Outline

Introduction

Experience and Proficiencies

Services Packages

Services Packages Details

Success Stories

Delivered Projects
VSSE Telecom Services, at the core of Vodafone Group

Vodafone Group
- 30 years old Multinational with HQ in UK with footprint in 70 countries
- World’s largest Mobile Telecommunication company by revenue (£44.2 B) and 2nd largest by subscribers (404 M)
- Most Valuable Telecom Brand in the world

Vodafone Shared Services Egypt (VSSE)
- Fully owned, operated and controlled by Vodafone Group
- operating out of India, Egypt, Hungary and Romania

Vodafone Shared Services
- VSS group centers work on reducing costs as well as delivering better unified services across Vodafone Local & partner markets

Access Networks Team
- 12 years Consultancy Heritage
- Vendor Agnostic Consultancy Centre
- A complete development life cycle
- Wide technologies experience on 2G/3G/4G with Multi-vendors platforms equipped with Vodafone best practices and Vodafone radio tools

Network Development
- Experienced team dedicated to arm the telecom operators with the required access, core, M2M resources and services
We are part of Vodafone Shared Services
12 years serving the world

17,000 Employees
80 Countries
13 Languages
5M Transactions
150+ Enterprises
50+ P&S
40M Customers
20% Process Efficiency
VSS Products & Services Portfolio

We Empower our Partners in a Challenging Global Climate through offering End-to-end integrated Services

**Customer Care Services**
Delivering the best customer experience

**Technology Services**
Utilizing Vodafone’s Global capabilities to best serve Enterprise customers across the globe

**Finance & Accounting Services**
Maximizing the finance operations efficiencies through a global view on your organization

**HR Services**
Availing consistent employee experience for the best development of your teams

**Supply Chain Services**
Granting the best return on your investment through global SCN deals

**Enterprise Services**
Utilizing Vodafone’s Global capabilities to best serve Enterprise customers across the globe

**BI, Research & Campaigns Management**
Creating value & new revenue streams from advanced data analysis, BI & research, and campaign mgmt.
VSSE - 12 Years Serving the World

3500 Employees
Highly motivated technically & professionally certified agents

100 Enterprise
Customers served by VSSE as their global partner of choice

30M Customers
Global customers access our value added services

50+ P&S
Rich portfolio of CC, IT, Training & Consultancy, and BI & Research Solutions

11 Languages
Multilingual workforce with neutral accent

80 Countries
Serving enterprise customers in more than 80 countries worldwide

2.5M Transactions
Calls & transactions processed monthly by the VSSE teams
VSSE E2E Services Cater for all Telecom Operators’ Needs

VAS
- Balance Transfer
- Promotion Engine
- LBS
- M2M
- Int. Roaming
- SDP

BSS
- Billing
- CRM
- Unified Communications
- Convergence
- Charging

Core
- Planning
- Optimization
- Acceptance
- Integration

OSS
- Integration
- Mediation
- Reporting
- Assurance
- Fulfillment

Access Networks
- Planning
- Optimization
- Acceptance
- Automation
- Dimensioning

1st Level Operations
- 2nd Level Operations
- Monitoring
- Hosting

Products/Innovation
Partners
Quality Assurance
Demand/Project Management/
Productization/Tooling/Automation

Business Intelligence
Enterprise Applications
VSSE End-to-End Access Networks Services

Radio Services
E2E handling of wireless resources responsible for managing communication between Mobile users and RAN nodes

Transmission Services
E2E handling of transmission resources responsible for communication between RAN nodes & communication with Core network elements

Material Planning
E2E handling of different RAN & Transmission nodes from power, HW and materials point of view covering the 3 main phases of “planning, acceptance and optimization”
VSSE Access Networks Services are Empowered by

**Academic Connections**
Investing in having on-going academic connections with different well-known universities to have full access to what so ever new in the telecom industry and getting up-to-the-minute information derived from Graduation projects and post graduate studies.

**12 years Consultancy Heritage**
A robust CRM & governance model including insightful reporting & monitoring techniques to facilitate decision making.

**Telecom Operator DNA**
Owing a variety of best practices derived from 15 years of experience – working with Vodafone Egypt – which is the outcome of wide exposure to the latest technologies in the markets.

**Diversity of Experience**
Relying on our calibers who have telecom background acquired from working with different operators and armed with excellent research & development capabilities.
Experience and Proficiencies
Having Deep Extensive with Various Optimization Vendors
Having the Know-how of Handling Widely Used Planning & Optimization Tools

Owned Licenses

Customer License

Open License
Certificates & Trainings

Our planning team members are 100% iBwave Certified (levels 1 & 2) and are regular attendees for LTE optimization workshops

Non-Technical Certificates

• MBA
• PMP

Technical Certificates

• iBwave (Level1)
• iBwave (Level2)

Courses and Trainings

Amphigean and Wray Castle Training Centers

• LTE RF Optimization Workshop – Coverage and Accessibility
• LTE RF Optimization - Mobility & Inter-RAT
• LTE Air Interface
• UTRAN Network Technologies
• HSPA+ Optimization Workshop
• 3G Mobility Parameterization
Where we offered our services Worldwide...

5 Continents | 13 Countries
Access Network Services

- UMTS 900
- Global Audits & Recommendations (2G/3G)
- Capacity Dimensioning (2G/3G)
- Automatic Frequency/Scrambling Codes
- VoLTE

- Log-files Analysis & Benchmarking
- Small Cells (outdoor)
- In building design
- Outdoor Radio Planning
- Antenna Portfolio Management
- Pre-Launch optimization
- Physical Audits & area re-engineering
- Cell Level Optimization
- Feature Activation & Validation
- RAN Acceptance
- RAN SWAP

- Customized Services
- Customized Radio Tools

- Technology based
- Technology independent
- Customized
End-to-End Access Network Services

Cell Level Optimization
In individual cases, parameters’ values adjustment is done in both idle and connected modes aiming to enhance network performance KPIs.

Capacity Dimensioning
Perform capacity dimensioning audits for interfaces and hardware capabilities covering BSCs/RNCs (transcoders, different interfaces, processor load and boards utilization), radio resources (TRX, codes, channel elements and power utilization) and signaling channels to accommodate traffic forecast or enhance current network congestion related KPIs.

In Building Design
Provide the required technology (2G, 3G, 4G-LTE & Wi-Fi) coverage for any building type (residential, shopping, stadiums…etc.) with the needed capacity using iBwave.

Antenna Portfolio Management
- Prepare a full portfolio (Regular – Special) of antennas needed based on the operator needs / requirements.
- Perform testing/acceptance processes for new antennas for any technology/vendors (including labs & factories)

UMTS 900
Handle the end-to-end/individual U900 deployment project (extract potential areas for U900 deployment, HW strategy/rollout, re-farming & 2G/3G legacy optimization)

Automatic Frequency Planning
- Optimize the frequency allocation over 2G networks ensuring minimal interference due to co-channel allocation and adjacent-channel allocation
- This service improves the 2G KPIs (HOSR, DCR), enables band re-farming for introducing new technologies and global change in radio configurations due to global traffic steering strategy
End-to-End Access Network Services

Physical Audits & area re-engineering
• Coverage Assessment to identify the weak coverage spots using Atoll Predictions, Coverage complaints Locations and Drive Test Assessments
• Propose planning actions to enhance coverage, quality and capacity of the network

Global Audits & Recommendations
On a cluster/networks level, provide wide ranges of audits covering the main KPIs in-addition to new recommended features activation

RAN Swap
RAN Swap mapping (main KPIs, power and basic parameters), preparation work-orders and license agreement and performance acceptance based on KPIs and field measurements

Outdoor Radio planning
• Radio planning activities including Master plan design, coverage and capacity dimensioning, new sites validation and physical design
• Site creation including integration phase, neighbor planning, frequency planning and scrambling code planning, new site acceptance and fine tuning.
• Outdoor radio planning tools are also supported (Atoll, Optimi, Google Earth, MapInfo, TEMS Discovery, TEMS Investigation)

Pre-Launch Optimization
Set initial parameters on site/cell levels followed by checking/troubleshooting its functionality ending with performance optimization to achieve target KPIs for node acceptance
End-to-End Access Network Services

Log-file analysis and Benchmarking
- Complete analysis for field measurements including coverage and quality and suspected HW problems to detect network problems from UE side
- Detailed troubleshooting for KPIs problems during drive test including failures and drops
- Optimization studies using the provided field measurements like missing neighbors detection, pilot pollution, overshoot. .. etc.
- Analysis for benchmarking drive test like swap, upgrades, migration, and parameter/feature trials in addition to comparison among operators

Feature Activation services
- Complete assessment/audit of the features (such as capacity, quality, power saving ...) and providing best-practice recommendations for the related parameters.
- The service package also includes the preparation of the needed CRs, following up on the implementation, and validating/assessing the network performance after activation

Customized Radio Tools
In a cooperation model between Radio experts and Product & Service development teams, many customized products and innovative tools over multi-vendors platforms were done and delivered to global customers touching all areas of efficiencies in terms of processes automation, quality & responsiveness improvement, time to market shortening, and cost reduction

RAN Acceptance
- Ensure that adopted parameters values/strategies are the deployed ones
- Detect any conflicting values between parameter
- Close monitoring and evaluation of different counters and KPIs to maintain network performance

Small Cells (outdoor)
Nomination for camouflaged outdoor small cells based on coverage gaps, capacity and performance issues
End-to-End Access Network Services

VoLTE
Voice over LTE (VoLTE) offers operators the chance to develop a richer suite of integrated services. Besides, VoLTE is a crucial step towards greater efficiency in the network, both in terms of spectrum management and the number of network technologies operators need to maintain through evolving voice services and improvement operators’ data service capability because it is more spectrally efficient than previous voice technologies, which will free up more bandwidth for non-voice services. VoLTE supports the wideband advanced multi-rate codecs that enable the next evolution of the phone call, HD Voice (HDV).

Finally, voice remains fundamental to Mobile Service Providers although users may be embracing data services; so to reduce costs as overall revenues flatten, VoLTE is needed. (Service package includes some preparation features in addition to VoIP capacity, coverage and quality improvement features.)
Ease of Doing Business

We have different flexible engagement models to suit your business

**Offshore:**
VSSE resources at VSSE premises & working overseas (long term projects)
**Charging:** Time & Material

**Hybrid:**
Traveling to Customer’s Premises when needed (all project types)
**Charging:** Hybrid (based on Travel Duration)

**Onsite:**
VSSE resources at the Customer’s Premises (short term projects up to 3 months, extendable)
**Charging:** Resource Daily Rate

**Engagement:**
Upon Governance agreement
Services Packages Details
In Building Design

Provide the required technology (2G, 3G, 4G-LTE & Wi-Fi) coverage for any building type (residential, shopping, stadiums...etc.) with the needed capacity

1 Inputs and requirements
- Customer complaints (Coverage-Capacity)
- CADs of the building reception and filtration
- CADS validation and macroscopic site visit
- Radio KPIs from operators

2 Site Visits and building modelling
- Detailed Site Visit and limitations
- Existing coverage assessment
- CWT (wall losses)
- 3D building Modelling (iBwave)
- CWT for propagation model tuning (iBwave + Walk test)

3 IBS Design
- Limiting technology determination
- 2G – 3G sectorization and capacity assessment
- Design the IBS solution with best practices (iBwave)
- Design Validation and tuning (Site Survey)
- Operators and partner approval

4 Testing and Optimization
- Implementation Guidelines.
- Design documentation and reporting.
- Post-install testing and optimization.
Small Cells (Outdoor)

Nomination for camouflaged outdoor small cells based on coverage gaps, capacity and performance issues

1. **Area Selection**

- Based on both Statistical and field KPIs, needed small cells are identified for one of mix of the below:
  - **Coverage Gaps**: a problematic area where no new Marco site can be deployed
  - **Capacity Issues**: congested areas suffering from capacity with no enough site to site distance to deploy new Marco site
  - **Performance Issues**: areas that served from more than site with no single dominant

2. **Validation**

- **Nominal Location**: based on planning tools like Atoll
- **Option Assessment**: field assessment for the nominated location to ensure the deployment targets
- **Hardware Design**: Site HW (cabinet, antennas and cables) selection from the available vendor catalogue Including all physical parameters (azimuth, height and tilt).

3. **Site Creation**

- Accurate frequency plan for GSM technology case and Scrambling codes plan for UMTS technology
- Neighbor Definition based on planning tools

4. **Optimization**

- **Pre-Launch Optimization**: initial parameters definition to ensure the required deployment purpose
- **Post-Launch Field assessment**: to ensure the site performance
- **Post-launch KPIs monitoring** and parameters fine tuning.
Capacity Dimensioning

Perform capacity dimensioning audits for interfaces and hardware capabilities covering BSCs/RNCs (transcoders, different interfaces, processor load and boards utilization), radio resources (TRX, codes, channel elements and power utilization) and signaling channels to accommodate traffic forecast or enhance current network congestion related KPIs.
Antenna Portfolio Management

Taking the end-to-end responsibility of Antenna management after detailed analysis for the operators’ needs and requirements

1. Vendor Selection
   - Customer needs analysis
   - Selection criteria
   - Vendor Selection
   - Antenna Selection
   - Datasheet Analysis

2. Field Test
   - Site Selection
   - Drive Test KPIs Analysis (Before antenna change)
   - Counters KPIs Analysis (Before antenna change)
   - Antenna Deployment
   - Drive Test KPIs Analysis (After antenna change)
   - Counters KPIs Analysis (After antenna change)

3. Lab Test
   - Far field KPIs checks
   - Near field KPIs checks
   - Bench Test
   - Range Test
# Universal Mobile Telecommunications System (UMTS) 900

Handle the end-to-end/individual U900 deployment project (extract potential areas for U900 deployment, HW strategy/rollout, re-farming & 2G/3G legacy optimization)

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<th>Strategy-Site Selection and HW</th>
<th>10 Working Days</th>
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<tr>
<td>-</td>
<td>Identify potential areas for U900 deployment based on the capacity, coverage, VIP &amp; area clutter</td>
<td></td>
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<tr>
<td>-</td>
<td>Revise HW Design strategy (Modules, Antennas, Radio Units...) based on the network component and warehouse availability in accordance with best practice implementations</td>
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<th>Strategy-2G Optimization Best Practice</th>
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<td>Traffic steering Strategy</td>
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<td>Neighbor strategy</td>
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<td>-</td>
<td>Related best practice features and parameters</td>
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<td>Automatic Frequency Plan for frequency tuning and new band clearance</td>
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<th>5</th>
<th>Implementation Governance – Local Team Support</th>
<th>20 Working Days</th>
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<tr>
<td>-</td>
<td>Communicate Checklist</td>
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<tr>
<td>-</td>
<td>Support Local team for smooth U9 introduction starting from troubleshooting pre-launch and post-launch performance while implementing the communicated process and checklist</td>
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</table>
Automatic Frequency Planning (AFP) / Scrambling Codes Planning

Optimize the frequency allocation over 2G networks ensuring minimal interference due to co-channel allocation and adjacent-channel allocation. The optimization results in improving the 2G KPIs (HOSR, DCR), band re-farming for introducing new technologies and global change in radio configurations due to global traffic steering strategy. Detection and correction of PSC clashes help improve network performance in terms of drops and failures, clashes are detected either geographically or redundancy in Nth tier neighbors, to be rectified using farthest distance SC considering SC reuse over the network.)

**1 Optimi AFP Preparations**
- Identifying the cluster and its borders
- Neighbor Cleanup
- 2G Utilization Study

**2 AFP Project Kickoff**
- Import Physical Data
- Import Network Data
- Consistency Checks
- Run BSIC Plan and Implement it

**3 System Recordings and Measurements**
- Freeze 2G Network
- Start Recordings and Measurements
- Import MRR Recordings and Mapping Files
- Generate Interference Matrix
- Generate and Import QoS for IM validation
- Generate and Import HO and Traffic Statistics

**4 Cost Scenarios Design and Running Frequency Optimizer**
- Design cost scenario
- Run the Optimi optimizer (BCCH, TCH and BSIO)
- Assess the optimizer output
- Export AFP
- Fine tuning and Scripts for external definitions
- Run scripts and AFP deployment

**5 AFP Acceptance**
- Acceptance Based on DT logs
- KPIs monitoring
Pre-Launch (2G, 3G & 4G-LTE)

Set initial parameters on site/cell levels followed by checking/troubleshooting its functionality ending with performance optimization to achieve target KPIs for node acceptance.

1. Layering Strategy
   - Idle Mode strategy
   - Traffic steering Strategy
   - Neighbour strategy
   - Related best practice features and parameters

2. Clusters definition & KPI Targets Agreement
   - Create reporting templates and KPIs for field and Network stats acceptance
   - Define area clusters and DT route
   - Site Database creation

3. Pre-Launch Optimization Activities
   - Setting pre-launch parameters
   - Troubleshooting configuration and site functionality
   - Field/Network KPIs Analysis and Reporting
   - Physical Parameters Optimization
   - Site/cluster optimization until launch

4. Vendor Management
   - Auditing Site/cluster Acceptance process
   - Accepting new sites and clusters
Global Parameters Audit & Recommendation

On a cluster/networks level, provide wide ranges of audits covering the main KPIs in-addition to new recommended features activation

<table>
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<tr>
<th>Parameters Audit</th>
<th>Mobility Audits</th>
<th>Lab Test</th>
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</table>
| • 2G BSC Parameter Audit  
• 2G Cell Parameter Audit  
• 3G RNC Parameter Audit  
• 3G NodeB Parameter Audit  
• 3G Cell Parameter Audit | • External Definition audit  
• Neighbor Clean-up based on requests and distance  
• Relation-level parameter audit  
• Uni-directional relation audit  
• Co-site missing relations audit | • 2G HW Configuration based on RRU/RFU capabilities, TRX Configuration, RAN Sharing and activated features  
• Locked TRXs based on congestion and utilization  
• 3G HW Configuration for BBP vs. CE License and Base-Band Resource Groups configuration  
• 3G HW Configuration for RRU vs. power settings considering RRU capabilities, RAB sharing and number of carriers per board  
• NE License audit vs. available resources and activated features |

15 WORKING DAYS  
15 WORKING DAYS  
15 WORKING DAYS
Outdoor Radio Planning

Radio planning activities include Master plan design, coverage and capacity dimensioning, new sites validation and physical design, site creation including integration phase, neighbor planning, frequency planning and scrambling code planning, new site acceptance and fine tuning. Outdoor radio planning tools are also supported (Atoll, Optimi, Google Earth, MapInfo, TEMS Discovery, TEMS Investigation)

1. **Atoll**
   - Atoll Update (Physical data/ Network data)
   - Running coverage predictions
   - Creation of (new sites/new expansions)
   - Neighbour Planning
   - Frequency, BSIC and Scrambling Code Planning
   - Population coverage Maps
   - Traffic Maps
   - Atoll Administration

2. **Radio Planning Activities**
   - New Site Validation & (Structure/HW) Design
   - New Site Creations, Expansions Creations
   - Swap Creations and Assessment
   - Concentric to Dual Band Conversion and Vice Versa
   - Coverage DT analysis, assessment and benchmarking
   - Physical Actions Recommendations
   - Site Modernization
   - New Sites Assessment
   - Customer Complaints

3. **Master Planning and Dimensioning**
   - Master Plan Generation based on Coverage and Capacity Dimensioning
   - Note: This working days number (in all phases) is subject to cluster size and services required
Cell Level Optimization

In individual cases, parameters’ values adjustment is done in both idle and connected modes aiming to enhance network performance KPIs

1. Retain-ability
   - Identify main KPI counters used in the formula
   - Locate top degraded cells geographically
   - Check alarms and HW/TX problems
   - Check Availability and Traffic behaviour
   - Check BSC/RNC trend
   - Take cell-level optimization action according to case
   - Make DT to check the field performance if needed

2. Accessibility
   - Identify main KPI counters used in the formula
   - Locate top degraded cells geographically
   - Check alarms and HW/TX problems
   - Check Availability and Traffic behaviour
   - Check BSC/RNC trend
   - Take cell-level optimization action according to case
   - Make DT to check the field performance if needed

3. Mobility
   - Identify main KPI counters used in the formula
   - Locate top degraded cells geographically
   - Check alarms and HW/TX problems
   - Check Availability and Traffic behaviour
   - Check BSC/RNC trend
   - Take cell-level optimization action according to case
   - Make DT to check the field performance if needed
Physical Audits & Area Re-engineering

Conducting coverage assessment and identifying the weak coverage spots using Atoll predictions, coverage complaints locations and drive test assessments resulting in proposing the planning actions to enhance the coverage and capacity of the network

1 Adding new sectors to live sites

- Master plan renovation (adding new nominal locations, shifting existing nominal locations, removing nominal locations)

2 Performing physical changes to live sites (Re-azimuth, Tilts, Heights, …)

- Live sites assessment in terms of coverage & capacity to propose new capacity needed nominal locations/dismantling un-needed sites
- Requesting Expansions on live sites (2G/3G)
- Determining blocked/shadowed sites and performing needed site-field surveys and proposing solutions to it
- Databases update for the newly planned MP and actions (Atoll/Remedy/NIM/…)

10 WORKING DAYS

10 WORKING DAYS
Log-file Analysis and Benchmarking

Conducting complete analysis for field measurements including coverage and quality to detect network problems from UE side. Detailed troubleshooting for KPIs problems during drive test including failures and drops. Optimization studies are carried out using the provided field measurements like missing neighbors detection, pilot pollution, overshooting... etc

1. **Network configuration & physical data exports**
   - Cell file and Mapinfo layer
   - Network configuration strategy detection

2. **Field Analysis**
   - Detailed troubleshooting for drops and failures
   - Coverage and Quality analysis for deteriorated areas

3. **Field Audit (optional)**
   - Optimization studies from field measurements like missing neighbours, pilot pollution, overshooting, etc.
Feature Activation and Validation

Complete assessment/audit of the existing features and proposing recommended ones to be implemented as per the defined need. The service also includes the preparation for the needed change requests, following-up on the implementation process, and validating/assessing the network performance after activation.

1. **Dump Extraction & Technical Analysis (Strategy)**
   - Dump extraction and analysis of all feature-related parameters or switches
   - Prerequisites evaluation for each feature and pre-activation actions identification

2. **Feature Preparation & Activation (Implementation)**
   - Feature activation execution procedures by means of change requests

3. **Feature Preparation & Validation (Implementation)**
   - Feature validation from relevant counters, drive test and network dump
   - Feature assessment based on KPIs benchmarking and field measurements when needed

4. **Feature Rollout (Implementation & Strategy)**
   - Rollout strategy based on the criteria of each feature
   - Feature rollout execution procedures by means of change requests
**VoLTE**

Complete assessment/audit of the existing features and proposing recommended ones to be implemented as per the defined need. The service also includes the preparation for the needed change requests, following-up on the implementation process, and validating/assessing the network performance after activation.

1. **Preparation Features***

   - LBFD-002017 DRX and LOFD-001105 Dynamic DRX “Tradeoff between VoIP performance and power saving”
   - LOFD-001078 E-UTRAN to UTRAN CS/PS Steering
   - LOFD-001033 CS Fallback to UTRAN (with PSHO) or GERAN
   - ICIC Features Package

2. **VoLTE-Related Features**

   (VoIP capacity, coverage and quality improvement)

   - LOFD-00101502 VoIP Dynamic Scheduling
     “When the VoIP services is not much, UE that moves at high speeds, camps on a cell with a low bandwidth or emergency calls”
   - LOFD-001016 VoIP Semi-persistent Scheduling
     “Guarantee system capacity and QoS requirement of VoIP service”
   - LOFD-001017 Robust Header Compression (ROHO) “Reduces IP header sizes and improves the voice coverage of edge users and user capacity when the capacity is limited”
   - LOFD-001048 TTI Bundling “To improve the cell edge VoIP user coverage”
   - LOFD-001022 SRVCC (Single Radio Voice Call Continuity) to UTRAN or LOFD-001023 SRVCC to GERAN
   - LOFD-001087 SRVCC Flexible Steering to UTRAN
   - UL RLC segmentation enhancement

3. **Mobility Management***

   - Intra-Frequency Handover
   - Inter-Frequency Handover
   - Inter-RAT Handover

4. **Admission and Congestion Control***

   - Load Monitoring
   - Admission Control
   - Load Control

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* Preparation Features Work-Package is customized based on customer need, network performance and features already deployed.
** VoIP over IMS ready, Interoperability with UTRAN (or GERAN) strategy and Network Elements support (like RNC Support), UE Support penetration and License Availability (for all features)
*** Features Work-Packages are not mandatory
Success Stories
Offering unique value proposition that is not offered by other vendors

LTE Antenna Portfolio Acceptance

Customer Requirements:
Vodafone Group wanted to carry out the Testing and acceptance procedures of Andrew LTE portfolio.

Service Provided:
VSSE team offered vendor agnostic technical testing and acceptance services for LTE Andrew antennas before introducing it to the different Vodafone local markets.

Customer Name:
Vodafone Group

Technology / Platform:
4G-LTE

Engagement Model:
Hybrid

Project Duration:
6 months
Smooth full in-building design for a residential building in Moscow

In-Building Design

Customer Name:
MTS

Technology / Platform:
- 2G, 3G and 4G-LTE

Tools:
- iBwave

Customer Requirements:
- MTS wanted to assure 2G, 3G and 4G-LTE readiness for a residential building in Moscow.

Service Provided:
Relying on Vodafone’s telecom DNA & experience formulated and tested over 12 years of excellence, VSSE team completed the in-building design for a residential building. Upon competition, the team provided a 2-day workshop to share the design & iBwave best practice with MTS participants from (Moscow) to ensure full service readiness and maintenance.

Engagement Model:
- Hybrid

Project Duration:
- 6 months
100% automation for VF Egypt manual cutover process using VSSE developed cutover tool resulting in 90% cost reduction and performance efficiency

Developing 2G Cutover Ericsson Tool

Customer Requirements:
- Vodafone Egypt requested to develop a tool that creates cutover scripts for BTS so that the TX mode is converted directly to Packet Abis instead of Abis TX mode conversion on old BSC then BTS migration to new BSC.

Customer Name: Vodafone Egypt
Technology / Platform:
- Ericsson OPS scripting

Service Provided:
VSSE team has developed a 2G cutover tool to fully automate the manual cutover process which resulted in 90% cost reduction and noticeably increased the performance efficiency.

Engagement Model:
- Off-shore

Project Duration:
- 3 Month
Operational efficiency resulting in up to 11% improvement in dropped call rate

2G Optimization Audits (2 main sites: Koln & Hamburg)

Customer Name: Vodafone Germany
Technology / Platform:
- 2G
Tools:
- TEMS Products, Actix

Service Provided:
VSSE team carried out 2G optimization audits for Koln & Hamburg. The optimization audits have optimized the operational efficiency and the overall network performance witnessed in the below results:
- 10% 2G DCR reduction in Koln.
- 11% 2G DCR reduction in Hamburg.
- Parameter & features inconsistencies clean-up & feature activations.
- 7 Optimization Proposals have been rolled out (out of 16 proposals) all over Germany.

Customer Requirements:
Vodafone Germany wanted to make 2G KPIs enhancements for 2 main sites; Koln & Hamburg.

Engagement Model:
- On-site

Project Duration:
- 3 months
Accelerating the site launching time by ~30%

2G, 3G and 4G-LTE Pre-Launch Optimization

Customer Name: Vodafone New Zealand

Technology / Platform:
- 2G/3G/4G-LTE over Nokia platform

Customer Requirements:
- Vodafone New Zealand wanted to shorten and accelerate the long time of the site launching cycle

Service Provided:
- VSSE team has made a thorough analysis and accordingly provided recommendations on how to accelerate the different pre-Launch optimization activities. The team also developed an in-house tool for automating the data processing activities saving a lot of the time and cost compared to the manual process. VSSE recommendations together with the in-house developed tool has resulted in accelerating the site launching time by ~30%.

Engagement Model:
- Onsite

Project Duration:
- 2 months
Acting as an extended arm for Vodafone Egypt while keeping the confidentiality of data & know-how within the Vodafone Group

2G/3G Field Optimization and KPI’s Monitoring

Customer Requirements:
Vodafone Egypt wanted to make Periodic auditing, hardware configuration checks, and KPIs monitoring while keeping the confidentiality of the information.

Customer Name:
Vodafone Egypt

Technology / Platform:
2G/3G over Huawei / Ericsson platform

Service Provided:
VSSE team acted as an extended arm for Vodafone Egypt in carrying out the Network performance tracking, field problems troubleshooting and network configuration consistency maintenance. The role of VSSE team was very crucial as it assured keeping the confidentiality of data and know-how inside Vodafone.

Engagement Model:
Hybrid

Project Duration:
12 months
40% operational efficiency in data & voice KPIs

3G Optimization Audits

Customer Name: Safaricom

Technology / Platform:
- 3G over Huawei platform

Tools:
- TEMS Products, Atoll

Customer Requirements:
- Safaricom wanted to enhance the 3G performance as a preparation for Local benchmark exam over Mombasa cluster

Service Provided:
VSSE team handled the end to end service based on Global parameter trial and carrying out capacity assessment, global audits, and field optimization. VSSE 3G optimization audits resulted in great enhancement in Network KPI’s, over 40% enhancement for most KPI’s was achieved which led to an edge in field measurements among other competitors.

Data field KPIs
- Safaricom has best mean throughput in both UL & DL by obvious margin from other competitors.
- Continuous 3G coverage during data sessions.
- Safaricom has achieved the lowest delay and 100% success rate in DL sessions

Voice field KPIs,
- 0% Call Drop Rate
- Realizing the best 3G penetration & the best voice quality

Engagement Model:
- Hybrid.

Project Duration:
- 2 months
Smooth full in-building design services for a complex structure building using VSSE best practices

In Building Design for The Grand Egyptian Museum

Customer Requirements:
- The Grand Egyptian Museum was lacking Macro 2G/3G sites coverage/Capacity inside all of its buildings located in the Giza region beside the pyramids. Vodafone Egypt sought the experience of VSSE team to carry out this strategic mission in such an important touristic place.

Customer Name:
Vodafone Egypt

Technology / Platform:
- 2G/3G in Building coverage

Tools:
- iBwave, TEMS Products

Service Provided:
Despite of the complex structure of the museum, VSSE team carried a smooth full in-building design for the GEM to support the coverage and capacity of 2G and 3G that will be shared by the three mobile operators in Egypt.

Engagement Model:
- Hybrid

Project Duration:
- 6 months
Fast lead time with 100% activation for the required features with the highest performance levels realizing ~50% cost reduction than other competitors

2G/3G Feature Activation

Customer Requirements:
- Vodafone Ghana wanted to activate the list of the Vodafone Group recommended features (VBP2 list).

Customer Name:
Vodafone Ghana

Technology / Platform:
- 2G/3G over Huawei Platform

Engagement Model:
- Hybrid

Project Duration:
- 6 Months
  (3 months per each phase)

Service Provided:
VSSE team activated 100% of the required RAN15&16 (3G) features and GBSS15 (2G) features with our best practice related parameters. In addition to the agreed-upon features, VSSE team has implemented 17 extra features based on VSSE best practice. The activation resulted in great enhancements in accessibility, retain-ability, throughput, and voice quality.
Offering Vendor-agnostic consultancy merged with 12 years of the operator’s DNA experience

2G/3G RAN Node Acceptance

Customer Requirements:
- Vodafone UK wanted to ensure the high-level performance of RAN nodes (BSCs & RNCs) after core evolution and has sought a vendor-agnostic consultant to provide unbiased consultancy.

Customer Name:
Vodafone United Kingdom

Technology / Platform:
- 2G/3G over Ericsson, Huawei, ALU and Nokia Platforms

Service Provided:
VSSE team offered vendor-agnostic consultancy ensuring the RAN KPIs performance for 250 nodes (BSCs & RNCs) over multi-vendors (Huawei, Nokia, Ericsson & ALU) after a complete CS core evolution from legacy Ericsson MSC to 8 blade cluster.

Engagement Model:
- Hybrid

Project Duration:
- 9 months
Offering multi-vendor-agnostic experience resulting in consistent end-to-end service in shorter time to market

**Customer Name:**
Vodafone Qatar

**Technology / Platform:**
- 2G, 3G and 4G over Huawei and ALU platforms

**Customer Requirements:**
- Vodafone Qatar required capacity modeling over Huawei and ALU. In addition to the need for activating some features over Huawei only.

**Service Provided:**
VSSE team has been the best vendor for handling the service including HW Configuration and license audits to confirm that all resources are fully utilized and maintain HW configuration dependencies for the planned features. In addition, the team prepared a “features testing” plan over Huawei for around 108 features in 2G, 3G and 4G to utilize SW CAP release and follow VF-Group recommended features. The planned features covering paging, load/throughput/capacity, UE capability, quality, coverage and power efficiency.

Moreover, the team carried out the capacity modelling for 2G, 3G and 4G for Huawei and ALU considering failures, success rate, resources utilization, traffic and throughput in order to have an overview of capacity limitations all over the network for corrective actions.

**Engagement Model:**
- On-site

**Project Duration:**
- 4 months
Delivered Projects
In Building Design

Provide the required technology (2G, 3G, 4G-LTE & Wi-Fi) coverage for any building type (residential, shopping, stadiums....etc.) with the needed capacity

<table>
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<tr>
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<tbody>
<tr>
<td>In-Building Design</td>
<td>MTS</td>
<td>2G, 3G, and 4G-LTE &amp; IB wave</td>
</tr>
<tr>
<td>In Building Design for MCCP Vodafone Building</td>
<td>Vodafone Egypt</td>
<td>2G/3G and Wi-Fi in Building coverage &amp; iBwave, TEMS Products</td>
</tr>
<tr>
<td>In Building Design: Royal Tulip Hotel</td>
<td>Vodafone Egypt</td>
<td>2G/3G in Building coverage &amp; iBwave, TEMS Products</td>
</tr>
<tr>
<td>In Building Design: Qatari Diar</td>
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<td>In Building Design for The Grand Egyptian Museum</td>
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</table>
## Antenna Portfolio Management

Taking the end-to-end responsibility of Antenna management after detailed analysis for the operators’ needs and requirements

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<tbody>
<tr>
<td>LTE Antenna Portfolio Acceptance</td>
<td>Vodafone Group</td>
<td>4G - LTE</td>
</tr>
<tr>
<td>Multiport Antenna Design &amp; Acceptance</td>
<td>Vodafone Egypt</td>
<td>2G &amp; 3G</td>
</tr>
</tbody>
</table>
Automatic Frequency Planning (AFP) / Scrambling Codes Planning

Optimize the frequency allocation over 2G networks ensuring minimal interference due to co-channel allocation and adjacent-channel allocation. The optimization results in improving the 2G KPIs (HOSR, DCR), band re-farming for introducing new technologies and global change in radio configurations due to global traffic steering strategy.

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<tr>
<td>Automatic Frequency Planning</td>
<td>Vodafone Egypt</td>
<td>2G &amp; Atoll, Optim i</td>
</tr>
<tr>
<td>Scrambling Code Planning</td>
<td>Safaricom</td>
<td>3G &amp; In-house tool</td>
</tr>
</tbody>
</table>
Pre-Launch (2G, 3G & 4G-LTE)

Set initial parameters on site/cell levels followed by checking/troubleshooting its functionality ending with performance optimization to achieve target KPIs for node acceptance

**Service Name**

2G, 3G and 4G-LTE Pre-Launch Optimization

**Technology**

2G/3G/4G-LTE over Nokia platform

**Customer**

Vodafone New Zealand
Outdoor Radio Planning

Radio planning activities include Master plan design, coverage and capacity dimensioning, new sites validation and physical design, site creation including integration phase, neighbor planning, frequency planning and scrambling code planning, new site acceptance and fine tuning. Outdoor radio planning tools are also supported (Atoll, Optimi, Google Earth, MapInfo, TEMS Discovery, TEMS Investigation).

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<td>Outdoor Radio Planning</td>
<td>Vodafone Qatar</td>
<td>2G/3G over Huawei/Alcatel Platform &amp; Atoll, TEMS Products</td>
</tr>
</tbody>
</table>
Cell Level Optimization & Global Parameters Audit & Recommendation

In individual cases, parameters’ values adjustment is done in both idle and connected modes aiming to enhance network performance KPIs. On a cluster/networks level, provide wide ranges of audits covering the main KPIs in-addition to new recommended features activation.

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<tr>
<td>3G Optimization Audits, Global Audits &amp; Recommendations for Mumbai Circle Zone</td>
<td>Vodafone India</td>
<td>3G &amp; Tems Products, Atoll, Actix</td>
</tr>
<tr>
<td>2G optimization audits on 2 main cities (Koln &amp; Hamburg) (Cell Level Optimization, Global Audits &amp; Recommendations)</td>
<td>Vodafone Germany</td>
<td>2G&amp; Tems Products, Actix</td>
</tr>
<tr>
<td>2G/3G Field Optimization and KPI’s Monitoring (Cell Level Optimization, Global Audits &amp; Recommendations)</td>
<td>Vodafone Egypt</td>
<td>2G/3G over Huawei / Ericsson platform</td>
</tr>
<tr>
<td>3G Optimization Audits (Cell Level Optimization, Global Audits &amp; Recommendations)</td>
<td>Safaricom</td>
<td>3G over Huawei platform &amp; TEMS Products, Atoll</td>
</tr>
</tbody>
</table>
Customized Tools & Customized Services

Conducting complete analysis for field measurements including coverage and quality to detect network problems from UE side. Detailed troubleshooting for KPIs problems during drive test including failures and drops. Optimization studies are carried out using the provided field measurements like missing neighbors detection, pilot pollution, overshooting,.. etc.

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<tr>
<td>Developing 2G Cutover Ericsson Tool</td>
<td>Ericsson OPS scripting</td>
<td>Vodafone Egypt</td>
</tr>
<tr>
<td>Service Name</td>
<td>Technology</td>
<td>Customer</td>
</tr>
<tr>
<td>AMAP Spring Dash Board</td>
<td>OHP (Oracle Hyperion Planning database)</td>
<td>Vodafone Group Network Strategy and Performance</td>
</tr>
</tbody>
</table>
Feature Activation and Validation

Complete assessment/audit of the existing features and proposing recommended ones to be implemented as per the defined need. The service also includes the preparation for the needed change requests, following-up on the implementation process, and validating/assessing the network performance after activation.

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<td>2G/3G Feature Activation</td>
<td>2G/3G over Huawei Platform</td>
<td>Vodafone Ghana</td>
</tr>
<tr>
<td>2G/3G/4G Feature Activation</td>
<td>2G/3G/4G over Huawei and ALU Platform</td>
<td>Vodafone Qatar</td>
</tr>
</tbody>
</table>
RAN Acceptance

Ensuring that the adopted parameters values/strategies are the deployed ones while detecting any conflicting values between parameters. The Acceptance also involves close monitoring and evaluation of different counters and KPIs to maintain network performance.

Service Name

2G/3G RAN Node Acceptance

Technology

2G/3G over Ericsson, Huawei and Nokia Platforms

Customer

Vodafone United Kingdom
Physical Audits & Area Re-engineering

Conducting coverage assessment and identifying the weak coverage spots using Atoll predictions, coverage complaints locations and drive test assessments resulting in proposing the planning actions to enhance the coverage and capacity of the network

<table>
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<tr>
<th>Service Name</th>
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<tr>
<td>Technology</td>
<td>2G/3G over Huawei and Ericsson Platform, Atoll</td>
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<td>Customer</td>
<td>Vodafone Egypt</td>
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</tbody>
</table>
Capacity Dimensioning

Perform capacity dimensioning audits for interfaces and hardware capabilities covering BSCs/RNCs (transcoders, different interfaces, processor load and boards utilization), radio resources (TRX, codes, channel elements and power utilization) and signaling channels to accommodate traffic forecast or enhance current network congestion related KPIs

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<td>2G/3G Capacity Assessment</td>
<td>2G/3G Huawei and ALU platforms</td>
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</table>

Safaricom

3G

Huawei platforms

2G/3G Capacity Assessment

2G/3G Huawei and ALU platforms

Vodafone Qatar

Service Name

Customer

Technology
Thank you