



**Audit & Assessment of Quality of Service
Of
Cellular Mobile Telephone Service
For
Telecom Regulatory Authority Of India
West Zone – Maharashtra & Goa Service Area
(July 2014 – September 2014)**

**Prepared by:-
TÜV SÜD SOUTH ASIA PVT. LTD,
C-153/1, Okhla Industrial Estate,
Phase-1, New Delhi – 110020
Telephone 011- 30889611
Fax: 011-30889595**

PREFACE

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

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

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



Index of Contents

1) BACKGROUND..... 6

2) OBJECTIVES AND METHODOLOGY 8

3) SAMPLE SIZE 10

 3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS. 10

 3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES 11

 3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS 11

4) EXECUTIVE SUMMARY 13

5) PMR AUDIT REPORTS:..... 16

 5.1 MONTHLY PMR:..... 16

 5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS: 16

 5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS:..... 16

 5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JULY 14 MONTH: 17

 5.1.4 QOS PERFORMANCE OF MONTHLY PMR – AUGUST 14 MONTH: 18

 5.1.5 QOS PERFORMANCE OF MONTHLY PMR – SEPTEMBER 14 MONTH: 19

 5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- SEPTEMBER-14 (JULY TO SEPTEMBER MONTHS AUDITED DATA)..... 20

 5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS: 21

 5.2 LIVE MEASUREMENT DATA (3-DAYS) FOR CELLULAR MOBILE SERVICE PROVIDERS (NETWORK SERVICE QUALITY PARAMETER): 24

 5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – JULY 14 MONTH: 24

 5.2.2 LIVE MEASUREMENT DATA (3-DAYS) – AUGUST-14 MONTH: 25

 5.2.3 LIVE MEASUREMENT DATA (3-DAYS) – SEPTEMBER 14 MONTH: 26

 5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF JULY TO SEPTEMBER 2014 MONTHS)..... 27

 5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS: 27

 5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES: 28

 5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS: 35

 5.3.1 CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (AVERAGE OF THREE MONTHS – JULY to SEPTEMBER): 35

 5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-SEPTEMBER 2014): 37

 5.3.3 KEY FINDINGS ON CUSTOMER SERVICE DELIVERY (CSD) PARAMETERS 38

6) LIVE CALLING ASSESSMENT:..... 40

 6.1 INTER OPERATOR CALLS ASSESSMENT: 40

 6.2 CUSTOMER CARE / HELPLINE ASSESSMENT: 41

 6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS: 41

 6.4 LEVEL -1 CALLING ASSESSMENT:..... 42



7) OPERATOR ASSISTED DRIVE TEST	44
7.1 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:	54
7.2 SSA WISE DRIVE TEST OBSERVATION:	56
7.3 KEY FINDINGS ON DRIVE TEST:	59
8) GRAPHICAL REPRESENTATION:	61



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

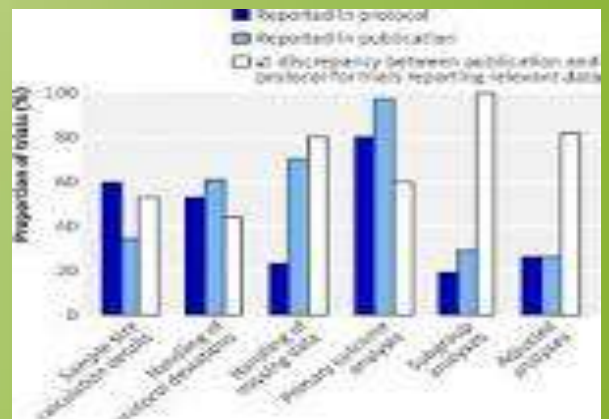
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

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 UP (E), UP (W) and MP&CG circles during the quarter July 2014– September 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
		July-14	August -14	September-14	
GSM Operators					
1	AIRCEL	9th to 11th July'2014	13th to 15th Aug'2014	16th to 18th Sept'2014	Aircel Ltd. , Commer Zone, Building no-2,6 Floor,Yerwada Jail Road,Yerwada,Pune-1
2	AIRTEL	09th to 11 July'2014	6th to 8th Aug'2014	3rd to 5th Sept'2014	D Building, Vega Center, Near Swargate Bus Stand, Pune
3	BSNL	10th to 12th July'2014	11th to 13th Aug'2014	2nd to 4th Sept'2014	2nd Floor, Telephone Bhawan, Near C'lai Shop, Bajirao Road, Pune 411002
4	UNINOR	18th to 22 July'2014	19th to 21 Aug'2014	19th to 21 Sept'2014	Telewings Communications Services Pvt Ltd. (Uninor) Welldone Technology Park Sec-48 Sohana Road Gurgaon
5	TATA GSM	8th to 10th July'2014	14th to 16th Aug'2014	16th to 18th Sept'2014	TATA Tel. Ltd., A1-Aqmar Building,5,Ganesh Kindh Road, Shivaji Nagar , Pune-5
6	IDEA	11th to 13th July'2014	12th to 14th Aug'2014	15th to 17th Sept'2014	IDEA Cellular Ltd. Sharada Centre, 11/1, Erandwane,Pune - 411 004.
7	RCOM GSM	9th to 11th July'2014	11th to 13th Aug'2014	2nd to 4th Sept'2014	Reliance Communications, 7th floor,Kumar cerebrum IT Park, B bldg, above standard chartered bank,near d-mart,kalyani nagar, Pune.
8	VODAFONE	10th to 12 th July'2014	11th to 13th Aug'2014	2nd to 4th Sept'2014	Vodafone Cellular Limited, Metropolitan, Old Mumbai -Pune Highway, Wakdewadi, Shivajinagar, Pune 411003
CDMA Operators					
9	RCOM CDMA	9th to 11th July'2014	11th to 13th Aug'2014	2nd to 4th Sept'2014	Reliance Communications, 7th floor,Kumar cerebrum IT Park, B bldg, above standard chartered bank,near d-mart,kalyani nagar, Pune.
10	TATA CDMA	8th to 10th July'2014	14th to 16th Aug'2014	16th to 18th Sept'2014	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 September 2014.

The data generated by monthly PMR and 3-days live measurements audit for the period July 2014 to September 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 September-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 September-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 monthly audit , 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-complied in all the three months of the quarter with their average performance of **5.60%** and **6.30%** respectively.

(ii) 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 **5.95% and 6.12%** respectively.

Similar non-compliance in respect of this parameter was also observed for these service providers during monthly audit.

(iii) 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, **BSNL and RCOM (GSM)** remained non-complied in case of Pre-paid complaints with their performance as **0.20%** and **0.30%** respectively. The performance level of Tata GSM and Tata CDMA against this parameter **‘100% resolution of the billing complaints within 4 weeks’** was **99.92 and 99.13%** respectively.

Regarding parameter “% calls answered by Operators (voice to voice) within 60 seconds”, Aircel, BSNL, RCOM (GSM) and RCOM (CDMA) could not achieve the benchmark with their performance as 70.32%, 76.88%, 88.44% and 85.95% respectively, which is below the benchmark of 90%.

(iv) The analysis of Drive tests results revealed that Service providers namely **BSNL, RCOM (GSM)/(CDMA), Tata (GSM)** and **Uninor** need to improve their network performance with respect to the parameters **Voice Quality, Call Drop rate and Call setup success rate** at different locations of the SSAs, where the drive tests were conducted.

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	Sept-14	20 Hrs-21 Hrs
2	AIRTEL	Sept-14	20 Hrs-21 Hrs
3	BSNL	Sept-14	19 Hrs-20 Hrs
4	IDEA	Sept-14	20 Hrs-21 Hrs
5	TATA GSM	Sept-14	19 Hrs-20 Hrs
6	RCOM GSM	Sept-14	19 Hrs-20 Hrs
7	UNINOR	Sept-14	20 Hrs-21 Hrs
8	VODAFONE	Sept-14	19 Hrs-20 Hrs
CDMA OPERATORS			
9	RCOM CDMA	Sept-14	19 Hrs-20 Hrs
10	TATA CDMA	Sept-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	1779	Huawei	Huawei
2	AIRTEL	25	160	10494	NSN	NSN
3	BSNL	18	141	6880	Alcatel	Alcatel
4	IDEA	42	92	10427	Ericsson	Ericsson
5	TATA GSM	4	31	4378	Huawei	Huawei
6	RCOM GSM	5	23	2767	Huawei	Huawei
7	UNINOR	8	26	4333	NSN+Huawei	NSN+Huawei
8	VODAFONE	16	120	9803	NSN	NSN
CDMA OPERATORS						
9	RCOM CDMA	10	8	1751	ZTE,Lucent	ZTE,Lucent
10	TATA CDMA	12	18	2265	Huawei, ZTE, Ericsson	Huawei, ZTE, Ericsson

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JULY 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- JULY-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%	July-14	0.19%	0.01%	1.90%	0.17%	0.091%	0.34%	0.29%	0.18%	0.28%	0.031%
	b) Worst affected BTSs due to downtime	<=2%	July-14	1.12%	0.00%	1.89%	0.85%	0.00%	0.90%	1.92%	0.98%	0.52%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	July-14	99.09%	99.87%	96.05%	98.26%	99.73%	99.61%	96.25%	99.28%	97.73%	97.62%
	b) SDCC/PAGING Channel congestion	<=1%	July-14	0.04%	0.04%	0.88%	0.52%	0.07%	0.02%	0.50%	0.39%	0.00%	0.00%
	c) TCH congestion	<=2%	July-14	0.24%	0.08%	1.85%	1.07%	0.10%	0.04%	1.85%	0.72%	0.04%	0.83%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	July-14	0.75%	0.45%	1.77%	1.09%	0.72%	0.48%	0.53%	0.83%	0.26%	1.18%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	July-14	2.91%	0.27%	2.80%	2.21%	6.50%	0.04%	0.83%	2.88%	1.36%	6.38%
	c) Connections with good voice quality	>=95%	July-14	97.41%	98.81%	95.98%	97.31%	97.76%	98.80%	97.45%	97.34%	99.80%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	July-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 – AUGUST 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- AUG 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%	Aug-14	0.12%	0.01%	1.87%	0.12%	0.07%	0.28%	0.26%	0.14%	0.23%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	Aug-14	0.45%	0.00%	1.93%	0.55%	0.00%	0.58%	1.68%	0.70%	0.51%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Aug-14	99.17%	99.87%	96.34%	98.58%	99.67%	99.61%	97.56%	99.56%	97.81%	97.97%
	b) SDCCH/PAGING Channel congestion	<=1%	Aug-14	0.04%	0.04%	0.65%	0.49%	0.09%	0.02%	0.30%	0.25%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-14	0.09%	0.08%	1.55%	0.84%	0.17%	0.03%	1.37%	0.44%	0.04%	0.49%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Aug-14	0.76%	0.45%	1.61%	1.09%	0.62%	0.48%	0.54%	0.83%	0.24%	1.08%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Aug-14	2.86%	0.27%	2.79%	2.24%	5.25%	0.02%	1.29%	2.82%	0.96%	6.39%
	c) Connections with good voice quality	>=95%	Aug-14	97.42%	98.68%	95.86%	97.27%	97.58%	98.79%	97.69%	97.26%	99.79%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Aug-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 – SEPTEMBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- SEP 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%	Sep-14	0.06%	0.01%	1.93%	0.12%	0.00%	0.18%	0.15%	0.12%	0.14%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Sep-14	0.06%	0.00%	1.86%	0.50%	0.00%	0.33%	0.60%	0.46%	0.40%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Sep-14	99.47%	99.87%	96.00%	99.62%	99.68%	99.59%	97.48%	99.64%	98.32%	98.36%
	b) SDCCH/PAGING Channel congestion	<=1%	Sep-14	0.05%	0.04%	0.61%	0.43%	0.08%	0.02%	0.34%	0.21%	0.00%	0.00%
	c) TCH congestion	<=2%	Sep-14	0.10%	0.08%	1.68%	0.82%	0.19%	0.04%	1.43%	0.36%	0.02%	0.11%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Sep-14	0.74%	0.45%	1.51%	1.24%	0.62%	0.47%	0.59%	0.79%	0.22%	1.05%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Sep-14	2.58%	0.22%	2.37%	1.78%	5.06%	0.01%	1.52%	2.79%	0.93%	6.12%
	c) Connections with good voice quality	>=95%	Sep-14	97.41%	98.79%	96.36%	97.16%	97.50%	98.79%	97.67%	97.21%	99.80%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Sep-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- SEPTEMBER-14 (JULY TO SEPTEMBER 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	0.12%	0.01%	1.90%	0.14%	0.06%	0.27%	0.23%	0.15%	0.22%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.54%	0.00%	1.89%	0.63%	0.00%	0.60%	1.40%	0.71%	0.48%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.24%	99.87%	96.13%	98.82%	99.69%	99.60%	97.10%	99.49%	97.95%	97.98%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.04%	0.04%	0.71%	0.48%	0.08%	0.02%	0.38%	0.28%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.14%	0.08%	1.69%	0.91%	0.15%	0.04%	1.55%	0.51%	0.03%	0.48%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.75%	0.45%	1.63%	1.14%	0.65%	0.48%	0.55%	0.82%	0.24%	1.10%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.78%	0.25%	2.65%	2.08%	5.60%	0.02%	1.21%	2.83%	1.08%	6.30%
	c) Connections with good voice quality	>=95%	Quarterly	97.41%	98.76%	96.07%	97.25%	97.61%	98.79%	97.60%	97.27%	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 0.24 %) 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-complied in all the three months of the quarter with its average performance as **5.60% and 6.30% respectively**.

- iii. Connections with good voice quality:

The audit results for this parameter indicates that all operators have met the benchmark 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) – JULY 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- JULY 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	0.33%	0.01%	1.39%	0.15%	0.07%	0.25%	0.30%	0.13%	0.20%	0.03%
	b) Worst affected BTSS due to downtime	<=2%	Live Data	0.23%	0.00%	0.10%	0.03%	0.00%	0.07%	0.00%	0.02%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live Data	99.12%	99.87%	96.01%	98.18%	99.69%	99.68%	96.95%	99.26%	98.35%	97.22%
	b) SDCCH/PAGING Channel congestion	<=1%	Live Data	0.05%	0.04%	0.85%	0.54%	0.06%	0.02%	0.26%	0.34%	0.00%	0.00%
	c) TCH congestion	<=2%	Live Data	0.21%	0.09%	1.81%	1.28%	0.07%	0.02%	1.86%	0.74%	0.02%	1.42%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live Data	0.73%	0.44%	1.77%	1.01%	0.79%	0.43%	0.76%	0.80%	0.23%	1.09%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live Data	2.78%	0.27%	2.72%	2.10%	7.85%	0.00%	0.69%	2.88%	1.16%	6.15%
	c) Connections with good voice quality	>=95%	Live Data	97.43%	98.90%	96.07%	97.41%	97.78%	98.87%	97.42%	97.33%	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.

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

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- AUG 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	0.05%	0.01%	0.92%	0.09%	0.04%	0.19%	0.30%	0.10%	0.15%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.03%	0.03%	0.00%	0.00%	0.03%	0.01%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.16%	99.87%	95.85%	98.86%	99.68%	99.68%	97.61%	99.54%	98.09%	98.49%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.02%	0.03%	0.77%	0.25%	0.11%	0.02%	0.38%	0.16%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.05%	0.08%	1.75%	0.63%	0.18%	0.03%	1.34%	0.46%	0.02%	0.11%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.72%	0.44%	1.66%	0.99%	0.59%	0.47%	0.53%	0.83%	0.22%	1.03%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.87%	0.26%	2.65%	1.78%	5.00%	0.01%	1.44%	2.82%	0.97%	6.46%
	c) Connections with good voice quality	>=95%	Live data	97.44%	98.90%	96.01%	97.37%	97.61%	98.84%	97.68%	97.34%	99.79%	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) – SEPTEMBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- SEP 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	0.13%	0.01%	1.12%	0.10%	0.04%	0.19%	0.07%	0.12%	0.12%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.06%	0.04%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.57%	99.87%	97.04%	98.69%	99.69%	99.66%	97.08%	99.71%	98.34%	98.54%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.03%	0.04%	0.42%	0.43%	0.06%	0.02%	0.26%	0.14%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.11%	0.08%	1.32%	0.78%	0.14%	0.02%	1.50%	0.29%	0.02%	0.04%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.75%	0.45%	1.44%	1.33%	0.61%	0.46%	0.80%	0.78%	0.23%	1.03%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.83%	0.25%	2.55%	1.37%	5.01%	0.00%	1.53%	2.78%	1.02%	5.75%
	c) Connections with good voice quality	>=95%	Live data	97.45%	98.72%	96.20%	97.19%	97.48%	98.82%	97.57%	97.22%	99.79%	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 JULY TO SEPTEMBER 2014 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	0.17%	0.01%	1.14%	0.11%	0.05%	0.21%	0.22%	0.12%	0.16%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.08%	0.00%	0.06%	0.03%	0.00%	0.02%	0.01%	0.02%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.28%	99.87%	96.30%	98.58%	99.69%	99.67%	97.21%	99.50%	98.26%	98.08%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.03%	0.04%	0.68%	0.41%	0.08%	0.02%	0.30%	0.21%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.12%	0.08%	1.63%	0.90%	0.13%	0.02%	1.57%	0.50%	0.02%	0.52%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.73%	0.44%	1.62%	1.11%	0.66%	0.45%	0.70%	0.80%	0.23%	1.05%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.83%	0.26%	2.64%	1.75%	5.95%	0.00%	1.22%	2.83%	1.05%	6.12%
	c) Connections with good voice quality	>=95%	Quarterly	97.44%	98.84%	96.09%	97.32%	97.62%	98.84%	97.56%	97.30%	99.79%	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 **5.95% and 6.12%** respectively.

Similar non-compliance in respect of this parameter was also observed for these service providers during monthly audit.

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 - July 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		July-14	1778	10403	6880	10339	4339	2769	3707	9583	1719	2275
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		July-14	2448	965	97011	13247	2952	6945	8109	12901	3638	523
	c) BTS Accumulated Downtime	<=2%	July-14	0.19%	0.01%	1.90%	0.17%	0.091%	0.34%	0.29%	0.18%	0.28%	0.031%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		July-14	20	0	130	88	0	25	71	94	9	0
	e) Worst affected BTSs due to downtime	<=2%	July-14	1.12%	0.00%	1.89%	0.85%	0.00%	0.90%	1.92%	0.98%	0.52%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	July-14	99.09%	99.87%	96.05%	98.26%	99.73%	99.61%	96.25%	99.28%	97.73%	97.62%
	b) SDCCH/PAGING Congestion	<=1%	July-14	0.04%	0.04%	0.88%	0.52%	0.07%	0.02%	0.50%	0.39%	0.00%	0.00%
	c) TCH congestion	<=2%	July-14	0.24%	0.08%	1.85%	1.07%	0.10%	0.04%	1.85%	0.72%	0.04%	0.83%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	July-14	0.75%	0.45%	1.77%	1.09%	0.72%	0.48%	0.53%	0.83%	0.26%	1.18%
	b) Worst affected cells>3% TCH drop	<=3%	July-14	2.91%	0.27%	2.80%	2.21%	6.50%	0.04%	0.83%	2.88%	1.36%	6.38%
	c) % of connections with good voice quality	>=95%	July-14	97.41%	98.81%	95.98%	97.31%	97.76%	98.80%	97.45%	97.34%	99.80%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		July-14	156	86	565	686	831	3	93	825	70	420
	e) Total no. of cells (Sector) in the licensed service area		July-14	5370	31845	20217	31054	12792	8260	11270	28659	5151	6573
No. of POI's having >=0.5% POI congestion													
4	No. of POI's having >=0.5% POI congestion		July-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		July-14	0	0	0	0	0	0	0	0	0	0
Network Data													
5	a) Equipped Capacity of Network in Erlang		July-14	54973	372371	259355	516874	192427	144000	146879	371936	230000	390730
	b) Total traffic in TCBH in erlang (Avg.)		July-14	25265	251430	105134	424248	56529	97989	168603	323575	61399	85610
	c) Total no. of customers served (as per VLR) on last day of the month		July-14	1022110	10361706	4620445	20057762	3184976	5120803	4758707	15360593	1784969	1457724

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.

TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- MH&G Circle - July 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	1775	10326	6880	10336	4317	2769	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		Live data	422	79	6889	1083	203	496	814	856	251	47
	c) BTS Accumulated Downtime	<=2%	Live data	0.33%	0.01%	1.39%	0.15%	0.07%	0.25%	0.30%	0.13%	0.20%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	4	0	7	3	0	2	0	2	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.23%	0.00%	0.10%	0.03%	0.00%	0.07%	0.00%	0.02%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.12%	99.87%	96.01%	98.18%	99.69%	99.68%	96.95%	99.26%	98.35%	97.22%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.05%	0.04%	0.85%	0.54%	0.06%	0.02%	0.26%	0.34%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.21%	0.09%	1.81%	1.28%	0.07%	0.02%	1.86%	0.74%	0.02%	1.42%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.73%	0.44%	1.77%	1.01%	0.79%	0.43%	0.76%	0.80%	0.23%	1.09%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.78%	0.27%	2.72%	2.10%	7.85%	0.00%	0.69%	2.88%	1.16%	6.15%
	c) % of connections with good voice quality	>=95%	Live data	97.43%	98.90%	96.07%	97.41%	97.78%	98.87%	97.42%	97.33%	99.80%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	149	86	549	653	1006	0	78	824	60	404
	e) Total no. of cells (Sector) in the licensed service area		Live data	5368	31749	20217	31063	12809	8260	11279	28651	5151	6570
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

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.

TABLE: 3

Detailed Network Data Assessment of Cellular Mobile Telephone Services- MH&G Circle – Aug 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		Aug-14	1774	10450	6880	10379	4371	2766	3978	9733	1750	2278
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Aug-14	1523	984	95956	9239	2419	5855	7807	10046	2970	767
	c) BTS Accumulated Downtime	<=2%	Aug-14	0.12%	0.01%	1.87%	0.12%	0.07%	0.28%	0.26%	0.14%	0.23%	0.05%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Aug-14	8	0	133	57	0	16	67	68	9	0
e) Worst affected BTSs due to downtime	<=2%	Aug-14	0.45%	0.00%	1.93%	0.55%	0.00%	0.58%	1.68%	0.70%	0.51%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Aug-14	99.17%	99.87%	96.34%	98.58%	99.67%	99.61%	97.56%	99.56%	97.81%	97.97%
	b) SDCCH/PAGING Congestion	<=1%	Aug-14	0.04%	0.04%	0.65%	0.49%	0.09%	0.02%	0.30%	0.25%	0.00%	0.00%
c) TCH congestion	<=2%	Aug-14	0.09%	0.08%	1.55%	0.84%	0.17%	0.03%	1.37%	0.44%	0.04%	0.49%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Aug-14	0.76%	0.45%	1.61%	1.09%	0.62%	0.48%	0.54%	0.83%	0.24%	1.08%
	b) Worst affected cells>3% TCH drop	<=3%	Aug-14	2.86%	0.27%	2.79%	2.24%	5.25%	0.02%	1.29%	2.82%	0.96%	6.39%
	c) % of connections with good voice quality	>=95%	Aug-14	97.42%	98.68%	95.86%	97.27%	97.58%	98.79%	97.69%	97.26%	99.79%	NP
	d)Total No. of cells exceeding 3% TCH drop (call drop)		Aug-14	153	85	565	697	677	2	153	816	50	421
e) Total no. of cells (Sector) in the licensed service area		Aug-14	5364	31889	20217	31103	12899	8251	11784	28902	5244	6583	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Aug-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Aug-14	0	0	0	0	0	0	0	0	0	0
5	Network Data												
	a) Equipped Capacity of Network in Erlang		Aug-14	54931	371492	259355	517480	195214	144000	153347	374984	230000	391960
	b) Total traffic in TCBH in erlang (Avg.)		Aug-14	24461	238818	99423	398785	62513	95805	165962	310589	60282	82717
c) Total no. of customers served (as per VLR) on last day of the month		Aug-14	1027327	10475717	4555809	20480599	3283879	5145835	4872936	15880689	1763471	1423906	

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.

TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- MH&G Circle- Aug-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	1772	10404	6880	10339	4360	2766	3793	9583	1750	2275
	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	62	75	4568	665	126	385	807	657	186	51
	c) BTS Accumulated Downtime	<=2%	Live data	0.05%	0.01%	0.92%	0.09%	0.04%	0.19%	0.30%	0.10%	0.15%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	2	3	0	0	1	1	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.03%	0.03%	0.00%	0.00%	0.03%	0.01%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.16%	99.87%	95.85%	98.86%	99.68%	99.68%	97.61%	99.54%	98.09%	98.49%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.02%	0.03%	0.77%	0.25%	0.11%	0.02%	0.38%	0.16%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.05%	0.08%	1.75%	0.63%	0.18%	0.03%	1.34%	0.46%	0.02%	0.11%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.72%	0.44%	1.66%	0.99%	0.59%	0.47%	0.53%	0.83%	0.22%	1.03%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.87%	0.26%	2.65%	1.78%	5.00%	0.01%	1.44%	2.82%	0.97%	6.46%
	c) % of connections with good voice quality	>=95%	Live data	97.44%	98.90%	96.01%	97.37%	97.61%	98.84%	97.68%	97.34%	99.79%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	154	83	537	552	646	1	177	815	51	425
	e) Total no. of cells (Sector) in the licensed service area		Live data	5358	31791	20217	31094	12914	8251	12277	28897	5244	6574
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

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.

TABLE: 5

Detailed Network Data Assessment of Cellular Mobile Telephone Services- MH&G Circle- Sep 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		Sep-14	1779	10494	6880	10427	4378	2767	4333	9803	1751	2265
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Sep-14	762	884	95478	8766	0	3632	4753	8411	1807	427
	c) BTS Accumulated Downtime	<=2%	Sep-14	0.06%	0.01%	1.93%	0.12%	0.00%	0.18%	0.15%	0.12%	0.14%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Sep-14	1	0	128	52	0	9	26	45	7	0
e) Worst affected BTSs due to downtime	<=2%	Sep-14	0.06%	0.00%	1.86%	0.50%	0.00%	0.33%	0.60%	0.46%	0.40%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Sep-14	99.47%	99.87%	96.00%	99.62%	99.68%	99.59%	97.48%	99.64%	98.32%	98.36%
	b) SDCCH/PAGING Congestion	<=1%	Sep-14	0.05%	0.04%	0.61%	0.43%	0.08%	0.02%	0.34%	0.21%	0.00%	0.00%
c) TCH congestion	<=2%	Sep-14	0.10%	0.08%	1.68%	0.82%	0.19%	0.04%	1.43%	0.36%	0.02%	0.11%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Sep-14	0.74%	0.45%	1.51%	1.24%	0.62%	0.47%	0.59%	0.79%	0.22%	1.05%
	b) Worst affected cells>3% TCH drop	<=3%	Sep-14	2.58%	0.22%	2.37%	1.78%	5.06%	0.01%	1.52%	2.79%	0.93%	6.12%
	c) % of connections with good voice quality	>=95%	Sep-14	97.41%	98.79%	96.36%	97.16%	97.50%	98.79%	97.67%	97.21%	99.80%	NP
	d)Total No. of cells exceeding 3% TCH drop (call drop)		Sep-14	139	69	479	556	651	1	197	812	49	403
e) Total no. of cells (Sector) in the licensed service area		Sep-14	5384	31984	20217	31204	12880	8254	12911	29062	5245	6586	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Sep-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Sep-14	0	0	0	0	0	0	0	0	0	0
5	Network Data												
	a) Equipped Capacity of Network in Erlang		Sep-14	55104	369726	259355	519091	195733	144000	159220	377285	230000	390525
	b) Total traffic in TCBH in erlang (Avg.)		Sep-14	25670	237104	101434	397326	67170	103658	173963	313750	60574	81140
c) Total no. of customers served (as per VLR) on last day of the month		Sep-14	1045711	10439325	4532058	20719002	3226923	5118908	4984819	15744374	1723311	1358044	

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.

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- MH&G Circle- Sep 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	1779	10455	6880	10379	4371	2767	4265	9733	1750	2281
	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	161	69	5525	766	126	382	225	848	155	78
	c) BTS Accumulated Downtime	<=2%	Live data	0.13%	0.01%	1.12%	0.10%	0.04%	0.19%	0.07%	0.12%	0.12%	0.05%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	4	4	0	0	0	2	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.06%	0.04%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.57%	99.87%	97.04%	98.69%	99.69%	99.66%	97.08%	99.71%	98.34%	98.54%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.03%	0.04%	0.42%	0.43%	0.06%	0.02%	0.26%	0.14%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.11%	0.08%	1.32%	0.78%	0.14%	0.02%	1.50%	0.29%	0.02%	0.04%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.75%	0.45%	1.44%	1.33%	0.61%	0.46%	0.80%	0.78%	0.23%	1.03%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.83%	0.25%	2.55%	1.37%	5.01%	0.00%	1.53%	2.78%	1.02%	5.75%
	c) % of connections with good voice quality	>=95%	Live data	97.45%	98.72%	96.20%	97.19%	97.48%	98.82%	97.57%	97.22%	99.79%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	152	80	515	427	648	0	198	809	53	379
	e) Total no. of cells (Sector) in the licensed service area		Live data	5377	31953	20217	31201	12925	8254	12932	29055	5244	6592
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

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.

CUSTOMER SERVICE QUALITY (CSD) PARAMETERS



5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS:

5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JULY to SEPTEMBER 2014 MONTHS AUDITED DATA):

QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES													
Quarterly 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	8517	1325117	1087298	4029868	169522	308393	NA	2748427	711557	100173
	B) No. of bills disputed including billing complaints during the quarter		MHG	0	258	53	4003	157	0	NA	2523	701	0
	C)% of billing complaints during the quarter	<= 0.1%	MHG	0.00%	0.02%	0.00%	0.10%	0.09%	0.00%	NA	0.09%	0.10%	0.00%
2	Metering & Billing Credibility -Pre Paid												
	A) Total No. of Pre-paid customers at the end of the quarter		MHG	3932408	9998235	4977700	55099186	5127658	4313003	20347575	15390381	1564793	1635117
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		MHG	42	430	9917	21118	15330	0	745	10780	1246	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	MHG	0.00%	0.00%	0.20%	0.04%	0.30%	0.00%	0.00%	0.07%	0.08%	0.00%
3	Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints												
	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		MHG	69	688	9970	19400	15487	2540	248	13303	1946	115
	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	69	688	9970	19400	15487	2538	248	13303	1946	114
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4/6 weeks	100 % within 4/6 week	MHG	100.00%	*100.00%	100.00%	100.00%	100.00%	99.92%	100.00%	100.00%	100.00%	99.13%
	D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	MHG	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES

Quarterly 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
4 Response time to customers for assistance													
	A) Total no of calls attempted to customer care/Call center		MHG	7462483	3482379	516247	62641269	6674740	1013285	2534609	29119612	2605346	228690
	B) Total no. of calls successfully established to customer care/Call center		MHG	7316299	3482379	516247	62150930	6627679	999942	2412977	29112179	2592125	226936
	C) % Accessibility of Call centre /customer Care (Total call successfully established*100/ Total call attempt)	>=95%	MHG	98.04%	100.00%	100.00%	99.22%	99.29%	98.68%	95.20%	99.97%	99.49%	99.23%
	D) Total Calls reached to agent desk for Voice to Voice (Total call attempts)		MHG	1140070	7426009	2810014.00	15470170	1724626	1413151	4895875	9802175	433013	205765
	E) Total number of calls answered by the operator (Voice to voice) within 60/90 seconds		MHG	801679	7242101	2160445.00	14260301	1525207	1369075	4731010	9340132	372166	199096
	F) % age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec/90 sec.*100 / Total call attempts)	>=90% (60 Sec.) & >=95% (90 Sec.)	MHG	70.32%	*97.52%	76.88%	*92.18%	*88.44%	*96.88%	*96.63%	95.29%	*85.95%	*96.76%
5 Termination/closure of service													
	A) Total No. of requests for Termination / Closure of service received during the quarter		MHG	29	4276	9310	25698	629	2944	NA	19350	4902	775
	B) No. of requests for Termination /Closure of service complied within 7 days during the quarter		MHG	29	4276	9310	25698	629	2944	NA	19350	4902	775
	C) % of Termination/ Closure of service within 7 days	<=7days	MHG	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
6 Time taken for refunds of deposits after closures.													
	A) No. of Payments/ Refunds due during the quarter		MHG	26	3875	387	538	979	623	NA	3800	1891	509
	B) No. of Payments/ Refunds Cleared during the quarter		MHG	26	3875	387	538	979	623	NA	3800	1891	508
	C)Time taken for refunds of deposits after closures.	100% within 60 days	MHG	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	99.80%

- I. NA: Not Applicable, Uninor have no post-paid customers, so data for parameters related to post-paid bills not applicable for them.
- II. * for the parameter "% of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4/6 weeks" – All Service Providers except Airtel has given the data for 4 weeks.
- III. * for the parameter "% age of calls answered by operator (voice to voice)" – All Service Providers except Airtel, BSNL and Vodafone have given the data for 90 seconds as per TRAI QoS Regulation (Third amendment) dated 21st August 2014.

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

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES – QE – SEP 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	211439	137715	14715	2028861	188309	421877	975756	962112	66364	85116
	Total no. of calls successfully established to customer care/Call center		MHG	208120	137715	14715	2012111	187034	416846	930286	960449	66106	84584
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempts)	>=95%	MHG	98.43%	100.00%	100.00%	99.17%	99.32%	98.81%	95.34%	99.83%	99.61%	99.37%
2	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		MHG	32848	230222	91558	479400	50616	48475	124458	304406	13235	5790
	Total number of calls answered by the operator (Voice to voice) within 60/90 seconds		MHG	3157	226636	60071	459507	48769	46760	115960	273164	12157	5615
	% age of calls answered by operator (voice to voice) (Total call successfully established within 60/90 Sec. *100/ Total call attempt)	>=90% (60 Sec.) & >=95% (90 Sec.)	MHG	9.61%	*98.44%	65.61%	*95.85%	*96.35%	*96.46%	*93.17%	89.74%	*91.85%	*96.98%

* All Service Providers except Aircel, BSNL and Vodafone have given the data for 90 seconds as per TRAI QoS Regulation (Third amendment) dated 21st August 2014.

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 $\leq 0.1\%$. However, **BSNL** and **RCOM (GSM)** remained non-complied in case of Pre-paid complaints with their performance as **0.20%** and **0.30%** respectively. 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 4/6 weeks except **Tata GSM** and **Tata (CDMA)**. The performance level of Tata GSM and Tata CDMA against this parameter was **99.92** and **99.13%** respectively. Apart from this, all service providers also have met the benchmark of 100 % refund in one week, where customers were due for credit / adjustment.

3. Response Time to the Customer for assistance

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

All service providers are in compliance with respect to the parameter 'Accessibility of call center'. However, **Aircel**, **BSNL**, **RCOM (GSM)** and **RCOM (CDMA)** have not met the benchmark for the parameter “% calls answered by Operators (voice to voice) within 60 seconds by Aircel, BSNL & Within 90 Sec by RCOM (GSM) and RCOM (CDMA)”. They have achieved their performance as **70.32%**, **76.88%**, **88.44%** and **85.95%** respectively.

4. Termination/Closure of Service

In case of this parameter all service providers have settled 100% closure/termination within the benchmark of 7 days.

5. Time Taken for Refund of deposits after closures

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

Live measurements:

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 **Aircel**, **BSNL** and **Vodafone** was **9.61%**, **65.61%** and **89.74%** respectively. The performance of Aircel was 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%	100%	100%	100%	100%	100%	100%	100%	100%
AIRTEL	MHG	100%	--	100%	100%	100%	100%	100%	97%	100%	100%
BSNL	MHG	99%	97%	--	97%	99%	97%	98%	100%	99%	99%
IDEA	MHG	100%	100%	100%	--	100%	100%	100%	98%	100%	100%
RCOM GSM	MHG	100%	100%	98%	100%	--	100%	100%	100%	100%	100%
TATA GSM	MHG	97%	100%	100%	100%	100%	--	99%	100%	100%	98%
VODAFONE	MHG	100%	99%	98%	100%	99%	98%	--	100%	100%	100%
UNINOR	MHG	100%	100%	100%	98%	100%	100%	100%	--	99%	100%
RCOM CDMA	MHG	99%	100%	90%	100%	100%	100%	100%	97%	--	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 Airtel to Uninor , successful calls interconnection was 97% , from BSNL to Airtel, Airtel, Idea, RCOM(GSM), Tata(GSM), Vodafone, RCOM(CDMA) and Tata(CDMA) was 98%, 97%, 97%, 99%, 97%, 98%, 99% and 99% respectively, from Tata(GSM) to Vodafone and Tata(CDMA) was 99% and 98%, from Vodafone to Airtel, BSNL, RCOM(GSM) and Tata(GSM) was 99%, 98%, 99% and 98% respectively, from Uninor to Idea and RCOM(CDMA) was 98% and 99%, and from RCOM(CDMA) to Airtel , BSNL and Uninor, the successful calls were 99%, 90% and 97% respectively. 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											
Parameter	Circle Name	AIRCEL	AIRTEL	UNINOR	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
Total no of calls attempted to customer care/Call center	MHG	100	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	MHG	98	100	96	100	99	99	99	99	99	98
% Accessibility of Call centre /customer Care (Total calls successfully established*100 / Total call attempts)	MHG	98.00%	100.00%	96.00%	100.00%	99.00%	99.00%	99.00%	99.00%	99.00%	98.00%
Total Calls reached to agent desk for Voice to Voice (Total call attempts)	MHG	98	100	96	95	99	97	98.00	99	99	98.00
Total number of calls answered by the operator (Voice to voice) within 90 seconds	MHG	50	98	94	80	96	88	95.00	95	85	97.00
% age of calls answered by operator(voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts)	MHG	51.02%	98.00%	97.92%	84.21%	96.97%	90.72%	96.94%	95.96%	85.86%	98.98%

In case of calls answered by operators (voice to voice) within 90 seconds when test calls were made to the call centers, Aircel, BSNL, and RCOM (GSM&CDMA) could connect 51.02%, 84.21%, 90.72% and 85.86% (below the benchmark of 95 %) of calls to the operator within 90 Seconds.

6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLAINTS:

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS									
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM (GSM)	VODAFONE	RCOM (CDMA)
Total No. of calls Attempted	MHG	100	100	100	100	100	100	100	100
Total No. of calls Answered	MHG	90	98	95	98	86	98	98	95
Cases resolved within 4 weeks	MHG	90	98	95	98	86	98	98	95
%age of cases resolved	MHG	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. 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	Latur	Ausa & Nilanga.	20	√	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091		Udgir & Ahmadpur	20	√	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091		Latur	10	√	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091	Nanded	Kandahar, Mukhed & Deglur.	20	√	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091		Bhokar & Biloli	20	√	√	√	√	NC	√	√	√	NC	√
100, 101, 102, 1091		Nanded	10	√	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091	Wardha	Hinganghjat , Samudrapur	20	√	√	√	√	NC-Samudrapur	√	NC-Samudrapur	√	√	√
100, 101, 102, 1091		Arvi , Deoli	20	√	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091		Wardha , Shelo	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 during the drive tests. In these SDCAs 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.

RCOM (GSM) had no coverage at Bhokar, Biloli and Samudrapur SDCAs, Uninor had no coverage at Samudrapur SDCA and RCOM (CDMA) had no coverage at Bhokar and Biloli SDCAs, so no level -1 testing was performed at these SDCAs during the drive test.

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 **Latur, Nanded and Wardha** in the months of July, August and September 2014 respectively. The total route Kms covered during drive tests in respective SSAs was **332 Kms, 316 Kms and 328 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 LATUR SSA IN JULY-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	Highways	220	25	204	25	187	25	187	25	202	25	208	25	170	25	200	25	180	25	205	25	
		Major Roads	154	25	133	25	126	27	139	25	130	25	130	25	137	25	138	26	130	25	129	25	
		Within City	166	25	142	25	136	25	136	25	132	25	144	25	133	25	130	25	138	25	146	25	
		Overall SSA	540	75	479	75	449	77	462	75	464	75	482	75	440	75	468	76	448	75	480	75	
2	Blocked Call Rate	Highways	0.45%	0.00%	0.00%	0.00%	1.60%	0.00%	0.00%	0.00%	0.50%	0.00%	3.37%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.44%	0.00%
		Major Roads	0.65%	0.00%	0.00%	0.00%	2.38%	0.00%	0.00%	0.00%	0.00%	0.00%	1.54%	0.00%	0.00%	0.00%	0.72%	0.00%	0.00%	0.00%	0.00%	1.55%	0.00%
		Within City	0.60%	0.00%	0.00%	0.00%	0.74%	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%	1.37%	0.00%
		Overall SSA	0.56%	0.00%	0.00%	0.00%	1.56%	0.00%	0.00%	0.00%	0.22%	0.00%	1.87%	0.00%	0.00%	0.00%	0.21%	0.00%	0.00%	0.00%	0.00%	1.88%	0.00%
3	Dropped Call Rate (<=2%)	Highways	0.92%	0.00%	0.00%	0.00%	1.09%	0.00%	1.60%	0.00%	0.50%	0.00%	1.44%	0.00%	0.00%	0.00%	0.50%	0.00%	1.11%	0.00%	0.50%	0.00%	
		Major Roads	1.97%	0.00%	0.00%	0.00%	1.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.78%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.57%	0.00%
		Within City	1.23%	0.00%	0.00%	0.00%	2.22%	0.00%	1.47%	0.00%	2.27%	0.00%	0.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	1.32%	0.00%	0.00%	0.00%	1.58%	0.00%	1.08%	0.00%	0.87%	0.00%	1.06%	0.00%	0.00%	0.00%	0.21%	0.00%	0.45%	0.00%	0.64%	0.00%	
4	Percentage connections with good voice quality (=>95%)																						
	(a) 0-4 (w/o frequency hopping for CDMA)	Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.43%	97.96%	99.08%	100%
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.91%	97.63%	99.26%	100%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.97%	97.50%	99.20%	100%

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



OPERATOR-ASSISTED DRIVE TEST AT LATUR SSA IN JULY-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
			Operators)																			
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.74%	97.70%	99.17%	100%
	(b) 0-5 (with frequency hopping for GSM Operators)	Highways	96.37%	98.39%	95.93%	98.73%	94.77%	95.30%	98.20%	100%	95.93%	98.92%	95.25%	99.33%	94.83%	99.78%	94.34%	98.42%	NA	NA	NA	NA
		Major Roads	98.02%	95.01%	97.14%	99.20%	94.72%	95.23%	99.34%	100%	97.07%	98.90%	98.12%	98.69%	96.12%	99.50%	96.13%	96.93%	NA	NA	NA	NA
		Within City	98.11%	98.63%	97.09%	98.79%	93.71%	93.77%	98.84%	100%	97.13%	98.52%	97.80%	99.79%	96.24%	98.69%	95.46%	99.17%	NA	NA	NA	NA
		Overall SSA	97.37%	97.34%	96.57%	98.84%	94.46%	94.78%	98.74%	100%	96.60%	98.78%	96.79%	99.48%	95.68%	99.32%	95.17%	98.20%	NA	NA	NA	NA
	Service Coverage																					
5	In door (>= - 75dBm)	Highways	53.12%	100%	77.50%	41.52%	66.90%	65.00%	76.40%	99.90%	65.59%	82.78%	58.95%	100%	78.77%	37.89%	96.33%	100%	99.81%	100%	65.34%	100%
		Major Roads	65.71%	0.00%	75.01%	0.00%	72.02%	56.99%	90.29%	97.04%	70.34%	2.44%	76.07%	0.00%	88.55%	7.71%	98.70%	89.09%	99.72%	100%	76.40%	0.00%
		Within City	66.92%	100%	85.02%	100%	74.29%	70.17%	95.50%	98.01%	70.76%	72.99%	71.83%	100%	88.44%	73.64%	98.41%	100%	100%	100%	74.49%	100%
		Overall SSA	60.90%	50.47%	79.07%	47.07%	70.50%	63.82%	87.40%	98.32%	68.41%	52.80%	67.42%	74.27%	84.88%	39.44%	97.56%	96.18%	99.84%	100%	71.04%	80.29%
	In-vehicle (>= - 85dBm)	Highways	79.51%	100%	94.38%	99.22%	97.53%	99.80%	94.50%	100%	92.56%	99.79%	82.45%	100%	94.65%	94.07%	99.41%	100%	99.98%	100%	86.20%	100%
		Major Roads	92.52%	62.59%	95.37%	82.79%	98.34%	100%	99.02%	100%	96.60%	44.60%	96.87%	0.00%	98.75%	93.16%	99.97%	100%	99.96%	100%	93.30%	100%
		Within City	90.09%	100%	98.13%	100%	98.77%	99.94%	99.88%	100%	96.44%	99.69%	93.08%	100%	98.55%	97.50%	99.92%	100%	100%	100%	93.84%	100%
		Overall SSA	86.44%	81.47%	9571.72%	93.99%	98.12%	99.92%	97.80%	100%	94.81%	81.41%	89.52%	89.24%	97.17%	94.90%	99.71%	100%	99.98%	100%	90.37%	85.67%
	Outdoor-in city (>= - 95dBm)	Highways	94.36%	100%	99.00%	100%	100%	100%	100%	100%	99.80%	100%	94.69%	100%	99.06%	100%	99.87%	100%	100%	100%	97.65%	100%
		Major Roads	99.50%	99.35%	99.05%	99.94%	100%	100%	100%	100%	99.93%	99.82%	99.57%	99.36%	99.84%	100%	100%	100%	100%	100%	99.59%	100%
		Within City	99.37%	100%	99.96%	100%	100%	100%	100%	100%	99.96%	99.97%	99.66%	100%	99.96%	100%	100%	100%	100%	100%	99.80%	100%
		Overall SSA	97.35%	99.68%	99.29%	99.98%	100%	100%	100%	100%	99.88%	99.93%	97.48%	100%	99.59%	100%	99.94%	100%	100%	100%	98.81%	100%

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



OPERATOR-ASSISTED DRIVE TEST AT LATUR SSA IN JULY-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	
			6	Call Setup Success Rate (>=95%)	Highways	98.64%	100%	100%	100%	98.40%	100%	100%	100%	98.51%	100%	96.63%	100%	99.41%	100%	100%	100%	100%	100%
Major Roads	98.70%	100%			100%	100%	97.62%	100%	100%	100%	100%	100%	98.46%	100%	99.27%	100%	99.28%	100%	100%	100%	100%	98.45%	100%
Within City	98.19%	100%			100%	100%	99.26%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.63%	100%
Overall SSA	98.52%	100%			100%	100%	98.44%	100%	100%	100%	99.35%	100%	98.13%	100%	99.55%	100%	99.79%	100%	100%	100%	100%	98.13%	100%
7	Hand Over Success Rate (HOSR)	Highways	99.70%	100%	100%	100%	95.69%	100%	98.67%	100%	100%	100%	99.41%	100%	100%	100%	98.90%	100%	100%	100%	100%	100%	100%
		Major Roads	99.07%	100%	100%	100%	98.68%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	97.64%	100%	100%	100%	98.96%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	98.94%	100%	100%	100%	97.21%	100%	99.44%	100%	100%	100%	99.73%	100%	100%	100%	99.41%	100%	100%	100%	100%	100%	100%

NA: Not Applicable

The service providers having block call rate more than 3% have been shaded in yellow colour.

DRIVE TEST TABLE-2

OPERATOR-ASSISTED DRIVE TEST AT NANDED SSA IN AUGUST 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	Highways	143	25	130	25	166	28	120	25	164	25	143	25	102	25	130	25	130	25
		Major Roads	138	25	161	25	131	25	184	25	158	25	130	25	145	25	148	25	171	25	131	25	
		Within City	132	25	116	25	135	23	136	25	120	25	110	25	94	25	123	25	134	25	111	25	
		Overall SSA	413	75	407	75	432	76	440	75	442	75	383	75	341	75	401	75	435	75	371	75	
2	Blocked Call Rate	Highways	1.40%	0.00%	0.00%	0.00%	4.82%	0.00%	0.00%	0.00%	0.00%	0.00%	4.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Major Roads	0.00%	0.00%	0.00%	0.00%	5.34%	4.00%	0.00%	0.00%	0.00%	0.00%	2.31%	0.00%	0.00%	0.00%	0.68%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	1.52%	0.00%	0.00%	0.00%	8.15%	0.00%	0.00%	0.00%	0.00%	0.00%	1.82%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.41%	0.00%	
		Overall SSA	0.97%	0.00%	0.00%	0.00%	6.02%	1.32%	0.00%	0.00%	0.00%	0.00%	2.87%	0.00%	0.00%	0.00%	0.25%	0.00%	0.00%	0.00%	1.62%	0.00%	
3	Dropped Call Rate (<=2%)	Highways	0.72%	0.00%	0.00%	0.00%	1.27%	0.00%	1.67%	0.00%	0.00%	0.00%	2.92%	0.00%	0.00%	0.00%	0.00%	0.00%	0.77%	0.00%	0.00%	0.00%	
		Major Roads	0.75%	0.00%	0.00%	0.00%	1.61%	0.00%	0.54%	0.00%	0.00%	0.00%	2.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.58%	0.00%	0.00%	0.00%	
		Within City	0.78%	0.00%	0.00%	0.00%	0.81%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.75%	0.00%	4.76%	0.00%	
		Overall SSA	0.75%	0.00%	0.00%	0.00%	1.23%	0.00%	0.68%	0.00%	0.00%	0.00%	1.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.69%	0.00%	1.37%	0.00%	
4	Percentage connections with good voice quality (=>95%)																						
	(a) 0-4 (w/o frequency hopping for CDMA)	Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.15%	95.67%	99.13%	100%	
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.58%	95.29%	99.63%	100%	
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.42%	95.20%	98.99%	100%	

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



OPERATOR-ASSISTED DRIVE TEST AT NANDED SSA IN AUGUST 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
			Operators)																			
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.71%	95.32%	99.28%	100%
	(b) 0-5 (with frequency hopping for GSM Operators)	Highways	98.66%	96.87%	97.08%	99.15%	92.00%	90.78%	98.14%	99.46%	96.25%	99.21%	92.74%	100%	97.52%	99.55%	96.71%	98.49%	NA	NA	NA	NA
		Major Roads	96.76%	99.81%	98.09%	99.68%	92.72%	100%	98.25%	99.84%	96.75%	99.84%	96.02%	100%	96.80%	99.67%	96.06%	99.61%	NA	NA	NA	NA
		Within City	98.13%	95.53%	97.95%	98.98%	89.51%	88.99%	98.61%	100%	96.96%	91.68%	96.97%	100%	96.99%	99.48%	96.41%	99.33%	NA	NA	NA	NA
		Overall SSA	97.84%	97.44%	97.68%	99.27%	91.60%	92.86%	98.34%	99.77%	96.62%	96.96%	95.14%	100%	97.08%	99.57%	96.42%	99.14%	NA	NA	NA	NA
	Service Coverage																					
5	In door (>= -75dBm)	Highways	47.45%	90.45%	60.35%	100%	63.88%	40.75%	92.70%	91.71%	82.64%	100%	38.12%	100%	70.20%	100%	96.33%	96.22%	92.80%	91.80%	63.51%	100%
		Major Roads	56.04%	100%	51.82%	98.29%	67.57%	100%	93.53%	92.26%	91.16%	100%	53.19%	100%	68.74%	100%	98.70%	99.89%	92.13%	99.90%	72.26%	100%
		Within City	60.80%	96.11%	62.82%	99.33%	61.09%	73.59%	95.53%	100%	89.06%	48.33%	59.38%	100%	89.12%	100%	98.41%	100%	92.83%	98.90%	72.99%	100%
		Overall SSA	54.75%	96.60%	57.76%	99.20%	64.18%	71.45%	93.92%	94.66%	87.38%	80.83%	49.73%	100%	74.80%	100%	97.56%	96.18%	92.59%	96.87%	69.57%	100%
	In-vehicle (>= -85dBm)	Highways	72.14%	95.91%	84.65%	100%	98.22%	100%	99.10%	96.80%	96.86%	100%	67.05%	100%	89.65%	100%	99.41%	100%	98.80%	99.60%	82.37%	100%
		Major Roads	80.60%	100%	84.16%	99.66%	95.74%	100%	98.90%	99.40%	99.17%	100%	76.15%	100%	91.43%	100%	99.97%	100%	99.10%	100%	90.33%	100%
		Within City	81.57%	100%	86.03%	99.97%	91.28%	100%	100%	100%	98.59%	99.26%	81.53%	100%	96.50%	100%	99.92%	100%	98.77%	100%	86.30%	100%
		Overall SSA	78.15%	99.01%	84.82%	99.88%	95.08%	100%	99.33%	98.73%	98.14%	99.73%	74.51%	100%	92.28%	100%	99.71%	100%	98.89%	99.87%	86.53%	100%
	Outdoor-in city (>= -95dBm)	Highways	97.42%	100%	98.00%	100%	99.89%	100%	100%	100%	99.80%	100%	89.89%	100%	99.56%	100%	99.87%	100%	100%	100%	96.20%	100%
		Major Roads	97.87%	100%	97.68%	99.69%	99.99%	100%	100%	100%	99.89%	100%	93.72%	100%	99.69%	100%	100%	100%	100%	100%	99.80%	100%
		Within City	98.34%	100%	96.74%	100%	100%	100%	100%	100%	99.92%	99.82%	97.31%	100%	99.52%	100%	100%	100%	100%	100%	95.56%	100%
		Overall SSA	97.87%	100%	97.56%	99.90%	99.97%	100%	100%	100%	99.86%	99.93%	93.38%	100%	99.60%	100%	99.94%	100%	100%	100%	97.28%	100%

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



OPERATOR-ASSISTED DRIVE TEST AT NANDED SSA IN AUGUST 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	
			6	Call Setup Success Rate (>=95%)	Highways	97.20%	100%	100%	100%	95.18%	100%	95.83%	100%	99.39%	100%	95.80%	100%	100%	100%	100%	100%	100%	100%
Major Roads	100%	100%			100%	100%	94.66%	96.00%	85.33%	100%	98.10%	100%	97.69%	100%	99.31%	100%	99.32%	100%	100%	100%	100%	100%	100%
Within City	98.48%	100%			100%	100%	91.85%	100%	89.71%	100%	100%	100%	98.18%	100%	97.87%	100%	100%	100%	100%	100%	94.59%	100%	100%
Overall SSA	98.55%	100%			100%	100%	93.98%	98.68%	89.55%	100%	99.10%	100%	97.13%	100%	99.12%	100%	99.75%	100%	100%	100%	98.38%	100%	100%
7	Hand Over Success Rate (HOSR)	Highways	100%	98.63%	100%	100%	86.60%	100%	99.16%	100%	100%	100%	100%	100%	100%	100%	99.36%	100%	100%	100%	100%	100%	100%
		Major Roads	97.19%	100%	100%	100%	87.50%	100%	99.07%	100%	100%	100%	100%	100%	100%	100%	99.52%	100%	100%	100%	100%	100%	100%
		Within City	100%	97.42%	100%	100%	98.91%	100%	100%	100%	100%	100%	99.36%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	98.57%	98.07%	100%	100%	91.98%	100%	99.37%	100%	100%	100%	99.81%	100%	100%	100%	99.63%	100%	100%	100%	100%	100%	100%

NA: Not Applicable

The service providers having block call rate more than 3% have been shaded in yellow colour.

DRIVE TEST TABLE-3

OPERATOR-ASSISTED DRIVE TEST AT WARDHA SSA IN SEPTEMBER 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	Highways	150	25	121	26	179	24	142	25	176	25	118	26	112	25	162	25	139	25	139	26	
		Major Roads	112	25	95	25	117	23	96	25	93	25	75	26	97	25	90	25	92	25	76	26	
		Within City	192	25	166	25	130	24	205	25	169	26	177	25	178	26	188	25	199	25	180	26	
		Overall SSA	454	75	382	76	426	71	443	75	438	76	370	77	387	76	440	75	430	75	395	78	
2	Blocked Call Rate	Highways	1.33%	0.00%	0.00%	0.00%	7.26%	4.17%	0.00%	0.00%	1.14%	0.00%	12.71%	3.85%	10.71%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Major Roads	1.79%	0.00%	0.00%	0.00%	7.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.85%	2.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.63%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	0.77%	4.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	0.88%	0.00%	0.00%	0.00%	5.40%	2.82%	0.00%	0.00%	0.46%	0.00%	4.05%	2.60%	3.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.51%	0.00%
3	Dropped Call Rate (<=2%)	Highways	1.35%	0.00%	0.00%	0.00%	0.00%	0.00%	1.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.99%	0.00%	0.00%	0.00%	0.72%	0.00%	0.00%	0.00%	
		Major Roads	1.82%	0.00%	0.00%	0.00%	0.97%	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%	
		Within City	1.05%	0.00%	0.00%	0.00%	0.78%	0.00%	0.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.57%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	1.34%	0.00%	0.00%	0.00%	0.51%	0.00%	0.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.54%	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	
4	Percentage connections with good voice quality (=>95%)																						
	(a) 0-4 (w/o frequency)	Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.22%	100%	98.31%	99.88%	
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.11%	99.31%	98.57%	99.88%

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



OPERATOR-ASSISTED DRIVE TEST AT WARDHA SSA IN SEPTEMBER 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
			hopping for CDMA Operators)	Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.33%
	Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.92%	99.74%	99.09%	99.89%
(b) 0-5 (with frequency hopping for GSM Operators)	Highways	96.23%	99.88%	97.01%	99.56%	92.37%	100%	96.96%	99.91%	96.38%	99.70%	82.39%	100%	93.04%	98.29%	95.95%	98.85%	NA	NA	NA	NA	
	Major Roads	96.34%	99.76%	98.68%	98.11%	94.26%	99.90%	97.46%	99.87%	97.37%	99.67%	89.89%	100%	95.70%	98.29%	97.11%	98.24%	NA	NA	NA	NA	
	Within City	97.28%	99.60%	97.89%	99.72%	93.14%	100%	98.24%	99.96%	97.88%	96.08%	95.60%	100%	94.76%	99.28%	95.82%	99.37%	NA	NA	NA	NA	
	Overall SSA	96.69%	99.75%	97.76%	99.13%	93.12%	99.97%	97.68%	99.91%	97.17%	98.47%	91.43%	100%	94.58%	98.60%	96.13%	98.82%	NA	NA	NA	NA	
Service Coverage																						
5	In door (>= - 75dBm)	Highways	40.06%	100%	65.49%	16.27%	59.33%	100%	91.03%	92.95%	58.28%	63.70%	67.39%	99.94%	46.27%	89.00%	71.54%	100%	99.93%	100%	59.52%	100%
		Major Roads	53.55%	100%	69.31%	75.27%	57.68%	61.82%	92.51%	100%	63.55%	98.69%	81.98%	99.94%	39.33%	100%	87.79%	99.29%	100%	100%	63.73%	100%
		Within City	71.61%	100%	77.19%	93.55%	61.13%	65.41%	92.61%	92.86%	69.63%	13.10%	89.00%	100%	50.67%	70.00%	92.11%	99.52%	99.98%	100%	71.03%	100%
		Overall SSA	56.60%	100%	71.26%	63.56%	59.38%	75.74%	92.03%	95.38%	63.38%	59.05%	80.65%	99.95%	45.42%	86.33%	84.87%	99.62%	99.97%	100%	65.35%	100%
5	In-vehicle (>= - 85dBm)	Highways	63.36%	100%	88.77%	92.67%	97.10%	100%	99.03%	98.44%	87.33%	100%	74.69%	100%	60.33%	100%	93.99%	100%	99.98%	100%	91.71%	100%
		Major Roads	78.53%	100%	94.98%	99.90%	95.67%	98.23%	98.53%	100%	91.73%	100%	91.39%	100%	73.00%	100%	98.35%	100%	100%	100%	95.24%	100%
		Within City	91.56%	100%	97.97%	99.83%	96.27%	100%	99.82%	98.00%	94.22%	98.53%	96.79%	100%	82.33%	100%	99.27%	100%	100%	100%	92.65%	100%
		Overall SSA	78.88%	100%	94.05%	97.61%	96.35%	99.41%	99.28%	98.86%	90.93%	99.52%	88.58%	100%	71.89%	100%	97.32%	100%	99.99%	100%	92.67%	100%
5	Outdoor-in city (>= - 95dBm)	Highways	97.18%	100%	98.62%	99.80%	99.98%	100%	100%	100%	98.66%	100%	90.78%	100%	83.33%	100%	99.69%	100%	100%	100%	99.97%	100%
		Major Roads	97.94%	100%	99.97%	100%	99.91%	100%	100%	100%	99.53%	100%	97.27%	100%	93.00%	100%	99.90%	100%	100%	100%	99.88%	100%
		Within City	99.18%	100%	99.91%	100%	99.90%	100%	100%	100%	99.47%	99.45%	99.34%	100%	96.67%	100%	99.97%	100%	100%	100%	99.96%	100%

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



OPERATOR-ASSISTED DRIVE TEST AT WARDHA SSA IN SEPTEMBER 14 MONTH- MAHARASHTRA & 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
			Overall SSA	98.21%	100%	99.47%	99.94%	99.93%	100%	100%	100%	99.16%	99.82%	96.16%	100%	91.00%	100%	99.86%	100%	100%	100%	99.95%
6	Call Setup Success Rate (>=95%)	Highways	98.67%	100%	100%	100%	92.74%	95.83%	100%	100%	98.86%	100%	87.29%	96.15%	90.18%	100%	100%	100%	100%	100%	100%	100%
		Major Roads	98.21%	100%	100%	100%	92.31%	100%	100%	100%	100%	100%	100%	96.15%	97.94%	100%	100%	100%	100%	100%	97.37%	100%
		Within City	98.44%	100%	100%	100%	99.23%	95.83%	100%	100%	99.41%	100%	100%	100%	98.88%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	98.46%	100%	100%	100%	94.60%	97.18%	100%	100%	99.32%	100%	95.95%	97.40%	96.12%	100%	100%	100%	100%	100%	99.49%	100%
7	Hand Over Success Rate (HOSR)	Highways	98.10%	100%	100%	100%	97.77%	100%	100%	100%	100%	100%	100%	100%	93.91%	90.00%	100%	100%	100%	100%	100%	100%
		Major Roads	97.40%	100%	100%	100%	98.39%	100%	100%	100%	100%	100%	100%	100%	97.40%	100%	100%	100%	100%	100%	100%	100%
		Within City	98.28%	100%	100%	100%	98.13%	100%	100%	100%	100%	100%	100%	100%	96.20%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	98.04%	100%	100%	100%	98.06%	100%	100%	100%	100%	100%	100%	100%	96.14%	95.00%	100%	100%	100%	100%	100%	100%

NA: Not Applicable

The service providers having block call rate more than 3% have been shaded in yellow colour.

7.1 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 4

DRIVE TEST ROUTE OF JULY TO SEPTEMBER 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
LATUR	July-14	Ausa & Nilanga /109 Km	1) Ausa---Highway-Ausa Rd - Nilanga Rd - Solapur Rd - Tuljapur Rd - Main Rd - AUSA Bhada Rd Main Rd - Mukteshwar Rd - Midc - Main Rd - Bus Stand 2) Nilanga Nilanga Rd - Bus Stand - Iti College - Udgir Rd - Ashok Nagar - Umarga Rd - Main Rd - Shivaji Chowk - Mubarakpur - Hadga Rd Mubarakpur - Bank Colony Rd - Anand Nagar - Midc - Shivaji Chowk - Bus Stand - Main Rd - Vidya Nagar AUSA Rd - Shivaji Nagar - Mcoe - Court - Vidya Nagar - Dapka Rd - Shivaji Chowk - Hadga Rd - AUSA Rd Indoor: Kudumbale Hospital, Nilanga	Udgir, Ahmadpur / 113 Km	1) Udgir : Khatib Colony - Nideban - Shelhal Rd - Hindustan Colony - Vikas Nagar - Shivaji College - Shivaji Chowk - Ram Nagar . 2) Ahmadpur:College Rd - Tembhumni Rd - Nanded Rd - Bank Colony - M.G. College Rd - Thodga Rd - Bus Stand - Latur Rd - Mahajan Nagar Indoor: Mahajan Honda Complex, Ahmadpur	Latur / 110 Km	Old Rlwy Station - Natraj Theatre - Masjid Rd - Anand Nagar - Labour Colony - Saraf Line - Market Yard - Kavha Rd- Majge Nagar - Shiv Nagar - Vidya Nagar - Shivaji Nagar - Narayan Nagar - Yashwant Nagar - Adarsh Colony - Old AUSA Rd - Bhagya Nagar - Vikram Nagar - Deepjyoti Nagar - Solankar Nagar - Midc - Pvr Cinema Indoor: Pvr Multiplex Building, Latur
NANDED	Aug-14	Khandhar, Mukhed, Deglur / 108 Km	1) Kandhar:Laxmi Mandir,Khandar Darga Road,Rafic Chouk,Post Office,Bus Stad,Nagar Parishad,Shivaji College,Bhagya	Bhokar, Billoli / 102 Km	1) Bhokar:Bajrag Chouk,Bus Stand,Saraf Bazar,Gandhi Chouk,Umri Chouk,Midc Area,Umri Rad,Mseb Umri, Bus Stand Umri,Market Area	Nanded / 106 Km	Nanded : Taroda Naka,Waman Nagar,Farande Nagar,Vijay Nagar,Police Station,Shivaji Nagar,Vip Road,Nawa Mondha,Law

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



DRIVE TEST ROUTE OF JULY TO SEPTEMBER 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
			Nagar,Lpg Gooddown,City Bus Stop. 2) Mukhed: Iti College,Bank Of India,Market Lane,Saraf Bazar,Busstop,Panchayat Samiti,Tasary Office,Civil Hospital. 3) Deglur:Deglur College, Bsnl Office,Old Bus Stop, Rampur Road,Ambedkar Nagar, Nath Nagar,Subhash Nagar. Indoor: Nagar Parishad Commercial Complex		Umri,Umribia-Pass. 2) Billoli: Kundalwadi, Food Gooddown, Civil Hospital, Lohar Galli, Idghah Road, Police Station, Maim Road, Bazar Peth, Gandhi Nagar, Police Quaters. Indoor: Rukhmini Commercial Complex		College,Ashok Nagar,Shobha Nagar,Govt. Guest House,Ambedkar Nagar,Railway Station,Civil Court,Bhagat Singh Road,Old Mondha,Gurudwara,Goverdhan Ghat. Indoor: Big Bazar-Nanded
WARDHA	Sep-14	Hinganghat, Samudrapur / 101 Km	1) Hinganghat-Chandrapur Highway, Wardha Highway, Jam-Higway, Gidkarwar-Major,Sindhi Colony,Mata Mandir Ward, Road And Town Road 2) Samudrapur-Jam Highway,Umred Highway, Nagpur Highway,Major Road And Town Road. Indoor: Pitchkate Commercial Complex	Deoli, Arvi / 102 Km	1) Deoli - Wardha, Yavatmal, Pulgaon, Major Road , Ambedkar Nagar, Bazar Ward And Within City Road. 2) Arvi-Wardha Highway, Pulgaon, Talegaon, Sai Nagar Kannmawar Nagar, Major Road And Within City. Indoor: Ashirwadh Commercial Complex	Wardha, Selu / 125 Km	1) Wardha -Nagpur Highway, Arvi Highway, Civil Line, Sewagram, Hindnagar, Yavatmal Highway And Covered All Major Roads. 2) Seloo-Nagpur Highway,Seloo-Wardha Highway, Major Road. Indoor: Laxmi Complex

7.2 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 5

DRIVE TEST OBSERVATION OF LATUR SSA (JULY-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	Ausa & Nilanga	Poor Rx Level observed at Nilanga: Bank colony and Ausa road	Udgir & Ahamdpur	Poor Rx Level & Quality observed at Udgir :Somnathpur, Tiwatgya, Venkatesh nagar	Latur	--
2	AIRTEL		Poor Rx Level observed at Nilanga Highway outer area		--		--
3	BSNL		Poor Rx Level & Quality at Ausa main road opp. To bus stand , Nilanga Highway		Poor Rx Level & Quality observed Udgir :Somnathpur, Tiwatgya, Venkatesh nagar , Ambedkar square & Ahamdpur state highway		Poor Quality observed in overall Latur SDCA ,Worst area are Ring road, near railway station and Poddar school
4	IDEA		Poor voice quality observed at : Nilanga-Kharola Highway		Poor voice quality observed at : Ahmedpur-Takalgaon Highway and Near Bus Stand-Udgir.		Poor voice quality observed at Latur Ring Road (Udaigir).
5	UNINOR		Poor voice quality observed at Nilanga: Ausa road.		Poor voice quality observed at near Bus Stand and Shrinagar colony.		--
6	VODAFONE		--		Poor voice quality observed at Ahamdpur: Shrinagar colony, Nr Bus Stand, Shrinagar colony / Udgir : Reddy Colony_Udgir, Jalkot Road and Ambika colony		Poor voice quality observed at :Latur: Swami samarth nagar , Tagore nagar
7	TATA GSM		--		--		--
8	TATA CDMA		--		--		--
9	RCOM GSM		Poor Rx Level & voice quality observed at nilanga road (Ausa), Nilanga: Ausa road, Bidar road		Poor Rx Level & voice quality observed at Udgir : Nanded Road,Latur Road, Bidar Road , Ahamdepur : Nanded Road,Latur Road,Thodga Road.		Poor Rx Level & voice quality observed at Nanded Road , Dense road
10	RCOM CDMA		Poor Rx Level observed at nilanga road (Ausa), Nilanga : Ausa road, Bidar road		Poor Rx Level observed at Udgir : Nanded Road, Latur Road, Bidar Road , Ahamdepur : Nanded Road,Thodga Road.		--

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF NANDED SSA (AUGUST-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	Kandhar, Mukhed, Degloor	Poor Rx level observed at Mukhed : Mukhed – NARSI Highway , Degloor: Degloor Udgir road and Degloor Hyd	Bhokar, Billoli	Billoli :Poor Rx level observed at Karegaon Road and Kondalwadi road / Poor Rx Quality observed at Kondalwadi Road	Nanded	Poor Rx Level & Quality observed at Vishnupuri , 4Nanded Latur Road.	
2	AIRTEL		--		--		Poor Rx Level & Quality observed at SAI BABA Niwas road , Treasure Bazar.	
3	BSNL		--		Poor Rx Level & Quality observed at Bhokar : Kinawat Road , Umari road , Old Bhokar / Billoli : Arjapur		Poor Rx Level & Quality observed at Govt polytechnic , Nagarjun Hotel , Hanumangarh Area,Ganesh Nagar,Latur phata area,Goverdhan Ghat Bridge,Tara singh market,Govt Medical collage & Near DRM Office	
4	IDEA		--		--		--	--
5	UNINOR		--		--		--	--
6	VODAFONE		--		--		Poor Rx Quality Observed at Nanairport & MGM College , Rahimpur	
7	TATA GSM		--		--		Poor Rx Quality observed at Sonawane Building	
8	TATA CDMA		--		--		--	
9	RCOM GSM		Poor Rx Level observed at Kandhar : Loha - Kandhar Road / Mukhed : Umardari road, Jamb road / Deglur :Takli & bargaon road		Poor Rx Level observed at Billoli : Nanded Road & Kundalwadi Road , Dharmabad : Dharmabad- Bannali Road / Poor Rx Quality observed at Dharmabad_karkheli Highway		Poor Rx Quality observed at Bhokar Phata	
10	RCOM CDMA		--		Poor Rx level observed at Billoli : Kundalwadi Road & Nanded Road		--	

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF WARDHA SSA (SEPTEMBER-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	Hinganghat , Samudrapur	Poor Rx level & Voice quality observed at Tambiri road and Sudarshan Cotton industry	Deoli, Arvi	Poor Rx level observed at Isapur (Deoli SDCA)	Wardha, Selu	--
2	AIRTEL		--		--		
3	BSNL		Samudrapur : Poor Rx Quality observed at Chandarpur Highway		Deoli:Poor Rx Quality observed at Sonegaon road & Adegaon road		Wardha : Poor Rx Quality observed at Hindi University area & Nagpur Highway
4	IDEA		--		--		--
5	UNINOR		Hinganghat : Poor Rx level & Quality observed at hinganghat to wardha highway		Deoli:Poor Rx Level & Quality observed at Sonegaon road,deoli to wardha road / Arvi :Poor Rx level observed at talegaon road & indira chowk road		Wardha : Poor Rx Level & Quality observed at Hindi University area & Nagpur Highway,Karla road
6	VODAFONE		--		--		Poor Rx Quality observed at Geeta Nagar & Nagpur Highway
7	TATA GSM		Hinganghat :Poor Rx Quality observed towards pandharkawada		--		Wardha : Poor Rx Quality observed at Hindi University area & Nagpur Highway
8	TATA CDMA		--		--		--
9	RCOM GSM		Poor Rx Quality observed at Hinganghat towards pandharkawada / Samudrapur : Nagpur-Chandrapur Road.		Deoli:Poor Rx Level & Quality observed at Arvi : talegaon Rd / Deoli : Wardha Rd, Pulgaon Road & Nandora Road		Wardha : Poor Rx Level & Quality observed at Hindi University area & Nagpur Highway, Karla road, Near ITI College
10	RCOM CDMA		--		--		--

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 July-14**, drive tests were conducted across Latur SSA, covering Ausa, Nilanga, Udgir, Ahmadpur and Latur SDCAs (Total 332 Kms). 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 parameter **'Voice Quality'** with its performance as **94.46% (outdoor) / 94.78% (Indoor)** on overall SSA basis. The performance of **Uninor and Vodafone on highways** for parameter **'Voice Quality'** remained under performed with their performance as **94.83% and 94.34%** respectively, however their performance on overall SSA basis was within the benchmark. Similarly, **BSNL** and **Idea** remained non-complied for parameter **Call Drop rate** with their performance as **2.22% and 2.27 %** within the city, however on overall SSA basis they were within benchmark.
- (ii) **In the Month of August-14**, drive test was conducted across Nanded SSA covering Khandhar, Mukhed, Deglur, Bhokar, Billoli, and Nanded SDCAs (Total 316Kms). The results of the drive test exposed that some of the service providers were not doing well on the Highways and within city 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 **'Voice Quality', CSSR and Blocked Call Rate with its achievement as 91.60 % (outdoor) / 92.86 % (Indoor), 93.98% and 6.02% respectively** on SSA level. **Tata (GSM)** also lagged behind in meeting the benchmark for parameter **CSSR (89.55%)** on overall SSA level. **RCOM (CDMA)** lagged behind in meeting the benchmark of **'Call drop rate' and 'Blocked Call Rate' within city** with its performance as **4.76% and 5.41%** respectively, however its performance on SSA level was within benchmark. **On Highways, RCOM (GSM)** was having below benchmark performance for parameters **CDR (2.92%), Voice Quality (92.74%) and Blocked call rate (4.20%)**.
- (iii) **In the month of September -14**, drive test was conducted across Wardha SSA covering Hinganghat, Samudrapur, Deoli, Arvi, Wardha and selu SDCAs (Total 328 Kms). The performance with respect to the parameter **'Voice quality'** remained under performed for **BSNL, RCOM (GSM) and Uninor** with their achieved level as **93.12%, 91.43% and 94.58%** respectively. **BSNL** also failed to meet the benchmarks of parameter **CSSR and Blocked Call rate** with its performance as **94.60% and 5.40%** respectively. The benchmark of **Blocked Call rate** could not be met by **RCOM-GSM (4.05%) and Uninor (3.88%)**.
- (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 Latur, Nanded and Wardha SSAs respectively.

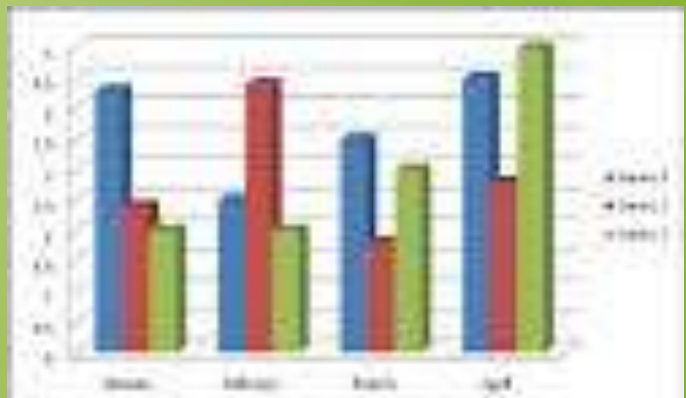
Thus the analysis of Drive tests results revealed that Service providers namely BSNL, RCOM (GSM)/(CDMA), Tata (GSM) and Uninor need to improve their network performance with respect to the parameters Voice Quality, Call Drop rate and Call setup success rate at different locations of the above SSAs, where the drive tests were conducted.

8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

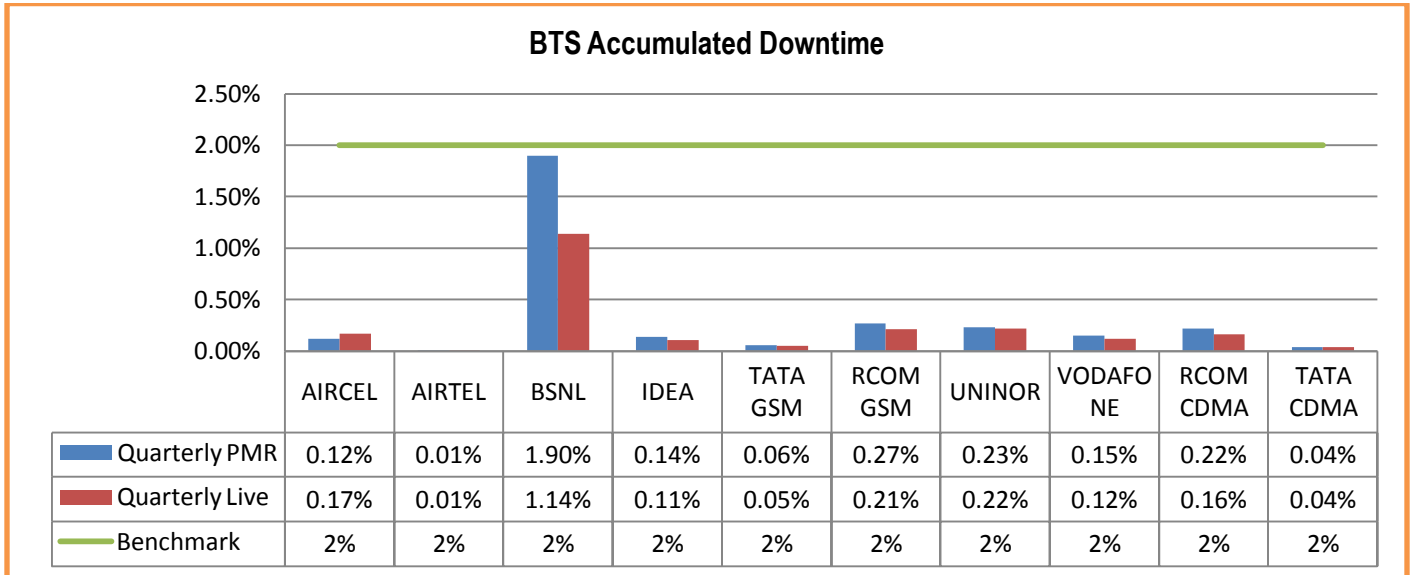
AVERAGED QUARTERLY 3-DAYs LIVE MEASUREMENT



8) GRAPHICAL REPRESENTATION:

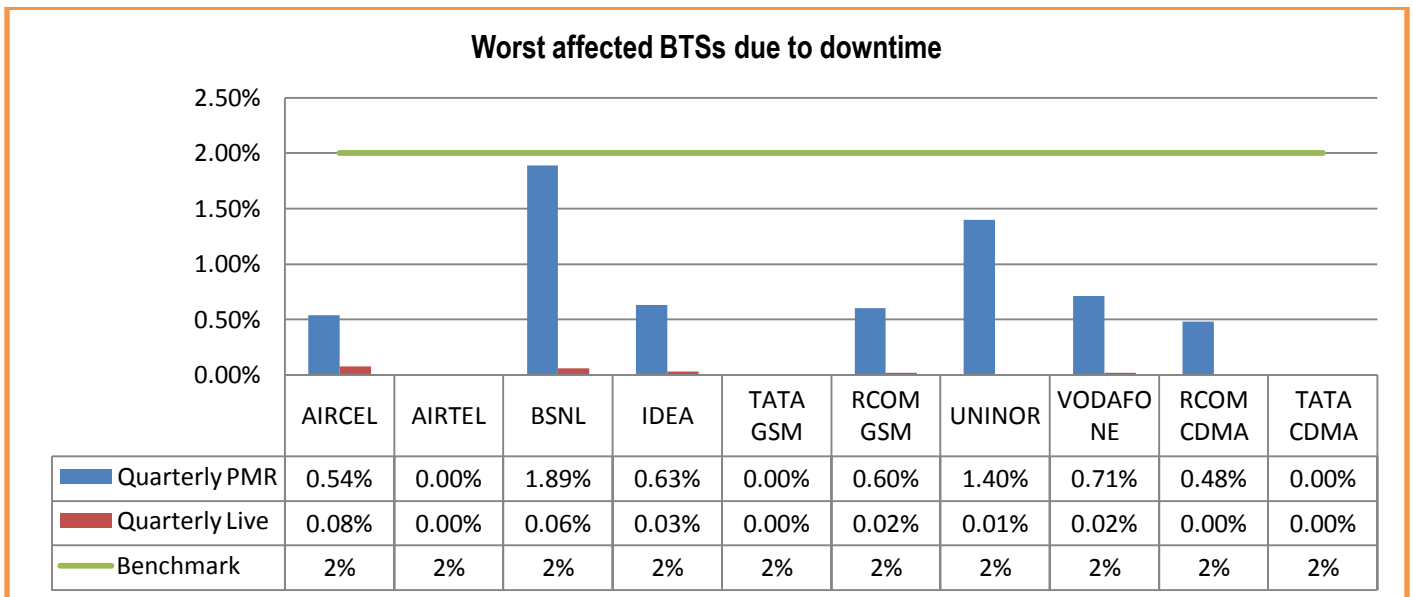
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

1) BTS ACCUMULATED DOWNTIME:



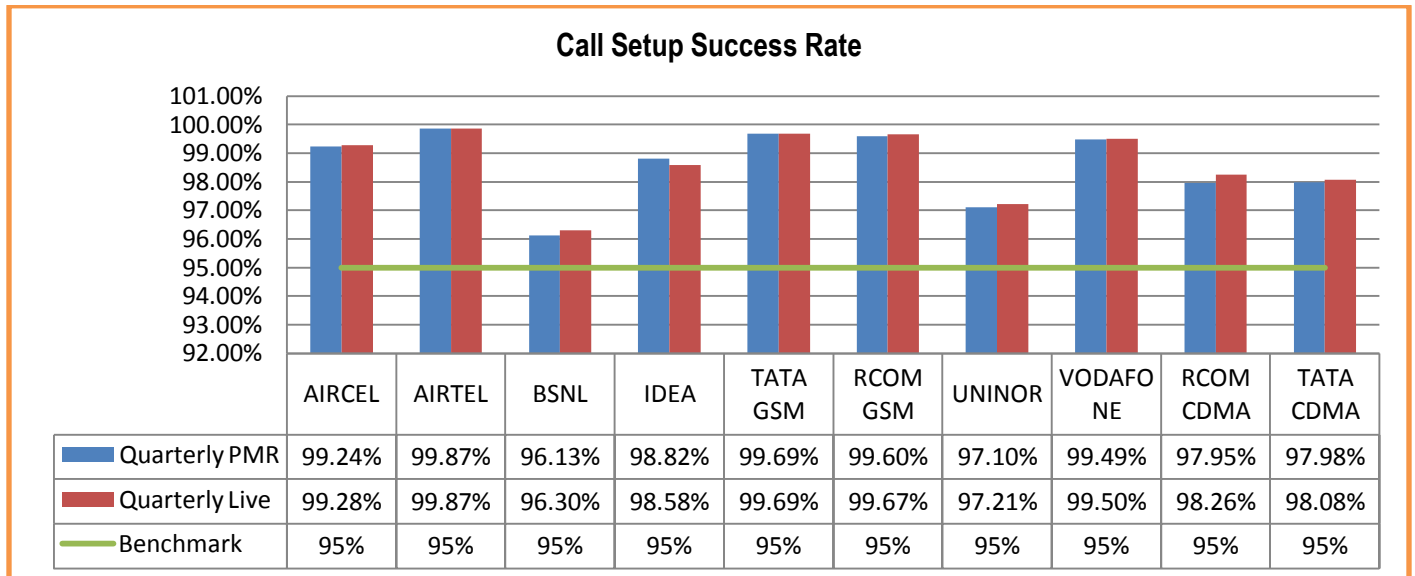
All operators are meeting the benchmarks.

2) WORST AFFECTED BTSS DUE TO DOWNTIME:



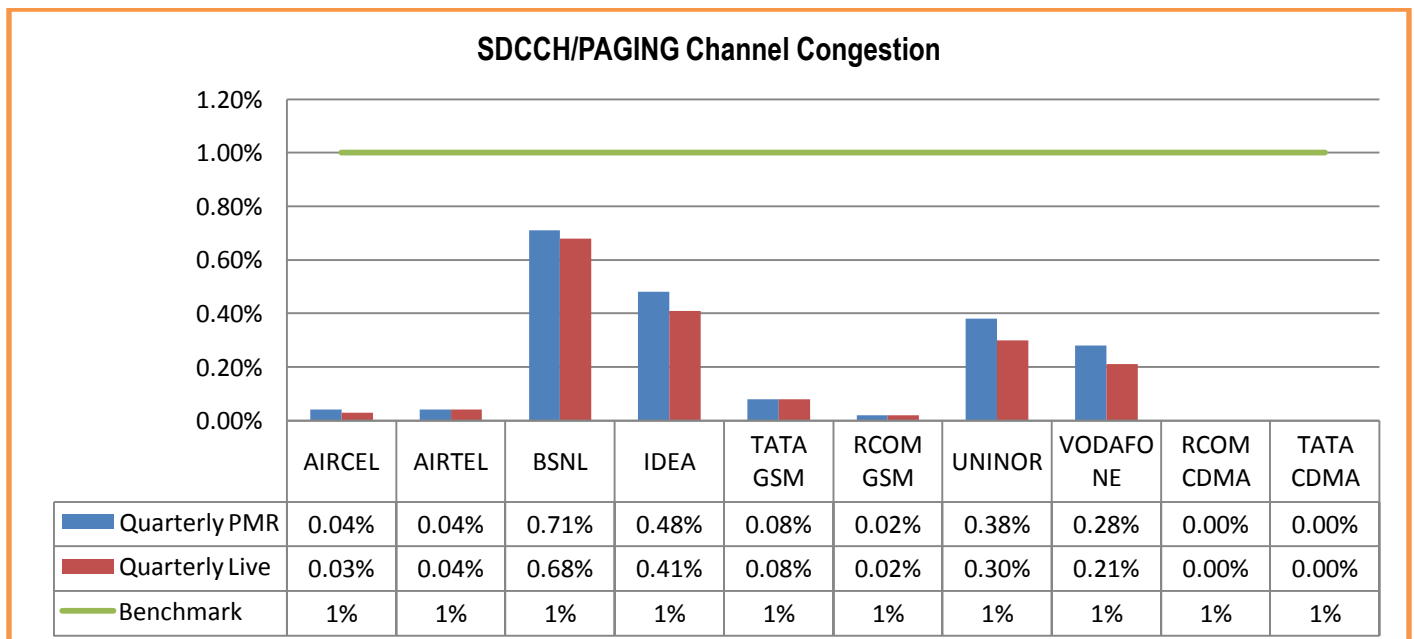
All operators are meeting the benchmarks.

3) CALL SETUP SUCCESS RATE :



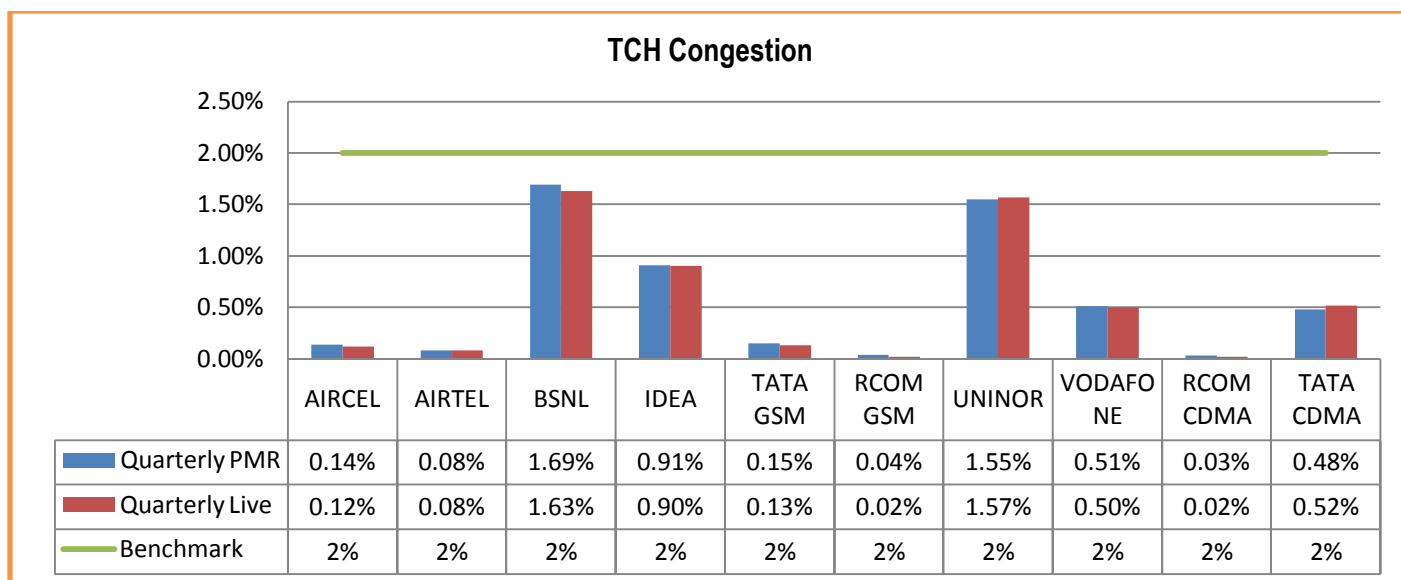
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION :



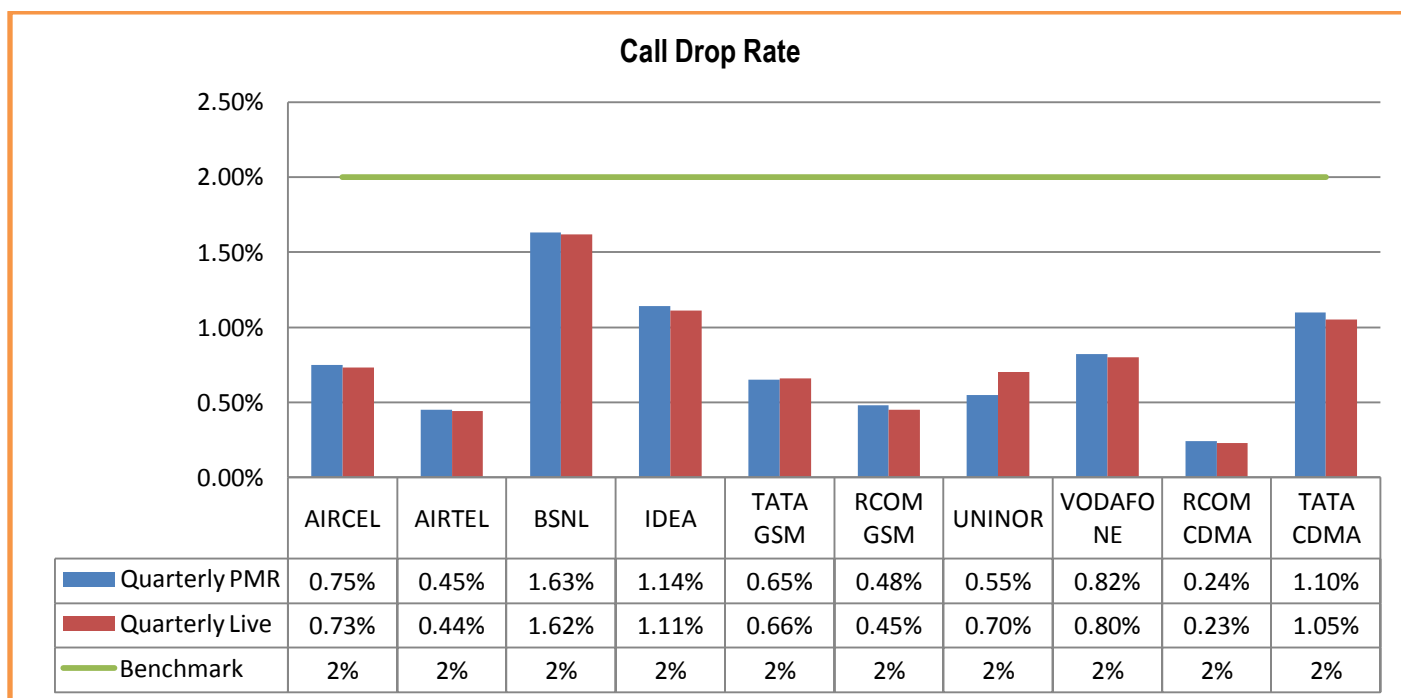
All operators are meeting the benchmarks.

5) TCH CONGESTION:



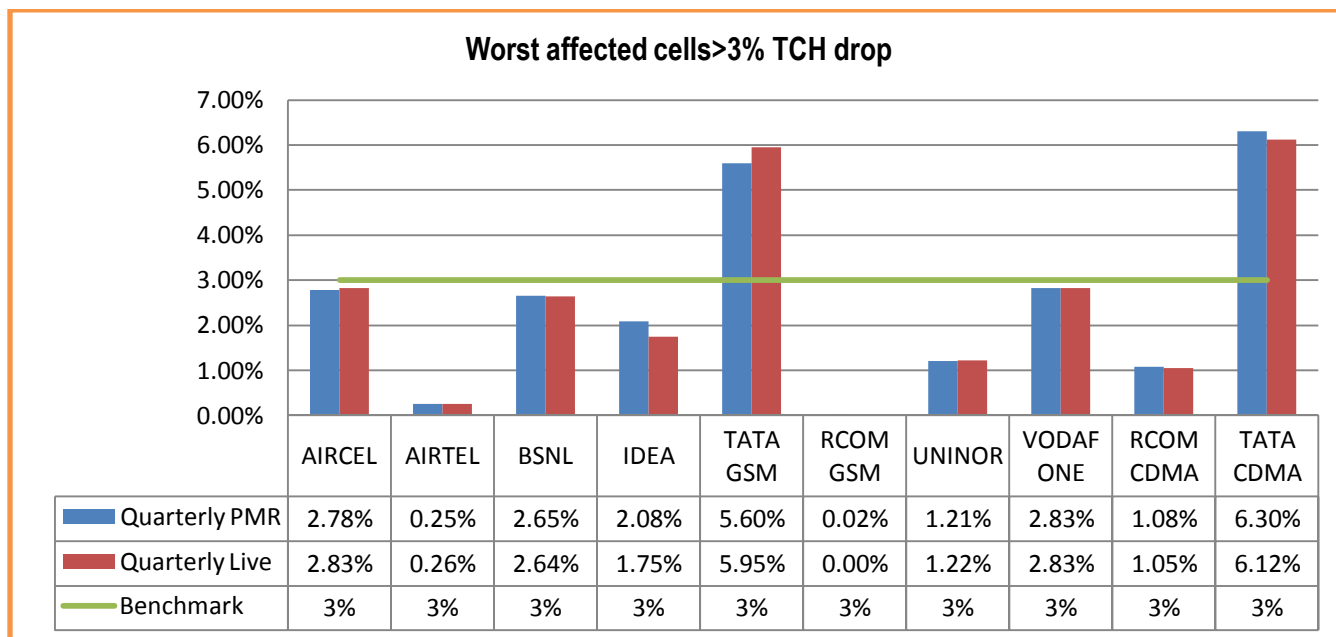
All operators are meeting the benchmarks.

6) CALL DROP RATE:



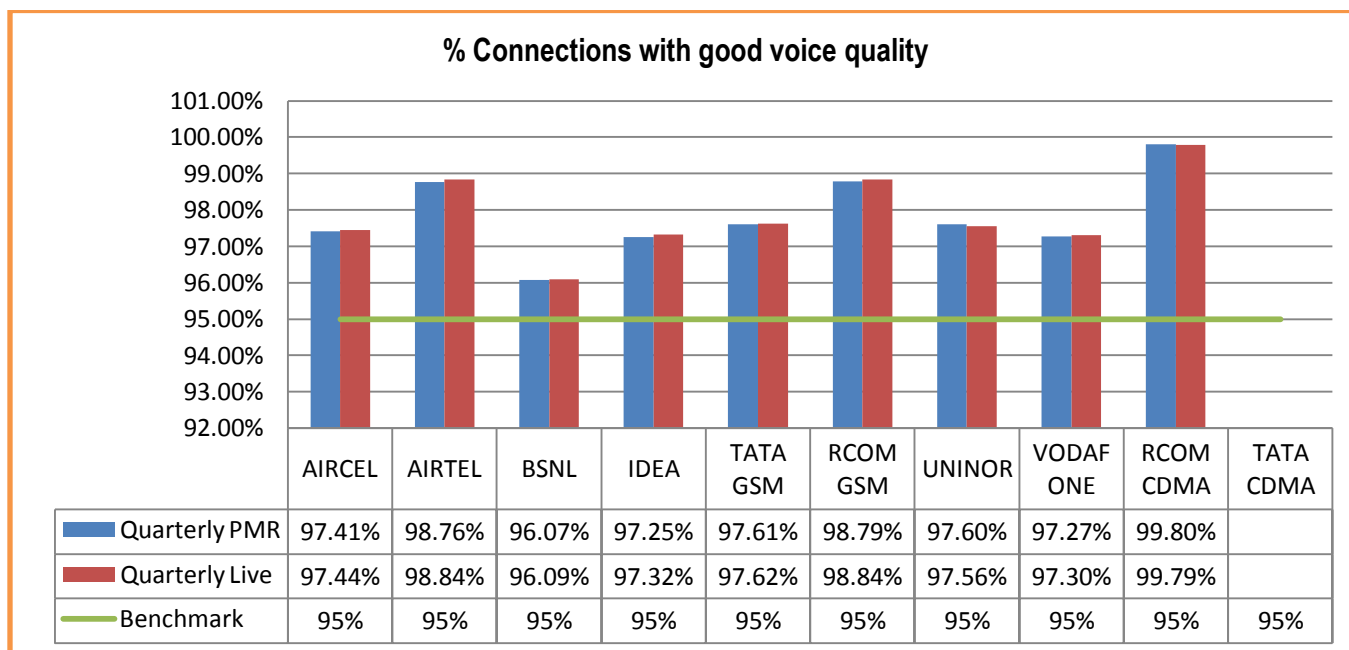
All operators are meeting the benchmarks.

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.