participant able to discuss with speaker to get opportunity to do a joint reasearch or get LOA (Letter of Acceptance) to get S2 or S3 study opportunity in abroad.

Speaker usually is a Doctor or Professor in abroad Universities who can promote you to study in their University.
CLOUD Computing Technology
Goal
This introduction to cloud computing technologies course provides the training and knowledge required to effectively evaluate and assess the business and technical benefits of cloud computing and analyze cloud application use for your organization. Additionally, this course helps trainee prepare for the Cloud Computing Certification Exam.

Training Objectives
The course presents the business advantages of the cloud and also the technical benefits it can provide. The technical discussions are at a level that attendees with a business background can understand and apply. Where technical knowledge is required, sufficient guidance for all backgrounds is provided to enable activities to be completed and the learning objectives achieved.
Subject Covered:
Delivering Platform as a Service (PaaS)
Exploring the technical foundation for PaaS
• Specifying the components of PaaS
• Analyzing vendor PaaS provisions
• Selecting an appropriate implementation

Building services with solution stacks
• Evaluating the architecture of vendor-specific platforms
• Becoming familiar with service platform tools

Managing cloud storage
• Controlling unstructured data in the cloud
• Deploying relational databases in the cloud
• Improving data availability

Employing support services
▪ Testing in the cloud
▪ Monitoring cloud-based services
▪ Analyzing portability across platforms

Deploying Infrastructure as a Service (IaaS)
Enabling technologies
▪ Scalable server clusters
▪ Achieving transparency with platform virtualization
▪ Elastic storage devices

Accessing IaaS
• Provisioning servers on demand
• Handling dynamic and static IP addresses
• Tools and support for management and monitoring

Deploying a Private Cloud
• Leveraging an existing infrastructure
• Comparing OpenStack and Eucalyptus
• Managing resources across teams and departments
• Integrating with public clouds

Building a Business Case
Calculating the financial implications
• Comparing in-house facilities to the cloud
• Estimating economic factors downstream

Preserving business continuity
• Selecting appropriate service-level agreements
• Safeguarding access to assets in the cloud
• Security, availability and disaster recovery strategies

Migrating to the cloud
• Rearchitecting applications for the cloud
• Integrating the cloud with existing applications
• Selecting a vendor and avoiding vendor lock-in
CLOUD COMPUTING TECHNOLOGY

Training Methods
Class Lecturing, discussion, simulation and practice

Target Participants
Network Engineer, Technical Staff, CTO

Pre-Requisites
Students attending this class must have fundamental electrical and telecommunication knowledge and one year on the-job cellular telecommunication experience.

Competence to be develop
• Adopting the Cloud
• Exploiting Software as a Service (SaaS)
• Delivering Platform as a Service (PaaS)
• Deploying Infrastructure as a Service (IaaS)
• Accessing IaaS
• Building a Business Case with cloud computing
Transmission Technology
Fundamental
Goal
This training will give the participant to plan microwave point-to-point links using software planning tool Pathloss, Including ability to analyze data from path surveys, create respective profile data and decide upon antenna heights, calculate Performance and Availability percentages of the link and optimize them with respect to the ITU-R objectives as well as cost-effectiveness.

Training Objectives
At the end of this workshop, participant will be able to:
- Understand the complete configuration of Pathloss program
- Understanding microwave network designing concept
- Simulation microwave transmission network effects
- Get informational knowledge how microwave transmission caters throughput requirements of different types of traffic
- Understand the planning activities of microwave network
Transmission Technology
Fundamental

Training Duration : 2 Days

Subject Covered :
Transmisson Planning Process
- Master Planning
- Detail Planning

Transmission Product Knowledge
- Huawei
- Ericsson
- Alcatel
- NEC
- ZTE
- Sagem
- Hariss

Fundamentals of Transmission
- Modulations
- Multiple Access Schemes

Digital Hierarchies – PDH and SDH
- Plesiochronous Digital Hierarchy (PDH)
- Synchronous Digital Hierarchy (SDH)
- Asynchronous Transfer Mode (ATM)

Line of Sight Transmission
- Free space loss
- Effect of terrain
- Reflection and diffraction
- Fresnel Zones and path profiles
- Clearance requirements
Transmission Technology Fundamental

Subject Covered:
Radio Propagation Phenomena
- Refraction
- Earth curvature
- Rain attenuation
- Fading
- Reflection
- Diffraction

Diversity
- Space
- Frequency
- Polarization
- Diversity combining and improvements over non-diversity systems

Link Design
- Site selection, mapping, path profile generation and analysis
- Reflection point analysis
- Microwave link budget
- Frequency planning

Pathloss Basis
- Installation
- Antenna and radio module
- Terrain module
- Antenna height module

Pathloss Options and Settings
- Diffraction module
- Multipath module
- Reflection module

Pathloss Design Links
- Network module
- Reporting
- Frequency assignment
- Interference calculation
- Network design
Transmission Technology Fundamental

Training Methods
Class Lecturing, discussion, simulation, and practice

Target Participants
Network Engineer, Technical Staff, CTO

Pre-Requisites
Students attending this class must have fundamental electrical and telecommunication knowledge and one year on the-job cellular telecommunication experience.

Competence to be develop
- Configuration of Pathloss program
- Microwave network designing concept
- Simulation microwave transmission network effects
- Knowledge of how microwave transmission caters throughput requirements of different types of traffic
- Planning activities of microwave network
IP Network Technology
Fundamental
Goal
Traditionally, IP has been used extensively to transmit data. Now, due to a host of driving forces, IP is seen as the answer to the transmission of not only of data but also voice and video – in today’s world and for the foreseeable future.

Training Objectives
At the end of this workshop, participant will be able to:
- Configuring an IP network
- Using subnets effectively
- TCP and UDP in the transportation of data
- Understanding the key differences between IPv4 and IPv6
- Troubleshooting IP Networks
- Using tools and utilities successfully
- Understanding bandwidth limitations
- Quality of service – can it be implemented
- Routers – how they make routing decisions
IP Network Technology Fundamental

**Subject Covered:**
- Basic theory of TCP/IP and UDP
- Migration from analogue to digital
- Subnet masking – a practical view
- Internet Security
- Firewalls
- Wireless technologies
- Protocols and their operational status
- Physical connections – coax UTP, cable and fibre
- Compression techniques explained
- Quality of service
- TCP, header, ports and windows
- Setting up IP cameras, domes and codecs
- RIP and OSPF technology explained
- Using VBR and CBR
- Network management
- Calculating bandwidth
IP Network Technology Fundamentals

Training Methods
Class Lecturing, discussion, simulation and practice

Target Participants
Network Engineer, Technical Staff, CTO

Pre-Requisites
Students attending this class must have fundamental electrical and telecommunication knowledge and one year on the-job cellular telecommunication experience.

Competence to be developed
- Configuring an IP network
- Using subnets effectively
- TCP and UDP in the transportation of data
- Understanding the key differences between IPv4 and IPv6
- Troubleshooting IP Networks
- Using tools and utilities successfully
- Understanding bandwidth limitations
- Quality of service – can it be implemented
- Routers – how they make routing decisions
Firewall Technology

Fundamental
Firewall Technology Fundamental

**Goal**
This introduction to firewall technologies course provides the training and knowledge required to understand firewall technology and network security.

**Training Objectives**
At the end of this workshop, participant will be able to:
- Understand the functions and classification of ACLs
- Grasp Interface-based packet filtering scenario and configuration
- Grasp Interzone packet filtering scenario and configuration
- Grasp the principles of the NAT technology
- Grasp the application of NAT
- Grasp the NAT configuration of firewalls
- Grasp the basic VLAN technology
- Grasp SA and E1 WAN interfacing technologies
- Grasp the basic ADSL technology
- Grasp WLAN and 3G technologies
Firewall Technology Fundamental

Subject Covered:

Firewall Packet Filtering Technology
- ACL Overview
- Interface-based Packet Filtering
- Interzone Packet Filtering
- Application Analysis of Packet Filtering

Network Address Translation Technology
- Introduction to Network Address Translation Technology
- NAT Technology Based on the Source IP Address
- NAT Technology Based on the Destination IP Address
- Bidirectional NAT Technology
- NAT Application Scenario and Configuration

Firewall Networking
- VLAN Feature Technology
- SA and E1 Feature Technology
- ADSL Feature Technology
- WLAN Feature Technology
- 3G Feature Technology

Network Security Overview
- OSI Model Introduction
- TCP/IP Introduction
- TCP/IP Security Issues
- Common Network Attacks

Basic Firewall Technology
- Firewall Overview
- Firewall Working Modes
- Firewall Security Zones
- Firewall Functions
- Basic Firewall Configuration
Firewall Technology Fundamental

Training Methods
Class Lecturing, discussion, simulation and practice

Target Participants
Network Engineer, Technical Staff, CTO

Pre-Requisites
Students attending this class must have fundamental electrical and telecommunication knowledge and one year on the-job cellular telecommunication experience.

Pre-Requisites Training: IP Network Technology Fundamental Training

Competence to be develop
• Understand the functions and classification of ACLs
• Grasp Interface-based packet filtering scenario and configuration
• Grasp Interzone packet filtering scenario and configuration
• Grasp the principles of the NAT technology
• Grasp the application of NAT
• Grasp the NAT configuration of firewalls
• Grasp the basic VLAN technology
• Grasp SA and E1 WAN interfacing technologies
• Grasp the basic ADSL technology
• Grasp WLAN and 3G technologies
RF Fundamental
RF Fundamental

Goal
This training explain basic principles of Radio Frequency, From mathematics equation to Application. It will also explain detail concept about link budgeting, antenna systems, digital modulation and also multiple access.

Training Objectives
At the end of this workshop, participant will be able to:
• Understand basic principles of RF
• Understand Basic Mathematics for Telecommunication Engineer
• Able to calculate link budget
• Understand the concept about Digital Modulation
• Understand the concept of Antenna
• Understand the concept of Multiple Access
RF Fundamental

Training Duration : 2 Days

Subject Covered :

RF Fundamental Knowledge
- Basic Mathematics for Telecommunication Engineer
- Frequency and Wavelength
- Radio Propagation
- dBm Review
- Link Budgeting
- Indoor Link Budgeting
- Antenna Systems
- Digital Modulation
- Multiple Access :
  - FDMA & TDMA
  - CDMA
  - OFDM

Radio Cellular Planning
- Cellular System Planning Cycle
- Planning Objectives
- Traffic Forecasting
- Coverage Threshold
- Site Configuration

Coverage Planning
- UL Link Budget & Parameters
- DL Link Budget & Parameters
- Propagation Model
- Cell Radius
- Nominal Planning

Capacity Planning
- Number of user
- User density
- Services and type
- Penetration : building, vehicular, pedestrian
- BHCA and call duration
- OBQ
- Site calculation

Deployment Planning
- Design Criteria
- RF Design - RAN
- Core Design
- LTE Deployment Scenario
RF Fundamental

Training Methods
Class Lecturing, discussion and simulation

Target Participants
Network Engineer, Technical Staff, CTO

Pre-Requisites
Students attending this class must have fundamental electrical and telecommunication knowledge and one year on the-job cellular telecommunication experience.

Competence to be develop
• Basic principles of RF
• Basic Mathematics for Telecommunication Engineer
• Calculating link budget
• The concept about Digital Modulation
• The concept of Antenna
• The concept of Multiple Access
4G RF Planning
4G RF Planning

Goal
This training presents how to design 4G LTE network with Atoll Planning tool. Perform network, create and calibrate propagation models, and also allocate RF configuration parameters like PCI, neighbours, Antenna parameters, Transmitters parameters, Cell parameters, MIMO Settings, Settings ICIC for LTE networks in Planning tool.

Training Objectives
At the end of this workshop, participant will be able to:
• Prepare the necessary data for designing LTE network
• Perform network modeling LTE (Antenna parameters, Transmitters parameters , Cell parameters, MIMO Settings, Settings ICIC)
• Create and calibrate propagation models for LTE networks
• Allocate neighbor, features, frequency and PCI in LTE networks
• Perform simulation modeling of traffic in LTE networks
• Perform a pre-analysis of interference in the 4G LTE network
4G RF Planning

Training Duration: 2 Days

Subject Covered:
Coverage Dimensioning
- DL Link Budget & Parameters
- Operating Band
- Channel Bandwidth
- Transmitter: eNodeB
- Receiver: UE
- UL Link Budget & Parameters
- Transmitter – Handset Receiver Examples

Capacity Dimensioning
- Number of user
- User density
- Services and type
- Penetration: building, vehicular, pedestrian
- BHCA and call duration
- OBQ
- Site calculation

Data Preparation for LTE Design
- Import of heights map
- Import of clutter map
- Import of vector map
- Setting a coordinate system
- Network data setting
- Import of the Sites table

Modelling an LTE Network
- Antenna parameters setting
- Transmitters parameters setting
- Cells parameters setting
- MIMO Settings
- ICIC Settings
- Smart Antenna Settings
- Propagation model
- SPM propagation model
- Set the propagation model for each transmitter
- Automatic calibration of the Cost-Hata model
- Set the propagation model for each transmitter
4G RF Planning

Subject Covered:
LTE Predictions
- Setting the Computation Zone
- Propagation and prediction studies calculation
- Best server prediction
- Coverage by Signal Level prediction
- Overlapping Zones prediction

Neighbour, Frequency & Physical Cell ID Allocation
- Automatic Neighbours Allocation
- Automatically Allocation Feature
- Automatic Frequency Allocation
- Automatic PCI Allocation

Point Analysis function
- Profile
- Reception
- Interference
- Details
- Other prediction studies

Traffic model Simulation
- Services
- Mobility types
- Terminals
- User profile environments
- User profile densities
- Sector traffic map
- User density traffic map (no of ser/km)
- Subscriber list
4G RF Planning

Training Methods
Class Lecturing, discussion, simulation and practice

Target Participants
Network Engineer, Technical Staff, CTO

Pre-Requisites
Students attending this class must have fundamental electrical and telecommunication knowledge and one year on the-job cellular telecommunication experience.

Competence to be develop
• Prepare the necessary data for designing LTE network
• Perform network modeling LTE (Antenna parameters, Transmitters parameters, Cell parameters, MIMO Settings, Settings ICIC)
• Create and calibrate propagation models for LTE networks
• Allocate neighbor, features, frequency and PCI in LTE networks
• Perform simulation modeling of traffic in LTE networks
• Perform a pre-analysis of interference in the 4G LTE network
BIG Data

Goal
Data analysis as part of business intelligence solutions is a growing demanding needs. It has become more and more mission critical than ever before.

The challenges are data is getting bigger in size and complexity, thus make it hard to provide a valid and timely management report. Recency is the key to making the prompt and right decision.

The problem of preparing the data can be solved by a promising and proven big data platform, Hadoop. Based on Google big data platform mechanism, Hadoop successfully grow from a small project into a mainstream big data platform nowadays.

This course is developed to provide you with a basic understanding of using Hadoop, when it can use best, and how to work with Hadoop with many of its frameworks.

Training Objectives
At the end of this workshop, participant will be able to:
• Understand the concepts of Big Data and Predictive Analytics
• Understand Hadoop storage, map reduce platform and its utilities
• Configuring Hadoop Cluster.
• Setting up, developing and configuring Hadoop, Map Reduce
BIG Data

Training Duration : 2 Days

Subject Covered :
Module 1: Introduction to Hadoop and Big Data
- What is Big Data?
- What are the challenges for processing big data?
- What technologies support big data?
- What is Hadoop?
- Why Hadoop?
- History of Hadoop
- Use cases of Hadoop
- RDBMS vs Hadoop
- When to use and when not to use Hadoop
- Ecosystem tour

Module 2: Hadoop Distributed File System
- Significance of HDFS in Hadoop
- Features of HDFS
- 5 daemons of Hadoop
  - Name Node and its functionality
  - Data Node and its functionality
  - Secondary Name Node and its functionality
  - Job Tracker and its functionality
  - Task Tracker and its functionality
BIG Data

Subject Covered:
Module 2: Hadoop Distributed File System (continue)

- Data Storage in HDFS
- Accessing HDFS
  - CLI (Command Line Interface) and admin commands
  - Java Based Approach
- Fault tolerance
- Download Hadoop
- Installation and set-up of Hadoop
- Start-up, Shut down process
BIG Data

Subject Covered:
Module 3: Map Reduce Basic
- Map Reduce Story
- Map Reduce Architecture
- How Map Reduce works
- Developing Map Reduce
- Map Reduce Programming Model
- Different phases of Map Reduce Algorithm
- Different Data types in Map Reduce
- How Write a basic Map Reduce Program
  - Driver Code
  - Mapper
  - Reducer
- Creating Input and Output Formats in Map Reduce Jobs
  - Text Input Format
  - Key Value Input Format
  - Sequence File Input Format
- Data localization in Map Reduce
- Combiner (Mini Reducer) and Partitioner
- Distributed cache
BIG Data

Training Methods
Class Lecturing, discussion, simulation and practice

Target Participants
Network Engineer, Technical Staff, CTO

Pre-Requisites
Students attending this class must have fundamental electrical and telecommunication knowledge and one year on the-job cellular telecommunication experience.

Competence to be develop
• Understand the concepts of Big Data and Predictive Analytics
• Understand Hadoop storage, map reduce platform and its utilities
• Configuring Hadoop Cluster.
• Setting up, developing and configuring Hadoop, Map Reduce
Introduction + Advance 3G WCDMA
Introduction & Advance 3G
WDMA

Goal
This training suitable for drivetest engineer, drivetest analyst, OSS engineer, RF engineer and junior PLO engineer who want to know deep understanding about optimization activity and technique. Detail process to formulated Key Performance Indicator, the differences between vendor, and how to achieve that KPI are explained in this training.

Training Objectives
At the end of this workshop, participant will be able to:
- Understand about Key Performance Indicator (KPI)
- Understand KPI Formula Mapping
- Participants know how to calculate Quality Of Service (QoS)
- Participants understand and know about Message Flow
- Understand about Performance Counter
- Participants understand and know about Optimization Flow and Optimization Parameter
- Understand and know about Parameter Mapping
Introduction & Advance 3G WDMA

Training Duration: 2 Days

Subject Covered

- Key Performance Indicator (KPI)
- KPI Formula Mapping
- Performance Indicator
- QoS (Quality of Service)
- Message Flow
- Performance Counter
- Optimization Flow
- Optimization Parameter
- Parameter Mapping
Introduction & Advance 3G WDMA

Training Methods
Class Lecturing, discussion, simulation and practice

Target Participants
Network Engineer, Technical Staff, CTO

Pre-Requisites
Students attending this class must have fundamental electrical and telecommunication knowledge and one year on the-job cellular telecommunication experience.
Pre-Requisites Training: RF Fundamental, 3G Drivetest

Competence to be develop
• Understand about Key Performance Indicator (KPI)
• Understand KPI Formula Mapping
• Participants know how to calculate Quality Of Service (QoS)
• Participants understand and know about Message Flow
• Understand about Performance Counter
• Participants understand and know about Optimization Flow and Optimization Parameter
• Understand and know about Parameter Mapping
Introduction + Advance LTE
Goal
This training presents difference between 2G, 3G and 4G, network architecture in LTE 4G and concept about OFDMA and SC-FDMA. In planning session it will explained about coverage and capacity planning depends on your LTE RF deployment criteria. In Optimization session it will presents about RF Configuration Parameters, Drivetest in LTE, Key Performance Indicator and Self Optimization Networks.

Training Objectives
At the end of this workshop, participant will be able to:
• Define the difference between 2G, 3G and 4G.
• Understand the network architecture in LTE 4G
• Understand the concept of OFDMA and SC-FDMA
• Calculate the data rate on the LTE network in a variety of network configurations
• Understand planning on 4G LTE network coverage
• Understand the planning capacity on its 4G LTE network
• Able to grasp the concept of deployment in future 4G networks.
• Understand the configuration of RF parameters on LTE network
• Understand Drivetest measurement and analysis of the LTE network coverage
• Understand Key Performance Indicators on LTE network
• Understand the features LTE network
Introduction & Advance LTE

Training Duration : 3 Days

Subject Covered:
Radio Cellular Technology
- Radio Cellular Technology
- Network Architecture
- Cellular Frequency Allocation

OFDMA
- OFDM and OFDMA
- LTE Downlink
- OFDMA time-frequency multiplexing
- LTE Spectrum Flexibility
- LTE Frame Structure type 1 (FDD), downlink
- LTE Frame Structure type 2 (TDD)

SC-FDMA
- Introduction to SC-FDMA and UL Frame Structure
- How to generate SC-FDMA?
- How does SC-FDMA signal look like?
- SC-FDMA Signal Generation
- SC-FDMA PAPR
- SC-FDMA Parameterization

Peak Capacity of LTE
- MIMO Antenna
- Review On Data Rate
- Overhead
- Overhead Estimation (2 x 2)
- Overhead Estimation (4 x 4)
Introduction & Advance LTE

Subject Covered:
RF Configuration Parameters
- PCI Planning
- PRACH Planning

RF Operational Parameters
- Cell Search Parameter
- Handover in LTE networks
- Power Control Overview

Drivetest and Coverage Analysis
- TD-LTE & FD-LTE
- Reference Signal Received Power (RSRP)
- Signal to Noise & Interference Ratio (SINR)

KPI in LTE Network
- Accessibility, Retainability & Mobility

LTE Feature Performance
- Beamforming
- IRC
- Comparison Static ICIC and Dynamic ICIC
- Self Optimization Network : AMR
- Self Optimization Network : CSFB
Introduction & Advance LTE

Training Methods
Class Lecturing, discussion, simulation and practice

Target Participants
Network Engineer, Technical Staff, CTO

Pre-Requisites
Students attending this class must have fundamental electrical and telecommunication knowledge and one year on the-job cellular telecommunication experience.

Pre-Requisites Training: RF Fundamental, 4G Drivetest

Competence to be develop
• Define the difference between 2G, 3G and 4G.
• Understand the network architecture in LTE 4G
• Understand the concept of OFDMA and SC-FDMA
• Calculate the data rate on the LTE network in a variety of network configurations
• Understand planning on 4G LTE network coverage
• Understand the planning capacity on its 4G LTE network
• Able to grasp the concept of deployment in future 4G networks.
• Understand the configuration of RF parameters on LTE network
• Understand Drivetest measurement and analysis of the LTE network coverage
• Understand Key Performance Indicators on LTE network
• Understand the features LTE network
RF Fundamental
RF Fundamental

Goal
This training explain basic principles of Radio Frequency, From mathematics equation to Application. It will also explain detail concept about link budgeting, antenna systems, digital modulation and also multiple access.

Training Objectives
At the end of this workshop, participant will be able to:
• Understand basic principles of RF
• Understand Basic Mathematics for Telecommunication Engineer
• Able to calculate link budget
• Understand the concept about Digital Modulation
• Understand the concept of Antenna
• Understand the concept of Multiple Access
RF Fundamental

Training Duration : 2 Days

Subject Covered :

RF Fundamental Knowledge
- Basic Mathematics for Telecommunication Engineer
- Frequency and Wavelength
- Radio Propagation
- dBm Review
- Link Budgeting
- Indoor Link Budgeting
- Antenna Systems
- Digital Modulation
- Multiple Access :
  - FDMA & TDMA
  - CDMA
  - OFDM

Radio Cellular Planning
- Cellular System Planning Cycle
- Planning Objectives
- Traffic Forecasting
- Coverage Threshold
- Site Configuration

Coverage Planning
- UL Link Budget & Parameters
- DL Link Budget & Parameters
- Propagation Model
- Cell Radius
- Nominal Planning

Capacity Planning
- Number of user
- User density
- Services and type
- Penetration : building, vehicular, pedestrian
- BHCA and call duration
- OBQ
- Site calculation

Deployment Planning
- Design Criteria
- RF Design - RAN
- Core Design
- LTE Deployment Scenario
**RF Fundamental**

**Training Methods**
Class Lecturing, discussion and simulation

**Target Participants**
Network Engineer, Technical Staff, CTO

**Pre-Requisites**
Students attending this class must have fundamental electrical and telecommunication knowledge and one year on the-job cellular telecommunication experience.

**Competence to be develop**
- Basic principles of RF
- Basic Mathematics for Telecommunication Engineer
- Calculating link budget
- The concept about Digital Modulation
- The concept of Antenna
- The concept of Multiple Access
RAN (Radio Access Network) Fundamental
RAN (Radio Access Network) Fundamental

Goal
In 2G RF session this training explain differences between GSM, GPRS and EDGE. In 3G RF session this training explain about scrambling code, spreading code and HSDPA. In 4G RF session this training explain about OFDMA and SC-FDMA, key radio access in 4G and also differences between LTE TDD and LTE FDD. This training also presents 2G/3G/4G technology architecture and frequency allocation in general.

Training Objectives
At the end of this workshop, participant will be able to:
• Participants understand differences between 2G/3G/4G Architecture & Hardware.
• Participants understand differences frequency allocation in 2G/3G/4G.
• Participants understand differences between 2G/3G/4G Channel (Logical, Transport and Physical Channel).
• Participants understand differences Multiple Access and Modulation in 2G/3G/4G.
RAN (Radio Access Network) Fundamental

Training Duration : 2 Days

Subject Covered

Radio Access Network
- 2G/3G/4G Architecture & Hardware
- 2G/3G/4G Frequency Allocation
- 2G/3G/4G Channel (Logical, Transport and Physical Channel)
- Multiple Access in 2G/3G/4G
- Modulation in 2G/3G/4G

2G Session
- GSM Technology
- GPRS
- EDGE

3G Session
- WCDMA Technology
- Spreading Code & Scrambling Code
- HSDPA

4G Session
- LTE TDD and LTE FDD
- OFDMA
- SC-FDMA
- MIMO
RAN (Radio Access Network) Fundamental

Training Methods
Class Lecturing, discussion, simulation, and practice

Target Participants
Network Engineer, Technical Staff, CTO

Pre-Requisites
Students attending this class must have fundamental electrical and telecommunication knowledge and one year on the-job cellular telecommunication experience.

Competence to be develop
• Participants understand differences between 2G/3G/4G Architecture & Hardware.
• Participants understand differences frequency allocation in 2G/3G/4G.
• Participants understand differences between 2G/3G/4G Channel (Logical, Transport and Physical Channel).
• Participants understand differences Multiple Access and Modulation in 2G/3G/4G.
Project Management In Network Deployment
Goal

**Define basic Project Management terminology**
Review for project management common terminology, these are to enable project manager to understand common terminology when dealing with projects, making report and project management process especially when the customer are such corporate who already implemented project management knowledge in their business process.

**List of parts of a project and how those parts fit together**
After familiar with the terminology, project manager should know what are the component and steps in project management. The outcome of the project shall in line with common project management knowledge.

**Explain the role of the Project Manager**
Step of when and where and how the project manager should lead, decide or collaborate with stakeholder.
Outline the dimensions of project success.
Discussion of what define the success of the projects and what should be recorded from the success and fail of the project as reference for the future.

**Outline the process used to plan and manage the project**
The outline of process according to the project management knowledge, this include on how to start each process and transition from one process to another and how to manage it.
Project Management in Network Deployment

Training Objectives
At the end of this workshop, participant will be able to:
- Define basic Project Management terminology
- List the parts of a project and how those parts fit together
- Explain the role of the Project Manager
- Outline the dimensions of project success
- Outlined the process used to plan and manage a project
Project Management in Network Deployment

Training Duration : 2 Days

Subject Covered :
- Project Overview
- Project Objectives
- Project Initiation
- Project Planning
- Project Scope Region
  - Project Scope of Work
  - Project Organizations
  - Project Resources Estimation
  - Task and Responsibilities of the Project Management Team
  - Project Responsibility Matrix
- Work Breakdown Structure Project
  - Procurement of Network Element
  - Procurement of Local Installation Material
  - Planning and Network Design
  - Site Survey
  - Site Engineering
  - Logistics
  - Installation & Commissioning
- Project Execution
- Supervision and Project Control
- Project Closure
Project Management in Network Deployment

Training Methods
Class Lecturing, discussion, simulation and practice

Target Participants
Team Leader, Project Manager

Pre-Requisites
Students attending this class must have one year experience in project management

Competence to be develop
• Define basic Project Management terminology
• List the parts of a project and how those parts fit together
• Explain the role of the Project Manager
• Outline the dimensions of project success
• Outlined the process used to plan and manage a project
Risk Management In Network Deployment Project
**Goal**

In this training will be explained in detail how to identify risks, define risk mitigation plan, and response strategies through risk treatment of the risk factors that become the source of delays in a cellular network deployment project.

**Training Objectives**

At the end of this workshop, participant will be able to:

- Identify Risks in Network Deployment Project
- Identify Risks Occurrence in Network Deployment Project
- Define Risks Mitigation Plan in Network Deployment Project
- Perform Risk Mitigation Plan and Strategic Response in Network Deployment Project
Risk Management in Network Deployment Project

Training Duration : 2 Days

Subject Covered :
- Risk Management Planning in Network Deployment Project
- Total Risk Occurrence in Project
- Identification of Risk Factors in Project
- Risk Mapping Based on Project Execution Phases
- Classification of Risk Factors in Project
- Description of Project Risk Factors
  ✓ Risk in Operations
  ✓ Risk in Engineering
  ✓ Risk in Procurement and Contracts
  ✓ Social Risk and Community Risk
  ✓ Risk in Law and Regulation
Risk Management in Network Deployment Project

Training Duration: 2 Days

**Subject Covered:**

- Percentage of Risk Contributions in Project Delays
- Probability Levels in Project Risk
- Level Impact in Project Risk
- Matrix of Critical Level in Project Risk
- Qualitative Analysis in Project Risk
  - Risk Factors in High Critical Level (H)
  - Risk Factors in Medium Critical Level (M)
  - Risk Factors in Low Critical Level (L)
- Risk Mitigation Plan and Strategic Response
  - Mitigation Plan and Strategic Response to Avoid Risk
  - Mitigation Plan and Strategic Response to Transferring Risk
  - Mitigation Plan and Strategic Response to Control Risk
  - Mitigation Plan and Strategic Response to Accept Risk
- Mitigation Plan for Reputation Risk
Risk Management in Network Deployment Project

Training Methods
Class Lecturing, discussion, simulation, and practice

Target Participants
Team Leader, Project Manager

Pre-Requisites
Students attending this class must have two years of experience in project management.
Pre-Requisites Training: Project Management in Network Deployment

Competence to be developed
- Identify Risks in Network Deployment Project
- Identify Risks Occurrence in Network Deployment Project
- Define Risks Mitigation Plan in Network Deployment Project
- Perform Risk Mitigation Plan and Strategic Response in Network Deployment Project
4G VoLTE BUSINESS & TECHNOLOGY PERSPECTIVE

Training Duration: 2 Days

TARGET AUDIENCE
People who has an access to daily cellular telecommunication business

PREREQUISITES
Students attending this class must have experience in telecommunication knowledge and business.

COURSE OUTLINE
In business perspective the purpose of this training is to present an understanding of the telecommunications business, and how to change the paradigm so that telecom operators not only retain on the network business but also maximize the utilization of telecommunications network by taking control on digital business. In technical perspective this programme will cover all aspect of IMS and its capabilities in respect of delivering voice services via the LTE network. The crucial elements of LTE architecture, bearers and QoS are outlined as well the structure and protocol of the IMS. The course participant will learn about the identities and configurations required for the UE and LTE core and IMS in order to provision the LTE voice service. CS Fallback is an important interim service and this programme will discuss the network requirements to support the fallback solution in both the UE procedure and core network. Interworking between IMS voice and CS voice and various mobility scenarios will also be covered.
OBJECTIVES
Participants will develop or be able to:

- Structure Telecommunication Industry in Indonesia
- Participants able to create Business Model
- An overall comprehension of all strategic and technical issues concerning the implementation of voice over LTE
- Contribute much more effectively to strategic discussions related to the deployment of voice services within LTE
- Evaluate implementation options for VoLTE and CS Fallback solutions
- Fully understand the LTE and IMS signalling procedures for a variety of call scenarios
- Fully understand the QoS and bearer implications for VoLTE
- An understanding of VoLTE performance and capacity
- Confidence to discuss potential issues regarding VoLTE, CSFB implementation
- Make decisions on technology implementation and procurement that are commercially viable, minimise risk, and in line with the strategy and goals of the wider organization
# 4G VoLTE BUSINESS & TECHNOLOGY PERSPECTIVE

<table>
<thead>
<tr>
<th>Session 1: Telecommunication Industry Overview</th>
<th>Session 2: Introduction to VoLTE (Voice over LTE)</th>
<th>Session 3: Business Model Generation</th>
<th>Session 4: Business Model Assessment</th>
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<tbody>
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<td>• Industry Timeline</td>
<td>• What is LTE?</td>
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**Session 1: Telecommunication Industry Overview**
- Industry Timeline
- Subscriber in number
- Revenue in number
- BTS in number
- Cellular Frequency Allocation

**Session 2: Introduction to VoLTE (Voice over LTE)**
- What is LTE?
- Telco Network Evolution - IMS Intro
- Signaling, Transport and Service Evolution
- The Future ALL IP
- Voice Over LTE service
- Native VoLTE and RCS

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- Customer Segments
- Customer Relationships
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- Key Activities
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- Key Partners
- Revenue Streams
- Cost Structure

**Session 4: Business Model Assessment**
- Business Model Assessment
# 4G VoLTE BUSINESS & TECHNOLOGY PERSPECTIVE

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<th>Session 5: Introduction to Digital Business A Paradigm Shift for Telecommunication Operators</th>
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<td>- E-commerce/Marketplace</td>
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<th>Session 6: Creating Digital Business Model</th>
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<td>- Creating Digital Business Model for Sampoerna Telekom</td>
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<th>Session 9: Circuit Switch Fall Back (CSFB) Solution</th>
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<td>- Handover between 4G LTE to 3G/2G</td>
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<td>- Circuit Switch Fall Back (CSFB) Solution</td>
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<tr>
<td>- Introduction SGs interface</td>
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<tr>
<td>- How CSFB works? CSFB Voice Flow</td>
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<td>- CSFB with data continuity</td>
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<td>- SMS over SGs Interface</td>
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Session 10 : Single Radio Voice Continuity Call (SRVCC)

- Single Radio Voice Continuity Call (SRVCC) for VoLTE Mobility
- SRVCC Handover for Voice from LTE to 2G/3G CS - Step by Step
- About STN - SR
- Enhanced Single Radio Voice Continuity Call (eSRVCC) for VoLTE Mobility
- eSRVCC Handover Voice from LTE to 2G/3G CS - Step by step
- About ATCF and ATGW
Thank You

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