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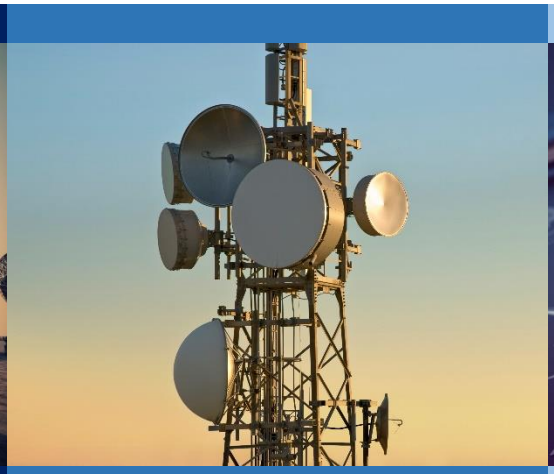
(IS/ISO 9001-2008 Certified Organisation)


AUDIT & ASSESSMENT OF QUALITY OF SERVICE

NORTH ZONE – HIMACHAL PRADESH CIRCLE
CELLULAR MOBILE TELEPHONE SERVICE (CMTS)
(OCTOBER TO DECEMBER 2015)

PREPARED BY:

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1. INTRODUCTION

1.1. ABOUT TRAI

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

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

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

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

1.2. ABOUT PHISTREAM CONSULTING PRIVATE LIMITED

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

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

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

1.3. OBJECTIVES

The primary objective of the Audit module is to:

- Audit and Assess the Quality of Services being rendered by Basic (Wireline), Cellular Mobile (Wireless), and Broadband 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

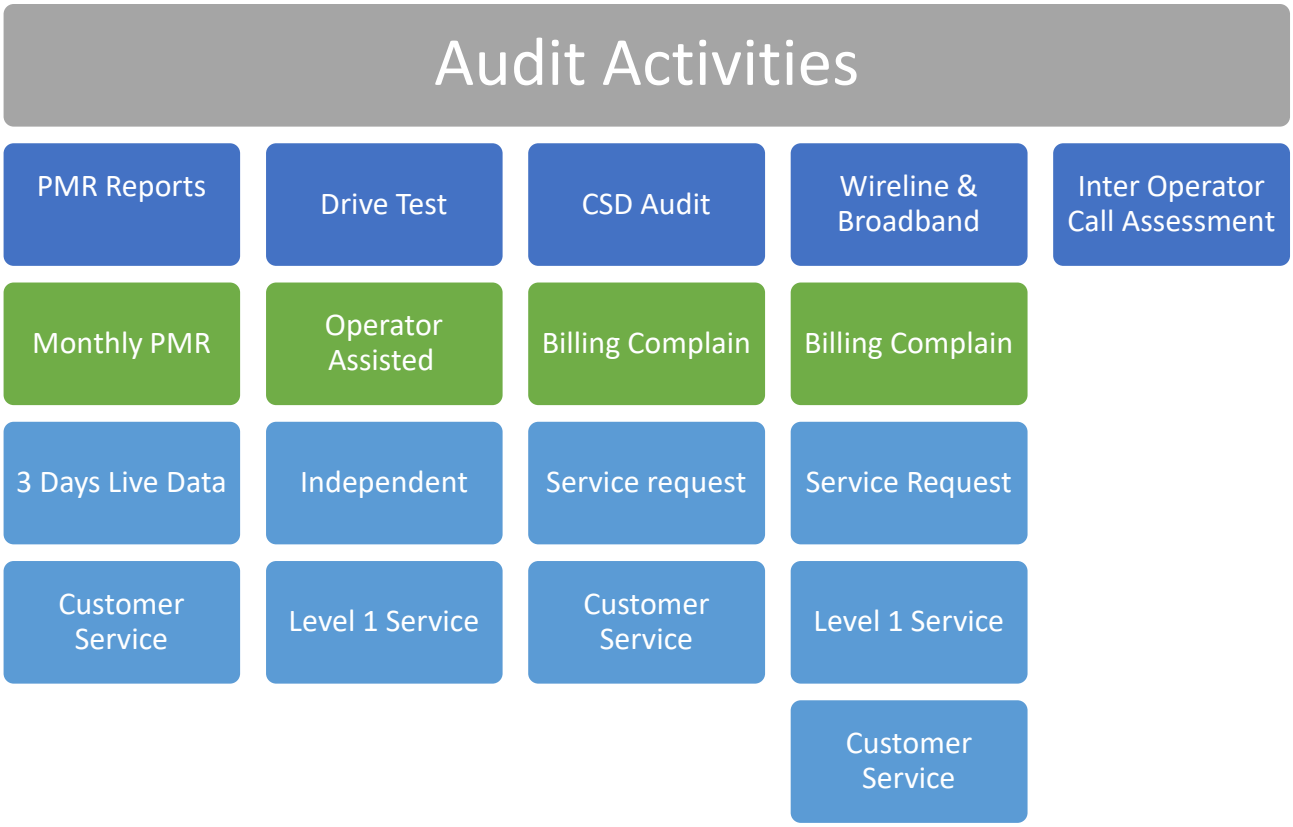
The audit was conducted in Himachal Pradesh Circle covering all SSAs (Secondary Switching Areas).

Image Source: Wikipedia

1.5. SSA List

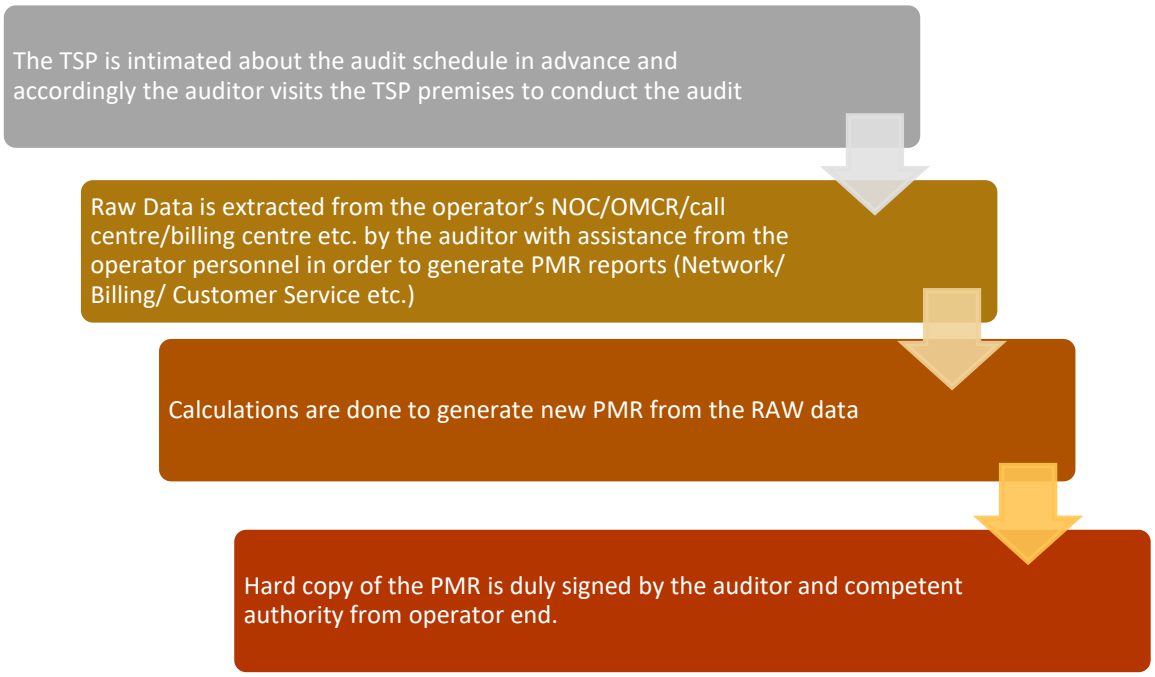
S. No.	Circle	SSA Name	SDCA Name
1	HP	Hamirpur	Amb
2	HP	Hamirpur	Bilaspur
3	HP	Hamirpur	Hamirpur
4	HP	Hamirpur	Una
5	HP	Kandra (dharamsala)	Pangi (killar)
6	HP	Kangra (dharamsala)	Bharmour
7	HP	Kangra (dharamsala)	Chamba
8	HP	Kangra (dharamsala)	Churah (tissa)
9	HP	Kangra (dharamsala)	Dehra gopipur
10	HP	Kangra (dharamsala)	Kangra (dharamsala)
11	HP	Kangra (dharamsala)	Nurpur
12	HP	Kangra (dharamsala)	Palampur
13	HP	Kullu	Banjar
14	HP	Kullu	Kullu
15	HP	Kullu	Lahul (keylong)
16	HP	Kullu	Nirmand
17	HP	Kullu	Spiti (kaza)
18	HP	Kullu	Udaipur
19	HP	Mandi	Jogindernagar
20	HP	Mandi	Mandi
21	HP	Mandi	Sundernagar
22	HP	Shimla	Kalpa
23	HP	Shimla	Pooh
24	HP	Shimla	Rampur bushahar
25	HP	Shimla	Rohru
26	HP	Shimla	Shimla
27	HP	Shimla	Theog
28	HP	Solan	Arki
29	HP	Solan	Nahan
30	HP	Solan	Nalagarh
31	HP	Solan	Paonta
32	HP	Solan	Rajgarh
33	HP	Solan	Solan

1.6. FRAMEWORK USED



2. PMR REPORTS

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



The PMR report for network parameters is taken for each month of the audit quarter and is extracted and verified in the first week of the subsequent month of the audit month. For example, October 2015 audit data was collected in the month of November 2015.

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 December 2015 was collected in the month of December 2015.

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 October, November and December 2015. The performance of operators on various parameters was assessed against the benchmarks.

Parameters includes:

Network Availability

- BTS accumulated downtime
- Worst affected BTS due to downtime

Connection Establishment (Accessibility)

- Call Set Up success Rate (CSSR)

Network Congestion Parameters

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

Connection Maintenance

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

Voice Quality

- % Connections with good voice quality

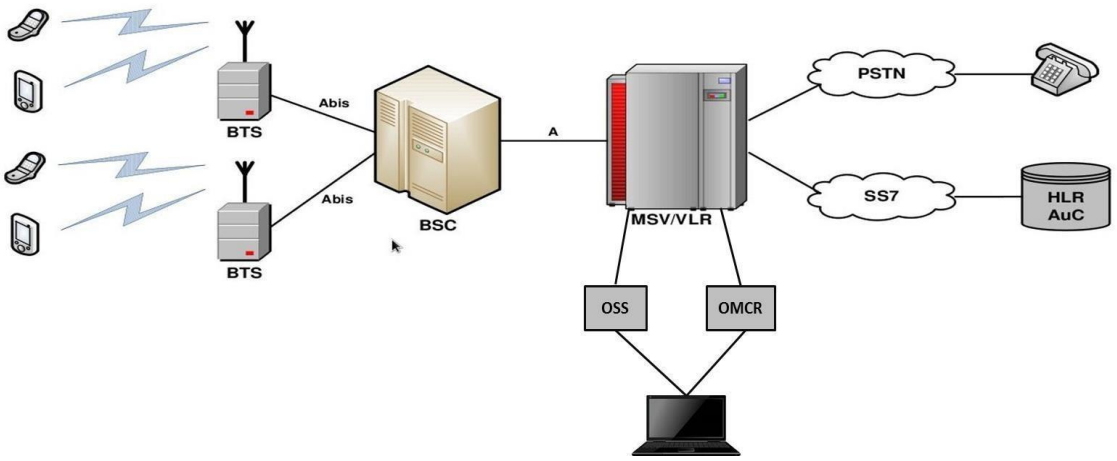
2.2. AUDIT PARAMETER: NETWORK

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

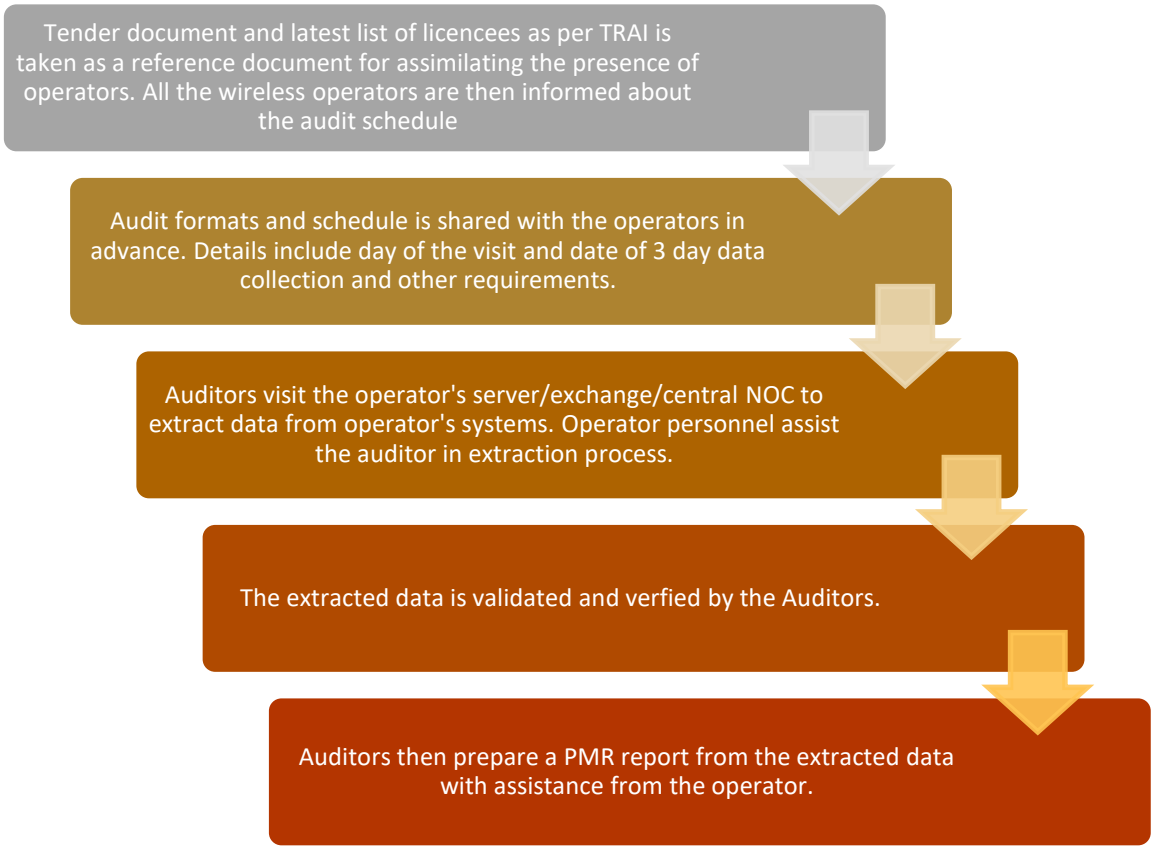
Network Availability	
BTSs Accumulated downtime (not available for service)	≤ 2%
Worst affected BTSs due to downtime	≤ 2%
Connection Establishment (Accessibility)	
Call Set-up Success Rate (within licensee's own network)	≥ 95%
SDCCH/ Paging Channel Congestion	≤ 1 %
TCH Congestion	≤ 2%
Connection Maintenance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

2.3. DATA EXTRACTION POINTS

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



2.4. AUDIT PROCEDURE



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

2.5. NETWORK CALCULATION METHODOLOGY

Parameter	Calculation Methodology
BTS Accumulated Downtime	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month / (24 x Number of days in a month x Number of BTSs in the network in licensed service area) x 100
Worst Affected BTS Due to Downtime	(Number of BTSs having accumulated downtime greater than 24 hours in a month / Number of BTS in Licensed Service Area) * 100
Call Setup Success Rate	(Calls Established / Total Call Attempts) * 100

SDCCH/ Paging Channel Congestion	SDCCH / TCH Congestion% = [(A1 x C1) + (A2 x C2) +…….+ (An x Cn)] / (A1 + A2 +…+ An) Where: A1 = Number of attempts to establish SDCCH / TCH made on day 1 C1 = Average SDCCH / TCH Congestion % on day 1 A2 = Number of attempts to establish SDCCH / TCH made on day 2
TCH Congestion	C2 = Average SDCCH / TCH Congestion % on day 2 An = Number of attempts to establish SDCCH / TCH made on day n Cn = Average SDCCH / TCH Congestion % on day n
POI Congestion	POI Congestion% = [(A1 x C1) + (A2 x C2) +…….+ (An x Cn)] / (A1 + A2 +…+ An) Where: A1 = POI traffic offered on all POIs (no. of calls) on day 1 C1 = Average POI Congestion % on day 1 A2 = POI traffic offered on all POIs (no. of calls) on day 2 C2 = Average POI Congestion % on day 2 An = POI traffic offered on all POIs (no. of calls) on day n Cn = Average POI Congestion % on day n
Call Drop Rate	Total Calls Dropped / Total Calls Established x 100
Worst Affected Cells having more than 3% TCH drop	Total number of cells having more than 3% TCH drop during CBBH/ Total number of cells in the LSA x 100
Connections with good voice quality	No. of voice samples with good voice quality / Total number of samples x 100

2.6. 3G VOICE

S. No.	Name of Parameter	Definition	Formula	Benchmark
1	Network Availability			
a.	Total no. of Node B's in LSA	Total no. of Node B's Licensed in LSA		
b.	Total downtime of all Node B's	When all the sector(s) of a Node B's are down for > 60 minutes at an instant in a whole day		
c.	No. of Worst Affected Node B's	Node B'ss having more than 24 hours of Downtime in 3 Days	No. of Node B's having accumulated downtime of >24 hours in a month ((No. of Node B's having Accumulated Downtime of > 24 hrs in a month) / Total no. of BTSs in the licensed service area)*100	*<=2%*
d.		Node B's downtime more than 24 hr in 3 days	Total no. of Node B's in the Licensed Service Area	*<=2%*

	Node B's accumulated downtime		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. of RAB Failed Calls to the Total no. of RAB Assigned Calls	RAB Attempts (RAB Setup Access) (C)	<=2%
			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 affected cells having more than 3% Circuit Switched Voice Drop Rate:	It is the % of total no. of Cells having > 3% Circuit Switched Voice drop to the total no. cells	Total No. of Cells (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	Total No. of POI's in Month having >=0.5% POI congestion	Total no. Of POI's which are exceeding the POI congession 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

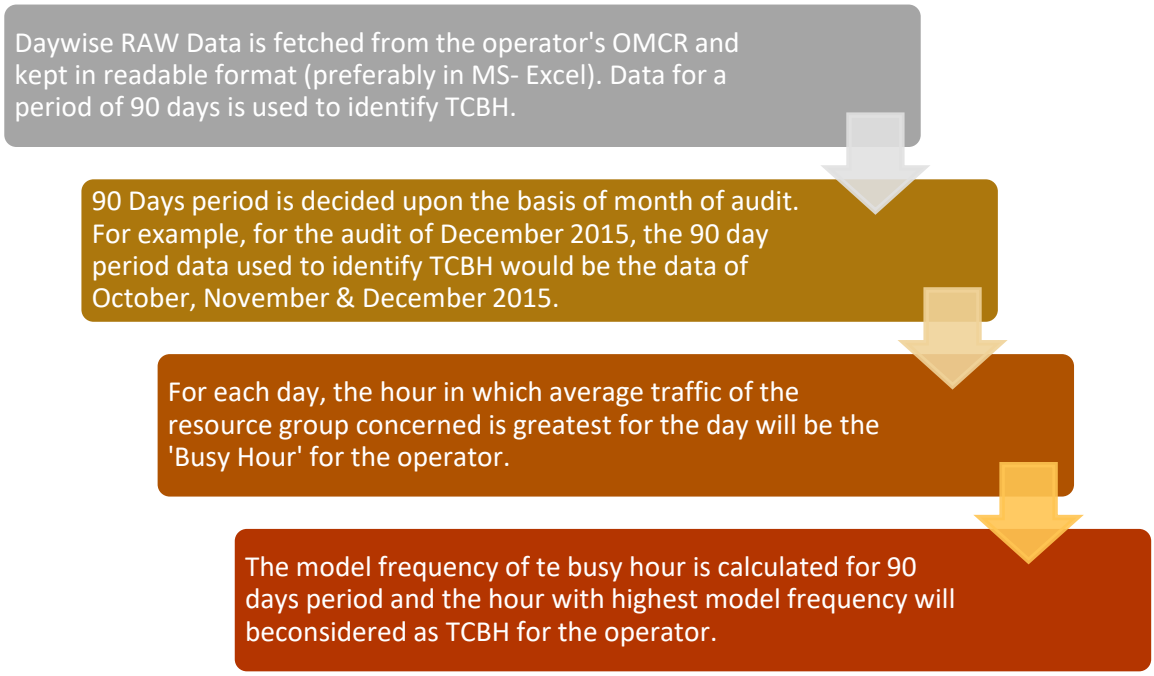
The main purpose of 3 day live measurement is to evaluate the network parameters on intraday basis. While the monthly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the network parameters discussed earlier. All the 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 Q0S network parameters. For example, network congestion being faced by an operator during busy/peak hours.

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

3.1. TCBH: SIGNIFICANCE AND SELECTION METHODOLOGY

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



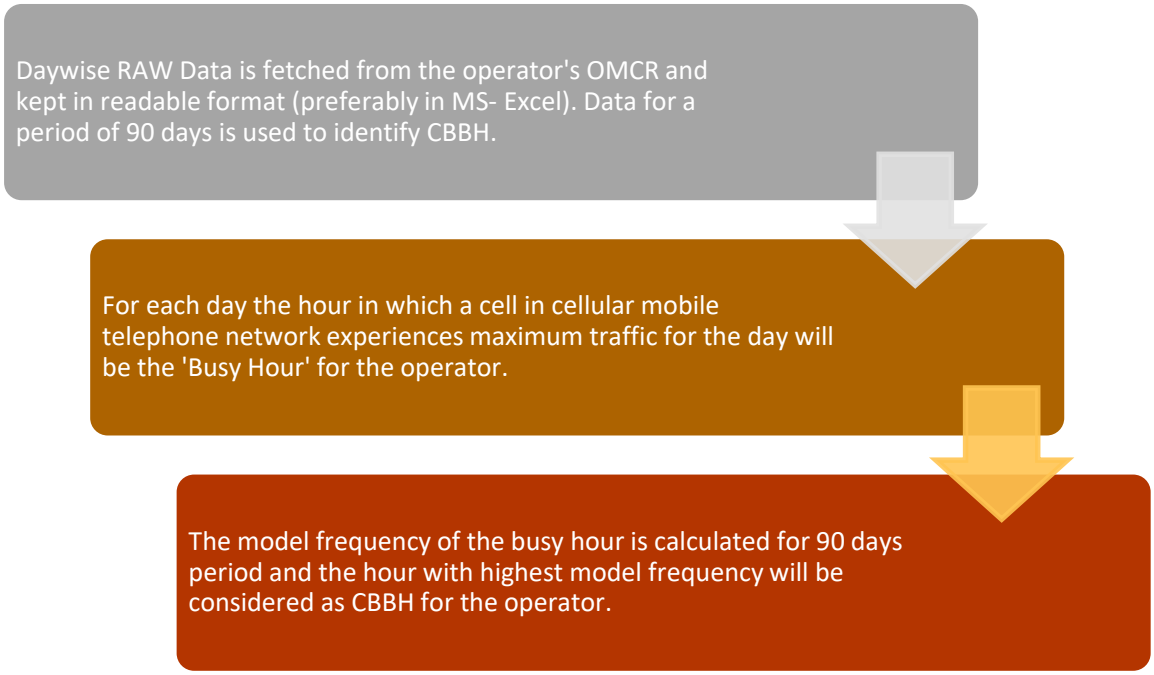
During audit, the auditors identified from the raw data that the TCBH for the operators in Oct – Nov – Dec 2015 was the time period as given below:

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

3.2. CBBH: Significance and Selection Methodology

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

Step by step procedure to identify CBBH for an operator:



4. CUSTOMER SERVICE PARAMETERS

The data to generate PMR report for customer service parameters is extracted at the operator premises and verified once every quarter in the subsequent month of the last month of the quarter. For example, data for quarter ending December 2015 was collected in the month of December 2015. To extract the data for customer service parameters for the purpose of audit, auditors primarily visit the following locations/ departments/ offices at the operator's end.

- Central Billing Center
- Central Customer Service Center

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

The Customer Service Quality Parameters include the following:

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

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

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

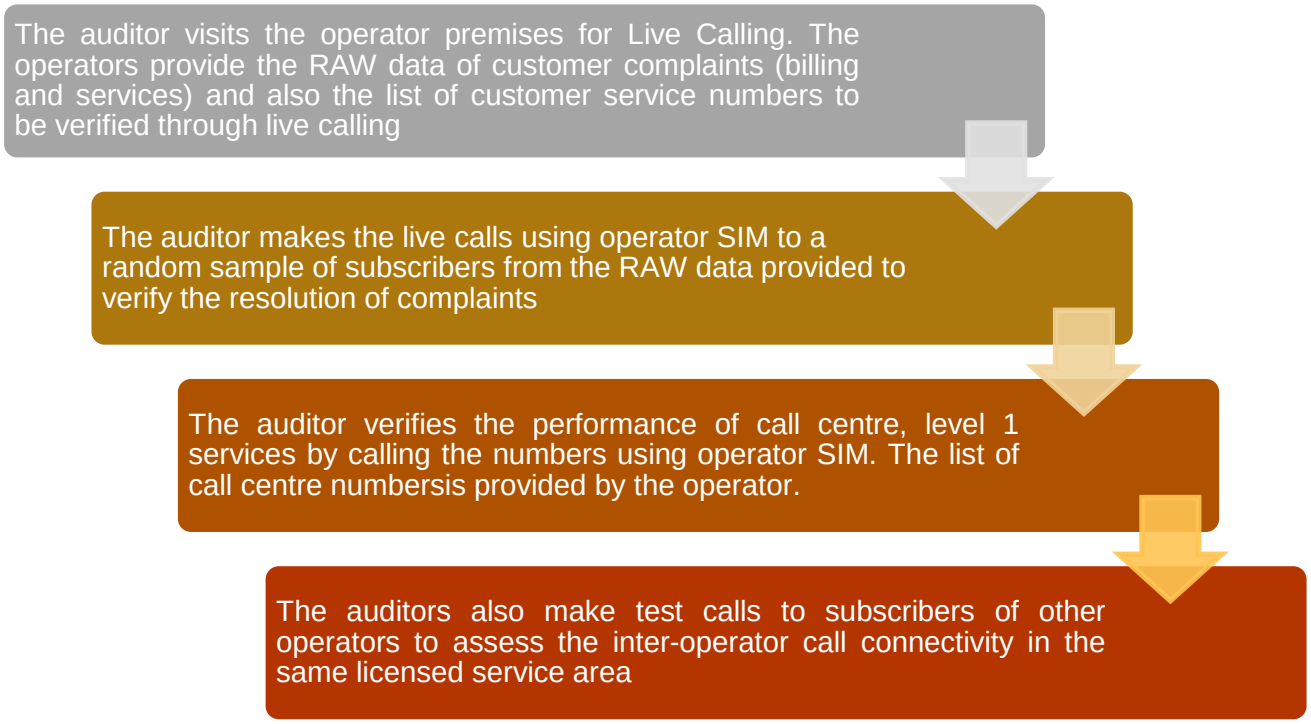
4.1. AUDIT PARAMETERS: CUSTOMER SERVICE

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

4.2. CALCULATION METHODOLOGY: CUSTOMER SERVICE PARAMETER

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

4.3. LIVE CALLING: SIGNIFICANCE AND METHODOLOGY



Live calling activity was carried out during the period of December 2015. 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 October 2015 was considered for live calling activity conducted in November 2015.
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 October, November and December'15, auditor has tried contacting the list of Level 1 services provided by TRAI as per the NNP (National Numbering Plan).

4.7. PROCESS TO TEST LEVEL 1 SERVICE

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

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

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

4.8. CUSTOMER CARE

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

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

The process for this parameter is stated below:

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

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

4.9. INTER OPERATOR CALL ASSESSMENT

A total of 100 calls per service provider to all the other service providers in a licensed service area were done for the purpose of audit.

Inter Operator Call Assessment	Aircel	Airtel	BSNL	Idea	Reliance GSM	Reliance CDMA	TTSL GSM	TTSL CDMA	Vodafone
Aircel	-	99%	99%	99%	99%	98%	99%	100%	99%
Airtel	99%	-	98%	99%	98%	100%	99%	98%	100%
BSNL	98%	100%	-	98%	100%	99%	98%	98%	98%
Idea	100%	100%	99%	-	100%	100%	99%	100%	100%
Reliance GSM	98%	97%	97%	98%	-	99	98	97	98%
Reliance CDMA	98%	99%	97%	99%	98%	-	99%	98%	100%
TTSL GSM	97%	98%	99%	100	99%	99%	-	98%	98%
TTSL CDMA	98%	99%	100%	100%	99%	99%	100%	-	98%
Vodafone	98%	96%	98%	98%	100%	100%	99%	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 consist 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 objective assessment of Quality of Service (QoS) carried out gives an insight into the overall performance of various operators in the Himachal Pradesh Circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

6.1. OPERATORS COVERED

Name of Operator	Number of Subscriber (Up to December 31, 2105)
BSNL	1566258
Airtel	2315704
Aircel	566436
Idea	786117
Reliance CDMA	176515
Reliance GSM	1567783
TATA CDMA	18656
TATA GSM	152
Vodafone	600608

TSP	No. of Cells	BTS	BSC	MSC+GMSC	Node B	RNC
Aircel	2193	735	8	2	NA	NA
Airtel	4440	1525	17	6	1308	5
Idea	3440	1150	7	2	522	2
TTSL GSM	15	5	1	1	NA	NA
TTSL CDMA	422	130	1	1	NA	NA
RCOM GSM	2250	751	12	2	170	2
RCOM CDMA	860	287	NA	1	NA	NA
Vodafone	2520	828	10	1	NA	NA
BSNL	3586	1231	18	4+1	294	6

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

6.2. AUDIT SCHEDULE

Operator	(3 Days Live) October 2015	October 2015	November 2015	December 2015
Airtel	29th Oct 2015	6th Nov 2015	10th Dec 2015	8th Jan 2016
Vodafone	2nd Nov 2015	16th Nov 2015	15th Dec 2015	13th Jan 2016
Idea	29th Oct 2015	9th Nov 2015	9th Dec 2015	11th Jan 2016
Reliance	26th Oct 2015	5th Nov 2015	11th Dec 2015	21st Jan 2016
BSNL	2nd Nov 2015	10th Nov 2015	16th Nov 2015	14th Jan 2016
Aircel	3rd Nov 2015	7th Nov 2015	15th Dec 2015	16th Jan 2016
Tata Teleservices	28th Oct 2015	10th Nov 2015	7th Dec 2015	19th Jan 2016

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

Colour codes to read the report:

	Not meeting the benchmark
NA	Data not applicable
DNA	Data not available at TSP premises

6.3. 2G VOICE PMR DATA: OCTOBER

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of BTSs in a month in hrs. in the licensed service area	No. of BTSs having accumulated downtime of >24 hours in a month	Call Set-up Success Rate (Within License own network	SDDCH/Paging chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst Affected cell having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	0.27%	1.09%	99.41%	0.03%	0.40%	1.40%	13.31%	95.33%
Airtel	0.08%	0.13%	97.93%	0.16%	0.43%	0.71%	1.49%	98.51%
BSNL	1.88%	1.96%	98.86%	0.84%	1.14%	1.78%	3.01%	DNA
Idea	0.14%	0.00%	98.82%	0.10%	0.60%	1.33%	2.10%	95.88%
RCOM CDMA	0.09%	0.70%	98.04%	0.00%	0.96%	0.06%	0.42%	98.87%
RCOM GSM	0.12%	0.93%	97.11%	0.21%	0.66%	0.48%	1.86%	96.92%
TTSL CDMA	0.02%	0.00%	99.16%	0.00%	0.04%	0.11%	1.70%	98.13%
TTSL GSM	0.00%	0.00%	99.48%	0.00%	0.00%	0.38%	4.20%	98.78%
Vodafone	0.02%	0.00%	99.80%	0.01%	0.20%	0.66%	2.44%	97.63%

- Aircel has a parameter value of **13.31%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- BSNL has a parameter value of **3.01%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- TTSL GSM has a parameter value of **4.20%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

6.4. 2G VOICE PMR DATA: NOVEMBER

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of BTSs in a month in hrs. in the licensed service area	No. of BTSs having accumulated downtime of >24 hours in a month	Call Set-up Success Rate (Within License own network	SDDCH/Paging chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Wost Affected call having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	0.21%	1.09%	99.67%	0.01%	0.13%	1.35%	11.38%	95.37%
Airtel	0.11%	0.40%	98.26%	0.18%	0.36%	0.81%	1.60%	98.26%
BSNL	1.94%	1.95%	98.37%	0.85%	1.61%	1.93%	2.98%	DNA
Idea	0.13%	0.26%	99.19%	0.08%	0.28%	1.17%	2.66%	97.56%
RCOM CDMA	0.05%	0.35%	98.09%	0.00%	0.93%	0.06%	0.37%	98.95%
RCOM GSM	0.08%	0.67%	97.19%	0.20%	0.65%	0.29%	1.33%	97.02%
TTSL CDMA	0.01%	0.00%	99.39%	0.00%	0.00%	0.09%	1.50%	98.14%
TTSL GSM	0.00%	0.00%	99.72%	0.00%	0.00%	0.35%	2.67%	98.67%
Vodafone	0.02%	0.00%	99.84%	0.04%	0.16%	0.61%	2.42%	97.71%

- Aircel has a parameter value of **11.38%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

6.5. 2G VOICE PMR DATA: DECEMBER

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of BTSs in a month in hrs. in the licensed service area	No. of BTSs having accumulated downtime of >24 hours in a month	Call Set-up Success Rate (Within License own network	SDDCH/Paging chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Wost Affected call having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	0.20%	1.09%	99.60%	0.01%	0.20%	1.30%	11.20%	95.45%
Airtel	0.13%	0.26%	97.96%	0.31%	0.57%	0.81%	1.65%	98.32%
BSNL	1.79%	1.95%	98.04%	0.64%	1.93%	1.99%	2.86%	DNA
Idea	0.10%	0.52%	99.28%	0.06%	0.29%	1.22%	1.66%	96.73%
RCOM CDMA	0.09%	0.70%	97.99%	0.00%	0.94%	0.06%	0.39%	99.11%
RCOM GSM	0.10%	0.67%	95.01%	0.26%	1.81%	0.30%	0.44%	96.75%
TTSL CDMA	0.00%	0.00%	99.43%	0.00%	0.01%	0.09%	1.34%	98.13%
TTSL GSM	0.00%	0.00%	99.75%	0.00%	0.00%	0.42%	6.02%	98.52%
Vodafone	0.02%	0.00%	99.90%	0.01%	0.10%	0.65%	2.46%	97.80%

- Aircel has a parameter value of **11.20%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- TTSL GSM has a parameter value of **6.02%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

6.6. 2G VOICE PMR DATA: CONSOLIDATED

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of BTSs in a month in hrs. in the licensed service area	No. of BTSs having accumulated downtime of >24 hours in a month	Call Set-up Success Rate (Within License own network	SDDCH/Paging chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Wost Affected call having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	0.23%	1.09%	99.56%	0.02%	0.24%	1.35%	11.96%	95.38%
Airtel	0.11%	0.26%	98.05%	0.21%	0.45%	0.78%	1.58%	98.36%
BSNL	1.87%	1.95%	98.42%	0.78%	1.56%	1.90%	2.96%	DNA
Idea	0.12%	0.26%	99.10%	0.08%	0.39%	1.24%	2.14%	96.72%
RCOM CDMA	0.08%	0.58%	98.04%	0.00%	0.94%	0.06%	0.39%	98.97%
RCOM GSM	0.10%	0.75%	96.44%	0.22%	1.04%	0.36%	1.22%	96.90%
TTSL CDMA	0.01%	0.00%	99.33%	0.00%	0.02%	0.09%	1.51%	98.13%
TTSL GSM	0.00%	0.00%	99.65%	0.00%	0.00%	0.38%	4.30%	98.66%
Vodafone	0.02%	0.00%	99.85%	0.02%	0.15%	0.64%	2.44%	97.71%

- Aircel has a parameter value of **11.96%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- TTSL GSM has a parameter value of **4.30%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

6.7. 2G VOICE 3 DAYS LIVE DATA

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

6.8. 2G VOICE 3 DAYS LIVE DATA: OCTOBER

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of BTSs in a month in hrs. in the licensed service area	No. of BTSs having accumulated downtime of >24 hours in a month	Call Set-up Success Rate (Within License own network	SDDCH/Paging chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Wost Affected call having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	0.23%	0.00%	99.59%	0.01%	0.23%	1.25%	11.52%	95.40%
Airtel	0.20%	0.00%	98.08%	0.04%	0.34%	0.73%	2.35%	98.49%
BSNL	2.68%	0.05%	97.52%	1.12%	2.48%	2.70%	5.40%	DNA
Idea	0.14%	0.00%	99.10%	0.16%	0.41%	1.26%	2.61%	95.93%
RCOM CDMA	0.14%	0.00%	98.09%	NA	0.92%	0.06%	0.31%	98.92%
RCOM GSM	0.14%	0.00%	97.11%	0.16%	0.48%	0.36%	0.92%	96.98%
TTSL CDMA	0.00%	0.00%	99.26%	NA	0.00%	0.09%	1.03%	98.16%
TTSL GSM	0.00%	0.00%	99.52%	0.00%	0.00%	0.00%	0.00%	99.24%
Vodafone	0.02%	0.00%	99.89%	0.01%	0.11%	0.61%	2.40%	97.63%

- Aircel has a parameter value of **11.52%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- BSNL has a parameter value of **1.12%** and failed to meet the benchmark for SDCCH Congestion which is pre-defined at ≤ 1%.
- BSNL has a parameter value of **2.68%** and failed to meet the benchmark for Sum of downtime of BTSs in a month in hrs. in the licensed service area which is pre-defined at ≤ 2%.
- BSNL has a parameter value of **2.48%** and failed to meet the benchmark for TCH Congestion drop which is pre-defined at ≤ 2%.
- BSNL has a parameter value of **2.70%** and failed to meet the benchmark for Call Drop Rate (%age) which is pre-defined at ≤ 2%.

- BSNL has a parameter value of **5.40%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- **For each instance of "DNA (Data Not Available)", please refer the respective hard copy of audit report(s).

6.9. 2G VOICE 3 DAYS LIVE DATA: NOVEMBER

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of BTSs in a month in hrs. in the licensed service area	No. of BTSs having accumulated downtime of >24 hours in a month	Call Set-up Success Rate (Within License own network	SDDCH/Paging chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Wost Affected call having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	0.16%	0.00%	99.72%	0.00%	0.09%	1.35%	12.68%	95.36%
Airtel	0.53%	0.00%	98.33%	0.04%	0.28%	0.70%	1.23%	98.55%
BSNL	2.32%	0.05%	97.65%	2.67%	2.35%	2.61%	4.12%	DNA
Idea	0.18%	0.00%	99.35%	0.03%	0.20%	1.15%	2.48%	95.74%
RCOM CDMA	0.14%	0.00%	98.04%	NA	0.92%	0.06%	0.43%	98.41%
RCOM GSM	0.15%	0.00%	96.89%	0.13%	0.59%	0.31%	0.64%	97.10%
TTSL CDMA	0.00%	0.00%	99.44%	NA	0.00%	0.09%	1.03%	98.19%
TTSL GSM	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	2.22%	99.34%
Vodafone	0.02%	0.00%	99.93%	0.01%	0.07%	0.61%	2.38%	97.61%

- Aircel has a parameter value of **12.68%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- BSNL has a parameter value of **2.67%** and failed to meet the benchmark for SDCCH Congestion which is pre-defined at ≤ 1%.
- BSNL has a parameter value of **2.32%** and failed to meet the benchmark for Sum of downtime of BTSs in a month in hrs. in the licensed service area which is pre-defined at ≤ 2%.
- BSNL has a parameter value of **2.35%** and failed to meet the benchmark for TCH Congestion drop which is pre-defined at ≤ 2%.
- BSNL has a parameter value of **2.61%** and failed to meet the benchmark for Call Drop Rate (%age) which is pre-defined at ≤ 2%.
- BSNL has a parameter value of **4.12%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- **For each instance of "DNA (Data Not Available)", please refer the respective hard copy of audit report(s).

6.10. 2G VOICE 3 DAYS LIVE DATA: DECEMBER

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of BTSs in a month in hrs. in the licensed service area	No. of BTSs having accumulated downtime of >24 hours in a month	Call Set-up Success Rate (Within License own network	SDDCH/Paging chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Wost Affected call having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	0.19%	0.00%	99.41%	0.01%	0.43%	1.09%	10.06%	95.53%
Airtel	0.62%	0.00%	98.19%	0.16%	0.40%	0.87%	1.58%	98.23%
BSNL	1.83%	0.05%	97.24%	0.67%	2.57%	2.13%	2.82%	DNA
Idea	0.09%	0.00%	99.45%	0.11%	0.20%	1.22%	2.23%	96.78%
RCOM CDMA	0.05%	0.00%	98.07%	NA	0.93%	0.05%	0.27%	99.06%
RCOM GSM	0.06%	0.00%	97.04%	0.14%	0.85%	0.26%	0.18%	97.21%
TTSL CDMA	0.00%	0.00%	99.42%	NA	0.00%	0.09%	1.66%	98.15%
TTSL GSM	0.00%	0.00%	DNA	0.00%	0.00%	1.38%	4.40%	98.51%
Vodafone	0.01%	0.00%	99.91%	0.01%	0.09%	0.61%	2.47%	97.82%

- Aircel has a parameter value of **10.06%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- BSNL has a parameter value of **2.57%** and failed to meet the benchmark for TCH Congestion drop which is pre-defined at ≤ 2%.
- BSNL has a parameter value of **2.13%** and failed to meet the benchmark for Call Drop Rate (%age) which is pre-defined at ≤ 2%.
- TTSL GSM has a parameter value of **4.40%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- **For each instance of “DNA (Data Not Available)”, please refer the respective hard copy of audit report(s).

6.11. 3 DAYS LIVE DATA: CONSOLIDATED

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of BTSs in a month in hrs. in the licensed service area	No. of BTSs having accumulated downtime of >24 hours in a month	Call Set-up Success Rate (Within License own network	SDDCH/Paging chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Wost Affected call having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	0.19%	0.00%	99.57%	0.01%	0.25%	1.23%	11.42%	95.43%
Airtel	0.45%	0.00%	98.20%	0.08%	0.34%	0.77%	1.72%	98.42%
BSNL	2.28%	0.05%	97.47%	1.48%	2.47%	2.48%	4.11%	DNA
Idea	0.14%	0.00%	99.30%	0.10%	0.27%	1.21%	2.44%	96.15%
RCOM CDMA	0.11%	0.00%	98.07%	NA	0.92%	0.06%	0.34%	98.79%
RCOM GSM	0.12%	0.00%	97.02%	0.14%	0.64%	0.31%	0.58%	97.10%
TTSL CDMA	0.00%	0.00%	99.38%	NA	0.00%	0.09%	1.24%	98.16%
TTSL GSM	0.00%	0.00%	99.76%	0.00%	0.00%	0.46%	2.21%	99.03%
Vodafone	0.02%	0.00%	99.91%	0.01%	0.09%	0.61%	2.42%	97.69%

- Aircel has a parameter value of **11.42%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- BSNL has a parameter value of **2.28%** and failed to meet the benchmark for Sum of downtime of BTSs in a month in hrs. in the licensed service area which is pre-defined at ≤ 2%.
- BSNL has a parameter value of **2.47%** and failed to meet the benchmark for TCH Congestion drop which is pre-defined at ≤ 2%.
- BSNL has a parameter value of **1.48%** and failed to meet the benchmark for SDDCH/Paging chl. Congestion which is pre-defined at ≤ 2%.
- BSNL has a parameter value of **2.48%** and failed to meet the benchmark for Call Drop Rate (%age) which is pre-defined at ≤ 2%.
- BSNL has a parameter value of **4.11%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- **For each instance of “DNA (Data Not Available)”, please refer the respective hard copy of audit report(s).

6.12. 3G VOICE PMR: CONSOLIDATED

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of Node B's in a month in hrs	No. of Node B's having Accumulated Downtime of > 24 hrs in a month	Call Set-up Success Rate (Within Licensee own network	RRC Congestion	RAB Congestion	Circuit Switched Voice Drop Rate	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate	%age of connections with Good Circuit Switched Voice Quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	NA	NA	NA	NA	NA	NA	NA	NA
Airtel	0.14%	0.17%	97.80%	0.33%	0.09%	0.75%	1.38%	98.59%
BSNL	1.29%	1.69%	96.24%	0.76%	0.75%	1.18%	2.75%	DNA
Idea	0.16%	0.14%	98.41%	0.67%	0.38%	1.57%	1.92%	97.67%
RCOM CDMA	NA	NA	NA	NA	NA	NA	NA	NA
RCOM GSM	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
TATA CDMA	NA	NA	NA	NA	NA	NA	NA	NA
TATA GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

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

6.13. 3G VOICE PMR: OCTOBER

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of Node B's in a month in hrs	No. of Node B's having Accumulated Downtime of > 24 hrs in a month	Call Set-up Success Rate (Within Licensee own network	RRC Congestion	RAB Congestion	Circuit Switched Voice Drop Rate	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate	%age of connections with Good Circuit Switched Voice Quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	NA	NA	NA	NA	NA	NA	NA	NA
Airtel	0.11%	0.19%	97.22%	0.67%	0.18%	0.77%	1.43%	98.42%
BSNL	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
Idea	0.21%	0.43%	98.25%	0.72%	0.38%	1.66%	2.16%	98.63%
RCOM CDMA	NA	NA	NA	NA	NA	NA	NA	NA
RCOM GSM	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
TATA CDMA	NA	NA	NA	NA	NA	NA	NA	NA
TATA GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

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

6.14. 3G VOICE PMR: NOVEMBER

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of Node B's in a month in hrs	No. of Node B's having Accumulated Downtime of > 24 hrs in a month	Call Set-up Success Rate (Within Licensee own network	RRC Congestion	RAB Congestion	Circuit Switched Voice Drop Rate	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate	%age of connections with Good Circuit Switched Voice Quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	NA	NA	NA	NA	NA	NA	NA	NA
Airtel	0.12%	0.18%	98.31%	0.30%	0.07%	0.75%	1.24%	98.49%
BSNL	1.33%	1.69%	96.32%	0.84%	0.82%	1.28%	2.80%	DNA
Idea	0.19%	0.00%	98.60%	0.70%	0.37%	1.58%	1.73%	96.87%
RCOM CDMA	NA	NA	NA	NA	NA	NA	NA	NA
RCOM GSM	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
TATA CDMA	NA	NA	NA	NA	NA	NA	NA	NA
TATA GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

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

6.15. 3G VOICE PMR: DECEMBER

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of Node B's in a month in hrs	No. of Node B's having Accumulated Downtime of > 24 hrs in a month	Call Set-up Success Rate (Within Licensee own network	RRC Congestion	RAB Congestion	Circuit Switched Voice Drop Rate	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate	%age of connections with Good Circuit Switched Voice Quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	NA	NA	NA	NA	NA	NA	NA	NA
Airtel	0.19%	0.13%	97.88%	0.02%	0.01%	0.73%	1.46%	98.86%
BSNL	1.25%	1.69%	96.15%	0.67%	0.67%	1.07%	2.70%	DNA
Idea	0.09%	0.00%	98.37%	0.58%	0.39%	1.46%	1.86%	97.50%
RCOM CDMA	NA	NA	NA	NA	NA	NA	NA	NA
RCOM GSM	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
TATA CDMA	NA	NA	NA	NA	NA	NA	NA	NA
TATA GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

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

6.16. 3G VOICE 3 DAYS LIVE DATA: CONSOLIDATED

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of Node B's in a month in hrs	No. of Node B's having Accumulated Downtime of > 24 hrs in a month	Call Set-up Success Rate (Within Licensee own network	RRC Congestion	RAB Congestion	Circuit Switched Voice Drop Rate	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate	%age of connections with Good Circuit Switched Voice Quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	NA	NA	NA	NA	NA	NA	NA	NA
Airtel	0.42%	0.00%	98.13%	0.14%	0.04%	0.87%	1.23%	98.45%
BSNL	0.00%	0.00%	96.53%	0.89%	0.73%	1.42%	2.71%	DNA
Idea	0.13%	0.00%	98.50%	0.65%	0.44%	1.57%	2.23%	98.16%
RCOM CDMA	NA	NA	NA	NA	NA	NA	NA	NA
RCOM GSM	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
TATA CDMA	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA
TATA GSM	NA	NA	NA	NA	NA	NA	NA	NA

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

6.17. 3G VOICE 3 DAYS LIVE DATA: OCTOBER

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of Node B's in a month in hrs	No. of Node B's having Accumulated Downtime of > 24 hrs in a month	Call Set-up Success Rate (Within Licensee own network	RRC Congestion	RAB Congestion	Circuit Switched Voice Drop Rate	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate	%age of connections with Good Circuit Switched Voice Quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	NA	NA	NA	NA	NA	NA	NA	NA
Airtel	0.62%	0.00%	97.33%	0.26%	0.06%	0.69%	1.15%	98.39%
BSNL	0.00%	0.00%	96.87%	0.89%	0.64%	1.22%	2.77%	DNA
Idea	0.13%	0.00%	98.51%	0.50%	0.34%	1.73%	2.43%	98.64%
RCOM CDMA	NA	NA	NA	NA	NA	NA	NA	NA
RCOM GSM	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
TATA CDMA	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA
TATA GSM	NA	NA	NA	NA	NA	NA	NA	NA

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

6.18. 3G VOICE 3 DAYS LIVE DATA: NOVEMBER

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of Node B's in a month in hrs	No. of Node B's having Accumulated Downtime of > 24 hrs in a month	Call Set-up Success Rate (Within Licensee own network	RRC Congestion	RAB Congestion	Circuit Switched Voice Drop Rate	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate	%age of connections with Good Circuit Switched Voice Quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	NA	NA	NA	NA	NA	NA	NA	NA
Airtel	0.32%	0.00%	98.53%	0.08%	0.03%	0.96%	1.27%	98.48%
BSNL	0.00%	0.00%	96.37%	0.89%	0.77%	1.52%	2.77%	DNA
Idea	0.16%	0.00%	98.78%	0.79%	0.31%	1.43%	2.13%	98.46%
RCOM CDMA	NA	NA	NA	NA	NA	NA	NA	NA
RCOM GSM	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
TATA CDMA	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA
TATA GSM	NA	NA	NA	NA	NA	NA	NA	NA

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

6.19. 3G VOICE 3 DAYS LIVE DATA: DECEMBER

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of Node B's in a month in hrs	No. of Node B's having Accumulated Downtime of > 24 hrs in a month	Call Set-up Success Rate (Within Licensee own network	RRC Congestion	RAB Congestion	Circuit Switched Voice Drop Rate	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate	%age of connections with Good Circuit Switched Voice Quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	NA	NA	NA	NA	NA	NA	NA	NA
Airtel	0.32%	0.00%	98.53%	0.08%	0.03%	0.96%	1.27%	98.48%
BSNL	0.00%	0.00%	96.40%	0.78%	0.69%	1.16%	2.55%	DNA
Idea	0.09%	0.00%	98.20%	0.66%	0.67%	1.56%	2.14%	97.37%
RCOM CDMA	NA	NA	NA	NA	NA	NA	NA	NA
RCOM GSM	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
TATA CDMA	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA
TATA GSM	NA	NA	NA	NA	NA	NA	NA	NA

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

7. CUSTOMER SERVICE DELIVERY

7.1. BILLING AND CUSTOMER CARE

Name of Service Provider	Metering and Billing credibility		Billing Complaints		Response time to customer for assistance	Termination & Closures	Time taken for refund of deposits after closures : Benchmark	Customer Care	
	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	0.03%	0.00%	100%	100%	100%	100%	100%	98.89%	98.33%
Airtel	0.01%	0.03%	100%	100%	100%	100%	100%	99.99%	97.26%
BSNL	0.02%	0.01%	100%	100%	100%	100%	100%	100%	95.18%
Idea	0.06%	0.07%	100%	100%	100%	100%	100%	99.22%	99.84%
RCOM CDMA	0.01%	0.08%	100%	100%	100%	100%	100%	98.39%	94.58%
RCOM GSM	0.08%	0.09%	100%	100%	100%	100%	100%	98.36%	93.45%
TTSL CDMA	0.00%	0.00%	100%	100%	100%	100%	100%	100.00%	99.95%
TTSL GSM	0.00%	0.00%	100%	100%	100%	100%	100%	99.29%	99.77%
Vodafone	0.03%	0.07%	100%	100%	100%	100%	100%	100%	99.48%

- RCOM CDMA has a parameter value of **94.58%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds which is pre-defined at ≥ 95%.

- RCOM GSM has a parameter value of **93.45%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds which is pre-defined at ≥ 95%.

Name of Service Provider	Customer Care & Grievances Redressal	
	% of complaints addressed at call center level.	% of complaints addressed by Appellate authority.
Benchmark		
Aircel	100%	NA
Airtel	98.96%	100%
BSNL	97.64%	100%
Idea	31.95%	100%
RCOM CDMA	100%	100%
RCOM GSM	100%	100%
TTSL CDMA	99.70%	100%
TTSL GSM	100%	100%
Vodafone	4.07%	DNA

7.2. LIVE CALLING DATA: CONSOLIDATED

Name of Service Provider	Metering and Billing (Service Request)				Response time to customer for Assistanse	
	Total Calls Attempted	No. of Subscribers reached	Compalints/ Request attended to satisfaction	% of Compalints/ Request attended to satisfaction	Accessibility of call centre / Customer care	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark					**≥ 95%**	**≥ 95%**
Aircel	21	21	20	95.24%	98.89%	98.33%
Airtel	70	40	40	100.00	100%	100.00%
BSNL	180	66	62	93.93%	100%	95.18%
Idea	107	98	97	98.98%	99.22%	99.84%
RCOM CDMA	70	36	32	88.89%	98.00%	95.00%
RCOM GSM	23	7	7	100.00%	98.00%	93.00%
TATA CDMA	0	0	0	100.00%	100%	100.00%
TATA GSM	0	0	0	100.00%	100%	100.00%
Vodafone	105	100	100	100.00%	100%	99.48%

- RCOM GSM has a parameter value of **93.00%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds which is pre-defined at ≥ 95%.

7.3. 3 Days Live Call Centre Data

	Response time to customer assistance							
	% age of Accessibility of Call centre	% age calls answered by the operator within 90 seconds	% age of Accessibility of Call centre	% age calls answered by the operator within 90 seconds	% age of Accessibility of Call centre	% age calls answered by the operator within 90 seconds	% age of Accessibility of Call centre	% age calls answered by the operator within 90 seconds
	Day 1		Day 2		Day 3		Average	
TSP Name	>=95%	>=95%	>=95%	>=95%	>=95%	>=95%	>=95%	>=95%
Idea	99.38%	96.88%	99.32%	99.00%	99.20%	91.85%	99.30%	95.91%
Airtel	100.00%	98.28%	100.00%	97.90%	100.00%	76.19%	100.00%	90.16%
TATA GSM	98.96%	100.00%	99.22%	100.00%	100.00%	100.00%	99.40%	100.00%
TATA CDMA	98.96%	100.00%	99.22%	100.00%	100.00%	100.00%	99.40%	100.00%
RCOM GSM	97.00%	98.00%	98.00%	96.00%	97.00%	99.00%	97.00%	99.00%
RCOM CDMA	98.00%	99.00%	98.00%	99.00%	98.00%	99.00%	98.00%	99.00%
Aircel	96.71%	97.92%	98.97%	99.19%	99.42%	98.79%	98.39%	98.64%
BSNL	100.00%	70.35%	100.00%	55.46%	100.00%	52.34%	100.00%	59.23%
Vodafone	100.00%	99.30%	100.00%	99.53%	100.00%	99.87%	100.00%	99.57%

- BSNL has a parameter value of **59.23%** and filed to meet the benchmark for % age calls answered by the operator within 90 seconds which is pre-defined at ≥95%.
- Airtel has a parameter value of **90.16%** and filed to meet the benchmark for % age calls answered by the operator within 90 seconds which is pre-defined at ≥95%.

8. L1 CALLING DATA

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

- Shimla 2nd Dec 2015 to 4th Dec 2015

8.1. Aircel

SR. NO.	EMERGENCY NUMBER	Bamloi	Theog	Reckong Pio
1	100	✓	✓	✓
2	101	✓	✓	☒
3	102	✓	✓	✓
4	104	☒	☒	☒
5	108	✓	✓	✓
6	138	✓	✓	☒
7	149	☒	☒	☒
8	181	✓	✓	☒
9	182	☒	☒	☒
10	1033	✓	✓	☒
11	1037	☒	☒	☒
12	1056	☒	☒	☒
13	1060	☒	☒	☒
14	1063	☒	☒	☒
15	1064	✓	✓	☒
16	1070	✓	☒	✓
17	1071	☒	☒	☒
18	1072	✓	✓	✓
19	1073	✓	✓	✓
20	1077	✓	☒	☒
21	1090	✓	☒	☒
22	1091	✓	✓	✓
23	1097	✓	✓	✓
24	1099	✓	✓	☒
25	1511	☒	✓	☒
26	1512	☒	✓	☒
27	1514	☒	✓	☒
28	1903	☒	✓	☒
29	1909	☒	✓	☒
30	1912	☒	✓	☒
31	1916	☒	☒	☒
32	1950	✓	✓	✓
33	10580	☒	☒	☒
34	10589	✓	✓	☒
35	10740	✓	✓	✓

36	10741	✓	✓	✓
37	15100	☒	☒	☒
38	155214	✓	☒	☒
39	155304	✓	✓	☒

8.2. Airtel

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

37	15100	✓	✓	✓	✓
38	155214	☒	☒	☒	☒
39	155304	✓	✓	✓	✓

8.3. BSNL

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

37	15100	☒	☒	☒
38	155214	☒	☒	☒
39	155304	✓	✓	✓

8.4. Idea

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

37	15100	✓	✓	✓	☒
38	155214	☒	☒	☒	☒
39	155304	✓	✓	✓	☒

8.5. RCOM CDMA

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

37	15100	☒	☒	☒
38	155214	☒	☒	☒
39	155304	☒	☒	☒

8.6. RCOM GSM

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

37	15100	✓	✓	✓
38	155214	☒	☒	☒
39	155304	☒	☒	☒

8.7. TTSL - GSM

NOTE: TTSL-CDMA has not provided the L1 Calling data.

SR. NO.	EMERGENCY NUMBER	Bamloi Shimla	Theog	Kalpa
1	100	✓	✓	✓
2	101	✓	✓	☒
3	102	☒	☒	✓
4	104	☒	☒	✓
5	108	✓	✓	✓
6	138	✓	✓	☒
7	149	☒	☒	☒
8	181	☒	☒	☒
9	182	☒	☒	☒
10	1033	✓	✓	✓
11	1037	☒	☒	☒
12	1056	☒	☒	☒
13	1060	☒	☒	☒
14	1063	☒	☒	☒
15	1064	✓	✓	☒
16	1070	☒	☒	☒
17	1071	☒	☒	☒
18	1072	✓	☒	✓
19	1073	☒	☒	☒
20	1077	☒	☒	☒
21	1090	☒	☒	☒
22	1091	✓	✓	☒
23	1097	☒	☒	☒
24	1099	☒	☒	☒
25	1511	☒	☒	☒
26	1512	☒	☒	☒
27	1514	☒	☒	☒
28	1903	☒	☒	☒
29	1909	☒	☒	☒
30	1912	☒	☒	☒
31	1916	☒	☒	☒
32	1950	✓	☒	☒
33	10580	☒	☒	☒
34	10589	☒	☒	☒
35	10740	✓	✓	☒

36	10741	☒	☒	☒
37	15100	☒	☒	☒
38	155214	☒	☒	☒
39	155304	☒	☒	☒

8.8. Vodafone

SR. NO.	EMERGENCY NUMBER	Shimla	Rampur	Tapri
1	100	✓	✓	✓
2	101	✓	✓	✓
3	102	✓	✓	✓
4	104	☒	☒	☒
5	108	☒	☒	☒
6	138	☒	☒	☒
7	149	☒	☒	☒
8	181	☒	☒	☒
9	182	☒	☒	☒
10	1033	✓	✓	✓
11	1037	✓	✓	✓
12	1056	☒	☒	☒
13	1060	☒	☒	☒
14	1063	☒	☒	☒
15	1064	☒	☒	☒
16	1070	☒	☒	☒
17	1071	☒	☒	☒
18	1072	☒	☒	☒
19	1073	☒	☒	☒
20	1077	☒	☒	☒
21	1090	☒	☒	☒
22	1091	✓	✓	✓
23	1097	☒	☒	☒
24	1099	☒	☒	☒
25	1511	☒	☒	☒
26	1512	☒	☒	☒
27	1514	☒	☒	☒
28	1903	☒	☒	☒
29	1909	☒	☒	☒
30	1912	☒	☒	☒
31	1916	☒	☒	☒
32	1950	☒	☒	☒
33	10580	☒	☒	☒
34	10589	☒	☒	☒

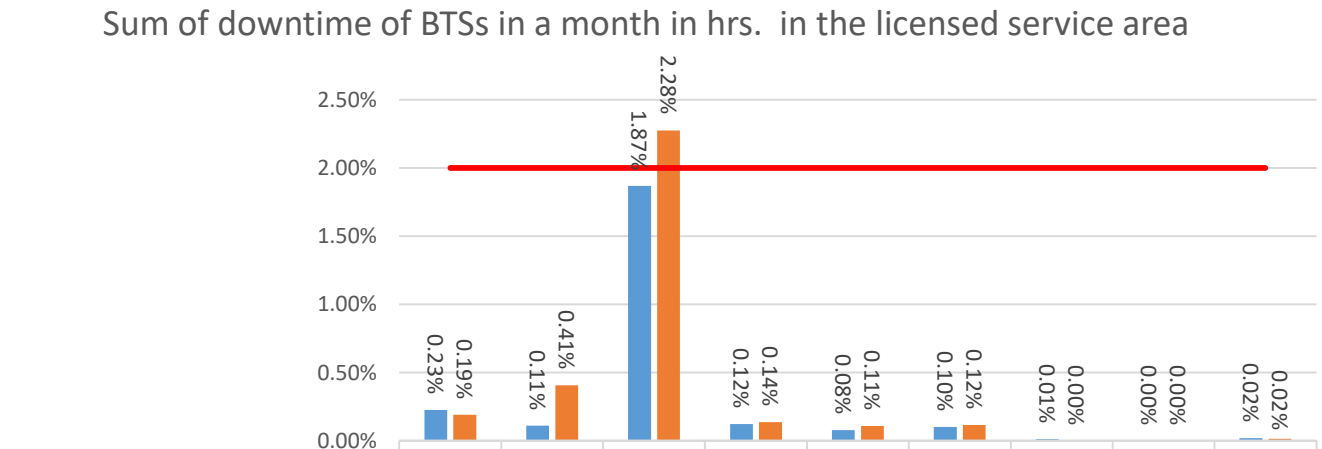
35	10740	☒	☒	☒
36	10741	☒	☒	☒
37	15100	☒	☒	☒
38	155214	☒	☒	☒
39	155304	☒	☒	☒

9. NETWORK PARAMETER: DESCRIPTION AND DETAILED FINDINGS

9.1. BTS ACCUMULATED DOWNTIME

- Parameter Description:
  - The parameter of network availability would be measured from following sub-parameters:
    - BTSs Accumulated Downtime (not available for service)
    - Worst effected BTSs due to downtime
- Definition: BTSs (Base Transceiver Station) accumulated downtime (not available for service) shall basically measure the downtime of the BTSs, including its transmission links/circuits during the period of a month, but excludes all planned service downtime for any maintenance or software up gradation. For measuring the performance against the benchmark for this parameter the downtime of each BTS lasting more than 1 hour at a time in a day during the period of a month were considered.
  - Computation Methodology:
    - BTS accumulated downtime (not available for service) = $\frac{\text{Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month}}{\text{24 x Number of days in a month x Number of BTSs in the network in licensed serv cearea}} * 100$
- TRAI Benchmark: BTSs Accumulated downtime (not available for service) ≤ 2%
- Audit Procedure:
  - The fault alarm details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) was audited.
  - All the BTS in service area were considered. Planned outages due to network up gradation, routine maintenance were not considered.
  - Any outage as a result of force majeure were not considered at the time of calculation.
  - Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.
  - List of operating sites with cell details and ids are taken from the operator.
  - When there is any outage a performance report gets generated in line with that cell resulting and master base of the Accumulated downtime and worst affected BTS due to downtime.

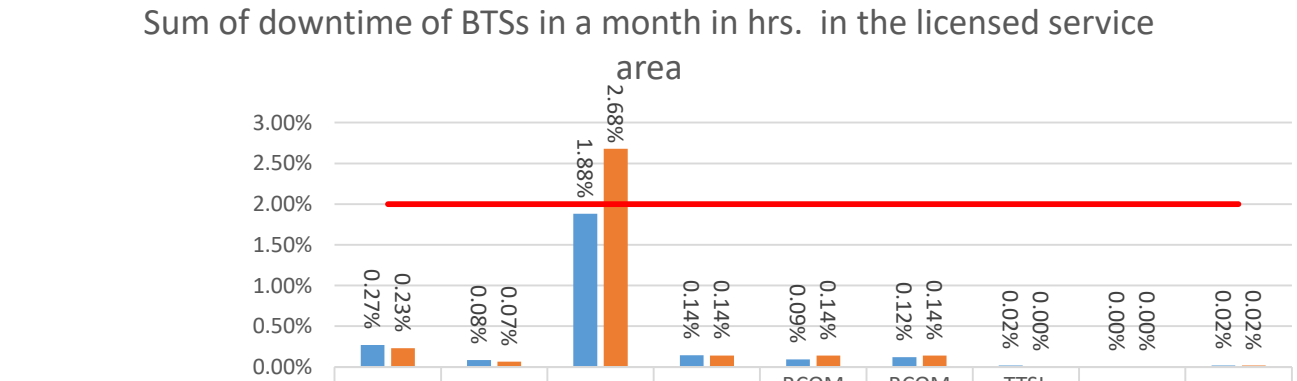
9.1.1. KEY FINDINGS: SUM OF DOWNTIME OF BTSS: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR Data 3 Month Consolidated	0.23%	0.11%	1.87%	0.12%	0.08%	0.10%	0.01%	0.00%	0.02%
3 Day Live 3 Month Consolidated	0.19%	0.41%	2.28%	0.14%	0.11%	0.12%	0.00%	0.00%	0.02%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- BSNL has a parameter value of **2.28%** and failed to meet the benchmark for Sum of downtime of BTSs in a month in hrs. in the licensed service area which is pre-defined at ≤ 2%.

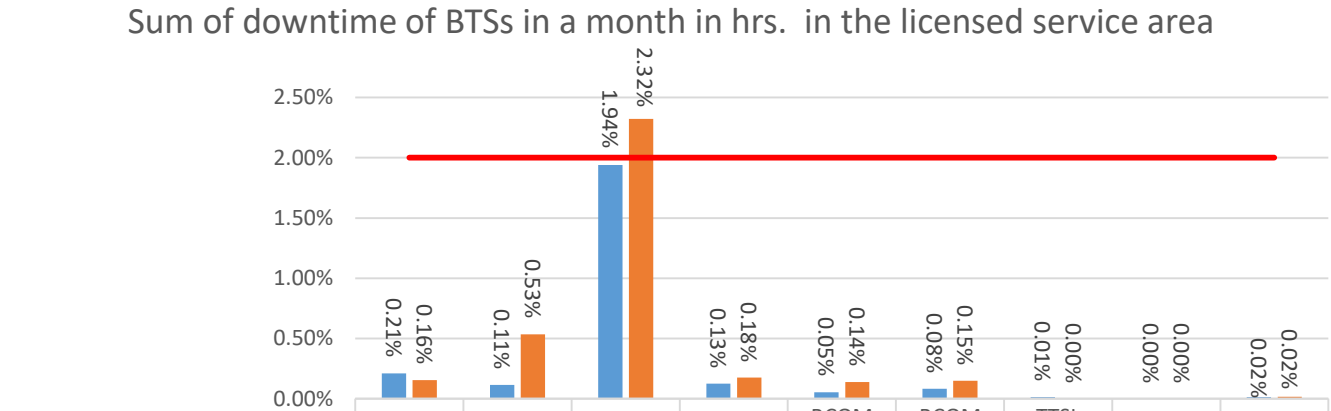
9.1.2. KEY FINDINGS: SUM OF DOWNTIME OF BTSS: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR October Month	0.27%	0.08%	1.88%	0.14%	0.09%	0.12%	0.02%	0.00%	0.02%
3 Day Live October Month	0.23%	0.07%	2.68%	0.14%	0.14%	0.14%	0.00%	0.00%	0.02%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- BSNL has a parameter value of **2.68%** and failed to meet the benchmark for Sum of downtime of BTSs in a month in hrs. in the licensed service area which is pre-defined at ≤ 2%.

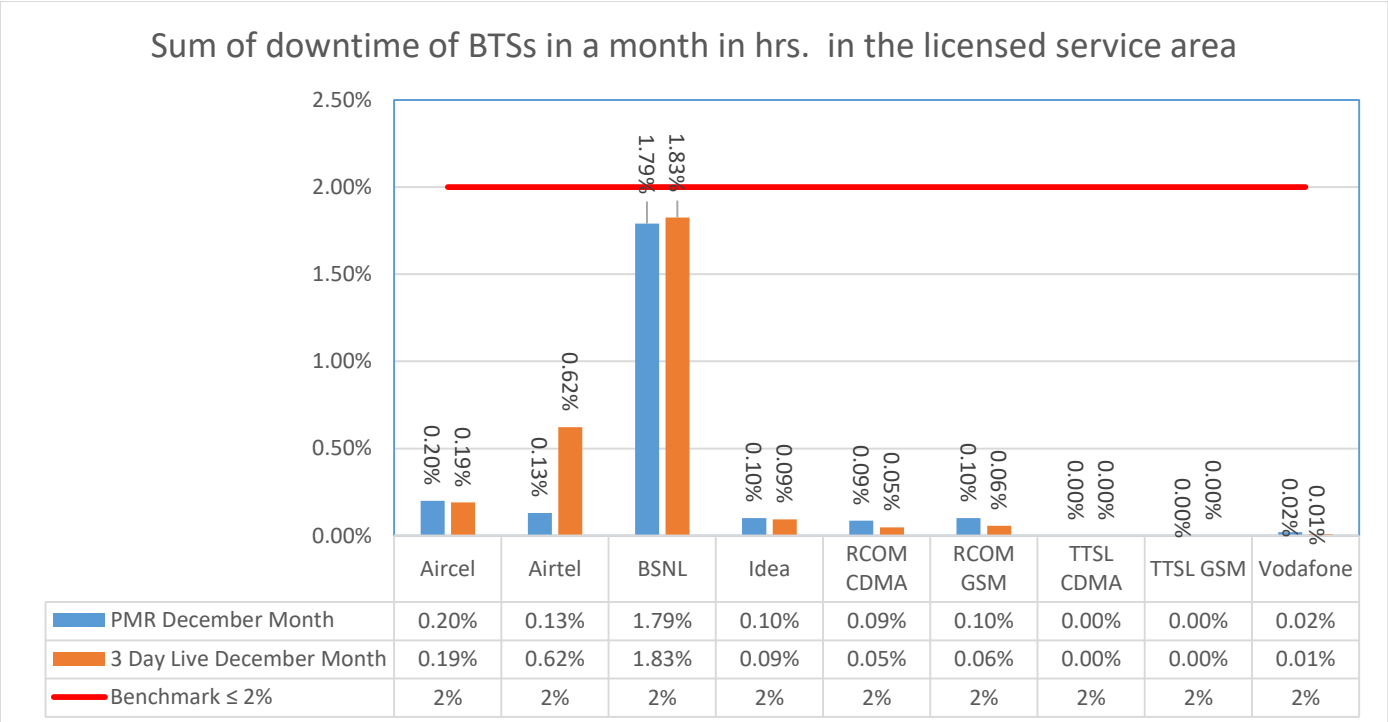
9.1.3. KEY FINDINGS: SUM OF DOWNTIME OF BTSS: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR November Month	0.21%	0.11%	1.94%	0.13%	0.05%	0.08%	0.01%	0.00%	0.02%
3 Day Live November Month	0.16%	0.53%	2.32%	0.18%	0.14%	0.15%	0.00%	0.00%	0.02%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- BSNL has a parameter value of **2.32%** and failed to meet the benchmark for Sum of downtime of BTSs in a month in hrs. in the licensed service area which is pre-defined at ≤ 2%.

9.1.4. KEY FINDINGS: SUM OF DOWNTIME OF BTSS: DECEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR December Month	0.20%	0.13%	1.79%	0.10%	0.09%	0.10%	0.00%	0.00%	0.02%
3 Day Live December Month	0.19%	0.62%	1.83%	0.09%	0.05%	0.06%	0.00%	0.00%	0.01%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- It is clear from the analysis that all the operators are within benchmark.

9.2. WORST AFFECTED BTS DUE TO DOWNTIME

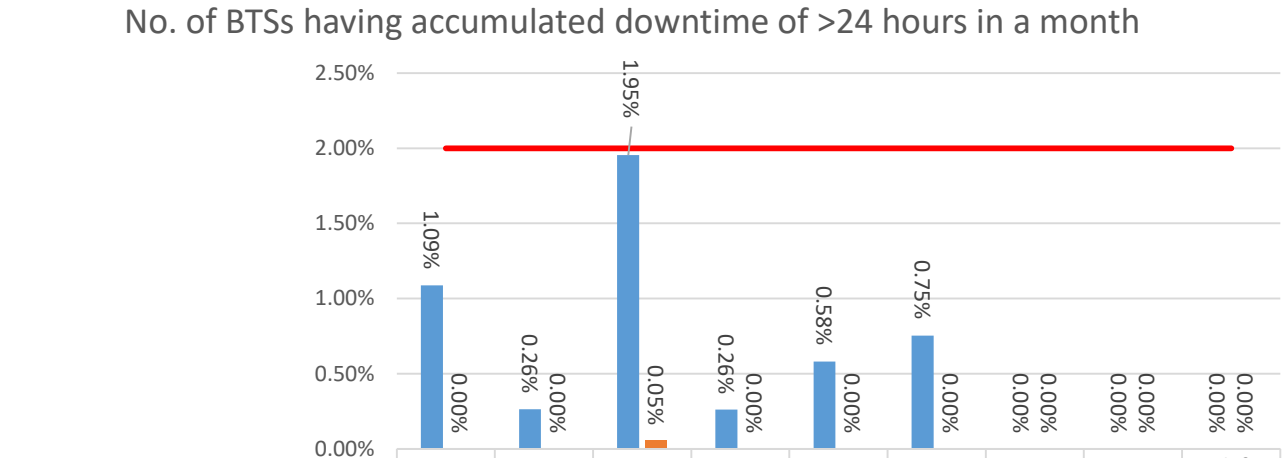
- Definition: Worst Affected BTS due to downtime shall basically measure percentage of BTS having downtime greater than 24 hours in a month. Planned outages were not considered as part while computing.

For measuring the parameter “Percentage of worst affected BTSs due to downtime" the downtime of each BTS lasting for more than 1 hour at a time in a day during the period of a month was considered.

- Computation Methodology: Worst affected BTSs due to downtime = $\frac{\textbf{Number of BTSs having accumulated downtime greater than 24 hours in a month}}{\textbf{Number of BTS in Licensed Service Area}} * 100$

- TRAI Benchmark: Worst affected BTSs due to downtime ≤ 2%
- Audit Procedure:
  - The fault alarm details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) was audited.
  - All the BTS in service area were considered. Planned outages due to network up gradation, routine maintenance were not considered.
  - Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.
  - Any outage as a result of force majeure was not considered at the time of calculation.
  - List of operating sites with cell details and ids are taken from the operator.
  - All the BTS having down time greater than 24 hours is assessed and values of BTS accumulated downtime is computed in accordance.

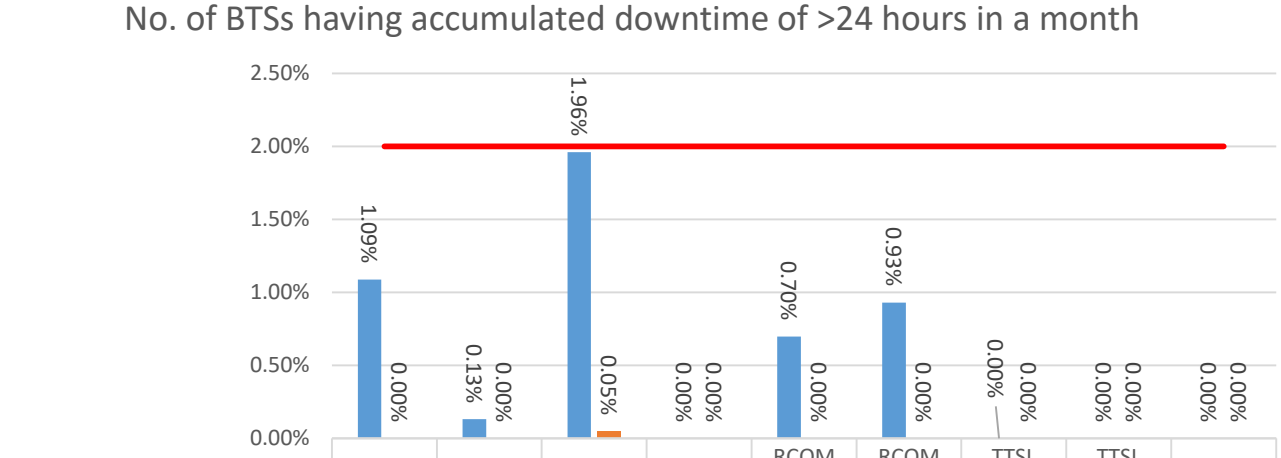
9.2.1. KEY FINDINGS: NO. OF BTSS HAVING ACCUMULATED DOWNTIME OF >24 HRS: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR Data 3 Month Consolidated	1.09%	0.26%	1.95%	0.26%	0.58%	0.75%	0.00%	0.00%	0.00%
3 Day Live 3 Month Consolidated	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- It is clear from the analysis that all the operators are within benchmark.

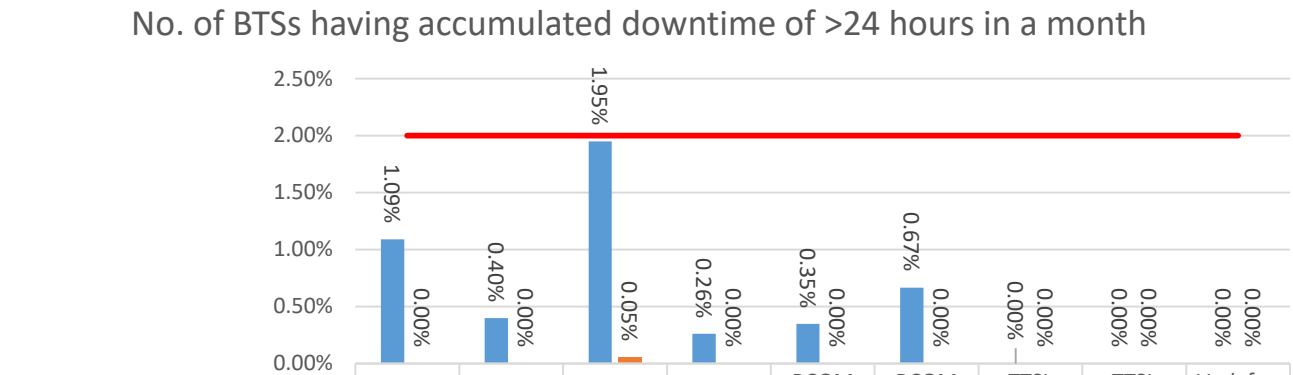
9.2.2. KEY FINDINGS: NO. OF BTSS HAVING ACCUMULATED DOWNTIME OF > 24 HRS: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR October Month	1.09%	0.13%	1.96%	0.00%	0.70%	0.93%	0.00%	0.00%	0.00%
3 Day Live October Month	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- It is clear from the analysis that all the operators are within benchmark.

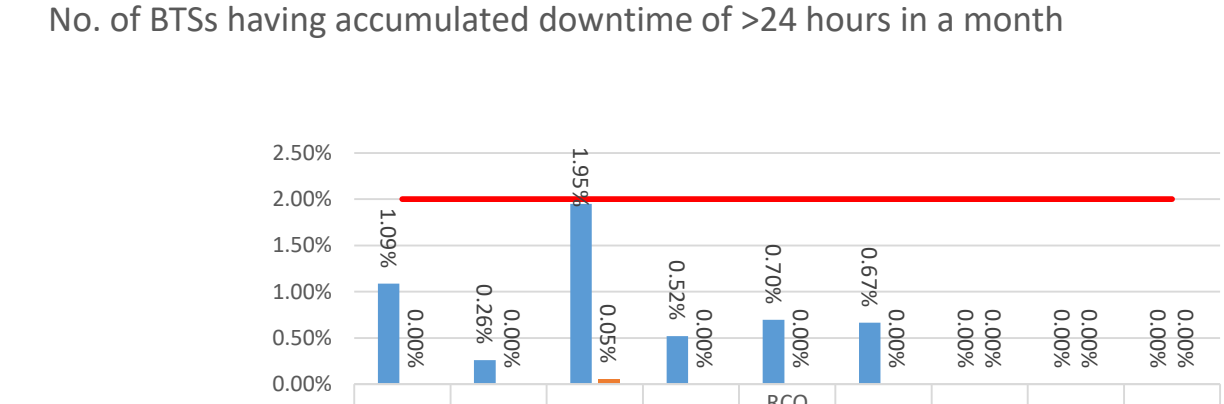
9.2.3. KEY FINDINGS: NO. OF BTSS HAVING ACCUMULATED DOWNTIME OF > 24 HRS: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR November Month	1.09%	0.40%	1.95%	0.26%	0.35%	0.67%	0.00%	0.00%	0.00%
3 Day Live November Month	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- It is clear from the analysis that all the operators are within benchmark.

9.2.4. KEY FINDINGS: NO. OF BTSS HAVING ACCUMULATED DOWNTIME OF > 24 HRS: DECEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR December Month	1.09%	0.26%	1.95%	0.52%	0.70%	0.67%	0.00%	0.00%	0.00%
3 Day Live December Month	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- It is clear from the analysis that all the operators are within benchmark.

9.3. CALL SETUP SUCCESS RATE

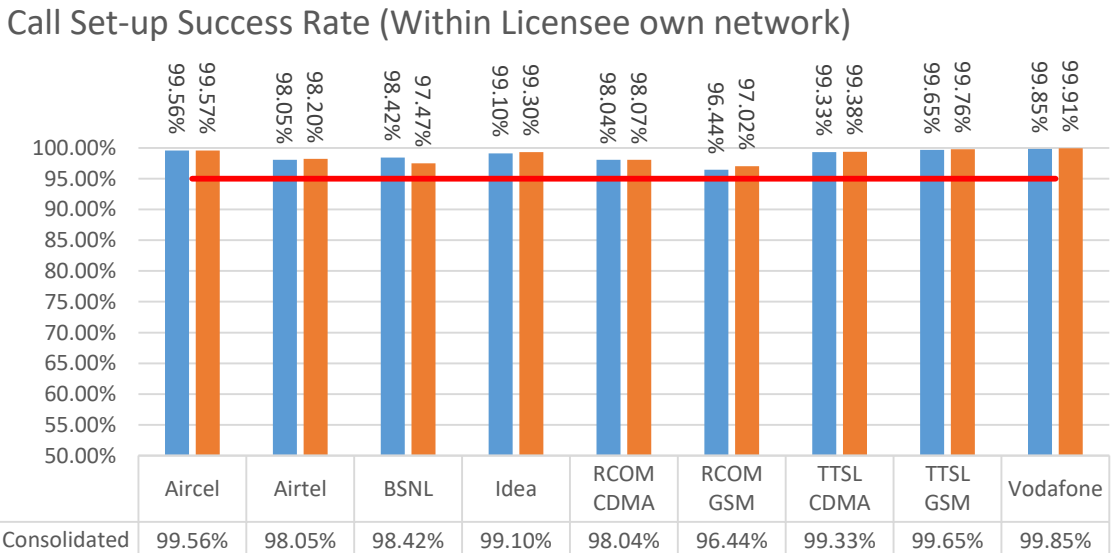
- Definition: The ratio of successful calls established to total calls is known as Call Set-Up Success Rate (CSSR).
- Computational Methodology: $\frac{Calls\ Established}{(Total\ call\ attempts)} * 100$

  Calls established means the following events happened in call setup:
  - Call attempt is made.
  - The TCH is allocated.
  - The call is routed to the outward path of the concerned MSC.

- TRAI Benchmark ≥ 95%
- Audit Procedure:
  - The cell-wise data generated through counters/ MMC available in the switch for traffic measurements.
  - CSSR calculation should be measured using OMC generated data only.
  - Measurement should be only in Time Consistent Busy Hour (CBBH) period for all days of the week.
  - Counter data is extracted from the NOC of the operators.
  - Total calls established include all calls established excluding Signaling blocking, TCH Drop and TCH blocking.

The numerator and denominator values are derived from adding the counter values from the MSC.

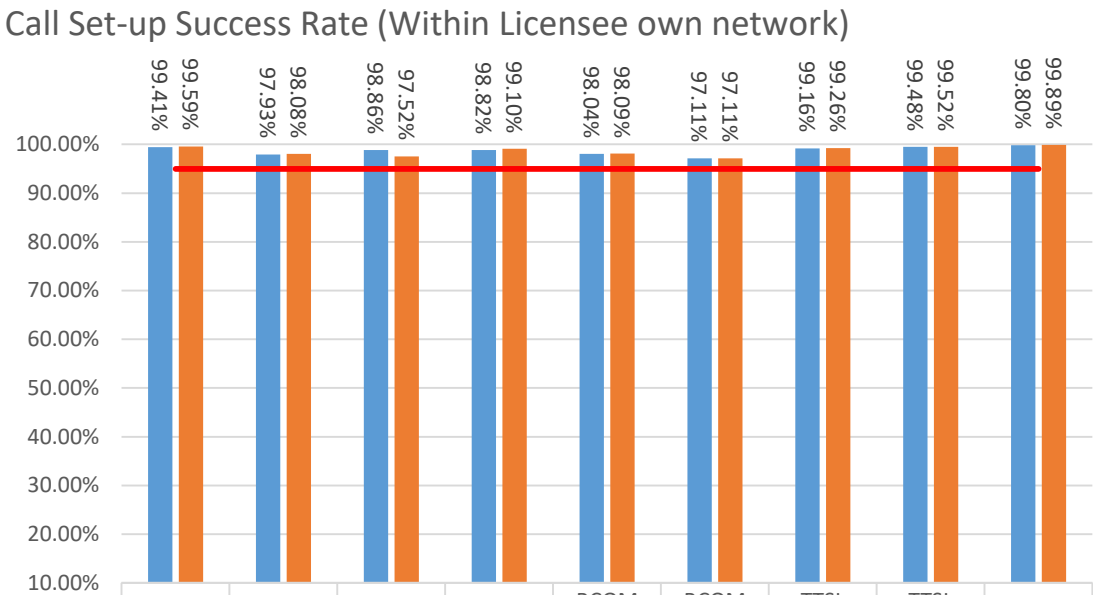
9.3.1. KEY FINDINGS: CALL SETUP SUCCESS RATE: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR Data 3 Month Consolidated	99.56%	98.05%	98.42%	99.10%	98.04%	96.44%	99.33%	99.65%	99.85%
3 Day Live 3 Month Consolidated	99.57%	98.20%	97.47%	99.30%	98.07%	97.02%	99.38%	99.76%	99.91%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

- It is clear from the analysis that all the operators are within benchmark.

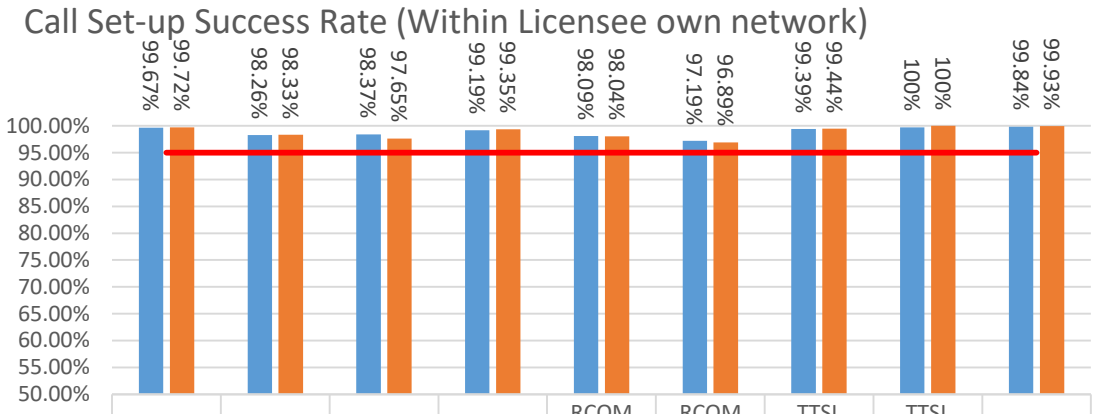
9.3.2. KEY FINDINGS: CALL SETUP SUCCESS RATE: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR October Month	99.41%	97.93%	98.86%	98.82%	98.04%	97.11%	99.16%	99.48%	99.80%
3 Day Live October Month	99.59%	98.08%	97.52%	99.10%	98.09%	97.11%	99.26%	99.52%	99.89%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

- It is clear from the analysis that all the operators are within benchmark.

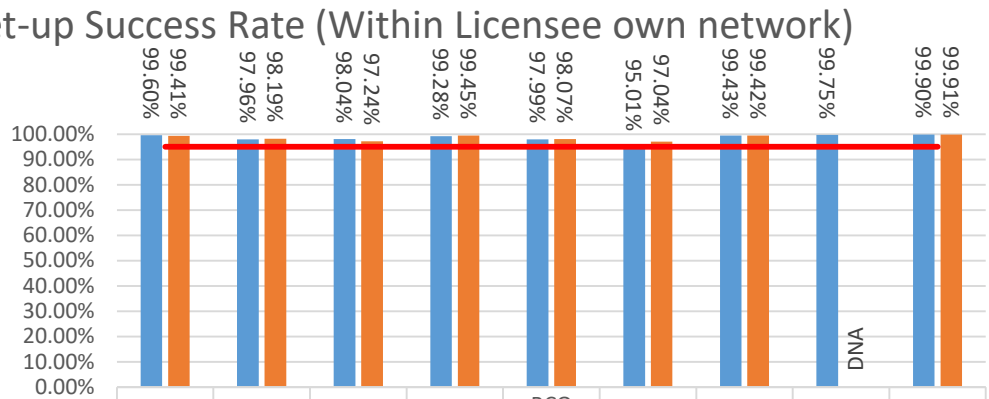
9.3.3. KEY FINDINGS: CALL SETUP SUCCESS RATE: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR November Month	99.67%	98.26%	98.37%	99.19%	98.09%	97.19%	99.39%	100%	99.84%
3 Day Live November Month	99.72%	98.33%	97.65%	99.35%	98.04%	96.89%	99.44%	100%	99.93%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

- It is clear from the analysis that all the operators are within benchmark.

9.3.4. KEY FINDINGS: CALL SETUP SUCCESS RATE: DECEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR December Month	99.60%	97.96%	98.04%	99.28%	97.99%	95.01%	99.43%	99.75%	99.90%
3 Day Live December Month	99.41%	98.19%	97.24%	99.45%	98.07%	97.04%	99.42%	0.00%	99.91%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

- It is clear from the analysis that all the operators are within benchmark.

9.4. NETWORK CHANNEL CONGESTION: PAGING CHANNEL/ TCH CONGESTION/ POI

- Definition: It means a call is not connected because there is no free channel to serve the call attempt. This parameter represents congestion in the network. It happens at three levels:
  - SDCCH Level: Stand-alone dedicated control channel
  - TCH Level: Traffic Channel
  - POI Level: Point of Interconnect.

- Computational Methodology:
  SDCCH / TCH Congestion% = $\frac{(A1 \times C1) + (A2 \times C2) + \cdots\ldots + (An \times Cn)}{(A1 + A2 + \cdots + An)}$

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
- 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% = $\frac{[(A1 \times C1) + (A2 \times C2) + \cdots\ldots + (An \times Cn)}{(A1 + A2 + \cdots + An}$

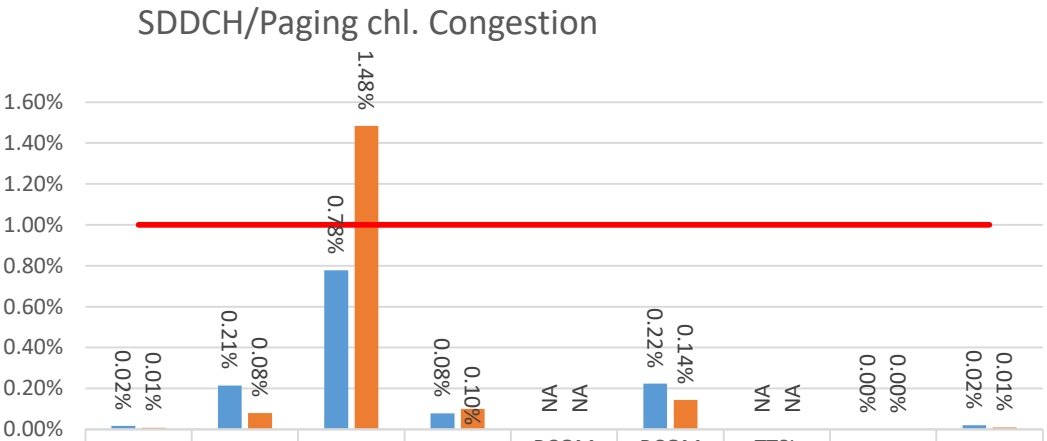
Where:

- 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

- Benchmark: SDCCH Congestion: ≤ 1%, TCH Congestion: ≤ 2%, POI Congestion: ≤ 0.5%

- Audit Procedure –
  - Audit of the details of SDCCH and TCH congestion percentages computed by the operator (using OMC–Switch data only) would be conducted.
  - The operator should be measuring this parameter during Time consistent busy hour (TCBH) only SDCCH.

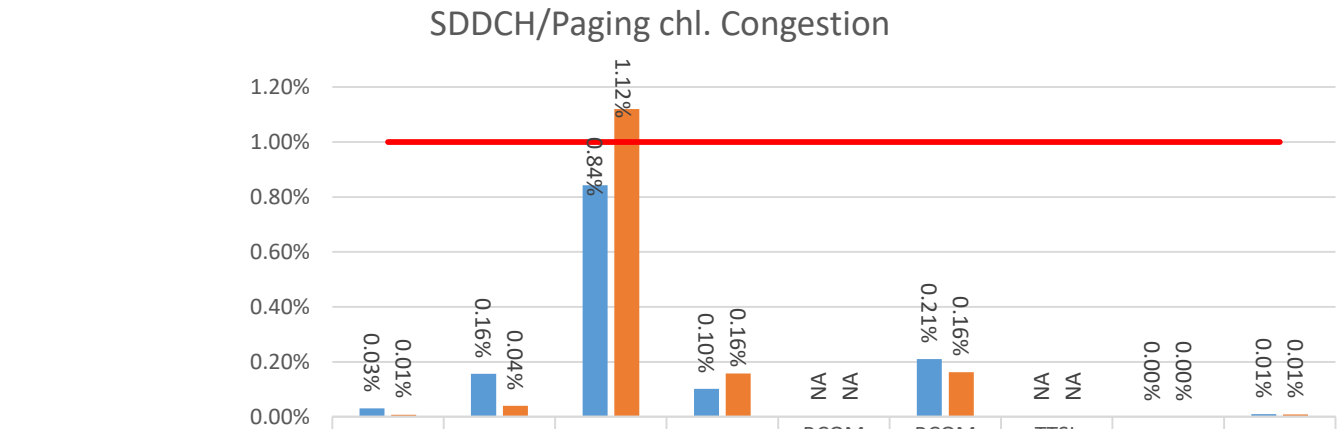
9.4.1. KEY FINDINGS: SDCC/ PAGING CHANNEL CONGESTION: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR Data 3 Month Consolidated	0.02%	0.21%	0.78%	0.08%	0.00%	0.22%	0.00%	0.00%	0.02%
3 Day Live 3 Month Consolidated	0.01%	0.08%	1.48%	0.10%	0.00%	0.14%	0.00%	0.00%	0.01%
Benchmark ≤ 1%	1%	1%	1%	1%	1%	1%	1%	1%	1%

- BSNL has a parameter value of **1.48%** and failed to meet the benchmark for SDDCH/Paging chl. Congestion which is pre-defined at ≤ 1%.

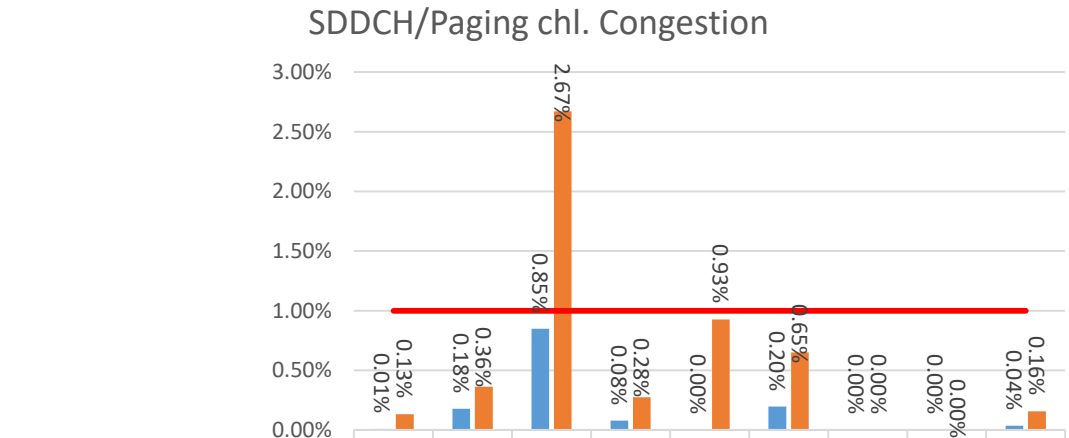
9.4.2. KEY FINDINGS: SDCC/ PAGING CHANNEL CONGESTION: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR October Month	0.03%	0.16%	0.84%	0.10%	0.00%	0.21%	0.00%	0.00%	0.01%
3 Day Live October Month	0.01%	0.04%	1.12%	0.16%	0.00%	0.16%	0.00%	0.00%	0.01%
Benchmark ≤ 1%	1%	1%	1%	1%	1%	1%	1%	1%	1%

- BSNL has a parameter value of **1.12%** and failed to meet the benchmark for SDDCH/Paging chl. Congestion which is pre-defined at ≤ 1%.

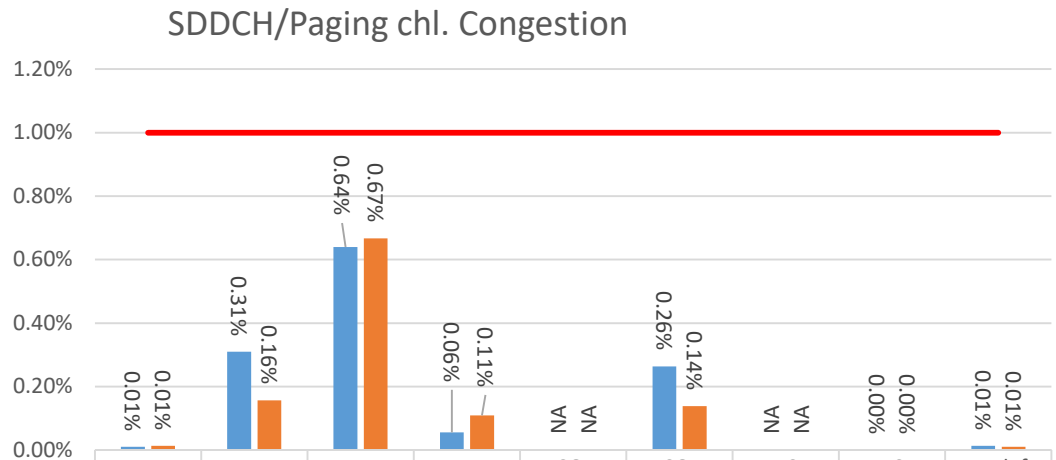
9.4.3. KEY FINDINGS: SDCC/ PAGING CHANNEL CONGESTION: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR November Month	0.01%	0.18%	0.85%	0.08%	0.00%	0.20%	0.00%	0.00%	0.04%
3 Day Live November Month	0.13%	0.36%	2.67%	0.28%	0.93%	0.65%	0.00%	0.00%	0.16%
Benchmark ≤ 1%	1%	1%	1%	1%	1%	1%	1%	1%	1%

- BSNL has a parameter value of **2.67%** and failed to meet the benchmark for SDDCH/Paging chl. Congestion which is pre-defined at ≤ 1%.

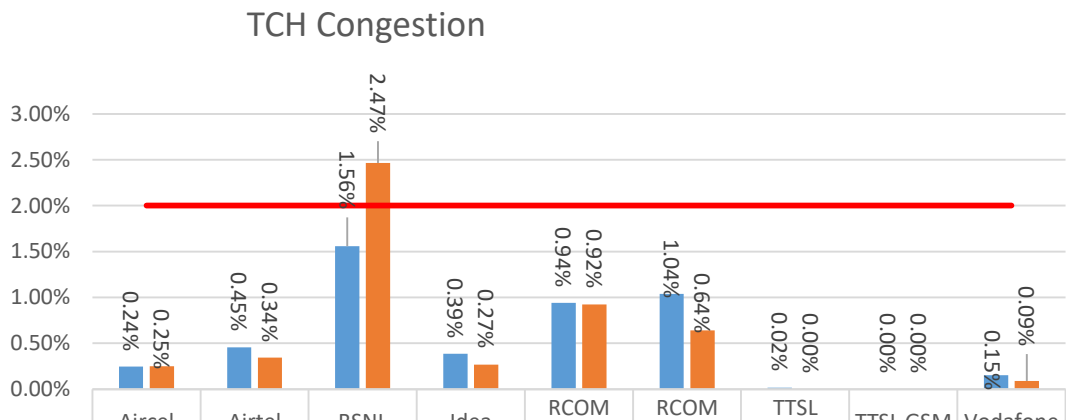
9.4.4. KEY FINDINGS: SDCC/ PAGING CHANNEL CONGESTION: DECEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR December Month	0.01%	0.31%	0.64%	0.06%	0.00%	0.26%	0.00%	0.00%	0.01%
3 Day Live December Month	0.01%	0.16%	0.67%	0.11%	0.00%	0.14%	0.00%	0.00%	0.01%
Benchmark ≤ 1%	1%	1%	1%	1%	1%	1%	1%	1%	1%

- It is clear from the analysis that all the operators are within benchmark.

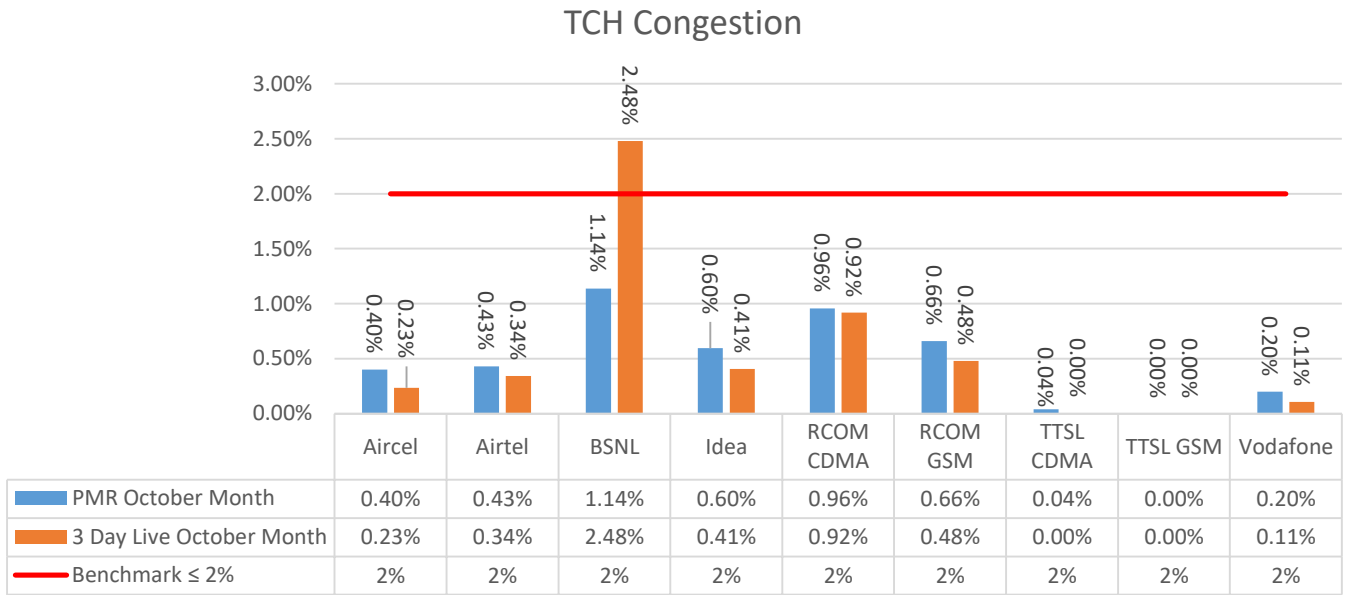
9.4.5. KEY FINDINGS: TCH CONGESTION: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR Data 3 Month Consolidated	0.24%	0.45%	1.56%	0.39%	0.94%	1.04%	0.02%	0.00%	0.15%
3 Day Live 3 Month Consolidated	0.25%	0.34%	2.47%	0.27%	0.92%	0.64%	0.00%	0.00%	0.09%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- BSNL has a parameter value of **2.47%** and failed to meet the benchmark for TCH Congestion which is pre-defined at ≤ 2%.

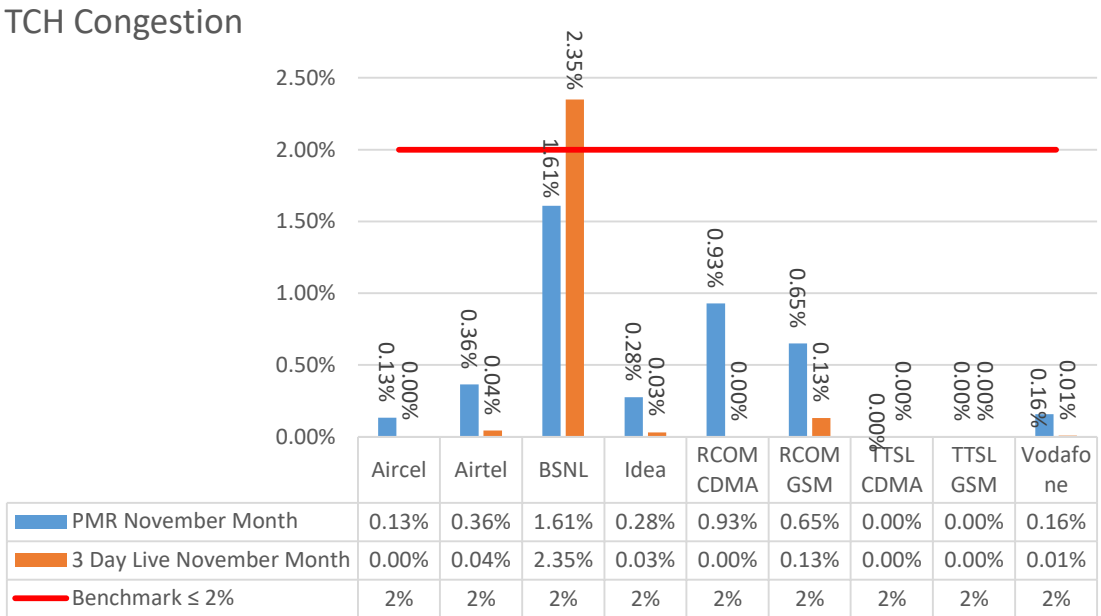
9.4.6. KEY FINDINGS: TCH CONGESTION: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR October Month	0.40%	0.43%	1.14%	0.60%	0.96%	0.66%	0.04%	0.00%	0.20%
3 Day Live October Month	0.23%	0.34%	2.48%	0.41%	0.92%	0.48%	0.00%	0.00%	0.11%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- BSNL has a parameter value of **2.48%** and failed to meet the benchmark for TCH Congestion which is pre-defined at ≤ 2%.

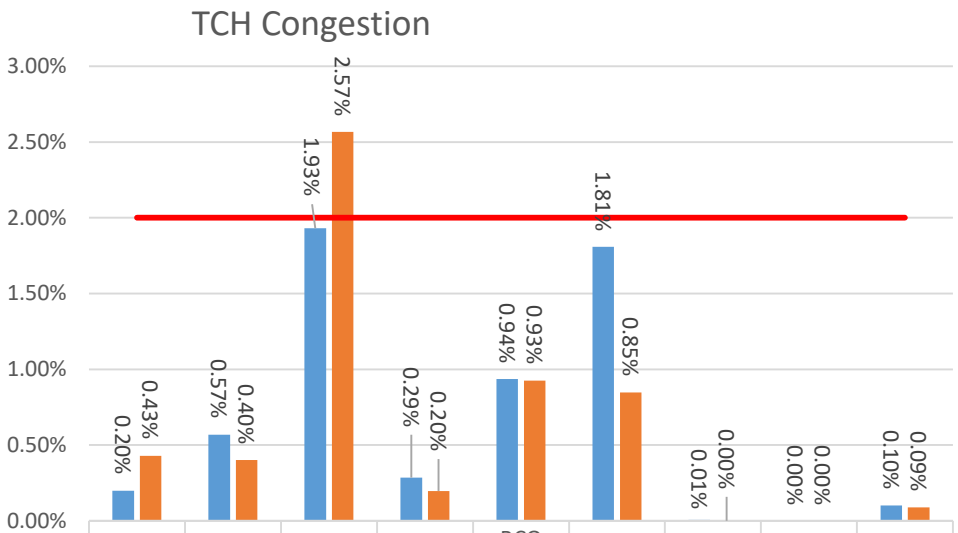
9.4.7. KEY FINDINGS: TCH CONGESTION: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR November Month	0.13%	0.36%	1.61%	0.28%	0.93%	0.65%	0.00%	0.00%	0.16%
3 Day Live November Month	0.00%	0.04%	2.35%	0.03%	0.00%	0.13%	0.00%	0.00%	0.01%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- BSNL has a parameter value of **2.35%** and failed to meet the benchmark for TCH Congestion which is pre-defined at ≤ 2%.

9.4.8. KEY FINDINGS: TCH CONGESTION: DECEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR December Month	0.20%	0.57%	1.93%	0.29%	0.94%	1.81%	0.01%	0.00%	0.10%
3 Day Live December Month	0.43%	0.40%	2.57%	0.20%	0.93%	0.85%	0.00%	0.00%	0.09%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- BSNL has a parameter value of **2.57%** and failed to meet the benchmark for TCH Congestion which is pre-defined at ≤ 2%.

9.5. CALL DROP RATE

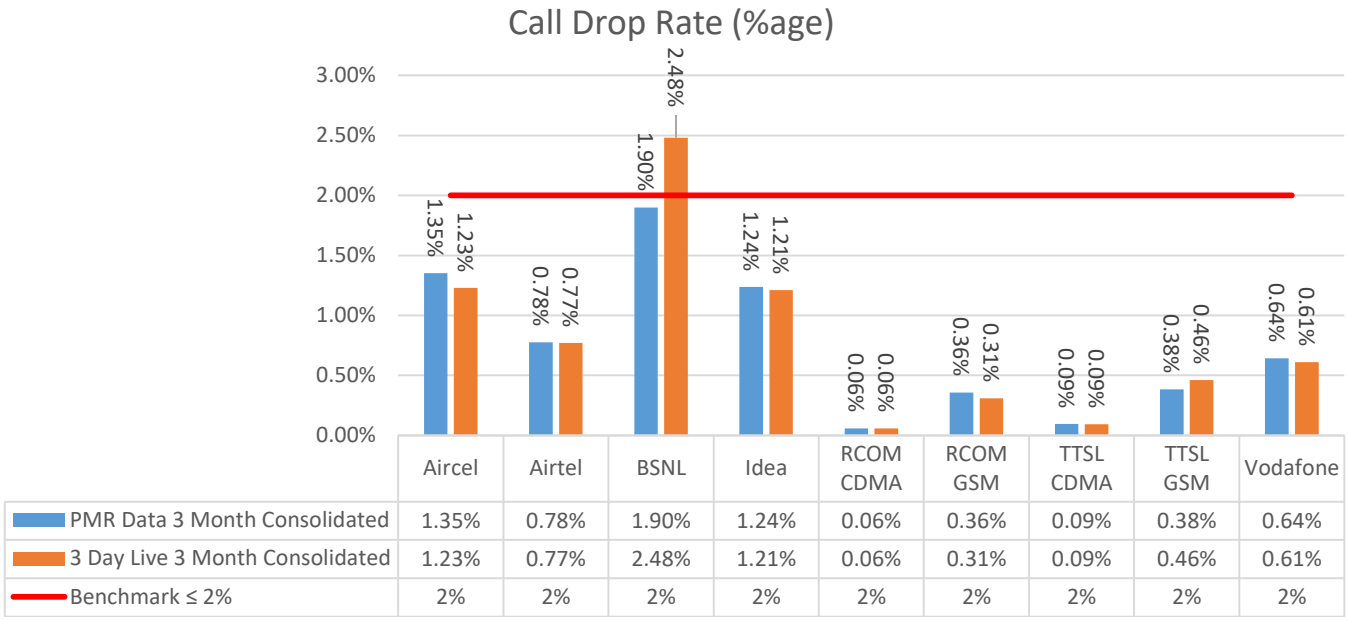
- Definition - The dropped call rate is the ratio of successfully originated calls that were found to drop to the total number of successfully originated calls that were correctly released.
  - Total calls dropped = All calls ceasing unnaturally i.e. due to handover or due to radio loss
  - Total calls established = All calls that have TCH allocation during busy hour

- Computational Methodology: $\frac{\text{Total Calls Dropped}}{\text{Total Calls Established}} * 100$

- TRAI Benchmark: Call drop rate ≤ 2%
- Audit Procedure:
  - Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR was used.

The operator should only be considering those calls which are dropped during Time consistent busy hour (TCBH) for all days of the relevant quarter.

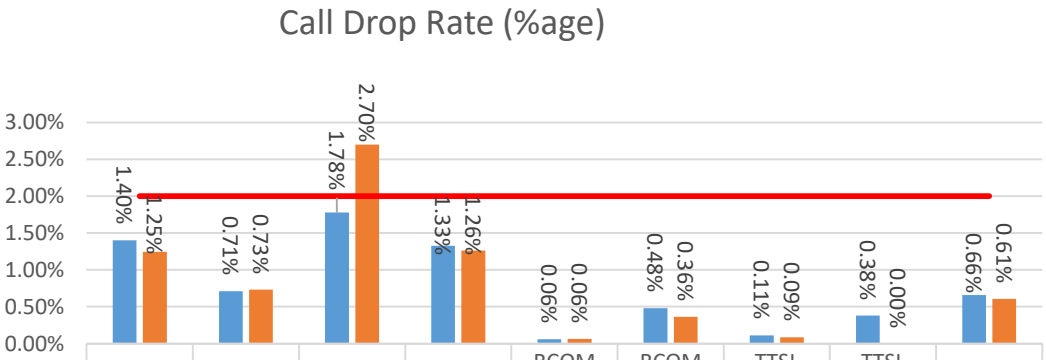
9.5.1. KEY FINDINGS: CALL DROP RATE: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR Data 3 Month Consolidated	1.35%	0.78%	1.90%	1.24%	0.06%	0.36%	0.09%	0.38%	0.64%
3 Day Live 3 Month Consolidated	1.23%	0.77%	2.48%	1.21%	0.06%	0.31%	0.09%	0.46%	0.61%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- BSNL has a parameter value of **2.48%** and failed to meet the benchmark for Call Drop Rate which is pre-defined at ≤ 2%.

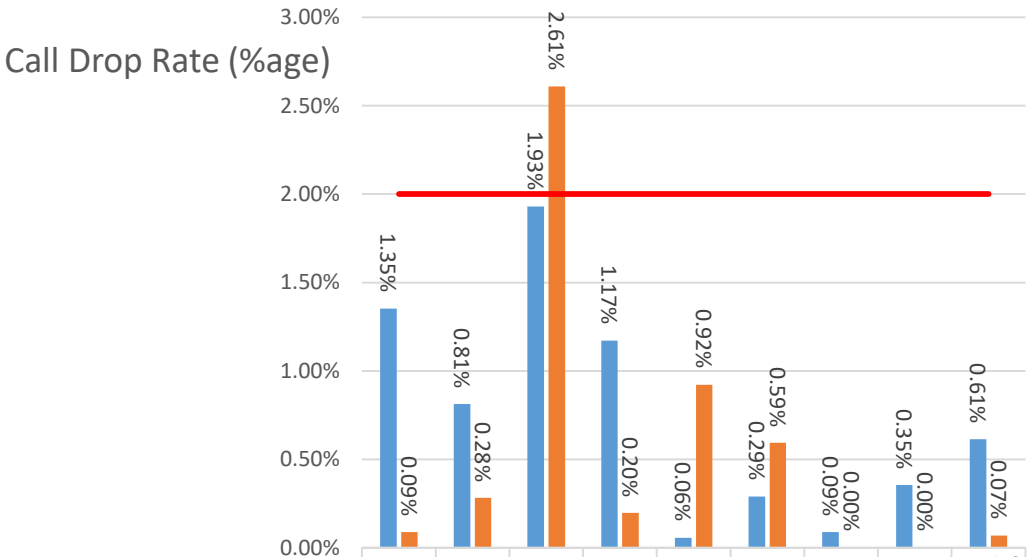
9.5.2. KEY FINDINGS: CALL DROP RATE: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR October Month	1.40%	0.71%	1.78%	1.33%	0.06%	0.48%	0.11%	0.38%	0.66%
3 Day Live October Month	1.25%	0.73%	2.70%	1.26%	0.06%	0.36%	0.09%	0.00%	0.61%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- BSNL has a parameter value of **2.70%** and failed to meet the benchmark for Call Drop Rate which is pre-defined at ≤ 2%.

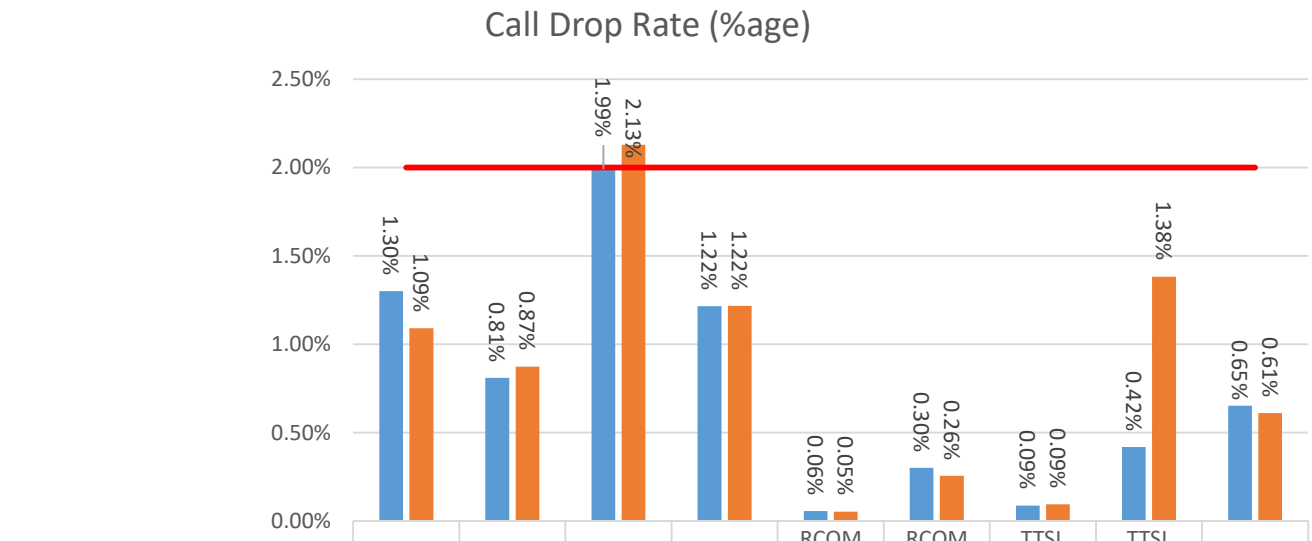
9.5.3. KEY FINDINGS: CALL DROP RATE: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR November Month	1.35%	0.81%	1.93%	1.17%	0.06%	0.29%	0.09%	0.35%	0.61%
3 Day Live November Month	0.09%	0.28%	2.61%	0.20%	0.92%	0.59%	0.00%	0.00%	0.07%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- BSNL has a parameter value of **2.61%** and failed to meet the benchmark for Call Drop Rate which is pre-defined at ≤ 2%.

9.5.4. KEY FINDINGS: CALL DROP RATE: DECEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR December Month	1.30%	0.81%	1.99%	1.22%	0.06%	0.30%	0.09%	0.42%	0.65%
3 Day Live December Month	1.09%	0.87%	2.13%	1.22%	0.05%	0.26%	0.09%	1.38%	0.61%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

- BSNL has a parameter value of **2.13%** and failed to meet the benchmark for Call Drop Rate which is pre-defined at ≤ 2%.

9.6. CELLS HAVING GREATER THAN 3% TCH DROP

- Definition- Worst Affected Cells having more than 3% TCH drop shall measure the ratio of total number of cells in the network to the ratio of cells having more than 3% TCH drop.

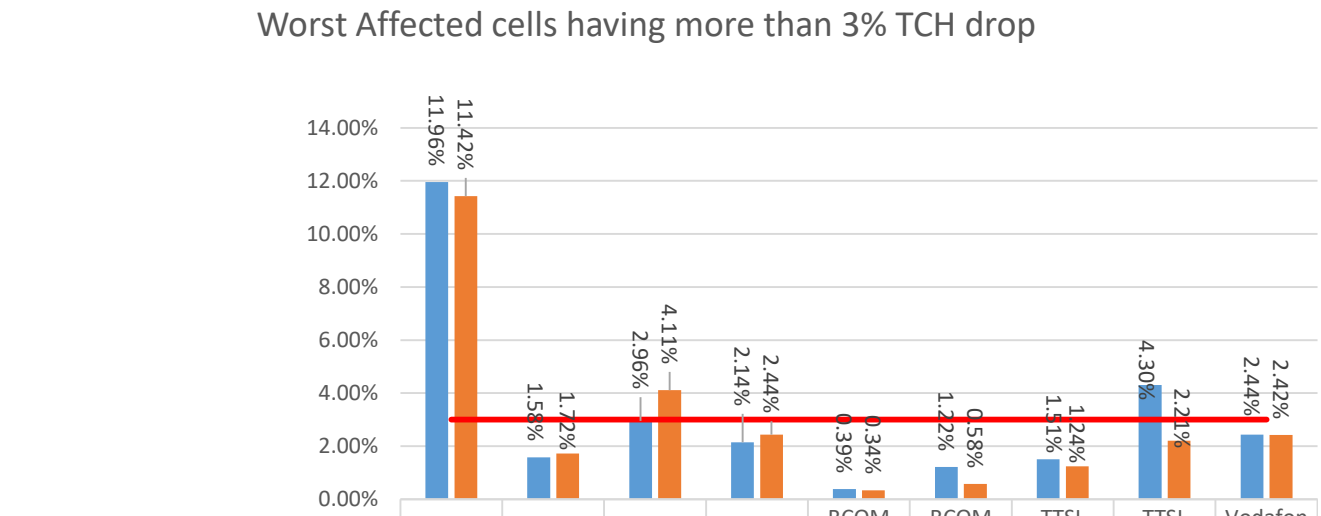
- Computational Methodology: $\frac{\text{Total number of cells having more than 3\% TCH drop during CBBH}}{\text{Total number of cells in the network}} * 100$

- TRAI Benchmark: Worst affected cells having more than 3% TCH drop rate ≤ 3%

- Audit Procedure:
  - Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR would be conducted.

The operator should only be considering those calls which are dropped during Cell Bouncing Busy hour (CBBH) for all days of the relevant quarter.

9.6.1. KEY FINDINGS: CELLS HAVING MORE THAN 3% TCH DROP: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR Data 3 Month Consolidated	11.96%	1.58%	2.96%	2.14%	0.39%	1.22%	1.51%	4.30%	2.44%
3 Day Live 3 Month Consolidated	11.42%	1.72%	4.11%	2.44%	0.34%	0.58%	1.24%	2.21%	2.42%
Benchmark ≤ 3%	3%	3%	3%	3%	3%	3%	3%	3%	3%

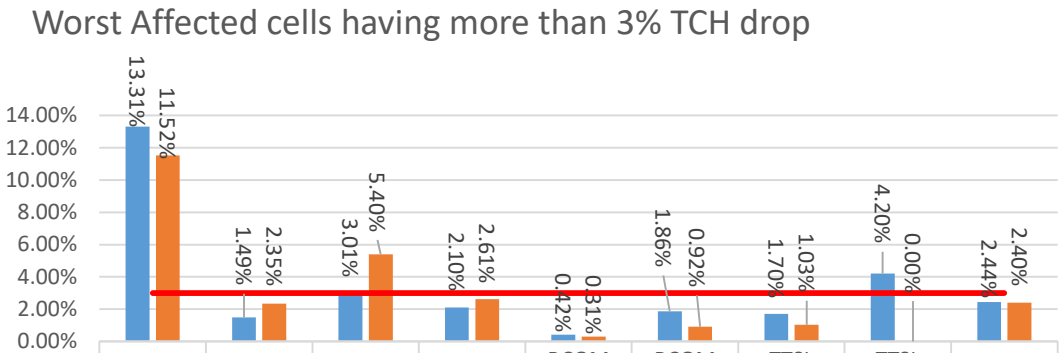
- Aircel has a parameter value of **11.96%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

- TTSL GSM has a parameter value of **4.30%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

- Aircel has a parameter value of **11.42%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

- BSNL has a parameter value of **4.11%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

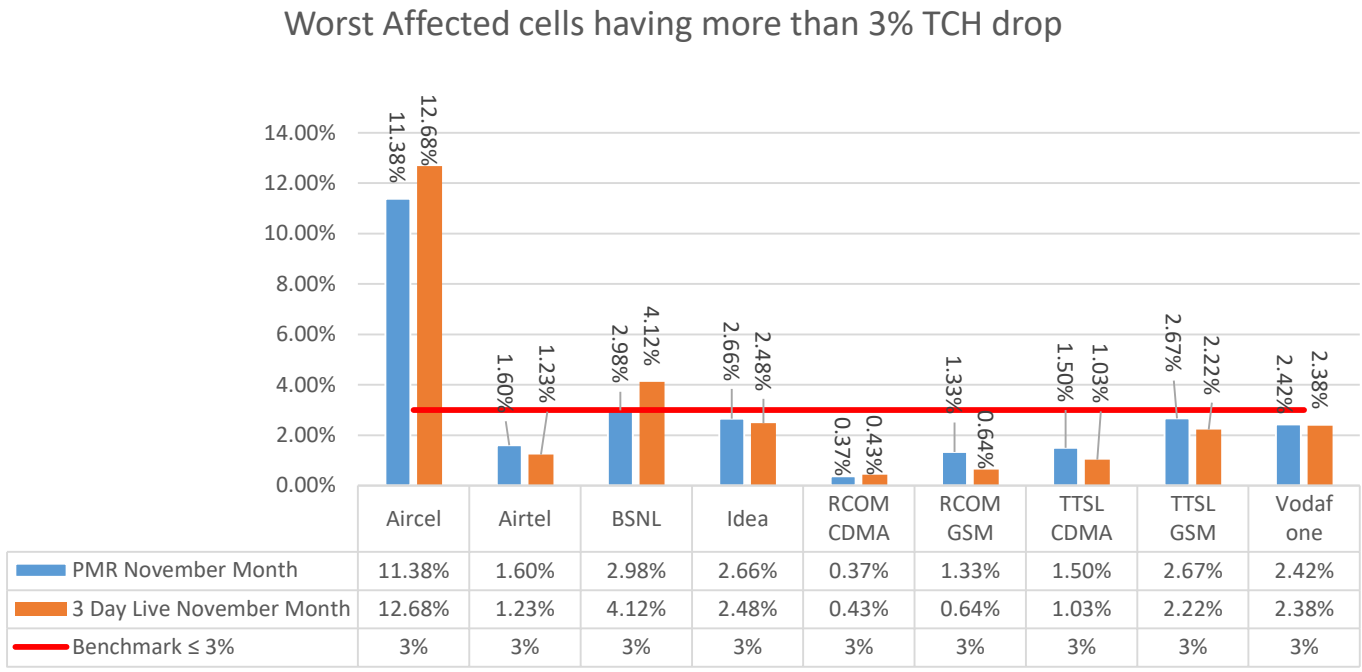
9.6.2. KEY FINDINGS: CELLS HAVING MORE THAN 3% TCH DROP: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR October Month	13.31%	1.49%	3.01%	2.10%	0.42%	1.86%	1.70%	4.20%	2.44%
3 Day Live October Month	11.52%	2.35%	5.40%	2.61%	0.31%	0.92%	1.03%	0.00%	2.40%
Benchmark ≤ 3%	3%	3%	3%	3%	3%	3%	3%	3%	3%

- Aircel has a parameter value of **13.31%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- TTSL GSM has a parameter value of **4.20%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- Aircel has a parameter value of **11.52%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- BSNL has a parameter value of **5.40%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

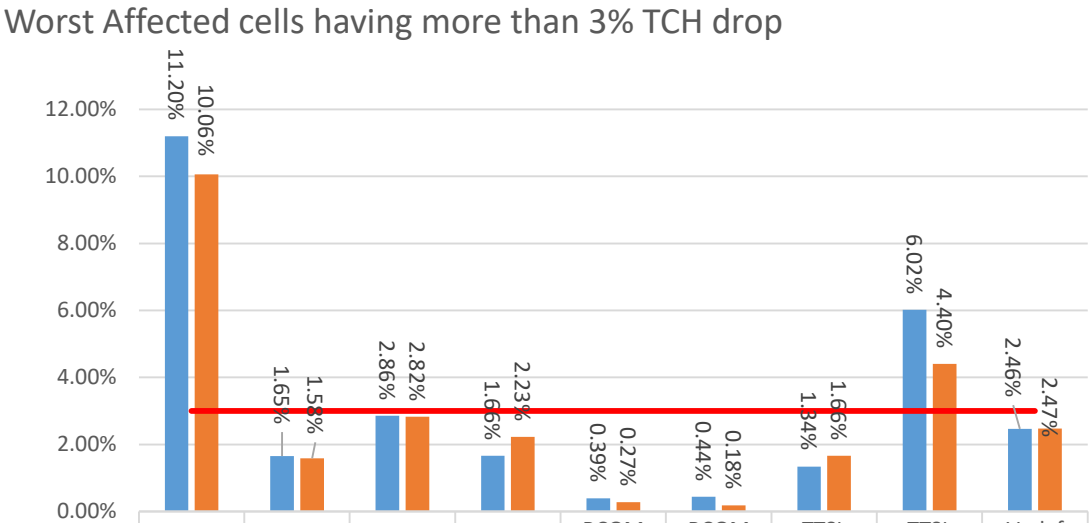
9.6.3. KEY FINDINGS: CELLS HAVING MORE THAN 3% TCH DROP: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR November Month	11.38%	1.60%	2.98%	2.66%	0.37%	1.33%	1.50%	2.67%	2.42%
3 Day Live November Month	12.68%	1.23%	4.12%	2.48%	0.43%	0.64%	1.03%	2.22%	2.38%
Benchmark ≤ 3%	3%	3%	3%	3%	3%	3%	3%	3%	3%

- Aircel has a parameter value of **11.38%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- Aircel has a parameter value of **12.68%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- BSNL has a parameter value of **4.12%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

9.6.4. KEY FINDINGS: CELLS HAVING MORE THAN 3% TCH DROP: DECEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR December Month	11.20%	1.65%	2.86%	1.66%	0.39%	0.44%	1.34%	6.02%	2.46%
3 Day Live December Month	10.06%	1.58%	2.82%	2.23%	0.27%	0.18%	1.66%	4.40%	2.47%
Benchmark ≤ 3%	3%	3%	3%	3%	3%	3%	3%	3%	3%

- Aircel has a parameter value of **11.20%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- TTSL GSM has a parameter value of **6.02%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- Aircel has a parameter value of **10.06%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- TTSL GSM has a parameter value of **4.40%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

9.7. VOICE QUALITY

- Definition:
  - For GSM service providers the calls having a value of 0 –5 are considered to be of good quality (on a seven point scale)

- For CDMA the measure of voice quality is Frame Error Rate (FER). FER is the probability that a transmitted frame will be received incorrectly. Good voice quality of a call is considered when it FER value lies between 0 – 4 %

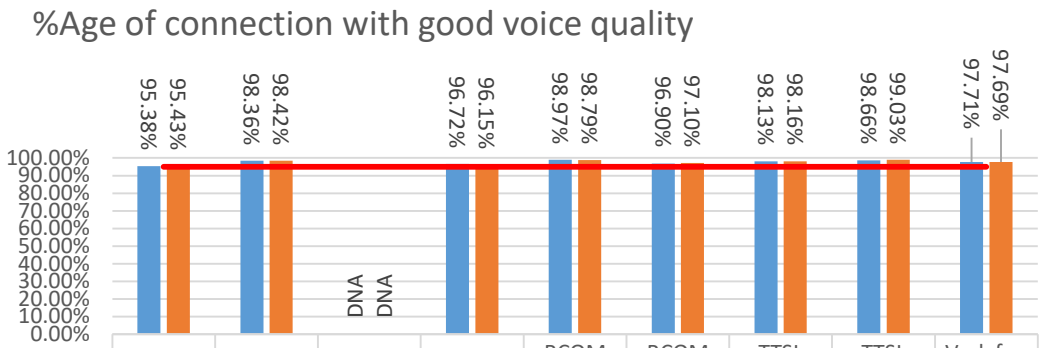
- Computational Methodology:

$$\% \text{ Connections with good voice quality} = \frac{\text{No.of voice samples with good voice quality}}{\text{Total number of samples}} * 100$$

- TRAI Benchmark: ≥ 95%

- Audit Procedure –
  - A sample of calls would be taken randomly from the total calls established.
  - The operator should only be considering those calls which are meeting the desired benchmark of good voice quality.

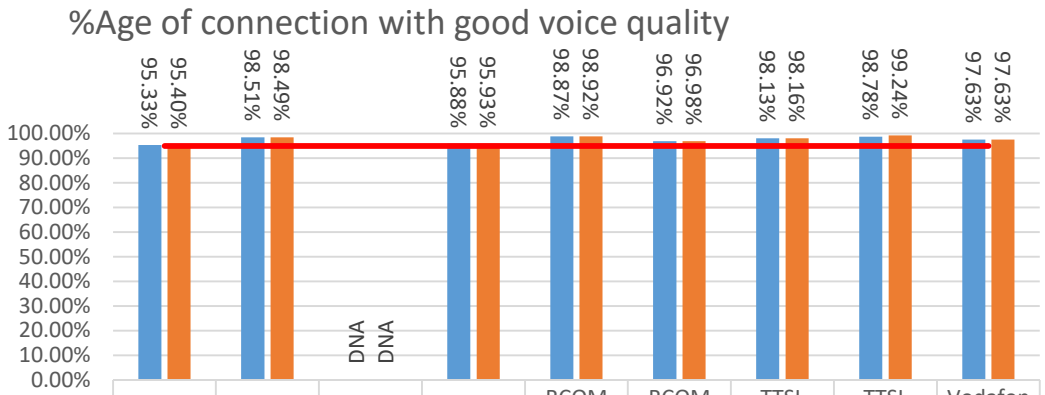
9.7.1. KEY FINDINGS: VOICE QUALITY: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR Data 3 Month Consolidated	95.38%	98.36%	0.00%	96.72%	98.97%	96.90%	98.13%	98.66%	97.71%
3 Day Live 3 Month Consolidated	95.43%	98.42%	0.00%	96.15%	98.79%	97.10%	98.16%	99.03%	97.69%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

- It is clear from the analysis that all the operators are within benchmark.

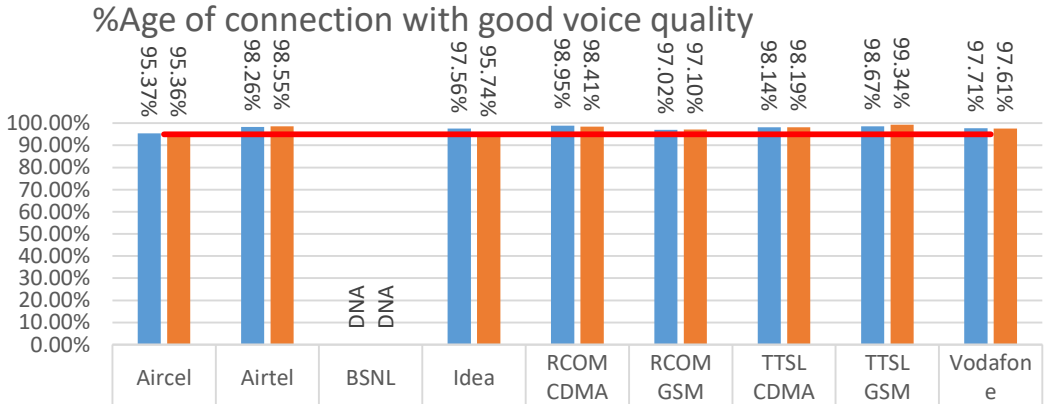
9.7.2. KEY FINDINGS: VOICE QUALITY: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR October Month	95.33%	98.51%	0.00%	95.88%	98.87%	96.92%	98.13%	98.78%	97.63%
3 Day Live October Month	95.40%	98.49%	0.00%	95.93%	98.92%	96.98%	98.16%	99.24%	97.63%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

- It is clear from the analysis that all the operators are within benchmark.

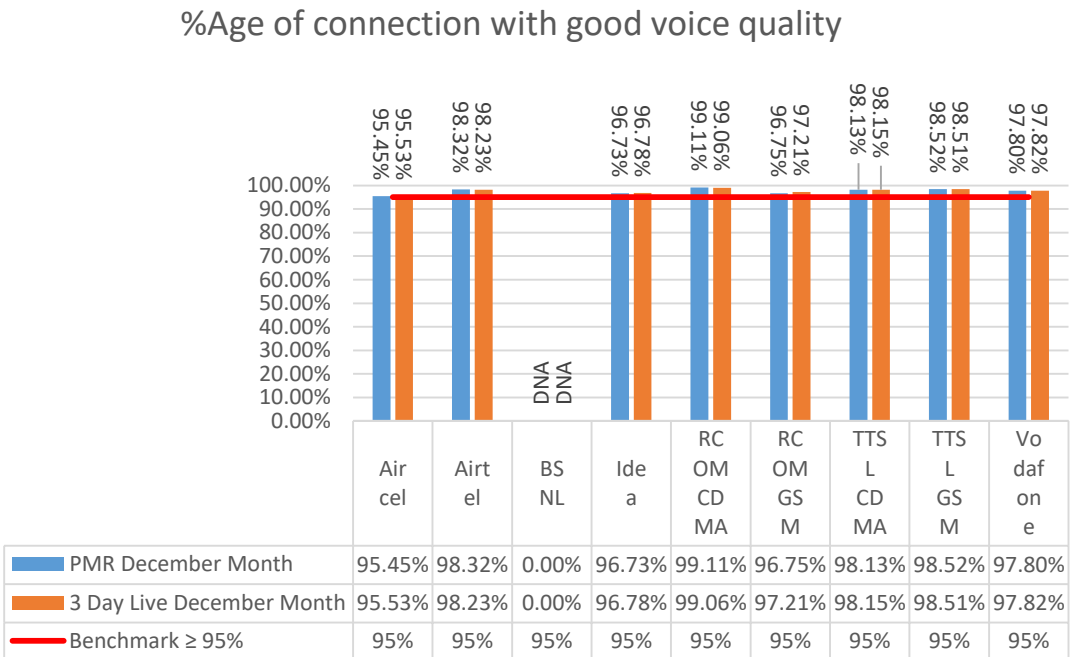
9.7.3. KEY FINDINGS: VOICE QUALITY: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
PMR November Month	95.37%	98.26%	0.00%	97.56%	98.95%	97.02%	98.14%	98.67%	97.71%
3 Day Live November Month	95.36%	98.55%	0.00%	95.74%	98.41%	97.10%	98.19%	99.34%	97.61%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

- It is clear from the analysis that all the operators are within benchmark.

9.7.4. KEY FINDINGS: VOICE QUALITY: DECEMBER



- It is clear from the analysis that all the operators are within benchmark.

9.8. POI CONGESTION: CONSOLIDATED

POI Congestion: PMR Consolidated									
POI Congestion	Benchmark	Aircel	Airtel		BSNL	Idea	TATA CDMA	TATA GSM	Vodafone
		2G	2G	3G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		191295	500813	510730	577706	3401	47472	1757	345423
Total traffic served on all POIs (Erlang)		5344.4267	26010.667	26918.93	11209.766	7207.37284	1309.598683	1047.164792	12011.929
Total No. of circuits on all individual POIs		14459.333	40573.667	44654	18405	13301.36667	6759.666667	183	26365.447
Total number of working POI Service Area wise		29	36.666667	35.666667	299.66667	20	55	1	66.666667
Capacity of all POIs		13414.62	40827.667	44993.333	16564.833	12714.16836	5062.34	155.6833333	25294.589
No. of all POI's having >=0.5% POI congestion	≤ 0.5%	0	0	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	NA	NA	NA	NA	NA	NA

POI Congestion: 3 Days Live December											
POI Congestion	Benchmark	Aircel	Airtel		BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
		2G	2G	3G	2G	2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		195594	504793	504793	3604267	3381	15779	226813	42384	1928	318873
Total traffic served on all POIs (Erlang)		5381	26176	26176	11786	7146	305	4126	1090	34	11373
Total No. of circuits on all individual POIs		14465	41228	41228	18405	13352	2094	14495	6093	183	26608
Total number of working POI Service Area wise		29	36	36	29	20	13	22	55	1	60
Capacity of all POIs		13420	40816	40816	16565	12764	1698	13309	5062	153	25460
No. of all POI's having >=0.5% POI congestion	≤ 0.5%	0	0	0	0	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

9.9. POI CONGESTION: OCTOBER

POI Congestion: PMR October											
POI Congestion	Benchmark	Aircel	Airtel		BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
		2G	2G	3G	2G	2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		207583	785870	785870	598493	3606	15689	240684	31616	1570	24861
Total traffic served on all POIs (Erlang)		5793	26862	26862	10243	7512	308	4286	1036	3075	12452
Total No. of circuits on all individual POIs		14444	39028	39028	18405	13180	2094	14514	8093	183	26008
Total number of working POI Service Area wise		29	36	36	29	20	13	22	55	1	80
Capacity of all POIs		13401	40617	40617	16565	12594	1697	13320	5062	159	24861
No. of all POI's having >=0.5% POI congestion	≤0.5%	0	0	0	0	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

POI Congestion: 3 Days Live October											
POI Congestion	Benchmark	Aircel	Airtel		BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
		2G	2G	3G	2G	2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		191341	770680	770680	9541788	3558	15104	226316	5062	1524	25380
Total traffic served on all POIs (Erlang)		5454	26437	26437	11504	7374	278	3975	1104	31	12035
Total No. of circuits on all individual POIs		14444	40401	40401	18405	13210	2094	14495	6093	183	26526
Total number of working POI Service Area wise		29	36	36	29	20	13	22	55	1	60
Capacity of all POIs		13401	39997	39997	16565	12624	1700	13295	5062	159	25380
No. of all POI's having >=0.5% POI congestion	≤0.5%	0	0	0	0	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

9.10. POI CONGESTION: NOVEMBER

POI Congestion: PMR November											
POI Congestion	Benchmark	Aircel	Airtel		BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
		2G	2G	3G	2G	2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		180124	716052	709686	587557	3447	15756	230893	56239	1799	506819
Total traffic served on all POIs (Erlang)		5053	25440	23897.79	11630	7243	305	4152	988	34	11795
Total No. of circuits on all individual POIs		14444	40886	41597	18405	13301	2094	14494	6093	183	26507
Total number of working POI Service Area wise		29	37	37	841	20	13	22	55	1	60
Capacity of all POIs		13401	40477	41163	16565	12714	1697	13312	5062	150	25490
No. of all POI's having >=0.5% POI congestion	≤0.5%	0	0	0	0	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

POI Congestion: 3 Days Live November											
POI Congestion	Benchmark	Aircel	Airtel		BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
		2G	2G	3G	2G	2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		188034	743188	743188	691439	3343	16454	227959	62795	2025	421440
Total traffic served on all POIs (Erlang)		5369	26562	26562	11833	7079	316	4293	1114	37	10226
Total No. of circuits on all individual POIs		14444	41399	41399	18405	13423	2094	14495	6093	183	26649
Total number of working POI Service Area wise		29	36	36	29	20	13	22	55	1	60
Capacity of all POIs		13401	40985	40985	16565	12835	1700	13300	5062	150	25500
No. of all POI's having >=0.5% POI congestion	≤ 0.5%	0	0	0	0	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

9.11. POI CONGESTION: DECEMBER

POI Congestion: PMR December											
POI Congestion	Benchmark	Aircel	Airtel		BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
		2G	2G	3G	2G	2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		186179	518	36635	547068	3150	15174	217263	54560	1903	504589
Total traffic served on all POIs (Erlang)		5186.90	25730	29997	11756	6867	310	3995	1905	32	11789
Total No. of circuits on all individual POIs		14490.00	41807	53337	18405	13423	2094	14487	6093	183	26582
Total number of working POI Service Area wise		29.00	37	34	29	20	13	22	55	1	60
Capacity of all POIs		13441.54	41389	53200	16565	12835	1696	13308	5062	159	25533
No. of all POI's having >=0.5% POI congestion	≤0.5%	0	0	0	0	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

POI Congestion: 3 Days Live December											
POI Congestion	Benchmark	Aircel	Airtel		BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
		2G	2G	3G	2G	2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		207408	510	510	579574	3240	15780	226164	59294	2236	509800
Total traffic served on all POIs (Erlang)		5320	25529	25529	12021	6986	320	4110	1053	36	11859
Total No. of circuits on all individual POIs		14506	41885	41885	18405	13423	2094	14494	6093	183	26649
Total number of working POI Service Area wise		29	36	36	29	20	13	22	55	1	60
Capacity of all POIs		13456	41466	41466	16565	12835	1693	13333	5062	150	25500
No. of all POI's having >=0.5% POI congestion	≤0.5%	0	0	0	0	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

10. Non Network Parameters: Description and Detailed Findings

10.1. Metering and Billing Credibility

The billing complaints for post-paid are calculated by averaging over one billing cycle in a quarter. For example, there are three billing cycles in a quarter, the data for each billing cycle is calculated separately and then averaged over.

The charging complaints for prepaid are calculated by taking all complaints in a quarter.

Parameter Description

All the complaints related to billing/ charging as per clause 3.7.2 of QoS regulation of 20th June, 2009 were covered. The types of billing complaints covered are listed below.

1. Payments made and not credited to the subscriber account
2. Payment made on time but late payment charge levied wrongly
3. Wrong roaming charges
4. Double charges
5. Charging for toll free services
6. Local calls charged/billed as STD/ISD or vice versa
7. Calls or messages made disputed
8. Validity related complaints
9. Credit agreed to be given in resolution of complaint, but not accounted in the bill
10. Charging for services provided without consent
11. Charging not as per tariff plans or top up vouchers/ special packs etc.
12. Overcharging or undercharging

In addition to the above, any billing complaint which leads to billing error, waiver, refund, credit, or any adjustment is also considered as valid billing complaint for calculating the number of disputed bills.

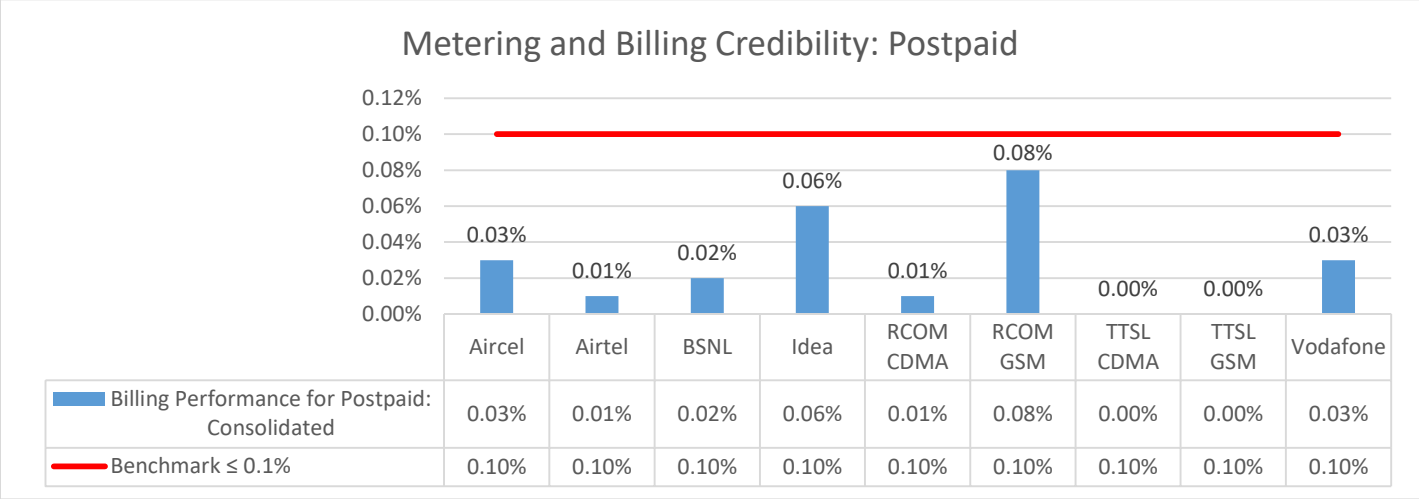
- Computational Methodology:
  - Metering and billing credibility (Post-paid)
    $$= \frac{\text{Total billing complaints} * \text{received during the relevant billing cycle}}{\text{Total bills generated} * \text{during the relevant billing cycle}} * 100$$
  - Operator to include all types of bills generated for customers. This would include printed bills, online bills and any other forms of bills generated
  - Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally.
  - Metering and billing credibility (Prepaid)
    $$= \frac{\text{Total charging complaints received during the quarter}}{\text{Total number of subscribers reported by the operator at the end of the quarter}} * 100$$

- TRAI Benchmark: <= 0.1%

- Audit Procedure:

  - Audit of billing complaint details for the complaints received during the quarter and used for arriving at the benchmark reported to TRAI would be conducted
  - For Post-paid, the total billing complaints would be audited by averaging over billing cycles in a quarter.
  - For Prepaid, the data of total charging complaints in a quarter would be taken for the purpose of audit.

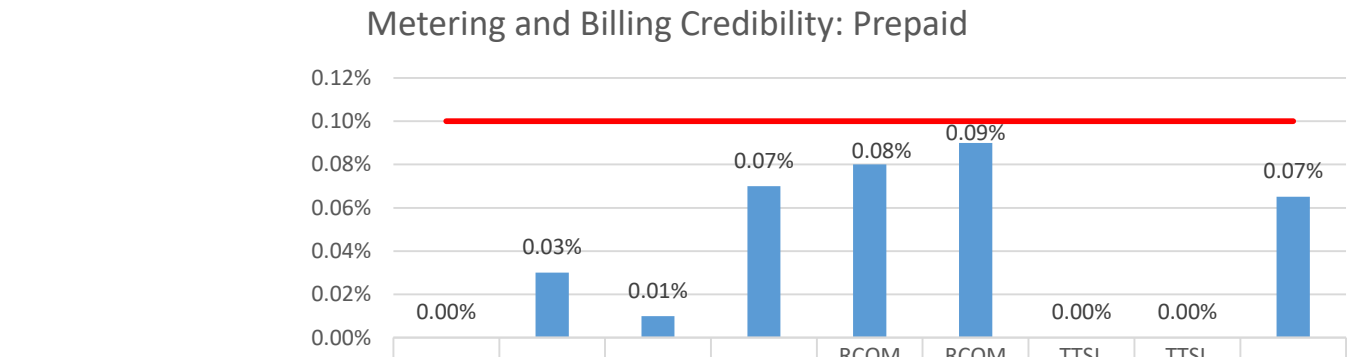
10.1.1. KEY FINDINGS: METERING AND BILLING CREDIBILITY: POST – PAID



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
Billing Performance for Postpaid: Consolidated	0.03%	0.01%	0.02%	0.06%	0.01%	0.08%	0.00%	0.00%	0.03%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

- It is clear from the analysis that all the operators are within benchmark.

10.1.2. KEY FINDINGS: METERING AND BILLING CREDIBILITY: PREPAID



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
Billing Performance for Prepaid: Consolidated	0.00%	0.03%	0.01%	0.07%	0.08%	0.09%	0.00%	0.00%	0.07%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

- It is clear from the analysis that all the operators are within benchmark.

10.2. RESOLUTION OF BILLING COMPLAINTS

Calculation of Percentage resolution of billing complaints: The calculation methodology (given below) as per QoS regulations 2009 (7 of 2009) was followed to calculate resolution of billing complaints.

Resolution of billing complaints within 4 weeks:

%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 4 weeks =

$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 4 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

Resolution of billing complaints within 6 weeks:

%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 6 weeks =

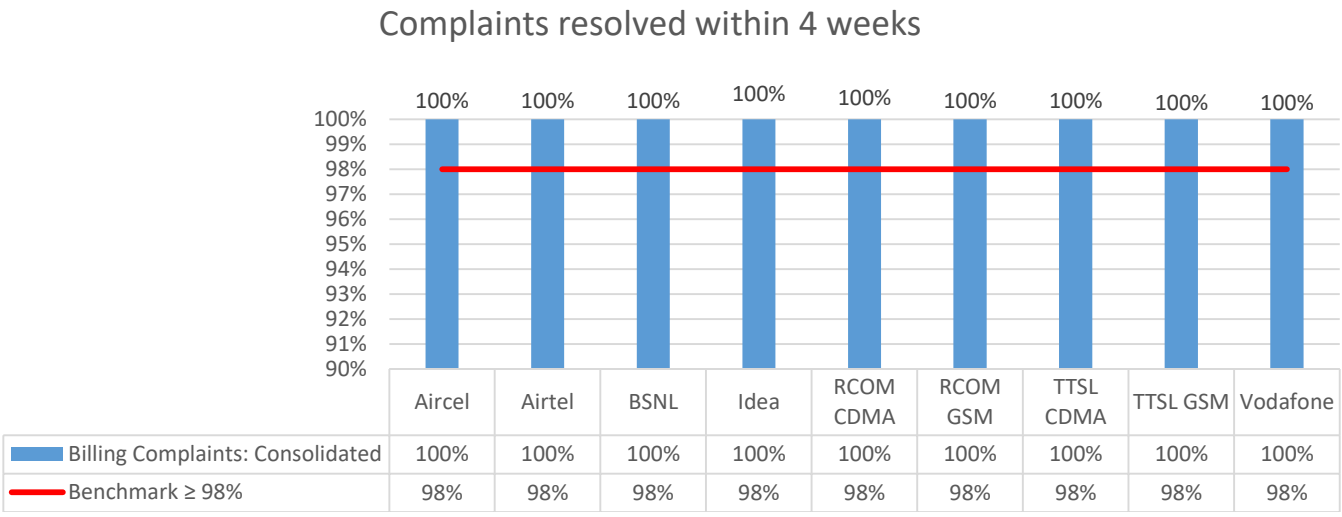
$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 6 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

- Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional

issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally. Complaints raised by the consumers to operator are only considered as part of the calculation.

- Date of resolution in this case would refer to the date when a communication has taken place from the operator's end to inform the complainant about the final resolution of the issue / dispute.
- Benchmark: 98% complaints resolved within 4 weeks, 100% within 6 weeks.

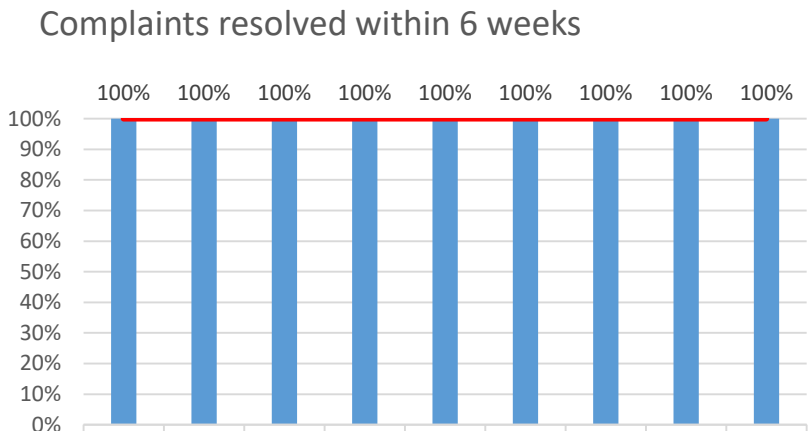
10.2.1. KEY FINDINGS: BILLING COMPLAINTS RESOLUTION WITHIN 4 WEEKS



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
Billing Complaints: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark ≥ 98%	98%	98%	98%	98%	98%	98%	98%	98%	98%

- It is clear from the analysis that all the operators are within benchmark.

10.2.2. KEY FINDINGS: BILLING COMPLAINTS RESOLUTION WITHIN 6 WEEKS



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
Billing Complaints: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark =100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

- It is clear from the analysis that all the operators are within benchmark.

10.3. PERIOD OF APPLYING CREDIT / WAVER

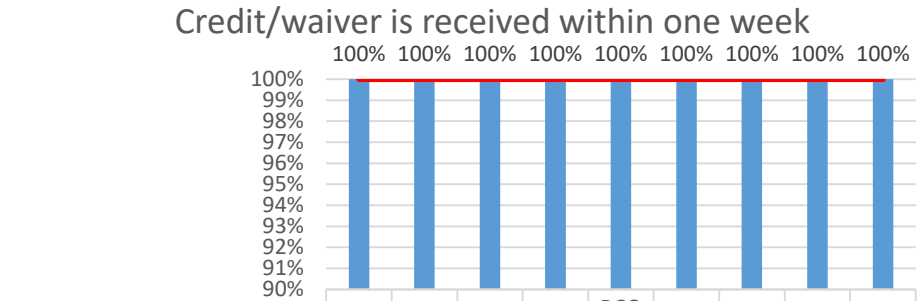
- Computational Methodology:

  Period of applying credit waiver = $\frac{\text{number of cases where credit waiver is applied within 7 days}}{\text{total number of cases eligible for credit waiver}} * 100$

- TRAI Benchmark: Period of applying credit waiver within 7 days: 100%

- Audit Procedure:
  - Operator to provide details of:-
  - List of all eligible cases along with
  - Date of applying credit waiver to all the eligible cases
  - Date of resolution of complaint for all eligible cases

10.4. KEY FINDINGS



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
%Age of Credit/weiver is received within one week	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark =100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

- It is clear from the analysis that all the operators are within benchmark.

10.5. CALL CENTRE PERFORMANCE: IVR

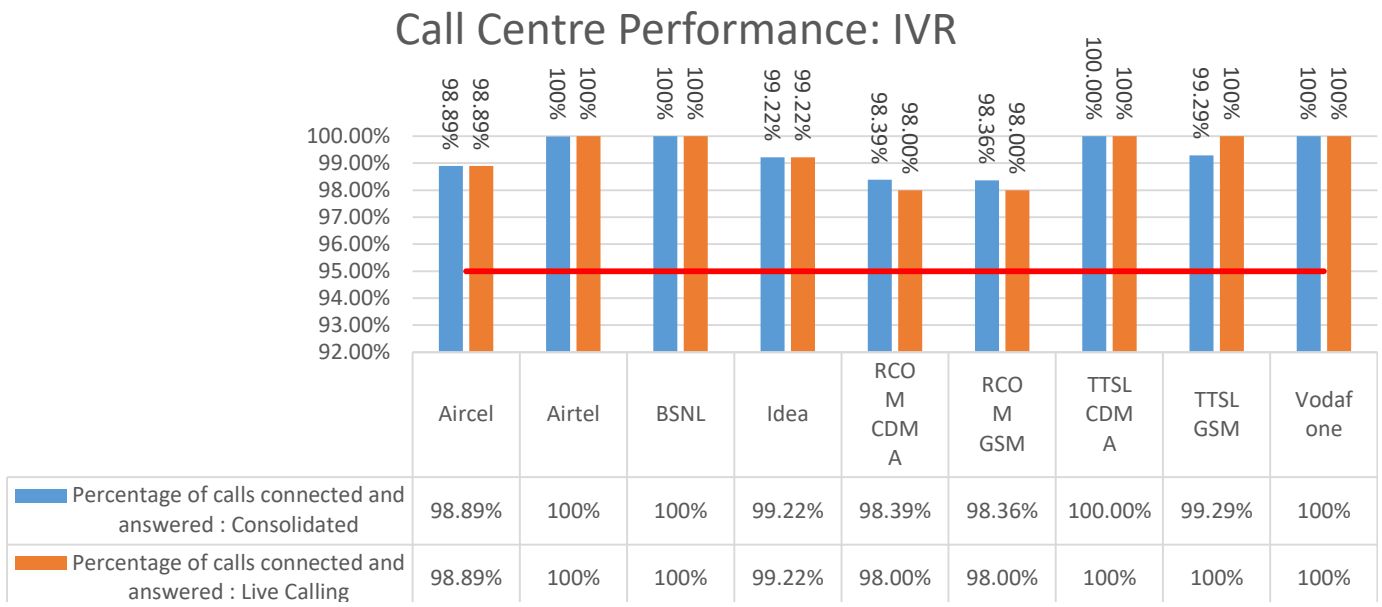
- Computational Methodology:

$$\text{Call centre performance IVR} = \frac{\text{Number of calls connected and answered by IVR}}{\text{All calls attempted to IVR}} * 100$$

- TRAI Benchmark: >= 95%

- Audit Procedure:
  - Operators provide details of the following from their central call centre/ customer service database:
  - Total calls connected and answered by IVR
  - Total calls attempted to IVR
  - Also live calling is done to test the calls connected and answered by IVR

10.6. KEY FINDINGS



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
Percentage of calls connected and answered : Consolidated	98.89%	100%	100%	99.22%	98.39%	98.36%	100.00%	99.29%	100%
Percentage of calls connected and answered : Live Calling	98.89%	100%	100%	99.22%	98.00%	98.00%	100%	100%	100%

- It is clear from the analysis that all the operators are within benchmark.

10.7. CALL CENTER PERFORMANCE: VOICE TO VOICE

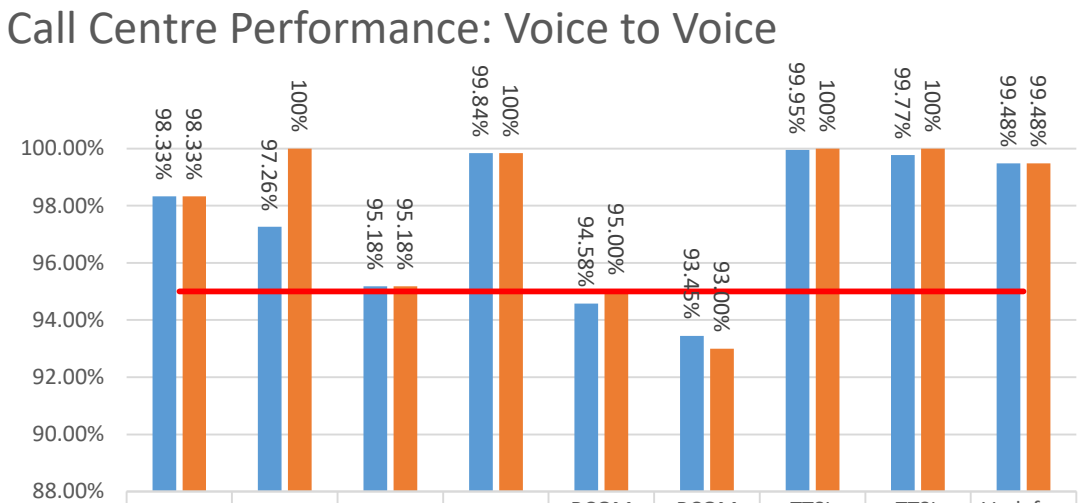
- Computational Methodology:

$$\text{Call centre performance Voice to Voice} = \frac{\text{Number of calls answered by operator within 90 seconds}}{\text{All calls attempted to connect to the operator}} * 100$$

- Audit Procedure:
  - Operators provide details of the following from their central call centre/ customer service database:
  - Total calls connected and answered by operator within 90 seconds
  - Total calls attempted to connect to the operator
  - Also live calling was done to test the calls answered within 90 seconds by the operator

- Benchmark: 95% calls to be answered within 90 seconds.

10.8. KEY FINDINGS



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
Percentage of calls connected and answered : 3 Month Data	98.33%	97.26%	95.18%	99.84%	94.58%	93.45%	99.95%	99.77%	99.48%
Percentage of calls connected and answered : Live Calling	98.33%	100%	95.18%	100%	95.00%	93.00%	100%	100%	99.48%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

- RCOM GSM has a parameter value of **93.00%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds which is pre-defined at ≥ 95%.

- RCOM CDMA has a parameter value of **94.58%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds which is pre-defined at ≥ 95%.

- RCOM GSM has a parameter value of **93.45%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds which is pre-defined at ≥ 95%.

10.9. TERMINATION OR CLOSURE OF SERVICE

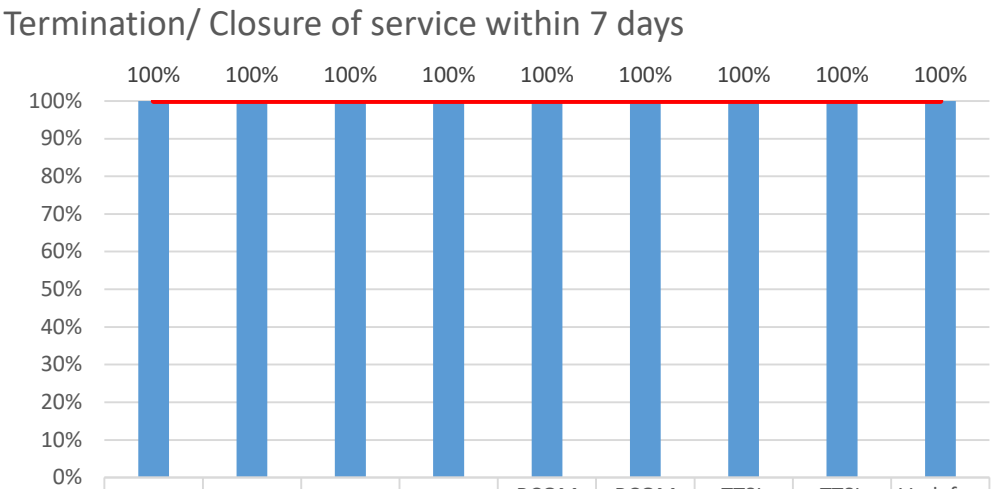
- Computational Methodology:

  Time taken for closure of service $= \frac{\text{number of closures done within 7 days}}{\text{total number of closure requests}} * 100$

- TRAI Benchmark: Termination/Closure of Service: <=7 days

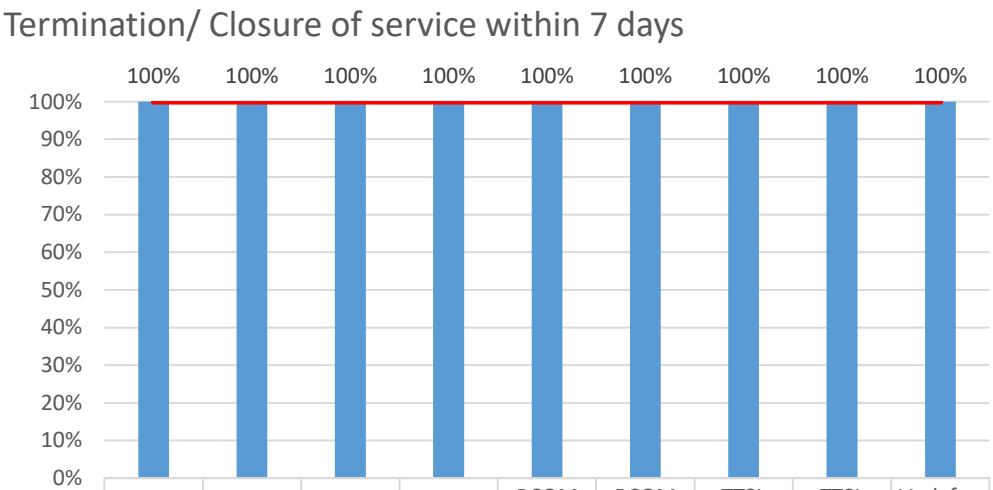
- Audit Procedure:
  - Operator provide details of the following from their central billing/CS database:
  - Date of lodging the closure request (all requests in given period)

- Date of closure of service



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
Percentage cases closure done within 7 days: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark =100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

10.9.1. KEY FINDINGS



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
Percentage cases closure done within 7 days: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark =100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

- It is clear from the analysis that all the operators are within benchmark.

10.10. REFUND OF DEPOSIT AFTER CLOSURE

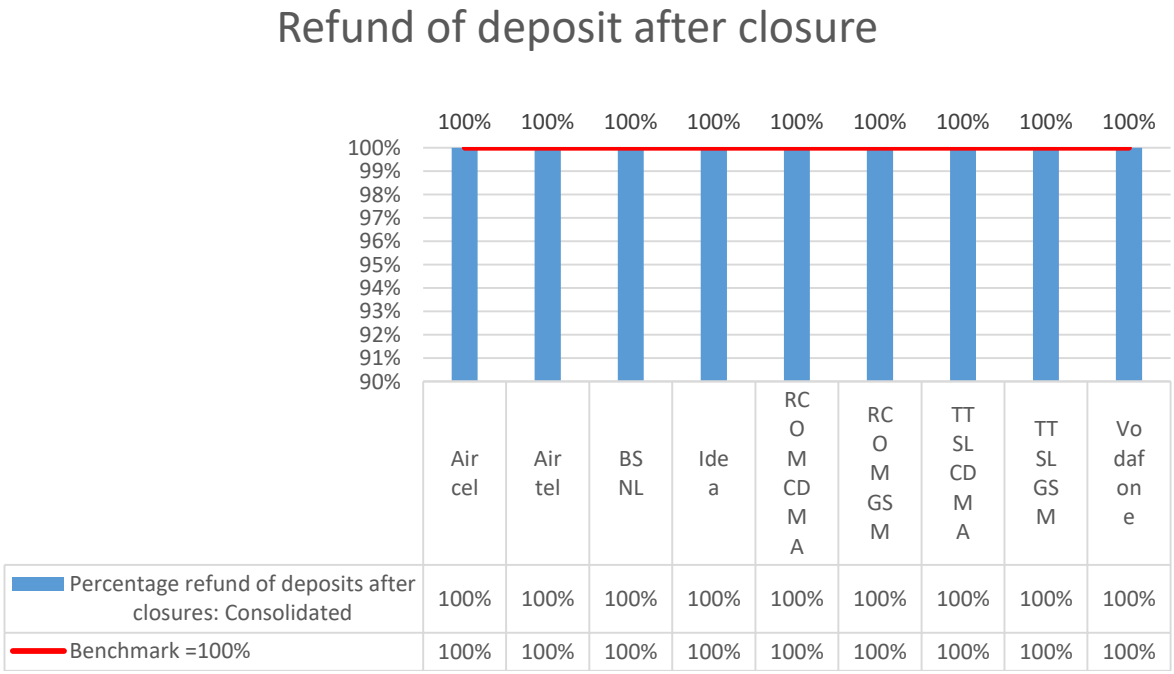
- Computational Methodology:

$$\text{Time taken for refund for deposit after closures} = \frac{\text{number of cases of refund after closure done within 60 days}}{\text{total number of cases of refund after closure}} * 100$$

- Any case where the operators need to return the amount back to consumers post closure of service in form of cheque/cash is considered to be refund.

- TRAI Benchmark: Time taken for refund for deposit after closures: 100% within 60 days
- Audit Procedure:
  - Operator provide details of the following from their central billing/refund database:
  - Dates of completion of all 'closure requests' resulting in requirement of a refund by the operator.
  - Dates of refund pertaining to all closure request received during relevant quarter

10.11. KEY FINDINGS



	Aircel	Airtel	BSNL	Idea	RCOMCDMA	RCOMGSM	TTSLCDMA	TTSLGSM	Vodafone
Percentage refund of deposits after closures: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark =100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

- It is clear from the analysis that all the operators are within benchmark.

11. CRITICAL FINDINGS

2G VOICE PMR DATA: OCTOBER

- Aircel has a parameter value of 13.31% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- BSNL has a parameter value of 3.01% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- TTSL GSM has a parameter value of 4.20% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤

2G VOICE PMR DATA: NOVEMBER

- Aircel has a parameter value of 11.38% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

2G VOICE PMR DATA: DECEMBER

- Aircel has a parameter value of 11.20% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- TTSL GSM has a parameter value of 6.02% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

2G VOICE PMR DATA: CONSOLIDATED

- Aircel has a parameter value of 11.96% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- TTSL GSM has a parameter value of 4.30% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

2G VOICE 3 DAYS LIVE DATA: OCTOBER

- Aircel has a parameter value of 11.52% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- BSNL has a parameter value of 1.12% and failed to meet the benchmark for SDCCH Congestion which is pre-defined at ≤ 1%.
- BSNL has a parameter value of 2.68% and failed to meet the benchmark for Sum of downtime of BTSs in a month in hrs. in the licensed service area which is pre-defined at ≤ 2%.
- BSNL has a parameter value of 2.48% and failed to meet the benchmark for TCH Congestion drop which is pre-defined at ≤ 2%.
- BSNL has a parameter value of 2.70% and failed to meet the benchmark for Call Drop Rate (%age) which is pre-defined at ≤ 2%.

- BSNL has a parameter value of 5.40% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

2G VOICE 3 DAYS LIVE DATA: NOVEMBER

- Aircel has a parameter value of 12.68% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- BSNL has a parameter value of 2.32% and failed to meet the benchmark for Sum of downtime of BTSs in a month in hrs. in the licensed service area which is pre-defined at ≤ 2%.
- BSNL has a parameter value of 2.67% and failed to meet the benchmark for SDCCH Congestion which is pre-defined at ≤ 1%.
- BSNL has a parameter value of 2.35% and failed to meet the benchmark for TCH Congestion drop which is pre-defined at ≤ 2%.
- BSNL has a parameter value of 2.61% and failed to meet the benchmark for Call Drop Rate (%age) which is pre-defined at ≤ 2%.
- BSNL has a parameter value of 4.12% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

2G VOICE 3 DAYS LIVE DATA: DECEMBER

- Aircel has a parameter value of 10.06% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- BSNL has a parameter value of 2.57% and failed to meet the benchmark for TCH Congestion drop which is pre-defined at ≤ 2%.
- BSNL has a parameter value of 2.13% and failed to meet the benchmark for Call Drop Rate (%age) which is pre-defined at ≤ 2%.
- TTSL GSM has a parameter value of 4.40% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

3 DAYS LIVE DATA: CONSOLIDATED

- Aircel has a parameter value of 11.42% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- BSNL has a parameter value of 2.28% and failed to meet the benchmark for Sum of downtime of BTSs in a month in hrs. in the licensed service area which is pre-defined at ≤ 2%.
- BSNL has a parameter value of 2.47% and failed to meet the benchmark for TCH Congestion drop which is pre-defined at ≤ 2%.
- BSNL has a parameter value of 1.48% and failed to meet the benchmark for SDDCH/Paging chl. Congestion which is pre-defined at ≤ 2%.

- BSNL has a parameter value of 2.48% and failed to meet the benchmark for Call Drop Rate (%age) which is pre-defined at ≤ 2%.

- BSNL has a parameter value of 4.11% and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

BILLING AND CUSTOMER CARE

- RCOM CDMA has a parameter value of 94.58% and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds which is pre-defined at ≥ 95%.

- RCOM GSM has a parameter value of 93.45% and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds which is pre-defined at ≥ 95%.

3 Days Live Call Centre Data

- BSNL has a parameter value of 59.23% and filed to meet the benchmark for % age calls answered by the operator within 90 seconds which is pre-defined at ≥95%.

- AIRTEL has a parameter value of 90.16% and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds which is pre-defined at ≥ 95%.

12. PMR COMPARISON (AGENCY VS TSP)

12.1. Network Parameters

Name of Service Provider	Network Availability				Connection Establishment (Accessibility)						Connection Maintenance (Retainability)					
	Sum of downtime of BTSs in a month in hrs. in the licensed service area		No. of BTSs having accumulated downtime of >24 hours in a month		Call Set-up Success Rate (Within Licensee own network		SDDCH/Paging chl. Congestion		TCH Congestion		Call Drop Rate (%age)		Wost Affected call having more than 3% TCH drop		%age of connection with good voice quality	
Benchmark	≤ 2%		≤ 2%		≥ 95%		≤ 1%		≤ 2%		≤ 2%		≤ 3%		≥ 95%	
	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP
Aircel	0.23%	0.23%	1.09%	1.09%	99.56%	99.56%	0.02%	0.02%	0.24%	0.24%	1.35%	1.35%	11.96%	11.96%	95.39%	95.38%
Airtel	0.11%	0.11%	0.26%	0.26%	98.05%	98.05%	0.21%	0.22%	0.45%	0.45%	0.78%	0.78%	1.58%	1.58%	98.36%	98.36%
BSNL	1.87%	1.87%	1.95%	1.95%	98.42%	98.42%	0.78%	0.78%	1.56%	1.56%	1.90%	1.90%	2.94%	2.94%	DNA	96.17%
Idea	0.12%	0.12%	0.26%	0.26%	99.10%	99.10%	0.08%	0.08%	0.39%	0.39%	1.24%	1.24%	2.14%	2.16%	96.72%	96.72%
RCOM CDMA	0.08%	0.08%	0.58%	0.58%	98.04%	98.04%	NA	0.00%	0.94%	0.94%	0.06%	0.06%	0.39%	0.43%	98.97%	99.00%
RCOM GSM	0.10%	0.10%	0.75%	0.75%	96.44%	96.99%	0.22%	0.22%	1.04%	1.04%	0.36%	0.37%	1.20%	1.47%	96.90%	96.90%
TATA CDMA	0.01%	0.01%	0.00%	0.00%	99.33%	99.33%	NA	0.00%	0.02%	0.02%	0.09%	0.09%	1.51%	1.51%	98.13%	98.13%
TATA GSM	0.00%	0.00%	0.00%	0.00%	99.65%	99.65%	0.00%	0.00%	0.00%	0.00%	0.38%	0.38%	4.30%	4.30%	98.66%	98.66%
Vodafone	0.02%	0.02%	0.00%	0.00%	99.85%	99.85%	0.02%	0.02%	0.15%	0.15%	0.64%	0.64%	2.44%	2.44%	97.71%	97.71%

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

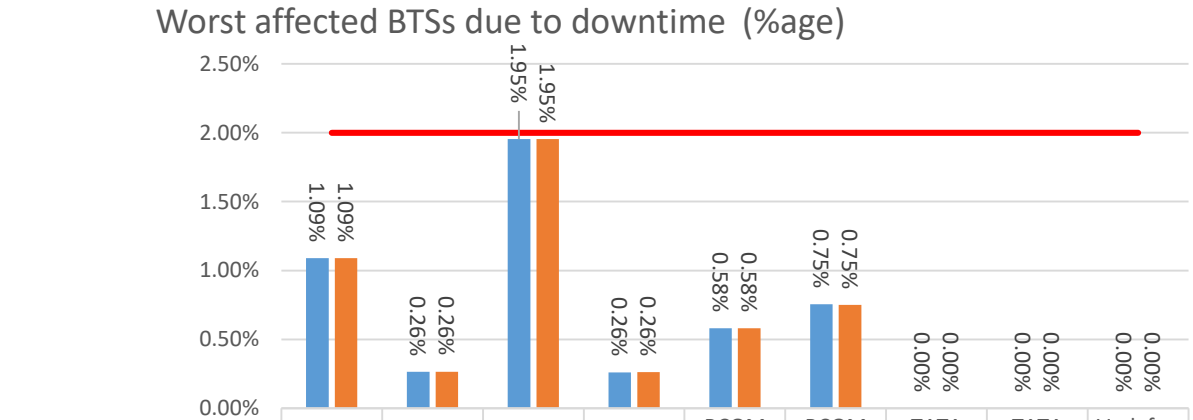
12.2. CSD Parameters

Name of Service Provider	Metering and Billing credibility				Billing Complaints						Termination & Closures		Time taken for refund of deposits after closures: Benchmark		Customer Care			
	Postpaid Subscribers		Prepaid Subscribers		%age complaints resolved within 4 weeks		%age complaints resolved within 6 weeks		%age of credit/weiver 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	0.03%	0.03%	0.00%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.89%	98.89%	98.33%	98.33%
Airtel	0.01%	0.01%	0.00%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100.00%	100.00%	97.26%	97.26%
BSNL	0.02%	0.02%	0.01%	0.01%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	95.18%	96.12%
Idea	0.06%	0.06%	0.07%	0.07%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.22%	99.22%	99.84%	99.84%
RCOM CDMA	0.00%	0.00%	0.08%	0.08%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.39%	98.39%	94.58%	94.58%
RCOM GSM	0.08%	0.08%	0.09%	0.09%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.36%	98.36%	93.45%	93.45%
TATA CDMA	0.00%	0.00%	0.00%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100.00%	100.00%	99.95%	99.95%
TATA GSM	0.00%	0.00%	0.00%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.29%	99.29%	99.77%	99.77%
Vodafone	0.03%	0.03%	0.07%	0.07%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.48%	99.48%

12.2. Key findings: BTS Accumulated Downtime

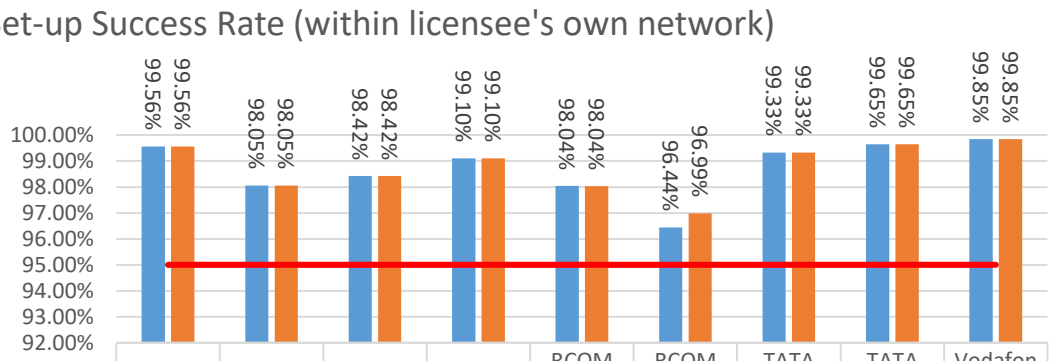
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	0.23%	0.11%	1.87%	0.12%	0.08%	0.10%	0.01%	0.00%	0.02%
PMR Data TSP: Consolidated	0.23%	0.11%	1.87%	0.12%	0.08%	0.10%	0.01%	0.00%	0.02%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

12.3. Key findings: Worst Effected BTSs due to Downtime



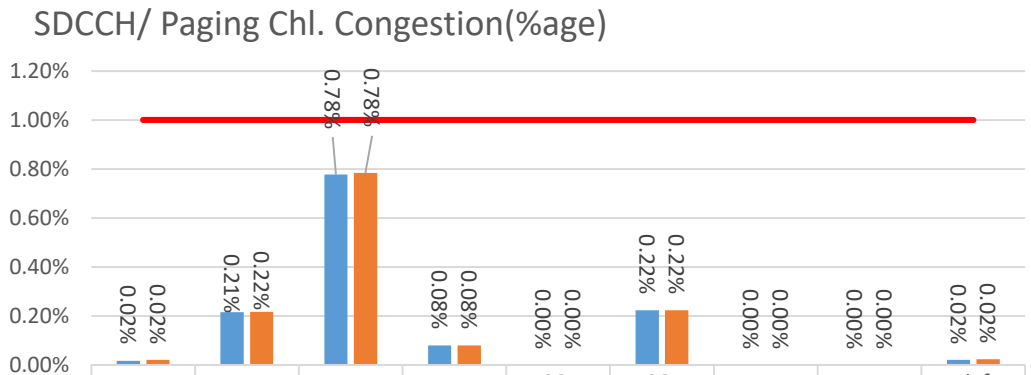
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	1.09%	0.26%	1.95%	0.26%	0.58%	0.75%	0.00%	0.00%	0.00%
PMR Data TSP: Consolidated	1.09%	0.26%	1.95%	0.26%	0.58%	0.75%	0.00%	0.00%	0.00%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

12.4. Key findings: Call Setup Success Rate



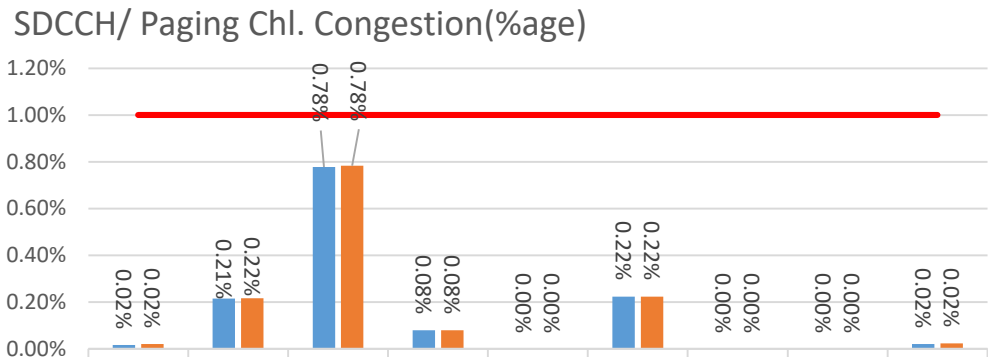
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	99.56%	98.05%	98.42%	99.10%	98.04%	96.44%	99.33%	99.65%	99.85%
PMR Data TSP: Consolidated	99.56%	98.05%	98.42%	99.10%	98.04%	96.99%	99.33%	99.65%	99.85%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

12.5. Key findings: SDCCH / Paging Chl. Congestion



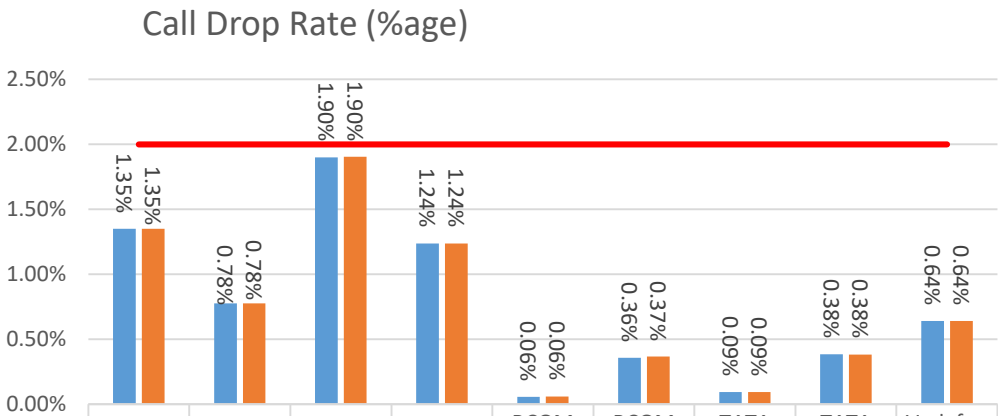
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	0.02%	0.21%	0.78%	0.08%	0.00%	0.22%	0.00%	0.00%	0.02%
PMR Data TSP: Consolidated	0.02%	0.22%	0.78%	0.08%	0.00%	0.22%	0.00%	0.00%	0.02%
Benchmark ≤ 1%	1%	1%	1%	1%	1%	1%	1%	1%	1%

12.6. Key findings: TCH Congestion



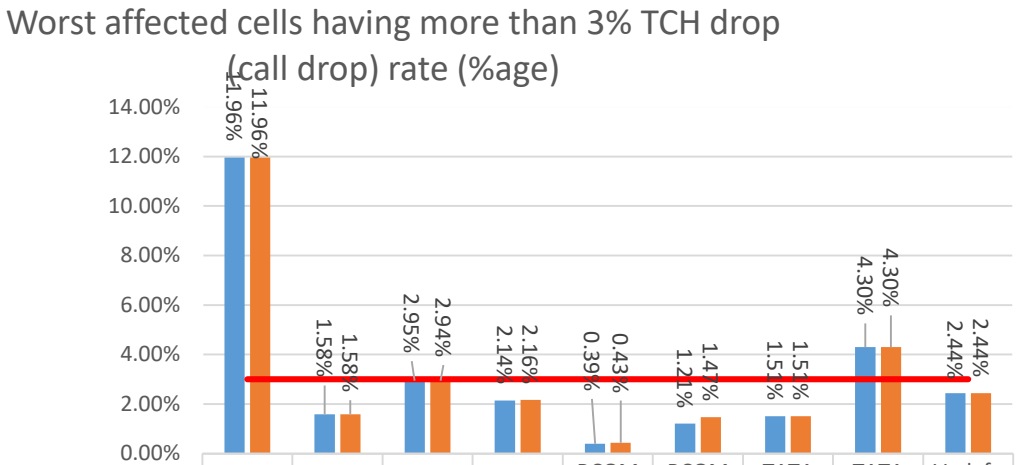
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	0.02%	0.21%	0.78%	0.08%	0.00%	0.22%	0.00%	0.00%	0.02%
PMR Data TSP: Consolidated	0.02%	0.22%	0.78%	0.08%	0.00%	0.22%	0.00%	0.00%	0.02%
Benchmark ≤ 1%	1%	1%	1%	1%	1%	1%	1%	1%	1%

12.7. Key findings: Call Drop Rate



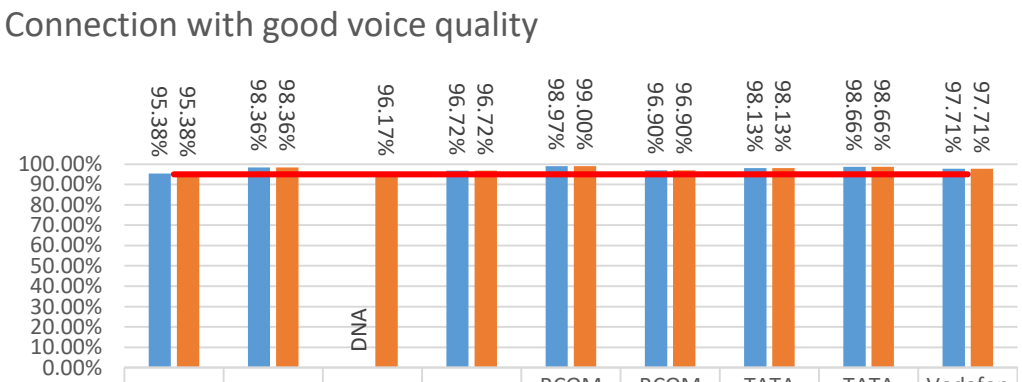
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	1.35%	0.78%	1.90%	1.24%	0.06%	0.36%	0.09%	0.38%	0.64%
PMR Data TSP: Consolidated	1.35%	0.78%	1.90%	1.24%	0.06%	0.37%	0.09%	0.38%	0.64%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

12.8. Key findings: Worst effected cell more than 3% TCH drop



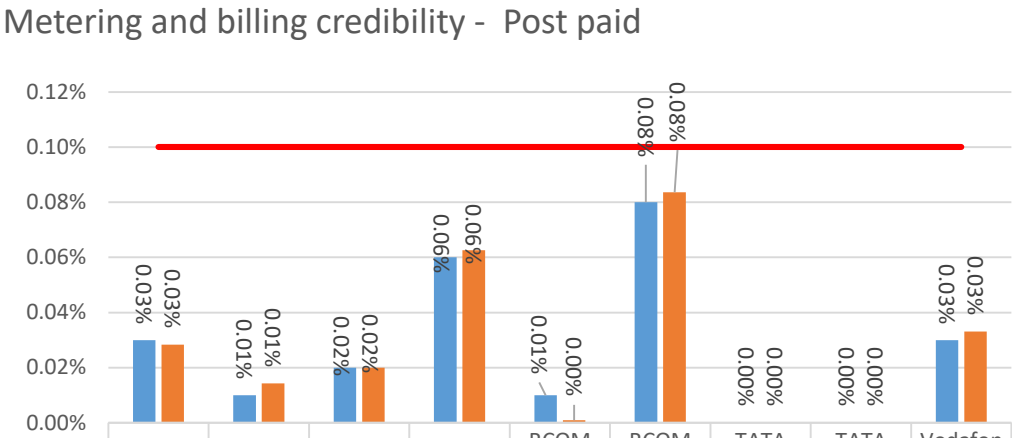
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	11.96%	1.58%	2.95%	2.14%	0.39%	1.21%	1.51%	4.30%	2.44%
PMR Data TSP: Consolidated	11.96%	1.58%	2.94%	2.16%	0.43%	1.47%	1.51%	4.30%	2.44%
Benchmark ≤ 3%	3%	3%	3%	3%	3%	3%	3%	3%	3%

12.9. Key findings: Connection with good voice quality



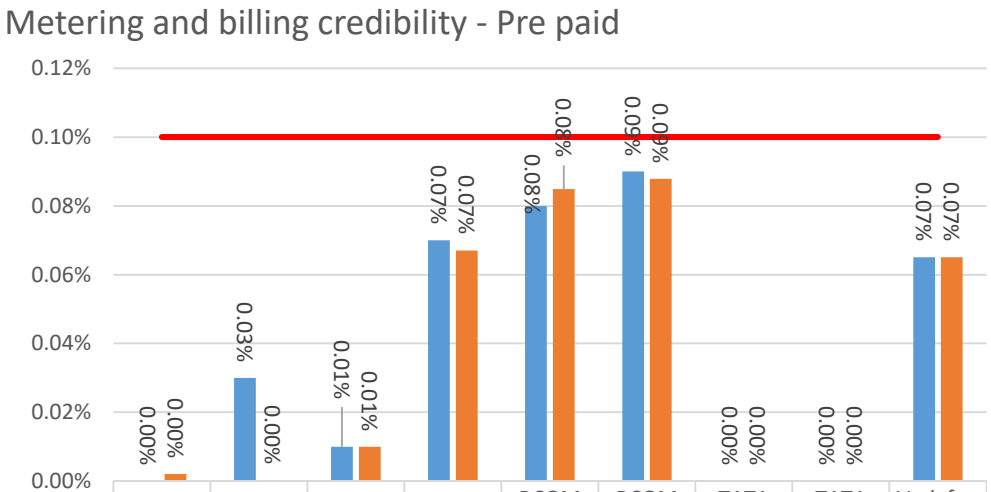
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	95.38%	98.36%	0.00%	96.72%	98.97%	96.90%	98.13%	98.66%	97.71%
PMR Data TSP: Consolidated	95.38%	98.36%	96.17%	96.72%	99.00%	96.90%	98.13%	98.66%	97.71%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

12.10. Key findings: Metering and Billing Credibility: Post Paid



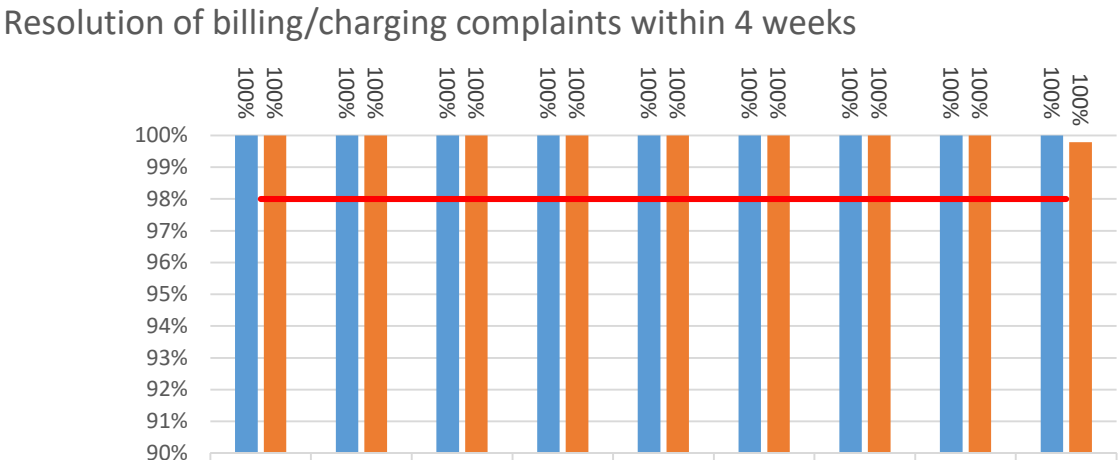
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	0.03%	0.01%	0.02%	0.06%	0.01%	0.08%	0.00%	0.00%	0.03%
PMR Data TSP: Consolidated	0.03%	0.01%	0.02%	0.06%	0.00%	0.08%	0.00%	0.00%	0.03%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

12.11. Key findings: Metering and Billing Credibility: Prepaid



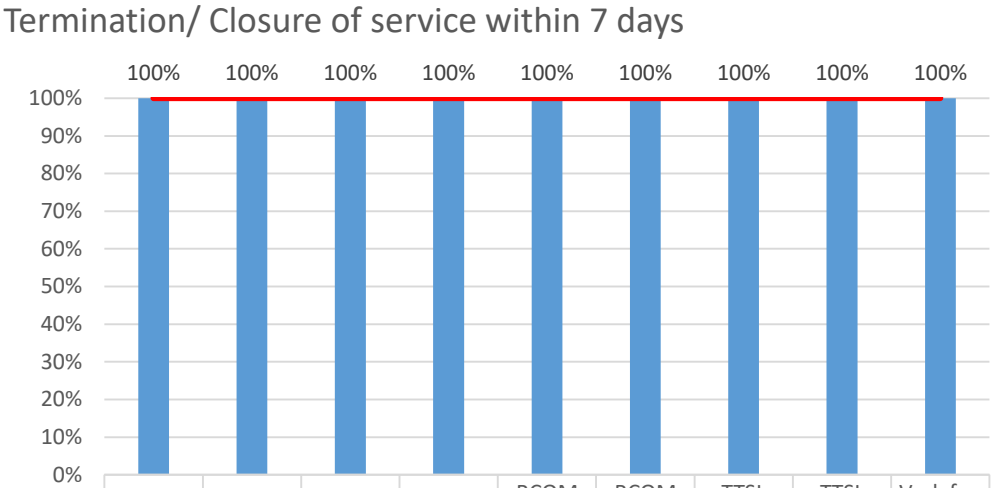
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	0.00%	0.03%	0.01%	0.07%	0.08%	0.09%	0.00%	0.00%	0.07%
PMR Data TSP: Consolidated	0.00%	0.00%	0.01%	0.07%	0.08%	0.09%	0.00%	0.00%	0.07%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

12.12. Key findings: Resolution of billing/charging complaints within 4 weeks



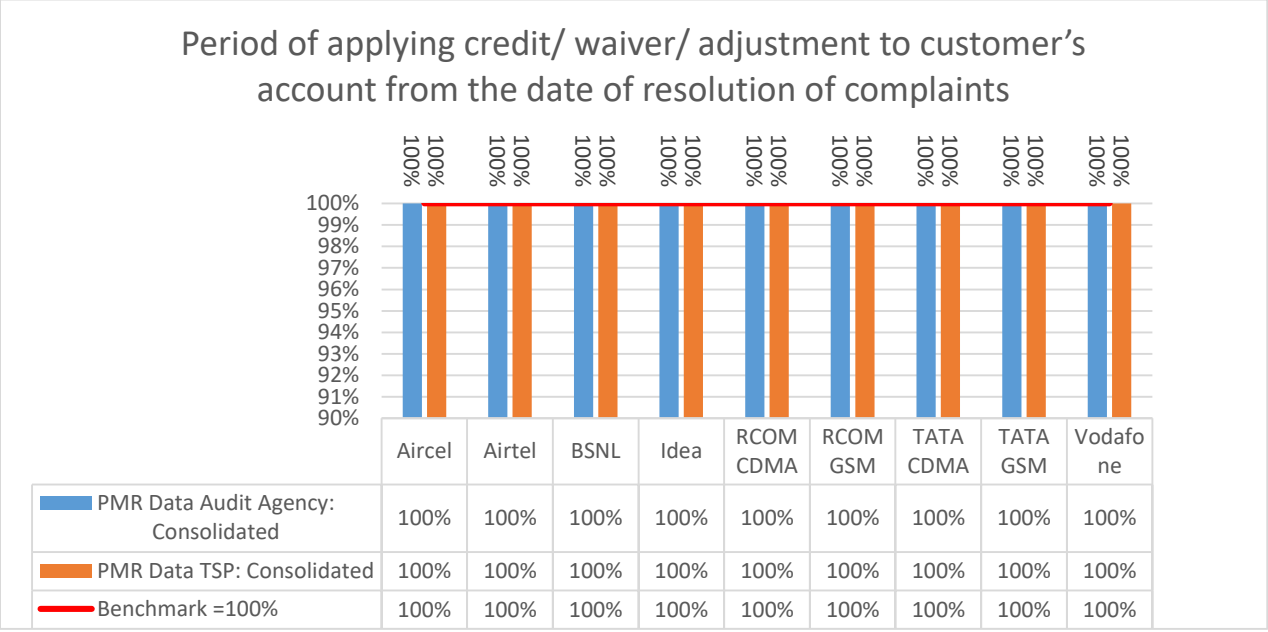
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
PMR Data TSP: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark ≥ 98%	98%	98%	98%	98%	98%	98%	98%	98%	98%

12.13. Key findings: Resolution of billing/charging complaints within 6 weeks



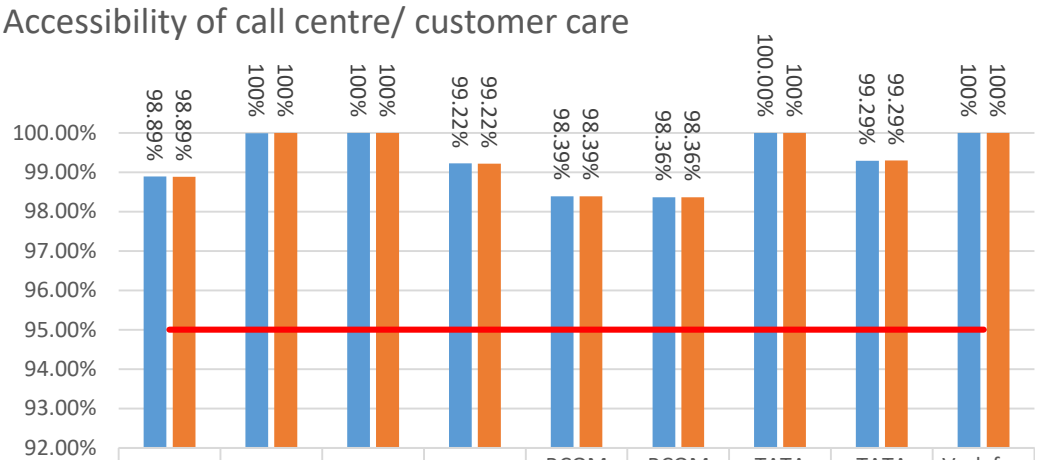
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
Percentage cases closure done within 7 days: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark =100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

12.14. Key findings: Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints



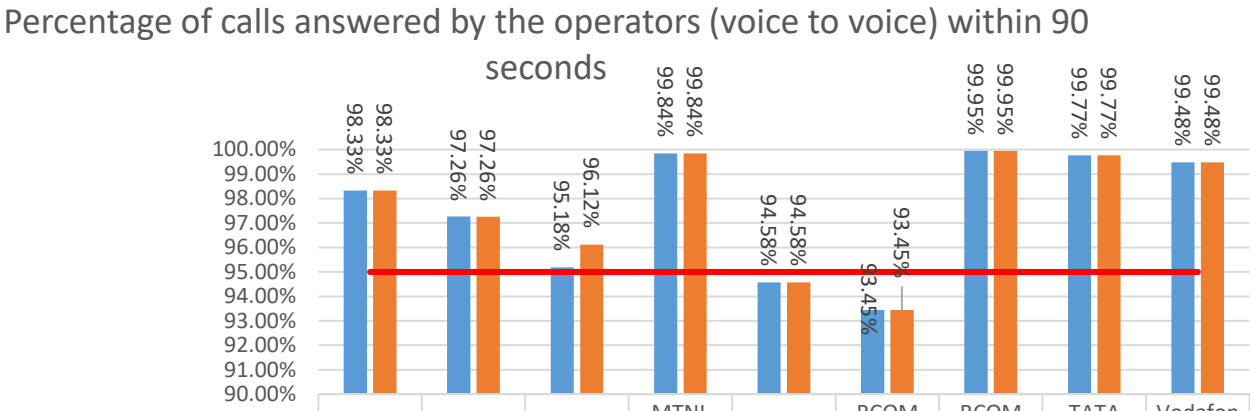
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
PMR Data TSP: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark =100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

12.15. Key findings: Accessibility of call centre/ customer care



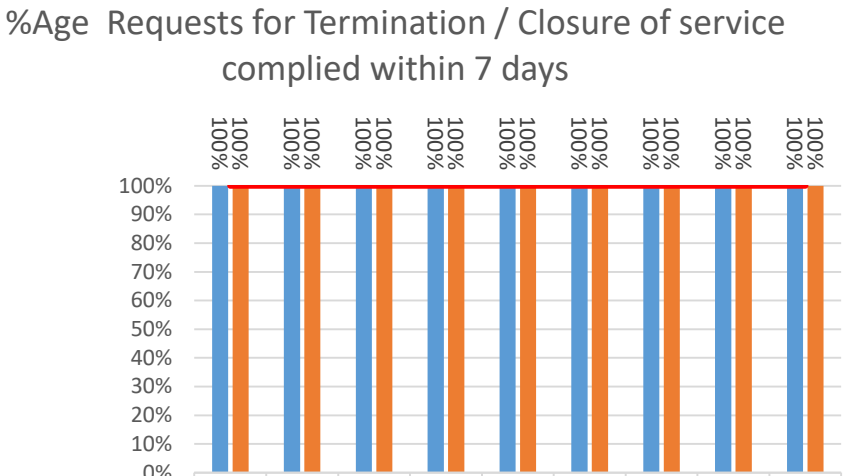
	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	98.89%	100%	100%	99.22%	98.39%	98.36%	100.00%	99.29%	100%
PMR Data TSP: Consolidated	98.89%	100%	100%	99.22%	98.39%	98.36%	100%	99.29%	100%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

12.16. Key findings: Percentage of calls answered by the operators (voice to voice) within 90 seconds



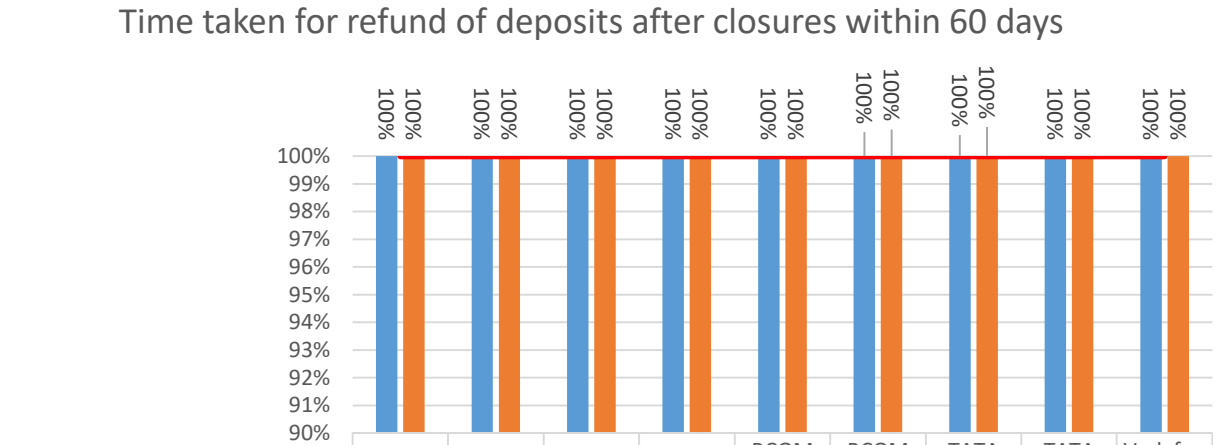
	Aircel	Airtel	Idea	MTNL GSM	MTS	RCOM CDMA	RCOM GSM	TATA CDMA	Vodafone
PMR Data Audit Agency: Consolidated	98.33%	97.26%	95.18%	99.84%	94.58%	93.45%	99.95%	99.77%	99.48%
PMR Data TSP: Consolidated	98.33%	97.26%	96.12%	99.84%	94.58%	93.45%	99.95%	99.77%	99.48%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

12.17. Key findings: Percentage requests for Termination / Closure of service complied within 7 days



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
PMR Data TSP: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark =100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

12.18. Key findings: Time taken for refund of deposits after closures within 60 days



	Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TATA CDMA	TATA GSM	Vodafone
PMR Data Audit Agency: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
PMR Data TSP: Consolidated	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark =100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

13. 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 October, November and December, 2015 were conducted at a SSA level. Drive test was conducted for three days in each SSA and the selection of routes ensured that the maximum towns, villages, highways are covered as part of drive test. The routes were selected on basis of the complaints received from the customers. The auditors were present in vehicles of every operator. The holding period for all test calls was 120 seconds and the gap between calls was 10 seconds.

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

13.1. December: Shimla SSA

Month	Name of SSA covered	Drive Test Schedule
December 2015	Shimla	December 2, 2015 to December 4, 2015

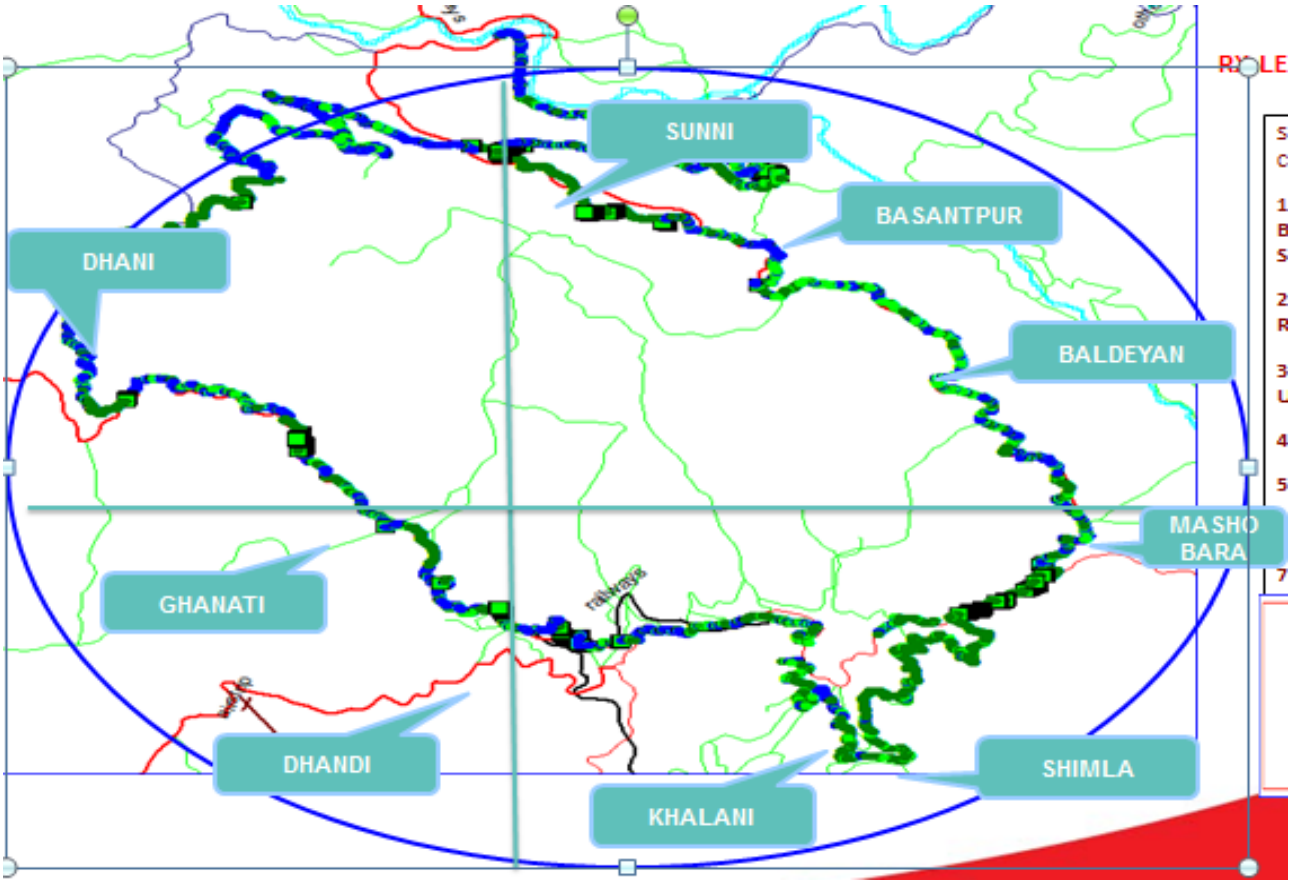
Note: Drive test log files and reports were not shared by Tata GSM, Tata CDMA and RCOM CDMA in the stipulated time and hence there reports are not included in the this report.

13.2. Distance Covered: Shimla SSA

Drive Test Distance Covered	Day 1	Day 2	Day 3
Shimla SSA	158 km	158 km	128 km

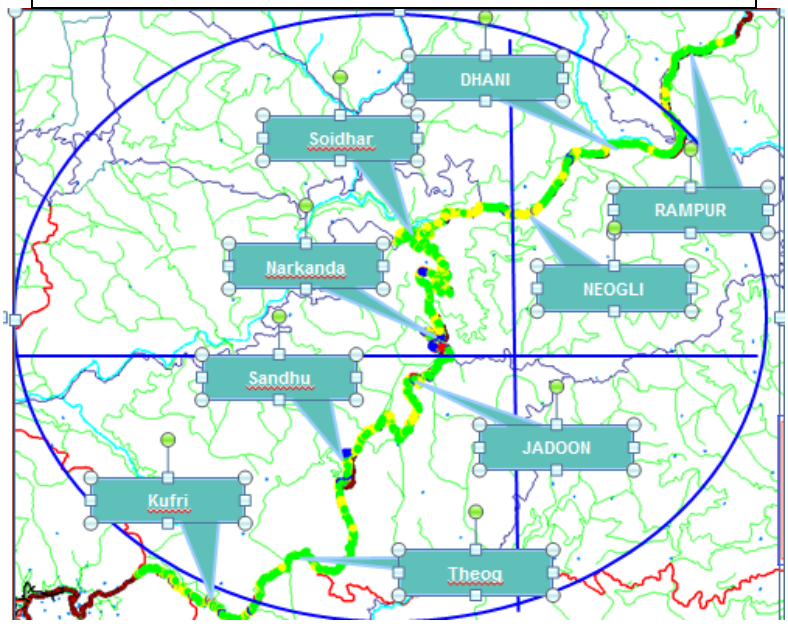
13.3. Route Map: Shimla SSA: Day 1

SSA: Shimla
Outdoor
Route Name
Dhali, Sunni, Dhami, Totu
Khalani, Sanjauli, Tunnel, Sunni, Totu,
New bus stand, Phalani
Indoor
Route Name
Basantpur


SUNNI
BASANTPUR
DHANI
BALDEYAN
MASHO BARA
GHANATI
DHANDI
SHIMLA
KHALANI

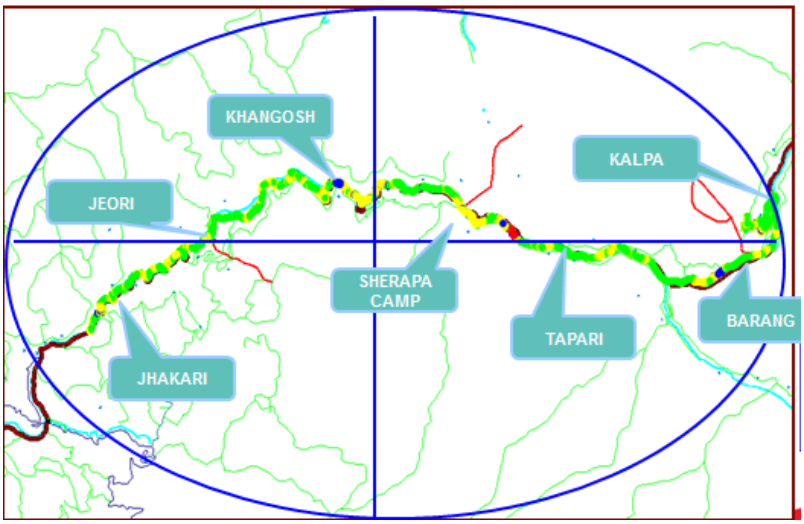
13.4. ROUTE MAP: SHIMLA SSA: DAY 2

SSA: Shimla
Outdoor
Route Name
Shimla, Thiog , Narkanda,Jubali, Kingal
Narkanda, Kingal
Narkanda, Rampur, thiog
Indoor
Route Name
Rampur Hospital



13.5. ROUTE MAP: HIMACHAL PRDESH SSA: DAY 3

SSA: Shimla
Outdoor
Route Name
Rampur, Jhakari, Tapri, Recongpio
Jeuri, Bhawanagar, Tapri, Recongpio
Indoor
Route Name
Tapri Bus stand



13.6. DRIVE REPORT ANALYSIS

13.6.1. AIRCEL DAY 1:

SSA (Urban/Rural)-Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	22169	25043	88.52	
1 ≤ S < 2	458	25043	1.83	
2 ≤ S < 3	512	25043	2.04	
3 ≤ S < 4	515	25043	2.06	
4 ≤ S < 5	483	25043	1.93	
5 ≤ S < 6	506	25043	2.02	
6 ≤ S	400	25043	1.6	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	16581	36399	45.55	

0 to > = -85	29299	36399	80.49	
0 to > = -95	34995	36399	96.14	

Office Complex SSA (Urban/Rural)- Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	7694	7727	99.57	
1 ≤ S < 2	3	7727	0.04	
2 ≤ S < 3	5	7727	0.06	
3 ≤ S < 4	1	7727	0.01	
4 ≤ S < 5	2	7727	0.03	
5 ≤ S < 6	2	7727	0.03	
6 ≤ S	20	7727	0.26	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	5965	6882	86.68	
0 to > = -85	6823	6882	99.14	
0 to > = -95	6882	6882	100	

Over All SSA Drive Test Details Day-1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA				
0-5 (with frequency hopping	31842	32770	97.17	
Total Call Attempt	185			
Blocked Call Rate (<=3%)	0%			
Dropped Call Rate (<=2%)	0%			
Call Setup Success Rate (>=95%)	100%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.7			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	22546	43281	52.09	
0 to > = -85	36122	43281	83.46	
0 to > = -95	41877	43281	96.76	

13.6.2. AIRCEL DAY 2:

SSA (Urban/Rural)-Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	16120	17373	92.79	
1 ≤ S < 2	271	17373	1.56	
2 ≤ S < 3	183	17373	1.05	
3 ≤ S < 4	198	17373	1.14	
4 ≤ S < 5	209	17373	1.2	
5 ≤ S < 6	147	17373	0.85	
6 ≤ S	245	17373	1.41	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	9450	24589	38.43	
0 to > = -85	16616	24589	67.57	
0 to > = -95	23088	24589	93.9	

Office Complex SSA (Urban/Rural)- Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	5583	6573	84.94	
1 ≤ S < 2	184	6573	2.8	
2 ≤ S < 3	195	6573	2.97	
3 ≤ S < 4	229	6573	3.48	
4 ≤ S < 5	217	6573	3.3	
5 ≤ S < 6	69	6573	1.05	
6 ≤ S	96	6573	1.46	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	4734	6750	70.13	
0 to > = -85	6742	6750	99.88	
0 to > = -95	6750	6750	100	

Over All SSA Drive Test Details Day-2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA				
0-5 (with frequency hopping	23389	23946	97.67	

Total Call Attempt	165			
Blocked Call Rate (<=3%)	0%			
Dropped Call Rate (<=2%)	0%			
Call Setup Success Rate (>=95%)	100%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	100			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	14184	31339	45.26	
0 to > = -85	23358	31339	74.53	
0 to > = -95	29838	31339	95.21	

13.6.3. AIRCEL DAY 3:

SSA (Urban/Rural)-Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	16449	17235	95.44	
1 ≤ S < 2	153	17235	0.89	
2 ≤ S < 3	134	17235	0.78	
3 ≤ S < 4	118	17235	0.68	
4 ≤ S < 5	80	17235	0.46	
5 ≤ S < 6	99	17235	0.57	
6 ≤ S	202	17235	1.17	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	8344	30303	27.54	
0 to > = -85	18702	30303	61.72	
0 to > = -95	28519	30303	94.11	

Office Complex SSA (Urban/Rural)- Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6202	6215	99.79	
1 ≤ S < 2	0	6215	0	
2 ≤ S < 3	0	6215	0	
3 ≤ S < 4	0	6215	0	
4 ≤ S < 5	0	6215	0	
5 ≤ S < 6	0	6215	0	

6 ≤ S	13	6215	0.21	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	5863	6519	89.94	
0 to > = -85	6474	6519	99.31	
0 to > = -95	6518	6519	99.98	

Over All SSA Drive Test Details Day-3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA				
0-5 (with frequency hopping	23136	23450	98.66	
Total Call Attempt	178			
Blocked Call Rate (<=3%)	0.56%			
Dropped Call Rate (<=2%)	0.56%			
Call Setup Success Rate (>=95%)	99.43%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	100			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	14207	36822	38.58	
0 to > = -85	25176	36822	68.37	
0 to > = -95	35037	36822	95.15	

13.6.4. AIRCEL OVERALL

Over All SSA Details			
RxQual	**Samples (S)**	**Total**	**%**
0 ≤ S < 1	74217	80166	92.58
1 ≤ S < 2	1069	80166	1.33
2 ≤ S < 3	1029	80166	1.28
3 ≤ S < 4	1061	80166	1.32
4 ≤ S < 5	991	80166	1.24
5 ≤ S < 6	823	80166	1.03
6 ≤ S	976	80166	1.22
RxLev	**Samples**	**Total**	**%**
0 to > = -75	50937	111442	45.71
0 to > = -85	84656	111442	75.96

0 to > = -95	106752	111442	95.79

Total Calls Attempt (A)	528
Total Calls Blocked (B)	1
Blocked Call Rate in % (B*100/A)	0.19
Total Calls Established ('C)	527
Total Calls Drop (D)	1
Dropped Calls Rate in % (D*100/C)	0.19
Call Setup Success Rate in % (C*100/A)	99.81%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.43

13.6.5. AIRTEL: DAY 1

SSA (Urban/Rural)-Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	63144	68308	92.44	97.31
1 ≤ S < 2	532	68308	0.78	
2 ≤ S < 3	606	68308	0.89	
3 ≤ S < 4	668	68308	0.98	
4 ≤ S < 5	636	68308	0.93	
5 ≤ S < 6	887	68308	1.3	
6 ≤ S	1835	68308	2.69	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	64348	72625	88.6	
0 to > = -85	69857	72625	96.19	
0 to > = -95	72099	72625	99.28	

Office Complex SSA (Urban/Rural)- Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6671	6725	99.2	99.78
1 ≤ S < 2	8	6725	0.12	
2 ≤ S < 3	16	6725	0.24	
3 ≤ S < 4	4	6725	0.06	
4 ≤ S < 5	5	6725	0.07	

5 ≤ S < 6	6	6725	0.09	
6 ≤ S	15	6725	0.22	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	7094	7125	99.56	
0 to > = -85	7125	7125	100	
0 to > = -95	7125	7125	100	

Over All SSA Drive Test Details Day-1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA	N/A	N/A	N/A	
0-5 (with frequency hopping	73183	75033	97.53	
Total Call Attempt	203			
Blocked Call Rate (<=3%)	0.99%			
Dropped Call Rate (<=2%)	0.50%			
Call Setup Success Rate (>=95%)	99.01%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.30%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	71442	79750	89.58	
0 to > = -85	76982	79750	96.53	
0 to > = -95	79224	79750	99.34	

13.6.6. AIRTEL: DAY 2

SSA (Urban/Rural)-Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	63381	73584	86.13	96.55
1 ≤ S < 2	1370	73584	1.86	
2 ≤ S < 3	1512	73584	2.05	
3 ≤ S < 4	1537	73584	2.09	
4 ≤ S < 5	1472	73584	2	
5 ≤ S < 6	1772	73584	2.41	
6 ≤ S	2540	73584	3.45	

RxLev	Samples	Total	%	
0 to > = -75	71208	78004	91.29	
0 to > = -85	77227	78004	99	
0 to > = -95	77910	78004	99.88	

Office Complex SSA (Urban/Rural)- Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6199	6213	99.77	99.79
1 ≤ S < 2	0	6213	0	
2 ≤ S < 3	0	6213	0	
3 ≤ S < 4	0	6213	0	
4 ≤ S < 5	0	6213	0	
5 ≤ S < 6	1	6213	0.02	
6 ≤ S	13	6213	0.21	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	6430	6434	99.94	
0 to > = -85	6434	6434	100	
0 to > = -95	6434	6434	100	

Over All SSA Drive Test Details Day-2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA	N/A	N/A	N/A	
0-5 (with frequency hopping	77244	79797	96.8	
Total Call Attempt	237			
Blocked Call Rate (<=3%)	0%			
Dropped Call Rate (<=2%)	0%			
Call Setup Success Rate (>=95%)	100%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.40%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	77638	84438	91.95	
0 to > = -85	83661	84438	99.08	

0 to > = -95	84344	84438	99.89	

13.6.7. AIRTEL: DAY 3

SSA (Urban/Rural)-Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	46073	55622	82.83	95.56
1 ≤ S < 2	1102	55622	1.98	
2 ≤ S < 3	1316	55622	2.37	
3 ≤ S < 4	1460	55622	2.62	
4 ≤ S < 5	1387	55622	2.49	
5 ≤ S < 6	1812	55622	3.26	
6 ≤ S	2472	55622	4.44	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	48740	57815	84.3	
0 to > = -85	57196	57815	98.93	
0 to > = -95	57760	57815	99.9	

Office Complex SSA (Urban/Rural)- Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	5724	6425	89.09	99.61
1 ≤ S < 2	208	6425	3.24	
2 ≤ S < 3	198	6425	3.08	
3 ≤ S < 4	162	6425	2.52	
4 ≤ S < 5	80	6425	1.25	
5 ≤ S < 6	28	6425	0.44	
6 ≤ S	25	6425	0.39	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	5286	6734	78.5	
0 to > = -85	6733	6734	100	
0 to > = -95	6734	6734	100	

Over All SSA Drive Test Details Day-3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA	N/A	N/A	N/A	

0-5 (with frequency hopping	59550	62047	95.98	
Total Call Attempt	165			
Blocked Call Rate (<=3%)	0%			
Dropped Call Rate (<=2%)	0%			
Call Setup Success Rate (>=95%)	100%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.64%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	54026	64549	83.7	
0 to > = -85	63929	64549	99.04	
0 to > = -95	64494	64549	99.91	

13.6.8. AIRTEL: OVERALL

Over All SSA Details				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	191192	216877	88.16	96.82
1 ≤ S < 2	3220	216877	1.48	
2 ≤ S < 3	3648	216877	1.68	
3 ≤ S < 4	3831	216877	1.77	
4 ≤ S < 5	3580	216877	1.65	
5 ≤ S < 6	4506	216877	2.08	
6 ≤ S	6900	216877	3.18	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	203106	228737	88.79	
0 to > = -85	224572	228737	98.18	
0 to > = -95	228062	228737	99.7	

Total Calls Attempt (A)	605
Total Calls Blocked (B)	2
Blocked Call Rate in % (B*100/A)	0.33%
Total Calls Established ('C)	603
Total Calls Drop (D)	1
Dropped Calls Rate in % (D*100/C)	0.17%
Call Setup Success Rate in % (C*100/A)	99.67%

Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.87%

13.6.9. IDEA: DAY 1

SSA (Urban/Rural)-Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	32109	39185	81.94	
1 ≤ S < 2	1488	39185	3.8	
2 ≤ S < 3	778	39185	1.99	
3 ≤ S < 4	1174	39185	3	
4 ≤ S < 5	1145	39185	2.92	
5 ≤ S < 6	852	39185	2.17	
6 ≤ S	1639	39185	4.18	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	19124	45960	41.61	
0 to > = -85	31851	45960	69.3	
0 to > = -95	42034	45960	91.46	

Office Complex SSA (Urban/Rural)- Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6735	6764	99.57	
1 ≤ S < 2	1	6764	0.01	
2 ≤ S < 3	0	6764	0	
3 ≤ S < 4	0	6764	0	
4 ≤ S < 5	0	6764	0	
5 ≤ S < 6	0	6764	0	
6 ≤ S	28	6764	0.41	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	6611	7203	91.78	
0 to > = -85	7060	7203	98.01	
0 to > = -95	7203	7203	100	

Over All SSA Drive Test Details Day-1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**

0-4 (w/o frequency hopping)/CDMA				
0-5 (with frequency hopping	44282	45949	96.37	
Total Call Attempt	190			
Blocked Call Rate (<=3%)	0.53%			
Dropped Call Rate (<=2%)	0.53%			
Call Setup Success Rate (>=95%)	98.95%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	97.95%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	25735	53163	48.41	
0 to > = -85	39502	53163	74.3	
0 to > = -95	49828	53163	93.73	

13.6.10. IDEA: DAY 2

SSA (Urban/Rural)-Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	34581	38526	89.76	
1 ≤ S < 2	1086	38526	2.82	
2 ≤ S < 3	483	38526	1.25	
3 ≤ S < 4	708	38526	1.84	
4 ≤ S < 5	535	38526	1.39	
5 ≤ S < 6	363	38526	0.94	
6 ≤ S	770	38526	2	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	14499	42666	33.98	
0 to > = -85	28296	42666	66.32	
0 to > = -95	40545	42666	95.03	

Office Complex SSA (Urban/Rural)- Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6092	6501	93.71	
1 ≤ S < 2	85	6501	1.31	
2 ≤ S < 3	55	6501	0.85	

3 ≤ S < 4	64	6501	0.98	
4 ≤ S < 5	49	6501	0.75	
5 ≤ S < 6	64	6501	0.98	
6 ≤ S	92	6501	1.42	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	1705	6974	24.45	
0 to > = -85	6144	6974	88.1	
0 to > = -95	6969	6974	99.93	

Over All SSA Drive Test Details Day-2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA				
0-5 (with frequency hopping	44165	45027	98.09	
Total Call Attempt	181			
Blocked Call Rate (<=3%)	1.10%			
Dropped Call Rate (<=2%)	0.00%			
Call Setup Success Rate (>=95%)	98.90%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.36%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	16204	49640	32.64	
0 to > = -85	34440	49640	69.38	
0 to > = -95	47514	49640	95.72	

13.6.11. IDEA: DAY 3

SSA (Urban/Rural)-Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6955	7510	92.61	
1 ≤ S < 2	139	7510	1.85	
2 ≤ S < 3	56	7510	0.75	
3 ≤ S < 4	95	7510	1.26	
4 ≤ S < 5	93	7510	1.24	
5 ≤ S < 6	62	7510	0.83	

6 ≤ S	110	7510	1.46	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	10950	23328	46.94	
0 to > = -85	17552	23328	75.24	
0 to > = -95	22385	23328	95.96	

Office Complex SSA (Urban/Rural)- Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	NA	NA	NA	
1 ≤ S < 2	NA	NA	NA	
2 ≤ S < 3	NA	NA	NA	
3 ≤ S < 4	NA	NA	NA	
4 ≤ S < 5	NA	NA	NA	
5 ≤ S < 6	NA	NA	NA	
6 ≤ S	NA	NA	NA	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	NA	NA	NA	
0 to > = -85	NA	NA	NA	
0 to > = -95	NA	NA	NA	

Over All SSA Drive Test Details Day-3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA				
0-5 (with frequency hopping	7400	7510	98.54	
Total Call Attempt	29			
Blocked Call Rate (<=3%)	0.00%			
Dropped Call Rate (<=2%)	0.00%			
Call Setup Success Rate (>=95%)	100.00%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	100.00%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	10950	23328	46.94	
0 to > = -85	17552	23328	75.24	

0 to > = -95	22385	23328	95.96	

13.6.12. IDEA: OVERALL

Over All SSA Details				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	86472	98486	87.8	
1 ≤ S < 2	2799	98486	2.84	
2 ≤ S < 3	1372	98486	1.39	
3 ≤ S < 4	2041	98486	2.07	
4 ≤ S < 5	1822	98486	1.85	
5 ≤ S < 6	1341	98486	1.36	
6 ≤ S	2639	98486	2.68	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	52889	126131	41.93	
0 to > = -85	90903	126131	72.07	
0 to > = -95	119136	126131	94.45	

Total Calls Attempt (A)	400
Total Calls Blocked (B)	3
Blocked Call Rate in % (B*100/A)	0.75
Total Calls Established ('C)	397
Total Calls Drop (D)	1
Dropped Calls Rate in % (D*100/C)	0.25
Call Setup Success Rate in % (C*100/A)	99.75%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.60%

13.6.13. RCOM GSM: DAY 1

SSA (Urban/Rural)-Day 1		
RxQual	**Samples (S)**	**Total**
0 ≤ S < 1	15860	20715
1 ≤ S < 2	680	20715
2 ≤ S < 3	842	20715
3 ≤ S < 4	854	20715
4 ≤ S < 5	1493	20715

5 ≤ S < 6	650	20715
6 ≤ S	336	20715
RxLev	**Samples**	**Total**
0 to > = -75	13248	20717
0 to > = -85	19001	20717
0 to > = -95	20577	20717

Office Complex SSA (Urban/Rural)- Day 1		
RxQual	**Samples (S)**	**Total**
0 ≤ S < 1	3103	3107
1 ≤ S < 2	2	3107
2 ≤ S < 3	1	3107
3 ≤ S < 4	0	3107
4 ≤ S < 5	1	3107
5 ≤ S < 6	0	3107
6 ≤ S	0	3107
RxLev	**Samples**	**Total**
0 to > = -75	2617	3120
0 to > = -85	3069	3120
0 to > = -95	3118	3120

Over All SSA Drive Test Details Day-1		
RxQual	**Samples (S)**	**Total**
0-4 (w/o frequency hopping)/CDMA		
0-5 (with frequency hopping	23486	23822
Total Call Attempt	247	
Blocked Call Rate (<=3%)	0.81%	
Dropped Call Rate (<=2%)	0.00%	
Call Setup Success Rate (>=95%)	99.19%	
Handover Success Rate % (total HO Success * 100/Total HO attempt)	100.00%	
RxLev	**Samples**	**Total**

0 to > = -75	15865	23837
0 to > = -85	22070	23837
0 to > = -95	23695	23837

13.6.14. RCOM GSM: DAY 2

SSA (Urban/Rural)-Day 2		
RxQual	**Samples (S)**	**Total**
0 ≤ S < 1	13399	15803
1 ≤ S < 2	381	15803
2 ≤ S < 3	419	15803
3 ≤ S < 4	431	15803
4 ≤ S < 5	775	15803
5 ≤ S < 6	276	15803
6 ≤ S	122	15803
RxLev	**Samples**	**Total**
0 to > = -75	6714	15804
0 to > = -85	13429	15804
0 to > = -95	15576	15804

Office Complex SSA (Urban/Rural)- Day 2		
RxQual	**Samples (S)**	**Total**
0 ≤ S < 1	2918	3006
1 ≤ S < 2	20	3006
2 ≤ S < 3	26	3006
3 ≤ S < 4	30	3006
4 ≤ S < 5	10	3006
5 ≤ S < 6	2	3006
6 ≤ S	0	3006
RxLev	**Samples**	**Total**
0 to > = -75	2630	3017
0 to > = -85	2969	3017
0 to > = -95	3017	3017

Over All SSA Drive Test Details Day-2		
RxQual	**Samples (S)**	**Total**

0-4 (w/o frequency hopping)/CDMA		
0-5 (with frequency hopping	18687	18809
Total Call Attempt	191	
Blocked Call Rate (<=3%)	0.52%	
Dropped Call Rate (<=2%)	0.00%	
Call Setup Success Rate (>=95%)	99.48%	
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.13%	
RxLev	**Samples**	**Total**
0 to > = -75	9344	18821
0 to > = -85	16398	18821
0 to > = -95	18593	18821

13.6.15. RCOM GSM: DAY 3

SSA (Urban/Rural)-Day 3		
RxQual	**Samples (S)**	**Total**
0 ≤ S < 1	12770	13686
1 ≤ S < 2	215	13686
2 ≤ S < 3	185	13686
3 ≤ S < 4	164	13686
4 ≤ S < 5	256	13686
5 ≤ S < 6	63	13686
6 ≤ S	33	13686
RxLev	**Samples**	**Total**
0 to > = -75	6025	13687
0 to > = -85	10786	13687
0 to > = -95	13232	13687

Office Complex SSA (Urban/Rural)- Day 3		
RxQual	**Samples (S)**	**Total**
0 ≤ S < 1	3030	3037
1 ≤ S < 2	6	3037
2 ≤ S < 3	1	3037

3 ≤ S < 4	0	3037
4 ≤ S < 5	0	3037
5 ≤ S < 6	0	3037
6 ≤ S	0	3037
RxLev	**Samples**	**Total**
0 to > = -75	2975	3048
0 to > = -85	3048	3048
0 to > = -95	3048	3048

Over All SSA Drive Test Details Day-3		
RxQual	**Samples (S)**	**Total**
0-4 (w/o frequency hopping)/CDMA		
0-5 (with frequency hopping	16690	16723
Total Call Attempt	161	
Blocked Call Rate (<=3%)	0.62%	
Dropped Call Rate (<=2%)	0.00%	
Call Setup Success Rate (>=95%)	99.38%	
Handover Success Rate % (total HO Success * 100/Total HO attempt)	100.00%	
RxLev	**Samples**	**Total**
0 to > = -75	9000	16735
0 to > = -85	13834	16735
0 to > = -95	16280	16735

13.6.16. RCOM GSM: OVERALL

Over All SSA Details				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	51080	59354	86.06	
1 ≤ S < 2	1304	59354	2.2	
2 ≤ S < 3	1474	59354	2.48	
3 ≤ S < 4	1479	59354	2.49	
4 ≤ S < 5	2535	59354	3.93	
5 ≤ S < 6	991	59354	1.67	

6 ≤ S	491	59354	0.83
RxLev	**Samples**	**Total**	**%**
0 to > = -75	34209	59393	57.6
0 to > = -85	52302	59393	88.06
0 to > = -95	58568	59393	98.61

Total Calls Attempt (A)	599
Total Calls Blocked (B)	4
Blocked Call Rate in % (B*100/A)	0.67%
Total Calls Established ('C)	595
Total Calls Drop (D)	0
Dropped Calls Rate in % (D*100/C)	0.00%
Call Setup Success Rate in % (C*100/A)	99.33%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.69%

13.6.17. VODAFONE: DAY 1

SSA (Urban/Rural)-Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	26841	31632	84.85	96.51
1 ≤ S < 2	519	31632	1.64	
2 ≤ S < 3	634	31632	2	
3 ≤ S < 4	718	31632	2.27	
4 ≤ S < 5	706	31632	2.23	
5 ≤ S < 6	1109	31632	3.51	
6 ≤ S	1105	31632	3.49	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	14946	31762	47.06	
0 to > = -85	24211	31762	76.23	
0 to > = -95	31762	31762	100	

Office Complex SSA (Urban/Rural)- Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6357	6380	99.64	99.7

1 ≤ S < 2	0	6380	0	
2 ≤ S < 3	0	6380	0	
3 ≤ S < 4	0	6380	0	
4 ≤ S < 5	0	6380	0	
5 ≤ S < 6	6	6380	0.09	
6 ≤ S	17	6380	0.27	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	5461	6634	82.32	
0 to > = -85	6578	6634	99.16	
0 to > = -95	6634	6634	100	

Over All SSA Drive Test Details Day-1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA	NA	NA	NA	
0-5 (with frequency hopping	36890	38012	97.05	
Total Call Attempt	165			
Blocked Call Rate (<=3%)	0.00%			
Dropped Call Rate (<=2%)	0.00%			
Call Setup Success Rate (>=95%)	100.00%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.21%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	20413	38396	53.16	
0 to > = -85	30789	38396	80.19	
0 to > = -95	38396	38396	100	

13.6.18. VODAFONE: DAY 2

SSA (Urban/Rural)-Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	28905	31714	91.14	97.91
1 ≤ S < 2	405	31714	1.28	
2 ≤ S < 3	393	31714	1.24	
3 ≤ S < 4	410	31714	1.29	

4 ≤ S < 5	427	31714	1.35	
5 ≤ S < 6	510	31714	1.61	
6 ≤ S	664	31714	2.09	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	8156	32620	25	
0 to > = -85	24364	32620	74.69	
0 to > = -95	32620	32620	100	

Office Complex SSA (Urban/Rural)- Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	5465	6272	87.13	97.96
1 ≤ S < 2	87	6272	1.39	
2 ≤ S < 3	90	6272	1.43	
3 ≤ S < 4	134	6272	2.14	
4 ≤ S < 5	182	6272	2.9	
5 ≤ S < 6	186	6272	2.97	
6 ≤ S	128	6272	2.04	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	5656	6437	87.87	
0 to > = -85	6424	6437	99.8	
0 to > = -95	6437	6437	100	

Over All SSA Drive Test Details Day-2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA	NA	NA	NA	
0-5 (with frequency hopping	37194	37986	97.92	
Total Call Attempt	171			
Blocked Call Rate (<=3%)	0.00%			
Dropped Call Rate (<=2%)	0.00%			
Call Setup Success Rate (>=95%)	100.00%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	97.87%			
RxLev	**Samples**	**Total**	**%**	

0 to > = -75	13812	39057	35.36	
0 to > = -85	30788	39057	78.83	
0 to > = -95	39057	39057	100	

13.6.19. VODAFONE: DAY 3

SSA (Urban/Rural)-Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	23874	25331	94.25	98.92
1 ≤ S < 2	258	25331	1.02	
2 ≤ S < 3	271	25331	1.07	
3 ≤ S < 4	241	25331	0.95	
4 ≤ S < 5	194	25331	0.77	
5 ≤ S < 6	219	25331	0.86	
6 ≤ S	274	25331	1.08	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	8581	26202	32.75	
0 to > = -85	18465	26202	70.47	
0 to > = -95	26202	26202	100	

Office Complex SSA (Urban/Rural)- Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6136	6159	99.63	
1 ≤ S < 2	0	6159		
2 ≤ S < 3	0	6159		
3 ≤ S < 4	0	6159		
4 ≤ S < 5	0	6159		
5 ≤ S < 6	9	6159		
6 ≤ S	14	6159	0.23	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	2309	6390	36.13	
0 to > = -85	6354	6390	99.44	
0 to > = -95	6390	6390	100	

Over All SSA Drive Test Details Day-3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA	NA	NA	NA	

0-5 (with frequency hopping	31202	31490	99.09	
Total Call Attempt	132			
Blocked Call Rate (<=3%)	0.00%			
Dropped Call Rate (<=2%)	0.00%			
Call Setup Success Rate (>=95%)	100.00%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	100.00%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	10890	32592	33.41	
0 to > = -85	24819	32592	76.15	
0 to > = -95	32592	32592	100	

13.6.20. VODAFONE: OVERALL

Over All SSA Details				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	97578	107488	90.78	
1 ≤ S < 2	1269	107488	1.18	
2 ≤ S < 3	1388	107488	1.29	
3 ≤ S < 4	1503	107488	1.4	
4 ≤ S < 5	1509	107488	1.4	
5 ≤ S < 6	2039	107488	1.9	97.95%
6 ≤ S	2202	107488	2.05	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	45115	110045	41.00%	
0 to > = -85	86396	110045	78.50%	
0 to > = -95	110045	110045	100.00%	

Total Calls Attempt (A)	468
Total Calls Blocked (B)	0
Blocked Call Rate in % (B*100/A)	0.00%
Total Calls Established ('C)	468
Total Calls Drop (D)	0
Dropped Calls Rate in % (D*100/C)	0.00%
Call Setup Success Rate in % (C*100/A)	100.00%

Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.40%

13.6.21. BSNL: DAY 1

SSA (Urban/Rural)-Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	21727	25265	86	95.45
1 ≤ S < 2	579	25265	2.29	
2 ≤ S < 3	556	25265	2.2	
3 ≤ S < 4	313	25265	1.24	
4 ≤ S < 5	386	25265	1.53	
5 ≤ S < 6	553	25265	2.19	
6 ≤ S	1151	25265	4.56	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	16580	26384	62.84	
0 to > = -85	24332	26384	92.22	
0 to > = -95	26069	26384	98.81	

Office Complex SSA (Urban/Rural)- Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	2793	3063	91.19	98.8
1 ≤ S < 2	18	3063	0.59	
2 ≤ S < 3	12	3063	0.39	
3 ≤ S < 4	51	3063	1.67	
4 ≤ S < 5	73	3063	2.38	
5 ≤ S < 6	79	3063	2.58	
6 ≤ S	37	3063	1.21	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	767	3082	24.89	
0 to > = -85	2074	3082	67.29	
0 to > = -95	3076	3082	99.81	

Over All SSA Drive Test Details Day-1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**

0-4 (w/o frequency hopping)/CDMA				
0-5 (with frequency hopping	27140	28328	95.81%	
Total Call Attempt	290			
Blocked Call Rate (<=3%)	2.75%			
Dropped Call Rate (<=2%)	2.12%			
Call Setup Success Rate (>=95%)	97.24%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.06%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	17347	29466	58.87	
0 to > = -85	26406	29466	89.62	
0 to > = -95	29145	29466	98.91	

13.6.22. BSNL: DAY 2

SSA (Urban/Rural)-Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	17251	20247	85.2	93.53
1 ≤ S < 2	133	20247	0.66	
2 ≤ S < 3	227	20247	1.12	
3 ≤ S < 4	398	20247	1.97	
4 ≤ S < 5	322	20247	1.59	
5 ≤ S < 6	605	20247	2.99	
6 ≤ S	1311	20247	6.48	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	10744	20712	51.87	
0 to > = -85	18625	20712	89.92	
0 to > = -95	20455	20712	98.76	

Office Complex SSA (Urban/Rural)- Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	2655	3046	87.16	99.8
1 ≤ S < 2	94	3046	3.09	
2 ≤ S < 3	52	3046	1.71	

3 ≤ S < 4	64	3046	2.1	
4 ≤ S < 5	58	3046	1.9	
5 ≤ S < 6	118	3046	3.87	
6 ≤ S	5	3046	0.16	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	3078	3078	100	
0 to > = -85	3078	3078	100	
0 to > = -95	3078	3078	100	

Over All SSA Drive Test Details Day-2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA				
0-5 (with frequency hopping	21977	23293	94.35%	
Total Call Attempt	211			
Blocked Call Rate (<=3%)	2.36%			
Dropped Call Rate (<=2%)	1.94%			
Call Setup Success Rate (>=95%)	97.63%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	96.96%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	13822	23790	58.1	
0 to > = -85	21703	23790	91.23	
0 to > = -95	23533	23790	98.92	

13.6.23. BSNL: DAY 3

SSA (Urban/Rural)-Day 3				
RxQual	**Samples (S)**	**`**	**%**	**Summary**
0 ≤ S < 1	13201	16770	78.72	
1 ≤ S < 2	614	16770	3.66	
2 ≤ S < 3	441	16770	2.63	93.82
3 ≤ S < 4	252	16770	1.5	
4 ≤ S < 5	582	16770	3.47	

5 ≤ S < 6	644	16770	3.84	
6 ≤ S	1036	16770	6.18	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	7469	17012	43.9	
0 to > = -85	12646	17012	74.34	
0 to > = -95	16523	17012	97.13	

Office Complex SSA (Urban/Rural)- Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	2661	2958	89.96	99.83
1 ≤ S < 2	38	2958	1.28	
2 ≤ S < 3	53	2958	1.79	
3 ≤ S < 4	74	2958	2.5	
4 ≤ S < 5	83	2958	2.81	
5 ≤ S < 6	44	2958	1.49	
6 ≤ S	5	2958	0.17	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	9	2998	0.3	
0 to > = -85	1394	2998	46.45	
0 to > = -95	2998	2998	100	

Over All SSA Drive Test Details Day-3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA				
0-5 (with frequency hopping	18687	19728	94.72%	
Total Call Attempt	173			
Blocked Call Rate (<=3%)	2.89%			
Dropped Call Rate (<=2%)	1.78%			
Call Setup Success Rate (>=95%)	97.10%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.72%			
RxLev	**Samples**	**Total**	**%**	

0 to > = -75	7478	20010	37.37	
0 to > = -85	14040	20010	70.16	
0 to > = -95	19521	20010	97.56	

13.6.24. BSNL: OVERALL

Over All SSA Details				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	60288	71349	84.5	95.03
1 ≤ S < 2	1476	71349	2.07	
2 ≤ S < 3	1341	71349	1.88	
3 ≤ S < 4	1152	71349	1.61	
4 ≤ S < 5	1504	71349	2.11	
5 ≤ S < 6	2043	71349	2.86	
6 ≤ S	3545	71349	4.97	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	38647	73266	52.75	
0 to > = -85	62149	73266	84.83	
0 to > = -95	72199	73266	98.54	

Total Calls Attempt (A)	674
Total Calls Blocked (B)	18
Blocked Call Rate in % (B*100/A)	2.67%
Total Calls Established ('C)	656
Total Calls Drop (D)	13
Dropped Calls Rate in % (D*100/C)	1.98%
Call Setup Success Rate in % (C*100/A)	97.32%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	97.90%

13.7. DRIVE TEST OUTCOME SUMMARY

Call Events	Aircel	Airtel	Idea	Reliance	Vodafone	BSNL
Total Calls Attempt (A)	528	605	400	599	468	674
Total Calls Blocked (B)	1	2	3	4	0	18
Blocked Call Rate in % (B*100/A)	0.19%	0.33%	0.75%	0.67%	0.00%	2.67%
Total Calls Established ('C)	527	603	397	595	468	656
Total Calls Drop (D)	1	1	1	0	0	13

Dropped Calls Rate in % (D*100/C)	0.19%	0.17%	0.25%	0.00%	0.00%	1.98%
Call Setup Success Rate in % (C*100/A)	99.81%	99.67%	99.75%	99.33%	100.00%	97.32%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.43%	98.87%	98.60%	99.69%	98.40%	97.90%

14. COUNTER DETAILS

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

		due to Failures to Return to Normal Call from local switching])/*Total no of calls successfully established (where traffic channel is allotted)* = ([Assignment Requests]-([Failed Assignments (Signaling Channel)]+[Failed Assignments during MOC on the A Interface (Including Directed Retry)]+[Failed Assignments during MTC on the A Interface (Including Directed Retry)]+[Failed Assignments during Emergency Call on the A Interface (Including Directed Retry)] +[Failed Assignments during Call Re-establishment on the A Interface (Including Directed Retry)]+[Failed Mode Modify Attempts (MOC) (TCHF)]+[Failed Mode Modify Attempts (MTC) (TCHF)]+[Failed Mode Modify Attempts (Emergency Call) (TCHF)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHF)]+[Failed Mode Modify Attempts (MOC) (TCHH)]+[Failed Mode Modify Attempts (MTC) (TCHH)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHH)])
5	**Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a month*100)/Total no of cells in the licensed service area**	**Above formula with counters being used in CBBH.**
6	**Connection with good quality voice= (Connection with good quality voice/Total voice samples)%**	***Connection with good quality voice* = ((Number of MRs on Downlink TCHF (Receive Quality Rank 0)+Number of MRs on Downlink TCHF (Receive Quality Rank 1)+Number of MRs on Downlink TCHF (Receive Quality Rank 2)+Number of MRs on Downlink TCHF (Receive Quality Rank 3)+Number of MRs on Downlink TCHF (Receive Quality Rank 4)+Number of MRs on Downlink TCHF (Receive Quality Rank 5)+Number of MRs on Downlink TCHH (Receive Quality Rank 0)+Number of MRs on Downlink TCHH (Receive Quality Rank 1)+Number of MRs on Downlink TCHH (Receive Quality Rank 2)+Number of MRs on Downlink TCHH (Receive Quality Rank 3)+Number of MRs on Downlink TCHH (Receive Quality Rank 4)+Number of MRs on Downlink TCHH (Receive Quality Rank 5)) /*Total voice samples*= ((Number of MRs on Downlink TCHF (Receive Quality Rank 0)+Number of MRs on Downlink TCHF (Receive Quality Rank 1)+Number of MRs on Downlink TCHF (Receive Quality Rank 2)+Number of MRs on Downlink TCHF (Receive Quality Rank 3)+Number of MRs on Downlink TCHF (Receive Quality Rank 4)+Number of MRs on Downlink TCHF (Receive Quality Rank 5)+Number of MRs on Downlink TCHF (Receive Quality Rank 6)+Number of MRs on Downlink TCHF (Receive Quality Rank 7)+Number of MRs on Downlink TCHH (Receive Quality Rank 0)+:Number of MRs on Downlink TCHH (Receive Quality Rank 1)+Number of MRs on Downlink TCHH (Receive Quality Rank 2)+Number of MRs on Downlink TCHH (Receive Quality Rank 3)+Number of MRs on Downlink TCHH (Receive Quality Rank 4)+Number of MRs on Downlink TCHH (Receive Quality Rank 5)+Number of MRs on Downlink TCHH (Receive Quality Rank 6)+Number of MRs on Downlink TCHH (Receive Quality Rank 7))**

14.1. Ericsson

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

6	**Connection with good quality voice= (Connection with good quality voice/Total voice samples)%**	Connection with good quality voice (Connection with good quality voice samples 0-5 /Total voice samples)= 100 * (QUAL50DL + QUAL40DL + QUAL30DL + QUAL20DL + QUAL10DL + QUAL00DL) / (QUAL70DL + QUAL60DL + QUAL50DL + QUAL40DL + QUAL30DL + QUAL20DL + QUAL10DL + QUAL00DL)

Ericsson Counters

Counter	Counter Description
TCASSALL	Number of assignment complete messages on TCH for all MS classes
TASSALL	Number of first assignment attempts on TCH for all MS classes.
CNRELCONG	Number of released connections on SDCCH due to TCH or Transcoder (TRA) congestion.
TNRELCONG	Number of released TCH signalling connections due to transcoder resource congestion during immediate assignment on TCH
CCONGS	Congestion counter for SDCCH. Stepped per congested allocation attempt.
CCALLS	Channel allocation attempt counter on SDCCH.
TNDROP	The total number of dropped TCH Connections.
QUAL00DL	Number of quality 0 reported on downlink.
QUAL10DL	Number of quality 1 reported on downlink.
QUAL20DL	Number of quality 2 reported on downlink.
QUAL30DL	Number of quality 3 reported on downlink.
QUAL40DL	Number of quality 4 reported on downlink.
QUAL50DL	Number of quality 5 reported on downlink.
QUAL60DL	Number of quality 6 reported on downlink.
QUAL70DL	Number of quality 7 reported on downlink

14.2. NSN (Nokia Siemens Network)

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

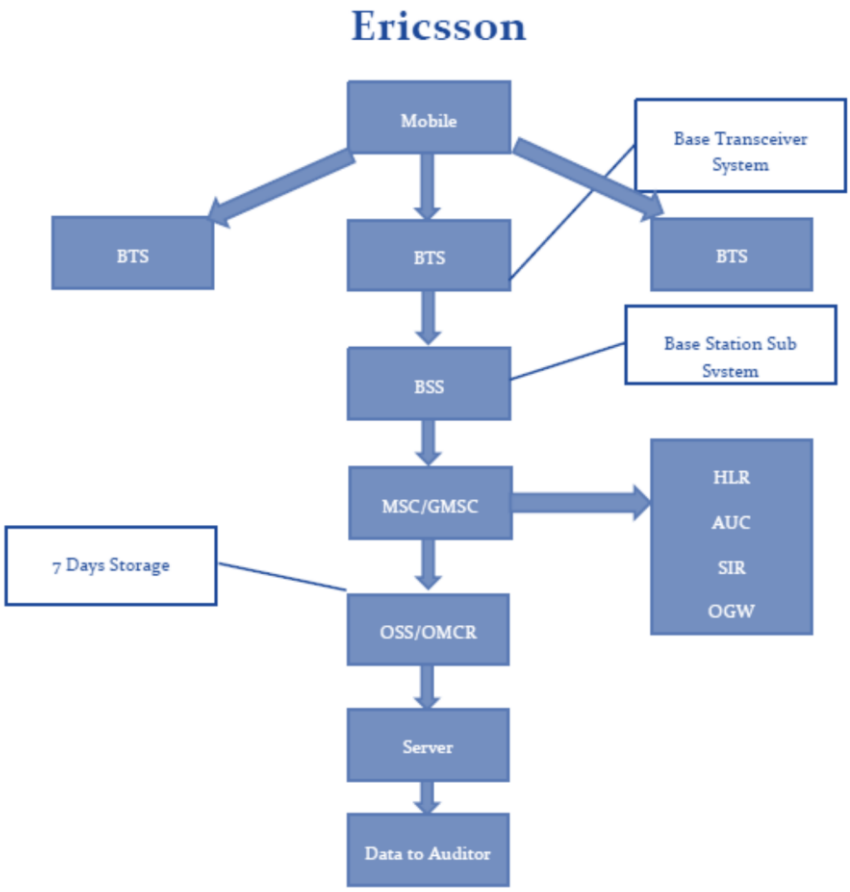
14.3. Huawei

SR .NO	KPI	HUAWEI FORMULA
1	CALL SETUP SUCCES (NUM)	[Successful CS IS-95 Orig Call Setups + Successful CS IS-2000 Orig Call Setups + Successful CS IS-95 Term Call Setups + Successful CS IS-2000 Term Call Setups] ([1157628567] + [1157628587] + [1157628568] + [1157628588])
2	CALL SETUP SUCCES (DEN)	[CS IS-95 Orig Attempts + CS IS-2000 Orig Attempts + CS IS-95 Term Attempts + CS IS-2000 Term Attempts] ([1157628553] + [1157628573] + [1157628554] + [1157628574])

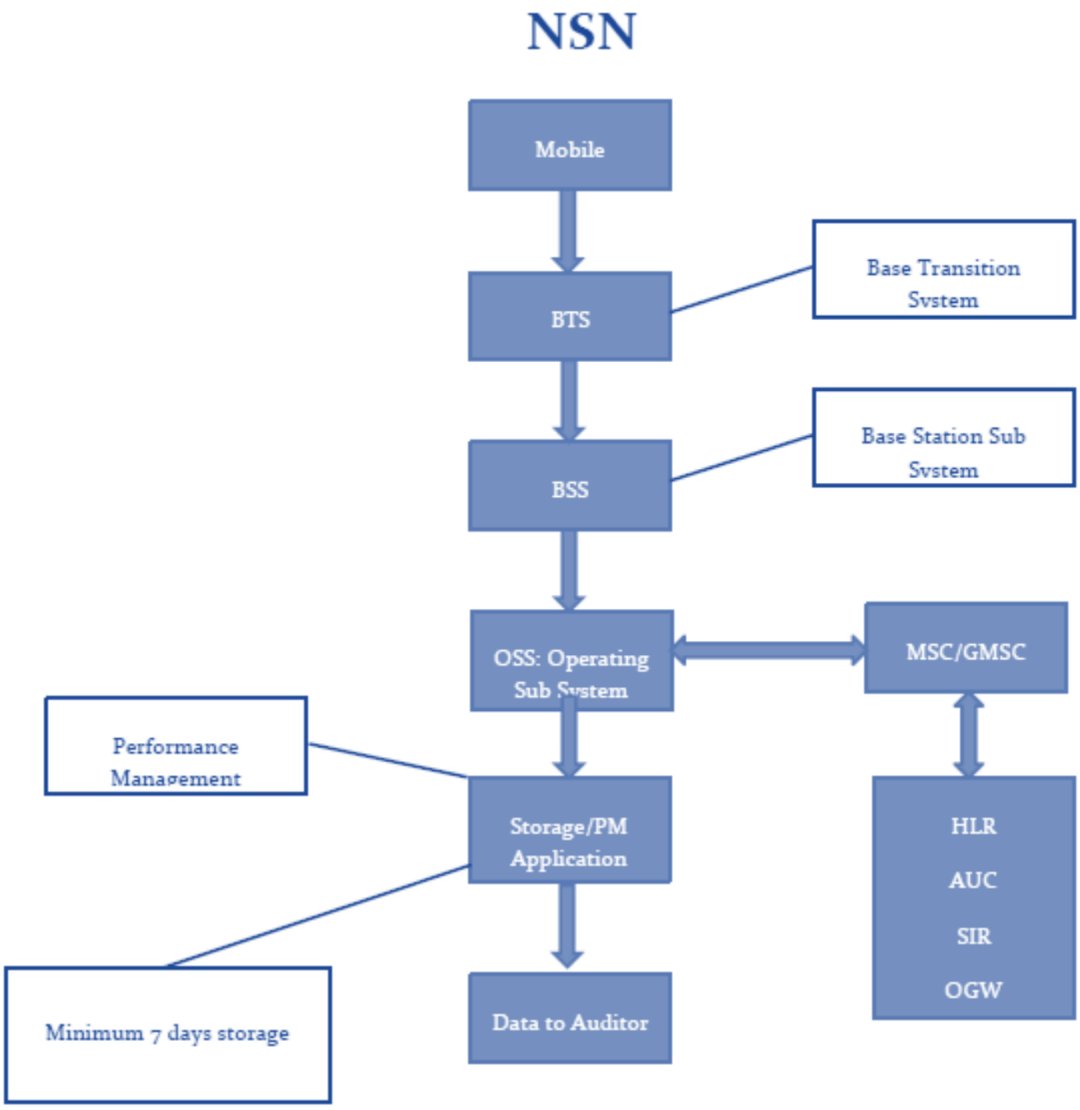
3	CALL SETUP SUCCESS RATE (%)	CALL SETUP SUCCES (NUM) / CALL SETUP SUCCES (DEN) * 100\
4	CALL DROP RATE (NUM)	[CS IS-95 Call Drops (Too many Erasure frames) + CS IS-2000 Call Drops (Too many Erasure frames) + CS IS-95 Call Drops (No reverse frame received) + CS IS-2000 Call Drops (No reverse frame received) + CS IS-95 Call Drops (Abis interface abnormal) + CS IS-2000 Call Drops (Abis interface abnormal) + CS IS-95 Call Drops (A2 interface abnormal) + CS IS-2000 Call Drops (A2 interface abnormal) + CS IS-95 Call Drops (HHO fail) + CS IS-2000 Call Drops (HHO fail) + CS IS-95 Call Drops (Other causes) + CS IS-2000 Call Drops (Other causes)] ([1157628608] + [1157628614] + [1157628609] + [1157628615] + [1157628610] + [1157628616] + [1157628611] + [1157628617] + [1157628612] + [1157628618] + [1157628613] + [1157628619])
5	CALL DROP RATE(DEN)	[Successful CS IS-95 Orig Call Setups + Successful CS IS-2000 Orig Call Setups + Successful CS IS-95 Term Call Setups + Successful CS IS-2000 Term Call Setups + CS IS-95 Successful Incoming Hard HOs + CS IS-2000 Successful Incoming Hard HOs] [1157628619]) x 100/([1157628567] + [1157628587] + [1157628568] + [1157628588] + [1157628569] + [1157628589])]
6	Call DROP Rate	CALL DROP RATE (NUM) / CALL DROP RATE(DEN) * 100\
7	RF BLOCK RATE (NUM)	{[(TCH Assignment Requests-CS Orig-IS95[Times] + TCH Assignment Requests-CS Orig-IS2000[Times] + TCH Assignment Requests-CS Term-IS95[Times] + TCH Assignment Requests-CS Term-IS2000[Times]) - (Successful TCH Assignments-CS Orig-IS95[Times] + Successful TCH Assignments-CS Orig-IS2000[Times] + Successful TCH Assignments-CS Term-IS95[Times] + Successful TCH Assignments-CS Term-IS2000[Times])] {[(1157628621 + 1157628628 + 1157628635+ 1157628642)
8	RF BLOCK RATE (DEN)	[((TCH Assignment Requests-CS Orig-IS95[Times] + TCH Assignment Requests-CS Orig-IS2000[Times] + TCH Assignment Requests-CS Term-IS95[Times] + TCH Assignment Requests-CS Term-IS2000[Times]))]} [(1157628621 + 1157628628 + 1157628635+ 1157628642)]}
9	RF BLOCK RATE	RF BLOCK RATE (NUM) / RF BLOCK RATE (DEN) *100
10	Call Quality (RFER)	CS Reverse Link Average FER of Carrier[%

15. BLOCK SCHEMATIC DIAGRAM

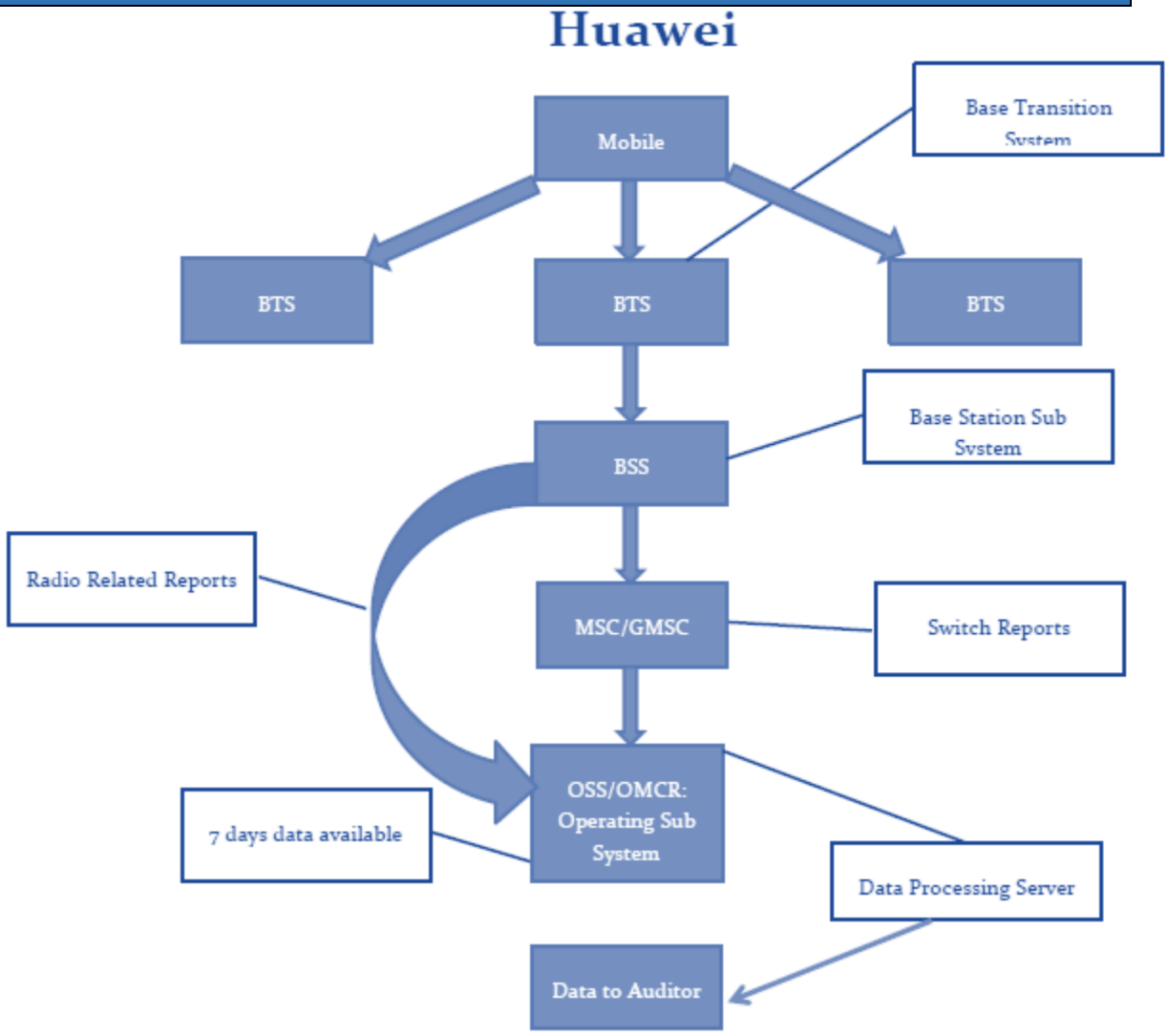
17.1. Ericsson



17.2. NSN


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

17.3. 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

16. 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
- QND'15 – Refers to the quarter of October, November and December 2015
- SSA – Secondary Switching Area
- NOC – Network Operation Center
- OMC – Operations and Maintenance Center
- MSC – Mobile Switching Center
- PMR – Performance Monitoring Reports
- TCBH – Time Consistent Busy Hour
- CBBH - Cell Bouncing Busy Hour
- BTS – Base Transceiver Station
- CSSR – Call Setup Success Rate
- TCH – Traffic Channel
- SDCCH – Standalone Dedicated Control Channel
- CDR – Call Drop Rate
- FER – Frame Error Rate
- SIM – Subscriber Identity Module
- GSM – Global System for Mobile
- CDMA – Code Division Multiple Access
- NA – Not Applicable
- NC – Non Compliance
- POI – Point of Interconnection
- IVR – Interactive Voice Response
- STD – Standard Trunk Dialing
- ISD – International Subscriber Dialing

17 ANNEXURE

17.1. 2G Voice PMR Data: Consolidated

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of BTSs in a month in hrs. in the licensed service area	No. of BTSs having accumulated downtime of >24 hours in a month	Call Set-up Success Rate (Within Licensee own network	SDDCH/Paging chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Wost Affected call having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	0.23%	1.09%	99.56%	0.02%	0.24%	1.35%	11.96%	95.38%
Airtel	0.11%	0.26%	98.05%	0.21%	0.45%	0.78%	1.58%	98.36%
BSNL	1.87%	1.95%	98.42%	0.78%	1.56%	1.90%	2.96%	DNA
Idea	0.12%	0.26%	99.10%	0.08%	0.39%	1.24%	2.14%	96.72%
RCOM CDMA	0.08%	0.58%	98.04%	0.00%	0.94%	0.06%	0.39%	98.97%
RCOM GSM	0.10%	0.75%	96.44%	0.22%	1.04%	0.36%	1.22%	96.90%
TTSL CDMA	0.01%	0.00%	99.33%	0.00%	0.02%	0.09%	1.51%	98.13%
TTSL GSM	0.00%	0.00%	99.65%	0.00%	0.00%	0.38%	4.30%	98.66%
Vodafone	0.02%	0.00%	99.85%	0.02%	0.15%	0.64%	2.44%	97.71%

- Aircel has a parameter value of **11.96%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.
- TTSL GSM has a parameter value of **4.30%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop which is pre-defined at ≤ 3%.

17.2. 3G Voice PMR: Consolidated

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Sum of downtime of Node B's in a month in hrs	No. of Node B's having Accumulated Downtime of > 24 hrs in a month	Call Set-up Success Rate (Within Licensee own network	RRC Congestion	RAB Congestion	Circuit Switched Voice Drop Rate	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate	%age of connections with Good Circuit Switched Voice Quality
Benchmark	**≤ 2%**	**≤ 2%**	**≥ 95%**	**≤ 1%**	**≤ 2%**	**≤ 2%**	**≤ 3%**	**≥ 95%**
Aircel	NA	NA	NA	NA	NA	NA	NA	NA
Airtel	0.14%	0.17%	97.80%	0.33%	0.09%	0.75%	1.38%	98.59%
BSNL	1.29%	1.69%	96.24%	0.76%	0.75%	1.18%	2.75%	DNA
Idea	0.16%	0.14%	98.41%	0.67%	0.38%	1.57%	1.92%	97.67%
RCOM CDMA	NA	NA	NA	NA	NA	NA	NA	NA
RCOM GSM	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
TATA CDMA	NA	NA	NA	NA	NA	NA	NA	NA
TATA GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

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

17.3. Billing and Customer Care

Name of Service Provider	Metering and Billing credibility		Billing Complaints		Response time to customer for assistance	Termination & Closures	Time taken for refund of deposits after closures: Benchmark	Customer Care		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 at call center level.
Benchmark	**≤ 0.1%**	**≤ 0.1%**	**≥ 98%**	**= 100%**	**= 100%**	**= 100%**	**= 100%**	**≥ 95%**	**≥ 95%**		
Aircel	0.03%	0.00%	100%	100%	100%	100%	100%	98.89%	98.33%	100%	NA
Airtel	0.01%	0.03%	100%	100%	100%	100%	100%	99.99%	97.26%	98.96%	100%
BSNL	0.02%	0.01%	100%	100%	100%	100%	100%	100%	95.18%	97.64%	100%
Idea	0.06%	0.07%	100%	100%	100%	100%	100%	99.22%	99.84%	31.95%	100%
RCOM CDMA	0.01%	0.08%	100%	100%	100%	100%	100%	98.39%	94.58%	100%	100%
RCOM GSM	0.08%	0.09%	100%	100%	100%	100%	100%	98.36%	93.45%	100%	100%
TTSL CDMA	0.00%	0.00%	100%	100%	100%	100%	100%	100.00%	99.95%	99.70%	100%
TTSL GSM	0.00%	0.00%	100%	100%	100%	100%	100%	99.29%	99.77%	100%	100%
Vodafone	0.03%	0.07%	100%	100%	100%	100%	100%	100%	99.48%	4.07%	DNA

- RCOM CDMA has a parameter value of **94.58%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds which is pre-defined at ≥ 95%.
- RCOM GSM has a parameter value of **93.45%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds which is pre-defined at ≥ 95%.

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

Name of Service Provider	Network Availability				Connection Establishment (Accessibility)						Connection Maintenance (Retainability)					
	Sum of downtime of BTSs in a month in hrs. in the licensed service area		No. of BTSs having accumulated downtime of >24 hours in a month		Call Set-up Success Rate (Within Licensee own network		SDDCH/Paging chl. Congestion		TCH Congestion		Call Drop Rate (%age)		Wost Affected call having more than 3% TCH drop		%age of connection with good voice quality	
Benchmark	≤ 2%		≤ 2%		≥ 95%		≤ 1%		≤ 2%		≤ 2%		≤ 3%		≥ 95%	
	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP
Aircel	0.23%	0.23%	1.09%	1.09%	99.56%	99.56%	0.02%	0.02%	0.24%	0.24%	1.35%	1.35%	11.96%	11.96%	95.39%	95.38%
Airtel	0.11%	0.11%	0.26%	0.26%	98.05%	98.05%	0.21%	0.22%	0.45%	0.45%	0.78%	0.78%	1.58%	1.58%	98.36%	98.36%
BSNL	1.87%	1.87%	1.95%	1.95%	98.42%	98.42%	0.78%	0.78%	1.56%	1.56%	1.90%	1.90%	2.94%	2.94%	DNA	96.17%
Idea	0.12%	0.12%	0.26%	0.26%	99.10%	99.10%	0.08%	0.08%	0.39%	0.39%	1.24%	1.24%	2.14%	2.16%	96.72%	96.72%
RCOM CDMA	0.08%	0.08%	0.58%	0.58%	98.04%	98.04%	NA	0.00%	0.94%	0.94%	0.06%	0.06%	0.39%	0.43%	98.97%	99.00%
RCOM GSM	0.10%	0.10%	0.75%	0.75%	96.44%	96.99%	0.22%	0.22%	1.04%	1.04%	0.36%	0.37%	1.20%	1.47%	96.90%	96.90%
TATA CDMA	0.01%	0.01%	0.00%	0.00%	99.33%	99.33%	NA	0.00%	0.02%	0.02%	0.09%	0.09%	1.51%	1.51%	98.13%	98.13%
TATA GSM	0.00%	0.00%	0.00%	0.00%	99.65%	99.65%	0.00%	0.00%	0.00%	0.00%	0.38%	0.38%	4.30%	4.30%	98.66%	98.66%
Vodafone	0.02%	0.02%	0.00%	0.00%	99.85%	99.85%	0.02%	0.02%	0.15%	0.15%	0.64%	0.64%	2.44%	2.44%	97.71%	97.71%

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

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

Name of Service Provider	Metering and Billing credibility				Billing Complaints						Termination & Closures		Time taken for refund of deposits after closures: Benchmark		Customer Care			
	Postpaid Subscribers		Prepaid Subscribers		%age complaints resolved within 4 weeks		%age complaints resolved within 6 weeks		%age of credit/weiver 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	0.03%	0.03%	0.00%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.89%	98.89%	98.33%	98.33%
Airtel	0.01%	0.01%	0.00%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100.00%	100.00%	97.26%	97.26%
BSNL	0.02%	0.02%	0.01%	0.01%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	95.18%	96.12%
Idea	0.06%	0.06%	0.07%	0.07%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.22%	99.22%	99.84%	99.84%
RCOM CDMA	0.00%	0.00%	0.08%	0.08%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.39%	98.39%	94.58%	94.58%
RCOM GSM	0.08%	0.08%	0.09%	0.09%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.36%	98.36%	93.45%	93.45%
TATA CDMA	0.00%	0.00%	0.00%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100.00%	100.00%	99.95%	99.95%
TATA GSM	0.00%	0.00%	0.00%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.29%	99.29%	99.77%	99.77%
Vodafone	0.03%	0.03%	0.07%	0.07%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.48%	99.48%