



REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
FOR
TELECOM REGULATORY AUTHORITY OF INDIA
WEST ZONE – MAHARASHTRA & GOA SERVICE AREA
(APRIL 2014 – JUNE 2014)

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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 **Maharashtra & Goa circle** against the QoS bench marks laid down by TRAI in the respective regulations.

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1. BACKGROUND



1) BACKGROUND

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

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

- i) Create conditions for consumer satisfaction by making known the quality of service, which the Service provider is required to provide, and the user has a right to expect.
- ii) Measure the Quality of Service provided by the Service Providers from time to time and to compare them with the norms so as to assess the level of performance.
- iii) Generally protect the interests of consumers of telecommunication services.

TRAI, the regulatory watch dog for the Quality of Service for the telecom services – Basic (Wire line), Cellular Mobile (Wireless) and Broadband has commissioned **M/s TUV-SUD South Asia Pvt. Ltd.** for conducting audit and assessment of quality of service of service providers, in terms of the benchmarks specified in the “The Standards of Quality of Service of Basic Telephone Service (Wire line) and Cellular Mobile Telephone Service Regulations, 2009 (7 of 2009) dated 20th March, 2009 and the Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated 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



2) OBJECTIVES AND METHODOLOGY

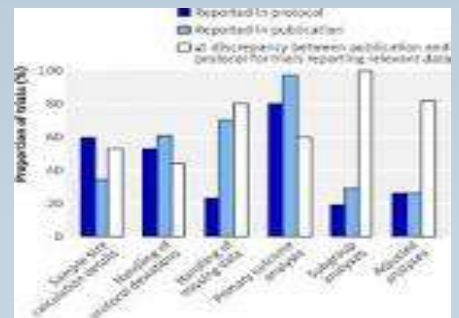
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

The audit and assessment of Quality of Service was carried out by **TUV SUD South Asia across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. Apart from this, QoS audit for Basic (Wire line) and Broadband Services was also undertaken for Punjab, Rajasthan & Gujarat circles during the quarter April – June 2014.**

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

- i) Preparation of Performance Monitoring reports (PMRs) and uploading in the system.
- ii) Live measurements of the performance of Service Providers (SPs) against the benchmarks for three days during each audit.
- iii) Monthly audit based on one month data of the SPs.
- iv) Drive test of the RF networks.
- v) Audit of the performance of call centers with respect to their accessibility and percentage of calls answered by the operators and random customer feedback by calling the customers to get feedback of the services provided by the service providers.
- vi) Transfer of data generated by the RF drive test/Live measurements / PMR/ monthly audit to the server located at TRAI premises on real time basis.

3. SAMPLE SIZE



3) SAMPLE SIZE

3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS.

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

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location
		April-14	May -14	June-14	
GSM Operators					
1	AIRCEL	7 to 9 April -14	7 to 9 May-14	8 to 10 June -14	Aircel Ltd. , Commer Zone, Building no-2,6 Floor,Yerwada Jail Road,Yerwada,Pune-1
2	AIRTEL	9 to 11 April- 14	5 to 7 May-14	4 to 6 June-14	7th Floor, Interface 7, Near IJMIMA Tower, Behind Infinity Mall, Malad (West), Mumbai-400064
3	BSNL	6 to 8 April-14	8 to 10 May -14	8 to 10 June-14	BSNL, O/O G.M. (Mobile) NWO-CM 2nd floor, Telephine Bhavan, Bajirao Road, Pune 411002
4	UNINOR	21 to 23 April-14	15 to 16, 19 May-14	9 to 11 June-14	Telewings Communications Services Pvt Ltd. (Uninor) Welldone Technology Park Sec-48 Sohana Road Gurgaon
5	TATA GSM	7 to 9 April -14	7 to 9 May-14	8 to 10 June -14	TATA Tel. Ltd., A1-Aqmar Building,5,Ganesh Kindh Road, Shivaji Nagar , Pune-5
6	IDEA	1 to 3 April -14	3 to 4 May-14	8 to 10 June -14	IDEA Cellulsr Ltd., 11-Sharda Center,Off Carve Road, Erandawane, Pune-4
7	RCOM GSM	17 to 19 April -14	12 to 14 May-14	6 to 7 June -14	Reliance Communications, 7th floor,Kumar cerebrum IT Park, B bldg, above standard chartered bank,near d-mart,kalyani nagar, Pune.
8	VODAFONE	15 to 17 April -14	13 to 15 May -14	7 to 9 June -14	Vodafone Cellular Limited, Metropolitan, Old Mumbai -Pune Highway, Wakdewadi, Shivajinagar, Pune 411003
CDMA Operators					
9	RCOM CDMA	17 to 19 April -14	12 to 14 May-14	6 to 7 June -14	Reliance Communication Limited, NH-1, VPO-Mohari, Kuruskhetra, Near Hasari Pouthry Farm, Milestone 188.
10	TATA CDMA	7 to 9 April -14	7 to 9 May-14	8 to 10 June -14	TATA Tel. Ltd., A1-Aqmar Building,5,Ganesh Kindh Road, Shivaji Nagar , Pune-5

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

The data generated by monthly PMR and 3-days live measurements audit for the period April 2014 to June 2014 has been successfully uploaded on the server located at TRAI premises.

3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES

- The QoS audit for basic (wire line) service was to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles. As per the clause 17.3 of the tender document, the QoS audit of Basis Telephone Service (Wireline) in a service area / circle is to be done only once in a year. **Since it has already been done during the QE December 2014, hence QoS audit of Wireline service in MH&G circle is not required to be done during QE June-14.**

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. As per the clause 17.3 of the tender document, the QoS audit of Broadband service in a service area / circle is to be done only once in a year. **Since it has already been done during the QE December 2014, hence QoS audit of broadband service in MH&G circle is not required to be done during QE June-14.**

4. EXECUTIVE SUMMARY



4) EXECUTIVE SUMMARY

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

- “Service provider performance report” for Cellular mobile, Basic (wire line) and Broadband services , which gives a foretaste of the performance of various operators against the benchmark specified by TRAI, during the months in which the Audit was carried out by TUV-SUD Auditors.
- “Parameter wise critical findings” for Cellular mobile, Basic (wire line) and Broadband services: This indicates key observations and findings from different activities carried out during the Audit process.
- TUV-SUD conducted audit involved a 3 stage verification process which consisted of auditing the records of the service providers and verifying the data submitted to TRAI. The second step involved a three day live measurement of all the network parameters. On the basis of the three days live measurement, the auditors checked the busy hour of the day for the service provider and collected the data for this busy hour for the month in which the audit was conducted Finally, the performance of the service providers was also gauged by conducting drive tests in three select SSAs per service provider per quarter.
- The three stage audit / verification viz audit of the records, live measurements and drive tests of all the cellular mobile operators was repeated every month. In case of Basic (Wire line) and Broadband, this exercise is required to be carried out on quarterly basis.

- **Essence of compliance report of service providers with respect to the QoS:**

(i) From month audit & 3 days live findings, it was concluded that on an average, performance of the operators in the Maharashtra & Goa service area was satisfactory as most of the operators were found to have largely met the benchmarks of **Network Parameters** except for one parameter namely **‘Worst affected cells having > 3% TCH drop’** which could not be met by **Tata (GSM) and Tata(CDMA)** as they remained non-compliant in all the three months of the quarter with their average performance of 4.45% and 5.05% respectively.

The three days live measurement assessment also revealed that the parameter **“Worst affected cells> 3 % TCH drops”** by **Tata (GSM) and Tata (CDMA)** with their average performance as **4.39% and 5.14%** respectively.

(ii) With regard to the **Customer Service Quality Parameters**, it is revealed that most of the operators are in well compliance of the parameters on Metering and Billing Credibility, Response Time to Customers, Termination of Service and Time taken for refunds. However, **Tata (GSM)** could perform **99.28%** against the parameter ‘Resolved the billing complaints’.

Regarding parameter **“% calls answered by Operators (voice to voice) within 60 seconds”**, **BSNL, RCOM (GSM) and RCOM (CDMA)** could not achieve the benchmark with their performance as **70.14%, 40.07% and 53.62%** respectively, which is way below the benchmark of 90%.

The performance of **Aircel** also lagged behind the benchmark for parameter **‘Closure’** and **‘Time taken for refund of deposit s after closures’** with its achieved level as **95% and 98.75% respectively**.

(iii) With regards to the outcome of drive tests, Service providers namely **BSNL, RCOM (GSM), Tata (GSM) / (CDMA)** need to improve their network performance with respect to the parameters Voice Quality, Call Drop rate and Call setup success rate.

5. PMR AUDIT REPORT



5) PMR AUDIT REPORTS:

5.1 MONTHLY PMR:

5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

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

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

5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS:

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	13	1780	Huawei	Huawei
2	AIRTEL	23	158	10439	NSN	NSN
3	BSNL	18	141	6880	Alcatel	Alcatel
4	IDEA	42	92	10336	Ericsson	Ericsson
5	TATA GSM	4	31	4306	Huawei	Huawei
6	RCOM GSM	5	23	2767	Huawei	Huawei
7	UNINOR	8	26	3707	NSN	NSN, Huawei
8	VODAFONE	16	116	9503	NSN	NSN
CDMA OPERATORS						
9	RCOM CDMA	10	8	1719	ZTE, Lucent	ZTE, Lucent
10	TATA CDMA	12	19	2274	Huawei, ZTE, Ericsson	Huawei, ZTE, Ericsson

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – APRIL-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- APRIL-14 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	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%	Apr-14	0.05%	0.01%	1.94%	0.23%	0.02%	0.30%	0.26%	0.10%	0.22%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Apr-14	0.06%	0.00%	1.82%	1.43%	0.00%	1.01%	1.83%	0.37%	0.70%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	99.49%	99.88%	95.27%	98.42%	99.73%	99.59%	97.40%	99.11%	97.96%	97.83%
	b) SDCCH/PAGING Channel congestion	<=1%	Apr-14	0.04%	0.04%	0.78%	0.74%	0.08%	0.03%	0.43%	0.29%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	0.15%	0.07%	1.86%	0.98%	0.13%	0.05%	1.87%	0.89%	0.04%	0.74%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Apr-14	0.75%	0.41%	1.76%	0.94%	0.67%	0.30%	0.55%	0.66%	0.20%	1.09%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Apr-14	2.91%	0.27%	2.85%	1.62%	3.28%	0.02%	1.76%	2.69%	0.83%	5.22%
	c) Connections with good voice quality	>=95%	Apr-14	96.91%	98.94%	95.83%	97.62%	98.04%	98.86%	97.52%	97.56%	99.79%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Apr-14	0	0	0	0	0	0	0	0	0	0

NP-Data not provided: Tata CDMA has not provided data for the parameter "Connections with good voice quality" because OMCR does not support this parameter.

5.1.4 QOS PERFORMANCE OF MONTHLY PMR – MAY-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- MAY-14 MONTH													
PMR Generation Data		Bench-mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	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%	May-14	0.05%	0.01%	1.85%	0.16%	0.05%	0.47%	0.33%	0.15%	0.41%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	May-14	0.11%	0.00%	1.74%	0.90%	0.00%	1.59%	1.83%	0.72%	1.66%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	May-14	99.26%	99.87%	95.54%	98.51%	99.72%	99.62%	97.86%	99.09%	97.44%	97.52%
	b) SDCCH/PAGING Channel congestion	<=1%	May-14	0.04%	0.04%	0.84%	0.70%	0.10%	0.03%	0.38%	0.34%	0.00%	0.00%
	c) TCH congestion	<=2%	May-14	0.11%	0.09%	1.83%	1.04%	0.12%	0.05%	1.45%	0.91%	0.06%	1.13%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	May-14	0.71%	0.43%	1.72%	0.94%	0.70%	0.29%	0.43%	0.69%	0.24%	1.04%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	May-14	2.84%	0.26%	2.79%	1.26%	3.45%	0.01%	0.73%	2.66%	0.63%	5.03%
	c) Connections with good voice quality	>=95%	May-14	97.13%	98.86%	95.79%	97.65%	98.02%	98.84%	97.69%	97.52%	99.80%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	May-14	0	0	0	0	0	0	0	0	0	0

NP-Data not provided: Tata CDMA has not provided data for the parameter "Connections with good voice quality" because OMCR does not support this parameter.

5.1.5 QOS PERFORMANCE OF MONTHLY PMR – JUNE-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- JUNE-14 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	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%	Jun-14	0.19%	0.01%	1.88%	0.19%	0.05%	0.55%	0.34%	0.21%	0.45%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Jun-14	0.90%	0.00%	1.85%	1.05%	0.00%	1.95%	1.65%	1.12%	0.99%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Jun-14	99.19%	99.87%	95.57%	98.49%	99.74%	99.63%	97.65%	99.03%	97.77%	98.01%
	b) SDCCCH/PAGING Channel congestion	<=1%	Jun-14	0.08%	0.04%	0.92%	0.71%	0.08%	0.03%	0.40%	0.51%	0.00%	0.00%
	c) TCH congestion	<=2%	Jun-14	0.11%	0.09%	1.80%	1.03%	0.11%	0.05%	1.89%	0.97%	0.04%	0.59%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Jun-14	0.70%	0.44%	1.74%	0.98%	0.73%	0.36%	0.44%	0.76%	0.25%	0.98%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jun-14	2.73%	0.27%	2.81%	1.58%	6.62%	0.02%	0.74%	2.90%	1.24%	4.87%
	c) Connections with good voice quality	>=95%	Jun-14	97.61%	98.95%	95.86%	97.54%	99.87%	98.86%	97.56%	97.44%	99.80%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Jun-14	0	0	0	0	0	0	0	0	0	0

NP-Data not provided: Tata CDMA has not provided data for the parameter "Connections with good voice quality "because OMCR does not support this parameter.

5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- JUNE-14 (APRIL TO JUNE MONTHS AUDITED DATA)

QUARTERLY QOS PERFORMANCE (AVERAGE OF THREE MONTHS) - MAHARASHTRA & GOA CIRCLE													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators		
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.10%	0.01%	1.89%	0.19%	0.04%	0.44%	0.31%	0.15%	0.36%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.36%	0.00%	1.80%	1.13%	0.00%	1.52%	1.77%	0.74%	1.12%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.31%	99.87%	95.46%	98.47%	99.73%	99.61%	97.64%	99.08%	97.72%	97.79%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.05%	0.04%	0.85%	0.72%	0.09%	0.03%	0.40%	0.38%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.12%	0.08%	1.83%	1.02%	0.12%	0.05%	1.74%	0.92%	0.05%	0.82%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.72%	0.43%	1.74%	0.95%	0.70%	0.32%	0.47%	0.70%	0.23%	1.04%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.83%	0.27%	2.82%	1.49%	4.45%	0.02%	1.08%	2.75%	0.90%	5.04%
	c) Connections with good voice quality	>=95%	Quarterly	97.22%	98.92%	95.83%	97.60%	98.64%	98.85%	97.59%	97.51%	99.80%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Quarterly	0	0	0	0	0	0	0	0	0	0

NP-Data not provided: Tata CDMA has not provided data for the parameter "Connections with good voice quality "because OMCR does not support this parameter.

5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS:

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

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 MH&G 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 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 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 (average 0.23 %) was for RCOM (CDMA) during the quarter.

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

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

The audit with respect to this parameter revealed that all the operators met the benchmark for this parameter except **Tata (GSM) and Tata (CDMA)**. **Tata GSM & CDMA** remained non-compliant in all the three months of the quarter with its average performance as **4.45% and 5.04% respectively**.

- iii. Connections with good voice quality:

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

**3-DAYS LIVE MEASUREMENT DATA VERIFICATION FOR
CELLULAR MOBILE SERVICE PROVIDERS
(NETWORK SERVICE QUALITY PARAMETER)**



5.2 LIVE MEASUREMENT DATA (3-DAYS) FOR CELLULAR MOBILE SERVICE PROVIDERS (NETWORK SERVICE QUALITY PARAMETER):

5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – APRIL-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- APRIL-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	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	0.08%	0.01%	1.06%	0.27%	0.01%	0.27%	0.42%	0.07%	0.20%	0.92%
	b) Worst affected BTSs due to downtime	<=2%	Live Data	0.00%	0.00%	0.07%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live Data	99.52%	99.89%	95.50%	98.54%	99.76%	99.65%	97.58%	99.10%	96.84%	98.09%
	b) SDCCH/PAGING Channel congestion	<=1%	Live Data	0.02%	0.03%	0.74%	0.64%	0.06%	0.02%	0.41%	0.34%	0.00%	0.00%
	c) TCH congestion	<=2%	Live Data	0.16%	0.08%	1.82%	0.98%	0.10%	0.04%	1.65%	0.90%	0.07%	0.48%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live Data	0.73%	0.39%	1.77%	0.91%	0.63%	0.31%	0.48%	0.65%	0.21%	1.12%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live Data	2.78%	0.26%	2.81%	1.67%	3.13%	0.01%	0.96%	2.49%	0.76%	5.46%
	c) Connections with good voice quality	>=95%	Live Data	97.10%	98.95%	95.90%	97.63%	98.07%	98.89%	97.49%	97.60%	99.73%	NP
4	No. of POI having >=0.5% congestion	<0.5%	Live Data	0	0	0	0	0	0	0	0	0	0

* NP-Data not provided: Tata CDMA has not provided data for the parameter "Connections with good voice quality" because OMCR does not support this parameter.

5.2.2 LIVE MEASUREMENT DATA (3-DAYS) – MAY-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- MAY-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	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	0.09%	0.01%	1.53%	0.18%	0.06%	0.39%	0.35%	0.09%	0.34%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.06%	0.05%	0.00%	0.06%	0.03%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.70%	99.88%	95.63%	98.46%	99.70%	99.66%	97.68%	99.09%	95.47%	97.67%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.07%	0.03%	0.81%	0.68%	0.12%	0.03%	0.61%	0.26%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.10%	0.08%	1.79%	1.08%	0.07%	0.04%	1.69%	0.91%	0.12%	0.86%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.76%	0.42%	1.66%	0.95%	0.74%	0.25%	0.43%	0.68%	0.24%	1.08%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.85%	0.28%	2.86%	1.27%	3.57%	0.00%	0.69%	2.48%	0.77%	5.09%
	c) Connections with good voice quality	>=95%	Live data	96.83%	98.93%	95.87%	97.66%	97.98%	98.86%	97.63%	97.55%	99.80%	NP
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	0	0	0

* NP-Data not provided: Tata CDMA has not provided data for the parameter "Connections with good voice quality "because OMCR does not support this parameter.

5.2.3 LIVE MEASUREMENT DATA (3-DAYS) – JUNE-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- JUNE-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	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	0.24%	0.01%	1.51%	0.19%	0.04%	0.69%	0.43%	0.19%	0.56%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.11%	0.00%	0.06%	0.04%	0.00%	0.03%	0.19%	0.04%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.11%	99.87%	95.66%	98.42%	99.72%	99.67%	97.99%	99.06%	97.26%	97.37%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.14%	0.04%	0.94%	0.67%	0.10%	0.04%	0.24%	0.36%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.10%	0.09%	1.83%	1.14%	0.07%	0.04%	1.37%	0.94%	0.06%	1.40%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.72%	0.44%	1.70%	0.96%	0.75%	0.30%	0.43%	0.71%	0.20%	0.92%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.88%	0.28%	2.76%	1.47%	6.46%	0.01%	0.66%	2.91%	1.18%	4.88%
	c) Connections with good voice quality	>=95%	Live data	97.63%	98.99%	95.77%	97.57%	97.88%	98.94%	97.61%	97.47%	99.81%	NP
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	0	0	0

* NP-Data not provided: Tata CDMA has not provided data for the parameter "Connections with good voice quality "because OMCR does not support this parameter.

5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF APRIL TO JUNE MONTHS)

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF THREE MONTHS) – MH&G CIRCLE													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.14%	0.01%	1.37%	0.21%	0.04%	0.45%	0.40%	0.12%	0.37%	0.34%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.04%	0.00%	0.06%	0.04%	0.00%	0.03%	0.07%	0.01%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.11%	99.88%	95.60%	98.47%	99.73%	99.66%	97.75%	99.08%	96.52%	97.71%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.08%	0.03%	0.83%	0.66%	0.09%	0.03%	0.42%	0.32%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.12%	0.08%	1.81%	1.07%	0.08%	0.04%	1.57%	0.92%	0.08%	0.91%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.74%	0.42%	1.71%	0.94%	0.71%	0.29%	0.45%	0.68%	0.22%	1.04%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.84%	0.27%	2.81%	1.47%	4.39%	0.01%	0.77%	2.63%	0.90%	5.14%
	c) Connections with good voice quality	>=95%	Quarterly	97.19%	98.96%	95.85%	97.62%	97.98%	98.90%	97.58%	97.54%	99.78%	NP
4	No. of POI having >=0.5% congestion	<0.5%	Quarterly	0	0	0	0	0	0	0	0	0	0

* NP-Data not provided: Tata CDMA has not provided data for the parameter "Connections with good voice quality "because OMCR does not support this parameter.

5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:

From three days live measurement assessment, it was revealed that the operators were largely meeting the benchmarks except for the parameter **“Worst affected cells> 3 % TCH drops”**. The benchmark for this parameter was not met by **Tata (GSM) and Tata (CDMA)** with their average performance as **4.39% and 5.14%** respectively.

5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services- MH&G Circle- April 14 month

S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	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		Apr-14	1775	10734	6880	10278	4214	3667	3670	9438	2280	2279
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Apr-14	622	976	95897	17388	590	7894	6828	6654	3581	219
	c) BTS Accumulated Downtime	<=2%	Apr-14	0.05%	0.01%	1.94%	0.23%	0.02%	0.30%	0.26%	0.10%	0.22%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Apr-14	1	0	125	147	0	37	67	35	16	0
	e) Worst affected BTSs due to downtime	<=2%	Apr-14	0.06%	0.00%	1.82%	1.43%	0.00%	1.01%	1.83%	0.37%	0.70%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	99.49%	99.88%	95.27%	98.42%	99.73%	99.59%	97.40%	99.11%	97.96%	97.83%
	b) SDCCH/PAGING Congestion	<=1%	Apr-14	0.04%	0.04%	0.78%	0.74%	0.08%	0.03%	0.43%	0.29%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	0.15%	0.07%	1.86%	0.98%	0.13%	0.05%	1.87%	0.89%	0.04%	0.74%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Apr-14	0.75%	0.41%	1.76%	0.94%	0.67%	0.30%	0.55%	0.66%	0.20%	1.09%
	b) Worst affected cells>3% TCH drop	<=3%	Apr-14	2.91%	0.27%	2.85%	1.62%	3.28%	0.02%	1.76%	2.69%	0.83%	5.22%
	c) % of connections with good voice quality	>=95%	Apr-14	96.91%	98.94%	95.83%	97.62%	98.04%	98.86%	97.52%	97.56%	99.79%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Apr-14	156	87	577	494	410	2	195	766	57	343.3
	e) Total no. of cells (Sector) in the licensed service area		Apr-14	5363	31809	20217	30483	12495	10951	11075	28449	6840	6579
No. of POI's having >=0.5% POI congestion													
4	No. of POI's having >=0.5% POI congestion		Apr-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Apr-14	0	0	0	0	0	0	0	0	0	0
Network Data													
5	a) Equipped Capacity of Network in Erlang		Apr-14	49809	377458	259355	513179	187778	144000	140898	363716	230000	391181
	b) Total traffic in TCBH in erlang (Avg.)		Apr-14	24481	370600	118398	447399	67432	128334	170580	356854	77119	83955
	c) Total no. of customers served (as per VLR) on last day of the month		Apr-14	960843	10340743	4698460	19325369	3083894	5151935	4408623	15034126	1815494	1563747

TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- MH&G Circle- April -14 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	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	1774	10717	6880	10267	4206	3667	3600	9438	2280	2276
	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	106	86	5268	1960	23	717	1092	448	330	1514
	c) BTS Accumulated Downtime	<=2%	Live data	0.08%	0.01%	1.06%	0.27%	0.01%	0.27%	0.42%	0.07%	0.20%	0.92%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	5	3	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.07%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.52%	99.89%	95.50%	98.54%	99.76%	99.65%	97.58%	99.10%	96.84%	98.09%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.02%	0.03%	0.74%	0.64%	0.06%	0.02%	0.41%	0.34%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.16%	0.08%	1.82%	0.98%	0.10%	0.04%	1.65%	0.90%	0.07%	0.48%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.73%	0.39%	1.77%	0.91%	0.63%	0.31%	0.48%	0.65%	0.21%	1.12%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.78%	0.26%	2.81%	1.67%	3.13%	0.01%	0.96%	2.49%	0.76%	5.46%
	c) % of connections with good voice quality	>=95%	Live data	97.10%	98.95%	95.90%	97.63%	98.07%	98.89%	97.49%	97.60%	99.73%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	149	84	569	508	391	1	107	708	52	359
	e) Total no. of cells (Sector) in the licensed service area		Live data	5363	31783	20217	30450	12505	19951	11117	28449	6839	6571
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

TABLE: 3

Detailed Network Data Assessment of Cellular Mobile Telephone Services- MH&G Circle - May-14 month													
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	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		May-14	1780	10752	6880	10305	4238	3517	3670	9438	2285	2279
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		May-14	600	990	94671	12413	1637	12394	9048	10588	7042	611
	c) BTS Accumulated Downtime	<=2%	May-14	0.05%	0.01%	1.85%	0.16%	0.05%	0.47%	0.33%	0.15%	0.41%	0.04%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		May-14	2	0	120	93	0	56	67	68	38	0
e) Worst affected BTSs due to downtime	<=2%	May-14	0.11%	0.00%	1.74%	0.90%	0.00%	1.59%	1.83%	0.72%	1.66%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	May-14	99.26%	99.87%	95.54%	98.51%	99.72%	99.62%	97.86%	99.09%	97.44%	97.52%
	b) SDCCH/PAGING Congestion	<=1%	May-14	0.04%	0.04%	0.84%	0.70%	0.10%	0.03%	0.38%	0.34%	0.00%	0.00%
c) TCH congestion	<=2%	May-14	0.11%	0.09%	1.83%	1.04%	0.12%	0.05%	1.45%	0.91%	0.06%	1.13%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	May-14	0.71%	0.43%	1.72%	0.94%	0.70%	0.29%	0.43%	0.69%	0.24%	1.04%
	b) Worst affected cells>3% TCH drop	<=3%	May-14	2.84%	0.26%	2.79%	1.26%	3.45%	0.01%	0.73%	2.66%	0.63%	5.03%
	c) % of connections with good voice quality	>=95%	May-14	97.13%	98.86%	95.79%	97.65%	98.02%	98.84%	97.69%	97.52%	99.80%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		May-14	153	84	565	388	414	1	82	757	43	331
e) Total no. of cells (Sector) in the licensed service area		May-14	5379	31835	20217	30833	11996	10505	11193	28449	6855	6582	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		May-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		May-14	0	0	0	0	0	0	0	0	0	0
5	Network Data												
	a) Equipped Capacity of Network in Erlang		May-14	51123	310941	259355	519386	191598	144000	141893	364874	230000	391058
	b) Total traffic in TCBH in erlang (Avg.)		May-14	23991	247851	113082	434869	58751	116545	157281	354520	67764	92145
c) Total no. of customers served (as per VLR) on last day of the month		May-14	969512	10430753	4692254	19561265	3060591	5033495	4381011	14940299	1766427	1507878	

TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- MH&G Circle- May-14 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	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	1778	10732	6880	10278	4214	3517	3670	9438	2280	2279
	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	112	81	7570	1355	186	990	933	606	550	97
	c) BTS Accumulated Downtime	<=2%	Live data	0.09%	0.01%	1.53%	0.18%	0.06%	0.39%	0.35%	0.09%	0.34%	0.06%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	4	5	0	2	1	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.06%	0.05%	0.00%	0.06%	0.03%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.70%	99.88%	95.63%	98.46%	99.70%	99.66%	97.68%	99.09%	95.47%	97.67%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.07%	0.03%	0.81%	0.68%	0.12%	0.03%	0.61%	0.26%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.10%	0.08%	1.79%	1.08%	0.07%	0.04%	1.69%	0.91%	0.12%	0.86%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.76%	0.42%	1.66%	0.95%	0.74%	0.25%	0.43%	0.68%	0.24%	1.08%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.85%	0.28%	2.86%	1.27%	3.57%	0.00%	0.69%	2.48%	0.77%	5.09%
	c) % of connections with good voice quality	>=95%	Live data	96.83%	98.93%	95.87%	97.66%	97.98%	98.86%	97.63%	97.55%	99.80%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	153	89	579	387	448	0	77	705	53	335
e) Total no. of cells (Sector) in the licensed service area		Live data	5376	31876	20217	30542	12554	10505	11214	28449	6839	6582	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0

TABLE: 5

Detailed Network Data Assessment of Cellular Mobile Telephone Services- MH&G Circle- June -14 month													
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA Cellular	TATA GSM	RCOM GSM	UNINOR	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		Jun-14	1780	10439	6880	10336	4294	2767	3707	9503	1719	2274
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Jun-14	2422	807	93134	14078	1684	11012	9137	14524	5526	391
	c) BTS Accumulated Downtime	<=2%	Jun-14	0.19%	0.01%	1.88%	0.19%	0.05%	0.55%	0.34%	0.21%	0.45%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jun-14	16	0	127	109	0	54	61	106	17	0
e) Worst affected BTSs due to downtime	<=2%	Jun-14	0.90%	0.00%	1.85%	1.05%	0.00%	1.95%	1.65%	1.12%	0.99%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Jun-14	99.19%	99.87%	95.57%	98.49%	99.74%	99.63%	97.65%	99.03%	97.77%	98.01%
	b) SDCCH/PAGING Congestion	<=1%	Jun-14	0.08%	0.04%	0.92%	0.71%	0.08%	0.03%	0.40%	0.51%	0.00%	0.00%
c) TCH congestion	<=2%	Jun-14	0.11%	0.09%	1.80%	1.03%	0.11%	0.05%	1.89%	0.97%	0.04%	0.59%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Jun-14	0.70%	0.44%	1.74%	0.98%	0.73%	0.36%	0.44%	0.76%	0.25%	0.98%
	b) Worst affected cells>3% TCH drop	<=3%	Jun-14	2.73%	0.27%	2.81%	1.58%	6.62%	0.02%	0.74%	2.90%	1.24%	4.87%
	c) % of connections with good voice quality	>=95%	Jun-14	97.61%	98.95%	95.86%	97.54%	99.87%	98.86%	97.56%	97.44%	99.80%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Jun-14	147	85	569	489	839	2	83	824	64	320
e) Total no. of cells (Sector) in the licensed service area		Jun-14	5382	31851	20217	30941	12683	8254	11244	28456	5151	6574	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Jun-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Jun-14	0	0	0	0	0	0	0	0	0	0
5	Network Data												
	a) Equipped Capacity of Network in Erlang		Jun-14	53637	376257	259355	517534	191934	144000	144022	366954	230000	390566
	b) Total traffic in TCBH in erlang (Avg.)		Jun-14	24721	234903	108539	412646	59706	108726	160997	347727	64266	83163
c) Total no. of customers served (as per VLR) on last day of the month		Jun-14	994839	10299801	4666649	19755242	3156986	5030320	4618706	15196255	1776777	1447981	

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- MH&G Circle- June-14 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators									
Network Service Quality Parameter													
Network Availability													
1	a) Total no. of BTSs in the licensed service area		Live data	1778	10740	6880	10305	4256	3517	3701	9438	2285	2279
	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	307.22	79	7496	1413	133.19	1750	1137	1300.94	917	47.41
	c) BTS Accumulated Downtime	<=2%	Live data	0.24%	0.01%	1.51%	0.19%	0.04%	0.69%	0.43%	0.19%	0.56%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	2	0	4	4	0	1	7	4	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.11%	0.00%	0.06%	0.04%	0.00%	0.03%	0.19%	0.04%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.11%	99.87%	95.66%	98.42%	99.72%	99.67%	97.99%	99.06%	97.26%	97.37%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.14%	0.04%	0.94%	0.67%	0.10%	0.04%	0.24%	0.36%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.10%	0.09%	1.83%	1.14%	0.07%	0.04%	1.37%	0.94%	0.06%	1.40%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.72%	0.44%	1.70%	0.96%	0.75%	0.30%	0.43%	0.71%	0.20%	0.92%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.88%	0.28%	2.76%	1.47%	6.46%	0.01%	0.66%	2.91%	1.18%	4.88%
	c) % of connections with good voice quality	>=95%	Live data	97.63%	98.99%	95.77%	97.57%	97.88%	98.94%	97.61%	97.47%	99.81%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	155	88	557	455	817	1	74	828	81	321
	e) Total no. of cells (Sector) in the licensed service area		Live data	5376	31795	20217	30924	12651	10505	11239	28449	6855	6582
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

CUSTOMER SERVICE QUALITY (CSD) PARAMETERS



5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS:

5.3.1 CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (QUARTERLY MONTHLY AVERAGE):

QUARTERLY AVERAGED CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-AVERAGE OF THREE MONTHS													
Quarterly Averaged CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA
S/ N	Name of Parameter			GSM Operators								CDMA Operators	
Customer Service Quality Parameters													
1	Metering & Billing Credibility -Post Paid												
	A) No. of bills issued during the quarter		MHG	3770	417109	371512	1271573	61428	100955	NA	872106	253954	84341
	B) No. of bills disputed including billing complaints during the quarter		MHG	1	78	108	1144	56	0	NA	737	249	0
	C)% of billing complaints during the quarter	<= 0.1%	MHG	0.01	0.02%	0.03%	0.09%	0.09%	NA	NA	0.08%	0.10%	NA
2	Metering & Billing Credibility -Pre Paid												
	A) Total No. of Pre-paid customers at the end of the quarter		MHG	1531494	10034112	5573573	17847376	5050530	4157134	6199370	14720387	1596772	1681134
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		MHG	113	360	3652	629	5046	0	354	4285	308	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	MHG	0.01%	0.00%	0.07%	0.00%	0.10%	NA	0.01%	0.03%	0.05%	NA
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		MHG	113	438	3652	13156	5102	554	354	5023	557	39
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		MHG	113	438	3652	13156	5102	550	354	5023	557	39
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 week	MHG	100%	100%	100%	100%	100%	99.28%	100%	100%	100%	100%
	D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	MHG	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

QUARTERLY AVERAGED CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-AVERAGE OF THREE MONTHS

S/ N	Quarterly Averaged CSD Audit Data Name of Parameter	Bench-mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
4	Response time to customers for assistance												
	A) Total no of calls attempted to customer care/Call center		MHG	2198130	1045587	166702	1815909	2362624	332554	26322153	8582157	668546	81489
	B) Total no. of calls successfully established to customer care/Call center		MHG	2158705	1045587	166702	1800327	2340404	328056	25113776	8577242	661884	80080
	C) % Accessibility of Call centre /customer Care (Total call successfully established*100/ Total call attempt)	>=95%	MHG	98.21%	100.00%	100.00%	99.14%	99.06%	98.65%	95.41%	99.94%	99.00%	98.27%
	D) Total Calls reached to agent desk for Voice to Voice (Total call attempts)		MHG	412251	2473004	761541	5025545	401639	437939	5555454	2977081	173982.33	70667
	E) Total number of calls answered by the operator (Voice to voice) within 60 seconds		MHG	376531	2263580	534161	4751115	160944.33	419426	5288489	2861235	93297	68229
	F) % age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100 / Total call attempts)	>=90%	MHG	91.34%	91.53%	70.14%	94.54%	40.07%	95.77%	95.19%	96.11%	53.62%	96.55%
5	Termination/closure of service												
	A) Total No. of requests for Termination / Closure of service received during the quarter		MHG	20	2072	NP	7898	300	639	NA	6422	619	113
	B) No. of requests for Termination /Closure of service complied within 7 days during the quarter		MHG	19	2072	NP	7898	300	639	NA	6422	619	113
	C) % of Termination/ Closure of service within 7 days	<=7days	MHG	95.00%	100.00%	NP	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
6	Time taken for refunds of deposits after closures.												
	A) No. of Payments/ Refunds due during the quarter		MHG	27	1185	NP	529	216	188	NA	1560	458	145
	B) No. of Payments/ Refunds Cleared during the quarter		MHG	26	1185	NP	529	216	188	NA	1560	458	145
	C)Time taken for refunds of deposits after closures.	100% within 60 days	MHG	98.75%	100.00%	NP	100%	100.00%	100.00%	NA	100.00%	100.00%	100.00%

NA: Not Applicable, Uninor have no post-paid customers, so data for parameters related to post-paid bills not applicable for them.

NP: Data not provided by BSNL, BSNL has not provided data for the parameter "Termination/closure of service and Time taken for refunds of deposits after closures" despite our best effort.

Note: Aircel has provided data for two months i.e. April & May month for the parameter 'Termination/closure/Closure of service' so calculation is based on two months data.

5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-JUNE 2014):

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE-JUNE-14													
3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA
S/ N	Name of Parameter			GSM Operators									CDMA Operators
Response time to customers for assistance													
1	Total no. of calls attempted to customer care/Call center		MHG	78222	34487	6444	64476	81883.66	11939	24628	303240	29032.33	2858
	Total no. of calls successfully established to customer care/Call center		MHG	77036	34487	6444	63904	81351	11776	23709	303232	28860.66	2814
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempts)	>=95%	MHG	98.48%	100.00%	100.00%	99.11%	99.34%	98.63%	96.26%	99.99%	99.40%	98.46%
2	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		MHG	14663	84878	23580	172566	46301	14715	65417	101454	3540	2167
	Total number of calls answered by the operator (Voice to voice) within 60 seconds		MHG	13372	79175	20075	165014	8332	11950	61895	94914	1227.33	2073
	% age of calls answered by operator (voice to voice) (Total call successfully established within 60 Sec. *100/ Total call attempt)	>=90%	MHG	91.19%	93.28%	85.13%	95.62%	17.99%	81.20%	94.61%	93.55%	34.67%	95.66%

5.3.3 KEY FINDINGS ON CUSTOMER SERVICE DELIVERY (CSD) PARAMETERS

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

The performance of the service providers with respect to the parameter metering and billing credibility for both post-paid and pre-paid is well within the prescribed bench mark of $\leq 0.1\%$. UNINOR has no post-paid customers, so not provided the data for billing related parameters applicable for post-paid subscribers.

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 except **Tata GSM**. The performance level of Tata GSM against this parameter was **99.28%**. Apart from this, all service providers also have met the benchmark of 100 % refund in one week, where customers were due for credit / adjustment.

3. Response Time to the Customer for assistance

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

All service providers are in compliance with respect to the parameter 'Accessibility of call center'. However, **BSNL, RCOM (GSM) and RCOM (CDMA)** have not met the benchmark for the parameter "**% calls answered by Operators (voice to voice) within 60 seconds**". They have achieved their performance as **70.14%, 40.07% and 53.62%** respectively, which is way below the benchmark of 90%.

4. Termination/Closure of Service

In case of this parameter all service providers except **Aircel** have settled 100% closure/termination within the benchmark of 7 days. Aircel has provided data for two months i.e. April & May -14 month for the parameter 'Termination/closure of service' so calculation is based on two months data. The performance of Aircel against this parameter was **95%**.

5. Time Taken for Refund of deposits after closures

All operators were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure except Aircel. The performance of Aircel against this parameter was **98.75%**.

The results for **three days live measurements** reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center'. However, with regard to the parameter '**Calls connection to operators (Voice to voice) within 60 seconds**', performance of **BSNL, RCOM (GSM), Tata (GSM) and RCOM (CDMA)** was **85.13%, 17.99%, 81.20% and 34.67%** respectively, way below the benchmark of $\geq 90\%$.

6. LIVE CALLING ASSESSMENT



6) LIVE CALLING ASSESSMENT:

6.1 INTER OPERATOR CALLS ASSESSMENT:

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in Maharashtra & Goa service area during the time 1100 to 1400 Hrs and 1600 to 1900 was carried out by TUV auditors. The test calls were made from one operator to another within the same licensed area to judge the ease of connectivity amongst the operators. While doing this exercise, the radio part, the switch part and POI in between the two operators are involved. Congestion in any of these network elements could result in congestion in the network.

INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT											
Calling Operators	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	UNINOR	RCOM CDMA	TATA CDMA
AIRCEL	MHG	--	100%	94%	100%	100%	97%	98%	100%	100%	100%
AIRTEL	MHG	100%	--	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	MHG	95%	100%	--	100%	96%	100%	100%	100%	100%	100%
IDEA	MHG	100%	100%	100%	--	100%	100%	100%	100%	100%	100%
RCOM GSM	MHG	100%	100%	93%	100%	--	97%	100%	100%	100%	100%
TATA GSM	MHG	100%	100%	100%	100%	96%	--	100%	100%	100%	100%
VODAFONE	MHG	100%	100%	100%	100%	100%	100%	--	100%	100%	100%
UNINOR	MHG	100%	100%	100%	100%	100%	100%	100%	--	100%	100%
RCOM CDMA	MHG	100%	100%	100%	100%	100%	100%	100%	100%	--	100%
TATA CDMA	MHG	100%	100%	100%	100%	100%	100%	100%	100%	100%	--

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. However, in case where Calls attempted from Aircel to BSNL, Tata GSM and Vodafone successful interconnection was 94.0%, 97% and 98% respectively, BSNL to Aircel and RCOM GSM was 95% and 96% respectively, RCOM GSM to BSNL and Tata GSM was 93% and 97% respectively and Tata GSM to RCOM GSM was 96% . Thus there was no remarkable problem in interconnection from one operator to other operators.

6.2 CUSTOMER CARE / HELPLINE ASSESSMENT:

LIVE CALLING TO CALL CENTRE											
	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA
Total No. of calls Attempted	MHG	100	100	100	100	100	100	100	100	100	100
Total No. of calls connected to IVR	MHG	100	100	100	100	100	100	100	100	100	100
Calls got connected to agent within 60 Sec	MHG	100	100	93	100	90	100	100	100	91	100
%age of calls got answered	MHG	100%	100%	93%	100%	90%	100%	100%	100%	91%	100%

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers, BSNL, RCOM (GSM) and RCOM (CDMA) could connect 93%, 90% and 91% of calls to the operator within 60 Seconds.

6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLAINTS:

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS											
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	MHG	100	100	100	100	100	100	100	100	100	100
Total No. of calls Answered	MHG	88	87	78	82	85	90	80	85	90	75
Resolution of Billing Complaints	MHG	88	87	78	82	85	90	80	85	90	75
%age of cases resolved	MHG	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

To test the Service Providers performance on billing related complaints and their resolutions, TUV-SUD auditors conducted a customer feedback calling for about random 100 nos. of customers. However, in some cases, the number of customers contacted for verification was less due to fewer number of billing complaints. During live calling, some of the customers did not attend the calls while some others reported that their complaints have been resolved but not sure of duration of their resolution. However, most of the customers expressed their satisfaction on resolution of the billing complaints.

6.4 LEVEL -1 CALLING ASSESSMENT:

LEVEL 1 LIVE CALLING													
Emergency no.	SSA Name	SDCA Name	No. of calls made	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	UNINOR	VODAFONE	RCOM (CDMA)	TATA (CDMA)
100, 101, 102,1091,108	PUNE	Saswad, Baramati, Walchand Nagar, Indapur, Daund	20	20	20	20	20	20	20	20	20	20	20
100, 101, 102,1091,108		Pune, Khadakwasla, Lonavala, Chinchwad	20	20	20	20	20	20	20	20	20	20	20
100, 101, 102,1091,108		Rajgurunagar, Manchar, Junnar, Shirur	10	10	10	10	10	10	10	10	10	10	10
100, 101, 102,1091,108	SATARA	Koregaon, Pusegaon, Vaduj, Dahiwadi, Mhaswad	20	20	20	20	20	20	20	20	20	20	20
100, 101, 102,1091,108		Satara, Karad, Patan	20	20	20	20	20	20	20	20	20	20	20
100, 101, 102,1091,108		Medha, Mahabaleshwar, Wathar, Phaltan	10	10	10	10	10	10	10	10	10	10	10
100, 101, 102,1091,108	SOLAPUR	Akkalkot , Solapur	20	20	18	20	18	19	20	20	18	19	20
100, 101, 102,1091,108		Mangalwedha, Sangola, Malsiras, Pandharpur	20	20	20	20	20	20	20	20	18	20	20
100, 101, 102,1091,108		Mohol, Madha, Barshi	10	10	10	10	10	10	10	10	8	10	10

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 these SDCA's of MH&G service areas, the emergency services as mentioned in the above table were found functional in the networks of all the service providers.

Airtel, Idea and Vodafone: 2 calls blocked on 1091 at Akkalkot SDCA.

RCOM GSM & CDMA: 1 call blocked on 1091 at Akkalkot SDCA

Vodafone: 2 calls blocked on 1091 at Malsiras SDCA.

Vodafone: 2 calls blocked on 1091 at Mohol SDCA.

7. DRIVE TEST



7) OPERATOR ASSISTED DRIVE TEST

In terms of TRAI's letter dated 21st January, 2014, the drive tests were conducted for three consecutive days in one select SSA each month in each service area. Thus, the drive tests were carried out in three SSA's namely **Pune, Satara and Sholapur** in the months of April, May and June 2014 respectively. The total route Kms covered during drive tests in respective SSAs was **321 Kms, 318 Kms and 326 Kms**. The performance of the operators has been highlighted below in the tables. The drive test was conducted simultaneously for all the operators following the same route of drive tests. The holding period for all test calls was 120 seconds. The drive test vehicle across all routes plied at a speed of about 30-50 km per hour.

For measuring voice quality, Rx Qual samples on a scale from 0 to 7 for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. As per the QoS norms, Rx Qual between 0- 5 for GSM operators and between 0-4 % FER value for CDMA operators is considered to be good, where as Rx Qual beyond this benchmark is considered to be bad. Call drops were measured by the number of calls that were dropped to the total number of calls established during the drive test. Similarly CSSR was measured as the ratio of total calls established to the total call attempts made. Signal strength was measured in dBm at street level with strength ≥ -75 dBm for in-door coverage and ≥ -85 dBm for in-vehicle.

DRIVE TEST TABLE-1

OPERATOR-ASSISTED DRIVE TEST AT PUNE SSA IN APRIL-14 MONTH- MAHARSTRA & GOA CIRCLE

S/N	Parameter	Days of drive test	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM		UNINOR		VODAFONE		TATA CDMA		RCOM CDMA				
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR			
			1	Call Attempts	Day-1	112	10	85	10	120	10	102	10	104	10	126	10	112	10	156	10	100	10	126	11
		Day-2	121	10	90	10	139	10	142	10	122	10	126	10	153	10	140	10	128	10	143	10			
		Day-3	70	10	58	10	89	10	86	10	71	10	72	10	53	10	76	10	66	10	73	10			
		Overall SSA	303	30	233	30	348	30	330	30	297	30	324	30	318	30	372	30	294	30	342	31			
2	Blocked Call Rate	Day-1	0.89%	0.00%	0.00%	0.00%	1.67%	0.00%	1.96%	0.00%	0.00%	0.00%	4.76%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.59%	0.00%		
		Day-2	1.65%	0.00%	0.00%	0.00%	2.16%	0.00%	1.41%	0.00%	0.00%	0.00%	3.97%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.70%	0.00%		
		Day-3	1.43%	0.00%	0.00%	0.00%	3.37%	0.00%	1.59%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.32%	0.00%	1.52%	0.00%	0.00%	0.00%			
		Overall SSA	1.32%	0.00%	0.00%	0.00%	2.30%	0.00%	1.82%	0.00%	0.00%	0.00%	3.40%	0.00%	0.00%	0.00%	0.27%	0.00%	0.34%	0.00%	0.88%	0.00%			
3	Dropped Call Rate (<=2%)	Day-1	0.90%	0.00%	0.00%	0.00%	1.69%	0.00%	1.00%	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	0.00%	2.42%	0.00%			
		Day-2	1.68%	0.00%	0.00%	0.00%	0.74%	0.00%	2.14%	0.00%	0.00%	0.00%	1.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.78%	0.00%	1.41%	0.00%			
		Day-3	1.45%	0.00%	0.00%	0.00%	1.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			
		Overall SSA	1.34%	0.00%	0.00%	0.00%	1.18%	0.00%	1.23%	0.00%	0.00%	0.00%	1.60%	0.00%	0.00%	0.00%	0.00%	0.00%	0.68%	0.00%	1.47%	0.00%			
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Percentage connections with good voice quality (=>95%)																							
		Day-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	92.89%	96.09%	98.90%	97.06%		
		Day-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.70%	99.34%	98.44%	97.22%		
		Day-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.74%	99.18%	97.76%	100%		
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.74%	98.39%	98.45%	97.79%		

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-MAHARASHTRA & GOA CIRCLE



OPERATOR-ASSISTED DRIVE TEST AT PUNE SSA IN APRIL-14 MONTH- MAHARSTR & GOA CIRCLE

S/N	Parameter	Days of drive test	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM		UNINOR		VODAFONE		TATA CDMA		RCOM CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
			(b) 0-5 (with frequency hopping for GSM Operators)	Day-1	96.53%	100%	97.26%	98.39%	96.26%	93.83%	98.38%	100%	96.79%	99.02%	98.70%	97.20%	96.68%	90.00%	95.90%	97.45%	NA	NA
	Day-2	95.88%	97.67%	96.75%	97.38%	92.04%	90.68%	95.96%	99.84%	95.43%	91.40%	95.82%	86.25%	96.13%	94.93%	95.24%	96.99%	NA	NA	NA	NA	
	Day-3	96.91%	90.65%	96.64%	97.85%	96.31%	93.97%	98.16%	100%	97.66%	98.75%	97.49%	98.27%	97.02%	89.17%	96.29%	96.71%	NA	NA	NA	NA	
	Overall SSA	96.35%	95.12%	96.91%	97.87%	94.67%	92.83%	96.80%	99.93%	96.47%	96.39%	97.26%	93.91%	96.44%	91.35%	95.69%	97.05%	NA	NA	NA	NA	
Service Coverage																						
5	In door (>= -75dBm)	Day-1	53.70%	43.17%	73.58%	100%	95.26%	30.43%	70.04%	100%	52.75%	35.62%	61.68%	0.00%	71.73%	99.78%	90.47%	100%	94.77%	100%	67.17%	99.73%
		Day-2	76.71%	84.08%	74.03%	100%	95.23%	53.10%	78.45%	99.01%	85.66%	87.84%	64.57%	26.28%	85.31%	98.37%	92.90%	100%	99.99%	100%	79.26%	100%
		Day-3	68.08%	6.96%	82.87%	98.94%	93.71%	40.90%	60.27%	99.40%	89.77%	16.78%	53.44%	2.34%	71.28%	81.68%	62.34%	100%	100%	100%	60.03%	61.30%
		Overall SSA	66.16%	44.74%	76.82%	99.65%	94.73%	41.48%	69.59%	99.47%	76.06%	46.75%	59.90%	9.54%	76.11%	93.28%	81.90%	100%	98.25%	100%	68.82%	87.01%
	In-vehicle (>= -85dBm)	Day-1	78.86%	73.27%	95.38%	100%	99.33%	93.18%	92.15%	100%	88.80%	98.22%	82.50%	16.39%	93.99%	100%	98.54%	100%	99.30%	100%	89.40%	100%
		Day-2	95.16%	99.79%	95.60%	100%	99.81%	99.49%	89.70%	100%	97.97%	98.61%	88.30%	97.03%	96.02%	99.98%	98.86%	100%	100%	100%	92.99%	100%
		Day-3	90.70%	61.24%	97.74%	100%	99.83%	98.06%	88.54%	100%	98.80%	59.24%	82.55%	68.34%	94.42%	98.72%	85.92%	100%	100%	100%	78.60%	99.97%
		Overall SSA	88.24%	78.10%	96.24%	100%	99.66%	96.91%	90.13%	100%	95.19%	85.36%	84.45%	60.59%	94.81%	99.57%	94.44%	100%	99.77%	100%	87.00%	99.99%
	Outdoor-in city (>= -95dBm)	Day-1	96.90%	94.42%	99.92%	100%	99.97%	99.70%	99.47%	100%	99.15%	100%	95.83%	82.77%	99.35%	100%	99.72%	100%	100%	100%	99.59%	100%
		Day-2	99.33%	100%	99.50%	100%	99.99%	99.99%	98.06%	100%	99.83%	100%	97.89%	100%	99.50%	100%	99.73%	100%	100%	100%	98.73%	100%
		Day-3	100%	95.62%	99.95%	100%	100%	100%	98.98%	100%	100%	100%	97.45%	99.68%	99.88%	100%	98.71%	100%	100%	100%	99.57%	100%
		Overall SSA	98.74%	96.68%	99.79%	100%	99.99%	99.90%	98.84%	100%	99.66%	100%	97.06%	94.15%	99.58%	100%	99.39%	100%	100%	100%	99.30%	100%
	6	Call Setup Success Rate (>=95%)	Day-1	99.11%	100%	100%	100%	98.33%	100%	98.04%	100%	100%	100%	95.24%	100%	97.31%	100%	100%	100%	100%	100%	98.41%
Day-2			98.35%	100%	100%	100%	90.65%	100%	98.59%	100%	100%	100%	96.03%	100%	100%	100%	100%	100%	100%	100%	99.30%	100%
Day-3			98.57%	100%	100%	100%	96.63%	100%	98.41%	100%	100%	100%	100%	100%	98.11%	100%	98.68%	100%	98.48%	100%	100%	100%
Overall SSA			98.68%	100%	100%	100%	94.83%	100%	98.18%	100%	100%	100%	96.60%	100%	98.74%	100%	99.73%	100%	99.66%	100%	99.12%	100%

OPERATOR-ASSISTED DRIVE TEST AT PUNE SSA IN APRIL-14 MONTH- MAHARSTR & GOA CIRCLE

S/N	Parameter	Days of drive test	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM		UNINOR		VODAFONE		TATA CDMA		RCOM CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
			7	Hand Over Success Rate (HOSR)	Day-1	98.81%	100%	100%	100%	99.30%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Day-2	99.07%	100%	100%	100%	99.03%	100%	99.32%	100%	99.69%	100%	100%	100%	98.72%	100%	100%	98.55%	100%	100%	100%	100%
		Day-3	98.78%	100%	100%	100%	99.15%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	98.95%	100%	100%	100%	99.14%	100%	99.55%	100%	99.83%	100%	100%	98.98%	100%	100%	99.09%	100%	100%	100%	100%	100%

NA: Not Applicable

DRIVE TEST TABLE-2

OPERATOR-ASSISTED DRIVE TEST AT SATARA SSA IN MAY-14 MONTH- MAHARSTRA & GOA CIRCLE

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM		UNINOR		VODAFONE		TATA CDMA		RCOM CDMA			
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR		
			1	Call Attempts	Major Roads	155	20	154	21	149	20	115	20	153	20	119	20	122	20	97	20	140	21	189
Highways	31	20			30	20	37	22	29	20	35	20	30	20	22	20	26	20	28	21	31	20		
Within City	227	20			218	20	231	21	213	20	211	20	270	20	209	20	256	20	250	21	175	20		
Overall SSA	413	60			402	61	417	63	357	60	399	60	419	60	353	60	379	60	418	63	395	60		
2	Blocked Call Rate	Major Roads	1.94%	0.00%	0.00%	0.00%	2.01%	0.00%	1.74%	0.00%	0.00%	0.00%	0.00%	0.00%	0.82%	0.00%	0.00%	0.00%	0.71%	0.00%	0.00%	0.00%		
		Highways	0.00%	0.00%	0.00%	0.00%	2.70%	0.00%	3.45%	0.00%	5.71%	0.00%	0.00%	0.00%	4.55%	0.00%	0.00%	0.00%	3.57%	0.00%	0.00%	0.00%		
		Within City	0.44%	0.00%	0.00%	0.00%	2.16%	0.00%	1.41%	0.00%	0.00%	0.00%	14.81%	0.00%	0.00%	0.00%	0.78%	0.00%	0.40%	0.00%	4.00%	0.00%		
		Overall SSA	0.97%	0.00%	0.00%	0.00%	2.16%	0.00%	1.68%	0.00%	0.50%	0.00%	9.55%	0.00%	0.57%	0.00%	0.53%	0.00%	0.72%	0.00%	1.77%	0.00%		
3	Dropped Call Rate (<=2%)	Major Roads	1.32%	0.00%	0.00%	0.00%	2.05%	0.00%	0.88%	0.00%	0.65%	0.00%	0.84%	0.00%	0.83%	0.00%	0.00%	0.00%	0.00%	0.00%	1.10%	0.00%		
		Highways	0.00%	0.00%	0.00%	0.00%	2.78%	0.00%	4.55%	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.33%	0.00%		
		Within City	0.88%	0.00%	0.00%	0.00%	2.21%	0.00%	1.43%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.80%	0.00%	0.00%	0.00%		
		Overall SSA	0.98%	0.00%	0.00%	0.00%	2.21%	0.00%	1.45%	0.00%	0.25%	0.00%	0.26%	0.00%	0.57%	0.00%	0.00%	0.00%	0.48%	0.00%	0.78%	0.00%		
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Percentage connections with good voice quality (=>95%)																						
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.23%	92.65%	97.34%	100%	
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	93.06%	93.20%	97.22%	100%	
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	94.98%	92.84%	98.00%	100%	
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.17%	92.84%	97.73%	100%	

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-MAHARASHTRA & GOA CIRCLE

OPERATOR-ASSISTED DRIVE TEST AT SATARA SSA IN MAY-14 MONTH- MAHARSTRA & GOA CIRCLE

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM		UNINOR		VODAFONE		TATA CDMA		RCOM CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads		98.31%	99.00%	98.20%	99.59%	89.59%	87.74%	97.14%	100%	96.54%	99.17%	97.42%	100%	97.25%	99.60%	97.15%	99.08%	NA	NA	NA	NA	
	Highways		98.53%	98.33%	96.07%	99.82%	85.59%	97.52%	94.21%	100%	93.72%	98.16%	87.62%	100%	91.82%	99.32%	89.21%	98.35%	NA	NA	NA	NA	
	Within City		97.35%	97.07%	97.95%	96.43%	90.78%	96.52%	98.23%	100%	96.70%	97.83%	93.49%	100%	95.86%	92.95%	96.53%	97.29%	NA	NA	NA	NA	
	Overall SSA		97.77%	97.07%	97.91%	98.61%	90.06%	93.90%	97.46%	100%	96.39%	98.39%	94.20%	100%	96.15%	97.25%	96.17%	98.24%	NA	NA	NA	NA	
Service Coverage																							
5	In door (>= -75dBm)	Major Roads	57.08%	98.53%	53.56%	26.01%	66.43%	70.75%	68.78%	67.59%	66.57%	100%	54.93%	95.97%	84.17%	100%	52.23%	100%	82.01%	100%	79.63%	100%	
		Highways	47.75%	96.50%	67.66%	39.54%	83.70%	100%	88.30%	99.68%	85.16%	99.70%	29.55%	60.27%	94.85%	100%	86.80%	99.48%	100%	100%	48.83%	100%	
		Within City	54.40%	100%	61.39%	80.51%	76.33%	35.94%	66.70%	96.65%	81.63%	100%	34.72%	71.43%	85.64%	87.32%	57.56%	99.58%	90.54%	92.48%	78.94%	100%	
		Overall SSA	54.79%	98.34%	60.87%	48.69%	73.67%	68.90%	69.60%	87.97%	76.29%	99.90%	40.45%	75.89%	88.22%	95.77%	65.53%	99.69%	88.26%	97.49%	76.61%	100%	
	In-vehicle (>= -85dBm)	Major Roads	85.15%	100%	82.53%	90.50%	97.76%	99.86%	88.01%	94.83%	90.54%	100%	86.34%	99.63%	96.93%	100%	85.12%	100%	94.45%	100%	94.89%	100%	
		Highways	79.84%	100%	95.05%	88.25%	98.85%	100%	96.57%	100%	99.08%	100%	75.91%	100%	100%	100%	97.38%	100%	100%	100%	76.78%	100%	
		Within City	82.08%	100%	90.39%	99.75%	98.07%	99.85%	90.71%	98.73%	98.29%	100%	69.27%	99.05%	98.14%	100%	85.77%	100%	98.92%	100%	92.72%	100%	
		Overall SSA	82.98%	100%	89.32%	92.83%	98.02%	99.90%	90.47%	97.85%	95.45%	100%	75.04%	99.56%	98.35%	100%	89.42%	100%	97.47%	100%	92.03%	100%	
	Outdoor-in city (>= -95dBm)	Major Roads	96.39%	100%	95.86%	99.94%	99.95%	100%	97.29%	100%	98.46%	100%	98.88%	100%	99.81%	100%	98.14%	100%	100%	100%	99.92%	100%	
		Highways	99.10%	100%	99.74%	99.83%	100%	100%	98.87%	100%	99.85%	100%	98.70%	100%	100%	100%	99.38%	100%	100%	100%	97.45%	100%	
		Within City	97.33%	100%	99.09%	98.98%	99.94%	100%	98.84%	100%	99.94%	100%	91.32%	100%	99.95%	100%	97.45%	100%	100%	100%	96.32%	100%	
		Overall SSA	97.15%	100%	98.23%	99.58%	99.95%	100%	98.36%	100%	99.38%	100%	94.25%	100%	99.92%	100%	98.32%	100%	100%	100%	97.50%	100%	
	6	Call Setup Success Rate	Major Roads	98.06%	100%	100%	100%	97.99%	100%	98.26%	100%	100%	100%	96.64%	100%	98.36%	100%	100%	100%	99.29%	100%	95.77%	100%
			Highways	100%	100%	100%	100%	97.30%	100%	96.55%	100%	94.29%	100%	100%	100%	90.91%	100%	100%	100%	96.43%	100%	96.77%	100%

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-MAHARASHTRA & GOA CIRCLE



OPERATOR-ASSISTED DRIVE TEST AT SATARA SSA IN MAY-14 MONTH- MAHARSTRA & GOA CIRCLE

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM		UNINOR		VODAFONE		TATA CDMA		RCOM CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
	(>=95%)	Within City	99.56%	100%	100%	100%	97.84%	100%	98.59%	100%	100%	100%	85.19%	100%	100%	100%	99.22%	100%	99.60%	100%	99.43%	100%
		Overall SSA	99.03%	100%	100%	100%	97.84%	100%	98.32%	100%	99.50%	100%	89.50%	100%	98.87%	100%	99.47%	100%	99.28%	100%	97.47%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	100%	100%	97.16%	100%	100%	100%	99.49%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	98%	100%	100%	100%	97.96%	100%	100%	100%	100%	100%	99.12%	98.72%	92.86%	100%	100%	100%	100%	100%	100%	100%
		Within City	99%	100%	100%	100%	98.26%	100%	99.09%	100%	100%	100%	98.90%	100%	99.12%	100%	99.62%	100%	100%	100%	100%	100%
		Overall SSA	99%	100%	100%	100%	97.93%	100%	99.66%	100%	99.83%	100%	99.22%	98.98%	98.77%	100%	99.76%	100%	100%	100%	100%	100%

NA: Not Applicable

DRIVE TEST TABLE-3

OPERATOR-ASSISTED DRIVE TEST AT SHOLAPUR SSA IN JUNE-14 MONTH- MAHARSTRA & GOA CIRCLE

S/N	Parameter	Classification of routes Covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM		UNINOR		VODAFONE		TATA CDMA		RCOM CDMA			
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
			1	Call Attempts	Major Roads	NA	25	NA	25	274	25	NA	25	NA	25	NA	25	NA	29	NA	26	NA	25	NA
Highways	247	25			276	25	108	25	285	25	240	25	225	25	363	27	259	25	246	25	222	25		
Within City	251	25			244	25	377	24	260	25	54	25	227	25	482	25	255	25	259	25	225	25		
Overall SSA	498	75			520	75	759	74	545	75	294	75	452	75	845	81	514	76	505	75	447	75		
2	Blocked Call Rate	Major Roads	NA	0.00%	NA	0.00%	1.46%	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%		
		Highways	0.81%	0.00%	0.00%	0.00%	1.85%	4.00%	1.05%	0.00%	0.42%	0.00%	1.33%	0.00%	0.00%	0.00%	0.39%	0.00%	0.00%	0.00%	0.00%	0.00%		
		Within City	0.80%	0.00%	0.00%	0.00%	1.59%	0.00%	0.38%	0.00%	1.18%	0.00%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.39%	0.00%	0.00%	0.00%		
		Overall SSA	0.80%	0.00%	0.00%	0.00%	1.58%	1.35%	0.73%	0.00%	0.81%	0.00%	0.88%	0.00%	0.00%	0.00%	0.19%	0.00%	0.20%	0.00%	0.00%	0.00%		
3	Dropped Call Rate (<=2%)	Major Roads	NA	0.00%	NA	0.00%	1.48%	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%		
		Highways	2.06%	0.00%	0.00%	0.00%	1.89%	0.00%	2.48%	0.00%	0.42%	0.00%	0.89%	0.00%	0.00%	0.00%	1.16%	0.00%	0.00%	0.00%	0.90%	0.00%		
		Within City	0.00%	0.00%	0.00%	0.00%	2.15%	0.00%	1.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.44%	0.00%		
		Overall SSA	1.02%	0.00%	0.00%	0.00%	1.87%	0.00%	2.22%	0.00%	0.21%	0.00%	0.44%	0.00%	0.00%	0.00%	0.58%	0.00%	0.00%	0.00%	0.67%	0.00%		
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Percentage connections with good voice quality (=>95%)																						
		Major Roads	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	NA	90.88%	NA	100%	
		Highways	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	94.91%	93.43%	99.76%	100%	
		Within City	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	95.96%	93.01%	99.70%	100%	
Overall SSA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	*NA	95.51%	91.81%	99.73%	100%			

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-MAHARASHTRA & GOA CIRCLE



OPERATOR-ASSISTED DRIVE TEST AT SHOLAPUR SSA IN JUNE-14 MONTH- MAHARSTRA & GOA CIRCLE

S/N	Parameter	Classification of routes Covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM		UNINOR		VODAFONE		TATA CDMA		RCOM CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
			(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	NA	99.26%	NA	98.44%	89.51%	88.74%	NA	99.84%	NA	97.21%	NA	96.30%	NA	95.53%	NA	99.63%	NA	NA
Highways	97.29%	99.16%		98.19%	99.27%	91.83%	97.52%	98.30%	99.32%	95.93%	96.52%	96.58%	100%	96.83%	95.88%	93.18%	98.41%	NA	NA	NA	NA	NA
Within City	96.47%	98.92%		97.71%	99.61%	94.32%	96.52%	98.93%	99.93%	96.43%	99.29%	96.41%	99.55%	97.00%	97.51%	96.25%	96.90%	NA	NA	NA	NA	NA
Overall SSA	96.88%	99.12%		97.96%	99.11%	92.68%	94.21%	98.63%	99.69%	96.18%	97.67%	96.51%	98.99%	96.92%	96.26%	94.94%	98.31%	NA	NA	NA	NA	NA
Service Coverage																						
5	In door (>= - 75dBm)	Major Roads	NA	98.31%	NA	80.88%	67.31%	46.82%	NA	99.30%	NA	99.67%	NA	88.12%	NA	100%	NA	99.81%	NA	100%	NA	100%
		Highways	47.13%	100%	64.81%	68.30%	67.76%	82.00%	47.09%	99.20%	87.24%	99.40%	48.49%	100%	80.82%	100%	85.49%	100%	82.74%	100%	61.58%	100%
		Within City	59.68%	100%	73.02%	14.52%	78.31%	92.50%	75.49%	95.10%	96.72%	100%	61.74%	98.25%	93.69%	100%	95.32%	95.86%	91.71%	100%	74.40%	100%
		Overall SSA	54.27%	99.65%	71.02%	55.74%	73.94%	73.98%	61.24%	97.88%	92.28%	99.36%	54.27%	96.33%	90.00%	100%	91.04%	98.56%	87.25%	100%	67.16%	100%
	In-vehicle (>= - 85dBm)	Major Roads	NA	100%	NA	97.73%	94.94%	96.20%	NA	100%	NA	99.68%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%
		Highways	76.19%	100%	88.78%	99.35%	93.98%	97.10%	82.22%	100%	99.05%	99.89%	81.08%	100%	95.16%	100%	97.90%	100%	99.25%	100%	87.28%	100%
		Within City	86.54%	100%	92.94%	92.58%	94.63%	99.85%	96.80%	100%	99.69%	100%	89.88%	100%	98.74%	100%	99.35%	99.57%	99.92%	100%	90.79%	100%
		Overall SSA	82.08%	100%	91.87%	96.60%	94.60%	97.71%	89.48%	100%	99.37%	99.86%	84.92%	100%	97.92%	100%	98.72%	99.86%	99.59%	100%	88.81%	100%
	Outdoor-in city (>= - 95dBm)	Major Roads	NA	100%	NA	99.95%	99.64%	100%	NA	100%	NA	99.79%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%
		Highways	96.65%	100%	99.09%	100%	99.93%	100%	97.94%	100%	99.87%	100%	98.26%	100%	99.50%	100%	99.79%	100%	100%	100%	98.39%	100%
		Within City	97.61%	100%	99.20%	99.63%	99.93%	100%	100%	100%	99.95%	100%	99.34%	100%	99.76%	100%	99.89%	99.97%	100%	100%	98.91%	100%
		Overall SSA	97.19%	100%	99.87%	99.86%	99.86%	100%	98.97%	100%	99.91%	99.93%	98.73%	100%	99.80%	100%	99.85%	99.99%	100%	100%	98.62%	100%
6	Call Setup Success Rate	Major Roads	NA	100%	NA	100%	96.72%	100%	NA	100%	NA	97.21%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%
		Highways	98.79%	100%	100%	100%	94.44%	96.00%	98.95%	100%	95.93%	96.52%	98.67%	100%	98.62%	100%	99.61%	100%	100%	100%	100%	100%

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-MAHARASHTRA & GOA CIRCLE



OPERATOR-ASSISTED DRIVE TEST AT SHOLAPUR SSA IN JUNE-14 MONTH- MAHARSTRA & GOA CIRCLE

S/N	Parameter	Classification of routes Covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM		UNINOR		VODAFONE		TATA CDMA		RCOM CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
			(>=95%)	Within City	99.20%	100%	100%	100%	97.08%	100%	99.62%	100%	96.43%	99.29%	99.56%	100%	99.59%	100%	100%	100%	99.61%	100%
	Overall SSA	99.00%	100%	100%	100%	96.57%	98.65%	99.27%	100%	96.18%	97.67%	99.12%	100%	99.17%	100%	99.81%	100%	99.80%	100%	100%	100%	
7	Hand Over Success Rate (HOSR)	Major Roads	NA	100%	NA	100%	97.41%	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	100%	100%	100%	100%
		Highways	98.67%	100%	100%	100%	95.51%	100%	99.32%	100%	99.50%	100%	98.58%	100%	100%	100%	97.61%	100%	100%	100%	100%	100%
		Within City	99.32%	100%	100%	100%	98.89%	100%	100%	100%	100%	100%	99.21%	100%	100%	100%	99.28%	100%	100%	100%	100%	100%
		Overall SSA	99.04%	100%	100%	100%	97.89%	100%	99.69%	100%	99.72%	100%	98.90%	100%	100%	100%	98.42%	100%	100%	100%	100%	100%

Note: - NA: Major roads covered as a within city so data include in within city and *NA: Not Applicable

Uninor: call duration taken 60 Sec in place of 120 Sec.

7.1 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 4

DRIVE TEST ROUTE OF APRIL TO JUNE - 14 – MH&G CIRCLE							
Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
PUNE	Apr-14	Saswad ,Baramati, Walchandnagar, Indapur, Dund,Kedgaon, / 102 KM	1) SASWAD----> PMT Bus Stand - Sopan Nagar - Sodanki Towers - City Bus Stand - Amar Chowk - Bajirao Peth - Saske Vishram Gruh 2) BARAMATI----> Dattawadi Morgaon - Saatav Nagar - Revenue Colony - Bajirao Kale Nagar - Cinema Road - Bus Stand - Rlwy Station - Shriram Nagar - Sanghavi Nagar - Hotel City Inn - Pencil Chowk - MIDC - RTO - Jadhochi - Pimpri 3) WALCHAND NAGAR----> Shivaji Nagar - Walchand Nagar - Ambedkar Bhavan - Bus Stand - Dhawalpuri - Jadhav Chowk - Kalamb - Bus Stand 4) INDAPUR----> Bus Stand - Anuradha Complex - Rajevali Nagar - Bus Depot - Akluj Road - Vyankatesh Nagar - Radhika Nagar - Shriram Nagar - Arunoday Nagar - NH-9 5) DAUND----> Borawke Nagar - Bhagat Singh Chowk - City Pride Complex - Rlwy Station - Bhim Nagar - Hind Talkies - Daund Patas Road - Post Office - Main Road 6) KEDGAON----> Kedgaon Road - Kedgaon - Rlwy Station INDOOR: BHAGWATI CHEMBERS (DAUND)	Pune,Chinchawad, Khadakwasla, Pirangut,Ionawal, / 109 KM	1) PUNE----> Bhawani Peth - Swargate Bus Stand - Bajirao Road - Appa Badwan Chowk - P.M.C. - J.M. Road - Shivaji Nagar - University Road - S.B. Road - Vetadbaba Chowk - Model Colony - Nai Stop - Mhatre Bridge - Dattawadi - Sinhgad Road - Dhayari 2) KHADAKWASLA----> Nanded Phata - Kirkitwadi - Khadakwasla Damm 3) PIRANGUT----> Pirangut MIDC - Paud Road - Ghotawade Phata - MIDC - Shivshakti Chowk - Shindewadi - Hinjewadi Road 4) LONAVALA----> Neeta Hotel - Walvan - Nangargaon - Shantivan - Bhangarwadi - Market Road - M.G. Road - Rlwy Station - Khandala Road - Bus Stand - Gawadiwada 5) CHINCHWAD----> Bhakti Shakti Chowk - Chinchwad Chowk - Telco Road - MIDC - K.S.B. Chowk - Yamuna Nagar - Spine Road - Nigdi - Aakurdi - Chinchwad Rlwy Station - Lokmanya Hospital - Pimpri MIDC - Morwadi - Pimpri. INDOOR: SHUBHAM GALLERIA COMPLEX (PIMPRI)	Rajguru Nagar, Manchar,Junnar & Shirur / 110 KM	1) RAJGURUNAGAR----> Bus Stand - Khed - Madimada - Wada Road - Bus Stand - Pabad Road - Bus Stand - Nashik Road 2) MANCHAR----> Gowardhan Factory - Pune Nashik Road - Bhimashankar Road - Sambhaji Chowk - Mudewadi - Nashik Road 3) JUNNAR----> Junnar Road - Shivaji Chowk - Nehru Bajar - Sada Bajar Peth - Godegaon 4) SHIRUR----> Ahmednagar Road - Ganesh Nagar - Bus Stand - Gopal Colony - Maltn Road - Kaapadi Bajar - Bus Stand - Ramling Shirur Road INDOOR: APMC BUILDING (SHIRUR)
SATARA	May-14	Koregaon , Pusgaon , Vaduj , Dahiwadi , Mhaswad/ 103 KM	1) KOREGAON----> (a) Major Road--> Koregaon Rlwy Station - Jalgaon Naka - Kumthe Phata (b) Within City--> Ajinkya Nagar - Bajarpeth - Bus Stand - Laxmi Nagar - BSNL Office 2) PUSEGAON----> (a) Major Road--> Satara-Pusegaon Rd - Main Rd - Dahiwadi Rd - Vaduj Rd (b) Within City--> Vaduj Rd - Shivthar - Bus Stand - Vaduj Rd 3) VADUJ----> (a) Major Road--> Vaduj Rd - Bus	Satara , Karad , Patan / 106 KM	1) SATARA----> (a) Major Road--> Powai Naka - Gururwar Peth - Shukrawar Peth (b) Within City--> Shukrawar peth - Pratapganj Peth - Shahupuri - Karanje Peth - Visawa Naka - MIDC - Shivaji Nagar - Rahimatpur Road - Kodoli - Sambhaji Nagar - Godoli - Kamathipura - Powai Naka - Bus Stand - Shahu Stadium - Shreenath Colony - NH4 (c) Highway--> NH4 - Yashoda Technical Campus - Maatoshri Park - Satara - Yashoda Nagar Godoli 2) KARAD----> (a) Highway--> NH4 - Karad - Malkapur - Karad (b) Within City--> BSNL Office - Shaniwar Peth	Medha , Mahabaleshwar , Wai , Wather , Palthan / 109 KM	1) MEDHA----> (a) Major Road--> Ritkawali - Medha - Bus Stand - Ambedkar Nagar - ITI College (b) Within City--> Medha - Bajarpeth - MSEB Office - Bus Stand 2) MAHABALESHWAR--> (a) Major Road--> Main Rd - Wilson Point - Bus Stand - Lodwik Point - MTDC - Canaught Peak - Kates Point - South Main Rd - Murry Peth - Bus Stand 3) WAI----> (a) Major road--> Wai Rd -

			<p>Stand - Karad Rd - Kuroli Phata (b) Within City--> Karad Rd - Shivaji Chowk - Vitthal Nagar - Bhagoday Nagar - Main Peth Rd - Karad Rd</p> <p>4) DAHIWADI--> (a) Major Road--> Dahiwadi Rd - Bus Stand - Ekta Nagar - Chaitanya Nagar (b) Within City--> Ekta Nagar - Balaji Nagar - Bus Stand - Bidal Road</p> <p>5) MHASWAD--> (a) Major Road--> Mhaswad Rd - Bus Stand - Pandharpur Rd (b) Within City--> Madi Galli - Ambedkar Nagar - Malhar Nagar - Sayaji Nagar - Police Station - BSNL Office</p> <p>Indoor: Abdagiri Complex, Mhaswad</p>	<p>- Datta Chowk - Shukrawar Peth - Somwar Peth - Mangalwar Peth - Saidapur - Banwadi - Oglewadi - Shaniwar Peth - Bus Stand - Market Yard - Sambhaji Nagar - Malkapur - Aagashiv Nagar (c) Major Road--> Aagashiv Nagar - P.B. Road - Talbhag - Shaniwar Peth - Datta Chowk - Station Rd - Bus Stand - Shaniwar Peth - Patan Rd</p> <p>3) PATAN--> (a) Major Road--> Patan Rd - Mhawshi Phata - Karad-Chiplun Rd - Ram Nagar - Ramapur (b) Within City--> Chafoli Rd - Yashwant Colony - Indira Nagar - Main Rd - Zenda Chowk - Bus Stand - Bajarpeth</p> <p>Indoor: Market Yard building, Patan</p>	<p>Bus stand - Pune Rd - Shahabag (b) Within City--> Bhadeshwar Nagar - Yashwant Nagar - Bus Stand - Gangapuri - Dhamapuri - Raviwar Peth - MIDC - Songirwadi - Pune Rd - Shahabag</p> <p>4) WATHAR--> (a) Major Road--> Wathar Rd - Wathar Station - Aadarsh Ngar - Indira Nagar</p> <p>5) PHALTAN--> (a) Major Road--> Phaltan Rd - Farandwadi - BSNL Exchange - Ring Rd (b) Within City--> Ring Rd - Laxmi Nagar - Mangalwar Paeth - Bhim Nagar - Raviwar Peth - Shivaji Chowk - Bus Stand - Ram Nagar - Market Yard - Ring Rd - Kolki - Gharsoli Ground</p> <p>Indoor: Nimbalkar Shopping center Palthan</p>
SHOLAPUR	Jun-14	Akkalkot, Solapur / 115 KM	<p>AKKALKOT--> (a) Highway--> Ambedkar Chowk - Telephone Exchange - Hannur Road - Karanja Chowk - Manik Peth - Maidargi Road - Kazi Colony - Station Road - Shivpuri //SOLAPUR--> (a) Highway--> NH9 - Ganesh Nagar - Bale - Barshi Road - Mukund Nagar - Shalgy - Bijapur Road - Hussain Nagar - Police Head Office</p> <p>Indoor: Prism Complex, Solapur</p>	<p>Mangalwedha, Sangola, Malsiras, Pandharpur / 102 KM</p> <p>1) MANGALWEDHA--> (b) Highway--> Solapur-Mangalwedha Highway - Borale Naka - Daamaji Chowk - Bus Stand - Pandharpur Road - Yashwant Nagar - Bypass Road (c) Within City--> Bypass Rd - Borale Naka - Madi Galli - BSNL Exchange - Tahseel Office - Nagarpalika - Damaji Rd - Damaji Chowk</p> <p>2) SANGOLA--> (a) Highway--> Sangola Rd - Miraj Rd - Kadlas Naka - Bus Stand - Wasud Road - Sangli Road - Rlwy Station - Pandharpur Rd - Akluj Rd - MahaTransco (b) Within City--> Civil Court - Maske Nagar - Bus Stand - Kacheri Rd - Trimurti Talkies - BSNL Office - Main Rd - Tahseel Office</p> <p>3) MALSIRAS--> (a) Within City--> Akluj Rd - Mhaswad Rd - Court - Shantinath Nagar - Bus Stand</p> <p>4) PANDHARPUR--> (a) Highway--> Vakhari - Pandharpur Rd - Hotel Sahara Inn - Bhatumbare - Govind Pura (b) Within City--> Junipeth - Bhosale Chowk - Station Rd - BSNL Exchange - Bus Stand - Navi Peth - Indira Gandhi Market - Saarda Bhavan - Mahadwar Chowk - Ghongdi Bajar - Navipeth - Tiranga Nagar - Link Rd- Rlwy Station - Sangola Rd - Bus Stand</p> <p>Indoor: City Bus Stand Complex, Pandharpur</p>	<p>Mohol, Madha, Barshi /109 KM</p> <p>1) MOHOL--> (a) Highway--> NH9 - Mohol - Bijapur Hgwy - Pandharpur Rd - Bus Stand - Pune Hgwy - Barshi Rd (b) Within City--> BSNL Exchange - Sambhaji Raje Chowk - Deshmukh Chowk - Aadarsh Chowk - Bhaji Mandai Chowk - NH9 - Bus Stand</p> <p>2) MADHA--> (a) Highway--> Madha Rd - Solapur Rd - Bus Stand - Vairag Rd - Barshi Rd - Shetphal Rd (b) Within City--> Shukrawar Peth - Kasba Peth - Mangalwar Peth - Tahseel Office - Yashwant Nagar - Kurduwadi Rd</p> <p>3) BARSHI--> (a) Highway--> Kurduwadi Rd - Paranda Rd - Kasba Peth - Somwar Peth - Latur Rd- ADC - Hotel Status - Aagadgaon Rd- Bus Stand - Tuljapur Rd (b) Within City--> Bus Stand - Bhawani Peth - Somwar Peth - Kasba Peth - Shivaji Nagar - Alipur Rd - Uplai Rd - Naikwadi - Paranda Rd - Junives - Subhash Nagar - Bus Stand.</p> <p>Indoor : Bus Stand Complex, Barshi</p>

7.2 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 5

DRIVE TEST OBSERVATION OF PUNE SSA (APRIL-14)

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Saswad ,Baramati, Walchandnagar, Indapur,Dund, Kedgaon	Poor Rx Level at walchand nagar Ambedkar park, Kedgaon	Pune, Chinchawad, Khadakwasla, Pirangut, lonawal.	Poor Rx Level & quality at Lonawala (lake view Resort), Poor Quality at Khadakwasla & Pimpri Chinchwad	Rajguru Nagar,Manchar,Junnar & Shirur.	Rx Level Poor at Shiroor
2	AIRTEL		Poor Rx Quality at BARAMATI		--		--
3	BSNL		Poor Rx Quality at saswad MIDC, Baramati (Court)		Poor Voice Quality At Om Market(Pune) Shukrawar Exchange , karve Nagar, Hingane; Chinchwad AkruDi Chowk, Bijli nagar		Poor Rx Quality at Shiroor
4	IDEA		Poor Rx Level at Awdhoot Nagar, DAUND(SRPF camp) Indapor (Rag Ragini Road) ; Poor Rx Quality at Baramati(Awdhoot Nagar)		Poor Rx Quality at Lonawala, Nigdi		Poor Rx Quality at Some Places at Manchar area
5	UNINOR		Poor Rx Level At Suryanagri, MIDC BARAMATI, Ambedkar Park (Walchand Nagar)		Poor Rx Quality at Some Places at Pirangute & Chinchwad (Pimpri Chikli Road) ; Poor Rx Level & Rx Quality At valvan and Mumbai - Pune Express Highway		--
6	VODAFONE		Poor Rx Level at ThakurGali(Indapur); Poor Rx quality at Kedgaon		Poor Rx Quality at Some Places at Chichwad		Poor Rx Level at Manchar
7	TATA GSM		Poor Rx Quality at Kumbharwadi (Saswad) Rx Level & Quality Poor at Pimpri Village(Baramati)		Poor Rx level & Quality At KhadakWasla Village, Premlok Park, AkruDi , Temghar Lavasa road Near Kirloskar Company, Poor Rx Level & quality in Lonawala (Raheja resort , Valvan village)		Poor Rx Level & Rx Quality Junnar - Narayan Gaon Road
8	TATA CDMA		--		Poor Rx quality spot over at Khandekar Chowk		--
9	RCOM GSM		Poor Rx Level at walchand nagar Ambedkar park, Kedgaon		Poor Rx quality spot over at Singad Road Higne Khurd (Pune) ; Khadakwasla (Nanded Phata); Poor Rx Level and Quality at Lonawala		Poor Rx Level & Rx Quality at Shiroor Singhavi Road
10	RCOM CDMA		--		Poor Rx level & Quality At Mumbai -Pune Express Way(Lonawala)		Poor Rx Level & Rx Quality at Shiroor Shivling Road; Rajguru Nagar

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF SATARA SSA (MAY-14)

S NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Koregaon , Pusgaon , Vaduj , Dahiwadi , Mhaswad	--	Satara , Karad , Patan	Poor voice quality observed at Satara highway	Medha , Mahabaleshwar , Wai , Wather , Palthan	Poor voice quality observed at Wai city
2	AIRTEL		--		--		
3	BSNL		Poor voice quality observed at All over Dahiwadi & Mhaswad		Poor voice quality observed at All over satara highway,		Poor voice quality observed at all over Palthan city
4	IDEA		--		Poor Quality Location– Near HP Petrol Pump, NH4 Satara		Poor voice quality observed at Hotal regal & Tharmex guest house due to hilly area
5	UNINOR		Poor voice quality observed at Dahiwadi mazor road,		--		--
6	VODAFONE		--		--		--
7	TATA GSM		--		Poor voice quality observed at Satara Wadhe village highway, Yashwantrao park karad		Poor voice quality observed at near horse riding ground, Polo ground road, Sultanpur wai,
8	TATA CDMA		--		--		Bad Quality patches nearby wheat rust research station and hotel Apsara
9	RCOM GSM		Koregaon, Man, Karanje Peth		Poor voice quality observed at Mangalwar Peth Karad, Hajarmachi Road, Karad		Poor voice quality observed at Wai, Mahabaleshwar
10	RCOM CDMA		--		Satara Sahupuri,		Chandgad Town Wai, Mahabalswer

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF SHOLAPUR SSA (JUNE-14)

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Akkalkot, Solapur	Poor voice quality observed at Pune- Solapur highway,Solapur Hydrabad Highway,Damani nagar	Mangalwedha, Sangola, Malsiras, Pandharpur	Poor Rx Level observed at Phandarpur and Mohol Road,Sangola Naka,Bandheshivgaon Road	Mohol, Madha, Barshi	Poor Rx Level observed at Mohol Mumbai Highway,Mohol bypass, Barsi Tuljapur Road,Barsi Highway
2	AIRTEL		--		Poor voice quality & Rx level observed at Pandharpur_Highways ner laxmi palace,Malsirash/ Barsi:Poor level Barshi_Highway		--
3	BSNL		Poor voice quality observed all over SDCA (Poor level at Akkalkot,mulegaon road,Avanti road,Anna chauk,Wadia chauk,Wadia Hospital)		Poor voice quality observed all over SDCA (Mangalwedha bypass road / Sangola kedlas road		Poor voice quality observed all over SDCA (Madha station road/Barsi: Ash nagar,Hagwant mandi,kurduwadi road.
4	IDEA		--		Sangola:Near Sangola College, Sangola to Kadlas HW,Near Sangmitra Ganesh Mandal, Sangola to Mahud HW,/Pandharpur: Pandharpur to Gursoli Highway		--
5	UNINOR		Poor voice quality observed at Datta nagar,Geeta nagar,Ganga tower		--		--
6	VODAFONE		Poor voice quality observed at Solapur:Geeta-Laudge,Bhawani Peeth,Adityanagar/Akkalkot:K onhati,Manik peth		Poor voice quality observed at Pandharpur Koligalli		Poor voice quality observed at Barshi: Siwaji nagar ,bypass road
7	TATA GSM		Poor voice quality observed at Gannesh Nagar,Saat rasta		--		Poor Rx Level observed at Siwaji nagar Barsi,Mohol state highway
8	TATA CDMA		--		Poor Rx Level observed at Pandharpur ganesh nagar		--
9	RCOM GSM		Poor voice quality & Level observed at Solapur to Akkalkot Highway, Datta nagar,Geeta nagar,Ganga tower		Poor voice quality & Level Sangola to Pandharpur Highway,Pandharpur,Sangola to Pandharpur Highway		Poor voice quality & Level Barsi:Mahatma Gandhi Statue
10	RCOM CDMA		--		--		Poor voice quality & Level Barsi:Mahatma Gandhi Statue,Cancer Hospital,Latur Road,Bas stand

7.3 KEY FINDINGS ON DRIVE TEST:

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

- (i) **In the Month of April-14**, drive tests were conducted across Pune SSA covering Saswad , Baramati, Walchandnagar, Indapur, Dund,Kedgaon, Pune,Chinchawad, Khadakwasla, Pirangut, Ionawal, Rajguru Nagar, Manchar, Junnar & Shirur SDCAs. The performance of the service providers was satisfactory from bench mark compliance point of view for most of the parameters. However, **BSNL** lagged behind its performance for parameters **'Voice Quality' and 'Call setup success rate'** with its performance as **94.67% (outdoor) / 92.83% (Indoor) and 94.83%** respectively on overall SSA basis. Indoor performance of **RCOM (GSM)** and **Uninor** for parameter **'Voice Quality'** on SSA basis remained under performed with their performance as **93.91% and 91.35%** respectively. Further, **RCOM (GSM)** also lagged behind in doing well with respect to the **Blocked Call rate (3.40%)**.
- (ii) **In the Month of May-14**, drive test was conducted across Satara covering Koregaon , Pusgaon , Vaduj , Dahiwadi , Mhaswad, Satara , Karad , Patan, Medha , Mahabaleshwar , Wai , Wather & Palthan SDCAs. The results of the drive test indicate that the some of the service providers are not doing well on the Highways as they lagged behind in respect of the parameters Call drop rate, Voice Quality, CSSR and Blocked call rate.. **BSNL could not comply with the benchmark of the parameters 'Call drop rate' and 'Voice Quality' with its achievement as 2.21% and 90.06% (outdoor) / 93.90% (Indoor)** respectively. **RCOM (GSM)** lagged behind in meeting the benchmark of **'Voice Quality', Call setup success rate and Blocked Call Rate** with its performance as **94.20%, 89.50% and 9.55%** respectively on SSA level. **Tata (CDMA)** could not do well in indoor performance for parameter **'Voice Quality' (92.84)**.
- (iii) **In the month of June -14**, drive test was conducted across Sholapur SSA covering Akkalkot, solapur, Sangola, Mangalwedha, Sangola, Malsiras, Pandharpur, Mohol, Madha and Barshi SDCAs. The performance with respect to the parameter **'Voice quality'** remained under performed for **BSNL, Vodafone and Tata(CDMA)** with their achieved level as **92.68%(outdoor) / 94.21%(Indoor), 94.94 and 91.81%(Indoor)** respectively. **Tata (GSM)** could not meet the benchmark of **Call Drop rate (2.22%)**.
- (iv) The deficiencies with respect to adequate coverage and poor voice quality, encountered by different Service providers at the various places as shown in the drive tests plots, are detailed in the above table.-5, table-6 and table-7 for Pune, Satara and Sholapur SSAs respectively.

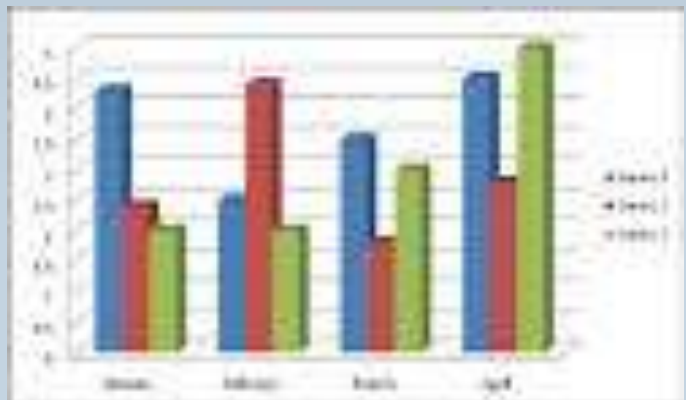
Thus the analysis of Drive tests results revealed that Service providers namely BSNL, RCOM (GSM), Tata (GSM) / (CDMA) need to improve their network performance with respect to the parameters Voice Quality, Call Drop rate and Call setup success rate.

8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

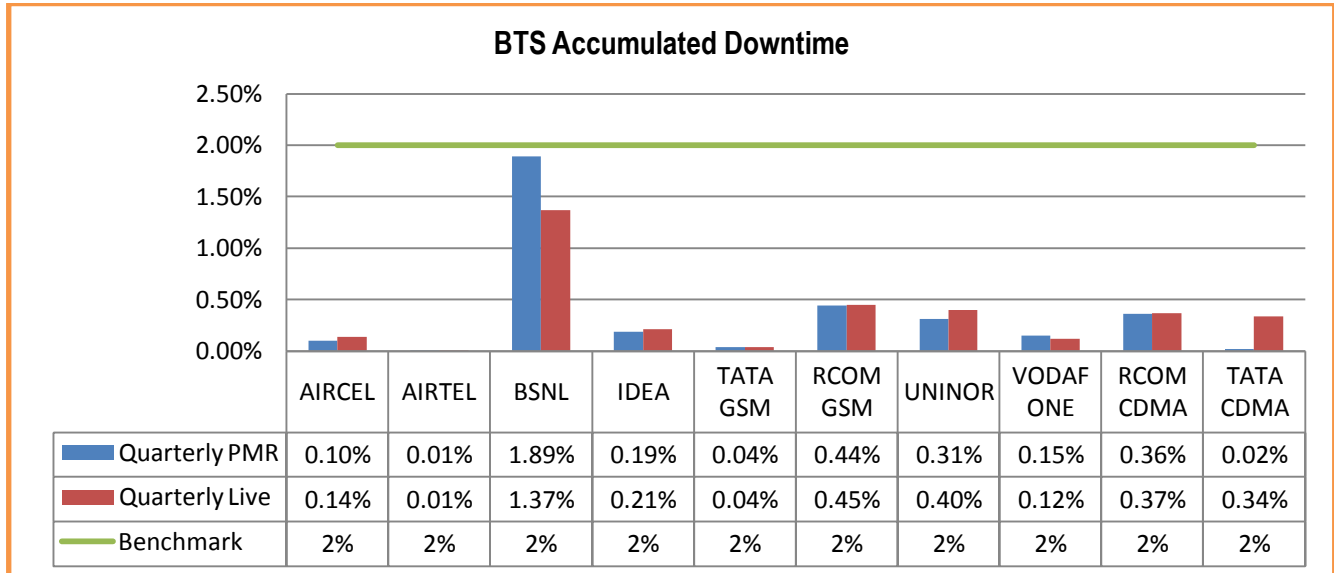
AVERAGED QUARTERLY 3-DAYs LIVE MEASUREMENT



8) GRAPHICAL REPRESENTATION:

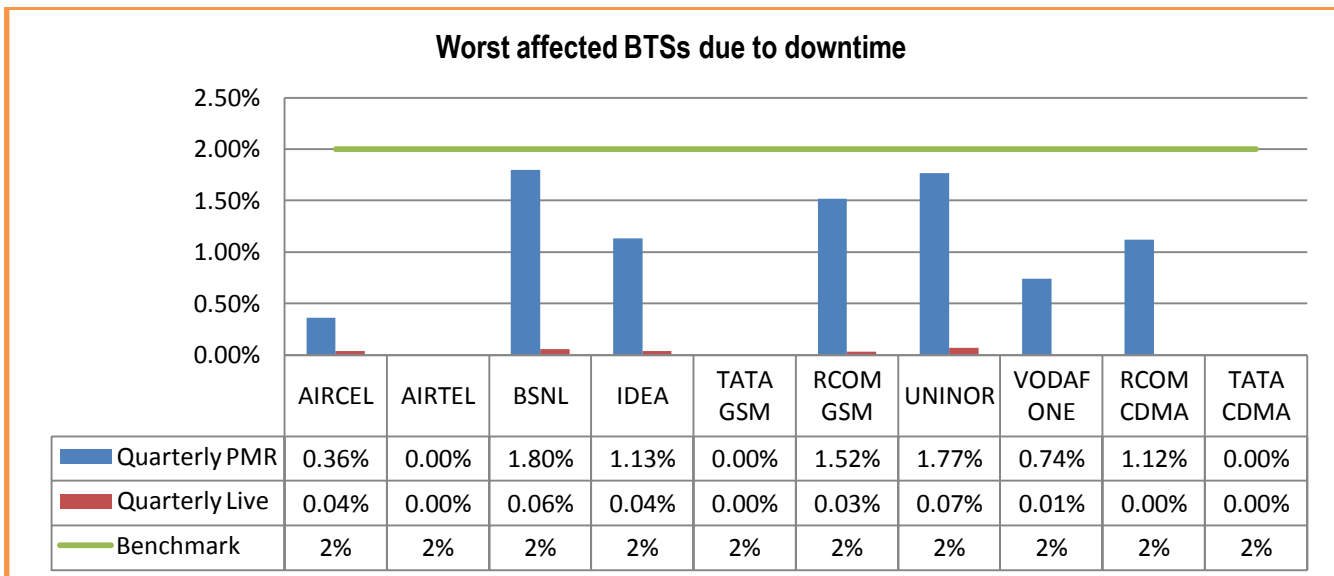
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

1) BTS ACCUMULATED DOWNTIME:



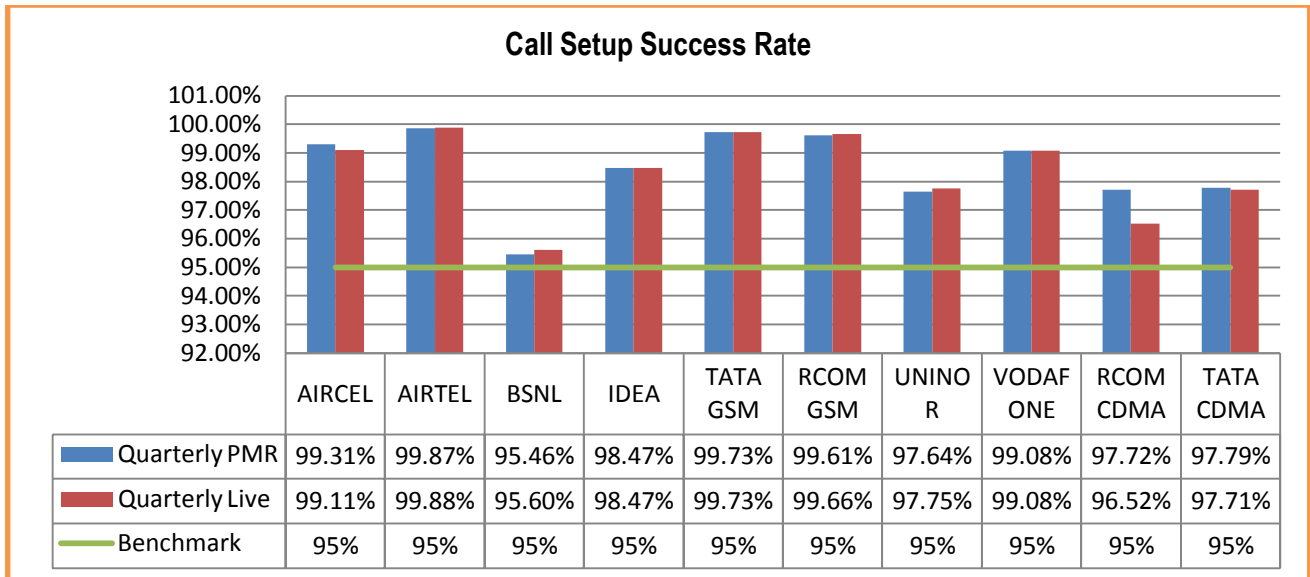
All operators are meeting the benchmarks.

2) WORST AFFECTED BTSS DUE TO DOWNTIME:



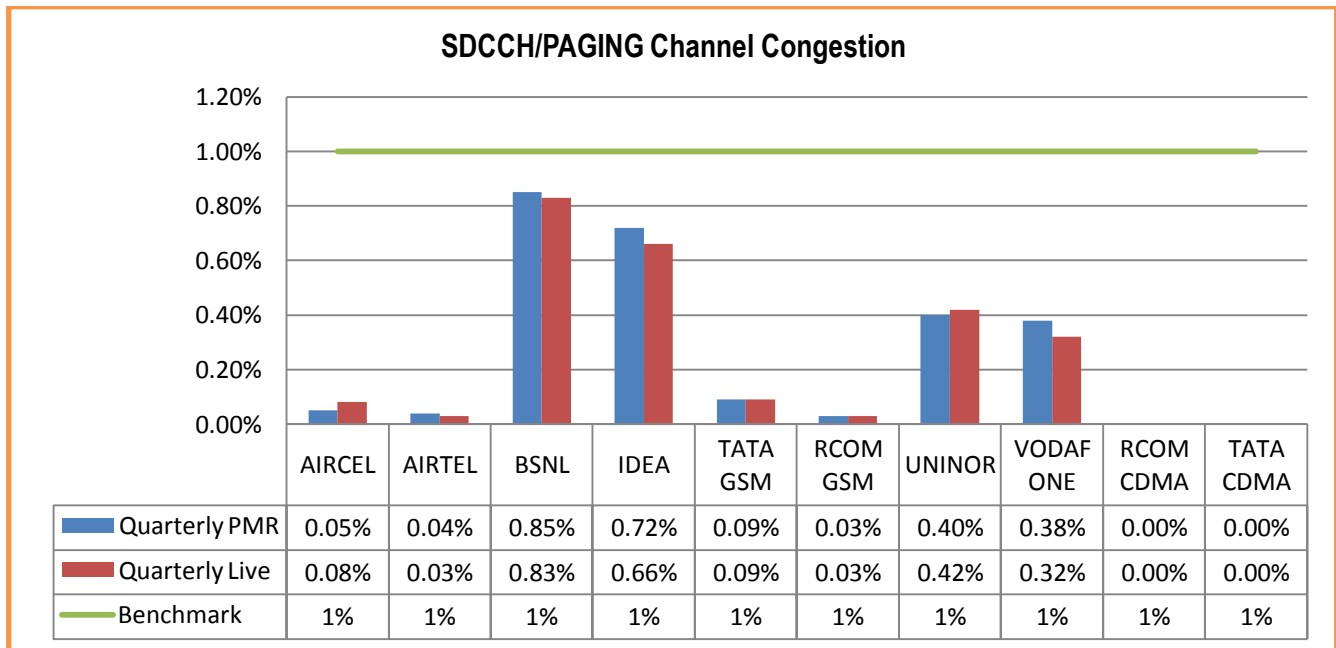
All operators are meeting the benchmarks.

3) CALL SETUP SUCCESS RATE :



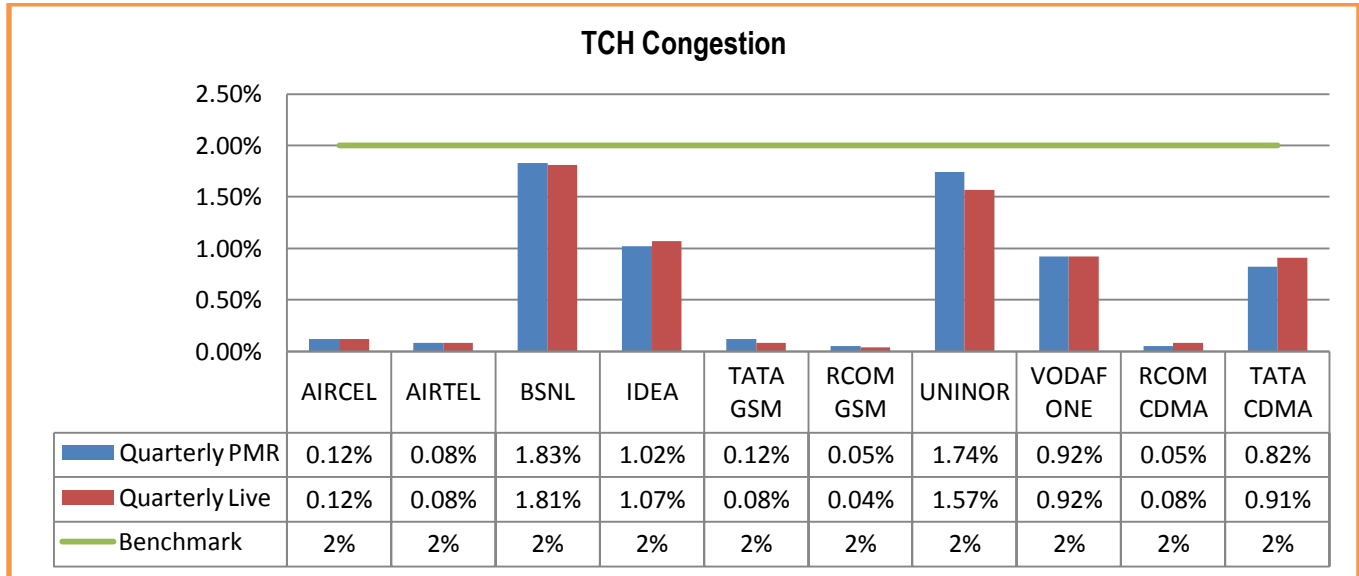
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION :



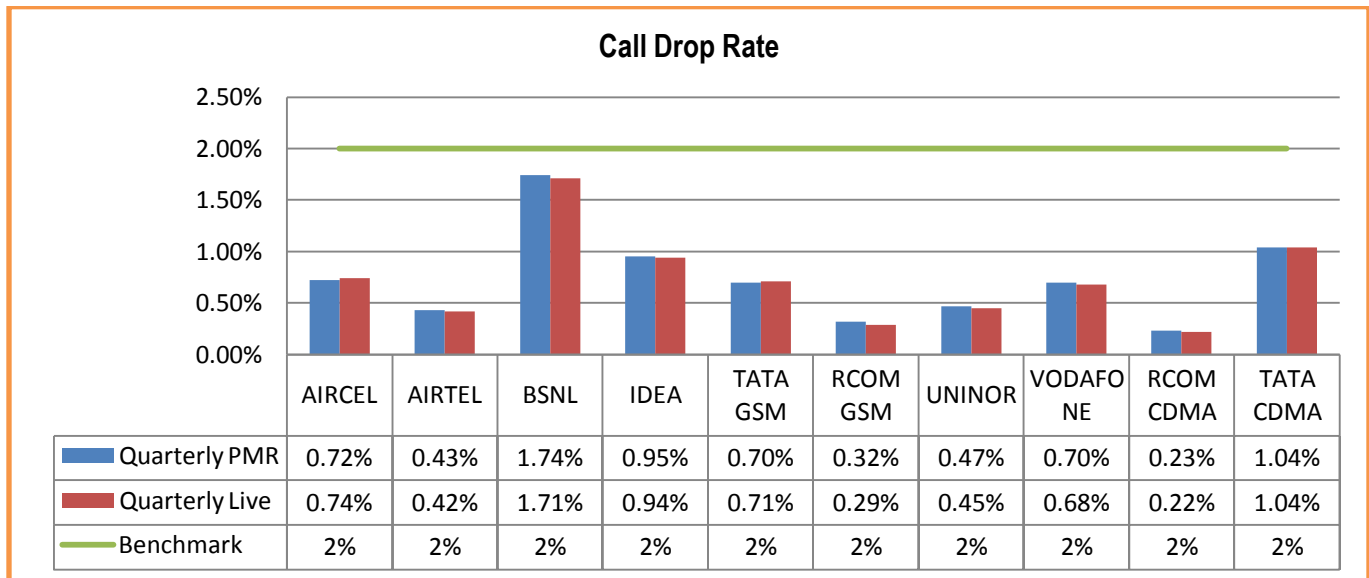
All operators are meeting the benchmarks.

5) TCH CONGESTION:



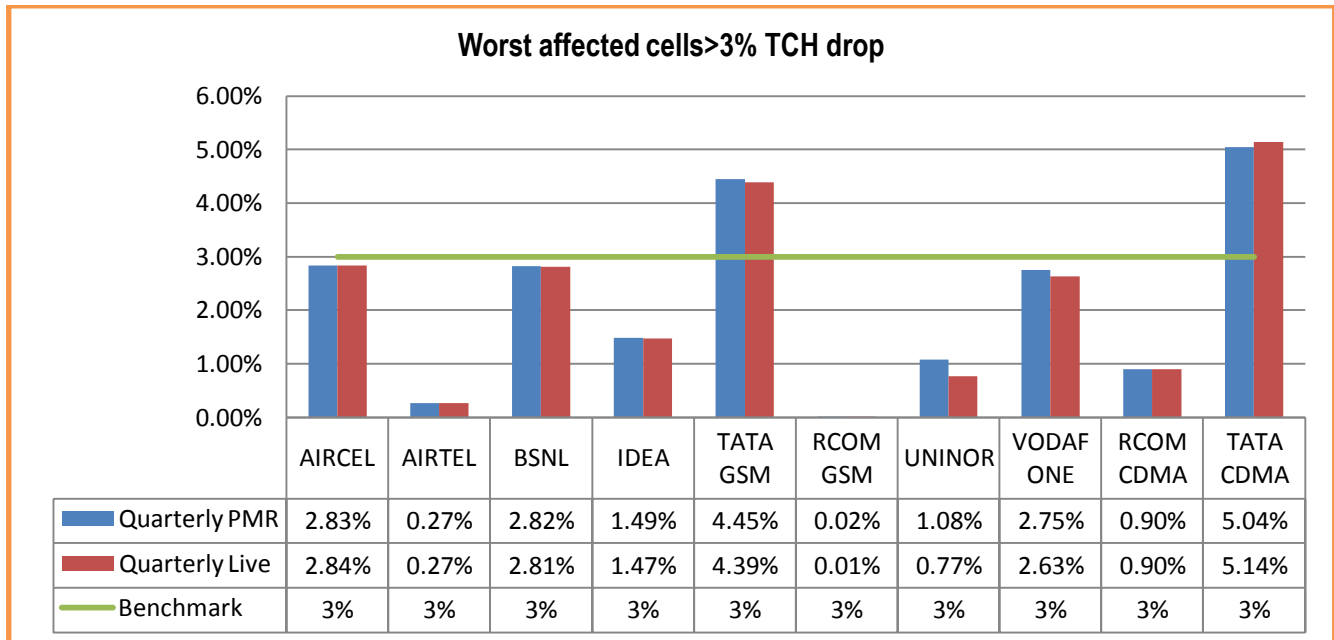
All operators are meeting the benchmarks.

6) CALL DROP RATE:



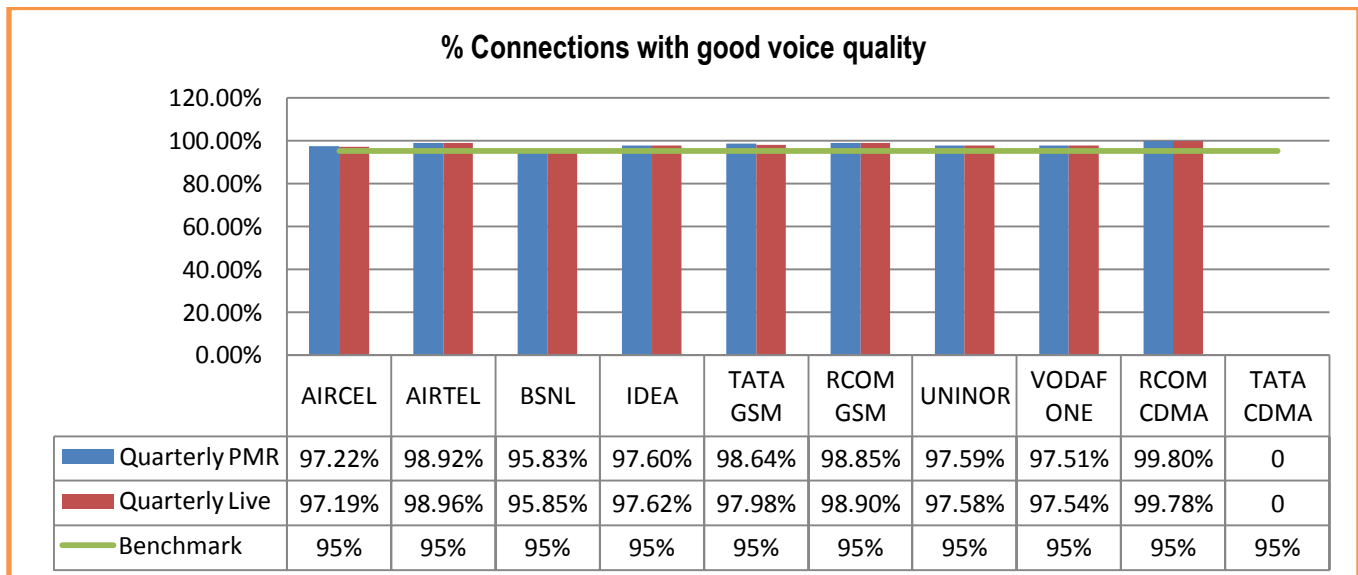
All operators are meeting the benchmarks.

7) WORST AFFECTED CELLS>3% TCH DROP:



All operators except Tata GSM and Tata (CDMA) are meeting the benchmarks.

8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:



All operators are meeting the benchmarks. Tata CDMA has not provided data for the parameter "Connections with good voice quality" because OMCR does not support this parameter.