



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

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PREFACE

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

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

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

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 – OCTOBER- 14 MONTH:	17
5.1.4 QOS PERFORMANCE OF MONTHLY PMR – NOVEMBER- 14 MONTH:	18
5.1.5 QOS PERFORMANCE OF MONTHLY PMR – DECEMBER- 14 MONTH:	19
5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- DECEMBER-14 (OCTOBR TO DECEMBER 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 MEASURMENT DATA (3-DAYS) – OCTOBER 14 MONTH:	24
5.2.2 LIVE MEASURMENT DATA (3-DAYS) – NOVEMBER-14 MONTH:	25
5.2.3 LIVE MEASURMENT DATA (3-DAYS) – DECEMBER 14 MONTH:	26
5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF OCTOBER TO DECEMBER- 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 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (OCTOBER to DECEMBER 2014 MONTHS AUDITED DATA):	35
5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE- DECEMBER 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:	58
7.3 KEY FINDINGS ON DRIVE TEST:	62
8) GRAPHICAL REPRESENTATION:.....	64



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

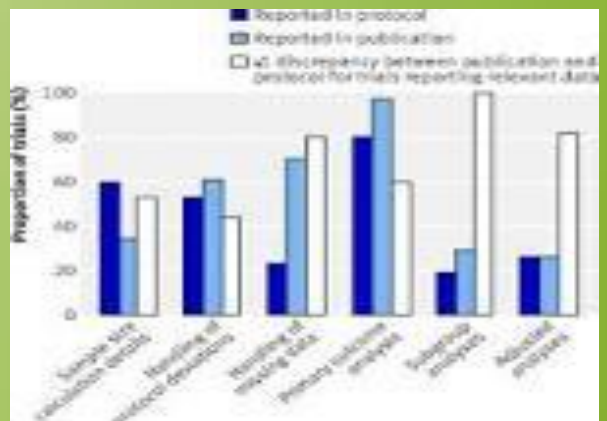
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

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 Delhi, Haryana and Mumbai circles during the quarter October – December 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
		October-14	November -14	December-14	
GSM Operators					
1	AIRCEL	18th to 20th Oct'2014	8th to 10th Nov'2014	19th to 21th Dec'2014	Aircel Ltd. , Commer Zone, Building no-2,6 Floor, Yerwada Jail Road, Yerwada, Pune-1
2	AIRTEL	8th Oct to 10th Oct	5th Nov to 7th Nov	2nd Dec to 4th Dec	D Building, Vega Center, Near Swargate Bus Stand, Pune
3	BSNL	6th Oct to 8th Oct	3rd Nov to 5th Nov	3rd Dec to 5th Dec	2nd Floor, Telephone Bhawan, Near C'lai Shop, Bajirao Road, Pune 411002
4	UNINOR	22th Oct to 24th Oct	13th, 14th & 17th Nov	5rd Dec to 9th Dec	Telewings Communications Services Pvt Ltd. (Uninor) Welldone Technology Park Sec-48 Sohana Road Gurgaon
5	TATA GSM	18th to 20th Oct'2014	8th to 10th Nov'2014	20th to 22th Dec'2014	TATA Tel. Ltd., A1-Aqmar Building, 5, Ganesh Kindh Road, Shivaji Nagar , Pune-5
6	IDEA	18th to 20th Oct'2014	7th to 9th Nov'2014	18th to 20th Dec'2014	IDEA Cellular Ltd. Sharada Centre, 11/1, Erandwane, Pune - 411 004.
7	RCOM GSM	6th Oct to 8th Oct	3rd Nov to 5th Nov	3rd Dec to 5th Dec	Reliance Communications, 7th floor, Kumar cerebrum IT Park, B bldg, above standard chartered bank, near d-mart, kalyani nagar, Pune.
8	VODAFONE	6th Oct to 8th Oct	3rd Nov to 5th Nov	3rd Dec to 5th Dec	Vodafone Cellular Limited, Metropolitan, Old Mumbai -Pune Highway, Wakdewadi, Shivajinagar, Pune 411003
CDMA Operators					
9	RCOM CDMA	6th Oct to 8th Oct	3rd Nov to 5th Nov	3rd Dec to 5th Dec	Reliance Communications, 7th floor, Kumar cerebrum IT Park, B bldg, above standard chartered bank, near d-mart, kalyani nagar, Pune.
10	TATA CDMA	18th to 20th Oct'2014	8th to 10th Nov'2014	20th to 22th Dec'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 Dec - 2014.

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

3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES

- The QoS audit for basic (wire line) service is 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**. **Based on this criterion, QoS audit of Wireline service in MH&G circle was not required to be done during QE December-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**. **Based on this criterion, QoS audit of broadband service in MH&G circle was not required to be done during QE December-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 **Aircel, Tata (GSM) and Tata(CDMA)** as they remained non-complied in all the three months of the quarter with their average performance of **3.80%, 5.19% and 5.76%** 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 **Aircel, Tata (GSM) and Tata (CDMA)** with their average performance as **3.37%, 5.27% and 5.54%** 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, **Idea and RCOM (GSM)** remained non-complied in case of **postpaid complaints and Pre-paid complaints** with their performance as **0.184% and 0.104%** respectively.

Regarding parameter **Refund of deposits within 60 days of closure**, only **Idea** remained non-complied by achieving the value **99.51%**, marginally below the benchmark. .

All service providers are in compliance with respect to the parameter '**Accessibility of call center**'. However, **Aircel, Idea, RCOM (GSM), Tata (GSM) and RCOM (CDMA)** have not met the benchmark for the parameter “**% calls answered by Operators (voice to voice) within 90 seconds**”. They have achieved their performance as **68.53%, 94.33%, 71.96%, 93.32% and 71.28%** respectively. The performance of **Aircel, RCOM (GSM) and RCOM (CDMA)** was way below the benchmark of >95%.

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 90 seconds**', performance of **Aircel, RCOM GSM and RCOM CDMA** was **94.11%, 91.55% and 86.14%** respectively. The performance of **RCOM CDMA** was way below the benchmark of >=95%.

*(iv) The analysis of Drive tests results revealed that Service providers namely **BSNL, RCOM (GSM)/(CDMA) and Uninor** remained non-complied and need to improve their network performance with respect to the parameters **Voice Quality, Call Drop rate and Call setup success rate / Blocked Call Rate** at different locations of the above 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	Dec-14	20 Hrs-21 Hrs
2	AIRTEL	Dec-14	20 Hrs-21 Hrs
3	BSNL	Dec-14	19 Hrs-20 Hrs
4	IDEA	Dec-14	19 Hrs-20 Hrs
5	TATA GSM	Dec-14	19 Hrs-20 Hrs
6	RCOM GSM	Dec-14	19 Hrs-20 Hrs
7	UNINOR	Dec-14	19 Hrs-20 Hrs
8	VODAFONE	Dec-14	19 Hrs-20 Hrs
CDMA OPERATORS			
9	RCOM CDMA	Dec-14	19 Hrs-20 Hrs
10	TATA CDMA	Dec-14	19 Hrs-20 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	1836	Huawei	Huawei
2	AIRTEL	25	162	10550	NSN	NSN
3	BSNL	18	141	6880	Alcatel	Alcatel
4	IDEA	42	93	10616	Ericsson	Ericsson
5	TATA GSM	4	30	4392	Huawei	Huawei
6	RCOM GSM	5	23	2767	Huawei	Huawei
7	UNINOR	8	26	4489	NSN+Huawei	NSN+Huawei
8	VODAFONE	16	118	10173	NSN	NSN
CDMA OPERATORS						
9	RCOM CDMA	10	8	1756	ZTE,Lucent	ZTE,Lucent
10	TATA CDMA	12	18	2239	Huawei, ZTE, Ericsson	Huawei, ZTE, Ericsson

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

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- OCT-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%	Oct-14	0.02%	0.01%	1.90%	0.11%	0.03%	0.18%	0.14%	0.10%	0.14%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Oct-14	0.00%	0.00%	1.92%	0.43%	0.00%	0.40%	0.52%	0.47%	0.29%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Oct-14	99.62%	99.52%	95.86%	98.47%	99.66%	99.61%	97.66%	99.55%	97.67%	98.40%
	b) SDCCCH/PAGING Channel congestion	<=1%	Oct-14	0.03%	0.04%	0.48%	0.69%	0.09%	0.02%	0.36%	0.33%	0.00%	0.00%
	c) TCH congestion	<=2%	Oct-14	0.05%	0.08%	1.59%	1.03%	0.17%	0.04%	1.37%	0.45%	0.04%	0.22%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Oct-14	0.78%	0.45%	1.49%	1.13%	0.61%	0.46%	0.51%	0.77%	0.20%	1.02%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Oct-14	2.61%	0.14%	2.27%	1.46%	4.89%	0.01%	1.47%	2.73%	0.83%	6.04%
	c) Connections with good voice quality	>=95%	Oct-14	97.39%	98.79%	96.28%	97.26%	97.54%	98.79%	97.72%	97.20%	99.80%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Oct-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 – NOVEMBER- 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE - NOV 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%	Nov-14	0.02%	0.01%	1.95%	0.09%	0.03%	0.26%	0.17%	0.08%	0.22%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Nov-14	0.00%	0.00%	1.89%	0.34%	0.00%	0.76%	0.54%	0.24%	0.46%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Nov-14	99.50%	99.87%	95.67%	98.19%	99.62%	99.56%	97.76%	99.48%	98.10%	98.33%
	b) SDCCH/PAGING Channel congestion	<=1%	Nov-14	0.03%	0.04%	0.55%	0.65%	0.11%	0.03%	0.48%	0.36%	0.00%	0.00%
	c) TCH congestion	<=2%	Nov-14	0.13%	0.08%	1.67%	1.14%	0.18%	0.04%	1.37%	0.52%	0.02%	0.22%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Nov-14	0.79%	0.45%	1.54%	1.10%	0.63%	0.46%	0.56%	0.79%	0.19%	0.92%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Nov-14	4.23%	0.13%	2.41%	1.12%	5.32%	0.01%	1.47%	2.74%	0.83%	5.97%
	c) Connections with good voice quality	>=95%	Nov-14	97.47%	98.74%	96.14%	97.29%	97.51%	98.76%	97.68%	97.22%	99.80%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Nov-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 – DECEMBER- 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- DEC 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%	Dec-14	0.05%	0.01%	1.90%	0.07%	0.01%	0.26%	0.16%	0.06%	0.21%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Dec-14	0.00%	0.00%	1.88%	0.20%	0.00%	1.01%	0.67%	0.13%	0.68%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Dec-14	99.52%	99.87%	95.83%	98.44%	99.56%	99.56%	97.65%	99.50%	98.11%	98.45%
	b) SDCCH/PAGING Channel congestion	<=1%	Dec-14	0.06%	0.04%	0.75%	0.59%	0.11%	0.02%	0.48%	0.31%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-14	0.12%	0.08%	1.59%	1.04%	0.23%	0.04%	1.46%	0.50%	0.02%	0.19%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Dec-14	0.84%	0.45%	1.57%	1.05%	0.64%	0.36%	0.59%	0.75%	0.18%	0.82%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Dec-14	4.55%	0.12%	2.40%	0.98%	5.35%	0.02%	1.50%	2.80%	0.72%	5.26%
	c) Connections with good voice quality	>=95%	Dec-14	97.16%	98.96%	95.96%	97.33%	97.40%	98.78%	97.62%	97.30%	99.80%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Dec-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- DECEMBER-14 (OCTOBR TO DECEMBER 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	0.03%	0.01%	1.92%	0.09%	0.02%	0.23%	0.16%	0.08%	0.19%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.00%	1.90%	0.32%	0.00%	0.72%	0.58%	0.28%	0.48%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.55%	99.75%	95.79%	98.37%	99.61%	99.58%	97.69%	99.51%	97.96%	98.39%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.04%	0.04%	0.59%	0.64%	0.10%	0.02%	0.44%	0.33%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.10%	0.08%	1.62%	1.07%	0.19%	0.04%	1.40%	0.49%	0.03%	0.21%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.80%	0.45%	1.53%	1.09%	0.63%	0.43%	0.55%	0.77%	0.19%	0.92%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	3.80%	0.13%	2.36%	1.19%	5.19%	0.01%	1.48%	2.76%	0.79%	5.76%
	c) Connections with good voice quality	>=95%	Quarterly	97.34%	98.83%	96.13%	97.29%	97.48%	98.78%	97.67%	97.24%	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 0.19 %) 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 **Aircel, Tata (GSM) and Tata (CDMA)**. **Aircel, Tata GSM & CDMA** remained non-complied in all the three months of the quarter with their average performance as **3.80%, 5.19% and 5.76% 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) – OCTOBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- OCT 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	0.01%	0.01%	1.48%	0.11%	0.03%	0.19%	0.09%	0.11%	0.13%	0.03%
	b) Worst affected BTSS due to downtime	<=2%	Live Data	0.00%	0.00%	0.06%	0.06%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live Data	99.59%	99.87%	95.31%	98.56%	99.65%	99.62%	97.89%	99.53%	98.26%	98.50%
	b) SDCCH/PAGING Channel congestion	<=1%	Live Data	0.03%	0.03%	0.48%	0.47%	0.11%	0.02%	0.36%	0.37%	0.00%	0.00%
	c) TCH congestion	<=2%	Live Data	0.08%	0.08%	1.88%	0.95%	0.09%	0.04%	1.30%	0.47%	0.02%	0.08%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live Data	0.79%	0.44%	1.45%	1.14%	0.61%	0.46%	0.41%	0.76%	0.21%	1.03%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live Data	2.84%	0.15%	2.32%	1.60%	5.08%	0.00%	1.08%	2.72%	0.83%	4.90%
	c) Connections with good voice quality	>=95%	Live Data	97.34%	98.82%	96.42%	97.27%	97.53%	98.79%	97.75%	97.26%	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) – NOVEMBER-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- NOV 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	0.01%	0.01%	1.69%	0.09%	0.04%	0.32%	0.16%	0.09%	0.24%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.07%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.59%	99.87%	95.69%	98.33%	99.66%	99.59%	97.66%	99.51%	96.90%	98.47%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.04%	0.03%	0.51%	0.42%	0.09%	0.02%	0.52%	0.29%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.08%	0.08%	1.70%	1.17%	0.14%	0.04%	1.58%	0.49%	0.06%	0.12%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.76%	0.45%	1.56%	1.08%	0.62%	0.45%	0.46%	0.76%	0.21%	0.89%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.76%	0.14%	2.22%	1.09%	5.24%	0.00%	1.50%	2.71%	0.96%	6.22%
	c) Connections with good voice quality	>=95%	Live data	97.53%	98.76%	96.09%	97.37%	97.50%	98.79%	97.65%	97.22%	99.80%	NP
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	0	0	0

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

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

CELLULAR MOBILE TELEPHONE SERVICES MAHARASHTRA & GOA CIRCLE- DEC 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	0.04%	0.01%	1.82%	0.09%	0.02%	0.31%	0.15%	0.05%	0.19%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.06%	0.02%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.56%	99.89%	95.64%	98.59%	99.64%	99.55%	97.71%	99.58%	98.53%	98.48%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.04%	0.04%	0.73%	0.62%	0.10%	0.02%	0.38%	0.25%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.10%	0.08%	1.64%	0.91%	0.19%	0.04%	1.39%	0.42%	0.01%	0.24%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.82%	0.45%	1.62%	1.05%	0.65%	0.46%	0.52%	0.77%	0.16%	0.84%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	4.52%	0.11%	2.30%	0.98%	5.48%	0.01%	1.34%	2.82%	0.70%	5.50%
	c) Connections with good voice quality	>=95%	Live data	97.18%	98.54%	95.81%	97.34%	97.33%	98.76%	97.65%	97.32%	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.

5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF OCTOBER TO DECEMBER- 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	0.02%	0.01%	1.66%	0.10%	0.03%	0.27%	0.13%	0.08%	0.19%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.00%	0.06%	0.03%	0.00%	0.00%	0.01%	0.01%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.58%	99.88%	95.55%	98.49%	99.65%	99.59%	97.75%	99.54%	97.90%	98.48%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.04%	0.03%	0.57%	0.50%	0.10%	0.02%	0.42%	0.30%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.09%	0.08%	1.74%	1.01%	0.14%	0.04%	1.42%	0.46%	0.03%	0.15%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.79%	0.45%	1.54%	1.09%	0.63%	0.46%	0.46%	0.76%	0.19%	0.92%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	3.37%	0.13%	2.28%	1.22%	5.27%	0.00%	1.31%	2.75%	0.83%	5.54%
	c) Connections with good voice quality	>=95%	Quarterly	97.35%	98.71%	96.11%	97.33%	97.45%	98.78%	97.68%	97.27%	99.80%	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 **Aircel, Tata (GSM) and Tata (CDMA)** with their average performance as **3.37%, 5.27% and 5.54%** 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 - Oct 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		Oct-14	1979	10493	6880	10495	4381	2767	4420	9933	1754	2266
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Oct-14	239.1	614.93	97011	8876	1028.1	3789	4603	7398.32	1841	539.73
	c) BTS Accumulated Downtime	<=2%	Oct-14	0.02%	0.01%	1.90%	0.11%	0.03%	0.18%	0.14%	0.10%	0.14%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Oct-14	0	0	132	45	0	11	23	47	5	0
	e) Worst affected BTSs due to downtime	<=2%	Oct-14	0.00%	0.00%	1.92%	0.43%	0.00%	0.40%	0.52%	0.47%	0.29%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Oct-14	99.62%	99.52%	95.86%	98.47%	99.66%	99.61%	97.66%	99.55%	97.67%	98.40%
	b) SDCCH/PAGING Congestion	<=1%	Oct-14	0.03%	0.04%	0.48%	0.69%	0.09%	0.02%	0.36%	0.33%	0.00%	0.00%
	c) TCH congestion	<=2%	Oct-14	0.05%	0.08%	1.59%	1.03%	0.17%	0.04%	1.37%	0.45%	0.04%	0.22%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Oct-14	0.78%	0.45%	1.49%	1.13%	0.61%	0.46%	0.51%	0.77%	0.20%	1.02%
	b) Worst affected cells>3% TCH drop	<=3%	Oct-14	2.61%	0.14%	2.27%	1.46%	4.89%	0.01%	1.47%	2.73%	0.83%	6.04%
	c) % of connections with good voice quality	>=95%	Oct-14	97.39%	98.79%	96.28%	97.26%	97.54%	98.79%	97.72%	97.20%	99.80%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Oct-14	140	44	459	457	516.55	1	195	799	44	397
	e) Total no. of cells (Sector) in the licensed service area		Oct-14	5378	32028	20217	31352	10558	8254	13273	29285	5256	6577
No. of POI's having >=0.5% POI congestion													
4	No. of POI's having >=0.5% POI congestion		Oct-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Oct-14	0	0	0	0	0	0	0	0	0	0
Network Data													
5	a) Equipped Capacity of Network in Erlang		Oct-14	54146	364922	259355	521588	198884	144000	163200	383492	230000	390648
	b) Total traffic in TCBH in erlang (Avg.)		Oct-14	24799	234290	98464	432533	70019	103676	170206	321197	53607	79651
	c) Total no. of customers served (as per VLR) on last day of the month		Oct-14	1025298	10412895	4482754	20842743	3221326	5124662	4876977	15999552	1660401	1341771

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 - Oct 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	1777	10497	6880	10427	4378	2767	4395	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		Live data	11.89	57.48	7308	817	84.73	383	283	797.86	158	45.57
	c) BTS Accumulated Downtime	<=2%	Live data	0.01%	0.01%	1.48%	0.11%	0.03%	0.19%	0.09%	0.11%	0.13%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	4	6	0	0	0	4	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.06%	0.06%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.59%	99.87%	95.31%	98.56%	99.65%	99.62%	97.89%	99.53%	98.26%	98.50%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.03%	0.03%	0.48%	0.47%	0.11%	0.02%	0.36%	0.37%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.08%	0.08%	1.88%	0.95%	0.09%	0.04%	1.30%	0.47%	0.02%	0.08%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.79%	0.44%	1.45%	1.14%	0.61%	0.46%	0.41%	0.76%	0.21%	1.03%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.84%	0.15%	2.32%	1.60%	5.08%	0.00%	1.08%	2.72%	0.83%	4.90%
	c) % of connections with good voice quality	>=95%	Live data	97.34%	98.82%	96.42%	97.27%	97.53%	98.79%	97.75%	97.26%	99.80%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	153	49	469	501	657	0	144	797	44	322
	e) Total no. of cells (Sector) in the licensed service area		Live data	5378	32071	20217	31363	12936	8254	13322	29272	5244	6576
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 – Nov 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		Nov-14	1776.7	10509	6880	10542	4392	2767	4480	10043	1755	2264
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Nov-14	266.63	543.72	96541	6810	1054.37	5205	5538	5965.46	2795	411.03
	c) BTS Accumulated Downtime	<=2%	Nov-14	0.02%	0.01%	1.95%	0.09%	0.03%	0.26%	0.17%	0.08%	0.22%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Nov-14	0	0	130	36	0	21	24	24	8	0
e) Worst affected BTSs due to downtime	<=2%	Nov-14	0.00%	0.00%	1.89%	0.34%	0.00%	0.76%	0.54%	0.24%	0.46%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Nov-14	99.50%	99.87%	95.67%	98.19%	99.62%	99.56%	97.76%	99.48%	98.10%	98.33%
	b) SDCCH/PAGING Congestion	<=1%	Nov-14	0.03%	0.04%	0.55%	0.65%	0.11%	0.03%	0.48%	0.36%	0.00%	0.00%
c) TCH congestion	<=2%	Nov-14	0.13%	0.08%	1.67%	1.14%	0.18%	0.04%	1.37%	0.52%	0.02%	0.22%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Nov-14	0.79%	0.45%	1.54%	1.10%	0.63%	0.46%	0.56%	0.79%	0.19%	0.92%
	b) Worst affected cells>3% TCH drop	<=3%	Nov-14	4.23%	0.13%	2.41%	1.12%	5.32%	0.01%	1.47%	2.74%	0.83%	5.97%
	c) % of connections with good voice quality	>=95%	Nov-14	97.47%	98.74%	96.14%	97.29%	97.51%	98.76%	97.68%	97.22%	99.80%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Nov-14	228	42	487	353	686.5	1	199	824	44	393
e) Total no. of cells (Sector) in the licensed service area		Nov-14	5381	32093	20217	31576	12896	8254	13510	30035	5259	6574	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Nov-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Nov-14	0	0	0	0	0	0	0	0	0	0
5	Network Data												
	a) Equipped Capacity of Network in Erlang		Nov-14	54008	362533	259355	528096	199245	144000	166960	374341	230000	390361
	b) Total traffic in TCBH in erlang (Avg.)		Nov-14	26126	235773	104243	457311	71589	109002	181214	337496	56792	86991
c) Total no. of customers served (as per VLR) on last day of the month		Nov-14	1069608	10753970	4427240	21352450	3337262	3110800	5145791	16204476	1669011	1352589	

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- Nov-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	1778	10496	6880	10495	4392	2767	4461	9933	1754	2266
	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	6.9	52.03	8376	696	118.05	637	518	640.64	299	52.89
	c) BTS Accumulated Downtime	<=2%	Live data	0.01%	0.01%	1.69%	0.09%	0.04%	0.32%	0.16%	0.09%	0.24%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	5	2	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.07%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.59%	99.87%	95.69%	98.33%	99.66%	99.59%	97.66%	99.51%	96.90%	98.47%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.04%	0.03%	0.51%	0.42%	0.09%	0.02%	0.52%	0.29%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.08%	0.08%	1.70%	1.17%	0.14%	0.04%	1.58%	0.49%	0.06%	0.12%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.76%	0.45%	1.56%	1.08%	0.62%	0.45%	0.46%	0.76%	0.21%	0.89%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.76%	0.14%	2.22%	1.09%	5.24%	0.00%	1.50%	2.71%	0.96%	6.22%
	c) % of connections with good voice quality	>=95%	Live data	97.53%	98.76%	96.09%	97.37%	97.50%	98.79%	97.65%	97.22%	99.80%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	148	44	448	345.33	676	0	203	793.33	51	409
	e) Total no. of cells (Sector) in the licensed service area		Live data	5374	32067	20217	31563	12908	8254	13503	29272	5256	6579
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 - Dec 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		Dec-14	1836	10550	6880	10616	4392	2767	4489	10173	1756	2239
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Dec-14	691.77	525.67	97501	5320	467.3	5393	5467	4475.64	2757	424.62
	c) BTS Accumulated Downtime	<=2%	Dec-14	0.05%	0.01%	1.90%	0.07%	0.01%	0.26%	0.16%	0.06%	0.21%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Dec-14	0	0	129	21	0	28	30	13	12	0
e) Worst affected BTSs due to downtime	<=2%	Dec-14	0.00%	0.00%	1.88%	0.20%	0.00%	1.01%	0.67%	0.13%	0.68%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Dec-14	99.52%	99.87%	95.83%	98.44%	99.56%	99.56%	97.65%	99.50%	98.11%	98.45%
	b) SDCCH/PAGING Congestion	<=1%	Dec-14	0.06%	0.04%	0.75%	0.59%	0.11%	0.02%	0.48%	0.31%	0.00%	0.00%
c) TCH congestion	<=2%	Dec-14	0.12%	0.08%	1.59%	1.04%	0.23%	0.04%	1.46%	0.50%	0.02%	0.19%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Dec-14	0.84%	0.45%	1.57%	1.05%	0.64%	0.36%	0.59%	0.75%	0.18%	0.82%
	b) Worst affected cells>3% TCH drop	<=3%	Dec-14	4.55%	0.12%	2.40%	0.98%	5.35%	0.02%	1.50%	2.80%	0.72%	5.26%
	c) % of connections with good voice quality	>=95%	Dec-14	97.16%	98.96%	95.96%	97.33%	97.40%	98.78%	97.62%	97.30%	99.80%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Dec-14	248	40	486	310.47	681.87	2	203	842	38	344.45
e) Total no. of cells (Sector) in the licensed service area		Dec-14	5439.35	32159	20217	31736.97	12749.39	8284	13587	30052	5260	6554.29	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Dec-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Dec-14	0	0	0	0	0	0	0	0	0	0
5	Network Data												
	a) Equipped Capacity of Network in Erlang		Dec-14	51289	362354	259355	529046	198973	144000	170517	380381	230000	400470
	b) Total traffic in TCBH in erlang (Avg.)		Dec-14	27884	267628	101919	460698	72316	110267	182143	340115	58639	82788
c) Total no. of customers served (as per VLR) on last day of the month		Dec-14	1126282	10881376	4429798	21842877	3532653	3135879	5325558	16683121	1672435	1344934	

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 - Dec 14 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Live data	1803	10514	6880	10542	4392	2767	4481	10043	1755	2264
	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	51.19	49.05	9030	720	54.99	621	500	334.18	236	14.54
	c) BTS Accumulated Downtime	<=2%	Live data	0.04%	0.01%	1.82%	0.09%	0.02%	0.31%	0.15%	0.05%	0.19%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	4	2	0	0	1	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.06%	0.02%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.56%	99.89%	95.64%	98.59%	99.64%	99.55%	97.71%	99.58%	98.53%	98.48%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.04%	0.04%	0.73%	0.62%	0.10%	0.02%	0.38%	0.25%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.10%	0.08%	1.64%	0.91%	0.19%	0.04%	1.39%	0.42%	0.01%	0.24%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.82%	0.45%	1.62%	1.05%	0.65%	0.46%	0.52%	0.77%	0.16%	0.84%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	4.52%	0.11%	2.30%	0.98%	5.48%	0.01%	1.34%	2.82%	0.70%	5.50%
	c) % of connections with good voice quality	>=95%	Live data	97.18%	98.54%	95.81%	97.34%	97.33%	98.76%	97.65%	97.32%	99.80%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	246	36	465	310	702	1	182	846	37	361
e) Total no. of cells (Sector) in the licensed service area		Live data	5445	32151	20217	31743	12800	8254	13578	30035	5259	6572	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0

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 (OCTOBER to DECEMBER 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													
Metering & Billing Credibility -Post Paid													
1	A) No. of bills issued during the quarter		MHG	7396	1481405	1067132	2522999	157245	315390	NA	2905040	658949	93963
	B) No. of bills disputed including billing complaints during the quarter		MHG	0	254	7	4647	130	1	NA	1808	563	0
	C) % of billing complaints during the quarter	<= 0.1%	MHG	0.000%	0.017%	0.001%	0.184%	0.083%	0.000%	NA	0.062%	0.085%	0.000%
Metering & Billing Credibility -Pre Paid													
2	A) Total No. of Pre-paid customers at the end of the quarter		MHG	1746573	10148745	5191345	19568335	3127827	4697003	7241912	15896058	1561452	1617935
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		MHG	93	88	4120	13618	3238	0	1195	9206	958	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	MHG	0.005%	0.001%	0.079%	0.070%	0.104%	0.000%	0.017%	0.058%	0.061%	0.000%
Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints													
3	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		MHG	93	342	4127	51648	3368	3535	1195	11041	1521	107
	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	93	342	4127	51648	3368	3535	1195	11041	1521	107
	C) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 6 weeks during the quarter		MHG	93	342	4127	51648	3368	3535	1195	11041	1521	107
	D) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	>=98% within 4 weeks	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		
	E) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 6 weeks	100% within 6 weeks	MHG	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	F) % 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%
Response time to customers for assistance													
	A) Total no of calls attempted to customer care/Call center		MHG	5776961	3936980	457759	62990404	5870800	1267780	2202360	32472779	2313571	212484
	B) Total no. of calls successfully established to customer care/Call center		MHG	5679569	3936980	457759	62488133	5828393	1243073	2102867	32465339	2298069	209893
4	C) % Accessibility of Call centre /customer Care (Total call successfully established*100/ Total call attempt)	>=95%	MHG	98.31%	100.00%	100.00%	99.20%	99.28%	98.05%	95.48%	99.98%	99.33%	98.78%
	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		MHG	939601	6729422	2114147	14938834	1282815	1633656	5681690	9274675	320531	182765
	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		MHG	643898	6497455	2064986	14091180	923112	1524487	5595395	9137343	228488	177695
	F) % age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100 / Total call attempts)	>=95%	MHG	68.53%	96.55%	97.67%	94.33%	71.96%	93.32%	98.48%	98.52%	71.28%	97.23%
Termination/closure of service													
5	A) Total No. of requests for Termination / Closure of service received during the quarter		MHG	16	3317	8638	25929	474	2913	NA	16133	4608	847
	B) No. of requests for Termination /Closure of service complied within 7 days during the quarter		MHG	16	3317	8638	25929	474	2913	NA	16133	4608	847
	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%
Time taken for refunds of deposits after closures.													
6	A) No. of Payments/ Refunds due during the quarter		MHG	12	3465	725	2486	1330	136	NA	5427	2456	113
	B) No. of Payments/ Refunds Cleared during the quarter		MHG	12	3465	725	2474	1330	136	NA	5427	2456	113
	C)Time taken for refunds of deposits after closures.	100% within 60 days	MHG	100.00%	100.00%	100.00%	99.51%	100.00%	100.00%	NA	100.00%	100.00%	100.00%

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

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

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES – QE – DEC 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	192110	125526	18078	1990392	181117	442472	823213	1048589	69194	82270
	Total no. of calls successfully established to customer care/Call center		MHG	189432	125526	18078	1974685	179121	432301	791692	1048306	68342	81612
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempts)	>=95%	MHG	98.60%	100.00%	100.00%	99.21%	98.91%	97.70%	96.17%	99.97%	98.81%	99.20%
2	Total Calls reached to operator for Voice to Voice (Total call attempt)		MHG	34403	208341	54582	461129	38472	54393	184903	304739	9397	5872
	Total number of calls answered by the operator (Voice to voice) within 90 seconds.		MHG	32380	204187	54582	446183	35210	52404	18061	301133	8093	5632
	% age of calls answered by operator (voice to voice) (Total call successfully established within 90 Sec. *100/ Total call attempts)	>=95%	MHG	94.11%	98.00%	100.00%	96.75%	91.55%	96.34%	97.81%	98.81%	86.14%	95.91%

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, **Idea** and **RCOM (GSM)** remained non-complied in case of **Pre-paid complaints** and **postpaid complaints** with their performance as **0.184%** and **0.104%** 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. 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**, **Idea**, **RCOM (GSM)**, **Tata (GSM)** and **RCOM (CDMA)** have not met the benchmark for the parameter "**% calls answered by Operators (voice to voice) within 90 seconds**". They have achieved their performance as **68.53%**, **94.33%**, **71.96%**, **93.32%** and **71.28%** respectively. The performance of **Aircel**, **RCOM (GSM)** and **RCOM (CDMA)** was way below the benchmark of $>95\%$.

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 except **Idea** which remained non-complied by achieving the value **99.51%**, marginally below the benchmark. .

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 90 seconds**', performance of **Aircel**, **RCOM GSM** and **RCOM CDMA** was **94.11%**, **91.55%** and **86.14%** respectively. The performance of **RCOM CDMA** was way below the benchmark of $\geq 95\%$.

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%	96%	100%	97%	100%	100%	100%	100%	100%
AIRTEL	MHG	100%	--	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	MHG	95%	100%	--	100%	94%	100%	100%	96%	100%	100%
IDEA	MHG	100%	100%	100%	--	100%	100%	100%	100%	100%	100%
RCOM GSM	MHG	95%	100%	97%	100%	--	100%	100%	100%	100%	100%
TATA GSM	MHG	100%	100%	100%	100%	100%	--	100%	100%	100%	100%
VODAFONE	MHG	100%	100%	100%	100%	100%	100%	--	100%	100%	100%
UNINOR	MHG	100%	100%	95%	100%	100%	100%	100%	--	100%	100%
RCOM CDMA	MHG	100%	100%	100%	100%	100%	100%	100%	100%	--	100%
TATA CDMA	MHG	100%	100%	100%	100%	100%	100%	100%	100%	100%	--

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. However, in case where calls attempted from Aircel to BSNL & RCOM GSM, successful calls interconnection were 96% and 97% respectively, from BSNL to Aircel, RCOM(GSM) and Uninor were 95%, 94% and 96% respectively, from RCOM (GSM) to Aircel and BSNL were 95% and 97% and from Uninor to BSNL, the successful calls were 95%. 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	100	100	100	100	100	100	100	100	100	100
% Accessibility of Call centre /customer Care (Total calls successfully established*100 / Total call attempts)	MHG	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Total Calls reached to agent desk for Voice to Voice (Total call attempts)	MHG	100	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 90 seconds	MHG	100	100	100	99	100	98	100	100	98	100
% age of calls answered by operator(voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts)	MHG	100.00%	100.00%	100.00%	99.00%	100.00%	98.00%	100.00%	100.00%	98.00%	100.00%

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 99.00%, 98.00% and 98.00% of calls to the operator within 90 Seconds.

6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS:

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS									
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM (GSM)	VODAFONE	RCOM (CDMA)
Total No. of calls Attempted	MHG	50	100	100	100	100	90	80	100
Total No. of calls Answered	MHG	45	95	96	94	96	88	80	90
Cases resolved within 4 weeks	MHG	45	95	96	94	96	88	80	90
%age of cases resolved	MHG	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

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 there complaints have been resolved but not sure of duration of their resolution. However, the customers, in general expressed their satisfaction on resolution of the billing complaints.

6.4 LEVEL -1 CALLING ASSESSMENT:

LEVEL 1 LIVE CALLING															
Emergency no.	Month	SSA Name	SDCA Name	No. of calls made	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	UNINOR	VODAFONE	RCOM (CDMA)	TATA (CDMA)	
100, 101, 108,1098	Oct-14	Nagpur	Kalmeshwar, Katol & Saoner	12	√	√	√	√	√	√	√	√	√	√	
			kamptee, Parseoni, Ramtek, maulda	16	√	√	√	√	√	√	√	√	√	√	√
			Nagpur	12	√	√	√	√	√	√	√	√	√	√	√
100, 101, 108,1098	Nov-14	Aurangabad	Sillod, kannad, Khulatabad	12	√	√	√	√	√	√	√	√	√	√	
			Aurangabad city	12	√	√	√	√	√	√	√	√	√	√	
			Paithan, Gangapur, Vaijapur	12	√	√	√	√	√	√	√	√	√	√	
100, 101, 108,1098	Dec-14	Jalgaon	Erandol, Parola, Amalner, Chopda	16	√	√	√	√	√	√	√	√	√	√	
			Jamner, Mukhtainagar, Bhusaval, Yawal	16	√	√	√	√	√	√	√	√	√	√	
			Jalgaon City	12	√	√	√	√	√	√	√	√	√	√	

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.

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 **Nagpur, Aurangabad and Jalgaon** in the months of October, November and December 2014 respectively. The total route Kms covered during drive tests in respective SSAs was **324 Kms, 323 Kms and 313 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 NAGPUR SSA IN OCTOBER 14 MONTH- MAHARSTRRA & 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	124	25	184	25	114	25	103	25	164	27	94	26	108	26	125	25	125	25	103
Major Roads	123	25			136	25	116	30	114	25	138	25	123	25	114	25	137	25	116	25	123	25		
Within City	268	25			306	25	222	25	203	25	244	25	210	25	234	28	251	25	229	25	205	25		
Overall SSA	515	75			626	75	452	80	420	75	546	77	427	76	456	79	513	75	470	75	431	76		
2	Blocked Call Rate	Highways	0.81%	0.00%	0.00%	0.00%	5.26%	0.00%	0.00%	0.00%	0.61%	0.00%	1.06%	3.85%	5.56%	0.00%	0.80%	0.00%	0.00%	0.00%	0.00%	0.00%		
		Major Roads	1.63%	0.00%	0.00%	0.00%	7.76%	3.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.51%	0.00%	0.00%	0.00%	0.00%	0.00%	0.81%	0.00%		
		Within City	0.75%	0.00%	0.00%	0.00%	3.60%	4.00%	0.00%	0.00%	0.00%	0.00%	1.90%	0.00%	2.14%	3.57%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
		Overall SSA	0.97%	0.00%	0.00%	0.00%	5.09%	2.50%	0.00%	0.00%	0.18%	0.00%	1.17%	1.32%	3.29%	0.00%	0.19%	0.00%	0.00%	0.00%	0.23%	0.00%		
3	Dropped Call Rate (<=2%)	Highways	0.81%	0.00%	0.00%	0.00%	2.78%	0.00%	1.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.80%	0.00%	0.97%	0.00%		
		Major Roads	0.83%	0.00%	0.00%	0.00%	1.87%	0.00%	0.00%	0.00%	0.00%	0.00%	1.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.81%	0.00%		
		Within City	1.50%	0.00%	0.00%	0.00%	1.40%	0.00%	0.51%	0.00%	0.00%	0.00%	1.46%	0.00%	0.00%	0.00%	0.00%	0.00%	0.44%	0.00%	0.98%	0.00%		
		Overall SSA	1.18%	0.00%	0.00%	0.00%	1.86%	0.00%	0.49%	0.00%	0.00%	0.00%	1.18%	0.00%	0.45%	0.00%	0.00%	0.00%	0.43%	0.00%	0.93%	0.00%		
4	(a) 0-4 (w/o frequency hopping for CDMA)	Percentage connections with good voice quality (=>95%)																						
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.17%	99.15%	96.74%	100%	
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.19%	99.80%	96.96%	100%	
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.46%	99.47%	97.53%	100%	

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



OPERATOR ASSISTED DRIVE TEST AT NAGPUR SSA IN OCTOBER 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	NA	97.83%	99.47%	97.19%	100%
	(b) 0-5 (with frequency hopping for GSM Operators)	Highways	96.55%	99.70%	96.62%	99.85%	90.28%	100%	96.27%	100%	95.24%	98.92%	92.27%	100%	94.67%	99.77%	96.11%	99.29%	NA	NA	NA	NA	
		Major Roads	98.08%	99.88%	96.70%	99.76%	92.05%	100%	97.58%	100%	96.34%	99.80%	92.29%	100%	95.38%	99.79%	95.79%	99.48%	NA	NA	NA	NA	
		Within City	97.95%	97.72%	97.16%	99.42%	88.44%	93.78%	97.45%	99.72%	96.81%	98.77%	90.64%	97.65%	95.12%	99.73%	95.61%	98.19%	NA	NA	NA	NA	
		Overall SSA	97.63%	99.11%	96.90%	99.68%	89.82%	97.80%	97.21%	99.91%	96.25%	99.17%	91.46%	98.44%	95.08%	99.76%	95.79%	98.99%	NA	NA	NA	NA	
	Service Coverage																						
5	In door (>= - 75dBm)	Highways	67.62%	50.44%	61.31%	74.69%	66.99%	61.78%	93.26%	90.80%	58.86%	99.96%	33.20%	92.75%	39.30%	91.00%	79.34%	100%	99.99%	100%	34.68%	96.32%	
		Major Roads	68.37%	100%	66.83%	100%	57.88%	80.73%	93.21%	95.48%	73.00%	67.66%	35.50%	100%	41.70%	8.30%	86.12%	27.24%	99.98%	100%	48.77%	100%	
		Within City	78.00%	88.02%	71.99%	100%	66.50%	98.18%	92.16%	98.41%	83.00%	74.84%	44.67%	98.23%	39.10%	98.80%	88.74%	100%	99.98%	100%	52.92%	100%	
		Overall SSA	73.11%	81.98%	67.88%	91.64%	64.58%	80.23%	92.70%	94.97%	73.52%	81.47%	37.79%	97.00%	39.80%	65.90%	85.59%	75.67%	99.98%	100%	45.46%	98.77%	
	In-vehicle (>= - 85dBm)	Highways	87.57%	98.33%	86.63%	99.89%	96.30%	99.71%	99.38%	95.07%	91.91%	100%	65.60%	100%	74.60%	99.80%	93.12%	100%	100%	100%	65.04%	100%	
		Major Roads	86.44%	100%	94.13%	100%	94.49%	99.56%	98.52%	97.96%	92.89%	99.96%	64.93%	100%	71.20%	95.60%	96.85%	61.55%	100%	100%	75.01%	100%	
		Within City	93.65%	99.93%	92.06%	100%	97.33%	100%	99.34%	100%	96.62%	99.15%	78.11%	100%	75.90%	99.80%	98.81%	100%	99.99%	100%	77.33%	100%	
		Overall SSA	90.42%	99.49%	91.01%	99.96%	96.02%	99.76%	99.13%	97.72%	94.33%	99.69%	69.54%	100%	74.50%	98.40%	96.80%	87.14%	99.99%	100%	72.46%	100%	
	Outdoor-in city (>= - 95dBm)	Highways	98.81%	100%	97.74%	100%	100%	100%	100%	100%	99.20%	100%	85.58%	100%	92.80%	100%	99.34%	100%	100%	100%	97.11%	100%	
		Major Roads	97.50%	100%	99.60%	100%	100%	100%	100%	100%	99.39%	100%	89.19%	100%	92.10%	100%	99.77%	95.29%	100%	100%	96.60%	100%	
		Within City	99.71%	100%	99.45%	100%	100%	100%	100%	100%	99.64%	100%	96.15%	100%	95.70%	100%	99.86%	100%	100%	100%	95.18%	100%	
		Overall SSA	98.96%	100%	99.01%	100%	100%	100%	100%	100%	99.45%	100%	90.31%	100%	94.20%	100%	99.70%	98.42%	100%	100%	96.30%	100%	

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



OPERATOR ASSISTED DRIVE TEST AT NAGPUR SSA IN OCTOBER 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	
			6	Call Setup Success Rate (>=95%)	Highways	99.19%	100%	100%	100%	94.74%	100%	100%	100%	99.39%	96.30%	98.94%	96.15%	95.37%	100%	99.20%	100%	100%	100%
Major Roads	98.37%	100%			100%	100%	92.24%	96.67%	100%	100%	97.83%	100%	100%	100%	95.61%	100%	100%	100%	100%	100%	100%	100%	100%
Within City	99.25%	100%			100%	100%	96.40%	96.00%	100%	100%	97.95%	100%	98.10%	100%	97.86%	96.43%	100%	100%	100%	100%	100%	99.51%	100%
Overall SSA	99.03%	100%			100%	100%	94.91%	97.50%	100%	100%	98.35%	98.70%	98.83%	98.68%	96.71%	98.73%	99.81%	100%	100%	100%	100%	99.77%	100%
7	Hand Over Success Rate (HOSR)	Highways	100%	100%	100%	100%	98.36%	100%	100%	100%	100%	100%	100%	100%	96.92%	100%	100%	100%	100%	100%	100%	100%	100%
		Major Roads	99.40%	100%	100%	100%	97.98%	100%	98.69%	100%	98.56%	100%	100%	100%	96.19%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	98.88%	100%	100%	100%	98.83%	100%	100%	100%	98.37%	100%	100%	100%	95.44%	100%	99.58%	100%	100%	100%	100%	100%	100%
		Overall SSA	99.25%	100%	100%	100%	98.45%	100%	99.67%	100%	98.88%	100%	100%	100%	95.88%	100%	99.82%	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 AURANGABAD SSA IN NOVEMBER 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	103	25	110	25	109	25	80	25	101	25	142	25	98	25	128	25	105
		Major Roads	166	25	172	25	180	25	160	25	164	25	170	25	157	25	179	25	180	25	149	25
		Within City	155	25	194	25	161	25	157	25	142	25	135	25	157	25	162	25	174	25	136	25
		Overall SSA	424	75	476	75	450	75	397	75	407	75	447	75	412	75	469	75	459	75	437	75
2	Blocked Call Rate	Highways	0.00%	0.00%	0.00%	0.00%	5.50%	0.00%	0.00%	0.00%	0.00%	0.00%	61.27%	0.00%	0.00%	0.00%	0.78%	0.00%	0.00%	0.00%	57.24%	0.00%
		Major Roads	0.00%	0.00%	0.00%	0.00%	3.89%	0.00%	0.00%	0.00%	0.00%	0.00%	32.94%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	19.46%	0.00%
		Within City	0.65%	0.00%	0.00%	0.00%	4.97%	0.00%	0.00%	0.00%	0.00%	0.00%	0.74%	0.00%	0.00%	0.00%	0.62%	0.00%	0.57%	0.00%	0.74%	4.00%
		Overall SSA	0.24%	0.00%	0.00%	0.00%	4.67%	0.00%	0.00%	0.00%	0.00%	0.00%	32.21%	0.00%	0.00%	0.00%	0.43%	0.00%	0.22%	0.00%	26.77%	1.33%
3	Dropped Call Rate (<=2%)	Highways	0.00%	0.00%	0.00%	0.00%	6.80%	4.00%	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.79%	0.00%	0.95%	0.00%	1.54%	0.00%
		Major Roads	0.00%	0.00%	0.00%	0.00%	4.05%	8.00%	0.63%	0.00%	0.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.50%	0.00%
		Within City	0.65%	0.00%	0.00%	0.00%	5.23%	0.00%	0.62%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.00%
		Overall SSA	0.24%	0.00%	0.00%	0.00%	5.13%	4.00%	0.76%	0.00%	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.21%	0.00%	0.22%	0.00%	1.25%	1.33%
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	98.14%	99.81%	98.83%	99.70%
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.69%	99.21%	99.02%	100%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.97%	99.80%	99.24%	99.49%

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



OPERATOR ASSISTED DRIVE TEST AT AURANGABAD SSA IN NOVEMBER 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	
			Operators)																				
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.67%	99.63%	99.09%	99.75%	
(b) 0-5 (with frequency hopping for GSM Operators)	Highways	96.02%	99.07%	97.27%	95.97%	93.38%	98.07%	97.42%	97.05%	96.61%	99.78%	95.85%	99.05%	96.59%	97.29%	96.14%	99.39%	NA	NA	NA	NA		
	Major Roads	97.60%	99.34%	97.32%	98.78%	92.56%	93.00%	97.59%	99.56%	96.24%	98.78%	96.19%	99.65%	96.25%	99.69%	96.41%	97.60%	NA	NA	NA	NA		
	Within City	97.36%	99.24%	97.09%	98.50%	93.85%	95.12%	97.80%	99.58%	97.09%	99.77%	97.26%	99.00%	96.73%	99.53%	96.27%	99.08%	NA	NA	NA	NA		
	Overall SSA	97.14%	99.22%	97.21%	97.75%	93.21%	95.36%	97.64%	98.78%	96.63%	99.44%	96.61%	99.25%	96.50%	98.84%	96.28%	98.69%	NA	NA	NA	NA		
Service Coverage																							
5	In door (>= -75dBm)	Highways	36.37%	61.98%	37.74%	2.77%	71.96%	99.11%	92.27%	95.67%	68.80%	95.84%	47.78%	92.35%	62.34%	100%	69.40%	32.93%	99.99%	100%	43.84%	100%	
		Major Roads	54.03%	38.67%	49.69%	96.09%	75.41%	100%	93.04%	92.35%	77.10%	100%	56.15%	100%	82.50%	100%	68.73%	77.14%	99.98%	100%	56.15%	100%	
		Within City	72.52%	45.79%	64.50%	0.00%	84.64%	97.93%	93.27%	91.83%	88.21%	9.23%	61.47%	98.55%	89.63%	99.94%	82.70%	64.36%	100%	100%	69.37%	56.50%	
		Overall SSA	56.30%	52.19%	52.06%	32.64%	77.34%	99.01%	92.97%	93.13%	78.94%	62.36%	56.91%	96.73%	81.04%	99.98%	74.11%	58.35%	99.99%	100%	56.45%	85.50%	
5	In-vehicle (>= -85dBm)	Highways	71.19%	90.17%	76.80%	82.52%	93.74%	100%	99.25%	98.38%	93.81%	99.87%	69.88%	100%	88.83%	100%	93.53%	99.71%	100%	100%	62.00%	100%	
		Major Roads	82.96%	83.15%	84.43%	100%	96.09%	100%	99.00%	97.27%	97.15%	100%	86.84%	100%	95.93%	100%	93.78%	98.86%	100%	100%	82.04%	100%	
		Within City	94.55%	89.33%	91.94%	83.50%	96.81%	100%	99.68%	95.86%	98.67%	32.04%	88.80%	100%	98.00%	100%	97.16%	99.73%	100%	100%	91.25%	56.50%	
		Overall SSA	84.22%	88.26%	85.24%	88.62%	95.55%	100%	99.32%	97.13%	96.85%	72.63%	84.44%	100%	95.24%	100%	94.97%	99.42%	100%	100%	78.43%	85.50%	
5	Outdoor-in city (>= -95dBm)	Highways	93.93%	97.81%	96.01%	99.77%	100%	100%	100%	100%	99.62%	100%	91.79%	100%	99.52%	100%	99.66%	100%	100%	100%	80.50%	100%	
		Major Roads	97.82%	99.79%	98.94%	100%	100%	100%	100%	100%	100%	99.72%	100%	98.35%	100%	99.83%	100%	99.75%	99.97%	100%	100%	90.61%	100%
		Within City	99.37%	99.52%	98.87%	99.97%	100%	100%	100%	100%	100%	99.82%	99.20%	99.05%	100%	99.72%	100%	99.83%	100%	100%	100%	97.42%	58.46%
		Overall SSA	97.43%	98.73%	98.18%	99.92%	100%	100%	100%	100%	100%	99.73%	99.68%	97.40%	100%	99.72%	100%	99.75%	100%	100%	100%	89.51%	86.15%

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



OPERATOR ASSISTED DRIVE TEST AT AURANGABAD SSA IN NOVEMBER 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	99.03%	100%	100%	100%	94.50%	100%	100%	100%	98.02%	100%	38.73%	100%	100%	100%	99.22%	100%	100%	100%
Major Roads	100%	100%			100%	100%	96.11%	100%	100%	100%	96.95%	100%	67.06%	100%	100%	100%	100%	100%	100%	100%	100%	80.54%	100%
Within City	99.35%	100%			100%	100%	95.03%	100%	100%	100%	99.30%	100%	99.26%	100%	99.36%	100%	99.38%	100%	99.43%	100%	99.26%	96.00%	
Overall SSA	99.53%	100%			100%	100%	95.33%	100%	100%	100%	98.03%	100%	67.79%	100%	99.76%	100%	99.57%	100%	99.78%	100%	73.23%	98.67%	
7	Hand Over Success Rate (HOSR)	Highways	100%	100%	100%	100%	91.11%	100%	100%	100%	100%	100%	98.91%	100%	100%	100%	98.80%	100%	100%	100%	100%	100%	100%
		Major Roads	98.93%	100%	100%	100%	97.07%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	98.41%	100%	100%	100%	100%	100%	100%	100%	99.49%	100%	100%	95.45%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	98.89%	100%	100%	100%	96.43%	100%	100%	100%	99.83%	100%	99.81%	99.55%	100%	100%	99.67%	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 JALGAON SSA IN DECEMBER 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	159	25	132	26	161	24	102	25	128	25	124	25	124	25	132	26	109	25	124	25
		Major Roads	198	25	144	25	145	25	152	25	128	25	145	25	162	25	111	25	150	25	143	25
		Within City	229	25	166	25	178	26	164	25	197	25	161	25	198	25	138	25	161	25	164	25
		Overall SSA	586	75	442	76	484	75	418	75	453	75	430	75	484	75	381	76	420	75	431	75
2	Blocked Call Rate	Highways	0.63%	0.00%	0.00%	0.00%	4.35%	4.17%	0.00%	0.00%	0.00%	0.00%	4.84%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Major Roads	0.51%	0.00%	0.00%	0.00%	6.90%	4.00%	0.00%	0.00%	0.00%	0.00%	7.59%	0.00%	0.00%	0.00%	0.90%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	1.31%	0.00%	0.00%	0.00%	3.93%	0.00%	0.00%	0.00%	0.00%	0.00%	4.97%	0.00%	0.00%	0.00%	0.72%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	0.85%	0.00%	0.00%	0.00%	4.96%	2.67%	0.00%	0.00%	0.00%	0.00%	5.81%	0.00%	0.00%	0.00%	0.52%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Highways	1.27%	0.00%	0.00%	0.00%	1.30%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.81%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Major Roads	1.52%	0.00%	0.00%	0.00%	2.22%	4.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.67%	0.00%	2.80%	0.00%
		Within City	0.44%	0.00%	0.00%	0.00%	0.58%	0.00%	0.61%	0.00%	0.00%	0.00%	0.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	1.03%	0.00%	0.00%	0.00%	1.30%	1.37%	0.24%	0.00%	0.00%	0.00%	0.25%	0.00%	0.21%	0.00%	0.00%	0.00%	0.24%	0.00%	0.93%	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	100%	100%	100%	100%
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100%	100%	100%	100%

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



OPERATOR ASSISTED DRIVE TEST AT JALGAON SSA IN DECEMBER 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
			hopping for CDMA Operators)	Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100%	100%
	Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100%	100%	100%	100%	
(b) 0-5 (with frequency hopping for GSM Operators)	Highways	95.28%	98.14%	97.22%	99.36%	88.56%	94.20%	96.19%	96.52%	96.08%	99.32%	94.19%	100%	94.20%	99.46%	95.63%	95.90%	NA	NA	NA	NA	
	Major Roads	96.84%	99.53%	98.17%	99.07%	89.87%	99.55%	96.67%	97.23%	96.95%	98.64%	93.79%	100%	95.22%	99.00%	95.88%	96.19%	NA	NA	NA	NA	
	Within City	96.84%	99.68%	97.45%	99.47%	89.54%	86.13%	97.65%	96.48%	96.81%	99.58%	93.84%	97.05%	95.88%	99.23%	95.72%	97.99%	NA	NA	NA	NA	
	Overall SSA	96.40%	99.13%	97.62%	99.30%	89.30%	92.13%	96.94%	96.71%	96.63%	99.18%	93.93%	98.53%	95.22%	99.24%	95.72%	96.69%	NA	NA	NA	NA	
Service Coverage																						
5	In door (>= - 75dBm)	Highways	56.59%	100%	78.67%	100%	71.86%	54.25%	93.14%	95.81%	66.31%	4.31%	43.86%	99.16%	61.69%	99.83%	71.86%	89.97%	99.97%	99.94%	58.97%	100%
		Major Roads	65.92%	100%	84.65%	85.45%	68.52%	66.87%	92.04%	90.23%	81.36%	23.78%	44.39%	91.37%	64.35%	92.46%	72.90%	99.58%	99.98%	100%	46.35%	100%
		Within City	60.96%	73.54%	79.93%	90.48%	56.32%	94.93%	91.61%	94.66%	73.07%	13.75%	49.34%	75.09%	58.42%	99.29%	76.60%	81.18%	99.97%	100%	68.01%	83.37%
		Overall SSA	61.40%	100%	81.08%	72.28%	65.55%	72.72%	92.14%	93.69%	72.45%	13.50%	46.38%	85.88%	61.25%	97.32%	73.90%	88.23%	99.97%	99.98%	57.78%	94.46%
5	In-vehicle (>= - 85dBm)	Highways	79.58%	100%	94.10%	100%	97.22%	98.93%	99%	97.89%	90.77%	52.87%	72.74%	100%	87.85%	100%	92.06%	99.75%	100%	100%	88.01%	100%
		Major Roads	87.85%	100%	97.13%	99.91%	98.27%	100%	98.71%	94.78%	95.53%	67.37%	71.03%	100%	86.42%	100%	94.04%	100%	100%	100%	79.31%	100%
		Within City	91.77%	99.99%	96.13%	99.94%	96.52%	100%	99.56%	98.03%	95.45%	89.87%	77.78%	100%	86.31%	100%	96.11%	99.85%	100%	100%	90.57%	100%
		Overall SSA	87.03%	100%	95.85%	99.83%	97.31%	45.78%	99.11%	97.02%	94.13%	70.66%	74.43%	100%	86.75%	100%	94.11%	99.86%	100%	100%	85.96%	100%
5	Outdoor-in city (>= - 95dBm)	Highways	96.89%	100%	99.42%	100%	100%	100%	100%	100%	98.02%	99.77%	91.48%	100%	96.99%	100%	99.45%	100%	100%	100%	99.40%	100%
		Major Roads	97.96%	100%	99.77%	99.99%	100%	100%	100%	100%	99.86%	99.76%	90.93%	100%	95.98%	100%	99.71%	100%	100%	100%	99.14%	100%
		Within City	99.27%	100%	99.46%	99.99%	100%	100%	100%	100%	99.65%	100%	94.03%	100%	97.40%	100%	99.87%	100%	100%	100%	98.96%	100%

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



OPERATOR ASSISTED DRIVE TEST AT JALGAON SSA IN DECEMBER 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	98.16%	100%	99.55%	99.97%	100%	100%	100%	100%	100%	99.25%	99.85%	90.35%	100%	96.82%	100%	99.98%	100%	100%	100%
6	Call Setup Success Rate (>=95%)	Highways	99.37%	100%	100%	100%	95.65%	95.83%	100%	100%	100%	100%	95.16%	100%	99.19%	100%	100%	100%	100%	100%	100%	100%
		Major Roads	99.49%	100%	100%	100%	93.10%	96.00%	100%	100%	99.22%	100%	92.41%	100%	99.38%	100%	99.10%	100%	100%	100%	100%	100%
		Within City	98.69%	100%	100%	100%	96.07%	100%	100%	100%	100%	100%	95.03%	100%	99.49%	100%	99.28%	100%	100%	100%	100%	100%
		Overall SSA	99.15%	100%	100%	100%	95.04%	97.33%	100%	100%	99.78%	100%	94.19%	100%	99.38%	100%	99.48%	100%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Highways	98.84%	100%	100%	100%	98.27%	100%	100%	100%	100%	100%	99.42%	100%	99.60%	100%	100%	100%	100%	100%	100%	100%
		Major Roads	98.00%	100%	100%	100%	93.75%	100%	100%	100%	100%	100%	100%	100%	97.40%	100%	98.48%	100%	100%	100%	100%	100%
		Within City	97.98%	100%	100%	100%	93.28%	100%	100%	100%	99.48%	100%	98.47%	100%	99.16%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	98.23%	100%	100%	100%	95.15%	100%	100%	100%	99.79%	100%	99.20%	100%	98.82%	100%	99.46%	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 OCTOBER TO DECEMBER 14 – MH&G CIRCLE							
Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered
NAGPUR	Oct-14	Kalmeshwar, Katol, Saoner / 105 KM	<p>Kalmeshwar : MIDC Area, Saoner Road\ Saoner Road, Dhapewadi road, Kalmeshwar Katol bypass, NH-69, nagpur katol road.</p> <p>Katol : Katol-ParadSinga raod, Bus stand road, Police station Road, Panchvati, Shri ramnagar, Dhantoli, katol Kalmeshwar, narkhed Road, katol Main road, Sawargaon road ,Katol HW, katol bypass, katol Station.</p> <p>Saoner: Masjid Road, Bajar chowk, Bus stand raod, Main road, Nagpur Road, Phatansaongi road Chindwada Road, Saoner HW, Dhapewada Raod, Bhopal Hw, Patansaongi Road.</p> <p>Indoor: Honey Hotel Premises - Saoner road.</p>	Kamptee, Parseoni, Ramtek, Mauda / 103 KM	<p>kamptee : Yerkheda, Durga chowk , Kanhan , Ranale, new Yerkheda , Siddhart, Nagar, Ramnagar, Dragon Palace , Bhavankar complex. Garud chowk, Kannan Chowk NH-7, Kamptee Road, Khaperkheda Road</p> <p>Parseoni : Khaperkheda Road, Market road, Police station road, Ramtek Road, Fhaudhari, Saoner Road, Bus Stand road, Khapar kheda Road , Parseoni HW</p> <p>Ramtek: Tumsar raod, Ramtalai, Gandhi chowk LBS Chowk, Mauda Raod, Tahsil raod Bhandara Hw, Mansar Road, Mauda Hw, Ramtek Hw</p> <p>Mauda : Main road, mauda Road, Nagpur Road, market, Police chauki.</p> <p>Indoor: Ramdham- Mansar</p>	Nagpur / 116 KM	<p>Nagpur : Civil lane Shastri Nagar, Sadar Bazaar raodes, LIC chowk, KL Park, CA raod, Agrasen Road, Sarafa Lane, Gandhi Putla, Mahal, Bulund darwaza , Etwari, samji Mandi, Golibar Square, Ramdas Peth, WHC Road Shankarnagar , Dharampeth, VIP road, Gokul Peth, VNIT Road, Airport Road, Madhav Nagar, Nagpur to bhandara HW, Nagpur Wardha Road, Nagpur Ramtek, Nagpur to Amravati raod</p> <p>Indoor: Joshi Apartment - Nagpur City</p>

DRIVE TEST ROUTE OF OCTOBER TO DECEMBER 14 – MH&G CIRCLE							
Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered
AURANGABAD	Nov-14	Sillod, Kannad, Khultabad / 109 KM	<p>Sillod: Indiranagar, Main Road, Bhagat Singh Chowk, Bharat Nagar, Vijay talkies Road, mandi road, Sillod Police station Road, Tilak Nagar , Sillod Road, Sillod Bypass, rajur Road, Bhokardhan road, Ajanta Road, Sillod HW, Phulambri HW, Khultabad raod, Ajanta Road.</p> <p>Kannad : Tahsil road, Kannad Police station Raod, Market Yard, Court road, college Road, Telephone exchange raod, Gautala raod, Hivarkheda Road, Duttanagar, Shivaji College, balajinagar , Pishore road, Chalisgoan road, Challisgaon road, main road, Ellora road, Sugar factory road.</p> <p>Khultabad : Khultabad Raod, Old Bus stand Raod, Aurangazeb dargah road, mehsmal road, Bhadramaruti road, Phulambri raod, Khultabad road, Aurangabad road, Pedgoan Road.</p> <p>Indoor: Astvinayak complex , kannad</p>	Aurangabad / 104 KM	<p>Aurangabad: Mali Galli, abhimav nagar, Shahagunj, Chelipura, Roshan Gate, Cidco Bustand, HC Road, 7 Hills, Cidco road, Rahim Nagar, Maulana Azad chowk, JNEC Collage , N-2,N-6. Cannaught place, Town center, Wockhard,N-5, Thakarey Nagar, Garkheda road, Tirupati nagar, Bagdiya nagar, Mhada Colony, Shivajinagar, darga Chowk, Ulkanagari , Jalgaon road.</p> <p>Sahkarnagar, Phulenagar, Polytechnic road, Osmanpura, railway Station Road, MIDC, Bansilal nagar, Jalna Road, Dhoot Hospital, Airport Road, Chikalthana, Bajajnagar, Oasis Chowk, Mahavir Chowk, waluj MIDC, Mohta Devi Waluj MIDC, ranjangoan</p> <p>Baba Petrol Pump Road, harsul Road, Harsul T -Point, Jatwada Road</p> <p>Indoor: Suvidha Premises.</p>	Paithan, gangapur, Vaijapur / 110 KM	<p>Paithan : Jain Mandir road, aana Bhu Saathe Chowk, Patelnagar, Shahu Chowk, Main road, Pardeshipura, pannalalnagar, Nehru chowk, Sunanda nagar, Dyaneshwar garden Road, Godavari Colony, Session court road, ramnagar, Sant Dyaneshwar Road, Pachod Road, Shevgaon Road Bidkin Road, Aurangabad raod.</p> <p>Gangapur : Ganpati road, Main Road, Shivaji chowk, Ambedkar chowk, Bus stand Road, Rajeev Gandhi Chowk, Pragati Colony, ZP School, Police station Road, maruti Chowk, Shivajinaga , Lasur Road , Aurangabad Road, Vaijapur road, Kaygoan-Nagar road,</p> <p>Vaijapur: post office road, Godavari Colony, Ravidas chowk, Shastrinagar, Court Road, Milotnagar , Vaijapur raod, Vaijapur Bus Stand raod, Shivaji chowk, Renuka nagar, main road , asur HW, Rotegaon Road, Ladgoan road, Nashik road, Puntamba road</p> <p>Indoor: Ladlee Hotel</p>

DRIVE TEST ROUTE OF OCTOBER TO DECEMBER 14 – MH&G CIRCLE							
Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered
JALGAON	Dec-14	Erandol, Parola, Amalner, Chopda / 110 Km	<p>Erandol: Mhasavatgaon raod, Dharangaon Road, Laxmi Nagar, Erandol Main Road, Bsnl Exchnage Road, Prabha Nagar, Parola Road, main Road, Jalgaon-Dhule Raod, Bus stand Road, Kasoda Road, Ramleela Maidan.</p> <p>Parola: Parola Road, Undirkheda road, Aadarsh Nagar,Jagmohandas Nagar, Kajgaon Road, Vidyanager Badgaon Nagar Balajinagar, Parola Road, main Road,Parola Mandi, Parola Bus Stand, Parola HW,Police station Road, Saikrupanagar, dhule HW .</p> <p>Amalner: Bus stand Road, Police Line road, Srikrishna Nagar,Jijao Chowl, Chopda Road,Main Road, Amalner Road,Amalner HW, Shirsala Raod,Sahadapur Raod, Shirpur Road,Bahadurpur Road.</p> <p>Chopda : Jalgaon Road, Kargil Chowk, Bus stand Road, Asha Talkies Road,Shivaji Chowk, Vidyavihar Colony,Velagaon Road, chopda road, Mahada Road.</p> <p>Indoor: Ganesh Hotel</p>	Jamner, Mukhtainagar, Bhusaval, Yawal / 102 KM	<p>Jamner: Shiv Colony, Girja Colony, Surya Colony, Nahata Nagar, Supari Bag, Ganpati Nagar, Dwarkanagar, Purshotam Nagar, Waki Road, Laxmi Colony, Aurangabad Road, Sanjay Nagar, Bhodvad Road, Main Road,Fatehpur Road Jamner Road, Bhusaval Road.</p> <p>Mukhtainagar: Shiv Colony, Shantinagar, Raghunath nagar, Police station Road, Burhanpur Road, Pratik Nagar, Old Mukhtainagar, Market Road, Pratibha Nagar, Santajinagar, Bhusaval Road, Mukhtainagar Road, Malkapur Road</p> <p>Bhusaval :Nagpur Road,J amner road, Nahata Colony road, Saraswati nagar, Military School, Almagir Chowk, Sundernagar, Bus stand Road, Station Road, Shivaji Nagar, Agrasen Chowk, Krishna nagar, ananad Nagar, Govind Colony, Bhusaval Road, Deepnagar, Limpus Park, RPD Road,J algaon Road, Sahakar Nagar, Srinagar, Konark Hospital, Yawal Road, Raver Road.</p> <p>Yawal: Yawal road, Bus Stand Road, Yawal Road, yawal Bypass, Aasaram Nagar, Yawal bus stand, Fejpur Road, Raver</p>	Jalgaon / 101 KM	<p>Jalgaon : MiDC, Godavari College, Ayodhya Nagar, Jagwanin Nagar, Market Yard, Ujwal Nikam Chowk, Royal Palace, SMohadi Road, Nehrunagar, Sambhajinagar Chowk, Adarshnagar,Ganpati Nagar, RTO Road, Pachora Road, Jain Irrigation System, Rajendra Nagar, Daulatnagar, Maydevi Nagar ,MG Road, Akashwani Chowk, Bhusaval road, Echadevi road, Aurangabad, MIDC, Raymond Chowk, Supreme Colony , MG Road, MJ College, Ramanand, Nagar, Harivithal Nagar, Nh-6, Pimpralanagar, Shri Colony, Gujral Petrol Pump. Parsham Colony, Shivajinagar, Phule Market, Panchmukhi Hanuman Mandir, Ganeshnagar, Bus Stand Road,Station Road, SP Office ,Bandale College, District Court, Ajay Colony, KC College, Babnabai Park</p> <p>Indoor: Baba Towers,Jalgaon</p>

DRIVE TEST ROUTE OF OCTOBER TO DECEMBER 14 – MH&G CIRCLE							
Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered
			Premises,Parola		Road, Raver Road,J algaon Road. Indoor: Ashwad Hotel Premises,Varangaon		

7.2 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 5

DRIVE TEST OBSERVATION OF NAGPUR SSA (OCT-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	Kalmeshwar, katol,saoner	---	Kamptee,pars eoni,ramtek,m auda	Poor voice quality observed at : kampte: market area, govt. School	Nagpur	Poor voice quality observed at nagpur: on highway near khapari
2	AIRTEL		Poor receiving level observed at : kamleswar highway		Poor level & voice quality observed at : kamptee : centt. Area		Poor level & voice quality observed at : nagpur: near bhole petrol pump
3	BSNL		Poor level & voice quality observed at all over ssa/sdca but highly bad at : kamleswar: midc area,saoner :SH 250, near umri village		Poor level & voice quality observed at all over ssa/sdca but highly bad at : NH 7 ,army cantonment entrance,kits engg college,SH 249, bodhisatva manjushri mahavihar,SH 253, ntpc –mouda road		Poor level & voice quality observed at all over ssa/sdca but highly bad at : 1) itwari market 2) ca road 3)near gmch 4)vip road 5)NH-07 , warhda road
4	IDEA		Poor level & voice quality observed at : saoner highway		---		Poor level & voice quality observed at : bapre nagar,railway station,airport
5	UNINOR		Poor rx level observed at : katol road,dhapewada road,saoner road,nagpur road,paradsinga road,patansawangi road		Poor level & voice quality observed at kamptee army cant area,kanhan road ,ramtek road,jain mandir road		Poor level & voice quality observed at :nagpur hyderabad highway road,wardha road
6	VODAFONE		---		---		---
7	TATA GSM		---		---		Kamptee
8	TATA CDMA		---		---		Nagpur itwari market
9	RCOM GSM		Poor level & voice quality observed at all over ssa/sdca but highly bad at : kamleswar:midc area ,senor: highway area nagpur-chhindwada road.		Poor level & voice quality observed at all over ssa/sdca but highly bad at : poor rx level & voice quality observed at : kamptee : army cantonment area,towards ramtek ,parshivni highway,ramtek rural,mouda:NH 6 area		Poor level & voice quality observed at all over ssa/sdca but highly bad at : poor rx level & voice quality observed at : trimuti nagar ,railway station,airport
10	RCOM CDMA		Poor voice quality observed at :kalmeshwar: midc,towards nagpur,		Poor voice quality observed at :kamptee : army cantonment ,highway area		Poor voice quality observed at :kamptee

Common Troublesome Areas: Kamleswar SDCA, MIDC Area Kamleswar, Army cent. Area (Kamptee), Nagpur railway station and Airport.

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF AURANGABAD SSA (NOVEMBER-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	Sillod, Kannad, Khultabad	---	Aurangabad	---	Paithan, gangapur, Vijapur	---
2	AIRTEL		Poor receiving level found at Khulatabad & Sillod outer area		---		---
3	BSNL		Poor Receiving level found at Khulatabad & Sillod outer area / Poor voice quality found at all over SDCA but worst at Panpoi (Kannad SDCA),Dautatabad Ghat (Khultabad SDCA)		Poor voice quality found at all over SDCA but worst at: Shivajinagar Road, Ulkanagri Area		Poor voice quality found at all over SDCA but worst at Aurangabad road,Lasur Road (Vijapur SDCA)
4	IDEA		---		---		---
5	UNINOR		---		---		---
6	VODAFONE		---		Poor voice quality found at : Aurangabad Highway		---
7	TATA GSM		---		---		---
8	TATA CDMA		---		---		---
9	RCOM GSM		Poor receiving level found at :Talwadi road (Kannad SDCA)		Poor voice quality found at :Sivaji nagar road		---
10	RCOM CDMA		Poor Rx Power found at : Talwadi road (Kannad SDCA)		---		Poor Rx level found at : All over gangapur & Paithan SDCA / Poor Rx quality at Paithan Highway

Common Troublesome Areas: Sivaji Nagar road / Khulatabad & Sillod outer area /Talwadi road (Kannad SDCA).

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF JALGAON SSA (DECEMBER-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	Erandol, Parola, Amalner and Chopada	Poor voice quality found at :Alamner : Dhangar Galli	Jamner, Mukatainagar, Bhusawal and Yawal	Poor voice quality found at :Bhusawal : Near Juna satara	Jalgaon	Poor voice quality found at :Jalgaon : Near Sivaji nagar & Ramdev baba nagar, Shri nagar
2	AIRTEL		---		---		
3	BSNL		Poor voice quality found at : Amalner : Sai-Sraddha nagar & Kranti Nagar / Chopada : Chopada police choki & naka area		Poor voice quality found at : Bhusawal : Usmania colony & Renuka nagar		Poor voice quality found at : Nanak nagar , Rameswar nagar, vidyanagar, Dattanagar, sivaji nagar
4	IDEA		Poor voice quality found at : Amalner : Guru nanak nagar & Krishi nagar		Poor voice quality found at : Yawal : Major road area		---
5	UNINOR		Poor voice quality found at : Near Sai-Sraddha nagar		Poor voice quality found at : Jamner : near bismillah nagar		---
6	VODAFONE		Poor voice quality found at : Amalner:Sundarnagar road		---		Poor voice quality found at : Near sivshakti colony, MIDC Jalgaon Area
7	TATA GSM		---		---		---
8	TATA CDMA		---		---		---
9	RCOM GSM		Poor Rx Level & voice quality found at : Parola : towards Amalner road ,towards Erandol road / Alamner : towards Parola road		Poor Rx Level & voice quality found at : Yawal : varangaon road		Poor Rx Level & voice quality found at : Jalgaon:MIDC Jalgaon Area, Upasani colony & sivdatt nagar
10	RCOM CDMA		---		---		Poor Rx Level & voice quality found at : Mohadi RD, GH Raisonni Eng Collge Area,MIDC Jalgaon Area

Common Troublesome Areas: Shri nagar , sivaji nagar ,MIDC Jalgaon in Jalgaon and Sai-Sraddha nagar in Amalner

DRIVE TEST TABLE: 8

NO NETWORK COVERAGE STATUS OF DRIVE TEST – OCTOBER TO DECEMBER 14

S No	Month of Drive Test	Operator	SSA	Total SDCA Covered	Status of no network coverage area (SDCA Name)	ICR Status (SDCA Name)
1	Oct-14	Aircel	Nagpur	Nagpur, Kalmeshwar, Katol, Saoner, Kamptee, Parseoni, Ramtek & Mauda	--	Aircel is on ICR with Reliance GSM for whole Nagpur SSA & SDCA
		Airtel			--	NO
		BSNL			--	NO
		Idea			--	NO
		Uninor			--	NO
		Vodafone			--	NO
		Tata GSM			--	NO
		Tata CDMA			--	NO
		RCOM GSM			--	NO
		RCOM CDMA			--	NO
2	Nov-14	Aircel	Aurangabad	Aurangabad City, Sillod, kannad, Khultabad, Paithan, gangapur & Vajapur	--	Aircel is on ICR with Reliance GSM for Silod & Kannad SDCA
		Airtel			--	NO
		BSNL			--	NO
		Idea			--	NO
		Uninor			--	NO
		Vodafone			--	NO
		Tata GSM			--	NO
		Tata CDMA			--	NO
		RCOM GSM			No Coverage at Telwadi (On Kannad-Chalisgaon Rd)	All Aurangabad city is on ICR with TATA GSM
		RCOM CDMA			No Coverage at Telwadi (On Kannad-Chalisgaon Rd)	No
3	Dec-14	Aircel	Jalgaon	Jalgaon City, Erandol, Parola, Amalner, Chopda, Jamner, Muktainagar, Bhusaval & Yawal	--	Aircel is on ICR with Reliance GSM at all over SSA/SDCA Coverd
		Airtel			--	No
		BSNL			--	No
		Idea			--	No
		Uninor			--	No
		Vodafone			--	No
		Tata GSM			--	No
		Tata CDMA			--	No
		RCOM GSM			Muktainagar	No
		RCOM CDMA			--	No

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 October-14**, drive tests were conducted across **Nagpur** SSA, covering Kalmeshwar, Katol, Saoner Kamptee, Parseoni, Ramtek, Mauda and Nagpur SDCAs (Total 324 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, CSSR and Blocked Call Rate** with its achieved values as **89.82%** (Outdoor), **94.91%** (Outdoor) and **5.09%** (Outdoor) respectively on overall SSA basis. The performance of **RCOM GSM and Uninor** also remained under performed for parameters **Voice Quality (91.46% - Outdoor)** and **Blocked Call Rate (3.29% - Outdoor)** respectively.
- (ii) **In the Month of November-14**, drive test was conducted across **Aurangabad** SSA covering Sillod, Kannad, Khultabad, Aurangabad, Paithan, Gangapur and Vijapur SDCAs (Total 323Kms). The results of the drive test exposed that **BSNL** could not comply with the benchmark of the parameters **Call drop Rate, Voice Quality and Blocked Call Rate** with its overall achievement as **5.13% (Outdoor) /4.00% (Indoor), 93.21% (Outdoor)** and **4.67% (Outdoor)** respectively on SSA level. Further, **RCOM (GSM) and RCOM (CDMA)** also lagged behind the benchmark of parameters **CSSR and Blocked Call Rate** with their performance as **67.79% (Outdoor), 73.23% (Outdoor)** and **32.21% (Outdoor), 26.77% (Outdoor)** respectively. The poor performance of **RCOM (GSM/CDMA)** indicates high congestion in their networks in **Aurangabad SSA**.
- (iii) **In the month of December -14**, drive test was conducted across **Jalgaon** SSA covering Erandol, Parola, Amalner and Chopada, Jamner, Mukatainagar, Bhusawal, Yawal and Jalgaon SDCAs (Total 313 Kms). The performance of **RCOM (GSM)** with respect to the parameters **Voice quality, CSSR and Blocked Call Rate** remained under performed with their achieved level as **93.93% (Outdoor), 94.19% (Outdoor)** and **5.81% (Outdoor)** respectively. Whereas, **BSNL** failed to meet the benchmark of **Voice Quality (89.30% - Outdoor / 92.13% - Indoor)** and **Blocked Call Rate (4.96%)**.

The deficiencies with respect to adequate coverage and poor voice quality, encountered by different Service providers at the various places, shown in the drive tests plots, are detailed in the above table.-5, table-6 and table-7 for Nagpur, Aurangabad and Jalgaon SSAs respectively.

The detail of Network coverage and Intra Circle Roaming (ICR) status of different service providers at various locations in the three SSAs is given in table-8.

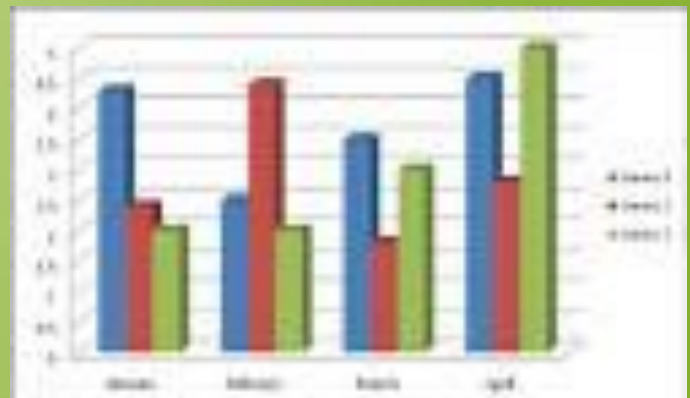
*Thus the analysis of Drive tests results revealed that Service providers namely **BSNL, RCOM (GSM)/(CDMA) and Uninor** remained non-complied and need to improve their network performance with respect to the parameters **Voice Quality, Call Drop rate and Call setup success rate / Blocked Call Rate** 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

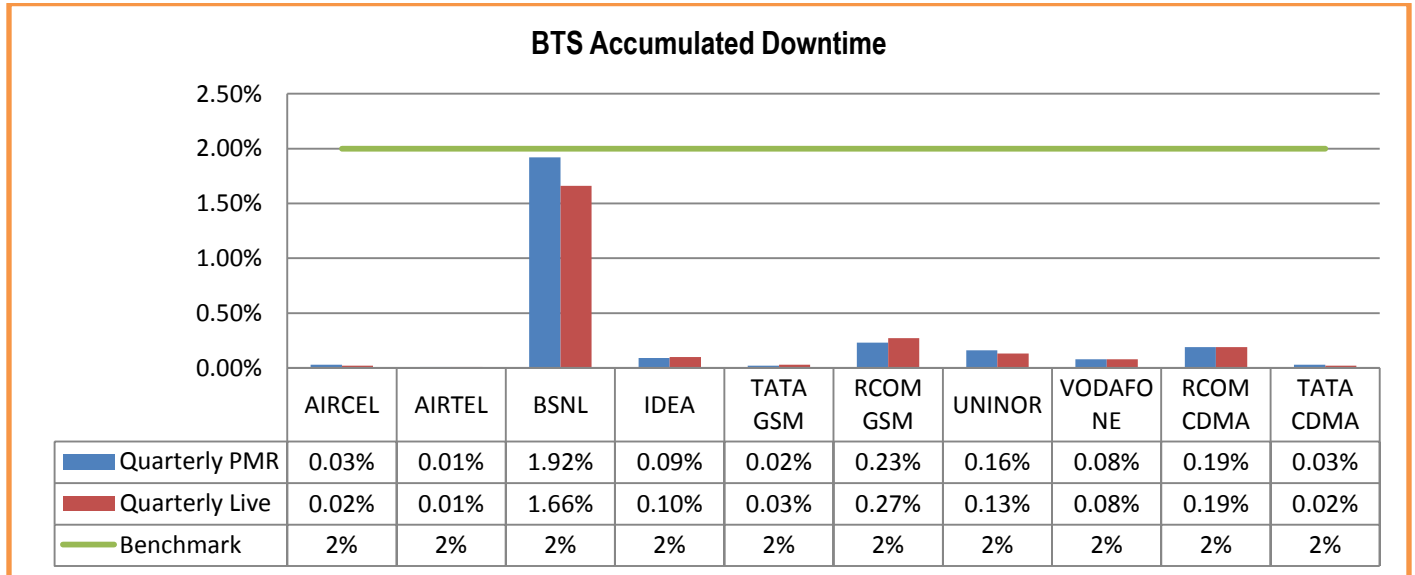
AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT



8) GRAPHICAL REPRESENTATION:

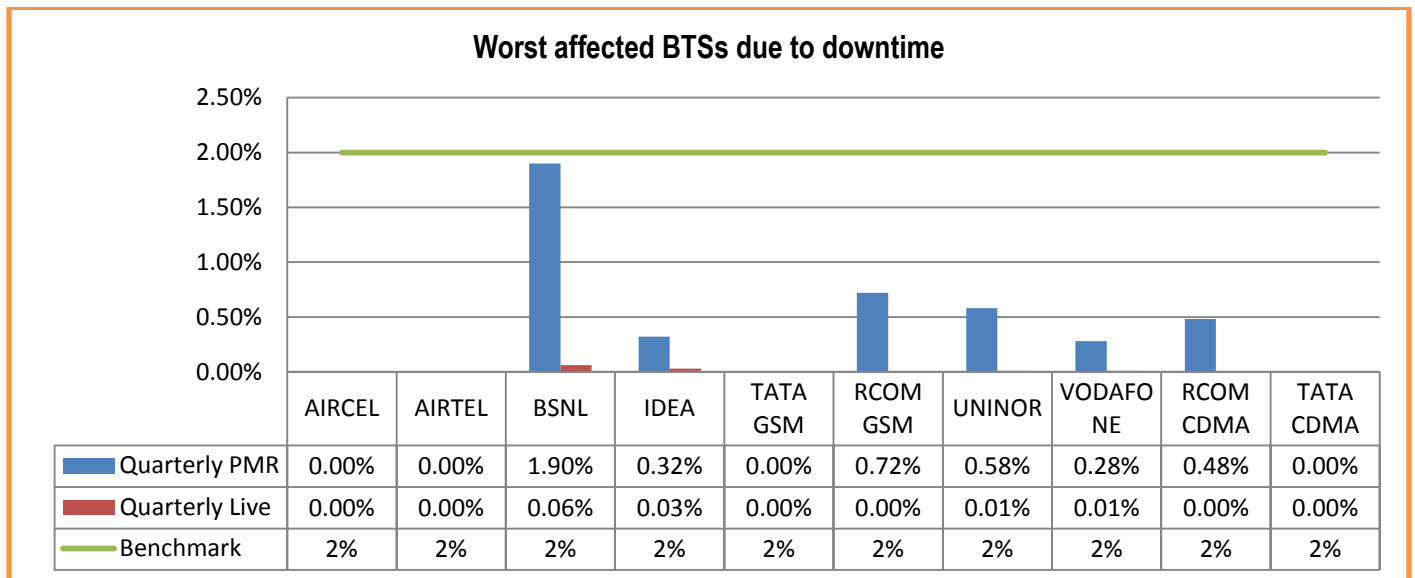
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

1) BTS ACCUMULATED DOWNTIME:



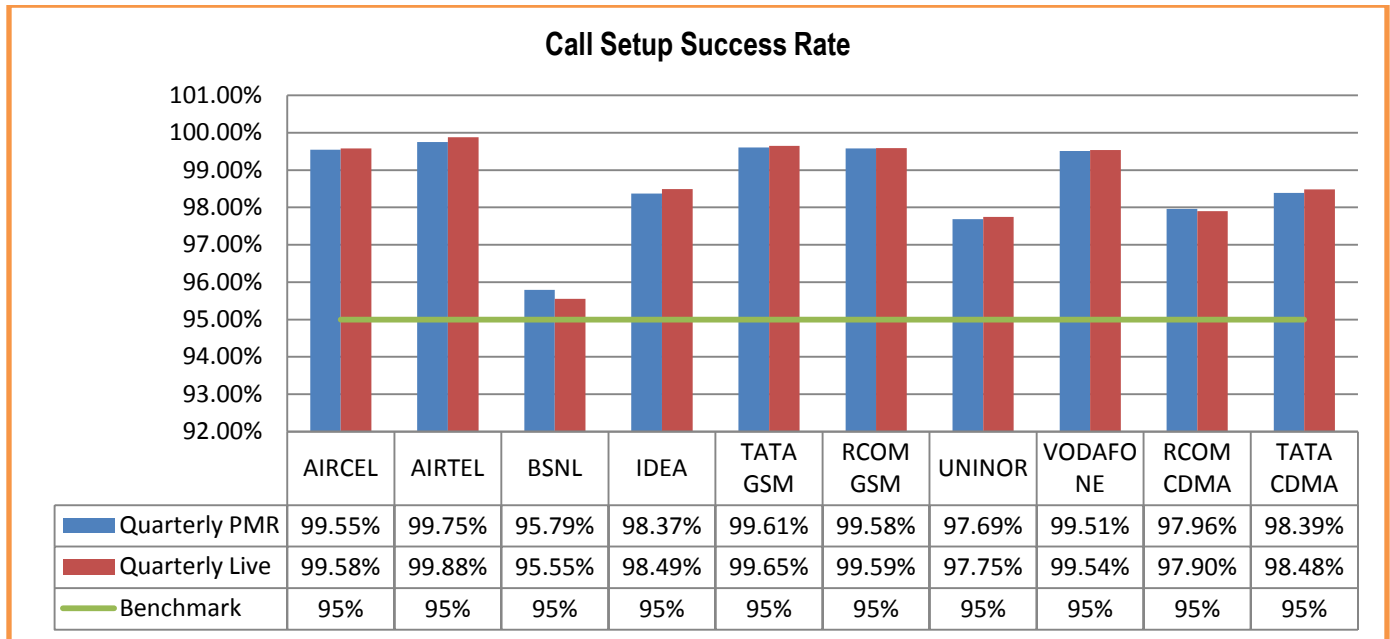
All operators are meeting the benchmarks.

2) WORST AFFECTED BTSS DUE TO DOWNTIME:



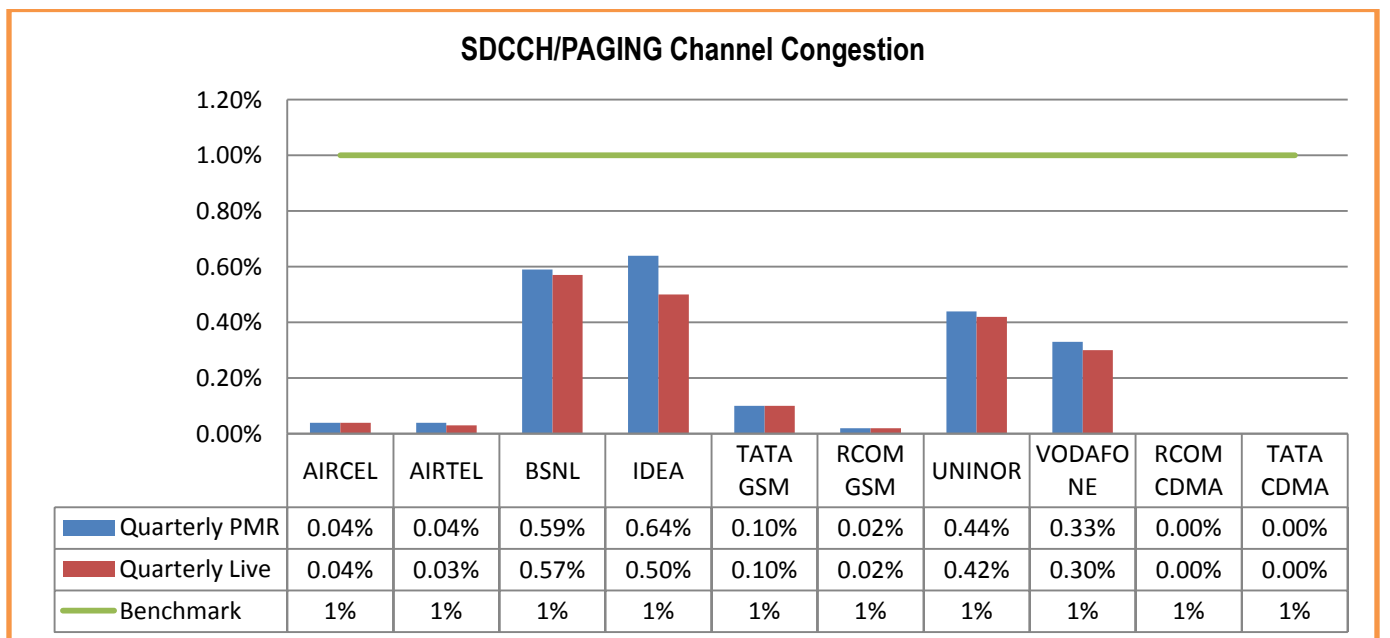
All operators are meeting the benchmarks.

3) CALL SETUP SUCCESS RATE :



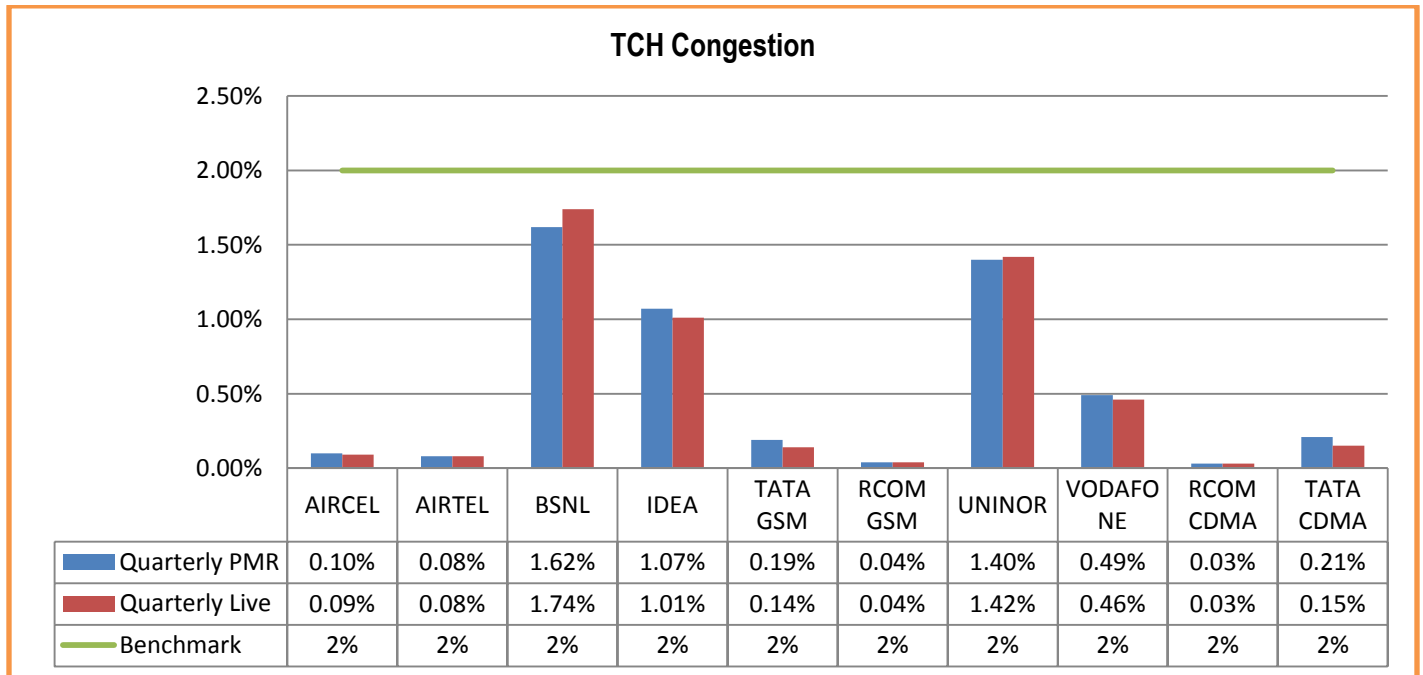
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION :



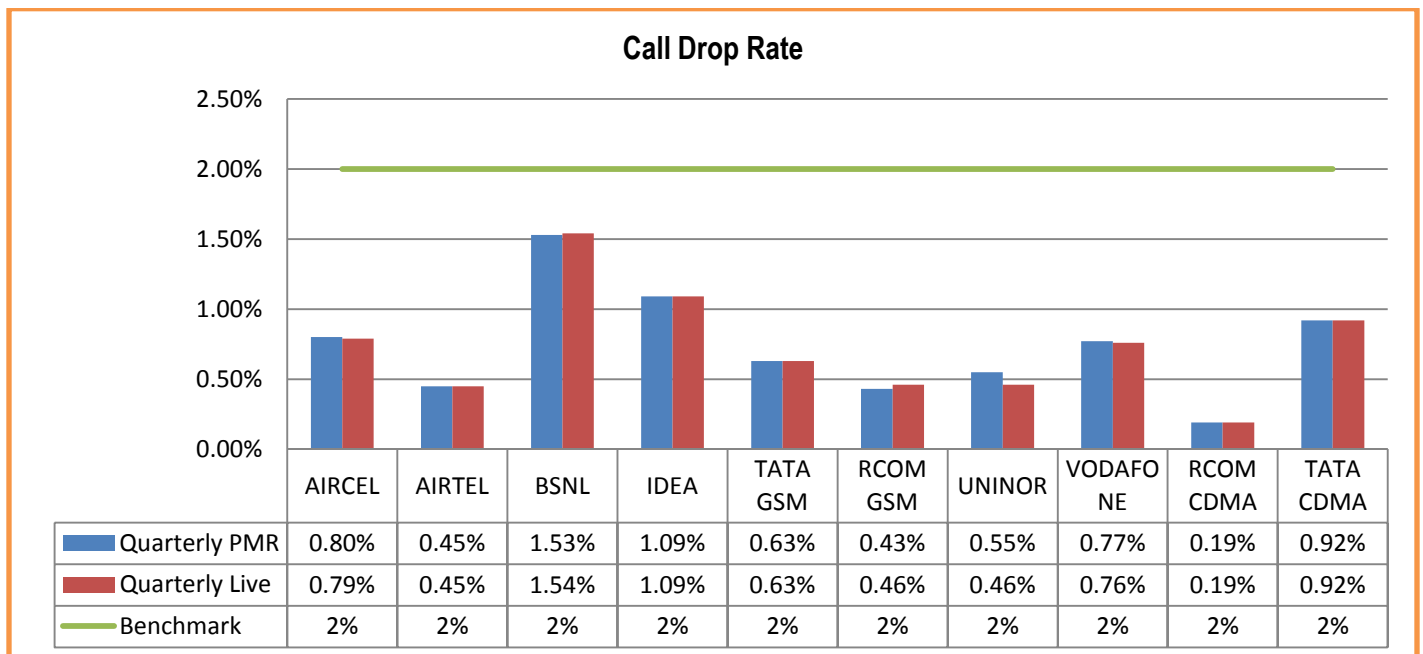
All operators are meeting the benchmarks.

5) TCH CONGESTION:



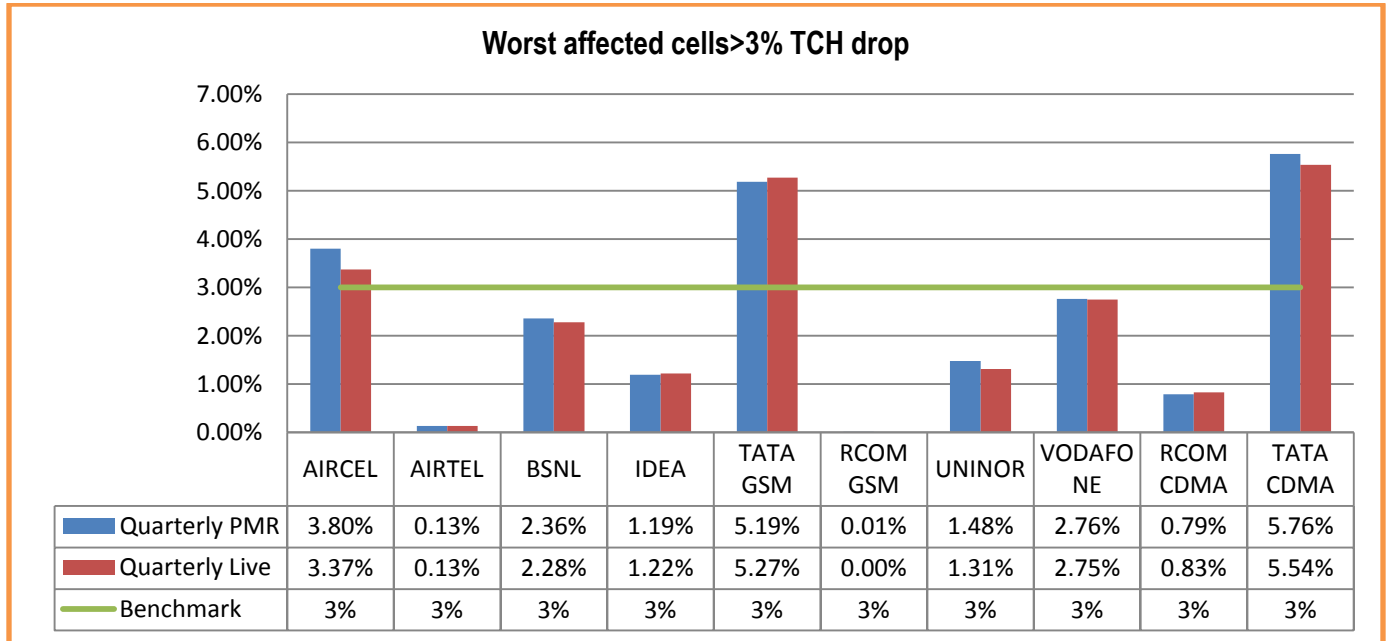
All operators are meeting the benchmarks.

6) CALL DROP RATE:



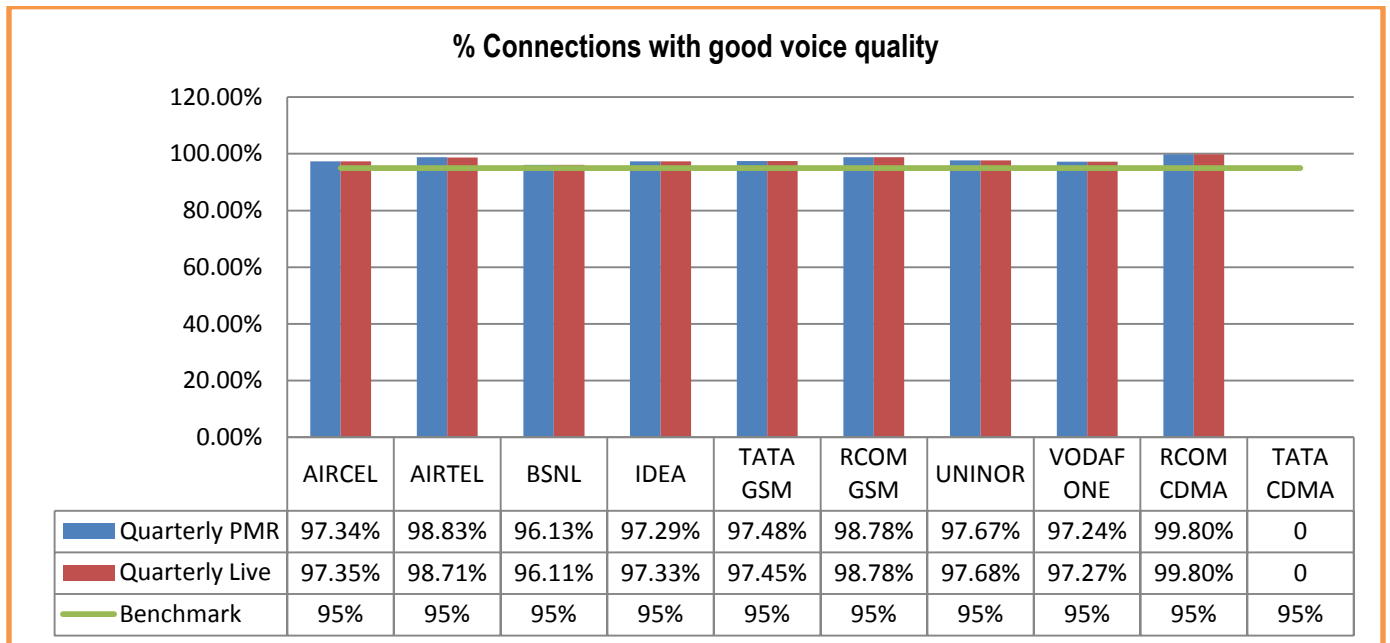
All operators are meeting the benchmarks.

7) WORST AFFECTED CELLS>3% TCH DROP:



All operators except Aircel, 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.