REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICE

&

BROADBAND SERVICE

FOR

TELECOM REGULATORY AUTHORITY OF INDIA

NORTH ZONE – HARYANA SERVICE AREA

(JANUARY 2014 – MARCH 2014)

PREPARED FOR:

TELECOM REGULATORY AUTHORITY OF INDIA

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PREFACE

The Telecom Regulatory Authority of India (TRAI) was established in 1997 by an Act of Parliament, called the Telecom Regulatory Authority of India Act, 1997, to regulate telecom services. The Authority's mission is to ensure that the interest of consumers are protected and at the same time to nurture conditions for growth of telecommunications, broadcasting and cable services in a manner and at a pace which will enable India to play a leading role in emerging global information society.

The Authority, in exercise of its functions as per the provisions in the TRAI Act, has been entrusted to measure the Quality of Service provided by the Service Providers from time to time and to compare them with the benchmarks so as to assess the level of performance. In pursuance of this, TRAI has appointed **M/s TUV-SUD South Asia Pvt. Ltd**. to carry out "Audit and Assessment of Quality of Service" provided by Basic (Wire line), Cellular Mobile and Broadband service providers in terms of the benchmarks specified in the respective regulations, in North and West Zones.

TUV-SUD South Asia carried out QoS audit as per the norms of TRAI in all the eight circles / services areas of the North Zone and four circles of the West Zone. This report details the performance of the various service providers in **Haryana circle** against the QoS bench marks laid down by TRAI in the respective regulations.

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1. BACKGROUND

1. **BACKGROUND**

Telecom Regulatory Authority of India has been entrusted to "lay down the standards of quality of service to be provided by the service providers and ensure the quality of service and conduct the periodical survey of such service provided by the service providers so as to protect interest of the consumers of telecommunication services" vide sub-clause (v) of clause (b) of sub-section (1) of section 11 of the Telecom Regulatory Authority of India Act, 1997 (24 of 1997).

The purpose of laying down Quality of Service Parameters is to:

i) Create conditions for consumer satisfaction by making known the quality of service, which the Service provider is required to provide, and the user has a right to expect.

ii) Measure the Quality of Service provided by the Service Providers from time to time and to compare them with the norms so as to assess the level of performance.

iii) Generally protect the interests of consumers of telecommunication services.

TRAI, the regulatory watch dog for the Quality of Service for the telecom services – Basic (Wire line), Cellular Mobile (Wireless) and Broadband has commissioned **M/s TUV-SUD South Asia Pvt. Ltd**. for conducting audit and assessment of quality of service of service providers, in terms of the benchmarks specified in the "The Standards of Quality of Service of Basic Telephone Service (Wire line) and Cellular Mobile Telephone Service Regulations, 2009 (7 of 2009) dated 20th March, 2009 and the Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated 6thOctober, 2006 on zonal basis for **North Zone and West Zone** comprising of the following Telecom Circles/Metro Service Areas:

North Zone: Delhi, Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Rajasthan, Uttar Pradesh-East and Uttar Pradesh-West (including Uttarakhand). For the cellular mobile telephone service the service area of Delhi includes Ghaziabad, Faridabad, Noida and Gurgaon.

West Zone: Mumbai, Maharashtra (including Goa and excluding Mumbai), Gujarat and Madhya Pradesh (including Chhattisgarh).

The Audit exercise would assess the Quality of Service of telecom operators providing Basic (Wire line), Cellular Mobile (Wireless) and Broadband services by auditing the relevant QoS records maintained by the operators, conducting drive tests as well as live measurements and comparing them with quality of service benchmarks stipulated by TRAI. The audit would be carried out by **TUV-SUD South Asia** every quarter across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. However, in respect of Basic telephone service (wireline) and Broadband service, a circle would be audited once in a year.

2. OBJECTIVES AND METHODOLOGY

2. **OBJECTIVES AND METHODOLOGY**

The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

The audit and assessment of Quality of Service is carried out by **TUV SUD South Asia across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. Apart from this, QoS audit for Basic (Wire line) is undertaken for J&K , Himachal Pradesh & Mumbai circles and for Broadband service, the audit is done for J&K , Himachal Pradesh, Haryana, Delhi & Mumbai Circles during the quarter January – March 2014.**

The Scope of work as per the Terms of Reference (TOR) includes the following:

i)   Preparation of Performance Monitoring reports (PMRs) and uploading in the system.

ii)   Live measurements of the performance of Service Providers (SPs) against the benchmarks for three days during each audit.

iii)   Monthly audit based on one month data of the SPs.

iv)   Drive test of the RF networks.

v)   Audit of the performance of call centers with respect to their accessibility and percentage of calls answered by the operators and random customer feedback by calling the customers to get feedback of the services provided by the service providers.

vi)   Transfer of data generated by the RF drive test/Live measurements / PMR/ monthly audit to the server located at TRAI premises on real time basis.

3. SAMPLE SIZE
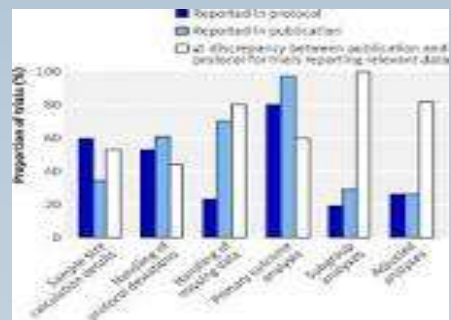
3. SAMPLE SIZE

3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS

▪ 100% of the Gateway MSC's (GMSC's) and Mobile Switching Centers (MSC's) of all the Cellular Mobile Service Providers or Unified Access Service Providers (UASP) were covered for audit in specified circles/service areas. Following were the various operators covered in Haryana circle

SI. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location
GSM Operators		January-14	February-14	March-14	
1	AIRCEL	17 to 21 Jan-14	24 to 26 Feb-14	18 to 20 March-14	Green Buleward Building, NSN office, Sector-62, Noida (UP)
2	AIRTEL	7 to 9th Jan-14	8th to 10th Feb-14	9th to 11th March	Bharti Airtel Ltd, Plot No. 21, Rajiv Gandhi Chandigarh Technology Park, Chandigarh.
3	BSNL	15th to 17th Jan-14	11th to 13th Feb-14	8th to 11th March-14	AGM (PG) Cum Nodal Officer (TRAI) O/o CGMT Haryana, Ambala (HR)
4	VIDEOCON	14th to 16th Jan-14	6th to 10th Feb-14	8th to 10th March-14	Videocon Telecommunication Ltd,Golden Palace,Near Vita Milk Plant,Jasmeet Nagar,Ambala City-134007
5	TATA GSM	14th to 16th Jan-14	6th to 10th Feb-14	14th to 19th March-14	Tata Teleservices Limited, 5 - Jasmeet Nagar,Near Vita Milk Plant Gt Road,Ambala, Ambala-134001, India
6	IDEA	16 to 20th Jan-14	21 to 25th Feb-14	18 to 20th March-14	Idea Cellular Limited, E-5, Sector-63, Noida (UP)
7	RCOM GSM	8th to 10th Jan-14	10th to 12th Feb-14	5th to 8th March-14	Reliance Communication Limited, NH-1, VPO-Mohari, Kuruskhetra, Near Hasari Pouthry Farm, Milestone 188.
8	VODAFONE	8th to 10th Jan-14	5th to 7th Feb-14	3rd to 5th March-14	Videocon Telecommunication Ltd,Golden Palace,Near Vita Milk Plant,Jasmeet Nagar,Ambala City-134007
CDMA Operators					
9	RCOM CDMA	8th to 10th Jan-14	10th to 12th Feb-14	5th to 8th March-14	Reliance Communication Limited, NH-1, VPO-Mohari, Kuruskhetra, Near Hasari Pouthry Farm, Milestone 188.
10	TATA CDMA	14th to 16th Jan-14	6th to 10th Feb-14	14th to 19th March-14	Tata Teleservices Limited, 5, Jasmeet Nagar,Near Vita Milk Plant Gt Road,Ambala, Ambala-134001, India

For all the above operators, audit was conducted in all the three months of the Quarter ended March 2014.

Transfer of data generated by monthly PMR and 3-days live measurements audit for the period January 2014 to March 2014 has been successfully uploaded to the server located at TRAI premises.

3.2 SAMPLING FOR BASIC (WIRELINE) SERVICES

▪   The QoS audit for basic (wireline) service is to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles. **However, QoS audit was not required to be done for Basic (Wireline) service during the quarter ended March 2014.**

3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

▪   TUV–SUD South Asia had to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who were having broadband subscriber base of more than 10,000 subscribers in their licensed service area. The QoS audit for following broadband service providers was undertaken during the quarter ended March 2014. The audit of Noida Software Technologies Pvt. Ltd. (NSTPL), Tikona and Spectranet for Noida, Faridabad and Gurgaon has been included in Delhi/NCR Circle.

Sl. No.	Name of Broadband Service Provider
1	BHARTI AIRTEL LIMITED
2	BSNL
3	FIVE NETWORKS
4	BROADBAND PACENET INDIA PVT. LTD
5	RELIANCE COMMUNICATION LIMITED (RCL)
6	TATA COMMUNICATION LIMITED (TCL)
7	TATA TELESERVICES LTD (TTL)
8	YOU BROADBAND

4. EXECUTIVE SUMMARY

4. <u>EXECUTIVE SUMMARY</u>

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 TUV-SUD 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

▪ TUV-SUD 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.

4.1 MONTHLY DATA VERIFICATION FOR CELLULAR MOBILE SERVICE PROVIDERS
(NETWORK SERVICE QUALITY PARAMETER)

4.1 SERVICE PROVIDER PERFORMANCE REPORT BASED ON MONTHLY DATA VERIFICATION: NETWORK SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES.

BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
GSM Operators			
1	AIRCEL	Mar-14	19:00 - 20:00
2	AIRTEL	Mar-14	20:00 - 21:00
3	BSNL	Mar-14	19:00 - 20:00
4	VIDEOCON	Mar-14	20:00 - 21:00
5	TATA GSM	Mar-14	19:00 - 20:00
6	IDEA	Mar-14	20:00 - 21:00
7	RCOM GSM	Mar-14	19:00 - 20:00
8	VODAFONE	Mar-14	20:00 - 21:00
CDMA Operators			
9	RCOM CDMA	Mar-14	20:00 - 21:00
10	TATA CDMA	Mar-14	19:00 - 20:00

The TCBH reported by all the service providers matched the network busy hour calculated by TUV auditors for the Haryana circle.

SWITCHES/BSC/BTS DETAILS OF OPERATORS:

Sl. No.	Name of Service Provider	No. of MSC + GMSC	No. of BSC	No. of BTS	NSS make	BSS make
GSM Operators						
1	AIRCEL	NA*	1	28	NSN	NSN
2	AIRTEL	4	24	2801	Ericsson	Ericsson
3	BSNL	8 (7+1)	28	1814	Ericsson & ZTE	Ericsson, NSN & ZTE
4	IDEA	5	29	2940	NSN	NSN
5	RCOM GSM	1	8	1194	Huawei	Huawei
6	TATA GSM	2	12	1503	NSN	NSN
7	VIDEOCON	1	8	1289	Huawei	Huawei
8	VODAFONE	7 (5+2)	45	2752	NSN	NSN
CDMA Operators						
9	RCOM CDMA	3 (2+1)	NA	773	Lucent & ZTE	Lucent
10	TATA CDMA	4	7	456	Ericsson & Huawei	ZTE & Motorola

*NA: Aircel is having one MSC at Gurgaon (NCR)

TABLES OF MONTHLY QOS PERFORMANCE:

TABLE: 1

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- JAN-14 MONTH												
PMR Generation Data		**Bench-mark**	**Audit Period**	**AIRCEL**	**AIRTEL**	**BSNL**	**VIDECON**	**TATA GSM**	**IDEA**	**RCOM GSM**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			**GSM Operators**								**CDMA Operators**	
	Network Service Quality Parameter												
	Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Jan-14	0.29%	0.11%	1.14%	0.18%	0.12%	0.01%	0.23%	0.08%	0.17%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	Jan-14	0.00%	0.07%	1.36%	0.31%	0.47%	0.00%	0.25%	0.22%	0.26%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Jan-14	98.33%	99.21%	97.71%	98.63%	98.39%	99.98%	99.24%	99.44%	98.58%	98.45%
	b) SDCCH/PAGING Channel congestion	<=1%	Jan-14	0.89%	0.18%	0.39%	0.11%	0.10%	0.48%	0.05%	0.15%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-14	0.00%	0.18%	0.94%	0.12%	0.74%	0.72%	0.02%	0.56%	0.06%	0.17%
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Jan-14	1.61%	0.41%	1.09%	0.59%	0.63%	0.67%	0.24%	0.73%	0.05%	0.44%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jan-14	**13.10%**	0.96%	0.66%	0.79%	**3.23%**	2.02%	0.03%	1.95%	0.16%	**4.53%**
	c) Connections with good voice quality	>=95%	Jan-14	99.01%	99.13%	NP	98.33%	97.70%	97.91%	99.18%	97.81%	99.76%	96.06%
4	**No. of POI's having >=0.5% POI congestion**	<=0.5%	Jan-14	0	0	0	0	0	0	0	0	0	0

*NP-Not Provided: BSNL having no directed counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided by data for this parameter.

TABLE: 2

	CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- FEB-14 MONTH											
PMR Generation Data		**Bench-mark**	**Audit Period**	**AIRCEL**	**AIRTEL**	**BSNL**	**VIDECON**	**TATA GSM**	**IDEA**	**RCOM GSM**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			**GSM Operators**								**CDMA Operators**	
	Network Service Quality Parameter												
	Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Feb-14	0.56%	0.07%	1.04%	0.14%	**4.25%**	0.00%	0.13%	0.05%	0.14%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Feb-14	0.00%	0.04%	1.44%	0.08%	0.00%	0.00%	0.08%	0.07%	0.13%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Feb-14	99.59%	99.14%	98.10%	98.59%	98.58%	99.98%	99.66%	99.78%	98.97%	98.38%
	b) SDCCH/PAGING Channel congestion	<=1%	Feb-14	0.17%	0.16%	0.41%	0.08%	0.05%	0.47%	0.02%	0.09%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-14	0.00%	0.24%	0.74%	0.15%	0.53%	0.75%	0.02%	0.22%	0.02%	0.27%
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Feb-14	1.01%	0.38%	1.02%	0.59%	0.61%	0.68%	0.24%	0.73%	0.05%	0.45%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Feb-14	**20.24%**	0.81%	0.66%	0.79%	**3.33%**	2.03%	0.03%	1.96%	0.13%	**4.34%**
	c) Connections with good voice quality	>=95%	Feb-14	99.76%	99.17%	NP	98.31%	97.70%	97.88%	99.17%	97.75%	99.75%	98.14%
4	**No. of POI's having >=0.5% POI congestion**	<=0.5%	Feb-14	0	0	0	0	0	0	0	0	0	0

*NP-Not Provided: BSNL having no directed counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided by data for this parameter.

TABLE: 3

	CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- MAR-14 MONTH											
PMR Generation Data		**Bench-mark**	**Audit Period**	**AIRCEL**	**AIRTEL**	**BSNL**	**VIDECON**	**TATA GSM**	**IDEA**	**RCOM GSM**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			**GSM Operators**								**CDMA Operators**	
	Network Service Quality Parameter												
	Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Mar-14	0.56%	0.05%	1.05%	0.10%	0.05%	0.00%	0.15%	0.04%	0.13%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Mar-14	0.00%	0.00%	1.54%	0.31%	0.00%	0.00%	0.17%	0.04%	0.13%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Mar-14	96.13%	99.18%	97.94%	98.67%	98.77%	99.99%	99.69%	99.74%	98.91%	96.34%
	b) SDCCH/PAGING Channel congestion	<=1%	Mar-14	0.00%	0.19%	0.43%	0.09%	0.04%	0.48%	0.05%	0.10%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-14	0.00%	0.19%	0.78%	0.12%	0.35%	0.72%	0.02%	0.26%	0.05%	**2.23%**
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Mar-14	0.61%	0.36%	1.04%	0.54%	0.63%	0.74%	0.26%	0.75%	0.05%	0.53%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Mar-14	**19.05%**	0.82%	0.73%	0.71%	**3.60%**	2.60%	0.06%	2.13%	0.13%	**5.19%**
	c) Connections with good voice quality	>=95%	Mar-14	99.18%	99.12%	NP	98.26%	97.62%	97.68%	99.18%	97.61%	99.74%	96.52%
4	**No. of POI's having >=0.5% POI congestion**	<=0.5%	Mar-14	0	0	0	0	0	0	0	**2**	0	0

*NP-Not Provided: BSNL having no directed counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided by data for this parameter.

TABLE OF QUARTERLY QOS PERFORMANCE:

TABLE: 4

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-MARCH-14) OF HARYANA CIRCLE													
PMR Generation Data		**Bench- mark**	**Audit Period**	**AIRCEL**	**AIRTEL**	**BSNL**	**VIDEOCON**	**TATA GSM**	**IDEA**	**RCOM GSM**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			**GSM Operators**								**CDMA Operators**	
	Network Service Quality Parameter												
	Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.47%	0.08%	1.08%	0.14%	1.47%	0.00%	0.17%	0.06%	0.15%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.04%	1.45%	0.23%	0.16%	0.00%	0.17%	0.11%	0.17%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	98.02%	99.18%	97.92%	98.63%	98.58%	99.98%	99.53%	99.65%	98.82%	97.72%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.35%	0.18%	0.41%	0.09%	0.06%	0.48%	0.04%	0.11%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.00%	0.20%	0.82%	0.13%	0.54%	0.73%	0.02%	0.35%	0.04%	0.89%
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.08%	0.38%	1.05%	0.57%	0.62%	0.70%	0.25%	0.74%	0.05%	0.47%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	**17.46%**	0.86%	0.68%	0.76%	**3.39%**	2.22%	0.04%	2.01%	0.14%	**4.69%**
	c) Connections with good voice quality	>=95%	Quarterly	99.32%	99.14%	NP	98.30%	97.67%	97.82%	99.18%	97.72%	99.75%	96.91%
4	**No. of POI's having >=0.5% POI congestion**	<=0.5%	Quarterly	0	0	0	0	0	0	0	**1**	0	0

KEY FINDINGS: CELLULAR MOBILE SERVICES

The audit for cellular mobile service providers was conducted at their respective MSCs in the circle, however in case Reliance Communication, the audit of CSD related parameters was conducted at their central NOC at DAKC Mumbai.

TUV conducted audit for cellular mobile operators based on **three stage audit / verification viz audit of the records, live measurements and drive tests. This exercise has been repeated every month for CMSPs.**

Network Service Quality Parameters:

- **Network Availability**

     i.   BTS Accumulated Downtime (Not Available for Service):
     ii.   Worst affected BTSs due to downtime

For measuring the performance against the benchmark for this parameter, down time of each BTS lasting for more than 1 hour at a time in a day during the period of a month has been taken for computation.

In Haryana circle, all the operators except BSNL found meeting benchmark on the above parameters 'BTS accumulated downtime' and 'worst affected BTSs due to down time' in all the three months of the quarter. **Tata (GSM) lagged behind in meeting the benchmark for parameter 'BTS Accumulated down time' with its performance as 4.25 % (Feb-14) against the benchmark of <= 2 %.**

- **Connection Establishment (Accessibility)**

     i.   Call Set-up Success Rate(CSSR)

CSSR includes complete signaling in the call set up process and does not aim to measure the performance of the called exchange or that of the Point of Interconnection (POI). CSSR was established as the ratio of total number of successful call attempts (establishment) to the total number of call attempts made. All the operators were found to be calculating the parameter as per the TRAI's specified norms.

All the operators were well performed on this parameter.

- **Parameters related to Network Congestion:**

The parameters namely SDCCH / Paging Channel Congestion, TCH and POI are prescribed with the aim of measuring the congestion in the network.

In CDMA system, there is no direct counter defined for reporting Paging Channel Congestion as reported by Tata Teleservices. However, they have a defined counter for Paging Channel Occupancy Ratio   (**PCH Average Using Ratio**) which is used to determine the Paging Channel Occupancy which on an average is < 50% on all sites in the network. When the value of this parameter is less than 100%, it is counted as 0% congestion. Thus, there is no congestion on the pegging channel in CDMA system.

With respect to this parameter, the performance of the operators is quite satisfactory as all operators except Tata (CDMA) met the TRAI specified benchmarks on TCH congestion parameters. Tata (CDMA) was out of benchmark (2.23%) in the month of March-14.

Vodafone was found having congestion on two individual POIs links between a service provider vis-à-vis other service providers namely Airtel and VSNL (NGN) NLD in the month of March-2014.

- **Connection Maintenance (Retainability)**

    i.   Call Drop Rate:

This parameter gives a reliable measurement of the mobile network used by the service provider for maintaining a call once it has been correctly established. Failures in coverage, network congestion and network failures have important impact on this parameter.

The audit of this parameter revealed that all the service providers were measuring this parameter as per the TRAI guidelines. Also, **all the service providers were found to be meeting the TRAI specified benchmark**. The lowest call drop rate (average 0 .05 %) was for RCOM (CDMA) during the quarter.

    ii.   Worst affected cells having more than 3% TCH drops

Worst affected cells are defined as cells in which the call drop rate exceeds 3% during Cell Bouncing Busy Hour (CBBH) or at any other hour of a day.

The audit with respect to this parameter revealed that all the operators met the benchmark for this parameter except Aircel and Tata Tele Services (TTSL). **Aircel failed to meet the benchmark in all the three months of the quarter ended March-2014 with its performance as 13.10%, 20.24% and 19.05% in the respective months of the quarter.** The performance of Aircel for this parameter, calculated taking average of three months was 17.46%.
Thus the performance of Aircel remained way beyond the benchmark. In fact, Aircel was having its very limited presence with only 28 BTSs in entire Haryana service area.

Tata (GSM) with its performance of 3.23% (Jan-14), 3.33% (Feb-14) & 4.34% (Mar-14) and Tata (CDMA) with its performance of 4.53%, 4.34% and 5.19% during the respective months of the quarter could not meet the bench mark. The performance of Tata (GSM) and Tata (CDMA) for this parameter, when calculated taking average of three months was 3.39% and 4.69 % respectively.

    iii. Connections with good voice quality:

Most of the Operators were measuring this parameter through the system generated data at their switches whereas BSNL was measuring through their periodic drive tests. Hence, BSNL has not provided the data for this parameter. **The audit results for this parameter indicate that all operators have met the bench mark during the quarter.**

4.2 CUSTOMER SERVICE QUALITY (CSD) PARAMETERS

4.2 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT-QE MAR-14:

	CSD Data for Cellular Mobile Telephone Services-QE Mar-14												
	Quarterly CSD Audit Data	**Bench-mark**	**Circle Name**	**AIRCEL**	**AIRTEL**	**BSNL**	**IDEA**	**RCOM GSM**	**TATA GSM**	**VIDEOCON**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/ N	**Name of Parameter**						**GSM Operators**					**CDMA Operators**	
	Customer Service Quality Parameters												
1	**Metering & Billing Credibility -Post Paid**												
	A) No. of bills issued during the quarter		*Haryana*	10	106479	20597	206470	20251	37724	NA	132492	45477	26801
	B) No. of bills disputed including billing complaints during the quarter		*Haryana*	0	166	14	202	16	0	NA	14	42	0
	C)% of billing complaints during the quarter	*<= 0.1%*	*Haryana*	0.00%	**0.16%**	0.07%	0.10%	0.08%	0.00%	NA	0.01%	0.09%	0.00%
2	**Metering & Billing Credibility -Pre Paid**												
	A) Total No. of Pre-paid customers at the end of the quarter		*Haryana*	11046	2255827	3291946	3970166	1690818	2048878	1459123	4747923	421105	528741
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		*Haryana*	0	178	188	250	1685	0	19	83	411	0
	C) % of Pre-paid Charging Complaints	*<= 0.1%*	*Haryana*	0.00%	0.01%	0.01%	0.01%	0.10%	0.00%	0.00%	0.00%	0.10%	0.00%
3	**Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints**												
	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		*Haryana*	0	344	202	452	1701	0	19	97	453	0
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		*Haryana*	0	344	202	452	1701	0	19	97	453	0
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	*100 % within 4 week*		NA	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	NA
	D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	*<=1 week*		NA	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	NA
4	**Response time to customers for assistance**												
	A) Accessibility of call centre/Customer Care	*>=95%*	*Haryana*	96.85%	99.39%	100.00%	100.00%	98.90%	99.19%	96.17%	100.00%	99.06%	97.08%
	B) % call answered by operators(voice to voice) within 60 sec.	*>=90%*	*Haryana*	94.47%	94.09%	**26.12%**	98.10%	93.25%	**88.14%**	91.29%	96.10%	94.73%	95.73%

5	Termination/closure of service													
	A) Total No. of requests for Termination / Closure of service received during the quarter		*Haryana*	0	592	74	794	50	194	NA	450	163	138
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		*Haryana*	0	592	74	794	50	194	NA	450	163	138
	C) % of Termination/ Closure of service within 7 days	<=7days	*Haryana*	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
6	Time taken for refunds of deposits after closures.													
	A) No. of Payments/ Refunds due during the quarter		*Haryana*	0	88	93	338	238	95	NA	189	297	62
	B) No. of Payments/ Refunds Cleared during the quarter		*Haryana*	0	88	93	338	238	95	NA	189	297	62
	C)Time taken for refunds of deposits after closures.	*100% within 60 days*	*Haryana*	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%

NA-Not Applicable

KEY FINDINGS: CUSTOMER SERVICE DELIVERY PARAMETERS

1. Metering and billing credibility-(Post paid & Pre-paid)

The performance of the service providers with respect to the parameter metering and billing credibility for both **post-paid and pre-paid is well within the prescribed bench mark of <=0.1 %, except Airtel as its performance was beyond the benchmark i.e, 0.16%.** Videocon is not having the post-paid customer in Haryana circle.

2. Resolution of Billing complaints and applying credits -

   i.   *Resolution of billing /charging complaints*

   ii.   *Period of applying credit/waiver/adjustment to customer's account from the date of resolution of complaints*

All operators have 100 % resolved the billing complaints within stipulated period of 4 weeks. In all cases where customers were due for credit / adjustment, all the service providers have met the benchmark of 100 % refund in one week.

3. Response Time to the Customer for assistance

   i.   Accessibility of call centre/customer care
   ii.   Percentage of calls answered by Operators (Voice to Voice)

All service providers were in compliance with respect to the parameter accessibility of call center and with regard to the parameter '% Calls answered by operator (voice to voice)'within 60 seconds, the performance of **BSNL and Tata (GSM)** remained non-complied with the benchmark with their performance as **26.12% (way below the benchmark)** and **88.14%** respectively, against the benchmark of >= 90 %.

4. Termination/Closure of Service

In case of this parameters also, all service providers have settled the closure/termination within the benchmark of 7 days.

5. Time Taken for Refund of deposits after closures

All operators were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure.

4.3 3-DAYS LIVE MEASUREMENT DATA VERIFICATION FOR

CELLULAR MOBILE SERVICE PROVIDERS

(NETWORK SERVICE QUALITY PARAMETER)

4.3 SERVICE PROVIDER PERFORMANCE REPORT BASED ON 3-DAYS LIVE MEASUREMENT DATA VERIFICATION CONDUCTED IN EACH MONTH OF THE QUARTER:

1) NETWORK SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES

TABLE: 1

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
	CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- JAN-14 MONTH												
	Live measurement Data						GSM Operators					CDMA Operators	
	Network Service Quality Parameter												
	Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Live data	2.06%	0.07%	1.45%	0.09%	0.04%	0.02%	0.19%	0.02%	0.17%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	96.92%	99.43%	97.79%	98.44%	98.96%	99.98%	99.24%	99.75%	98.88%	97.81%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.00%	0.04%	0.42%	0.08%	0.09%	0.37%	0.02%	0.14%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.10%	0.86%	0.20%	0.24%	0.55%	0.02%	0.25%	0.03%	0.23%
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.59%	0.39%	1.06%	0.62%	0.55%	0.68%	0.22%	0.71%	0.05%	0.42%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	0.79%	1.02%	0.73%	0.68%	2.77%	2.33%	0.01%	1.85%	0.09%	4.88%
	c) Connections with good voice quality	>=95%	Live data	99.21%	99.15%	NP	98.34%	97.82%	97.88%	99.21%	97.82%	99.76%	NP
4	**No. of POI having >=0.5% congestion**	<0.5%	Live data	0	0	0	0	0	0	0	0	0	0

* NP-Not Provided: BSNL and Tata CDMA having no direct counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided by data for this parameter.

TABLE: 2

	CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- FEB-14 MONTH											
Live measurement Data		**Bench-mark**	**Average of 3 Days**	**AIRCEL**	**AIRTEL**	**BSNL**	**VIDEOCON**	**TATA GSM**	**IDEA**	**RCOM GSM**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			GSM Operators								CDMA Operators	
	Network Service Quality Parameter												
	Network Availability												
1	a) BTS Accumulated Downtime	**<=2%**	Live data	1.17%	0.05%	1.03%	0.03%	0.04%	0.01%	0.10%	0.03%	0.08%	0.08%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	**>=95%**	Live data	98.15%	99.10%	98.04%	98.77%	98.89%	99.99%	99.78%	99.82%	99.05%	98.64%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.00%	0.16%	0.15%	0.06%	0.03%	0.38%	0.02%	0.09%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	0.00%	0.27%	0.72%	0.10%	0.32%	0.79%	0.02%	0.18%	0.02%	0.08%
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	1.15%	0.38%	1.00%	0.55%	0.60%	0.64%	0.24%	0.65%	0.04%	0.40%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	2.78%	0.79%	0.66%	0.65%	**3.33%**	1.72%	0.00%	1.88%	0.22%	**4.22%**
	c) Connections with good voice quality	**>=95%**	Live data	99.62%	99.20%	NP	98.34%	97.79%	97.89%	99.20%	97.85%	99.76%	NP
4	**No. of POI having >=0.5% congestion**	**<0.5%**	Live data	0	0	**2**	0	0	0	0	0	0	0

* NP-Not Provided: BSNL and Tata CDMA having no direct counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided by data for this parameter.

TABLE: 3

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- MAR-14 MONTH													
\multicolumn{2}{c}{**Live measurement Data**}	**Bench-mark**	**Average of 3 Days**	**AIRCEL**	**AIRTEL**	**BSNL**	**VIDEOCON**	**TATA GSM**	**IDEA**	**RCOM GSM**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			\multicolumn{8}{c}{**GSM Operators**}							\multicolumn{2}{c}{**CDMA Operators**}	
	Network Service Quality Parameter												
	Network Availability												
1	a) BTS Accumulated Downtime	**<=2%**	Live data	0.00%	0.03%	1.66%	0.14%	0.02%	0.00%	0.12%	0.03%	0.09%	0.08%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.00%	0.00%	0.17%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	**>=95%**	Live data	96.49%	99.07%	97.42%	98.65%	99.02%	99.99%	99.77%	99.71%	99.19%	95.85%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.00%	0.25%	0.41%	0.07%	0.02%	0.24%	0.01%	0.09%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	0.00%	0.22%	0.90%	0.12%	0.17%	0.44%	0.02%	0.29%	0.01%	**2.78%**
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	**5.26%**	0.38%	1.04%	0.55%	0.58%	0.66%	0.23%	0.75%	0.03%	0.40%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	1.59%	0.83%	0.77%	0.73%	**3.38%**	1.87%	0.00%	1.81%	0.14%	**4.93%**
	c) Connections with good voice quality	**>=95%**	Live data	97.46%	99.15%	NP	98.25%	97.73%	97.85%	99.20%	97.64%	99.75%	NP
4	**No. of POI having >=0.5% congestion**	**<0.5%**	Live data	0	0	0	0	0	0	0	0	0	0

* NP-Not Provided: BSNL and Tata CDMA having no direct counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided by data for this parameter.

TABLE OF QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT DATA:

TABLE: 4

	QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE-MARCH-14) – HARYANA CIRCLE											
Live measurement Data		**Bench- mark**	**Average of 3 Days**	**AIRCEL**	**AIRTEL**	**BSNL**	**VIDEOCON**	**TATA GSM**	**IDEA**	**RCOM GSM**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			**GSM Operators**								**CDMA Operators**	
	Network Service Quality Parameter												
	Network Availability												
1	a) BTS Accumulated Downtime	**<=2%**	Quarterly	1.08%	0.05%	1.38%	0.09%	0.03%	0.01%	0.14%	0.03%	0.11%	0.07%
	b) Worst affected BTSs due to downtime	**<=2%**	Quarterly	0.00%	0.00%	0.08%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	**>=95%**	Quarterly	97.19%	99.20%	97.75%	98.62%	98.96%	99.99%	99.60%	99.76%	99.04%	97.43%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Quarterly	0.00%	0.15%	0.33%	0.07%	0.05%	0.33%	0.02%	0.11%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Quarterly	0.00%	0.20%	0.83%	0.14%	0.24%	0.59%	0.02%	0.24%	0.02%	1.03%
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	**<=2%**	Quarterly	**2.67%**	0.38%	1.03%	0.57%	0.58%	0.66%	0.23%	0.70%	0.04%	0.41%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Quarterly	1.72%	0.88%	0.70%	0.69%	**3.16%**	1.97%	0.00%	1.85%	0.15%	**4.68%**
	c) Connections with good voice quality	**>=95%**	Quarterly	98.76%	99.17%	NP	98.31%	97.78%	97.87%	99.20%	97.77%	99.76%	NP
4	**No. of POI having >=0.5% congestion**	**<0.5%**	Quarterly	0	0	1	0	0	0	0	0	0	0

KEY FINDING: 3 DAYS LIVE MEASUREMENTS AUDIT

From three days assessment, it is found that the performance of all operators is satisfactory as they have largely met the benchmarks except the parameter '**Worst affected cells> 3 % TCH drops**", which could not be complied with by Tata (GSM) and Tata (CDMA) in all the three months of this quarter. The performance of Tata (GSM) and Tata (CDMA) for this parameter, taking average of three months was **3.16 % and 4.68 %** respectively. **The similar non-compliance of Tata (GSM) and Tata (CDMA) was also observed for monthly audit of the quarter.**

Aircel was having Call drop rate **5.26%** in the month of March-14, however the same was **2.67%** on taking average of three months of the quarter. Tata (CDMA) was found to have TCH congestion as 2.78% during three days live measurements in the month of March-14.

2) CUSTOMER SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES

CSD 3 days live data for Cellular Mobile Telephone Services-QE-Mar-14													
3 days live CSD Audit Data		**Bench-mark**	**Circle Name**	**AIRCEL**	**AIRTEL**	**BSNL**	**IDEA**	**RCOM GSM**	**TATA GSM**	**VIDEOCON**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			**GSM Operators**								**CDMA Operators**	
1	Response time to customers for assistance												
	A) Accessibility of call centre/Customer Care	>=95%	Haryana	97.85%	100.00%	100.00%	100.00%	98.80%	99.16%	100.00%	100.00%	98.51%	96.72%
	B) % call answered by operators(voice to voice) within 60 sec.	>=90%	Haryana	94.74%	91.90%	**14.50%**	97.60%	97.21%	96.03%	90.70%	97.90%	95.79%	95.84%

CUSTOMER CARE / HELPLINE ASSESSMENT

LIVE CALLING TO CALL CENTRE											
Parameter	**Circle Name**	**AIRCEL**	**AIRTEL**	**BSNL**	**IDEA**	**RCOM (GSM)**	**TATA (GSM)**	**VIDEOCON**	**VODAFONE**	**RCOM (CDMA)**	**TATA (CDMA)**
Total No. of calls Attempted	Haryana	100	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	Haryana	100	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	Haryana	100	100	100	100	100	100	100	100	100	100
*% Accessibility of Call centre /customer Care (Total call attempt*100/ Total call successfully established)*	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	Haryana	100	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 60 seconds	Haryana	96	100	80	100	100	98	100	100	100	100
*% age of calls answered by operator(voice to voice) (Total call attempt*100/ Total call successfully established within 60 Sec.)*	Haryana	96.00%	100.00%	80.00%	100.00%	100.00%	98.00%	100.00%	100.00%	100.00%	100.00%

The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center'. However, in case of call connection to operators (Voice to voice) within 60 seconds only **BSNL** could not met the benchmark with their performance as **14.50%**. Thus the performance of BSNL was way below the benchmark.

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers. Aircel, BSNL and Tata GSM could connect 96%, 80% and 98% of calls to the operator within 60 Seconds.

INTER OPERATOR CALLS ASSESSMENT

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 TUV 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 BASED ON LIVE MEASUREMENT											
Calling Operators	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VIDEOCON	VODAFONE	RCOM CDMA	TATA CDMA
AIRCEL	Haryana	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
AIRTEL	Haryana	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
BSNL	Haryana	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
IDEA	Haryana	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
RCOM GSM	Haryana	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%
TATA GSM	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%
VIDEOCON	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%
VODAFONE	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%
RCOM CDMA	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%
TATA CDMA	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory as there was hardly any problem in interconnection from one operator to other operators which indicated there was no congestion on the individual POIs of the service providers.

LEVEL-1 LIVE CALLING

LEVEL-1 LIVE CALLING

Level 1 live calling													
Emergency no.	**Circle Name**	**SDCA Name**	**No. of calls made**	**Aircel**	**AIRTEL**	**BSNL**	**IDEA**	**RCOM (GSM)**	**TATA (GSM)**	**VIDEOCON**	**VODAFONE**	**RCOM (CDMA)**	**TATA (CDMA)**
100,101,108,1091,1098	HRY	Ambala	10	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Jagadri	5	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Yamunanagar	10	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Barara	10	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Chhichhrauli	5	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Naraingarh	5	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Kalka	10	NS	✔	✔	✔	✔	✔	✔	✔	✔	NS
100,101,108,1091,1098	HRY	Sonipat	5	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Gohana	10	NS	✔	✔	✔	✔	✔	✔	✔	✔	NS
100,101,108,1091,1098	HRY	Fatebad	5	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Tohana	5	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Barbala	10	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Ratia	5	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Adampur mandi	10	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Hisar	5	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Hansi	10	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Ellenabad	5	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Sirsa	10	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Dababali	5	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔
100,101,108,1091,1098	HRY	Kalabali	10	NS	✔	✔	✔	✔	✔	✔	✔	✔	✔

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by various mobile service providers, the calls were made from mobile phones provided by the service providers. In Haryana service area, these services were found functional in the networks of all the service providers except in the SDCAs where they don't have their services.

5. DRIVE TEST

5. <u>DRIVE TEST</u>

In terms of TRAI's letter dated 21st January, 2014, the drive tests were conducted for three consecutive days in one select SSA each month in each service area. Thus, the drive tests were carried out in three SSA's namely **Ambala, Sonipat and Hisar** in the months of January, February and March 2014 respectively, covering minimum 300 Km distance in each SSA . The performance of the operators has been highlighted below in the tables. The drive test was conducted simultaneously for all the operators following the same route of drive tests. The holding period for all test calls was 120 seconds. The drive test vehicle across all routes plied at a speed of about 30-50 km per hour.

For measuring voice quality, Rx Qual samples on a scale from 0 to 7 for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. As per the QoS norms, Rx Qual between 0- 5 for GSM operators and between 0-4% FER value for CDMA operators is considered to be good, where as Rx Qual beyond this benchmark is considered to be 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 at street level with strength ≥ -75 dBm for in-door coverage and ≥ -85 dBm for in-vehicle.

DRIVE TEST TABLE: 1

S/N	Parameter	Ambala SSA	Drive Test Period	AIRCEL	AIRTEL	BSNL	TATA GSM	IDEA	RCOM GSM	VIDEOCON	VODAFONE	TATA CDMA	RCOM CDMA
							GSM Operators					CDMA Operators	
1	Call Attempts	Day 1	Jan-14	NS	161	157	189	190	179	203	170	151	178
		Day 2	Jan-14	NS	158	162	147	179	183	168	159	151	184
		Day 3	Jan-14	NS	152	169	157	180	131	181	157	143	131
		Overall SSA	Total	NS	471	488	493	549	493	552	486	445	493
2	Blocked Call Rate	Day 1	Jan-14	NS	0.00%	2.55%	2.65%	0.53%	2.79%	0.99%	0.00%	0.00%	0.00%
		Day 2	Jan-14	NS	0.00%	1.85%	1.36%	0.00%	1.09%	0.60%	0.00%	0.00%	0.00%
		Day 3	Jan-14	NS	0.00%	2.37%	1.91%	0.00%	0.00%	0.55%	1.27%	0.00%	0.00%
		Overall SSA	Total	NS	0.00%	2.25%	2.03%	0.14%	1.42%	0.72%	0.41%	0.00%	0.00%
3	DROPPED CALL RATE (<=2%)	Day 1	Jan-14	NS	0.00%	2.61%	0.53%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Jan-14	NS	0.00%	0.63%	0.00%	0.00%	0.55%	0.00%	0.63%	0.00%	1.63%
		Day 3	Jan-14	NS	0.00%	1.21%	0.00%	0.00%	4.58%	0.00%	0.65%	0.00%	4.58%
		Overall SSA	Total	NS	0.00%	1.47%	0.20%	0.00%	1.44%	0.00%	0.41%	0.00%	1.83%
4	PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=>95%)												
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Jan-14	NA	NA	NA	NA	NA	NA	NA	NA	96.06%	99.98%
		Day 2	Jan-14	NA	NA	NA	NA	NA	NA	NA	NA	95.87%	99.97%
		Day 3	Jan-14	NA	NA	NA	NA	NA	NA	NA	NA	95.80%	99.94%
		Overall SSA	Total	NA	NA	NA	NA	NA	NA	NA	NA	95.92%	99.97%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Jan-14	NS	95.74%	91.51%	95.54%	96.31%	94.98%	96.89%	95.48%	NA	NA
		Day 2	Jan-14	NS	95.81%	92.69%	95.62%	96.05%	95.87%	96.30%	96.10%	NA	NA
		Day 3	Jan-14	NS	95.13%	87.07%	97.48%	95.94%	96.37%	97.82%	96.44%	NA	NA
		Overall SSA	Total	NS	95.59%	90.61%	96.27%	96.11%	95.70%	97.02%	96.03%	NA	NA
5	SERVICE COVERAGE												
	In door (>= -75dBm)	Day 1	Jan-14	NS	48.10%	56.24%	78.42%	94.20%	56.97%	93.93%	98.10%	53.74%	98.49%
		Day 2	Jan-14	NS	61.53%	46.94%	84.88%	86.10%	68.78%	95.64%	98.14%	64.56%	99.06%
		Day 3	Jan-14	NS	70.63%	45.41%	78.50%	95.07%	64.98%	92.29%	96.07%	87.89%	97.86%
		Overall SSA	Total	NS	58.63%	49.48%	80.38%	91.96%	63.57%	93.91%	97.42%	66.58%	98.57%
	In-vehicle (>= -85dBm)	Day 1	Jan-14	NS	91.03%	80.04%	97.14%	99.13%	80.64%	98.77%	99.34%	85.32%	99.87%
		Day 2	Jan-14	NS	91.12%	73.89%	98.51%	98.78%	88.36%	98.98%	99.61%	89.89%	99.86%
		Day 3	Jan-14	NS	94.85%	71.62%	95.52%	99.36%	88.71%	98.33%	98.71%	98.06%	99.47%
		Overall SSA	Total	NS	92.11%	75.19%	96.99%	99.10%	85.76%	98.69%	99.23%	90.30%	99.77%
	Outdoor- in	Day 1	Jan-14	NS	99.40%	86.14%	99.75%	99.84%	96.84%	99.96%	99.96%	98.31%	100.00%

city (>= -95dBm)	Day 2	Jan-14	NS	98.76%	81.52%	99.88%	99.88%	97.33%	99.95%	99.86%	98.43%	100.00%
	Day 3	Jan-14	NS	99.81%	81.01%	99.70%	99.79%	98.45%	99.95%	99.83%	99.44%	100.00%
	Overall SSA	**Total**	**NS**	**99.31%**	**82.86%**	**99.77%**	**99.84%**	**97.47%**	**99.95%**	**99.88%**	**98.65%**	**100.00%**
6	Call Setup Success Rate (>=95%)	Day 1	Jan-14	NS	100.00%	98.45%	97.35%	99.47%	97.21%	99.01%	100.00%	100.00%	100.00%
		Day 2	Jan-14	NS	100.00%	98.15%	98.64%	100.00%	98.91%	99.40%	100.00%	100.00%	100.00%
		Day 3	Jan-14	NS	100.00%	97.63%	98.09%	100.00%	100.00%	99.45%	98.73%	100.00%	100.00%
		Overall SSA	**Total**	**NS**	**100.00%**	**97.75%**	**97.97%**	**99.86%**	**98.58%**	**99.28%**	**99.59%**	**100.00%**	**100.00%**
7	Hand Over Success Rate (HOSR)	Day 1	Jan-14	NS	99.27%	98.14%	97.21%	98.52%	100.00%	100.00%	99.34%	98.35%	100.00%
		Day 2	Jan-14	NS	100.00%	96.83%	100.00%	99.19%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	NS	99.67%	98.52%	100.00%	98.43%	100.00%	100.00%	99.70%	100.00%	100.00%
		Overall SSA	**Total**	**NS**	**99.63%**	**97.90%**	**98.71%**	**98.82%**	**100.00%**	**100.00%**	**99.67%**	**99.16%**	**100.00%**

- **NS-No Service**

- **NA-Not Applicable**

DRIVE TEST TABLE: 2

S/N	Parameter	Ambala SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL	TATA GSM	IDEA	RCOM GSM	VIDEOCON	VODAFONE	TATA CDMA	RCOM CDMA
								GSM Operators					CDMA Operators	
1	Call Attempts	Day 1	Jan-14	Haveli Hotel, Civil Hospital, Term Cell Office	NS	24	36	28	26	27	26	25	26	27
		Day 2	Jan-14	Hotel Plaza, Hotel Sharma, Thana Chappar	NS	25	34	24	27	26	24	25	24	26
		Day 3	Jan-14	Bus stand, Ramgarh Fort, Pinjore Garden	NS	23	35	24	30	27	24	28	16	27
		Overall SSA	Jan-14		NS	72	105	76	83	80	74	78	66	80
2	Blocked Call Rate	Day 1	Jan-14	Haveli Hotel, Civil Hospital, Term Cell Office	NS	0.00%	2.78%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Jan-14	Hotel Plaza, Hotel Sharma, Thana Chappar	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Jan-14	Bus stand, Ramgarh Fort, Pinjore Garden	NS	0.00%	2.86%	0.00%	0.00%	0.00%	0.00%	3.57%	0.00%	0.00%
		Overall SSA	Jan-14		NS	0.00%	1.90%	0.00%	0.00%	0.00%	0.00%	1.28%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Jan-14	Haveli Hotel, Civil Hospital, Term Cell Office	NS	0.00%	2.86%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Jan-14	Hotel Plaza, Hotel Sharma, Thana Chappar	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Jan-14	Bus stand, Ramgarh Fort, Pinjore Garden	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Jan-14		NS	0.00%	0.97%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
4	**Percentage connections with good voice quality (=>95%)**													
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Jan-14	Haveli Hotel, Civil Hospital, Term Cell Office	NA	NA	NA	NA	NA	NA	NA	NA	98.32%	100.00%
		Day 2	Jan-14	Hotel Plaza, Hotel Sharma, Thana Chappar	NA	NA	NA	NA	NA	NA	NA	NA	98.79%	99.99%
		Day 3	Jan-14	Bus stand, Ramgarh Fort, Pinjore Garden	NA	NA	NA	NA	NA	NA	NA	NA	97.35%	99.99%
		Overall SSA	Jan-14		NA	NA	NA	NA	NA	NA	NA	NA	98.10%	99.99%
	(b) 0-5 (with frequency	Day 1	Jan-14	Haveli Hotel, Civil Hospital, Term Cell Office	NS	99.41%	95.24%	99.42%	98.99%	99.88%	98.96%	98.76%	NA	NA

	hopping for GSM Operators)	Day 2	Jan-14	Hotel Plaza, Hotel Sharma, Thana Chappar	NS	98.07%	95.01%	98.14%	98.85%	99.87%	98.09%	96.95%	NA	NA
		Day 3	Jan-14	Bus stand, Ramgarh Fort, Pinjore Garden	NS	95.35%	**91.24%**	99.21%	98.39%	99.88%	99.01%	95.94%	NA	NA
		Overall SSA	Jan-14		NS	97.68%	**93.80%**	98.91%	98.72%	99.55%	98.62%	97.22%	NA	NA
	Service Coverage													
5	In door (>= -75dBm)	Day 1	Jan-14	Haveli Hotel, Civil Hospital, Term Cell Office	NS	84.72%	94.74%	78.46%	99.73%	93.56%	97.67%	99.16%	87.12%	97.52%
		Day 2	Jan-14	Hotel Plaza, Hotel Sharma, Thana Chappar	NS	65.75%	85.95%	94.99%	100.00%	66.29%	100.00%	99.62%	99.94%	98.24%
		Day 3	Jan-14	Bus stand, Ramgarh Fort, Pinjore Garden	NS	85.39%	86.54%	78.55%	100.00%	88.31%	97.02%	98.76%	88.70%	99.61%
		Overall SSA	Jan-14		NS	77.97%	88.41%	83.79%	99.89%	82.86%	98.41%	99.16%	91.80%	98.36%
	In-vehicle (>= -85dBm)	Day 1	Jan-14	Haveli Hotel, Civil Hospital, Term Cell Office	NS	98.39%	98.76%	99.97%	100.00%	100.00%	99.83%	100.00%	99.90%	100.00%
		Day 2	Jan-14	Hotel Plaza, Hotel Sharma, Thana Chappar	NS	94.41%	98.33%	99.90%	100.00%	96.86%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	Bus stand, Ramgarh Fort, Pinjore Garden	NS	99.63%	95.80%	99.39%	100.00%	99.78%	100.00%	99.30%	90.60%	100.00%
		Overall SSA	Jan-14		NS	97.31%	97.59%	99.71%	100.00%	98.90%	99.95%	99.75%	97.25%	100.00%
	Outdoor- in city (>= -95dBm)	Day 1	Jan-14	Haveli Hotel, Civil Hospital, Term Cell Office	NS	100.00%	99.42%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Jan-14	Hotel Plaza, Hotel Sharma, Thana Chappar	NS	99.89%	99.41%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	Bus stand, Ramgarh Fort, Pinjore Garden	NS	99.98%	98.29%	100.00%	100.00%	100.00%	100.00%	99.79%	97.03%	100.00%
		Overall SSA	Jan-14		NS	99.96%	99.03%	100.00%	100.00%	100.00%	100.00%	99.93%	99.14%	100.00%
6	Call Setup Success Rate (>=95%)	Day 1	Jan-14	Haveli Hotel, Civil Hospital, Term Cell Office	NS	100.00%	97.22%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Jan-14	Hotel Plaza, Hotel Sharma, Thana Chappar	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	Bus stand, Ramgarh Fort, Pinjore Garden	NS	100.00%	97.14%	100.00%	100.00%	100.00%	100.00%	96.43%	100.00%	100.00%
		Overall SSA	Jan-14		NS	100.00%	98.10%	100.00%	100.00%	100.00%	100.00%	98.72%	100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Day 1	Jan-14	Haveli Hotel, Civil Hospital, Term Cell Office	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Jan-14	Hotel Plaza, Hotel Sharma, Thana Chappar	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	Bus stand, Ramgarh Fort, Pinjore Garden	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Jan-14		NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

DRIVE TEST TABLE: 3

S/N	Parameter	Sonipat SSA	Drive Test Period	AIRCEL	AIRTEL	BSNL	TATA GSM	IDEA	RCOM GSM	VIDEOCON	VODAFONE	TATA CDMA	RCOM CDMA
	OPERATOR-ASSISTED DRIVE TEST-HARYANA CIRCLE (SONIPAT SSA) – FEB -14 MONTH												
							GSM Operators					CDMA Operators	
1	Call Attempts	Day 1	Feb-14	NS	182	195	163	134	214	167	184	135	212
		Day 2	Feb-14	NS	154	157	147	186	172	160	155	155	174
		Day 3	Feb-14	NS	129	135	129	126	129	150	139	130	129
		Overall SSA	Total	NS	465	487	439	446	515	477	478	420	515
2	Blocked Call Rate	Day 1	Feb-14	NS	0.00%	0.51%	0.00%	0.00%	2.34%	0.00%	0.00%	0.00%	0.00%
		Day 2	Feb-14	NS	0.00%	0.64%	0.00%	0.00%	0.58%	0.00%	0.65%	0.00%	0.00%
		Day 3	Feb-14	NS	0.00%	1.48%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Total	NS	0.00%	0.82%	0.00%	0.00%	1.17%	0.00%	0.21%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Feb-14	NS	0.00%	0.00%	0.00%	0.00%	0.48%	0.00%	0.00%	0.00%	0.00%
		Day 2	Feb-14	NS	0.00%	0.00%	0.00%	0.00%	0.58%	0.00%	0.00%	0.00%	0.57%
		Day 3	Feb-14	NS	0.00%	0.75%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.78%
		Overall SSA	Total	NS	0.00%	0.21%	0.00%	0.00%	0.39%	0.00%	0.00%	0.00%	0.39%
4	PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=>95%)												
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Feb-14	NA	NA	NA	NA	NA	NA	NA	NA	95.93%	99.96%
		Day 2	Feb-14	NA	NA	NA	NA	NA	NA	NA	NA	95.35%	99.92%
		Day 3	Feb-14	NA	NA	NA	NA	NA	NA	NA	NA	95.92%	99.96%
		Overall SSA	Total	NA	NA	NA	NA	NA	NA	NA	NA	95.73%	99.95%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Feb-14	NS	96.49%	96.72%	97.64%	95.39%	96.93%	95.64%	95.42%	NA	NA
		Day 2	Feb-14	NS	95.51%	96.87%	95.65%	93.06%	94.22%	95.07%	95.24%	NA	NA
		Day 3	Feb-14	NS	96.66%	95.49%	96.78%	96.77%	96.70%	96.04%	95.64%	NA	NA
		Overall SSA	Total	NS	96.20%	96.44%	96.71%	94.82%	95.98%	95.54%	95.40%	NA	NA
5	SERVICE COVERAGE												
	In door (>= -75dBm)	Day 1	Feb-14	NS	86.74%	95.15%	87.46%	84.27%	73.08%	84.01%	96.62%	67.56%	98.98%
		Day 2	Feb-14	NS	68.80%	88.50%	71.28%	84.53%	45.69%	85.43%	97.84%	53.01%	97.29%
		Day 3	Feb-14	NS	75.26%	81.73%	79.33%	97.03%	56.80%	67.95%	90.36%	56.73%	96.99%
		Overall SSA	Total	NS	77.47%	89.41%	79.81%	86.63%	59.70%	85.39%	95.58%	58.84%	97.92%
	In-vehicle (>= -85dBm)	Day 1	Feb-14	NS	98.40%	99.84%	98.17%	98.12%	91.80%	96.97%	99.46%	92.38%	99.94%
		Day 2	Feb-14	NS	93.12%	99.71%	93.91%	98.92%	81.35%	97.27%	99.75%	87.16%	99.71%
		Day 3	Feb-14	NS	95.46%	97.05%	96.89%	99.95%	80.53%	90.89%	98.96%	86.02%	99.12%
		Overall SSA	Total	NS	95.79%	99.07%	96.38%	98.71%	85.32%	96.41%	99.45%	88.45%	99.66%

	Outdoor- in city (>= -95dBm)	Day 1	Feb-14	NS	99.97%	100.00%	99.79%	99.70%	98.09%	99.93%	99.88%	99.57%	100.00%
		Day 2	Feb-14	NS	99.70%	100.00%	99.39%	99.92%	97.47%	99.55%	99.91%	99.54%	100.00%
		Day 3	Feb-14	NS	99.76%	99.77%	99.78%	100.00%	96.39%	99.52%	99.80%	99.74%	100.00%
		Overall SSA	**Total**	**NS**	**99.82%**	**99.94%**	**99.65%**	**99.82%**	**97.43%**	**99.85%**	**99.87%**	**99.61%**	**100.00%**
6	**Call Setup Success Rate (>=95%)**	Day 1	Feb-14	NS	100.00%	99.49%	100.00%	100.00%	97.66%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	NS	100.00%	99.36%	100.00%	100.00%	99.42%	100.00%	99.35%	100.00%	100.00%
		Day 3	Feb-14	NS	100.00%	98.52%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Total**	**NS**	**100.00%**	**99.18%**	**100.00%**	**100.00%**	**98.83%**	**100.00%**	**99.79%**	**100.00%**	**100.00%**
7	**Hand Over Success Rate (HOSR)**	Day 1	Feb-14	NS	99.58%	100.00%	100.00%	100.00%	100.00%	100.00%	99.66%	100.00%	100.00%
		Day 2	Feb-14	NS	99.74%	99.56%	98.66%	100.00%	100.00%	99.48%	100.00%	100.00%	100.00%
		Day 3	Feb-14	NS	100.00%	99.27%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Total**	**NS**	**99.75%**	**99.66%**	**99.50%**	**100.00%**	**100.00%**	**99.82%**	**99.87%**	**100.00%**	**100.00%**

- **NS-No Service**

- **NA-Not Applicable**

DRIVE TEST TABLE: 4

S/N	Parameter	Sonipat SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL	TATA GSM	IDEA	RCOM GSM	VIDEOCON	VODAFONE	TATA CDMA	RCOM CDMA
OPERATOR-ASSISTED DRIVE TEST-HARYANA CIRCLE (SONIPAT SSA) – FEB -14 MONTH - INDOOR
							GSM Operators						CDMA Operators	
1	**Call Attempts**	Day 1	Feb-14	Sec-14 Market, Rly Station, PWD Rest House	NS	26	24	24	17	27	22	24	24	27
		Day 2	Feb-14	Sec-15 Market, TDI Mall, DCR University	NS	24	24	24	25	24	24	24	24	24
		Day 3	Feb-14	Gohana Court, Civil Hospital, Khanpur University	NS	24	24	24	32	24	24	24	24	24
		Overall SSA	Feb-14		NS	74	72	72	74	75	70	72	72	75
2	**Blocked Call Rate**	Day 1	Feb-14	Sec-14 Market, Rly Station, PWD Rest House	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Feb-14	Sec-15 Market, TDI Mall, DCR University	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Feb-14	Gohana Court, Civil Hospital, Khanpur University	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Feb-14		NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	**Dropped Call Rate (<=2%)**	Day 1	Feb-14	Sec-14 Market, Rly Station, PWD Rest House	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Feb-14	Sec-15 Market, TDI Mall, DCR University	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Feb-14	Gohana Court, Civil Hospital, Khanpur University	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Feb-14		NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
4	**Percentage connections with good voice quality (=>95%)**
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Feb-14	Sec-14 Market, Rly Station, PWD Rest House	NA	NA	NA	NA	NA	NA	NA	NA	98.78%	100.00%
		Day 2	Feb-14	Sec-15 Market, TDI Mall, DCR University	NA	NA	NA	NA	NA	NA	NA	NA	96.15%	100.00%
		Day 3	Feb-14	Gohana Court, Civil Hospital, Khanpur University	NA	NA	NA	NA	NA	NA	NA	NA	98.14%	100.00%
		Overall SSA	Feb-14		NA	NA	NA	NA	NA	NA	NA	NA	97.77%	100.00%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Feb-14	Sec-14 Market, Rly Station, PWD Rest House	NS	97.35%	99.63%	99.27%	98.60%	99.76%	98.16%	98.20%	NA	NA
		Day 2	Feb-14	Sec-15 Market, TDI Mall, DCR University	NS	97.86%	99.52%	98.66%	**93.66%**	98.49%	98.30%	95.93%	NA	NA

		Day 3	Feb-14	Gohana Court, Civil Hospital, Khanpur University	NS	98.14%	96.73%	97.46%	97.59%	98.51%	99.18%	98.00%	NA	NA
		Overall SSA	Feb-14		NS	97.76%	98.71%	98.51%	96.70%	98.94%	98.55%	97.26%	NA	NA
	Service Coverage													
5	**In door (>= -75dBm)**	Day 1	Feb-14	Sec-14 Market, Rly Station, PWD Rest House	NS	95.54%	100.00%	99.83%	92.16%	99.76%	100.00%	99.96%	99.46%	100.00%
		Day 2	Feb-14	Sec-15 Market, TDI Mall, DCR University	NS	51.23%	99.35%	84.86%	69.88%	41.23%	99.97%	94.86%	49.24%	97.56%
		Day 3	Feb-14	Gohana Court, Civil Hospital, Khanpur University	NS	54.46%	79.70%	87.01%	98.47%	65.65%	68.48%	95.08%	66.48%	97.36%
		Overall SSA	Feb-14		NS	67.78%	93.38%	91.03%	88.99%	69.87%	89.64%	96.61%	71.70%	98.33%
	In-vehicle (>= -85dBm)	Day 1	Feb-14	Sec-14 Market, Rly Station, PWD Rest House	NS	99.98%	100.00%	99.92%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	Sec-15 Market, TDI Mall, DCR University	NS	85.39%	100.00%	99.91%	99.08%	91.46%	100.00%	100.00%	99.36%	100.00%
		Day 3	Feb-14	Gohana Court, Civil Hospital, Khanpur University	NS	86.86%	99.64%	99.94%	100.00%	68.93%	97.73%	100.00%	97.84%	99.34%
		Overall SSA	Feb-14		NS	90.96%	99.89%	99.92%	99.79%	87.17%	99.25%	100.00%	99.05%	99.80%
	Outdoor- in city (>= -95dBm)	Day 1	Feb-14	Sec-14 Market, Rly Station, PWD Rest House	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	Sec-15 Market, TDI Mall, DCR University	NS	99.77%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Feb-14	Gohana Court, Civil Hospital, Khanpur University	NS	99.36%	100.00%	100.00%	100.00%	99.97%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Feb-14		NS	99.73%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%
6	**Call Setup Success Rate (>=95%)**	Day 1	Feb-14	Sec-14 Market, Rly Station, PWD Rest House	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	Sec-15 Market, TDI Mall, DCR University	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Feb-14	Gohana Court, Civil Hospital, Khanpur University	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Feb-14		NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
7	**Hand Over Success Rate (HOSR)**	Day 1	Feb-14	Sec-14 Market, Rly Station, PWD Rest House	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	Sec-15 Market, TDI Mall, DCR University	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Feb-14	Gohana Court, Civil Hospital, Khanpur University	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Feb-14		NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

DRIVE TEST TABLE: 5

S/N	Parameter	Hisar SSA	Drive Test Period	AIRCEL	AIRTEL	BSNL	TATA GSM	IDEA	RCOM GSM	VIDEOCON	VODAFONE	TATA CDMA	RCOM CDMA
OPERATOR-ASSISTED DRIVE TEST-HARYANA CIRCLE (HISAR SSA) – MAR -14 MONTH													
							GSM Operators					CDMA Operators	
1	Call Attempts	Day 1	Mar-14	NS	192	194	145	225	124	174	197	190	212
		Day 2	Mar-14	NS	177	188	156	173	144	194	178	180	170
		Day 3	Mar-14	NS	151	168	149	155	137	139	140	143	138
		Overall SSA	Total	NS	520	550	450	553	405	507	515	513	520
2	Blocked Call Rate	Day 1	Mar-14	NS	0.00%	5.15%	0.00%	0.00%	2.42%	0.57%	1.02%	0.00%	0.00%
		Day 2	Mar-14	NS	0.00%	5.32%	0.00%	0.00%	2.78%	0.52%	0.00%	0.00%	0.00%
		Day 3	Mar-14	NS	0.00%	0.60%	0.00%	0.65%	0.73%	0.72%	1.43%	0.00%	0.00%
		Overall SSA	Total	NS	0.00%	3.82%	0.00%	0.18%	1.98%	0.59%	0.78%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Mar-14	NS	0.00%	4.71%	0.00%	0.00%	0.00%	0.00%	1.54%	0.00%	1.42%
		Day 2	Mar-14	NS	0.00%	6.70%	0.00%	0.00%	0.00%	0.00%	1.12%	0.00%	1.76%
		Day 3	Mar-14	NS	0.00%	1.19%	0.00%	0.00%	0.74%	0.00%	0.00%	0.00%	0.72%
		Overall SSA	Total	NS	0.00%	4.28%	0.00%	0.00%	0.25%	0.00%	0.98%	0.00%	1.35%
4	PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=>95%)												
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	96.53%	99.56%
		Day 2	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	96.68%	99.65%
		Day 3	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	98.18%	98.95%
		Overall SSA	Total	NA	NA	NA	NA	NA	NA	NA	NA	97.19%	99.45%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Mar-14	NS	96.31%	74.84%	95.50%	93.66%	96.54%	96.22%	96.88%	NA	NA
		Day 2	Mar-14	NS	95.56%	66.45%	96.71%	93.14%	95.41%	95.65%	95.53%	NA	NA
		Day 3	Mar-14	NS	96.52%	55.73%	96.04%	93.23%	98.04%	97.04%	97.05%	NA	NA
		Overall SSA	Total	NS	96.10%	69.67%	96.11%	93.38%	96.60%	96.24%	96.51%	NA	NA
5	SERVICE COVERAGE												
	In door (>= -75dBm)	Day 1	Mar-14	NS	59.94%	30.19%	78.76%	92.91%	54.02%	86.66%	89.57%	44.77%	74.52%
		Day 2	Mar-14	NS	73.42%	41.20%	85.28%	98.09%	56.11%	91.55%	90.44%	47.13%	73.79%
		Day 3	Mar-14	NS	69.89%	43.96%	85.14%	98.41%	68.86%	93.16%	93.59%	42.53%	90.22%
		Overall SSA	Total	NS	67.68%	36.04%	83.03%	96.09%	59.40%	90.36%	91.48%	44.96%	77.75%
	In-vehicle (>= -85dBm)	Day 1	Mar-14	NS	90.16%	72.95%	85.68%	98.71%	79.22%	94.10%	98.39%	67.18%	88.02%
		Day 2	Mar-14	NS	95.17%	81.85%	96.81%	99.74%	82.73%	97.51%	99.36%	62.21%	90.30%
		Day 3	Mar-14	NS	91.56%	91.46%	95.29%	99.90%	92.01%	98.33%	99.76%	78.80%	96.47%
		Overall SSA	Total	NS	92.37%	78.05%	92.58%	99.37%	84.47%	96.59%	99.20%	68.72%	90.68%

		Day 1	Mar-14	NS	99.67%	100.00%	99.42%	99.88%	93.32%	99.49%	99.61%	99.46%	99.15%
	Outdoor- in city (>= -95dBm)	Day 2	Mar-14	NS	99.92%	100.00%	99.54%	99.97%	98.99%	99.92%	99.82%	97.20%	99.52%
		Day 3	Mar-14	NS	99.74%	100.00%	99.41%	99.96%	99.30%	99.97%	99.96%	97.49%	99.96%
		Overall SSA	**Total**	**NS**	**99.78%**	**100.00%**	**99.46%**	**99.93%**	**97.22%**	**99.79%**	**99.81%**	**98.12%**	**99.46%**
6	Call Setup Success Rate (>=95%)	Day 1	Mar-14	NS	100.00%	**93.81%**	100.00%	100.00%	97.58%	99.43%	98.98%	100.00%	100.00%
		Day 2	Mar-14	NS	100.00%	**90.43%**	100.00%	100.00%	97.22%	99.48%	100.00%	100.00%	100.00%
		Day 3	Mar-14	NS	100.00%	99.40%	100.00%	99.35%	97.27%	99.28%	98.57%	100.00%	100.00%
		Overall SSA	**Total**	**NS**	**100.00%**	**94.36%**	**100.00%**	**99.82%**	**98.02%**	**99.41%**	**99.22%**	**100.00%**	**100.00%**
7	Hand Over Success Rate (HOSR)	Day 1	Mar-14	NS	100.00%	93.85%	99.21%	100.00%	100.00%	99.26%	100.00%	100.00%	100.00%
		Day 2	Mar-14	NS	99.15%	88.45%	100.00%	100.00%	100.00%	100.00%	99.61%	100.00%	100.00%
		Day 3	Mar-14	NS	100.00%	99.40%	98.70%	99.36%	99.34%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Total**	**NS**	**99.67%**	**94.60%**	**99.36%**	**99.81%**	**99.76%**	**99.83%**	**99.87%**	**100.00%**	**100.00%**

- **NS-No Service**
- **NA-Not Applicable**

DRIVE TEST TABLE: 6

S/N	Parameter	Hisar SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL	TATA GSM	IDEA	RCOM GSM	VIDEOCON	VODAFONE	TATA CDMA	RCOM CDMA
								GSM Operators					CDMA Operators	
1	Call Attempts	Day 1	Mar-14	Ellenabad Court, Civil Hospital Dabwali & Sirsa	NS	24	25	24	26	23	16	24	24	23
		Day 2	Mar-14	Court Fatehabad, Rajiv Gandhi Thermal Plant, GJU University	NS	24	24	24	25	26	26	25	24	25
		Day 3	Mar-14	Bus Stand Adampur, Civil Hospital Hissar, Hansi Court	NS	24	24	24	24	20	16	24	24	20
		Overall SSA	Mar-14		NS	72	73	72	75	69	58	73	72	68
2	Blocked Call Rate (<=3%)	Day 1	Mar-14	Ellenabad Court, Civil Hospital Dabwali & Sirsa	NS	0.00%	0.00%	0.00%	0.00%	8.70%	0.00%	0.00%	0.00%	0.00%
		Day 2	Mar-14	Court Fatehabad, Rajiv Gandhi Thermal Plant, GJU University	NS	0.00%	0.00%	0.00%	0.00%	7.69%	0.00%	0.00%	0.00%	0.00%
		Day 3	Mar-14	Bus Stand Adampur, Civil Hospital Hissar, Hansi Court	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Mar-14		NS	0.00%	0.00%	0.00%	0.00%	5.80%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Mar-14	Ellenabad Court, Civil Hospital Dabwali & Sirsa	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Mar-14	Court Fatehabad, Rajiv Gandhi Thermal Plant, GJU University	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Mar-14	Bus Stand Adampur, Civil Hospital Hissar, Hansi Court	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Mar-14		NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
4	Percentage connections with good voice quality (=>95%)													
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Mar-14	Ellenabad Court, Civil Hospital Dabwali & Sirsa	NA	NA	NA	NA	NA	NA	NA	NA	97.31%	99.94%
		Day 2	Mar-14	Court Fatehabad, Rajiv Gandhi Thermal Plant, GJU University	NA	NA	NA	NA	NA	NA	NA	NA	97.60%	100.00%
		Day 3	Mar-14	Bus Stand Adampur, Civil Hospital Hissar, Hansi Court	NA	NA	NA	NA	NA	NA	NA	NA	99.09%	100.00%
		Overall SSA	Mar-14		NA	NA	NA	NA	NA	NA	NA	NA	98.13%	99.98%
	(b) 0-5 (with frequency hopping for GSM	Day 1	Mar-14	Ellenabad Court, Civil Hospital Dabwali & Sirsa	NS	98.53%	98.35%	95.53%	98.18%	93.58%	95.48%	97.11%	NA	NA
		Day 2	Mar-14	Court Fatehabad, Rajiv Gandhi Thermal Plant, GJU University	NS	99.17%	99.71%	99.60%	92.58%	93.78%	94.36%	94.76%	NA	NA

#	Parameter	Day	Month	Location										
	Operators)	Day 3	Mar-14	Bus Stand Adampur, Civil Hospital Hissar, Hansi Court	NS	98.80%	98.08%	96.27%	95.33%	97.43%	96.15%	98.75%	NA	NA
		Overall SSA	**Mar-14**		**NS**	**96.33%**	**98.71%**	**97.30%**	**95.40%**	**94.83%**	**95.02%**	**96.77%**	**NA**	**NA**
	Service Coverage													
5	In door (>= -75dBm)	Day 1	Mar-14	Ellenabad Court, Civil Hospital Dabwali & Sirsa	NS	80.84%	89.81%	83.06%	89.18%	38.68%	81.42%	99.96%	47.05%	77.16%
		Day 2	Mar-14	Court Fatehabad, Rajiv Gandhi Thermal Plant, GJU University	NS	75.68%	99.48%	96.82%	99.84%	25.65%	85.86%	92.37%	71.42%	66.63%
		Day 3	Mar-14	Bus Stand Adampur, Civil Hospital Hissar, Hansi Court	NS	45.05%	97.61%	92.41%	97.16%	80.05%	46.06%	97.38%	47.73%	98.85%
		Overall SSA	**Mar-14**		**NS**	**67.53%**	**95.63%**	**91.07%**	**95.39%**	**46.36%**	**81.24%**	**96.33%**	**55.10%**	**78.26%**
	In-vehicle (>= -85dBm)	Day 1	Mar-14	Ellenabad Court, Civil Hospital Dabwali & Sirsa	NS	97.41%	99.69%	95.82%	99.69%	51.29%	84.89%	100.00%	68.57%	98.43%
		Day 2	Mar-14	Court Fatehabad, Rajiv Gandhi Thermal Plant, GJU University	NS	92.49%	99.96%	99.83%	99.96%	64.82%	97.98%	99.73%	75.95%	96.12%
		Day 3	Mar-14	Bus Stand Adampur, Civil Hospital Hissar, Hansi Court	NS	85.83%	100.00%	96.76%	100.00%	99.96%	61.11%	100.00%	98.96%	100.00%
		Overall SSA	**Mar-14**		**NS**	**92.00%**	**99.88%**	**97.54%**	**99.89%**	**71.22%**	**89.05%**	**99.90%**	**81.49%**	**97.86%**
	Outdoor- in city (>= -95dBm)	Day 1	Mar-14	Ellenabad Court, Civil Hospital Dabwali & Sirsa	NS	99.92%	100.00%	99.65%	100.00%	73.07%	98.78%	100.00%	96.02%	100.00%
		Day 2	Mar-14	Court Fatehabad, Rajiv Gandhi Thermal Plant, GJU University	NS	99.97%	100.00%	99.94%	100.00%	98.09%	100.00%	99.90%	96.30%	100.00%
		Day 3	Mar-14	Bus Stand Adampur, Civil Hospital Hissar, Hansi Court	NS	99.98%	100.00%	99.69%	100.00%	100.00%	99.85%	100.00%	100.00%	100.00%
		Overall SSA	**Mar-14**		**NS**	**99.96%**	**100.00%**	**99.76%**	**100.00%**	**90.72%**	**99.36%**	**99.97%**	**97.49%**	**100.00%**
6	Call Setup Success Rate (>=95%)	Day 1	Mar-14	Ellenabad Court, Civil Hospital Dabwali & Sirsa	NS	100.00%	100.00%	100.00%	100.00%	**91.30%**	100.00%	100.00%	100.00%	100.00%
		Day 2	Mar-14	Court Fatehabad, Rajiv Gandhi Thermal Plant, GJU University	NS	100.00%	100.00%	100.00%	100.00%	**92.31%**	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	Bus Stand Adampur, Civil Hospital Hissar, Hansi Court	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Mar-14**		**NS**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**94.20%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
7	Hand Over Success Rate (HOSR)	Day 1	Mar-14	Ellenabad Court, Civil Hospital Dabwali & Sirsa	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Mar-14	Court Fatehabad, Rajiv Gandhi Thermal Plant, GJU University	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	Bus Stand Adampur, Civil Hospital Hissar, Hansi Court	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Mar-14**		**NS**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 7

Name of SSA	Date of Drive Test	Day 1		Day 2		Day 3	
		Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
AMBALA	29-31 Jan-14	Ambala, Barara **(120 Km)**	Ambala Cantt Telephone Exchange, Bus Stand,Mall Road, Kingfisher, Baldev Nagar, kalka chowk, Jagadhari Gate,Sec.8 Road, Manav Chowk,Khanpur, Kesri, Saha, Kalpi, Bihta, Mullana, MM University, Barara	Jagadhari,Yamuna Nagar, Chhichhrauli **(179 Km)**	Jagadhari Bus Stand, Bilaspur Road, Chhotumal College, Sec.17,Govindpur, Model Town,Khalsa College, Industrial Area Ph.1,Kanhaiya Chowk,Chhichhrauli, Hotel Sharma, Damoli, Ledi, Bilaspur,Thana Chhappar,Bamboli	Naraingarh, Pinjore, Kalka **(103 Km)**	Naraingarh, Naraingarh Bus Stand, Ramgarh,Pinjore Garden, Kalka Main Road,Chhajju Majra, Bhamana, Sahzadpur, Bhurewala,Raipurrani,Khandeshara, ITBP Bhanu,Ramgarh, Nanakpur, Kauna
SONIPAT	17-19 Feb-14	Sonipat **(103 Km)**	Sec14 Market - Sonipat Bus Stand - Geeta Bhawan Chowk - Atlas Road - Kalupur Chungi - Bayyanpur - Rohat - Jharot - Saidpur - Kharkhoda - Sisana - Farmana - Bhatgaon - Mohana – Karewari – Badwasini - Sec 23 - Shani Mandir - Jatwara - Subzi mandi - Murthal Road - Sec 14.	Sonipat **(110 Km)**	Sec-15 Telephone Exchange - Sec-12 - ITI Chowk - Harsana – Jagdishpur - Rai – Biswamil - Kundli - Rai - Bhalgarh - Khewada - Palri - Murthal – Bhigaon - Barhi - Ganaur - Datauli - Ganaur City - Ganaur Railway Station - Govt Girls School - Railway Crossing - Bhogipur - Kheri Gurjar - Kami	Gohana **(110 Km)**	Pinana - Kheri Damakan - Sarai Nander - Fayur chowk - Sector-7 - Gohana Railway Station - Civil Hospital Gohana - Bus Stand - Gudawali Village - Ahulana – Bedoda – Butana - Ishpur Kheri – Genjna – Bichpadi – Mehmadpur – Mudalana - Garhi Ujala – Gambari – Khanpur - Kasanda.
HISAR	24-26 Mar-14	ELLENABAD, SIRSA, DABWALI, KALANBALI **(210 Km)**	Sirsa Local - Hisar road,,C-block, Civil Hospital,Dabwali Road Sirsa,Odhan-Tappi-Dabawali,Sirsa-Ottu-Rania-Jeevan Ngr-Ellenabaad,Ellenabad City area -Ward no.7 Ellenabad-Namsate Chowk Ellenabad,Elenabad - Malekan-Madhosinghana-Elb Rd -Sirsa	FATEBAD, TOHANA, BARBALA, RATIA **(155 Km)**	Fatehabad City-Bhuna Mor, Bighar Chowk, Nahar Colony, Bus stand,Ratia City-Sakuntla Devi, Bus Stand Ratia, Lali Gate Ratia, Tohana Road,Tohana to Barwala via Kanhari Samain Surewala Mod,Barwala - Hisar via Sarsod and Talwandi Rana,Kabral	Adampur mandi, Hisar, HANSI **(105 Km)**	Adampur City-Mandi, Bus Stand Agroha Road,Balsamand to Hisar via Bhiwani Rohilla, Rawalwas, Aryanaga,Hisar -Hansi via Satrod, Mayyar,Hansi City- Gandhi Colony, Barsi Gate, Krishna Colony, Sisai Pull,Hansi to Sorkhi via Dhana Ghadi

SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 8

DRIVE TEST OBSERVATION OF AMBALA SSA (JAN-14)

S. NO	Name of SP	Month	SSA Covered	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRTEL	Jan-14	Ambala	Ambala and Barara	Poor Rx Level & Quality near Bulana and Between Matehri & Tarwa Village, Poor Quality, Level between Mohari to Kesari, Behta, Mulana Village	Yamuna Nagar and Chachrauli	Poor Rx Level & Quality at Jaruda, Pihurwala Village, Poor Level & Quality between Ledi to Chaachrauli and Chachrauli to Mundakheda	Kalkaji and Pinjore	Poor Rx Level & Quality near Dhamala and HMT Complex Pinjore, Laha Village
2	BSNL				Poor Rx Level & Quality near Bulana and Matehri Village, Poor Level & Quality between Mohari to Kesari, kesari to Behta and Behta Village Outer and Mulana to Barara Road		Poor Rx Level & Quality between Jaruda to Chahron and Chachrauli to Mundakheda		No Coverage at Khandseda and Khatauli, Pyarewala, Hingola, Poor Rx Level & Quality near Bharog Village
3	TATA GSM				No Coverage at Mahteri, Tarwa, Daurana, Kesari Village, Poor Level & Quality near Bulana, Mohri, Between Behta to Saha and Mulana Village		No Coverage at Jarauda, Chahrol, Pihurwal, Malakpurbangar, Ledi Villages, Poor Level & Quality near Chachrauli Outer		Poor Level & Quality between Pyareala to Laha
4	IDEA				Poor Quality near Tarwa, Daurana and between Mohari to Kesari Village		Poor Quality near Khera, Mahlawali Village, near Jain Mandir (Yamuna Nagar)		Poor Quality near Manka and Banun Village
5	RCOM GSM				No Coverage at Mahteri, Tarwa, Kesari, Mulana Village and Poor Rx Level & Quality at Daurana, Dhanori Village		Poor Level & Quality at Kheda, Kanharikalan, ThanaChapar, Jarauda, Pihurwal Village and Between Mandkheri to Jagadhari		Poor Level & Quality at Narayanwala, No Coverage at Manja, Khamsera Village, Poor Rx Level & Quality near Bharog Village

6	**RCOM CDMA**				No Coverage at Mahteri, Tarwa, Kesari, Mulana Village		---		No Coverage at Manja, Khamsera Village
7	**VIDEOCON**				Poor Quality near Tarwa Village and between kesari to Behta		No Coverage at Malakpur Bangar and Ledi Village, Poor Level & Quality near Mandkheri Village		Poor Quality HMT Complex Pinjore
8	**VODAFONE**				Poor Quality patches between Mohari to Kesari, kesari to Behta and Behta Village Outer		Poor Quality near Kanharikalan , Khera Village		Poor Rx Level & Quality near Dhamala and Bharog Village
9	**AIRCEL**				No Coverage		No Coverage		No Coverage

DRIVE TEST TABLE: 9

DRIVE TEST OBSERVATION OF SONIPAT SSA (FEB-14)

S. NO	Name of SP	Month	SSA Covered	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRTEL				Quality Poor at Sec 14 (Sonipat), Sisana & Badwasini		Quality Poor at Kheri Guarjar		Gohana Outer
2	BSNL				Poor Quality at Industrial Area (Sonipat), Jharot		Poor Quality Between Murthal & Bahalgarh		Poor Rx Level at Gamri Village, Poor Quality Between Butana and Nurankheda
3	TATA GSM				No Coverage at Gorar Village		No Coverage at Palri, Dipalpur Village, Poor Coverage at Jagdishpur, Poor Quality at Rathdana, Poor Quality between Bahalgarh and Dipalpur		No Coverage between Nurankheda and Gangana Village, Mehmadpur
4	TATA CDMA	Feb-14	Sonipat	Sonipat	They have coverage in Sonipat & Kharkhoda only	Sonipat	--	Gohana	Poor Rx Level at Pinana Village
5	IDEA				Poor Quality at Mohana, Baraswani & between Sisana Kharkhoda Road		Poor Quality between Jateri & Jagdishpur Road		No Coverage between Butana to Kasanda via Ishpur Khedi, Bichpadi, Mehmadpur, Gohana Outer, Khanpur villages, Poor Quality near Ahulana Village
6	RCOM GSM				Poor Covergae at Rohat, Rohna, Jasrana, Bhaiswal Kalan, Badshahpur Machhri, Kilorad and Poor Quality at Rohat, Farmana, Badshahpur Machhri, Kilorad		Poor Coverage & Quality at Shadipur, Rathdana, Rasoi, Kundali, Khewra, Dipalpur, Sahapur Tarak, Kara Ibrahimpur, Barot, Khizarpur Ahir		Poor Coverage at Kasnda, Garhi sarai, bichpari, Baroda, Ahulana, Kheri Dhamkan and Poor Quality at Kheri Dhamkan & Bichpari

7	**RCOM CDMA**				No Coverage at Rohat & Guran		No Coverage at Rathdana		Poor Coverage at Kheri Dhamkan
8	**VIDEOCON**				Poor Quality at Jhorat		Poor Quality & One Handover failure at Dipalpur & Poor Quality between murthal & Barhi		No Coverage at Kasanda
9	**VODAFONE**				Barwasini Outer, Guhana to Mohana and Kharkhoda Outer		Poor Quality between Ganaur to Dhatauli, Bahalgarh		Poor Quality at Gohana Bypass, Ahulana to Gohana and Bichpuri to Mehmudpur
10	**AIRCEL**				No Coverage		No Coverage		No Coverage

DRIVE TEST TABLE: 10

DRIVE TEST OBSERVATION OF HISAR SSA (MAR-14)

S. NO	Name of SP	Month	SSA Covered	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRTEL	Mar-14	Hisar	Sirsa, Ellanabad, Dabawali, Kalanwali	Poor Quality between Kaharwali to Dhudian wali, Rania Chngi to Mangala, Badagudha to Akharwali	Fatehabad, Ratia, Tohana, Barwala, Hisar	Poor Level & Quality between Ratia to Chinmon, Gabibpur to Barwala and poor Quality near modal town Fatehabad	Adampur Mandi, Hisar, Hansi	Poor Level & Quality between Adampur to Kabrel and Poor Quality patch between Hisar to Neoli Kalan
2	BSNL				Poor Level & Quality near Sahuwala, Gadrana, Alanwali, Mithri, Gorilwala, Keharwala, Jeevan Nagar, Porkha, Malekan, Rania Chungi to Mangala Villages (Sirsa)		Poor Quality betweenTohana to Jamalpur Sekhon, Between Chikmon to Ratia, between Alaxi to Modeel Town Fatehabad, between Sarsod to Behbalpur and near talwandi Rana		Poor Quality between Admapur outer to Shiswal and outer of Hansi to Mayyar
3	TATA GSM				Poor Quality near Sahuwala, Poor Coverage connectivity between Kalanwali to Dabwali, No Coverage between Dabwali to Jeevan Nagar, Poor Level & Quality between Jeevan Nagar to Ellanabad City, Poor Quality Between Mangala to Rania Chungi (Sirsa)		Poor Quality patch between Behbalpur to Sirsod, No Coverage between Bithmara to Samain, Poor Level & Quality Between Cinmon to Ratia City and near Alaxi Village		Poor Level between Adampur mandi to Kabrel, Kabrel to Neoni Kalan and Hansi to Mandal
4	TATA CDMA				They have coverage only in SDCA, Poor Level & Quality at outer of all SDCA		They have coverage only in SDCA, Poor Level & Quality at outer of all SDCA		No Coverage between Adampur to Siswal, Neoli Kalan to Hisar, Mayyar to Hansi and Poor Level at outer of town, Poor Connectivity between Hansi to Mandal

5	IDEA				Poor Level & Quality at Dabwali outer, near Masit Village, between sirsa to Sahuwala and Malekan to Porkha Village		Poor Quality patch between hisar outer to Talwanirana, near Bithmara Village, Quality between Ratia to Chinmon and Fatehabad outer toward Ratia		Poor Quality patch between Hisar to Neoli Kalan and near Mundhal Village	
6	RCOM GSM				They have coverage only in SDCA, Poor Quality at Sirsa outer towards Sahuwala Vullage		Poor Level & Quality near Talwanirana Village, No Coverage at gabibpur, Surewala, Bithmara, between Jamalpur Sekhon to Kullan, and Between Chinmon to Ratia City		No Coverage between Adampur to Siswal, Neoli Kalan to Hisar, Mayyar to Hansi and Poor Level at outer of town, Poor Connectivity between Hansi to Mandal	
7	RCOM CDMA				Poor Level between Akarwali to Kalanwali, Kalanwali to Sanwantkhera Village, Masita to Goriwala, Keharwala to Jeevan Nagar, Ellanabad to Mallekan		Poor Level between Gabibpur to Samain, Jamalpur Sekhon to Kullan, Chinmon to Ratia City		No Coverage between Adampur to Siswal, Neoli Kalan to Hisar, Mayyar to Hansi and Poor Level at outer of town, Poor Connectivity between Hansi to Mandal	
8	VIDEOCON				No Coverage between Dabwali to Jeevan Nagar, Poor Leval near Porkha Village, Poor Level & Quality between Mithri to Pipli		Poor Level & Quality between Kullan to Jamalpur Sekhon		Poor Level & Quality between Hisar to Neoli Kalan	
9	VODAFONE				Poor Quality patch between Rania Chngi to Mangala, Jeevan Nagar to Dhindian wali and near Goriwala		Poor Quality patch between Kullan to Jamalpur Sekhon, Sarsod to Behbalpur and Surwalia to Garibpur		Poor Quality patch between Hisar to Neoli Kalan, mayyar to Hansi	
10	AIRCEL				No Coverage		No Coverage		No Coverage	

KEY FINDINGS: DRIVE TEST

The key observations that could be derived from the results of the drive tests are as under –

(i) Aircel is not operating its service in all the SSAs where drive tests were conducted during the quarter. In fact, Aircel is having its very limited presence in Haryana circle with only 28 BTSs in entire Haryana service area.

(ii) Tata (GSM/CDMA), RCOM (GSM/CDMA), Videocon and BSNL were having no coverage/partial coverage in some of the SDCAs of three select SSAs.

(i) **In the Month of January-14** drive tests were conducted at Ambala SSA covering Ambala, Barara, Yamuna Nagar, Chachrauli, Kalkaji and Pinjore SDCAs for three consecutive days. The performance of **BSNL, RCOM (GSM)/RCOM (CDMA)** with regard to the parameter Call Drop rate was found lagging behind the benchmark during the drive tests conducted on one or the other day. The performance of **BSNL** also remained under performed for parameter Good Voice quality with its performance as **90.61%** on SSA level. Call Drop rate for BSNL was **2.61%** on day-1 of drive test, whereas for **RCOM (GSM) / RCOM (CDMA)**, it was **4.58 %** on day-3 of drive test. The deficiencies with respect to inadequate coverage and voice quality, observed on the drive tests plots, at the various places are summarized in the table.-8 (above).

In case of Indoor drive test, **BSNL** could not meet the benchmark for the parameter 'Good voice quality' with its performance as **93.80%**

(ii) **In the Month of February-14,** drive tests were conducted at Sonipat SSA covering Sonipat and Gohana SDCAs. In this SSA, **Idea Cellular and RCOM (GSM)** remained underperformed for parameter Voice Quality with their performance as **93.06 % and 94.22%** respectively on day-2 of drive test. The deficiencies with respect to inadequate coverage and voice quality, observed on the drive tests plots, at various places are summarized in the table.-9 (above).

(iii) **In the month of March-14,** drive tests were conducted at Hissar SSA covering various locations in Sirsa, Ellanabad, Dabawali, Kalanwali Fatehabad, Ratia, Tohana, Barwala, Hisar Adampur Mandi and Hansi. **BSNL** was the only service provider that failed to meet the benchmarks of the prime parameters namely, Blocked Call Rate, Call Drop Rate , Voice Quality and Call Setup success rate with its performance on SSA level as **3.82 %, 4.28%, 69.67%** (way below the benchmark of >=95%) and **94.36%** respectively. **Idea Cellular** also remained underperformed for the parameter Voice Quality with its performance as **93.38%.** The deficiencies with respect to inadequate coverage and voice quality, observed on the drive tests plots, at the various places are summarized in the table -10 (above).

In case of Indoor drive test, **RCOM (GSM)** could not meet the benchmark for the parameters 'Blocked call rate', 'Good voice quality' and 'CSSR with its performance as **5.80%, 94.83% and 94.20%** respectively.

Thus BSNL, RCOM (GSM)/CDMA and Idea Cellular were non-compliant with respect to one or the other parameters in the above three SSAs. The underperformed operators need to improve their network performance in respect of the parameters as mentioned above.

6. ESSENCE OF COMPLIANCE REPORT OF SERVICE PROVIDERS WITH RESPECT TO THE QOS

6. <u>ESSENCE OF COMPLIANCE REPORT OF SERVICE PROVIDERS WITH RESPECT TO THE QOS</u>

Based on monthly audit, it was concluded that the performance of the service providers was fairly satisfactory for **Network Parameters** in Haryana service area as they were largely found to have met the benchmarks of most of the parameters during the quarter. However, Aircel, Tata (GSM) and Tata (CDMA) failed to meet the benchmark of parameter 'Worst affected cells > 3 % TCH drop' in all the three months of the quarter ended March 2014. Their average performance during the quarter was 17.46% (way beyond the benchmark), 3.38% and 4.69% respectively. Tata (GSM) lagged behind in meeting the benchmark for parameter 'BTS Accumulated down time' with its performance as 4.25 % (Feb-14) against the benchmark of <= 2 %. However, it was within benchmark on an average for the quarter.

From three days live measurement assessment, it was found that the performance of all operators was satisfactory as they have largely met the benchmarks except the parameter 'Worst affected cells> 3 % TCH drops", which could not be complied with by Tata (GSM) and Tata (CDMA) in all the three months of this quarter. The performance of Tata (GSM) and Tata (CDMA) for this parameter, calculated taking average of three months was 3.16 % and 4.68 % respectively. **The similar non-compliance of Tata (GSM) and Tata (CDMA) was also observed for monthly audit of the quarter.**

With regard to the **Customer Service Quality Parameters,** the service providers were found in well compliance of most of the parameters on Metering and Billing Credibility, Response Time to Customers, Termination of Service and Time taken for refunds. However, **Airtel** failed to meet the benchmark for parameter ' % billing complaints' with its performance as **0.16%.** With regard to the parameter '% Calls answered by operator (voice to voice)'within 60 seconds, the performance of **BSNL and Tata (GSM)** remained non-complied with the benchmark with their performance as **26.12% (way below the benchmark)** and **88.14%** respectively, against the benchmark of >= 90 %.

With regard to drive tests, BSNL, RCOM (GSM)/CDMA and Idea Cellular were non-compliant with respect to one or the other parameters in the above three SSAs. The underperformed operators need to improve their network performance in respect of the parameters which were not complied with.

7. DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES

7. DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE:

TABLE: 1

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
							GSM Operators					CDMA Operators	
Network Service Quality Parameter												
1	**Network Availability**												
	a) Total no. of BTSs in the licensed service area		Jan-14	28	2801	1760	1270	1492	2841	1194	2738	770	456
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Jan-14	61.19	2297.96	14868.23	1692.94	1324.14	188.55	2085	1715	967	219.47
	c) BTS Accumulated Downtime	<=2%	Jan-14	0.29%	0.11%	1.14%	0.18%	0.12%	0.01%	0.23%	0.08%	0.17%	0.06%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jan-14	0	2	24	4	7	0	3	6	2	0
	e) Worst affected BTSs due to downtime	<=2%	Jan-14	0.00%	0.07%	1.36%	0.31%	0.47%	0.00%	0.25%	0.22%	0.26%	0.00%
2	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)	>=95%	Jan-14	98.33%	99.21%	97.71%	98.63%	98.39%	99.98%	99.24%	99.44%	98.58%	98.45%
	b) SDCCH/PAGING Congestion	<=1%	Jan-14	0.89%	0.18%	0.39%	0.11%	0.10%	0.48%	0.05%	0.15%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-14	0.00%	0.18%	0.94%	0.12%	0.74%	0.72%	0.02%	0.56%	0.06%	0.17%
3	**Connection Maintenance (Retainability)**												
	a) Call Drop Rate (CDR)	<=2%	Jan-14	1.61%	0.41%	1.09%	0.59%	0.63%	0.67%	0.24%	0.73%	0.05%	0.44%
	b) Worst affected cells>3% TCH drop	<=3%	Jan-14	**13.10%**	0.96%	0.66%	0.79%	**3.23%**	2.02%	0.03%	1.95%	0.16%	**4.53%**
	c) % of connections with good voice quality	>=95%	Jan-14	99.01%	99.13%	NP	98.33%	97.70%	97.91%	99.18%	97.81%	99.76%	96.06%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Jan-14	11	80	35	31	146	173	1	162	4	62
	e) Total no. of cells (Sector) in the licensed service area		Jan-14	84	8353	5276	3868	4502	8524	3576	8296	2310	1366
4	**No. of POI's having >=0.5% POI congestion**												
	No. of POI's having >=0.5% POI congestion		Jan-14	0	0	0	0	0	0	0	0	0	0

	Name of POI not meeting the benchmark		Jan-14	0	0	0	0	0	0	0	0	0	0
5	**Network Data**												
	a) Equipped Capacity of Network in Erlang		Jan-14	176.25	81951	200000	48961	100011	101191	50000	138011	56000	94300
	b) Total traffic in TCBH in erlang (Avg.)		Jan-14	1.30	61992	80275	21356	37141	105612	45125	127967	16281	18362
	c) Total no. of customers served (as per VLR) on last day of the month		Jan-14	391	2296825	1613407	743838	1458997	4042837	1630414	4593266	462558	305848

TABLE: 2

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurements-Haryana Circle- Jan-14 month													
Network Service Quality Parameter													
1	**Network Availability**												
	a) Total no. of BTSs in the licensed service area		Live data	28	2806	1756	1269	1487	2841	1194	2745	770	456
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Live data	41.44	147.05	1835.41	79.73	39.70	31.14	168	43	95	19.49
	c) BTS Accumulated Downtime	<=2%	Live data	**2.06%**	0.07%	1.45%	0.09%	0.04%	0.02%	0.19%	0.02%	0.17%	0.06%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	1	0	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	96.92%	99.43%	97.79%	98.44%	98.96%	99.98%	99.24%	99.75%	98.88%	97.81%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.04%	0.42%	0.08%	0.09%	0.37%	0.02%	0.14%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.10%	0.86%	0.20%	0.24%	0.55%	0.02%	0.25%	0.03%	0.23%
3	**Connection Maintenance (Retainability)**												
	a) Call Drop Rate (CDR)	<=2%	Live data	1.59%	0.39%	1.06%	0.62%	0.55%	0.68%	0.22%	0.71%	0.05%	0.42%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	0.79%	1.02%	0.73%	0.68%	2.77%	2.33%	0.01%	1.85%	0.09%	**4.88%**
	c) % of connections with good voice quality	>=95%	Live data	99.21%	99.15%	NP	98.34%	97.82%	97.88%	99.21%	97.82%	99.76%	NP
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	1	86	38	26	125	199	1	154	2	67
	e) Total no. of cells (Sector) in the licensed service area		Live data	84	8384	5262	3866	4502	8541	3576	8319	2310	1366
4	**No. of POI's having >=0.5% POI congestion**												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0

TABLE: 3

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
				\multicolumn{7}{c}{GSM Operators}							CDMA Operators	

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Haryana Circle- Feb-14 month

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
Network Service Quality Parameter													
	Network Availability												
1	a) Total no. of BTSs in the licensed service area		Feb-14	28	2801	1806	1274	1496	2911	1194	2740	770	456
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Feb-14	105.23	1312.98	12666.2	1204.41	42704.68	81.09	1033	885.83	713	100.22
	c) BTS Accumulated Downtime	<=2%	Feb-14	0.56%	0.07%	1.04%	0.14%	**4.25%**	0.00%	0.13%	0.05%	0.14%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Feb-14	0	1	26	1	0	0	1	2	1	0
	e) Worst affected BTSs due to downtime	<=2%	Feb-14	0.00%	0.04%	1.44%	0.08%	0.00%	0.00%	0.08%	0.07%	0.13%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Feb-14	99.59%	99.14%	98.10%	98.59%	98.58%	99.98%	99.66%	99.78%	98.97%	98.38%
	b) SDCCH/PAGING Congestion	<=1%	Feb-14	0.17%	0.16%	0.41%	0.08%	0.05%	0.47%	0.02%	0.09%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-14	0.00%	0.24%	0.74%	0.15%	0.53%	0.75%	0.02%	0.22%	0.02%	0.27%
	Connection Maintenance (Retainability)												
3	a) Call Drop Rate (CDR)	<=2%	Feb-14	1.01%	0.38%	1.02%	0.59%	0.61%	0.68%	0.24%	0.73%	0.05%	0.45%
	b) Worst affected cells>3% TCH drop	<=3%	Feb-14	**20.24%**	0.81%	0.66%	0.79%	**3.33%**	2.03%	0.03%	1.96%	0.13%	**4.34%**
	c) % of connections with good voice quality	>=95%	Feb-14	99.76%	99.17%	NP	98.31%	97.70%	97.88%	99.17%	97.75%	99.75%	98.14%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Feb-14	17	68	35	31	151	176	1	163	3	59
	e) Total no. of cells (Sector) in the licensed service area		Feb-14	84	8353	5342	3894	4526	8670	3576	8303	2310	1366
	No. of POI's having >=0.5% POI congestion												
4	No. of POI's having >=0.5% POI congestion		Feb-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Feb-14	0	0	0	0	0	0	0	0	0	0
5	**Network Data**												

a) Equipped Capacity of Network in Erlang		Feb-14	211.89	81810	200000	50496	100290	102259	50000	138718	56000	94300
b) Total traffic in TCBH in erlang (Avg.)		Feb-14	0.52	63482	76365	22849	37553	109714	44786	127159	16102	20434
c) Total no. of customers served (as per VLR) on last day of the month		Feb-14	413	2336601	1605533	762066	1463526	4124419	1642229	4686108	454657	248378

TABLE: 4

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurements-Haryana Circle- Feb-14 month												
						GSM Operators						CDMA Operators	
Network Service Quality Parameter													
1	**Network Availability**												
	a) Total no. of BTSs in the licensed service area		Live data	28	2801	1778	1272	1496	2892	1194	2740	770	456
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Live data	23.59	91.2	1318.15	25.38	45.00	15.08	83	54.25	43	25.02
	c) BTS Accumulated Downtime	<=2%	Live data	1.17%	0.05%	1.03%	0.03%	0.04%	0.01%	0.10%	0.03%	0.08%	0.08%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	1	0	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.15%	99.10%	98.04%	98.77%	98.89%	99.99%	99.78%	99.82%	99.05%	98.64%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.16%	0.15%	0.06%	0.03%	0.38%	0.02%	0.09%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.27%	0.72%	0.10%	0.32%	0.79%	0.02%	0.18%	0.02%	0.08%
3	**Connection Maintenance (Retainability)**												
	a) Call Drop Rate (CDR)	<=2%	Live data	1.15%	0.38%	1.00%	0.55%	0.60%	0.64%	0.24%	0.65%	0.04%	0.40%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.78%	0.79%	0.66%	0.65%	**3.33%**	1.72%	0.00%	1.88%	0.22%	**4.22%**
	c) % of connections with good voice quality	>=95%	Live data	99.62%	99.20%	NP	98.34%	97.79%	97.89%	99.20%	97.85%	99.76%	NP
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	2	66	35	25	151	151	0	156	5	58
	e) Total no. of cells (Sector) in the licensed service area		Live data	84	8353	5323	3888	4528	8747	3576	8303	2310	1366
4	**No. of POI's having >=0.5% POI congestion**												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	**2**	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	Idea Mobile & Reliance International	0	0	0	0	0	0	0

TABLE: 5

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
Network Service Quality Parameter													
1	**Network Availability**												
	a) Total no. of BTSs in the licensed service area		Mar-14	28	2801	1814	1289	1503	2940	1194	2752	773	456
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Mar-14	116.07	963.28	14124.95	1005.42	523.00	35.99	1312	795	764	139.85
	c) BTS Accumulated Downtime	<=2%	Mar-14	0.56%	0.05%	1.05%	0.10%	0.05%	0.00%	0.15%	0.04%	0.13%	0.04%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Mar-14	0	0	28	4	2	0	2	1	1	0
	e) Worst affected BTSs due to downtime	<=2%	Mar-14	0.00%	0.00%	1.54%	0.31%	0.13%	0.00%	0.17%	0.04%	0.13%	0.00%
2	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)	>=95%	Mar-14	96.13%	99.18%	97.94%	98.67%	98.77%	99.99%	99.69%	99.74%	98.91%	96.34%
	b) SDCCH/PAGING Congestion	<=1%	Mar-14	0.00%	0.19%	0.43%	0.09%	0.04%	0.48%	0.05%	0.10%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-14	0.00%	0.19%	0.78%	0.12%	0.35%	0.72%	0.02%	0.26%	0.05%	**2.23%**
3	**Connection Maintenance (Retainability)**												
	a) Call Drop Rate (CDR)	<=2%	Mar-14	0.61%	0.36%	1.04%	0.54%	0.63%	0.74%	0.26%	0.75%	0.05%	0.53%
	b) Worst affected cells>3% TCH drop	<=3%	Mar-14	**19.05%**	0.82%	0.73%	0.71%	**3.60%**	2.60%	0.06%	2.13%	0.13%	**5.19%**
	c) % of connections with good voice quality	>=95%	Mar-14	99.18%	99.12%	NP	98.26%	97.62%	97.68%	99.18%	97.61%	99.74%	96.52%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Mar-14	16	68	39	28	164	231	2	178	3	71
	e) Total no. of cells (Sector) in the licensed service area		Mar-14	84	8353	5419	3946	4541	8860	3576	8340	2319	1366
4	**No. of POI's having >=0.5% POI congestion**												
	No. of POI's having >=0.5% POI congestion		Mar-14	0	0	0	0	0	0	0	**2**	0	0

	Name of POI not meeting the benchmark		Mar-14	0	0	0	0	0	0	0	Airtel & VSNL (NGN) NLD	0	0
5	**Network Data**												
	a) Equipped Capacity of Network in Erlang		Mar-14	211.89	81705	200000	54714	100681	103911	50000	139567	56000	94300
	b) Total traffic in TCBH in erlang (Avg.)		Mar-14	0.47	64122	79616	23172	37266	114686	45479	131985	16194	20775
	c) Total no. of customers served (as per VLR) on last day of the month		Mar-14	336	2387311	1613523	806390	1459164	4172585	1687479	4719301	445915	249396

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurements-Haryana Circle- Mar-14 month													
S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
Network Service Quality Parameter													
1	**Network Availability**												
	a) Total no. of BTSs in the licensed service area		Live data	28	2801	1809	1276	1503	2940	1194	2742	770	456
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Live data	0.00	61.2	2156.8	132	26.98	1.15	105	50	52	24.66
	c) BTS Accumulated Downtime	<=2%	Live data	0.00%	0.03%	1.66%	0.14%	0.02%	0.00%	0.12%	0.03%	0.09%	0.08%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	3	1	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.17%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	96.49%	99.07%	97.42%	98.65%	99.02%	99.99%	99.77%	99.71%	99.19%	95.85%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.25%	0.41%	0.07%	0.02%	0.24%	0.01%	0.09%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.22%	0.90%	0.12%	0.17%	0.44%	0.02%	0.29%	0.01%	2.78%
3	**Connection Maintenance (Retainability)**												
	a) Call Drop Rate (CDR)	<=2%	Live data	5.26%	0.38%	1.04%	0.55%	0.58%	0.66%	0.23%	0.75%	0.03%	0.40%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	1.59%	0.83%	0.77%	0.73%	3.38%	1.87%	0.00%	1.81%	0.14%	4.93%
	c) % of connections with good voice quality	>=95%	Live data	97.46%	99.15%	NP	98.25%	97.73%	97.85%	99.20%	97.64%	99.75%	NP
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	1	69	42	28	154	166	0	151	3	67
	e) Total no. of cells (Sector) in the licensed service area		Live data	84	8353	5412	3907	4549	8882	3576	8303	2310	1366
4	**No. of POI's having >=0.5% POI congestion**												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0

8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT

:
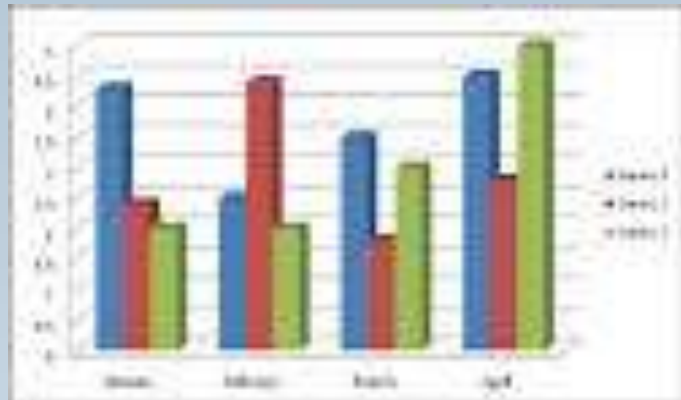
8. <u>GRAPHICAL REPRESENTATION OF PERFORMANCE OF THE CELLULAR MOBILE SERVICE PROVIDERS-MONTHLY V/S 3-DAYS LIVE MEASUREMENT:</u>

1) BTS ACCUMULATED DOWNTIME:

BTS Accumulated Downtime

	AIRCEL	AIRTEL	BSNL	VIDEOC ON	TATA GSM	IDEA	RCOM GSM	VODAF ONE	RCOM CDMA	TATA CDMA
Quarterly PMR	0.47%	0.08%	1.08%	0.14%	1.47%	0.00%	0.17%	0.06%	0.15%	0.04%
Quarterly Live	1.08%	0.05%	1.38%	0.09%	0.03%	0.01%	0.14%	0.03%	0.11%	0.07%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
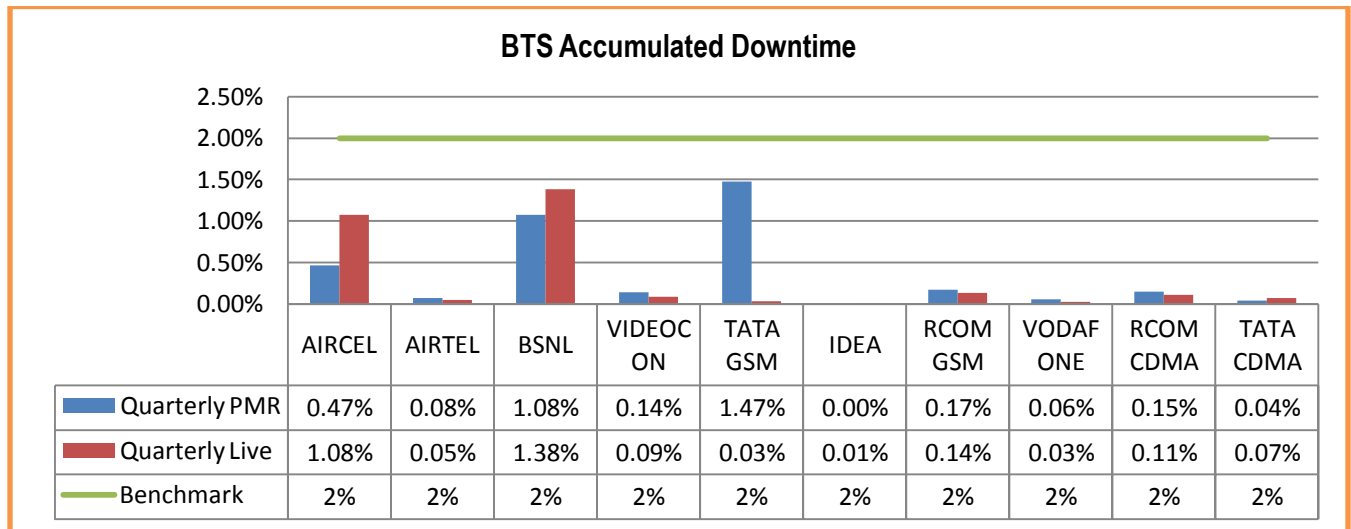
All operators are meeting the benchmarks.

2) WORST AFFECTED BTSS DUE TO DOWNTIME:

Worst affected BTSs due to downtime

	AIRTEL	BSNL	VIDEOCO N	TATA GSM	IDEA	RCOM GSM	VODAFO NE	RCOM CDMA	TATA CDMA
Quarterly PMR	0.04%	1.45%	0.23%	0.16%	0.00%	0.17%	0.11%	0.17%	0.00%
Quarterly Live	0.00%	0.08%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
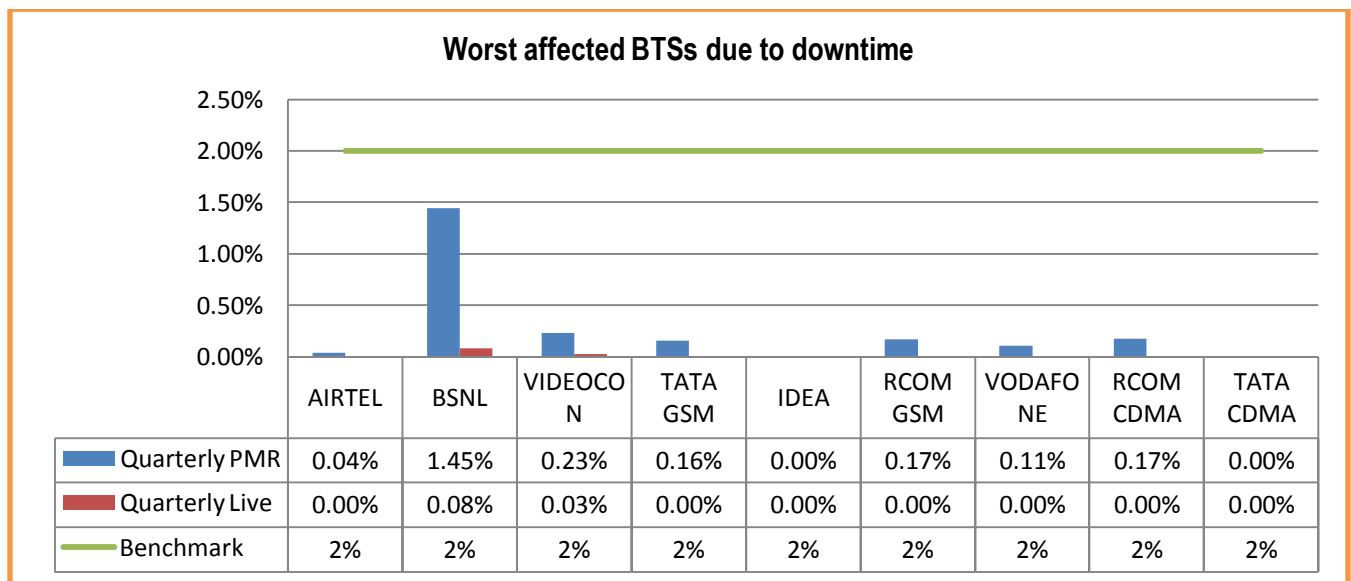
All operators are meeting the benchmarks.

3) CALL SETUP SUCCESS RATE:

Call Setup Success Rate

	AIRCEL	AIRTEL	BSNL	VIDEOC ON	TATA GSM	IDEA	RCOM GSM	VODAF ONE	RCOM CDMA	TATA CDMA
■ Quarterly PMR	98.02%	99.18%	97.92%	98.63%	98.58%	99.98%	99.53%	99.65%	98.82%	97.72%
■ Quarterly Live	97.19%	99.20%	97.75%	98.62%	98.96%	99.99%	99.60%	99.76%	99.04%	97.43%
▬ Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
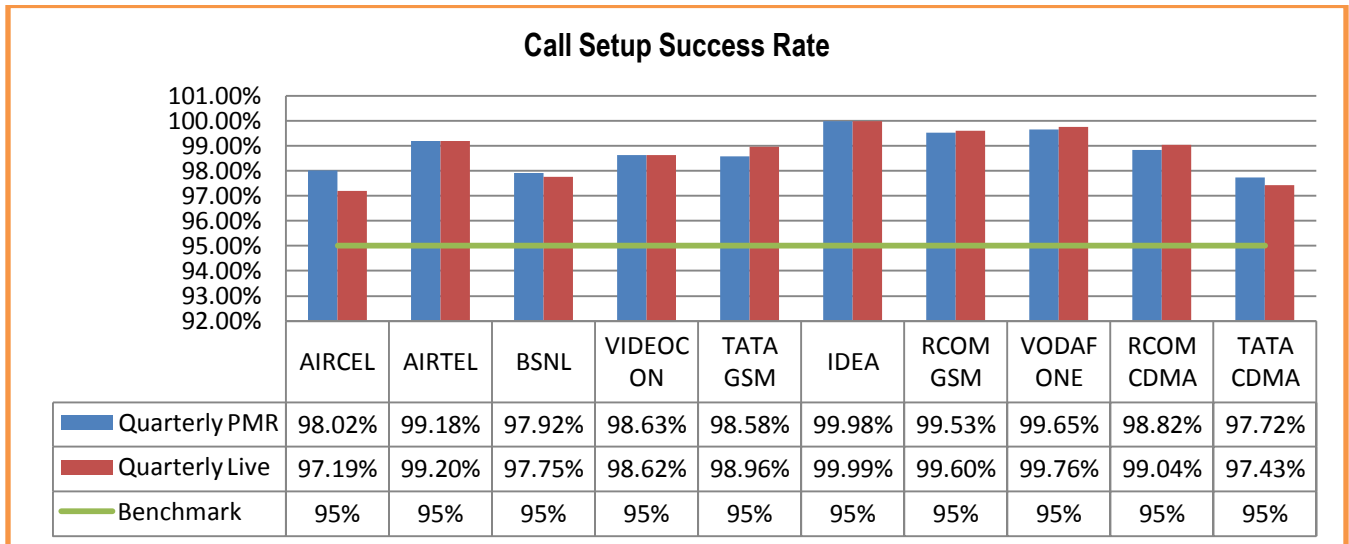
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION:

SDCCH/PAGING Channel Congestion

	AIRCEL	AIRTEL	BSNL	VIDEOC ON	TATA GSM	IDEA	RCOM GSM	VODAF ONE	RCOM CDMA	TATA CDMA
■ Quarterly PMR	0.35%	0.18%	0.41%	0.09%	0.06%	0.48%	0.04%	0.11%	0.00%	0.00%
■ Quarterly Live	0.00%	0.15%	0.33%	0.07%	0.05%	0.33%	0.02%	0.11%	0.00%	0.00%
▬ Benchmark	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
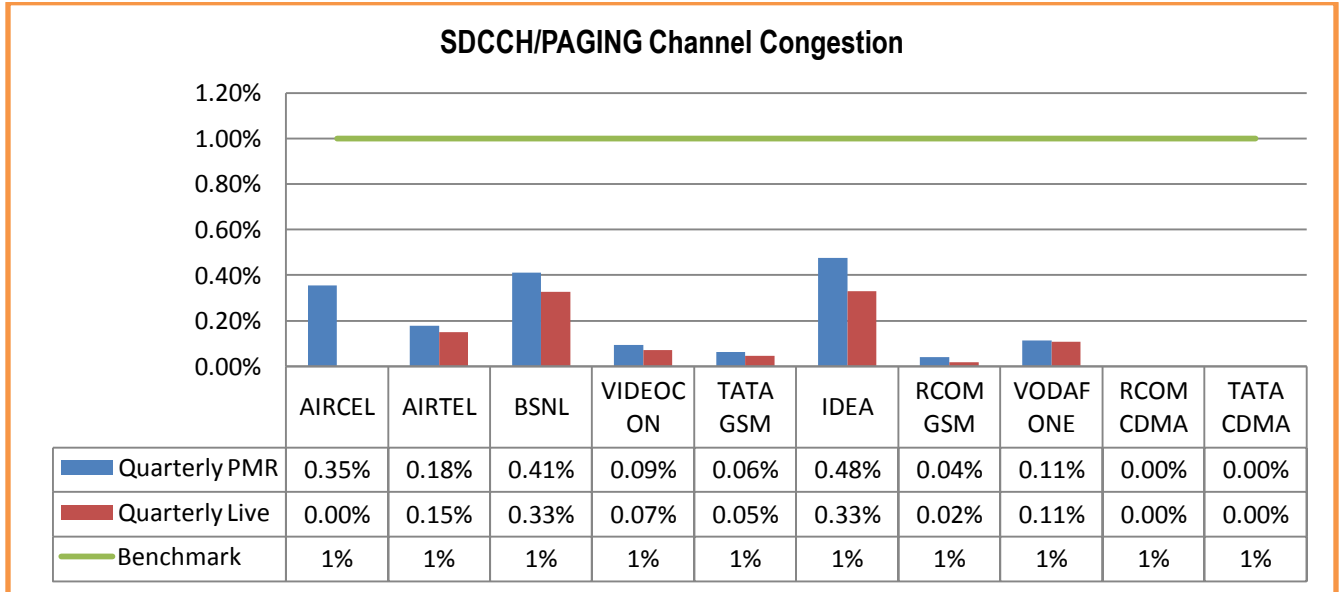
All operators are meeting the benchmarks.

5) TCH CONGESTION:

TCH Congestion

	AIRCEL	AIRTEL	BSNL	VIDEOC ON	TATA GSM	IDEA	RCOM GSM	VODAF ONE	RCOM CDMA	TATA CDMA
Quarterly PMR	0.00%	0.20%	0.82%	0.13%	0.54%	0.73%	0.02%	0.35%	0.04%	0.89%
Quarterly Live	0.00%	0.20%	0.83%	0.14%	0.24%	0.59%	0.02%	0.24%	0.02%	1.03%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
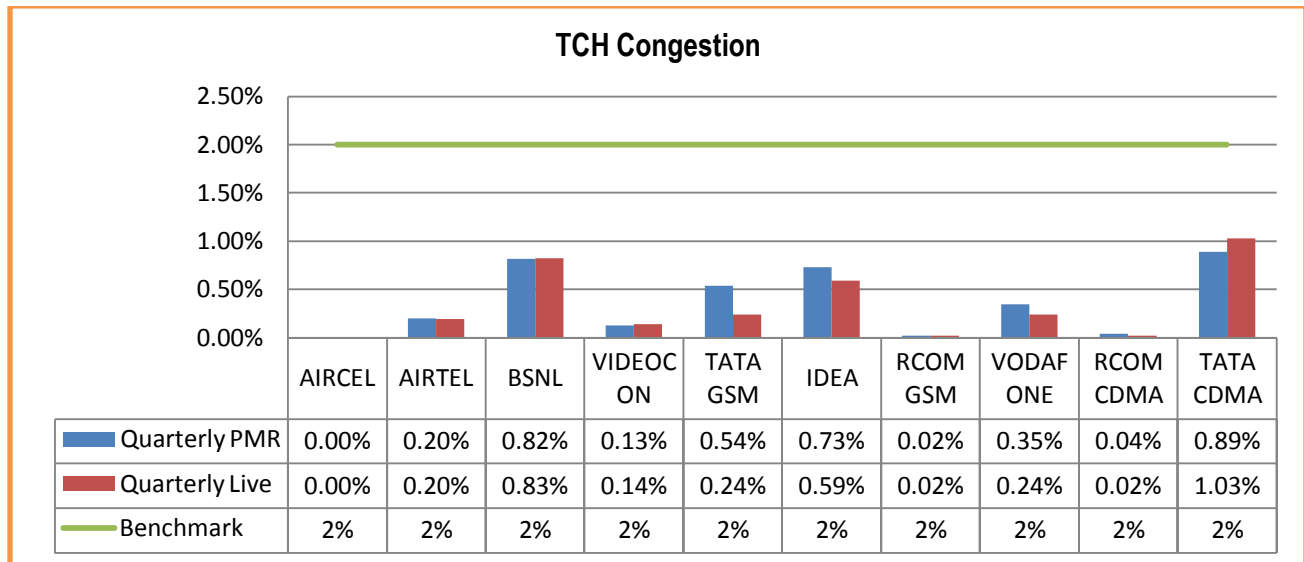
All operators are meeting the benchmarks.

6) CALL DROP RATE:

Call Drop Rate

	AIRCEL	AIRTEL	BSNL	VIDEOC ON	TATA GSM	IDEA	RCOM GSM	VODAF ONE	RCOM CDMA	TATA CDMA
Quarterly PMR	1.08%	0.38%	1.05%	0.57%	0.62%	0.70%	0.25%	0.74%	0.05%	0.47%
Quarterly Live	2.67%	0.38%	1.03%	0.57%	0.58%	0.66%	0.23%	0.70%	0.04%	0.41%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
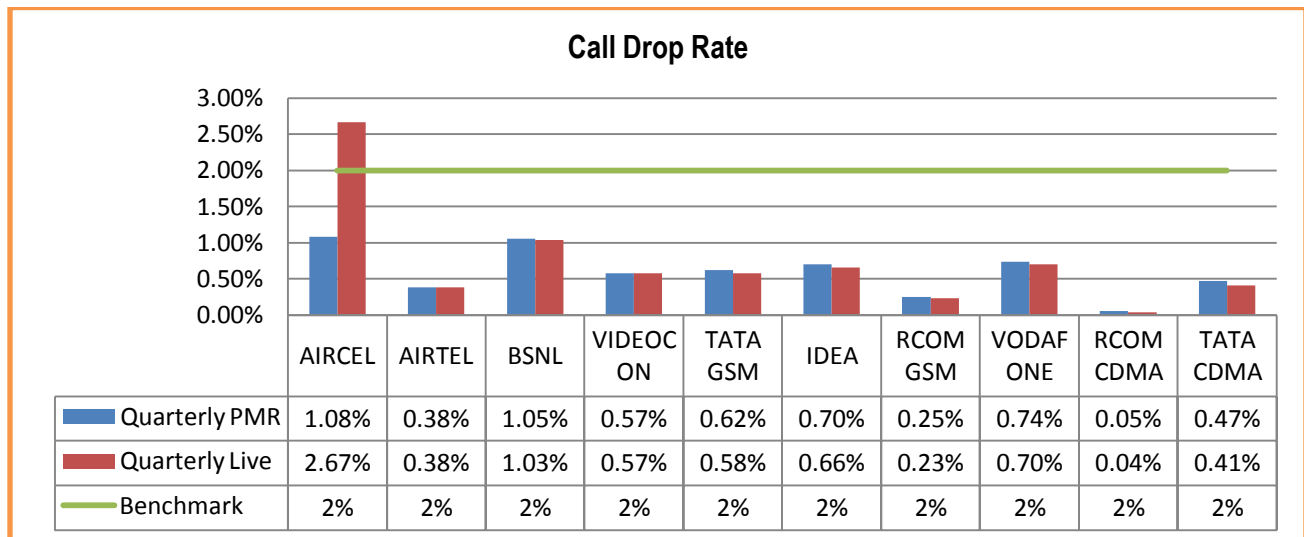
All operators are meeting the benchmarks except Aircel in 3 days live measurement.

7) WORST AFFECTED CELLS>3% TCH DROP:

Worst affected cells>3% TCH drop

	AIRCEL	AIRTEL	BSNL	VIDEOC ON	TATA GSM	IDEA	RCOM GSM	VODAF ONE	RCOM CDMA	TATA CDMA
Quarterly PMR	17.46%	0.86%	0.68%	0.76%	3.39%	2.22%	0.04%	2.01%	0.14%	4.69%
Quarterly Live	1.72%	0.88%	0.70%	0.69%	3.16%	1.97%	0.00%	1.85%	0.15%	4.68%
Benchmark	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
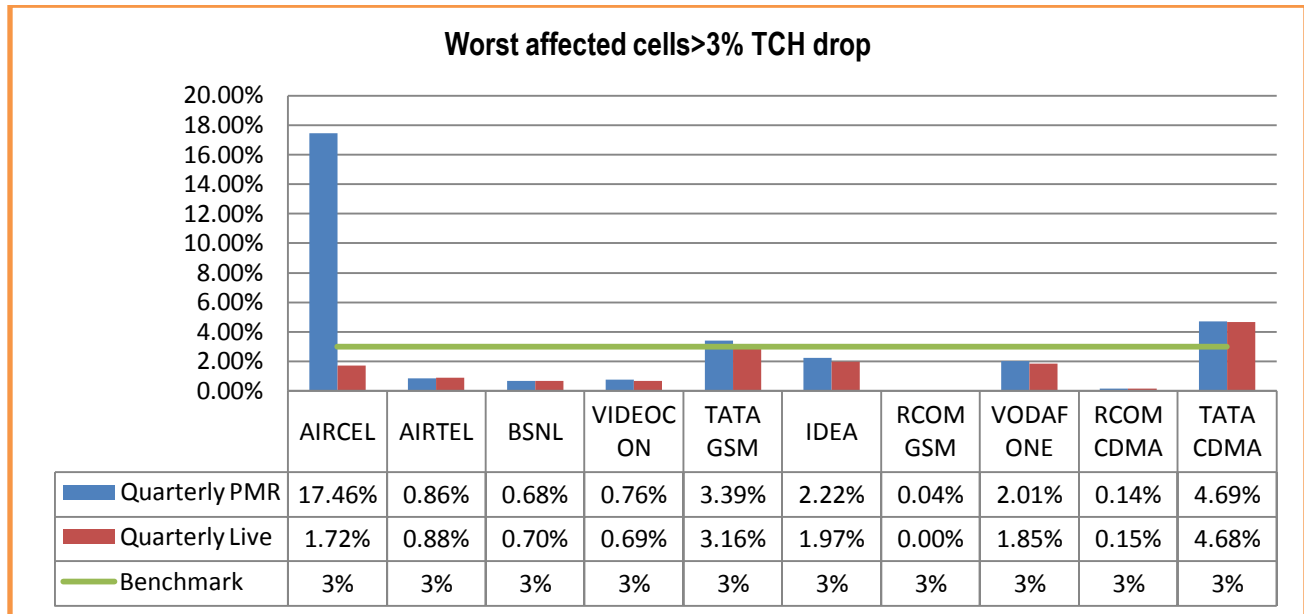
All operators are meeting the benchmarks except Aircel and Tata GSM & CDMA.

8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:

% Connections with good voice quality

	AIRCEL	AIRTEL	BSNL	VIDEOC ON	TATA GSM	IDEA	RCOM GSM	VODAF ONE	RCOM CDMA	TATA CDMA
Quarterly PMR	99.32%	99.14%	0.00%	98.30%	97.67%	97.82%	99.18%	97.72%	99.75%	96.91%
Quarterly Live	98.76%	99.17%	0.00%	98.31%	97.78%	97.87%	99.20%	97.77%	99.76%	0.00%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
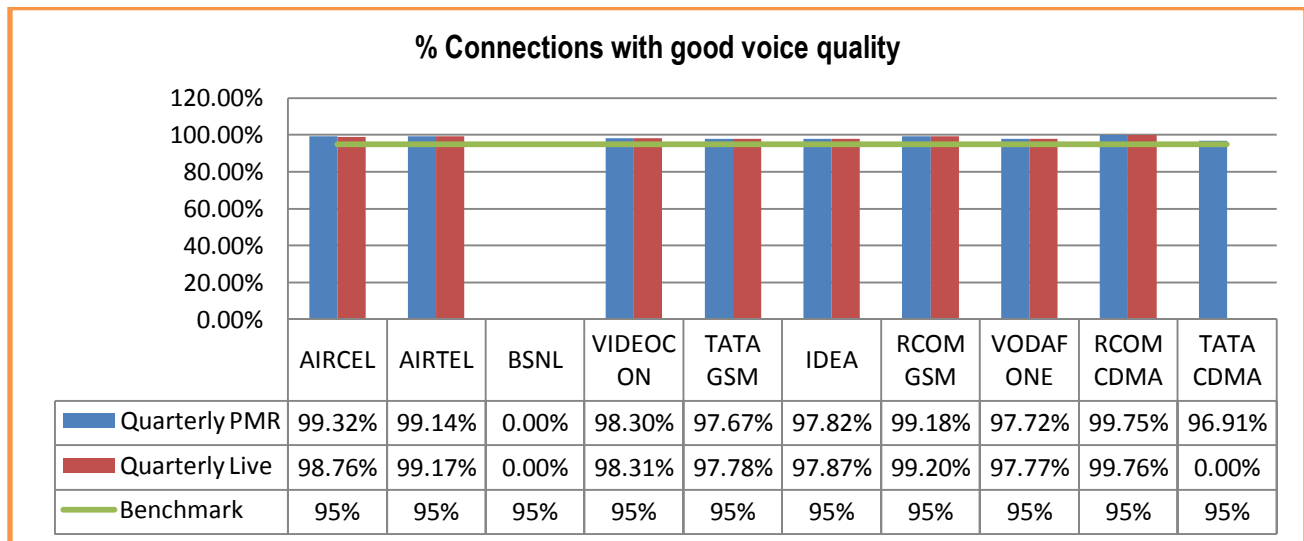
All operators are meeting the benchmarks. BSNL is not having the system generated data for VQ, so not provided the data.

9) NO. OF POI'S HAVING >=0.5% POI CONGESTION:

No. of POI's having >=0.5% POI congestion

	AIRCEL	AIRTEL	BSNL	VIDEOC ON	TATA GSM	IDEA	RCOM GSM	VODAF ONE	RCOM CDMA	TATA CDMA
Quarterly PMR	0	0	0	0	0	0	0	1	0	0
Quarterly Live	0	0	1	0	0	0	0	0	0	0
Benchmark										
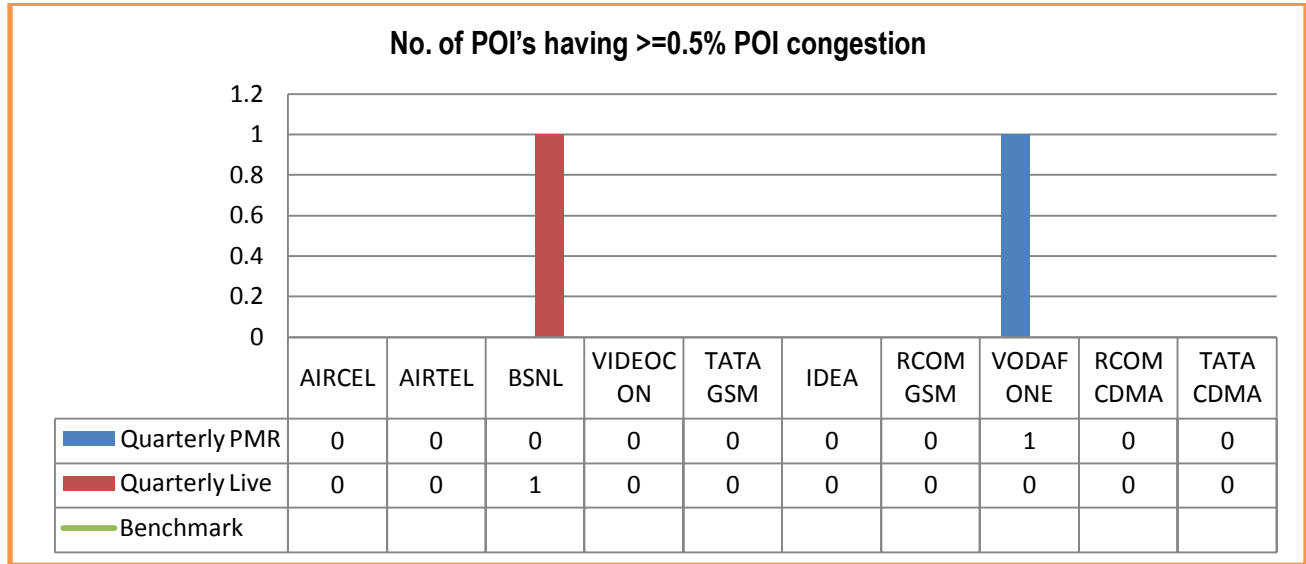
BSNL & Vodafone were having congestion on the individual POIs.

9. QOS AUDIT OF BROADBAND SERVICE PROVIDERS

9. QUALITY OF SERVICE AUDIT OF BROADBAND SERVICE PROVIDERS

TUV–SUD South Asia conducted the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who were having broadband subscriber base of more than 10,000 subscribers in their licensed service area. The following Broadband Service providers in Haryana Circle were audited for their quality of service assessment. The audit of Noida Software Technologies Pvt. Ltd. (NSTPL), Tikona and Spectranet for Noida, Faridabad and Gurgaon has been included in Delhi/NCR Metro Circle.

Sl. No.	Name of Broadband Service Provider
1	BHARTI AIRTEL LIMITED
2	BSNL
3	FIVE NETWORKS
4	BROADBAND PACENET INDIA PVT. LTD
5	RELIANCE COMMUNICATION LIMITED (RCL)
6	TATA COMMUNICATION LIMITED (TCL)
7	TATA TELESERVICES LTD (TTL)
8	YOU BROADBAND

THE AUDITED DATA HAS BEEN GIVEN IN THE FOLLOWING TABLE:

S/N	Parameters	Benchmark	Period	BHARTI AIRTEL	BSNL	FIVE NETWORKS	PACENET	RCL	TTL	TCL	YOU BROADBAND

Quarterly Averaged (Jan to March-13) Audited data for Broadband Services - Haryana circle

S/N	Parameters	Benchmark	Period	BHARTI AIRTEL	BSNL	FIVE NETWORKS	PACENET	RCL	TTL	TCL	YOU BROADBAND
1	**Service Provisioning/Activation Time**										
	100% cases in 15 days (subject to technical feasibility)	**<15 days**	**Quarterly**	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%
	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.**	**Quarterly**	0	0	0	0	0	0	0	0
2	**Faults Repair/Restoration Time**										
	By next working day	**>90%**	**Quarterly**	97.53%	93.33%	100.00%	97.83%	NIL	100.00%	96.04%	**88.90%**
	within 3 working day	**≥99%**	**Quarterly**	100.00%	99.75%	100.00%	100.00%	NIL	100.00%	100.00%	**98.01%**
2.1	**Rebate**										
	Faults Pending for > 3 working days and < 7 working days: (Rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance)		**Quarterly**	0	2	0	0	NIL	0	0	16
	Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)		**Quarterly**	0	0	0	0	NIL	0	0	3
	Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)		**Quarterly**	0	0	0	0	NIL	0	0	0
3	**Billing Performance**										
	Billing complaints per 100 bills issued	**<2%**	**Quarterly**	0.04%	0.01%	NA	0.00%	0.00%	0.45%	0.00%	0.00%
	%age of complaints resolved within 4 weeks	**100%**	**Quarterly**	100.00%	100.00%	NA	100.00%	100.00%	100.00%	NA	100.00%
	Time taken for refund of deposits after closure (within 60 days)	**100%**	**Quarterly**	100.00%	100.00%	NA	100.00%	100.00%	NA	NA	100.00%
4	**Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)**										
	within 60 sec	**>60%**	**Quarterly**	95.72%	81.90%	100.00%	85.50%	96.42%	80.00%	90.46%	85.32%
	within 90 sec	**>80%**	**Quarterly**	97.35%	86.97%	100.00%	100.00%	98.59%	86.67%	92.58%	90.13%
5	**Bandwidth Utilization/ Throughput:**										
	POP to ISP Gateway Node [Intra-network] Link(s)	**<80%**	**Quarterly**	62.30%	50.16%	52.50%	52.50%	15.17%	55.37%	52.27%	NA
	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	**<80%**	**Quarterly**	NA	24.73%	NA	NA	45.44%	20.70%	48.11%	71.15%

	Broadband Connection Speed (download) - from ISP Node to User	**>80%**	**Quarterly**	103.00%	86.96%	NP	NP	NP	99.00%	98.05%	88.00%
6	**Service Availability/Uptime (for all users) in %age**										
	Service Availability (%)	**>98%**	**Quarterly**	100.00%	99.73%	99.96%	**92.89%**	100.00%	99.94%	100.00%	99.46%
7	**Packet Loss**										
	% of Packet loss	**<1%**	**Quarterly**	0.00%	0.17%	0.26%	NP	0.00%	0.09%	0.00%	0.00%
8	**Network latency (for wired broadband access)**										
	User reference point at POP/ISP Gateway node to IGSP/NIXI	**<120 ms**	**Quarterly**	31	39	25	NA	51	43	18	5
	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	**<350 ms**	**Quarterly**	76	84	217	NP	188	220	274	82
	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)	**<800 ms**	**Quarterly**	NA	NA	NA	NA	NA	NA	NA	NA

*NA- Not Applicable

10. 3 DAYS LIVE MEASUREMENT FOR BROADBAND SERVICE PROVIDERS:

S/N	Parameters	Benchmark	Audit Period	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROADBAND
				3 DAYS LIVE DATA FOR BROADBAND SERVICES - HARYANA CIRCLE							
1	Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)										
	Within 60 sec	**>60%**	Live	89.86%	89.33%	100.00%	**56.00%**	95.63%	100.00%	97.67%	76.63%
	Within 90 sec	**>80%**	Live	92.75%	97.53%	100.00%	100.00%	98.65%	100.00%	98.39%	83.85%
2	Bandwidth Utilization/ Throughput										
2.1	POP to ISP Gateway Node [Intra-network] Link(s)	< 80%	Live	50.69%	49.27%	55.65%	63.29%	34.82%	49.12%	39.20%	NA
2.2	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	< 80%	Live	NA	27.41%	NA	NA	55.42%	49.12%	68.56%	70.57%
2.3	Broadband Connection Speed (download) - from ISP Node to User	> 80%	Live	105.37%	93.53%	98.63%	88.02%	91.67%	97.32%	80.47%	88.00%
3	Packet loss										
	% of Packet loss	**<1%**	Live	0.23%	**1.50%**	0.26%	0.00%	0.00%	0.20%	0.00%	0.00%
4	Network latency (for wired broadband access)										
4.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	<120 ms	Live	43	49	35	NA	77	42	1	33
4.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	<350 ms	Live	70	80	191	100	193	223	242	84
4.3	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)	<800 ms	Live	NA	NA	NA	NA	NA	NA	NA	NA

- NA:Not Applicable

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 **You Broadband**, its achievement level was **88.90%** for fault Repair by next working day and **98.01%** for fault Repair by 3 working days.

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

During live calling the response from the subscribers was of mixed nature. Some of the customers reported that the billing complaints were resolved to their satisfaction; some reported that they don't remember about the resolution of complaints. However, majority of the customer reported that their complaints were resolved satisfactorily.

Response Time to Customer for assistance by operator (Voice to Voice): For parameter percentage of calls getting connected to call center and answered, all operators were found meeting the benchmark. However, **Pacenet** could not meet the benchmark for this parameter during live measurement as it could connect only **56%** of calls against the benchmarks of >60% within 60 seconds.

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 i.e. within benchmark during quarterly audit as well as live measurement.

Service Availability/Uptime: All service providers were found meeting the benchmark for this parameter except **Pacenet.** It could achieve 92.89**%** against the benchmark of >98%.

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 (except BSNL) were meeting the benchmark prescribed by TRAI. The performance of BSNL in live measurement was **1.50%** against the benchmark of < 1%.

CUSTOMER CARE / HELPLINE ASSESSMENT

LIVE CALLING TO CALL CENTRE FOR BROADBAND SERVICES									
Parameter	Circle Name	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOUBROADBAND
Total No. of calls Attempted	Haryana	100	100	100	100	100	100	100	100
Total number of calls answered by the operator within 60 seconds	Haryana	100	91	100	64	92	92	92	100
% age calls answered by the operator in 60 seconds	Haryana	100.00%	90.00%	100.00%	64.00%	92.00%	92.00%	92.00%	100.00%
Total number of calls answered by the operator within 90 seconds	Haryana	100	98	100	84	98	100	100	100
% age calls answered by the operator within 90 seconds	Haryana	100.00%	98.00%	100.00%	84.00%	98.00%	100.00%	100.00%	100.00%

In case of calls answered by operators (voice to voice) within 60 seconds and 90 seconds, when test calls were made to the call centers. BSNL, Pacenet and RCL could connect 98%, 84% and 98% of calls to the operator within 90 Seconds.

11. GRAPHICAL REPRESENTATION OF BROADBAND SERVICES
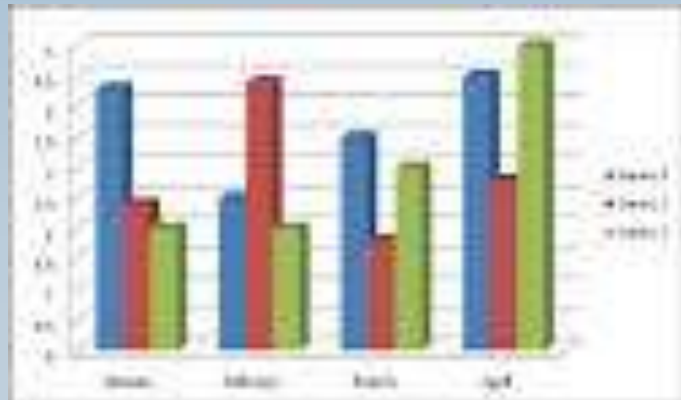
11. GRAPHICAL REPRESENTATION OF QUARTERLY PERFORMANCE OF BROADBAND SERVICE PROVIDERS:

1. SERVICE PROVISIONING/ACTIVATION TIME:

Service Provisioning/Activation Time

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROADBAND
100% cases in 15 days	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%		100.00%
Benchmark <15 days	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
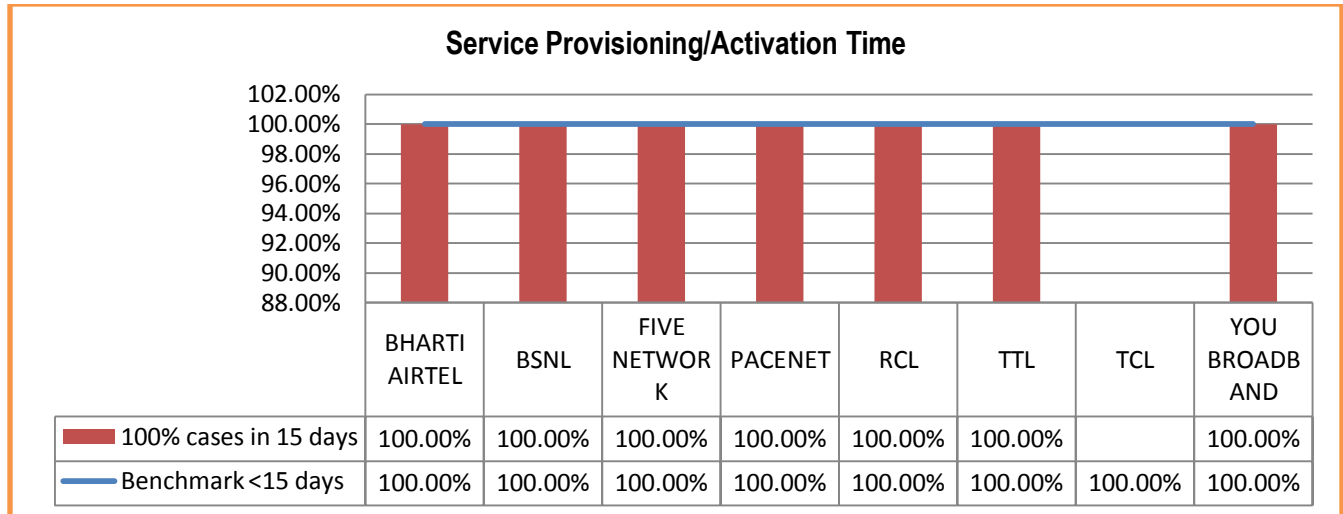
All Operators are meeting the benchmarks .Due to no installation of new broadband connections of M/S TCL in quarter (Jan to Mar 14) ending March 14, hence not applicable.

2. BILLING PERFORMANCE:

Billing Performance

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROADBAND
Billing complaints per 100 bills issued	0.04%	0.01%		0.00%	0.00%	0.45%	0.00%	0.00%
Benchmark <2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
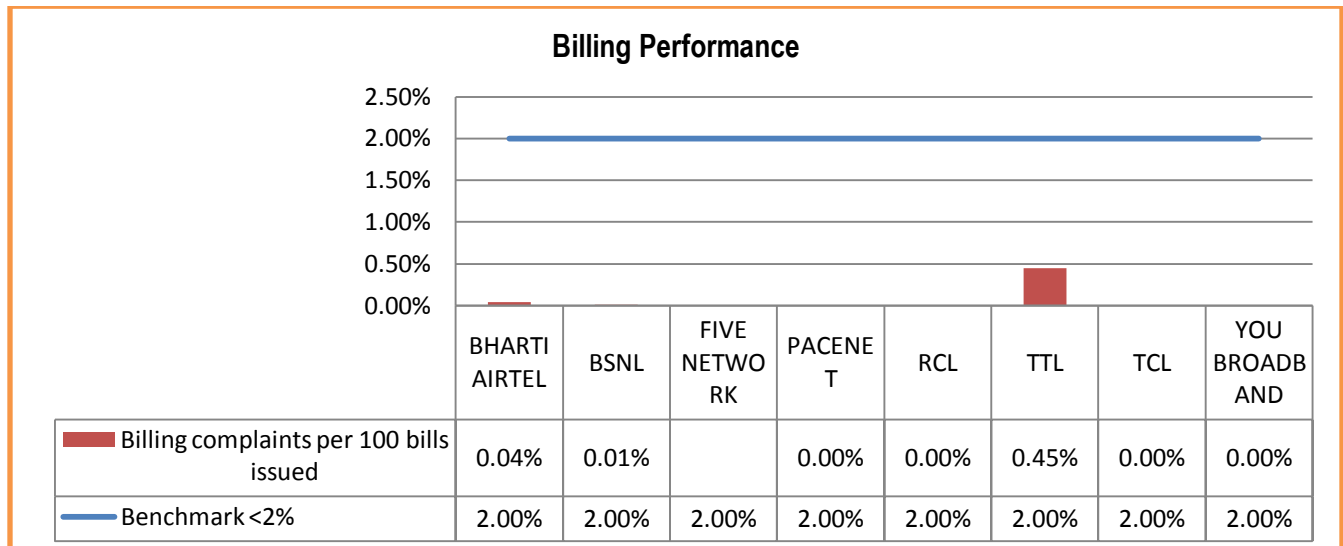
All Operators are meeting the benchmarks. In case of five networks, they are not having post-paid connections.

3. FAULTS REPAIR/RESTORATION TIME:

Faults Repair/Restoration Time

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROADBAND
Faults Repair time within 3 working day	100.00%	99.75%	100.00%	100.00%		100.00%	100.00%	98.01%
Benchmark ≥99%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%
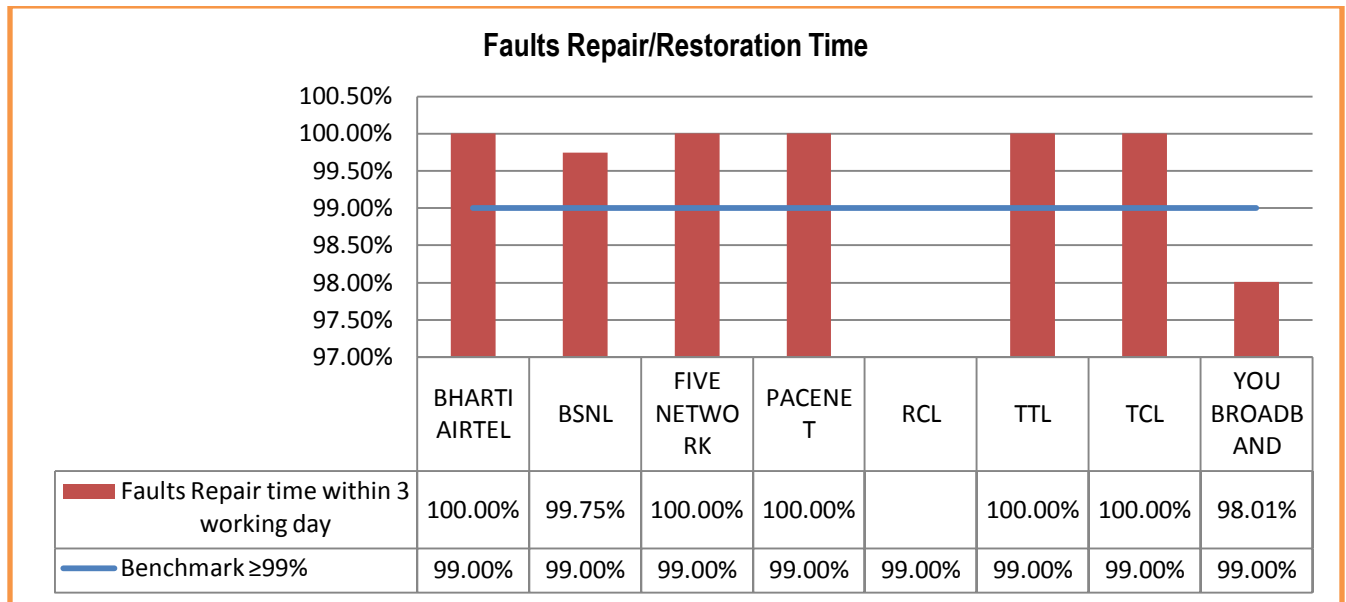
All Operators are meeting the benchmarks except You broadband and In case of RCL, no fault registered in this quarter, hence not applicable.

4. COMPLAINT RESOLUTION:

Complaint Resolution

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROADBAND
%age of complaints resolved within 4 weeks	100.00%	100.00%		100.00%	100.00%	100.00%		100.00%
Benchmark 100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
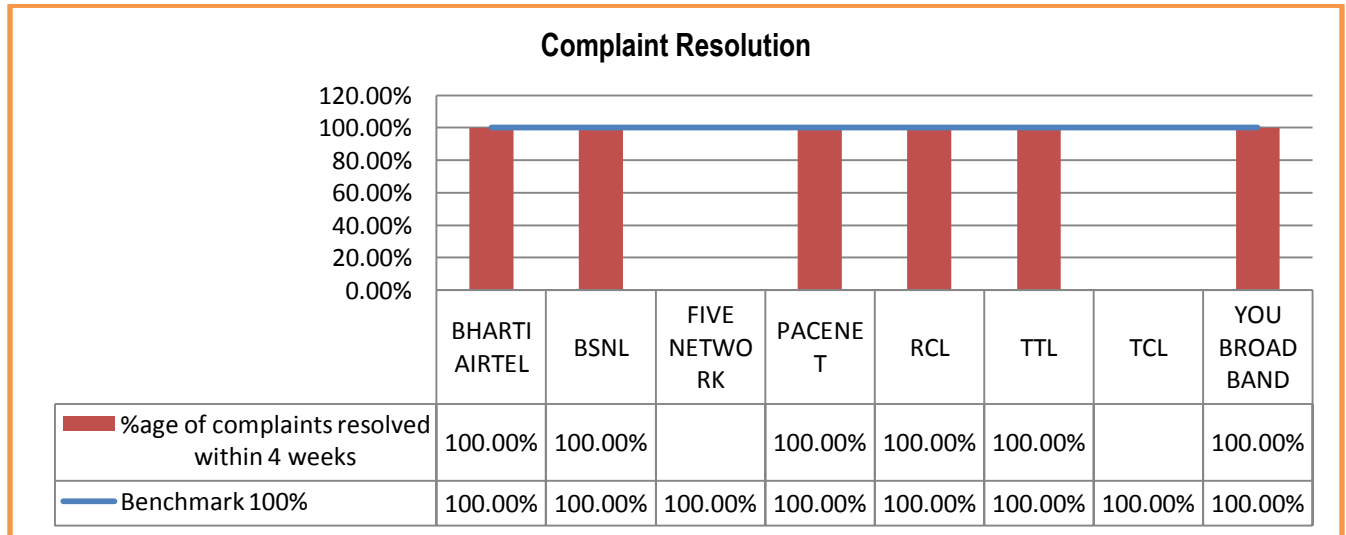
All Operators are meeting the benchmarks.

5. REFUND:

Refund

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROAD BAND
Time taken for refund of deposits after closure (within 60 days)	100.00%	100.00%		100.00%	100.00%			100.00%
Benchmark 100% (within 60 days)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
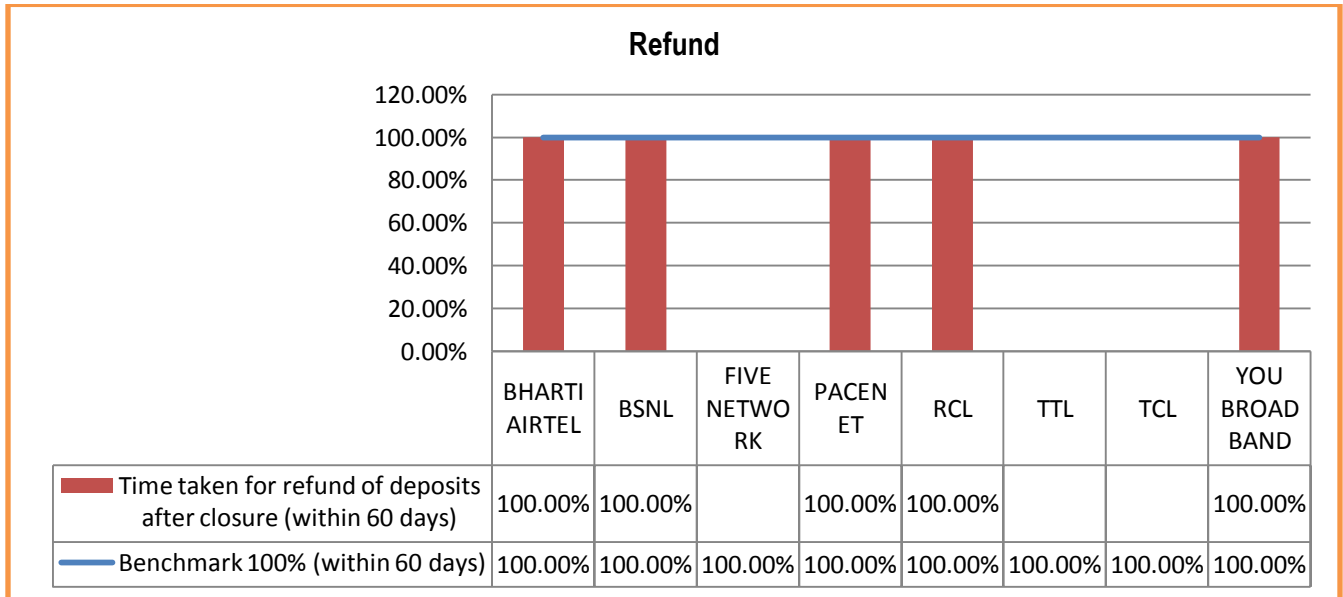
All Operators are meeting the benchmarks.

6. SERVICE AVAILABILITY/UPTIME:

Service Availability/Uptime (for all users) in %age

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROAD BAND
Service Availability/Uptime (for all users) in %age	100.00%	99.73%	99.96%	92.89%	100.00%	99.94%	100.00%	99.46%
Benchmark >98%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%
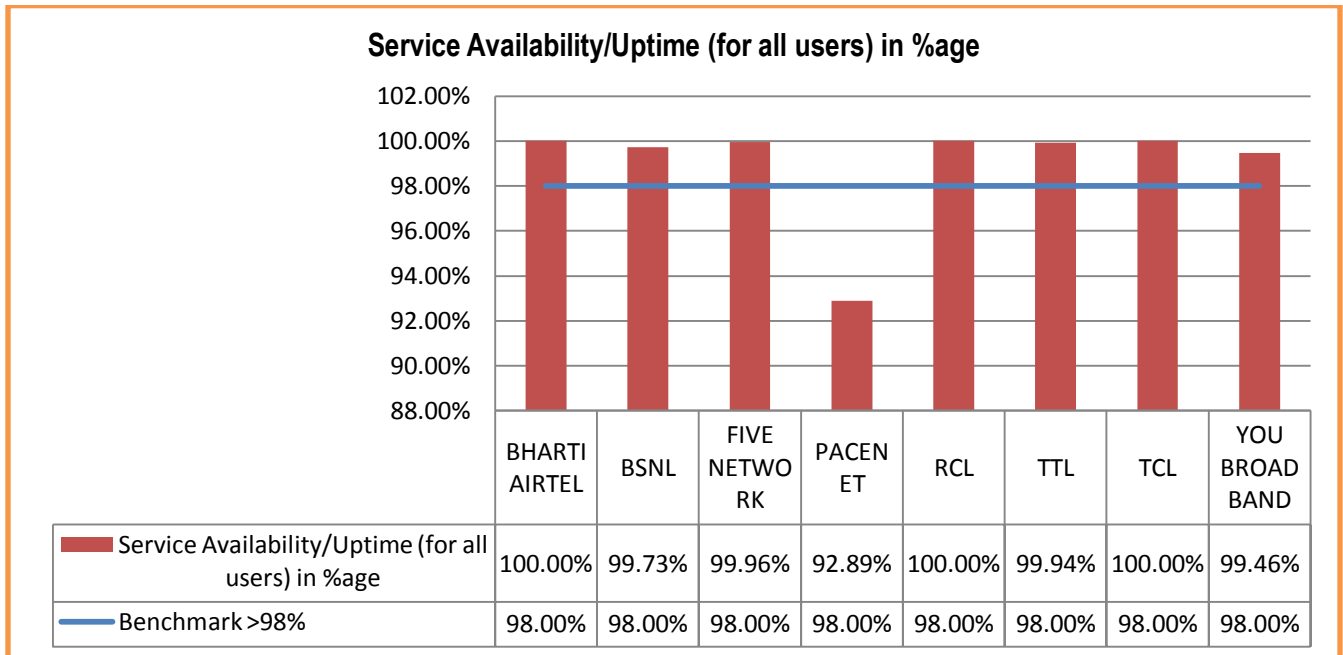
All Operators are meeting the benchmarks except Pacenet.

12. GRAPHICAL REPRESENTATION OF PERFORMANCE OF THE BROADBAND SERVICE PROVIDERS V/S 3-DAYS LIVE MEASUREMENT:

1. **BROADBAND UTILIZATION/THROUGHPUT POP TO ISP GATEWAY NODE:**

Bandwidth Utilization/ Throughput
POP to ISP Gateway Node [Intra-network] Link(s)

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROADBAND
Quarterly	62.30%	50.16%	52.50%	52.50%	15.17%	55.37%	52.27%	
Live	50.69%	49.27%	55.65%	63.29%	34.82%	49.12%	39.20%	
Benchmark <80%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
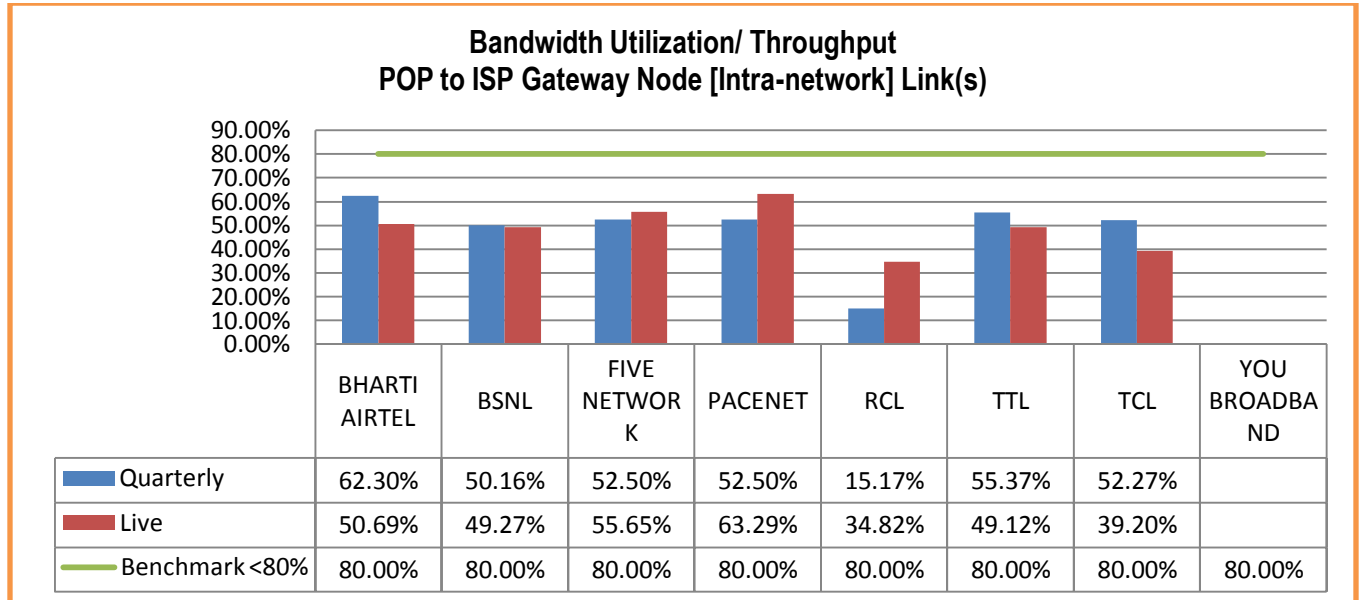
All Operators are meeting the benchmarks.

2. **BROADBAND UTILIZATION/THROUGHPUT ISP GATEWAY NODE TO IGSP/NIXI NODE:**

Bandwidth Utilization/ Throughput
ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROADBAND
Quarterly		24.73%			45.44%	20.70%	48.11%	71.15%
Live		27.41%			55.42%	49.12%	68.56%	70.57%
Benchmark <80%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
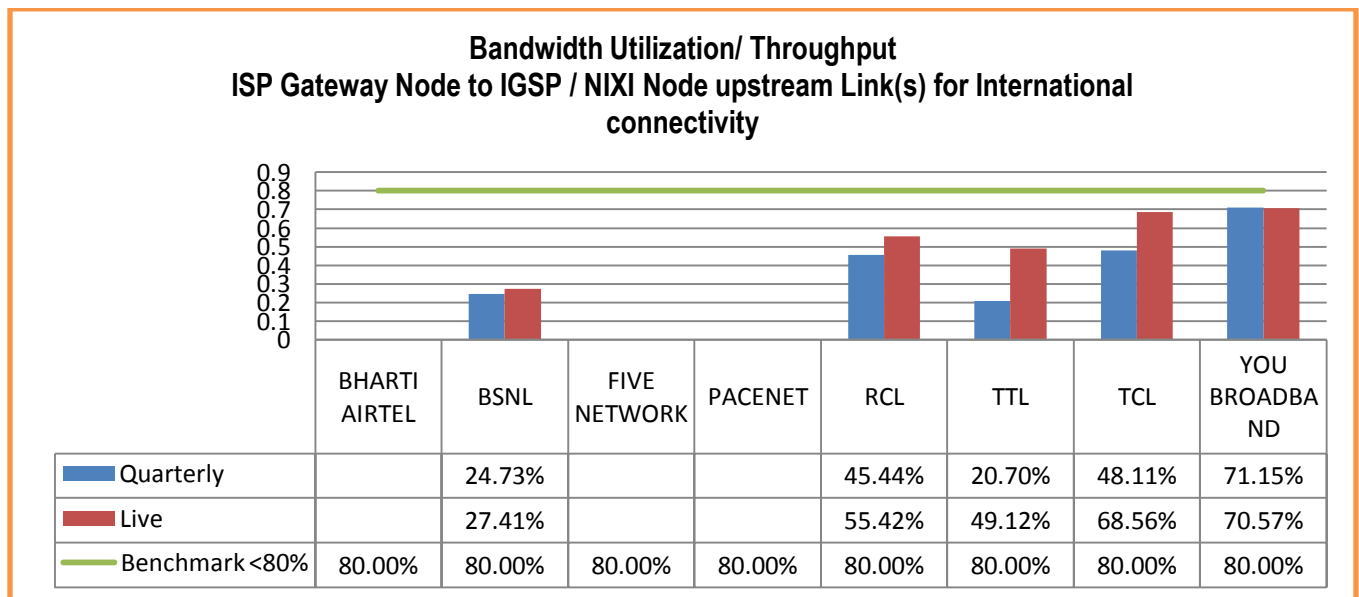
All Operators are meeting the benchmarks.

3. BROADBAND CONNECTION SPEED (DOWNLOAD) FROM ISP NODE TO USER:

Broadband Connection Speed (download) - from ISP Node to User

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROADB AND
■ Quarterly	103.00%	86.96%	0.00%	0.00%	0.00%	99.00%	98.05%	88.00%
■ Live	105.37%	93.53%	98.63%	88.02%	91.67%	97.32%	80.47%	88.00%
— Benchmark >80%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
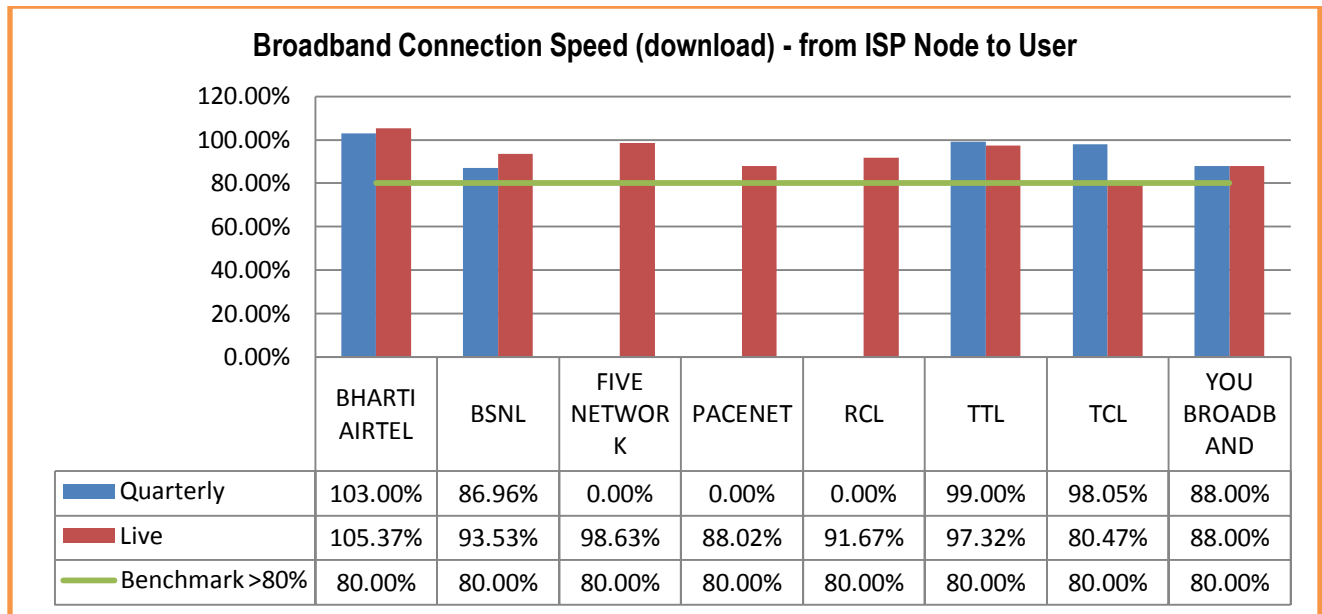
All Operators are meeting the benchmarks.

4. PACKET LOSS:

% of Packet loss

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROADBA ND
■ Quarterly	0.00%	0.17%	0.26%		0.00%	0.09%	0.00%	0.00%
■ Live	0.23%	1.50%	0.26%	0.00%	0.00%	0.20%	0.00%	0.00%
— Benchmark <1%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
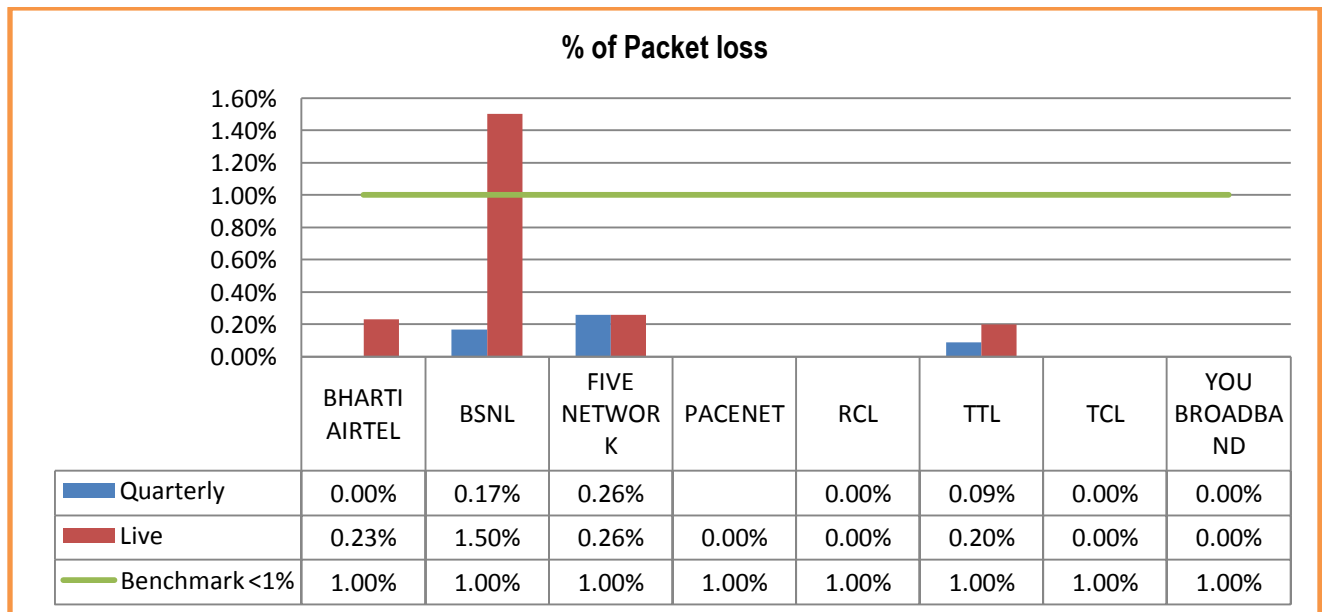
All Operators are meeting the benchmarks except BSNL in 3 days live measurement.

5. NETWORK LATENCY USER REFERENCE POINT AT POP/ISP GATEWAY NODE TO IGSP/NIXI:

Network latency (for wired broadband access)
User reference point at POP/ISP Gateway node to IGSP/NIXI

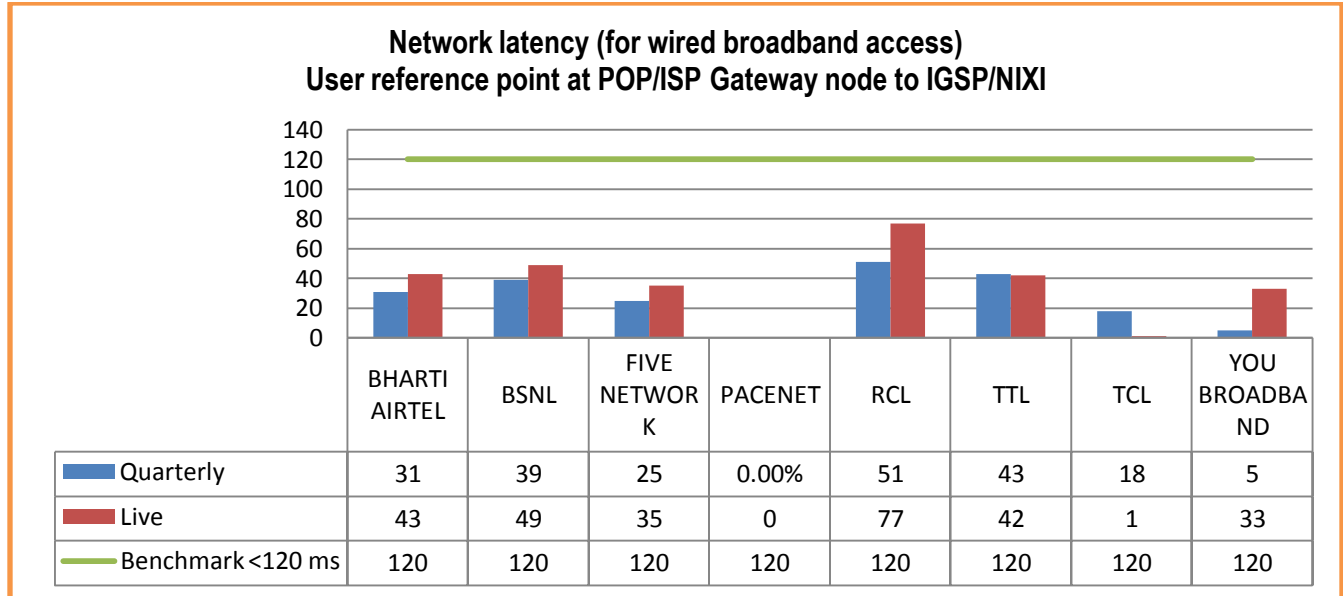|	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROADBAND
Quarterly	31	39	25	0.00%	51	43	18	5
Live	43	49	35	0	77	42	1	33
Benchmark <120 ms	120	120	120	120	120	120	120	120

All Operators are meeting the benchmarks.

6. NETWORK LATENCY USER REFERENCE POINT AT ISP GATEWAY NODE TO INTERNATIONAL NEAREST NAP PORT ABROAD (TERRESTRIAL):

Network latency (for wired broadband access) User reference point at ISP
Gateway node to International nearest NAP port abroad (terrestrial)

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROADBAND
Quarterly	76	84	217	0.00%	188	220	274	82
Live	70	80	191	100	193	223	242	84
Benchmark <350 ms	350	350	350	350	350	350	350	350
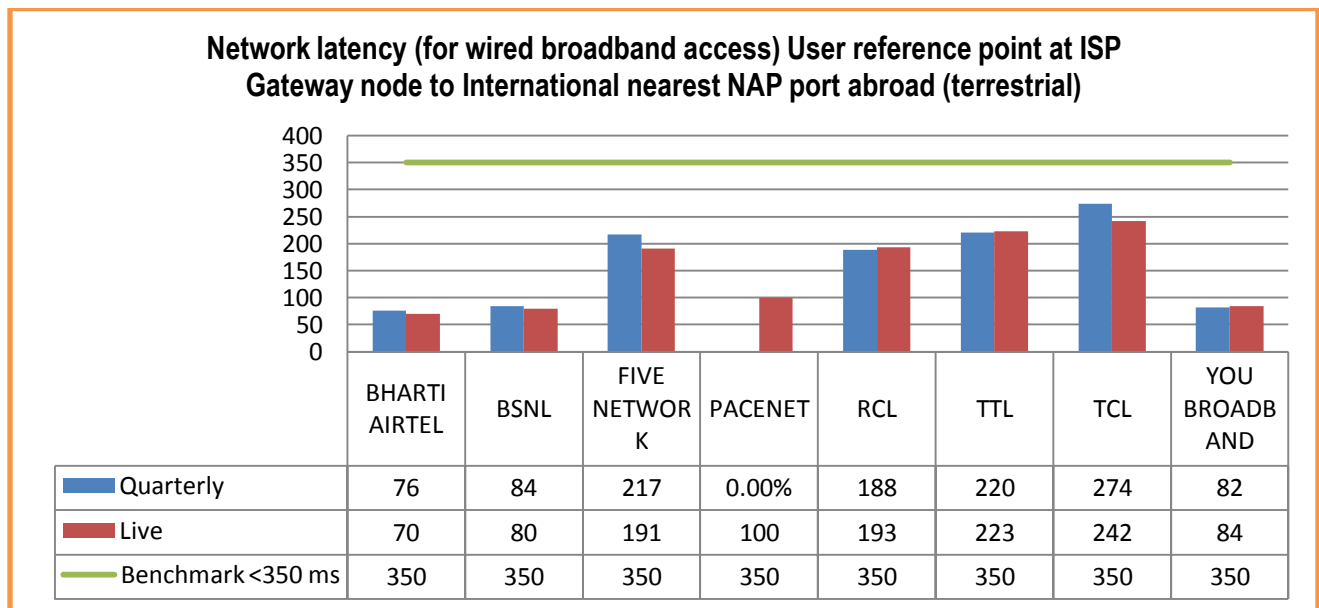
All Operators are meeting the benchmarks.

7. RESPONSE TIME TO THE CUSTOMER FOR ASSISTANCE ACCESSIBILITY BY OPERATOR WITHIN 60 SECONDS:

Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROAD BAND
Quarterly	95.72%	81.90%	100.00%	85.50%	96.42%	80.00%	90.46%	85.32%
Live	89.86%	89.33%	100.00%	56.00%	95.63%	100.00%	97.67%	76.63%
Benchmark >60% (within 60 sec)	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%
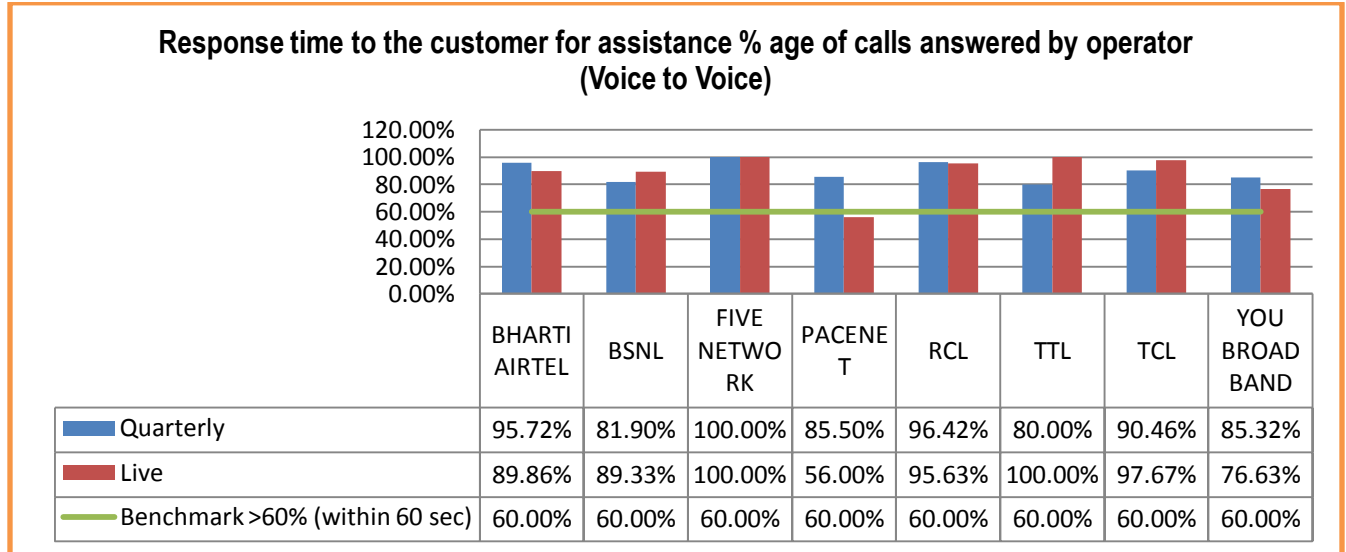
Pacenet could not meet the benchmarks for this parameter as Pacenet could connect only 56% of calls against the benchmarks of >60% within 60 seconds.

8. RESPONSE TIME TO THE CUSTOMER FOR ASSISTANCE ACCESSIBILITY BY OPERATOR WITHIN 90 SECONDS:

Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)

	BHARTI AIRTEL	BSNL	FIVE NETWORK	PACENET	RCL	TTL	TCL	YOU BROAD BAND
Quarterly	97.35%	86.97%	100.00%	100.00%	98.59%	86.67%	92.58%	90.13%
Live	92.75%	97.53%	100.00%	100.00%	98.65%	100.00%	98.39%	83.85%
Benchmark >80% (within 90 sec)	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%

All Operators are meeting the benchmarks.