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



AUDIT & ASSESSMENT OF QUALITY OF SERVICE

NORTH ZONE – HARYANA CIRCLE
CELLULAR MOBILE TELEPHONE SERVICE (CMTS)
(APRIL TO JUNE 2016)

PREPARED BY:

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TABLE OF CONTENTS

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 Junket 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 9001:2008 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 by in the respective regulations published by TRAI).
- This report covers the audit results of the audit conducted for Cellular Mobile (Wireless) services in Haryana circle.

1.4. COVERAGE

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

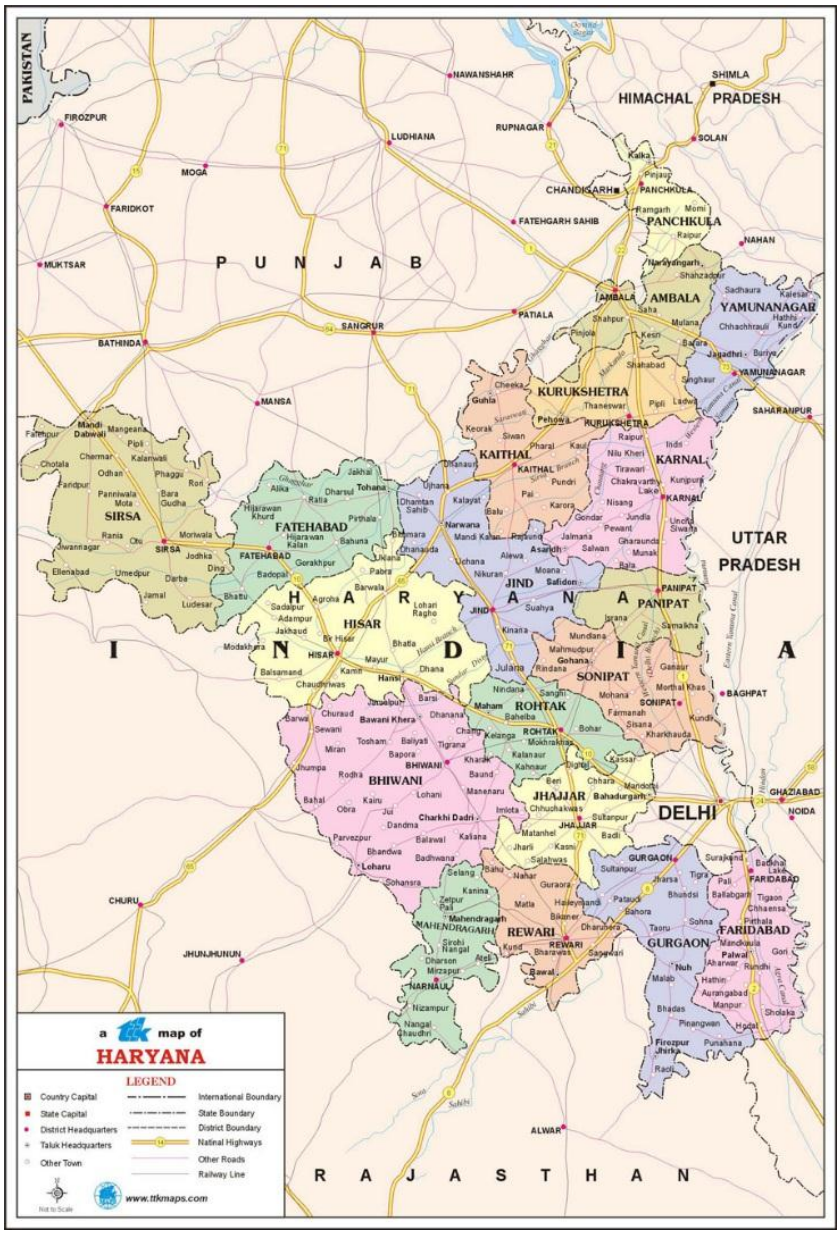
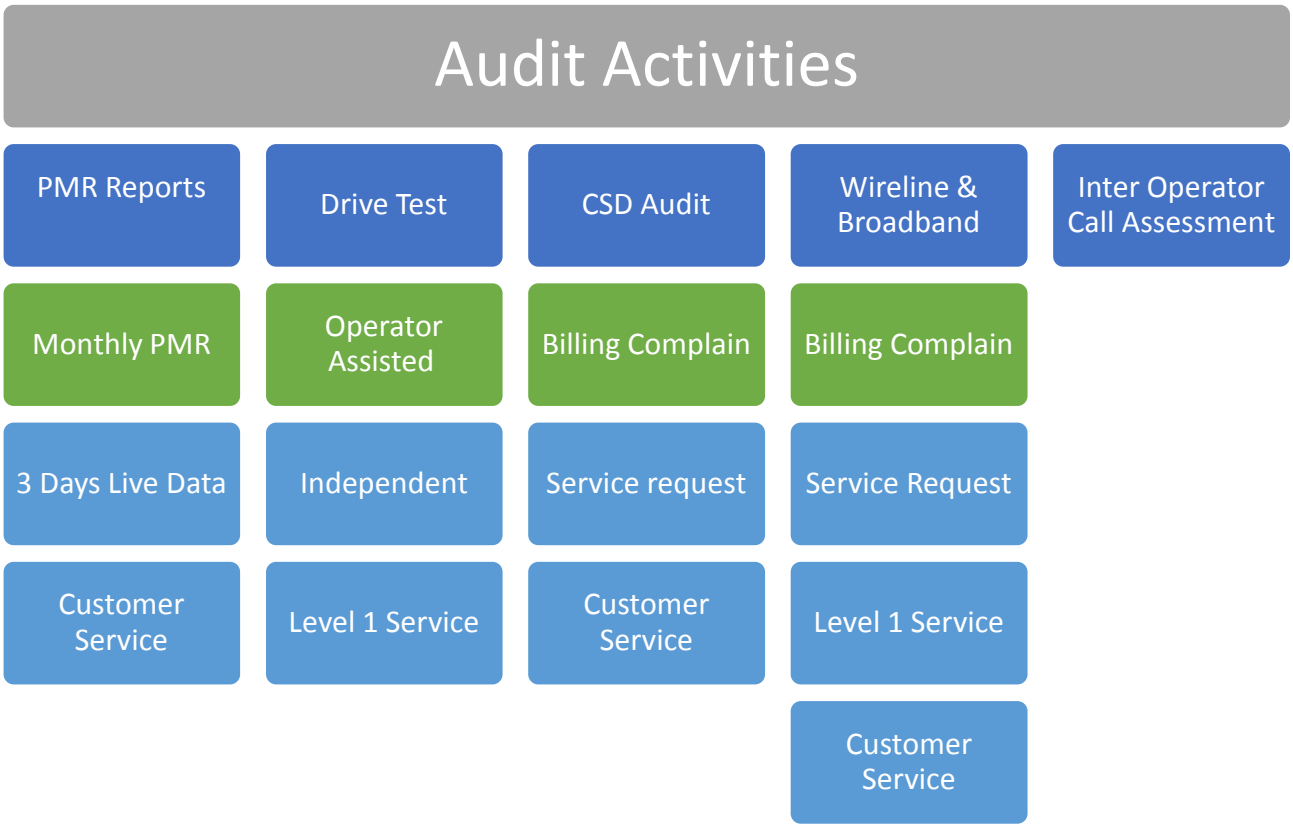


Image Source: TTK Maps

1.5. SSA LIST

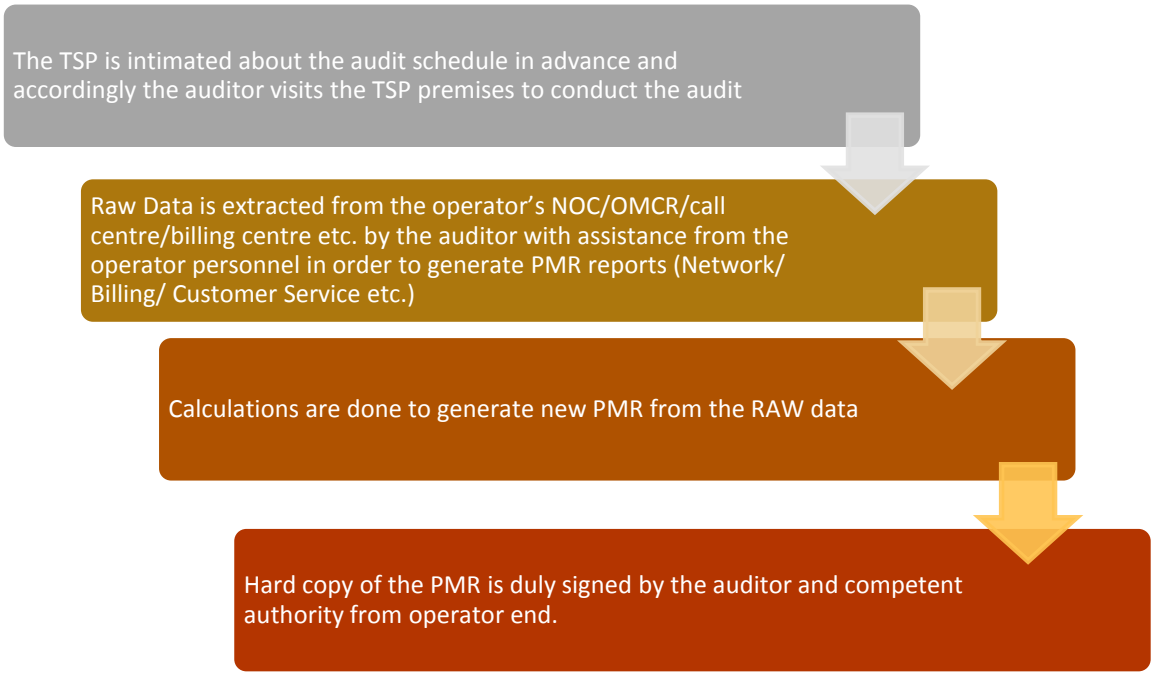
S. No.	Circle	SSA Name	SDCA Name
1	HA	Ambala	Ambala
2	HA	Ambala	Barara
3	HA	Ambala	Chaaharauli
4	HA	Ambala	Jagadhari
5	HA	Ambala	Kalka
6	HA	Ambala	Naraingarh
7	HA	Gurgaon	Faridabad
8	HA	Gurgaon	Ferojpur
9	HA	Gurgaon	Gurgaon
10	HA	Gurgaon	Nuh
11	HA	Gurgaon	Palwal
12	HA	Hissar	Adampur mandi
13	HA	Hissar	Barwala
14	HA	Hissar	Dabwali
15	HA	Hissar	Ellenabad
16	HA	Hissar	Fatehabad
17	HA	Hissar	Hansi
18	HA	Hissar	Hissar
19	HA	Hissar	Kalanwali
20	HA	Hissar	Ratia
21	HA	Hissar	Sirsa
22	HA	Hissar	Tohana
23	HA	Jind	Jind
24	HA	Jind	Julana
25	HA	Jind	Narwana
26	HA	Jind	Safidon
27	HA	Karnal	Assandh
28	HA	Karnal	Cheeka
29	HA	Karnal	Gharaunda
30	HA	Karnal	Kaithal
31	HA	Karnal	Karnal
32	HA	Karnal	Kurukshetra
33	HA	Karnal	Nilokheri
34	HA	Karnal	Panipat
35	HA	Karnal	Pehowa
36	HA	Narnaul	Bawal
37	HA	Narnaul	Jatusana
38	HA	Narnaul	Kosli
39	HA	Narnaul	Mohindergarh
40	HA	Narnaul	Narnaul
41	HA	Narnaul	Rewari
42	HA	Rohtak	Bahadurgarh
43	HA	Rohtak	Bawanikhera
44	HA	Rohtak	Bhiwani
45	HA	Rohtak	Charkhidadri
46	HA	Rohtak	Jhajjar
47	HA	Rohtak	Kalanaur
48	HA	Rohtak	Loharu
49	HA	Rohtak	Meham
50	HA	Rohtak	Rohtak
51	HA	Rohtak	Siwani
52	HA	Rohtak	Tohsham
53	HA	Sonipat	Gohana
54	HA	Sonipat	Sonipat

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, April 2016 audit data was collected in the month of May 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 June 2016 was collected in the month of June 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 April, May and June 2016. The performance of operators on various parameters was assessed against the benchmarks.

Parameters include:

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

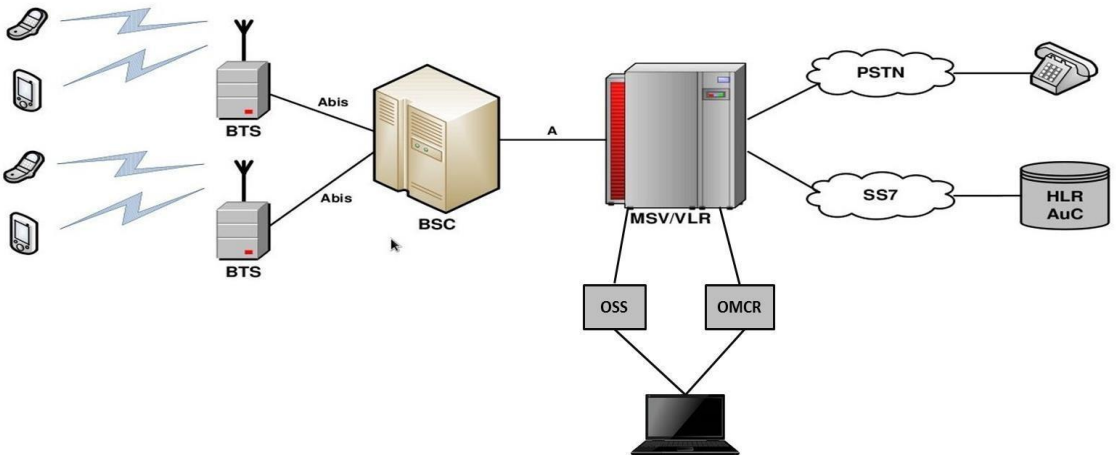
2.2. AUDIT PARAMETER: NETWORK

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

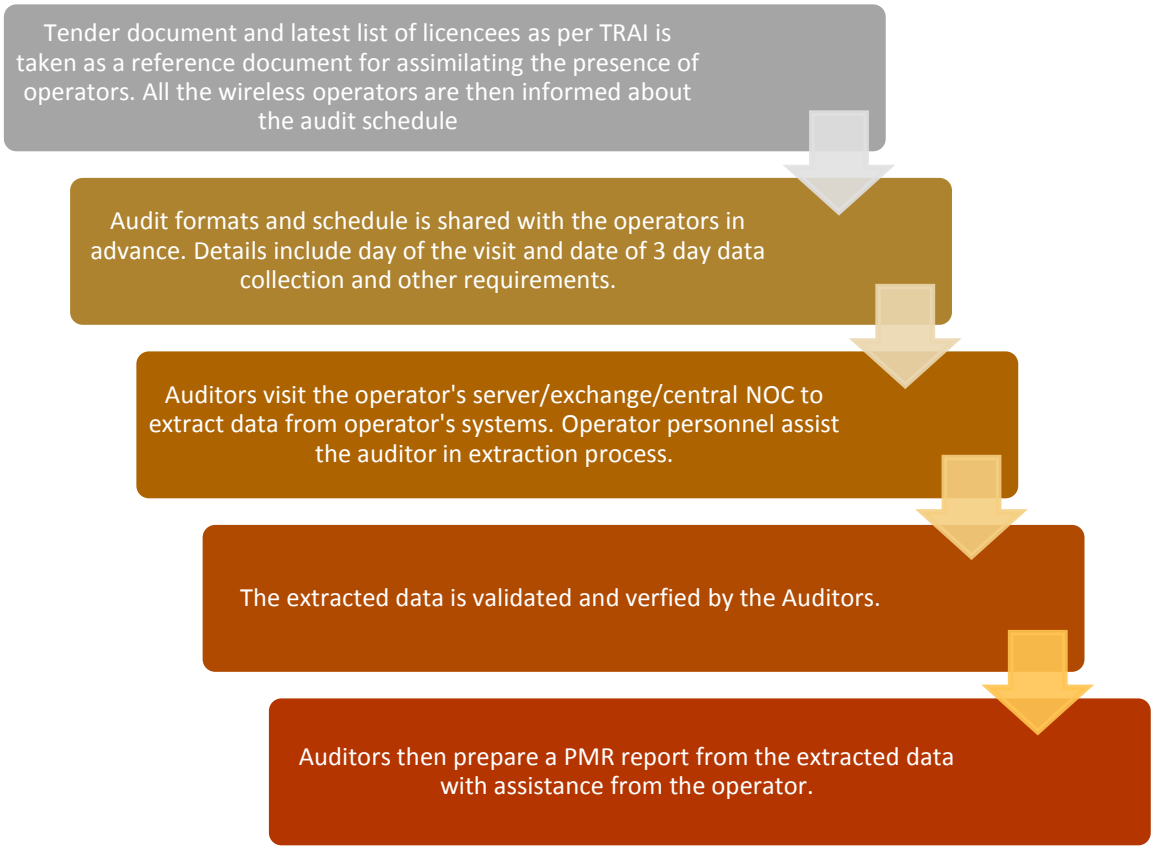
Network Availability	
BTSs Accumulated downtime (not available for service)	≤ 2%
Worst affected BTSs due to downtime	≤ 2%
Connection Establishment (Accessibility)	
Call Set-up Success Rate (within licensee's own network)	≥ 95%
SDCCH/ Paging Channel Congestion	≤ 1 %
TCH Congestion	≤ 2%
Connection Maintenance (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 OMCR & 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

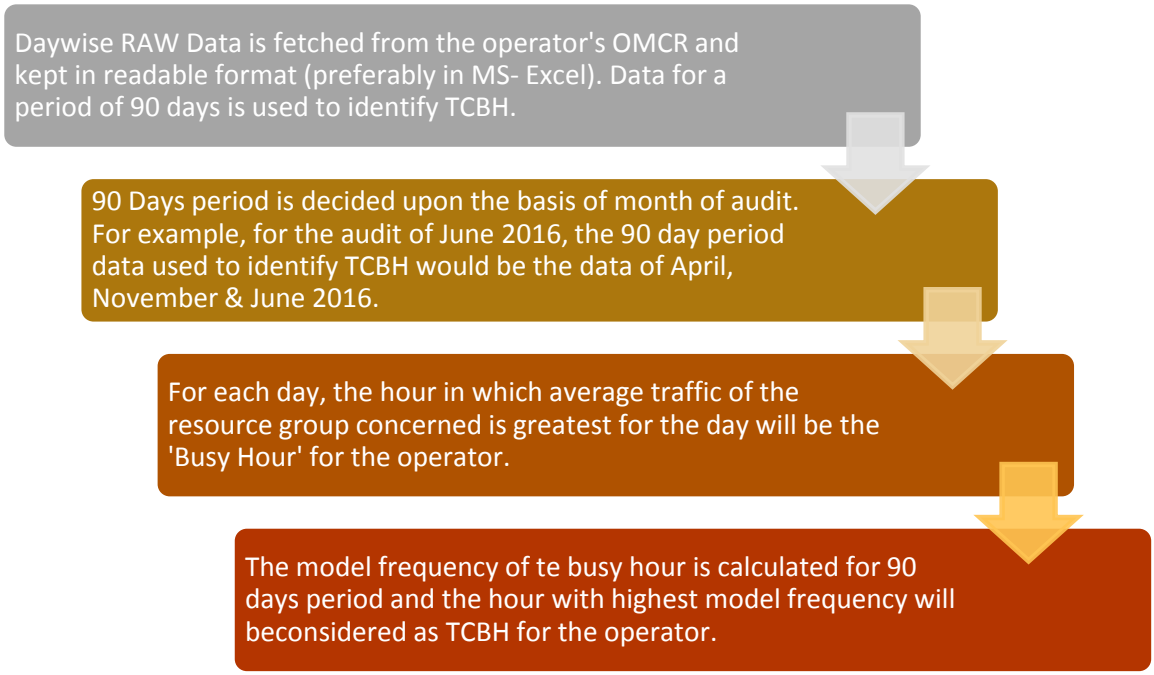
The main purpose of 3 day live measurement is to evaluate the network parameters on intraday basis. While the monthly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the network parameters discussed earlier. All the 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 Q0S 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.



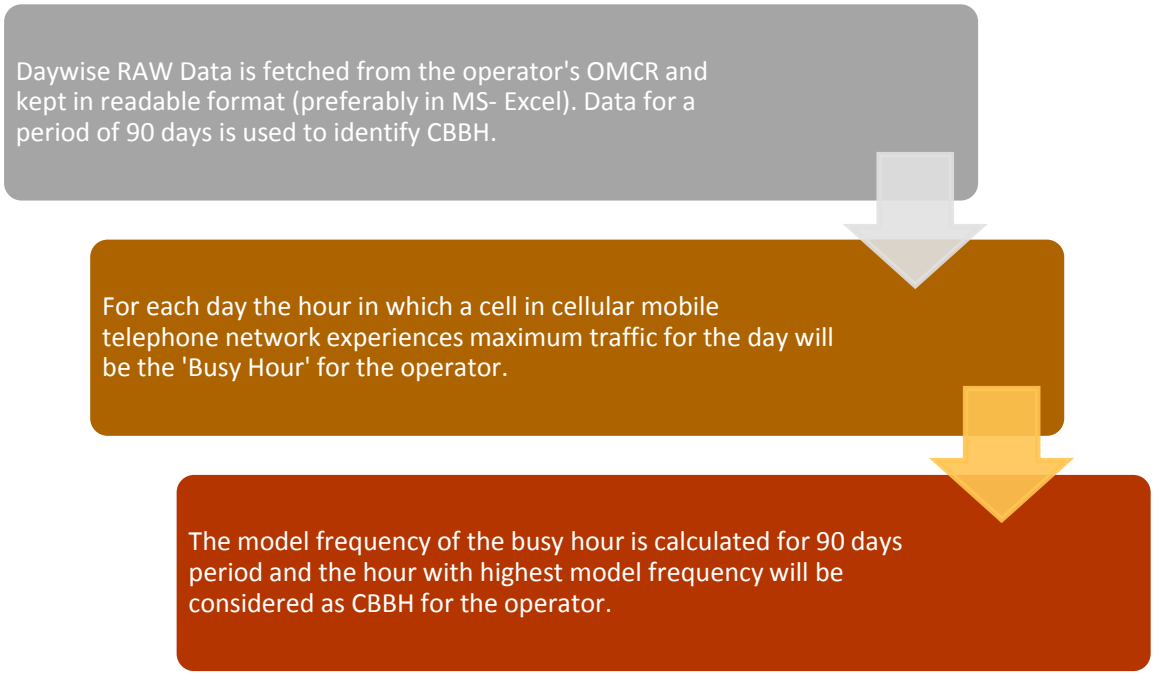
During audit, the auditors identified from the raw data that the TCBH for the operators in Apr – May – Jun 2016 was the time period as given below:

Aircel	Airtel	BSNL	Idea	RCOM GSM	RCOM CDMA	TTSL GSM	TTSL CDMA	Videocon	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	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 June 2016 was collected in the month of June 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.

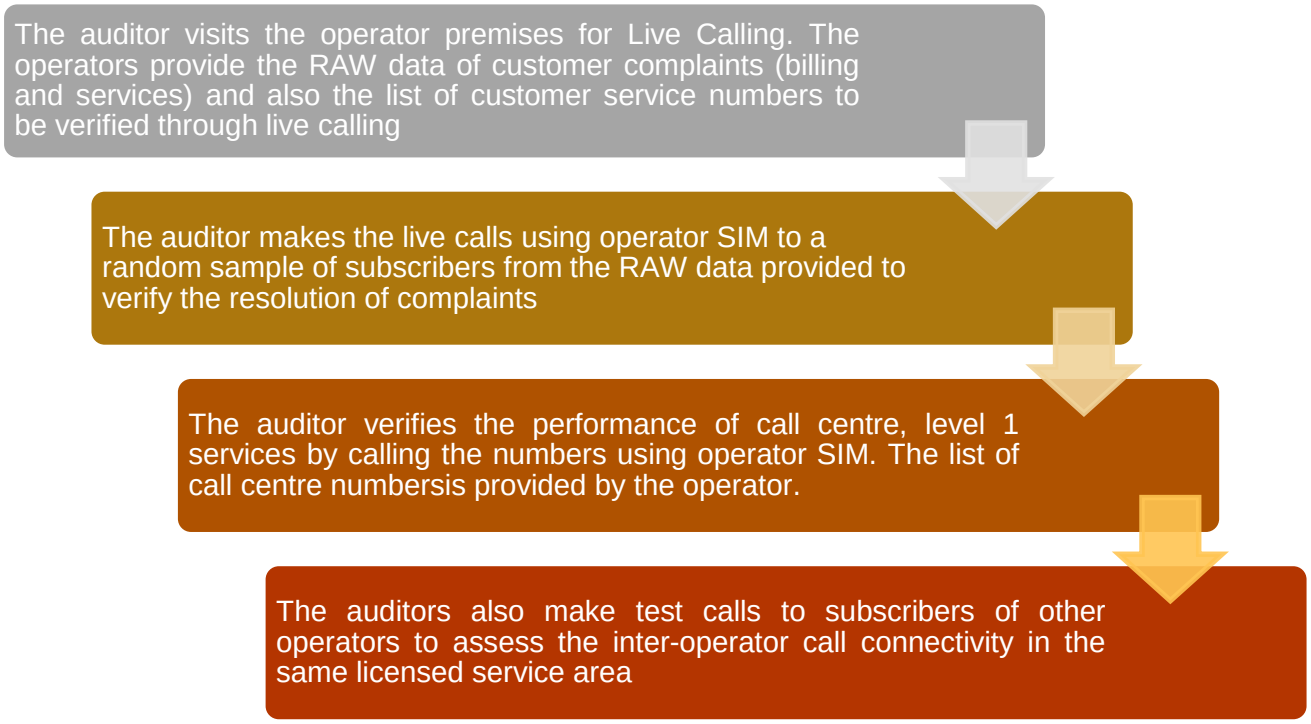
4.1. AUDIT PARAMETERS: CUSTOMER SERVICE

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 June 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 April 2016 was considered for live calling activity conducted in May 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 April, May and June'15, auditor has tried contacting the list of Level 1 services provided by TRAI as per the NNP (National Numbering Plan).

4.7. 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

4.8. 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.

4.9. INTER OPERATOR CALL ASSESSMENT

A total of 100 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	BSNL	Idea	Reliance GSM	Reliance CDMA	TTSL CDMA	TTSL GSM	Videocon	Vodafone
Aircel	-	100%	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	100%	100%	-	100%	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	-	100%	100%	100%	100%	100%	100%
Reliance GSM	100%	100%	100%	100%	-	100%	100%	100%	100%	100%
Reliance CDMA	100%	100%	100%	100%	100%	-	100%	100%	100%	100%
TTSL CDMA	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
TTSL GSM	100%	100%	100%	100%	100%	100%	100%	-	100%	100%
Videocon	100%	100%	100%	100%	100%	100%	100%	100%	-	100%
Vodafone	100%	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

Haryana circle consist of total 8 SSA's and each SSA needs to be audit 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 Junided 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 Haryana Circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

6.1. OPERATORS COVERED

Name of Operator	Number of Subscriber (Up to June 30, 2016)
AIRCEL	3050
AIRTEL	3238189
BSNL	3240915
IDEA	4817453
RCOM CDMA	329676
RCOM GSM	1623127
TTSL CDMA	218237
TTSL GSM	3340127
VIDEOCON*	NA
VODAFONE	5549816

*VIDEOCON (QTL) shutdown it's operation in the circle in March 2016.

TSP	No. of Cells	BTS	BSC	MSC+GMSC	Node B	RNC
Aircel	84	28	1	1	NA	NA
Airtel	8967	2965	25	5	2060	4
BSNL	6313	2110	29	7+2	469	8
IDEA	10157	3341	32	5+1	2156	4
RCOM GSM	2684	896	DNA	1	NA	NA
RCOM CDMA	1653	551	DNA	2+1	NA	NA
TTSL CDMA	1034	361	5	2+2	NA	NA
TTSL GSM	5135	1699	12	2+1	1138	3
VIDEOCON	4448	1450	8	1	NA	NA
VODAFONE	9748	3218	46	5+2	1993	5

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

Haryana Circle				
Operator	**3 Days Live (April 2016)**	**April 2016**	**May 2016**	**June 2016**
Airtel	12th Apr 2016	7th May 2016	15th Jun 2016	12th Jul 2016
Vodafone	5th Apr 2016	6th May 2016	7th Jun 2016	5th Jul 2016
Idea	11th Apr 2016	6th May 2016	14th Jun 2016	11th Jul 2016
Reliance	6th Apr 2016	5th May 2016	8th Jun 2016	6th Jul 2016
BSNL	8th Apr 2016	18th May 2016	10th Jun 2016	8th Jul 2016
Aircel	13th Apr 2016	9th May 2016	14th Jun 2016	13th Jul 2016
Tata Teleservices	6th Apr 2016	10th May 2016	8th Jun 2016	6th Jul 2016
Videocon	7th Apr 2016	16th May 2016	9th Jun 2016	7th Jul 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: APRIL

Apr-16												
Network Parameters		Name of Service Provider										
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.11%	0.12%	0.85%	0.03%	0.15%	0.11%	0.26%	0.21%	0.19%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.10%	1.02%	0.00%	0.91%	0.78%	0.00%	0.64%	0.48%	0.12%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	99.19%	99.19%	98.59%	97.98%	98.46%	98.29%	98.54%	98.58%	99.81%
	SDDCH/Paging chl. Congestion	≤ 1%	1.40%	0.35%	0.33%	0.34%	0.00%	0.15%	0.00%	0.12%	0.11%	0.09%
	TCH Congestion	≤ 2%	0.00%	0.61%	0.81%	0.24%	0.84%	0.16%	0.08%	0.37%	0.10%	0.19%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.65%	0.47%	0.47%	0.22%	0.08%	0.33%	0.51%	0.43%	0.47%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.04%	0.20%	1.00%	1.35%	1.15%	0.54%	1.87%	2.02%	0.50%	1.21%
	%age of connection with good voice quality	≥ 95%	99.98%	98.83%	94.96%	98.14%	99.84%	99.66%	NA	96.85%	97.67%	98.12%

6.4. 2G VOICE PMR DATA: MAY

May-16												
Network Parameters		Name of Service Provider										
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.22%	0.13%	1.77%	0.16%	0.08%	0.10%	0.72%	0.47%	NA	0.12%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.13%	1.66%	0.00%	0.00%	1.01%	0.00%	1.61%	NA	0.12%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	98.93%	97.83%	98.50%	98.71%	96.69%	98.06%	97.78%	NA	99.75%
	SDDCH/Paging chl. Congestion	≤ 1%	0.09%	0.52%	0.77%	0.62%	0.00%	0.98%	0.00%	0.27%	NA	0.22%
	TCH Congestion	≤ 2%	0.00%	0.83%	0.81%	0.54%	0.06%	0.21%	0.24%	0.77%	NA	0.25%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.72%	1.24%	0.51%	0.28%	0.09%	0.36%	0.63%	NA	0.53%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.15%	0.35%	0.90%	1.92%	1.36%	0.59%	1.94%	2.76%	NA	1.77%
	%age of connection with good voice quality	≥ 95%	99.96%	98.77%	DNA	98.02%	99.85%	99.62%	DNA	96.76%	NA	97.96%

6.5. 2G VOICE PMR DATA: JUNE

Jun-16											
Network Parameters		Name of Service Provider									
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.44%	0.14%	1.00%	0.09%	NA	0.14%	0.64%	0.26%	NA	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.13%	1.23%	0.00%	NA	1.12%	0.00%	0.35%	NA	0.03%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	99.13%	98.16%	97.76%	NA	97.38%	98.13%	98.40%	NA	99.75%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.56%	0.54%	0.34%	NA	0.22%	0.00%	0.18%	NA	0.13%
	TCH Congestion	≤ 2%	0.00%	0.62%	0.72%	0.52%	NA	0.13%	0.20%	0.67%	NA	0.25%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.82%	1.31%	0.62%	NA	0.09%	0.35%	0.59%	NA	0.62%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	0.39%	1.15%	2.63%	NA	0.48%	2.29%	2.73%	NA	1.92%
	%age of connection with good voice quality	≥ 95%	97.56%	98.64%	DNA	97.94%	NA	99.53%	DNA	96.74%	NA	97.84%

6.6. 2G VOICE PMR DATA: CONSOLIDATED

Consolidated											
Network Parameters		Name of Service Provider									
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.25%	0.13%	1.21%	0.09%	0.12%	0.12%	0.54%	0.31%	0.19%	0.08%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.12%	1.30%	0.00%	0.45%	0.97%	0.00%	0.87%	0.48%	0.09%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	99.08%	98.39%	98.28%	98.34%	97.51%	98.16%	98.24%	98.58%	99.77%
	SDDCH/Paging chl. Congestion	≤ 1%	0.50%	0.48%	0.55%	0.43%	0.00%	0.45%	0.00%	0.19%	0.11%	0.15%
	TCH Congestion	≤ 2%	0.00%	0.69%	0.78%	0.43%	0.45%	0.17%	0.17%	0.61%	0.10%	0.23%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.73%	1.00%	0.53%	0.25%	0.09%	0.35%	0.58%	0.43%	0.54%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.06%	0.31%	1.02%	1.97%	1.25%	0.54%	2.03%	2.51%	0.50%	1.63%
	%age of connection with good voice quality	≥ 95%	99.17%	98.75%	94.96%	98.03%	99.84%	99.60%	#DIV/0!	96.79%	97.67%	97.97%

- RCOM CDMA has parameter value of 2.12% and failed to meet the benchmark of ≤ 2% No. of BTSs having accumulated downtime of >24 hours in a month
- TTSL CDMA has parameter value of 92.78% and failed to meet the benchmark of ≥ 95% Call Set-up Success Rate (Within Licensee own network
- TTSL CDMA has parameter value of 4.85% and failed to meet the benchmark of ≤ 2% TCH Congestion
- TTSL CDMA has parameter value of 5.11% and failed to meet the benchmark of ≤ 3% Worst Affected cell having more than 3% TCH drop

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: APRIL

Apr-16												
Network Parameters		Name of Service Provider										
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.00%	0.03%	0.97%	0.00%	0.29%	0.13%	0.50%	0.30%	0.32%	0.04%
	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%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	99.09%	99.14%	98.52%	97.79%	95.54%	98.41%	98.42%	98.62%	99.69%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.39%	0.78%	0.15%	NA	0.37%	0.00%	0.15%	0.17%	0.08%
	TCH Congestion	≤ 2%	0.00%	0.72%	0.86%	0.35%	1.04%	0.21%	0.22%	0.43%	0.11%	0.31%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.65%	0.48%	0.49%	0.18%	0.08%	0.30%	0.53%	0.49%	0.54%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	0.26%	1.34%	1.40%	0.95%	0.63%	1.41%	2.02%	0.85%	1.63%
	%age of connection with good voice quality	≥ 95%	100.00%	98.83%	94.80%	97.95%	DNA	99.65%	NA	96.96%	97.48%	97.96%

6.9. 2G VOICE 3 DAYS LIVE DATA: MAY

May-16												
Network Parameters		Name of Service Provider										
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.00%	0.09%	2.07%	0.09%	0.07%	0.10%	0.14%	0.32%	NA	6.67%
	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%	1.62%	NA	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	98.86%	97.84%	98.58%	98.37%	94.09%	98.23%	96.69%	NA	99.67%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.39%	0.60%	0.16%	0.00%	5.17%	0.00%	0.24%	NA	0.80%
	TCH Congestion	≤ 2%	0.00%	0.90%	0.82%	0.28%	0.19%	0.16%	0.20%	0.89%	NA	0.33%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.68%	1.27%	0.48%	0.27%	0.10%	0.36%	0.57%	NA	0.57%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.40%	0.38%	0.81%	1.38%	1.20%	0.56%	1.87%	2.11%	NA	1.86%
	%age of connection with good voice quality	≥ 95%	100.00%	98.77%	DNA	98.19%	99.88%	99.65%	95.87%	96.83%	NA	97.95%

6.10. 2G VOICE 3 DAYS LIVE DATA: JUNE

Jun-16											
Network Parameters		Name of Service Provider									
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.27%	0.03%	0.77%	0.07%	NA	0.17%	0.22%	0.22%	NA	0.08%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	NA	0.00%	0.00%	0.35%	NA	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	99.37%	0.00%	97.69%	NA	99.60%	98.44%	98.57%	NA	99.76%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.47%	0.21%	0.45%	NA	0.15%	0.00%	0.20%	NA	0.10%
	TCH Congestion	≤ 2%	0.00%	0.35%	0.73%	0.55%	NA	0.14%	0.11%	0.54%	NA	0.24%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.89%	1.17%	0.60%	NA	0.09%	0.37%	0.55%	NA	0.63%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	0.37%	0.99%	2.56%	NA	0.44%	2.16%	2.39%	NA	2.11%
	%age of connection with good voice quality	≥ 95%	97.29%	98.58%	DNA	97.71%	NA	99.49%	NA	96.74%	NA	97.79%

6.11. 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated											
Network Parameters		Name of Service Provider									
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.09%	0.05%	1.27%	0.05%	0.18%	0.14%	0.29%	0.28%	0.32%	2.26%
	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%	0.65%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	99.11%	65.66%	98.26%	98.08%	96.41%	98.36%	97.89%	98.62%	99.71%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.42%	0.53%	0.26%	0.00%	1.90%	0.00%	0.20%	0.17%	0.33%
	TCH Congestion	≤ 2%	0.00%	0.65%	0.80%	0.40%	0.61%	0.17%	0.17%	0.62%	0.11%	0.29%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.74%	0.97%	0.52%	0.22%	0.09%	0.34%	0.55%	0.49%	0.58%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.13%	0.34%	1.05%	1.78%	1.07%	0.54%	1.81%	2.17%	0.85%	1.87%
	%age of connection with good voice quality	≥ 95%	99.10%	98.73%	94.80%	97.95%	99.88%	99.60%	95.87%	96.84%	97.48%	97.90%

- BSNL has parameter value of 65.66% and failed to meet the benchmark of ≥ 95% Call Set-up Success Rate (Within Licensee own network
- Aircel has parameter value of 94.80% and failed to meet the benchmark of ≥ 95% %age of connection with good voice quality
- VODAFONE has parameter value of 2.26% and failed to meet the benchmark of ≤ 2% Sum of downtime of BTSs in a month in hrs. in the licensed service area

6.12. 3G VOICE PMR: APRIL

Apr-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.83%	0.02%	0.12%	0.06%	0.00%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	1.34%	0.00%	0.59%	0.15%	0.00%
Connection Establishment (Accessibi	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.99%	99.28%	99.23%	99.86%	99.85%
	RRC Congestion:	≤ 1%	0.00%	1.24%	0.42%	0.34%	0.00%
	RAB Congestion:	≤ 2%	0.00%	0.72%	0.18%	0.49%	0.00%
Connection Maintenance (Retainabil	Circuit Switched Voice Drop Rate	≤ 2%	0.14%	0.47%	0.30%	0.11%	0.19%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.64%	0.84%	2.16%	0.84%	1.47%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.89%	100.00%	98.81%	99.15%	98.39%

6.13. 3G VOICE PMR: MAY

May-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.12%	DNA	0.12%	0.36%	0.16%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.13%	DNA	0.00%	1.97%	0.20%
Connection Establishment (Accessibi	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.00%	DNA	99.26%	99.81%	99.83%
	RRC Congestion:	≤ 1%	0.00%	DNA	0.56%	0.43%	0.02%
	RAB Congestion:	≤ 2%	0.02%	DNA	0.22%	0.76%	0.00%
Connection Maintenance (Retainabil	Circuit Switched Voice Drop Rate	≤ 2%	0.11%	DNA	0.32%	0.13%	0.21%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.87%	DNA	2.51%	1.00%	1.60%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.89%	DNA	98.96%	99.14%	98.37%

6.14. 3G VOICE PMR: JUNE

Jun-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.22%	DNA	0.01%	0.14%	0.12%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	DNA	0.00%	0.74%	0.00%
Connection Establishment (Accessibi	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.22%	DNA	99.34%	99.85%	99.79%
	RRC Congestion:	≤ 1%	0.00%	DNA	0.30%	0.34%	0.00%
	RAB Congestion:	≤ 2%	0.00%	DNA	0.13%	0.54%	0.00%
Connection Maintenance (Retainabil	Circuit Switched Voice Drop Rate	≤ 2%	0.06%	DNA	0.30%	0.14%	0.36%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.46%	DNA	2.64%	1.13%	2.88%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.69%	DNA	0.00%	99.14%	97.60%

6.15. 3G VOICE PMR: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.39%	0.02%	0.09%	0.18%	0.09%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.49%	0.00%	0.20%	0.95%	0.07%
Connection Establishment (Accessibi	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.07%	99.28%	99.28%	99.84%	99.82%
	RRC Congestion:	≤ 1%	0.00%	1.24%	0.43%	0.37%	0.01%
	RAB Congestion:	≤ 2%	0.01%	0.72%	0.18%	0.59%	0.00%
Connectio n Maintenan ce (Retainabil ity)	Circuit Switched Voice Drop Rate	≤ 2%	0.11%	0.47%	0.31%	0.13%	0.25%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.66%	0.84%	2.44%	0.99%	1.98%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.82%	100.00%	65.92%	99.14%	98.12%

- Idea has parameter value of 65.92% and failed to meet the benchmark of ≥ 95% Percentage of connections with Good Circuit Switched Voice Quality

6.16. 3G VOICE 3 DAYS LIVE DATA: APRIL

Apr-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.02%	1.11%	0.00%	0.34%	0.05%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.98%	0.00%	99.50%	99.83%	99.85%
	RRC Congestion:	≤ 1%	0.00%	0.00%	0.25%	0.39%	0.00%
	RAB Congestion:	≤ 2%	0.00%	0.00%	0.14%	0.64%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.10%	0.00%	0.24%	0.11%	0.19%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.73%	0.00%	2.26%	0.86%	2.15%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.86%	100.00%	98.83%	99.15%	98.24%

6.17. 3G VOICE 3 DAYS LIVE DATA: MAY

May-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.27%	DNA	0.03%	0.22%	17.65%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	DNA	DNA	2.03%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.00%	DNA	99.35%	99.78%	99.85%
	RRC Congestion:	≤ 1%	0.00%	DNA	0.46%	0.52%	0.00%
	RAB Congestion:	≤ 2%	0.02%	DNA	0.22%	0.66%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.11%	DNA	0.25%	0.13%	0.19%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.72%	DNA	1.90%	0.92%	1.59%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.89%	DNA	98.99%	99.14%	98.46%

6.18. 3G VOICE 3 DAYS LIVE DATA: JUNE

Jun-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.22%	DNA	0.01%	0.14%	0.12%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	DNA	0.00%	0.74%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.22%	DNA	99.34%	99.85%	99.79%
	RRC Congestion:	≤ 1%	0.00%	DNA	0.30%	0.34%	0.00%
	RAB Congestion:	≤ 2%	0.00%	DNA	0.13%	0.54%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.06%	DNA	0.30%	0.14%	0.36%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.46%	DNA	2.64%	1.13%	2.88%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.69%	DNA	0.00%	99.14%	97.60%

6.19. 3G VOICE 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.17%	1.11%	0.01%	0.24%	5.94%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.92%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.07%	0.00%	99.40%	99.82%	99.83%
	RRC Congestion:	≤ 1%	0.00%	0.00%	0.34%	0.42%	0.00%
	RAB Congestion:	≤ 2%	0.01%	0.00%	0.17%	0.61%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.09%	0.00%	0.26%	0.12%	0.25%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.64%	0.00%	2.27%	0.97%	2.21%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.81%	100.00%	65.94%	99.14%	98.10%

- AIRTEL has parameter value of 65.94% and failed to meet the benchmark of ≥ 95% Percentage of connections with Good Circuit Switched Voice Quality
- VODAFONE has parameter value of 5.94% and failed to meet the benchmark of ≤ 2% Sum of downtime of BTSs in a month in hrs. in the licensed service area

6.20. PMR MONTHLY 2G WIRELESS DATA - CONSOLIDATED

Consolidated												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		10	DNA	DNA	228974	68	2324	DNA	68	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		10	DNA	DNA	228470	68	2324	DNA	67	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	100.00%	DNA	DNA	99.78%	100.00%	100.00%	DNA	98.53%	DNA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		1490	14926746	DNA	10439310	DNA	DNA	DNA	68	DNA	15582820
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		1488	14922700	DNA	10428003	DNA	DNA	DNA	67	DNA	15563936
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.89%	99.97%	DNA	99.89%	98.73%	98.95%	DNA	98.53%	DNA	99.88%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		126890	2082429824	453480927	7111585543	2593745	283610827	2675	764189572	DNA	1097771962
ii)	RNC originated PS Domain Iu Connection Release (B)		1378	16612295	4900744	71965682	13265	5151280	24	17390408	DNA	43509672
iii)	Drop Rate = (B/A) * 100	<=5%	1.09%	0.80%	1.08%	1.01%	0.51%	1.74%	0.82%	2.28%	DNA	3.96%

6.21. PMR MONTHLY 2G WIRELESS DATA - APRIL

Apr-16												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	191012	126.00	2387	DNA	68	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	190675	126.00	2387	DNA	67	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	99.82%	100.00%	99.99%	DNA	98.53%	DNA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		819	15834969	DNA	9890087	DNA	DNA	DNA	DNA	DNA	16532230
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		819	15827343	DNA	9876761	DNA	DNA	DNA	DNA	DNA	16514390
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	99.95%	DNA	99.87%	98.32%	99.26%	DNA	DNA	DNA	99.89%
3	3											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		149324	1972449921	453480927	7084292175	2880573	23655326	1661	747425345	DNA	1094591530
ii)	RNC originated PS Domain Iu Connection Release (B)		1434	14020501	4900744	62240172	14835	389278	9	15799848	DNA	41985604
iii)	Drop Rate = (B/A) * 100	<=5%	0.96%	0.71%	1.08%	0.88%	0.52%	1.65%	0.56%	2.11%	DNA	3.84%

6.22. PMR MONTHLY 2G WIRELESS DATA – MAY

May-16												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		16	DNA	DNA	248650	10.00	2630	DNA	DNA	NA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		16	DNA	DNA	247763	10.00	2630	DNA	DNA	NA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	100.00%	DNA	DNA	99.64%	100.00%	100.00%	DNA	DNA	NA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		2419	15870752	DNA	11453087	DNA	DNA	DNA	68	NA	16516639
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		2419	15867181	DNA	11440736	DNA	DNA	DNA	67	NA	16495739
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	99.98%	DNA	99.89%	99.15%	99.15%	DNA	98.53%	NA	99.87%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		147118	2215838035	DNA	7240881950	2306917	26656524	3921.857143	811121826	NA	1176383205
ii)	RNC originated PS Domain Iu Connection Release (B)		1772	17635484	DNA	75749775	11695	466036	41.04761905	18302877	NA	48302082
iii)	Drop Rate = (B/A) * 100	<=5%	1.20%	0.80%	DNA	1.05%	0.51%	1.75%	1.05%	2.26%	NA	4.11%

6.23. PMR MONTHLY 2G WIRELESS DATA - JUNE

Jun-16												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		3	DNA	DNA	247259	NA	1956	DNA	DNA	NA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		3	DNA	DNA	246973	NA	1956	DNA	DNA	NA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	100.00%	DNA	DNA	99.88%	NA	100.00%	DNA	DNA	NA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		1231	13074516	DNA	9974755	NA	DNA	DNA	DNA	NA	13699592
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		1227	13073577	DNA	9966512	NA	DNA	DNA	DNA	NA	13681679
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.68%	99.99%	DNA	99.92%	NA	98.45%	DNA	DNA	NA	99.87%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		84227	2059001516	DNA	7009582503	NA	800520632	2441.275862	734021544	NA	1022341150
ii)	RNC originated PS Domain Iu Connection Release (B)		929	18180899	DNA	77907099	NA	14598526	21.21	18068498	NA	40241329
iii)	Drop Rate = (B/A) * 100	<=5%	1.10%	0.88%	DNA	1.11%	NA	1.82%	0.87%	2.46%	NA	3.94%

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

Consolidated												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	14438	12	3552	DNA	68	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	14401	12	3552	DNA	67	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	99.69%	100.00%	100.00%	DNA	98.53%	DNA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		239	1477121	3507010	1015393	DNA	DNA	794514	327218	DNA	1578331
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		239	1476865	3486693	1013693	DNA	DNA	766532	327047	DNA	1575785
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	99.98%	99.42%	99.83%	98.88%	99.08%	96.48%	99.95%	DNA	99.84%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		13976	208882263	47377423	705667870	391185	78333963	2867	76331456	DNA	111448223
ii)	RNC originated PS Domain Iu Connection Release (B)		128	1717996	498485	6864258	1912	1316203	16	1707577	DNA	4510610
iii)	Drop Rate = (B/A) * 100	<=5%	5.77%	0.82%	1.05%	0.98%	0.51%	1.68%	0.67%	2.24%	DNA	4.05%

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

Apr-16												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	10990	20	5687	DNA	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	10931	20	5687	DNA	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	99.46%	100.00%	100.00%	DNA	DNA	DNA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		118	1543624	3507010	963334.00	DNA	DNA	794514	327218	DNA	1744497
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		118	1543164	3486693	962173.00	DNA	DNA	766532	327047	DNA	1743433
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	99.97%	99.42%	99.88%	98.22%	99.17%	96.48%	99.95%	DNA	99.94%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		21062	197723119	DNA	699242348.00	277987	70762636	4485	74791194	DNA	115733335
ii)	RNC originated PS Domain Iu Connection Release (B)		4	1443801	DNA	6270573.00	1629	1173108	13	1607032	DNA	4751197
iii)	Drop Rate = (B/A) * 100	<=5%	0.02%	0.73%	DNA	0.90%	0.59%	1.66%	0.29%	2.15%	DNA	4.11%

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

May-16												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	DNA	3.00	2693.00	DNA	68	NA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	3.00	2693.00	DNA	67	NA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	DNA	100.00%	100.00%	DNA	98.53%	NA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		359	1545438	3507010.454	1033461	DNA	DNA	DNA	DNA	NA	1585752
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		359	1545192	3486693	1030585	DNA	DNA	DNA	DNA	NA	1581135
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	99.98%	99.42%	99.72%	99.53%	99.53%	DNA	DNA	NA	99.71%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		20627	216117978	DNA	734808501	504382.00	77275277.00	1971	79053786	NA	111994263
ii)	RNC originated PS Domain Iu Connection Release (B)		343	1772311	DNA	6455469	2194.00	1250210.00	17	1672652	NA	4452032
iii)	Drop Rate = (B/A) * 100	<=5%	1.66%	0.82%	DNA	0.88%	0.43%	1.62%	0.84%	2.12%	NA	3.98%

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

Jun-16												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	17886	NA	2275.67	DNA	68.00	NA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	17871	NA	2275.67	DNA	67.00	NA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	99.92%	NA	100.00%	DNA	98.53%	NA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	1342300	DNA	1049385	NA	DNA	DNA	DNA	NA	1404743
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	1342238	DNA	1048320	NA	DNA	DNA	DNA	NA	1402788
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	100.00%	DNA	99.90%	NA	98.53%	DNA	DNA	NA	99.86%
3	Drop Rate = (B/A) * 100											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		238.666667	212805693	47377423	682952760	NA	86963975.00	2145	75149389	NA	106617071
ii)	RNC originated PS Domain Iu Connection Release (B)		37.3333333	1937875	498485	7866733	NA	1525291.00	18.66666667	1843046	NA	4328601
iii)	Drop Rate = (B/A) * 100	<=5%	15.64%	0.91%	1.05%	1.15%	NA	1.75%	0.87%	2.45%	NA	4.06%

6.28. PMR MONTHLY 3G WIRELESS DATA - CONSOLIDATED

Consolidated							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	248650	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	247763	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	99.64%	DNA	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		3250509	DNA	6642623	DNA	6908757
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		3247443	DNA	6546075	DNA	6889010
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.91%	DNA	98.54%	99.94%	99.71%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		216376200	42439161	214845050	13746279	220942454
ii)	RNC originated PS Domain Iu Connection Release (B)		100706	272108	4096831	90551	1645664
iii)	Drop Rate = (B/A) * 100	<=5%	0.05%	0.64%	1.92%	0.67%	0.74%

6.29. PMR MONTHLY 3G WIRELESS DATA - APRIL

Apr-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	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)		3116856	DNA	6120531	DNA	7290437
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		3110868	DNA	6040599	DNA	7271237
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.81%	DNA	98.69%	DNA	99.74%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		210152323	42439161	204042457	12753766	202703213
ii)	RNC originated PS Domain Iu Connection Release (B)		91323	272108	3966878	131037	1427324
iii)	Drop Rate = (B/A) * 100	<=5%	0.04%	0.64%	1.94%	1.03%	0.70%

6.30. PMR MONTHLY 3G WIRELESS DATA - MAY

May-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	248650	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	247763	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	99.64%	DNA	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		3496700	DNA	7452518	DNA	7506945
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		3493502	DNA	7355895	DNA	7485534
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.91%	DNA	98.70%	99.94%	99.71%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		228487349	DNA	247418077	14627544	237498312
ii)	RNC originated PS Domain Iu Connection Release (B)		110405	DNA	4447062	85564	1688217
iii)	Drop Rate = (B/A) * 100	<=5%	0.05%	DNA	1.80%	0.58%	0.71%

6.31. PMR MONTHLY 3G WIRELESS DATA - JUNE

Jun-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	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)		3137971	DNA	6354821	DNA	5928890
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		3137960	DNA	6241732	DNA	5910258
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	98.22%	DNA	99.69%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		210488928	DNA	193074616	13857526	222625838
ii)	RNC originated PS Domain Iu Connection Release (B)		100390	DNA	3876552	55052	1821452
iii)	Drop Rate = (B/A) * 100	<=5%	0.05%	DNA	2.01%	0.40%	0.82%

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

Consolidated							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	10990	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	10931	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	99.46%	DNA	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		327745	3189524	626484	285420	704350
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		327328	3184855	619747	285420	702363
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.87%	99.85%	98.94%	100.00%	99.71%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		21423302	4264038	21533007	1263044	21794603
ii)	RNC originated PS Domain Iu Connection Release (B)		9577	26449	391474	7981	172390
iii)	Drop Rate = (B/A) * 100	<=5%	0.04%	0.62%	1.82%	0.64%	0.78%

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

Apr-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	10990	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	10931	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	99.46%	DNA	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		307198	3189524	610268	285420	680818
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		306327	3184855	607207	285420	678595
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.72%	99.85%	99.50%	100.00%	99.67%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		20023636	4264038	20344713	1221902	19903453
ii)	RNC originated PS Domain Iu Connection Release (B)		8525	26449	360302	12501	152077
iii)	Drop Rate = (B/A) * 100	<=5%	0.04%	0.62%	1.77%	1.02%	0.76%

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

May-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	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	D						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		344856	3189524	DNA	DNA	796090
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		344476	3184855	DNA	DNA	794313
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.89%	99.85%	DNA	DNA	99.78%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		22495585	DNA	DNA	1137840	21847119
ii)	RNC originated PS Domain Iu Connection Release (B)		10906	DNA	DNA	5812	120542
iii)	Drop Rate = (B/A) * 100	<=5%	0.05%	DNA	DNA	0.51%	0.55%

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

Jun-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	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)		331182	DNA	642699	DNA	636141
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		331181	DNA	632287	DNA	634181
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	98.38%	DNA	99.69%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		21750685	DNA	22721301	1429389	23633238
ii)	RNC originated PS Domain Iu Connection Release (B)		9299	DNA	422646	5630	244552
iii)	Drop Rate = (B/A) * 100	<=5%	0.04%	DNA	1.86%	0.39%	1.03%

6.36. POI CONGESTION: CONSOLIDATED

Consolidated											
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service											
S. No.	Name of Parameter	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter											
7	Total No. of POI's in Month having < = 0.5% POI congestion										
	Total No. of call attempts on POI	1032	1531285	2314264	34250	136250	77893	286242	263362	149606	2724833
	Total traffic served on all POIs (Erlang)	3	36068	37439	1503	2811	1458	6967	4544	3951	83018
	Total No. of circuits on all individual POIs	6847	60057	49562	1945	9220	5376	19007	11126	11662	79615
	Total number of working POI Service Area wise	34	42	64	58	10	4	76	19	21	21
	Capacity of all POIs	6292	59456	34693	1929	7948	4509	17354	9718	11020	78203
	No. of all POI's having >=0.5% POI congestion	0	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	NIL

6.37. POI CONGESTION: APRIL

Apr-16											
Monthl											
S. No.	Name of Parameter	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Networ											
7	**Total No. of POI's in Month having < = 0.5% POI**										
	Total No. of call attempts on POI	933	1505330	DNA	34247	134307	9045	407407	228203	149606	2810219
	Total traffic served on all POIs (Erlang)	3	36401	DNA	1038	2821	162	9541	3885	3951	45967
	Total No. of circuits on all individual POIs	6911	60656	DNA	2001	9044	1564	25896	9696	11662	80380
	Total number of working POI Service Area wise	35	42	DNA	57	18	9	83	16	21	21
	Capacity of all POIs	6343	60050	DNA	1985	7801	1105	23929	8447	11020	79015
	No. of all POI's having >=0.5% POI congestion	Nil	Nil	DNA	Nil	Nil	Nil	NIL	NIL	NIL	Nil
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)	Nil	Nil	DNA	Nil	Nil	Nil	NIL	NIL	NIL	Nil

6.38. POI CONGESTION: MAY

May-16											
Monthly TRAI											
S. No.	Name of Parameter	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network											
7	**Total No. of POI's in Month having < = 0.5% POI congestion**										
	Total No. of call attempts on POI	1269	1581307	2388587	35150	138192	84020	312518	198468	NA	2783573
	Total traffic served on all POIs (Erlang)	4	36626	37853	2406	2800	1528	7283	3456	NA	121706
	Total No. of circuits on all individual POIs	6873	60036	48603	1907	9396	5847	17636	9612	NA	79496
	Total number of working POI Service Area wise	35	42	63	58	1	1	76	16	NA	22
	Capacity of all POIs	6309	59436	34022	1892	8095	4684	16031	8447	NA	78080
	No. of all POI's having >=0.5% POI congestion	0	0	0	0	Nil	Nil	NIL	NIL	NA	0
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)	NIL	NIL	NIL	nil	Nil	Nil	NIL	NIL	NA	na

6.39. POI CONGESTION: JUNE

Jun-16											
Monthly TRAI											
S. No.	Name of Parameter	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network											
7	**Total No. of POI's in Month having < = 0.5% POI congestion**										
	Total No. of call attempts on POI	893	1507219	2239941	33352	NA	140615	138800	363415	NA	2580706
	Total traffic served on all POIs (Erlang)	3	35178	37025	1066	NA	2683	4079	6289	NA	81381
	Total No. of circuits on all individual POIs	6757	59478	50521	1926	NA	8718	13489	14070	NA	78970
	Total number of working POI Service Area wise	32	42	65	58	NA	1	71	24	NA	21
	Capacity of all POIs	6225	58883	35365	1910	NA	7738	12101	12259	NA	77513
	No. of all POI's having >=0.5% POI congestion	0	0	0	0	NA	Nil	NIL	NIL	NA	0
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)	Nil	NA	NIL	nil	NA	Nil	NIL	NIL	NA	na

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	0.00%	0.00%	DNA	DNA	100.00%	DNA	DNA	98.13%	99.26%
AIRTEL	0.02%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	89.36%
BSNL	0.05%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.59%
IDEA	0.08%	0.15%	100.00%	100.00%	100.00%	100.00%	99.89%	99.83%	97.77%
RCOM CDMA	0.10%	0.01%	100.00%	100.00%	100.00%	100.00%	DNA	96.43%	97.61%
RCOM GSM	0.09%	0.08%	100.00%	100.00%	100.00%	100.00%	59.29%	98.91%	95.23%
TTSL CDMA	0.01%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	DNA	99.66%
TTSL GSM	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.48%	93.05%
VIDEOCON	DNA	DNA	DNA	DNA	100.00%	100.00%	DNA	DNA	DNA
VODAFONE	0.07%	0.07%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.04%

Name of Service Provider	Customer Care & Grievances Redressal	
	% of Complaints addressed at call center level	% of Complaints addressed by Appellate Authority
Benchmark		
AIRCEL	100.00%	100.00%
AIRTEL	100.00%	100.00%
BSNL	98.70%	100.00%
IDEA	68.71%	100.00%
RCOM CDMA	100.00%	100.00%
RCOM GSM	100.00%	100.00%
TTSL CDMA	99.64%	100.00%
TTSL GSM	99.39%	92.45%
VIDEOCON	DNA	DNA
VODAFONE	100.00%	100.00%

7.2. LIVE CALLING DATA: CONSOLIDATED

Name of Service Provider	Metering and Billing (Service Request)				Response time to customer for Assistanse	
	Total Calls Attempted	No. of Subscribers reached	Compalints/ 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	100	100	100	100.00%	100.00%	100.00%
AIRTEL	159	39	39	100.00%	100.00%	96.00%
BSNL	200	200	198	99.00%	100.00%	99.00%
IDEA	470	300	295	98.33%	100.00%	100.00%
RCOM CDMA	NA	NA	NA	NA	NA	NA
RCOM GSM	380	281	278	98.93%	100.00%	98.00%
TTSL CDMA	DNA	DNA	DNA	DNA	DNA	DNA
TTSL GSM	DNA	DNA	DNA	DNA	DNA	DNA
VIDEOCON	NA	NA	NA	NA	NA	NA
VODAFONE	200	93	93	100.00%	100.00%	100.00%

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

7.3. 3 DAYS LIVE CALL CENTRE DATA

Response time to customer assistance						
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					
OPERATOR			>=95%			>=95%
AIRCEL	79	79	100.00%	50	50	100.00%
AIRTEL	25795	25795	100.00%	55855	54640	97.82%
BSNL	5258	5258	100.00%	4877	4877	100.00%
IDEA	579295	578805	99.92%	125469	122713	97.80%
RCOM CDMA	0	0	DNA	0	0	DNA
RCOM GSM	69465	69046	99.40%	14497	13932	96.10%
TTSL CDMA	DNA	DNA	DNA	969	968	99.90%
TTSL GSM	DNA	DNA	DNA	42674	42291	99.10%
VIDEOCON	DNA	DNA	DNA	DNA	DNA	DNA
VODAFONE	229389	229389	100.00%	117013	115491	98.70%

8. L1 CALLING DATA

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

- Karnal: 28th June 2016 to 30th June 2016

8.1. KARNAL

8.1.1. AIRTEL

Airtel											
SR. NO.	EMERGENCY NUMBER	CALLS MADE	Nelokheri	Kurukshetra	Pehwa	Panipat	Gauranda	Assandh	Karnal	Kaithal	Cheeka
1	100	√	√	√	√	√	√	√	√	√	√
2	101	√	√	√	√	√	√	√	√	√	√
3	102	√	√	√	√	√	√	√	√	√	√
4	104	√	√	√	√	√	√	√	√	√	√
5	108	√	√	√	√	√	√	√	√	√	√
6	138	√	√	√	√	√	√	√	√	√	√
7	149	√	√	√	√	√	√	√	√	√	√
8	181	√	√	√	√	√	√	√	√	√	√
9	182	√	√	√	√	√	√	√	√	√	√
10	1033	√	√	√	√	√	√	√	√	√	√
11	1037	√	√	√	√	√	√	√	√	√	√
12	1056	√	√	√	√	√	√	√	√	√	√
13	1060	√	√	√	√	√	√	√	√	√	√
14	1063	√	√	√	√	√	√	√	√	√	√
15	1064	√	√	√	√	√	√	√	√	√	√
16	1070	√	√	√	√	√	√	√	√	√	√
17	1071	√	√	√	√	√	√	√	√	√	√
18	1072	√	√	√	√	√	√	√	√	√	√
19	1073	√	√	√	√	√	√	√	√	√	√
20	1077	√	×	×	×	×	×	×	×	×	×
21	1090	√	×	×	×	×	×	×	×	×	×
22	1091	√	√	√	√	√	√	√	√	√	√
23	1097	√	√	√	√	√	√	√	√	√	√
24	1099	√	×	×	×	×	×	×	×	×	×
25	10580	√	×	×	×	×	×	×	×	×	×
26	10589	√	×	×	×	×	×	×	×	×	×
27	10740	√	×	×	×	×	×	×	×	×	×
28	10741	√	×	×	×	×	×	×	×	×	×
29	1511	√	×	×	×	×	×	×	×	×	×
30	1512	√	√	√	√	√	√	√	√	√	√
31	1514	√	×	×	×	×	×	×	×	×	×
32	15100	√	×	×	×	×	×	×	×	×	×
33	155304	√	×	×	×	×	×	×	×	×	×
34	155214	√	×	×	×	×	×	×	×	×	×
35	1903	√	×	×	×	×	×	×	×	×	×
36	1909	√	√	√	√	√	√	√	√	√	√
37	1912	√	√	√	√	√	√	√	√	√	√
38	1916	√	√	√	√	√	√	√	√	√	√
39	1950	√	√	√	√	√	√	√	√	√	√

8.1.2. AIRCEL

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

8.1.3. IDEA

IDEA											
SR. NO.	EMERGENCY NUMBER	CALLS MADE	Nilokheri	Kurushetra	Pehowa	Gharaunda	Panipat	Assandh	Karnal	Kaithal	Cheeka
1	100	5	√	√	√	√	√	√	√	√	√
2	101	5	√	√	√	√	×	√	√	√	√
3	102	5	√	×	×	√	√	√	√	√	×
4	104	5	×	×	×	×	×	×	×	×	×
5	108	5	×	×	×	×	×	×	×	×	×
6	138	5	×	√	√	×	×	√	×	×	√
7	149	5	×	×	×	×	×	×	×	×	×
8	181	5	√	√	√	√	√	√	√	√	√
9	182	5	×	×	√	×	×	×	×	×	×
10	1033	5	√	√	√	√	√	√	√	√	√
11	1037	5	×	×	×	×	×	×	×	×	×
12	1056	5	×	×	×	×	×	×	×	×	×
13	1060	5	×	×	×	×	×	×	×	×	×
14	1063	5	×	√	√	√	√	√	√	×	√
15	1064	5	×	√	×	×	√	√	×	×	√
16	1070	5	√	√	√	√	√	√	√	√	√
17	1071	5	×	×	×	×	×	×	×	×	×
18	1072	5	√	×	×	√	×	√	√	√	√
19	1073	5	√	√	×	√	√	√	√	√	√
20	1077	5	×	×	√	×	×	×	×	×	×
21	1090	5	×	×	×	×	×	×	×	×	×
22	1091	5	√	√	√	×	√	√	√	√	×
23	1097	5	√	×	√	√	√	√	√	√	√
24	1099	5	×	√	×	×	×	×	×	×	×
25	10580	5	×	×	×	×	×	×	×	×	×
26	10589	5	×	×	×	×	×	×	×	×	×
27	10740	5	×	×	×	×	×	×	×	×	×
28	10741	5	×	×	×	×	×	×	×	×	×
29	1511	5	×	×	×	×	×	×	×	×	×
30	1512	5	×	×	×	√	√	×	√	×	×
31	1514	5	×	×	×	×	×	×	×	×	×
32	15100	5	×	×	×	×	×	×	×	×	×
33	155304	5	×	×	×	×	×	×	×	×	×
34	155214	5	×	×	×	×	×	×	×	×	×
35	1903	5	√	√	×	√	√	√	√	√	√
36	1909	5	√	√	√	√	√	√	√	√	√
37	1912	5	×	√	×	×	×	×	×	×	×
38	1916	5	×	×	×	×	×	×	×	×	×
39	1950	5	√	√	×	√	√	√	√	√	×

8.1.4. RCOM

RCOM											
SR. NO.	EMERGENCY NUMBER	CALLS MADE	Nilokheri	Kurukshetra	Pehowa	Gharaunda	Panipat	Assandh	Karnal	Kaithal	Cheeka
1	100	5	√	√	√	√	√	√	√	√	×
2	101	5	√	√	√	×	√	×	√	×	×
3	102	5	√	√	√	√	√	√	√	√	×
4	104	5	×	×	×	×	×	×	×	×	×
5	108	5	×	×	×	×	×	×	×	×	×
6	138	5	√	√	√	√	√	×	√	√	×
7	149	5	×	×	×	×	×	×	×	×	×
8	181	5	√	√	√	√	√	√	√	√	√
9	182	5	√	√	√	√	√	×	√	√	×
10	1033	5	√	√	√	√	√	√	√	√	√
11	1037	5	×	×	×	×	×	×	×	×	×
12	1056	5	×	×	×	×	×	×	×	×	×
13	1060	5	×	×	×	×	×	×	×	×	×
14	1063	5	√	√	√	√	√	√	√	√	√
15	1064	5	×	×	×	×	×	×	×	×	×
16	1070	5	×	×	×	×	×	×	×	×	×
17	1071	5	×	×	×	×	×	×	×	×	×
18	1072	5	×	×	×	×	×	×	×	×	×
19	1073	5	√	√	√	√	√	√	√	√	√
20	1077	5	×	×	×	×	×	×	×	×	×
21	1090	5	×	×	×	×	×	×	×	×	×
22	1091	5	×	×	×	×	×	×	×	×	×
23	1097	5	√	√	√	√	√	√	√	√	√
24	1099	5	×	×	×	×	×	×	×	×	×
25	10580	5	×	×	×	×	×	×	×	×	×
26	10589	5	×	×	×	×	×	×	×	×	×
27	10740	5	×	×	×	×	×	×	×	×	×
28	10741	5	×	×	×	×	×	×	×	×	×
29	1511	5	×	×	×	×	×	×	×	×	×
30	1512	5	√	√	√	√	√	×	√	√	√
31	1514	5	×	×	×	×	×	×	×	×	×
32	15100	5	×	×	×	×	×	×	×	×	×
33	155304	5	×	×	×	×	×	×	×	×	×
34	155214	5	×	×	×	×	×	×	×	×	×
35	1903	5	√	√	√	√	√	√	√	√	√
36	1909	5	√	√	√	√	√	√	√	√	√
37	1912	5	×	×	×	×	×	×	×	×	×
38	1916	5	×	×	×	×	×	×	×	×	×
39	1950	5	√	√	√	√	√	√	√	√	×

8.1.5. TTSL – CDMA

SR. NO.	EMERGENCY NUMBER	CALLS MADE	NILOKHERI	KURUKSHETRA	PEHOWA	GHARUNDA	PANIPAT	ASSANDH	KARNAL	KAITHAL	GULHA CHEEKA
1	100	5	√	√	√	√	√	√	√	√	√
2	101	5	√	√	√	√	√	√	√	√	√
3	102	5	√	√	√	√	√	√	√	√	√
4	104	5	×	×	×	×	×	×	×	×	×
5	108	5	×	×	×	×	×	×	×	×	×
6	138	5	√	√	√	√	√	√	√	√	√
7	149	5	×	×	×	×	×	×	×	×	×
8	181	5	√	√	√	√	√	√	√	√	√
9	182	5	×	×	×	×	×	×	×	×	×
10	1033	5	√	√	√	√	√	√	√	√	√
11	1037	5	×	×	×	×	×	×	×	×	×
12	1056	5	×	×	×	×	×	×	×	×	×
13	1060	5	×	×	×	×	×	×	×	×	×
14	1063	5	×	×	×	×	×	×	×	×	×
15	1064	5	×	×	×	×	×	×	×	×	×
16	1070	5	√	√	√	√	√	√	√	×	√
17	1071	5	×	×	×	×	×	×	×	×	×
18	1072	5	×	×	×	√	√	√	√	√	√
19	1073	5	√	√	√	√	√	√	√	√	√
20	1077	5	×	×	×	×	×	×	×	×	×
21	1090	5	×	×	×	×	×	×	×	×	×
22	1091	5	√	√	√	√	√	√	√	√	√
23	1097	5	√	√	√	√	√	√	√	√	√
24	1099	5	√	√	√	√	√	√	√	√	√
25	10580	5	×	×	×	×	×	×	×	×	×
26	10589	5	×	×	×	×	×	×	×	×	×
27	10740	5	×	×	×	×	×	×	×	×	×
28	10741	5	×	×	×	×	×	×	×	×	×
29	1511	5	×	×	×	×	×	×	×	×	×
30	1512	5	√	√	√	√	√	√	√	√	√
31	1514	5	×	×	×	×	×	×	×	×	×
32	15100	5	×	×	×	×	×	×	×	×	×
33	155304	5	×	×	×	×	×	×	×	×	×
34	155214	5	√	√	√	√	√	√	√	√	√
35	1903	5	×	×	×	×	×	×	×	×	×
36	1909	5	√	√	√	√	√	√	√	√	√
37	1912	5	×	×	×	×	×	×	×	×	×
38	1916	5	×	×	×	×	×	×	×	×	×
39	1950	5	×	×	×	×	×	×	×	×	×

8.1.6. VODAFONE

VODAFONE											
SR. NO.	EMERGENCY NUMBER	CALLS MADE	NILOKHERI	KURUKSHETRA	PEHOWA	GHARUNDA	PANIPAT	ASSANDH	KARNAL	KAITHAL	GULHA CHEEKA
1	100	5	√	√	√	√	√	√	√	√	√
2	101	5	√	√	√	√	√	√	√	√	√
3	102	5	√	√	√	√	√	√	√	√	√
4	104	5	×	×	×	×	×	×	×	×	×
5	108	5	×	×	×	×	×	×	×	×	×
6	138	5	√	√	√	√	√	√	√	√	√
7	149	5	×	×	×	×	×	×	×	×	×
8	181	5	√	√	√	√	√	√	√	√	√
9	182	5	×	×	×	×	×	×	×	×	×
10	1033	5	√	√	√	√	√	√	√	√	√
11	1037	5	×	×	×	×	×	×	×	×	×
12	1056	5	×	×	×	×	×	×	×	×	×
13	1060	5	×	×	×	×	×	×	×	×	×
14	1063	5	×	×	×	×	×	×	×	×	×
15	1064	5	×	×	×	×	×	×	×	×	×
16	1070	5	√	√	√	√	√	√	√	×	√
17	1071	5	×	×	×	×	×	×	×	×	×
18	1072	5	×	×	×	√	√	√	√	√	√
19	1073	5	√	√	√	√	√	√	√	√	√
20	1077	5	×	×	×	×	×	×	×	×	×
21	1090	5	×	×	×	×	×	×	×	×	×
22	1091	5	√	√	√	√	√	√	√	√	√
23	1097	5	√	√	√	√	√	√	√	√	√
24	1099	5	√	√	√	√	√	√	√	√	√
25	10580	5	×	×	×	×	×	×	×	×	×
26	10589	5	×	×	×	×	×	×	×	×	×
27	10740	5	×	×	×	×	×	×	×	×	×
28	10741	5	×	×	×	×	×	×	×	×	×
29	1511	5	×	×	×	×	×	×	×	×	×
30	1512	5	√	√	√	√	√	√	√	√	√
31	1514	5	×	×	×	×	×	×	×	×	×
32	15100	5	×	×	×	×	×	×	×	×	×
33	155304	5	×	×	×	×	×	×	×	×	×
34	155214	5	√	√	√	√	√	√	√	√	√
35	1903	5	×	×	×	×	×	×	×	×	×
36	1909	5	√	√	√	√	√	√	√	√	√
37	1912	5	×	×	×	×	×	×	×	×	×
38	1916	5	×	×	×	×	×	×	×	×	×
39	1950	5	×	×	×	×	×	×	×	×	×

9. OPERATOR ASSISTED DRIVE TEST

9.1. METHODOLOGY

The drive test was conducted simultaneously for all the operators present in the Haryana circle. As per the new directive given by TRAI headquarters, drive test for the month of April, May and June, 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 Haryana circle.

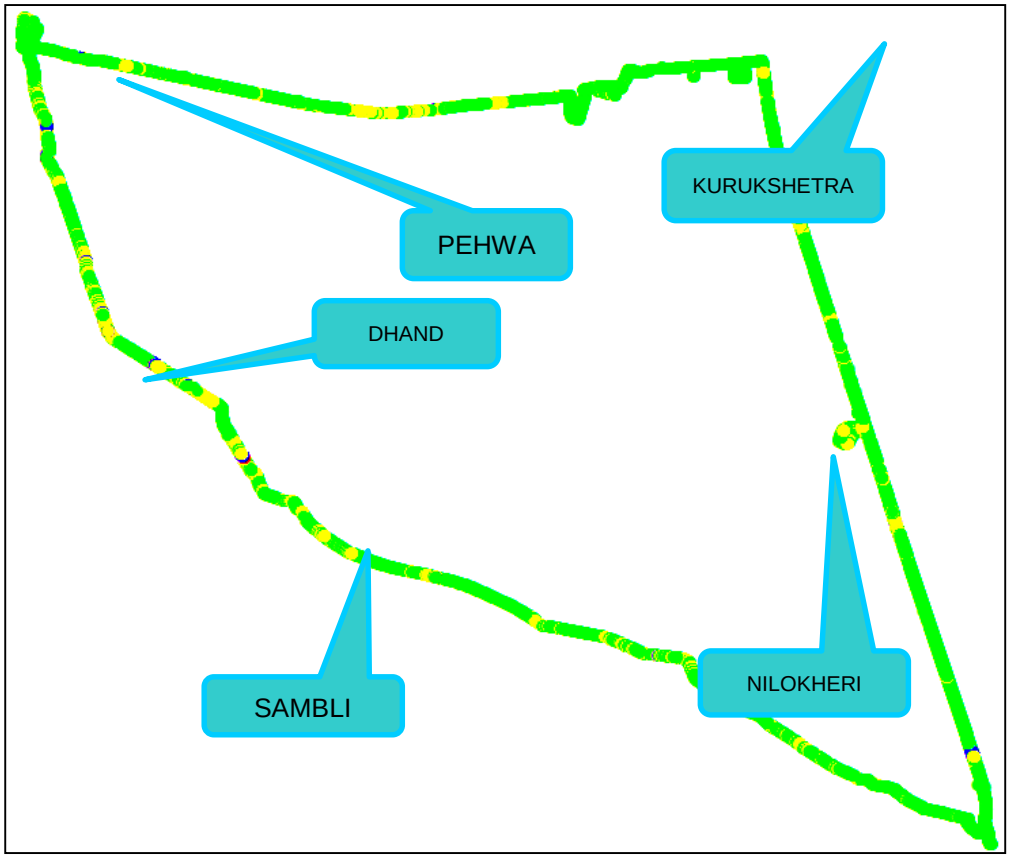
9.2. MAY: KARNAL SSA

Month	Name of SSA covered	Drive Test Schedule
May 2016	KARNAL	May 25, 2016 to May 27, 2016

9.3. DISTANCE COVERED: KARNAL SSA

Drive Test Distance Covered	Day 1	Day 2	Day 3
KARNAL SSA	171 km	165 km	153 km

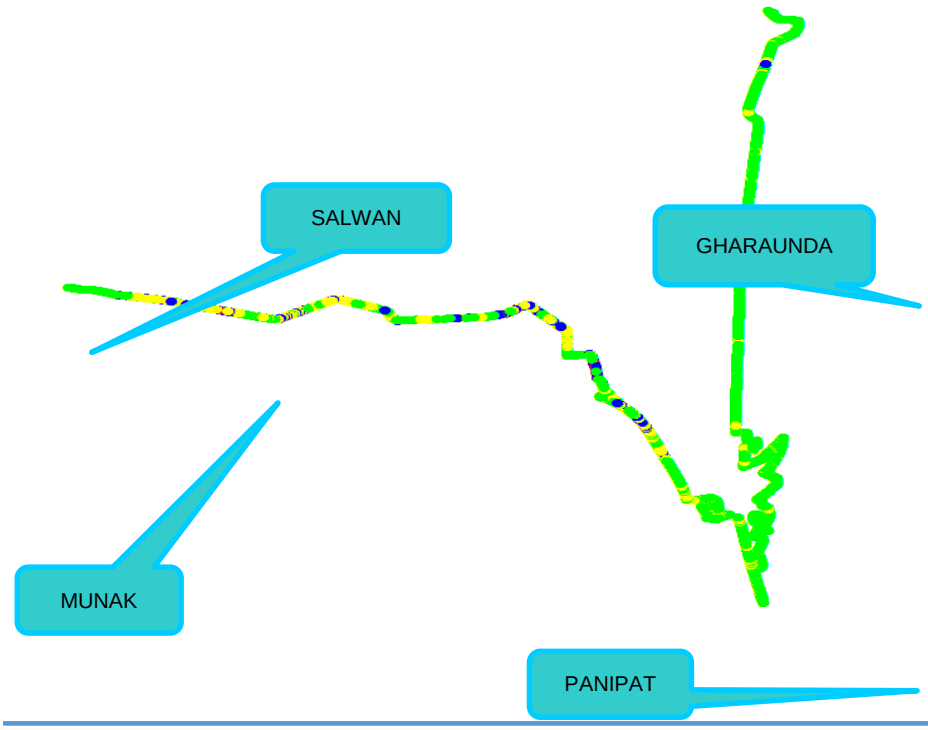
9.4. ROUTE MAP: KARNAL SSA: DAY 1



SSA- Route Covered-Day1

1. PEHWA
2. KURUKSHETA
3. SAMBLI
4. NILOKHERI
5. DHAND

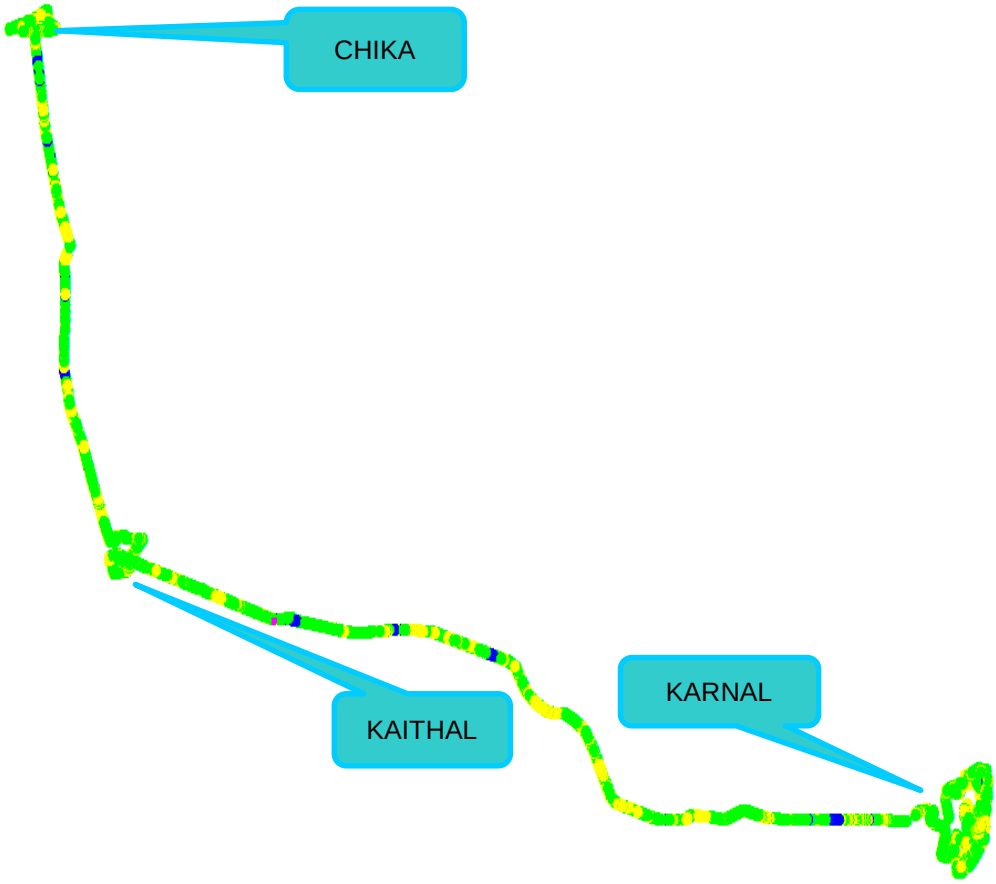
9.5. ROUTE MAP: KARNALSSA: DAY 2



SSA- Route Covered-Day2

1. GHARAUNDA
2. PANIPAT
3. MUNAK
4. SALWAN

9.6. ROUTE MAP: KARNAL SSA: DAY 3



SSA- Route Covered-Day3

1 CHIKA

2 KAITHAL

3 KARNAL

9.7. DRIVE TEST OUTCOME

	Aircel	Airtel	Idea	RCOM GSM	TTSL GSM	TTSL CDMA	Vodafone
Total Calls Attempt (A)	31	679	739	663	667	270	559
Total Calls Blocked (B)	0	3	1	1	3	1	9
Blocked Call Rate in % (B*100/A)	0.00%	0.44%	0.14%	0.15%	0.45%	0.37%	1.61%
Total Calls Established ('C)	31	676	738	662	664	269	550
Total Calls Drop (D)	0	6	0	2	1	2	6
Dropped Calls Rate in % (D*100/C)	0.00%	0.89%	0.00%	0.30%	0.15%	0.74%	1.09%
Call Setup Success Rate in % (C*100/A)	100.00%	99.56%	99.86%	99.85%	99.64%	99.63%	98.39%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	100.00%	99.57%	99.53%	100%	99.76%	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 downlink.
QUAL40DL Number of quality 4 reported on downlink.
QUAL50DL Number of quality 5 reported on downlink.
QUAL60DL Number of quality 6 reported on downlink.
QUAL70DL Number of quality 7 reported on downlink

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 (where 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 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= (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)

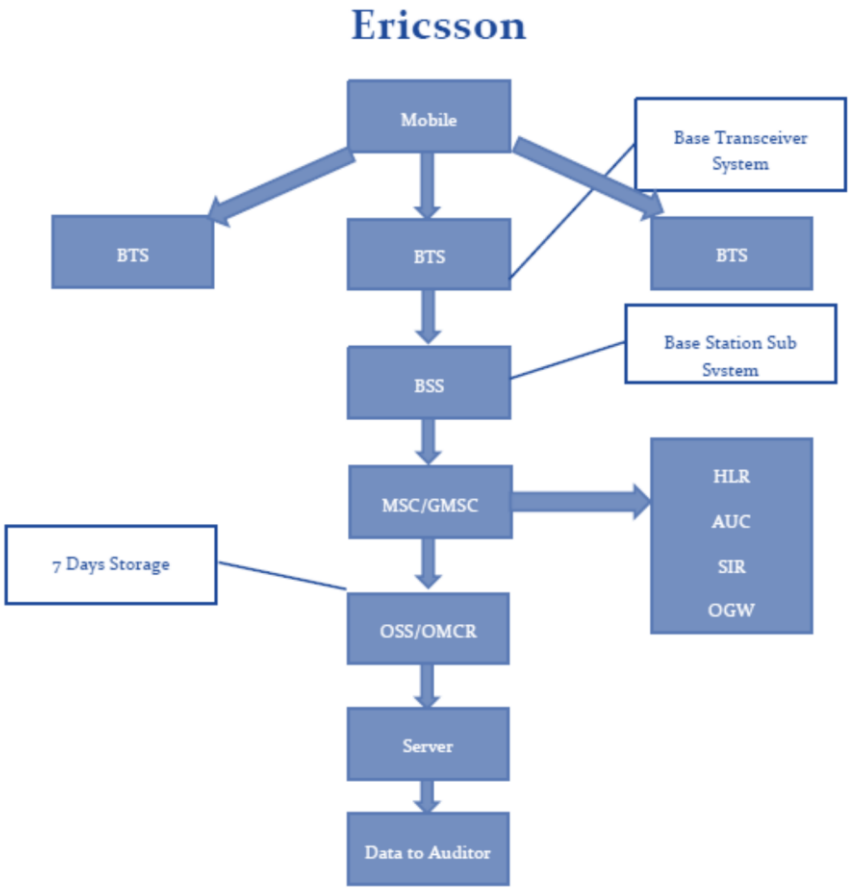
10.3. HUAWEI

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

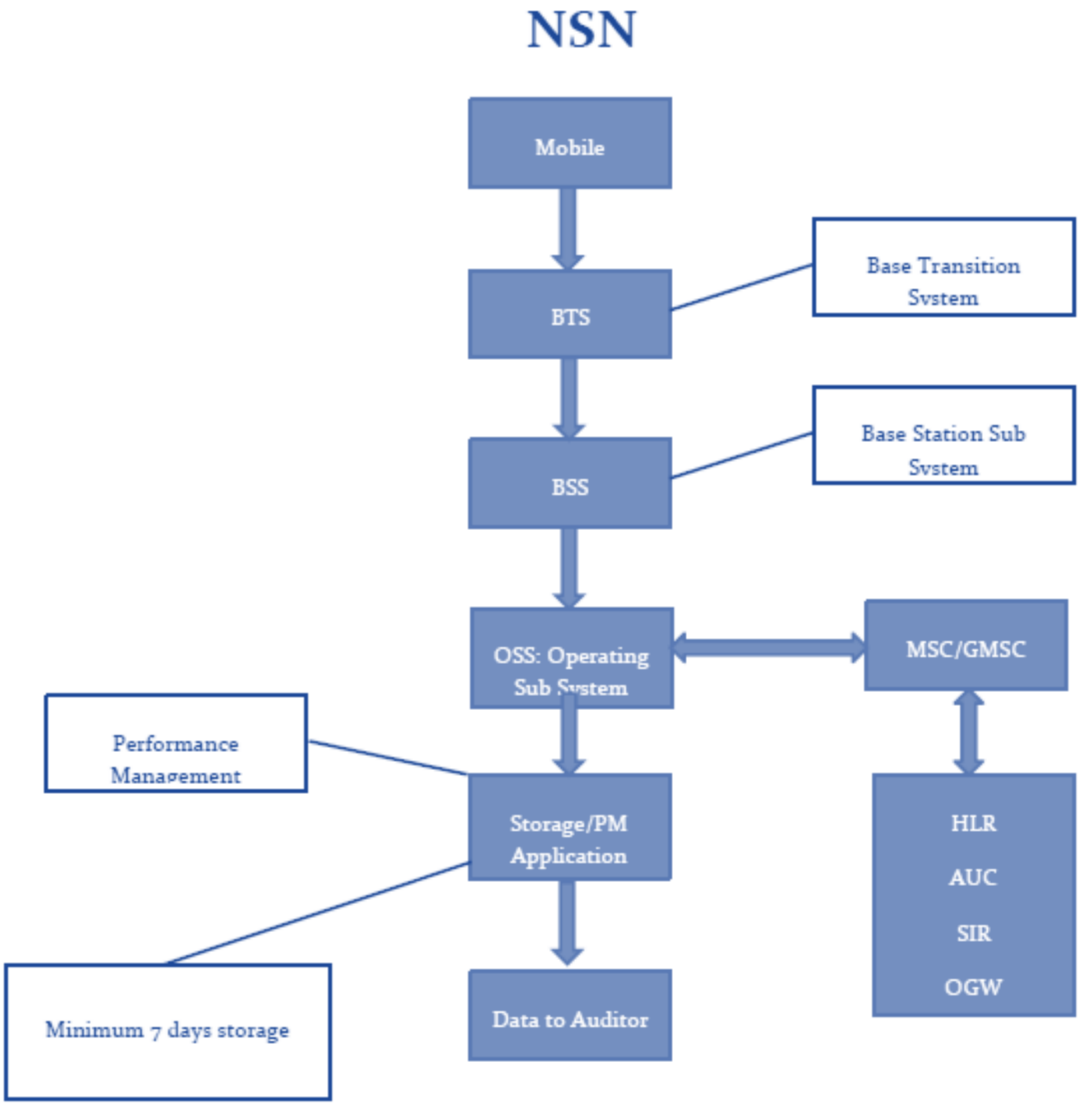
		Orig-IS2000[Times] + Successful TCH Assignments-CS Term-IS95[Times] + Successful TCH Assignments-CS Term-IS2000[Times])] {[(1157628621 + 1157628628 + 1157628635+ 1157628642)
8	RF BLOCK RATE (DEN)	[((TCH Assignment Requests-CS Orig-IS95[Times] + TCH Assignment Requests-CS Orig-IS2000[Times] + TCH Assignment 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

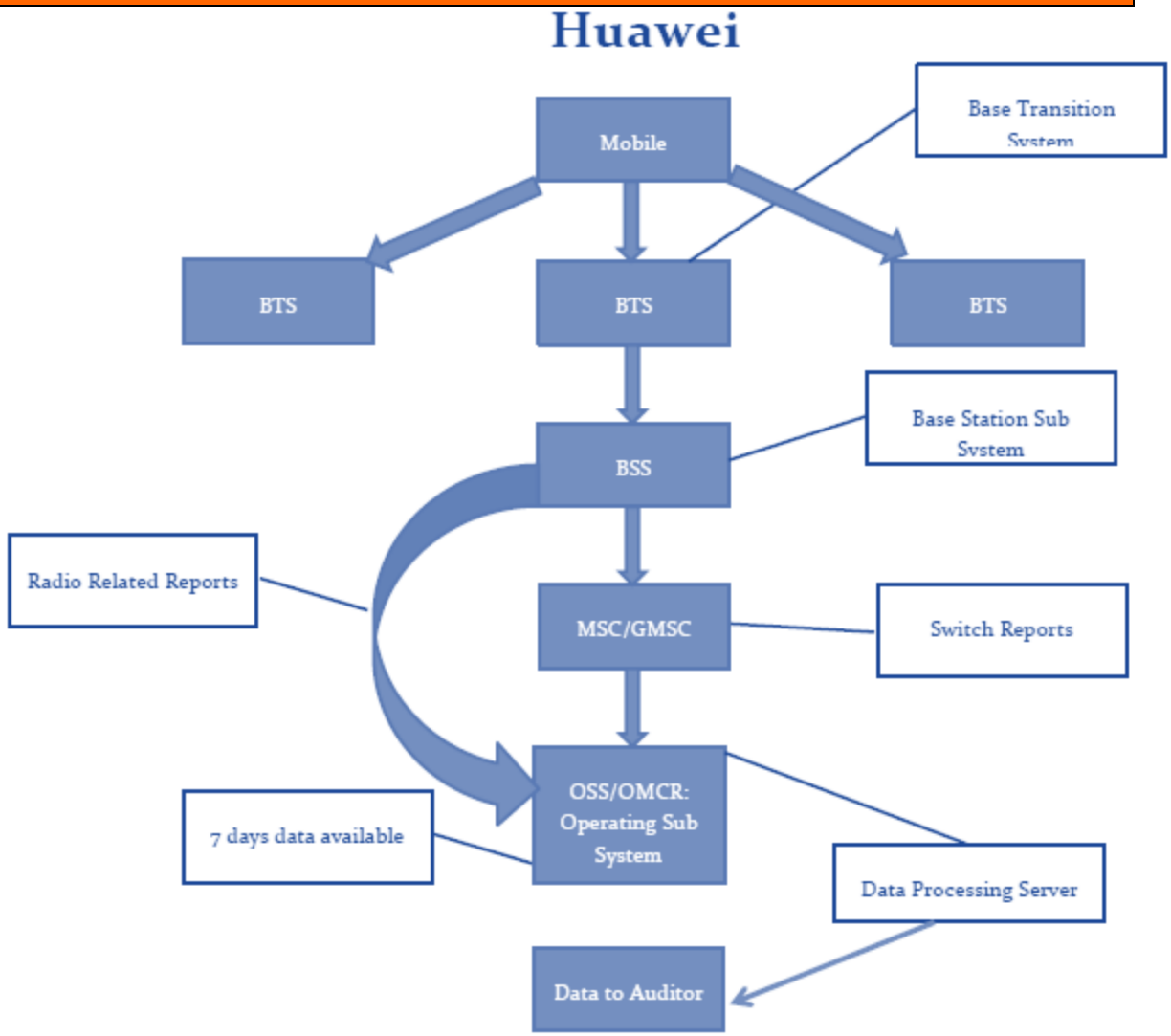
11.1. ERICSSON



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
- AMJ'16 – Refers to the quarter of April, May and June 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	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.25%	0.13%	1.21%	0.09%	0.12%	0.12%	0.54%	0.31%	0.19%	0.08%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.12%	1.30%	0.00%	0.45%	0.97%	0.00%	0.87%	0.48%	0.09%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	99.08%	98.39%	98.28%	98.34%	97.51%	98.16%	98.24%	98.58%	99.77%
	SDDCH/Paging chl. Congestion	≤ 1%	0.50%	0.48%	0.55%	0.43%	0.00%	0.45%	0.00%	0.19%	0.11%	0.15%
	TCH Congestion	≤ 2%	0.00%	0.69%	0.78%	0.43%	0.45%	0.17%	0.17%	0.61%	0.10%	0.23%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.73%	1.00%	0.53%	0.25%	0.09%	0.35%	0.58%	0.43%	0.54%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.06%	0.31%	1.02%	1.97%	1.25%	0.54%	2.03%	2.51%	0.50%	1.63%
	%age of connection with good voice quality	≥ 95%	99.17%	98.75%	94.96%	98.03%	99.84%	99.60%	#DIV/0!	96.79%	97.67%	97.97%

13.2. 3G VOICE PMR: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.39%	0.02%	0.09%	0.18%	0.09%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.49%	0.00%	0.20%	0.95%	0.07%
Connection Establishment (Accessibi	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.07%	99.28%	99.28%	99.84%	99.82%
	RRC Congestion:	≤ 1%	0.00%	1.24%	0.43%	0.37%	0.01%
	RAB Congestion:	≤ 2%	0.01%	0.72%	0.18%	0.59%	0.00%
Connection Maintenance (Retainabil ity)	Circuit Switched Voice Drop Rate	≤ 2%	0.11%	0.47%	0.31%	0.13%	0.25%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.66%	0.84%	2.44%	0.99%	1.98%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.82%	100.00%	65.92%	99.14%	98.12%

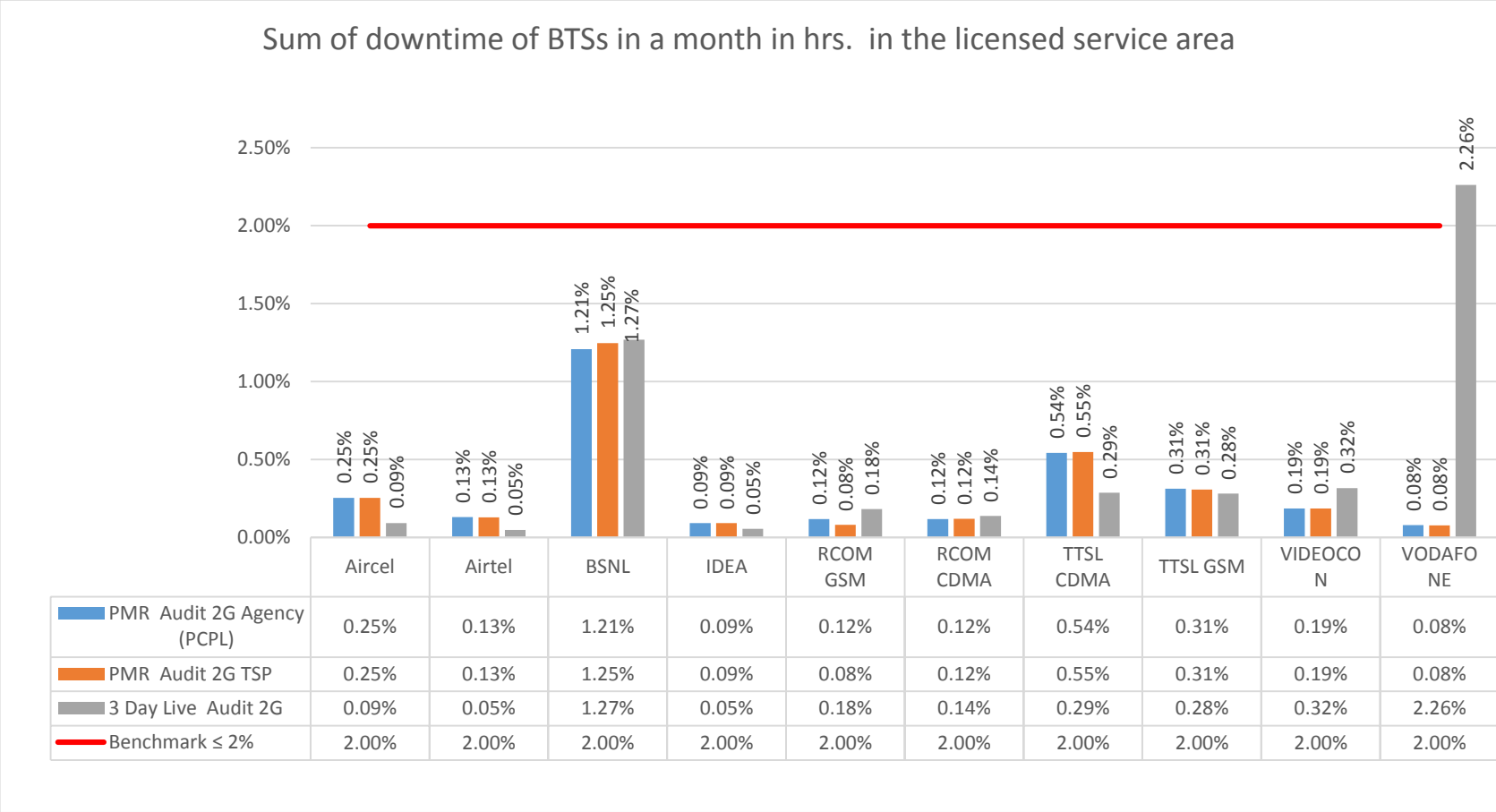
13.3. BILLING AND CUSTOMER CARE

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	0.00%	0.00%	DNA	DNA	100.00%	DNA	DNA	98.13%	99.26%
AIRTEL	0.02%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	89.36%
BSNL	0.05%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.59%
IDEA	0.08%	0.15%	100.00%	100.00%	100.00%	100.00%	99.89%	99.83%	97.77%
RCOM CDMA	0.10%	0.01%	100.00%	100.00%	100.00%	100.00%	DNA	96.43%	97.61%
RCOM GSM	0.09%	0.08%	100.00%	100.00%	100.00%	100.00%	59.29%	98.91%	95.23%
TTSL CDMA	0.01%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	DNA	99.66%
TTSL GSM	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.48%	93.05%
VIDEOCON	DNA	DNA	DNA	DNA	100.00%	100.00%	DNA	DNA	DNA
VODAFONE	0.07%	0.07%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.04%

13.4. 2G PMR Comparison (TSP vs. Audit Agency): Network Parameters

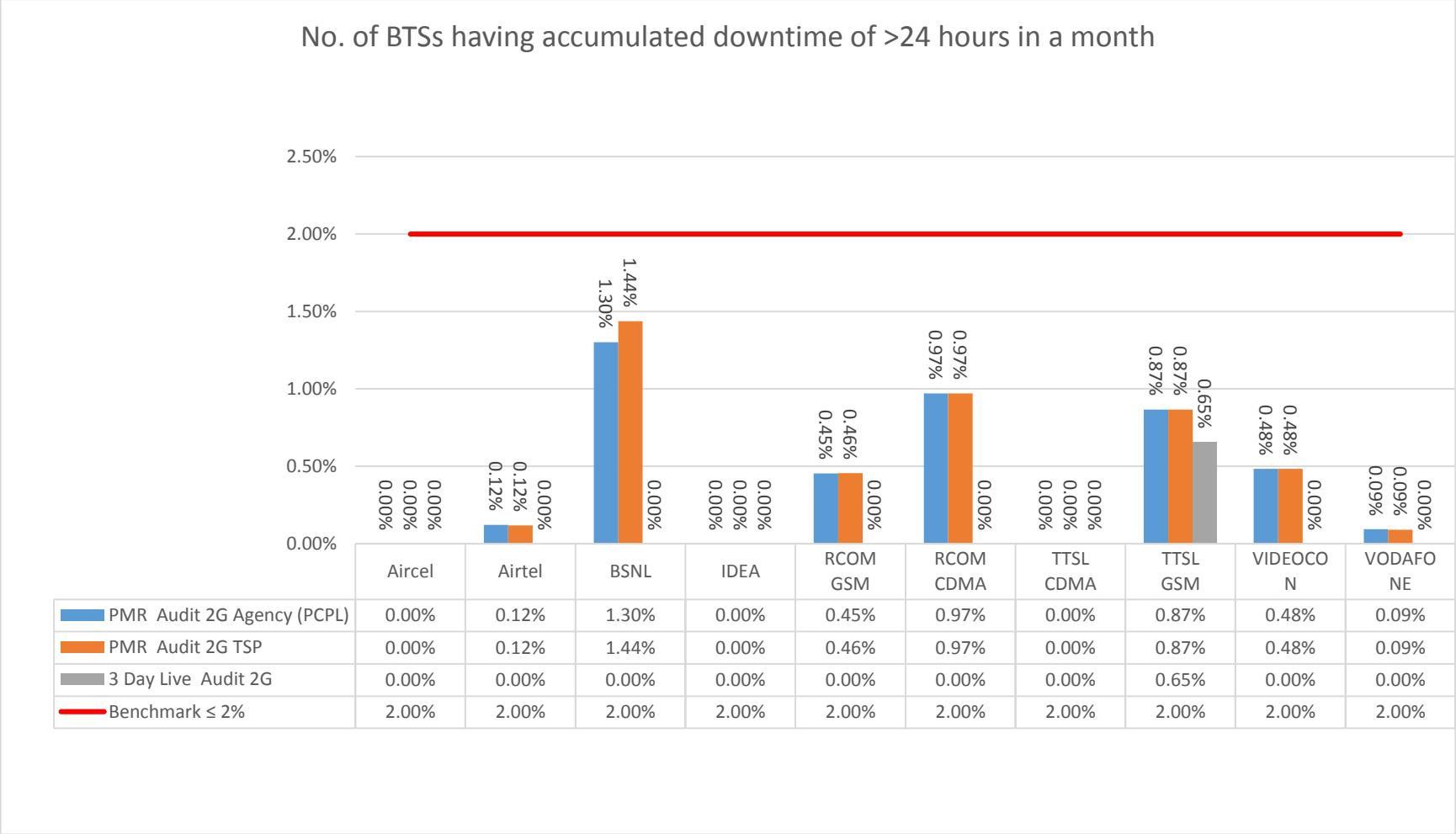
PMR Report Comparison between Audit Agency and TSP													
Network Parameters		Name of Service Provider											
		Benchmark		Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.25%	0.13%	1.21%	0.09%	0.12%	0.12%	0.54%	0.31%	0.19%	0.08%
			TSP	0.25%	0.13%	1.25%	0.09%	0.08%	0.12%	0.55%	0.31%	0.19%	0.08%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	0.00%	0.12%	1.30%	0.00%	0.45%	0.97%	0.00%	0.87%	0.48%	0.09%
			TSP	0.00%	0.12%	1.44%	0.00%	0.46%	0.97%	0.00%	0.87%	0.48%	0.09%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	Agency	100.00%	99.08%	98.39%	98.28%	98.34%	97.51%	98.16%	98.24%	98.58%	99.77%
			TSP	99.52%	98.81%	98.45%	98.50%	98.62%	97.81%	93.64%	98.47%	98.68%	99.61%
	SDDCH/Paging chl. Congestion	≤ 1%	Agency	0.50%	0.48%	0.55%	0.43%	0.00%	0.45%	0.00%	0.19%	0.11%	0.15%
			TSP	0.03%	0.45%	0.53%	0.43%	0.00%	0.45%	0.00%	0.19%	0.11%	0.15%
	TCH Congestion	≤ 2%	Agency	0.00%	0.69%	0.78%	0.43%	0.45%	0.17%	0.17%	0.61%	0.10%	0.23%
			TSP	0.00%	0.71%	0.78%	0.43%	0.50%	0.17%	0.17%	0.61%	0.10%	0.23%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	Agency	0.00%	0.73%	1.00%	0.53%	0.25%	0.09%	0.35%	0.58%	0.43%	0.54%
			TSP	0.00%	0.70%	1.24%	0.53%	0.25%	0.09%	0.34%	0.58%	0.43%	0.54%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	Agency	0.06%	0.31%	1.02%	1.97%	1.25%	0.54%	2.03%	2.51%	0.50%	1.63%
			TSP	0.06%	0.29%	0.99%	1.96%	1.27%	0.54%	2.03%	2.51%	0.50%	1.63%
	%age of connection with good voice quality	≥ 95%	Agency	99.17%	98.75%	94.96%	98.03%	99.84%	99.60%	DNA	96.79%	97.67%	97.97%
			TSP	99.17%	98.78%	97.22%	98.03%	99.88%	99.60%	97.14%	96.79%	97.67%	97.97%

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



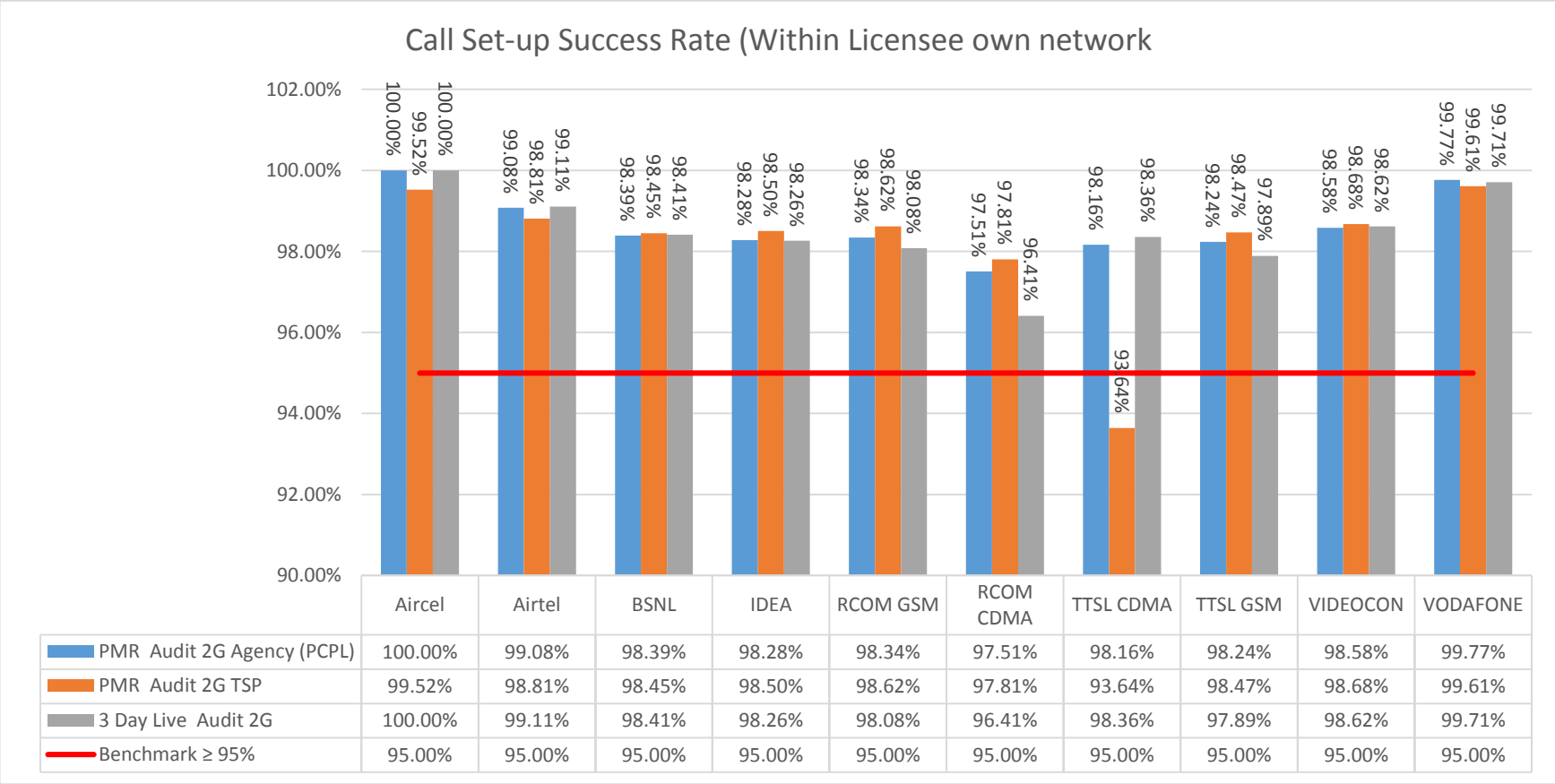
	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	0.25%	0.13%	1.21%	0.09%	0.12%	0.12%	0.54%	0.31%	0.19%	0.08%
PMR Audit 2G TSP	0.25%	0.13%	1.25%	0.09%	0.08%	0.12%	0.55%	0.31%	0.19%	0.08%
3 Day Live Audit 2G	0.09%	0.05%	1.27%	0.05%	0.18%	0.14%	0.29%	0.28%	0.32%	2.26%
Benchmark ≤ 2%	2.00%	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



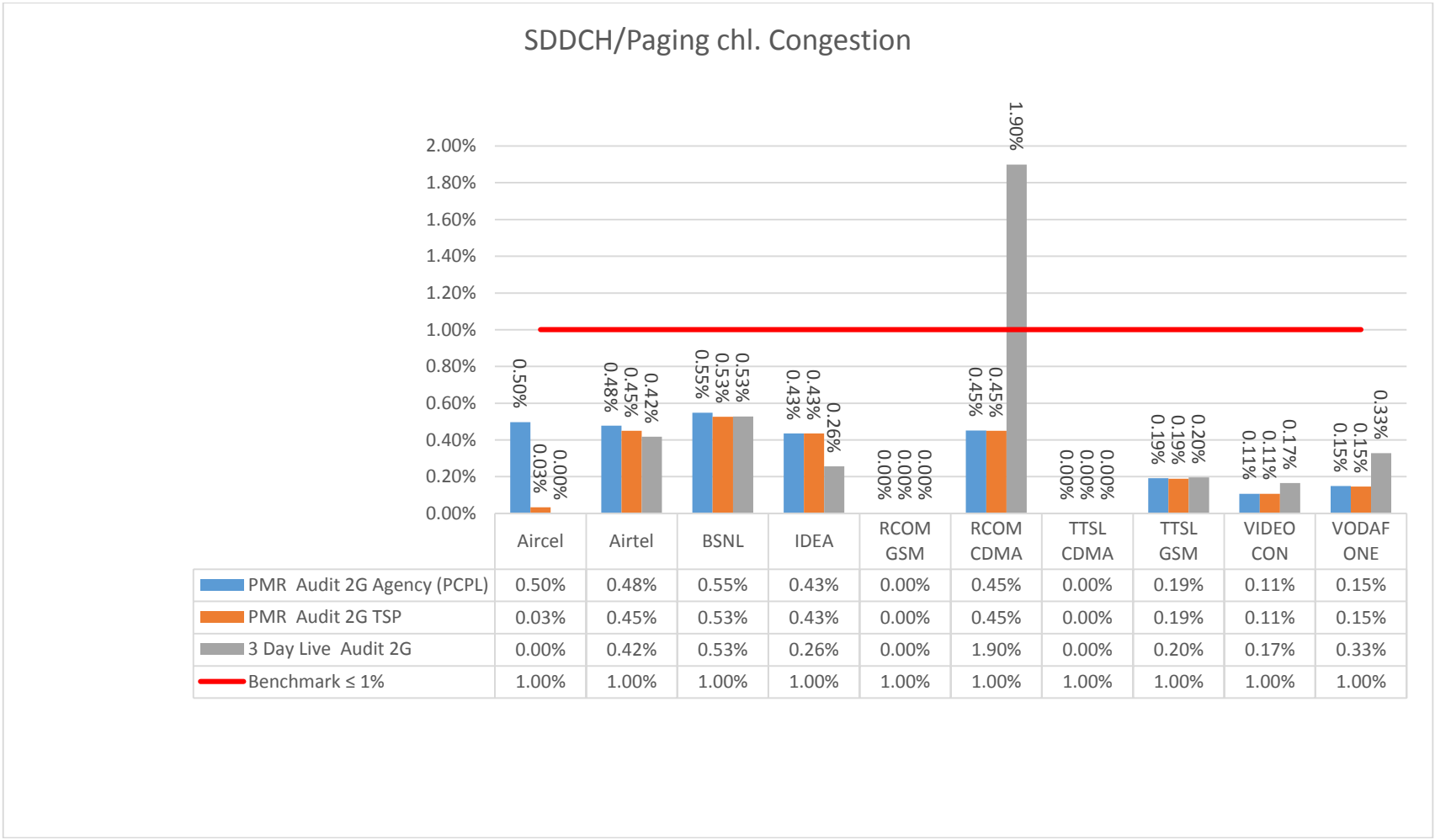
	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	0.00%	0.12%	1.30%	0.00%	0.45%	0.97%	0.00%	0.87%	0.48%	0.09%
PMR Audit 2G TSP	0.00%	0.12%	1.44%	0.00%	0.46%	0.97%	0.00%	0.87%	0.48%	0.09%
3 Day Live Audit 2G	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.65%	0.00%	0.00%
Benchmark ≤ 2%	2.00%	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)



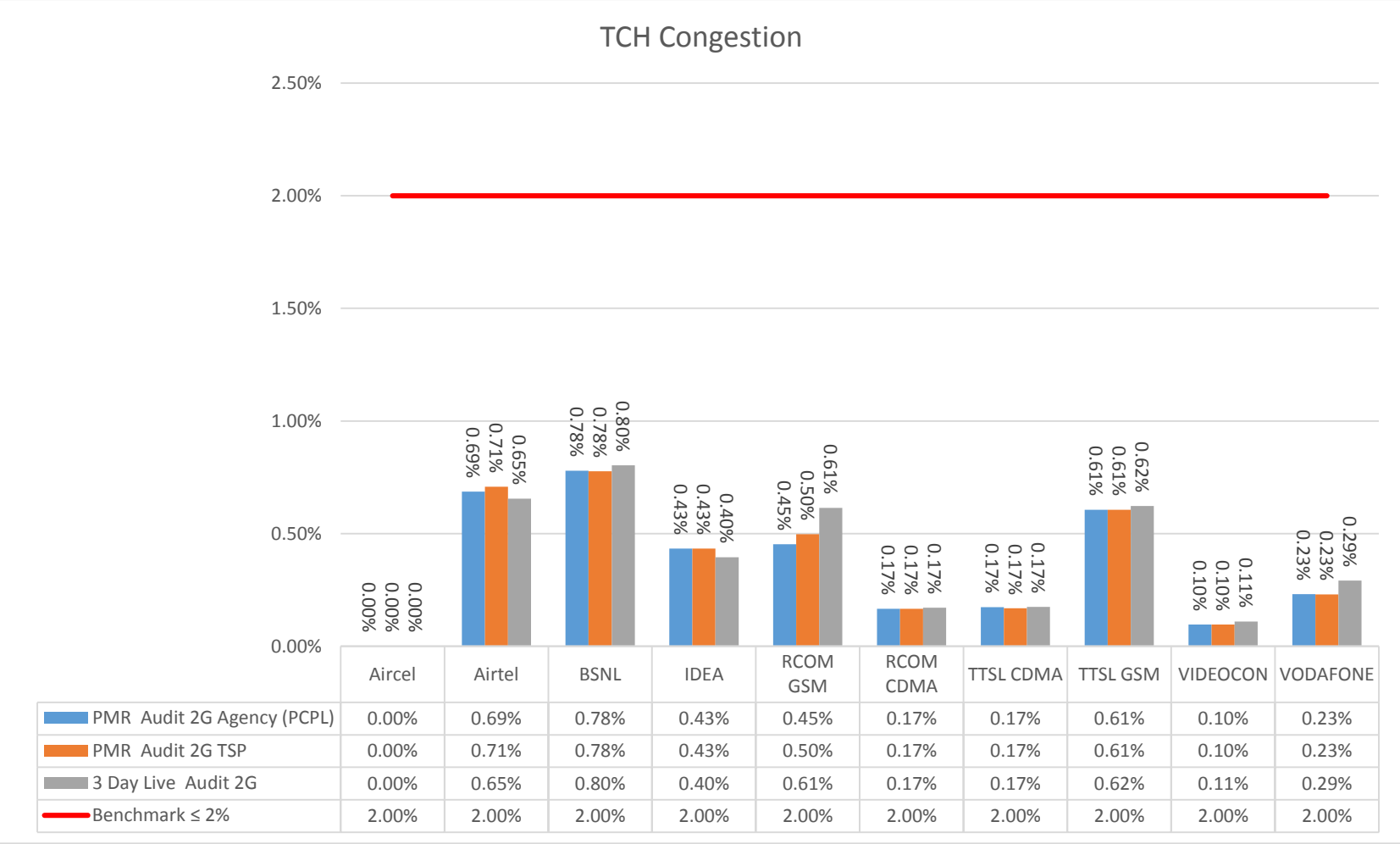
	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	100.00%	99.08%	98.39%	98.28%	98.34%	97.51%	98.16%	98.24%	98.58%	99.77%
PMR Audit 2G TSP	99.52%	98.81%	98.45%	98.50%	98.62%	97.81%	93.64%	98.47%	98.68%	99.61%
3 Day Live Audit 2G	100.00%	99.11%	98.41%	98.26%	98.08%	96.41%	98.36%	97.89%	98.62%	99.71%
Benchmark ≥ 95%	95.00%	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



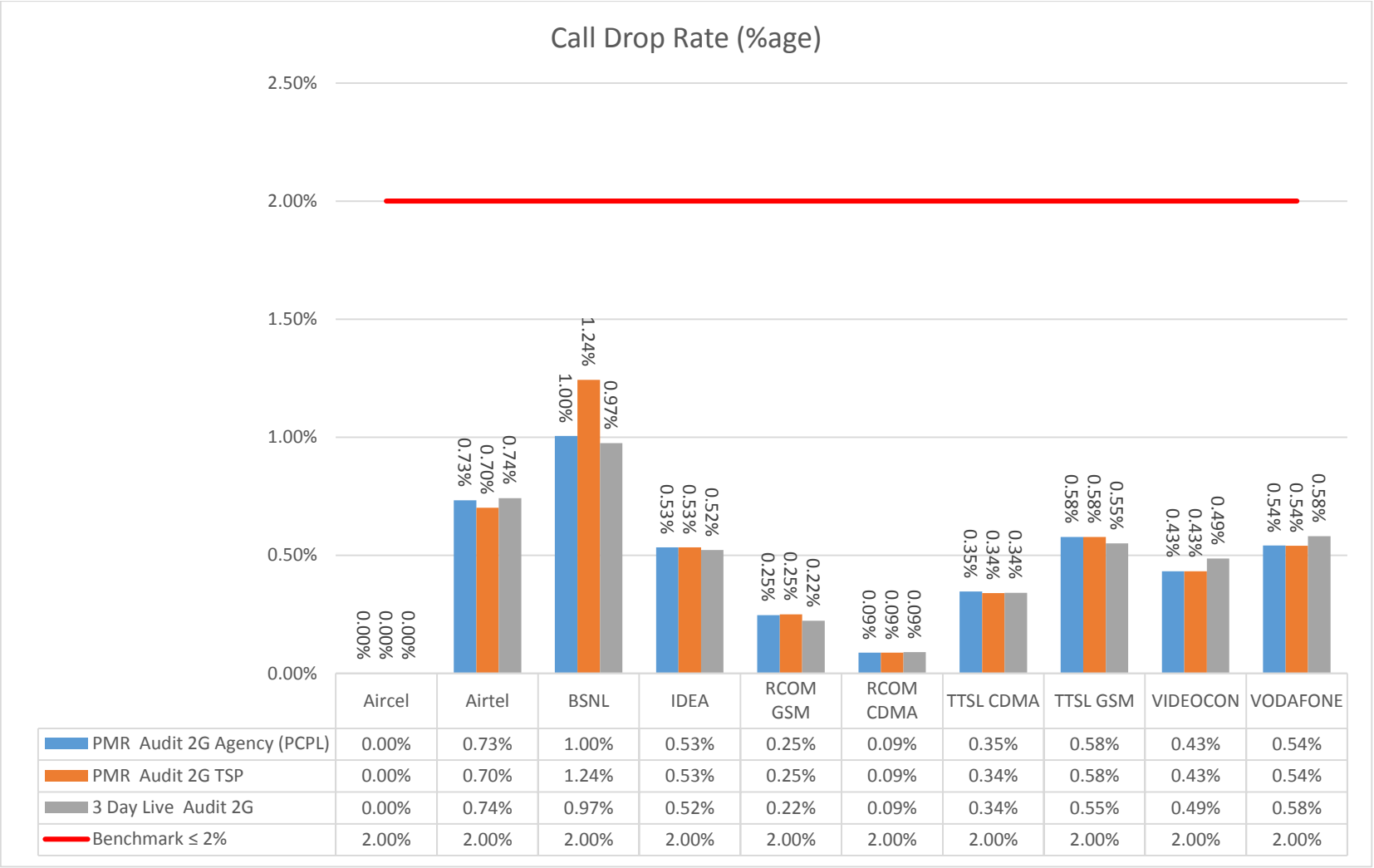
	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEO CON	VODAF ONE
PMR Audit 2G Agency (PCPL)	0.50%	0.48%	0.55%	0.43%	0.00%	0.45%	0.00%	0.19%	0.11%	0.15%
PMR Audit 2G TSP	0.03%	0.45%	0.53%	0.43%	0.00%	0.45%	0.00%	0.19%	0.11%	0.15%
3 Day Live Audit 2G	0.00%	0.42%	0.53%	0.26%	0.00%	1.90%	0.00%	0.20%	0.17%	0.33%
Benchmark ≤ 1%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

13.4.5. TCH CONGESTION



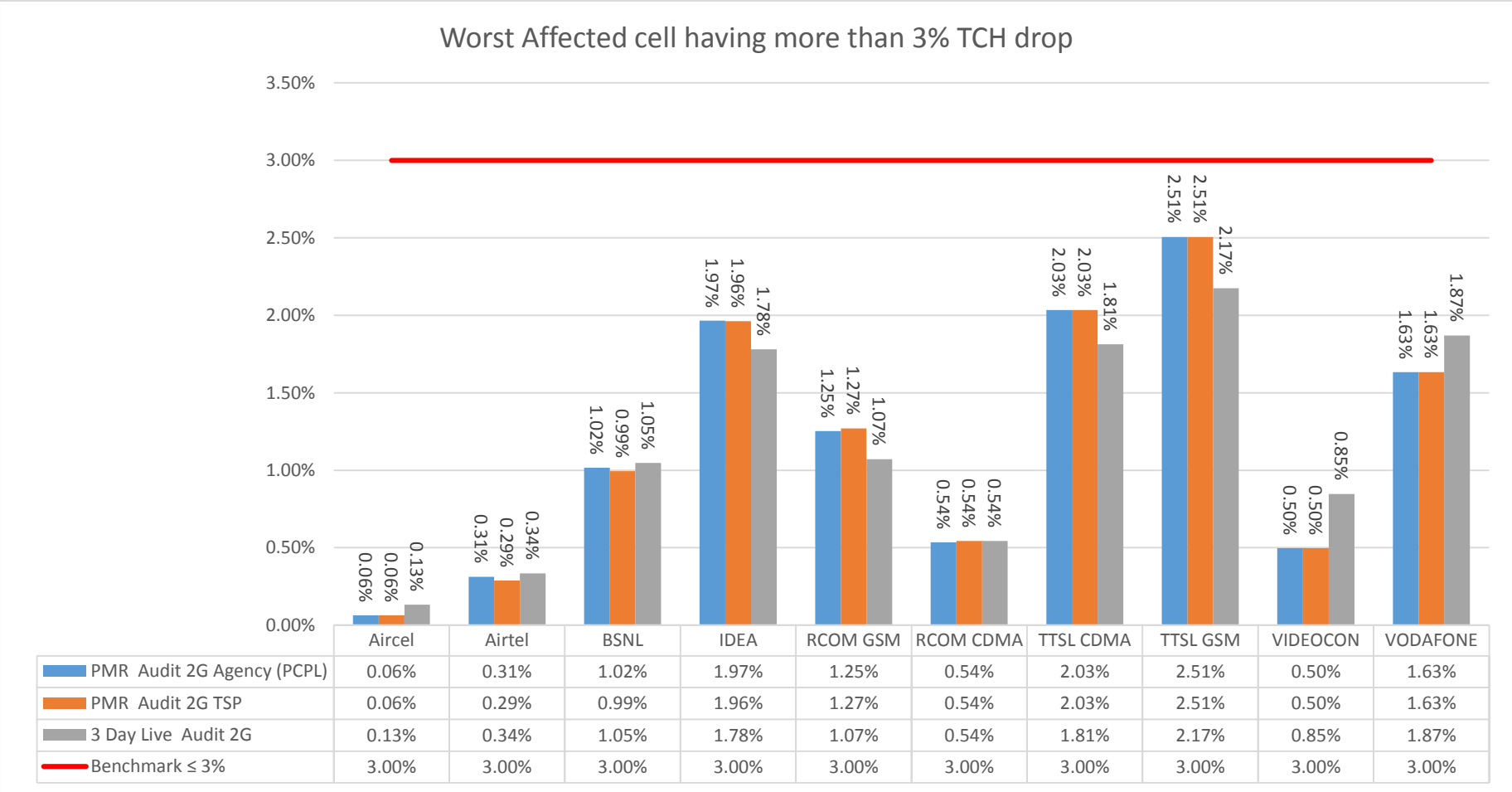
	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	0.00%	0.69%	0.78%	0.43%	0.45%	0.17%	0.17%	0.61%	0.10%	0.23%
PMR Audit 2G TSP	0.00%	0.71%	0.78%	0.43%	0.50%	0.17%	0.17%	0.61%	0.10%	0.23%
3 Day Live Audit 2G	0.00%	0.65%	0.80%	0.40%	0.61%	0.17%	0.17%	0.62%	0.11%	0.29%
Benchmark ≤ 2%	2.00%	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)



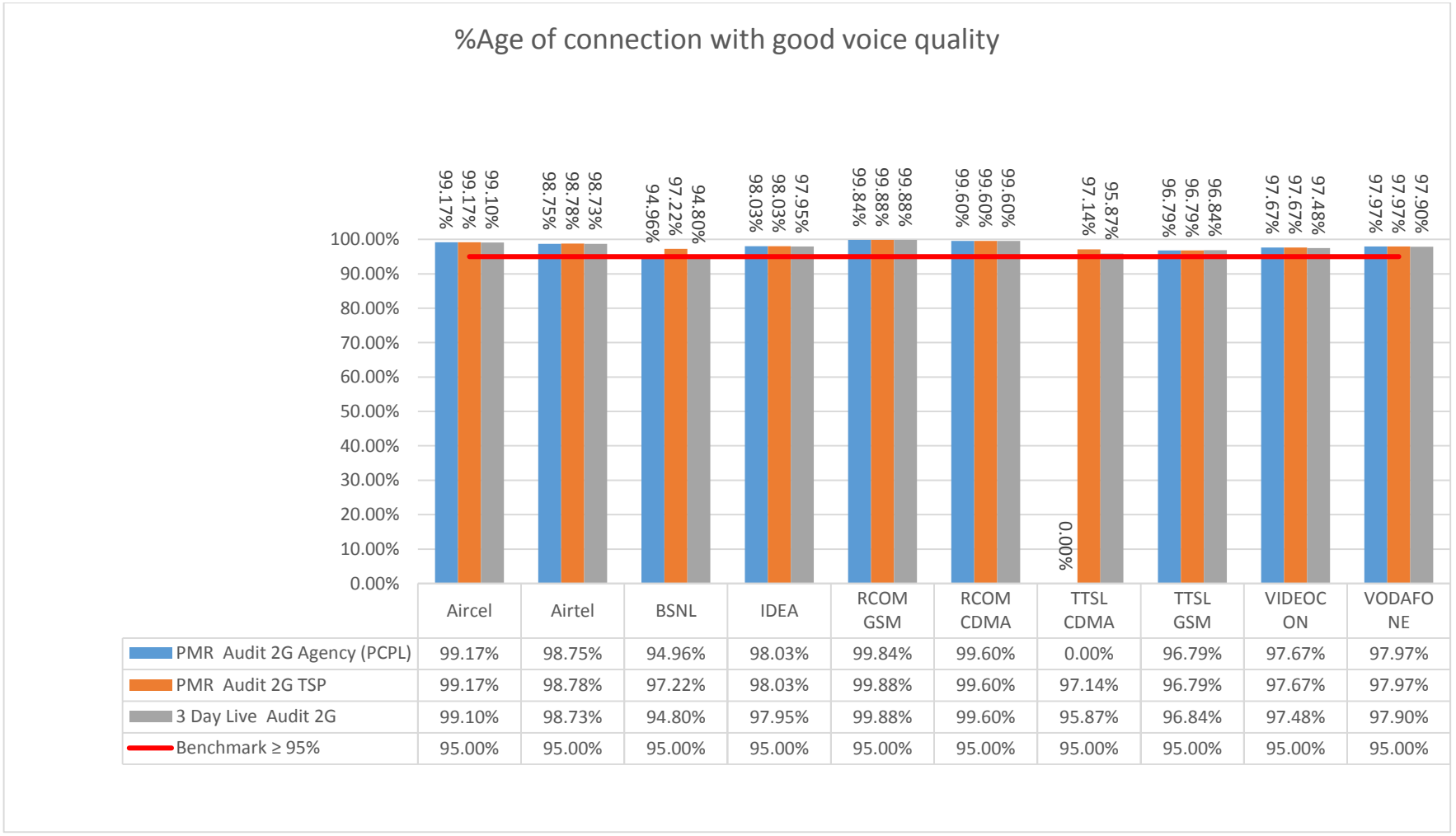
	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	0.00%	0.73%	1.00%	0.53%	0.25%	0.09%	0.35%	0.58%	0.43%	0.54%
PMR Audit 2G TSP	0.00%	0.70%	1.24%	0.53%	0.25%	0.09%	0.34%	0.58%	0.43%	0.54%
3 Day Live Audit 2G	0.00%	0.74%	0.97%	0.52%	0.22%	0.09%	0.34%	0.55%	0.49%	0.58%
Benchmark ≤ 2%	2.00%	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	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	0.06%	0.31%	1.02%	1.97%	1.25%	0.54%	2.03%	2.51%	0.50%	1.63%
PMR Audit 2G TSP	0.06%	0.29%	0.99%	1.96%	1.27%	0.54%	2.03%	2.51%	0.50%	1.63%
3 Day Live Audit 2G	0.13%	0.34%	1.05%	1.78%	1.07%	0.54%	1.81%	2.17%	0.85%	1.87%
Benchmark ≤ 3%	3.00%	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

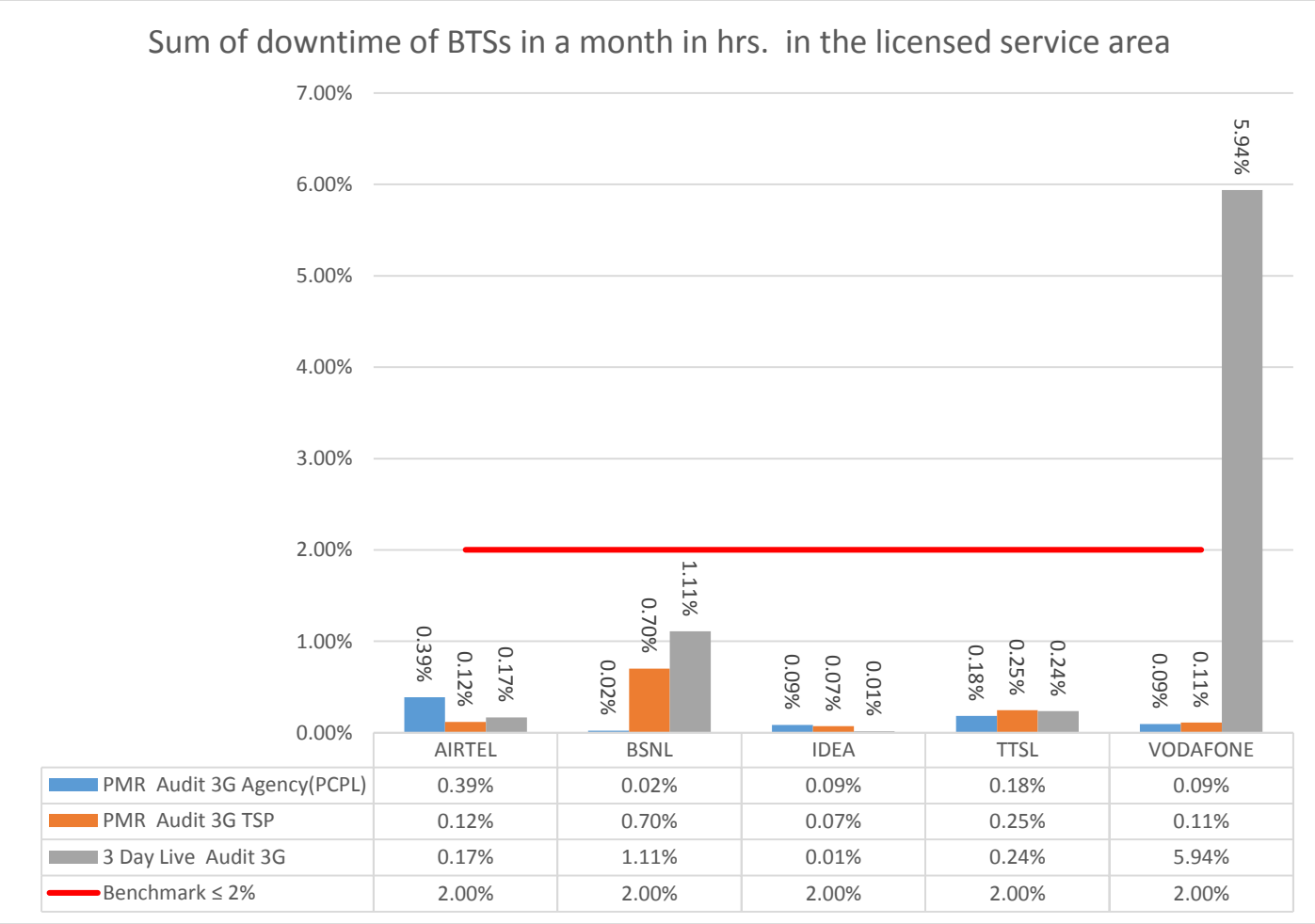


	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	99.17%	98.75%	94.96%	98.03%	99.84%	99.60%	0.00%	96.79%	97.67%	97.97%
PMR Audit 2G TSP	99.17%	98.78%	97.22%	98.03%	99.88%	99.60%	97.14%	96.79%	97.67%	97.97%
3 Day Live Audit 2G	99.10%	98.73%	94.80%	97.95%	99.88%	99.60%	95.87%	96.84%	97.48%	97.90%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

13.5. 3G PMR Comparison (TSP vs. Audit Agency): Network Parameters

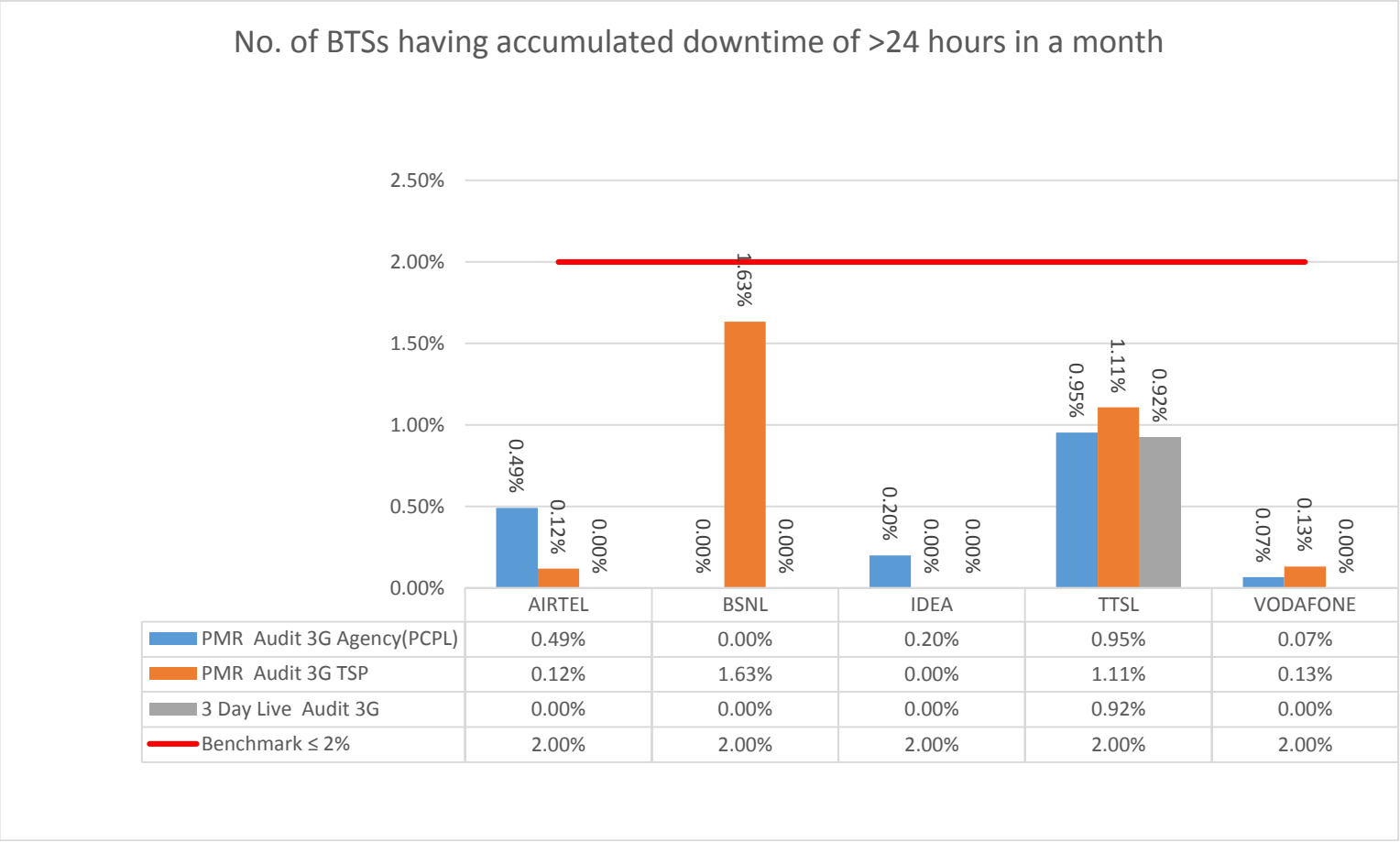
PMR Report Comparison between Audit Agency and TSP								
Network Parameters		Name of Service Provider						
		Benchmark		AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.39%	0.02%	0.09%	0.18%	0.09%
			TSP	0.12%	0.70%	0.07%	0.25%	0.11%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	0.49%	0.00%	0.20%	0.95%	0.07%
			TSP	0.12%	1.63%	0.00%	1.11%	0.13%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	Agency	99.07%	99.28%	99.28%	99.84%	99.82%
			TSP	99.01%	99.00%	99.29%	99.82%	99.83%
	RRC Congestion:	≤ 1%	Agency	0.00%	1.24%	0.43%	0.37%	0.01%
			TSP	0.00%	0.83%	0.39%	0.39%	0.01%
	RAB Congestion:	≤ 2%	Agency	0.01%	0.72%	0.18%	0.59%	0.00%
			TSP	0.01%	0.60%	0.16%	0.62%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	Agency	0.11%	0.47%	0.31%	0.13%	0.25%
			TSP	0.12%	0.57%	0.32%	0.13%	0.22%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	Agency	0.66%	0.84%	2.44%	0.99%	1.98%
			TSP	0.73%	1.33%	2.45%	0.94%	1.78%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	Agency	97.82%	100.00%	98.88%	99.14%	98.12%
			TSP	97.85%	96.77%	98.90%	99.14%	98.31%

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



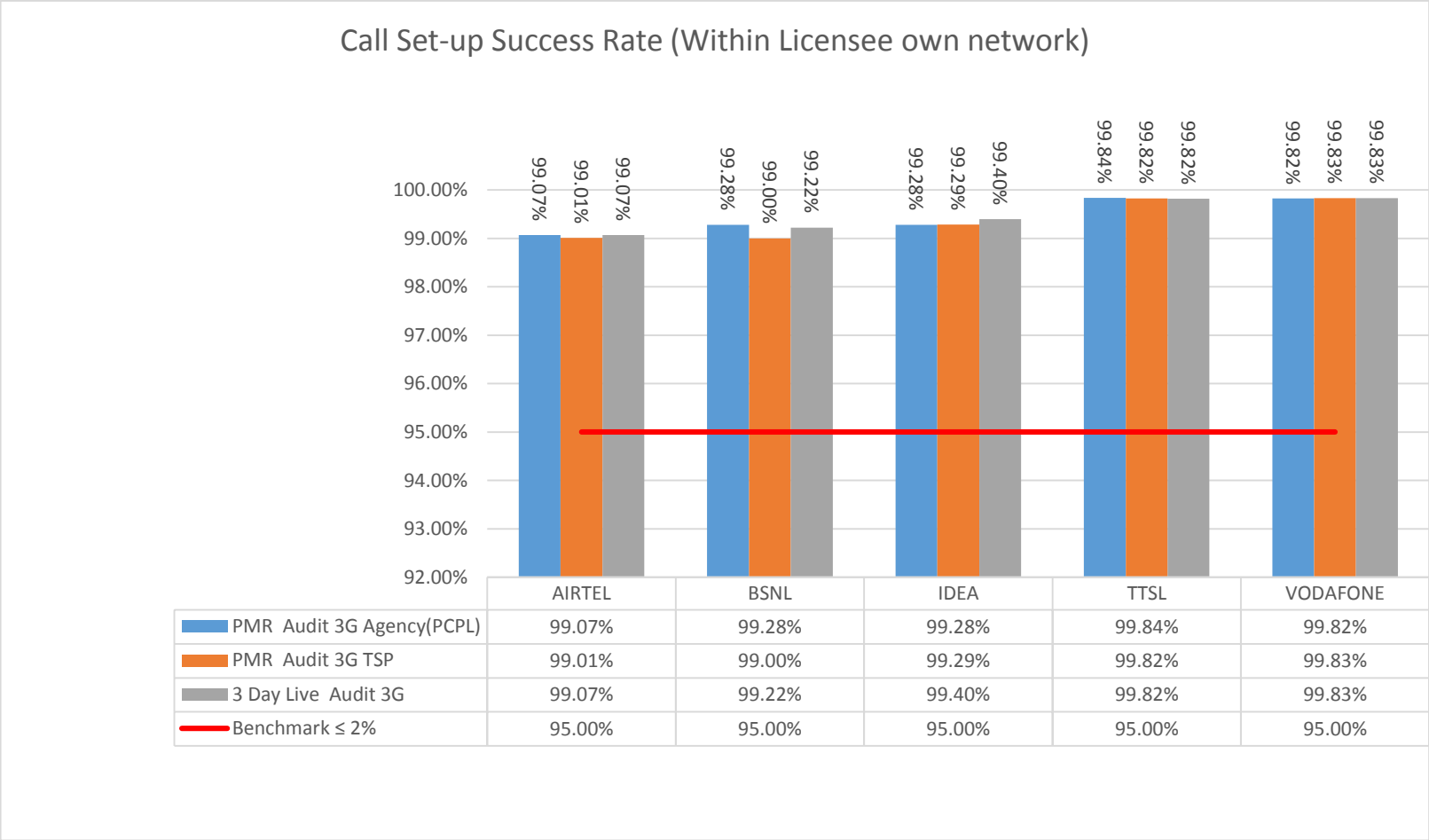
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	0.39%	0.02%	0.09%	0.18%	0.09%
PMR Audit 3G TSP	0.12%	0.70%	0.07%	0.25%	0.11%
3 Day Live Audit 3G	0.17%	1.11%	0.01%	0.24%	5.94%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

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



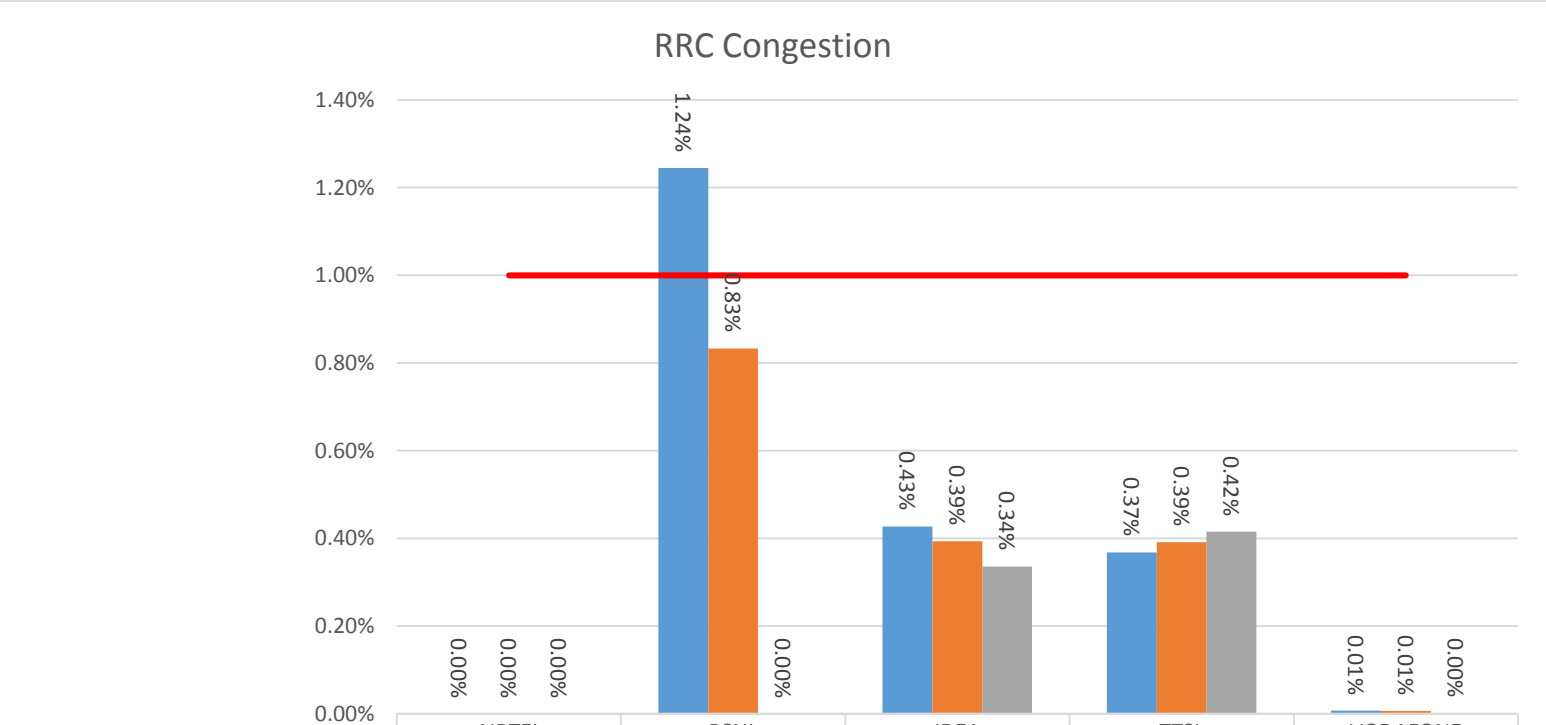
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	0.49%	0.00%	0.20%	0.95%	0.07%
PMR Audit 3G TSP	0.12%	1.63%	0.00%	1.11%	0.13%
3 Day Live Audit 3G	0.00%	0.00%	0.00%	0.92%	0.00%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

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



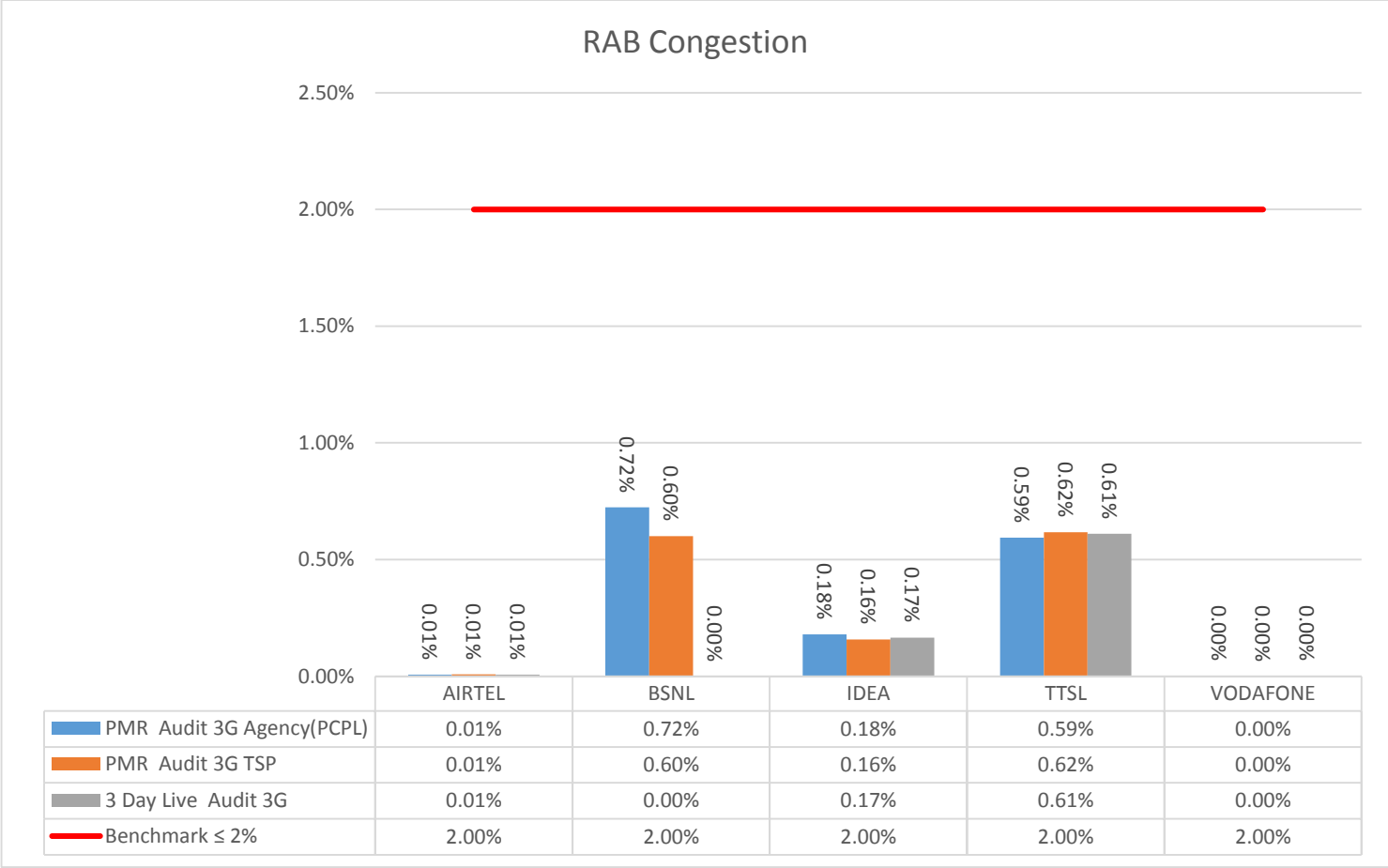
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	99.07%	99.28%	99.28%	99.84%	99.82%
PMR Audit 3G TSP	99.01%	99.00%	99.29%	99.82%	99.83%
3 Day Live Audit 3G	99.07%	99.22%	99.40%	99.82%	99.83%
Benchmark ≤ 2%	95.00%	95.00%	95.00%	95.00%	95.00%

13.5.4. RRC CONGESTION



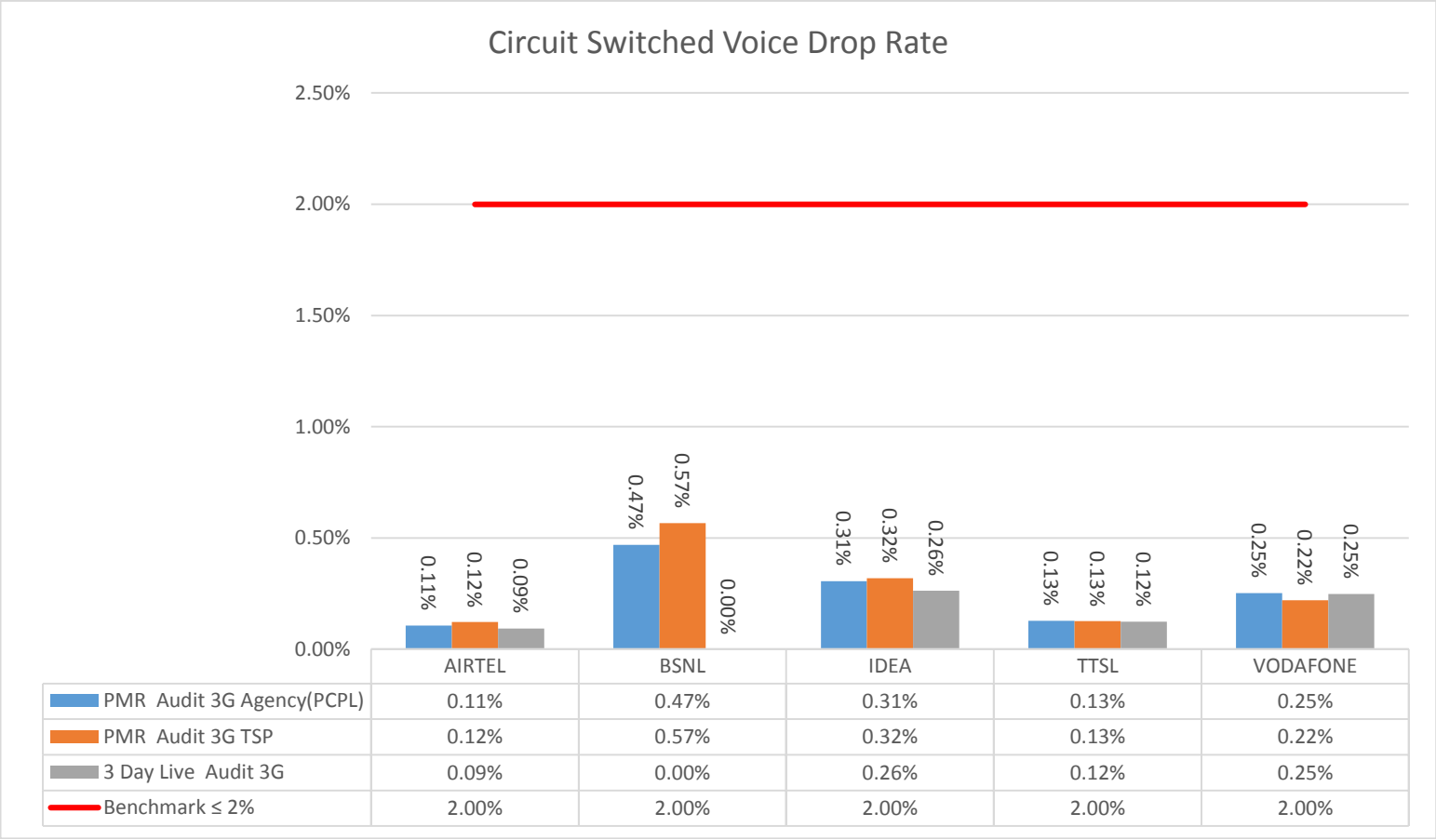
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	0.00%	1.24%	0.43%	0.37%	0.01%
PMR Audit 3G TSP	0.00%	0.83%	0.39%	0.39%	0.01%
3 Day Live Audit 3G	0.00%	0.00%	0.34%	0.42%	0.00%
Benchmark ≤ 2%	1.00%	1.00%	1.00%	1.00%	1.00%

13.5.5. RAB CONGESTION



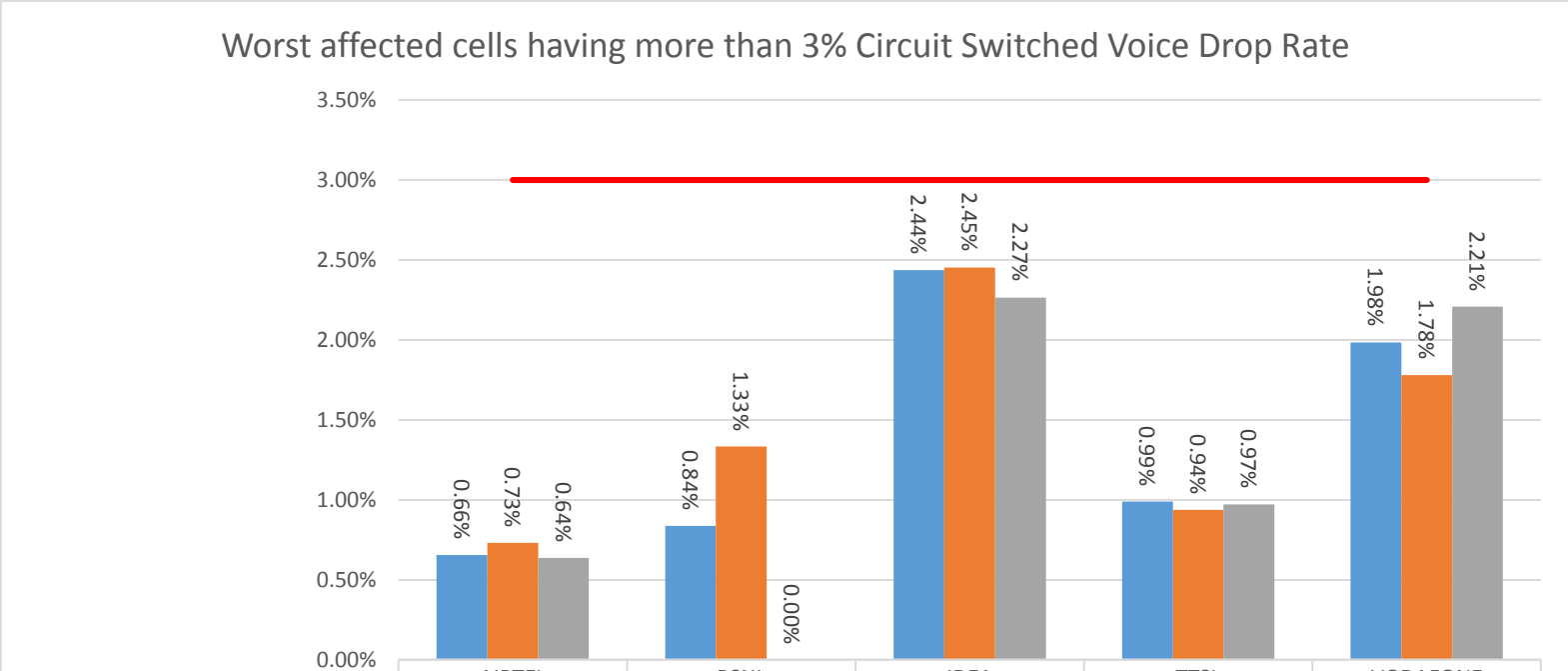
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	0.01%	0.72%	0.18%	0.59%	0.00%
PMR Audit 3G TSP	0.01%	0.60%	0.16%	0.62%	0.00%
3 Day Live Audit 3G	0.01%	0.00%	0.17%	0.61%	0.00%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

13.5.6. CIRCUIT SWITCHED VOICE DROP RATE



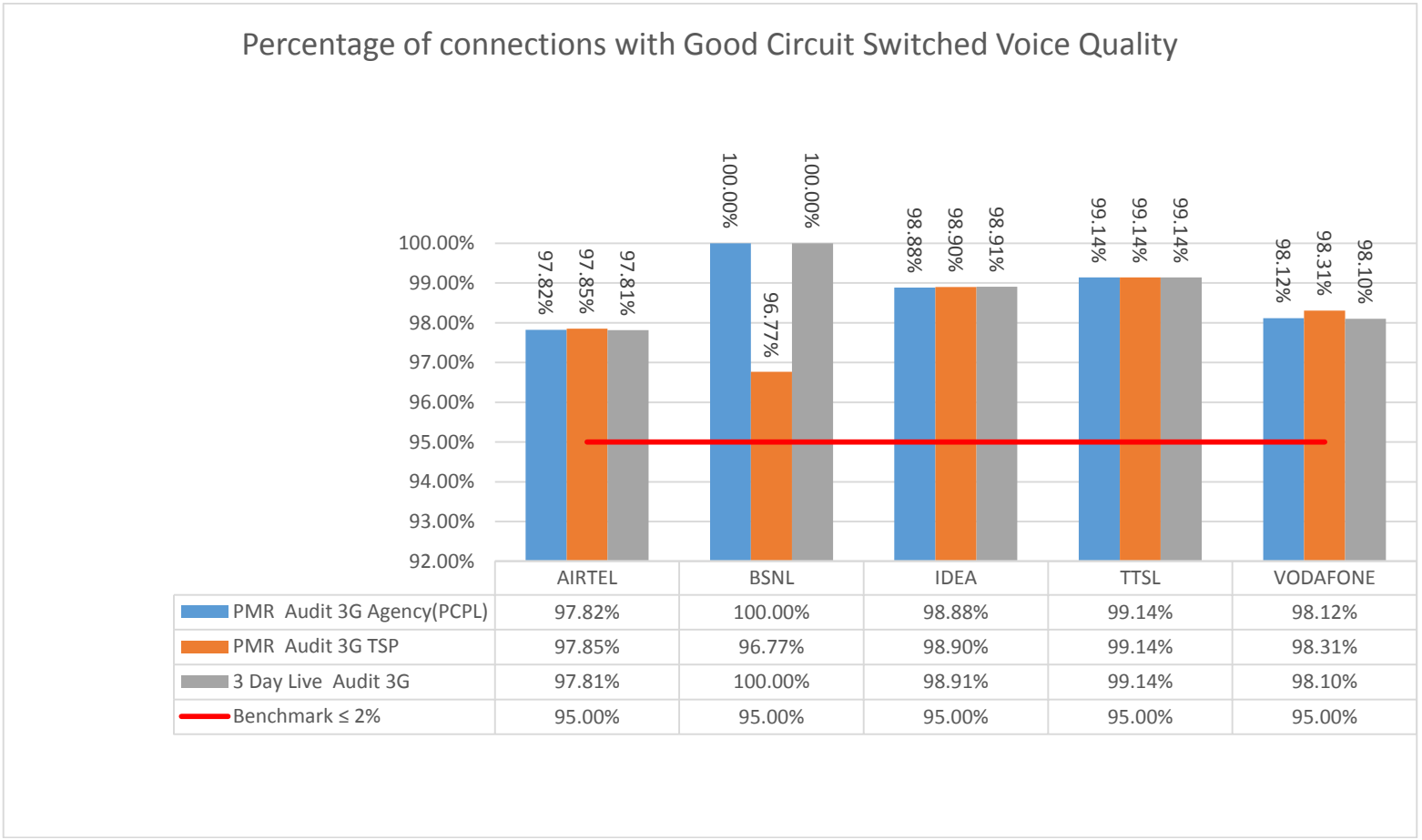
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	0.11%	0.47%	0.31%	0.13%	0.25%
PMR Audit 3G TSP	0.12%	0.57%	0.32%	0.13%	0.22%
3 Day Live Audit 3G	0.09%	0.00%	0.26%	0.12%	0.25%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

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



	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	0.66%	0.84%	2.44%	0.99%	1.98%
PMR Audit 3G TSP	0.73%	1.33%	2.45%	0.94%	1.78%
3 Day Live Audit 3G	0.64%	0.00%	2.27%	0.97%	2.21%
Benchmark ≤ 2%	3.00%	3.00%	3.00%	3.00%	3.00%

13.5.8. % AGE OF CONNECTION WITH GOOD SWITCHED VOICE QUALITY

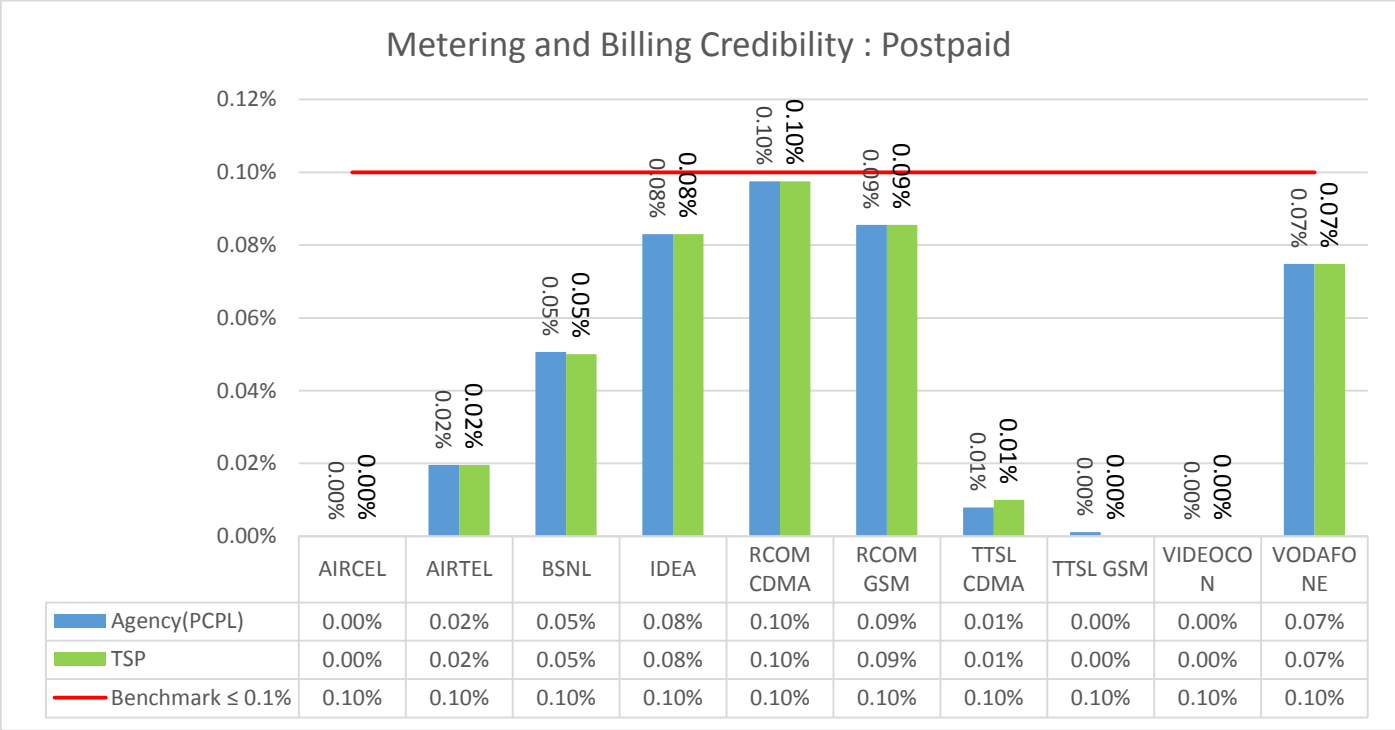


	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	97.82%	100.00%	98.88%	99.14%	98.12%
PMR Audit 3G TSP	97.85%	96.77%	98.90%	99.14%	98.31%
3 Day Live Audit 3G	97.81%	100.00%	98.91%	99.14%	98.10%
Benchmark ≤ 2%	95.00%	95.00%	95.00%	95.00%	95.00%

13.6. PMR Comparison (TSP vs. Audit Agency): CSD Parameters

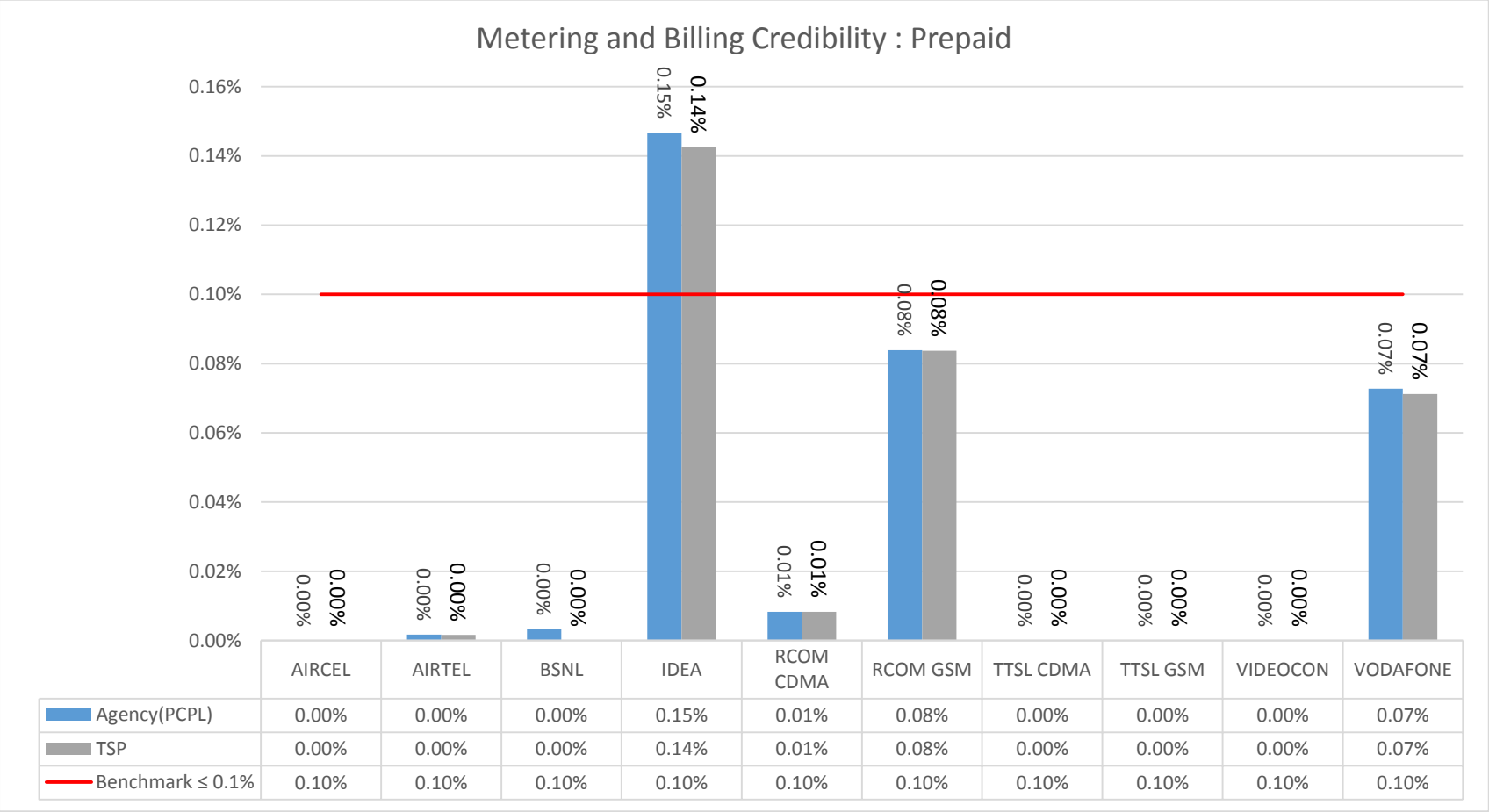
Name of Service Provider	Metering and Billing credibility				Billing Complaints						Termination & Closures		Time taken for refund of deposits after closures: Benchmark		Response time to customer for assistance			
	Postpaid Subscribers		Prepaid Subscribers		%age complaints resolved within 4 weeks		%age 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%	
	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP
AIRCEL	0.00%	0.00%	0.00%	0.00%	DNA	100.00%	DNA	100.00%	100.00%	100.00%	DNA	100.00%	DNA	100.00%	98.13%	98.13%	99.26%	99.26%
AIRTEL	0.02%	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%	89.36%	89.36%
BSNL	0.05%	0.05%	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%	97.59%	99.99%
IDEA	0.08%	0.08%	0.15%	0.14%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.89%	99.89%	99.83%	99.83%	97.77%	97.77%
RCOM CDMA	0.10%	0.10%	0.01%	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	DNA	80.63%	96.43%	96.43%	97.61%	97.61%
RCOM GSM	0.09%	0.09%	0.08%	0.08%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	59.29%	59.29%	98.91%	98.91%	95.23%	95.23%
TTSL CDMA	0.01%	0.01%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	DNA	100.00%	99.66%	99.66%
TTSL GSM	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%	98.48%	98.48%	93.05%	93.05%
VIDEOCON	NA	NA	DNA	NA	DNA	NA	DNA	NA	100.00%	NA	100.00%	NA	DNA	NA	DNA	NA	DNA	NA
VODAFONE	0.07%	0.07%	0.07%	0.07%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.04%	99.04%

13.6.1. METERING AND BILLING CREDIBILITY : POSTPAID



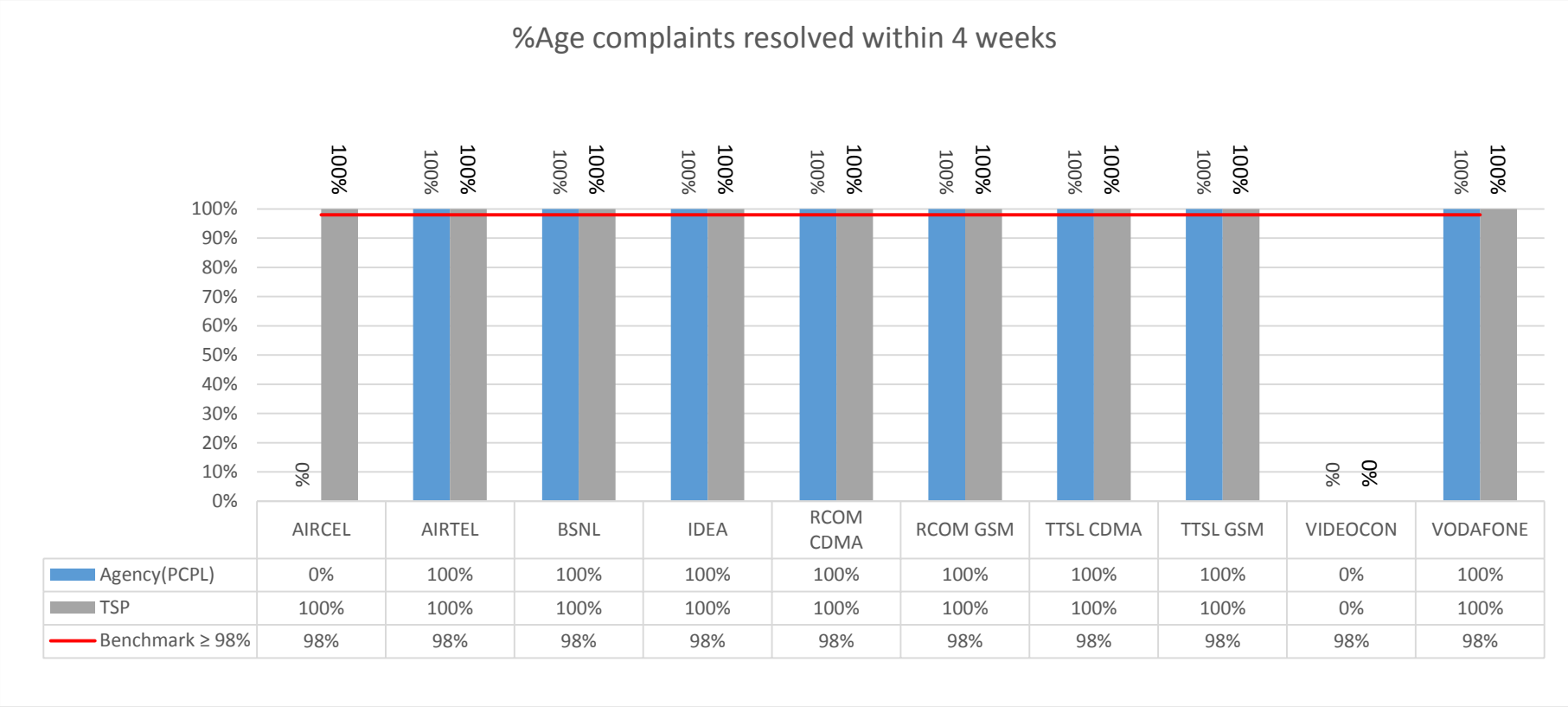
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Agency(PCPL)	0.00%	0.02%	0.05%	0.08%	0.10%	0.09%	0.01%	0.00%	0.00%	0.07%
TSP	0.00%	0.02%	0.05%	0.08%	0.10%	0.09%	0.01%	0.00%	0.00%	0.07%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

13.6.2. METERING AND BILLING CREDIBILITY : PREPAID



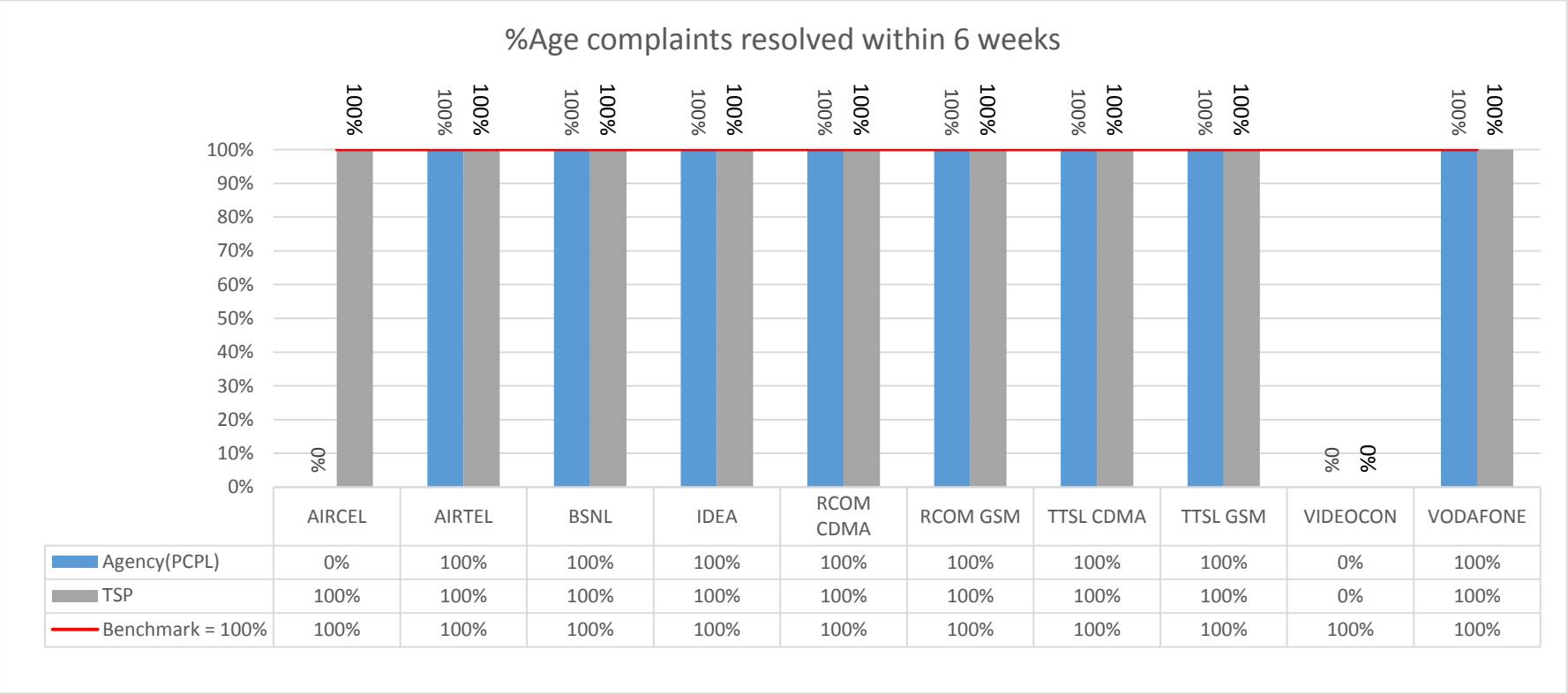
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Agency(PCPL)	0.00%	0.00%	0.00%	0.15%	0.01%	0.08%	0.00%	0.00%	0.00%	0.07%
TSP	0.00%	0.00%	0.00%	0.14%	0.01%	0.08%	0.00%	0.00%	0.00%	0.07%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

13.6.3. %AGE COMPLAINT RESOLVED WITHIN 4 WEEKS



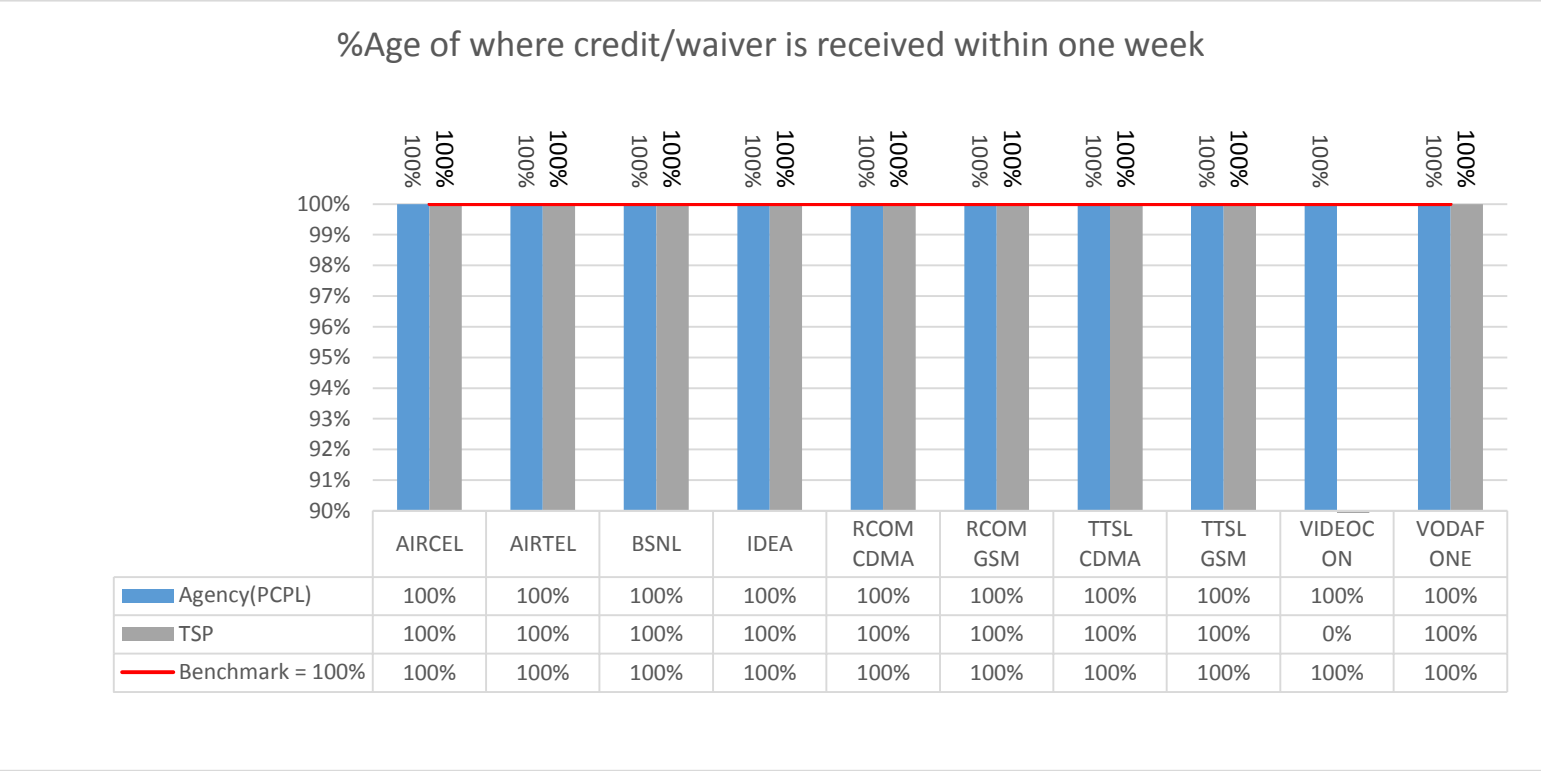
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Agency(PCPL)	0%	100%	100%	100%	100%	100%	100%	100%	0%	100%
TSP	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%
Benchmark ≥ 98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%

13.6.4. %AGE COMPLAINTS RESOLVED WITHIN 6 WEEKS



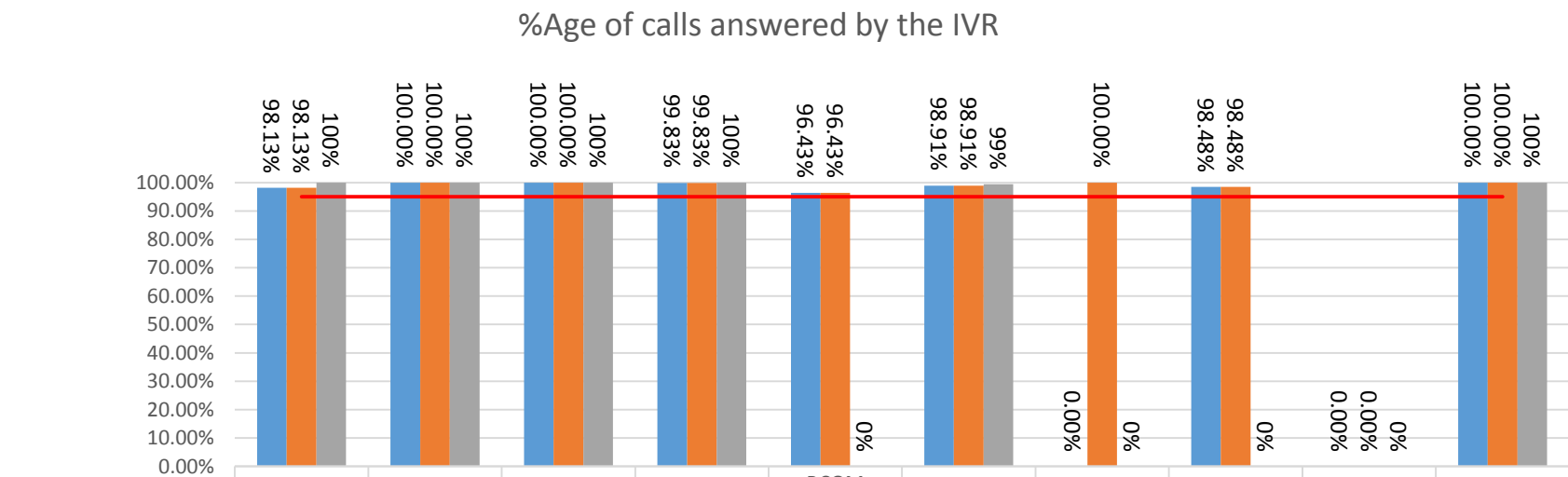
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Agency(PCPL)	0%	100%	100%	100%	100%	100%	100%	100%	0%	100%
TSP	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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



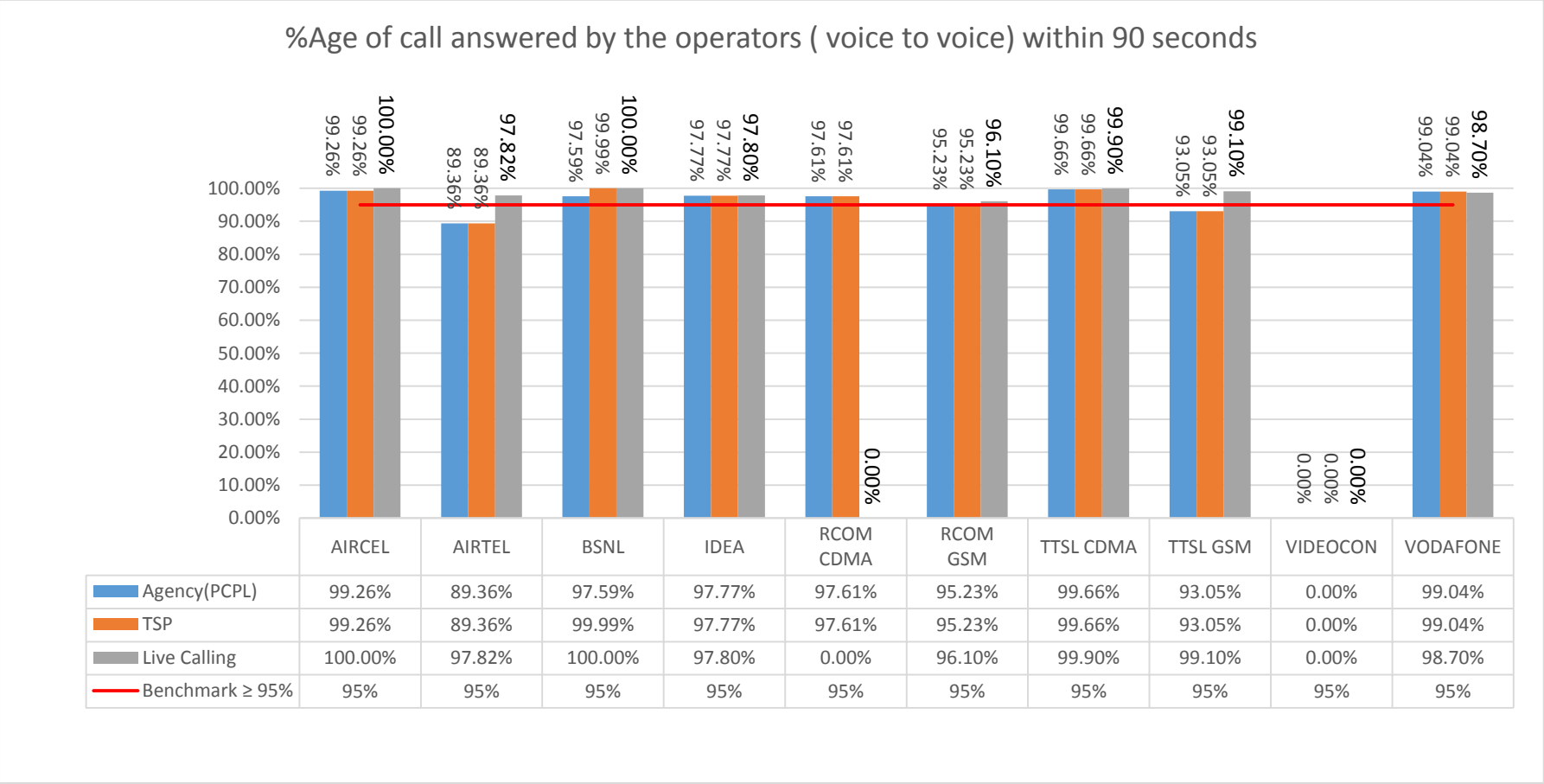
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
TSP	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

13.6.6. %AGE OF CALLS ANSWERED BY THE IVR



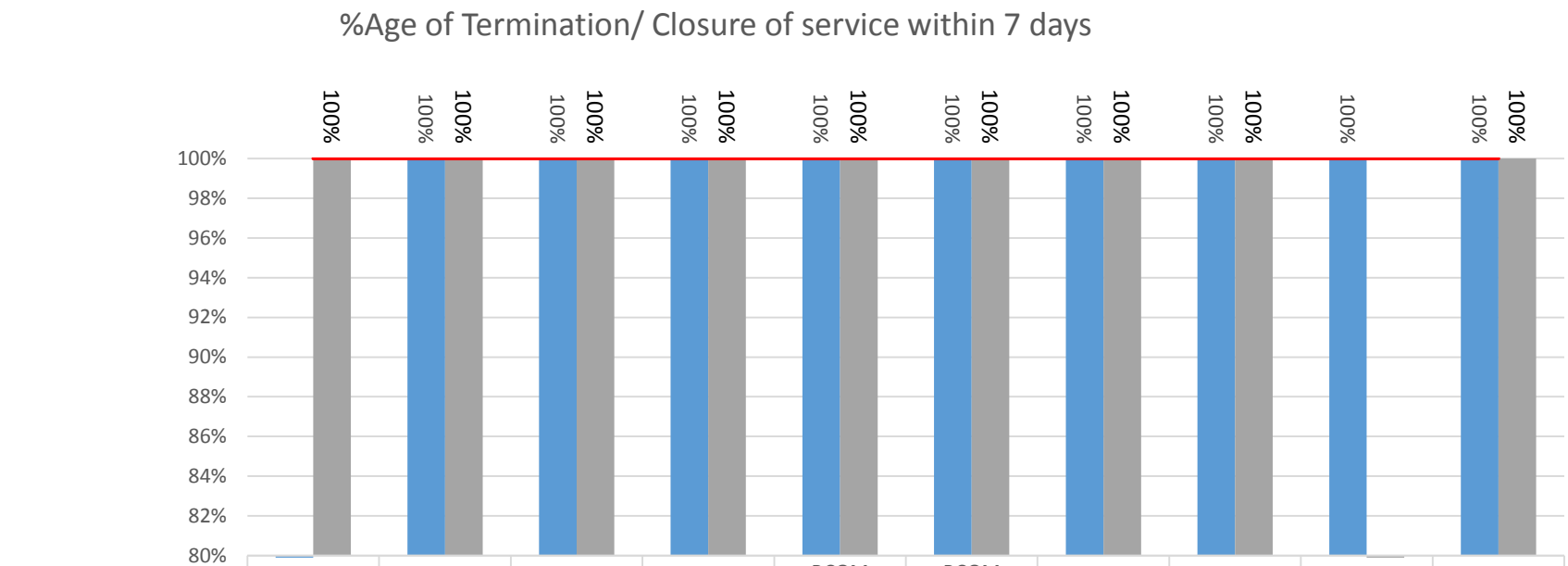
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Agency(PCPL)	98.13%	100.00%	100.00%	99.83%	96.43%	98.91%	0.00%	98.48%	0.00%	100.00%
TSP	98.13%	100.00%	100.00%	99.83%	96.43%	98.91%	100.00%	98.48%	0.00%	100.00%
Live Calling	100%	100%	100%	100%	0%	99%	0%	0%	0%	100%
Benchmark ≥ 95%	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



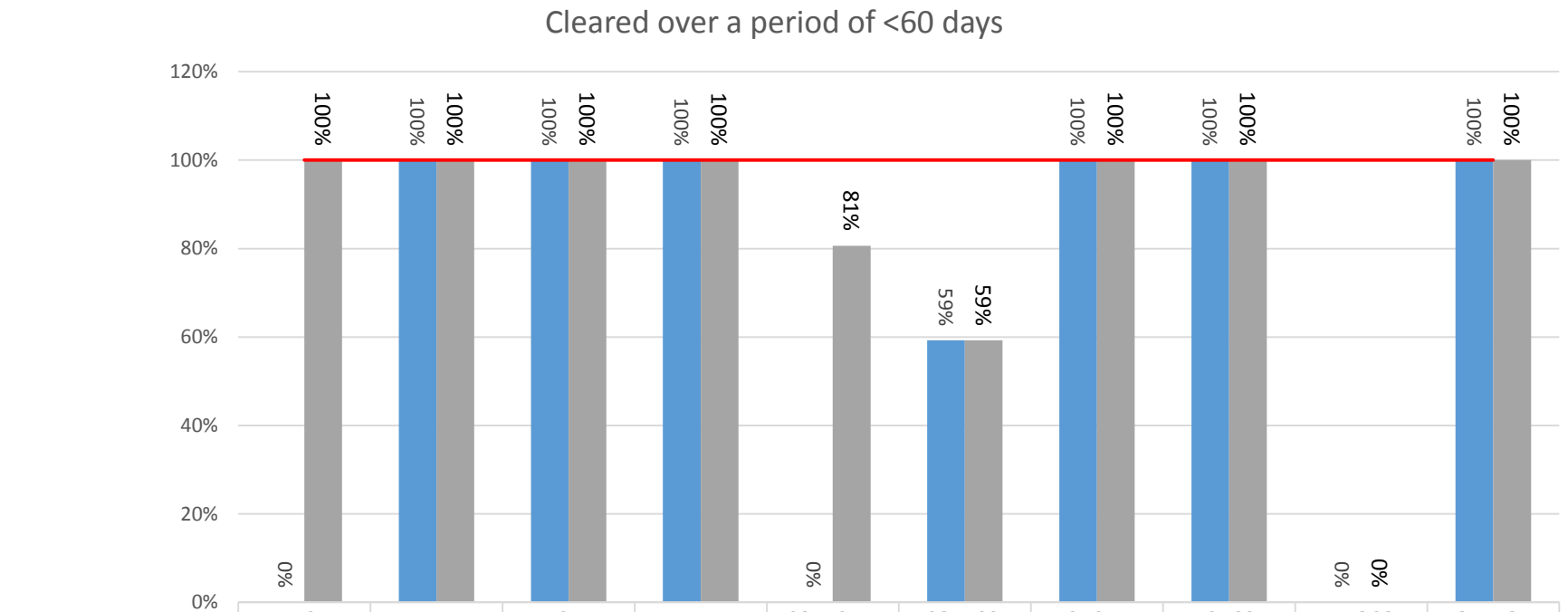
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Agency(PCPL)	99.26%	89.36%	97.59%	97.77%	97.61%	95.23%	99.66%	93.05%	0.00%	99.04%
TSP	99.26%	89.36%	99.99%	97.77%	97.61%	95.23%	99.66%	93.05%	0.00%	99.04%
Live Calling	100.00%	97.82%	100.00%	97.80%	0.00%	96.10%	99.90%	99.10%	0.00%	98.70%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

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



	AIRCEL	AIRTEL	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Agency(PCPL)	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%
TSP	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

13.6.9. CLEARED OVER A PERIOD OF <60 DAYS



	AIRCEL	AIRTEL	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Agency(PCPL)	0%	100%	100%	100%	0%	59%	100%	100%	0%	100%
TSP	100%	100%	100%	100%	81%	59%	100%	100%	0%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

14 KEY FINDINGS

NETWORK FINDINGS:

- Aircel has parameter value of 94.96% and failed to meet the benchmark of ≥ 95% percentage of connection with good voice quality
- BSNL has parameter value of 1.24% and failed to meet the benchmark of ≤ 1% RCC Congestion

CUSTOMER SERVICE DELIVERY:

- RCOM CDMA has parameter value of 80.63% and failed to meet the benchmark of = 100% for refund of deposits cleared over a period of <60 days
- RCOM GSM has parameter value of 59.29% and failed to meet the benchmark of = 100% for refund of deposits cleared over a period of <60 days