QUALITY OF SERVICE REGULATIONS & MONITORING EXPERIENCE OF

POTRAZ

ZIMBABWE

ITU Workshop on Performance, QoS and QoE for Multimedia Services
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- LEGAL FRAMEWORK FOR QUALITY OF SERVICE MONIRORING AND ENFORCEMENT IN ZIMBABWE
- QOS MEASUREMENT METHODOLOGIES USED BY POTRAZ
- RPM SYSTEM OVERVIEW
- SITE SYSTEM OVERVIEW
- POSITIVE CHANGES SINCE IMPLEMENTING QOS REGULATIONS

Legal Framework for Monitoring and Enforcement of Quality of Service in Zimbabwe

POTRAZ is a Statutory Body formed in terms of the Postal and Telecommunications Act [Chapter 12:05]. POTRAZ was formed in 2001 and started operations in 2002.

- The Postal and Telecommunications Act [Chapter 12:05] gives POTRAZ the mandate to monitor and enforce QoS standards.
- The Postal and Telecommunication (Quality of Service) Regulations, 2016 - Statutory Instrument 42 of 2016 – is the legal framework used for enforcement of QoS standards.
- The Postal and Telecommunication (QoS) Regulations, 2016 specifies QoS standards and the enforcement measures.
- The Drafting of the QoS Regulations started in 2013 and the Stakeholder Consultative Workshop was held on 12 and 13 November 2014.
- The consultative process included Operators and Consumers (Consumer Representatives).
- The Statutory Instrument covers Cellular Telecommunications Services, Public Fixed Voice Telephony Services, Data and Internet Services, Interconnection Services, Postal and Courier Services and Customer Care Parameters.
- The QoS Regulations were gazetted in April 2016

Overview of the Postal and Telecommunications (QoS) Regulations

The Postal and Telecommunications (Quality of Service) Regulations, 2016 is divided 10 Sections and has Six Schedules

SECTION 1: Title

- Section 1 is the Title of the Regulations

SECTION 2 : Interpretation

- This section comprise definition of terms as used in the Regulations. The purpose of Interpretation or definitions in the Regulations is-
- To provide the meaning of a word or phrase outside its ordinary meaning by narrowing or widening in terms of the Regulations.
- To remove any ambiguities - there are a number of definitions to some acronyms so it is important to define them as used in the regulations

Postal and Telecommunications (QoS) Regulations

SECTION 3 : Application

- The QoS Regulation applies to Postal. Courier and Public Telecommunication Licensees.

SECTION 4: Objectives of The QoS Regulations

This section highlights the main objectives of the QoS regulations which includes:

- To promote the interests of consumer by setting minimum QoS standards
- Enabling Authority to monitor Operators and enforce minimum QoS standards
- Promote effective competition in the sector.
- Improving performance of public

Postal and Telecommunications (QoS) Regulations

SECTION 5 : Licensee Obligations

The obligations of the licensee in terms of QoS Regulations shall be:

- ❑To meet or exceed the minimum QoS standards as set by the Authority
- ❑To provide consumers with enough information enabling them to make informed decisions.
- ❑Submit Network Performance Data as required by the Authority
- ❑Retain QoS raw data(PM Files) for a minimum of time specified by the Authority

Postal and Telecommunications (QoS) Regulations

SECTION 6 : Quality of Service Parameters

The sections defines the QoS Parameters that are prescribed in the Postal and Telecommunications Regulations.

The Regulations sets parameters for the following services:

- ❑Cellular Telecommunications Services
- ❑Public Fixed Voice Telephony Services
- ❑Data and Internet Services
- ❑Interconnection Services
- ❑Postal and Courier Services
- ❑Customer Care Parameters

The section also defines which parameters each licence category is required to comply with.

Postal and Telecommunications (QoS) Regulations

SECTION 7 : Publication of QoS Reports

The sections gives the Authority the Powers to generate and Publish individual(Audit) or comparative (Benchmark) QoS Reports. The Authority is also empowered to carryout consumer satisfaction surveys and publish them.

The main reasons for publication of Reports:

- ❑ To enable consumers to make informed decisions
- ❑ to maintain and promote competition amongst players
- ❑ To improve operation and performance of public networks

SECTION 8 : Compliance

This section compels operators to comply or exceed set targets and limits of QoS key performance indicators (KPIs) and also to resolve consumer complaints within the resolution times set in the Regulations.

Postal and Telecommunications (QoS) Regulations

SECTION 9 : Enforcement Measures

Sections 9 gives the action that the Authority may take, if a licensee fails to comply with any of the KPIs set out on the QoS Regulations or fails to resolve consumer complaints within a specified time. **(ITU-T E.800 supplement 9)**

Authority may require the Licensee to:

- submit a report to the Authority and explain non-compliance and inform the end users or consumers;
- Compensate consumers (customer oriented approach) and or
- Pay a penalty for non-compliance (regulator oriented approach)

POTRAZ chose “the above ” for enforcement of QoS where Performance targets are set in regulations, Monitor set target, publish QoS information, dialogue with Operators and impose fines payable to the regulator if targets are not achieved.

Postal and Telecommunications (QoS) Regulations

SECTION 10 : Considerations for assessing QoS

In assessing QoS Performance the Regulations provides for reasonable factors that are beyond the operators and some of the reasons are:

- Service deficiencies arising from other operators (e.g. interconnection faults)
- Extreme service deficiencies from unregulated service providers (e.g. prolonged Commercial Power Faults)
- unforeseeable changes in operating environment
- Lone cells that has no neighbours to handover calls;
- Force majeure - causes that are outside the control of the operators, such as natural disasters that cannot be avoided.

Postal and Telecommunications (QoS) Regulations

SHEDULES

The following is the list of Schedules in the QoS Regulations:

- **First Schedule:** Quality of Service Standards for Cellular Telecommunication Services – Voice and Mobile Data
- **Second Schedule:** Quality of Service Standards for Public Fixed Telephony Services - Voice
- **Third Schedule:** Quality of Service Standards Public Fixed Data and Internet services
- **Fourth Schedule:** Quality of Service Standards for Interconnection Services
- **Fifth Schedule:** Quality of Service Standards for Postal and Courier Services
- **Sixth Schedule:** Customer Care Parameters (All Services)

QoS Measurement Methodologies used by POTRAZ

POTRAZ uses two different and complementary approaches to QoS Monitoring in terms of ETSI EG 202 057- Part 3. The approaches are based on:

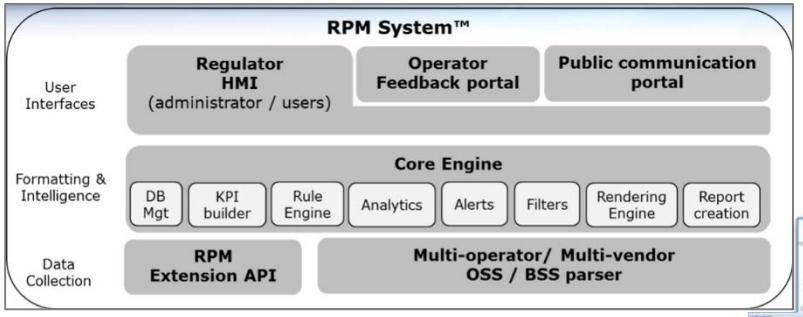
- **1. Network Element Counters (OMC-R data) whereby QoS Audit reports are generated by processing and analysing PM files.**
  - **QoS Tool:** POTRAZ uses the **RPM system supplied by Planet Network International (PNI)** – The RPM system is a QoS Monitoring tool built for regulators in accordance with ITU-T E.800 Recommendation.
- **2. Active Testing (Stationary/ Walk / Drive Testing) whereby QoS audit reports are generated by processing and analysing log files from active tests.**
  - **QoS Tool:** POTRAZ uses the **SITE system supplied by SIGOS** – The SITE system is a**n end-to-end** QoS monitoring tool that generates test calls and analysing log files in accordance with **ETSI TS 102 250 series** to evaluate QoS offered by an operator.

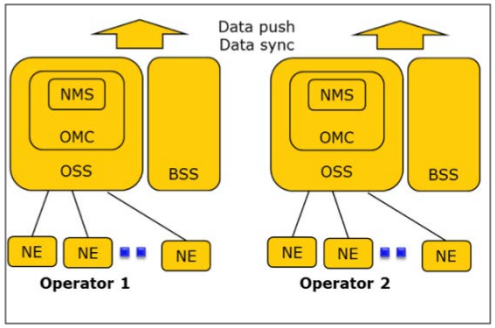
With these tools, it is clear that POTRAZ is well equipped to ensure that QoS in Zimbabwe is stellar with the corroboration of the stakeholders.

Network Element Counters

RPM SYSTEM OVERVIEW

Regulatory **P**erformance **M**anagement **(RPM)** System interfaces with all the Mobile Network Operators (MNOs) via FTP links and collect Performance Management data records and calculates Performance Indicators. The Performance Indicators are compared with set standards in the Regulations for compliance.





RPM system compliance to standards

RPM system built in conformance to the under listed International ITU/TMN standards

X.700, X.711, X.721, X.733(OSI CMIP)

M.3000, M.3010,M.3400 (TMN FCAPS)

RPM system QoS KPIs aligns with

ITU-T E.800 Sup 9 (QoS for Regulators)

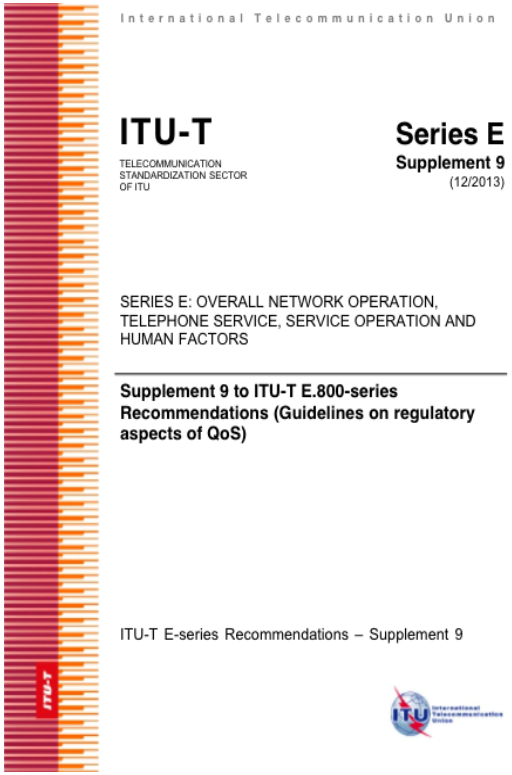
ETSI EG 202 057/ EG 202 O09 series

ETSI TS 102 250 series

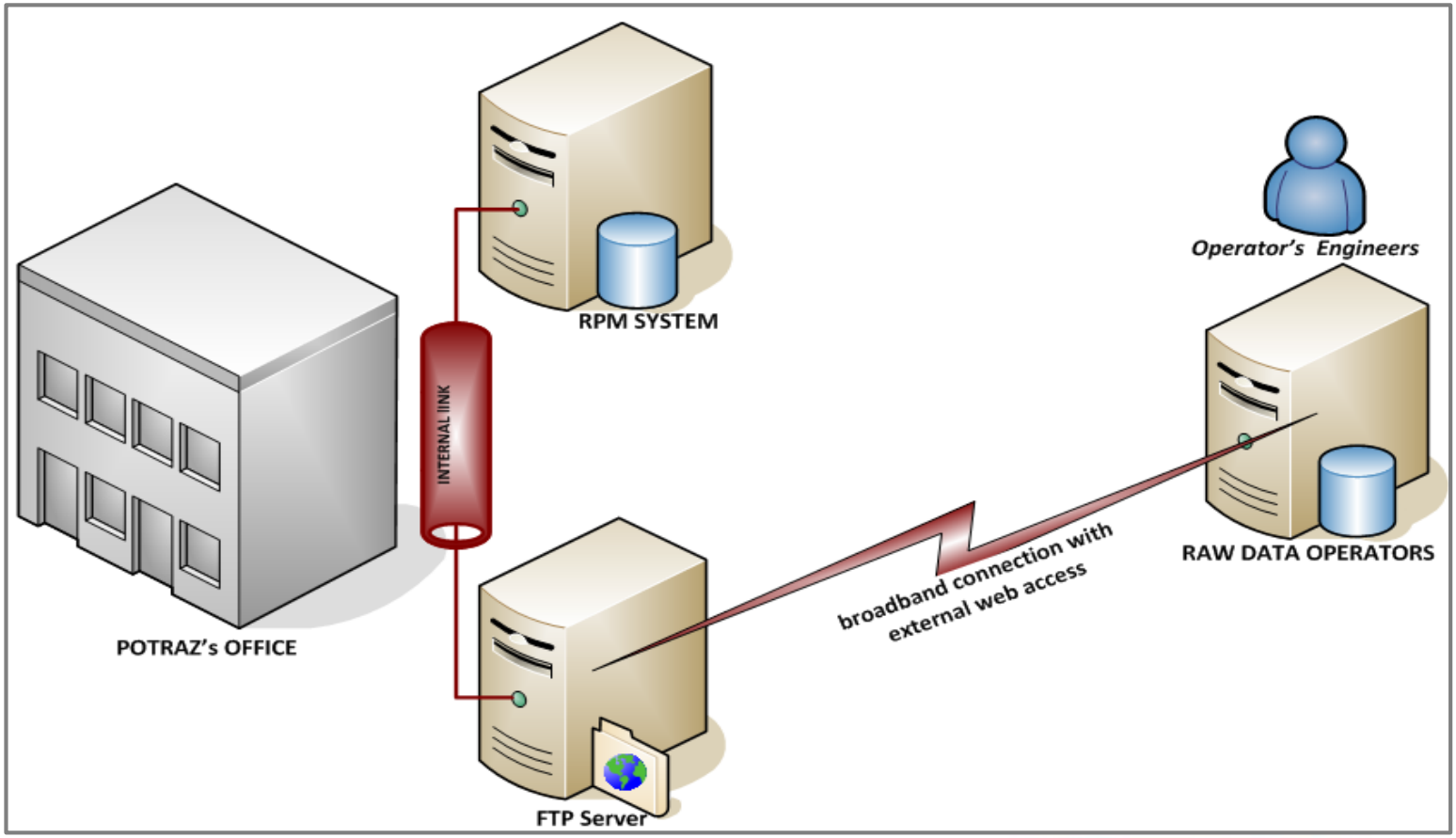
CO-OP KPI Formula (3GPP TR 32.814)

PM Counters (3GPP 52.402)

Vendor Specific counters & Formulas

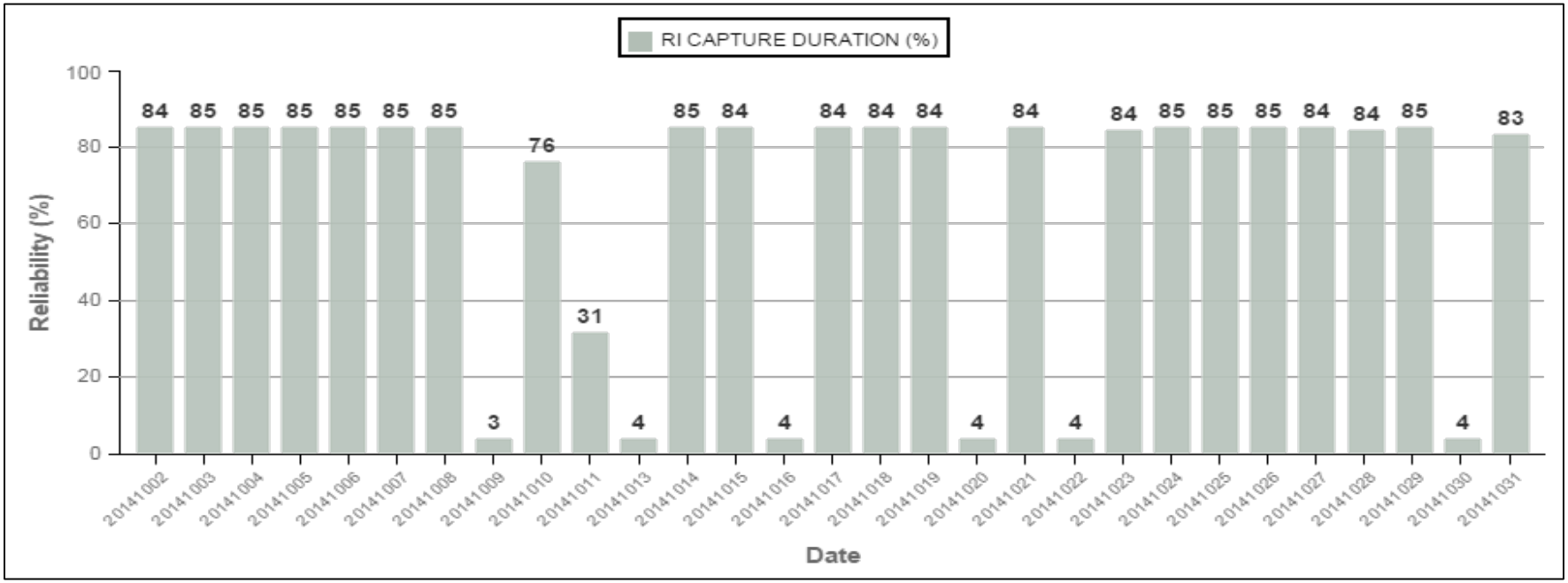


RPM system MNO Connectivity-POTRAZ



Some Functionalities of RPM System

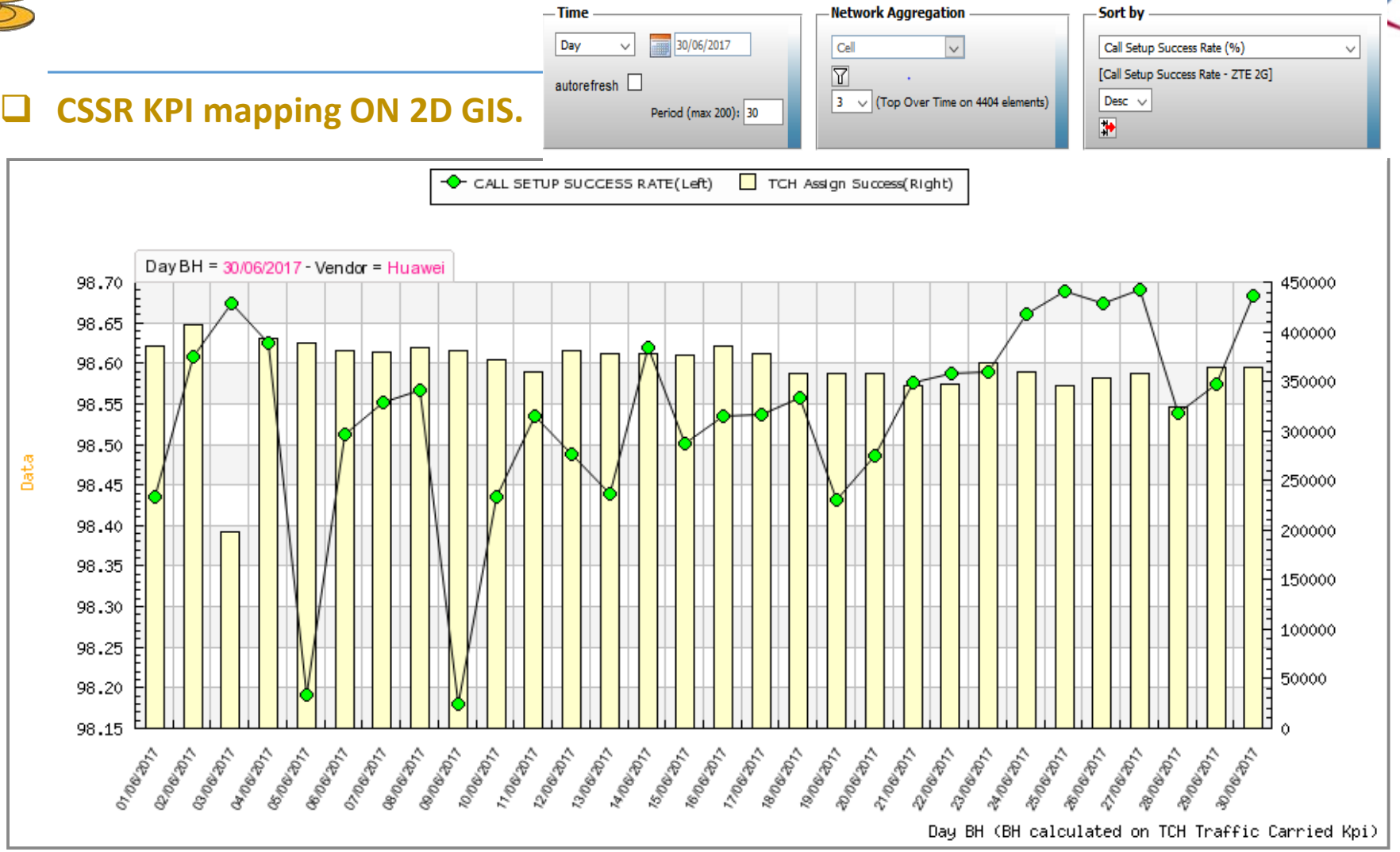
- **Before processing the OMC-R raw data the RPM system checks for the Reliability and Integrity of the data (RI – Indicator).**



Reliability Indicator checks the integrity of the PM files Topology-wise(network elements) and Over time (measurement window usually 60 minutes)

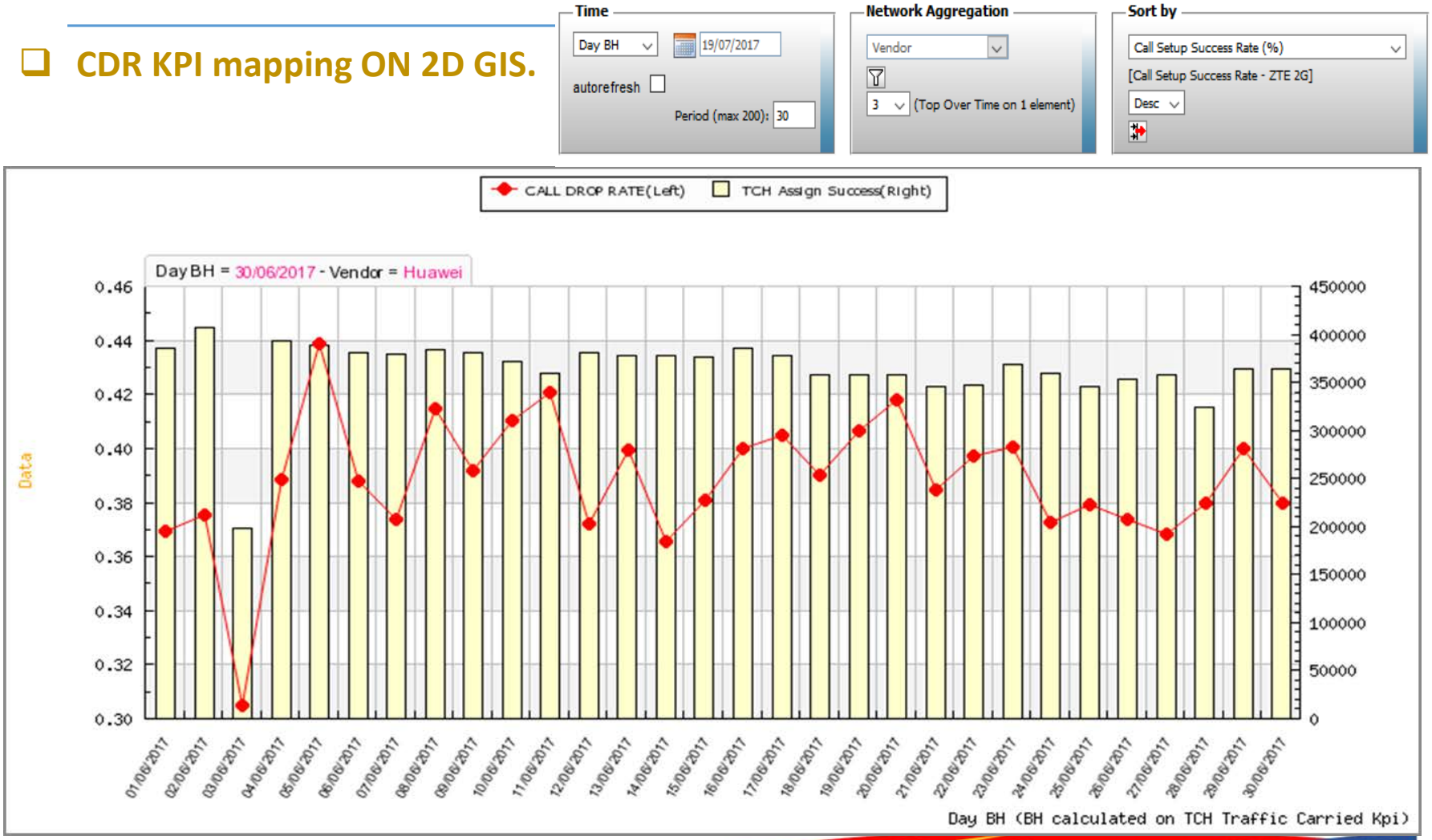
Some Functionalities of RPM System

- **CSSR KPI mapping ON 2D GIS.**



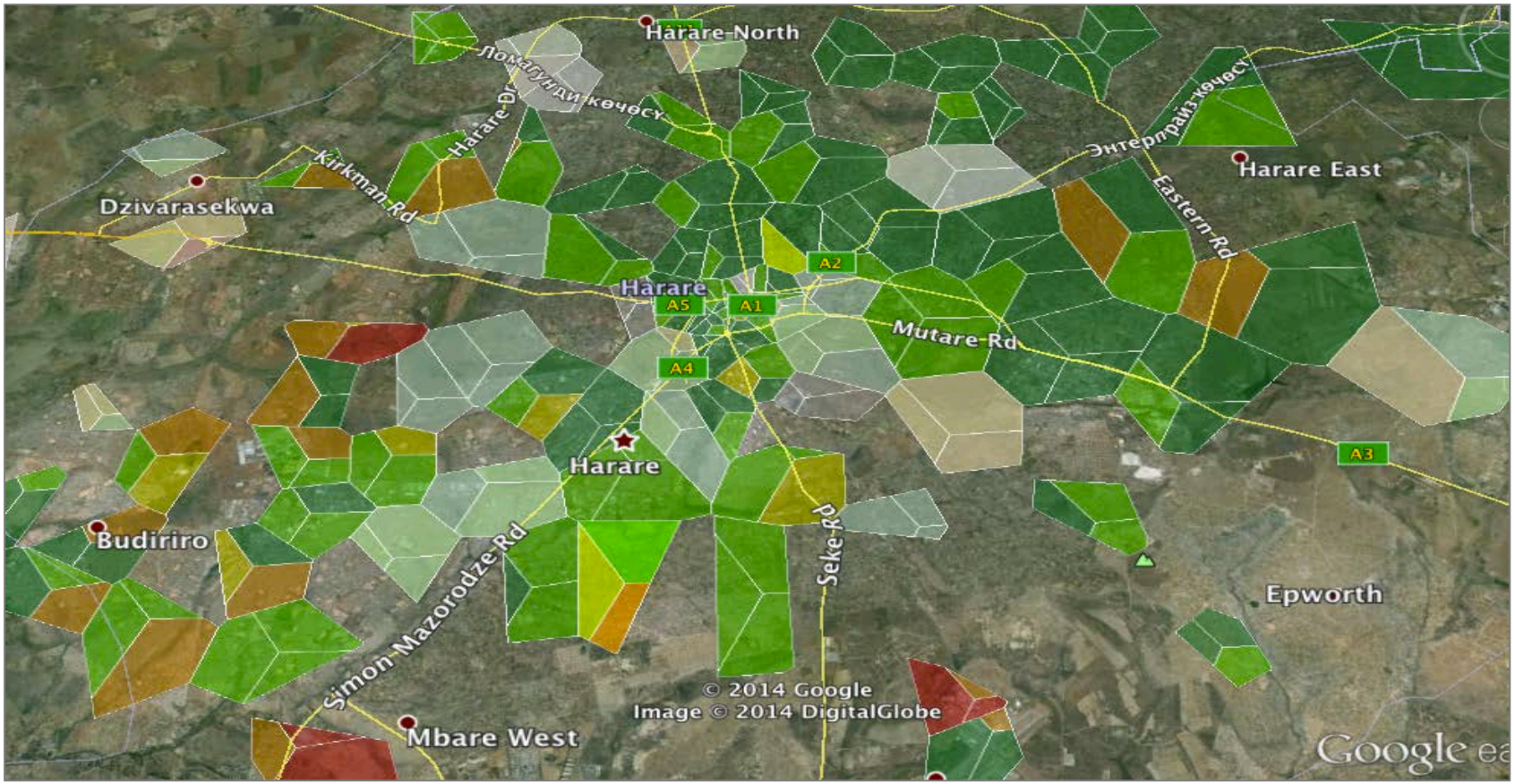
Some Functionalities of RPM System

- **CDR KPI mapping ON 2D GIS.**



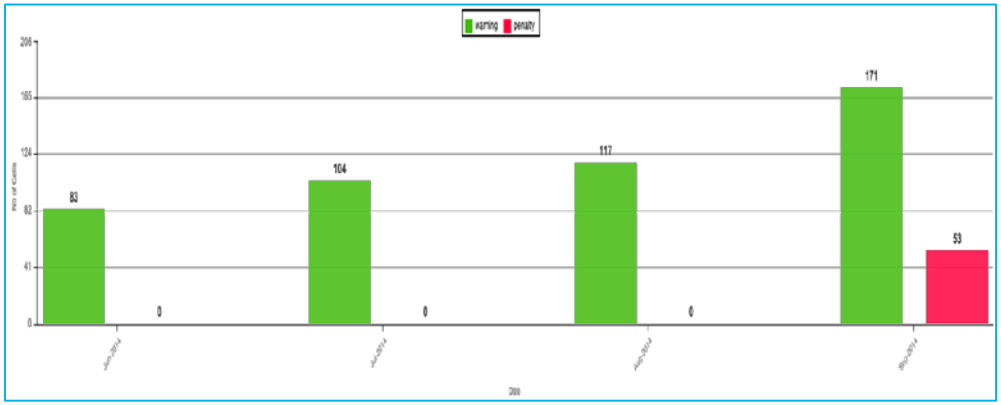
Some Functionalities of RPM System

- **CSSR KPI mapping on google earth -GIS 3D.**



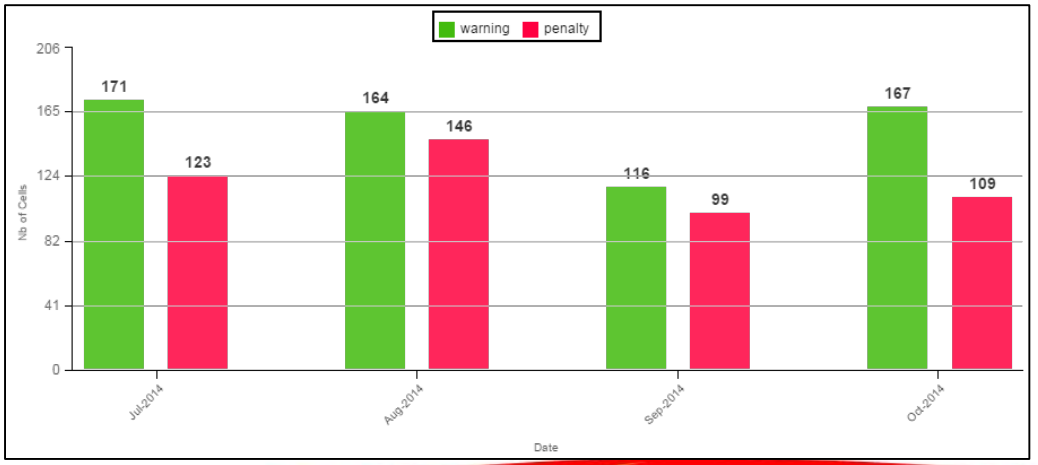
Some Functionalities of RPM System

- **Enforcement Mechanism- Penalty and Warning cells.**



Warning cells are cells that are non compliant with targets specified in S1 42 of 2016.

Penalty cells (109) in Oct 2014 are warning cells of month Jul 2014 (171) whose FRT has elapsed.



OVERVIEW OF SITE SYSTEM
ACTIVE TESTING (Stationary/Walk/Drive Testing)

- The SITE system is an active QoS Measurement System. It consist of 6 x Compact Local Units (CLUs), 3 x Wireless Local Units (WLUs) and 2x Mobile Local Units (MLUs), 1 x Central Unit (CU) and SIMMUX
- Test cases are scheduled through a Graphical User Interface (GUI) in the CU
- The CLUs and WLUs are used for making scheduled test cases or random calls between them and the statistics are collected in the CU.
- WLUs are the same as CLUs but can be moved from one place to another.
- MLUs are used for Drive Tests and are mounted on vehicles

Active Testing Equipment deployed by POTRAZ

Architecture

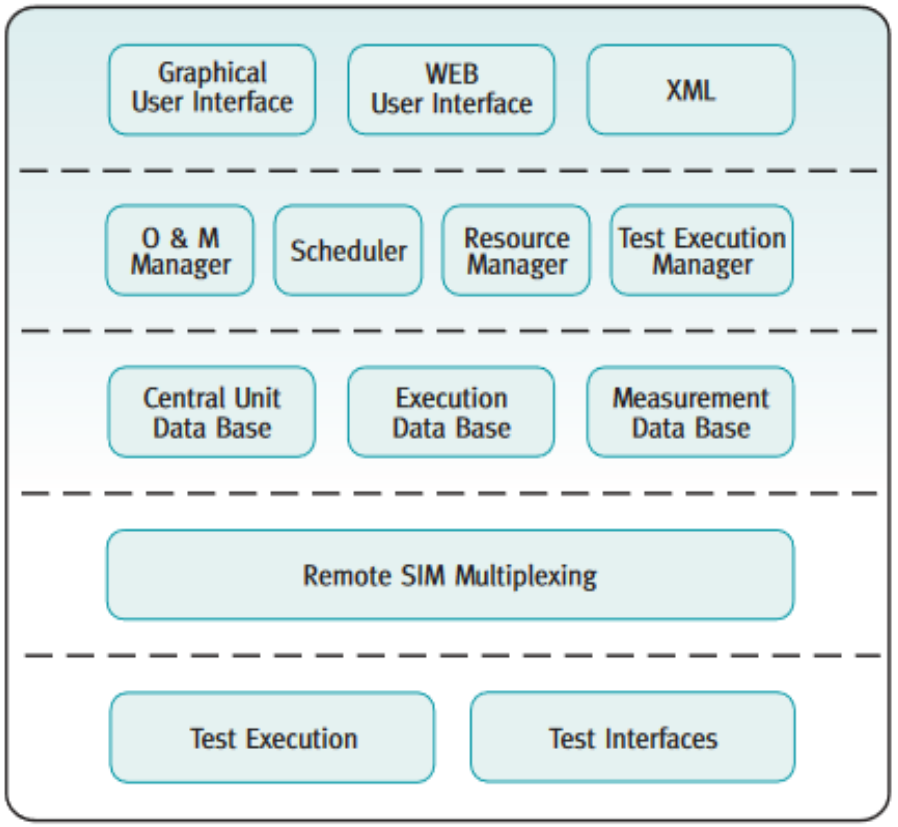
Client

Central Unit/
Central Unit
Extension

Data Bases

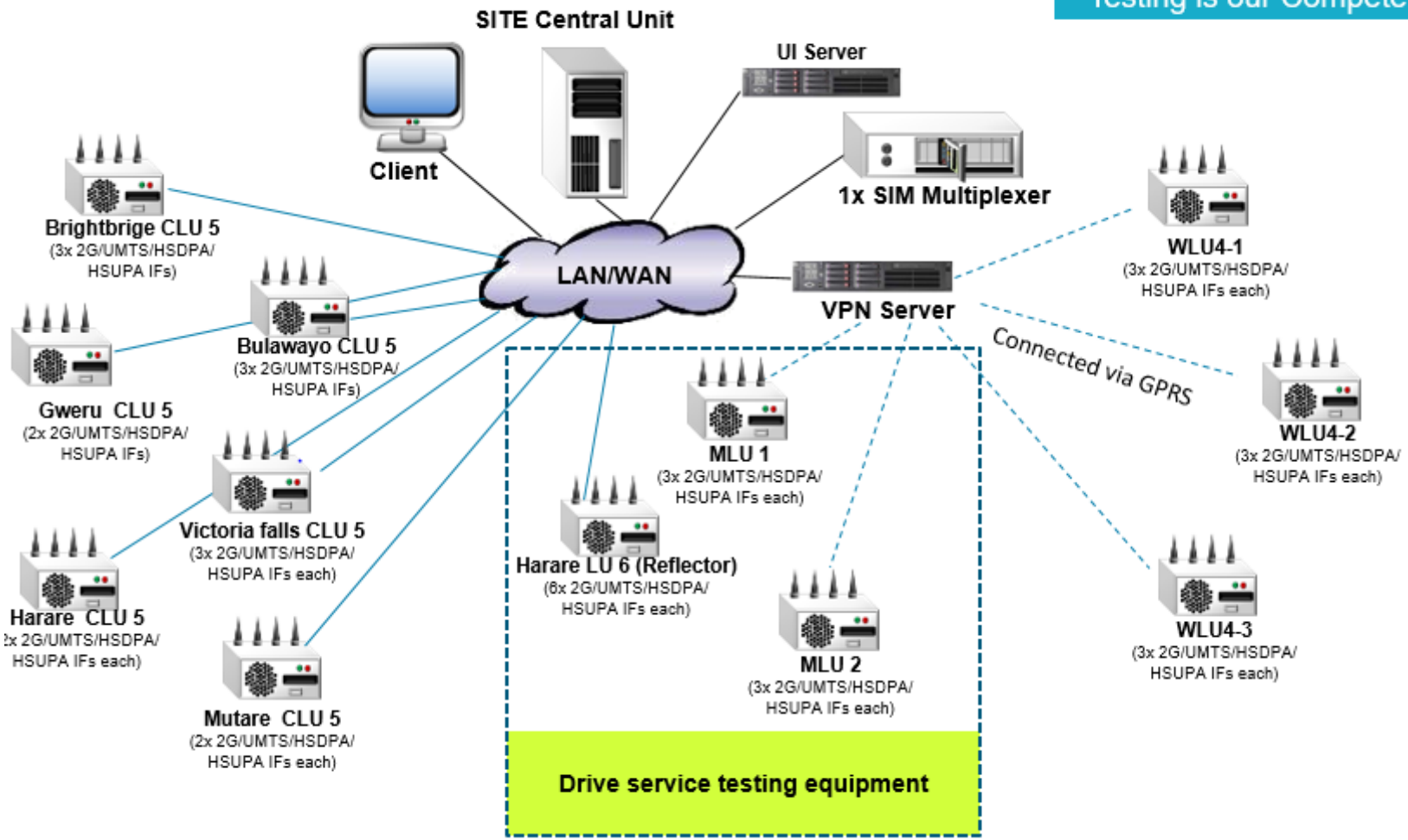
SIM
Multiplexer

Compact
Local Unit/
Mobile Local Unit/
Wireless Local Unit

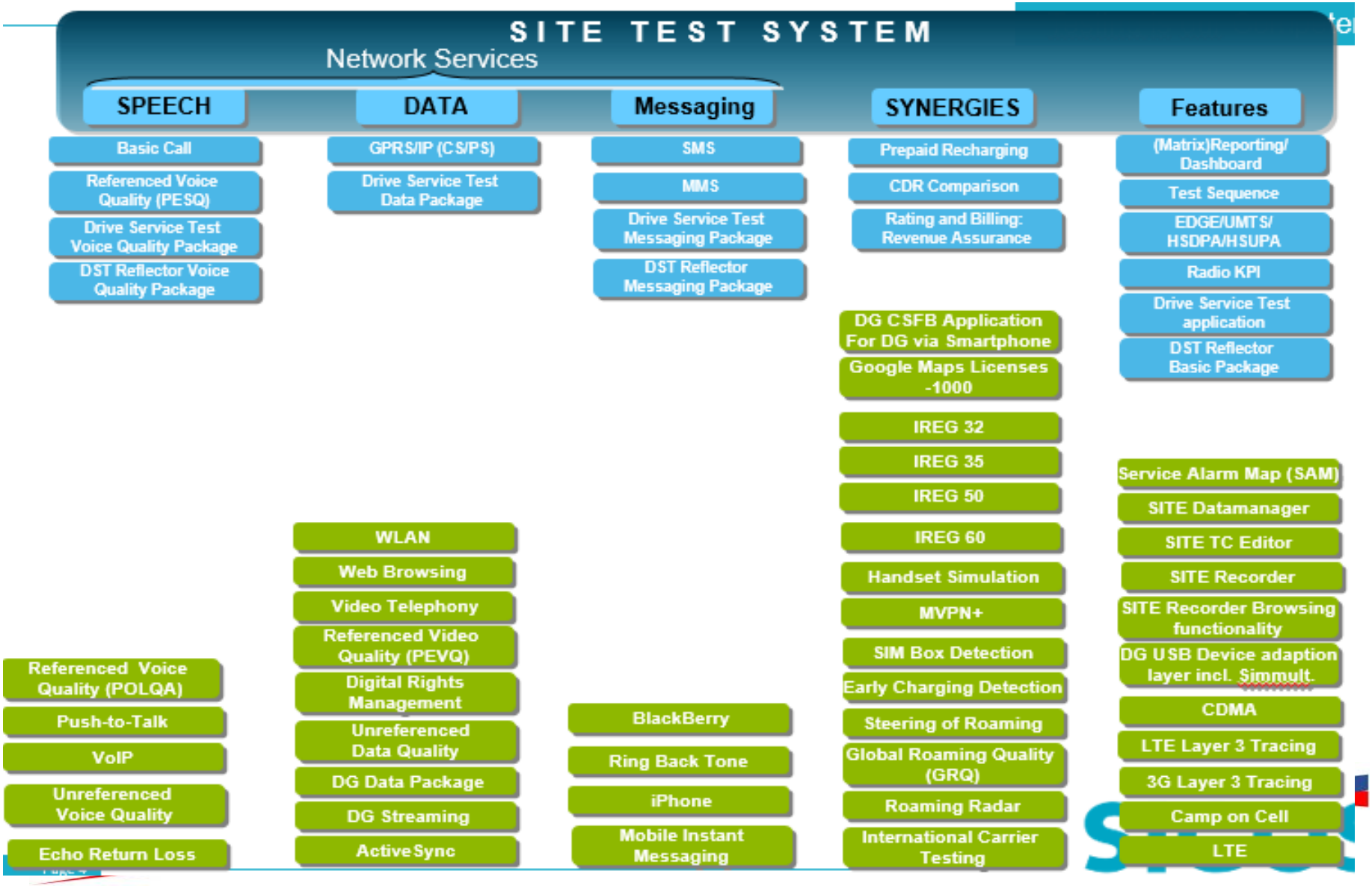


Active Testing Equipment deployed by POTRAZ

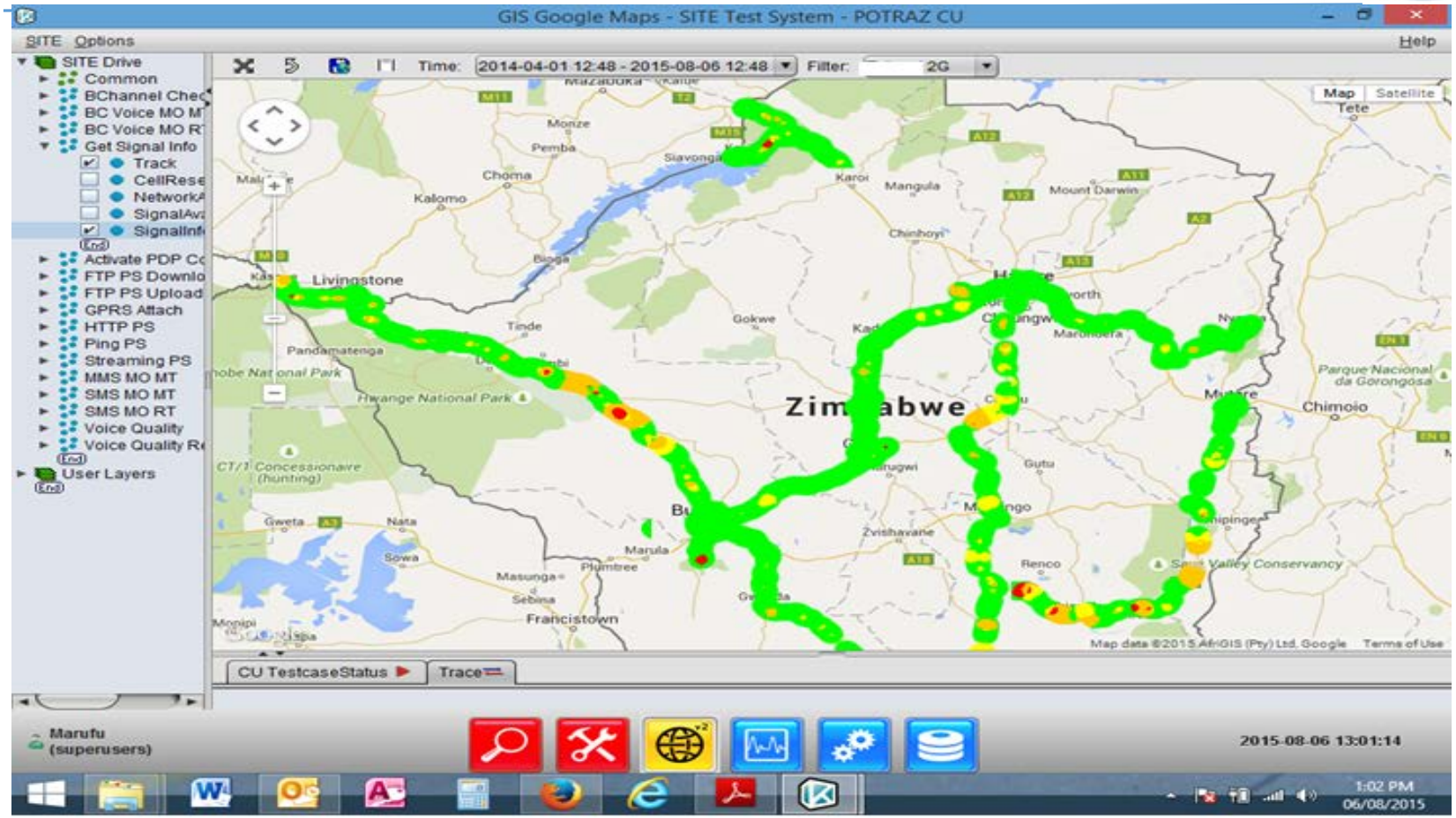
Testing is our Competence



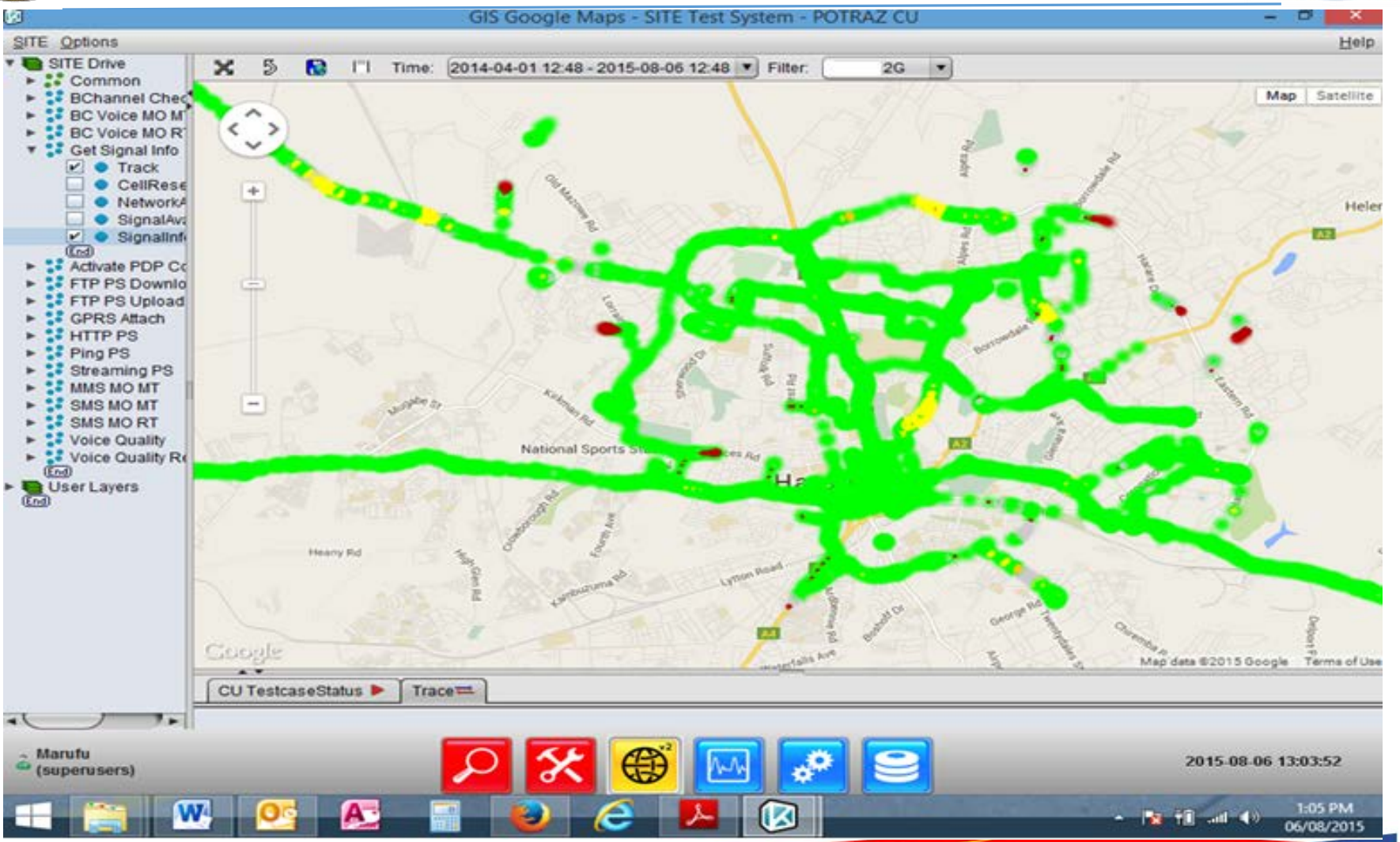
TESTS CASES


SITE TEST SYSTEM
Network Services
SPEECH
DATA
Messaging
SYNERGIES
Features
Basic Call
Referenced Voice Quality (PESQ)
Drive Service Test Voice Quality Package
DST Reflector Voice Quality Package
GPRS/IP (CS/PS)
Drive Service Test Data Package
SMS
MMS
Drive Service Test Messaging Package
DST Reflector Messaging Package
Prepaid Recharging
CDR Comparison
Rating and Billing: Revenue Assurance
(Matrix)Reporting/ Dashboard
Test Sequence
EDGE/UMTS/ HSDPA/HSUPA
Radio KPI
Drive Service Test application
DST Reflector Basic Package
DG CSFB Application For DG via Smartphone
Google Maps Licenses -1000
IREG 32
IREG 35
IREG 50
IREG 60
Handset Simulation
MVPN+
SIM Box Detection
Early Charging Detection
Steering of Roaming
Global Roaming Quality (GRQ)
Roaming Radar
International Carrier Testing
Service Alarm Map (SAM)
SITE Datamanager
SITE TC Editor
SITE Recorder
SITE Recorder Browsing functionality
DG USB Device adaption layer incl. Simmult.
CDMA
LTE Layer 3 Tracing
3G Layer 3 Tracing
Camp on Cell
LTE
WLAN
Web Browsing
Video Telephony
Referenced Video Quality (PEVQ)
Digital Rights Management
Unreferenced Data Quality
DG Data Package
DG Streaming
ActiveSync
BlackBerry
Ring Back Tone
iPhone
Mobile Instant Messaging
Referenced Voice Quality (POLQA)
Push-to-Talk
VoIP
Unreferenced Voice Quality
Echo Return Loss

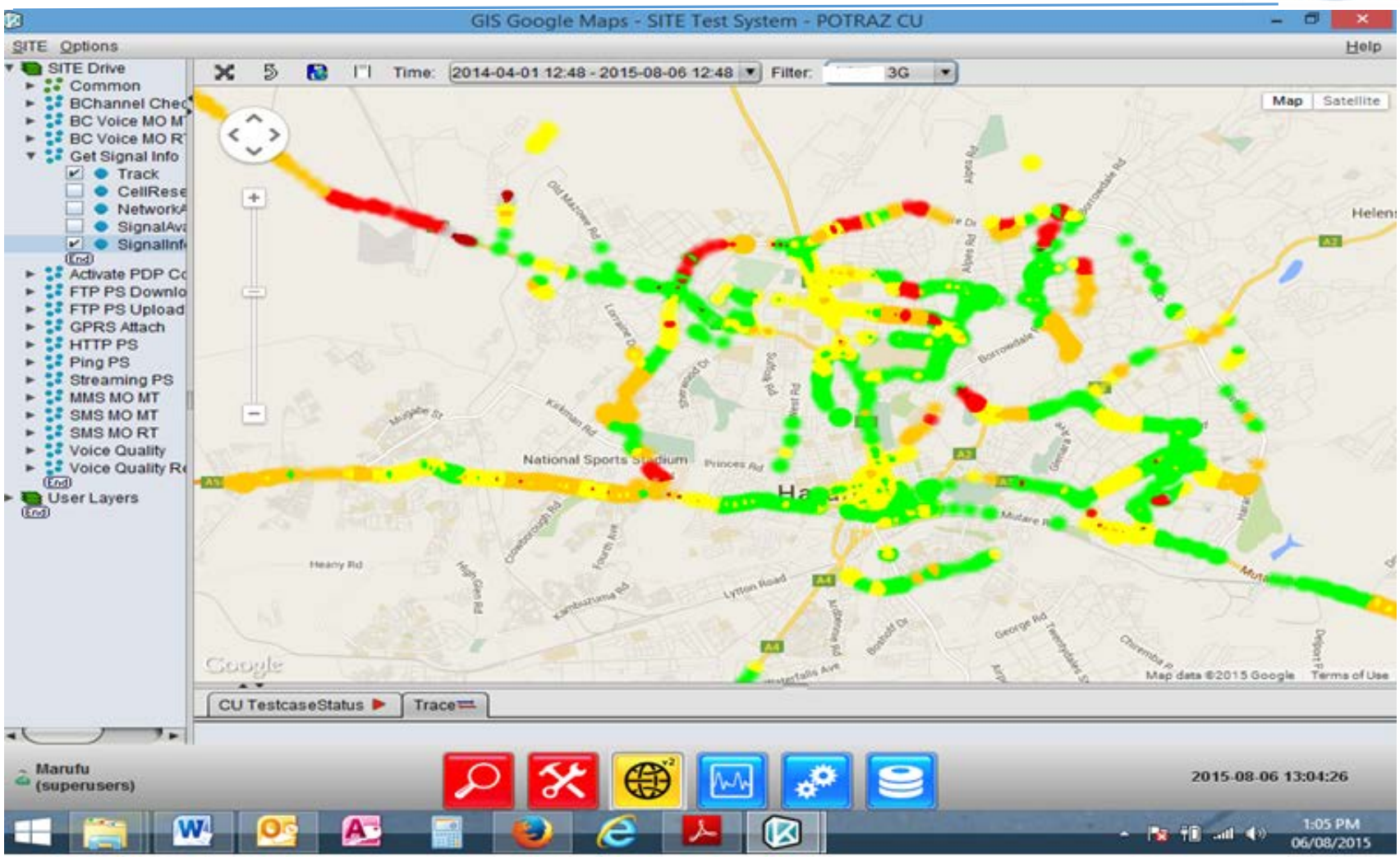
Drive Test Screen Shot



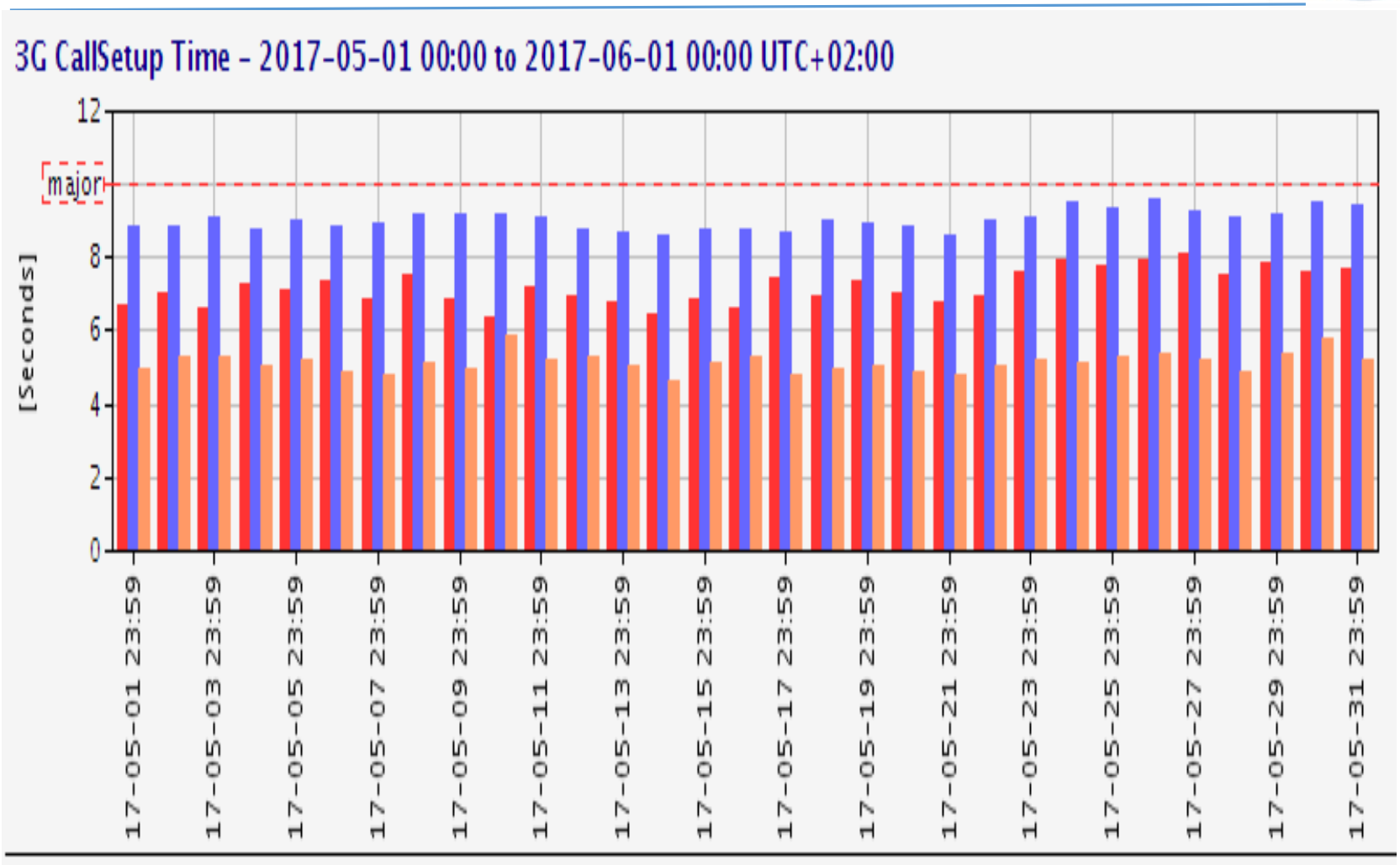
Drive Test Screen Shot



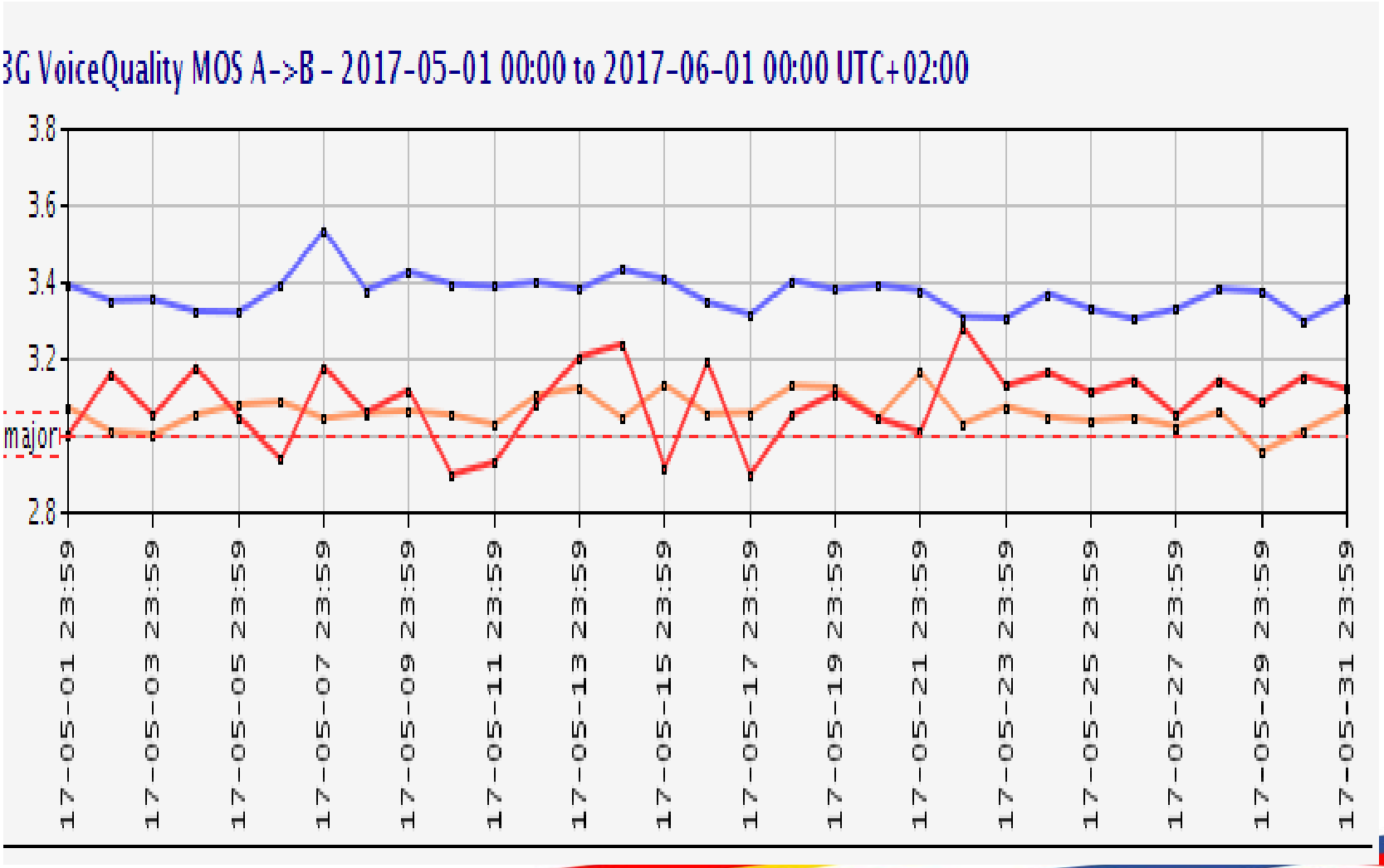
Drive Test Screen Shot



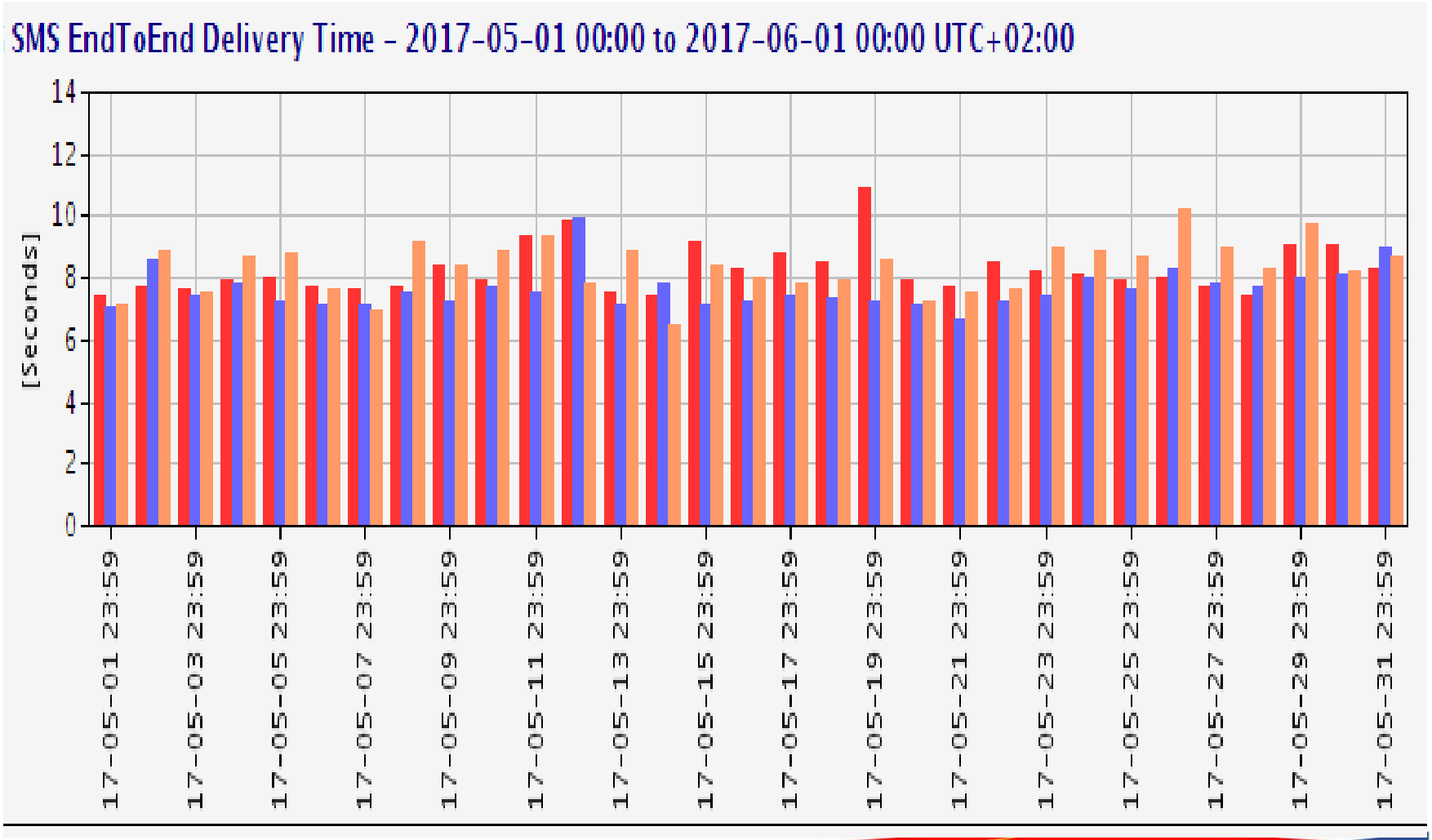
Screen Shot – 3G Call setup Time



Screen Shot – 3G Voice Quality



Screen Shot – SMS End-to-End Delivery time

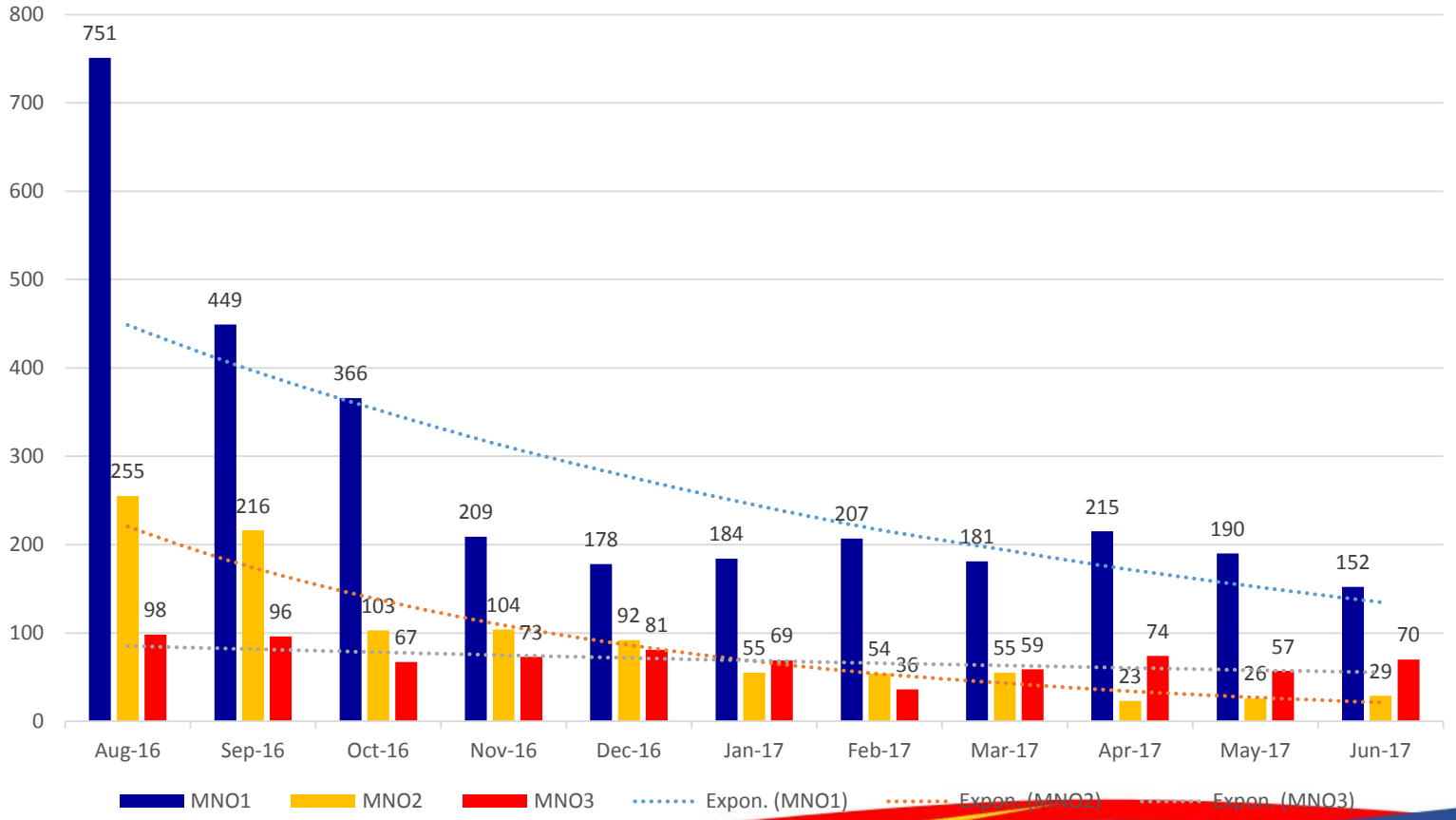


Benefits of ACTIVE TESTING

- Maximum flexibility due to modular design architecture
- Full picture on service quality as well as on end-users' experience
- Fast identification/localization of service and network outages before actual service degradation and threat of revenue losss
- Reduced operating costs by automated testing, monitoring and reporting
- Tests over all interfaces and all services
- Real-time reporting and alarming
- Efficient benchmarking
- Anywhere, anytime

Positive changes Since Implementing QoS Regulations

- **Some of the Positive changes we have experienced since the implementation of QoS Regulations and evaluation using the RPM system and monitoring CSSR and CDR**



THANK YOU

FOR YOUR ATTENTION

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&
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