PHISTREAM
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TRAI
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Telecom Regulatory Authority of India
(IS/ISO 9001-2008 Certified Organisation)



AUDIT & ASSESSMENT OF QUALITY OF SERVICE

NORTH ZONE – DELHI CIRCLE
CELLULAR MOBILE TELEPHONE SERVICE (CMTS)
(JANUARY TO MARCH 2016)

PREPARED BY:

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1. INTRODUCTION

1.1. ABOUT TRAI

TRAI's mission is to create and nurture conditions for growth of telecommunications in the country in a manner and at a pace that will enable India to play a leading role in the emerging global information society. One of the main objectives of TRAI is to provide a fair and transparent policy environment which promotes a level playing field and facilitates fair competition.

In pursuance of above objective, TRAI has been issuing regulations, order and directives to deal with the issues or complaints raised by the operators as well as the consumers. These regulations, order and directives have helped to nurture the growth of multi operator multi service - an open competitive market from a government owned monopoly. Also, the directions, orders and regulations issued cover a wide range of subjects including tariff, interconnection and quality of service as well as governance of the Authority.

TRAI initiated a regulation - The Standard of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service regulations, 2009 (7 of 2009) dated June 20, 2009 and Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated April 6, 2006 that provide the benchmarks for the parameters on customer perception of service to be achieved by service provider.

In order to assess the above regulations, TRAI has commissioned a third party agency to conduct the audit of the service providers and check the performance of the operators on the various benchmarks set by Telecom Regulatory Authority of India (TRAI).

1.2. ABOUT PHISTREAM CONSULTING PRIVATE LIMITED

Phistream Consulting Private Limited is an ISO: 9001 certified company who are one of the pioneers in the field of technical audit, quality assurance and third party inspection services. Established more than a decade ago in 2004, we aspire to provide longer term savings based on year-on-year productivity. With our size, we are nimble and aspire to being a full service partner for providing consultancy services.

We have been helping our clients by determining the best solutions and enabling businesses to enjoy the benefits of top-notch support without distracting their team from the main business focus. Our business analysts have enough experience to get involved at the requirements gather stage through consulting work handing off a detailed requirements document to our operations staff who in turn can train our support and maintenance resources for ongoing engagement.

In keeping with our goal of being a one stop quality assurance and consulting partner, our specialists employ a strategy and consulting-based implementation methodology and capitalize on strong program governance to offer a wide range of services for various industry verticals.

1.3. OBJECTIVES

The primary objective of the Audit module is to:

- Audit and Assess the Quality of Services being rendered by Cellular Mobile (Wireless) service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified in the respective regulations published by TRAI).
- This report covers the audit results of the audit conducted for Cellular Mobile (Wireless) services in Delhi circle.

1.4. COVERAGE

The audit was conducted in Delhi Circle covering all SSAs (Secondary Switching Areas).

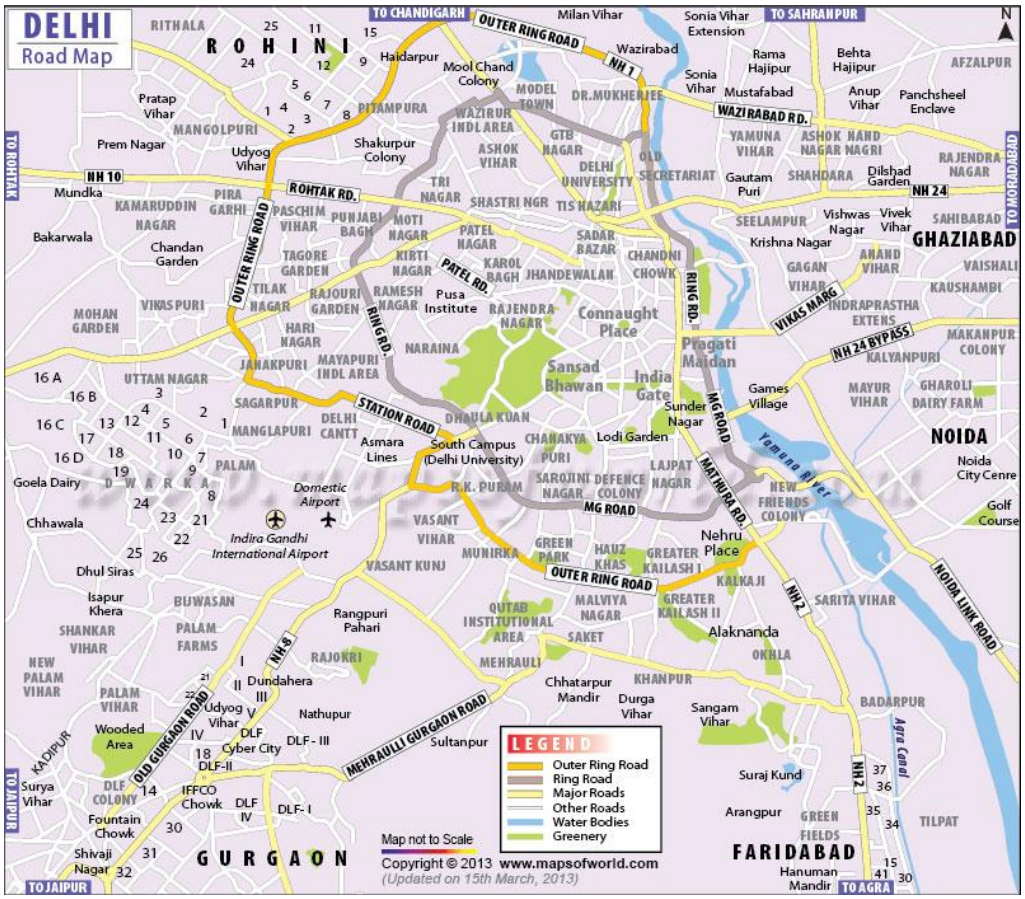
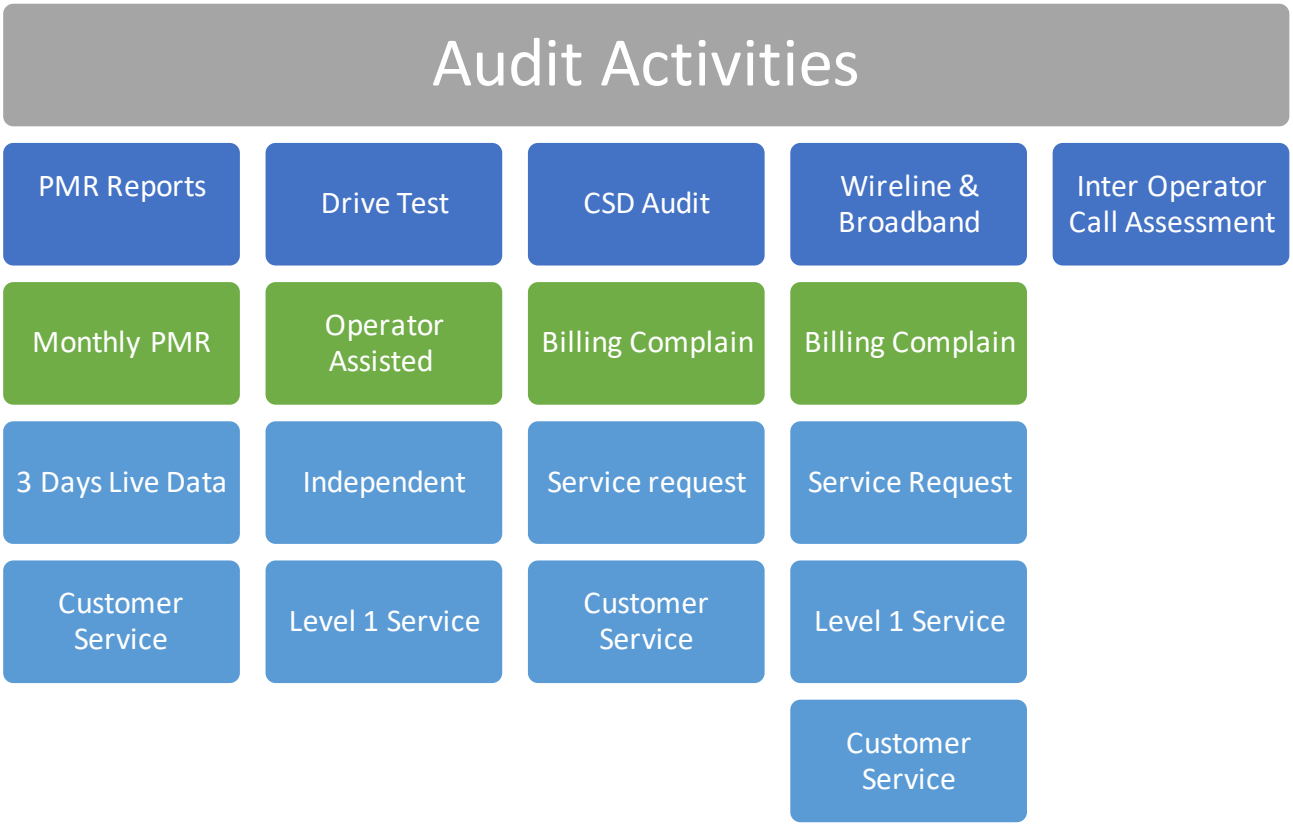


Image Source: Wikipedia

1.5. SSA LIST

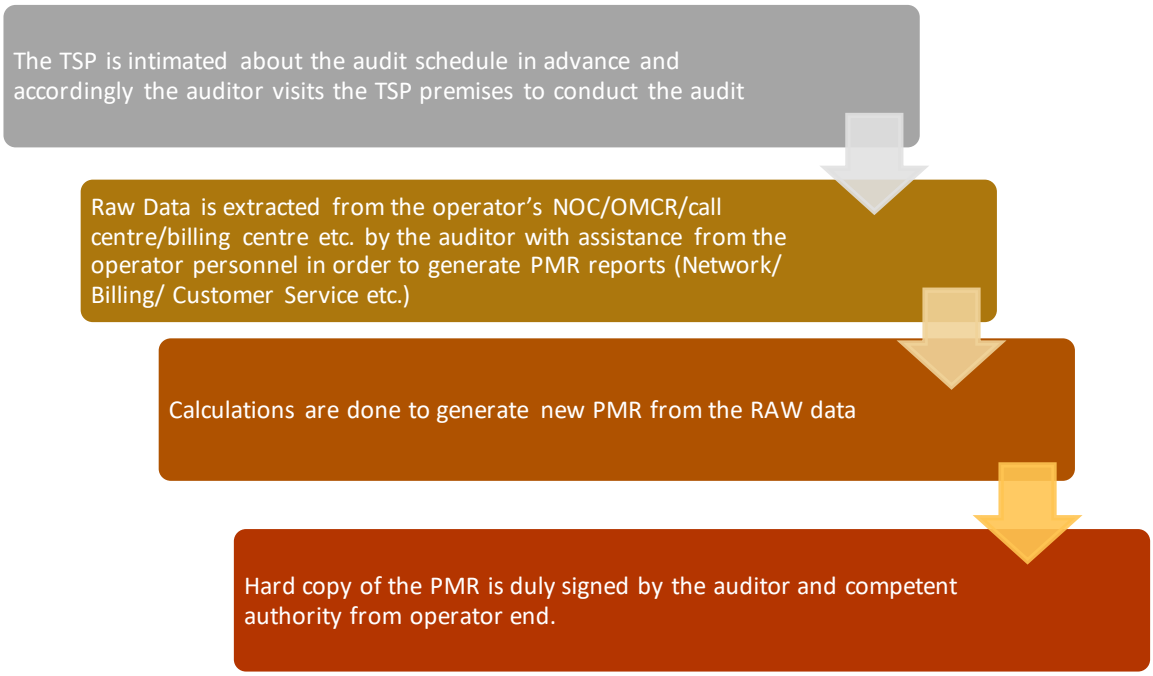
S. No.	Circle	SSA Name	SDCA Name
1	New Delhi	NEW DELHI	NEW DELHI

1.6. FRAMEWORK USED



2. PMR REPORTS

Significance and methodology: PMR or Performance Monitoring Reports are generated to assess the various Quality of Service parameters involved in the mobile telephony service, which indicate the overall health of service for an operator.



The PMR report for network parameters is taken for each month of the audit quarter and is extracted and verified in the first week of the subsequent month of the audit month. For example, January 2016 audit data was collected in the month of February 2016.

The PMR report for customer service parameters is extracted from Customer Service Centre and verified once every quarter in the subsequent month of the last month of the quarter. For example, data for quarter ending March 2016 was collected in the month of March 2016.

The raw data extracted from operator's systems is used to create PMR in the following three formats:

- Monthly PMR (Network Parameters)
- 3 Day Live Measurement Data (Network Parameters)
- Customer Service Data

Let us understand these formats in details.

2.1. MONTHLY PMR

This involved calculation of the various Quality of Service network parameters through monthly Performance Monitoring Reports (PMR). The PMR reports were generated from the data extracted from operator's systems by the auditor with the assistance of the operator at the operator's premises for the month of January, February and March 2016. The performance of operators on various parameters was assessed against the benchmarks.

Parameters includes:

Network Availability

- BTS accumulated downtime
- Worst affected BTS due to downtime

Connection Establishment (Accessibility)

- Call Set Up success Rate (CSSR)

Network Congestion Parameters

- SDCCH/Paging Channel Congestion
- TCH Congestion
- Point of Interconnection

Connection Maintenance

- Call Drop rate
- Worst affected cells having more than 3% TCH drop

Voice Quality

- % Connections with good voice quality

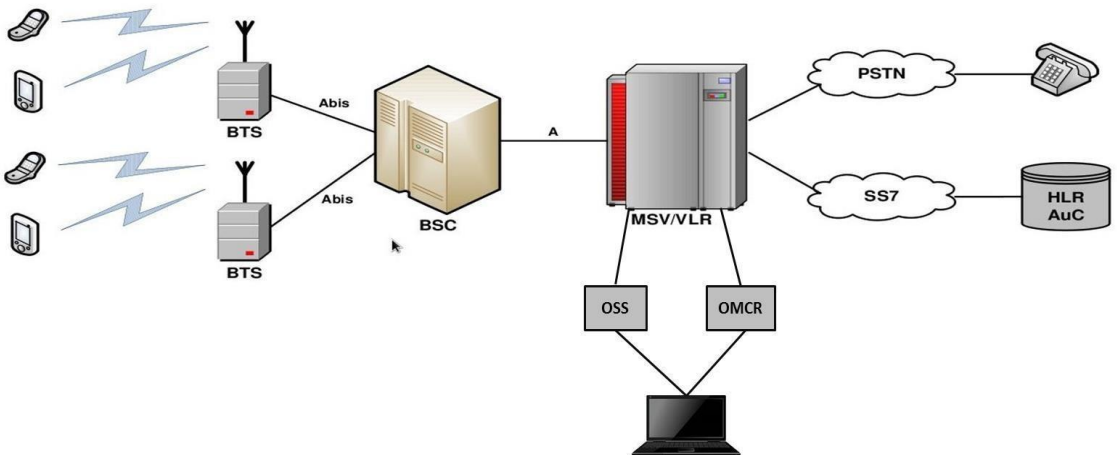
2.2. AUDIT PARAMETER: NETWORK

Let us now look at the various parameters involved in the audit reports.

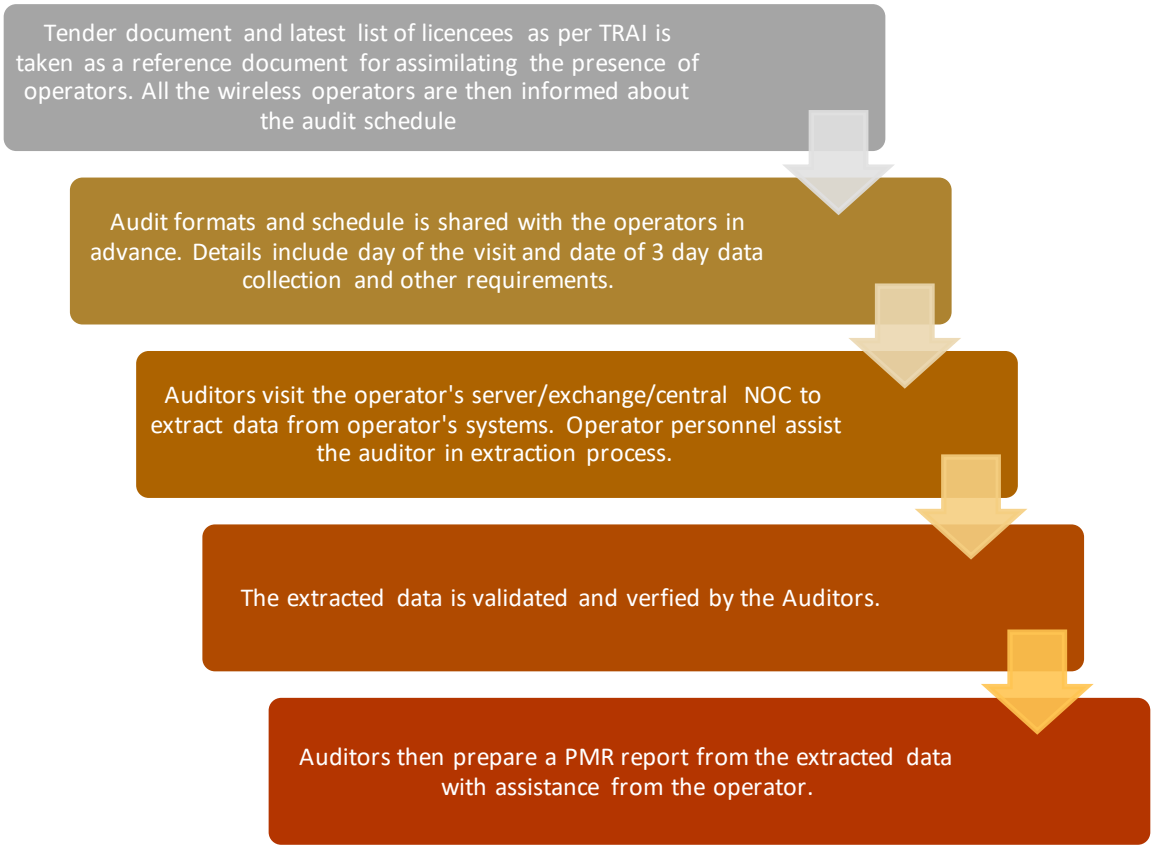
Network Availability	
BTSs Accumulated downtime (not available for service)	≤ 2%
Worst affected BTSs due to downtime	≤ 2%
Connection Establishment (Accessibility)	
Call Set-up Success Rate (within licensee's own network)	≥ 95%
SDCCH/ Paging Channel Congestion	≤ 1 %
TCH Congestion	≤ 2%
Connection Maintenance (Retainability)	
Call Drop Rate	≤ 2%
Worst affected cells having more than 3% TCH drop (call drop) rate	≤ 3%
Connections with good voice quality	≥ 95%
Point of Interconnection	
(POI) Congestion (on individual POI)	≤ 0.5%

2.3. DATA EXTRACTION POINTS

The data is extracted from a terminal/computer connected to NOC or OMCR or OSS on the operator network.



2.4. AUDIT PROCEDURE



Extracted data is calculated as per the counter details provided by the operators. The details of counters have been provided in the report. The calculation methodology for each parameter has been stated in the table given below:

2.5. NETWORK CALCULATION METHODOLOGY

Parameter	Calculation Methodology
BTS Accumulated Downtime	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month / (24 x Number of days in a month x Number of BTSs in the network in licensed service area) x 100
Worst Affected BTS Due to Downtime	(Number of BTSs having accumulated downtime greater than 24 hours in a month / Number of BTS in Licensed Service Area) * 100
Call Setup Success Rate	(Calls Established / Total Call Attempts) * 100
SDCCH/ Paging Channel Congestion	SDCCH / TCH Congestion% = [(A1 x C1) + (A2 x C2) +…….+ (An x Cn)] / (A1 + A2 +…+ An) Where: A1 = Number of attempts to establish SDCCH / TCH made on day 1 C1 = Average SDCCH / TCH Congestion % on day 1 A2 = Number of attempts to establish SDCCH / TCH made on day 2
TCH Congestion	C2 = Average SDCCH / TCH Congestion % on day 2 An = Number of attempts to establish SDCCH / TCH made on day n Cn = Average SDCCH / TCH Congestion % on day n
POI Congestion	POI Congestion% = [(A1 x C1) + (A2 x C2) +…….+ (An x Cn)] / (A1 + A2 +…+ An) Where: A1 = POI traffic offered on all POIs (no. of calls) on day 1 C1 = Average POI Congestion % on day 1 A2 = POI traffic offered on all POIs (no. of calls) on day 2 C2 = Average POI Congestion % on day 2 An = POI traffic offered on all POIs (no. of calls) on day n Cn = Average POI Congestion % on day n
Call Drop Rate	Total Calls Dropped / Total Calls Established x 100
Worst Affected Cells having more than 3% TCH drop	Total number of cells having more than 3% TCH drop during CBBH/ Total number of cells in the LSA x 100
Connections with good voice quality	No. of voice samples with good voice quality / Total number of samples x 100

2.6. 3G VOICE

S. No.	Name of Parameter	Definition	Formula	Benchmark
1	Network Availability			
a.	Total no. of Node B's in LSA	Total no. of Node B's Licensed in LSA		
b.	Total downtime of all Node B's	When all the sector(s) of a Node B's are down for > 60 minutes at an instant in a whole day		
c.	No. of Worst Affected Node B's	Node B'ss having more than 24 hours of Downtime in 3 Days	No. of Node B's having accumulated downtime of >24 hours in a month ((No. of Node B's having Accumulated Downtime of > 24 hrs in a month) / Total no. of BTSs in the licensed service area)*100	<=2%
d.	Node B's accumulated downtime	Node B's downtime more than 24 hr in 3 days	Total no. of Node B's in the Licensed Service Area Sum of downtime of Node B's in a month in hours i.e. total outage time of all Node B's in hours in a month [(Sum of downtime of Node B's in a month in hrs)/(24* no. of days in the month*no. of Node B's in the licensed service area)]*100	<=2%
2	Connection Establishment (Accessibility)			
a.	Call Setup Success Rate:	It is the % of total no. of call established to the total no. of call attempt	Total No. of Voice Call Attempts Total No. of Voice Call Establishment CSSR (Call Setup Success Rate = (Total No. of Voice Call Attempts/ Total No. of Voice Call Establishment)*100)	>=95%
b.	RRC Congestion:	RRC Congestion rate is the % of Total No. of RRC Failed Calls to the Total no. of RRC Assigned Calls	RRC Attempts (RRC Connection Access) (A) RRC Failed (RRC Connection Access Failed) (B) RRC Congestion (%) [B/A]*100	<=1%
c.	RAB Congestion:	RAB Congestion rate is the % of Total No. of RAB Failed Calls to the Total no. of RAB Assigned Calls	RAB Attempts (RAB Setup Access) (C) RAB Failed (RAB Setup Access Failed) (D) RAB Congestion (%) [D/C]*100	<=2%
3	Connection Maintenance (Retainability)			
a.	Circuit Switched Voice Drop Rate	It is the % of total no. of Dropped Calls to the total no. of Calls Established	Total Established Calls (A) Calls Dropped after Establishment (B) Call Drop Rate [B/A]*100	<=2%
b.			Total No. of Cells (Sector)	<=3%

	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	It is the % of total no. of Cells having > 3% Circuit Switched Voice drop to the total no. cells	Total No. of Cells exceeding 3% Circuit Switched Voice Drop Rate in CBBH (Cell Bouncing Busy Hour) % of cells having more than 3% Circuit Switched Voice Drop Rate [(No. of cells having Circuit Switched Voice Drop Rate > 3% during CBBH in 31 days*100) / Total no. of cells in the licensed service area]	
c.	Percentage of connections with Good Circuit Switched Voice Quality	It can be defined as the % of Good Voice Quality Samples to the total No. of Quality Samples	Percentage of connection with Good Circuit Switched Voice Quality	*>=95%*
4	Total No. of POI's in Month having >=0.5% POI congestion	Total no. Of POI's which are exceeding the POI congestion more than 0.5 %.	Total No. of call attempts on POI Total traffic served on all POIs (Erlang) Total No. of circuits on all individual POIs Total number of working POI Service Area wise Capacity of all POIs No. of all POI's having >=0.5% POI congestion Name of POI not meeting the benchmark (having >=0.5% POI congestion)	<=0.5%

2.7. 2G & 3G WIRELESS

S. No.	Name of Parameter	Definition	Formula	Benchmark
1	Service Activation/ Provisioning	This refers to the activation of services after activation of the SIM. This involves programming the various databases with the customer's information and any gateways to standard Internet chat or mail services or any data services.	Total No. of Subscribers for Service Activation (A) Total Service Activations provided within 4 Hours (B) Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*
2	PDP Context Activation Success Rate	PDP Context Activation Success Rate is the ratio of total number of successfully completed PDP context activations to the total attempts of context activation	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) PDP Context Activation Success Rate =(B/A) *100	>=95%
3	Drop Rate	It measures the inability of Network to maintain a connection and is defined as the ratio of abnormal disconnects w.r.t. all disconnects.	RNC originated PS Domain Iu Connection Setup Success (A) RNC originated PS Domain Iu Connection Release (B) Drop Rate = (B/A) * 100	<=5%

3. 3 DAYS LIVE DATA

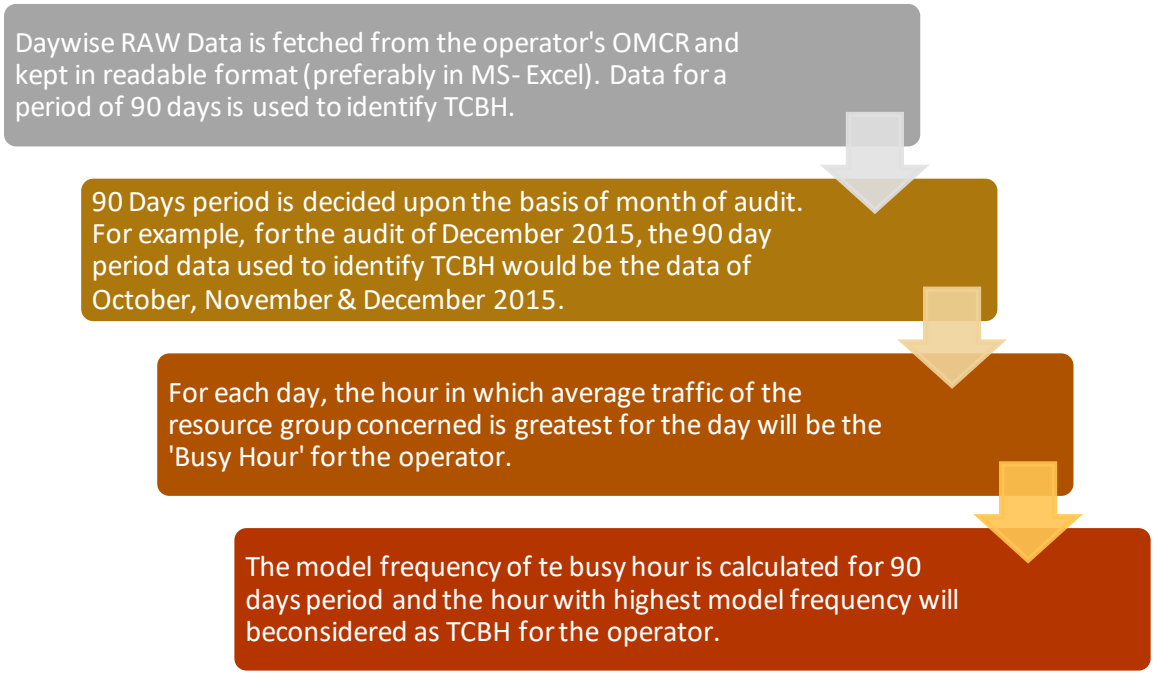
The main purpose of 3 day live measurement is to evaluate the network parameters on intraday basis. While the monthly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the network parameters discussed earlier. All the calculations are done on the basis of that raw data of 3 days.

The 3 day live data provides a sample of 9 days in a quarter (3 days each month of a quarter) with hourly performance, which enables the auditor to identify and validate intraday issues for an operator on the QOS network parameters. For example, network congestion being faced by an operator during busy/peak hours.

Network related parameters were evaluated for a period of 3 days in each month. 3 day live audit was conducted for 3 consecutive weekdays for each month. The data was extracted from each operator's server/ NOC etc. at the end of the 3rd day. The extracted data is then used to create a report (similar to PMR report) to assess the various QoS parameters.

3.1. TCBH: SIGNIFICANCE AND SELECTION METHODOLOGY

As per QoS regulations 2009 (7 of 2009), Time Consistent Busy Hour" or "TCBH" means the one hour period starting at the same time each day for which the average traffic of the resource group concerned is greatest over the days under consideration and such Time Consistent Busy Hour shall be established on the basis of analysis of traffic data for a period of ninety days.



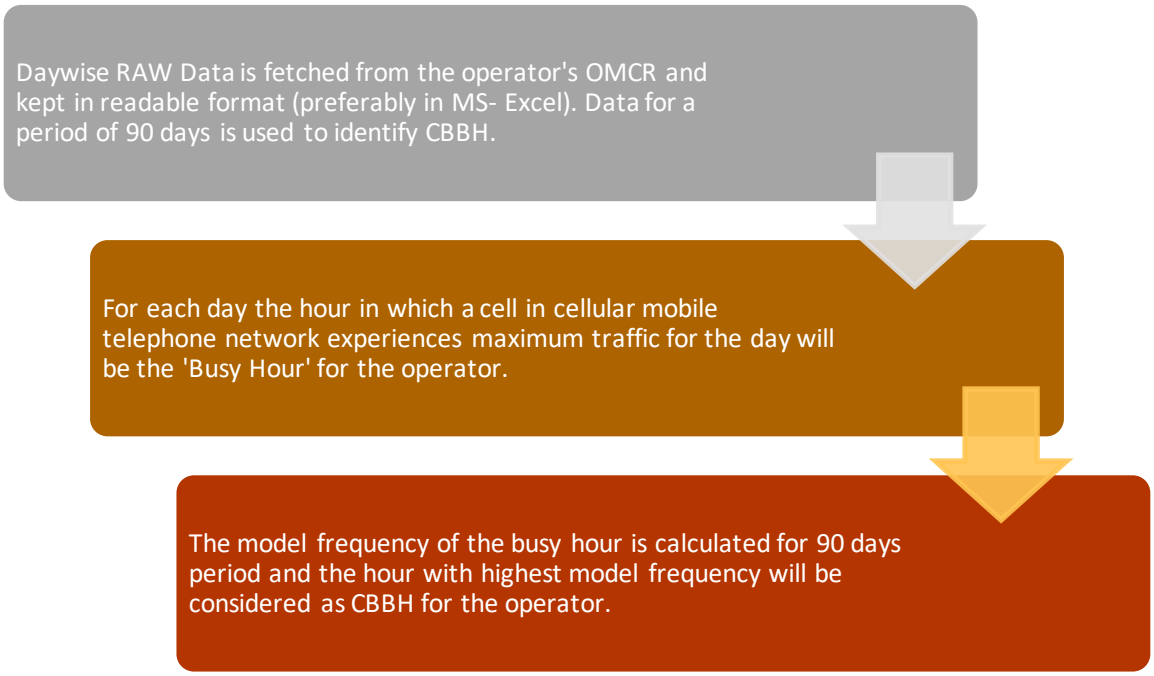
During audit, the auditors identified from the raw data that the TCBH for the operators in Jan – Feb – Mar 2016 was the time period as given below:

Aircel	Airtel	MTNL	Idea	RCOM GSM	RCOM CDMA	MTS	TTSL CDMA	Vodafone
19:00-20:00	19:00-20:00	19:00-20:00	19:00-20:00	19:00-20:00	19:00-20:00	19:00-20:00	19:00-20:00	19:00-20:00

3.2. CBBH: Significance and Selection Methodology

As per QoS regulations 2009 (7 of 2009), Cell Bouncing Busy Hour (CBBH) means the one hour period in a day during which a cell in cellular mobile telephone network experiences the maximum traffic.

Step by step procedure to identify CBBH for an operator:



4. CUSTOMER SERVICE PARAMETERS

The data to generate PMR report for customer service parameters is extracted at the operator premises and verified once every quarter in the subsequent month of the last month of the quarter. For example, data for quarter ending March 2016 was collected in the month of March 2016. To extract the data for customer service parameters for the purpose of audit, auditors primarily visit the following locations/ departments/ offices at the operator's end.

- Central Billing Center
- Central Customer Service Center

The operators are duly informed in advance about the audit schedule.

The Customer Service Quality Parameters include the following:

- Metering and billing credibility (post-paid and prepaid)
- Resolution of billing/charging complaints
- Period of applying credit/waiver/adjustment to customer's account
- Response time to the customer for assistance
- Termination/closure of service
- Time taken for refund of security deposit after closures.

Most of the customer service parameters were calculated by averaging over the quarter; however billing parameters were calculated by averaging over one billing cycle for a quarter. All the parameters have been described in detail along with key findings of the parameter in the report.

The benchmark values for each parameter have been given in the table below.

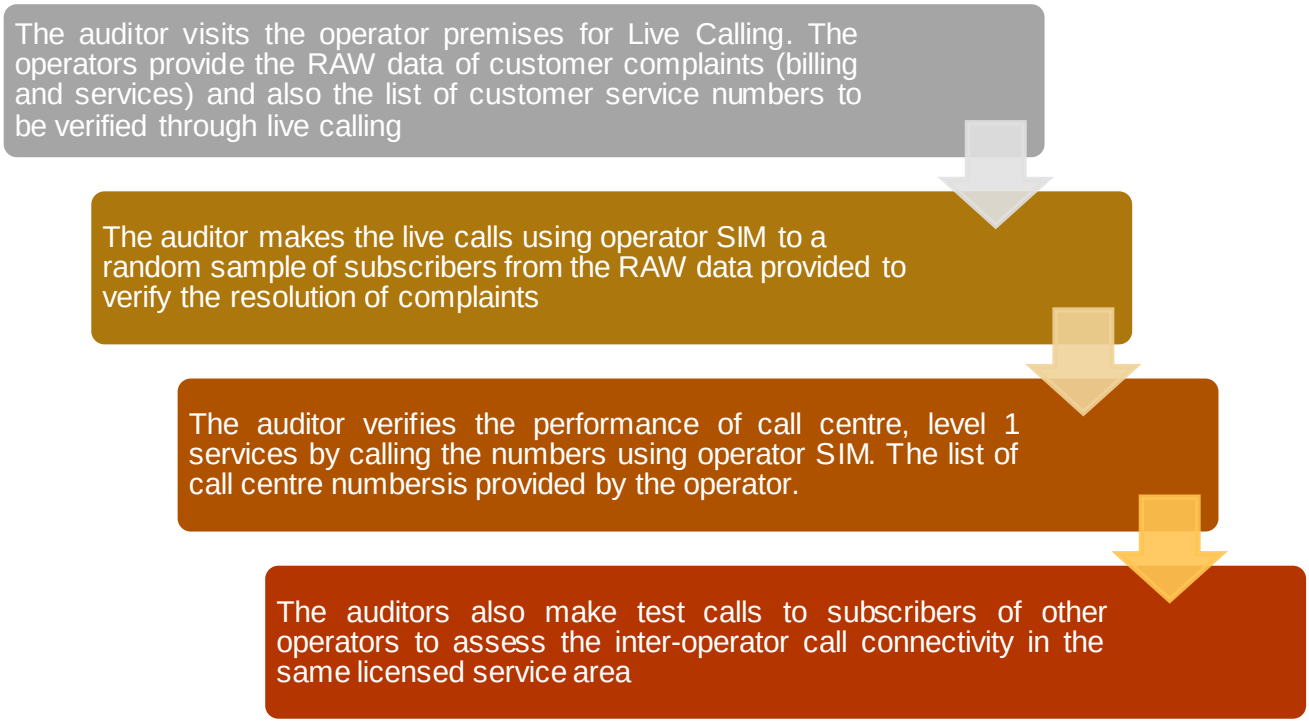
4.1. AUDIT PARAMETERS: CUSTOMER SERVICE

Metering and Billing Credibility	Benchmark
No of billing complaints received - Post paid	≤ 0.1%
No. of billing complaints received- Prepaid	≤ 0.1%
Resolution of billing/ charging complaints within 4 weeks	98%
Resolution of billing/ charging complaints within 6 weeks	100%
Period of applying credit/ waiver within 1 week of resolution of complaint	100%
Response Time to the Customer form Assistance	
Accessibility of call centre/customer care	≥ 95%
Percentage of calls answered by the operators (voice to voice) within 90 seconds	≥ 95%
Termination/ closure of service	≤ 7 days
Time taken for refund of deposits after closures within 60 days	100%

4.2. CALCULATION METHODOLOGY: CUSTOMER SERVICE PARAMETER

Parameter	Calculation Methodology
Metering and billing credibility : Post-paid	Total billing complaints received during the relevant billing cycle / Total bills generated during the relevant billing cycle *100
Metering and billing credibility : Pre-paid	Total charging complaints received during the quarter/ Total number of subscribers reported by the operator at the end of the quarter * 100
Resolution of billing/ charging complaints (Post-paid + Pre-paid)	There are two benchmarks involved here: Billing or Charging Complaints resolved in 4 weeks from date of receipt / Total billing or charging complaints received during the quarter) x 100 Billing or Charging Complaints resolved in 6 weeks from date of receipt / Total billing or charging complaints received during the quarter) x 100
Period of applying credit waiver	Number of cases where credit waiver is applied within 7 days/ total number of cases eligible for credit waiver * 100
Call centre performance IVR (Calling getting connected and answered by IVR)	Number of calls connected and answered by IVR/ All calls attempted to IVR * 100
Call centre performance (Voice to Voice)	Call centre performance Voice to Voice = (Number of calls answered by operator within 90 seconds/ All calls attempted to connect to the operator) * 100 The calculation excludes the calls dropped before 90 seconds
Time taken for termination/ closure of service	Number of closures done within 7 days/ total number of closure requests * 100
Time taken for refund for deposit after closures	Number of cases of refund after closure done within 60 days/ total number of cases of refund after closure * 100

4.3. LIVE CALLING: SIGNIFICANCE AND METHODOLOGY



Live calling activity was carried out during the period of March 2016. The data considered for live calling was for the month prior to the month in which the live calling activity was being conducted. In this case, data of January 2016 was considered for live calling activity conducted in February 2016.
A detailed explanation of each parameter is explained below:

4.4. BILLING COMPLAINTS

Live calling is done to verify Resolution of billing complaints within stipulated time. The process for this parameter is stated below:

- Auditors request the operator provided the database of all the subscribers who reported billing complaints in one month prior to the auditor visit. In case of BSNL, data for the complaints from the subscribers belonging to the sample exchanges is requested specifically.
- A sample of 10% or 100 complainants, whichever is less, is selected randomly from the list provided by operator.

Calls are made by auditors to the sample of subscribers to check and record whether the complaint was resolved within the timeframes as mentioned in the benchmark.

All the complaints related to billing as per clause 3.7.2 of QoS regulation of 20th June, 2016 were considered as population for selection of samples.

TRAI Benchmark: Resolution of billing/ charging complaints: 98% within 4 weeks, 100% within 6 weeks.

4.5. Service Complaints Requests

"Service request" means a request made to a service provider by its consumer pertaining to his account, and includes:

- A request for change of tariff plan
- A request for activation or deactivation of a value added service or a supplementary service or a special pack
- A request for activation of any service available on the service provider's network
- A request for shift or closure or termination of service or for billing details

All the complaints other than billing were covered. A total of 100 calls per service provider for each service in licensed service area were done by the auditors.

4.6. Level 1

Level 1 is used for accessing special services like emergency services, supplementary services, inquiry and operator-assisted services.

Level 1 Services include services such as police, fire, ambulance (Emergency services). Test calls were made from operator SIMs. A total of 150 test calls were made per service provider in the quarter.

While most of the Level 1 services are toll free, it has been observed that some Level 1 services may not be toll free. In January, February and March'15, auditor has tried contacting the list of Level 1 services provided by TRAI as per the NNP (National Numbering Plan).

4.6.1. Process to Test Level 1 Service

- During the operator assisted drive test, auditors ask the operator authorized personnel to make 5 calls in each SDCA on the Level 1 Service numbers provided by TRAI. The list contains a description of the numbers along with dialling code.
- Operators might also provide a list of L1 services. To identify emergency L1 service numbers, auditors check if there is any number that starts with code '10' in that list. If auditors find any emergency number in addition to the below list, that number is also tested during live calling.
- On receiving the list, auditors verify it if the below given list of numbers are active in the service provider's network.
- If there are any other additional numbers provided by the operator, auditors also do live calling on those numbers along with below list.
- If any of these numbers is not active, then we would write the same in our report, auditors write in the report.
- Post verifying the list, auditors do live calling by equally distributing the calls among the various numbers and update the results in the live calling sheet.

L1 Number Details
100 Police
101 Fire
102 Ambulance
104 Health Information Helpline

108 Emergency and Disaster Management Helpline
138 All India Helpine for Passangers
149 Public Road Transport Utility Service
181 Chief Minister Helpline
182 Indian Railway Security Helpline
1033 Road Accident Management Service
1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'
1056 Emergency Medical Services
106X State of the Art Hospitals - AIIMS
1063 Public Grievance Cell DoT Hq
1064 Anti Corruption Helpline
1070 Relief Commission for Natural Calamities
1071 Air Accident Helpline
1072 Rail Accident Helpline
1073 Road Accident Helpline
1077 Control Room for District Collector
1090 Call Alart (Crime Branch)
1091 Women Helpline
1097 National AIDS Helpline to NACO
1099 Central Accident and Trauma Services (CATS)
10580 Educational& Vocational Guidance and Counselling
10589 Mother and Child Tracking (MCTH)
10740 Central Pollution Control Board
10741 Pollution Control Board
1511 Police Related Service for all Metro Railway Project
1512 Prevention of Crime in Railway
1514 National Career Service(NCS)
15100 Free Legal Service Helpline
155304 Municipal Corporations
155214 Labour Helpline
1903 Sashastra Seema Bal (SSB)
1909 National Do Not Call Registry
1912 Complaint of Electricity
1916 Drinking Water Supply
1950 Election Commission of India

4.7. CUSTOMER CARE

Live calling is done to verify response time for customer assistance is done to verify the performance of call centre in terms of:

- Calls getting connected and answered by operator's IVR.
- % age of calls answered by operator / voice to voice) within 90 seconds: In 95% of the cases or more

The process for this parameter is stated below:

- Overall sample size is 100 calls per service provider per circle at different points of time, evenly distributed across the selected exchanges – 50 calls between 1100 HRS to 1400 HRS and 50 calls between 1600 HRS to 1900 HRS.

- Time to answer the call by the operator was assessed from the time interviewer pressed the requisite button for being assisted by the operator.
- All the supplementary services that have any kind of human intervention are to be covered here. It also includes the IVR assisted services.

4.8. INTER OPERATOR CALL ASSESSMENT

A total of 5 calls per service provider to all the other service providers in a licensed service area were done for the purpose of audit.

Inter Operator Call Assessment	Aircel	Airtel	MTNL	Idea	RCOM GSM	RCOM CDMA	TTSL CDMA	Vodafone	MTS
Aircel	-	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%	100%
MTNL	100%	100%	-	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	-	100%	100%	100%	100%	100%
RCOM GSM	100%	100%	100%	100%	-	100%	100%	100%	100%
RCOM CDMA	100%	100%	100%	100%	100%	-	100%	100%	100%
TTSL CDMA	100%	100%	100%	100%	100%	100%	-	100%	100%
Vodafone	100%	100%	100%	100%	100%	100%	100%	-	100%
MTS	100%	100%	100%	100%	100%	100%	100%	100%	-

5. DRIVE TEST: SIGNIFICANCE AND METHODOLOGY

Drive test, as the name suggests, is conducted to measure the outdoor coverage in a moving vehicle in a specified network coverage area.

The main purpose of the drive test is to check the health of the mobile network of various operators in the area in terms of coverage (signal strength), voice quality, call drop rate, call set up success rate etc.

To assess the indoor coverage, the test is also conducted at two static indoor locations in each SSA, such as Malls, office buildings, shopping complexes, government buildings etc.

There are two types of drive test as mentioned below.

- Operator Assisted Drive Test
- Independent Drive Test

The main difference between the two is that in the operator assisted, operators participate in the drive test along with their hardware, software, phones etc. while in the independent drive test PhiStream conducts the drive test on solitary basis and uses its own hardware. Operators generally do not have any knowledge of the independent drive test being conducted.

5.1. OPERATOR ASSISTED DRIVE TEST

Delhi circle consist of total one SSA's and it needs to be audited in the span of 12 months.

The methodology adopted for the drive test:

- 3 consecutive days drive test in each SSA. SSA would be defined as per DOT guidelines and month wise SSA list is finalized by regional TRAI office.
- On an average, a minimum of 80 kilometres are covered each day
- Route map was designed in such a way that all the major roads, highways and all the important towns and villages were covered as part of audit.
- Special emphasis was given to those areas where the number of complaints received were on the higher side, if provided by TRAI.
- The route is defined in a way that we cover maximum area in the SSA and try to cover maximum villages and cities within the SSA. The route is designed such that there is no overlap of roads and we can start from the point from where we had left last day (if possible).
- The route was classified as – Within City, Major Roads, Highways, Shopping complex/ Mall and Office Complex/ Government Building
- There were no fixed calls which we need to do for within city, major roads and highways, but a minimum of 30 calls in each route, i.e., within city, major roads and highways on each day. For indoors, 20 calls each for shopping and office complex each day preferably in relatively bigger city.
- The drive test covered selected cities and adjoining towns/rural areas where the service provider has commenced service, including congested areas and indoor sites.
- The drive test of each mobile network was conducted between 10 am and 8 pm on weekdays.
- The Vehicle used in the drive tests was equipped with the test tool that automatically generates calls on the mobile telephone networks.
- The speed of the vehicle was kept at around 30 km/hr.
- The holding period of each test call was 120 seconds.
- A test call was generated 10 seconds after the previous test call is completed.

- Height of the antenna was kept uniform in case of all service providers.

5.2. INDEPENDENT DRIVE TEST

The number of independent drive tests to be conducted and their locations are Marided basis TRAI recommendation.

- A minimum of 80 kilometres was traversed during the independent drive test in a SSA. The SSA would be defined as per BSNL and SSA list will be finalized by regional TRAI office.
- Route map was designed in such a way that all the major roads, highways and all the important towns and villages were covered as part of audit.
- Special emphasis was given to those areas where the number of complaints received were on the higher side, if provided by TRAI.
- The route is defined in a way that we cover maximum area in the SSA and try to cover maximum villages and cities within the SSA. The route is designed such that there is no overlap of roads (if possible).
- The route was classified as – Within city, Major Roads, Highways, Shopping complex / Mall and Office Complex/ Government Building
- There were no fixed calls which we need to do for within city, major roads and highways, but a minimum of 30 calls in each route, i.e., within city, major roads and highways on each day. For indoors, 20 calls each for shopping and office complex each day preferably in relatively bigger city.
- The drive test covered selected cities and adjoining towns/rural areas where the service provider has commenced service, including congested areas and indoor sites.
- The drive test of each mobile network was conducted between 10 am and 8 pm on weekdays.
- The Vehicle used in the drive tests was equipped with the test tool that automatically generates calls on the mobile telephone networks.
- The speed of the vehicle was kept at around 30 km/hr.
- The holding period of each test call was 120 seconds.
- A test call was generated 10 seconds after the previous test call is completed.
- Height of the antenna was kept uniform in case of all service providers.

5.3. PARAMETERS EVALUATED DURING DRIVE TEST

The parameters which were captured during the drive test include. Below are the parameters which are captured for the GSM and CDMA operators.

- Coverage-Signal strength (GSM)
  - Total calls made (A)
  - Number of calls with signal strength between 0 to -75 dBm
  - Number of calls with signal strength between 0 to -85 dBm
  - Number of calls with signal strength between 0 to -95 dBm
- Coverage-Signal strength (CDMA)
  - Total Ec/Io BINS (A)
  - Total Ec/Io BINS with less than –15 (B)
  - Low Interference = [1 - (B/A)] x 100
- Voice quality (GSM)
  - Total RxQual Samples– A
  - RxQual samples with 0-5 value – B
  - %age samples with good voice quality = B/A x 100

- Voice quality (CDMA)
  - Total FER BINs (forward FER) – A
  - FER BINs with 0-2 value (forward FER) – B
  - FER BINs with 0-4 value (forward FER) – C
  - %age samples with FER bins having 0-2 value (forward FER) = B/A x 100
  - %age samples with FER bins having 0-4 value (forward FER) = C/A x 100
  - No. of FER samples with value > 4 = [A-C]
- Call setup success rate
  - Total number of call attempts – A
  - Total Calls successfully established – B
  - Call success rate (%age) = (B/A) x 100
- Blocked calls
  - 100% - Call Set up Rate
- Call drop rate
  - Total Calls successfully established – A
  - Total calls dropped after being established – B
  - Call Drop Rate (%age) = (B/A) x 100

6. EXECUTIVE SUMMARY

The objective assessment of Quality of Service (QoS) carried out gives an insight into the overall performance of various operators in the Delhi Circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

6.1. OPERATORS COVERED

Name of Operator	Number of Subscriber (Up to March 31, 2016)
Aircel	6104002
Airtel	11207790
Idea	6151925
MTNL	2316792
MTS	924066
RCOM CDMA	3053784
RCOM GSM	5422773
TTSL CDMA	2461078
Vodafone	10045493

TSP	No. of cells	BTS	BSC	MSC+GMSC	Node B	RNC
AIRCEL	11884	4064	23	6+1	NA	NA
AIRTEL	17606	6630	62	23+10	6617	27
IDEA	14731	5094	50	7+3	3060	3
MTS	4095	1047	6	1	NA	NA
MTNL	3219	1128	31	4+2	DNA	DNA
RCOM GSM	6877	2504	14	4+1	2252	4
RCOM CDMA	2648	900	DNA	5+2	NA	NA
TTSL CDMA	5122	1471	8	4+4	NA	NA
VODAFONE	16658	6345	56	6 + 9	6110	25

Note: Node B & RNC is marked as Not Applicable (N.A.) for the services providers who do not have 3G services licence in the circle.

6.2. AUDIT SCHEDULE

OPERATOR	3 Days Live Jan-16	Jan-16	Feb-16	Mar-16
AIRCEL	16th Jan 2016	10th Feb 2016	15th Mar 2016	16th April 2016
AIRTEL	8th Jan 2016	9th Feb 2016	10th Mar 2016	8th April 2016
IDEA	11th Jan 2016	6th Feb 2016	9th Mar 2016	11th April 2016
MTS	20th Jan 2016	5th Feb 2016	8th Mar 2016	20th April 2016
MTNL	14th Jan 2016	19th Feb 2016	16th Feb 2016	14th April 2016
RCOM (GSM + CDMA)	21st Jan 2016	17th Feb 2016	11th Mar 2016	21st April 2016
TTSL CDMA	19th Jan 2016	10th Feb 2016	7th Mar 2016	19th April 2016
VODAFONE	13th Jan 2016	13th Feb 2016	15th Mar 2016	13th April 2016

Note: Audit schedule mentioned above is for the PMR audit for the last month. 3 day live monitoring for the current month was carried along with the PMR audit.

Colour codes to read the report:

	Not meeting the benchmark
NA	Not Applicable
DNA	Data not available (at TSP premises)

6.3. 2G VOICE PMR DATA: JANUARY

Jan-16										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.13%	0.01%	0.03%	0.05%	0.12%	0.02%	3.44%	0.03%	0.16%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.30%	0.00%	0.00%	0.00%	0.09%	0.00%	0.08%	0.00%	0.70%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.62%	99.86%	99.21%	99.09%	96.78%	96.92%	97.36%	99.27%	98.88%
	SDDCH/Paging chl. Congestion	≤ 1%	0.22%	0.04%	0.42%	0.00%	0.44%	0.00%	0.47%	0.00%	0.30%
	TCH Congestion	≤ 2%	1.63%	0.03%	0.34%	0.14%	1.77%	1.26%	1.13%	0.06%	0.55%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.75%	0.75%	0.69%	0.25%	1.82%	0.17%	0.14%	0.23%	1.15%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	3.09%	1.13%	2.46%	1.30%	2.58%	0.81%	0.57%	1.00%	2.69%
	%age of connection with good voice quality	≥ 95%	96.56%	99.16%	98.17%	99.20%	97.05%	99.38%	98.58%	99.19%	98.02%

6.4. 2G VOICE PMR DATA: FEBRUARY

Feb-16										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.13%	0.01%	0.03%	0.03%	0.12%	0.03%	0.04%	0.03%	0.14%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.30%	0.00%	0.00%	0.00%	0.36%	0.00%	0.04%	0.00%	0.45%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.62%	98.98%	98.93%	99.12%	96.76%	96.64%	97.01%	99.31%	99.11%
	SDDCH/Paging chl. Congestion	≤ 1%	0.25%	0.04%	0.55%	0.00%	0.42%	0.00%	0.68%	0.00%	0.20%
	TCH Congestion	≤ 2%	1.56%	0.03%	0.54%	0.09%	1.77%	1.27%	1.21%	0.04%	0.83%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.70%	0.72%	0.67%	0.24%	1.83%	0.21%	0.13%	0.22%	1.12%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.92%	1.11%	2.29%	1.23%	2.54%	1.28%	0.56%	0.99%	2.68%
	%age of connection with good voice quality	≥ 95%	96.38%	99.14%	98.17%	99.20%	97.24%	99.36%	98.50%	99.20%	97.90%

6.5. 2G VOICE PMR DATA: MARCH

Mar-16										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.13%	0.01%	0.03%	0.04%	0.10%	0.07%	0.04%	0.04%	0.17%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.22%	0.00%	0.00%	0.00%	0.18%	0.00%	0.16%	0.07%	0.84%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.61%	98.95%	98.92%	99.10%	96.83%	97.25%	96.64%	99.13%	99.05%
	SDDCH/Paging chl. Congestion	≤ 1%	0.28%	0.06%	0.57%	0.00%	0.53%	0.00%	0.84%	0.00%	0.18%
	TCH Congestion	≤ 2%	1.16%	0.03%	0.53%	0.08%	1.78%	0.60%	1.42%	0.21%	0.95%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.82%	0.72%	0.65%	0.27%	1.80%	0.28%	0.13%	0.23%	1.12%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.86%	1.65%	2.08%	1.22%	2.49%	0.73%	0.47%	1.30%	2.64%
	%age of connection with good voice quality	≥ 95%	96.06%	99.16%	98.20%	99.19%	97.32%	99.76%	98.93%	99.20%	97.79%

6.6. 2G VOICE PMR DATA: CONSOLIDATED

Consolidated											
Network Parameters		Name of Service Provider									
		Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.13%	0.01%	0.03%	0.04%	0.11%	0.04%	1.17%	0.03%	0.16%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.27%	0.00%	0.00%	0.00%	0.21%	0.00%	0.09%	0.02%	0.66%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.62%	99.26%	99.02%	99.11%	96.79%	96.94%	97.00%	99.24%	99.02%
	SDDCH/Paging chl. Congestion	≤ 1%	0.25%	0.05%	0.51%	0.00%	0.46%	0.00%	0.66%	0.00%	0.23%
	TCH Congestion	≤ 2%	1.45%	0.03%	0.47%	0.10%	1.77%	1.04%	1.25%	0.10%	0.78%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.76%	0.73%	0.67%	0.25%	1.82%	0.22%	0.13%	0.23%	1.13%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.96%	1.30%	2.28%	1.25%	2.54%	0.94%	0.53%	1.10%	2.67%
	%age of connection with good voice quality	≥ 95%	96.33%	99.16%	98.18%	99.20%	97.20%	99.50%	98.67%	99.20%	97.91%

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6.7. 2G VOICE 3 DAYS LIVE DATA

A three day live measurement was conducted to measure the QoS provided by the operators. It was seen from the live data collected, that the performance of the operators across all parameters more or less corroborated with the audit data collected.

6.8. 2G VOICE 3 DAYS LIVE DATA: JANUARY

Jan-16										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.17%	0.02%	0.04%	0.03%	0.01%	0.00%	0.05%	0.03%	0.17%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.80%	99.87%	99.24%	99.13%	96.93%	97.08%	98.26%	99.22%	98.95%
	SDDCH/Paging chl. Congestion	≤ 1%	0.29%	0.03%	0.38%	0.00%	0.38%	0.00%	0.35%	0.00%	0.20%
	TCH Congestion	≤ 2%	1.34%	0.02%	0.32%	0.12%	1.74%	1.27%	0.97%	0.07%	0.45%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.70%	0.76%	0.70%	0.25%	1.77%	0.14%	0.15%	0.39%	1.18%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.65%	0.97%	2.39%	1.18%	2.76%	0.86%	1.94%	2.46%	2.79%
	%age of connection with good voice quality	≥ 95%	96.56%	99.15%	98.20%	99.20%	97.03%	99.33%	98.57%	99.12%	98.04%

6.9. 2G VOICE 3 DAYS LIVE DATA: FEBRUARY

Feb-16										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.14%	0.02%	0.02%	0.04%	0.01%	0.02%	0.03%	0.03%	0.20%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.52%	99.03%	99.18%	99.04%	96.77%	96.63%	97.77%	98.87%	99.11%
	SDDCH/Paging chl. Congestion	≤ 1%	0.15%	0.06%	0.33%	0.00%	0.40%	0.00%	0.47%	0.00%	0.29%
	TCH Congestion	≤ 2%	1.20%	0.02%	0.37%	0.18%	1.63%	1.27%	0.72%	0.40%	0.36%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.71%	0.78%	0.69%	0.23%	1.82%	0.24%	0.13%	0.27%	1.21%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.99%	1.04%	2.33%	1.50%	2.49%	1.64%	1.67%	0.74%	2.71%
	%age of connection with good voice quality	≥ 95%	96.57%	99.13%	98.23%	99.20%	97.27%	99.25%	98.62%	99.16%	97.83%

6.10. 2G VOICE 3 DAYS LIVE DATA: MARCH

Mar-16										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.08%	0.03%	0.02%	0.04%	0.01%	0.01%	0.06%	0.04%	0.17%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.63%	98.93%	99.03%	98.90%	96.66%	97.31%	97.11%	98.07%	98.93%
	SDDCH/Paging chl. Congestion	≤ 1%	0.24%	0.10%	0.45%	0.00%	0.63%	0.00%	0.81%	0.00%	0.31%
	TCH Congestion	≤ 2%	1.22%	0.03%	0.45%	0.27%	1.65%	0.80%	1.35%	1.09%	1.07%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.72%	0.76%	0.66%	0.26%	1.77%	0.23%	0.11%	0.46%	1.21%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	3.28%	1.71%	2.07%	1.02%	2.55%	0.55%	1.16%	1.64%	2.62%
	%age of connection with good voice quality	≥ 95%	96.24%	99.13%	98.11%	99.19%	97.26%	99.82%	98.90%	99.02%	97.69%

6.11. 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.13%	0.02%	0.03%	0.04%	0.01%	0.01%	0.05%	0.03%	0.18%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.65%	99.28%	99.15%	99.02%	96.79%	97.01%	97.71%	98.72%	98.99%
	SDDCH/Paging chl. Congestion	≤ 1%	0.23%	0.06%	0.39%	0.00%	0.47%	0.00%	0.54%	0.00%	0.27%
	TCH Congestion	≤ 2%	1.26%	0.02%	0.38%	0.19%	1.67%	1.11%	1.01%	0.52%	0.63%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.71%	0.77%	0.68%	0.25%	1.79%	0.20%	0.13%	0.37%	1.20%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.97%	1.24%	2.26%	1.23%	2.60%	1.02%	1.59%	1.61%	2.71%
	%age of connection with good voice quality	≥ 95%	96.46%	99.14%	98.18%	99.20%	97.19%	99.47%	98.70%	99.10%	97.85%

6.12. 3G VOICE PMR: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.12%	0.05%	DNA	0.22%	0.19%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.06%	0.00%	DNA	1.42%	0.97%
Connection Establishment (Accessibi	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.70%	99.86%	DNA	99.77%	99.60%
	RRC Congestion:	≤ 1%	0.14%	0.02%	DNA	0.11%	0.16%
	RAB Congestion:	≤ 2%	0.15%	0.01%	DNA	0.02%	0.16%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.46%	0.34%	DNA	0.16%	0.58%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.34%	2.45%	DNA	0.52%	2.66%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.76%	98.38%	DNA	99.27%	98.85%

6.13. 3G VOICE PMR: JANUARY

Jan-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.19%	NA	DNA	DNA	0.20%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.17%	NA	DNA	DNA	1.19%
Connection Establishment (Accessibi	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.60%	NA	DNA	DNA	99.61%
	RRC Congestion:	≤ 1%	0.14%	NA	DNA	DNA	0.11%
	RAB Congestion:	≤ 2%	0.18%	NA	DNA	DNA	0.16%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.45%	NA	DNA	DNA	0.57%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.19%	NA	DNA	DNA	2.67%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.76%	NA	DNA	DNA	98.86%

6.14. 3G VOICE PMR: FEBRUARY

Feb-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.11%	0.04%	DNA	DNA	0.17%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.02%	0.00%	DNA	DNA	0.57%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.63%	99.85%	DNA	DNA	99.60%
	RRC Congestion:	≤ 1%	0.14%	0.03%	DNA	DNA	0.16%
	RAB Congestion:	≤ 2%	0.15%	0.01%	DNA	DNA	0.17%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.45%	0.34%	DNA	DNA	0.59%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.31%	2.47%	DNA	DNA	2.60%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.76%	98.37%	DNA	DNA	98.88%

6.15. 3G VOICE PMR: MARCH

Mar-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.06%	0.05%	DNA	0.22%	0.20%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	DNA	1.42%	1.16%
Connection Establishment (Accessibi	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.87%	99.86%	DNA	99.77%	99.58%
	RRC Congestion:	≤ 1%	0.13%	0.02%	DNA	0.11%	0.20%
	RAB Congestion:	≤ 2%	0.11%	0.01%	DNA	0.02%	0.16%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.46%	0.34%	DNA	0.16%	0.57%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.51%	2.43%	DNA	0.52%	2.73%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.77%	98.38%	DNA	99.27%	98.82%

6.16. 3G VOICE 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.15%	0.04%	DNA	1.00%	0.20%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.01%	0.00%	DNA	0.58%	0.02%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.61%	99.86%	DNA	99.99%	99.69%
	RRC Congestion:	≤ 1%	0.16%	0.06%	DNA	0.03%	0.18%
	RAB Congestion:	≤ 2%	0.14%	0.01%	DNA	0.01%	0.16%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.45%	0.33%	DNA	0.15%	0.56%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.15%	2.45%	DNA	1.10%	2.64%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.77%	98.37%	DNA	98.81%	99.08%

6.17. 3G VOICE 3 DAYS LIVE DATA: JANUARY

Jan-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.20%	DNA	DNA	DNA	0.21%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	DNA	DNA	DNA	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.76%	DNA	DNA	DNA	99.91%
	RRC Congestion:	≤ 1%	0.07%	DNA	DNA	DNA	0.11%
	RAB Congestion:	≤ 2%	0.11%	DNA	DNA	DNA	0.13%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.43%	DNA	DNA	DNA	0.48%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.89%	DNA	DNA	DNA	2.68%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.79%	DNA	DNA	DNA	99.98%

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6.18. 3G VOICE 3 DAYS LIVE DATA: FEBRUARY

Feb-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.17%	0.03%	DNA	DNA	0.27%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.02%	0.00%	DNA	DNA	0.05%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.44%	99.86%	DNA	DNA	99.64%
	RRC Congestion:	≤ 1%	0.26%	0.10%	DNA	DNA	0.08%
	RAB Congestion:	≤ 2%	0.23%	0.01%	DNA	DNA	0.15%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.48%	0.33%	DNA	DNA	0.55%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.39%	2.58%	DNA	DNA	2.55%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.76%	98.38%	DNA	DNA	98.90%

6.19. 3G VOICE 3 DAYS LIVE DATA: MARCH

Mar-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.09%	0.05%	DNA	1.00%	0.13%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	DNA	0.58%	0.02%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.64%	99.86%	DNA	99.99%	99.50%
	RRC Congestion:	≤ 1%	0.15%	0.02%	DNA	0.03%	0.35%
	RAB Congestion:	≤ 2%	0.10%	0.01%	DNA	0.01%	0.18%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.43%	0.34%	DNA	0.15%	0.64%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.16%	2.32%	DNA	1.10%	2.70%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.77%	98.35%	DNA	98.81%	98.35%

6.20. PMR MONTHLY 2G WIRELESS DATA - CONSOLIDATED

Consolidated											
Cellular Mobile Telephone Services											
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Service Quality Parameter											
1	Service Activation/ Provisioning										
i)	Total No. of Subscribers for Service Activation (A)		1111909	DNA	135323	23922	DNA	DNA	DNA	DNA	16941
ii)	Total Service Activations provided within 4 Hours (B)		1091641	DNA	135323	23922	DNA	DNA	DNA	DNA	16776
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	98.18%	DNA	100.00%	100.00%	DNA	DNA	DNA	DNA	98.95%
2	PDP Context Activation Success Rate										
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		271533175	1035399857	327028645	7498764	DNA	DNA	DNA	8454776	10862279
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		262792236	1032289821	324445351	7351117	DNA	DNA	DNA	8163610	10820237
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	96.76%	99.60%	99.21%	98.03%	DNA	DNA	DNA	96.56%	99.61%
3	Drop Rate										
i)	RNC originated PS Domain Iu Connection Setup Success (A)		10740949370	7287225337	10386139886	130579733	DNA	DNA	DNA	47135337	3711660949
ii)	RNC originated PS Domain Iu Connection Release (B)		167394842	77935709	40195814	1320141	DNA	DNA	DNA	536847	6588053074
iii)	Drop Rate = (B/A) * 100	<=5%	1.59%	1.08%	0.47%	1.01%	DNA	DNA	DNA	1.13%	1.78%

6.21. PMR MONTHLY 2G WIRELESS DATA - JANUARY

Cellular Mobile Telephone Services											
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Service Quality Parameter											
1	Service Activation/ Provisioning										
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	24227	DNA	DNA	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	24227	DNA	DNA	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	100%	DNA	DNA	DNA	DNA	DNA
2	PDP Context Activation Success Rate										
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		255282909	DNA	340598785	7622786	DNA	DNA	DNA	8836690	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		245831061	DNA	337980057	7500855	DNA	DNA	DNA	8528935	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	96.30%	DNA	99.23%	98.40%	DNA	DNA	DNA	96.52%	DNA
3	Drop Rate										
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	DNA	133985670	DNA	DNA	DNA	33966637	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	DNA	1350917	DNA	DNA	DNA	373682	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	1.61%	DNA	0.62%	1.01%	DNA	DNA	DNA	1.10%	DNA

6.22. PMR MONTHLY 2G WIRELESS DATA - FEBRUARY

Cellular Mobile Telephone Services											
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Service Quality Parameter											
1	Service Activation/ Provisioning										
i)	Total No. of Subscribers for Service Activation (A)		1111909	DNA	124835	22476	DNA	DNA	DNA	DNA	22220
ii)	Total Service Activations provided within 4 Hours (B)		1091641	DNA	124835	22476	DNA	DNA	DNA	DNA	22041
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	98.18%	DNA	100.00%	100%	DNA	DNA	DNA	DNA	99.19%
2	PDP Context Activation Success Rate										
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		263656937	DNA	316564258	7328898	DNA	DNA	DNA	7934538	11055950
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		255583602	DNA	314264037	7173927	DNA	DNA	DNA	7667863	11034863
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	96.94%	99.50%	99.27%	97.89%	DNA	DNA	DNA	96.64%	99.81%
3	Drop Rate										
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	9103052602	127015442	DNA	DNA	DNA	41863051	3723009156
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	37983129	1263176	DNA	DNA	DNA	475168	6744192048
iii)	Drop Rate = (B/A) * 100	<=5%	1.59%	1.09%	0.42%	0.99%	DNA	DNA	DNA	1.14%	1.82%

6.23. PMR MONTHLY 2G WIRELESS DATA - MARCH

Cellular Mobile Telephone Services											
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Service Quality Parameter											
1	Service Activation/ Provisioning										
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	145811	25063	DNA	DNA	DNA	DNA	11661
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	145811	25063	DNA	DNA	DNA	DNA	11511
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	100.00%	100.00%	DNA	DNA	DNA	DNA	98.71%
2	PDP Context Activation Success Rate										
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		295659679	1035399857	323922893	7544609	DNA	DNA	DNA	8593101.00	10668607
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		286962045	1032289821	321091958	7378568	DNA	DNA	DNA	8294032.00	10605610
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	97.06%	99.70%	99.13%	97.80%	DNA	DNA	DNA	96.52%	99.41%
3	Drop Rate										
i)	RNC originated PS Domain Iu Connection Setup Success (A)		10740949370	7287225337	11669227169	130738086	DNA	DNA	DNA	65576324.00	3700312742
ii)	RNC originated PS Domain Iu Connection Release (B)		167394842	77935709	42408498	1346329	DNA	DNA	DNA	761691.00	6431914100
iii)	Drop Rate = (B/A) * 100	<=5%	1.56%	1.07%	0.36%	1.03%	DNA	DNA	DNA	1.16%	1.74%

6.24. PMR 3 DAY LIVE 2G WIRELESS DATA - CONSOLIDATED

Consolidated							
Cellular Mobile Telephone Services							
S. No.	**Name of Parameter**	**Benchmark**	**AIRTEL**	**IDEA**	**MTNL**	**RCOM-GSM**	**VODAFONE**
Network Service Quality Parameter							
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		DNA	6097	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	6097	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	DNA	DNA	DNA
2	**PDP Context Activation Success Rate**						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	16419652	DNA	DNA	2485257.67
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	16016763	DNA	DNA	2455909.67
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.95%	97.55%	DNA	DNA	98.77%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	39561281	DNA	DNA	76248106.3
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	297251	DNA	DNA	1042562.33
iii)	Drop Rate = (B/A) * 100	<=5%	0.50%	0.75%	DNA	DNA	1.37%

6.25. PMR 3 DAY LIVE 2G WIRELESS DATA - JANUARY

Jan-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	NA	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	NA	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	NA	DNA	DNA	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	NA	DNA	DNA	3260287.00
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	NA	DNA	DNA	3230938.00
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	NA	DNA	DNA	99.10%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	NA	DNA	DNA	75735847
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	NA	DNA	DNA	1002459
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	NA	DNA	DNA	1.32%

6.26. PMR 3 DAY LIVE 2G WIRELESS DATA - FEBRUARY

Feb-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	DNA	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	DNA	DNA	DNA	2098099
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	DNA	DNA	DNA	2075155
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	DNA	DNA	DNA	98.91%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	DNA	DNA	75735847
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	DNA	DNA	1002459
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	DNA	DNA	DNA	1.32%

6.27. PMR 3 DAY LIVE 2G WIRELESS DATA - MARCH

Mar-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	6097	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	6097	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	DNA	DNA	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	16419652	DNA	DNA	2097387
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	16016763	DNA	DNA	2061636
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.95%	97.55%	DNA	DNA	98.30%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	39561281	DNA	DNA	77272625
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	297251	DNA	DNA	1122769
iii)	Drop Rate = (B/A) * 100	<=5%	0.50%	0.75%	DNA	DNA	1.45%

6.28. PMR MONTHLY 3G WIRELESS DATA - CONSOLIDATED

Consolidated							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	135323	DNA	DNA	223744.5
ii)	Total Service Activations provided within 4 Hours (B)		DNA	135323	DNA	DNA	221762.5
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	DNA	DNA	99.10%
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		26427045	167228003	DNA	DNA	24894176.26
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		26421330	163280199	DNA	DNA	24548699.33
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.96%	97.65%	DNA	DNA	98.51%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		1205609571	392498240.5	DNA	DNA	766384001
ii)	RNC originated PS Domain Iu Connection Release (B)		6076481	2839284	DNA	DNA	10530126
iii)	Drop Rate = (B/A) * 100	<=5%	0.54%	0.72%	DNA	DNA	1.37%

6.29. PMR MONTHLY 3G WIRELESS DATA - JANUARY

Jan-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	NA	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	NA	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	NA	DNA	DNA	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	NA	DNA	DNA	33542310
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	NA	DNA	DNA	33242720
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	NA	DNA	DNA	99.11%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	NA	DNA	DNA	763760215
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	NA	DNA	DNA	10135278
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	NA	DNA	DNA	1.33%

6.30. PMR MONTHLY 3G WIRELESS DATA - FEBRUARY

Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Service Quality Parameter							
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		DNA	124835	DNA	DNA	199472
ii)	Total Service Activations provided within 4 Hours (B)		DNA	124835	DNA	DNA	197491
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	DNA	DNA	99.01%
2	**PDP Context Activation Success Rate**						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	162271410	DNA	DNA	20182940
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	159235012	DNA	DNA	19923712
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.94%	98.13%	DNA	DNA	98.72%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	373468854	DNA	DNA	747998907
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	2716149	DNA	DNA	10237081
iii)	Drop Rate = (B/A) * 100	<=5%	0.58%	0.73%	DNA	DNA	1.37%

6.31. PMR MONTHLY 3G WIRELESS DATA – MARCH

Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Service Quality Parameter							
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		DNA	145811	DNA	DNA	248017
ii)	Total Service Activations provided within 4 Hours (B)		DNA	145811	DNA	DNA	246034
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	DNA	DNA	99.20%
2	**PDP Context Activation Success Rate**						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		26427045	172184596	DNA	DNA	20957279
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		26421330	167325386	DNA	DNA	20479666
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.98%	97.18%	DNA	DNA	97.72%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		1205609571	411527627	DNA	DNA	787392881
ii)	RNC originated PS Domain Iu Connection Release (B)		6076481	2962419	DNA	DNA	11218019
iii)	Drop Rate = (B/A) * 100	<=5%	0.50%	0.72%	DNA	DNA	1.42%

6.32. PMR 3 DAY LIVE 3G WIRELESS DATA - CONSOLIDATED

Consolidated							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	6097	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	6097	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	DNA	DNA	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	16419652	DNA	DNA	2485258
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	16016763	DNA	DNA	2455910
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.95%	97.55%	DNA	DNA	98.77%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	39561281	DNA	DNA	76248106
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	297251	DNA	DNA	1042562
iii)	Drop Rate = (B/A) * 100	<=5%	0.50%	0.75%	DNA	DNA	1.37%

6.33. PMR 3 DAY LIVE 3G WIRELESS DATA - JANUARY

Jan-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Service Quality Parameter							
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		DNA	NA	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	NA	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	NA	DNA	DNA	DNA
2	**PDP Context Activation Success Rate**						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	NA	DNA	DNA	3260287
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	NA	DNA	DNA	3230938
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	NA	DNA	DNA	99.10%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	NA	DNA	DNA	75735847
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	NA	DNA	DNA	1002459
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	NA	DNA	DNA	1.32%

6.34. PMR 3 DAY LIVE 3G WIRELESS DATA - FEBRUARY

Feb-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	DNA	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	DNA	DNA	DNA	2098099
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	DNA	DNA	DNA	2075155
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	DNA	DNA	DNA	98.91%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	DNA	DNA	75735847
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	DNA	DNA	1002459
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	DNA	DNA	DNA	1.32%

6.35. PMR 3 DAY LIVE 3G WIRELESS DATA - MARCH

Mar-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	6097	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	6097	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	DNA	DNA	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	16419652	DNA	DNA	2097387
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	16016763	DNA	DNA	2061636
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.95%	97.55%	DNA	DNA	98.30%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	39561281	DNA	DNA	77272625
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	297251	DNA	DNA	1122769
iii)	Drop Rate = (B/A) * 100	<=5%	0.50%	0.75%	DNA	DNA	1.45%

6.36. POI CONGESTION: CONSOLIDATED

Consolidated											
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service											
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
7	Total No. of POI's in Month having < = 0.5% POI congestion										
	Total No. of call attempts on POI		116883694	329145808	1221228	133932	367548	594581	844574	177949	337606656
	Total traffic served on all POIs (Erlang)		2466250.597	7281695.383	41112.44667	3546.666667	8014.850412	9358.666667	13779.18907	5964.113333	7333649.033
	Total No. of circuits on all individual POIs		4450059	11739650	6631162	15653	1693134	18964	18623	2608221	8122855
	Total number of working POI Service Area wise		5300	16	89	50	2700	28	27	35	4214
	Capacity of all POIs		4241633	383459	6549042	14565	1693134	15790	16667	2364330	12344610
	No. of all POI's having >=0.5% POI congestion		0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

6.37. POI CONGESTION: JANUARY

Jan-16											
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service											
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
7	Total No. of POI's in Month having < = 0.5% POI congestion										
	Total No. of call attempts on POI		103166599	330312521	1247046	132183	347789	617440	878946	193308	330400855
	Total traffic served on all POIs (Erlang)		2372346	7376334	36872	3707	8005	9660	13961	6434	7182754
	Total No. of circuits on all individual POIs		4396709	12212687	6843077	15980	1730265	20096	20444	2709263	12185450
	Total number of working POI Service Area wise		5336	16	89	50	2759	30	30	35	383
	Capacity of all POIs		4054451	380739	6757853	14869	1730265	17504	18457	2565595	12305602
	No. of all POI's having >=0.5% POI congestion		0	0	0	0	0	0	0	0	1
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	2-11303 & 2-7661

6.38. POI CONGESTION: FEBRUARY

Feb-16											
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service											
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
7	Total No. of POI's in Month having < = 0.5% POI congestion										
	Total No. of call attempts on POI		120220200	319127447	1179295.60	132637	373409	574153	810647	208807	332965180
	Total traffic served on all POIs (Erlang)		2438273.53	6960135.08	48958.82	3411	7942	9033	13264	6987	7247134
	Total No. of circuits on all individual POIs		4275339	10916211	6324574	14967	1616795	17380	17048	3189938	11772802
	Total number of working POI Service Area wise		5090	16	89	50	2581	26	25	35	384
	Capacity of all POIs		4112913	389431	6246900	13927	1616795	14967	15233	3023732	11888884
	No. of all POI's having >=0.5% POI congestion		0	0	0	0	0	0	0	0	1
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	2-11305 & 2-9105

6.39. POI CONGESTION: MARCH

Mar-16											
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service											
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
7	**Total No. of POI's in Month having < = 0.5% POI congestion**										
	Total No. of call attempts on POI		127264282	337997457	1237341	136977	381447.06	592150	844130	131733	349453933
	Total traffic served on all POIs (Erlang)		2588132.26	7508617.07	37506.52	3522	8097.55	9383	14112	4471	7571059.1
	Total No. of circuits on all individual POIs		4678130	12090052	6725834	16011	1732342	19417	18376	1925462	410314
	Total number of working POI Service Area wise		5473	16	88	50	2759	29	27	35	11875
	Capacity of all POIs		4557535	380208	6642373	14899	1732342	14898	16311	1503663	12839345
	No. of all POI's having >=0.5% POI congestion		0	0	0	0	0	0	0	0	1
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	2-9036 & 2-9027

7. CUSTOMER SERVICE DELIVERY

7.1. BILLING AND CUSTOMER CARE

Name of Service Provider	Metering and Billing credibility		Billing Complaints			Termination & Closures	Time taken for refund of deposits after closures: Benchmark	Response time to customer for assistance	
	Postpaid Subscribers	Prepaid Subscribers	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	%age of where credit/waiver is received within one week	% of Termination/ Closure of service within 7 days (100 %)	Cleared over a period of <60 days (100%)	%age of calls answered by the IVR	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark	≤ 0.1%	≤ 0.1%	≥ 98%	= 100%	= 100%	= 100%	= 100%	≥ 95%	≥ 95%
AIRCEL	0.01%	0.00%	100.00%	100.00%	100.00%	100.00%	81.31%	99.01%	95.30%
AIRTEL	0.03%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	95.54%
MTNL	0.06%	0.02%	100.00%	100.00%	100.00%	100.00%	100.00%	97.75%	97.35%
IDEA	0.07%	0.26%	100.00%	100.00%	100.00%	100.00%	100.00%	98.95%	99.03%
MTS	0.00%	0.00%	100.00%	0.00%	100.00%	100.00%	100.00%	99.04%	96.07%
RCOM-GSM	0.09%	0.10%	100.00%	100.00%	100.00%	100.00%	100.00%	99.84%	91.52%
RCOM-CDMA	0.07%	0.03%	100.00%	100.00%	100.00%	100.00%	100.00%	98.66%	91.42%
TTSL-CDMA	0.00%	0.00%	100.00%	0.00%	100.00%	100.00%	100.00%	98.87%	94.03%
VODAFONE	0.17%	0.03%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	95.26%

Name of Service Provider	Customer Care & Grievances Redressal	
	% of Complaints addressed at call center level	% of Complaints addressed by Appellate Authority
AIRCEL	100.00%	NIL
AIRTEL	98.03%	44.39%
MTNL	100.00%	100.00%
IDEA	39.66%	100.00%
MTS	32.59%	100.00%
RCOM-GSM	100.00%	100.00%
RCOM-CDMA	100.00%	100.00%
TTSL-CDMA	98.51%	95.27%
VODAFONE	90.79%	0.00%

7.2. LIVE CALLING DATA: CONSOLIDATED

Name of Service Provider	Metering and Billing (Service Request)				Response time to customer for Assistance	
	Total Calls Attempted	No. of Subscribers reached	Complaints/ Request attended to satisfaction	% of Complaints/ Request attended to satisfaction	Accessibility of call centre / Customer care	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark					**≥ 95%**	**≥ 95%**
AIRCEL	80	49	45	91.84%	100.00%	96.00%
AIRTEL	211	119	115	96.64%	100%	100%
MTNL	357	250	227	90.80%	100.00%	100.00%
IDEA	345	200	198	99.00%	100%	100%
MTS	35	14	14	100.00%	100%	100%
RCOM-GSM	230	179	168	93.85%	100.00%	94.00%
RCOM-CDMA	329	200	193	96.50%	97.00%	97.00%
TTSL-CDMA	3	3	3	100.00%	100%	100%
VODAFONE	300	122	119	97.54%	100%	100%

Live calling data has been conducted by the auditor from the operator call centre(s).

7.3. 3 DAYS LIVE CALL CENTRE DATA

OPERATOR	Total no of calls attempted to customer care/Call center	Total no. of calls successfully established to customer care/Call center	% age of Accessibility of Call centre	Total Calls reached to operator for (Voice to Voice)	Total number of calls answered by the operator (Voice to voice) within 90 seconds	% age calls answered by the operator within 90 seconds
DAYS	AVERAGE					
BENCHMARK			>=95%			>=95%
AIRCEL	672403	671751	99.90%	136625	131390	96.17%
AIRTEL	81910	81910	100.00%	233426	231049	98.98%
MTNL	22883	22883	100.00%	14625	14585	99.73%
IDEA	676836	671486	99.21%	161202	161077	99.92%
MTS	75675	71301	94.22%	13259	12677	95.61%
RCOM-GSM	79663	79268	99.50%	14063	13813	98.22%
RCOM-CDMA	341717	340153	99.54%	58966	58356	98.97%
TTSL-CDMA	67127	66738	99.42%	5251	5235	99.70%
VODAFONE	663645	663645	100.00%	245892	237265	96.49%

8. L1 CALLING DATA

L1 Calling data covers all the SDCA covered across the two operator assisted drive tests:

- Delhi: 18th Feb to 20 Feb 2016

8.1. DELHI

SR. No.	EMERGENCY NUNMBER	CALLS MADE	AIRTEL	AIRCEL	IDEA	MTS	MTS	RCOM CDMA	RCOM GSM	TTSL	VODAFONE
1	100	5	√	√	√	√	√	√	√	√	√
2	101	5	√	√	√	√	√	√	√	√	√
3	102	5	√	√	√	√	√	√	√	√	√
4	104	5	×	×	×	X	×	X	X	X	×
5	108	5	X	X	×	√	√	X	X	X	×
6	138	5	×	×	√	√	√	√	√	X	√
7	149	5	×	×	×	X	×	X	X	X	×
8	181	5	√	√	√	√	√	√	√	√	√
9	182	5	√	√	√	√	√	√	√	X	√
10	1033	5	√	√	√	√	√	√	√	√	√
11	1037	5	X	X	×	X	×	X	X	X	×
12	1056	5	×	×	×	X	×	X	X	X	×
13	1060	5	×	×	√	√	×	√	√	X	×
14	1063	5	×	×	√	√	×	√	√	√	√
15	1064	5	√	√	√	√	√	√	√	√	√
16	1070	5	√	√	√	√	√	X	X	√	√
17	1071	5	×	×	×	X	×	X	X	X	×
18	1072	5	√	√	√	√	√	√	√	√	√
19	1073	5	X	X	√	√	√	X	X	X	√
20	1077	5	√	√	√	√	√	√	√	√	√
21	1090	5	√	√	×	√	√	√	√	√	√
22	1091	5	√	√	√	√	√	√	√	√	√
23	1097	5	√	√	√	√	√	√	√	√	×
24	1099	5	×	×	√	√	√	X	X	√	×
25	10580	5	√	√	√	√	×	X	X	X	√
26	10589	5	×	×	×	X	×	X	X	X	×
27	10740	5	×	×	×	X	×	X	X	X	×
28	10741	5	×	×	×	X	×	X	X	X	×
29	1511	5	√	√	√	√	√	X	X	√	√
30	1512	5	√	√	√	√	√	X	X	X	√
31	1514	5	×	×	×	×	×	X	X	X	×
32	15100	5	√	√	√	√	√	X	X	√	√
33	155304	5	×	×	×	X	×	X	X	X	×
34	155214	5	√	√	√	√	√	√	√	√	√
35	1903	5	√	√	√	√	√	√	√	√	√
36	1909	5	X	X	√	√	√	√	√	√	√
37	1912	5	×	×	×	X	×	X	X	X	×
38	1916	5	√	√	√	√	√	√	√	√	√
39	1950	5	√	√	√	√	√	√	√	√	√

9. OPERATOR ASSISTED DRIVE TEST

The drive test was conducted simultaneously for all the operators present in the Delhi circle. As per the new directive given by TRAI headquarters, drive test for the month of January, February and March, 2016 were conducted at a SSA level. Drive test was conducted for three days in each SSA and the selection of routes ensured that the maximum towns, villages, highways are covered as part of drive test. The routes were selected on basis of the complaints received from the customers. The auditors were present in vehicles of every operator. The holding period for all test calls was 120 seconds and the gap between calls was 10 seconds.

For measuring voice quality RxQual samples for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. RxQual greater than 5 meant that the sample was not of appropriate voice quality and for CDMA operators FERs of more than 4 were considered bad. Call drops were measured by the number of calls that were dropped to the total number of calls established during the drive test. Similarly CSSR was measured as the ratio of total calls established to the total call attempts made. Signal strength was measured in Dbm with strength > -75dbm for indoor, -85 dbm for in-vehicle and > -95 dbm outdoor routes. Below is the schedule and operators involved in the drive test for the Delhi circle.

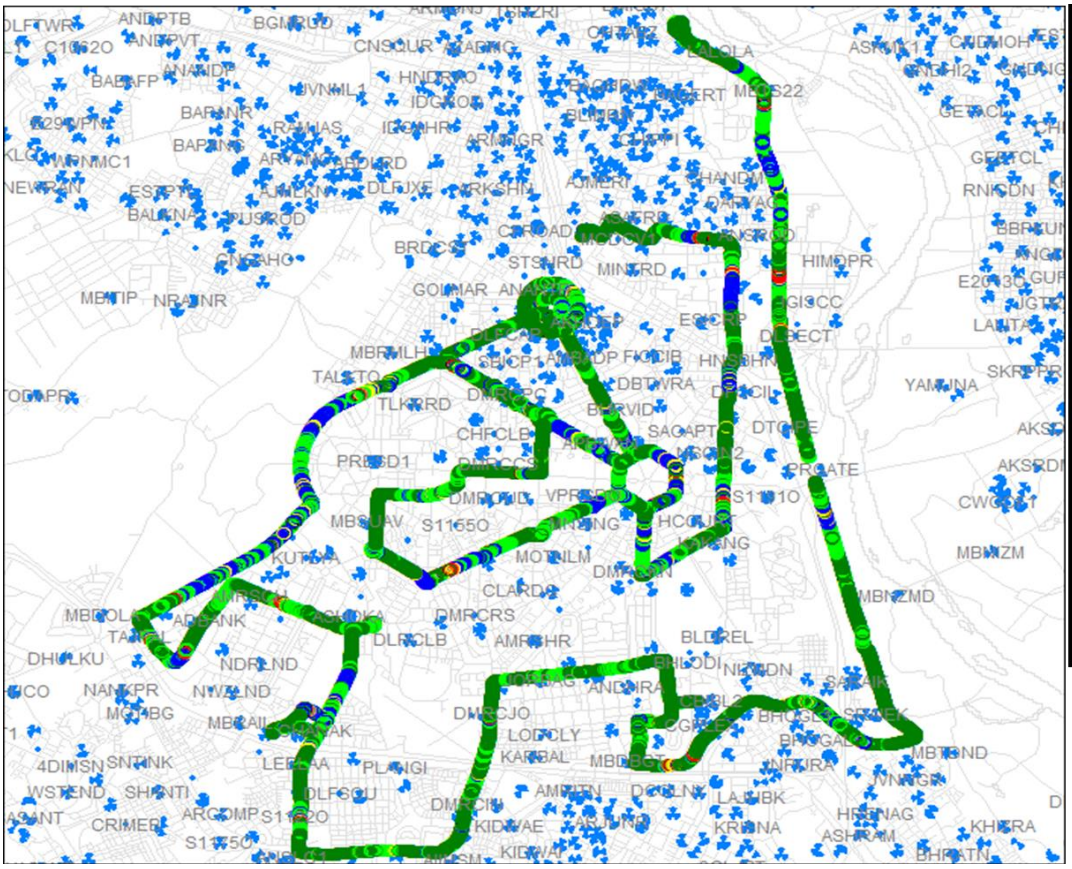
9.1. FEBRUARY: DELHI SSA

Month	Name of SSA covered	Drive Test Schedule
February 2016	Delhi	February 18, 2016 to February 20, 2016

9.2. DISTANCE COVERED: DELHI SSA

Drive Test Distance Covered	Day 1	Day 2	Day 3
Delhi SSA	90 km	135 km	95 km

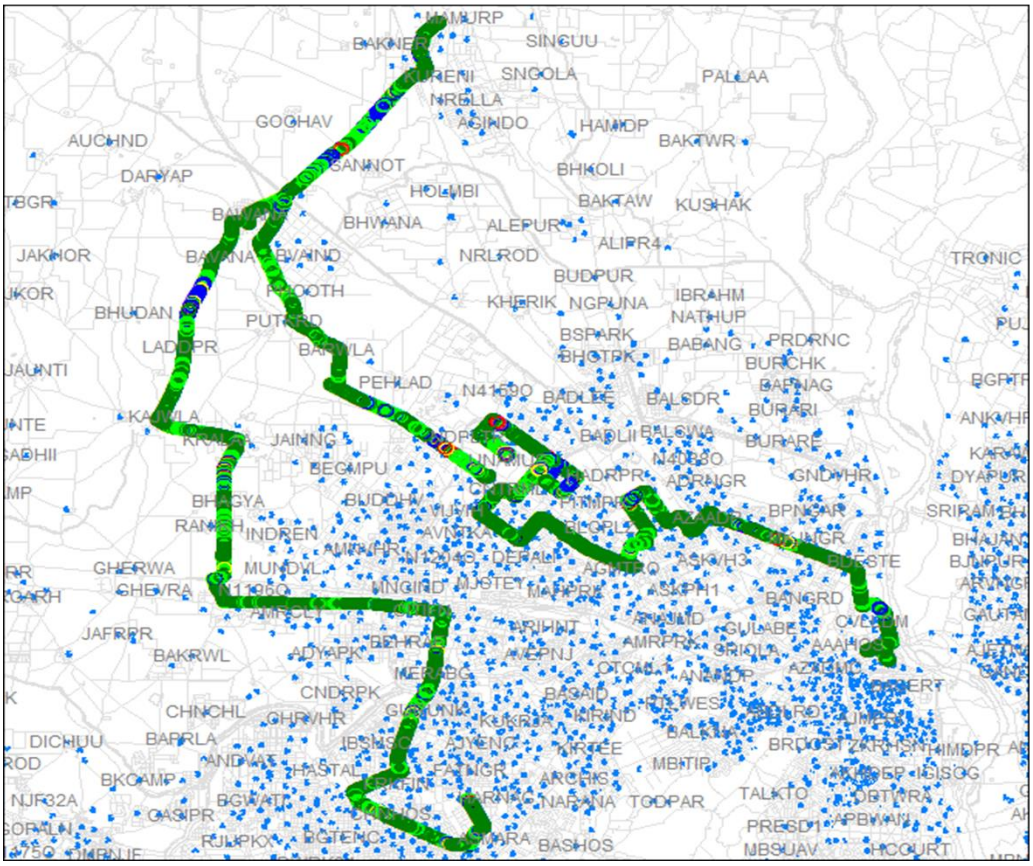
9.3. ROUTE MAP: DELHI SSA: DAY 1



Route Covered Day1

1. New Delhi Railway Station
2. India Gate
3. Sanchar Bhawan
4. Akbar Road
5. South Avenue
6. RML Hospital
7. Sardar Patel Marg
8. ITC Maurya Hotel
9. Karnatka Bhawan
10. Gol Market
11. AIIMS
12. Delhi Haat
13. INA
14. Zor Bagh
15. Rajiv Gandhi Bhawan
16. Lodhi Road-
17. CGO Complex
18. Bhishma Pitamah Road
19. JLN Stadium
20. Nizamuddin
21. IP Park
22. Red Fort

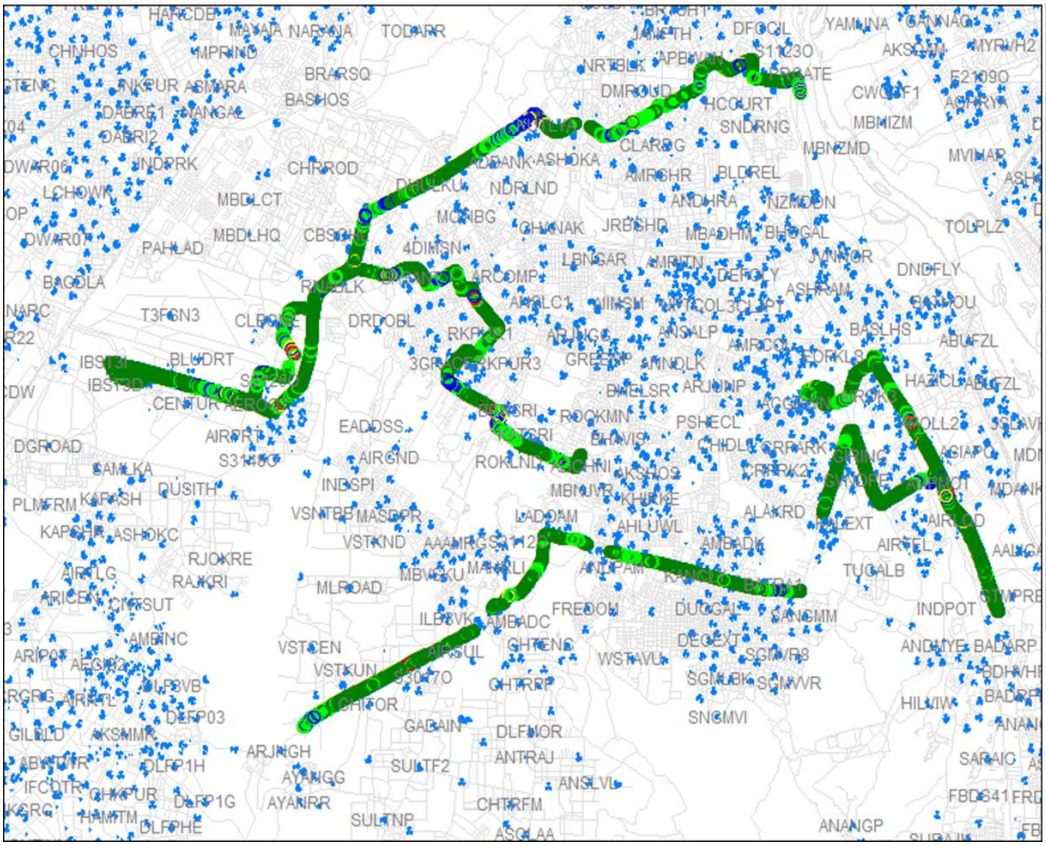
9.4. ROUTE MAP: DELHI SSA: DAY 2



Route Covered Day 2

1. ISBT Kashmere Gate
2. Civil Line
3. Azadpur
4. Shalimar Bagh
5. Rohini
6. Pitampura
7. Bawana Road
8. Bawana
9. Nangloi-
10. Rithala
11. Narela
12. Kanjahwala
13. Mundka
14. Uttam Nagar
15. Jail Road
16. Paschim Vihar
17. Vikas puri

9.5. Route Map: Delhi SSA: Day 3



Route Covered Day3

1. Nehru Place
2. Mohan Estate
3. Airport
4. Dhaula Kuan
5. Lado Sarai
6. Mehrauli
7. Vasant Kunj
8. Sultanpur
9. Ghitorni
10. Rk Puram
11. Mahipalpur
12. Okhla
13. Govindpuri
14. Tuglakabad
15. Khanpu
16. Adchini
17. Katwaria Sarai
18. Munirka
19. RK Puram

9.6. Drive Test Outcome

	Aircel	Airtel	Idea	MTNL	MTS	RCOM GSM	RCOM CDMA	TTSL	Vodafone
Total Calls Attempt (A)	554	624	583	369	608	594	651	668	559
Total Calls Blocked (B)	7	8	8	41	3	15	0	0	9
Blocked Call Rate in % (B*100/A)	1.26%	1.28%	1.37%	11.11%	0.49%	2.53%	0.00%	0.00%	1.61%
Total Calls Established ('C)	540	610	559	321	605	575	651	668	550
Total Calls Drop (D)	3	4	4	35	2	5	1	1	6
Dropped Calls Rate in % (D*100/C)	0.56%	0.66%	0.72%	10.90%	0.33%	0.87%	0.15%	0.15%	1.09%
Call Setup Success Rate in % (C*100/A)	97.47%	97.76%	95.88%	86.99%	99.51%	96.80%	100.00%	100.00%	98.39%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.56%	97.22%	98.41%	79.50%	100.00%	94.56%	100.00%	100.00%	98.52%

10. COUNTER DETAILS

Sl No.	KPI	Formula with Counter Description
1	CSSR= (No of established Calls / No of Attempted Calls)%	*No of established Calls* = ([Assignment Requests]-([Failed Assignments (Signaling Channel)]+[Failed Assignments during MOC on the A Interface (Including Directed Retry)]+[Failed Assignments during MTC on the A Interface (Including Directed Retry)]+[Failed Assignments during Emergency Call on the A Interface (Including Directed Retry)]+[Failed Assignments during Call Re-establishment on the A Interface (Including Directed Retry)]+[Failed Mode Modify Attempts (MOC) (TCHF)]+[Failed Mode Modify Attempts (MTC) (TCHF)]+[Failed Mode Modify Attempts (Emergency Call) (TCHF)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHF)]+[Failed Mode Modify Attempts (MOC) (TCHH)]+[Failed Mode Modify Attempts (MTC) (TCHH)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHH)]))/*No of Attempted Calls* = ([Assignment Requests (Signaling Channel) (TCH)] + [Assignment Requests (Signaling Channel) (SDCCH)] + [Assignment Requests (TCHF Only)] + [Assignment Requests (TCHH Only)] + [Assignment Requests (TCHF Preferred, Channel Type Unchangeable)] + [Assignment Requests (TCHH Preferred, Channel Type Unchangeable)] + [Assignment Requests (TCHF or TCHH, Channel Type Unchangeable)] + [Assignment Requests (TCHF Preferred, Channel Type Changeable)] + [Assignment Requests (TCHH Preferred, Channel Type Changeable)] + [Assignment Requests (TCHF or TCHH, Channel Type Changeable)])
2	SDCCH congestion= (SDCCH Failure/SDCCH attempts)%	*SDCCH Failure* = ([Channel Assignment Failures (All Channels Busy or Channels Unconfigured) in Immediate Assignment Procedure (SDCCH)] + [Failed Internal Intra-Cell Handovers (No Channel Available) (SDCCH)] + [Number of Unsuccessful Incoming Internal Inter-Cell Handovers (No Channel Available) (SDCCH)] + [Failed Incoming External Inter-Cell Handovers (No Channel Available) (SDCCH)])/*SDCCH attempts* = ([Channel Assignment Requests in Immediate Assignment Procedure (SDCCH)] + [Internal Intra-Cell Handover Requests (SDCCH)] + [Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (900/850/810-900/850/810)] + [Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (1800/1900-1800/1900)] + [Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (900/850/810-1800/1900)] + [Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (1800/1900-900/850/810)] + [Incoming External Inter-Cell Handover Requests (SDCCH) (900/850/810-900/850/810)] + [Incoming External Inter-Cell Handover Requests (SDCCH) (1800/1900-1800/1900)] + [Incoming External Inter-Cell Handover Requests (SDCCH) (900/850/810-1800/1900)] + [Incoming External Inter-Cell Handover Requests (SDCCH) (1800/1900-900/850/810)])
3	TCH congestion= (TCH Failures /TCH Attempts)%	*TCH Failures* = ((Failed TCH Seizures due to Busy TCH (Signaling Channel)+([Failed Assignments (First Assignment, No Channel Available in Assignment Procedure)]+[Failed Assignments (First Assignment, No Channel Available in Directed Retry Procedure)]+[Failed Assignments (Reconnection to Old Channels, No Channel Available in Assignment)]+[Failed Assignments (Reconnection to Old Channels, No Channel Available in Directed Retry)])/*TCH Attempts* = ([Assignment Requests (Signaling Channel) (TCH)] + [Assignment Requests (Signaling Channel) (SDCCH)] + [Assignment Requests (TCHF Only)] + [Assignment Requests (TCHH Only)] + [Assignment Requests (TCHF Preferred, Channel Type Unchangeable)] + [Assignment Requests (TCHH Preferred, Channel Type Unchangeable)] + [Assignment Requests (TCHF or TCHH, Channel Type Unchangeable)] + [Assignment Requests (TCHF Preferred, Channel Type Changeable)] + [Assignment Requests (TCHH Preferred, Channel Type Changeable)] + [Assignment Requests (TCHF or TCHH, Channel Type Changeable)])
4	Call Drop Rate= (The total no of dropped calls*100)/Total no of calls successfully established (where traffic channel is allotted)	*The total no of dropped calls* = ([Call Drops on Radio Interface in Stable State (Traffic Channel)] + [Call Drops on Radio Interface in Handover State (Traffic Channel)] + [Call Drops Due to No MR from MS for a Long Time (Traffic Channel)] + [Call Drops due to Abis Terrestrial Link Failure (Traffic Channel)] + [Call Drops due to Equipment Failure (Traffic Channel)] + [Call Drops due to Forced Handover (Traffic Channel)] + [Call Drops due to local switching Start Failure] + [Call Drops due to Failures to Return to Normal Call from local switching])/*Total no of calls successfully established (where traffic channel is allotted)* = ([Assignment Requests]-([Failed Assignments (Signaling Channel)]+[Failed Assignments during MOC on the A Interface (Including Directed Retry)]+[Failed Assignments during MTC on the A Interface (Including Directed Retry)]+[Failed Assignments during Emergency Call on the A Interface (Including Directed Retry)] +[Failed Assignments during Call Re-establishment on the A Interface (Including Directed Retry)]+[Failed Mode Modify Attempts (MOC) (TCHF)]+[Failed Mode Modify Attempts (MTC) (TCHF)]+[Failed Mode Modify Attempts (Emergency Call) (TCHF)]+[Failed Mode Modify Attempts (Call Re-establishment)

		(TCHF)]+[Failed Mode Modify Attempts (MOC) (TCHH)]+[Failed Mode Modify Attempts (MTC) (TCHH)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHH)])
5	**Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a month*100)/Total no of cells in the licensed service area**	**Above formula with counters being used in CBBH.**
6	**Connection with good quality voice= (Connection with good quality voice/Total voice samples)%**	***Connection with good quality voice*** **= ((Number of MRs on Downlink TCHF (Receive Quality Rank 0)+Number of MRs on Downlink TCHF (Receive Quality Rank 1)+Number of MRs on Downlink TCHF (Receive Quality Rank 2)+Number of MRs on Downlink TCHF (Receive Quality Rank 3)+Number of MRs on Downlink TCHF (Receive Quality Rank 4)+Number of MRs on Downlink TCHF (Receive Quality Rank 5)+Number of MRs on Downlink TCHH (Receive Quality Rank 0)+Number of MRs on Downlink TCHH (Receive Quality Rank 1)+Number of MRs on Downlink TCHH (Receive Quality Rank 2)+Number of MRs on Downlink TCHH (Receive Quality Rank 3)+Number of MRs on Downlink TCHH (Receive Quality Rank 4)+Number of MRs on Downlink TCHH (Receive Quality Rank 5)) /*Total voice samples*= ((Number of MRs on Downlink TCHF (Receive Quality Rank 0)+Number of MRs on Downlink TCHF (Receive Quality Rank 1)+Number of MRs on Downlink TCHF (Receive Quality Rank 2)+Number of MRs on Downlink TCHF (Receive Quality Rank 3)+Number of MRs on Downlink TCHF (Receive Quality Rank 4)+Number of MRs on Downlink TCHF (Receive Quality Rank 5)+Number of MRs on Downlink TCHF (Receive Quality Rank 6)+Number of MRs on Downlink TCHF (Receive Quality Rank 7)+Number of MRs on Downlink TCHH (Receive Quality Rank 0)+:Number of MRs on Downlink TCHH (Receive Quality Rank 1)+Number of MRs on Downlink TCHH (Receive Quality Rank 2)+Number of MRs on Downlink TCHH (Receive Quality Rank 3)+Number of MRs on Downlink TCHH (Receive Quality Rank 4)+Number of MRs on Downlink TCHH (Receive Quality Rank 5)+Number of MRs on Downlink TCHH (Receive Quality Rank 6)+Number of MRs on Downlink TCHH (Receive Quality Rank 7))**

10.1. ERICSSON

Sl No.	KPI	Ericsson
1	**CSSR= (No of established Calls / No of Attempted Calls)%**	CSSR (No of established Calls / No of Attempted Calls)=(TCASSALL/TASSALL)*100
2	**SDCCH congestion= (SDCCH Failure/SDCCH attempts)%**	SDCCH congestion (SDCCH Failure/SDCCH attempts)% = (CCONGS/CCALLS)*100
3	**TCH congestion= (TCH Failures /TCH Attempts)%**	TCH congestion (TCH Failures /TCH Attempts)%= (CNRELCONG+TNRELCONG)/TASSALL)*100
4	**Call Drop Rate= (The total no of dropped calls*100)/Total no of calls successfully established (where traffic channel is allotted)**	Call Drop Rate (Total no dropped calls/No of established calls)%= (TNDROP)/TCASSALL*100
5	**Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a month*100)/Total no of cells in the licensed service area**	Above formula with counters being used in CBBH.
6	**Connection with good quality voice= (Connection with good quality voice/Total voice samples)%**	Connection with good quality voice (Connection with good quality voice samples 0-5 /Total voice samples)= 100 * (QUAL50DL + QUAL40DL + QUAL30DL + QUAL20DL + QUAL10DL + QUAL00DL) / (QUAL70DL + QUAL60DL + QUAL50DL + QUAL40DL + QUAL30DL + QUAL20DL + QUAL10DL + QUAL00DL)

Ericsson Counters

Counter	Counter Description
TCASSALL	Number of assignment complete messages on TCH for all MS classes
TASSALL	Number of first assignment attempts on TCH for all MS classes.
CNRELCONG	Number of released connections on SDCCH due to TCH or Transcoder (TRA) congestion.
TNRELCONG	Number of released TCH signalling connections due to transcoder resource congestion during immediate assignment on TCH
CCONGS	Congestion counter for SDCCH. Stepped per congested allocation attempt.
CCALLS	Channel allocation attempt counter on SDCCH.
TNDROP	The total number of dropped TCH Connections.
QUAL00DL	Number of quality 0 reported on downlink.
QUAL10DL	Number of quality 1 reported on downlink.
QUAL20DL	Number of quality 2 reported on downlink.

QUAL30DL Number of quality 3 reported on dow nlink.
QUAL40DL Number of quality 4 reported on dow nlink.
QUAL50DL Number of quality 5 reported on dow nlink.
QUAL60DL Number of quality 6 reported on dow nlink.
QUAL70DL Number of quality 7 reported on dow nlink

10.2. NSN (NOKIA SIEMENS NETWORK)

Sl No.	KPI	NSN
1	CSSR= (No of established Calls / No of Attempted Calls)%	CSSR= 100-100*((SDCCH_BUSY_ATT)-(TCH_SEIZ_DUE_SDCCH_CON) + (SDCCH_RADIO_FAIL)+(SDCCH_RF_OLD_HO)+(SDCCH_USER_ACT)+(SDCCH_BCSU_RESET)+(SDCCH_NETW_ACT)+(SDCCH_BTS_FAIL)+(SDCCH_LAPD_FAIL)+ (BLCK_8I_NOM)/ {(CH_REQ_MSG_REC)+(PACKET_CH_REQ)}-{(GHOST_CCCH_RES)-(REJ_SEIZ_ATT_DUE_DIST)}
2	SDCCH congestion= (SDCCH Failure/SDCCH attempts)%	SDCCH congestion = (sdcch_busy_att - .tch_seiz_due_sdcch_con)/{(CH_REQ_MSG_REC)+(PACKET_CH_REQ)}- {(GHOST_CCCH_RES)-(REJ_SEIZ_ATT_DUE_DIST)}
3	TCH congestion= (TCH Failures /TCH Attempts)%	TCH congestion = BLCK_8I_NOM / {(TCH_NORM_SEIZ)+(MSC_I_SDCCH_TCH_AT)+(BSC_I_SDCCH_TCH_AT)}
4	Call Drop Rate= (The total no of dropped calls*100)/Total no of calls successfully established (w here traffic channel is allotted)	TCH Drop = (drop_after_tch_assign)-(tch_re_est_release)/ {(TCH_NORM_SEIZ)+(MSC_I_SDCCH_TCH_AT)+(BSC_I_SDCCH_TCH_AT)}
5	Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a month*100)/Total no of cells in the licensed service area	Above formula w ith counters being used in CBBH.
6	Connection w ith good quality voice= (Connection w ith good quality voice/Total voice samples)%	Connection w ith good quality voice= (FREQ_DL_QUAL0+FREQ_DL_QUAL1+FREQ_DL_QUAL2+FREQ_DL_QUAL3+FREQ_DL_QUAL4+FREQ_DL_QUAL5) / (FREQ_DL_QUAL0+FREQ_DL_QUAL1+FREQ_DL_QUAL2+FREQ_DL_QUAL3+FREQ_DL_QUAL4+FREQ_DL_QUAL5+FREQ_DL_QUAL6+FREQ_DL_QUAL7)

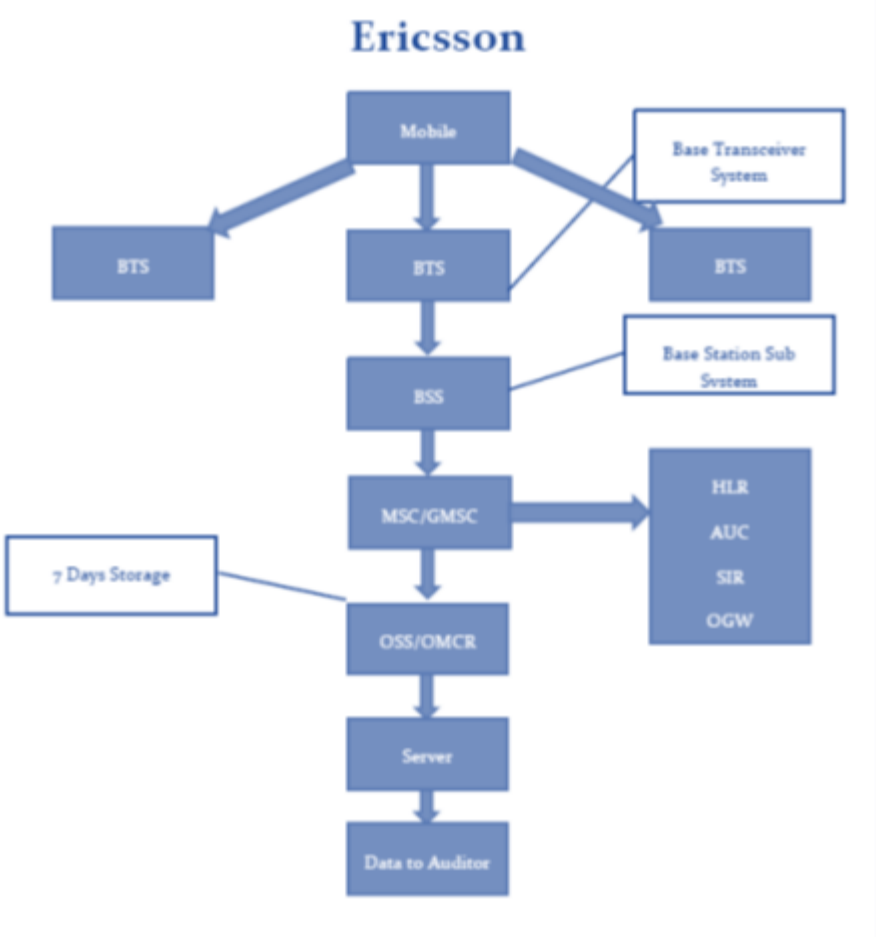
10.3. HUAWEI

SR .NO	KPI	HUAWEI FORMULA
1	CALL SETUP SUCCES (NUM)	[Successful CS IS-95 Orig Call Setups + Successful CS IS-2000 Orig Call Setups + Successful CS IS-95 Term Call Setups + Successful CS IS-2000 Term Call Setups] ([1157628567] + [1157628587] + [1157628568] + [1157628588])
2	CALL SETUP SUCCES (DEN)	[CS IS-95 Orig Attempts + CS IS-2000 Orig Attempts + CS IS-95 Term Attempts + CS IS-2000 Term Attempts] ([1157628553] + [1157628573] + [1157628554] + [1157628574])
3	CALL SETUP SUCCESS RATE (%)	CALL SETUP SUCCES (NUM) / CALL SETUP SUCCES (DEN) * 100\
4	CALL DROP RATE (NUM)	[CS IS-95 Call Drops (Too many Erasure frames) + CS IS-2000 Call Drops (Too many Erasure frames) + CS IS-95 Call Drops (No reverse frame received) + CS IS-2000 Call Drops (No reverse frame received) + CS IS-95 Call Drops (Abis interface abnormal) + CS IS-2000 Call Drops (Abis interface abnormal) + CS IS-95 Call Drops (A2 interface abnormal) + CS IS-2000 Call Drops (A2 interface abnormal) + CS IS-95 Call Drops (HHO fail) + CS IS-2000 Call Drops (HHO fail) + CS IS-95 Call Drops (Other causes) + CS IS-2000 Call Drops (Other causes)] ([1157628608] + [1157628614] + [1157628609] + [1157628615] + [1157628610] + [1157628616] + [1157628611] + [1157628617] + [1157628612] + [1157628618] + [1157628613] + [1157628619])
5	CALL DROP RATE(DEN)	[Successful CS IS-95 Orig Call Setups + Successful CS IS-2000 Orig Call Setups + Successful CS IS-95 Term Call Setups + Successful CS IS-2000 Term Call Setups + CS IS-95 Successful Incoming Hard HOs + CS IS-2000 Successful Incoming Hard HOs] [1157628619]) x 100/([1157628567] + [1157628587] + [1157628568] + [1157628588] + [1157628569] + [1157628589])]
6	Call DROP Rate	CALL DROP RATE (NUM) / CALL DROP RATE(DEN) * 100\
7	RF BLOCK RATE (NUM)	{[(TCH Assignment Requests-CS Orig-IS95[Times] + TCH Assignment Requests-CS Orig-IS2000[Times] + TCH Assignment Requests-CS Term-IS95[Times] + TCH Assignment Requests-CS Term-IS2000[Times]) - (Successful TCH Assignments-CS Orig-IS95[Times] + Successful TCH Assignments-CS

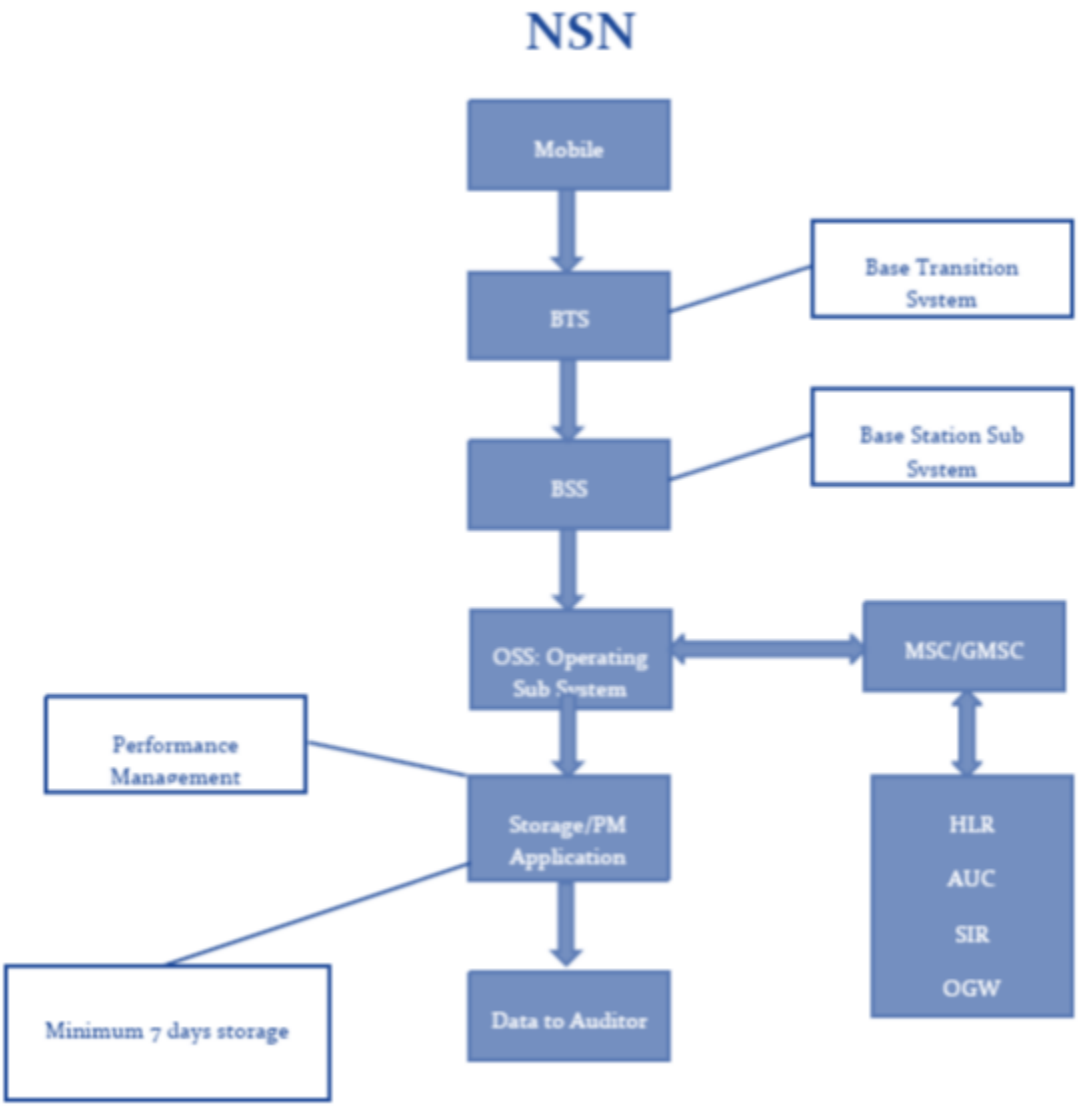
		Orig-IS2000[Times] + Successful TCH Assignments-CS Term-IS95[Times] + Successful TCH Assignments-CS Term-IS2000[Times])] {[(1157628621 + 1157628628 + 1157628635+ 1157628642)
8	RF BLOCK RATE (DEN)	[((TCH Assignment Requests-CS Orig-IS95[Times] + TCH Assignment Requests-CS Orig-IS2000[Times] + TCH Assignment Requests-CS Term-IS95[Times] + TCH Assignment Requests-CS Term-IS2000[Times]))]} [(1157628621 + 1157628628 + 1157628635+ 1157628642)]}
9	RF BLOCK RATE	RF BLOCK RATE (NUM) / RF BLOCK RATE (DEN) *100
10	Call Quality (RFER)	CS Reverse Link Average FER of Carrier[%

11. BLOCK SCHEMATIC DIAGRAM

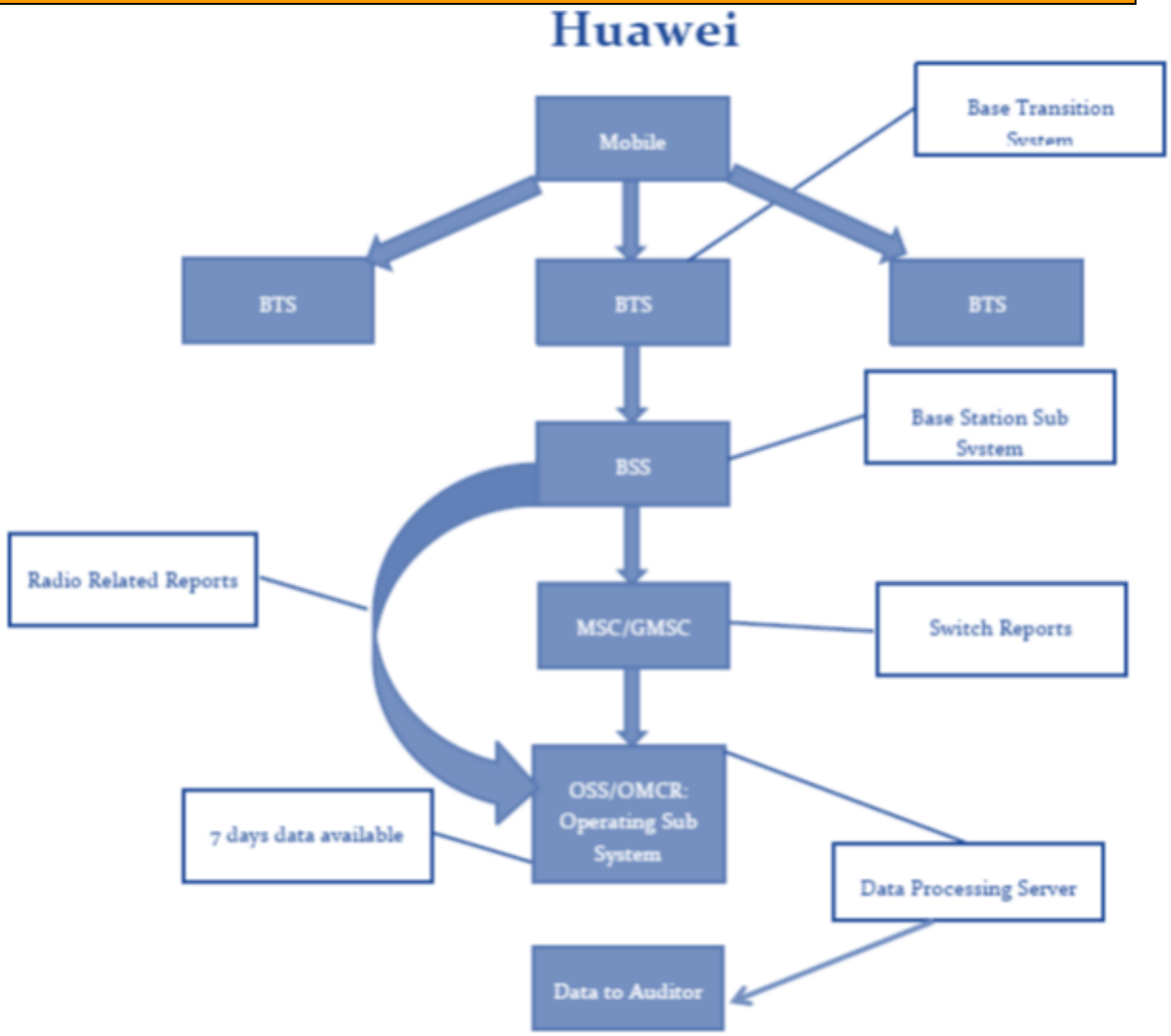
11.1. ERICSSON



11.2. NSN


NSN
Mobile
BTS
Base Transition System
BSS
Base Station Sub System
OSS: Operating Sub System
MSC/GMSC
Performance Management
Storage/PM Application
HLR
AUC
SIR
OGW
Minimum 7 days storage
Data to Auditor

11.3. HUAWEI


Huawei
Mobile
Base Transition System
BTS
BTS
BTS
Base Station Sub System
BSS
Radio Related Reports
MSC/GMSC
Switch Reports
OSS/OMCR: Operating Sub System
7 days data available
Data Processing Server
Data to Auditor

12. ABBREVIATIONS

Following terms/abbreviations have been used in this report. This section provides meaning of the abbreviations used in the report.

- TRAI – Telecom Regulatory Authority of India
- PCPL – Phistream Consulting Private Limited
- QoS – Quality of Service
- JFM'16 – Refers to the quarter of January, February and March 2016
- SSA – Secondary Switching Area
- NOC – Network Operation Center
- OMC – Operations and Maintenance Center
- MSC – Mobile Switching Center
- PMR – Performance Monitoring Reports
- TCBH – Time Consistent Busy Hour
- CBBH - Cell Bouncing Busy Hour
- BTS – Base Transceiver Station
- CSSR – Call Setup Success Rate
- TCH – Traffic Channel
- SDCCH – Standalone Dedicated Control Channel
- CDR – Call Drop Rate
- FER – Frame Error Rate
- SIM – Subscriber Identity Module
- GSM – Global System for Mobile
- CDMA – Code Division Multiple Access
- NA – Not Applicable
- NC – Non Compliance
- POI – Point of Interconnection
- IVR – Interactive Voice Response
- STD – Standard Trunk Dialing
- ISD – International Subscriber Dialing

13 ANNEXURE

13.1. 2G VOICE PMR DATA: CONSOLIDATED

Consolidated										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.13%	0.01%	0.03%	0.04%	0.11%	0.04%	1.17%	0.03%	0.16%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.27%	0.00%	0.00%	0.00%	0.21%	0.00%	0.09%	0.02%	0.66%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.62%	99.26%	99.02%	99.11%	96.79%	96.94%	97.00%	99.24%	99.02%
	SDDCH/Paging chl. Congestion	≤ 1%	0.25%	0.05%	0.51%	0.00%	0.46%	0.00%	0.66%	0.00%	0.23%
	TCH Congestion	≤ 2%	1.45%	0.03%	0.47%	0.10%	1.77%	1.04%	1.25%	0.10%	0.78%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.76%	0.73%	0.67%	0.25%	1.82%	0.22%	0.13%	0.23%	1.13%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.96%	1.30%	2.28%	1.25%	2.54%	0.94%	0.53%	1.10%	2.67%
	%age of connection with good voice quality	≥ 95%	96.33%	99.16%	98.18%	99.20%	97.20%	99.50%	98.67%	99.20%	97.91%

13.2. 3G VOICE PMR: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.12%	0.05%	DNA	0.22%	0.19%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.06%	0.00%	DNA	1.42%	0.97%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.70%	99.86%	DNA	99.77%	99.60%
	RRC Congestion:	≤ 1%	0.14%	0.02%	DNA	0.11%	0.16%
	RAB Congestion:	≤ 2%	0.15%	0.01%	DNA	0.02%	0.16%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.46%	0.34%	DNA	0.16%	0.58%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.34%	2.45%	DNA	0.52%	2.66%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.76%	98.38%	DNA	99.27%	98.85%

- **For each instance of "DNA (Data Not Available)", please refer the respective hard copy of audit report(s).

13.3. BILLING AND CUSTOMER CARE

Name of Service Provider	Metering and Billing credibility		Billing Complaints			Termination & Closures	Time taken for refund of deposits after closures: Benchmark	Response time to customer for assistance	
	Postpaid Subscribers	Prepaid Subscribers	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	%age of where credit/waiver is received within one week	% of Termination/ Closure of service within 7 days (100 %)	Cleared over a period of <60 days (100%)	%age of calls answered by the IVR	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark	≤ 0.1%	≤ 0.1%	≥ 98%	= 100%	= 100%	= 100%	= 100%	≥ 95%	≥ 95%
AIRCEL	0.01%	0.00%	100.00%	100.00%	100.00%	100.00%	81.31%	99.01%	95.30%
AIRTEL	0.03%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	95.54%
MTNL	0.06%	0.02%	100.00%	100.00%	100.00%	100.00%	100.00%	97.75%	97.35%
IDEA	0.07%	0.26%	100.00%	100.00%	100.00%	100.00%	100.00%	98.95%	99.03%
MTS	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.04%	96.07%
RCOM-GSM	0.09%	0.10%	100.00%	100.00%	100.00%	100.00%	100.00%	99.84%	91.52%
RCOM-CDMA	0.07%	0.03%	100.00%	100.00%	100.00%	100.00%	100.00%	98.66%	91.42%
TTSL-CDMA	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.87%	94.03%
VODAFONE	0.17%	0.03%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	95.26%

- AIRCEL has parameter value of 81.31% and failed to meet the benchmark of =100% time taken for refund of deposits after closures which is cleared over period of <60 days.
- IDEA has a parameter value of 0.26% and failed to meet the benchmark of ≤ 0.1% metering and billing credibility for prepaid subscriber.
- RCOM GSM has a parameter value of 91.52% and failed to meet the benchmark of ≥ 95% for Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 seconds.
- RCOM CDMA has a parameter value of 91.42% and failed to meet the benchmark of ≥ 95% for Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 seconds.

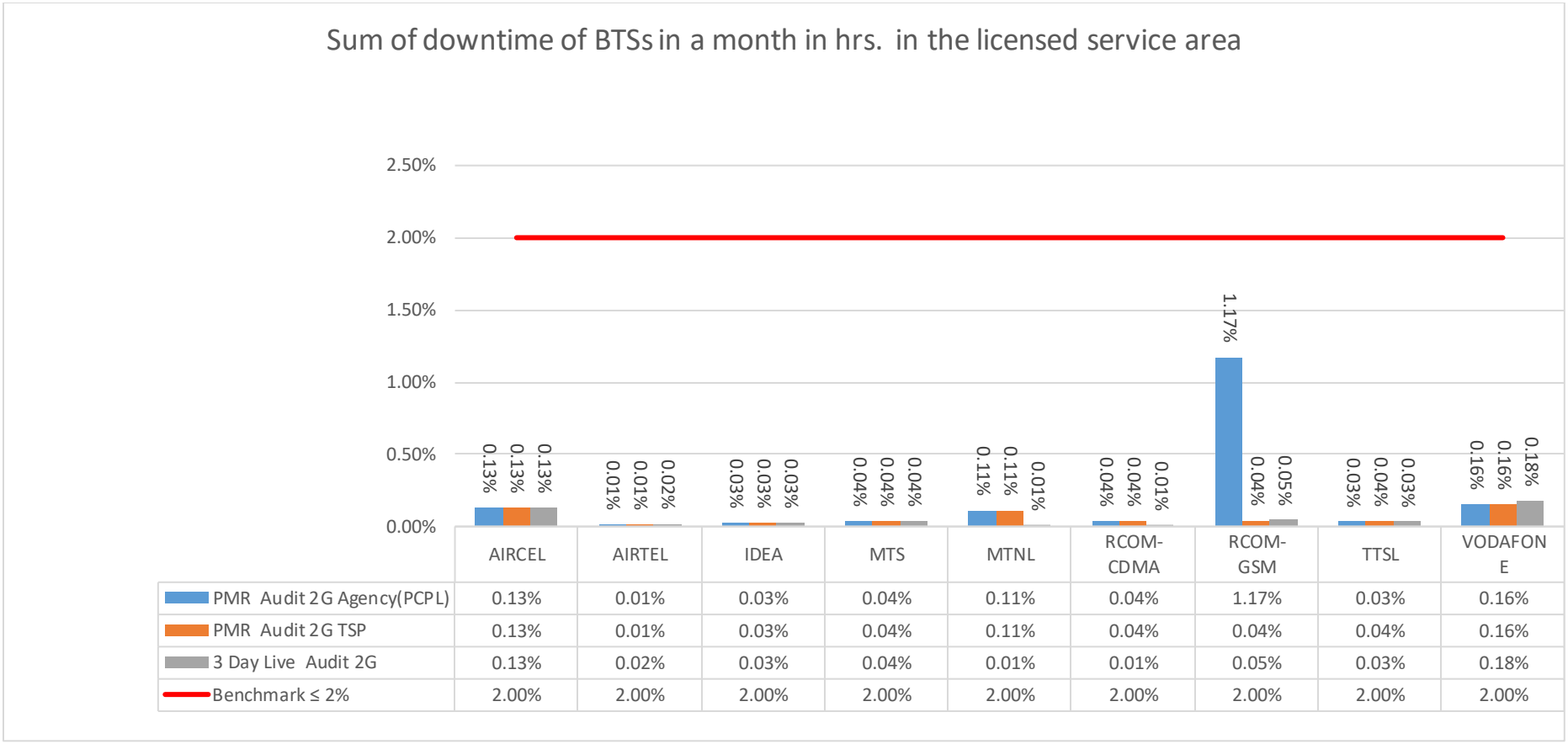
- TTSL CDMA has a parameter value of 94.03% and failed to meet the benchmark of ≥ 95% for Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 seconds.
- VODAFONE has a parameter value of 0.17% and failed to meet the benchmark of ≤ 0.1 for Metering and Billing credibility for postpaid subscriber.
- VODAFONE has a parameter value of 99.99% and failed to meet the benchmark of =100% for time taken for refund of deposits after closures which is cleared over period of <60 days.

13.4. PMR COMPARISON (TSP VS. AUDIT AGENCY): NETWORK PARAMETERS

PMR Report Comparison between Audit Agency and TSP												
Network Parameters		Benchmark	Name of Service Provider									
				AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.13%	0.01%	0.03%	0.04%	0.11%	0.04%	1.17%	0.03%	0.16%
			TSP	0.13%	0.01%	0.03%	0.04%	0.11%	0.04%	0.04%	0.04%	0.16%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	0.27%	0.00%	0.00%	0.00%	0.21%	0.00%	0.09%	0.02%	0.66%
			TSP	0.27%	0.00%	0.00%	0.00%	0.21%	0.00%	0.09%	0.07%	0.66%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	Agency	97.62%	99.26%	99.02%	99.11%	96.79%	96.94%	97.00%	99.24%	99.02%
			TSP	97.62%	99.37%	99.02%	99.10%	96.79%	97.01%	98.17%	99.23%	99.01%
	SDDCH/Paging chl. Congestion	≤ 1%	Agency	0.25%	0.05%	0.51%	0.00%	0.46%	0.00%	0.66%	0.00%	0.23%
			TSP	0.25%	0.04%	0.51%	0.00%	0.46%	0.00%	0.40%	0.00%	0.23%
	TCH Congestion	≤ 2%	Agency	1.45%	0.03%	0.47%	0.10%	1.77%	1.04%	1.25%	0.10%	0.78%
			TSP	1.45%	0.03%	0.47%	0.10%	1.77%	0.98%	0.95%	0.10%	0.78%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	Agency	0.76%	0.73%	0.67%	0.25%	1.82%	0.22%	0.13%	0.23%	1.13%
			TSP	0.51%	0.73%	0.67%	0.25%	1.82%	0.22%	0.13%	0.25%	1.13%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	Agency	2.96%	1.30%	2.28%	1.25%	2.54%	0.94%	0.53%	1.10%	2.67%
			TSP	2.96%	1.18%	2.28%	1.25%	2.54%	0.97%	0.52%	1.45%	2.67%
	%age of connection with good voice quality	≥ 95%	Agency	96.33%	99.16%	98.18%	99.20%	97.20%	99.50%	98.67%	99.20%	97.91%
			TSP	96.33%	99.15%	98.18%	99.20%	97.20%	99.50%	98.69%	99.19%	97.90%

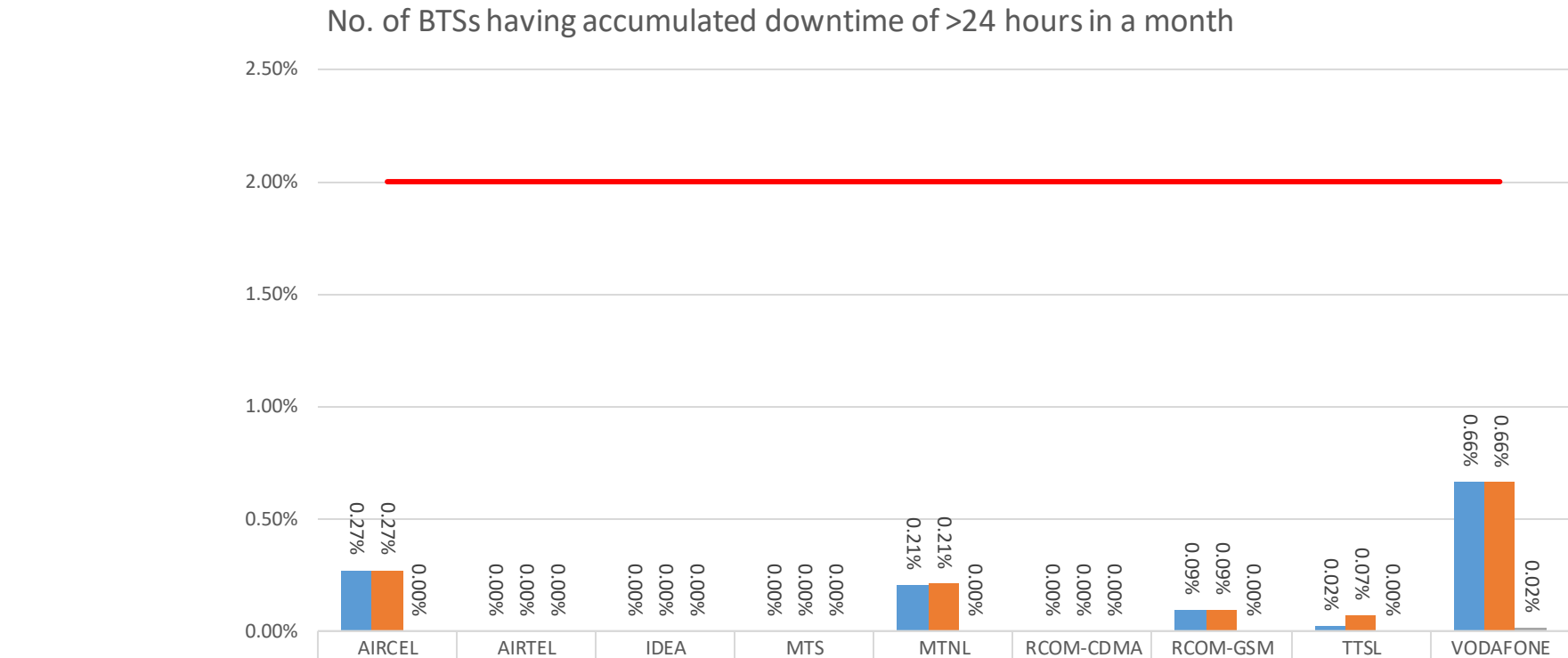
- **For each instance of "DNA (Data Not Available)", please refer the respective hard copy of audit report(s).

13.4.1. SUM OF DOWNTIME OF BTSS IN A MONTH IN HRS. IN THE LICENSED SERVICE



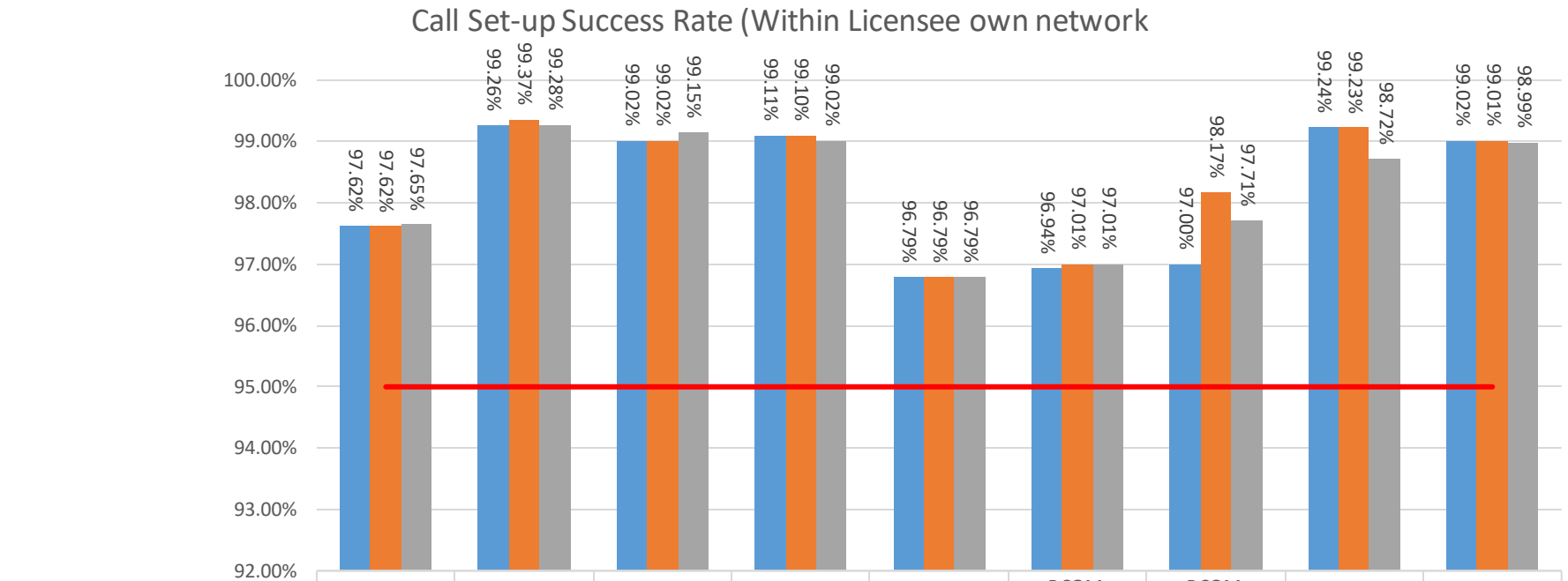
	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
PMR Audit 2G Agency(PCPL)	0.13%	0.01%	0.03%	0.04%	0.11%	0.04%	1.17%	0.03%	0.16%
PMR Audit 2G TSP	0.13%	0.01%	0.03%	0.04%	0.11%	0.04%	0.04%	0.04%	0.16%
3 Day Live Audit 2G	0.13%	0.02%	0.03%	0.04%	0.01%	0.01%	0.05%	0.03%	0.18%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

13.4.2. NO. OF BTSS HAVING ACCUMULATED DOWNTIME OF >24 HOURS IN A MONTH



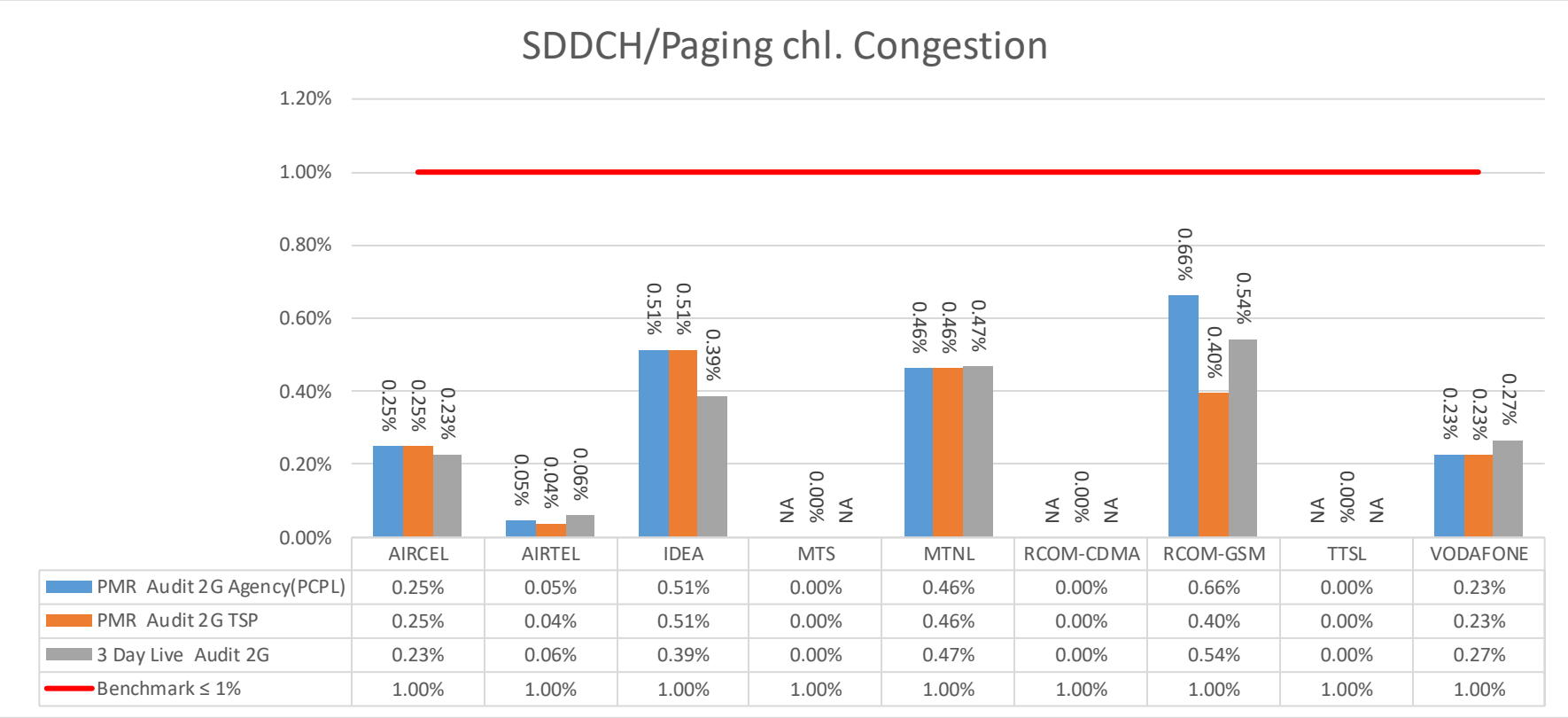
	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
PMR Audit 2G Agency(PCPL)	0.27%	0.00%	0.00%	0.00%	0.21%	0.00%	0.09%	0.02%	0.66%
PMR Audit 2G TSP	0.27%	0.00%	0.00%	0.00%	0.21%	0.00%	0.09%	0.07%	0.66%
3 Day Live Audit 2G	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

13.4.3. CALL SET-UP SUCCESS RATE (WITHIN LICENSEE OWN NETWORK)



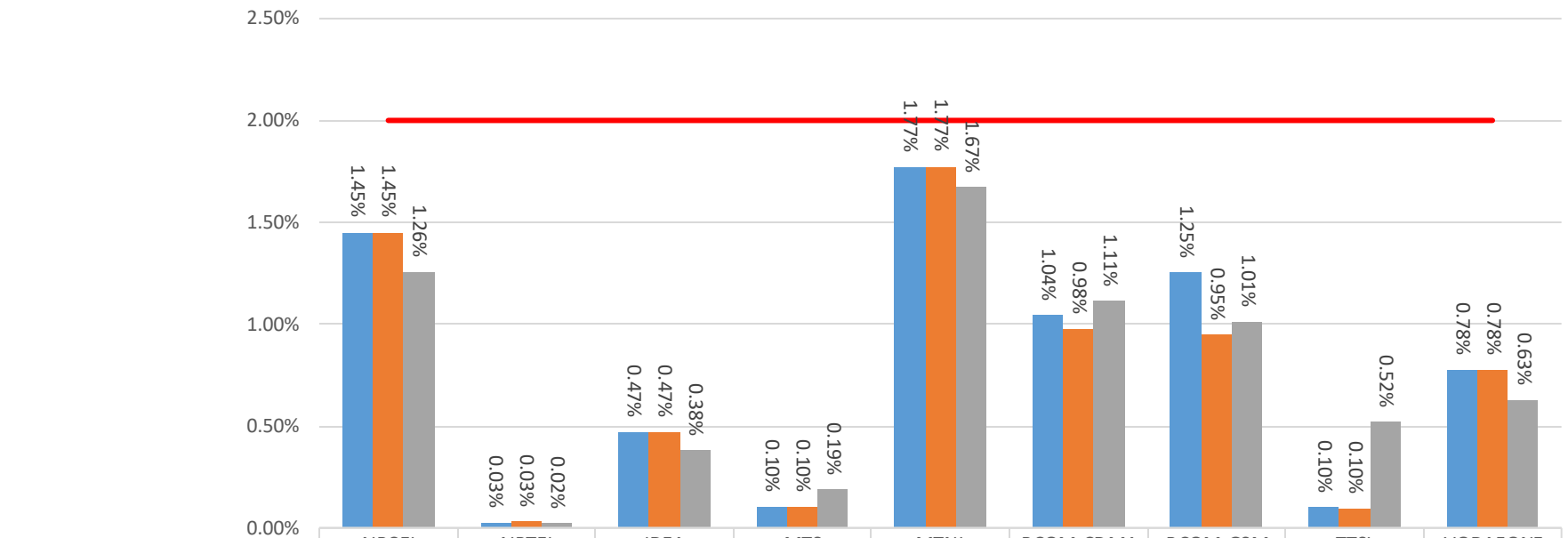
	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
PMR Audit 2G Agency(PCPL)	97.62%	99.26%	99.02%	99.11%	96.79%	96.94%	97.00%	99.24%	99.02%
PMR Audit 2G TSP	97.62%	99.37%	99.02%	99.10%	96.79%	97.01%	98.17%	99.23%	99.01%
3 Day Live Audit 2G	97.65%	99.28%	99.15%	99.02%	96.79%	97.01%	97.71%	98.72%	98.99%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

13.4.4. SDDCH/PAGING CHL. CONGESTION



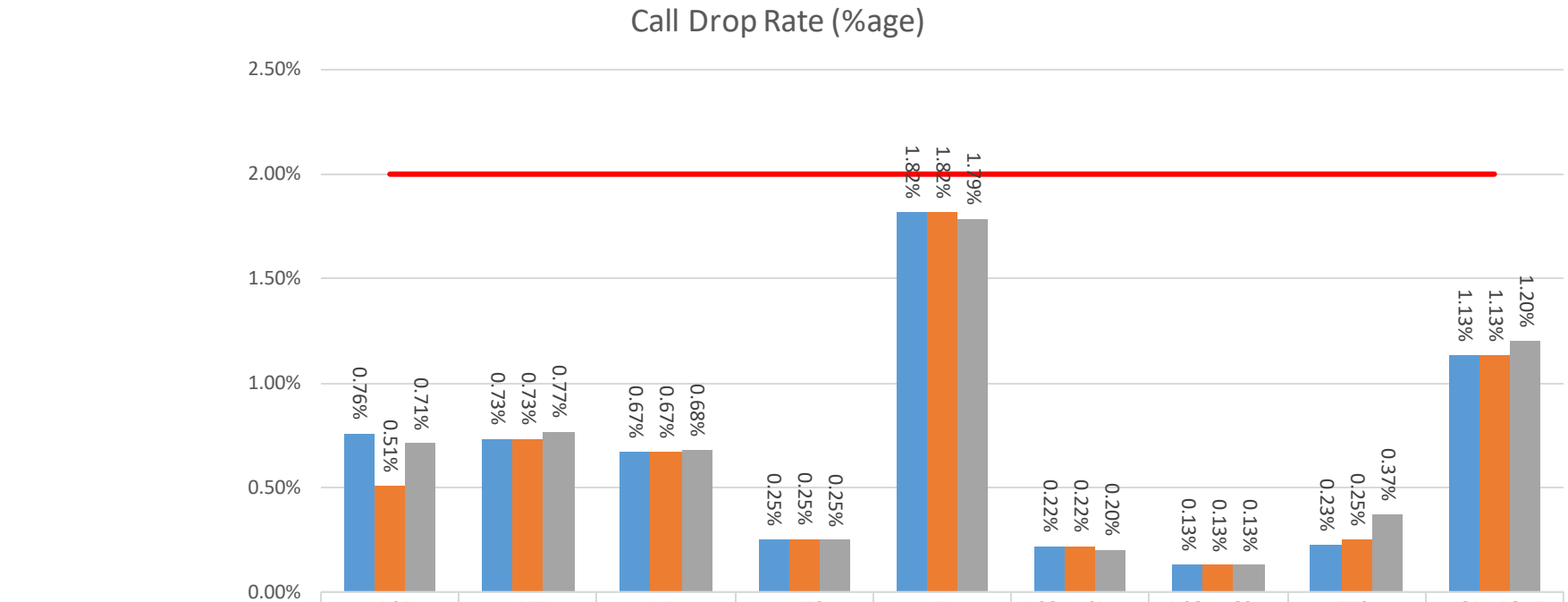
	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
PMR Audit 2G Agency(PCPL)	0.25%	0.05%	0.51%	0.00%	0.46%	0.00%	0.66%	0.00%	0.23%
PMR Audit 2G TSP	0.25%	0.04%	0.51%	0.00%	0.46%	0.00%	0.40%	0.00%	0.23%
3 Day Live Audit 2G	0.23%	0.06%	0.39%	0.00%	0.47%	0.00%	0.54%	0.00%	0.27%
Benchmark ≤ 1%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

13.4.5. TCH CONGESTION



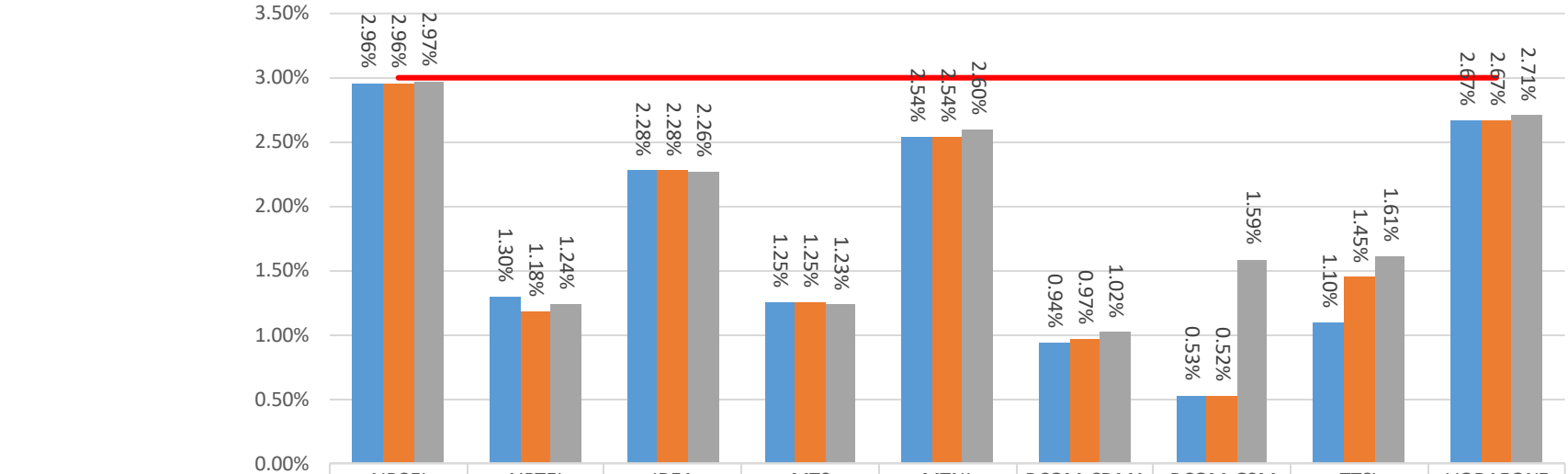
	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
PMR Audit 2G Agency(PCPL)	1.45%	0.03%	0.47%	0.10%	1.77%	1.04%	1.25%	0.10%	0.78%
PMR Audit 2G TSP	1.45%	0.03%	0.47%	0.10%	1.77%	0.98%	0.95%	0.10%	0.78%
3 Day Live Audit 2G	1.26%	0.02%	0.38%	0.19%	1.67%	1.11%	1.01%	0.52%	0.63%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

13.4.6. CALL DROP RATE (%AGE)



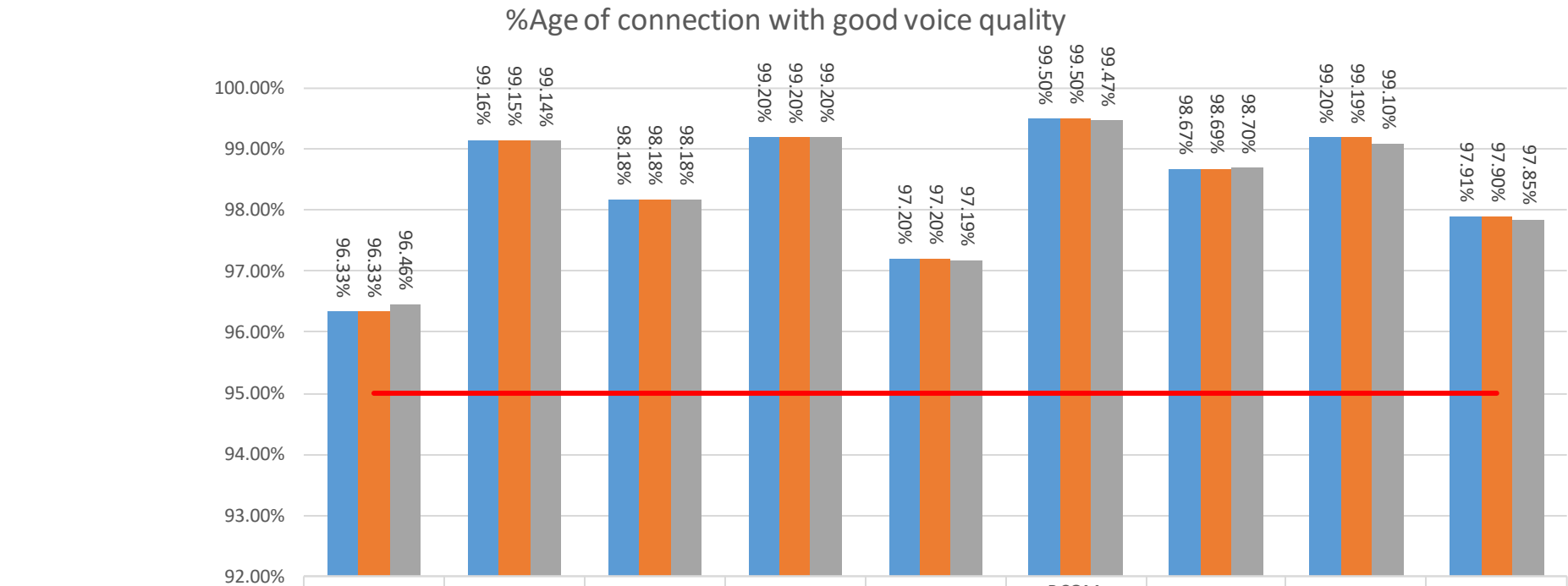
	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
PMR Audit 2G Agency(PCPL)	0.76%	0.73%	0.67%	0.25%	1.82%	0.22%	0.13%	0.23%	1.13%
PMR Audit 2G TSP	0.51%	0.73%	0.67%	0.25%	1.82%	0.22%	0.13%	0.25%	1.13%
3 Day Live Audit 2G	0.71%	0.77%	0.68%	0.25%	1.79%	0.20%	0.13%	0.37%	1.20%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

13.4.7. WORST AFFECTED CELL HAVING MORE THAN 3% TCH DROP



	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
PMR Audit 2G Agency(PCPL)	2.96%	1.30%	2.28%	1.25%	2.54%	0.94%	0.53%	1.10%	2.67%
PMR Audit 2G TSP	2.96%	1.18%	2.28%	1.25%	2.54%	0.97%	0.52%	1.45%	2.67%
3 Day Live Audit 2G	2.97%	1.24%	2.26%	1.23%	2.60%	1.02%	1.59%	1.61%	2.71%
Benchmark ≤ 3%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%

13.4.8. %AGE OF CONNECTION WITH GOOD VOICE QUALITY

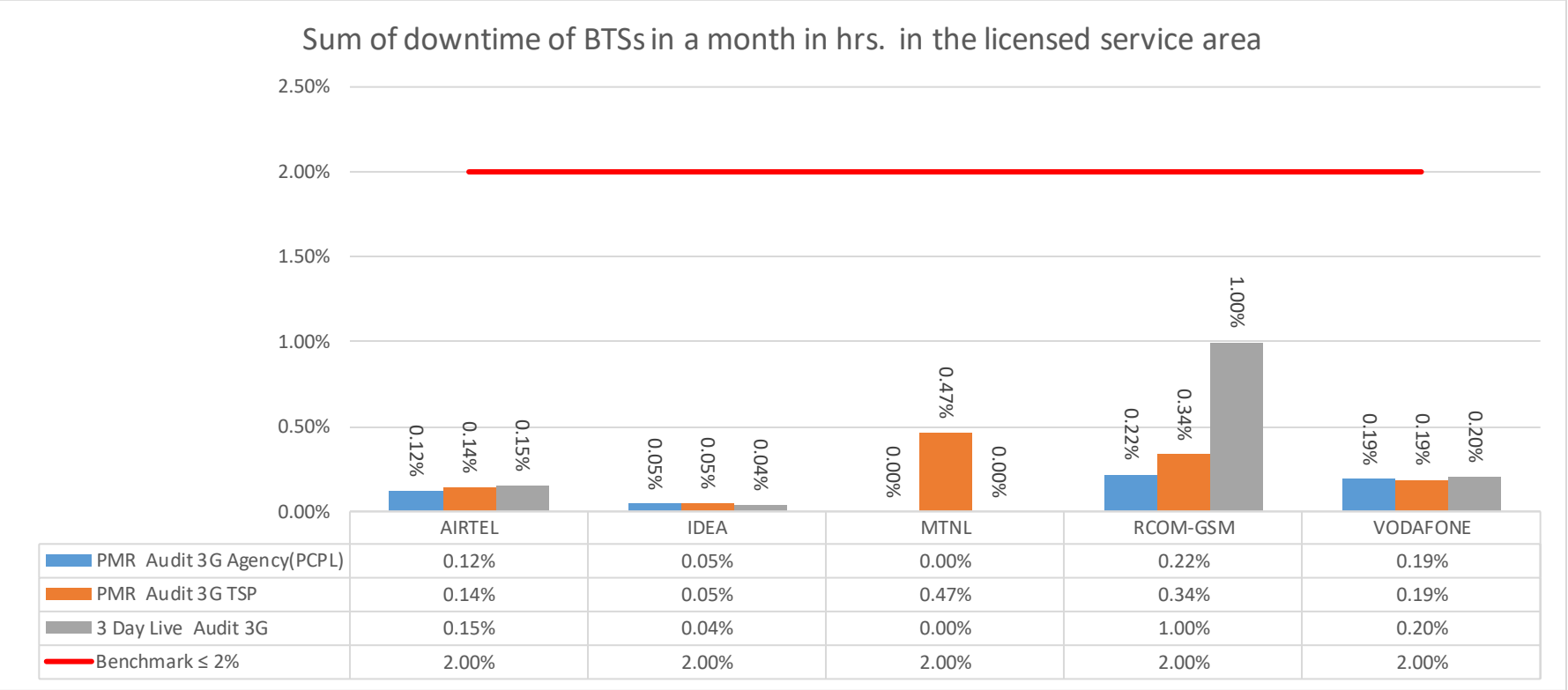


	AIRCEL	AIRTEL	IDEA	MTS	MTNL	RCOM-CDMA	RCOM-GSM	TTSL	VODAFONE
PMR Audit 2G Agency(PCPL)	96.33%	99.16%	98.18%	99.20%	97.20%	99.50%	98.67%	99.20%	97.91%
PMR Audit 2G TSP	96.33%	99.15%	98.18%	99.20%	97.20%	99.50%	98.69%	99.19%	97.90%
3 Day Live Audit 2G	96.46%	99.14%	98.18%	99.20%	97.19%	99.47%	98.70%	99.10%	97.85%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

13.5. PMR Comparison (TSP vs. Audit Agency): Network Parameters

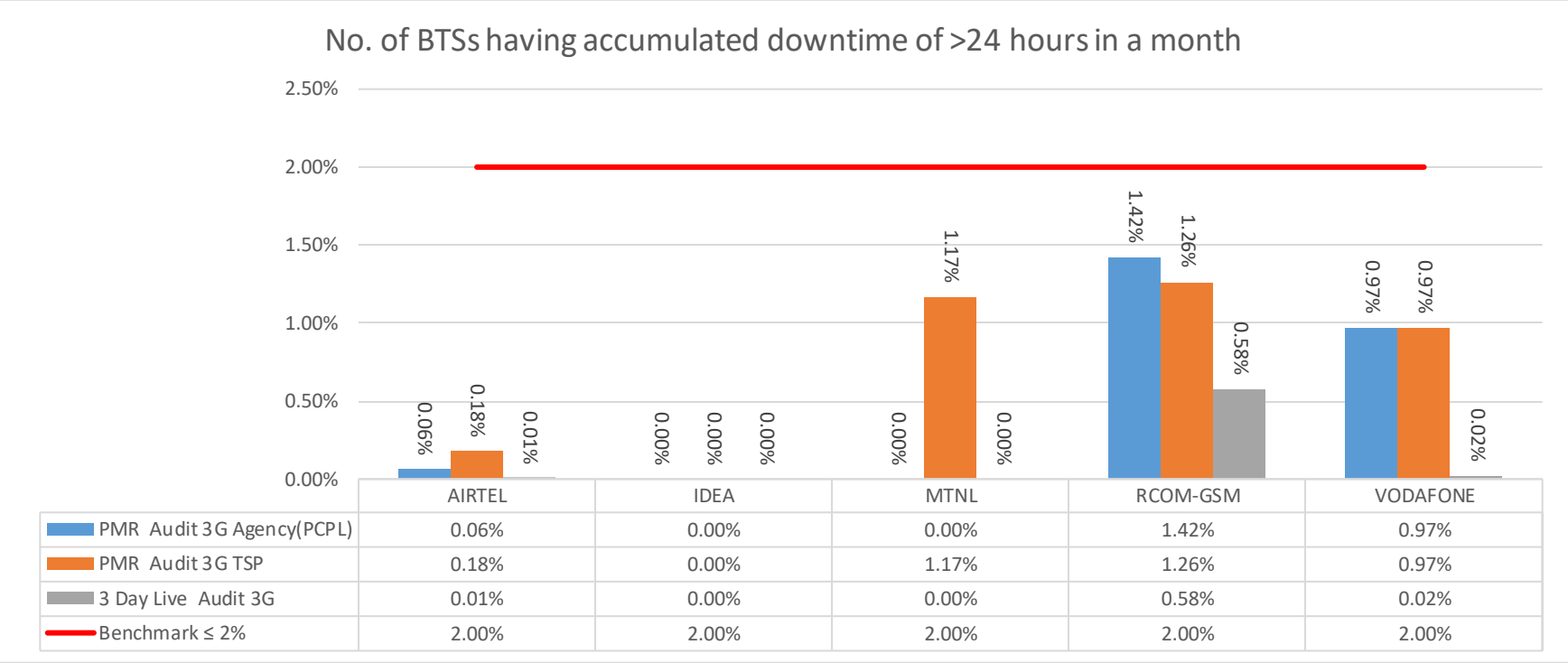
3G PMR Report Comparison between Audit Agency and TSP								
Network Parameters		Name of Service Provider						
		Benchmark		AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.12%	0.05%	DNA	0.22%	0.19%
			TSP	0.14%	0.05%	0.47%	0.34%	0.19%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	0.06%	0.00%	DNA	1.42%	0.97%
			TSP	0.18%	0.00%	1.17%	1.26%	0.97%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	Agency	98.70%	99.86%	DNA	99.77%	99.60%
			TSP	98.64%	99.85%	96.56%	99.28%	99.64%
	RRC Congestion:	≤ 1%	Agency	0.14%	0.02%	DNA	0.11%	0.16%
			TSP	0.14%	0.03%	0.77%	0.12%	0.15%
	RAB Congestion:	≤ 2%	Agency	0.15%	0.01%	DNA	0.02%	0.16%
			TSP	0.16%	0.01%	1.53%	0.14%	0.16%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	Agency	0.46%	0.34%	DNA	0.16%	0.58%
			TSP	0.46%	0.35%	1.43%	0.39%	0.58%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	Agency	2.34%	2.45%	DNA	0.52%	2.66%
			TSP	2.28%	2.49%	1.83%	1.49%	2.67%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	Agency	98.76%	98.38%	DNA	99.27%	98.85%
			TSP	98.76%	98.37%	95.97%	99.52%	98.87%

13.5.1. SUM OF DOWNTIME OF BTSS IN A MONTH IN HRS. IN THE LICENSED SERVICE AREA



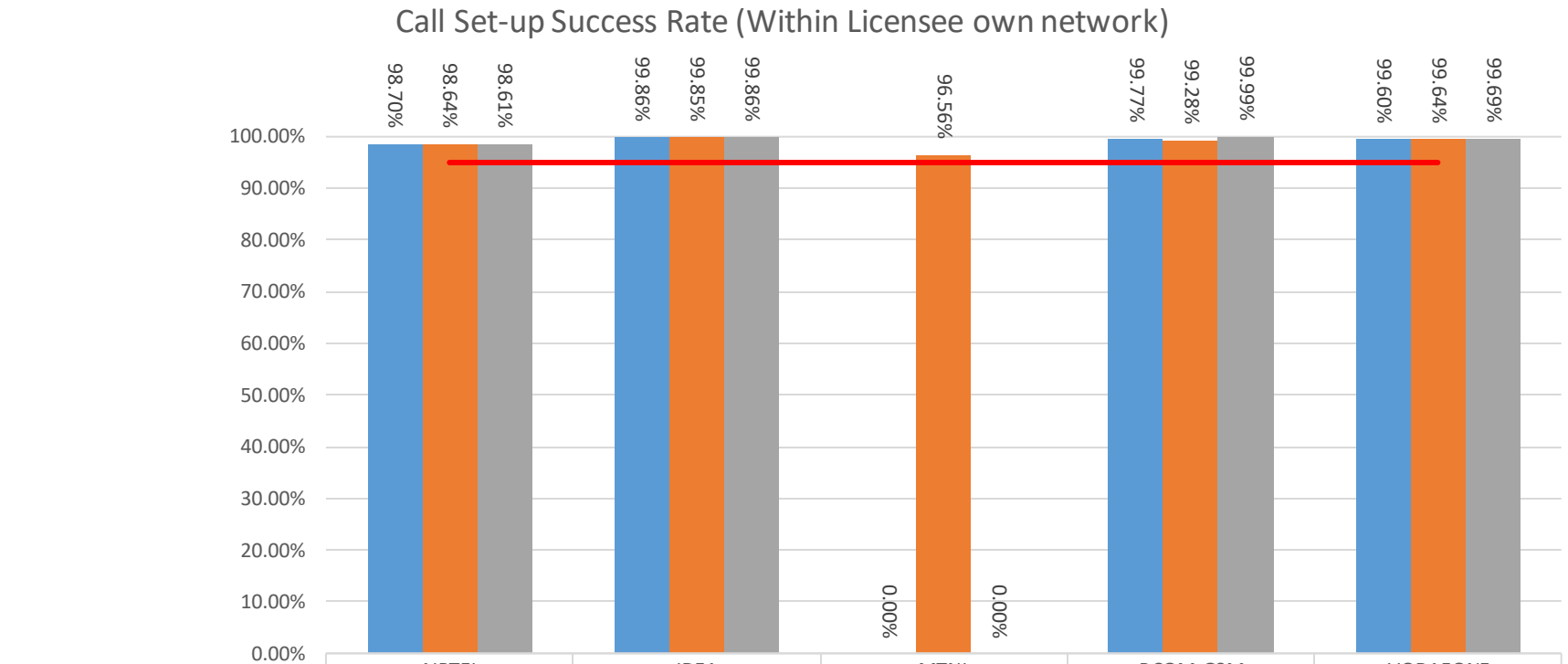
	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
PMR Audit 3G Agency(PCPL)	0.12%	0.05%	0.00%	0.22%	0.19%
PMR Audit 3G TSP	0.14%	0.05%	0.47%	0.34%	0.19%
3 Day Live Audit 3G	0.15%	0.04%	0.00%	1.00%	0.20%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

13.5.2. NO. OF BTSS HAVING ACCUMULATED DOWNTIME OF >24 HOURS IN A MONTH



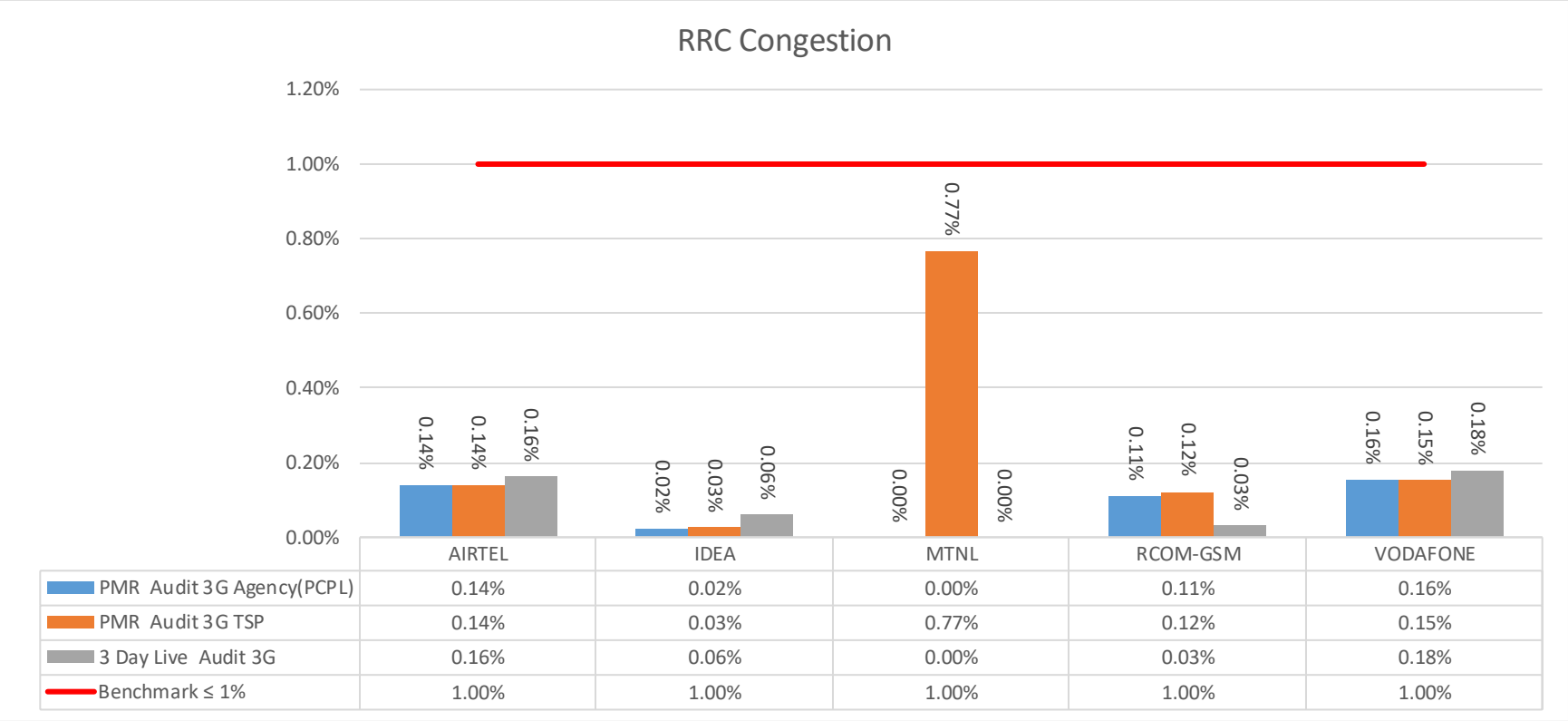
	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
PMR Audit 3G Agency(PCPL)	0.06%	0.00%	0.00%	1.42%	0.97%
PMR Audit 3G TSP	0.18%	0.00%	1.17%	1.26%	0.97%
3 Day Live Audit 3G	0.01%	0.00%	0.00%	0.58%	0.02%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

13.5.3. CALL SET-UP SUCCESS RATE (WITHIN LICENSEE OWN NETWORK)



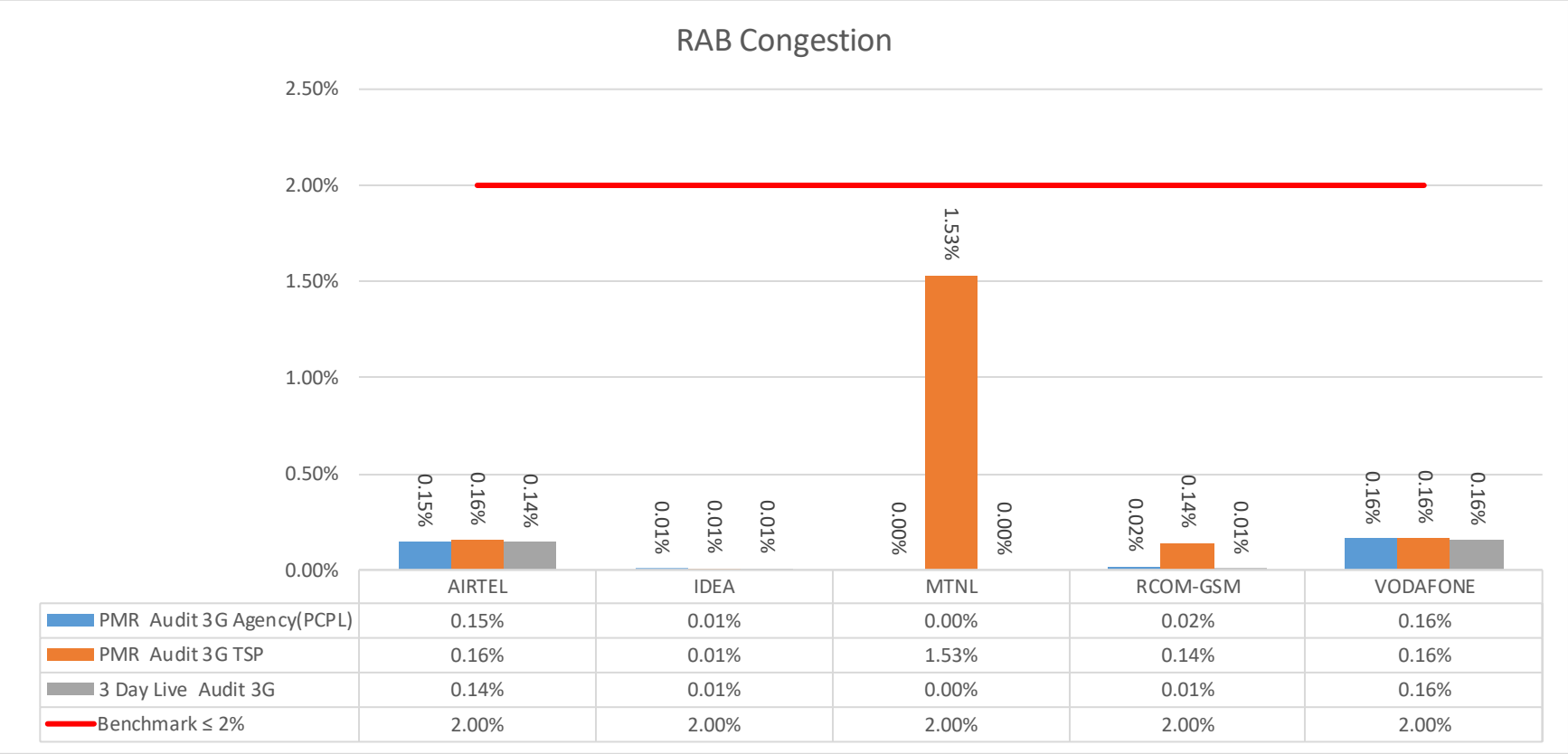
	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
PMR Audit 3G Agency(PCPL)	98.70%	99.86%	0.00%	99.77%	99.60%
PMR Audit 3G TSP	98.64%	99.85%	96.56%	99.28%	99.64%
3 Day Live Audit 3G	98.61%	99.86%	0.00%	99.99%	99.69%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%

13.5.4. RRC CONGESTION



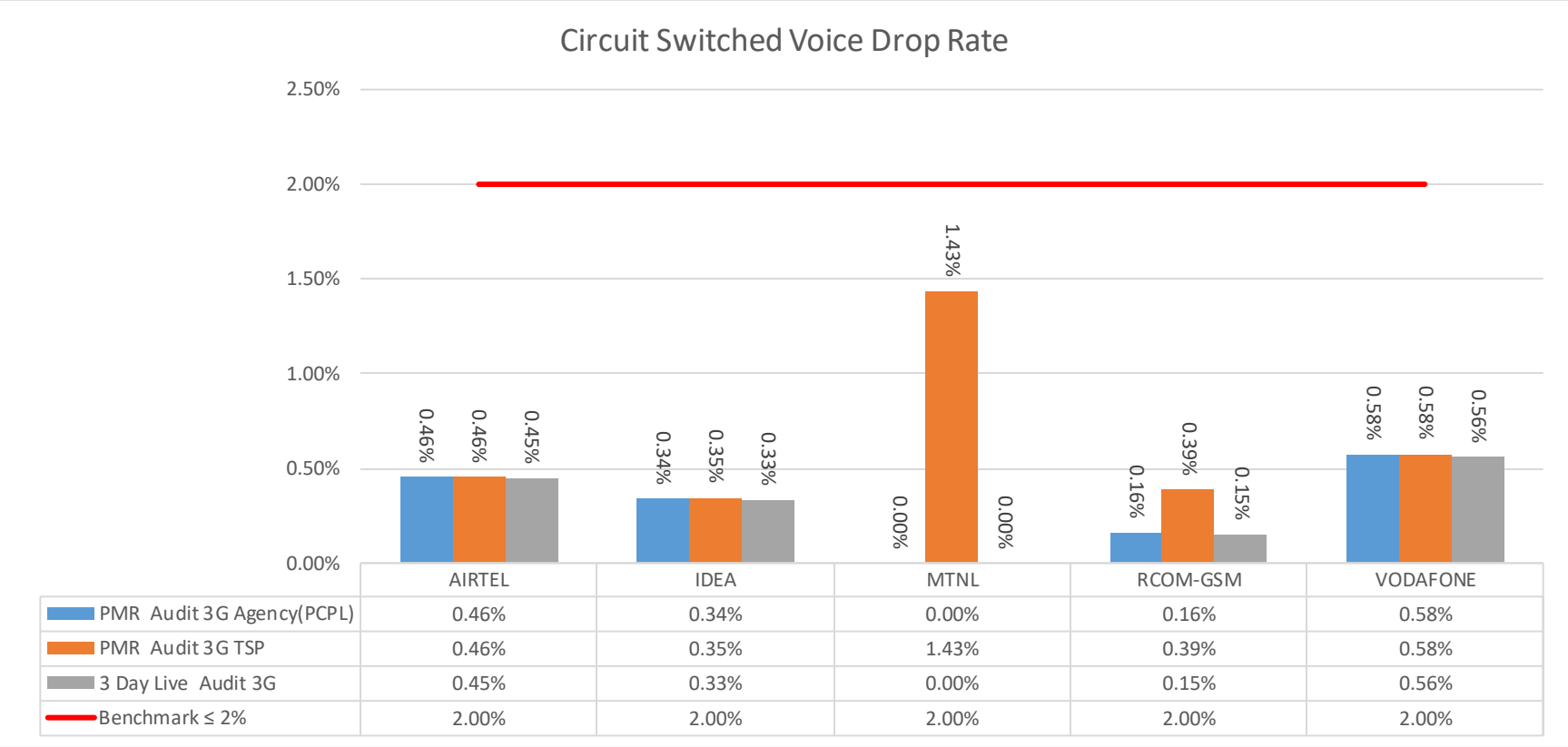
	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
PMR Audit 3G Agency(PCPL)	0.14%	0.02%	0.00%	0.11%	0.16%
PMR Audit 3G TSP	0.14%	0.03%	0.77%	0.12%	0.15%
3 Day Live Audit 3G	0.16%	0.06%	0.00%	0.03%	0.18%
Benchmark ≤ 1%	1.00%	1.00%	1.00%	1.00%	1.00%

13.5.5. RAB CONGESTION



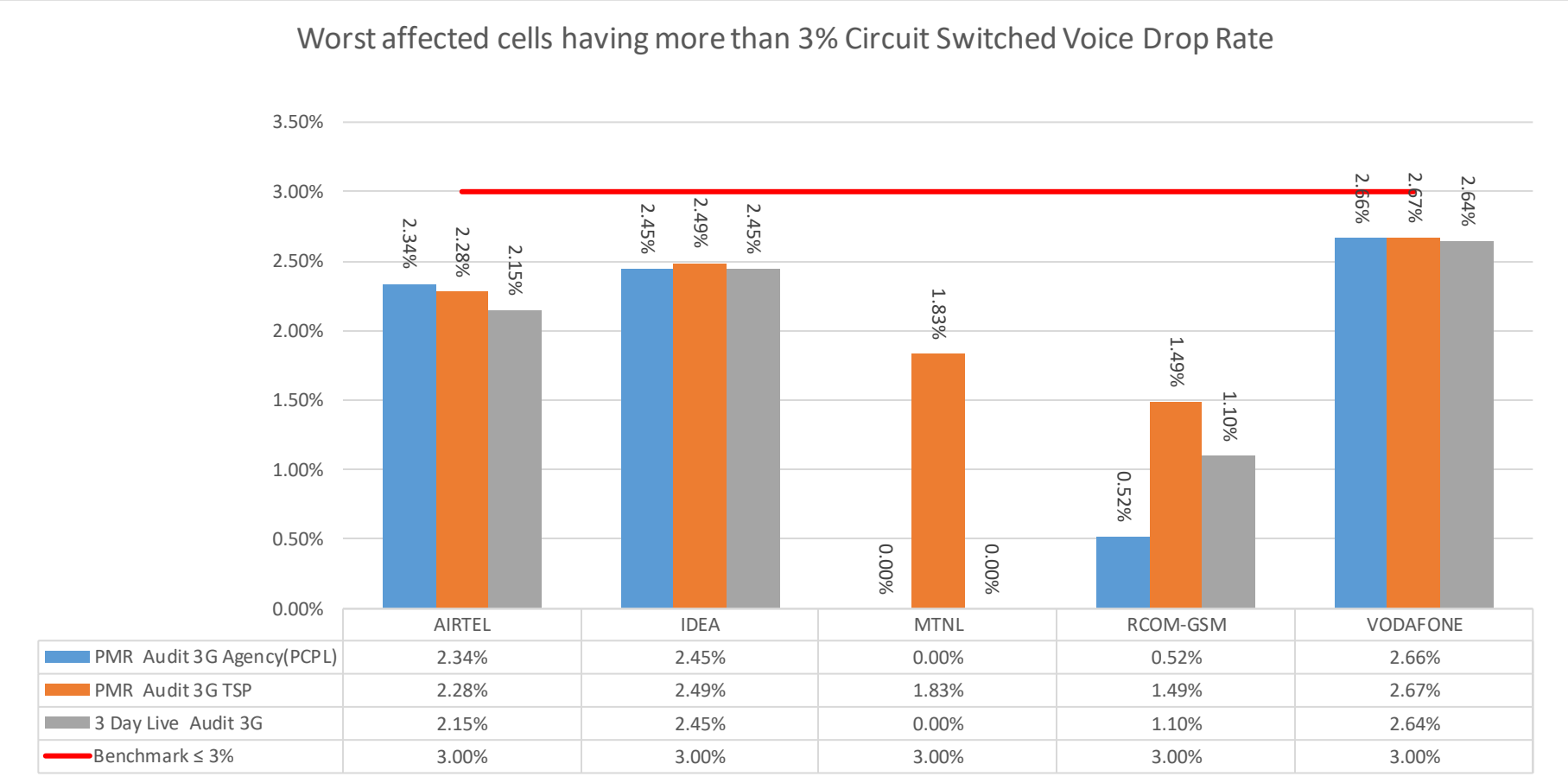
	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
PMR Audit 3G Agency(PCPL)	0.15%	0.01%	0.00%	0.02%	0.16%
PMR Audit 3G TSP	0.16%	0.01%	1.53%	0.14%	0.16%
3 Day Live Audit 3G	0.14%	0.01%	0.00%	0.01%	0.16%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

13.5.6. CIRCUIT SWITCHED VOICE DROP RATE



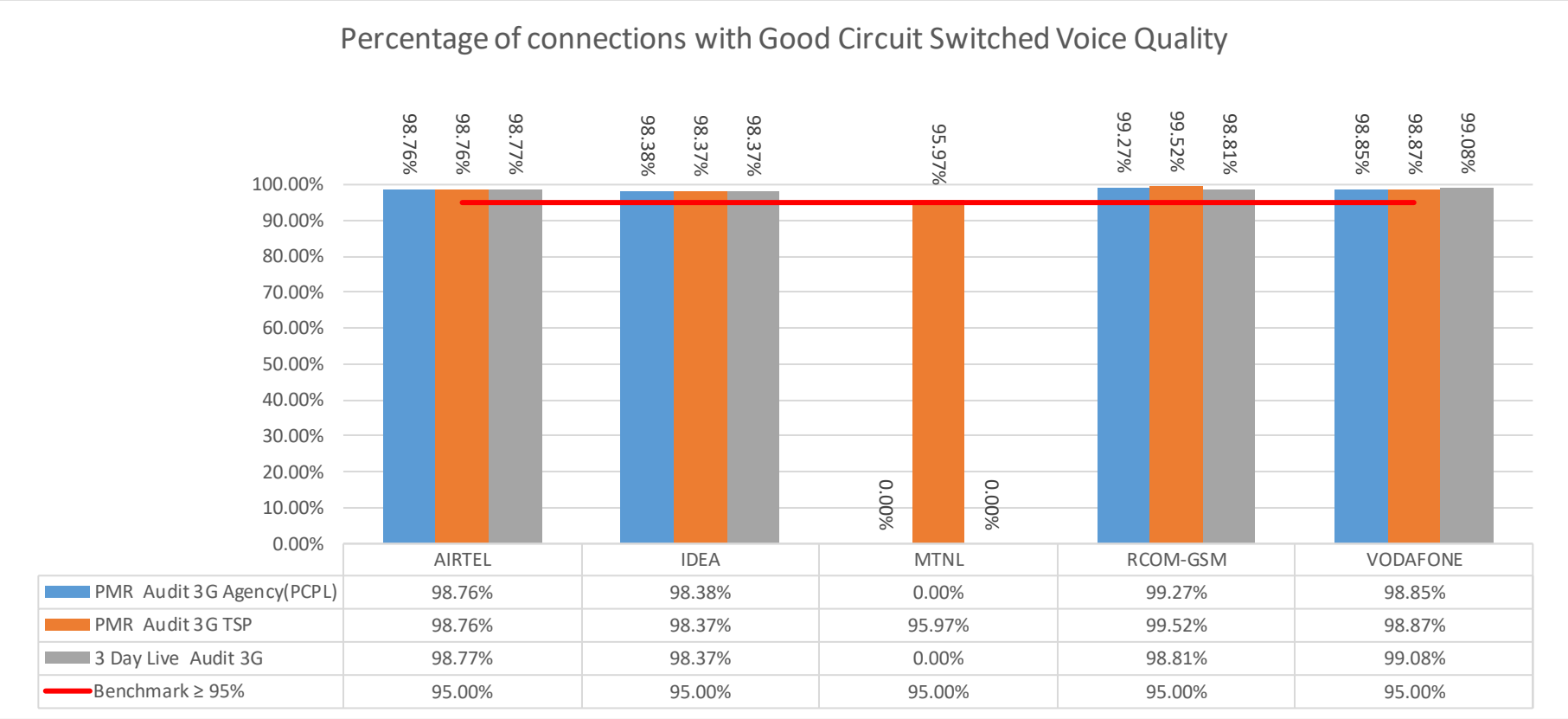
	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
PMR Audit 3G Agency(PCPL)	0.46%	0.34%	0.00%	0.16%	0.58%
PMR Audit 3G TSP	0.46%	0.35%	1.43%	0.39%	0.58%
3 Day Live Audit 3G	0.45%	0.33%	0.00%	0.15%	0.56%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

13.5.7. WORST AFFECTED CELLS HAVING MORE THAN 3% CIRCUIT SWITCHED VOICE DROP RATE



	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
PMR Audit 3G Agency(PCPL)	2.34%	2.45%	0.00%	0.52%	2.66%
PMR Audit 3G TSP	2.28%	2.49%	1.83%	1.49%	2.67%
3 Day Live Audit 3G	2.15%	2.45%	0.00%	1.10%	2.64%
Benchmark ≤ 3%	3.00%	3.00%	3.00%	3.00%	3.00%

13.5.8. PERCENTAGE OF CONNECTIONS WITH GOOD CIRCUIT SWITCHED VOICE QUALITY

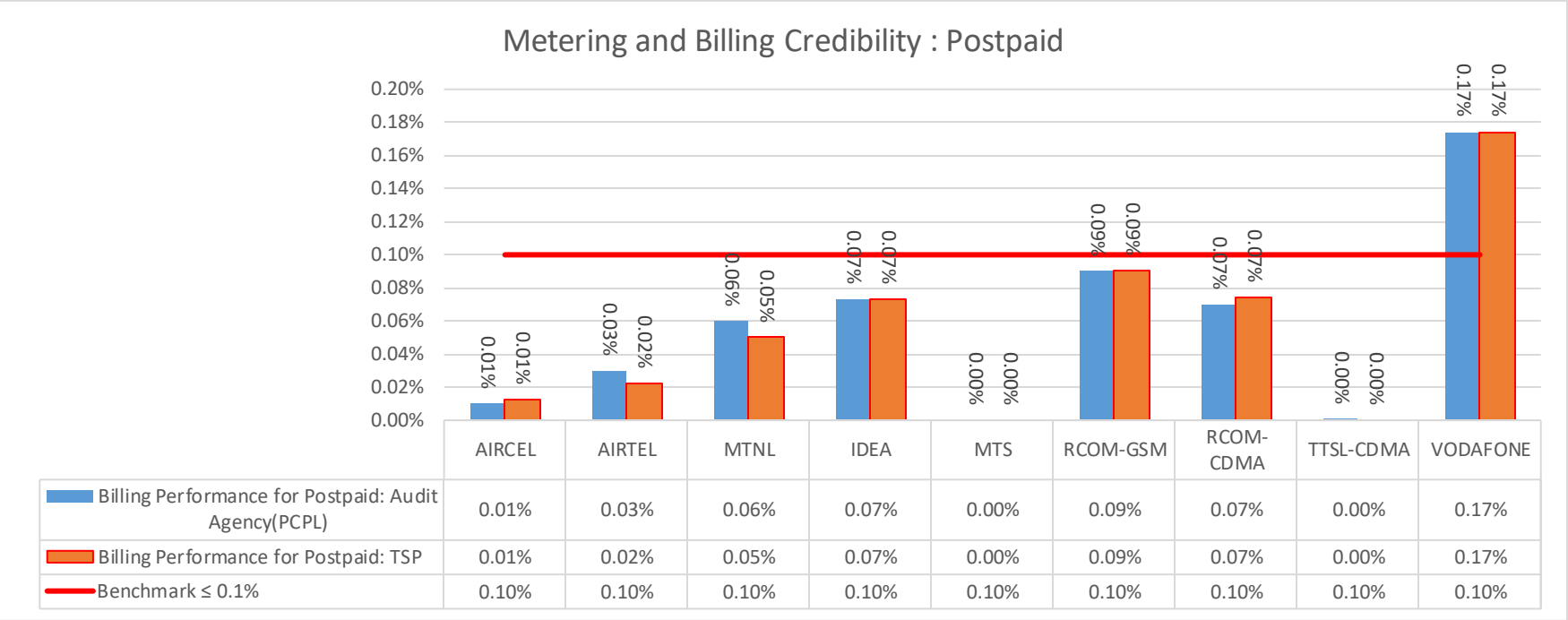


	AIRTEL	IDEA	MTNL	RCOM-GSM	VODAFONE
PMR Audit 3G Agency(PCPL)	98.76%	98.38%	0.00%	99.27%	98.85%
PMR Audit 3G TSP	98.76%	98.37%	95.97%	99.52%	98.87%
3 Day Live Audit 3G	98.77%	98.37%	0.00%	98.81%	99.08%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%

13.6. PMR COMPARISON (TSP VS. AUDIT AGENCY): CSD PARAMETERS

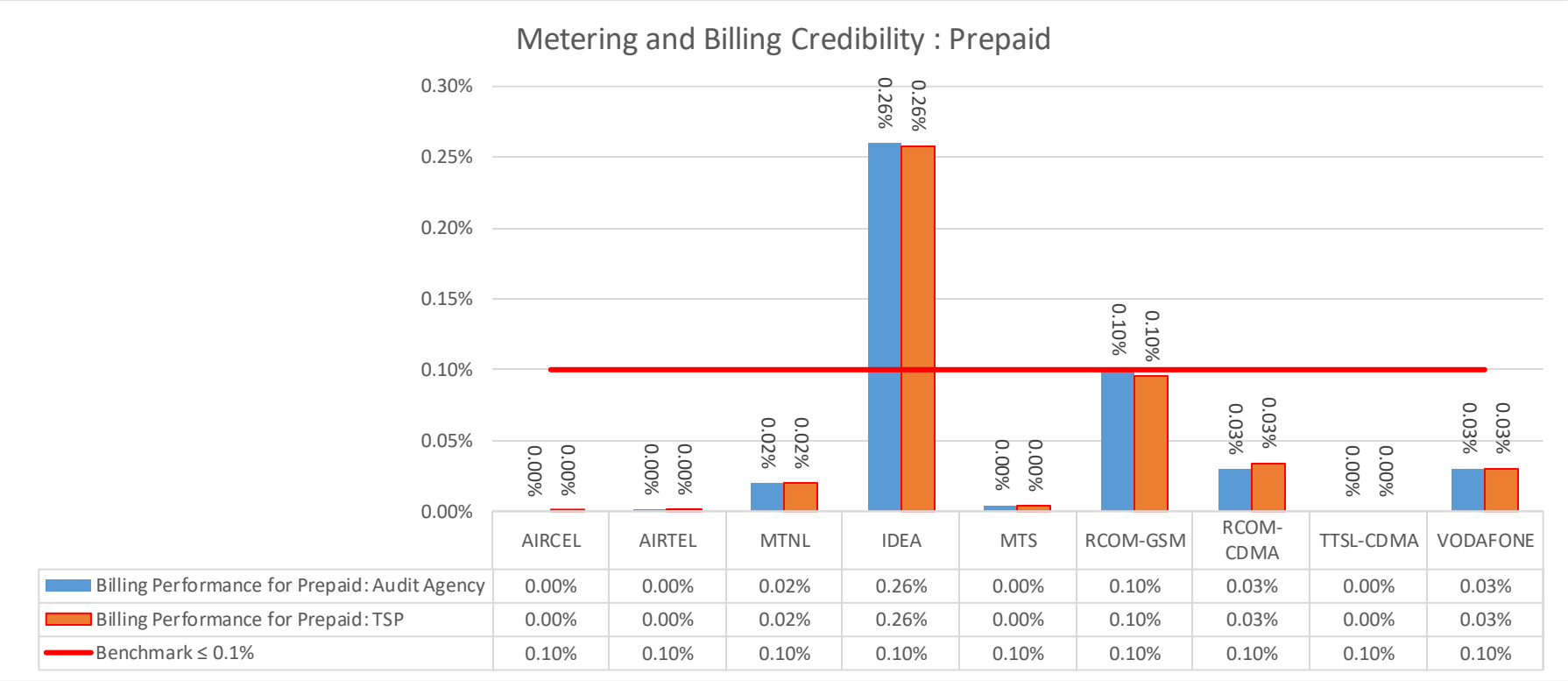
Name of Service	Metering and Billing credibility				Billing Complaints						Termination & Closures		Time taken for refund of deposits		Response time to customer for assistance			
	Postpaid Subscribers		Prepaid Subscribers		%age complaints resolved within 4		%age complaints resolved within 6		%age of where credit/waiver is		% of Termination/ Closure of		Cleared over a period of <60 days		%age of calls answered by the IVR		%age of call answered by the	
Benchmark	≤ 0.1%		≤ 0.1%		≥ 98%		= 100%		= 100%		= 100%		= 100%		≥ 95%		≥ 95%	
	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP
AIRCEL	0.01%	0.01%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	81.31%	81.31%	99.01%	99.01%	95.30%	95.30%
AIRTEL	0.03%	0.02%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	95.54%	95.54%
MTNL	0.06%	0.05%	0.02%	0.02%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.75%	97.77%	97.35%	97.30%
IDEA	0.07%	0.07%	0.26%	0.26%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.95%	98.95%	99.03%	99.03%
MTS	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.04%	99.04%	96.07%	96.07%
RCOM-GSM	0.09%	0.09%	0.10%	0.10%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.84%	99.84%	91.52%	91.52%
RCOM-CDMA	0.07%	0.07%	0.03%	0.03%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.66%	99.66%	91.42%	91.42%
TTSL-CDMA	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.87%	98.87%	94.03%	94.03%
VODAFONE	0.17%	0.17%	0.03%	0.03%	100.00%	100.00%	100.00%	100.00%	99.99%	99.99%	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	95.26%	95.28%

13.6.1. METERING AND BILLING CREDIBILITY : POSTPAID



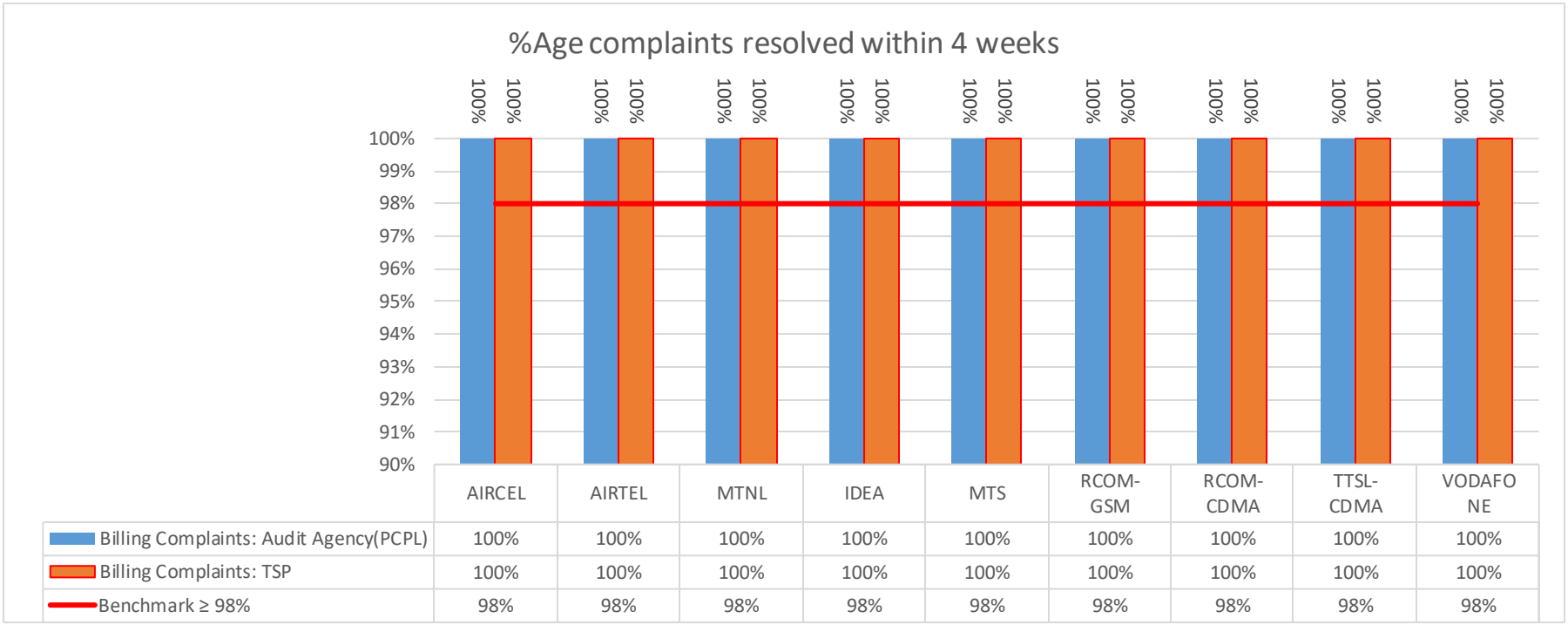
	AIRCEL	AIRTEL	MTNL	IDEA	MTS	RCOM-GSM	RCOM-CDMA	TTSL-CDMA	VODAFONE
Billing Performance for Postpaid: Audit Agency(PCPL)	0.01%	0.03%	0.06%	0.07%	0.00%	0.09%	0.07%	0.00%	0.17%
Billing Performance for Postpaid: TSP	0.01%	0.02%	0.05%	0.07%	0.00%	0.09%	0.07%	0.00%	0.17%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

13.6.2. METERING AND BILLING CREDIBILITY : PREPAID



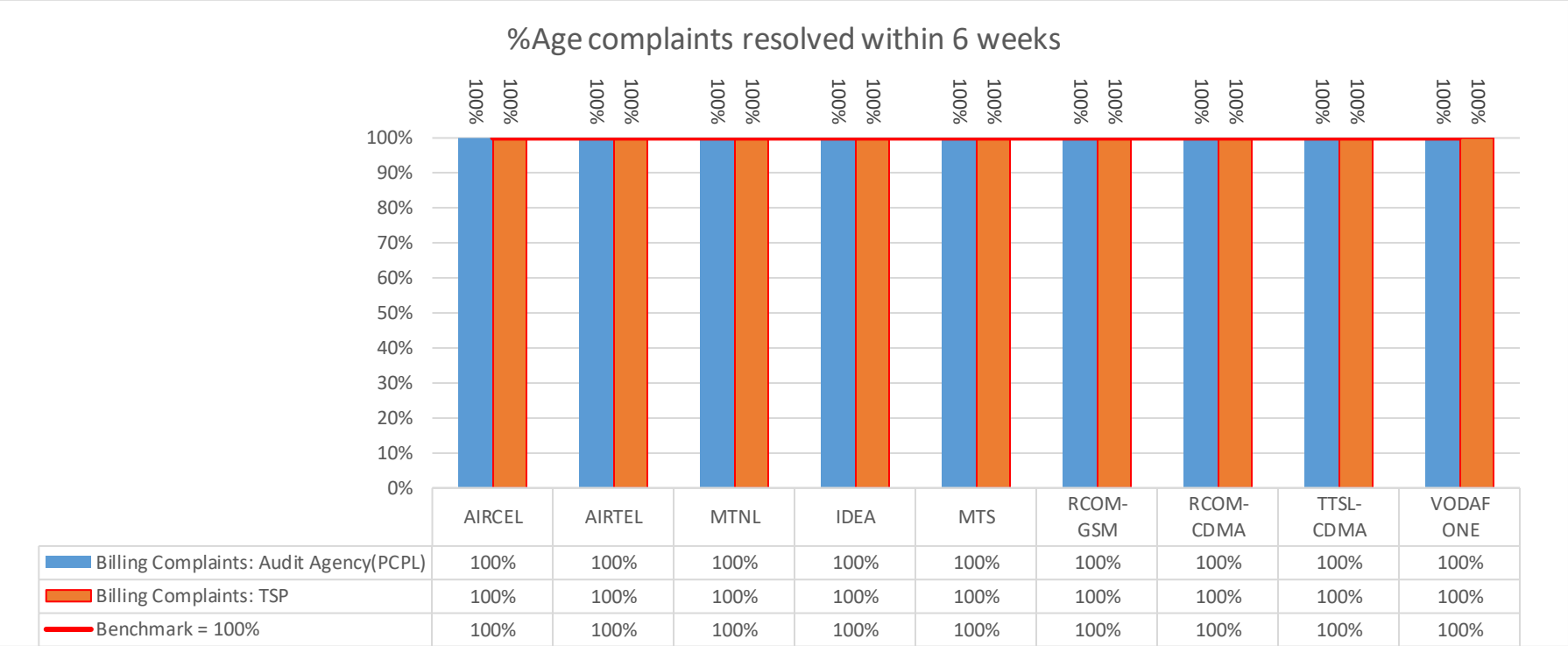
	AIRCEL	AIRTEL	MTNL	IDEA	MTS	RCOM-GSM	RCOM-CDMA	TTSL-CDMA	VODAFONE
Billing Performance for Prepaid: Audit Agency	0.00%	0.00%	0.02%	0.26%	0.00%	0.10%	0.03%	0.00%	0.03%
Billing Performance for Prepaid: TSP	0.00%	0.00%	0.02%	0.26%	0.00%	0.10%	0.03%	0.00%	0.03%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

13.6.3. %AGE COMPLAINT RESOLVED WITHIN 4 WEEKS



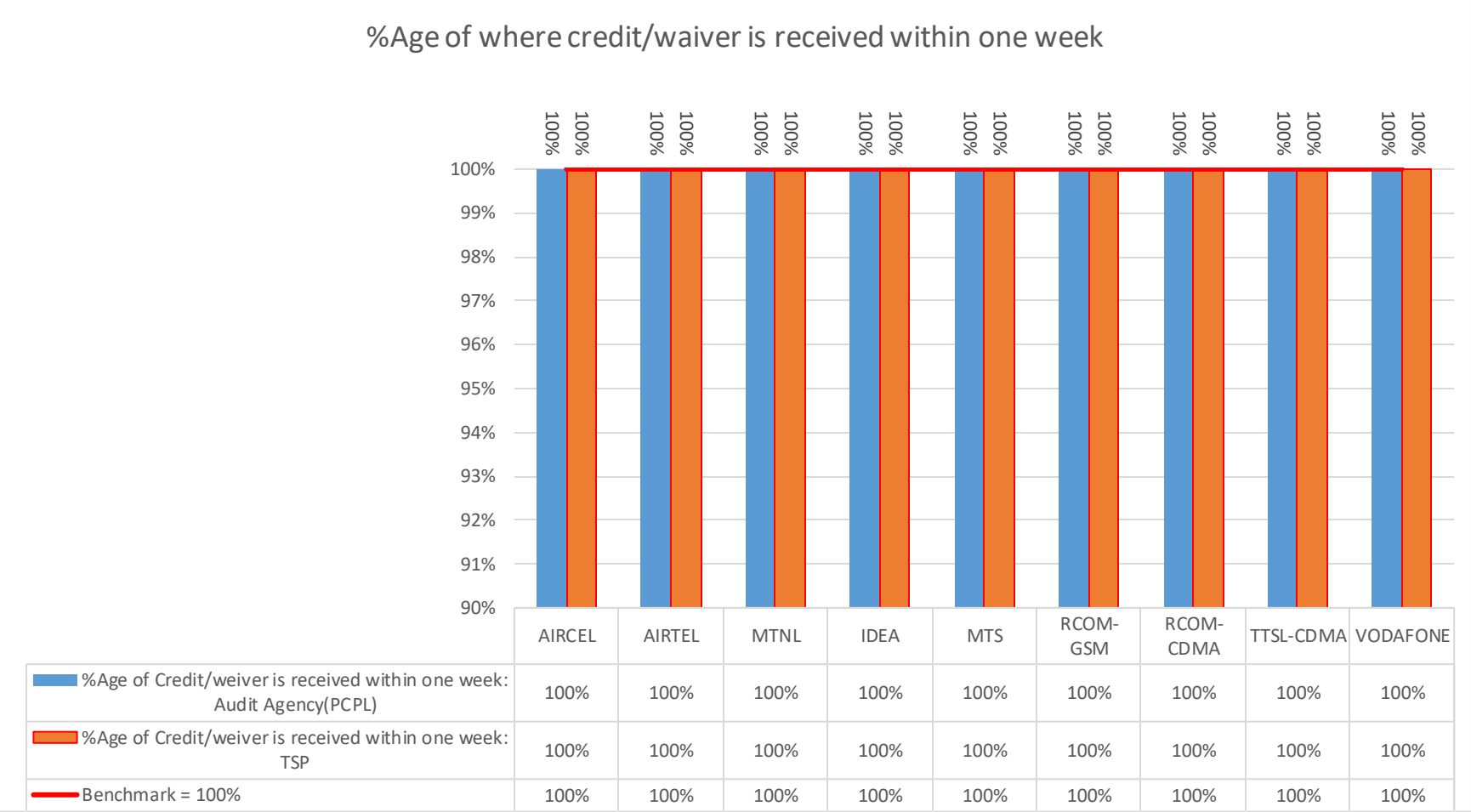
	AIRCEL	AIRTEL	MTNL	IDEA	MTS	RCOM-GSM	RCOM-CDMA	TTSL-CDMA	VODAFONE
Billing Complaints: Audit Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Billing Complaints: TSP	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark ≥ 98%	98%	98%	98%	98%	98%	98%	98%	98%	98%

13.6.4. %AGE COMPLAINTS RESOLVED WITHIN 6 WEEKS



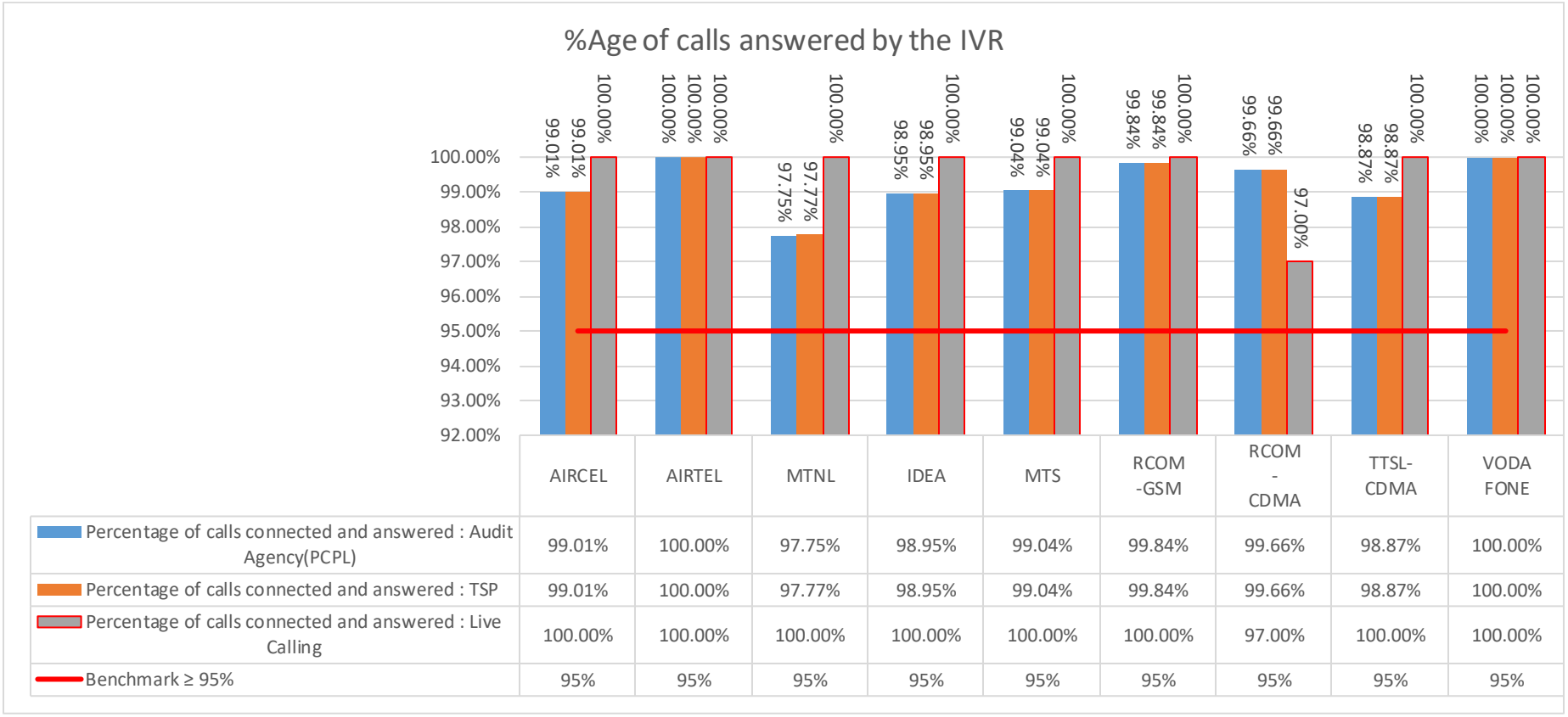
	AIRCEL	AIRTEL	MTNL	IDEA	MTS	RCOM-GSM	RCOM-CDMA	TTSL-CDMA	VODAFONE
Billing Complaints: Audit Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Billing Complaints: TSP	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

13.6.5. %AGE OF WHERE CREDIT/WAIVER IS RECEIVED WITHIN ONE WEEK



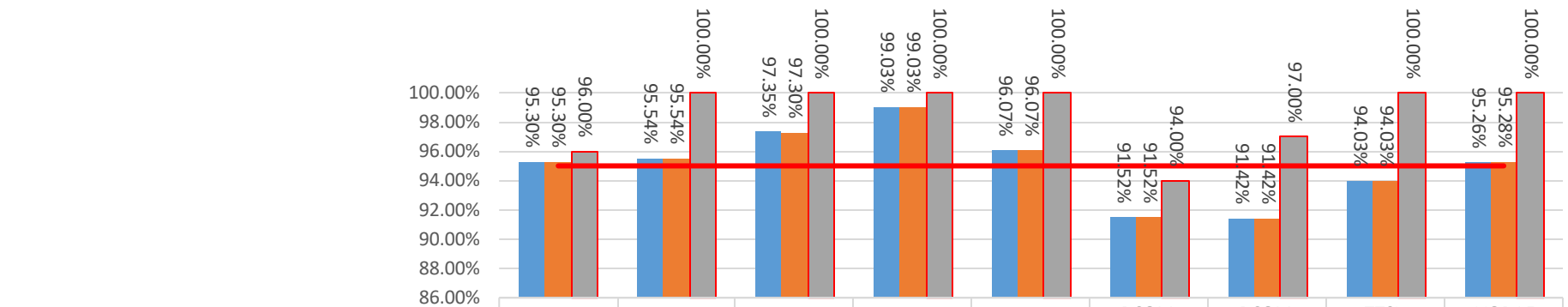
	AIRCEL	AIRTEL	MTNL	IDEA	MTS	RCOM-GSM	RCOM-CDMA	TTSL-CDMA	VODAFONE
%Age of Credit/weiver is received within one week: Audit Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%	100%
%Age of Credit/weiver is received within one week: TSP	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

13.6.6. %AGE OF CALLS ANSWERED BY THE IVR



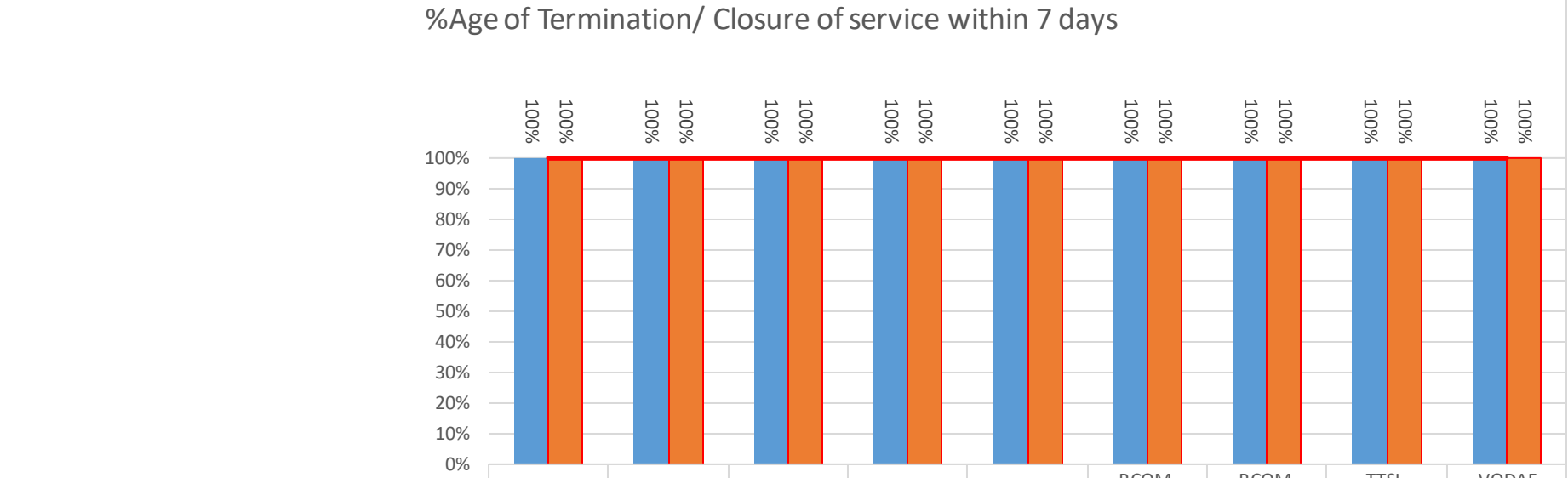
	AIRCEL	AIRTEL	MTNL	IDEA	MTS	RCOM -GSM	RCOM - CDMA	TTSL-CDMA	VODA FONE
Percentage of calls connected and answered : Audit Agency(PCPL)	99.01%	100.00%	97.75%	98.95%	99.04%	99.84%	99.66%	98.87%	100.00%
Percentage of calls connected and answered : TSP	99.01%	100.00%	97.77%	98.95%	99.04%	99.84%	99.66%	98.87%	100.00%
Percentage of calls connected and answered : Live Calling	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.00%	100.00%	100.00%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

13.6.7. %AGE OF CALLS ANSWERED BY THE OPERATORS (VOICE TO VOICE) WITHIN 90 SECONDS



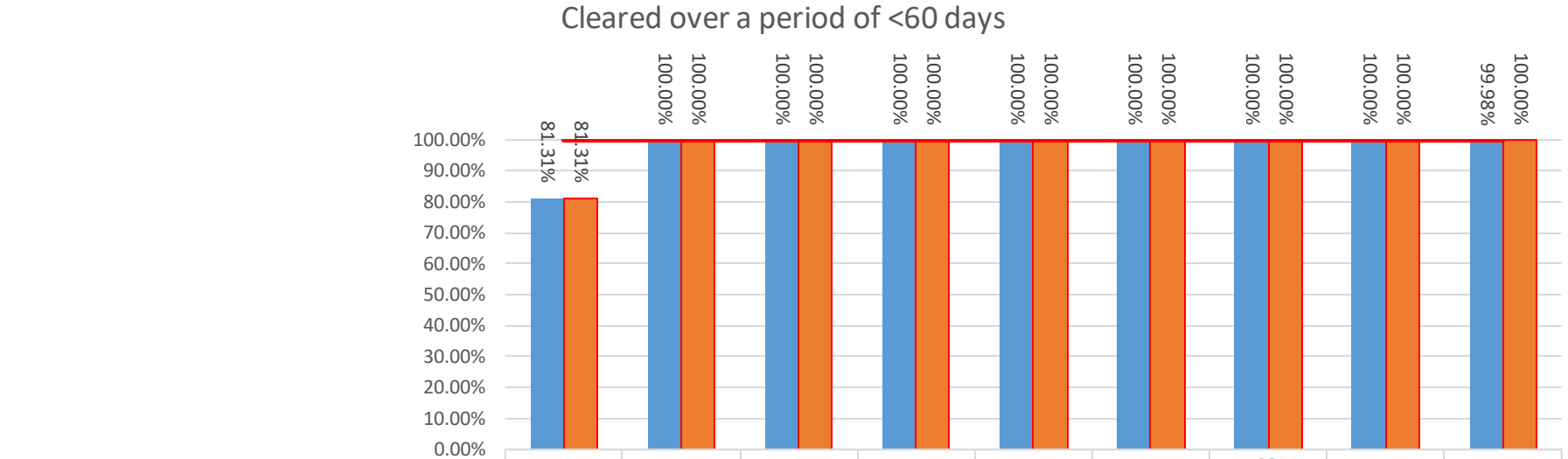
	AIRCEL	AIRTEL	MTNL	IDEA	MTS	RCOM-GSM	RCOM-CDMA	TTSL-CDMA	VODAFONE
Percentage of calls connected and answered by the operators: Audit Agency(PCPL)	95.30%	95.54%	97.35%	99.03%	96.07%	91.52%	91.42%	94.03%	95.26%
Percentage of calls connected and answered by the operators: TSP	95.30%	95.54%	97.30%	99.03%	96.07%	91.52%	91.42%	94.03%	95.28%
Percentage of calls connected and answered by the operators: Live Calling	96.00%	100.00%	100.00%	100.00%	100.00%	94.00%	97.00%	100.00%	100.00%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

13.6.8. %AGE OF TERMINATION/CLOSURE OF SERVICE WITHIN 7 DAYS



	AIRCEL	AIRTEL	MTNL	IDEA	MTS	RCOM-GSM	RCOM-CDMA	TTSL-CDMA	VODAFONE
Percentage cases closure done within 7 days: Audit Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Percentage cases closure done within 7 days: TSP	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

13.6.9. CLEARED OVER A PERIOD OF <60 DAYS



	AIRCEL	AIRTEL	MTNL	IDEA	MTS	RCOM-GSM	RCOM-CDMA	TTSL-CDMA	VODAFONE
Percentage refund of deposits after closures: Audit Agency(PCPL)	81.31%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.98%
Percentage refund of deposits after closures: TSP	81.31%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

14 KEY FINDINGS

14.1. BILLING AND CUSTOMER CARE

- AIRCEL has parameter value of 81.31% and failed to meet the benchmark of =100% time taken for refund of deposits after closures which is cleared over period of <60 days.
- IDEA has a parameter value of 0.26% and failed to meet the benchmark of ≤ 0.1% metering and billing credibility for prepaid subscriber.
- RCOM GSM has a parameter value of 91.52% and failed to meet the benchmark of ≥ 95% for Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 seconds.
- RCOM CDMA has a parameter value of 91.42% and failed to meet the benchmark of ≥ 95% for Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 seconds.
- TTSL CDMA has a parameter value of 94.03% and failed to meet the benchmark of ≥ 95% for Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 seconds.
- VODAFONE has a parameter value of 0.17% and failed to meet the benchmark of ≤ 0.1 for Metering and Billing credibility for postpaid subscriber.
- VODAFONE has a parameter value of 99.99% and failed to meet the benchmark of =100% for time taken for refund of deposits after closures which is cleared over period of <60 days.