Audit & Assessment of Quality of Service
Of
Cellular Mobile Telephone Service
For
Telecom Regulatory Authority of India

West Zone – Mumbai Service Area
(July 2015 – September 2015)

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

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1. BACKGROUND

1. BACKGROUND

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

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

i) Create conditions for consumer satisfaction by making known the quality of service, which the Service provider is required to provide, and the user has a right to expect.

ii) Measure the Quality of Service provided by the Service Providers from time to time and to compare them   with the norms so as to assess the level of performance.

iii) Generally protect the interests of consumers of telecommunication services.

TRAI, the regulatory watch dog for the Quality of Service for the telecom services – Basic (Wire line), Cellular Mobile (Wireless) and Broadband has commissioned **M/s TUV-SUD South Asia Pvt. Ltd**. for conducting audit and assessment of quality of service of service providers, in terms of the benchmarks specified in the "The Standards of Quality of Service of Basic Telephone Service (Wire line) and Cellular Mobile Telephone Service Regulations, 2009 (7 of 2009) dated 20th March, 2009 and the Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated 6thOctober, 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 (wire line) and Broadband service, a circle would be audited once in a year**.**

2. OBJECTIVES AND METHODOLOGY

2. **OBJECTIVES AND METHODOLOGY**

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

The audit and assessment of Quality of Service was carried out by **TUV SUD South Asia across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. Apart from this, QoS audit for Basic (Wire line) and Broadband Services was also undertaken for UP (E), UP (W), and MP&CG circles during the quarter July 2015 – September 2015.**

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
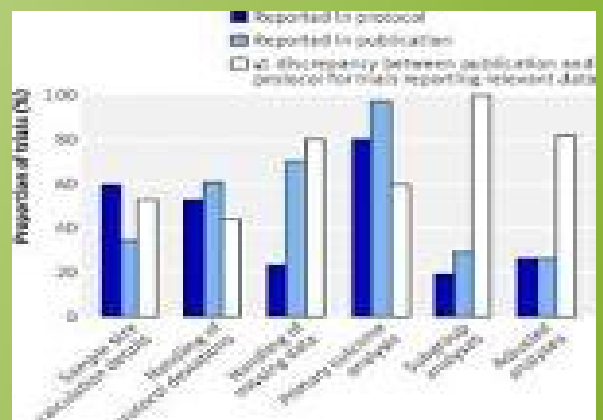
3. **SAMPLE SIZE**

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 Mumbai Metro circle

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location
GSM Operators		**July -15**	**August -15**	**September-15**	
1	AIRCEL	7,8 and 9th July	5, 6, & 7 August	3, 4 & 5th September	Aircel Limited, Opus Center, Opp. Hotel Tunga Paradise, Near Speez ,Andheri(E)
2	AIRTEL	6,7 and 8th July	4, 5 & 6 August	2, 3 & 4th September	7th Floor, Interface 7, Near IJMIMA Tower, Behind Infinity Mall, Malad (West), Mumbai-400064
3	MTNL	7,8 and 9th July	5, 6 & 7 August	3, 4 & 5th September	OMC-R unit, 10th Floor, Prabhadevi Telecom Bldg., V.S. Marg, Dadar(W),Mumbai-400028
4	TATA GSM	6,7 and 8th July	3, 4 & 5 August	2, 3 & 4th September	2nd Floor,TTML,Technopolis Park,Andheri(E),Mumbai
5	IDEA	6,7 and 8th July	5, 6 & 7 August	3, 4 & 5th September	3rd Floor Windsor ,Kalina CST Road,Santacruz East,Mumbai
6	RCOM GSM	6,7 and 8th July	10,11 & 12 August	2, 3 & 4th September	Ai8, Reliance Infrastructure bldg,A-wing,MBP,mahape,Navi Mumbai.
7	VODAFONE	7,8 and 9th July	5, 6 & 7 August	3, 4 & 5th September	Skyline ikon, Near Mittal Industrial Estate, Andheri Kurla Road, Marol Naka, Andheri (E), Mumbai-59
CDMA Operators					
8	RCOM CDMA	6,7 and 8th July	10,11 & 12 August	2, 3 & 4th September	Ai8, Reliance Infrastructure bldg,A-wing,MBP,mahape,Navi Mumbai.
9	TATA CDMA	6,7 and 8th July	3,4 & 5 August	2, 3 & 4th September	2nd Floor,TTML,Technopolis Park,Andheri(E),Mumbai

For all the above operators, audit was conducted in all the three months of the Quarter ended Sept. 2015.

The data generated by monthly PMR and 3-days live measurements audit for the period July 2015 to September 2015 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 **once in a year. Based on this criterion, QoS audit for basic (wire line) service is not required to be done for Mumbai Circle in the quarter ended September - 2015, as the same has already been done during QE December 2014.**

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 **once in a year**. **Based on this criterion**, **the QoS audit for Broadband service is not required to be done for Mumbai Circle in the quarter ended September- 2015, as the same has already been done during QE December 2014.**

4. EXECUTIVE SUMMARY

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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 Mumbai Metro Service area was satisfactory for **Network Parameters** except for one parameter namely **'Worst affected cells > 3% TCH drop"** which could not be met by **Aircel, Tata(GSM) and Tata(CDMA)** with their quarterly average performance as **5.69%, 3.48% and 4.40%** respectively**.**

(ii) From three days live assessment, it was found that the performance of all operators was satisfactory as they were largely meeting the benchmarks except for the parameter **'Worst affected cells> 3 % TCH drops".** This parameter was not complied with by **Aircel, Tata (GSM) and Tata (CDMA)** during live audit with their quarterly average performance as **5.57%, 3.60% and 3.09%** respectively**.**

 (**iii**) With regard to the **Customer Service Quality Parameters,** it was revealed that the parameters namely 'Metering and Billing Credibility, Response Time to Customers, Termination of Service and Time taken for refunds' have been largely met by the operators. However, **Vodafone** failed to meet the benchmark of **Billing Creditability for Post-paid** with its performance as **0.51**%. Regarding resolution of billing complaints, all operators except **Vodafone** have 100 % resolved the billing complaints within stipulated period of 4/6weeks. The performance of **Vodafone** for this parameter was **89.71% / 89.78%.**

Vodafone also failed to meet the benchmark for the parameter "Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints" with its performance as **99.28%.**

Regarding response time to customer for assistance, all service providers are in compliance of the parameter Accessibility of call center. However, **Airtel, RCOM (GSM) ,RCOM (CDMA) and Tata (CDMA)** have not met the benchmark of **Calls answered by Operators (voice to voice) within 90 seconds.** They have achieved their performance as **88.76%, 27.21%, 47.55%, and 90.94%** respectively. The parameter **Time taken for refunds after closure** remained   underperformed by **Vodafone, RCOM (GSM) and RCOM (CDMA) with their performance** as **78.87%, 97.87% and 92.76% respectively.**

The results for **three days live measurements** reveal that only   **RCOM GSM/RCOM CDMA** and **Tata (GSM)** have not met the parameter **calls connection to operators (Voice to voice),** with their performed value as **19.95% / 36.61% and , 94..44%** respectively. The performance of **RCOM (GSM) / RCOM (CDMA)** was way below the benchmark.

(iv) Based on the analysis of the **drive test results**, it was revealed that **Aircel, MTNL, Idea, RCOM (GSM) and RCOM (CDMA)** were having non-complied performance for the parameters **Voice quality and Call drop rate** across South Mumbai, Kalyan and North Mumbai SSAs where the drive tests were conducted during the quarter. **RCOM (CDMA)/GSM** also failed to do well with respect to the parameter **CSSR/BCR** across these SSAs. These operators need improvement in their networks to remove the deficiencies with respect to non-complied parameters.

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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	AIRTEL	September-15	20 Hrs-21 Hrs
2	AIRCEL	September-15	20 Hrs-21 Hrs
3	MTNL	September-15	19 Hrs-20 Hrs
4	IDEA	September-15	20 Hrs-21 Hrs
5	RCOM GSM	September-15	19 Hrs-20 Hrs
6	TATA GSM	September-15	19 Hrs-20 Hrs
7	VODAFONE	September-15	19 Hrs-20 Hrs
CDMA Operators			
8	RCOM CDMA	September-15	19 Hrs-20 Hrs
9	TATA CDMA	September-15	11 Hrs-12 Hrs

The TCBH reported by all the service providers matched the network busy hour calculated by TUV auditors for the Mumbai Metro 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	AIRTEL	15	70	4076	NSN	NSN
2	AIRCEL	3	17	1912	NSN	NSN
3	MTNL	5	46	987	Alcatel	Motorola, Alcatel
4	IDEA	8	33	3533	Ericsson	Ericsson
5	RCOM GSM	3	11	2147	Huawei	Huawei
6	TATA GSM	4	16	2876	Huawei	Huawei
7	VODAFONE	21	63	4597	Ericsson	Ericsson
CDMA Operators						
8	RCOM CDMA	8	NA	842	Lucent, ZTE, Ericsson	Lucent.
9	TATA CDMA	5	6	942	Huawei	Huawei

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JULY-15 MONTH:

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
	PMR Generation Data						GSM Operators				CDMA Operators	
Network Service Quality Parameter												
1	**Network Availability**											
	a) BTS Accumulated Downtime	<=2%	July-15	0.08%	0.01%	0.66%	0.07%	0.02%	0.05%	0.02%	0.15%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	July-15	0.16%	0.00%	1.22%	0.03%	0.00%	0.00%	0.00%	0.45%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	July-15	97.86%	99.96%	98.78%	98.77%	99.19%	99.31%	99.23%	97.56%	99.02%
	b) SDCCH/PAGING Channel congestion	<=1%	July-15	0.17%	0.01%	0.25%	0.29%	0.05%	0.12%	0.05%	0.00	0.00%
	c) TCH congestion	<=2%	July-15	0.89%	0.01%	0.08%	0.84%	0.10%	0.11%	0.77%	0.05	0.04%
3	**Connection maintenance (Retainability)**											
	a) CDR (Call Drop Rate)	<=2%	July-15	0.96%	0.41%	1.39%	1.39%	0.40	0.56%	1.10%	1.01	0.56%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	July-15	**5.82%**	0.27%	1.97%	2.12%	0.03%	**3.78%**	2.17%	0.12%	**3.92%**
	c) Connections with good voice quality	>=95%	July-15	97.26%	97.32%	95.15%	95.94%	98.85%	97.34%	97.00%	99.80%	99.11%
4	No. of POI's having >=0.5% POI congestion		July-15	0	0	0	0	0	0	0	0	0

Note: Data not provided by RCOM (GSM) for the period 1st July to 20th July-15 and 22nd, 23rd, 25th July-15 due to TTI server issue.

Data not provided by RCOM (CDMA) for the period 1st July to 20th July and 25th July-15 due to TTI server issue.

5.1.4 QOS PERFORMANCE OF MONTHLY PMR – AUGUST -15 MONTH:

	CELLULAR MOBILE TELEPHONE SERVICES MUMBAI METRO CIRCLE - AUGUST 15 MONTH											
	PMR Generation Data	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators	
Network Service Quality Parameter												
	Network Availability											
1	a) BTS Accumulated Downtime	<=2%	Aug-15	0.05%	0.01%	0.54%	0.08%	0.15%	0.01%	0.03%	0.09%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Aug-15	0.00%	0.00%	0.91%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Aug-15	97.72%	99.95%	99.03%	98.85%	99.27%	99.33%	99.23%	97.99%	99.05%
	b) SDCCH/PAGING Channel congestion	<=1%	Aug-15	0.18%	0.01%	0.40%	0.37%	0.06%	0.13%	0.05%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-15	0.83%	0.01%	0.11%	0.73%	0.14%	0.14%	0.77%	0.03%	0.03%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Aug-15	0.92%	0.42%	1.47%	1.42%	0.42%	0.56%	1.08%	0.83%	0.53%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Aug-15	**5.86%**	0.28%	1.93%	2.12%	0.05%	**3.25%**	2.05%	0.08%	**4.21%**
	c) Connections with good voice quality	>=95%	Aug-15	97.18%	97.37%	95.41%	95.91%	98.78%	97.50%	97.10%	99.75%	99.12%
4	No. of POI's having >=0.5% POI congestion		Aug-15	0	0	0	0	0	0	0	0	0

5.1.5 QOS PERFORMANCE OF MONTHLY PMR – SEPTEMBER-15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES MUMBAI METRO CIRCLE – SEPTEMBER 15 MONTH											
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators	
Network Service Quality Parameter												
1	**Network Availability**											
	a) BTS Accumulated Downtime	<=2%	Aug-15	0.08%	0.01%	0.60%	0.08%	0.20%	0.01%	0.03%	0.08%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Aug-15	0.16%	0.00%	1.11%	0.03%	0.84%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Aug-15	97.96%	99.95%	99.36%	98.82%	99.37%	99.29%	99.32%	98.35%	99.06%
	b) SDCCH/PAGING Channel congestion	<=1%	Aug-15	0.30%	0.02%	0.35%	0.32%	0.05%	0.10%	0.10%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-15	0.80%	0.01%	0.11%	0.77%	0.16%	0.12%	0.68%	0.02%	0.08%
3	**Connection maintenance (Retainability)**											
	a) CDR (Call Drop Rate)	<=2%	Aug-15	0.87%	0.45%	1.50%	1.31%	0.39%	0.73%	0.95%	0.72%	0.37%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Aug-15	**5.38%**	0.29%	1.96%	1.97%	0.05%	**3.41%**	1.67%	1.60%	**5.08%**
	c) Connections with good voice quality	>=95%	Aug-15	97.43%	97.56%	95.63%	96.30%	98.81%	97.37%	97.52%	99.76%	99.14%
4	No. of POI's having >=0.5% POI congestion		Aug-15	0	0	0	0	0	0	0	0	0

5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE – SEPTEMBER 15(JULY TO SEPTEMBER MONTHS AUDITED DATA)

QUARTERLY QOS PERFORMANCE (AVERAGE OF THREE MONTHS) OF MUMBAI METRO CIRCLE											
PMR Generation Data		**Bench- mark**	**Audit Period**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**TATA GSM**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			**GSM Operators**							**CDMA Operators**	
Network Service Quality Parameter												
1	**Network Availability**											
	a) BTS Accumulated Downtime	<=2%	Quarterly	0.07%	0.01%	0.60%	0.08%	0.12%	0.02%	0.03%	0.11%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.11%	0.00%	1.08%	0.03%	0.28%	0.00%	0.00%	0.15%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.85%	99.95%	99.06%	98.81%	99.28%	99.31%	99.26%	97.97%	99.04%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.22%	0.01%	0.33%	0.33%	0.05%	0.12%	0.07%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.84%	0.01%	0.10%	0.78%	0.13%	0.12%	0.74%	0.03%	0.05%
3	**Connection maintenance (Retainability)**											
	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.92%	0.43%	1.45%	1.37%	0.40%	0.62%	1.04%	0.85%	0.49%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	**5.69%**	0.28%	1.95%	2.07%	0.04%	**3.48%**	1.96%	0.60%	**4.40%**
	c) Connections with good voice quality	>=95%	Quarterly	97.29%	97.42%	95.40%	96.05%	98.81%	97.40%	97.21%	99.77%	99.12%
4	No. of POI's having >=0.5% POI congestion		Quarterly	0	0	0	0	0	0	0	0	0

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

- **Connection Establishment (Accessibility)**

    i. Call Set-up Success Rate(CSSR)

CSSR includes complete signaling in the call set up process and does not aim to measure the performance of the called exchange or that of the Point of Interconnection (POI). CSSR was established as the ratio of total number of successful call attempts (establishment) to the total number of call attempts made. All the operators were found to be calculating the parameter as per the TRAI's specified norms.

All the operators were comfortably meeting the benchmark on this parameter.

- **Parameters related to Network Congestion:**

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

In CDMA system, there is no direct counter defined for reporting Paging Channel Congestion as reported by Tata Teleservices. However, they have a defined counter for <u>Paging Channel Occupancy Ratio</u> (**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 pegging channel in CDMA system.

With respect to this parameter, the performance of the operators is quite satisfactory as **all operators met the TRAI specified benchmarks on the congestion parameters**. There was no congestion on individual POI links between a service provider vis-à-vis other service providers.

- **Connection Maintenance (Retainability)**

    i. Call Drop Rate:

This parameter gives a reliable measurement of the mobile network used by the service provider for maintaining a call once it has been correctly established. Failures in coverage, network congestion and network failures have important impact on this parameter.

The audit of this parameter revealed that all the service providers were measuring this parameter as per the TRAI guidelines. Also, **all the service providers were found to be meeting the TRAI specified benchmark**. The lowest call drop rate (0.40%) was for RCOM GSM during the quarter.

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

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

The audit with respect to this parameter revealed that all the operators except **Aircel, Tata (GSM) and Tata (CDMA),** were in compliance of the benchmark for this parameter. The quarterly average performance of **Aircel, Tata (GSM) and Tata (CDMA)** with respect to this parameter was **5.69%, 3.48% and 4.40%** respectively.

    iii. Connections with good voice quality:

All operators were found to have met the bench mark for the parameter 'Good Voice Quality'

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 MEASURMENT DATA (3-DAYS) – JULY -15 MONTH:

	CELLULAR MOBILE TELEPHONE SERVICES - MUMBAI METRO CIRCLE- JULY 15 MONTH											
Live measurement Data		**Bench- mark**	**Average of 3 Days**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**TATA GSM**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			**GSM Operators**							**CDMA Operators**	
Network Service Quality Parameter												
1	**Network Availability**											
	a) BTS Accumulated Downtime	<=2%	Live data	0.09%	0.01%	0.56%	0.08%	0.00%	0.04%	0.02%	0.11%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.02%	99.95%	98.62%	98.71%	98.92%	99.33%	99.31%	97.55%	99.04%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.10%	0.02%	0.33%	0.24%	0.05%	0.13%	0.04%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.03%	0.01%	0.05%	0.92%	0.10%	0.11%	0.69%	0.05%	0.07%
3	**Connection maintenance (Retainability)**											
	a) CDR (Call Drop Rate)	<=2%	Live data	0.91%	0.44%	1.38%	1.38%	0.42%	0.56%	1.11%	0.98%	0.47%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	**5.34%**	0.74%	2.00%	1.93%	0.05%	**4.14%**	2.14%	0.12%	**3.07%**
	c) Connections with good voice quality	>=95%	Live data	97.34%	97.33%	95.17%	95.98%	98.81%	97.30%	96.94%	99.76%	99.11%
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0

5.2.2 LIVE MEASURMENT DATA (3-DAYS) – AUGUST 15 MONTH:

	CELLULAR MOBILE TELEPHONE SERVICES - MUMBAI METRO CIRCLE- AUGUST 15 MONTH											
	Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter				GSM Operators							CDMA Operators	
Network Service Quality Parameter													
1	**Network Availability**												
	a) BTS Accumulated Downtime		<=2%	Live data	0.05%	0.01%	0.48%	0.11%	0.00%	0.03%	0.06%	0.03%	0.03%
	b) Worst affected BTSs due to downtime		<=2%	Live data	0.00%	0.00%	0.10%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)		>=95%	Live data	97.73%	99.98%	98.89%	98.98%	99.38%	99.36%	99.08%	98.30%	99.10%
	b) SDCCH/PAGING Channel congestion		<=1%	Live data	0.11%	0.02%	0.40%	0.37%	0.06%	0.15%	0.05%	0.00%	0.00%
	c) TCH congestion		<=2%	Live data	0.46%	0.01%	0.04%	0.63%	0.10%	0.17%	0.92%	0.02%	0.02%
3	**Connection maintenance (Retainability)**												
	a) CDR (Call Drop Rate)		<=2%	Live data	0.91%	0.05%	1.49%	1.43%	0.40%	0.54%	1.15%	0.77%	0.49%
	b) Worst affected cells>3% TCH drop (Call drop) rate		<=3%	Live data	**5.90%**	0.38%	2.28%	1.91%	0.03%	**3.03%**	2.19%	0.12%	**3.64%**
	c) Connections with good voice quality		>=95%	Live data	97.23%	97.42%	95.10%	95.96%	98.78%	97.64%	97.08%	99.76%	99.13%
4	No. of POI's having >=0.5% POI congestion			Live data	0	0	0	0	0	0	0	0	0

5.2.3 LIVE MEASURMENT DATA (3-DAYS) – SEPTEMBER-15 MONTH:

				AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
CELLULAR MOBILE TELEPHONE SERVICES - MUMBAI METRO CIRCLE – SEPTEMBER 15 MONTH												
Live measurement Data		Bench-mark	Average of 3 Days									
S/N	**Name of Parameter**					GSM Operators					CDMA Operators	
Network Service Quality Parameter												
1	**Network Availability**											
	a) BTS Accumulated Downtime	<=2%	Live data	0.09%	0.01%	0.46%	0.11%	0.20%	0.00%	0.03%	0.27%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.90%	99.95%	99.11%	98.76%	99.45%	99.24%	99.36%	98.24%	99.13%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.20%	0.02%	0.38%	0.48%	0.05%	0.10%	0.06%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.72%	0.01%	0.13%	0.84%	0.15%	0.12%	0.64%	0.02%	0.02%
3	**Connection maintenance (Retainability)**											
	a) CDR (Call Drop Rate)	<=2%	Live data	0.88%	0.41%	1.49%	1.51%	0.42%	0.77%	1.04%	0.68%	0.43%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	**5.48%**	0.23%	2.50%	2.36%	0.05%	**3.64%**	1.76%	0.17%	2.55%
	c) Connections with good voice quality	>=95%	Live data	97.25%	97.38%	99.52%	95.95%	99.60%	97.31%	97.34%	99.76%	99.13%
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0

5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF JULY TO SEPTEMBER 2015)

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF THREE MONTHS) – MUMBAI CIRCLE												
Live measurement Data		**Bench- mark**	**Average of 3 Days**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**TATA GSM**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			**GSM Operators**							**CDMA Operators**	
Network Service Quality Parameter												
1	**Network Availability**											
	a) BTS Accumulated Downtime	<=2%	Quarterly	0.08%	0.01%	0.50%	0.10%	0.07%	0.02%	0.04%	0.14%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.00%	0.07%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.88%	99.96%	98.87%	98.82%	99.25%	99.31%	99.25%	98.03%	99.09%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.14%	0.02%	0.37%	0.36%	0.05%	0.13%	0.05%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.74%	0.01%	0.07%	0.80%	0.12%	0.13%	0.75%	0.03%	0.04%
3	**Connection maintenance (Retainability)**											
	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.90%	0.30%	1.45%	1.44%	0.41%	0.62%	1.10%	0.81%	0.46%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	**5.57%**	0.45%	2.26%	2.07%	0.04%	**3.60%**	2.03%	0.14%	**3.09%**
	c) Connections with good voice quality	>=95%	Quarterly	97.27%	97.38%	96.60%	95.96%	99.06%	97.42%	97.12%	99.76%	99.12%
4	No. of POI's having >=0.5% POI congestion		Quarterly	0	0	0	0	0	0	0	0	0

5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:

From three days live assessment, it was found that the performance of all operators was satisfactory as they were largely meeting the benchmarks except for the parameter **'Worst affected cells> 3 % TCH drops".** This parameter was not complied with by **Aircel, Tata (GSM) and Tata (CDMA)** in all the three months of the quarter with their quarterly average performance as **5.57%, 3.60% and 3.09%** respectively**.**

5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:

TABLE: 1

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services- Mumbai Metro Circle- July 15 month						GSM Operators				CDMA Operators	
Network Service Quality Parameter												
1	**Network Availability**											
	a) Total no. of BTSs in the licensed service area		July-15	1895	4017	982	3495	2178	2879	4604	883	946
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		July-15	1132	213	4803	1933	71	1164	767	283	444
	c) BTS Accumulated Downtime	<=2%	July-15	0.08%	0.01%	0.66%	0.07%	0.02%	0.05%	0.02%	0.15%	0.06%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		July-15	3	0	12	1	0	0	0	4	0
	e) Worst affected BTSs due to downtime	<=2%	July-15	0.16%	0.00%	1.22%	0.03%	0.00%	0.00%	0.00%	0.45%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	July-15	97.86%	99.96%	98.78%	98.77%	99.19%	99.31%	99.23%	97.56%	99.02%
	b) SDCCH/PAGING Congestion	<=1%	July-15	0.17%	0.01%	0.25%	0.29%	0.05%	0.12%	0.05%	0.00	0.00%
	c) TCH congestion	<=2%	July-15	0.89%	0.01%	0.08%	0.84%	0.10%	0.11%	0.77%	0.05	0.04%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	July-15	0.96%	0.41%	1.39%	1.39%	0.40	0.56%	1.10%	1.01	0.56%
	b) Worst affected cells>3% TCH drop	<=3%	July-15	**5.82%**	0.27%	1.97%	2.12%	0.03%	**3.78%**	2.17%	0.12%	**3.92%**
	c) % of connections with good voice quality	>=95%	July-15	97.26%	97.32%	95.15%	95.94%	98.85%	97.34%	97.00%	99.80%	99.11%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		July-15	323	30	52	215	2	305	249	3	102
	e) Total no. of cells (Sector) in the licensed service area		July-15	5548	11022	2636	10133	6056	8064	11454	2590.00	2605
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		July-15	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		July-15	0	0	0	0	0	0	0	0	0
5	**Network Data**											
	a) Equipped Capacity of Network in Erlang		July-15	60342	159131	37627	128661	72000	117627	293086	168000	106067
	b) Total traffic in TCBH in erlang (Avg.)		July-15	42663	99585	15462	108739	65181	59080	146578	77205	43062
	c) Total no. of customers served (as per VLR) on last day of the month		July-15	1536688	5007016	872564	3806780	3082350	2040891	7362996	2161239	472704

TABLE: 2

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
**Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live - Mumbai Metro Circle - July 15 month**											
							GSM Operators				CDMA Operators	
**Network Service Quality Parameter**											
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		Live data	1889	4031	990	3481	2178	2887	4543	883	946
	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	123	19	398	212	0	89	72	72	35
	c) BTS Accumulated Downtime	<=2%	Live data	0.09%	0.01%	0.56%	0.08%	0.00%	0.04%	0.02%	0.11%	0.05%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	1	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.02%	99.95%	98.62%	98.71%	98.92%	99.33%	99.31%	97.55%	99.04%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.10%	0.02%	0.33%	0.24%	0.05%	0.13%	0.04%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.03%	0.01%	0.05%	0.92%	0.10%	0.11%	0.69%	0.05%	0.07%
	Connection Maintenance (Retainability)											
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.91%	0.44%	1.38%	1.38%	0.42%	0.56%	1.11%	0.98%	0.47%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	**5.34%**	0.74%	2.00%	1.93%	0.05%	**4.14%**	2.14%	0.12%	**3.07%**
	c) % of connections with good voice quality	>=95%	Live data	97.34%	97.33%	95.17%	95.98%	98.81%	97.30%	96.94%	99.76%	99.11%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	296	82	53	195	3	334	246	3	80
	e) Total no. of cells (Sector) in the licensed service area		Live data	5540	11008	2644	10127	6110	8072	11475	2572	2610
	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
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

TABLE: 3

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services - Mumbai Metro Circle- August 15 month											
							GSM Operators				CDMA Operators	
Network Service Quality Parameter												
1	**Network Availability**											
	a) Total no. of BTSs in the licensed service area		Aug-15	1910	4068	985	3515	2154	2878	4571	859	943
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Aug-15	720	226	3846	2038	2376	303	1093	578	77
	c) BTS Accumulated Downtime	<=2%	Aug-15	0.05%	0.01%	0.54%	0.08%	0.15%	0.01%	0.03%	0.09%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Aug-15	0	0	9	1	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Aug-15	0.00%	0.00%	0.91%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Aug-15	97.72%	99.95%	99.03%	98.85%	99.27%	99.33%	99.23%	97.99%	99.05%
	b) SDCCH/PAGING Congestion	<=1%	Aug-15	0.18%	0.01%	0.40%	0.37%	0.06%	0.13%	0.05%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-15	0.83%	0.01%	0.11%	0.73%	0.14%	0.14%	0.77%	0.03%	0.03%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Aug-15	0.92%	0.42%	1.47%	1.42%	0.42%	0.56%	1.08%	0.83%	0.53%
	b) Worst affected cells>3% TCH drop	<=3%	Aug-15	5.86%	0.28%	1.93%	2.12%	0.05%	3.25%	2.05%	0.08%	4.21%
	c) % of connections with good voice quality	>=95%	Aug-15	97.18%	97.37%	95.41%	95.91%	98.78%	97.50%	97.10%	99.75%	99.12%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Aug-15	328	31	51	216	3	262	237	2	98
	e) Total no. of cells (Sector) in the licensed service area		Aug-15	5601	11110	2640	10202	6032	8057	11587	2551	2328
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		Aug-15	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Aug-15	0	0	0	0	0	0	0	0	0
5	**Network Data**											
	a) Equipped Capacity of Network in Erlang		Aug-15	59940	164447	37627	130034	NP	117894	299664	NP	106067
	b) Total traffic in TCBH in erlang (Avg.)		Aug-15	43870	99757	15980	108151	NP	76534	143772	NP	39547
	c) Total no. of customers served (as per VLR) on last day of the month		Aug-15	1561482	5119496	NP	3910009	NP	NP	7495328	NP	NP

TABLE: 4

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live - Mumbai Metro Circle – August 15 month							GSM Operators			CDMA Operators	
Network Service Quality Parameter												
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		Live data	1900	4045	982	3503	2170	2881	4604	889	944
	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	67	19	343	288	0	57	183	17	24
	c) BTS Accumulated Downtime	<=2%	Live data	0.05%	0.01%	0.48%	0.11%	0.00%	0.03%	0.06%	0.03%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	1	1	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.10%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.73%	99.98%	98.89%	98.98%	99.38%	99.36%	99.08%	98.30%	99.10%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.11%	0.02%	0.40%	0.37%	0.06%	0.15%	0.05%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.46%	0.01%	0.04%	0.63%	0.10%	0.17%	0.92%	0.02%	0.02%
	Connection Maintenance (Retainability)											
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.91%	0.05%	1.49%	1.43%	0.40%	0.54%	1.15%	0.77%	0.49%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	**5.90%**	0.38%	2.28%	1.91%	0.03%	**3.03%**	2.19%	0.12%	**3.64%**
	c) % of connections with good voice quality	>=95%	Live data	97.23%	97.42%	95.10%	95.96%	98.78%	97.64%	97.08%	99.76%	99.13%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	330	42	60	195	2	244	254	3	94
	e) Total no. of cells (Sector) in the licensed service area		Live data	5591	11077	2633	10198	6060	8063	11574	2578	2579
	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
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

TABLE: 5

S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services - Mumbai Metro Circle- September 15 month											
							GSM Operators				CDMA Operators	
Network Service Quality Parameter												
1	**Network Availability**											
	a) Total no. of BTSs in the licensed service area		Sep-15	1912	4076	987	3533	2147	2876	4597	842	942
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Sep-15	1048	234	4295	2039	3138	117	1088	488	42
	c) BTS Accumulated Downtime	<=2%	Sep-15	0.08%	0.01%	0.60%	0.08%	0.20%	0.01%	0.03%	0.08%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Sep-15	3	0	11	1	18	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Sep-15	0.16%	0.00%	1.11%	0.03%	0.84%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Sep-15	97.96%	99.95%	99.36%	98.82%	99.37%	99.29%	99.32%	98.35%	99.06%
	b) SDCCH/PAGING Congestion	<=1%	Sep-15	0.30%	0.02%	0.35%	0.32%	0.05%	0.10%	0.10%	0.00%	0.00%
	c) TCH congestion	<=2%	Sep-15	0.80%	0.01%	0.11%	0.77%	0.16%	0.12%	0.68%	0.02%	0.08%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Sep-15	0.87%	0.45%	1.50%	1.31%	0.39%	0.73%	0.95%	0.72%	0.37%
	b) Worst affected cells>3% TCH drop	<=3%	Sep-15	**5.38%**	0.29%	1.96%	1.97%	0.05%	**3.41%**	1.67%	1.60%	**5.08%**
	c) % of connections with good voice quality	>=95%	Sep-15	97.43%	97.56%	95.63%	96.30%	98.81%	97.37%	97.52%	99.76%	99.14%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Sep-15	304	32	52	203	3	275	196	40	131
	e) Total no. of cells (Sector) in the licensed service area		Sep-15	5648	11167	2647	10285	6009	8059	11714	2502	2579
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		Sep-15	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Sep-15	0	0	0	0	0	0	0	0	0
5	**Network Data**											
	a) Equipped Capacity of Network in Erlang		Sep-15	60154	168105	37627	131320	NP	122373	266873	NP	106067
	b) Total traffic in TCBH in erlang (Avg.)		Sep-15	42949	98500	15788	106496	NP	58056	139471	NP	38480
	c) Total no. of customers served (as per VLR) on last day of the month		Sep-15	1547514	5124550	880960	3851533	NP	2033863	7431793	NP	445291

NP: Data not provided by RCOM (GSM & CDMA).

TABLE: 6

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services -3 days live - Mumbai Metro Circle - September 15 month											
							GSM Operators				CDMA Operators	
Network Service Quality Parameter												
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		Live data	1910	4080	985	3515	2156	2879	4549	859	943
	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	124	21	328	273	317	2	92	166	0
	c) BTS Accumulated Downtime	<=2%	Live data	0.09%	0.01%	0.46%	0.11%	0.20%	0.00%	0.03%	0.27%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	0	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.90%	99.95%	99.11%	98.76%	99.45%	99.24%	99.36%	98.24%	99.13%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.20%	0.02%	0.38%	0.48%	0.05%	0.10%	0.06%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.72%	0.01%	0.13%	0.84%	0.15%	0.12%	0.64%	0.02%	0.02%
	Connection Maintenance (Retainability)											
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.88%	0.41%	1.49%	1.51%	0.42%	0.77%	1.04%	0.68%	0.43%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	**5.48%**	0.23%	2.50%	2.36%	0.05%	**3.64%**	1.76%	0.17%	2.55%
	c) % of connections with good voice quality	>=95%	Live data	97.25%	97.38%	99.52%	95.95%	99.60%	97.31%	97.34%	99.76%	99.13%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	309	26	66	242	3	293	206	4	66
	e) Total no. of cells (Sector) in the licensed service area		Live data	5636	11197	2642	10242	6032	8057	11709	2551	2584
	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
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

CUSTOMER SERVICE QUALITY (CSD) PARAMETERS

5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS:

5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JULY to SEPTEMBER 2015 MONTHS AUDITED DATA):

QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES										
Quarterly CSD Audit Data	**Bench- mark**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**TATA GSM**	**VODAFONE**	**RCOM CDMA**	**TATA CDMA**
S/N **Name of Parameter**		GSM Operators							CDMA Operators	
1 **Metering & Billing Credibility -Post Paid**										
A) No. of bills issued during the quarter		120739	2466363	400217	2026544	807187	327757	7182727	1198634	85059
B) No. of bills disputed including billing complaints during the quarter		4	249	241	1151	719	7	36619	996	3
C)% of billing complaints during the quarter	<= 0.1%	**0.00%**	**0.01%**	**0.06%**	**0.06%**	**0.09%**	**0.00%**	**0.51%**	**0.08%**	**0.00%**
2 **Metering & Billing Credibility -Pre Paid**										
A) Total No. of Pre-paid customers at the end of the quarter		2725693	3999562	1071811	3503516	3006356	2780573	6301477	1630428	693815
B) Total No. of complaints relating to charging, Credit and Validity during the quarter		1	44	18	590	2632	1	3612	1143	0
C) % of Pre-paid Charging Complaints	<= 0.1%	**0.00%**	**0.00%**	**0.00%**	**0.02%**	**0.09%**	**0.00%**	**0.06%**	**0.07%**	**0.00%**
3 **Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints**										
A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		5	208	241	15401	3351	8	40321	2139	3
B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		5	208	240	15401	3351	8	36170	2139	3
C) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 6 weeks during the quarter		5	208	241	15401	3351	8	36201	2139	3
D) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	>=98% within 4 weeks	**100.00%**	**100.00%**	**99.59%**	**100.00%**	**100.00%**	**100.00%**	**89.91%**	**100.00%**	**100.00%**
E) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 6 weeks	100% within 6 weeks	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**89.98%**	**100.00%**	**100.00%**
F) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**99.28%**	**100.00%**	**100.00%**

	QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES										
	Quarterly CSD Audit Data	Bench-mark	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	**Name of Parameter**		GSM Operators							CDMA Operators	
4	**Response time to customers for assistance**										
	A) Total no of calls attempted to customer care/Call center		10210904	1074730	NA	9403193	1033971	542840	13423519	519396	115436
	B) Total no. of calls successfully established to customer care/Call center.		10125250	1073708	NA	9371886	1023014	536201	13400917	508251	114847
	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	>=95%	**99.16%**	**99.90%**	**NA**	**99.67%**	**98.94%**	**98.78%**	**99.83%**	**97.85%**	**99.49%**
	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		1938334	3139624	973608	2983605	1132540	919149	4854414	208977	119550
	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		1849503	2786619	932252	2950849	308127	874680	4654304	99367	108719
	F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts)	>=95%	**95.42%**	**88.76%**	**95.75%**	**98.90%**	**27.21%**	**95.16%**	**95.88%**	**47.55%**	**90.94%**
5	**Termination/closure of service**										
	A) Total No. of requests for Termination / Closure of service received during the quarter		734	8649	14949	10908	2320	4839	24201	5733	2544
	B) No. of requests for Termination /Closure of service complied within 7 days during the quarter		734	8649	14949	10908	2320	4839	24201	5733	2544
	C) % of Termination/ Closure of service within 7 days	<=7days	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
6	**Time taken for refunds of deposits after closures.**										
	A) No. of Payments/ Refunds due during the quarter		279	1303	722	2701	892	345	7461	843	502
	B) No. of Payments/ Refunds Cleared during the quarter		279	1303	722	2701	873	345	5873	782	502
	C) Time taken for refunds of deposits after closures.	100% within 60 days	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**97.87%**	**100.00%**	**78.72%**	**92.76%**	**100.00%**

NB: Accessibility of call center / Customer care data of RCOM (GSM & CDMA) are based on average of two months' data i.e. August & September 15, July-15 month data was not provided by RCOM (GSM & CDMA) due to technical issue in their system.

Refund related data of Airtel are based on average of two months' data i.e. July & August 15, September-15 month data was not provided by Airtel due to technical issue in their system.

5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES:

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES – QE SEPTEMBER 2015											
3 days live CSD Audit Data		Bench- mark	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/ N	**Name of Parameter**		GSM Operators							CDMA Operators	
1	Response time to customers for assistance										
	Total no of calls attempted to customer care/Call center		295345	38855	NA	231094	NP	16202	416417	NP	3618
	Total no. of calls successfully established to customer care/Call center		292800	38855	NA	231083	NP	16088	416313	NP	3601
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempts)	>=95%	**99.14%**	**100.00%**	**NA**	**99.995%**	**NP**	**99.30%**	**99.98%**	**NP**	**99.53%**
2	Total Calls reached to operator for Voice to Voice (Total call attempts)		56556	100202	38062	91675	50393	27257	164996	7028	2836
	Total number of calls answered by the operator (Voice to voice) within 90 seconds.		55331	98516	36216	91209	10051	25741	157340	2573	2754
	% age of calls answered by operator(voice to voice) (Total calls successfully established within 90 sec. *100 / Total call attempts)	>=95%	97.83%	98.32%	95.15%	99.49%	19.95%	94.44%	95.36%	36.61%	97.11%

NP: RCOM (GSM & CDMA) has not provided data for the parameter "Accessibility of call center / Customer care" due to technical issue in their system.

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 was within the prescribed bench mark of <=0.1 %. However, **Vodafone** failed to meet the benchmark of Billing Creditability for Post-paid with its performance as **0.51%.**

2. *Resolution of Billing complaints and applying credits -*

   i.   *Resolution of billing /charging complaints*

   ii. *Period of applying credit/waiver/adjustment to customer's account from the date of resolution of complaints*

All operators except **Vodafone** have 100 % resolved the billing complaints within stipulated period of 4/6weeks. The performance of Vodafone for this parameter was **89.91% / 89.98%. Vodafone** also failed to meet the benchmark for the parameter "Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints" with its performance as **99.28%.**

3. *Response Time to the Customer for assistance*

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

All service providers are in compliance of the parameter Accessibility of call center. However, **Airtel, RCOM (GSM) ,RCOM (CDMA) and Tata (CDMA)** have not met the benchmark of **Calls answered by Operators (voice to voice) within 90 seconds.** They have achieved their performance as **88.76%, 27.21%, 47.55%, and 90.94%** respectively.

4. *Termination/Closure of Service*

In case of this parameters also, all operators have settled 100 % closure/termination within 7 days.

5. *Time Taken for Refund of deposits after closures*

Vodafone, RCOM (GSM) and RCOM (CDMA) were found non- complied for this parameter with their performance as **78.72%, 97.87% and 92.76% respectively.**

Live Measurements:

The results for **three days live measurements** reveal that only **RCOM GSM, RCOM CDMA and Tata (GSM)** have not met the benchmarks of parameter **calls connection to operators (Voice to voice),** with their performance as **19.95%,36.61% and 94.44%** respectively, against the benchmark of >=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 Mumbai Metro service area during the time 1100 to 1400 Hrs and 1600 to 1900 was carried out by TUV auditors. The test calls were made from one operator to another within the same licensed area to judge the ease of connectivity amongst the operators. While doing this exercise, the radio part, the switch part and POI in between the two operators are involved. Congestion in any of these network elements could result in congestion in the network.

Calling Operators	Circle Name	Aircel	Airtel	MTNL	Idea	RCOM (GSM)	Tata (GSM)	Vodafone	RCOM (CDMA)	Tata (CDMA)
INTER OPERATOR CALL ASSESSMENT										
Aircel		--	100%	100%	100%	100%	100%	100%	100%	100%
Airtel		100%	--	100%	100%	100%	100%	100%	100%	100%
MTNL		100%	100%	--	100%	100%	100%	100%	100%	100%
Idea		100%	100%	100%	--	100%	100%	100%	100%	100%
RCOM (GSM)	Mumbai	100%	100%	100%	100%	--	100%	100%	100%	100%
Tata (GSM)		100%	100%	100%	100%	100%	--	100%	100%	100%
Vodafone		100%	100%	100%	100%	100%	100%	--	100%	100%
RCOM (CDMA)		100%	100%	100%	100%	100%	100%	100%	--	100%
Tata (CDMA)		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. 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	MTNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	Mumbai Metro	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	Mumbai Metro	100	100	NA	100	100	100	100	100	100
% Accessibility of Call centre /customer Care (Total call successfully established *100/ Total call attempt)	Mumbai Metro	**100.00%**	**100.00%**	**NA**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	Mumbai Metro	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 90 seconds.	Mumbai Metro	100	100	100	100	100	100	100	100	100
% age of calls answered by operator (voice to voice) (Total call successfully established within 90 Sec.*100 /Total call attempt)	Mumbai Metro	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

In case of calls answered by operators (voice to voice) within 90 seconds when test calls were made to the call centers, the performance with respect to the calls connection was satisfactory.

6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS:

Parameter	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS										
Total No. of calls Attempted	Mumbai	4	100	100	100	100	7	100	100	3
Total No. of calls Answered	Mumbai	3	91	85	91	98	7	88	98	2
Resolution of Billing Complaints	Mumbai	3	100	85	91	98	7	88	98	2
%age of cases resolved	Mumbai	**100.00%**	**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. However, in some cases, the number of customers contacted for verification was very less due to less number of billing complaints. During live calling, some of the customers did not attend the calls, so shortfall was made good by taking other complaints to make verification of 100 Complaints. Some of the complainants reported that they didn't exactly remember about the resolution of complaints. However, majority of the customers reported that the billing complaints were resolved to their satisfaction.

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)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
100, 101, 102,1098			South Mumbai Day 1	20	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 102,1098	July 15'	South Mumbai	South Mumbai Day 2	20	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 102,1098			South Mumbai Day 3	10	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 102,1098			Kalyan Day 1	20	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 102,1098	Aug 15'	Kalyan	Kalyan Day 2	20	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 102,1098			Kalyan Day 3	10	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 102,1098			North Mumbai Day 1	20	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 102,1098	Sep 15'	North Mumbai	North Mumbai Day 2	20	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 102,1098			North Mumbai Day 3	10	✓	✓	✓	✓	✓	✓	✓	✓	✓

To assess the availability and efficiency of level 1 services such as police, fire, ambulance, women help line and child help line (emergency services) offered by various mobile service providers, the calls were made during the drive test (July15 – Sep15) in different SDCAs. In Mumbai Metro service area, these services 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 **South Mumbai, Kalyan and North Mumbai** in the months of July, August and September 2015 respectively. The total route Kms covered during drive tests in respective SSAs was **303 Kms, 302 Kms and 327 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 $\geq$ -75 dBm for in-door coverage and $\geq$ -85 dBm for in-vehicle.

7.1 OPERATOR ASSISTED DRIVE TEST: SOUTH MUMBAI (JULY-15)

DRIVE TEST TABLE – 1

S/N	Parameter	Classification of Route covered	AIRCEL		AIRTEL		MTNL		TATA GSM		IDEA		RCOM GSM		VODAFONE		TATA CDMA		RCOM CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
1	Call Attempts	Highways	90	30	94	30	95	32	91	30	94	30	109	30	96	30	96	30	101	31
		Major Roads	92	30	96	30	92	31	94	30	108	30	150	30	102	30	97	30	121	30
		Within City	270	30	351	30	316	31	355	30	371	30	374	30	314	31	264	30	364	30
		Overall SSA	452	90	541	90	503	94	540	90	573	90	633	90	512	91	457	90	586	91
2	Blocked Call Rate	Highways	1.11%	0.00%	0.00%	0.00%	5.26%	0.00%	1.10%	0.00%	0.00%	0.00%	15.60%	0.00%	0.00%	0.00%	0.00%	0.00%	3.96%	0.00%
		Major Roads	0.00%	0.00%	0.00%	0.00%	4.35%	0.00%	0.00%	0.00%	0.93%	0.00%	3.33%	3.33%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	1.90%	0.00%	0.56%	0.00%	0.27%	0.00%	3.74%	0.00%	0.00%	0.00%	0.00%	0.00%	4.12%	0.00%
		Overall SSA	0.22%	0.00%	0.00%	0.00%	2.98%	0.00%	0.56%	0.00%	0.35%	0.00%	5.69%	1.11%	0.00%	0.00%	0.00%	0.00%	3.41%	0.00%
3	Dropped Call Rate (<=2%)	Highways	0.00%	0.00%	0.00%	0.00%	4.44%	0.00%	0.00%	0.00%	0.00%	0.00%	4.35%	0.00%	0.00%	0.00%	0.00%	0.00%	3.09%	0.00%
		Major Roads	0.00%	0.00%	0.00%	0.00%	3.41%	0.00%	0.00%	0.00%	1.87%	0.00%	6.21%	0.00%	0.00%	0.00%	0.00%	0.00%	2.50%	0.00%
		Within City	0.37%	0.00%	0.00%	0.00%	2.26%	0.00%	0.85%	0.00%	1.08%	0.00%	4.44%	0.00%	0.00%	0.00%	0.38%	0.00%	2.58%	0.00%
		Overall SSA	0.22%	0.00%	0.00%	0.00%	2.87%	0.00%	0.56%	0.00%	1.05%	0.00%	4.86%	0.00%	0.00%	0.00%	0.22%	0.00%	2.65%	0.00%

S/N	Parameter	Classification of Route covered	AIRCEL		AIRTEL		MTNL		TATA GSM		IDEA		RCOM GSM		VODAFONE		TATA CDMA		RCOM CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
	Percentage connections with good voice quality (=>95%)																			
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.71%	98.97%	95.49%	98.69%
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.55%	98.37%	94.37%	98.61%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.68%	99.08%	93.88%	98.83%
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.66%	98.81%	94.26%	98.69%
	(b) 0-5 (with frequency hopping for GSM Operators)	Highways	94.78%	96.27%	96.70%	98.94%	87.65%	99.82%	96.96%	99.72%	95.01%	99.74%	89.84%	99.66%	95.27%	99.33%	NA	NA	NA	NA
		Major Roads	94.63%	98.03%	96.84%	99.34%	91.27%	99.79%	96.94%	98.92%	94.36%	99.74%	89.29%	99.21%	95.52%	99.70%	NA	NA	NA	NA
		Within City	94.04%	99.69%	97.14%	99.54%	93.38%	99.75%	97.20%	99.34%	94.92%	99.74%	90.03%	100%	95.12%	99.63%	NA	NA	NA	NA
		Overall SSA	94.32%	97.99%	97.02%	99.27%	91.95%	99.79%	97.12%	99.33%	94.83%	99.74%	89.85%	99.65%	95.24%	99.55%	NA	NA	NA	NA
	Service Coverage																			
5	In door (>= -75dBm)	Highways	88.81%	62.43%	83.00%	77.87%	25.85%	6.91%	98.63%	98.22%	90.14%	99.77%	71.27%	15.41%	80.89%	100%	97.64%	99.12%	85.56%	100%
		Major Roads	92.63%	69.78%	76.34%	94.83%	26.60%	8.86%	97.40%	98.76%	89.16%	98.12%	69.03%	99.30%	78.59%	100%	98.31%	99.04%	86.74%	100%
		Within City	93.92%	99.84%	76.64%	92.58%	27.06%	9.83%	96.50%	99.01%	91.78%	100%	70.82%	98.77%	79.61%	97.91%	98.22%	99.37%	90.43%	100%
		Overall SSA	92.61%	77.34%	78.66%	88.43%	26.76%	8.48%	96.98%	98.65%	90.36%	99.30%	70.54%	55.43%	79.64%	99.30%	98.11%	99.18%	88.85%	100%
	In-vehicle (>= -85dBm)	Highways	96.40%	99.81%	96.95%	99.58%	68.51%	67.24%	99.97%	100%	99.69%	100%	92.88%	97.28%	95.84%	100%	100%	100%	98.70%	100%
		Major Roads	98.71%	98.52%	93.90%	99.97%	70.71%	53.58%	99.98%	100%	99.10%	99.96%	88.86%	100%	95.67%	100%	100%	100%	98.27%	100%
		Within City	98.80%	100%	93.89%	99.86%	73.21%	51.85%	99.82%	100%	99.71%	100%	92.38%	100%	96.84%	100%	100%	100%	99.70%	100%
		Overall SSA	98.29%	99.45%	94.92%	99.80%	71.90%	57.82%	99.87%	100%	99.50%	99.99%	91.76%	98.58%	96.40%	100%	100%	100%	99.24%	100%
	Outdoor- in city (>= -95dBm)	Highways	99.26%	100%	100%	100%	96.93%	99.49%	100%	100%	99.99%	100%	99.02%	100%	99.23%	100%	100%	100%	100%	100%
		Major Roads	99.70%	100%	100%	100%	98.62%	99.62%	100%	100%	99.95%	100%	97.60%	100%	99.66%	100%	100%	100%	100%	100%
		Within City	99.66%	100%	100%	100%	97.73%	99.19%	100%	100%	99.98%	100%	98.72%	100%	99.74%	100%	100%	100%	100%	100%
		Overall SSA	99.59%	100%	100%	100%	97.75%	99.44%	100%	100%	99.97%	100%	98.55%	100%	99.62%	100%	100%	100%	100%	100%

S/N	Parameter	Classification of Route covered	AIRCEL		AIRTEL		MTNL		TATA GSM		IDEA		RCOM GSM		VODAFONE		TATA CDMA		RCOM CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
6	Call Setup Success Rate (>=95%)	Highways	98.89%	100%	100%	100%	**94.74%**	100%	98.90%	100%	100%	100%	**84.40%**	100%	100%	100%	100%	100%	96.04%	100%
		Major Roads	100%	100%	100%	100%	95.65%	100%	100%	100%	99.07%	100%	96.67%	96.67%	100%	100%	100%	100%	99.17%	100%
		Within City	99.63%	100%	100%	100%	98.10%	100%	99.44%	100%	99.73%	100%	96.26%	100%	100%	100%	100%	100%	95.88%	100%
		Overall SSA	99.56%	100%	100%	100%	97.02%	100%	99.44%	100%	99.65%	100%	**94.31%**	98.89%	100%	100%	100%	100%	96.59%	100%
7	Hand Over Success Rate (HOSR)	Highways	100%	100%	99.22%	100%	93.00%	100%	97.52%	100%	98.41%	100%	91.95%	100%	98.39%	100%	100%	100%	100%	100%
		Major Roads	95.91%	100%	96.97%	100%	95.55%	100%	97.97%	100%	98.69%	100%	90.70%	100%	99.04%	100%	100%	100%	100%	100%
		Within City	99.12%	100%	98.28%	100%	97.56%	100%	98.87%	100%	98.16%	100%	95.71%	100%	98.89%	100%	99.82%	100%	100%	100%
		Overall SSA	98.53%	100%	98.17%	100%	95.76%	100%	98.52%	100%	98.29%	100%	94.05%	100%	98.83%	100%	99.90%	100%	100%	100%

NA: Not Applicable

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

7.2 OPERATOR ASSISTED DRIVE TEST: KALYAN (AUGUST-15)

DRIVE TEST TABLE – 2

S/N	Parameter	Classification of Route covered	AIRCEL OUTDOOR	AIRCEL INDOOR	AIRTEL OUTDOOR	AIRTEL INDOOR	MTNL OUTDOOR	MTNL INDOOR	TATA GSM OUTDOOR	TATA GSM INDOOR	IDEA OUTDOOR	IDEA INDOOR	RCOM GSM OUTDOOR	RCOM GSM INDOOR	VODAFONE OUTDOOR	VODAFONE INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR
1	Call Attempts	Highways	62	30	70	30	66	31	60	30	82	30	69	36	62	30	61	30	66	30
		Major Roads	109	30	112	30	91	31	110	30	116	30	122	30	123	30	101	30	105	30
		Within City	217	30	208	30	208	31	242	30	239	30	227	30	240	30	215	30	215	31
		Overall SSA	388	90	390	90	365	93	412	90	437	90	418	96	425	90	377	90	386	91
2	Blocked Call Rate	Highways	1.61%	0.00%	0.00%	0.00%	1.52%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Major Roads	0.00%	0.00%	0.00%	0.00%	2.20%	0.00%	0.00%	0.00%	0.86%	0.00%	2.46%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	1.38%	0.00%	0.48%	0.00%	1.44%	0.00%	1.24%	0.00%	0.00%	0.00%	**4.41%**	0.00%	0.00%	0.00%	0.47%	0.00%	0.00%	0.00%
		Overall SSA	1.03%	0.00%	0.26%	0.00%	1.64%	0.00%	0.73%	0.00%	0.23%	0.00%	**3.11%**	0.00%	0.00%	0.00%	0.27%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Highways	1.61%	0.00%	0.00%	0.00%	1.54%	0.00%	0.00%	0.00%	0.00%	0.00%	1.45%	0.00%	0.00%	0.00%	0.00%	0.00%	1.52%	0.00%
		Major Roads	0.92%	0.00%	0.00%	0.00%	**3.37%**	0.00%	0.91%	0.00%	0.87%	0.00%	0.84%	0.00%	1.63%	0.00%	0.00%	0.00%	**2.86%**	0.00%
		Within City	0.47%	0.00%	0.00%	0.00%	1.95%	0.00%	1.26%	0.00%	0.00%	0.00%	0.92%	0.00%	0.00%	0.00%	0.47%	0.00%	0.93%	0.00%
		Overall SSA	0.78%	0.00%	0.00%	0.00%	**2.23%**	0.00%	0.98%	0.00%	0.23%	0.00%	0.99%	0.00%	0.47%	0.00%	0.27%	0.00%	1.55%	0.00%
4	Percentage connections with good voice quality (=>95%)																			

S/N	Parameter	Classification of Route covered	AIRCEL		AIRTEL		MTNL		TATA GSM		IDEA		RCOM GSM		VODAFONE		TATA CDMA		RCOM CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.19%	99.56%	94.80%	100%
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.91%	99.86%	90.07%	97.84%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.87%	100%	94.99%	100%
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.49%	99.80%	93.79%	99.63%
	(b) 0-5 (with frequency hopping for GSM Operators)	Highways	96.75%	98.91%	97.86%	98.14%	93.26%	98.61%	97.82%	100%	95.35%	98.60%	94.06%	100%	97.09%	99.82%	NA	NA	NA	NA
		Major Roads	95.80%	99.75%	97.07%	99.60%	91.56%	99.78%	98.05%	99.80%	94.57%	98.56%	92.20%	100%	95.17%	99.69%	NA	NA	NA	NA
		Within City	97.40%	97.24%	97.39%	98.52%	91.41%	99.77%	97.64%	99.73%	94.58%	99.54%	94.02%	98.97%	95.86%	99.33%	NA	NA	NA	NA
		Overall SSA	96.85%	98.63%	97.39%	98.75%	91.77%	99.40%	97.78%	99.84%	94.72%	98.90%	93.53%	99.36%	95.86%	99.61%	NA	NA	NA	NA
	Service Coverage																			
5	In door (>= -75dBm)	Highways	84.02%	99.76%	90.73%	79.52%	13.61%	19.87%	99.16%	100%	94.78%	99.99%	68.32%	100%	76.07%	100%	96.63%	98.17%	76.84%	100%
		Major Roads	81.14%	10.69%	75.66%	99.05%	15.93%	20.17%	97.96%	98.93%	94.33%	99.89%	62.84%	100%	64.49%	97.93%	95.20%	99.58%	57.25%	100%
		Within City	76.11%	63.66%	68.68%	81.16%	12.24%	22.37%	98.29%	99.71%	93.39%	99.96%	55.26%	99.60%	65.08%	95.11%	96.74%	99.46%	59.52%	100%
		Overall SSA	78.91%	58.03%	78.36%	86.58%	13.39%	20.85%	98.34%	99.50%	94.17%	99.95%	59.64%	99.75%	66.62%	97.68%	96.28%	99.06%	62.01%	100%
	In-vehicle (>= -85dBm)	Highways	92.33%	100%	98.42%	98.86%	70.51%	90.32%	99.98%	100%	99.93%	100%	90.67%	100%	96.42%	100%	100%	100%	98.62%	100%
		Major Roads	95.03%	97.97%	96.39%	99.92%	74.52%	89.77%	99.96%	100%	99.94%	100%	88.70%	100%	91.66%	100%	100%	100%	86.57%	100%
		Within City	92.28%	98.82%	91.70%	99.47%	66.46%	83.99%	99.86%	100%	99.90%	100%	85.25%	100%	93.65%	99.92%	100%	100%	85.47%	100%
		Overall SSA	93.01%	98.93%	95.50%	99.42%	69.16%	87.90%	99.90%	100%	99.92%	100%	87.15%	100%	93.51%	99.97%	100%	100%	88.07%	100%
	Outdoor- in city (>= -95dBm)	Highways	98.89%	100%	100%	100%	96.81%	99.72%	100%	100%	100%	100%	98.50%	100%	99.96%	100%	100%	100%	100%	100%
		Major Roads	99.09%	100%	100%	100%	98.28%	99.70%	100%	100%	100%	100%	98.51%	100%	99.75%	100%	100%	100%	100%	100%
		Within City	99.01%	99.99%	100%	100%	96.03%	99.73%	100%	100%	100%	100%	97.50%	100%	99.73%	100%	100%	100%	100%	100%
		Overall SSA	99.01%	100%	100%	100%	96.73%	99.72%	100%	100%	100%	100%	97.95%	100%	99.77%	100%	100%	100%	100%	100%
6	Call Setup Success	Highways	100%	100%	100%	100%	98.48%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

S/N	Parameter	Classification of Route covered	AIRCEL		AIRTEL		MTNL		TATA GSM		IDEA		RCOM GSM		VODAFONE		TATA CDMA		RCOM CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
	Rate (>=95%)	Major Roads	100%	100%	100%	100%	97.80%	100%	100%	100%	99.14%	100%	97.54%	100%	100%	100%	100%	100%	100%	100%
		Within City	98.16%	100%	99.52%	100%	98.56%	100%	98.76%	100%	100%	100%	95.59%	100%	100%	100%	99.53%	100%	100%	100%
		Overall SSA	98.97%	100%	99.74%	100%	98.36%	100%	99.27%	100%	99.77%	100%	96.89%	100%	100%	100%	99.73%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Highways	100%	100%	98.11%	100%	99.17%	100%	98.13%	100%	99.53%	100%	98.92%	100%	100%	100%	100%	100%	100%	100%
		Major Roads	100%	100%	98.95%	100%	98.36%	100%	98.91%	100%	100%	100%	98.98%	100%	98.38%	100%	100%	100%	100%	100%
		Within City	98.32%	100%	98.39%	100%	98.50%	100%	99.04%	100%	97.20%	100%	99.80%	100%	98.71%	100%	100%	100%	100%	100%
		Overall SSA	99.15%	100%	98.48%	100%	98.57%	100%	98.92%	100%	98.37%	100%	99.38%	100%	98.82%	100%	100%	100%	100%	100%

NA: Not Applicable

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

7.3 OPERATOR ASSISTED DRIVE TEST: NORTH MUMBAI (SEPTEMBER-15)

DRIVE TEST TABLE – 3

S/N	Parameter	Classification of Route covered	AIRCEL OUTDOOR	AIRCEL INDOOR	AIRTEL OUTDOOR	AIRTEL INDOOR	MTNL OUTDOOR	MTNL INDOOR	TATA GSM OUTDOOR	TATA GSM INDOOR	IDEA OUTDOOR	IDEA INDOOR	RCOM GSM OUTDOOR	RCOM GSM INDOOR	VODAFONE OUTDOOR	VODAFONE INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR
1	Call Attempts	Highways	71	30	57	30	57	30	51	30	42	30	59	30	42	30	56	30	54	30
		Major Roads	140	30	119	30	131	31	105	30	107	30	130	31	123	31	131	30	121	31
		Within City	344	30	337	30	332	32	323	30	393	30	320	30	352	30	345	30	315	38
		Overall SSA	555	90	513	90	520	93	479	90	542	90	509	91	517	91	532	90	490	99
2	Blocked Call Rate	Highways	1.41%	0.00%	0.00%	0.00%	1.75%	0.00%	0.00%	0.00%	0.00%	0.00%	8.47%	3.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Major Roads	0.71%	0.00%	0.00%	0.00%	4.58%	0.00%	0.95%	0.00%	0.00%	0.00%	7.69%	0.00%	0.00%	0.00%	0.76%	0.00%	0.00%	0.00%
		Within City	0.87%	0.00%	0.00%	0.00%	1.81%	0.00%	0.93%	0.00%	0.25%	0.00%	3.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.63%	0.00%
		Overall SSA	0.90%	0.00%	0.00%	0.00%	2.50%	0.00%	0.84%	0.00%	0.18%	0.00%	4.91%	1.10%	0.00%	0.00%	0.19%	0.00%	0.41%	0.00%
3	Dropped Call Rate (<=2%)	Highways	0.00%	0.00%	0.00%	0.00%	5.36%	0.00%	0.00%	0.00%	2.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.70%	0.00%
		Major Roads	0.00%	0.00%	0.00%	0.00%	1.60%	0.00%	0.96%	0.00%	0.00%	0.00%	6.67%	0.00%	0.81%	0.00%	0.76%	0.00%	7.44%	0.00%
		Within City	0.30%	0.00%	0.00%	0.00%	1.84%	0.00%	0.63%	0.00%	0.77%	0.00%	1.29%	0.00%	0.00%	0.00%	0.00%	0.00%	1.60%	0.00%
		Overall SSA	0.18%	0.00%	0.00%	0.00%	2.17%	0.00%	0.63%	0.00%	0.74%	0.00%	2.48%	0.00%	0.19%	0.00%	0.19%	0.00%	3.28%	0.00%

S/N	Parameter	Classification of Route covered	AIRCEL		AIRTEL		MTNL		TATA GSM		IDEA		RCOM GSM		VODAFONE		TATA CDMA		RCOM CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
	Percentage connections with good voice quality (=>95%)																			
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Highways	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	100%	100%	100%	100%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100%	100%	100%	100%
		Overall SSA	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	95.14%	100%	95.50%	99.54%	**90.72%**	99.76%	97.14%	99.98%	**90.45%**	99.77%	95.77%	100%	95.79%	99.50%	NA	NA	NA	NA
		Major Roads	96.32%	97.70%	97.36%	97.69%	**92.23%**	99.82%	97.32%	98.69%	**93.82%**	99.80%	**88.24%**	99.79%	96.56%	99.15%	NA	NA	NA	NA
		Within City	**94.96%**	99.01%	97.12%	99.66%	**92.32%**	99.78%	97.76%	99.14%	**94.85%**	99.82%	**91.13%**	100%	96.34%	99.65%	NA	NA	NA	NA
		Overall SSA	95.33%	98.90%	96.99%	98.96%	**92.15%**	99.79%	97.61%	99.26%	**94.31%**	99.80%	**91.39%**	99.91%	96.35%	99.43%	NA	NA	NA	NA
	Service Coverage																			
5	In door (>= -75dBm)	Highways	97.68%	99.88%	95.58%	89.00%	32.84%	47.57%	99.24%	98.01%	98.32%	99.96%	83.85%	99.78%	89.03%	97.82%	98.51%	99.51%	94.95%	100%
		Major Roads	79.09%	97.61%	75.25%	66.63%	20.80%	38.22%	97.27%	98.71%	87.04%	100%	55.31%	100%	79.38%	99.97%	95.88%	99.63%	55.40%	100%
		Within City	80.29%	21.71%	78.39%	100%	18.57%	21.81%	97.68%	98.02%	91.62%	99.98%	71.13%	95.02%	77.44%	99.91%	98.04%	99.46%	76.62%	100%
		Overall SSA	83.07%	73.08%	83.07%	85.21%	20.45%	35.58%	97.75%	98.25%	91.22%	99.98%	70.01%	70.59%	78.85%	99.23%	97.52%	99.53%	73.34%	100%
	In-vehicle (>= -85dBm)	Highways	99.19%	100%	99.61%	99.36%	75.68%	99.57%	99.85%	100%	100%	99.98%	95.38%	100%	99.29%	99.97%	100%	100%	99.91%	100%
		Major Roads	91.52%	100%	91.11%	98.66%	61.75%	97.55%	99.89%	100%	96.33%	100%	79.55%	100%	94.77%	100%	100%	100%	76.80%	100%
		Within City	95.63%	99.36%	95.62%	100%	60.83%	85.29%	99.96%	99.90%	99.49%	99.99%	93.10%	100%	97.01%	100%	100%	100%	97.29%	100%
		Overall SSA	95.29%	99.79%	95.45%	99.34%	62.43%	93.98%	99.94%	99.96%	98.90%	99.99%	90.59%	90.78%	96.67%	99.99%	100%	100%	92.61%	100%
	Outdoor- in city (>= -95dBm)	Highways	99.62%	100%	100%	100%	98.02%	100%	100%	100%	100%	100%	99.87%	100%	100%	100%	100%	100%	100%	100%
		Major Roads	98.25%	100%	100%	100%	95.58%	100%	100%	100%	99.42%	100%	94.48%	100%	99.56%	100%	100%	100%	100%	100%
		Within City	99.39%	100%	100%	100%	95.98%	99.70%	100%	100%	99.97%	100%	99.24%	100%	99.88%	100%	100%	100%	100%	100%
		Overall SSA	99.16%	100%	100%	100%	96.07%	99.90%	100%	100%	99.87%	100%	98.32%	98.36%	99.81%	100%	100%	100%	100%	100%

S/N	Parameter	Classification of Route covered	AIRCEL		AIRTEL		MTNL		TATA GSM		IDEA		RCOM GSM		VODAFONE		TATA CDMA		RCOM CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
6	Call Setup Success Rate (>=95%)	Highways	98.59%	100%	100%	100%	98.25%	100%	100%	100%	100%	100%	91.53%	96.67%	100%	100%	100%	100%	100%	100%
		Major Roads	99.29%	100%	100%	100%	95.42%	100%	99.05%	100%	100%	100%	92.31%	100%	100%	100%	99.24%	100%	100%	100%
		Within City	98.26%	100%	99.41%	100%	98.19%	96.88%	99.07%	100%	99.24%	100%	96.88%	100%	100%	100%	100%	100%	99.37%	100%
		Overall SSA	98.56%	100%	99.61%	100%	97.50%	98.92%	99.16%	100%	99.45%	100%	95.09%	98.90%	100%	100%	99.81%	100%	99.59%	100%
7	Hand Over Success Rate (HOSR)	Highways	99.17%	100%	99.60%	100%	94.23%	100%	98.11%	100%	97.56%	100%	96.57%	100%	98.64%	100%	100%	100%	100%	100%
		Major Roads	98.48%	100%	98.75%	100%	98.40%	100%	98.41%	100%	98.10%	100%	96.68%	100%	99.69%	100%	100%	100%	100%	100%
		Within City	98.21%	100%	98.49%	100%	99.45%	100%	98.84%	100%	96.47%	100%	96.81%	100%	99.09%	100%	100%	100%	100%	100%
		Overall SSA	98.47%	100%	98.74%	100%	98.70%	100%	98.65%	100%	96.85%	100%	96.75%	100%	99.14%	100%	100%	100%	100%	100%

NA: Not Applicable

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

7.4 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 4

DRIVE TEST ROUTE OF JULY TO SEPTEMBER 15 – MUMBAI METRO CIRCLE							
		Day 1		Day 2		Day 3	
Name of SSA	**Drive test Period**	**Name of SDCA Covered / KM covered**	**Route Covered**	**Name of SDCA Covered / KM covered**	**Route Covered**	**Name of SDCA Covered / KM covered**	**Route Covered**
South Mumbai	**July-15**	South Mumbai / 101 KM	Shivajipark ,Mahim ,Bandra-Worli Sea Link ,Worli ,Haji Ali ,Pedder Rd ,Gamdevi ,Grant Rd ,Byculla ,Mumbai Central ,Mazgaon ,Dockyard ,Reay Rd ,Sewree ,Parel ,Lalbaugh ,Wadala ,Dadar ,Prabhadevi ,N M Joshi Marg ,Delisle Rd ,S B Rd ,Mahalaxmi ,Lower Parel ,Curry Rd. Indoor: Palladium Mall	South Mumbai / 110 KM	Shivajipark ,Dadar ,S B rd ,Mahalaxmi ,KK Rd ,Haji Ali ,Pedder Rd ,Kemps Corner ,Girgaum Chowpaty ,Marine Lines ,Marine Drive ,Nariman Point ,Cooperage ,Cuffparade ,Navy Nagar ,Colaba ,SB Rd ,Regal ,Fountain ,Fort ,CST ,JJ Flyover ,Dr B A Rd ,Dadar TT ,Matunga ,Wadala ,Five Gardens ,Antop Hill ,Prabhadevi ,N M joshi Rd ,Sat Rasta Circle ,Byculla ,Mumbai Central ,MS Ali Rd ,Mandvi ,Masjid ,Kalbadevi ,Bhuleshwar ,Girgaum ,GPO ,P D'Mello Rd ,Sewree ,Parel ,Lalbaugh. Indoor: Nakshtra Mall	South Mumbai / 92 KM	Shivajipark ,Mahim ,SB Rd ,Bandra-Worli Sea Link ,Worli ,Haji Ali ,Napean Sea Rd ,Malabar Hill ,Walkeshwar Rd ,Girgaum Chowpaty ,Marine Lines ,Marine Drive ,Nariman Point ,Cooperage ,Cuffparade ,Navy Nagar ,Colaba ,Gateway of India ,Regal ,S B Rd ,P D'Mello Rd.Eastern Free Way ,Wadala ,Five Gardens ,Antop Hill ,Sewree ,Parel ,Lalbaugh ,Lower Parel ,N M Joshi Rd ,Prabhadevi. Indoor: Central Mall
Kalyan	**Aug-15**	Kalyan / 102 KM	Ganpati Mandir road ,NewKalyan Road ,Shilphata Road ,Ambivli titwala road ,Pandurang wada ,Sunil nagar road ,Nandivli Road ,Malangad Road. Indoor: Gopi Cinema	Kalyan / 90 KM	Pandit Dindayal Rd ,Thakur Wadi ,Old dombivli RD ,Kalyan ,Shilphata RD ,Kopar Road ,Retibunder road , Subhashchandra road. Indoor: Metro Mall	Kalyan / 110 KM	Ganpati Mandir Road ,Kalyan ahmedabad Rd ,shilphata road ,kalyan badlapur road ,itwala ambiwali Road ,Pune Link Road ,Umbarde Road Indor: Sarvodaya Mall

		DRIVE TEST ROUTE OF JULY TO SEPTEMBER 15 – MUMBAI METRO CIRCLE						
		Day 1		Day 2		Day 3		
Name of SSA	Drive test Period	Name of SDCA Covered / KM covered	Route Covered	Name of SDCA Covered / KM covered	Route Covered	Name of SDCA Covered / KM covered	Route Covered	
North Mumbai	Sep-15	North Mumbai / 113 KM	Western express highway , S.V road ,Link road Datta Pada road Boriwali (E) , Akurli road kandivali (E) , Boraspada Road Charko , Lok-Manya tilak road , Gorai ,Western Express highway. Indoor: Infinity 2 mall	North Mumbai / 98 KM	Western express highway , Mira bahynder road , S.V road, Silver park road Mira road ,Dr . KBH Road Bahynder(W) ,Mira bahynder road , Western express highway ,Silver park road , mira road ,Mandapeswhar Road Dahisar (w) ,Swami vivekanand road Dahisar (E) ,Link road , Uttan road. Indoor: Oberoi mall	North Mumbai / 116 KM	Western express ,highway ,S.V road ,Link road ,Marve road ,Daftari road ,Abdul hameed ,road(malwani) ,Western express highway , Link road ,S.V road ,Marve road ,New link road ,Daftari road ,Malad station road ,S.V road , Link road ,Marve road. Indoor: Inorbit mall	

7.5 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 5

DRIVE TEST OBSERVATION OF SOUTH MUMBAI (JULY-15)

S NO	Name of SP	Day 1 Observation	Day 2 Observation	Day 3 Observation
1	AIRTEL	Poor Rx Quality observed at: Dr. Annie Besant Road	Poor Rx Quality observed at: Nathalal parekh Marg	Poor Rx Quality observed at: Senapati Bapat Marg(Pikale Junction), Road: Eastern Freeway
2	AIRCEL	Poor Rx Quality observed at: khan abdul gaffar khan road and Thadani Marg,Sea-Phase Worli, Pedder Road, Near siddhivinayak Mandir	Poor Rx Quality observed at: S.M Road Antop Hill, opp Jaslok Hospital, Pedder Road, Navy Nagar	Poor Rx Quality observed at: Free Way, Antop Hill, Khare Gate Road Parking Colony and Hindu Colony, L.N. Road,khan abdul gaffar khan road and Thadani Marg, Sea-Phase Worli, Navy Nagar
3	MTNL	Poor Rx Quality observed at: Bandra-Worli Sea Link, Crawford Market Area, Lalbaugh, Racecourse	Poor Rx Quality observed at: Narimon Point, KK Rd,Haji Ali Square, Five Gardens Wadala, Antop Hill,	Poor Rx Quality observed at: Five Gardens Wadala,P D'Mello Rd Wadala, Matunga, Antop Hill, Bandra-Worli Sea Link, Prabhadevi
4	IDEA	Poor Rx Quality observed at: E Moses Road, MahaLaxmi, bandra-worli sea link, peddar road, Dadar, Ambedkar road,	Poor Rx Quality observed at: Senapati Bapat Marg, Marine Drive, Peddar Road, N M JOSHI MARG, wadala, Asiatic Library(PDM Road), Navy nagar	Poor Rx Quality observed at: Mahalaxmi, Bandra-worli sea link, Prabhadevi, Wadala, Dadar(w), Freeway
5	VODAFONE	Poor Rx Quality observed at: Bandra-Worli Sea Link/Reclamation,Parel DR SS RAO MARG, Chinchpokli, Byculla Bakre Adda	Poor Rx Quality observed at: Matunga Taikalwadi, Dadar Shivaji Park, Parel Flyover, Five Garden, Colaba/ Navy Nagar	Poor Rx Quality observed at: Navy nagar, Bandra -Worli Sea Link, Dadar/Shivaji Park, Five Garden, BPT Road, Worli/Century Bazar, Hazi Ali/Mahalaxmi, Narimon Point, Eastern Freeway
6	TATA GSM	Poor Rx Quality observed at: Bandra-Worli Sea Link, Shankar Rao Naram Path ,Lower Parel.	Poor Rx Quality observed at: Senapati Bapat Marg, Marine Drive, Lower Parel, Navy nagar	Poor Rx Quality observed at: Bandra-Worli Sea Link, Lala Lajpat rai marg/Worli, H. R. Mahajani Marg, Matunga Road, Marine Drive, PDM Road, Navy Nagar
7	TATA CDMA	Poor Rx Quality observed at: . LALA LAJPATRAI MARG(HORNBY VELLA ROAD), Bandra-Worli Sea Link,	Poor Rx Quality observed at:Senapati Bapat Marg, Marine Drive, Lower Parel, Navy nagar, Colaba, N M JOSHI MARG	Poor Rx Quality observed at:Shivaji Park/Dadar
8	RCOM GSM	Poor Rx Quality observed at: Bandra Reclamation, Worli Dairy, Byculla railway colony , Kalachowki Police station , Parel village bus stop, Gupte Marg/Mahim	Poor Rx Quality observed at: at Colaba Causeway, Maheshwari-Tulpule Flyover, Lalbaug Flyover, Dr.Babasaheb Ambedkar road , Jijamata Udyan, Frere Road, at Katrak road Police colony, Nathala Parekh	Poor Rx Quality observed at: Bandra-Worli Sea Link, Mahim Flyover, Bombay Port trust Road, Eastern Freeway, Poddar college, Nathala Parekh, King Edward rd Parel Villege
9	RCOM CDMA	Poor Rx Quality observed at: NM Joshi Road near Chinchpokli, Worli Sea Face/Sealink	Poor Rx Quality observed at: Marine Lines	Poor Rx Quality observed at: Bhulabhai Road near Breach Candy Hospital , Waleshwar Road,Colaba, Antop Hill, Gokhle Road,

Common observation Area: Bandra-Worli Sea Link, Navy Nagar, Colaba, Wadala, Antop Hill,Mahalaxmi/Hazi Ali, Prabhadevi, Eastern Freeway, Peddar Road,Dadar/Shivaji Park, Five Garden, Senapati vapat marg, Marine Drive/Lines, NM Joshi Marg, Mahim, Waleshwar.

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF KALYAN SSA (AUGUST-15)

S .No	Name of SP	Day 1 Observation	Day 2 Observation	Day 3 Observation
1	AIRTEL	Poor Rx Quality at: Pandurang Wadi Road	.--	.--
2	AIRCEL	Poor Rx Quality observed at: Chole gaon,Thakurli, KDMC Sports complex, Sunil nagar, Lodha city/Kalyan-shilphata road, kalyan sape road,Sahad, Ambiwali	Poor Rx Quality observed at:Chole gaon/Thakurli, MIDC Bhauchiwadi, Aazade Gaoni, Lodha city/Kalyan shilphata road,	Poor Rx Quality observed at:Anupam Nagar, Kalyan sape road, Lodha/Kalyan shilphata road, Ambiwali, shahd
3	MTNL	Poor Rx Quality observed at: Kalyan-Shilphata Road/Lodha City, nandivali,P&T colony, dombivali east, Purnima kalyan west	Poor Rx Quality observed at:Kalyan-Shilphata Road, near reti bunder rd,umesh nagar rd, dombivali west	Poor Rx Quality observed at:Kalyan-Shilphata Road, Ambivali
4	IDEA	Poor Rx Quality observed at: Kalyan-Shilphata Road, Dombivli MIDC, Mhatre Nagar, Kalyan Station, Shahad-Ambivali Road , Gandhi Nagar	Poor Rx Quality observed at: Kalyan-Shilphata Road, Dombivali(W), Dombivali €, Near TATA Power, Gandhi Nagar, Birla college Road,	Poor Rx Quality observed at: Kalyan-Shilphata road, Manish Nagar, Shahad Ambivali Road, Kalyan E/W bridge, Shivaji Nagar
5	VODAFONE	Poor Rx Quality observed at: Area Name-Vadavali Village/Ambivali, Kalyan-Ulhas Nagar Road,	Poor Rx Quality observed at: Kalyan-Ulhas Nagar Road, MIDC Dombiwali (east), Savarkar Road,	Poor Rx Quality observed at: Vadavali Village/Ambivali, Kalyan(Kalyan-Ulhas Nagar Road),Kalyan-Shilphata Road
6	TATA GSM	Poor Rx Quality observed at: Manpada Road/ Dombivali(East), Mohane road/shahad(W), MIDC, Dombiwali Station Road, Dombiwali(W)	Poor Rx Quality observed at: Tilak road/Dombivali east, Thakurli	Poor Rx Quality observed at: Gajanan hospital/Kalyan west, Sahad, Ambiwali,
7	TATA CDMA	Poor Rx Quality observed at: Thakurli(w), Gandhinagar/Dombiwali East, Birla College, Kalyan Shil Road	Poor Rx Quality observed at:Kalyan-Shilphata Road, Subhash Nagar/Dombiwali east	Poor Rx Quality observed at:Kalyan-Shilphata Road, Manpada gaon, Dombivali/Dindayal Road,kalyan badalapur road/kalyan west, Ambivali Station Road
8	RCOM GSM	Poor Rx Quality observed at: Golvali Naka/Kalyan Shil Road, Idea Coloney, Tata Power House, Cholegaon, Ramchandra Nagar, Mamta Chowk, Vedant Complex	Poor Rx Quality observed at: Golvali Naka/Kalyan Shil Road, Kalu Nagar, Corporation Park, Cholegaon, Tata power House, Kopar Road	Poor Rx Quality observed at:Cholegaon, Tata Power House, Shahd, Govali naka, Milind Nagar
9	RCOM CDMA	Poor Rx Quality observed at: Trimurti Nagar, Thakurli, near P & T Colony, Nandivali Panchanand and Sagarli & Azde gaon, Ambivali,Rambaug	Poor Rx Quality observed at:Dombiwali, Tilak Nagar, Gopal Nagar and Trimurti Nagar, Balaji Nagar, Kalyan-Shilphata Road near Padle gaon,	Poor Rx Quality observed at:Bhoiwada Kalyan and Kachore Gaon, Balaji Nagar/Dombiwali, Ambiwali, Kalyan east, Kalyan-shil road

Common observation Area: Ambivali, Kalyan-Shilphata Road, Dombiwali East/West, Thakurli, Tata Power House, Cholegaon, Golvali Naka, Shahd, Kalyan east.

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF NORTH MUMBAI (SEPTEMBER-15)

S. NO	Name of SP	Day 1 Observation	Day 2 Observation	Day 3 Observation
1	AIRTEL	Poor Rx Quality found at: Akruli Cross Road(Kadamwadi Bus stop)	.--	MDP Road(Midblash Landscape garden), Hari Bapu Road(Post Office Malad East)
2	AIRCEL	Poor Rx Quality found at: Shimpoli, Western Express Highway(V-Mall), Akurli Road	Poor Rx Quality found at: Dahisar(Western Express highway), Uttan Road, Gorai Road	Poor Rx Quality found at: Malvani
3	MTNL	Poor Rx Quality found at: Few places at Western Exp Highway, Pathanwadi, Dahisar Link Road	Poor Rx Quality found at: Uttan Road,Dahisar Link road	Link Rd Kandivali-Malad east, Bunder Road, WEH Malad, Marve Road
4	IDEA	Poor Rx Quality found at: W E Highway Road(Laxmi Baug), Charkop Road 8, LT Road	Poor Rx Quality found at:Few places on WEH, Link Road,Gorai Road, Malad West,	Poor Rx Quality found at: WEH, Link Road, Malad west, Marve road
5	VODAFONE	Poor Rx Quality found at:Marve Road, Name-Akruli Road,Kandivali-W,Malad East, Mud Road, WEH goregaon	Poor Rx Quality found at: Uttan Road,Dahisar Link road, Bhyander west, Uttan Road	Poor Rx Quality found at:Madh Island Road, few places in borivali & kandivali west, Link rd malad west, Charkhop, Madh road
6	TATA GSM	Poor Rx Quality found at: WEH, Thakur International School, Aksha Beach Road	Poor Rx Quality found at: Dahisar west,Uttan Road.	Poor Rx Quality found at: Marve Rd, Link Rd, Malad stn Road
7	TATA CDMA	Poor Rx Quality found at: Few places in WEH, Kandivali East	Poor Rx Quality found at:western Express Highway,Mira Bhayandar Rd, Gorai	Poor Rx Quality found at: Few Places in WEH, Madh Road, Kandivali west
8	RCOM GSM	Poor Rx Quality found at:Malad Marve Rd area, Mud road, Ashok nagar, WEH, Akurli road, Babhi naka	Poor Rx Quality found at:WEH, Link road, prem nagar	Poor Rx Quality found at:Mudh chincholi bunder, Mud marve road, Gautam nagar malad, pathanvadi, goregaon mulund road, shankar lane kandivali,
9	RCOM CDMA	Poor Rx Quality found at: Siddharth nagar borivali, Rayani gram borivali, madh marve road, link road chincholi,Malad marve road,	Poor Rx Quality found at: CS Link road, Rna complex mira road, Uttan road, WEH	Poor Rx Quality found at: Malad(mahindra nagar, chincholi bunder). Marve road,WEH

Common observation Area: Western Express Highway, Aksa Beach Road,Uttan Road/Madh Road/ Marve Road,Gorai Road,Link Road, Malad, Mira-Bhayander Road, Kandivali W, Dahisar,Akruli Road, Link road.

7.6 KEY FINDINGS ON DRIVE TEST:

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

(i) **In the Month of July -15**, drive test was conducted across **South Mumbai** SSA (Total Drive Test 303Kms). The analysis of the drive test conducted during the three consecutive days in South Mumbai SSA revealed that following service providers remained non-complied in respect of some of the parameters:

Aircel: Voice Quality: **94.32%**
MTNL: Call drop rate: **2.87%,** Voice Quality: **91.95%.**
Idea: Voice Quality**: 94.83%.**
RCOM (GSM): Call drop rate: **4.86%, Voice quality: 89.85%,** CSSR**: 94.31% and** Blocked Call rate (BCR)**: 5.69%.**
RCOM (CDMA): Call drop rate: **2.65%,** Voice quality: **94.26%** and Blocked Call rate: **3.41%.**

(ii) **In the Month of August -15**, drive test was conducted across **Kalyan** SSA for three consecutive days (Total drive test 302 Kms). In this SSA also, performance of **MTNL, Idea, RCOM (GSM) and RCOM (CDMA)** was not in compliance for some of the parameters as mentioned below:

MTNL: Call drop rate: **2.23%,** Voice Quality: **91.77%.**
Idea: Voice Quality**: 94.72%.**
RCOM (GSM): Voice quality: **93.53% and** Blocked Call rate**: 3.11%.**
RCOM (CDMA): Voice quality: **93.79** %**.**

(iii) **In the month of September-15**, drive tests were conducted across **North Mumbai** SSA (Total 327 Kms). The non-compliance of the service providers in respect of some of the parameters is summerised below:

MTNL: Call drop rate: **2.17%,** Voice Quality: **92.15%**
RCOM (GSM): Call drop rate**: 2.48%,** Blocked call rate: **4.91%.**
RCOM (CDMA): Call Drop rate: **3.28%**
Idea: Voice Quality: **94.31%**

The deficiencies with respect to adequate coverage and voice quality, encountered by different Service providers at various places as shown in the drive tests plots, are detailed in the above tables.-5, 6 & 7.

Thus, ***Aircel, MTNL, Idea, RCOM (GSM) and RCOM (CDMA)*** *were having non-complied performance for the parameters* ***Voice quality and Call drop rate*** *across the above SSAs where the drive tests were conducted during the quarter.* ***RCOM (CDMA)/GSM*** *also failed to do well with respect to the parameter* ***CSSR/BCR*** *across these SSAs. These operators need improvement in their networks to remove the deficiencies with respect to non-complied parameters.*

8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT
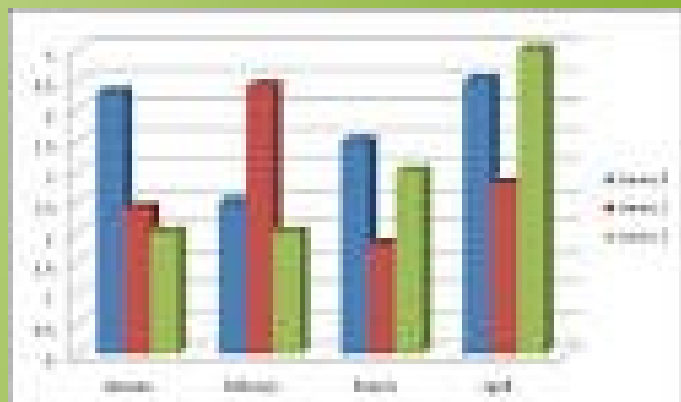
8. **GRAPHICAL REPRESENTATION (CMTS):**

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

1) BTS ACCUMULATED DOWNTIME:

BTS Accumulated Downtime

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
Quarterly PMR	0.07%	0.01%	0.60%	0.08%	0.12%	0.02%	0.03%	0.11%	0.03%
Quarterly Live	0.08%	0.01%	0.50%	0.10%	0.07%	0.02%	0.04%	0.14%	0.03%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
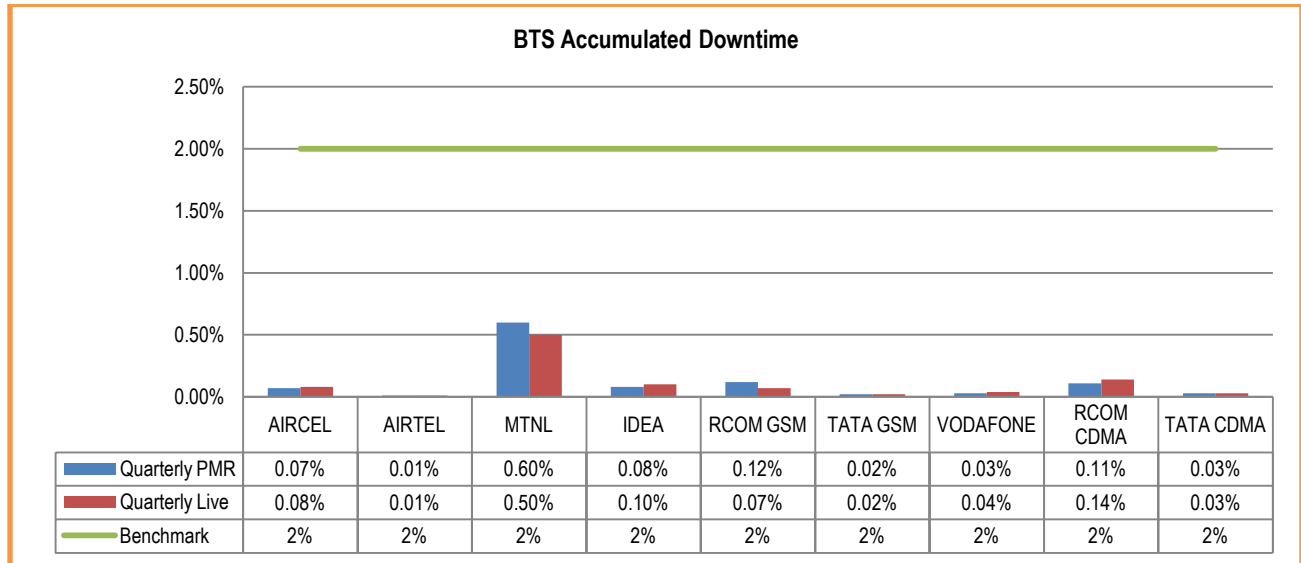
All operators are meeting the benchmarks.

2) WORST AFFECTED BTSs DUE TO DOWNTIME:

Worst affected BTSs due to downtime

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
Quarterly PMR	0.11%	0.00%	1.08%	0.03%	0.28%	0.00%	0.00%	0.15%	0.00%
Quarterly Live	0.00%	0.00%	0.07%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
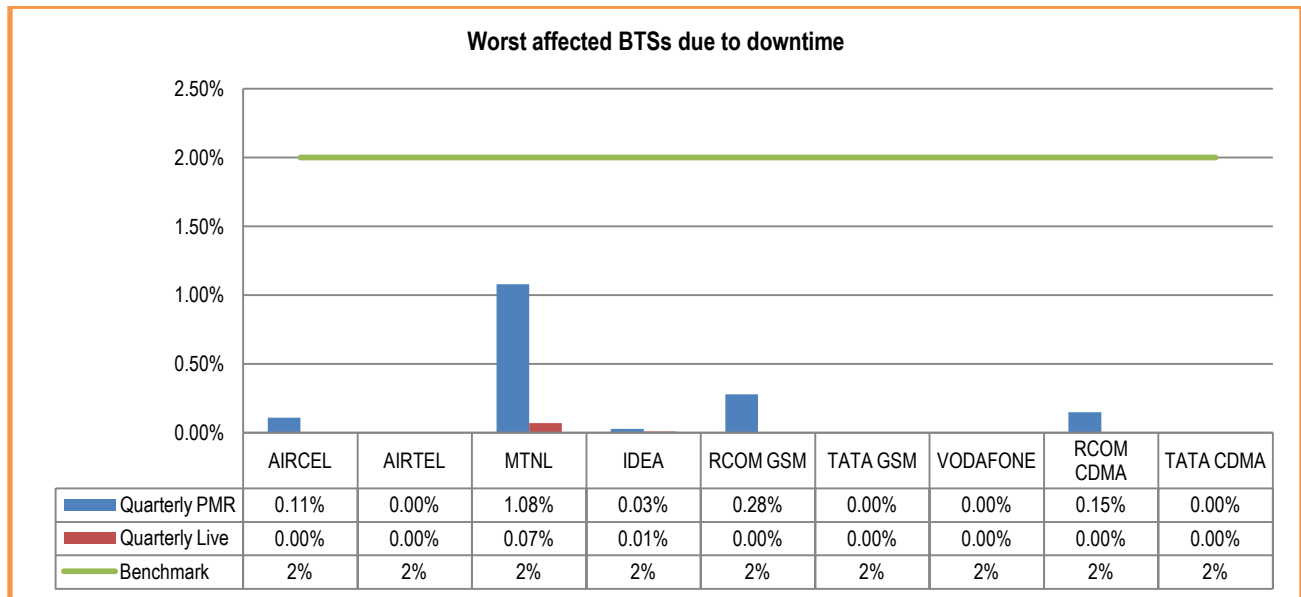
All operators are meeting the benchmarks.

3) CALL SETUP SUCCESS RATE:

Call Setup Success Rate

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
Quarterly PMR	97.85%	99.95%	99.06%	98.81%	99.28%	99.31%	99.26%	97.97%	99.04%
Quarterly Live	97.88%	99.96%	98.87%	98.82%	99.25%	99.31%	99.25%	98.03%	99.09%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%
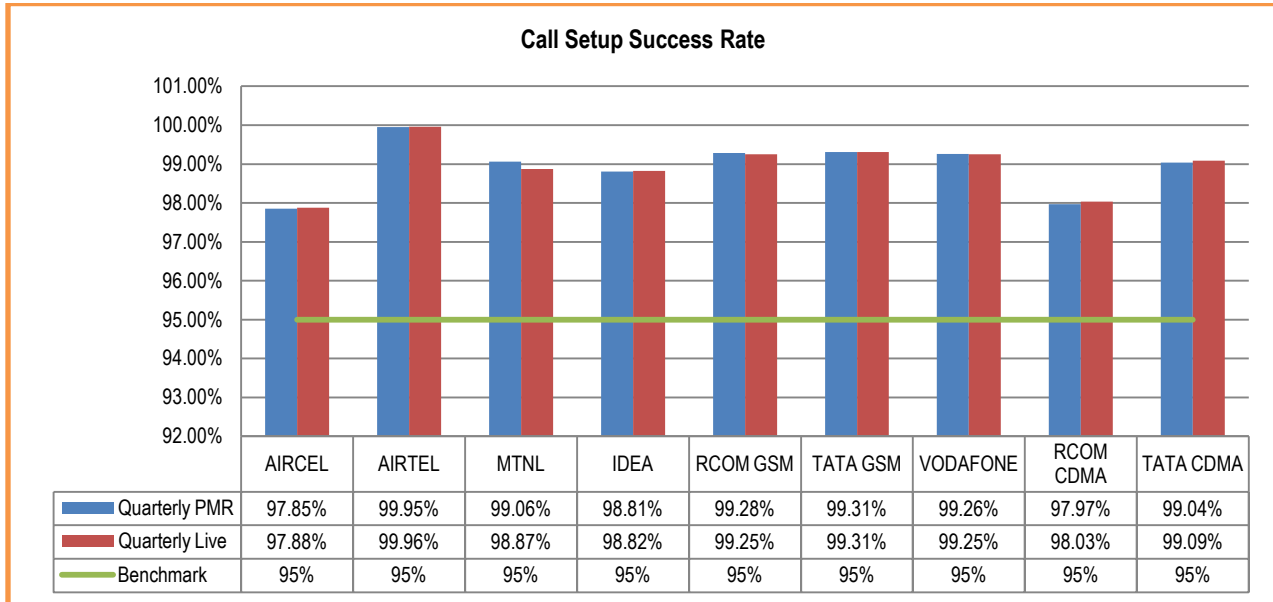
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION:

SDCCH/PAGING Channel Congestion

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
Quarterly PMR	0.22%	0.01%	0.33%	0.33%	0.05%	0.12%	0.07%	0.00%	0.00%
Quarterly Live	0.14%	0.02%	0.37%	0.36%	0.05%	0.13%	0.05%	0.00%	0.00%
Benchmark	1%	1%	1%	1%	1%	1%	1%	1%	1%
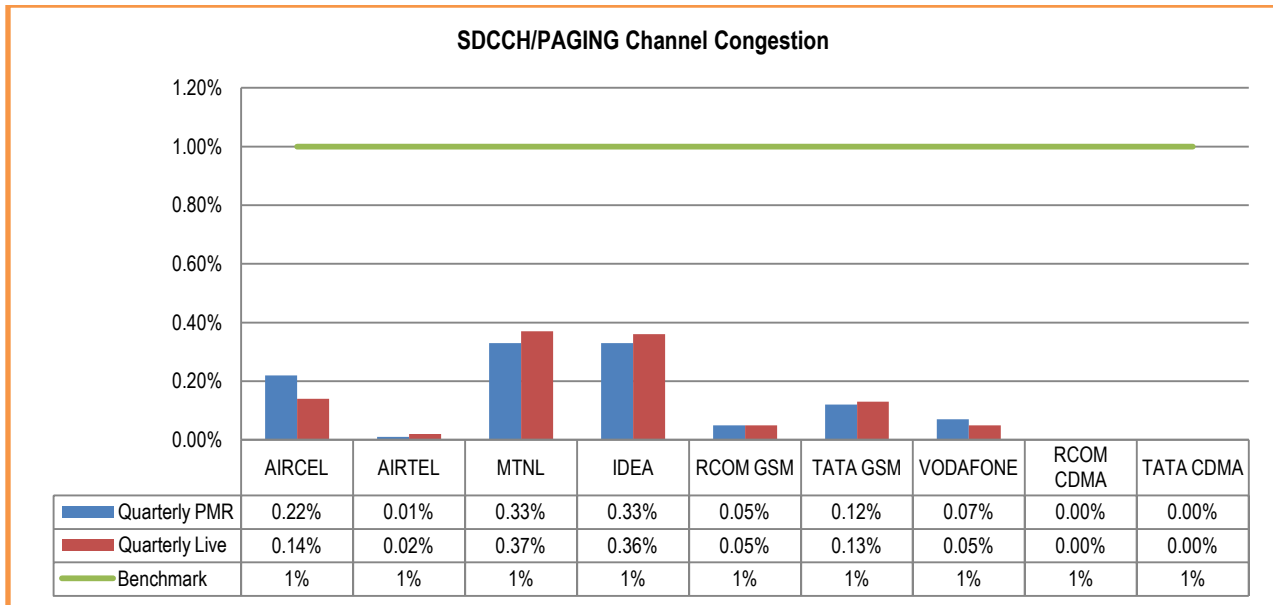
All operators are meeting the benchmarks.

5) TCH CONGESTION:

TCH Congestion

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
Quarterly PMR	0.84%	0.01%	0.10%	0.78%	0.13%	0.12%	0.74%	0.03%	0.05%
Quarterly Live	0.14%	0.02%	0.37%	0.36%	0.05%	0.13%	0.05%	0.00%	0.00%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
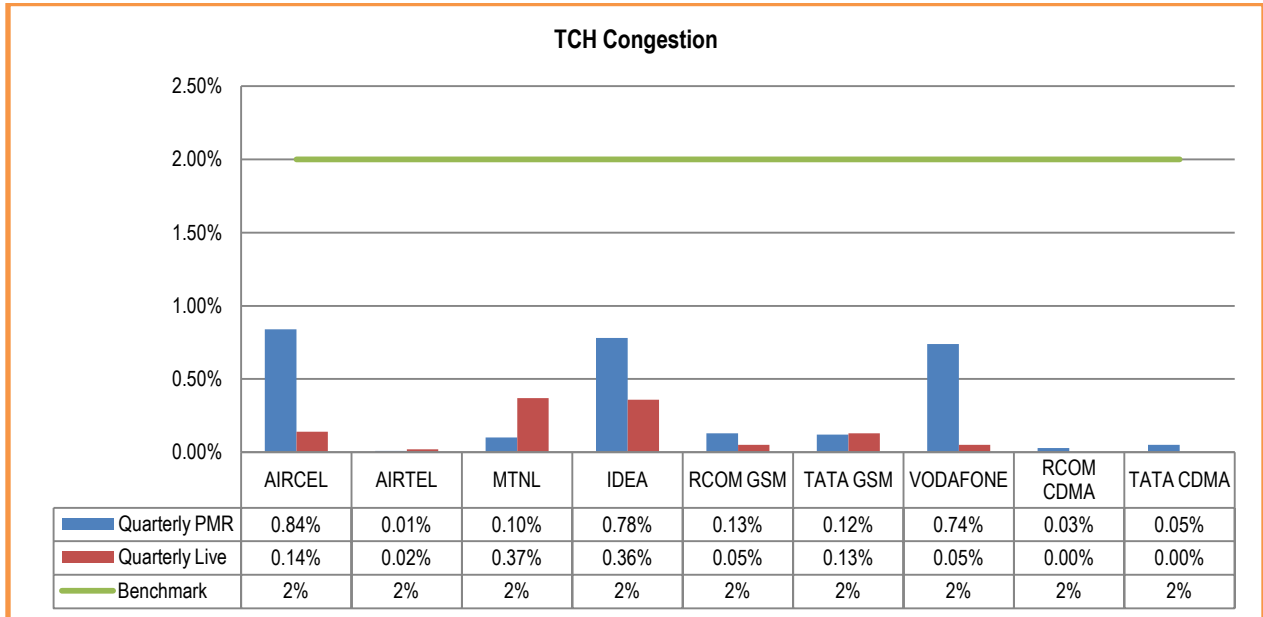
All operators are meeting the benchmarks.

6) CALL DROP RATE:

Call Drop Rate

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
Quarterly PMR	0.92%	0.43%	1.45%	1.37%	0.40%	0.62%	1.04%	0.85%	0.49%
Quarterly Live	0.90%	0.30%	1.45%	1.44%	0.41%	0.62%	1.10%	0.81%	0.46%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
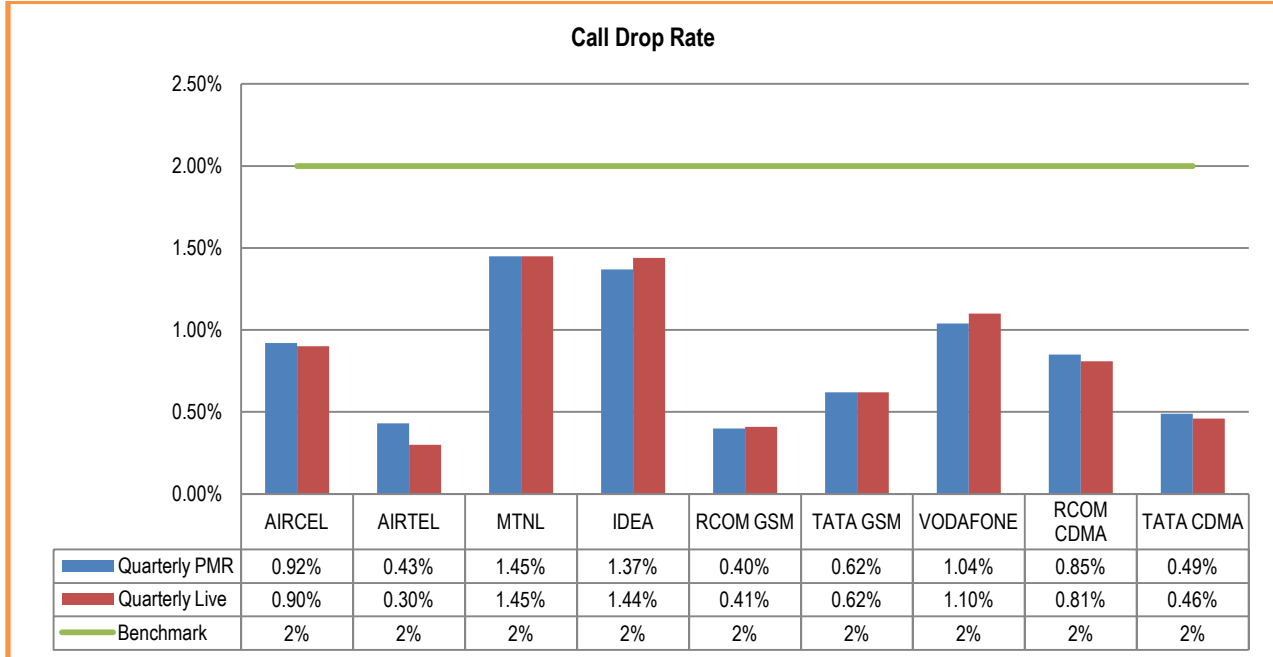
All operators are meeting the benchmarks.

7) WORST AFFECTED CELLS>3% TCH DROP :

Worst affected cells>3% TCH drop

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
Quarterly PMR	5.69%	0.28%	1.95%	2.07%	0.04%	3.48%	1.96%	0.60%	4.40%
Quarterly Live	5.57%	0.45%	2.26%	2.07%	0.04%	3.60%	2.03%	0.14%	3.09%
Benchmark	3%	3%	3%	3%	3%	3%	3%	3%	3%
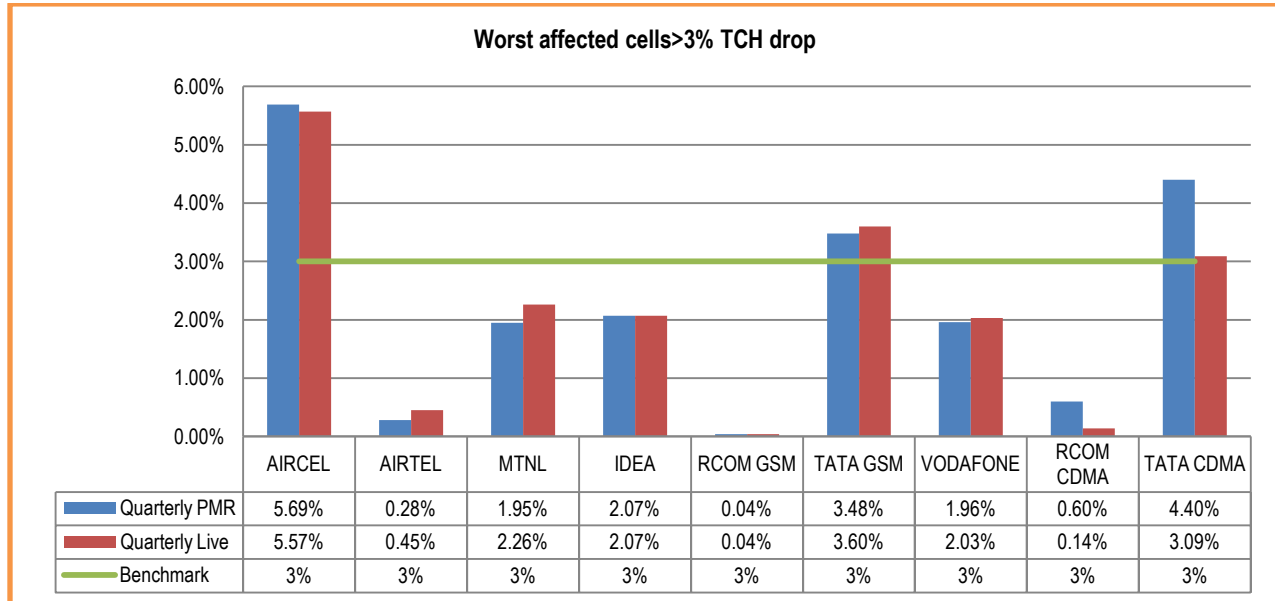
All operators are meeting the benchmarks except Aircel, Tata GSM and Tata CDMA.

8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:

% Connections with good voice quality

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
Quarterly PMR	97.29%	97.42%	95.40%	96.05%	98.81%	97.40%	97.21%	99.77%	99.12%
Quarterly Live	97.27%	97.38%	96.60%	95.96%	99.06%	97.42%	97.12%	99.76%	99.12%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%
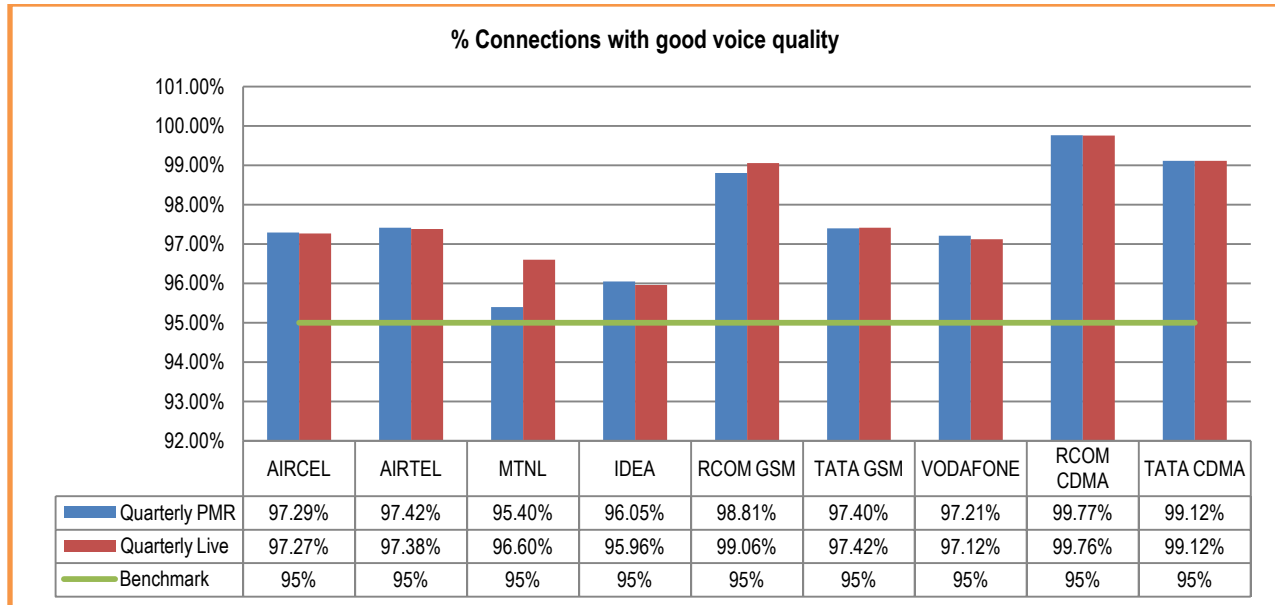
All operators are meeting the benchmarks.

9. PMR VERIFICATION TABLE:

(i) NETWORK RELATED PARAMETERS:

| Name of Service Provider	Parameter	BTS Accumulated Downtime	Worst affected BTSs due to downtime	CSSR (Call Setup Success Rate)	SDCCH / PAGING Channel congestion	TCH congestion	CDR (Call Drop Rate)	Worst affected cells>3% TCH drop (Call drop) rate	Connections with good voice quality	No. of POI's having >=0.5% POI congestion
Benchmark		≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%	≤ 0.5%
AIRCEL	Reported	0.07	0.11	97.85	0.22	0.84	0.92	**5.69**	97.29	0
	Verified	0.07%	0.11%	97.85%	0.22%	0.84%	0.92%	**5.69%**	97.29%	0
AIRTEL	Reported	0.01	0.00	99.95	0.01	0.01	0.42	0.28	97.37	0
	Verified	0.01%	0.00%	99.95%	0.01%	0.01%	0.43%	0.28%	97.42%	0
MTNL	Reported	0.60	1.08	99.06	0.33	0.10	1.45	1.94	95.40	0
	Verified	0.60%	1.08%	99.06%	0.33%	0.10%	1.45%	1.95%	95.40%	0
IDEA	Reported	0.08	0.03	98.81	0.20	0.54	0.90	2.07	96.05	0
	Verified	0.08%	0.03%	98.81%	0.33%	0.78%	1.37%	2.07%	96.05%	0
RCOM GSM	Reported	0.15	0.51	99.28	0.05	0.13	0.40	0.04	98.81	0
	Verified	0.12%	0.28%	99.28%	0.05%	0.13%	0.40%	0.04%	98.81%	0
TATA GSM	Reported	0.02	0.00	99.31	0.12	0.12	0.62	**3.48**	97.40	0
	Verified	0.02%	0.00%	99.31%	0.12%	0.12%	0.62%	**3.48%**	97.40%	0
VODAFONE	Reported	0.03	0.00	99.26	0.07	0.74	1.04	1.96	97.20	0
	Verified	0.03%	0.00%	99.26%	0.07%	0.74%	1.04%	1.96%	97.21%	0
RCOM CDMA	Reported	0.11	0.00	97.97	0.00	0.03	0.85	0.62	99.77	0
	Verified	0.11%	0.15%	97.97%	0.00%	0.03%	0.85%	0.60%	99.77%	0
TATA CDMA	Reported	0.03	0.00	99.04	0.00	0.05	0.49	**4.40**	99.12	0
	Verified	0.03%	0.00%	99.04%	0.00%	0.05%	0.49%	**4.40%**	99.12%	0

- The above data is averaged for three months of the quarter ending September-2015.
- The PMR data provided by the service providers is largely matching with verified (audited) data. However the variation in data has been indicated by yellow colour.
- Aircel, Tata GSM and Tata CDMA have not met the benchmark for the parameter "Worst affected cells>3% TCH drop".

(ii) CUSTOMER SERVICE DELIVERY (CSD) RELATED PARAMETER:

Name of Service Provider	Parameter	Metering and billing credibility - post paid	Metering and billing credibility - pre paid	Resolution of billing / charging / validity complaints	Resolution of billing / charging / validity complaints	Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints	Accessibility of call centre/ customer care	Percentage of calls answered by the operators (voice to voice) within 90 seconds	%age requests for Termination / Closure of service	Time taken for refund of deposits after closures
Benchmark		*<= 0.1%*	*<= 0.1%*	*98% within 4 weeks*	*100% within 6 weeks*	*<=1 week*	*≥ 95%*	*≥ 95%*	*100% within <=7days*	*100% within 60 days*
AIRCEL	Reported	0.00	0.00	100.00	100.00	100.00	99.16	95.42	100.00	100.00
	Verified	0.00%	0.00%	100.00%	100.00%	100.00%	99.16%	95.42%	100.00%	100.00%
AIRTEL	Reported	0.01	0.00	100.00	100.00	100.00	100.00	88.76	100.00	100.00
	Verified	0.01%	0.00%	100.00%	100.00%	100.00%	99.90%	88.76%	100.00%	100.00%
MTNL	Reported	0.06	0.00	99.59	100.00	100.00	95.57	95.75	100.00	100.00
	Verified	0.06%	0.00%	99.59%	100.00%	100.00%	NA	95.75%	100.00%	100.00%
IDEA	Reported	0.06	0.02	100.00	100.00	100.00	99.67	98.90	100.00	100.00
	Verified	0.06%	0.02%	100.00%	100.00%	100.00%	99.67%	98.90%	100.00%	100.00%
RCOM (GSM)	Reported	0.09	0.09	100.00	100.00	100.00	98.94	27.21	100.00	97.87
	Verified	0.09%	0.09%	100.00%	100.00%	100.00%	98.94%	27.21%	100.00%	97.87%
TATA (GSM)	Reported	0.00	0.00	100.00	100.00	100.00	98.78	95.16	100.00	100.00
	Verified	0.00%	0.00%	100.00%	100.00%	100.00%	98.78%	95.16%	100.00%	100.00%
VODAFONE	Reported	0.01	0.00	89.91	89.98	97.83	99.83	95.88	100.00	78.72
	Verified	0.51%	0.06%	89.91%	89.98%	99.28%	99.83%	95.88%	100.00%	78.72%
RCOM (CDMA)	Reported	0.08	0.07	100.00	100.00	100.00	97.89	47.55	100.00	92.76
	Verified	0.08%	0.07%	100.00%	100.00%	100.00%	97.85%	47.55%	100.00%	92.76%
TATA (CDMA)	Reported	0.00	0.00	100.00	100.00	100.00	99.49	90.94	100.00	100.00
	Verified	0.00%	0.00%	100.00%	100.00%	100.00%	99.49%	90.94%	100.00%	100.00%

➢ The above data is average for three months of the quarter ending September-2015.
➢ The PMR data provided by the service providers is largely matching with verified (audited) data. However the variation in data has been indicated by yellow colour.
➢ Airtel Tata CDMA and RCOM (GSM & CDMA) have not met the benchmark for the parameter "% call answered by operators (voice to voice) within 90 sec".
➢ Vodafone has not met the benchmark for the parameters "Metering and billing credibility - Post paid", "Resolution of billing / charging / validity complaints, "Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints" and "Time taken for refund of deposits after closures".
➢ RCOM (GSM and CDMA) has not met the benchmark for the parameter "Time taken for refund of deposits after closures".