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TRAI

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

AUDIT & ASSESSMENT OF QUALITY OF SERVICE CELLULAR MOBILE TELEPHONE SERVICE (CMTS)

(JULY TO SEPTEMBER 2016)

NORTH ZONE – UP WEST CIRCLE

PREPARED BY:

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1. INTRODUCTION

1.1. ABOUT TRAI

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

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

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

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

1.2. ABOUT PHISTREAM CONSULTING PRIVATE LIMITED

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

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

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

1.3. OBJECTIVES

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

1.4. COVERAGE

The audit was conducted in UP West Circle covering all SSAs (Secondary Switching Areas).
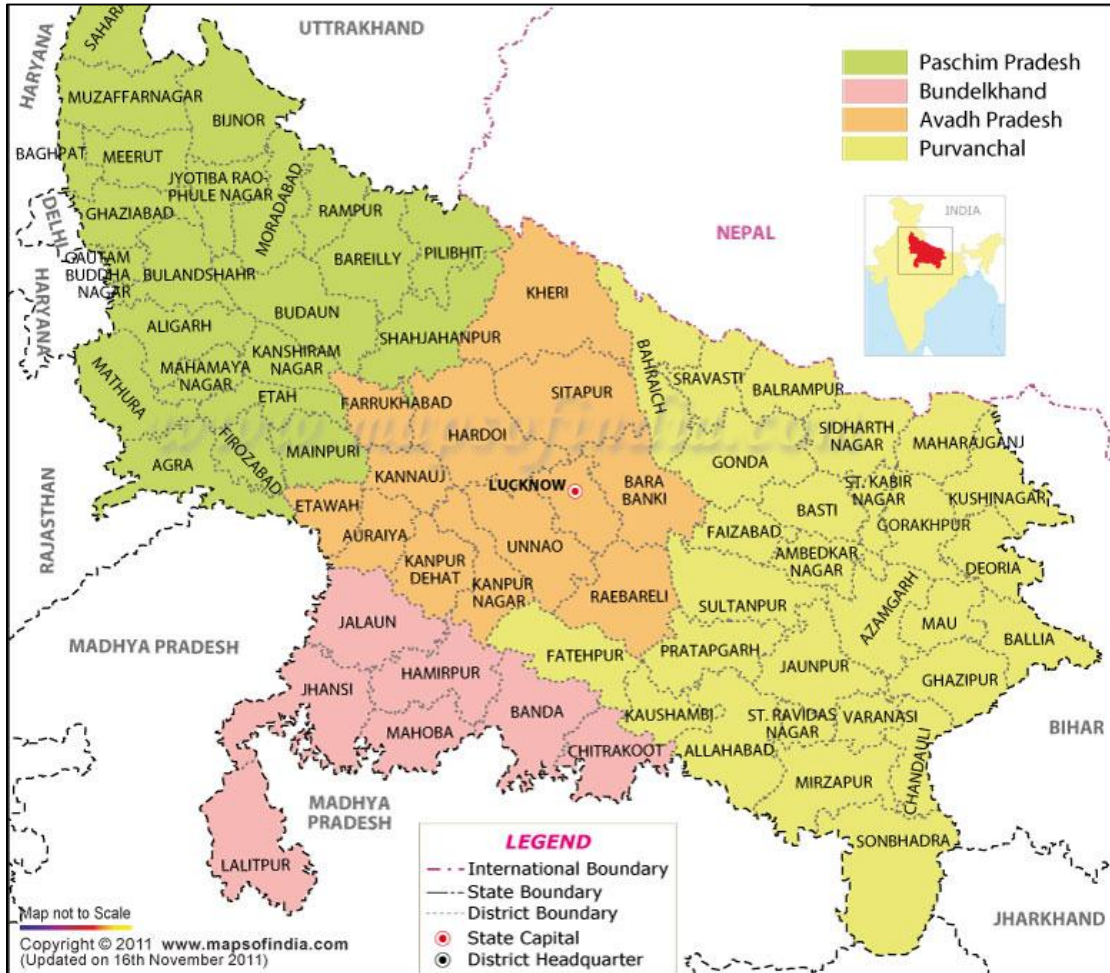
Image Source: Maps of India

1.5. SSA LIST

S. No.	Circle	SSA Name
1	UPW	Agra
2	UPW	Badaun
3	UPW	Bareilly
4	UPW	Bijnore
5	UPW	Etah
6	UPW	Ghaziabad
7	UPW	Mathura
8	UPW	Meerut
9	UPW	Moradabad
10	UPW	Muzaffarnagar
11	UPW	Pilibhit
12	UPW	Rampur
13	UPW	Saharanpur
14	UPW	Almora
15	UPW	Dehradun
16	UPW	Kotdwara
17	UPW	Nainital
18	UPW	Saharanpur
19	UPW	Uttarkashi

Audit Activities

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

2. PMR Reports

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

The 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, Sep 2016 audit data was collected in the month of Oct 2016.

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

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

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

Let us understand these formats in details.

This involved calculation of the various Quality of Service network parameters through monthly Performance Monitoring Reports (PMR). The PMR reports were generated from the data extracted from operator's systems by the auditor with the assistance of the operator at the operator's premises for the month of April, May and June2016. The performance of operators on various parameters was assessed against thebenchmarks.

Parameters includes:

Network Availability

- BTS accumulated downtime
- Worst affected BTS due to downtime

Connection Establishment (Accessibility)

- Call Set Up success Rate (CSSR)

Network Congestion Parameters

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

Connection Maintenance

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

Voice Quality

- % Connections with good voice quality

2.2. AUDIT PARAMETER: NETWORK

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

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

2.3. DATA EXTRACTION POINTS

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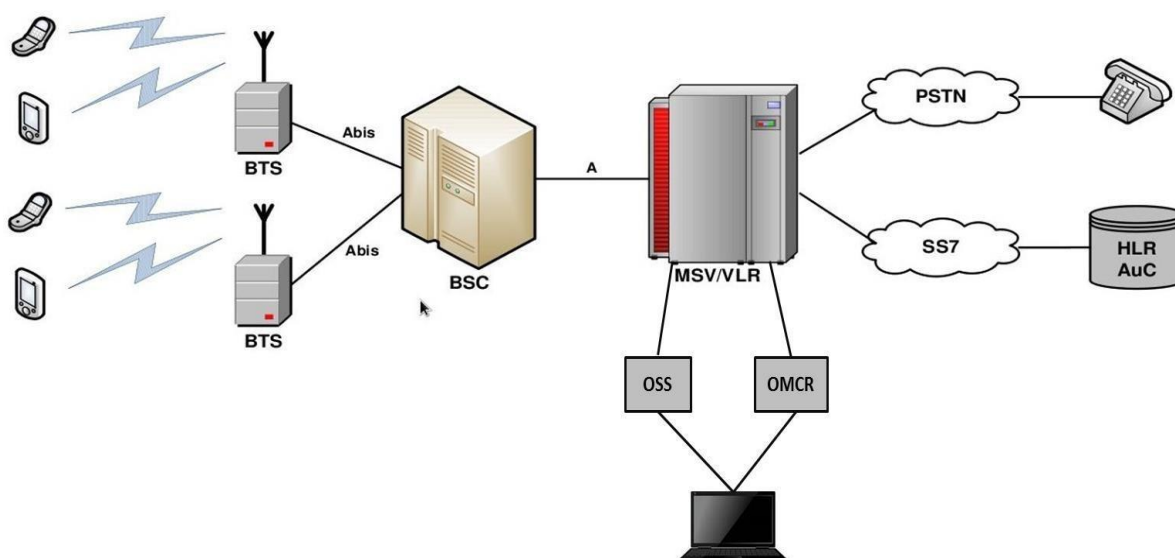
2.4. AUDIT PROCEDURE

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

2.7. 2G & 3G WIRELESS

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

3. 3 DAYS LIVE DATA

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

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

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

3.1. TCBH: SIGNIFICANCE AND SELECTION METHODOLOGY

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

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 Junided upon the basis of month of audit. For example, for the audit of June 2016, the 90 day period data used to identify TCBH would be the data of April, May & June 2016.

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.

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 September 2016 was collected in the month of October 2016. To extract the data for customer service parameters for the purpose of audit, auditors primarily visit the following locations/ departments/ offices at the operator's end.

- Central Billing Center
- Central Customer Service Center

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

The Customer Service Quality Parameters include the following:

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

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

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

4.1. AUDIT PARAMETERS: CUSTOMER SERVICE

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

4.2. CALCULATION METHODOLOGY: CUSTOMER SERVICE PARAMETER

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

4.3. LIVE CALLING: SIGNIFICANCE AND METHODOLOGY

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

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

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

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

Live calling activity was carried out during the period of QE Sep 2016. The data considered for live calling was for the month prior to the month in which the live calling activity was being conducted. In this case, data of Sep 2016 was considered for live calling activity conducted in Oct 2016.

A detailed explanation of each parameter is explained below:

4.4. BILLING COMPLAINTS

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

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

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

All the complaints related to billing as per clause 3.7.2 of QoS regulation of 20th June, 2015 were considered as population for selection of samples.

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

4.5. SERVICE COMPLAINTS REQUESTS

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

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

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

4.6. LEVEL 1

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

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

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

4.7. PROCESS TO TEST LEVEL 1 SERVICE

- During the operator assisted drive test, auditors ask the operator authorized personnel to make 5 calls in each SDCA on the Level 1 Service numbers provided by TRAI. The list contains a description of the numbers along with dialling code.

- Operators might also provide a list of L1 services. To identify emergency L1 service numbers, auditors check if there is any number that starts with code '10' in that list. If auditors find any emergency number in addition to the below list, that number is also tested during live calling.

- On receiving the list, auditors verify it if the below given list of numbers are active in the service provider's network.

- If there are any other additional numbers provided by the operator, auditors also do live calling on those numbers along with below list.

- If any of these numbers is not active, then we would write the same in our report, auditors write in the report.

- Post verifying the list, auditors do live calling by equally distributing the calls among the various numbers and update the results in the live calling sheet.

Sr.No.	Level-1 (Emergency) Helpline Number Details
1	100 Police
2	101 Fire
3	102 Ambulance
4	104 Health Information Helpline
5	108 Emergency and Disaster Management Helpline
6	138 All India Helpine for Passangers
7	149 Public Road Transport Utility Service
8	181 Chief Minister Helpline
9	182 Indian Railway Security Helpline
10	1033 Road Accident Management Service
11	1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'
12	1056 Emergency Medical Services
13	106X State of the Art Hospitals - AIIMS
14	1063 Public Grievance Cell DoT Hq
15	1064 Anti Corruption Helpline
16	1070 Relief Commission for Natural Calamities
17	1071 Air Accident Helpline
18	1072 Rail Accident Helpline
19	1073 Road Accident Helpline
20	1077 Control Room for District Collector
21	1090 Call Alart (Crime Branch)
22	1091 Women Helpline
23	1097 National AIDS Helpline to NACO
24	1099 Central Accident and Trauma Services (CATS)
25	10580 Educational& Vocational Guidance and Counselling
26	10589 Mother and Child Tracking (MCTH)
27	10740 Central Pollution Control Board
28	10741 Pollution Control Board
29	1511 Police Related Service for all Metro Railway Project
30	1512 Prevention of Crime in Railway
31	1514 National Career Service(NCS)
32	15100 Free Legal Service Helpline
33	155304 Municipal Corporations
34	155214 Labour Helpline
35	1903 SashastraSeemaBal (SSB)
36	1909 National Do Not Call Registry
37	1912 Complaint of Electricity
38	1916 Drinking Water Supply
39	1950 Election Commission of India

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4.8. CUSTOMER CARE

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

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

The process for this parameter is stated below:

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

4.9. INTER OPERATOR CALL ASSESSMENT

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

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

UP West circle consist of total 19 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.

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

- A minimum of 80 kilometres was traversed during the independent drive test in a SSA. The SSA would be defined as per BSNL and SSA list will be finalized by regional TRAI office.

- Route map was designed in such a way that all the major roads, highways and all the important towns and villages were covered as part of audit.

- Special emphasis was given to those areas where the number of complaints received were on the higher side, if provided by TRAI.

- The route is defined in a way that we cover maximum area in the SSA and try to cover maximum villages and cities within the SSA. The route is designed such that there is no overlap of roads (if possible).

- The route was classified as – Within city, Major Roads, Highways, Shopping complex/ Mall and Office Complex/ Government Building

- There were no fixed calls which we need to do for within city, major roads and highways, but a minimum of 30 calls in each route, i.e., within city, major roads and highways on each day. For indoors, 20 calls each for shopping and office complex each day preferably in relatively bigger city.

- The drive test covered selected cities and adjoining towns/rural areas where the service provider has commenced service, including congested areas and indoor sites.

- The drive test of each mobile network was conducted between 10 am and 8 pm on weekdays.

- The Vehicle used in the drive tests was equipped with the test tool that automatically generates calls on the mobile telephone networks.

- The speed of the vehicle was kept at around 30 km/hr.

- The holding period of each test call was 120 seconds.

- A test call was generated 10 seconds after the previous test call is completed.

- Height of the antenna was kept uniform in case of all service providers.

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

- Coverage-Signal strength (GSM)
    - Total calls made (A)
    - Number of calls with signal strength between 0 to -75 dBm
    - Number of calls with signal strength between 0 to -85 dBm
    - Number of calls with signal strength between 0 to -95 dBm

- Coverage-Signal strength (CDMA)
    - Total Ec/Io BINS (A)
    - Total Ec/Io BINS with less than –15 (B)
    - Low Interference = [1 - (B/A)] x 100

- Voice quality (GSM)
    - Total RxQual Samples– A
    - RxQual samples with 0-5 value – B
    - %age samples with good voice quality = B/A x 100

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

- Call setup success rate
    - Total number of call attempts – A
    - Total Calls successfully established – B
    - Call success rate (%age) = (B/A) x 100

- Blocked calls
    - 100% - Call Set up Rate

- Call drop rate
    - Total Calls successfully established – A
    - Total calls dropped after being established – B
    - Call Drop Rate (%age) = (B/A) x 100

6. EXECUTIVE SUMMARY

The executive summary put in a nutshell the key findings of the Audit by providing: -

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

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

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

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

6.   GENERAL INFORMATION

6.1.   OPERATORS COVERED & active subscriber base

Name of Operator	Number of Subscriber (Up to September 30, 2016)
AIRCEL	785329
AIRTEL	7509487
BSNL	3863767
IDEA	14635159
MTS	128297
TELENOR	8523574
RCOM GSM	5504703
TTSL CDMA	305813
TTSL GSM	3883410
VODAFONE	11378616

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

Sr.No.	Name of Service Provider	No. of cells	BTS	BSC	MSC+GMSC	NSS make	BSS make	Node B	RNC
1	Aircel	2023	669	8	1+1	ZTE	ZTE	NA	NA
2	Airtel	20768	6945	70	14+6	Ericsson	Ericsson	4436	14
3	BSNL	3070	1034	15	5	Ericsson, ZTE	Ericsson, ZTE, Nokia	503	7
4	IDEA	25559	8455	62	19	Nokia	Nokia	4990	8
5	RCOM GSM	4971	1655	14	3+1	Huawei	Huawei	NA	NA
6	TELENOR	12103	4026	33	8	Ericsson + Huawei	Ericsson + Huawei	NA	NA
7	TTSL CDMA	1455	457	4	3+2	Ericsson & Huawei	Huawai & Motorola	NA	NA
8	TTSL GSM	5376	1764	18	3	NSN	NSN	NA	NA
9	MTS	1544	444	1	1	Huawei	Huawei	NA	NA
10	VODAFONE	21722	7220	80+20	7+4	Nokia	Nokia+Ericsson	NA	NA

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

DNA: Data not available

6.3. BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

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

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

Sl. No.	Service Provider	Dates of live measurement Audit			
	GSM Operators	**July-16**	**Aug-16**	**Sept-16**	**Audit Location**
1	AIRCEL	6 to 8 July 2016	1 to 3 Aug 2016	1 to 3 Sept 2016	325/1,Dishnet Wireless Ltd. ShikharTower,Mangal Pandey Nagar, Garh Road, Meerut
2	AIRTEL	4 to 6 July 2016	4 to 6 Aug 2016	4 to 6 Sept 2016	Bharti Airtel Ltd., Divider Chowk, Ganganagar, Mwana Road, Meerut
3	BSNL	5 to 7 July 2016	5 to 7 Aug 2016	5 to 7 Sept 2016	BSNL Telephone Exchange, Brahampuri, Delhi Road, Meerut
4	IDEA	11 to 13 July 2016	22 to 24 Aug 2016	5 to 7 Sept 2016	Idea Cellular Limited, First Floor A-68, Sector-64, Noida (UP)
5	MTS	7, 8 & 11 July 2016	2 to 4 Aug 2016	1,2 & 5 Sept 2016	SSTL,Near Sri Ram Plaza,Opp.Ccs University, Meerut
6	TELENOR	4 to 6 July 2016	17 to 19 Aug 2016	14 to 16 Sept 2016	Telewings Communications Services Pvt Ltd. (Uninor) Welldone Technology Park Sec-48 Sohna Road Gurgaon
7	RCOM GSM	4 to 6 July 2016	1 to 3 Aug 2016	1 to 3 Sept 2016	Rcom Ltd.,Vill-Jatauli,Near Krishna Public School, Bypass Road Meerut
8	TATA CDMA	4 to 6 July 2016	3 to 5 Aug 2016	1 to 3 Sept 2016	TTSL, Near CCS University, Meerut
9	TATA GSM	4 to 6 July 2016	3 to 5 Aug 2016	1 to 3 Sept 2016	TTSL, Near CCS University, Meerut
10	VODAFONE	4 to 6 July 2016	3 to 5 Aug 2016	7 to 9 Sept 2016	Vodafone South Ltd.,NishyamKunjBuilding,NearKailashPrkashStadium,CivilLines,Meerut

6.4.   **AUDIT SCHEDULE**

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

Colour codes to read the report:

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

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

Network Parameters		Benchmark	Name of Service Provider									
			AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.17%	1.40%	1.58%	0.15%	0.04%	0.02%	0.36%	0.16%	0.29%	0.41%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.45%	1.25%	1.71%	0.39%	0.00%	0.12%	1.02%	0.00%	0.79%	1.36%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.52%	98.24%	97.78%	98.13%	99.69%	98.24%	98.40%	98.82%	97.82%	98.97%
	SDDCH/Paging chl. Congestion	≤ 1%	0.31%	0.52%	0.64%	0.80%	NA	0.28%	0.49%	NA	0.30%	0.38%
	TCH Congestion	≤ 2%	0.46%	1.35%	1.22%	1.21%	0.00%	0.55%	1.04%	0.09%	0.50%	1.03%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.87%	1.38%	1.38%	1.04%	0.28%	0.14%	0.93%	0.34%	0.58%	0.94%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	3.80%	DNA	2.55%	2.71%	3.00%	0.35%	5.54%	3.04%	3.02%	2.98%
	%age of connection with good voice quality	≥ 95%	96.43%	96.60%	96.52%	96.06%	98.80%	98.84%	97.17%	98.84%	96.85%	96.35%

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

Network Parameters		Benchmark	Name of Service Provider									
			AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.10%	1.01%	1.58%	0.14%	0.03%	0.05%	0.21%	0.21%	0.16%	0.28%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.15%	0.81%	1.70%	0.33%	0.00%	0.24%	0.25%	0.86%	0.34%	1.37%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.17%	97.96%	98.07%	98.46%	99.75%	99.17%	98.67%	99.02%	98.02%	98.97%
	SDDCH/Paging chl. Congestion	≤ 1%	0.25%	0.49%	0.64%	0.80%	NA	0.15%	0.48%	NA	0.22%	0.38%
	TCH Congestion	≤ 2%	0.45%	1.61%	1.25%	0.97%	0.00%	0.45%	0.74%	0.13%	0.40%	1.03%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.76%	1.46%	1.41%	1.11%	0.28%	0.15%	0.89%	0.28%	0.57%	0.94%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.83%	2.63%	2.54%	2.67%	2.97%	0.47%	4.82%	2.39%	3.17%	2.95%
	%age of connection with good voice quality	≥ 95%	96.52%	96.68%	96.16%	95.94%	98.95%	98.64%	97.10%	98.84%	96.88%	96.35%

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

Network Parameters		Benchmark	Name of Service Provider									
			AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.08%	0.70%	1.61%	0.08%	0.04%	0.06%	0.19%	0.18%	0.08%	0.22%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.45%	0.55%	1.80%	0.14%	0.00%	0.48%	0.10%	0.00%	0.11%	0.53%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.42%	97.68%	98.13%	98.18%	99.80%	99.30%	98.98%	99.14%	98.27%	99.06%
	SDDCH/Paging chl. Congestion	≤ 1%	0.16%	0.50%	0.60%	0.61%	0.00%	0.09%	0.29%	NA	0.12%	0.33%
	TCH Congestion	≤ 2%	0.97%	1.89%	1.08%	1.20%	0.00%	0.41%	0.52%	0.08%	0.40%	0.69%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.68%	1.39%	1.34%	1.18%	0.27%	0.15%	0.83%	0.24%	0.48%	0.89%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.11%	2.37%	2.36%	2.90%	2.87%	0.46%	3.56%	2.04%	2.25%	2.91%
	%age of connection with good voice quality	≥ 95%	96.69%	96.98%	96.43%	95.93%	99.08%	98.48%	97.19%	98.87%	97.14%	96.47%

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

Consolidated											
Network Parameters		Name of Service Provider									
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.12%	1.04%	1.59%	0.12%	0.04%	0.04%	0.25%	0.18%	0.18%	0.30%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.35%	0.87%	1.73%	0.29%	0.00%	0.28%	0.45%	0.29%	0.42%	1.09%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.70%	97.96%	97.99%	98.25%	99.75%	98.91%	98.68%	99.00%	98.04%	99.00%
	SDDCH/Paging chl. Congestion	≤ 1%	0.24%	0.50%	0.63%	0.74%	0.00%	0.17%	0.42%	#DIV/0!	0.22%	0.36%
	TCH Congestion	≤ 2%	0.63%	1.62%	1.18%	1.12%	0.00%	0.47%	0.77%	0.10%	0.44%	0.92%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.77%	1.41%	1.38%	1.11%	0.28%	0.15%	0.88%	0.28%	0.54%	0.93%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.91%	2.50%	2.49%	2.76%	2.95%	0.43%	4.64%	2.49%	2.82%	2.95%
	%age of connection with good voice quality	≥ 95%	96.55%	96.75%	96.37%	95.97%	98.94%	98.66%	97.15%	98.85%	96.96%	96.39%

6.9. 2G VOICE 3 DAYS LIVE DATA

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

6.10. 2G VOICE 3 DAYS LIVE DATA: JULY

Jul-16											
Network Parameters		Name of Service Provider									
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.04%	1.24%	1.56%	0.10%	0.46%	0.02%	0.24%	0.19%	0.20%	0.14%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	1.08%	4.98%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.70%	98.27%	97.27%	98.51%	99.75%	96.54%	98.03%	99.10%	97.80%	99.09%
	SDDCH/Paging chl. Congestion	≤ 1%	0.31%	0.56%	0.67%	0.67%	NA	0.45%	0.35%	NA	0.34%	0.38%
	TCH Congestion	≤ 2%	0.62%	1.35%	1.24%	0.93%	0.00%	0.74%	1.39%	0.05%	0.63%	0.91%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.74%	1.29%	1.44%	1.00%	0.28%	0.14%	0.85%	0.37%	0.51%	0.95%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.55%	2.27%	2.69%	2.50%	2.77%	0.28%	5.15%	3.16%	2.45%	4.26%
	%age of connection with good voice quality	≥ 95%	96.38%	96.67%	96.86%	96.23%	98.73%	98.80%	97.32%	98.86%	96.92%	96.40%

6.11. 2G VOICE 3 DAYS LIVE DATA: AUGUST

Aug-16											
Network Parameters		Name of Service Provider									
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.08%	1.24%	1.60%	0.09%	0.01%	0.02%	0.16%	0.09%	0.21%	0.30%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	4.94%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.48%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.90%	98.15%	97.70%	98.44%	99.73%	98.79%	98.67%	99.19%	98.30%	98.94%
	SDDCH/Paging chl. Congestion	≤ 1%	0.21%	0.90%	0.70%	0.62%	NA	0.83%	0.31%	NA	0.10%	0.30%
	TCH Congestion	≤ 2%	0.33%	1.43%	1.32%	1.04%	0.00%	0.49%	0.77%	0.00%	0.22%	1.06%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.90%	1.46%	1.53%	1.05%	0.22%	0.14%	0.89%	0.26%	0.57%	0.85%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	3.71%	2.78%	2.73%	2.85%	3.21%	0.45%	4.49%	2.04%	3.22%	3.02%
	%age of connection with good voice quality	≥ 95%	96.35%	96.57%	96.71%	96.14%	98.96%	98.82%	96.94%	98.85%	96.88%	96.53%

6.12. 2G VOICE 3 DAYS LIVE DATA: SEPTEMBER

Sep-16											
Network Parameters		Name of Service Provider									
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.05%	0.73%	1.60%	0.09%	0.02%	0.07%	0.16%	0.06%	0.08%	0.15%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	5.64%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.33%	97.63%	97.92%	98.16%	99.81%	98.25%	99.00%	99.14%	98.29%	99.07%
	SDDCH/Paging chl. Congestion	≤ 1%	0.15%	0.49%	0.63%	0.79%	NA	0.04%	0.22%	NA	0.07%	0.38%
	TCH Congestion	≤ 2%	0.38%	1.94%	0.97%	1.25%	0.00%	0.39%	0.51%	0.02%	0.35%	0.70%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.70%	1.41%	1.42%	1.10%	0.25%	0.15%	0.84%	0.35%	0.49%	1.01%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.03%	2.30%	2.41%	2.94%	2.99%	0.56%	3.82%	2.65%	2.35%	2.97%
	%age of connection with good voice quality	≥ 95%	96.69%	96.91%	96.65%	95.96%	99.07%	98.51%	97.17%	98.84%	97.02%	96.31%

July to September 2016 – UP West Circle

6.13. 2G 3 DAYS LIVE DATA: CONSOLIDATED

Network Parameters		Benchmark	Name of Service Provider									
			AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.05%	1.07%	1.59%	0.09%	0.17%	0.04%	0.19%	0.12%	0.16%	0.20%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.36%	5.19%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.49%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.65%	98.02%	97.63%	98.37%	99.76%	97.86%	98.57%	99.14%	98.13%	99.03%
	SDDCH/Paging chl. Congestion	≤ 1%	0.22%	0.65%	0.67%	0.69%	NA	0.44%	0.30%	NA	0.17%	0.35%
	TCH Congestion	≤ 2%	0.44%	1.58%	1.18%	1.08%	0.00%	0.54%	0.89%	0.02%	0.40%	0.89%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.78%	1.39%	1.47%	1.05%	0.25%	0.15%	0.86%	0.33%	0.52%	0.94%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.76%	2.45%	2.61%	2.76%	2.99%	0.43%	4.49%	2.62%	2.67%	3.42%
	%age of connection with good voice quality	≥ 95%	96.48%	96.72%	96.74%	96.11%	98.92%	98.71%	97.14%	98.85%	96.94%	96.42%

6.14. 3G VOICE PMR: JULY

			Name of Service Provider				
Network Parameters		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	1.48%	1.65%	0.39%	0.29%	DNA
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	1.12%	0.70%	1.91%	0.86%	DNA
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.01%	97.60%	99.35%	98.93%	100.00%
	RRC Congestion:	≤ 1%	0.04%	0.91%	0.88%	0.40%	0.06%
	RAB Congestion:	≤ 2%	0.00%	1.19%	0.40%	0.67%	0.19%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.61%	1.21%	0.32%	0.22%	0.45%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	DNA	2.69%	2.86%	1.79%	4.79%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.88%	DNA	DNA	99.12%	98.71%

Jul-16

6.15. 3G VOICE PMR: AUGUST

			Name of Service Provider				
Network Parameters		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	1.23%	1.56%	0.31%	0.15%	0.28%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.86%	0.69%	0.86%	0.21%	1.95%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.36%	97.80%	99.35%	98.96%	100.00%
	RRC Congestion:	≤ 1%	0.03%	0.88%	0.95%	0.39%	0.01%
	RAB Congestion:	≤ 2%	0.00%	0.75%	0.40%	0.63%	0.02%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.56%	0.97%	0.33%	0.22%	0.45%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.34%	2.60%	2.97%	1.86%	DNA
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.86%	DNA	98.88%	99.12%	98.70%

Aug-16

6.16. 3G VOICE PMR: SEPTEMBER

			Name of Service Provider				
Network Parameters		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.03%	1.68%	0.25%	0.10%	DNA
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.02%	1.84%	0.82%	0.00%	DNA
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.29%	98.58%	99.34%	99.31%	100.00%
	RRC Congestion:	≤ 1%	0.05%	0.87%	0.78%	0.38%	0.01%
	RAB Congestion:	≤ 2%	0.00%	0.56%	0.36%	0.36%	0.01%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.56%	0.99%	0.31%	0.18%	0.40%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.36%	2.52%	2.99%	1.41%	4.01%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.88%	DNA	98.95%	99.13%	98.76%

Sep-16

6.17. 3G Voice PMR: Consolidated

Consolidated								
Network Parameters		**Name of Service Provider**						
		Benchmark	**AIRTEL**	**BSNL**	**IDEA**	**TTSL**	**VODAFONE**	
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.92%	1.63%	0.32%	0.18%	0.28%	
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.67%	1.08%	1.20%	0.36%	1.95%	
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.22%	97.99%	99.35%	99.07%	100.00%	
	RRC Congestion:	≤ 1%	0.04%	0.89%	0.87%	0.39%	0.02%	
	RAB Congestion:	≤ 2%	0.00%	0.83%	0.39%	0.55%	0.07%	
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.58%	1.05%	0.32%	0.21%	0.43%	
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.35%	2.60%	2.94%	1.69%	4.40%	
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.87%	DNA	98.91%	99.12%	98.72%	

6.18. 3G VOICE 3 DAYS LIVE DATA: JULY

Network Parameters		Benchmark	Name of Service Provider				
Jul-16							
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	1.29%	DNA	0.39%	0.15%	DNA
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	1.04%	DNA	0.00%	0.00%	DNA
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.19%	DNA	99.37%	98.73%	100.00%
	RRC Congestion:	≤ 1%	0.03%	DNA	0.81%	0.39%	0.02%
	RAB Congestion:	≤ 2%	0.00%	DNA	0.40%	0.90%	0.01%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.61%	DNA	0.31%	0.20%	0.56%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.68%	DNA	2.42%	1.19%	DNA
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.90%	DNA	98.92%	99.13%	98.56%

6.19. 3G VOICE 3 DAYS LIVE DATA: AUGUST

Network Parameters		Benchmark	Name of Service Provider				
Aug-16							
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	1.27%	DNA	0.34%	0.20%	0.16%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	DNA	0.00%	0.00%	1.14%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.40%	DNA	99.30%	99.13%	100.00%
	RRC Congestion:	≤ 1%	0.01%	DNA	0.87%	0.39%	0.00%
	RAB Congestion:	≤ 2%	0.00%	DNA	0.45%	0.47%	0.02%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.59%	DNA	0.32%	0.23%	0.31%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.41%	DNA	2.76%	1.96%	2.88%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.88%	DNA	98.88%	99.12%	98.15%

6.20. 3G VOICE 3 DAYS LIVE DATA: SEPTEMBER

Network Parameters		Benchmark	Name of Service Provider				
Sep-16							
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.90%	0.58%	0.26%	0.11%	DNA
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.15%	0.06%	0.00%	DNA
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.42%	98.34%	99.37%	99.35%	100.00%
	RRC Congestion:	≤ 1%	0.02%	0.84%	0.71%	0.34%	0.02%
	RAB Congestion:	≤ 2%	0.00%	0.57%	0.38%	0.32%	0.01%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.52%	1.04%	0.30%	0.17%	0.56%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.27%	2.48%	2.84%	1.36%	DNA
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.87%	DNA	98.97%	99.12%	98.56%

Consolidated							
Network Parameters		**Name of Service Provider**					
		Benchmark	**AIRTEL**	**BSNL**	**IDEA**	**TTSL**	**VODAFONE**
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	1.15%	0.58%	0.33%	0.15%	0.16%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.35%	0.15%	0.02%	0.00%	1.14%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.34%	98.34%	99.35%	99.07%	100.00%
	RRC Congestion:	≤ 1%	0.02%	0.84%	0.80%	0.37%	0.01%
	RAB Congestion:	≤ 2%	0.00%	0.57%	0.41%	0.56%	0.02%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.58%	1.04%	0.31%	0.20%	0.48%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.45%	2.48%	2.68%	1.50%	2.88%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.89%	DNA	98.92%	99.12%	98.56%

						Jul-16						
					Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter												
1	**Service Activation/ Provisioning**											
i)	Total No. of Subscribers for Service Activation (A)		41910	DNA	DNA	713277	DNA	DNA	351452	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		41907	DNA	DNA	713257	DNA	DNA	339937	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	99.99%	DNA	DNA	100.00%	DNA	DNA	96.72%	DNA	DNA	DNA
2	**PDP Context Activation Success Rate**											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		21178167	19142955	DNA	48887486	2385676	DNA	816733871	7734119	3008712	7352042
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		20361726	19136410	DNA	48845512	2377228	DNA	812257798	7501942	3007069	7344344
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	96.14%	99.97%	DNA	99.91%	99.65%	98.72%	99.45%	97.00%	99.95%	99.90%
3												
i)	RNC originated PS Domain Iu Connection Setup Success (A)		479936265	5227213566	DNA	17579523684	23931395	1804390334	2891017581	DNA	686347959	88040779
ii)	RNC originated PS Domain Iu Connection Release (B)		3769274	49190913	DNA	198559083	284067	42753018	24423115	DNA	18589513	87799033
iii)	Drop Rate = (B/A) * 100	<=5%	0.79%	0.94%	DNA	1.13%	1.19%	2.37%	0.84%	DNA	2.71%	0.28%

						Aug-16						
					Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter												
1	**Service Activation/ Provisioning**											
i)	Total No. of Subscribers for Service Activation (A)		155591	DNA	DNA	DNA	DNA	DNA	1563407	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		155569	DNA	DNA	DNA	DNA	DNA	1551101	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	99.99%	DNA	DNA	DNA	DNA	DNA	99.21%	DNA	DNA	DNA
2	**PDP Context Activation Success Rate**											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		20669778	18946399	DNA	45998896.00	2193921	DNA	801833871	7173013.00	2661656	7351901
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		20111660	18944130	DNA	45968506.00	2186164	DNA	798917228	6938908.00	2658957	7348523
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	97.30%	99.99%	DNA	99.93%	99.65%	99.29%	99.64%	96.74%	99.90%	99.95%
3	**Drop Rate**											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		477481772	4945425254	DNA	16902720952	22176488	1663810485	2935752645	DNA	661802174	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		3837401	52880997	DNA	191851174	264268	40323717	23553368	DNA	17991561	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.80%	1.07%	DNA	1.14%	1.19%	2.42%	0.80%	DNA	2.72%	DNA

						Sep-16						
					Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter												
1	**Service Activation/ Provisioning**											
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	DNA	DNA	DNA	277944	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA	DNA	267187	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	DNA	DNA	DNA	DNA	96.13%	DNA	DNA	DNA
2	**PDP Context Activation Success Rate**											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		20680558	36468173	DNA	52795320	56985	DNA	624603417	4791634	2780505	7129683
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		19566059	36429566	DNA	52742936	56899	DNA	621350194	4636405	2779087	7124088
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	94.61%	99.89%	DNA	99.90%	99.85%	98.83%	99.48%	96.76%	99.95%	99.92%
3	**Drop Rate**											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		417296052	4320328897	DNA	16534343534	613368	1452029112	2705349198	DNA	561747626	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		3078940	45049511	DNA	222574143	7347	32797445	19356608	DNA	14382071	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.74%	1.04%	DNA	1.35%	1.20%	2.26%	0.72%	DNA	2.56%	DNA

6.25. 2G WIRELESS DATA: CONSOLIDATED

S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL UK	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
						Consolidated						
					Cellular Mobile Telephone Services							
Network Service Quality Parameter												
1	**Service Activation/ Provisioning**											
i)	Total No. of Subscribers for Service Activation (A)		98751	DNA	DNA	713277	DNA	DNA	730934	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		98738	DNA	DNA	713257	DNA	DNA	719408	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	99.99%	DNA	DNA	100.00%	DNA	DNA	97.36%	DNA	DNA	DNA
2	**PDP Context Activation Success Rate**											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		20842834	24852509	DNA	49227234	1545527	DNA	747723720	6566255	2816958	7277875
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		20013148	24836702	DNA	49185651	1540097	DNA	744175073	6359085	2815038	7272318
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	96.02%	99.95%	DNA	99.92%	99.71%	98.95%	99.52%	96.83%	99.93%	99.92%
3	**Drop Rate**											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		458238030	4830989239	DNA	17005529390	15573750	1640076644	2844039808	DNA	636632586	88040779
ii)	RNC originated PS Domain Iu Connection Release (B)		3561872	49040474	DNA	204328133	185227	38624727	22444364	DNA	16987715	87799033
iii)	Drop Rate = (B/A) * 100	<=5%	0.78%	1.02%	DNA	1.20%	1.19%	2.35%	0.79%	DNA	2.66%	0.28%

6.26. 2G WIRELESS 3 DAYS LIVE DATA: JULY

S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Jul-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	33303	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA	DNA	32310	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	DNA	DNA	DNA	DNA	97.02%	DNA	DNA	DNA
2	**PDP Context Activation Success Rate**											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		1386135	1999848	DNA	4756874	236957	DNA	77817101	776040	304183	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		1364870	1998325	DNA	4752264	234906	DNA	77538996	752534	303991	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.47%	99.92%	DNA	99.90%	99.13%	98.60%	99.64%	96.97%	99.94%	DNA
3												
	RNC originated PS Domain Iu Connection Setup Success (A)		46824723	535028909	DNA	1624679485	2380989	167923316	286058687	DNA	67972128	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		328618	4502875	DNA	18808389	29016	3615150	2514796	DNA	1795663	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.70%	0.84%	DNA	1.16%	1.22%	2.15%	0.88%	DNA	2.64%	DNA

6.27. 2G WIRELESS 3 DAYS LIVE DATA: AUGUST

S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Aug-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	25295	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA	DNA	24335	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	DNA	DNA	DNA	DNA	96.20%	DNA	DNA	DNA
2	**PDP Context Activation Success Rate**											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		1923965	1638186	DNA	4343502	226916	DNA	73032065	685704	22467	729181
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		1904100	1638072	DNA	4341386	226442	DNA	72789033	662987	22369	728817
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.97%	99.99%	DNA	99.95%	99.79%	99.46%	99.67%	96.69%	99.56%	99.95%
3												
	RNC originated PS Domain Iu Connection Setup Success (A)		45659451	479381992	DNA	1586428665	2442221	168964116	306178748	DNA	63676943	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		387783	4915924	DNA	18163856	34057	4239581	2460199	DNA	1783293	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.85%	1.03%	DNA	1.14%	1.39%	2.51%	0.80%	DNA	2.80%	DNA

6.28. 2G WIRELESS 3 DAYS LIVE DATA: SEPTEMBER

S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Sep-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	277944	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA	DNA	267187	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	DNA	DNA	DNA	DNA	96.13%	DNA	DNA	DNA
2	**PDP Context Activation Success Rate**											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		1961580	3559994	DNA	5368320	194989	DNA	624603417	694283	284839	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		1912429	3557766	DNA	5362940	194456	DNA	621350194	671642	284711	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	97.49%	99.94%	DNA	99.90%	99.73%	DNA	99.48%	96.74%	99.96%	DNA
3												
	RNC originated PS Domain Iu Connection Setup Success (A)		44529376	451771853	DNA	1447335177	2086099	DNA	2705349198	DNA	58272081	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		331644	4916399	DNA	17377368	26070	DNA	19356608	DNA	1556932	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.74%	1.09%	DNA	1.20%	1.25%	DNA	0.72%	DNA	2.67%	DNA

6.29. 2G WIRELESS 3 DAYS LIVE DATA: CONSOLIDATED

S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
					Consolidated							
					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	112181	DNA	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA	DNA	107944	DNA	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	DNA	DNA	DNA	DNA	96.45%	DNA	DNA	DNA
2	PDP Context Activation Success Rate											
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		1757227	2399343	DNA	4822899	219621	DNA	258484194	718676	203830	729181
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		1727133	2398054	DNA	4818863	218601	DNA	257226074	695721	203690	728817
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.31%	99.95%	DNA	99.92%	99.55%	99.03%	99.60%	96.80%	99.82%	99.95%
3	Drop Rate											
i)	RNC originated PS Domain Iu Connection Setup Success (A)		30172482	311885573	DNA	1552814442	2303103	168443716	1099195544	DNA	63307051	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		15848050	4778399	DNA	18116538	29714	3927366	8110534	DNA	1711963	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.77%	0.99%	DNA	1.17%	1.29%	2.33%	0.80%	DNA	2.70%	DNA

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6.30. 3G WIRELESS DATA: JULY

S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Jul-16
Cellular Mobile Telephone Services
Network Service Quality Parameter
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	713277	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	713257	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	100.00%	DNA	DNA
2	**PDP Context Activation Success Rate**						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		8743258	DNA	34822848	2713822	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		8742793	DNA	34567082	2713821	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.99%	DNA	99.27%	100.00%	DNA
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		574643095	DNA	1056896977	10498921	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		3009567	DNA	9838745	131579	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.52%	DNA	0.93%	1.25%	DNA

6.31. 3G WIRELESS DATA: AUGUST

S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Aug-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)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		9448928	DNA	33042390	2543953	1897648
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		9448913	DNA	32774112	2543953	1878998
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	99.19%	100.00%	99.02%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		595077987	DNA	957007087	10422088	70440992
ii)	RNC originated PS Domain Iu Connection Release (B)		3233436	DNA	8739702	128748	70231108
iii)	Drop Rate = (B/A) * 100	<=5%	0.54%	DNA	0.91%	1.24%	99.70%

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6.32. 3G WIRELESS DATA: SEPTEMBER

							Sep-16
			Cellular Mobile Telephone Services				
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	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)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		8357947	DNA	30923546	2283534	1892077
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		8357872	DNA	30697926	2283534	1867348
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	99.27%	100.00%	98.69%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		541775980	DNA	46613108	9334724	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		2682304	DNA	791828	102003	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.50%	DNA	1.70%	1.09%	DNA

6.33. 3G WIRELESS DATA: CONSOLIDATED

							Consolidated
			Cellular Mobile Telephone Services				
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	713277	DNA	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	713257	DNA	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	100.00%	DNA	DNA
2	**PDP Context Activation Success Rate**						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		8850044	DNA	32929595	2513770	1894863
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		8849859	DNA	32679707	2513769	1873173
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	99.24%	100.00%	98.86%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		570499021	DNA	686839057	10085244	70440992
ii)	RNC originated PS Domain Iu Connection Release (B)		2975102	DNA	6456758	120777	70231108
iii)	Drop Rate = (B/A) * 100	<=5%	0.52%	DNA	1.18%	1.19%	99.70%

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6.34. 3G WIRELESS 3 DAYS LIVE DATA: JULY

Jul-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	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)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		862957	DNA	3375588	257453	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		862827	DNA	3350068	257453	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.98%	DNA	99.24%	100.00%	DNA
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		55964225	DNA	102983520	974606	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		288875	DNA	936424	12911	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.52%	DNA	0.91%	1.32%	DNA

6.35. 3G WIRELESS 3 DAYS LIVE DATA: AUGUST

Aug-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	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)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		808603	DNA	3409244	269985	153948
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		808603	DNA	3362244	269985	152528
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	98.62%	100.00%	99.08%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		57049412	DNA	87126670	1002494	6668359
ii)	RNC originated PS Domain Iu Connection Release (B)		309548	DNA	814392	12757	6649754
iii)	Drop Rate = (B/A) * 100	<=5%	0.54%	DNA	0.93%	1.27%	99.72%

6.36. 3G WIRELESS 3 DAYS LIVE DATA: SEPTEMBER

S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
			Sep-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)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		823055	DNA	3095090	DNA	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		823032	DNA	3071628	DNA	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	99.24%	DNA	DNA
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		51705302	DNA	82782357	973616	DNA
ii)	RNC originated PS Domain Iu Connection Release (B)		279996	DNA	786303	11454	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	0.54%	DNA	0.95%	1.18%	DNA

6.37. 3G WIRELESS 3 DAYS LIVE DATA: CONSOLIDATED

S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
			Consolidated				
			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)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		831538	DNA	3293307	263719	153948
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		831487	DNA	3261313	263719	152528
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.99%	DNA	99.04%	100.00%	99.08%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		54906313	DNA	90964182	983572	6668359
ii)	RNC originated PS Domain Iu Connection Release (B)		292806	DNA	845706	12374	6649754
iii)	Drop Rate = (B/A) * 100	<=5%	0.53%	DNA	0.93%	1.26%	99.72%

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6.38. POI CONGESTION: JULY

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Jul-16										
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service										
Name of Parameter	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Total No. of POI's in Month having < = 0.5% POI congestion										
Total No. of call attempts on POI	416244	2581552	19117	22365	10279	875900	3385511	995635	669833	3145927
Total traffic served on all POIs (Erlang)	7276	109939	19106	438	181	18088	72950	20205	11666	55811
Total No. of circuits on all individual POIs	13096	183266	60457	1228	6281	43643	204371	50350	20690	140522
Total number of working POI Service Area wise	47	45	37	160.3225806	43	60.26666667	37	148	31	113
Capacity of all POIs	11566	176433	45343	1184	5548	40888	190270	46302.72	19061	137962
No. of all POI's having >=0.5% POI congestion	0	4	0	0	NIL	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	N/A	N/A	NA	NA	NIL	N/A	0	NA	NA	0

6.39. POI CONGESTION: AUGUST

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Aug-16										
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service										
Name of Parameter	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Total No. of POI's in Month having < = 0.5% POI congestion										
Total No. of call attempts on POI	390745	2637048	18809	22365	8896	814771	3051096	924280	604416	2910373
Total traffic served on all POIs (Erlang)	7349	119922	18799	438	160	17837	69917	20021	11113	54868
Total No. of circuits on all individual POIs	13572	200707	63036	1228	6595	44490	141560	50865	20690	142339
Total number of working POI Service Area wise	47	47	37	160	43	65	37	149	31	114
Capacity of all POIs	12058	193437	47277	1184	5828	41686	138198	46773	19061	138800
No. of all POI's having >=0.5% POI congestion	0	0	0	0	NIL	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	N/A	N/A	NA	NA	N/A	N/A	0	NA	NA	0

6.40. POI CONGESTION: SEPTEMBER

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Sep-16										
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service										
Name of Parameter	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Total No. of POI's in Month having < = 0.5% POI congestion										
Total No. of call attempts on POI	388311	2884001	18777	22365	11161	849653	2893202	897991	571910	2910491
Total traffic served on all POIs (Erlang)	7655	125391	18764	438	146	18311	68245	20305	10716	54904
Total No. of circuits on all individual POIs	13572	207567	63036	1228	6595	44779	332870	51406	20690	142319
Total number of working POI Service Area wise	47	47	37	160	43	65	27	150	31	114
Capacity of all POIs	12058	200312	47277	1184	5828	41954	329869	47250	19061	138748
No. of all POI's having >=0.5% POI congestion	0	1	0	0	NIL	0	1	0	0	1
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	NA	NA	NA	NA	NA	NA	NA	NA	NA	1

6.41. POI CONGESTION: CONSOLIDATED

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Consolidated										
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service										
Name of Parameter	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Total No. of POI's in Month having < = 0.5% POI congestion										
Total No. of call attempts on POI	398433	2700867	18901	22365	10112	846775	3109936	939302	615386	2988930
Total traffic served on all POIs (Erlang)	7427	118417	18890	438	162	18079	70371	20177	11165	55194
Total No. of circuits on all individual POIs	13413	197180	62176	1228	6490	44304	226267	50873	20690	141727
Total number of working POI Service Area wise	47	46	37	160	43	63	34	149	31	114
Capacity of all POIs	11894	190061	46632	1184	5735	41509	219446	46775	19061	138503
No. of all POI's having >=0.5% POI congestion	0	2	0	0	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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CUSTOMER SERVICE QUALITY (CSD) PARAMETERS

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

S.No	PARAMETERS	SUB-PARAMETERS	CUSTOMER SERVICE DELIVERY AUDITS									
			AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
1	Metering and Billing Credibility (Post Paid) – Benchmark (Not more than 0.1% of bills issued should be disputed over a billing cycle)	No. of bills issued during the period (A)	34	633221	112465	1397565	106742	130016	0	34579	113588	862201
		No. of bills disputed including billing complaints over a	0	78	4	1493	25	113	0	0	4	746
		Billing Compliant (%) = B/A*100	0.0%	0.01%	0.00%	0.11%	0.02%	0.09%	NA	0.00%	0.00%	0.09%
2	Metering and Billing Credibility (Pre- Paid) – Benchmark (Not more than 1 complaint per 1000 customers i.e. 0.1% complaints for metering, charging, credit, and validity)	Total No. of Pre-paid customers at the end of the month	747219	7265231	3591985	14098623	111365	4842941	8703300	329314	3900680	11147362
		Total No. of complaints relating to charging, Credit and Validity during a month (B)	0	6211	33	326	16	4696	122	0	3	6594
		Pre-paid Charging Complaints (%) = B/A*100	0.00%	0.09%	0.00%	0.00%	0.01%	0.10%	0.00%	0.00%	0.00%	0.06%
3	Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints Benchmark: (Resolution ≥ 98% within 4 weeks & 100% within 6 weeks and Credit/Waiver within one week of resolution of complaints)	No. of Billing/Charging/Credit/Validity Complaints received during the month	0	6211	33	40464	41	4809	122	0	7	7340
		No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the month	0	6211	33	40464	41	4809	122	0	7	7340
		No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 6 weeks during the month	0	6211	33	40464	41	4809	122	0	7	7340
		% of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%
		% of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%
		Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints (In	NA	7	7	7	7	7	7	NA	7	7
4	Termination / Closures (Customer care promptness in attending to customers request)	No. of Requests for Termination/ Closure of service (A)	0	3274	658	14047	3474	79	0	478	1321	4524
		No. of requested handled within 7 days (B)	0	3274	658	14047	3474	79	0	478	1321	4524
		% of Termination/ Closure of service within 7 days	NA	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
5	Time taken for refund of deposits after closures: Benchmark (100% within 60 days)	No. of Payments/ Refunds due (A)	0	0	147	4415	1748	2063	0	99	82	8424
		Cleared over a period of <60 days (B)	0	0	147	4415	1748	1897	0	99	82	8424
		Refunds Successfull Completion (B/A)*100	NA	NA	100.00%	100.00%	100.00%	91.95%	NA	100.00%	100.00%	100.00%
6	Response time to customer assistance Benchmark: (Accessibility of call center >=95% and Calls answered by operator within 90 seconds i.e. Voice to Voice >=95%)	Total no of calls attempted to customer care/Call center(A)	1438613	2438184	3857834	34533509	9686365	4323729	19662656	0	650054	21032025
		Total no. of calls successfully established to customer care/Call center (B)	1415730	2438184	3857834	34337845	9682617	4286505	19447238	0	637236	21032025
		% Accessibility of Call centre /customer Care (B *100/ A)	98.41%	100.00%	100.00%	99.43%	99.96%	99.14%	98.90%	NA	98.03%	100.00%
		Total Calls reached to operator for Voice to Voice (C)	206752	3123312	1734654	8759193	12293	1235873	5110732	38151	1009157	7781984
		Total number of calls answered by the operator (Voice to voice) within 90 seconds (D)	205047	3041143	1702380	8717871	11744	1176230	5070667	37746	981588	7589429
		% age of calls answered by the operators (voice to voice) within 90 seconds (D *100/ C)	99.18%	97.37%	98.14%	99.53%	95.53%	95.17%	99.22%	98.94%	97.27%	97.53%
7	Customer Care & Grievances Redressal	Total no of complaints received in the call centre (Tech+	275	94802	36359	70519	4292	5918	8369	1015	8999	88306
		Total no of complaints addressed at call center level	275	92123	20538	25530	513	5918	0	1012	8911	88306
		% of complaints addressed at call center level	100.00%	97.17%	56.49%	36.20%	11.95%	100.00%	0.00%	99.70%	99.02%	100.00%
		Total no of appeals received by the appellate authority	0	3	0	6	0	39	0	3	88	6
		Total no of complaints addressed by Appellate authority	0	1	0	6	0	39	0	3	71	6
		% of complaints addressed by Appellate authority	NA	33.33%	NA	100.00%	NA	100.00%	NA	100.00%	80.68%	100.00%

7.2. 3 DAY LIVE CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JULY TO SEPTEMBER - 2016 MONTHS AUDITED DATA)

OPERATOR	Total no of calls attempted to customer care/Call center	Total no. of calls successfully established to customer care/Call center	% age of Accessibility of Call centre	Total Calls reached to operator for (Voice to Voice)	Total number of calls answered by the operator (Voice to voice) within 90 seconds	% age calls answered by the operator within 90 seconds
OPERATOR			>=95%			>=95%
AIRCEL	36020	35353	98.15%	5262	5251	99.79%
AIRTEL	89377	89377	100.00%	207305	203097	97.97%
BSNL	135187	135187	100.00%	59154	57559	97.30%
IDEA	843170	840891	99.73%	268274	268002	99.90%
MTS	51620	51560	99.88%	334	324	97.01%
RCOM GSM	DNA	DNA	99.15%	DNA	DNA	95.33%
TELENOR	611985	605508	98.94%	176017	175499	99.71%
TTSL CDMA	DNA	DNA	DNA	701	696	99.29%
TTSL GSM	17657	17263	97.77%	25103	24858	99.02%
VODAFONE	693252	693252	100.00%	221120	217242	98.25%

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8. CUSTOMER SERVICE DELIVERY (SUMMARY)

Name of Service Provider	Metering and Billing credibility		Billing Complaints			Termination & Closures	Time taken for refund of deposits after closures: Benchmark	Response time to customer for assistance	
	Postpaid Subscribers	Prepaid Subscribers	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	%age of where credit/waiver is received within one week	% of Termination/ Closure of service within 7 days (100 %)	Cleared over a period of <60 days (100%)	%age of calls answered by the IVR	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark	≤ 0.1%	≤ 0.1%	≥ 98%	= 100%	= 100%	= 100%	= 100%	≥ 95%	≥ 95%
AIRCEL	0.00%	0.00%	NA	NA	100.00%	NA	NA	98.41%	99.18%
AIRTEL	0.01%	0.09%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	97.37%
BSNL	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.14%
IDEA	0.11%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.43%	99.53%
MTS	0.02%	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%	99.96%	95.53%
RCOM GSM	0.09%	0.10%	100.00%	100.00%	100.00%	100.00%	91.95%	99.14%	95.17%
TELENOR	NA	0.00%	100.00%	100.00%	100.00%	NA	NA	98.90%	99.22%
TTSL CDMA	0.00%	0.00%	NA	NA	100.00%	100.00%	100.00%	NA	98.94%
TTSL GSM	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.03%	97.27%
VODAFONE	0.09%	0.06%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.53%

Name of Service Provider	Customer Care & Grievances Redressal	
	% of Complaints addressed at call center level	% of Complaints addressed by Appellate Authority
AIRCEL	100.00%	NIL
AIRTEL	97.17%	33.33%
BSNL	56.49%	NIL
IDEA	36.20%	NIL
MTS	11.95%	NA
RCOM GSM	100.00%	100.00%
TELENOR	0.00%	NIL
TTSL CDMA	99.70%	100.00%
TTSL GSM	99.02%	80.68%
VODAFONE	100.00%	100.00%

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LIVE CALLING ASSESSMENT

9. LIVE CALLING ASSESSMENT:

9.1. INTER OPERATOR CALLS ASSESSMENT:

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

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

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

10. CUSTOMER CARE / HELPLINE ASSESSMENT& BILLING COMPLAINTS:

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

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

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS										
Parameter	Aircel	Airtel	BSNL	IDEA	RCOM GSM	Telenor	TTSL CDMA	TTSL GSM	MTS	VODAFONE
Total No. of calls Attempted	0	78	4	100	100	0	0	4	25	100
Total No. of calls Answered	0	66	2	84	79	0	0	3	17	73
Cases resolved within 4 weeks	0	66	2	84	79	0	0	3	17	73
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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

11. LEVEL -1 CALLING ASSESSMENT:

Level 1 Live Calling											
DATE:	3 to 5 August 2016										
CIRCLE:	UP-West										
T√PE:	CELLULAR/BASIC SERVICE PROVIDER										
PUT x FOR UNSUCCESSFUL CALL AND TICK FOR SUCCESSFUL CALL											
S. NO.	**L1 Service Number**	**SSA: Bareilly**									
	Details	**MTS**	**Aircel**	**Airtel**	**BSNL**	**Idea**	**Telenor**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**Vodafone**
1	100 Police	√	√	√	AB	√	√	√	√	√	√
2	101 Fire	√	√	√		√	√	√	√	√	√
3	102 Ambulance	√	√	√		√	√	√	√	√	√
4	104 Health Information Helpline	x	×	×		×	×	×	×	×	×
5	108 Emergenc√ and Disaster Management Helpline	√	√	√		√	√	√	√	√	√
6	138 All India Helpline for Passangers	x	×	√		×	√	√	√	√	√
7	149 Public Road Transport Utilit√ Service	x	×	√		×	×	s	√	√	×
8	181 Chief Minister Helpline	x	×	√		×	√	√	√	√	√
9	182 Indian Railwa√ Securit√ Helpline	x	×	×		×	×	×	×	×	×
10	1033 Road Accident Management Service	x	√	√		√	×	√	√	√	×
11	1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'	x	×	×		×	×	×	×	×	×
12	1056 Emergenc√ Medical Services	x	×	×		×	×	×	×	×	×
13	106X State of the Art Hospitals	x	×	×		×	×	×	×	×	×
14	1063 Public Grievance Cell DoT Hq	x	×	√		×	×	×	×	×	√
15	1064 Anti Corruption Helpline	x	×	×		×	×	×	×	×	×
16	1070 Relief Commission for Natural Calamities	√	√	×		√	×	×	√	√	√
17	1071 Air Accident Helpline	x	×	×		×	√	×	×	×	×
18	1072 Rail Accident Helpline	x	×	√		×	√	√	×	×	√
19	1073 Road Accident Helpline	x	×	×		×	×	×	×	×	×
20	1077 Control Room for District Collector	x	×	√		×	√	×	×	×	√
21	1090 Call Alart (Crime Branch)	√	√	√		√	√	√	√	√	√
22	1091 Women Helpline	x	×	×		×	√	×	×	×	×

S. NO.	L1 Service Number Details	MTS	Aircel	Airtel	BSNL	Idea	Telenor	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
23	1097 National AIDS Helpline to NACO	x	√	√		√	×	√	√	√	√
24	1099 Central Accident and Trauma Services (CATS)	x	×	×		×	×	×	√	√	×
25	10580 Educational& Vocational Guidance and Counselling	x	×	×		×	×	×	×	×	×
26	10589 Mother and Child Tracking (MCTH)	x	×	×		×	×	×	×	×	×
27	10740 Central Pollution Control Board	x	×	×		×	×	×	×	×	×
28	10741 Pollution Control Board	x	×	×		×	×	×	√	√	×
29	1511 Police Related Service for all Metro Railwa√ Project	x	×	×		×	×	√	√	√	×
30	1512 Prevention of Crime in Railwa√	x	×	×		×	√	√	×	×	√
31	1514 National Career Service(NCS)	x	×	×		×	×	√	×	×	×
32	15100 Free Legal Service Helpline	x	×	√		×	×	×	√	√	×
33	155304 Municipal Corporations	x	×	×		×	×	×	×	×	×
34	155214 Labour Helpline	x	×	×		×	×	×	×	×	√
35	1903 SashastraSeemaBal (SSB)	x	×	√		×	×	√	×	×	√
36	1909 National Do × Call Registr√	x	√	√		√	√	√	×	×	√
37	1912 Complaint of Electricit√	x	×	×		×	√	√	×	×	√
38	1916 Drinking Water Suppl√	x	×	×		×	×	×	×	×	×
39	1950 Election Commission of India	√	×	√		×	×	×	×	×	×

Level 1 Live Calling											
DATE:	22 to 24 August 2016										
CIRCLE:	UP-West										
TYPE:	CELLULAR/BASIC SERVICE PROVIDER										
PUT x FOR UNSUCCESSFUL CALL AND TICK FOR SUCCESSFUL CALL											
S. NO.	**L1 Service Number**	**SSA: Meerut**									
	Details	**MTS**	**Aircel**	**Airtel**	**BSNL**	**Idea**	**Telenor**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**Vodafone**

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#	Service										
1	100 Police	√	AB	√	AB	√	√	√	√	√	√
2	101 Fire	√		√		√	√	√	√	√	√
3	102 Ambulance	√		√		√	√	√	√	√	√
4	104 Health Information Helpline	×		×		×	×	×	×	×	×
5	108 Emergency and Disaster Management Helpline	√		√		√	√	√	√	√	√
6	138 All India Helpine for Passangers	×		√		√	×	√	×	×	√
7	149 Public Road Transport Utility Service	×		√		×	×	√	×	×	×
8	181 Chief Minister Helpline	√		√		√	√	√	√	√	√
9	182 Indian Railway Security Helpline	×		×		√	×	√	×	×	×
10	1033 Road Accident Management Service	√		√		√	×	√	√	×	×
11	1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'	×		×		×	×	×	×	×	×
12	1056 Emergency Medical Services	×		×		×	√	×	×	√	×
13	106X State of the Art Hospitals	×		×		×	×	×	×	×	×
14	1063 Public Grievance Cell DoT Hq	×		√		√	×	×	×	×	√
15	1064 Anti Corruption Helpline	×		×		×	×	×	×	×	×
16	1070 Relief Commission for Natural Calamities	√		×		×	×	×	√	×	×
17	1071 Air Accident Helpline	×		×		×	√	×	×	√	×
18	1072 Rail Accident Helpline	×		√		√	√	√	×	√	×
19	1073 Road Accident Helpline	×		×		×	×	√	×	×	√
20	1077 Control Room for District Collector	×		√		×	×	×	×	×	×
21	1090 Call Alart (Crime Branch)	√		√		√	√	√	√	√	×
22	1091 Women Helpline	×		×		√	√	×	×	√	×
23	1097 National AIDS Helpline to NACO	√		√		×	×	√	√	×	√
24	1099 Central Accident and Trauma Services (CATS)	×		×		×	×	×	×	×	×
25	10580 Educational& Vocational Guidance and Counselling	×		×		×	×	×	×	×	×
26	10589 Mother and Child Tracking (MCTH)	√		×		×	×	×	√	×	×
27	10740 Central Pollution Control Board	×		×		×	×	×	×	×	×

28	10741 Pollution Control Board	√		×		×	×	×	√	×	×
29	1511 Police Related Service for all Metro Railway Project	√		×		×	×	×	√	×	×
30	1512 Prevention of Crime in Railway	×		×		×	√	×	×	√	√
31	1514 National Career Service(NCS)	×		×		×	×	×	×	×	×
32	15100 Free Legal Service Helpline	√		√		×	×	×	√	×	√
33	155304 Municipal Corporations	×		×		×	×	×	×	×	×
34	155214 Labour Helpline	×		×		×	×	×	×	×	√
35	1903 SashastraSeemaBal (SSB)	×		√		√	√	√	×	√	×
36	1909 National Do Not Call Registry	×		√		√	×	×	×	×	√
37	1912 Complaint of Electricity	×		×		√	×	√	×	×	×
38	1916 Drinking Water Supply	×		×		×	×	×	×	×	×
39	1950 Election Commission of India	×		√		×	×	×	×	×	×

Level 1 Live Calling											
DATE:	29 to 31 August 2016										
CIRCLE:	UP-West										
T√PE:	CELLULAR/BASIC SERVICE PROVIDER										
PUT x FOR UNSUCCESSFUL CALL AND TICK FOR SUCCESSFUL CALL											
S. NO.	**L1 Service Number**	**SSA: Pilibhit**									
	Details	**MTS**	**Aircel**	**Airtel**	**BSNL**	**Idea**	**Telenor**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**Vodafone**
1	100 Police	√	AB	√	AB	√	√	√	√	√	√
2	101 Fire	√		√		√	√	√	√	√	√
3	102 Ambulance	√		√		√	√	√	√	√	√
4	104 Health Information Helpline	×		×		×	×	×	×	×	×
5	108 Emergenc√ and Disaster Management Helpline	√		√		√	√	√	√	√	√

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No.	Service										
6	138 All India Helpline for Passangers	√		√		√	×	√	×	×	√
7	149 Public Road Transport Utilit√ Service	×		√		√	×	×	×	×	×
8	181 Chief Minister Helpline	√		√		√	√	√	√	√	√
9	182 Indian Railwa√ Securit√ Helpline	×		×		×	×	√	×	×	×
10	1033 Road Accident Management Service	√		√		√	×	√	√	√	×
11	1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'	×		×		×	×	√	×	×	×
12	1056 Emergenc√ Medical Services	×		×		×	√	×	×	×	×
13	106X State of the Art Hospitals	×		×		×	×	×	×	×	×
14	1063 Public Grievance Cell DoT Hq	×		√		√	×	√	×	×	√
15	1064 Anti Corruption Helpline	×		×		×	×	×	×	×	×
16	1070 Relief Commission for Natural Calamities	×		×		×	×	×	√	√	×
17	1071 Air Accident Helpline	×		×		×	√	×	×	×	×
18	1072 Rail Accident Helpline	×		√		√	√	×	×	×	×
19	1073 Road Accident Helpline	×		×		×	×	×	×	×	√
20	1077 Control Room for District Collector	×		√		√	×	×	×	×	×
21	1090 Call Alart (Crime Branch)	√		√		√	√	√	√	√	×
22	1091 Women Helpline	×		×		×	√	×	×	×	×
23	1097 National AIDS Helpline to NACO	×		√		√	×	×	√	√	√
24	1099 Central Accident and Trauma Services (CATS)	×		×		×	×	×	×	×	×
25	10580 Educational& Vocational Guidance and Counselling	×		×		×	×	×	×	×	×
26	10589 Mother and Child Tracking (MCTH)	×		×		×	×	×	√	√	×
27	10740 Central Pollution Control Board	×		×		×	×	×	×	×	×
28	10741 Pollution Control Board	×		×		×	×	×	√	√	×
29	1511 Police Related Service for all Metro Railwa√ Project	×		×		×	×	√	√	√	×
30	1512 Prevention of Crime in Railwa√	×		×		×	√	√	×	×	√
31	1514 National Career Service(NCS)	×		×		×	×	√	×	×	×
32	15100 Free Legal Service Helpline	×		√		√	×	√	√	√	√

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S. No.	Details	MTS		Airtel		Idea	Telenor	RCOM			Vodafone
33	155304 Municipal Corporations	✗		✗		✗	✗	✗	✗	✗	✗
34	155214 Labour Helpline	✗		✗		✗	✗	✗	✗	✗	√
35	1903 SashastraSeemaBal (SSB)	✗		√		√	√	√	✗	✗	✗
36	1909 National Do ✗ Call Registr√	✗		√		√	✗	√	✗	✗	√
37	1912 Complaint of Electricit√	✗		✗		✗	✗	✗	✗	✗	✗
38	1916 Drinking Water Suppl√	✗		✗		✗	✗	✗	✗	✗	✗
39	1950 Election Commission of India	✗		√		√	✗	✗	✗	✗	✗

Level 1 Live Calling	
DATE:	14 to 16 September 2016
CIRCLE:	UP-West
T√PE:	CELLULAR/BASIC SERVICE PROVIDER
PUT x FOR UNSUCCESSFUL CALL AND TICK FOR SUCCESSFUL CALL	

S. NO.	L1 Service Number	SSA: Dehradun									
	Details	MTS	Aircel	Airtel	BSNL	Idea	Telenor	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
1	100 Police	√	√	√	AB	√	√	√	√	√	√
2	101 Fire	√	√	√		√	√	√	√	√	√
3	102 Ambulance	√	√	√		√	√	√	√	√	√
4	104 Health Information Helpline	✗	✗	✗		✗	✗	✗	✗	✗	✗
5	108 Emergenc√ and Disaster Management Helpline	√	√	√		√	√	√	√	√	√
6	138 All India Helpine for Passangers	√	√	√		√	√	√	✗	✗	√
7	149 Public Road Transport Utilit√ Service	✗	✗	√		✗	✗	✗	✗	✗	✗
8	181 Chief Minister Helpline	√	√	√		√	√	√	√	√	√
9	182 Indian Railwa√ Securit√ Helpline	✗	✗	✗		√	√	✗	✗	✗	✗
10	1033 Road Accident Management Service	√	√	√		√	√	√	√	√	✗
11	1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'	✗	✗	✗		✗	✗	✗	✗	✗	✗

12	1056 Emergenc√ Medical Services	×	×	×		×	×	×	×	×	×
13	106X State of the Art Hospitals	×	×	×		×	×	×	×	×	×
14	1063 Public Grievance Cell DoT Hq	×	×	√		√	√	×	×	×	√
15	1064 Anti Corruption Helpline	×	×	×		√	×	×	×	×	×
16	1070 Relief Commission for Natural Calamities	×	√	×		√	×	×	√	√	×
17	1071 Air Accident Helpline	×	×	×		√	×	×	×	×	×
18	1072 Rail Accident Helpline	√	×	√		×	√	√	×	×	×
19	1073 Road Accident Helpline	×	×	×		√	×	×	×	×	√
20	1077 Control Room for District Collector	×	√	√		√	×	×	×	×	×
21	1090 Call Alert (Crime Branch)	√	√	√		√	√	√	√	√	×
22	1091 Women Helpline	×	×	×		×	×	×	×	×	×
23	1097 National AIDS Helpline to NACO	√	√	√		√	×	√	√	√	√
24	1099 Central Accident and Trauma Services (CATS)	×	×	×		×	×	×	×	×	×
25	10580 Educational& Vocational Guidance and Counselling	×	×	×		×	×	×	×	×	×
26	10589 Mother and Child Tracking (MCTH)	×	×	×		×	×	×	√	√	×
27	10740 Central Pollution Control Board	×	×	×		×	×	×	×	×	×
28	10741 Pollution Control Board	×	×	×		×	×	×	√	√	×
29	1511 Police Related Service for all Metro Railwa√ Project	√	×	×		×	×	√	√	√	×
30	1512 Prevention of Crime in Railwa√	√	×	×		√	×	√	×	×	√
31	1514 National Career Service(NCS)	√	×	×		√	×	√	×	×	×
32	15100 Free Legal Service Helpline	×	×	√		×	×	×	√	√	√
33	155304 Municipal Corporations	×	×	×		×	×	×	×	×	×
34	155214 Labour Helpline	×	×	×		×	×	×	×	×	√
35	1903 SashastraSeemaBal (SSB)	√	×	√		√	√	√	×	×	×
36	1909 National Do × Call Registr√	√	√	√		√	√	√	×	×	√
37	1912 Complaint of Electricit√	√	×	×		√	√	√	×	×	×
38	1916 Drinking Water Suppl√	×	×	×		×	×	×	×	×	×
39	1950 Election Commission of India	×	√	√		×	×	×	×	×	×

Level 1 Live Calling											
DATE:	19 to 21 September 2016										
CIRCLE:	UP-West										
T√PE:	CELLULAR/BASIC SERVICE PROVIDER										
PUT x FOR UNSUCCESSFUL CALL AND TICK FOR SUCCESSFUL CALL											
S. NO.	**L1 Service Number**	**SSA: Saharanpur**									
	Details	**MTS**	**Aircel**	**Airtel**	**BSNL**	**Idea**	**Telenor**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**Vodafone**
1	100 Police	√	√	√	AB	√	√	√	√	√	√
2	101 Fire	√	√	√		√	√	√	√	√	√
3	102 Ambulance	√	√	√		√	√	√	√	√	√
4	104 Health Information Helpline	x	×	x		×	×	×	×	×	×
5	108 Emergenc√ and Disaster Management Helpline	√	√	√		×	√	√	√	√	√
6	138 All India Helpine for Passangers	x	×	x		×	√	√	×	×	√
7	149 Public Road Transport Utilit√ Service	x	×	x		×	×	×	×	×	×
8	181 Chief Minister Helpline	x	×	x		√	√	√	√	√	√
9	182 Indian Railwa√ Securit√ Helpline	x	×	x		×	×	×	×	×	×
10	1033 Road Accident Management Service	x	√	x		×	×	√	√	√	×
11	1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'	x	×	x		×	×	×	×	×	×
12	1056 Emergenc√ Medical Services	x	×	x		×	×	×	×	×	×
13	106X State of the Art Hospitals	x	×	x		×	×	×	×	×	×
14	1063 Public Grievance Cell DoT Hq	x	×	x		√	√	×	×	×	√
15	1064 Anti Corruption Helpline	x	×	x		√	×	×	×	×	×
16	1070 Relief Commission for Natural Calamities	√	√	√		×	×	×	√	√	×
17	1071 Air Accident Helpline	x	×	x		×	×	×	×	×	×
18	1072 Rail Accident Helpline	x	×	x		×	√	√	×	×	×
19	1073 Road Accident Helpline	x	×	x		×	×	×	×	×	√
20	1077 Control Room for District Collector	x	×	x		√	×	×	×	×	×
21	1090 Call Alart (Crime Branch)	√	√	√		√	√	√	√	√	×
22	1091 Women Helpline	x	×	x		√	√	×	×	×	×
23	1097 National AIDS Helpline to NACO	x	√	x		√	×	√	√	√	√
24	1099 Central Accident and	x	×	x		×	×	×	×	×	×

#	Service									
	Trauma Services (CATS)									
25	10580 Educational& Vocational Guidance and Counselling	x	×	x		×	×	×	×	×	×
26	10589 Mother and Child Tracking (MCTH)	x	×	x		×	×	×	√	√	×
27	10740 Central Pollution Control Board	x	×	x		×	×	×	×	×	×
28	10741 Pollution Control Board	x	×	x		×	×	×	√	√	×
29	1511 Police Related Service for all Metro Railwa√ Project	x	×	x		×	×	√	√	√	×
30	1512 Prevention of Crime in Railwa√	x	×	x		×	×	√	×	×	√
31	1514 National Career Service(NCS)	x	×	x		×	×	√	×	×	×
32	15100 Free Legal Service Helpline	x	×	x		×	×	×	√	√	√
33	155304 Municipal Corporations	x	×	x		×	×	×	×	×	×
34	155214 Labour Helpline	x	×	x		×	×	×	×	×	√
35	1903 SashastraSeemaBal (SSB)	x	×	x		×	√	√	×	×	×
36	1909 National Do × Call Registr√	x	√	x		√	√	√	×	×	√
37	1912 Complaint of Electricit√	x	×	x		√	×	√	×	×	×
38	1916 Drinking Water Suppl√	x	×	x		×	×	×	×	×	×
39	1950 Election Commission of India	√	×	√		×	×	×	×	×	×

	Level 1 Live Calling									
DATE:	28 to 30 September 2016									
CIRCLE:	UP-West									
T√PE:	CELLULAR/BASIC SERVICE PROVIDER									
	PUT x FOR UNSUCCESSFUL CALL AND TICK FOR SUCCESSFUL CALL									
S. NO.	**L1 Service Number**	**SSA: Agra**								
	Details	**MTS**	**Aircel**	**Airtel**	**BSNL**	**Idea**	**Telenor**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**Vodafone**
1	100 Police	√	√	√	AB	√	√	√	√	√	√
2	101 Fire	√	√	√		√	√	√	√	√	×
3	102 Ambulance	√	√	√		√	√	√	√	√	×
4	104 Health Information Helpline	×	×	×		×	√	√	×	×	×
5	108 Emergenc√ and Disaster Management Helpline	√	√	√		√	√	√	√	√	√
6	138 All India Helpine for Passangers	×	√	√		√	√	√	×	×	√
7	149 Public Road Transport Utilit√ Service	×	√	√		×	√	×	×	×	×
8	181 Chief Minister Helpline	√	×	√		√	×	×	√	√	√
9	182 Indian Railwa√ Securit√ Helpline	×	√	×		√	×	×	×	×	×
10	1033 Road Accident Management Service	√	×	√		√	×	×	√	√	×
11	1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'	×	×	×		×	×	×	×	×	×
12	1056 Emergenc√ Medical Services	×	×	×		×	√	×	×	×	×
13	106X State of the Art Hospitals	×	×	×		×	√	×	×	×	×
14	1063 Public Grievance Cell DoT Hq	×	×	√		√	×	×	×	×	√
15	1064 Anti Corruption Helpline	×	×	×		×	√	×	×	×	×
16	1070 Relief Commission for Natural Calamities	√	×	×		×	√	×	√	√	×
17	1071 Air Accident Helpline	×	×	×		×	√	×	×	×	×
18	1072 Rail Accident Helpline	×	×	√		×	×	√	×	×	√
19	1073 Road Accident Helpline	×	×	×		√	×	√	×	×	×
20	1077 Control Room for District Collector	×	×	√		√	×	√	×	×	√
21	1090 Call Alart (Crime Branch)	√	×	√		√	√	√	√	√	√
22	1091 Women Helpline	×	√	×		√	√	×	×	×	×
23	1097 National AIDS Helpline to NACO	√	√	√		√	×	√	√	√	√
24	1099 Central Accident and	×	×	×		×	×	×	×	×	×

#	Service									
	Trauma Services (CATS)									
25	10580 Educational& Vocational Guidance and Counselling	×	×	×		×	×	×	×	×	×
26	10589 Mother and Child Tracking (MCTH)	√	×	×		×	√	×	√	√	×
27	10740 Central Pollution Control Board	×	×	×		×	×	√	×	×	×
28	10741 Pollution Control Board	√	×	×		×	×	×	√	√	×
29	1511 Police Related Service for all Metro Railwa√ Project	√	×	×		×	√	√	√	√	×
30	1512 Prevention of Crime in Railwa√	×	×	×		√	√	×	×	×	×
31	1514 National Career Service(NCS)	×	×	×		×	√	×	×	×	×
32	15100 Free Legal Service Helpline	√	√	√		×	×	×	√	√	√
33	155304 Municipal Corporations	×	√	×		×	×	×	×	×	×
34	155214 Labour Helpline	×	×	×		×	×	×	×	×	√
35	1903 SashastraSeemaBal (SSB)	×	×	√		√	×	√	×	×	√
36	1909 National Do × Call Registr√	×	×	√		√	√	√	×	×	√
37	1912 Complaint of Electricit√	×	√	×		√	×	×	×	×	×
38	1916 Drinking Water Suppl√	×	√	×		×	×	×	×	×	×
39	1950 Election Commission of India	×	×	√		×	√	×	×	×	×

DRIVE TEST

12. OPERATOR ASSISTED DRIVE TEST

The drive test was conducted simultaneously for all the operators present in the UP West circle. As per the new directive given by TRAI headquarters, drive test for the month of July, August and September, 2016 were conducted at 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 theUP West circle.

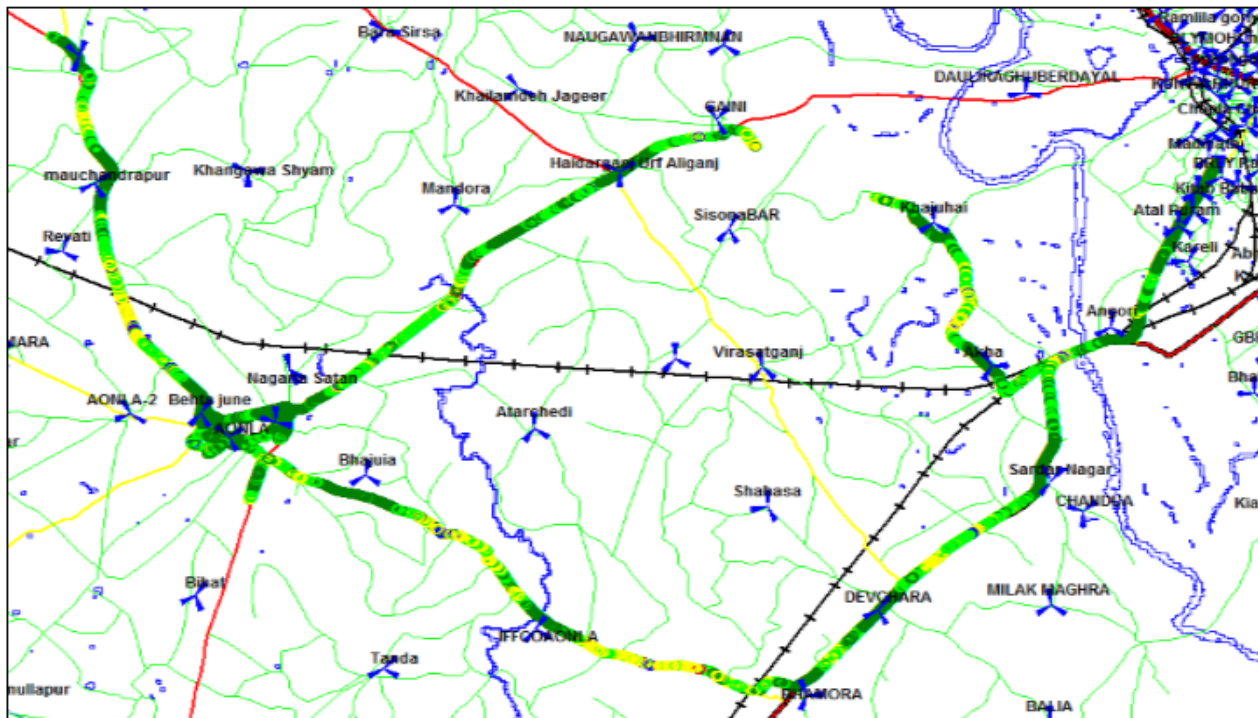| Drive Test		
Sr.No.	Date	Name of SSA
1	3 TO 5 AUGUST	Bareilly
2	22 TO 24 AUGUST	Meerut
3	29 TO 31 AUGUST	Pilibhit
4	14 TO 16 SEPTEMBER	Dehradun
5	19 TO 21 SEPTEMBER	Saharanpur
6	28 TO 30 SEPTEMBER	Agra

| Date	Name of SSA	Day 1		Day 2		Day 3	
		Name of SDCA & KM Covered	Route Covered (Outdoor/Indoor)	Name of SDCA & KM Covered	Route Covered (Outdoor/Indoor)	Name of SDCA & KM Covered	Route Covered (Outdoor/Indoor)
3 TO 5 AUGUST	Bareilly	aonla, ramnagar - 135 KM	Outdoor: Major Road- ramnagar to aliganj,gainee,khajuria,dhaka,akha, bareilly Highway - BE to aonla, aonla to ram nagar Within City- bareilly, qila bazar, main market, post office,khalifa wali masjid, kwality sweets,goudam masjid, chand hotel, bajaria turn,purani masjid,aonla-shabad road,axis bank,ramnagar,gainee Indoor: chand hotel	Bareilly - 180 KM	Outdoor: Major Road- pilibhit road,postofficce,junction,cb ganj,fatehganj paschimi Highway- fatehganj-faridpur Within city- aonla bus stand,chaupla,ayub khan.kotwali,gangapur ,shyamganj,sahukara, kutubkhana,barabazar ,sbi colony,kuhadapeer,bhoor,siklapur,old bus stand,rampur road,premnagar,rajendra nagar,dd puram,stadium,durga nagar,fatehganj Indoor: bareilly railway junction	Baheri,nawabganj - 170 KM	Outdoor: Major Road - badaun road to karamchari nagar, baheri to sethal to nawabganj High way- bareilly to baheri,nawabganj to bareilly Within City - aonla bus stand, subhashnagar,chaupla,city,madinath,minibyepass,postoffice,main market,shastri ngr,ramleela ground, railway station Indoor: railway station baheri
22 TO 24 AUGUST	Meerut	Meerut city - 110 KM	Outdoor: Major road: Unvirsity Rd, Grah Rd, PVS Rd,Hapur Rd, Bijali, Poolbhag colony, Vaishali Colony, Bombayby pass Highway: NH-58,With in city-Pallavpuram,Saket, Ganganagar, Bhasker Rd, IJO Rd, BSC Rd, Begampul, Nala Rd, Nehru rd Within City : Old mohanpuri, Manvad Rd, Killa Rd, Abdullapur,Jail chungi, Surajkund, Krishna City Indoor: Apex Tower	Meerut, Bhagpat, Baraut, Sardana- 160 KM	Outdoor: Major road: Cantt Rd, Kankerhera,Wajidpur, Bijrol, Sirsholi Highway:Delhi Rd, NH-58, Bhagpat Road Within City: Nai Basti, Jaat Clz market, Mertro Plaza, Railway Rd,Ghanta ghar, Gandhi Road, Bhagwan Mandir Marg, Binoli Rd, Saradna Church, Chaudary Market, Main Market, Multan Nagar Indoor: CCS University	Mawana, Hastinapur - 125 KM	Outdoor: Major Road: Shaini, Incholi, Masoorie, Bana, Bhaismua Within City: Mangal Pandey Nagar, Ganga Ngar Indoor: Jain Mandir, Ajay Hospital
29 TO 31 AUGUST	Pilibhit	BISALPUR - 196 KM	Outdoor: Major road: Eithgaon to bisalpur choraha ,bhadosiya,inerta ,rasakhanpur, Raipur Highway: karankabridge to pilibhit, to khemadiya bridge Within City : Eadgah choraha,Pathar road, gopi taqeez, naveedh taqeez road, sugar mill, eadgah,bsnl exchange, ramleela ground, durgaparsad degree college Indoor: CIVIL COURT	PURANPUR - 165 KM	Outdoor: Major road:Puranpur to madhutanda to kalinagar Highway: Pilibhit to puranpur , kalinagar to puranpur Within City: Chungdyai,st josh public school,comart road railway station,main market tehseel,khandelwal farmasam road ,prabha taqeez,vidhya mandir Indoor: RAILWAY STATION	PILIBHIT - 110 KM	Outdoor: Major Road: Stadium road,awasvikas road,station road ,bareily road Highway: Pilibhit to majhola,bhitaripur to pilibhit Within City: Asam choiraha ,nagma choraha, jatowala choraha,dudhiya mandir,rama college,purana ganj, lohamandi,kotwali lalaroad,awas vikas balon wali masjid,bsnal exchange Indoor: NAKTA DANA CHORAHA

Date	City	Area 1	Details 1	Area 2	Details 2	Area 3	Details 3
14 TO 16 SEPTEMBER	Dehradun	Dehradoon city - 200 KM	Outdoor: Major road: Prem nagar,Chakrata road, Langha road, Vikas nagar, barkot road. Highway: Chakrata road. Within City : Naya nagar, Gandhi road, Omkar road, Saket, Rajpur road, Sahastradhra, Rajpur market, Survey chowk, Transport nagar, Ec road indra nagar, Engineer enclave, Sabji mandi, Lal pul, Pathari bagh chowk, Vidhya vihar, Muslim colony,Paltan bazar road,Arhat bazaar road. Indoor: Prem nagar police chowki	Chakrata & Vikas Nagar - 160 KM	Outdoor: MAJOR ROAD-LANGHA RD, BARKOT RD. Highway:CHAKRATA RD.,VIKASNAGAR. Within City: MALIK CHOWK, BALLIWALA, KANWALI RD, CHAKRATA RD, PREM NAGAR-VIKASNAGAR,DAKPATTHAR. Indoor: INDRA NAGAR BSNL EXCHANGE	Mussoorie - 145 KM	Outdoor: Major Road-MUSSOORIE RD, KUTHAL GAON, BARLOW GANJ, CART RD. Highway: MUSSOORIE ROAD. Within City: ITBP RD, KANWALI RD, GN MAHADEV SINGH RD, VAN VIHAR, SAHEED KASMIR SINGH MARG, DAKRA RD, BEACHER RD, SUPPLY RD, CAMEL BACK RD, LIBRARY RD, CART RD, SPRING RD. Indoor: ENGINEER ENCLAVE
19 TO 21 SEPTEMBER	Saharanpur	Deoband,Nakur & Gangoh- 195 KM	Outdoor: Major road: MRD2W ,Maheshpur, Baragaon ,Nanauata ,Gangoh, MRD147W, Nakur, Sharanpur Rd, Link Rd. Highway: -Dehradun Rd, NH344. Within City : Lahaswara , Barla RD, Chimmipwara ,Rashid Maszid Rd, Shivpuri Colony, Sani Sarai, Collage Rd, Holiwala Rd, Juddi Rd ,Main Market Rd. Indoor: Bikaner saharanpur	Saharanpur,Roorkee - 180 KM	Outdoor: Major road:Chilkana Rd, Paper Mill Rd Manglaur Khera Mugal. Highway: NH344 , Bhagwanpur , Chutmalpur. Within City: Dara Rajpura,Hanumat Vatika, Numaish Camp, Chok Harati , Transportnagar, Dinesh Vihar Colony Company Gardan Azadnagar , Adarshnagar Purani Mandi Station Rd ,Collectrate Rd, Main Market, Model Town. Indoor: police chowki roorkee	Haridwar & Rishikesh - 170 KM	Outdoor: Major Road: Old railway road. Highway: Rishikesh highway.Haridwar High. Within City: Pwd colony, Khanjarpur Cant, New adarsh nagar, Ashok nagar Dhandera, Peer baba colony, Sainik colony, Ramnagar chowk,Main market, Rishikesh bus stand. Indoor: Hari Ki Paurai Haridwar
28 TO 30 SEPTEMBER	Agra	Agra city - 132 KM	Outdoor: Major Road- Gwalior Road ,MG Road ,Bhagwan Talkies,Artoni,Raja ki Mandi , Rambagh,Muni road,Sadar, Fathehabad. Highway:NH-2, Gwalior Road, Mathura Road, Bypass Road. Within City : Sahzad Mandi, Sadar Bazar,Nailakhabazar,Defence State bazar, Rajiv Nagar, Klamla Nagar, Agra Fort rd,.Cantt Area,Tajganj,Sarkit house. Indoor: BSNL OFFICE BIZLIGHAR,AGRA	FIROZABAD & BAHA - 251 KM	Outdoor: Major road: Langre ki choki,Rambagh ,Srinagar Colony,Sahrda Road,NH-19,Jaleshar rd,Kakrua,Kotard,Jarar,Basai,Fathehabad rd,Mall rd,Partappura,Mahatma Gandhi Road. Highway:Dholpura,Agra Road,Bypass Road,NH-19, SH-62, MDR77W. Within City: Jamamasjid Road, Kinaribazar rd,Kasniribazar,Chili int rd,Freeganj rd,Motilal Nehru rd,RatanpuraNorth, Vijay Nagar colony,Dwarika puram,Sadarbazar rd,Jashiyan mohlla,Rasulpur. Indoor: DABRI	ACHNERA- 151 KM	Outdoor: Major Road- Slaqueim road,Sikendera road,Lal mandi, Bikaner road. Highway: NH21,NH22,NH11,Bypass. Within City: Aulia road,Raqueb ganj, Belan ganj,Taz road,Chat galli,Dataganj. Indoor: Tax office

12.1. ROUTE COVER MAP: BAREILLY SSA: DAY 1

12.2. ROUTE MAP: BAREILLY SSA: DAY 2
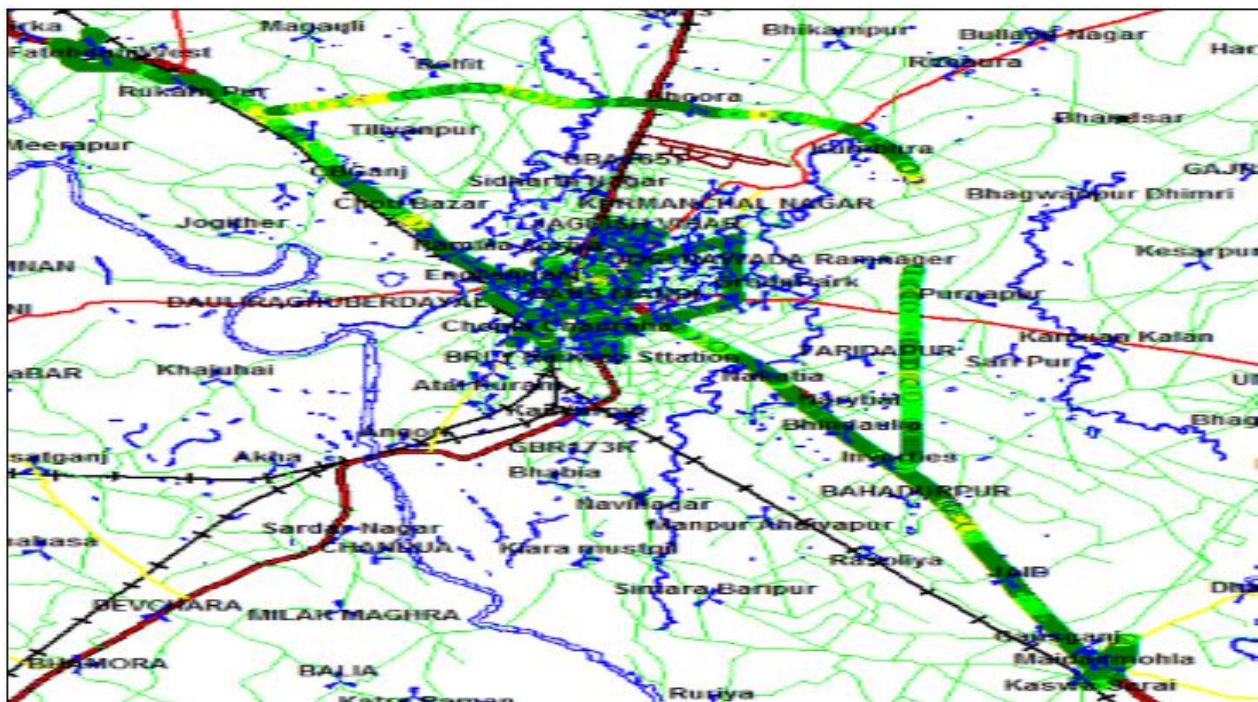
12.3. ROUTE MAP: BAREILLY SSA: DAY 3
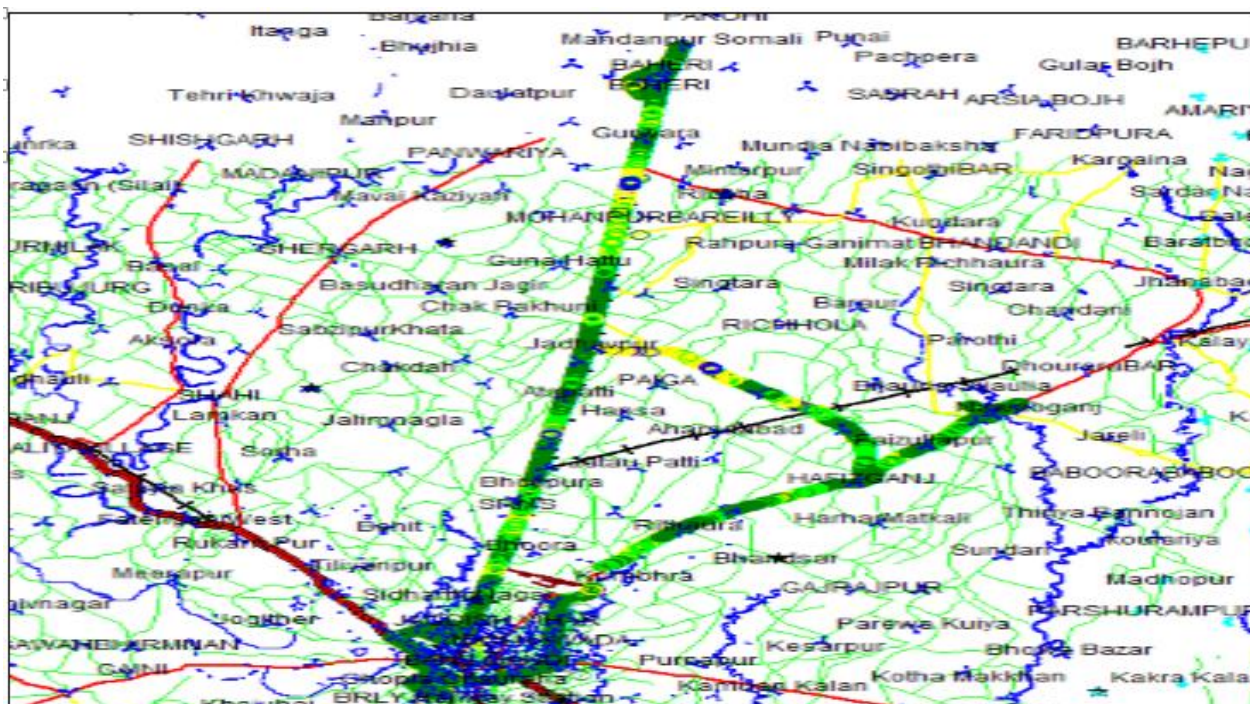
12.4. DRIVE TEST OUTCOME

Sr.No.	Parameter	Aircel	Airtel	Idea	BSNL	MTS	RCOM GSM	TTSL GSM	TTSL CDMA	Telenor	Vodafone
1	Total Calls Attempt (A)	579	700	786	AB	579	535	563	680	620	780
2	Total Calls Blocked (B)	1	3	2		0	1	0	0	0	0
3	Blocked Call Rate in % (B*100/A)	0.17%	0.43%	0.25%		0.00%	0.19%	0.00%	0.00%	0.00%	0.00%
4	Total Calls Established ('C)	577	678	779		579	530	563	680	616	780
5	Total Calls Drop (D)	1	1	0		0	1	0	0	1	0
6	Dropped Calls Rate in % (D*100/C)	0.17%	0.15%	0.00%		0.00%	0.19%	0.00%	0.00%	0.16%	0.00%
7	Call Setup Success Rate in % (C*100/A)	99.65%	96.86%	99.11%		100.00%	99.07%	100.00%	100.00%	99.35%	100.00%
8	Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.58%	99.24%	98.88%		100.00%	99.86%	99.80%	100.00%	99.56%	99.67%

July to September 2016 – UP West Circle

12.5. ROUTE COVER MAP: MEERUT SSA: DAY 1
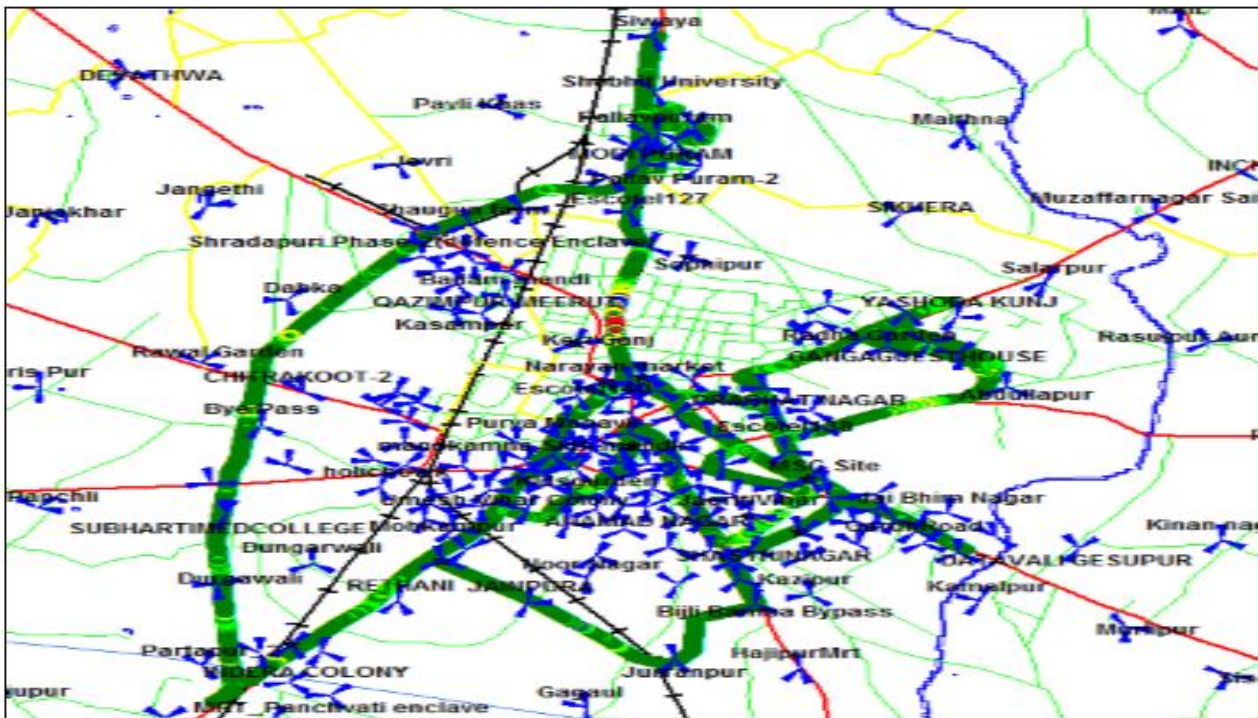
12.6. ROUTE MAP: MEERUT SSA: DAY 2
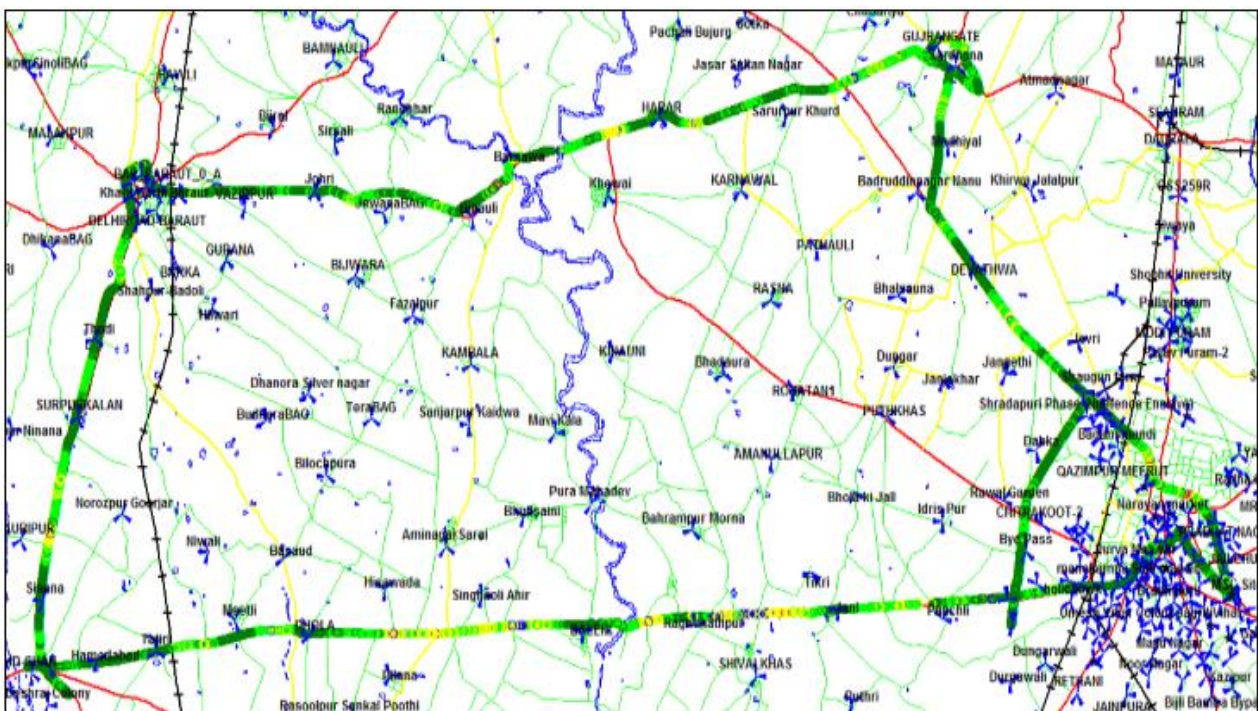
12.7. ROUTE MAP: MEERUT SSA: DAY 3

12.8. DRIVE TEST OUTCOME

Sr.No.	Parameter	Aircel	Airtel	Idea	BSNL	MTS	RCOM GSM	TTSL GSM	TTSL CDMA	Telenor	Vodafone
1	Total Calls Attempt (A)	AB	539	572	AB	461	412	479	430	456	573
2	Total Calls Blocked (B)	AB	7	2		0	4	0	0	0	3
3	Blocked Call Rate in % (B*100/A)	AB	1.30%	0.35%		0.00%	0.97%	0.00%	0.00%	0.00%	0.52%
4	Total Calls Established ('C)	AB	532	570		461	408	479	430	456	571
5	Total Calls Drop (D)	AB	2	1		0	1	0	0	0	2
6	Dropped Calls Rate in % (D*100/C)	AB	0.38%	0.18%		0.00%	0.25%	0.00%	0.00%	0.00%	0.35%
7	Call Setup Success Rate in % (C*100/A)	AB	98.70%	99.65%		100.00%	99.03%	100.00%	100.00%	100.00%	99.65%
8	Handover Success Rate % (total HO Success * 100/Total HO attempt)	AB	99.23%	99.39%		100.00%	100.00%	98.94%	100.00%	96.35%	99.02%

12.9. ROUTE COVER MAP: PILIBHIT SSA: DAY 1

12.10. ROUTE MAP: PILIBHIT SSA: DAY 2
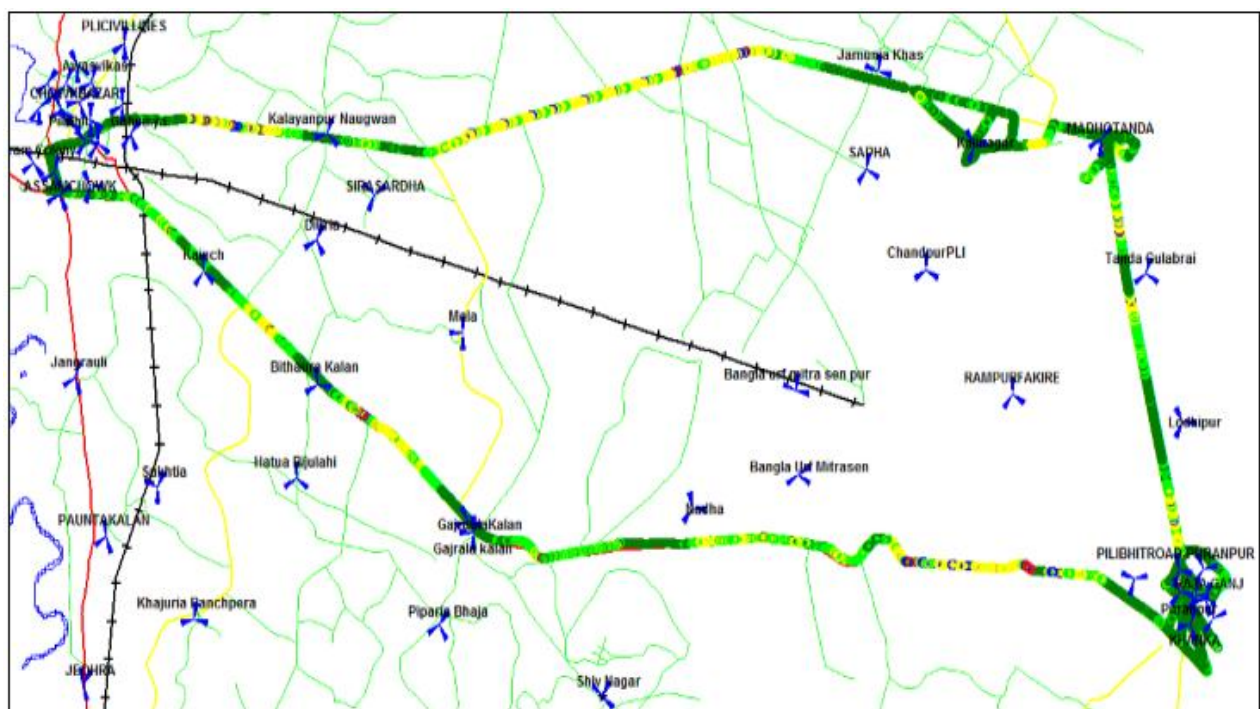
12.11. ROUTE MAP: PILIBHIT SSA: DAY 3
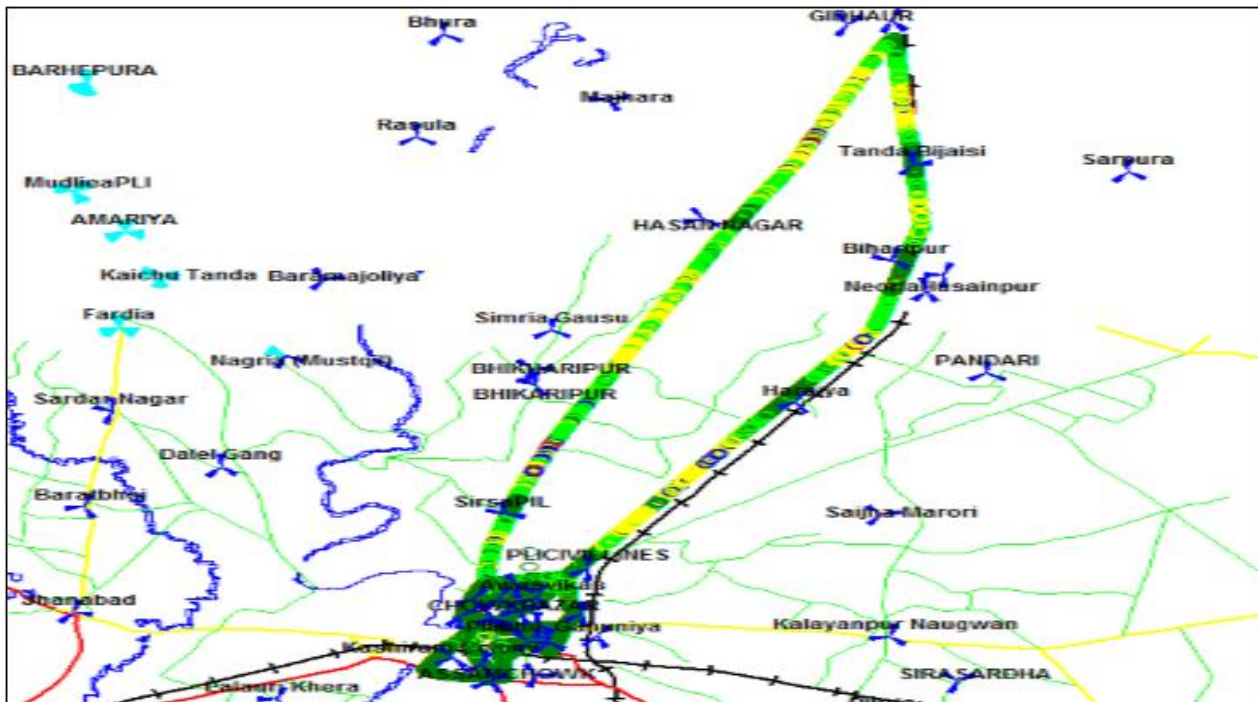
12.12. DRIVE TEST OUTCOME

Sr.No.	Parameter	Aircel	Airtel	Idea	BSNL	MTS	RCOM GSM	TTSL GSM	TTSL CDMA	Telenor	Vodafone
1	Total Calls Attempt (A)	AB	497	664	AB	178	368	492	202	526	651
2	Total Calls Blocked (B)	AB	1	2		0	0	0	0	1	3
3	Blocked Call Rate in % (B*100/A)	AB	0.20%	0.30%		0.00%	0.00%	0.00%	0.00%	0.19%	0.46%
4	Total Calls Established ('C)	AB	491	662		178	368	492	202	525	650
5	Total Calls Drop (D)	AB	0	1		0	0	0	0	0	1
6	Dropped Calls Rate in % (D*100/C)	AB	0.00%	0.15%		0.00%	0.00%	0.00%	0.00%	0.00%	0.15%
7	Call Setup Success Rate in % (C*100/A)	AB	98.79%	99.70%		100.00%	100.00%	100.00%	100.00%	99.81%	99.85%
8	Handover Success Rate % (total HO Success * 100/Total HO attempt)	AB	100.00%	99.46%		100.00%	99.60%	100.00%	100.00%	99.82%	99.66%

12.13. ROUTE COVER MAP: DEHRADUN SSA: DAY 1
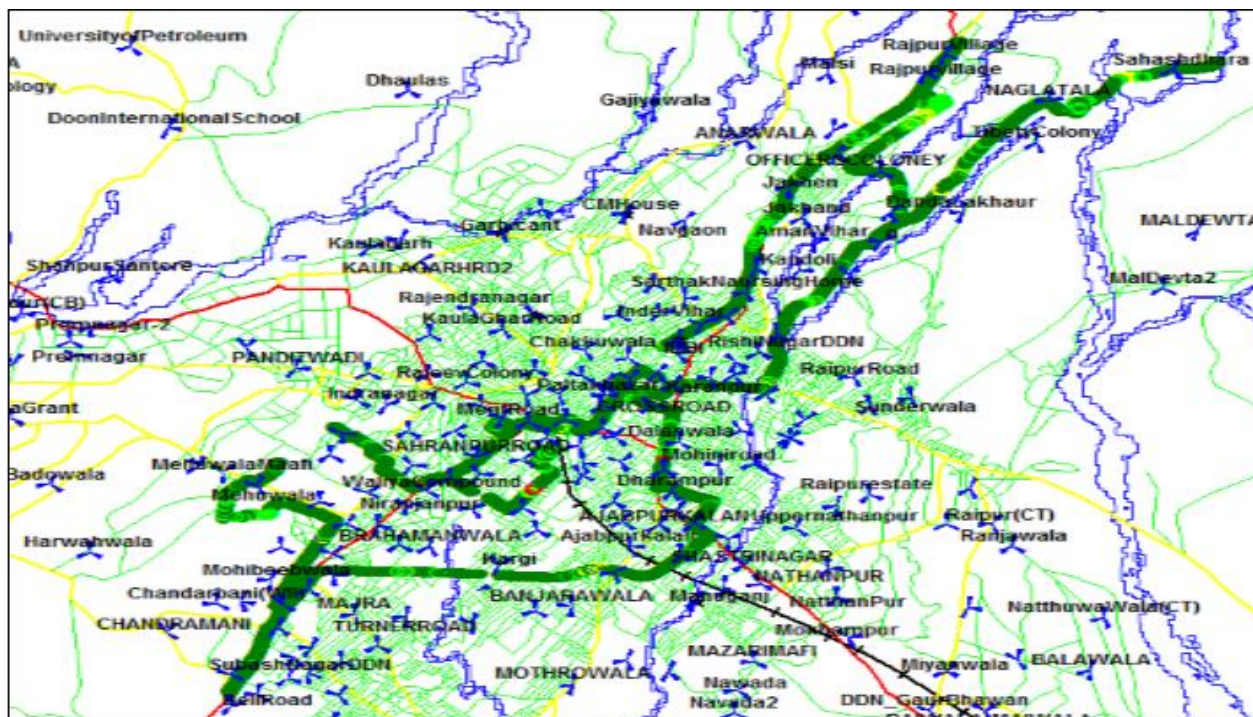
12.14. ROUTE MAP: DEHRADUN SSA: DAY 2
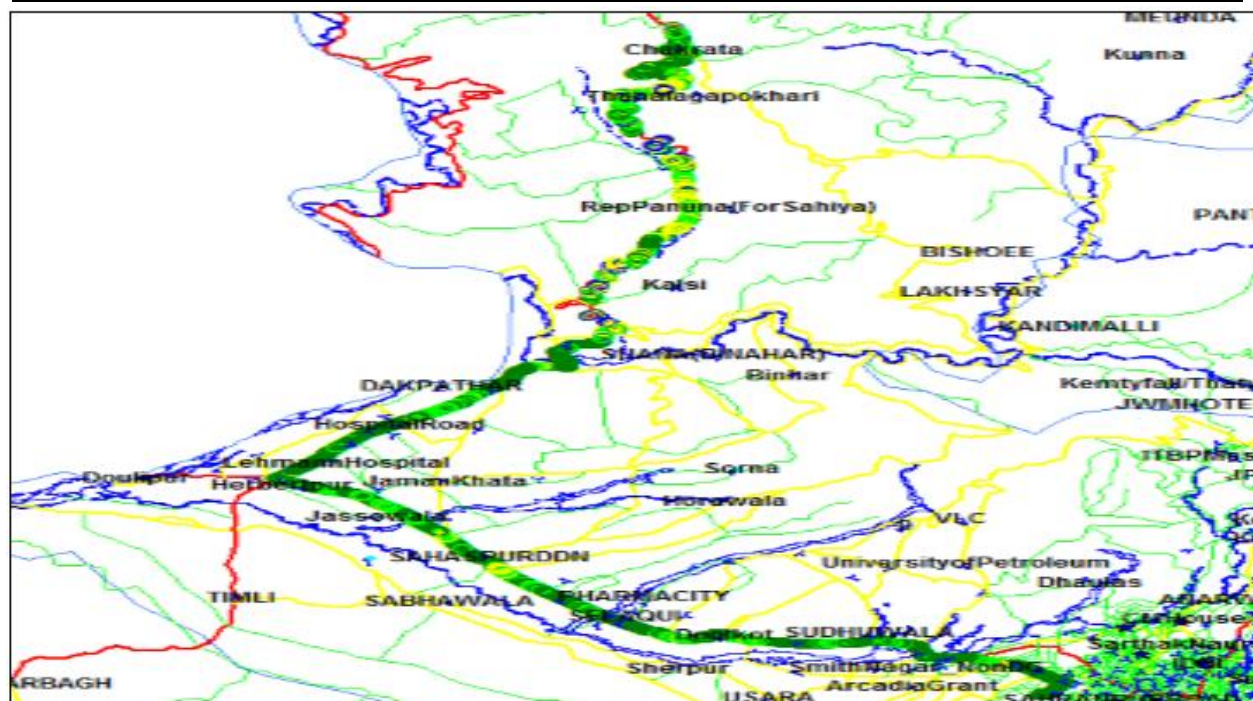
12.15. ROUTE MAP: DEHRADUN SSA: DAY 3
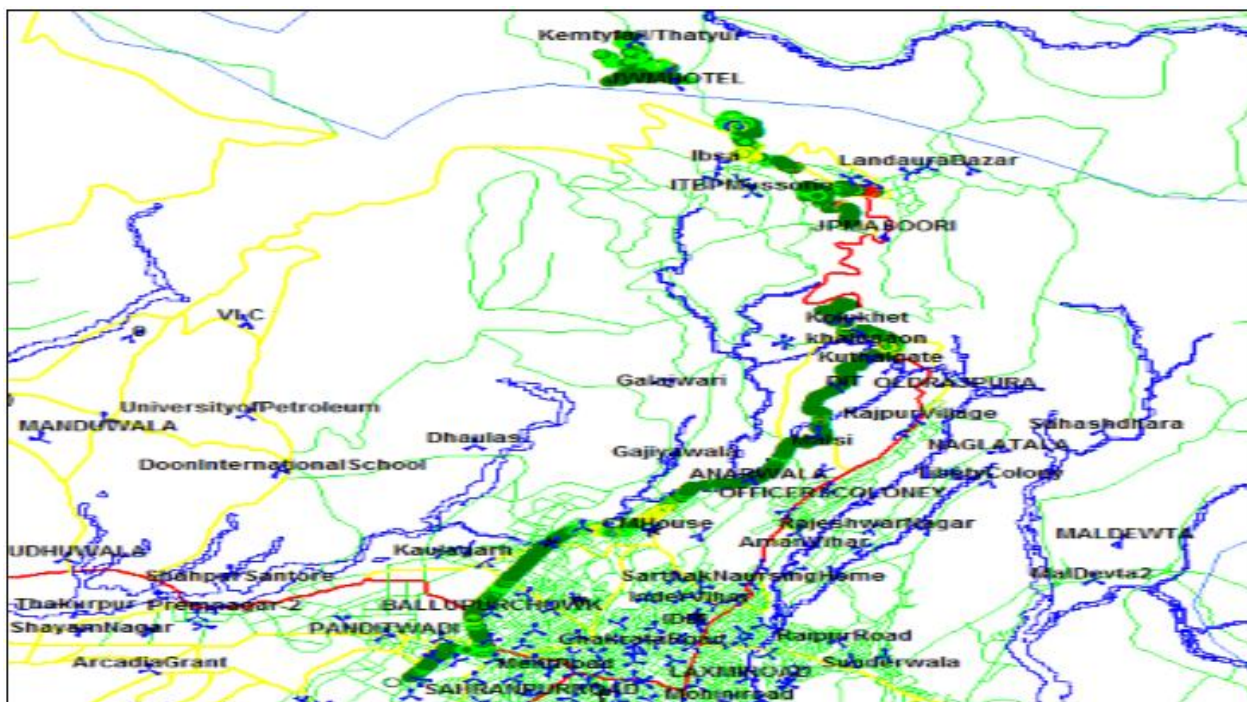
12.16. DRIVE TEST OUTCOME

Sr.No.	Parameter	Aircel	Airtel	Idea	BSNL	MTS	RCOM GSM	TTSL GSM	TTSL CDMA	Telenor	Vodafone
1	Total Calls Attempt (A)	357	499	438	AB	364	288	352	366	334	470
2	Total Calls Blocked (B)	3	6	1		1	2	0	0	0	2
3	Blocked Call Rate in % (B*100/A)	0.84%	1.20%	0.22%		0.27%	0.69%	0.00%	0.00%	0.00%	0.43%
4	Total Calls Established ('C)	351	489	434		363	286	352	366	334	468
5	Total Calls Drop (D)	0	5	1		0	0	0	0	0	2
6	Dropped Calls Rate in % (D*100/C)	0.00%	1.02%	0.23%		0.00%	0.00%	0.00%	0.00%	0.00%	0.43%
7	Call Setup Success Rate in % (C*100/A)	98.32%	98.00%	99.08%		99.73%	99.31%	100.00%	100.00%	100.00%	99.57%
8	Handover Success Rate % (total HO Success * 100/Total HO attempt)	97.69%	99.16%	99.01%		100.00%	100.00%	99.62%	100.00%	96.25%	98.60%

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12.17. ROUTE COVER MAP: SAHARANPUR SSA: DAY 1
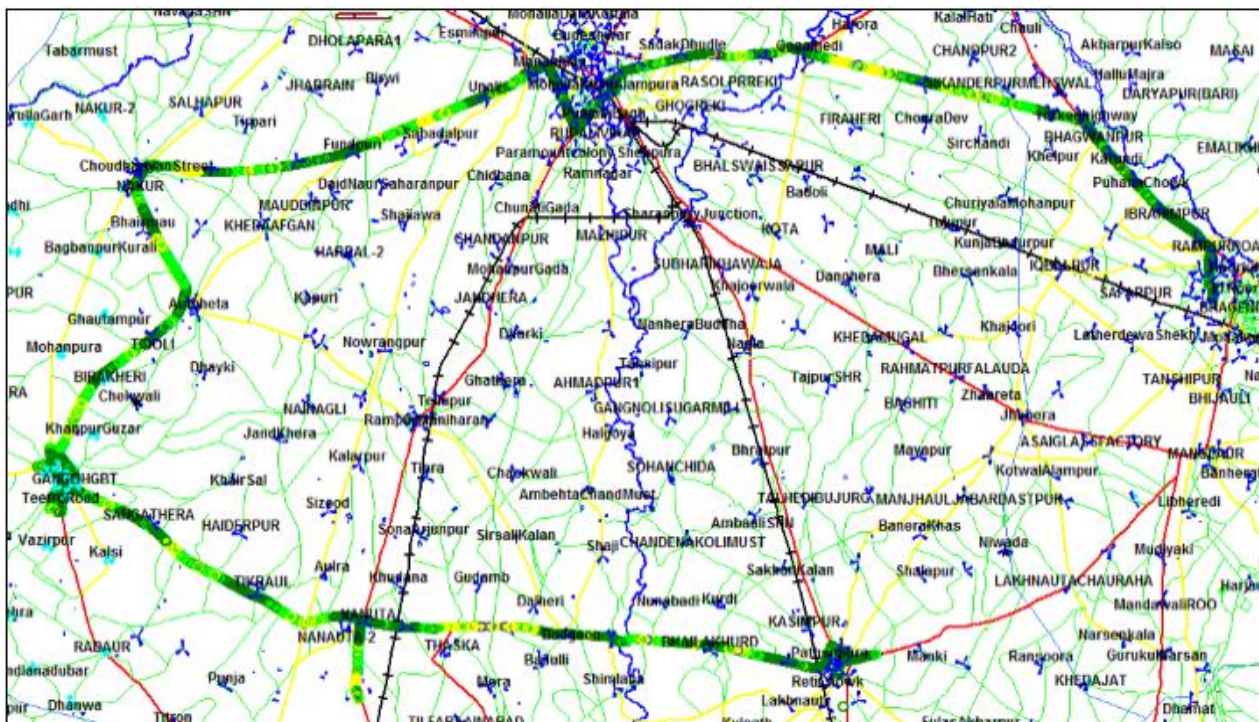
12.18. ROUTE MAP: SAHARANPUR SSA: DAY 2
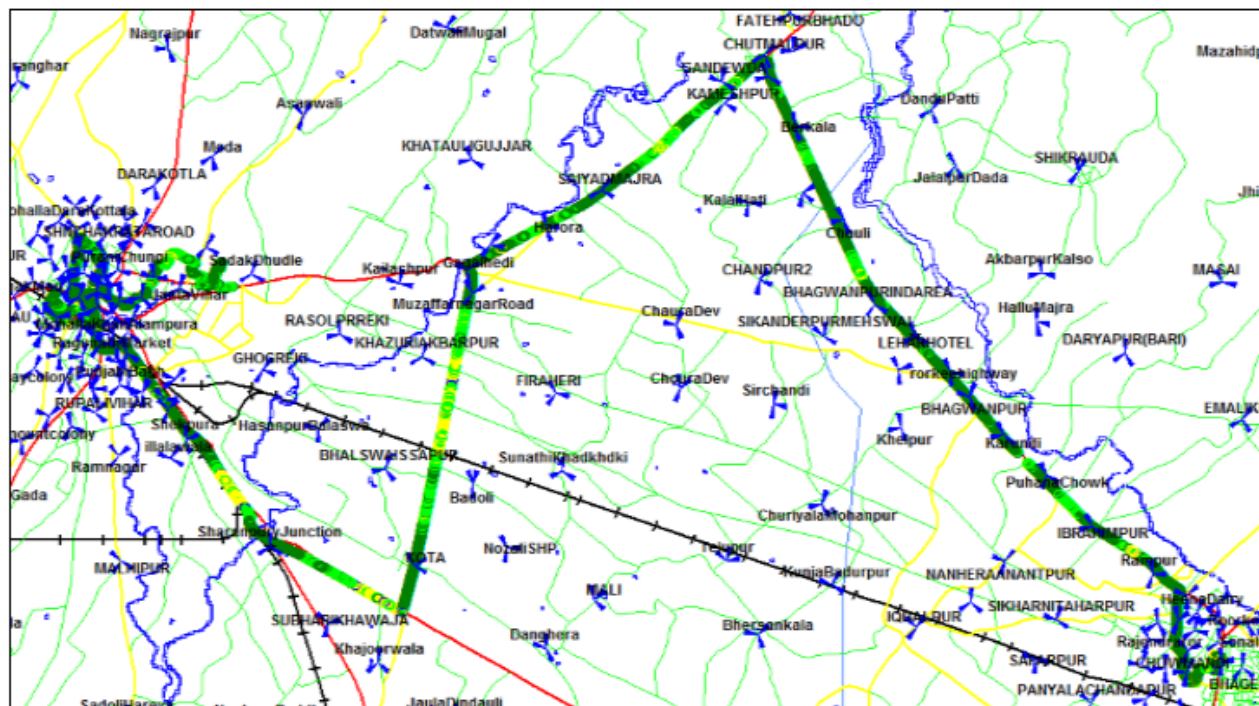
12.19. ROUTE MAP: SAHARANPUR SSA: DAY 3
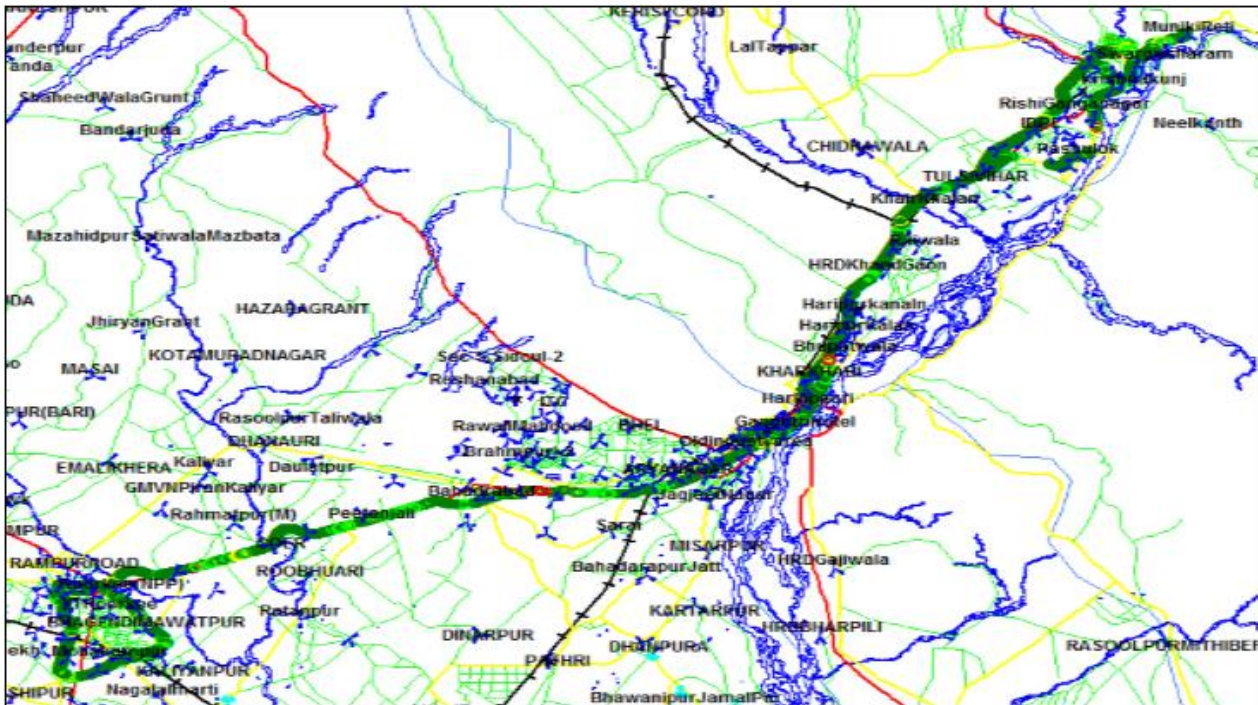
12.20. DRIVE TEST OUTCOME

Sr.No.	Parameter	Aircel	Airtel	Idea	BSNL	MTS	RCOM GSM	TTSL GSM	TTSL CDMA	Telenor	Vodafone
1	Total Calls Attempt (A)	67	518	699	AB	457	358	538	442	484	630
2	Total Calls Blocked (B)	0	8	0		2	2	0	0	4	1
3	Blocked Call Rate in % (B*100/A)	0.00%	1.54%	0.00%		0.44%	0.56%	0.00%	0.00%	0.83%	0.16%
4	Total Calls Established ('C)	67	505	695		455	356	538	442	480	630
5	Total Calls Drop (D)	0	1	0		0	0	1	0	4	0
6	Dropped Calls Rate in % (D*100/C)	0.00%	0.20%	0.00%		0.00%	0.00%	0.19%	0.00%	0.83%	0.00%
7	Call Setup Success Rate in % (C*100/A)	100.00%	97.49%	99.43%		99.56%	99.44%	100.00%	100.00%	99.17%	100.00%
8	Handover Success Rate % (total HO Success * 100/Total HO attempt)	96.00%	98.25%	99.66%		100.00%	98.95%	100.00%	100.00%	97.27%	99.66%

12.21. ROUTE COVER MAP: AGRA SSA: DAY 1
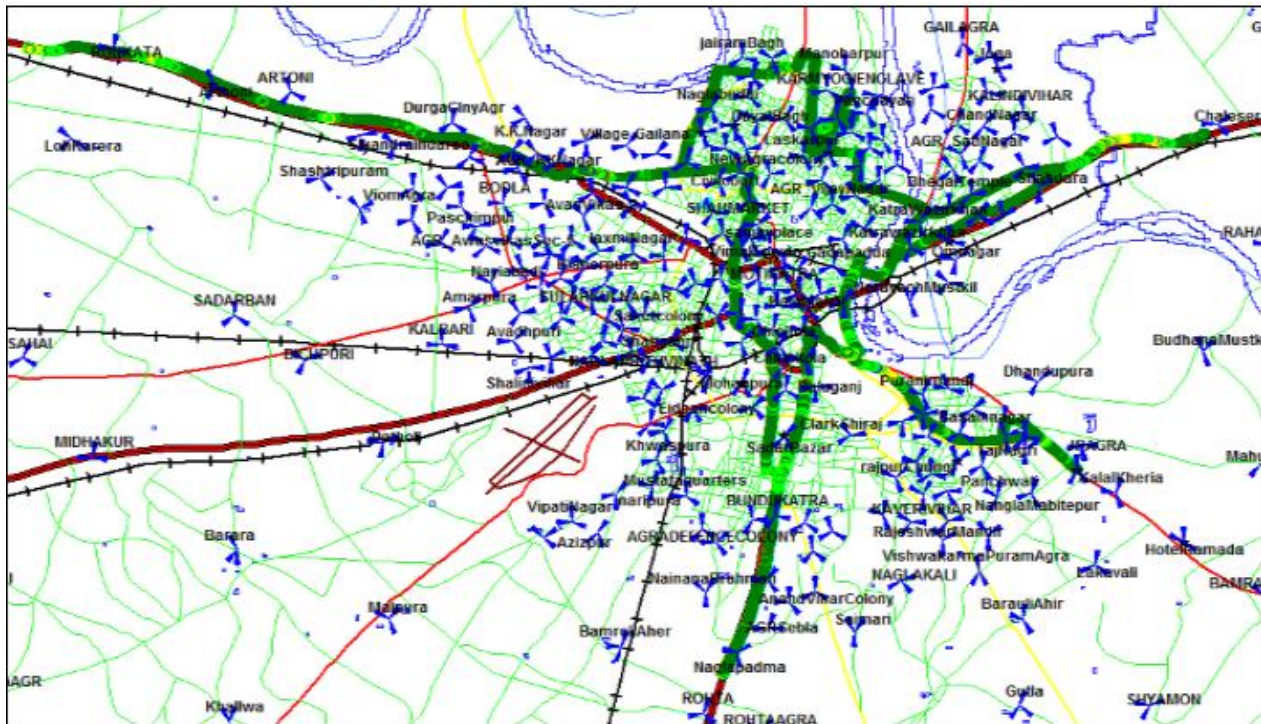
12.22. ROUTE MAP: AGRA SSA: DAY 2

12.23. ROUTE MAP: AGRA SSA: DAY 3

12.24. DRIVE TEST OUTCOME

Sr.No.	Parameter	Aircel	Airtel	Idea	BSNL	MTS	RCOM GSM	TTSL GSM	TTSL CDMA	Telenor	Vodafone
1	Total Calls Attempt (A)	430	641	617	AB	357	426	557	470	496	672
2	Total Calls Blocked (B)	3	7	4		1	1	0	0	1	1
3	Blocked Call Rate in % (B*100/A)	0.70%	1.09%	0.65%		0.28%	0.23%	0.00%	0.00%	0.20%	0.15%
4	Total Calls Established ('C)	418	628	608		356	425	557	470	495	669
5	Total Calls Drop (D)	1	6	1		0	0	0	0	2	3
6	Dropped Calls Rate in % (D*100/C)	0.24%	0.96%	0.16%		0.00%	0.00%	0.00%	0.00%	0.40%	0.45%
7	Call Setup Success Rate in % (C*100/A)	97.21%	97.97%	98.54%		99.72%	99.77%	100.00%	100.00%	99.80%	99.55%
8	Handover Success Rate % (total HO Success * 100/Total HO attempt)	99.44%	98.46%	98.27%		100.00%	99.37%	99.64%	100.00%	97.13%	98.53%

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13. BLOCK SCHEMATIC DIAGRAM

13.1. ERICSSON
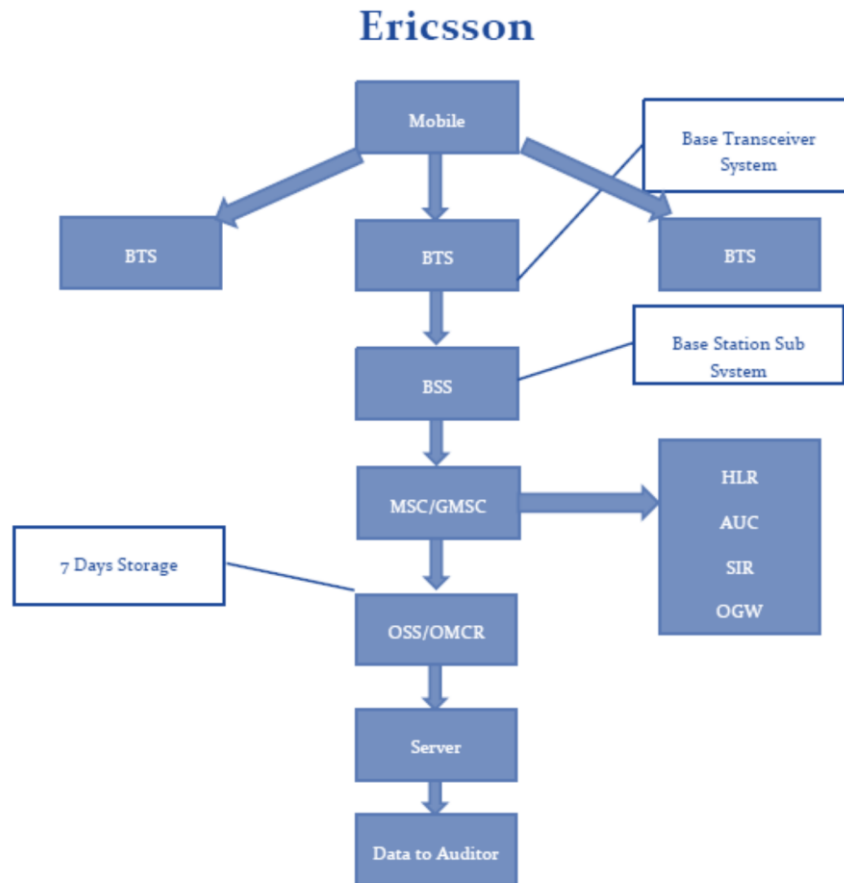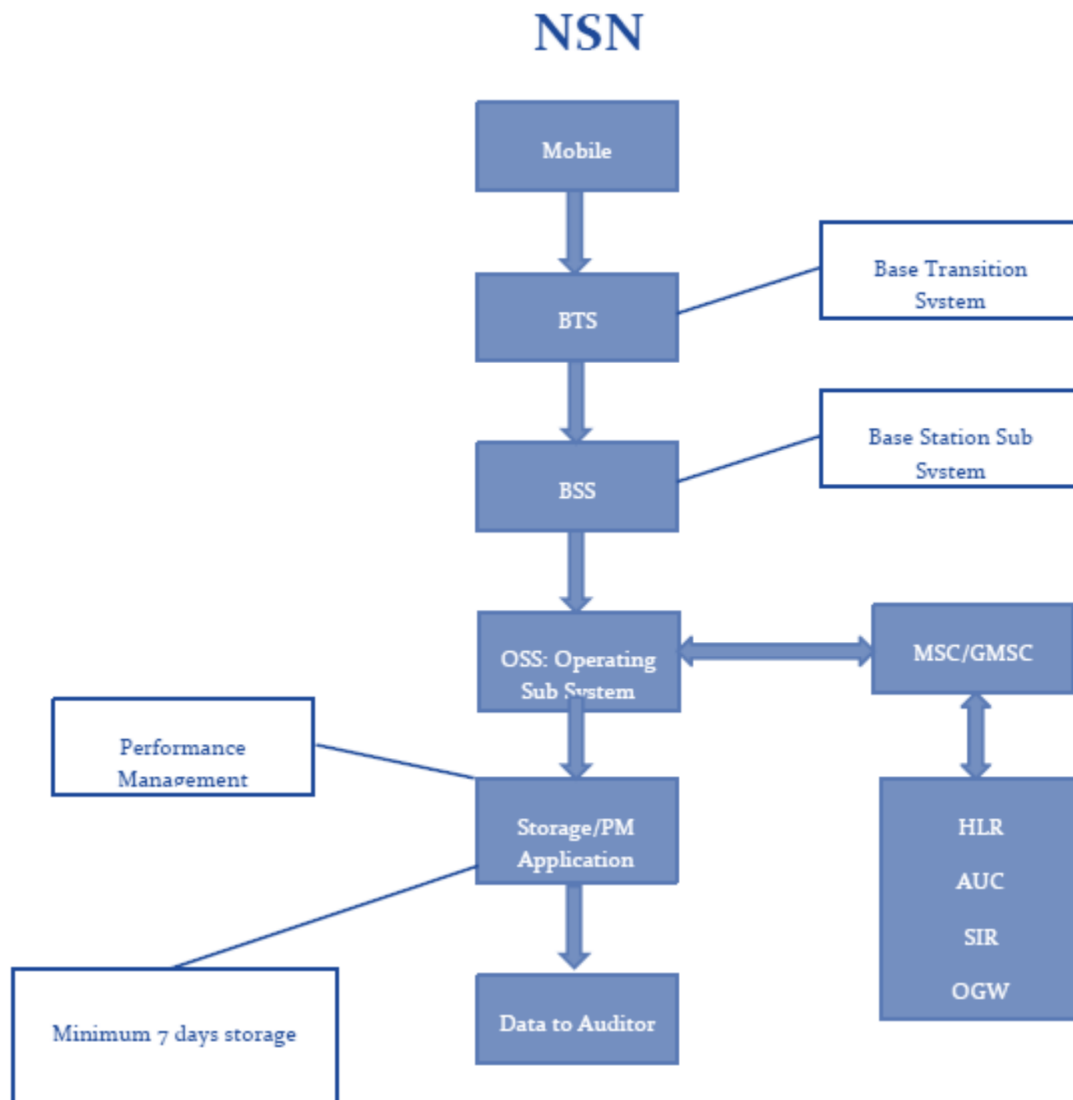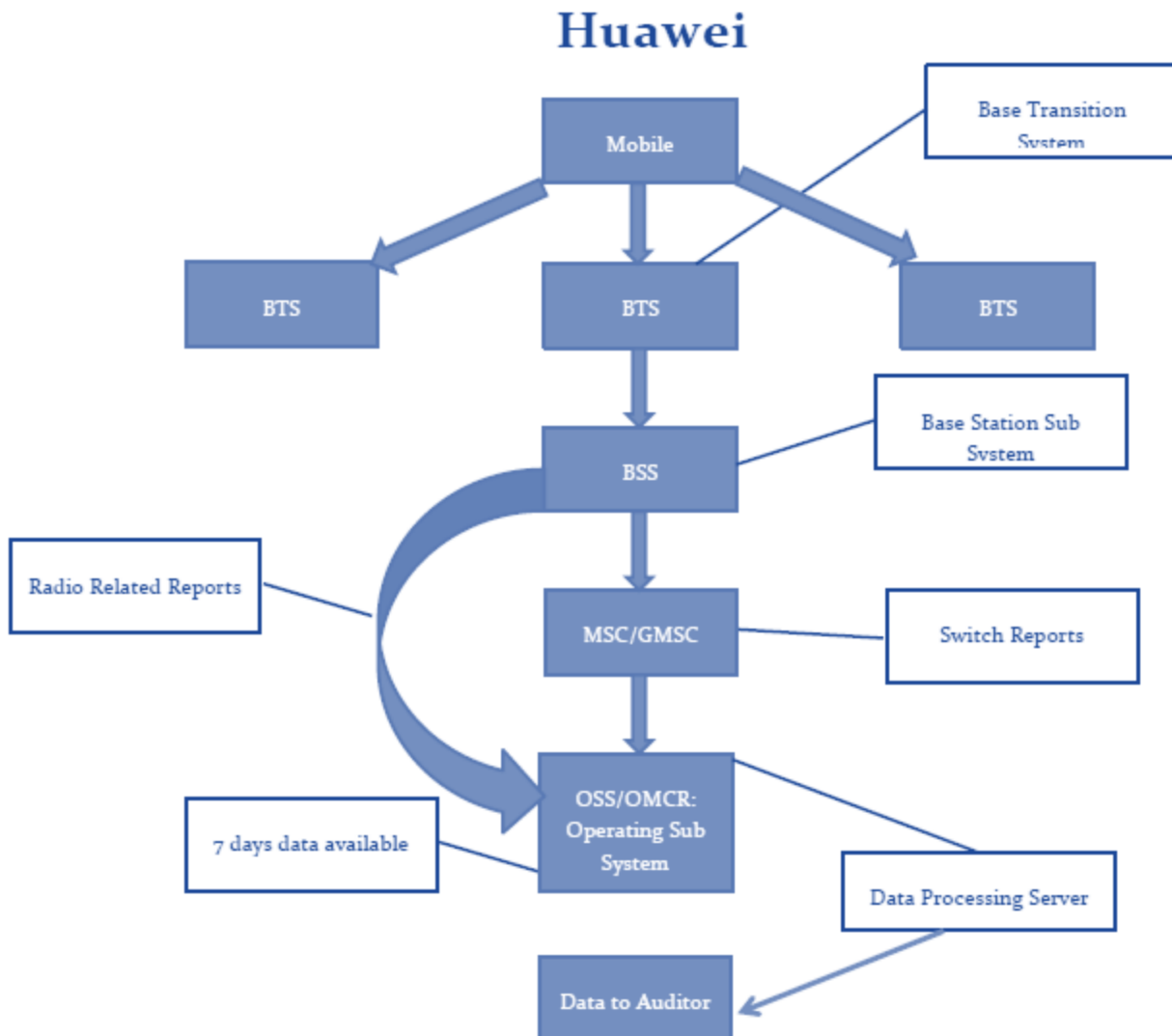
Ericsson block schematic diagram showing Mobile, Base Transceiver System, BTS, BSS (Base Station Sub System), MSC/GMSC, HLR AUC SIR OGW, 7 Days Storage, OSS/OMCR, Server, and Data to Auditor.

NSN

Huawei

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

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

15.1. 2G VOICE PMR DATA: CONSOLIDATED

Consolidated											
Network Parameters		**Name of Service Provider**									
		Benchmark	**AIRCEL**	**AIRTEL**	**BSNL**	**IDEA**	**MTS**	**RCOM GSM**	**TELENOR**	**TTSL CDMA**	**TTSL GSM**	**VODAFONE**
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.12%	1.04%	1.59%	0.12%	0.04%	0.04%	0.25%	0.18%	0.18%	0.30%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.35%	0.87%	1.73%	0.29%	0.00%	0.28%	0.45%	0.29%	0.42%	1.09%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.70%	97.96%	97.99%	98.25%	99.75%	98.91%	98.68%	99.00%	98.04%	99.00%
	SDDCH/Paging chl. Congestion	≤ 1%	0.24%	0.50%	0.63%	0.74%	0.00%	0.17%	0.42%	#DIV/0!	0.22%	0.36%
	TCH Congestion	≤ 2%	0.63%	1.62%	1.18%	1.12%	0.00%	0.47%	0.77%	0.10%	0.44%	0.92%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.77%	1.41%	1.38%	1.11%	0.28%	0.15%	0.88%	0.28%	0.54%	0.93%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	2.91%	2.50%	2.49%	2.76%	2.95%	0.43%	4.64%	2.49%	2.82%	2.95%
	%age of connection with good voice quality	≥ 95%	96.55%	96.75%	96.37%	95.97%	98.94%	98.66%	97.15%	98.85%	96.96%	96.39%

- TELENOR has parameter value of 3.48% and failed to meet the benchmark of ≤ 3% Worst affected cell having TCH drop.

15.2. 3G VOICE PMR: CONSOLIDATED

Consolidated							
Network Parameters		**Name of Service Provider**					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.92%	1.63%	0.32%	0.18%	0.28%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.67%	1.08%	1.20%	0.36%	1.95%
Connection Establishment (Accessibi	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.22%	97.99%	99.35%	99.07%	100.00%
	RRC Congestion:	≤ 1%	0.04%	0.89%	0.87%	0.39%	0.02%
	RAB Congestion:	≤ 2%	0.00%	0.83%	0.39%	0.55%	0.07%
Connection Maintenance (Retainabil ity)	Circuit Switched Voice Drop Rate	≤ 2%	0.58%	1.05%	0.32%	0.21%	0.43%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	1.35%	2.60%	2.94%	1.69%	4.40%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.87%	DNA	98.91%	99.12%	98.72%

- VODAFONE has parameter value of 4.40% and failed to meet the benchmark of ≤ 3% Worst affected cell having TCH drop.

15.3. BILLING AND CUSTOMER CARE

Name of Service Provider	Metering and Billing credibility		Billing Complaints			Termination & Closures	Time taken for refund of deposits after closures: Benchmark	Response time to customer for assistance	
	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%	NA	NA	100.00%	NA	NA	98.41%	99.18%
AIRTEL	0.01%	0.09%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	97.37%
BSNL	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.14%
IDEA	0.11%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.43%	99.53%
MTS	0.02%	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%	99.96%	95.53%
RCOM GSM	0.09%	0.10%	100.00%	100.00%	100.00%	100.00%	91.95%	99.14%	95.17%
TELENOR	NA	0.00%	100.00%	100.00%	100.00%	NA	NA	98.90%	99.22%
TTSL CDMA	0.00%	0.00%	NA	NA	100.00%	100.00%	100.00%	NA	98.94%
TTSL GSM	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.03%	97.27%
VODAFONE	0.09%	0.06%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.53%

- IDEA has parameter value of 0.11% and failed to meet the benchmark of ≤ 0.1% Metering and Billing credibility Postpaid Subscribers.
- RCOM has parameter value of 0.11% and failed to meet the benchmark of =100% Time taken for refund of deposits after closures: Benchmark Cleared over a period of <60 days (100%).

Name of Service Provider	Customer Care & Grievances Redressal	
	% of Complaints addressed at call center level	% of Complaints addressed by Appellate Authority
Benchmark		
AIRCEL	100.00%	NIL
AIRTEL	97.17%	33.33%
BSNL	56.49%	NIL
IDEA	36.20%	NIL
MTS	11.95%	NA
RCOM GSM	100.00%	100.00%
TELENOR	0.00%	NIL
TTSL CDMA	99.70%	100.00%
TTSL GSM	99.02%	80.68%
VODAFONE	100.00%	100.00%

15.4. PMR COMPARISON (TSP VS. AUDIT AGENCY): NETWORK PARAMETERS

				3G-PMR Report Comparison between Audit Agency and TSP									
Network Parameters				**Name of Service Provider**										
		Benchmark		AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.12%	1.04%	1.59%	0.12%	0.04%	0.04%	0.25%	0.18%	0.18%	0.30%
			TSP	0.12%	1.15%	1.59%	0.12%	0.04%	0.04%	0.25%	0.18%	0.18%	0.27%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	0.35%	0.87%	1.73%	0.29%	0.00%	0.28%	0.45%	0.29%	0.42%	1.09%
			TSP	0.35%	0.98%	1.78%	0.29%	0.00%	0.28%	0.45%	0.29%	0.41%	0.90%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	Agency	98.70%	97.96%	97.99%	98.25%	99.75%	98.91%	98.68%	99.00%	98.04%	99.00%
			TSP	98.70%	98.05%	98.23%	98.26%	99.75%	98.91%	98.68%	98.99%	98.04%	99.03%
	SDDCH/Paging chl. Congestion	≤ 1%	Agency	0.24%	0.50%	0.63%	0.74%	0.00%	0.17%	0.42%	0.00%	0.22%	0.36%
			TSP	0.24%	0.50%	0.60%	0.74%	0.00%	0.17%	0.42%	0.00%	0.21%	0.38%
	TCH Congestion	≤ 2%	Agency	0.63%	1.62%	1.18%	1.12%	0.00%	0.47%	0.77%	0.10%	0.44%	0.92%
			TSP	0.63%	1.53%	1.19%	1.13%	0.00%	0.47%	0.77%	0.10%	0.43%	0.89%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	Agency	0.77%	1.41%	1.38%	1.11%	0.28%	0.15%	0.88%	0.28%	0.54%	0.93%
			TSP	0.77%	1.42%	1.31%	1.11%	0.28%	0.15%	0.88%	0.29%	0.54%	0.95%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	Agency	2.91%	2.50%	2.49%	2.76%	2.95%	0.43%	4.64%	2.49%	2.82%	2.95%
			TSP	2.91%	2.55%	2.25%	2.81%	2.94%	0.43%	4.62%	2.49%	2.82%	2.94%
	%age of connection with good voice quality	≥ 95%	Agency	96.55%	96.75%	96.37%	95.97%	98.94%	98.66%	97.15%	98.85%	96.96%	96.39%
			TSP	96.55%	96.68%	96.18%	95.98%	98.94%	98.66%	97.15%	98.85%	96.96%	96.40%

15.4.1.   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
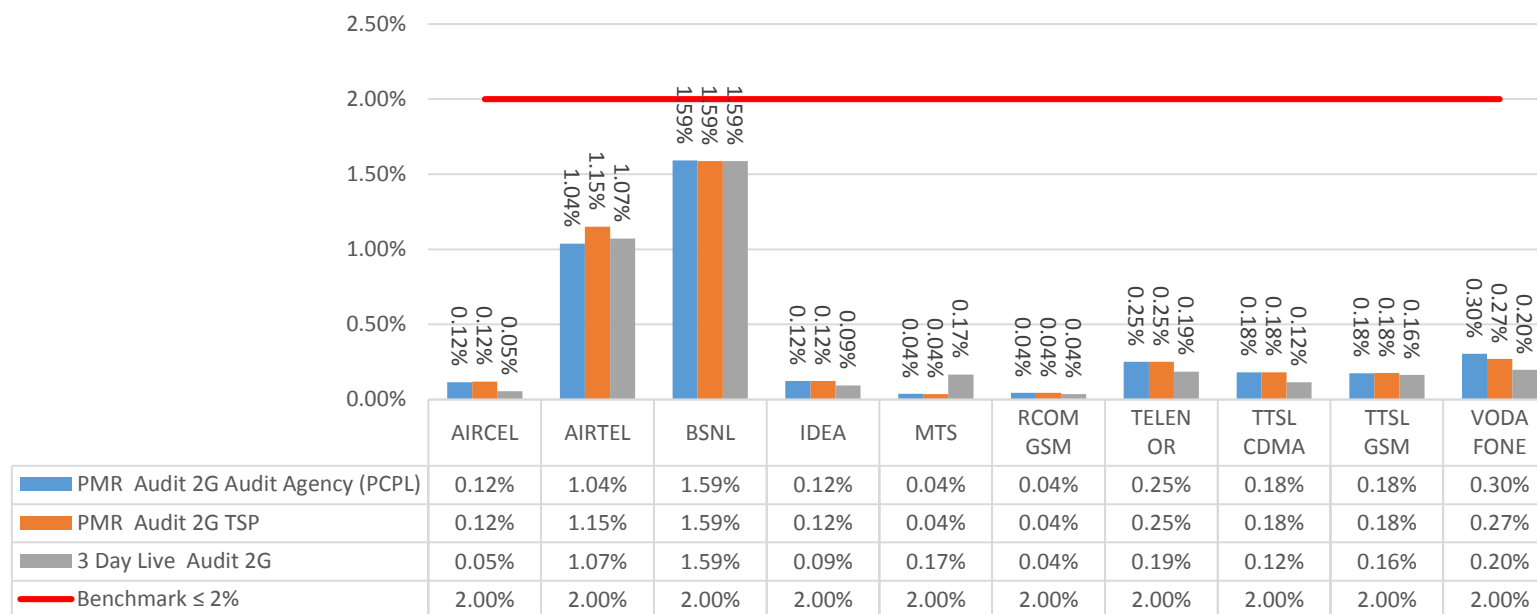
	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELEN OR	TTSL CDMA	TTSL GSM	VODA FONE
PMR Audit 2G Audit Agency (PCPL)	0.12%	1.04%	1.59%	0.12%	0.04%	0.04%	0.25%	0.18%	0.18%	0.30%
PMR Audit 2G TSP	0.12%	1.15%	1.59%	0.12%	0.04%	0.04%	0.25%	0.18%	0.18%	0.27%
3 Day Live Audit 2G	0.05%	1.07%	1.59%	0.09%	0.17%	0.04%	0.19%	0.12%	0.16%	0.20%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

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

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

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency (PCPL)	0.35%	0.87%	1.73%	0.29%	0.00%	0.28%	0.45%	0.29%	0.42%	1.09%
PMR Audit 2G TSP	0.35%	0.98%	1.78%	0.29%	0.00%	0.28%	0.45%	0.29%	0.41%	0.90%
3 Day Live Audit 2G	0.00%	0.36%	5.19%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.49%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

15.4.3.   CALL SET-UP SUCCESS RATE (WITHIN LICENSEE OWN NETWORK)
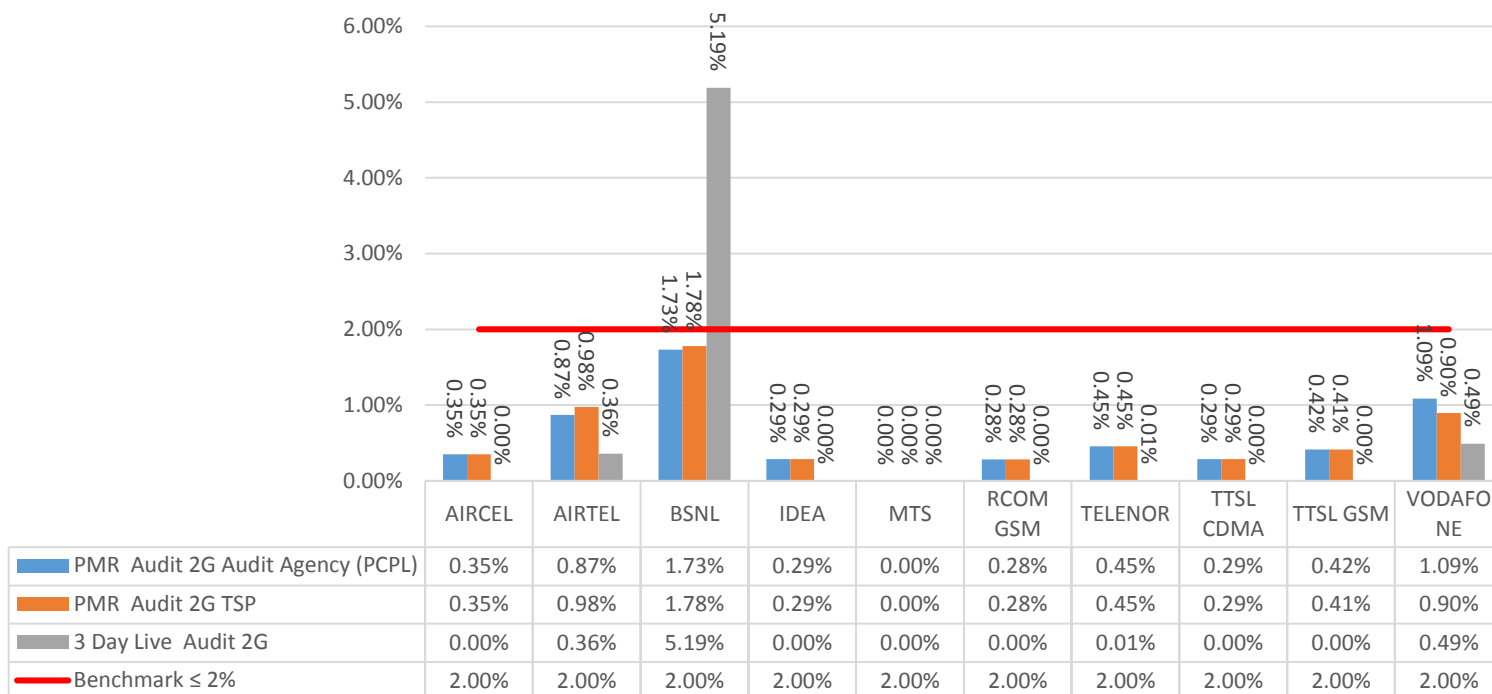
Call Set-up Success Rate (Within Licensee own network
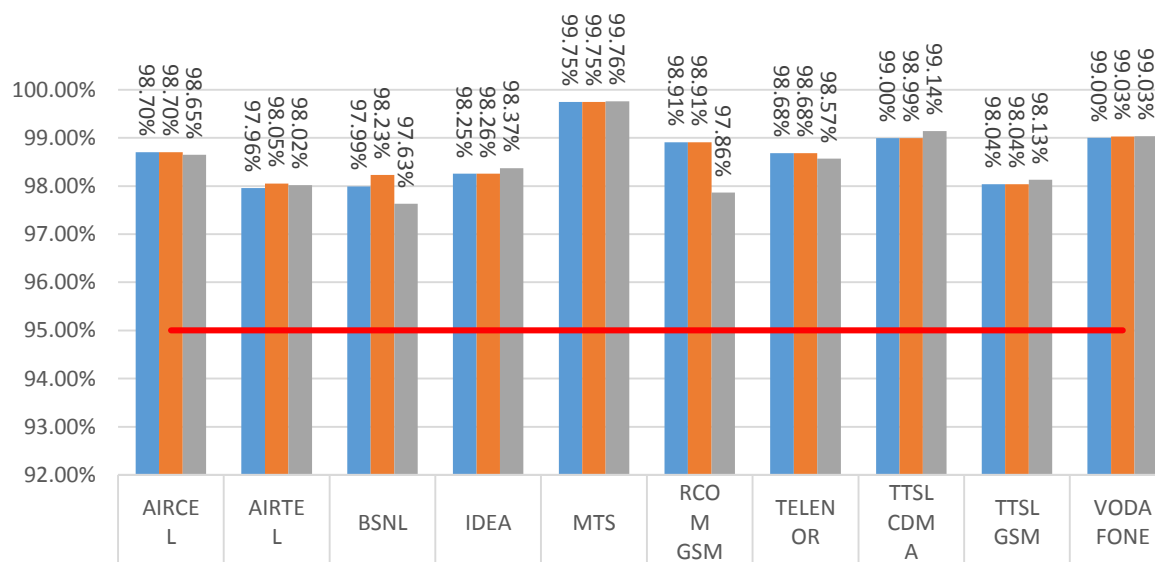
	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency (PCPL)	98.70%	97.96%	97.99%	98.25%	99.75%	98.91%	98.68%	99.00%	98.04%	99.00%
PMR Audit 2G TSP	98.70%	98.05%	98.23%	98.26%	99.75%	98.91%	98.68%	98.99%	98.04%	99.03%
3 Day Live Audit 2G	98.65%	98.02%	97.63%	98.37%	99.76%	97.86%	98.57%	99.14%	98.13%	99.03%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

15.4.4.   SDDCH/Paging chl. Congestion

SDDCH/Paging chl. Congestion
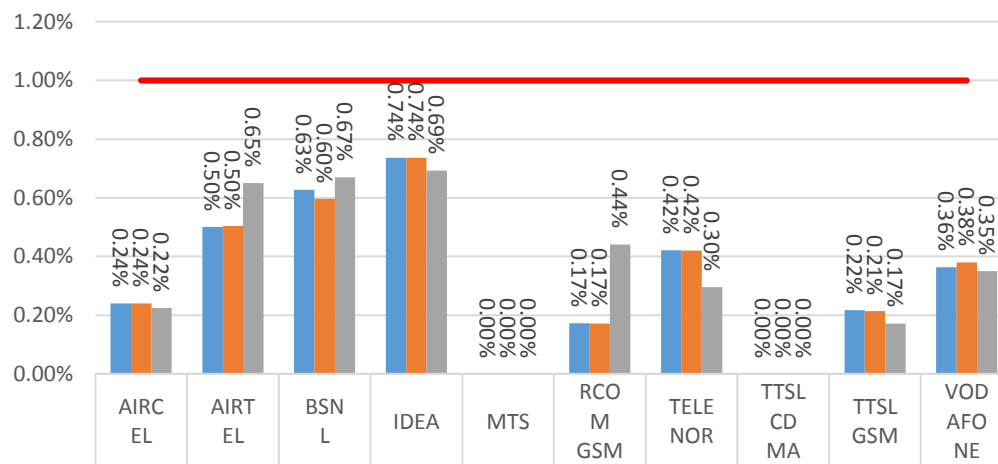
	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency (PCPL)	0.24%	0.50%	0.63%	0.74%	0.00%	0.17%	0.42%	0.00%	0.22%	0.36%
PMR Audit 2G TSP	0.24%	0.50%	0.60%	0.74%	0.00%	0.17%	0.42%	0.00%	0.21%	0.38%
3 Day Live Audit 2G	0.22%	0.65%	0.67%	0.69%	0.00%	0.44%	0.30%	0.00%	0.17%	0.35%
Benchmark ≤ 1%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

15.4.5. TCH CONGESTION

TCH Congestion
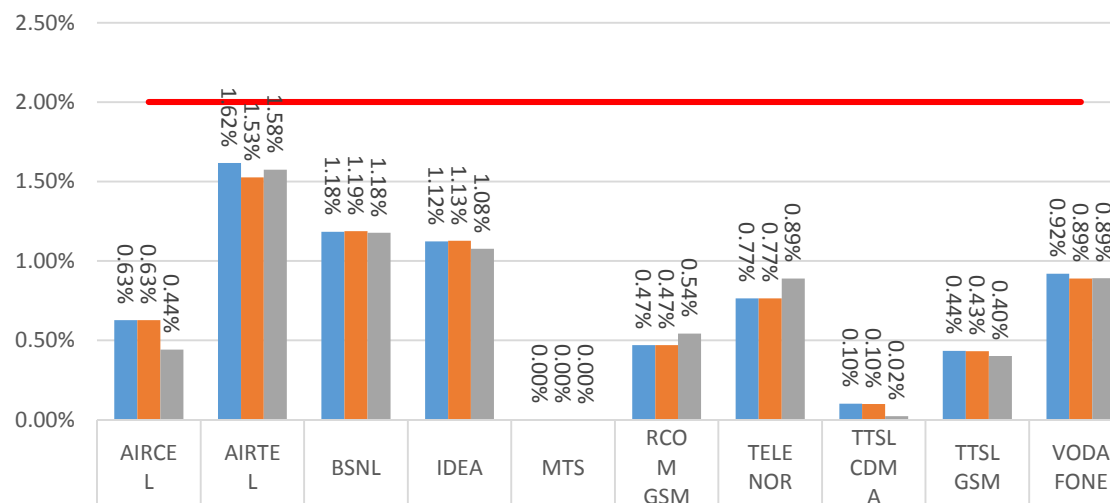
	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELE NOR	TTSL CDMA	TTSL GSM	VODA FONE
PMR Audit 2G Audit Agency (PCPL)	0.63%	1.62%	1.18%	1.12%	0.00%	0.47%	0.77%	0.10%	0.44%	0.92%
PMR Audit 2G TSP	0.63%	1.53%	1.19%	1.13%	0.00%	0.47%	0.77%	0.10%	0.43%	0.89%
3 Day Live Audit 2G	0.44%	1.58%	1.18%	1.08%	0.00%	0.54%	0.89%	0.02%	0.40%	0.89%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

15.4.6.   CALL DROP RATE (%AGE)

Call Drop Rate (%age)
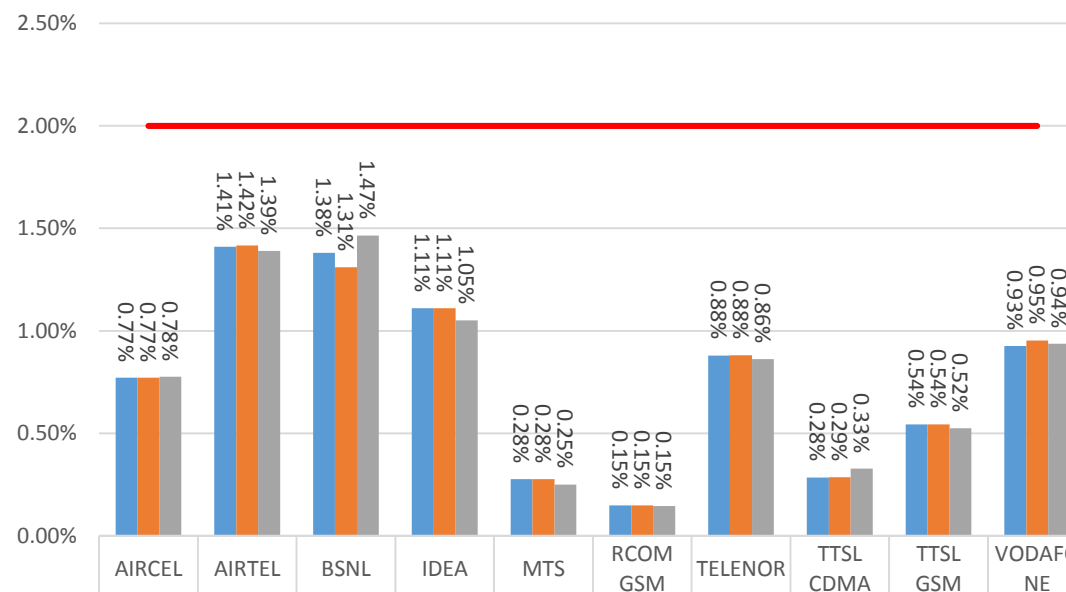
	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency (PCPL)	0.77%	1.41%	1.38%	1.11%	0.28%	0.15%	0.88%	0.28%	0.54%	0.93%
PMR Audit 2G TSP	0.77%	1.42%	1.31%	1.11%	0.28%	0.15%	0.88%	0.29%	0.54%	0.95%
3 Day Live Audit 2G	0.78%	1.39%	1.47%	1.05%	0.25%	0.15%	0.86%	0.33%	0.52%	0.94%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

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

Worst Affected cell having more than 3% TCH drop

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency (PCPL)	2.91%	2.50%	2.49%	2.76%	2.95%	0.43%	4.64%	2.49%	2.82%	2.95%
PMR Audit 2G TSP	2.91%	2.55%	2.25%	2.81%	2.94%	0.43%	4.62%	2.49%	2.82%	2.94%
3 Day Live Audit 2G	2.76%	2.45%	2.61%	2.76%	2.99%	0.43%	4.49%	2.62%	2.67%	3.42%
Benchmark ≤ 3%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
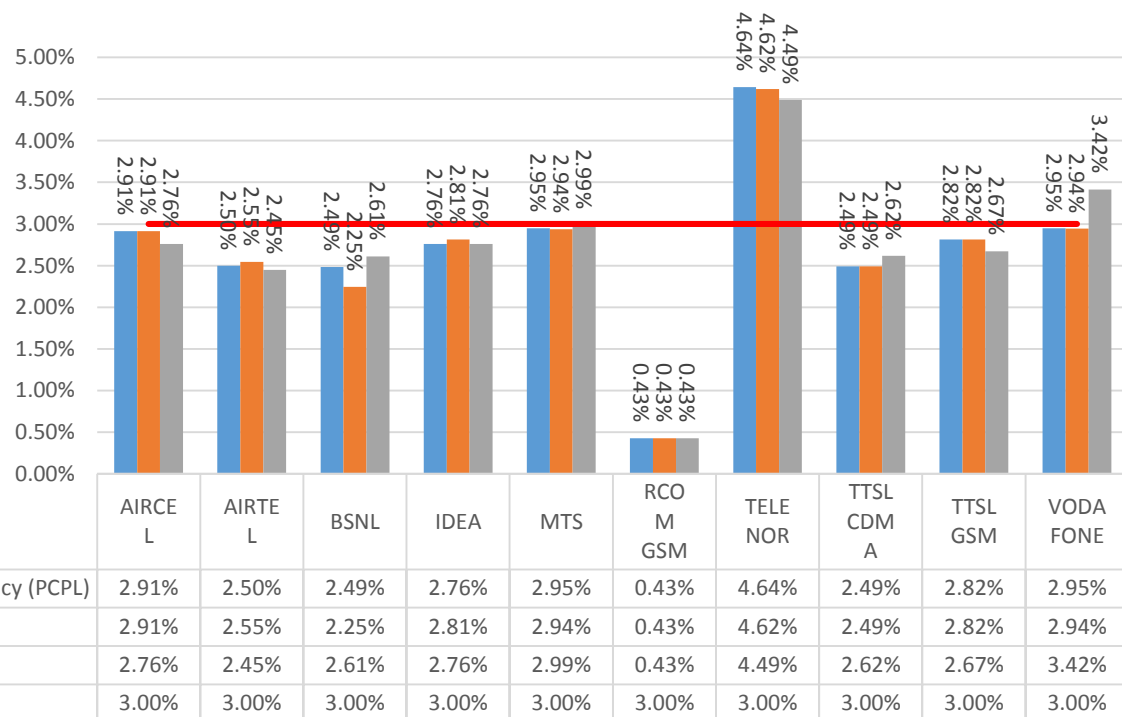
15.4.8. %AGE OF CONNECTION WITH GOOD VOICE QUALITY

%Age of connection with good voice quality
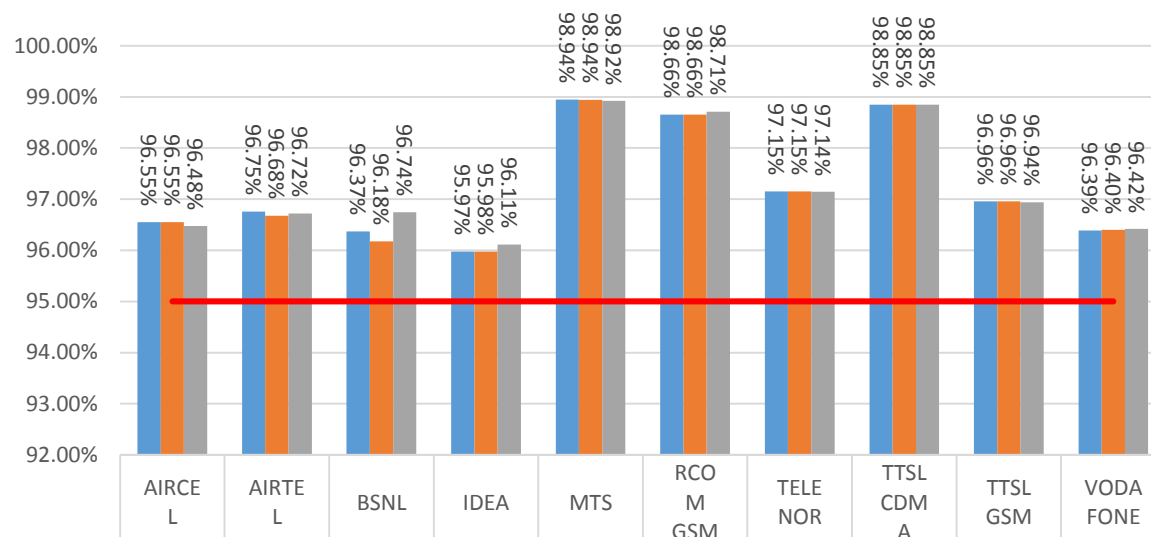
	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency (PCPL)	96.55%	96.75%	96.37%	95.97%	98.94%	98.66%	97.15%	98.85%	96.96%	96.39%
PMR Audit 2G TSP	96.55%	96.68%	96.18%	95.98%	98.94%	98.66%	97.15%	98.85%	96.96%	96.40%
3 Day Live Audit 2G	96.48%	96.72%	96.74%	96.11%	98.92%	98.71%	97.14%	98.85%	96.94%	96.42%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

15.5. 3G-PMR COMPARISON (TSP VS. AUDIT AGENCY): NETWORK PARAMETERS

Network Parameters		Benchmark		AIRTEL	BSNL	IDEA	TTSL	VODAFONE
3G-PMR Report Comparison between Audit Agency and TSP								
				Name of Service Provider				
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.92%	1.63%	0.32%	0.18%	0.28%
			TSP	1.31%	1.52%	0.32%	0.18%	0.27%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	0.67%	1.08%	1.20%	0.36%	1.95%
			TSP	0.95%	1.62%	1.20%	0.36%	1.46%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	Agency	99.22%	97.99%	99.35%	99.07%	100.00%
			TSP	99.20%	97.50%	99.35%	99.07%	99.70%
	RRC Congestion:	≤ 1%	Agency	0.04%	0.89%	0.87%	0.39%	0.02%
			TSP	0.04%	0.85%	0.87%	0.39%	0.03%
	RAB Congestion:	≤ 2%	Agency	0.00%	0.83%	0.39%	0.55%	0.07%
			TSP	0.00%	1.07%	0.39%	0.55%	0.01%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	Agency	0.58%	1.05%	0.32%	0.21%	0.43%
			TSP	0.58%	0.92%	0.32%	0.21%	0.35%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	Agency	1.35%	2.60%	2.94%	1.69%	4.40%
			TSP	1.42%	2.47%	2.87%	1.69%	2.60%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	Agency	98.87%	DNA	98.91%	99.12%	98.72%
			TSP	98.87%	96.43%	98.90%	99.12%	98.72%

15.5.1. 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
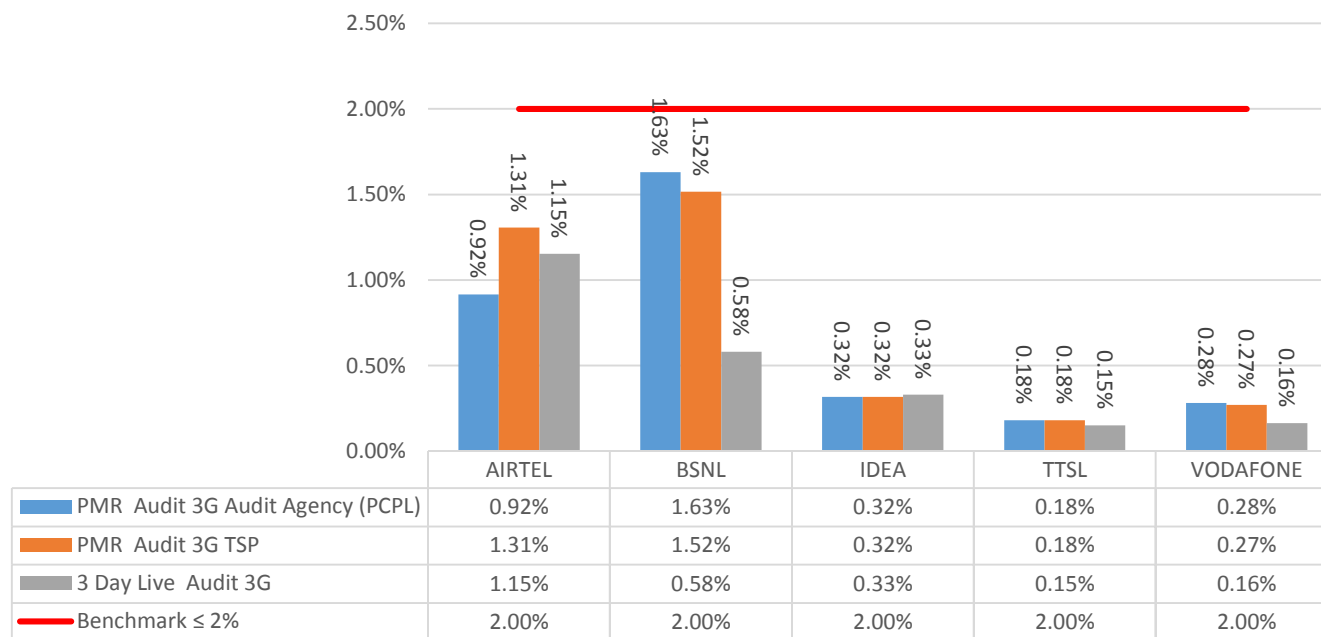
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency (PCPL)	0.92%	1.63%	0.32%	0.18%	0.28%
PMR Audit 3G TSP	1.31%	1.52%	0.32%	0.18%	0.27%
3 Day Live Audit 3G	1.15%	0.58%	0.33%	0.15%	0.16%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

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

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

	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency (PCPL)	0.67%	1.08%	1.20%	0.36%	1.95%
PMR Audit 3G TSP	0.95%	1.62%	1.20%	0.36%	1.46%
3 Day Live Audit 3G	0.35%	0.15%	0.02%	0.00%	1.14%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

15.5.3.   CALL SET-UP SUCCESS RATE (WITHIN LICENSEE OWN NETWORK)
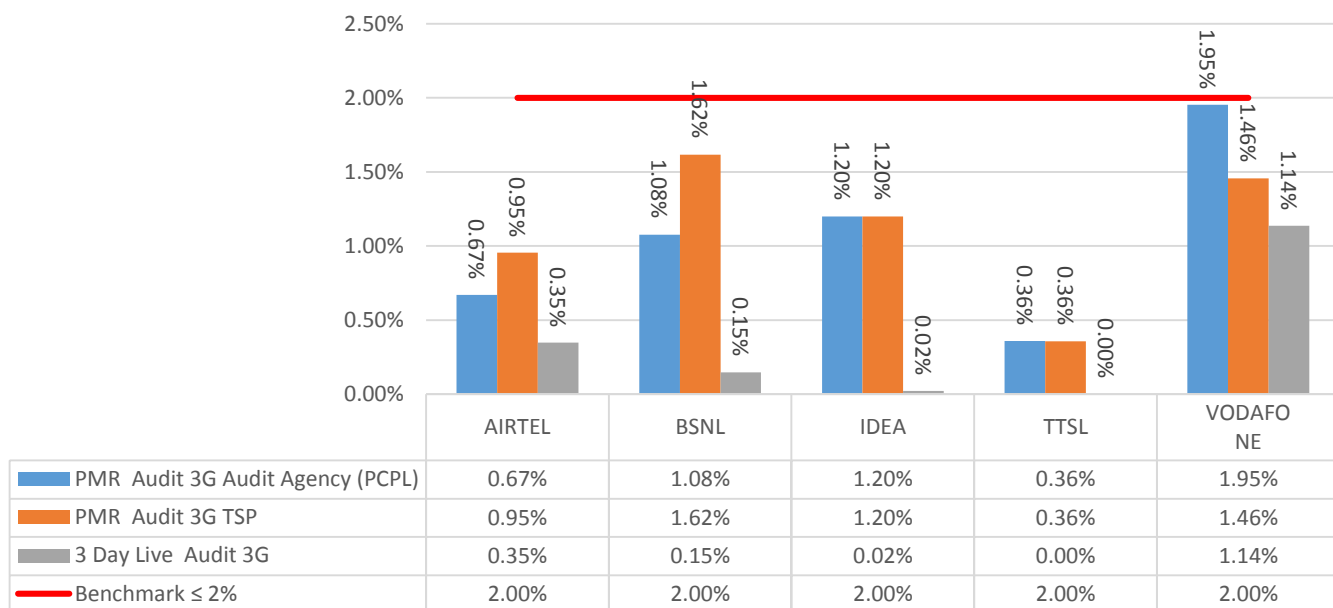
Call Set-up Success Rate (Within Licensee own network)
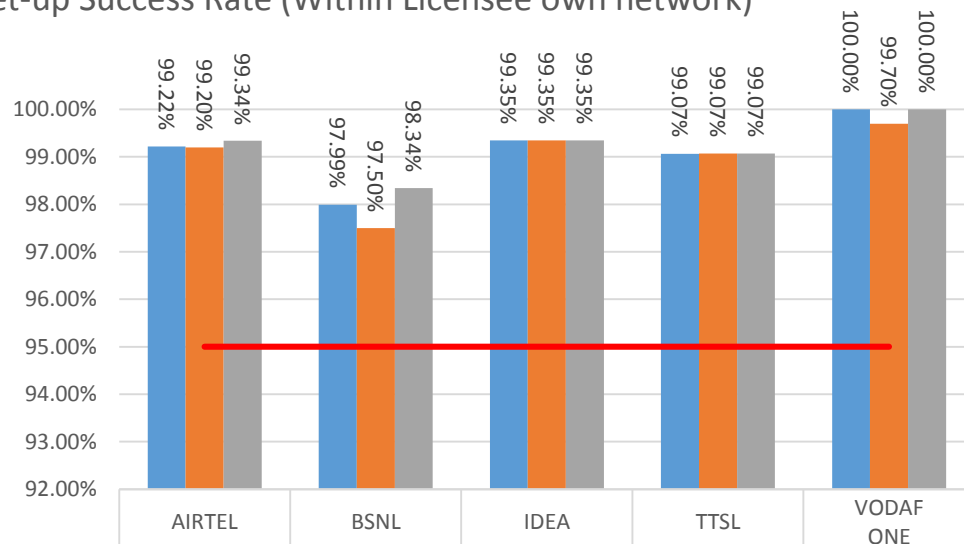
	AIRTEL	BSNL	IDEA	TTSL	VODAF ONE
PMR Audit 3G Audit Agency (PCPL)	99.22%	97.99%	99.35%	99.07%	100.00%
PMR Audit 3G TSP	99.20%	97.50%	99.35%	99.07%	99.70%
3 Day Live Audit 3G	99.34%	98.34%	99.35%	99.07%	100.00%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%

15.5.4.   RRC Congestion

RRC Congestion

	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
■ PMR Audit 3G Audit Agency (PCPL)	0.04%	0.89%	0.87%	0.39%	0.02%
■ PMR Audit 3G TSP	0.04%	0.85%	0.87%	0.39%	0.03%
■ 3 Day Live Audit 3G	0.02%	0.84%	0.80%	0.37%	0.01%
▬ Benchmark ≤ 1%	1.00%	1.00%	1.00%	1.00%	1.00%

15.5.5.   RAB CONGESTION

RAB Congestion

	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency (PCPL)	0.00%	0.83%	0.39%	0.55%	0.07%
PMR Audit 3G TSP	0.00%	1.07%	0.39%	0.55%	0.01%
3 Day Live Audit 3G	0.00%	0.57%	0.41%	0.56%	0.02%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%
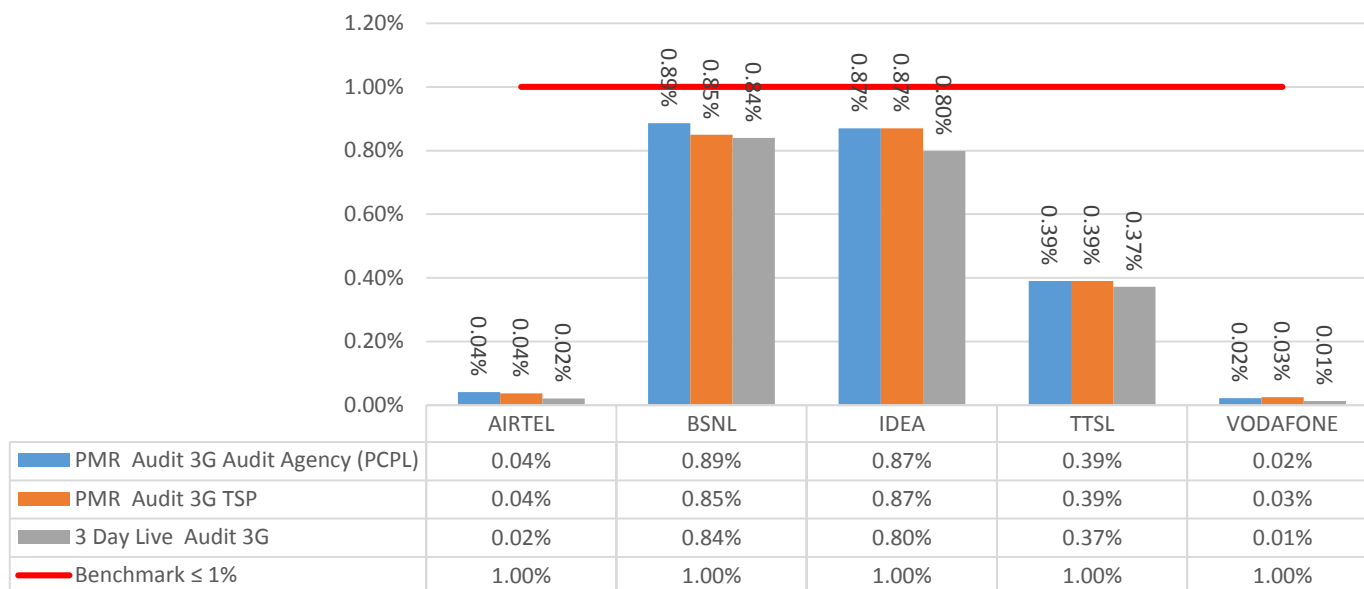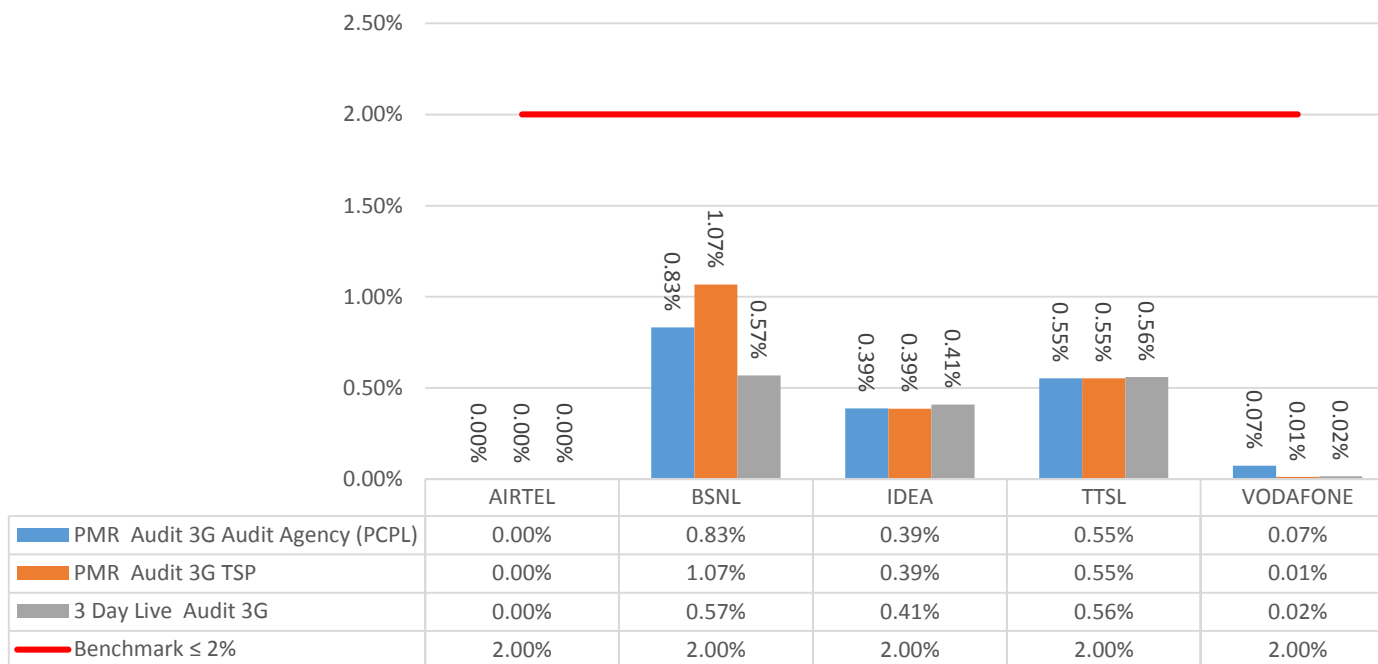
15.5.6.   CIRCUIT SWITCHED VOICE DROP RATE

Circuit Switched Voice Drop Rate
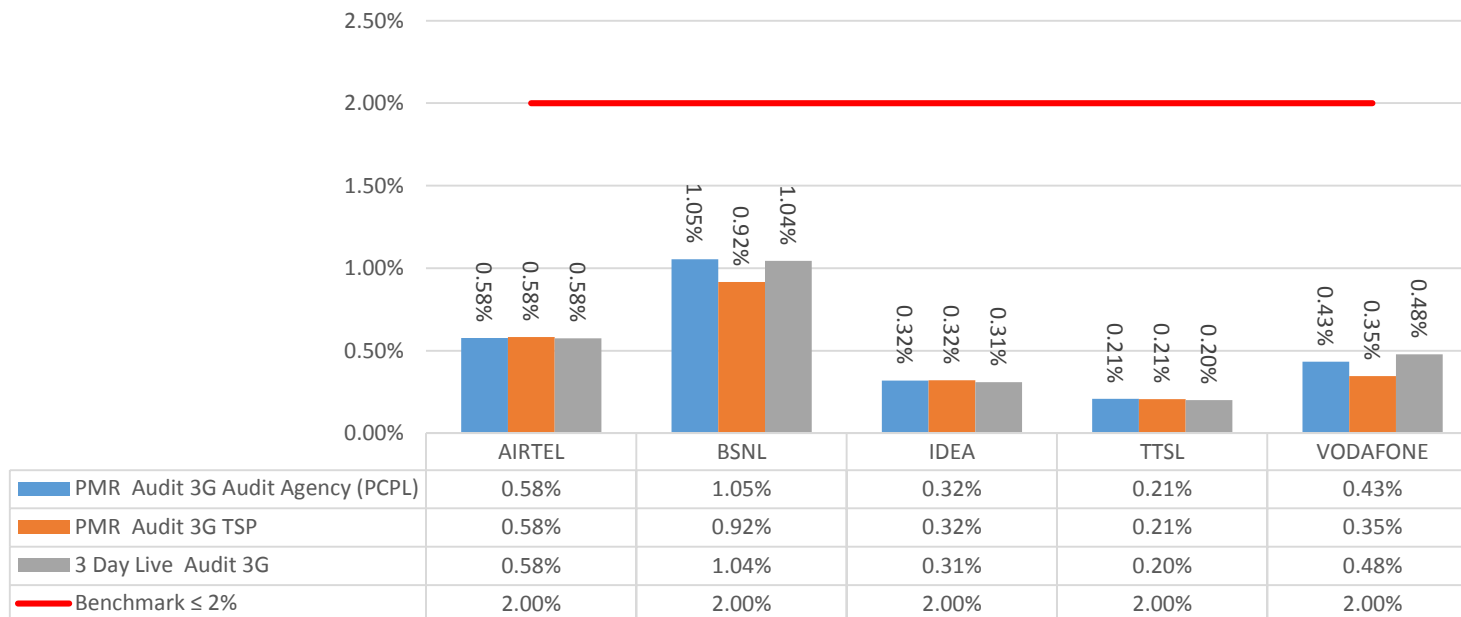
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency (PCPL)	0.58%	1.05%	0.32%	0.21%	0.43%
PMR Audit 3G TSP	0.58%	0.92%	0.32%	0.21%	0.35%
3 Day Live Audit 3G	0.58%	1.04%	0.31%	0.20%	0.48%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

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

	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
■ PMR Audit 3G Audit Agency (PCPL)	1.35%	2.60%	2.94%	1.69%	4.40%
■ PMR Audit 3G TSP	1.42%	2.47%	2.87%	1.69%	2.60%
■ 3 Day Live Audit 3G	1.45%	2.48%	2.68%	1.50%	2.88%
— Benchmark ≤ 3%	3.00%	3.00%	3.00%	3.00%	3.00%
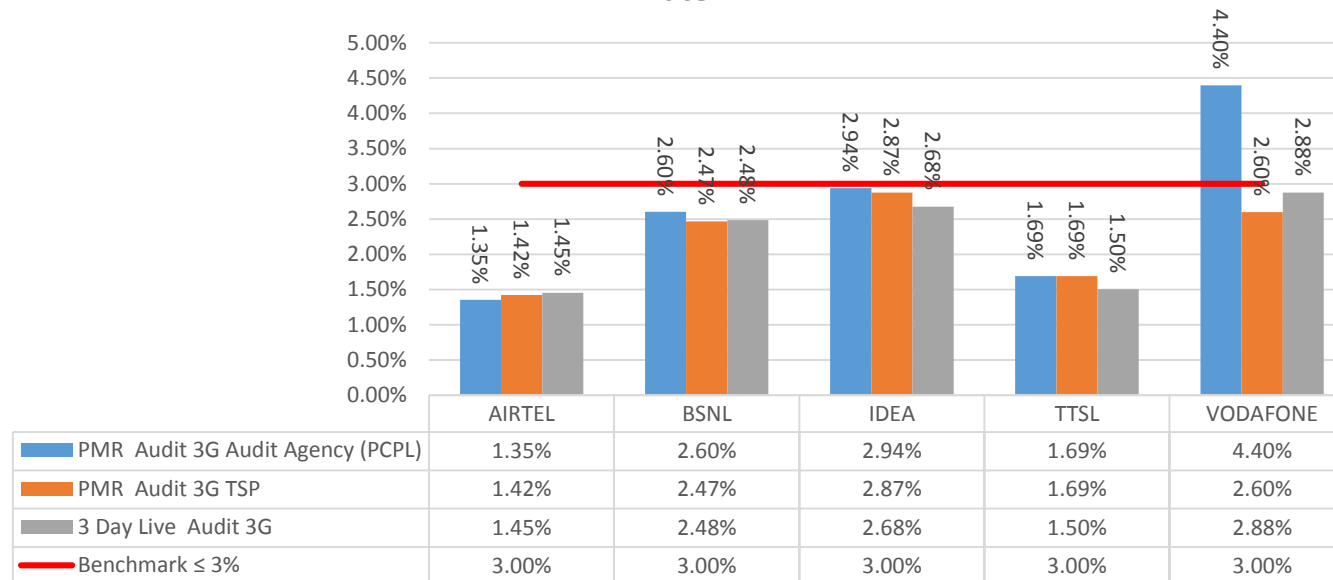
15.5.7.   PERCENTAGE OF CONNECTIONS WITH GOOD CIRCUIT SWITCHED VOICE QUALITY

Percentage of connections with Good Circuit Switched Voice Quality

	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency (PCPL)	98.87%	0.00%	98.91%	99.12%	98.72%
PMR Audit 3G TSP	98.87%	96.43%	98.90%	99.12%	98.72%
3 Day Live Audit 3G	98.89%	0.00%	98.92%	99.12%	98.56%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%
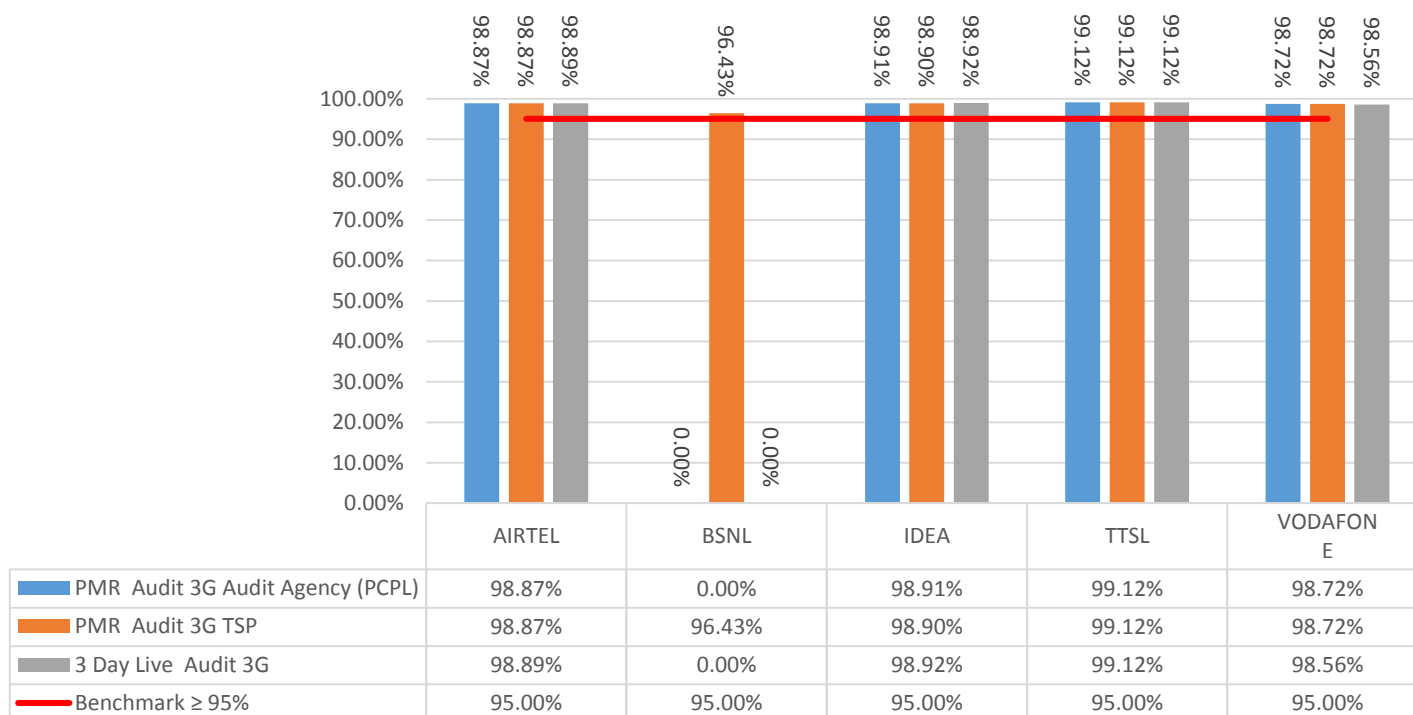
15.6. PMR COMPARISON (TSP VS. AUDIT AGENCY): CSD PARAMETERS

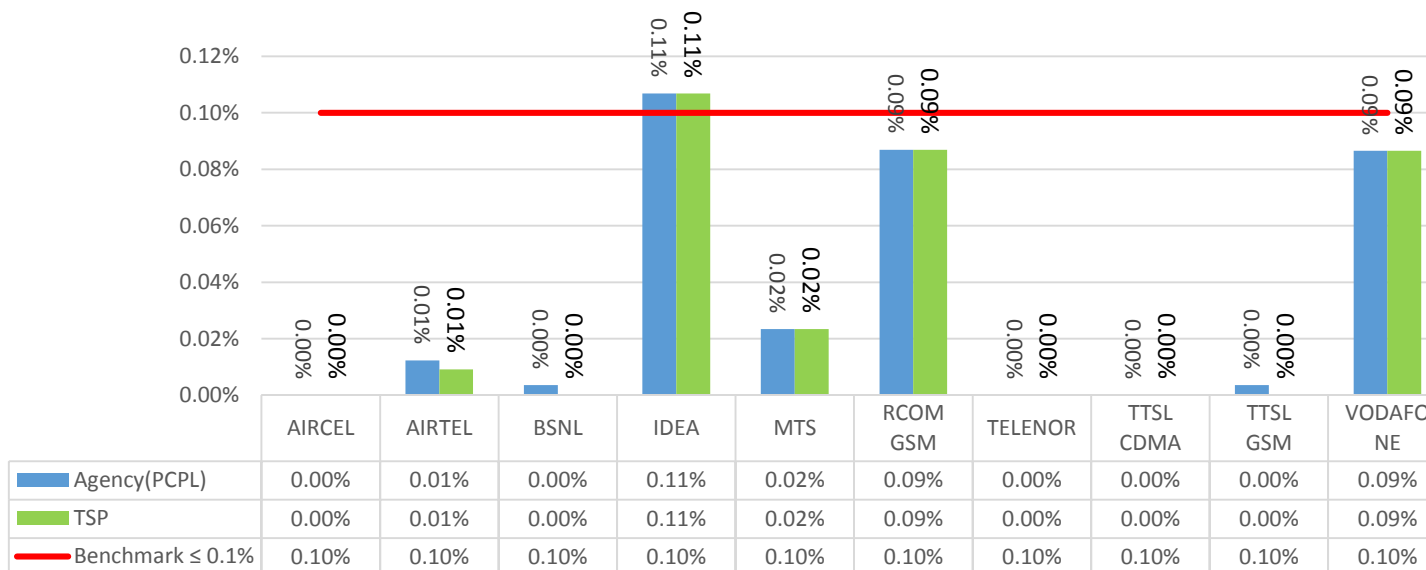| Name of Service Provider	Metering and Billing credibility				Billing Complaints						Termination & Closures		Time taken for refund of		Response time to customer for assistance			
	Postpaid Subscribers		Prepaid Subscribers		%age complaints resolved within 4 weeks		%age complaints resolved within 6 weeks		%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	
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%	NA	100.00%	NA	100.00%	100.00%	100.00%	NA	100.00%	NA	100.00%	98.41%	98.41%	99.18%	99.18%
AIRTEL	0.01%	0.01%	0.09%	0.08%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	97.37%	97.37%
BSNL	0.00%	0.00%	0.00%	0.00%	100.00%	99.87%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.14%	97.95%
IDEA	0.11%	0.11%	0.00%	0.00%	100.00%	99.97%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.43%	99.43%	99.53%	99.53%
MTS	0.02%	0.02%	0.01%	0.02%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.96%	99.96%	95.53%	95.53%
RCOM GSM	0.09%	0.09%	0.10%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	91.95%	91.95%	99.14%	99.14%	95.17%	96.13%
TELENOR	NA	#VALUE!	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	#VALUE!	NA	#VALUE!	NA	#VALUE!	98.90%	98.90%	99.22%	99.22%
TTSL CDMA	0.00%	0.00%	0.00%	0.00%	NA	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	98.94%	99.64%
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%	98.03%	98.03%	97.27%	98.70%
VODAFONE	0.09%	0.09%	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%	97.53%	97.55%

15.6.1. METERING AND BILLING CREDIBILITY : POSTPAID

Metering and Billing Credibility : Postpaid

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	0.00%	0.01%	0.00%	0.11%	0.02%	0.09%	0.00%	0.00%	0.00%	0.09%
TSP	0.00%	0.01%	0.00%	0.11%	0.02%	0.09%	0.00%	0.00%	0.00%	0.09%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

15.6.2. METERING AND BILLING CREDIBILITY : PREPAID

Metering and Billing Credibility : Prepaid

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELEN OR	TTSL CDMA	TTSL GSM	VODAF ONE
Agency(PCPL)	0.00%	0.09%	0.00%	0.00%	0.01%	0.10%	0.00%	0.00%	0.00%	0.06%
TSP	0.00%	0.08%	0.00%	0.00%	0.02%	0.09%	0.00%	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%
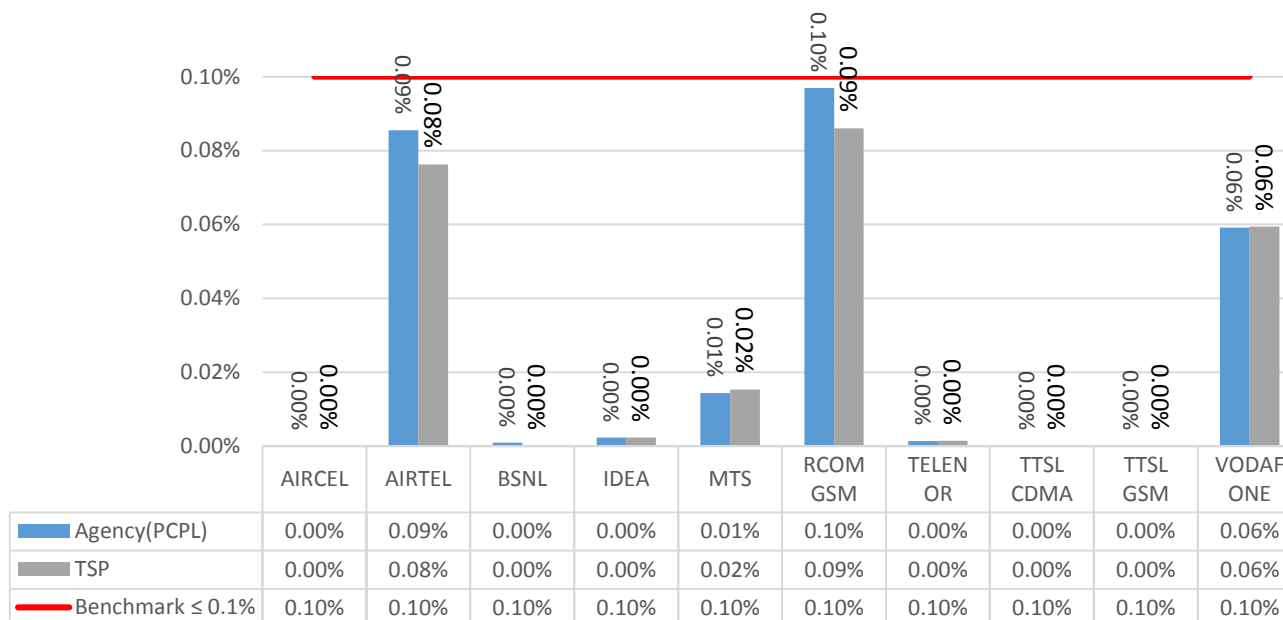
15.6.3. %AGE COMPLAINT RESOLVED WITHIN 4 WEEKS

%Age complaints resolved within 4 weeks

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELEN OR	TTSL CDMA	TTSL GSM	VODAF ONE
Agency(PCPL)	0%	100%	100%	100%	100%	100%	100%	0%	100%	100%
TSP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark ≥ 98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%

15.6.4. %AGE COMPLAINTS RESOLVED WITHIN 6 WEEKS

%Age complaints resolved within 6 weeks

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
■ Agency(PCPL)	0%	100%	100%	100%	100%	100%	100%	0%	100%	100%
■ TSP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
▬ Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
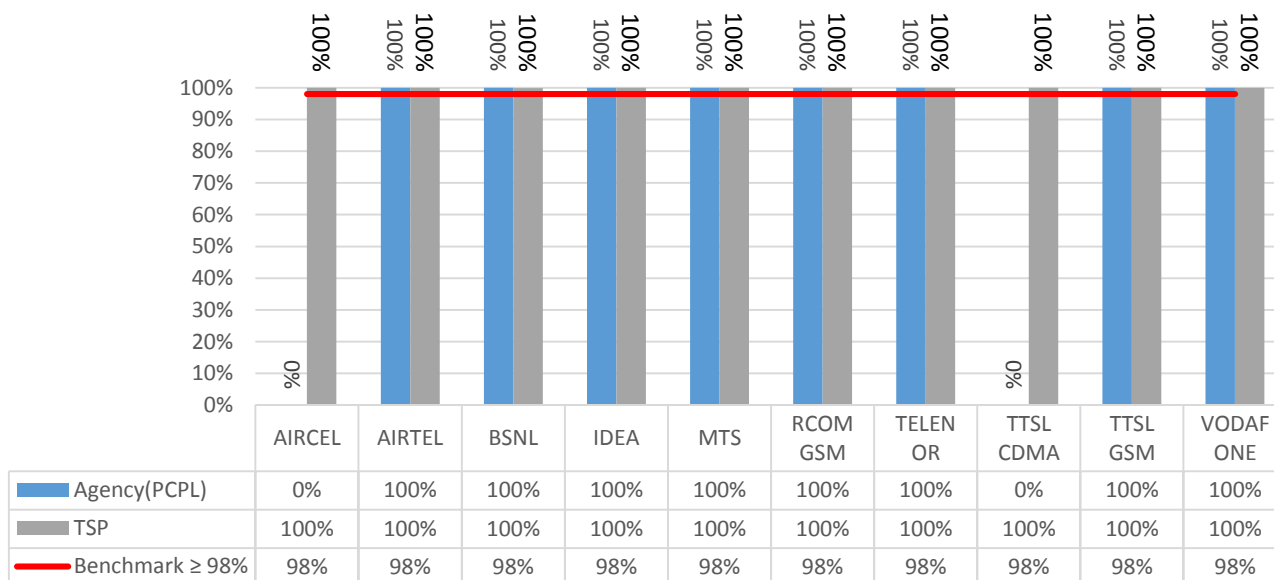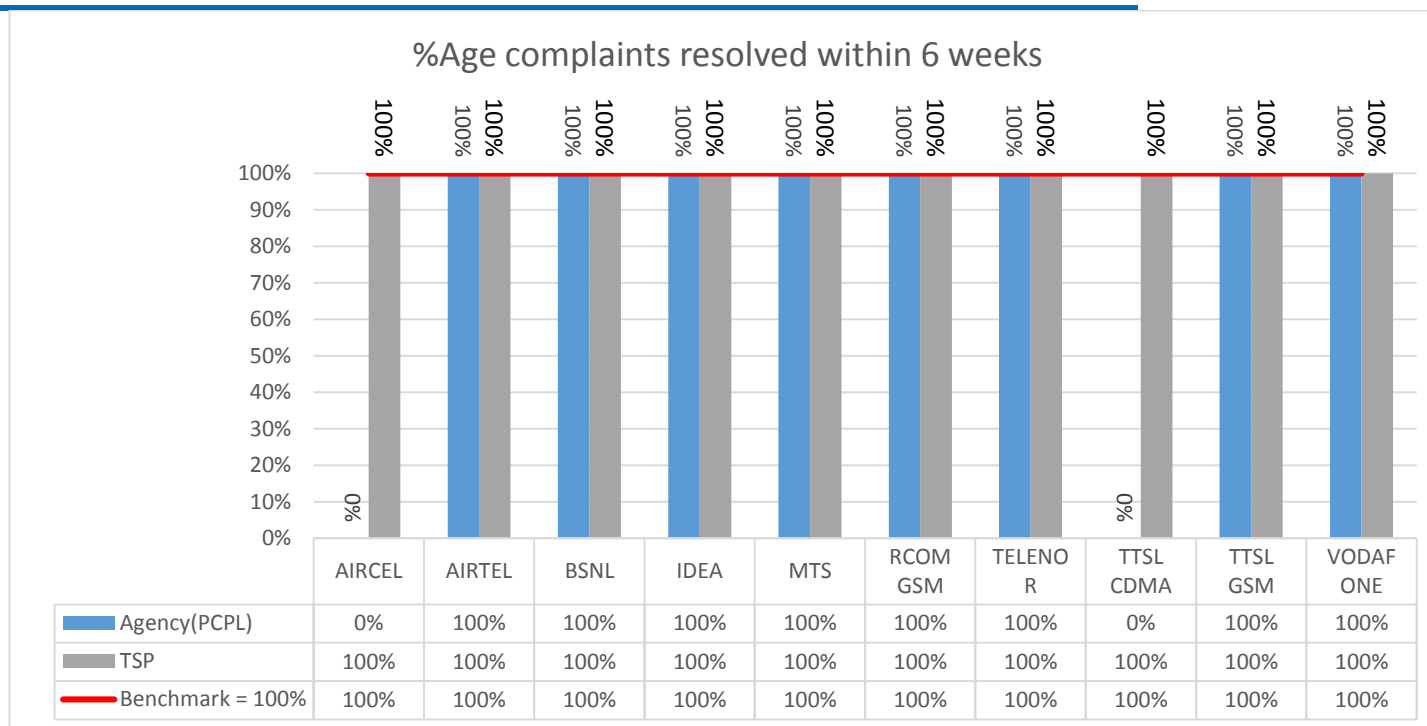
15.6.5. %AGE OF WHERE CREDIT/WAIVER IS RECEIVED WITHIN ONE WEEK

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

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELEN OR	TTSL CDMA	TTSL GSM	VODAF ONE
Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
TSP	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
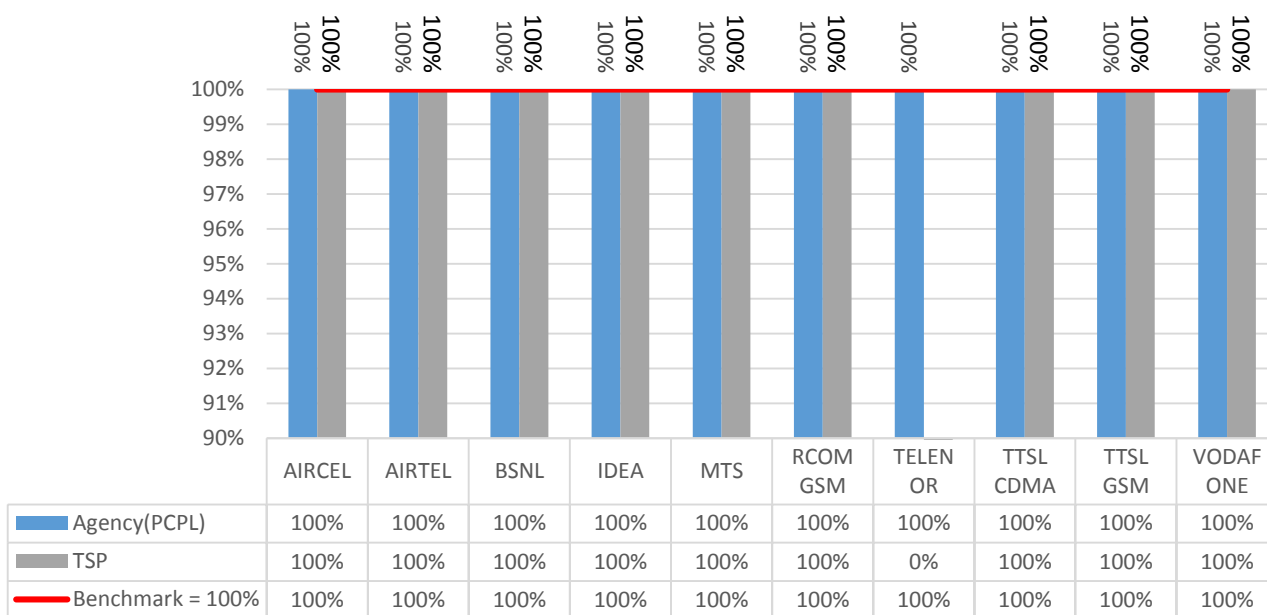
15.6.6. %AGE OF CALLS ANSWERED BY THE IVR

%Age of calls answered by the IVR

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	98.41%	100%	100%	99.43%	99.96%	99.14%	98.90%	0.00%	98.03%	100%
TSP	98.41%	100%	100%	99.43%	99.96%	99.14%	98.90%	100%	98.03%	100%
Live Calling	98.15%	100%	100%	99.73%	99.88%	0.00%	98.94%	0.00%	97.77%	100%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

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

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	99.18%	97.37%	98.14%	99.53%	95.53%	95.17%	99.22%	98.94%	97.27%	97.53%
TSP	99.18%	97.37%	97.95%	99.53%	95.53%	96.13%	99.22%	99.64%	98.70%	97.55%
Live Calling	99.79%	97.97%	97.30%	99.90%	97.01%	0.00%	99.71%	99.29%	99.02%	98.82%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

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

%Age of Termination/ Closure of service within 7 days

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%
TSP	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

15.6.9. CLEARED OVER A PERIOD OF <60 DAYS

Cleared over a period of <60 days

	AIRCEL	AIRTEL	BSNL	IDEA	MTS	RCOM GSM	TELENOR	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	0%	0%	100%	100%	100%	92%	0%	100%	100%	100%
TSP	100%	100%	100%	100%	100%	92%	0%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
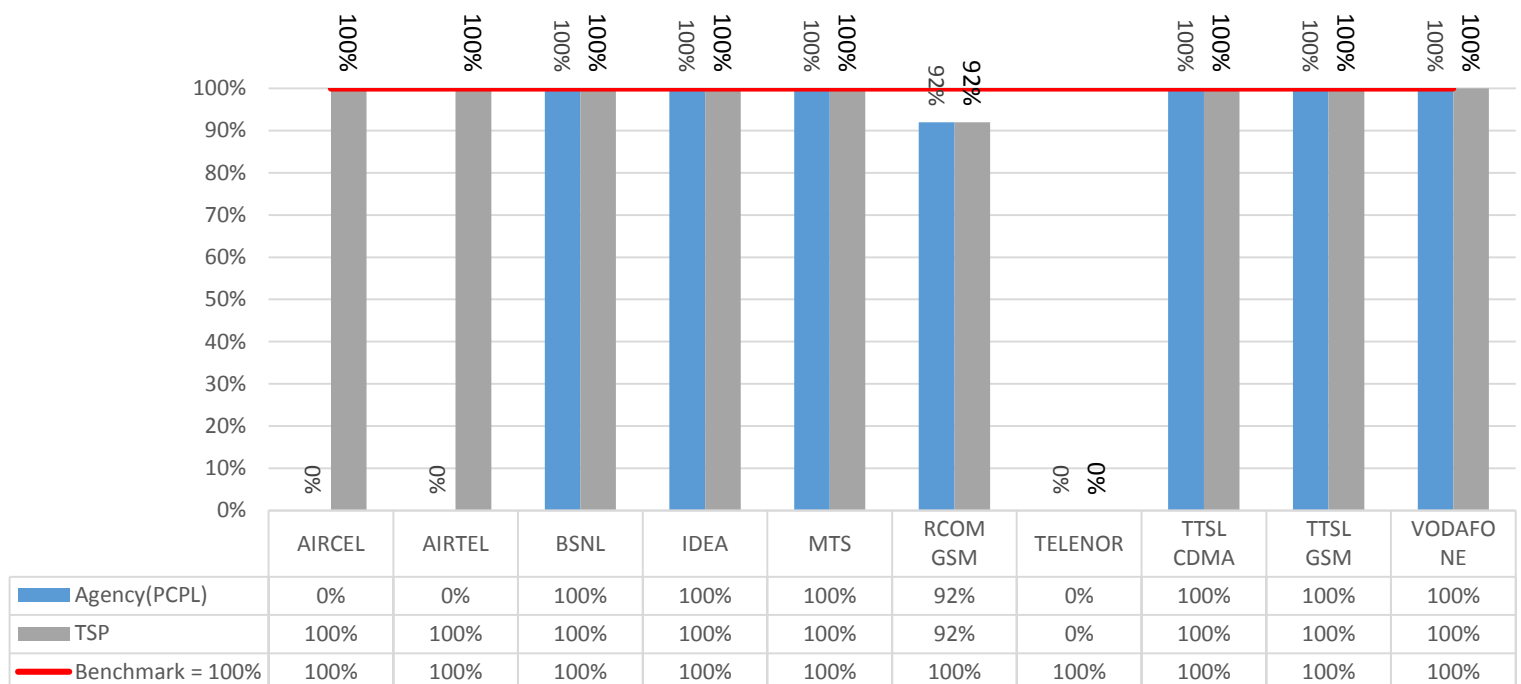
16. KEY FINDINGS

17.2. 2G VOICE PMR - CONSOLIDATED

- TELENOR has parameter value of 3.48% and failed to meet the benchmark of ≤ 3% Worst affected cell having TCH drop.

17.3. 3G VOICE PMR - CONSOLIDATED

- VODAFONE has parameter value of 4.40% and failed to meet the benchmark of ≤ 3% Worst affected cell having TCH drop.

17.4. BILLING AND CUSTOMER CARE

- IDEA has parameter value of 0.11% and failed to meet the benchmark of ≤ 0.1% Metering and Billing credibility Postpaid Subscribers.
- RCOM has parameter value of 0.11% and failed to meet the benchmark of =100% Time taken for refund of deposits after closures: Benchmark Cleared over a period of <60 days (100%).
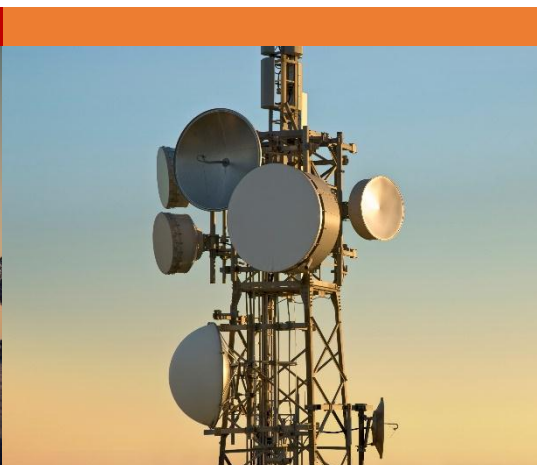
AUDIT & ASSESSMENT
OF
QUALITY OF SERVICE

NORTH ZONE – UP-WEST CIRCLE

WIRELINE & BROADBAND SERVICES
(JULY TO SEP 2016)

PREPARED BY:

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1. INTRODUCTION

1.1. ABOUT TRAI

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

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

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

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

1.2. ABOUT PHISTREAM CONSULTING PRIVATE LIMITED

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

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

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

1.3. OBJECTIVES

The primary objective of the Audit module is to:

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

1.4. COVERAGE

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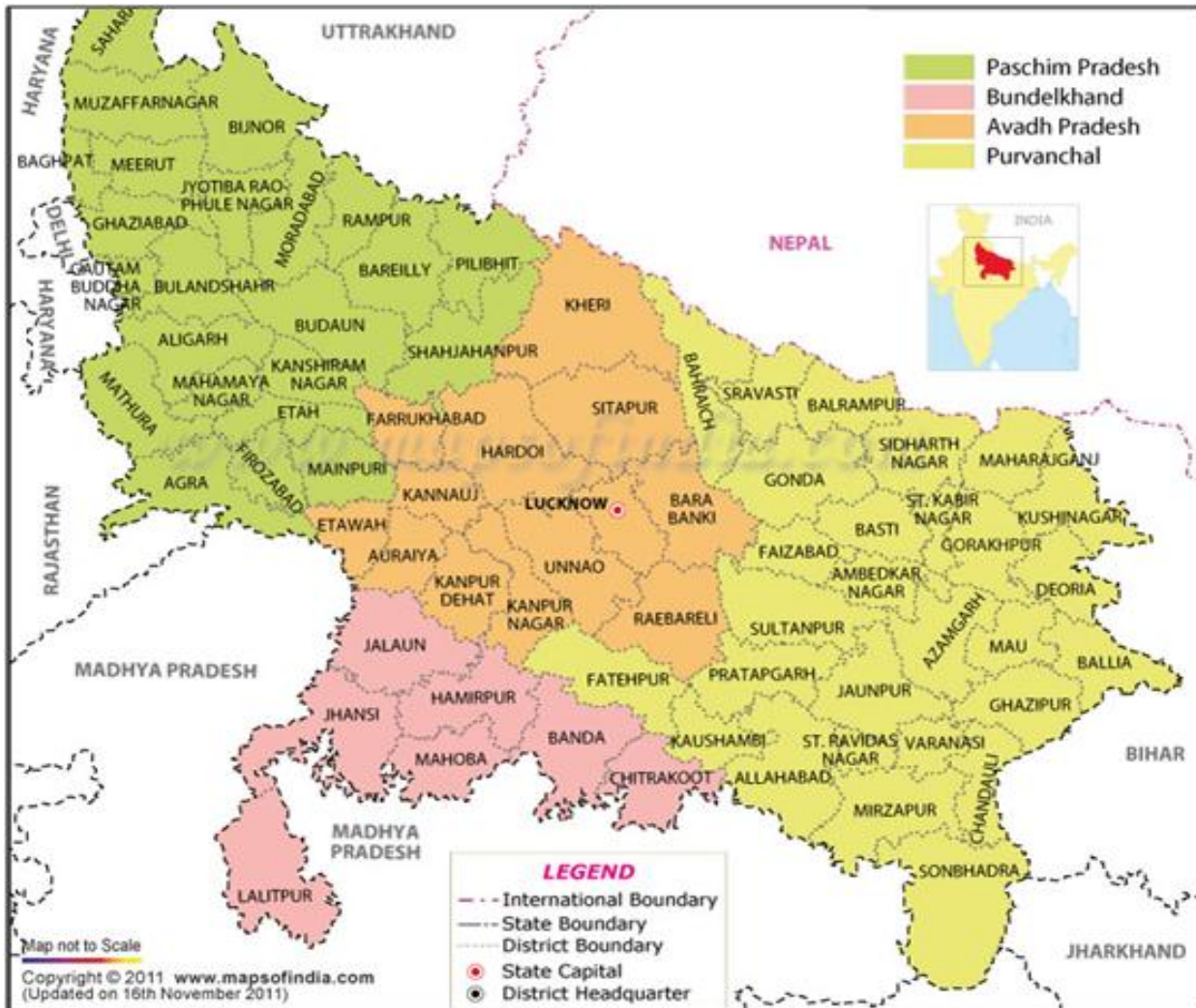
Image Source: TTK Maps

1.5. FRAMEWORK USED

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. BASIC TELEPHONE SERVICE (WIRELINE) AND BROADBAND SERVICES

2.1. WIRELINE SERVICE PARAMETER

S. No.	Name of Parameter	Benchmark
1	Fault incidences (Fault incidences subscribers / month)	≤ 7
2	Fault repair by next working day	For urban areas: By next working day: ≥85% and within 5 days: 100%. For rural and hilly areas: By next working day: ≥75% and within 7days: 100%. Rent Rebate: Faults pending for >3 days and ≤7 days: Rent rebate for 7 days. Faults pending for >7 days and ≤15 days: Rent rebate for 15 days. Faults pending for> 15 days: rent rebate for one month.
3	Mean Time To Repair (MTTR)	≤ 10 Hrs
4	Point of Interconnection (POI) Congestion (on individual POI)	≤ 0.5%
5	Metering and billing credibility – post paid	Not more than 0.1% of bills issued should be disputed over a billing cycle
6	Metering and billing credibility –- pre-paid	Not more than 1 complaint per 1000 customers, i.e. 0.1% complaints for metering, charging, credit, and validity
7	Resolution of billing / charging complaints	≥ 98% within 4 weeks 100% within 6 weeks
8	Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints	Within one week of resolution of complaint
9	Response Time to the customer for assistance	
	(a) Accessibility of call centre/ customer care	≥ 95%
	(b)Percentage of calls answered by the operators (voice to voice) within 60 seconds	≥ 95%
10	Termination/ closure of service	≤ 7
11	Time taken for refund of deposits after closures	100% within 60 days.

2.2. BROADBAND SERVICE PARAMETER

S. No.	Name of Parameter	Benchmark
1	Service provisioning\ Activation	100% cases in ≤ 15 working days (subject to technical feasibility). In all cases where payment towards installation charge & security deposit is taken and the Broadband connection is not provided within 15 working days, a credit at the rate ofRs.10/ per day, subject to a maximum of installation charge or equivalent usage allowance shall be given to the customer, at the time of issue of first bill.
2	Fault Repair\Restoration Time	By next working day: > 90% and within 3 working days: 99% Rebate: (a) Faults Pending for > 3 working days and < 7 working days: rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance (b) Faults Pending for > 7 working days and < 15 working days: rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance (c) Faults Pending for > 15 working to one month of minimum monthly usage allowance.
3	Billing Performance	
	• Billing complaints per 100 bills issued	<2%
	• %age of Billing Complaints Resolved	100% within 4 weeks
	• Time taken for refund of deposits after closure	100% within 60 days
4	Response time to the customer assitance	% age of calls answered by operator (Voice to Voice) Within 60 seconds > 60% Within 90 seconds > 80%
5	Bandwidth Utilization/ throughput	
	a) Bandwidth Utilization	
	i) POP to ISP Gateway Node (Intra – Network) Links.	
	ii) ISP Gateway Node to IGSP / NIXI upstream links for international connectivity.	<80% link(s)/route bandwidth utilization during peak hours (TCBH).
	b) Broadband connection speed (download).	Subscribed Broadband Connection Speed to be met >80% from ISP Node to User.
6	Service Availability / Uptime for all users	> 98%

7	Packet Loss (for wired broadband access)	<1%
8	Network Latency (for wired broadband access)	
	• User reference point at POP\ ISP gateway node to international gateway.	<120 msec
	• User reference point at ISP Gateway Node to international nearest NAP port abroad.	<350 msec
	• User reference point at ISP Gateway Node to international nearest NAP port abroad	<800 msec
9	Customer perception of services	
a	% satisfied with the provision of services.	>90%
b	% satisfied with the billing performance.	>90%
c	% satisfied with help services	>90%
d	% satisfied with network performance, reliability and availability	>85%
e	% satisfied with maintainability	>85%
f	% satisfied with Overall customer satisfaction	>85%
g	% satisfied Customer satisfaction with offered supplementary services such as allocation of static/fixed IP addresses, email-id's.	>85%

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

Basic Telephone (Wire line) Service

3. EXECUTIVE SUMMARY : BASIC (WIRELINE)

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

3.1. BASIC (WIRELINE)

The QoS audit for basic (wire line) service was undertaken for assessment of quarterly performance of the service providers for quarter ended Sep-2016.

Sampling has been done for each service provider separately as per TRAI Guideline. In an LSA, sample has been included all POPs located in 10% of SDCAs in the LSA or 10 SDCAs, whichever is more, subject to maximum of the number of SDCAs covered by the service provider in the LSA. SDCAs selected should be evenly spread over the LSA and shall include major population centers. List and details of POPs shall be obtained from NOC/ISP Node of the operators. The performance of the Service providers against each parameter has been evaluated by taking average of performance value of each parameter for all the exchanges of the respective service providers. The averaged value of each parameter has been tabulated as follows.

Sr. No	Service Provider	Circle	Audit Location	No. of Exchanges Covered for Audit
1	BSNL	UP West	Gajiyabad & Buland Sahar	167
3	RCL		1st Floor Magnum Plaza Eldeco Green Gomti nagar Lucknow	1
	Total Exchanges			**168**

3.2. SERVICE PROVIDER PERFORMANCE REPORT BASED ON QUARTERLY MEASUREMENT DATA VERIFICATION FOR BASIC TELEPHONE SERVICE (WIRELINE) PROVIDERS

AVERAGED AUDITED DATA FOR WIRELINE (BASIC) SERVICES – UP West CIRCLE

Sl. No.	Parameters	Benchmark	Period	RELIANCE	BSNL
1	**Fault incidences**				
	(No. of faults/100 subscribers /month)	< 7%	*Quarterly*	0.00%	4.03%
2	**Faults Repair/Restoration Time**				
	Fault repair by next working day(Urban Area)	**>85%**	*Quarterly*	**NA**	**91.47%**
	% of fault repair within 5 days (Urban Area)	**100%**	*Quarterly*	**NA**	**100.00%**
	Fault repair by next working day(Rural & hilly Area)	**>75%**	*Quarterly*	**NA**	**100.00%**
	% of fault repair within 7 days(Rural & hilly Area)	**100%**	*Quarterly*	**NA**	**100.00%**
	Mean time to Repair(MTTR)	**≤10 Hrs**	*Quarterly*	**NA**	**7.67**
3	**Rent Rebate**				
	Fault pending > 3 days & <7 days	**Rebate for 7 days**	*Quarterly*	NA	0
	Fault Pending > 7 days & < 15 days	**Rebate for 15 days**	*Quarterly*	NA	51
	Fault pending > 15 days	**Rebate for 1 month**	*Quarterly*	NA	55
4	**Metering & Billing Performance**				
	% of disputed Bills over bills issued (Post Paid)	**< 0.1%**	*Quarterly*	0.00%	0.29%
	% of Pre-paid Charging Complaints	**< 0.1%**	*Quarterly*	**NA**	**NA**
	% of billing complaints resolved within 4 weeks	**98% within 4 weeks**	*Quarterly*	**NA**	**100.00%**
	% of billing complaints resolved within 6 weeks	**100% within 6 weeks**	*Quarterly*	**NA**	**100.00%**
	Period of all refunds/payments from the date of resolution of complaints within 1weeks	**<=1 week**	*Quarterly*	**NA**	**100.00%**
5	**POI Congestion**				
	No. of POI's having congestion >0.5%		*Quarterly*	0	0
6	**Response Time to customer for assistance**				
	Accessibility of Call centre/customer Care	**>=95%**	*Quarterly*	**98.88%**	**98.86%**
	% age of calls answered by operator(voice to voice) within 90 seconds	**>=95%**	*Quarterly*	**99.63%**	**99.77%**
7	**Customer care(promptness in attending to customers request)**				
	Termination / Closures	**100%**	*Quarterly*	**100.00%**	**100.00%**
	Time taken for refunds of deposit after closures	**100%**	*Quarterly*	**NA**	**99.78%**

3.3. SERVICE PROVIDER PERFORMANCE REPORT BASED ON 3 DAYS LIVE MEASUREMENT DATA VERIFICATION FOR BASIC TELEPHONE SERVICE (WIRELINE) PROVIDERS

SI No.	Parameters	Benchmark	Period	RCL	BSNL
1	**POI Congestion**				
	No. of POI's having congestion >0.5%	≤0.5%	Quarterly	0	0
2	**Response Time to customer for assistance**				
	Accessibility of Call centre/customer Care	≥95%	Quarterly	**98.69%**	**98.40%**
	% age of calls answered by operator(voice to voice) within 90 seconds	≥95%	Quarterly	**99.69%**	**99.90%**

<p align="center">**3 DAYS LIVE MEASUREMENT DATA FOR WIRELINE (BASIC) SERVICES - UP West CIRCLE**</p>

3.4. KEY FINDINGS: BASIC TELEPHONE SERVICES (WIRELINE)

Fault Incidences: -The audit of the service providers revealed that the performance of all service providers was well within the benchmark.

Fault Repair/Restoration Time: - The audit of the service providers revealed that the performance of all service providers was well within the benchmark.

Mean Time to Repair: - The audit of the service providers revealed that the performance of all service providers was well within the benchmark.

Metering and Billing performance: - For this parameter, all operators were meeting the benchmark except BSNL could not meet the benchmark with their performance as 0.29% against the benchmark of >0.1%.

POI Congestion: - All operators were found meeting the benchmark for this parameter.

Response Time to Customer for assistance: - For percentage of calls getting connected to call center and answered, all operators managed to meet the TRAI benchmark.

Termination/Closures: - All operators were found meeting the benchmark for this parameter.

3.5. INTER OPERATOR CALL ASSESSMENT (WIRELINE SERVICES)

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in UP-West Circle service area during the time 1000 to 1300 Hrs and 1500 to 1700 was carried out by auditors. The test calls were made from one operator to another within the same licensed area to judge the ease of connectivity amongst the operators

INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT				
Calling Operators	Circle Name	Total No. of calls Made	BSNL	RCL
BSNL	UP West	100	--	100%
RCL		100	100%	--

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

3.6. LEVEL-1 LIVE CALLING (WIRELINE SERVICES)

PHISTREAM
An ISO-9001:2008 Certified Company

Level 1 Live Calling

PUT x FOR UNSUCCESSFUL CALL AND TICK FOR SUCCESSFUL CALL			
S. NO.	L1 Service Number	CIRCLE NAME:UP West	
	Details/TSP	RCOM	BSNL
1	100 Police	√	✓
2	101 Fire	√	✓
3	102 Ambulance	x	✓
4	104 Health Information Helpline	x	X
5	108 Emergency and Disaster Management Helpline	√	✓
6	138 All India Helpine for Passangers	√	X
7	149 Public Road Transport Utility Service	√	X
8	181 Chief Minister Helpline	√	✓
9	182 Indian Railway Security Helpline	x	X
10	1033 Road Accident Management Service	x	✓
11	1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'	x	X
12	1056 Emergency Medical Services	√	X
13	106X State of the Art Hospitals	x	X
14	1063 Public Grievance Cell DoT Hq	x	✓
15	1064 Anti Corruption Helpline	x	✓
16	1070 Relief Commission for Natural Calamities	x	X
17	1071 Air Accident Helpline	x	X
18	1072 Rail Accident Helpline	x	✓
19	1073 Road Accident Helpline	x	✓
20	1077 Control Room for District Collector	x	X
21	1090 Call Alart (Crime Branch)	√	✓
22	1091 Women Helpline	√	✓
23	1097 National AIDS Helpline to NACO	√	✓
24	1099 Central Accident and Trauma Services (CATS)	x	X
25	10580 Educational& Vocational Guidance and Counselling	x	X
26	10589 Mother and Child Tracking (MCTH)	x	X
27	10740 Central Pollution Control Board	x	X
28	10741 Pollution Control Board	x	X
29	1511 Police Related Service for all Metro Railway Project	x	X

30	1512 Prevention of Crime in Railway	√	X
31	1514 National Career Service(NCS)	√	X
32	15100 Free Legal Service Helpline	√	X
33	155304 Municipal Corporations	x	X
34	155214 Labour Helpline	x	X
35	1903 Sashastra Seema Bal (SSB)	√	✓
36	1909 National Do Not Call Registry	√	✓
37	1912 Complaint of Electricity	√	✓
38	1916 Drinking Water Supply	x	X
39	1950 Election Commission of India	x	X

To assess the availability and efficiency of level 1 service such as police, fire, ambulance (emergency services), the calls were made from telephone provided by service providers, these services were found functional in the networks of all the service providers.

3.7. CUSTOMER CARE / HELPLINE ASSESSMENT (WIRELINE SERVICES)

LIVE CALLING TO CALL CENTRE				
	Benchmark	Circle	BSNL	RCL
Total No. of calls Attempted			100	100
A) Total no of calls attempted to customer care/Call center			100	100
B) Total no. of calls successfully established to customer care/Call center			100	100
C) % Accessibility of Call centre /customer Care (Total call attempt*100/ Total call successfully established)	>=95%	UP West	**100.00%**	**100.00%**
D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)			100	100
E) Total number of calls answered by the operator (Voice to voice) within 90 seconds			100	100
F) % age of calls answered by the operators (voice to voice) within 90 seconds (E *100/ D)	>=95%		**100.00%**	**100.00%**

In case of calls answered by operators (voice to voice), when test calls were made to the call centres, all service providers, 100% calls were connected to the call centre within 90 seconds.

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

Broadband Service

4. EXECUTIVE SUMMARY : BROADBAND

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

4.1. QUALITY OF SERVICE AUDIT OF BROADBAND SERVICE PROVIDERS

Phistream has to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who are having broadband subscriber base of more than 10,000 subscribers in their licensed service area as per TRAI guideline; Sampling shall be done for each service provider separately. In an LSA, sample shall include all POPs located in 10% of SDCAs in the LSA or 10 SDCAs, whichever is more, subject to maximum of the number of SDCAs covered by the service provider in the LSA. SDCAs selected should be evenly spread over the LSA and shall include major population centers. List and details of POPs shall be obtained from NOC/ISP Node of the operators. A service areal circle in the contracted Zone shall be audited only once in a year.

Discussion with the private broadband service providers reveals that there is no concept of their PoPs on SDCA basis; they are maintaining their entire data on centralized basis so audit has been done for the centralized data.

Audit was done for the following Broadband service Providers in UP-West circle.

Sl. No.	Name of Broadband Service Providers	Subscriber Base	Location of Audit
1	DEN Network	8099	Okhla, Phase III, New Delhi
2	Hathway Cable	21661	Meerut (UP-West)
3	Pacenet	514	Delhi
4	Tikona	1088	Meerut (UP-West)
5	RCL	182	Meerut (UP-West)
6	BSNL	16249	Gajiyabad & Buland Sahar

4.2. SERVICE PROVIDER PERFORMANCE REPORT BASED ON QUARTERLY MEASUREMENT DATA VERIFICATION FOR BROADBAND SERVICE PROVIDERS

S/N	Name of Parameter	Benchmark	Circle Name	DEN Network	Hathway	Pacenet	Tikona	RCL	BSNL
	AVERAGED QUARTERLY (JULY TO SEP-16) AUDIT DATA FOR BROADBAND SERVICES — Broadband Audit Data								
1	**Service Provisioning/Activation Time**								
	A) No of connections registered during the period			1766	3877	69	1088	120	980
	B) Total number of connections provided within 15 days of registration on demand during the period			1766	3837	69	1088	120	980
	C) % age of connections provided within 15 days of registration on demand (subject to technical feasibility)	<15 days		100.00%	98.97%	100.00%	100.00%	100.00%	100.00%
	D)Total number of connections provided after 15 days of registration on demand			0	0	0	0	0	0
	E) %age of connections provided after 15 days of registration on demand			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	F) In all cases where payment towards installation charge & SD is taken and the Broadband connection is not provided within 15 working days	credit @ Rs.10/ per day.		NA	NA	NA	NA	NA	NA
2	**Fault Repair/Restoration Time**								
	A) Total number of faults registered during the period			4549	8614	26	2680	0	3975
	B) Total number of faults repaired by next working day			4360	8526	25	2569	NA	3869
	C) % age of faults repaired by next working day	>90%		95.85%	98.98%	96.15%	95.86%	NA	97.33%
	D) Total number of faults repaired within three working days			4539	8564	26	2676	NA	3975
	E)% age of faults repaired within three working days	≥99%		99.78%	99.42%	100.00%	99.85%	NA	100.00%
3	**Rent Rebate**								
	A) Faults Pending for > 3 working days and < 7,working days: (Rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance)			0	0	0	35	0	3
	B) Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)			0	0	0	17	0	0
	C) Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)			0	0	0	10	0	0
4	**Billing Performance**								
	A) Total bills generated during period			NA (Prepaid Model)	NA (Prepaid Model)	153	12165	231	109047
	B) Total complaints received from customers/ Bills disputed			NA	NA	0	62	0	194
	C) Billing complaints per 100 bills issued	<2%		NA	NA	0.00%	0.51%	0.00%	0.18%
	D) Total number of complaints resolved in 4 weeks from date of receipt			NA	NA	NA	62	NA	194
	E) %age billing complaints resolved in 4 weeks	100%		NA	NA	NA	100.00%	NA	100.00%
	F) Total number of cases requiring refund of deposits after closure			NA	NA	NA	0	NA	1366
	G) Total number of cases where refund was made in <60 days			NA	NA	NA	0	NA	1360
	H) Percentage cases in which refund received within 60 days	100%		NA	NA	NA	NA	NA	99.56%
5	Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)								

	A) Total number of calls received by the operator			291025	DNA	19	27478	86286	59991
	B) Total number of calls answered by the operator within 60 seconds			263095	DNA	19	17404	84783	59773
	C) % age calls answered by the operator in 60 seconds	>60%		92.13%	DNA	100.00%	63.34%	98.26%	99.64%
	D) Total number of calls answered by the operator within 90 seconds			270032	DNA	19	23026	84953	59915
	E) % age calls answered by the operator within 90 seconds	>80%		94.55%	DNA	100.00%	83.80%	98.46%	99.87%
6	Bandwidth Utilization/ Throughput: (If on any link(s) / route bandwidth utilization exceeds 90%, then network is considered to have congestion. For this additional provisioning of Bandwidth on immediate basis, but not later than one month, is mandated.) < 80% link(s) / route bandwidth utilization during peak hours (TCBH).								
	POP to ISP Gateway Node [Intra-network] Link(s)								
6.1	A) Total Bandwidth Available at the link for the period days			11935	DNA	465	2865	6000	15366
	B) Total Bandwidth utilized during the period during TCBH (In Mpbs)			9954	DNA	311	2817	1401	8905.2
	C) % age Bandwidth utilized during the period	<80%		83.40%	DNA	66.88%	98.32%	23.35%	57.95%
	A) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity								
6.2	A) Total number of upstream links for Inter International connectivity			6	16	DNA	6	11	21
	B) Number of Links having Bandwidth utilization > 90% during TCBH			6	0	DNA	0	0	6
	C) Total Internationall bandwidth available from ISP Node to IGSP/NIXI/DNAP			11935	12886	DNA	2550	110000	10416
	D) Total International bandwidth utilization during peak hours (TCBH) in Mpbs			9954	7880	DNA	1986.5	43139	5933
	E) %age International Bandwidth utilization during peak hours (TCBH)	<80%		83.40%	61.15%	DNA	77.90%	39.22%	56.96%
	Broadband Connection Speed (download) - from ISP Node to User								
6.3	A) Total committed download speed to the sample subscribers (In mpbs)			15	63	34	12288	12	18
	B) Total average download speed observed for the sample subscribers during TCBH (In Mpbs)			15	59.97	32.23	10452	10.46	14.5
	C) % age subscribed speed available to the subscriber during TCBH	>80%		100.00%	95.19%	94.79%	85.06%	87.17%	80.56%
	Service Availability/Uptime								
7	A) Total operational Hours			2208	2208	2208	2208	2208	4392
	B) Total downtime (In hours)			11.65	7.39	0	1.52	0	57.00
	C) Total time when the service was available (In Hrs)			2196.35	2200.61	2208	2206.48	2208	4335
	D) % age of Service availability uptime	>98%		99.47%	99.67%	100.00%	99.93%	100.00%	98.70%
	Packet Loss								
8	A) Total number of ping packets transmitted			3000	3000	3000	3000	92000	6000
	B) Total number of ping packets lost			0	0	1	0	632	3
	C) % age packet loss	<1%		0.00%	0.00%	0.03%	0.00%	0.69%	0.05%
9	Network latency (for wired broadband access)								
	Network Latency from User reference point at POP/ISP Node to IGSP/NIXI gateway								
9.1	A) Total number of ping packets transmitted			3000	3000	DNA	DNA	1000	6000
	B) Average round trip tip time for all the ping transmitted	<120 ms		102	23	DNA	DNA	1	28
	Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Terrestrial)								
9.2	A) Total number of ping packets transmitted			3000	3000	3000	DNA	1000	3000
	B) Average round trip tip time for all the ping transmitted	<350 ms		23.33	166	145.67	DNA	6.67	34

9.3	Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Satellite)								
	B) Average round trip tip time for all the ping transmitted			NA	NA	NA	NA	NA	NA
	C) Average round trip tip time for all the ping transmitted	<800 ms		NA	NA	NA	NA	NA	NA

4.3. SERVICE PROVIDER PERFORMANCE REPORT BASED ON 3 DAYS MEASUREMENT DATA VERIFICATION FOR BROADBAND SERVICE PROVIDERS

3 DAYS LIVE DATA FOR BROADBAND SERVICES

S/N	3 days live Broadband Audit Data / Name of Parameter	Bench-mark	Circle name	DEN Network	Hathway	Pacenet	Tikona	RCL	BSNL
1	Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)								
	A) Total number of calls received by the operator			8820	DNA	1	734	3103	2052
	B) Total number of calls answered by the operator within 60 seconds			7995	DNA	1	551	3042	2046
	C) % age calls answered by the operator in 60 seconds	>60%		92.38%	DNA	100.00%	75.07%	98.03%	99.71%
	D) Total number of calls answered by the operator within 90 seconds			8201	DNA	1	719	3051	2050
	E) % age calls answered by the operator within 90 seconds	>80%		95.81%	DNA	100.00%	97.96%	98.32%	99.89%
2	Bandwidth Utilization/ Throughput: (If on any link(s) / route bandwidth utilization exceeds 90%, then network is considered to have congestion. For this additional provisioning of Bandwidth on immediate basis, but not later than one month, is mandated.) < 80% link(s) / route bandwidth utilization during peak hours (TCBH).								
2.1	POP to ISP Gateway Node [Intra-network] Link(s)								
	A) Total Bandwidth Available at the link for the period days			10230	DNA	465	2865	6000	4272
	B) Total Bandwidth utilized during the period during TCBH (In Mpbs)			10090	DNA	311	1886.512	1594	1983
	C) % age Bandwidth utilized during the period	<80%		98.63%	DNA	66.88%	65.85%	26.57%	46.42%
2.2	A) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity								
	A) Total number of upstream links for International connectivity			5	6	DNA	6	11	21
	B) Number of Links having Bandwidth utilization > 90% during TCBH			5	0	DNA	0	0	4
	C) Total International bandwidth available from ISP Node to IGSP/NIXI/DNAP			10230	14886	DNA	2550	110000	10416
	D) Total international bandwidth utilization during peak hours (TCBH) in Mpbs			10090	11360	DNA	1886	52987.67	5988
	E) %age International Bandwidth utilization during peak hours (TCBH)	<80%		98.63%	76.31%	DNA	73.96%	48.17%	57.49%
2.3	Broadband Connection Speed (download) - from ISP Node to User								

A) Total committed download speed to the sample subscribers (In mpbs)			15	63	32	12288	20	18
B) Total average download speed observed for the sample subscribers during TCBH (In Mpbs)			15	58.94	30.96	10770	18.1	14.52
C) % age subscribed speed available to the subscriber during TCBH	>80%		100.00%	93.56%	96.75%	87.65%	90.50%	80.67%

3	Packet Loss							
	A) Total number of ping packets transmitted			3000	3000	3000	3000	3000	6000
	B) Total number of ping packets lost			0	0	12	0	0	1
	C) % age packet loss	<1%		0.00%	0.00%	0.40%	0.00%	0.00%	0.02%

4	Network latency (for wired broadband access)							
	Network Latency from User reference point at POP/ISP Node to IGSP/NIXI gateway								
4.1	A) Total number of ping packets transmitted			3000	3000	DNA	DNA	1000	6000
	B) Average round trip tip time for all the ping transmitted	<120 ms		10	19.66	DNA	DNA	1	27.65
	Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Terrestrial)								
4.2	A) Total number of ping packets transmitted			3000	3000	3000	DNA	1000	3000
	B) Average round trip tip time for all the ping transmitted	<350 ms		16.5	168	63.33	DNA	6.67	33
	Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Satellite)								
4.3	A) Total number of ping packets transmitted			NA	NA	NA	NA	NA	NA
	B) Average round trip tip time for all the ping transmitted	<800 ms		NA	NA	NA	NA	NA	NA

5	Service Availability/Uptime							
	A) Total operatioDNAl Hours			72	72	72	2160	72	72
	B) Total downtime (In hours)			0.3	0.13	0	0	0	0
	C) Total time when the service was available (In Hrs)			71.7	71.87	72	2160	72	72
	D) % age of Service availability uptime	>98%		99.58%	99.81%	100.00%	100.00%	100.00%	100.00%

4.4.   KEY FINDINGS: BROADBAND SERVICES

Service Provisioning / Activation Time: - All service providers were found meeting the benchmark for this parameter.

Fault Repair/Restoration Time: - All service providers were found meeting the benchmark for this parameter.

Billing Performance: - For this parameter also the performance of the service providers was found well within the compliance benchmarks.

Response Time to Customer for assistance by operator (Voice to Voice): - All service providers were found meeting the benchmark for this parameter.

Bandwidth Utilization/ Throughput: - The performance of Den Network and Tikona for the parameter Bandwidth Utilization/ Throughput (POP to ISP Gateway Node [Intra-network] Link(s) was 83.40% and 98.32% respectively against the benchmark of <80%.

Live measurement: - The performance of Den Network for the parameter Bandwidth Utilization/ Throughput (POP to ISP Gateway Node [Intra-network] Link(s) was 98.63% against the benchmark of <80%.

Service Availability/Uptime: - All service providers were found meeting the benchmark for this parameter.

Packet Loss and Network Latency: - It was observed that almost all operators were measuring packet loss and latency by conducting ping test on random basis for their internal assessment.
However, the ping test conducted during live measurement revealed that all service providers were meeting the benchmark prescribed by TRAI.

4.5. CUSTOMER CARE / HELPLINE ASSESSMENT

LIVE CALLING TO CALL CENTRE FOR BROADBAND SERVICES

Parameter	Circle Name	DEN Network	Hathway	Pacenet	Tikona	RCL	BSNL
Total No. of calls Attempted	UPW	100	100	100	100	100	100
Total number of calls answered by the operator within 60 seconds		100	100	100	100	100	100
% age calls answered by the operator in 60 seconds		**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Total number of calls answered by the operator within 90 seconds		100	100	100	100	100	100
% age calls answered by the operator within 90 seconds		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

4.6. LIVE CALLING FOR BILLING COMPLAINTS

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS

Parameter	Circle Name	DEN Network	Hathway	Pacenet	Tikona	RCL	BSNL
Total No. of calls Attempted	UPW	NA (Prepaid Model)	NA (Prepaid Model)	NA	62	NA	100
Total No. of calls Answered		NA	NA	NA	40	NA	60
Cases resolved within 4 weeks		NA	NA	NA	40	NA	60
%age of cases resolved		**NA**	**NA**	NA	**100%**	NA	**100%**

To test the Service Providers performance on billing related complaints and their resolutions, auditors conducted a customer feedback calling for about random 100 nos. of customers. However, in some cases, the number of customers contacted for verification was very less due to less number of billing complaints. During live calling, some of the customers did not attend the calls while few others reported that there complaints have been resolved but did not remember about the duration of their resolution. However, most of the customers reported their satisfaction on resolution of the billing complaints.

5. ABBREVIATIONS

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

- TRAI – Telecom Regulatory Authority of India

- QoS – Quality of Service

- AMJ16 – Refers to the quarter of April, May and June 2016

- SSA – Secondary Switching Area

- NOC – Network Operation Center

- OMC – Operations and Maintenance Center

- MSC – Mobile Switching Center

- PMR – Performance Monitoring Reports

- TCBH – Time Consistent Busy Hour

- CBBH - Cell Bouncing Busy Hour

- BTS – Base Transceiver Station

- CSSR – Call Setup Success Rate

- TCH – Traffic Channel

- SDCCH – Standalone Dedicated Control Channel

- CDR – Call Drop Rate

- FER – Frame Error Rate

- SIM – Subscriber Identity Module

- GSM – Global System for Mobile

- CDMA – Code Division Multiple Access

- NA – Not Applicable

- NC – Non Compliance

- POI – Point of Interconnection

- IVR – Interactive Voice Response

- STD – Standard Trunk Dialing

- ISD – International Subscriber Dialing

Exchanges covered for QoS audit in UP-West Circle -

S.NO	Service provider	SSA Name	SDCA Name	EXCHANGE NAME	Exchange Code
1	**BSNL**	Bulandshahr	Siyana	AGOTA TE	BULAGT
2	**BSNL**	Bulandshahr	Khurja	AHMEDGARH TE	BULAMG
3	**BSNL**	Bulandshahr	Jhangirabad	ANUPSHAHAR ADDA	BULASR
4	**BSNL**	Bulandshahr	Jhangirabad	ANUPSHAHAR TE	BULANP
5	**BSNL**	Bulandshahr	Khurja	ARNIYA TE	BULARN
6	**BSNL**	Bulandshahr	Siyana	AURANGABAD TE	BULARD
7	**BSNL**	Bulandshahr	Bulandshahr	AVAS VIKAS TE	BULAVS
8	**BSNL**	Bulandshahr	Siyana	B B NAGAR TE	BULBBN
9	**BSNL**	Bulandshahr	Sikandrabad	BARAL TE	BULBRL
10	**BSNL**	Bulandshahr	Debai	BELON TE	BULBLN
11	**BSNL**	Bulandshahr	Bulandshahr	BHOOR TE ZTE	BULBHR
12	**BSNL**	Bulandshahr	Bulandshahr	BHOOR-1st TE	BULBHR
13	**BSNL**	Bulandshahr	Bulandshahr	BHOOR-2nd TE	BULBHR
14	**BSNL**	Bulandshahr	Jhangirabad	BIBYANA TE	BULBBY
15	**BSNL**	Bulandshahr	Jhangirabad	BIROLI TE	BULBLI
16	**BSNL**	Bulandshahr	Siyana	BUGRASI TE	BULBUG
17	**BSNL**	Bulandshahr	Khurja	CHATTARI TE	BULCHT
18	**BSNL**	Bulandshahr	Sikandrabad	CHOLA TE	BULCHL
19	**BSNL**	Bulandshahr	Debai	DANPUR TE	BULDNP
20	**BSNL**	Bulandshahr	Bulandshahr	DAV EXCH TE	BULDAV
21	**BSNL**	Bulandshahr	Debai	DEBAI TE	BULDBI
22	**BSNL**	Bulandshahr	Khurja	GANGATHALA	BULGTL
23	**BSNL**	Bulandshahr	Sikandrabad	GULAOTHI TE	BULGLI
24	**BSNL**	Bulandshahr	Jhangirabad	JAHANGIRABAD TE	BULJRD
25	**BSNL**	Bulandshahr	Debai	JARGAWAN TE	BULJRN
26	**BSNL**	Bulandshahr	Sikandrabad	JOKHABAD TE	BULIAX
27	**BSNL**	Bulandshahr	Sikandrabad	KARANVAS TE	BULKVS
28	**BSNL**	Bulandshahr	Khurja	KARORA TE	BULKRR
29	**BSNL**	Bulandshahr	Siyana	KHANPUR TE	BULKHP
30	**BSNL**	Bulandshahr	Debai	KHARKWARI TE	BULKRI
31	**BSNL**	Bulandshahr	Khurja	KHURJA MAIN TE	BULKRJ
32	**BSNL**	Bulandshahr	Khurja	Khurja Junction TE	BULKJN
33	**BSNL**	Bulandshahr	Khurja	Khurja RSU TE	BULKRS
34	**BSNL**	Bulandshahr	Bulandshahr	MOTIBAGH TE	BULMTB

35	BSNL	Bulandshahr	Bulandshahr	MOTIBAGH TE ZTE	BULMTB
36	BSNL	Bulandshahr	Debai	NARORA TE	BULNRR
37	BSNL	Bulandshahr	Khurja	PAHASU TE	BULPSU
38	BSNL	Bulandshahr	Siyana	PARTAPUR TE	BULPTP
39	BSNL	Bulandshahr	Jhangirabad	POTA BADSHAHPUR TE	BULPBP
40	BSNL	Bulandshahr	Sikandrabad	SATELLITE TE	BULSXE
41	BSNL	Bulandshahr	Siyana	SHIKARPUR TE	BULSKU
42	BSNL	Bulandshahr	Sikandrabad	SIKANDRABAD CITY TE	BULCXE
43	BSNL	Bulandshahr	Siyana	SIYANA TE	BULSIY
44	BSNL	Bulandshahr	Jhangirabad	UNCHAGAON TE	BULOGN
45	BSNL	Bulandshahr	Jhangirabad	Maddupura TE	BULMDP
46	BSNL	Bulandshahr	Jhangirabad	Jadol TE	BULJDL
47	BSNL	Bulandshahr	Jhangirabad	Chitson TE	BULCHN
48	BSNL	Bulandshahr	Jhangirabad	Makhena TE	BULMKN
49	BSNL	Ghaziabad	AIR FORCE HINDON	AIR FORCE HINDON	3825
50	BSNL	Ghaziabad	ALTTC GHAZIABAD	ALTTC GHAZIABAD	2030
51	BSNL	Ghaziabad	Avantika (Sh Ram Piston)	Avantika (Sh Ram Piston)	3830
52	BSNL	Ghaziabad	Avantika 2	Avantika 2	2040
53	BSNL	Ghaziabad	Bahadurgarh	Bahadurgarh	3802
54	BSNL	Ghaziabad	Bahadurpur	Bahadurpur	2061
55	BSNL	Ghaziabad	Brijghat	Brijghat	3804
56	BSNL	Ghaziabad	CEL	CEL	2011
57	BSNL	Ghaziabad	Chirrori	Chirrori	3805
58	BSNL	Ghaziabad	Crossing Republic	Crossing Republic	2020
59	BSNL	Ghaziabad	Dehrakuti	Dehrakuti	3806
60	BSNL	Ghaziabad	Dhaulana	Dhaulana	3836
61	BSNL	Ghaziabad	DosaBanzarpur	DosaBanzarpur	3807
62	BSNL	Ghaziabad	Duhai	Duhai	2006
63	BSNL	Ghaziabad	Farid Nagar	Farid Nagar	3808
64	BSNL	Ghaziabad	Garh	Garh	3824
65	BSNL	Ghaziabad	Govindpuram	Govindpuram	2004
66	BSNL	Ghaziabad	Govindpuram	Govindpuram	2047
67	BSNL	Ghaziabad	Hapur	Hapur	2649
68	BSNL	Ghaziabad	Hapur	Hapur	2603
69	BSNL	Ghaziabad	Babugarh	Babugarh	2610
70	BSNL	Ghaziabad	KishanGanj 2	KishanGanj 2	2629
71	BSNL	Ghaziabad	Harsinghpur	Harsinghpur	3909
72	BSNL	Ghaziabad	Hero Nagar	Hero Nagar	2026
73	BSNL	Ghaziabad	Indirapuram	Indirapuram	2028
74	BSNL	Ghaziabad	Indirapuram	Indirapuram	2057

75	BSNL	Ghaziabad	Indirapuram 2	Indirapuram 2	2039
76	BSNL	Ghaziabad	Jharina	Jharina	3810
77	BSNL	Ghaziabad	Kaushambi	Kaushambi	2015
78	BSNL	Ghaziabad	Kaushambi	Kaushambi	2016
79	BSNL	Ghaziabad	Kaushambi	Kaushambi	2054
80	BSNL	Ghaziabad	KSB III (S Vihar)	KSB III (S Vihar)	3833
81	BSNL	Ghaziabad	KSBIV	KSBIV	3821
82	BSNL	Ghaziabad	KSB V (Income Tax)	KSB V (Income Tax)	3834
83	BSNL	Ghaziabad	Fortune rajnagar extension	Fortune rajnagar extension	3835
84	BSNL	Ghaziabad	Kuchesar Road	Kuchesar Road	2609
85	BSNL	Ghaziabad	Loni	Loni	2012
86	BSNL	Ghaziabad	Mandola	Mandola	2036
87	BSNL	Ghaziabad	Massorie	Massorie	2007
88	BSNL	Ghaziabad	Model Town	Model Town	2025
89	BSNL	Ghaziabad	Model Town	Model Town	2048
90	BSNL	Ghaziabad	MODINAGAR	MODINAGAR	2650
91	BSNL	Ghaziabad	Modinagar	Modinagar	2604
92	BSNL	Ghaziabad	Century Lamination	Century Lamination	2613
93	BSNL	Ghaziabad	Mohan Nagar	Mohan Nagar	2013
94	BSNL	Ghaziabad	Mohan Nagar	Mohan Nagar	2053
95	BSNL	Ghaziabad	Mudafara	Mudafara	3811
96	BSNL	Ghaziabad	Muradnagar	Muradnagar	2605
97	BSNL	Ghaziabad	Nan	Nan	3818
98	BSNL	Ghaziabad	Nand Gram	Nand Gram	2005
99	BSNL	Ghaziabad	Nanpur	Nanpur	3813
100	BSNL	Ghaziabad	Nehru Nagar	Nehru Nagar	2021
101	BSNL	Ghaziabad	Nehru Nagar	Nehru Nagar	2045
102	BSNL	Ghaziabad	Noorpur	Noorpur	3814
103	BSNL	Ghaziabad	Patel Marg	Patel Marg	2024
104	BSNL	Ghaziabad	Patel Marg	Patel Marg	2043
105	BSNL	Ghaziabad	Sarehome	Sarehome	3829
106	BSNL	Ghaziabad	Patla	Patla	2602
107	BSNL	Ghaziabad	Pilukhuwa	Pilukhuwa	2607
108	BSNL	Ghaziabad	shastrinagar	shastrinagar	2002
109	BSNL	Ghaziabad	PartapVihar	PartapVihar	2044
110	BSNL	Ghaziabad	Raj nagar	Raj nagar	2017
111	BSNL	Ghaziabad	Raj nagar	Raj nagar	2018
112	BSNL	Ghaziabad	Raj nagar	Raj nagar	2019
113	BSNL	Ghaziabad	Raj Nagar	Raj Nagar	2042
114	BSNL	Ghaziabad	Rajendra Nagar	Rajendra Nagar	2009

115	BSNL	Ghaziabad	Rajendra Nagar	Rajendra Nagar	2052
116	BSNL	Ghaziabad	Rajendra Nagar II	Rajendra Nagar II	2038
117	BSNL	Ghaziabad	RAJNAGAR EXTN	RAJNAGAR EXTN	3822
118	BSNL	Ghaziabad	RAJNAGAR EXTN	RAJNAGAR EXTN	3823
119	BSNL	Ghaziabad	Saloni	Saloni	2616
120	BSNL	Ghaziabad	samana	samana	3817
121	BSNL	Ghaziabad	Sanjay Nagar	Sanjay Nagar	2003
122	BSNL	Ghaziabad	Sanjay Nagar	Sanjay Nagar	2046
123	BSNL	Ghaziabad	Sanjay Nagar II	Sanjay Nagar II	2041
124	BSNL	Ghaziabad	Sapnawat	Sapnawat	2616
125	BSNL	Ghaziabad	Shahdara (East)	Shahdara (East)	2051
126	BSNL	Ghaziabad	Air force hindon	Air force hindon	2031
127	BSNL	Ghaziabad	SHE	SHE	2008
128	BSNL	Ghaziabad	SHAKTI KHAND IV	SHAKTI KHAND IV	2059
129	BSNL	Ghaziabad	Shalimar Garden	Shalimar Garden	2014
130	BSNL	Ghaziabad	Shalimar Garden II	Shalimar Garden II	2060
131	BSNL	Ghaziabad	Shipra Sun City	Shipra Sun City	2032
132	BSNL	Ghaziabad	Shipra sun City	Shipra sun City	2050
133	BSNL	Ghaziabad	Shipra Sun City 2	Shipra Sun City 2	2033
134	BSNL	Ghaziabad	Simbhawali	Simbhawali	2608
135	BSNL	Ghaziabad	Surya Nagar	Surya Nagar	2010
136	BSNL	Ghaziabad	Surya Nagar (S MALL)	Surya Nagar (S MALL)	2058
137	BSNL	Ghaziabad	Talheta	Talheta	2614
138	BSNL	Ghaziabad	Tilamore	Tilamore	2023
139	BSNL	Ghaziabad	Tronicca City	Tronicca City	2035
140	BSNL	Ghaziabad	Vasundhara	Vasundhara	2027
141	BSNL	Ghaziabad	Vasundhara II	Vasundhara II	2037
142	BSNL	Ghaziabad	Vasundhara-1	Vasundhara-1	2055
143	BSNL	Ghaziabad	Vasundhara-2	Vasundhara-2	2056
144	BSNL	Ghaziabad	Vidyut Nagar	Vidyut Nagar	2022
145	BSNL	Ghaziabad	Vidyut Nagar	Vidyut Nagar	2049
146	BSNL	Ghaziabad	SAREHOME	SAREHOME	3829
147	BSNL	Ghaziabad	DADRI AIRFORCE	DADRI AIRFORCE	3831
148	BSNL	Ghaziabad	RAJNAGAR 960PORTS P II DSLAM	RAJNAGAR 960PORTS P II DSLAM	2302
149	BSNL	Ghaziabad	RAJNAGAR 960PORTS P II DSLAM	RAJNAGAR 960PORTS P II DSLAM	2303
150	BSNL	Ghaziabad	HAPUR960P-PHASE-II DSLAM	HAPUR960P-PHASE-II DSLAM	2802
151	BSNL	Ghaziabad	HAPUR960P-PHASE-II DSLAM	HAPUR960P-PHASE-II DSLAM	2803
152	BSNL	Ghaziabad	MODINAGAR 480 PORTS P II DSLAM	MODINAGAR 480 PORTS P II DSLAM	2818
153	BSNL	Ghaziabad	NEHRU NAGAR DSLAM	NEHRU NAGAR DSLAM	3009
154	BSNL	Ghaziabad	PATEL MARG DSLAM	PATEL MARG DSLAM	3010

155	**BSNL**	Ghaziabad	PRATAP VIHAR DSLAM	PRATAP VIHAR DSLAM	3011
156	**BSNL**	Ghaziabad	RAJNAGAR DSLAM	RAJNAGAR DSLAM	3012
157	**BSNL**	Ghaziabad	RAJNAGAR DSLAM	RAJNAGAR DSLAM	3013
158	**BSNL**	Ghaziabad	VASUNDHRA II DSLAM	VASUNDHRA II DSLAM	3020
159	**BSNL**	Ghaziabad	MODINAGAR DSLAM	MODINAGAR DSLAM	3603
160	**BSNL**	Ghaziabad	GOVINDPURAM ZTE	GOVINDPURAM ZTE	3004
161	**BSNL**	Ghaziabad	ALTTC ZTE	ALTTC ZTE	3002
162	**BSNL**	Ghaziabad	Kaushabi ZTE	Kaushabi ZTE	3007
163	**BSNL**	Ghaziabad	Kaushabi ZTE SLAVE	Kaushabi ZTE SLAVE	3008
164	**BSNL**	Ghaziabad	Aashiyana Rajnagar Ext	Aashiyana Rajnagar Ext	3017
165	**BSNL**	Ghaziabad	Ordinance factory	Ordinance factory	3604
166	**BSNL**	Ghaziabad	Hapur ZTE 480	Hapur ZTE 480	3602