AUDIT & ASSESSMENT
OF
QUALITY OF SERVICE

NORTH ZONE – PUNJAB CIRCLE
CELLULAR MOBILE TELEPHONE SERVICE
(CMTS)
(JANUARY TO MARCH2016)

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1. INTRODUCTION

1.1. ABOUT TRAI

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

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

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

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

1.2. ABOUT PHISTREAM CONSULTING PRIVATE LIMITED

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

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

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

1.3. OBJECTIVES

The primary objective of the Audit module is to:

- Audit and Assess the Quality of Services being rendered by Basic (Wireline), Cellular Mobile (Wireless), and Broadband service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified by in the respective regulations published by TRAI).

- This report covers the audit results of the audit conducted for Cellular Mobile (Wireless) services in Punjab circle.

1.4. COVERAGE

The audit was conducted in Punjab Circle covering all SSAs (Secondary Switching Areas).
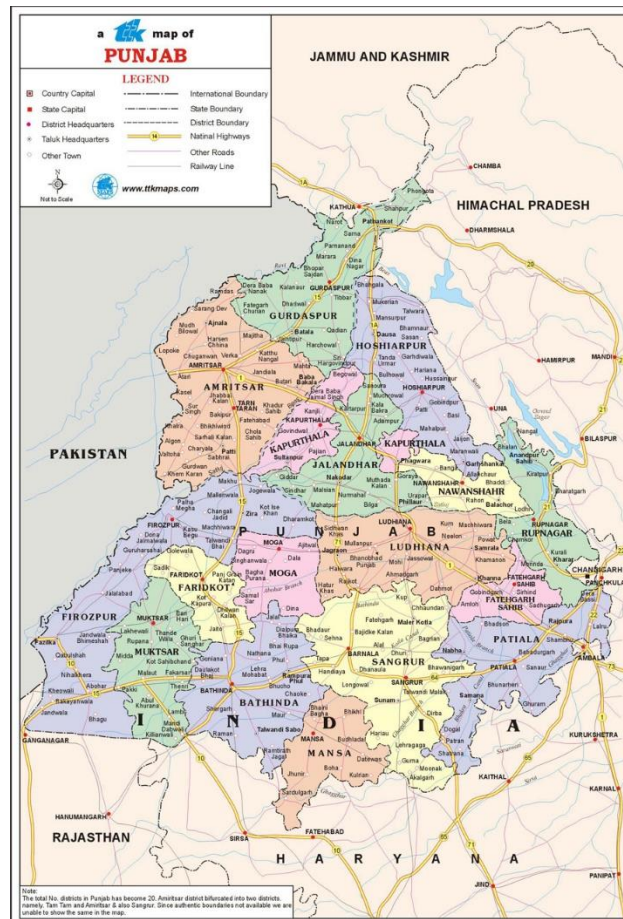
Image Source: TTK Maps

1.5. SSA LIST

SSA	SDCA
Amritsar	Ajnala
Amritsar	Amritsar
Amritsar	Goindwal
Amritsar	Patti
Amritsar	Rayya
Amritsar	Tarantaran
Bhatinda	Bhatinda
Bhatinda	Mansa
Bhatinda	Phulmandi
Bhatinda	Raman

Bhatinda	Sardulgarh
Chandigarh	Chandigarh
Ferozepur	Abohar
Ferozepur	Faridakot
Ferozepur	Fazilka
Ferozepur	Ferozepur
Ferozepur	Guruharsahai
Ferozepur	Kotkapura
Ferozepur	Malaut
Ferozepur	Moga
Ferozepur	Muktasar
Ferozepur	Zira
Hosiarpur	Balachaur
Hosiarpur	Dasua
Hosiarpur	Garhashanker
Hosiarpur	Hoshiarpur
Hosiarpur	Tandaurmar
Jalandhar	Jallandhar
Jalandhar	Kapurthala
Jalandhar	Nakodar
Jalandhar	Nawanshahar
Jalandhar	Phagwara
Jalandhar	Phillaur
Jalandhar	Sultanpurlodhi
Ludhiana	Jagraon
Ludhiana	Ludhiana
Ludhiana	Samrala
Pathankot	Batala
Pathankot	Dinanagar
Pathankot	Gurdaspur
Pathankot	Jugial
Pathankot	Pathankot
Pathankot	Quadian
Patiala	Nabha
Patiala	Patiala
Patiala	Rajpura
Patiala	Samana
Patiala	Sarhind
Ropar	Kharar
Ropar	Nangal
Ropar	Ropar
Sangrur	Barnala
Sangrur	Malerkotla
Sangrur	Sangrur
Sangrur	Sunam

Audit Activities

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

2. PMR Reports

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

The TSP is intimated about the audit schedule in advance and accordingly the auditor visits the TSP premises to conduct the audit

Raw Data is extracted from the operator's NOC/OMCR/call centre/billing centre etc. by the auditor with assistance from the operator personnel in order to generate PMR reports (Network/ Billing/ Customer Service etc.)

Calculations are done to generate new PMR from the RAW data

Hard copy of the PMR is duly signed by the auditor and competent authority from operator end.

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, January2016 audit data was collected in the month of February2016.

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 March2016 was collected in the month of March2016.

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 March2016. 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.
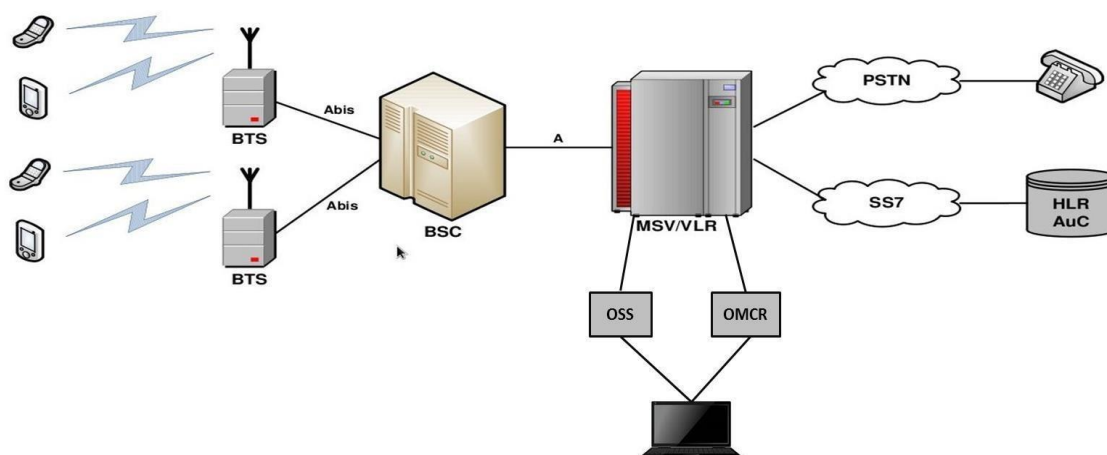
2.4. AUDIT PROCEDURE

Tender document and latest list of licencees as per TRAI is taken as a reference document for assimilating the presence of operators. All the wireless operators are then informed about the audit schedule

Audit formats and schedule is shared with the operators in advance. Details include day of the visit and date of 3 day data collection and other requirements.

Auditors visit the operator's server/exchange/central NOC to extract data from operator's systems. Operator personnel assist the auditor in extraction process.

The extracted data is validated and verfied by the Auditors.

Auditors then prepare a PMR report from the extracted data with assistance from the operator.

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

2.5. NETWORK CALCULATION METHODOLOGY

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

2.6. 3G VOICE

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

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

2.7. 2G & 3G WIRELESS

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

3. 3 DAYS LIVE DATA

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

The 3 day live data provides a sample of 9 days in a quarter (3 days each month of a quarter) with hourly performance, which enables the auditor to identify and validate intraday issues for an operator on the Q0S network parameters. For example, network congestion being faced by an operator during busy/peak hours.

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

3.1. TCBH: SIGNIFICANCE AND SELECTION METHODOLOGY

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

Daywise RAW Data is fetched from the operator's OMCR and kept in readable format (preferably in MS- Excel). Data for a period of 90 days is used to identify TCBH.

90 Days period is decided upon the basis of month of audit. For example, for the audit of December 2015, the 90 day period data used to identify TCBH would be the data of October, November & December 2015.

For each day, the hour in which average traffic of the resource group concerned is greatest for the day will be the 'Busy Hour' for the operator.

The model frequency of te busy hour is calculated for 90 days period and the hour with highest model frequency will beconsidered as TCBH for the operator.

During audit, the auditors identified from the raw data that the TCBH for the operators in Jan – Feb – Mar2016 was the time period as given below:

Aircel	Airtel	BSNL	Idea	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone	Videocon

19:00-20:00	19:00-20:00	19:00-20:00	19:00-20:00	19:00-20:00	19:00-20:00	18:00-19:00	18:00-19:00	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:

Daywise RAW Data is fetched from the operator's OMCR and kept in readable format (preferably in MS- Excel). Data for a period of 90 days is used to identify CBBH.

For each day the hour in which a cell in cellular mobile telephone network experiences maximum traffic for the day will be the 'Busy Hour' for the operator.

The model frequency of the busy hour is calculated for 90 days period and the hour with highest model frequency will be considered as CBBH for the 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

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

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

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

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

Live calling activity was carried out during the period of March2016. 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 January2016 was considered for live calling activity conducted in February2016.
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 SashastraSeemaBal (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%	-	98%	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%
Tata CDMA	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
Tata 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

Punjab Circleconsist of total 11 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 PUNJAB Circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

6.1. OPERATORS COVERED

Name of Operator	Number of Subscriber (As On 31stMarch2016)
Aircel	1073030
Airtel	8013787
BSNL	3337315
Idea	7739273
RCOM CDMA	152014
RCOM GSM	1500854
TTSL CDMA	241466
TTSL GSM	2850919
QTL	3161732

TSP	No. of cells	BTS	BSC	MSC+GMSC	Node B	RNC
Aircel	1962	654	5	1	386	2
Airtel	17656	5825	56	25	NA	NA
BSNL	10137	3379	46	12	1540	11
IDEA	16315	5403	50	9	3501	8
RCOM GSM	4550	1528	8	2+1	866	2
RCOM CDMA	1856	619	3	2+2	NA	NA
TTSL CDMA	1247	390	4	2+1	NA	NA
TTSL GSM	4971	1629	12	2+1	933	3
VIDEOCON	7667	2394	14	1	NA	NA
VODAFONE	15917	5598	52	4+5	NA	NA

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

6.2. AUDIT SCHEDULE

Operator	3 Days Live Audit (January2016)	January2016	February2016	March2016
Airtel	12th Jan 2016	6thFeb2016	15thMar2016	12thApr 2016
Vodafone	11th Jan 2016	16thFeb2016	11thMar2016	11thApr 2016
Idea	14th Jan 2016	9thFeb2016	14thMar2016	14thApr 2016
Reliance	5th Jan 2016	5thFeb2016	7thMar2016	5thApr 2016
BSNL	8th Jan 2016	18thFeb2016	8thMar2016	8thApr 2016
Aircel	6th Jan 2016	9thFeb2016	14thMar2016	6thApr 2016
Tata Teleservices	7th Jan 2016	10thFeb2016	9thMar2016	7thApr 2016
Videocon	8th Jan 2016	7thFeb2016	10thMar2016	8thApr 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	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.22%	0.04%	0.02%	0.05%	0.11%	0.60%	0.11%	0.03%	0.07%	0.09%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	1.09%	0.05%	0.02%	0.04%	0.31%	1.99%	0.85%	0.00%	0.65%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.60%	99.31%	99.80%	98.70%	98.18%	97.22%	99.87%	98.71%	97.89%	98.87%
	SDDCH/Paging chl. Congestion	≤ 1%	0.07%	0.24%	0.03%	0.04%	0.10%	0.60%	0.04%	0.07%	0.00%	0.00%
	TCH Congestion	≤ 2%	0.14%	0.20%	0.20%	0.19%	0.15%	1.18%	0.07%	0.18%	1.07%	0.03%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.74%	0.71%	0.55%	0.45%	0.65%	0.25%	0.06%	0.61%	0.04%	0.28%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.47%	1.00%	2.79%	0.99%	2.41%	1.35%	0.37%	3.29%	0.14%	3.46%
	%age of connection with good voice quality	≥ 95%	96.97%	98.35%	97.97%	98.27%	97.38%	96.08%	99.03%	97.37%	96.11%	99.10%

6.4. 2G Voice PMR Data: February

Network Parameters		Benchmark	eocon(QT	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	COM-GSM	ATA-GSM	COM-CDM	ATA-CDM
Feb-16						Name of Service Provider						
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.19%	0.04%	0.02%	0.05%	0.24%	0.60%	0.10%	0.03%	0.08%	0.05%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.21%	0.00%	0.02%	0.02%	0.61%	1.96%	0.72%	0.00%	0.81%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.03%	99.27%	99.86%	98.75%	97.95%	97.40%	99.62%	98.63%	97.80%	98.42%
	SDDCH/Paging chl. Congestion	≤ 1%	0.11%	0.37%	0.02%	0.03%	0.14%	0.40%	0.04%	0.13%	0.00%	0.00%
	TCH Congestion	≤ 2%	0.21%	0.20%	0.14%	0.12%	0.11%	0.88%	0.10%	0.13%	1.09%	0.07%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.80%	0.73%	0.55%	0.47%	0.71%	0.23%	0.06%	0.55%	0.05%	0.31%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.55%	1.18%	2.83%	1.25%	2.61%	1.13%	0.37%	2.85%	0.26%	**3.33%**
	%age of connection with good voice quality	≥ 95%	96.60%	98.29%	97.99%	98.06%	96.88%	96.65%	98.99%	97.16%	99.18%	99.02%

6.5. 2G Voice PMR Data: March

Network Parameters		Benchmark	eocon(QT	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	COM-GSM	ATA-GSM	COM-CDM	ATA-CDM
Mar-16						Name of Service Provider						
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.11%	0.07%	0.03%	0.06%	0.14%	0.63%	0.09%	0.03%	0.09%	0.02%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.13%	0.02%	0.02%	0.02%	0.00%	1.86%	0.72%	0.06%	0.81%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.07%	99.28%	99.83%	98.22%	97.84%	96.75%	97.46%	98.51%	98.55%	98.40%
	SDDCH/Paging chl. Congestion	≤ 1%	0.17%	0.30%	0.04%	0.14%	0.10%	0.63%	0.08%	0.14%	0.00%	0.00%
	TCH Congestion	≤ 2%	0.27%	1.90%	0.17%	0.36%	0.22%	0.84%	0.13%	0.16%	0.11%	0.16%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.82%	0.62%	0.56%	0.60%	0.82%	0.23%	0.07%	0.52%	0.09%	0.29%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.59%	0.64%	2.88%	1.61%	2.92%	1.21%	0.29%	**3.05%**	0.80%	2.95%
	%age of connection with good voice quality	≥ 95%	96.59%	98.34%	97.93%	96.91%	96.86%	96.23%	99.44%	97.20%	99.38%	99.02%

6.6. 2G VOICE PMR DATA: CONSOLIDATED

Network Parameters		Benchmark	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
Consolidated												
						Name of Service Provider						
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.17%	0.05%	0.02%	0.05%	0.16%	0.61%	0.10%	0.03%	0.08%	0.05%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.48%	0.02%	0.02%	0.02%	0.31%	1.94%	0.76%	0.02%	0.75%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.23%	99.28%	99.83%	98.56%	97.99%	97.12%	98.98%	98.62%	98.08%	98.57%
	SDDCH/Paging chl. Congestion	≤ 1%	0.11%	0.30%	0.03%	0.07%	0.12%	0.54%	0.05%	0.11%	0.00%	0.00%
	TCH Congestion	≤ 2%	0.21%	0.19%	0.17%	0.22%	0.16%	0.97%	0.10%	0.16%	0.76%	0.09%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.79%	0.69%	0.55%	0.51%	0.73%	0.24%	0.06%	0.56%	0.06%	0.29%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.54%	0.94%	2.83%	1.28%	2.65%	1.23%	0.34%	3.06%	0.40%	3.24%
	%age of connection with good voice quality	≥ 95%	96.72%	98.33%	97.96%	97.75%	97.04%	96.32%	99.16%	97.24%	98.22%	99.05%

6.7. 2G VOICE 3 DAYS LIVE DATA: JANUARY

Network Parameters		Benchmark	QTL	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
Jan-16												
						Name of Service Provider						
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.05%	0.01%	0.01%	0.03%	0.30%	0.80%	0.11%	0.02%	0.06%	0.00%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.59%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.61%	99.46%	99.85%	99.07%	98.43%	96.98%	99.94%	98.80%	97.89%	99.12%
	SDDCH/Paging chl. Congestion	≤ 1%	0.08%	0.22%	0.02%	0.02%	0.01%	0.27%	0.02%	0.06%	0.00%	0.00%
	TCH Congestion	≤ 2%	0.10%	0.17%	0.15%	0.15%	0.05%	1.14%	0.03%	0.25%	1.08%	0.02%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.72%	0.72%	0.55%	0.43%	0.50%	0.30%	0.05%	0.61%	0.04%	0.26%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.24%	0.97%	2.83%	0.88%	1.91%	1.70%	0.39%	DNA	0.05%	4.50%
	%age of connection with good voice quality	≥ 95%	96.92%	98.30%	97.93%	98.35%	97.83%	96.03%	99.06%	97.35%	99.19%	99.10%

6.8. 2G VOICE 3 DAYS LIVE DATA: FEBRUARY

Feb-16											
Network Parameters		Benchmark	QTL	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
									Name of Service Provider			
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.18%	0.10%	0.02%	0.06%	0.16%	0.93%	0.12%	0.02%	0.10%	0.01%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.56%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.55%	99.32%	99.86%	98.36%	98.04%	97.28%	99.67%	98.89%	97.80%	98.28%
	SDDCH/Paging chl. Congestion	≤ 1%	0.10%	0.16%	0.02%	0.04%	0.01%	0.40%	0.04%	0.02%	NA	0.00%
	TCH Congestion	≤ 2%	0.13%	0.17%	0.14%	0.17%	0.03%	0.86%	0.09%	0.06%	1.11%	0.02%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.78%	0.63%	0.54%	0.43%	0.66%	0.24%	0.06%	0.50%	0.03%	0.29%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.50%	1.41%	2.86%	1.14%	2.34%	1.22%	0.34%	2.47%	0.25%	3.31%
	%age of connection with good voice quality	≥ 95%	96.71%	98.62%	98.03%	98.20%	96.95%	96.06%	99.00%	97.21%	99.18%	98.04%

6.9. 2G VOICE 3 DAYS LIVE DATA: MARCH

Mar-16											
Network Parameters		Benchmark	QTL	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
									Name of Service Provider			
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.13%	0.01%	0.02%	0.04%	0.11%	0.79%	0.10%	0.02%	0.10%	0.01%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.59%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.13%	99.22%	99.86%	98.42%	97.25%	97.64%	99.42%	98.70%	98.59%	98.89%
	SDDCH/Paging chl. Congestion	≤ 1%	0.12%	0.30%	0.02%	0.05%	0.26%	0.17%	0.10%	0.07%	NA	0.00%
	TCH Congestion	≤ 2%	0.24%	0.22%	0.14%	0.32%	0.30%	0.60%	0.14%	0.06%	0.19%	0.08%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.82%	0.65%	0.55%	0.60%	0.99%	0.22%	0.09%	0.56%	0.07%	0.22%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.64%	0.87%	2.87%	1.88%	4.31%	1.29%	0.23%	3.37%	0.90%	1.74%
	%age of connection with good voice quality	≥ 95%	96.70%	98.33%	97.96%	96.50%	96.90%	96.53%	99.41%	97.28%	99.38%	99.05%

6.10. 2G VOICE 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated											
Network Parameters		Benchmark	QTL	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
									Name of Service Provider			
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.12%	0.04%	0.02%	0.04%	0.19%	0.84%	0.11%	0.02%	0.09%	0.00%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.58%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.43%	99.33%	99.86%	98.62%	97.91%	97.30%	99.68%	98.80%	98.09%	98.77%
	SDDCH/Paging chl. Congestion	≤ 1%	0.10%	0.23%	0.02%	0.04%	0.09%	0.28%	0.05%	0.05%	0.00%	0.00%
	TCH Congestion	≤ 2%	0.16%	0.18%	0.14%	0.21%	0.13%	0.87%	0.08%	0.12%	0.79%	0.04%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.77%	0.67%	0.55%	0.49%	0.71%	0.25%	0.07%	0.56%	0.05%	0.26%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.46%	1.08%	2.85%	1.30%	2.85%	1.40%	0.32%	2.92%	0.40%	3.18%
	%age of connection with good voice quality	≥ 95%	96.78%	98.42%	97.97%	97.68%	97.23%	96.21%	99.16%	97.28%	99.25%	98.73%

6.10.1. 3G VOICE PMR: JANUARY

Jan-16							
Network Parameters		**Name of Service Provider**					
		Benchmark	**IDEA**	**AIRCEL**	**BSNL**	**RCOM-GSM**	**TATA-GSM**
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.03%	0.20%	0.43%	DNA	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.06%	0.52%	1.65%	DNA	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.44%	99.23%	99.02%	DNA	98.51%
	RRC Congestion:	≤ 1%	0.21%	0.35%	0.93%	DNA	0.38%
	RAB Congestion:	≤ 2%	0.10%	0.04%	0.29%	DNA	1.10%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.74%	0.50%	0.34%	DNA	0.19%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.08%	6.20%	0.75%	DNA	0.00%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	99.34%	99.06%	97.77%	DNA	99.13%

6.11. 3G VOICE PMR: FEBRUARY

Feb-16							
Network Parameters		**Name of Service Provider**					
		Benchmark	**IDEA**	**AIRCEL**	**BSNL**	**RCOM-GSM**	**TATA-GSM**
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.02.%	0.29%	0.42%	0.06%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.09%	1.30%	1.63%	0.12%	0.11%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.57%	99.13%	98.97%	99.53%	97.97%
	RRC Congestion:	≤ 1%	0.12%	0.66%	0.85%	0.01%	0.69%
	RAB Congestion:	≤ 2%	0.10%	0.08%	0.30%	0.06%	0.31%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.65%	0.42%	0.38%	0.26%	0.18%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.07%	5.45%	0.74%	1.81%	0.90%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	99.36%	99.11%	97.75%	99.74%	99.11%

Mar-16						
Network Parameters		**Name of Service Provider**				
		Benchmark	**IDEA**	**AIRCEL**	**BSNL**	**RCOM-GSM**	**TATA-GSM**
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.01%	0.32%	0.46%	0.66%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.26%	1.82%	1.85%	0.11%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.48%	98.96%	99.07%	99.23%	97.95%
	RRC Congestion:	≤ 1%	0.19%	0.45%	0.79%	0.09%	0.56%
	RAB Congestion:	≤ 2%	0.16%	0.09%	0.27%	0.06%	1.45%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.64%	0.50%	0.37%	0.14%	0.17%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.04%	6.29%	0.62%	1.89%	0.81%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	99.33%	99.06%	97.61%	99.40%	99.12%

6.13. 3G VOICE PMR: CONSOLIDATED

		Consolidated					
Network Parameters		**Name of Service Provider**					
		Benchmark	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.02%	0.27%	0.44%	0.36%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.05%	0.69%	1.70%	0.99%	0.07%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.50%	99.11%	99.02%	99.38%	98.14%
	RRC Congestion:	≤ 1%	0.17%	0.49%	0.86%	0.05%	0.54%
	RAB Congestion:	≤ 2%	0.12%	0.07%	0.29%	0.06%	0.95%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.68%	0.47%	0.36%	0.20%	0.18%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.06%	5.98%	0.70%	1.85%	0.57%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	99.34%	99.08%	97.71%	99.57%	99.12%

6.14. 3G VOICE 3 DAYS LIVE DATA: CONSOLIDATED

		Consolidated					
Network Parameters		**Name of Service Provider**					
		Benchmark	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.03%	0.25%	DNA	0.01%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	DNA	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.47%	98.94%	DNA	99.98%	98.70%
	RRC Congestion:	≤ 1%	0.09%	0.77%	DNA	0.02%	0.50%
	RAB Congestion:	≤ 2%	0.10%	0.38%	DNA	0.02%	1.13%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.34%	0.52%	DNA	0.09%	0.18%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.38%	11.16%	DNA	0.36%	0.94%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	99.41%	98.96%	DNA	98.83%	99.12%

6.15. 3G VOICE 3 DAYS LIVE DATA: JANUARY

Jan-16						
Network Parameters		**Name of Service Provider**				
		Benchmark	**IDEA**	**AIRCEL**	**BSNL**	**RCOM-GSM**	**TATA-GSM**
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.00%	0.36%	DNA	DNA	0.05%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	DNA	DNA	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.35%	99.51%	DNA	DNA	98.80%
	RRC Congestion:	≤ 1%	0.00%	0.49%	DNA	DNA	0.40%
	RAB Congestion:	≤ 2%	0.00%	0.29%	DNA	DNA	0.83%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.00%	0.73%	DNA	DNA	0.19%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.00%	21.13%	DNA	DNA	DNA
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	99.39%	98.85%	DNA	DNA	99.13%

6.16. 3G VOICE 3 DAYS LIVE DATA: FEBRUARY

Feb-16						
Network Parameters		**Name of Service Provider**				
		Benchmark	**IDEA**	**AIRCEL**	**BSNL**	**RCOM-GSM**	**TATA-GSM**
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.08%	0.18%	DNA	DNA	0.02%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	DNA	DNA	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.64%	99.53%	DNA	DNA	97.97%
	RRC Congestion:	≤ 1%	0.14%	1.23%	DNA	DNA	0.50%
	RAB Congestion:	≤ 2%	0.18%	0.32%	DNA	DNA	1.47%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.47%	0.36%	DNA	DNA	0.18%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.01%	7.78%	DNA	DNA	1.03%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	99.41%	99.04%	DNA	DNA	99.11%

6.17. 3G VOICE 3 DAYS LIVE DATA: MARCH

Mar-16	
Network Parameters	**Name of Service Provider**

		Benchmark	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.00%	0.22%	DNA	0.01%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	DNA	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.40%	97.79%	DNA	99.98%	99.33%
	RRC Congestion:	≤ 1%	0.12%	0.60%	DNA	0.02%	0.60%
	RAB Congestion:	≤ 2%	0.10%	0.54%	DNA	0.02%	1.10%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.56%	0.46%	DNA	0.09%	0.18%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.14%	4.56%	DNA	0.36%	0.85%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	99.44%	99.00%	DNA	98.83%	99.12%

6.18. POI CONGESTION: CONSOLIDATED

Mar-16									
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service									
Name of Parameter	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
Total No. of POI's in Month having < = 0.5% POI congestion										
Total No. of call attempts on POI	24853193	1037590868	4231867	909524	17600002	59138147	6064263	863482	5084260	10589343
Total traffic served on all POIs (Erlang)	429594	3236105	86721	2180785	409942	1232007	131110	16612	113656	444789
Total No. of circuits on all individual POIs	782844	5861960	168955	3931649	1054155	2011869	488310	30323	446709	1175302
Total number of working POI Service Area wise	841	102	149	806	1612	1643	783	434	858	3813
Capacity of all POIs	724478	5803340	165852	3726834	1007123	2011869	460300	28960	445341	1084638
No. of all POI's having >=0.5% POI congestion	0	0	0	0	19	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	0	0	0	0	0	0	0	0	0	0

6.19. POI CONGESTION:JANUARY

		Jan-16									
		Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service									
S. No.	Name of Parameter	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
1	**Total No. of POI's in Month having < = 0.5% POI congestion**										
	Total No. of call attempts on POI	503096	96011045	121892940	30025	14829649	50639936	6454346	811280	5504119	12023388
	Total traffic served on all POIs (Erlang)	9196	3271189	2431525	70017	378073	1227208	141210	15279	129862	528126
	Total No. of circuits on all individual POIs	17768	5765016	5249380	126775	1042164	2011869	565502	30163	138687	130571
	Total number of working POI Service Area wise	899	96	4605	26	1612	1643	899	434	1023	3813
	Capacity of all POIs	16394	5765016	5160876	123018	995175	2011869	529052	28806	495087	1215350
	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)	0	0	0	0	0	0	0	0	0	0

6.20. POI CONGESTION: FEBRUARY

	Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service									
Name of Parameter	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
Total No. of POI's in Month having < = 0.5% POI congestion										
Total No. of call attempts on POI	26053311	97026337	115179248	30993	16568886	54558635	6431894	816105	5218026	11376949
Total traffic served on all POIs (Erlang)	424577	3134090	2429452	73536	377719	1211094	142486	15436	116725	465160
Total No. of circuits on all individual POIs	732430	5450946	4962403	128666	986825	1882071	510138	28394	489179	1150877
Total number of working POI Service Area wise	841	103	149	26	1508	1537	812	406	891	3567
Capacity of all POIs	677805	5396436	4879460	124422	942612	1882071	477658	27122	431882	1065351
No. of all POI's having >=0.5% POI congestion	0	0	0	0	16	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	0	0	0	0	0	0	0	0	0	0

6.21. POI CONGESTION: MARCH

Mar-16										
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service										
Name of Parameter	**Videocon(QTL)**	**AIRTEL**	**VODAFONE**	**IDEA**	**AIRCEL**	**BSNL**	**RCOM-GSM**	**TATA-GSM**	**RCOM-CDMA**	**TATA-CDMA**
Network Service Quality Parameter										
Total No. of POI's in Month having < = 0.5% POI congestion										
Total No. of call attempts on POI	24853193	1037590868	4231867	909524	17600002	59138147	6064263	863482	5084260	10589343
Total traffic served on all POIs (Erlang)	429594	3236105	86721	2180785	409942	1232007	131110	16612	113656	444789
Total No. of circuits on all individual POIs	782844	5861960	168955	3931649	1054155	2011869	488310	30323	446709	1175302
Total number of working POI Service Area wise	841	102	149	806	1612	1643	783	434	858	3813
Capacity of all POIs	724478	5803340	165852	3726834	1007123	2011869	460300	28960	445341	1084638
No. of all POI's having >=0.5% POI congestion	0	0	0	0	19	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	0	0	0	0	0	0	0	0	0	0

6.22. 2G WIRELESS DATA: JANUARY

Jan-16													
Cellular Mobile Telephone Services													
S. No.	Name of Parameter	Benchmark	Videocon (QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA	
Network Service Quality Parameter													
1	**Service Activation/ Provisioning**												
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	32125	DNA	180676	DNA	142705	184	6734	27	
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	31791	DNA	180558	DNA	142693	183	6731	27	
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	98.96%	DNA	99.93%	DNA	99.99%	99.46%	99.96%	100.00%	
2	**PDP Context Activation Success Rate**												
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		163469114	DNA	618247585	DNA	41020624	119634401	DNA	3894130.00	DNA	8836690	
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		159271110	DNA	617536344	DNA	40704860	116226740	DNA	3857743.00	DNA	8528935	
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	97.43%	DNA	99.88%	DNA	99.23%	97.15%	99.54%	99.07%	98.73%	96.52%	
3	**Drop Rate**												
i)	TBF originated PS Domain Iu Connection Setup Success (A)		264188306	DNA	2566527912	DNA	DNA	DNA	262208960000	1083618369.00	3574819.00	187378	
ii)	TBF originated PS Domain Iu Connection Release (B)		3269206	DNA	42735657	DNA	DNA	DNA	1464350239	26003936.00	10699.00	1371	
iii)	Drop Rate = (B/A) * 100	<=5%	1.24%	DNA	1.67%	DNA	1.10%	0.85%	0.56%	2.40%	0.30%	0.73%	

6.23. 2G WIRELESS DATA: FEBRUARY

S. No.	Name of Parameter	Benchmark	Videocon (QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
					Feb-16							
					Cellular Mobile Telephone Services							
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	29559	117122	202885	DNA	145546	141	6369	21
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	29250	117118	202781	DNA	145524	138	6365	21
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success	DNA	DNA	98.95%	100.00%	99.95%	DNA	99.98%	97.87%	99.94%	100.00%
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		157709229	DNA	580454307	340579116	DNA	100030998	DNA	3769653	DNA	7934538
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		153622733	DNA	575950456	338248915	DNA	96782712	DNA	3726721	DNA	7667863
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	97.41%	DNA	99.22%	99.32%	99.63%	96.75%	99.44%	98.86%	98.92%	96.64%
3	Drop Rate											
i)	TBF originated PS Domain Iu Connection Setup Success (A)		241192372	DNA	2446100973	DNA	DNA	DNA	214613010000	1011073507	3244647.00	170870
ii)	TBF originated PS Domain Iu Connection Release (B)		3186533	DNA	42255853	DNA	DNA	DNA	1042174212	26348695	12075.00	1401
iii)	Drop Rate = (B/A) * 100	<=5%	1.32%	DNA	1.73%	DNA	1.08%	0.96%	0.49%	2.61%	0.37%	0.82%

6.24. 2G WIRELESS DATA: MARCH

S. No.	Name of Parameter	Benchmark	Videocon (QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
					Mar-16							
					Cellular Mobile Telephone Services							
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	30628	213929	109510	DNA	136530	100	4489	24
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	30246	213929	109275	DNA	136514	99	4486	24
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	98.75%	100.00%	99.79%	DNA	99.99%	99.00%	99.93%	100.00%
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		181692276	60976219	675278677	420411493	36983622.00	96505836.00	DNA	4780384.00	DNA	8593101
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		176946443	60943581	669851339	416042040	36728547.00	95195991.00	DNA	4774418.00	DNA	8294032
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	97.39%	99.95%	99.20%	98.96%	99.31%	98.64%	99.50%	99.88%	98.09%	96.52%
3	Drop Rate											
i)	TBF originated PS Domain Iu Connection Setup Success (A)		236781041	2572083106	2451801248	6220333252	DNA	DNA	1048125689.00	1039574103.00	2766283.00	173086
ii)	TBF originated PS Domain Iu Connection Release (B)		3341756	21006027.01	44783231	129293400	DNA	DNA	23127080.00	28892287.00	10641.00	1537
iii)	Drop Rate = (B/A) * 100	<=5%	1.41%	0.82%	1.83%	2.08%	1.08%	0.95%	2.21%	2.78%	0.38%	0.89%

6.25. 2G WIRELESS DATA: CONSOLIDATED

S. No.	Name of Parameter	Benchmark	Videocon (QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
				Consolidated								
				Cellular Mobile Telephone Services								
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	30770.66667	165525.5	164357	DNA	141593.6667	141.6666667	5864	24
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	30429	165523.5	164204.6667	DNA	141577	140	5860.666667	24
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	98.89%	100.00%	99.91%	DNA	99.99%	98.82%	99.94%	100.00%
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		167623539.7	60976219	624660189.7	380495304.5	39002123	105390411.7	DNA	4148055.667	DNA	8454776.333
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		163280095.3	60943581	621112713	377145477.5	38716703.5	102735147.7	DNA	4119627.333	DNA	8163610
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	97.41%	99.95%	99.43%	99.12%	99.27%	97.48%	DNA	99.31%	DNA	96.56%
3	Drop Rate											
i)	TBF originated PS Domain Iu Connection Setup Success (A)		247387239.7	2572083106	2488143378	6220333252	DNA	DNA	1.5929E+11	1044755326	3195249.667	177111.3333
ii)	TBF originated PS Domain Iu Connection Release (B)		3265831.667	21006027.01	43258247	129293400	DNA	DNA	843217177	27081639.33	11138.33333	1436.333333
iii)	Drop Rate = (B/A) * 100	<=5%	1.32%	0.82%	1.74%	2.08%	1.09%	0.92%	0.53%	2.59%	0.35%	0.81%

6.26. 2G WIRELESS 3 DAYS LIVE DATA: JANUARY

S. No.	Name of Parameter	Benchmark	Videocon (QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
				Jan-16								
				Cellular Mobile Telephone Services								
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		16663713	DNA	59643350	DNA	DNA	13781861	DNA	355799	DNA	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		16270337	DNA	59611059	DNA	DNA	13500567	DNA	353155	DNA	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	97.64%	DNA	99.95%	DNA	DNA	97.96%	99.58%	99.26%	DNA	98.83%
3	.											
i)	TBF originated PS Domain Iu Connection Setup Success (A)		26259296	DNA	DNA	DNA	DNA	DNA	8305276667	99569406	DNA	335961
ii)	TBF originated PS Domain Iu Connection Release (B)		323814	DNA	DNA	DNA	DNA	DNA	47872670	2370594	DNA	1027
iii)	Drop Rate = (B/A) * 100	<=5%	1.23%	DNA	DNA	DNA	DNA	0.86%	0.58%	2.38%	DNA	0.31%

6.27. 2G WIRELESS 3 DAYS LIVE DATA: FEBRUARY

S. No.	Name of Parameter	Benchmark	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
					Feb-16							
					Cellular Mobile Telephone Services							
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	DNA	DNA	DNA	14631	DNA	446	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA	DNA	14631	DNA	446	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success	DNA	DNA	DNA	DNA	DNA	DNA	100%	DNA	100.00%	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		25889722	DNA	60079070	DNA	3938543	DNA	DNA	375299	DNA	827825
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		329647	DNA	60033560	DNA	12846	DNA	DNA	372615	DNA	799750
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.73%	DNA	99.92%	DNA	99.67%	DNA	99.58%	99.28%	98.83%	96.61%
3	Drop Rate											
i)	TBF originated PS Domain Iu Connection Setup Success (A)		15458217	DNA	4310835	DNA	DNA	DNA	24697110000	104205527	359494.00	16632
ii)	TBF originated PS Domain Iu Connection Release (B)		15019679	DNA	252451099	DNA	DNA	DNA	120174267	2614488	1132.00	117
iii)	Drop Rate = (B/A) * 100	<=5%	2.84%	DNA	1.71%	DNA	0.97%	DNA	0.49%	2.51%	0.31%	0.70%

6.28. 2G WIRELESS 3 DAYS LIVE DATA: MARCH

S. No.	Name of Parameter	Benchmark	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
					Mar-16							
					Cellular Mobile Telephone Services							
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	19072	DNA	DNA	DNA	100	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	19072	DNA	DNA	DNA	99	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	DNA	100%	DNA	DNA	DNA	99.00%	DNA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		17438013	DNA	69350934	42637306	3642201.00	DNA	DNA	4780384.00	DNA	511480
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		16978238	DNA	68734520	42310446	3501948.00	DNA	DNA	4774418.00	DNA	511375
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	97.36%	DNA	99.21%	99.23%	96.15%	DNA	99.55%	99.88%	98.83%	99.98%
3	Drop Rate											
i)	TBF originated PS Domain Iu Connection Setup Success (A)		23138324	DNA	245519466	DNA	DNA	DNA	118091119	1039574103.00	349347.00	100321954
ii)	TBF originated PS Domain Iu Connection Release (B)		334331	DNA	4633778	DNA	DNA	DNA	2589417	28892287.00	1288.00	2938499
iii)	Drop Rate = (B/A) * 100	<=5%	1.44%	DNA	1.89%	DNA	1.14%	DNA	2.19%	2.78%	0.37%	2.93%

6.29. 2G WIRELESS 3 DAYS LIVE DATA: CONSOLIDATED

	CONSOLIDATED											
	Cellular Mobile Telephone Services											
S. No.	Name of Parameter	Benchmark	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
Network Service Quality Parameter												
1	Service Activation/ Provisioning											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	6357	DNA	DNA	4877	DNA	149	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	6357	DNA	DNA	4877	DNA	149	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95%	DNA	DNA	DNA	33.33%	DNA	DNA	33.33%	DNA	100.00%	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		19997149	DNA	63024451	42637306	3790372	DNA	DNA	1837161	DNA	669653
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		11192741	DNA	62793046	42310446	1757397	DNA	DNA	1833396	DNA	655563
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	97.91%	DNA	99.69%	99.23%	97.91%	DNA	99.57%	99.47%	98.83%	98.47%
3	Drop Rate											
i)	TBF originated PS Domain Iu Connection Setup Success (A)		21618612	DNA	124915151	DNA	DNA	DNA	11040159262	414449679	354421	33558182
ii)	TBF originated PS Domain Iu Connection Release (B)		5225941	DNA	128542439	DNA	DNA	DNA	56878785	11292456	1210	979881
iii)	Drop Rate = (B/A) * 100	<=5%	1.84%	DNA	1.80%	DNA	1.06%	DNA	1.09%	2.56%	0.34%	1.31%

6.30. 3G WIRELESS DATA: JANUARY

	Jan-16						
	Cellular Mobile Telephone Services						
S. No.	Name of Parameter	Benchmark	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	180676	DNA	DNA	184
ii)	Total Service Activations provided within 4 Hours (B)		DNA	180558	DNA	DNA	183
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	99.93%	DNA	DNA	99.46%
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	30095665	119634401	DNA	3630322
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	29768379	116226740	DNA	3630322
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	98.91%	97.15%	DNA	100.00%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	26642452	DNA	DNA	14439481
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	430209	DNA	DNA	387783
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	1.61%	0.85%	DNA	2.69%

6.31. 3G WIRELESS DATA: FEBRUARY

			Feb-16				
			Cellular Mobile Telephone Services				
S. No.	**Name of Parameter**	**Benchmark**	**IDEA**	**AIRCEL**	**BSNL**	**RCOM-GSM**	**TATA-GSM**
Network Service Quality Parameter							
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		DNA	202885	DNA	46704	141
ii)	Total Service Activations provided within 4 Hours (B)		DNA	202781	DNA	46694	138
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	99.95%	DNA	99.98%	97.87%
2	**PDP Context Activation Success Rate**						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		340579116	30972978	100030998	DNA	3542548
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		338248915	30819522	96782712	DNA	3542547
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.32%	99.50%	96.75%	97.45%	100.00%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	26054801	DNA	146793437	13851435
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	345081	DNA	859739	409690
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	1.32%	0.96%	0.59%	2.96%

6.32. 3G WIRELESS DATA: MARCH

			Mar-16				
			Cellular Mobile Telephone Services				
S. No.	**Name of Parameter**	**Benchmark**	**IDEA**	**AIRCEL**	**BSNL**	**RCOM-GSM**	**TATA-GSM**
Network Service Quality Parameter							
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		DNA	109510	DNA	DNA	100
ii)	Total Service Activations provided within 4 Hours (B)		DNA	109275	DNA	DNA	99
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	99.79%	DNA	DNA	99%
2	**PDP Context Activation Success Rate**						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		269882822	32449880	DNA	DNA	4300273
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		261283159	32234364	DNA	DNA	4300260
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	96.81%	99.34%	DNA	99.50%	100.00%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		7239325718	28181005	DNA	150610655	14879966
ii)	RNC originated PS Domain Iu Connection Release (B)		119707713	395766	DNA	813037	381292
iii)	Drop Rate = (B/A) * 100	<=5%	1.65%	1.40%	DNA	0.54%	2.56%

6.33. 3G WIRELESS DATA: CONSOLIDATED

S. No.	Name of Parameter	Benchmark	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
				Consolidated			
			Cellular Mobile Telephone Services				
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	164357	DNA	46704	142
ii)	Total Service Activations provided within 4 Hours (B)		DNA	164205	DNA	46694	140
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	100%	DNA	100%	99%
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		305230969	31172841	109832700	DNA	3824381
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		299766037	30940755	106504726	DNA	3824376
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.06%	99.25%	96.95%	98.48%	100.00%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		7239325718	26959419	DNA	148702046	14390294
ii)	RNC originated PS Domain Iu Connection Release (B)		119707713	390352	DNA	836388	392922
iii)	Drop Rate = (B/A) * 100	<=5%	1.65%	1.45%	0.91%	0.56%	2.73%

6.34. 3G WIRELESS 3 DAYS LIVE DATA: JANUARY

S. No.	Name of Parameter	Benchmark	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
				Jan-16			
			Cellular Mobile Telephone Services				
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	DNA	DNA	DNA
2	PDP Context Activation Success Rate						
i)	PDP Context Activation Requests (from SGSN to GGSN) (A)		DNA	2952304	DNA	DNA	368037
ii)	Context Activation Success (path created b/w SGSN and GGSN) (B)		DNA	16714	DNA	DNA	368037
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	DNA	99.43%	DNA	DNA	100.00%
3	Drop Rate						
i)	originated PS Domain Iu Connection Setup Success (A)		DNA	2511852	DNA	DNA	1412422
ii)	NC originated PS Domain Iu Connection Release (B)		DNA	36341	DNA	DNA	38521
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	1.45%	DNA	DNA	2.73%

6.35. 3G WIRELESS 3 DAYS LIVE DATA: FEBRUARY

Feb-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	DNA	DNA
ii)	ervice Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA
iii)	vice Activation / Provisioning = (B/A) *	Within 4 Hours with 95% Success Rate	DNA	DNA	DNA	DNA	DNA
2	PDP Context Activation Success Rate						
i)	Context Activation Requests (from SGSN to GGSN)		DNA	2952304	11513569	DNA	307664
ii)	xt Activation Success (path created b/w SGSN and (		DNA	16714	DNA	DNA	307663
iii)	Context Activation Success Rate =(B/A)	>=95%	DNA	99.43%	DNA	DNA	100.00%
3	Drop Rate						
i)	ated PS Domain Iu Connection Setup Success (A)		DNA	837284	DNA	DNA	1376554
ii)	riginated PS Domain Iu Connection Release (B)		DNA	12113	DNA	DNA	37595
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	1.45%	DNA	DNA	2.73%

6.36. 3G WIRELESS 3 DAYS LIVE DATA: MARCH

Mar-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		19072	DNA	DNA	DNA	100
ii)	Total Service Activations provided within 4 Hours (B)		19072	DNA	DNA	DNA	99
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	100%	DNA	DNA	DNA	99.00%
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		26430873	3330842	DNA	DNA	4300273
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		25529179	3227416	DNA	DNA	4300260
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	96.59%	96.89%	DNA	99.16%	100.00%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	3063391	DNA	15646190	14879966
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	40849	DNA	92854	381292
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	1.33%	DNA	0.59%	2.56%

6.37. 3G WIRELESS 3 DAYS LIVE DATA: CONSOLIDATED

S. No.	Name of Parameter	Benchmark	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
	CONSOLIDATED						
	Cellular Mobile Telephone Services						
Network Service Quality Parameter							
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		19072	DNA	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		19072	DNA	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	100%	DNA	DNA	DNA	DNA
2	**PDP Context Activation Success Rate**						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		26430873	3078483	DNA	DNA	1658658
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		25529179	1086948	DNA	DNA	1658653
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	96.59%	98.59%	DNA	99.16%	100.00%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		DNA	2137509	DNA	15646190	5889647
ii)	RNC originated PS Domain Iu Connection Release (B)		DNA	29768	DNA	92854	152469
iii)	Drop Rate = (B/A) * 100	<=5%	DNA	1.41%	DNA	0.59%	2.67%

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%	97.92%	97.08%
AIRTEL	0.02%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	93.63%
BSNL	0.04%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.25%
IDEA	0.07%	0.04%	100.00%	100.00%	100.00%	100.00%	100.00%	99.88%	99.24%
QTL (VIDEOCON)	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.64%
RCOM-CDMA	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	97.42%	96.89%
RCOM-GSM	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	99.43%	94.51%
TTSL-CDMA	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.81%	99.18%
TTSL-GSM	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.63%	94.88%
VODAFONE	0.17%	0.06%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.99%

Name of Service Provider	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	98.73%	100.00%
IDEA	24.11%	100.00%
QTL (VIDEOCON)	100.00%	NIL
RCOM-CDMA	100.00%	100.00%
RCOM-GSM	100.00%	100.00%
TTSL-CDMA	99.43%	77.78%
TTSL-GSM	98.52%	96.11%
VODAFONE	11.28%	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	10	10	10	100	100%	100%
AIRTEL	192	81	66	81.48%	100%	100%
BSNL	DNA	DNA	DNA	DNA	DNA	DNA
IDEA	0	0	0	100	100%	100%
RCOM-GSM	265	265	200	75.47%	100%	96%
RCOM-CDMA	124	124	124	100	DNA	DNA
TTSL-GSM	0	0	0	100	100%	100%
TTSL-CDMA	0	0	0	100	100%	100%
VIDEOCON	8	8	8	100	100%	100%
VODAFONE	0	0	0	100	100%	100%

7.3. 3 DAYS LIVE CALL CENTRE DATA

Response time to customer assistance

OPERATOR	Total no of calls attempted to customer care/Call center	Total no. of calls successfully established to customer care/Call center	% age of Accessibility of Call centre	Total Calls reached to operator for (Voice to Voice)	Total number of calls answered by the operator (Voice to voice) within 90 seconds	% age calls answered by the operator within 90 seconds
DAYS	AVERAGE					
OPERATOR			>=95%			>=95%
AIRCEL	143550	141438	98.53%	19888	19106	96.07%
AIRTEL	53656	53656	100.00%	114692	106487	92.85%
BSNL	3520	3520	100.00%	2802	2802	100.00%
IDEA	513560	513095	99.91%	115682	111083	96.02%
RCOM-GSM	88484	88134	99.60%	25498	24799	97.26%
RCOM-CDMA	6570	6333	96.39%	2742	2676	97.59%
TTSL-GSM	15922	15753	98.94%	30756	30425	98.92%
TTSL-CDMA	15922	15753	98.94%	1094	1093	99.91%
VIDEOCON	19822	19822	100.00%	3968	3875	97.66%
VODAFONE	197316	197316	100.00%	80473	79606	98.92%

8. L1 CALLING DATA

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

- Sangrur: 4th Feb to 6th Feb 2016
- Pathankot: 24th Feb to 26th Feb 2016
- Amritsar: 1st March to 3rd March 2016
- Ropar: 28th March to 30th March 2016

8.1. SANGRUR

SR. N.	EMERGENCY NUMBER	AIRCEL			
		CALLS MADE	SANGRUR	BARNALA	DHURI, MALERKOTLA
1	100	5	√	√	√
2	1903	5	√	√	√
3	15100	5	√	√	√
4	155304	5	√	X	X
5	155214	5	√	√	√
6	1091	5	√	X	√
7	1097	5	√	√	√
8	101	5	√	√	√
9	104	5	√	√	√
10	108	5	√	√	√
11	181	5	√	√	√
12	182	5	X	X	X
13	1033	5	√	√	√
14	1909	5	√	√	√
15	1912	5	√	√	√
16	1950	5	√	√	√
17	1063	5	X	X	X

SR. N.	AIRTEL EMERGENCY NUMBER	SANGRUR	SUNAM	BARNALA	MALERKOTLA
1	100	√	√	√	√
2	101	√	√	√	√
3	102	√	√	√	√
4	104	√	√	√	√
5	181	√	√	√	√
6	182	√	√	√	√
7	1903	√	√	√	√
8	15100	√	√	√	√
9	155304	✗	✗	✗	✗
10	155214	✗	✗	✗	✗
11	1091	√	√	√	√
12	1097	√	√	√	√
13	1033	√	√	√	√
14	1909	√	√	√	√
15	1912	√	√	√	√
16	1950	√	√	√	√
17	1063	√	√	√	√

BSNL EMERGENCY NUMBER	SANGRUR	SUNAM	BARNALA	DHURI	MALERKOTLA
100	√	√	√	x	x
101	√	√	√	x	x
102	x	x	x	x	x
104	√	√	√	x	x
108	√	√	√	x	x
138	x	x	x	x	x
149	x	x	x	x	x
181	√	√	√	x	x
182	√	√	√	x	x
1033	√	√	√	x	x
1037	X	X	X	x	x
1056	X	X	X	x	x
1060	X	X	X	x	x

1063	√	√	√	x	x
1064	X	x	x	x	x
1070	X	X	X	x	x
1071	X	X	X	x	x
1072	X	X	X	x	x
1073	X	X	X	x	x
1077	X	X	X	x	x
1090	X	x	x	x	x
1091	√	√	√	x	x
1097	√	√	√	x	x
1099	X	X	X	x	x
10580	X	X	X	x	x
10589	X	X	X	x	x
10740	X	X	X	x	x
10741	X	X	X	x	x
1511	X	X	X	x	x
1512	√	√	√	x	x
1514	X	X	X	x	x
15100	√	√	√	x	x
155304	X	X	X	x	x
155214	X	X	X	x	x
1903	√	√	√	x	x
1909	√	√	√	x	x
1912	√	√	√	x	x
1916	X	X	X	x	x
1950	√	√	√	x	x

SR. N.	IDEA	
	EMERGENCY NUMBER	SANGRUR
1	100	√
2	1903	√
3	15100	√
4	155304	√
5	155214	✕
6	1091	√
7	1097	√
8	101	√
9	104	√
10	108	√
11	181	√
12	182	√
13	1033	√
14	1909	√
15	1912	√
16	1950	√
17	1063	✕

SR. N.	EMERGENCY NUMBER	QTL-VIDEOCON		
		SANGRUR/ SUNAM	BARNALA	MALERK OTLA
1	100	√	√	√
2	101	√	√	√
3	104	√	√	√
4	108	√	√	√
5	181	√	√	√
6	182	×	×	×
7	1033	√	√	√
8	1063	×	×	×
9	1091	√	×	×
10	1097	√	√	√
11	15100	×	×	×
12	155304	×	×	×
13	155214	×	×	×
14	1903	√	√	√
15	1909	√	√	√
16	1912	√	√	√
17	1950	√	√	√

SR. N.	EMERGENCY NUMBER	RCOM CDMA			
		SANGRUR	SUNAM	DHANAULA (BARNALA)	DHURI
1	100	√	√	√	√
2	101	√	√	√	√
3	104	√	√	√	√
4	108	√	√	√	√
5	181	√	√	√	√
6	182	√	√	√	√
7	1033	√	√	√	√
8	1063	×	×	×	×
9	1091	×	×	×	×
10	1097	√	√	√	√
11	15100	√	√	√	√
12	155304	×	×	×	×
13	155214	×	×	×	×
14	1903	√	√	√	√
15	1909	√	√	√	√
16	1912	√	√	√	√
17	1950	√	√	√	√

	RCOM GSM				
SR. N.	EMERGENCY NUMBER	SANGRUR	SUNAM	DHANAULA (BARNALA)	DHURI
1	100	√	√	√	√
2	101	√	√	√	√
3	104	√	√	√	√
4	108	√	√	√	√
5	181	√	√	√	√
6	182	√	√	√	√
7	1033	√	√	√	√
8	1063	×	×	×	×
9	1091	×	×	×	×
10	1097	√	√	√	√
11	15100	√	√	√	√
12	155304	×	×	×	×
13	155214	×	×	×	×
14	1903	√	√	√	√
15	1909	√	√	√	√
16	1912	√	√	√	√
17	1950	√	√	√	√

SR. N.	TATA CDMA			
	EMERGENCY NUMBER	SUNAM	BARNALA	DHURI
1	100	√	√	√
2	101	√	√	√
3	104	✕	✕	✕
4	108	√	√	√
5	181	√	√	√
6	182	✕	✕	✕
7	1033	√	√	√
8	1063	✕	✕	✕
9	1091	√	√	√
10	1097	✕	✕	✕
11	15100	✕	✕	✕
12	155304	✕	✕	✕
13	155214	✕	✕	✕
14	1903	√	√	√
15	1909	✕	✕	✕
16	1912	✕	✕	✕
17	1950	✕	✕	✕

SR. N.	EMERGENCY NUMBER	TATA GSM		
		SUNAM	BARNALA	DHURI
1	100	√	√	√
2	101	√	√	√
3	104	×	×	×
4	108	√	√	√
5	181	√	√	√
6	182	×	×	×
7	1033	√	√	√
8	1063	×	×	×
9	1091	√	√	√
10	1097	×	×	×
11	15100	×	×	×
12	155304	×	×	×
13	155214	×	×	×
14	1903	√	√	√
15	1909	×	×	×
16	1912	×	×	×
17	1950	×	×	×

SR. N.	EMERGENCY NUMBER	VODAFONE			
		SANGRUR	SUNAM	BARNALA	MALERKOTLA
1	100	√	√	√	√
2	101	√	√	√	√
3	104	√	√	√	√
4	108	√	√	√	√
5	181	√	√	√	√
6	182	√	√	√	√
7	1033	√	√	√	√
8	1063	×	×	×	×
9	1091	√	√	√	√
10	1097	√	√	√	√
11	15100	√	√	√	√
12	155304	√	√	√	√
13	155214	√	√	√	√
14	1903	√	√	√	√
15	1909	√	√	√	√
16	1912	√	√	√	√
17	1950	√	√	√	√

8.2. PATHANKOT

SR. N.	EMERGENCY NUMBER	AIRCEL			
		CALLS MADE	PATHANKOT	GURDASPUR	BATALA/QUADIAN
1	100	5	√	√	√
2	1093	5	√	√	√
3	15100	5	x	x	x
4	155214	5	√	√	√
5	155304	5	x	x	x
6	1091	5	√	√	√
7	1097	5	x	x	x
8	101	5	√	√	√
9	104	5	√	√	√
10	108	5	√	√	√
11	181	5	√	√	√
12	182	5	x	x	x
13	1033	5	x	x	x
14	1909	5	√	√	√
15	1912	5	√	√	√
16	1950	5	√	√	√
17	1063	5	x	x	x

SR. N.	EMERGENCY NUMBER	AIRTEL			
		SANGRUR	SUNAM	BARNALA	MALERKOTLA
1	100	√	√	√	√
2	101	√	√	√	√
3	102	√	√	√	√
4	104	√	√	√	√
5	181	√	√	√	√
6	182	√	√	√	√
7	1903	√	√	√	√
8	15100	√	√	√	√
9	155304	✕	✕	✕	✕
10	155214	✕	✕	✕	✕
11	1091	√	√	√	√
12	1097	√	√	√	√
13	1033	√	√	√	√
14	1909	√	√	√	√
15	1912	√	√	√	√
16	1950	√	√	√	√
17	1063	√	√	√	√

	BSNL					
SR. N.	EMERGENCY NUMBER	PATHANKOT	JUGIYAL	DINANAGAR	GURDASPUR	BATALA	QUADIAN
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	×	×	×	×	×	×

	IDEA			
SR. N.	EMERGENCY NUMBER	PATHANKOT	GURDASPUR	BATALA
1	100	√	√	√
2	1903	√	√	√
3	15100	√	√	√
4	155304	×	×	×
5	155214	×	×	×
6	1091	√	√	√
7	1097	√	√	√
8	101	√	√	√
9	104	√	√	√
10	108	√	√	√
11	181	√	√	√

12	182	√	√	√
13	1033	√	√	√
14	1909	√	√	√
15	1912	√	√	√
16	1950	√	√	√
17	1063	×	×	×

	RCOM CDMA					
SR. N.	EMERGENCY NUMBER	PATHANKOT	JUGIAL	DINANAGAR	GURDAS PUR	BATALA	QUADIA N
1	100	√	×	√	√	√	√
2	101	√	×	√	√	√	√
3	1903	√	×	√	√	√	√
4	15100	√	×	√	√	√	√
5	155304	×	×	×	×	×	×
6	155214	×	×	×	×	×	×
7	1091	√	×	√	√	√	√
8	1097	√	×	√	√	√	√
9	104	√	×	√	√	√	√
10	108	√	×	√	√	√	√
11	181	√	×	√	√	√	√
12	182	√	×	√	√	√	√
13	1033	√	×	√	√	√	√
14	1909	√	×	√	√	√	√
15	1912	√	×	√	√	√	√
16	1950	√	×	√	√	√	√
17	1063	×	×	×	×	×	×

SR. N.	EMERGENCY NUMBER	RCOM GSM					
		PATHANKOT	JUGIAL	DINANAGAR	GURDAS PUR	BATALA	QUADIAN
1	100	√	√	√	√	√	√
2	101	√	√	√	√	√	√
3	1903	√	√	√	√	√	√
4	15100	√	√	√	√	√	√
5	155304	×	×	×	×	×	×
6	155214	×	×	×	×	×	×
7	1091	√	√	√	√	√	√
8	1097	√	√	√	√	√	√
9	104	√	√	√	√	√	√
10	108	√	√	√	√	√	√
11	181	√	√	√	√	√	√
12	182	√	√	√	√	√	√
13	1033	√	√	√	√	√	√
14	1909	√	√	√	√	√	√
15	1912	√	√	√	√	√	√
16	1950	√	√	√	√	√	√
17	1063	×	×	×	×	×	×

SR. N.	EMERGENCY NUMBER	TATA CDMA					
		PATHANKOT	JUGIAL	DINANGAR	GURDAS PUR	BATALA	QADIAN
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	×	×	×	×	×	×

SR. N.	EMERGENCY NUMBER	TATA GSM					
		PATHANKOT	JUGIAL	DINANGAR	GURDAS PUR	BATALA	QADIAN
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	×	×	×	×	×	×

SR. N.	EMERGENCY NUMBER	VODAFONE					
		PATHANKOT	JUGIAL	DINANAGAR	GURDASPUR	BATALA	QADIAN
1	100	√	√	√	√	√	√
2	101	√	√	×	√	√	√
3	104	√	√	√	√	√	√
4	108	√	√	√	√	√	√
5	181	√	√	√	√	√	√
6	182	√	√	√	√	√	√
7	1033	√	√	√	√	√	√
8	1063	×	×	×	×	×	×
9	1091	√	√	√	√	√	√
10	1097	√	√	√	√	√	√
11	155304	√	√	√	√	√	√
12	155214	√	√	√	√	√	√
13	1903	√	√	√	√	√	√
14	1909	√	√	√	√	√	√
15	1912	√	√	√	√	√	√
16	1950	√	√	√	√	√	√

SR. n.	EMERGENCY NUMBER	AIRCEL			
		CALLS MADE	TARN-TARAN	GOINDWAL	AMRITSAR
1	100	5	×	×	√
2	1903	5	√	√	√
3	15100	5	√	√	√
4	155214	5	√	√	√
5	155304	5	×	×	×
6	1091	5	×	×	×
7	1097	5	×	×	√
8	101	5	×	×	√
9	104	5	√	√	√
10	108	5	√	√	√
11	181	5	√	√	√
12	182	5	×	×	√
13	1033	5	×	×	×
14	1909	5	√	√	√
15	1912	5	√	√	√
16	1950	5	√	√	√
17	1063	5	×	×	×

SR. n.	EMERGENCY NUMBER	AIRTEL				
		AMRITSAR	PATTI	TARN-TARAN	GOINDWAL	AJNALA
1	100	√	√	√	√	√
2	101	√	√	√	√	√
3	102	√	√	√	√	√
4	104	√	√	√	√	√
5	181	√	√	√	√	√
6	182	√	√	√	√	√
7	1903	√	√	√	√	√
8	15100	√	√	√	√	√
9	155304	×	×	×	×	×
10	155214	×	×	×	×	×
11	1091	√	√	√	√	√
12	1097	√	√	√	√	√
13	1033	√	√	√	√	√
14	1909	√	√	√	√	√
15	1912	√	√	√	√	√
16	1950	√	√	√	√	√
17	1063	√	√	√	√	√

SR. n.	EMERGENCY NUMBER	BSNL				
		AMRITSAR	TARAN TARN	GOWINDWAL	AJNALA	RAYYA
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	✖	✖	✖	✖	✖

SR. n.	EMERGENCY NUMBER	IDEA					
		TARN TARAN	PATTI	GOINDWAL	RAYYA	AJNALA	TRILLIUM
1	100	√	√	√	√	√	√
2	1903	√	√	√	√	√	√
3	15100	✖	√	✖	✖	✖	✖
4	155304	✖	✖	✖	✖	✖	✖
5	155214	✖	✖	✖	✖	✖	✖
6	1091	✖	✖	✖	√	√	✖
7	1097	√	√	√	√	√	√
8	101	√	√	√	√	√	√
9	104	√	√	√	√	√	√
10	108	√	√	√	√	√	√
11	181	√	√	√	√	√	√
12	182	√	√	√	√	√	√
13	1033	√	√	√	√	√	√
14	1909	√	√	√	√	√	√
15	1912	√	√	√	√	√	√
16	1950	√	√	√	√	√	√
17	1063	✖	✖	✖	✖	✖	✖

SR. n.	EMERGENCY NUMBER	QTL		
		TARNTA RN/PAT TI	RAYYA/ GOIND WAL SAHIB	AMRITS AR/AJNA LA
1	100	√	√	√
2	101	√	√	√
3	104	√	√	√
4	108	√	√	√
5	181	√	√	√
6	182	×	×	×
7	1033	√	√	√
8	1063	×	×	×
9	1091	×	×	×
10	1097	√	√	√
11	15100	√	√	√
12	155304	×	×	×
13	155214	×	×	×
14	1903	√	√	√
15	1909	√	√	√
16	1912	√	√	√
17	1950	√	√	√

EMERGENCY NUMBER	RCOM CDMA					
	TARAN TARN	PATTI	GOIND WAL SAHIB	RAYYA	AJNALA	AMRITS AR
100	√	√	√	√	×	√
101	√	√	√	√	×	√
102	×	×	×	×	×	×
104	√	√	√	√	×	√
108	√	√	√	√	×	√
138	×	×	×	×	×	×
149	×	×	×	×	×	×
181	√	√	√	√	×	√
182	√	√	√	√	×	√
1033	√	√	√	√	×	√
1037	×	×	×	×	×	×
1056	×	×	×	×	×	×
1060	×	×	×	×	×	×
1063	×	×	×	×	×	×
1064	×	×	×	×	×	×
1070	×	×	×	×	×	×
1071	×	×	×	×	×	×
1072	×	×	×	×	×	×
1073	×	×	×	×	×	×
1077	×	×	×	×	×	×
1090	×	×	×	×	×	×
1091	×	×	×	×	×	×
1097	√	√	√	√	×	√
1099	×	×	×	×	×	×
10580	×	×	×	×	×	×
10589	×	×	×	×	×	×
10740	×	×	×	×	×	×
10741	×	×	×	×	×	×
1511	×	×	×	×	×	×
1512	×	×	×	×	×	×
1514	×	×	×	×	×	×
15100	√	√	√	√	×	√
155304	×	×	×	×	×	×
155214	×	×	×	×	×	×
1903	√	√	√	√	×	√
1909	√	√	√	√	×	√
1912	√	√	√	√	×	√
1916	×	×	×	×	×	×
1950	√	√	√	√	×	√

SR. n.	EMERGENCY NUMBER	RCOM GSM					
		TARAN TARN	PATTI	GOINDWAL SAHIB	RAYYA	AJNALA	AMRITSAR
1	100	√	√	√	√	√	√
2	101	√	√	√	√	√	√
3	102	×	×	×	×	×	×
4	104	√	√	√	√	×	√
5	108	√	√	√	√	1	√
6	138	×	×	×	×	×	×
7	149	×	×	×	×	×	×
8	181	√	√	√	√	1	√
9	182	√	√	√	√	1	√
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	√	√	√	√	1	√

SR. n.	EMERGENCY NUMBER	TATA CDMA					
		TARNTARAN	PATTI	GOINDWAL SAHIB	RAYYA	AMRITSAR	AJNALA
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	×	×	×	×	×	×

SR. n.	EMERGENCY NUMBER	TATA GSM					
		TARNTARAN	PATTI	GOIND WAL SAHIB	RAYYA	AMRITSAR	AJNALA
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	×	×	×	×	×	×

SR. n.	EMERGENCY NUMBER	VODAFONE					
		AMRITSAR	AJNALA	PATTI	TARANTARAN	GOINDWAL	RAYYA
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	√	√	√	√	√	√

8.4. ROPAR

SR. N.	EMERGENCY NUMBER	CALLS MADE	ROPAR	NANGAL	KHARAR
		AIRTEL			
1	100	5	√	√	√
2	101	5	√	√	√
3	108	5	√	√	√
4	1070	5	√	√	√
5	181	5	√	√	√
6	182	5	√	√	√
7	1903	5	√	√	√
8	15100	5	√	√	√
9	155304	5	√	√	√
10	155214	5	×	×	×
11	1091	5	√	√	√
12	1097	5	√	√	√
13	1033	5	√	√	√
14	1909	5	√	√	√
15	1912	5	√	√	√
16	1950	5	√	√	√
17	1063	5	√	√	√
18	1512	5	√	√	√
19	138	5	√	√	√
20	104	5	√	√	√

SR. N.	BSNL EMERGENCY NUMBER	ROPAR	NANGAL	KHARAR
	BSNL			
1	100	√	√	√
2	101	√	√	√
3	104	√	√	√
4	108	√	√	√
5	138	√	√	√
6	181	√	√	√
7	182	✕	√	✕
8	1033	√	√	√
9	1063	✕	✕	✕
10	1070	√	√	√
11	1091	✕	✕	✕
12	1097	√	√	√
13	1512	√	√	√
14	15100	√	√	√
15	155304	✕	✕	✕
16	155214	✕	✕	✕
17	1903	√	√	√
18	1909	√	√	√
19	1912	√	√	√
20	1950	√	√	√

SR. N.	IDEA EMERGENCY NUMBER	ROPAR	NANGAL	KHARAR
	IDEA			
1	100	√	√	√
2	1903	√	√	√
3	15100	√	√	√
4	155304	√	√	√
5	155214	✕	✕	✕
6	1091	√	√	√
7	1097	√	√	√
8	101	√	√	✕
9	104	√	√	√
10	108	√	√	√
11	181	√	√	√
12	182	√	√	√
13	1033	√	√	√
14	1909	√	√	√
15	1912	√	√	√
16	1950	√	√	√
17	1063	✕	✕	✕
18	1070	√	√	√
19	1512	√	√	√
20	138	✕	✕	✕

SR. N.	EMERGENCY NUMBER	QTL-VIDEOCON		
		TARNTARN/PATTI	RAYYA/ GOINDWAL SAHIB	AMRITSAR/AJNALA
1	100	√	√	√
2	101	√	√	√
3	104	√	√	√
4	108	√	√	√
5	181	√	√	√
6	182	×	×	×
7	1033	√	√	√
8	1063	×	×	×
9	1091	×	×	×
10	1097	√	√	√
11	15100	√	√	√
12	155304	×	×	×
13	155214	×	×	×
14	1903	√	√	√
15	1909	√	√	√
16	1912	√	√	√
17	1950	√	√	√
18	1070	√	√	√
19	1512	√	√	√
20	138	√	√	√

RCOM CDMA			
EMERGENCY NUMBER	**ROPAR**	**NANGAL**	**KHARAR**
100	√	√	√
101	√	√	×
102	×	×	×
104	√	√	√
108	√	√	√
138	×	×	×
149	×	×	×
181	√	√	√
182	√	√	√
1033	√	√	√
1037	×	×	×
1056	×	×	×
1060	×	×	×
1063	×	×	×
1064	×	×	×
1070	×	×	×
1071	×	×	×
1072	×	×	×
1073	×	×	×
1077	×	×	×
1090	×	×	×
1091	×	×	×
1097	√	×	×
1099	×	×	×
10580	×	×	×
10589	×	×	×
10740	×	×	×
10741	×	×	×
1511	×	×	×
1512	×	×	×
1514	×	×	×
15100	√	√	√
155304	√	√	√
155214	×	×	×
1903	√	√	√
1909	√	√	√
1912	√	√	√
1916	×	×	×
1950	√	√	√

SR. N.	EMERGENCY NUMBER	RCOM GSM		
		ROPAR	NANGAL	KHARAR
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	√	√	√

SR. N.	EMERGENCY NUMBER	ROAPAR	NANGAL	KHARAR
	TATA CDMA			
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	×	×	√

SR. N.	EMERGENCY NUMBER	ROAPAR	NANGAL	KHARAR
	TATA GSM			
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	√	√	√

SR. N.	EMERGENCY NUMBER	VODAFONE		
		ROPAR	NANGAL	KHARAR
1	100	√	√	√
2	101	√	√	√
3	104	√	√	√
4	108	√	√	√
5	138	√	√	√
6	181	√	√	√
7	182	√	√	√
8	1033	√	√	√
9	1063	✕	✕	✕
10	1070	✕	✕	✕
11	1091	√	√	√
12	1097	√	√	√
13	1512	✕	✕	✕
14	15100	√	√	√
15	155304	√	√	√
16	155214	√	√	√
17	1903	√	√	√
18	1909	√	√	√
19	1912	√	√	√
20	1950	√	√	√

9. OPERATOR ASSISTED DRIVE TEST

The drive test was conducted simultaneously for all the operators present in the Punjab 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 thePunjab circle.

9.1. FEBRUARY: SANGRUR SSA

Month	Name of SSA covered	Drive Test Schedule
February 2016	SANGRUR	February 4, 2016 to February 5, 2016

9.2. DISTANCE COVERED: SANGRUR SSA

Drive Test Distance Covered	Day 1	Day 2	Day 3
SANGRUR SSA	120 km	116 km	106 km
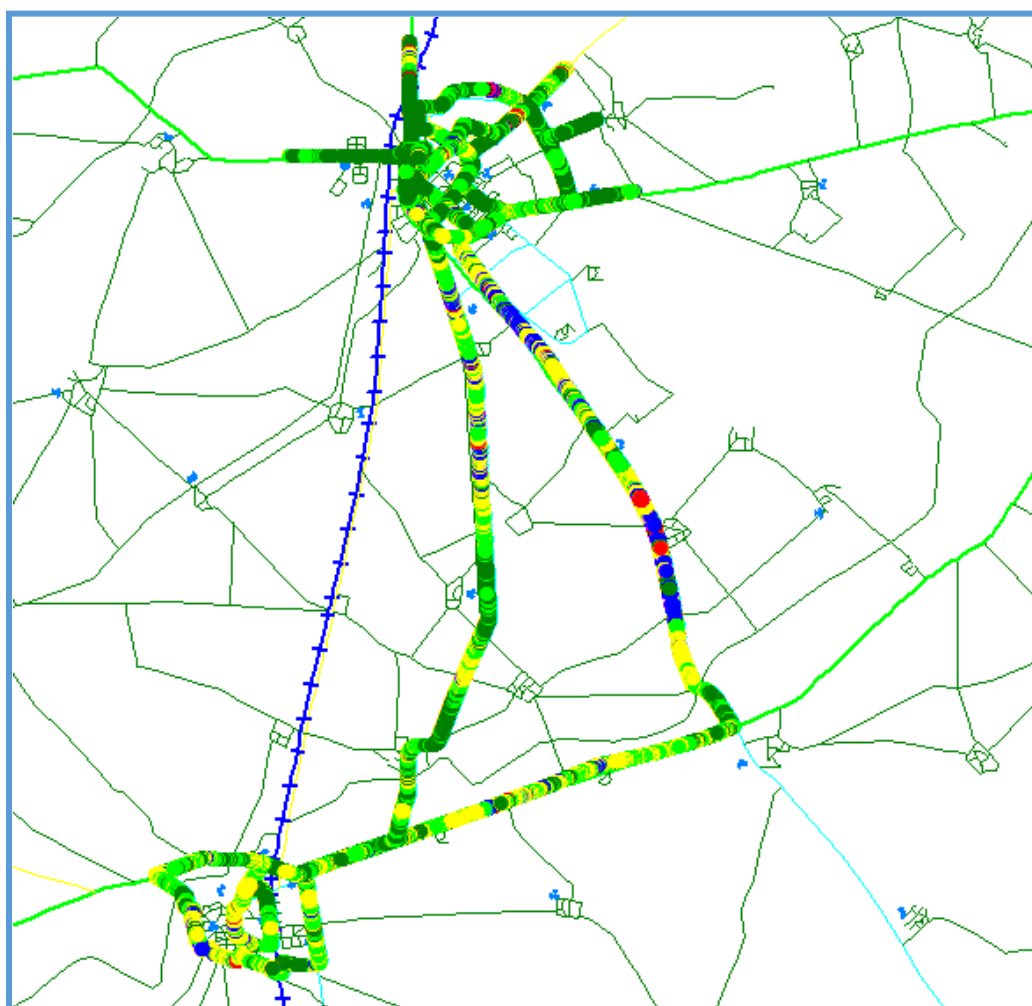
SSA-Route Covered– SANGRUR

1 SANGRUR

2 SAMANA

9.4. ROUTE MAP: SANGRUR SSA: DAY 2
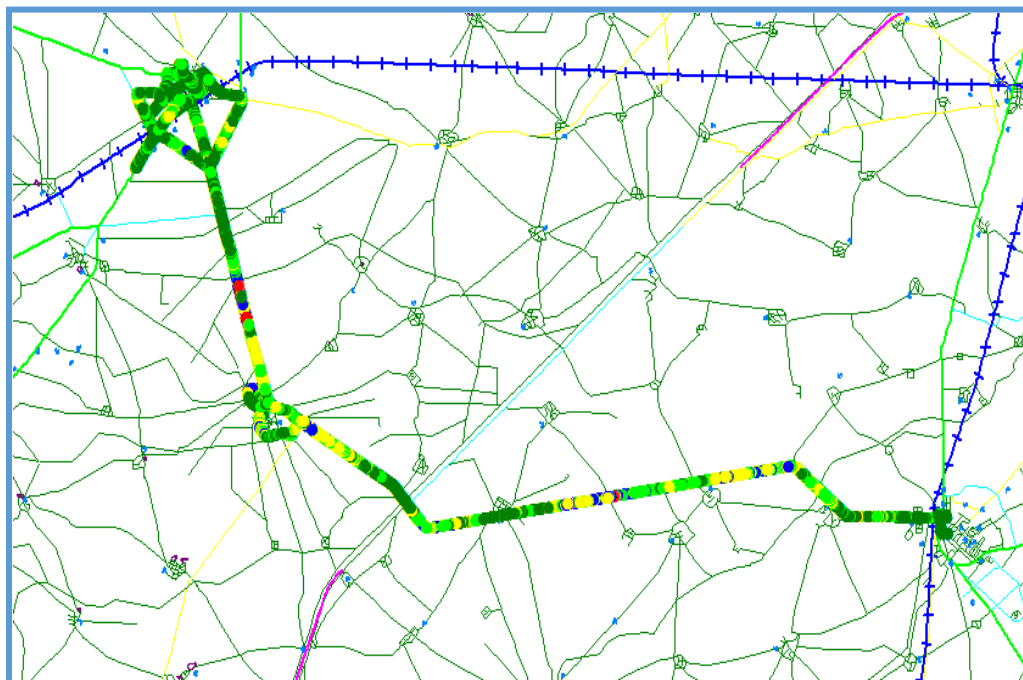
SSA- Route
Covered—
SANGRUR

SANGRUR
BADRUKHAN
BAHADURPU
R
DHAUNALA
BARNALA

9.5. ROUTE MAP: SANGRUR SSA: DAY 3
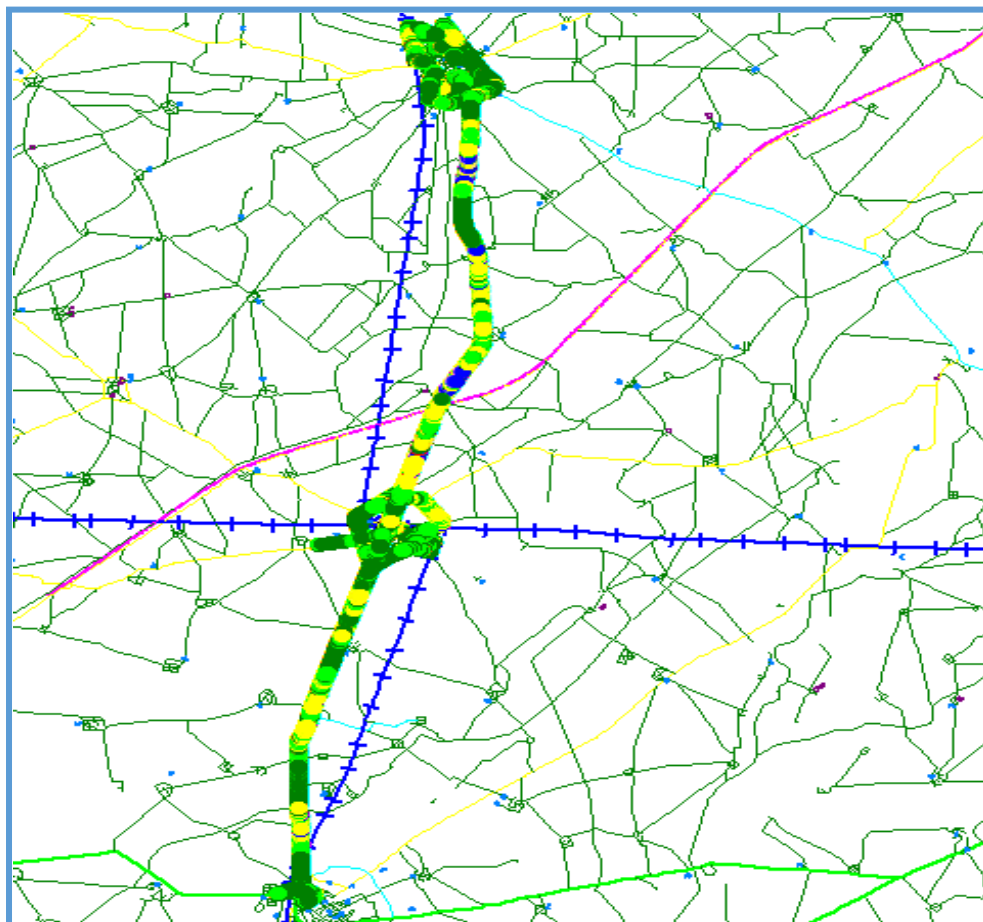
SSA- Route Covered—
CHANDIGARH

1 SANGRUR

2 LADDA

3 DHURI

4 MALERKOTLA

9.6. DRIVE TEST OUTCOME

	Aircel	Airtel	BSNL	IDEA	QTL	RCOM CDMA	RCOM GSM	Tata CDMA	Tata GSM	Vodafone
Total Calls Attempt (A)	629	615	439	666	627	668	633	649	626	627
Total Calls Blocked (B)	10	4	4	1	6	0	1	0	2	0
Blocked Call Rate in % (B*100/A)	1.59%	0.65%	0.91%	0.15%	0.96%	0.00%	0.16%	0.00%	0.32%	0.00%
Total Calls Established ('C)	593	611	418	664	622	668	632	649	624	627
Total Calls Drop (D)	5	0	0	0	4	1	0	0	0	0
Dropped Calls Rate in % (D*100/C)	0.84%	0.00%	0.00%	0.00%	0.64%	0.15%	0.00%	0.00%	0.00%	0.00%
Call Setup Success Rate in % (C*100/A)	94.28%	99.35%	95.22%	99.70%	99.20%	100.00%	99.84%	100.00%	99.68%	100.00%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	98.87%	98.97%	98.30%	100.00%	97.96%	100.00%	99.30%	100.00%	99.61%	99.90%

9.7. FEBRUARY: PATHANKOT SSA

Month	Name of SSA covered	Drive Test Schedule
February 2016	Pathankot	February 24, 2016 to February 26, 2016

9.8. DISTANCE COVERED: PATHANKOT SSA

Drive Test Distance Covered	Day 1	Day 2	Day 3
Pathankot SSA	120 km	125 km	130 km

9.9. ROUTE MAP: PATHANKOT SSA: DAY 1

Route Covered-day 1

Pathankot Railway station,Kali Mata Temple, Patel Chowk, Basant colony, Ramsharnam Colony, Adyal Market, Patel Nagar,Jugail Ground, Auckland School, Peer Baba Road, Ramleela Ground.

Siali Road, Military Hospital, Dhangu Road,
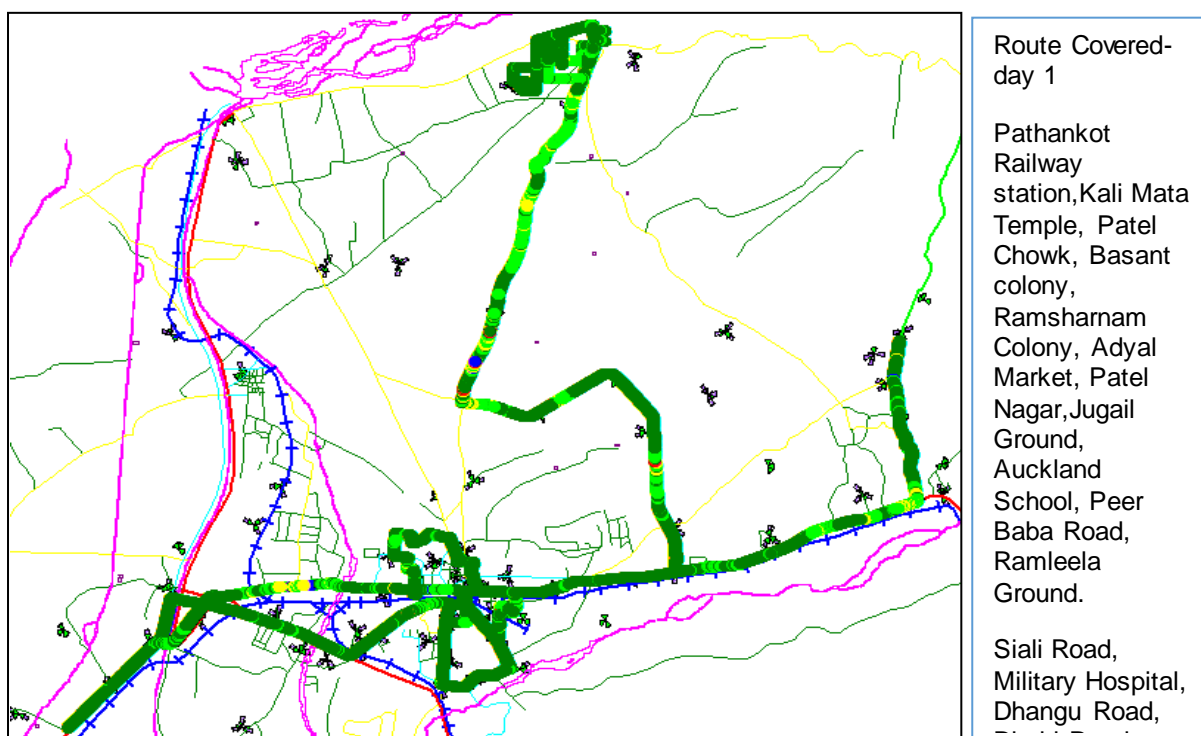
9.10. ROUTE MAP: PATHANKOT SSA: DAY 2
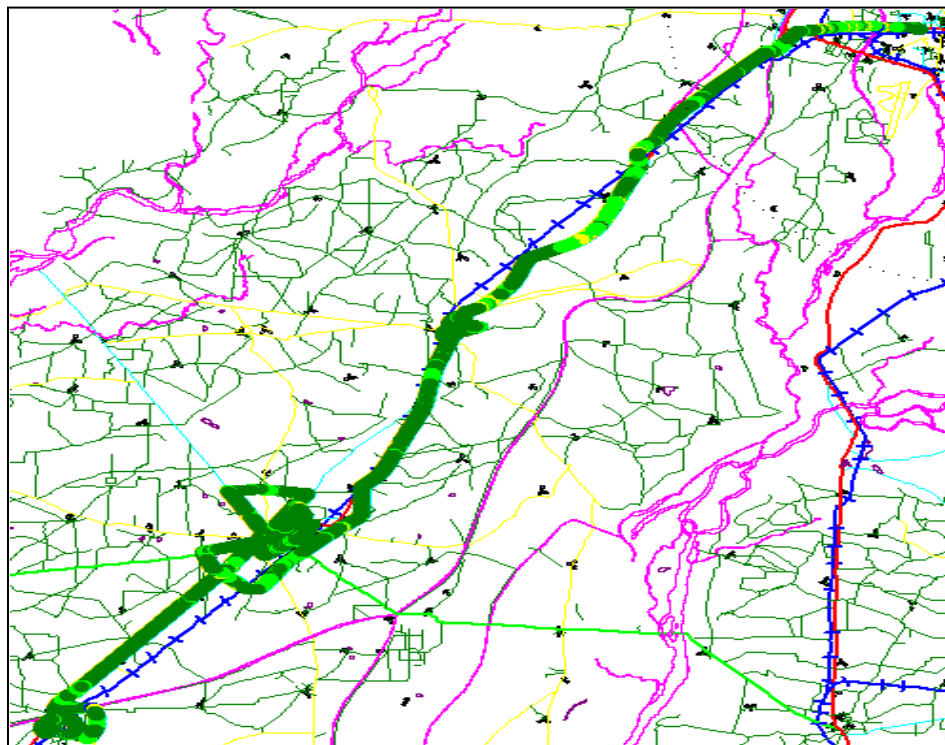
Route Covered-Day-2

SSM college, Railway Station Dinanagar, Bus Stand,GoldenAve neue Colony, Lohgarh Axis Bank,Sarvanand Group of Institutions,Police Station, Mill Ground Dhariwal, Bus stand dhariwal.

Nabipur , KhnuwanChowk , Kalsi Hospital , SD College , Railway Road Gurdaspur, Hanuman Chowk
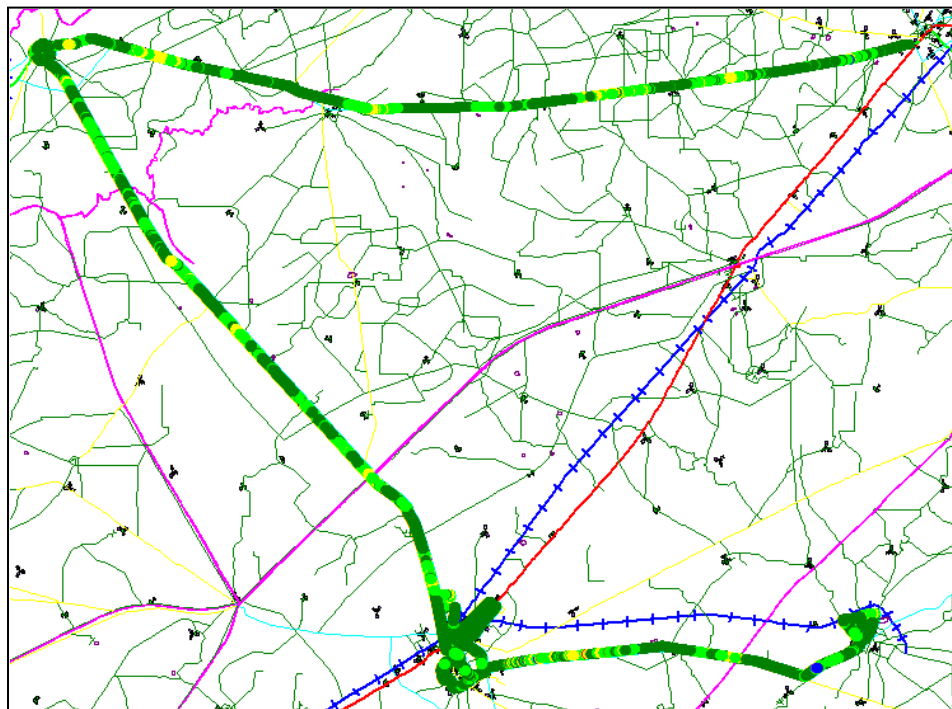
Route Covered-day 3

Gandhi Chowk, Bank Colony , Bus Stand,Batala Police lines ,MuhagiMohalla , Bearing College, Civil Hoshpital, Pahadi Gath , Kandh Sahib Gurudwara.

Shikar Road, Kotli , DdamNangal, Dhara Market, City Medical Hospital, Qadian, SBI

9.12. DRIVE TEST OUTCOME

	Aircel	Airtel	BSNL	IDEA	QTL	RCOM CDMA	RCOM GSM	Tata CDMA	Tata GSM	Vodafone
Total Calls Attempt (A)	554	631	700	658	540	534	610	573	598	625
Total Calls Blocked (B)	3	2	8	5	1	0	7	0	0	0
Blocked Call Rate in % (B*100/A)	0.54%	0.32%	1.14%	0.76%	0.19%	0.00%	1.15%	0.00%	0.00%	0.00%
Total Calls Established ('C)	535	629	685	650	539	534	603	571	598	614
Total Calls Drop (D)	5	2	2	0	1	1	6	2	0	0
Dropped Calls Rate in % (D*100/C)	0.93%	0.32%	0.29%	0.00%	0.19%	0.19%	1.00%	0.35%	0.00%	0.00%
Call Setup Success Rate in % (C*100/A)	96.57%	99.68%	97.86%	98.78%	99.81%	100.00%	98.85%	99.65%	100.00%	98.24%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	97.57%	97.75%	99.43%	99.91%	98.70%	100.00%	99.40%	100.00%	99.39%	99.47%

9.13. MARCH: AMRITSAR SSA

Month	Name of SSA covered	Drive Test Schedule
March 2016	AMRITSAR	March 1, 2016 to March 3, 2016

9.14. DISTANCE COVERED: AMRITSAR SSA

Drive Test Distance Covered	Day 1	Day 2	Day 3
AMRITSAR SSA	106 km	108 km	124 km

9.15. ROUTE MAP: AMRITSAR SSA: DAY 1
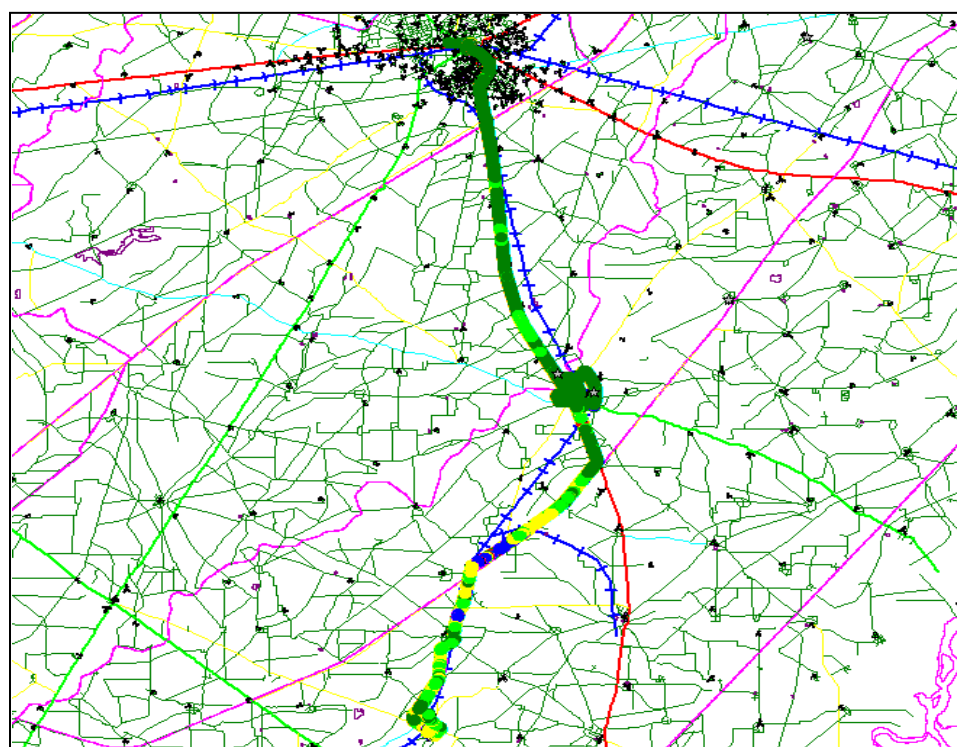
Route Covered- day 1

City ,BSnlexchange,Railwaystn,Hallgate, sultanwindgate,shedahngurudwara,Chabalroad,Darbarshaib,Sardarenclave, Gurukakha, Ranjitsingh school,

Major - Court tarantaran ,Harike road ,Jandialabypass,Bus stand tarn taran

Highway - Amritsar tarantaranroad , Tarn taranpatti road , Sarhali road

9.16.   ROUTE MAP: AMRITSAR SSA: DAY 2
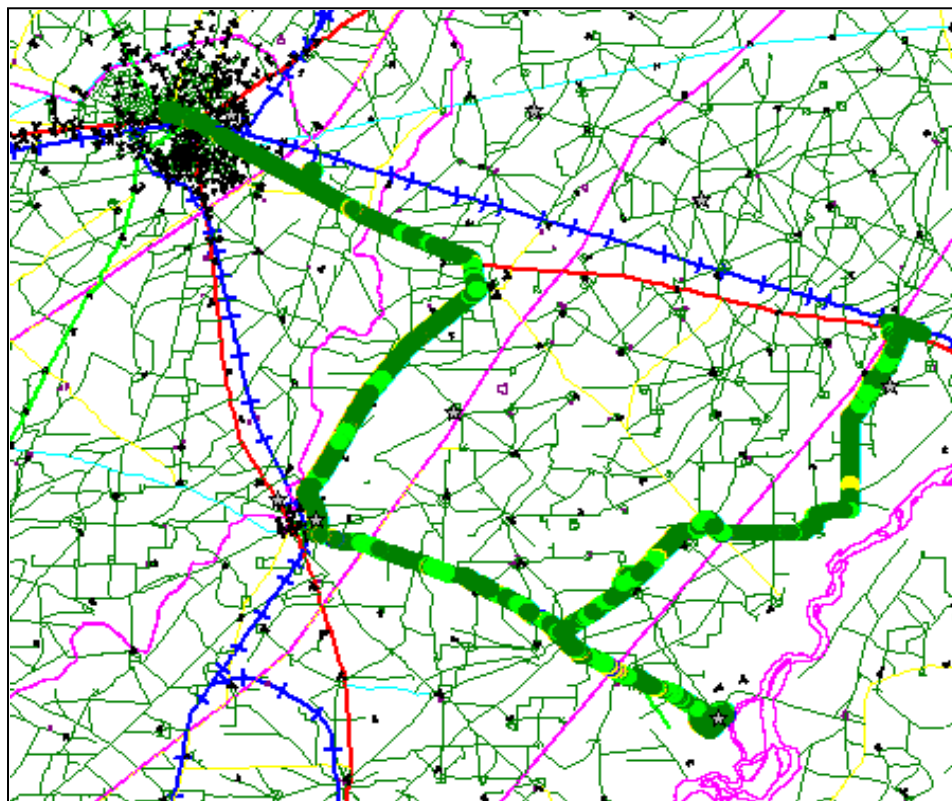
Route Covered-Day-2

Guru Amardasschool,BHELcolony,BsnlExchange,Gurudwarakhoosahib,sahid ,Sn, angel Deg. College, Rayyacity,Mana enclave

Ckt house road , crystal chowk, Hussainpurachowk ,New Amritsar road

Batalaroad ,Khabbeydera road , sabha road , Highway -Amritsar -jalandhar road ,

9.17. ROUTE MAP: AMRITSAR SSA: DAY 3
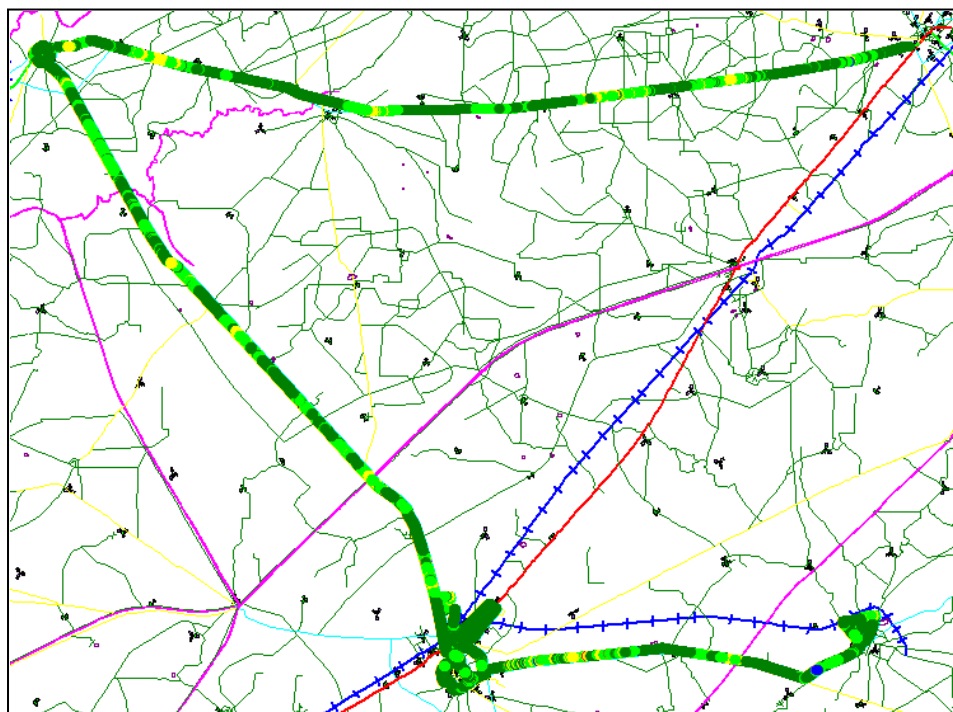
Route Covered- day 3

jaliyanwale ,harmindersingh sahib, civilhospital,ajnala main bazaar,life care hospital,medicalhospital,trillium mall

bsnlexchange,gndu,indiagate,cherrataroad,golden temple road,attari,

cherrataroad,bypass ,meritorious school road,mirakot ,raja sansi road ,

9.18. DRIVE TEST OUTCOME

	Aircel	Airtel	BSNL	IDEA	QTL	RCOM CDMA	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
Total Calls Attempt (A)	667	673	743	743	565	562	693	419	733	687
Total Calls Blocked (B)	4	3	18	1	2	0	3	0	12	1
Blocked Call Rate in % (B*100/A)	0.60%	0.45%	2.42%	0.13%	0.35%	0.00%	0.43%	0.00%	1.64%	0.15%
Total Calls Established ('C)	653	670	722	739	563	562	690	418	721	687
Total Calls Drop (D)	4	1	5	0	1	1	6	1	4	0
Dropped Calls Rate in % (D*100/C)	0.61%	0.15%	0.69%	0.00%	0.18%	0.18%	0.87%	0.24%	0.55%	0.00%
Call Setup Success Rate in % (C*100/A)	97.90%	99.55%	97.17%	99.46%	99.65%	100.00%	99.57%	99.76%	98.36%	100.00%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.34%	99.63%	98.29%	99.90%	96.97%	100.00%	100.00%	100.00%	97.87%	99.05%

9.19. MARCH: ROPAR SSA

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

9.20. DISTANCE COVERED: ROPAR SSA

Drive Test Distance Covered	Day 1	Day 2	Day 3
ROPAR SSA	125 km	135 km	128 km

9.21. ROUTE MAP: ROPAR SSA: DAY 1

SSA- Route Covered–

1 ROPAR

2 CHAMKAUR SAHIB
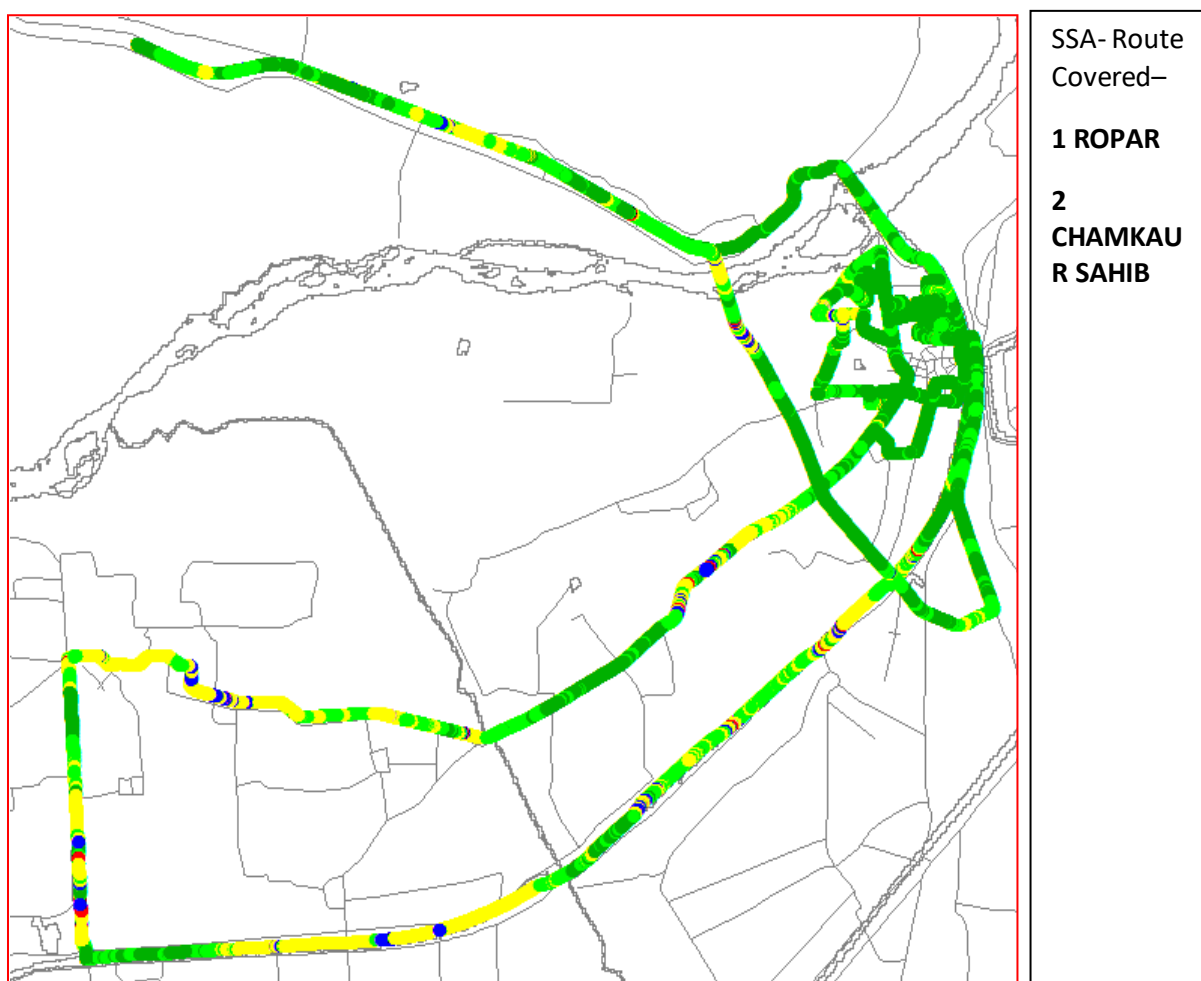
9.22. ROUTE MAP: ROPAR SSA: DAY 2
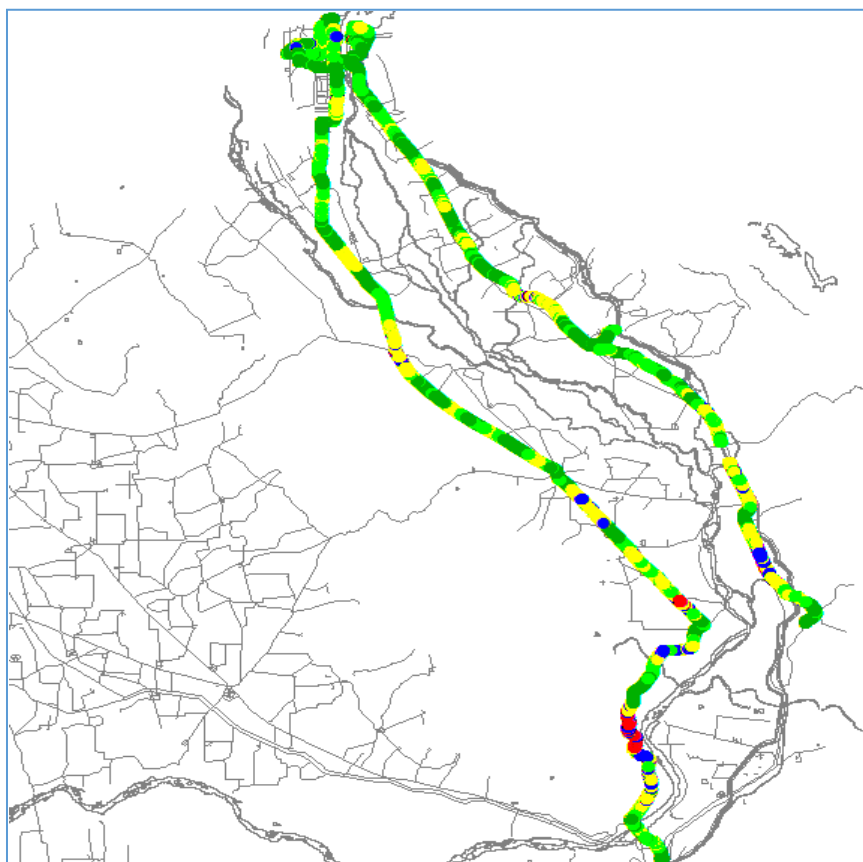
SSA- Route Covered—

1. TIBBA SAHIB
2. NURPUR
3. NANGAL
4. ANANDPUR
5. KIRATPUR
6. BHAGATPUR

9.23. ROUTE MAP: ROPAR SSA: DAY 3
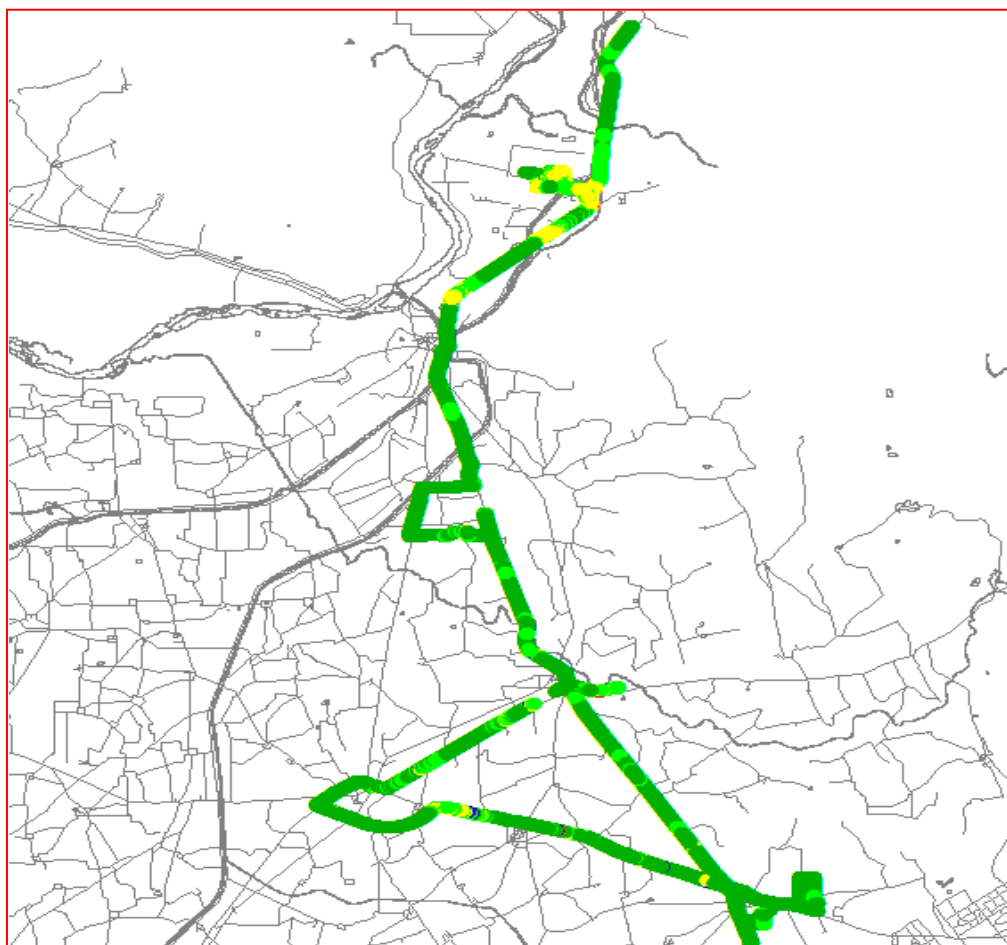
SSA- Route Covered–

1 BHAGATPUR

2 GANOULI

3 KURALI

4 KHARAR

5 MORINDA

9.24. DRIVE TEST OUTCOME

	Aircel	Airtel	BSNL	IDEA	QTL	RCOM CDMA	RCOM GSM	Tata CDMA	Tata GSM	Vodafone
Total Calls Attempt (A)	541	685	608	680	537	626	589	438	587	648
Total Calls Blocked (B)	9	3	12	2	3	0	1	0	0	0
Blocked Call Rate in % (B*100/A)	1.66%	0.44%	1.97%	0.29%	0.56%	0.00%	0.17%	0.00%	0.00%	0.00%
Total Calls Established ('C)	514	682	595	678	534	626	588	438	587	644
Total Calls Drop (D)	2	1	2	0	0	4	1	0	1	0
Dropped Calls Rate in % (D*100/C)	0.39%	0.15%	0.34%	0.00%	0.00%	0.64%	0.17%	0.00%	0.17%	0.00%
Call Setup Success Rate in % (C*100/A)	95.01%	99.56%	97.86%	99.71%	99.44%	100.00%	99.83%	100.00%	100.00%	99.38%
Handover Success Rate % (total HO Success * 100/Total HO attempt)	100.00%	99.54%	95.20%	99.66%	98.41%	98.56%	99.83%	98.56%	96.05%	99.73%

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

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

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

Ericsson Counters

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

QUAL40DL   Number of quality 4 reported on 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)

S 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

S .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

Ericsson

NSN

11.3. HUAWEI

Huawei

13.1. 2G VOICE PMR DATA: CONSOLIDATED

Consolidated												
Network Parameters			Name of Service Provider									
		Benchmark	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.17%	0.05%	0.02%	0.05%	0.16%	0.61%	0.10%	0.03%	0.08%	0.05%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.48%	0.02%	0.02%	0.02%	0.31%	1.94%	0.76%	0.02%	0.75%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.23%	99.28%	99.83%	98.56%	97.99%	97.12%	98.98%	98.62%	98.08%	98.57%
	SDDCH/Paging chl. Congestion	≤ 1%	0.11%	0.30%	0.03%	0.07%	0.12%	0.54%	0.05%	0.11%	0.00%	0.00%
	TCH Congestion	≤ 2%	0.21%	0.19%	0.17%	0.22%	0.16%	0.97%	0.10%	0.16%	0.76%	0.09%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.79%	0.69%	0.55%	0.51%	0.73%	0.24%	0.06%	0.56%	0.06%	0.29%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.54%	0.94%	2.83%	1.28%	2.65%	1.23%	0.34%	3.06%	0.40%	3.24%
	%age of connection with good voice quality	≥ 95%	96.72%	98.33%	97.96%	97.75%	97.04%	96.32%	99.16%	97.24%	98.22%	99.05%

- TTSL GSM has a parameter value of 3.06% and failed to meet the benchmark of ≤ 3% connection maintenance worst affected cell with TCH drop.
- TTSL CDMA has a parameter value of 3.24% and failed to meet the benchmark of ≤ 3% connection maintenance worst affected cell with TCH drop

Consolidated							
Network Parameters		**Benchmark**	**Name of Service Provider**				
			IDEA	**AIRCEL**	**BSNL**	**RCOM-GSM**	**TATA-GSM**
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.02%	0.27%	0.44%	0.36%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.05%	0.69%	1.70%	0.99%	0.07%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.50%	99.11%	99.02%	99.38%	98.14%
	RRC Congestion:	≤ 1%	0.17%	0.49%	0.86%	0.05%	0.54%
	RAB Congestion:	≤ 2%	0.12%	0.07%	0.29%	0.06%	0.95%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.68%	0.47%	0.36%	0.20%	0.18%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	2.06%	5.98%	0.70%	1.85%	0.57%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	99.34%	99.08%	97.71%	99.57%	99.12%

- AIRCEL has a parameter value of 5.98% and failed to meet the benchmark of ≤ 3% connection maintenance worst affected cell with Circuit switched voice.

13.3. Billing and Customer Care

Name of Service Provider	Metering and Billing credibility		Billing Complaints			Termination & Closures	Time taken for refund of deposits after closures: Benchmark	Response time to customer for assistance	
	Postpaid Subscribers	Prepaid Subscribers	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	%age of where credit/waiver is received within one week	% of Termination/ Closure of service within 7 days (100 %)	Cleared over a period of <60 days (100%)	%age of calls answered by the IVR	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark	≤ 0.1%	≤ 0.1%	≥ 98%	= 100%	= 100%	= 100%	= 100%	≥ 95%	≥ 95%
AIRCEL	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.92%	97.08%
AIRTEL	0.02%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	93.63%
BSNL	0.04%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.25%
IDEA	0.07%	0.04%	100.00%	100.00%	100.00%	100.00%	100.00%	99.88%	99.24%
QTL (VIDEOCON)	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.64%
RCOM-CDMA	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	97.42%	96.89%
RCOM-GSM	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	99.43%	94.51%
TTSL-CDMA	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.81%	99.18%
TTSL-GSM	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.63%	94.88%
VODAFONE	0.17%	0.06%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.99%

- AIRTEL has a parameter value of 93.63% and failed to meet the benchmark of ≥95% for Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 seconds.
- RCOM GSM has a parameter value of 94.51% and failed to meet the benchmark of ≥95% for Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 seconds.
- TTSL GSM has a parameter value of 94.88% and failed to meet the benchmark of ≥95% for Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 seconds.
- VODAFONE has a parameter value of 0.17% and failed to meet the benchmark of≤0.1% metering and billing creditibility for postpaid subscribers.

Name of Service Provider	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	98.73%	100.00%
IDEA	24.11%	100.00%
QTL (VIDEOCON)	100.00%	NIL
RCOM-CDMA	100.00%	100.00%
RCOM-GSM	100.00%	100.00%
TTSL-CDMA	99.43%	77.78%
TTSL-GSM	98.52%	96.11%
VODAFONE	11.28%	NIL

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

<table>
<tr><td colspan="14">PMR Report Comparison between Audit Agency and TSP</td></tr>
<tr><td rowspan="2" colspan="2">Network Parameters</td><td rowspan="2">Benchmark</td><td colspan="11">Name of Service Provider</td></tr>
<tr><td></td><td>QTL</td><td>AIRTEL</td><td>VODAFONE</td><td>IDEA</td><td>AIRCEL</td><td>BSNL</td><td>RCOM-GSM</td><td>TATA-GSM</td><td>RCOM-CDMA</td><td>TATA-CDMA</td></tr>
<tr><td rowspan="4">Network Availability</td><td rowspan="2">Sum of downtime of BTSs in a month in hrs. in the licensed service area</td><td rowspan="2">≤ 2%</td><td>Agency</td><td>0.17%</td><td>0.05%</td><td>0.02%</td><td>0.05%</td><td>0.16%</td><td>0.61%</td><td>0.10%</td><td>0.03%</td><td>0.08%</td><td>0.05%</td></tr>
<tr><td>TSP</td><td>0.17%</td><td>0.05%</td><td>0.02%</td><td>0.06%</td><td>0.16%</td><td>0.61%</td><td>0.10%</td><td>0.03%</td><td>0.08%</td><td>0.05%</td></tr>
<tr><td rowspan="2">No. of BTSs having accumulated downtime of >24 hours in a month</td><td rowspan="2">≤ 2%</td><td>Agency</td><td>0.48%</td><td>0.02%</td><td>0.02%</td><td>0.02%</td><td>0.31%</td><td>1.94%</td><td>0.76%</td><td>0.02%</td><td>0.75%</td><td>0.00%</td></tr>
<tr><td>TSP</td><td>0.49%</td><td>0.03%</td><td>0.01%</td><td>0.02%</td><td>0.31%</td><td>1.94%</td><td>0.76%</td><td>0.02%</td><td>0.75%</td><td>0.00%</td></tr>
<tr><td rowspan="6">Connection Establishment (Accessibility)</td><td rowspan="2">Call Set-up Success Rate (Within Licensee own network</td><td rowspan="2">≥ 95%</td><td>Agency</td><td>98.23%</td><td>99.28%</td><td>99.83%</td><td>98.56%</td><td>97.99%</td><td>97.12%</td><td>98.98%</td><td>98.62%</td><td>98.08%</td><td>98.57%</td></tr>
<tr><td>TSP</td><td>98.23%</td><td>98.23%</td><td>98.23%</td><td>98.23%</td><td>98.23%</td><td>98.23%</td><td>98.23%</td><td>98.23%</td><td>98.23%</td><td>98.23%</td></tr>
<tr><td rowspan="2">SDDCH/Paging chl. Congestion</td><td rowspan="2">≤ 1%</td><td>Agency</td><td>0.11%</td><td>0.30%</td><td>0.03%</td><td>0.07%</td><td>0.12%</td><td>0.54%</td><td>0.05%</td><td>0.11%</td><td>0.00%</td><td>0.00%</td></tr>
<tr><td>TSP</td><td>0.12%</td><td>0.12%</td><td>0.12%</td><td>0.12%</td><td>0.12%</td><td>0.12%</td><td>0.12%</td><td>0.12%</td><td>0.12%</td><td>0.12%</td></tr>
<tr><td rowspan="2">TCH Congestion</td><td rowspan="2">≤ 2%</td><td>Agency</td><td>0.21%</td><td>0.19%</td><td>0.17%</td><td>0.22%</td><td>0.16%</td><td>0.97%</td><td>0.10%</td><td>0.16%</td><td>0.76%</td><td>0.09%</td></tr>
<tr><td>TSP</td><td>0.21%</td><td>0.20%</td><td>0.17%</td><td>0.22%</td><td>0.16%</td><td>0.97%</td><td>0.10%</td><td>0.16%</td><td>0.76%</td><td>0.09%</td></tr>
<tr><td rowspan="6">Connection Maintenance (Retainability)</td><td rowspan="2">Call Drop Rate (%age)</td><td rowspan="2">≤ 2%</td><td>Agency</td><td>0.79%</td><td>0.69%</td><td>0.55%</td><td>0.51%</td><td>0.73%</td><td>0.24%</td><td>0.06%</td><td>0.56%</td><td>0.06%</td><td>0.29%</td></tr>
<tr><td>TSP</td><td>0.79%</td><td>0.71%</td><td>0.55%</td><td>0.51%</td><td>0.73%</td><td>0.24%</td><td>0.07%</td><td>0.56%</td><td>0.06%</td><td>0.29%</td></tr>
<tr><td rowspan="2">Worst Affected cell having more than 3% TCH drop</td><td rowspan="2">≤ 3%</td><td>Agency</td><td>0.54%</td><td>0.94%</td><td>2.83%</td><td>1.28%</td><td>2.65%</td><td>1.23%</td><td>0.34%</td><td>3.06%</td><td>0.40%</td><td>3.24%</td></tr>
<tr><td>TSP</td><td>0.52%</td><td>1.04%</td><td>2.83%</td><td>1.28%</td><td>2.65%</td><td>1.23%</td><td>0.34%</td><td>3.06%</td><td>0.39%</td><td>3.25%</td></tr>
<tr><td rowspan="2">%age of connection with good voice quality</td><td rowspan="2">≥ 95%</td><td>Agency</td><td>96.72%</td><td>98.33%</td><td>97.96%</td><td>97.75%</td><td>97.04%</td><td>96.32%</td><td>99.16%</td><td>97.24%</td><td>98.22%</td><td>99.05%</td></tr>
<tr><td>TSP</td><td>96.72%</td><td>98.32%</td><td>97.96%</td><td>97.75%</td><td>97.04%</td><td>96.40%</td><td>99.15%</td><td>97.24%</td><td>99.22%</td><td>99.05%</td></tr>
</table>

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

Sum of downtime of BTSs in a month in hrs. in the licensed service area

	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
■ PMR Audit 2G Audit Agency(PCPL)	0.22%	0.04%	0.02%	0.05%	0.11%	0.60%	0.11%	0.03%	0.07%	0.09%
■ PMR Audit 2G TSP	0.17%	0.05%	0.02%	0.06%	0.16%	0.61%	0.10%	0.03%	0.08%	0.05%
■ 3 Day Live Audit 2G	0.12%	0.04%	0.02%	0.04%	0.19%	0.84%	0.11%	0.02%	0.09%	0.00%
— Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

No. of BTSs having accumulated downtime of >24 hours in a month

	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
PMR Audit 2G Audit Agengy(PCPL)	0.00%	0.05%	0.02%	0.04%	0.31%	1.99%	0.85%	0.00%	0.65%	0.00%
PMR Audit 2G TSP	0.49%	0.03%	0.01%	0.02%	0.31%	1.94%	0.76%	0.02%	0.75%	0.00%
3 Day Live Audit 2G	0.00%	0.00%	0.00%	0.00%	0.00%	0.58%	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)

Call Set-up Success Rate (Within Licensee own network)

	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
PMR Audit 2G Audit Agengy(PCPL)	98.60%	99.31%	99.80%	98.70%	98.18%	97.22%	99.87%	98.71%	97.89%	98.87%
PMR Audit 2G TSP	98.23%	99.29%	99.83%	98.56%	97.99%	97.12%	98.97%	98.62%	98.09%	98.56%
3 Day Live Audit 2G	98.43%	99.33%	99.86%	98.62%	97.91%	97.30%	99.68%	98.80%	98.09%	98.77%
Benchmark ≤ 2%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

SDDCH/Paging chl. Congestion

	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
PMR Audit 2G Audit Agengy(PCPL)	0.07%	0.24%	0.03%	0.04%	0.10%	0.60%	0.04%	0.07%	0.00%	0.00%
PMR Audit 2G TSP	0.12%	0.30%	0.03%	0.07%	0.11%	0.54%	0.05%	0.11%	0.00%	0.00%
3 Day Live Audit 2G	0.10%	0.23%	0.02%	0.04%	0.09%	0.28%	0.05%	0.05%	0.00%	0.00%
Benchmark ≤ 2%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

TCH Congestion

	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
PMR Audit 2G Audit Agengy(PCPL)	0.14%	0.20%	0.20%	0.19%	0.15%	1.18%	0.07%	0.18%	1.07%	0.03%
PMR Audit 2G TSP	0.21%	0.20%	0.17%	0.22%	0.16%	0.97%	0.10%	0.16%	0.76%	0.09%
3 Day Live Audit 2G	0.16%	0.18%	0.14%	0.21%	0.13%	0.87%	0.08%	0.12%	0.79%	0.04%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

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13.4.6. CALL DROP RATE (%AGE)

Call Drop Rate (%age)

	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
PMR Audit 2G Audit Agengy(PCPL)	0.74%	0.71%	0.55%	0.45%	0.65%	0.25%	0.06%	0.61%	0.04%	0.28%
PMR Audit 2G TSP	0.79%	0.71%	0.55%	0.51%	0.73%	0.24%	0.07%	0.56%	0.06%	0.29%
3 Day Live Audit 2G	0.77%	0.67%	0.55%	0.49%	0.71%	0.25%	0.07%	0.56%	0.05%	0.26%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

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

Worst Affected cell having more than 3% TCH drop

	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
PMR Audit 2G Audit Agengy(PCPL)	0.47%	1.00%	2.79%	0.99%	2.41%	1.35%	0.37%	3.29%	0.14%	3.46%
PMR Audit 2G TSP	0.52%	1.04%	2.83%	1.28%	2.65%	1.23%	0.34%	3.06%	0.39%	3.25%
3 Day Live Audit 2G	0.46%	1.08%	2.85%	1.30%	2.85%	1.40%	0.32%	2.92%	0.40%	3.18%
Benchmark ≤ 2%	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**

%Age of connection with good voice quality

	Videocon(QTL)	AIRTEL	VODAFONE	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM	RCOM-CDMA	TATA-CDMA
PMR Audit 2G Audit Agengy(PCPL)	96.97%	98.35%	97.97%	98.27%	97.38%	96.08%	99.03%	97.37%	96.11%	99.10%
PMR Audit 2G TSP	96.72%	98.32%	97.96%	97.75%	97.04%	96.40%	99.15%	97.24%	99.22%	99.05%
3 Day Live Audit 2G	96.78%	98.42%	97.97%	97.68%	97.23%	96.21%	99.16%	97.28%	99.25%	98.73%
Benchmark ≤ 2%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

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

PMR Report Comparison between Audit Agency and TSP								
Network Parameters				**Name of Service Provider**				
		Benchmark		**IDEA**	**AIRCEL**	**BSNL**	**RCOM-GSM**	**TATA-GSM**
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.02%	0.27%	0.44%	0.36%	0.04%
			TSP	0.02%	0.27%	0.40%	0.24%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	0.05%	0.69%	1.70%	0.99%	0.07%
			TSP	0.05%	0.69%	1.67%	0.42%	0.07%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	Agency	99.50%	99.11%	99.02%	99.38%	98.14%
			TSP	99.50%	99.10%	99.00%	98.94%	98.14%
	RRC Congestion:	≤ 1%	Agency	0.17%	0.49%	0.86%	0.05%	0.54%
			TSP	0.17%	0.49%	0.80%	0.06%	0.54%
	RAB Congestion:	≤ 2%	Agency	0.12%	0.07%	0.29%	0.06%	0.95%
			TSP	0.12%	0.07%	0.23%	0.15%	1.29%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	Agency	0.68%	0.47%	0.36%	0.20%	0.18%
			TSP	0.68%	0.47%	0.30%	0.26%	0.18%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	Agency	2.06%	5.98%	0.70%	1.85%	0.57%
			TSP	2.06%	5.98%	0.67%	1.75%	0.95%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	Agency	99.34%	99.08%	97.71%	99.57%	99.12%
			TSP	99.34%	99.07%	97.67%	99.63%	99.12%

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

Sum of downtime of BTSs in a month in hrs. in the licensed service area

	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
PMR Audit 3G Audit Agency(PCPL)	0.02%	0.27%	0.44%	0.36%	0.04%
PMR Audit 3G TSP	0.02%	0.27%	0.40%	0.24%	0.04%
3 Day Live Audit 3G	0.03%	0.25%	0.00%	0.01%	0.04%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

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13.5.2.   No. OF BTSs HAVING ACCUMULATED DOWNTIME OF >24 HOURS IN A MONTH

No. of BTSs having accumulated downtime of >24 hours in a month

	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
PMR Audit 3G Audit Agency(PCPL)	0.05%	0.69%	1.70%	0.99%	0.07%
PMR Audit 3G TSP	0.05%	0.69%	1.67%	0.42%	0.07%
3 Day Live Audit 3G	0.00%	0.00%	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)

Call Set-up Success Rate (Within Licensee own network)

	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
PMR Audit 3G Audit Agency(PCPL)	99.50%	99.11%	99.02%	99.38%	98.14%
PMR Audit 3G TSP	99.50%	99.10%	99.00%	98.94%	98.14%
3 Day Live Audit 3G	99.47%	98.94%	0.00%	99.98%	98.70%
Benchmark ≤ 2%	95.00%	95.00%	95.00%	95.00%	95.00%

13.5.4. RRC CONGESTION

RRC Congestion

	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
PMR Audit 3G Audit Agency(PCPL)	0.17%	0.49%	0.86%	0.05%	0.54%
PMR Audit 3G TSP	0.17%	0.49%	0.80%	0.06%	0.54%
3 Day Live Audit 3G	0.09%	0.77%	0.00%	0.02%	0.50%
Benchmark ≤ 2%	1.00%	1.00%	1.00%	1.00%	1.00%

13.5.5. RAB CONGESTION

RAB Congestion

	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
■ PMR Audit 3G Audit Agency(PCPL)	0.12%	0.07%	0.29%	0.06%	0.95%
■ PMR Audit 3G TSP	0.12%	0.07%	0.23%	0.15%	1.29%
■ 3 Day Live Audit 3G	0.10%	0.38%	0.00%	0.02%	1.13%
▬ Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

13.5.6.   CIRCUIT SWITCHED VOICE DROP RATE

Circuit Switched Voice Drop Rate

	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
PMR Audit 3G Audit Agency(PCPL)	0.68%	0.47%	0.36%	0.20%	0.18%
PMR Audit 3G TSP	0.68%	0.47%	0.30%	0.26%	0.18%
3 Day Live Audit 3G	0.34%	0.52%	0.00%	0.09%	0.18%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

Worst affected cells having more than 3% Circuit Switched Voice Drop Rate

	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
PMR Audit 3G Audit Agency(PCPL)	2.06%	5.98%	0.70%	1.85%	0.57%
PMR Audit 3G TSP	2.06%	5.98%	0.67%	1.75%	0.95%
3 Day Live Audit 3G	1.38%	11.16%	0.00%	0.36%	0.94%
Benchmark ≤ 2%	3.00%	3.00%	3.00%	3.00%	3.00%

Percentage of connections with Good Circuit Switched Voice Quality

	IDEA	AIRCEL	BSNL	RCOM-GSM	TATA-GSM
PMR Audit 3G Audit Agency(PCPL)	99.34%	99.08%	97.71%	99.57%	99.12%
PMR Audit 3G TSP	99.34%	99.07%	97.67%	99.63%	99.12%
3 Day Live Audit 3G	99.41%	98.96%	0.00%	98.83%	99.12%
Benchmark ≤ 2%	95.00%	95.00%	95.00%	95.00%	95.00%

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

Name of Service Provider	Metering and Billing credibility				Billing Complaints						Termination & Closures		Time taken for refund of deposits after closures		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%	97.92%	97.92%	97.08%	97.08%
AIRTEL	0.02%	0.02%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	93.63%	93.63%
BSNL	0.04%	0.04%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.25%	99.43%
IDEA	0.07%	0.07%	0.04%	0.04%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.88%	99.88%	99.24%	99.24%
QTL (VIDEOCON)	0.00%	0.00%	0.00%	0.03%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.64%	96.64%
RCOM-CDMA	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%	97.42%	97.42%	96.89%	96.89%
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%	99.43%	99.43%	94.51%	94.51%
TTSL-CDMA	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.81%	98.81%	99.18%	99.18%
TTSL-GSM	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.63%	98.63%	94.88%	94.88%
VODAFONE	0.17%	0.17%	0.06%	0.06%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.99%	98.80%

13.6.1.   METERING AND BILLING CREDIBILITY : POSTPAID

Metering and Billing Credibility : Postpaid

	AIRCEL	AIRTEL	BSNL	IDEA	QTL (VIDEOCON)	RCOM-CDMA	RCOM-GSM	TTSL-CDMA	TTSL-GSM	VODAFONE
Billing Performance for Postpaid: Audit Agency(PCPL)	0.00%	0.02%	0.04%	0.07%	0.00%	0.09%	0.09%	0.00%	0.00%	0.17%
Billing Performance for Postpaid: TSP	0.00%	0.02%	0.04%	0.07%	0.00%	0.09%	0.09%	0.00%	0.00%	0.17%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

Metering and Billing Credibility : Prepaid

	AIRCEL	AIRTEL	BSNL	IDEA	QTL (VIDEOCON)	RCOM-CDMA	RCOM-GSM	TTSL-CDMA	TTSL-GSM	VODAFONE
Billing Performance for Prepaid: Audit Agency(PCPL)	0.00%	0.00%	0.00%	0.04%	0.00%	0.09%	0.09%	0.00%	0.00%	0.06%
Billing Performance for Prepaid: TSP	0.00%	0.00%	0.00%	0.04%	0.03%	0.09%	0.09%	0.00%	0.00%	0.06%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

%Age complaints resolved within 4 weeks

	AIRCEL	AIRTEL	BSNL	IDEA	QTL (VIDEOCON)	RCOM-CDMA	RCOM-GSM	TTSL-CDMA	TTSL-GSM	VODAFONE
Billing Complaints: Audit Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%
Billing Complaints: TSP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark ≥ 98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%

13.6.4. **%AGE COMPLAINTS RESOLVED WITHIN 6 WEEKS**

%Age complaints resolved within 6 weeks

	AIRCEL	AIRTEL	BSNL	IDEA	QTL (VIDEOCON)	RCOM-CDMA	RCOM-GSM	TTSL-CDMA	TTSL-GSM	VODAFONE
Billing Complaints: Audit Agency(PCPL)	100%	100%	100%	100%	0%	100%	100%	0%	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%

%Age of where credit/waiver is received within one week

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

13.6.6. %AGE OF CALLS ANSWERED BY THE IVR

%Age of calls answered by the IVR

	AIRCEL	AIRTEL	BSNL	IDEA	QTL (VIDEOCON)	RCOM-CDMA	RCOM-GSM	TTSL-CDMA	TTSL-GSM	VODAFONE
Percentage of calls connected and answered : Audit Agency(PCPL)	97.92%	100.00%	100.00%	99.88%	100.00%	97.42%	99.43%	98.81%	98.63%	100.00%
Percentage of calls connected and answered : TSP	97.92%	100.00%	100.00%	99.88%	100.00%	97.42%	99.43%	98.81%	98.63%	100.00%
Percentage of calls connected and answered : Live Calling	100%	100%	0%	100%	100%	0%	100%	100%	100%	100%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

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

%Age of call answered by the operators (voice to voice) within 90 seconds

|	AIRCEL	AIRTEL	BSNL	IDEA	QTL (VIDEOCON)	RCOM-CDMA	RCOM-GSM	TTSL-CDMA	TTSL-GSM	VODAFONE
Percentage of calls connected and answered by the operators: Audit Agency(PCPL)	97.08%	93.63%	96.25%	99.24%	96.64%	96.89%	94.51%	99.18%	94.88%	98.99%
Percentage of calls connected and answered by the operators: TSP	97.08%	93.63%	99.43%	99.24%	96.64%	96.89%	94.51%	99.18%	94.88%	98.80%
Percentage of calls connected and answered by the operators: Live Calling	100%	100%	0%	100%	96%	0%	100%	100%	100%	100%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

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

%Age of Termination/ Closure of service within 7 days

	AIRCEL	AIRTEL	BSNL	IDEA	QTL (VIDE OCON)	RCOM -CDMA	RCOM -GSM	TTSL-CDMA	TTSL-GSM	VODA FONE
Percentage cases closure done within 7 days: Audit Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%	100%	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

Cleared over a period of <60 days

	AIRCEL	AIRTEL	BSNL	IDEA	QTL (VIDEOCON)	RCOM-CDMA	RCOM-GSM	TTSL-CDMA	TTSL-GSM	VODAFONE
Percentage refund of deposits after closures: Audit 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%
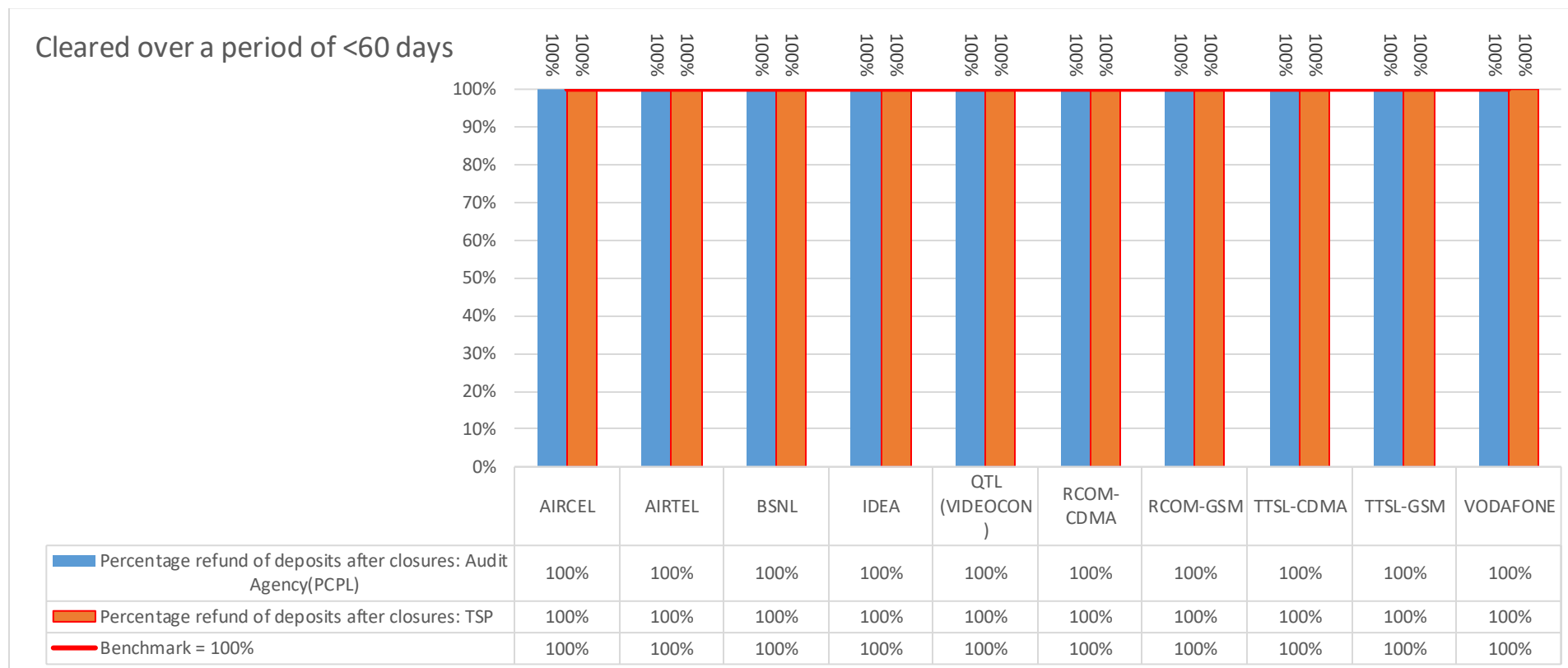
14   KEY FINDINGS

14.1. 2G VOICE PMR - CONSOLIDATED

- TTSL GSM has a parameter value of 3.06% and failed to meet the benchmark of ≤ 3% connection maintenance worst affected cell with TCH drop.
- TTSL CDMA has a parameter value of 3.24% and failed to meet the benchmark of ≤ 3% connection maintenance worst affected cell with TCH drop

14.2. 3G VOICE PMR - CONSOLIDATED

- AIRCEL has a parameter value of 5.98% and failed to meet the benchmark of ≤ 3% connection maintenance worst affected cell with Circuit switched voice.

14.3. Billing and Customer Care

- AIRTEL has a parameter value of 93.63% and failed to meet the benchmark of ≥95% for Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 seconds.
- RCOM GSM has a parameter value of 94.51% and failed to meet the benchmark of ≥95% for Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 seconds.
- TTSL GSM has a parameter value of 94.88% and failed to meet the benchmark of ≥95% for Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 seconds.
- VODAFONE has a parameter value of 0.17% and failed to meet the benchmark of≤0.1% metering and billing creditibility for postpaid subscribers.