PHISTREAM
EMPOWERING LEADERSHIP, TRANSFORMING BUSINESS

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



AUDIT & ASSESSMENT OF QUALITY OF SERVICE

NORTH ZONE – JAMMU & KASHMIR CIRCLE
CELLULAR MOBILE TELEPHONE SERVICE (CMTS)
(OCTOBER TO DECEMBER 2015)

PREPARED BY:

PHISTREAM CONSULTING PRIVATE LIMITED
(An ISO – 9001:2008 Certified Company)
Office: A-46, First Floor, Sector 72, Noida ● **Telephone:** +91-120-644-7778 ● **Email:** info@phistream.com

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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 Jammu & Kashmir circle.

1.4. COVERAGE

The audit was conducted in Jammu and Kashmir Circle covering all SSAs (Secondary Switching Areas).

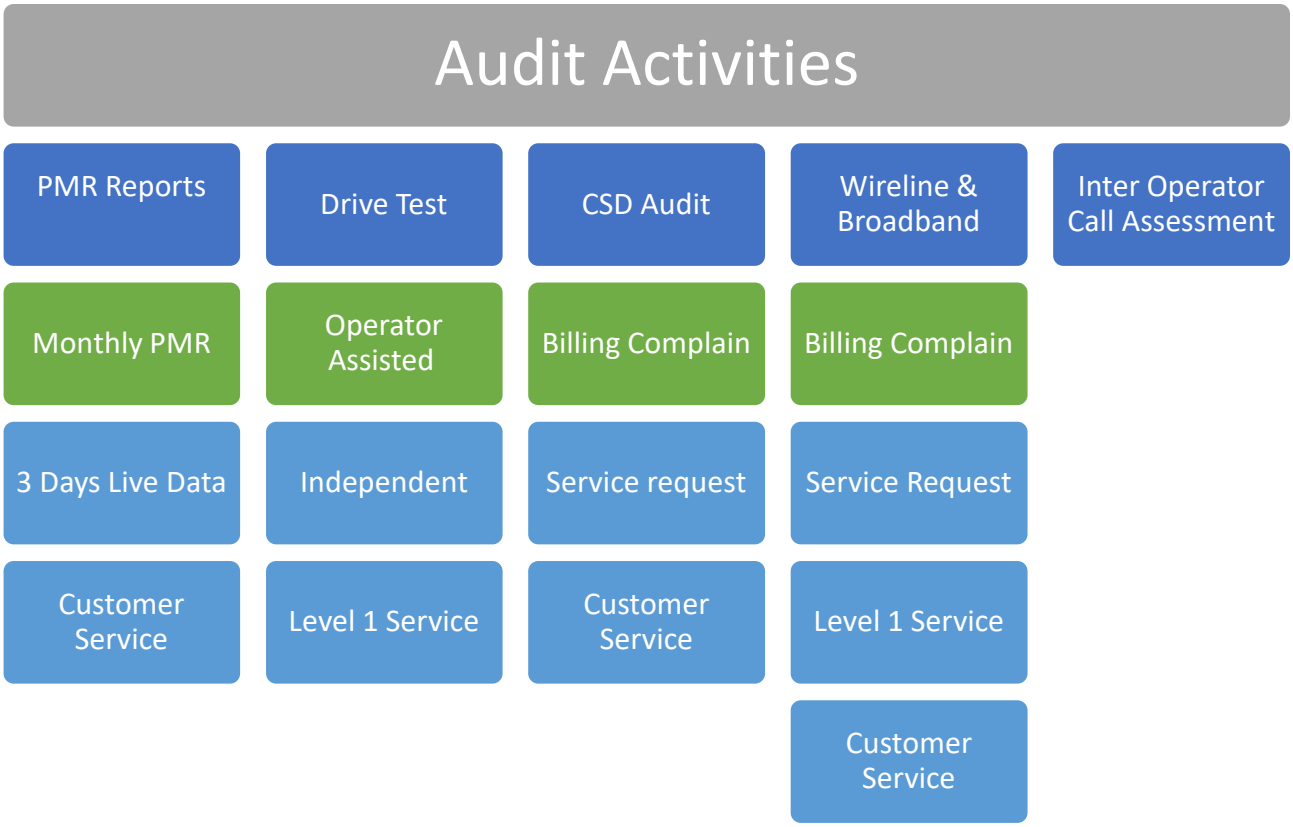
Image Source: Wikipedia

1.5. SSA LIST

S. No.	Circle	SSA Name	SDCA Name
1	JK	Jammu	Akhnoor
2	JK	Jammu	Basholi
3	JK	Jammu	Jammu
4	JK	Jammu	Kathua
5	JK	Jammu	Samba
6	JK	Leh	Kargil

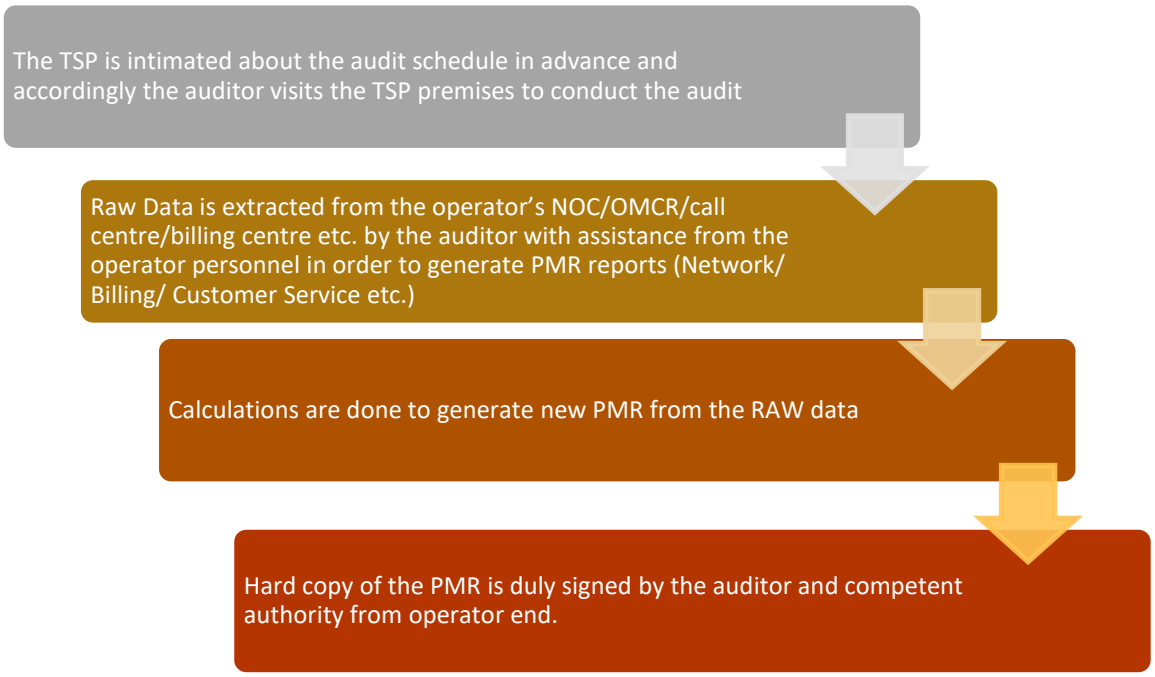
7	JK	Leh	Leh
8	JK	Leh	Nobra
9	JK	Leh	Nyoma
10	JK	Leh	Zanaskar
11	JK	Rajouri	Kalakot
12	JK	Rajouri	Nowshera
13	JK	Rajouri	Poonch
14	JK	Rajouri	Rajouri
15	JK	Srinagar	Anantnag
16	JK	Srinagar	Badgam
17	JK	Srinagar	Bandipur
18	JK	Srinagar	Baramulla
19	JK	Srinagar	Karnah
20	JK	Srinagar	Kulgam
21	JK	Srinagar	Kupwara
22	JK	Srinagar	Pahalgam
23	JK	Srinagar	Pulwama
24	JK	Srinagar	Sopore
25	JK	Srinagar	Srinagar
26	JK	Srinagar	Uri
27	JK	Udhampur	Bedarwah
28	JK	Udhampur	Doda
29	JK	Udhampur	Kishtwar
30	JK	Udhampur	Mahore
31	JK	Udhampur	Ramban
32	JK	Udhampur	Ramnagar
33	JK	Udhampur	Reasi
34	JK	Udhampur	Udhampur

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 April, May and June 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

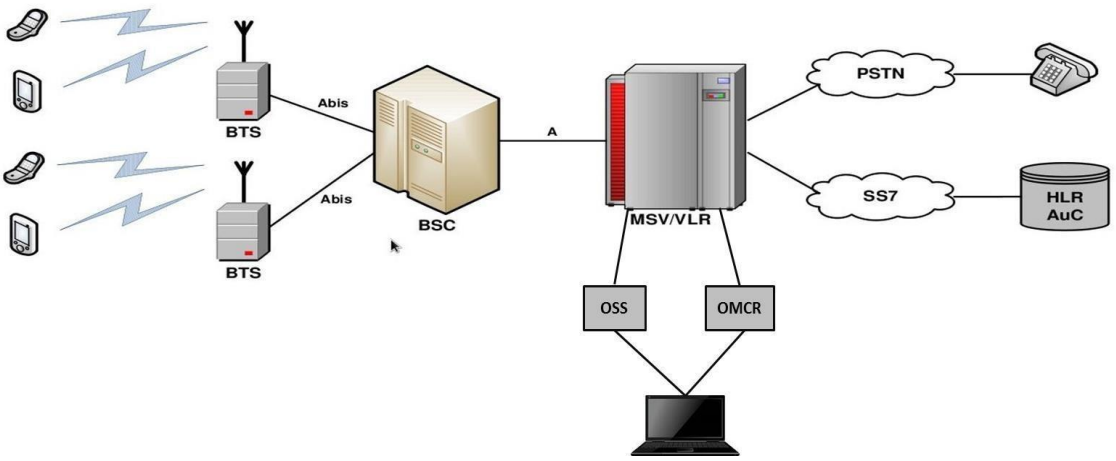
2.2. AUDIT PARAMETER: NETWORK

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

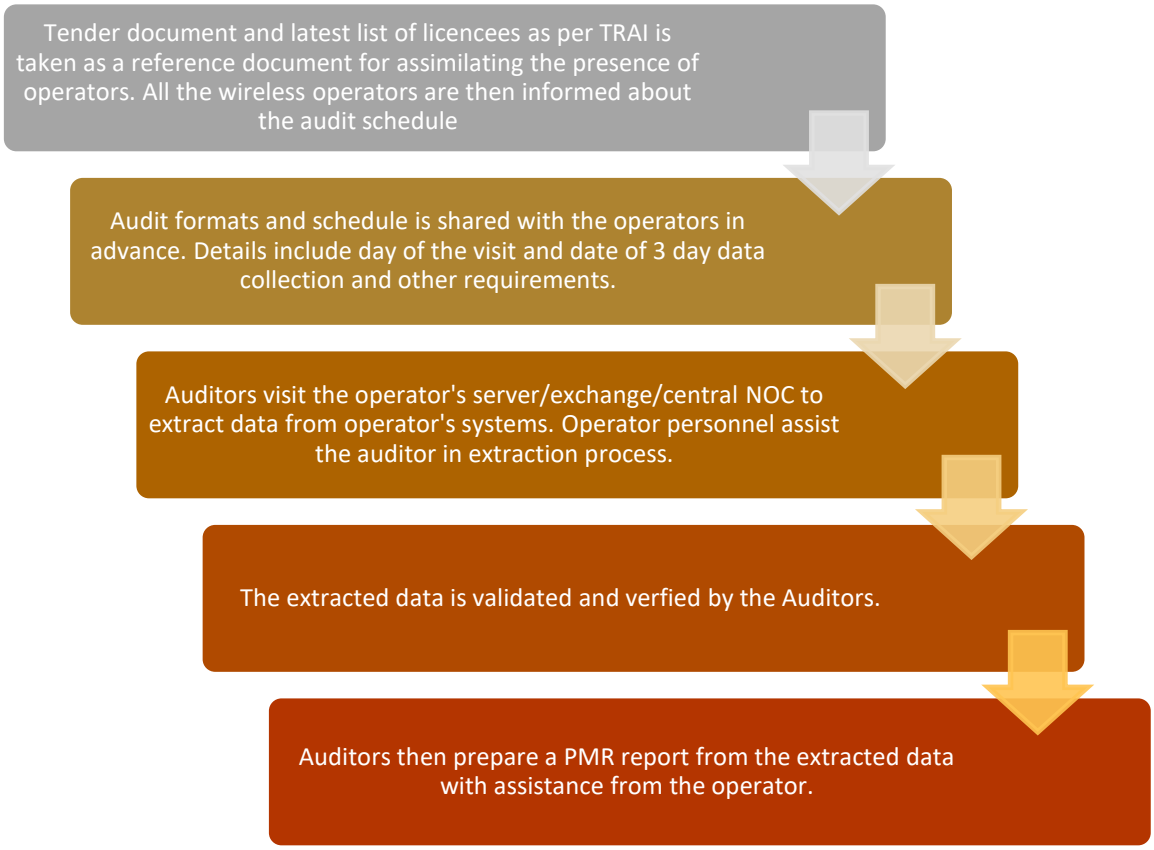
Network Availability	
BTSs Accumulated downtime (not available for service)	≤ 2%
Worst affected BTSs due to downtime	≤ 2%
Connection Establishment (Accessibility)	
Call Set-up Success Rate (within licensee's own network)	≥ 95%
SDCCH/ Paging Channel Congestion	≤ 1 %
TCH Congestion	≤ 2%
Connection Maintenance (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 accumulated downtime	Node B's downtime more than 24 hr in 3 days	Total no. of Node B's in the Licensed Service Area Sum of downtime of Node B's in a month in hours i.e. total outage time of all Node B's in hours in a month [(Sum of downtime of Node B's in a month in hrs)/(24* no. of days in the month*no. of Node B's in the licensed service area)]*100	*<=2%*
2	Connection Establishment (Accessibility)			
a.	Call Setup Success Rate:	It is the % of total no. of call established to the total no. of call attempt	Total No. of Voice Call Attempts Total No. of Voice Call Establishment CSSR (Call Setup Success Rate = (Total No. of Voice Call Attempts/ Total No. of Voice Call Establishment)*100)	*>=95%*
b.	RRC Congestion:	RRC Congestion rate is the % of Total No. of RRC Failed Calls to the Total no. of RRC Assigned Calls	RRC Attempts (RRC Connection Access) (A) RRC Failed (RRC Connection Access Failed) (B) RRC Congestion (%) [B/A]*100	*<=1%*
c.	RAB Congestion:	RAB Congestion rate is the % of Total No. of RAB Failed Calls to the Total no. of RAB Assigned Calls	RAB Attempts (RAB Setup Access) (C) RAB Failed (RAB Setup Access Failed) (D) RAB Congestion (%) [D/C]*100	*<=2%*
3	Connection Maintenance (Retainability)			
a.	Circuit Switched Voice Drop Rate	It is the % of total no. of Dropped Calls to the total no. of Calls Established	Total Established Calls (A) Calls Dropped after Establishment (B) Call Drop Rate [B/A]*100	*<=2%*
b.	Worst affected cells having more than 3% Circuit	It is the % of total no. of Cells having > 3% Circuit Switched	Total No. of Cells (Sector) Total No. of Cells exceeding 3% Circuit Switched Voice Drop Rate in CBBH (Cell Bouncing Busy Hour)	*<=3%*

	Switched Voice Drop Rate:	Voice drop to the total no. cells	% 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 Total traffic served on all POIs (Erlang) Total No. of circuits on all individual POIs Total number of working POI Service Area wise Capacity of all POIs No. of all POI's having >=0.5% POI congestion Name of POI not meeting the benchmark (having >=0.5% POI congestion)	<=0.5%

2.7. 2G & 3G WIRELESS

S. No.	Name of Parameter	Definition	Formula	Benchmark
1	Service Activation/ Provisioning	This refers to the activation of services after activation of the SIM. This involves programming the various databases with the customer's information and any gateways to standard Internet chat or mail services or any data services.	Total No. of Subscribers for Service Activation (A) Total Service Activations provided within 4 Hours (B) Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*
2	PDP Context Activation Success Rate	PDP Context Activation Success Rate is the ratio of total number of successfully completed PDP context activations to the total attempts of context activation	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)	>=95%

			PDP Context Activation Success Rate =(B/A) *100	
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)	<=5%
			RNC originated PS Domain Iu Connection Release (B)	
			Drop Rate = (B/A) * 100	

3. 3 DAYS LIVE DATA

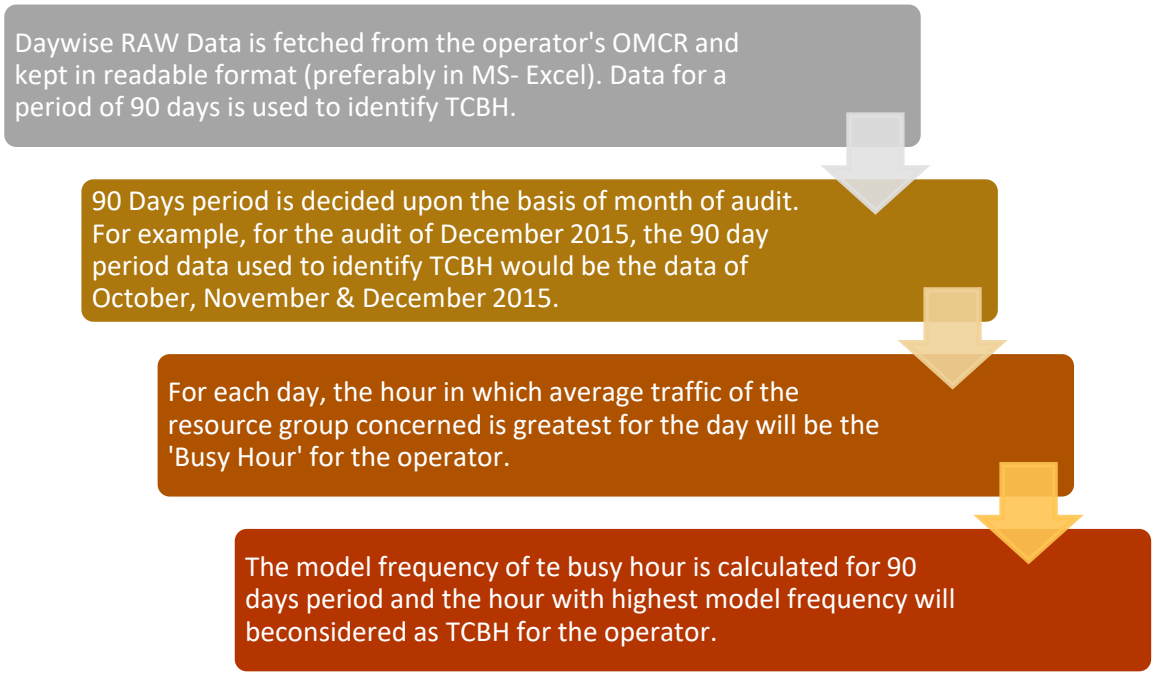
The main purpose of 3 day live measurement is to evaluate the network parameters on intraday basis. While the monthly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the network parameters discussed earlier. All the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



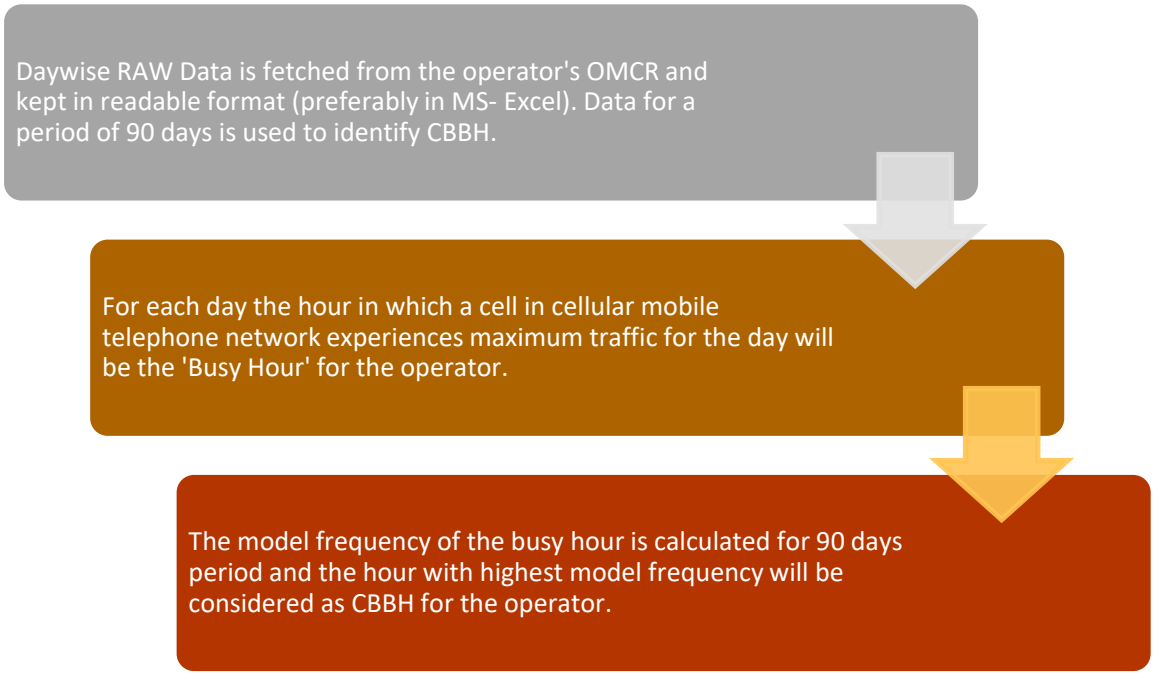
During audit, the auditors identified from the raw data that the TCBH for the operators in Oct – Nov – Dec 2015 was the time period as given below:

Aircel	Airtel	BSNL	Idea	RCOM GSM	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

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.

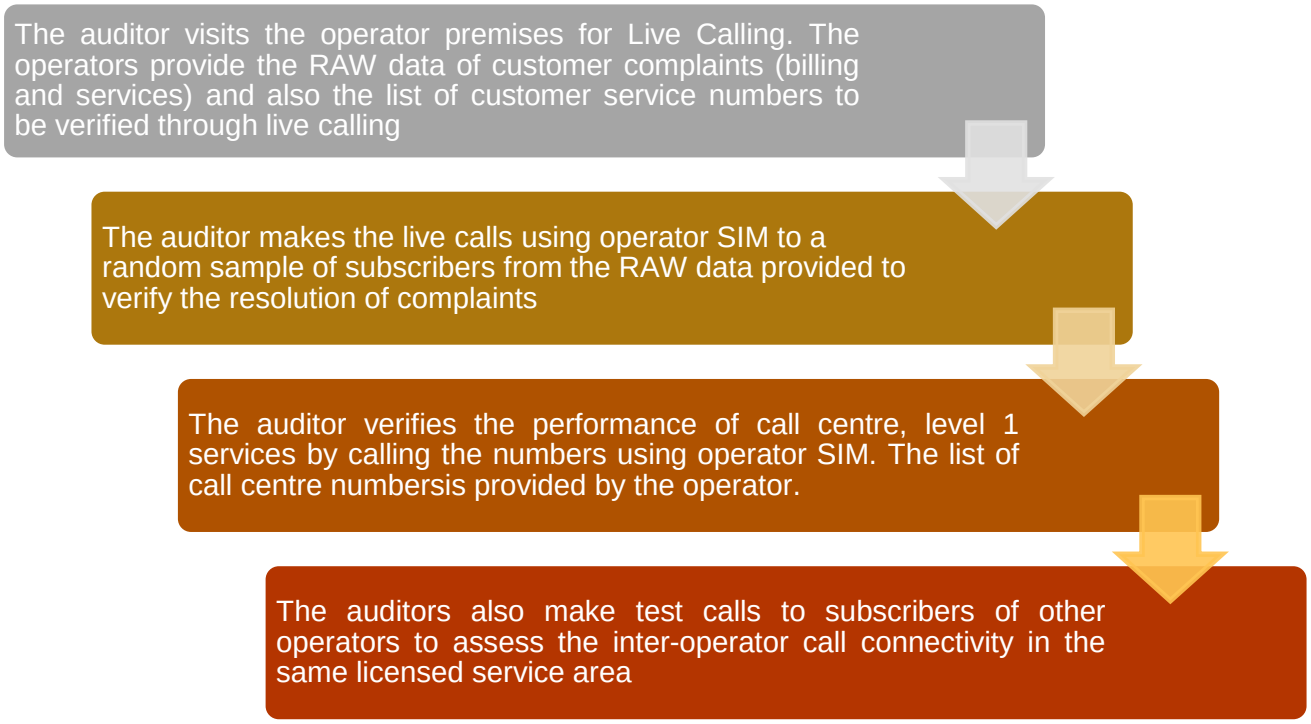
4.1. AUDIT PARAMETERS: CUSTOMER SERVICE

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).

4.6.1. PROCESS TO TEST LEVEL 1 SERVICE

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

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

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

4.7. CUSTOMER CARE

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

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

The process for this parameter is stated below:

- Overall sample size is 100 calls per service provider per circle at different points of time, evenly distributed across the selected exchanges – 50 calls between 1100 HRS to 1400 HRS and 50 calls between 1600 HRS to 1900 HRS.
- Time to answer the call by the operator was assessed from the time interviewer pressed the requisite button for being assisted by the operator.
- All the supplementary services that have any kind of human intervention are to be covered here. It also includes the IVR assisted services.

4.8. INTER OPERATOR CALL ASSESSMENT

A total of 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	Vodafone
Aircel	-	99%	99%	99%	99%	99%
Airtel	99%	-	98%	99%	98%	100%
BSNL	98%	100%	-	98%	100%	98%
Idea	100%	100%	100%	-	100%	100%
Reliance GSM	98%	97%	97%	98%	-	98%
Vodafone	98%	96%	98%	98%	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

Jammu and Kashmir circle consist of total 5 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 Jammu and Kashmir Circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

6.1. OPERATORS COVERED

Name of Operator	Number of Subscriber
BSNL	1233474
Airtel	2472891
Aircel	2651437
Idea	597889
Reliance GSM	849831
Vodafone	1048029

TSP	No. of cells	BTS	BSC	MSC+GMSC	Node B	RNC
Aircel	6802	2283	22	6	543	3
AIRTEL	8512	2865	33	12	1577	5
Idea	3335	1112	7	2	425	2
RCOM GSM	2558	854	4	1	NA	NA
VODAFONE	4715	1565	16	2	NA	NA
BSNL	3459	1166	21	8	392	7

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	15th Dec 2015	12th Jan 2016
Vodafone	31st Oct 2015	9th Nov 2015	9th Dec 2015	7th Jan 2016
Idea	30th Oct 2015	9th Nov 2015	14th Dec 2015	14th Jan 2016
Reliance	26th Oct 2015	7th Nov 2015	8th Dec 2015	6th Jan 2016
BSNL	4th Nov 2015	10th Nov 2015	10th Dec 2015	8th Jan 2016
Aircel	3rd Nov 2015	5th Nov 2015	7th Dec 2015	5th 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	Not Applicable
DNA	Data Not Available

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)	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	0.03%	3.45%	97.51%	0.38%	1.96%	1.39%	13.74%	95.14%
Airtel	0.11%	0.18%	97.29%	0.33%	0.40%	0.76%	2.06%	97.56%
BSNL	1.66%	0.00%	96.23%	0.34%	1.38%	1.43%	2.09%	98.24%
Idea	0.36%	0.90%	98.37%	0.16%	1.29%	1.50%	2.49%	96.28%
RCOM GSM	0.06%	0.00%	99.23%	0.13%	0.09%	0.15%	13.89%	99.21%
Vodafone	0.14%	0.45%	99.25%	0.01%	0.75%	0.76%	2.85%	98.52%

- Aircel has a parameter value of **3.45%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%.

- Aircel has a parameter value of **13.74%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.

- RCOM GSM has a parameter value of **13.89%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it 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)	Worst 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	0.69%	4.51%	97.89%	0.21%	1.66%	1.26%	12.02%	95.27%
Airtel	0.12%	0.21%	97.99%	0.43%	0.35%	0.95%	2.11%	97.73%
BSNL	1.63%	0.07%	98.46%	0.62%	1.33%	1.13%	2.09%	96.87%
Idea	0.35%	1.89%	98.03%	0.14%	1.59%	1.84%	2.31%	96.05%
RCOM GSM	0.48%	0.00%	97.96%	0.04%	0.12%	0.16%	0.66%	99.26%
Vodafone	0.14%	1.02%	99.10%	0.01%	0.90%	0.66%	2.91%	98.77%

- Aircel has a parameter value of **4.51%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%.

- Aircel has a parameter value of **12.02%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it 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)	Worst 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	0.84%	5.70%	98.34%	0.35%	1.23%	1.25%	11.57%	95.22%
Airtel	0.10%	0.10%	96.86%	0.39%	0.61%	0.97%	2.19%	97.78%
BSNL	1.45%	0.60%	98.63%	0.63%	1.36%	1.03%	2.28%	96.75%
Idea	0.42%	1.71%	97.89%	0.11%	1.54%	1.63%	2.29%	96.70%
RCOM GSM	0.07%	0.00%	98.22%	0.04%	0.16%	0.18%	0.47	99.24%
Vodafone	0.26%	1.66%	98.56%	0.03%	1.44%	0.63%	2.86%	98.87%

- Aircel has a parameter value of **5.70%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%.

- Aircel has a parameter value of **11.57%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it is pre-defined at ≤ 3%

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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)	Worst 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	0.52%	4.55%	97.91%	0.31%	1.62%	1.30%	12.44%	95.21%
Airtel	0.11%	0.17%	97.38%	0.39%	0.45%	0.89%	2.12%	97.69%
BSNL	1.58%	0.22%	97.77%	0.53%	1.36%	1.20%	2.16%	97.29%
Idea	0.38%	1.50%	98.10%	0.14%	1.47%	1.66%	2.36%	96.34%
RCOM GSM	0.20%	0.00%	98.47%	0.07%	0.12%	0.17%	5.01%	99.24%
Vodafone	0.18%	1.04%	98.97%	0.02%	1.03%	0.69%	2.87%	98.72%

- Aircel has a parameter value of **4.55%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%

- Aircel has a parameter value of **12.44%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it is pre-defined at ≤ 3%.

- RCOM-GSM has a parameter value of **5.01%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it is pre-defined at ≤ 3%

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6.7. 2G VOICE 3 DAYS LIVE DATA

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

6.8. 2G VOICE 3 DAYS LIVE DATA: 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 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	0.71%	0.31%	96.60%	0.23%	2.96%	1.35%	13.62%	95.12%
Airtel	0.12%	0.00%	93.64%	0.31%	1.14%	0.77%	1.97%	97.64%
BSNL	1.53%	0.00%	96.38%	0.30%	1.35%	1.41%	2.10%	98.22%
Idea	0.47%	0.18%	98.41%	0.09%	1.22%	1.78%	2.37%	96.42%
RCOM GSM	0.10%	0.00%	99.51%	0.15%	0.24%	0.15%	0.95%	99.18%
Vodafone	0.19%	0.06%	99.41%	0.01%	0.01%	0.70%	2.80%	98.58%

- Aircel has a parameter value of **2.96%** and failed to meet the benchmark for TCH Congestion as it is pre-defined at ≤ 2%.
- Aircel has a parameter value of **13.62%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.
- Airtel has a parameter value of **93.64%** and failed to meet the benchmark for Call Set-up Success Rate (Within Licensee own network as it is pre-defined at ≥ 95%

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 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	1.02%	0.09%	98.26%	0.19%	1.28%	1.37%	12.51%	95.23%
Airtel	0.07%	0.00%	98.00%	0.34%	0.27%	0.75%	1.81%	97.70%
BSNL	1.82%	0.00%	96.36%	0.31%	1.40%	1.46%	2.23%	98.22%
Idea	0.39%	0.09%	98.29%	0.12%	1.39%	1.75%	2.67%	95.40%
RCOM GSM	0.01%	0.00%	99.11%	0.02%	0.07%	0.15%	0.52%	99.26%
Vodafone	0.19%	0.00%	99.00%	0.02%	1.00%	0.73%	2.87%	98.66%

- Aircel has a parameter value of **12.51%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.

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 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	0.58%	0.18%	98.45%	0.42%	1.11%	1.19%	11.13%	95.01%
Airtel	0.05%	0.00%	97.75%	0.35%	0.43%	0.96%	2.14%	97.81%
BSNL	1.57%	0.00%	98.50%	0.65%	1.50%	1.00%	2.36%	96.19%
Idea	0.55%	0.00%	97.58%	0.18%	1.54%	1.58%	2.12%	96.56%
RCOM GSM	0.08%	0.00%	93.51%	0.16%	0.26%	0.18%	0.59%	99.25%
Vodafone	0.17%	0.00%	98.74%	0.01%	1.26%	0.64%	2.94%	98.88%

- Aircel has a parameter value of **11.13%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.
- RCOM GSM has a parameter value of **93.51%** and failed to meet the benchmark for Call Set-up Success Rate (Within Licensee own network).

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	0.77%	0.19%	97.77%	0.28%	1.78%	1.30%	12.42%	95.12%
Airtel	0.08%	0.00%	96.46%	0.33%	0.61%	0.83%	1.97%	97.72%
BSNL	1.64%	0.00%	97.08%	0.42%	1.42%	1.29%	2.23%	97.54%
Idea	0.47%	0.09%	98.09%	0.13%	1.38%	1.70%	2.39%	96.13%
RCOM GSM	0.06%	0.00%	97.37%	0.11%	0.19%	0.16%	0.69%	99.23%
Vodafone	0.18%	0.02%	99.05%	0.01%	0.76%	0.69%	2.87%	98.71%

- Aircel has a parameter value of **12.42%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.

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 License 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	0.94%	0.07%	96.47%	0.42%	0.14%	2.35%	21.22%	98.07%
Airtel	0.20%	0.11%	98.09%	0.10%	0.04%	0.76%	1.51%	98.88%
BSNL	1.74%	0.82%	95.90%	0.85%	1.23%	1.39%	2.27%	DNA
Idea	0.27%	1.05%	98.40%	0.58%	0.38%	1.12%	2.41%	98.20%
RCOM GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

- Aircel has a parameter value of **2.35%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 2%.

- Aircel has a parameter value of **21.22%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

6.13. 3G VOICE PMR: OCTOBER

OCTOBER'15								
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 License 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	0.95%	0.10%	95.86%	0.32%	0.09%	2.12%	18.27%	98.36%
Airtel	0.18%	0.00%	97.95%	0.24%	0.10%	0.82%	1.66%	98.93%
BSNL	1.74%	1.34%	95.56%	0.89%	1.15%	1.40%	1.75%	DNA
Idea	0.05%	0.07%	99.52%	0.46%	0.34%	0.67%	1.88%	99.41%
RCOM GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

- Aircel has a parameter value of **18.27%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.
- Aircel has a parameter value of **2.12%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 2%.

6.14. 3G VOICE PMR: NOVEMBER

NOVEMBER'15								
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 License 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	0.70%	0.05%	96.78%	0.53%	0.19%	2.37%	21.96%	97.93%
Airtel	0.23%	0.21%	98.43%	0.05%	0.02%	0.74%	1.42%	98.86%
BSNL	1.74%	1.02%	96.09%	0.80%	0.86%	1.08%	2.41%	DNA
Idea	0.38%	1.20%	97.25%	0.67%	0.42%	1.57%	3.12%	97.45%
RCOM GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

- Aircel has a parameter value of **21.96%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.
- Aircel has a parameter value of **2.37%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 2%.
- Idea has a parameter value of **3.12%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

6.15. 3G VOICE PMR: DECEMBER

DECEMBER'15								
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 License 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	1.18%	0.07%	96.76%	0.41%	0.14%	2.55%	23.44%	97.91%
Airtel	0.19%	0.13%	97.88%	0.02%	0.01%	0.73%	1.46%	98.86%
BSNL	1.75%	0.09%	96.06%	0.86%	1.69%	1.68%	2.64%	DNA
Idea	0.38%	1.88%	98.43%	0.61%	0.38%	1.12%	2.23%	97.75%
RCOM GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

- Aircel has a parameter value of **23.44%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

- Aircel has a parameter value of **2.55%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

6.16. 3G VOICE 3 DAYS LIVE DATA: CONSOLIDATED

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 License 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	0.94%	0.07%	96.46%	0.42%	0.14%	2.35%	21.22%	98.07%
Airtel	0.20%	0.11%	98.08%	0.10%	0.04%	0.76%	1.51%	98.89%
BSNL	1.75%	0.82%	95.90%	0.85%	1.23%	1.39%	1.66%	DNA
Idea	0.27%	1.05%	98.40%	0.58%	0.49%	1.36%	2.41%	98.21%
RCOM GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

- Aircel has a parameter value of **2.35%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 2%.
- Aircel has a parameter value of **21.22%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

6.17. 3G VOICE 3 DAYS LIVE DATA: OCTOBER

OCTOBER'15								
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	0.55%	0.37%	93.86%	0.29%	0.11%	2.48%	21.48%	98.02%
Airtel	0.65%	0.00%	99.37%	0.10%	0.00%	0.73%	1.37%	98.92%
BSNL	1.74%	0.00%	95.56%	0.89%	1.15%	1.40%	0.00%	DNA
Idea	0.04%	0.07%	99.52%	0.46%	0.34%	0.67%	1.88%	98.41%
RCOM GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

- Aircel has a parameter value of **21.48%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

- Aircel has a parameter value of **2.48%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 2%.

- Aircel has a parameter value of **93.86%** and failed to meet the benchmark for Call Set-up Success Rate (Within Licensee own network) as it is pre-defined at ≥ 95%.

6.18. 3G VOICE 3 DAYS LIVE DATA: NOVEMBER

NOVEMBER'15								
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 License 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	1.32%	0.19%	95.65%	0.29%	0.13%	2.59%	22.96%	97.79%
Airtel	0.63%	0.00%	98.74%	0.06%	0.02%	0.79%	1.07%	98.91%
BSNL	1.81%	0.27%	95.63%	0.78%	0.94%	0.85%	2.43%	DNA
Idea	0.29%	0.00%	98.53%	0.74%	0.32%	1.48%	2.58%	97.24%
RCOM GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

- Aircel has a parameter value of **22.96%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at % ≤3%.

- Aircel has a parameter value of **2.59%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at % ≤2%.

6.19. 3G VOICE 3 DAYS LIVE DATA: DECEMBER

DECEMBER'15								
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 License 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	0.26%	0.00%	96.97%	0.36%	0.15%	2.40%	22.02%	98.01%
Airtel	0.63%	0.00%	98.74%	0.06%	0.02%	0.79%	1.07%	98.91%
BSNL	1.71%	0.26%	97.01%	0.86%	1.55%	0.51%	2.64%	DNA
Idea	0.37%	0.00%	97.77%	0.58%	0.74%	1.10%	2.09%	97.09%
RCOM GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

- Aircel has a parameter value of **2.40%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at % ≤2%.

- Aircel has a parameter value of **22.02%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at % ≤2%.

7. CUSTOMER SERVICE DELIVERY

7.1. BILLING AND CUSTOMER CARE

Name of Service Provider	Metering and Billing credibility		Billing Complaints			Termination & Closures	Time taken for refund of deposits after closures: Benchmark	Customer Care	
	Postpaid Subscribers	Prepaid Subscribers	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	%age of 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%**	**equal to 100%**	**equal to 100%**	**equal to 100%**	**equal to 100%**	**≥ 95%**	**≥ 95%**
Aircel	0.00%	0.00%	100%	100%	100%	100%	100%	100.00%	100.00%
Airtel	0.02%	0.04%	100%	100%	100%	100%	100%	99.97%	97.23%
BSNL	0.03%	0.02%	100%	100%	100%	100%	100%	100.00%	88.08%
Idea	0.01%	0.09%	100%	100%	100%	100%	100%	96.09%	99.47%
RCOM GSM	0.09%	0.09%	100%	100%	100%	100%	100%	98.00%	94.00%
Vodafone	0.04%	0.19%	100%	100%	100%	100%	100%	100.00%	99.53%

- Vodafone has a parameter value of **0.19%** and failed to meet the benchmark for Metering and Billing Credibility (Prepaid) as it is pre-defined at **≤ 0.1%**
- BSNL has a parameter value of **88.08%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds as it is pre-defined at **≥** 95%.
- RCOM GSM has a parameter value of **94.00%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds as it is pre-defined at **≥** 95%.

Name of Service Provider	Customer Care & Grievances Redressal	
	% of Complaints addressed at call centre level	% of Complaints addressed by Appellate Authority
Benchmark		
Aircel	100%	NIL
Airtel	100%	100%
BSNL	100%	100%
Idea	100%	100%
RCOM GSM	100%	100%
Vodafone	100%	NIL

- Aircel & Vodafone do not have complaints addressed to appellate authority and has been defined "NIL".

7.2. LIVE CALLING DATA: CONSOLIDATED

Name of Service Provider	Metering and Billing (Service Request)				Response time to customer for Assistance	
	Total Calls Attempted	No. of Subscribers reached	Complaints/ Request attended to satisfaction	% of Complaints/ Request attended to satisfaction	Accessibility of call centre / Customer care	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark					≥ 95%	≥ 95%
Aircel	50	50	50	100.00%	100.00%	100.00%
Airtel	69	37	37	100.00	100.00%	100.00%
BSNL	163	79	60	75.95%	100.00%	100.00%
Idea	25	22	19	86.36%	100.00%	100.00%
RCOM GSM	242	90	90	100.00%	97.00%	96.00%
Vodafone	217	144	144	100.00%	100.00%	99.53%

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		Averaged	
TSP Name	>=95%	>=95%	>=95%	>=95%	>=95%	>=95%	>=95%	>=95%
Aircel	97.52%	96.97%	97.37%	96.60%	97.54%	97.52%	97.47%	97.03%
Airtel	100.00%	87.71%	100.00%	93.85%	100.00%	78.38%	100.00%	86.48%
BSNL	100.00%	67.20%	100.00%	72.07%	100.00%	56.90%	100.00%	65.39%
Idea	96.92%	67.89%	96.88%	97.11%	97.67%	60.79%	97.16%	75.26%
RCOM GSM	97.00%	97.00%	97.00%	100.00%	97.00%	99.00%	97.00%	99.00%
Vodafone	100.00%	99.62%	100.00%	99.67%	100.00%	99.41%	100.00%	99.57%

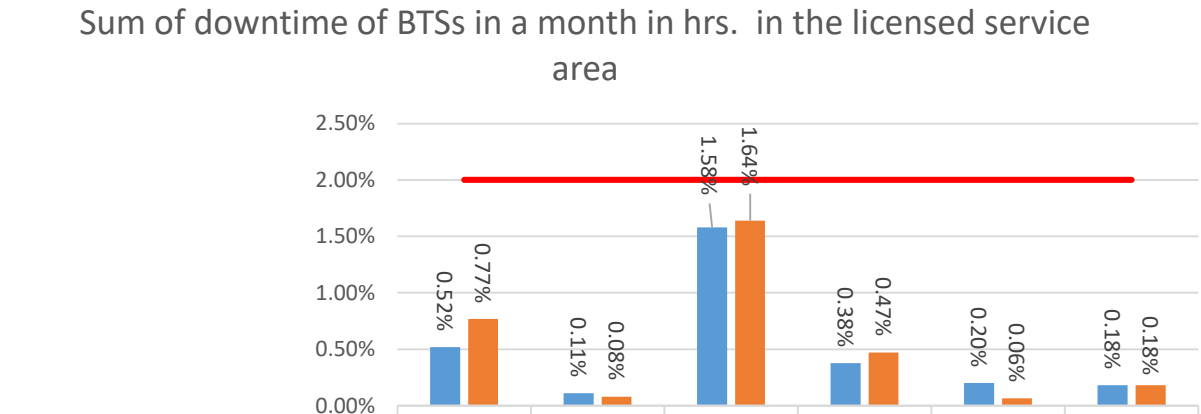
- Airtel has a parameter value of **86.48%** failed to meet the benchmark for % age calls answered by the operator within 90 seconds as it is pre-defined at ≥ 95%.
- BSNL has a parameter value of **65.39%** failed to meet the benchmark for % age calls answered by the operator within 90 seconds as it is pre-defined at ≥ 95%.
- Idea has a parameter value of **75.26%** failed to meet the benchmark for % age calls answered by the operator within 90 seconds as it is pre-defined at ≥ 95%.

8. NETWORK PARAMETER: DESCRIPTION AND DETAILED FINDINGS

8.1. 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) = $\frac{\text{Sum of downtime of BTSs in a month in hours i.e.total outage time of all BTSs in hours during a month}}{\text{24 x Number of days in a month x Number of BTSs in the network in licensed service area}} * 100$
- 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.

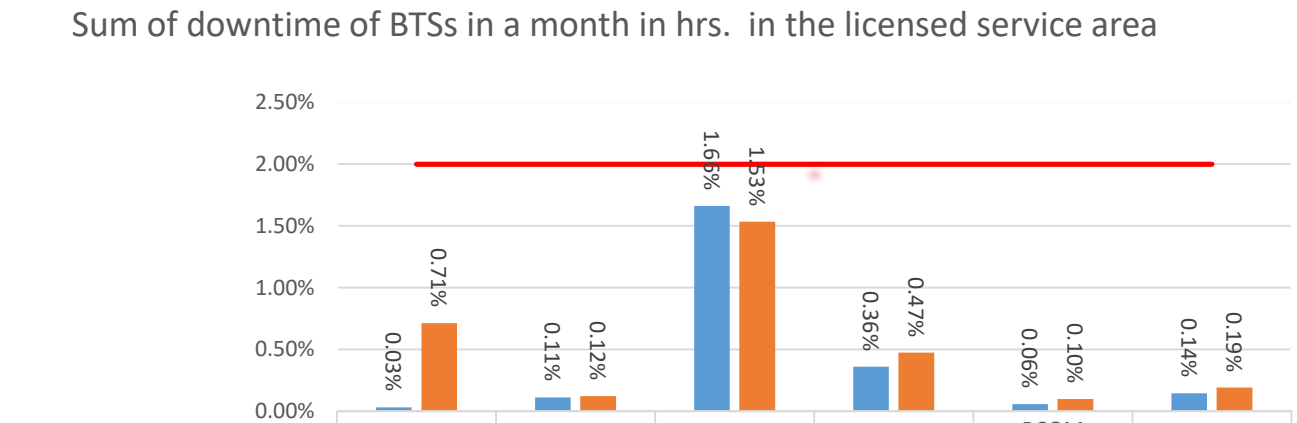
8.1.1. KEY FINDINGS: SUM OF DOWNTIME OF BTSS: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data 3 Month Consolidated	0.52%	0.11%	1.58%	0.38%	0.20%	0.18%
3 Day Live 3 Month Consolidated	0.77%	0.08%	1.64%	0.47%	0.06%	0.18%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

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

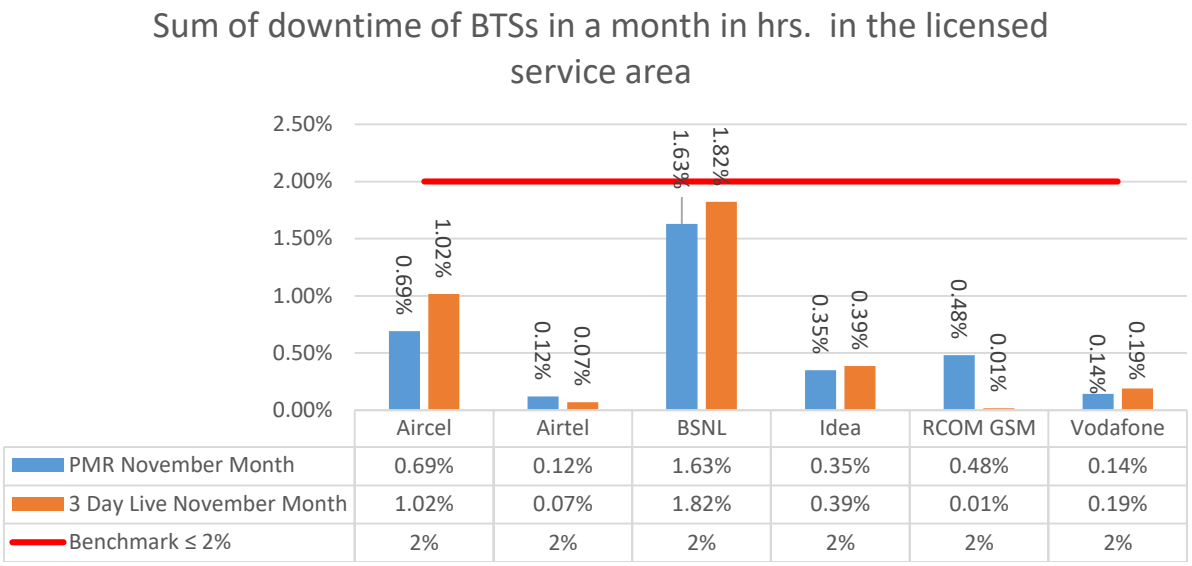
8.1.2. KEY FINDINGS: SUM OF DOWNTIME OF BTSS: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR October Month	0.03%	0.11%	1.66%	0.36%	0.06%	0.14%
3 Day Live October Month	0.71%	0.12%	1.53%	0.47%	0.10%	0.19%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

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

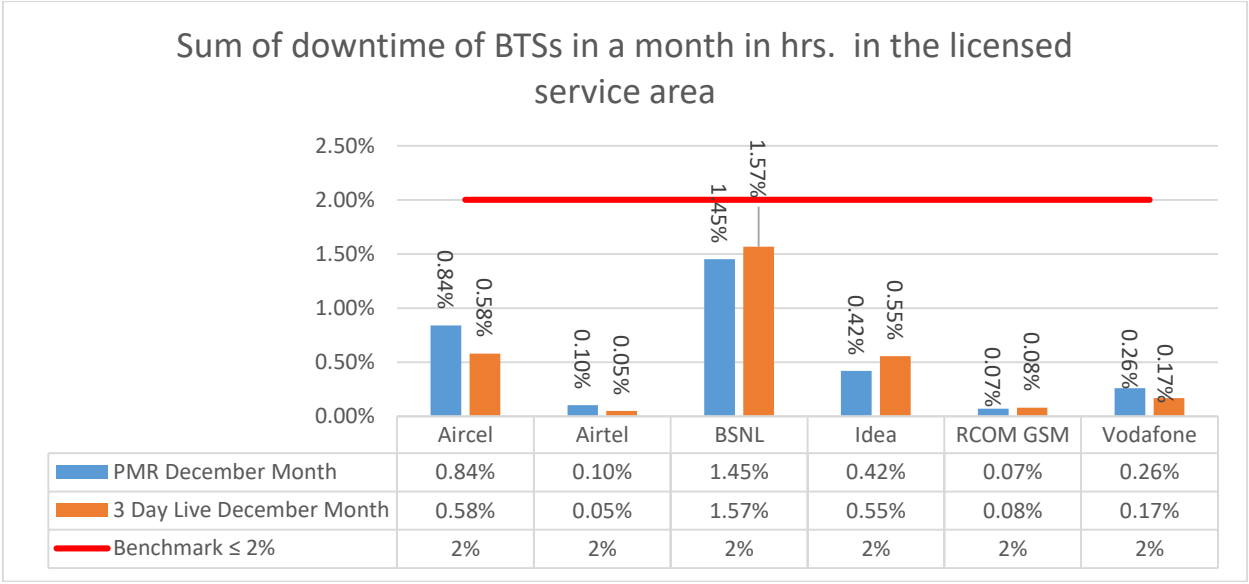
8.1.3. KEY FINDINGS: SUM OF DOWNTIME OF BTSS: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR November Month	0.69%	0.12%	1.63%	0.35%	0.48%	0.14%
3 Day Live November Month	1.02%	0.07%	1.82%	0.39%	0.01%	0.19%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

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

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



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR December Month	0.84%	0.10%	1.45%	0.42%	0.07%	0.26%
3 Day Live December Month	0.58%	0.05%	1.57%	0.55%	0.08%	0.17%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

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

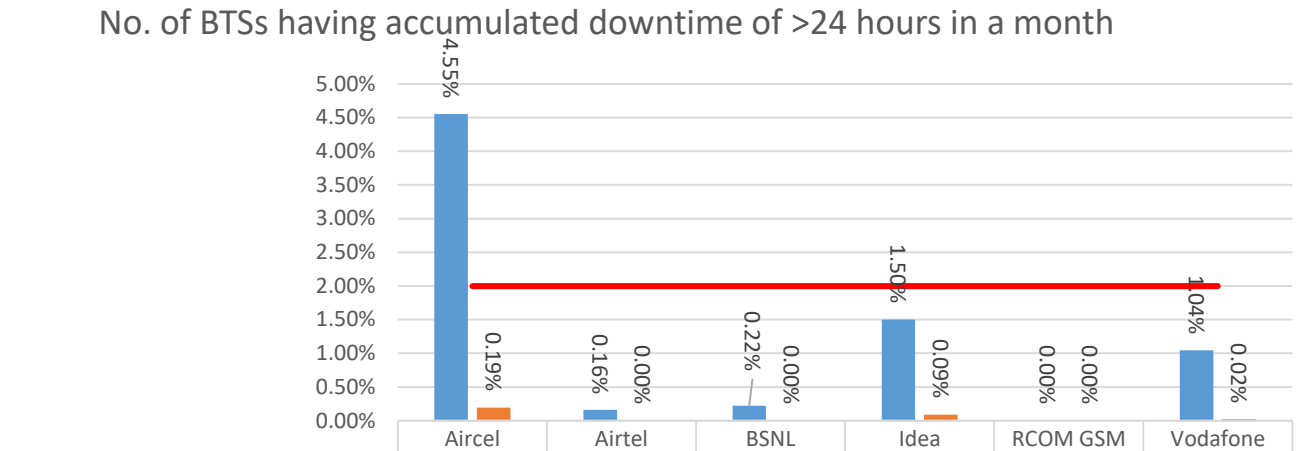
8.2. WORST AFFECTED BTS DUE TO DOWNTIME

- 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.

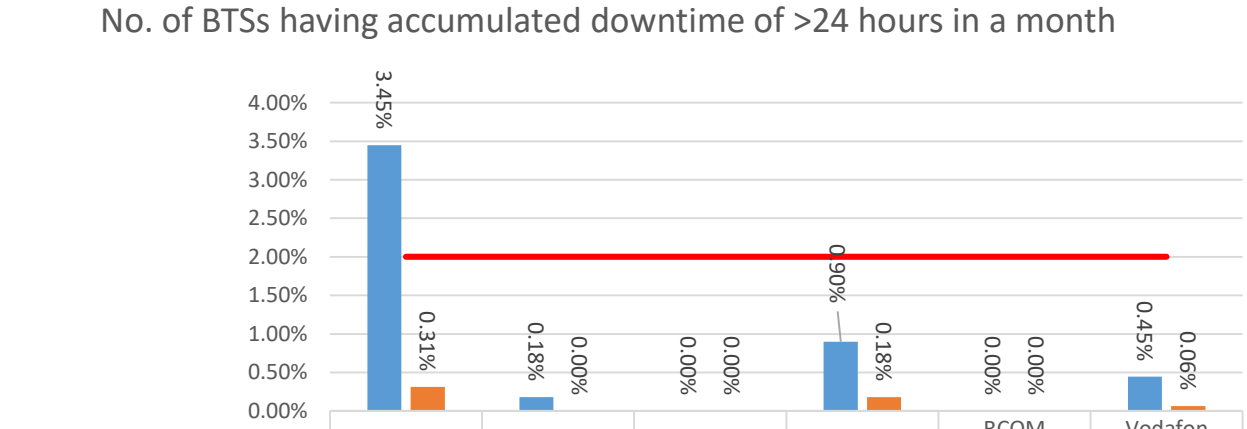
8.2.1. KEY FINDINGS: NO. OF BTSS HAVING ACCUMULATED DOWNTIME OF >24 HRS: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data 3 Month Consolidated	4.55%	0.16%	0.22%	1.50%	0.00%	1.04%
3 Day Live 3 Month Consolidated	0.19%	0.00%	0.00%	0.09%	0.00%	0.02%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

- Aircel has a parameter value of **4.55%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%

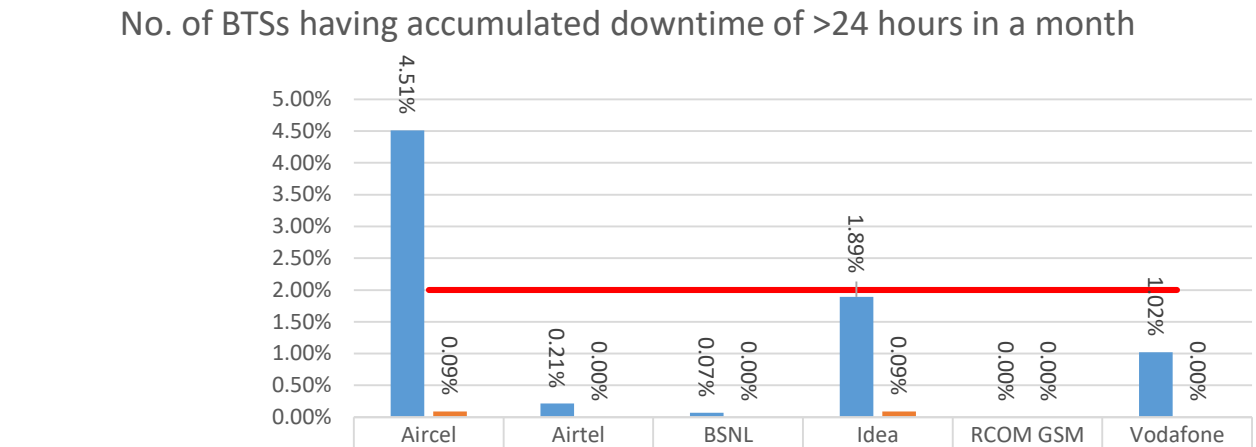
8.2.2. KEY FINDINGS: NO. OF BTSS HAVING ACCUMULATED DOWNTIME OF > 24 HRS: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR October Month	3.45%	0.18%	0.00%	0.90%	0.00%	0.45%
3 Day Live October Month	0.31%	0.00%	0.00%	0.18%	0.00%	0.06%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

- Aircel has a parameter value of **3.45%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%.

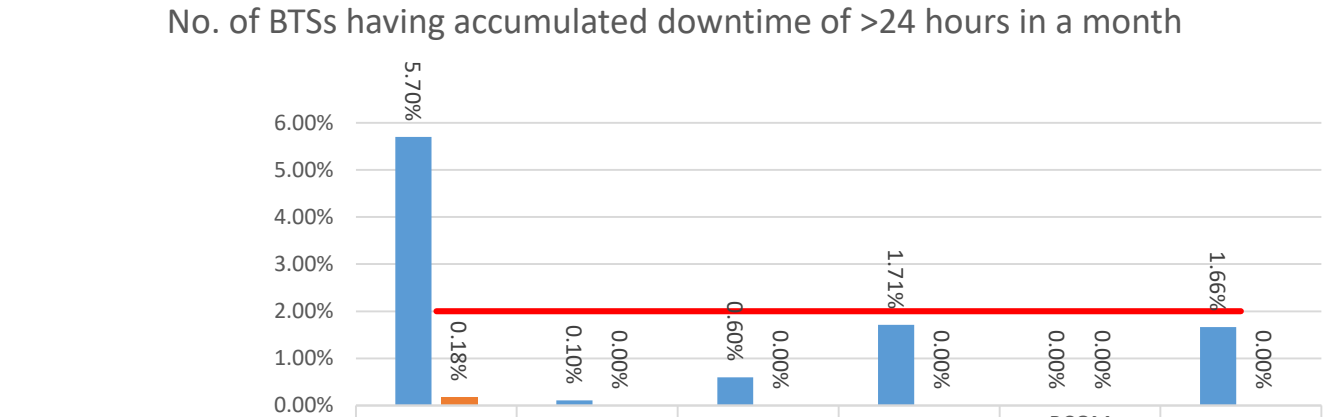
8.2.3. KEY FINDINGS: NO. OF BTSS HAVING ACCUMULATED DOWNTIME OF > 24 HRS: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR November Month	4.51%	0.21%	0.07%	1.89%	0.00%	1.02%
3 Day Live November Month	0.09%	0.00%	0.00%	0.09%	0.00%	0.00%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

- Aircel has a parameter value of **4.51%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%..

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



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR December Month	5.70%	0.10%	0.60%	1.71%	0.00%	1.66%
3 Day Live December Month	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

- Aircel has a parameter value of **5.70%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%.

8.3. CALL SETUP SUCCESS RATE

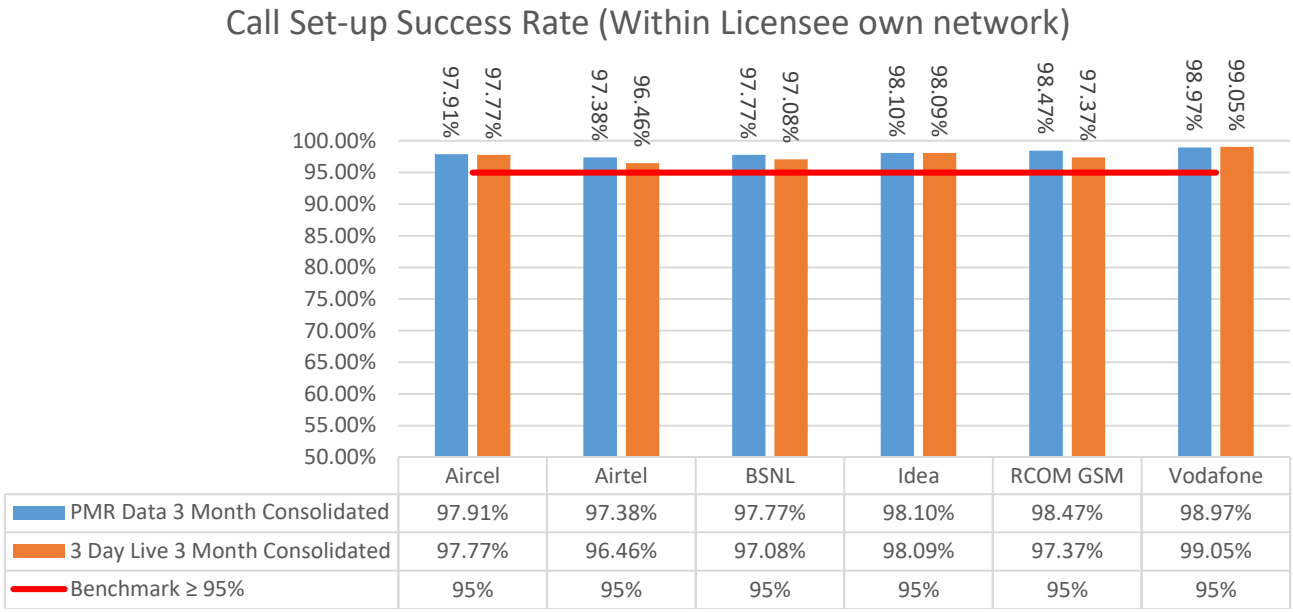
- Definition: The ratio of successful calls established to total calls is known as Call Set-Up Success Rate (CSSR).
- Computational Methodology: $\frac{Calls\ Established}{(Total\ call\ attempts)} * 100$

  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.

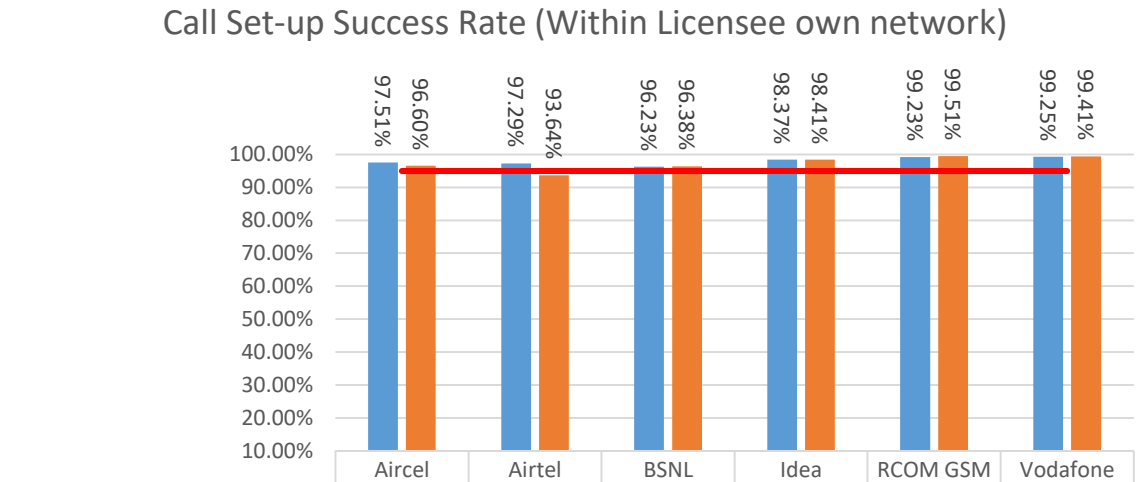
8.3.1. KEY FINDINGS: CALL SETUP SUCCESS RATE: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data 3 Month Consolidated	97.91%	97.38%	97.77%	98.10%	98.47%	98.97%
3 Day Live 3 Month Consolidated	97.77%	96.46%	97.08%	98.09%	97.37%	99.05%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

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

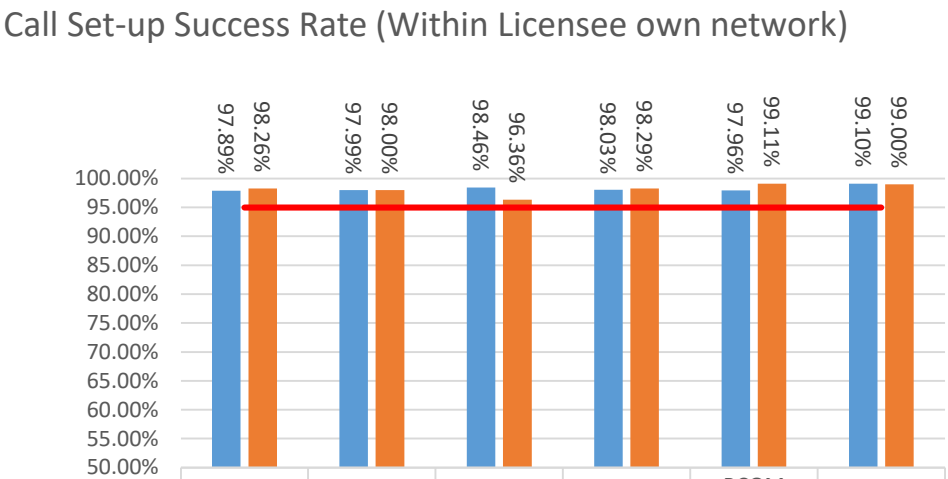
8.3.2. KEY FINDINGS: CALL SETUP SUCCESS RATE: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR October Month	97.51%	97.29%	96.23%	98.37%	99.23%	99.25%
3 Day Live October Month	96.60%	93.64%	96.38%	98.41%	99.51%	99.41%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

- Airtel has a parameter value of **93.64%** and failed to meet the benchmark for Call Set-up Success Rate (Within Licensee own network as it is pre-defined at ≥ 95%

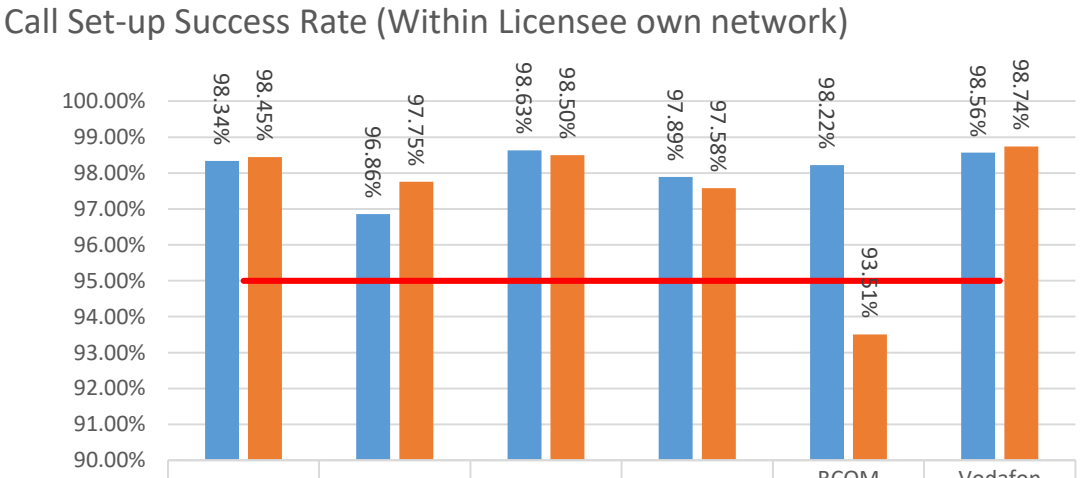
8.3.3. KEY FINDINGS: CALL SETUP SUCCESS RATE: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR November Month	97.89%	97.99%	98.46%	98.03%	97.96%	99.10%
3 Day Live November Month	98.26%	98.00%	96.36%	98.29%	99.11%	99.00%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

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

8.3.4. KEY FINDINGS: CALL SETUP SUCCESS RATE: DECEMBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR December Month	98.34%	96.86%	98.63%	97.89%	98.22%	98.56%
3 Day Live December Month	98.45%	97.75%	98.50%	97.58%	93.51%	98.74%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

- RCOM has a parameter value of **93.51%** and failed to meet the benchmark for Call Set-up Success Rate (Within Licensee own network) as it is pre-defined at ≥ 95%.

8.4. 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

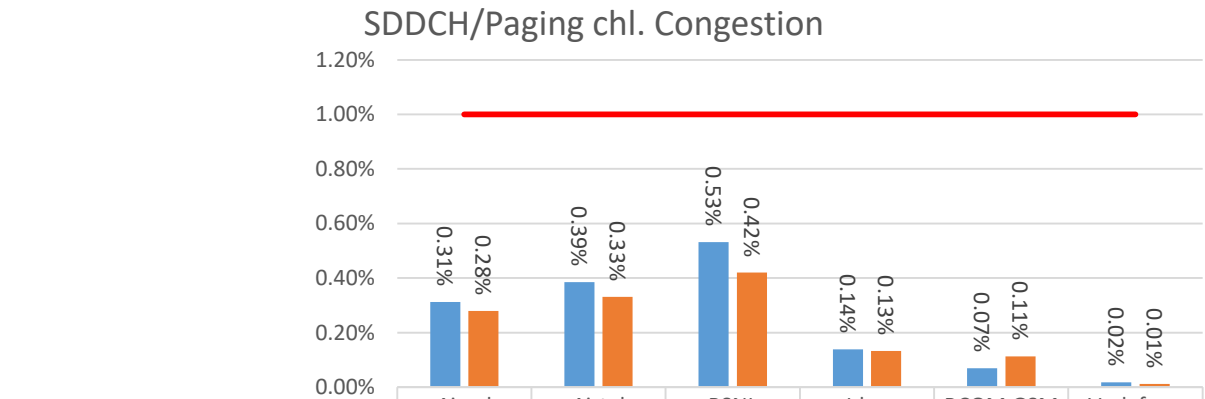
  POI Congestion% = $\frac{[(A1 \times C1) + (A2 \times C2) + \cdots\ldots + (An \times Cn)}{(A1 + A2 + \cdots + An}$

  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.

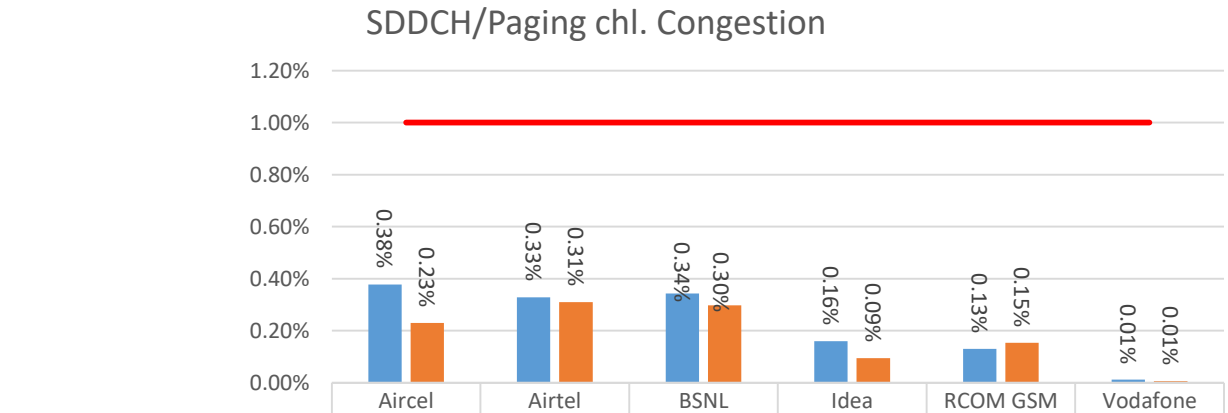
8.4.1. KEY FINDINGS: SDCC/ PAGING CHANNEL CONGESTION: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data 3 Month Consolidated	0.31%	0.39%	0.53%	0.14%	0.07%	0.02%
3 Day Live 3 Month Consolidated	0.28%	0.33%	0.42%	0.13%	0.11%	0.01%
Benchmark ≤ 1%	1%	1%	1%	1%	1%	1%

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

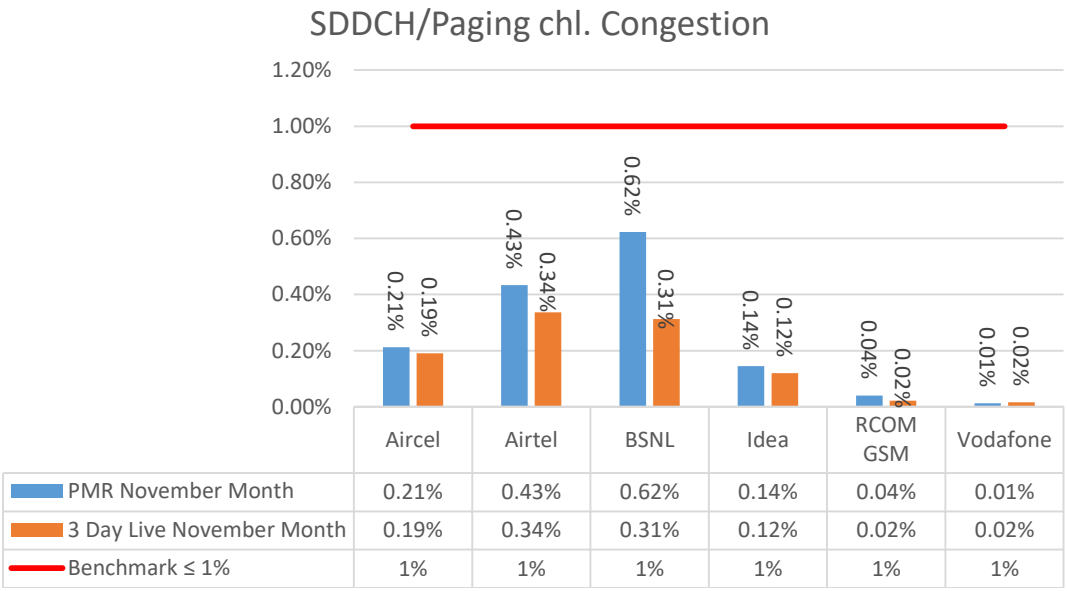
8.4.2. KEY FINDINGS: SDCC/ PAGING CHANNEL CONGESTION: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR October Month	0.38%	0.33%	0.34%	0.16%	0.13%	0.01%
3 Day Live October Month	0.23%	0.31%	0.30%	0.09%	0.15%	0.01%
Benchmark ≤ 1%	1%	1%	1%	1%	1%	1%

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

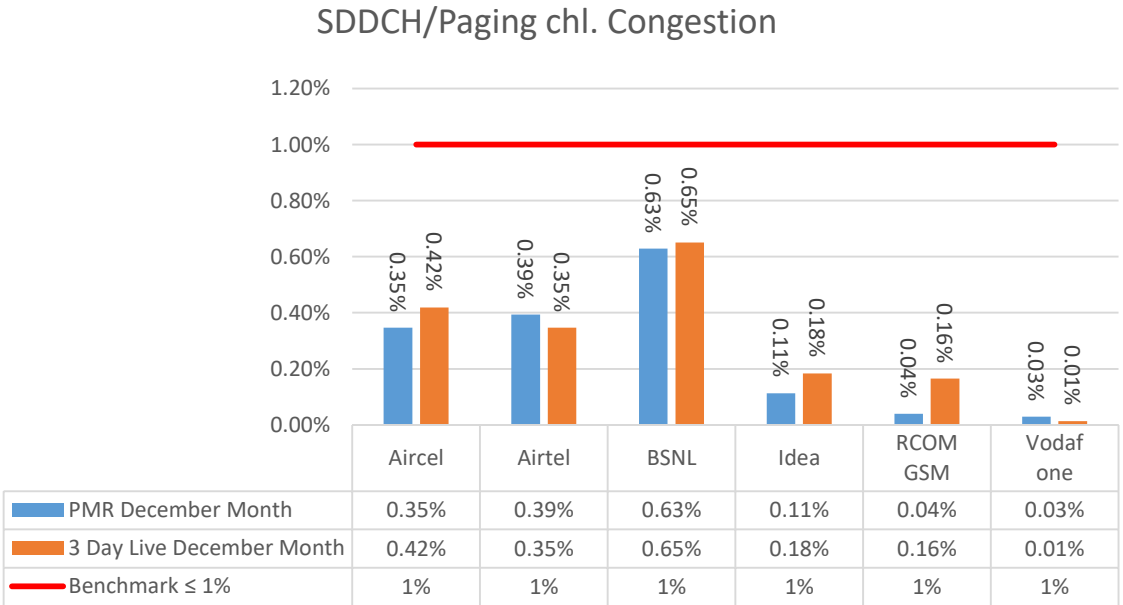
8.4.3. KEY FINDINGS: SDCC/ PAGING CHANNEL CONGESTION: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR November Month	0.21%	0.43%	0.62%	0.14%	0.04%	0.01%
3 Day Live November Month	0.19%	0.34%	0.31%	0.12%	0.02%	0.02%
Benchmark ≤ 1%	1%	1%	1%	1%	1%	1%

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

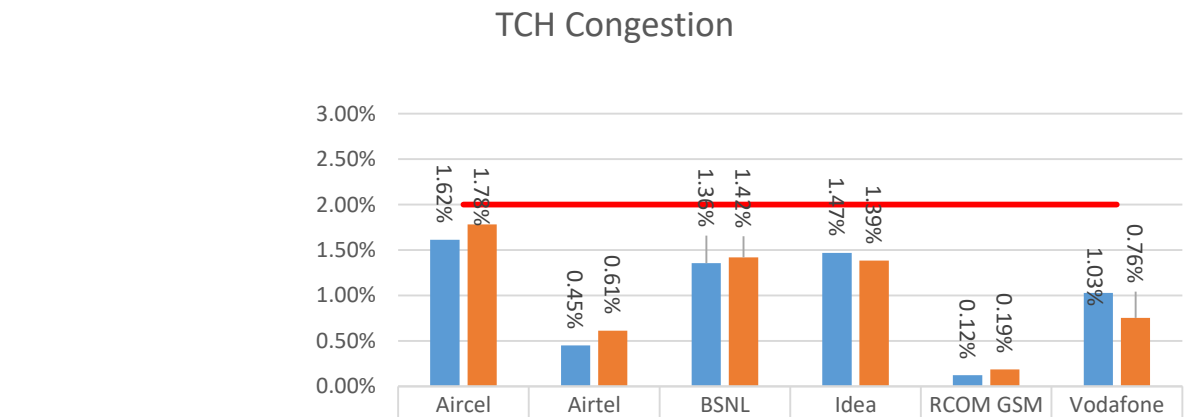
8.4.4. KEY FINDINGS: SDCC/ PAGING CHANNEL CONGESTION: DECEMBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR December Month	0.35%	0.39%	0.63%	0.11%	0.04%	0.03%
3 Day Live December Month	0.42%	0.35%	0.65%	0.18%	0.16%	0.01%
Benchmark ≤ 1%	1%	1%	1%	1%	1%	1%

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

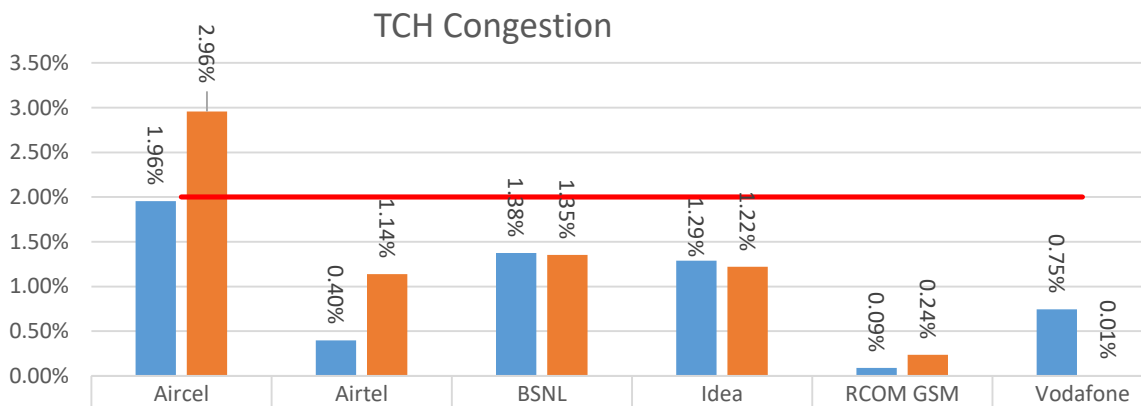
8.4.5. KEY FINDINGS: TCH CONGESTION: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data 3 Month Consolidated	1.62%	0.45%	1.36%	1.47%	0.12%	1.03%
3 Day Live 3 Month Consolidated	1.78%	0.61%	1.42%	1.39%	0.19%	0.76%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

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

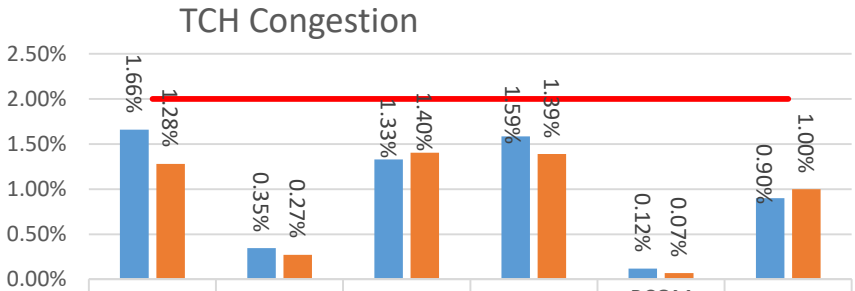
8.4.6. KEY FINDINGS: TCH CONGESTION: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR October Month	1.96%	0.40%	1.38%	1.29%	0.09%	0.75%
3 Day Live October Month	2.96%	1.14%	1.35%	1.22%	0.24%	0.01%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

- Aircel has a parameter value of **2.96%** and failed to meet the benchmark for TCH Congestion as it is pre-defined at ≤ 2%.

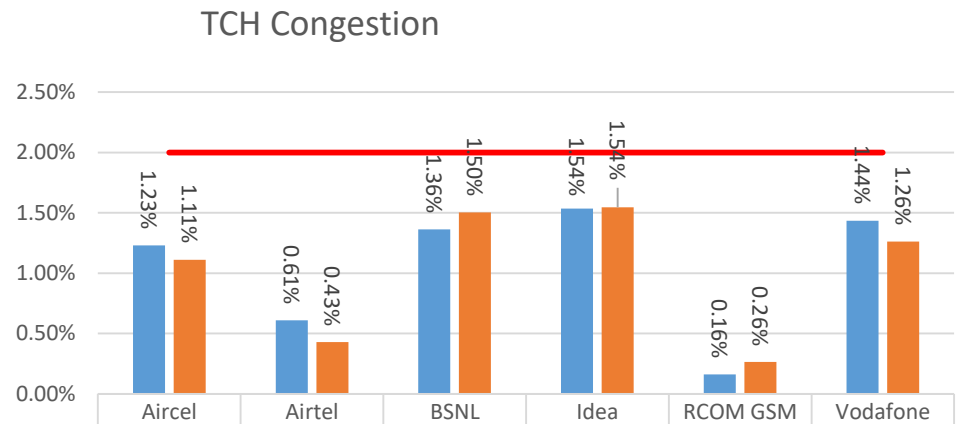
8.4.7. KEY FINDINGS: TCH CONGESTION: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR November Month	1.66%	0.35%	1.33%	1.59%	0.12%	0.90%
3 Day Live November Month	1.28%	0.27%	1.40%	1.39%	0.07%	1.00%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

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

8.4.8. KEY FINDINGS: TCH CONGESTION: DECEMBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR December Month	1.23%	0.61%	1.36%	1.54%	0.16%	1.44%
3 Day Live December Month	1.11%	0.43%	1.50%	1.54%	0.26%	1.26%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

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

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8.5. CALL DROP RATE

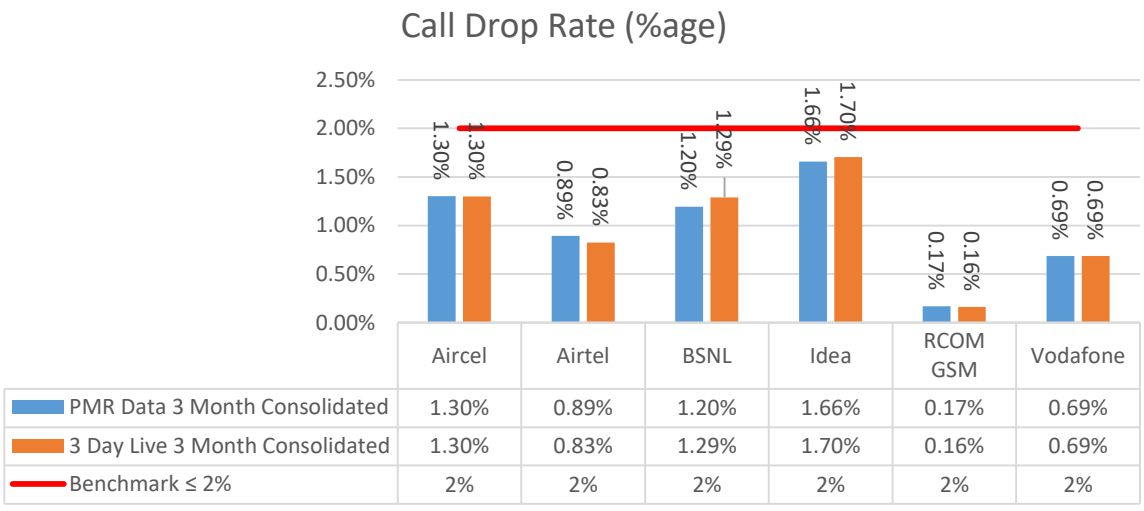
- Definition - The dropped call rate is the ratio of successfully originated calls that were found to drop to the total number of successfully originated calls that were correctly released.
  - Total calls dropped = All calls ceasing unnaturally i.e. due to handover or due to radio loss
  - Total calls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

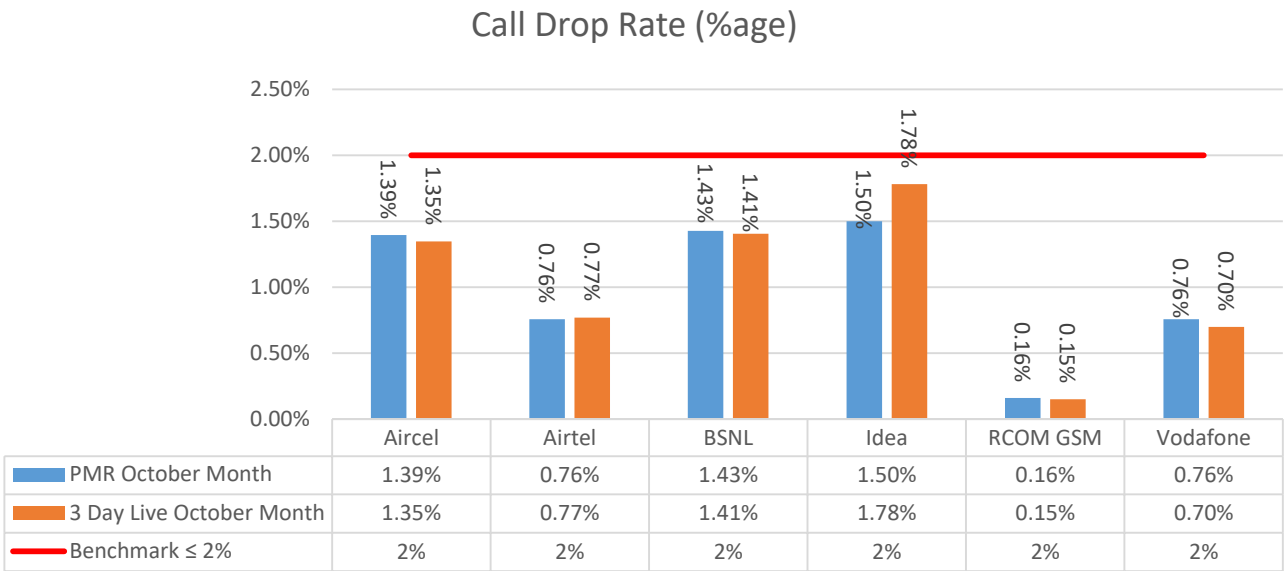
8.5.1. KEY FINDINGS: CALL DROP RATE: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data 3 Month Consolidated	1.30%	0.89%	1.20%	1.66%	0.17%	0.69%
3 Day Live 3 Month Consolidated	1.30%	0.83%	1.29%	1.70%	0.16%	0.69%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

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

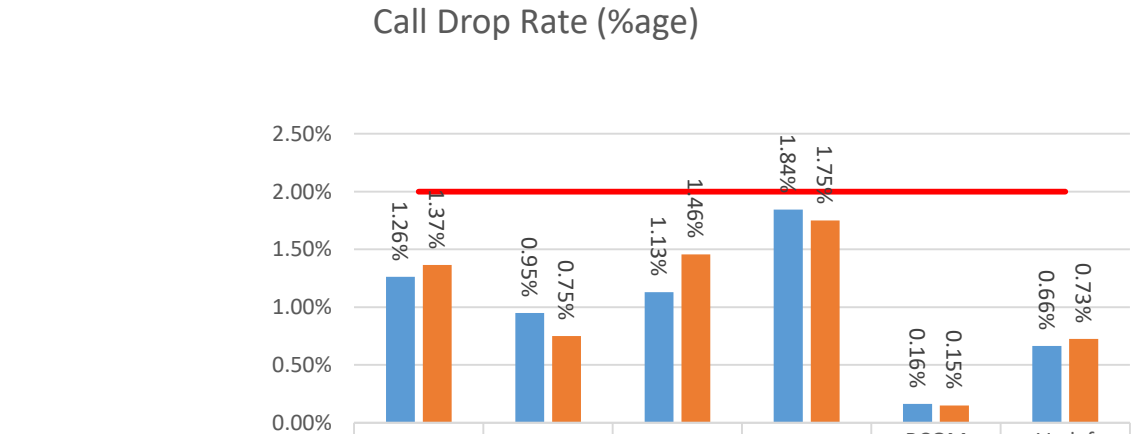
8.5.2. KEY FINDINGS: CALL DROP RATE: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR October Month	1.39%	0.76%	1.43%	1.50%	0.16%	0.76%
3 Day Live October Month	1.35%	0.77%	1.41%	1.78%	0.15%	0.70%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

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

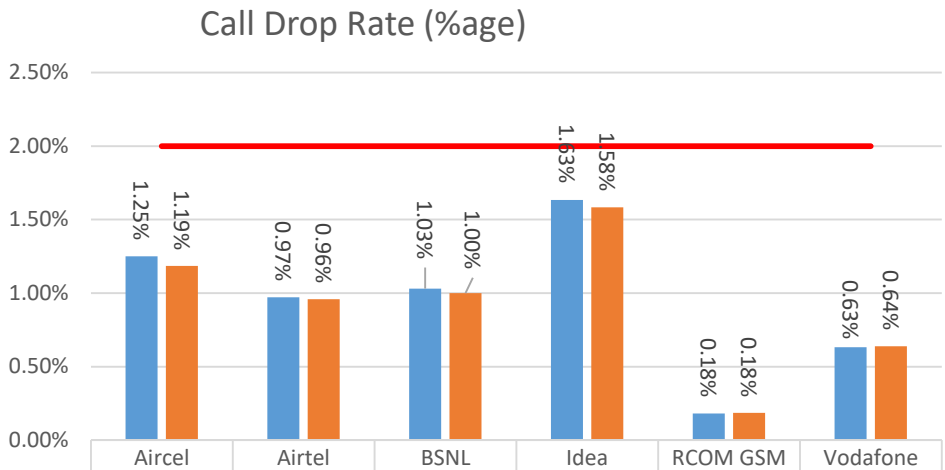
8.5.3. KEY FINDINGS: CALL DROP RATE: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR November Month	1.26%	0.95%	1.13%	1.84%	0.16%	0.66%
3 Day Live November Month	1.37%	0.75%	1.46%	1.75%	0.15%	0.73%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

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

8.5.4. KEY FINDINGS: CALL DROP RATE: DECEMBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR December Month	1.25%	0.97%	1.03%	1.63%	0.18%	0.63%
3 Day Live December Month	1.19%	0.96%	1.00%	1.58%	0.18%	0.64%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

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

8.6. 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.

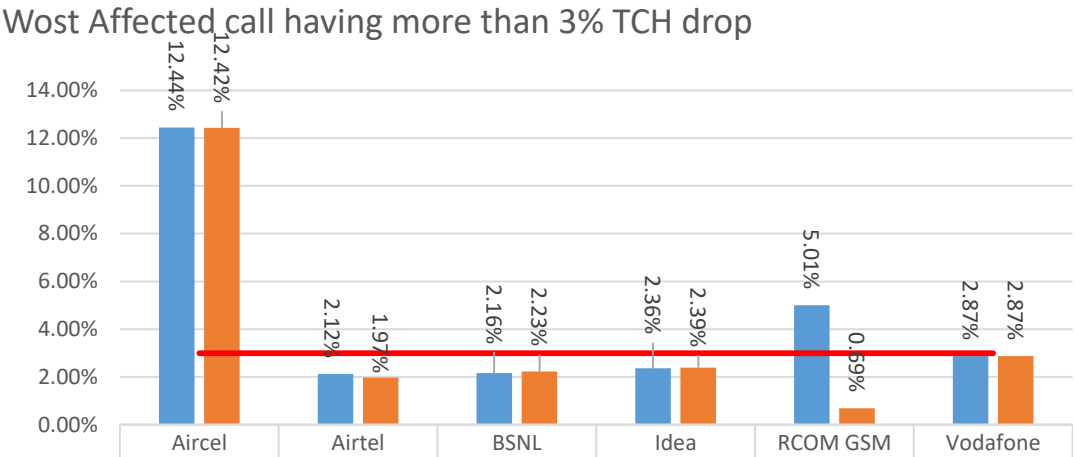
- Computational Methodology: $\frac{\textbf{Total number of cells having more than 3\% TCH drop during CBBH}}{\textbf{Total number of cells in the network}} * 100$

- 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.

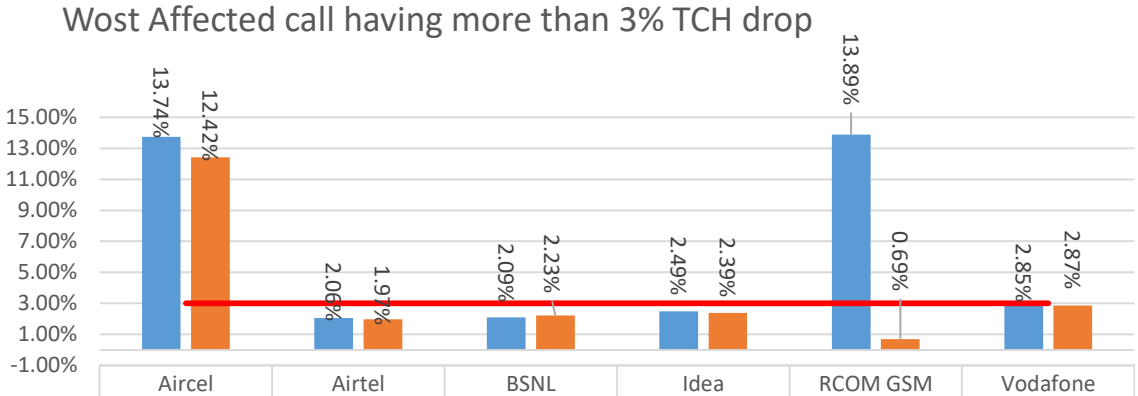
8.6.1. KEY FINDINGS: CELLS HAVING MORE THAN 3% TCH DROP: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data 3 Month Consolidated	12.44%	2.12%	2.16%	2.36%	5.01%	2.87%
3 Day Live 3 Month Consolidated	12.42%	1.97%	2.23%	2.39%	0.69%	2.87%
Benchmark ≤ 3%	3%	3%	3%	3%	3%	3%

- Aircel has a parameter value of **12.42%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.
- Aircel has a parameter value of **12.44%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it is pre-defined at ≤ 3%
- RCOM GSM has a parameter value of **5.01%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it is pre-defined at ≤ 3%

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



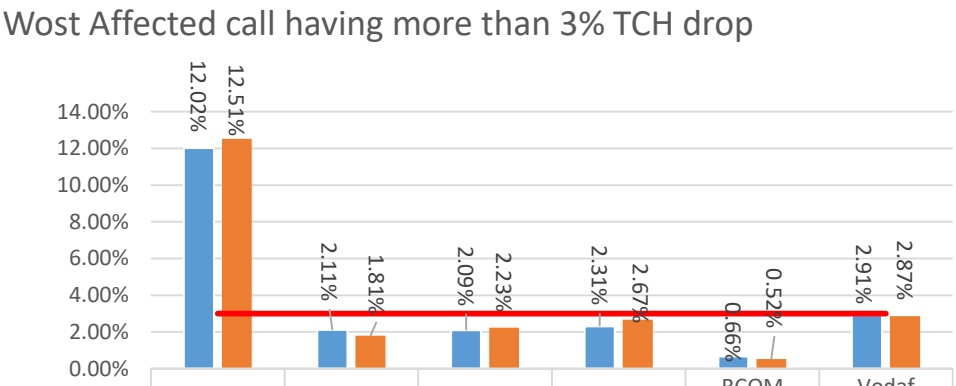
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR October Month	13.74%	2.06%	2.09%	2.49%	13.89%	2.85%
3 Day Live October Month	12.42%	1.97%	2.23%	2.39%	0.69%	2.87%
Benchmark ≤ 3%	3%	3%	3%	3%	3%	3%

- Aircel has a parameter value of **12.42%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.

- Aircel has a parameter value of **13.74%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.

- RCOM GSM has a parameter value of **13.89%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.

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

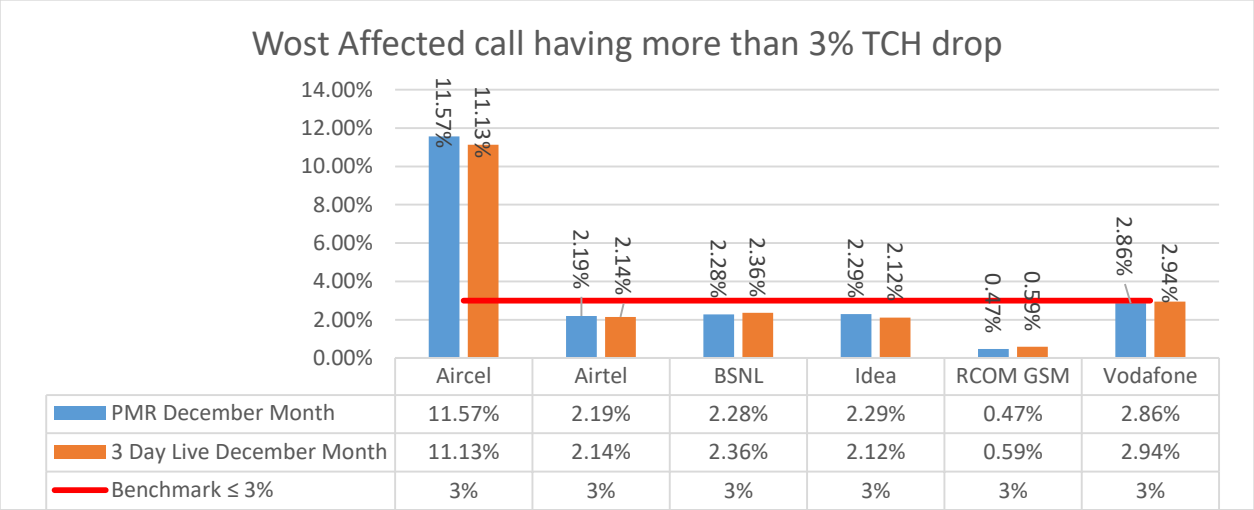


	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR November Month	12.02%	2.11%	2.09%	2.31%	0.66%	2.91%
3 Day Live November Month	12.51%	1.81%	2.23%	2.67%	0.52%	2.87%
Benchmark ≤ 3%	3%	3%	3%	3%	3%	3%

- Aircel has a parameter value of **12.02%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it is pre-defined at ≤ 3%.

- Aircel has a parameter value of **12.51%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.

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



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR December Month	11.57%	2.19%	2.28%	2.29%	0.47%	2.86%
3 Day Live December Month	11.13%	2.14%	2.36%	2.12%	0.59%	2.94%
Benchmark ≤ 3%	3%	3%	3%	3%	3%	3%

- Aircel has a parameter value of **11.57%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it is pre-defined at ≤ 3%

- Aircel has a parameter value of **11.13%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.

8.7. 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 %

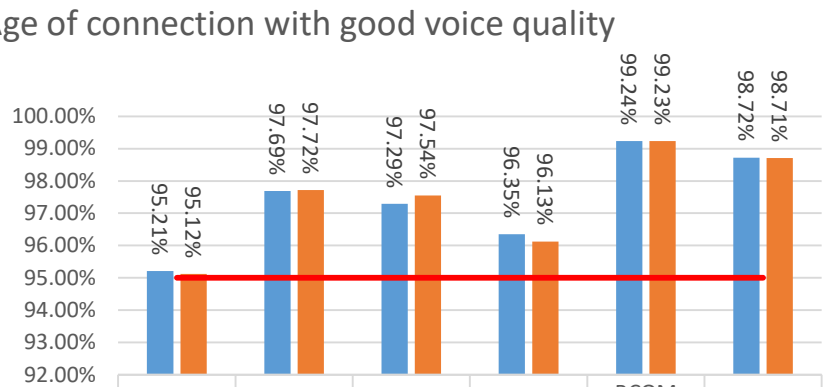
- Computational Methodology:

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

- 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.

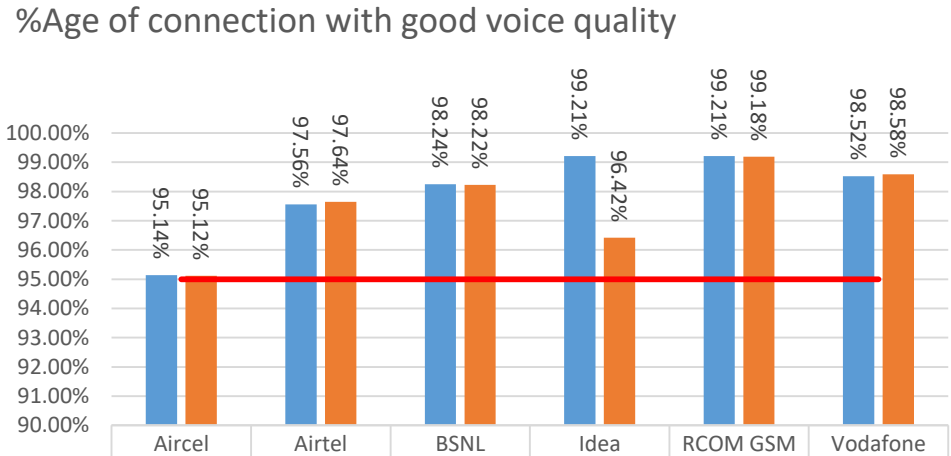
8.7.1. KEY FINDINGS: VOICE QUALITY: CONSOLIDATED



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data 3 Month Consolidated	95.21%	97.69%	97.29%	96.35%	99.24%	98.72%
3 Day Live 3 Month Consolidated	95.12%	97.72%	97.54%	96.13%	99.23%	98.71%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

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

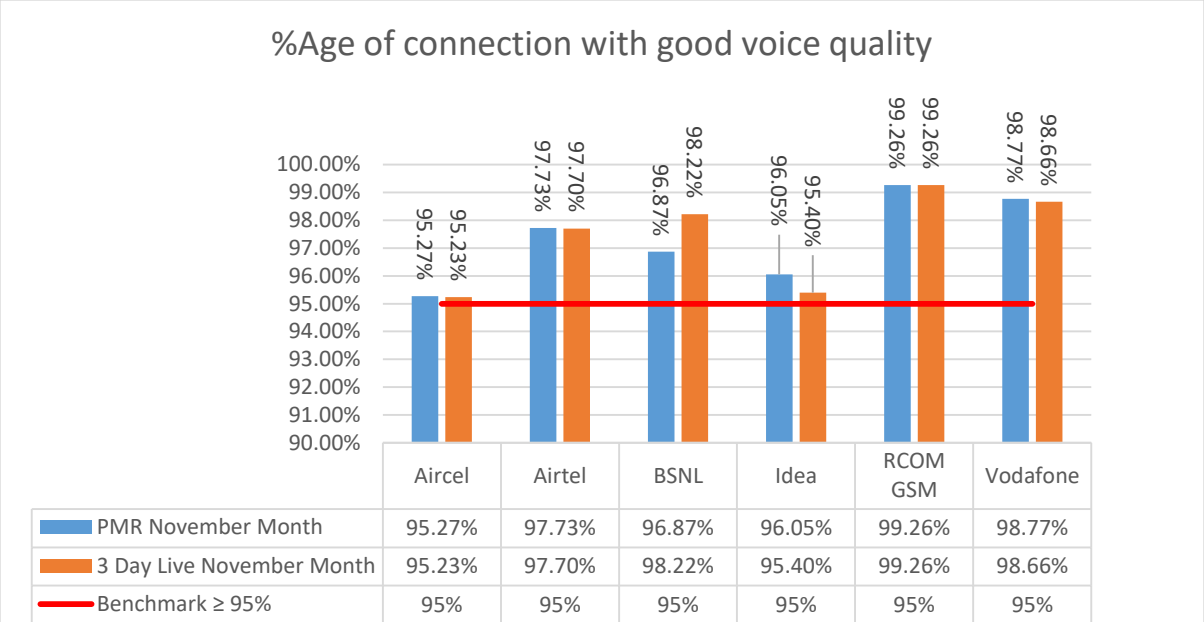
8.7.2. KEY FINDINGS: VOICE QUALITY: OCTOBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR October Month	95.14%	97.56%	98.24%	99.21%	99.21%	98.52%
3 Day Live October Month	95.12%	97.64%	98.22%	96.42%	99.18%	98.58%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

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

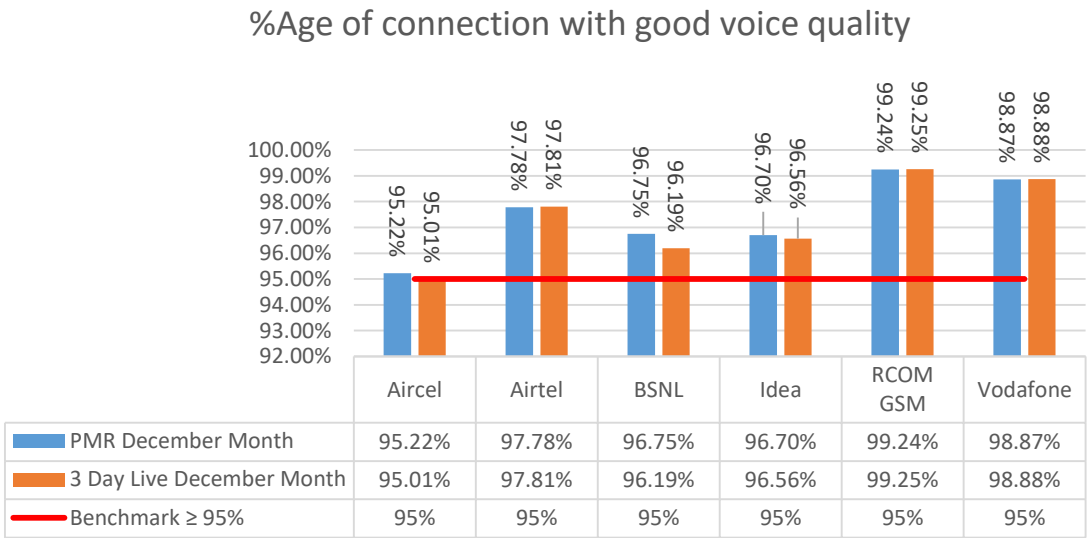
8.7.3. KEY FINDINGS: VOICE QUALITY: NOVEMBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR November Month	95.27%	97.73%	96.87%	96.05%	99.26%	98.77%
3 Day Live November Month	95.23%	97.70%	98.22%	95.40%	99.26%	98.66%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

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

8.7.4. KEY FINDINGS: VOICE QUALITY: DECEMBER



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR December Month	95.22%	97.78%	96.75%	96.70%	99.24%	98.87%
3 Day Live December Month	95.01%	97.81%	96.19%	96.56%	99.25%	98.88%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

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

8.8. POI CONGESTION: CONSOLIDATED

POI Congestion: PMR Consolidated							
POI Congestion	Benchmark	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
		2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		2025083	848640	899110	1990	483038	1262108
Total traffic served on all POIs (Erlang)		33955	30488	17562	4134	6898	22657
Total No. of circuits on all individual POIs		69535	54070	29034	10879	10250	51141
Total number of working POI Service Area wise		47	34	22	12	9437	49
Capacity of all POIs		66824	53529	20324	10461	20	49231
No. of all POI's having >=0.5% POI congestion	≤ 0.5%	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL

POI Congestion: 3 Day Live Consolidated							
POI Congestion	Benchmark	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
		2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		1915603	774654	947647	1819	452315	591706
Total traffic served on all POIs (Erlang)		34124	30068	14994	3793	6349	16437
Total No. of circuits on all individual POIs		69265	53901	29080	10910	10410	41665
Total number of working POI Service Area wise		46	35	22	12	3181	50
Capacity of all POIs		66574	89268	20356	10492	6357	40557
No. of all POI's having >=0.5% POI congestion	≤ 0.5%	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL

8.8.1. POI Congestion: October

POI Congestion: PMR October							
POI Congestion	Benchmark	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
		2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		2076351	1316209	948902	2669	486234	2076351
Total traffic served on all POIs (Erlang)		35932	31434	24613	5421	7026	35931
Total No. of circuits on all individual POIs		70086	54473	29132	10703	10369	70086
Total number of working POI Service Area wise		48	34	22	12	9540	48
Capacity of all POIs		67336	53929	20392	10285	20	66574
No. of all POI's having >=0.5% POI congestion	≤ 0.5%	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL

POI Congestion : 3 Day Live October							
POI Congestion	Benchmark	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
		2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		1956690	1107352	1001628	2321	481374	40570
Total traffic served on all POIs (Erlang)		34595	31253	15168	4668	6204	16954
Total No. of circuits on all individual POIs		69265	54402	29132	10703	10390	41679
Total number of working POI Service Area wise		46	34	22	12	20	50
Capacity of all POIs		66574	161575	20392	10285	9482	40570
No. of all POI's having >=0.5% POI congestion	≤ 0.5%	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL

8.8.2. POI Congestion: November

POI Congestion: PMR November							
POI Congestion	Benchmark	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
		2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		1853400	1193076	898298	1759	495649	865898
Total traffic served on all POIs (Erlang)		33324	30032	14320	3698	6964	16367
Total No. of circuits on all individual POIs		69265	53999	28993	10921	10390	41658
Total number of working POI Service Area wise		46	34	22	12	9523	50
Capacity of all POIs		66574	53459	20295	10502	20	40549
No. of all POI's having >=0.5% POI congestion	≤ 0.5%	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL

POI Congestion: 3 Day Live November							
POI Congestion	Benchmark	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
		2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		1892964	1182712	924873	1671	462352	823591
Total traffic served on all POIs (Erlang)		33953	29478	14796	3558	6313	16243
Total No. of circuits on all individual POIs		69265	53143	29132	11014	10390	41638
Total number of working POI Service Area wise		46	36	22	12	9502	50
Capacity of all POIs		66574	52612	20392	10595	20	40531
No. of all POI's having >=0.5% POI congestion	≤ 0.5%	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL

8.8.3. POI Congestion: December

POI Congestion: PMR December							
POI Congestion	Benchmark	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
		2G	2G	2G	2G	2G	2G
Total No. of call attempts on POI		2145497	36635	850130	1541	467231	844074
Total traffic served on all POIs (Erlang)		32608	29997	13753	3282	6703	15673
Total No. of circuits on all individual POIs		69254	53737	28977	11014	9990	41679
Total number of working POI Service Area wise		46	34	22	12	9249	50

Capacity of all POIs		66563	53200	20284	10595	20	40570
No. of all POI's having >=0.5% POI congestion	≤ 0.5%	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL

POI Congestion: 3 Day Live December							
POI Congestion	**Benchmark**	**Aircel**	**Airtel**	**BSNL**	**Idea**	**RCOM GSM**	**Vodafone**
		2G	**3G/2G**	**2G**	**2G**	**2G**	**2G**
Total No. of call attempts on POI		1897154	33897	916440	1466	413220	910957
Total traffic served on all POIs (Erlang)		33824	29474	15018	3154	6532	16113
Total No. of circuits on all individual POIs		69265	54158	28977	11014	10449	41679
Total number of working POI Service Area wise		46	34	22	12	20	50
Capacity of all POIs		66574	53617	20284	10595	9569	40570
No. of all POI's having >=0.5% POI congestion	≤ 0.5%	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL

9. L1 CALLING DATA

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

- Jammu 2nd Dec 2015 to 4th Dec 2015

9.1. Aircel

SR. NO.	EMERGENCY NUMBER	JAMMU	Kathua	Samba	Akhnoor
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	☒	☒	☒	☒

9.2. Airtel

SR. NO.	EMERGENCY NUMBER	JAMMU	RS PURA	KATHUA	SAMBA	AKHNOOR
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	✓	✓	✓	✓	✓

9.3. RCOM GSM

SR. NO.	EMERGENCY NUMBER	JAMMU	Akhnoor	KATHUA	SAMBA
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	✓	✓	✓	✓

9.4. Vodafone

SR. NO.	EMERGENCY NUMBER	JAMMU	KATHUA	AKHNOOR	SAMBA
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	✓	✓	✓	✓

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.

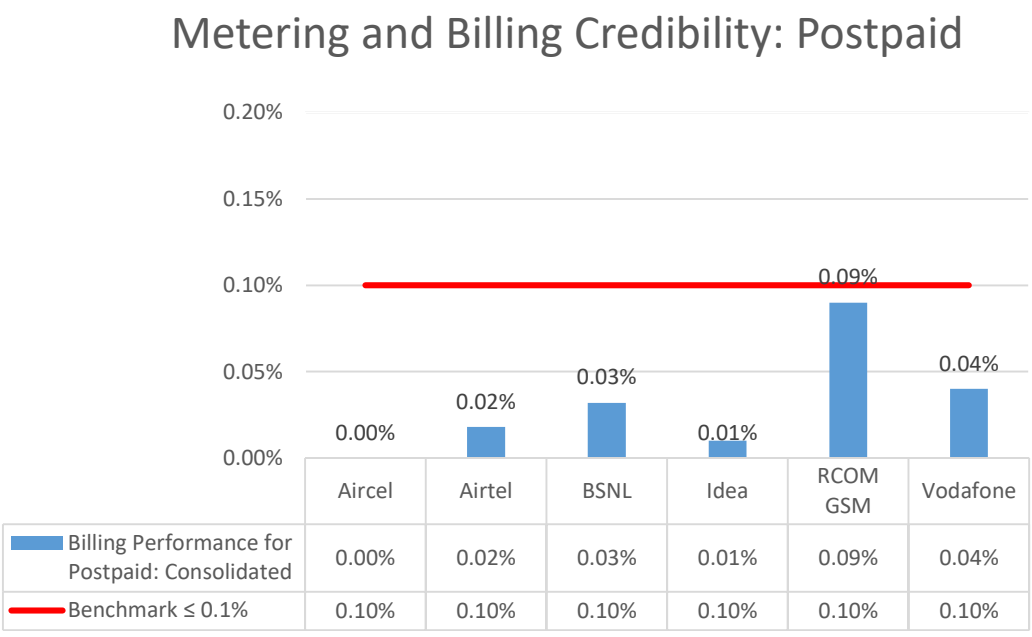
1. Payments made and not credited to the subscriber account
2. Payment made on time but late payment charge levied wrongly
3. Wrong roaming charges
4. Double charges
5. Charging for toll free services
6. Local calls charged/billed as STD/ISD or vice versa
7. Calls or messages made disputed
8. Validity 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:

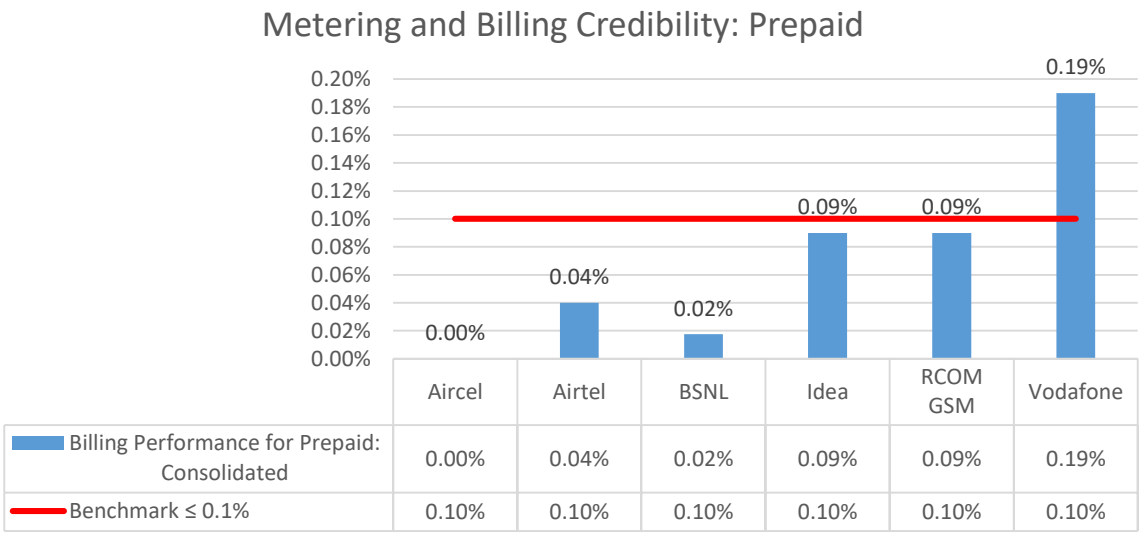
- Audit of billing complaint details for the complaints received during the quarter and used for arriving at the benchmark reported to TRAI would be conducted
- For Post-paid, the total billing complaints would be audited by averaging over billing cycles in a quarter.
- For Prepaid, the data of total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

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



- 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 GSM	Vodafone
Billing Performance for Prepaid: Consolidated	0.00%	0.04%	0.02%	0.09%	0.09%	0.19%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

- Vodafone has a parameter value of **0.19%** and failed to meet the benchmark for Metering and Billing Credibility (Prepaid) as it is pre-defined at **≤** 0.10%.

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 =

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

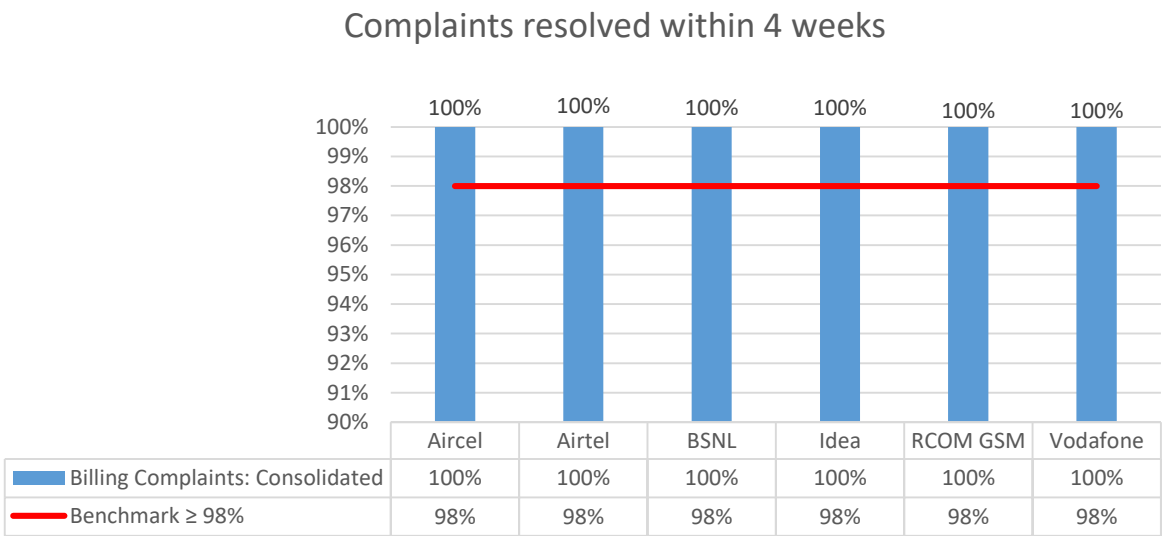
Resolution of billing complaints within 6 weeks:

%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.

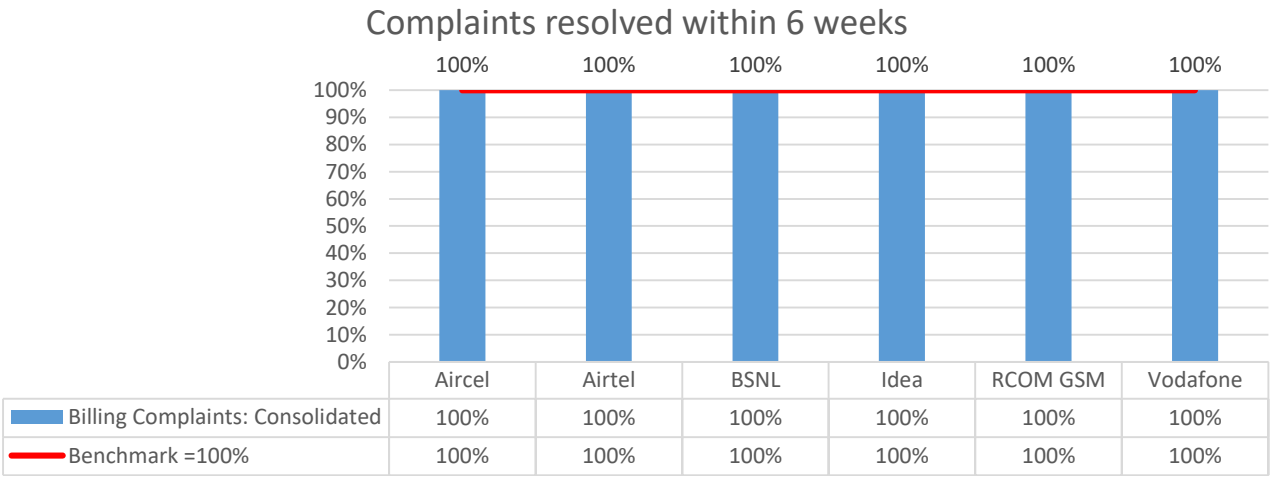
10.2.1. KEY FINDINGS: BILLING COMPLAINTS RESOLUTION WITHIN 4 WEEKS



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

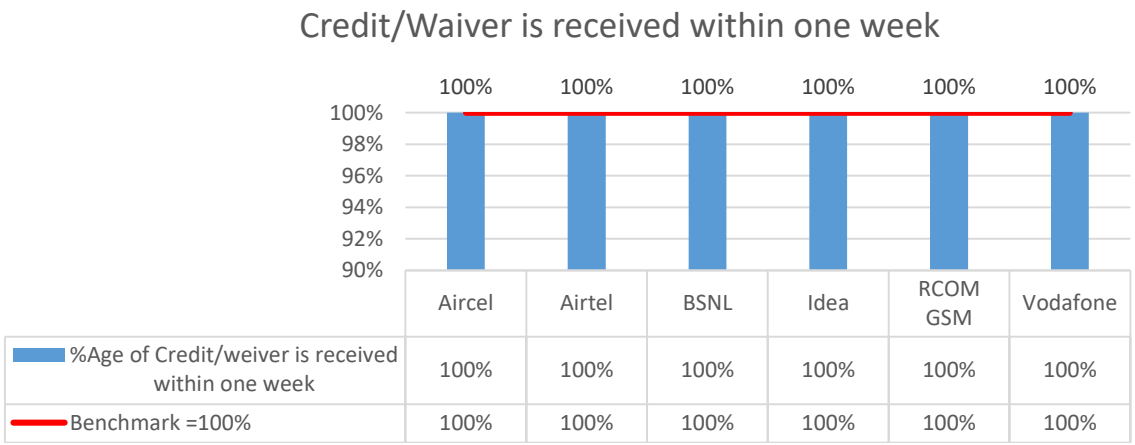
- Computational Methodology:

  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

10.3.1. Key Findings



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

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

10.4. Call Centre Performance: IVR

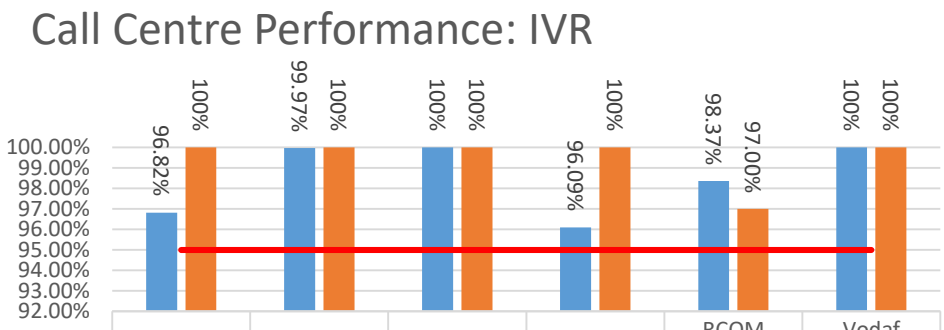
- Computational Methodology:

  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

10.4.1. KEY FINDINGS



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
Percentage of calls connected and answered : Consolidated	96.82%	99.97%	100%	96.09%	98.37%	100%
Percentage of calls connected and answered : Live Calling	100%	100%	100%	100%	97.00%	100%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

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

10.5. CALL CENTER PERFORMANCE: VOICE TO VOICE

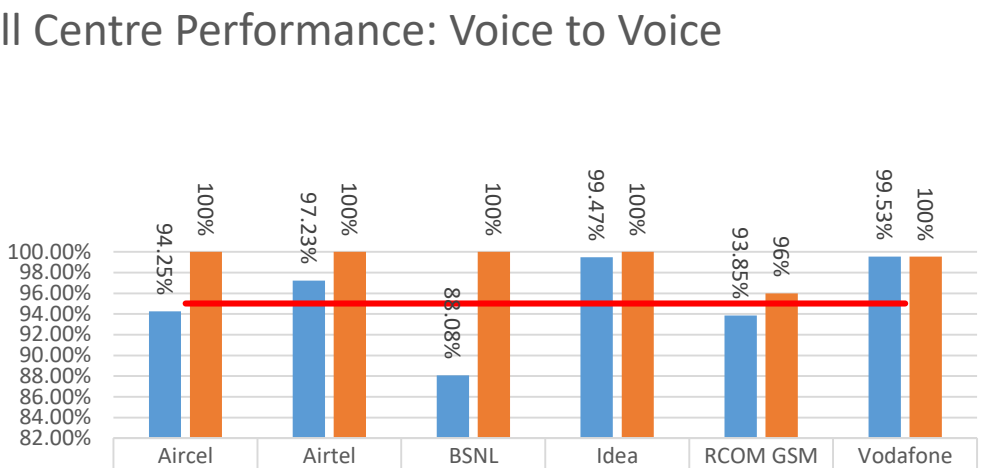
- Computational Methodology:

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

- 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.

10.5.1. KEY FINDINGS



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
Percentage of calls connected and answered : 3 Month Data	94.25%	97.23%	88.08%	99.47%	93.85%	99.53%
Percentage of calls connected and answered : Live Calling	100%	100%	100%	100%	96%	100%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

- BSNL has a parameter value of **88.08%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds as it is pre-defined at **≥** 95%.
- RCOM GSM has a parameter value of **93.85%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds as it is pre-defined at **≥** 95%.

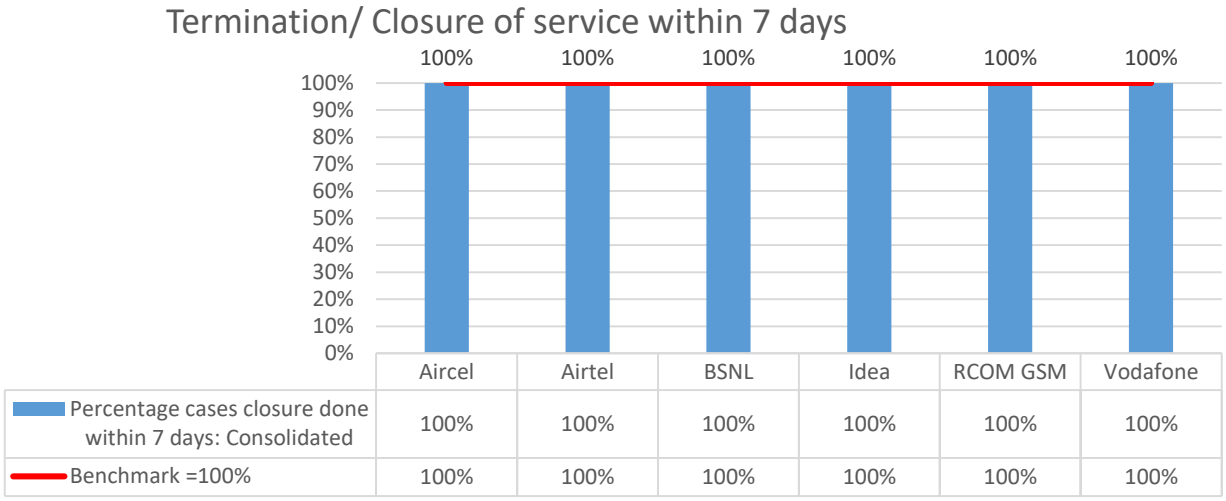
10.6. TERMINATION OR CLOSURE OF SERVICE

- 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

10.6.1. KEY FINDINGS



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

10.7. REFUND OF DEPOSIT AFTER CLOSURE

- Computational Methodology:

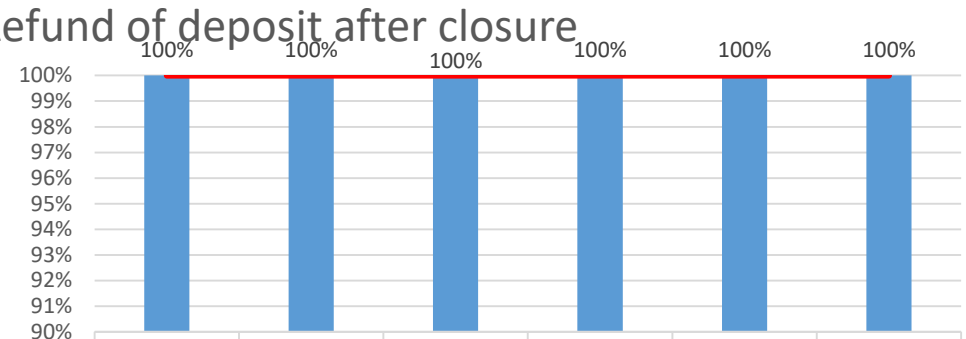
  Time taken for refund for deposit after closures = $\frac{\text{number of cases of refund after closure done within 60 days}}{\text{total number of cases of refund after closure}} * 100$

  - 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

10.7.1. KEY FINDINGS



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
Percentage refund of deposits after closures: Consolidated	100%	100%	100%	100%	100%	100%
Benchmark =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 **3.45%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%.

- Aircel has a parameter value of **13.74%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 2%.

2G VOICE PMR DATA: NOVEMBER

- Aircel has a parameter value of **4.51%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%.

- Aircel has a parameter value of **12.02%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it is pre-defined at ≤ 3%.

2G VOICE PMR DATA: DECEMBER

- • Aircel has a parameter value of **5.70%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%.

- Aircel has a parameter value of **11.57%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it is pre-defined at ≤ 3%

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2G VOICE PMR DATA: CONSOLIDATED

- Aircel has a parameter value of **4.55%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%

- Aircel has a parameter value of **12.44%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it is pre-defined at ≤ 3%

2G VOICE 3 DAYS LIVE DATA: OCTOBER

- Aircel has a parameter value of **2.96%** and failed to meet the benchmark for TCH Congestion as it is pre-defined at ≤ 2%.

- Aircel has a parameter value of **13.62%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.

- Airtel has a parameter value of **93.64%** and failed to meet the benchmark for Call Set-up Success Rate (Within Licensee own network as it is pre-defined at ≥ 95%

2G VOICE 3 DAYS LIVE DATA: NOVEMBER

- Aircel has a parameter value of **12.51%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.

2G VOICE 3 DAYS LIVE DATA: DECEMBER

- Aircel has a parameter value of **11.13%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.

- RCOM has a parameter value of **93.51%** and failed to meet the benchmark for Call Set-up Success Rate (Within Licensee own network as it is pre-defined at ≤ 3%.

3 DAYS LIVE DATA: CONSOLIDATED

- Aircel has a parameter value of **12.42%** and failed to meet the benchmark for Worst Affected cell having more than 3% TCH drop as it is pre-defined at ≤ 3%.

3G VOICE PMR: CONSOLIDATED

- Aircel has a parameter value of **21.22%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

- Aircel has a parameter value of **2.35%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 2%.

3G VOICE PMR: OCTOBER

- Aircel has a parameter value of **18.27%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

- Aircel has a parameter value of **2.12%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 2%.

3G VOICE PMR: NOVEMBER

- Aircel has a parameter value of **21.96%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

- Aircel has a parameter value of **2.37%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 2%.

- Idea has a parameter value of **3.12%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

3G VOICE PMR: DECEMBER

- Aircel has a parameter value of **23.44%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

- Aircel has a parameter value of **2.55%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 2%.

3G VOICE 3 DAYS LIVE DATA: CONSOLIDATED

- Aircel has a parameter value of **2.49%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 2%.

- Aircel has a parameter value of **22.15%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

3G VOICE 3 DAYS LIVE DATA: OCTOBER

- Aircel has a parameter value of **21.48%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.

- Aircel has a parameter value of **2.48%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 2%.

- Aircel has a parameter value of **93.86%** and failed to meet the benchmark for Call Set-up Success Rate (Within Licensee own network) as it is pre-defined at ≥ 95%.

3G VOICE 3 DAYS LIVE DATA: NOVEMBER

- Aircel has a parameter value of **22.96%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at % ≤3%.

- Aircel has a parameter value of **2.59%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at % ≤2%.

3G VOICE 3 DAYS LIVE DATA: DECEMBER

- Aircel has a parameter value of **2.40%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at % ≤2%.

- Aircel has a parameter value of **22.02%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at % ≤2%.

BILLING AND CUSTOMER CARE: CONSOLIDATED

- Vodafone has a parameter value of **0.19%** and failed to meet the benchmark for Metering and Billing Credibility (Prepaid) as it is pre-defined at **≥** 95%.

- BSNL has a parameter value of **88.08%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds as it is pre-defined at **≥** 95%.

- RCOM GSM has a parameter value of **94.00%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds as it is pre-defined at **≥** 95%.

12. PMR COMPARISON (AGENCY VS TSP)

12.1. Network Parameters

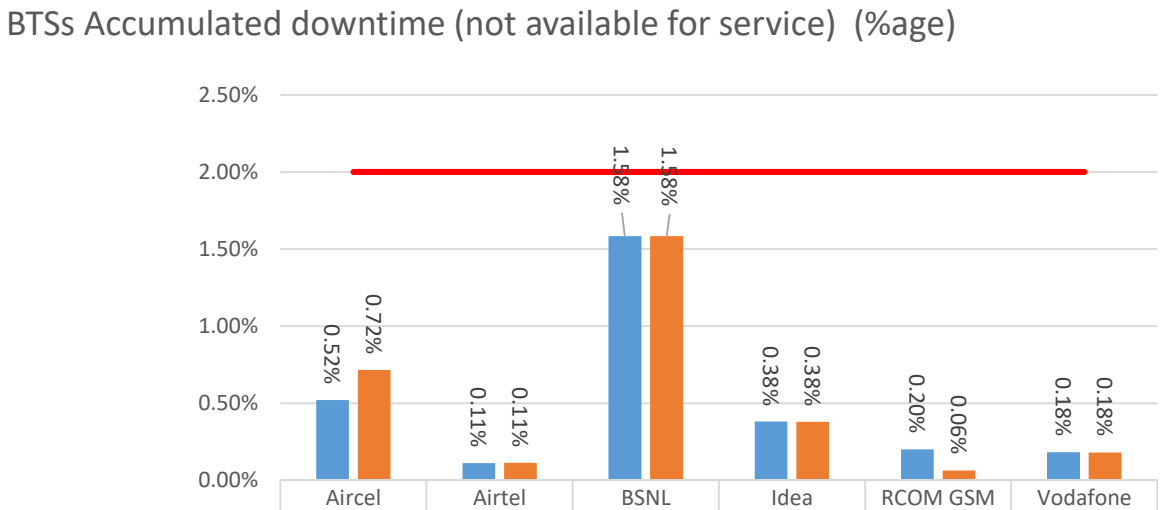
Name of Service Provider	Network Availability				Connection Establishment (Accessibility)						Connection Maintenance (Retainability)					
	Sum of downtime of BTSs in a month in hrs. in the licensed service area		No. of BTSs having accumulated downtime of >24 hours in a month		Call Set-up Success Rate (Within Licensee own network		SDDCH/Paging chl. Congestion		TCH Congestion		Call Drop Rate (%age)		Worst 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	0.52%	0.72%	4.55%	4.55%	97.91%	97.91%	0.31%	0.31%	1.62%	1.61%	1.30%	1.30%	12.44%	12.45%	95.21%	95.21%
Airtel	0.11%	0.11%	0.17%	0.16%	97.38%	97.58%	0.39%	0.38%	0.45%	0.45%	0.89%	0.89%	2.12%	2.12%	97.69%	97.69%
BSNL	1.58%	1.58%	0.22%	0.01%	97.77%	97.77%	0.53%	0.53%	1.36%	1.36%	1.20%	1.20%	2.16%	2.45%	97.29%	97.29%
Idea	0.38%	0.38%	1.50%	1.50%	98.10%	98.10%	0.14%	0.14%	1.47%	1.47%	1.66%	1.66%	2.36%	2.36%	96.34%	96.35%
RCOM GSM	0.20%	0.06%	0.00%	0.31%	98.47%	98.45%	0.07%	0.07%	0.12%	0.12%	0.17%	0.17%	5.01%	0.55%	99.24%	99.24%
Vodafone	0.18%	0.18%	1.04%	1.04%	98.97%	98.97%	0.02%	0.02%	1.03%	1.03%	0.69%	0.68%	2.87%	2.88%	98.72%	98.72%

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

12.2. CSD Parameters

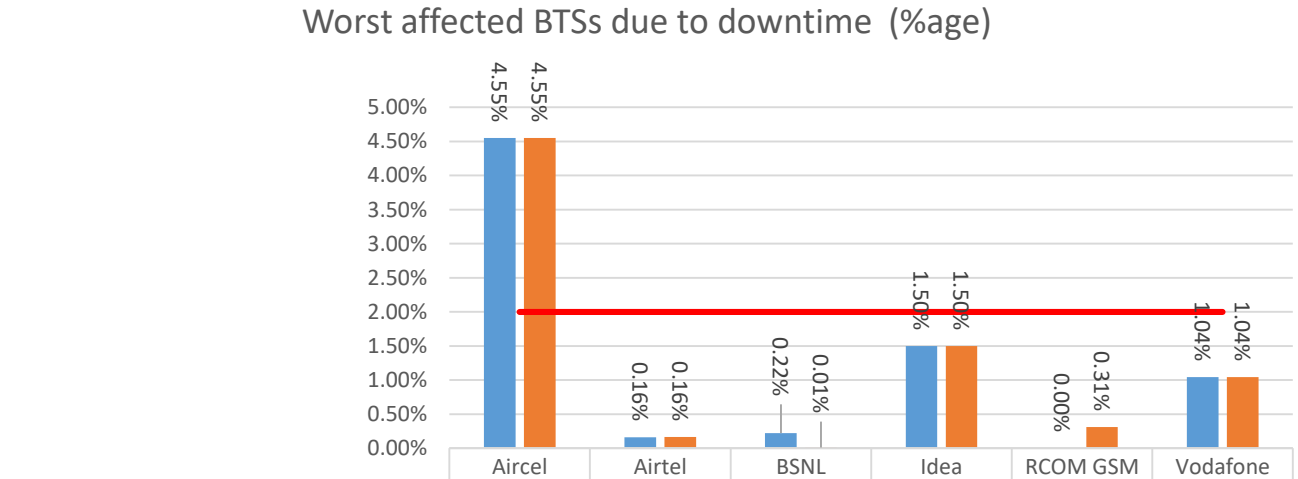
Name of Service Provider	Metering and Billing credibility				Billing Complaints						Termination & Closures		Time taken for refund of deposits after closures: Benchmark		Customer Care			
	Postpaid Subscribers		Prepaid Subscribers		%age complaints resolved within 4 weeks		%age complaints resolved within 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	0.00%	0.00%	0.00%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	96.82%	96.82%	94.25%	94.25%
Airtel	0.02%	0.02%	0.04%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.97%	99.99%	97.23%	97.26%
BSNL	0.03%	0.03%	0.02%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	88.08%	95.05%
Idea	0.01%	0.01%	0.09%	0.09%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	96.09%	96.09%	99.47%	99.47%
RCOM GSM	0.09%	0.09%	0.09%	0.09%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.37%	98.37%	93.85%	93.85%
Vodafone	0.04%	0.04%	0.19%	0.19%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.53%	99.53%

12.3. Key findings: BTS Accumulated Downtime



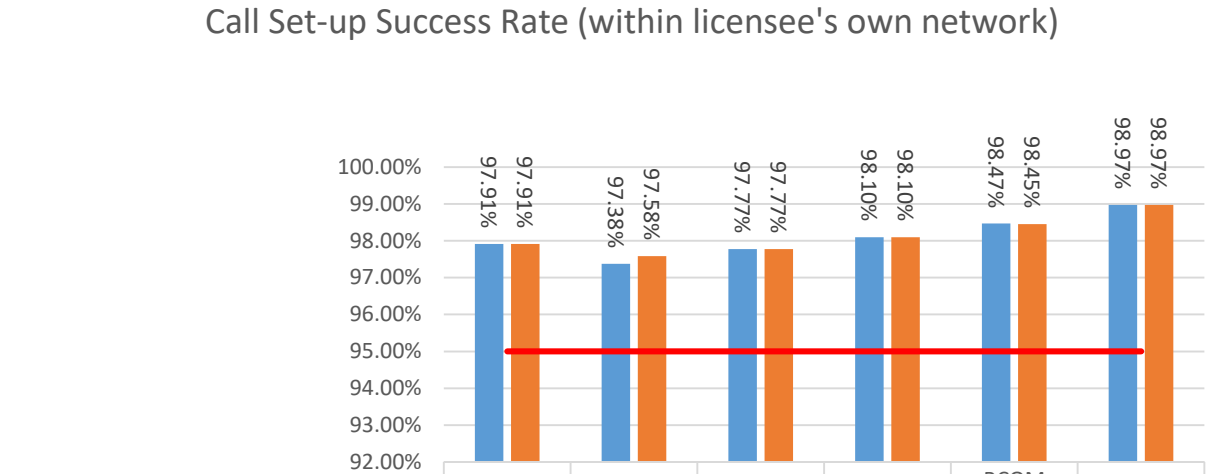
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	0.52%	0.11%	1.58%	0.38%	0.20%	0.18%
PMR Data TSP: Consolidated	0.72%	0.11%	1.58%	0.38%	0.06%	0.18%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

12.4. Key findings: Worst Effected BTSs due to Downtime



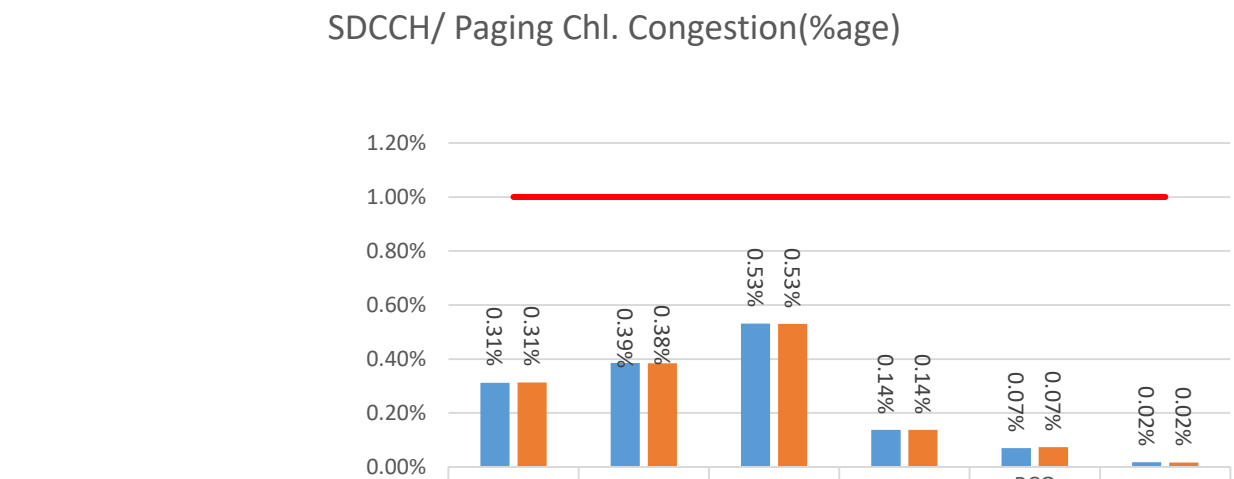
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	4.55%	0.16%	0.22%	1.50%	0.00%	1.04%
PMR Data TSP: Consolidated	4.55%	0.16%	0.01%	1.50%	0.31%	1.04%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

12.5. Key findings: Call Setup Success Rate



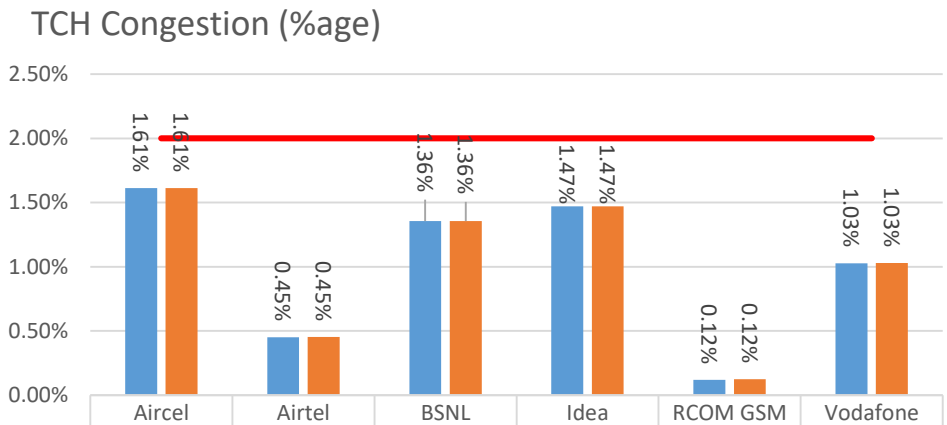
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	97.91%	97.38%	97.77%	98.10%	98.47%	98.97%
PMR Data TSP: Consolidated	97.91%	97.58%	97.77%	98.10%	98.45%	98.97%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

12.6. Key findings: SDCCH / Paging Chl. Congestion



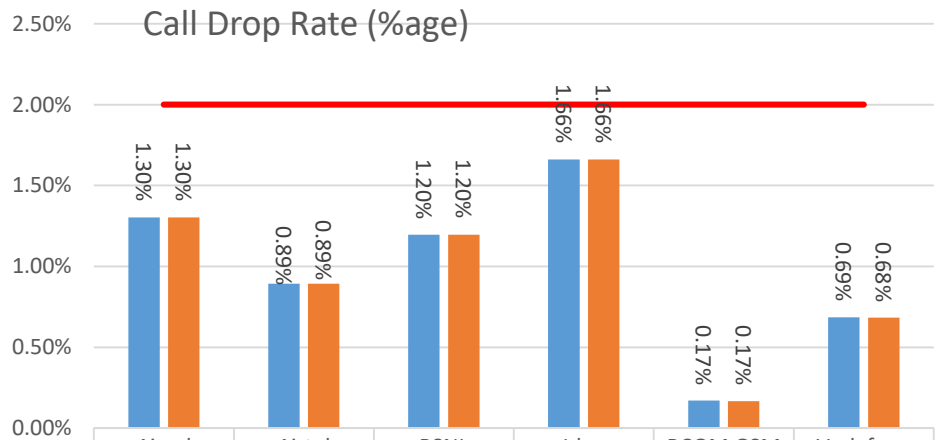
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	0.31%	0.39%	0.53%	0.14%	0.07%	0.02%
PMR Data TSP: Consolidated	0.31%	0.38%	0.53%	0.14%	0.07%	0.02%
Benchmark ≤ 1%	1%	1%	1%	1%	1%	1%

12.7. Key findings: TCH Congestion



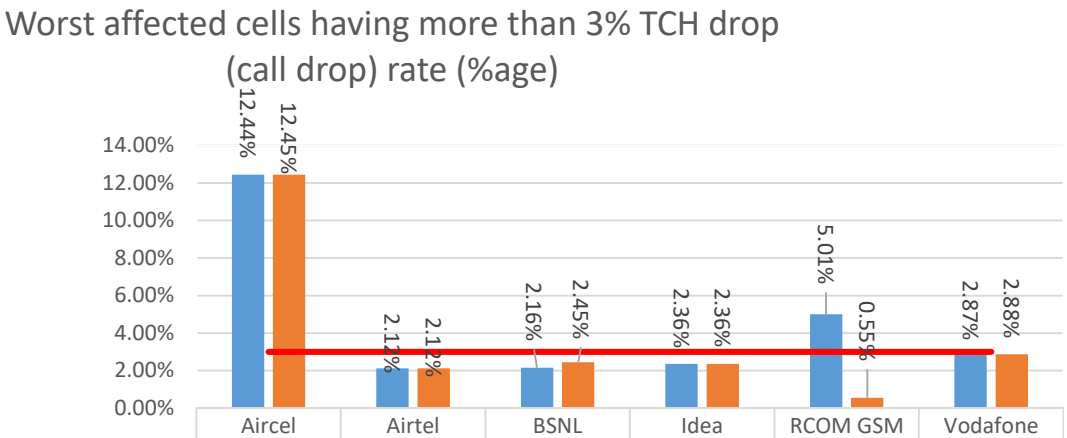
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	1.61%	0.45%	1.36%	1.47%	0.12%	1.03%
PMR Data TSP: Consolidated	1.61%	0.45%	1.36%	1.47%	0.12%	1.03%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

12.8. Key findings: Call Drop Rate



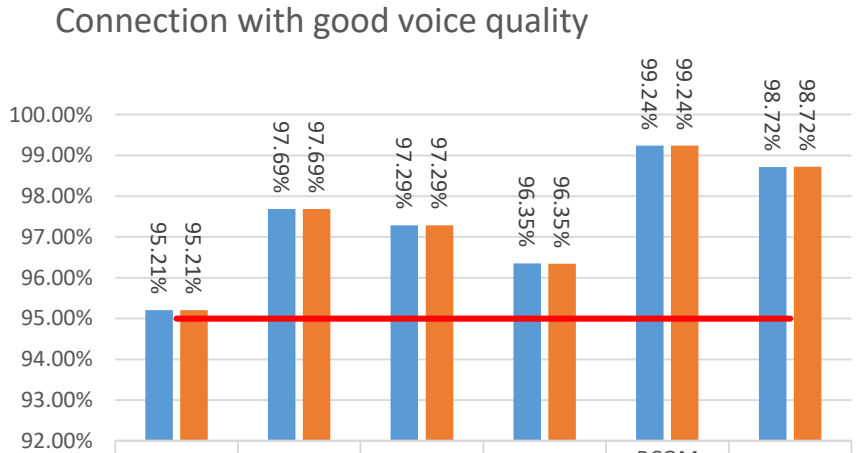
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	1.30%	0.89%	1.20%	1.66%	0.17%	0.69%
PMR Data TSP: Consolidated	1.30%	0.89%	1.20%	1.66%	0.17%	0.68%
Benchmark ≤ 2%	2%	2%	2%	2%	2%	2%

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



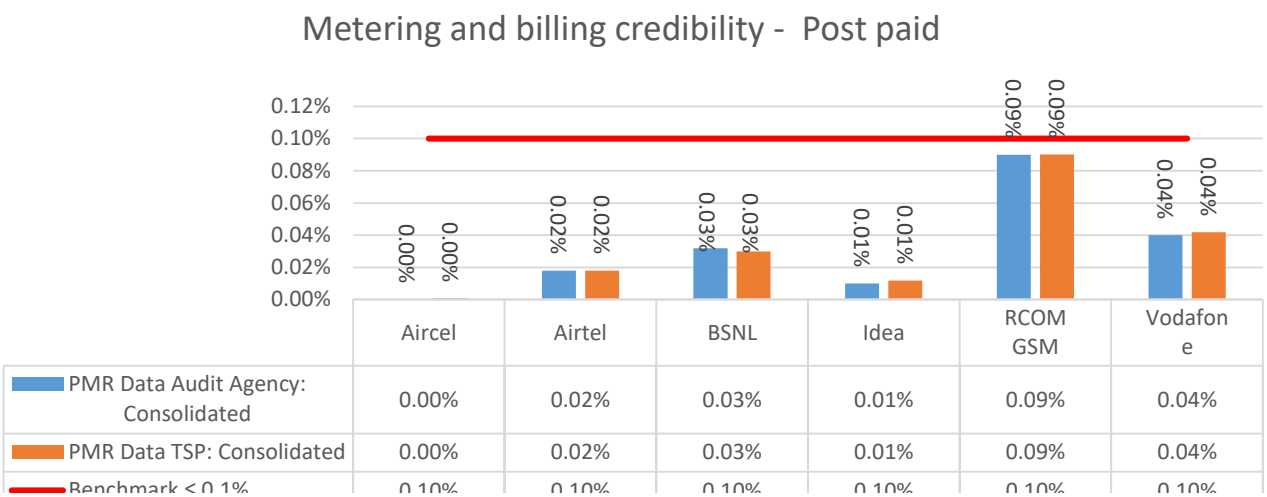
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	12.44%	2.12%	2.16%	2.36%	5.01%	2.87%
PMR Data TSP: Consolidated	12.45%	2.12%	2.45%	2.36%	0.55%	2.88%
Benchmark ≤ 3%	3%	3%	3%	3%	3%	3%

12.10. Key findings: Connection with good voice quality



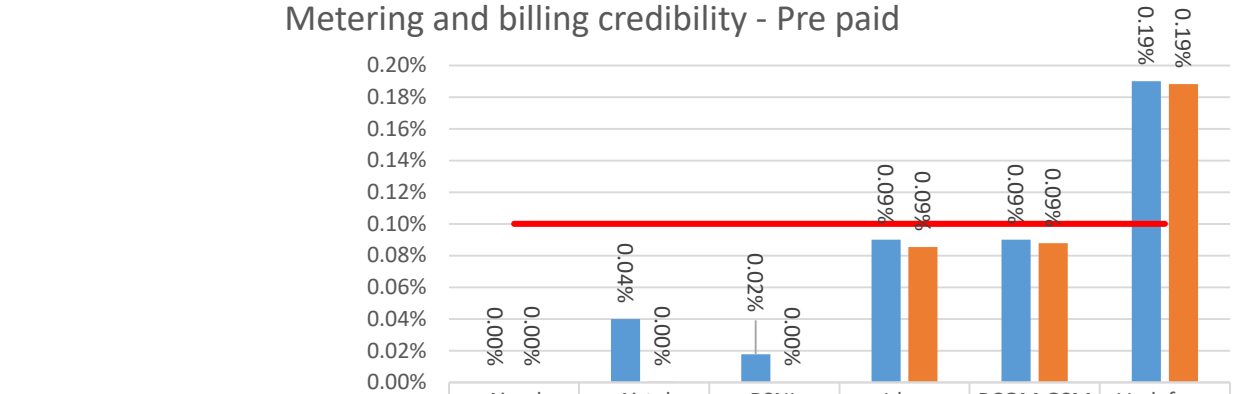
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	95.21%	97.69%	97.29%	96.35%	99.24%	98.72%
PMR Data TSP: Consolidated	95.21%	97.69%	97.29%	96.35%	99.24%	98.72%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

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



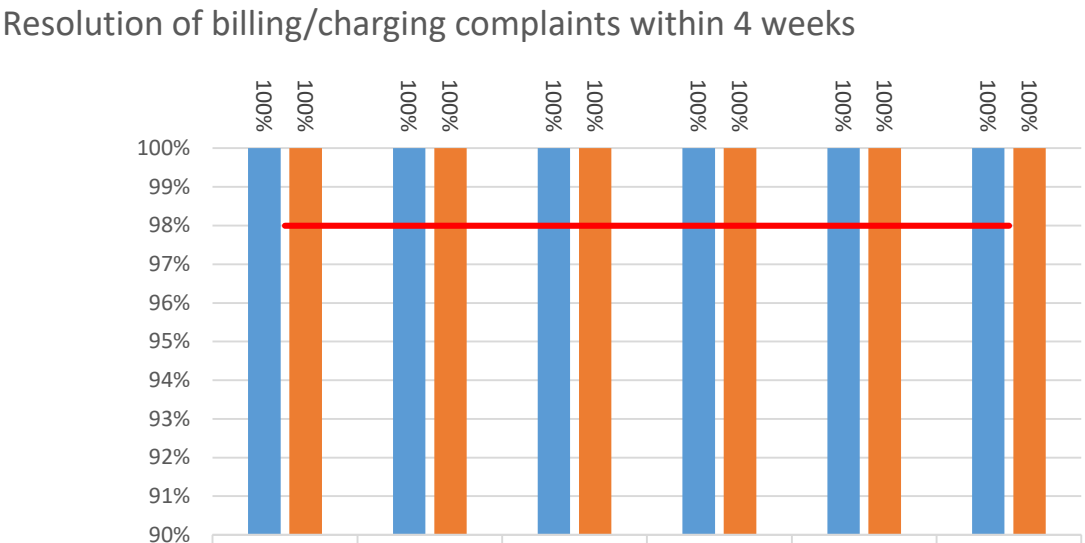
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	0.00%	0.02%	0.03%	0.01%	0.09%	0.04%
PMR Data TSP: Consolidated	0.00%	0.02%	0.03%	0.01%	0.09%	0.04%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

12.12. Key findings: Metering and Billing Credibility: Prepaid



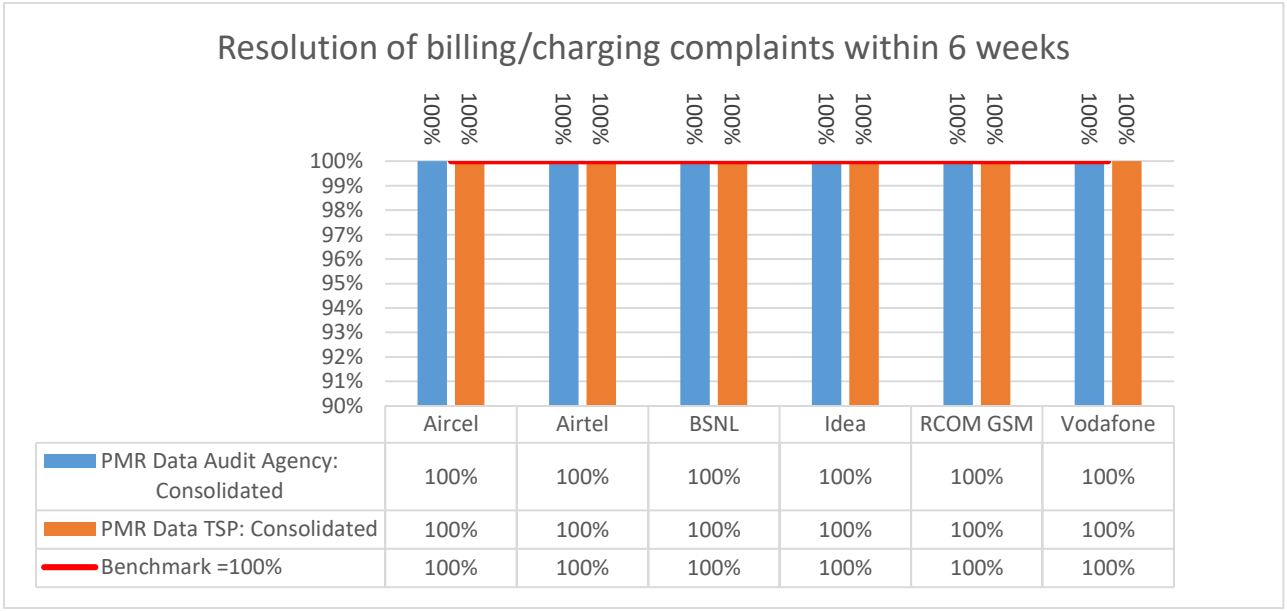
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	0.00%	0.04%	0.02%	0.09%	0.09%	0.19%
PMR Data TSP: Consolidated	0.00%	0.00%	0.00%	0.09%	0.09%	0.19%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

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



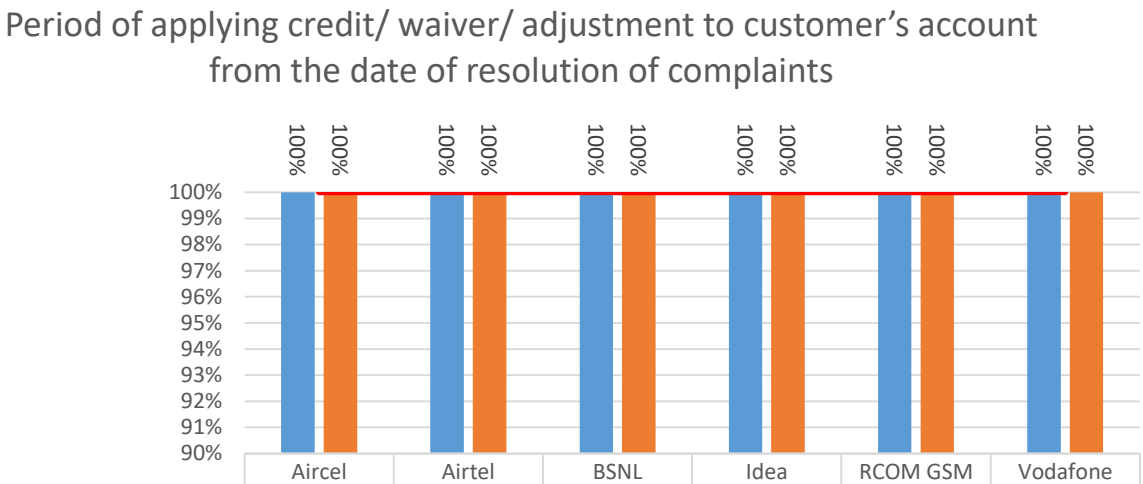
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	100%	100%	100%	100%	100%	100%
PMR Data TSP: Consolidated	100%	100%	100%	100%	100%	100%
Benchmark ≥ 98%	98%	98%	98%	98%	98%	98%

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



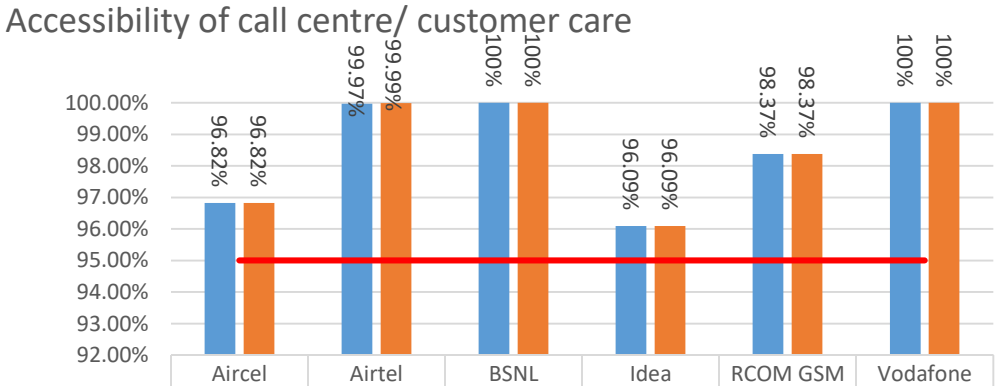
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	100%	100%	100%	100%	100%	100%
PMR Data TSP: Consolidated	100%	100%	100%	100%	100%	100%
Benchmark =100%	100%	100%	100%	100%	100%	100%

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



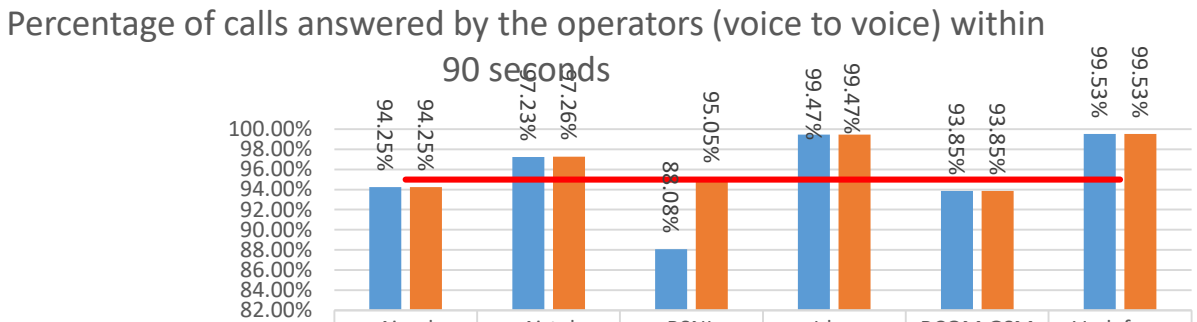
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	100%	100%	100%	100%	100%	100%
PMR Data TSP: Consolidated	100%	100%	100%	100%	100%	100%
Benchmark =100%	100%	100%	100%	100%	100%	100%

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



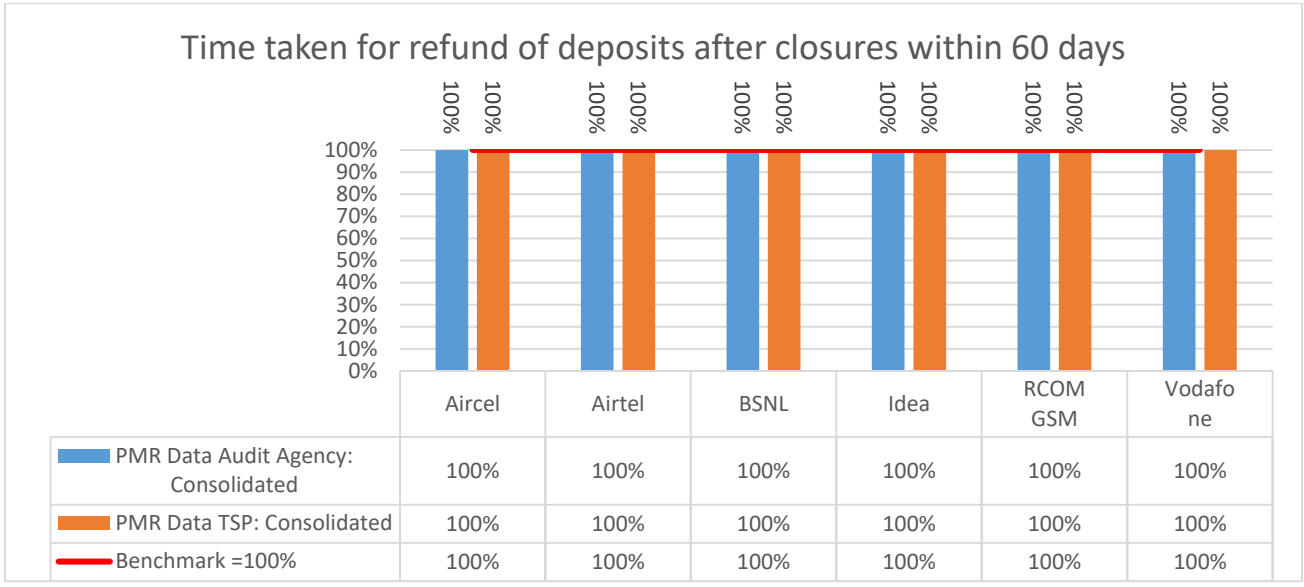
	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	96.82%	99.97%	100%	96.09%	98.37%	100%
PMR Data TSP: Consolidated	96.82%	99.99%	100%	96.09%	98.37%	100%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

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



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	94.25%	97.23%	88.08%	99.47%	93.85%	99.53%
PMR Data TSP: Consolidated	94.25%	97.26%	95.05%	99.47%	93.85%	99.53%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%

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



	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
PMR Data Audit Agency: Consolidated	100%	100%	100%	100%	100%	100%
PMR Data TSP: Consolidated	100%	100%	100%	100%	100%	100%
Benchmark =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 Jammu & Kashmir 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 Jammu & Kashmir circle.

13.1. December: Jammu SSA

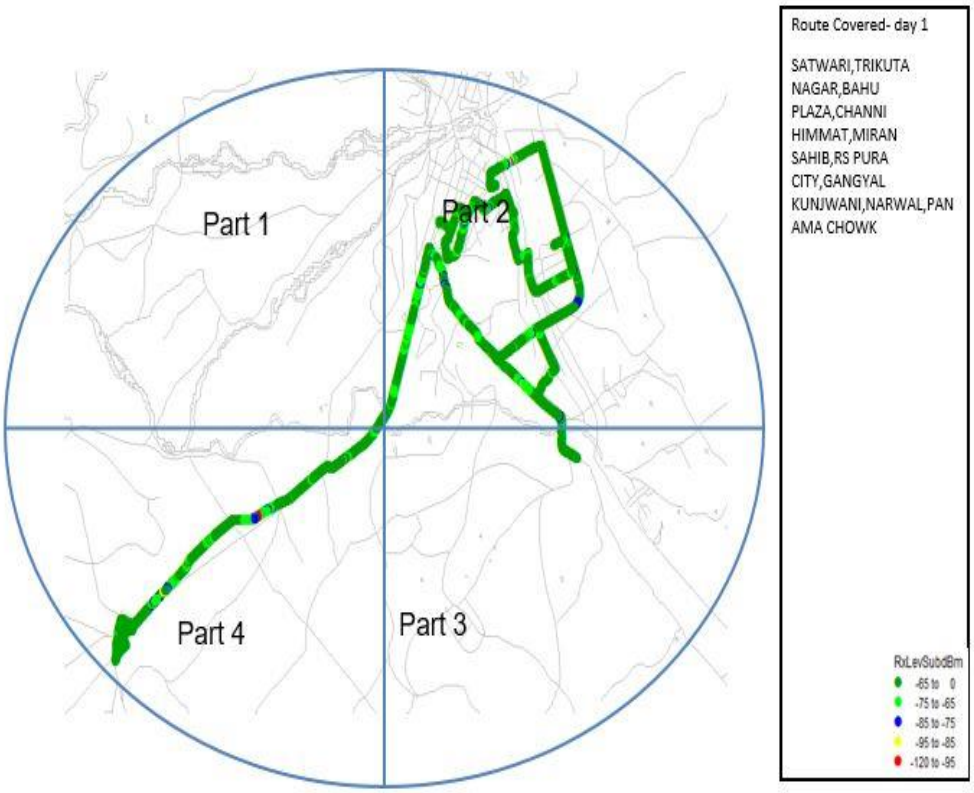
Month	Name of SSA covered	Drive Test Schedule
December 2015	Jammu	December 2, 2015 to December 4, 2015

13.2. Distance Covered: Jammu SSA

Drive Test Distance Covered	Day 1	Day 2	Day 3
Jammu SSA	100 km	140 km	110 km

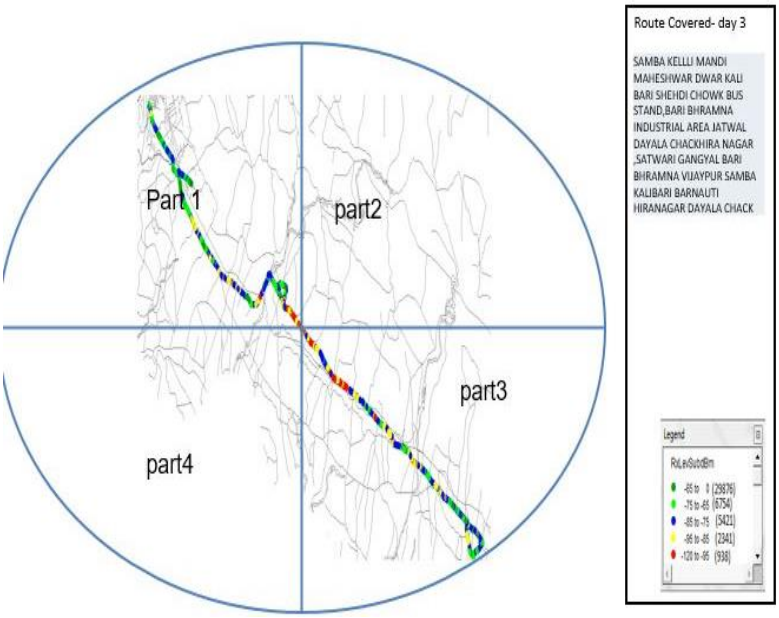
13.3. Route Map: Jammu SSA: Day 1

SSA: Jammu
Outdoor
Route Name
Bahu Plaza, Railway Statio0n, Chanmi, Hikuta Nagar, Gandhi Nagar, Shastri Nagar, Lastmorh, RS Pura City
Digana, Gamgyal, Kunjwani, Baribrahmana, Greater Kailash, Natwal
Satwari Airport, Miran Sahib, Kullian, RS Pura
Indoor
Route Name
J.K Dhaba Bus Stand, RS Pura


Part 1
Part 2
Part 3
Part 4
Route Covered- day 1
SATWARI,TRIKUTA
NAGAR,BAHU
PLAZA,CHANNI
HIMMAT,MIRAN
SAHIB,RS PURA
CITY,GANGYAL
KUNJWANI,NARWAL,PAN
AMA CHOWK
RxLevSubdBm
-65 to 0
-75 to -65
-85 to -75
-95 to -85
-120 to -95

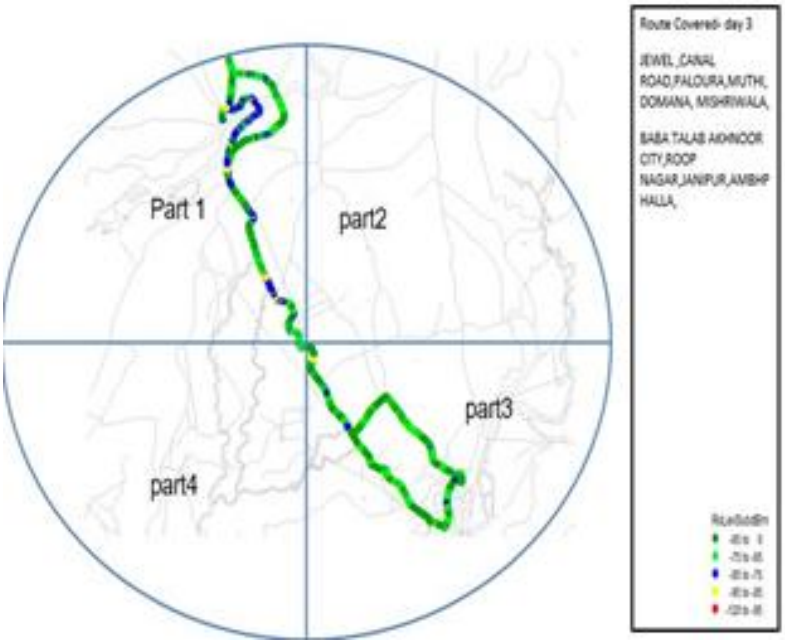
13.4. ROUTE MAP: JAMMU SSA: DAY 2

SSA: Jammu
Outdoor
Route Name
SAMBA KELLLI MANDI MAHESHWAR DWAR KALI BARI SHEHDI CHOWK BUS STAND
BARI BHRAMNA INDUSTRIAL AREA JATWAL DAYALA CHACKHIRA NAGAR
SATWARI GANGYAL BARI BHRAMNA VIJAYPUR SAMBA KALIBARI BARNAUTI HIRANAGAR DAYALA CHACK
Indoor
Route Name
FAUJI DHABA RAJBAGH



13.5. Route Map: Jammu SSA: Day 3

SSA: Jammu
Outdoor
Route Name
GANDHI NAGAR,VIKRAM CHOWK,JEWEL,KACHI CHWANI AKHNOOR HW,BABA TALAB,BANTALAB MUTHI,NEW PLOT
JEWEL AKHNNOR CITY PALOURA MUTHI DOMANA MISHRIWALA
BABA TALAB AKHNOOR CITY BRIDGE
Indoor
Route Name
LAKSHMI DHABBA AKHNOOR



13.6. Drive Report Analysis

13.6.1. Aircel Day 1:

SSA (Urban/Rural)-Day 1				
RxQual	Samples (S)	Total	%	Summary
0 ≤ S < 1	81527	89813	90.77	96.41
1 ≤ S < 2	827	89813	0.92	
2 ≤ S < 3	899	89813	1	
3 ≤ S < 4	953	89813	1.06	
4 ≤ S < 5	1032	89813	1.15	
5 ≤ S < 6	1350	89813	1.5	

6 ≤ S	3225	89813	3.59	
RxLev	Samples	Total	%	
0 to > = -75	97454	101750	95.78	
0 to > = -85	101353	101750	99.61	
0 to > = -95	101689	101750	99.94	

Office Complex SSA (Urban/Rural)- Day 1				
RxQual	Samples (S)	Total	%	Summary
0 ≤ S < 1	6345	6370	99.61	99.69
1 ≤ S < 2	0	6370	0	
2 ≤ S < 3	0	6370	0	
3 ≤ S < 4	0	6370	0	
4 ≤ S < 5	5	6370	0.08	
5 ≤ S < 6	0	6370	0	
6 ≤ S	20	6370	0.31	
RxLev	Samples	Total	%	
0 to > = -75	6765	6765	100	
0 to > = -85	6765	6765	100	
0 to > = -95	6765	6765	100	

Over All SSA Drive Test Details Day-1				
RxQual	Samples (S)	Total	%	Summary
0-4 (w/o frequency hopping)/CDMA				96.63
0-5 (with frequency hopping	92938	96183	96.63	
Total Call Attempt	182			
Blocked Call Rate (<=3%)	0.54%			
Dropped Call Rate (<=2%)	0.00%			
Call Setup Success Rate (>=95%)	99.45%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.66%			
RxLev	Samples	Total	%	
0 to > = -75	104219	108515	96.04	
0 to > = -85	108118	108515	99.63	
0 to > = -95	108454	108515	99.94	

13.6.2. AIRCEL DAY 2:

SSA (Urban/Rural)-Day 2				
RxQual	Samples (S)	Total	%	Summary
0 ≤ S < 1	49696	53935	92.14	97.83
1 ≤ S < 2	560	53935	1.04	
2 ≤ S < 3	570	53935	1.06	
3 ≤ S < 4	600	53935	1.11	
4 ≤ S < 5	660	53935	1.22	
5 ≤ S < 6	681	53935	1.26	
6 ≤ S	1168	53935	2.17	
RxLev	Samples	Total	%	
0 to > = -75	49598	55310	89.67	
0 to > = -85	54219	55310	98.03	

0 to > = -95	55217	55310	99.83	

Office Complex SSA (Urban/Rural)- Day 2				
RxQual	Samples (S)	Total	%	Summary
0 ≤ S < 1	7656	7674	99.77	99.77
1 ≤ S < 2	0	7674	0	
2 ≤ S < 3	0	7674	0	
3 ≤ S < 4	0	7674	0	
4 ≤ S < 5	0	7674	0	
5 ≤ S < 6	0	7674	0	
6 ≤ S	18	6375	0.28	
RxLev	Samples	Total	%	
0 to > = -75	7938	7944	99.92	
0 to > = -85	7944	7944	100	
0 to > = -95	7944	7944	100	

Over All SSA Drive Test Details Day-2				
RxQual	Samples (S)	Total	%	Summary
0-4 (w/o frequency hopping)/CDMA				98.07
0-5 (with frequency hopping	60423	61609	98.07	
Total Call Attempt	166			
Blocked Call Rate (<=3%)	0.60%			
Dropped Call Rate (<=2%)	0.00%			
Call Setup Success Rate (>=95%)	99.39%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.54%			
RxLev	Samples	Total	%	
0 to > = -75	57536	63254	90.96	
0 to > = -85	62163	63254	98.28	
0 to > = -95	63161	63254	99.85	

13.6.3. AIRCEL DAY 3:

SSA (Urban/Rural)-Day 3				
RxQual	Samples (S)	Total	%	Summary
0 ≤ S < 1	66245	74278	89.19	96.53
1 ≤ S < 2	833	74278	1.12	
2 ≤ S < 3	922	74278	1.24	
3 ≤ S < 4	1058	74278	1.42	
4 ≤ S < 5	1125	74278	1.51	
5 ≤ S < 6	1516	74278	2.04	
6 ≤ S	2579	74278	3.47	
RxLev	Samples	Total	%	
0 to > = -75	72083	77262	93.3	
0 to > = -85	76308	77262	98.77	
0 to > = -95	77115	77262	99.81	

Office Complex SSA (Urban/Rural)- Day 3				
RxQual	Samples (S)	Total	%	Summary

0 ≤ S < 1	6075	6395	95	99.22
1 ≤ S < 2	35	6395	0.55	
2 ≤ S < 3	85	6395	1.33	
3 ≤ S < 4	60	6395	0.94	
4 ≤ S < 5	35	6395	0.55	
5 ≤ S < 6	55	6395	0.86	
6 ≤ S	50	6395	0.78	
RxLev	Samples	Total	%	
0 to > = -75	6625	6670	99.33	
0 to > = -85	6670	6670	100	
0 to > = -95	6670	6670	100	

Over All SSA Drive Test Details Day-3				
RxQual	Samples (S)	Total	%	Summary
0-4 (w/o frequency hopping)/CDMA				96.74
0-5 (with frequency hopping	78044	80673	96.74	
Total Call Attempt	178			
Blocked Call Rate (<=3%)	0.00%			
Dropped Call Rate (<=2%)	0.56%			
Call Setup Success Rate (>=95%)	100.00%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.56%			
RxLev	Samples	Total	%	
0 to > = -75	78708	83932	93.78	
0 to > = -85	82978	83932	98.86	
0 to > = -95	83785	83932	99.82	

13.6.4. AIRCEL OVERALL

RxQual	Samples (S)	Total	%
0 ≤ S < 1	217544	238465	91.23
1 ≤ S < 2	2255	238465	0.95
2 ≤ S < 3	2476	238465	1.04
3 ≤ S < 4	2671	238465	1.12
4 ≤ S < 5	2857	238465	1.2
5 ≤ S < 6	3602	238465	1.51
6 ≤ S	7060	238465	2.96
RxLev	Samples	Total	%
0 to > = -75	240463	255701	94.04
0 to > = -85	253259	255701	99.04
0 to > = -95	255400	255701	99.88
Total Calls Attempt (A)	526		
Total Calls Blocked (B)	2		
Blocked Call Rate in % (B*100/A)	0.38%		
Total Calls Established ('C)	524		
Total Calls Drop (D)	1		
Dropped Calls Rate in % (D*100/C)	0.19%		

Call Setup Success Rate in % (C*100/A)	99.61%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.60%

13.6.5. AIRTEL: DAY 1

SSA (Urban/Rural)-Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	58387	67823	86.09	96.44
1 ≤ S < 2	1254	67823	1.85	
2 ≤ S < 3	1308	67823	1.93	
3 ≤ S < 4	1403	67823	2.07	
4 ≤ S < 5	1398	67823	2.06	
5 ≤ S < 6	1657	67823	2.44	
6 ≤ S	2416	67823	3.56	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	79351	88492	89.67	
0 to > = -85	87269	88492	98.62	
0 to > = -95	88437	88492	99.94	

Office Complex SSA (Urban/Rural)- Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	4534	6008	75.47	95.87
1 ≤ S < 2	236	6008	3.93	
2 ≤ S < 3	235	6008	3.91	
3 ≤ S < 4	244	6008	4.06	
4 ≤ S < 5	259	6008	4.31	
5 ≤ S < 6	252	6008	4.19	
6 ≤ S	248	6008	4.13	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	6017	7001	85.94	
0 to > = -85	6996	7001	99.93	
0 to > = -95	7001	7001	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	71167	73831	96.39	
Total Call Attempt	186			
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)	99.61%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	85368	95493	89.4	
0 to > = -85	94265	95493	98.71	
0 to > = -95	95438	95493	99.94	

13.6.6. AIRTEL: DAY 2

SSA (Urban/Rural)-Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	59599	68771	86.66	96.11
1 ≤ S < 2	1085	68771	1.58	
2 ≤ S < 3	1119	68771	1.63	
3 ≤ S < 4	1268	68771	1.84	
4 ≤ S < 5	1389	68771	2.02	
5 ≤ S < 6	1636	68771	2.38	
6 ≤ S	2675	68771	3.89	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	73247	87303	83.9	
0 to > = -85	84654	87303	96.97	
0 to > = -95	87198	87303	99.88	

Office Complex SSA (Urban/Rural)- Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	5190	5825	89.1	99.23
1 ≤ S < 2	140	5825	2.4	
2 ≤ S < 3	120	5825	2.06	

3 ≤ S < 4	125	5825	2.15	
4 ≤ S < 5	130	5825	2.23	
5 ≤ S < 6	75	5825	1.29	
6 ≤ S	45	5825	0.77	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	8825	9405	93.83	
0 to > = -85	9400	9405	99.95	
0 to > = -95	9405	9405	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	71876	74596	96.35	
Total Call Attempt	172			
Blocked Call Rate (<=3%)	0%			
Dropped Call Rate (<=2%)	0.58%			
Call Setup Success Rate (>=95%)	100%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.19%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	82072	96708	84.87	
0 to > = -85	94054	96708	97.26	
0 to > = -95	96603	96708	99.89	

13.6.7. AIRTEL: DAY 3

SSA (Urban/Rural)-Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	75789	86225	87.9	96.13
1 ≤ S < 2	1043	86225	1.21	
2 ≤ S < 3	1162	86225	1.35	
3 ≤ S < 4	1363	86225	1.58	
4 ≤ S < 5	1500	86225	1.74	
5 ≤ S < 6	2031	86225	2.36	

6 ≤ S	3337	86225	3.87	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	94273	102089	92.34	
0 to > = -85	100690	102089	98.63	
0 to > = -95	101972	102089	99.89	

Office Complex SSA (Urban/Rural)- Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6036	6252	96.55	98.29
1 ≤ S < 2	13	6252	0.21	
2 ≤ S < 3	12	6252	0.19	
3 ≤ S < 4	18	6252	0.29	
4 ≤ S < 5	28	6252	0.45	
5 ≤ S < 6	38	6252	0.61	
6 ≤ S	107	6252	1.71	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	11311	11318	99.94	
0 to > = -85	11318	11318	100	
0 to > = -95	11318	11318	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	89033	92477	96.28	
Total Call Attempt	146			
Blocked Call Rate (<=3%)	0.68%			
Dropped Call Rate (<=2%)	0.69%			
Call Setup Success Rate (>=95%)	99.32%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.16%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	105584	113407	93.1	
0 to > = -85	112008	113407	98.77	

0 to > = -95	113290	113407	99.9	

13.6.8. AIRTEL: OVERALL

Over All SSA Details				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	209535	240904	86.98	96.34
1 ≤ S < 2	3771	240904	1.57	
2 ≤ S < 3	3956	240904	1.64	
3 ≤ S < 4	4421	240904	1.84	
4 ≤ S < 5	4704	240904	1.95	
5 ≤ S < 6	5689	240904	2.36	
6 ≤ S	8828	240904	3.66	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	273024	305608	89.34	
0 to > = -85	300327	305608	98.27	
0 to > = -95	305331	305608	99.91	

Total Calls Attempt (A)	504
Total Calls Blocked (B)	1
Blocked Call Rate in % (B*100/A)	0.20%
Total Calls Established ('C)	503
Total Calls Drop (D)	2
Dropped Calls Rate in % (D*100/C)	0.40%
Call Setup Success Rate in % (C*100/A)	99.80%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.32%

13.6.9. IDEA: DAY 1

SSA (Urban/Rural)-Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	52525	62916	83.48	96.31%
1 ≤ S < 2	1594	62916	2.53	
2 ≤ S < 3	1066	62916	1.69	
3 ≤ S < 4	1586	62916	2.52	
4 ≤ S < 5	1494	62916	2.37	
5 ≤ S < 6	2331	62916	3.7	
6 ≤ S	2320	62916	3.69	

RxLev	Samples	Total	%	
0 to > = -75	32975	81198	40.61	
0 to > = -85	46053	81198	56.72	
0 to > = -95	74320	81198	91.53	

Office Complex SSA (Urban/Rural)- Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	5710	6432	88.77	99.25%
1 ≤ S < 2	189	6432	2.94	
2 ≤ S < 3	142	6432	2.21	
3 ≤ S < 4	154	6432	2.39	
4 ≤ S < 5	117	6432	1.82	
5 ≤ S < 6	72	6432	1.12	
6 ≤ S	48	6432	0.75	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	6917	9012	76.75	
0 to > = -85	8997	9012	99.83	
0 to > = -95	9012	9012	100	

Over All SSA Drive Test Details Day-1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA				96.69
0-5 (with frequency hopping	60924	63012	96.69	
Total Call Attempt	156			
Blocked Call Rate (<=3%)	0.00%			
Dropped Call Rate (<=2%)	0.64%			
Call Setup Success Rate (>=95%)	100.00%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.58%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	39892	90210	44.22	
0 to > = -85	55050	90210	61.02	

0 to > = -95	83332	90210	92.38	

13.6.10. IDEA: DAY 2

SSA (Urban/Rural)-Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	38189	45049	84.77	96.78
1 ≤ S < 2	1092	45049	2.42	
2 ≤ S < 3	845	45049	1.88	
3 ≤ S < 4	1051	45049	2.33	
4 ≤ S < 5	1017	45049	2.26	
5 ≤ S < 6	1406	45049	3.12	
6 ≤ S	1449	45049	3.22	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	24153	63049	38.31	
0 to > = -85	41199	63049	65.34	
0 to > = -95	59660	63049	94.62	

Office Complex SSA (Urban/Rural)- Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6275	6375	98.43	99.61
1 ≤ S < 2	25	6375	0.39	
2 ≤ S < 3	0	6375	0	
3 ≤ S < 4	25	6375	0.39	
4 ≤ S < 5	25	6375	0.39	
5 ≤ S < 6	0	6375	0	
6 ≤ S	25	6375	0.39	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	800	9253	8.65	
	7803	9253	84.33	
0 to > = -95	9228	9253	99.73	

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

0-4 (w/o frequency hopping)/CDMA				97.13
0-5 (with frequency hopping	49950	51424	97.13	
Total Call Attempt	167			
Blocked Call Rate (<=3%)	0.59%			
Dropped Call Rate (<=2%)	0.00%			
Call Setup Success Rate (>=95%)	99.40%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	100.00%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	24953	72302	34.51	
0 to > = -85	49002	72302	67.77	
0 to > = -95	68888	72302	95.28	

13.6.11. IDEA: DAY 3

SSA (Urban/Rural)-Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	40264	49333	81.62	96.01
1 ≤ S < 2	1312	49333	2.66	
2 ≤ S < 3	1014	49333	2.06	
3 ≤ S < 4	1468	49333	2.98	
4 ≤ S < 5	1347	49333	2.73	
5 ≤ S < 6	1962	49333	3.98	
6 ≤ S	1966	49333	3.99	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	27552	66085	41.69	
0 to > = -85	39886	66085	60.36	
0 to > = -95	61153	66085	92.54	

Office Complex SSA (Urban/Rural)- Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6319	6408	98.61	99.73
1 ≤ S < 2	21	6408	0.33	
2 ≤ S < 3	24	6408	0.37	

3 ≤ S < 4	7	6408	0.11	
4 ≤ S < 5	14	6408	0.22	
5 ≤ S < 6	6	6408	0.09	
6 ≤ S	17	6408	0.27	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	8515	9023	94.37	
0 to > = -85	8952	9023	99.21	
0 to > = -95	9023	9023	100	

Over All SSA Drive Test Details Day-3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA				96.44
0-5 (with frequency hopping	53758	55741	96.44	
Total Call Attempt	145			
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)	99.41%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	36067	75108	48.02	
0 to > = -85	48838	75108	65.02	
0 to > = -95	70176	75108	93.43	

13.6.12. IDEA: OVERALL

Over All SSA Details				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	149282	176513	84.57	96.70%
1 ≤ S < 2	4233	176513	2.4	
2 ≤ S < 3	3091	176513	1.75	
3 ≤ S < 4	4291	176513	2.43	
4 ≤ S < 5	4014	176513	2.27	
5 ≤ S < 6	5777	176513	3.27	
6 ≤ S	5825	176513	3.3	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	100912	237620	42.47	
0 to > = -85	152890	237620	64.34	
0 to > = -95	222396	237620	93.59	

Total Calls Attempt (A)	468
Total Calls Blocked (B)	1
Blocked Call Rate in % (B*100/A)	0.213675214
Total Calls Established ('C)	467
Total Calls Drop (D)	1
Dropped Calls Rate in % (D*100/C)	0.214132762
Call Setup Success Rate in % (C*100/A)	99.78632479
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.30%

13.6.13. RCOM GSM: DAY 1

SSA (Urban/Rural)-Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	30444	34510	88.22	96.76%
1 ≤ S < 2	577	34510	1.67	
2 ≤ S < 3	539	34510	1.56	
3 ≤ S < 4	567	34510	1.64	
4 ≤ S < 5	559	34510	1.62	
5 ≤ S < 6	707	34510	2.05	
6 ≤ S	1117	34510	3.24	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	23758	52282	45.44	
0 to > = -85	42678	52282	81.63	
0 to > = -95	49729	52282	95.12	

Office Complex SSA (Urban/Rural)- Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	4615	4636	99.55	99.70%
1 ≤ S < 2	1	4636	0.02	
2 ≤ S < 3	2	4636	0.04	
3 ≤ S < 4	4	4636	0.09	
4 ≤ S < 5	0	4636	0	
5 ≤ S < 6	0	4636	0	
6 ≤ S	14	4636	0.3	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	6047	7491	80.72	
0 to > = -85	7413	7491	98.96	
0 to > = -95	7487	7491	99.95	

Over All SSA Drive Test Details Day-1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA				97.11
0-5 (with frequency hopping	38015	39146	97.11	
Total Call Attempt	140			
Blocked Call Rate (<=3%)	0.86%			

Dropped Call Rate (<=2%)	0.00%			
Call Setup Success Rate (>=95%)	99.45%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.53%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	29805	59773	49.86	
0 to > = -85	50091	59773	83.8	
0 to > = -95	57216	59773	95.72	

13.6.14. RCOM GSM: DAY 2

SSA (Urban/Rural)-Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	24363	28125	86.62	96.53
1 ≤ S < 2	542	28125	1.93	
2 ≤ S < 3	510	28125	1.81	
3 ≤ S < 4	570	28125	2.03	
4 ≤ S < 5	534	28125	1.9	
5 ≤ S < 6	630	28125	2.24	
6 ≤ S	976	28125	3.47	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	16125	45330	35.57	
0 to > = -85	34422	45330	75.94	
0 to > = -95	42484	45330	93.72	

Office Complex SSA (Urban/Rural)- Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	3556	3881	91.63	99.02
1 ≤ S < 2	72	3881	1.86	
2 ≤ S < 3	56	3881	1.44	
3 ≤ S < 4	67	3881	1.73	
4 ≤ S < 5	47	3881	1.21	
5 ≤ S < 6	45	3881	1.16	
6 ≤ S	38	3881	0.98	
RxLev	**Samples**	**Total**	**%**	

0 to > = -75	3847	4044	99.92	
0 to > = -85	4044	4044	100	
0 to > = -95	4044	4044	100	

Over All SSA Drive Test Details Day-2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA				96.83
0-5 (with frequency hopping	30992	32006	96.83	
Total Call Attempt	134			
Blocked Call Rate (<=3%)	1.49%			
Dropped Call Rate (<=2%)	0.00%			
Call Setup Success Rate (>=95%)	99.39%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.50%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	19972	49374	40.45	
0 to > = -85	38466	49374	77.91	
0 to > = -95	46528	49374	94.24	

13.6.15. RCOM GSM: DAY 3

SSA (Urban/Rural)-Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	33010	38904	84.85	95.46
1 ≤ S < 2	686	38904	1.76	
2 ≤ S < 3	769	38904	1.98	
3 ≤ S < 4	808	38904	2.08	
4 ≤ S < 5	870	38904	2.24	
5 ≤ S < 6	995	38904	2.56	
6 ≤ S	1766	38904	4.54	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	15135	52253	28.96	
0 to > = -85	38493	52253	73.67	
0 to > = -95	46585	52253	89.15	

Office Complex SSA (Urban/Rural)- Day 3

RxQual	Samples (S)	Total	%	Summary
0 ≤ S < 1	7128	7181	99.26	99.61
1 ≤ S < 2	6	7181	0.08	
2 ≤ S < 3	7	7181	0.1	
3 ≤ S < 4	3	7181	0.04	
4 ≤ S < 5	6	7181	0.08	
5 ≤ S < 6	3	7181	0.04	
6 ≤ S	28	7181	0.39	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	8110	11473	70.7	
0 to > = -85	11447	11473	99.8	
0 to > = -95	11473	11473	100	

Over All SSA Drive Test Details Day-3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0-4 (w/o frequency hopping)/CDMA				95.99
0-5 (with frequency hopping	43483	45299	95.99	
Total Call Attempt	121			
Blocked Call Rate (<=3%)	0.82%			
Dropped Call Rate (<=2%)	0.00%			
Call Setup Success Rate (>=95%)	100.00%			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.17%			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	23245	63726	36.48	
0 to > = -85	49940	63726	78.37	
0 to > = -95	58058	63726	91.11	

13.6.16. RCOM GSM: OVERALL

Over All SSA Details				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	103116	117237	87.96	96.9
1 ≤ S < 2	1884	117237	1.61	

2 ≤ S < 3	1883	117237	1.61
3 ≤ S < 4	2019	117237	1.72
4 ≤ S < 5	2016	117237	1.72
5 ≤ S < 6	2380	117237	2.03
6 ≤ S	3939	117237	3.36
RxLev	**Samples**	**Total**	**%**
0 to > = -75	73022	172873	42.24
0 to > = -85	138497	172873	80.11
0 to > = -95	161802	172873	93.6

Total Calls Attempt (A)	395
Total Calls Blocked (B)	4
Blocked Call Rate in % (B*100/A)	1.012658228
Total Calls Established ('C)	391
Total Calls Drop (D)	0
Dropped Calls Rate in % (D*100/C)	0.00%
Call Setup Success Rate in % (C*100/A)	98.98734177
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.30%

13.6.17. VODAFONE: DAY 1

SSA (Urban/Rural)-Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	30491	34808	87.6	97.5
1 ≤ S < 2	631	34808	1.81	
2 ≤ S < 3	679	34808	1.95	
3 ≤ S < 4	716	34808	2.06	
4 ≤ S < 5	683	34808	1.96	
5 ≤ S < 6	737	34808	2.12	
6 ≤ S	871	34808	2.5	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	25615	36286	70.59	
0 to > = -85	34590	36286	95.33	
0 to > = -95	36248	36286	99.9	

Office Complex SSA (Urban/Rural)- Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**

0 ≤ S < 1	6257	6348	98.57	
1 ≤ S < 2	9	6348	0.14	
2 ≤ S < 3	11	6348	0.17	
3 ≤ S < 4	9	6348	0.14	
4 ≤ S < 5	9	6348	0.14	
5 ≤ S < 6	17	6348	0.27	
6 ≤ S	36	6348	0.57	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	6361	6613	96.19	
0 to > = -85	6609	6613	99.94	
0 to > = -95	6613	6613	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	40249	41156	97.8	
Total Call Attempt	167			
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	31976	42899	74.54	
0 to > = -85	41199	42899	96.04	
0 to > = -95	42861	42899	99.91	

13.6.18. VODAFONE: DAY 2

SSA (Urban/Rural)-Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	33879	37224	91.01	98.35

1 ≤ S < 2	518	37224	1.39	
2 ≤ S < 3	537	37224	1.44	
3 ≤ S < 4	574	37224	1.54	
4 ≤ S < 5	516	37224	1.39	
5 ≤ S < 6	587	37224	1.58	
6 ≤ S	613	37224	1.65	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	22578	38847	58.12	
0 to > = -85	34166	38847	87.95	
0 to > = -95	38511	38847	99.14	

Office Complex SSA (Urban/Rural)- Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6342	6360	99.72	
1 ≤ S < 2	0	6360	0	
2 ≤ S < 3	0	6360	0	
3 ≤ S < 4	0	6360	0	
4 ≤ S < 5	0	6360	0	
5 ≤ S < 6	6	6360	0.09	
6 ≤ S	12	6360	0.19	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	6610	6610	100	
0 to > = -85	6610	6610	100	
0 to > = -95	6610	6610	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	42959	43584	98.57	
Total Call Attempt	177			
Blocked Call Rate (<=3%)	0.00%			
Dropped Call Rate (<=2%)	0.56			
Call Setup Success Rate (>=95%)	100.00%			

Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.56			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	29188	45457	64.21	
0 to > = -85	40776	45457	89.7	
0 to > = -95	45121	45457	99.26	

13.6.19. VODAFONE: DAY 3

SSA (Urban/Rural)-Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	26859	30957	86.76	97.04
1 ≤ S < 2	607	30957	1.96	
2 ≤ S < 3	589	30957	1.9	
3 ≤ S < 4	610	30957	1.97	
4 ≤ S < 5	599	30957	1.93	
5 ≤ S < 6	777	30957	2.51	
6 ≤ S	916	30957	2.96	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	20100	32887	61.12	
0 to > = -85	28734	32887	87.37	
0 to > = -95	32422	32887	98.59	

Office Complex SSA (Urban/Rural)- Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6428	6448	99.69	
1 ≤ S < 2	0	6448	0	
2 ≤ S < 3	0	6448	0	
3 ≤ S < 4	0	6448	0	
4 ≤ S < 5	0	6448	0	
5 ≤ S < 6	7	6448	0.11	
6 ≤ S	13	6448	0.2	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	6740	6740	100	
0 to > = -85	6740	6740	100	
0 to > = -95	6740	6740	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	36476	37405	97.52	
Total Call Attempt	152			
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	26840	39627	67.73	
0 to > = -85	35474	39627	89.52	
0 to > = -95	39162	39627	98.83	

13.6.20. VODAFONE: OVERALL

Over All SSA Details				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	110256	122145	90.27	97.99
1 ≤ S < 2	1765	122145	1.45	
2 ≤ S < 3	1816	122145	1.49	
3 ≤ S < 4	1909	122145	1.56	
4 ≤ S < 5	1807	122145	1.48	
5 ≤ S < 6	2131	122145	1.74	
6 ≤ S	2461	122145	2.01	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	88004	127983	68.76	
0 to > = -85	117449	127983	91.77	
0 to > = -95	127144	127983	99.34	

Total Calls Attempt (A)	496
Total Calls Blocked (B)	0
Blocked Call Rate in % (B*100/A)	0.00%

Total Calls Established ('C)	496
Total Calls Drop (D)	1
Dropped Calls Rate in % (D*100/C)	0.2
Call Setup Success Rate in % (C*100/A)	100
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.84

13.6.21. BSNL: DAY 1

SSA (Urban/Rural)-Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	23975	40927	58.58	100
1 ≤ S < 2	2272	40927	5.55	
2 ≤ S < 3	2306	40927	5.63	
3 ≤ S < 4	3030	40927	7.4	
4 ≤ S < 5	3341	40927	8.16	
5 ≤ S < 6	3011	40927	7.36	
6 ≤ S	2992	40927	7.31	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	31867	42699	74.63	
0 to > = -85	41685	42699	97.63	
0 to > = -95	42681	42699	99.96	

Office Complex SSA (Urban/Rural)- Day 1				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	3470	6277	55.28	100
1 ≤ S < 2	501	6277	7.98	
2 ≤ S < 3	628	6277	10	
3 ≤ S < 4	645	6277	10.28	
4 ≤ S < 5	576	6277	9.18	
5 ≤ S < 6	300	6277	4.78	
6 ≤ S	157	6277	2.5	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	6528	6589	99.07	
0 to > = -85	6589	6589	100	
0 to > = -95	6589	6589	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	44055	47204	93.33	
Total Call Attempt	200			
Blocked Call Rate (<=3%)	12			
Dropped Call Rate (<=2%)	1			
Call Setup Success Rate (>=95%)	94			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.02			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	38395	49288	77.9	
0 to > = -85	48274	49288	97.94	
0 to > = -95	49270	49288	99.96	

13.6.22. BSNL: DAY 2

SSA (Urban/Rural)-Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	27672	40717	67.96	100
1 ≤ S < 2	1730	40717	4.25	
2 ≤ S < 3	1731	40717	4.25	
3 ≤ S < 4	2370	40717	5.82	
4 ≤ S < 5	2471	40717	6.07	
5 ≤ S < 6	2251	40717	5.53	
6 ≤ S	2492	40717	6.12	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	34732	42994	80.78	
0 to > = -85	42297	42994	98.38	
0 to > = -95	42956	42994	99.91	

Office Complex SSA (Urban/Rural)- Day 2				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**

0 ≤ S < 1	5148	6679	77.08	100
1 ≤ S < 2	322	6679	4.82	
2 ≤ S < 3	360	6679	5.39	
3 ≤ S < 4	423	6679	6.33	
4 ≤ S < 5	262	6679	3.92	
5 ≤ S < 6	126	6679	1.89	
6 ≤ S	38	6679	0.57	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	6989	6999	99.86	
0 to > = -85	6999	6999	100	
0 to > = -95	6999	6999	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	44866	47396	94.66	
Total Call Attempt	203			
Blocked Call Rate (<=3%)	7			
Dropped Call Rate (<=2%)	1			
Call Setup Success Rate (>=95%)	96.55			
Handover Success Rate % (total HO Success * 100/Total HO attempt)	95.68			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	41721	49993	83.45	
0 to > = -85	49296	49993	98.61	
0 to > = -95	49955	49993	99.92	

13.6.23. BSNL: DAY 3

SSA (Urban/Rural)-Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	23484	37532	62.57	100

1 ≤ S < 2	1874	37532	4.99	
2 ≤ S < 3	1913	37532	5.1	
3 ≤ S < 4	2617	37532	6.97	
4 ≤ S < 5	2953	37532	7.87	
5 ≤ S < 6	2545	37532	6.78	
6 ≤ S	2146	37532	5.72	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	30542	39365	77.59	
0 to > = -85	38551	39365	97.93	
0 to > = -95	39360	39365	99.99	

Office Complex SSA (Urban/Rural)- Day 3				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	6279	6714	93.52	100
1 ≤ S < 2	125	6714	1.86	
2 ≤ S < 3	94	6714	1.4	
3 ≤ S < 4	98	6714	1.46	
4 ≤ S < 5	63	6714	0.94	
5 ≤ S < 6	25	6714	0.37	
6 ≤ S	30	6714	0.45	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	6480	7050	91.91	
0 to > = -85	7047	7050	99.96	
0 to > = -95	7050	7050	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	42070	44246	95.08	
Total Call Attempt	186			
Blocked Call Rate (<=3%)	6			
Dropped Call Rate (<=2%)	1			
Call Setup Success Rate (>=95%)	96.77			

Handover Success Rate % (total HO Success * 100/Total HO attempt)	95.91			
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	37022	46415	79.76	
0 to > = -85	45598	46415	98.24	
0 to > = -95	46410	46415	99.99	

13.6.24. BSNL: OVERALL

Over All SSA Details				
RxQual	**Samples (S)**	**Total**	**%**	**Summary**
0 ≤ S < 1	90028	138846	64.84	100
1 ≤ S < 2	6824	138846	4.91	
2 ≤ S < 3	7032	138846	5.06	
3 ≤ S < 4	9183	138846	6.61	
4 ≤ S < 5	9666	138846	6.96	
5 ≤ S < 6	8258	138846	5.95	
6 ≤ S	7855	138846	5.66	
RxLev	**Samples**	**Total**	**%**	
0 to > = -75	117138	145696	80.4	
0 to > = -85	143168	145696	98.26	
0 to > = -95	145635	145696	99.96	

Total Calls Attempt (A)	589
Total Calls Blocked (B)	25
Blocked Call Rate in % (B*100/A)	4.24
Total Calls Established ('C)	564
Total Calls Drop (D)	3
Dropped Calls Rate in % (D*100/C)	0.53
Call Setup Success Rate in % (C*100/A)	95.76
Handover Success Rate % (total HO Success * 100/Total HO attempt)	95.58

13.7. DRIVE TEST OUTCOME SUMMARY

Call Events	Aircel	Airtel	Idea	Reliance	Vodafone	BSNL
Total Calls Attempt (A)	526	504	468	395	496	589
Total Calls Blocked (B)	2	1	1	4	0	25

Blocked Call Rate in % (B*100/A)	0.38%	0.20%	0.21%	1.01%	0.00%	4.24%
Total Calls Established ('C)	524	503	467	391	496	564
Total Calls Drop (D)	1	2	1	0	1	3
Dropped Calls Rate in % (D*100/C)	0.19%	0.40%	0.21%	0.00%	0.20%	0.53%
Call Setup Success Rate in % (C*100/A)	99.62%	99.80%	99.79%	98.99%	100.00%	95.76%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.60%	99.32%	99.30%	99.30%	99.84%	95.58%

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)

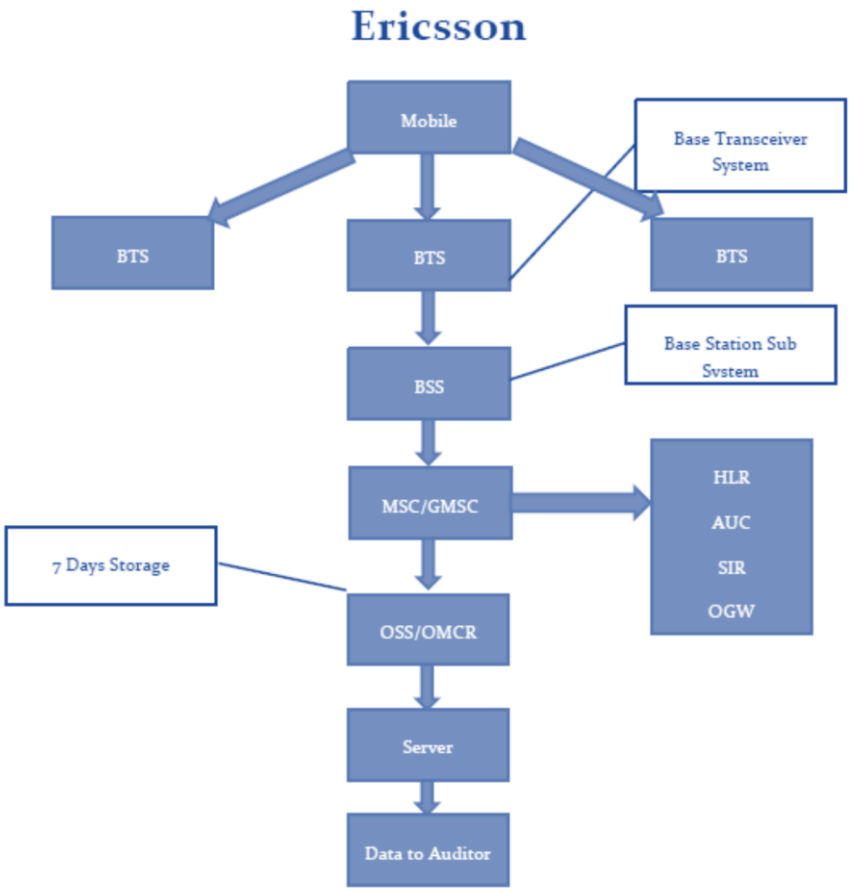
14.3. Huawei

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])

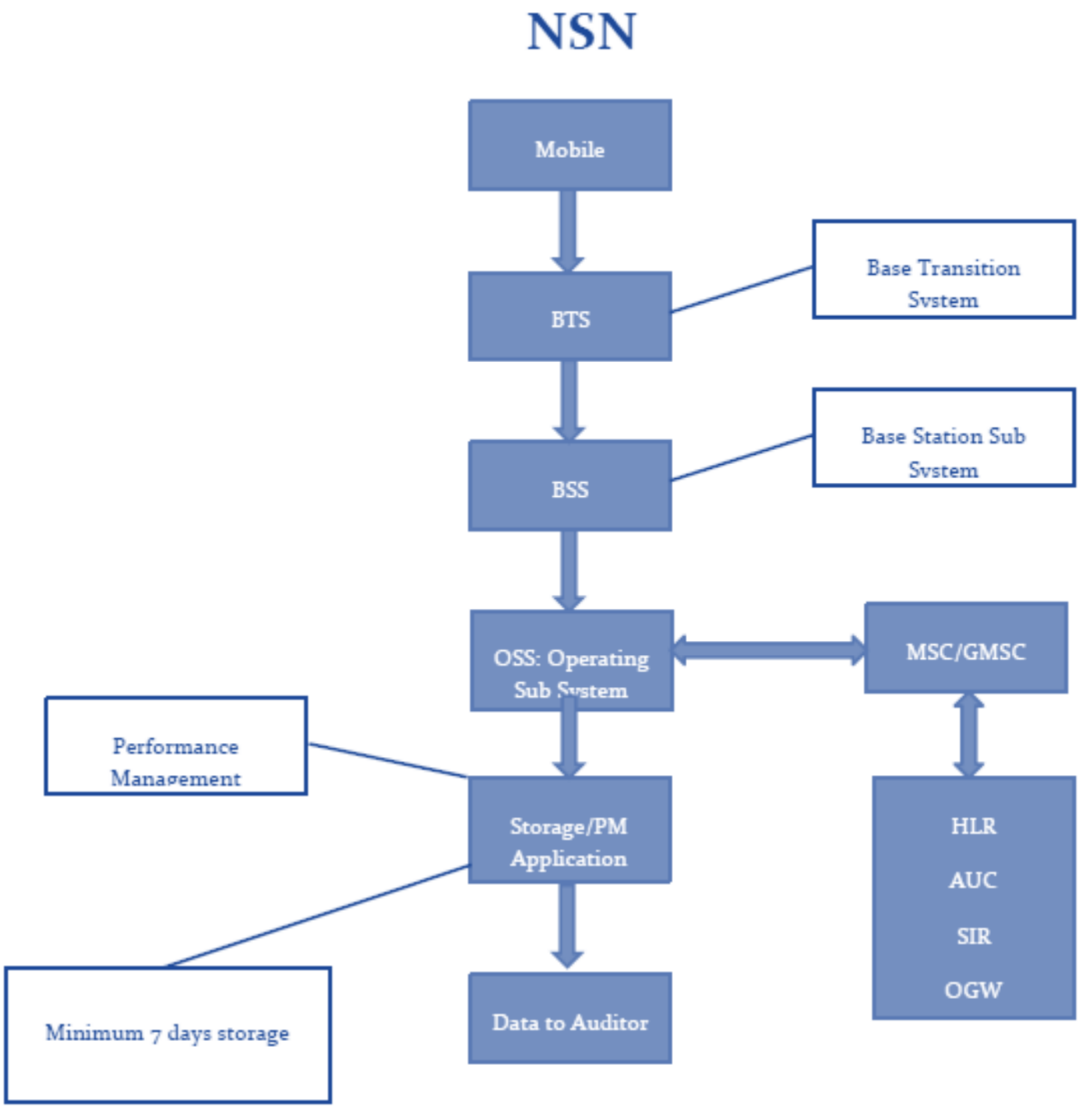
3	CALL SETUP SUCCESS RATE (%)	CALL SETUP SUCCES (NUM) / CALL SETUP SUCCES (DEN) * 100\
4	CALL DROP RATE (NUM)	[CS IS-95 Call Drops (Too many Erasure frames) + CS IS-2000 Call Drops (Too many Erasure frames) + CS IS-95 Call Drops (No reverse frame received) + CS IS-2000 Call Drops (No reverse frame received) + 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

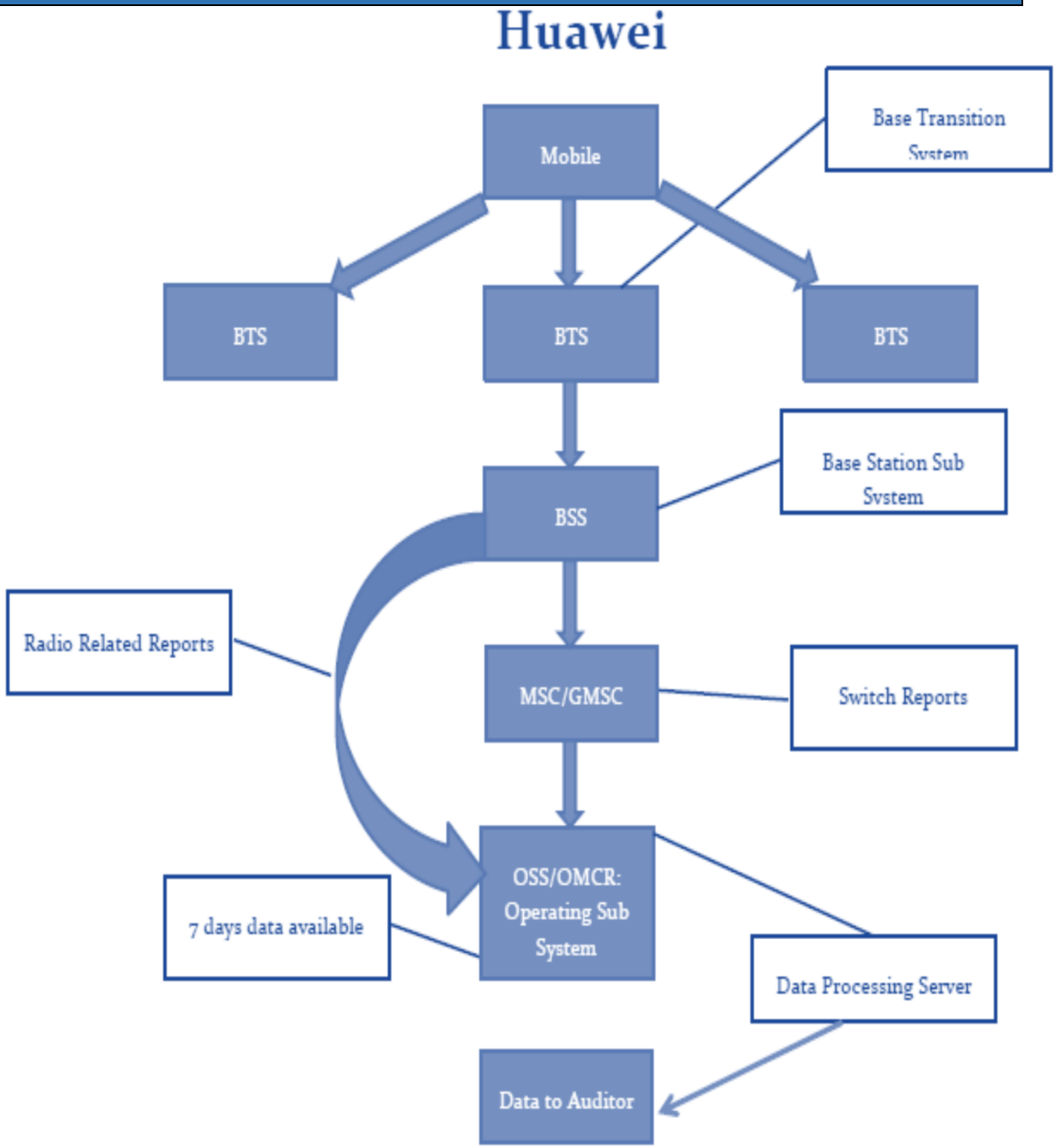
15.1. Ericsson



15.2. 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

15.3. 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)	Worst 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	0.52%	4.55%	97.91%	0.31%	1.62%	1.30%	12.44%	95.21%
Airtel	0.11%	0.17%	97.38%	0.39%	0.45%	0.89%	2.12%	97.69%
BSNL	1.58%	0.22%	97.77%	0.53%	1.36%	1.20%	2.16%	97.29%
Idea	0.38%	1.50%	98.10%	0.14%	1.47%	1.66%	2.36%	96.34%
RCOM GSM	0.20%	0.00%	98.47%	0.07%	0.12%	0.17%	5.01%	99.24%
Vodafone	0.18%	1.04%	98.97%	0.02%	1.03%	0.69%	2.87%	98.72%

- Aircel has a parameter value of **4.55%** and failed to meet the benchmark for No. of BTSs having accumulated downtime of >24 hours in a month as it is pre-defined at ≤ 2%
- Aircel has a parameter value of **12.44%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it is pre-defined at ≤ 3%.
- RCOM-GSM has a parameter value of **5.01%** and failed to meet the benchmark for Worst Affected call having more than 3% TCH drop as it 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	0.94%	0.07%	96.47%	0.42%	0.14%	2.35%	21.22%	98.07%
Airtel	0.20%	0.11%	98.09%	0.10%	0.04%	0.76%	1.51%	98.88%
BSNL	1.74%	0.82%	95.90%	0.85%	1.23%	1.39%	2.27%	DNA
Idea	0.27%	1.05%	98.40%	0.58%	0.38%	1.12%	2.41%	98.20%
RCOM GSM	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	NA	NA	NA	NA	NA	NA	NA	NA

- Aircel has a parameter value of **21.22%** and failed to meet the benchmark for Worst affected cells having more than 3% Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 3%.
- Aircel has a parameter value of **2.35%** and failed to meet the benchmark for Circuit Switched Voice Drop Rate as it is pre-defined at ≤ 2%.

17.3. BILLING AND CUSTOMER CARE

Name of Service Provider	Metering and Billing credibility		Billing Complaints			Termination & Closures	Time taken for refund of deposits after closures: Benchmark	Customer Care		Customer Care & Grievances Redressal	
	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	% of Complaints addressed at call centre level	% of Complaints addressed by Appellate Authority
Benchmark	**≤ 0.1%**	**≤ 0.1%**	**≥ 98%**	**= 100%**	**= 100%**	**= 100%**	**= 100%**	**≥ 95%**	**≥ 95%**		
Aircel	0.00%	0.00%	100%	100%	100%	100%	100%	100.00%	100.00%	100%	NIL
Airtel	0.02%	0.04%	100%	100%	100%	100%	100%	99.97%	97.23%	100%	100%
BSNL	0.03%	0.02%	100%	100%	100%	100%	100%	100.00%	88.08%	100%	100%
Idea	0.01%	0.09%	100%	100%	100%	100%	100%	96.09%	99.47%	100%	100%
RCOM GSM	0.09%	0.09%	100%	100%	100%	100%	100%	98.00%	94.00%	100%	100%
Vodafone	0.04%	0.19%	100%	100%	100%	100%	100%	100.00%	99.53%	100%	NIL

- Vodafone has a parameter value of **0.19%** and failed to meet the benchmark for Metering and Billing Credibility (Prepaid) as it is pre-defined at **≥** 95%.
- BSNL has a parameter value of **88.08%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds as it is pre-defined at **≥** 95%.
- RCOM GSM has a parameter value of **94.00%** and failed to meet the benchmark for %age of call answered by the operators (voice to voice) within 90 seconds as it is pre-defined at **≥** 95%.
- **For each instance of “DNA (Data Not Available)”, please refer the respective hard copy of audit report(s).
- Aircel & Vodafone do not have complaints addressed to appellate authority and has been defined “NIL”.

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)		Worst 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	0.52%	0.72%	4.55%	4.55%	97.91%	97.91%	0.31%	0.31%	1.62%	1.61%	1.30%	1.30%	12.44%	12.45%	95.21%	95.21%
Airtel	0.11%	0.11%	0.17%	0.16%	97.38%	97.58%	0.39%	0.38%	0.45%	0.45%	0.89%	0.89%	2.12%	2.12%	97.69%	97.69%
BSNL	1.58%	1.58%	0.22%	0.01%	97.77%	97.77%	0.53%	0.53%	1.36%	1.36%	1.20%	1.20%	2.16%	2.45%	97.29%	97.29%
Idea	0.38%	0.38%	1.50%	1.50%	98.10%	98.10%	0.14%	0.14%	1.47%	1.47%	1.66%	1.66%	2.36%	2.36%	96.34%	96.35%
RCOM GSM	0.20%	0.06%	0.00%	0.31%	98.47%	98.45%	0.07%	0.07%	0.12%	0.12%	0.17%	0.17%	5.01%	0.55%	99.24%	99.24%
Vodafone	0.18%	0.18%	1.04%	1.04%	98.97%	98.97%	0.02%	0.02%	1.03%	1.03%	0.69%	0.68%	2.87%	2.88%	98.72%	98.72%

- **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	0.00%	0.00%	0.00%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	96.82%	96.82%	94.25%	94.25%
Airtel	0.02%	0.02%	0.04%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.97%	99.99%	97.23%	97.26%
BSNL	0.03%	0.03%	0.02%	0.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	88.08%	95.05%
Idea	0.01%	0.01%	0.09%	0.09%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	96.09%	96.09%	99.47%	99.47%
RCOM GSM	0.09%	0.09%	0.09%	0.09%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.37%	98.37%	93.85%	93.85%
Vodafone	0.04%	0.04%	0.19%	0.19%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.53%	99.53%