TRAI

REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICE

&

BROADBAND SERVICES

FOR

TELECOM REGULATORY AUTHORITY OF INDIA

NORTH ZONE – DELHI METRO SERVICE AREA

(JANUARY 2014 – MARCH 2014)

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 **Delhi Metro circle** against the QoS bench marks laid down by TRAI in the respective regulations.

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1. BACKGROUND

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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
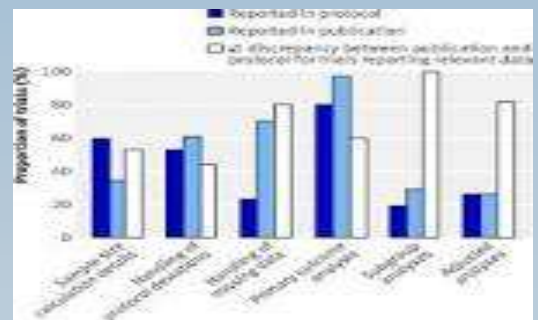
3. SAMPLE SIZE:

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 are the various operators covered in Delhi Metro circle

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location
		Jan-14	**Feb-14**	**March-14**	
	GSM Operators				
1	AIRCEL	18,20 & 21 Jan-14	10,11 & 12 Feb-14	10,11 & 12 March-14	MTNL Exchange Karol Bagh Near Rejendra Place Metro Stn.New Delhi.
2	AIRTEL	15,16 & 17 Jan-14	19,20 & 21 Feb-14	24, 25 & 26 March-14	Plot No 16 Udhyog Vihar Ph-4 Gurgaon Haryana.
3	MTNL	20,21, & 22 Jan-14	11,12 &13 feb-13	12,13 & 14 March-14	MTNL Exchange Karol Bagh Near Rajendra Place Metro Stn.New Delhi.
4	IDEA	16, 17 & 20 Jan-14	21, 24 & 25 Feb-14	18, 19 & 20 March-14	Idea Cellular Limited, E-5, Sector-63, Noida (UP)
5	RCOM GSM	13,14 & 15 Jan-14	9, 10 & 13 Feb-14	6,7 & 8 March-14	Reliance Center Maharaja Ranjit Singh Hotel, Maharaja Ranjit Singh Marg New Delhi.
6	VODAFONE	14, 15 & 16 Jan-14	21, 22 & 24 Feb-14	7,10 & 11 March-14	A-19 Mohan Cooperative Industrial Estates, Mathura Road New Delhi.
	CDMA Operators				
7	MTS	13, 14 & 15 Jan-14	21, 24 & 26 Feb-14	17, 18 & 19 March-14	A-194 Okhla Phase 1 New Delhi
8	RCOM CDMA	13,14 & 15 Jan-14	13, 14 & 15 Feb-14	6,7 & 8 March-14	Reliance Center Maharaja Ranjit Singh Hotel, Maharaja Ranjit Singh Marg New Delhi.
9	TATA CDMA	**13,14 & 15 Jan-14**	20, 21 & 24 Feb-14	13,14 & 18 March-14	TTSL 2 A Old Iswar Nagar Near NFC New Delhi

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

3.2 SAMPLING FOR BASIC (WIRELINE) SERVICES

- The QoS audit for basic (wireline) service was 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 for Basic (Wireline) service was not required to be done in this quarter.**

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, for 5% of Point of Presence (PoPs) spread over in 10% SDCAs in specified Telecom Circle. The QoS audit for following broadband service providers was undertaken during the quarter ended March 2014.

Sl. No.	Name of Broadband Service Providers
1	BHARTI AIRTEL LIMITED
2	HATHWAY
3	INDUS MEDIA & COMMUNICATION LTD.
4	NSTPL
5	BROADBAND PACENET INDIA PVT. LTD
6	CITYCOM NETWORKS PVT. LTD. (SPECTRANET)
7	TIKONA DIGITAL NETWORKS
8	MTNL
9	RELIANCE COMMUNICATION LIMITED (RCL)
10	TATA COMMUNICATION LIMITED (TCL)
11	TATA TELESERVICES LIMITED (TTL)

4. EXECUTIVE SUMMARY

4. EXECUTIVE SUMMARY:

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

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

BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

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

The TCBH reported by all the service providers matched the network busy hour calculated by TUV auditors for the Delhi metro 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	3	24	2901	NSN	NSN
2	AIRTEL	31	56	5477	Ericsson	Ericsson
3	MTNL	6	31	1116	NSN	NSN
4	IDEA	10	37	4535	NSN	NSN
5	RCOM GSM	4	14	2568	Huawei	Huawei
6	VODAFONE	15	53	5740	Ericsson	Ericsson
CDMA Operators						
7	MTS	1	4	926	ZTE	ZTE
8	RCOM CDMA	7	NA	1000	Lucent & ZTE	Lucent
9	TATA CDMA	9	8	1491	Huawei	Huawei

TABLES OF MONTHLY QOS PERFORMANCE:

TABLE: 1

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	PMR Generation Data						GSM Operators			CDMA Operators		
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	<=2%	Jan-14	0.42%	0.01%	0.49%	0.00%	0.23%	0.02%	0.09%	0.11%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Jan-14	**2.15%**	0.00%	1.71%	0.00%	0.19%	0.02%	0.43%	0.10%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Jan-14	97.93%	99.87%	96.02%	99.97%	99.56%	99.58%	99.04%	98.72%	99.16%
	b) SDCCH/PAGING Channel congestion	<=1%	Jan-14	0.27%	0.02%	0.42%	0.40%	0.08%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-14	0.91%	0.04%	1.80%	0.85%	0.04%	0.18%	0.29%	0.01%	0.05%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Jan-14	1.10%	0.56%	1.65%	0.58%	0.41%	0.85%	0.58%	0.46%	0.57%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jan-14	2.87%	0.69%	2.58%	1.59%	0.02%	2.63%	1.43%	1.88%	2.97%
	c) Connections with good voice quality	>=95%	Jan-14	97.69%	99.32%	97.81%	98.23%	98.74%	97.59%	98.87%	99.80%	99.13%
4	**No. of POI's having >=0.5% POI congestion**	<=0.5%	Jan-14	0	0	0	0	0	0	0	0	0

Table heading: **CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- JAN-14 MONTH**

TABLE: 2

				AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- FEB-14 MONTH												
PMR Generation Data		**Bench- mark**	**Audit Period**									
S/N	**Name of Parameter**			**GSM Operators**						**CDMA Operators**		
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	<=2%	Feb-14	0.30%	0.02%	0.40%	0.00%	0.20%	0.03%	0.06%	0.10%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Feb-14	1.32%	0.00%	1.25%	0.00%	0.04%	0.02%	0.11%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Feb-14	97.75%	99.86%	96.00%	99.97%	99.56%	99.60%	98.92%	98.33%	99.04%
	b) SDCCH/PAGING Channel congestion	<=1%	Feb-14	0.26%	0.03%	0.48%	0.74%	0.07%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-14	1.26%	0.05%	1.83%	1.05%	0.05%	0.17%	0.26%	0.02%	0.10%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Feb-14	1.15%	0.55%	1.61%	0.58%	0.40%	0.82%	0.61%	0.53%	0.63%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Feb-14	2.97%	0.64%	2.51%	1.58%	0.04%	2.75%	1.37%	2.41%	2.97%
	c) Connections with good voice quality	>=95%	Feb-14	97.50%	99.30%	97.77%	98.33%	98.78%	97.47%	99.19%	99.79%	99.11%
4	**No. of POI's having >=0.5% POI congestion**	<=0.5%	Feb-14	0	0	0	0	0	0	0	0	0

TABLE: 3

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- MAR-14 MONTH											

	PMR Generation Data	**Bench- mark**	**Audit Period**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**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	0.28%	0.02%	0.50%	0.00%	0.21%	0.01%	0.04%	0.12%	0.07%
	b) Worst affected BTSs due to downtime	<=2%	Mar-14	1.62%	0.00%	1.88%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Mar-14	97.66%	99.86%	96.16%	99.97%	99.63%	99.71%	99.10%	98.11%	99.03%
	b) SDCCH/PAGING Channel congestion	<=1%	Mar-14	0.25%	0.03%	0.45%	0.76%	0.02%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-14	1.32%	0.05%	1.78%	1.47%	0.05%	0.12%	0.14%	0.04%	0.06%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Mar-14	1.09%	0.52%	1.65%	0.53%	0.37%	0.73%	0.54%	0.25%	0.71%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Mar-14	2.62%*	0.63%	2.46%	1.48%	0.02%	2.53%	1.83%	2.72%	**3.63%**
	c) Connections with good voice quality	>=95%	Mar-14	97.60%	99.33%	97.64%	98.69%	98.83%	97.60%	99.19%	99.80%	99.07%
4	**No. of POI's having >=0.5% POI congestion**	<=0.5%	Mar-14	0	0	0	0	0	0	0	0	0

TABLE OF QUARTERLY QOS PERFORMANCE:

TABLE: 4

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-MARCH-14) OF DELHI METRO CIRCLE											
PMR Generation Data		**Bench- mark**	**Audit Period**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**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	0.33%	0.02%	0.46%	0.00%	0.21%	0.02%	0.06%	0.11%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	1.70%	0.00%	1.61%	0.00%	0.09%	0.01%	0.18%	0.03%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.78%	99.86%	96.06%	99.97%	99.58%	99.63%	99.02%	98.39%	99.08%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.26%	0.03%	0.45%	0.63%	0.06%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	1.16%	0.05%	1.80%	1.12%	0.05%	0.16%	0.23%	0.02%	0.07%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.11%	0.54%	1.64%	0.56%	0.39%	0.80%	0.58%	0.41%	0.64%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.82%	0.65%	2.52%	1.55%	0.03%	2.64%	1.54%	2.34%	**3.19%**
	c) Connections with good voice quality	>=95%	Quarterly	97.60%	99.32%	97.74%	98.42%	98.78%	97.55%	99.08%	99.80%	99.10%
4	**No. of POI's having >=0.5% POI congestion**	<=0.5%	Quarterly	0	0	0	0	0	0	0	0	0

- Aircel provided the data averaged over a month, not on daily basis.

The audit of network related parameters for cellular mobile service providers was conducted at their respective MSCs in the circles.

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 Delhi Metro circle, the audit with respect to this parameter revealed that all the operators met the benchmark for this parameter except Aircel. **Aircel** could not meet the benchmark for the parameter 'worst affected BTSs due to down' with its performance of **2.15** % in the month of Jan-14, however on average for the quarter, it has met the benchmark.

- **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 in compliance on the benchmark for 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 <u>Paging Channel Occupancy Ratio</u>   (**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 met the TRAI specified benchmarks on TCH/SDCCH/Paging Channel congestion parameters.

There was no congestion on individual POI links between a service provider vis-à-vis other service.

- **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 .39 %) was for RCOM (GSM) 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 results for this parameter indicates that all operators except Tata (CDMA), have met the bench mark successfully during the quarter. **Tata (CDMA)** could perform as **3.19%** on an average for the quarter.

Aircel has provided the data on monthly basis but not on daily basis. For audit purpose, data was required on daily basis.

    iii.   Connections with good voice quality:

The audit results for this parameter indicates that all operators have met the bench mark during the quarter.

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

The audit with respect to this parameter revealed that all the operators met the benchmark for this parameter as there was no individual POI having congestion > 0.5.

4.2 CUSTOMER SERVICE QUALITY (CSD) PARAMETERS

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

S/ N	Name of Parameter	Bench- mark	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	Quarterly CSD Audit Data						**GSM Operators**				**CDMA Operators**	
	Customer Service Quality Parameters											
1	**Metering & Billing Credibility -Post Paid**											
	A) No. of bills issued during the quarter		Delhi	50603	1742540	159536	632317	129024	1704722	665	319918	352050
	B) No. of bills disputed including billing complaints during the quarter		Delhi	2	535	33	416	126	1701	0	314	7
	C)% of billing complaints during the quarter	<= 0.1%	Delhi	0.00%	0.03%	0.02%	0.07%	0.10%	0.10%	0.00%	0.10%	0.00%
2	**Metering & Billing Credibility -Pre Paid**											
	A) Total No. of Pre-paid customers at the end of the quarter		Delhi	3735162	8313084	2146154	4719263	45000341	7450259	450700	2803142	1160705
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		Delhi	4	591	65	585	4496	969	352	2800	15
	C) % of Pre-paid Charging Complaints	<= 0.1%	Delhi	0.00%	0.01%	0.003%	0.01%	0.10%	0.01%	0.08%	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		Delhi	6	1126	98	1001	4622	2670	353	3114	22
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		Delhi	6	1126	98	1001	4622	2670	353	3114	22

CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE MAR-14

C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 week	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
4	**Response time to customers for assistance**										
A) Accessibility of call centre/Customer Care	>=95%	Delhi	97.76%	100.00%	98.0%	99.55%	98.56%	95.88%	99.42%	98.52%	100.00%
B) % call answered by operators(voice to voice) within 60 sec.	>=90%	Delhi	**72.69%**	91.24%	95.77%	98.68%	**87.39%**	94.17%	95.11%	**89.11%**	98.28%
5	**Termination/closure of service**										
A) Total No. of requests for Termination / Closure of service received during the quarter		Delhi	213	8555	7	7588	1619	5109	2	2061	3626
B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		Delhi	213	8555	7	7588	1619	5109	2	2061	3626
C) % of Termination/ Closure of service within 7 days	<=7days	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
6	**Time taken for refunds of deposits after closures.**										
A) No. of Payments/ Refunds due during the quarter		Delhi	696	1548	0	1936	1264	1705	13	1486	162
B) No. of Payments/ Refunds Cleared during the quarter		Delhi	696	1548	0	1908	1264	1705	6	1486	162
C) Time taken for refunds of deposits after closures.	100% within 60 days	Delhi	100.00%	100.00%	100.00%	**98.55%**	100.00%	100.00%	**46.15%**	100.00%	100.00%

KEY FINDINGS:

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 %.

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. Apart from this, all service providers also have met the benchmark of 100 % refund in one week, where customers were due for credit / adjustment.

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 are in compliance with respect to the parameter accessibility of call center. However, **Aircel and RCOM (GSM & CDMA)** were unable to meet the benchmark of calls answered by Operators (voice to voice) within 60 seconds. They achieved their performance as **72.69 %, 87.39%** and **89.11 %** respectively.

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 except **Idea and MTS**. They achieved their performance as **98.55 %** and **46.15 %** respectively. The poor performance of MTS was due to their CRM migration (Upgradation) on PAN India basis.

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

	CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- JAN-14 MONTH										
Live measurement Data		**Bench- mark**	**Average of 3 Days**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**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	1.31%	0.02%	0.39%	0.00%	0.13%	0.02%	0.19%	0.05%	0.06%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.07%	0.00%	0.45%	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	97.85%	99.88%	96.02%	99.98%	99.54%	99.65%	98.77%	98.85%	99.08%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.32%	0.01%	0.35%	0.38%	0.06%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	0.70%	0.04%	1.78%	0.62%	0.04%	0.13%	0.58%	0.01%	0.11%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	1.15%	0.58%	1.73%	0.58%	0.39%	0.85%	0.59%	0.48%	0.52%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	4.64%	0.69%	2.65%	1.50%	0.01%	2.95%	2.13%	2.61%	2.64%
	c) Connections with good voice quality	**>=95%**	Live data	97.67%	99.26%	97.75%	98.20%	98.74%	97.63%	98.83%	99.80%	99.13%
4	**No. of POI having >=0.5% congestion**	**<0.5%**	Live data	0	0	0	0	0	0	0	0	0

TABLE: 2

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- FEB-14 MONTH												
Live measurement Data		**Bench- mark**	**Average of 3 Days**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**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	0.22%	0.02%	0.43%	0.00%	0.12%	0.02%	0.02%	0.18%	0.01%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.00%	0.00%	0.54%	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	97.74%	99.85%	96.05%	99.96%	99.53%	99.48%	98.42%	97.92%	99.04%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.33%	0.03%	0.37%	0.59%	0.02%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	1.43%	0.05%	1.84%	1.19%	0.06%	0.23%	0.44%	0.03%	0.02%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	1.13%	0.58%	1.50%	0.56%	0.41%	0.81%	0.71%	0.54%	0.67%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	**6.72%**	0.61%	2.58%	1.51%	0.00%	2.61%	1.43%	**3.28%**	2.67%
	c) Connections with good voice quality	**>=95%**	Live data	97.35%	99.27%	97.80%	98.61%	98.76%	97.47%	99.18%	99.79%	99.09%
4	**No. of POI having >=0.5% congestion**	**<0.5%**	Live data	**2**	0	0	0	0	0	0	0	0

TABLE: 3

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- MAR-14 MONTH												
Live measurement Data		**Bench- mark**	**Average of 3 Days**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**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	0.59%	0.01%	0.31%	0.00%	0.26%	0.02%	0.02%	0.21%	0.03%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.00%	0.00%	0.18%	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	97.70%	99.86%	95.73%	99.96%	99.66%	99.66%	99.07%	98.05%	99.13%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.23%	0.03%	0.54%	0.53%	0.01%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	1.16%	0.05%	1.83%	0.92%	0.04%	0.15%	0.19%	0.02%	0.02%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	1.14%	0.55%	1.69%	0.50%	0.37%	0.79%	0.53%	0.65%	0.60%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	**7.08%**	0.58%	2.50%	1.45%	0.00%	2.67%	1.24%	**4.05%**	2.94%
	c) Connections with good voice quality	**>=95%**	Live data	97.54%	99.32%	97.62%	98.75%	98.91%	97.56%	99.20%	99.79%	99.11%
4	**No. of POI having >=0.5% congestion**	**<0.5%**	Live data	0	0	0	0	0	0	0	0	0

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) - DELHI METRO CIRCLE												
PMR Generation Data		**Bench- mark**	**Audit Period**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**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	0.71%	0.02%	0.38%	0.00%	0.17%	0.02%	0.08%	0.15%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.02%	0.00%	0.39%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.76%	99.86%	95.93%	99.97%	99.58%	99.60%	98.75%	98.27%	99.08%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.29%	0.02%	0.42%	0.50%	0.03%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	1.10%	0.05%	1.82%	0.91%	0.05%	0.17%	0.40%	0.02%	0.05%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.14%	0.57%	1.64%	0.55%	0.39%	0.82%	0.61%	0.56%	0.60%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	**6.90%**	0.63%	2.58%	1.49%	0.00%	2.74%	1.60%	**3.31%**	2.75%
	c) Connections with good voice quality	>=95%	Quarterly	97.52%	99.28%	97.72%	98.52%	98.80%	97.55%	99.07%	99.79%	99.11%
4	**No. of POI's having >=0.5% POI congestion**	<=0.5%	Quarterly	**1**	0	0	0	0	0	0	0	0

KEY FINDINGS ON 3 DAYS LIVE MEASUREMENTS:

From three days live assessment, it was found that the performance of all operators was satisfactory as they were largely complying with the benchmarks of parameters except for the parameter 'Worst affected Cell having > 3% TCH drop' which could not be met by **Aircel** and **RCom (CDMA)** with their performance as 6.72 % & 3.28% respectively in the month of Feb-14 and 7.08 % & 4.05% respectively in the month of March-14. On an average of the quarter also their achievements remained non-complied with their performance as 6.90% and 3.31% respectively. Further, Aircel was found having congestion on two individual POIs in the month of Feb-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	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/ N	**Name of Parameter**			GSM Operators						CDMA Operators		
	Response time to customers for assistance											
1	A) Accessibility of call centre/Customer Care	>=95%	Delhi	97.93%	100.00%	99.95%	98.59%	98.81%	**94.07%**	99.53%	98.83%	100.00%
	B) % call answered by operators(voice to voice) within 60 sec.	>=90%	Delhi	92.77%	**86.16%**	98.79%	97.12%	96.52%	92.02%	97.84%	91.69%	98.67%

CUSTOMER CARE / HELPLINE ASSESSMENT

LIVE CALLING TO CALL CENTRE										
Parameter	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	Delhi	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	Delhi	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	Delhi	100	100	100	100	100	100	100	100	100
*% Accessibility of Call centre /customer Care (Total calls successfully established * 100 / Total call attempts)*	Delhi	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)	Delhi	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 60 seconds	Delhi	100	100	100	100	100	100	84	100	100
% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100 / Total calls attempts)	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	84.00%	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 except **Vodafone**. The performance of Vodafone for this parameter was recorded as **94.07%.** However, in case of calls connection to operators (Voice to voice) within 60 seconds, performance of **Airtel** was **86.16%**.

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers, all operators were able to connect the calls with their call center operators/agents successfully except **MTS**. MTS could connect 84% 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 Delhi Metro 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	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
AIRCEL	*Delhi*	--	100%	100%	100%	100%	100%	100%	100%	100%
AIRTEL	*Delhi*	100%	--	100%	100%	100%	100%	100%	100%	100%
MTNL	*Delhi*	100%	100%	--	100%	100%	100%	100%	100%	100%
IDEA	*Delhi*	100%	100%	100%	--	100%	100%	100%	100%	100%
RCOM GSM	*Delhi*	100%	100%	100%	100%	--	100%	100%	100%	100%
VODAFONE	*Delhi*	100%	100%	100%	100%	100%	--	100%	100%	100%
MTS	*Delhi*	100%	100%	100%	100%	100%	100%	--	100%	100%
RCOM CDMA	*Delhi*	100%	100%	100%	100%	100%	100%	100%	--	100%
TATA CDMA	*Delhi*	100%	100%	100%	100%	100%	100%	100%	100%	--

The result of the testing revealed that the inter connection performance among the operators is quite satisfactory as there was hardly any problem in interconnection from one operator to other operators.

LEVEL-1 LIVE CALLING

LEVEL-1 LIVE CALLING

			LEVEL 1 LIVE CALLING								
Emergency no.	Circle Name	No. of calls made	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
100	Delhi	20	✔	✔	✔	✔	✔	✔	✔	✔	✔
101	Delhi	20	✔	✔	✔	✔	✔	✔	✔	✔	✔
102	Delhi	20	✔	✔	✔	✔	✔	✔	✔	✔	✔
1091	Delhi	20	✔	✔	✔	✔	✔	✔	✔	✔	✔
1098	Delhi	20	✔	✔	✔	✔	✔	✔	✔	✔	✔
1291	Delhi	20	✔	✔	✔	✔	✔	✔	✔	✔	✔
1070	Delhi	20	✔	✔	✔	✔	✔	✔	✔	✔	✔
181	Delhi	20	✔	✔	✔	✔	✔	✔	✔	✔	✔

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 Delhi Metro service area, these services were found functional in the networks of all the service providers.

5. DRIVE TEST

5. DRIVE TEST

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 **South Delhi (Municipal Area), North Delhi (NDMC Area) and East Delhi (Municipal Area)** 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 $\geq$ -75 dBm for in-door coverage and $\geq$ -85 dBm for in-vehicle.

DRIVE TEST TABLE: 1

S/N	Parameter	SSA Name: South Delhi	Drive Test Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
1	Call Attempts	Day 1	Jan-14	140	163	193	172	194	156	163	155	157
		Day 2	Jan-14	241	215	255	243	309	227	227	218	227
		Day 3	Jan-14	98	102	92	98	134	81	87	90	80
		Overall SSA	Total	479	480	540	513	637	464	477	463	464
2	Blocked Call Rate	Day 1	Jan-14	2.86%	0.00%	8.81%	0.58%	3.09%	1.28%	1.23%	0.00%	2.55%
		Day 2	Jan-14	4.15%	0.00%	5.10%	2.06%	0.65%	0.44%	1.32%	0.00%	0.44%
		Day 3	Jan-14	2.04%	0.00%	6.52%	2.04%	0.00%	0.00%	2.30%	0.00%	0.00%
		Overall SSA	Total	3.34%	0.00%	6.67%	1.56%	1.26%	0.65%	1.47%	0.00%	1.08%
3	Dropped Call Rate (<=2%)	Day 1	Jan-14	0.74%	0.62%	5.39%	0.00%	1.06%	0.00%	0.62%	0.00%	0.00%
		Day 2	Jan-14	0.00%	0.00%	4.60%	0.00%	0.33%	0.00%	0.45%	0.46%	1.33%
		Day 3	Jan-14	0.00%	0.00%	5.81%	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%
		Overall SSA	Total	0.21%	0.21%	5.08%	0.00%	0.48%	0.00%	0.43%	0.22%	0.87%
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	98.89%	96.14%	96.28%
		Day 2	Jan-14	NA	NA	NA	NA	NA	NA	99.16%	96.99%	96.90%
		Day 3	Jan-14	NA	NA	NA	NA	NA	NA	99.54%	97.05%	95.56%
		Overall SSA	Total	NA	NA	NA	NA	NA	NA	99.14%	96.71%	96.46%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Jan-14	91.66%	95.45%	94.83%	91.43%	88.28%	95.49%	NA	NA	NA
		Day 2	Jan-14	90.89%	93.92%	95.62%	90.62%	92.38%	95.21%	NA	NA	NA
		Day 3	Jan-14	87.99%	95.58%	95.16%	89.44%	90.92%	95.10%	NA	NA	NA
		Overall SSA	Total	90.50%	94.94%	95.27%	90.66%	90.82%	95.28%	NA	NA	NA
5	SERVICE COVERAGE											
	In door (>= -75dBm)	Day 1	Jan-14	88.45%	96.00%	52.44%	42.35%	72.23%	92.64%	79.77%	85.42%	88.39%
		Day 2	Jan-14	82.61%	95.77%	37.08%	57.65%	67.97%	88.36%	87.79%	85.53%	98.82%
		Day 3	Jan-14	60.62%	85.89%	34.81%	37.58%	37.66%	72.73%	81.04%	85.83%	80.58%
		Overall SSA	Total	79.65%	94.10%	41.84%	48.68%	63.53%	86.98%	83.78%	85.57%	92.23%
	In-vehicle (>= -85dBm)	Day 1	Jan-14	99.09%	98.59%	88.05%	86.45%	93.84%	98.63%	99.04%	99.24%	98.25%
		Day 2	Jan-14	97.89%	99.10%	83.96%	93.01%	93.30%	97.43%	99.92%	98.75%	99.98%
		Day 3	Jan-14	96.57%	97.38%	82.81%	86.31%	79.91%	95.86%	100.00%	99.51%	99.84%
		Overall SSA	Total	97.97%	98.62%	85.12%	89.53%	90.91%	97.54%	99.64%	99.10%	99.38%
	Outdoor- in city (>= -95dBm)	Day 1	Jan-14	100.00%	99.19%	98.97%	99.25%	100.00%	99.47%	100.00%	100.00%	100.00%
		Day 2	Jan-14	100.00%	99.75%	98.96%	99.57%	100.00%	99.29%	100.00%	100.00%	100.00%
		Day 3	Jan-14	100.00%	98.83%	99.05%	99.23%	100.00%	98.81%	100.00%	100.00%	100.00%
		Overall SSA	Total	100.00%	99.40%	98.98%	99.40%	100.00%	99.26%	100.00%	100.00%	100.00%
6	Call Setup Success Rate (>=95%)	Day 1	Jan-14	97.14%	99.39%	86.53%	99.42%	96.91%	98.72%	98.77%	100.00%	97.45%
		Day 2	Jan-14	96.68%	97.67%	93.73%	97.94%	99.35%	99.56%	98.68%	100.00%	99.56%
		Day 3	Jan-14	98.98%	100.00%	93.48%	97.96%	100.00%	100.00%	97.70%	100.00%	100.00%
		Overall SSA	Total	97.29%	98.75%	91.11%	98.44%	98.74%	99.35%	98.53%	100.00%	98.92%

The table title row:

OPERATOR-ASSISTED DRIVE TEST AT SOUTH DELHI SSA IN JAN-14 MONTH- DELHI METRO CIRCLE

7	Hand Over Success Rate (HOSR)	Day 1	Jan-14	96.34%	100.00%	86.10%	98.89%	95.34%	97.91%	100.00%	100.00%	100.00%
		Day 2	Jan-14	98.95%	97.68%	94.77%	99.78%	98.53%	98.68%	100.00%	100.00%	100.00%
		Day 3	Jan-14	98.84%	96.55%	88.02%	99.17%	96.24%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Total**	**98.05%**	**98.54%**	**91.14%**	**99.36%**	**97.08%**	**98.60%**	**100.00%**	**100.00%**	**100.00%**

- **NA-Not Applicable**

DRIVE TEST TABLE: 2

S/N	Parameter	South Delhi SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
							GSM Operators					CDMA Operators	
1	Call Attempts	Day 1	Jan-14	Vardhman South Plaza	10	11	11	10	10	10	12	5	10
		Day 2	Jan-14	CCD & PVR Vikaspuri	10	10	13	10	10	10	11	5	10
		Day 3	Jan-14	IGL Bhavan	10	10	12	10	10	10	10	5	10
		Overall SSA	Jan-14		30	31	36	30	30	30	33	15	30
2	Blocked Call Rate	Day 1	Jan-14	Vardhman South Plaza	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Jan-14	CCD & PVR Vikaspuri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Jan-14	IGL Bhavan	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Jan-14		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	Jan-14	Vardhman South Plaza	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Jan-14	CCD & PVR Vikaspuri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Jan-14	IGL Bhavan	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Jan-14		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	Jan-14	Vardhman South Plaza	NA	NA	NA	NA	NA	NA	99.79%	100.00%	100.00%
		Day 2	Jan-14	CCD & PVR Vikaspuri	NA	NA	NA	NA	NA	NA	100.00%	100.00%	99.70%
		Day 3	Jan-14	IGL Bhavan	NA	NA	NA	NA	NA	NA	100.00%	100.00%	97.70%
		Overall SSA	Jan-14		NA	NA	NA	NA	NA	NA	99.93%	100.00%	99.15%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Jan-14	Vardhman South Plaza	95.80%	97.82%	99.39%	97.91%	95.46%	98.76%	NA	NA	NA
		Day 2	Jan-14	CCD & PVR Vikaspuri	84.28%	97.52%	97.38%	97.59%	97.78%	98.83%	NA	NA	NA
		Day 3	Jan-14	IGL Bhavan	64.42%	98.12%	93.34%	89.51%	83.81%	96.16%	NA	NA	NA
		Overall SSA	Jan-14		81.04%	97.82%	96.80%	95.01%	92.23%	97.76%	NA	NA	NA
5	**Service Coverage**												
	In door (>= -75dBm)	Day 1	Jan-14	Vardhman South Plaza	99.87%	100.00%	28.41%	95.92%	100.00%	100.00%	50.04%	100.00%	100.00%
		Day 2	Jan-14	CCD & PVR Vikaspuri	86.94%	100.00%	65.32%	92.87%	100.00%	100.00%	100.00%	100.00%	100.00%

		Day 3	Jan-14	IGL Bhavan	50.37%	100.00%	33.73%	51.03%	10.66%	100.00%	25.52%	94.70%	44.66%
		Overall SSA	**Jan-14**		**78.43%**	**100.00%**	**42.52%**	**78.60%**	**69.27%**	**100.00%**	**58.41%**	**98.27%**	**82.30%**
	In-vehicle (>= - 85dBm)	Day 1	Jan-14	Vardhman South Plaza	100.00%	100.00%	93.47%	99.93%	100.00%	100.00%	99.03%	100.00%	100.00%
		Day 2	Jan-14	CCD & PVR Vikaspuri	97.54%	100.00%	97.41%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	IGL Bhavan	99.94%	100.00%	84.18%	98.62%	68.26%	100.00%	100.00%	100.00%	99.85%
		Overall SSA	**Jan-14**		**99.20%**	**100.00%**	**91.97%**	**99.47%**	**89.08%**	**100.00%**	**99.68%**	**100.00%**	**99.95%**
	Outdoor- in city (>= - 95dBm)	Day 1	Jan-14	Vardhman South Plaza	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Jan-14	CCD & PVR Vikaspuri	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	IGL Bhavan	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Jan-14**		**100.00%**	**100.00%**	**99.99%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
6	**Call Setup Success Rate (>=95%)**	Day 1	Jan-14	Vardhman South Plaza	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Jan-14	CCD & PVR Vikaspuri	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	IGL Bhavan	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Jan-14**		**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	Jan-14	Vardhman South Plaza	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Jan-14	CCD & PVR Vikaspuri	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	IGL Bhavan	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Jan-14**		**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	SSA Name: North Delhi	Drive Test Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
1	Call Attempts	Day 1	Feb-14	146	180	184	194	192	153	184	143	172
		Day 2	Feb-14	156	138	158	151	177	111	127	148	144
		Day 3	Feb-14	148	111	135	134	119	134	125	129	139
		Overall SSA	Total	450	429	477	479	488	398	436	420	455
2	Blocked Call Rate	Day 1	Feb-14	2.05%	1.11%	3.80%	1.55%	1.56%	0.00%	2.72%	0.00%	1.74%
		Day 2	Feb-14	0.64%	0.00%	5.70%	1.32%	0.56%	0.00%	2.36%	0.00%	0.69%
		Day 3	Feb-14	0.00%	0.90%	3.70%	5.97%	4.20%	0.75%	2.40%	0.00%	0.72%
		Overall SSA	Total	0.89%	0.70%	4.40%	2.71%	1.84%	0.25%	2.52%	0.00%	1.10%
3	Dropped Call Rate (<=2%)	Day 1	Feb-14	0.00%	0.00%	0.00%	1.57%	0.00%	0.00%	1.68%	0.70%	2.96%
		Day 2	Feb-14	0.65%	0.00%	2.80%	0.00%	0.00%	0.00%	1.61%	0.68%	0.70%
		Day 3	Feb-14	0.68%	0.00%	2.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.72%
		Overall SSA	Total	0.45%	0.00%	1.60%	0.64%	0.00%	0.00%	1.18%	0.48%	1.56%
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	93.14%	87.82%	95.76%
		Day 2	Feb-14	NA	NA	NA	NA	NA	NA	94.82%	79.96%	99.17%
		Day 3	Feb-14	NA	NA	NA	NA	NA	NA	99.16%	86.97%	90.30%
		Overall SSA	Total	NA	NA	NA	NA	NA	NA	95.46%	85.11%	95.31%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Feb-14	90.47%	93.86%	89.85%	92.58%	89.00%	95.29%	NA	NA	NA
		Day 2	Feb-14	90.93%	94.13%	87.81%	92.21%	90.10%	95.64%	NA	NA	NA
		Day 3	Feb-14	88.47%	94.76%	81.19%	92.50%	89.82%	95.29%	NA	NA	NA
		Overall SSA	Total	89.97%	94.22%	86.70%	92.44%	89.59%	95.39%	NA	NA	NA
5	SERVICE COVERAGE											
	In door (>= -75dBm)	Day 1	Feb-14	66.64%	92.67%	38.87%	42.90%	63.95%	92.62%	81.70%	98.02%	67.83%
		Day 2	Feb-14	69.49%	97.53%	50.62%	58.85%	79.80%	92.11%	87.85%	98.71%	78.06%
		Day 3	Feb-14	74.26%	97.95%	42.74%	65.41%	70.50%	95.16%	88.35%	97.96%	71.67%
		Overall SSA	Total	70.07%	95.56%	43.71%	54.52%	71.12%	93.24%	85.53%	98.24%	72.78%
	In-vehicle (>= -85dBm)	Day 1	Feb-14	93.20%	99.42%	85.37%	88.90%	89.47%	99.31%	99.70%	99.99%	91.59%
		Day 2	Feb-14	96.64%	99.57%	85.40%	95.06%	95.13%	99.11%	98.25%	99.93%	95.85%
		Day 3	Feb-14	97.12%	97.74%	78.56%	95.16%	94.43%	98.90%	99.42%	99.91%	90.75%
		Overall SSA	Total	95.63%	99.55%	83.43%	92.65%	92.74%	99.13%	99.18%	99.95%	92.89%
	Outdoor- in city (>= -95dBm)	Day 1	Feb-14	98.98%	99.89%	99.03%	99.56%	100.00%	99.83%	100.00%	100.00%	100.00%
		Day 2	Feb-14	99.98%	99.81%	98.41%	99.93%	100.00%	99.79%	100.00%	100.00%	100.00%
		Day 3	Feb-14	99.89%	99.88%	96.88%	99.94%	100.00%	99.76%	100.00%	100.00%	100.00%
		Overall SSA	Total	99.61%	99.86%	98.22%	99.79%	100.00%	99.80%	100.00%	100.00%	100.00%
6	Call Setup Success Rate (>=95%)	Day 1	Feb-14	96.58%	98.89%	91.85%	98.45%	98.44%	100.00%	97.28%	100.00%	98.26%
		Day 2	Feb-14	98.72%	99.28%	90.51%	98.68%	99.44%	100.00%	97.64%	100.00%	99.31%
		Day 3	Feb-14	99.32%	97.30%	93.33%	94.03%	95.80%	99.25%	97.60%	100.00%	99.28%
		Overall SSA	Total	98.22%	98.60%	91.82%	97.29%	98.16%	99.75%	97.48%	100.00%	98.90%

The DRIVE TEST AT NORTH DELHI AND NDMC AREA SSA IN FEB-14 MONTH- DELHI METRO CIRCLE

7	Hand Over Success Rate (HOSR)	Day 1	Feb-14	98.58%	99.72%	95.15%	99.49%	94.99%	99.57%	100.00%	100.00%	100.00%
		Day 2	Feb-14	98.15%	99.66%	96.04%	99.55%	97.43%	100.00%	100.00%	100.00%	100.00%
		Day 3	Feb-14	97.29%	99.49%	97.54%	99.48%	98.31%	99.75%	100.00%	100.00%	100.00%
		Overall SSA	**Total**	**98.00%**	**99.65%**	**96.28%**	**99.50%**	**96.62%**	**99.76%**	**100.00%**	**100.00%**	**100.00%**

- **NA-Not Applicable**

DRIVE TEST TABLE: 4

S/N	Parameter	North Delhi SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
							GSM Operators					CDMA Operators	
1	Call Attempts	Day 1	Feb-14	MTNL Bhawan	10	10	12	10	10	10	10	10	10
		Day 2	Feb-14	ISBT Kashmiri Gate, MC Donald	10	11	10	10	10	10	12	10	10
		Day 3	Feb-14	City Center Rohini	11	10	11	10	10	10	10	10	10
		Overall SSA	Feb-14		31	31	33	30	30	30	32	30	30
2	Blocked Call Rate	Day 1	Feb-14	MTNL Bhavan	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Feb-14	ISBT Kashmiri Gate, MC Donald	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Feb-14	City Center Rohini	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Feb-14		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	MTNL Bhavan	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Feb-14	ISBT Kashmiri Gate, MC Donald	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Feb-14	City Center Rohini	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Feb-14		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	MTNL Bhavan	NA	NA	NA	NA	NA	NA	96.63%	90.76%	99.67%
		Day 2	Feb-14	ISBT Kashmiri Gate, MC Donald	NA	NA	NA	NA	NA	NA	100.00%	52.17%	100.00%
		Day 3	Feb-14	City Center Rohini	NA	NA	NA	NA	NA	NA	99.96%	97.14%	94.85%
		Overall SSA	Feb-14		NA	NA	NA	NA	NA	NA	99.02%	83.19%	97.85%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Feb-14	MTNL Bhavan	92.59%	96.06%	94.75%	97.89%	78.52%	99.00%	NA	NA	NA
		Day 2	Feb-14	ISBT Kashmiri Gate, MC Donald	96.09%	91.96%	91.69%	94.01%	85.43%	98.85%	NA	NA	NA
		Day 3	Feb-14	City Center Rohini	95.22%	99.09%	78.12%	93.72%	89.04%	98.82%	NA	NA	NA
		Overall SSA	Feb-14		94.70%	95.57%	88.36%	95.14%	88.00%	98.89%	NA	NA	NA
5	**Service Coverage**												

	In door (>= -75dBm)	Day 1	Feb-14	MTNL Bhavan	96.85%	99.02%	69.03%	49.40%	0.02%	100.00%	44.95%	100.00%	98.78%
		Day 2	Feb-14	ISBT Kashmiri Gate, MC Donald	78.34%	95.31%	52.83%	51.94%	17.71%	100.00%	36.62%	98.99%	93.90%
		Day 3	Feb-14	City Center Rohini	100.00%	99.65%	59.98%	98.87%	68.51%	100.00%	99.92%	100.00%	100.00%
		Overall SSA	**Feb-14**		**91.67%**	**97.91%**	**60.82%**	**67.33%**	**60.88%**	**100.00%**	**62.51%**	**99.92%**	**97.25%**
	In-vehicle (>= -85dBm)	Day 1	Feb-14	MTNL Bhavan	99.50%	99.93%	97.73%	96.62%	51.79%	100.00%	99.71%	100.00%	100.00%
		Day 2	Feb-14	ISBT Kashmiri Gate, MC Donald	100.00%	99.87%	86.46%	99.29%	75.18%	100.00%	80.95%	100.00%	100.00%
		Day 3	Feb-14	City Center Rohini	100.00%	100.00%	93.40%	100.00%	94.03%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Feb-14**		**99.84%**	**99.93%**	**92.66%**	**98.70%**	**90.16%**	**100.00%**	**93.55%**	**100.00%**	**100.00%**
	Outdoor-in city (>= -95dBm)	Day 1	Feb-14	MTNL Bhavan	100.00%	100.00%	100.00%	99.66%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	ISBT Kashmiri Gate, MC Donald	100.00%	100.00%	99.63%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Feb-14	City Center Rohini	100.00%	100.00%	99.24%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Feb-14**		**100.00%**	**100.00%**	**99.63%**	**99.89%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
6	**Call Setup Success Rate (>=95%)**	Day 1	Feb-14	MTNL Bhavan	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	ISBT Kashmiri Gate, MC Donald	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Feb-14	City Center Rohini	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Feb-14**		**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	MTNL Bhavan	100.00%	100.00%	**90.91%**	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	ISBT Kashmiri Gate, MC Donald	100.00%	100.00%	100.00%	100.00%	96.43%	100.00%	100.00%	100.00%	100.00%
		Day 3	Feb-14	City Center Rohini	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	**Feb-14**		**100.00%**	**100.00%**	**94.74%**	**100.00%**	**96.77%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

DRIVE TEST TABLE: 5

S/N	Parameter	SSA Name: East Delhi	Drive Test Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
**OPERATOR-ASSISTED DRIVE TEST AT EAST DELHI SSA IN MAR-14 MONTH- DELHI METRO CIRCLE**												
				GSM Operators						CDMA Operators		
1	Call Attempts	Day 1	Mar-14	151	169	170	209	207	118	153	160	170
		Day 2	Mar-14	116	112	117	102	114	134	111	126	135
		Day 3	Mar-14	137	138	134	133	142	169	136	144	177
		Overall SSA	Total	404	419	421	444	463	421	400	430	482
2	Blocked Call Rate	Day 1	Mar-14	1.32%	1.18%	3.53%	0.48%	1.45%	0.00%	1.96%	0.00%	0.59%
		Day 2	Mar-14	1.72%	1.79%	3.42%	0.98%	0.00%	0.75%	2.70%	0.00%	0.00%
		Day 3	Mar-14	1.46%	2.90%	0.75%	1.50%	1.41%	0.59%	2.21%	0.00%	0.00%
		Overall SSA	Total	1.49%	1.91%	2.61%	0.90%	1.08%	0.48%	2.25%	0.00%	0.21%
3	Dropped Call Rate (<=2%)	Day 1	Mar-14	0.70%	0.00%	1.84%	0.00%	0.98%	0.00%	0.00%	0.00%	0.00%
		Day 2	Mar-14	0.91%	0.00%	0.90%	0.88%	0.00%	0.00%	0.00%	0.79%	0.00%
		Day 3	Mar-14	0.00%	0.00%	2.33%	0.00%	1.43%	0.00%	1.50%	0.69%	0.00%
		Overall SSA	Total	0.52%	0.00%	1.74%	0.00%	1.09%	0.00%	0.51%	0.47%	0.00%
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	97.95%	95.96%	97.10%
		Day 2	Mar-14	NA	NA	NA	NA	NA	NA	98.24%	97.97%	98.37%
		Day 3	Mar-14	NA	NA	NA	NA	NA	NA	98.28%	95.19%	97.76%
		Overall SSA	Total	NA	NA	NA	NA	NA	NA	98.07%	96.31%	97.70%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Mar-14	90.30%	95.85%	86.38%	92.56%	90.59%	96.73%	NA	NA	NA
		Day 2	Mar-14	89.27%	95.25%	89.59%	92.60%	89.55%	96.73%	NA	NA	NA
		Day 3	Mar-14	91.10%	95.76%	88.42%	91.36%	90.45%	96.64%	NA	NA	NA
		Overall SSA	Total	90.31%	95.63%	87.93%	92.20%	90.28%	96.70%	NA	NA	NA
5	SERVICE COVERAGE												
	In door (>= -75dBm)	Day 1	Mar-14	88.66%	97.27%	25.79%	60.91%	89.56%	93.61%	96.45%	98.81%	83.60%
		Day 2	Mar-14	81.44%	95.38%	58.79%	58.36%	81.12%	90.82%	90.19%	99.99%	91.80%
		Day 3	Mar-14	87.56%	97.38%	40.14%	60.33%	87.72%	93.07%	97.83%	99.90%	86.74%
		Overall SSA	Total	86.46%	96.72%	39.17%	60.11%	87.17%	92.54%	95.10%	99.50%	87.05%
	In-vehicle (>= -85dBm)	Day 1	Mar-14	98.98%	99.43%	76.36%	96.52%	99.03%	99.21%	99.86%	99.91%	99.62%
		Day 2	Mar-14	97.71%	99.02%	87.48%	94.41%	98.20%	99.02%	99.06%	100.00%	99.98%
		Day 3	Mar-14	98.20%	99.41%	85.73%	96.19%	98.59%	98.35%	99.92%	100.00%	99.66%
		Overall SSA	Total	98.40%	99.29%	82.29%	95.90%	98.72%	98.84%	99.65%	99.97%	99.74%
	Outdoor- in city (>= -95dBm)	Day 1	Mar-14	99.99%	99.90%	98.65%	99.61%	100.00%	99.80%	100.00%	99.99%	100.00%
		Day 2	Mar-14	99.98%	99.71%	99.37%	99.85%	100.00%	99.68%	100.00%	100.00%	100.00%
		Day 3	Mar-14	100.00%	99.83%	98.53%	99.88%	100.00%	99.12%	100.00%	100.00%	100.00%
		Overall SSA	Total	100.00%	99.82%	98.81%	99.75%	100.00%	99.52%	100.00%	100.00%	100.00%
6	Call Setup Success Rate (>=95%)	Day 1	Mar-14	94.04%	98.82%	95.88%	99.52%	98.55%	100.00%	98.04%	100.00%	99.41%
		Day 2	Mar-14	94.83%	97.32%	94.87%	99.02%	100.00%	99.25%	97.30%	100.00%	100.00%
		Day 3	Mar-14	98.54%	95.65%	96.27%	98.50%	98.59%	99.41%	97.79%	100.00%	100.00%
		Overall SSA	Total	95.79%	97.37%	95.72%	99.10%	98.92%	99.52%	97.75%	100.00%	99.79%

7	Hand Over Success Rate (HOSR)	Day 1	Mar-14	97.18%	98.48%	82.11%	99.33%	96.03%	98.25%	100.00%	100.00%	100.00%
		Day 2	Mar-14	94.61%	99.31%	89.54%	100.00%	99.66%	99.15%	100.00%	100.00%	100.00%
		Day 3	Mar-14	99.55%	98.16%	89.52%	99.11%	96.28%	97.87%	100.00%	100.00%	100.00%
		Overall SSA	Total	97.18%	98.66%	87.04%	99.44%	97.18%	98.42%	100.00%	100.00%	100.00%

- **NA-Not Applicable**

DRIVE TEST TABLE: 6

S/N	Parameter	East Delhi SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
					GSM Operators						CDMA Operators		
1	Call Attempts	Day 1	Mar-14	V3S Mall, Pragati Complex	10	10	11	10	10	11	10	10	10
		Day 2	Mar-14	EDM Mall, Big Bazar	10	10	10	11	9	11	10	10	10
		Day 3	Mar-14	Cross River Mall, Haldi Ram	10	10	10	10	11	12	10	10	10
		Overall SSA	Mar-14		30	30	31	31	30	34	30	30	30
2	Blocked Call Rate	Day 1	Mar-14	V3S Mall, Pragati Complex	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Mar-14	EDM Mall, Big Bazar	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Mar-14	Cross River Mall, Haldi Ram	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Mar-14		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	Mar-14	V3S Mall, Pragati Complex	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Mar-14	EDM Mall, Big Bazar	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Mar-14	Cross River Mall, Haldi Ram	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Mar-14		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	V3S Mall, Pragati Complex	NA	NA	NA	NA	NA	NA	99.91%	96.41%	100.00%
		Day 2	Mar-14	EDM Mall, Big Bazar	NA	NA	NA	NA	NA	NA	99.81%	92.79%	100.00%
		Day 3	Mar-14	Cross River Mall, Haldi Ram	NA	NA	NA	NA	NA	NA	99.87%	90.99%	98.99%
		Overall SSA	Mar-14		NA	NA	NA	NA	NA	NA	99.87%	94.29%	99.64%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Mar-14	V3S Mall, Pragati Complex	95.41%	95.81%	91.74%	96.96%	97.57%	98.89%	NA	NA	NA
		Day 2	Mar-14	EDM Mall, Big Bazar	88.23%	97.86%	93.63%	98.59%	96.09%	99.78%	NA	NA	NA
		Day 3	Mar-14	Cross River Mall, Haldi Ram	95.07%	94.99%	88.01%	94.15%	96.99%	97.88%	NA	NA	NA
		Overall SSA	Mar-14		92.92%	96.21%	91.16%	96.52%	96.90%	98.82%	NA	NA	NA
5	**Service Coverage**												
	In door (>= -	Day 1	Mar-14	V3S Mall, Pragati Complex	100.00%	100.00%	15.83%	93.64%	100.00%	100.00%	100.00%	100.00%	100.00%

75dBm)	Day 2	Mar-14	EDM Mall, Big Bazar	41.52%	100.00%	46.37%	96.87%	100.00%	100.00%	24.13%	99.93%	87.39%
	Day 3	Mar-14	Cross River Mall, Haldi Ram	96.09%	100.00%	40.95%	63.21%	100.00%	100.00%	93.43%	99.81%	20.35%
	Overall SSA	**Mar-14**		**79.16%**	**100.00%**	**34.41%**	**84.41%**	**100.00%**	**100.00%**	**72.88%**	**99.91%**	**67.67%**
In-vehicle (>= -85dBm)	Day 1	Mar-14	V3S Mall, Pragati Complex	100.00%	100.00%	91.65%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Day 2	Mar-14	EDM Mall, Big Bazar	97.16%	100.00%	94.20%	99.95%	100.00%	100.00%	90.74%	100.00%	100.00%
	Day 3	Mar-14	Cross River Mall, Haldi Ram	99.18%	100.00%	88.00%	97.71%	100.00%	100.00%	99.15%	100.00%	99.08%
	Overall SSA	**Mar-14**		**98.78%**	**100.00%**	**91.31%**	**99.21%**	**100.00%**	**100.00%**	**96.67%**	**100.00%**	**99.67%**
Outdoor-in city (>= -95dBm)	Day 1	Mar-14	V3S Mall, Pragati Complex	100.00%	100.00%	99.39%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Day 2	Mar-14	EDM Mall, Big Bazar	99.79%	100.00%	99.88%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Day 3	Mar-14	Cross River Mall, Haldi Ram	99.93%	100.00%	98.53%	99.93%	100.00%	100.00%	100.00%	100.00%	100.00%
	Overall SSA	**Mar-14**		**99.91%**	**100.00%**	**99.27%**	**99.98%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
6 Call Setup Success Rate (>=95%)	Day 1	Mar-14	V3S Mall, Pragati Complex	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Day 2	Mar-14	EDM Mall, Big Bazar	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Day 3	Mar-14	Cross River Mall, Haldi Ram	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Overall SSA	**Mar-14**		**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	Mar-14	V3S Mall, Pragati Complex	100.00%	100.00%	75.00%	100.00%	50.00%	100.00%	100.00%	100.00%	100.00%
	Day 2	Mar-14	EDM Mall, Big Bazar	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Day 3	Mar-14	Cross River Mall, Haldi Ram	100.00%	100.00%	96.88%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Overall SSA	**Mar-14**		**100.00%**	**100.00%**	**92.16%**	**100.00%**	**94.74%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 7

DRIVE TEST ROUTE OF JAN TO MAR - 14 – DELHI METRO CIRCLE							
Name of SSA	**Drive test Period**	**Day 1**		**Day 2**		**Day 3**	
		Name of SDCA Covered	**Route Covered**	**Name of SDCA Covered**	**Route Covered**	**Name of SDCA Covered**	**Route Covered**
South Delhi (Municipal Area)	Jan-14	South Delhi (Municipal Area) **(98 KM)**	Indraprastha, Kala Khan, AIIMS, Motibagh, Dhaula Kuan, Jharera, Jia Sarai, Nehru Place, Govindpuri, Jamia Hamdard, Saket, Mehrauli, Hauz Khas, Gautam Nagar,.	South Delhi (Municipal Area) **(162 Km)**	INA Metro, Safdarjang, Pusp Vihar, Vasant Kunj, Kisan Garh, Munrika, Vasant Vihar, Rangpuri Pahadi, Mahipalpur, Rajokri, Kapasheda, Dwarka Sec-11, Dabrimod, Nawada, Najafgarh, Chatikra, Brajwasan Gaon, Gaon Pochan Pur, JJ Colony, Vikas Puri, Janakpuri, Subhash Nagar.	South Delhi (Municipal Area) **(60 Km)**	INA, Leela Hotel, Moti Bagh, Vasant Enclave, Mohan Singh Market, R.K Puram, Green Park, Andrews Ganj, Defence Colony.
North Delhi & NDMC Area	Feb-14	North Delhi & NDMC Area **(99 Km)**	Khan Market Metro, Barakhamba, CP, Minto Road, Delhi Gate, Dariya ganj, Red Fort, ITO, New Delhi Railway Station, Pahadganj, Karol Bagh, Gol market, India Gate, 30 Jan Marg, Sardar Patel Marg, Railway Colony, Sarojni Nagar Marg, CGO complex, Pragati Maidan, Pulbangash,Mori gate, Kashmiri gate.	North Delhi & NDMC Area **(115 Km)**	ISBT, Civil Line, Viswvidyalaya, GTB Nagar, Model Town, Azadpur, Adarsh Nagar, Jahangir Puri, Sant Nagar, Burari gaon, Nathupura Gaon, Baktawar Pur, Mukraba chowk flyover, Singala Village, Alipur, Narela, Bawana, Pudh Khurd, Barwala, Prahladpur Village, Rohini sec-14,15,16, Badli crossing, Gopal pur, Majnuka Teela, Kashmiri Gate.	North Delhi & NDMC Area **(103 Km)**	Viswvidyalaya, GTB Nagar, Dhaka Gaon, Yograj Colony, Shalimar Bagh, Pitampura, Madhuban Chowk, Rohini sec-11,12, 13,14, Rithala, Qutab Garh, Khor Punjab, Jonti Village, Lodpur, Karala Chowk, Begumpur, Poond Kalan Gaon, Budh Vihar, Mangolpuri, Rohini West.
East Delhi (Municipal Area)	Mar-14	East Delhi (Municipal Area) **(100 Km)**	Anand Vihar ISBT, Old Seema Puri, Ttahirpur, Loni Border, Jauhripur, Karawal Nagar, Khajuri Khas, Bhajanpura, Seelampur, Jafrabad, Shadra, Rajgarh Colony, Priti Vihar.	East Delhi (Municipal Area) **(101 Km)**	Preet Vihar Metro, Anand Vihar Colony, Jhilmil Colony, Soorajmal Vihar, Gazipur Deepo, South Ganesh Nagar, Patpar Ganj, East Vinod Nagar, Indraprastha, Akshardham, Kotla Village, Trilokpuri, Mayur Vihar, Kondali Gaon, Mayur Vihar Phase-3.	East Delhi (Municipal Area) **(100 Km)**	Anand Vihar, Gagan Cinema, Nand nagari, Durga Puri, Yamuna Vihar, Bhajanpura, Dilshad Garden, Vivek Vihar, Shakarpur, New Brijpuri, Hasanpur, DND, Khichripur, Pandav Nagar, Akshardham.

SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 8

DRIVE TEST OBSERVATION OF SOUTH DELHI (MUNICIPAL AREA) - JAN-14

S NO	Name of SP	Month	SSA Covered	Area Covered in Day 1	Day 1 Observation	Area Covered in Day 2	Day 2 Observation	Area Covered in Day 3	Day 3 Observation
1	AIRCEL				Poor Quality near Madhuban, Sarita Vihar, Vasant Kunj		Poor Level & Qulity at Cantt Area, Najafgarh Bridge, Poor Quality near, kidki Ext, Bhartal		Poor Quality near Green Park, LBS School, RK Puam Sec-5
2	AIRTEL				Poor Level at Cantt Area, Badarpur Border, Sant Nagar, Kailash Colony, Poor Quality at Tuglakabad Extension		Poor Level & Quality near Najafgarh, Bhartal, Samalkha, Harinagar		Poor Level & Quality at RK Puram, Pilani Village, LBS School, INA Colony, Green Park
3	MTNL				Poor Level & Quality at Cantt Area, Saket, Poor Quality near Tuglakabad Ext, Kalkaji, Madhuban		Poor Level & Quality near Cannt Area, Dwarka Sec-5, Najafgarh Brigde, Mahipalpur		Poor Level near Varun Marg, Poor Qualiyu & Level near Kotla, Arjun Nagar, Sant Gaon, Chankyapuri, RK Puram Sec-5
4	TATA CDMA				Poor Quality near Pragati Maidan, Cantt Area	INA Metro, Safdarjang, Pusp Vihar, Vasant Kunj, Kisan Garh, Munrika, Vasant Vihar, Rangpuri Pahadi, Mahipalpur, Rajokri, Kapasheda, Dwarka Sec-11, Dabrimod, Nawada, Najafgarh, Chatikra, Brajwasan Gaon, Gaon Pochan Pur, JJ Colony, Vikas Puri, Janakpuri, Subhash Nagar.	Poor Quality at Cantt Area, Samalkha	INA, Leela Hotel, Moti Bagh, Vasant Enclave, Mohan Singh Market, R.K Puram, Green Park, Andrews Ganj, Defence Colony.	Poor Quality at Chhawla Camp, Mohan Garden
5	IDEA	Jan-14	South Delhi (Municipal Area)	Indraprastha, Kala Khan, AIIMS, Motibagh, Dhaula Kuan, Jharera, Jia Sarai, Nehru Place, Govindpuri, Jamia Hamdard, Saket, Mehrauli, Hauz Khas, Gautam Nagar,.	Poor Level at SIFI Auditorium, Poor Quality near greater Kailash, Delhi Cantt Area		Poor Level & Quality at Vasant Vihar Cut, Vasantkunj Sec-C, Lado Sarai, Poor Quality near Munrika Vihar, netaji Nagar, Hotel Hyatt, yashwant Place, Ber Sarai		Poor Level & Quality at Tejpur Khurd, Chhawla Camp, Mohan garden, Bad Quality at Rajouri Garden, Dwarka Sec-13
6	RCOM GSM				Poor Level & Quality at Dhaula Kaun, Ashram, Munirka, Tuglakabad, Sarita Vihar, Safdarjung, Kalkaji		Poor Level & Quality at Delhi Cantt, Palam Ext, Dwarka Sec-19, Najafgarh Brij, Bhartal, Nasant Kunj		Poor Level & Quality at Lajpat Nagar, Green Park, LBS School, RK Puram Sec-5, Sant Gaon, Motibagh, Netaji Nagar, Chankyapuri
7	RCOM CDMA				Poor Rx Level & Quality at Delhi Cantt, Poor Quality near Sarita Vihar		Poor Quality near Dhaula Kuan, Bhartal		Poor Quality near INA Colony, Lajpat Nagar
8	MTS				Poor Level & Quality at Delhi Cantt Area, Poor Quality near Pragati Maidan		Poor Quality near Malta Lines, near Bijwasan		----
9	VODAFONE				Poor Quality near Oberai Hotel, Sriniwaspuri, Badarpur Border		Poor Level & Quality near Cantt, Najafgarh Brij, Nagal Raya, Poor Quality Vasant kunj, Samalkha		Poor Quality & Level at Pilani Village, Arjun Nagar, RK Puram Sec-5, LBS School

DRIVE TEST TABLE: 9

DRIVE TEST OBSERVATION OF NORTH DELHI AND NDMC AREA (FEB-14)

S NO	Name of SP	Month	SSA Covered	Area Covered in Day 1	Day 1 Observation	Area Covered in Day 2	Day 2 Observation	Area Covered in Day 3	Day 3 Observation
1	AIRCEL	Feb-14	North Delhi & NDMC Area	Khan Market Metro, Barakhamba, CP, Minto Road, Delhi Gate, Dariya ganj, Red Fort, ITO, New Delhi Railway Station, Pahadganj, Karol Bagh, Gol market, India Gate, 30 Jan Marg, Sardar Patel Marg, Railway Colony, Sarojni Nagar Marg, CGO complex, Pragati Maidan, Pulbangash,Mori gate, Kashmiri gate.	Poor Level & Quality at Khanmarket, Akbar RD, Statemen House, Panchkuian Road, Tis Hazari	ISBT, Civil Line, Viswvidyalaya, GTB Nagar, Model Town, Azadpur, Adarsh Nagar, Jahangir Puri, Sant Nagar, Burari gaon, Nathupura Gaon, Baktawar Pur, Mukraba chowk flyover, Singala Village, Alipur, Narela, Bawana, Pudh Khurd, Barwala, Prahladpur Village, Rohini sec-14,15,16, Badli crossing, Gopal pur, Majnuka Teela, Kashmiri Gate.	Poor Level & Quality at Nathupura, Sirspur, DITC Narela, Poor Quality at Bawana, between Poth Khurd to Bawana Road, Shakti Nagar	Viswvidyalaya, GTB Nagar, Dhaka Gaon, Yograj Colony, Shalimar Bagh, Pitampura, Madhuban Chowk, Rohini sec-11,12, 13,14, Rithala, Qutab Garh, Khor Punjab, Jonti Village, Lodpur, Karala Chowk, Begumpur, Poond Kalan Gaon, Budh Vihar, Mangolpuri, Rohini West.	Poor Quality near Jatkhor, Karla, Rohini Sec-24, Prashant Vihar
2	AIRTEL				Poor Quality near Chankyapuri, Panchkuian Road, SP Mard		Poor Quality near DITC Narela, Rajniwas, Haidarpur		Poor Quality near Rohini Sec-24, Pritampura
3	MTNL				Poor Level & Quality near Pusa Road, Akbar Road, Satya Niketan, Statemen House, Kamla Market, ITO		Poor Quality & Level near Bawana, Tigipur, Rajniwas		Poor Quality & level Bajidpur, Jaunti Village, Poothkhurd, Budh Vihar, Roop Nagar, Rohi Sec-24
4	TATA CDMA				Poor Quality near Tis Hazari, ISBT, NDMC Tilak Lane, Kotla, Embessay Area, NDMC Area,		----		Poor Quality near Narela, Kanjhawala, Karala
5	IDEA				Poor Level & Quality near Lodhi Road		Poor Quality near DITC Narela, Sirsapur		Poor Level & Quality near pehladpur Bangar, Rithala
6	RCOM GSM				Poor Level & Quality near Tis hazari, panchkuian Road, Statemen House, Kali Bari, Pragati Maidan, Sarojani Nagar, Lodhi Colony		Poor Quality near Shakti Nagar, Wazirabad, Alipur, Narela		Poor Quality near Bajidpur, Karala, Rithala, Azadpur
7	RCOM CDMA				Poor Quality near Kali Bari		Poor Quality near Narela, Tigipur, Alipur		----
8	MTS				Poor Quality near Lodhi Road, Pragati Maidan, Tis Hazari, Nai Sadak, Pusa Road, Gaffar Market		Poor Quality near Rajniwas, Wazirabad, Tigipur, Narela		----
9	VODAFONE				Poor Quality patch near Dhaula Kaun		----		Poor Level at Karala

DRIVE TEST TABLE: 10

DRIVE TEST OBSERVATION OF EAST DELHI (MUNICIPAL AREA) - MAR-14

S NO	Name of SP	Month	SSA Covered	Area Covered in Day 1	Day 1 Observation	Area Covered in Day 2	Day 2 Observation	Area Covered in Day 3	Day 3 Observation
1	AIRCEL	Mar-14	East Delhi (Municipal Area)	Anand Vihar ISBT, Old Seema Puri, Ttahirpur, Loni Border, Jauhripur, Karawal Nagar, Khajuri Khas, Bhajanpura, Seelampur, Jafrabad, Shadra, Rajgarh Colony, Priti Vihar.	Poor Quality near Karwal Nagar, Gautam Vihar, Brahampuri	Preet Vihar Metro, Anand Vihar Colony, Jhilmil Colony, Soorajma l Vihar, Gazipur Deepo, South Ganesh Nagar, Patpar Ganj, East Vinod Nagar, Indraprastha, Akshardham, Kotl a Village, Trilokpuri, Mayur Vihar, Kondali Gaon, Mayur Viha r Phase-3.	----	Anand Vihar, Gagan Cinema, Nand nagari, Durga Puri, Yamuna Vihar, Bhajanpura, Dilsh ad Garden, Vivek Vihar, Shakarpur, New Brijpuri, Hasanpur, DND, Khichripur, Panda v Nagar, Akshardham	Poor Level & Quality near CWG Village, Mayur Vihar, Patpadganj, Poor Quality, Sungar Nagri
2	AIRTEL				----		Poor Quality at Noida Delhi link Road		Poor Quality near Mayur Vihar
3	MTNL				Poor Level & Quality near Brahampuri, Sahadara, Shankarpur, Loni, Shiv Vihar, Poor Quality near Bajarng Nagar, Bhajanpura		Poor Level & Quality at ITO, Pragati Maidan, Gazipur, Poor Quality near mayur Vihar, Dallapura, Takshila, Laxmi Nagar, Anand Vihar, Jhilmil		Poor Level & Quality near Shankarpur, Jagriti Enclave, Gautam Vihar, Viswas Nagar, Ganesh Nagar, Mayur Vihar P-2
4	TATA CDMA				Poor Quality near Vivek Vihar, Sahadara, Ganesh Nagar, Pandav Nagar		Poor Quality at Jhilmil Colony, Laxmi Nagar Metro, Pragati Maidan, Akshardham, Mayur Vihar		Poor Quality near Seemapuri under Pass, Rampuri Market, Gazipur, Kirlokari
5	IDEA				Poor Quality near Shimapuri, Shastri Park, Silampur, Sonia Vihar, Welcome		Poor Quality & Level near Sarai Kalen Khan, Yamuna Bridge, Laxmi Nagar		Poor Quality & Level near Patpadganj, DND Flyover,
6	RCOM GSM				Poor Quality near Sonia Vihar, Gautam Vihar, Shastri Nagar, Shankarpur, Yojna Vihar, Nand Nagri, Loni, Bajrang Nagar		Poor Quality near Nizamudin, New Ashok Nagar, kondli, Gazipur, Ganesh Nagar, ITO, Patpadganj		Poor Quality near DND Flyover, Noida-Delhi Link Road, Bhajanpura, Viswas Nagar
7	RCOM CDMA				Poor Quality near Brahampuri, Gandhi Nagar		Poor Quality near Nizamudin, Mayur Vihar P-2		Poor Quality near Gautam Vihar, Patpadganj, Mayur Vihar P-2, DND Flyover
8	MTS				Poor Quality near Geeta Colony, Sahadara, Seelampur		Poor Quality between Noida-Delhi Link Road		Poor Quality at DND Flyover, Noida Link Road, Kadkaddooma
9	VODAFONE				Poor Quality near Shastri Nagar, Shankarpur, Loni		Poor Quality near Yojna Vihar, Dullupura, Payur Vihar		Poor Quality Patch near Sahadara, Ganesh Nagar, Mayur Vihar P-2

KEY FINDINGS:

The drive tests conducted in different parts of Delhi region such as South Delhi, North Delhi and East Delhi on various routes given above in table-4, during three months of the quarter ended March 2014 revealed that the performance of the service providers in general was not satisfactory as most of the service providers remained non-compliant of different parameters in different areas of Delhi. The performance of the service providers with respect to the different parameters is summed up as follows:

The performance of the service providers with respect to the different parameters is summed up as follows:

1. **MTNL**: The performance of MTNL remained non-complied in respect of all the prime network parameters namely Blocked Call Rate, Call drop rate, Good Voice quality and Call setup success rate in most of the parts of South , North and East Delhi

2. **RCOM (GSM):** Remained under performed in respect of the parameter for the parameter Voice Quality

3. **RCOM (CDMA):** Failed to meet the benchmark of Voice Quality in North Delhi SSA.

4. **Aircel:** Could not perform well in respect of parameter' Voice Quality' as it remained under performed in most of the parts of Delhi. In respect of the parameter Block Call rate also, it could not perform well in South Delhi.

5. **Airtel:** Airtel also remained under performed for the parameter Voice quality in South and North Delhi SSAs.

6. **Idea:** The performance of Idea Cellular was not up to the benchmark for parameter Voice Quality in South, North Delhi and East Delhi SSAs.

In Month of Jan-14:- In case of Indoor drive test, **Airce**l **& RCOM (GSM)** could not meet the benchmark for the parameter **'Good Voice Quality'** with their performance as **81.04% & 92.23%** respectively.

In Month of Feb-14:- In case of Indoor drive test, **Aircel, MTNL, RCOM (GSM) & RCOM (CDMA)** could not meet the benchmark for the parameter **'Good Voice Quality'** with their performance as **94.70%, 88.36%, 88.00% and 83.19%** respectively.

In Month of Mar-14**:-** In case of Indoor drive test**, Aircel, MTNL & RCOM (CDMA)** could not meet the benchmark for the parameter **'Good Voice Quality'** with their performance as **92.92%, 91.16% and 94.29%** respectively.

The deficiencies with respect to inadequate coverage and voice quality, encountered by different Service providers at various places as shown in the drive tests plots, are detailed in the above drive test table.-8, 9 & 10.

From the above, it was further concluded that the performance of the service providers with respect to the parameter 'Voice Quality' remained main area of concern as majority of operators failed to comply with its bench mark. However, the MTNL also remained non- compliant in respect of other parameters like Blocked Call rate, Dropped Call rate and Call setup success rate in different areas of Delhi.

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

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

Based on monthly audit, it was concluded that the performance of the service providers was fairly satisfactory for **Network Parameters** in DELHI METRO service area as they were found to have met the benchmarks of all the parameters during the quarter. Only Tata (CDMA) was non-compliant in respect of the parameter 'Worst affected Cells > 3% TCH Drop' with its performance as 3.19% on an average for the quarter.

From three days live assessment, it was found that the performance of all operators was satisfactory as they were largely complying with the benchmarks of parameters except for the parameter 'Worst affected Cell having > 3% TCH drop' which could not be met by **Aircel** and **RCOM (CDMA)** with their performance as **6.90 % and 3.31 %,** calculated on an average for three months of the quarter.

With regard to the **Customer Service Quality Parameters,** all 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, **Aircel and RCOM (GSM & CDMA)** were unable to meet the benchmark of calls answered by Operators (voice to voice) within 60 seconds. They achieved their performance as **72.69 %, 87.39%** and **89.11 %** respectively. With regard to the parameter '**Refund of deposits within 60 days of closure', Idea and MTS** remained underperformed with their performance as **98.55 %** and **46.15 %** respectively.

With regard to Drive Test, it was concluded that the performance of the service providers with respect to the parameter 'Voice Quality' remained main area of concern as majority of operators failed to comply with its bench mark. However, MTNL also remained non-compliant in respect of other parameters like Blocked Call rate, Dropped Call rate and Call setup success rate in different areas of Delhi.

7. DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES

7. DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES – DELHI METRO CIRCLE:

TABLE: 1

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle- Jan-14 month											
						GSM Operators				CDMA Operators		
	Network Service Quality Parameter											
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		Jan-14	2885	5415	1112	4456	2580	5440	920	1010	1460
	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	8916.46	573.46	4037	121.73	4408	848.59	598	802.67	205.51
	c) BTS Accumulated Downtime	<=2%	Jan-14	0.42%	0.01%	0.49%	0.00%	0.23%	0.02%	0.09%	0.11%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jan-14	62	0	19	0	5	1	4	1	0
	e) Worst affected BTSs due to downtime	<=2%	Jan-14	**2.15%**	0.00%	1.71%	0.00%	0.19%	0.02%	0.43%	0.10%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Jan-14	97.93%	99.87%	96.02%	99.97%	99.56%	99.58%	99.04%	98.72%	99.16%
	b) SDCCH/PAGING Congestion	<=1%	Jan-14	0.27%	0.02%	0.42%	0.40%	0.08%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-14	0.91%	0.04%	1.80%	0.85%	0.04%	0.18%	0.29%	0.01%	0.05%
	Connection Maintenance (Retainability)											
3	a) Call Drop Rate (CDR)	<=2%	Jan-14	1.10%	0.56%	1.65%	0.58%	0.41%	0.85%	0.58%	0.46%	0.57%
	b) Worst affected cells>3% TCH drop	<=3%	Jan-14	2.87%	0.69%	2.58%	1.59%	0.02%	2.63%	1.43%	1.88%	2.97%
	c) % of connections with good voice quality	>=95%	Jan-14	97.69%	99.32%	97.81%	98.23%	98.74%	97.59%	98.87%	99.80%	99.13%
	d)Total No. of cells exceeding 3% TCH drop (call drop)		Jan-14	248	94	82	191	2	358	43	56	146
	e) Total no. of cells (Sector) in the licensed service area		Jan-14	8641	13505	3189	12016	7085	13606	3022	2974	4918
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
	Name of POI not meeting the benchmark		Jan-14	0	0	0	0	0	0	0	0	0
5	**Network Data**											
	a) Equipped Capacity of Network in Erlang		Jan-14	114471	321171	NP	155289	96000	331518	42000	140000	311846
	b) Total traffic in TCBH in erlang (Avg.)		Jan-14	69978	210698	NP	147353	83914	237943	15843	116382	134320
	c) Total no. of customers served (as per VLR) on last day of the month		Jan-14	2346641	8361085	NP	5480658	4521068	8600013	430817	3016239	1769882

TABLE: 2

	Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Delhi Metro Circle- Jan-14 month											

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	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	2884	5415	1112	4433	2577	5234	917	1012	1432
	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	2720.34	69.10	313	2.02	245	58.74	122.88	37	20.23
	c) BTS Accumulated Downtime	<=2%	Live data	1.31%	0.02%	0.39%	0.00%	0.13%	0.02%	0.19%	0.05%	0.06%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	2	0	5	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.07%	0.00%	0.45%	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	97.85%	99.88%	96.02%	99.98%	99.54%	99.65%	98.77%	98.85%	99.08%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.32%	0.01%	0.35%	0.38%	0.06%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.70%	0.04%	1.78%	0.62%	0.04%	0.13%	0.58%	0.01%	0.11%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Live data	1.15%	0.58%	1.73%	0.58%	0.39%	0.85%	0.59%	0.48%	0.52%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	**4.64%**	0.69%	2.65%	1.50%	0.01%	2.95%	2.13%	2.61%	2.64%
	c) % of connections with good voice quality	>=95%	Live data	97.67%	99.26%	97.75%	98.20%	98.74%	97.63%	98.83%	99.80%	99.13%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	401	94	84	180	1	402	64	78	131
	e) Total no. of cells (Sector) in the licensed service area		Live data	8638	13505	3187	12051	7082	13606	3018	2976	4949
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
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

TABLE: 3

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
						GSM Operators				CDMA Operators		
Network Service Quality Parameter												
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		Feb-14	2889	5444	1119	4493	2577	5512	923	1011	1472
	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	5899	659	3010	106	3493	1065.83	388	683	416
	c) BTS Accumulated Downtime	<=2%	Feb-14	0.30%	0.02%	0.40%	0.00%	0.20%	0.03%	0.06%	0.10%	0.04%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Feb-14	38	0	14	0	1	1	1	0	0
	e) Worst affected BTSs due to downtime	<=2%	Feb-14	1.32%	0.00%	1.25%	0.00%	0.04%	0.02%	0.11%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Feb-14	97.75%	99.86%	96.00%	99.97%	99.56%	99.60%	98.92%	98.33%	99.04%
	b) SDCCH/PAGING Congestion	<=1%	Feb-14	0.26%	0.03%	0.48%	0.74%	0.07%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-14	1.26%	0.05%	1.83%	1.05%	0.05%	0.17%	0.26%	0.02%	0.10%
	Connection Maintenance (Retainability)											
3	a) Call Drop Rate (CDR)	<=2%	Feb-14	1.15%	0.55%	1.61%	0.58%	0.40%	0.82%	0.61%	0.53%	0.63%
	b) Worst affected cells>3% TCH drop	<=3%	Feb-14	2.97%	0.64%	2.51%	1.58%	0.04%	2.75%	1.37%	2.41%	2.97%
	c) % of connections with good voice quality	>=95%	Feb-14	97.50%	99.30%	97.77%	98.33%	98.78%	97.47%	99.19%	99.79%	99.11%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Feb-14	257	87	80	193	3	383	42	72	150
	e) Total no. of cells (Sector) in the licensed service area		Feb-14	8645	13602	3184	12174	7079	13945	3029	2977	5045
	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
	Name of POI not meeting the benchmark		Feb-14	0	0	0	0	0	0	0	0	0
	Network Data											
5	a) Equipped Capacity of Network in Erlang		Feb-14	113908	314598	NP	284268	96000	331518	42000	140000	300530
	b) Total traffic in TCBH in erlang (Avg.)		Feb-14	72126	217079	NP	298417	82168	240081	16077	119477	145788
	c) Total no. of customers served (as per VLR) on last day of the month		Feb-14	2373734	8398743	NP	11556221	4546459	8698492	434029	3009799	1794017

TABLE: 4

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Delhi Metro 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	2882	5429	1111	4493	2577	5487	925	1008	1472
	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	451.36	67.88	347	2.15	217	67.91	14.48	134	4.90
	c) BTS Accumulated Downtime	<=2%	Live data	0.22%	0.02%	0.43%	0.00%	0.12%	0.02%	0.02%	0.18%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	6	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.54%	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	97.74%	99.85%	96.05%	99.96%	99.53%	99.48%	98.42%	97.92%	99.04%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.33%	0.03%	0.37%	0.59%	0.02%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.43%	0.05%	1.84%	1.19%	0.06%	0.23%	0.44%	0.03%	0.02%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Live data	1.13%	0.58%	1.50%	0.56%	0.41%	0.81%	0.71%	0.54%	0.67%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	**6.72%**	0.61%	2.58%	1.51%	0.00%	2.61%	1.43%	**3.28%**	2.67%
	c) % of connections with good voice quality	>=95%	Live data	97.35%	99.27%	97.80%	98.61%	98.76%	97.47%	99.18%	99.79%	99.09%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	579	83	82	184	0	365	43	97	5057
	e) Total no. of cells (Sector) in the licensed service area		Live data	8624	13854	3184	12226	7071	13981	3034	2968	135
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		Live data	**2**	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	Aircel NLD, Aircel ILD	0	0	0	0	0	0	0	0

TABLE: 5

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle- Mar-14 month											
								GSM Operators			CDMA Operators	
Network Service Quality Parameter												
1	**Network Availability**											
	a) Total no. of BTSs in the licensed service area		Mar-14	2901	5477	1116	4535	2568	5648	926	1000	1491
	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	5984.37	627.42	4154	63.61	4095	625.31	245.57	871.33	755.50
	c) BTS Accumulated Downtime	<=2%	Mar-14	0.28%	0.02%	0.50%	0.00%	0.21%	0.01%	0.04%	0.12%	0.07%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Mar-14	47	0	21	0	1	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Mar-14	1.62%	0.00%	1.88%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Mar-14	97.66%	99.86%	96.16%	99.97%	99.63%	99.71%	99.10%	98.11%	99.03%
	b) SDCCH/PAGING Congestion	<=1%	Mar-14	0.25%	0.03%	0.45%	0.76%	0.02%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-14	1.32%	0.05%	1.78%	1.47%	0.05%	0.12%	0.14%	0.04%	0.06%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Mar-14	1.09%	0.52%	1.65%	0.53%	0.37%	0.73%	0.54%	0.25%	0.71%
	b) Worst affected cells>3% TCH drop	<=3%	Mar-14	2.62%	0.63%	2.46%	1.48%	0.02%	2.53%	1.83%	2.72%	**3.63%**
	c) % of connections with good voice quality	>=95%	Mar-14	97.60%	99.33%	97.64%	98.69%	98.83%	97.60%	99.19%	99.80%	99.07%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Mar-14	228	86	78	182	2	358	56	80	184
	e) Total no. of cells (Sector) in the licensed service area		Mar-14	8691	13708	3189	12307	7055	14163	3042	2950	5075
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	0	0
	Name of POI not meeting the benchmark		Mar-14	0	0	0	0	0	0	0	0	0
5	**Network Data**											
	a) Equipped Capacity of Network in Erlang		Mar-14	114934	312510	NP	156743	96000	337798	42000	140000	307787
	b) Total traffic in TCBH in erlang (Avg.)		Mar-14	73650	209928	NP	154644	87745	236914	15727	118117	146436
	c) Total no. of customers served (as per VLR) on last day of the month		Mar-14	2391269	8251468	NP	5515407	4605129	8802019	440796	3003411	1767140

TABLE: 6

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
Network Service Quality Parameter												
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		Live data	2890	5485	1118	4525	2577	5520	928	1011	1478
	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	1229.42	58.62	250.75	9.15	482	73.33	12.12	150.67	26.76
	c) BTS Accumulated Downtime	<=2%	Live data	0.59%	0.01%	0.31%	0.00%	0.26%	0.02%	0.02%	0.21%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	2	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.18%	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	97.70%	99.86%	95.73%	99.96%	99.66%	99.66%	99.07%	98.05%	99.13%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.23%	0.03%	0.54%	0.53%	0.01%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.16%	0.05%	1.83%	0.92%	0.04%	0.15%	0.19%	0.02%	0.02%
	Connection Maintenance (Retainability)											
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.14%	0.55%	1.69%	0.50%	0.37%	0.79%	0.53%	0.65%	0.60%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	7.08%	0.58%	2.50%	1.45%	0.00%	2.67%	1.24%	4.05%	2.94%
	c) % of connections with good voice quality	>=95%	Live data	97.54%	99.32%	97.62%	98.75%	98.91%	97.56%	99.20%	99.79%	99.11%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	612	80	80	178	0	377	38	121	149
	e) Total no. of cells (Sector) in the licensed service area		Live data	8650	13740	3188	12241	7079	14155	3044	2977	5075
	No. of POI's having >=0.5% POI congestion											
4	No. of POI's having >=0.5% POI congestion		Live data	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

8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT
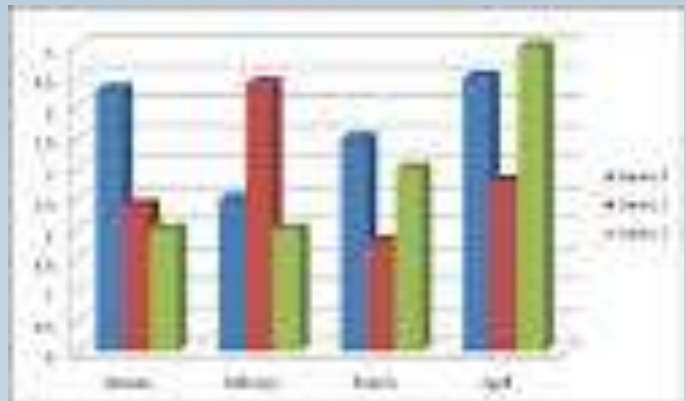
8. GRAPHICAL REPRESENTATION OF PERFORMANCE OF THE CELLULAR MOBILE SERVICE PROVIDERS-MONTHLY V/S 3-DAYS LIVE MEASUREMENT:

1) **BTS ACCUMULATED DOWNTIME :**

BTS Accumulated Downtime

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	0.33%	0.02%	0.46%	0.00%	0.21%	0.02%	0.06%	0.11%	0.04%
Quarterly Live	0.71%	0.017%	0.38%	0.00%	0.17%	0.02%	0.08%	0.15%	0.03%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
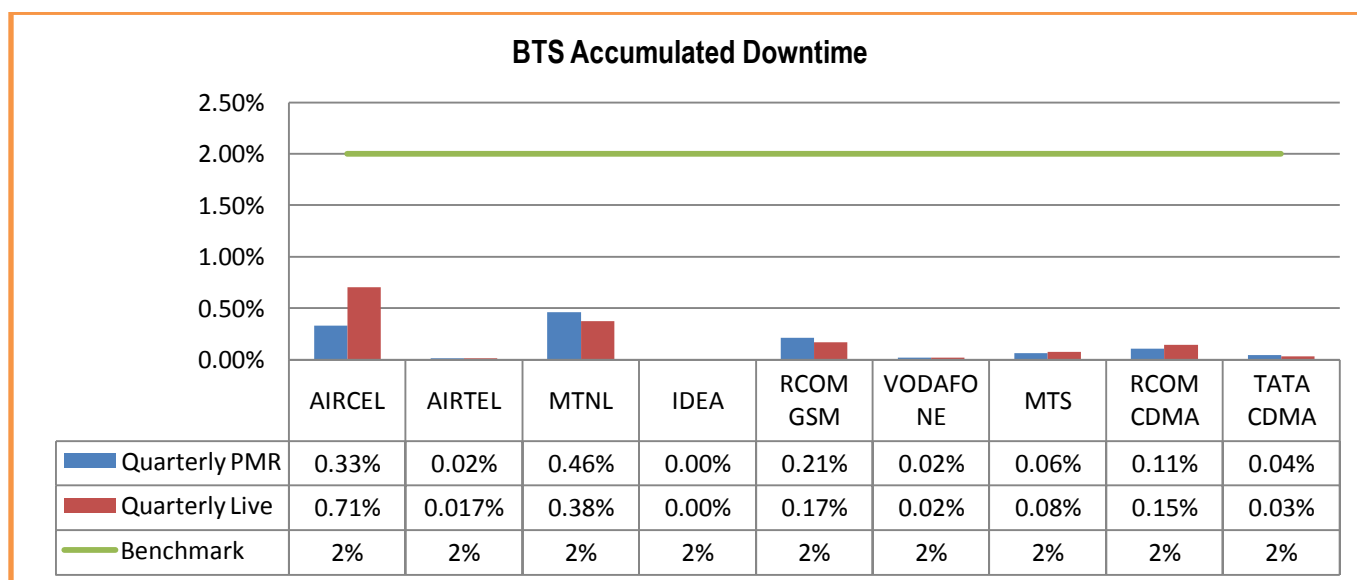
All operators are meeting the benchmarks.

2) **WORST AFFECTED BTSS DUE TO DOWNTIME :**

Worst affected BTSs due to downtime

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	1.70%	0.00%	1.61%	0.00%	0.09%	0.01%	0.18%	0.03%	0.00%
Quarterly Live	0.02%	0.00%	0.39%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
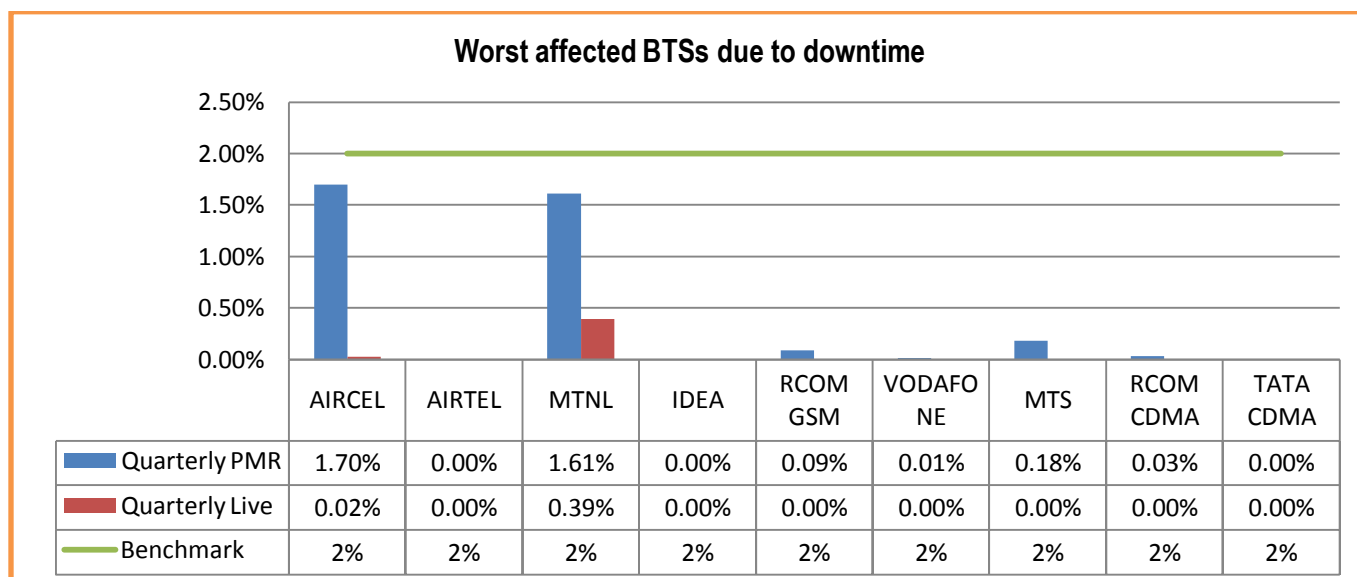
All operators are meeting the benchmarks.

3) CALL SETUP SUCCESS RATE :

Call Setup Success Rate

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAF ONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	97.78%	99.86%	96.06%	99.97%	99.58%	99.63%	99.02%	98.39%	99.08%
Quarterly Live	97.76%	99.86%	95.93%	99.97%	99.58%	99.60%	98.75%	98.27%	99.08%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%
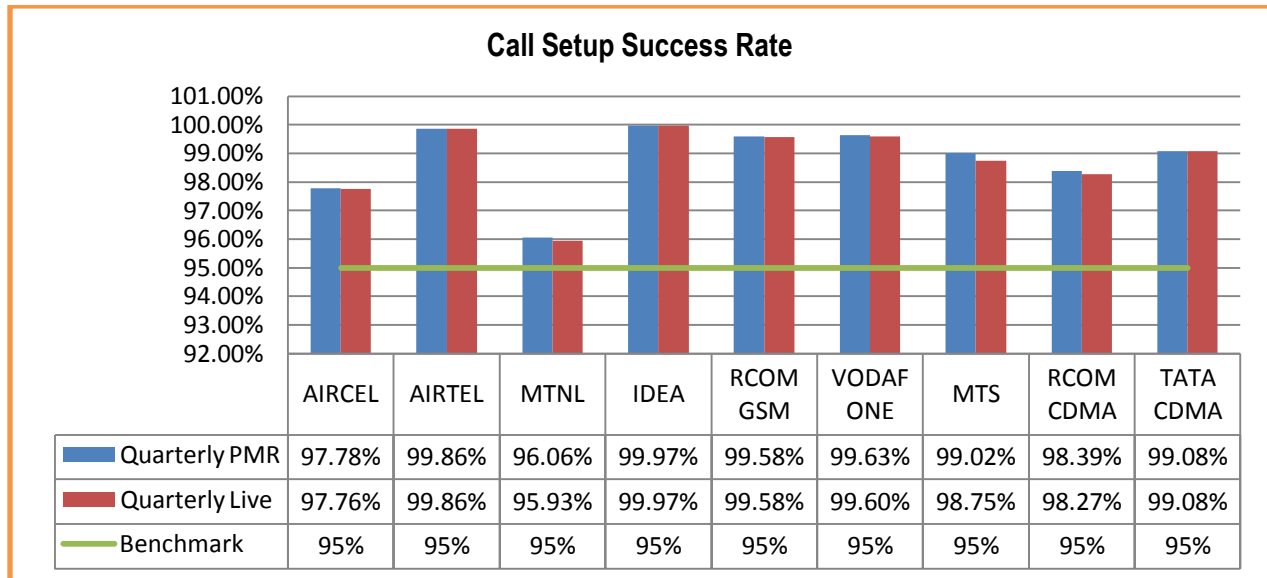
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION :

SDCCH/PAGING Channel Congestion

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAF ONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	0.26%	0.03%	0.45%	0.63%	0.06%	0.04%	0.00%	0.00%	0.00%
Quarterly Live	0.29%	0.02%	0.42%	0.50%	0.03%	0.04%	0.00%	0.00%	0.00%
Benchmark	1%	1%	1%	1%	1%	1%	1%	1%	1%
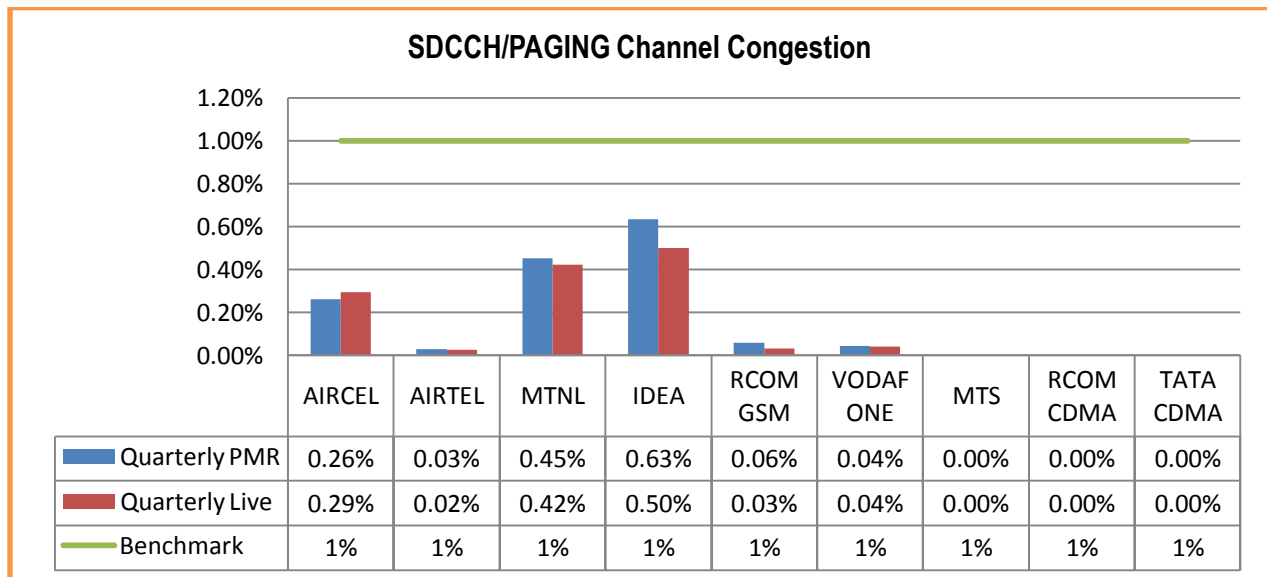
All operators are meeting the benchmarks.

5) TCH CONGESTION :

TCH Congestion

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAF ONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	1.16%	0.05%	1.80%	1.12%	0.05%	0.16%	0.23%	0.02%	0.07%
Quarterly Live	1.10%	0.05%	1.82%	0.91%	0.05%	0.17%	0.40%	0.02%	0.05%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
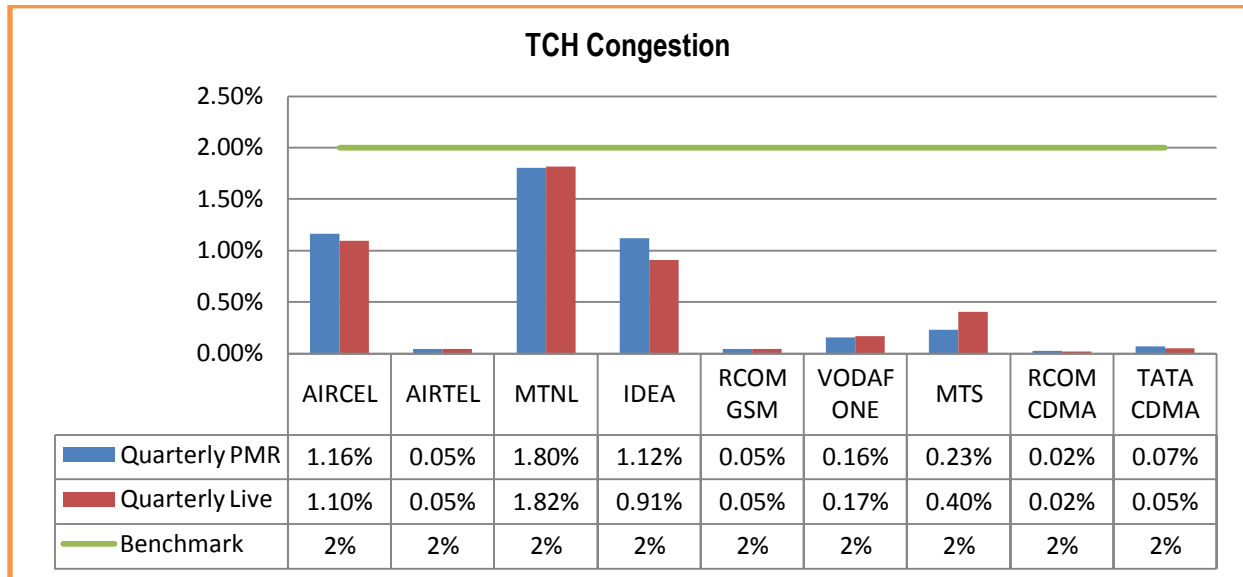
All operators are meeting the benchmarks.

6) CALL DROP RATE :

Call Drop Rate

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAF ONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	1.11%	0.54%	1.64%	0.56%	0.39%	0.80%	0.58%	0.41%	0.64%
Quarterly Live	1.14%	0.57%	1.64%	0.55%	0.39%	0.82%	0.61%	0.56%	0.60%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
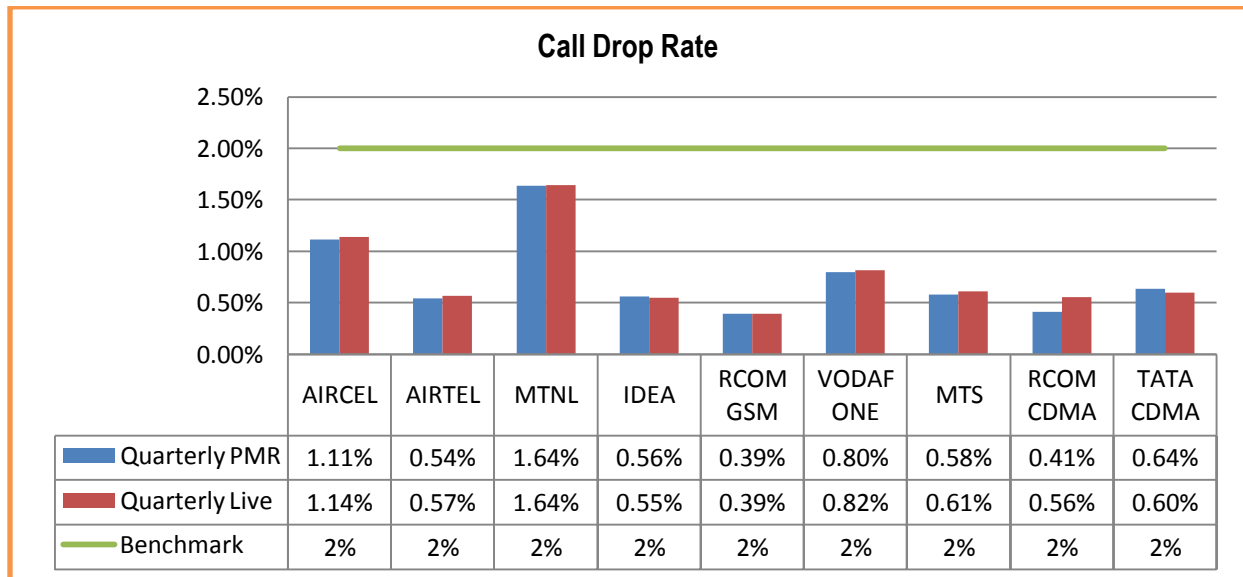
All operators are meeting the benchmarks.

7) WORST AFFECTED CELLS>3% TCH DROP :

Worst affected cells>3% TCH drop

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	2.82%	0.65%	2.52%	1.55%	0.03%	2.64%	1.54%	2.34%	3.19%
Quarterly Live	6.90%	0.63%	2.58%	1.49%	0.00%	2.74%	1.60%	3.31%	2.75%
Benchmark	3%	3%	3%	3%	3%	3%	3%	3%	3%
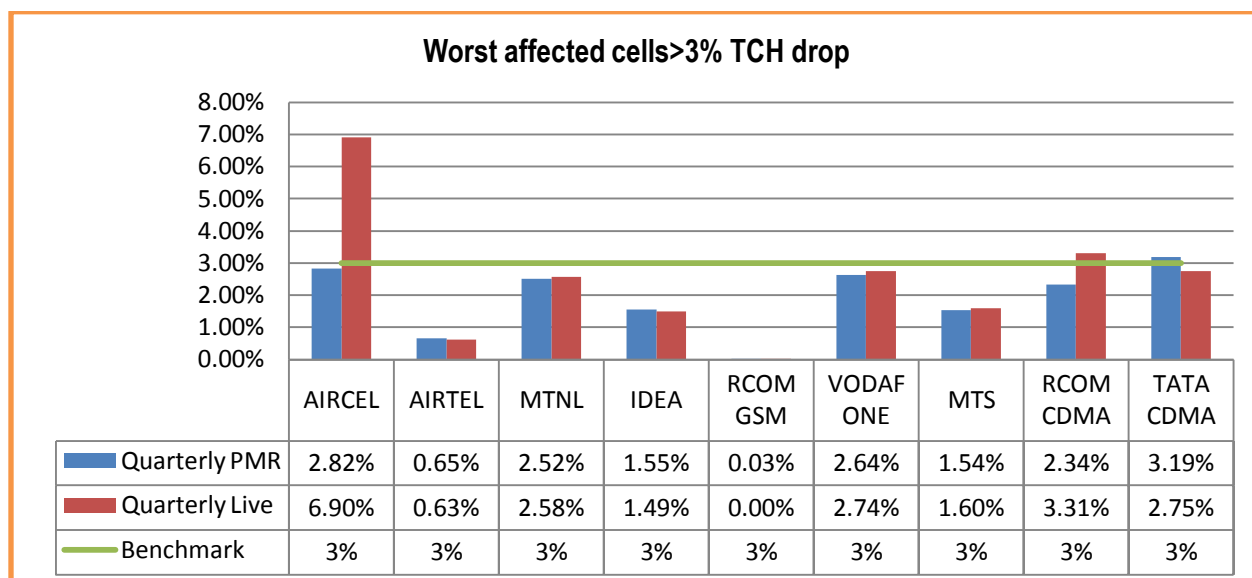
All operators are meeting the benchmarks except Aircel, RCOM CDMA in 3 days live measurement and Tata CDMA in Quarterly PMR.

8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY :

% Connections with good voice quality

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	97.60%	99.32%	97.74%	98.42%	98.78%	97.55%	99.08%	99.80%	99.10%
Quarterly Live	97.52%	99.28%	97.72%	98.52%	98.80%	97.55%	99.07%	99.79%	99.11%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%
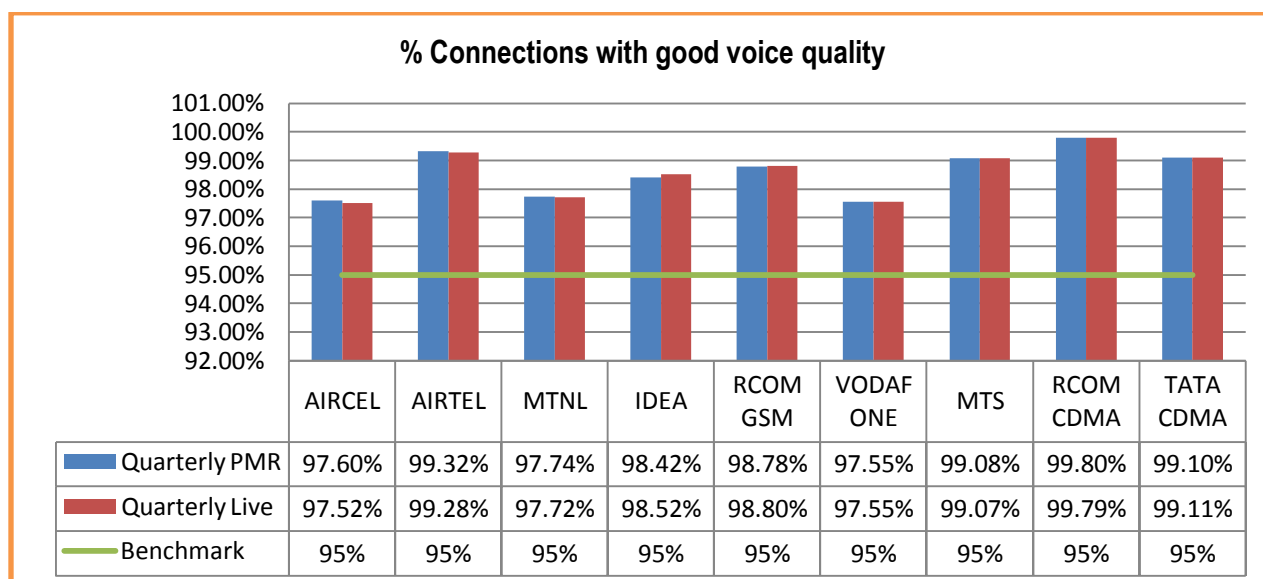
All operators are meeting the benchmarks.

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

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

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	0	0	0	0	0	0	0	0	0
Quarterly Live	1	0	0	0	0	0	0	0	0
Benchmark									
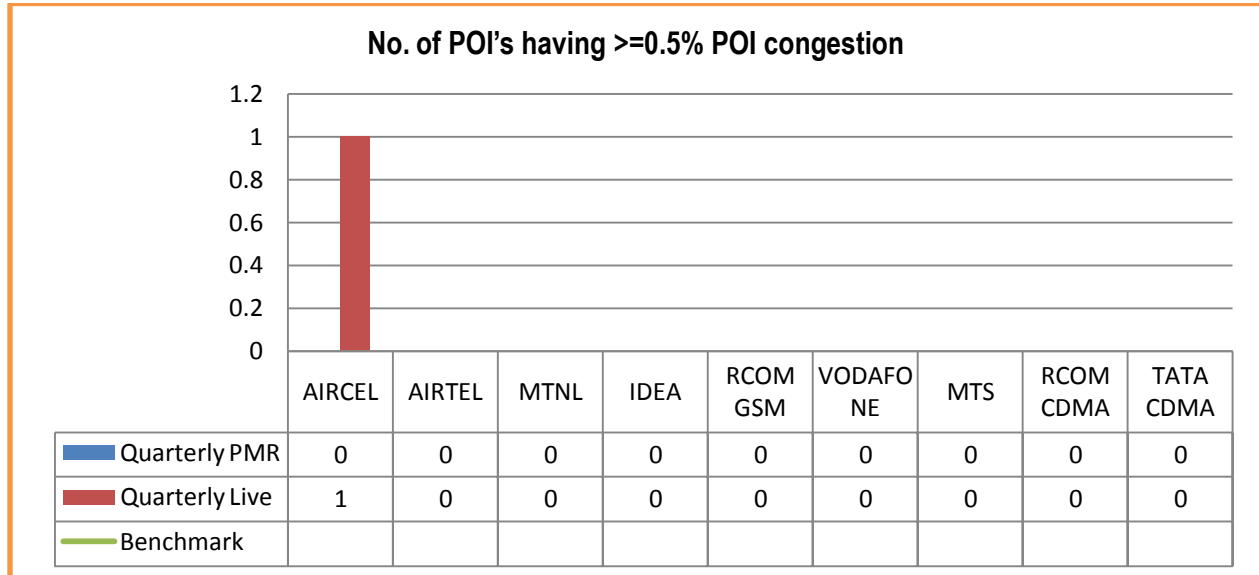
All operators are meeting the benchmarks. Only Aircel was found having congestion on individual POI.

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 Delhi Circle were audited for their quality of service assessment. The NCR region viz Noida, Faridabad and Gurgaon have been included for audit of NSTPL, Tikona and Spectranet.

Sl. No.	Name of Broadband Service Providers
1	BHARTI AIRTEL LIMITED
2	HATHWAY
3	INDUS MEDIA & COMMUNICATION LTD.
4	NOIDA SOFTWARE TECHNOLOGIES PVT. LTD (NSTPL)
5	BROADBAND PACENET INDIA PVT. LTD
6	CITYCOM NETWORKS PVT. LTD. (SPECTRANET)
7	TIKONA DIGITAL NETWORKS
8	MTNL
9	RELIANCE COMMUNICATION LIMITED (RCL)
10	TATA COMMUNICATION LIMITED (TCL)
11	TATA TELESERVICES LIMITED (TTL)

The audited data has been given in the following table:

AVERAGED AUDITED DATA FOR BROADBAND SERVICES – DELHI METRO CIRCLE													
S/N	**Parameters**	**Benchmark**	**Period**	**BHARTI AIRTEL**	**HATHWAY**	**INDUS**	**NSTPL**	**PACENET**	**SPECTRANET**	**TIKONA**	**MTNL**	**RCL**	**TCL**	**TTL**
1	**Service Provisioning/Activation Time**													
	100% cases in 15 days (subject to technical feasibility)	**<15 days**	**Quarterly**	100.00%	100.00%	**94.94%**	100.00%	100.00%	100.00%	100.00%	**97.14%**	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	0	NA	0
2	**Faults Repair/Restoration Time**													
	By next working day	**>90%**	**Quarterly**	94.92%	96.37%	100.00%	100.00%	93.85%	98.34%	91.73%	**82.93%**	100.00%	NP	100.00%
	within 3 working day	**≥99%**	**Quarterly**	99.38%	99.34%	100.00%	100.00%	100.00%	99.45%	99.30%	**95.14%**	100.00%	NP	100.00%
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	21	0	0	0	0	33	2275	0	NP	0
	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	1	0	0	0	0	0	660	0	NP	0
	Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)		**Quarterly**	0	0	0	0	0	2	0	328	0	NP	0
3	**Billing Performance**													
	Billing complaints per 100 bills issued	**<2%**	**Quarterly**	0.01%	0.54%	0.00%	**NA	0.17%	0.65%	0.44%	0.10%	0.15%	0.14%	0.78%
	%age of complaints resolved within 4 weeks	**100%**	**Quarterly**	100.00%	100.00%	100.00%	**NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Time taken for refund of deposits after closure (within 60 days)	**100%**	**Quarterly**	100.00%	100.00%	100.00%	**NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
4	**Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)**													
	within 60 sec	**>60%**	**Quarterly**	90.93%	70.94%	100.00%	100.00%	92.12%	86.39%	61.50%	99.87%	96.42%	90.46%	73.40%
	within 90 sec	**>80%**	**Quarterly**	93.13%	84.19%	100.00%	100.00%	98.47%	89.88%	80.26%	99.93%	98.59%	92.58%	**77.34%**

5	**Bandwidth Utilization/ Throughput:**													
	POP to ISP Gateway Node [Intra-network] Link(s)	<80%	Quarterly	5.02%	66.14%	**80.00%**	53.94%	54.24%	58.35%	71.29%	46.40%	15.17%	52.27%	56.70%
	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	<80%	Quarterly	**83.60%**	68.10%	NA	NA	NA	63.05%	68.13%	**83.85%**	45.44%	48.11%	56.70%
	Broadband Connection Speed (download) - from ISP Node to User	>80%	Quarterly	105.61%	97.00%	NP	NP	NP	88.50%	98.58%	97.00%	NP	98.05%	99.00%
6	**Service Availability/Uptime (for all users) in %age**													
	Service Availability(%)	>98%	Quarterly	99.82%	99.16%	100.00%	**97.25%**	**96.67%**	99.89%	99.20%	99.40%	99.59%	NP	99.79%
7	**Packet Loss**													
	% of Packet loss	<1%	Quarterly	0.00%	0.00%	NP	NP	NP	0.00%	0.00%	0.13%	0.61%	0.00%	0.09%
8	**Network latency (for wired broadband access)**													
	User reference point at POP/ISP Gateway node to IGSP/NIXI	<120 ms	Quarterly	40	9	NA	NA	NA	2	NA	13	51	18	43
	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	<350 ms	Quarterly	76	85	NA	NA	NA	162	NA	256	19	274	220
	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	NA	NA

NA-Not Applicable
**NA-Not Applicable as NSTPL is providing only prepaid connections.
NP-Not Provided- Monthly data not monitored by ISPs

10. 3 DAYS LIVE MEASUREMENT DATA VERIFICATION FOR BROADBAND SERVICE PROVIDERS:

3 DAYS LIVE DATA FOR BROADBAND SERVICES- DELHI METRO CIRCLE														
S/N	Parameters	Benchmark	Audit Period	BHARTI AIRTEL	HATHWAY	INDUS	NSTPL	PACENET	SPECTRANET	TIKONA	MTNL	RCL	TCL	TTL
1	**Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)**													
	Within 60 sec	>60%	Live	92.00%	79.08%	100.00%	100.00%	86.90%	63.20%	61.95%	80.39%	95.63%	97.67%	90.00%
	Within 90 sec	>80%	Live	100.00%	90.59%	100.00%	100.00%	100.00%	**68.19%**	83.89%	80.43%	98.65%	97.59%	90.00%
2	**Bandwidth Utilization/ Throughput**													
2.1	POP to ISP Gateway Node [Intra-network] Link(s)	< 80%	Live	4.06%	72.66%	72.00%	78.72%	59.82%	56.24%	57.87%	46.00%	34.82%	39.20%	49.12%

2.2	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	< 80%	Live	78.42%	77.97%	NA	NA	NA	61.54%	66.29%	**81.23%**	55.42%	68.56%	49.32%
2.3	Broadband Connection Speed (download) - from ISP Node to User	> 80%	Live	115.28%	91.67%	99.02%	84.44%	100.00%	90.00%	99.63%	99.50%	89.17%	80.47%	98.00%
3	**Packet loss**													
	% of Packet loss	<1%	Live	0.10%	0.00%	1.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%
4	**Network latency (for wired broadband access)**													
4.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	<120 ms	Live	33	50	46	50	20	20	NA	15	70	10	42
4.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	<350 ms	Live	83	208	NA	NA	NA	162	NA	256	193	242	225
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	243	NA	NA	NA

- **NA-Not Applicable**
- **NP-Not Provided**

KEY FINDINGS:

Service Provisioning / Activation Time: The audit of the service providers revealed that **INDUS and MTNL** were the only two operators falling short of the benchmark. Their performance was **94.94%** and **97.14%** respectively against the benchmark of 100% in <15 days. Other service providers were well performed achieving the benchmark of 100%.

Fault Repair/Restoration Time: For this parameter also**, MTNL** failed to meet benchmark. Its performance level was **82.93%** and **95.14%** for parameters 'Fault repaired by next working day and within 3 days' respectively.

Billing Performance: For this parameter the performance of the service providers was found well within the compliance benchmarks.
During live calling the responses of the customers were 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 customers confirmed that their billing complaints were resolved to their satisfaction.

Response Time to Customer for assistance by operator (Voice to Voice): For percentage of calls getting connected to call center and answered, all operators (except TTL) were found to have connected 60% and 80% of calls within 60 seconds. & 90 seconds respectively. Only **TTL failed** to meet the benchmark by connecting **77.34%** of calls within 90 seconds.
In 3 days live measurement also all operators (except Spectranet) were found meeting the benchmark for this parameter. **Spectranet** could connect **68.19%** of calls to operator (Voice to Voice) within 90 seconds against the benchmark of >80%.

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.
For bandwidth utilization on IGSP / NIXI Node upstream Link(s) for International connectivity, **Bharti** and **MTNL** were performing with **83.60%** and **83.85%** against the benchmark of <80%.

During 3 days live measurement, the performance **MTNL** for the parameter 'IGSP / NIXI Node upstream Link(s) for International connectivity' was **81.23%** against the benchmark of <80%.

Service Availability/Uptime: For this parameter, only two operators namely **NSTPL** and **Pacenet** were found lagging behind the benchmark of >98% with their performance as **97.25%** and **96.67 %** respectively.

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 only **INDUS** was having packet loss **1.70%** against the benchmark of < 1 %.

CUSTOMER CARE / HELPLINE ASSESSMENT

Parameter	Circle Name	BHARTI AIRTEL	HATHWAY	INDUS	NSTPL	PACENET	SPECTRANET	TIKONA	MTNL	RCL	TCL	TTL
						LIVE CALLING TO CALL CENTRE FOR BROADBAND SERVICES						
Total No. of calls Attempted	Delhi	100	100	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator within 60 seconds	Delhi	100	100	100	100	50	100	90	78	100	90	98
% age calls answered by the operator in 60 seconds	Delhi	100.00%	100%	100.00%	100.00%	50.00%	100.00%	90.00%	78%	100.00%	90.00%	98.00%
Total number of calls answered by the operator within 90 seconds	Delhi	100	100	100	100	86	100	100	86	100	96	100
% age calls answered by the operator within 90 seconds	Delhi	100.00%	100%	100.00%	100.00%	86.00%	100.00%	100.00%	86.00%	100.00%	96.00%	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. Pacenet, MTNL and TCL could connect 86%, 86% and 96% of calls to the operator within 90 Seconds

11. GRAPHICAL REPRESENTATION OF BROADBAND SERVICES

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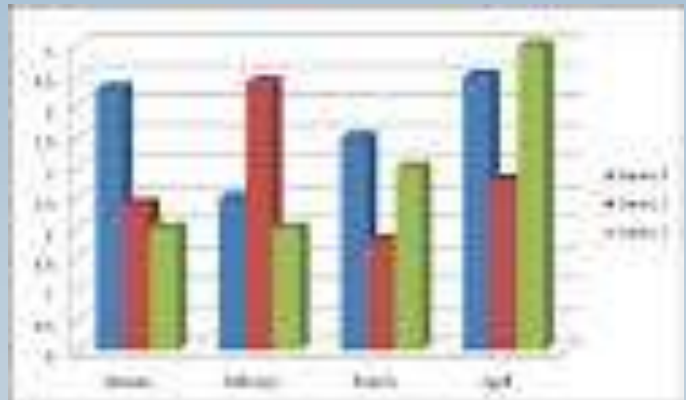
11. GRAPHICAL REPRESENTATION OF QUARTERLY PERFORMANCE OF BROADBAND SERVICE PROVIDERS:

1. SERVICE PROVISIONING/ACTIVATION TIME:

Service Provisioning/Activation Time

	BHARTI AIRTEL	HATH WAY	INDUS	NSTPL	PACEN ET	SPECTR ANET	TIKON A	MTNL	RCL	TCL	TTL
100% cases in 15 days	100%	100%	94.94%	100%	100%	100%	100%	97.14%	100%		100%
Benchmark <15 days	100%	100%	100.0%	100%	100%	100%	100%	100%	100%	100%	100%
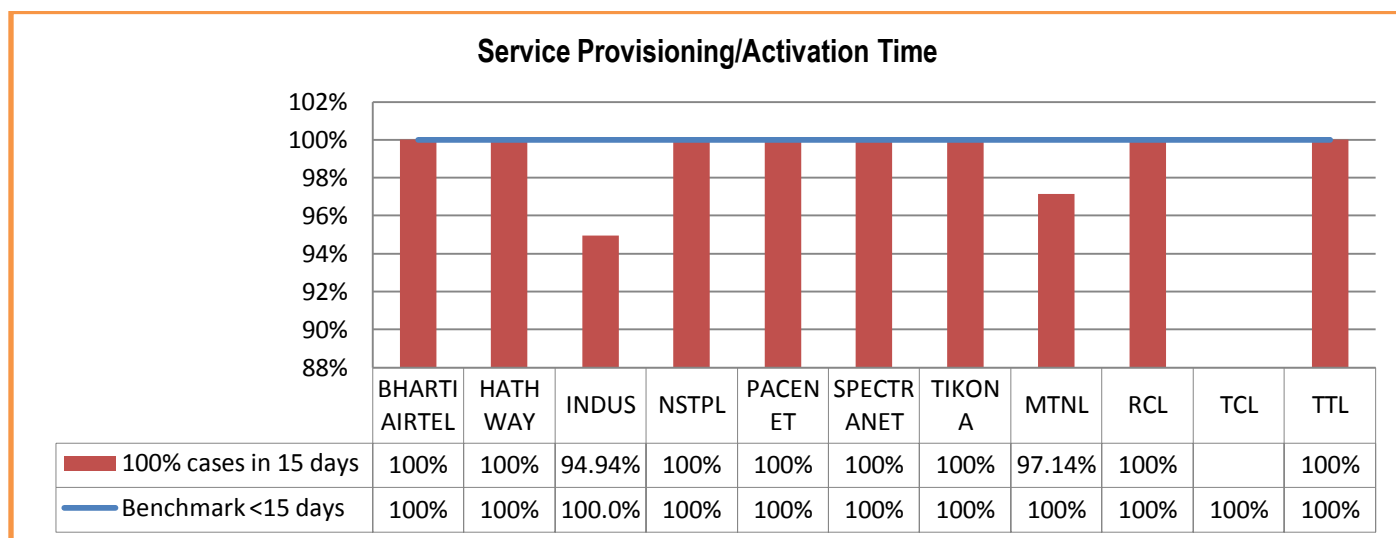
Indus and MTNL were falling short of the benchmark. Their performance was 94.94% and 97.14% respectively against the benchmark of 100% in <15 days.

2. BILLING PERFORMANCE:
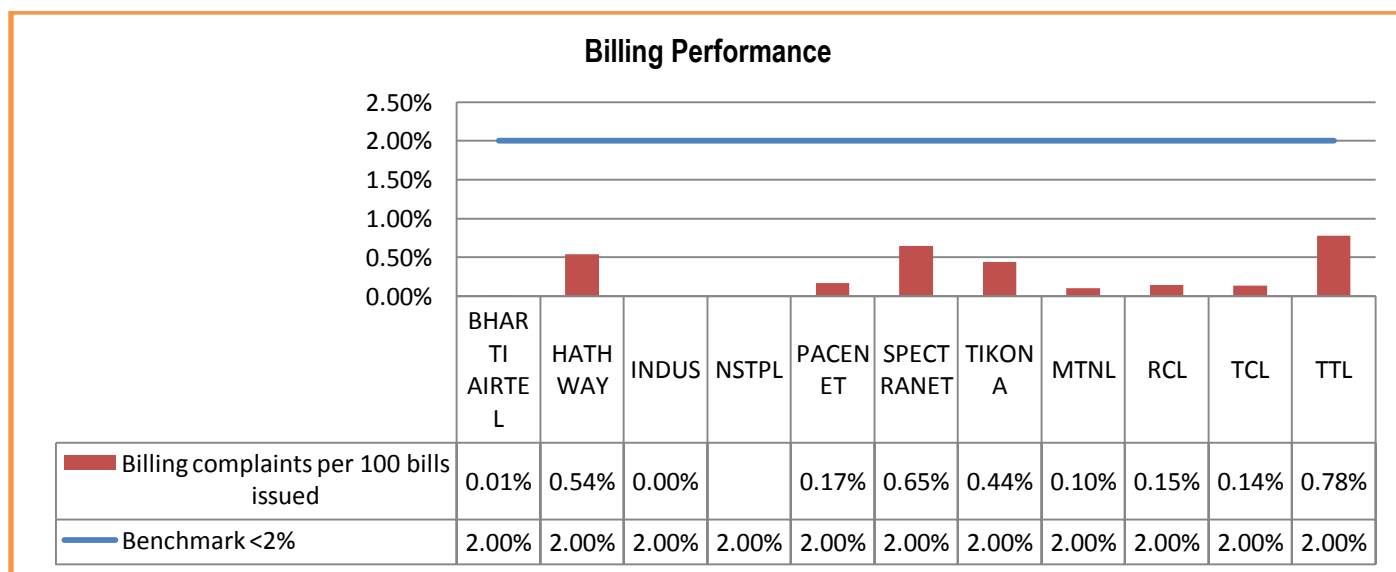
Billing Performance

	BHARTI AIRTEL	HATH WAY	INDUS	NSTPL	PACEN ET	SPECT RANET	TIKON A	MTNL	RCL	TCL	TTL
Billing complaints per 100 bills issued	0.01%	0.54%	0.00%		0.17%	0.65%	0.44%	0.10%	0.15%	0.14%	0.78%
Benchmark <2%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

For this parameter the performance of the service providers was found well within the compliance benchmark of <2%.

3. FAULTS REPAIR/RESTORATION TIME:

Faults Repair/Restoration Time

	BHARTI AIRTEL	HATHWAY	INDUS	NSTPL	PACENET	SPECTRANET	TIKONA	MTNL	RCL	TCL	TTL
Faults Repair time within 3 working day	99.38%	99.34%	100%	100%	100%	99.45%	99.30%	95.14%	100%		100%
Benchmark ≥99%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%
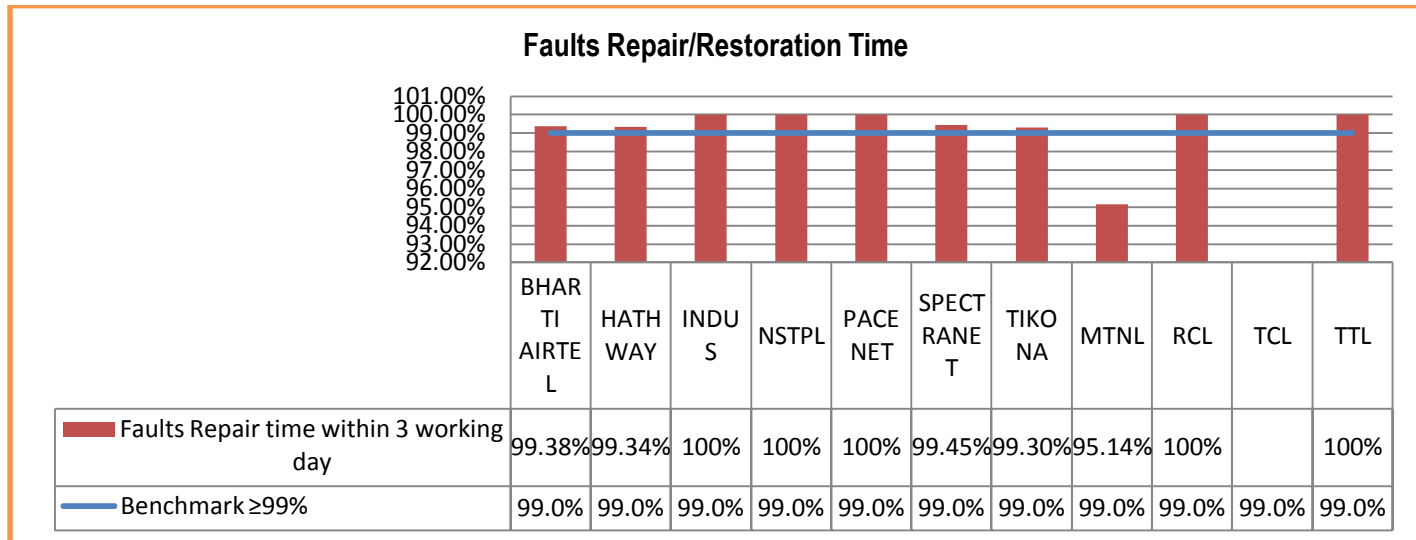
All Broadband Service Providers were found meeting the TRAI prescribed benchmark except MTNL.

4. COMPLAINT RESOLUTION:
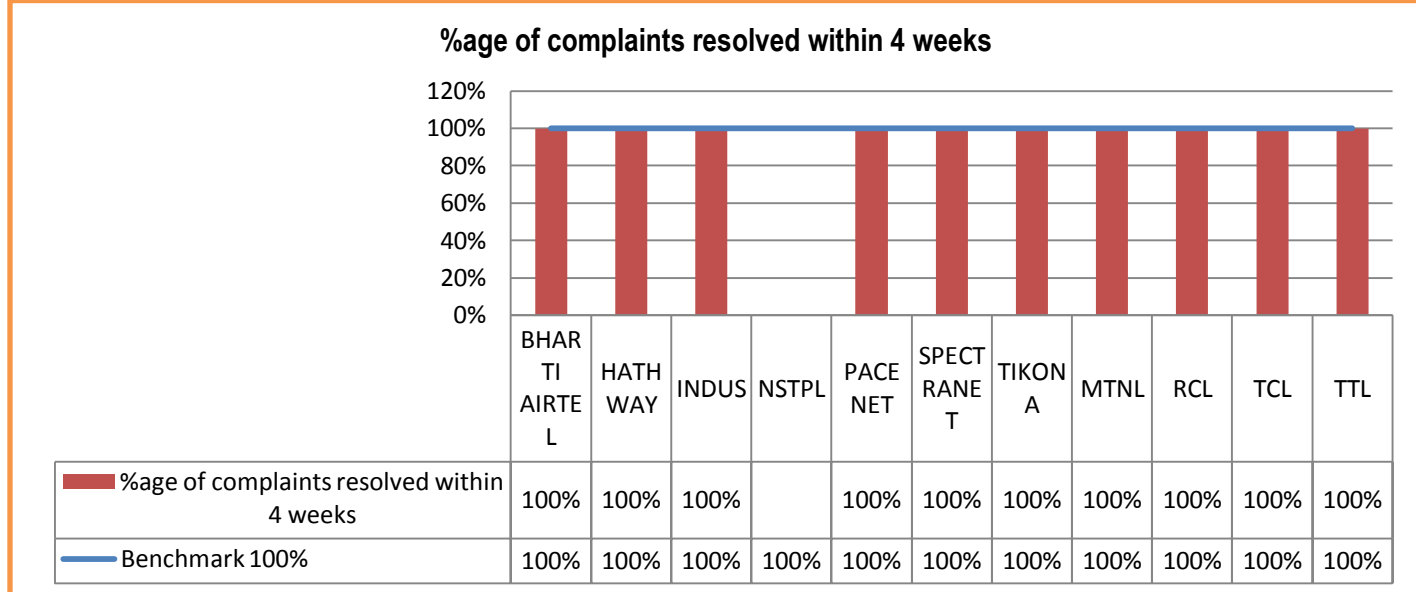
%age of complaints resolved within 4 weeks

	BHARTI AIRTEL	HATHWAY	INDUS	NSTPL	PACENET	SPECTRANET	TIKONA	MTNL	RCL	TCL	TTL
%age of complaints resolved within 4 weeks	100%	100%	100%		100%	100%	100%	100%	100%	100%	100%
Benchmark 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

For this parameter the performance of the service providers was found well within the compliance benchmark of 100%. NSTP is providing only Pre-paid connections.

5. REFUND:

Time taken for refund of deposits after closure (within 60 days)

	BHARTI AIRTEL	HATH WAY	INDUS	NSTPL	PACE NET	SPECT RANET	TIKON A	MTNL	RCL	TCL	TTL
Time taken for refund of deposits after closure (within 60 days)	100%	100%	100%		100%	100%	100%	100%	100%	100%	100%
Benchmark 100% (within 60 days)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
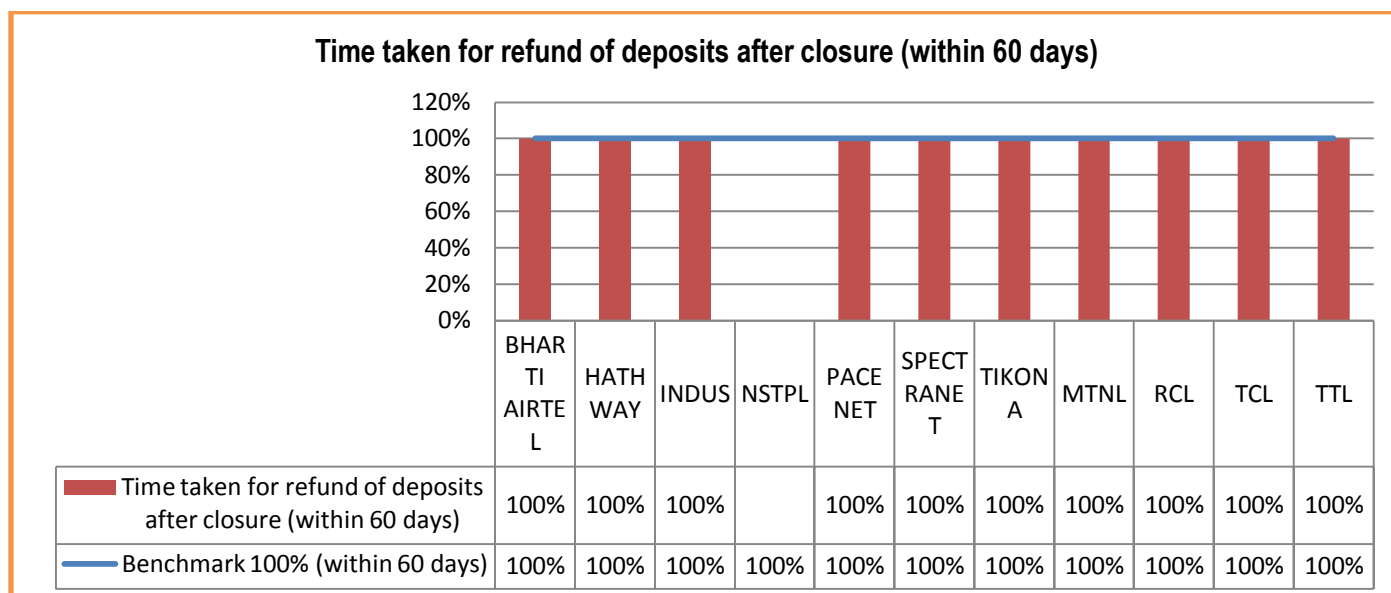
All Broadband Service Providers were found meeting the TRAI prescribed benchmark. NSTP is providing only Pre-paid connections.

6. SERVICE AVAILABILITY/UPTIME:

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

	BHARTI AIRTEL	HATH WAY	INDUS	NSTPL	PACEN ET	SPECT RANET	TIKON A	MTNL	RCL	TCL	TTL
Service Availability/Uptime	99.82%	99.16%	100.00%	97.25%	96.67%	99.89%	99.20%	99.40%	99.59%		99.79%
Benchmark >98%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%
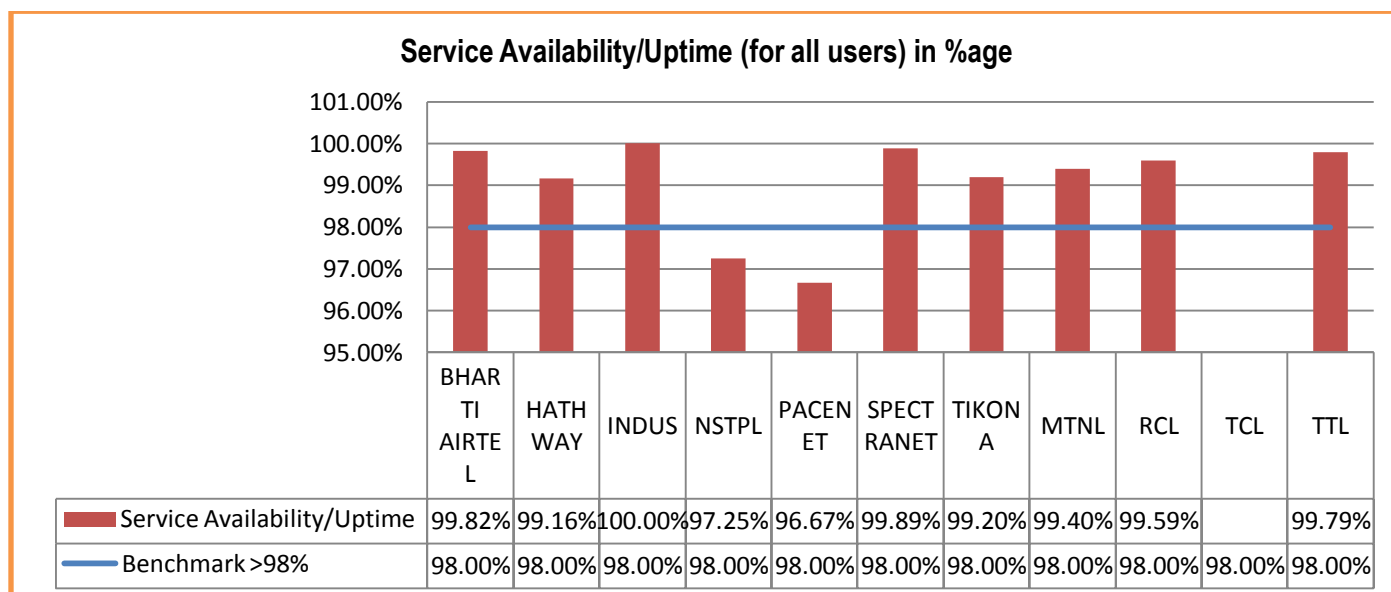
All service providers were meeting the benchmark for this parameter except NSTPL and Pace net.

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

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

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

	BHARTI AIRTEL	HATHW AY	INDUS	NSTPL	PACEN ET	SPECTR ANET	TIKONA	MTNL	RCL	TCL	TTL
Quarterly	5.02%	66.14%	80.00%	53.94%	54.24%	58.35%	71.29%	46.40%	15.17%	52.27%	56.70%
Live	4.06%	72.66%	72.00%	78.72%	59.82%	56.24%	57.87%	46.00%	34.82%	39.20%	
Benchmark <80%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%

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	HATHW AY	INDUS	NSTPL	PACEN ET	SPECTR ANET	TIKONA	MTNL	RCL	TCL	TTL
Quarterly	83.60%	68.10%	0.00%	0.00%	0.00%	63.05%	68.13%	83.85%	45.44%	48.11%	56.70%
Live	78.42%	77.97%	0.00%	0.00%	0.00%	61.54%	66.29%	81.23%	55.42%	68.56%	
Benchmark <80%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%

For bandwidth utilization on Pop to ISP Gateway Node, Indus is not meeting the benchmark with its performance as 80% against the benchmark of <80%.

For bandwidth utilization on IGSP / NIXI Node upstream Link(s) for International connectivity, Bharti Airtel and MTNL are not meeting the benchmark with its performance as 83.60% and 83.85% respectively against the benchmark of <80%.

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

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

	BHARTI AIRTEL	HATH WAY	INDUS	NSTPL	PACEN ET	SPECTR ANET	TIKONA	MTNL	RCL	TCL	TTL
Quarterly	105.61%	97.00%				88.50%	98.58%	97.00%		98.05%	
Live	115.28%	91.67%	99.02%	84.44%	100.00%	90.00%	99.63%	99.50%	89.17%	80.47%	
Benchmark >80%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%

All Broadband service providers were meeting the benchmark.

4. PACKET LOSS:

% of Packet loss
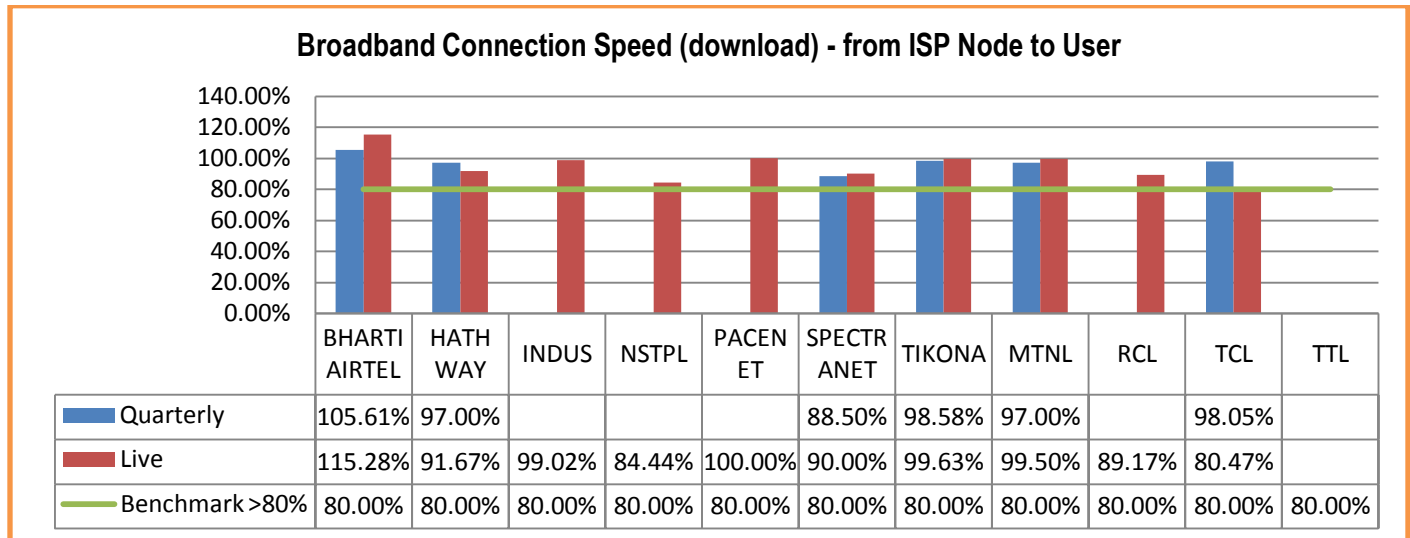

	BHARTI AIRTEL	HATH WAY	INDUS	NSTPL	PACEN ET	SPECTR ANET	TIKONA	MTNL	RCL	TCL	TTL
Quarterly	0.00%	0.00%				0.00%	0.00%	0.13%	0.61%	0.00%	0.09%
Live	0.10%	0.00%	1.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%
Benchmark <1%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
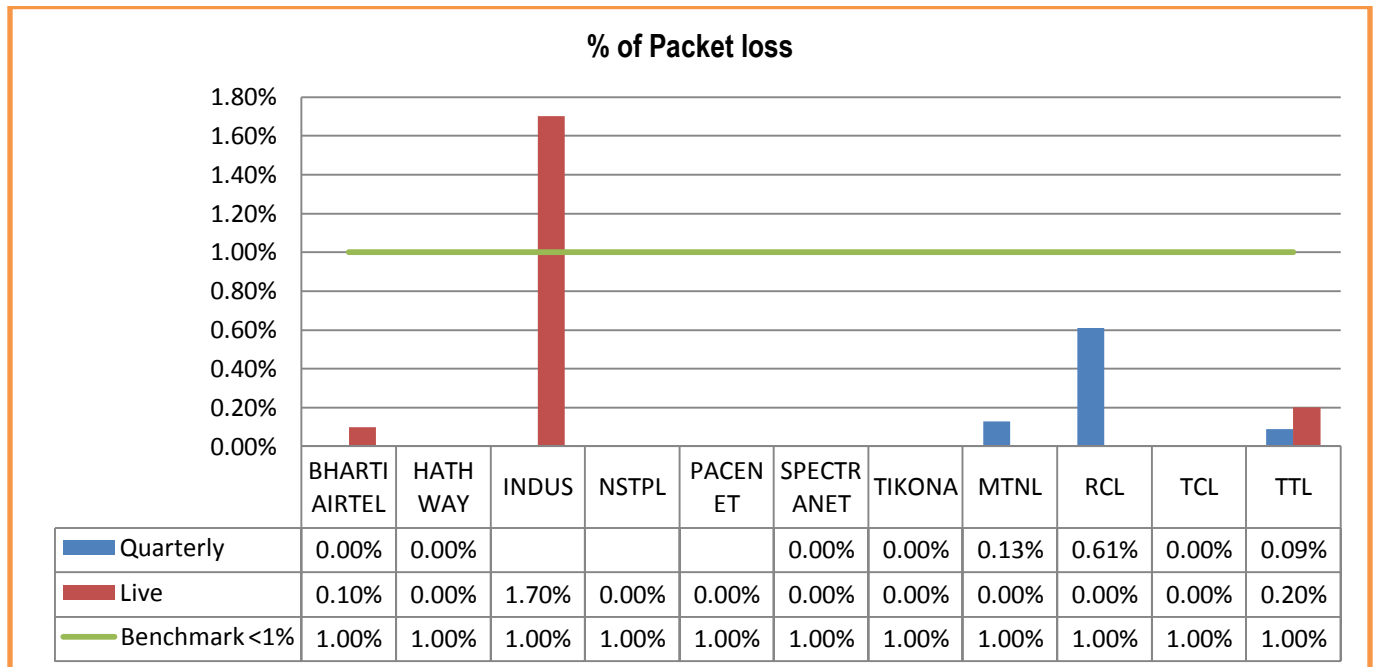
All Broadband service providers were meeting the benchmark except Indus in 3 days live measurement.

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	HATH WAY	INDUS	NSTPL	PACEN ET	SPECTR ANET	TIKON A	MTNL	RCL	TCL	TTL
Quarterly	40	9				2		13	51	18	
Live	33	50	46	50	20	20		15	70	10	
Benchmark <120 ms	120	120	120	120	120	120	120	120	120	120	120

All Broadband service providers were meeting the benchmark.

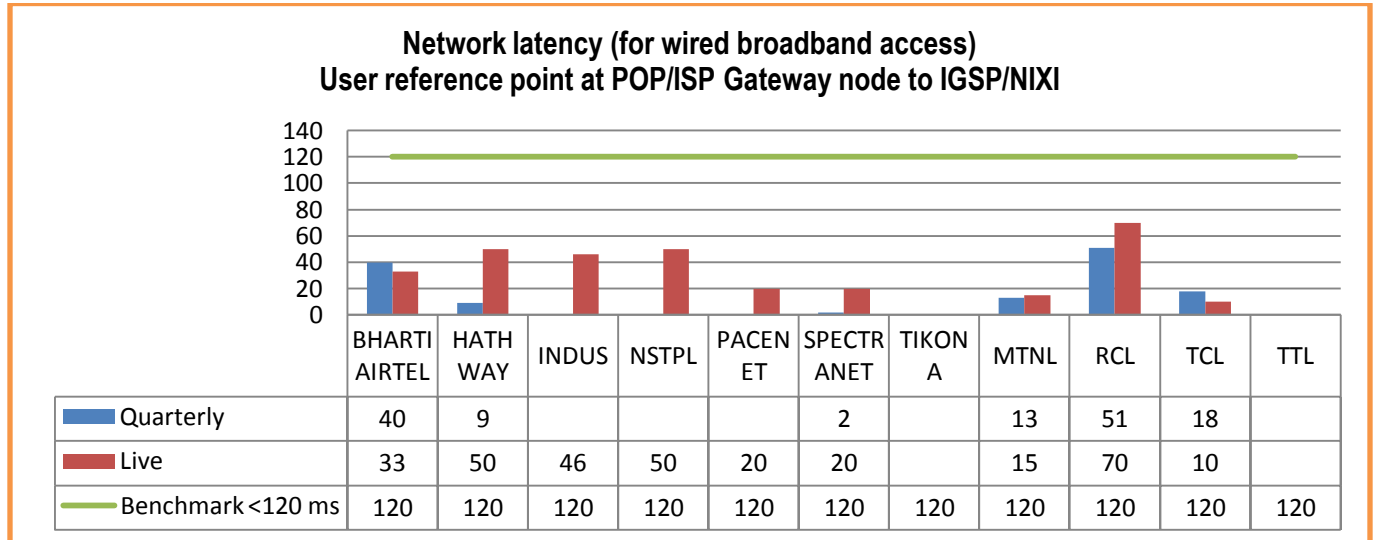## 6. NETWORK LATENCY USER REFERENCE POINT AT ISP GATEWAY NODE TO INTERNATIONAL NEAREST NAP PORT ABROAD (TERRESTRIAL):

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

	BHARTI AIRTEL	HATH WAY	INDUS	NSTPL	PACEN ET	SPECTR ANET	TIKON A	MTNL	RCL	TCL	TTL
Quarterly	76	85				162		256	19	274	
Live	83	208				162		256	193	242	
Benchmark <350 ms	350	350	350	350	350	350	350	350	350	350	350
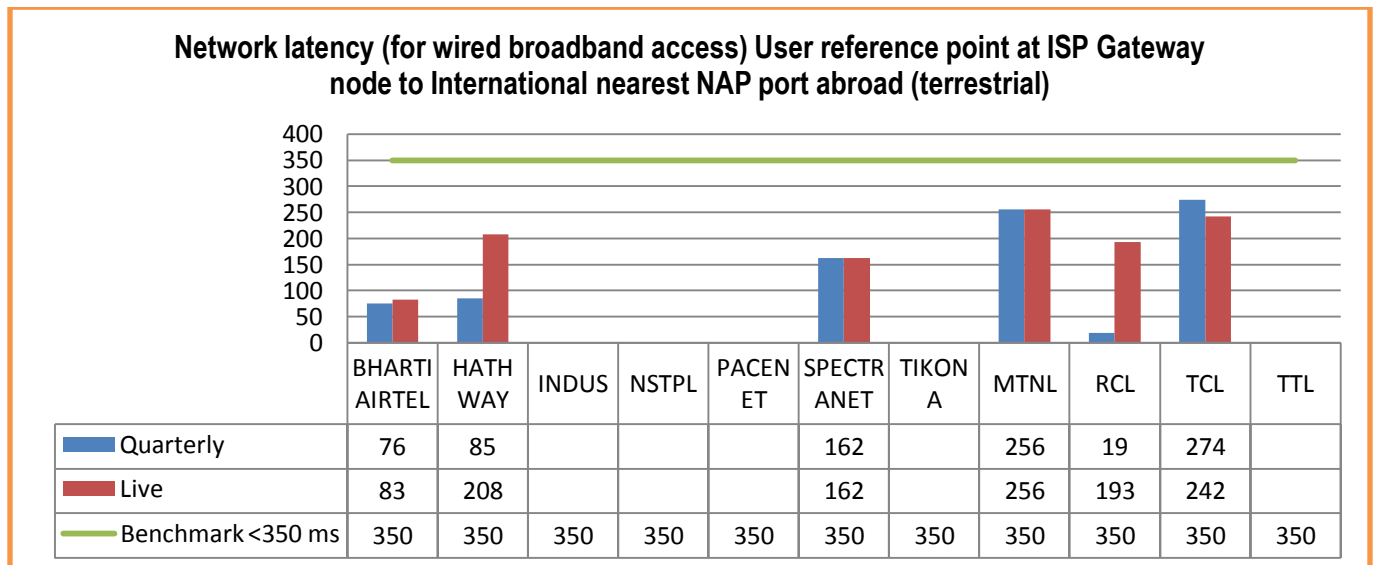
All Broadband service providers were meeting the benchmark.

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	HATH WAY	INDUS	NSTPL	PACEN ET	SPECTR ANET	TIKON A	MTNL	RCL	TCL	TTL
Quarterly	90.93%	70.94%	100.0%	100.0%	92.12%	86.39%	61.50%	99.87%	96.42%	90.46%	73.40%
Live		79.08%	100.0%	100.0%	86.90%	63.20%	61.95%	80.39%	95.63%	97.67%	90.00%
Benchmark >60%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%
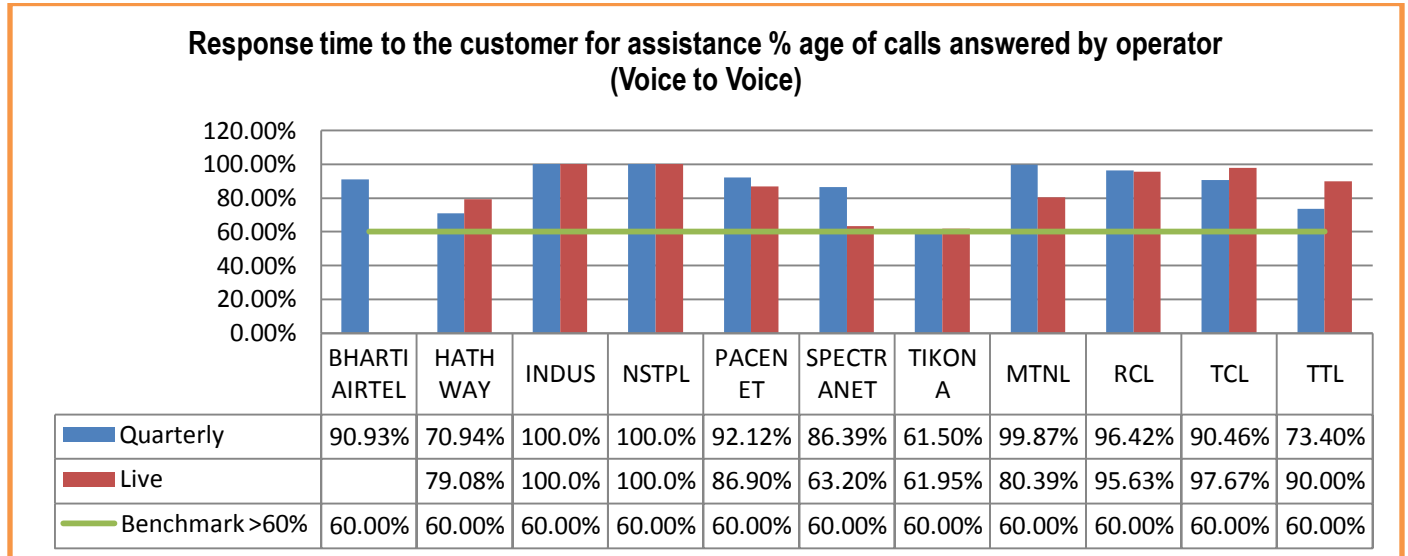
All Broadband service providers were meeting the benchmark.

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	HATH WAY	INDUS	NSTPL	PACEN ET	SPECTR ANET	TIKONA	MTNL	RCL	TCL	TTL
Quarterly	93.13%	84.19%	100.00%	100.00%	98.47%	89.88%	80.26%	99.93%	98.59%	92.58%	77.34%
Live		90.59%	100.00%	100.00%	100.00%	68.19%	83.89%	80.43%	98.65%	97.59%	90.00%
Benchmark >80%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
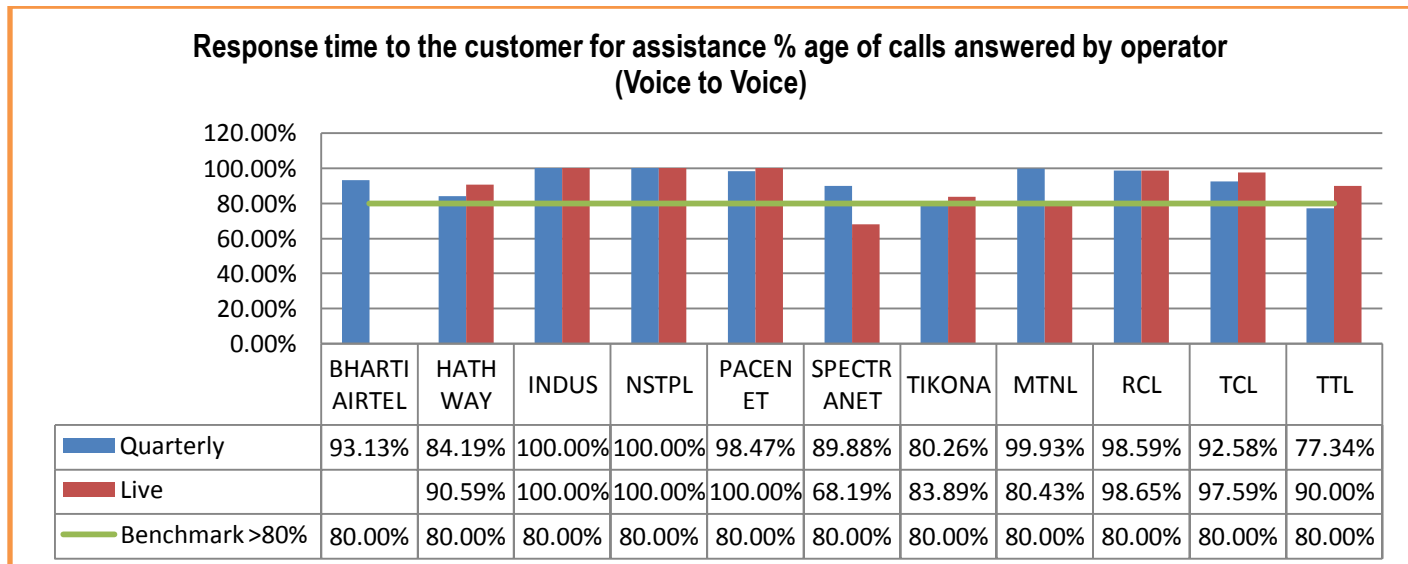
All Broadband service providers were meeting the benchmark except Spectra net (3 days live) and TTL.