



REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
BASIC (WIRELINER) SERVICE
&
BROADBAND SERVICE
FOR
TELECOM REGULATORY AUTHORITY OF INDIA
NORTH ZONE – DELHI METRO CIRCLE
(OCTOBER 2013 – DECEMBER 2013)

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PREFACE

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

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

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



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CHAPTER-1: INTRODUCTION

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 6th October, 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.

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, Delhi, Haryana & Maharashtra Circles also include audit for Basic (Wire line) and Broadband services as mandated by TRAI, during the quarter October- December 2013.**

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.



SAMPLE SIZE:

a) 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
GSM Operators	
1	AIRCEL
2	AIRTEL
3	MTNL
4	IDEA
5	RCOM GSM
6	VODAFONE
CDMA Operators	
7	MTS
8	RCOM CDMA
9	TATA CDMA

For all the above operators, audit was conducted in all the three months of the Quarter ended December 2013.

b) SAMPLING FOR BASIC (WIRELIN) 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. The following Service providers, providing the Basic (Wireline) service have been audited for their quality of service assessment.



Sl. No.	Name of Wireline Service Provider
1	BHARTI AIRTEL
2	MTNL
3	RCOM
4	TATA
5	VODAFONE

c) 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.



CHAPTAR-2: QOS AUDIT FOR CELLULAR MOBILE SERVICE

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 3 drive tests in different cities of a circle/service area per service provider per month. Thus total 81 (3x9x3) drive tests in three months of quarter ended December 2013 were carried out in **Delhi Metro circle**.

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.



**a) 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	Dec-13	19:00 - 20:00
2	AIRTEL	Dec-13	20:00 - 21:00
3	MTNL	Dec-13	20:00 - 21:00
4	IDEA	Dec-13	19:00 - 20:00
5	RCOM GSM	Dec-13	19:00 - 20:00
6	VODAFONE	Dec-13	19:00 - 20:00
CDMA Operators			
7	MTS	Dec-13	19:00 - 20:00
8	RCOM CDMA	Dec-13	20:00 - 21:00
9	TATA CDMA	Dec-13	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	2876	NSN	NSN
2	AIRTEL	31	57	5400	Ericsson	Ericsson
3	MTNL	6	31	1114	NSN	NSN
4	IDEA	10	37	4385	NSN	NSN
5	RCOM GSM	4	14	2596	Huawei	Huawei
6	VODAFONE	15	54	5527	Ericsson	Ericsson
CDMA Operators						
7	MTS	1	4	3018	ZTE	ZTE
8	RCOM CDMA	7	NA	2956	Lucent & ZTE	Lucent
9	TATA CDMA	9	8	1405	Huawei	Huawei



TABLES OF MONTHLY QOS PERFORMANCE:

TABLE: 1

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- OCT-13 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%	Oct-13	0.33%	0.02%	0.36%	0.00%	0.23%	0.02%	0.09%	0.12%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Oct-13	1.70%	0.00%	1.53%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Oct-13	96.70%	99.88%	96.81%	99.98%	99.55%	99.48%	99.21%	98.45%	99.13%
	b) SDCCH/PAGING Channel congestion	<=1%	Oct-13	0.15%	0.02%	0.21%	0.53%	0.02%	0.13%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Oct-13	0.56%	0.05%	1.78%	0.55%	0.05%	0.25%	0.20%	0.01%	0.05%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Oct-13	1.12%	0.61%	1.74%	0.61%	0.41%	0.85%	0.55%	0.61%	0.58%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Oct-13	2.52%	0.65%	2.56%	1.55%	0.03%	2.47%	1.90%	1.23%	0.00%
	c) Connections with good voice quality	>=95%	Oct-13	97.56%	99.30%	97.57%	98.38%	98.81%	97.50%	99.98%	99.79%	99.15%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Oct-13	1	0	0	0	0	0	0	0	0



TABLE: 2

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- NOV-13 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%	Nov-13	0.21%	0.02%	0.36%	0.00%	0.16%	0.02%	0.07%	0.10%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Nov-13	0.98%	0.00%	1.44%	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Nov-13	97.89%	99.87%	96.16%	99.98%	99.63%	99.60%	99.22%	98.80%	99.14%
	b) SDCCH/PAGING Channel congestion	<=1%	Nov-13	0.32%	0.04%	0.43%	0.65%	0.03%	0.09%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Nov-13	0.47%	0.04%	1.53%	0.49%	0.04%	0.17%	0.25%	0.01%	0.07%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Nov-13	1.08%	0.55%	1.65%	0.55%	0.37%	0.77%	0.54%	0.50%	0.54%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Nov-13	2.89%	0.90%	2.30%	1.50%	0.02%	2.25%	1.78%	1.96%	1.34%
	c) Connections with good voice quality	>=95%	Nov-13	97.65%	99.41%	97.73%	98.34%	98.91%	97.67%	98.26%	99.79%	99.15%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Nov-13	5	0	0	0	0	0	0	0	0



TABLE: 3

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- DEC-13 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%	Dec-13	0.38%	0.02%	0.42%	0.01%	0.19%	0.02%	0.11%	0.09%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Dec-13	2.47%	0.00%	1.80%	0.00%	0.23%	0.00%	0.11%	0.10%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Dec-13	97.96%	99.88%	96.00%	99.97%	99.52%	99.65%	99.18%	98.77%	99.03%
	b) SDCCH/PAGING Channel congestion	<=1%	Dec-13	0.32%	0.01%	0.45%	0.49%	0.02%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-13	0.59%	0.05%	1.74%	0.59%	0.04%	0.13%	0.24%	0.01%	0.07%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Dec-13	1.07%	0.54%	1.67%	0.54%	0.41%	0.79%	0.63%	0.50%	0.61%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Dec-13	2.79%	0.75%	2.40%	1.49%	0.01%	2.22%	1.77%	1.97%	1.26%
	c) Connections with good voice quality	>=95%	Dec-13	97.65%	99.41%	97.66%	98.28%	98.72%	97.70%	98.33%	99.80%	99.12%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Dec-13	3	0	0	0	0	0	0	0	0

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

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



Network Service Quality Parameters:

▪ **Network Availability**

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

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

In 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 **2.47 %** in the month of Dec-13.

▪ **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 comfortably meeting the benchmark of this parameter.

▪ **Parameters related to Network Congestion:**

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

In CDMA system, there is no direct counter defined for reporting Paging Channel Congestion as reported by Tata Teleservices. However, they have a defined counter for Paging Channel Occupancy Ratio (**PCH Average Using Ratio**) which is used to determine the Paging Channel Occupancy which on an average is < 50% on all sites in the network. When the value of this parameter is less than 100%, it is counted as 0% congestion. Thus, there is no congestion on the paging 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 providers, except **Aircel**. Aircel was the only service provider that was found having congestion on one POI with ABS-NLD in the month of October-13, on five POIs with Aircel-NLD, BTSOL-NLD, Idea-local, Reliance-NLD and BSNL-NLD in the month of November-13 and three POIs with MTNL, Reliance-local and Idea-local in the month of December-13.



▪ 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 0.40 %) 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 have met the bench mark successfully during the quarter.

iii. Connections with good voice quality:

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

iv. No. of POI's having $\geq 0.5\%$ POI congestion:

The audit with respect to this parameter revealed that all the operators met the benchmark for this parameter except **Aircel**. Aircel was the only service provider that was found having congestion on one POI with ABS-NLD in the month of October-13, on five POIs with Aircel-NLD, BTSOL-NLD, Idea-local, Reliance-NLD and BSNL-NLD in the month of November-13 and three POIs with MTNL, Reliance-local and Idea-local in the month of December-13.

AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-DELHI METRO CIRCLE



b) CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT-QE DEC-13:

CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE DEC-13												
Quarterly 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		
Customer Service Quality Parameters												
1	Metering & Billing Credibility -Post Paid											
	A) No. of bills issued during the quarter		<i>Delhi</i>	49030	1677647	173631	593223	110818	827500	815	335246	359892
	B) No. of bills disputed including billing complaints during the quarter		<i>Delhi</i>	19	614	55	350	106	1174	0	331	149
	C)% of billing complaints during the quarter	<= 0.1%	<i>Delhi</i>	0.04%	0.04%	0.03%	0.06%	0.10%	0.10%	0.00%	0.10%	0.04%
2	Metering & Billing Credibility -Pre Paid											
	A) Total No. of Pre-paid customers at the end of the quarter		<i>Delhi</i>	3380291	8129383	2320836	4574176	4506774	7317547	423008	2835167	3149630
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		<i>Delhi</i>	101	4297	51	1683	4448	3257	82	2839	30
	C) % of Pre-paid Charging Complaints	<= 0.1%	<i>Delhi</i>	0.00%	0.05%	0.002%	0.04%	0.10%	0.04%	0.02%	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		<i>Delhi</i>	120	4913	106	2033	4554	4431	82	3170	179
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		<i>Delhi</i>	120	4913	106	2033	4554	4431	82	3170	179

AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-DELHI METRO CIRCLE



	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	92.24%	100.00%	96.80%	100.00%	98.69%	100.00%	99.14%	98.42%	100.00%
	B) % call answered by operators(voice to voice) within 60 sec.	>=90%	Delhi	72.62%	93.00%	96.76%	99.46%	66.59%	98.76%	94.95%	92.91%	93.00%
	C) Total no. of call attempts to call centre & customer care nos. during TCBH during the quarter		Delhi	1068663	2740949	450225	374254	10494615	8145355	857233	1444852	390274
	D) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH during the quarter		Delhi	985735	2740949	435817	374254	10357136	8145355	849861	1422023	390274
5	Termination/closure of service											
	A) Total No. of requests for Termination / Closure of service received during the quarter		Delhi	712	8892	14	7208	1146	3825	2	1728	435
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		Delhi	712	8892	14	7208	1146	3825	2	1728	435
	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	665	1502	0	2610	1156	1022	0	1364	207
	B) No. of Payments/ Refunds Cleared during the quarter		Delhi	665	1502	0	2610	1156	1022	0	1364	207
	C)Time taken for refunds of deposits after closures.	100% within 60 days	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	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 $\leq 0.1\%$.

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 except **Aircel**. The performance of **Aircel** with respect to this parameter was recorded as **92.24%** against the benchmark of 95%. **Aircel and RCOM (GSM)** were also unable to meet the benchmark of calls answered by Operators (voice to voice) within 60 seconds. They achieved their performance as **72.62 %** and **66.59 %** 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.



c) 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- OCT-13 MONTH												
<u>Live measurement Data</u>		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	0.13%	0.02%	0.39%	0.01%	0.19%	0.02%	0.00%	0.06%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.36%	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	97.80%	99.89%	95.53%	99.98%	99.52%	99.45%	99.40%	98.29%	99.04%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.06%	0.01%	0.35%	0.36%	0.02%	0.10%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.50%	0.04%	1.75%	0.43%	0.05%	0.26%	0.10%	0.02%	0.17%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.27%	0.60%	1.74%	0.65%	1.24%	0.89%	0.50%	0.54%	0.56%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	0.00%	0.90%	2.39%	1.64%	0.04%	2.50%	1.63%	2.25%	1.31%
	c) Connections with good voice quality	>=95%	Live data	97.29%	99.35%	97.53%	98.22%	98.81%	97.47%	99.98%	99.79%	99.16%
4	No. of POI having >=0.5% congestion	<0.5%	Live data	1	0	0	0	0	0	0	0	0



TABLE: 2

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- NOV-13 MONTH												
<u>Live measurement Data</u>		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	0.32%	0.016%	0.29%	0.00%	0.20%	0.01%	0.07%	0.13%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.27%	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%	99.79%	95.41%	99.98%	99.62%	99.62%	99.03%	98.80%	99.10%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.57%	0.11%	0.72%	0.45%	0.02%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.49%	0.04%	1.68%	0.37%	0.05%	0.15%	0.42%	0.01%	0.13%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.16%	0.56%	1.60%	0.54%	0.37%	0.80%	0.56%	0.53%	0.50%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	0.00%	0.79%	2.30%	1.45%	0.00%	2.32%	1.40%	2.63%	1.15%
	c) Connections with good voice quality	>=95%	Live data	97.60%	99.40%	97.65%	98.31%	98.87%	97.63%	98.26%	99.79%	99.05%
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	0	0



TABLE: 3

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- DEC-13 MONTH												
<u>Live measurement Data</u>		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	0.01%	0.020%	0.32%	0.01%	0.15%	0.01%	0.13%	0.09%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.07%	0.00%	0.36%	0.00%	0.00%	NP	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.50%	99.89%	95.83%	99.98%	99.55%	99.67%	99.19%	98.89%	98.91%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.23%	0.01%	0.58%	0.58%	0.02%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.68%	0.04%	1.72%	0.39%	0.03%	0.12%	0.26%	0.01%	0.11%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.20%	0.52%	1.65%	0.53%	0.41%	0.79%	0.59%	0.47%	0.58%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	NP	0.70%	2.58%	1.34%	0.00%	2.49%	1.34%	2.55%	2.72%
	c) Connections with good voice quality	>=95%	Live data	97.53%	99.43%	97.66%	98.28%	98.74%	97.69%	98.25%	99.80%	99.10%
4	No. of POI having >=0.5% congestion	<0.5%	Live data	3	0	0	0	0	0	0	0	0

- NP-Not Provided

KEY FINDINGS ON 3 DAYS LIVE MEASUREMENTS:

From three days live measurement assessment, it was found that the performance of all operators was satisfactory as they were largely complying with the benchmarks of parameters except **Aircel** which was having congestion on **one** POI , and **three** POIs in the months of October and December -13 respectively.



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.



2) CUSTOMER SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE-DEC-13												
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	100.00%	100.00%	95.22%	100.00%	98.78%	100.00%	99.41%	98.21%	100.00%
	B) % call answered by operators(voice to voice) within 60 sec.	>=90%	Delhi	34.02%	90.10%	98.72%	99.39%	89.44%	99.09%	94.44%	89.01%	100.00%

CUSTOMER CARE / HELPLINE ASSESSMENT

LIVE CALLING TO CALL CENTRE											
	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA	
Total No. of calls Attempted	Delhi	50	50	50	50	50	50	50	50	50	
Total No. of calls connected to IVR	Delhi	50	50	50	50	50	50	50	50	50	
Calls got connected to operator within 60 Sec	Delhi	42	50	40	45	47	50	46	45	43	
%age of calls got answered by operator	Delhi	84.00%	100.00%	80.00%	90.00%	94.00%	100.00%	92.00%	90.00%	86.00%	

The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center. However, in case of calls connection to operators (Voice to voice) within 60 seconds, performance of Aircel, RCOM (GSM) and RCOM (CDMA) was 34.02 %, 89.44% and 89.01% respectively. The performance of **Aircel (34.02%)** was way below the benchmark of 90 %.

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers, only two operators namely Airtel and Vodafone could connect 100% of calls to the operators., whereas MTNL, Aircel, Tata (CDMA), Idea, RCOM (CDMA), MTS and RCOM (GSM) could connect 80%, 84%, 86%, 90%, 90%, 92% and 94% of calls respectively, to the operator within 60 Seconds.



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	100%	100%	100%	100%	100%	100%	100%	100%	100%
101	Delhi	20	100%	100%	100%	100%	100%	100%	100%	100%	100%
102	Delhi	20	100%	100%	100%	100%	100%	100%	100%	100%	100%
108	Delhi	20	100%	100%	100%	100%	100%	100%	100%	100%	100%
139	Delhi	20	100%	100%	100%	100%	100%	100%	100%	100%	100%

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.

DRIVE TEST

1) OPERATOR ASSISTED DRIVE TEST:

In Delhi Metro Service area, total 81 drive tests in three months of the quarter ended December 2013 @ of 3 drive tests per operator per month (total 3x9x3=81 drive tests) were conducted covering different areas of Delhi/NCR region. The performance of the operators assessed during the drive tests each month has been highlighted below in the Tables 1 to 4. The drive tests were conducted simultaneously for all the operators following the same route of drive tests. A sample of about 120 - 150 test calls were made during a drive test covering about a distance of 100 K.M. 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. The routes were so selected that the drive test could cover the congested areas/commercial areas /peripheral areas of Delhi/NCR region.

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 FERs is considered to be good, where as Rx Qual beyond this benchmark is considered to be bad. Call drops were measured by the number of calls that were dropped to the total number of calls established during the drive test. Similarly CSSR was measured as the ratio of total calls established to the total call attempts made. Signal strength was measured in dBm at street level with strength ≥ -75 dBm for in-door coverage and ≥ -85 dBm for in-vehicle.



DRIVE TEST TABLE: 1

OPERATOR-ASSISTED DRIVE TEST-DELHI METRO CIRCLE-OCT-13 MONTH												
S/N	Parameter	City Name	Drive Test Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
1	Blocked Call Rate (<=3%)	Gurgaon	Oct-13	0.00%	1.07%	9.52%	0.00%	4.31%	6.29%	0.00%	0.00%	0.82%
		Faridabad	Oct-13	0.00%	0.50%	7.74%	0.00%	3.15%	0.88%	0.00%	0.00%	0.00%
		Noida	Oct-13	1.34%	0.52%	6.55%	0.00%	1.20%	1.07%	0.00%	0.00%	0.62%
2	Dropped Call Rate (<=2%)	Gurgaon	Oct-13	1.52%	0.53%	1.90%	0.00%	0.00%	0.70%	0.00%	0.62%	0.00%
		Faridabad	Oct-13	0.77	0.00%	4.17%	0.00%	0.00%	0.00%	0.00%	0.75%	0.00%
		Noida	Oct-13	0.00%	1.05%	2.98%	0.00%	0.00%	0.00%	0.00%	1.95%	0.00%
Percentage connections with good voice quality (=>95%)												
3	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Gurgaon	Oct-13	NA	NA	NA	NA	NA	NA	95.21%	96.29%	96.84%
		Faridabad	Oct-13	NA	NA	NA	NA	NA	NA	96.40%	98.53%	97.37%
		Noida	Oct-13	NA	NA	NA	NA	NA	NA	96.13%	95.33%	97.41%
	(b) 0-5 (with frequency hopping for GSM Operators)	Gurgaon	Oct-13	97.99%	94.93%	95.50%	96.38%	91.41%	93.98%	NA	NA	NA
		Faridabad	Oct-13	96.99%	95.29%	87.94%	96.56%	95.11%	94.54%	NA	NA	NA
		Noida	Oct-13	97.31%	95.00%	92.31%	94.42%	93.64%	98.21%	NA	NA	NA
Service Coverage												
4	In door (>= -75dBm)	Gurgaon	Oct-13	89.46%	41.73%	62.22%	55.57%	30.37%	96.30%	67.35%	77.19%	91.23%
		Faridabad	Oct-13	88.30%	94.32%	78.13%	50.69%	30.41%	88.90%	92.23%	88.93%	83.58%
		Noida	Oct-13	91.16%	98.46%	68.47%	50.04%	33.23%	95.75%	94.86%	61.65%	99.50%
	In-vehicle (>= -85dBm)	Gurgaon	Oct-13	97.19%	88.47%	78.21%	94.41%	66.91%	99.14%	99.30%	99.89%	99.86%
		Faridabad	Oct-13	96.84%	99.50%	93.00%	93.07%	69.36%	99.42%	99.78%	99.68%	99.99%
		Noida	Oct-13	98.56%	99.76%	89.47%	94.25%	68.29%	98.97%	99.94%	99.40%	100.00%
	Outdoor- in city (>= -95dBm)	Gurgaon	Oct-13	100.00%	100.00%	79.47%	99.89%	100.00%	100.00%	100.00%	100.00%	100.00%
		Faridabad	Oct-13	100.00%	100.00%	100.00%	99.95%	100.00%	100.00%	100.00%	100.00%	100.00%
		Noida	Oct-13	100.00%	100.00%	90.98%	99.80%	100.00%	100.00%	100.00%	100.00%	100.00%
5	Call Setup Success Rate (>=95%)	Gurgaon	Oct-13	98.48%	98.40%	88.58%	100.00%	95.69%	93.01%	100.00%	99.38%	99.18%
		Faridabad	Oct-13	99.23%	99.50%	88.10%	100.00%	96.85%	99.12%	100.00%	99.25%	100.00%
		Noida	Oct-13	98.66%	98.43%	90.48%	100.00%	98.80%	98.93%	100.00%	98.05%	99.38%

• NA-Not Applicable



DRIVE TEST TABLE: 2

OPERATOR-ASSISTED DRIVE TEST – DELHI METRO CIRCLE-NOV-13 MONTH												
S/N	Parameter	City Name	Drive Test Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
1	Blocked Call Rate (<=3%)	South West Delhi	Nov_13	0.60%	0.66%	3.82%	0.73%	2.67%	0.00%	1.25%	0.00%	0.73%
		South Delhi	Nov_13	0.69%	1.53%	7.50%	0.00%	2.60%	0.00%	0.64%	0.00%	0.00%
		West Delhi	Nov_13	1.88%	0.00%	5.70%	1.56%	2.11%	0.00%	1.94%	0.00%	0.00%
2	Dropped Call Rate (<=2%)	South West Delhi	Nov_13	1.25%	0.00%	3.31%	0.00%	0.67%	0.00%	0.00%	0.70%	0.00%
		South Delhi	Nov_13	1.38%	0.00%	4.76%	0.00%	0.65%	0.00%	0.00%	0.75%	0.00%
		West Delhi	Nov_13	0.64%	0.00%	3.40%	0.79%	0.00%	1.97%	0.00%	0.00%	0.00%
Percentage connections with good voice quality (=>95%)												
3	(a) 0-4 (w/o frequency hopping for CDMA Operators)	South West Delhi	Nov_13	NA	NA	NA	NA	NA	NA	98.67%	96.34%	96.67%
		South Delhi	Nov_13	NA	NA	NA	NA	NA	NA	98.48%	95.65%	96.70%
		West Delhi	Nov_13	NA	NA	NA	NA	NA	NA	99.77%	97.08%	95.78%
	(b) 0-5 (with frequency hopping for GSM Operators)	South West Delhi	Nov_13	92.60%	94.82%	93.39%	95.46%	90.89%	94.03%	NA	NA	NA
		South Delhi	Nov_13	92.53%	95.42%	92.89%	95.86%	90.08%	94.44%	NA	NA	NA
		West Delhi	Nov_13	92.14%	95.88%	93.70%	94.07%	91.44%	95.04%	NA	NA	NA
Service Coverage												
4	In door (>= -75dBm)	South West Delhi	Nov_13	71.50%	93.52%	54.87%	39.01%	71.81%	92.33%	84.79%	93%	98.56%
		South Delhi	Nov_13	71.65%	85.92%	53.76%	41.17%	72.43%	95.46%	88.72%	99.71%	98.76%
		West Delhi	Nov_13	80.69%	89.00%	73.39%	52.73%	63.45%	95.95%	100.00%	99.96%	99.62%
	In-vehicle (>= -85dBm)	South West Delhi	Nov_13	93.03%	99.28%	68.82%	86.08%	95.17%	99.80%	99.13%	99.29%	99.96%
		South Delhi	Nov_13	94.75%	98.32%	68.60%	89.08%	97.59%	99.91%	99.94%	100.00%	99.97%
		West Delhi	Nov_13	96.58%	98.88%	93.50%	93.14%	93.36%	99.21%	100.00%	100.00%	99.97%
	Outdoor- in city (>= -95dBm)	South West Delhi	Nov_13	99.16%	99.89%	70.07%	98.70%	100.00%	100.00%	100.00%	100.00%	100.00%
		South Delhi	Nov_13	99.41%	99.84%	69.92%	99.50%	100.00%	100.00%	100.00%	100.00%	100.00%
		West Delhi	Nov_13	99.16%	99.80%	95.08%	99.73%	100.00%	99.69%	100.00%	100.00%	100.00%
5	Call Setup Success Rate (>=95%)	South West Delhi	Nov_13	95.81%	99.34%	96.18%	99.27%	99.33%	100.00%	98.75%	100.00%	99.27%
		South Delhi	Nov_13	98.61%	98.47%	91.88%	100.00%	99.35%	100.00%	99.36%	100.00%	100.00%
		West Delhi	Nov_13	97.50%	100.00%	94.30%	98.44%	100.00%	98.70%	98.06%	100.00%	100.00%

- NA-Not Applicable

AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-DELHI METRO CIRCLE



DRIVE TEST TABLE: 3

OPERATOR-ASSISTED DRIVE TEST-DELHI METRO CIRCLE-DEC-13 MONTH												
S/N	Parameter	City Name	Drive Test Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators					CDMA Operators			
1	Blocked Call Rate (<=3%)	North West Delhi	Dec-13	1.27%	0.00%	0.67%	2.03%	1.69%	1.33%	2.22%	0.00%	0.72%
		North Delhi	Dec-13	2.74%	0.83%	2.30%	0.72%	2.24%	1.77%	2.46%	0.00%	0.00%
		Central Delhi	Dec-13	3.85%	0.00%	4.22%	1.89%	4.07%	0.98%	0.68%	0.00%	0.00%
2	Dropped Call Rate (<=2%)	North West Delhi	Dec-13	0.65%	0.67%	2.68%	0.00%	1.14%	0.00%	1.14%	0.00%	0.73%
		North Delhi	Dec-13	0.70%	0.00%	1.56%	0.00%	0.00%	0.00%	1.68%	0.00%	1.67%
		Central Delhi	Dec-13	1.39%	0.00%	1.40%	0.00%	0.00%	0.99%	0.68%	0.70%	2.14%
Percentage connections with good voice quality (=>95%)												
3	(a) 0-4 (w/o frequency hopping for CDMA Operators)	North West Delhi	Dec-13	NA	NA	NA	NA	NA	NA	98.84%	98.33%	96.50%
		North Delhi	Dec-13	NA	NA	NA	NA	NA	NA	98.37%	96.41%	95.74%
		Central Delhi	Dec-13	NA	NA	NA	NA	NA	NA	98.51%	97.24%	93.93%
	(b) 0-5 (with frequency hopping for GSM Operators)	North West Delhi	Dec-13	93.44%	95.86%	93.74%	95.43%	91.72%	95.52%	NA	NA	NA
		North Delhi	Dec-13	92.21%	96.19%	91.79%	96.32%	93.29%	96.61%	NA	NA	NA
		Central Delhi	Dec-13	93.33%	94.58%	92.99%	95.03%	91.62%	96.43%	NA	NA	NA
Service Coverage												
4	In door (>= -75dBm)	North West Delhi	Dec-13	87.30%	93.69%	55.58%	54.43%	67.79%	92.98%	52.72%	85.24%	97.08%
		North Delhi	Dec-13	86.36%	93.68%	39.74%	44.82%	83.35%	86.59%	70.82%	97.42%	91.29%
		Central Delhi	Dec-13	81.16%	82.29%	30.17%	33.94%	56.96%	77.86%	80.90%	92.71%	92.40%
	In-vehicle (>= -85dBm)	North West Delhi	Dec-13	98.08%	99.22%	90.64%	94.58%	93.21%	99.96%	89.97%	99.75%	99.96%
		North Delhi	Dec-13	97.03%	99.32%	84.94%	90.48%	97.46%	99.50%	99.50%	99.99%	99.95%
		Central Delhi	Dec-13	92.37%	97.69%	79.30%	84.62%	88.37%	95.56%	99.44%	100%	99.62%
	Outdoor- in city (>= -95dBm)	North West Delhi	Dec-13	99.86%	99.87%	99.35%	99.87%	100.00%	100.00%	100.00%	100.00%	100.00%
		North Delhi	Dec-13	99.66%	99.89%	99.13%	99.52%	100.00%	100.00%	100.00%	100.00%	100.00%
		Central Delhi	Dec-13	98.65%	99.57%	98.54%	98.78%	100.00%	100.00%	100.00%	100.00%	100.00%
5	Call Setup Success Rate (>=95%)	North West Delhi	Dec-13	97.47%	99.33%	97.32%	97.97%	98.87%	98.67%	97.78%	100.00%	99.28%
		North Delhi	Dec-13	97.26%	100.00%	98.44%	99.28%	100.00%	98.23%	97.54%	100.00%	100.00%
		Central Delhi	Dec-13	94.23%	100.00%	98.60%	98.11%	100.00%	98.48%	99.32%	100.00%	100.00%

• NA-Not Applicable



Detail of the routes covered during the drive tests and various benchmarks not met by the service providers are summarized in the following Table-4.

TABLE NO:-4

Drive Test Delhi Metro Circle Oct-13 to Dec-13			Name of the Operators not met the Benchmark			
Month/Year	City	Route Covered	Blocked Call Rate (<=3%)	Dropped Call Rate (<=2%)	Percentage connections with good voice quality (=>95%)	Call Setup Success Rate (>=95%)
Oct-13	Gurgaon	Gurudronacharya metro to sikandarpur metro to ifcco chowk to signature tower to scholar block to sheetla mata road to railway road to sector-4 to sadar bazar to maruti udyog limited to dundahera.	MTNL, RCOM GSM, VODAFONE	All met the benchmark Gurgaon	AIRTEL, RCOM GSM, VODAFONE	MTNL, VODAFONE
	Faridabad	Badarpur Toll to Sarai to Barkhal to Sec-21 to Faridabad Gurgaon mode to One two chowk to Hardware chowk to Sohna T point to Sec-9 chowk to Old Faridabad chowk, Badarpur Bypass to Kheri mode to Sec-16 17 mode to Badarpur Bypass	MTNL, RCOM GSM	MTNL	MTNL,VODAFONE	MTNL
	Noida	Sec-15 Metro to Sec-16 Metro to Submall to Sec-37 to City Center to Sec-52 to Sai Mandir Fortis Hospital to Sec-62 to chowki khora to labor chowk to sec-57 to pvr spice mall to sec-26 tokailash hospital to sec-20 22 to harda metro hospital to sec-5 market,Harola, sec-5 market, Labor Chowk, Sec-9, salarpur, Bhangel, Sec-18 GIP to Vinayak Hospital to Sec 37 to Chalera Baraula to Soalapur to Bhangel to Noida phase 2 to Sec 18.	MTNL	MTNL	MTNL, IDEA, RCOM GSM	MTNL
Nov-13	South West Delhi	Hauzkhas Metro, IIT, Munirka, Vasant Kung, Mahipalpur, Rajokri, Dwarka Sec-21, Dwarka Sec-22, Dwarka Sec-6,7, Dabari Mor, Janakpuri Road, Mayapuri Industrial Area, Janakpuri B Block, Janakpuri C Block, Janakpuri West Metro, Janakpuri East Metro, District Center, Hauzkhas Metro, Panchsheel Enclave, GK, TCIL, Nehru Place, Modi Mill, Escort Hospital.	MTNL	MTNL	AIRCEL, AIRTEL, MTNL, RCOM GSM, VOIDAFONE	All met the benchmark South West Delhi
	South Delhi	Sarai kale khan, Ashram, South X, AIIMS, Hauzkhas, IIT Flyover, Mehrauli, Saket, Khanpur, Batra Hospital, Tuglakabad, Govindpuri, Neru Place, Sirifort, Green Park Block A,B,C, Safdurjung Enclave, Green Park, Ashram, NFC, Ishwer Nagar, Appolo Hospital, Sarita Vihar, Mohan Cooperative, Badarpur Border.	MTNL	MTNL	AIRCEL, MTNL, RCOM GSM, VOIDAFONE	MTNL
	West Delhi	Peeragari, Pachim Vihar, Guru Harikishan Nagar, Vikaspuri, Vikaspuri Ext, Mohan Garden, Navada, Uttam Nagar, Tilak Nagar, Hari Nagar, Rajauri Garden, Punjabi Bagh, Nooharpur Village, Rohini Sec-7, Rohini Sec-5, Rohini Sec-9, Sec-14, Sec-13, Prashant Vihar, Punjabi Bagh Metro, Paschim Vihar, Peeragarhi, Udyog Vihar, Nagloi, Rajdhani Park, Mundaka.	MTNL	MTNL	AIRCEL, MTNL, IDEA, RCOM GSM	MTNL
Dec-13	Northwest Delhi-	Viswvidalaya, GTB Nagar, Mouris Nagar, Sabzi Mandi Ghanta Ghar, Nawab Ganj, Pratap Nagar, Vivekanand Colony, Shashtri Nagar, Inderlok, Ramesh Nagar, Kirti Nagar, Subhash Nagar, Tagor Garden, Rajauri Garden, raghubeer Nagar, Budh Vihar, Tilak Nagar, jail Road, Hari Nagar., Viswvidalaya, Model Town, Shalimar Bagh, Pitam Pura, Ring Road, Rohini.	All met the benchmark North West Delhi	MTNL	AIRCEL, MTNL, RCOM GSM	All met the benchmark North West Delhi



North Delhi	ISBT Kasmiri Gate, Burari Crossing, Model Town, Shakti Nagar, Sabzi Mandi Ghanta Ghar, Ashok Nagar Phase-1, Ashok Vihar Phase-2, Bazeer Pura, Pitampura, Khanya Nagar Metro, Ashokvihar, Derawal Nagar, Azadpur, Adarsh Nagar, Jhangirpuri, Tivoli Garden, Bakolo Crossing.	All met the benchmark North Delhi	All met the benchmark North Delhi	AIRCEL, MTNL, RCOM GSM	All met the benchmark North Delhi
Central Delhi	Khan Market, Pragati Maidan, Mandi House, CP, Jhandewalan, Rajendraplace, Karolbagh, Todapur, India gate, Himachal Bhawan, Firozshah Road, Ashoka Road, President House, Sent Martin Road, Lodhi Road, Habitade Center, Sai Mandir, JLNS, Humayun Tomb, Dargah Hazrat Nizamuddin, Apolo.	AIRCEL, MTNL, RCOM GSM	TATA CDMA	AIRCEL, AIRTEL, MTNL, RCOM GSM, TATA CDMA	AIRCEL

KEY FINDINGS:

The drive tests conducted in different parts of Delhi/NCR region on various routes during three months of the quarter ended December 2013 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 / NCR region. The performance of the service providers with respect to the different parameters is summed up as follows:

- 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 Delhi /NCR region.
- Vodafone:** Failed to meet the benchmarks of Blocked Call Rate at Gurgaon, Voice Quality at Gurgaon, Faridabad, South West Delhi & South Delhi and Call setup success rate at Gurgaon.
- RCOM (GSM):** Could not meet the benchmarks of Blocked call rate at Gurgaon, Faridabad & Central Delhi and Voice Quality at Gurgaon, Noida and most of the parts of Delhi.
- Aircel:** Could not perform well in respect of parameter 'Voice Quality' as it remained below the benchmark in most of the parts of Delhi.
- Tata (CDMA):** Failed to meet the benchmarks of Call Drop rate and Voice quality in Central Delhi.
- Airtel:** The performance of Airtel was somewhat satisfactory as it met the benchmarks of most of the parameters except Voice Quality which could not be met at Gurgaon, South West Delhi and Central Delhi.
- Idea:** The performance of Idea Cellular was also satisfactory in respect of most of the parameters across most of the areas of Delhi/NCR region except only one Parameter, namely Voice quality in Noida and West Delhi.

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 complied with its bench mark. However, the Service providers also remained under performed in respect of other parameters like Blocked Call rate, Dropped Call rate and Call setup success rate in different areas of Delhi / NCR region.

2) INDEPENDENT DRIVE TEST:

The independent drive tests are to be carried out by M/s TUV for any service provider on receiving advice from TRAI, based on any complaint from subscribers, relating to poor network coverage in certain areas of the cities. As TUV was not advised by TRAI to conduct the drive test independently on the basis of Subscribers complaint or otherwise, the independent drive tests were not conducted by TUV in this quarter.



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

Based on monthly audit & 3 days live findings, 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 Aircel was non-compliant of parameter 'Worst affected BTSs due to downtime' with its performance as 2.47 % in the month of October 2013. Aircel was also found having congestion on individual POI in the respective months of 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, the performance of Aircel with respect to parameter 'Accessibility of Customer care' was recorded as 92.24% against the benchmark of 95%. Aircel and RCOM (GSM) were also unable to meet the benchmark of calls answered by Operators (voice to voice) within 60 seconds. They achieved their performance as 72.62 % and 66.59 % respectively.

The **drive tests** conducted in different parts of Delhi/NCR region on various routes during three months of the quarter ended December 2013 revealed that the performance of the service providers in general was not satisfactory. 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 Service providers also remained under performed in respect of other network parameters like Blocked Call rate, Dropped Call rate and Call setup success rate in different areas of Delhi / NCR region.



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

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle- Oct-13 month												
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												
1	Network Availability											
	a) Total no. of BTSs in the licensed service area		Oct-13	2824	5316	1112	4296	2595	5236	890	1003	1322
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Oct-13	6895.26	680.50	2996	138.23	4446	794	583	887	299.16
	c) BTS Accumulated Downtime	<=2%	Oct-13	0.33%	0.02%	0.36%	0.00%	0.23%	0.02%	0.09%	0.12%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Oct-13	48	0	17	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Oct-13	1.70%	0.00%	1.53%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Oct-13	96.70%	99.88%	96.81%	99.98%	99.55%	99.48%	99.21%	98.45%	99.13%
	b) SDCCH/PAGING Congestion	<=1%	Oct-13	0.15%	0.02%	0.21%	0.53%	0.02%	0.13%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Oct-13	0.56%	0.05%	1.78%	0.55%	0.05%	0.25%	0.20%	0.01%	0.05%	
3	Connection Maintenance (Retainability)											
	a) Call Drop Rate (CDR)	<=2%	Oct-13	1.12%	0.61%	1.74%	0.61%	0.41%	0.85%	0.55%	0.61%	0.58%
	b) Worst affected cells>3% TCH drop	<=3%	Oct-13	2.52%	0.65%	2.56%	1.55%	0.03%	2.47%	1.90%	1.23%	0.00%
c) % of connections with good voice quality	>=95%	Oct-13	97.56%	99.30%	97.57%	98.38%	98.81%	97.50%	99.98%	99.79%	99.15%	

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	d) Total No. of cells exceeding 3% TCH drop (call drop)		Oct-13	203	86	82	181	2	323	56	36	61
	e) Total no. of cells (Sector) in the licensed service area		Oct-13	8071	13267	3188	11642	7123	13091	2939	2945	4579
No. of POI's having >=0.5% POI congestion												
4	No. of POI's having >=0.5% POI congestion		Oct-13	1	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Oct-13	ABS ILD	0	0	0	0	0	0	0	0
Network Data												
5	a) Equipped Capacity of Network in Erlang		Oct-13	113077.85	327140	100000	155707.93	96000	317183	42000	140000	374289
	b) Total traffic in TCBH in erlang (Avg.)		Oct-13	65296.823	224019	21288	142123.04	84621.95	243598	15873	110509.82	133508
	c) Total no. of customers served (as per VLR) on last day of the month		Oct-13	2060307	8198613	1146232	5082061	4343978	8380685	409262	3003317	1836228



TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Delhi Metro Circle- Oct-13 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	2814	5316	1113	4287	2591	5245	889	1003	3948
	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	270.08	60.15	315.50	36.35	360	61.13	13.40	47	28.50
	c) BTS Accumulated Downtime	<=2%	Live data	0.13%	0.02%	0.39%	0.01%	0.19%	0.02%	0.00%	0.06%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	4	0	0	0	0	0	
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.36%	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	97.80%	99.89%	95.53%	99.98%	99.52%	99.45%	99.40%	98.29%	99.04%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.06%	0.01%	0.35%	0.36%	0.02%	0.10%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.50%	0.04%	1.75%	0.43%	0.05%	0.26%	0.10%	0.02%	0.17%	
3	Connection Maintenance (Retainability)											
	a) Call Drop Rate (CDR)	<=2%	Live data	1.27%	0.60%	1.74%	0.65%	1.24%	0.89%	0.50%	0.54%	0.56%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	0.00%	0.90%	2.39%	1.64%	0.04%	2.50%	1.63%	2.25%	1.31%
	c) % of connections with good voice quality	>=95%	Live data	97.29%	99.35%	97.53%	98.22%	98.81%	97.47%	99.98%	99.79%	99.16%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	0	119	76	191	3	329	48	66	60
e) Total no. of cells (Sector) in the licensed service area		Live data	8071	13244	3188	11647	7113	13165	2939	2945	4596	
4	No. of POI's having >=0.5% POI congestion											
	No. of POI's having >=0.5% POI congestion		Live data	1	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	ABS ILD	0	0	0	0	0	0	0	0



TABLE: 3

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle- Nov-13 month												
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												
1	Network Availability											
	a) Total no. of BTSs in the licensed service area		Nov-13	2847	5357	1112	4350	2594	5234	899	999	1353
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Nov-13	4277.98	624	2887	106	2992	686	423	742	12.05
	c) BTS Accumulated Downtime	<=2%	Nov-13	0.21%	0.02%	0.36%	0.00%	0.16%	0.02%	0.07%	0.10%	0.04%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Nov-13	28	0	16	0	0	0	1	0	0
e) Worst affected BTSs due to downtime	<=2%	Nov-13	0.98%	0.00%	1.44%	0.00%	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Nov-13	97.89%	99.87%	96.16%	99.98%	99.63%	99.60%	99.22%	98.80%	99.14%
	b) SDCC/PAGING Congestion	<=1%	Nov-13	0.32%	0.04%	0.43%	0.65%	0.03%	0.09%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Nov-13	0.47%	0.04%	1.53%	0.49%	0.04%	0.17%	0.25%	0.01%	0.07%	
3	Connection Maintenance (Retainability)											
	a) Call Drop Rate (CDR)	<=2%	Nov-13	1.08%	0.55%	1.65%	0.55%	0.37%	0.77%	0.54%	0.50%	0.54%
	b) Worst affected cells>3% TCH drop	<=3%	Nov-13	2.89%	0.90%	2.30%	1.50%	0.02%	2.25%	1.78%	1.96%	1.34%
	c) % of connections with good voice quality	>=95%	Nov-13	97.65%	99.41%	97.73%	98.34%	98.91%	97.67%	98.26%	99.79%	99.15%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Nov-13	236	119	73	176	1	296	53	58	62
e) Total no. of cells (Sector) in the licensed service area		Nov-13	8157	13283	3188	11694	7118	13169	2951	2933	4648	
4	No. of POI's having >=0.5% POI congestion											

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	No. of POI's having $\geq 0.5\%$ POI congestion		Nov-13	5	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Nov-13	(Aircel NLD, BTSOL NLD, Idea Local, Reliance NLD, VSNL NLD)	0	0	0	0	0	0	0	0
Network Data												
5	a) Equipped Capacity of Network in Erlang		Nov-13	113265.78	322487.34	100000	156276.58	96000	318664	42000	140000	292084
	b) Total traffic in TCBH in erlang (Avg.)		Nov-13	62655.38	195701.87	20579	138044.23	83787.96	232484	14341.23	109130.21	123132.12
	c) Total no. of customers served (as per VLR) on last day of the month		Nov-13	2081718	7986823	1147007	5150433	4417162	8277602	407783	3003875	1807720



TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Delhi Metro Circle- Nov-13 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	2843	5334	1112	4330	2594	5236	890	998	1324
	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	659.92	61.10	232	17.71	380	46.01	44.80	92	5.08
	c) BTS Accumulated Downtime	<=2%	Live data	0.32%	0.016%	0.29%	0.00%	0.20%	0.01%	0.07%	0.13%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	3	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.27%	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	97.70%	99.79%	95.41%	99.98%	99.62%	99.62%	99.03%	98.80%	99.10%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.57%	0.11%	0.72%	0.45%	0.02%	0.02%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.49%	0.04%	1.68%	0.37%	0.05%	0.15%	0.42%	0.01%	0.13%	
3	Connection Maintenance (Retainability)											
	a) Call Drop Rate (CDR)	<=2%	Live data	1.16%	0.56%	1.60%	0.54%	0.37%	0.80%	0.56%	0.53%	0.50%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	0.00%	0.79%	2.30%	1.45%	0.00%	2.32%	1.40%	2.63%	1.15%
	c) % of connections with good voice quality	>=95%	Live data	97.60%	99.40%	97.65%	98.31%	98.87%	97.63%	98.26%	99.79%	99.05%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	0	105	73	170	0	307	41	77	53
e) Total no. of cells (Sector) in the licensed service area		Live data	8045	13282	3188	11737	7118	13205	2939	2928	4614	
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: 5

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle- Dec-13 month												
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												
1	Network Availability											
	a) Total no. of BTSs in the licensed service area		Dec-13	2876	5400	1114	4385	2596	5339	917	1004	1405
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Dec-13	8041.66	636.40	3494	294.89	3707	691.14	727	690	401.75
	c) BTS Accumulated Downtime	<=2%	Dec-13	0.38%	0.02%	0.42%	0.01%	0.19%	0.02%	0.11%	0.09%	0.04%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Dec-13	71	0	20	0	6	0	1	1	0
	e) Worst affected BTSs due to downtime	<=2%	Dec-13	2.47%	0.00%	1.80%	0.00%	0.23%	0.00%	0.11%	0.10%	0.00%
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Dec-13	97.96%	99.88%	96.00%	99.97%	99.52%	99.65%	99.18%	98.77%	99.03%
	b) SDCCH/PAGING Congestion	<=1%	Dec-13	0.32%	0.01%	0.45%	0.49%	0.02%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-13	0.59%	0.05%	1.74%	0.59%	0.04%	0.13%	0.24%	0.01%	0.07%
3	Connection Maintenance (Retainability)											
	a) Call Drop Rate (CDR)	<=2%	Dec-13	1.07%	0.54%	1.67%	0.54%	0.41%	0.79%	0.63%	0.50%	0.61%
	b) Worst affected cells>3% TCH drop	<=3%	Dec-13	2.79%	0.75%	2.40%	1.49%	0.01%	2.22%	1.77%	1.97%	1.26%
	c) % of connections with good voice quality	>=95%	Dec-13	97.65%	99.41%	97.66%	98.28%	98.72%	97.70%	98.33%	99.80%	99.12%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Dec-13	240	101	77	177	1	296	53	58	60
	e) Total no. of cells (Sector) in the licensed service area		Dec-13	8616	13476	3194	11861	7124	13306	2998	2956	4780
4	No. of POI's having >=0.5% POI congestion											
	No. of POI's having >=0.5% POI congestion		Dec-13	3	0	0	0	0	0	0	0	0

AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-DELHI METRO CIRCLE



	Name of POI not meeting the benchmark	Dec-13	MTNL, Reliance local and Idea local	0	0	0	0	0	0	0	0	
5	Network Data											
	a) Equipped Capacity of Network in Erlang	Dec-13	113266.89	314254	100000	156276.58	96000	325081	42000	140000	301760	
	b) Total traffic in TCBH in erlang (Avg.)	Dec-13	67410.54	195870	20362	144774.85	87634.03	236908	15336	113729.43	128071	
	c) Total no. of customers served (as per VLR) on last day of the month	Dec-13	2252661	8117323	1143621	5272633	4539340	8357559	414596	3006920	1806887	

AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-DELHI METRO CIRCLE



TABLE: 6

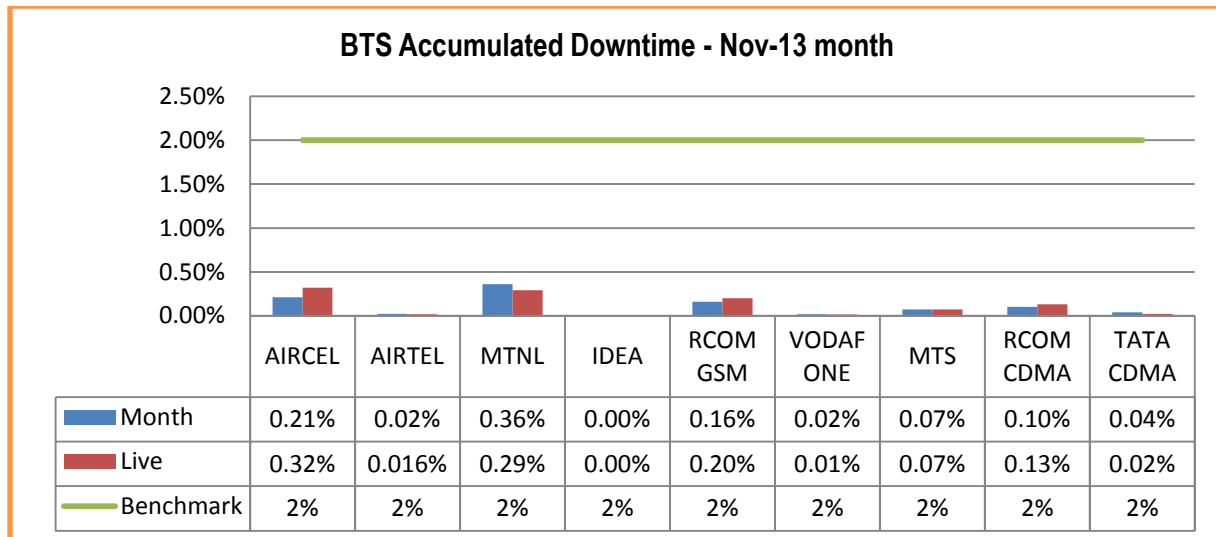
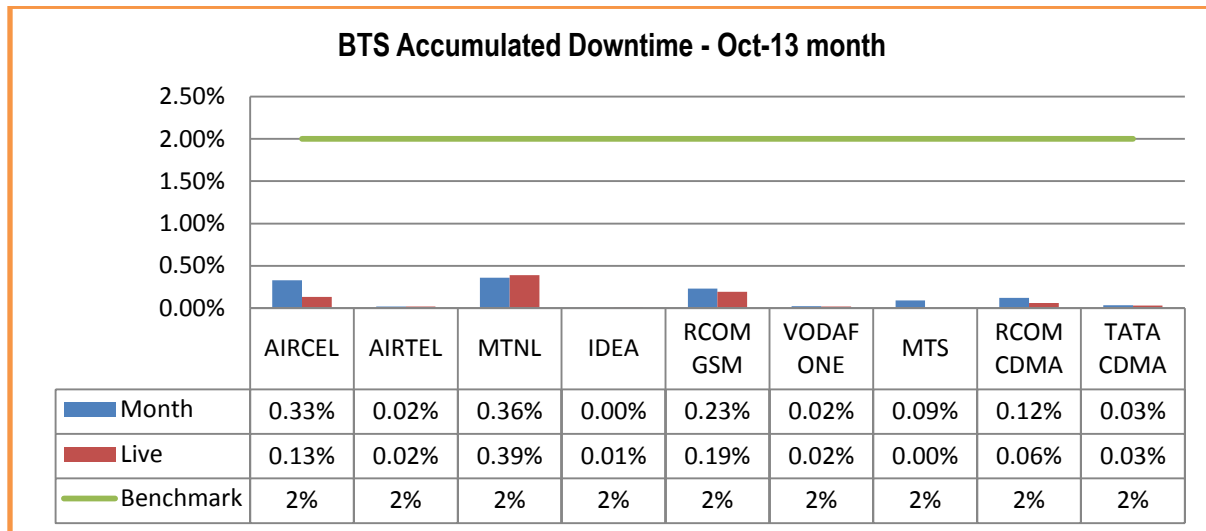
Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Delhi Metro Circle- Dec-13 month												
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
Network Service Quality Parameter												
1	Network Availability											
	a) Total no. of BTSs in the licensed service area		Live data	2847	5358	1114	4367	2595	5238	2724	1003	1353
	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	228.22	62.30	254	29	287	52.33	86.50	65	13.57
	c) BTS Accumulated Downtime	<=2%	Live data	0.01%	0.020%	0.32%	0.01%	0.15%	0.01%	0.13%	0.09%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	2	0	4	0	0	NP	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.07%	0.00%	0.36%	0.00%	0.00%	NP	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.50%	99.89%	95.83%	99.98%	99.55%	99.67%	99.19%	98.89%	98.91%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.23%	0.01%	0.58%	0.58%	0.02%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.68%	0.04%	1.72%	0.39%	0.03%	0.12%	0.26%	0.01%	0.11%
3	Connection Maintenance (Retainability)											
	a) Call Drop Rate (CDR)	<=2%	Live data	1.20%	0.52%	1.65%	0.53%	0.41%	0.79%	0.59%	0.47%	0.58%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	NP	0.70%	2.58%	1.34%	0.00%	2.49%	1.34%	2.55%	2.72%
	c) % of connections with good voice quality	>=95%	Live data	97.53%	99.43%	97.66%	98.28%	98.74%	97.69%	98.25%	99.80%	99.10%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	NP	93	82	159	0	331	40	75	128
	e) Total no. of cells (Sector) in the licensed service area		Live data	8395	13362	3194	11806	7124	13287	2986	2950	4701
4	No. of POI's having >=0.5% POI congestion											
	No. of POI's having >=0.5% POI congestion		Live data	3	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	MTNL, Reliance local and Idea local	0	0	0	0	0	0	0	0

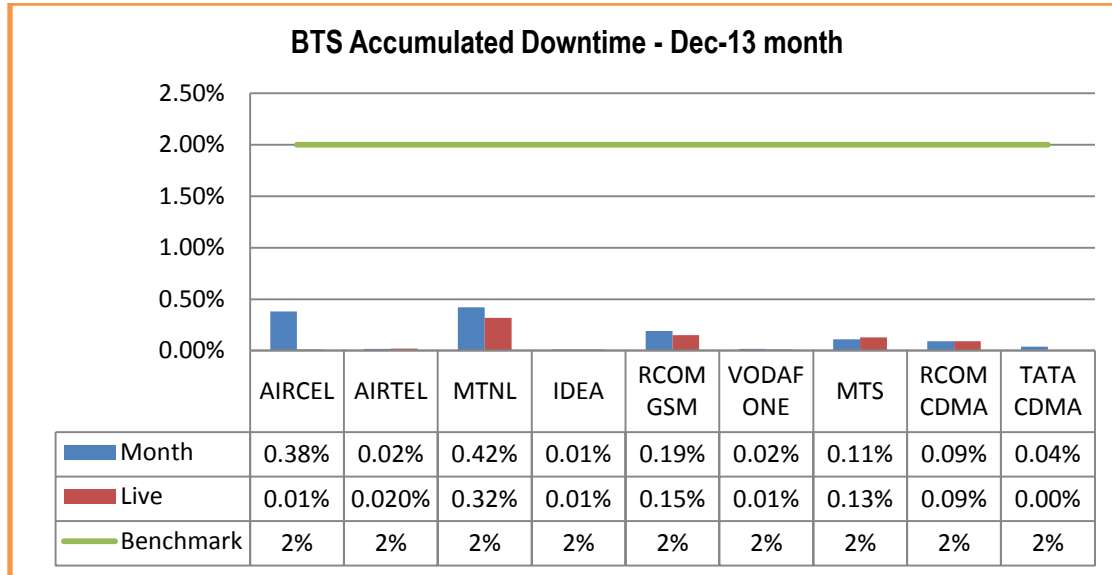
• NP-Not Provided



GRAPHICAL REPRESENTATION OF PERFORMANCE OF THE CELLULAR MOBILE SERVICE PROVIDERS-MONTHLY V/S 3-DAYS LIVE MEASUREMENT:

1) BTS ACCUMULATED DOWNTIME :

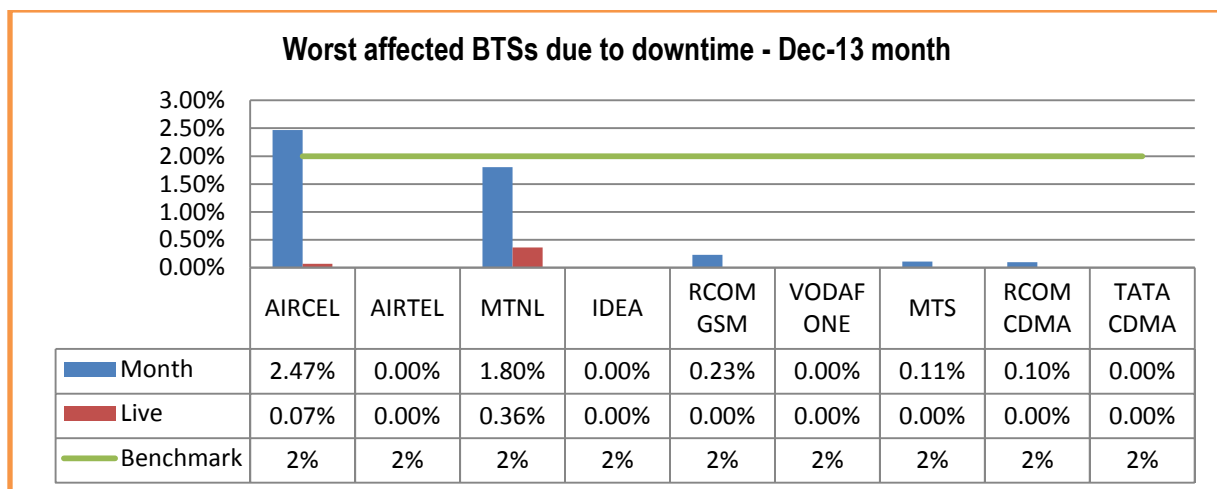
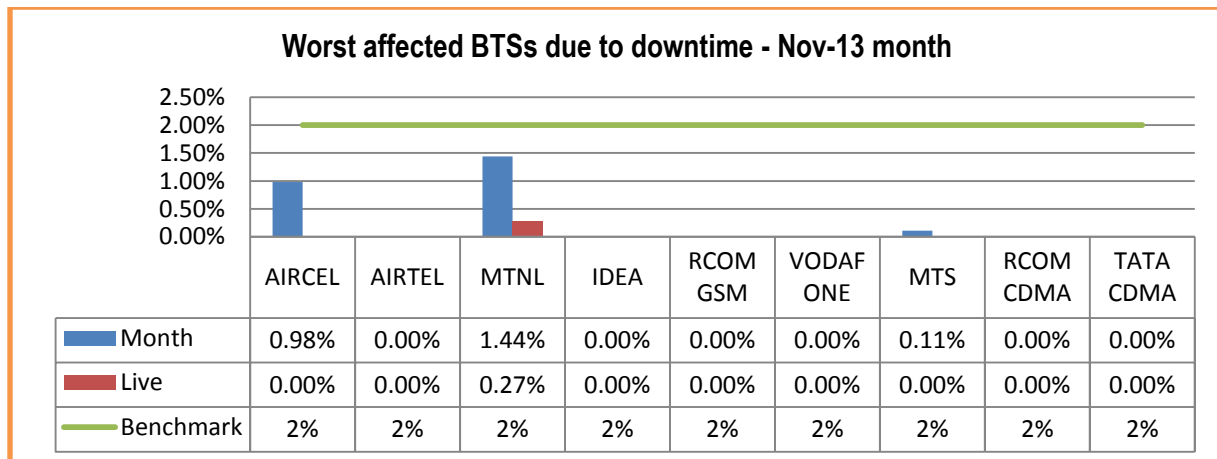
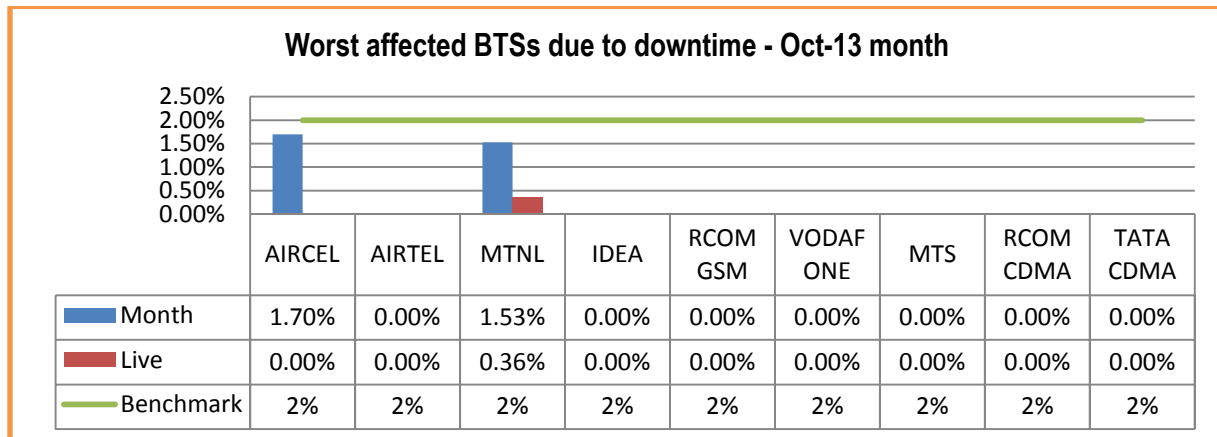




All operators are meeting the benchmarks.



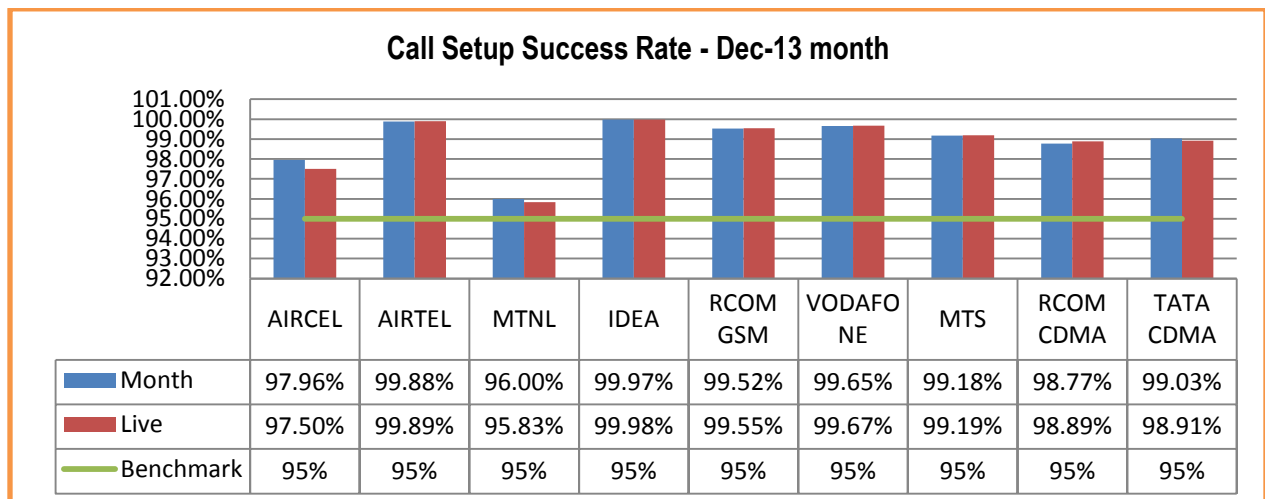
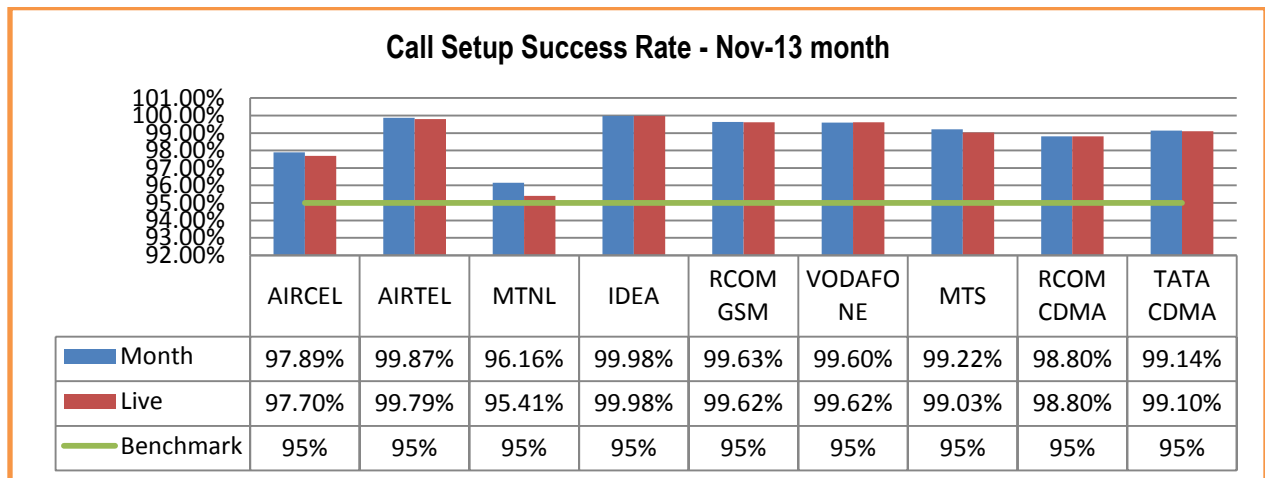
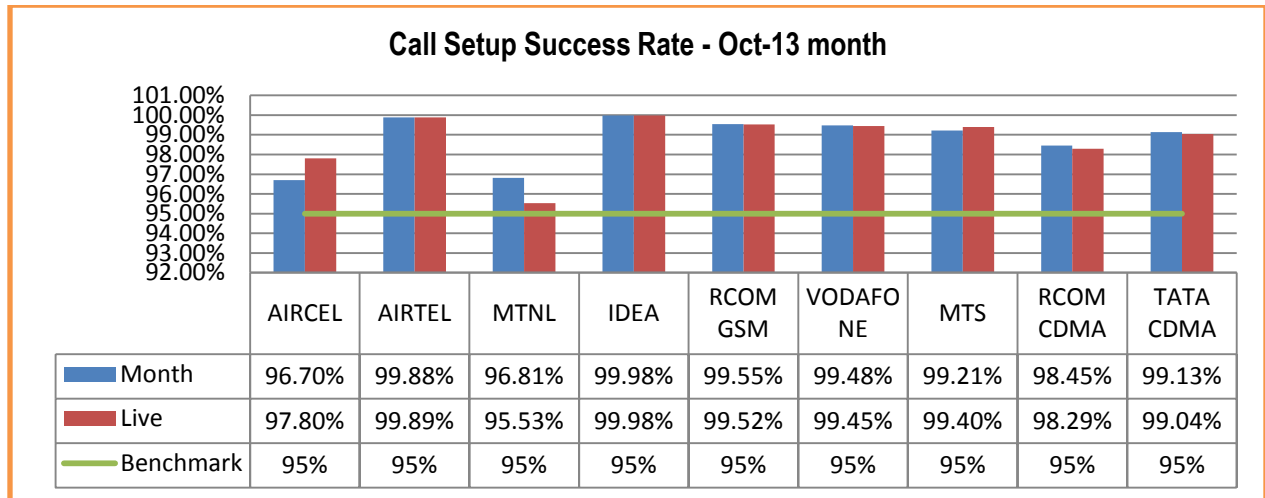
2) WORST AFFECTED BTSS DUE TO DOWNTIME :



All operators are meeting the benchmark except Aircel in the month of December 2013.



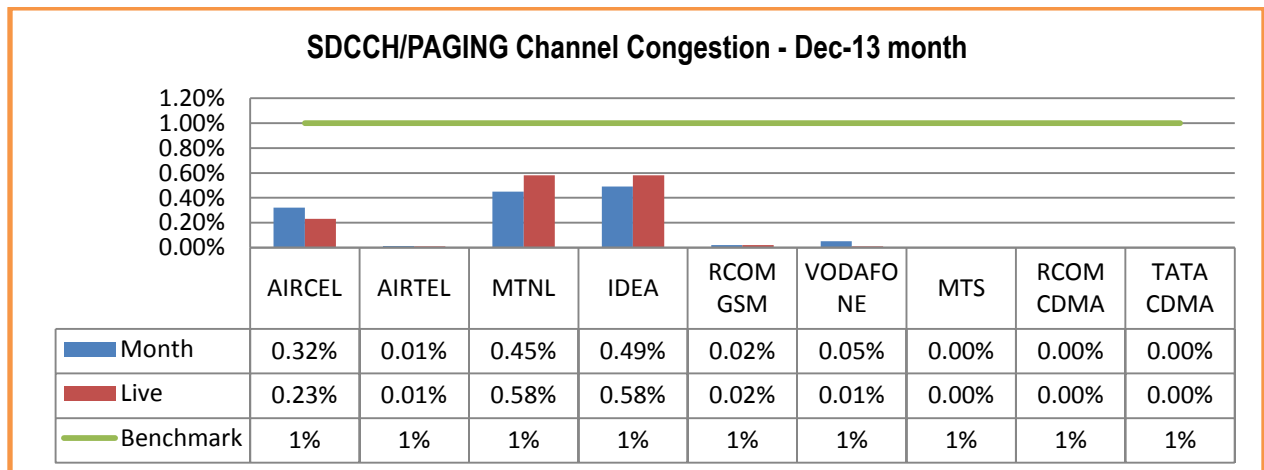
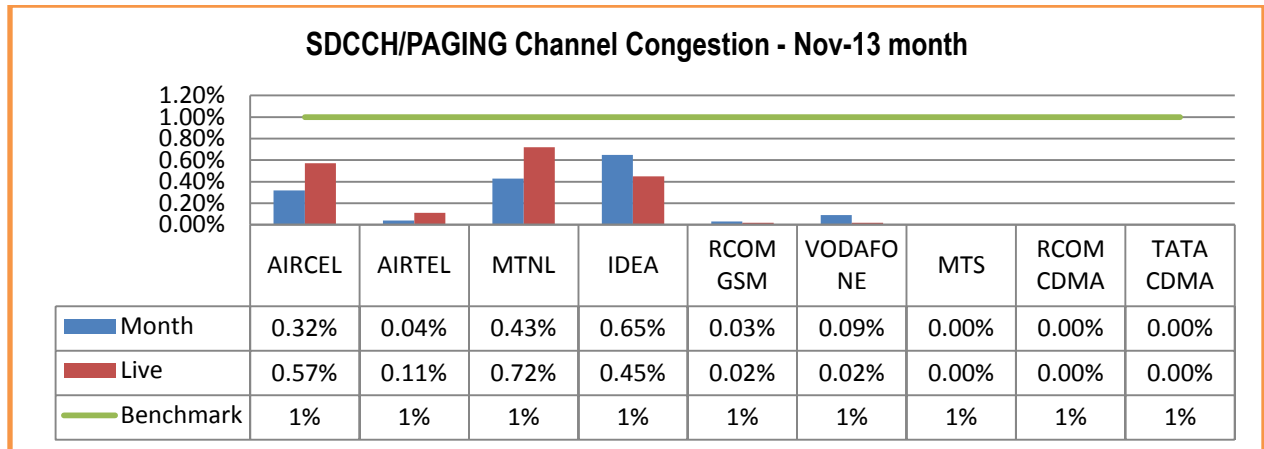
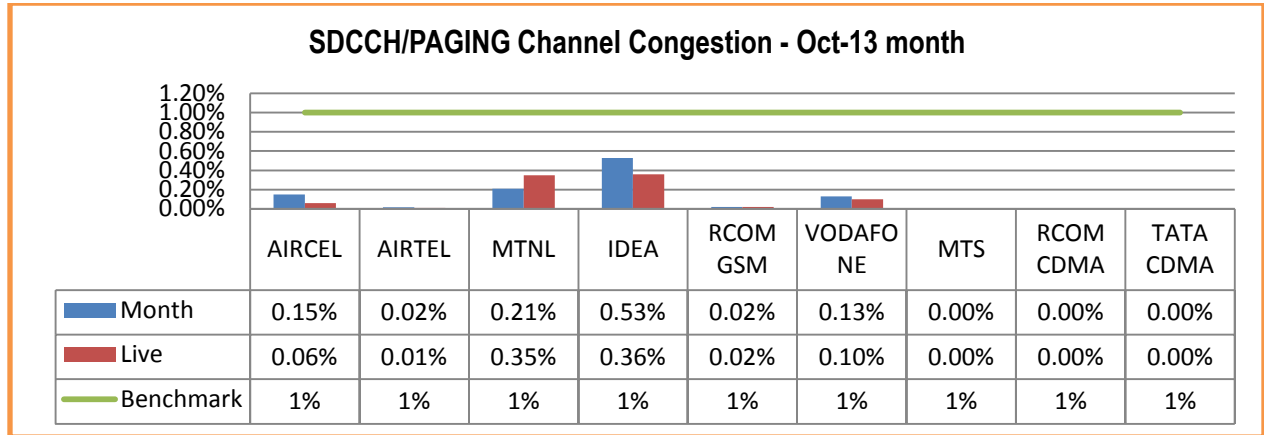
3) CALL SETUP SUCCESS RATE :



All operators are meeting the benchmarks.



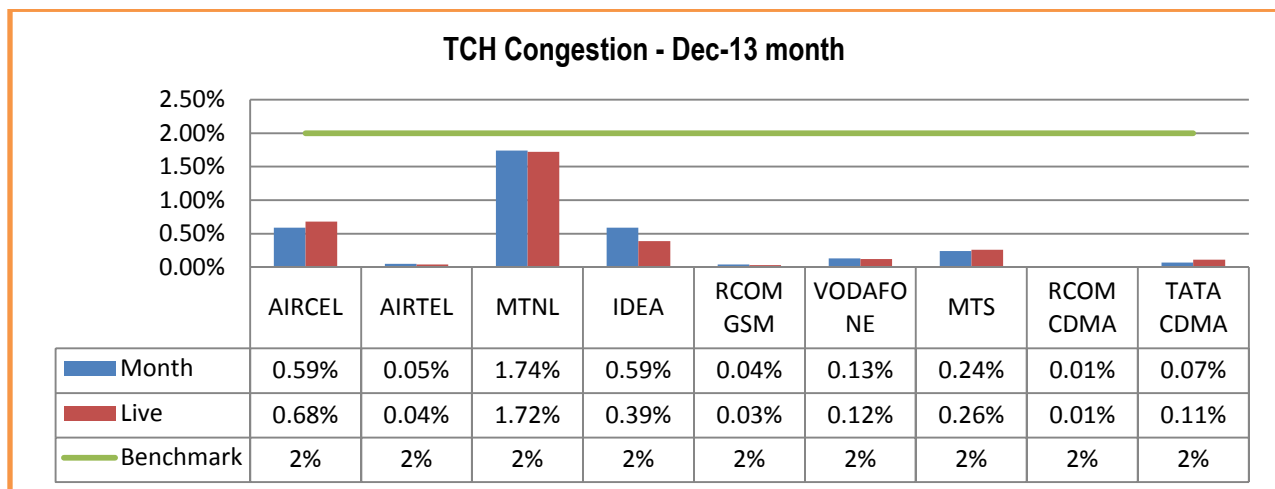
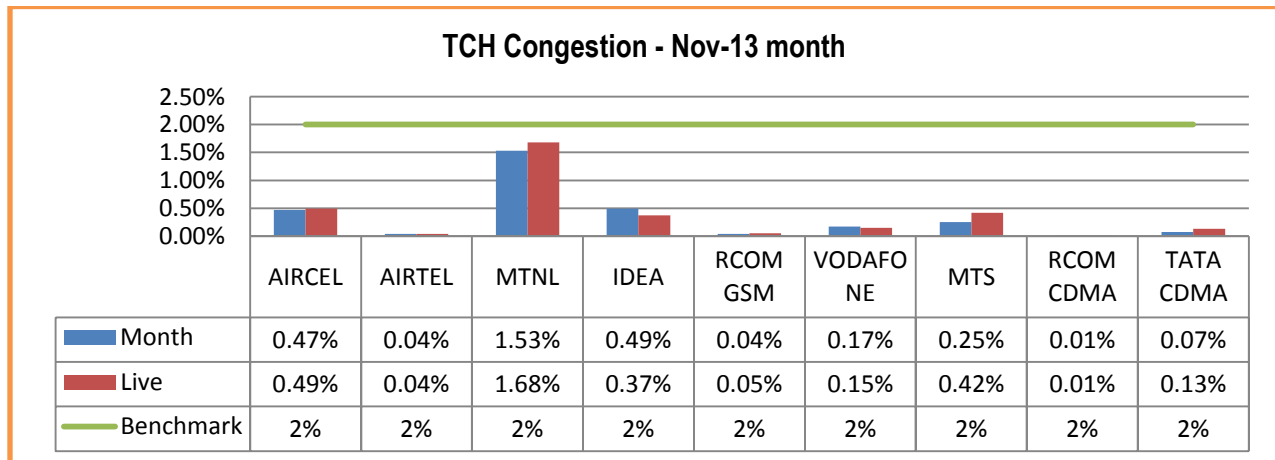
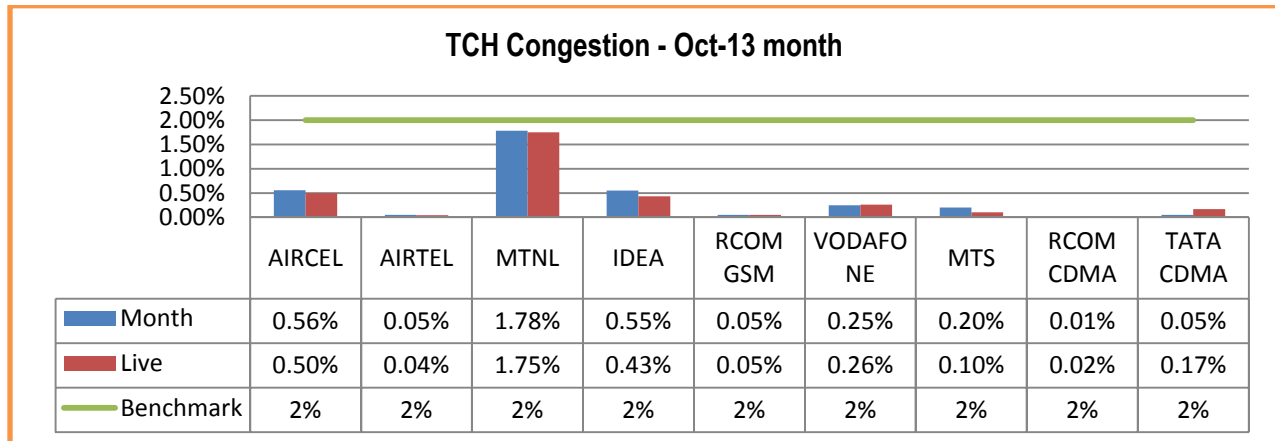
4) SDCCH/PAGING CHANNEL CONGESTION :



All operators are meeting the benchmarks.



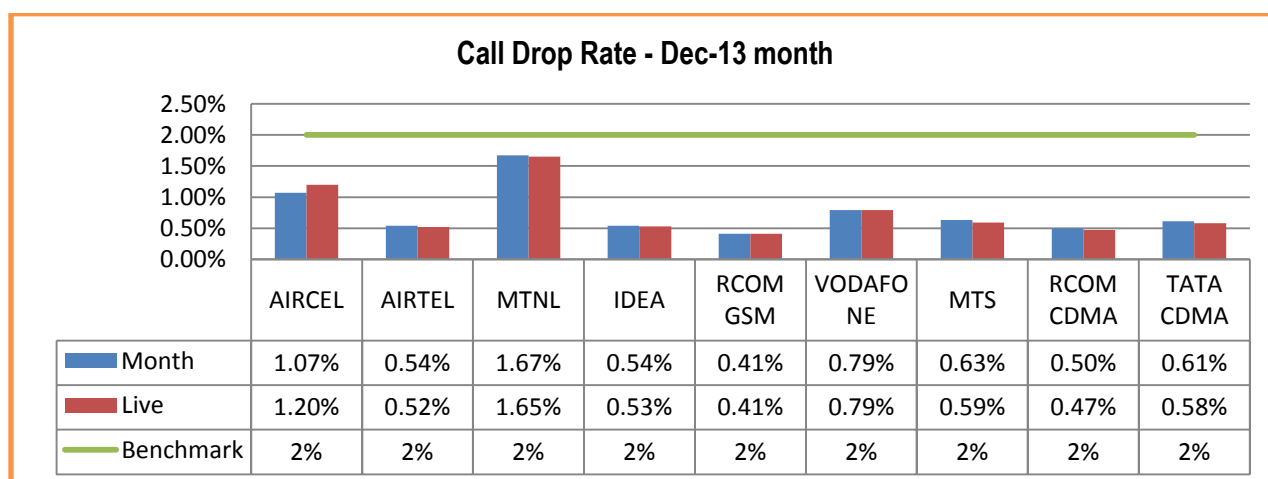
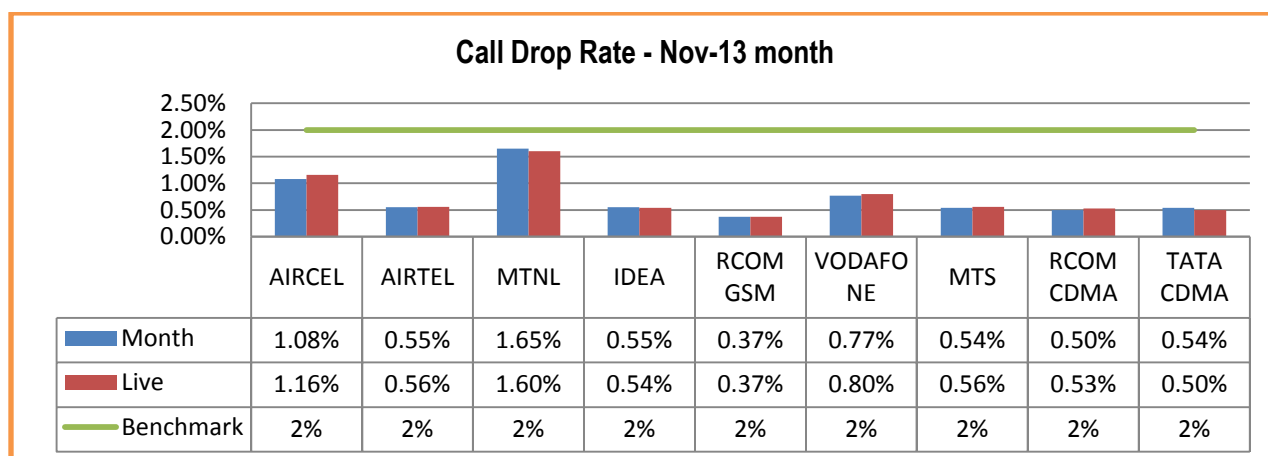
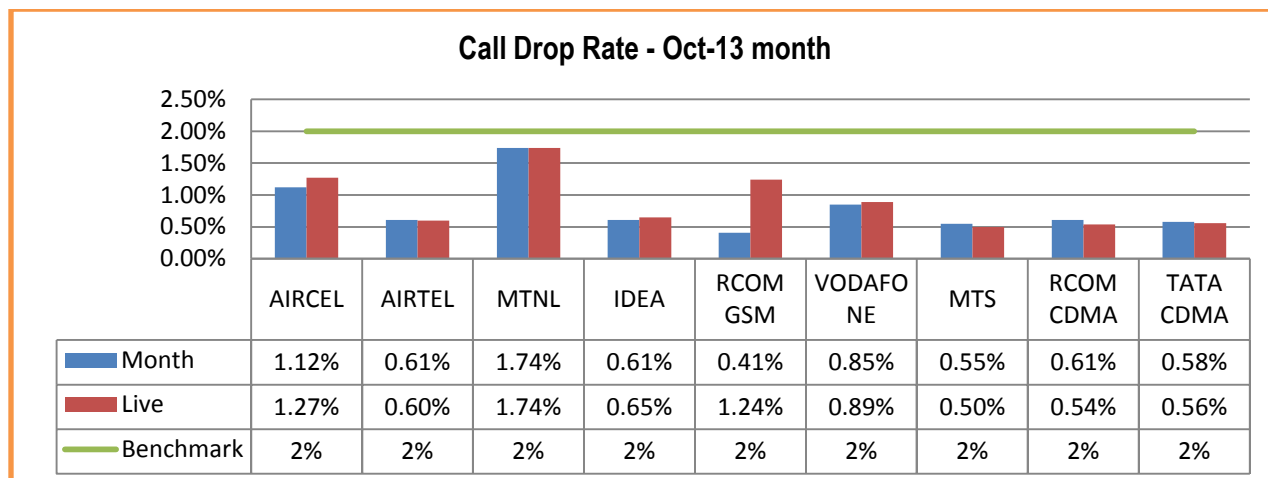
5) TCH CONGESTION :



All operators are meeting the benchmarks.



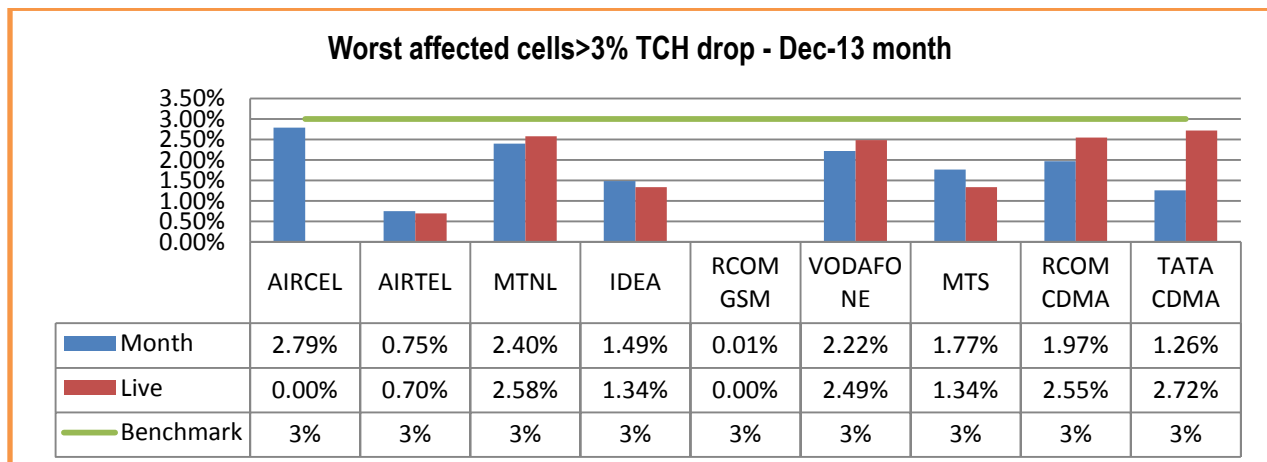
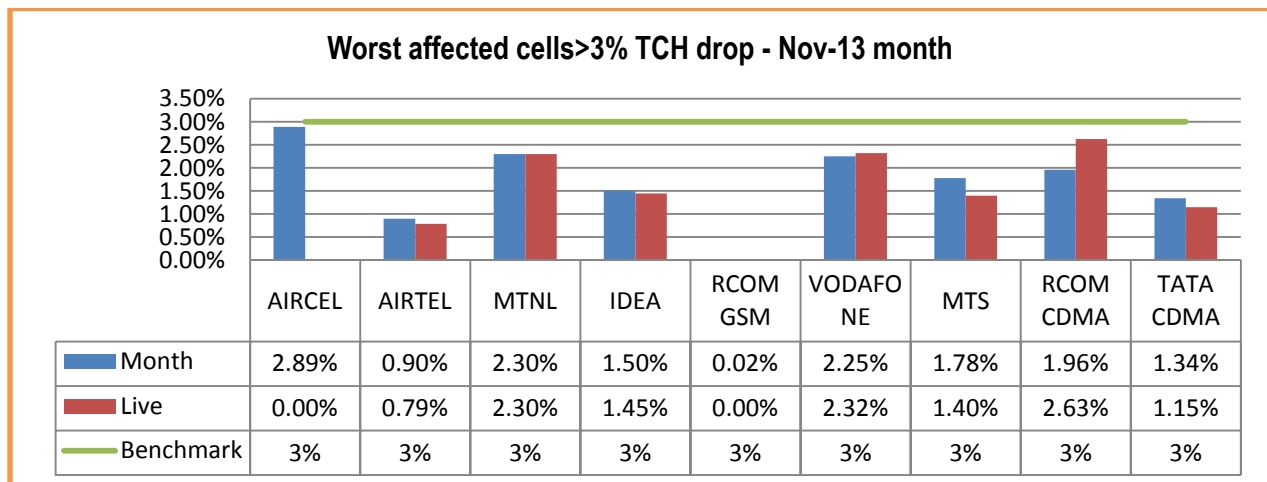
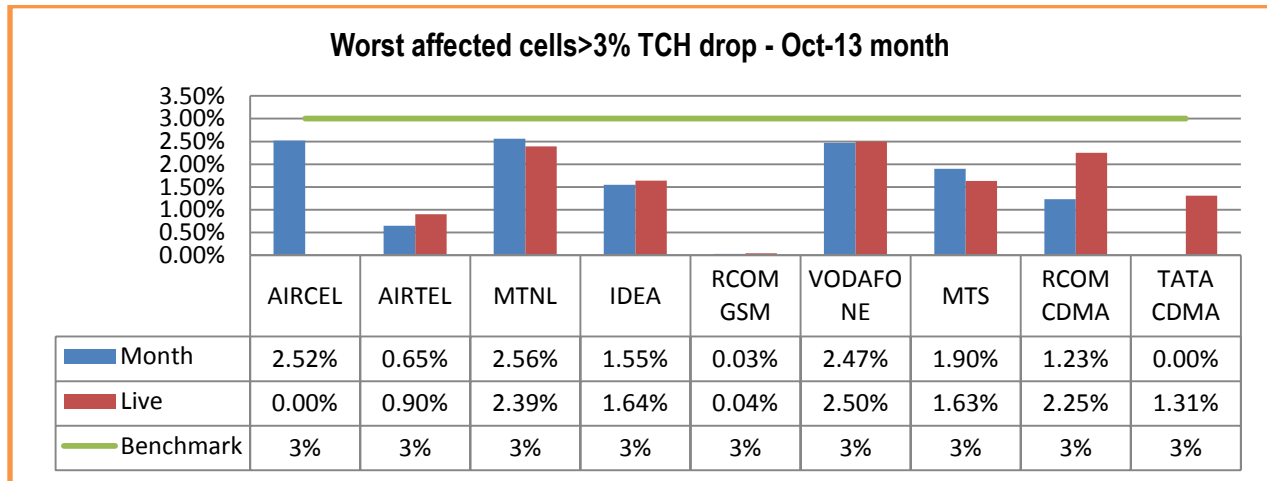
6) CALL DROP RATE :



All operators are meeting the benchmarks.



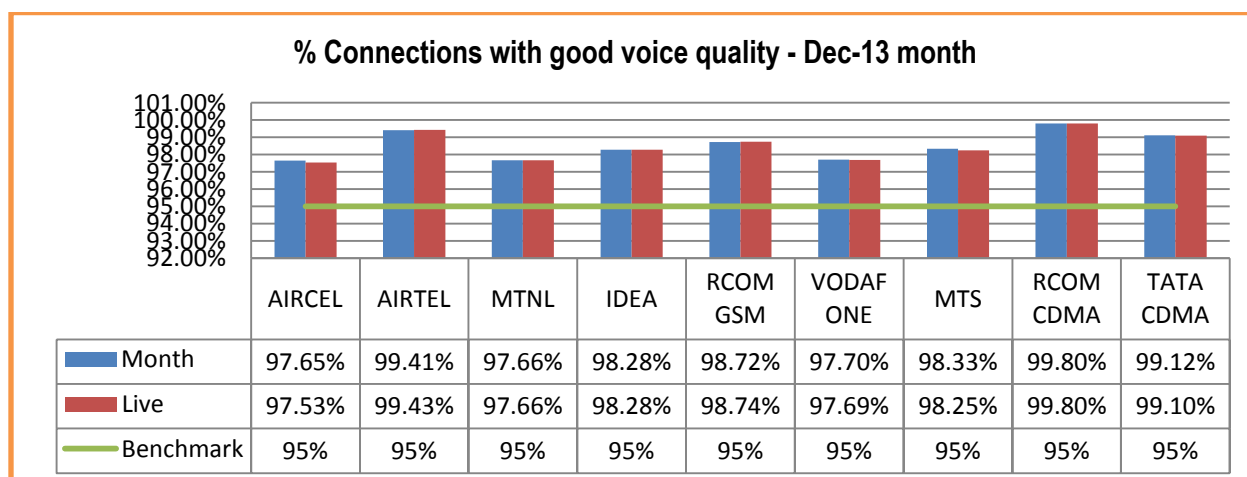
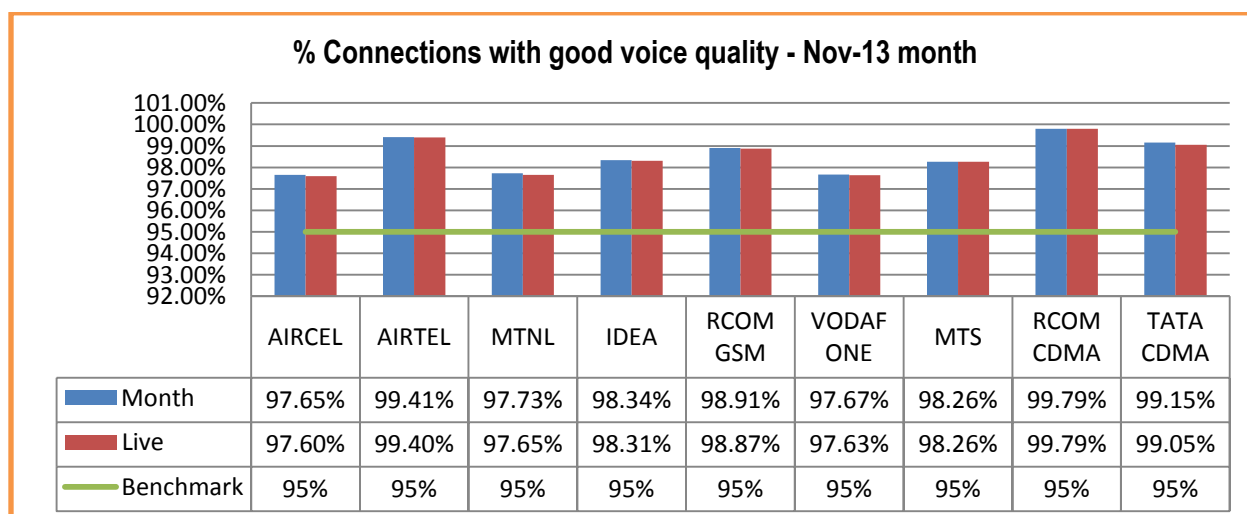
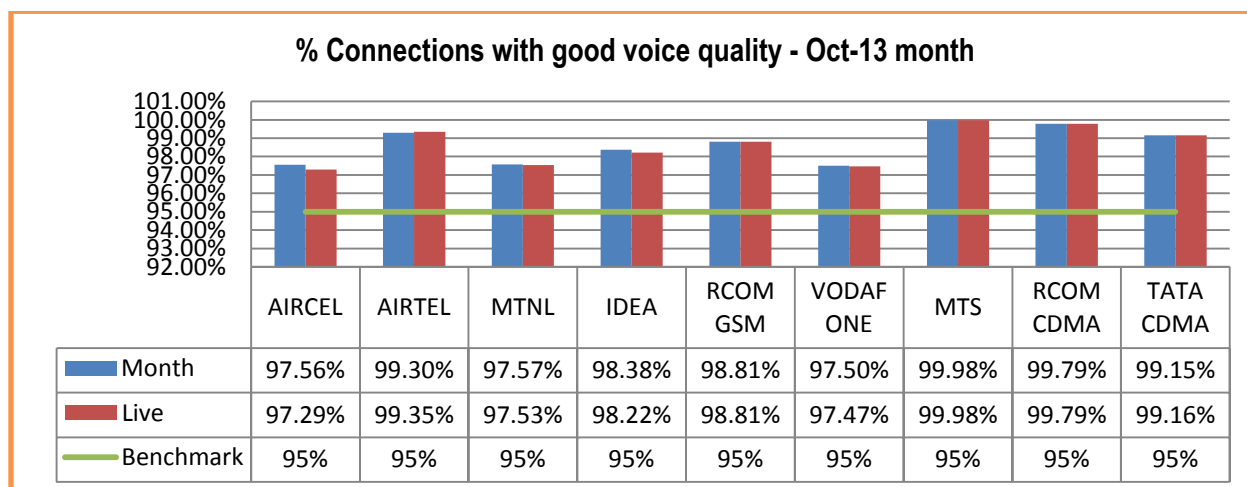
7) WORST AFFECTED CELLS>3% TCH DROP :



All operators are meeting the benchmarks.



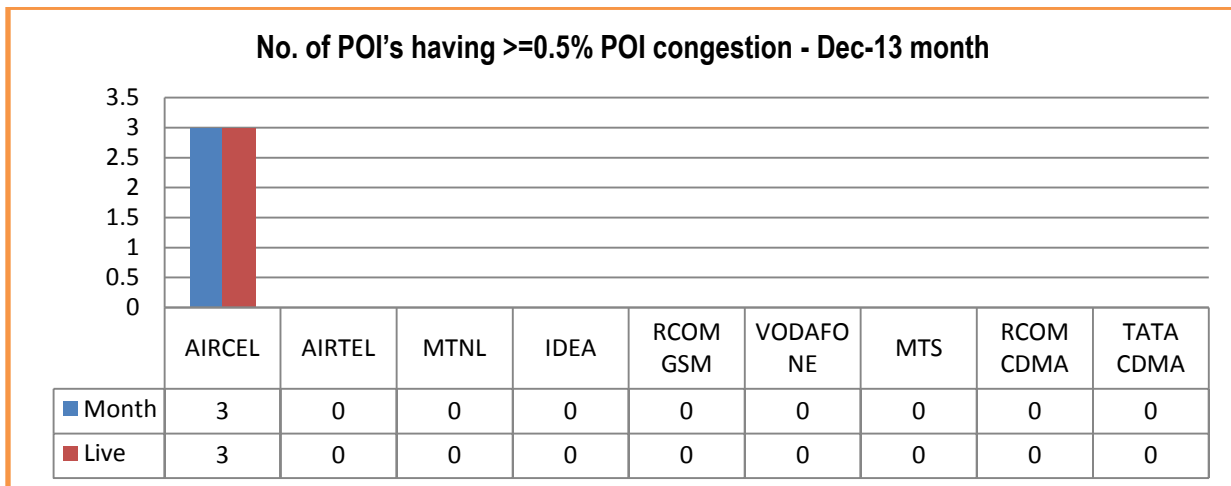
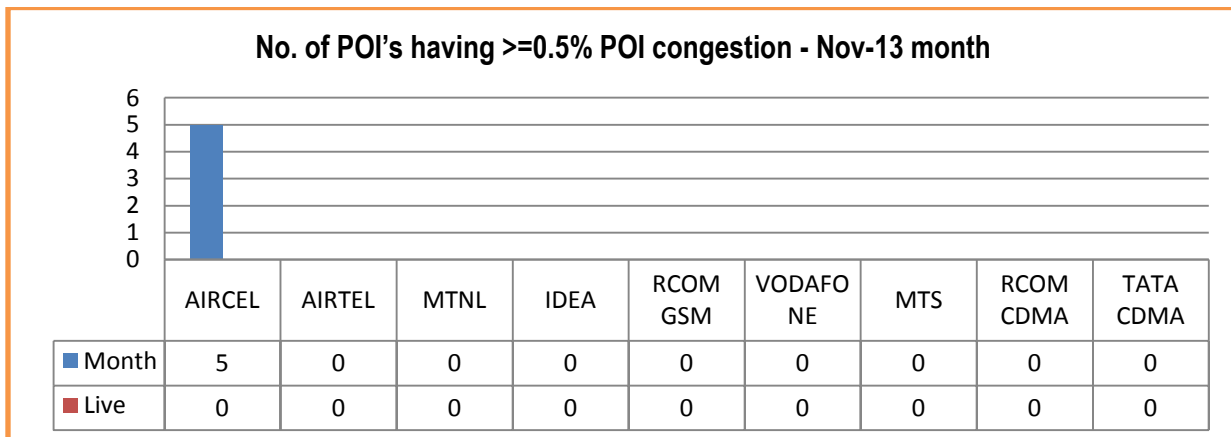
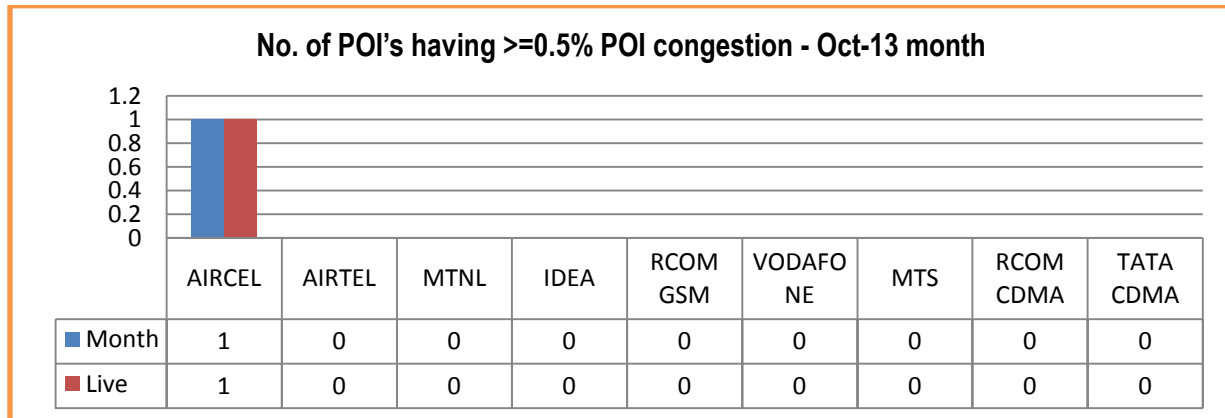
8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY :



All operators are meeting the benchmarks.



9) NO. OF POI'S HAVING $\geq 0.5\%$ POI CONGESTION:



All operators are meeting the benchmarks. Only Aircel was found having congestion on individual POI.



PMR VERIFICATION SHEET:

a) NETWORK RELATED PARAMETER:

Delhi Metro Circle		BTS Accumulated Downtime	Worst affected BTSs due to downtime	CSSR (Call Setup Success Rate)	SDCCH/PAGING Channel congestion	TCH congestion	CDR (Call Drop Rate)	Worst affected cells>3% TCH drop (Call drop) rate	Connections with good voice quality	No. of POI's having >=0.5% POI congestion
Benchmark		≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%	≤ 0.5%
AIRCEL	Reported	0.30	1.72	97.52	0.26	0.54	1.09	2.74	97.62	0
	Verified	0.31%	1.72%	97.52%	0.26%	0.54%	1.09%	2.73%	97.62%	3
AIRTEL	Reported	0.02	0.00	99.88	0.02	0.05	0.57	0.50	99.38	0
	Verified	0.02%	0.00%	99.88%	0.02%	0.05%	0.57%	0.77%	99.37%	0
MTNL	Reported	0.38	1.58	96.32	0.36	1.68	1.69	2.42	97.65	0
	Verified	0.38%	1.59%	96.32%	0.36%	1.68%	1.69%	2.42%	97.65%	0
IDEA	Reported	0.01	0.00	99.97	0.56	0.54	0.56	1.52	98.30	0
	Verified	0.00%	0.00%	99.98%	0.56%	0.54%	0.57%	1.51%	98.33%	0
RCOM GSM	Reported	0.19	0.17	99.57	0.03	0.04	0.40	0.02	98.82	0
	Verified	0.19%	0.08%	99.57%	0.02%	0.04%	0.40%	0.02%	98.81%	0
VODAFONE	Reported	0.02	0.00	99.58	0.09	0.18	0.80	1.79	97.62	0
	Verified	0.02%	0.00%	99.58%	0.09%	0.18%	0.80%	2.31%	97.62%	0
MTS	Reported	0.09	0.07	99.20	0.00	0.24	0.58	1.75	98.86	0
	Verified	0.09%	0.07%	99.20%	0.00%	0.23%	0.57%	1.82%	98.86%	0
RCOM CDMA	Reported	0.10	0.07	98.67	0.00	0.01	0.54	1.69	99.79	0
	Verified	0.10%	0.03%	98.67%	0.00%	0.01%	0.54%	1.72%	99.79%	0
TATA CDMA	Reported	0.04	0.00	99.10	0.00	0.06	0.57	1.00	99.14	0
	Verified	0.04%	0.00%	99.10%	0.00%	0.06%	0.58%	0.87%	99.14%	0

- I. The above data is averaged for three months of the quarter ending December-2013.
- II. The PMR data provided by the service providers is largely matching with verified (audited) data.
- III. Aircel has reported no congestion on any individual POI but on verification it was found that Aircel was having congestion on 3 POIs.



b) CUSTOMER SERVICE DELIVERY (CSD) RELATED PARAMETER:

Delhi Metro Circle		% of billing complaints during the quarter	% of Pre-paid Charging Complaints	% of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	% of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	Accessibility of call centre/Customer Care	% call answered by operators (voice to voice) within 60 sec.	% of Termination/Closure of service within 7 days	Time taken for refunds of deposits after closures.
Benchmark		<= 0.1%	<= 0.1%	100 % within 4 week	<=1 week	>=95%	>=90%	100% within <=7days	100% within 60 days
AIRCEL	Reported	0.04	0.01	100.00	100.00	97.76	74.64	100.00	100.00
	Verified	0.04%	0.00%	100.00%	100.00%	92.24%	72.62%	100.00%	100.00%
AIRTEL	Reported	0.04	0.05	100.00	100.00	100.00	93.00	100.00	100.00
	Verified	0.04%	0.05%	100.00%	100.00%	100.00%	93.00%	100.00%	100.00%
MTNL	Reported	0.03	0.01	100.00	100.00	95.64	96.22	100.00	100.00
	Verified	0.03%	0.00%	100.00%	100.00%	96.80%	96.76%	100.00%	100.00%
IDEA	Reported	0.06	0.04	100.00	100.00	99.46	98.37	100.00	100.00
	Verified	0.06%	0.04%	100.00%	100.00%	100.00%	99.46%	100.00%	100.00%
RCOM (GSM)	Reported	0.10	0.10	100.00	100.00	98.70	64.62	100.00	100.00
	Verified	0.10%	0.10%	100.00%	100.00%	98.69%	66.59%	100.00%	100.00%
VODAF ONE	Reported	0.15	0.04	100.00	100.00	100.00	98.74	100.00	100.00
	Verified	0.10%	0.04%	100.00%	100.00%	100.00%	98.76%	100.00%	100.00%
MTS	Reported	0.04	0.06	100.00	100.00	99.00	92.94	100.00	100.00
	Verified	0.00%	0.02%	100.00%	100.00%	99.14%	94.95%	100.00%	100.00%
RCOM (CDMA)	Reported	0.10	0.10	100.00	100.00	98.42	92.84	100.00	100.00
	Verified	0.10%	0.10%	100.00%	100.00%	98.42%	92.91%	100.00%	100.00%
TATA (CDMA)	Reported	0.03	0.00	100.00	100.00	99.02	93.82	100.00	100.00
	Verified	0.04%	0.00%	100.00%	100.00%	100.00%	93.00%	100.00%	100.00%

- i. The above data is averaged for three months of the quarter ending December-2013.
- ii. The PMR data provided by the service providers is largely matching with verified (audited) data.
- iii. Aircel has not met the benchmark for the parameter "Accessibility of call centre/Customer Care" and "% call answered by operators (voice to voice) within 60 sec.".
- iv. RCOM GSM has not met the benchmark for the parameter "% call answered by operators (voice to voice) within 60 sec.".



CHAPTER-3: QOS AUDIT OF BASIC TELEPHONE SERVICE (WIRELINE)

- The QoS audit for basic (wire line) service was undertaken for assessment of quarterly performance of the service providers for quarter ended December-2013. Audit was done for sampled **18** exchanges of MTNL, **2** exchanges of Bharti-Airtel, **1** exchange of TTSL, **1** exchange of RCOM and **2** exchanges of Vodafone. The performance of the Service providers against each parameter has been evaluated by taking average of performance value of each parameter for all the exchanges of the respective service providers. The averaged value of each parameter has been tabulated as follows:

Averaged Audited data for Wireline (Basic) Services – Delhi Metro Circle								
Sl. No.	Parameters	Benchmark	Period	BHARTI AIRTEL	MTNL	RCOM	TATA	VODAFONE
1	Fault incidences							
	(No. of faults/100 subscribers /month)	< 5%	Quarterly	2.97%	8.44%	0.18%	0.17%	0.16%
2	Faults Repair/Restoration Time							
	Fault repair by next working day(Urban Area)	>90%	Quarterly	94.61%	87.88%	100.00%	100.00%	100.00%
	Within 3 days day	100%	Quarterly	100.00%	94.49%	100.00%	100.00%	100.00%
	Fault repair by next working day(Rural & hilly Area)	>90%	Quarterly	NA	NA	NA	NA	NA
	Within 5 days	100%	Quarterly	NA	NA	NA	NA	NA
	Mean time to Repair(MTTR)	≤8 Hrs	Quarterly	3.74 Hrs	4.24 Hrs	4.09 Hrs	5.12Hrs	2.14 Hrs
3	Rent Rebate							
	Fault pending > 3 days & <7 days	Rebate for 7 days	Quarterly	0	332	0	0	0
	Fault Pending > 7 days & < 15 days	Rebate for 15 days	Quarterly	0	225	0	0	0
	Fault pending > 15 days	Rebate for 1 month	Quarterly	0	178	0	0	0
4	Call Completion Ratio (CCR) & Answer to seizure Ratio(ASR)							
	CCR & ASR	> 55%(CCR) & >75%(ASR)	Quarterly	90.34%	59.73%	93.79%	99.99%	100.00%
5	Metering & Billing Performance							
	Disputed Bills over bills issued	< 0.1%	Quarterly	0.00%	0.04%	0.01%	0.05%	0.00%
	% of billing complaints resolved within 4 weeks	100%	Quarterly	100.00%	100.00%	100.00%	100.00%	100.00%
	Period of all refunds/payments from the date of resolution of complaints within 1weeks	100%	Quarterly	100.00%	100.00%	100.00%	100.00%	100.00%
6	POI Congestion							
	No. of POI's having congestion >0.5%		Quarterly	0	0	0	0	0
7	Response Time to customer for assistance							



	Accessibility of Call centre/customer Care within 40 sec.	>=95%	Quarterly	100.00%	100.00%	94.00%	100.00%	100.00%
	% age of calls answered by operator(voice to voice) within 60 seconds	>=90%	Quarterly	97.00%	97.01%	95.00%	94.50%	97.70%
	Customer care(promptness in attending to customers request)							
8	Termination / Closures	100%	Quarterly	100.00%	100.00%	100.00%	100.00%	100.00%
	Time taken for refunds of deposit after closures	100%	Quarterly	100.00%	99.00%	100.00%	100.00%	100.00%

- NA-Not Applicable
- NP-Not Provided

KEY FINDINGS:

Fault Incidences: The audit of the service providers revealed that MTNL was the only operator having its performance beyond the benchmark. Its performance was 8.44% against the benchmark of <5%. Other service providers were well within the benchmark.

Fault Repair/Restoration Time: For this parameter also, MTNL failed to meet benchmark. Its performance level was 87.88% and 94.49% for parameters ‘Fault repaired by next day and within 3 days’ respectively.

Mean Time to Repair: All service providers were found to have meet the benchmark for this parameter.

Call Completion Rate/Answer to seizure ration: All the operators were found to be comfortably meeting the benchmark on this parameter at various exchanges.

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

Response Time to Customer for assistance: For percentage of calls getting connected to call center and answered, all operators except RCOM managed to meet the TRAI benchmark. RCOM could connect 94.00 % of calls to its call center against the benchmark of 95 %.

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

Time Taken for refunds of deposits after closures: MTNL marginally remained under performed for this parameter with its performance as 99.00% against the benchmark of 100%.



3 DAYS LIVE MEASUREMENT DATA VERIFICATION FOR BASIC TELEPHONE SERVICE (WIRELINE) PROVIDERS:

3 DAYS LIVE DATA FOR WIRELINE (BASIC) SERVICES- DELHI METRO CIRCLE								
Sl. No.	Parameters	Benchmark	Period	BHARTI AIRTEL	MTNL	RCOM	TATA	VODAFONE
1	Call Completion Ratio (CCR) & Answer to seizure Ratio(ASR)							
	CCR & ASR	> 55%(CCR) & > 75%(ASR)	Live Data	97.21%	57.68%	93.99%	100.00%	100.00%
2	POI Congestion							
	No. of POI's having congestion >0.5%		Live Data	0	0	0	0	0
3	Response Time to customer for assistance							
	Accessibility of Call centre/customer Care within 40 seconds	≥95%	Live Data	100.00%	100.00%	93.33%	100.00%	100.00%
	% age of calls answered by operator(voice to voice) within 60 seconds	≥90%	Live Data	96.00%	95.00%	96.00%	94.50%	99.54%

- NP-Not Provided

KEY FINDINGS: The three days live measurements were within TRAI' norms for all the operators except RCOM. The Performance level of **RCOM** for the parameter 'Calls answered by operator (Voice to Voice) within 60 seconds was **93.33%** against the benchmark of ≥95%.

INTER OPERATOR CALLS ASSESSMENT

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in Delhi Metro Circle service area during the time 1000 to 1300 Hrs and 1500 to 1700 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.



INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT						
Calling Operators	Circle Name	BHARTI AIRTEL	MTNL	RCOM	TATA	VODAFONE
BHARTI AIRTEL	<i>DELHI</i>	--	100%	100%	100%	100%
MTNL	<i>DELHI</i>	100%	--	100%	100%	100%
RCOM	<i>DELHI</i>	100%	100%	--	100%	100%
TATA	<i>DELHI</i>	100%	100%	100%	--	100%
VODAFONE	<i>DELHI</i>	100%	100%	100%	100%	--

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

CUSTOMER CARE / HELPLINE ASSESSMENT

LIVE CALLING TO CALL CENTRE						
	Circle Name	BHARTI AIRTEL	MTNL	RCOM	TATA	VODAFONE
Total No. of calls Attempted	<i>Delhi</i>	100	100	100	100	100
Total No. of calls connected to IVR	<i>Delhi</i>	100	100	100	100	100
Calls got connected to agent within 60 Sec	<i>Delhi</i>	96	95	100	100	100
%age of calls got answered	<i>Delhi</i>	96.00%	95.00%	100.00%	100.00%	100.00%

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers, Bharti-Airtel and MTNL, were found connected 96 % and 95% of calls respectively, to the operator within 60 second.



LEVEL-1 LIVE CALLING:

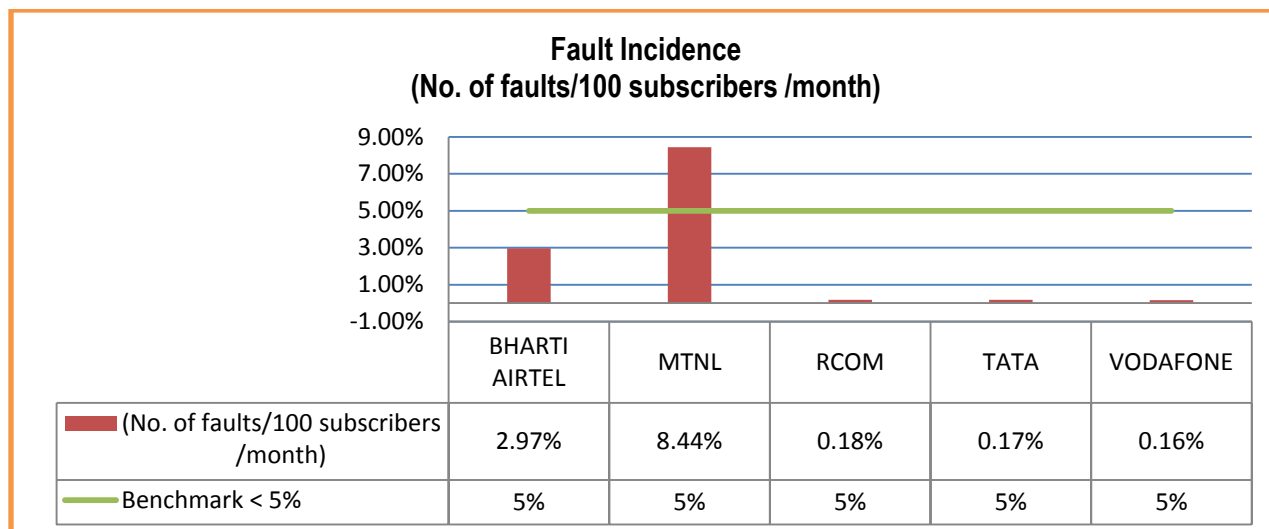
LEVEL 1 LIVE CALLING							
Emergency no.	Circle Name	No. of calls made	BHARTI AIRTEL	MTNL	RCOM	TATA	VODAFONE
100	Delhi	30	30	30	30	30	30
101	Delhi	40	40	40	40	40	40
102	Delhi	40	40	40	40	40	40
1091	Delhi	40	40	40	40	40	40

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by various service providers, the calls were made from telephones provided by the service providers. In Delhi Metro Circle service area, these services were found functional in the networks of all the service providers.



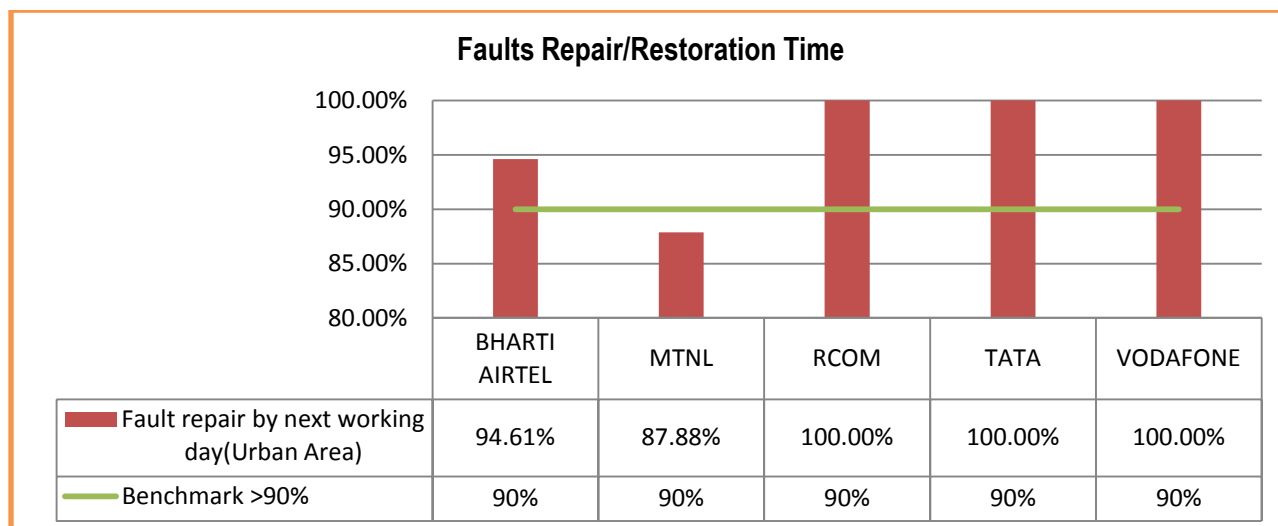
GRAPHICAL REPRESENTATION OF QUARTERLY PERFORMANCE OF THE BASIC TELEPHONE SERVICE (WIRELINE) PROVIDERS:

1) FAULT INCIDENCE:



All Operators are meeting the benchmarks except MTNL with its performance as 8.44% against the benchmark < 5 %.

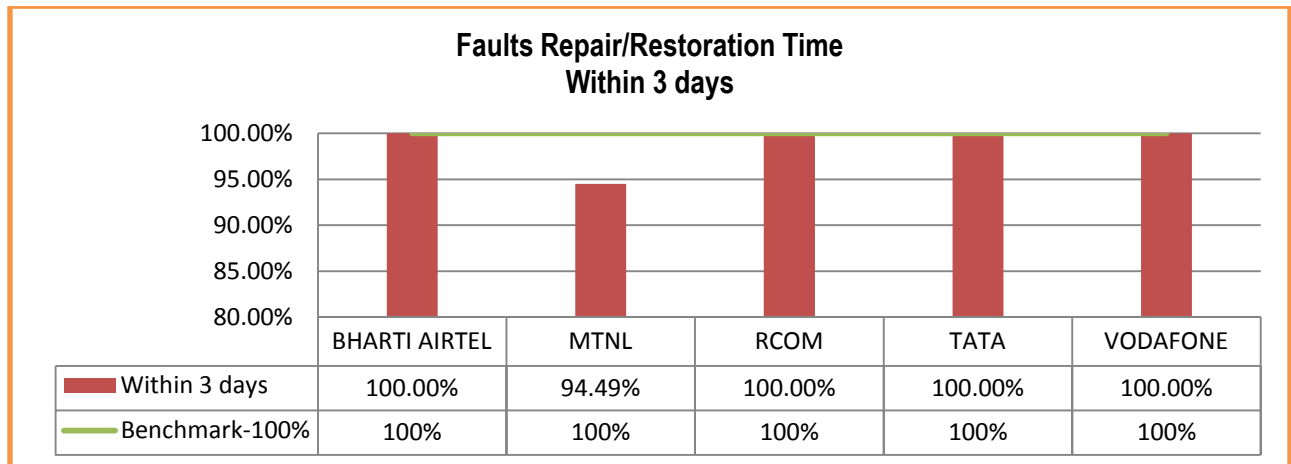
2) FAULTS REPAIR/RESTORATION TIME:



All Operators are meeting the benchmarks except MTNL with its performance as 87.88% against the benchmark > 90 %.

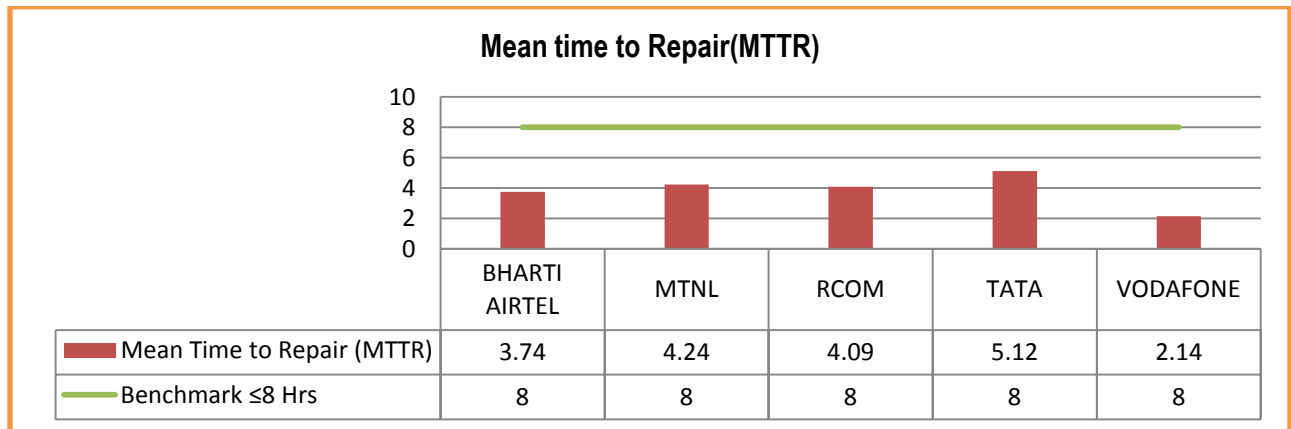


3) FAULTS REPAIR/RESTORATION TIME WITHIN 3 DAYS:



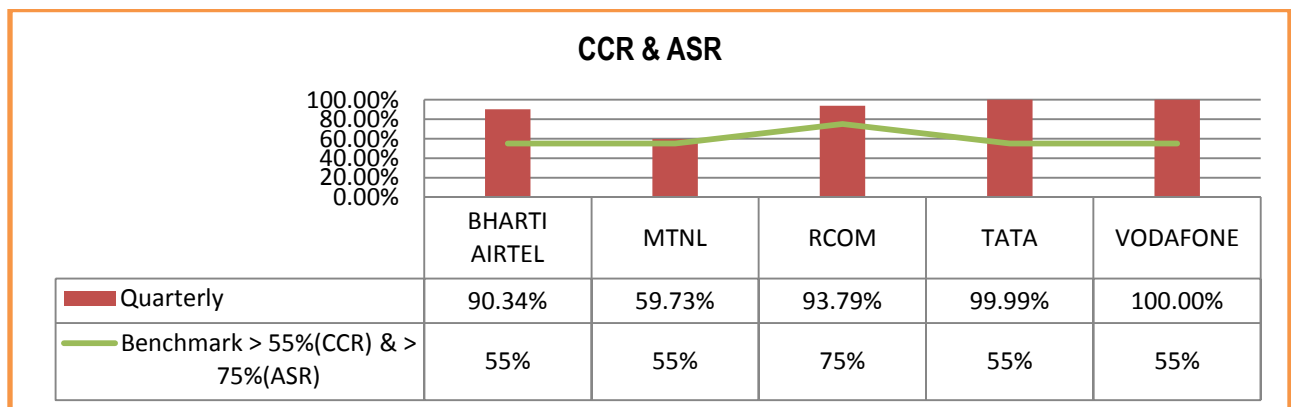
All Operators are meeting the benchmarks except MTNL with its performance of 94.49% against the benchmark of 100 %.

4) MEAN TIME TO REPAIR (MTTR):



All Operators are meeting the benchmarks.

5) CALL COMPLETION RATIO (CCR) & ANSWER TO SEIZURE RATIO(ASR):

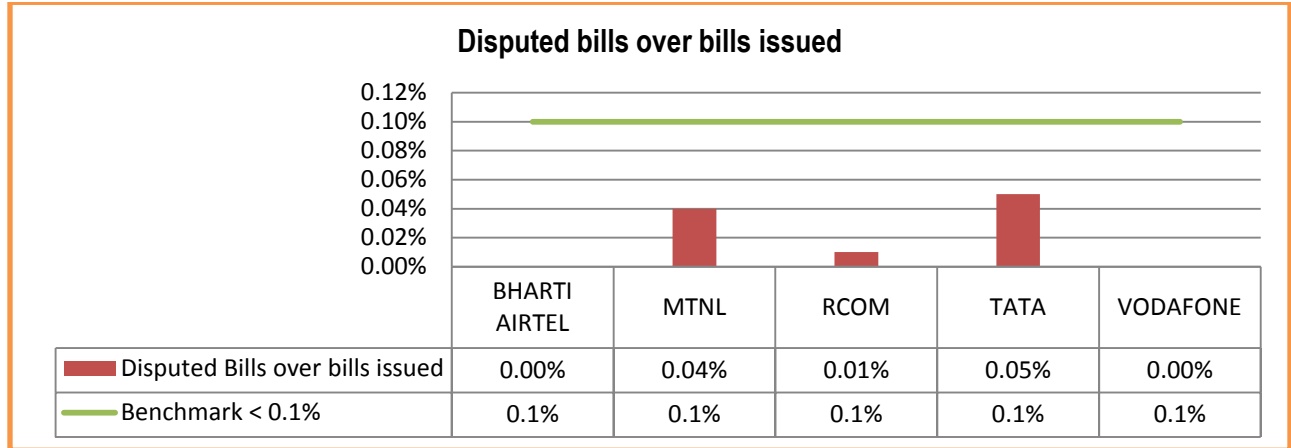


All Operators are meeting the benchmarks. RCOM has provided ASR instead of CCR.



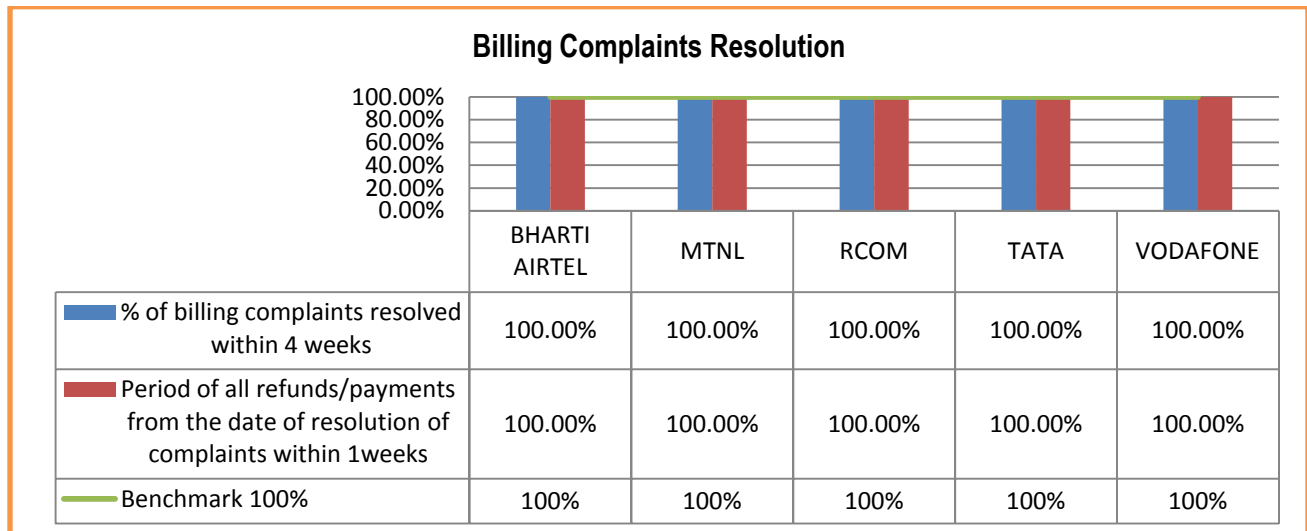
6) METERING & BILLING PERFORMANCE:

a) DISPUTED BILLS OVER BILL ISSUED :



All Operators are meeting the benchmarks.

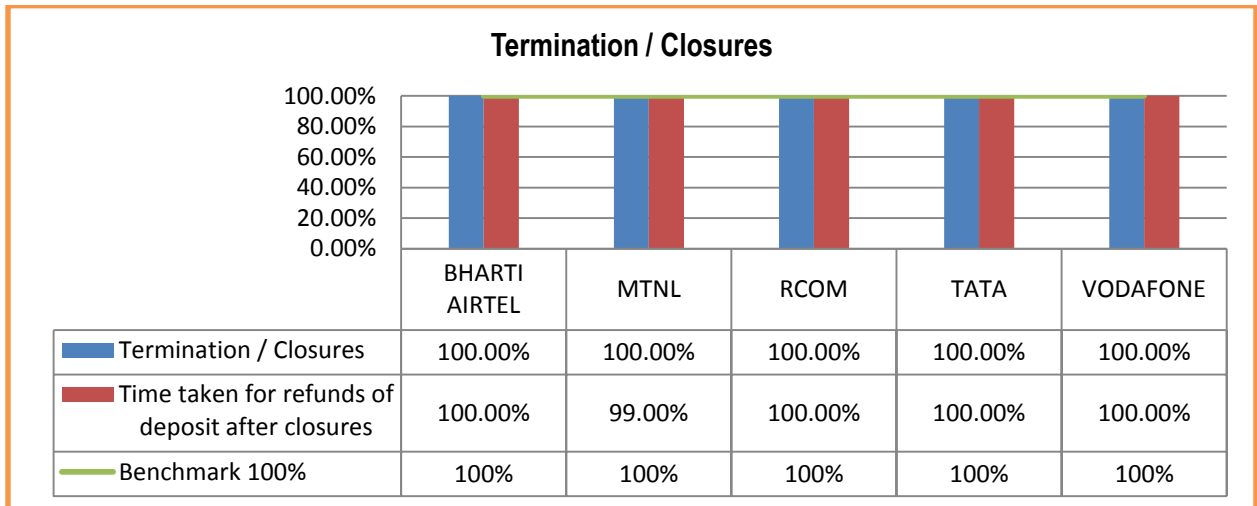
b) BILLING COMPLAINT RESOLUTION:



All Operators are meeting the benchmarks.



7) TERMINATION & CLOSURES:

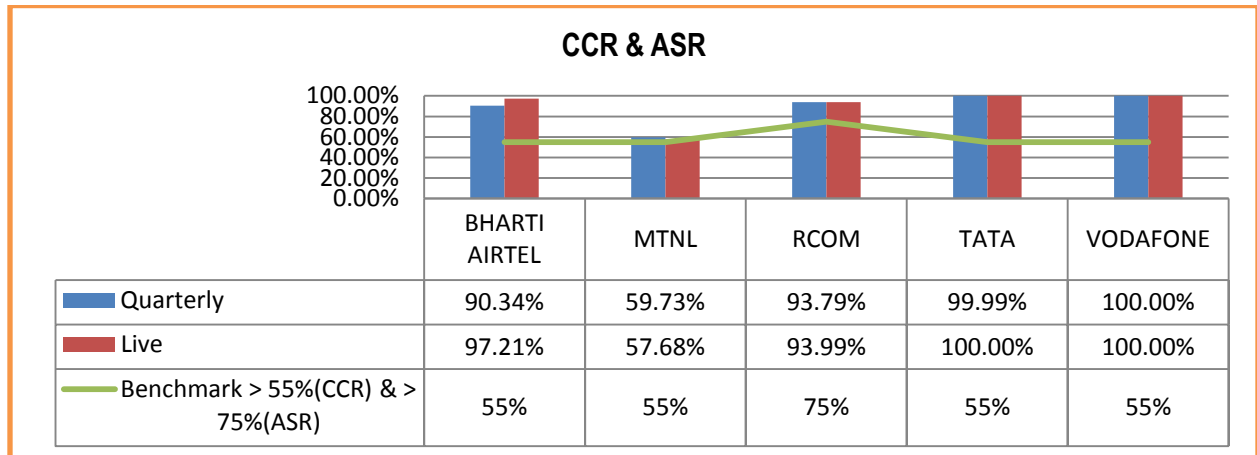


All Operators are meeting the benchmarks except MTNL with its performance very marginally below the benchmark.



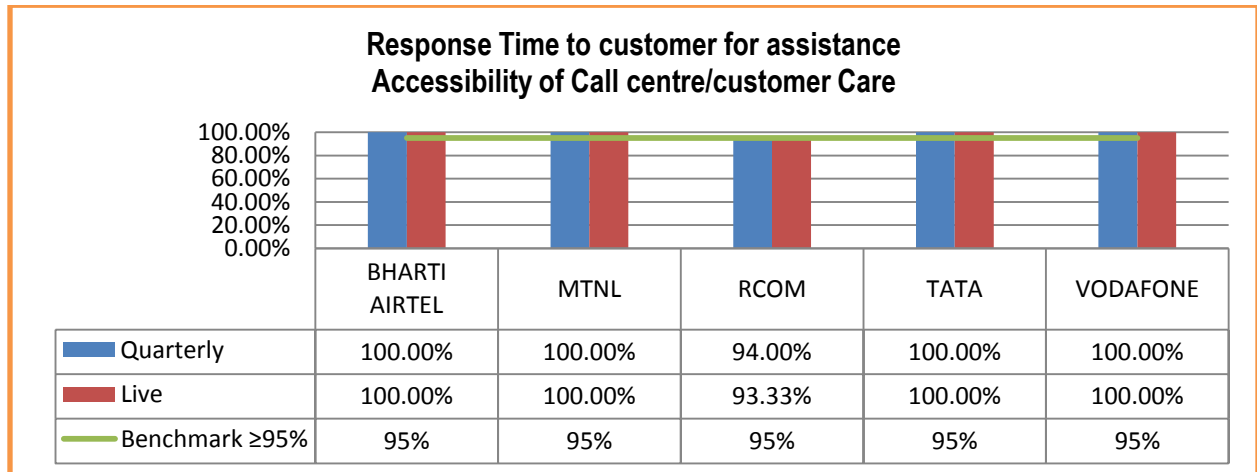
GRAPHICAL REPRESENTATION OF PERFORMANCE OF THE BASIC TELEPHONE SERVICE (WIRELINE) PROVIDERS V/S 3-DAYS LIVE MEASUREMENT:

1) CALL COMPLETION RATIO (CCR) & ANSWER TO SEIZURE RATIO(ASR):



All Operators are meeting the benchmarks.

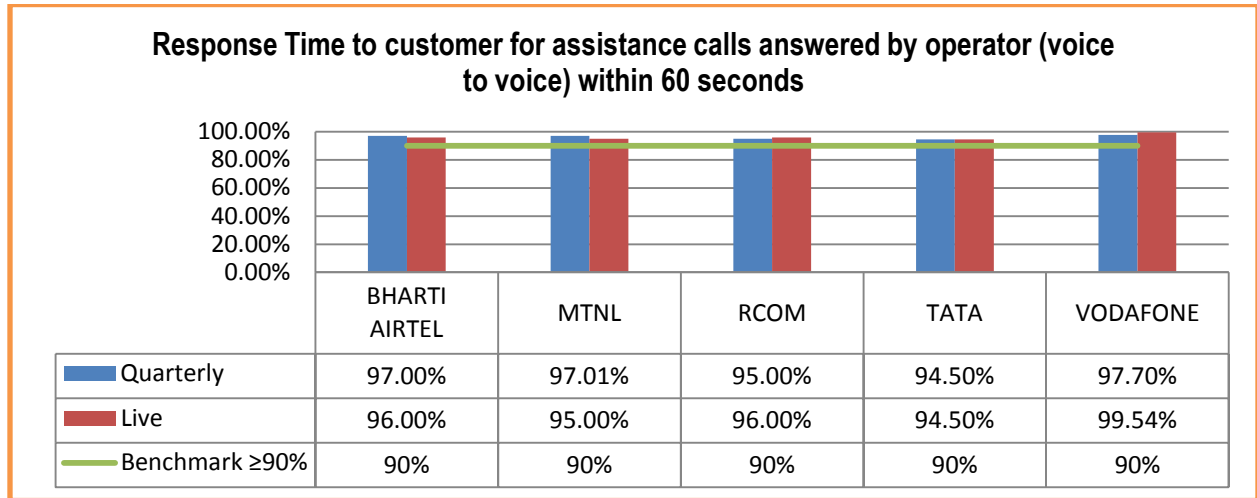
2) RESPONSE TIME TO CUSTOMER FOR ASSISTANCE ACCESSIBILITY OF CALL CENTRE/CUSTOMER CARE:



All Operators are meeting the benchmarks except RCOM.



3) **RESPONSE TIME TO CUSTOMER FOR ASSISTANCE CALL ANSWERED BY OPERATORS :**



All Operators are meeting the benchmarks.