



REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
FOR
TELECOM REGULATORY AUTHORITY OF INDIA
WEST ZONE – MUMBAI METRO CIRCLE
(OCTOBER 2013 – DECEMBER 2013)

TUV-SUD SOUTH ASIA PVT LTD.
C-153/1, OKHLA INDUSTRIAL AREA
PHASE – 1, NEW DELHI - 110020
TEL: +91 11 30889611, FAX: +91-11-30889595



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



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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 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.

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, 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.



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 Mumbai Metro circle

Sl. No.	Name of Service Provider
GSM Operators	
1	AIRTEL
2	AIRCEL
3	MTNL
4	IDEA
5	RCOM GSM
6	TATA GSM
7	LOOP MOBILE
8	VODAFONE
CDMA Operators	
9	RCOM CDMA
10	TATA CDMA

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

3.2 SAMPLING FOR BASIC (WIRELIN) SERVICES

- The QoS audit for basic (wireline) service is to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles. **However, QoS audit for basic (wireline) service was not required to be done for Mumbai Metro Circle in the quarter ended December 2013.**



3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

- TUV–SUD South Asia has to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who are having broadband subscriber base of more than 10,000 subscribers in their licensed service area, for 5% of Point of Presence (PoPs) spread over in 10% SDCAs in specified Telecom Circle. However, **the QoS audit for Broadband service was not required to be done for Mumbai Metro Circle in the quarter ended December 2013.**

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 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 90 (3x10x3) drive tests in three months of quarter ended December 2013 were carried out in **Mumbai 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.



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

BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
GSM Operators			
1	AIRTEL	Dec-13	20:00 - 21:00
2	AIRCEL	Dec-13	19:00 - 20:00
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	TATA GSM	Dec-13	19:00 - 20:00
7	LOOP MOBILE	Dec-13	19:00 - 20:00
8	VODAFONE	Dec-13	19:00 - 20:00
CDMA Operators			
9	RCOM CDMA	Dec-13	19:00 - 20:00
10	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 Mumbai 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	AIRTEL	13	72	3864	NSN	NSN
2	AIRCEL	3	20	1941	NSN	NSN
3	MTNL	5	46	993	Alcatel	Motorola & Alcatel
4	IDEA	8	31	3087	Ericsson	Ericsson
5	RCOM GSM	3	11	2330	Huawei	Huawei
6	TATA GSM	4	15	2638	Huawei	Huawei
7	LOOP MOBILE	3	23	2086	Huawei	Huawei & ZTE
8	VODAFONE	21	62	3965	Ericsson	Ericsson
CDMA Operators						
9	RCOM CDMA	8	NA	893	Lucent, ZTE & Ericsson	Lucent
10	TATA CDMA	5	6	967	Huawei	Huawei

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



TABLES OF MONTHLY QOS PERFORMANCE:

TABLE: 1

Cellular Mobile Telephone Services Mumbai Metro Circle- Oct-13 month													
PMR Generation Data		Bench- mark	Audit Period	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators		
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Oct-13	0.00%	0.04%	0.67%	0.04%	0.17%	0.04%	0.00%	0.00%	0.18%	0.09%
	b) Worst affected BTSs due to downtime	<=2%	Oct-13	0.00%	0.00%	0.05%	0.13%	0.13%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Oct-13	99.99%	98.11%	97.78%	98.21%	99.73%	99.58%	99.17%	99.46%	98.84%	98.95%
	b) SDCCH/PAGING Channel congestion	<=1%	Oct-13	0.00%	0.08%	0.50%	0.41%	0.04%	0.07%	0.03%	0.04%	0.00%	0.00%
	c) TCH congestion	<=2%	Oct-13	0.00%	0.16%	0.04%	1.11%	0.04%	0.15%	0.02%	0.54%	0.01%	0.03%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Oct-13	0.31%	0.86%	1.30%	1.90%	0.36%	0.51%	0.62%	0.86%	0.41%	0.69%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Oct-13	0.00%	1.90%	2.30%	2.87%	0.07%	1.95%	0.78%	2.56%	0.19%	0.88%
	c) Connections with good voice quality	>=95%	Oct-13	99.97%	97.97%	96.08%	98.32%	99.15%	98.79%	98.06%	97.27%	99.79%	98.98%
4	No. of POI's having >=0.5% POI congestion		Oct-13	0	0	0	0	0	0	0	0	0	0

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



TABLE: 2

Cellular Mobile Telephone Services Mumbai Metro Circle- Nov-13 month													
PMR Generation Data		Bench- mark	Audit Period	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators		
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Nov-13	0.00%	0.03%	0.58%	0.03%	0.14%	0.04%	0.01%	0.00%	0.15%	0.14%
	b) Worst affected BTSs due to downtime	<=2%	Nov-13	0.00%	0.00%	1.81%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Nov-13	99.99%	98.25%	97.74%	98.25%	99.53%	99.57%	99.29%	99.49%	99.07%	98.96%
	b) SDCCH/PAGING Channel congestion	<=1%	Nov-13	0.00%	0.10%	0.30%	0.43%	0.02%	0.07%	0.06%	0.05%	0.00%	0.00%
	c) TCH congestion	<=2%	Nov-13	0.00%	0.18%	0.06%	1.02%	0.04%	0.16%	0.04%	0.51%	0.00%	0.04%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Nov-13	0.32%	0.79%	1.25%	1.87%	0.34%	0.66%	0.62%	0.83%	0.38%	0.64%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Nov-13	0.00%	1.54%	2.38%	2.88%	0.03%	1.47%	0.77%	2.54%	0.07%	1.33%
	c) Connections with good voice quality	>=95%	Nov-13	99.97%	97.99%	96.90%	98.19%	99.16%	98.58%	98.10%	97.43%	99.79%	89.96%
4	No. of POI's having >=0.5% POI congestion		Nov-13	0	0	0	0	0	0	0	0	0	0



TABLE: 3

Cellular Mobile Telephone Services Mumbai Metro Circle- Dec-13 month													
PMR Generation Data		Bench- mark	Audit Period	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Dec-13	0.00%	0.02%	0.64%	0.04%	0.26%	0.05%	0.00%	0.00%	0.33%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Dec-13	0.00%	0.05%	1.41%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Dec-13	99.99%	98.22%	98.18%	98.21%	99.69%	99.59%	99.26%	99.53%	99.07%	98.97%
	b) SDCCH/PAGING Channel congestion	<=1%	Dec-13	0.00%	0.10%	0.21%	0.39%	0.04%	0.08%	0.03%	0.05%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-13	0.00%	0.16%	0.04%	1.03%	0.06%	0.15%	0.04%	0.47%	0.00%	0.02%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Dec-13	0.31%	0.80%	1.20%	1.93%	0.38%	0.65%	0.62%	0.83%	0.38%	0.01%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Dec-13	0.00%	1.60%	2.39%	2.86%	0.02%	1.39%	0.74%	2.87%	0.07%	0.95%
	c) Connections with good voice quality	>=95%	Dec-13	99.97%	98.00%	96.90%	98.16%	99.09%	98.56%	98.10%	97.49%	99.79%	99.09%
4	No. of POI's having >=0.5% POI congestion		Dec-13	0	0	0	0	0	0	0	0	0	0

KEY FINDINGS: CELLULAR MOBILE SERVICES

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 Mumbai Metro circle, all the operators were found meeting benchmark on the above parameters 'BTS accumulated downtime' and 'worst affected BTSs due to down time' in all the three months of the quarter.

▪ **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 on this parameter.

▪ **Parameters related to Network Congestion:**

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

In CDMA system, there is no direct counter defined for reporting Paging Channel Congestion as reported by Tata Teleservices. However, they have a defined counter for Paging Channel Occupancy Ratio (PCH Average Using Ratio) which is used to determine the Paging Channel Occupancy which on an average is < 50% on all sites in the network. When the value of this parameter is less than 100%, it is counted as 0% congestion. Thus, there is no congestion on the 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 the congestion parameters. There was no congestion on individual POI links between a service provider vis-à-vis other service providers.

▪ **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 (0.31 %) was for Airtel during the quarter.

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

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

The audit with respect to this parameter revealed that all the operators were in compliance of the benchmark for this parameter comfortably.

iii. Connections with good voice quality:

Some of the Operators are measuring this parameter through the system generated data at their switches whereas some are measuring through their periodic drive tests. The audit results for this parameter indicate that all operators except **Tata (CDMA)** in the month of November- 13, have met the bench mark during the quarter. The achievement level of **Tata (CDMA)** for this parameter in November-2013 was **89.96 %**.

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



4.2 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	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
S/ N	Name of Parameter			GSM Operators							CDMA Operators		
1	Metering & Billing Credibility -Post Paid												
	A) No. of bills issued during the quarter		Mumbai Metro	764228	26660	137518	494861	119731	109959	47919	1870194	464993	303521
	B) No. of bills disputed including billing complaints during the quarter		Mumbai Metro	138	0	44	315	116	231	1	1118	461	67
	C)% of billing complaints during the quarter	<= 0.1%	Mumbai Metro	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	Metering & Billing Credibility -Pre Paid												
	A) Total No. of Pre-paid customers at the end of the quarter		Mumbai Metro	3413931	17557748	1135001	2818083	2765186	1309799	2622285	5145068	2654041	389864
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		Mumbai Metro	125	9	24	464	2717	64	108	552	1801	23
	C) % of Pre-paid Charging Complaints	<= 0.1%	Mumbai Metro	0.00%	0.00%	0.00%	0.02%	0.10%	0.00%	0.00%	0.01%	0.07%	0.01%
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		Mumbai Metro	1704	10	60	2441	2833	295	127	1670	2262	91
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		Mumbai Metro	1704	10	59	2441	2833	295	127	1670	2262	91
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 week	Mumbai Metro	100%	100%	98.88%	100%	100%	100%	100%	100%	100%	100%
	D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	Mumbai Metro	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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



4 Response time to customers for assistance													
	A) Accessibility of call centre/Customer Care	>=95%	Mumbai Metro	100%	100%	NP	100%	99.37%	100%	97.18%	100%	99.44%	100%
	B) % call answered by operators(voice to voice) within 60 sec.	>=90%	Mumbai Metro	94%	84%	95.62%	98%	89.42%	92.33%	99.01%	95%	93.41%	92.01%
5 Termination/closure of service													
	A) Total No. of requests for Termination / Closure of service received during the quarter		Mumbai Metro	3141	188	5994	3454	886	497	898	6546	5687	179
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		Mumbai Metro	3141	185	5979	3454	886	497	898	6546	5687	179
	C) % of Termination/ Closure of service within 7 days	<=7days	Mumbai Metro	100%	98.40%	99.75%	100%	100%	100%	100%	100%	100%	100%
6 Time taken for refunds of deposits after closures.													
	A) No. of Payments/ Refunds due during the quarter		Mumbai Metro	1577	186	310	1106	898	292	212	1217	1605	70
	B) No. of Payments/ Refunds Cleared during the quarter		Mumbai Metro	1577	186	310	1106	898	292	212	1217	1605	70
	C)Time taken for refunds of deposits after closures.	100% within 60 days	Mumbai Metro	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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 except **MTNL**, have 100 % resolved the billing complaints within stipulated period of 4 weeks. Only **MTNL** could not meet the benchmark with its achievement of **98.88 %**, marginally below the benchmark of 100%. In all cases where customers were due for credit / adjustment, all the service providers have met the benchmark of 100 % refund in one week.



3. Response Time to the Customer for assistance

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

All service providers are in compliance of the parameter accessibility of call center. However, **Aircel and RCOM (GSM)** have not met the benchmark of calls answered by Operators (voice to voice) within 60 seconds. They have achieved their performance as **84% and 89.42%** respectively.

4. Termination/Closure of Service

In case of this parameters also, only two operators namely **Aircel and MTNL** were not found to have settled 100 % closure/termination within 7 days. Their performance with respect to this parameter was **98.40 % and 99.75 %** respectively.

5. Time Taken for Refund of deposits after closures

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



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

A) NETWORK SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES

TABLE: 1

Cellular Mobile Telephone Services Mumbai Metro Circle- Oct-13 month													
Live measurement Data		Bench- mark	Average of 3 Days	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators								CDMA Operators	
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.01%	0.02%	0.80%	0.04%	0.08%	1.34%	0.05%	0.00%	0.08%	1.42%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.99%	98.07%	98.18%	98.87%	99.73%	99.56%	99.29%	99.45%	98.83%	98.88%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.00%	0.07%	0.12%	0.52%	0.02%	0.08%	0.01%	0.08%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.19%	0.01%	0.90%	0.04%	0.15%	0.02%	0.55%	0.93%	0.10%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.31%	0.88%	1.28%	1.87%	0.36%	0.80%	0.68%	0.86%	0.41%	0.67%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	0.00%	2.79%	2.15%	2.85%	0.01%	1.68%	0.84%	3.38%	0.04%	1.23%
	c) Connections with good voice quality	>=95%	Live data	99.97%	97.97%	96.82%	98.63%	99.15%	98.38%	98.12%	97.27%	99.79%	98.95%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0



TABLE: 2

Cellular Mobile Telephone Services Mumbai Metro Circle- Nov-13 month													
Live measurement Data		Bench- mark	Average of 3 Days	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators								CDMA Operators	
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.00%	0.04%	0.63%	0.03%	0.07%	0.11%	0.00%	1.83%	0.01%	0.28%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.99%	98.08%	98.06%	98.11%	99.73%	99.55%	99.34%	99.50%	98.89%	99.04%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.00%	0.20%	0.23%	0.29%	0.02%	0.05%	0.18%	0.02%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.40%	0.10%	1.22%	0.04%	0.23%	0.02%	0.50%	0.01%	0.02%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.31%	0.81%	1.21%	1.83%	0.34%	0.66%	0.40%	0.90%	0.35%	0.63%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	0.00%	2.49%	2.35%	2.89%	0.00%	1.65%	0.69%	2.50%	0.04%	2.65%
	c) Connections with good voice quality	>=95%	Live data	99.97%	98.00%	96.80%	98.19%	99.16%	98.57%	98.10%	97.45%	99.79%	99.79%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0



TABLE: 3

Cellular Mobile Telephone Services Mumbai Metro Circle- Dec-13 month													
Live measurement Data		Bench- mark	Average of 3 Days	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators								CDMA Operators	
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.00%	0.01%	0.98%	0.03%	0.35%	0.53%	0.00%	0.00%	0.35%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.99%	98.07%	98.32%	98.38%	99.72%	99.62%	99.24%	99.53 %	99.12%	98.94%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.00%	0.06%	0.14%	0.44%	0.02%	0.07%	0.02%	0.02%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.11%	0.01%	0.88%	0.05%	0.10%	0.07%	0.47%	0.00%	0.02%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.31%	0.81%	1.20%	1.90%	0.37%	0.67%	0.64%	0.83%	0.39%	0.64%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	0.00%	2.41%	2.57%	2.88%	0.00%	1.55%	0.82%	2.96%	0.00%	2.35%
	c) Connections with good voice quality	>=95%	Live data	99.97%	98.00%	96.90%	98.16%	99.09%	98.58%	98.05%	97.48 %	99.78%	99.06%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0

KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:

From three days live measurement assessment, it is found that the performance of all operators is satisfactory as they are largely meeting the benchmarks except the parameter "Worst affected cells> 3 % TCH drops". This parameter was not met by **Vodafone (3.38%)** in the month of Oct-13.



INTER OPERATOR CALLS ASSESSMENT

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in Mumbai 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	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
AIRTEL	Mumbai Metro	--	100%	100%	100%	100%	100%	100%	97%	100%	100%
AIRCEL	Mumbai Metro	100%	--	100%	100%	100%	100%	100%	100%	100%	100%
MTNL	Mumbai Metro	100%	100%	--	100%	100%	100%	100%	100%	100%	100%
IDEA	Mumbai Metro	100%	100%	100%	--	100%	100%	100%	100%	100%	100%
RCOM GSM	Mumbai Metro	100%	100%	100%	100%	--	100%	100%	100%	100%	100%
TATA GSM	Mumbai Metro	100%	100%	100%	100%	100%	--	100%	100%	100%	100%
LOOP MOBILE	Mumbai Metro	100%	100%	100%	100%	100%	100%	--	100%	100%	100%
VODAFONE	Mumbai Metro	100%	100%	100%	100%	100%	100%	100%	--	100%	100%
RCOM CDMA	Mumbai Metro	100%	100%	100%	100%	100%	100%	100%	100%	--	100%
TATA CDMA	Mumbai Metro	100%	100%	100%	100%	100%	100%	100%	100%	100%	--

The result of the testing revealed that there was hardly any problem in interconnection from one operator to other operators. However, Calls attempted from Airtel to Vodafone were 97% successful. In other cases, the interconnections between the operators were 100%.



B) 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	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	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%	Mumbai Metro	100%	100%	NP	100%	99.41%	100%	98.41%	100%	99.57%	100%
	B) % call answered by operators(voice to voice) within 60 sec.	>=90%	Mumbai Metro	96%	100%	95.75	99%	85.06%	96%	99.23%	NA	94.72%	96%

CUSTOMER CARE / HELPLINE ASSESSMENT

LIVE CALLING TO CALL CENTRE												
	Circle Name	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA	
Total No. of calls Attempted	Mumbai Metro	100	100	100	100	100	100	100	100	100	100	
Total No. of calls connected to IVR	Mumbai Metro	100	100	100	100	100	100	100	100	100	100	
Calls got connected to agent within 60 Sec	Mumbai Metro	100	94	93	100	95	100	100	100	97	100	
%age of calls got answered	Mumbai Metro	100.00%	94.00%	93.00%	100.00%	95.00%	100.00%	100.00%	100.00%	97.00%	100.00%	

KEY FINDINGS: The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center and call connection to operators (Voice to voice) except **RCOM (GSM)** which could connect **85.06%** of calls to operator within 60 seconds.

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers, Aircel, MTNL, RCOM (GSM) and RCOM (CDMA) could connect 94%, 93%, 95% and 97% respectively of calls to the operator within 60 Seconds.



LEVEL-1 LIVE CALLING

LEVEL 1 LIVE CALLING												
Emergency no.	Circle Name	No. of calls made	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
100	Mumbai Metro	20	20	20	20	20	20	20	20	20	20	20
101	Mumbai Metro	50	50	50	50	50	50	50	50	50	50	50
102	Mumbai Metro	30	30	30	30	30	30	30	30	30	30	30
108	Mumbai Metro	30	30	30	30	30	30	30	30	30	30	30

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

5. DRIVE TEST

5.1 OPERATOR ASSISTED DRIVE TEST:

In Mumbai Metro Service area, total 90 drive tests in three months of the quarter ended December 2013 @ of 3 drive tests per operator per month (total 3x10x3=90 drive tests) were conducted covering Kalyan, Thane and Navi Mumbai during the month of October-13, Chambur, Andheri and Worli during November -13 and Bandra, Ghatkoper and Borivali areas during December-2013 . 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. 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 of the above 09 locations of Mumbai Metro Service area.

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.

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



DRIVE TEST TABLE: 1

Operator-Assisted Drive Test-Mumbai Metro Circle-Oct-13 Month													
S/N	Parameter	City Name	Drive Test Period	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
1	Blocked Call Rate (<=3%)	Kalyan	Oct-13	0.00%	2.45%	3.00%	0.00%	1.49%	0.86%	0.00%	1.05%	0.00%	0.00%
		Thana	Oct-13	0.00%	0.00%	2.53%	0.00%	0.74%	0.00%	1.23%	0.00%	0.00%	1.21%
		Navi Mumbai	Oct-13	1.47%	0.00%	1.02%	0.00%	0.00%	1.56%	1.37%	0.00%	0.74%	0.00%
2	Dropped Call Rate (<=2%)	Kalyan	Oct-13	0.00%	0.84%	6.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.65%
		Thana	Oct-13	0.00%	0.00%	12.9%	0.00%	0.88%	0.00%	0.00%	0.00%	0.00%	0.00%
		Navi Mumbai	Oct-13	0.00%	0.00%	9.28%	0.00%	0.00%	1.59%	0.00%	0.00%	0.76%	1.15%
Percentage connections with good voice quality (=>95%)													
3	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Kalyan	Oct-13	NA	NA	NA	NA	NA	NA	NA	NA	97.69%	98.05%
		Thana	Oct-13	NA	NA	NA	NA	NA	NA	NA	NA	97.60%	99.03%
		Navi Mumbai	Oct-13	NA	NA	NA	NA	NA	NA	NA	NA	97.59%	98.71%
	(b) 0-5 (with frequency hopping for GSM Operators)	Kalyan	Oct-13	97.63%	95.69%	94.5%	92.40%	86.69%	96.50%	95.48%	97.26%	NA	NA
		Thana	Oct-13	96.53%	95.64%	89.0%	90.48%	98.74%	95.62%	94.63%	95.77%	NA	NA
		Navi Mumbai	Oct-13	96.68%	95.07%	86.7%	88.50%	96.66%	96.45%	94.53%	95.01%	NA	NA
Service Coverage													
4	In door (>= - 75dBm)	Kalyan	Oct-13	91.55%	91.63%	14.7%	92.54%	44.22%	96.15%	65.99%	24.57%	57.48%	95.05%
		Thana	Oct-13	96.09%	94.33%	27.4%	98.60%	70.16%	95.29%	74.21%	29.92%	80.60%	99.97%
		Navi Mumbai	Oct-13	91.92%	95.87%	29.8%	96.31%	48.83%	98.42%	71.54%	23.41%	72.14%	99.92%
	In-vehicle (>= - 85dBm)	Kalyan	Oct-13	99.77%	99.08%	70.9%	99.95%	75.38%	100.0%	93.98%	60.95%	80.97%	100.0%
		Thana	Oct-13	99.45%	99.40%	72.9%	99.97%	93.23%	99.30%	97.52%	64.68%	98.86%	100.0%
		Navi Mumbai	Oct-13	98.22%	99.40%	87.5%	99.56%	83.26%	100.0%	97.08%	59.71%	97.68%	100.0%
	Outdoor- in city (>= - 95dBm)	Kalyan	Oct-13	100.0%	99.85%	97.9%	100.0%	93.66%	100.0%	100.0%	100.0%	99.84%	100.0%
		Thana	Oct-13	100.0%	99.90%	97.0%	100.0%	98.51%	100.0%	100.0%	100.0%	100.0%	100.0%
		Navi Mumbai	Oct-13	100.0%	99.91%	99.4%	100.0%	95.98%	100.0%	100.0%	100.0%	100.0%	100.0%
5	Call Setup Success Rate (>=95%)	Kalyan	Oct-13	100.0%	97.54%	96.6%	100.0%	98.51%	99.00%	100.0%	98.94%	100.0%	99.35%
		Thana	Oct-13	100.0%	100.0%	97.4%	98.90%	99.26%	100.0%	98.76%	100.0%	100.0%	98.78%
		Navi Mumbai	Oct-13	99.56%	100.0%	98.9%	100.0%	100.0%	98.44%	98.63%	100.0%	100.0%	100.0%

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



DRIVE TEST TABLE: 2

Operator-Assisted Drive Test-Mumbai Metro Circle-Nov-13 Month													
S/N	Parameter	City Name	Drive Test Period	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators									CDMA Operator
1	Blocked Call Rate (<=3%)	CHEMBUR	Nov-13	0.00%	0.18%	1.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		ANDHERI	Nov-13	0.00%	0.41%	1.72%	0.00%	1.29%	1.59%	0.00%	0.00%	0.00%	0.00%
		WORLI	Nov-13	0.00%	0.00%	0.00%	0.85%	2.36%	0.78%	0.00%	0.00%	0.00%	0.96%
2	Dropped Call Rate (<=2%)	CHEMBUR	Nov-13	0.00%	0.00%	1.56%	1.22%	1.32%	0.00%	0.00%	0.00%	2.27%	0.00%
		ANDHERI	Nov-13	0.00%	0.41%	0.88%	0.00%	0.65%	0.00%	0.00%	0.00%	0.00%	1.43%
		WORLI	Nov-13	0.00%	0.00%	1.92%	0.00%	0.00%	0.78%	0.00%	0.00%	0.00%	0.00%
Percentage connections with good voice quality (=>95%)													
3	(a) 0-4 (w/o frequency hopping for CDMA Operators)	CHEMBUR	Nov-13	NA	NA	NA	NA	NA	NA	NA	NA	97.59%	97.88%
		ANDHERI	Nov-13	NA	NA	NA	NA	NA	NA	NA	NA	99.13%	97.99%
		WORLI	Nov-13	NA	NA	NA	NA	NA	NA	NA	NA	98.96%	97.96%
	(b) 0-5 (with frequency hopping for GSM Operators)	CHEMBUR	Nov-13	95.21%	96.9%	96.24%	89.90%	95.2%	96.65%	95.17%	95.29%	NA	NA
		ANDHERI	Nov-13	95.75%	96.3%	96.86%	91.10%	97.1%	97.16%	96.18%	96.58%	NA	NA
		WORLI	Nov-13	96.10%	96.9%	96.23%	90.70%	94.9%	96.44%	96.14%	96.31%	NA	NA
Service Coverage													
4	In door (>= - 75dBm)	CHEMBUR	Nov-13	94.08%	98.2%	69.74%	94.98%	61.5%	96.42%	74.04%	65.61%	93.57%	99.85%
		ANDHERI	Nov-13	88.73%	91.3%	71.83%	98.67%	67.5%	97.95%	63.60%	82.96%	99.47%	100.0%
		WORLI	Nov-13	85.82%	89.9%	50.81%	97.98%	55.8%	93.79%	54.11%	80.71%	97.51%	98.80%
	In-vehicle (>= - 85dBm)	CHEMBUR	Nov-13	98.88%	99.7%	90.67%	99.33%	88.4%	99.76%	98.18%	91.53%	98.47%	100.0%
		ANDHERI	Nov-13	98.77%	99.6%	99.33%	99.99%	94.2%	99.93%	96.53%	98.54%	100.0%	100.0%
		WORLI	Nov-13	96.81%	98.9%	61.78%	98.99%	86.6%	98.73%	94.59%	98.36%	100.0%	100.0%
	Outdoor- in city (>= - 95dBm)	CHEMBUR	Nov-13	100.0%	99.9%	92.20%	100.0%	96.2%	100.0%	100.0%	100.0%	100.0%	100.0%
		ANDHERI	Nov-13	100.0%	99.9%	100.0%	100.0%	99.7%	100.0%	100.0%	100.0%	100.0%	100.0%
		WORLI	Nov-13	100.0%	99.7%	62.26%	100.0%	97.8%	100.0%	100.0%	100.0%	100.0%	100.0%
5	Call Setup Success Rate (>=95%)	CHEMBUR	Nov-13	100.0%	99.8%	98.46%	100.0%	98.7%	100.0%	96.08%	100.0%	100.0%	100.0%
		ANDHERI	Nov-13	100.0%	99.6%	98.46%	100.0%	98.7%	98.41%	98.43%	100.0%	100.0%	100.0%
		WORLI	Nov-13	100.0%	96.9%	100.0%	99.15%	97.6%	99.22%	96.92%	100.0%	100.0%	99.04%

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



DRIVE TEST TABLE: 3

Operator-Assisted Drive Test-Mumbai Metro Circle-Dec-13 Month													
S/N	Parameter	City Name	Drive Test Period	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators									CDMA Operator
1	Blocked Call Rate (<=3%)	BANDRA	Dec-13	2.04%	0.92%	0.88%	0.95%	0.72%	3.00%	0.91%	0.89%	0.00%	0.00%
		GHATKOPAR	Dec-13	0.00%	0.00%	0.89%	0.00%	1.64%	0.00%	2.50%	0.00%	1.65%	0.01%
		BORIVALI	Dec-13	0.00%	0.00%	0.00%	0.98%	0.00%	1.01%	0.99%	0.00%	0.00%	0.00%
2	Dropped Call Rate (<=2%)	BANDRA	Dec-13	0.00%	0.93%	4.46%	0.96%	1.46%	0.00%	0.00%	0.00%	0.00%	0.00%
		GHATKOPAR	Dec-13	0.00%	0.00%	0.90%	0.93%	0.00%	0.00%	2.50%	0.00%	0.00%	0.00%
		BORIVALI	Dec-13	0.00%	0.00%	1.12%	3.06%	0.00%	0.00%	0.00%	0.00%	1.05%	0.00%
Percentage connections with good voice quality (=>95%)													
3	(a) 0-4 (w/o frequency hopping for CDMA Operators)	BANDRA	Dec-13	NA	NA	NA	NA	NA	NA	NA	NA	98.60%	96.17%
		GHATKOPAR	Dec-13	NA	NA	NA	NA	NA	NA	NA	NA	98.69%	96.04%
		BORIVALI	Dec-13	NA	NA	NA	NA	NA	NA	NA	NA	98.12%	96.05%
	(b) 0-5 (with frequency hopping for GSM Operators)	BANDRA	Dec-13	95.32%	95.46%	93.78%	91.90%	97.14%	97.14%	94.67%	96.91%	NA	NA
		GHATKOPAR	Dec-13	94.42%	95.21%	96.30%	87.80%	96.35%	97.00%	90.91%	96.92%	NA	NA
		BORIVALI	Dec-13	93.62%	95.15%	95.33%	90.30%	96.58%	97.00%	93.58%	95.75%	NA	NA
Service Coverage													
4	In door (>= - 75dBm)	BANDRA	Dec-13	80.29%	84.88%	69.89%	96.49%	72.24%	97.18%	68.2%	75.52%	86.55%	98.78%
		GHATKOPAR	Dec-13	85.87%	87.37%	69.74%	99.29%	72.95%	96.10%	73.6%	82.88%	97.24%	99.95%
		BORIVALI	Dec-13	86.82%	92.95%	55.85%	98.99%	85.42%	97.19%	86.7%	92.41%	97.31%	99.96%
	In-vehicle (>= - 85dBm)	BANDRA	Dec-13	95.71%	98.14%	96.97%	99.96%	94.04%	99.13%	94.9%	94.23%	96.84%	100.0%
		GHATKOPAR	Dec-13	97.67%	98.36%	98.25%	100.0%	94.88%	99.03%	94.9%	98.50%	100.0%	100.0%
		BORIVALI	Dec-13	97.44%	98.90%	74.05%	99.99%	98.99%	99.30%	98.5%	99.53%	100.0%	100.0%
	Outdoor- in city (>= - 95dBm)	BANDRA	Dec-13	99.83%	99.81%	99.98%	100.0%	99.40%	100.0%	99.6%	100.0%	100.0%	100.0%
		GHATKOPAR	Dec-13	99.82%	99.77%	99.75%	100.0%	99.59%	100.0%	99.7%	100.0%	100.0%	100.0%
		BORIVALI	Dec-13	100.00%	99.82%	76.28%	100.0%	100.00%	99.99%	100.0%	100.0%	100.0%	100.0%
5	Call Setup Success Rate (>=95%)	BANDRA	Dec-13	97.96%	99.07%	99.12%	99.05%	99.28%	97.14%	99.1%	98.97%	100.0%	100.0%
		GHATKOPAR	Dec-13	100.00%	100.00%	99.11%	100.00%	98.36%	100.00%	97.50%	100.00%	98.35%	99.02%
		BORIVALI	Dec-13	100.00%	100.00%	100.00%	96.08%	100.00%	98.98%	99.01%	100.00%	100.00%	100.00%



DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 4

Drive Test Mumbai Metro Circle Oct-13 to Dec-13					
Month/Year	City	P1	P2	Across	Congested
Oct-13	KALYAN	Kalyan To Dombivali Shilphata Midc	Shilphata Dombivali To Kalyan	Kalyan, Murbad	Old Agra Rd, Kalyan
	THANE	Jvlr, Powai, Bhandup Eeh & Thane	Thane To Borivali Via Powai, Jvlr	Borivali National Park To Jogeshwari	Thane- Mandpada, Balkum, Hiranandani
	NAVI MUMBAI	Palm Beach Road	Airoli- Koparkhairane- Turbhe	Nerul, Sanpada & Belapur	Turbhe To Kharghar
Nov-13	CHEMBUR	Matunga To Priyadarshani	Mankurd To Matunga	Within Chembur	Trombay
	ANDHERI	Sahar Roadto Jvlr	L&T To Sahar Road	Lokhandwala To Juhu Circle	Andheri West To Seepz
	WORLI	Matunga East To Mahalaxmi	Elphiston To King Circle	Worli Police Camp To Worli Police Depot	Within Lower Parel
Dec-13	Bandra	Bkc Mtnl Karter Road	Khar Exchange To Ville Parle East	Bandra To Parlla East	Ville Parle East
	Ghatkopar	Kannamwar Nagar	Ghatkopar Lbs Road	Nahur East	Vikroli To Ghatkopar
	Borivali	National Park To Ic Colony	Ic Colony To Mahavir	Shimploi	Shimpoli To Mahaveer



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

- (i) **In the Month of October-13**, drive tests were conducted across Kalyan, Thane and Navi Mumbai. MTNL failed to meet the benchmarks of parameters Call Drop Rate and Voice Quality in all the three Metro areas. Loop Mobile, Idea and RCOM also could not meet the benchmarks of parameter Good Voice quality. The performance of **MTNL** for parameter Call Drop rate was **6.00%** (Kalyan), **12.98 %** (Thane) and **9.28%** (Navi Mumbai) and for parameter Voice Quality was **94.59%** (Kalyan), **89.01%** (Thane) and **86.71%** (Navi Mumbai). The performance of **Idea** for parameter Voice quality was recorded as **92.40%** (Kalyan), **90.48%** (Thane) and **88.50%** (Navi Mumbai). The achievement level of **Loop Mobile** for the same parameter was **94.63%** (Thane) & **94.53%** (Navi Mumbai), whereas for **RCOM (GSM)** achieved level of Voice Quality was **86.69%** (Kalyan).
- (ii) **In the Month of November-13**, drive tests were conducted across Chembur, Andheri and Worli areas. RCOM (CDMA) failed to meet the benchmark of the parameter Dropped call rate with performance level of **2.27%** in Chembur area. In case of parameter Voice Quality, **Idea** failed to meet the benchmark in all the three metro areas with performance level of Idea as **89.90%** (Chembur), **91.10%** (Andheri) and **90.70%** (Worli), while RCOM (GSM) failed to meet the benchmark of Voice Quality with performance level of **94.97%** in Worli area.
- (iii) **In the month of December-13**, drive tests were conducted across Bandra, Ghatkopar and Borivali areas. **MTNL, Idea and Loop mobile** could not meet the benchmark of Call Drop Rate with their performance as **4.46%** (Bandra), **3.06%** (Borivali) and **2.50%** (Ghatkopar) respectively. In respect of parameter Voice Quality , performance of **Airtel, Idea and Loop Mobile** was recorded below the benchmark with performance level of **Airtel** as **94.42%** (Ghatkopar) and **93.62%** (Borivali), of **Idea** as **91.90%**(Bandra), **87.80%** (Ghatkopar) and **90.30%** (Borivali) and that of **Loop Mobile** as **94.67%** (Bandra), **90.91** (Ghatkopar) and **93.58%** (Borivali). **MTNL** also failed to meet the benchmark of the same parameter with performance level as **93.78%** across Bandra.

5.2 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.



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

(i) From months audit & 3 days live findings, it can be concluded that on an average, performance of the operators in the Mumbai Metro Service area is satisfactory for **Network Parameters** except for one parameter namely '**Connection with Good Voice Quality**' which could not be met by Tata (CDMA) with its performance as 89.96 % in the month of November-13. In case of live measurements during October-2013, Vodafone could not meet the benchmark of parameter '**Worst affected cells > 3% TCH drop**'. Its performance for this parameter was 3.38% against the benchmark of 3%.

(ii) With regard to the **Customer Service Quality Parameters**, it is revealed that the parameters namely 'Metering and Billing Credibility, Response Time to Customers, Termination of Service and Time taken for refunds' have not been met by some of the operators. All operators except MTNL, have 100 % resolved the billing complaints within stipulated period of 4 weeks. Only MTNL could not meet the benchmark with its achievement of 98.88 %, marginally below the benchmark of 100%.

Aircel and RCOM (GSM) have not met the benchmark for the parameter '%age calls answered by operator (Voice to Voice)'. They have achieved their performance as 84% and 89.42% respectively. In case of parameter '% of termination/closure within 7days' also, only two operators namely Aircel and MTNL were not found to have settled 100 % closure/termination within 7 days. Their performance with respect to this parameter was 98.40 % and 99.75 % respectively.

(iii) The performance of the service providers with regard to the **drive test**, the performance of MTNL, Idea, Loop Mobile, Airtel and RCOM remained **unsatisfactory** for prime network parameters namely Call Drop Rate and Voice Quality in different areas where the drive test was conducted in the month of October, November and December 2013. The bench mark of Call Drop rate could not be met by MTNL across Kalyan (6.00%), Thane (12.98%), Navi Mumbai (9.28%), and Bandra (4.45%), by RCOM (CDMA) across Chembur (2.27%), by Idea across Borivali (3.06%) and by Loop Mobile across Ghatkopar (2.50%).

In case of (Voice Quality), the performance of Idea Cellular was lagging behind the benchmark in all the areas where drive test was conducted followed by MTNL, Loop and Airtel. The performance level of Idea cellular was recorded as 92.40 % (Kalyan), 90.48 % (Thane), 88.50 % (Navi Mumbai), 89.90% (Chembur), 91.10% (Andheri), 90.70% (Worli), 91.90% (Bandra), 87.80% (Ghatkopar) and 90.30% (Borivali). The achievement level of MTNL was 94.59 % (Kalyan), 89.01% (Thane), 86.71% (Navi Mumbai), and 93.71% (Bandra). In case of Loop Mobile, the performance level was 94.67% (Bandra), 90.91% (Ghatkopar) and 93.58% (Borivali). The performance of RCOM (GSM) was 86.69% (Kalyan), 94.97% (Worli) and that of Airtel, it was 94.42 % (Ghatkopar) and 93.62% (Borivali).

Thus, based on the analysis of the drive test results, it is concluded that the networks of MTNL, Idea cellular, Loop Mobile, Airtel and RCOM need improvements with regard to the parameters call drop rate and voice quality.



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

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Mumbai Metro Circle- Oct-13 month

S/N	Name of Parameter	Bench- mark	Audit Period	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	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		Oct-13	3846	1937	955	3009	2326	2608	2074	3868	889	713
	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	35.03	603.45	4983	959	2900	119.91	190	1.57	1199	57.46
	c) BTS Accumulated Downtime	<=2%	Oct-13	0.00%	0.04%	0.67%	0.04%	0.17 %	0.04%	0.00%	0.00%	0.18%	0.09%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Oct-13	0	0	1	4	3	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Oct-13	0.00%	0.00%	0.05%	0.13%	0.13%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Oct-13	99.99%	98.11%	97.78%	98.21%	99.73%	99.58%	99.17%	99.46%	98.84%	98.95%
	b) SDCCH/PAGING Congestion	<=1%	Oct-13	0.00%	0.08%	0.50%	0.41%	0.04%	0.07%	0.03%	0.04%	0.00%	0.00%
	c) TCH congestion	<=2%	Oct-13	0.00%	0.16%	0.04%	1.11%	0.04%	0.15%	0.02%	0.54%	0.01%	0.03%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Oct-13	0.31%	0.86%	1.30%	1.90%	0.36%	0.51%	0.62%	0.86%	0.41%	0.69%
	b) Worst affected cells>3% TCH drop	<=3%	Oct-13	0.00%	1.90%	2.30%	2.87%	0.07%	1.95%	0.78%	2.56%	0.19%	0.88%

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	c) % of connections with good voice quality	>=95%	Oct-13	99.97%	97.97%	96.08%	98.32%	99.15%	98.79%	98.06%	97.27%	99.79%	98.98%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Oct-13	0	107	61	247	5	140	47	244	5	23
	e) Total no. of cells (Sector) in the licensed service area		Oct-13	9747	5624	2655	8599	6978	7166	5984	9520	2667	2629
No. of POI's having >=0.5% POI congestion													
4	No. of POI's having >=0.5% POI congestion		Oct-13	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Oct-13	0	0	0	0	0	0	0	0	0	0
Network Data													
5	a) Equipped Capacity of Network in Erlang		Oct-13	189018.5	66629.2	89200	114415.9	72000	108079	157817.8	243869	168000	323367
	b) Total traffic in TCBH in erlang (Avg.)		Oct-13	110222.5	30785.4	13934	90164	65351.2	47428.7	52019	188154.7	117430.5	51104
	c) Total no. of customers served (as per VLR) on last day of the month		Oct-13	3803279	1018727	741702	2867910	2677397	NP	1399502	6368727	3006009	NP

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TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Mumbai Metro Circle- Oct-13 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Live data	3845	1937	995	3004	2334	2596	2074	3818	888	975
	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	19.29	27.97	580.22	84.53	44	25.21	24	2.43	17.33	9.46
	c) BTS Accumulated Downtime	<=2%	Live data	0.01%	0.02%	0.80%	0.04%	0.08%	1.34%	0.05%	0.00 %	0.08%	1.42%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	0	0	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00 %	0.00%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.99%	98.07%	98.18%	98.87%	99.73%	99.56%	99.29%	99.45%	98.83%	98.88%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.07%	0.12%	0.52%	0.02%	0.08%	0.01%	0.08%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.00%	0.19%	0.01%	0.90%	0.04%	0.15%	0.02%	0.55 %	0.93%	0.10%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.31%	0.88%	1.28%	1.87%	0.36%	0.80%	0.68%	0.86 %	0.41%	0.67%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	0.00%	2.79%	2.15%	2.85%	0.01%	1.68%	0.75%	3.38%	0.04%	1.23%
	c) % of connections with good voice quality	>=95%	Live data	99.97%	97.97%	96.82%	98.63%	99.15%	98.38%	98.12%	97.27%	99.79%	98.95%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	0	157	57	246	1	120	45	318	1	12
e) Total no. of cells (Sector) in the licensed service area		Live data	9709	5624	2655	8616	6282	7136	6011	9432	2636	2639	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0

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TABLE: 3

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Mumbai Metro Circle- Nov-13 month													
S/N	Name of Parameter	Bench- mark	Audit Period	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Nov-13	3834	1940	995	3032	2325	2621	2083	3930	891	970
	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	39.2	477.77	4173	731	2256	71.19	146.2	65.4	970	104.38
	c) BTS Accumulated Downtime	<=2%	Nov-13	0.00%	0.03%	0.58%	0.03%	0.14%	0.04%	0.01%	0.00%	0.15%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Nov-13	0	0	18	3	0	0	0	0	0	0
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95 %	Nov-13	99.99%	98.25%	97.74%	98.25%	99.53%	99.57%	99.29%	99.49%	99.07%	98.96%
	b) SDCCH/PAGING Congestion	<=1%	Nov-13	0.00%	0.10%	0.30%	0.43%	0.02%	0.07%	0.06%	0.05%	0.00%	0.00%
	c) TCH congestion	<=2%	Nov-13	0.00%	0.18%	0.06%	1.02%	0.04%	0.16%	0.04%	0.51%	0.00%	0.04%
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Nov-13	0.31%	0.79%	1.25%	1.87%	0.34%	0.66%	0.62%	0.83%	0.38%	0.64%
	b) Worst affected cells>3% TCH drop	<=3%	Nov-13	0.00%	1.54%	2.38%	2.88%	0.03%	1.47%	0.77%	2.54%	0.07%	1.33%
	c) % of connections with good voice quality	>=95%	Nov-13	99.97%	97.99%	96.90%	98.19%	99.16%	98.58%	98.10%	97.43%	99.79%	89.96%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Nov-13	0	87	63	251	2	105	46	343	2	35
	e) Total no. of cells (Sector) in the licensed service area		Nov-13	9768	5633	2655	8683	6280	7178	6010	9563	2679	2615

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No. of POI's having $\geq 0.5\%$ POI congestion													
4	No. of POI's having $\geq 0.5\%$ POI congestion		Nov-13	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Nov-13	0	0	0	0	0	0	0	0	0	0
Network Data													
5	a) Equipped Capacity of Network in Erlang		Nov-13	187290.7	66546.1	1730755.5	115081.2	NP	108138	148000.6	243869	NP	321645
	b) Total traffic in TCBH in erlang (Avg.)		Nov-13	105781.6	29935.4	15145.9	88845.9	NP	46726.4	49886	188154.7	NP	47418.7
	c) Total no. of customers served (as per VLR) on last day of the month		Nov-13	3758819	1030954	802729	2868630	NP	NP	1382198	6368727	NP	NP

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TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Mumbai Metro Circle- Nov-13 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Live data	3848	1940	995	3010	2326	2608	2074	3868	889	967
	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	9.5	60.42	455	59	122	2.22	1.45	1.83	50	2.18
	c) BTS Accumulated Downtime	<=2%	Live data	0.00%	0.04%	0.63%	0.03%	0.07%	0.11%	0.00%	1.83%	0.01%	0.28%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	1	0	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.99%	98.08%	98.06%	98.11%	99.73%	99.55%	99.34%	99.50%	98.89%	99.04%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.20%	0.23%	0.29%	0.02%	0.05%	0.18%	0.02%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.00%	0.40%	0.10%	1.22%	0.04%	0.23%	0.02%	0.50%	0.01%	0.02%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.31%	0.81%	1.21%	1.83%	0.34%	0.66%	0.40%	0.90%	0.35%	0.63%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	0.00%	2.49%	2.35%	2.89%	0.00%	1.65%	0.69%	2.50%	0.04%	2.65%
	c) % of connections with good voice quality	>=95%	Live data	99.97%	98.00%	96.80%	98.19%	99.16%	98.57%	98.10%	97.45%	99.79%	99.79%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	0	140	62	250	1	118	41	238	1	69
e) Total no. of cells (Sector) in the licensed service area		Live data	9721	5633	2655	8636	6978	7166	6006	9527	2636	2615	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0

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



TABLE: 5

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Mumbai Metro Circle- Dec-13 month													
S/N	Name of Parameter	Bench- mark	Audit Period	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Dec-13	3864	1941	993	3087	2330	2638	2086	3965	891	967
	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	44.3	323.4	4557.5	853	4323	151.6	144.5	43.67	2103	72.16
	c) BTS Accumulated Downtime	<=2%	Dec-13	0.00%	0.02%	0.64%	0.04%	0.26%	0.05%	0.01%	0.00%	0.33%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Dec-13	0	1	14	2	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Dec-13	0.00%	0.05%	1.41%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Dec-13	99.99%	98.22%	98.18%	98.21%	99.69%	99.59%	99.26%	99.53%	99.07%	98.97%
	b) SDCCH/PAGING Congestion	<=1%	Dec-13	0.00%	0.10%	0.21%	0.39%	0.04%	0.08%	0.03%	0.05%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-13	0.00%	0.16%	0.04%	1.03%	0.06%	0.15%	0.04%	0.47%	0.00%	0.02%
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Dec-13	0.31%	0.80%	1.20%	1.93%	0.38%	0.65%	0.62%	0.83%	0.38%	0.01%
	b) Worst affected cells>3% TCH drop	<=3%	Dec-13	0.00%	1.60%	2.39%	2.86%	0.02%	1.39%	0.74%	2.87%	0.07%	0.95%

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



	c) % of connections with good voice quality	>=95%	Dec-13	99.97%	98.00%	96.90%	98.16%	99.09%	98.56%	98.10%	97.49%	99.79%	99.09%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Dec-13	0	90	64	251	1	100	1330	278	2	25
	e) Total no. of cells (Sector) in the licensed service area		Dec-13	9840	5636	2655	8768	6316	7215	6027	9689	2673	2611
No. of POI's having >=0.5% POI congestion													
4	No. of POI's having >=0.5% POI congestion		Dec-13	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Dec-13	0	0	0	0	0	0	0	0	0	0
Network Data													
5	a) Equipped Capacity of Network in Erlang		Dec-13	188806.1	66798.8	1730755.5	116041.5	72000	108777	148047.8	256978.5	168000	321582
	b) Total traffic in TCBH in erlang (Avg.)		Dec-13	104838.7	31449.6	16022.10	92806.3	63691.9	47681	50569	184512.8	114284.9	47735
	c) Total no. of customers served (as per VLR) on last day of the month		Dec-13	3947174	1093908	NA	3078908	2762596	NA	1391873	6232460	3011504	NA

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



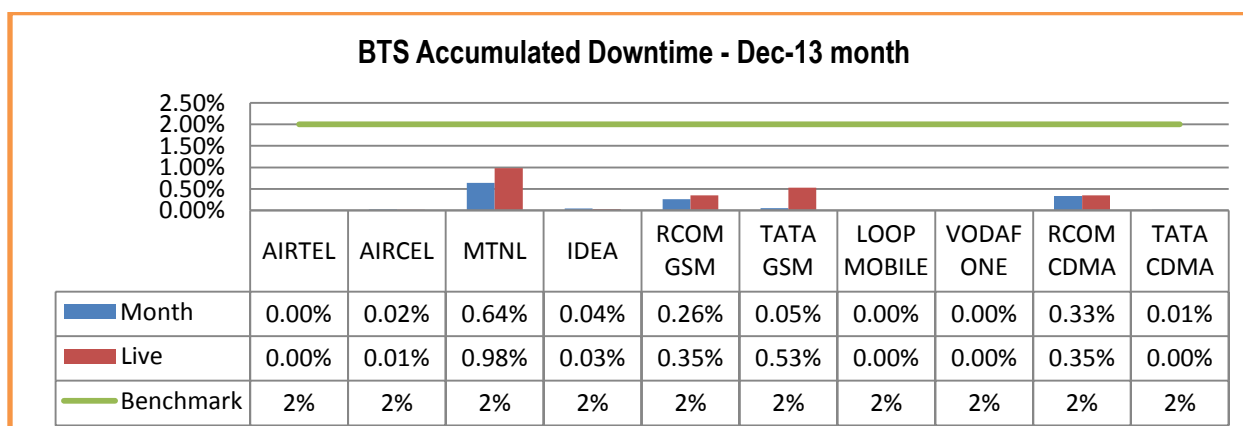
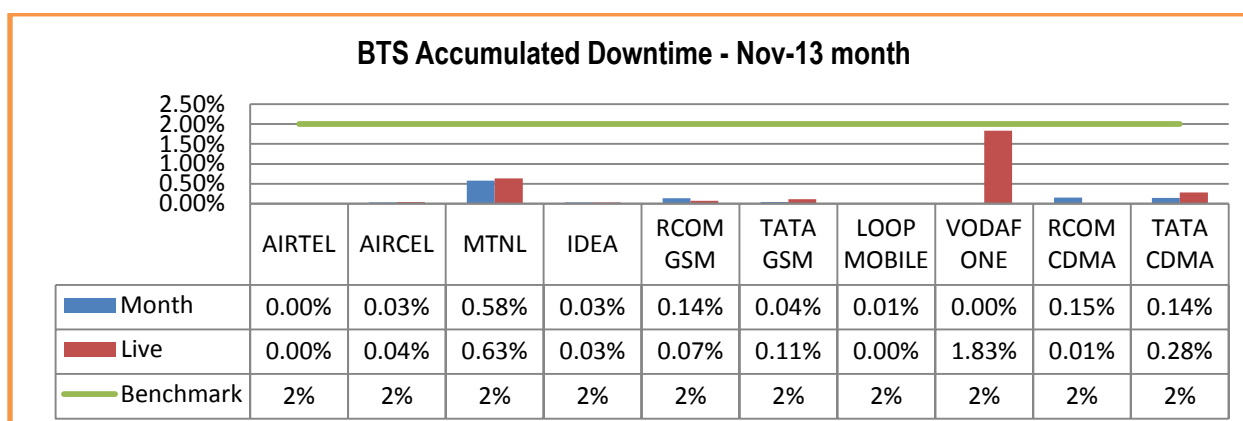
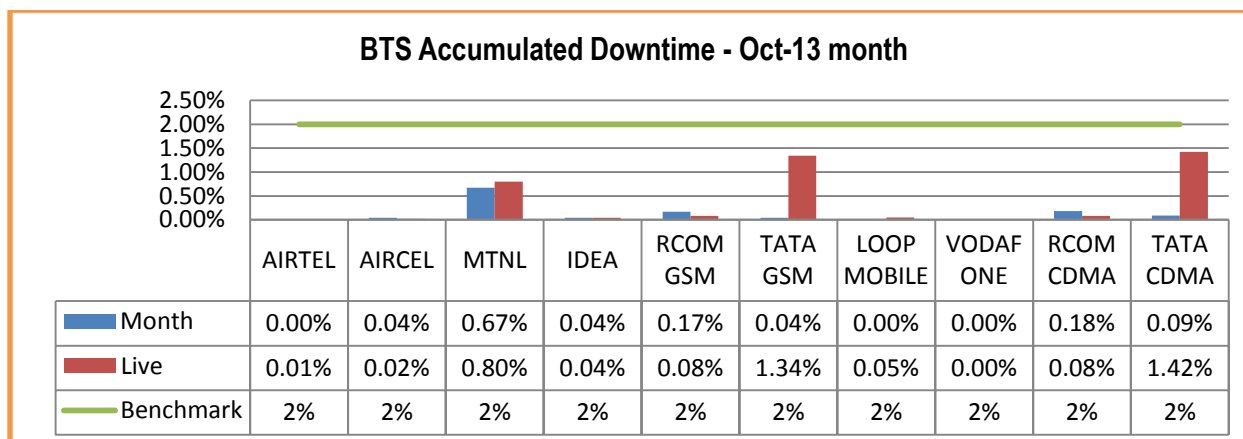
TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Mumbai Metro Circle- Dec-13 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRTEL	AIRCEL	MTNL	IDEA	RCOM GSM	TATA GSM	LOOP MOBILE	VODAFONE	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	3836	1940	995	3036	2331	2525	2083	3930	893	1901
	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	8.8	13.95	701	55.5	603	10.03	8.55	2.5	225	3.02
	c) BTS Accumulated Downtime	<=2%	Live data	0.00%	0.01%	0.98%	0.03%	0.35%	0.53%	0.00%	0.00%	0.35%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	2	0	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.99%	98.07%	98.32%	98.38%	99.72%	99.62%	99.24%	99.53%	99.12%	98.94%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.06%	0.14%	0.44%	0.02%	0.07%	0.02%	0.02%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.11%	0.01%	0.88%	0.05%	0.10%	0.07%	0.47%	0.00%	0.02%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.31%	0.81%	1.20%	1.90%	0.37%	0.67%	0.64%	0.83%	0.39%	0.64%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	0.00%	2.41%	2.57%	2.88%	0.00%	1.55%	0.82%	2.96%	0.00%	2.35%
	c) % of connections with good voice quality	>=95%	Live data	99.97%	98.00%	96.90%	98.16%	99.09%	98.58%	98.05%	97.48%	99.78%	99.06%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	0	136	68	251	0	111	49	282	0	61
	e) Total no. of cells (Sector) in the licensed service area		Live data	9767	5633	2655	8717	6255	7200	6017	9534	2619	2615
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	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0



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

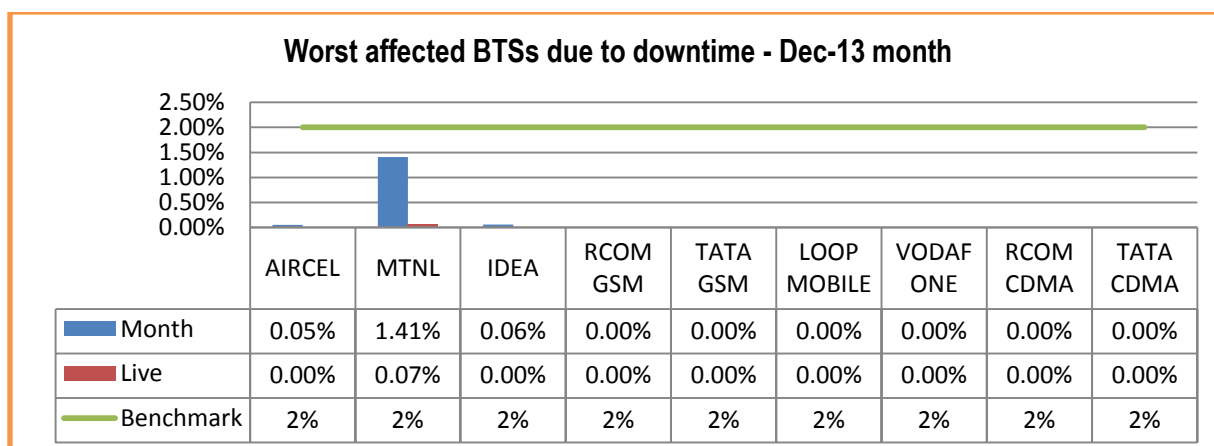
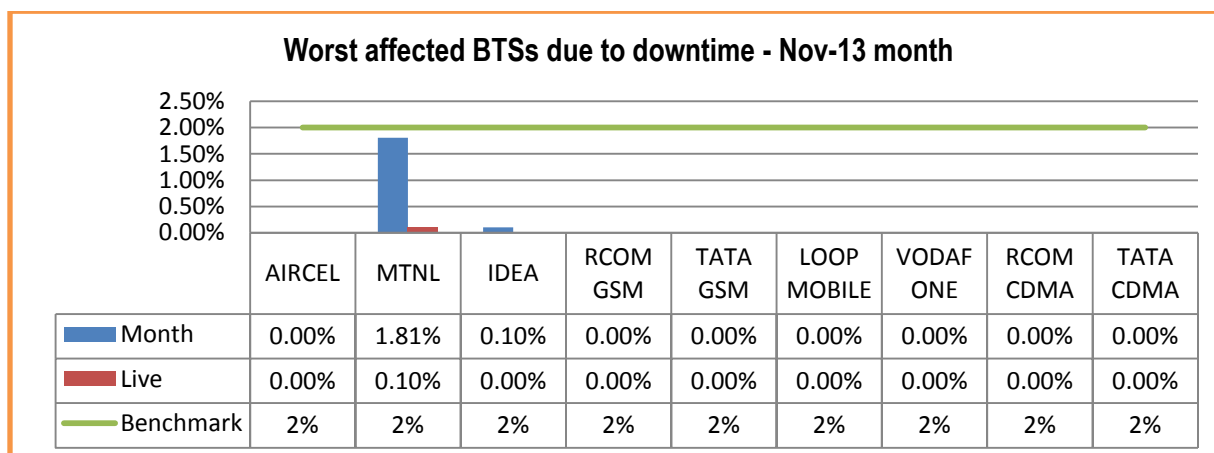
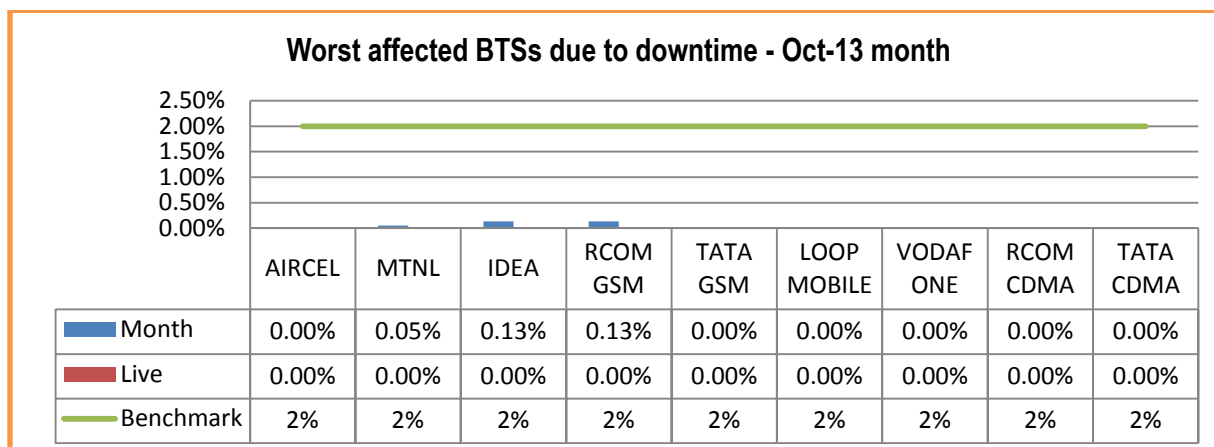
1) BTS ACCUMULATED DOWNTIME:



All operators are meeting the benchmarks for the parameter "BTS Accumulated down" Time for all the three months.



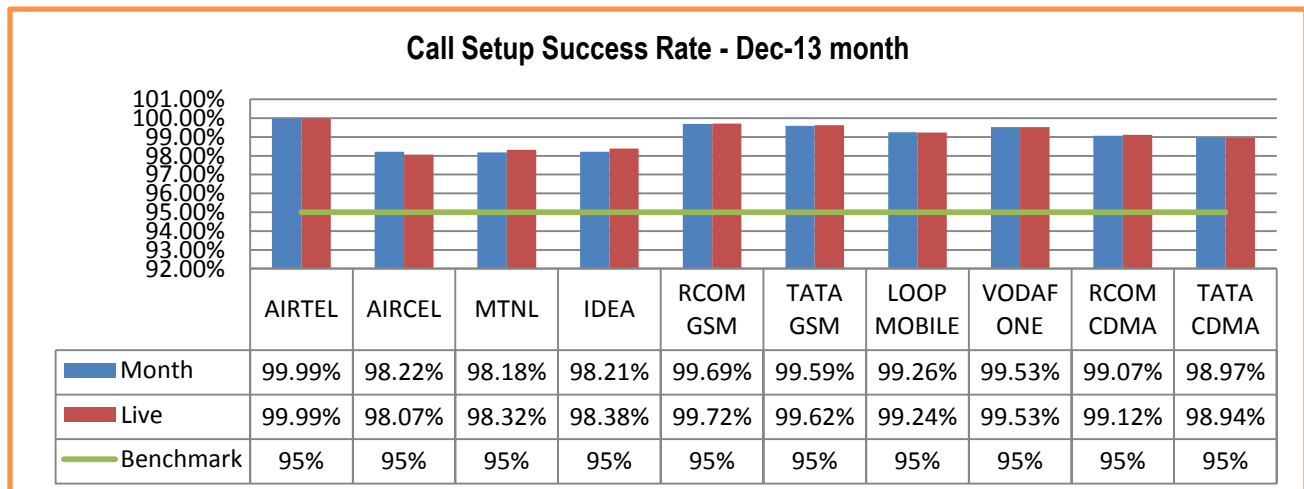
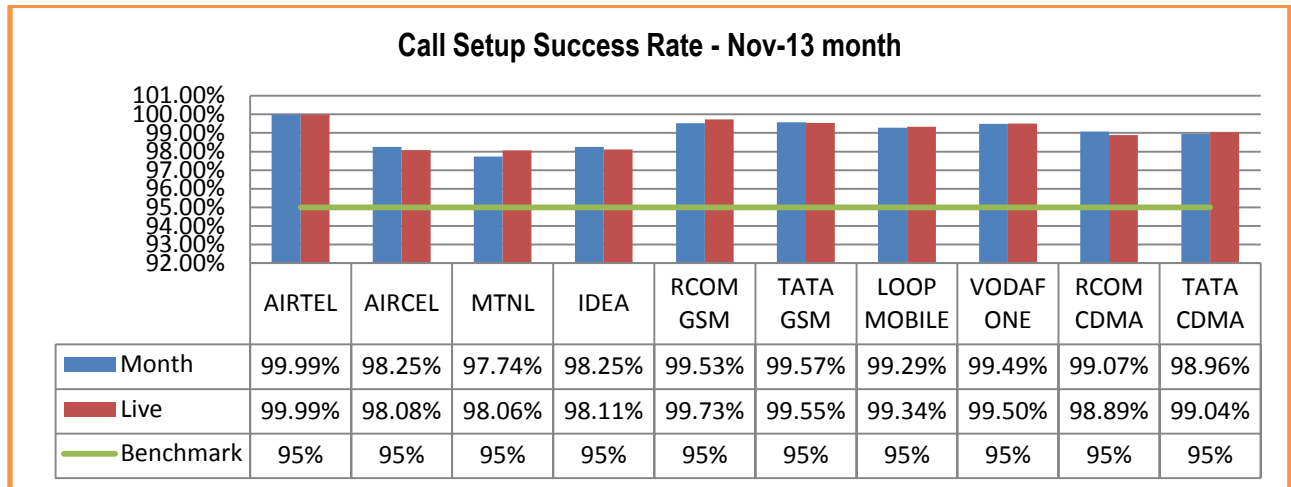
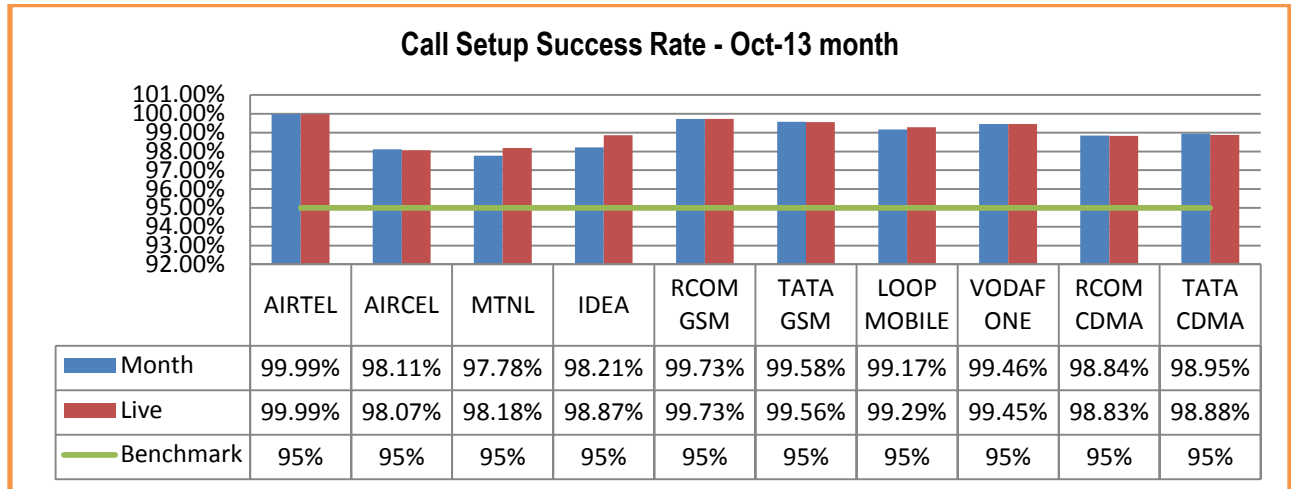
2) WORST AFFECTED BTSS DUE TO DOWNTIME:



All operators are meeting the benchmark of the parameter “Worst affected BTSs due to downtime” for all the three months.



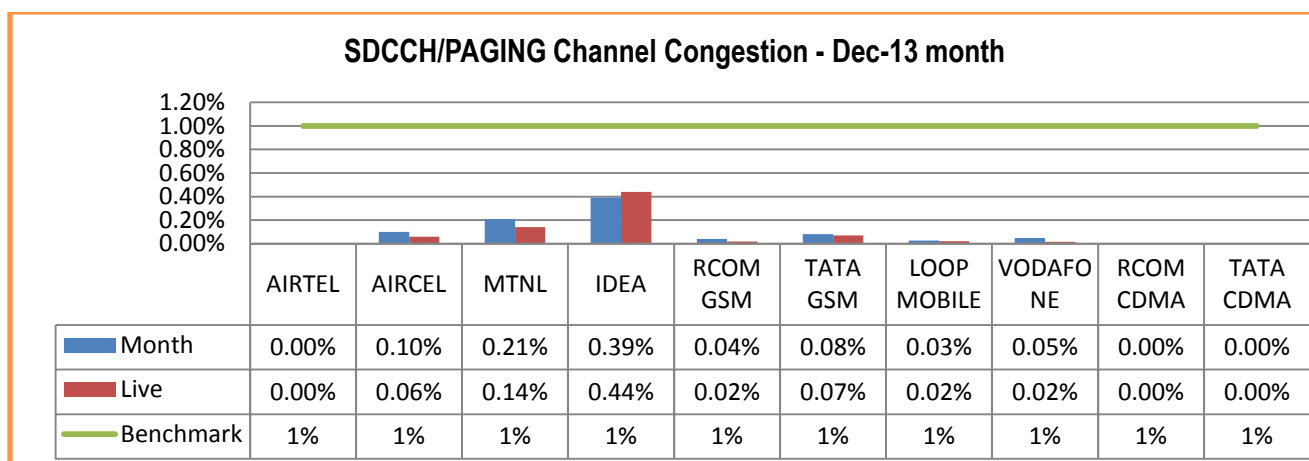
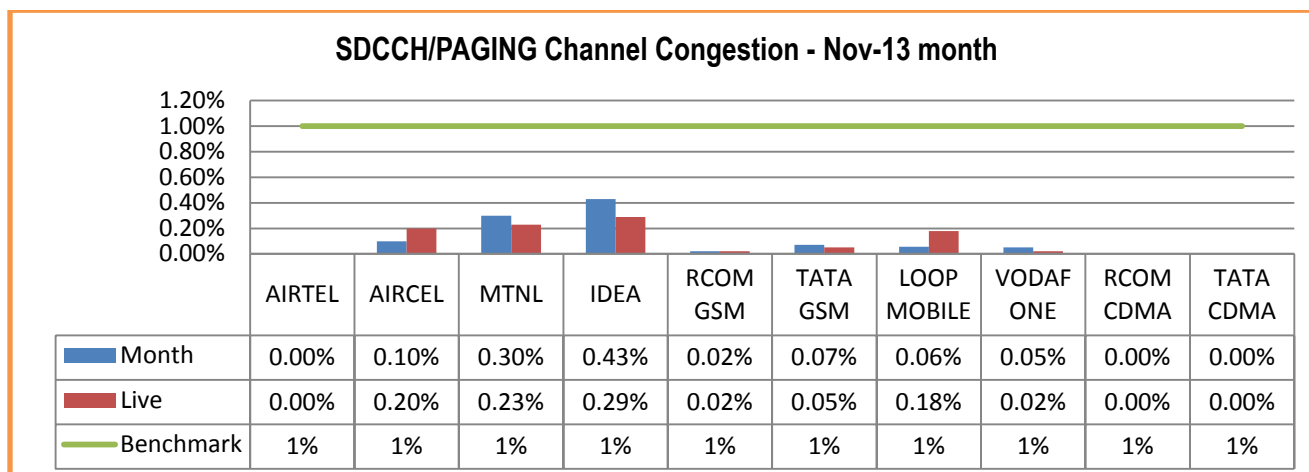
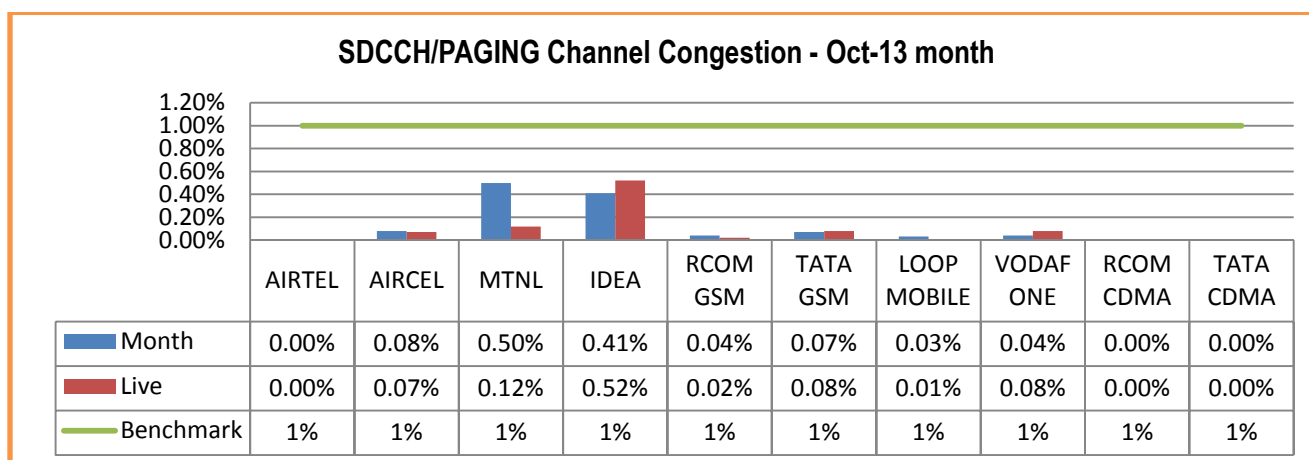
3) CALL SETUP SUCCESS RATE:



All operators are meeting the benchmarks.



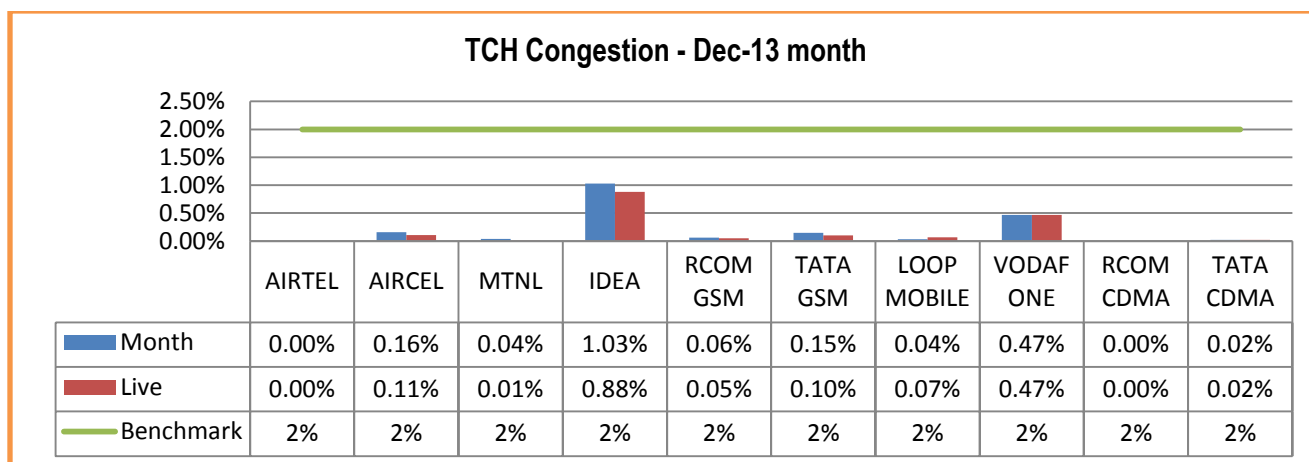
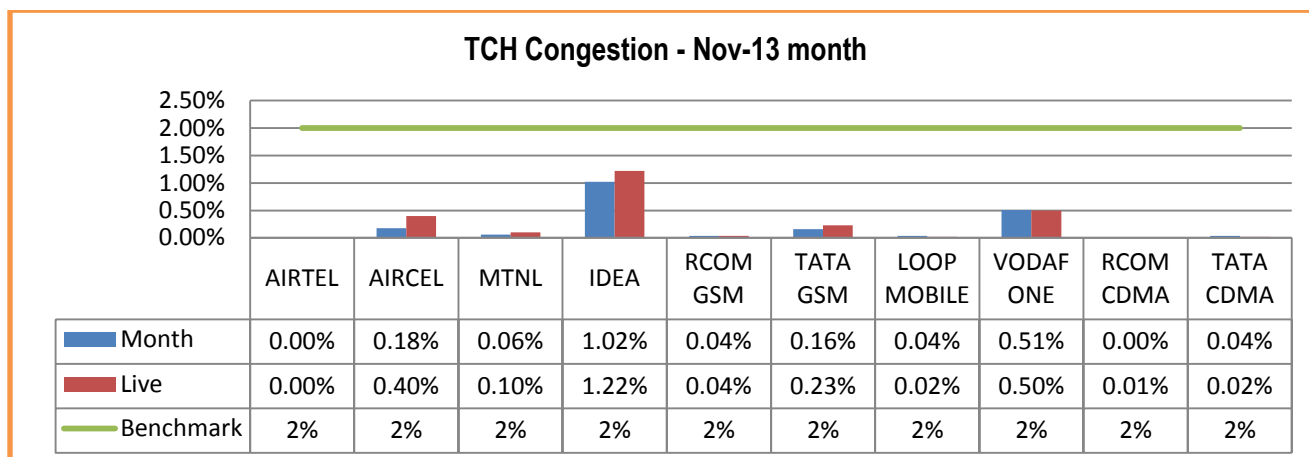
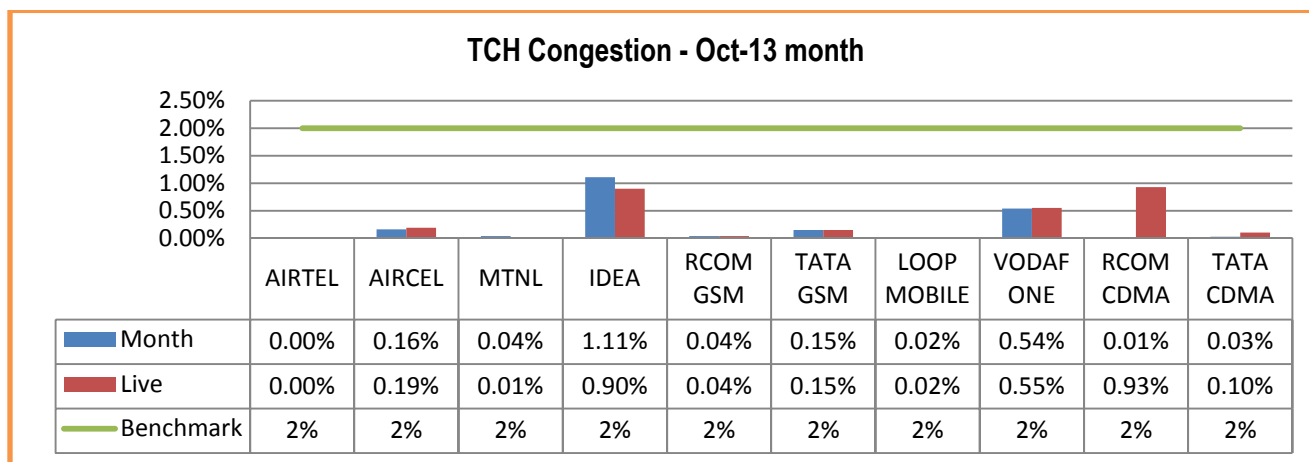
4) SDCCH/PAGING CHANNEL CONGESTION:



All operators are meeting the benchmarks.



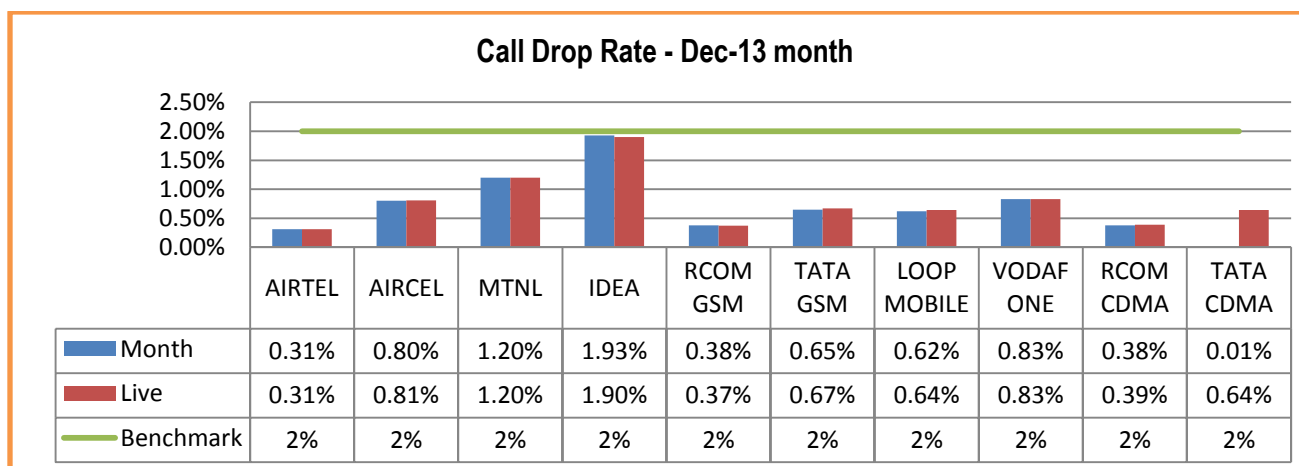
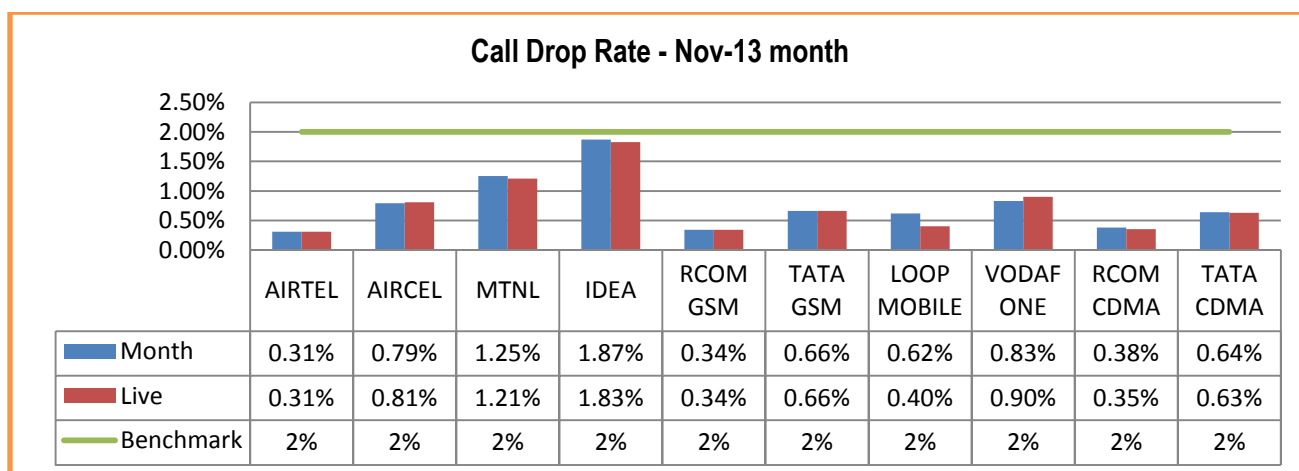
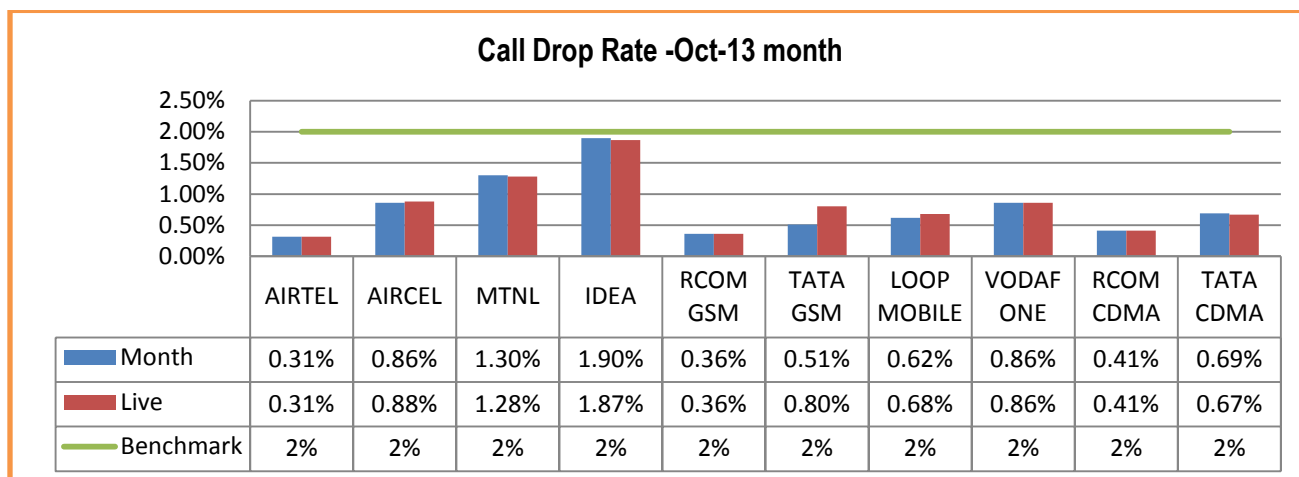
5) TCH CONGESTION:



All operators are meeting the benchmarks.



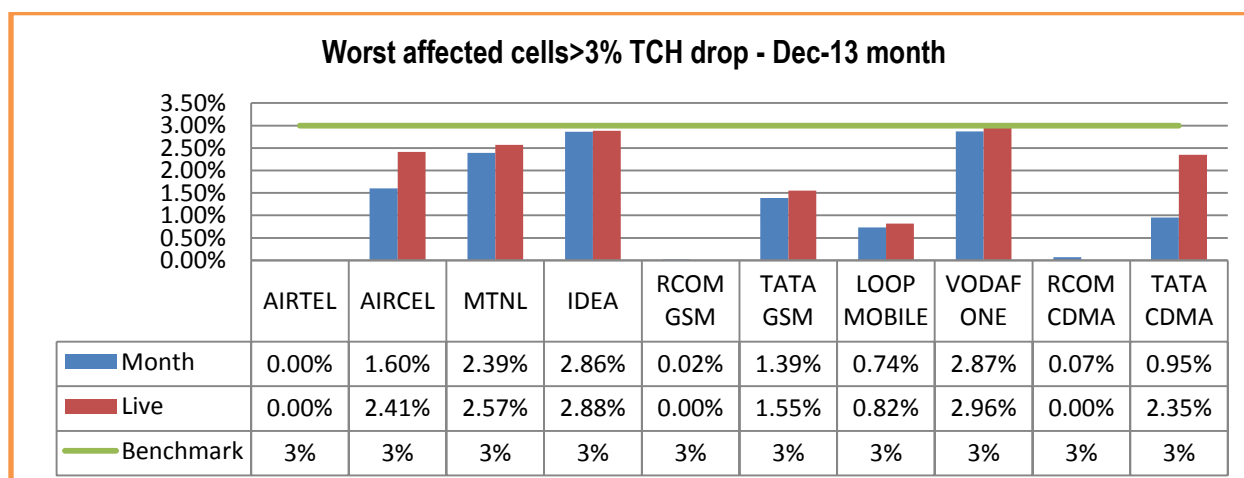
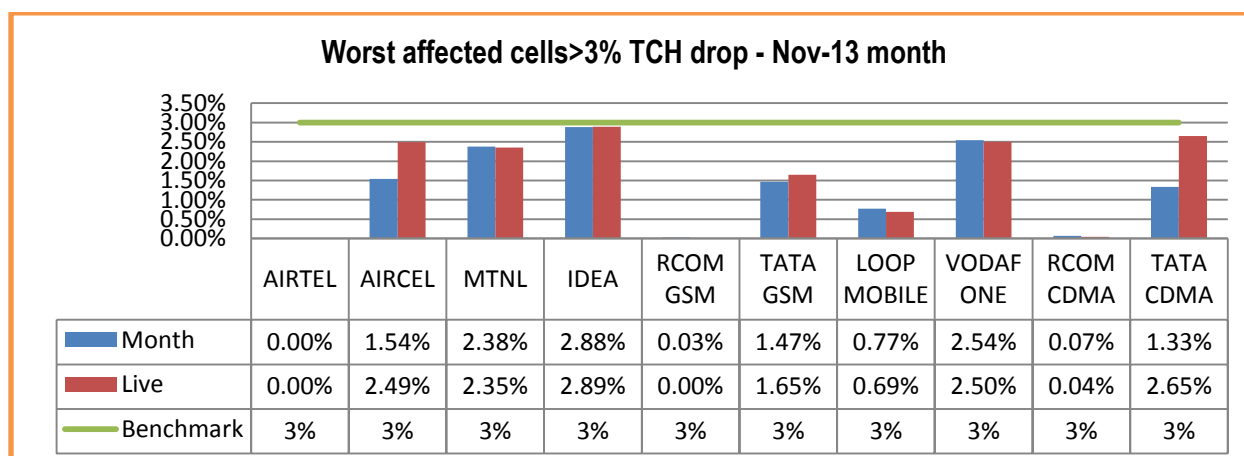
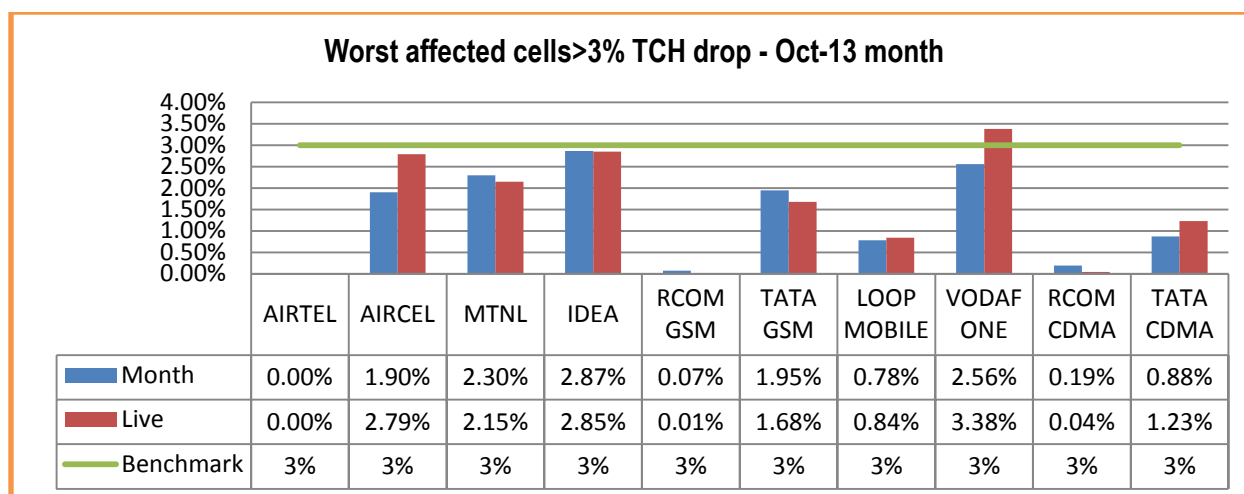
6) CALL DROP RATE:



All operators are meeting the benchmarks.



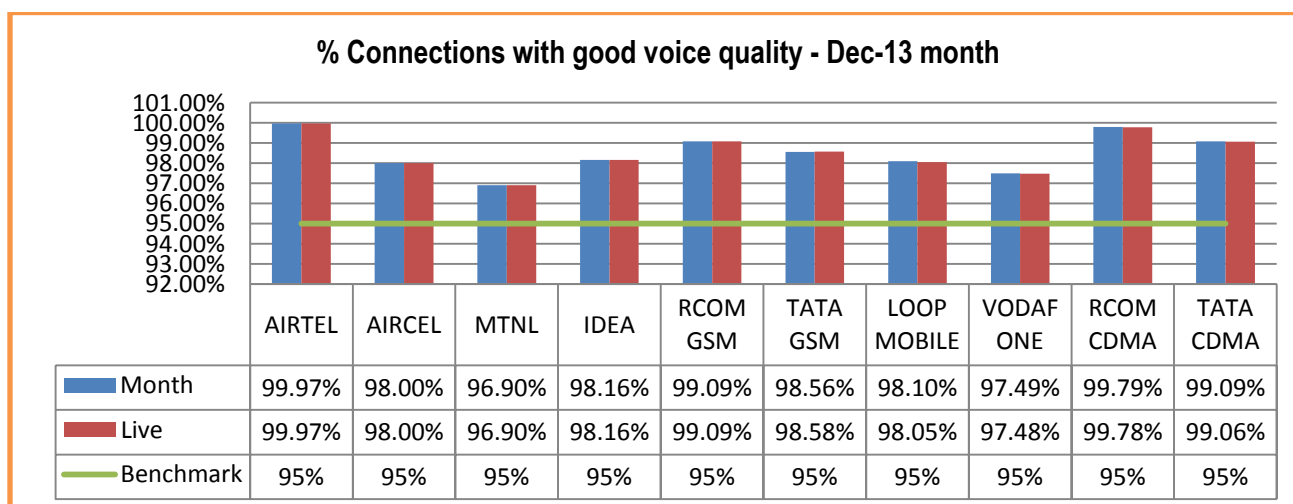
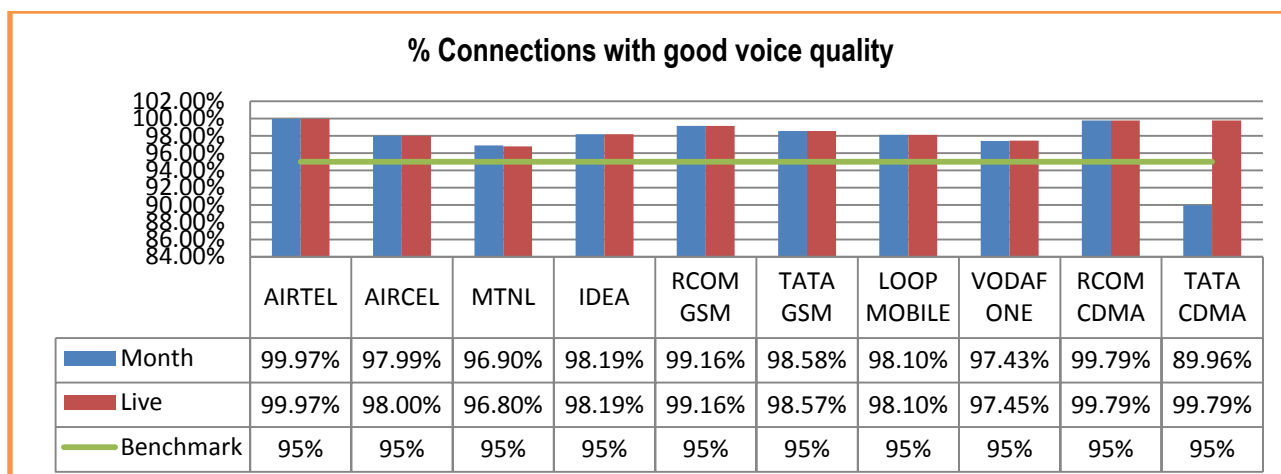
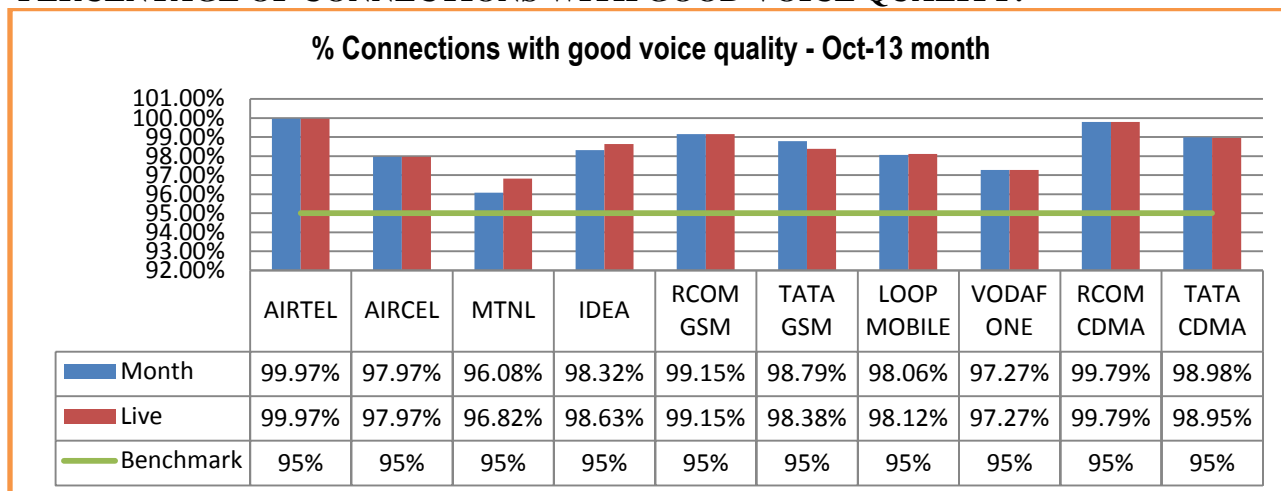
7) WORST AFFECTED CELLS>3% TCH DROP (OCT-13 MONTH):



Vodafone could not meet the benchmark during live measurements in the month of October- 2013.



8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:



All operators are meeting the benchmarks except Tata (CDMA) which could achieve 89.96% in the month of November 2013.



9. PMR VERIFICATION SHEET:

a) NETWORK RELATED PARAMETER:

Mumbai 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%
AIRTEL	Reported	0.00	0.00	99.99	0.00	0.00	0.31	0.00	99.97	0
	Verified	0.00%	0.00%	99.99%	0.00%	0.00%	0.31%	0.00%	99.97%	0
AIRCEL	Reported	0.03	0.02	98.19	0.09	0.17	0.82	1.68	97.99	0
	Verified	0.03%	0.02%	98.19%	0.09%	0.17%	0.82%	1.68%	97.99%	0
MTNL	Reported	0.63	1.58	97.90	0.35	0.05	1.25	2.36	96.86	0
	Verified	0.63%	1.09%	97.90%	0.34%	0.05%	1.25%	2.36%	96.63%	0
IDEA	Reported	0.04	0.10	98.22	0.41	1.05	1.90	2.87	98.22	0
	Verified	0.04%	0.10%	98.22%	0.41%	1.05%	1.90%	2.87%	98.22%	0
RCOM GSM	Reported	0.18	0.14	99.65	0.03	0.04	0.36	0.02	99.13	0
	Verified	0.19%	0.04%	99.65%	0.03%	0.05%	0.36%	0.04%	99.13%	0
TATA GSM	Reported	0.01	0.00	99.58	0.08	0.15	0.70	1.54	98.47	0
	Verified	0.04%	0.00%	99.58%	0.07%	0.15%	0.61%	1.60%	98.64%	0
LOOP MOBILE	Reported	0.01	0.00	99.19	0.04	0.04	0.63	0.76	98.09	0
	Verified	0.00%	0.00%	99.24%	0.04%	0.03%	0.62%	0.76%	98.09%	0
VODAFONE	Reported	0.00	0.00	99.49	0.05	0.51	0.84	2.66	97.40	0
	Verified	0.00%	0.00%	99.49%	0.05%	0.51%	0.84%	2.66%	97.40%	0
RCOM CDMA	Reported	0.21	0.04	98.99	0.00	0.01	0.39	0.07	99.79	0
	Verified	0.22%	0.00%	98.99%	0.00%	0.00%	0.39%	0.11%	99.79%	0
TATA CDMA	Reported	0.01	0.00	98.96	0.00	0.03	0.65	1.06	99.04	0
	Verified	0.08%	0.00%	98.96%	0.00%	0.03%	0.45%	1.05%	96.01%	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 matching with verified (audited) data. Hence there is no discrepancy between reported and verified data.



b) CUSTOMER SERVICE DELIVERY (CSD) RELATED PARAMETER:

Mumbai 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.
		≤ 0.1%	≤ 0.1%	100 % within 4 week	≤ 1 week	≥ 95%	≥ 90%	100% within ≤ 7 days	100% within 60 days
AIRTEL	Reported	0.02	0.00	100.00	100.00	100.00	94.00	100.00	100.00
	Verified	0.00%	0.00%	100%	100%	100%	94%	100%	100%
AIRCEL	Reported	0.00	0.00	100.00	100.00	99.51	82.91	100.00	100.00
	Verified	0.00%	0.00%	100%	100%	100%	84.00%	98.40%	100%
MTNL	Reported	0.03	0.01	100.00	100.00	95.91	95.91	100.00	100.00
	Verified	0.00%	0.00%	98.88%	100%	NP	95.62%	99.75%	100%
IDEA	Reported	0.06	0.02	100.00	100.00	99.36	97.59	100.00	100.00
	Verified	0.00%	0.02%	100%	100%	100%	98%	100%	100%
RCOM (GSM)	Reported	0.10	0.10	100.00	100.00	99.38	89.36	100.00	100.00
	Verified	0.00%	0.10%	100%	100%	99.37%	89.42%	100%	100%
TATA (GSM)	Reported	0.00	0.00	100.00	100.00	99.44	94.09	100.00	100.00
	Verified	0.00%	0.00%	100%	100%	100%	92.33%	100%	100%
LOOP MOBILE	Reported	0.00	0.01	100.00	100.00	99.34	99.01	100.00	100.00
	Verified	0.00%	0.00%	100%	100%	97.18%	99.01%	100%	100%
VODAFONE	Reported	0.06	0.01	100.00	100.00	99.91	95.10	100.00	100.00
	Verified	0.00%	0.01%	100%	100%	100%	95%	100%	100%
RCOM (CDMA)	Reported	0.10	0.07	100.00	100.00	99.44	93.41	100.00	100.00
	Verified	0.00%	0.07%	100%	100%	99.44%	93.41%	100%	100%
TATA (CDMA)	Reported	0.00	0.00	100.00	100.00	99.62	94.54	100.00	100.00
	Verified	0.00%	0.01%	100%	100%	100%	92.01%	100%	100%

- 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 “% call answered by operators (voice to voice) within 60 sec.” and “% of Termination/ Closure of service within 7 days”
- iv. MTNL has not met the benchmark for the parameter “% of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks” and “% of Termination/ Closure of service within 7 days”.
- v. RCOM GSM has not met the benchmark for the parameter “% call answered by operators (voice to voice) within 60 sec.”