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 – HARYANA CIRCLE
CELLULAR MOBILE TELEPHONE SERVICE (CMTS)
(JANUARY TO MARCH 2016)

PREPARED BY:

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1. INTRODUCTION

1.1. ABOUT TRAI

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

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

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

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

1.2. ABOUT PHISTREAM CONSULTING PRIVATE LIMITED

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

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

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

1.3. OBJECTIVES

The primary objective of the Audit module is to:

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

1.4. COVERAGE

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

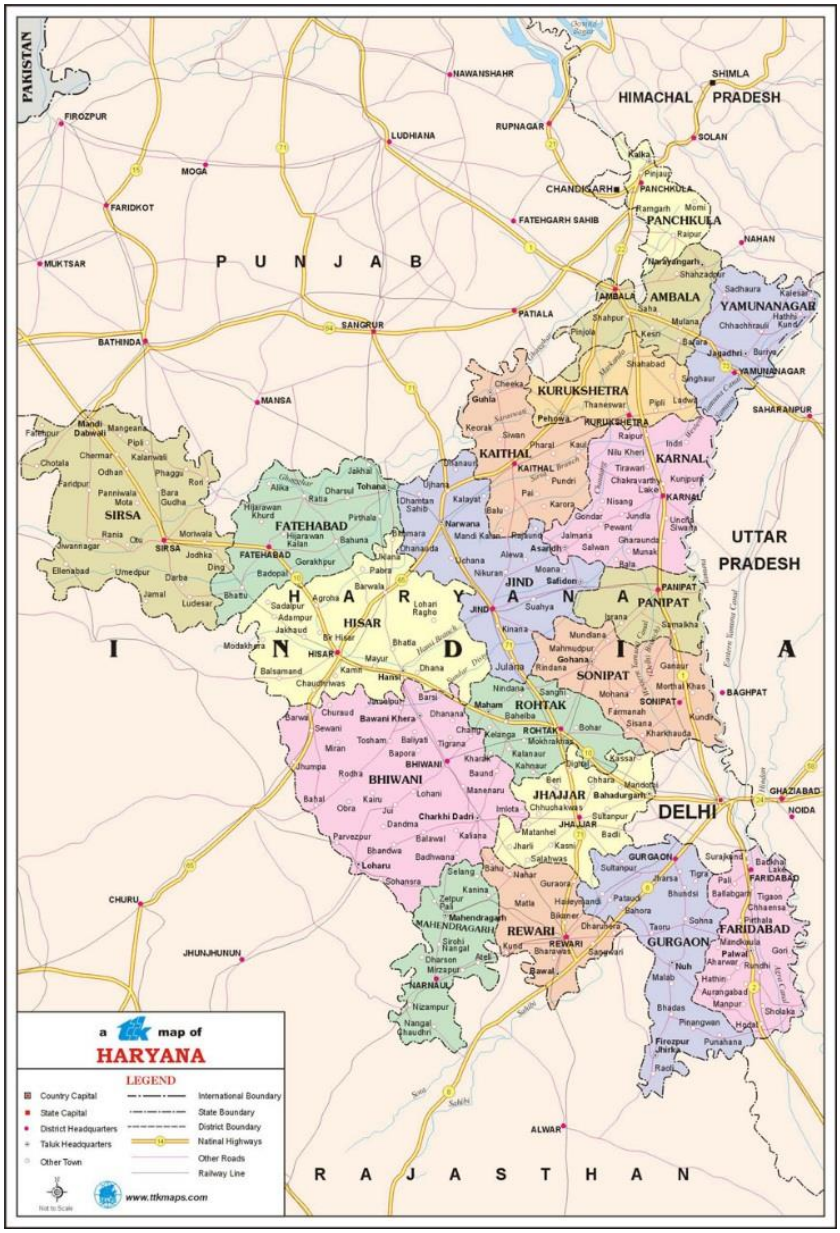


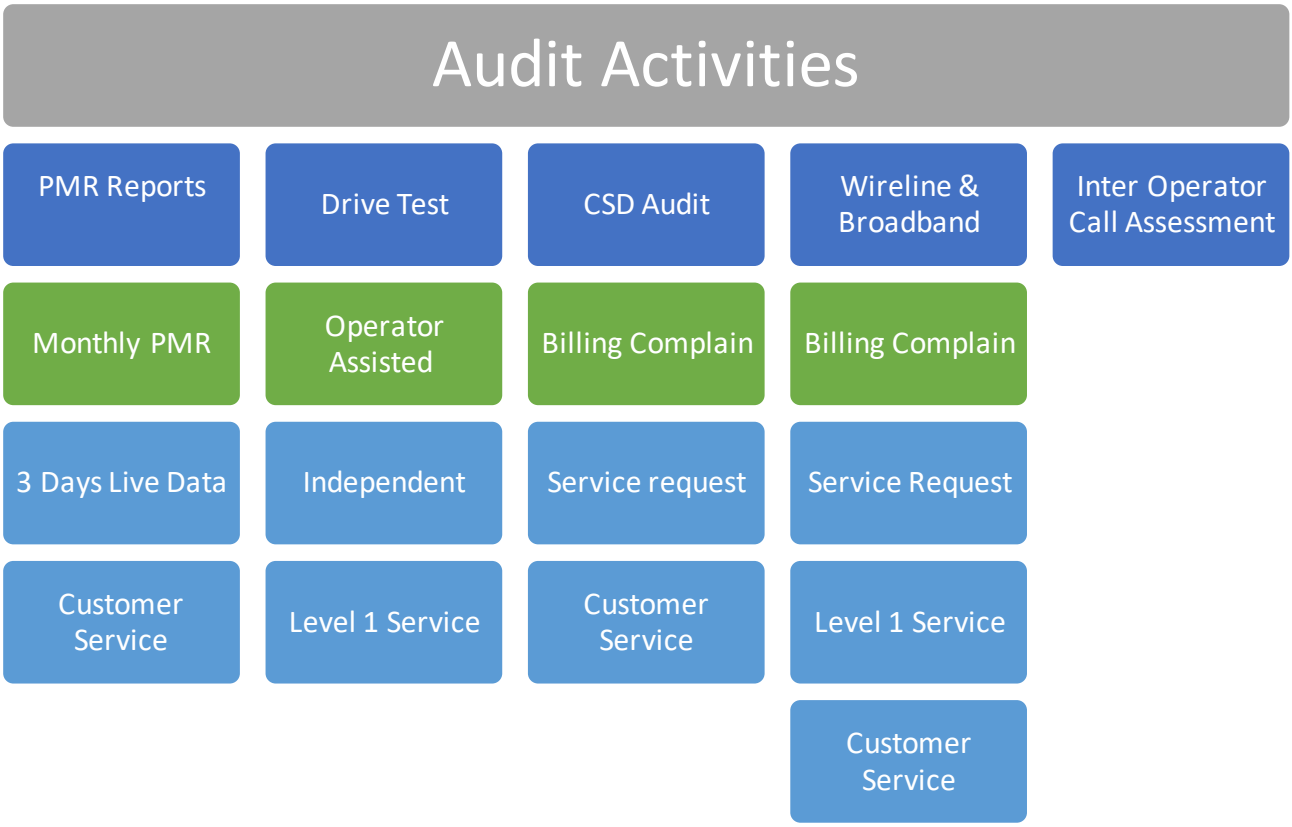
Image Source: TTK Maps

1.5. SSA LIST

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

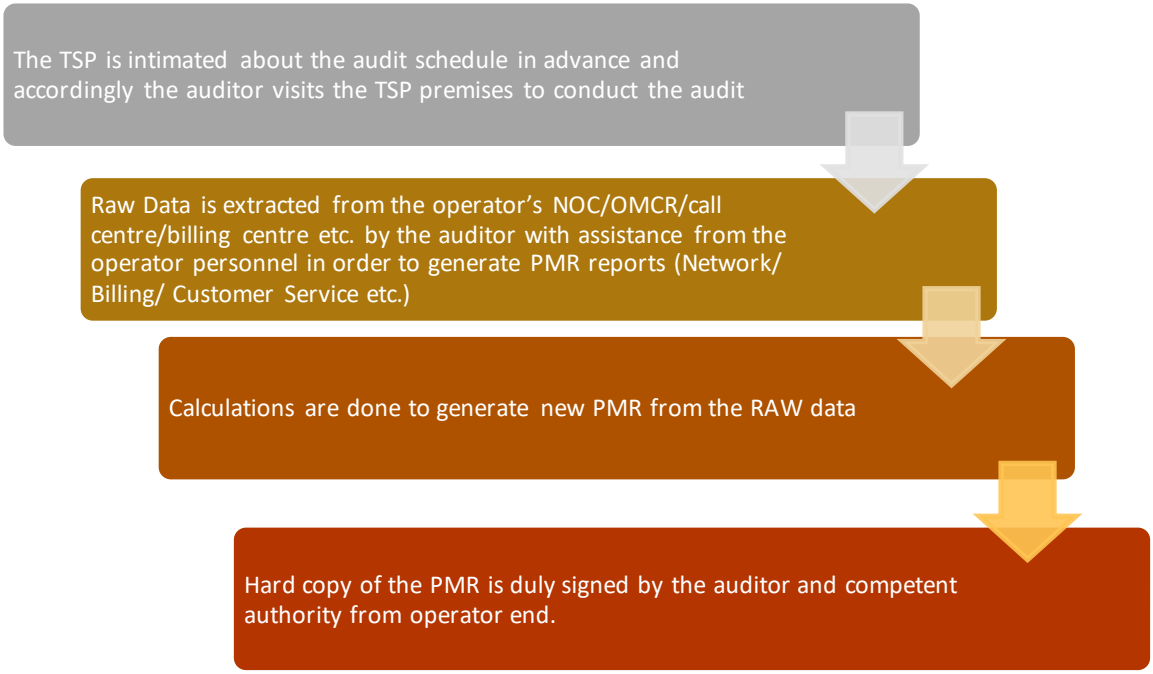
48	HA	Rohtak	Loharu
49	HA	Rohtak	Meham
50	HA	Rohtak	Rohtak
51	HA	Rohtak	Siwani
52	HA	Rohtak	Tohsham
53	HA	Sonipat	Gohana
54	HA	Sonipat	Sonipat

1.6. FRAMEWORK USED



2. PMR REPORTS

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



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

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

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

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

Let us understand these formats in details.

2.1. MONTHLY PMR

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

Parameters includes:

Network Availability

- BTS accumulated downtime
- Worst affected BTS due to downtime

Connection Establishment (Accessibility)

- Call Set Up success Rate (CSSR)

Network Congestion Parameters

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

Connection Maintenance

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

Voice Quality

- % Connections with good voice quality

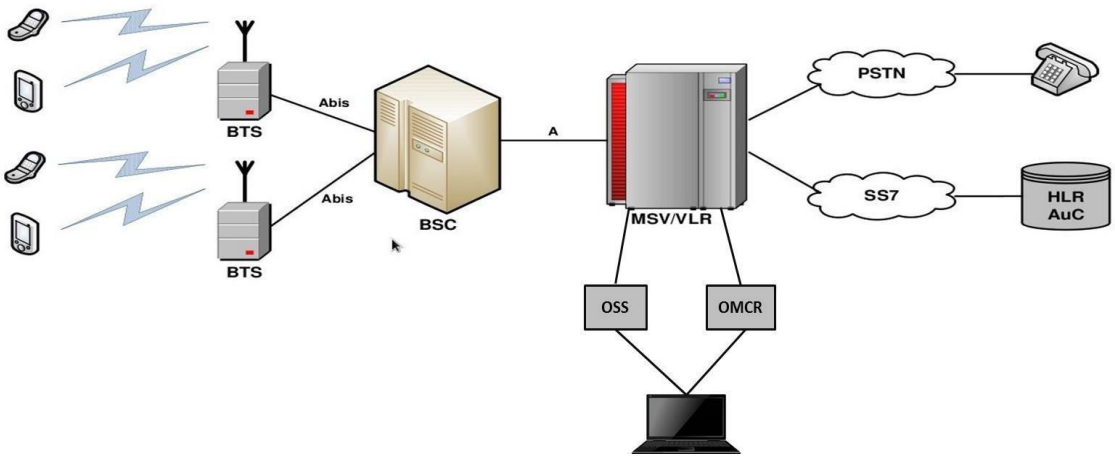
2.2. AUDIT PARAMETER: NETWORK

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

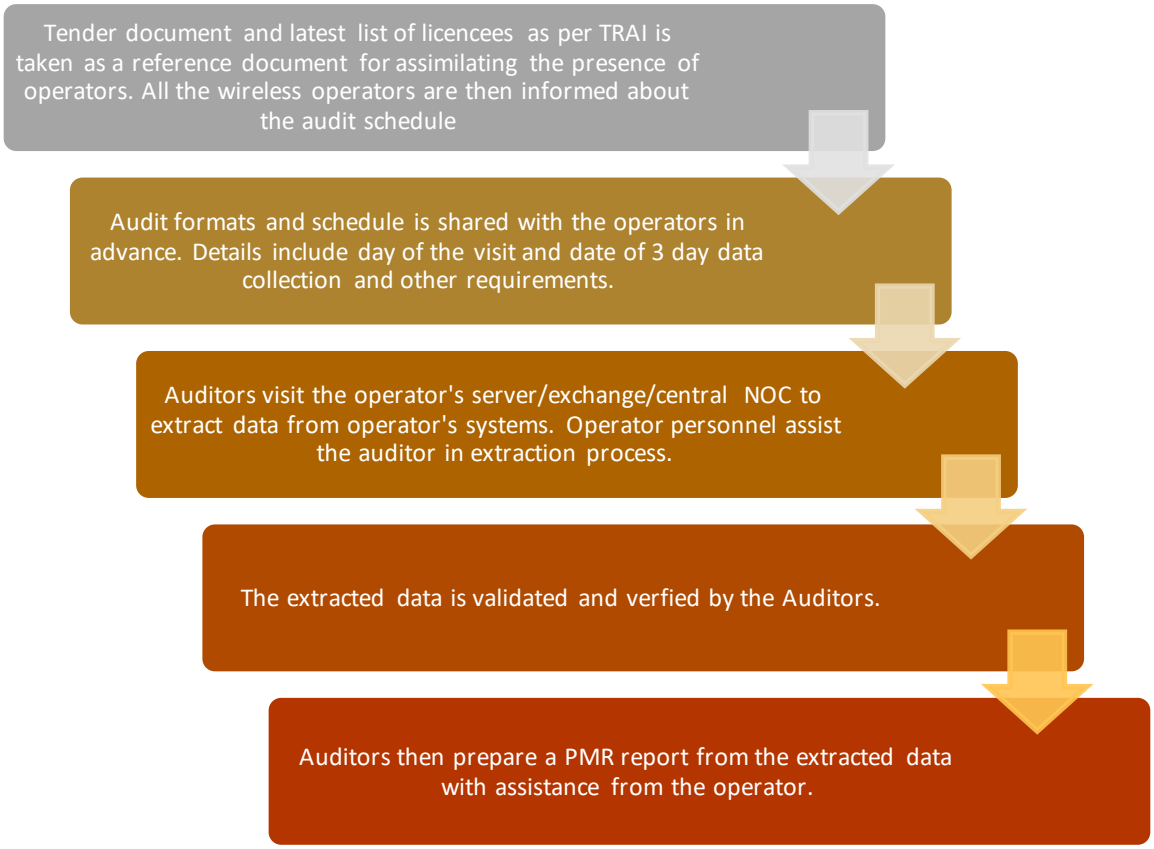
Network Availability	
BTSs Accumulated downtime (not available for service)	≤ 2%
Worst affected BTSs due to downtime	≤ 2%
Connection Establishment (Accessibility)	
Call Set-up Success Rate (within licensee's own network)	≥ 95%
SDCCH/ Paging Channel Congestion	≤ 1 %
TCH Congestion	≤ 2%
Connection Maintenance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

2.3. DATA EXTRACTION POINTS

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



2.4. AUDIT PROCEDURE



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

2.5. NETWORK CALCULATION METHODOLOGY

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

2.6. 3G VOICE

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

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

2.7. 2G & 3G WIRELESS

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

3. 3 Days Live Data

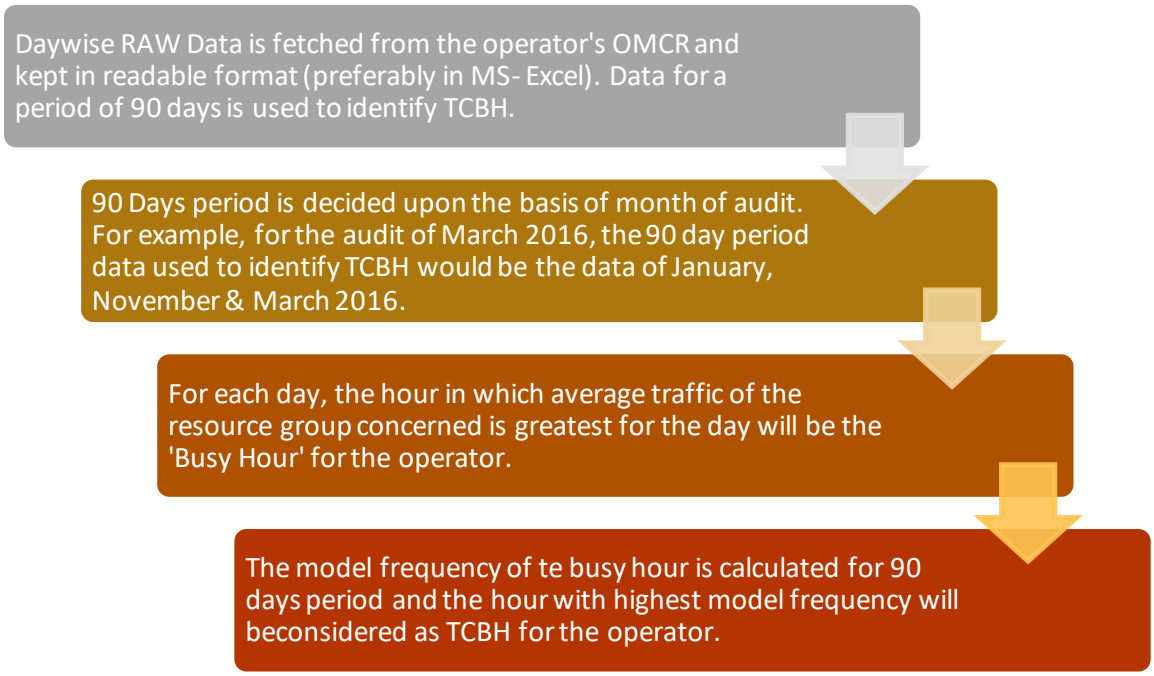
The main purpose of 3 day live measurement is to evaluate the network parameters on intraday basis. While the monthly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the network parameters discussed earlier. All the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

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

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

3.1. TCBH: Significance and Selection Methodology

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



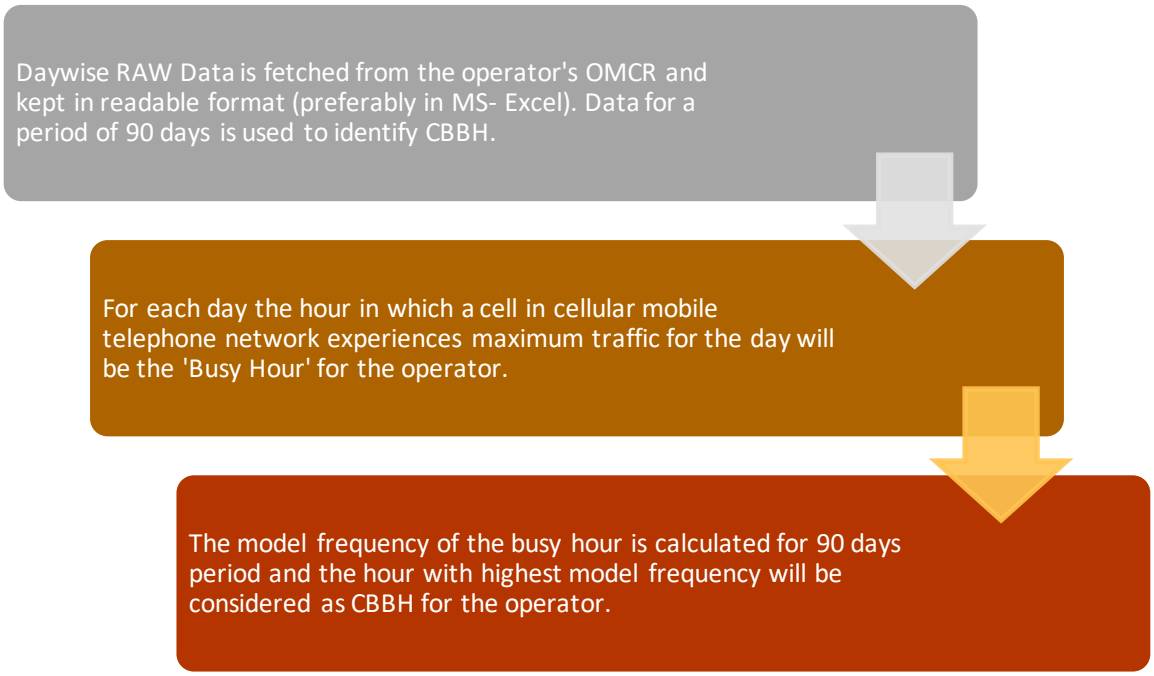
During audit, the auditors identified from the raw data that the TCBH for the operators in Jan – Feb – Mar 2016 was the time period as given below:

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

3.2. CBBH: SIGNIFICANCE AND SELECTION METHODOLOGY

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

Step by step procedure to identify CBBH for an operator:



4. CUSTOMER SERVICE PARAMETERS

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

- Central Billing Center
- Central Customer Service Center

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

The Customer Service Quality Parameters include the following:

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

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

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

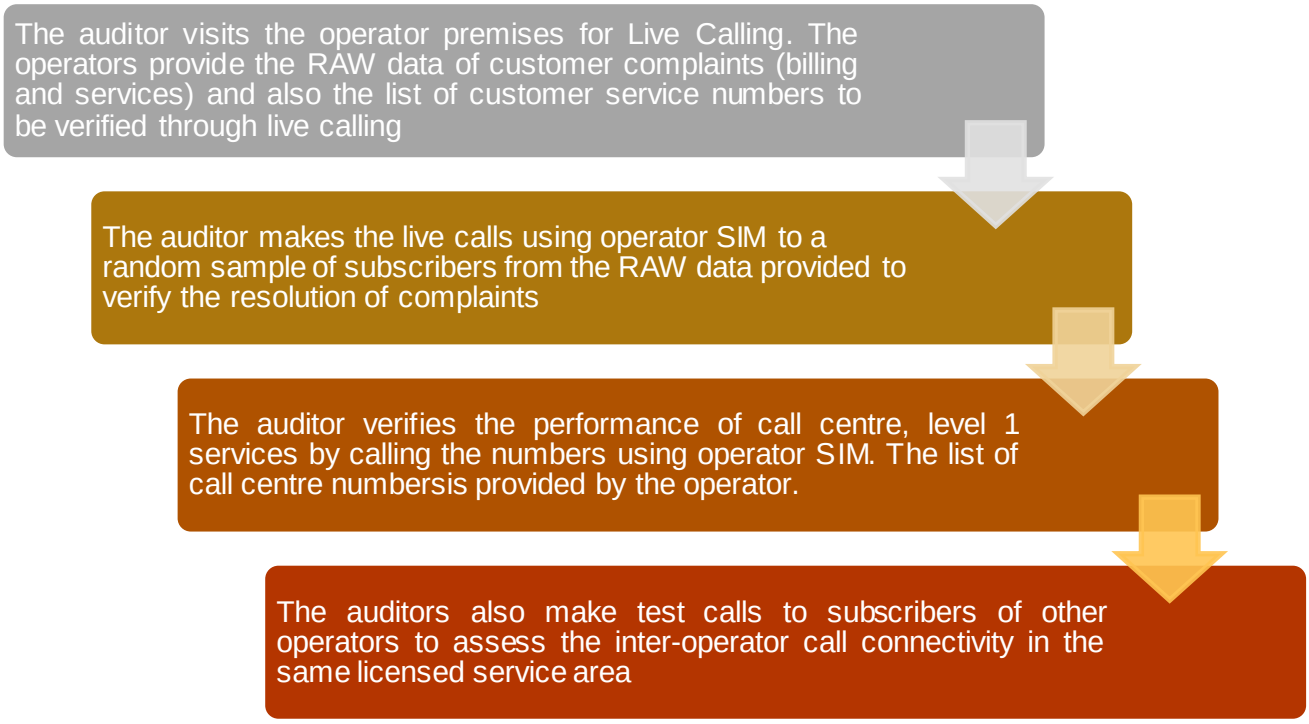
4.1. AUDIT PARAMETERS: CUSTOMER SERVICE

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

4.2. CALCULATION METHODOLOGY: CUSTOMER SERVICE PARAMETER

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

4.3. LIVE CALLING: SIGNIFICANCE AND METHODOLOGY



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

4.4. BILLING COMPLAINTS

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

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

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

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

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

4.5. Service Complaints Requests

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

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

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

4.6. Level 1

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

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

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

4.7. Process to Test Level 1 Service

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

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

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

4.8. CUSTOMER CARE

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

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

The process for this parameter is stated below:

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

4.9. INTER OPERATOR CALL ASSESSMENT

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

Inter Operator Call Assessment	Aircel	Airtel	BSNL	Idea	Reliance GSM	Reliance CDMA	TTSL CDMA	TTSL GSM	Videocon	Vodafone
Aircel	-	100%	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	100%	100%	-	100%	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	-	100%	100%	100%	100%	100%	100%
Reliance GSM	100%	100%	100%	100%	-	100%	100%	100%	100%	100%
Reliance CDMA	100%	100%	100%	100%	100%	-	100%	100%	100%	100%
TTSL CDMA	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
TTSL GSM	100%	100%	100%	100%	100%	100%	100%	-	100%	100%
Videocon	100%	100%	100%	100%	100%	100%	100%	100%	-	100%
Vodafone	100%	100%	100%	100%	100%	100%	100%	100%	100%	-

5. DRIVE TEST: SIGNIFICANCE AND METHODOLOGY

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

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

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

There are two types of drive test as mentioned below.

- Operator Assisted Drive Test
- Independent Drive Test

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

5.1. OPERATOR ASSISTED DRIVE TEST

Haryana circle consist of total 8 SSA's and each SSA needs to be audit in the span of 12 months. The methodology adopted for the drive test:

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

5.2. INDEPENDENT DRIVE TEST

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

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

5.3. PARAMETERS EVALUATED DURING DRIVE TEST

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

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

- FER BINs with 0-2 value (forward FER) – B
- FER BINs with 0-4 value (forward FER) – C
- %age samples with FER bins having 0-2 value (forward FER) = B/A x 100
- %age samples with FER bins having 0-4 value (forward FER) = C/A x 100
- No. of FER samples with value > 4 = [A-C]

- Call setup success rate
  - Total number of call attempts – A
  - Total Calls successfully established – B
  - Call success rate (%age) = (B/A) x 100
- Blocked calls
  - 100% - Call Set up Rate
- Call drop rate
  - Total Calls successfully established – A
  - Total calls dropped after being established – B
  - Call Drop Rate (%age) = (B/A) x 100

6. EXECUTIVE SUMMARY

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

6.1. OPERATORS COVERED

Name of Operator	Number of Subscriber (Up to March 31, 2016)
Aircel	3092
Airtel	2934743
BSNL	3235557
Idea	4650669
RCOM CDMA	369712
RCOM GSM	1588663
TTSL CDMA	279769
TTSL GSM	3355088
Videocon	2252375
Vodafone	5504376

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

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

6.2. AUDIT SCHEDULE

Haryana Circle				
Operator	**3 Days Live (January 2016)**	**January 2016**	**February 2016**	**March 2016**
Airtel	12th Jan 2016	7th Feb 2016	15th Mar 2016	12th Apr 2016
Vodafone	5th Jan 2016	6th Feb 2016	7th Mar 2016	5th Apr 2016
Idea	11th Jan 2016	6th Feb 2016	14th Mar 2016	11th Apr 2016
Reliance	6th Jan 2016	5th Feb 2016	8th Mar 2016	6th Apr 2016
BSNL	8th Jan 2016	18th Feb 2016	10th Mar 2016	8th Apr 2016
Aircel	13th Jan 2016	9th Feb 2016	14th Mar 2016	13th Apr 2016
Tata Teleservices	6th Jan 2016	10th Feb 2016	8th Mar 2016	6th Apr 2016
Videocon	7th Jan 2016	16th Feb 2016	9th Mar 2016	7th Apr 2016

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

Colour codes to read the report:

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

6.3. 2G VOICE PMR DATA: JANUARY

Jan-16											
Network Parameters		Name of Service Provider									
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.09%	0.06%	0.85%	0.00%	0.13%	0.18%	0.13%	0.14%	0.09%	0.03%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.03%	1.38%	0.00%	1.23%	2.00%	0.27%	0.18%	0.00%	0.09%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.57%	98.66%	98.26%	98.60%	98.50%	97.63%	96.72%	98.64%	98.80%	99.51%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.46%	0.28%	0.37%	0.20%	NA	NA	0.08%	0.13%	0.13%
	TCH Congestion	≤ 2%	0.00%	0.56%	0.72%	0.46%	0.07%	1.17%	0.22%	0.21%	0.11%	0.49%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.87%	1.05%	0.58%	0.06%	0.08%	0.71%	0.63%	0.50%	0.62%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.04%	1.24%	1.04%	2.32%	0.45%	0.32%	6.13%	3.05%	0.60%	1.78%
	%age of connection with good voice quality	≥ 95%	100.00%	98.37%	DNA	98.03%	99.49%	99.74%	DNA	96.82%	97.43%	97.89%

6.4. 2G VOICE PMR DATA: FEBRUARY

Feb-16											
Network Parameters		Name of Service Provider									
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.30%	0.08%	1.05%	0.03%	0.14%	0.44%	0.15%	0.57%	0.07%	0.14%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.10%	1.47%	0.00%	0.67%	2.54%	0.28%	5.12%	0.14%	1.27%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	98.92%	98.61%	98.52%	98.99%	97.54%	86.41%	98.22%	98.64%	99.62%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.40%	0.26%	0.26%	0.19%	NA	NA	0.46%	0.20%	0.10%
	TCH Congestion	≤ 2%	0.00%	0.43%	0.60%	0.25%	0.20%	1.18%	11.79%	0.30%	0.27%	0.38%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.81%	1.17%	0.61%	0.06%	0.07%	0.75%	0.96%	0.57%	0.62%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	1.26%	1.20%	2.21%	0.43%	0.31%	5.80%	3.04%	0.70%	2.13%
	%age of connection with good voice quality	≥ 95%	99.97%	98.50%	DNA	97.86%	99.46%	DNA	96.53%	96.94%	97.53%	97.84%

6.5. 2G VOICE PMR DATA: MARCH

Mar-16											
Network Parameters		Name of Service Provider									
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.19%	0.08%	1.11%	0.01%	0.08%	0.21%	0.11%	0.20%	0.14%	0.03%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.10%	1.56%	0.00%	0.78%	1.81%	0.00%	0.41%	0.28%	0.06%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	98.98%	98.42%	98.39%	98.37%	98.25%	95.22%	98.58%	98.59%	99.69%
	SDDCH/Paging chl. Congestion	≤ 1%	0.02%	0.28%	0.31%	0.40%	0.14%	DNA (PAGING)	0.00%	0.17%	0.26%	0.22%
	TCH Congestion	≤ 2%	0.00%	0.39%	0.61%	0.34%	0.16%	0.59%	2.54%	0.24%	0.22%	0.31%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.81%	1.19%	0.61%	0.07%	0.19%	0.58%	0.53%	0.63%	0.62%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	0.33%	1.31%	2.07%	0.42%	0.80%	3.38%	2.39%	0.99%	1.85%
	%age of connection with good voice quality	≥ 95%	99.97%	98.40%	DNA	97.66%	99.61%	99.87%	96.69%	96.70%	97.23%	97.81%

6.6. 2G VOICE PMR DATA: CONSOLIDATED

Consolidated											
Network Parameters		Name of Service Provider									
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.19%	0.07%	1.00%	0.01%	0.12%	0.28%	0.13%	0.30%	0.10%	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.08%	1.47%	0.00%	0.89%	2.12%	0.18%	1.90%	0.14%	0.48%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.52%	98.85%	98.43%	98.50%	98.62%	97.81%	92.78%	98.48%	98.68%	99.61%
	SDDCH/Paging chl. Congestion	≤ 1%	0.01%	0.38%	0.28%	0.34%	0.18%	DNA	0.00%	0.24%	0.20%	0.15%
	TCH Congestion	≤ 2%	0.00%	0.46%	0.64%	0.35%	0.14%	0.98%	4.85%	0.25%	0.20%	0.39%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.83%	1.14%	0.60%	0.06%	0.12%	0.68%	0.71%	0.57%	0.62%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.01%	0.95%	1.18%	2.20%	0.43%	0.48%	5.11%	2.82%	0.76%	1.92%
	%age of connection with good voice quality	≥ 95%	99.98%	98.42%	DNA	97.85%	99.52%	99.81%	96.61%	96.82%	97.40%	97.85%

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

6.7. 2G VOICE 3 DAYS LIVE DATA

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

6.8. 2G VOICE 3 DAYS LIVE DATA: JANUARY

Jan-16											
Network Parameters		Name of Service Provider									
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.00%	0.02%	1.56%	0.00%	0.18%	0.42%	0.04%	0.17%	0.29%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	98.79%	98.56%	98.54%	99.72%	97.58%	96.55%	98.83%	98.77%	99.38%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.42%	0.20%	0.24%	0.24%	NA	NA	0.06%	0.11%	0.12%
	TCH Congestion	≤ 2%	0.00%	0.50%	1.22%	0.35%	0.02%	1.17%	0.15%	0.13%	0.09%	0.62%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.90%	0.91%	0.56%	0.06%	0.10%	0.68%	0.69%	0.60%	0.66%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	1.21%	1.33%	2.31%	0.35%	0.50%	5.54%	3.26%	1.10%	2.39%
	%age of connection with good voice quality	≥ 95%	100.00%	98.33%	DNA	98.03%	99.47%	99.75%	DNA	96.83%	97.32%	97.65%

6.9. 2G VOICE 3 DAYS LIVE DATA: FEBRUARY

Feb-16											
Network Parameters		Name of Service Provider									
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.27%	0.03%	1.85%	0.00%	0.12%	0.35%	0.12%	0.10%	0.05%	0.02%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.66%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	99.01%	98.45%	98.64%	99.03%	97.53%	98.19%	98.71%	98.73%	99.84%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.25%	0.20%	0.17%	0.36%	NA	NA	0.04%	0.21%	0.10%
	TCH Congestion	≤ 2%	0.00%	0.37%	0.63%	0.14%	0.12%	1.18%	0.02%	0.14%	0.20%	0.16%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.81%	1.17%	0.53%	0.06%	0.07%	0.61%	0.65%	0.56%	0.63%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	1.31%	1.17%	2.23%	0.37%	0.40%	5.91%	2.76%	0.65%	2.50%
	%age of connection with good voice quality	≥ 95%	100.00%	98.32%	DNA	98.05%	99.46%	99.78%	DNA	96.85%	97.32%	97.80%

6.10. 2G VOICE 3 DAYS LIVE DATA: MARCH

Mar-16											
Network Parameters		Name of Service Provider									
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.00%	0.01%	1.55%	0.07%	0.10%	0.28%	0.05%	0.12%	0.06%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.71%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	99.10%	98.24%	98.34%	98.88%	98.47%	96.98%	98.60%	98.48%	99.71%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.20%	0.19%	0.53%	0.16%	NA	0.00%	0.16%	0.33%	0.07%
	TCH Congestion	≤ 2%	0.00%	0.32%	0.44%	0.39%	0.15%	0.17%	1.15%	0.23%	0.26%	0.29%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.85%	1.38%	0.63%	0.08%	0.21%	0.46%	0.57%	0.66%	0.64%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	0.35%	1.54%	2.18%	0.46%	1.07%	2.66%	2.41%	0.88%	2.55%
	%age of connection with good voice quality	≥ 95%	100.00%	98.33%	DNA	97.57%	99.60%	99.87%	DNA	96.62%	97.10%	97.63%

6.11. 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated											
Network Parameters		Name of Service Provider									
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.09%	0.02%	1.65%	0.02%	0.13%	0.35%	0.07%	0.13%	0.13%	0.03%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	98.97%	98.42%	98.51%	99.21%	97.86%	97.24%	98.71%	98.66%	99.64%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.29%	0.20%	0.31%	0.25%	NA	0.00%	0.09%	0.22%	0.10%
	TCH Congestion	≤ 2%	0.00%	0.39%	0.77%	0.29%	0.10%	0.84%	0.44%	0.17%	0.18%	0.36%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.85%	1.15%	0.57%	0.06%	0.13%	0.58%	0.63%	0.61%	0.64%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	0.95%	1.35%	2.24%	0.39%	0.66%	4.70%	2.81%	0.88%	2.48%
	%age of connection with good voice quality	≥ 95%	100.00%	98.33%	DNA	97.88%	99.51%	99.80%	DNA	96.77%	97.25%	97.69%

- TTSL CDMA has parameter value of 4.70% and failed to meet the benchmark of ≤ 3% Worst Affected cell having more than 3% TCH drop

6.12. 3G VOICE PMR: JANUARY

Jan-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	DNA	1.23%	0.06%	0.09%	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	DNA	1.74%	0.00%	0.00%	0.26%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	DNA	99.23%	99.15%	99.81%	99.78%
	RRC Congestion:	≤ 1%	DNA	0.04%	0.42%	0.51%	0.03%
	RAB Congestion:	≤ 2%	DNA	0.33%	0.29%	0.69%	0.02%
	Circuit Switched Voice Drop Rate	≤ 2%	DNA	0.61%	0.31%	0.20%	0.32%

Connection Maintenance (Retainability)	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	DNA	2.09%	2.18%	1.27%	2.95%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	DNA	DNA	98.72%	99.13%	97.56%

6.13. 3G VOICE PMR: FEBRUARY

Feb-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.10%	1.19%	0.00%	0.49%	0.08%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.05%	1.95%	0.00%	4.39%	0.37%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.08%	99.38%	99.32%	91.61%	99.78%
	RRC Congestion:	≤ 1%	0.00%	0.04%	0.45%	38.64%	0.02%
	RAB Congestion:	≤ 2%	0.00%	0.28%	0.25%	1.09%	0.01%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.34%	0.61%	0.25%	0.22%	0.28%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.42%	1.88%	1.81%	1.46%	3.04%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.07%	DNA	98.82%	99.12%	98.02%

6.14. 3G VOICE PMR: MARCH

Mar-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.31%	1.63%	0.04%	0.07%	0.05%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	1.49%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.09%	99.37%	99.47%	99.85%	99.78%
	RRC Congestion:	≤ 1%	0.00%	0.03%	0.49%	0.35%	0.20%
	RAB Congestion:	≤ 2%	0.00%	0.34%	0.10%	0.61%	0.02%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.08%	0.59%	0.25%	0.16%	0.42%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.71%	1.26%	2.17%	2.00%	3.80%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.00%	DNA	98.89%	99.14%	97.37%

6.15. 3G VOICE PMR: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.20%	1.35%	0.03%	0.22%	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.03%	1.73%	0.00%	1.46%	0.21%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.09%	99.33%	99.32%	97.09%	99.78%
	RRC Congestion:	≤ 1%	0.00%	0.04%	0.45%	13.17%	0.08%
	RAB Congestion:	≤ 2%	0.00%	0.32%	0.22%	0.80%	0.02%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.21%	0.60%	0.27%	0.19%	0.34%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.56%	1.74%	2.05%	1.58%	3.26%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.03%	DNA	98.81%	99.13%	97.65%

- TTSL has parameter value of 13.17% and failed to meet the benchmark of ≤ 1% RRC Congestion
- VODAFONE has parameter value of 3.26% and failed to meet the benchmark of ≤ 3% Worst affected cells having more than 3% Circuit Switched Voice Drop Rate

6.16. 3G VOICE 3 DAYS LIVE DATA: JANUARY

Jan-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	DNA	1.49%	0.97%	0.32%	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	DNA	1.32%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	DNA	99.23%	98.04%	99.85%	99.77%
	RRC Congestion:	≤ 1%	DNA	0.03%	0.80%	0.35%	0.00%
	RAB Congestion:	≤ 2%	DNA	0.32%	0.37%	0.81%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	DNA	0.61%	0.42%	0.19%	0.45%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	DNA	2.62%	2.15%	1.42%	4.20%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	DNA	DNA	98.71%	99.13%	96.84%

6.17. 3G VOICE 3 DAYS LIVE DATA: FEBRUARY

Feb-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.14%	1.84%	0.00%	0.08%	0.02%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.65%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.12%	99.24%	99.38%	99.75%	99.74%
	RRC Congestion:	≤ 1%	0.00%	0.05%	0.47%	0.76%	0.01%
	RAB Congestion:	≤ 2%	0.00%	0.36%	0.27%	0.75%	0.02%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.34%	0.63%	0.23%	0.18%	0.24%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.45%	1.87%	2.32%	1.05%	2.20%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.15%	DNA	98.86%	99.13%	98.32%

6.18. 3G VOICE 3 DAYS LIVE DATA: MARCH

Mar-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.31%	1.63%	0.04%	0.07%	0.05%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	1.49%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.09%	99.37%	99.47%	99.85%	99.78%
	RRC Congestion:	≤ 1%	0.00%	0.03%	0.49%	0.35%	0.20%
	RAB Congestion:	≤ 2%	0.00%	0.34%	0.10%	0.61%	0.02%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.08%	0.59%	0.25%	0.16%	0.42%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.71%	1.26%	2.17%	2.00%	3.80%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.00%	DNA	98.89%	99.14%	97.37%

6.19. 3G VOICE 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.22%	1.65%	0.34%	0.16%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	1.15%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.11%	99.28%	98.96%	99.82%	99.77%
	RRC Congestion:	≤ 1%	0.00%	0.04%	0.58%	0.49%	0.07%
	RAB Congestion:	≤ 2%	0.00%	0.34%	0.25%	0.72%	0.02%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.21%	0.61%	0.30%	0.18%	0.37%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.58%	1.92%	2.22%	1.49%	3.40%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.08%	DNA	98.82%	99.13%	97.51%

- VODAFONE has parameter value of 3.40% and failed to meet the benchmark of ≤ 3% Worst affected cells having more than 3% Circuit Switched Voice Drop Rate

6.20. PMR MONTHLY 2G WIRELESS DATA - CONSOLIDATED

Consolidated												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		75	DNA	DNA	102536	2201	4438	1	90	DNA	33404
ii)	Total Service Activations provided within 4 Hours (B)		75	DNA	DNA	101985	2201	4438	1	87	DNA	33312
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	100.00%	DNA	DNA	99.54%	100.00%	100.00%	100.00%	95.68%	DNA	99.72%
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		1750	14424158	36319907	124938333	DNA	DNA	5682808	2860200	DNA	14864807
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		1749	14421817	36034017	122960428	DNA	DNA	5488116	2858072	DNA	14849682
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.98%	99.98%	99.22%	98.58%	DNA	DNA	96.56%	99.91%	DNA	99.90%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		8117	2268852898	DNA	5255817346	76485153484	2760705	51794	788424543	DNA	1297248391
ii)	RNC originated PS Domain Iu Connection Release (B)		73	18567218	DNA	49148661	459003523	9233	505	18141744	DNA	50564191
iii)	Drop Rate = (B/A) * 100	<=5%	2.36%	0.82%	DNA	0.90%	1.00%	0.33%	0.87%	2.30%	DNA	3.90%

6.21. PMR MONTHLY 2G WIRELESS DATA - JANUARY

Jan-16												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		8	DNA	DNA	DNA	2354	5539	1	135	DNA	32987
ii)	Total Service Activations provided within 4 Hours (B)		8	DNA	DNA	DNA	2354	5539	1	132	DNA	32828
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	100.00%	DNA	DNA	DNA	100.00%	100.00%	100.00%	97.78%	DNA	99.52%
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		459	DNA	41330175	154284933	DNA	DNA	8836690.00	3082235	DNA	15323942
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		459	DNA	40948847	151284706	DNA	DNA	8528935.00	3080549	DNA	15307279
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	99.08%	98.06%	99.54%	98.73%	96.52%	99.95%	DNA	99.89%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	DNA	1482638170	130820260000	2799739	70797	872799672	DNA	1393373701
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	DNA	12310004	816909688	8720	637	19479339	DNA	53163457
iii)	Drop Rate = (B/A) * 100	<=5%	4.28%	DNA	DNA	0.83%	0.62%	0.31%	0.90%	2.23%	DNA	3.82%

6.22. PMR MONTHLY 2G WIRELESS DATA - FEBRUARY

Feb-16												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		2	DNA	DNA	85281	2280	3989	0	59	DNA	33821
ii)	Total Service Activations provided within 4 Hours (B)		2	DNA	DNA	85281	2280	3989	0	55	DNA	33795
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	100.00%	DNA	DNA	100.00%	100.00%	100.00%	NIL	93.22%	DNA	99.92%
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		2873	DNA	30107966	127437013	DNA	DNA	7934538	2004649	DNA	12705573
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		2873	DNA	29883569	124590769	DNA	DNA	7667863	2001441	DNA	12696172
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	99.25%	97.77%	99.44%	98.92%	96.64%	99.84%	DNA	99.93%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	DNA	6257484656	98609650000	2532800	82359	675843285	DNA	1153106523
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	DNA	56816923	559639732	8226	862	15515413	DNA	45361496
iii)	Drop Rate = (B/A) * 100	<=5%	1.90%	DNA	DNA	0.91%	0.57%	0.32%	1.05%	2.30%	DNA	3.93%

6.23. PMR MONTHLY 2G WIRELESS DATA - MARCH

Mar-16												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		214	DNA	DNA	119791	1968	3787	1	76	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		214	DNA	DNA	118689	1968	3787	1	73	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	100%	DNA	DNA	99.08%	100.00%	100.00%	100%	96.05%	DNA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		1917	14424158	37521581	93093052	DNA	DNA	277197	3493715	DNA	16564907
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		1916	14421817	37269634	93005810	DNA	DNA	267549	3492227	DNA	16545596
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.95%	99.98%	99.33%	99.91%	99.50%	98.09%	96.52%	99.96%	DNA	99.88%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		8117	2268852898	DNA	8027329212	25550453	2949575	2226	816630671	DNA	1345264950
ii)	RNC originated PS Domain Iu Connection Release (B)		73	18567218	DNA	78319056	461148	10752	15	19430481	DNA	53167621
iii)	Drop Rate = (B/A) * 100	<=5%	0.90%	0.82%	DNA	0.98%	1.80%	0.36%	0.66%	2.38%	DNA	3.95%

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

Consolidated												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	8891	10763	602	0	12	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	8877	10763	602	0	11	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	99.83%	100.00%	100.00%	NIL	85.62%	DNA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		562	DNA	2440458	10692417	DNA	DNA	853722	286483	DNA	1468110
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		562	DNA	2418464	10642860	DNA	DNA	824279	286200	DNA	1465337
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	98.49%	99.51%	99.52%	98.54%	96.55%	99.89%	DNA	99.81%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	DNA	541268083	8739197922	301453	4228	82536054	DNA	126621846
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	DNA	4765142	53774470	1188.666667	35	1854603	DNA	5281201
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	DNA	DNA	0.83%	1.00%	0.39%	0.60%	2.25%	DNA	4.20%

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

Jan-16												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	DNA	DNA	DNA	0	26	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA	DNA	0	25	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	DNA	DNA	DNA	NIL	96.15%	DNA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	DNA	1240627	896970	DNA	DNA	861639	245415	DNA	1509062
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	DNA	1206705	892141	DNA	DNA	831851	244877	DNA	1503019
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	DNA	97.27%	99.46%	99.59%	98.80%	96.54%	99.78%	DNA	99.60%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	DNA	41990210	12418410000	313478	6930	85284821	DNA	139372516
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	DNA	308721	78808271	1553	65	1813921	DNA	5676287
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	DNA	DNA	0.74%	0.63%	0.50%	0.94%	2.13%	DNA	4.07%

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

Feb-16												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	9391	10763	602	DNA	4	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	9391	10763	602	DNA	3	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	100.00%	100.00%	100.00%	DNA	75.00%	DNA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	DNA	3640289	15123519	DNA	DNA	836808	237583	DNA	1438797
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	DNA	3630222	14991897	DNA	DNA	808667	237418	DNA	1437494
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	DNA	99.72%	99.13%	99.42%	98.92%	96.64%	99.93%	DNA	99.91%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	DNA	790802969	13720930000	299516	DNA	83852770	DNA	130938197
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	DNA	6357351	81130567	927	DNA	1846146	DNA	5152100
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	DNA	DNA	0.80%	0.59%	0.31%	DNA	2.20%	DNA	3.93%

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

Mar-16												
Cellular Mobile Telephone Services												
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	8391	DNA	DNA	0	7	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	8362	DNA	DNA	0	6	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	99.65%	DNA	DNA	NIL	85.71%	DNA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		562	DNA	DNA	16056762	DNA	DNA	862720	376451	DNA	1456470
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		562	DNA	DNA	16044543	DNA	DNA	832319	376306	DNA	1455497
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	DNA	99.92%	99.55%	97.90%	96.48%	99.96%	DNA	99.93%
3	Drop Rate = (B/A) * 100											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	DNA	791011071	78253766	291366	1526	78470570	DNA	109554824
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	DNA	7629355	1384572	1086	4	1903742	DNA	5015215
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	DNA	DNA	0.96%	1.77%	0.37%	0.26%	2.43%	DNA	4.58%

6.28. PMR MONTHLY 3G WIRELESS DATA - CONSOLIDATED

Consolidated							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	90	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	87	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	95.68%	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		3050758	33789770	5415699	3333221	6316946
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		3044143	33266955	5342860	3332061	6289625
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.78%	98.39%	98.65%	99.96%	99.57%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		198370799	DNA	194921881	12716923	202297970
ii)	RNC originated PS Domain Iu Connection Release (B)		96832	DNA	3465523	204462	2087988
iii)	Drop Rate = (B/A) * 100	<=5%	0.05%	DNA	1.77%	1.60%	1.02%

6.29. PMR MONTHLY 3G WIRELESS DATA - JANUARY

Jan-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	135	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	132	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	97.78%	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	37991412.16	5635548	3082235	6245766
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	37491255	5575307	3080549	6213808
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	98.68%	98.93%	99.95%	99.49%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	211480013	13997917	237168595
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	4074172	256409	2696450
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	DNA	1.93%	1.83%	1.14%

6.30. PMR MONTHLY 3G WIRELESS DATA - FEBRUARY

Feb-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	59	33821
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	55	33795
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	93.22%	99.92%
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	29650218	4625228	3538527	5777243
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	28781997	4554476	3536856	5755260
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	97.07%	98.47%	99.95%	99.62%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	164844556	11015497	180712726
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	2692157	177975	1662247
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	DNA	1.63%	1.62%	0.92%

6.31. PMR MONTHLY 3G WIRELESS DATA - MARCH

Mar-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	76	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	73	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	96.05%	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		3050758	33727680	5986322	3378900	6927830
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		3044143	33527614	5898798	3378777	6899808
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.78%	99.41%	98.54%	99.996%	99.60%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		198370799	DNA	208441074	13137355	189012588
ii)	RNC originated PS Domain Iu Connection Release (B)		96832	DNA	3630240	179001	1905267
iii)	Drop Rate = (B/A) * 100	<=5%	0.05%	DNA	1.74%	1.36%	1.01%

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

Consolidated							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	12	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	11	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	85.62%	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	3138997	622221	310239	613441
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	3103218	611324	310128	610928
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	98.72%	98.21%	99.96%	99.60%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	20921471	1321883	21377518
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	442360	21444	274523
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	DNA	2.12%	1.63%	1.29%

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

Jan-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	26	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	25	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	96.15%	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	2752089	606333	292500	639550
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	2686444	593693	292424	635693
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	97.61%	97.92%	99.97%	99.40%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	20985438	1303028	22680214
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	613909	27595	370517
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	DNA	2.93%	2.12%	1.63%

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

Feb-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	4	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	3	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	75.00%	DNA
2	D						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	3525905	671761	308115	623113
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	3519992	665836	307859	620981
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	99.83%	99.12%	99.92%	99.66%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	21820535	1321627	22504758
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	351581	19207	177720
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	DNA	1.61%	1.45%	0.79%

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

Mar-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	7	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	6	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	85.71%	DNA
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	DNA	588570	330101	577661
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	DNA	574444	330101	576111
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	DNA	97.60%	100%	99.73%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	DNA	19958441	1340994	18947583
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	DNA	361589	17529	275332
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	DNA	1.81%	1.31%	1.45%

6.36. POI CONGESTION: CONSOLIDATED

Consolidated											
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service											
S. No.	Name of Parameter	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network											
7	**Total No. of POI's in Month having < = 0.5% POI congestion**										
	Total No. of call attempts on POI	9401	1405745	21663592	33320	9359	150590	404556	220433	9650564	2577594
	Total traffic served on all POIs (Erlang)	30.43951971	37028.73095	394317.4828	1351.609362	169.3018727	3221.116865	10776.97055	3794.00584	250176.29	46353.44822
	Total No. of circuits on all individual POIs	71414	60528	541536	2019	1666	9502	31609	9101	334577	79958
	Total number of working POI Service Area wise	362	42	682	57	9	18	87	16	612	21
	Capacity of all POIs	65540	59923	379076	2003	1398	8606	29394	8447	315964	78590
	No. of all POI's having >=0.5% POI congestion	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

6.37. POI CONGESTION: JANUARY

Jan-16											
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service											
S. No.	Name of Parameter	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter											
7	**Total No. of POI's in Month having < = 0.5% POI congestion**										
	Total No. of call attempts on POI	1182	1365008	61118362	32190	8876.03	145323	403539	210153	10366131	2426285
	Total traffic served on all POIs (Erlang)	4	37586	1111816	1160	157.10	2946.906436	11639	3826	240702	45656
	Total No. of circuits on all individual POIs	6911	60775	1525913	2001	1666.00	9502	31940	9015	337559	79699
	Total number of working POI Service Area wise	35	42	1922	57	9.00	18	85	16	620	21
	Capacity of all POIs	6343	60167	1068141	1985	1380.77	8635.525756	29749	8447	318731	78330.41
	No. of all POI's having >=0.5% POI congestion	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

6.38. POI CONGESTION: FEBRUARY

Feb-16											
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service											
S. No.	Name of Parameter	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter											
7	**Total No. of POI's in Month having < = 0.5% POI congestion**										
	Total No. of call attempts on POI	26145	1389200	1962191	34029	9873	152921	369045	225389	8260880	2622809
	Total traffic served on all POIs (Erlang)	84.71	37078	35756	1149	173.96	3329.900539	8957	3892	233403	47517
	Total No. of circuits on all individual POIs	200419	61023	49223	2033	1666	9502	31803	9084	315781	79794
	Total number of working POI Service Area wise	1015	42	62	57	9	18	88	16	580	21
	Capacity of all POIs	183934	60413	34456	2017	1407	8597	29571	8447	298168	78425
	No. of all POI's having >=0.5% POI congestion	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

6.39. POI CONGESTION: MARCH

Mar-16											
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service											
S. No.	Name of Parameter	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Service Quality Parameter											
7	**Total No. of POI's in Month having < = 0.5% POI congestion**										
	Total No. of call attempts on POI	877	1463028	1910223	33740	9329	153527	441084	225757	10324680	2683686
	Total traffic served on all POIs (Erlang)	3	36422	35380	1746	177	3387	11734	3664	276423	45887
	Total No. of circuits on all individual POIs	6911	59786	49471	2023	1666	9502	31085	9204	350392	80380
	Total number of working POI Service Area wise	35	42	62	57	9	18	88	16	636	21
	Capacity of all POIs	6343	59188	34630	2007	1405	8585	28863	8447	330993	79015
	No. of all POI's having >=0.5% POI congestion	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

7. CUSTOMER SERVICE DELIVERY

7.1. BILLING AND CUSTOMER CARE

Name of Service Provider	Metering and Billing credibility		Billing Complaints			Termination & Closures	Time taken for refund of deposits after closures: Benchmark	Response time to customer for assistance	
	Postpaid Subscribers	Prepaid Subscribers	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	%age of where credit/waiver is received within one week	% of Termination/ Closure of service within 7 days (100 %)	Cleared over a period of <60 days (100%)	%age of calls answered by the IVR	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark	≤ 0.1%	≤ 0.1%	≥ 98%	= 100%	= 100%	= 100%	= 100%	≥ 95%	≥ 95%
AIRCEL	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.17%	99.91%
AIRTEL	0.03%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.87%	94.75%
BSNL	0.06%	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.40%
IDEA	0.08%	0.39%	100.00%	100.00%	100.00%	100.00%	100.00%	99.78%	97.92%
RCOM-GSM	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	99.16%	93.12%
RCOM-CDMA	0.09%	0.08%	100.00%	100.00%	100.00%	100.00%	100.00%	98.07%	96.27%
TTSL-GSM	0.00%	0.00%	100.00%	100.00%	83.33%	100.00%	100.00%	97.86%	88.91%
TTSL-CDMA	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.86%	99.62%
VIDEOCON	NA	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.22%
VODAFONE	0.07%	0.08%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.46%

	Customer Care & Grievances Redressal	
	% of Complaints addressed at call center level	% of Complaints addressed by Appellate Authority
AIRCEL	100.00%	NIL
AIRTEL	100.00%	100.00%
BSNL	99.28%	NIL
IDEA	63.45%	100.00%
RCOM-GSM	100.00%	100.00%
RCOM-CDMA	100.00%	100.00%
TTSL-GSM	99.28%	98.21%
TTSL-CDMA	99.69%	100.00%
VIDEOCON	100.00%	NIL
VODAFONE	100.00%	NIL

7.2. LIVE CALLING DATA: CONSOLIDATED

Name of Service Provider	Metering and Billing (Service Request)				Response time to customer for Assistanse	
	Total Calls Attempted	No. of Subscribers reached	Compalints/ Request attended to satisfaction	% of Complaints/ Request attended to satisfaction	Accessibility of call centre / Customer care	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark					**≥ 95%**	**≥ 95%**
AIRCEL	237	200	197	98.50%	100%	100%
AIRTEL	159	38	34	89.47%	100%	100%
BSNL	137	66	36	54.55%	100%	97%
IDEA	300	50	38	76.00%	100%	100%
RCOM-GSM	112	93	84	90.32%	100%	99%
RCOM-CDMA	153	111	100	90.09%	98%	98%
TTSL-GSM	0	0	0	100.00%	100%	96%
TTSL-CDMA	0	0	0	100.00%	100%	97%
VIDEOCON	15	7	2	28.57%	97%	96%
VODAFONE	256	200	196	98.00%	100%	100%

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

7.3. 3 DAYS LIVE CALL CENTRE DATA

Response time to customer assistance						
OPERATOR	**Total no of calls attempted to customer care/Call center**	**Total no. of calls successfully established to customer care/Call center**	**% age of Accessibility of Call centre**	**Total Calls reached to operator for (Voice to Voice)**	**Total number of calls answered by the operator (Voice to voice) within 90 seconds**	**% age calls answered by the operator within 90 seconds**
	AVERAGE					
OPERATOR			**>=95%**			**>=95%**
AIRCEL	125	125	100.00%	60	56	93.33%
AIRTEL	24924	24924	100.00%	53929	46438	86.11%
BSNL	8501	8501	100.00%	2887	2887	100.00%
IDEA	519914	518766	99.78%	115852	114859	99.14%
RCOM-GSM	58066	57759	99.47%	15032	14742	98.07%
RCOM-CDMA	9641	9376	97.25%	3142	3096	98.54%
TTSL-GSM	21378	21084	98.62%	39899	39243	98.36%
TTSL-CDMA	21378	21084	98.62%	1117	1116	99.91%
VIDEOCON	18658	18658	100.00%	3631	3544	97.60%
VODAFONE	293286	293286	100.00%	115941	115007	99.19%

8. L1 CALLING DATA

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

- Jind: 28th March 2016 to 30th March 2016
- Rohtak: 4th February 2016 to 6th February 2016

8.1. JIND

8.1.1. AIRTEL

SR. N.	EMERGENCY NUMBER	CALLS MADE	JIND	NARWANA	SAFIDON	JULANA
1	100	5	√	√	√	√
2	101	5	√	√	√	√
3	102	5	√	√	√	√
4	104	5	√	√	√	√
5	108	5	√	√	√	√
6	138	5	√	√	√	√
7	149	5	√	√	√	√
8	181	5	√	√	√	√
9	182	5	√	√	√	√
10	1033	5	√	√	√	√
11	1037	5	√	√	√	√
12	1056	5	√	√	√	√
13	1060	5	√	√	√	√
14	1063	5	√	√	√	√
15	1064	5	√	√	√	√
16	1070	5	√	√	√	√
17	1071	5	√	√	√	√
18	1072	5	√	√	√	√
19	1073	5	√	√	√	√
20	1077	5	X	X	X	X
21	1090	5	X	X	X	X
22	1091	5	√	√	√	√
23	1097	5	√	√	√	√
24	1099	5	X	X	X	X
25	10580	5	X	X	X	X
26	10589	5	X	X	X	X
27	10740	5	X	X	X	X
28	10741	5	X	X	X	X
29	1511	5	X	X	X	X
30	1512	5	√	√	√	√
31	1514	5	X	X	X	X
32	15100	5	X	X	X	X
33	155304	5	X	X	X	X
34	155214	5	X	X	X	X
35	1903	5	X	X	X	X
36	1909	5	√	√	√	√
37	1912	5	√	√	√	√
38	1916	5	√	√	√	√
39	1950	5	√	√	√	√

8.1.2. BSNL

		BSNL			
SR. N.	EMERGENCY NUMBER	JIND	NARWANA	SAFIDON	JULANA
1	100	√	√	×	×
2	101	√	√	×	×
3	102	√	√	×	×
4	104	√	√	×	×
5	108	×	×	×	×
6	138	×	×	×	×
7	149	×	×	×	×
8	181	×	×	×	×
9	182	×	×	×	×
10	1033	×	√	×	×
11	1037	×	×	×	×
12	1056	×	×	×	×
13	1060	×	×	×	×
14	1063	×	×	×	×
15	1064	×	×	×	×
16	1070	√	√	×	×
17	1071	×	×	×	×
18	1072	√	√	×	×
19	1073	×	×	×	×
20	1077	√	√	×	×
21	1090	×	×	×	×
22	1091	×	×	×	×
23	1097	×	×	×	×
24	1099	×	×	×	×
25	10580	×	×	×	×
26	10589	×	×	×	×
27	10740	×	×	×	×
28	10741	×	×	×	×
29	1511	×	×	×	×
30	1512	×	×	×	×
31	1514	×	×	×	×
32	15100	√	√	√	√
33	155304	×	×	×	×
34	155214	×	×	×	×
35	1903	√	√	×	×
36	1909	√	√	√	√
37	1912	×	×	×	×
38	1916	×	×	×	×
39	1950	×	×	×	×

8.1.3. IDEA

		IDEA			
SR. N.	EMERGENCY NUMBER	JIND	NARWANA	SAFIDON	JULANA
1	100	✓	✓	×	×
2	101	✓	✓	×	×
3	102	✓	✓	×	×
4	104	×	×	×	×
5	108	×	×	×	×
6	138	×	×	×	×
7	149	×	×	×	×
8	181	✓	✓	×	×
9	182	×	×	×	×
10	1033	✓	✓	✓	✓
11	1037	×	×	×	×
12	1056	×	×	×	×
13	1060	×	×	×	×
14	1063	✓	✓	×	×
15	1064	×	×	×	×
16	1070	✓	✓	×	×
17	1071	×	×	×	×
18	1072	✓	✓	×	×
19	1073	✓	✓	×	×
20	1077	×	×	×	×
21	1090	×	×	×	×
22	1091	✓	✓	×	×
23	1097	×	×	×	×
24	1099	×	×	×	×
25	10580	×	×	×	×
26	10589	×	×	×	×
27	10740	×	×	×	×
28	10741	×	×	×	×
29	1511	×	×	×	×
30	1512	✓	×	×	×
31	1514	×	×	×	×
32	15100	✓	✓	×	×
33	155304	×	×	×	×
34	155214	×	×	×	×
35	1903	✓	×	×	×
36	1909	✓	✓	✓	✓
37	1912	×	×	×	×
38	1916	×	×	×	×
39	1950	✓	✓	×	×

8.1.4. RCOM – CDMA

		RCOM CDMA			
SR. N.	EMERGENCY NUMBER	JIND	NARWANA	SAFIDON	JULANA
1	100	√	×	√	×
2	101	√	×	√	×
3	102	√	×	√	×
4	104	×	×	×	×
5	108	×	×	×	×
6	138	√	×	√	×
7	149	×	×	×	×
8	181	√	×	√	×
9	182	√	×	√	×
10	1033	√	×	√	×
11	1037	×	×	×	×
12	1056	×	×	×	×
13	1060	×	×	×	×
14	1063	×	×	×	×
15	1064	×	×	×	×
16	1070	×	×	×	×
17	1071	×	√	×	√
18	1072	√	×	√	×
19	1073	√	×	√	×
20	1077	×	×	×	×
21	1090	×	×	×	×
22	1091	√	×	√	×
23	1097	√	×	√	×
24	1099	×	×	×	×
25	10580	×	×	×	×
26	10589	×	×	×	×
27	10740	×	×	×	×
28	10741	×	×	×	×
29	1511	×	×	×	×
30	1512	√	×	√	×
31	1514	×	×	×	×
32	15100	√	×	√	×
33	155304	×	×	×	×
34	155214	×	×	×	×
35	1903	×	×	×	×
36	1909	√	×	√	×
37	1912	×	×	×	×
38	1916	×	×	×	×
39	1950	×	×	×	×

8.1.5. RCOM – GSM

		RCOM GSM			
SR. N.	EMERGENCY NUMBER	JIND	NARWANA	SAFIDON	JULANA
1	100	√	×	√	×
2	101	√	×	√	×
3	102	√	×	√	×
4	104	×	×	×	×
5	108	×	×	×	×
6	138	√	×	√	×
7	149	×	×	×	×
8	181	√	×	√	×
9	182	√	×	√	×
10	1033	√	×	√	×
11	1037	×	×	×	×
12	1056	×	×	×	×
13	1060	×	×	×	×
14	1063	×	×	×	×
15	1064	×	×	×	×
16	1070	×	×	×	×
17	1071	×	√	×	√
18	1072	√	×	√	×
19	1073	√	×	√	×
20	1077	×	×	×	×
21	1090	×	×	×	×
22	1091	√	×	√	×
23	1097	√	×	√	×
24	1099	×	×	×	×
25	10580	×	×	×	×
26	10589	×	×	×	×
27	10740	×	×	×	×
28	10741	×	×	×	×
29	1511	×	×	×	×
30	1512	√	×	√	×
31	1514	×	×	×	×
32	15100	√	×	√	×
33	155304	×	×	×	×
34	155214	×	×	×	×
35	1903	×	×	×	×
36	1909	√	×	√	×
37	1912	×	×	×	×
38	1916	×	×	×	×
39	1950	×	×	×	×

8.1.6. TTSL – CDMA

		TATA CDMA			
SR. N.	EMERGENCY NUMBER	JIND	NARWANA	SAFIDON	JULANA
1	100	√	√	×	×
2	101	√	√	×	×
3	102	√	√	×	×
4	104	×	×	×	×
5	108	×	×	×	×
6	138	√	√	×	×
7	149	×	×	×	×
8	181	√	√	×	×
9	182	×	×	`	×
10	1033	√	√	√	√
11	1037	×	×	×	×
12	1056	×	×	×	×
13	1060	√	√	×	×
14	1063	×	×	×	×
15	1064	×	×	×	×
16	1070	√	√	×	×
17	1071	×	×	×	×
18	1072	√	√	×	×
19	1073	√	√	×	√
20	1077	×	×	×	×
21	1090	√	√	×	×
22	1091	√	√	×	√
23	1097	√	√	×	√
24	1099	×	×	×	×
25	10580	×	×	×	×
26	10589	×	×	×	×
27	10740	×	×	×	×
28	10741	×	×	×	×
29	1511	×	×	×	×
30	1512	×	×	×	×
31	1514	×	×	×	×
32	15100	×	×	×	×
33	155304	×	×	×	×
34	155214	×	×	×	×
35	1903	×	×	×	×
36	1909	×	×	×	×
37	1912	×	×	×	×
38	1916	×	×	×	×
39	1950	×	×	×	×

8.1.7. TTSL – GSM

		TATA GSM			
SR. N.	EMERGENCY NUMBER	JIND	NARWANA	SAFIDON	JULANA
1	100	√	√	×	×
2	101	√	√	×	×
3	102	√	√	×	×
4	104	×	×	×	×
5	108	×	×	×	×
6	138	√	√	×	×
7	149	×	×	×	×
8	181	√	√	×	×
9	182	×	×	`	×
10	1033	√	√	√	√
11	1037	×	×	×	×
12	1056	×	×	×	×
13	1060	√	√	×	×
14	1063	×	×	×	×
15	1064	×	×	×	×
16	1070	√	√	×	×
17	1071	×	×	×	×
18	1072	√	√	×	×
19	1073	√	√	×	√
20	1077	×	×	×	×
21	1090	√	√	×	×
22	1091	√	√	×	√
23	1097	√	√	×	√
24	1099	×	×	×	×
25	10580	×	×	×	×
26	10589	×	×	×	×
27	10740	×	×	×	×
28	10741	×	×	×	×
29	1511	×	×	×	×
30	1512	×	×	×	×
31	1514	×	×	×	×
32	15100	×	×	×	×
33	155304	×	×	×	×
34	155214	×	×	×	×
35	1903	×	×	×	×
36	1909	×	×	×	×
37	1912	×	×	×	×
38	1916	×	×	×	×
39	1950	×	×	×	×

8.1.8. VIDEOCON

		VIDEOCON		
SR. N.	EMERGENCY NUMBER	JIND	NARWANA	SAFIDON
1	100	√	√	×
2	101	√	√	×
3	102	√	√	×
4	104	×	×	×
5	108	×	×	×
6	138	√	√	×
7	149	×	×	×
8	181	√	√	×
9	182	×	×	`
10	1033	√	√	×
11	1037	×	×	×
12	1056	×	×	×
13	1060	√	√	×
14	1063	×	×	×
15	1064	×	×	×
16	1070	√	√	×
17	1071	×	×	×
18	1072	√	√	×
19	1073	√	√	×
20	1077	×	×	×
21	1090	√	√	×
22	1091	√	√	×
23	1097	√	√	×
24	1099	×	×	×
25	10580	×	×	×
26	10589	×	×	×
27	10740	×	×	×
28	10741	×	×	×
29	1511	×	×	×
30	1512	×	×	×
31	1514	×	×	×
32	15100	×	×	×
33	155304	×	×	×
34	155214	×	×	×
35	1903	×	×	×
36	1909	×	×	×
37	1912	×	×	×
38	1916	×	×	×
39	1950	×	×	×

8.1.9. VODAFONE

		VODAFONE			
SR. N.	EMERGENCY NUMBER	JIND	NARWANA	SAFIDON	JULANA
1	100	√	√	×	×
2	101	√	√	×	×
3	102	√	√	×	×
4	104	×	×	×	×
5	108	×	×	×	×
6	138	√	√	×	×
7	149	×	×	×	×
8	181	√	√	×	×
9	182	×	×	×	×
10	1033	√	√	×	×
11	1037	×	×	×	×
12	1056	×	×	×	×
13	1060	×	×	×	×
14	1063	×	×	×	×
15	1064	×	×	×	×
16	1070	√	√	×	×
17	1071	×	×	×	×
18	1072	√	√	×	×
19	1073	√	√	√	√
20	1077	×	×	×	×
21	1090	×	×	×	×
22	1091	√	√	×	×
23	1097	√	√	×	×
24	1099	×	×	×	×
25	10580	×	×	×	×
26	10589	×	×	×	×
27	10740	×	×	×	×
28	10741	×	×	×	×
29	1511	×	×	×	×
30	1512	√	×	×	×
31	1514	×	×	×	×
32	15100	×	×	×	×
33	155304	×	×	×	×
34	155214	√	√	√	√
35	1903	×	×	×	×
36	1909	√	√	√	√
37	1912	×	×	×	×
38	1916	×	×	×	×
39	1950	×	×	×	×

8.2. ROHTAK

8.2.1. AIRTEL

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

8.2.2. BSNL

		BSNL										
SR. No.	EMERGENCY NUMBER	MEHAM	BHIWANI	CHARKHI DADRI	KALANAUR	BAWANI KHERA	TOSHAM	SIWANI	LOHARU	ROHTAK	BAHADURGARH	JHAJJAR
1	100	×	×	X	×	×	×	×	×	×	X	×
2	101	×	×	X	×	×	×	×	×	×	×	×
3	102	X	×	X	X	×	×	×	×	×	×	X
4	104	X	X	X	X	X	X	X	X	X	X	X
5	108	X	X	X	X	X	X	X	X	X	X	X
6	138	X	×	×	×	×	×	×	×	×	×	×
7	149	X	X	X	X	X	X	X	X	X	X	X
8	181	×	×	×	×	×	×	×	×	×	×	×
9	182	X	X	X	X	X	X	X	X	X	X	X
10	1033	×	×	×	×	×	×	×	×	×	×	×
11	1037	X	X	X	X	X	X	X	X	X	X	X
12	1056	X	X	X	X	X	X	X	X	X	X	X
13	1060	X	X	X	X	X	X	X	X	X	X	X
14	1063	X	X	X	X	X	X	X	X	X	X	X
15	1064	X	X	X	X	X	X	X	X	X	X	X
16	1070	×	×	X	X	X	X	X	X	X	X	X
17	1071	X	X	X	X	X	X	X	X	X	X	X
18	1072	×	×	X	×	X	X	X	X	×	X	X
19	1073	×	×	×	×	×	×	×	×	×	×	×
20	1077	X	X	X	X	X	X	X	X	X	X	X
21	1090	X	X	X	X	X	X	X	X	X	X	X
22	1091	X	×	X	×	×	×	×	×	×	X	X
23	1097	X	X	X	X	X	X	X	X	X	X	X
24	1099	X	X	X	X	X	X	X	X	X	X	X
25	10580	X	X	X	X	X	X	X	X	X	X	X
26	10589	X	X	X	X	X	X	X	X	X	X	X
27	10740	X	X	X	X	X	X	X	X	X	X	X
28	10741	X	X	X	X	X	X	X	X	X	X	X
29	1511	X	X	X	X	X	X	X	X	X	X	X
30	1512	×	×	×	×	×	×	×	×	×	X	X
31	1514	X	X	X	X	X	X	X	X	X	X	X
32	15100	X	X	X	X	X	X	×	×	X	X	X
33	155304	X	X	X	X	X	X	X	X	X	X	X
34	155214	X	X	X	X	X	X	X	X	X	X	X
35	1903	×	X	X	X	X	X	X	X	X	X	X
36	1909	×	×	×	×	×	×	×	×	×	×	×
37	1912	×	X	X	X	X	X	X	X	X	X	X
38	1916	X	X	X	X	X	X	X	X	X	X	X
39	1950	X	X	X	X	X	X	X	X	X	X	X

8.2.3. IDEA

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

8.2.4. RCOM CDMA

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

8.2.5. RCOM GSM

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

8.2.6. VIDEOCON

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

8.2.7. VODAFONE

		VODAFONE										
SR. No.	EMERGENCY NUMBER	MEHAM	CIVIL HOSPITAL BHIWANI	CHARKHI DADRI SDCA	KALANAUR SDCA	BHAWANI KHERA	TOSHAM ANAJ MANDI	SIWANI	LOHARU	ROHTAK	BAHADURGARH	JHAJJAR
1	100	√	√	√	√	√	√	√	√	√	√	√
2	101	√	√	√	√	√	√	√	√	√	√	√
3	102	√	√	√	√	√	√	√	√	√	√	√
4	104	×	×	×	×	×	×	×	×	×	×	×
5	108	×	×	×	×	×	×	×	×	×	×	×
6	138	√	√	√	√	√	√	√	√	√	√	√
7	149	×	×	×	×	×	×	×	×	×	×	×
8	181	√	√	√	√	√	√	√	√	√	√	√
9	182	×	×	×	×	×	×	×	×	×	×	×
10	1033	×	×	×	×	×	×	×	×	×	×	×
11	1037	×	×	×	×	×	×	×	×	×	×	×
12	1056	×	×	×	×	×	×	×	×	×	×	×
13	1060	×	×	×	×	×	×	×	×	×	×	×
14	1063	×	×	×	×	×	×	×	×	×	×	×
15	1064	×	×	×	×	×	×	×	×	×	×	×
16	1070	×	×	×	×	×	×	×	×	×	×	×
17	1071	×	×	×	×	×	×	×	×	×	×	×
18	1072	√	√	√	√	√	√	√	√	√	√	√
19	1073	√	√	√	√	√	√	√	√	√	√	√
20	1077	×	×	×	×	×	×	×	×	×	×	×
21	1090	×	×	×	×	×	×	×	×	×	×	×
22	1091	√	√	√	√	√	√	√	√	√	√	√
23	1097	√	√	×	×	×	×	√	×	×	×	√
24	1099	×	×	×	×	×	×	×	×	×	×	×
25	10580	×	×	×	×	×	×	×	×	×	×	×
26	10589	×	×	×	×	×	×	×	×	×	×	×
27	10740	×	×	×	×	×	×	×	×	×	×	×
28	10741	×	×	×	×	×	×	×	×	×	×	×
29	1511	×	×	×	×	×	×	×	×	×	×	×
30	1512	×	×	×	×	×	×	×	×	×	×	×
31	1514	×	×	×	×	×	×	×	×	×	×	×
32	15100	√	√	√	√	√	×	×	×	√	√	×
33	155304	×	×	×	×	×	×	×	×	×	×	×
34	155214	×	×	×	×	×	×	×	×	×	×	×
35	1903	×	×	×	×	×	×	×	×	×	×	×
36	1909	√	√	√	√	√	√	√	√	√	√	√
37	1912	×	×	×	×	×	×	×	×	×	×	×
38	1916	×	×	×	×	×	×	×	×	×	×	×
39	1950	×	×	×	×	×	×	×	×	×	×	×

9. Operator Assisted Drive Test

9.1. Methodology

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

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

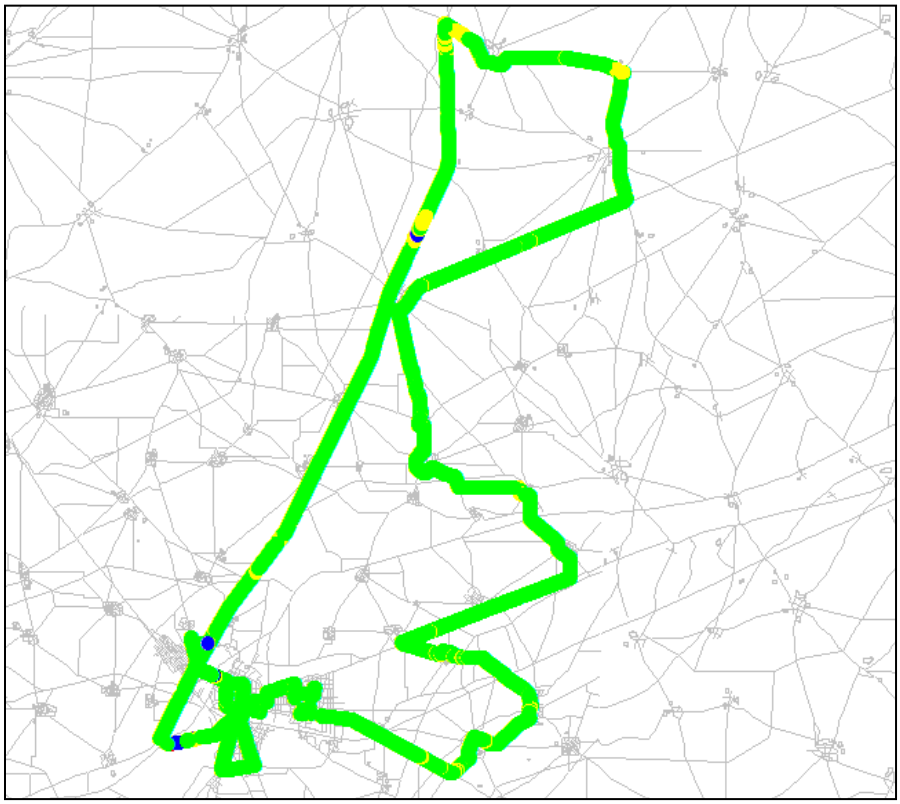
9.2. March: JIND SSA

Month	Name of SSA covered	Drive Test Schedule
March 2016	JIND	March 28, 2016 to March 30, 2016

9.3. Distance Covered: JIND SSA

Drive Test Distance Covered	Day 1	Day 2	Day 3
JIND SSA	150 km	160 km	150 km

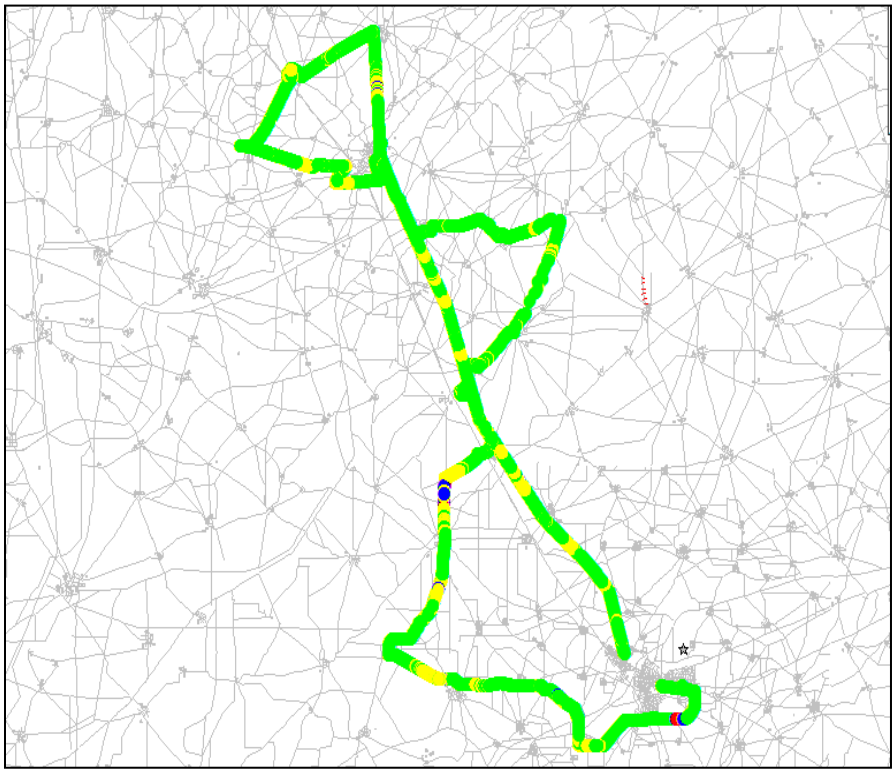
9.4. ROUTE MAP: JIND SSA: DAY 1



Route Covered- day 1

1. Urban Estate,DAV School,Post Office,Rani Talab,patiala road,SFD Gate, Vijaynagar, Old Sabji Mandi
2. Railway Road,Bhiwani Byepass road,New Hansi Road,Old Hansi Road,Rohtak Road,Tel Exchg road,fuwara chowk,old bus stand road
3. Jind-Kaithal Road,Naguran,Pegan,Pindara,Bhahkhurd,Nirjan,Lochab,Alewa,Kandela,gohana road,Def. colony jind

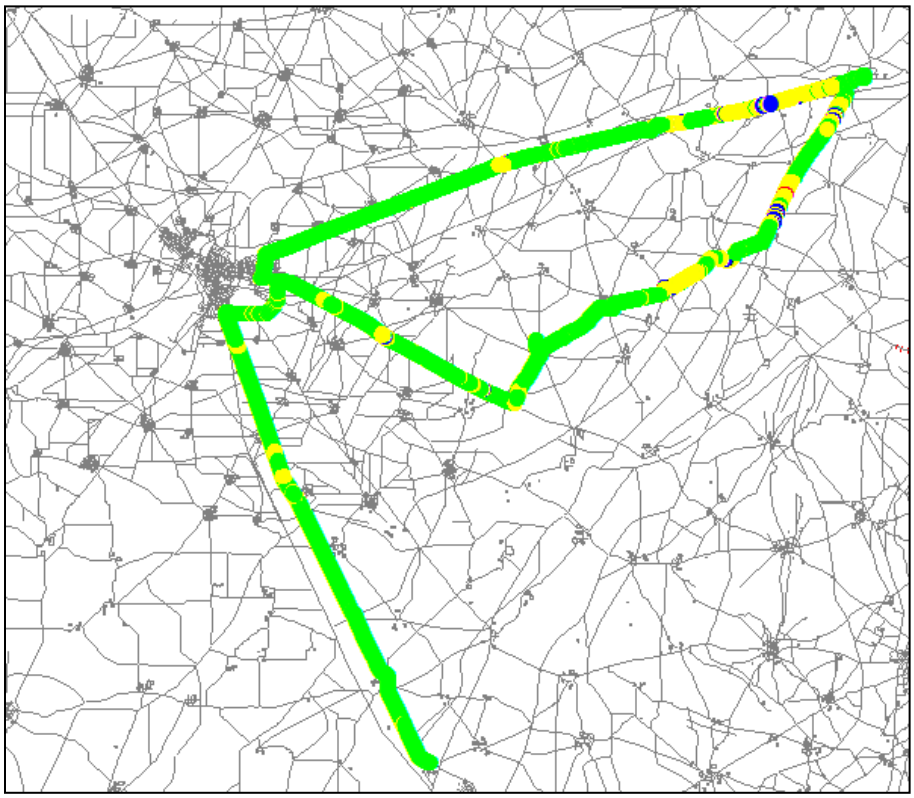
9.5. ROUTE MAP: JIND SSA: DAY 2



Route Covered- day 2

1. Uchana Fatak,Uchana Mandi,Model Tow n Nw a,Hanuman Nagar Nw a,Civil Hospital Nw a,Bus Stand Nw a
2. Uchana mandi,Dablain,Fr ain Kalan,Dhrodi,Du mrakhan Kalan,Sudkain Kalan,Lodhar,Alip ura,Karsindhu,Bar oda.
3. Jind to Narw ana Road,Nw a to hissar road,balrakhan to nw a,barw ala to jind road
4. Civil Hospital Narw ana

9.6. ROUTE MAP: JIND SSA: DAY 3



Route Covered- day 3

1. Jind,Nirjan,Pillukhera,BudhaKhera,Bahadurgarh,Safidon
2. Safidon Bus Stand, Geeta Colony, Main Bazar,Main Hatt Road
3. Hatt,Gangoli, Bhirtana,Gohana Road,Jind Rohtak Road,Julana
4. Civil Hospital Safidon

9.7. DRIVE TEST OUTCOME

	Aircel	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	Tata CDMA	TTSL GSM	VIDEOCON	Vodafone
Total Calls Attempt (A)	35	544	498	516	418	416	318	481	427	555
Total Calls Blocked (B)	0	2	2	0	0	1	2	2	2	0
Blocked Call Rate in % (B*100/A)	0.00%	0.37%	0.40%	0.00	0.00%	0.24%	0.63%	0.42%	0.47%	0.00%
Total Calls Established ('C)	35	542	489	516	418	415	316	479	425	555
Total Calls Drop (D)	0	1	1	0	1	2	1	4	2	0
Dropped Calls Rate in % (D*100/C)	0.00%	0.18%	0.20%	0.00%	0.24%	0.48%	0.32%	0.84%	0.47%	0.00%
Call Setup Success Rate in % (C*100/A)	100.00%	99.63%	98.19%	100.00%	100.00%	99.76%	99.37%	99.58%	99.53%	100.00%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	100.00%	98.80%	96.90%	99.87%	100.00%	99.64%	100.00%	99.54%	99.40%	100.00%

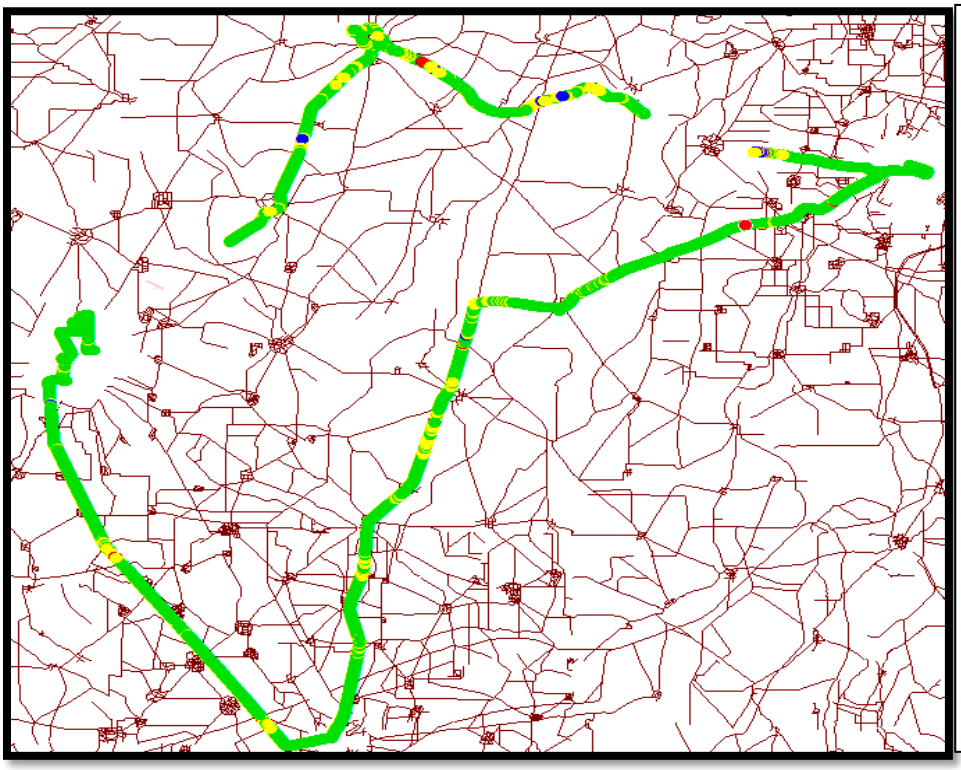
9.8. MARCH: ROHTAK SSA

Month	Name of SSA covered	Drive Test Schedule
February 2016	ROHTAK	February 4, 2016 to February 6, 2016

9.9. DISTANCE COVERED: ROHTAK SSA

Drive Test Distance Covered	Day 1	Day 2	Day 3
ROHTAK SSA	243 km	385 km	150 km

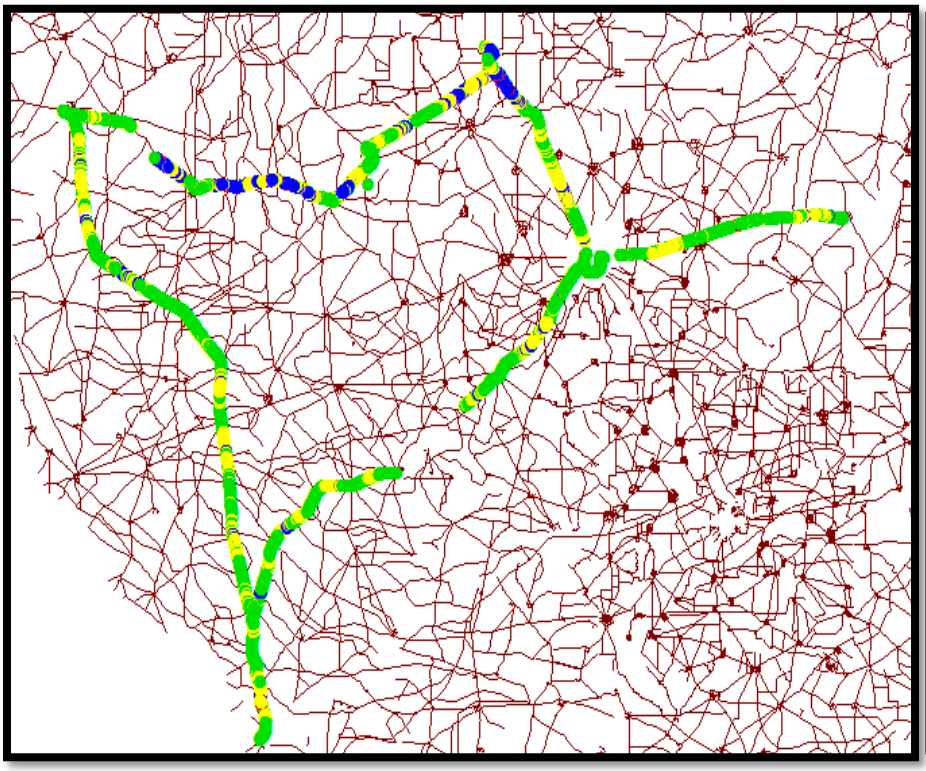
9.10. ROUTE MAP: ROHTAK SSA: DAY 1



Route Covered- day 1

1. Rohtak, Madina Meham
2. Meham, Bhiwani
3. Bhiwani, Charkhi dadri
4. Charkhi dadri, Kalanaur, Rohtak

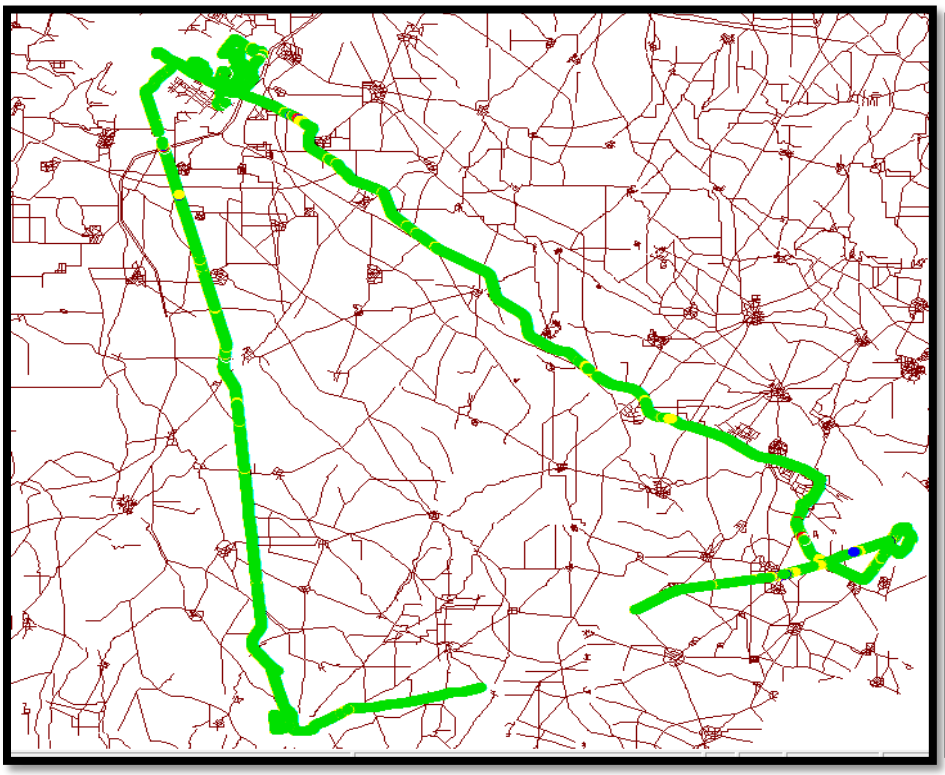
9.11. ROUTE MAP: ROHTAK SSA: DAY 2



Route Covered- day 2

1. Kalanaur-Bhiwani-Bawani khera
2. Bawanikhera-Tosham-Shiwani
3. Shiwani-Obra-Loharu
4. Loharu-Bhiwani

9.12. ROUTE MAP: ROHTAK SSA: DAY 3



Route Covered- day 3

1. RohtakCity -Sampla
2. Sampla - Bahadurgarh
3. Bahadurgarh -Jhajjar
4. Jhajjar – Deeghal-Rohtak

9.13. DRIVE TEST OUTCOME

	Airtel	BSNL	IDEA	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	VIDEOCON	Vodafone
Total Calls Attempt (A)	672	494	614	478	478	426	565	506	665
Total Calls Blocked (B)	2	34	1	0	3	2	4	2	0
Blocked Call Rate in % (B*100/A)	0.30%	6.88%	0.16%	0.00%	0.63%	0.47%	0.71%	0.40%	0.00%
Total Calls Established ('C)	670	457	613	478	475	424	561	504	665
Total Calls Drop (D)	1	7	1	0	0	1	2	2	0
Dropped Calls Rate in % (D*100/C)	0.15%	1.53%	0.16%	0.00%	0.00%	0.24%	0.36%	0.40%	0.00%
Call Setup Success Rate in % (C*100/A)	99.70%	92.51%	99.84%	100.00%	99.37%	99.53%	99.29%	99.60%	100.00%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.26%	99.00%	99.84%	100.00%	100.00%	100.00%	98.09%	99.00%	99.32%

10. COUNTER DETAILS

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

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

10.1. ERICSSON

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

Ericsson Counters

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

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

10.2. NSN (NOKIA SIEMENS NETWORK)

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

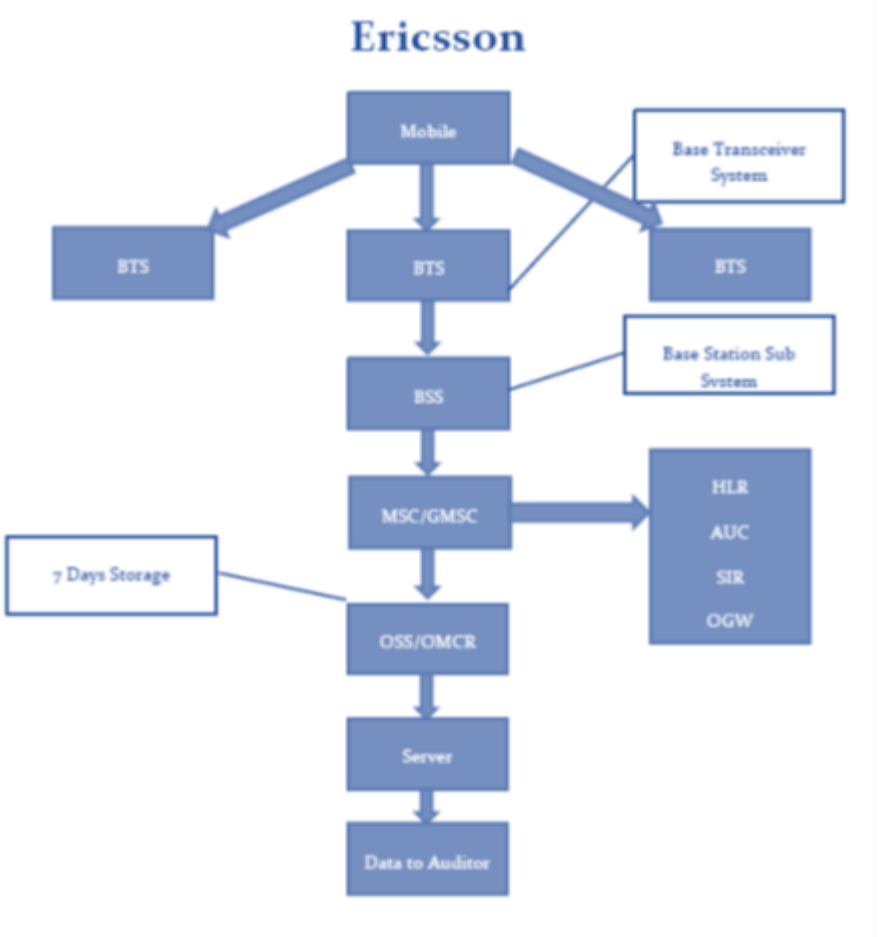
10.3. HUAWEI

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

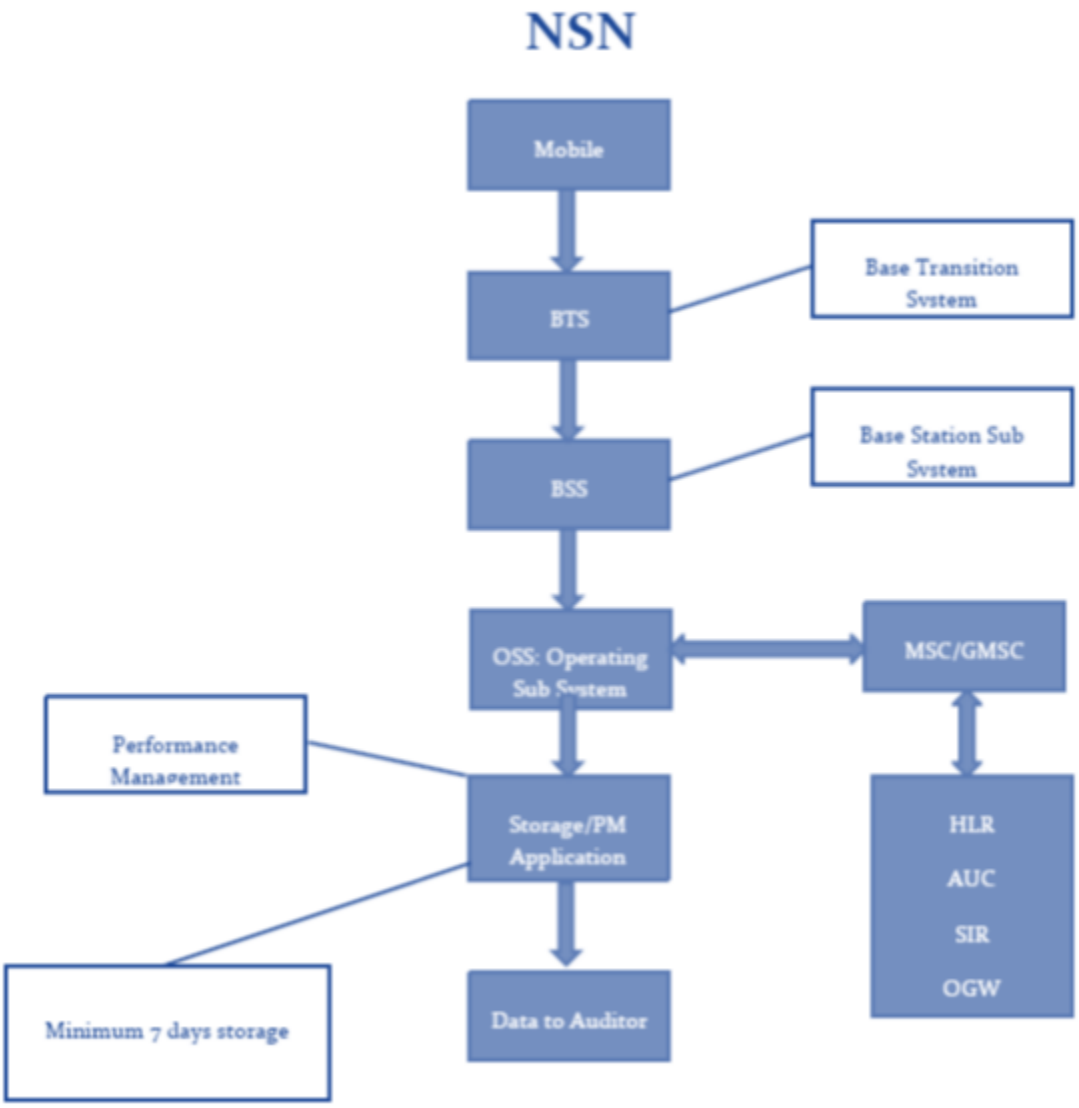
		Orig-IS2000[Times] + Successful TCH Assignments-CS Term-IS95[Times] + Successful TCH Assignments-CS Term-IS2000[Times])] {[(1157628621 + 1157628628 + 1157628635+ 1157628642)
8	RF BLOCK RATE (DEN)	[((TCH Assignment Requests-CS Orig-IS95[Times] + TCH Assignment Requests-CS Orig-IS2000[Times] + TCH Assignment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

11. BLOCK SCHEMATIC DIAGRAM

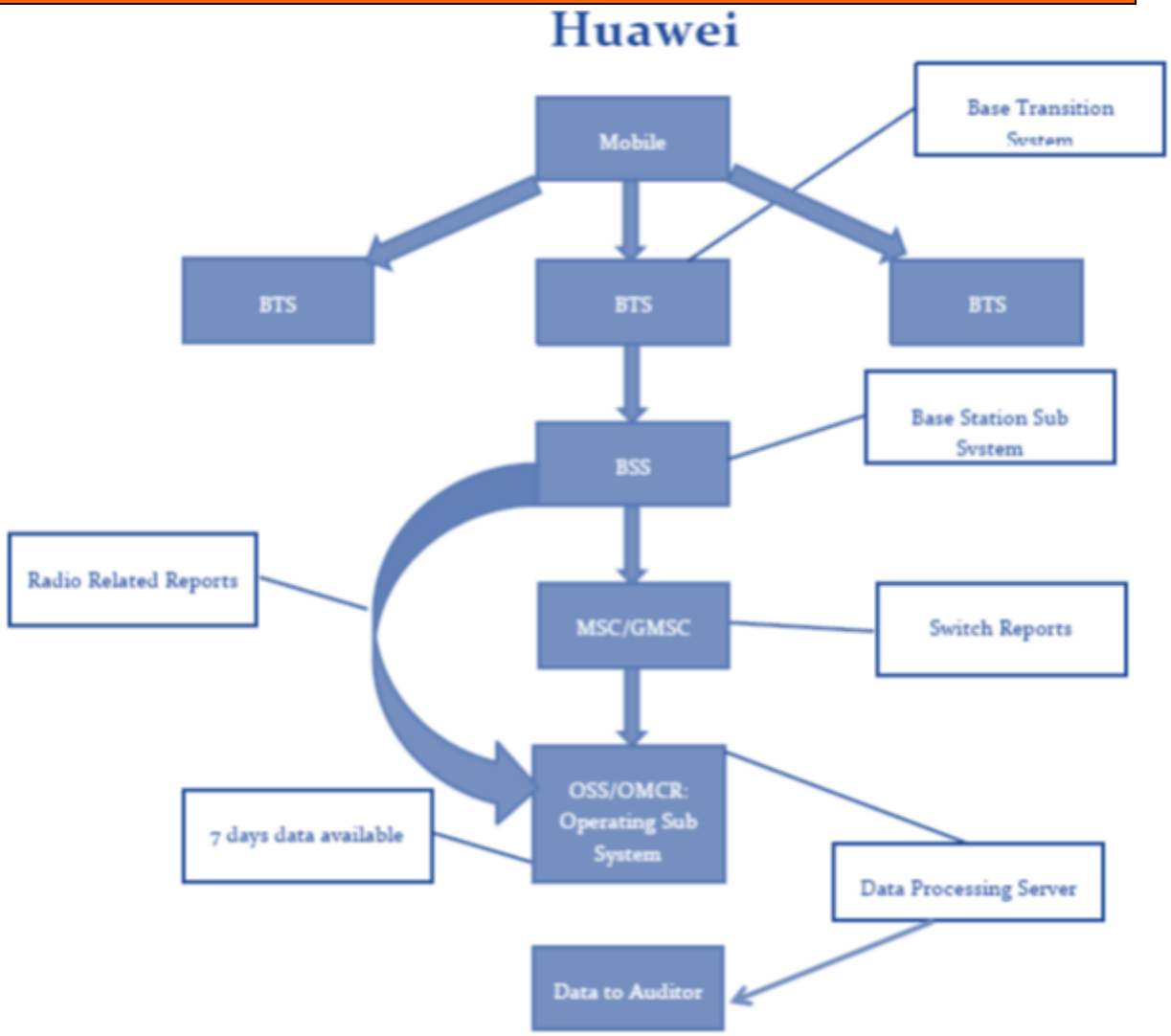
11.1. ERICSSON



11.2. NSN


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

11.3. HUAWEI


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

12. ABBREVIATIONS

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

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

13 ANNEXURE

13.1. 2G VOICE PMR DATA: CONSOLIDATED

Consolidated												
Network Parameters		Name of Service Provider										
		Benchmark	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.19%	0.07%	1.00%	0.01%	0.12%	0.28%	0.13%	0.30%	0.10%	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.08%	1.47%	0.00%	0.89%	2.12%	0.18%	1.90%	0.14%	0.48%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.52%	98.85%	98.43%	98.50%	98.62%	97.81%	92.78%	98.48%	98.68%	99.61%
	SDDCH/Paging chl. Congestion	≤ 1%	0.01%	0.38%	0.28%	0.34%	0.18%	DNA	0.00%	0.24%	0.20%	0.15%
	TCH Congestion	≤ 2%	0.00%	0.46%	0.64%	0.35%	0.14%	0.98%	4.85%	0.25%	0.20%	0.39%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.83%	1.14%	0.60%	0.06%	0.12%	0.68%	0.71%	0.57%	0.62%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.01%	0.95%	1.18%	2.20%	0.43%	0.48%	5.11%	2.82%	0.76%	1.92%
	%age of connection with good voice quality	≥ 95%	99.98%	98.42%	DNA	97.85%	99.52%	99.81%	96.61%	96.82%	97.40%	97.85%

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

13.2. 3G VOICE PMR: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.20%	1.35%	0.03%	0.22%	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.03%	1.73%	0.00%	1.46%	0.21%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.09%	99.33%	99.32%	97.09%	99.78%
	RRC Congestion:	≤ 1%	0.00%	0.04%	0.45%	13.17%	0.08%
	RAB Congestion:	≤ 2%	0.00%	0.32%	0.22%	0.80%	0.02%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.21%	0.60%	0.27%	0.19%	0.34%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.56%	1.74%	2.05%	1.58%	3.26%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.03%	DNA	98.81%	99.13%	97.65%

- TTSL has parameter value of 13.17% and failed to meet the benchmark of ≤ 1% RRC Congestion:
- VODAFONE has parameter value of 3.26% and failed to meet the benchmark of ≤ 3% Worst affected cells having more than 3% Circuit Switched Voice Drop Rate

13.3. BILLING AND CUSTOMER CARE

	Metering and Billing credibility		Billing Complaints			Termination & Closures	Time taken for refund of deposits after closures: Benchmark	Response time to customer for assistance	
	Postpaid Subscribers	Prepaid Subscribers	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	%age of where credit/waiver is received within one week	% of Termination/ Closure of service within 7 days (100 %)	Cleared over a period of <60 days (100%)	%age of calls answered by the IVR	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark	≤ 0.1%	≤ 0.1%	≥ 98%	= 100%	= 100%	= 100%	= 100%	≥ 95%	≥ 95%
AIRCEL	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.17%	99.91%
AIRTEL	0.03%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.87%	94.75%
BSNL	0.06%	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.40%
IDEA	0.08%	0.39%	100.00%	100.00%	100.00%	100.00%	100.00%	99.78%	97.92%
RCOM-GSM	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	99.16%	93.12%
RCOM-CDMA	0.09%	0.08%	100.00%	100.00%	100.00%	100.00%	100.00%	98.07%	96.27%
TTSL-GSM	0.00%	0.00%	100.00%	100.00%	83.33%	100.00%	100.00%	97.86%	88.91%
TTSL-CDMA	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.86%	99.62%
VIDEOCON	NA	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.22%
VODAFONE	0.07%	0.08%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.46%

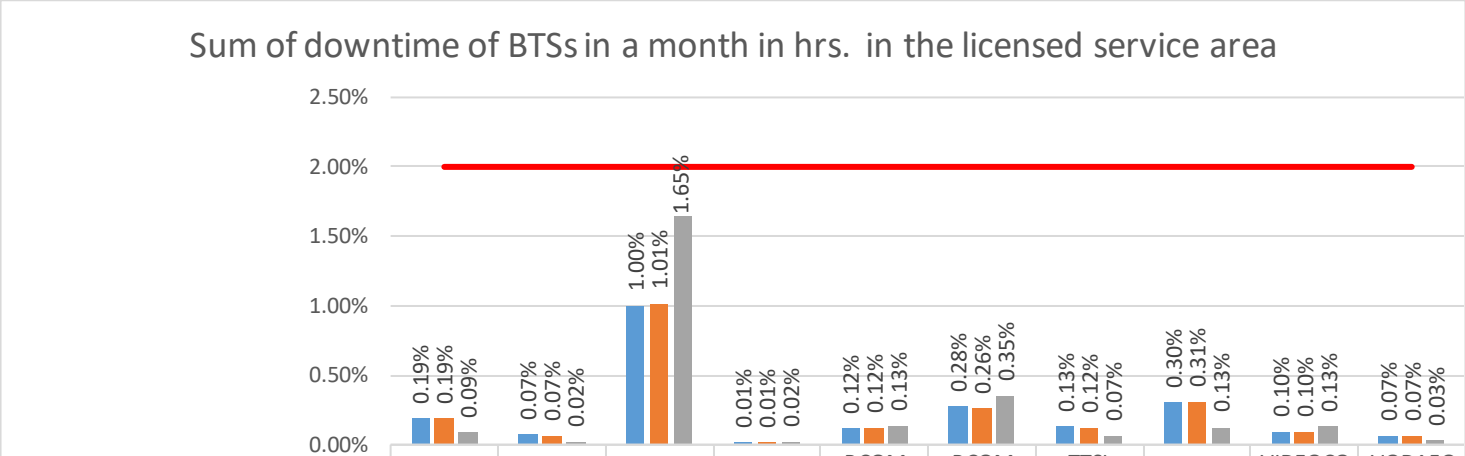
- AIRTEL has parameter value of **94.75%** and failed to meet the benchmark of ≥95% for %age of call answered by the operators (voice to voice) within 90 seconds.
- IDEA has parameter value of **0.39%** and failed to meet the benchmark of ≤0.1% for Metering and Billing credibility for Prepaid subscribers.
- RCOM GSM has parameter value of **93.12%** and failed to meet the benchmark of ≥95% for %age of call answered by the operators (voice to voice) within 90 seconds.
- TTSL GSM has parameter value of **83.33%** and failed to meet the benchmark of =100% for %age of where credit/ waiver is received within one week
- TTSL GSM has parameter value of **88.91%** and failed to meet the benchmark of ≥95% for %age of call answered by the operators (voice to voice) within 90 seconds.

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

PMR Report Comparison between Audit Agency and TSP												
Network Parameters		Name of Service Provider										
		Benchmark		Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.19%	0.07%	1.00%	0.01%	0.12%	0.28%	0.13%	0.30%	0.10%	0.07%
			TSP	0.19%	0.07%	1.01%	0.01%	0.12%	0.26%	0.12%	0.31%	0.10%	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	0.00%	0.08%	1.47%	0.00%	0.89%	2.12%	0.18%	1.90%	0.14%	0.48%
			TSP	0.00%	0.07%	1.47%	0.00%	0.89%	2.12%	0.18%	1.90%	0.14%	0.47%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	Agency	99.52%	98.85%	98.43%	98.50%	98.62%	97.81%	92.78%	98.48%	98.68%	99.61%
			TSP	99.52%	98.81%	98.45%	98.50%	98.62%	97.81%	93.64%	98.47%	98.68%	99.61%
	SDDCH/Paging chl. Congestion	≤ 1%	Agency	0.01%	0.38%	0.28%	0.34%	0.18%	DNA	0.00%	0.24%	0.20%	0.15%
			TSP	0.00%	0.41%	0.28%	0.34%	0.18%	0.00%	0.00%	0.24%	0.20%	0.15%
	TCH Congestion	≤ 2%	Agency	0.00%	0.46%	0.64%	0.35%	0.14%	0.98%	4.85%	0.25%	0.20%	0.39%
			TSP	0.00%	0.48%	0.64%	0.35%	0.14%	0.98%	3.98%	0.25%	0.20%	0.39%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	Agency	0.00%	0.83%	1.14%	0.60%	0.06%	0.12%	0.68%	0.71%	0.57%	0.62%
			TSP	0.00%	0.84%	1.14%	0.60%	0.06%	0.12%	0.68%	0.71%	0.57%	0.62%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	Agency	0.01%	0.95%	1.18%	2.20%	0.43%	0.48%	5.11%	2.82%	0.76%	1.92%
			TSP	0.01%	1.15%	1.18%	2.20%	0.44%	0.47%	4.95%	2.82%	0.76%	1.92%
	%age of connection with good voice quality	≥ 95%	Agency	99.98%	98.42%	DNA	97.85%	99.52%	99.81%	96.61%	96.82%	97.40%	97.85%
			TSP	99.99%	98.43%	97.24%	97.85%	99.52%	99.80%	96.58%	96.82%	97.40%	97.85%

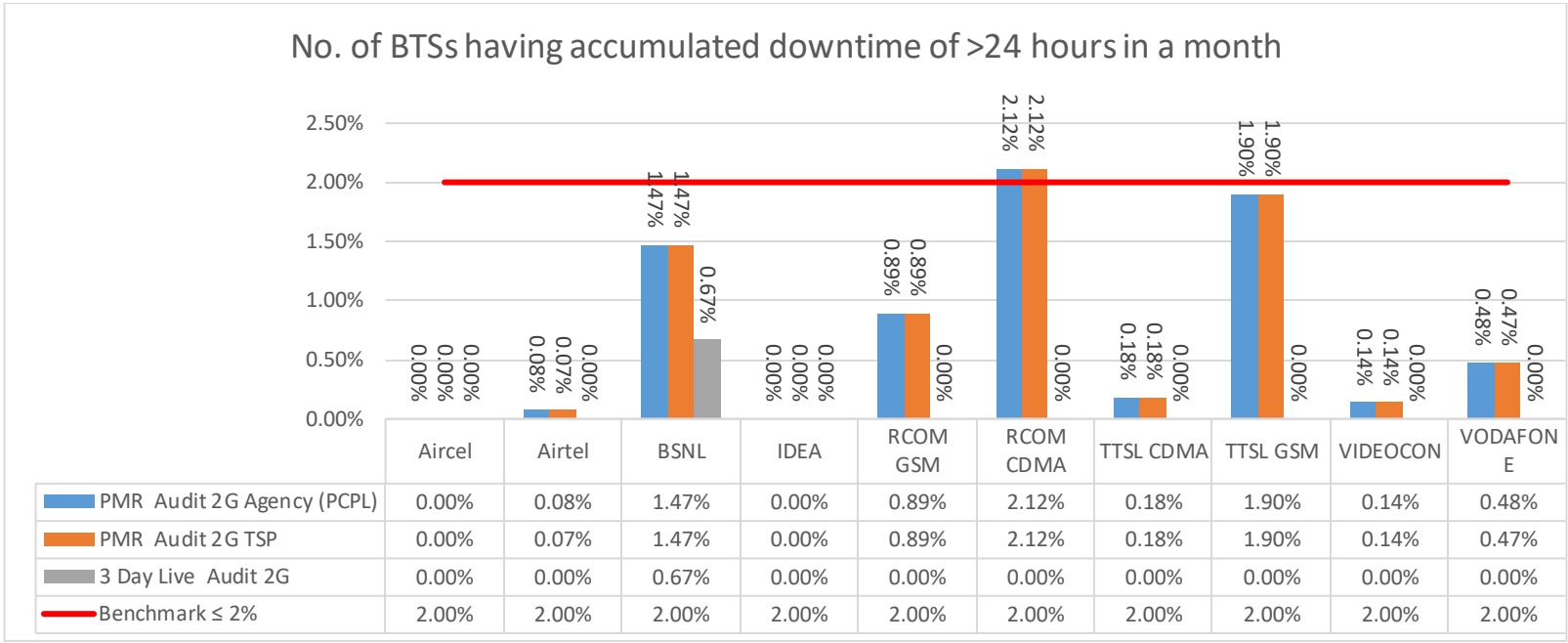
- **For each instance of "DNA (Data Not Available)", please refer the respective hard copy of audit report(s).

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



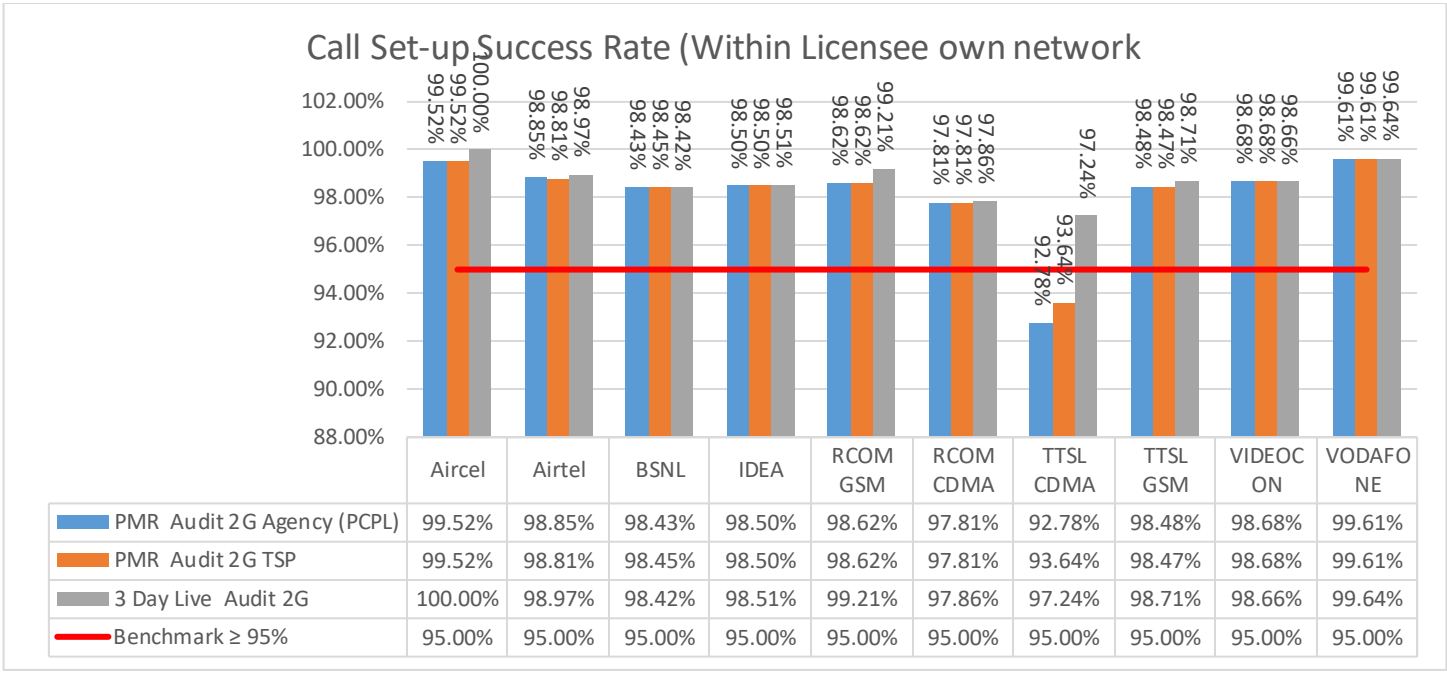
	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	0.19%	0.07%	1.00%	0.01%	0.12%	0.28%	0.13%	0.30%	0.10%	0.07%
PMR Audit 2G TSP	0.19%	0.07%	1.01%	0.01%	0.12%	0.26%	0.12%	0.31%	0.10%	0.07%
3 Day Live Audit 2G	0.09%	0.02%	1.65%	0.02%	0.13%	0.35%	0.07%	0.13%	0.13%	0.03%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

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



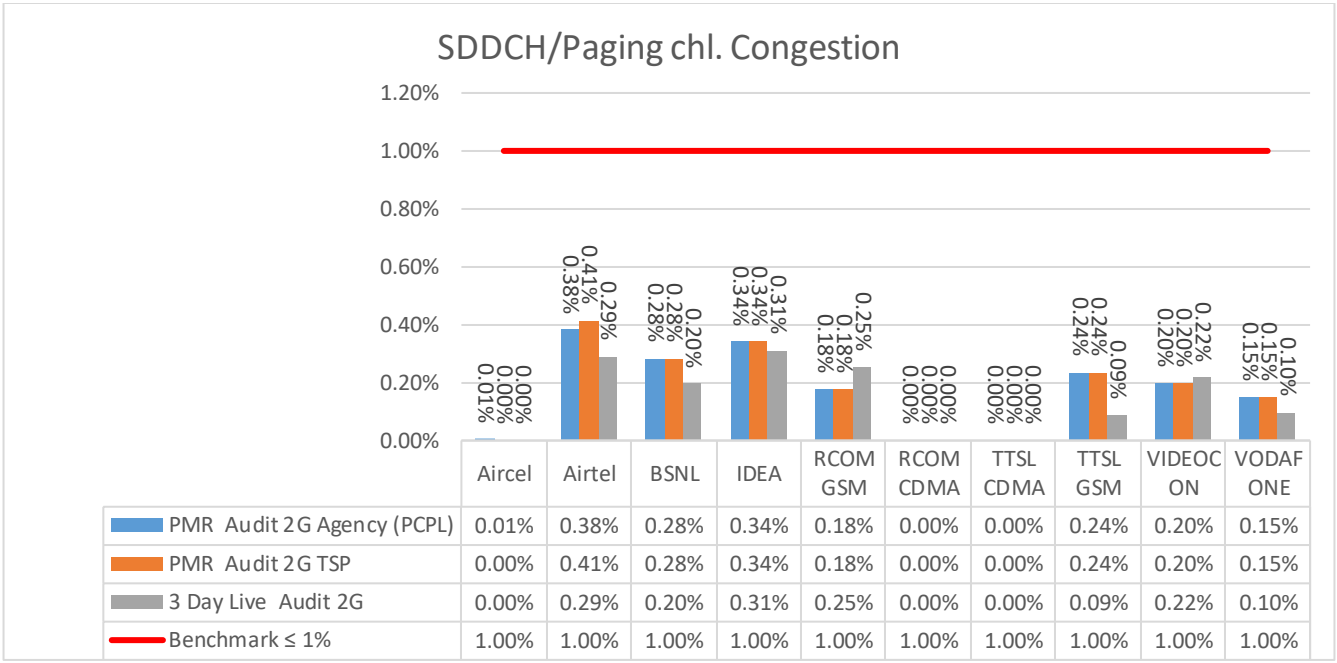
	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	0.00%	0.08%	1.47%	0.00%	0.89%	2.12%	0.18%	1.90%	0.14%	0.48%
PMR Audit 2G TSP	0.00%	0.07%	1.47%	0.00%	0.89%	2.12%	0.18%	1.90%	0.14%	0.47%
3 Day Live Audit 2G	0.00%	0.00%	0.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

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

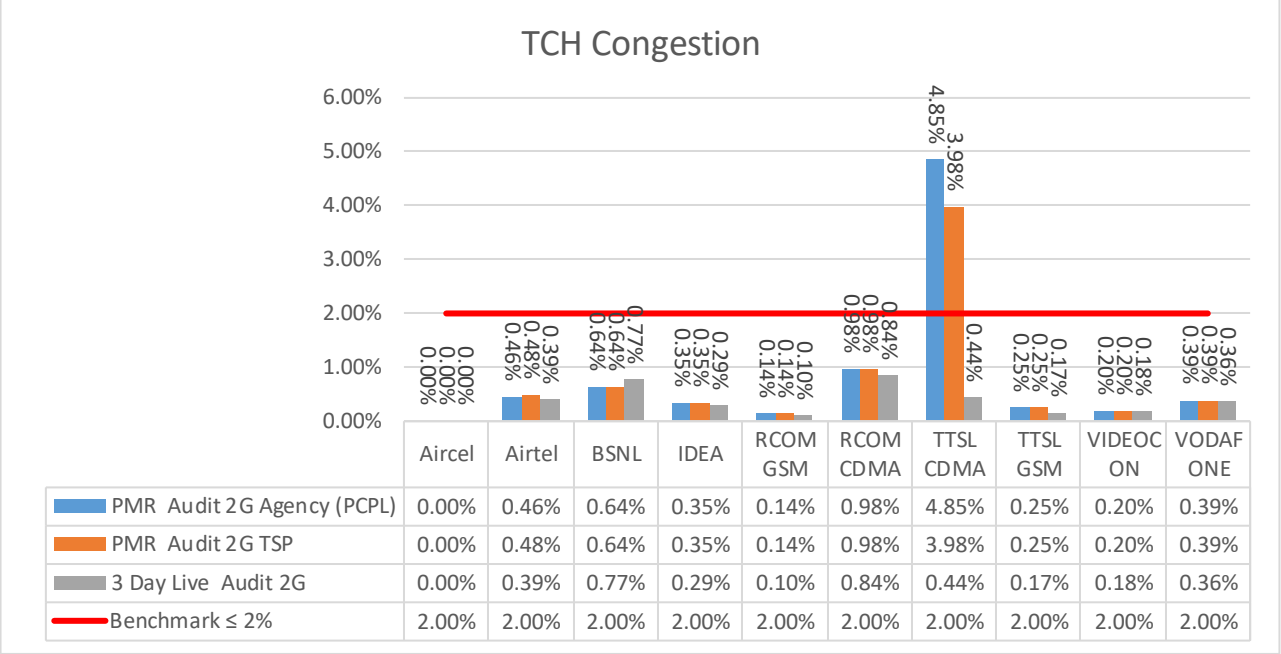


	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	99.52%	98.85%	98.43%	98.50%	98.62%	97.81%	92.78%	98.48%	98.68%	99.61%
PMR Audit 2G TSP	99.52%	98.81%	98.45%	98.50%	98.62%	97.81%	93.64%	98.47%	98.68%	99.61%
3 Day Live Audit 2G	100.00%	98.97%	98.42%	98.51%	99.21%	97.86%	97.24%	98.71%	98.66%	99.64%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

13.4.4. SDDCH/PAGING CHL. CONGESTION

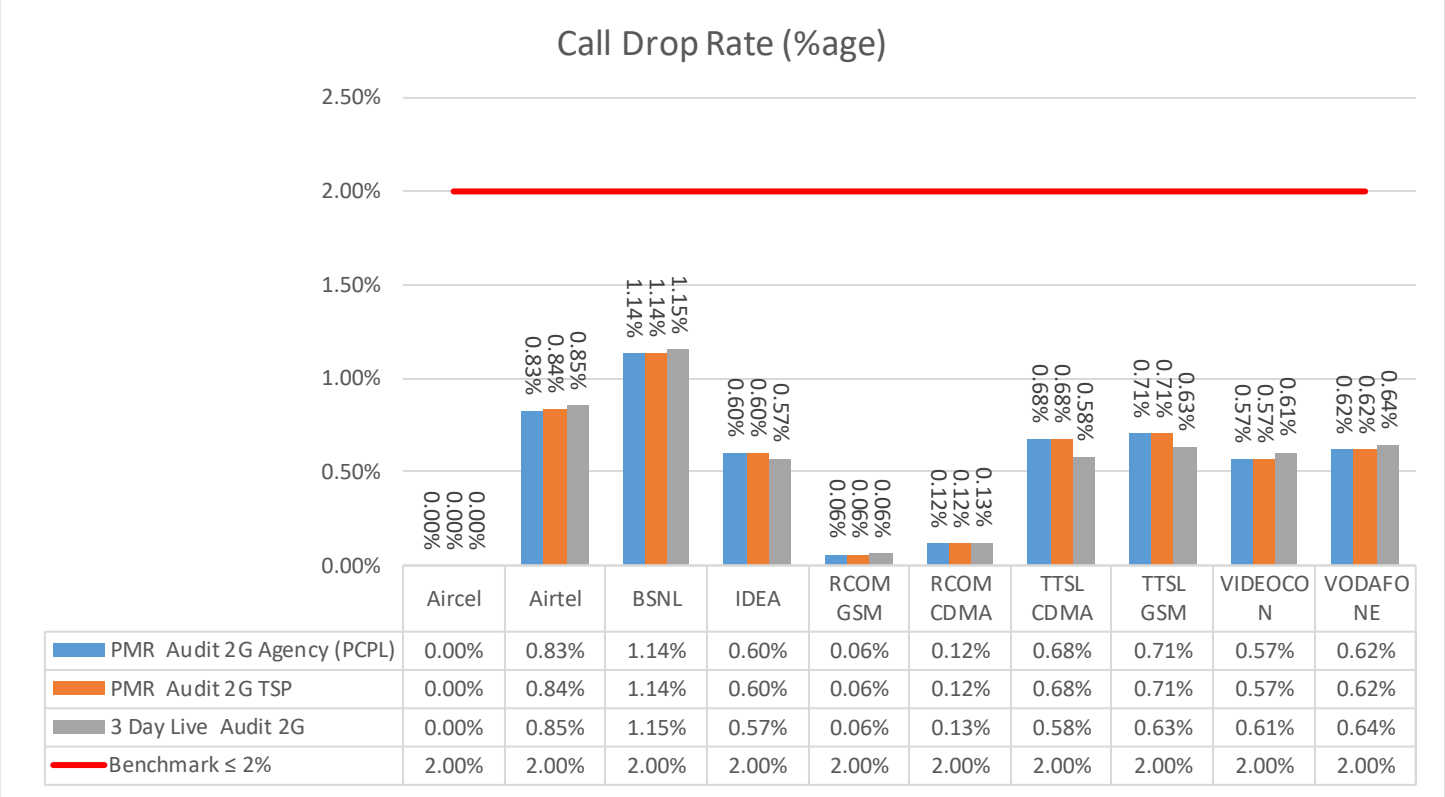


13.4.5. TCH CONGESTION



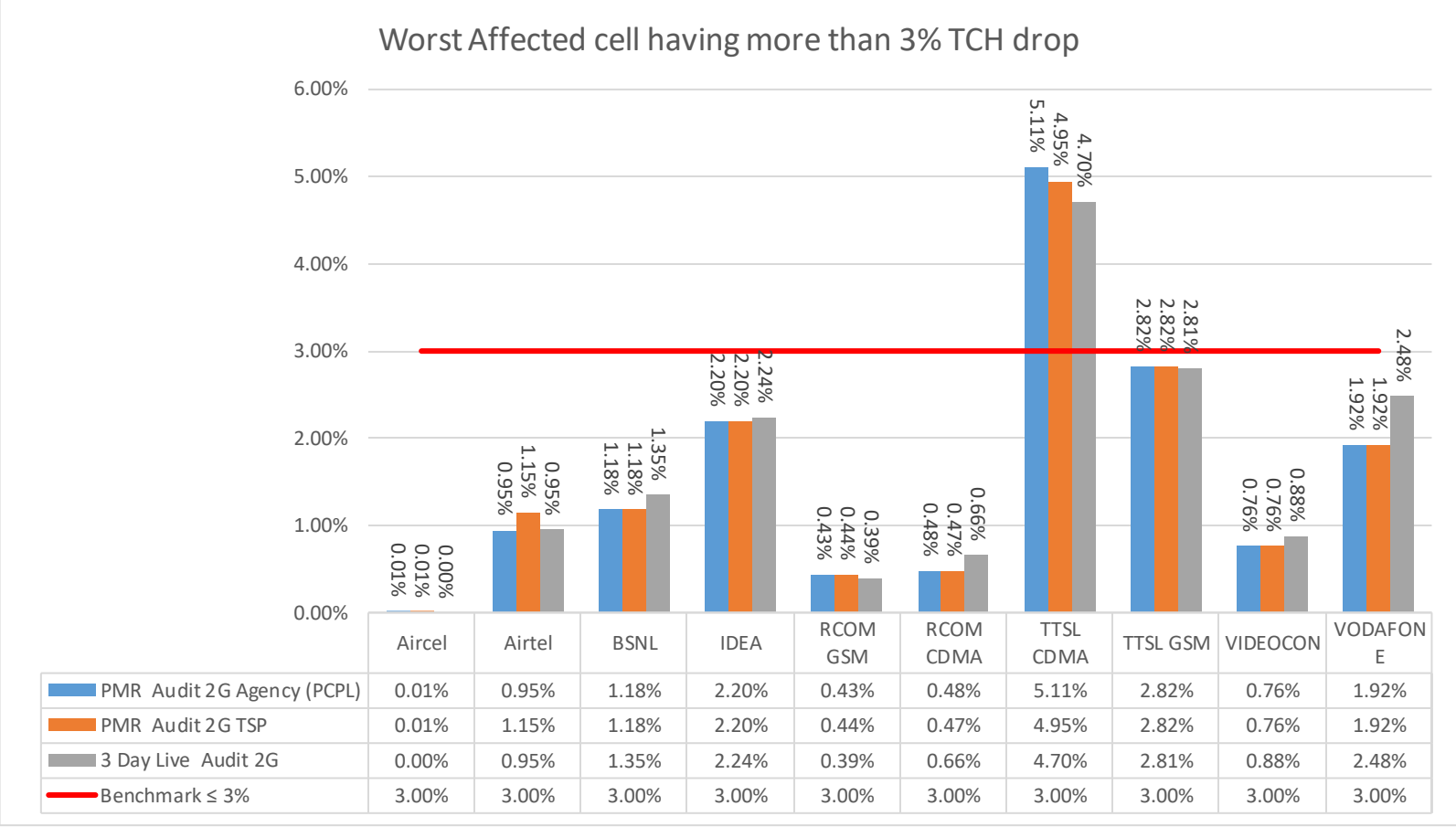
	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	0.00%	0.46%	0.64%	0.35%	0.14%	0.98%	4.85%	0.25%	0.20%	0.39%
PMR Audit 2G TSP	0.00%	0.48%	0.64%	0.35%	0.14%	0.98%	3.98%	0.25%	0.20%	0.39%
3 Day Live Audit 2G	0.00%	0.39%	0.77%	0.29%	0.10%	0.84%	0.44%	0.17%	0.18%	0.36%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

13.4.6. CALL DROP RATE (%AGE)



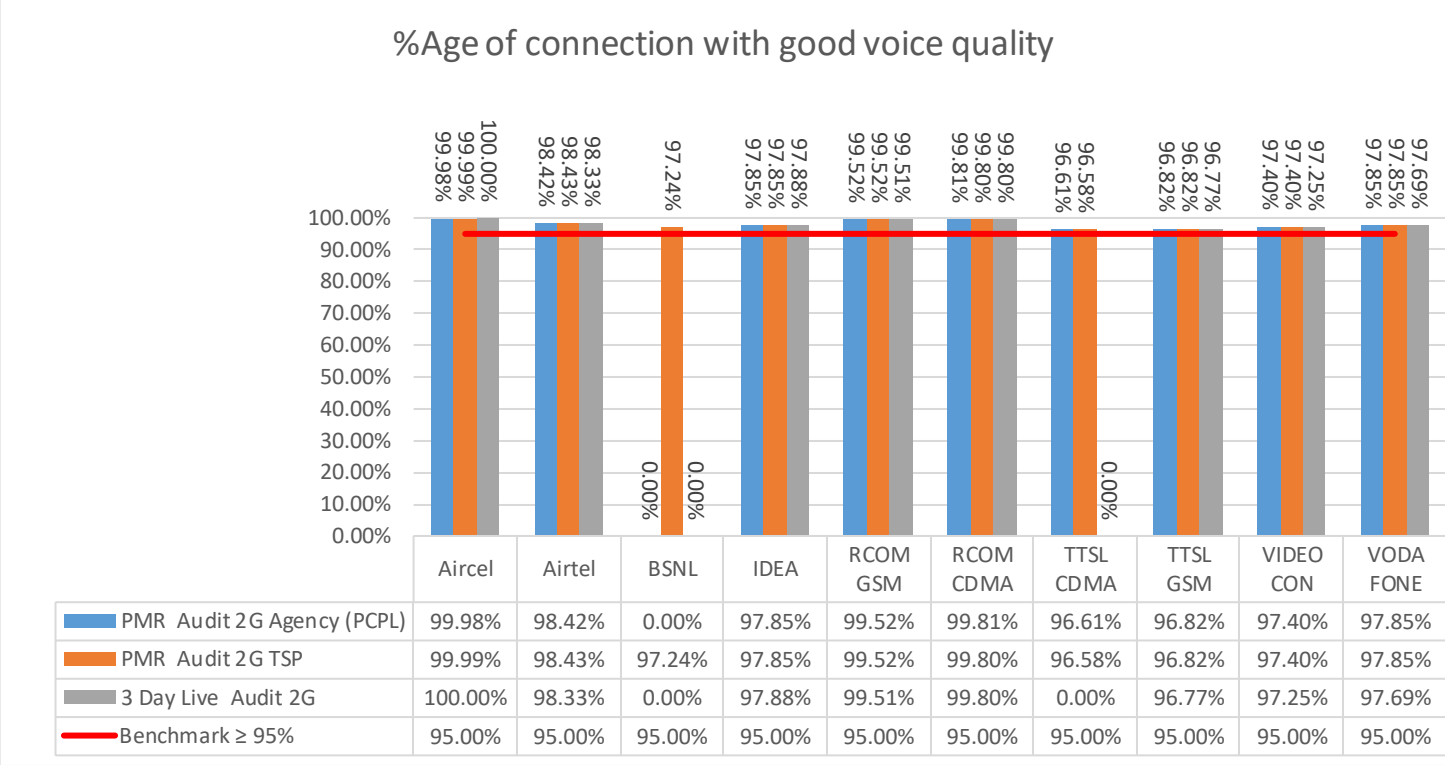
	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	0.00%	0.83%	1.14%	0.60%	0.06%	0.12%	0.68%	0.71%	0.57%	0.62%
PMR Audit 2G TSP	0.00%	0.84%	1.14%	0.60%	0.06%	0.12%	0.68%	0.71%	0.57%	0.62%
3 Day Live Audit 2G	0.00%	0.85%	1.15%	0.57%	0.06%	0.13%	0.58%	0.63%	0.61%	0.64%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

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



	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEOCON	VODAFONE
PMR Audit 2G Agency (PCPL)	0.01%	0.95%	1.18%	2.20%	0.43%	0.48%	5.11%	2.82%	0.76%	1.92%
PMR Audit 2G TSP	0.01%	1.15%	1.18%	2.20%	0.44%	0.47%	4.95%	2.82%	0.76%	1.92%
3 Day Live Audit 2G	0.00%	0.95%	1.35%	2.24%	0.39%	0.66%	4.70%	2.81%	0.88%	2.48%
Benchmark ≤ 3%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%

13.4.8. % AGE OF CONNECTION WITH GOOD VOICE QUALITY



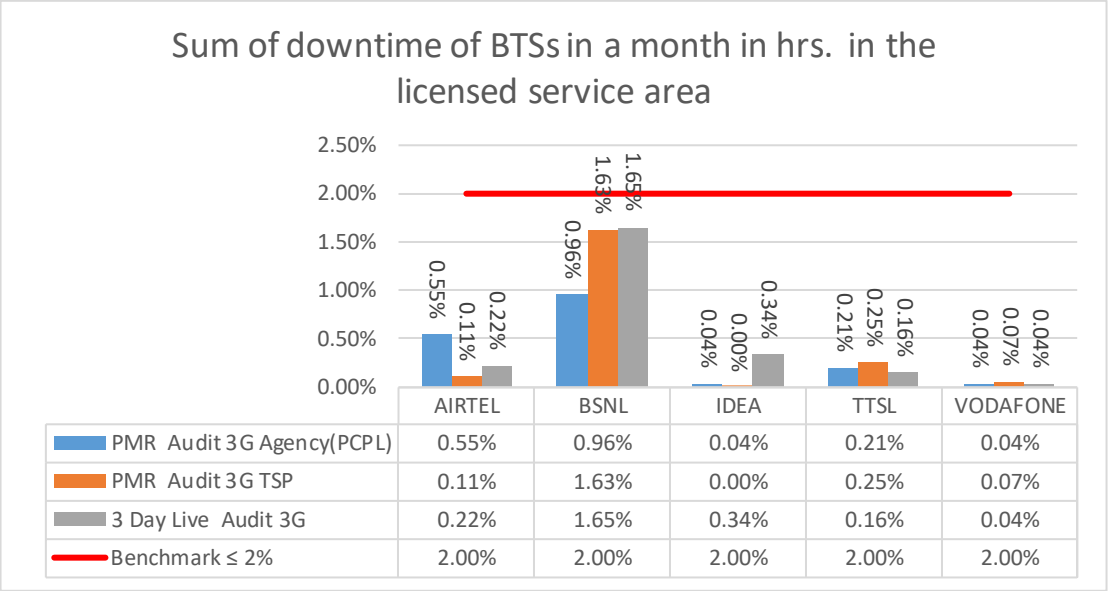
	Aircel	Airtel	BSNL	IDEA	RCOM GSM	RCOM CDMA	TTSL CDMA	TTSL GSM	VIDEO CON	VODA FONE
PMR Audit 2G Agency (PCPL)	99.98%	98.42%	0.00%	97.85%	99.52%	99.81%	96.61%	96.82%	97.40%	97.85%
PMR Audit 2G TSP	99.99%	98.43%	97.24%	97.85%	99.52%	99.80%	96.58%	96.82%	97.40%	97.85%
3 Day Live Audit 2G	100.00%	98.33%	0.00%	97.88%	99.51%	99.80%	0.00%	96.77%	97.25%	97.69%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

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

3G - PMR Report Comparison between Audit Agency and TSP								
Network Parameters		Name of Service Provider						
		Benchmark		AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.55%	0.96%	0.04%	0.21%	0.04%
			TSP	0.11%	1.63%	0.00%	0.25%	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	0.60%	1.15%	0.00%	1.55%	0.12%
			TSP	0.07%	1.50%	0.00%	1.61%	0.28%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	Agency	99.09%	99.33%	99.32%	97.09%	99.78%
			TSP	99.06%	97.00%	99.29%	96.91%	33.92%
	RRC Congestion:	≤ 1%	Agency	0.00%	0.04%	0.45%	13.17%	0.08%
			TSP	0.00%	0.57%	0.40%	14.15%	0.03%
	RAB Congestion:	≤ 2%	Agency	0.00%	0.32%	0.22%	0.80%	0.02%
			TSP	0.00%	0.80%	0.23%	0.78%	0.01%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	Agency	0.21%	0.60%	0.27%	0.19%	0.34%
			TSP	0.26%	1.30%	0.28%	0.19%	0.30%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	Agency	0.56%	1.74%	2.05%	1.58%	3.26%
			TSP	0.50%	1.80%	2.12%	1.30%	3.17%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	Agency	98.03%	DNA	98.81%	99.13%	97.65%
			TSP	98.10%	96.87%	98.78%	99.13%	97.81%

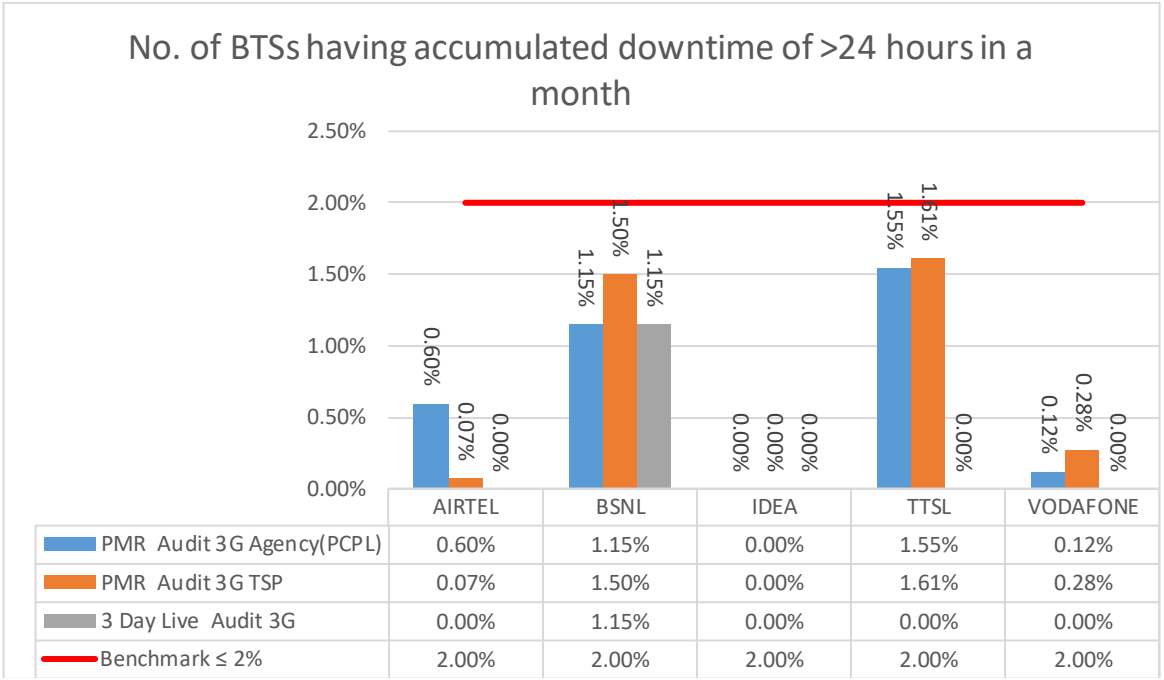
- **For each instance of "DNA (Data Not Available)", please refer the respective hard copy of audit report(s).

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



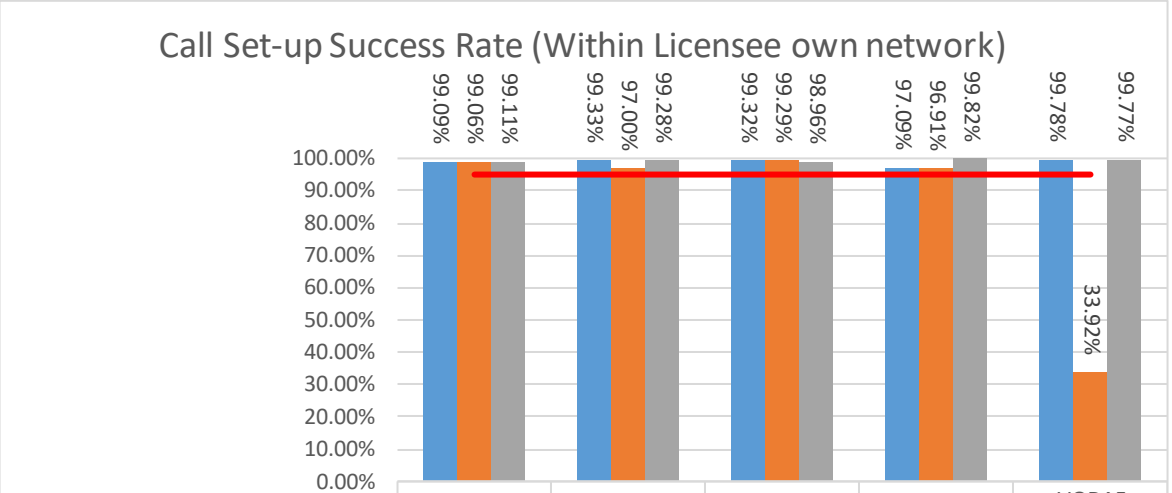
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	0.55%	0.96%	0.04%	0.21%	0.04%
PMR Audit 3G TSP	0.11%	1.63%	0.00%	0.25%	0.07%
3 Day Live Audit 3G	0.22%	1.65%	0.34%	0.16%	0.04%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

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



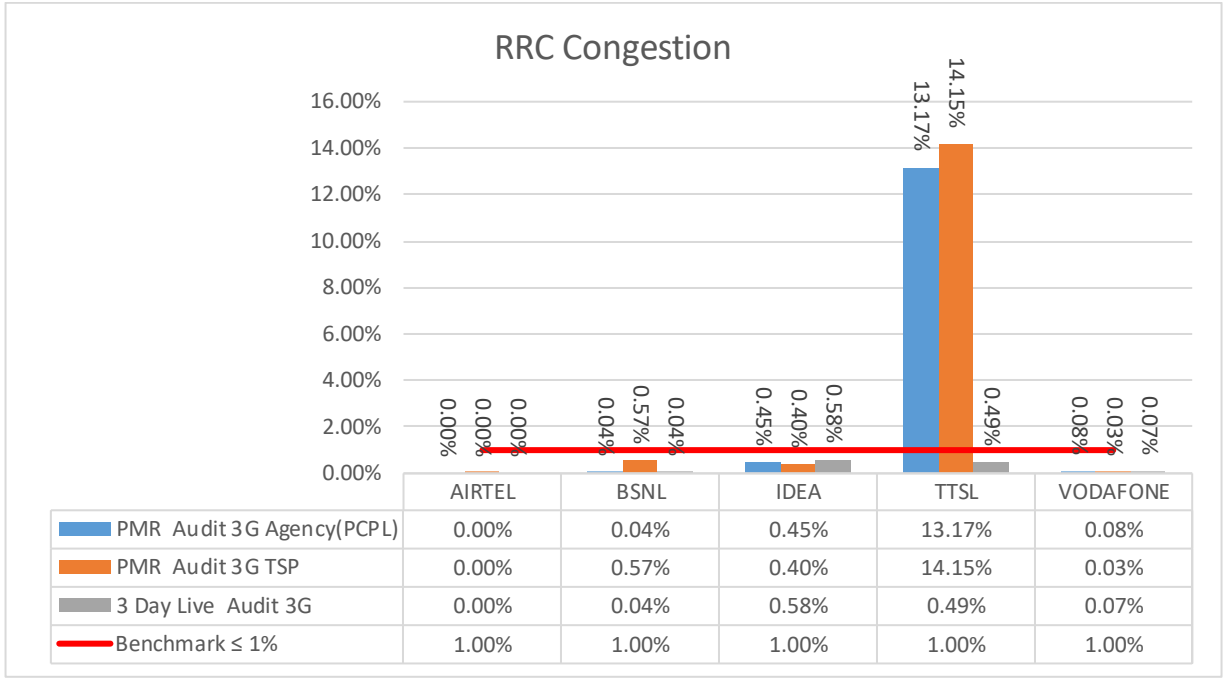
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	0.60%	1.15%	0.00%	1.55%	0.12%
PMR Audit 3G TSP	0.07%	1.50%	0.00%	1.61%	0.28%
3 Day Live Audit 3G	0.00%	1.15%	0.00%	0.00%	0.00%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

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



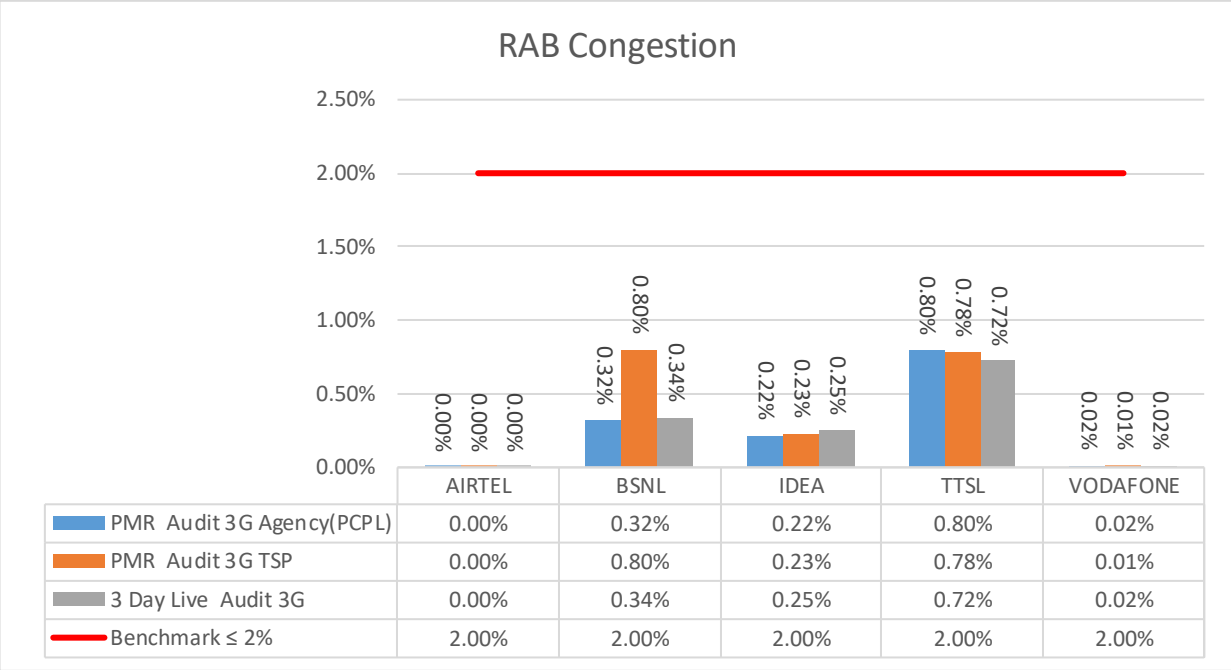
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	99.09%	99.33%	99.32%	97.09%	99.78%
PMR Audit 3G TSP	99.06%	97.00%	99.29%	96.91%	33.92%
3 Day Live Audit 3G	99.11%	99.28%	98.96%	99.82%	99.77%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%

13.5.4. RRC CONGESTION



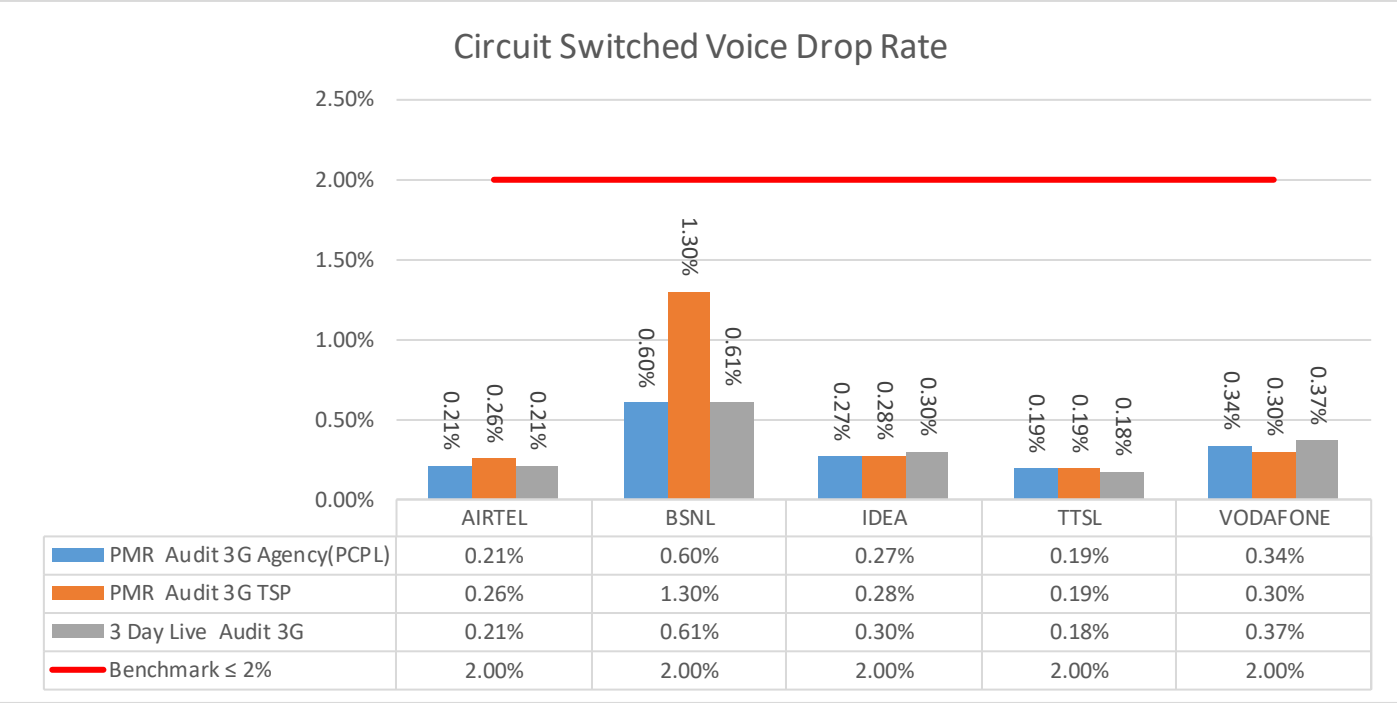
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	0.00%	0.04%	0.45%	13.17%	0.08%
PMR Audit 3G TSP	0.00%	0.57%	0.40%	14.15%	0.03%
3 Day Live Audit 3G	0.00%	0.04%	0.58%	0.49%	0.07%
Benchmark ≤ 1%	1.00%	1.00%	1.00%	1.00%	1.00%

13.5.5. RAB CONGESTION



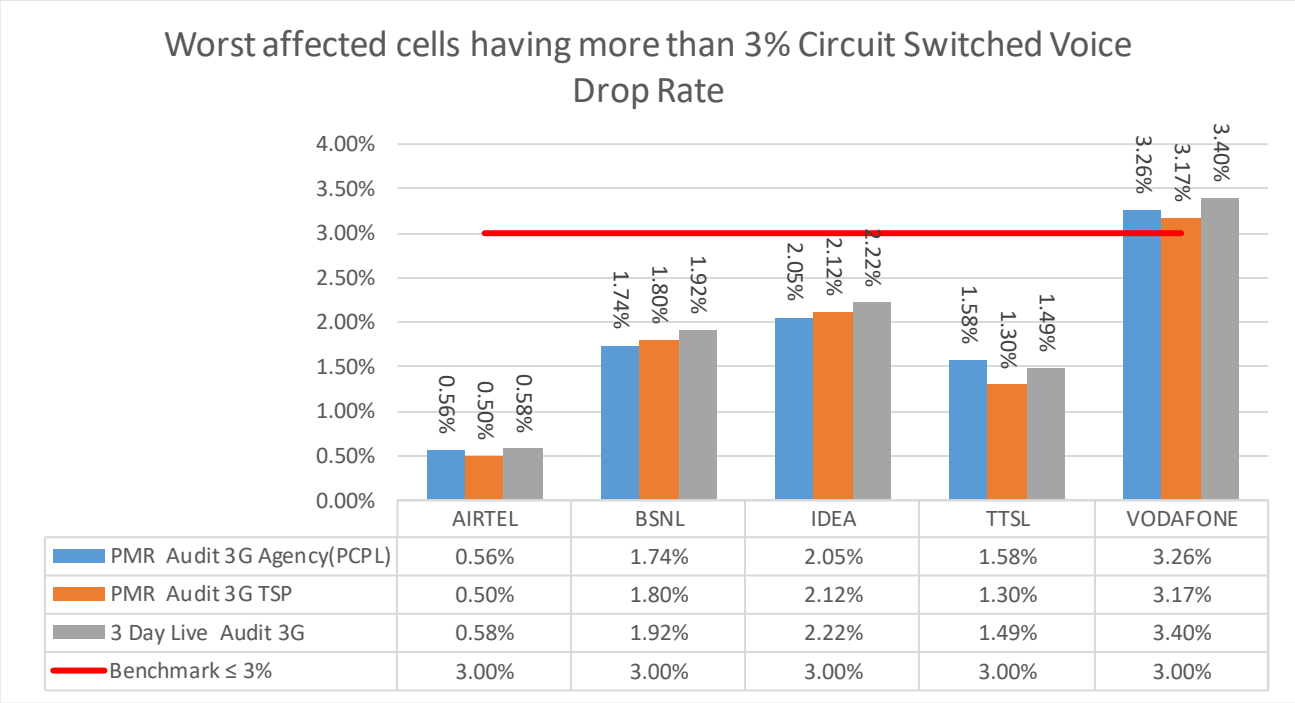
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	0.00%	0.32%	0.22%	0.80%	0.02%
PMR Audit 3G TSP	0.00%	0.80%	0.23%	0.78%	0.01%
3 Day Live Audit 3G	0.00%	0.34%	0.25%	0.72%	0.02%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

13.5.6. CIRCUIT SWITCHED VOICE DROP RATE



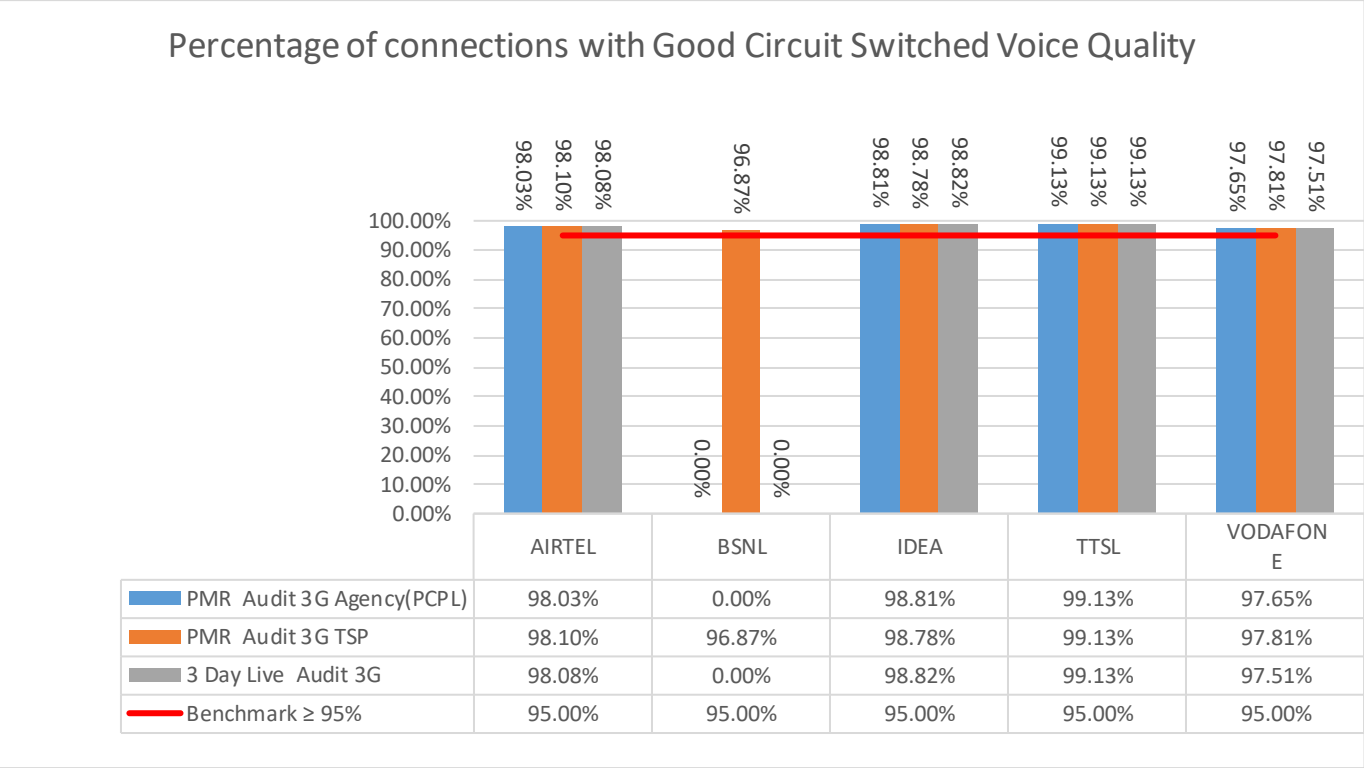
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	0.21%	0.60%	0.27%	0.19%	0.34%
PMR Audit 3G TSP	0.26%	1.30%	0.28%	0.19%	0.30%
3 Day Live Audit 3G	0.21%	0.61%	0.30%	0.18%	0.37%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

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



	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	0.56%	1.74%	2.05%	1.58%	3.26%
PMR Audit 3G TSP	0.50%	1.80%	2.12%	1.30%	3.17%
3 Day Live Audit 3G	0.58%	1.92%	2.22%	1.49%	3.40%
Benchmark ≤ 3%	3.00%	3.00%	3.00%	3.00%	3.00%

13.5.8. % AGE OF CONNECTION WITH GOOD SWITCHED VOICE QUALITY

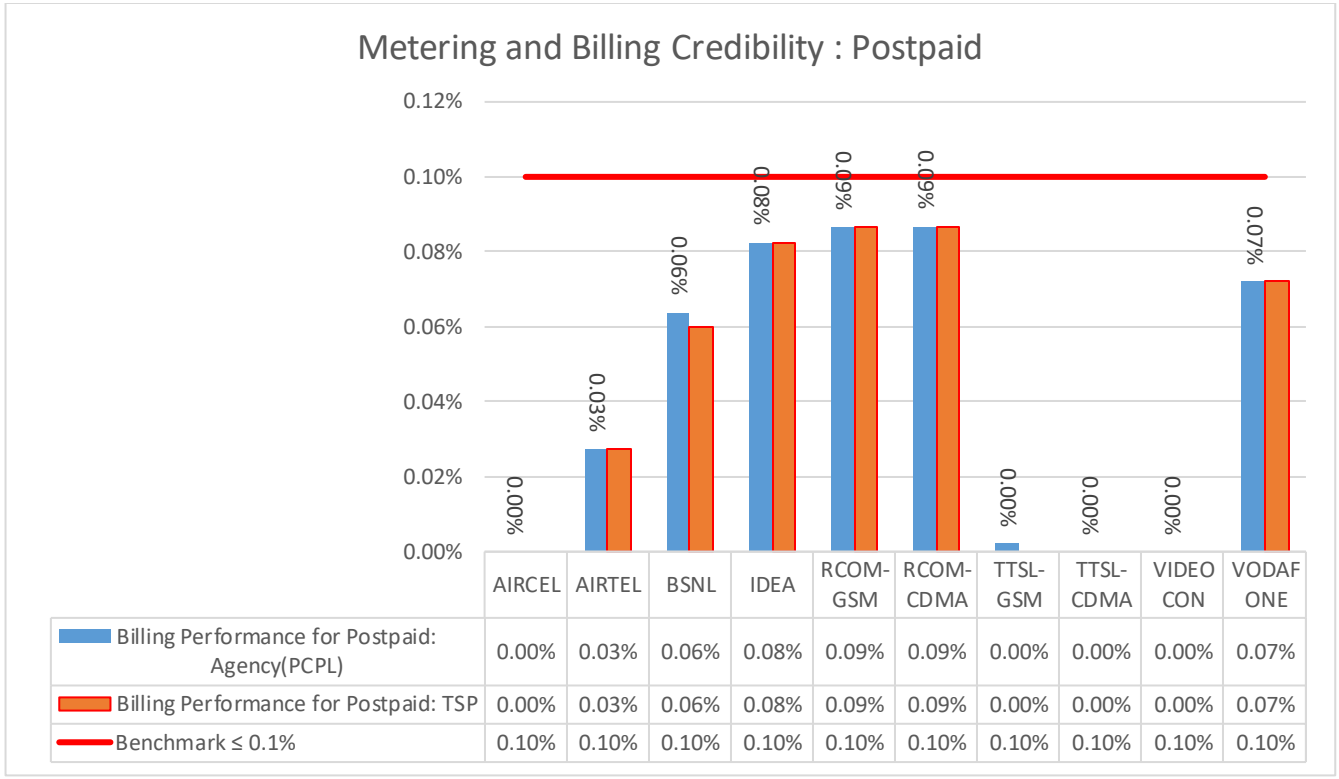


	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Agency(PCPL)	98.03%	0.00%	98.81%	99.13%	97.65%
PMR Audit 3G TSP	98.10%	96.87%	98.78%	99.13%	97.81%
3 Day Live Audit 3G	98.08%	0.00%	98.82%	99.13%	97.51%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%

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

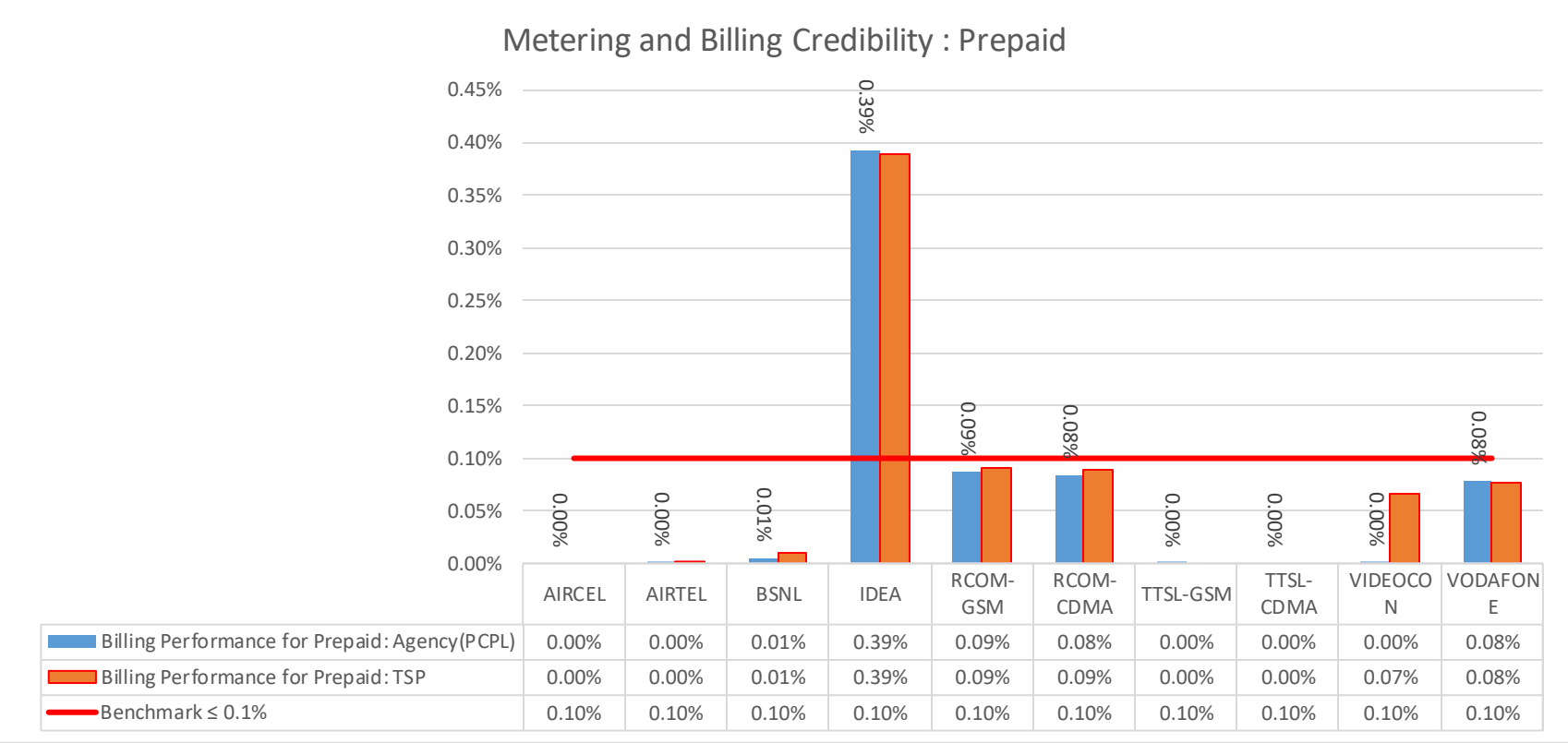
Name of Service Provider	Metering and Billing credibility				Billing Complaints						Termination & Closures		Time taken for refund of deposits after		Response time to customer for assistance			
	Postpaid Subscribers		Prepaid Subscribers		%age complaints resolved within 4 weeks		%age complaints resolved within 6 weeks		%age of where credit/waiver is received within one week		% of Termination/ Closure of service within 7 days (100 %)		Cleared over a period of <60 days (100%)		%age of calls answered by the IVR		%age of call answered by the operators (voice to voice) within 90 seconds	
Benchmark	≤ 0.1%		≤ 0.1%		≥ 98%		= 100%		= 100%		= 100%		= 100%		≥ 95%		≥ 95%	
	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP
AIRCEL	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.17%	98.17%	99.91%	100.09%
AIRTEL	0.03%	0.03%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.87%	100.00%	94.79%	75.91%
BSNL	0.06%	0.06%	0.01%	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.40%	99.63%
IDEA	0.08%	0.08%	0.39%	0.39%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.78%	99.78%	97.92%	97.92%
RCOM-GSM	0.09%	0.09%	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.16%	99.16%	93.12%	93.12%
RCOM-CDMA	0.09%	0.09%	0.08%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.07%	98.07%	96.27%	96.27%
TTSL-GSM	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	83.33%	83.33%	100.00%	100.00%	100.00%	100.00%	97.86%	97.86%	88.91%	88.91%
TTSL-CDMA	0.00%	0.00%	0.00%	0.00%	NILL	100.00%	NILL	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	DNA	100.00%	99.62%	99.62%
VIDEOCON	NA	#VALUE!	0.00%	0.07%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	#VALUE!	100.00%	100.00%	100.00%	100.00%	96.22%	96.22%
VODAFONE	0.07%	0.07%	0.08%	0.08%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.46%	98.46%

13.6.1. METERING AND BILLING CREDIBILITY : POSTPAID



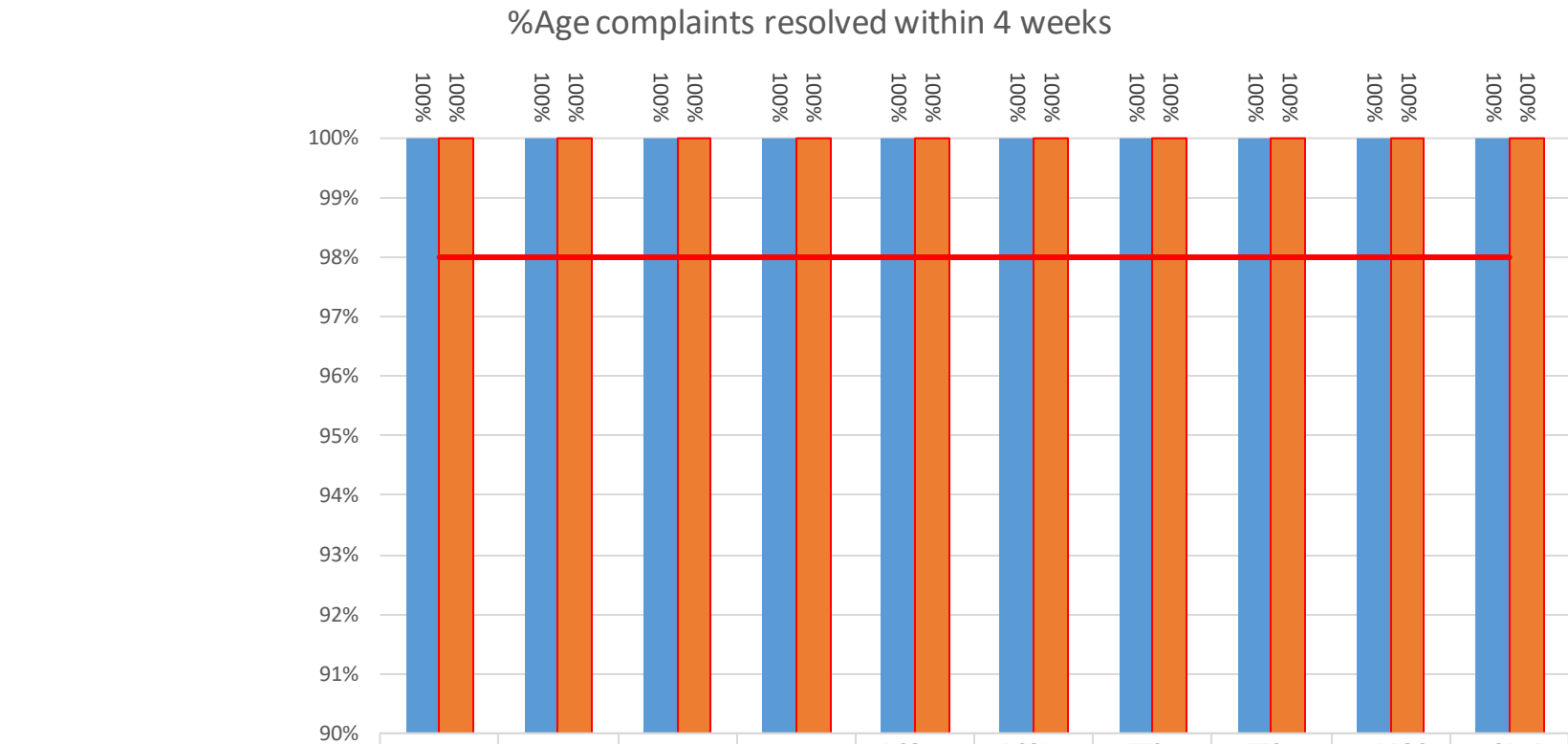
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM-GSM	RCOM-CDMA	TTSL-GSM	TTSL-CDMA	VIDEOCON	VODAFONE
Billing Performance for Postpaid: Agency(PCPL)	0.00%	0.03%	0.06%	0.08%	0.09%	0.09%	0.00%	0.00%	0.00%	0.07%
Billing Performance for Postpaid: TSP	0.00%	0.03%	0.06%	0.08%	0.09%	0.09%	0.00%	0.00%	0.00%	0.07%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

13.6.2. METERING AND BILLING CREDIBILITY : PREPAID



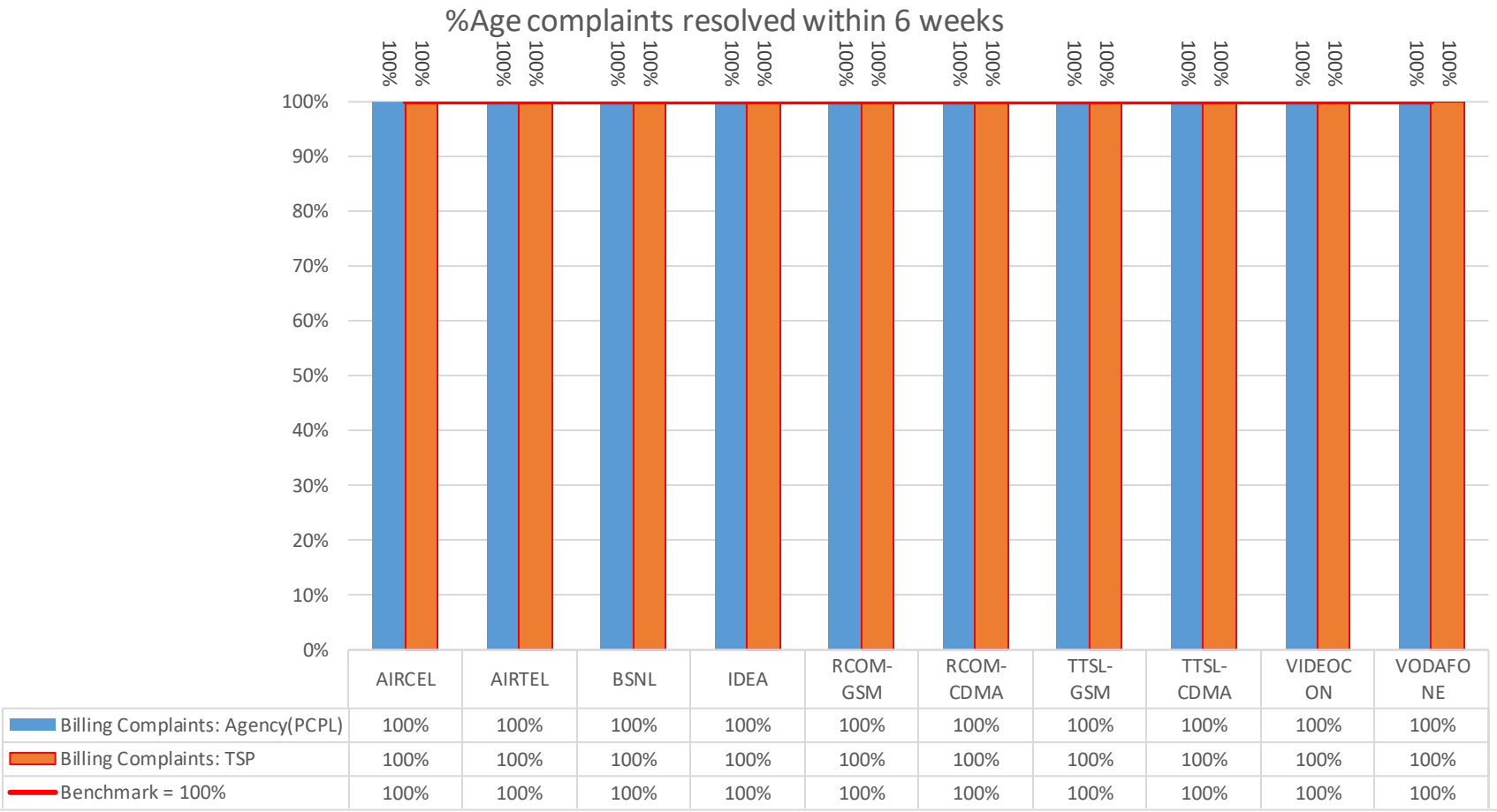
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM-GSM	RCOM-CDMA	TTSL-GSM	TTSL-CDMA	VIDEOCON	VODAFONE
Billing Performance for Prepaid: Agency(PCPL)	0.00%	0.00%	0.01%	0.39%	0.09%	0.08%	0.00%	0.00%	0.00%	0.08%
Billing Performance for Prepaid: TSP	0.00%	0.00%	0.01%	0.39%	0.09%	0.09%	0.00%	0.00%	0.07%	0.08%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

13.6.3. %AGE COMPLAINT RESOLVED WITHIN 4 WEEKS



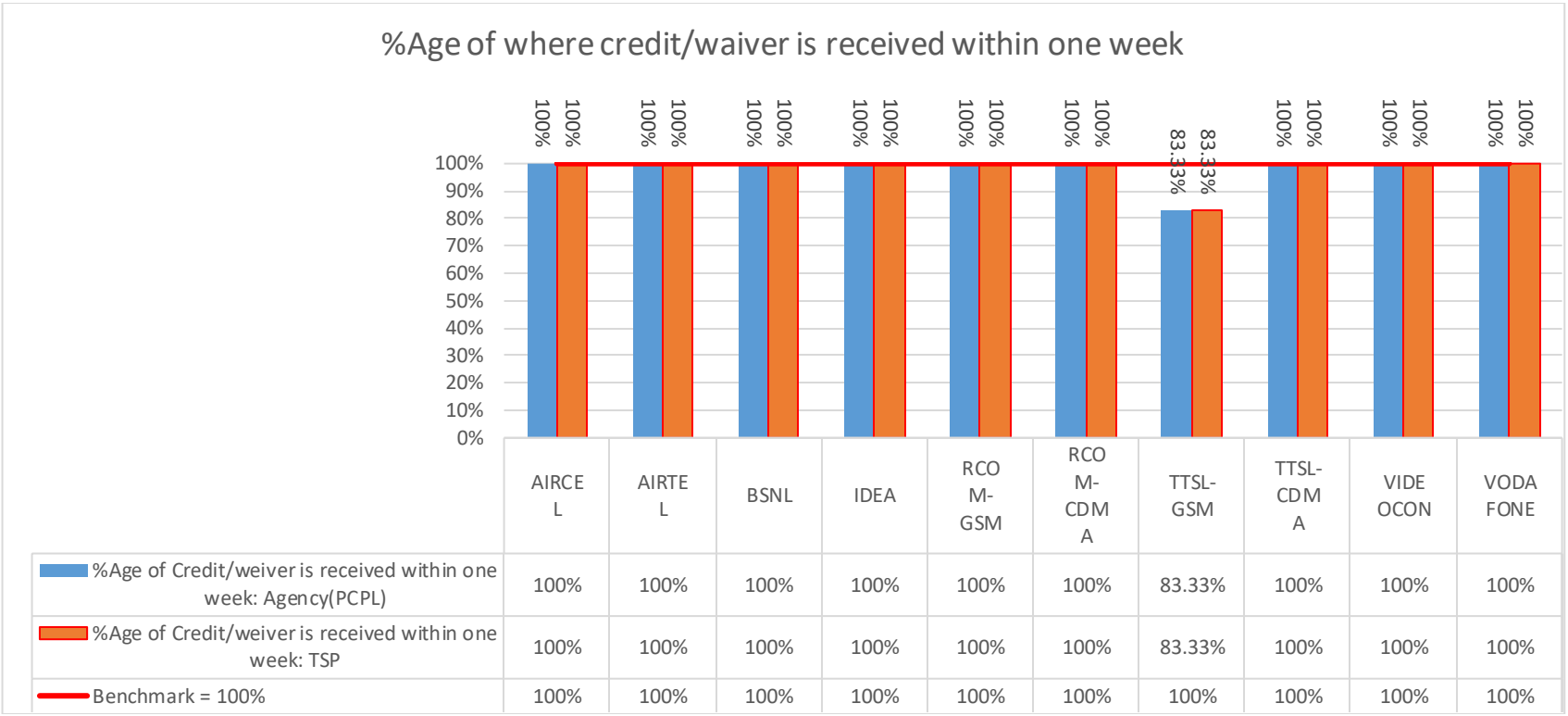
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM-GSM	RCOM-CDMA	TTSL-GSM	TTSL-CDMA	VIDEOCON	VODAFONE
Billing Complaints: Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Billing Complaints: TSP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark ≥ 98%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%

13.6.4. %AGE COMPLAINTS RESOLVED WITHIN 6 WEEKS



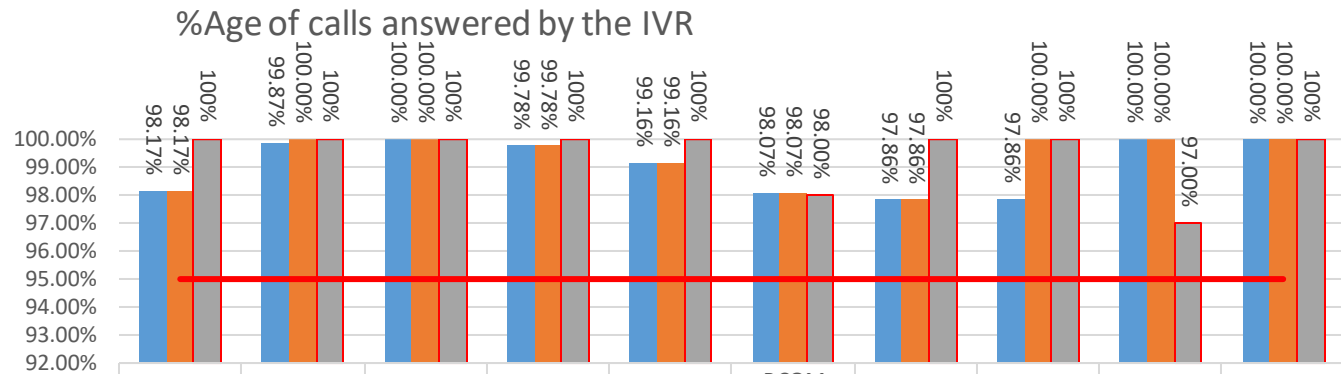
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM-GSM	RCOM-CDMA	TTSL-GSM	TTSL-CDMA	VIDEOCON	VODAFONE
Billing Complaints: Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Billing Complaints: TSP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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



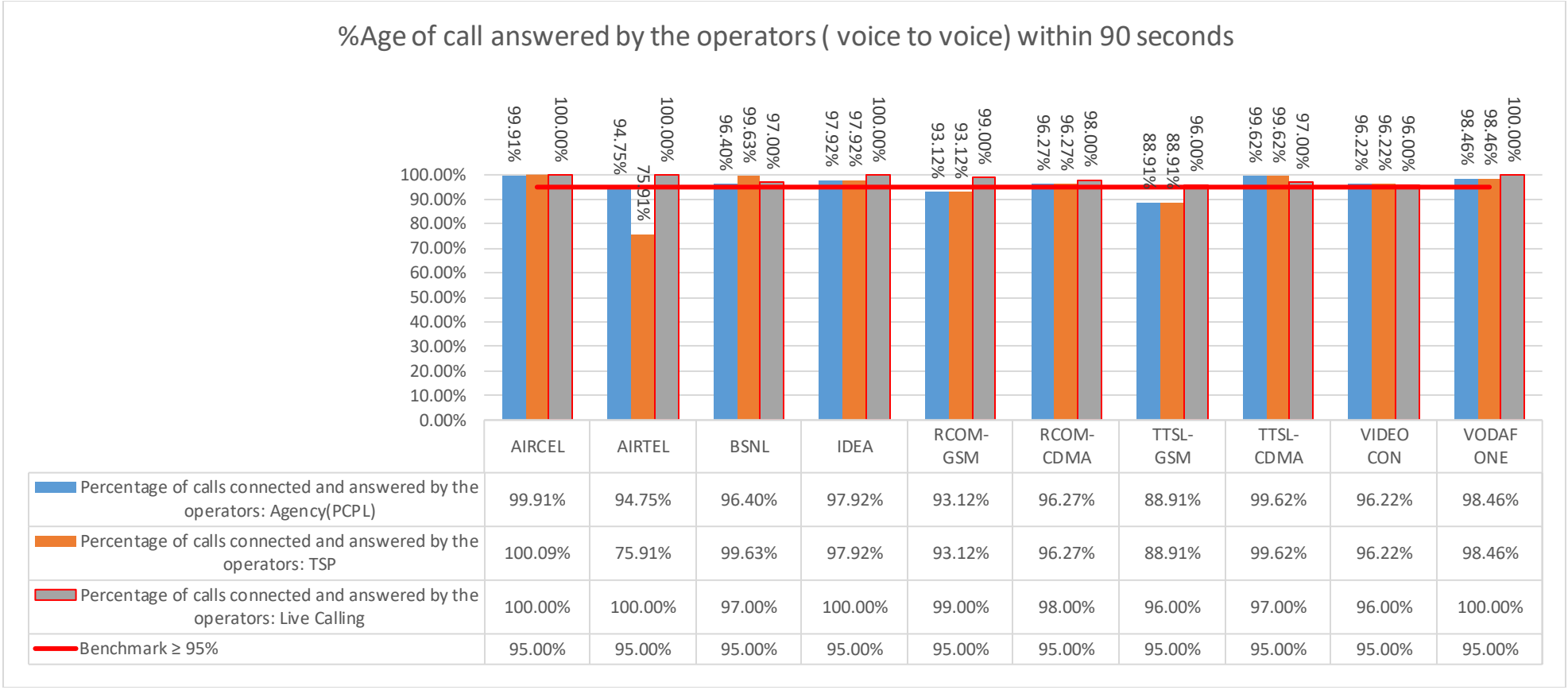
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM-GSM	RCOM-CDMA	TTSL-GSM	TTSL-CDMA	VIDEOCON	VODAFONE
%Age of Credit/weiver is received within one week: Agency(PCPL)	100%	100%	100%	100%	100%	100%	83.33%	100%	100%	100%
%Age of Credit/weiver is received within one week: TSP	100%	100%	100%	100%	100%	100%	83.33%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

13.6.6. %AGE OF CALLS ANSWERED BY THE IVR



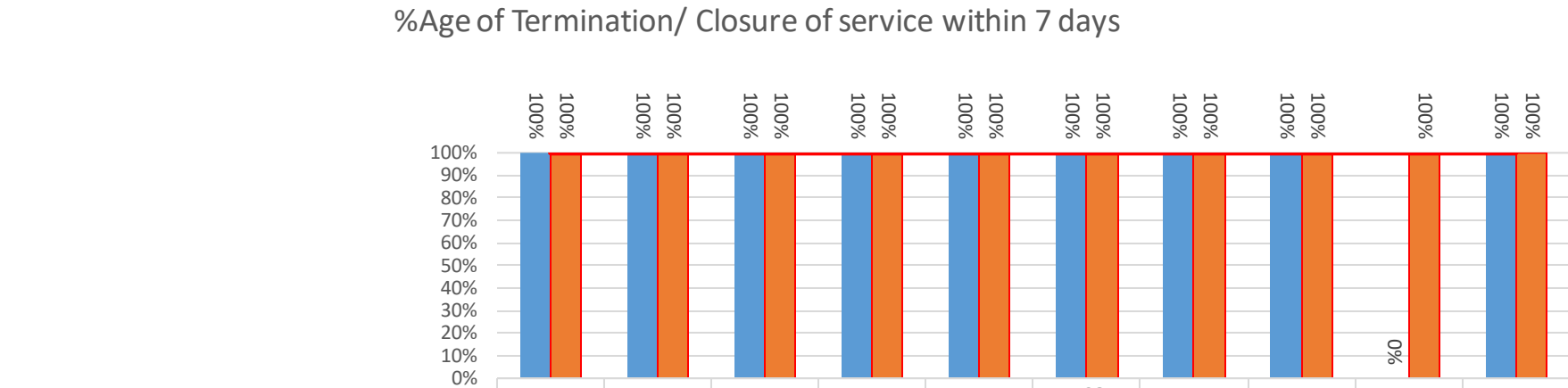
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM-GSM	RCOM-CDMA	TTSL-GSM	TTSL-CDMA	VIDEOCON	VODAFONE
Percentage of calls connected and answered : Agency(PCPL)	98.17%	99.87%	100.00%	99.78%	99.16%	98.07%	97.86%	97.86%	100.00%	100.00%
Percentage of calls connected and answered : TSP	98.17%	100.00%	100.00%	99.78%	99.16%	98.07%	97.86%	100.00%	100.00%	100.00%
Percentage of calls connected and answered : Live Calling	100%	100%	100%	100%	100%	98.00%	100%	100%	97.00%	100%

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



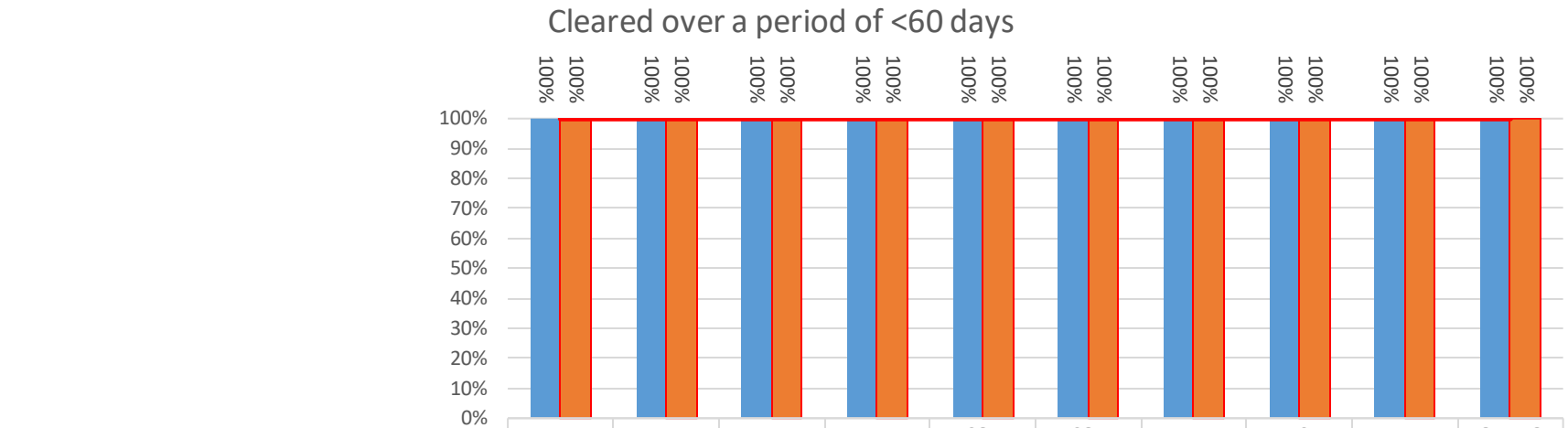
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM-GSM	RCOM-CDMA	TTSL-GSM	TTSL-CDMA	VIDEOCON	VODAFONE
Percentage of calls connected and answered by the operators: Agency(PCPL)	99.91%	94.75%	96.40%	97.92%	93.12%	96.27%	88.91%	99.62%	96.22%	98.46%
Percentage of calls connected and answered by the operators: TSP	100.09%	75.91%	99.63%	97.92%	93.12%	96.27%	88.91%	99.62%	96.22%	98.46%
Percentage of calls connected and answered by the operators: Live Calling	100.00%	100.00%	97.00%	100.00%	99.00%	98.00%	96.00%	97.00%	96.00%	100.00%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

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



	AIRCEL	AIRTEL	BSNL	IDEA	RCOM-GSM	RCOM-CDMA	TTSL-GSM	TTSL-CDMA	VIDEOCON	VODAFONE
Percentage cases closure done within 7 days: Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%
Percentage cases closure done within 7 days: TSP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

13.6.9. CLEARED OVER A PERIOD OF <60 DAYS



	AIRCEL	AIRTEL	BSNL	IDEA	RCOM-GSM	RCOM-CDMA	TTSL-GSM	TTSL-CDMA	VIDEOCON	VODAFONE
Percentage refund of deposits after closures: Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Percentage refund of deposits after closures: TSP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

14 KEY FINDINGS

14.1. 2G VOICE PMR - CONSOLIDATED

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

14.2. 3G VOICE PMR - CONSOLIDATED

- TTSL has parameter value of 13.17% and failed to meet the benchmark of ≤ 1% RRC Congestion:
- VODAFONE has parameter value of 3.26% and failed to meet the benchmark of ≤ 3% Worst affected cells having more than 3% Circuit Switched Voice Drop Rate

14.3. BILLING AND CUSTOMER CARE

- AIRTEL has parameter value of **94.75%** and failed to meet the benchmark of ≥95% for %age of call answered by the operators (voice to voice) within 90 seconds.
- IDEA has parameter value of **0.39%** and failed to meet the benchmark of ≤0.1% for Metering and Billing credibility for Prepaid subscribers.
- RCOM GSM has parameter value of **93.12%** and failed to meet the benchmark of ≥95% for %age of call answered by the operators (voice to voice) within 90 seconds.
- TTSL GSM has parameter value of **83.33%** and failed to meet the benchmark of =100% for %age of where credit/ waiver is received within one week
- TTSL GSM has parameter value of **88.91%** and failed to meet the benchmark of ≥95% for %age of call answered by the operators (voice to voice) within 90 seconds.