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



AUDIT & ASSESSMENTOFQUALITY OF SERVICE CELLULAR MOBILE TELEPHONE SERVICE (CMTS)

(JULY TO SEPTEMBER2016)

NORTH ZONE –HIMACHAL PRADESH CIRCLE

PREPARED BY:

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1. INTRODUCTION

1.1. ABOUT TRAI

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

In pursuance of above objective, TRAI has been issuing regulations, order and directives to deal with the issues or complaints raised by the operators as well as the consumers. These regulations, order and directives have helped to nurture the growth of multi operator multi service - an open competitive 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 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 Basic 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 Himachal Pradesh circle.

1.4. COVERAGE

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

Image Source: Wikipedia

1.5. SSA LIST

S. No.	Circle	SSA Name
1	HP	Hamirpur
2	HP	Kangra (Dharamsala)
3	HP	Kullu
4	HP	Mandi
5	HP	Shimla
6	HP	Solan

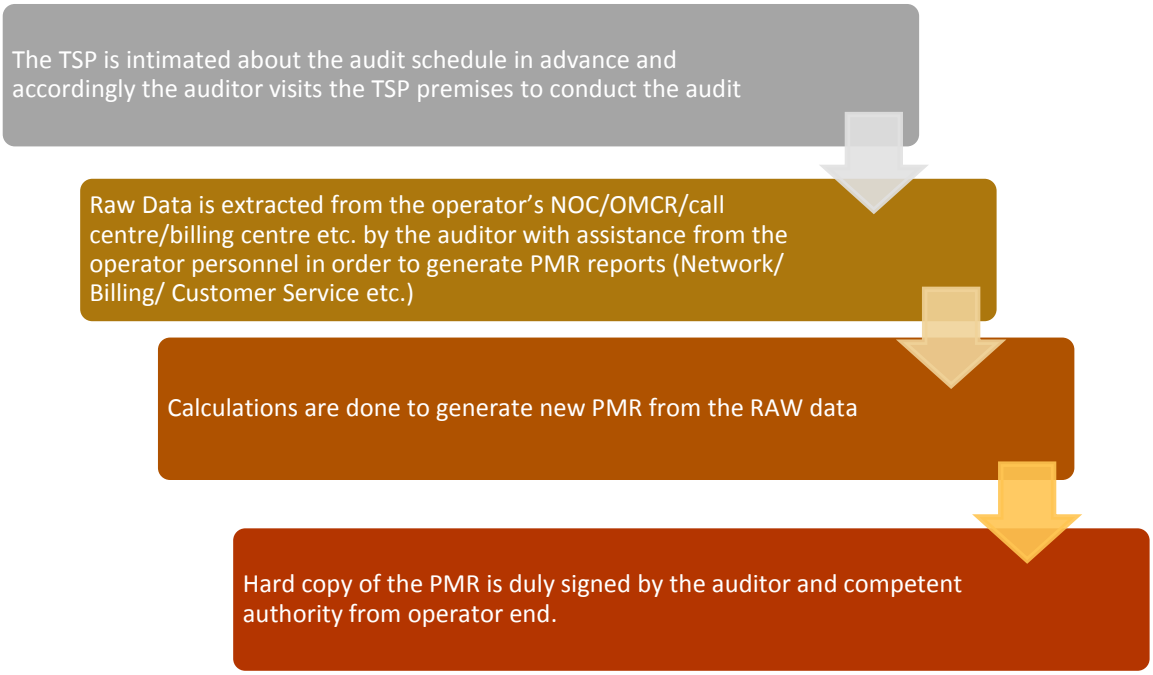
1.6. FRAMEWORK USED

Audit Activities

PMR Reports	Drive Test	CSD Audit (Quarterly)	Wireline & Broadband (Quarterly)	Inter Operator Call Assessment
Monthly PMR	Operator Assisted	Billing Complain	Billing Complain	
3 Days Live Data	Independent	Service request	Service Request	
	Level 1 Service	Customer Service	Level 1 Service/Inter Operator	
			Customer Service	

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, Sep 2016 audit data was collected in the month of Oct 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 Sep 2016 was collected in the month of Oct 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 July, August and September 2016. The performance of operators on various parameters was assessed against thebenchmarks.

Parameters includes:

Network Availability

- BTS accumulated downtime
- Worst affected BTS due to downtime

Connection Establishment (Accessibility)

- Call Set Up success Rate (CSSR)

Network Congestion Parameters

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

Connection Maintenance

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

Voice Quality

- % Connections with good voice quality

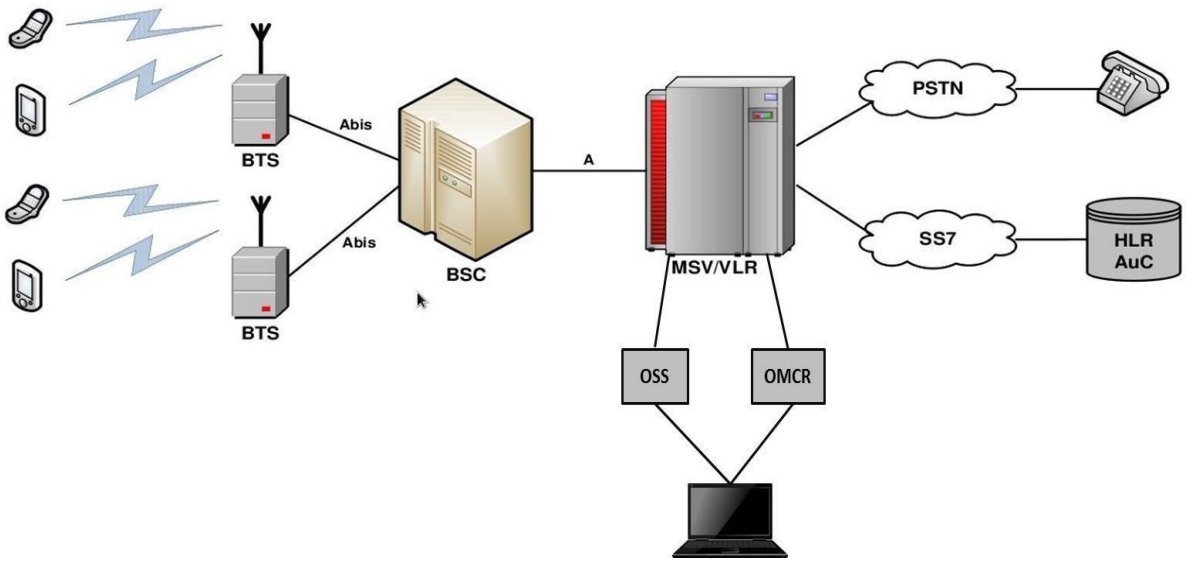
2.2. AUDIT PARAMETER: NETWORK

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

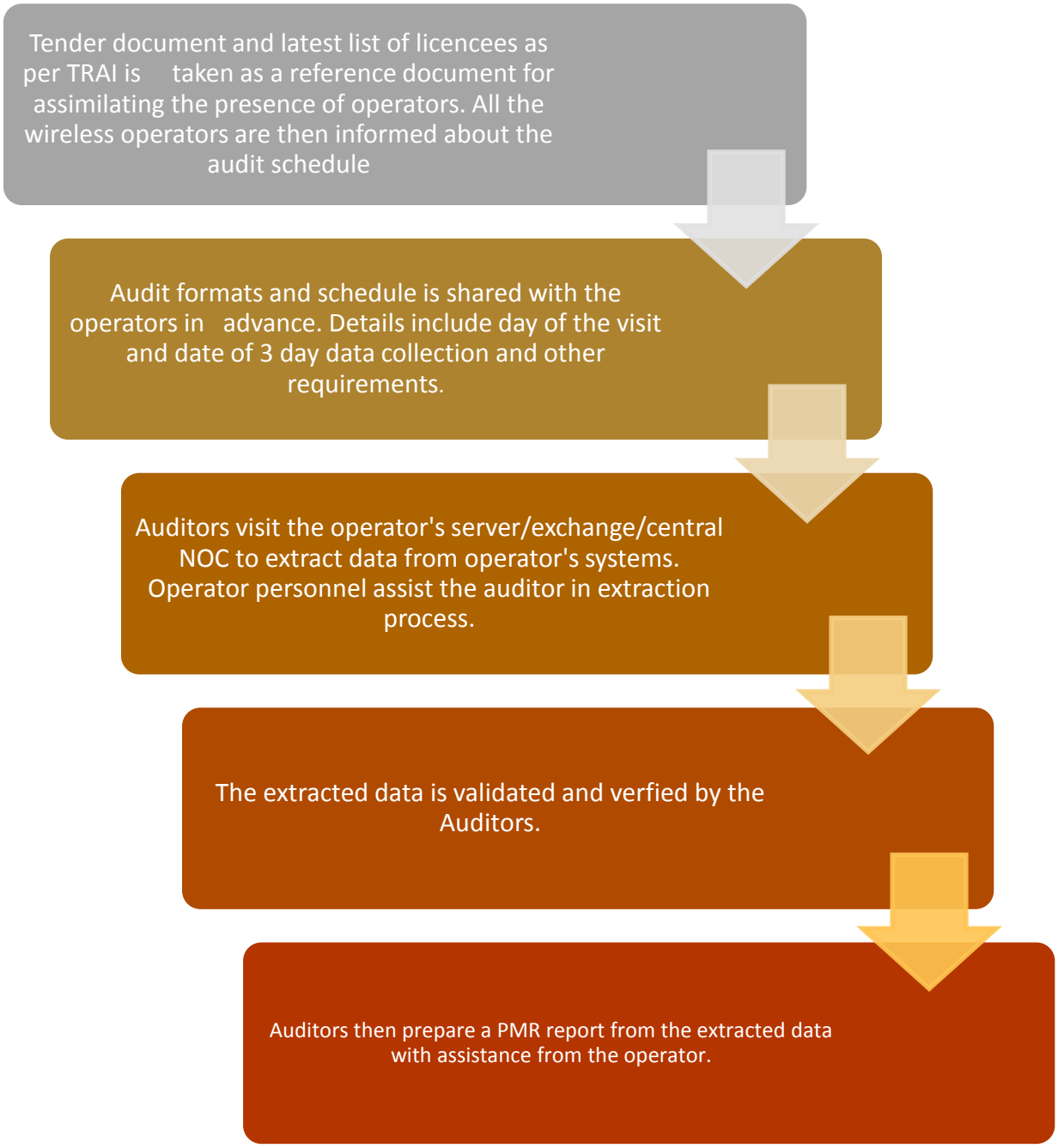
Network Availability	
BTSs Accumulated downtime (not available for service)	≤ 2%
Worst affected BTSs due to downtime	≤ 2%
Connection Establishment (Accessibility)	
Call Set-up Success Rate (within licensee's own network)	≥ 95%
SDCCH/ Paging Channel Congestion	≤ 1 %
TCH Congestion	≤ 2%
Connection Maintenance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

2.3. DATA EXTRACTION POINTS

The data is extracted from a terminal/computer connected to 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	<=2%
			((No. of Node B's having Accumulated Downtime of > 24 hrs in a month) / Total no. of BTSs in the licensed service area)*100	
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	<=2%
			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	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	>=95%
			Total No. of Voice Call Establishment	
			CSSR (Call Setup Success Rate = (Total No. of Voice Call Attempts/ Total No. of Voice Call Establishment)*100)	
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)	<=1%
			RRC Failed (RRC Connection Access Failed) (B)	
			RRC Congestion (%) [B/A]*100	
c.	RAB Congestion:	RAB Congestion rate is the % of Total No.	RAB Attempts (RAB Setup Access) (C)	<=2%

		of RAB Failed Calls to the Total no. of RAB Assigned Calls	RAB Failed (RAB Setup Access Failed) (D)	
			RAB Congestion (%) [D/C]*100	
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)	*<=2%*
			Calls Dropped after Establishment (B)	
			Call Drop Rate [B/A]*100	
b.	Worst affectedcells 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 (Sector)	*<=3%*
			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	POI			
	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	<=0.5%
			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)	

2.7. 2G & 3G WIRELESS

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

3. 3 DAYS LIVE DATA

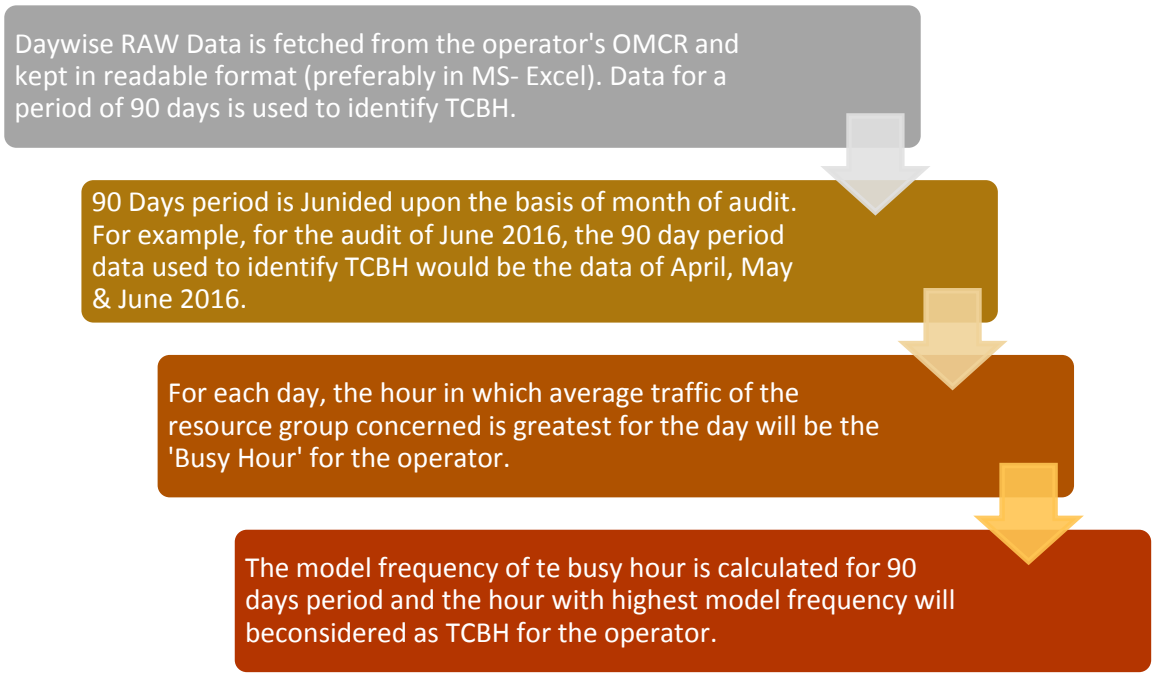
The main purpose of 3 day live measurement is to evaluate the network parameters on intraday basis. While the monthly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the network parameters discussed earlier. All the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

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

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

3.1. TCBH: SIGNIFICANCE AND SELECTION METHODOLOGY

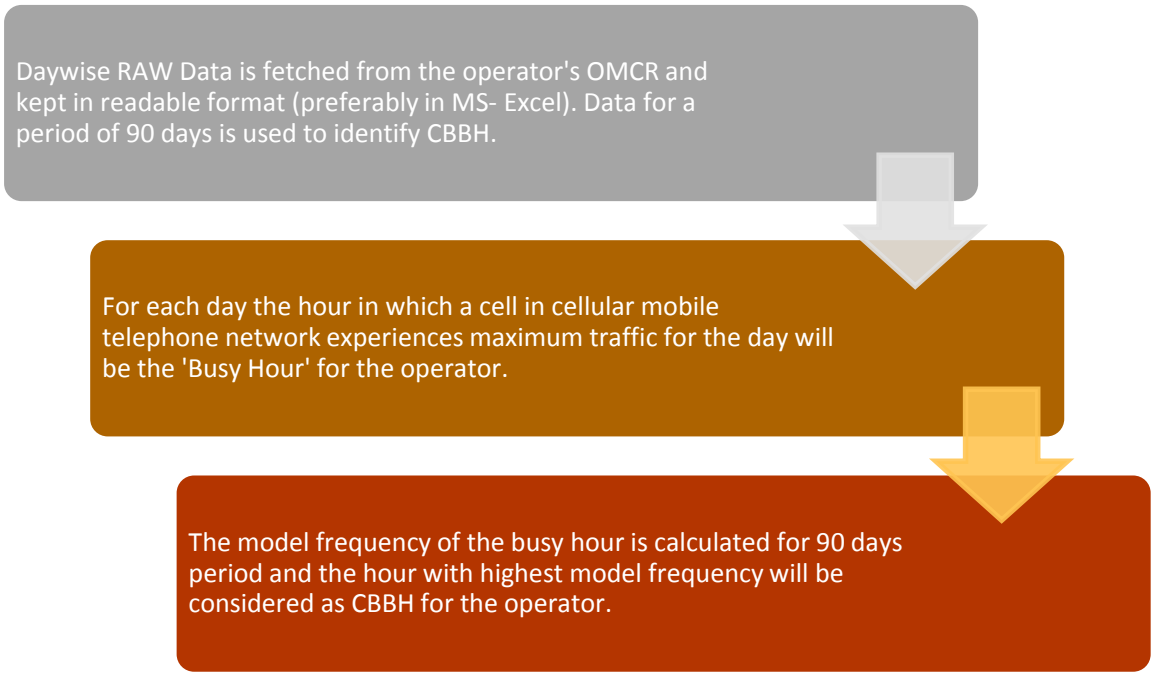
As per QoS regulations 2009 (7 of 2009), Time Consistent Busy Hour" or "TCBH" means the one hour period starting at the same time each day for which the average traffic of the resource group concerned is greatest over the days under consideration and such Time Consistent Busy Hour shall be established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



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. CUSTOMERSERVICE 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 September 2016 was collected in the month of October 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

The auditor visits the operator premises for Live Calling. The operators provide the RAW data of customer complaints (billing and services) and also the list of customer service numbers to be verified through live calling

The auditor makes the live calls using operator SIM to a random sample of subscribers from the RAW data provided to verify the resolution of complaints

The auditor verifies the performance of call centre, level 1 services by calling the numbers using operator SIM. The list of call centre numbersis provided by the operator.

The auditors also make test calls to subscribers of other operators to assess the inter-operator call connectivity in the same licensed service area

Live calling activity was carried out during the period of QE September2016. 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 September2016 was considered for live calling activity conducted in October2016.
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, 2015 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.

Sr.No.	Level-1 (Emergency) Helpline Number Details
1	100 Police
2	101 Fire
3	102 Ambulance
4	104 Health Information Helpline
5	108 Emergency and Disaster Management Helpline
6	138 All India Helpine for Passangers
7	149 Public Road Transport Utility Service
8	181 Chief Minister Helpline
9	182 Indian Railway Security Helpline
10	1033 Road Accident Management Service
11	1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'
12	1056 Emergency Medical Services
13	106X State of the Art Hospitals - AIIMS
14	1063 Public Grievance Cell DoT Hq
15	1064 Anti-Corruption Helpline
16	1070 Relief Commission for Natural Calamities
17	1071 Air Accident Helpline
18	1072 Rail Accident Helpline
19	1073 Road Accident Helpline
20	1077 Control Room for District Collector
21	1090 Call Alert (Crime Branch)
22	1091 Women Helpline
23	1097 National AIDS Helpline to NACO
24	1099 Central Accident and Trauma Services (CATS)
25	10580 Educational& Vocational Guidance and Counselling
26	10589 Mother and Child Tracking (MCTH)
27	10740 Central Pollution Control Board
28	10741 Pollution Control Board
29	1511 Police Related Service for all Metro Railway Project
30	1512 Prevention of Crime in Railway
31	1514 National Career Service(NCS)
32	15100 Free Legal Service Helpline
33	155304 Municipal Corporations
34	155214 Labour Helpline
35	1903 Sashastra Seema Bal (SSB)
36	1909 National Do Not Call Registry
37	1912 Complaint of Electricity
38	1916 Drinking Water Supply
39	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	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
Aircel	-	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%
BSNL	100%	100%	-	100%	100%	100%	100%	100%
Idea	100%	100%	100%	-	100%	100%	100%	100%
RCOM GSM	100%	100%	100%	100%	-	100%	100%	100%
TTSL CDMA	100%	100%	100%	100%	100%	-	100%	100%
TTSL GSM	100%	100%	100%	100%	100%	100%	-	100%
VODAFONE	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

Himachal Pradesh circle consists of total 6 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 decided 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 executive summary put in a nutshell the key findings of the Audit by providing: -

- *"Service provider performance report"* for Cellular mobile, Basic (wire line) and Broadband services , which gives a foretaste of the performance of various operators against the benchmark specified by TRAI, during the months in which the Audit was carried out by PhiStream Consulting Pvt. Ltd. Auditors.

- *"Parameter wise critical findings"* for Cellular mobile, Basic (wire line) and Broadband services: This indicates key observations and findings from different activities carried out during the Audit process.

- PhiStream conducted audit involved a 3 stage verification process which consisted of auditing the records of the service providers and verifying the data submitted to TRAI. The second step involved a three day live measurement of all the network parameters. On the basis of the three days live measurement, the auditors checked the busy hour of the day for the service provider and collected the data for this busy hour for the month in which the audit was conducted Finally, the performance of the service providers was also gauged by conducting drive tests in three select SSAs per service provider per quarter.

- The three stage audit / verification viz audit of the records, live measurements and drive tests of all the cellular mobile operators was repeated every month. In case of Basic (Wire line) and Broadband, this exercise is required to be carried out on quarterly basis.

6. GENERAL INFORMATION

6.1. OPERATORS COVERED& ACTIVE SUBSCRIBER BASE

Name of Operator	Number of Subscriber (Up to September 30, 2016)
AIRCEL	1108791
AIRTEL	2917431
BSNL	1910245
IDEA	815076
RCOM GSM	1595450
TTSL CDMA	48277
TTSL GSM	177072
VODAFONE	755615

6.2 . SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS:

SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS:									
Sr.No.	**Name of Service Provider**	**No. of cells**	**BTS**	**BSC**	**MSC+GMSC**	**NSS make**	**BSS make**	**Node B**	**RNC**
1	Aircel	2193	735	8	2	Ericsson/ZTE	Ericsson	NA	NA
2	Airtel	4749	1619	17	4	Ericsson	Ericsson	1534	5
3	BSNL	3635	1247	19	4+1	Ericsson+ZTE	Ericsson+Nokia+ZTE	364	6
4	IDEA	3485	1181	7	3	Ericsson	Ericsson	732	3
5	RCOM GSM	2254	765	12	2	MSC-Huawei	ZTE	188	2
6	TTSL CDMA	422	130	1	1	Ericsson	ZTE	NA	NA
7	TTSL GSM	2254	765	12	2	MSC-Huawei	ZTE	188	2
8	VODAFONE	2667	877	11	1	NSN	NSN	NA	NA

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.

DNA: Data not available

6.3. BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
GSM Operators			
1	Aircel	September-16	20:00 - 21:00
2	Airtel	September-16	19:00 - 20:00
3	BSNL	September-16	19:00 - 20:00
4	IDEA	September-16	20:00 - 21:00
5	RCOM GSM	September-16	19:00 - 20:00
6	TTSL CDMA	September-16	20:00 - 21:00
7	TTSL GSM	September-16	20:00 - 21:00
8	VODAFONE	September-16	20:00 - 21:00

The TCBH reported by all the service providers matched the network busy hour calculated by Phistream auditors for the Himachal Pradeshcircle.

6.4. AUDIT SCHEDULE

Sl. No.	Service Provider	Dates of live measurement Audit			
GSM Operators		July-16	Aug-16	Sept-16	Audit Location
1	AIRCEL	11 to 13 July 2016	17 to19Aug 2016	13 to 15 Sept 2016	3rd Floor Keothal Complex Khalini Shimla.
2	AIRTEL	14, 15&18 July 2016	22 to 24Aug 2016	21 to 23 Sept 2016	Bharti Airtel Campus, Plot No 21, Rajiv Gandhi Information and Technology Park, Chandigarh, 160101
3	BSNL	11 to 13July 2016	16 to 18Aug 2016	9, 12 & 13 Sept 2016	BSNL Shimla
4	IDEA	6 to 8July 2016	4,5 & 8 Aug 2016	5 to 7 Sept 2016	Idea Cellular Limited, Phase -7 Industrial Area, Mohali
5	RCOM GSM	6 to 8July 2016	3 to 5Aug 2016	21 to 23 Sept 2016	Reliance Communications Ltd., Phase-8, Industrial Area, Mohali
6	TATA CDMA	1,2 & 4 July 2016	4, 5 & 8 Aug 2016	22, 23 & 26 Sept 2016	Tata Teleservices Ltd Charu sood Building Chota Shimla, Kasumpti
7	TATA GSM	1,2 & 4 July 2016	4, 5 & 8 Aug 2016	22, 23 & 26 Sept 2016	Tata Teleservices Ltd Charu sood Building Chota Shimla, Kasumpti
8	VODAFONE	4 to 6July 2016	3 to 5Aug 2016	1, 2 & 5 Sept 2016	130 durga cottage SDA complex Kasumpti Shimla

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
N/A	Not applicable
DNA	Data not available (At TSP premises)
NP	Not Provided by TSP

6.5. 2G VOICE QOS PERFORMANCE OF MONTHLY PMR – JULY 2016 MONTH

Jul-16										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.16%	0.02%	1.97%	0.21%	0.15%	0.01%	0.00%	0.02%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.19%	1.92%	1.20%	1.60%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.37%	98.74%	98.44%	99.42%	95.14%	99.26%	99.52%	99.89%
	SDDCH/Paging chl. Congestion	≤ 1%	0.10%	0.30%	0.90%	0.15%	0.33%	0.00%	0.00%	0.02%
	TCH Congestion	≤ 2%	0.43%	0.36%	1.56%	0.24%	0.84%	0.03%	0.00%	0.11%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.26%	0.59%	1.92%	1.34%	0.35%	0.11%	0.12%	0.68%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	11.85%	0.54%	2.45%	2.27%	1.23%	2.34%	0.00%	2.31%
	%age of connection with good voice quality	≥ 95%	95.21%	98.02%	95.02%	96.92%	96.59%	98.06%	94.67%	97.29%

6.6. 2G VOICE QOS PERFORMANCE OF MONTHLY PMR – AUGUST 2016 MONTH

Aug-16										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.17%	0.02%	1.91%	0.27%	0.16%	0.04%	0.00%	0.03%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.12%	1.92%	1.86%	1.18%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.44%	98.68%	98.05%	99.35%	95.98%	99.12%	100.00%	99.86%
	SDDCH/Paging chl. Congestion	≤ 1%	0.14%	0.32%	0.99%	0.11%	0.22%	0.00%	0.00%	0.02%
	TCH Congestion	≤ 2%	0.37%	0.35%	1.95%	0.25%	0.45%	0.05%	0.00%	0.14%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.24%	0.62%	1.86%	1.44%	0.40%	0.12%	0.00%	0.76%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	11.89%	0.65%	2.59%	2.28%	1.69%	2.74%	0.00%	2.29%
	%age of connection with good voice quality	≥ 95%	95.30%	97.94%	95.03%	97.78%	96.50%	98.03%	97.44%	97.29%

6.7. 2G VOICE QOS PERFORMANCE OF MONTHLY PMR – SEPTEMBER 2016 MONTH

Sep-16										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.10%	0.03%	1.89%	0.12%	0.15%	0.00%	0.00%	0.02%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.12%	1.84%	0.67%	1.57%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.41%	99.10%	98.58%	99.53%	95.81%	99.35%	99.82%	99.83%
	SDDCH/Paging chl. Congestion	≤ 1%	0.05%	0.17%	0.68%	0.05%	0.24%	0.00%	0.00%	0.01%
	TCH Congestion	≤ 2%	0.40%	0.12%	1.42%	0.06%	1.01%	0.00%	0.00%	0.17%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.18%	0.65%	1.98%	1.46%	0.45%	0.01%	0.00%	0.78%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	10.68%	0.66%	2.74%	1.75%	1.88%	0.53%	0.00%	2.28%
	%age of connection with good voice quality	≥ 95%	95.50%	97.95%	95.03%	97.40%	96.55%	97.91%	96.38%	97.37%

6.8. 2G VOICE QOS PERFORMANCE OF MONTHLY PMR QE – SEPTEMBER 2016

Consolidated										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.14%	0.02%	1.92%	0.20%	0.15%	0.02%	0.00%	0.02%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.14%	1.90%	1.25%	1.45%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.41%	98.84%	98.36%	99.43%	95.64%	99.24%	99.78%	99.86%
	SDDCH/Paging chl. Congestion	≤ 1%	0.09%	0.26%	0.86%	0.11%	0.27%	0.00%	0.00%	0.02%
	TCH Congestion	≤ 2%	0.40%	0.28%	1.64%	0.18%	0.77%	0.03%	0.00%	0.14%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.22%	0.62%	1.92%	1.41%	0.40%	0.08%	0.04%	0.74%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	11.48%	0.62%	2.59%	2.10%	1.60%	1.87%	0.00%	2.29%
	%age of connection with good voice quality	≥ 95%	95.34%	97.97%	95.03%	97.37%	96.55%	98.00%	96.16%	97.32%

6.9. 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.

6.10. 2G VOICE 3 DAYS LIVE DATA: JULY

Jul-16										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.04%	0.01%	2.00%	0.43%	0.31%	0.00%	0.00%	0.05%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.40%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.62%	98.65%	97.64%	99.61%	96.37%	99.14%	100.00%	99.83%
	SDDCH/Paging chl. Congestion	≤ 1%	0.01%	0.40%	0.69%	0.18%	0.15%	0.00%	0.00%	0.01%
	TCH Congestion	≤ 2%	0.20%	0.43%	2.36%	0.07%	0.35%	0.17%	0.00%	0.17%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.16%	0.56%	1.94%	1.25%	0.34%	0.11%	0.00%	0.66%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	11.52%	0.46%	2.45%	2.50%	1.20%	2.53%	DNA	2.30%
	%age of connection with good voice quality	≥ 95%	95.24%	98.12%	95.62%	95.39%	96.62%	98.06%	97.19%	97.27%

6.11. 2G VOICE 3 DAYS LIVE DATA: AUGUST

Aug-16										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.19%	0.01%	2.02%	0.18%	0.28%	0.05%	0.00%	0.02%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.24%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.62%	98.52%	98.11%	99.39%	96.26%	99.34%	100.00%	99.88%
	SDDCH/Paging chl. Congestion	≤ 1%	0.01%	0.45%	0.86%	0.05%	0.24%	0.00%	0.00%	0.01%
	TCH Congestion	≤ 2%	0.19%	0.40%	1.89%	0.23%	0.37%	0.00%	0.00%	0.12%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.15%	0.66%	1.72%	1.38%	0.36%	0.10%	0.00%	0.72%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	10.85%	0.99%	2.59%	2.51%	1.51%	2.21%	DNA	2.32%
	%age of connection with good voice quality	≥ 95%	95.23%	97.84%	95.15%	96.76%	96.58%	98.09%	96.73%	97.34%

6.12. 2G VOICE 3 DAYS LIVE DATA: SEPTEMBER

Sep-16										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.08%	0.01%	1.55%	0.12%	0.18%	0.00%	0.00%	0.03%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.38%	99.03%	98.27%	99.65%	94.95%	99.45%	100.00%	99.89%
	SDDCH/Paging chl. Congestion	≤ 1%	0.03%	0.25%	1.26%	0.05%	0.45%	0.00%	0.00%	0.00%
	TCH Congestion	≤ 2%	0.42%	0.15%	1.73%	0.04%	1.10%	0.01%	0.00%	0.11%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.19%	0.68%	1.84%	1.24%	0.50%	0.01%	0.00%	0.81%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	10.14%	0.39%	8.01%	2.38%	2.17%	0.40%	DNA	2.30%
	%age of connection with good voice quality	≥ 95%	95.39%	97.94%	95.39%	97.69%	96.51%	9797.87%	98.75%	97.39%

6.13. 2G 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.10%	0.01%	1.86%	0.24%	0.26%	0.02%	0.00%	0.03%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.27%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.54%	98.73%	98.01%	99.55%	95.86%	99.31%	100.00%	99.87%
	SDDCH/Paging chl. Congestion	≤ 1%	0.02%	0.37%	0.93%	0.10%	0.28%	0.00%	0.00%	0.01%
	TCH Congestion	≤ 2%	0.27%	0.33%	1.99%	0.11%	0.61%	0.06%	0.00%	0.13%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.17%	0.63%	1.83%	1.29%	0.40%	0.07%	0.00%	0.73%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	10.84%	0.62%	4.35%	2.46%	1.63%	1.71%	DNA	2.31%
	%age of connection with good voice quality	≥ 95%	95.29%	97.97%	95.39%	96.61%	96.57%	3331.34%	97.56%	97.33%

6.14. 3G VOICE PMR: JULY

Jul-16						
Network Parameters		Name of Service Provider				
		Benchmark	AIRTEL	BSNL	IDEA	RCOM GSM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.12%	1.45%	0.12%	0.21%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.20%	1.47%	0.00%	0.59%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.12%	98.39%	99.30%	98.70%
	RRC Congestion:	≤ 1%	0.00%	0.61%	0.38%	0.15%
	RAB Congestion:	≤ 2%	0.00%	0.63%	0.13%	0.01%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.59%	0.93%	0.82%	0.05%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.12%	DNA	1.74%	0.16%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.93%	99.67%	97.30%	99.90%

6.15. 3G VOICE PMR: AUGUST

Aug-16						
Network Parameters		Name of Service Provider				
		Benchmark	AIRTEL	BSNL	IDEA	RCOM GSM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.18%	1.39%	0.14%	0.18%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.13%	1.37%	1.78%	0.53%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.13%	98.75%	99.30%	99.67%
	RRC Congestion:	≤ 1%	0.01%	0.59%	0.35%	0.05%
	RAB Congestion:	≤ 2%	0.00%	0.49%	0.18%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.61%	0.92%	0.86%	0.04%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.08%	DNA	1.63%	0.20%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.84%	99.60%	96.54%	99.90%

6.16. 3G VOICE PMR: SEPTEMBER

Sep-16						
Network Parameters		Name of Service Provider				
		Benchmark	AIRTEL	BSNL	IDEA	RCOM GSM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.14%	1.42%	0.10%	0.31%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.13%	1.26%	0.00%	1.60%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.22%	98.80%	99.16%	99.70%
	RRC Congestion:	≤ 1%	0.05%	0.56%	0.28%	0.03%
	RAB Congestion:	≤ 2%	0.01%	0.52%	0.13%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.58%	0.88%	0.64%	0.06%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.00%	2.08%	1.95%	0.41%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.89%	99.61%	96.99%	99.90%

6.17. 3G VOICE PMR: CONSOLIDATED

Consolidated						
Network Parameters		Name of Service Provider				
		Benchmark	AIRTEL	BSNL	IDEA	RCOM GSM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.15%	1.42%	0.12%	0.23%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.15%	1.37%	0.59%	0.91%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.16%	98.65%	99.25%	99.36%
	RRC Congestion:	≤ 1%	0.02%	0.59%	0.33%	0.08%
	RAB Congestion:	≤ 2%	0.00%	0.54%	0.15%	0.01%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.60%	0.91%	0.77%	0.05%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.07%	2.08%	1.77%	0.26%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.89%	99.63%	96.95%	99.90%

6.18. 3G VOICE 3 DAYS LIVE DATA: JULY

Jul-16						
Network Parameters		Name of Service Provider				
		Benchmark	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.35%	DNA	0.18%	0.13%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	DNA	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.18%	98.71%	99.46%	98.25%
	RRC Congestion:	≤ 1%	0.00%	0.62%	0.14%	0.08%
	RAB Congestion:	≤ 2%	0.00%	0.44%	0.04%	0.01%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.56%	0.89%	0.72%	0.09%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.24%	DNA	1.72%	0.47%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.93%	99.68%	98.17%	99.90%

6.19. 3G VOICE 3 DAYS LIVE DATA: AUGUST

Aug-16						
Network Parameters		Name of Service Provider				
		Benchmark	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.59%	DNA	0.10%	0.03%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	DNA	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.21%	98.95%	99.40%	99.17%
	RRC Congestion:	≤ 1%	0.01%	0.61%	0.21%	0.08%
	RAB Congestion:	≤ 2%	0.00%	0.41%	0.09%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.64%	0.89%	1.26%	0.06%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.50%	DNA	2.11%	0.00%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.85%	99.45%	98.25%	99.90%

6.20. 3G VOICE 3 DAYS LIVE DATA: SEPTEMBER

Sep-16						
Network Parameters		Name of Service Provider				
		Benchmark	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.41%	DNA	0.07%	0.24%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	DNA	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.06%	98.78%	97.89%	99.92%
	RRC Congestion:	≤ 1%	0.16%	0.59%	0.17%	0.02%
	RAB Congestion:	≤ 2%	0.02%	0.67%	0.09%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.60%	0.88%	0.63%	0.07%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.96%	DNA	2.27%	0.48%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.89%	99.61%	97.81%	99.90%

6.21. 3G VOICE 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated						
Network Parameters		Name of Service Provider				
		Benchmark	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.45%	DNA	0.12%	0.13%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	DNA	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.15%	98.81%	98.92%	99.11%
	RRC Congestion:	≤ 1%	0.06%	0.61%	0.18%	0.06%
	RAB Congestion:	≤ 2%	0.01%	0.51%	0.07%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.60%	0.89%	0.87%	0.07%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.23%	DNA	2.03%	0.32%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.89%	99.58%	98.08%	99.90%

6.22. 2G WIRELESS DATA: JULY

Jul-16										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter										
1	Service Activation/ Provisioning									
i)	Total No. of Subscribers for Service Activation (A)		157586	DNA	188	53619	42720	DNA	DNA	3165
ii)	Total Service Activations provided within 4 Hours (B)		157562	DNA	188	53617	42720	DNA	DNA	3164
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	99.98%	DNA	100.00%	100.00%	100.00%	DNA	DNA	99.97%
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		25967081	8163283	62793338.4	38420874	DNA	7734119	76	513706833
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		25530845	8161181	62121892.8	37064638	DNA	7501942	76	511302549
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.32%	99.97%	98.93%	96.47%	99.90%	97.00%	100.00%	99.53%
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		675333774	2760947331	DNA	1150224645	313722966	329034	38070	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		7213239	33268939	DNA	8160487	15169846	3878	52	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	1.07%	1.20%	1.39%	0.71%	4.84%	1.18%	0.14%	DNA

6.23. 2G WIRELESS DATA: AUGUST

Aug-16										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter										
1	Service Activation/ Provisioning									
i)	Total No. of Subscribers for Service Activation (A)		136200	DNA	108	51584	43869	DNA	DNA	2562
ii)	Total Service Activations provided within 4 Hours (B)		136094	DNA	108	51554	43869	DNA	DNA	2556
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	99.92%	DNA	100.00%	99.94%	100.00%	DNA	DNA	99.77%
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		25176214	10391511	41731069	46025472	DNA	7173013	36	516086183
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		24896977	10389983	40138609	44813946	DNA	6938908	36	513996710
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.89%	99.99%	96.18%	97.37%	99.89%	96.74%	100.00%	99.60%
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		632542080	2699216324	DNA	1162424238	217106897.1	272703	12196	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		6206066	32565132	DNA	8847799	10657567.18	3563	40	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.98%	1.21%	1.33%	0.76%	4.91%	1.31%	0.33%	DNA

6.24. 2G WIRELESS DATA: SEPTEMBER

Sep-16										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network										
1	Service Activation/ Provisioning									
i)	Total No. of Subscribers for Service Activation (A)		36567	DNA	63	50336	38900	DNA	DNA	2016
ii)	Total Service Activations provided within 4 Hours (B)		36543	DNA	63	50332	38900	DNA	DNA	2012
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	99.93%	DNA	100.00%	99.99%	100.00%	DNA	DNA	99.80%
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		23264367	9699350	57106599.88	37519253	DNA	4791634	35	493609552
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		23261451	9698481	56525197.49	36801031	DNA	4636405	35	491599073.9
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.99%	99.99%	98.98%	98.09%	99.87%	96.76%	100.00%	99.59%
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		609347650	2410742152	DNA	991815666	3105527671	178663	4818	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		17354479	27462133	DNA	8030462	152713753	1923	13	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	2.85%	1.14%	1.30%	0.81%	4.92%	1.08%	0.27%	DNA

6.25. 2G WIRELESS DATA: CONSOLIDATED

Consolidated										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter										
1	Service Activation/ Provisioning									
i)	Total No. of Subscribers for Service Activation (A)		110118	DNA	120	51846	41830	DNA	DNA	2581
ii)	Total Service Activations provided within 4 Hours (B)		110066	DNA	120	51834	41830	DNA	DNA	2577
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	99.95%	DNA	100.00%	99.98%	100.00%	DNA	DNA	99.85%
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		24802554	9418048	53877003	40655200	DNA	6566255	49	507800856
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		24563091	9416548	52928566	39559872	DNA	6359085	49	505632778
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.07%	99.98%	98.03%	97.31%	99.89%	96.83%	100.00%	99.57%
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		416367656	1714409138	DNA	1101488183	1212119178	260133	18361	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		232964773	31098735	DNA	8346249	59513722	3121	35	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	1.63%	1.18%	1.34%	0.76%	4.89%	1.19%	0.24%	DNA

6.26. 2G WIRELESS 3 DAYS LIVE DATA: JULY

Jul-16										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter										
1	Service Activation/ Provisioning									
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	25	4641	4139	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	25	4641	4139	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	100.00%	100.00%	100.00%	DNA	DNA	DNA
2	.									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		2411513	835812	5872135.58	3040464	DNA	777451	13	16810977.67
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		2375362	835712	5837363	2909152	DNA	753140	13	16737302
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.50%	99.99%	99.41%	95.68%	99.91%	96.87%	100.00%	99.56%
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		63322745	277562682	DNA	108578318	31016810	37200	8409	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		660896	3144135	DNA	744820	1505726	432	5	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	1.04%	1.13%	1.33%	0.69%	4.85%	1.16%	0.06%	DNA

6.27. 2G WIRELESS 3 DAYS LIVE DATA: AUGUST

Aug-16										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter										
1	Service Activation/ Provisioning									
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	9	5783	3383	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	9	5779	3383	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	100.00%	99.93%	100.00%	DNA	DNA	DNA
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		2391780	989445	3934921.178	3642398	DNA	682699	5	49325103
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		2391485	989210	3759347.793	3481239	DNA	660358	5	49175895
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.99%	99.98%	95.54%	95.58%	99.94%	96.73%	100.00%	99.70%
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		62168910	248622490	DNA	109553655	29023334	25648	2790	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		554837	3009617	DNA	798596	1413140	310	13	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.89%	1.21%	1.42%	0.73%	4.87%	1.21%	0.47%	DNA

6.28. 2G WIRELESS 3 DAYS LIVE DATA: SEPTEMBER

Sep-16										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter										
1	Service Activation/ Provisioning									
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	6	6619	DNA	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	6	6619	DNA	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	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)		2362034	981688	5657063.027	3912700	49721483	206948	3	49721483
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		2361723	981601	5624676.307	3846679	49556380	200294	3	49556380
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.99%	99.99%	99.43%	98.31%	99.67%	96.78%	100.00%	99.67%
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		65696158	232527604	DNA	90897378	DNA	19919	289	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		581624	2579471	DNA	753370	DNA	192	0	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.89%	1.11%	1.33%	0.83%	DNA	0.96%	0.00%	DNA

6.29. 2G WIRELESS 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter										
1	Service Activation/ Provisioning									
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	13.33	5681	3761	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	13.33	5679.67	3761	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	1	1.00	1	DNA	DNA	DNA
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		2388442.33	935648.33	5154706.59	3531854.00	49721483.00	555699.33	7.00	38619187.89
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		2376190.00	935507.67	5073795.70	3412356.67	49556380.00	537930.67	7.00	38489859.00
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	0.99	1.00	0.98	0.97	1.00	0.97	1.00	1.00
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		63729271.00	252904258.67	DNA	103009783.67	30020072.00	27589.00	3829.33	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		599119.00	2911074.33	DNA	765595.33	1459433.00	311.33	6.00	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.01	0.01	0.01	0.01	0.05	0.01	0.00	DNA

6.30. 3G WIRELESS DATA: JULY

Jul-16						
Cellular Mobile Telephone Services						
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter						
1	Service Activation/ Provisioning					
i)	Total No. of Subscribers for Service Activation (A)		DNA	355	53619	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	355	53617	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	100.00%	DNA
2	PDP Context Activation Success Rate					
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		2775286	41813291.5	22994867	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		2775231	40220387.4	22533871	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	96.19%	98.00%	98.25%
3	Drop Rate					
i)	RNC originated PS Domain Iu Connection Setup Success (A)		213947119	DNA	74153489	10310169
ii)	RNC originated PS Domain Iu Connection Release (B)		1470021	DNA	1326050	114953
iii)	Drop Rate = (B/A) * 100	<=5%	0.69%	1.66%	1.79%	1.11%

6.31. 3G WIRELESS DATA: AUGUST

Aug-16						
Cellular Mobile Telephone Services						
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter						
1	Service Activation/ Provisioning					
i)	Total No. of Subscribers for Service Activation (A)		DNA	423	51584	43869
ii)	Total Service Activations provided within 4 Hours (B)		DNA	423	51554	43869
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	99.94%	100.00%
2	PDP Context Activation Success Rate					
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		3375890	41731069	49737700	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		3375656	40138609	49016726	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.99%	96.18%	98.55%	98.25%
3	3					
i)	RNC originated PS Domain Iu Connection Setup Success (A)		218184708	DNA	91846622	10561445
ii)	RNC originated PS Domain Iu Connection Release (B)		1527018	DNA	1789014	142082
iii)	Drop Rate = (B/A) * 100	<=5%	0.70%	1.32%	1.95%	1.35%

6.32. 3G WIRELESS DATA: SEPTEMBER

Sep-16						
Cellular Mobile Telephone Services						
S. No.	**Name of Parameter**	**Benchmark**	**AIRTEL**	**BSNL**	**IDEA**	**RCOM**
Network Service Quality Parameter						
1	**Service Activation/ Provisioning**					
i)	Total No. of Subscribers for Service Activation (A)		DNA	327	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	327	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	DNA	DNA
2	**PDP Context Activation Success Rate**					
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		3442286	50962387	42823270	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		3442285	48918012	42357308	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	95.99%	98.91%	98.38%
3	**Drop Rate**					
i)	RNC originated PS Domain Iu Connection Setup Success (A)		207483473	DNA	84768627	9963999
ii)	RNC originated PS Domain Iu Connection Release (B)		1339468	DNA	1567976	122994
ii)	Drop Rate = (B/A) * 100	<=5%	0.65%	0.99%	1.85%	1.23%

6.33. 3G WIRELESS DATA: CONSOLIDATED

Consolidated						
Cellular Mobile Telephone Services						
S. No.	**Name of Parameter**	**Benchmark**	**AIRTEL**	**BSNL**	**IDEA**	**RCOM**
Network Service Quality Parameter						
1	**Service Activation/ Provisioning**					
i)	Total No. of Subscribers for Service Activation (A)		DNA	368	52602	43869
ii)	Total Service Activations provided within 4 Hours (B)		DNA	368	52586	43869
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	99.97%	100.00%
2	**PDP Context Activation Success Rate**					
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		3197821	44835583	38518612	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		3197724	43092336	37969302	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	96.12%	98.49%	98.29%
3	**Drop Rate**					
i)	RNC originated PS Domain Iu Connection Setup Success (A)		213205100	DNA	55856029	6998203
ii)	RNC originated PS Domain Iu Connection Release (B)		1445502	DNA	1561013	28341887
iii)	Drop Rate = (B/A) * 100	<=5%	0.68%	1.32%	1.86%	1.23%

6.34. 3G WIRELESS 3 DAYS LIVE DATA: JULY

Jul-16						
Cellular Mobile Telephone Services						
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter						
1	**Service Activation/ Provisioning**					
i)	Total No. of Subscribers for Service Activation (A)		DNA	50	4641	4139
ii)	Total Service Activations provided within 4 Hours (B)		DNA	50	4641	4139
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	100.00%	100.00%
2	**PDP Context Activation Success Rate**					
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		269165	3905425	1786807	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		269165	3763767	1757545	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	96.37%	98.36%	98.52%
3	**Drop Rate**					
i)	RNC originated PS Domain Iu Connection Setup Success (A)		20991940	DNA	8803334	918035
ii)	RNC originated PS Domain Iu Connection Release (B)		146283	DNA	169350	12360
iii)	Drop Rate = (B/A) * 100	<=5%	0.70%	1.61%	1.92%	1.35%

6.35. 3G WIRELESS 3 DAYS LIVE DATA: AUGUST

Aug-16						
Cellular Mobile Telephone Services						
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter						
1	**Service Activation/ Provisioning**					
i)	Total No. of Subscribers for Service Activation (A)		DNA	44	5783	3383
ii)	Total Service Activations provided within 4 Hours (B)		DNA	44	5779	3383
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	99.93%	100.00%
2	**PDP Context Activation Success Rate**					
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		326705	3934921	4597904	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		326701	3759348	4516149	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	95.54%	98.22%	97.98%
3	**Drop Rate**					
i)	RNC originated PS Domain Iu Connection Setup Success (A)		20443802	DNA	8795200	974359
ii)	RNC originated PS Domain Iu Connection Release (B)		146272	DNA	168416	11971
iii)	Drop Rate = (B/A) * 100	<=5%	0.72%	1.26%	1.91%	1.23%

6.36. 3G WIRELESS 3 DAYS LIVE DATA: SEPTEMBER

Sep-16						
Cellular Mobile Telephone Services						
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter						
1	Service Activation/ Provisioning					
i)	Total No. of Subscribers for Service Activation (A)		DNA	27	6619	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	27	6619	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	100.00%	DNA
2	PDP Context Activation Success Rate					
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		342184	5281492	4597946	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		342184	5117317	4531673	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	96.89%	98.56%	98.36%
3	Drop Rate					
i)	RNC originated PS Domain Iu Connection Setup Success (A)		18496007	DNA	8366086	1053880
ii)	RNC originated PS Domain Iu Connection Release (B)		123216	DNA	154199	12647
iii)	Drop Rate = (B/A) * 100	<=5%	0.67%	0.97%	1.84%	1.20%

6.37. 3G WIRELESS 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated						
Cellular Mobile Telephone Services						
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter						
1	Service Activation/ Provisioning					
i)	Total No. of Subscribers for Service Activation (A)		DNA	40	5681	3761
ii)	Total Service Activations provided within 4 Hours (B)		DNA	40	5680	3761
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	100.00%	99.98%	100.00%
2	PDP Context Activation Success Rate					
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		312685	4373946	3660886	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		312683	4213477	3601789	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	96.27%	98.38%	98.29%
3	Drop Rate					
i)	RNC originated PS Domain Iu Connection Setup Success (A)		19977250	DNA	8654873	982091
ii)	RNC originated PS Domain Iu Connection Release (B)		138590	DNA	163988	12326
iii)	Drop Rate = (B/A) * 100	<=5%	0.69%	1.28%	1.89%	1.26%

6.38. POI CONGESTION: JULY

Jul-16								
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service								
Name of Parameter	**AIRCEL**	**AIRTEL**	**BSNL**	**IDEA**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**VODAFONE**
Total No. of POI's in Month having < = 0.5% POI congestion								
Total No. of call attempts on POI	242443	762062	639673	169731	222856	1535590	50929	532709
Total traffic served on all POIs (Erlang)	5878	23591	11413	6313	4120	27571	811	11844
Total No. of circuits on all individual POIs	14720	42580	20200	13824	13925	182640	5307	26135
Total number of working POI Service Area wise	28	37	34	20	22	1650	29	61
Capacity of all POIs	13665	42154	18180	13219	12890	151731	4350	24968
No. of all POI's having >=0.5% POI congestion	0	0	0	NA	0	0	0	NA
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	0	NA	0	NA	0	0	0	NA

6.39. POI CONGESTION: AUGUST

Aug-16								
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service								
Name of Parameter	**AIRCEL**	**AIRTEL**	**BSNL**	**IDEA**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**VODAFONE**
Total No. of POI's in Month having < = 0.5% POI congestion								
Total No. of call attempts on POI	247150	854275	688730	188939	220477	50338	1648	519004
Total traffic served on all POIs (Erlang)	5943	26555	12610	7048	4166	897	27	12297
Total No. of circuits on all individual POIs	14720	43063	20200	13570	13918	6203	183	25494
Total number of working POI Service Area wise	28	38	34	19	22	57	1	60
Capacity of all POIs	13665	42632	18180	12995	12868	5143	150	24349
No. of all POI's having >=0.5% POI congestion	0	0	0	NA	0	0	0	NA
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	0	NA	0	NA	0	0	0	NA

6.40. POI CONGESTION: SEPTEMBER

Sep-16								
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service								
Name of Parameter	**AIRCEL**	**AIRTEL**	**BSNL**	**IDEA**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**VODAFONE**
Total No. of POI's in Month having < = 0.5% POI congestion								
Total No. of call attempts on POI	225024	871107	717223	189554	228914	46961	1659	495925
Total traffic served on all POIs (Erlang)	5924	29190	13615	7745	4255	877	29	12662
Total No. of circuits on all individual POIs	14930	43419	20200	13836	14539	6360	183	26448
Total number of working POI Service Area wise	28	38	34	20	23	58	1	60
Capacity of all POIs	13610	42985	18180	13223	13496	5274	150	25302
No. of all POI's having >=0.5% POI congestion	0	0	0	NIL	DNA	0	0	NA
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	0	NA	0	NIL	DNA	0	0	NA

6.41. POI CONGESTION: CONSOLIDATED

Consolidated								
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service								
Name of Parameter	**AIRCEL**	**AIRTEL**	**BSNL**	**IDEA**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**VODAFONE**
Total No. of POI's in Month having < = 0.5% POI congestion								
Total No. of call attempts on POI	238206	829148	681875	182741	224082	544297	18079	515879
Total traffic served on all POIs (Erlang)	5915	26445	12546	7036	4180	9782	289	12268
Total No. of circuits on all individual POIs	14790	43020	20200	13743	14127	65068	1891	26026
Total number of working POI Service Area wise	28	38	34	20	22	588	10	60
Capacity of all POIs	13647	42590	18180	13146	13085	54050	1550	24873
No. of all POI's having >=0.5% POI congestion	0	0	0	DNA	0	0	0	DNA
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	0	DNA	0	DNA	0	0	0	DNA

CUSTOMER SERVICE QUALITY (CSD) PARAMETERS

7. CUSTOMER SERVICE DELIVERY

7.1. QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JULY TO SEPTEMBER- 2016 MONTHS AUDITED DATA)

S.No	PARAMETERS	SUB-PARAMETERS	CUSTOMER SERVICE DELIVERY AUDITS							
			AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
1	**Metering and Billing Credibility (Post Paid) – Benchmark (**Not more than 0.1% of bills issued should be disputed over a billing cycle**)**	No. of bills issued during the period (A)	2774	224295	139625	27252	46174	9801	11781	33382
		No. of bills disputed including billing complaints over a billing cycle (B)	0	106	15	2	36	0	0	17
		Billing Compliant (%) = B/A*100	0.0%	0.05%	0.01%	0.01%	0.08%	0.00%	0.00%	0.05%
2	**Metering and Billing Credibility (Pre- Paid) – Benchmark** (Not more than 1 complaint per 1000 customers i.e. 0.1% complaints for metering, charging, credit, and validity)	Total No. of Pre-paid customers at the end of the month (A)	1108605	2746487	1792198	799716	1563834	20552	41677	727332
		Total No. of complaints relating to charging, Credit and Validity during a month (B)	41	3531	21	127	1413	0	0	220
		Pre-paid Charging Complaints (%) = B/A*100	0.00%	0.13%	0.00%	0.02%	0.09%	0.00%	0.00%	0.03%
3	**Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints Benchmark: (**Resolution ≥ 98% within 4 weeks & 100% within 6 weeks and Credit/Waiver within one week of resolution of complaints)	No. of Billing/Charging/Credit/Validity Complaints received during the month	41	3637	36	411	1449	0	0	237
		No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the month	41	3637	36	411	1449	0	0	237
		No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 6 weeks during the month	41	3637	36	411	1449	0	0	237
		% of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%
		% of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 6 weeks	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%
		Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints (In **DAYS**)	7	7	7	7	7	NA	NA	7
4	**Termination / Closures (**Customer care promptness in attending to customers request)	No. of Requests for Termination/ Closure of service (A)	11	1228	750	233	222	128	285	157
		No. of requested handled within 7 days (B)	11	1228	750	233	222	128	285	157
		% of Termination/ Closure of service within 7 days (B*100/A)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
5	**Time taken for refund of deposits after closures: Benchmark** (100% within 60 days)	No. of Payments/ Refunds due (A)	26	49	373	57	315	18	10	0
		Cleared over a period of <60 days (B)	26	49	373	57	315	18	10	0
		Refunds Successfull Completion (B/A)*100	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA
6	**Response time to customer assistance Benchmark:** (Accessibility of call center >=95% and Calls answered by operator within 90 seconds i.e. Voice to Voice >=95%)	Total no of calls attempted to customer care/Call center(A)	1072024	605918	81186	1225828	2218358	1811	8042	982580
		Total no. of calls successfully established to customer care/Call center (B)	1054678	600496	81186	1217249	2198480	1798	7910	982580
		% Accessibility of Call centre /customer Care (B *100/ A)	98.38%	99.11%	100.00%	99.30%	99.10%	99.28%	98.36%	100.00%
		Total Calls reached to operator for Voice to Voice (C)	448884	874421	407575	453635	421457	4771	5729	332793
		Total number of calls answered by the operator (Voice to voice) within 90 seconds (D)	432520	843654	400408	450848	411479	4719	5684	331229
		% age of calls answered by the operators (voice to voice) within 90 seconds (D *100/ C)	96.35%	96.48%	98.24%	99.39%	97.63%	98.91%	99.21%	99.53%
7	**Customer Care & Grievances Redressal**	Total no of complaints received in the call centre (Tech+ Non Tech)	3017	0	407575	3791	2111	233	138	1567
		Total no of complaints addressed at call center level	3017	0	399737	1601	2111	233	138	132
		% of complaints addressed at call center level	100.00%	NA	98.08%	42.23%	100.00%	100.00%	100.00%	8.42%
		Total no of appeals received by the appellate authority	0	0	0	0	19	0	0	0
		Total no of complaints addressed by Appellate authority	0	0	0	0	19	0	0	0
		% of complaints addressed by Appellate authority	NA	NA	NA	NA	100.00%	NA	NA	NA
8	**Subscribers Base**	**POSTPAID**	2774	75418	46542	9218	16500	29531	3880	33382
		PREPAID	1106017	2776359	1863703	805858	1578950	18746	40795	722233

7.2. 3 DAY LIVE CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JULY TO SEPTEMBER- 2016 MONTHS AUDITED 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**
OPERATOR			>=95%			>=95%
AIRCEL	29999	29488	98.30%	12471	12289	98.54%
AIRTEL	26111	26111	100.00%	26674	26170	98.11%
BSNL	2422	2422	100.00%	1603	1603	100.00%
IDEA	35749	35533	99.40%	13037	12808	98.24%
RCOM GSM	62852	62265	99.07%	9429	8824	93.58%
TTSL CDMA	50	50	DNA	0	0	NA
TTSL GSM	88	87	DNA	0	0	NA
VODAFONE	32517	32517	100.00%	9954	9658	97.03%

8. CUSTOMER SERVICE DELIVERY (SUMMARY)

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%	100.00%	100.00%	100.00%	100.00%	100.00%	98.38%	96.35%
AIRTEL	0.05%	0.13%	100.00%	100.00%	100.00%	100.00%	100.00%	99.11%	96.48%
BSNL	0.01%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.24%
IDEA	0.01%	0.02%	100.00%	100.00%	100.00%	100.00%	100.00%	99.30%	99.39%
RCOM GSM	0.08%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	99.10%	97.63%
TTSL CDMA	0.00%	0.00%	NA	NA	NA	100.00%	100.00%	99.28%	98.36%
TTSL GSM	0.00%	0.00%	NA	NA	NA	100.00%	100.00%	98.36%	99.21%
VODAFONE	0.05%	0.03%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.53%

Name of Service Provider	Customer Care & Grievances Redressal	
	% of Complaints addressed at call center level	% of Complaints addressed by Appellate Authority
AIRCEL	100.00%	NA
AIRTEL	NA	NA
BSNL	98.08%	NA
IDEA	42.23%	NA
RCOM GSM	100.00%	100.00%
TTSL CDMA	100.00%	NA
TTSL GSM	100.00%	NA
VODAFONE	8.42%	NA

LIVE CALLING ASSESSMENT

9. LIVE CALLING ASSESSMENT:

9.1. INTER OPERATOR CALLS ASSESSMENT:

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in Himachal Pradesh service area during the time 1100 to 1400 Hrs and 1600 to 1900 was carried out by Phistream auditors. The test calls were made from one operator to another within the same licensed area to judge the ease of connectivity amongst the operators. While doing this exercise, the radio part, the switch part and POI in between the two operators are involved. Congestion in any of these network elements could result in congestion in the network.

Inter Operator Call Assessment	Aircel	Airtel	BSNL	Idea	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
Aircel	-	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%
BSNL	100%	100%	-	100%	100%	100%	100%	100%
Idea	100%	100%	100%	-	100%	100%	100%	100%
RCOM GSM	100%	100%	100%	100%	-	100%	100%	100%
TTSL CDMA	100%	100%	100%	100%	100%	-	100%	100%
TTSL GSM	100%	100%	100%	100%	100%	100%	-	100%
VODAFONE	100%	100%	100%	100%	100%	100%	100%	-

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. Thus there was no remarkable problem in interconnection from one operator to other operators.

10. CUSTOMER CARE / HELPLINE ASSESSMENT& BILLING COMPLAINTS:

LIVE CALLING TO CALL CENTRE								
Parameter	**Aircel**	**Airtel**	**BSNL**	**IDEA**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**Vodafone**
Total No. of calls Attempted	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	100	100	100	100	100	100	100	100
% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 90 seconds	100	100	100	100	100	100	100	100
% age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100 / Total call attempt)	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

In case of calls answered by operators (voice to voice) within 90 seconds when test calls were made to the call centers, 100% calls were connected to the Operator within 90 seconds.

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS								
Parameter	**Aircel**	**Airtel**	**BSNL**	**IDEA**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**VODAFONE**
Total No. of calls Attempted	0	100	15	2	36	0	0	17
Total No. of calls Answered	0	79	9	2	21	0	0	11
Cases resolved within 4 weeks	0	79	9	2	21	0	0	11
%age of cases resolved	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

To test the Service Providers performance on billing related complaints and their resolutions, PhiStream auditors conducted a customer feedback calling for about random 100 nos. of customers. However, in some cases, the number of customers contacted for verification was very less due to less number of billing complaints. During live calling, some of the customers did not attend the calls, so shortfall was made good by taking other complaints to make verification of 100 Complaints. However, most of the customers reported their satisfaction on resolution of the billing complaints.

11. LEVEL -1 CALLING ASSESSMENT:

Level 1 Live Calling									
DATE:	19, 20, 21 September 2016								
CIRCLE:	Himachal Pradesh								
TYPE:	CELLULAR/BASIC SERVICE PROVIDER								
PUT x FOR UNSUCCESSFUL CALL AND TICK FOR SUCCESSFUL CALL									
S. NO.	**L1 Service Number**	**SSA: Kangra**							
	Details	**Aircel**	**Airtel**	**BSNL**	**Idea**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**Vodafone**
1	100 Police	√	√	√	√	√	√	√	√
2	101 Fire	√	√	√	√	√	√	√	√
3	102 Ambulance	√	√	×	√	√	√	√	√
4	104 Health Information Helpline	√	√	√	×	√	×	×	√
5	108 Emergency and Disaster Management Helpline	×	√	√	√	√	√	√	√
6	138 All India Helpine for Passangers	√	√	×	×	√	√	√	√
7	149 Public Road Transport Utility Service	√	×	×	×	×	×	×	×
8	181 Chief Minister Helpline	×	×	×	×	×	×	×	√
9	182 Indian Railway Security Helpline	×	×	×	×	√	×	×	√
10	1033 Road Accident Management Service	√	√	√	√	√	√	√	√
11	1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'	×	×	×	×	×	×	×	√
12	1056 Emergency Medical Services	×	×	×	×	×	×	×	×
13	106X State of the Art Hospitals	×	×	×	×	×	×	×	×
14	1063 Public Grievance Cell DoT Hq	√	√	×	√	×	×	×	×
15	1064 Anti Corruption Helpline	√	×	×	×	×	√	√	√
16	1070 Relief Commission for Natural Calamities	√	√	√	×	√	×	×	√
17	1071 Air Accident Helpline	√	×	×	×	×	×	×	×
18	1072 Rail Accident Helpline	√	√	√	√	√	√	√	√
19	1073 Road Accident Helpline	√	√	×	√	√	×	×	√
20	1077 Control Room for District Collector	√	×	√	√	√	×	×	√

S. NO.	L1 Service Number								
	Details	Aircel	Airtel	BSNL	Idea	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
21	1090 Call Alart (Crime Branch)	×	×	×	×	×	×	×	×
22	1091 Women Helpline	√	×	×	√	×	√	√	×
23	1097 National AIDS Helpline to NACO	√	√	×	√	√	×	×	√
24	1099 Central Accident and Trauma Services (CATS)	×	√	×	×	×	×	×	×
25	10580 Educational& Vocational Guidance and Counselling	×	×	×	×	×	×	×	×
26	10589 Mother and Child Tracking (MCTH)	×	×	×	×	×	×	×	×
27	10740 Central Pollution Control Board	×	×	×	×	×	×	×	×
28	10741 Pollution Control Board	×	×	×	×	×	×	×	×
29	1511 Police Related Service for all Metro Railway Project	×	×	×	×	×	×	×	×
30	1512 Prevention of Crime in Railway	×	×	×	×	×	×	×	√
31	1514 National Career Service(NCS)	×	×	×	×	×	×	×	×
32	15100 Free Legal Service Helpline	√	×	×	√	√	√	√	√
33	155304 Municipal Corporations	×	×	×	×	√	×	×	×
34	155214 Labour Helpline	×	×	×	×	×	×	×	√
35	1903 Sashastra Seema Bal (SSB)	√	√	×	√	√	√	√	√
36	1909 National Do Not Call Registry	√	√	×	√	√	×	×	√
37	1912 Complaint of Electricity	√	√	×	√	√	×	×	√
38	1916 Drinking Water Supply	×	×	×	×	√	×	×	√
39	1950 Election Commission of India	√	√	×	√	√	×	×	√

Test calls will be made from all the levels working in a particular SDCA (Short Distance Charging Area) visited.(300 calls per licence service area per service per Quarter)

DRIVE TEST

12. OPERATOR ASSISTED DRIVE TEST

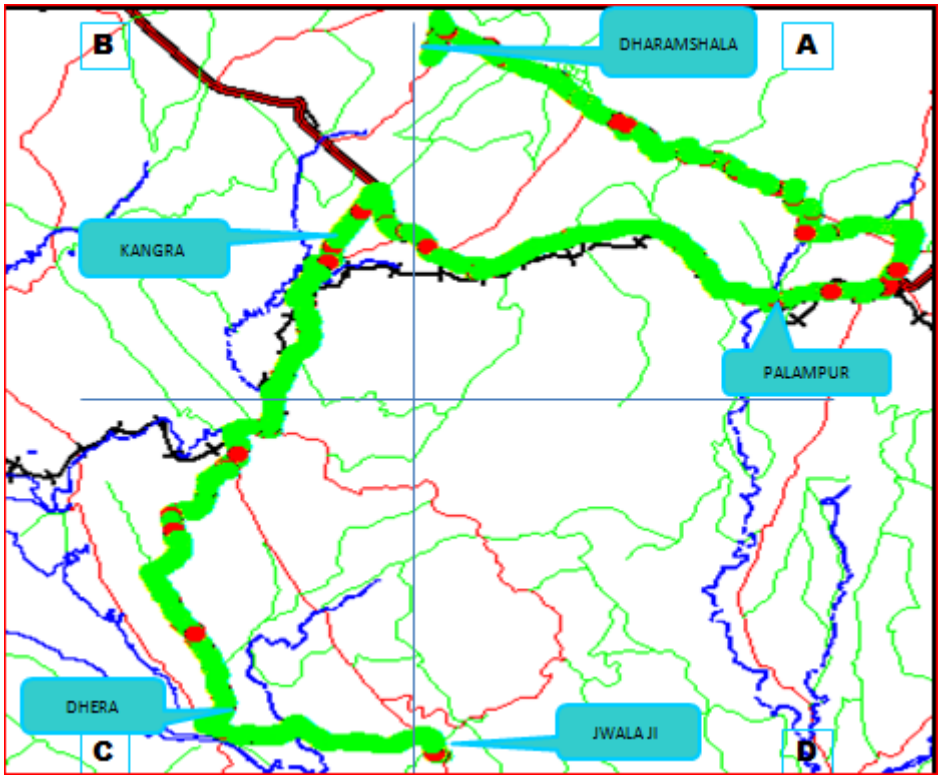
The drive test was conducted simultaneously for all the operators present in the Himachal Pradesh circle. As per the new directive given by TRAI headquarters, drive test for the month of July, August and September, 2016 were conducted at a SSA level. Drive test was conducted for three days in each SSA 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 theHimachal Pradesh circle.

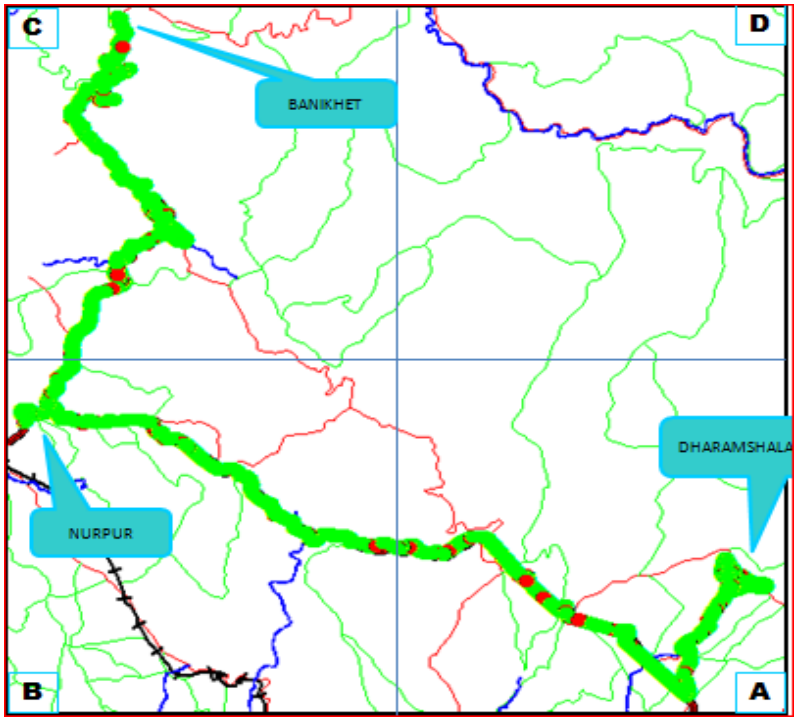
Drive Test		
Sr.No.	**Date**	**Name of SSA**
1	19th to 21st Sep 2016	Kangra

Date	**Name of SSA**	**Day 1**		**Day 2**		**Day 3**	
		Name of SDCA & KM Covered	**Route Covered (Outdoor/Indoor)**	**Name of SDCA & KM Covered**	**Route Covered (Outdoor/Indoor)**	**Name of SDCA & KM Covered**	**Route Covered (Outdoor/Indoor)**
19th to 21st Sep 2016	Kangra	Dehra, Kangra,Palampur / 150 KM	Outdoor: Within city : Jwalaji , Kathog, Dwala,Dehra, Kangra,Nagrota, Palampur Highway : Dehra to Ranital,Daulatpur to Kangra,Shila Chownk to Daharamshala Major roads : Dehra,Kangra,Palampur Indoor : Maan Vaishno Dhaba Kangara	Dharamshala, Nurpur / 165 KM	Outdoor: Within City: Mcleodganj Road, Dharamshala Chowk, Shila chowk,Police Stadium,Civil Hospital,Nurpur Bus Stand,Police station Highway : Gaggal to Nurpur Major Road Dharamshala to Gaggal, Nurpur to Banikhet Indoor : Dogara Bhojnalay	Chamba. Chauran / 139 KM	Outdoor: Within City: Banikhet Bus Stand, Dalhousie, Subhash Chowk,Bharmaur Chowk, Chamba, DC Office, Chaugam, Civil Hospital. Highway : Banikhet to Chamba Major Road : Chamba to Bathri Indoor : Madra Dhaba, Chamba

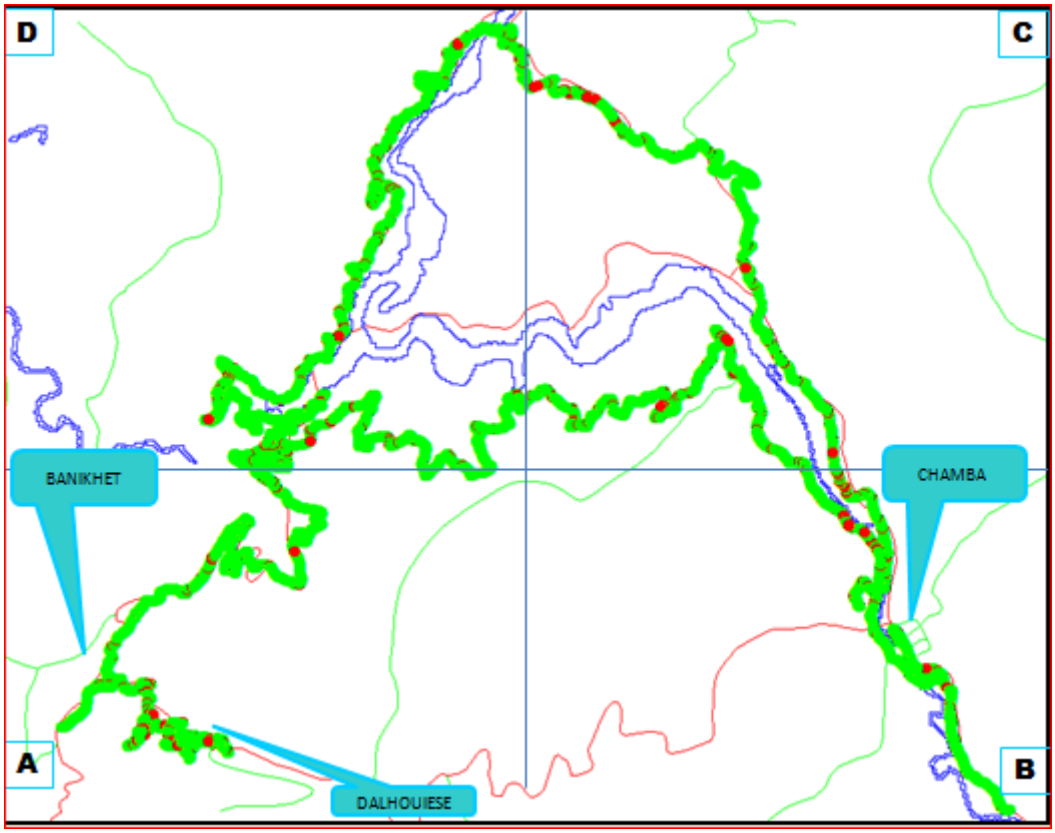
12.1. ROUTE COVER MAP: KANGRA SSA: DAY 1



12.2. ROUTE MAP: KANGRA SSA: DAY 2



12.3. ROUTE MAP: KANGRA SSA: DAY 3



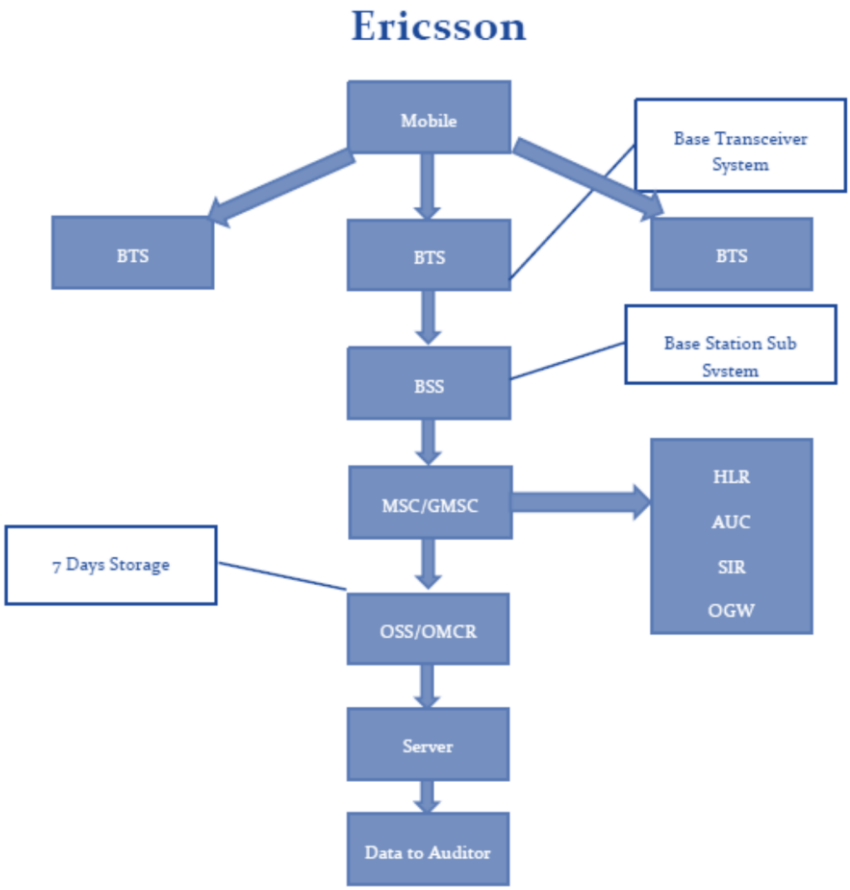
12.4. DRIVE TEST OUTCOME

Sr.No	Test Parameter	Benchmark	Aircel	Airtel	Idea	BSNL	RCOM GSM	TTSL GSM	TTSL CDMA	Vodafone
1	Total Calls Attempt (A)	--	414	541	541	684	716	430	272	541
2	Total Calls Blocked (B)	--	3	0	2	7	3	0	0	3
3	Blocked Call Rate in % (B*100/A)	<=3%	0.72%	0.00%	0.37%	1.02%	0.42%	0.00%	0.00%	0.55%
4	Total Calls Established ('C)	--	411	541	539	677	713	430	272	537
5	Total Calls Drop (D)	--	0	3	1	9	1	1	1	1
6	Dropped Calls Rate in % (D*100/C)	<=2%	0.00%	0.55%	0.19%	1.33%	0.14%	0.23%	0.37%	0.19%
7	Call Setup Success Rate in % (C*100/A)	>=95%	99.28%	100.00%	99.63%	98.98%	99.58%	100.00%	100.00%	98.26%
8	Handover Success Rate % (total HO Success * 100/Total HO attempt)	>=95%	99.45%	100.00%	98.90%	96.94%	99.39%	99.8%	100.00%	99.64%
9	Connection with good voice Quality % (0-5 & 0-4)	>=95%	97.15%	96.91%	96.34%	87.19%	96.18%	97.99%	98.81%	96.41%

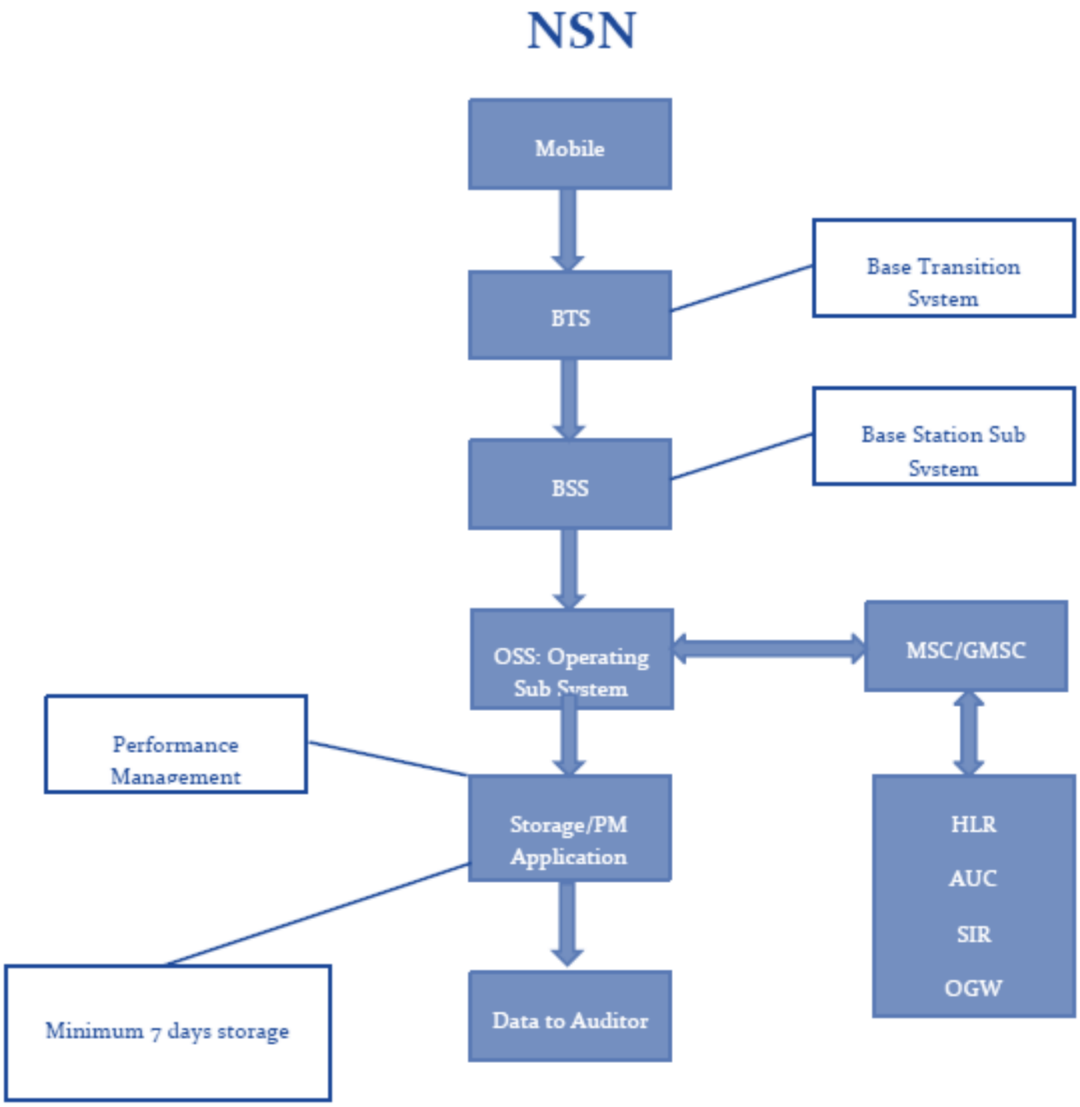
Connection with good voice Quality % (0-5 With Frequency Hopping for GSM,0-4 Witout Frequency Hopping for GSM & 0-4 for CDMA)

13. BLOCK SCHEMATIC DIAGRAM

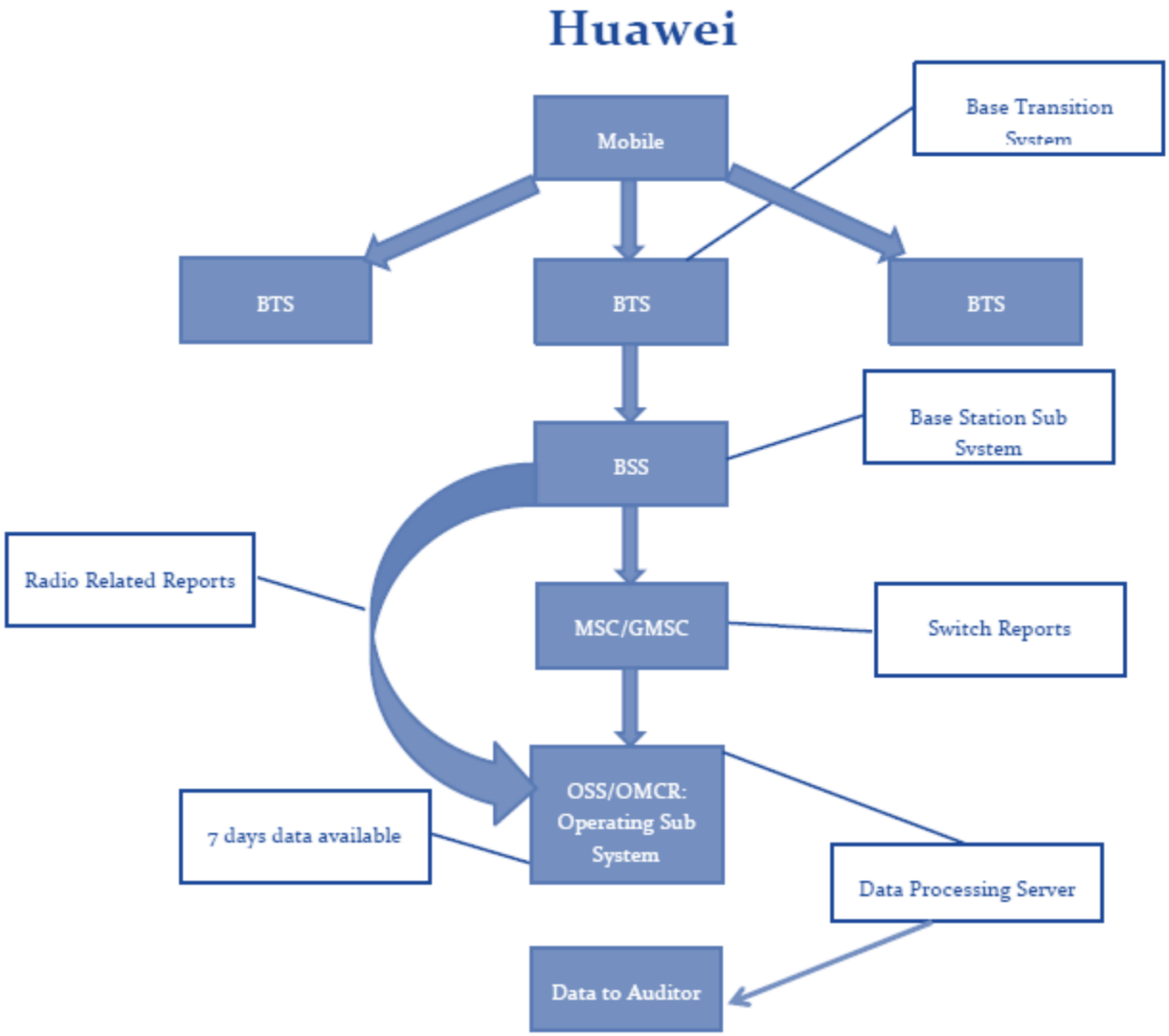
13.1. ERICSSON



13.2. 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

13.3. 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

14. 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
- QoS – Quality of Service
- 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 Dialling
- ISD – International Subscriber Dialling

15. ANNEXURE

15.1. 2G VOICE PMR DATA: CONSOLIDATED

Consolidated										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.14%	0.02%	1.92%	0.20%	0.15%	0.02%	0.00%	0.02%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.14%	1.90%	1.25%	1.45%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.41%	98.84%	98.36%	99.43%	95.64%	99.24%	99.78%	99.86%
	SDDCH/Paging chl. Congestion	≤ 1%	0.09%	0.26%	0.86%	0.11%	0.27%	0.00%	0.00%	0.02%
	TCH Congestion	≤ 2%	0.40%	0.28%	1.64%	0.18%	0.77%	0.03%	0.00%	0.14%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.22%	0.62%	1.92%	1.41%	0.40%	0.08%	0.04%	0.74%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	11.48%	0.62%	2.59%	2.10%	1.60%	1.87%	0.00%	2.29%
	%age of connection with good voice quality	≥ 95%	95.34%	97.97%	95.03%	97.37%	96.55%	98.00%	96.16%	97.32%

- AIRCEL has parameter value of 11.48% and failed to meet the benchmark of ≤ 3% Worst Affected cell having more than 3% TCH drop.

15.2. 3G VOICE PMR: CONSOLIDATED

Consolidated						
Network Parameters		Name of Service Provider				
		Benchmark	AIRTEL	BSNL	IDEA	RCOM GSM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.15%	1.42%	0.12%	0.23%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.15%	1.37%	0.59%	0.91%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.16%	98.65%	99.25%	99.36%
	RRC Congestion:	≤ 1%	0.02%	0.59%	0.33%	0.08%
	RAB Congestion:	≤ 2%	0.00%	0.54%	0.15%	0.01%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.60%	0.91%	0.77%	0.05%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.07%	2.08%	1.77%	0.26%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.89%	99.63%	96.95%	99.90%

15.3. 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		Customer Care & Grievances Redressal	
	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	% of Complaints addressed at call center level	% of Complaints addressed by Appellate Authority
Benchmark	≤ 0.1%	≤ 0.1%	≥ 98%	= 100%	= 100%	= 100%	= 100%	≥ 95%	≥ 95%		
AIRCEL	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.38%	96.35%	100.00%	NILL
AIRTEL	0.05%	0.13%	100.00%	100.00%	100.00%	100.00%	100.00%	99.11%	96.48%	#DIV/0!	NILL
BSNL	0.01%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.24%	98.08%	NILL
IDEA	0.01%	0.02%	100.00%	100.00%	100.00%	100.00%	100.00%	99.30%	99.39%	42.23%	NILL
RCOM GSM	0.08%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	99.10%	97.63%	100.00%	100.00%
TTSL CDMA	0.00%	0.00%	NA	NA	NA	100.00%	100.00%	99.28%	98.36%	100.00%	NILL
TTSL GSM	0.00%	0.00%	NA	NA	NA	100.00%	100.00%	98.36%	99.21%	100.00%	NILL
VODAFONE	0.05%	0.03%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.53%	8.42%	NILL

- AIRTEL has parameter value of 0.13% and failed to meet the benchmark of ≤ 0.1% Metering and Billing credibility Prepaid Subscribers.

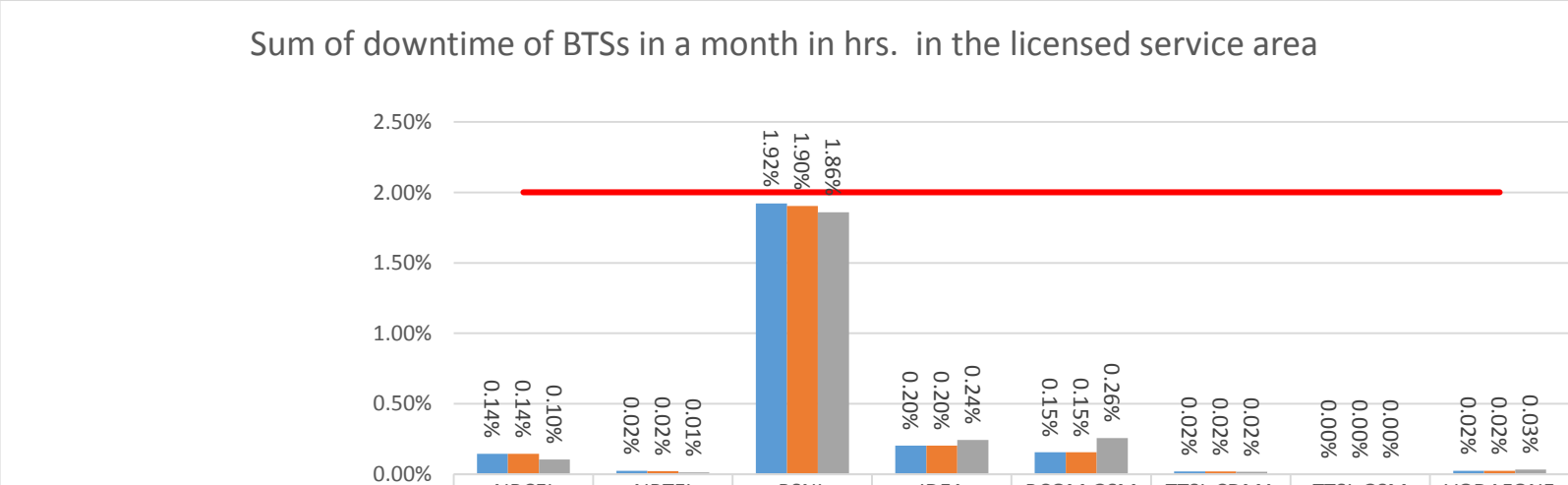
15.4. 2G PMR Comparison (TSP vs. Audit Agency): Network Parameters

2G PMR Report Comparison between Audit Agency and TSP

Network Parameters		Benchmark		Name of Service Provider							
				AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.14%	0.02%	1.92%	0.20%	0.15%	0.02%	0.00%	0.02%
			TSP	0.14%	0.02%	1.90%	0.20%	0.15%	0.02%	0.00%	0.02%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	0.00%	0.14%	1.90%	1.25%	1.45%	0.00%	0.00%	0.00%
			TSP	0.23%	0.15%	1.89%	1.25%	1.45%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	Agency	99.41%	98.84%	98.36%	99.43%	95.64%	99.24%	99.78%	99.86%
			TSP	99.41%	98.75%	98.34%	99.43%	95.64%	99.24%	99.78%	99.86%
	SDDCH/Paging chl. Congestion	≤ 1%	Agency	0.09%	0.26%	0.86%	0.11%	0.27%	0.00%	0.00%	0.02%
			TSP	0.09%	0.29%	0.86%	0.11%	0.27%	0.00%	0.00%	0.02%
	TCH Congestion	≤ 2%	Agency	0.40%	0.28%	1.64%	0.18%	0.77%	0.03%	0.00%	0.14%
			TSP	0.40%	0.33%	1.64%	0.18%	0.77%	0.02%	0.00%	0.14%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	Agency	1.22%	0.62%	1.92%	1.41%	0.40%	0.08%	0.04%	0.74%
			TSP	1.22%	0.61%	1.92%	1.41%	0.40%	0.08%	0.00%	0.74%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	Agency	11.48%	0.62%	2.59%	2.10%	1.60%	1.87%	0.00%	2.29%
			TSP	11.47%	0.61%	2.60%	2.10%	1.63%	1.87%	0.00%	2.29%
	%age of connection with good voice quality	≥ 95%	Agency	95.34%	97.97%	95.03%	97.37%	96.55%	98.00%	96.16%	97.32%
			TSP	95.34%	97.98%	95.02%	97.37%	96.55%	98.00%	96.27%	97.32%

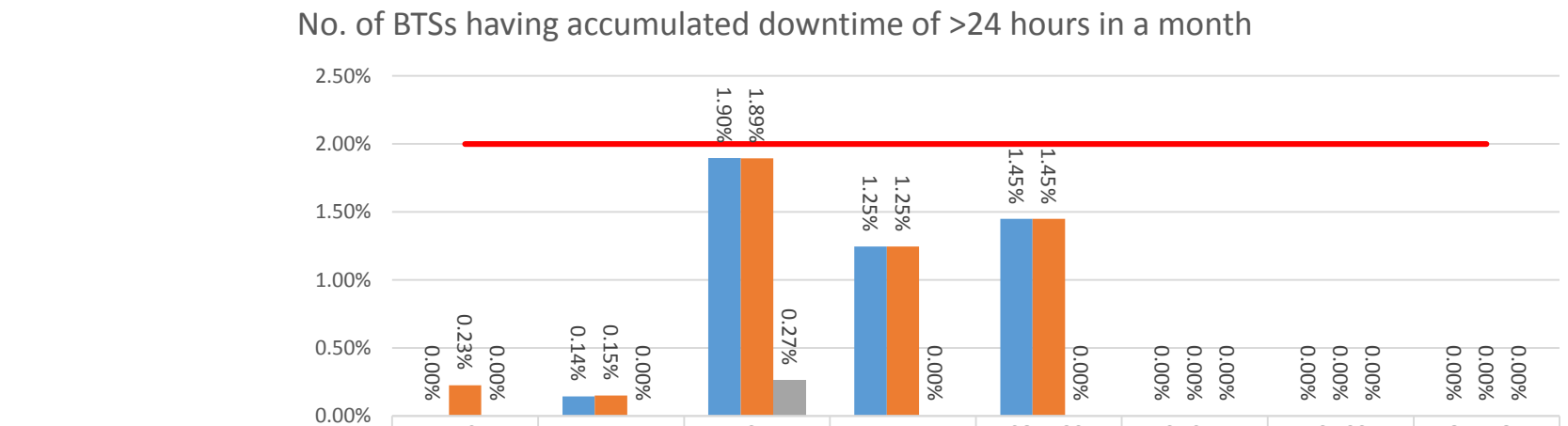
- **For each instance of “DNA (Data Not Available)”, please refer the respective hard copy of audit report(s).

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



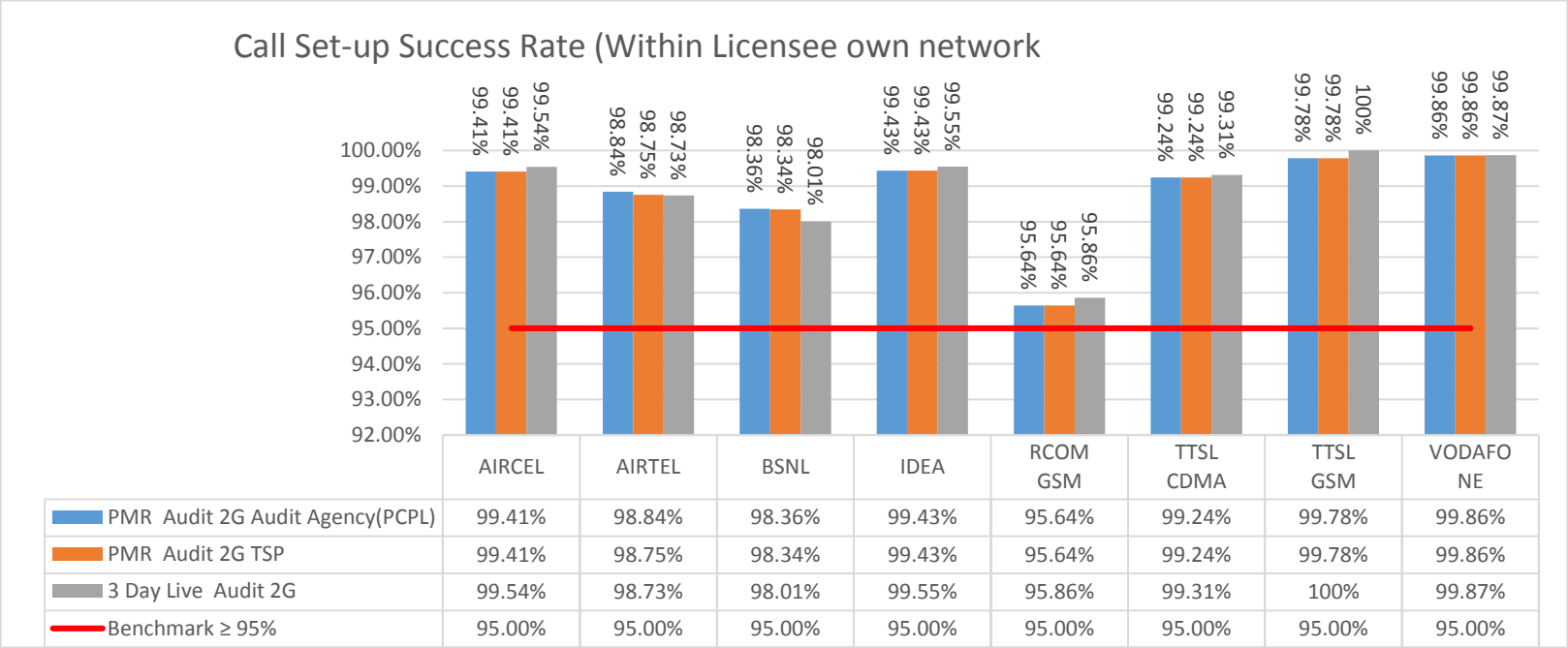
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	0.14%	0.02%	1.92%	0.20%	0.15%	0.02%	0.00%	0.02%
PMR Audit 2G TSP	0.14%	0.02%	1.90%	0.20%	0.15%	0.02%	0.00%	0.02%
3 Day Live Audit 2G	0.10%	0.01%	1.86%	0.24%	0.26%	0.02%	0.00%	0.03%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

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



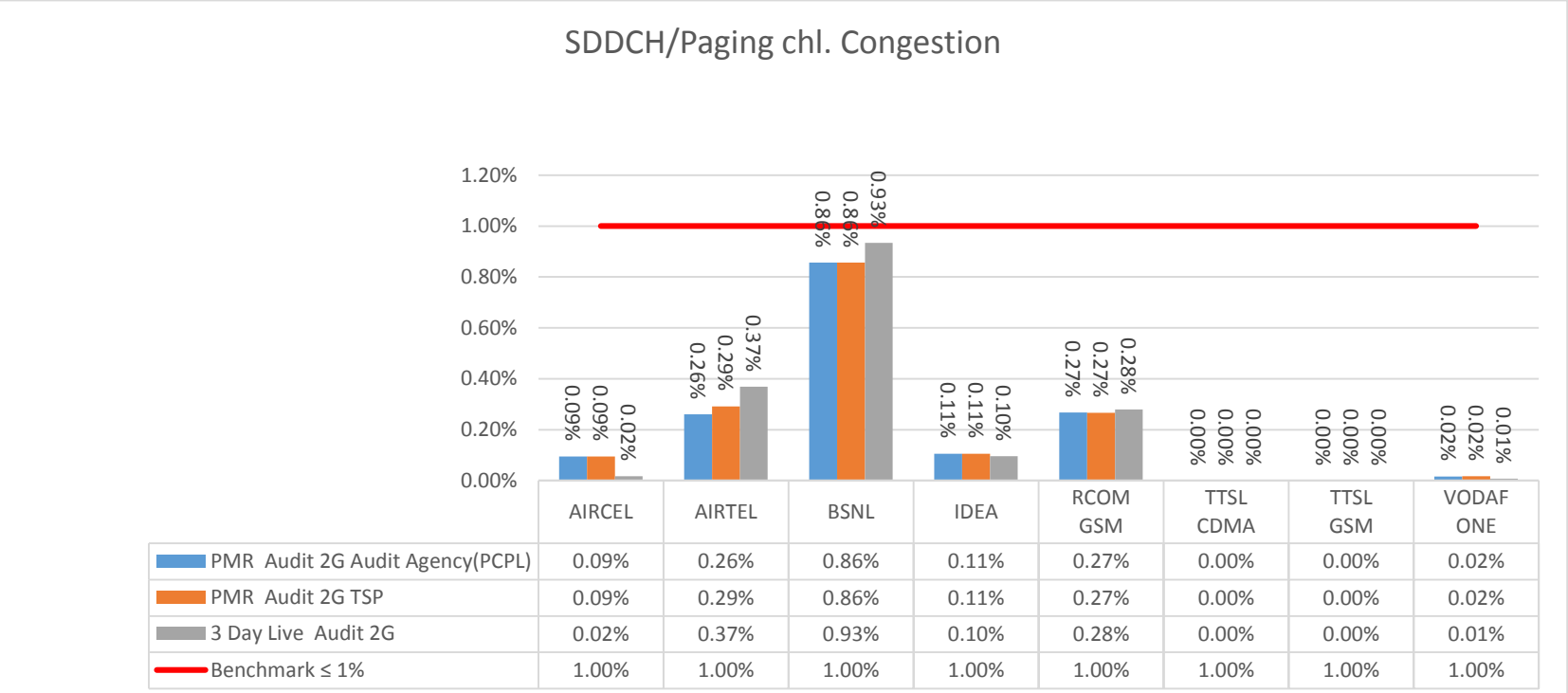
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	0.00%	0.14%	1.90%	1.25%	1.45%	0.00%	0.00%	0.00%
PMR Audit 2G TSP	0.23%	0.15%	1.89%	1.25%	1.45%	0.00%	0.00%	0.00%
3 Day Live Audit 2G	0.00%	0.00%	0.27%	0.00%	0.00%	0.00%	0.00%	0.00%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

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



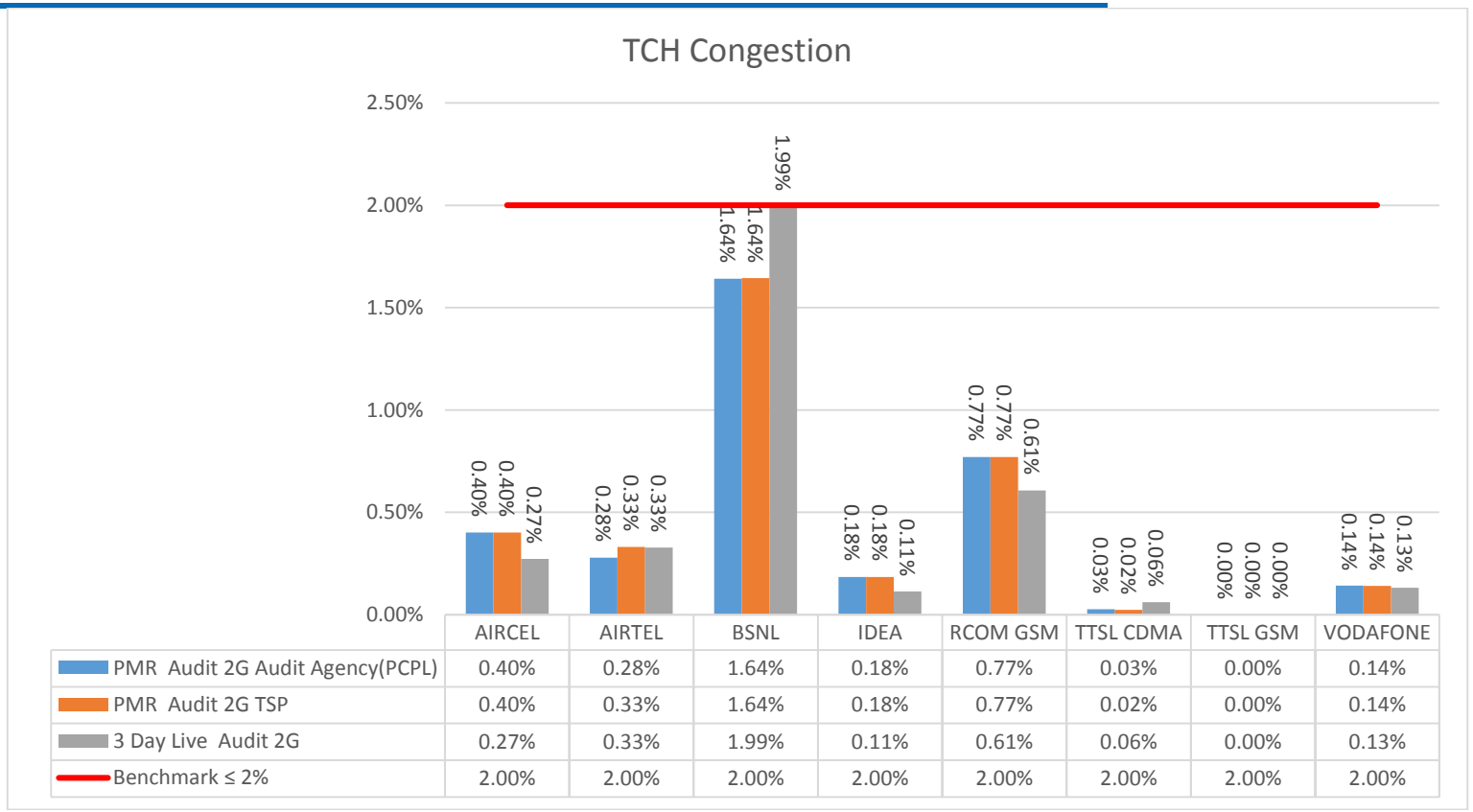
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	99.41%	98.84%	98.36%	99.43%	95.64%	99.24%	99.78%	99.86%
PMR Audit 2G TSP	99.41%	98.75%	98.34%	99.43%	95.64%	99.24%	99.78%	99.86%
3 Day Live Audit 2G	99.54%	98.73%	98.01%	99.55%	95.86%	99.31%	100%	99.87%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

15.4.4. SDDCH/PAGING CHL. CONGESTION



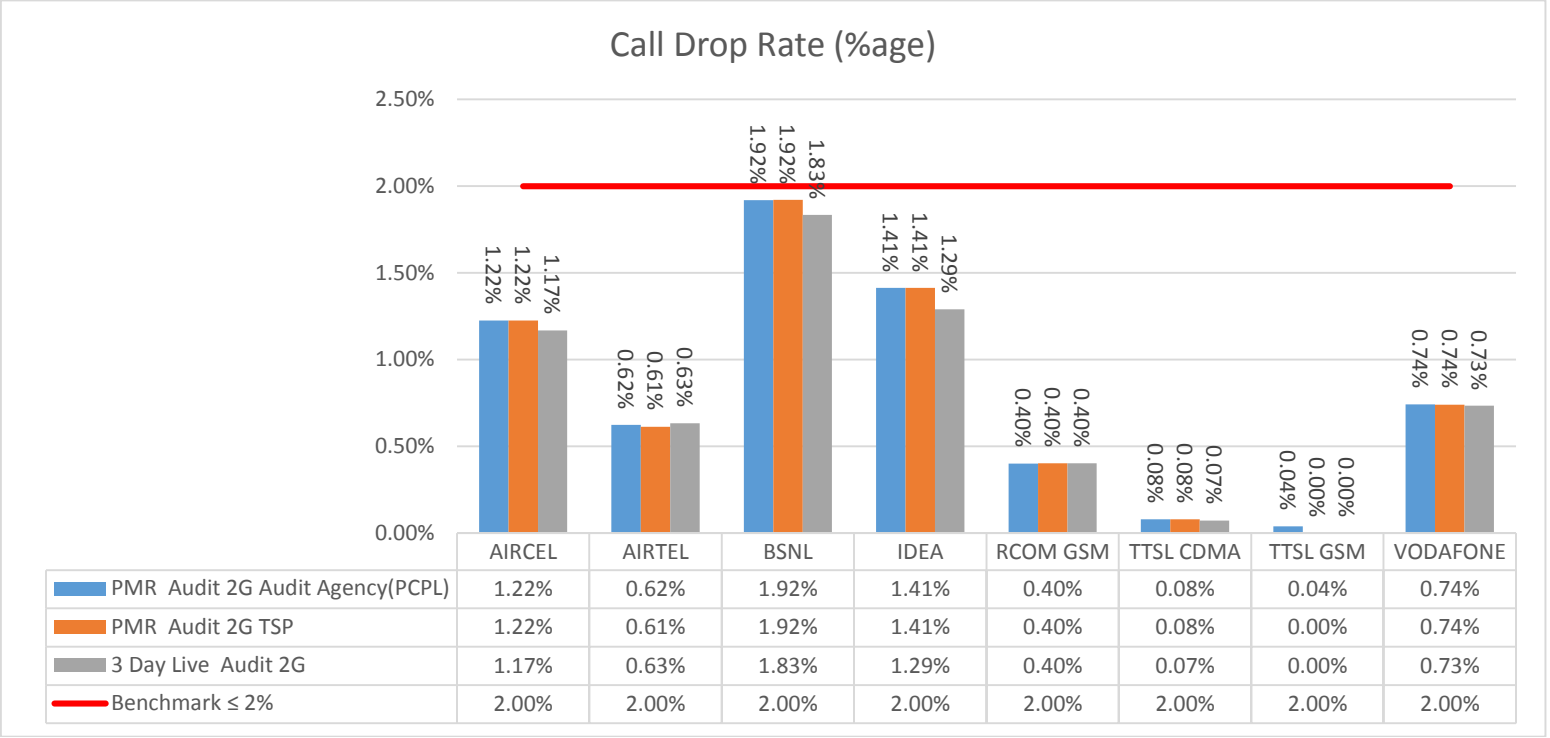
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	0.09%	0.26%	0.86%	0.11%	0.27%	0.00%	0.00%	0.02%
PMR Audit 2G TSP	0.09%	0.29%	0.86%	0.11%	0.27%	0.00%	0.00%	0.02%
3 Day Live Audit 2G	0.02%	0.37%	0.93%	0.10%	0.28%	0.00%	0.00%	0.01%
Benchmark ≤ 1%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

15.4.5. TCH CONGESTION



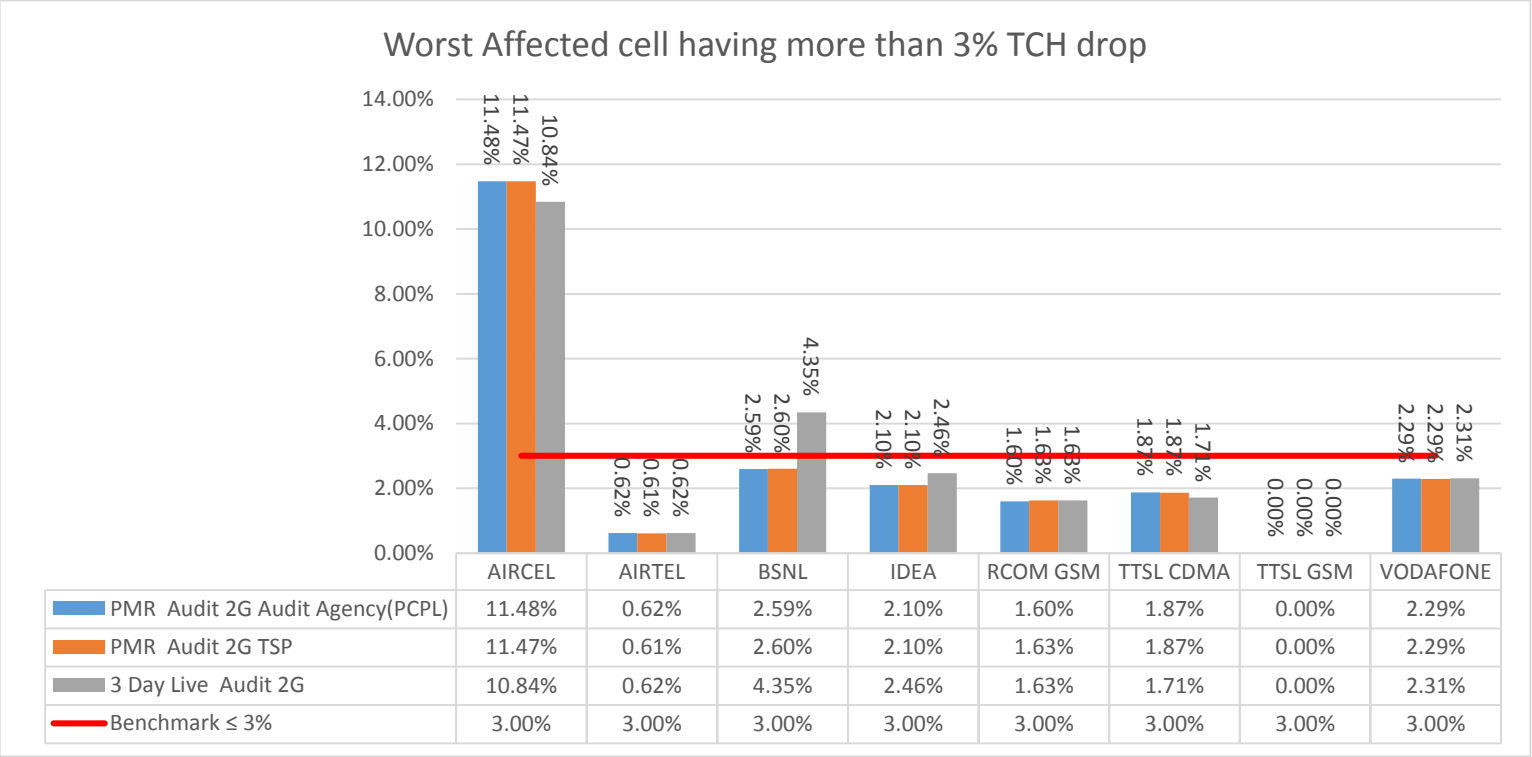
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	0.40%	0.28%	1.64%	0.18%	0.77%	0.03%	0.00%	0.14%
PMR Audit 2G TSP	0.40%	0.33%	1.64%	0.18%	0.77%	0.02%	0.00%	0.14%
3 Day Live Audit 2G	0.27%	0.33%	1.99%	0.11%	0.61%	0.06%	0.00%	0.13%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

15.4.6. CALL DROP RATE (%AGE)



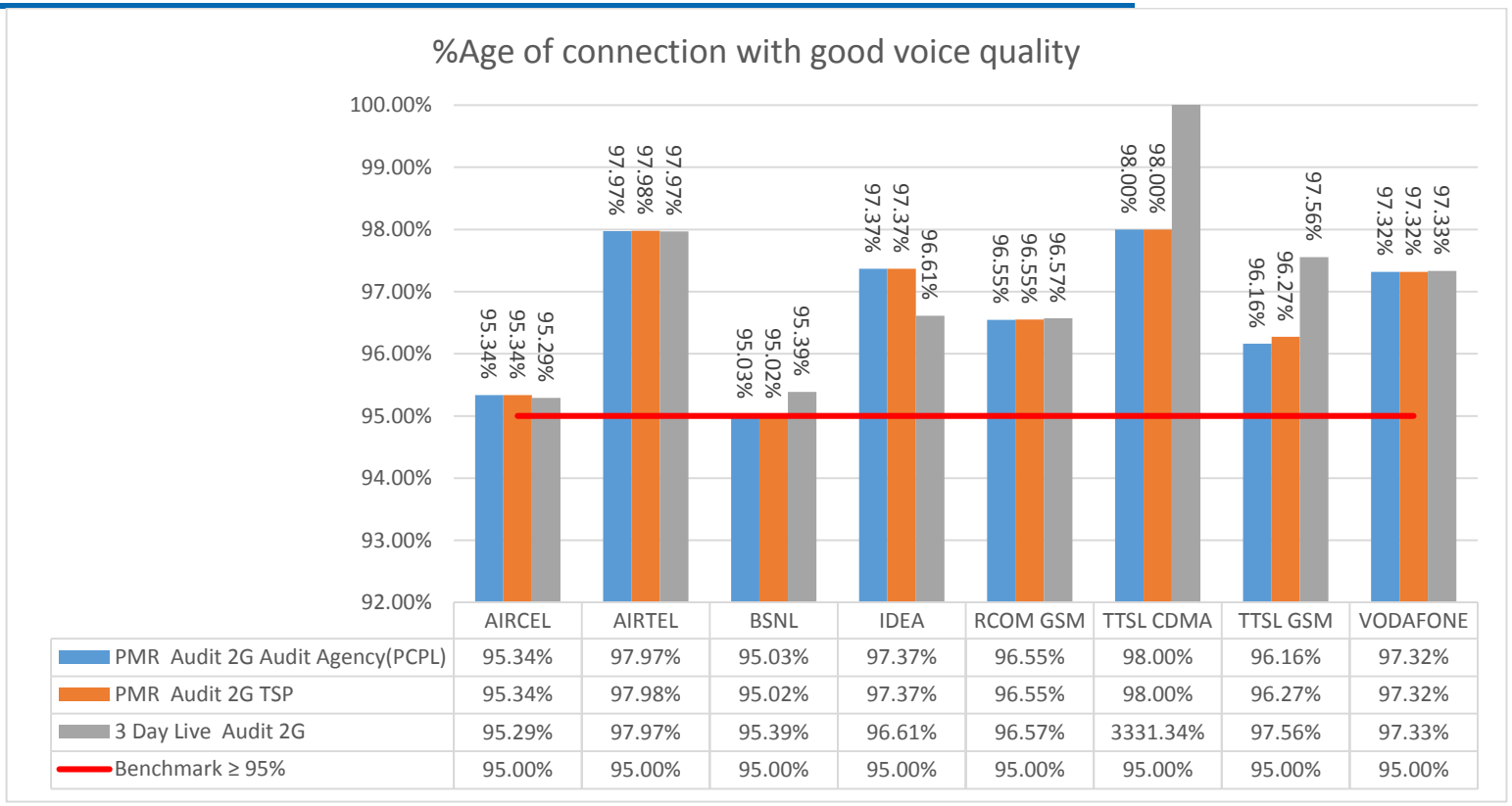
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	1.22%	0.62%	1.92%	1.41%	0.40%	0.08%	0.04%	0.74%
PMR Audit 2G TSP	1.22%	0.61%	1.92%	1.41%	0.40%	0.08%	0.00%	0.74%
3 Day Live Audit 2G	1.17%	0.63%	1.83%	1.29%	0.40%	0.07%	0.00%	0.73%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

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



	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	11.48%	0.62%	2.59%	2.10%	1.60%	1.87%	0.00%	2.29%
PMR Audit 2G TSP	11.47%	0.61%	2.60%	2.10%	1.63%	1.87%	0.00%	2.29%
3 Day Live Audit 2G	10.84%	0.62%	4.35%	2.46%	1.63%	1.71%	0.00%	2.31%
Benchmark ≤ 3%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%

15.4.8. %AGE OF CONNECTION WITH GOOD VOICE QUALITY



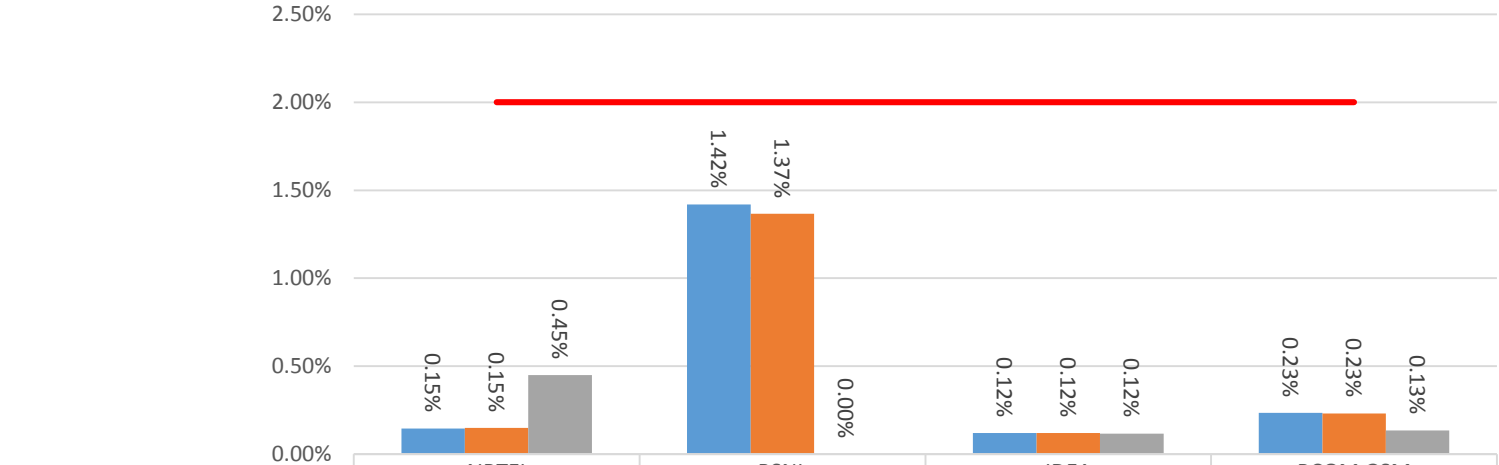
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	95.34%	97.97%	95.03%	97.37%	96.55%	98.00%	96.16%	97.32%
PMR Audit 2G TSP	95.34%	97.98%	95.02%	97.37%	96.55%	98.00%	96.27%	97.32%
3 Day Live Audit 2G	95.29%	97.97%	95.39%	96.61%	96.57%	3331.34%	97.56%	97.33%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

15.5. 3G PMR Comparison (TSP vs. Audit Agency): Network Parameters

3G PMR Report Comparison between Audit Agency and TSP					
Network Parameters	Name of Service Provider				
	Benchmark		AIRTEL	BSNL	IDEA	RCOM GSM

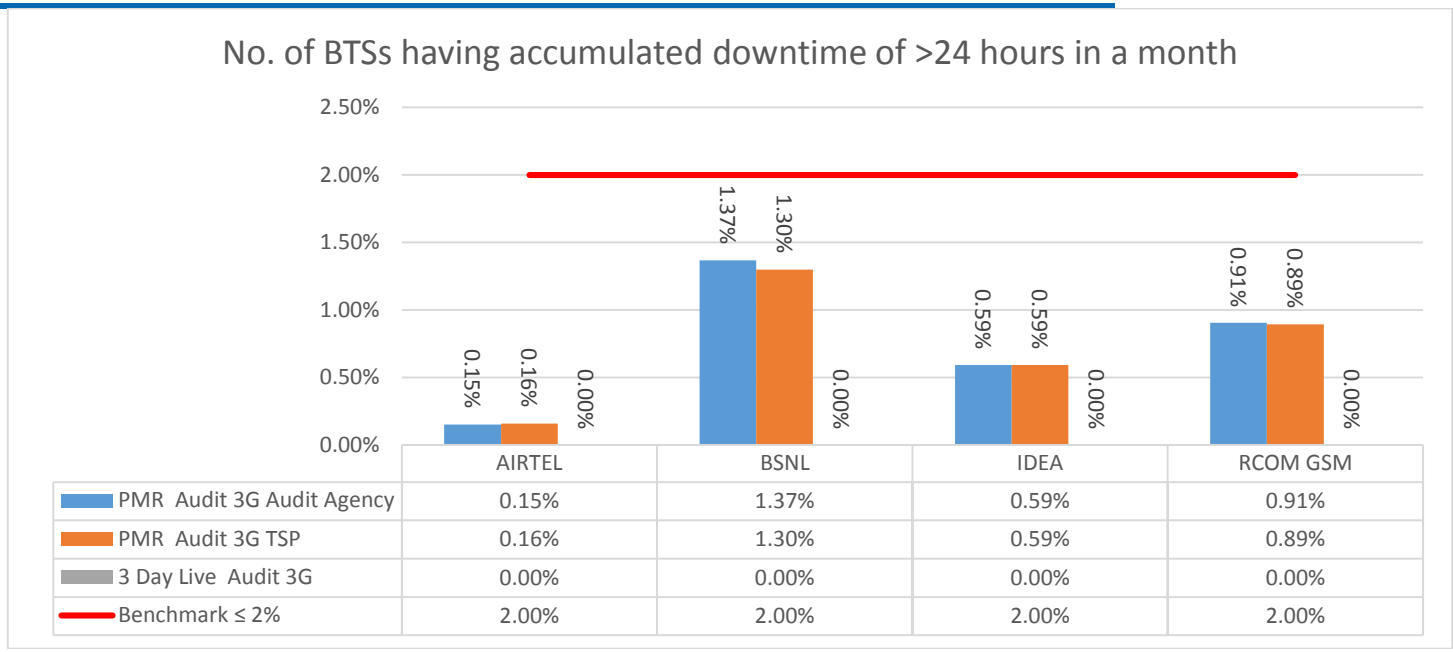
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.15%	1.42%	0.12%	0.23%
			TSP	0.15%	1.37%	0.12%	0.23%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	0.15%	1.37%	0.59%	0.91%
			TSP	0.16%	1.30%	0.59%	0.89%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	Agency	99.16%	98.65%	99.25%	99.36%
			TSP	99.14%	98.67%	99.25%	99.34%
	RRC Congestion:	≤ 1%	Agency	0.02%	0.59%	0.33%	0.08%
			TSP	0.01%	0.53%	0.33%	0.08%
	RAB Congestion:	≤ 2%	Agency	0.00%	0.54%	0.15%	0.01%
			TSP	0.00%	0.50%	0.15%	0.01%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	Agency	0.60%	0.91%	0.77%	0.05%
			TSP	0.60%	0.87%	0.77%	0.05%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	Agency	1.07%	2.08%	1.77%	0.26%
			TSP	1.09%	2.17%	1.77%	0.26%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	Agency	98.89%	99.63%	96.95%	99.90%
			TSP	98.89%	99.60%	96.95%	99.78%

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



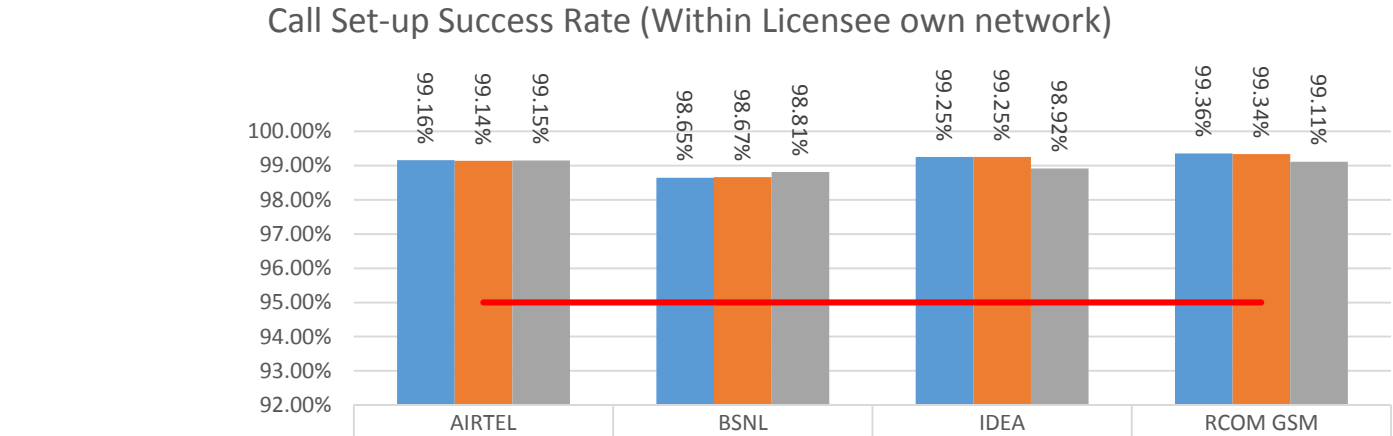
	AIRTEL	BSNL	IDEA	RCOM GSM
PMR Audit 3G Audit Agency	0.15%	1.42%	0.12%	0.23%
PMR Audit 3G TSP	0.15%	1.37%	0.12%	0.23%
3 Day Live Audit 3G	0.45%	0.00%	0.12%	0.13%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%

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



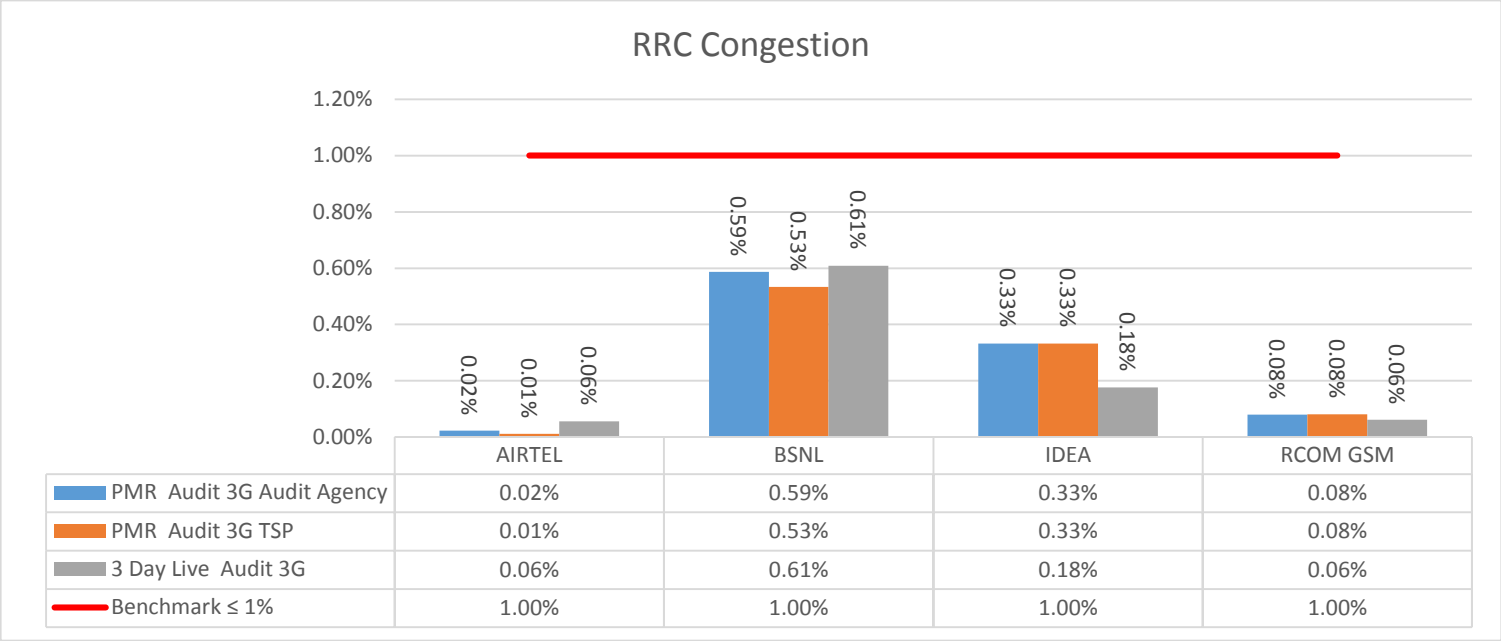
	AIRTEL	BSNL	IDEA	RCOM GSM
PMR Audit 3G Audit Agency	0.15%	1.37%	0.59%	0.91%
PMR Audit 3G TSP	0.16%	1.30%	0.59%	0.89%
3 Day Live Audit 3G	0.00%	0.00%	0.00%	0.00%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%

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



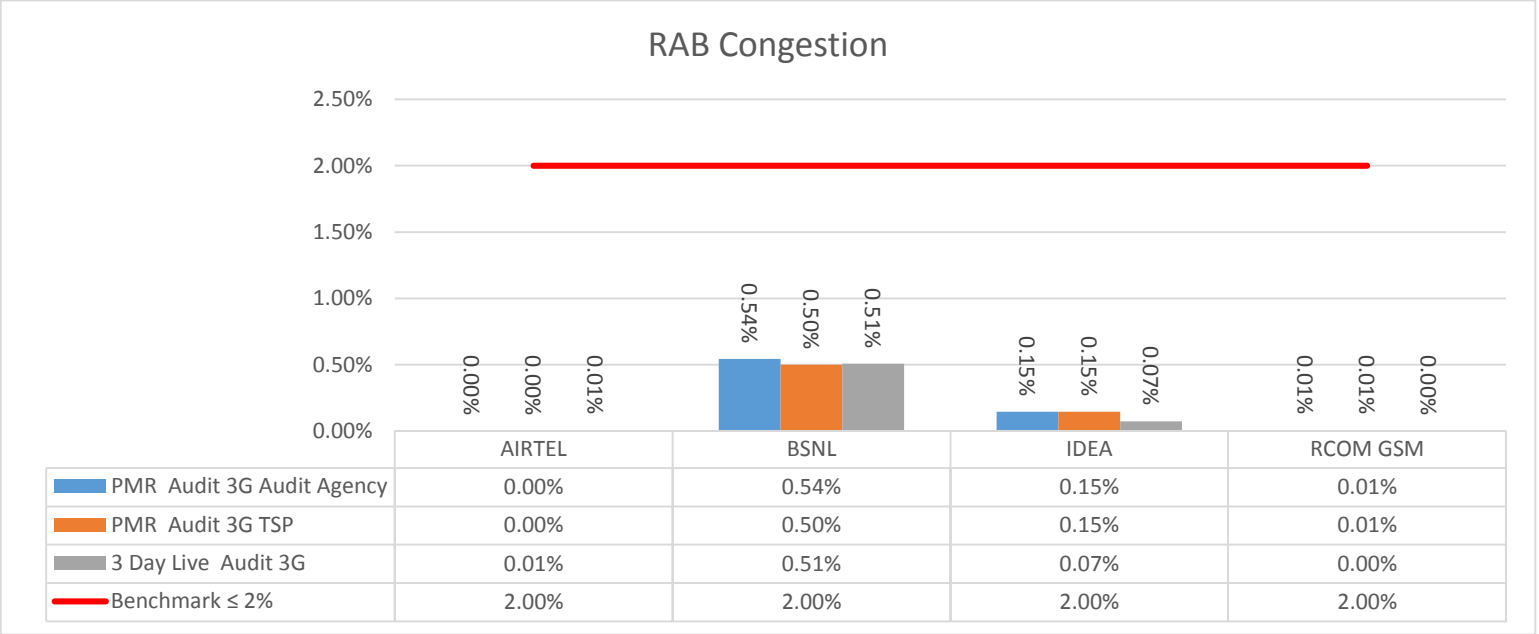
	AIRTEL	BSNL	IDEA	RCOM GSM
PMR Audit 3G Audit Agency	99.16%	98.65%	99.25%	99.36%
PMR Audit 3G TSP	99.14%	98.67%	99.25%	99.34%
3 Day Live Audit 3G	99.15%	98.81%	98.92%	99.11%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%

15.5.4. RRC CONGESTION



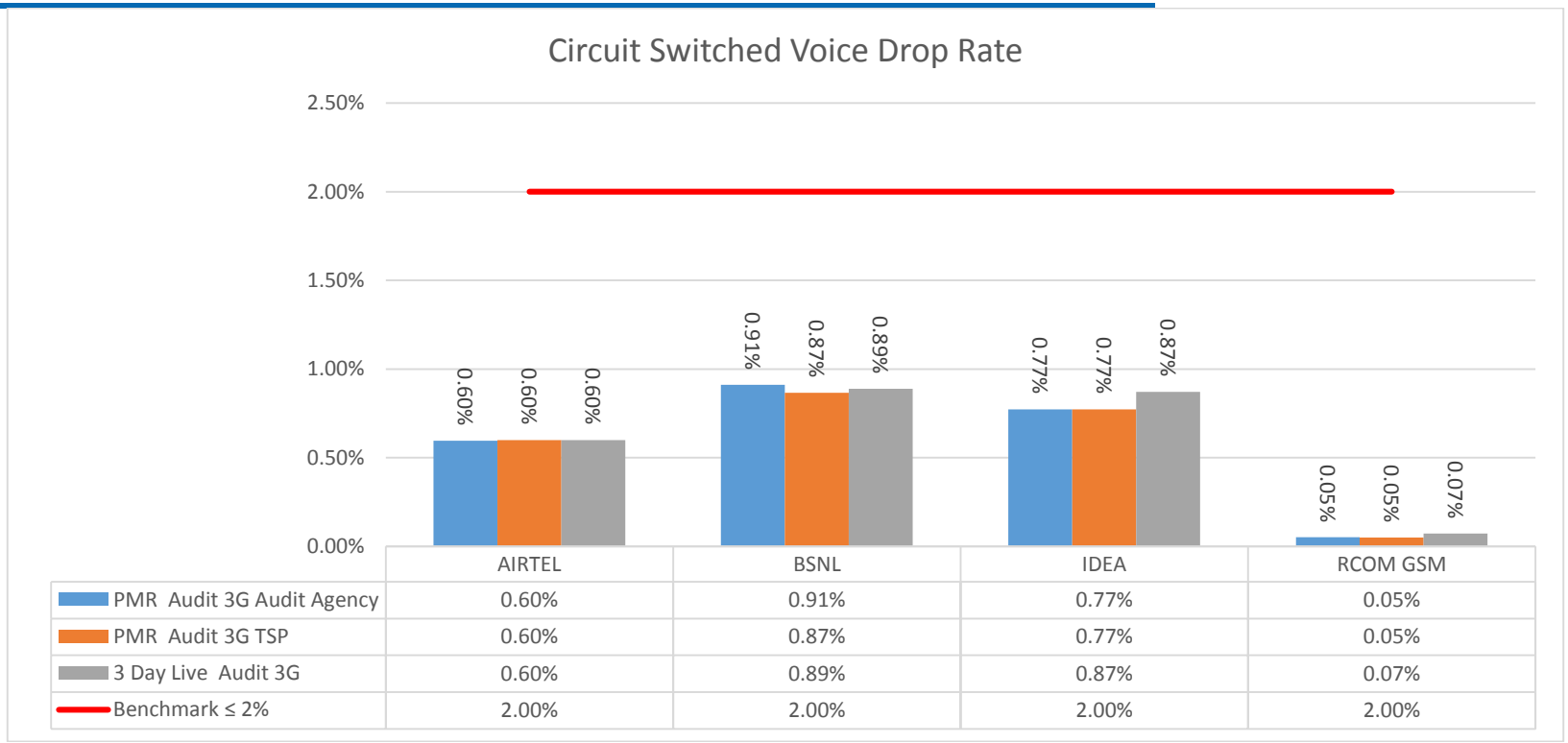
	AIRTEL	BSNL	IDEA	RCOM GSM
PMR Audit 3G Audit Agency	0.02%	0.59%	0.33%	0.08%
PMR Audit 3G TSP	0.01%	0.53%	0.33%	0.08%
3 Day Live Audit 3G	0.06%	0.61%	0.18%	0.06%
Benchmark ≤ 1%	1.00%	1.00%	1.00%	1.00%

15.5.5. RAB CONGESTION



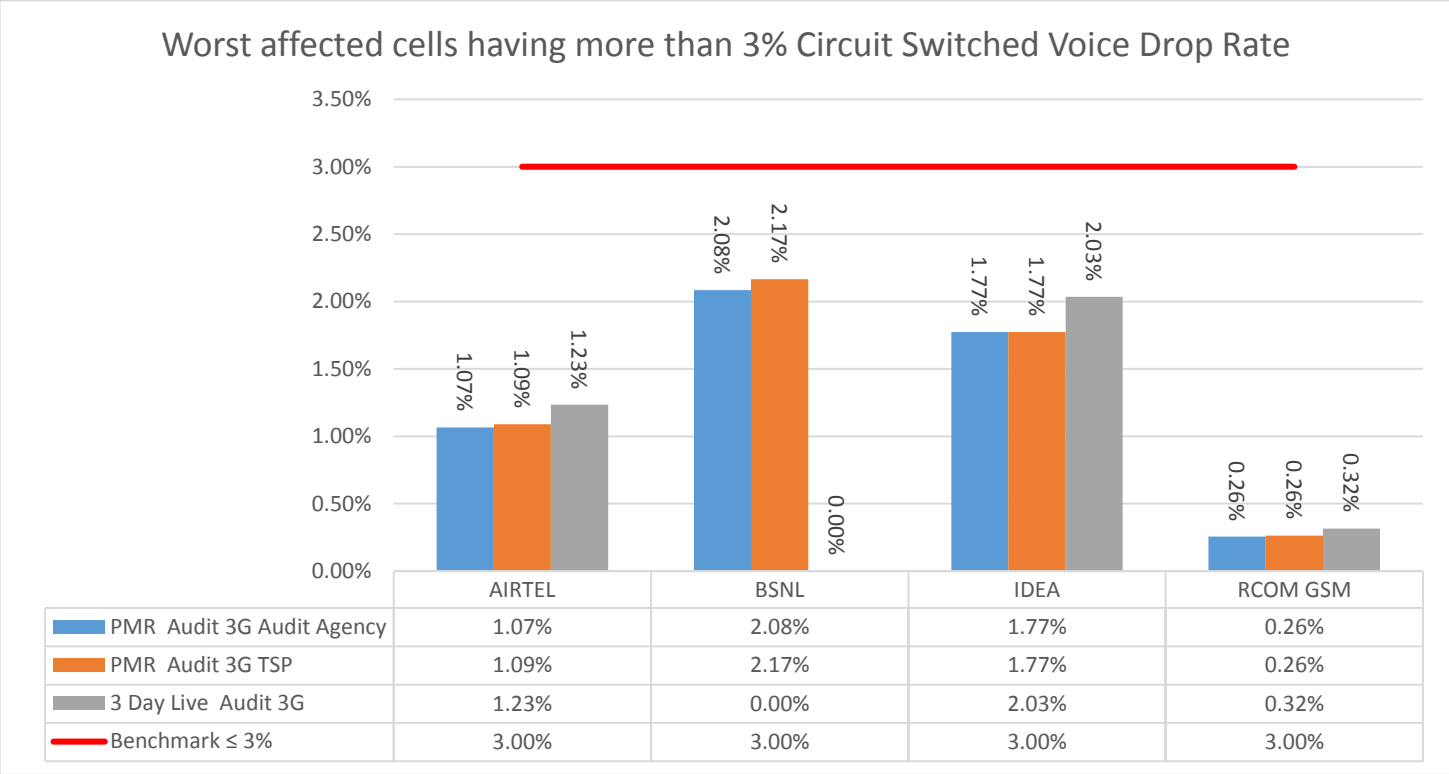
	AIRTEL	BSNL	IDEA	RCOM GSM
PMR Audit 3G Audit Agency	0.00%	0.54%	0.15%	0.01%
PMR Audit 3G TSP	0.00%	0.50%	0.15%	0.01%
3 Day Live Audit 3G	0.01%	0.51%	0.07%	0.00%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%

15.5.6. CIRCUIT SWITCHED VOICE DROP RATE



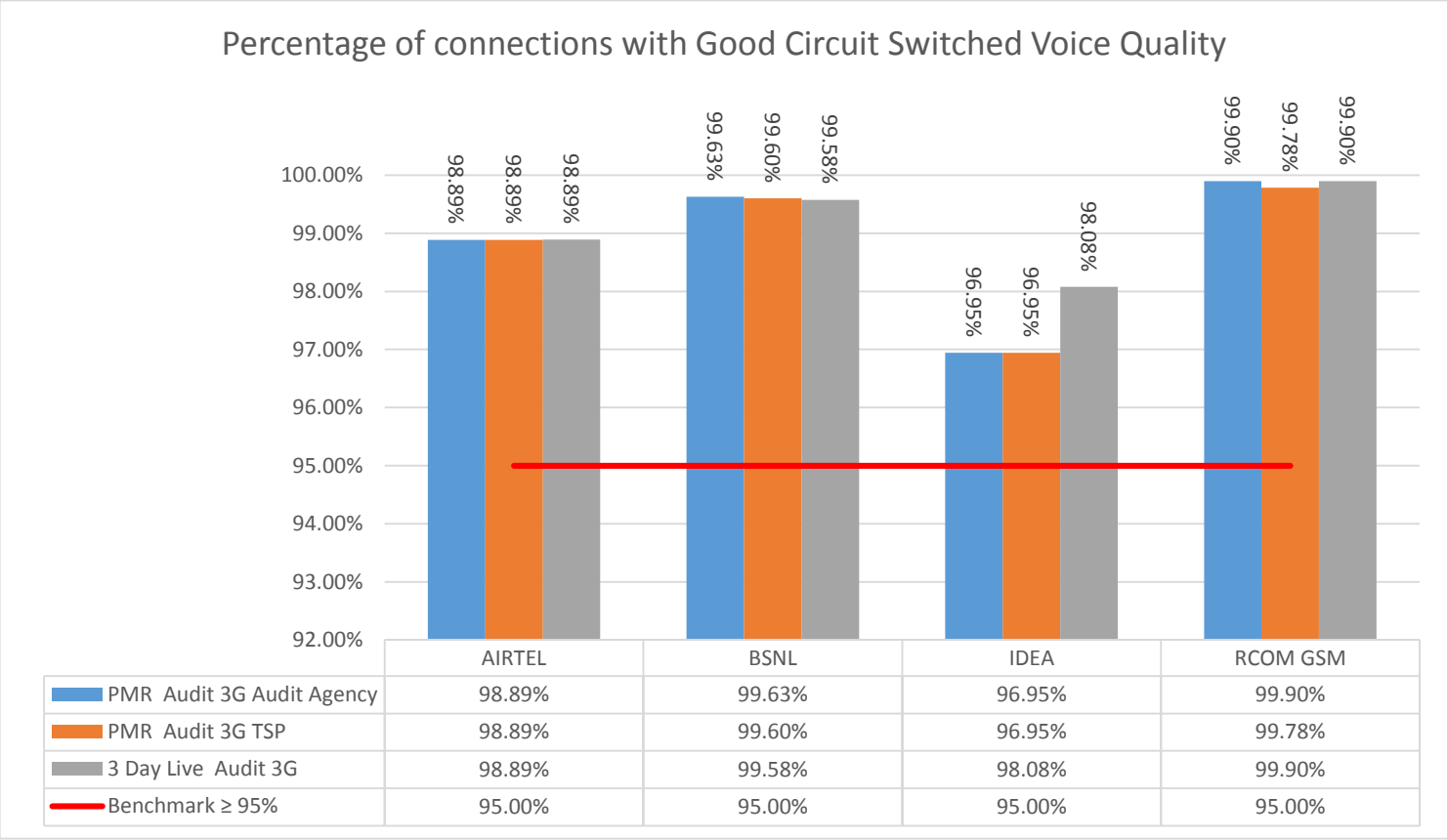
	AIRTEL	BSNL	IDEA	RCOM GSM
PMR Audit 3G Audit Agency	0.60%	0.91%	0.77%	0.05%
PMR Audit 3G TSP	0.60%	0.87%	0.77%	0.05%
3 Day Live Audit 3G	0.60%	0.89%	0.87%	0.07%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%

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



	AIRTEL	BSNL	IDEA	RCOM GSM
PMR Audit 3G Audit Agency	1.07%	2.08%	1.77%	0.26%
PMR Audit 3G TSP	1.09%	2.17%	1.77%	0.26%
3 Day Live Audit 3G	1.23%	0.00%	2.03%	0.32%
Benchmark ≤ 3%	3.00%	3.00%	3.00%	3.00%

15.5.8. PERCENTAGE OF CONNECTIONS WITH GOOD CIRCUIT SWITCHED VOICE QUALITY

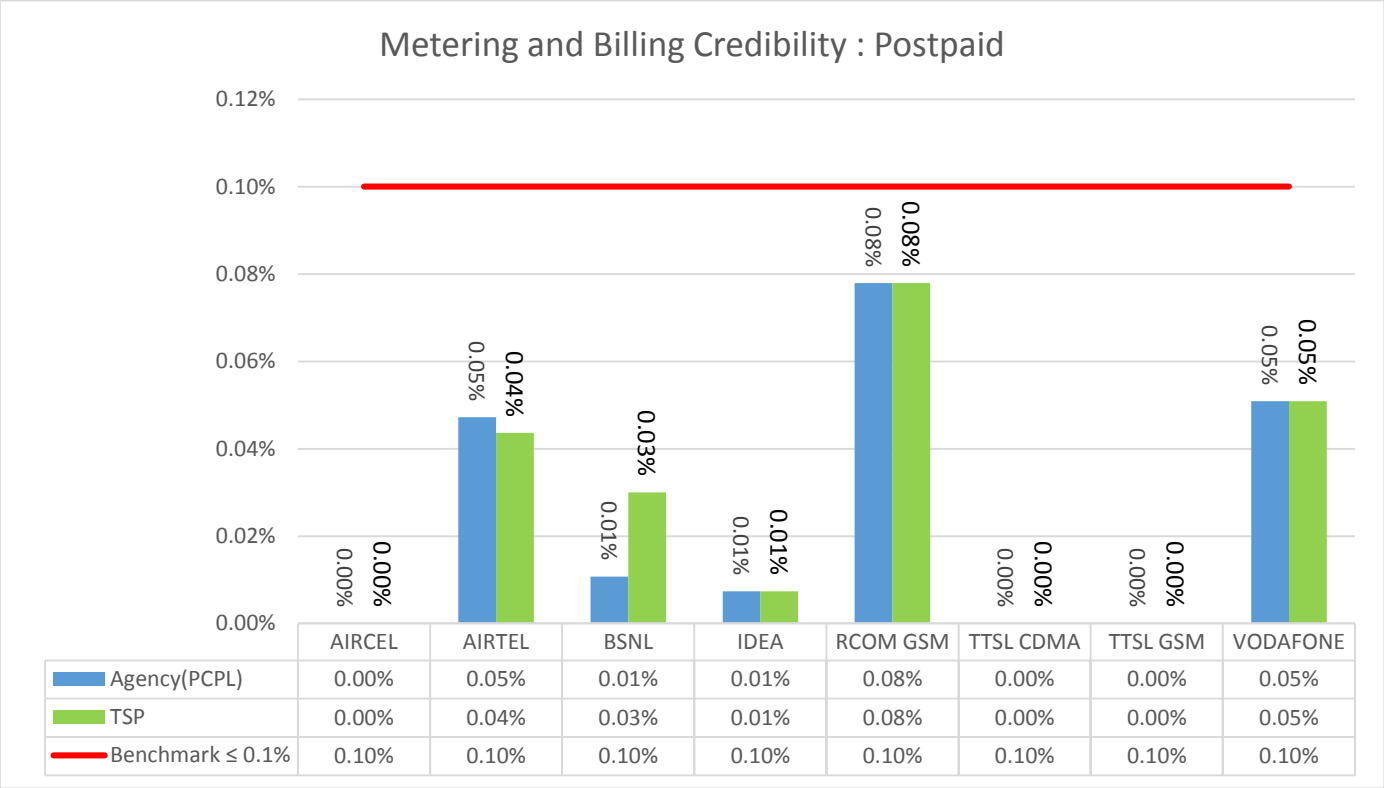


	AIRTEL	BSNL	IDEA	RCOM GSM
PMR Audit 3G Audit Agency	98.89%	99.63%	96.95%	99.90%
PMR Audit 3G TSP	98.89%	99.60%	96.95%	99.78%
3 Day Live Audit 3G	98.89%	99.58%	98.08%	99.90%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%

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

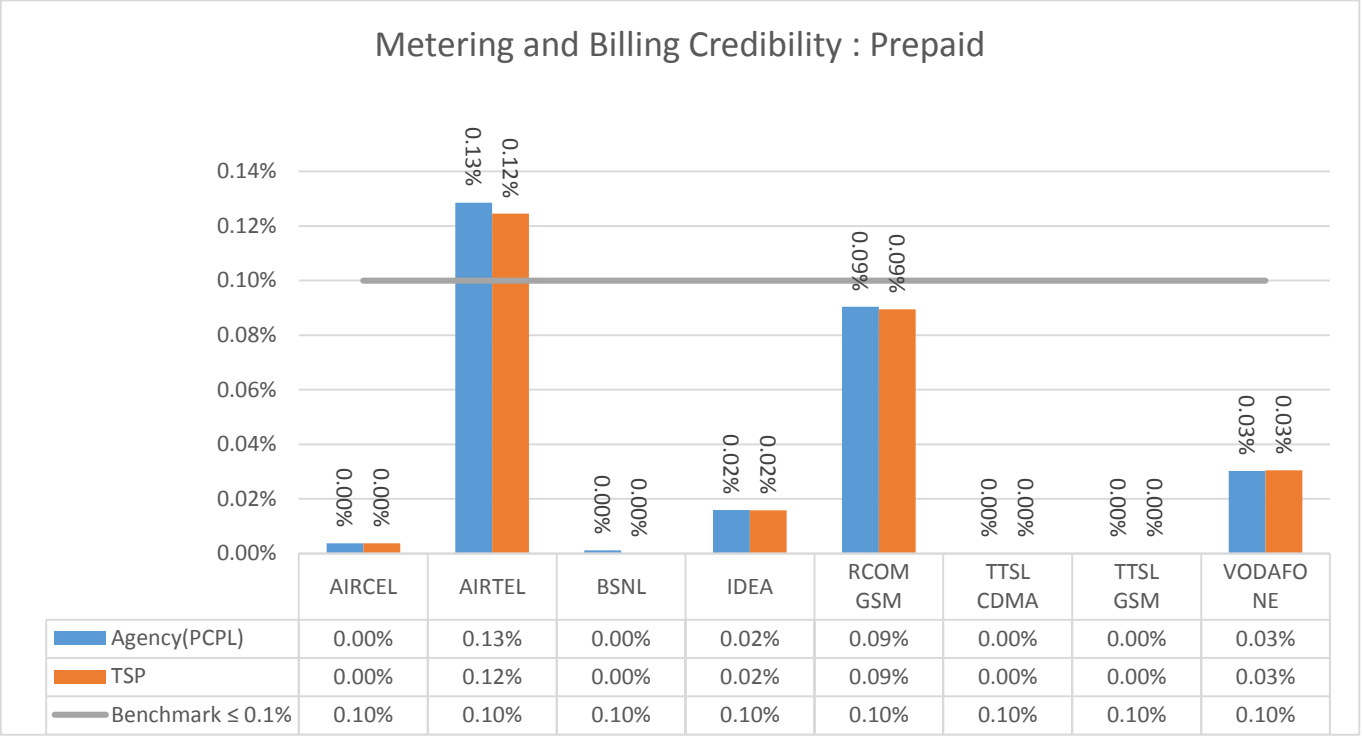
Name of Service Provider	Metering and Billing				Billing Complaints						rmination & Closu		Time taken for		Response time to customer for			
	Postpaid Subscribers		Prepaid Subscribers		%age complaints resolved within 4 weeks		%age complaints resolved within 6 weeks		%age of where credit/waiver is received 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%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.38%	98.38%	96.35%	96.35%
AIRTEL	0.05%	0.04%	0.13%	0.12%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.11%	99.11%	96.48%	96.48%
BSNL	0.01%	0.03%	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%	98.24%	99.53%
IDEA	0.01%	0.01%	0.02%	0.02%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.30%	99.30%	99.39%	99.39%
RCOM GSM	0.08%	0.08%	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.10%	99.10%	97.63%	96.51%
TTSL CDMA	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.28%	100.00%	98.36%	99.60%
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%	98.36%	98.36%	99.21%	99.74%
VODAFONE	0.05%	0.05%	0.03%	0.03%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.53%	99.52%

15.6.1. METERING AND BILLING CREDIBILITY : POSTPAID

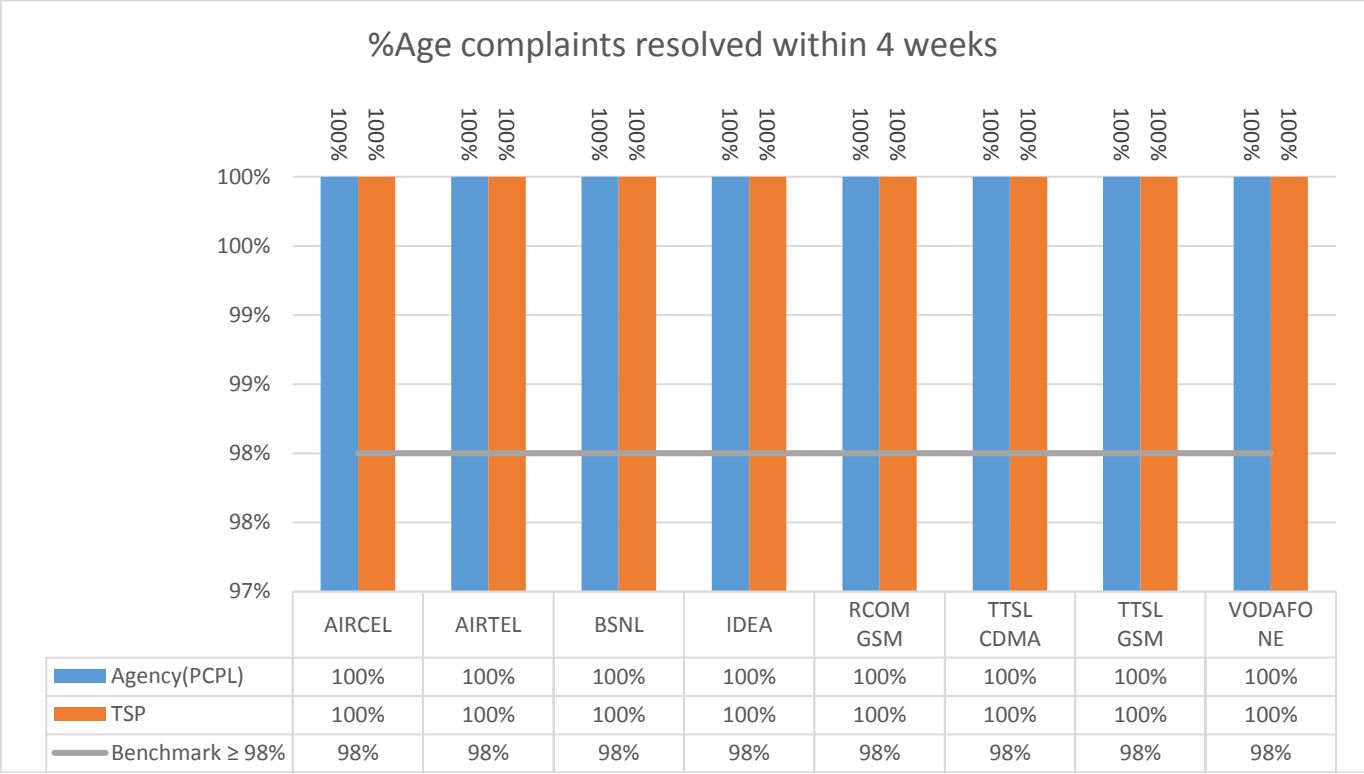


	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	0.00%	0.05%	0.01%	0.01%	0.08%	0.00%	0.00%	0.05%
TSP	0.00%	0.04%	0.03%	0.01%	0.08%	0.00%	0.00%	0.05%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

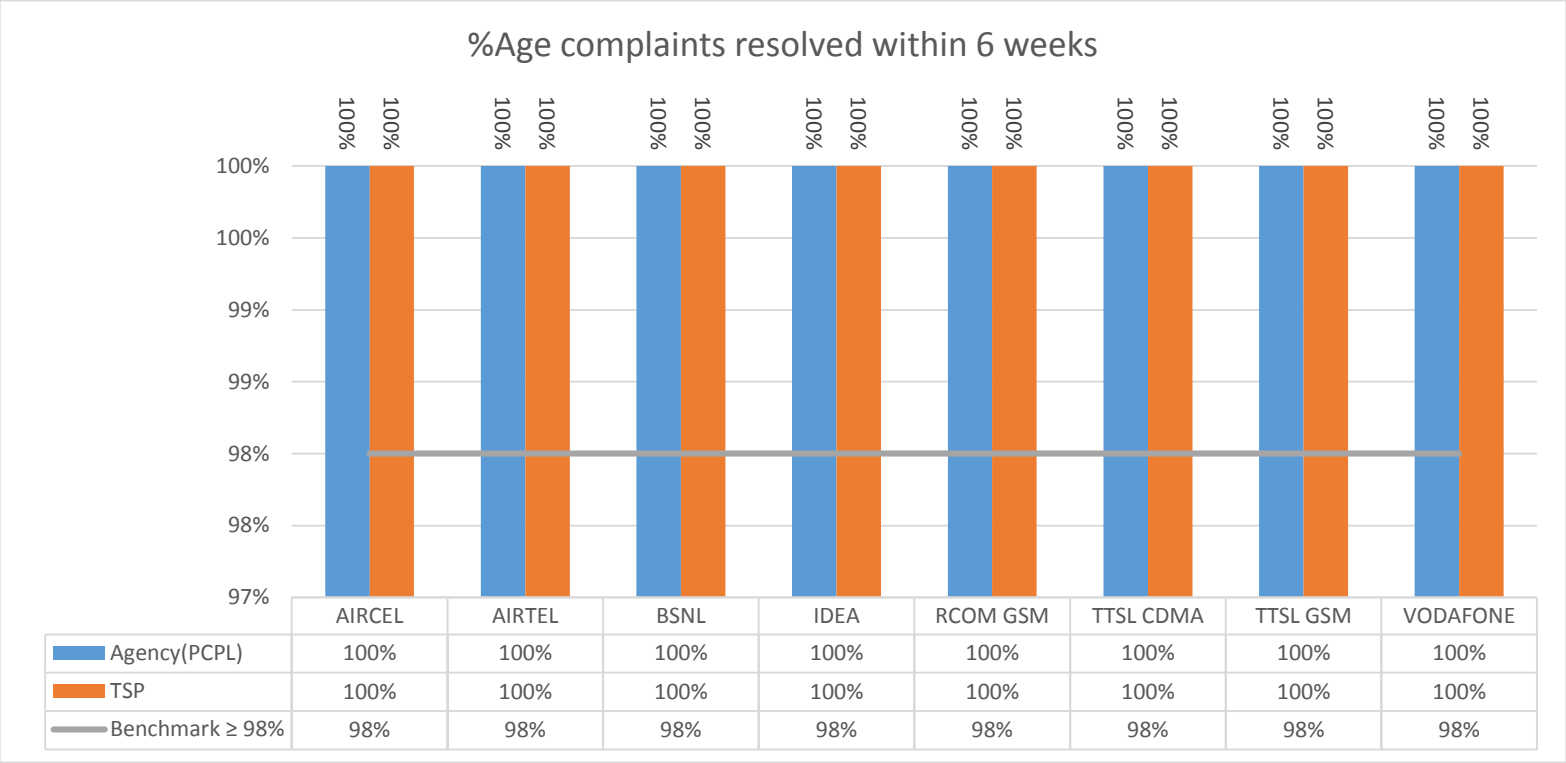
15.6.2. METERING AND BILLING CREDIBILITY : PREPAID



15.6.3. %AGE COMPLAINT RESOLVED WITHIN 4 WEEKS

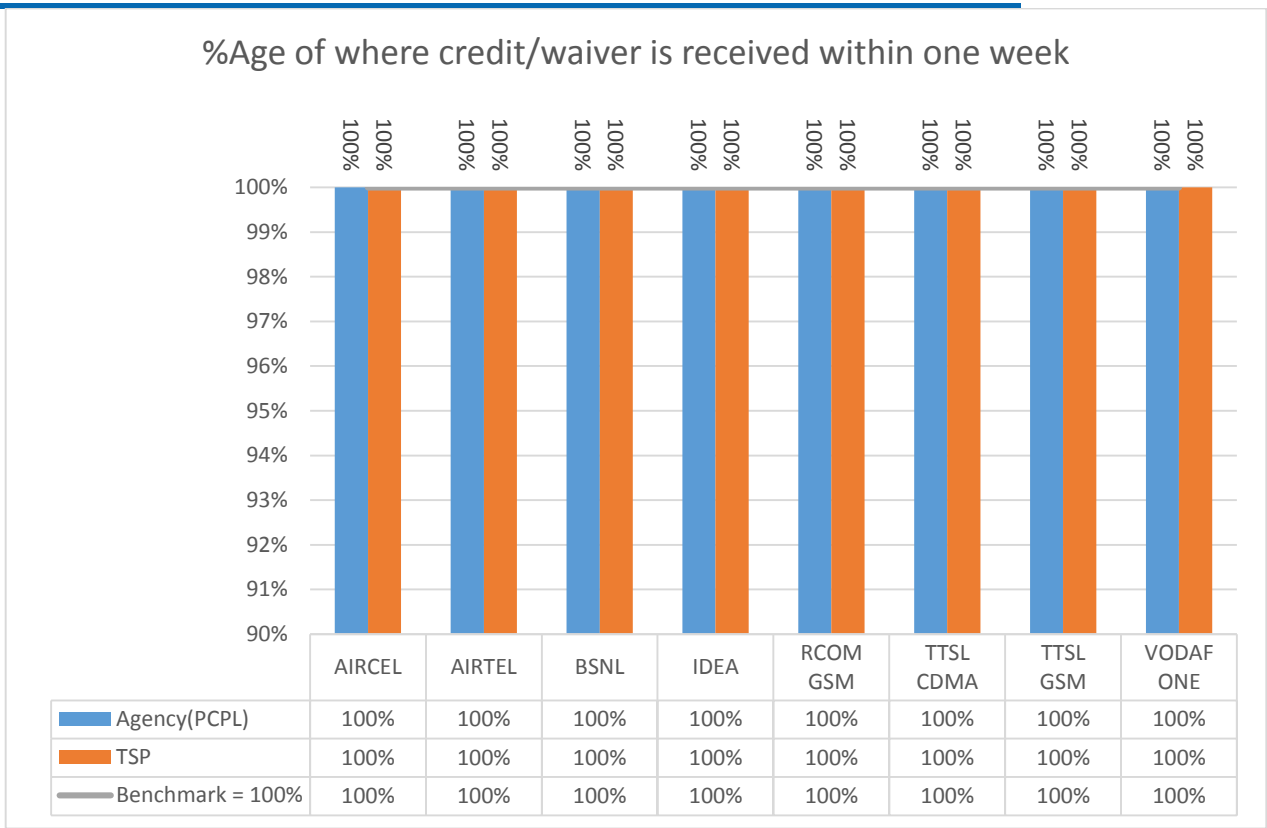


15.6.4. %AGE COMPLAINTS RESOLVED WITHIN 6 WEEKS



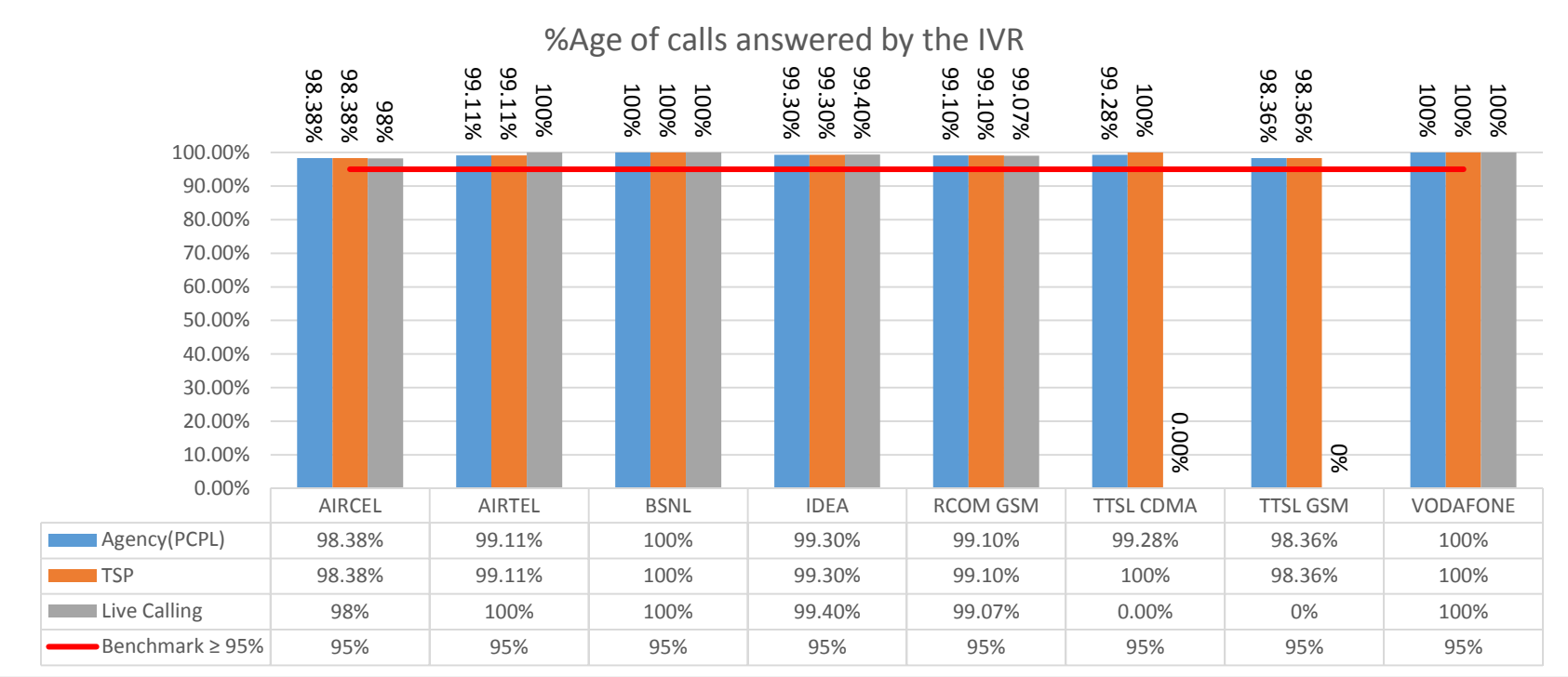
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%
TSP	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark ≥ 98%	98%	98%	98%	98%	98%	98%	98%	98%

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



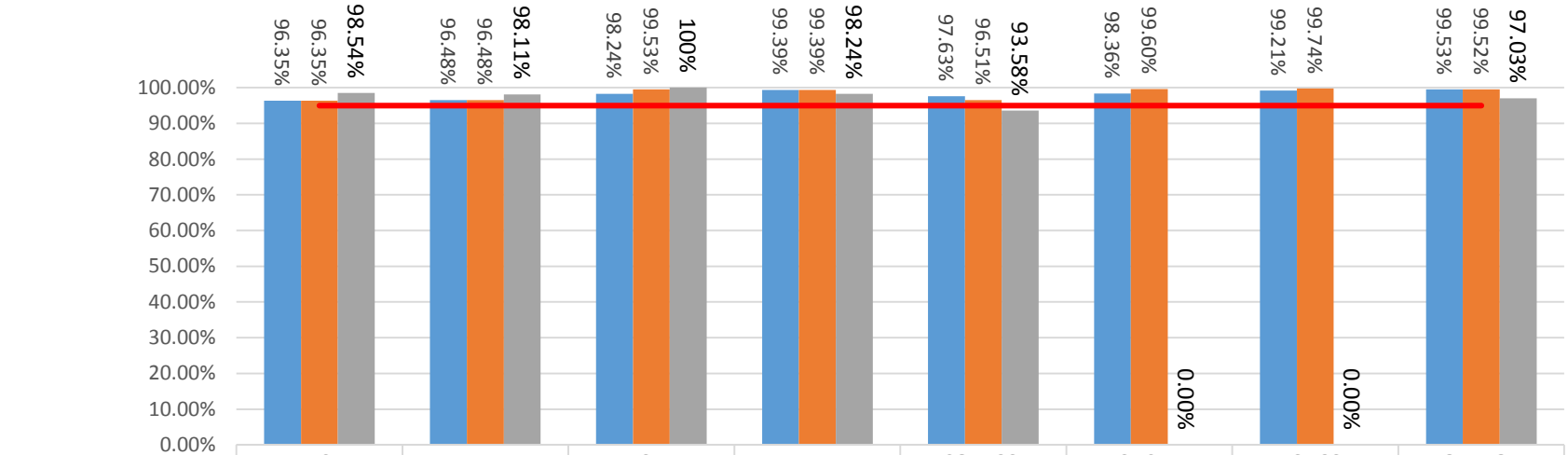
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%
TSP	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%

15.6.6. %AGE OF CALLS ANSWERED BY THE IVR



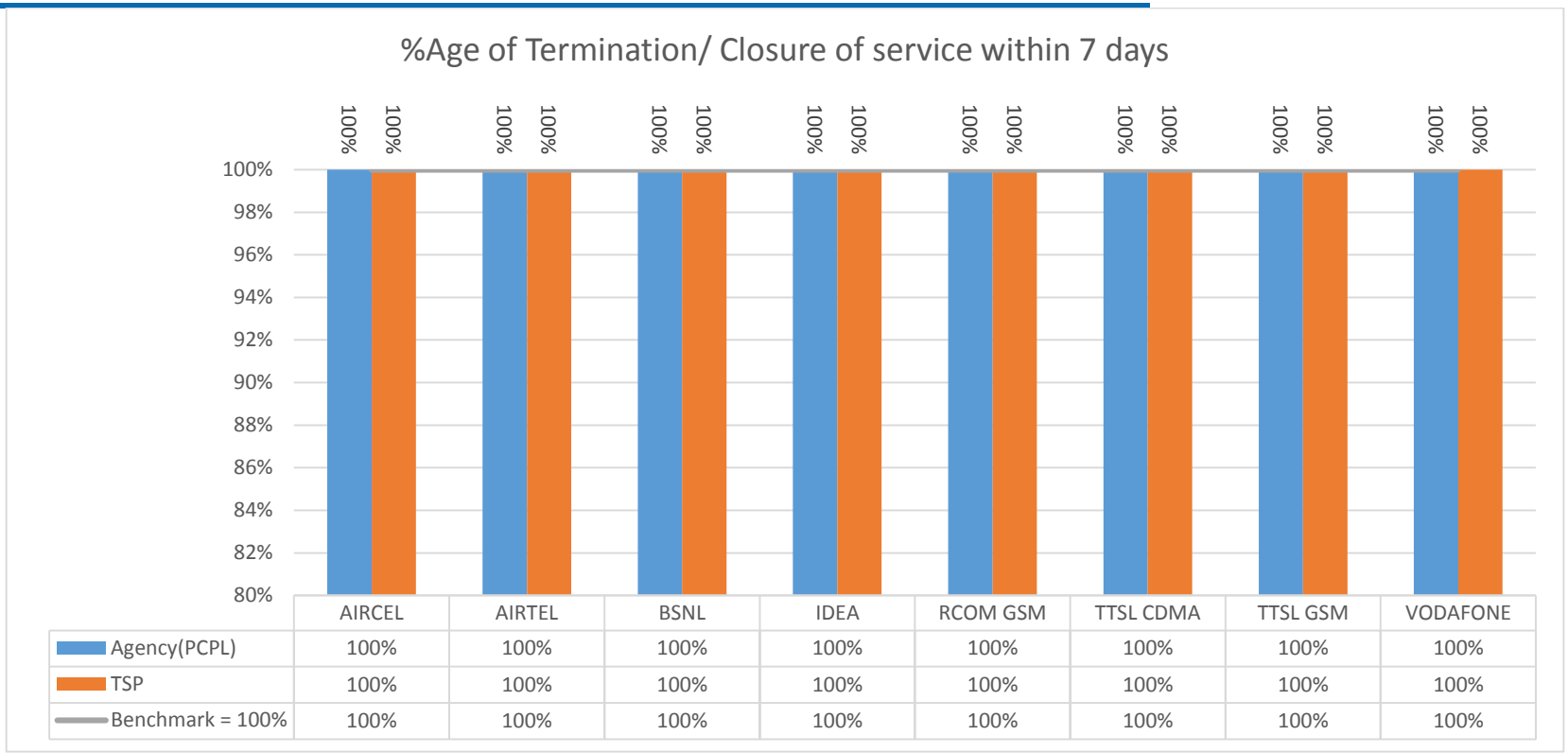
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	98.38%	99.11%	100%	99.30%	99.10%	99.28%	98.36%	100%
TSP	98.38%	99.11%	100%	99.30%	99.10%	100%	98.36%	100%
Live Calling	98%	100%	100%	99.40%	99.07%	0.00%	0%	100%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%

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



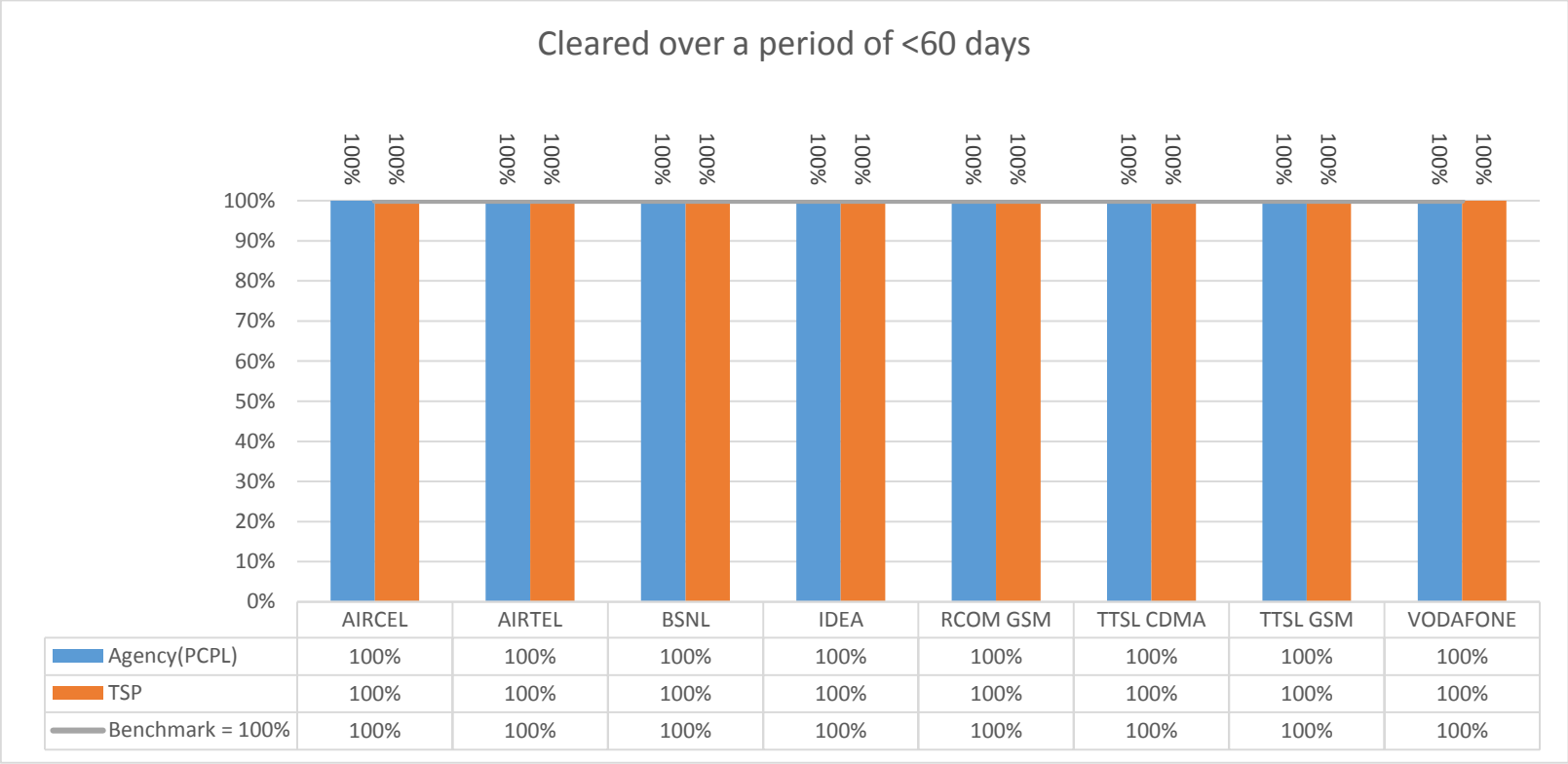
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	96.35%	96.48%	98.24%	99.39%	97.63%	98.36%	99.21%	99.53%
TSP	96.35%	96.48%	99.53%	99.39%	96.51%	99.60%	99.74%	99.52%
Live Calling	98.54%	98.11%	100%	98.24%	93.58%	0.00%	0.00%	97.03%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%

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

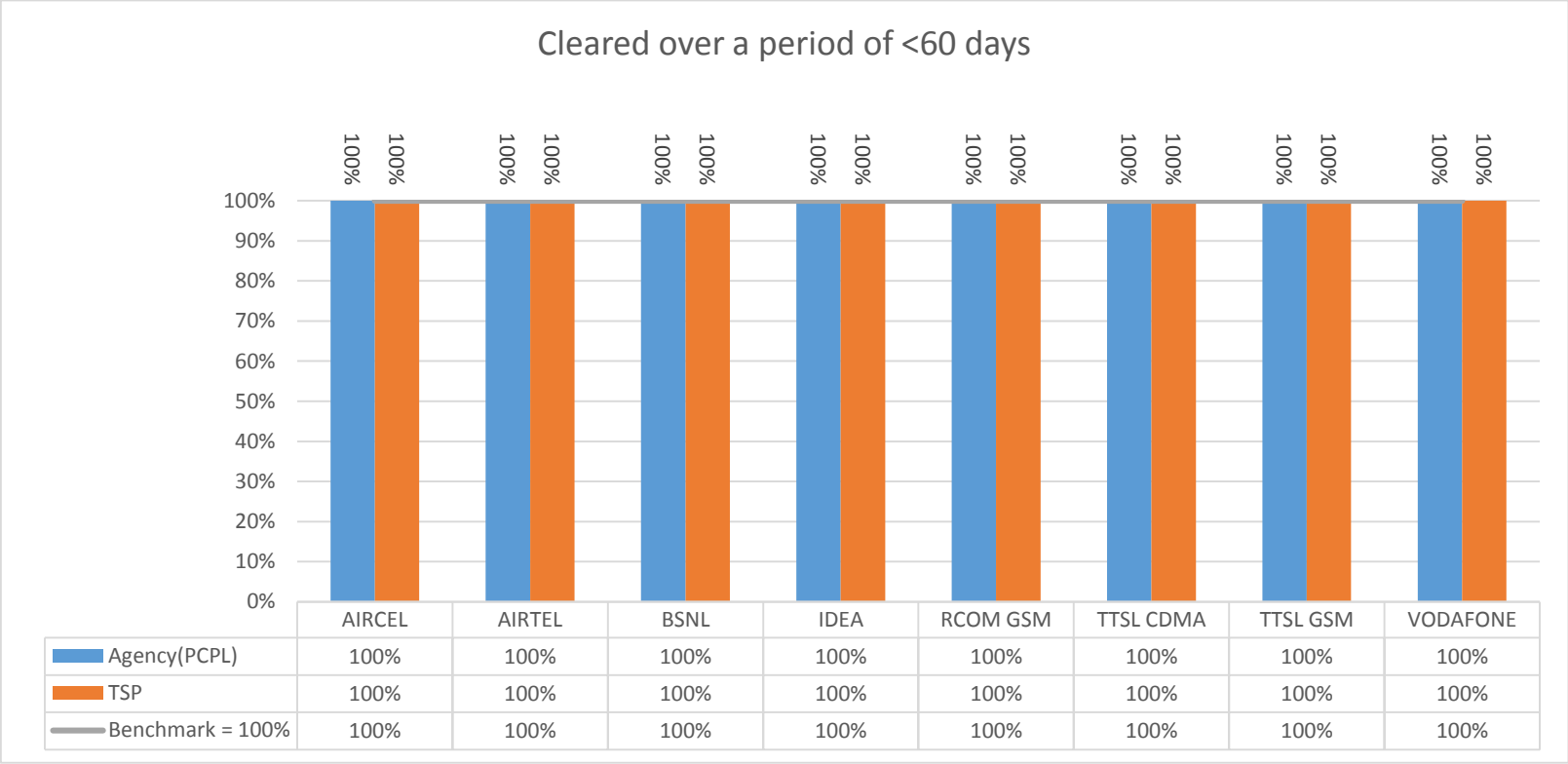


	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%
TSP	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%

15.6.9. CLEARED OVER A PERIOD OF <60 DAYS



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



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

16. KEY FINDINGS

16.1. 2G VOICE PMR – CONSOLIDATED

16.2. 3 DAY LIVE - 2G VOICE PMR – CONSOLIDATED

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

16.3. BILLING AND CUSTOMER CARE

- AIRTEL has parameter value of 0.13% and failed to meet the benchmark of ≤ 0.1% Metering and Billing credibility Prepaid Subscribers.