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



AUDIT & ASSESSMENT OF QUALITY OF SERVICE

NORTH ZONE – HARYANA 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.

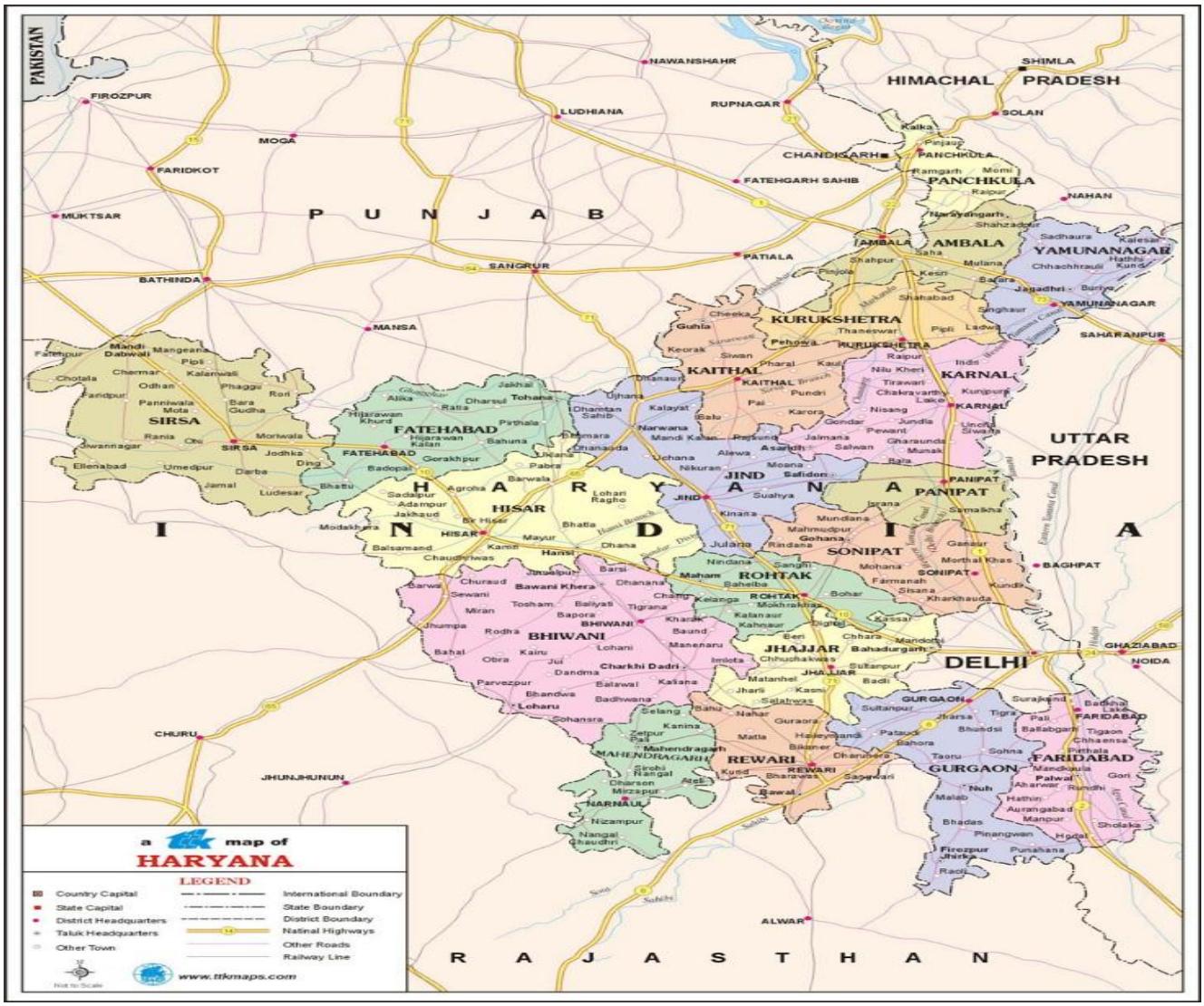
1.3. OBJECTIVES

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 Haryana Circle covering all SSAs (Secondary Switching Areas).



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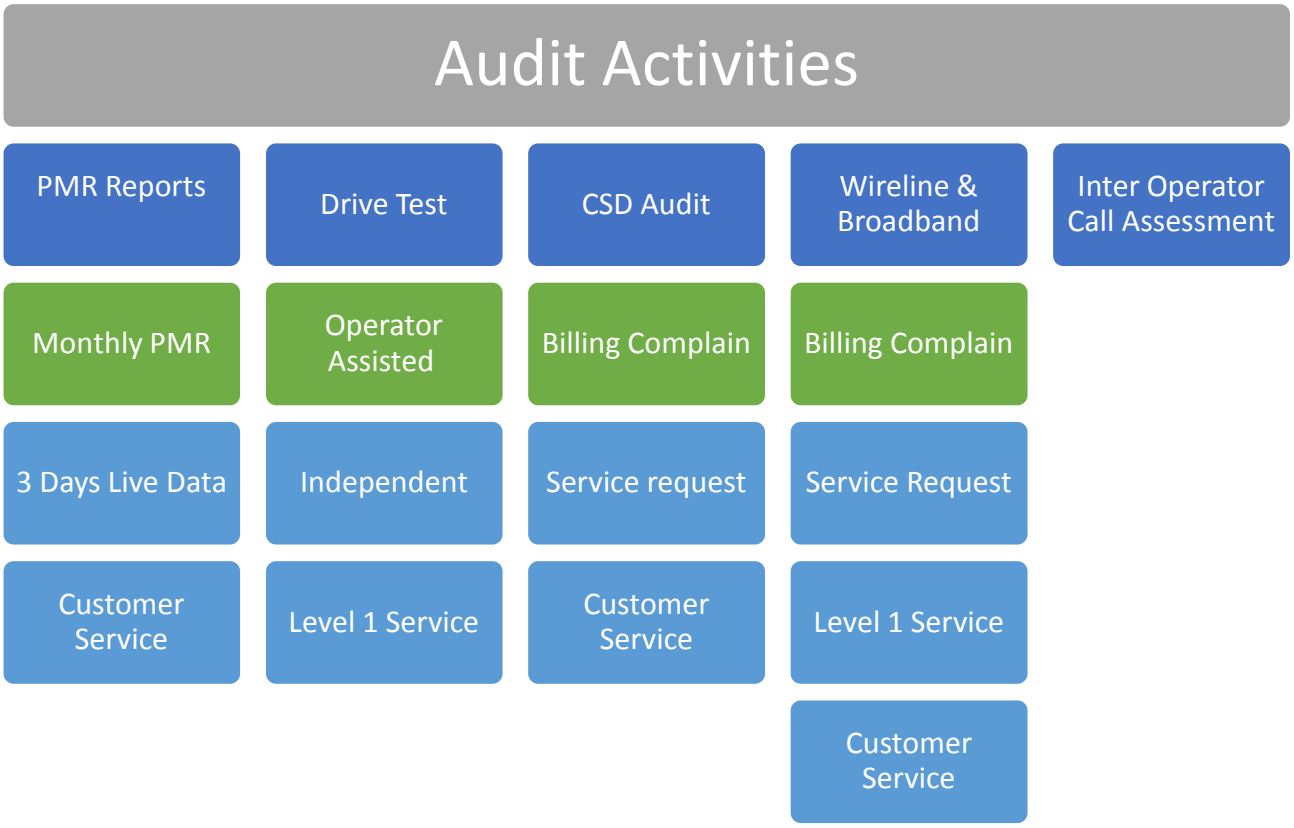
1.5. FRAMEWORK USED



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.	<80% link(s)/route bandwidth utilization during peak hours (TCBH).
	ii) ISP Gateway Node to IGSP / NIXI upstream links for international connectivity.	
	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 Haryana 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 Place	Exchanges Covered for Audit
1	BSNL	Haryana	Ambala	157
2	Bharti-Airtel		Plot No 41-42, HSIIDC Food Park,Chandigarh	1
3	RCL		Rajiv Gandhi IT Park DLF Building Tower F 1st Floor Chandigarh	1
5	TTL		Tata Tele-Services ,Karnal	1
Total Exchanges				160

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 – HARIYANA CIRCLE							
Sl. No.	**Parameters**	**Benchmark**	**Period**	**RCL**	**AIRTEL**	**TTL**	**BSNL**
1	**Fault incidences**						
	(No. of faults/100 subscribers /month)	< 7%	*Quarterly*	**0.00%**	**6.96%**	**3.85%**	**6.92%**
2	**Faults Repair/Restoration Time**						
	Fault repair by next working day(Urban Area)	>85%	*Quarterly*	**NA**	**94.80%**	**96.33%**	**91.67%**
	% of fault repair within 5 days (Urban Area)	100%	*Quarterly*	**NA**	**100.00%**	**100.00%**	**100.00%**
	Fault repair by next working day(Rural & hilly Area)	>75%	*Quarterly*	**NA**	**NA**	**NA**	**91.24%**
	% of fault repair within 7 days(Rural & hilly Area)	100%	*Quarterly*	**NA**	**NA**	**NA**	**100.00%**
	Mean time to Repair(MTTR)	≤10 Hrs	*Quarterly*	**NA**	**5.25**	**6.85**	**11.28**
3	**Rent Rebate**						
	Fault pending > 3 days & <7 days	Rebate for 7 days	*Quarterly*	0	0	1	0
	Fault Pending > 7 days & < 15 days	Rebate for 15 days	*Quarterly*	0	0	0	0
	Fault pending > 15 days	Rebate for 1 month	*Quarterly*	0	0	0	94
4	**Metering & Billing Performance**						
	% of disputed Bills over bills issued (Post Paid)	< 0.1%	*Quarterly*	**0.00%**	**0.07%**	**0.20%**	**0.18%**
	% of Pre-paid Charging Complaints	< 0.1%	*Quarterly*	**NA**	**NA**	**NA**	**NA**
	% of billing complaints resolved within 4 weeks	98% within 4 weeks	*Quarterly*	**NA**	**100.00%**	**100.00%**	**100.00%**
	% of billing complaints resolved within 6 weeks	100% within 6 weeks	*Quarterly*	**NA**	**100.00%**	**100.00%**	**100.00%**
	Period of all refunds/payments from the date of resolution of complaints within 1weeks	<=1 week	*Quarterly*	**NA**	**100.00%**	**100.00%**	**100.00%**
5	**POI Congestion**						
	No. of POI's having congestion >0.5%		*Quarterly*	0	0	0	0
6	**Response Time to customer for assistance**						
	Accessibility of Call centre/customer Care	>=95%	*Quarterly*	**98.88%**	**100.00%**	**98.41%**	**99.43%**
	% age of calls answered by operator(voice to voice) within 90 seconds	>=95%	*Quarterly*	**99.63%**	**94.39%**	**96.82%**	**99.89%**
7	**Customer care(promptness in attending to customers request)**						
	Termination / Closures	100%	*Quarterly*	**NA**	**100.00%**	**100.00%**	**100.00%**
	Time taken for refunds of deposit after closures	100%	*Quarterly*	**NA**	**100.00%**	**100.00%**	**100.00%**

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

3 DAYS LIVE MEASUREMENT DATA FOR WIRELINE (BASIC) SERVICES - HARYANA CIRCLE							
Sl No.	**Parameters**	**Benchmark**	**Period**	**RCL**	**AIRTEL**	**TTL**	**BSNL**
1	**POI Congestion**						
	No. of POI's having congestion >0.5%	≤0.5%	Quarterly	0	0	0	0
2	**Response Time to customer for assistance**						
	Accessibility of Call centre/customer Care	≥95%	Quarterly	**98.69%**	**100.00%**	**100.00%**	**98.29%**
	% age of calls answered by operator(voice to voice) within 90 seconds	≥95%	Quarterly	**99.69%**	**99.40%**	**100.00%**	**99.73%**

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 for the parameter 'No. of faults/100 subscribers /month'.

Fault Repair/Restoration Time: - For this parameter, all operators were meeting the benchmark.

Mean Time to Repair: Only BSNL could not achieve the benchmark with their achieved level as 11.28%.

Metering and Billing performance: - All operators were found meeting the benchmark for this parameter except TTL & BSNL. TTL could not meet the benchmark for the parameter with its performance as 0.20% & 0.18% respectively 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 (except Airtel) managed to meet the TRAI benchmark. Airtel could achieve its level as 94.39% With respect to the parameter of calls answered by operator (voice to voice within 90 sec) against the benchmark of >= 95%.

Termination/Closures: -All operators were found meeting the benchmark for this parameter against the benchmark of 100%.

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 Haryana 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	Airtel	TTSL	SISTEM A SHYAN
BSNL	Haryana	100	--	100%	100%	100%	100%
RCL	Haryana	100	100%	--	100%	100%	100%
AIRTEL	Haryana	100	100%	100%	--	100%	100%
TTSL	Haryana	100	100%	100%	100%	--	100%
SISTEM SHYAM	Haryana	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.

3.6. LEVEL-1 LIVE CALLING (WIRELINE SERVICES)

Level 1 Live Calling					
PUT x FOR UNSUCCESSFUL CALL AND TICK FOR SUCCESSFUL CALL					
S. NO.	L1 Service Number	CIRCLE NAME: Hariyana			
	Details	RCOM	Airtel	TTL	BSNL
1	100 Police	√	√	√	√
2	101 Fire	√	√	√	√
3	102 Ambulance	√	√	√	√
4	104 Health Information Helpline	x	x	x	√
5	108 Emergency and Disaster Management Helpline	x	√	√	√
6	138 All India Helpine for Passangers	x	x	x	√
7	149 Public Road Transport Utility Service	x	x	x	√
8	181 Chief Minister Helpline	√	√	√	√
9	182 Indian Railway Security Helpline	x	x	x	√
10	1033 Road Accident Management Service	x	√	√	√
11	1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'	x	x	x	√
12	1056 Emergency Medical Services	x	x	x	√
13	106X State of the Art Hospitals	√	√	√	√
14	1063 Public Grievance Cell DoT Hq	x	x	x	√
15	1064 Anti Corruption Helpline	√	√	√	√
16	1070 Relief Commission for Natural Calamities	x	x	x	√
17	1071 Air Accident Helpline	x	x	x	x

18	1072 Rail Accident Helpline	√	√	√	√
19	1073 Road Accident Helpline	x	x	x	√
20	1077 Control Room for District Collector	x	x	x	x
21	1090 Call Alart (Crime Branch)	x	x	x	x
22	1091 Women Helpline	√	x	x	√
23	1097 National AIDS Helpline to NACO	√	√	√	√
24	1099 Central Accident and Trauma Services (CATS)	x	x	x	x
25	10580 Educational& Vocational Guidance and Counselling	x	x	x	x
26	10589 Mother and Child Tracking (MCTH)	x	x	x	x
27	10740 Central Pollution Control Board	x	x	x	x
28	10741 Pollution Control Board	x	√	x	x
29	1511 Police Related Service for all Metro Railway Project	x	x	x	√
30	1512 Prevention of Crime in Railway	√	√	√	√
31	1514 National Career Service(NCS)	x	x	x	x
32	15100 Free Legal Service Helpline	√	√	√	√
33	155304 Municipal Corporations	x	x	x	x
34	155214 Labour Helpline	x	x	√	x
35	1903 Sashastra Seema Bal (SSB)	x	x	x	√
36	1909 National Do Not Call Registry	x	√	x	√
37	1912 Complaint of Electricity	x	x	x	√
38	1916 Drinking Water Supply	x	x	x	x
39	1950 Election Commission of India	√	√	√	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	RCL	AIRTEL	TTL	BSNL
Total No. of calls Attempted		Haryana	100	100	100	100
A) Total no of calls attempted to customer care/Call center			100	100	100	100
B) Total no. of calls successfully established to customer care/Call center			100	100	100	100
C) % Accessibility of Call centre /customer Care (Total call attempt*100/ Total call successfully established)	*>=95%*		**100.00%**	**100.00%**	**100.00%**	**100.00%**
D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)			100	100	100	100
E) Total number of calls answered by the operator (Voice to voice) within 90 seconds			100	100	100	100
F) % age of calls answered by the operators (voice to voice) within 90 seconds (E *100/ D)	*>=95%*		**100.00%**	**100.00%**	**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 Haryana 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 Haryana circle.

Sl. No.	Name of Broadband Service Providers	Subscriber Base	Location of Audit
1	You Broadband	2305	You Broadband,Chandigarh
2	AirTel	18799	BHARTI AIRTEL LIMITED AMBALA
3	Five Network	182	Five Network Solution India Limited,Chandigarh
4	BROADBAND PACENET INDIA PVT.LTD	4200	BROADBAND PACENET INDIA PVT. LTD., SUBHASH NAGAR, DELHI
5	Tata Tele-Services Pvt. Ltd.	567	Tata Tele-Services Pvt. Ltd.,Karnal
6	RCOM	1214	Rajiv Gandhi IT Park DLF Building Tower F 1st Floor Chandigarh-160101
7	BSNL	22660	BSNL Hariyana (Ambala SSA)

4.2. Service Provider Performance Report Based On Quarterly Measurement Data Verification For Broadband Service Providers

AVERAGED QUARTERLY (JULY TO SEP-16) AUDIT DATA FOR BROADBAND SERVICES

S/N	Broadband Audit Data: Name of Parameter	Benchmark	Circle Name	You Broadband	Airtel	Five Network	BROADBAND PACENET	TTL	RCOM	BSNL
1	**Service Provisioning/Activation Time**									
	A) No of connections registered during the period			312	1924	12	197	64	3204	3174
	B) Total number of connections provided within 15 days of registration on demand during the period			312	1924	12	197	64	3204	3174
	D)Total number of connections provided after 15 days of registration on demand			0	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%	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	NA
2	**Fault Repair/Restoration Time**									
	A) Total number of faults registered during the period			2567	3747	100	87	130	0	9404
	B) Total number of faults repaired by next working day			2364	3416	100	74	123	0	8766
	C) % age of faults repaired by next working day	>90%		92.09%	91.17%	100.00%	85.06%	94.62%	NA	93.22%
	D) Total number of faults repaired within three working days			2561	3723	100	87	128	0	9404
	E)% age of faults repaired within three working days	≥99%		99.76%	99.36%	100.00%	100.00%	98.46%	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)			147	19	0	0	1	0	0
	B) Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)			59	5	0	0	0	0	0
	C) Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)			24	0	0	0	0	0	0
4	**Billing Performance**									
	A) Total bills generated during period			NA (Prepaid Model)	56005	NA (Prepaid Model)	605	567	2446	70230
	B) Total complaints received from customers/ Bills disputed			NA	6	NA	0	3	0	77
	C) Billing complaints per 100 bills issued	<2%		NA	0.01%	NA	0.00%	0.53%	0.00%	0.11%
	D) Total number of complaints resolved in 4 weeks from date of receipt			NA	6	NA	NA	3	NA	77
	E) %age billing complaints resolved in 4 weeks	100%		NA	100.00%	NA	NA	100.00%	NA	100.00%
	F) Total number of cases requiring refund of deposits after closure			NA	74	NA	0	0	NA	NA
	G) Total number of cases where refund was made in <60 days			NA	74	NA	NA	NA	NA	NA

	H) Percentage cases in which refund received within 60 days	100%		NA	100.00%	NA	NA	NA	NA	NA
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			8520	26952	DNA	13	346	86286	84041
	B) Total number of calls answered by the operator within 60 seconds			7534	24078	DNA	13	329	86286	83728
	C) % age calls answered by the operator in 60 seconds	>60%		88.43%	89.34%	DNA	100.00%	95.09%	100.00%	99.63%
	D) Total number of calls answered by the operator within 90 seconds			7924	25142	DNA	13	335	84953	83952
	E) % age calls answered by the operator within 90 seconds	>80%		93.00%	93.28%	DNA	100.00%	96.82%	98.33	99.89%
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).									
6.1	POP to ISP Gateway Node [Intra-network] Link(s)									
	A) Total Bandwidth Available at the link for the period days			DNA	DNA	135	1656	9216	21000	9216
	B) Total Bandwidth utilized during the period during TCBH (In Mpbs)			DNA	DNA	78.76	1307	2808	549	3265.8
	C) % age Bandwidth utilized during the period	<80%		DNA	DNA	58.34%	78.92%	30.47%	2.61%	35.44%
6.2	A) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity									
	A) Total number of upstream links for Inter International connectivity			6	DNA	DNA	DNA	3	11	15
	B) Number of Links having Bandwidth utilization > 90% during TCBH			0	DNA	DNA	DNA	0	0	0
	C) Total Internationall bandwidth available from ISP Node to IGSP/NIXI/DNAP			1350	DNA	DNA	DNA	82305	110000	38400
	D) Total International bandwidth utilization during peak hours (TCBH) in Mpbs			1050	DNA	DNA	DNA	67072	43139	10572.7
	E) %age International Bandwidth utilization during peak hours (TCBH)	<80%		77.78%	DNA	DNA	DNA	81.49%	39.21%	27.53%
6.3	Broadband Connection Speed (download) - from ISP Node to User									
	A) Total committed download speed to the sample subscribers (In mpbs)			5.28	6	DNA	40	15.99	3	30
	B) Total average download speed observed for the sample subscribers during TCBH (In Mpbs)			4.8	6	DNA	38.8	15.138	2.61	30
	C) % age subscribed speed available to the subscriber during TCBH	>80%		90.91%	100.00%	DNA	97.00%	94.62%	87.00%	100.00%
7	Service Availability/Uptime									
	A) Total operational Hours			1848840	41216544	2208	2160	28728	2208	2,208
	B) Total downtime (In hours)			12,929	6303	0	26	10	0	0
	C) Total time when the service was available (In Hrs)			1835911	41210241	2208	2134	28718	2208	2,208
	D) % age of Service availability uptime	>98%		99.31%	99.98%	100.00%	98.79%	99.96%	100.00%	100.00%
8	Packet Loss									
	A) Total number of ping packets transmitted			3000	3000	92000	3000	3236	92000	12000
	B) Total number of ping packets lost			0	0	0	3	0	772	41
	C) % age packet loss	<1%		0.00%	0.00%	0.00%	0.10%	0.00%	0.84%	0.34%
9	Network latency (for wired broadband access)									
9.1	Network Latency from User reference point at POP/ISP Node to IGSP/NIXI gateway									
	A) Total number of ping packets transmitted			3000	3000	92000	DNA	3236	3000	12000
	C) Average round trip tip time for all the ping transmitted	<120 ms		9	26	41.36	DNA	79	1	11.25
9.2	Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Terrestrial)									

	A) Total number of ping packets transmitted			3000	DNA	92000	3000	3600	3000	12000
	C) Average round trip tip time for all the ping transmitted	<350 ms		280	DNA	146.73	84	61	6.67	25
9.3	Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Satellite)									
	A) Total number of ping packets transmitted			NA	NA	NA	NA	NA	NA	NA
	B) Total round trip time for all the ping packets transmitted during the period			NA	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	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	You Broadband	Airtel	Five Network	BROADBAND PACENET	TTL	RCOM	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			DNA	734	DNA	7	16	3103	2563
	B) Total number of calls answered by the operator within 60 seconds			DNA	733	DNA	7	16	3042	2552
	D) Total number of calls answered by the operator within 90 seconds			DNA	734	DNA	7	16	3051	2559
	E) % age calls answered by the operator within 90 seconds	>80%		DNA	100.00%	DNA	100.00%	100.00%	98.32%	99.84%
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			DNA	DNA	135	1656	9216	21000	9216
	B) Total Bandwidth utilized during the period during TCBH (In Mpbs)			DNA	DNA	86.75	1321	3233	668	3703
	C) % age Bandwidth utilized during the period	<80%		DNA	DNA	64.26%	79.77%	35.08%	3.20%	40.18%
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			6	DNA	DNA	DNA	3	11	15
	B) Number of Links having Bandwidth utilization > 90% during TCBH			DNA	DNA	DNA	DNA	0	0	0
	C) Total International bandwidth available from ISP Node to IGSP/NIXI/DNAP			DNA	DNA	DNA	DNA	82305	110000	38400
	D) Total international bandwidth utilization during peak hours (TCBH) in Mpbs			DNA	DNA	DNA	DNA	61700	52988	9163
	E) %age International Bandwidth utilization during peak hours (TCBH)	<80%		DNA	DNA	DNA	DNA	74.97%	48.17%	23.86%

2.3	Broadband Connection Speed (download) - from ISP Node to User									
	A) Total committed download speed to the sample subscribers (In mpbs)			5.28	6	48	22	15	6	30
	B) Total average download speed observed for the sample subscribers during TCBH (In Mpbs)			4.8	6	44.63	21.8	14.18	6	30
	C) % age subscribed speed available to the subscriber during TCBH	>80%		90.91%	100.00%	92.98%	99.09%	94.53%	100.00%	100.00%
3	**Packet Loss**									
	A) Total number of ping packets transmitted			DNA	3000	3000	3000	2587	3000	3000
	B) Total number of ping packets lost			DNA	0	0	6	7	0	0
	C) % age packet loss	<1%		DNA	0.00%	0.00%	0.20%	0.27%	0.00%	0.00%
4	**Network latency (for wired broadband access)**									
4.1	Network Latency from User reference point at POP/ISP Node to IGSP/NIXI gateway									
	A) Total number of ping packets transmitted			DNA	3000	3000	DNA	2592	3000	3000
	B) Average round trip tip time for all the ping transmitted	<120 ms		DNA	109	37.33	DNA	88.67	1.84	2
4.2	Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Terrestrial)									
	A) Total number of ping packets transmitted			DNA	DNA	3000	3000	3600	3000	3000
	B) Average round trip tip time for all the ping transmitted	<350 ms		DNA	DNA	95.33	64	60.00	1.37	10
4.3	Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Satellite)									
	A) Total number of ping packets transmitted			DNA	NA	NA	NA	NA	NA	NA
	B) Average round trip tip time for all the ping transmitted	<800 ms		DNA	NA	NA	NA	NA	NA	NA
5	**Service Availability/Uptime**									
	A) Total operatioDNAl Hours			DNA	72	72	72	864	72	72
	B) Total downtime (In hours)			DNA	0.3	0	0	1	0	0
	C) Total time when the service was available (In Hrs)			DNA	71.7	72	72	863	72	72
	D) % age of Service availability uptime	>98%		DNA	99.58%	100.00%	100.00%	99.88%	100.00%	100.00%

4.4. KEY FINDINGS: BROADBAND SERVICES

Service Provisioning / Activation Time: - The audit of the service providers revealed that all Broadband service providers were well within the benchmark.

Fault Repair/Restoration Time: - With regards to this parameter the performance of the service providers was within TRAI norms except Broadband Pacenet & TTL, its achievement level was 85.06% for parameter Fault Repair by next working day. Further, TTL also remained under performed for parameter Faults repaired within three working days with its performance as 98.46%.

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): - For percentage of calls getting connected to call centre and answered, all service providers were found meeting the benchmark for this parameter.

Bandwidth Utilization/ Throughput: - All the service providers were found using Multiple Router Traffic Grapher (MRTG) and also it was observed that all service providers were reporting combined bandwidth utilization for corporate customers and household customers. The performance of service providers with respect of these parameters was found satisfactory except TTL %age International Bandwidth utilization during peak hour was 81.49% against the benchmark of <80%.

Live measurement: - All service providers were found meeting the benchmark for this parameter

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	You Broadband	Airtel	Five Network	BROADBAND PACENET	TTL	RCOM	BSNL
Total No. of calls Attempted	Haryana	DNA	100	DNA	DNA	DNA	100	100
Total number of calls answered by the operator within 60 seconds		DNA	100	DNA	DNA	DNA	100	100
% age calls answered by the operator in 60 seconds		DNA	**100.00%**	DNA	DNA	DNA	**100.00%**	**100.00%**
Total number of calls answered by the operator within 90 seconds		DNA	100	DNA	DNA	DNA	100	100

4.6. LIVE CALLING FOR BILLING COMPLAINTS

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS

Parameter	Circle Name	You Broadband	Airtel	Five Network	BROADBAND PACENET	TTL	RCOM	BSNL
Total No. of calls Attempted	Haryana	NA (Prepaid Model)	6	NA (Prepaid Model)	NA	3	NA	77
Total No. of calls Answered		NA	4	NA	NA	3	NA	40
Cases resolved within 4 weeks		NA	4	NA	NA	3	NA	40
%age of cases resolved		**NA**	**100%**	**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

6. ANNEXURE – I

Exchanges covered for QoS audit in Haryana Circle -

S.NO	Service provider	SSA Name	SDCA Name	EXCHANGE NAME	Exchange Code
1	BSNL	AMBALA	AMBALA	DAYAL BAGH	AMBABD
2	BSNL	AMBALA	AMBALA	AMBALA CANTT MAIN	AMBABE
3	BSNL	AMBALA	AMBALA	GOBIND NAGAR	AMBABG
4	BSNL	AMBALA	AMBALA	INDUSTRIAL AREA Ambala Cantt	AMBABI
5	BSNL	AMBALA	AMBALA	BALDEV NAGAR Ambala City	AMBABN
6	BSNL	AMBALA	AMBALA	PALAM VIHAR Ambala Cantt	AMBABP
7	BSNL	AMBALA	AMBALA	RAILWAY ROAD	AMBABR
8	BSNL	AMBALA	AMBALA	SHASTRI COLONY	AMBABS
9	BSNL	AMBALA	AMBALA	AMBALA CITY MAIN	AMBACE
10	BSNL	AMBALA	AMBALA	HISAR ROAD	AMBAHR
11	BSNL	AMBALA	AMBALA	MODEL TOWN	AMBAMT
12	BSNL	AMBALA	AMBALA	NOWALTY ROAD	AMBANR
13	BSNL	AMBALA	AMBALA	BABYAL	AMBBBY
14	BSNL	AMBALA	AMBALA	BIHTA	AMBBIT
15	BSNL	AMBALA	AMBALA	BULLANA	AMBBLA
16	BSNL	AMBALA	AMBALA	BOH	AMBBOH
17	BSNL	AMBALA	AMBALA	BARAULA	AMBBRL
18	BSNL	AMBALA	AMBALA	DANIPUR	AMBDNP
19	BSNL	AMBALA	AMBALA	DURANA	AMBDRN
20	BSNL	AMBALA	AMBALA	GHAIL	AMBGHL
21	BSNL	AMBALA	AMBALA	HANDESRA	AMBHDA
22	BSNL	AMBALA	AMBALA	JALBEHRA	AMBJLB
23	BSNL	AMBALA	AMBALA	JANSUI	AMBJNS
24	BSNL	AMBALA	AMBALA	JARRAUT	AMBJRT
25	BSNL	AMBALA	AMBALA	KACHHA BAZAR	AMBKBZ
26	BSNL	AMBALA	AMBALA	KHUDDA	AMBKDA
27	BSNL	AMBALA	AMBALA	KHANNA MAJRA	AMBKHM
28	BSNL	AMBALA	AMBALA	KESRI	AMBKSI
29	BSNL	AMBALA	AMBALA	KAULAN	AMBKUL
30	BSNL	AMBALA	AMBALA	LOHGARH	AMBLGH
31	BSNL	AMBALA	AMBALA	MOHRA	AMBMHR
32	BSNL	AMBALA	AMBALA	MALAUR	AMBMLR
33	BSNL	AMBALA	AMBALA	MEHMUDPUR	AMBMMD
34	BSNL	AMBALA	AMBALA	MATEHRI	AMBMTR
35	BSNL	AMBALA	AMBALA	NIHONI	AMBNHI
36	BSNL	AMBALA	AMBALA	NANEOLA	AMBNNL
37	BSNL	AMBALA	AMBALA	OMAXE	AMBOMX

38	BSNL	AMBALA	AMBALA	PANJOKHRA	AMBPJK
39	BSNL	AMBALA	AMBALA	RAMPUR SARSEHRI	AMBRMP
40	BSNL	AMBALA	AMBALA	PILAKHANI	AMBSBP
41	BSNL	AMBALA	AMBALA	SAHA	AMBSHA
42	BSNL	AMBALA	AMBALA	SHAHPUR	AMBSHP
43	BSNL	AMBALA	AMBALA	SAMALKHA	AMBSLK
44	BSNL	AMBALA	AMBALA	THARWA MAJRI	AMBTHW
45	BSNL	AMBALA	BARARA	BARARA	AMBBRR
46	BSNL	AMBALA	BARARA	DHEEN	AMBDHN
47	BSNL	AMBALA	BARARA	DHANAURA	AMBDNR
48	BSNL	AMBALA	BARARA	DERA SALIMPUR	AMBDRS
49	BSNL	AMBALA	BARARA	HOLI	AMBHOL
50	BSNL	AMBALA	BARARA	JHARU MAJRA	AMBJRU
51	BSNL	AMBALA	BARARA	KAMBASSI	AMBKBA
52	BSNL	AMBALA	BARARA	MULLANA	AMBMLA
53	BSNL	AMBALA	BARARA	RAJAULY	AMBRJY
54	BSNL	AMBALA	BARARA	SHERPUR	AMBSPR
55	BSNL	AMBALA	BARARA	THAMBER	AMBTMB
56	BSNL	AMBALA	BARARA	TAPRIAN	AMBTPR
57	BSNL	AMBALA	BARARA	TANDWAL	AMBTWL
58	BSNL	AMBALA	BARARA	UGGALA	AMBUGA
59	BSNL	AMBALA	CHHACHHRAULI	BAKKARWALA	AMBBKR
60	BSNL	AMBALA	CHHACHHRAULI	BILASPUR	AMBBLS
61	BSNL	AMBALA	CHHACHHRAULI	BERTHAL	AMBBTH
62	BSNL	AMBALA	CHHACHHRAULI	CHHACHHRAULI	AMBCCU
63	BSNL	AMBALA	CHHACHHRAULI	DADUPUR	AMBDDP
64	BSNL	AMBALA	CHHACHHRAULI	DEVDHAR	AMBDVD
65	BSNL	AMBALA	CHHACHHRAULI	FATEHGARH TUMBI	AMBFTB
66	BSNL	AMBALA	CHHACHHRAULI	FATEHGARH	AMBFTG
67	BSNL	AMBALA	CHHACHHRAULI	JAGDHAULI	AMBJGL
68	BSNL	AMBALA	CHHACHHRAULI	KHARWAN	AMBKRW
69	BSNL	AMBALA	CHHACHHRAULI	KOTLA	AMBKTL
70	BSNL	AMBALA	CHHACHHRAULI	KHIZRABAD	AMBKZB
71	BSNL	AMBALA	CHHACHHRAULI	LEDI	AMBLDI
72	BSNL	AMBALA	CHHACHHRAULI	MACHHRAULI	AMBMCH
73	BSNL	AMBALA	CHHACHHRAULI	MUNDA KHERA	AMBMDK
74	BSNL	AMBALA	CHHACHHRAULI	MUKARABPUR	AMBMKP
75	BSNL	AMBALA	CHHACHHRAULI	MUSSIMBLE	AMBMSL
76	BSNL	AMBALA	CHHACHHRAULI	PABNI KALAN	AMBPBN
77	BSNL	AMBALA	CHHACHHRAULI	RANJITPUR	AMBRNJ
78	BSNL	AMBALA	CHHACHHRAULI	RAMPUR KAMBOYAN	AMBRNP

79	BSNL	AMBALA	CHHACHHRAULI	RAMPUR JATTAN	AMBRPJ
80	BSNL	AMBALA	CHHACHHRAULI	RASULPUR	AMBRSL
81	BSNL	AMBALA	CHHACHHRAULI	SAIDUPUR	AMBSDP
82	BSNL	AMBALA	CHHACHHRAULI	SADHAURA	AMBSDU
83	BSNL	AMBALA	CHHACHHRAULI	SARAWAN	AMBSRW
84	BSNL	AMBALA	CHHACHHRAULI	TELIPURA	AMBTLP
85	BSNL	AMBALA	CHHACHHRAULI	YAKUBPUR	AMBYKB
86	BSNL	AMBALA	JAGADHRI	ALAHAR	AMBALH
87	BSNL	AMBALA	JAGADHRI	BAMBHOLI	AMBBBL
88	BSNL	AMBALA	JAGADHRI	BHOGPUR	AMBBHO
89	BSNL	AMBALA	JAGADHRI	BURIA	AMBBUR
90	BSNL	AMBALA	JAGADHRI	CHAMRAURI	AMBCHM
91	BSNL	AMBALA	JAGADHRI	JORIAN+BURIA GATE	AMBDLJ
92	BSNL	AMBALA	JAGADHRI	DAMLA	AMBDML
93	BSNL	AMBALA	JAGADHRI	GUDIANA	AMBGDN
94	BSNL	AMBALA	JAGADHRI	GHILLOUR	AMBGLR
95	BSNL	AMBALA	JAGADHRI	GUMTHALA RAO	AMBGTL
96	BSNL	AMBALA	JAGADHRI	HARNAUL	AMBHNL
97	BSNL	AMBALA	JAGADHRI	JAGADHRI	AMBJGD
98	BSNL	AMBALA	JAGADHRI	JAGURI	AMBJGR
99	BSNL	AMBALA	JAGADHRI	JATHLANA	AMBJTL
100	BSNL	AMBALA	JAGADHRI	KHURDBAN	AMBKHB
101	BSNL	AMBALA	JAGADHRI	KALANAUR	AMBKLN
102	BSNL	AMBALA	JAGADHRI	KALANPUR	AMBKPR
103	BSNL	AMBALA	JAGADHRI	LAWANA	AMBLWN
104	BSNL	AMBALA	JAGADHRI	MUSTFABAD	AMBMFB
105	BSNL	AMBALA	JAGADHRI	MEHLANWALI	AMBMHL
106	BSNL	AMBALA	JAGADHRI	MASSANA RANGRA	AMBMSR
107	BSNL	AMBALA	JAGADHRI	NAHARPUR	AMBNHP
108	BSNL	AMBALA	JAGADHRI	RADAUR	AMBRDU
109	BSNL	AMBALA	JAGADHRI	SABHAPUR	AMBSBH
110	BSNL	AMBALA	JAGADHRI	SABAPUR	AMBSBR
111	BSNL	AMBALA	JAGADHRI	SUDHAIL	AMBSDL
112	BSNL	AMBALA	JAGADHRI	SARAN	AMBSRN
113	BSNL	AMBALA	JAGADHRI	JAGADHRI-Thermal Colony	AMBTCY
114	BSNL	AMBALA	JAGADHRI	TIGRI	AMBTGR
115	BSNL	AMBALA	JAGADHRI	TALAKAUR	AMBTLK
116	BSNL	AMBALA	JAGADHRI	VISHNUNAGAR	AMBVNR
117	BSNL	AMBALA	JAGADHRI	YAMUNA NAGAR INDUSTRY AREA	AMBYIN
118	BSNL	AMBALA	JAGADHRI	YAMUNA NAGAR	AMBYMN
119	BSNL	AMBALA	JAGADHRI	SAHARANPUR ROAD	AMBYSR

120	BSNL	AMBALA	KALKA	BASAULAN	AMBBSL
121	BSNL	AMBALA	KALKA	BARWALA	AMBBWL
122	BSNL	AMBALA	KALKA	HIMSIKHA	AMBHIS
123	BSNL	AMBALA	KALKA	HMT PINJORE	AMBHMT
124	BSNL	AMBALA	KALKA	KALKA	AMBKKA
125	BSNL	AMBALA	KALKA	KOT	AMBKOT
126	BSNL	AMBALA	KALKA	KARANPUR	AMBKRP
127	BSNL	AMBALA	KALKA	KHATAULI	AMBKTA
128	BSNL	AMBALA	KALKA	MORNI	AMBMRH
129	BSNL	AMBALA	KALKA	MARANWALA	AMBMWL
130	BSNL	AMBALA	KALKA	NADDA SAHIB	AMBNDS
131	BSNL	AMBALA	KALKA	PARWALA	AMBPAR
132	BSNL	AMBALA	KALKA	PINJORE	AMBPNJ
133	BSNL	AMBALA	KALKA	RAMGARH	AMBRMG
134	BSNL	AMBALA	KALKA	RATTEWALI	AMBRTW
135	BSNL	AMBALA	KALKA	SURAJPUR	AMBSJP
136	BSNL	AMBALA	NARAINGARH	BADHOLI	AMBBDL
137	BSNL	AMBALA	NARAINGARH	BADHAUR	AMBBDR
138	BSNL	AMBALA	NARAINGARH	BHUREWALA	AMBBHW
139	BSNL	AMBALA	NARAINGARH	BHAROG	AMBBRG
140	BSNL	AMBALA	NARAINGARH	BERKHERI	AMBBRK
141	BSNL	AMBALA	NARAINGARH	DHANANA	AMBDNA
142	BSNL	AMBALA	NARAINGARH	DERA HAMIDPUR	AMBDRH
143	BSNL	AMBALA	NARAINGARH	HANGOLA	AMBHNG
144	BSNL	AMBALA	NARAINGARH	JEOLLY	AMBJLY
145	BSNL	AMBALA	NARAINGARH	JATWAR	AMBJTW
146	BSNL	AMBALA	NARAINGARH	KORWA KHURD	AMBKKD
147	BSNL	AMBALA	NARAINGARH	KAKAR MAJRA	AMBKKM
148	BSNL	AMBALA	NARAINGARH	KURALI	AMBKRI
149	BSNL	AMBALA	NARAINGARH	MAGHARPURA	AMBKSN
150	BSNL	AMBALA	NARAINGARH	KATHE MAJRA	AMBKTH
151	BSNL	AMBALA	NARAINGARH	MAULI	AMBMLI
152	BSNL	AMBALA	NARAINGARH	NARAINGARH	AMBNGH
153	BSNL	AMBALA	NARAINGARH	NANHERA	AMBNNR
154	BSNL	AMBALA	NARAINGARH	PATREHRI	AMBPTI
155	BSNL	AMBALA	NARAINGARH	RAIPUR RANI	AMBRPI
156	BSNL	AMBALA	NARAINGARH	RAIWALI	AMBRWI
157	BSNL	AMBALA	NARAINGARH	SHAHZADPUR	AMBSZP

PHISTREAM
EMPOWERING LEADERSHIP, TRANSFORMING BUSINESS

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



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

(JULY TO SEPTEMBER 2016)

NORTH ZONE – HARYANA CIRCLE

PREPARED BY:

PHISTREAM CONSULTING PRIVATE LIMITED
(An ISO – 9001:2008 Certified Company)
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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 Haryana circle.

1.4. COVERAGE

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

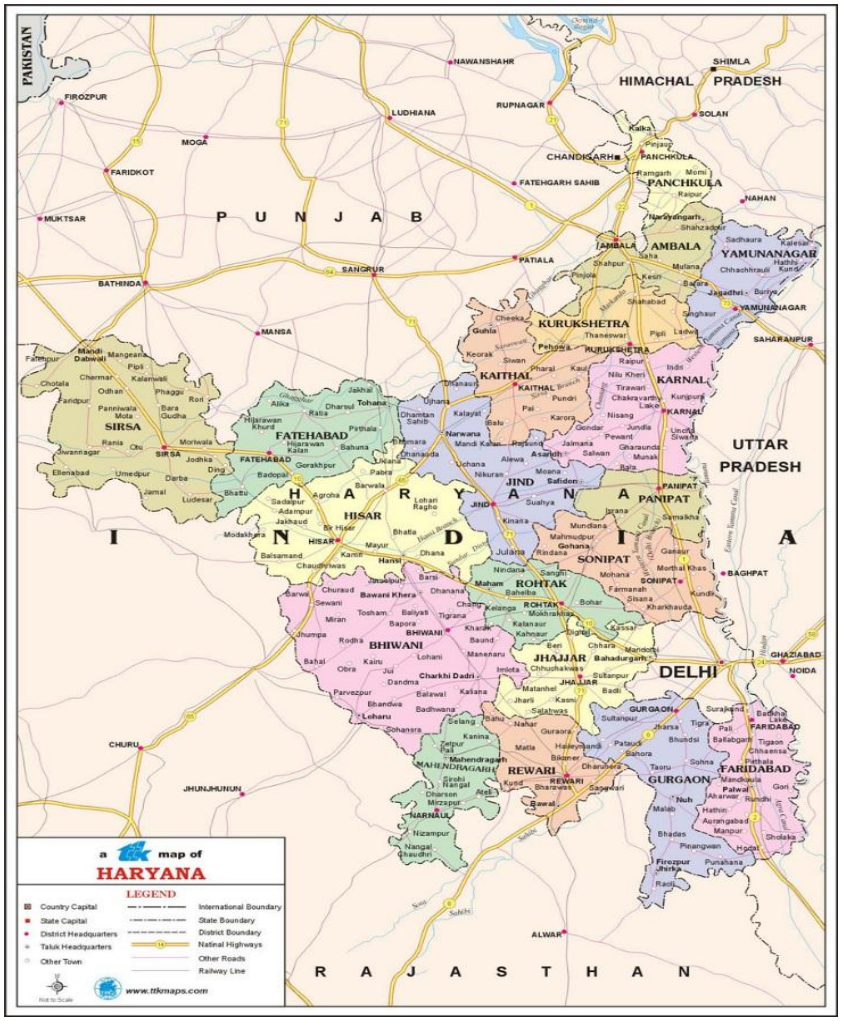


Image Source: TTK Maps

1.5. SSA LIST

S. No.	Circle	SSA Name
1	HA	Ambala
2	HA	Gurgaon
3	HA	Hissar
4	HA	Jind
5	HA	Karnal
6	HA	Narnaul
7	HA	Rohtak
8	HA	Sonipat

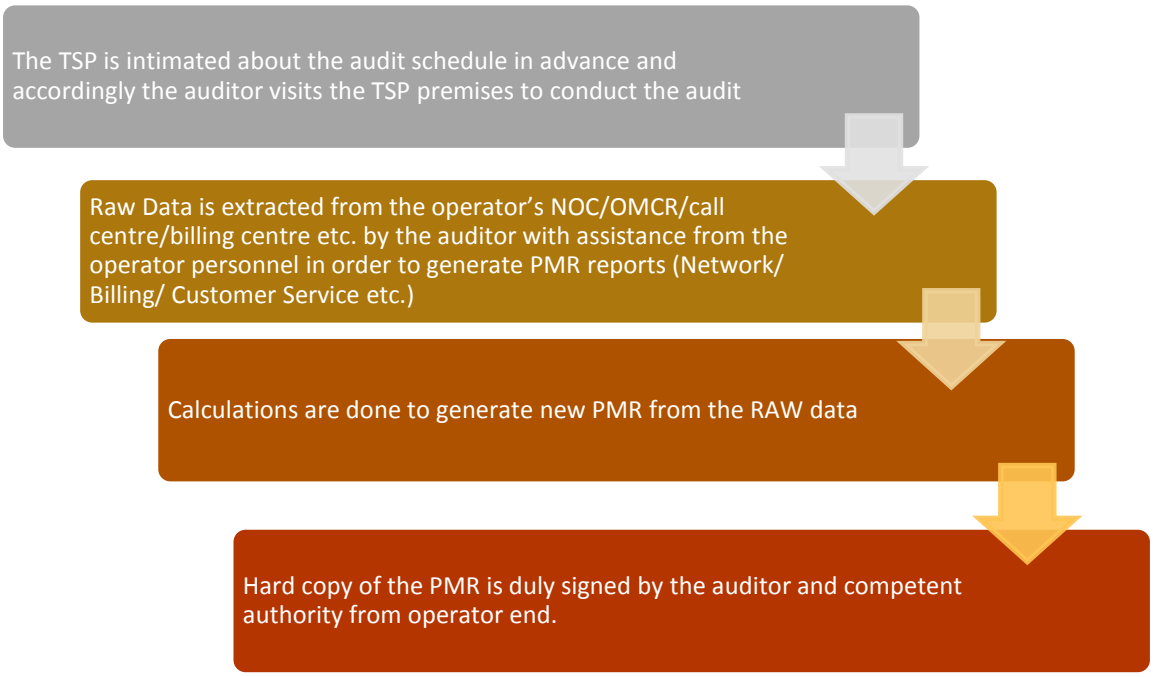
1.6. FRAMEWORK USED

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 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, September 2016 audit data was collected in the month of October 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 September 2016 was collected in the month of October 2016.

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

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

Let us understand these formats in details.

2.1. MONTHLY PMR

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

Parameters includes:

Network Availability

- BTS accumulated downtime
- Worst affected BTS due to downtime

Connection Establishment (Accessibility)

- Call Set Up success Rate (CSSR)

Network Congestion Parameters

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

Connection Maintenance

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

Voice Quality

- % Connections with good voice quality

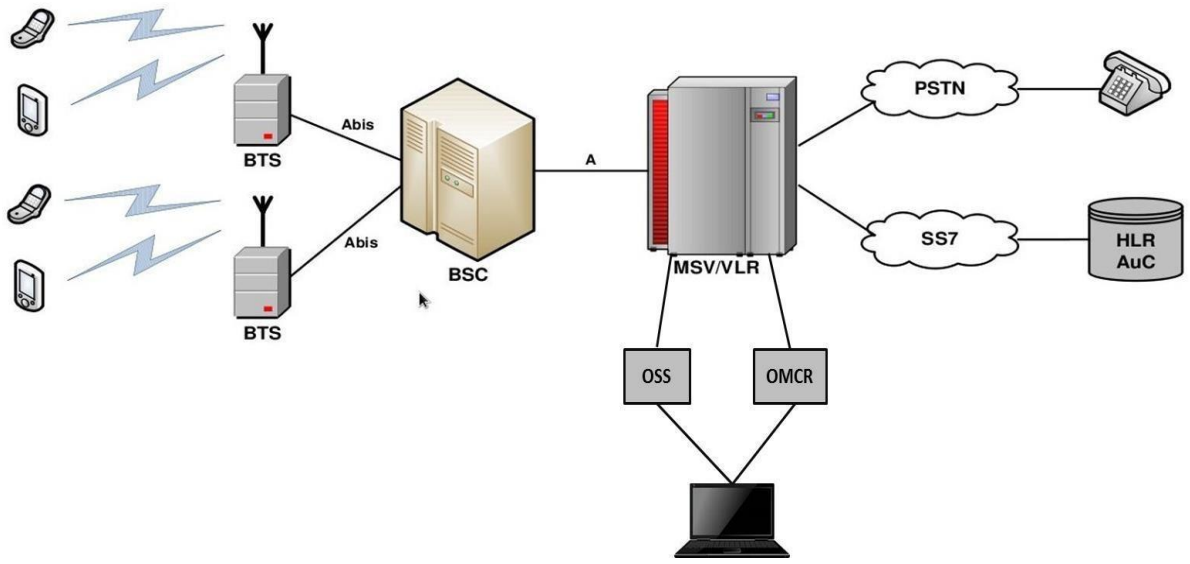
2.2. AUDIT PARAMETER: NETWORK

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

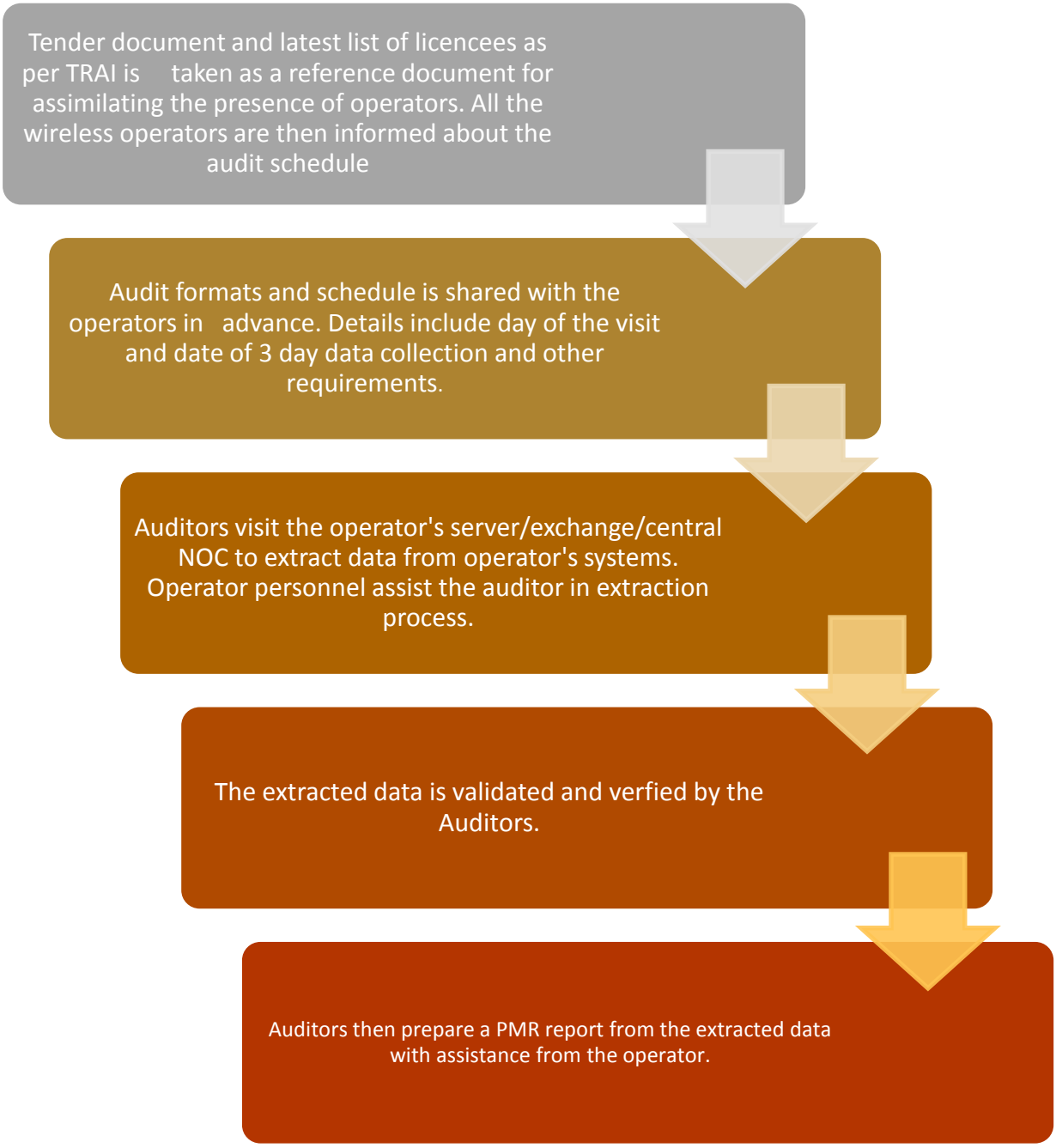
Network Availability	
BTSs Accumulated downtime (not available for service)	≤ 2%
Worst affected BTSs due to downtime	≤ 2%
Connection Establishment (Accessibility)	
Call Set-up Success Rate (within licensee's own network)	≥ 95%
SDCCH/ Paging Channel Congestion	≤ 1 %
TCH Congestion	≤ 2%
Connection Maintenance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

2.3. DATA EXTRACTION POINTS

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



2.4. AUDIT PROCEDURE



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

2.5. NETWORK CALCULATION METHODOLOGY

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

2.6. 3G VOICE

S. No.	Name of Parameter	Definition	Formula	Benchmark
1	Network Availability			
a.	Total no. of Node B's in LSA	Total no. of Node B's Licensed in LSA		
b.	Total downtime of all Node B's	When all the sector(s) of a Node B's are down for > 60 minutes at an instant in a whole day		
c.	No. of Worst Affected Node B's	Node B'ss having more than 24 hours of Downtime in 3 Days	No. of Node B's having accumulated downtime of >24 hours in a month	*<=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

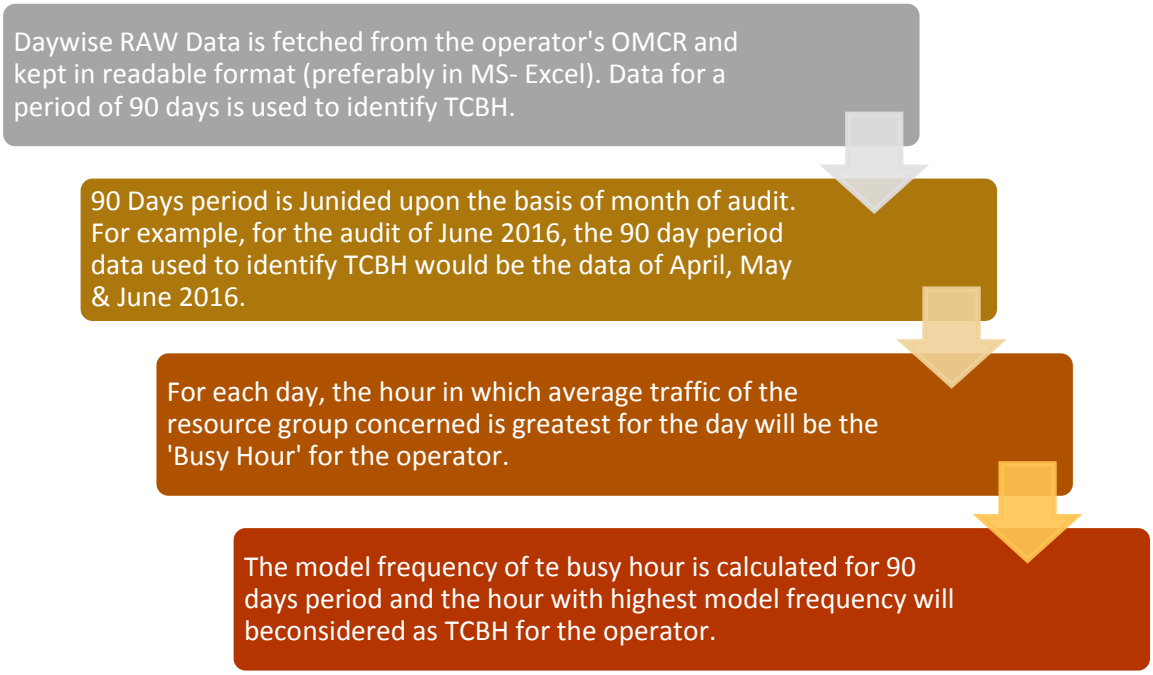
The main purpose of 3 day live measurement is to evaluate the network parameters on intraday basis. While the monthly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the network parameters discussed earlier. All the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

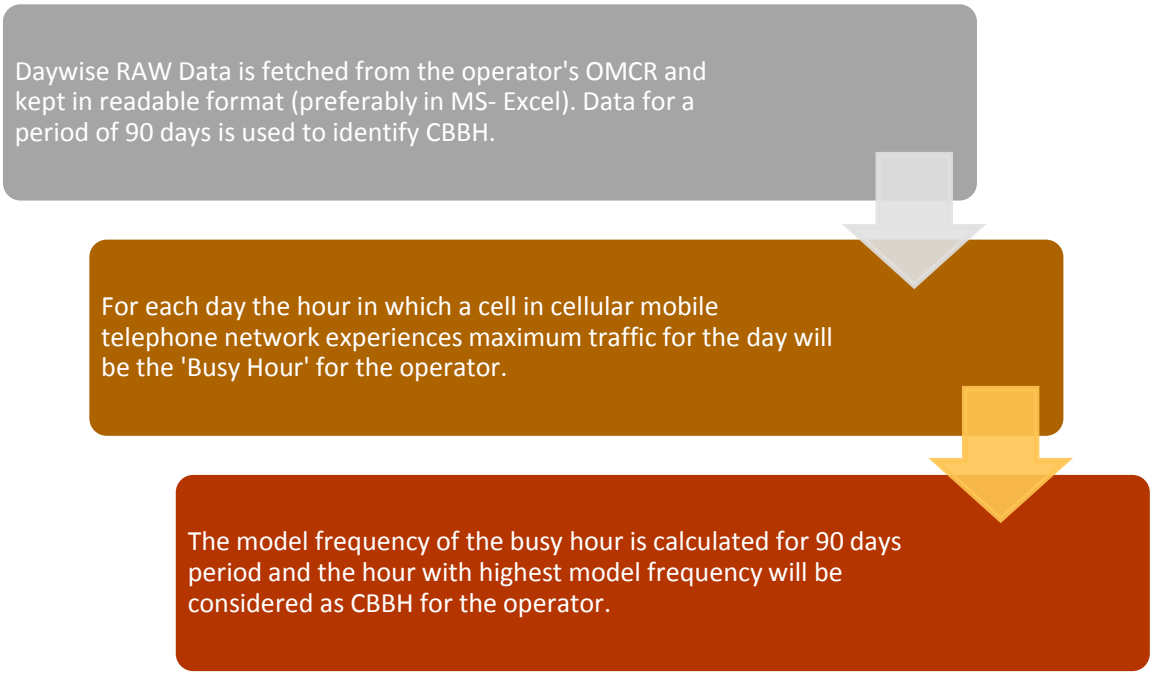
As per QoS regulations 2009 (7 of 2009), Time Consistent Busy Hour" or "TCBH" means the one hour period starting at the same time each day for which the average traffic of the resource group concerned is greatest over the days under consideration and such Time Consistent Busy Hour shall be established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



3.2. CBBH: Significance and Selection Methodology

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

Step by step procedure to identify CBBH for an operator:



4. CUSTOMERSERVICE 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 September 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 September 2016 was considered for live calling activity conducted in October 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 Helpline for Passengers
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 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 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 Sashastra Seema Bal (SSB)
36	1909 National Do Not Call Registry
37	1912 Complaint of Electricity
38	1916 Drinking Water Supply
39	1950 Election Commission of India

4.8. CUSTOMER CARE

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

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

The process for this parameter is stated below:

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

4.9. INTER OPERATOR CALL ASSESSMENT

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

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

5. DRIVE TEST: SIGNIFICANCE AND METHODOLOGY

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

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

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

There are two types of drive test as mentioned below.

- Operator Assisted Drive Test
- Independent Drive Test

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

5.1. OPERATOR ASSISTED DRIVE TEST

Haryana circle consists of total 8 SSA's and each SSA needs to be audit in the span of 12 months.

The methodology adopted for the drive test:

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

5.2. INDEPENDENT DRIVE TEST

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

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

5.3. PARAMETERS EVALUATED DURING DRIVE TEST

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

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

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

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

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

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

- Blocked calls
  - 100% - Call Set up Rate

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

6. EXECUTIVE SUMMARY

The 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	3092
AIRTEL	3333550
BSNL	1910245
IDEA	4802859
RCOM GSM	1544821
TTSL CDMA	193858
TTSL GSM	3491709
VODAFONE	5557582

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

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	84	28	1	-	Nokia	Nokia	NA	NA
2	Airtel	9318	3064	25	5	Ericsson	Ericsson	2266	5
3	BSNL	6449	2155	30	7+2	Ericsson, ZTE	Ericsson, Nokia, ZTE	NA	NA
4	IDEA	10205	3356	34	5+1	Nokia	Nokia	2611	5
5	RCOM GSM	2675	893	NA	1	Huawei	Huawei	NA	NA
6	TTSL CDMA	903	230	5	2+2	NA	Motorola / ZTE	NA	NA
7	TTSL GSM	5242	1732	12	2+1	Nokia	Nokia	1244	3
8	VODAFONE	9940	3283	44	5+2	Nokia	Nokia	2268	5

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

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	19:00 - 20:00
3	BSNL	September-16	19:00 - 20:00
4	IDEA	September-16	20:00 - 21:00
5	RCOM GSM	September-16	20:00 - 21:00
6	TTSL CDMA	September-16	19:00 - 20:00
7	TTSL GSM	September-16	20:00 - 21:00
8	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 Haryana circle.

6.4. AUDIT SCHEDULE

Sl. No.	Service Provider	Dates of live measurement Audit			
GSM Operators		July-16	Aug-16	Sept-16	Audit Location
1	AIRCEL	4 to 6 July 2016	1 to 3 Aug 2016	2, 3 & 5 Sept 2016	Green Buleward Building, NSN office, Sector-62, Noida (UP)
2	AIRTEL	14 to 16 July 2016	22 to 24 Aug 2016	21 to 23 Sept 2016	Bharti Airtel Ltd, Plot No. 21, Rajiv Gandhi Chandigarh Technology Park, Chandigarh.
3	BSNL	11 to 13 July 2016	22 to 24 Aug 2016	7 to 9 Sept 2016	AGM (PG) Cum Nodal Officer (TRAI) O/o CGMT Haryana, Ambala (HR)
4	IDEA	18 to 20 July 2016	8 to 10 Aug 2016	5 to 7 Sept 2016	Idea Cellular Limited, E-5, Sector-63, Noida (UP)
5	RCOM GSM	6 to 8 July 2016	3 to 5 Aug 2016	21 to 23 Sept 2016	Reliance Communication Limited, NH-1, VPO-Mohari, Kuruskhetra, Near Hasari Pouthry Farm, Milestone 188.
6	TATA CDMA	1, 4 & 5 July 2016	4, 5 & 8 Aug 2016	22, 23 & 26 Sept 2016	Tata Teleservices Limited, 5, Jasmeet Nagar,Near Vita Milk Plant Gt Road,Ambala, Ambala-134001, India
7	TATA GSM	1, 4 & 5 July 2016	4, 5 & 8 Aug 2016	22, 23 & 26 Sept 2016	Tata Teleservices Limited, 5 - Jasmeet Nagar,Near Vita Milk Plant Gt Road,Ambala, Ambala-134001, India
8	VODAFONE	8, 11 to 12 July 2016	24 to 26 Aug 2016	21 to 23 Sept 2016	Vodafone Digilink Limited, 173 HSIDC Industrial Area, Sector-3, Karnal (Har.)

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

Jul-16									
Network Parameters		Name of Service Provider							
		Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.26%	0.11%	1.06%	0.05%	0.15%	0.21%	0.18%	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.13%	1.42%	0.06%	1.68%	0.00%	0.69%	0.12%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	96.00%	99.29%	98.04%	97.70%	99.23%	97.58%	98.20%	99.79%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.34%	0.27%	0.57%	0.19%	NA	0.10%	0.09%
	TCH Congestion	≤ 2%	0.00%	0.40%	0.70%	0.42%	0.10%	0.06%	0.42%	0.21%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.91%	1.38%	0.75%	0.10%	0.40%	0.66%	0.68%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.04%	0.48%	1.10%	2.73%	0.51%	2.52%	2.88%	2.19%
	%age of connection with good voice quality	≥ 95%	99.95%	98.46%	DNA	97.77%	99.49%	DNA	96.70%	97.81%

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

Aug-16									
Network Parameters		Name of Service Provider							
		Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.31%	0.10%	1.04%	0.05%	0.17%	0.19%	0.12%	0.09%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.10%	1.21%	0.15%	0.90%	0.00%	0.23%	0.34%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.39%	99.22%	98.45%	97.24%	99.72%	97.48%	98.12%	99.77%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.28%	0.37%	0.40%	0.14%	0.00%	0.10%	0.11%
	TCH Congestion	≤ 2%	0.00%	0.43%	0.63%	0.60%	0.10%	0.92%	0.46%	0.23%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.97%	1.57%	0.81%	0.12%	0.45%	0.69%	0.73%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	0.59%	1.33%	2.70%	0.73%	1.90%	2.71%	2.44%
	%age of connection with good voice quality	≥ 95%	99.96%	98.35%	DNA	97.66%	99.41%	98.51%	96.80%	97.65%

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

Sep-16									
Network Parameters		Name of Service Provider							
		Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.09%	0.12%	0.88%	0.03%	0.15%	0.07%	0.07%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.10%	1.67%	0.09%	1.57%	0.00%	0.12%	0.03%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.95%	99.39%	98.04%	97.96%	99.81%	97.30%	97.93%	99.81%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.27%	0.40%	0.29%	0.10%	0.00%	0.07%	0.10%
	TCH Congestion	≤ 2%	0.00%	0.29%	0.69%	0.68%	0.11%	0.80%	0.75%	0.19%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.89%	1.54%	0.76%	0.12%	0.57%	0.63%	0.68%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.04%	0.43%	1.24%	2.62%	0.68%	2.36%	2.33%	2.09%
	%age of connection with good voice quality	≥ 95%	99.98%	98.63%	DNA	97.67%	99.38%	DNA	96.92%	97.78%

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

Consolidated										
Network Parameters		Name of Service Provider								
		Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.22%	0.11%	1.00%	0.05%	0.16%	0.16%	0.12%	0.06%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.11%	1.44%	0.10%	1.38%	0.00%	0.35%	0.16%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.78%	99.30%	98.17%	97.63%	99.59%	97.45%	98.08%	99.79%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.29%	0.35%	0.42%	0.14%	0.00%	0.09%	0.10%
	TCH Congestion	≤ 2%	0.00%	0.38%	0.67%	0.57%	0.10%	0.60%	0.54%	0.21%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.92%	1.49%	0.77%	0.12%	0.47%	0.66%	0.70%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.03%	0.50%	1.22%	2.68%	0.64%	2.26%	2.64%	2.24%
	%age of connection with good voice quality	≥ 95%	99.96%	98.48%	DNA	97.70%	99.42%	98.51%	96.80%	97.75%

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	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.00%	0.01%	0.07%	0.00%	0.02%	0.02%	0.02%	0.01%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.69%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	99.26%	97.88%	97.62%	99.71%	98.04%	98.29%	99.88%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.31%	0.20%	0.39%	0.16%	0.00%	0.07%	0.05%
	TCH Congestion	≤ 2%	0.00%	0.40%	0.78%	0.35%	0.07%	0.11%	0.37%	0.12%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.92%	1.26%	0.84%	0.11%	0.35%	0.62%	0.62%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	0.60%	0.75%	2.00%	0.62%	3.30%	2.98%	1.80%
	%age of connection with good voice quality	≥ 95%	100.00%	98.44%	DNA	97.55%	99.43%	DNA	96.63%	97.92%

6.11. 2G VOICE 3 DAYS LIVE DATA: AUGUST

Aug-16										
Network Parameters		Name of Service Provider								
		Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.32%	0.04%	0.70%	0.06%	0.19%	0.07%	0.12%	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	100.00%	99.30%	98.31%	97.37%	99.93%	98.29%	98.24%	99.79%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.36%	0.19%	0.29%	0.08%	0.00%	0.08%	0.19%
	TCH Congestion	≤ 2%	0.00%	0.38%	0.73%	0.53%	0.08%	0.01%	0.37%	0.21%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.96%	1.53%	0.74%	0.12%	0.49%	0.66%	0.76%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	0.54%	1.15%	2.38%	0.74%	1.59%	2.70%	2.54%
	%age of connection with good voice quality	≥ 95%	100.00%	98.35%	DNA	97.80%	99.49%	DNA	96.75%	97.55%

6.12. 2G VOICE 3 DAYS LIVE DATA: SEPTEMBER

Sep-16										
Network Parameters		Name of Service Provider								
		Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.00%	0.04%	0.43%	0.02%	0.13%	0.01%	0.08%	0.02%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	66.67%	99.43%	98.02%	97.99%	99.91%	98.15%	98.20%	99.85%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.23%	0.57%	0.18%	0.09%	0.00%	0.03%	0.05%
	TCH Congestion	≤ 2%	0.00%	0.24%	0.71%	0.48%	0.11%	0.08%	0.56%	0.15%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.85%	1.68%	0.76%	0.14%	0.49%	0.60%	0.65%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	0.31%	1.58%	2.79%	0.90%	2.18%	2.26%	1.87%
	%age of connection with good voice quality	≥ 95%	100.00%	98.73%	DNA	97.66%	99.42%	DNA	96.94%	97.90%

6.13. 2G 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated										
Network Parameters		Name of Service Provider								
		Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.11%	0.03%	0.40%	0.03%	0.12%	0.03%	0.07%	0.03%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.31%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	88.89%	99.33%	98.07%	97.66%	99.85%	98.16%	98.24%	99.84%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.30%	0.32%	0.29%	0.11%	0.00%	0.06%	0.10%
	TCH Congestion	≤ 2%	0.00%	0.34%	0.74%	0.45%	0.08%	0.07%	0.43%	0.16%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.91%	1.49%	0.78%	0.12%	0.44%	0.63%	0.68%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.00%	0.49%	1.16%	2.39%	0.75%	2.36%	2.65%	2.07%
	%age of connection with good voice quality	≥ 95%	100.00%	98.51%	DNA	97.67%	99.45%	DNA	96.77%	97.79%

6.14. 3G VOICE PMR: JULY

Jul-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.10%	0.98%	0.04%	0.15%	0.10%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.14%	1.73%	0.00%	0.33%	0.14%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.16%	99.45%	99.12%	99.84%	99.82%
	RRC Congestion:	≤ 1%	0.00%	0.89%	0.24%	0.36%	0.00%
	RAB Congestion:	≤ 2%	0.00%	0.40%	0.06%	0.33%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.07%	0.64%	0.33%	0.14%	0.26%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.52%	1.28%	3.01%	0.99%	2.31%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.48%	DNA	98.94%	99.14%	98.08%

6.15. 3G VOICE PMR: AUGUST

Aug-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.11%	0.73%	0.02%	0.10%	0.09%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.14%	1.48%	0.00%	0.08%	0.14%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.07%	99.46%	99.31%	99.82%	99.72%
	RRC Congestion:	≤ 1%	0.00%	0.72%	0.37%	0.37%	0.01%
	RAB Congestion:	≤ 2%	0.00%	0.46%	0.11%	0.45%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.09%	0.55%	0.34%	0.15%	0.27%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.63%	1.21%	2.74%	1.14%	2.21%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.59%	DNA	98.92%	99.13%	97.87%

6.16. 3G VOICE PMR: SEPTEMBER

Sep-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.11%	0.76%	0.02%	0.05%	0.05%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.13%	1.48%	0.00%	0.72%	0.04%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.09%	99.46%	99.11%	99.84%	99.84%
	RRC Congestion:	≤ 1%	0.00%	0.72%	0.55%	0.39%	0.03%
	RAB Congestion:	≤ 2%	0.00%	0.46%	0.39%	0.29%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.09%	0.55%	0.34%	0.13%	0.27%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.55%	1.21%	2.77%	0.92%	2.09%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.65%	DNA	98.97%	99.13%	98.12%

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%	0.11%	0.82%	0.02%	0.10%	0.08%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.14%	1.56%	0.00%	0.38%	0.11%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.11%	99.46%	99.18%	99.84%	99.79%
	RRC Congestion:	≤ 1%	0.00%	0.78%	0.38%	0.38%	0.01%
	RAB Congestion:	≤ 2%	0.00%	0.44%	0.19%	0.36%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.08%	0.58%	0.34%	0.14%	0.26%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.57%	1.23%	2.84%	1.02%	2.20%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.57%	DNA	98.94%	99.14%	98.02%

6.18. 3G VOICE 3 DAYS LIVE DATA: JULY

Jul-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.25%	0.66%	0.00%	0.14%	0.09%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.33%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.19%	99.45%	99.29%	99.85%	99.85%
	RRC Congestion:	≤ 1%	0.00%	1.35%	0.18%	0.33%	0.01%
	RAB Congestion:	≤ 2%	0.00%	0.39%	0.05%	0.32%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.07%	0.64%	0.33%	0.15%	0.24%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.54%	1.14%	2.72%	0.86%	1.87%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.49%	DNA	98.93%	99.14%	98.24%

6.19. 3G VOICE 3 DAYS LIVE DATA: AUGUST

Aug-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.04%	1.11%	0.01%	0.11%	0.08%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.08%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.03%	99.44%	99.30%	99.84%	99.07%
	RRC Congestion:	≤ 1%	0.00%	0.86%	0.28%	0.36%	0.01%
	RAB Congestion:	≤ 2%	0.00%	0.47%	0.08%	0.31%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.10%	0.60%	0.31%	0.13%	0.34%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.72%	1.19%	2.63%	0.97%	2.53%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.59%	DNA	98.94%	99.13%	97.63%

6.20. 3G VOICE 3 DAYS LIVE DATA: SEPTEMBER

Sep-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.11%	0.54%	0.01%	0.07%	0.04%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	98.99%	99.57%	99.13%	99.84%	99.87%
	RRC Congestion:	≤ 1%	0.00%	0.82%	0.45%	0.36%	0.00%
	RAB Congestion:	≤ 2%	0.00%	0.33%	0.19%	0.17%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.09%	0.57%	0.39%	0.13%	0.23%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.46%	1.17%	2.60%	1.02%	2.11%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.66%	DNA	98.91%	99.13%	98.28%

6.21. 3G VOICE 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.13%	0.77%	0.01%	0.11%	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.00%	0.00%	0.14%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.07%	99.49%	99.24%	99.84%	99.60%
	RRC Congestion:	≤ 1%	0.00%	1.01%	0.31%	0.35%	0.01%
	RAB Congestion:	≤ 2%	0.00%	0.40%	0.11%	0.27%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.09%	0.60%	0.34%	0.14%	0.27%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.57%	1.17%	2.65%	0.95%	2.17%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.58%	DNA	98.93%	99.14%	98.05%

6.22. 2G WIRELESS DATA: JULY

Jul-16										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter										
1	Service Activation/ Provisioning									
i)	Total No. of Subscribers for Service Activation (A)		12	DNA	DNA	230930	1903	DNA	68	DNA
ii)	Total Service Activations provided within 4 Hours (B)		12	DNA	DNA	230782	1903	DNA	67	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	100.00%	DNA	DNA	99.94%	99.99%	DNA	98.53%	DNA
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		1864	12413710	DNA	11342494	DNA	249487.71	3237493	14156322
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		1863	12409282	DNA	11334709	DNA	241998.129	3235712	14139640
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.95%	99.96%	DNA	99.93%	98.70%	97.00%	99.94%	99.88%
3										
i)	RNC originated PS Domain Iu Connection Setup Success (A)		122622	2138262039	DNA	8356709723	478683144	936	786299987	1066630634
ii)	RNC originated PS Domain Iu Connection Release (B)		2173	19180235	DNA	94424647	7569354	4	20110106	44262281
iii)	Drop Rate = (B/A) * 100	<=5%	1.77%	0.90%	DNA	1.13%	1.58%	0.42%	2.56%	4.15%

6.23. 2G WIRELESS DATA: AUGUST

Aug-16										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter										
1	Service Activation/ Provisioning									
i)	Total No. of Subscribers for Service Activation (A)		136200	DNA	DNA	DNA	2009	DNA	68	DNA
ii)	Total Service Activations provided within 4 Hours (B)		136094	DNA	DNA	DNA	2009	DNA	67	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	99.92%	DNA	DNA	DNA	100.00%	DNA	98.53%	DNA
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		2268	13598934	DNA	10936474	DNA	231388	3331526	15072126
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		2228	13597176	DNA	10909555	DNA	223836	3329580	15056591
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.24%	99.99%	DNA	99.75%	99.26%	96.74%	99.94%	99.90%
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		228341	1937086989	DNA	8678533201	28736582	971	773018223	1059266728
ii)	RNC originated PS Domain Iu Connection Release (B)		859	17324242	DNA	106246007	540183	5	20590928	46971582
iii)	Drop Rate = (B/A) * 100	<=5%	0.38%	0.89%	DNA	1.22%	1.88%	0.54%	2.66%	4.43%

6.24. 2G WIRELESS DATA: SEPTEMBER

Sep-16										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	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	290600	70022	DNA	68	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	290440	70021	DNA	67	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	99.94%	100.00%	DNA	98.53%	DNA
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		1962	12764983	31348660	9289909	DNA	217802	2820935	13806930
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		1928	12764100	30599417	9116340	DNA	210746	2819598	13792310
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.27%	99.99%	97.61%	98.13%	98.83%	96.76%	99.95%	99.89%
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		225324	1811805255	DNA	7413393682	785252203	924	632081289	929568272
ii)	RNC originated PS Domain Iu Connection Release (B)		1864	14649975	DNA	94063320	14440880	7	18152286	36332140
iii)	Drop Rate = (B/A) * 100	<=5%	0.83%	0.81%	DNA	1.27%	1.84%	0.78%	2.87%	3.91%

6.25. 2G WIRELESS DATA: CONSOLIDATED

Consolidated										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Service Quality Parameter										
1	Service Activation/ Provisioning									
i)	Total No. of Subscribers for Service Activation (A)		68106	DNA	DNA	260765	24644.80	DNA	68	DNA
ii)	Total Service Activations provided within 4 Hours (B)		68053	DNA	DNA	260611	24644.42	DNA	67	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	99.96%	DNA	DNA	99.94%	100.00%	DNA	98.53%	DNA
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		2031.33	12925875.67	31348660.12	10522959	DNA	232892.26	3129984.67	14345126.000
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		2006.33	12923519.33	30599417	10453534.67	DNA	225526.52	3128296.67	14329513.67
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.82%	99.98%	97.61%	99.27%	98.93%	96.83%	99.95%	99.89%
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		192095.6667	1962384761	DNA	8149545535	430890643	943.73	730466499.67	1018488545
ii)	RNC originated PS Domain Iu Connection Release (B)		1632	17051484	DNA	98244658	7516805.81	5.44	19617773.33	42522001
iii)	Drop Rate = (B/A) * 100	<=5%	0.99%	0.87%	DNA	1.21%	1.77%	0.58%	2.70%	4.16%

6.26. 2G WIRELESS 3 DAYS LIVE DATA: JULY

Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	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	1367	DNA	68	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	1367	DNA	67	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	DNA	100.00%	DNA	98.53%	DNA
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		6	1199215	DNA	1088670	DNA	258603	295314	1307310
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		6	1199111	DNA	1088069	DNA	250535	295146	1305719
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	99.99%	DNA	99.94%	DNA	96.88%	99.94%	99.88%
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		13134	197840989	DNA	784627978	22972452	1002	78622497	102166512
ii)	RNC originated PS Domain Iu Connection Release (B)		104	1758872	DNA	9668290	285428	4	1983963	4074707
iii)	Drop Rate = (B/A) * 100	<=5%	0.79%	0.89%	DNA	1.23%	1.24%	0.37%	2.52%	3.99%

6.27. 2G WIRELESS 3 DAYS LIVE DATA: AUGUST

Aug-16										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	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	68	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA	DNA	67	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	DNA	DNA	DNA	98.53%	DNA
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		259	1264664	DNA	1069338	DNA	227566.3333	317108	1423745
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		259	1264576	DNA	1068570	DNA	220119.3333	316925	1422055
iii)	PDP Context Activation Success Rate =(B/A) *100		100.00%	99.99%	DNA	99.93%	99.38%	96.73%	99.94%	99.88%
3										
i)	RNC originated PS Domain Iu Connection Setup Success (A)		27655	184004746	DNA	832854747	89373923.00	1002	74170586	102556180
ii)	RNC originated PS Domain Iu Connection Release (B)		70	1549400	DNA	9565840	1707395.00	5	1833677	4689473
iii)	Drop Rate = (B/A) * 100		0.25%	0.84%	DNA	1.15%	1.91%	0.50%	2.47%	4.57%

6.28. 2G WIRELESS 3 DAYS LIVE DATA: SEPTEMBER

Sep-16										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	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	68	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	DNA	DNA	67	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	DNA	DNA	DNA	98.53%	DNA
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		254	1312136	DNA	928151	DNA	206948	270945	1341834
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		249	1312072	DNA	912805	DNA	200294	270862	1339666
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.03%	100.00%	DNA	98.35%	98.99%	96.78%	99.97%	99.84%
3	Drop Rate = (B/A) * 100									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		29895	181580044	DNA	758216536	77865504	1029	60731013	89670503
ii)	RNC originated PS Domain Iu Connection Release (B)		221	1391009	DNA	9282092	1463736	4	2023104	3575846
iii)	Drop Rate = (B/A) * 100	<=5%	0.74%	0.77%	DNA	1.22%	1.88%	0.39%	3.33%	3.99%

6.29. 2G WIRELESS 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated										
Cellular Mobile Telephone Services										
S. No.	Name of Parameter	Benchmark	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	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	1367	DNA	68	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	DNA	DNA	1367	DNA	67	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	*Within 4 Hours with 95% Success Rate*	DNA	DNA	DNA	DNA	100.00%	DNA	98.53%	DNA
2	PDP Context Activation Success Rate									
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		173	1258672	DNA	1028720	DNA	231039	294456	1357630
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		171	1258586	DNA	1023148	DNA	223650	294311	1355813
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.34%	99.99%	DNA	99.41%	99.18%	96.80%	99.95%	99.87%
3	Drop Rate									
i)	RNC originated PS Domain Iu Connection Setup Success (A)		23561	187808593	DNA	791899754	63403960	1011	71174699	98131065
ii)	RNC originated PS Domain Iu Connection Release (B)		132	1566427	DNA	9505407	1152186	4	1946915	4113342
iii)	Drop Rate = (B/A) * 100	<=5%	0.59%	0.83%	DNA	1.20%	1.68%	0.42%	2.78%	4.18%

6.30. 3G WIRELESS 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)		3371613	DNA	6251180	3174863	6407026
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		3371604	DNA	6154909	3174488	6384457
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	98.46%	99.99%	99.65%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		243985896	DNA	203551869	14655486	233382200
ii)	RNC originated PS Domain Iu Connection Release (B)		107409	DNA	3893989	57788	1915873
iii)	Drop Rate = (B/A) * 100	<=5%	0.04%	DNA	1.91%	0.39%	0.82%

6.31. 3G WIRELESS 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)		4111308	30100076	6289286	3125064	6540101
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		4111307	29522290	6113688	3124618	6522305
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	98.08%	97.21%	99.99%	99.73%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		248787553	DNA	228589200	14171594	226313346
ii)	RNC originated PS Domain Iu Connection Release (B)		123553	DNA	4456418	52111	2047970
iii)	Drop Rate = (B/A) * 100	<=5%	0.05%	DNA	1.95%	0.37%	0.90%

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)		4449581	DNA	5497502	2581964	6230322
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		4449568	DNA	5398555	2581637	6214180
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	98.20%	99.99%	99.74%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		262354680	DNA	251334432	11189090	200166316
ii)	RNC originated PS Domain Iu Connection Release (B)		142468	DNA	4600320	31919	1733080
iii)	Drop Rate = (B/A) * 100	<=5%	0.05%	DNA	1.83%	0.29%	0.87%

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	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)		3977501	30100076	6012656	2960630	6392483
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		3977493	29522290	5889051	2960248	6373647
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	98.08%	97.96%	99.99%	99.71%
3	Drop Rate						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		251709376	DNA	227825167	13338723.33	219953954
ii)	RNC originated PS Domain Iu Connection Release (B)		124476.67	DNA	4316909	47272.66667	1898974.333
iii)	Drop Rate = (B/A) * 100	<=5%	0.05%	DNA	1.90%	0.35%	0.86%

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)		334452	DNA	588578	324150	621939
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		334451	DNA	579510	324114	619439
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	98.46%	99.99%	99.60%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		23251195	DNA	19863294	1474685	22946468
ii)	RNC originated PS Domain Iu Connection Release (B)		10195	DNA	371489	6446	166317
iii)	Drop Rate = (B/A) * 100	<=5%	0.04%	DNA	1.87%	0.44%	0.72%

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	**D**						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		397938	DNA	622373	307904	661610
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		397938	DNA	610968	307833	659971
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	98.17%	99.98%	99.75%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		24677453	DNA	22828622	1382951	21848462
ii)	RNC originated PS Domain Iu Connection Release (B)		12538	DNA	445222	5216	208629
iii)	Drop Rate = (B/A) * 100	<=5%	0.05%	DNA	1.95%	0.38%	0.95%

6.36. 3G Wireless 3 Days Live 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)		491140	DNA	584167	242960	208978
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		491140	DNA	574722	242907	208405
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	98.38%	99.98%	99.73%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		25111273	DNA	22181514	906367	6545189
ii)	RNC originated PS Domain Iu Connection Release (B)		15693	DNA	437444	2397	46686
iii)	Drop Rate = (B/A) * 100	<=5%	0.06%	DNA	1.97%	0.26%	0.71%

6.37. 3G Wireless 3 Days Live Data: Consolidated

Consolidated							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Service Quality Parameter							
1	**Service Activation/ Provisioning**						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	DNA	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)		407843	DNA	598373	291671	497509
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		407843	DNA	588400	291618	495938
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	100.00%	DNA	98.34%	99.98%	99.69%
3	**Drop Rate**						
i)	RNC originated PS Domain Iu Connection Setup Success (A)		24346640	DNA	21624477	1254668	17113373
ii)	RNC originated PS Domain Iu Connection Release (B)		12809	DNA	418052	4686	140544
iii)	Drop Rate = (B/A) * 100	<=5%	0.05%	DNA	1.93%	0.36%	0.80%

6.38. POI CONGESTION: JULY

Jul-16								
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service								
Name of Parameter	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Total No. of POI's in Month having < = 0.5% POI								
Total No. of call attempts on POI	844	1575565	2074564	32620	128201	323075	450581	2550269
Total traffic served on all POIs (Erlang)	3	37102	36487	1089	2505	9536	7646	41968
Total No. of circuits on all individual POIs	6786	59416	50521	1933	8426	26896	16769	78970
Total number of working POI Service Area wise	33	42	65	58	1	81	24	21
Capacity of all POIs	6244	58821	35365	1917	7433	24920	16814	77513
No. of all POI's having >=0.5% POI congestion	0	0	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	0	0	0	0	0	0	0	0

6.39. POI CONGESTION: AUGUST

Aug-16								
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service								
Name of Parameter	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Total No. of POI's in Month having < = 0.5% POI congestion								
Total No. of call attempts on POI	2179	1586448	1882132	32652	121312	263910	512884	2612661
Total traffic served on all POIs (Erlang)	9	38479	36337	1098	2444	9488	8392	43949
Total No. of circuits on all individual POIs	6786	60696	50397	1921	8634	28782	17591	79094
Total number of working POI Service Area wise	33	42	65	58	17	85	24	21
Capacity of all POIs	6244	60089	35278	1906	7595	26671	16814	77634
No. of all POI's having >=0.5% POI congestion	0	0	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	0	0	0	0	0	0	0	0

6.40. POI CONGESTION: SEPTEMBER

Sep-16								
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service								
Name of Parameter	Aircel	AIRTEL	BSNL	IDEA	RCOM-GSM	TTSL CDMA	TTSL GSM	VODAFONE
Total No. of POI's in Month having < = 0.5% POI congestion								
Total No. of call attempts on POI	803	1867544	2057959	35451	120977	264653	564246	2783935
Total traffic served on all POIs (Erlang)	3	44806	37404	2612	2506	8396	8752	47830
Total No. of circuits on all individual POIs	6789	61239	50397	1992	7770	29013	17732	80458
Total number of working POI Service Area wise	33	44	65	112	1	85	24	21
Capacity of all POIs	6244	60626	35365	1976	6950	26882	16814	78997
No. of all POI's having >=0.5% POI congestion	0	0	0	0	0	0	1	1
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	Nil	0	0	0	0	0	External POI RELAINCE JIO	Reliance Jio

6.41. POI CONGESTION: CONSOLIDATED

Consolidated								
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service								
Name of Parameter	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Total No. of POI's in Month having < = 0.5% POI congestion								
Total No. of call attempts on POI	1275	1676519	2004885	33574	123497	283879	509237	2648955
Total traffic served on all POIs (Erlang)	5	40129	36743	1600	2485	9140	8263	44583
Total No. of circuits on all individual POIs	6787	60450	50438	1949	8277	28230	17364	79507
Total number of working POI Service Area wise	33	43	65	76	6	84	24	21
Capacity of all POIs	6244	59846	35336	1933	7326	26158	16814	78048
No. of all POI's having >=0.5% POI congestion	0	0	0	0	0	0	0	0
Name of POI not meeting the benchmark (having >=0.5% POI congestion)	0	0	0	0	0	0	0	0

CUSTOMER SERVICE QUALITY (CSD) PARAMETERS

7. CUSTOMER SERVICE DELIVERY

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	RCOM GSM	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	No. of bills issued during the period (A)	13	488808	139625	909216	106879	30554	172404	647678
		No. of bills disputed including billing complaints over a billing cycle (B)	0	131	15	682	88	0	1	517
		Billing Compliant (%) = B/A*100	0.0%	0.03%	0.01%	0.08%	0.08%	0.00%	0.00%	0.08%
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	Total No. of Pre-paid customers at the end of the month (A)	3046	3095386	1792198	4488832	1551054	3292083	3292083	5336091
		Total No. of complaints relating to charging, Credit and Validity during a month (B)	0	2279	21	1823	1359	0	7	2847
		Pre-paid Charging Complaints (%) = B/A*100	0.00%	0.07%	0.00%	0.04%	0.09%	0.00%	0.00%	0.05%
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	2410	36	12114	1447	0	8	3364
		No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the month	0	2410	36	12114	1447	0	8	3364
		No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 6 weeks during the month	0	2410	36	12114	1447	0	8	3364
		% of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	NA	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 within 6 weeks	NA	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 **DAYS**)	NA	7	7	7	7	7	7	7
4	**Termination / Closures** (Customer care promptness in attending to customers request)	No. of Requests for Termination/ Closure of service (A)	0	2478	750	11905	353	587	1855	1537
		No. of requested handled within 7 days (B)	0	2478	750	11905	353	587	1855	1537
		% of Termination/ Closure of service within 7 days (B*100/A)	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
5	**Time taken for refund of deposits after closures: Benchmark** (100% within 60	No. of Payments/ Refunds due (A)	0	201	373	3366	1250	56	71	9053
		Cleared over a period of <60 days (B)	0	201	373	3363	1249	56	71	9053
		Refunds Successfull Completion (B/A)*100	NA	100.00%	100.00%	99.91%	99.92%	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)	2453	868683	81186	15707495	2016551	0	670998	8385668
		Total no. of calls successfully established to customer care/Call center (B)	2417	868683	81186	15658320	1990600	0	660349	8385643
		% Accessibility of Call centre /customer Care (B *100/ A)	98.53%	100.00%	100.00%	99.69%	98.71%	NA	98.41%	100.00%
		Total Calls reached to operator for Voice to Voice (C)	1440	1522114	407575	3647370	437894	25550	1315426	3455037
		Total number of calls answered by the operator (Voice to voice) within 90 seconds (D)	1438	1424171	400408	3581270	422209	25278	1273117	3401440
		% age of calls answered by the operators (voice to voice) within 90 seconds (D *100/ C)	99.86%	93.57%	98.24%	98.19%	96.42%	98.94%	96.78%	98.45%
7	**Customer Care & Grievances Redressal**	Total no of complaints received in the call centre (Tech+ Non Tech)	1	22795	407178	52066	3533	943	9806	22139
		Total no of complaints addressed at call center level	1	22795	399737	23575	3533	936	9752	22139
		% of complaints addressed at call center level	100.00%	100.00%	98.17%	45.28%	100.00%	99.26%	99.45%	100.00%
		Total no of appeals received by the appellate authority	0	3	0	10	78	5	54	0
		Total no of complaints addressed by Appellate authority	0	3	0	10	78	5	50	0
		% of complaints addressed by Appellate authority	NA	100.00%	NA	100.00%	100.00%	100.00%	92.59%	NA
8	**Subscribers Base**	**POSTPAID**	46	164876	46542	299156	38444	17190	219704	218063
		PREPAID	3046	3168674	1863703	4503703	1506377	176668	3272005	5339519

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

Response time to customer assistance						
OPERATOR	**Total no of calls attempted to customer care/Call center**	**Total no. of calls successfully established to customer care/Call center**	**% age of Accessibility of Call centre**	**Total Calls reached to operator for (Voice to Voice)**	**Total number of calls answered by the operator (Voice to voice) within 90 seconds**	**% age calls answered by the operator within 90 seconds**
OPERATOR			>=95%			>=95%
AIRCEL	66	66	100.00%	43	43	100.00%
AIRTEL	41819	41819	100.00%	48467	47067	97.11%
BSNL	2422	2422	100.00%	1603	1603	100.00%
IDEA	596383	593406	99.50%	128717	127042	98.70%
RCOM GSM	56311	55691	98.90%	11848	11083	93.54%
TTSL CDMA	539	535	99.26%	0	0	DNA
TTSL GSM	41958	41450	98.79%	0	0	DNA
VODAFONE	317486	317486	100.00%	115029	112556	97.85%

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	98.53%	99.86%
AIRTEL	0.03%	0.07%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	93.57%
BSNL	0.01%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.24%
IDEA	0.08%	0.04%	100.00%	100.00%	100.00%	100.00%	99.91%	99.69%	98.19%
RCOM GSM	0.08%	0.09%	100.00%	100.00%	100.00%	100.00%	99.92%	98.71%	96.42%
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%	98.41%	96.78%
VODAFONE	0.08%	0.05%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.45%

Name of Service Provider	Customer Care & Grievances Redressal	
	% of Complaints addressed at call center level	% of Complaints addressed by Appellate Authority
AIRCEL	100.00%	NA
AIRTEL	100.00%	100.00%
BSNL	98.17%	NA
IDEA	45.28%	100.00%
RCOM GSM	100.00%	100.00%
TTSL CDMA	99.26%	100.00%
TTSL GSM	99.45%	92.59%
VODAFONE	100.00%	NA

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 Haryana 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
Aircel	-	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%
BSNL	100%	100%	-	100%	100%	100%	100%	100%
Idea	100%	100%	100%	-	100%	100%	100%	100%
RCOM GSM	100%	100%	100%	100%	-	100%	100%	100%
TTSL CDMA	100%	100%	100%	100%	100%	-	100%	100%
TTSL GSM	100%	100%	100%	100%	100%	100%	-	100%
VODAFONE	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	**Aircel**	**Airtel**	**BSNL**	**IDEA**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**Vodafone**
Total No. of calls Attempted	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
Total no. of calls successfully established to customer care/Call center	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%**
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	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
% 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%**

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**	**TTSL CDMA**	**TTSL GSM**	**VODAFONE**
Total No. of calls Attempted	0	100	15	100	88	0	1	100
Total No. of calls Answered	0	84	10	75	62	0	1	76
Cases resolved within 4 weeks	0	84	10	75	62	0	1	76
%age of cases resolved	**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 :	Haryana								
TYPE:	CELLULAR/BASIC SERVICE PROVIDER								
PUT x FOR UNSUCCESSFUL CALL AND TICK FOR SUCCESSFUL CALL									
S. NO.	**L1 Service Number**	**SSA: Hissar**							
	Details	**Aircel**	**Airtel**	**BSNL**	**Idea**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**Vodafone**
1	100 Police	√	√	√	√	√	√	√	√
2	101 Fire	√	√	√	√	√	√	√	√
3	102 Ambulance	√	√	√	√	√	√	√	√
4	104 Health Information Helpline	x	√	×	×	×	x	x	×
5	108 Emergency and Disaster Management Helpline	x	√	×	×	×	x	x	×
6	138 All India Helpine for Passangers	√	√	√	√	√	√	√	√
7	149 Public Road Transport Utility Service	x	√	×	×	×	x	x	×
8	181 Chief Minister Helpline	x	√	√	√	√	x	x	√
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'	x	√	×	×	×	x	x	×
12	1056 Emergency Medical Services	x	√	×	×	×	x	x	×
13	106X State of the Art Hospitals	x	√	×	×	×	x	x	×
14	1063 Public Grievance Cell DoT Hq	x	√	×	×	√	x	x	×
15	1064 Anti Corruption Helpline	x	√	×	×	×	x	x	×
16	1070 Relief Commission for Natural Calamities	√	√	√	√	×	√	√	√
17	1071 Air Accident Helpline	x	√	×	×	×	x	x	×
18	1072 Rail Accident Helpline	x	√	√	√	√	x	x	√
19	1073 Road Accident Helpline	√	√	√	√	√	√	√	√
20	1077 Control Room for District Collector	√	×	√	√	×	√	√	×
21	1090 Call Alart (Crime Branch)	x	×	×	×	×	x	x	×
22	1091 Women Helpline	√	√	√	√	√	√	√	√
23	1097 National AIDS Helpline to NACO	x	√	×	√	√	x	x	√
24	1099 Central Accident and Trauma Services (CATS)	x	×	×	×	×	x	x	×
25	10580 Educational& Vocational Guidance and Counselling	x	×	×	×	×	x	x	×
26	10589 Mother and Child Tracking (MCTH)	x	×	×	×	×	x	x	×
27	10740 Central Pollution Control Board	x	×	×	×	×	x	x	×

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

Level 1 Live Calling	
DATE:	19 to 21 September 2016
CIRCLE:	Haryana
TYPE:	CELLULAR/BASIC SERVICE PROVIDER

PUT x FOR UNSUCCESSFUL CALL AND TICK FOR SUCCESSFUL CALL

S. NO.	L1 Service Number	SSA: Sonipat							
	Details	Aircel	Airtel	BSNL	Idea	RCOM GSM	TTSL CDMA	TTSL GSM	Vodafone
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	×	√	√	×	×	×	×	×
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 Sashastra Seema Bal (SSB)	×	×	√	√	×	×	×	×
36	1909 National Do Not Call Registry	√	√	√	√	√	√	√	√
37	1912 Complaint of Electricity	×	√	√	√	×	×	×	√
38	1916 Drinking Water Supply	×	√	√	×	×	×	×	×
39	1950 Election Commission of India	×	√	√	×	√	×	×	√

DRIVE TEST

12. OPERATOR ASSISTED DRIVE TEST

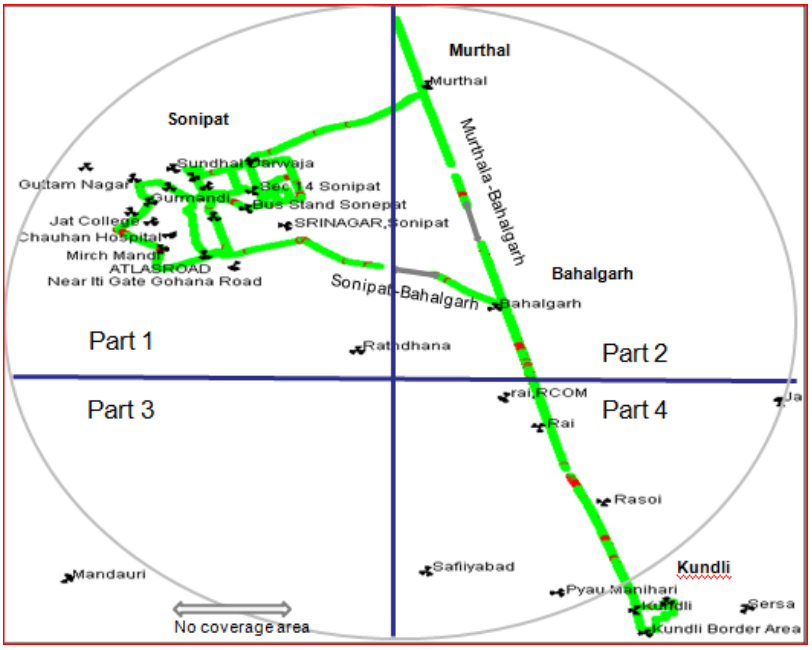
The drive test was conducted simultaneously for all the operators present in the Haryana circle. As per the new directive given by TRAI headquarters, drive test for the month of July, August and September, 2016 were conducted at a SSA level. Drive test was conducted for three days in each SSA and the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

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

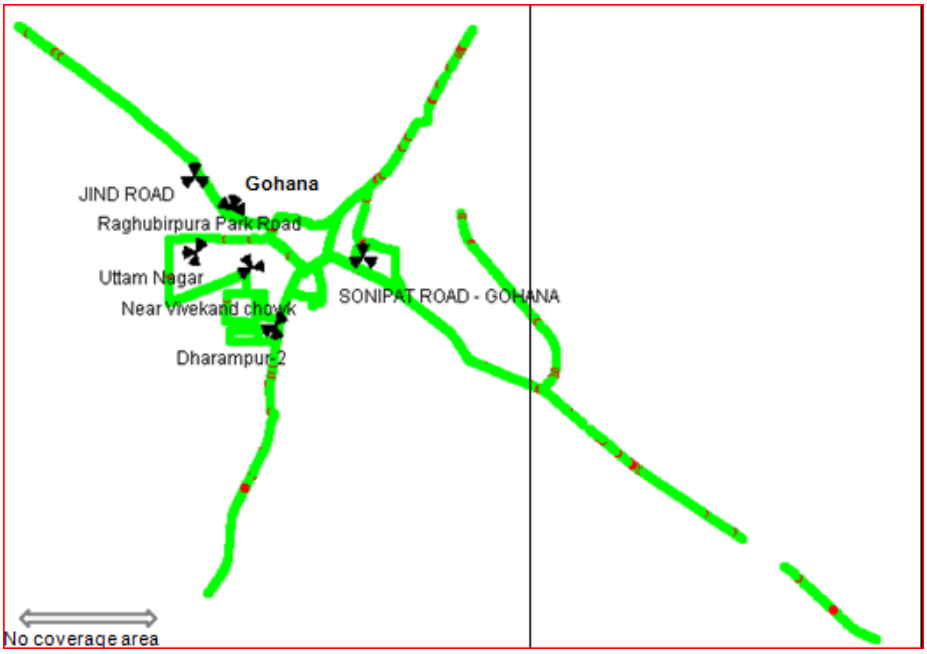
Drive Test		
Sr.No.	**Date**	**Name of SSA**
1	3rd to 5th Aug 2016	Sonipat
2	19th to 21st Sep 2016	Hissar

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)
3rd to 5th Aug 2016	Sonipat (Gohana,Sonipat)	Sonipat / 125 KM	Outdoor: City: Balmiki Basti ,Devilal Chowk ,Geeta Bhawan Chowk ,Pinana ,Kheri Damkan ,Gohana. Highway: Sonipat to Gohana Major Road: Delhi Road ,Mehlana Road ,Panipat Road ,Jind - Gohana Road. Indoor : Radha Swami Satsang Ashram ,Gohana	Sonipat ,Kundli ,Murthal / 115 KM	Outdoor: City : Murthal ,Sector 15 ,Vivekanand Chowk ,Shikha Colony Highway : Old DC Road ,Atlas Road Major Road: Gohana Road ,Shyam Nagar ,Rohtak Road ,Bahalgarh Road,ITI Chowk ,NH-1 ,Kundli ,Jati Road Indoor : Sector-14 Market ,Sonipat	Sonipat ,Kharkhoda,Gohana / 95 KM	Outdoor: City : Gorad ,Kharkhoda Road ,Main Market ,Sampla Road Highway : Anaj Mandi ,Delhi Road ,Sector 15 ,NH-1 Major Road : Gurhmandi ,Kalapur Chungi ,Kharkhoda ,Biyanpur. Indoor: Chottu Ram Dharamshala ,Sonipat
19th to 21st Sep 2016	Hissar	Adampur,Fatehabad,Raina,Tohana,Barwala / 262 KM	Outdoor: City- Bsnl Exchange,Sector-14,Adampur ,Fateabad,Main Market,Model Town Highway- Hissar to Adampur to Fatheabad to Tohana to Hissar Major Raod-AdampurAgroha,Fatheadbad to Ratiya to Tohana. Indoor : Fatheabad Grain Market	Sirsa,Hissa & Allenabad / 278 KM	Outdoor: City-Bus Stand Sirsa,Sector - 6,Main Market ,Sadar Bazar,Civil Hospital,Iti Highway- Fatheabad to Sirsa to Oadha to Kalanwali to Sirsa Major Road- Sirsa to Ellenabad,Goriwala. Indoor : Railway Station Ellenabad	Hissar / 150 KM	Outdoor: Within city : BSNL Exchange, Sec-14, Auto Market, GJU,Mill Gate, Sabzi Mandi, Rajgarh Market, Balsamdh Road,HAU,Red Square Market, Railway Station, Sant Nagar, Kaimri Road,Sec-16, Sec-17, Urban Estate,HSIDC, Hansi. Highway : Hissar to Hansi, Delhi Road Major Road : Hissar to Kaimri to Gangwa to Hissar to Dabra Indoor: Bhai ji Vaisnav Dhaba, Hansi

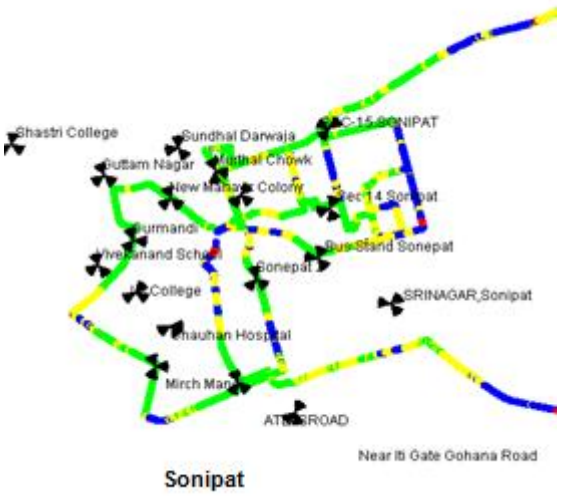
12.1. ROUTE COVER MAP: SONIPAT SSA: DAY 1



12.2. ROUTE MAP: SONIPAT SSA: DAY 2



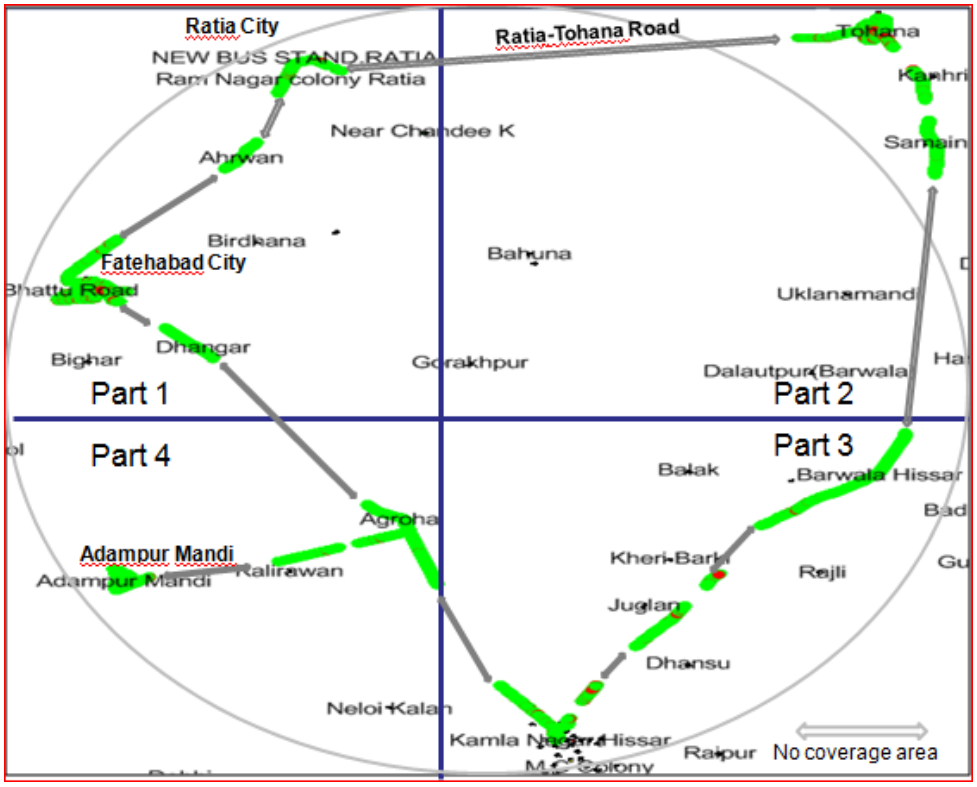
12.3. ROUTE MAP: SONIPAT SSA: DAY 3



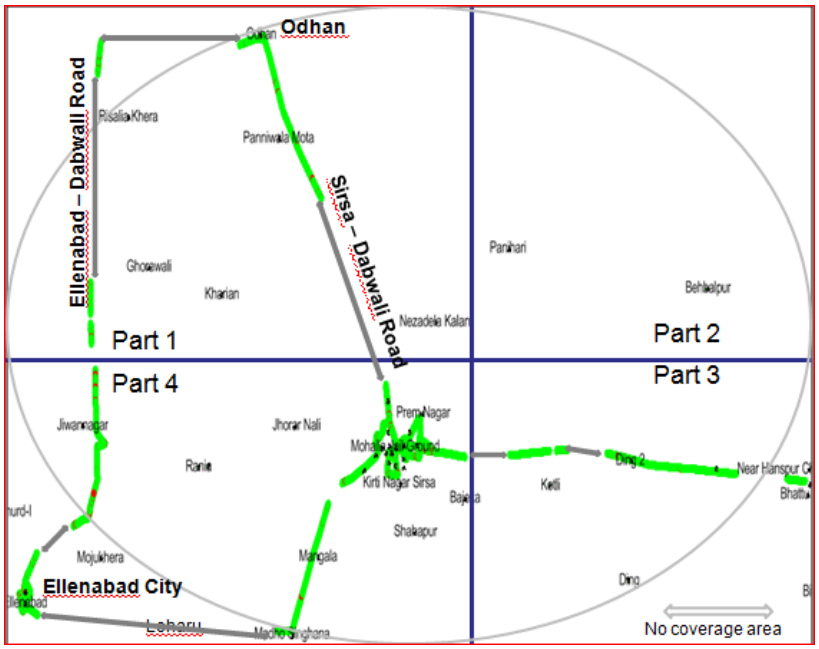
12.4. DRIVE TEST OUTCOME

Sr.No	Test Parameter	Bench mark	Aircel	Airtel	Idea	BSNL	RCOM GSM	TTSL GSM	TTSL CDMA	Vodafone
1	Total Calls Attempt (A)	--	41	469	475	580	430	479	326	510
2	Total Calls Blocked (B)	--	0	4	0	0	0	3	1	2
3	Blocked Call Rate in % (B*100/A)	<=3%	0.00%	0.85%	0.00%	0.00%	0.00%	0.63%	0.31%	0.39%
4	Total Calls Established ('C)	--	41	465	475	579	430	476	325	508
5	Total Calls Drop (D)	--	0	10	0	1	1	6	1	2
6	Dropped Calls Rate in % (D*100/C)	<=2%	0.00%	2.15%	0.00%	0.17%	0.23%	1.26%	0.31%	0.39%
7	Call Setup Success Rate in % (C*100/A)	>=95%	100.00%	99.15%	100.00%	99.83%	100.00%	99.37%	99.69%	99.61%
8	Handover Success Rate % (total HO Success * 100/Total HO attempt)	>=95%	100.0%	98.76%	99.88%	99.77%	99.66%	99.76%	100.00%	99.58%
9	Connection with good voice Quality % (0-5 & 0-4)	>=95%	99.56%	96.81%	96.08%	580	97.70%	95.90%	98.06%	95.73%

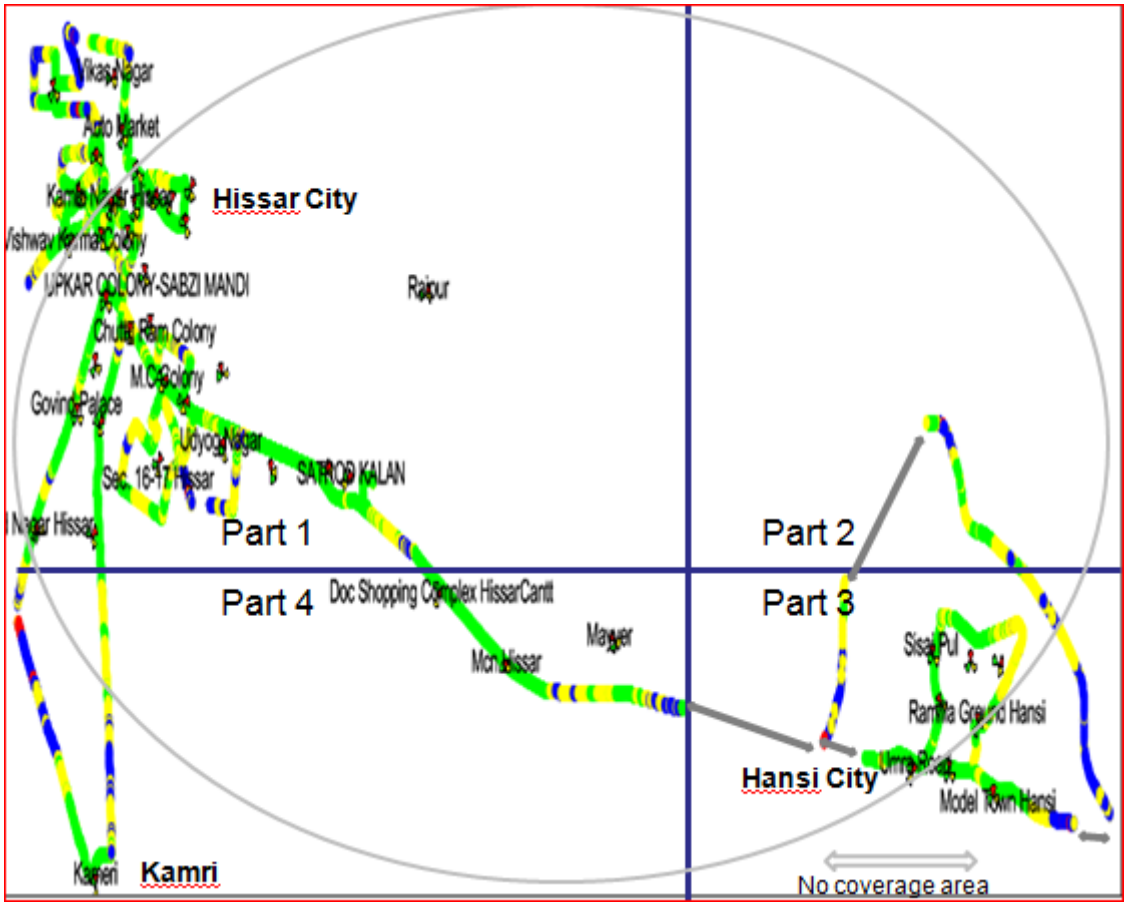
12.5. ROUTE COVER MAP: HISSAR SSA: DAY 1



12.6. ROUTE MAP: HISSAR SSA: DAY 2



12.7. ROUTE MAP: SONIPAT SSA: DAY 3

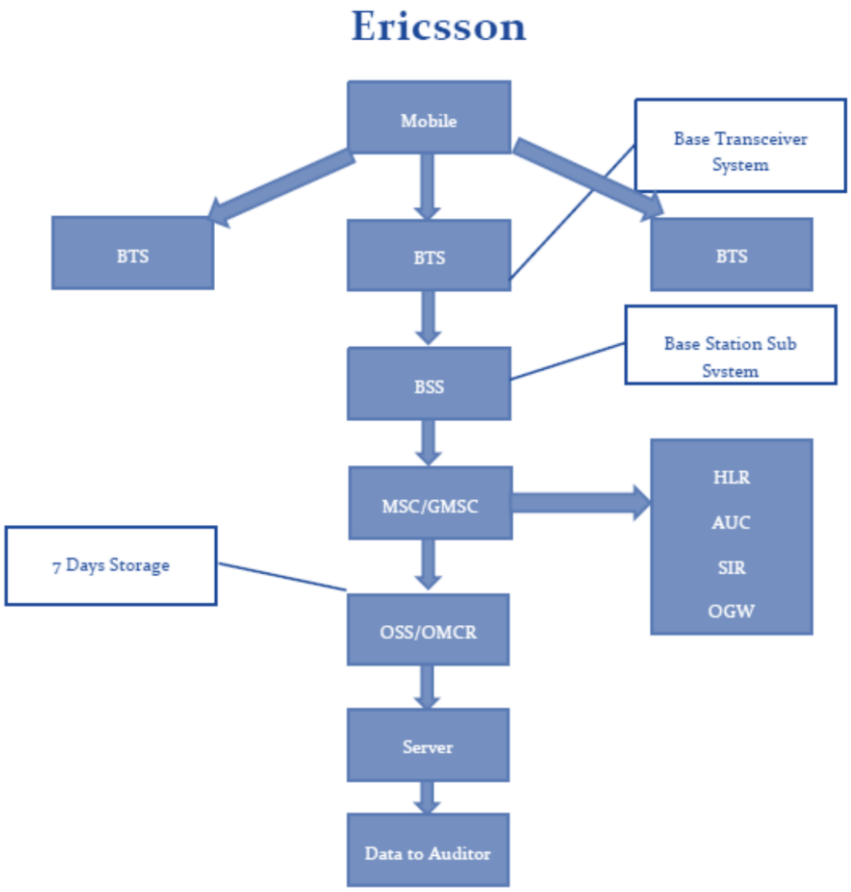


12.8. DRIVE TEST OUTCOME

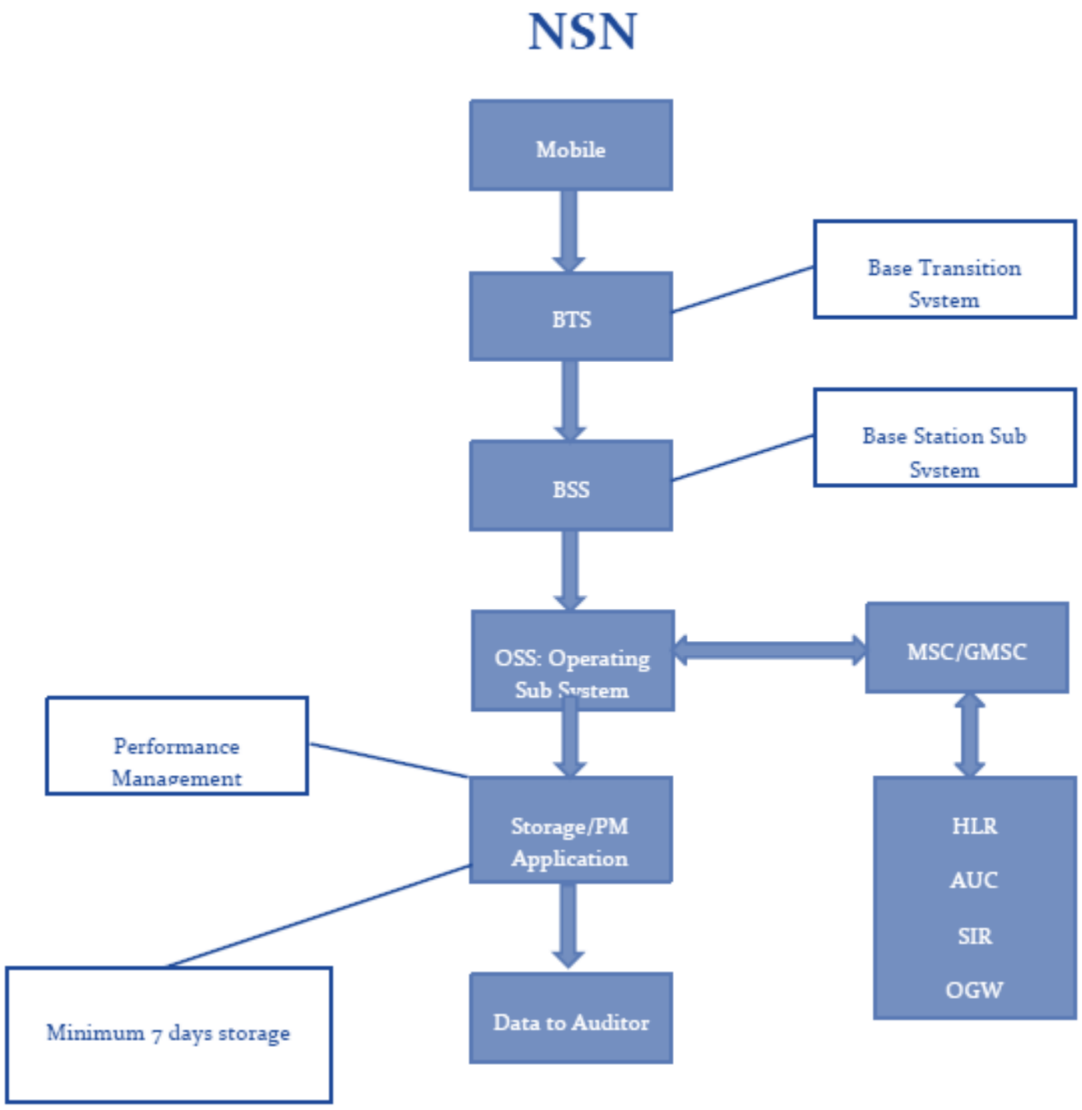
Sr.No	Test Parameter	Benchmark	Aircel	Airtel	Idea	BSNL	RCOM GSM	TTSL GSM	TTSL CDMA	Vodafone
1	Total Calls Attempt (A)	--	40	639	631	781	538	522	327	627
2	Total Calls Blocked (B)	--	0	3	0	10	3	3	2	0
3	Blocked Call Rate in % (B*100/A)	<=3%	0.00%	0.47%	0.00%	1.28%	0.56%	0.57%	0.61%	0.00%
4	Total Calls Established ('C)	--	40	636	631	779	535	519	325	627
5	Total Calls Drop (D)	--	0	2	0	15	1	0	2	2
6	Dropped Calls Rate in % (D*100/C)	<=2%	0.00%	0.31%	0.00%	1.93%	0.19%	0.00%	0.62%	0.32%
7	Call Setup Success Rate in % (C*100/A)	>=95%	100.00%	99.53%	100.00%	100.00%	99.44%	99.64%	99.39%	100.00%
8	Handover Success Rate % (total HO Success * 100/Total HO attempt)	>=95%	100.00%	99.43%	99.91%	99.00%	98.99%	99.76%	100.00%	99.24%
9	Connection with good voice Quality % (0-5 & 0-4)	>=95%	98.92%	96.13%	95.86%	83.79%	96.68%	95.44%	96.75%	95.29%

13. BLOCK SCHEMATIC DIAGRAM

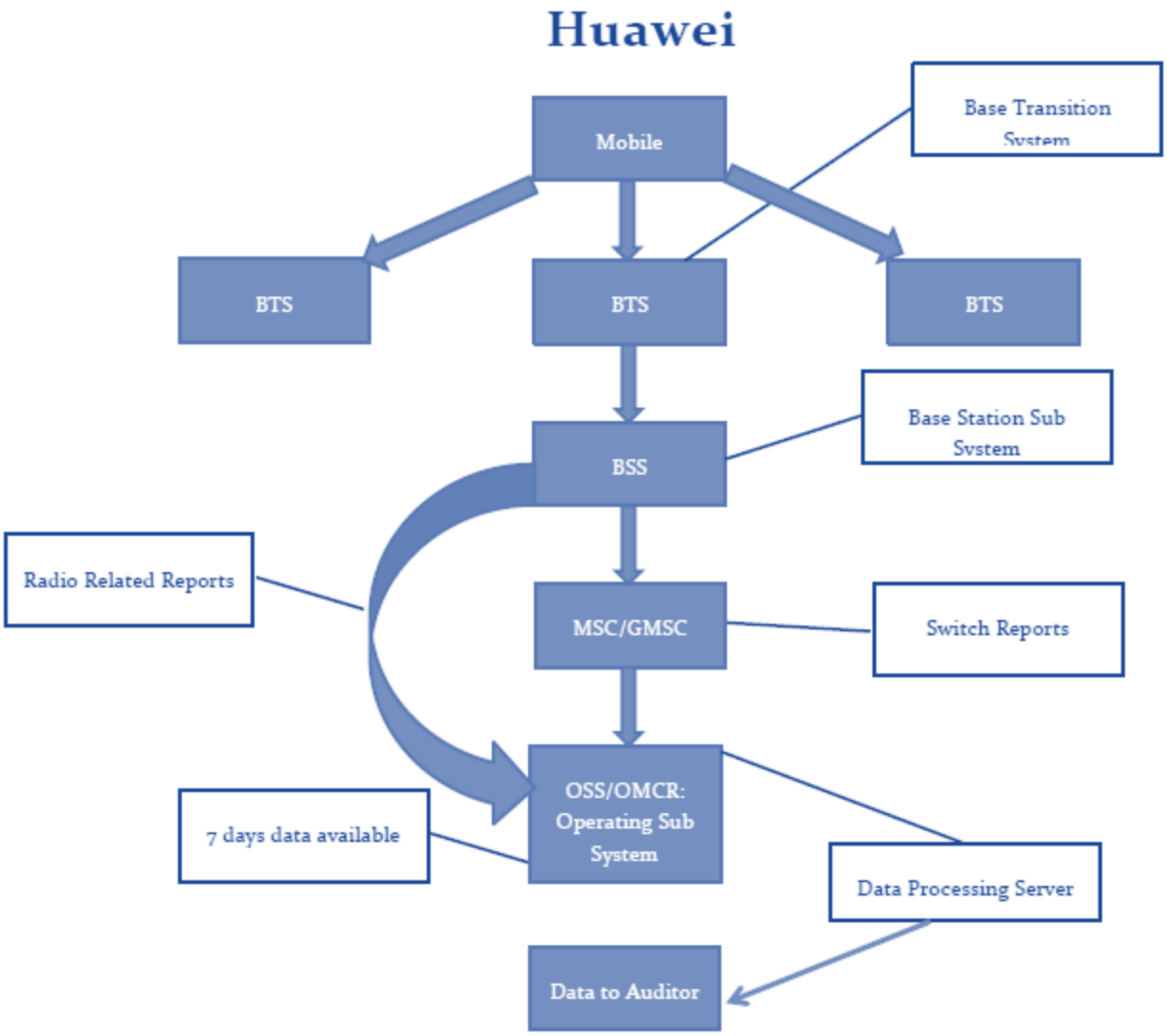
13.1. ERICSSON



13.2. NSN


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

13.3. HUAWEI


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

14. 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
- 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. ANNEXURE

15.1. 2G VOICE PMR DATA: CONSOLIDATED

Consolidated										
Network Parameters		Name of Service Provider								
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.22%	0.11%	1.00%	0.05%	0.16%	0.16%	0.12%	0.06%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.00%	0.11%	1.44%	0.10%	1.38%	0.00%	0.35%	0.16%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	97.78%	99.30%	98.17%	97.63%	99.59%	97.45%	98.08%	99.79%
	SDDCH/Paging chl. Congestion	≤ 1%	0.00%	0.29%	0.35%	0.42%	0.14%	0.00%	0.09%	0.10%
	TCH Congestion	≤ 2%	0.00%	0.38%	0.67%	0.57%	0.10%	0.60%	0.54%	0.21%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	0.00%	0.92%	1.49%	0.77%	0.12%	0.47%	0.66%	0.70%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	0.03%	0.50%	1.22%	2.68%	0.64%	2.26%	2.64%	2.24%
	%age of connection with good voice quality	≥ 95%	99.96%	98.48%	DNA	97.70%	99.42%	98.51%	96.80%	97.75%

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%	0.11%	0.82%	0.02%	0.10%	0.08%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.14%	1.56%	0.00%	0.38%	0.11%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	99.11%	99.46%	99.18%	99.84%	99.79%
	RRC Congestion:	≤ 1%	0.00%	0.78%	0.38%	0.38%	0.01%
	RAB Congestion:	≤ 2%	0.00%	0.44%	0.19%	0.36%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	0.08%	0.58%	0.34%	0.14%	0.26%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	0.57%	1.23%	2.84%	1.02%	2.20%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.57%	DNA	98.94%	99.14%	98.02%

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		Customer Care & Grievances Redressal	
	Postpaid Subscribers	Prepaid Subscribers	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	%age of where credit/waiver is received within one week	% of Termination/ Closure of service within 7 days (100 %)	Cleared over a period of <60 days (100%)	%age of calls answered by the IVR	%age of call answered by the operators (voice to voice) within 90 seconds	% of Complaints addressed at call center level	% of Complaints addressed by Appellate Authority
Benchmark	≤ 0.1%	≤ 0.1%	≥ 98%	= 100%	= 100%	= 100%	= 100%	≥ 95%	≥ 95%		
AIRCEL	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.53%	99.86%	100.00%	#DIV/0!
AIRTEL	0.03%	0.07%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	93.57%	100.00%	100.00%
BSNL	0.01%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.24%	98.17%	#DIV/0!
IDEA	0.08%	0.04%	100.00%	100.00%	100.00%	100.00%	99.91%	99.69%	98.19%	45.28%	100.00%
RCOM GSM	0.08%	0.09%	100.00%	100.00%	100.00%	100.00%	99.92%	98.71%	96.42%	100.00%	100.00%
TTSL CDMA	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.94%	99.26%	100.00%
TTSL GSM	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.41%	96.78%	99.45%	92.59%
VODAFONE	0.08%	0.05%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.45%	100.00%	#DIV/0!

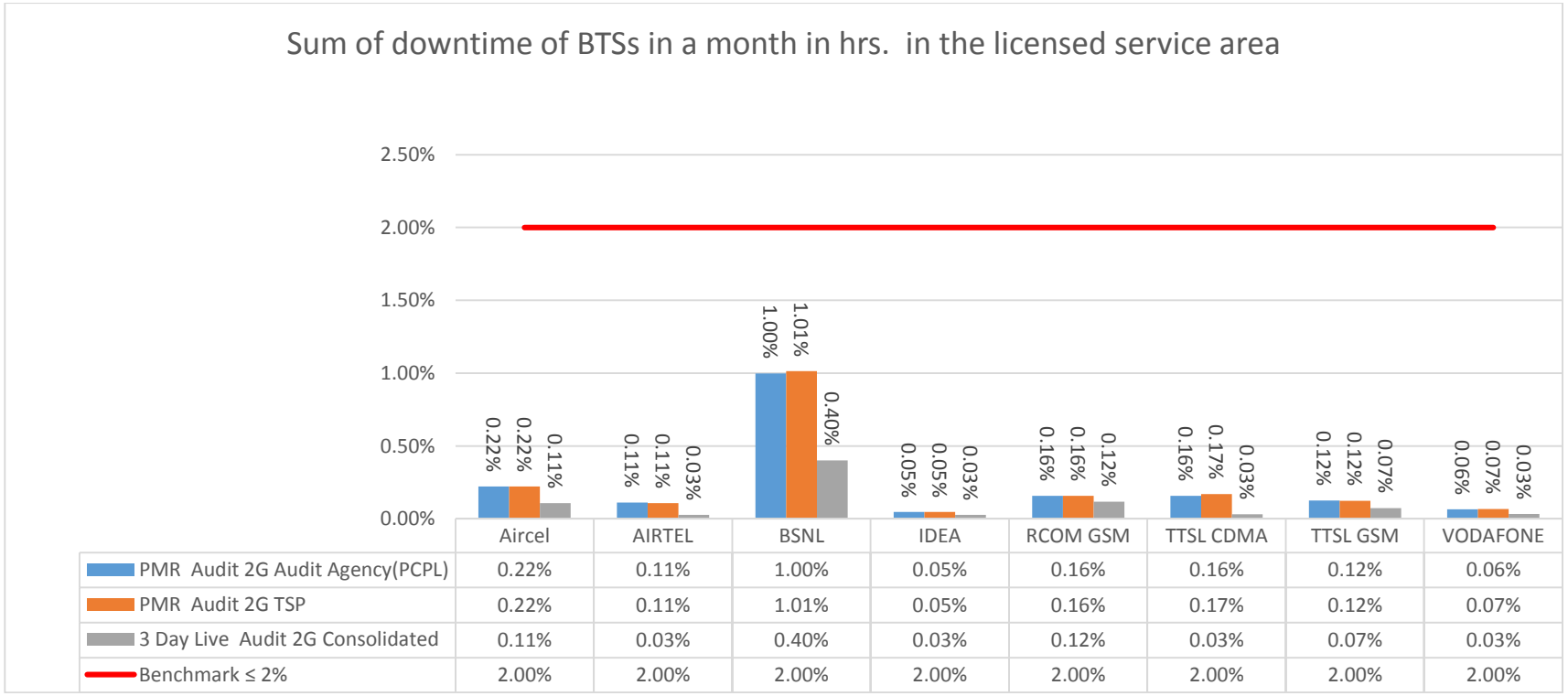
- IDEA has parameter value of **99.91%** and failed to meet the benchmark of =100% for Time taken for refund of deposits after closures: Benchmark Cleared over a period of <60 days (100%).
- RCOM has parameter value of **99.92%** and failed to meet the benchmark of =100% for Time taken for refund of deposits after closures: Benchmark Cleared over a period of <60 days (100%).
- AIRTEL has parameter value of **93.57%** and failed to meet the benchmark of ≥95% for %age of call answered by the operators (voice to voice) within
  90 seconds.

15.4. 2G PMR Comparison (TSP vs. Audit Agency): Network Parameters

PMR Report Comparison between Audit Agency and TSP										
Network Parameters		**Name of Service Provider**								
		Benchmark		**Aircel**	**AIRTEL**	**BSNL**	**IDEA**	**RCOM GSM**	**TTSL CDMA**	**TTSL GSM**	**VODAFONE**
Network Availability	**Sum of downtime of BTSs in a month in hrs. in the licensed service area**	**≤ 2%**	**Agency**	0.22%	0.11%	1.00%	0.05%	0.16%	0.16%	0.12%	0.06%
			TSP	0.22%	0.11%	1.01%	0.05%	0.16%	0.17%	0.12%	0.07%
	No. of BTSs having accumulated downtime of >24 hours in a month	**≤ 2%**	**Agency**	0.00%	0.11%	1.44%	0.10%	1.38%	0.00%	0.35%	0.16%
			TSP	0.00%	0.11%	1.43%	0.10%	1.38%	0.00%	0.35%	0.16%
Connection Establishment (Accessibility)	**Call Set-up Success Rate (Within Licensee own network**	**≥ 95%**	**Agency**	97.78%	99.30%	98.17%	97.63%	99.59%	97.45%	98.08%	99.79%
			TSP	97.78%	99.27%	98.17%	97.63%	99.59%	97.55%	98.08%	99.79%
	SDDCH/Paging chl. Congestion	**≤ 1%**	**Agency**	0.00%	0.29%	0.35%	0.42%	0.14%	0.00%	0.09%	0.10%
			TSP	0.00%	0.30%	0.34%	0.42%	0.14%	0.00%	0.09%	0.10%
	TCH Congestion	**≤ 2%**	**Agency**	0.00%	0.38%	0.67%	0.57%	0.10%	0.60%	0.54%	0.21%
			TSP	0.00%	0.40%	0.67%	0.57%	0.10%	0.50%	0.54%	0.21%
Connection Maintenance (Retainability)	**Call Drop Rate (%age)**	**≤ 2%**	**Agency**	0.00%	0.92%	1.49%	0.77%	0.12%	0.47%	0.66%	0.70%
			TSP	0.00%	0.93%	1.50%	0.77%	0.12%	0.47%	0.66%	0.70%
	Worst Affected cell having more than 3% TCH drop	**≤ 3%**	**Agency**	0.03%	0.50%	1.22%	2.68%	0.64%	2.26%	2.64%	2.24%
			TSP	0.02%	0.53%	1.22%	2.68%	0.63%	2.24%	2.64%	2.24%
	%age of connection with good voice quality	**≥ 95%**	**Agency**	99.96%	98.48%	DNA	97.70%	99.42%	98.51%	96.80%	97.75%
			TSP	99.98%	98.43%	97.77%	97.70%	99.42%	97.21%	96.80%	97.75%

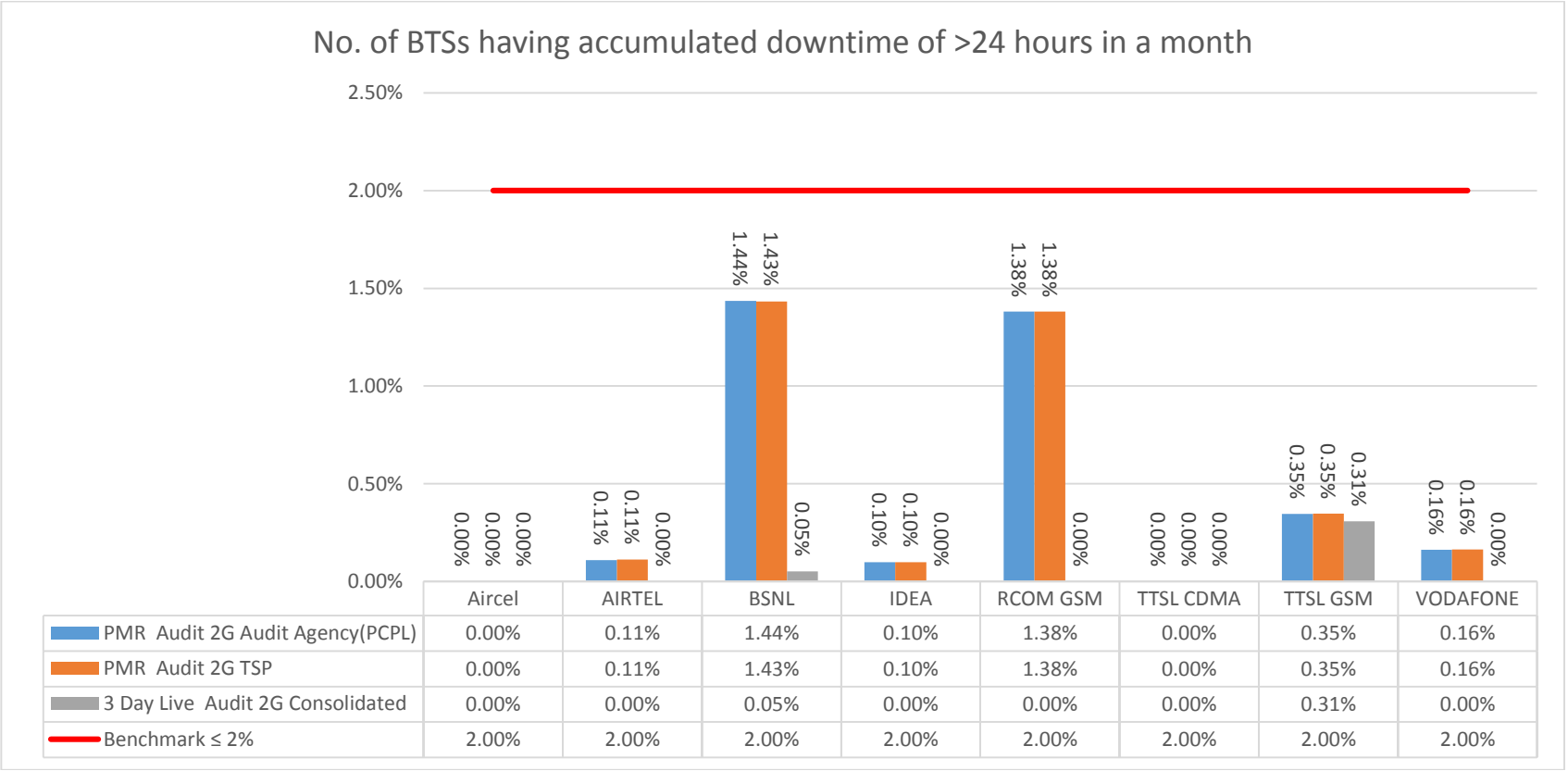
- **For each instance of “DNA (Data Not Available)”, please refer the respective hard copy of audit report(s).

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



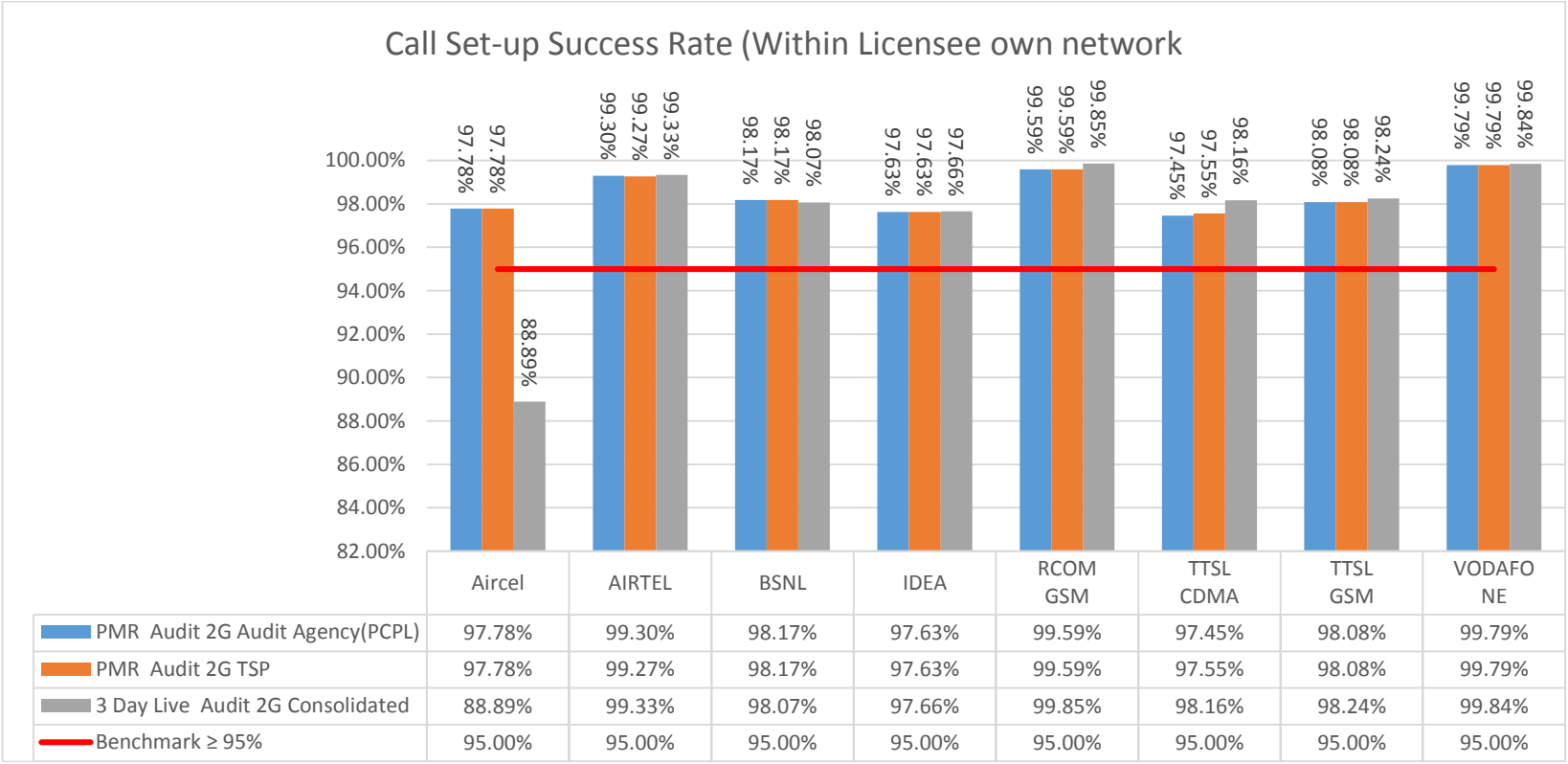
	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	0.22%	0.11%	1.00%	0.05%	0.16%	0.16%	0.12%	0.06%
PMR Audit 2G TSP	0.22%	0.11%	1.01%	0.05%	0.16%	0.17%	0.12%	0.07%
3 Day Live Audit 2G Consolidated	0.11%	0.03%	0.40%	0.03%	0.12%	0.03%	0.07%	0.03%
Benchmark ≤ 2%	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



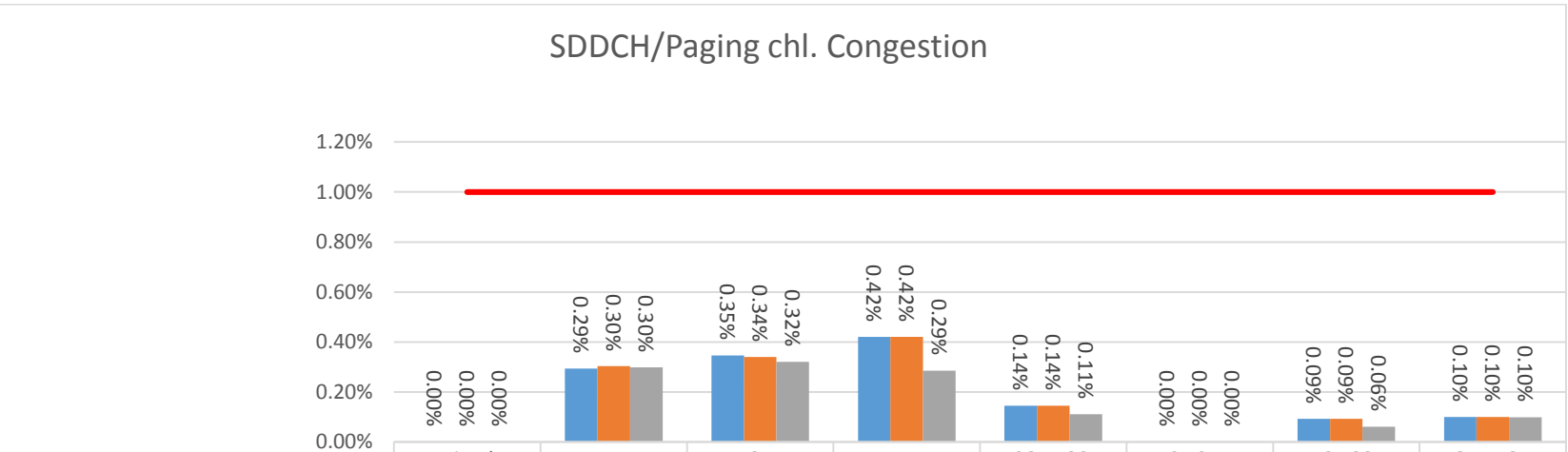
	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	0.00%	0.11%	1.44%	0.10%	1.38%	0.00%	0.35%	0.16%
PMR Audit 2G TSP	0.00%	0.11%	1.43%	0.10%	1.38%	0.00%	0.35%	0.16%
3 Day Live Audit 2G Consolidated	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.31%	0.00%
Benchmark ≤ 2%	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)



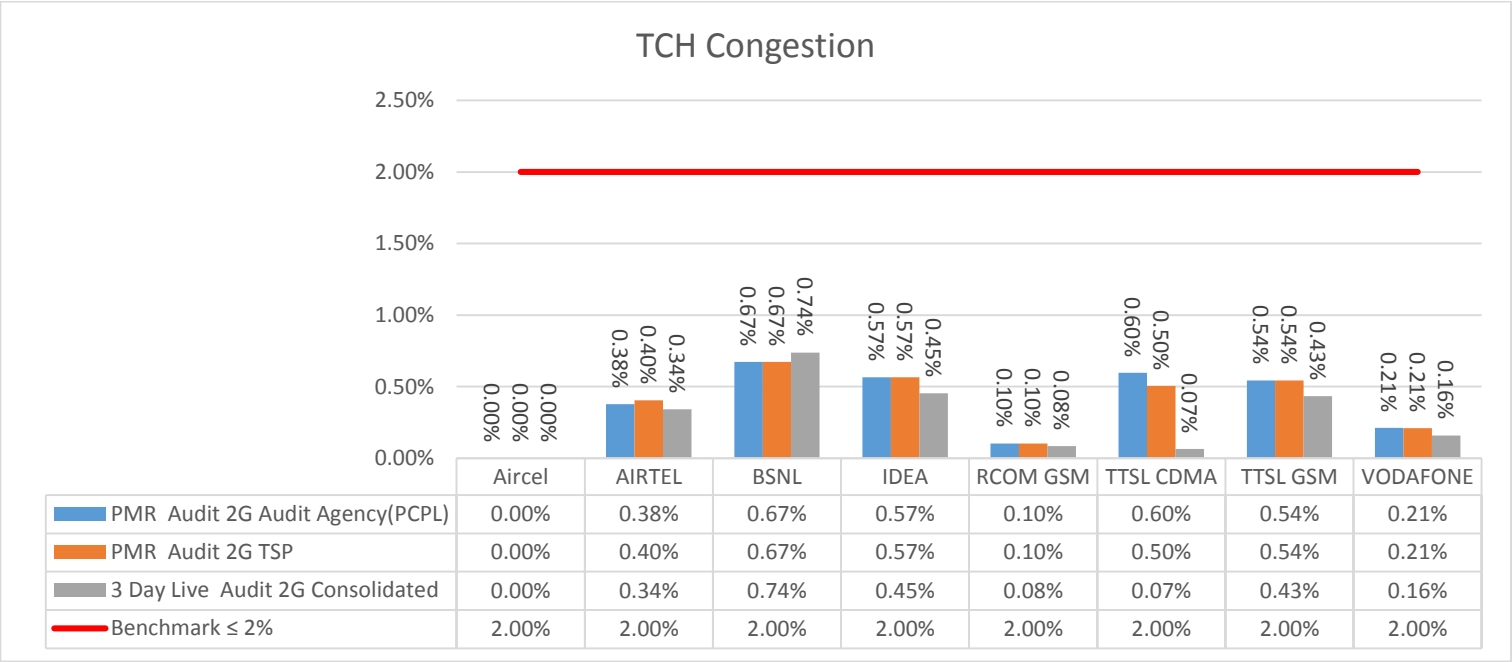
	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	97.78%	99.30%	98.17%	97.63%	99.59%	97.45%	98.08%	99.79%
PMR Audit 2G TSP	97.78%	99.27%	98.17%	97.63%	99.59%	97.55%	98.08%	99.79%
3 Day Live Audit 2G Consolidated	88.89%	99.33%	98.07%	97.66%	99.85%	98.16%	98.24%	99.84%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

15.4.4. SDDCH/PAGING CHL. CONGESTION



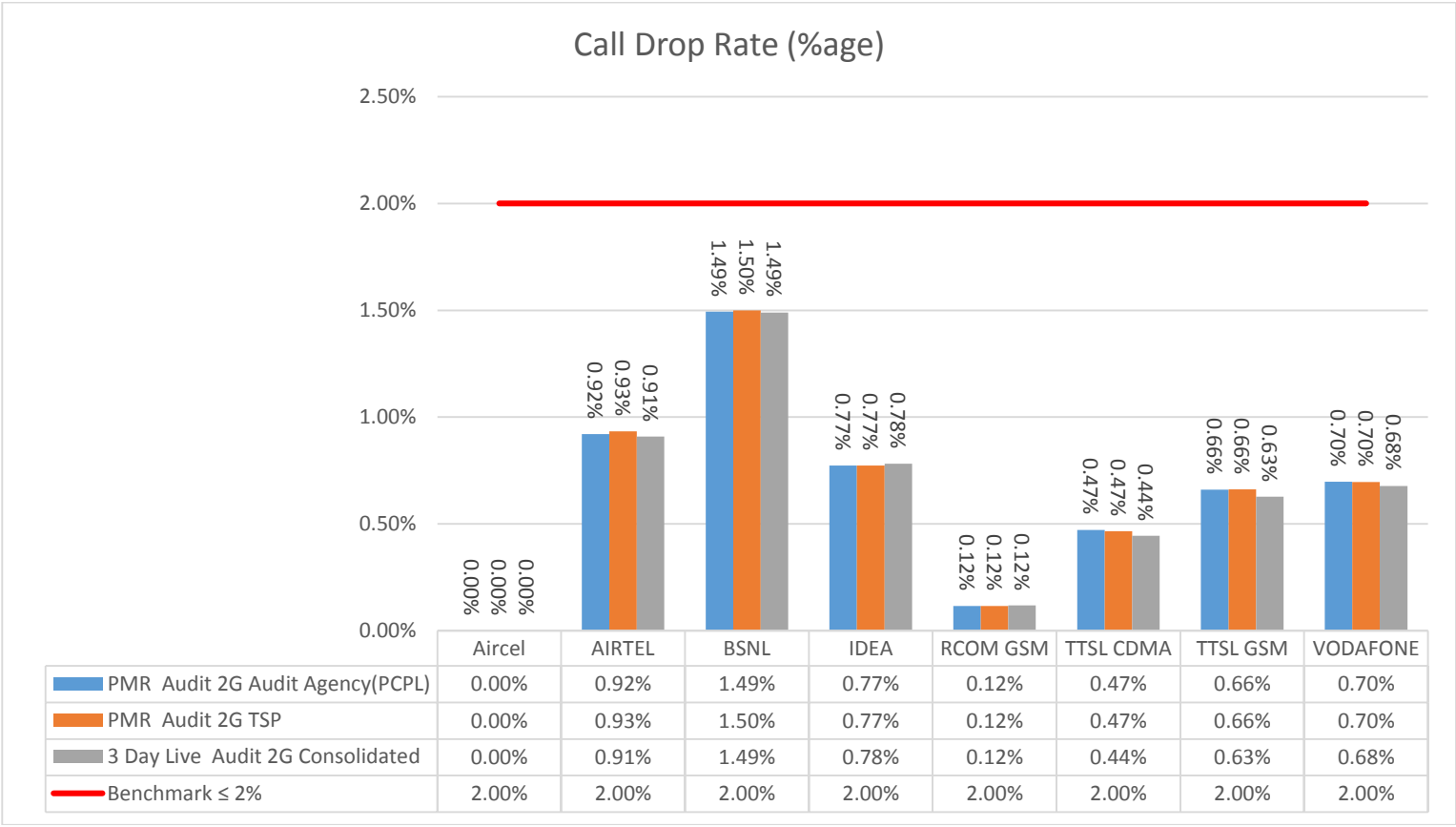
	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	0.00%	0.29%	0.35%	0.42%	0.14%	0.00%	0.09%	0.10%
PMR Audit 2G TSP	0.00%	0.30%	0.34%	0.42%	0.14%	0.00%	0.09%	0.10%
3 Day Live Audit 2G Consolidated	0.00%	0.30%	0.32%	0.29%	0.11%	0.00%	0.06%	0.10%
Benchmark ≤ 1%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

15.4.5. TCH CONGESTION



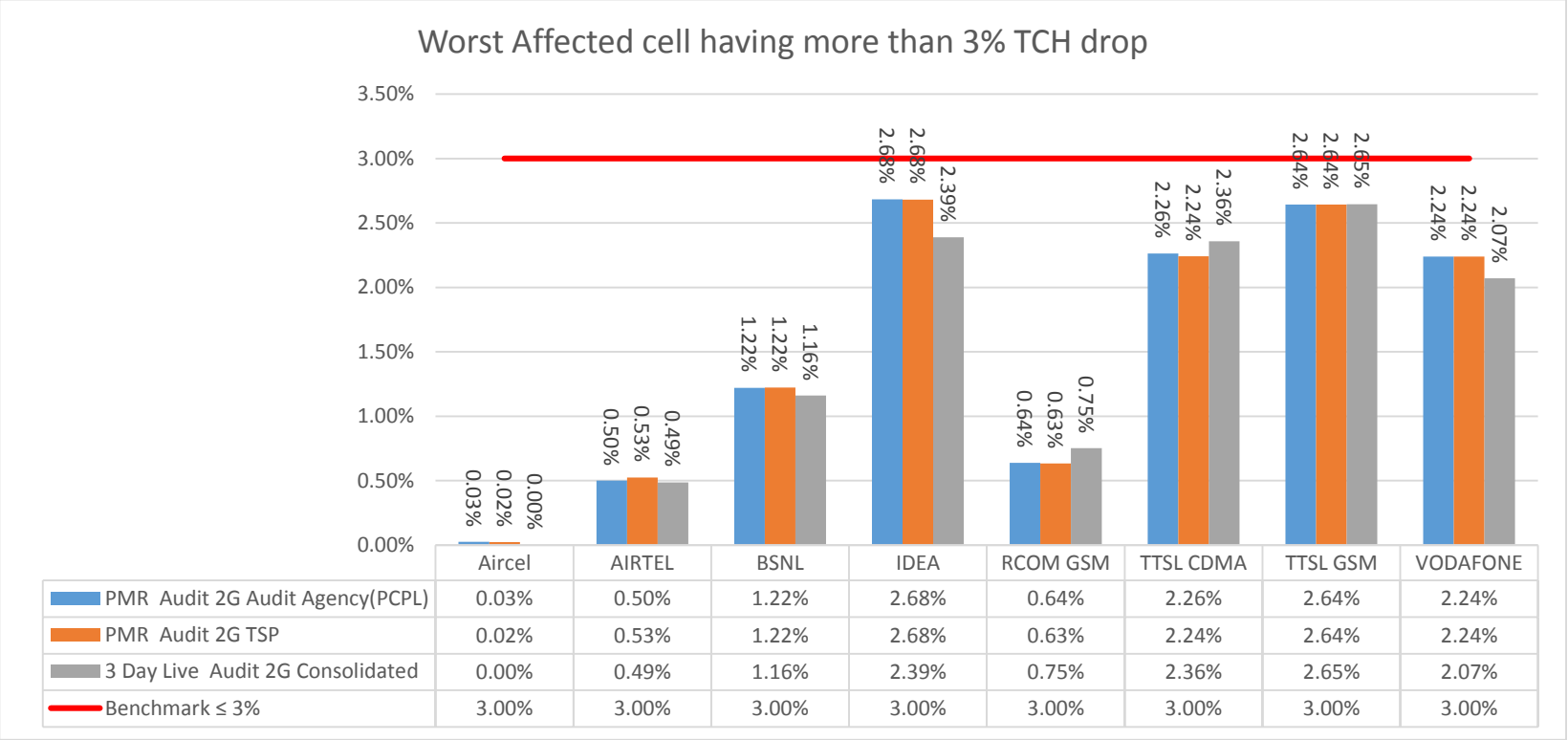
	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	0.00%	0.38%	0.67%	0.57%	0.10%	0.60%	0.54%	0.21%
PMR Audit 2G TSP	0.00%	0.40%	0.67%	0.57%	0.10%	0.50%	0.54%	0.21%
3 Day Live Audit 2G Consolidated	0.00%	0.34%	0.74%	0.45%	0.08%	0.07%	0.43%	0.16%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

15.4.6. CALL DROP RATE (%AGE)



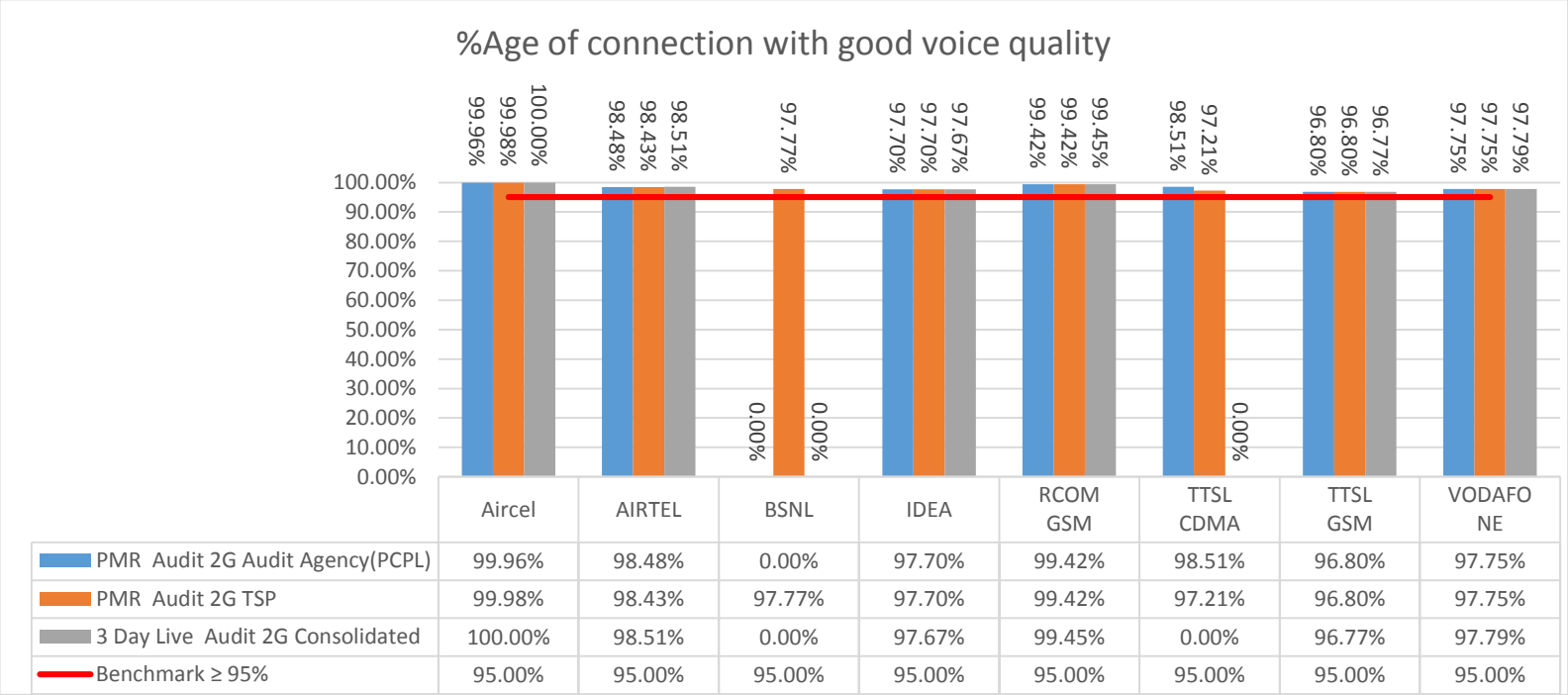
	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	0.00%	0.92%	1.49%	0.77%	0.12%	0.47%	0.66%	0.70%
PMR Audit 2G TSP	0.00%	0.93%	1.50%	0.77%	0.12%	0.47%	0.66%	0.70%
3 Day Live Audit 2G Consolidated	0.00%	0.91%	1.49%	0.78%	0.12%	0.44%	0.63%	0.68%
Benchmark ≤ 2%	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



	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	0.03%	0.50%	1.22%	2.68%	0.64%	2.26%	2.64%	2.24%
PMR Audit 2G TSP	0.02%	0.53%	1.22%	2.68%	0.63%	2.24%	2.64%	2.24%
3 Day Live Audit 2G Consolidated	0.00%	0.49%	1.16%	2.39%	0.75%	2.36%	2.65%	2.07%
Benchmark ≤ 3%	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



	Aircel	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
PMR Audit 2G Audit Agency(PCPL)	99.96%	98.48%	0.00%	97.70%	99.42%	98.51%	96.80%	97.75%
PMR Audit 2G TSP	99.98%	98.43%	97.77%	97.70%	99.42%	97.21%	96.80%	97.75%
3 Day Live Audit 2G Consolidated	100.00%	98.51%	0.00%	97.67%	99.45%	0.00%	96.77%	97.79%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%

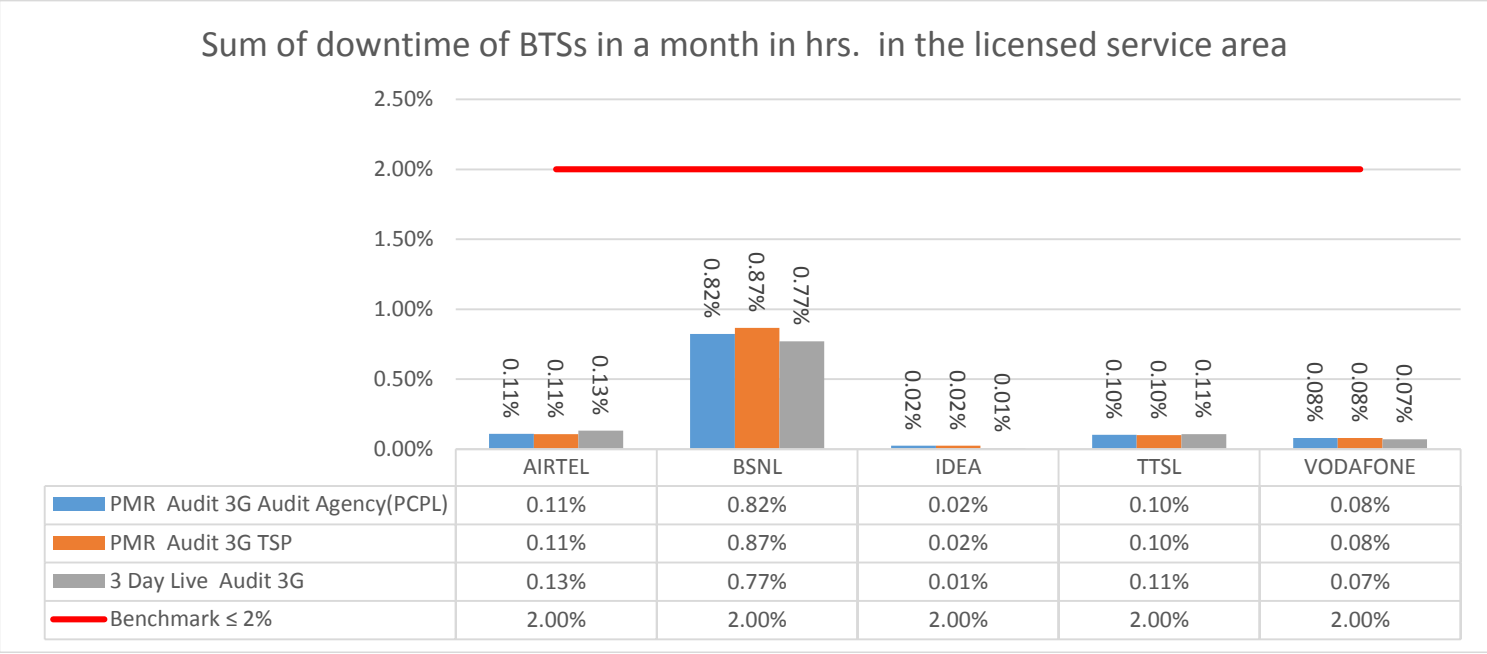
13.5. 3G PMR COMPARISON (TSP VS. AUDIT AGENCY): NETWORK PARAMETERS

3G PMR Report Comparison between Audit Agency and TSP

Network Parameters		Name of Service Provider						
		Benchmark		AIRTEL	BSNL	IDEA	TTSL	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.11%	0.82%	0.02%	0.10%	0.08%
			TSP	0.11%	0.87%	0.02%	0.10%	0.08%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	0.14%	1.56%	0.00%	0.38%	0.11%
			TSP	0.14%	1.47%	0.00%	0.14%	0.11%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network	≥ 95%	Agency	99.11%	99.46%	99.18%	99.84%	99.79%
			TSP	99.11%	99.00%	99.18%	99.84%	99.79%
	RRC Congestion:	≤ 1%	Agency	0.00%	0.78%	0.38%	0.38%	0.01%
			TSP	0.00%	0.77%	0.38%	0.38%	0.01%
	RAB Congestion:	≤ 2%	Agency	0.00%	0.44%	0.19%	0.36%	0.00%
			TSP	0.00%	0.40%	0.19%	0.35%	0.00%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	Agency	0.08%	0.58%	0.34%	0.14%	0.26%
			TSP	0.08%	0.57%	0.34%	0.14%	0.27%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	Agency	0.57%	1.23%	2.84%	1.02%	2.20%
			TSP	0.57%	1.23%	2.74%	1.02%	2.20%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	Agency	97.57%	DNA	98.94%	99.14%	98.02%
			TSP	97.55%	97.67%	98.94%	99.14%	98.02%

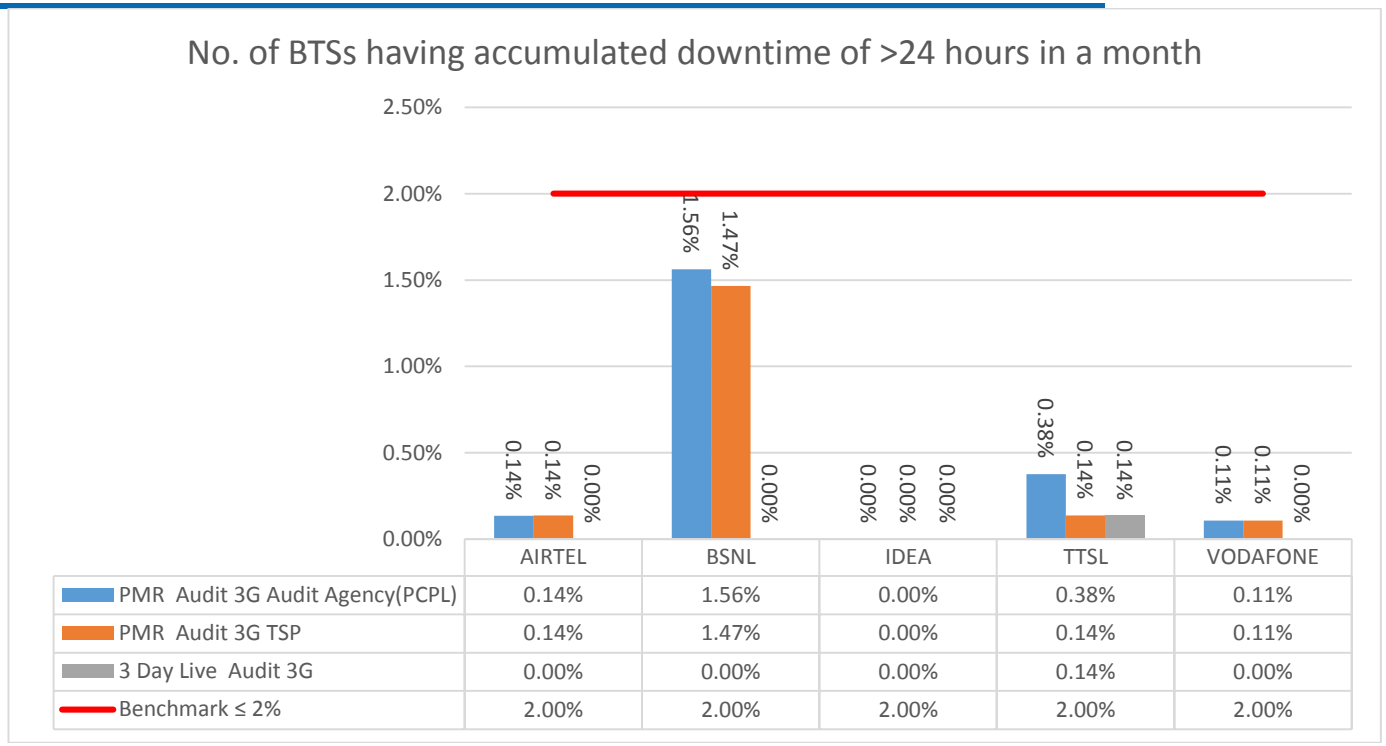
- **For each instance of “DNA (Data Not Available)”, please refer the respective hard copy of audit report(s).

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



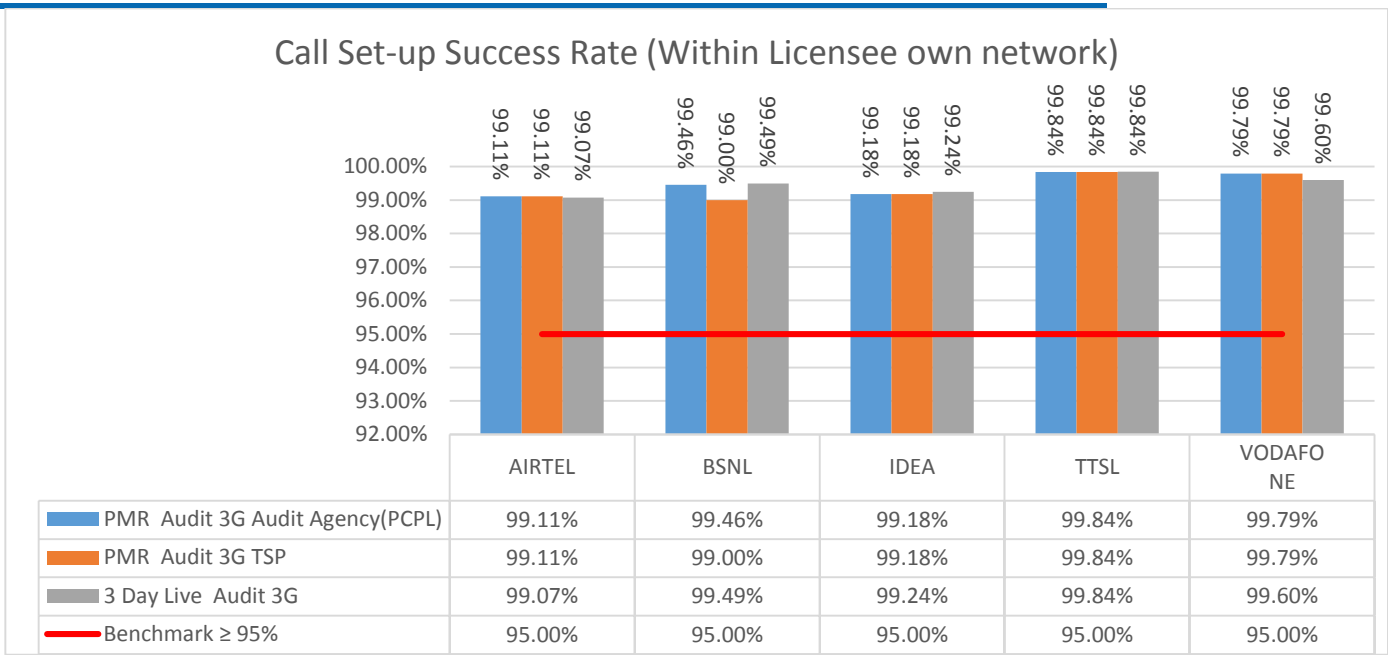
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency(PCPL)	0.11%	0.82%	0.02%	0.10%	0.08%
PMR Audit 3G TSP	0.11%	0.87%	0.02%	0.10%	0.08%
3 Day Live Audit 3G	0.13%	0.77%	0.01%	0.11%	0.07%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

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



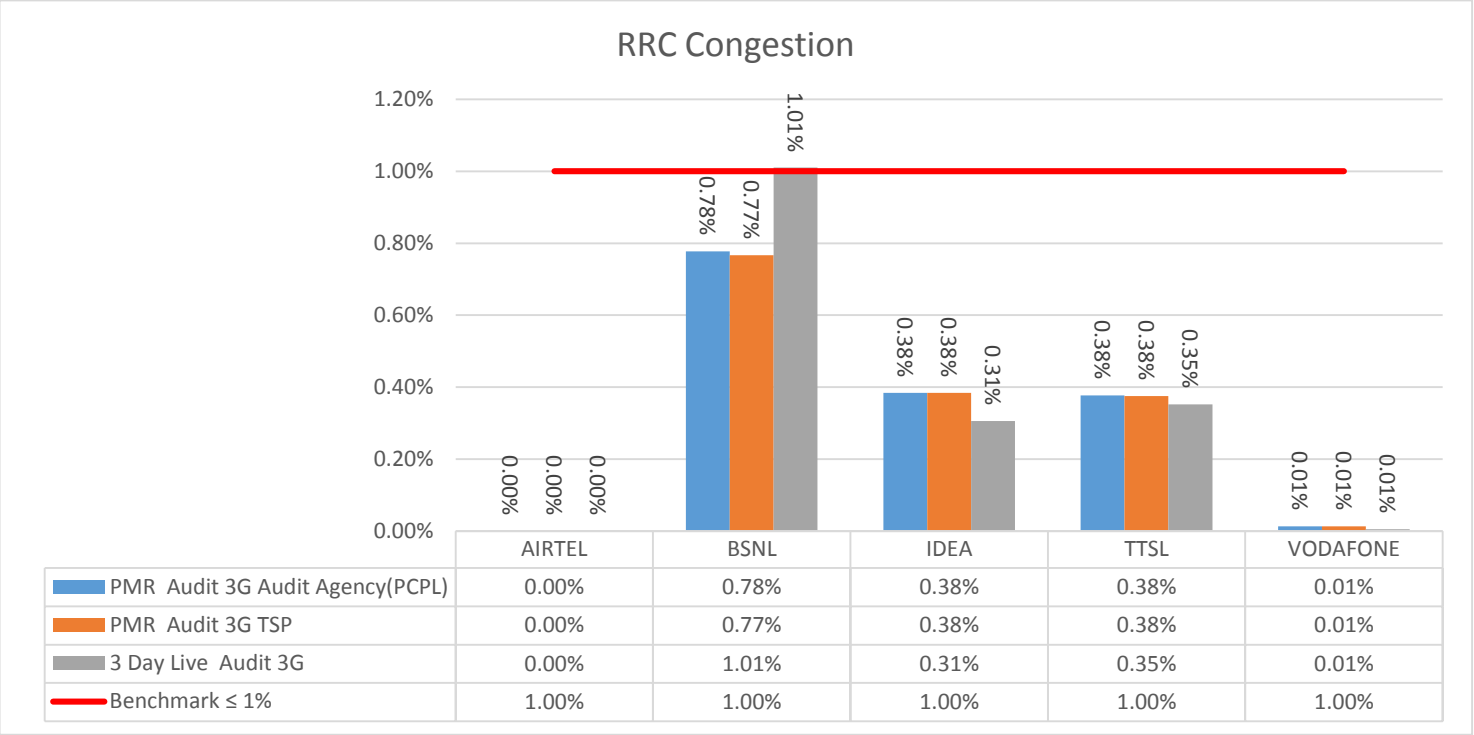
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency(PCPL)	0.14%	1.56%	0.00%	0.38%	0.11%
PMR Audit 3G TSP	0.14%	1.47%	0.00%	0.14%	0.11%
3 Day Live Audit 3G	0.00%	0.00%	0.00%	0.14%	0.00%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

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



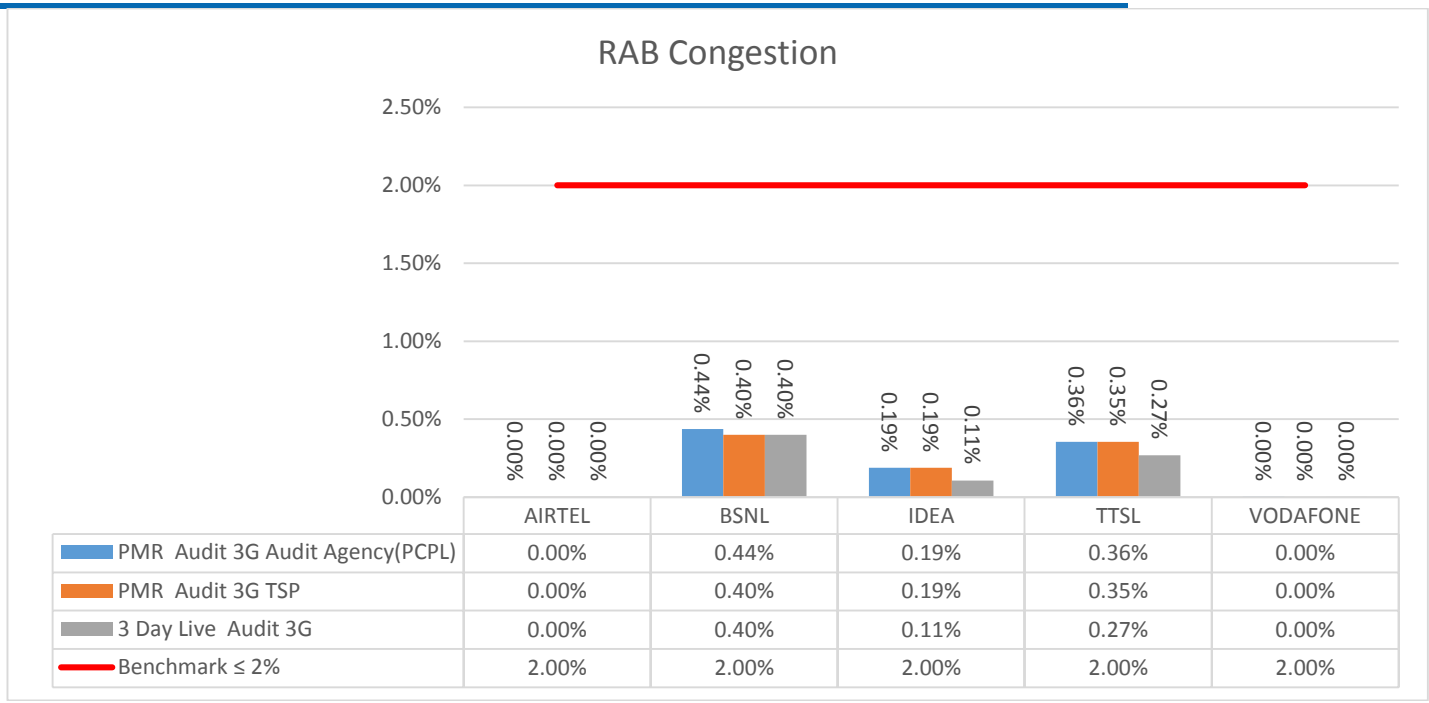
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency(PCPL)	99.11%	99.46%	99.18%	99.84%	99.79%
PMR Audit 3G TSP	99.11%	99.00%	99.18%	99.84%	99.79%
3 Day Live Audit 3G	99.07%	99.49%	99.24%	99.84%	99.60%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%

15.5.4. RRC CONGESTION



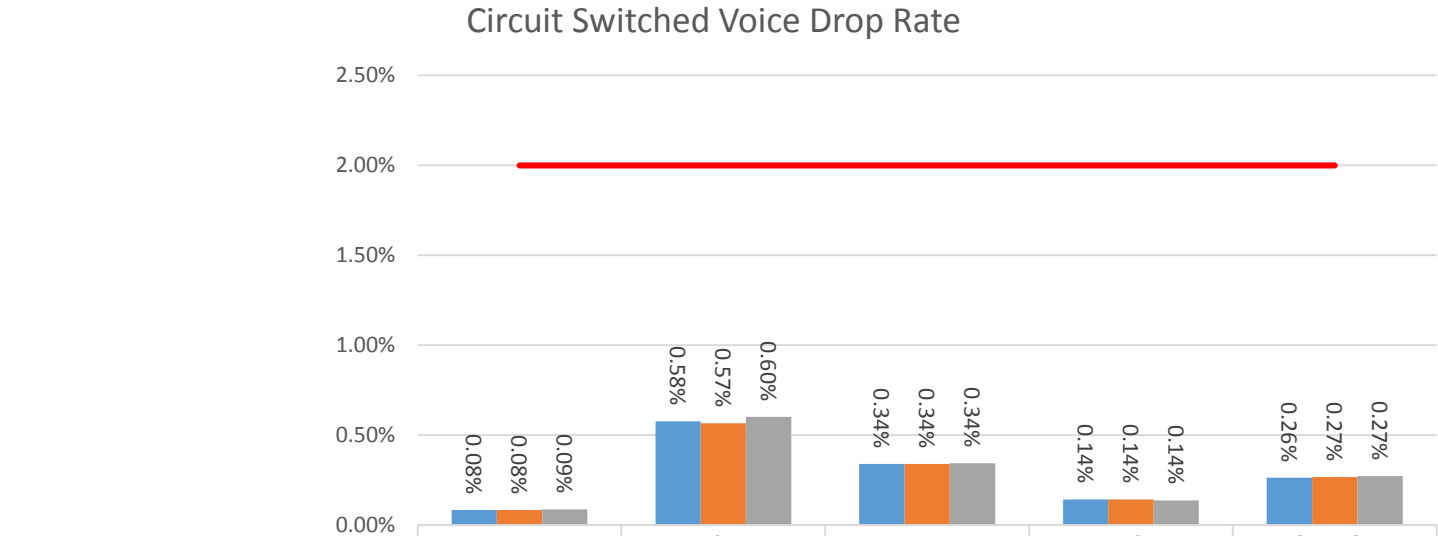
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency(PCPL)	0.00%	0.78%	0.38%	0.38%	0.01%
PMR Audit 3G TSP	0.00%	0.77%	0.38%	0.38%	0.01%
3 Day Live Audit 3G	0.00%	1.01%	0.31%	0.35%	0.01%
Benchmark ≤ 1%	1.00%	1.00%	1.00%	1.00%	1.00%

15.5.5. RAB CONGESTION



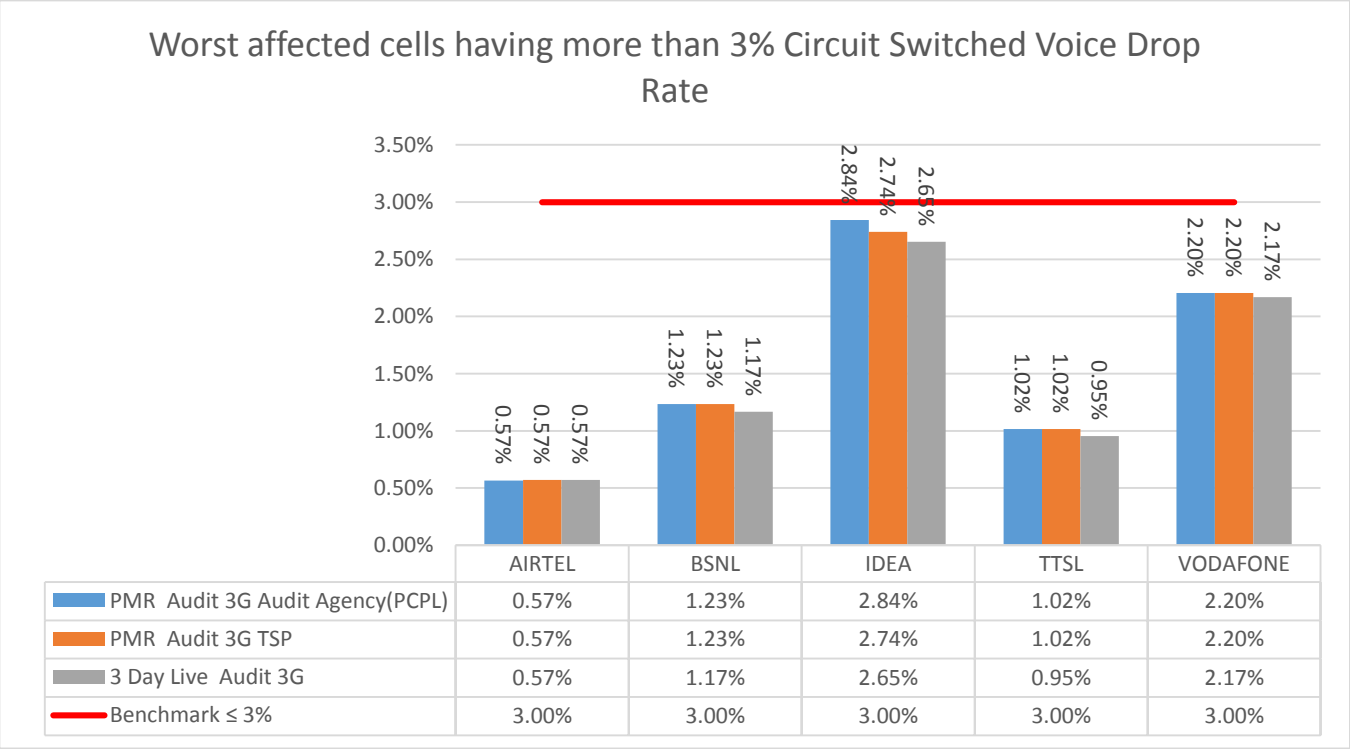
	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency(PCPL)	0.00%	0.44%	0.19%	0.36%	0.00%
PMR Audit 3G TSP	0.00%	0.40%	0.19%	0.35%	0.00%
3 Day Live Audit 3G	0.00%	0.40%	0.11%	0.27%	0.00%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

15.5.6. CIRCUIT SWITCHED VOICE DROP RATE



	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency(PCPL)	0.08%	0.58%	0.34%	0.14%	0.26%
PMR Audit 3G TSP	0.08%	0.57%	0.34%	0.14%	0.27%
3 Day Live Audit 3G	0.09%	0.60%	0.34%	0.14%	0.27%
Benchmark ≤ 2%	2.00%	2.00%	2.00%	2.00%	2.00%

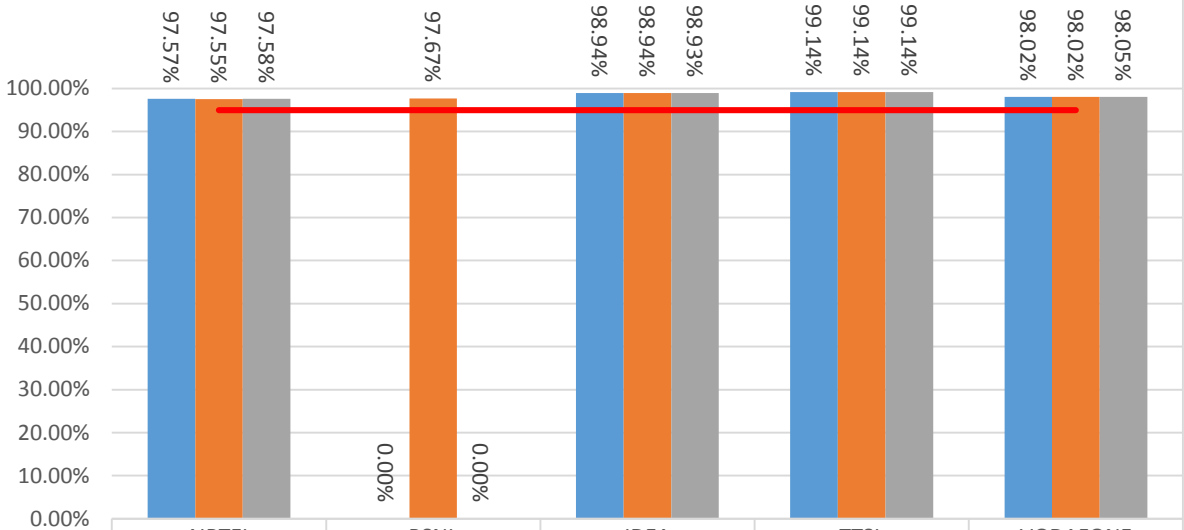
15.5.7. WORST AFFECTED CELLS HAVING MORE THAN 3% CIRCUIT SWITCHED VOICE DROP RATE



	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency(PCPL)	0.57%	1.23%	2.84%	1.02%	2.20%
PMR Audit 3G TSP	0.57%	1.23%	2.74%	1.02%	2.20%
3 Day Live Audit 3G	0.57%	1.17%	2.65%	0.95%	2.17%
Benchmark ≤ 3%	3.00%	3.00%	3.00%	3.00%	3.00%

15.5.8. % AGE OF CONNECTION WITH GOOD SWITCHED VOICE QUALITY

Percentage of connections with Good Circuit Switched Voice Quality

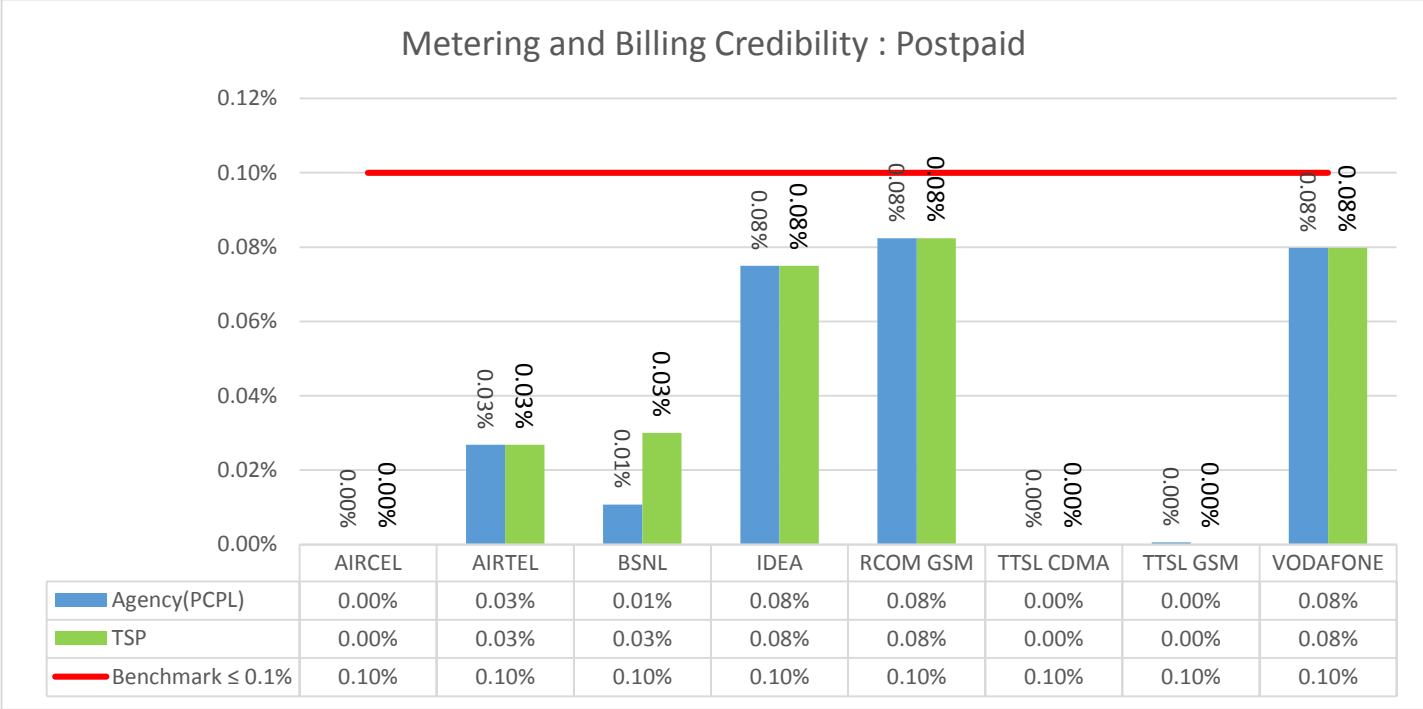


	AIRTEL	BSNL	IDEA	TTSL	VODAFONE
PMR Audit 3G Audit Agency(PCPL)	97.57%	0.00%	98.94%	99.14%	98.02%
PMR Audit 3G TSP	97.55%	97.67%	98.94%	99.14%	98.02%
3 Day Live Audit 3G	97.58%	0.00%	98.93%	99.14%	98.05%
Benchmark ≥ 95%	95.00%	95.00%	95.00%	95.00%	95.00%

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

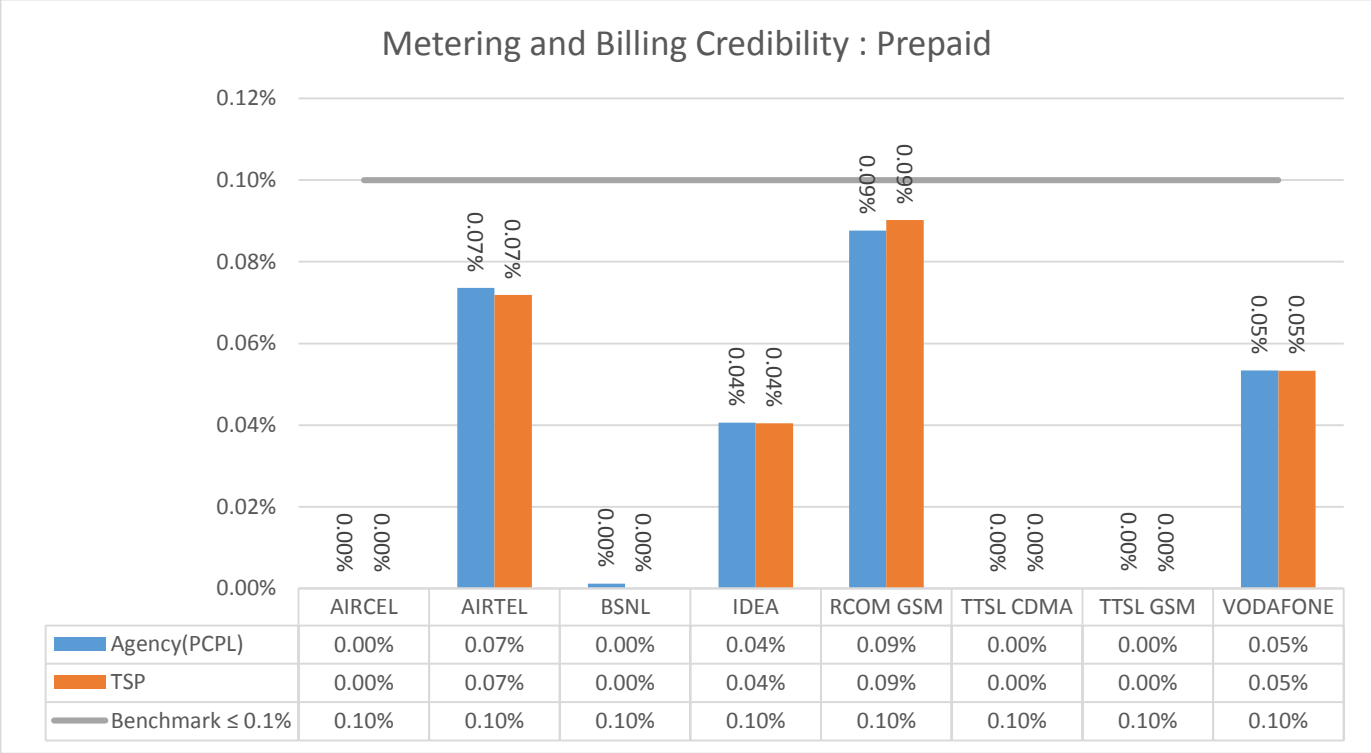
Name of Service Provider	Metering and Billing credibility				Billing Complaints						rmination & Closu		Time taken for refund of deposits after closures: Benchmark		Response time to customer for assistance			
	Postpaid Subscribers		Prepaid Subscribers		%age complaints resolved within 4 weeks		%age complaints resolved within 6 weeks		%age of where credit/waiver is received within one week		% of Termination/ Closure of service within 7		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)	
Benchmark	≤ 0.1%		≤ 0.1%		≥ 98%		= 100%		= 100%		= 100%		= 100%		≥ 95%		≥ 95%	
	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP
AIRCEL	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.53%	98.53%	99.86%	99.86%
AIRTEL	0.03%	0.03%	0.07%	0.07%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	93.57%	93.57%
BSNL	0.01%	0.03%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.24%	99.43%
IDEA	0.08%	0.08%	0.04%	0.04%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.91%	99.69%	99.69%	98.19%	98.19%
RCOM GSM	0.08%	0.08%	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.92%	98.71%	98.71%	96.42%	96.42%
TTSL CDMA	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.94%	99.44%
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%	98.41%	98.41%	96.78%	97.88%
VODAFONE	0.08%	0.08%	0.05%	0.05%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.45%	98.43%

15.6.1. METERING AND BILLING CREDIBILITY : POSTPAID



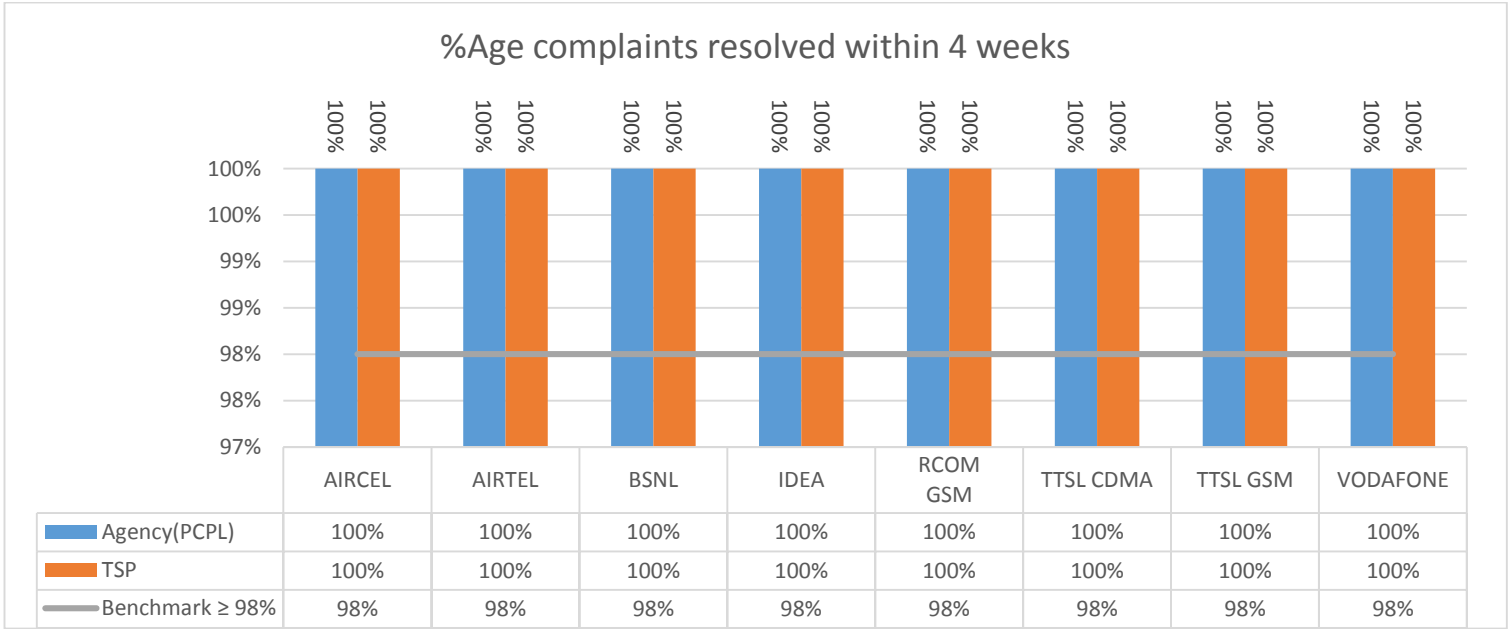
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	0.00%	0.03%	0.01%	0.08%	0.08%	0.00%	0.00%	0.08%
TSP	0.00%	0.03%	0.03%	0.08%	0.08%	0.00%	0.00%	0.08%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

15.6.2. METERING AND BILLING CREDIBILITY : PREPAID



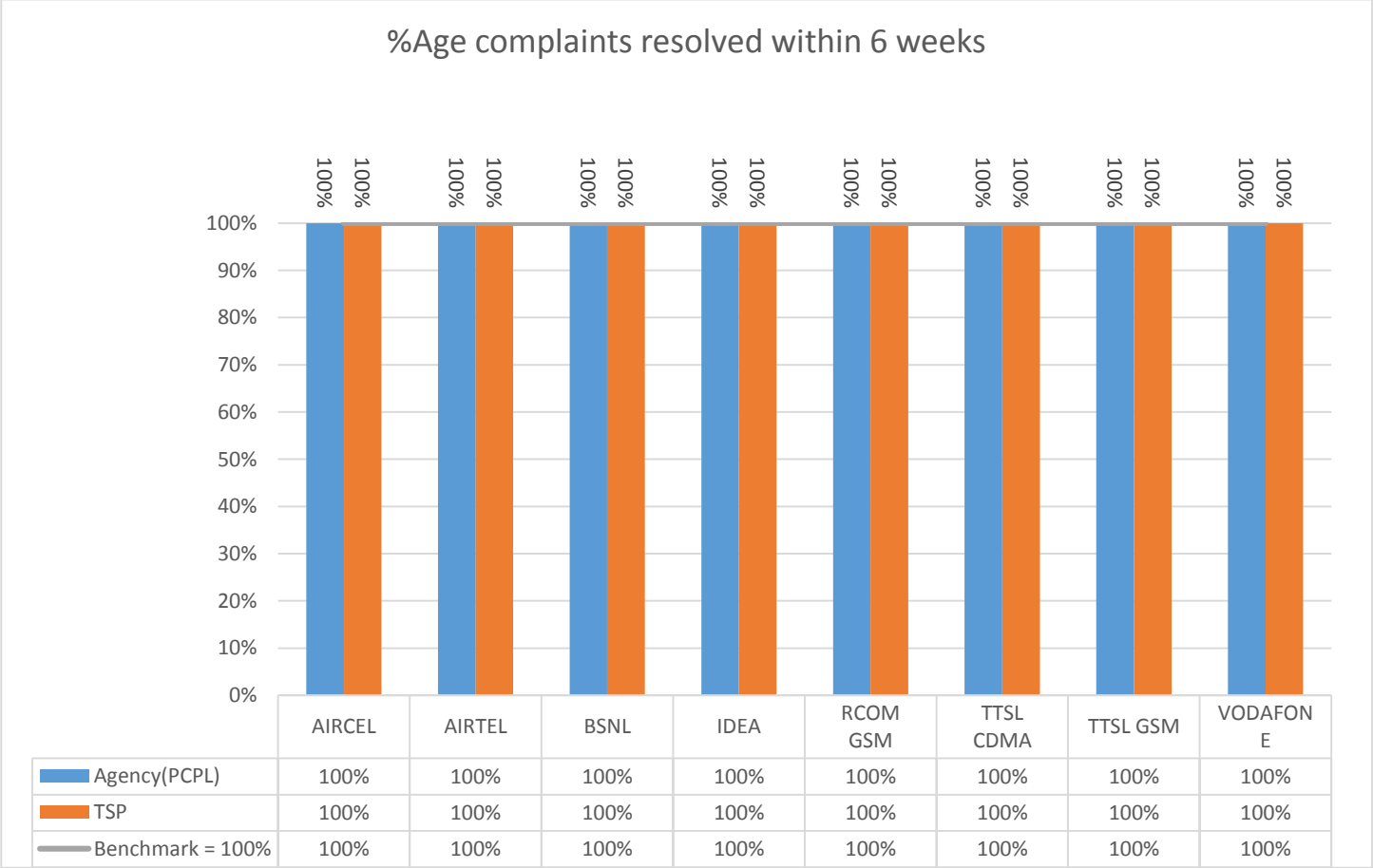
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	0.00%	0.07%	0.00%	0.04%	0.09%	0.00%	0.00%	0.05%
TSP	0.00%	0.07%	0.00%	0.04%	0.09%	0.00%	0.00%	0.05%
Benchmark ≤ 0.1%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%

15.6.3. %AGE COMPLAINT RESOLVED WITHIN 4 WEEKS



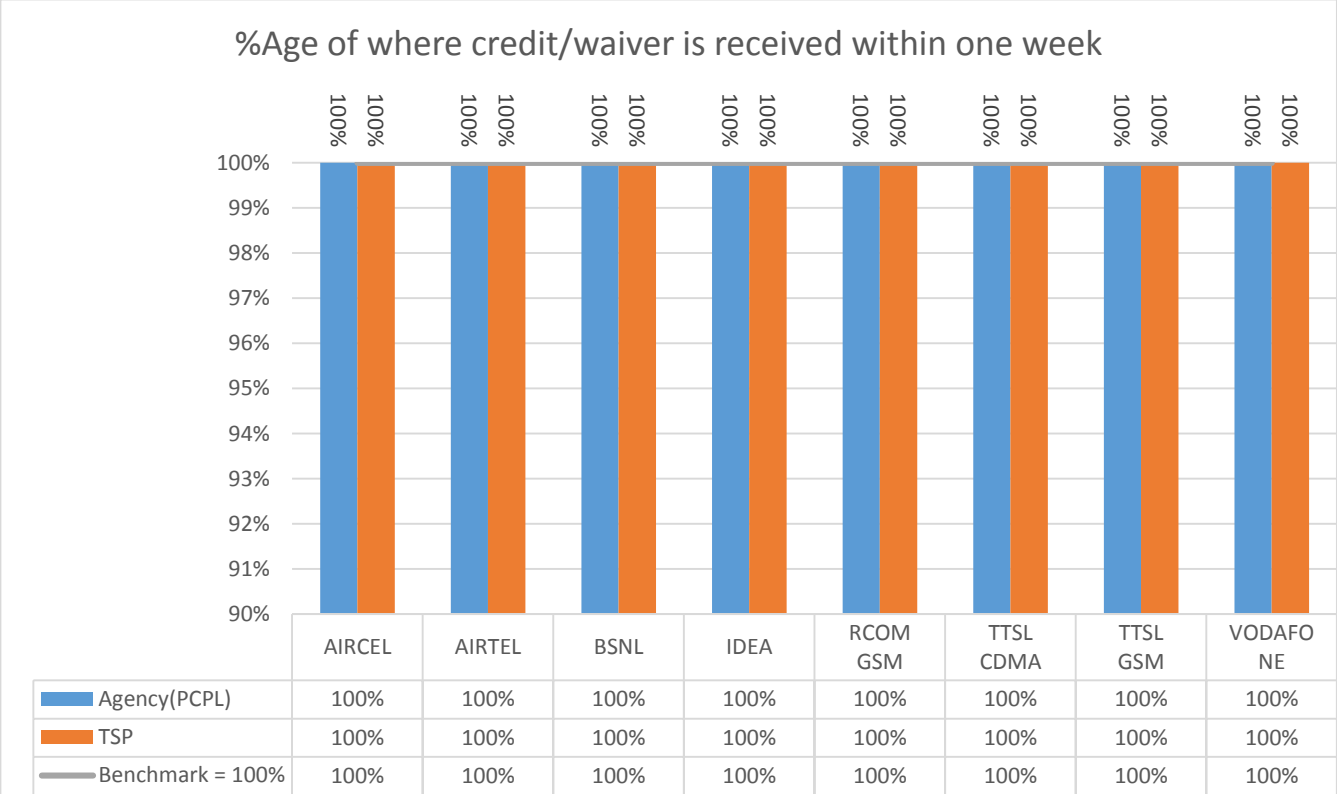
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%
TSP	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark ≥ 98%	98%	98%	98%	98%	98%	98%	98%	98%

15.6.4. %AGE COMPLAINTS RESOLVED WITHIN 6 WEEKS



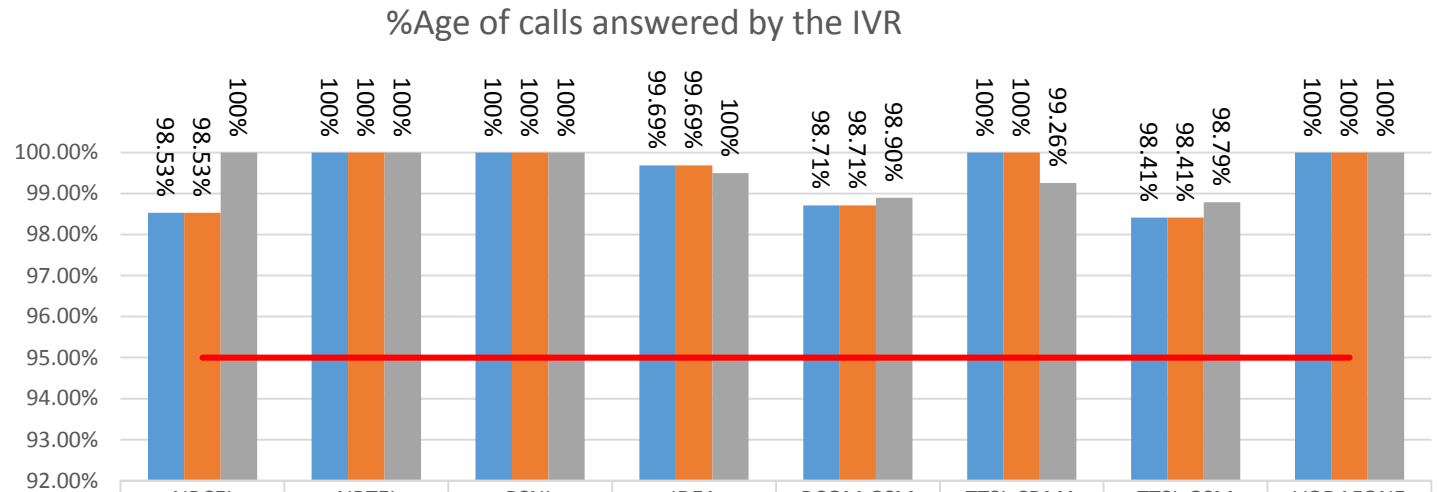
	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	100%	100%	100%	100%	100%	100%	100%	100%
TSP	100%	100%	100%	100%	100%	100%	100%	100%
Benchmark = 100%	100%	100%	100%	100%	100%	100%	100%	100%

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



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

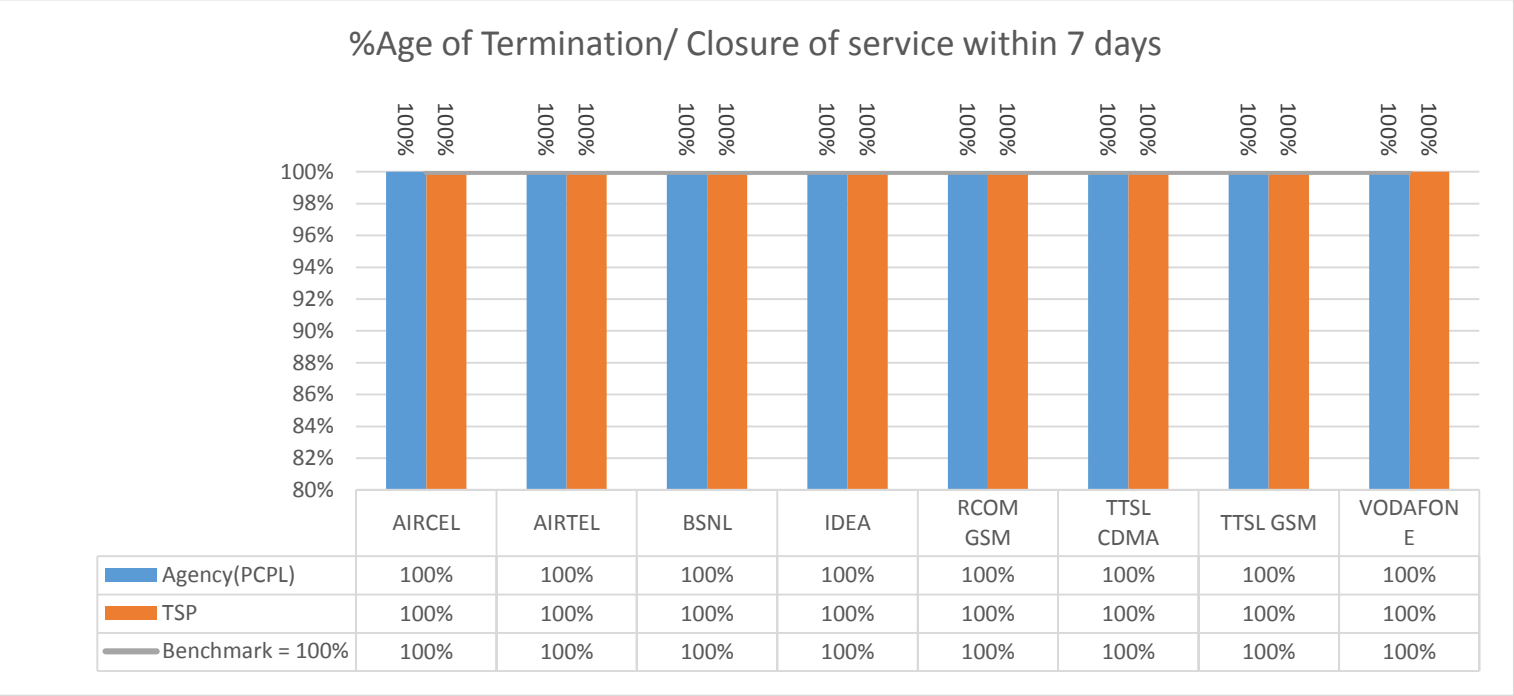
15.6.6. %AGE OF CALLS ANSWERED BY THE IVR



	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TTSL CDMA	TTSL GSM	VODAFONE
Agency(PCPL)	98.53%	100%	100%	99.69%	98.71%	100%	98.41%	100%
TSP	98.53%	100%	100%	99.69%	98.71%	100%	98.41%	100%
Live Calling	100%	100%	100%	100%	98.90%	99.26%	98.79%	100%
Benchmark ≥ 95%	95%	95%	95%	95%	95%	95%	95%	95%

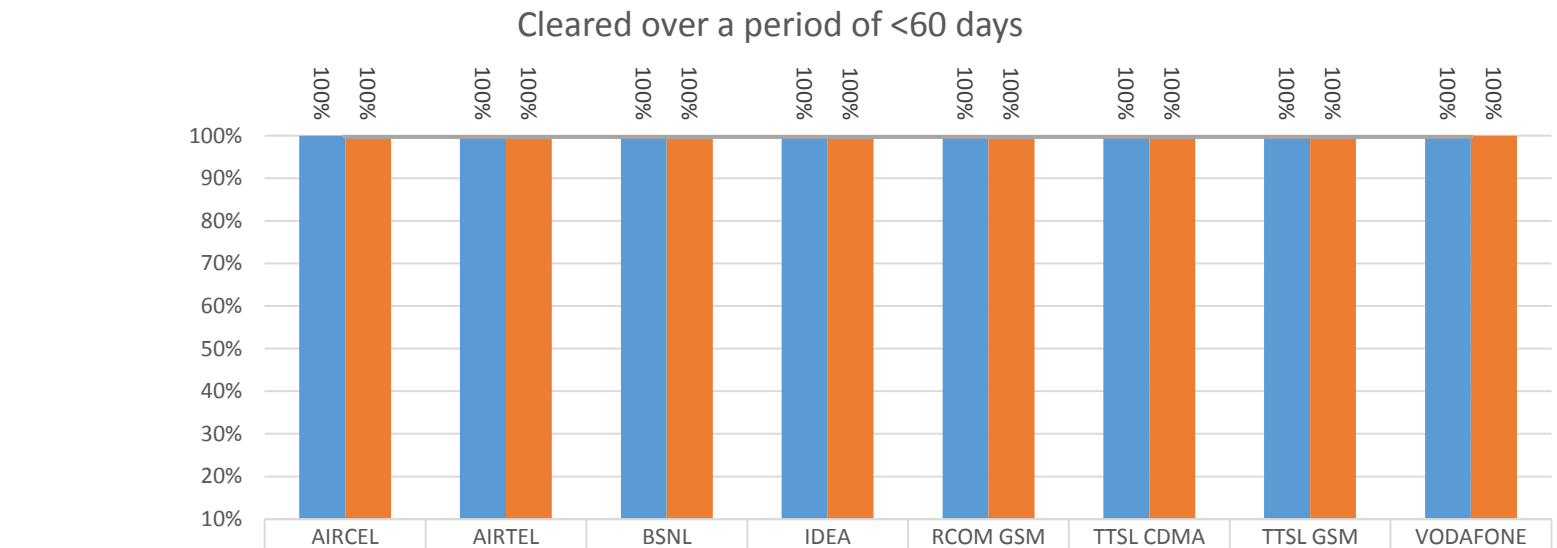
15.6.7. %AGE OF CALLS ANSWERED BY THE OPERATORS (VOICE TO VOICE) WITHIN 90 SECONDS

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



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

15.6.9. CLEARED OVER A PERIOD OF <60 DAYS



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

16. KEY FINDINGS

17.1. 2G VOICE PMR - CONSOLIDATED

17.2. 3G VOICE PMR - CONSOLIDATED

17.3. BILLING AND CUSTOMER CARE

- IDEA has parameter value of **99.91%** and failed to meet the benchmark of =100% for Time taken for refund of deposits after closures: Benchmark Cleared over a period of <60 days (100%).
- RCOM has parameter value of **99.92%** and failed to meet the benchmark of =100% for Time taken for refund of deposits after closures: Benchmark Cleared over a period of <60 days (100%).
- AIRTEL has parameter value of **93.57%** and failed to meet the benchmark of ≥95% for %age of call answered by the operators (voice to voice) within 90 seconds.