



**Audit & Assessment of Quality of Service
Of
Cellular Mobile Telephone Service**

**For
Telecom Regulatory Authority of India
North Zone – Delhi Service Area**

(April 2015 – June 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 **Delhi 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 6th October, 2006 on zonal basis for **North Zone and West Zone** comprising of the following Telecom Circles/Metro Service Areas”:

North Zone: Delhi, Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Rajasthan, Uttar Pradesh-East and Uttar Pradesh-West (including Uttarakhand). For the cellular mobile telephone service the service area of Delhi includes Ghaziabad, Faridabad, Noida and Gurgaon.

West Zone: Mumbai, Maharashtra (including Goa and excluding Mumbai), Gujarat and Madhya Pradesh (including Chhattisgarh).

The Audit exercise would assess the Quality of Service of telecom operators providing Basic (Wire line), Cellular Mobile (Wireless) and Broadband services by auditing the relevant QoS records maintained by the operators, conducting drive tests as well as live measurements and comparing them with quality of service benchmarks stipulated by TRAI. The audit would be carried out by **TUV-SUD South Asia** every quarter across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. However, in respect of Basic telephone service (wireline) and Broadband service, a circle would be audited once in a year.

2. OBJECTIVES AND METHODOLOGY



2) OBJECTIVES AND METHODOLOGY:

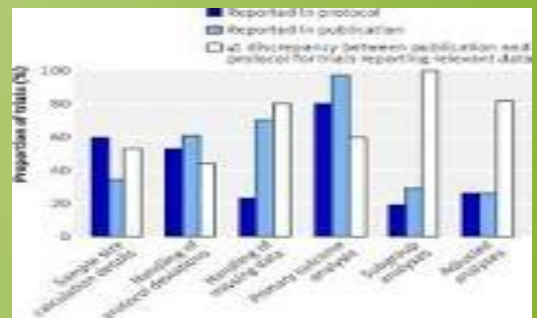
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

The audit and assessment of Quality of Service was carried out by **TUV SUD South Asia across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. Apart from this, QoS audit for Basic (Wire line) and Broadband Services was also undertaken for Punjab, Rajasthan and Gujarat circles during the quarter April 2015 – June 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 Delhi Metro circle

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location
GSM Operators		April-15	May-15	June-15	
1	AIRCEL	14 to 16 Apr-15	14, 15 & 18 May-15	5, 8 & 9 Jun-15	Aircel Ltd, Near Sarita Vihar Metro Station, New Delhi
2	AIRTEL	16, 17 & 20 Apr-15	6 to 8 May-15	3 to 5 Jun-15	Plot No 16 Udhog Vihar Ph-4 Gurgaon Haryana.
3	MTNL	20 to 22 Apr-15	11 to 13 May-15	2 to 4 Jun-15	MTNL Exchange Karol Bagh Near Rajendra Place Metro Stn.New Delhi.
4	IDEA	14 to 16 Apr-15	12 to 14 May-15	5, 8 & 9 Jun-15	Idea Cellular Limited, E-5, Sector-63, Noida (UP)
5	RCOM GSM	15 to 17 Apr-15	6 to 8 May-15	8 to 10 Jun-15	Reliance Center Maharaja Ranjit Singh Hotel, Maharaja Ranjit Singh Marg New Delhi.
6	VODAFONE	13 to 15 Apr-15	21, 22 & 25 May-15	11, 12 & 15 Jun-15	A-19 Mohan Cooperative Industrial Estates, Mathura Road New Delhi.
CDMA Operators					
7	MTS	7 to 9 Apr-15	13 to 15 May-15	8 to 10 Jun-15	A-194 Okhla Phase 1 New Delhi
8	RCOM CDMA	15 to 17 Apr-15	12 to 14 May-15	8 to 10 Jun-15	Reliance Center Maharaja Ranjit Singh Hotel, Maharaja Ranjit Singh Marg New Delhi.
9	TATA CDMA	10, 13 & 14 Apr-15	19, 21 & 22 May-15	3 to 5 Jun-15	TTSL 2 A Old Iswar Nagar Near NFC New Delhi

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

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

4. EXECUTIVE SUMMARY



4) **EXECUTIVE SUMMARY:**

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

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

Cellular Mobile:

(i) Based on monthly audit, it was concluded that the performance of the service providers was fairly satisfactory for **Network Parameters** in Delhi Metro service area as they were found to have met the benchmarks of most of the parameters during the quarter. Only **Aircel and Tata (CDMA)** were non-complaints in respect of the parameter **‘Worst affected Cells > 3% TCH Drop’** with their quarterly average performance as **6.87%, and 3.15%** respectively.

(ii) From three days live assessment, it was found that the performance of all operators was satisfactory as they were largely complying with the benchmarks of all parameters except for the parameter **‘Worst affected Cell having > 3% TCH drop’** which could not be met by **Aircel and Tata (CDMA)** with their performance as **6.43% and 3.19%** (average of the quarter).

Aircel and Tata (CDMA) have shown the similar non compliance for this parameter in case of monthly audit.

(iii) With regard to the **Customer Service Quality Parameters**, service providers were found in well compliance of most of the parameters on Metering and Billing Credibility, Response Time to Customers, Termination of Service and Time taken for refunds. However, **Vodafone** failed to meet the benchmark of billing credibility for Post-paid with its performance as **0.15%**.

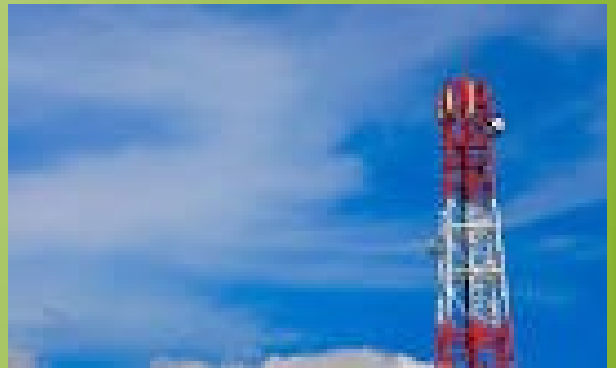
In case of the parameter **Accessibility to Call Center** and **Calls answered by Operators (voice to voice)**, most of the service providers were in compliance with the benchmarks. Only **MTNL** failed to meet the benchmark of Accessibility of Call Center with its performance as **94.89%**. Further, **Airtel** could not meet the benchmark of **'calls answered by Operators (voice to voice) within 90 seconds'** having achieved its performance as **80.53%** against the benchmark of **>=95%**.

In case of the parameters **Termination/closure** and **Time taken for refunds**, only **Idea** could not meet the benchmark with its achieved level as **99.99%** very narrowly below the benchmark and **99.35%**, marginally below the benchmark of **100%**.

The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center' and 'calls connection to operators (Voice to voice) within 90 seconds'. Only **MTNL** has not met the benchmark of **Accessibility** with its performance as **94.92%**, whereas **Airtel and Vodafone** lagged behind the benchmark of **'calls answered by Operators (voice to voice) within 90 seconds'** having achieved their performance as **57.04% and 93.03%** respectively against the benchmark of **>=95%**.

(iv) With regard to **Drive Test**, it was concluded that the performance of the service providers with respect to the parameter **'Voice Quality'** remained main area of concern as **majority of operators namely Airtel, Idea, RCOM(GSM), RCOM(CDMA), Vodafone and MTNL** failed to comply with its bench mark. Apart from this, **MTNL** also remained non-compliant in respect of other parameters also like **Call Drop rate, Call setup success rate and Blocked Call rate** and **RCOM (GSM)** could not do well in respect of the parameter **CSSR / Blocked Call Rate** in different areas of Delhi Service Area. These operators need to take corrective action to improve their networks.

5. PMR AUDIT REPORT



5) PMR AUDIT REPORTS:

5.1 MONTHLY PMR:

5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
GSM Operators			
1	AIRCEL	June-15	20:00 - 21:00
2	AIRTEL	June-15	19:00 - 20:00
3	MTNL	June-15	20:00 - 21:00
4	IDEA	June-15	20:00 - 21:00
5	RCOM GSM	June-15	19:00 - 20:00
6	VODAFONE	June-15	20:00 - 21:00
CDMA Operators			
7	MTS	June-15	20:00 - 21:00
8	RCOM CDMA	June-15	20:00 - 21:00
9	TATA CDMA	June-15	12:00 - 13:00

The TCBH reported by all the service providers matched the network busy hour calculated by TUV auditors for the Delhi 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	AIRCEL	4	24	3749	NSN	NSN
2	AIRTEL	35	54	5988	Ericsson	Ericsson
3	MTNL	6	31	1120	NSN	NSN
4	IDEA	10	38	4804	NSN	NSN
5	RCOM GSM	4	14	2494	Huawei	Huawei
6	VODAFONE	15	54	6115	Ericsson	Ericsson
CDMA Operators						
7	MTS	1	6	1033	ZTE	ZTE
8	RCOM CDMA	7	NA	982	Lucent & ZTE	Lucent
9	TATA CDMA	8	8	1466	Huawei	Huawei

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

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- APRIL 15 MONTH												
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
Network Service Quality Parameter												
Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Apr-15	0.37%	0.01%	0.12%	0.01%	0.32%	0.12%	0.07%	0.33%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Apr-15	1.48%	0.00%	0.27%	0.00%	0.32%	0.55%	0.00%	0.92%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Apr-15	97.30%	99.85%	96.72%	99.80%	99.46%	99.43%	99.03%	96.92%	99.06%
	b) SDCCH/PAGING Channel congestion	<=1%	Apr-15	0.73%	0.03%	0.58%	0.66%	0.04%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-15	1.60%	0.08%	1.75%	1.61%	0.10%	0.11%	0.09%	0.09%	0.14%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Apr-15	1.13%	0.48%	1.88%	0.60%	0.35%	1.06%	0.52%	0.49%	0.39%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Apr-15	7.09%	0.52%	2.47%	2.36%	0.11%	2.78%	0.70%	2.11%	3.76%
	c) Connections with good voice quality	>=95%	Apr-15	97.19%	99.38%	96.94%	98.57%	98.56%	97.28%	99.20%	99.78%	99.12%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Apr-15	0	0	0	0	0	0	0	0	0

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

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE - MAY 15 MONTH												
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
Network Service Quality Parameter												
Network Availability												
1	a) BTS Accumulated Downtime	<=2%	May-15	0.48%	0.01%	0.19%	0.01%	0.32%	0.15%	0.11%	0.38%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	May-15	2.29%	0.00%	1.15%	0.00%	0.16%	0.71%	0.00%	0.92%	0.07%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	May-15	97.54%	99.84%	97.25%	99.77%	99.47%	99.49%	99.00%	96.55%	99.11%
	b) SDCCH/PAGING Channel congestion	<=1%	May-15	0.82%	0.05%	0.57%	0.83%	0.04%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	May-15	1.11%	0.06%	1.78%	1.71%	0.11%	0.10%	0.04%	0.09%	0.09%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	May-15	1.07%	0.52%	1.80%	0.58%	0.32%	1.00%	0.53%	0.51%	0.35%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	May-15	7.01%	0.65%	2.53%	2.57%	0.12%	2.78%	0.92%	2.61%	2.90%
	c) Connections with good voice quality	>=95%	May-15	97.25%	99.39%	96.96%	98.64%	98.67%	97.38%	99.20%	99.78%	99.16%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	May-15	0	0	0	0	0	0	0	0	0

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

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE - JUNE 15 MONTH												
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
Network Service Quality Parameter												
Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Jun-15	0.42%	0.01%	0.19%	0.02%	0.39%	0.13%	0.11%	0.41%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	Jun-15	1.60%	0.00%	1.07%	0.00%	0.76%	0.52%	0.00%	0.51%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Jun-15	97.37%	99.83%	96.96%	99.76%	99.41%	99.38%	98.86%	96.77%	99.05%
	b) SDCCH/PAGING Channel congestion	<=1%	Jun-15	0.77%	0.05%	0.61%	0.69%	0.07%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Jun-15	1.59%	0.08%	1.81%	1.75%	0.12%	0.13%	0.20%	0.11%	0.13%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Jun-15	1.14%	0.57%	1.84%	0.59%	0.33%	1.06%	0.65%	0.49%	0.38%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jun-15	6.52%	0.74%	2.50%	2.39%	0.12%	2.83%	1.06%	2.14%	2.78%
	c) Connections with good voice quality	>=95%	Jun-15	97.25%	99.30%	96.96%	98.64%	98.65%	97.26%	99.19%	99.78%	99.15%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Jun-15	0	0	0	0	0	0	0	0	0

5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- JUNE 15 (APRIL TO JUNE 2015 MONTHS AUDITED DATA)

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE- JUNE 15) OF DELHI METRO CIRCLE												
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
Network Service Quality Parameter												
Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.42%	0.01%	0.17%	0.01%	0.34%	0.13%	0.10%	0.37%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	1.80%	0.00%	0.83%	0.00%	0.41%	0.59%	0.00%	0.78%	0.02%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.40%	99.84%	96.98%	99.78%	99.45%	99.43%	98.96%	96.75%	99.07%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.77%	0.04%	0.59%	0.73%	0.05%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	1.43%	0.07%	1.78%	1.69%	0.11%	0.11%	0.11%	0.10%	0.12%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.11%	0.52%	1.84%	0.59%	0.33%	1.04%	0.57%	0.50%	0.37%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	6.87%	0.64%	2.50%	2.44%	0.12%	2.80%	0.89%	2.29%	3.15%
	c) Connections with good voice quality	>=95%	Quarterly	97.23%	99.36%	96.95%	98.62%	98.63%	97.31%	99.20%	99.78%	99.14%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	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 circles.

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 Delhi Metro circle, the audit with respect to this parameter revealed that **all the operators met the benchmark for this parameter.**

▪ **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 operators were in compliance on the benchmark for this parameter.

▪ **Parameters related to Network Congestion:**

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

In CDMA system, there is no direct counter defined for reporting Paging Channel Congestion as reported by Tata Teleservices. However, they have a defined counter for Paging Channel Occupancy Ratio (**PCH Average Using Ratio**) which is used to determine the Paging Channel Occupancy which on an average is < 50% on all sites in the network. When the value of this parameter is less than 100%, it is counted as 0% congestion. Thus, there is no congestion on the paging channel in CDMA system.

With respect to this parameter, the performance of the operators is quite satisfactory as **all operators met the TRAI specified benchmarks** on TCH/SDCCH/Paging Channel congestion parameters.

There was no congestion on individual POI links between a service provider vis-à-vis other service.

- **Connection Maintenance (Retainability)**

- i. Call Drop Rate:

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

The audit of this parameter revealed that all the service providers were measuring this parameter as per the TRAI guidelines. Also, **all the service providers were found to be meeting the TRAI specified benchmark**. The lowest call drop rate (average 0.33%) 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 results for this parameter indicate that all operators (**except Aircel and Tata CDMA**) have met the bench mark successfully during the quarter. Quarterly average performance of **Aircel and Tata (CDMA)** was **6.87%** and **3.15%** respectively.

- iii. Connections with good voice quality:

The audit results for this parameter indicate that **all operators have met the benchmark during the quarter**.

- iv. No. of POI's having $\geq 0.5\%$ POI congestion:

The audit with respect to this parameter revealed that **all the operators met the benchmark for this parameter** as there was no individual POI having congestion $> 0.5\%$.

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



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

5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – APRIL- 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE – APRIL 15 MONTH												
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
Network Service Quality Parameter												
Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Live data	0.35%	0.01%	0.07%	0.00%	0.28%	0.13%	0.08%	0.76%	0.02%
	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%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.38%	99.85%	96.81%	99.77%	99.49%	99.41%	99.14%	97.32%	98.58%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.62%	0.03%	0.68%	0.69%	0.04%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.24%	0.08%	1.59%	1.68%	0.08%	0.10%	0.01%	0.05%	0.33%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.25%	0.49%	1.81%	0.61%	0.31%	1.10%	0.53%	0.47%	0.83%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	6.97%	0.46%	2.46%	2.49%	0.11%	2.71%	0.80%	1.73%	4.48%
	c) Connections with good voice quality	>=95%	Live data	97.23%	99.36%	96.93%	98.55%	98.58%	97.25%	99.19%	99.78%	98.85%
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	0	0

5.2.2 LIVE MEASUREMENT DATA (3-DAYS) – MAY- 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE - MAY 15 MONTH												
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
Network Service Quality Parameter												
Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Live data	0.52%	0.01%	0.10%	0.01%	0.34%	0.14%	0.13%	0.18%	0.08%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.68%	99.83%	97.06%	99.78%	99.50%	99.43%	99.15%	95.94%	98.95%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.63%	0.05%	0.45%	0.73%	0.03%	0.19%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.73%	0.08%	1.63%	1.61%	0.11%	0.15%	0.01%	0.12%	0.20%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.26%	0.55%	1.81%	0.58%	0.31%	1.05%	0.45%	0.44%	0.52%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	6.68%	0.61%	2.43%	2.27%	0.14%	2.71%	0.98%	1.96%	2.54%
	c) Connections with good voice quality	>=95%	Live data	97.27%	99.36%	96.94%	98.64%	98.61%	97.34%	99.20%	99.80%	99.09%
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	0	0

5.2.3 LIVE MEASUREMENT DATA (3-DAYS) – JUNE-- 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- JUNE 15 MONTH												
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
Network Service Quality Parameter												
Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Live data	0.49%	0.01%	0.12%	0.02%	0.31%	0.10%	0.08%	0.29%	0.04%
	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%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.69%	99.85%	97.10%	99.77%	99.44%	99.45%	99.13%	97.38%	99.15%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.67%	0.05%	0.33%	0.83%	0.08%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.83%	0.06%	1.67%	1.61%	0.13%	0.09%	0.06%	0.05%	0.07%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.97%	0.51%	1.75%	0.55%	0.34%	1.01%	0.50%	0.51%	0.39%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	5.63%	0.60%	2.44%	2.45%	0.16%	2.89%	0.92%	2.81%	2.56%
	c) Connections with good voice quality	>=95%	Live data	97.31%	99.38%	96.97%	98.66%	98.71%	97.33%	99.20%	99.78%	99.16%
4	No. of POI having >=0.5% congestion	<0.5%	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 APRIL TO JUNE 2015 MONTHS AUDITED DATA)

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE- JUNE 15) - DELHI METRO CIRCLE												
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
Network Service Quality Parameter												
Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.45%	0.01%	0.10%	0.01%	0.31%	0.12%	0.10%	0.41%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.58%	99.84%	96.99%	99.77%	99.48%	99.43%	99.14%	96.88%	98.89%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.64%	0.04%	0.49%	0.75%	0.05%	0.10%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.93%	0.07%	1.63%	1.63%	0.11%	0.11%	0.03%	0.07%	0.20%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.16%	0.52%	1.79%	0.58%	0.32%	1.05%	0.49%	0.47%	0.58%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	6.43%	0.56%	2.44%	2.40%	0.14%	2.77%	0.90%	2.17%	3.19%
	c) Connections with good voice quality	>=95%	Quarterly	97.27%	99.37%	96.95%	98.62%	98.63%	97.31%	99.20%	99.79%	99.03%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	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 complying with the benchmarks of all parameters except for the parameter '**Worst affected Cell having > 3% TCH drop**' which could not be met by **Aircel** and **Tata (CDMA)** with their performance as **6.43%** and **3.19%** (average of the quarter).

Aircel and Tata (CDMA) have shown the similar non compliance for this parameter in case of monthly audit.

5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services - Delhi Metro Circle – April 15 month												
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
Network Service Quality Parameter												
1	Network Availability											
	a) Total no. of BTSs in the licensed service area		Apr-15	3640	5927	1118	4702	2504	5808	1018	982	1466
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Apr-15	9611.18	299.88	1004.00	251.68	5845.53	4916.72	481.65	2344.57	320.48
	c) BTS Accumulated Downtime	<=2%	Apr-15	0.37%	0.01%	0.12%	0.01%	0.32%	0.12%	0.07%	0.33%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Apr-15	54	0	3	0	8	32	0	9	0
e) Worst affected BTSs due to downtime	<=2%	Apr-15	1.48%	0.00%	0.27%	0.00%	0.32%	0.55%	0.00%	0.92%	0.00%	
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Apr-15	97.30%	99.85%	96.72%	99.80%	99.46%	99.43%	99.03%	96.92%	99.06%
	b) SDCCH/PAGING Congestion	<=1%	Apr-15	0.73%	0.03%	0.58%	0.66%	0.04%	0.04%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Apr-15	1.60%	0.08%	1.75%	1.61%	0.10%	0.11%	0.09%	0.09%	0.14%	
3	Connection Maintenance (Retainability)											
	a) Call Drop Rate (CDR)	<=2%	Apr-15	1.13%	0.48%	1.88%	0.60%	0.35%	1.06%	0.52%	0.49%	0.39%
	b) Worst affected cells>3% TCH drop	<=3%	Apr-15	7.09%	0.52%	2.47%	2.36%	0.11%	2.78%	0.70%	2.11%	3.76%
	c) % of connections with good voice quality	>=95%	Apr-15	97.19%	99.38%	96.94%	98.57%	98.56%	97.28%	99.20%	99.78%	99.12%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Apr-15	739	79	79	272	7	423	26	61	193
e) Total no. of cells (Sector) in the licensed service area		Apr-15	10428	15270	3208	11534	6891	15226	3679	2894	5122	
4	No. of POI's having >=0.5% POI congestion											
	No. of POI's having >=0.5% POI congestion		Apr-15	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Apr-15	0	0	0	0	0	0	0	0	0
5	Network Data											
	a) Equipped Capacity of Network in Erlang		Apr-15	145496	289373	100000	137797	96000	286095	98129	140000	264095
	b) Total traffic in TCBH in erlang (Avg.)		Apr-15	102961	209695	23332	126221	82653	226722	14911	97987	106738
c) Total no. of customers served (as per VLR) on last day of the month		Apr-15	3432757	9082244	1030907	5528696	5411017	9519050	485954	2649468	1323818	

TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Delhi Metro Circle- April 15 month												
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
Network Service Quality Parameter												
Network Availability												
1	a) Total no. of BTSs in the licensed service area		Live data	3599	5932	1118	4702	2512	5840	1020	986	1467
	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	905.79	30.25	60.00	8.08	498.00	542.36	55.82	539.00	21.18
	c) BTS Accumulated Downtime	<=2%	Live data	0.35%	0.01%	0.07%	0.00%	0.28%	0.13%	0.08%	0.76%	0.02%
	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	97.38%	99.85%	96.81%	99.77%	99.49%	99.41%	99.14%	97.32%	98.58%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.62%	0.03%	0.68%	0.69%	0.04%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.24%	0.08%	1.59%	1.68%	0.08%	0.10%	0.01%	0.05%	0.33%
Connection Maintenance (Retainability)												
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.25%	0.49%	1.81%	0.61%	0.31%	1.10%	0.53%	0.47%	0.83%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	6.97%	0.46%	2.46%	2.49%	0.11%	2.71%	0.80%	1.73%	4.48%
	c) % of connections with good voice quality	>=95%	Live data	97.23%	99.36%	96.93%	98.55%	98.58%	97.25%	99.19%	99.78%	98.85%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	727	70	79	288	8	412	29	50	230
	e) Total no. of cells (Sector) in the licensed service area		Live data	10431	15292	3205	11592	6911	15205	3676	2906	5125
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

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle - May 15 month												
S/ N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
Network Service Quality Parameter												
Network Availability												
1	a) Total no. of BTSs in the licensed service area		May-15	3713	5931	1127	4702	2496	5805	1022	983	1468
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		May-15	13323.07	356.59	1598.00	456.16	5893.42	6470.70	803.48	2775.25	501.08
	c) BTS Accumulated Downtime	<=2%	May-15	0.48%	0.01%	0.19%	0.01%	0.32%	0.15%	0.11%	0.38%	0.05%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		May-15	85	0	13	0	4	41	0	9	1
	e) Worst affected BTSs due to downtime	<=2%	May-15	2.29%	0.00%	1.15%	0.00%	0.16%	0.71%	0.00%	0.92%	0.07%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	May-15	97.54%	99.84%	97.25%	99.77%	99.47%	99.49%	99.00%	96.55%	99.11%
	b) SDCCH/PAGING Congestion	<=1%	May-15	0.82%	0.05%	0.57%	0.83%	0.04%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	May-15	1.11%	0.06%	1.78%	1.71%	0.11%	0.10%	0.04%	0.09%	0.09%
Connection Maintenance (Retainability)												
3	a) Call Drop Rate (CDR)	<=2%	May-15	1.07%	0.52%	1.80%	0.58%	0.32%	1.00%	0.53%	0.51%	0.35%
	b) Worst affected cells>3% TCH drop	<=3%	May-15	7.01%	0.65%	2.53%	2.57%	0.12%	2.78%	0.92%	2.61%	2.90%
	c) % of connections with good voice quality	>=95%	May-15	97.25%	99.39%	96.96%	98.64%	98.67%	97.38%	99.20%	99.78%	99.16%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		May-15	749	99	81	271	9	424	35	76	148
	e) Total no. of cells (Sector) in the licensed service area		May-15	10685	15298	3199	10555	6871	15286	3772	2897	5121
No. of POI's having >=0.5% POI congestion												
4	No. of POI's having >=0.5% POI congestion		May-15	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		May-15	0	0	0	0	0	0	0	0	0
Network Data												
5	a) Equipped Capacity of Network in Erlang		May-15	151466	283467	100000	125510	96000	285846	101165	140000	263948
	b) Total traffic in TCBH in Erlang (Avg.)		May-15	100435	194528	22059	111499	87958	217255	14103	96687	101170
	c) Total no. of customers served (as per VLR) on last day of the month		May-15	3189871	8890023	22059	5306842	5277892	9454796	478441	2659060	1257760

TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live - Delhi Metro Circle – May 15 month												
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators					CDMA Operators			
Network Service Quality Parameter												
1	Network Availability											
	a) Total no. of BTSs in the licensed service area		Live data	3685	5922	1120	4702	2498	5808	1017	983	1468
	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	1374.78	31.37	84.00	27.42	612.27	603.00	96.74	126.15	88.70
	c) BTS Accumulated Downtime	<=2%	Live data	0.52%	0.01%	0.10%	0.01%	0.34%	0.14%	0.13%	0.18%	0.08%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	0	0	0	2	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.68%	99.83%	97.06%	99.78%	99.50%	99.43%	99.15%	95.94%	98.95%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.63%	0.05%	0.45%	0.73%	0.03%	0.19%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.73%	0.08%	1.63%	1.61%	0.11%	0.15%	0.01%	0.12%	0.20%	
3	Connection Maintenance (Retainability)											
	a) Call Drop Rate (CDR)	<=2%	Live data	1.26%	0.55%	1.81%	0.58%	0.31%	1.05%	0.45%	0.44%	0.52%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	6.68%	0.61%	2.43%	2.27%	0.14%	2.71%	0.98%	1.96%	2.54%
	c) % of connections with good voice quality	>=95%	Live data	97.27%	99.36%	96.94%	98.64%	98.61%	97.34%	99.20%	99.80%	99.09%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	717	93	78	242	9	412	37	57	130
e) Total no. of cells (Sector) in the licensed service area		Live data	10733	15294	3199	10625	6887	15205	3756	2896	5123	
4	No. of POI's having >=0.5% POI congestion											
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

TABLE: 5

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle - June 15 month												
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
Network Service Quality Parameter												
1	Network Availability											
	a) Total no. of BTSs in the licensed service area		Jun-15	3749	5988	1120	4804	2494	5820	1033	982	1466
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Jun-15	11335.96	354.59	1531.00	810.52	7006.15	5501.55	810.37	2923.12	523.65
	c) BTS Accumulated Downtime	<=2%	Jun-15	0.42%	0.01%	0.19%	0.02%	0.39%	0.13%	0.11%	0.41%	0.05%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jun-15	60	0	12	0	19	30	0	5	0
e) Worst affected BTSs due to downtime	<=2%	Jun-15	1.60%	0.00%	1.07%	0.00%	0.76%	0.52%	0.00%	0.51%	0.00%	
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Jun-15	97.37%	99.83%	96.96%	99.76%	99.41%	99.38%	98.86%	96.77%	99.05%
	b) SDCCH/PAGING Congestion	<=1%	Jun-15	0.77%	0.05%	0.61%	0.69%	0.07%	0.03%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Jun-15	1.59%	0.08%	1.81%	1.75%	0.12%	0.13%	0.20%	0.11%	0.13%	
3	Connection Maintenance (Retainability)											
	a) Call Drop Rate (CDR)	<=2%	Jun-15	1.14%	0.57%	1.84%	0.59%	0.33%	1.06%	0.65%	0.49%	0.38%
	b) Worst affected cells>3% TCH drop	<=3%	Jun-15	6.52%	0.74%	2.50%	2.39%	0.12%	2.83%	1.06%	2.14%	2.78%
	c) % of connections with good voice quality	>=95%	Jun-15	97.25%	99.30%	96.96%	98.64%	98.65%	97.26%	99.19%	99.78%	99.15%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Jun-15	709	114	80	229	8	411	42	62	142
e) Total no. of cells (Sector) in the licensed service area		Jun-15	10.873	15359	3198	9604	6862	14560	3923	2894	5113	
4	No. of POI's having >=0.5% POI congestion											
	No. of POI's having >=0.5% POI congestion		Jun-15	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Jun-15	0	0	0	0	0	0	0	0	0
5	Network Data											
	a) Equipped Capacity of Network in Erlang		Jun-15	146260	282702	100000	145018	96000	278815	104887	140000	263405
	b) Total traffic in TCBH in erlang (Avg.)		Jun-15	104525	181390	22747	118046	89138	213712	14047	95230	103345
c) Total no. of customers served (as per VLR) on last day of the month		Jun-15	3490057	9660219	1142919	5679923	5135961	10043798	494754	2845872	1285071	

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live - Delhi Metro Circle – June 15 month												
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
Network Service Quality Parameter												
1	Network Availability											
	a) Total no. of BTSs in the licensed service area		Live data	3724	5932	1126	4702	2500	5805	1027	983	1468
	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	1313.00	35.48	101.00	62.71	560.80	422.95	55.67	202.30	43.58
	c) BTS Accumulated Downtime	<=2%	Live data	0.49%	0.01%	0.12%	0.02%	0.31%	0.10%	0.08%	0.29%	0.04%
	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%
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.69%	99.85%	97.10%	99.77%	99.44%	99.45%	99.13%	97.38%	99.15%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.67%	0.05%	0.33%	0.83%	0.08%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.83%	0.06%	1.67%	1.61%	0.13%	0.09%	0.06%	0.05%	0.07%
3	Connection Maintenance (Retainability)											
	a) Call Drop Rate (CDR)	<=2%	Live data	0.97%	0.51%	1.75%	0.55%	0.34%	1.01%	0.50%	0.51%	0.39%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	5.63%	0.60%	2.44%	2.45%	0.16%	2.89%	0.92%	2.81%	2.56%
	c) % of connections with good voice quality	>=95%	Live data	97.31%	99.38%	96.97%	98.66%	98.71%	97.33%	99.20%	99.78%	99.16%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	612	91	78	241	11	408	36	81	131
	e) Total no. of cells (Sector) in the licensed service area		Live data	10871	15315	3196	9831	6880	14122	3897	2897	5123
4	No. of POI's having >=0.5% POI congestion											
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	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-QE JUNE.-15:

5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICE (APRIL TO JUNE 2015 MONTHS AUDITED DATA):

QUARTERLY CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE JUNE 15												
Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/ N	Name of Parameter			GSM Operators						CDMA Operators		
Customer Service Quality Parameters												
Metering & Billing Credibility -Post Paid												
1	A) No. of bills issued during the quarter		Delhi	220981	4952671	391804	2524198	458341	6051469	920	693897	399654
	B) No. of bills disputed including billing complaints during the quarter		Delhi	1	1020	202	2035	416	9163	0	627	7
	C)% of billing complaints during the quarter	<= 0.1%	Delhi	0.00%	0.02%	0.05%	0.08%	0.09%	0.15%	0.00%	0.09%	0.002%
Metering & Billing Credibility -Pre Paid												
2	A) Total No. of Pre-paid customers at the end of the quarter		Delhi	5233210	10897529	2125418	5178077	4978187	7671360	1027261	2758825	2525236
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		Delhi	44	100	291	1419	4604	4319	140	1598	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	Delhi	0.001%	0.001%	0.01%	0.03%	0.09%	0.06%	0.01%	0.06%	0.00%
Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints												
3	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		Delhi	45	1120	493	19603	5020	13482	140	2225	7
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		Delhi	45	1120	493	19597	5020	13479	140	2225	7

QUARTERLY CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE JUNE 15

Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/ N	Name of Parameter			GSM Operators						CDMA Operators		
	C) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 6 weeks during the quarter		Delhi	45	1120	493	19603	5020	13482	140	2225	7
	D) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	>=98% within 4 weeks	Delhi	100.00%	100.00%	100.00%	99.97%	100.00%	99.98%	100.00%	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	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	F) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Response time to customers for assistance												
4	A) Total no of calls attempted to customer care/Call center		Delhi	23258910	3207811	998755	19258653	19527275	30111430	2029138	2827834	466770
	B) Total no. of calls successfully established to customer care/Call center.		Delhi	22775874	3207706	947704	19122379	19130602	30111430	1968737	2783206	463193
	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	>=95%	Delhi	97.92%	100.00%	94.89%	99.29%	97.97%	100.00%	97.02%	98.42%	99.23%
	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		Delhi	4447902	7729212	674194	6238658	1461364	8660183	1326793	308423	583786
	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		Delhi	4313582	6224284	660573	6196444	1445794	8508711	1291436	305437	572279
	F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts)	>=95%	Delhi	96.98%	80.53%	97.98%	99.32%	98.93%	98.25%	97.34%	99.03%	98.03%
5	Termination/closure of service											

QUARTERLY CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE JUNE 15

Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/ N	Name of Parameter			GSM Operators						CDMA Operators		
	A) Total No. of requests for Termination / Closure of service received during the quarter		Delhi	4143	27796	16	22496	4871	14901	9	6057	4560
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		Delhi	4143	27796	16	22493	4871	14901	9	6057	4560
	C) % of Termination/ Closure of service within 7 days	<=7days	Delhi	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%
Time taken for refunds of deposits after closures.												
6	A) No. of Payments/ Refunds due during the quarter		Delhi	2358	3708	80	13606	1816	22597	6	1734	2797
	B) No. of Payments/ Refunds Cleared during the quarter		Delhi	2358	3708	80	13518	1816	22597	6	1734	2797
	C) Time taken for refunds of deposits after closures.	100% within 60 days	Delhi	100.00%	100.00%	100.00%	99.35%	100.00%	100.00%	100.00%	100.00%	100.00%

5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-JUNE 2015):

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES – QE – JUNE 15												
3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
S/ N	Name of Parameter			GSM Operators						CDMA Operators		
Response time to customers for assistance												
1	A) Total no of calls attempted to customer care/Call center		Delhi	896499	132064	30180	749264	NP	1076126	74829	NP	206450
	B) Total no. of calls successfully established to customer care/Call center.		Delhi	896005	132064	28647	741068	NP	1076126	71249	NP	205123
	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	>=95%	Delhi	99.94%	100.00%	94.92%	98.91%	NP	100.00%	95.22%	NP	99.36%
	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		Delhi	153962	278761	16296	210806	50130	313605	44012	10510	19895
2	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		Delhi	147368	158995	16139	210106	49893	291732	43216	10387	19628
	F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts)	>=95%	Delhi	95.72%	57.04%	99.04%	99.67%	99.53%	93.03%	98.19%	98.83%	98.66%

KEY FINDINGS:

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

The performance of the service providers with respect to the parameter metering and billing credibility for both post-paid and pre-paid is **well within the prescribed bench mark** of $\leq 0.1\%$. However, **Vodafone** failed to meet the benchmark for Post-paid with its performance as **0.15%**.

2. Resolution of Billing complaints and applying credits -

- i. Resolution of billing /charging complaints
- ii. Period of applying credit/waiver/adjustment to customer's account from the date of resolution of complaints

All operators have 100% resolved the billing complaints within stipulated period of 4/6 weeks and also have met the benchmark of 100% cases of credit/waiver in one week where customers were due for credit / adjustment.

3. Response Time to the Customer for assistance

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

All service providers (except **MTNL**) are in compliance with respect to the parameter **Accessibility of call center**. **MTNL** failed to meet the benchmark with its performance as **94.89%**. Further, **Airtel** could not meet the benchmark of **'calls answered by Operators (voice to voice) within 90 seconds'** having achieved its performance as **80.53%** against the benchmark of $\geq 95\%$.

4. Termination/Closure of Service

In case of this parameters also, all service providers have settled the **'closure/termination'** within the benchmark of 7 days. Only **Idea** could not meet the benchmark with its achieved level as **99.99%** very narrowly below the benchmark of 100%.

5. Time Taken for Refund of deposits after closures

All operators were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure. Only **Idea** could not meet the benchmark with its achieved level as **99.35%**, marginally below the benchmark of 100%.

Live Measurements

The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center' and 'calls connection to operators (Voice to voice) within 90 seconds'. Only **MTNL** has not met the benchmark of **Accessibility** with its performance as **94.92%**, whereas **Airtel and Vodafone** lagged behind the benchmark of **'calls answered by Operators (voice to voice) within 90 seconds'** having achieved their performance as **57.04% and 93.03%** respectively against the benchmark of $\geq 95\%$.

6. LIVE CALLING ASSESSMENT



6) LIVE CALLING ASSESSMENT:

6.1 INTER OPERATOR CALLS ASSESSMENT:

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

INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT										
Calling Operators	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	RCOM CDMA	TATA CDMA	MTS	VODAFONE
AIRCEL	Delhi	---	100%	100%	100%	100%	100%	100%	100%	100%
AIRTEL	Delhi	100%	---	100%	100%	100%	100%	100%	100%	100%
MTNL	Delhi	100%	100%	---	100%	100%	100%	100%	100%	100%
IDEA	Delhi	100%	100%	100%	---	100%	100%	100%	100%	100%
RCOM GSM	Delhi	100%	100%	100%	100%	---	100%	100%	100%	100%
RCOM CDMA	Delhi	100%	100%	100%	100%	100%	---	100%	100%	100%
TATA CDMA	Delhi	100%	100%	100%	100%	100%	100%	---	100%	100%
MTS	Delhi	100%	100%	100%	100%	100%	100%	100%	---	100%
VODAFONE	Delhi	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 as no problem was observed 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)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	Delhi	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	Delhi	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	Delhi	100	100	100	100	100	100	100	97	100
% Accessibility of Call centre /customer Care (Total calls successfully established * 100 / Total call attempts)	Delhi	100%	100%	100%	100%	100%	100%	100%	97%	100%
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	Delhi	100	100	100	100	100	100	100	97	100
Total number of calls answered by the operator (Voice to voice) within 90 seconds	Delhi	100	80	98	100	94	98	97	94	100
% age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100 / Total calls attempts)	Delhi	100%	80%	98%	100%	94%	98%	97%	97%	100%

In case of calls answered by operators (voice to voice) within 90 seconds when test calls were made to the call centers, Airtel, MTNL, RCOM (GSM), Vodafone, MTS and RCOM (CDMA) could connect 80%, 98%, 94%, 98%, 97% and 97% of calls to the operator .

6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS:

PERFORMANCE (LIVE CALLING FOR BILLING COMPLAINTS)										
Parameter	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	Delhi	44	120	104	114	116	135	115	103	7
Total No. of calls Answered	Delhi	16	100	100	100	100	111	100	100	7
Cases resolved within 4 weeks	Delhi	16	100	100	100	100	111	100	100	7
%age of cases resolved	Delhi	100%	100%	100%	100%	100%	100%	100%	100%	100%

To test the Service Providers performance on billing related complaints and their resolutions, TUV-SUD auditors conducted a customer feedback calling for about random 100 nos. of customers. However, in some cases, the number of customers contacted for verification was 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																
Month	Circle Name	SSA Name	Name of SDCA	Emergency No.	No. of calls made	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	RCOM CDMA	TATA CDMA	MTS	VODAFONE		
April'15	Delhi	SDMC /South Delhi Municipal Area	SDMC	100	2	√	√	√	√	√	√	√	√	√		
				101	2	√	√	√	√	√	√	√	√	√	√	
				102	2	√	√	√	√	√	√	√	√	√	√	√
				181	2	√	√	√	√	√	√	√	√	√	√	√
				1091	2	√	√	√	√	√	√	√	√	√	√	√
				1098	2	√	√	√	√	√	√	√	√	√	√	√
				1070	2	√	√	√	√	√	x	x	√	√	√	√
May'15	Delhi	NDMC / North Delhi Municipal Area	NDMC	100	2	√	√	√	√	√	√	√	√	√		
				101	2	√	√	√	√	√	√	√	√	√	√	
				102	2	√	√	√	√	√	√	√	√	√	√	√
				181	2	√	√	√	√	√	√	√	√	√	√	√
				1091	2	√	√	√	√	√	√	√	√	√	√	√
				1078	2	√	√	√	√	√	√	√	√	√	√	x
				1070	2	√	√	√	√	√	x	x	√	√	√	√
June'15	Delhi	EDMC / East Delhi Municipal Area	EDMC	100	2	√	√	√	√	√	√	√	√	√		
				101	2	√	√	√	√	√	√	√	√	√	√	
				102	2	√	√	√	√	√	√	√	√	√	√	
				108	2	x	x	x	x	x	x	x	x	√	x	
				182	2	√	√	√	√	√	√	√	√	√	√	√
				1070	2	√	√	√	√	√	x	x	√	√	√	√
				1073	2	x	x	√	x	√	√	x	√	√	√	√
				1091	2	√	√	√	√	√	√	√	√	√	√	√
				1098	2	√	√	√	√	√	√	√	√	√	√	√
1056	2	x	x	x	x	x	x	x	x	x	x	x				

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by various mobile service providers, a number of calls were made from mobile phones provided by them during the drive test. In Delhi Metro service area, the emergency services as mentioned in the above table were largely found functional except for some of the service providers, level-1 calling was not matured at some of the places and have been ticked as "X".

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 Delhi (Municipal Area)**, **North Delhi (NDMC Area)** and **East Delhi (Municipal Area)** in the months of April, May and June 2015 respectively, the total route Kms covered during the drive tests in respective SSAs was **311 KMs, 335 KMs and 313 KMs** respectively. The performance of the operators has been highlighted below in the tables. The drive test was conducted simultaneously for all the operators following the same route of drive tests. The holding period for all test calls was 120 seconds. The drive test vehicle across all routes plied at a speed of about 30-50 km per hour.

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

7.1 OPERATOR ASSISTED DRIVE TEST: SOUTH DELHI (MUNICIPAL AREA) – APRIL15

DRIVE TEST TABLE: 1

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
1	Call Attempts	Major Roads	180	30	176	30	191	27	197	30	217	31	189	30	163	41	196	30	224	33	
		Highways	61	31	49	31	55	31	49	30	55	30	53	30	42	32	53	30	51	32	
		Within City	226	30	225	30	246	30	220	30	230	30	227	30	246	32	241	30	267	34	
		Overall SSA	467	91	450	91	492	88	466	90	502	91	469	90	451	105	490	90	542	99	
2	Blocked Call Rate	Major Roads	1.11%	0.00%	0.57%	0.00%	5.76%	7.41%	0.00%	0.00%	2.30%	0.00%	2.12%	0.00%	1.84%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highways	1.64%	0.00%	0.00%	0.00%	3.64%	0.00%	0.00%	0.00%	5.45%	0.00%	3.77%	0.00%	2.38%	0.00%	0.00%	0.00%	1.96%	0.00%	
		Within City	0.88%	0.00%	1.33%	0.00%	10.16%	0.00%	0.45%	0.00%	2.17%	0.00%	2.64%	0.00%	0.81%	0.00%	0.00%	0.00%	0.75%	0.00%	
		Overall SSA	1.07%	0.00%	0.89%	0.00%	7.72%	2.27%	0.21%	0.00%	2.59%	0.00%	2.56%	0.00%	1.33%	0.00%	0.00%	0.00%	0.55%	0.00%	
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	2.22%	12.00%	0.00%	0.00%	0.47%	0.00%	0.00%	0.00%	0.00%	0.00%	0.51%	0.00%	0.45%	0.00%	
		Highways	0.00%	0.00%	0.00%	0.00%	3.77%	9.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	8.26%	0.00%	0.91%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.75%	0.00%	
		Overall SSA	0.00%	0.00%	0.00%	0.00%	5.32%	6.98%	0.43%	0.00%	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.00%	0.56%	0.00%
4	Percentage connections with good voice quality (=>95%)																				
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.05%	99.98%	95.97%	87.56%	97.37%	88.42%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.21%	100%	93.15%	100%	93.01%	100%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.25%	100%	96.88%	96.12%	96.59%	100%
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.46%	99.99%	96.18%	94.14%	96.55%	95.85%

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SIN	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads		92.39%	96.28%	96.26%	96.26%	94.41%	97.47%	89.65%	92.98%	91.07%	91.06%	93.67%	96.20%	NA	NA	NA	NA	NA	NA
	Highways		95.06%	95.41%	94.75%	99.65%	91.76%	93.85%	93.05%	97.99%	87.24%	98.11%	93.69%	98.70%	NA	NA	NA	NA	NA	NA
	Within City		94.18%	97.53%	95.52%	98.74%	93.29%	98.55%	88.60%	97.68%	90.01%	99.52%	93.78%	97.70%	NA	NA	NA	NA	NA	NA
	Overall SSA		93.61%	96.41%	95.72%	98.20%	93.54%	96.56%	89.51%	96.31%	90.19%	95.97%	93.73%	97.56%	NA	NA	NA	NA	NA	NA
Service Coverage																				
5	In door (>= -75dBm)	Major Roads	78.86%	99.20%	95.44%	100%	60.88%	46.00%	76.70%	98.72%	68.99%	100%	87.45%	97.66%	81.87%	100%	83.76%	100%	68.86%	94.16%
		Highways	83.17%	99.89%	77.07%	100%	65.90%	83.20%	93.31%	99.76%	56.28%	99.06%	71.81%	100%	82.27%	98.88%	96.78%	100%	41.86%	100%
		Within City	77.37%	99.96%	95.19%	100%	53.13%	76.30%	69.45%	99.90%	56.29%	99.70%	83.33%	97.36%	84.30%	100%	80.69%	100%	64.48%	100%
		Overall SSA	78.69%	99.68%	93.35%	100%	57.97%	73.04%	75.05%	99.43%	60.52%	99.58%	84.24%	98.34%	83.21%	99.66%	83.37%	100%	63.80%	97.91%
	In-vehicle (>= -85dBm)	Major Roads	95.52%	100%	98.95%	100%	93.15%	89.00%	95.60%	99.43%	90.13%	100%	97.09%	99.96%	99.09%	100%	96.45%	100%	91.70%	100%
		Highways	94.72%	99.96%	96.60%	100%	94.60%	96.40%	98.91%	99.96%	93.02%	99.58%	84.55%	100%	99.95%	100%	100%	100%	71.09%	100%
		Within City	94.54%	99.99%	98.74%	100%	89.05%	95.40%	95.14%	100%	85.36%	100%	97.23%	99.77%	99.45%	100%	98.27%	100%	92.74%	100%
		Overall SSA	94.94%	99.98%	98.60%	100%	91.45%	94.53%	95.73%	99.78%	87.57%	99.85%	96.76%	99.91%	99.36%	100%	97.72%	100%	90.09%	100%
	Outdoor- in city (>= -95dBm)	Major Roads	98.40%	100%	99.66%	100%	99.18%	97.10%	99.19%	99.83%	100%	100%	99.26%	99.98%	100%	100%	99.99%	100%	98.99%	100%
		Highways	98.50%	99.98%	99.07%	100%	99.70%	98.90%	99.64%	99.96%	100%	100%	94.73%	100%	100%	100%	100%	100%	99.97%	100%
		Within City	98.97%	99.99%	99.60%	100%	98.85%	99.20%	99.04%	100%	100%	100%	99.32%	99.98%	100%	100%	99.96%	100%	99.85%	100%
		Overall SSA	98.69%	99.99%	99.57%	100%	99.10%	98.67%	99.17%	99.93%	100%	100%	99.15%	99.99%	100%	100%	99.98%	100%	99.54%	100%
6	Call Setup Success Rate (>=95%)	Major Roads	97.22%	100%	98.86%	100%	94.24%	92.59%	100%	100%	97.70%	100%	97.88%	100%	98.16%	100%	100%	100%	100%	
		Highways	93.44%	96.77%	100%	100%	96.36%	100%	100%	100%	94.55%	100%	96.23%	100%	97.62%	100%	100%	100%	98.04%	100%
		Within City	94.25%	100%	98.22%	100%	88.62%	100%	99.55%	100%	97.83%	100%	97.36%	100%	99.19%	100%	100%	100%	99.25%	100%

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SIN	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
			Overall SSA	95.29%	98.90%	98.67%	100%	91.67%	97.73%	99.79%	100%	97.41%	100%	97.44%	100%	98.67%	100%	100%	100%	99.45%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	97.06%	100%	79.01%	54.17%	99.79%	98.28%	89.33%	95.12%	98.94%	100%	100%	100%	100%	100%	100%	100%	
		Highways	98.11%	100%	98.39%	100%	84.27%	41.67%	100%	100%	94.41%	100%	96.04%	100%	100%	100%	100%	100%	100%	100%	
		Within City	99.60%	100%	97.08%	57.14%	81.59%	81.25%	99.78%	100%	96.80%	60.00%	98.20%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	99.63%	100%	97.16%	60.00%	80.71%	50.74%	99.80%	98.39%	93.49%	93.02%	98.36%	100%	100%	100%	100%	100%	100%	100%	100%

NA-Not Applicable

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

7.2 OPERATOR ASSISTED DRIVE TEST: NORTH DELHI & NDMC AREA – MAY 15

DRIVE TEST TABLE: 2

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
1	Call Attempts	Major Roads	183	30	184	30	159	31	185	30	199	30	187	30	221	30	220	31	195	34	
		Highways	130	30	133	30	127	30	119	30	121	30	147	30	122	30	139	32	140	30	
		Within City	128	30	159	28	167	31	161	30	166	32	181	30	173	30	167	30	176	31	
		Overall SSA	441	90	476	88	453	92	465	90	486	92	515	90	516	90	526	93	511	95	
2	Blocked Call Rate	Major Roads	1.09%	0.00%	1.63%	0.00%	3.14%	0.00%	1.08%	0.00%	2.01%	0.00%	1.07%	0.00%	0.90%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highways	0.00%	0.00%	4.51%	0.00%	2.36%	0.00%	0.84%	0.00%	1.65%	0.00%	0.68%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	3.13%	0.00%	1.26%	0.00%	3.59%	0.00%	0.62%	0.00%	6.02%	3.13%	1.11%	0.00%	0.58%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	1.36%	0.00%	2.31%	0.00%	3.09%	0.00%	0.86%	0.00%	3.29%	1.09%	0.97%	0.00%	0.78%	0.00%	0.00%	0.00%	0.00%	0.00%	
3	Dropped Call Rate (<=2%)	Major Roads	0.56%	0.00%	0.00%	0.00%	7.84%	0.00%	0.00%	0.00%	1.03%	0.00%	0.00%	0.00%	0.00%	0.00%	1.82%	0.00%	1.54%	0.00%	
		Highways	0.00%	0.00%	0.00%	0.00%	2.44%	0.00%	0.85%	0.00%	0.00%	0.00%	0.69%	0.00%	0.00%	0.00%	1.44%	0.00%	1.43%	0.00%	
		Within City	0.81%	0.00%	0.00%	0.00%	9.38%	3.23%	0.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.80%	0.00%	0.57%	0.00%	
		Overall SSA	0.47%	0.00%	0.00%	0.00%	6.88%	1.10%	0.43%	0.00%	0.43%	0.00%	0.20%	0.00%	0.00%	0.00%	1.71%	0.00%	1.17%	0.00%	
4	Percentage connections with good voice quality (=>95%)																				
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.59%	99.97%	97.83%	100%	96.66%	99.98%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.38%	100%	96.41%	96.05%	97.05%	99.15%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.16%	99.97%	92.62%	98.81%	94.01%	100%
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.27%	99.98%	96.05%	97.69%	95.87%	99.73%

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SIN	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	91.91%	97.91%	95.21%	99.75%	91.11%	99.89%	91.34%	98.45%	92.03%	99.29%	93.63%	99.16%	NA	NA	NA	NA	NA	NA
		Highways	93.52%	95.18%	95.96%	98.51%	93.78%	96.93%	90.39%	95.48%	93.73%	96.72%	95.44%	98.79%	NA	NA	NA	NA	NA	NA
		Within City	92.46%	98.06%	95.49%	98.39%	92.65%	97.79%	92.64%	98.84%	92.23%	98.48%	93.93%	98.98%	NA	NA	NA	NA	NA	NA
		Overall SSA	92.54%	97.40%	95.52%	98.93%	92.43%	98.21%	91.54%	97.55%	92.52%	98.12%	94.32%	98.98%	NA	NA	NA	NA	NA	NA
Service Coverage																				
5	In door (>= -75dBm)	Major Roads	79.69%	63.42%	95.36%	100%	49.72%	55.62%	79.54%	98.23%	46.64%	99.60%	83.41%	100%	70.86%	69.71%	68.54%	100%	82.18%	92.50%
		Highways	93.31%	52.95%	97.74%	100%	61.06%	83.49%	91.13%	99.98%	63.38%	99.45%	92.11%	100%	74.61%	99.93%	78.67%	100%	94.36%	99.42%
		Within City	62.83%	64.76%	93.91%	100%	49.46%	59.74%	68.32%	60.64%	47.14%	92.54%	75.35%	99.94%	68.94%	99.96%	66.87%	99.89%	68.28%	100%
		Overall SSA	77.90%	61.77%	95.54%	100%	52.78%	66.02%	78.30%	86.81%	51.55%	98.08%	83.11%	99.98%	71.02%	89.85%	70.65%	99.96%	80.78%	97.07%
	In-vehicle (>= -85dBm)	Major Roads	95.53%	99.56%	99.00%	100%	84.67%	90.26%	94.59%	100%	83.04%	100%	96.39%	100%	98.31%	100%	95.96%	100%	97.39%	100%
		Highways	98.57%	99.79%	99.17%	100%	91.21%	97.76%	98.80%	100%	87.44%	99.82%	98.81%	100%	100%	100%	97.66%	100%	99.77%	100%
		Within City	85.43%	99.88%	98.76%	100%	87.61%	95.72%	91.26%	98.61%	81.26%	99.92%	96.78%	100%	98.23%	100%	90.66%	100%	95.43%	100%
		Overall SSA	93.03%	99.73%	98.97%	100%	87.56%	94.54%	94.41%	99.56%	83.66%	99.88%	97.23%	100%	98.65%	100%	94.95%	100%	97.38%	100%
	Outdoor- in city (>= -95dBm)	Major Roads	98.53%	100%	99.71%	100%	98.98%	99.88%	98.82%	100%	100%	100%	99.33%	100%	100%	100%	99.94%	100%	99.84%	100%
		Highways	99.64%	100%	99.64%	100%	99.53%	99.56%	99.64%	100%	100%	100%	99.71%	100%	100%	100%	100%	100%	99.94%	100%
		Within City	96.31%	100%	99.51%	100%	98.59%	99.31%	98.62%	99.76%	100%	100%	99.57%	100%	100%	100%	99.99%	100%	99.93%	100%
		Overall SSA	98.11%	100%	99.62%	100%	98.99%	99.59%	98.94%	99.92%	100%	100%	99.52%	100%	100%	100%	99.97%	100%	99.90%	100%
6	Call Setup Success Rate (>=95%)	Major Roads	96.72%	100%	97.28%	100%	96.23%	96.77%	98.92%	100%	97.99%	100%	96.79%	100%	99.10%	100%	100%	100%	100%	100%
		Highways	96.15%	100%	95.49%	100%	96.85%	100%	99.16%	100%	98.35%	100%	98.64%	100%	99.18%	100%	100%	100%	100%	100%
		Within City	96.88%	100%	98.74%	100%	95.81%	100%	99.38%	100%	93.98%	96.88%	97.79%	100%	99.42%	100%	100%	100%	100%	100%

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SIN	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
			Overall SSA	96.60%	100%	97.27%	100%	96.25%	98.91%	99.14%	100%	96.71%	98.91%	97.67%	100%	99.22%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	98.30%	100%	99.16%	100%	85.82%	100%	100%	100%	98.14%	100%	99.32%	100%	100%	100%	100%	100%	100%	100%
		Highways	98.88%	100%	97.28%	100%	92.61%	100%	100%	100%	99.58%	100%	99.45%	100%	100%	100%	100%	100%	100%	100%
		Within City	99.21%	100%	98.64%	100%	93.24%	100%	99.23%	100%	96.95%	100%	99.47%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	98.70%	100%	98.35%	100%	90.34%	100%	99.74%	100%	98.09%	100%	99.42%	100%	100%	100%	100%	100%	100%	100%

NA-Not Applicable

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

7.3 OPERATOR ASSISTED DRIVE TEST: EAST DELHI (MUNICIPAL AREA) - JUNE 15

DRIVE TEST TABLE: 3

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
1	Call Attempts	Major Roads	145	30	131	30	141	31	131	30	134	30	147	30	136	30	153	31	132	31	
		Highways	81	30	90	30	89	30	94	30	108	30	100	30	89	30	105	30	100	31	
		Within City	217	30	228	30	240	30	235	31	237	30	239	30	253	30	243	30	248	30	
		Overall SSA	443	90	449	90	470	91	460	91	479	90	486	90	478	90	501	91	480	92	
2	Blocked Call Rate	Major Roads	1.38%	0.00%	1.53%	0.00%	3.55%	3.23%	0.00%	0.00%	4.48%	0.00%	2.04%	0.00%	1.47%	0.00%	0.00%	0.00%	1.52%	0.00%	
		Highways	1.23%	0.00%	3.33%	0.00%	2.25%	0.00%	1.06%	0.00%	5.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	0.00%	0.00%	0.44%	0.00%	5.83%	0.00%	0.85%	0.00%	5.49%	0.00%	2.09%	0.00%	1.19%	0.00%	0.00%	0.00%	0.40%	0.00%	
		Overall SSA	0.68%	0.00%	1.34%	0.00%	4.47%	1.10%	0.65%	0.00%	5.22%	0.00%	1.65%	0.00%	1.05%	0.00%	0.00%	0.00%	0.63%	0.00%	
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	0.75%	0.00%	0.76%	0.00%	0.78%	0.00%	0.69%	0.00%	0.00%	0.00%	1.31%	0.00%	1.54%	0.00%	
		Highways	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.94%	0.00%	0.00%	0.00%	0.00%	0.00%	2.86%	0.00%	0.00%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	3.57%	0.00%	0.00%	0.00%	1.34%	0.00%	0.43%	0.00%	0.00%	0.00%	0.82%	0.00%	0.81%	0.00%	
		Overall SSA	0.00%	0.00%	0.00%	0.00%	2.02%	0.00%	0.22%	0.00%	1.54%	0.00%	0.42%	0.00%	0.00%	0.00%	1.40%	0.00%	0.84%	0.00%	
4	Percentage connections with good voice quality (=>95%)																				
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.71%	100.00%	93.29%	94.92%	95.30%	99.91%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.50%	99.91%	89.99%	100.00%	95.24%	99.87%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.99%	99.11%	94.96%	100.00%	95.58%	100.00%
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.25%	99.68%	93.37%	97.84%	95.43%	99.92%

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE 2015-DELHI METRO CIRCLE



SIN	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	88.97%	89.93%	96.89%	95.95%	94.79%	96.58%	87.21%	94.61%	90.18%	99.21%	96.00%	97.38%	NA	NA	NA	NA	NA	NA
		Highways	87.03%	96.38%	95.38%	99.37%	95.35%	98.13%	86.95%	99.16%	86.92%	99.30%	95.82%	98.72%	NA	NA	NA	NA	NA	NA
		Within City	90.49%	97.72%	96.70%	97.50%	93.73%	99.03%	90.04%	98.44%	90.51%	99.69%	95.35%	98.53%	NA	NA	NA	NA	NA	NA
		Overall SSA	89.40%	95.16%	96.50%	97.61%	94.37%	97.91%	88.59%	97.47%	89.67%	99.40%	95.66%	98.25%	NA	NA	NA	NA	NA	NA
Service Coverage																				
5	In door (>= -75dBm)	Major Roads	91.04%	42.23%	97.46%	100%	58.29%	68.10%	90.14%	96.41%	76.41%	100%	87.61%	100%	99.59%	100%	64.68%	100%	81.71%	100%
		Highways	95.43%	99.98%	96.66%	98.94%	71.21%	81.10%	92.44%	100%	74.61%	99.74%	92.25%	99.32%	99.89%	100%	79.52%	100%	93.20%	100%
		Within City	81.70%	99.55%	97.97%	99.98%	69.49%	67.90%	89.62%	100%	72.14%	100%	92.53%	100%	94.88%	99.97%	73.41%	99.89%	91.25%	97.93%
		Overall SSA	87.32%	83.20%	97.58%	99.64%	66.48%	72.32%	90.39%	98.80%	74.26%	99.92%	90.95%	99.76%	97.15%	99.99%	71.96%	99.96%	89.07%	99.33%
	In-vehicle (>= -85dBm)	Major Roads	98.39%	99.66%	98.89%	100%	92.43%	94.70%	98.70%	98.91%	96.62%	100%	97.48%	100%	100%	100%	92.70%	100%	99.93%	100%
		Highways	98.71%	100%	98.79%	100%	94.86%	99.40%	98.20%	100%	96.61%	99.95%	98.86%	100%	100%	100%	93.09%	100%	99.76%	100%
		Within City	96.36%	100%	99.29%	100%	94.53%	92.90%	97.82%	100%	92.79%	100%	98.31%	100%	99.90%	100%	96.18%	100%	99.53%	100%
		Overall SSA	97.47%	99.90%	99.07%	100%	93.97%	95.65%	98.16%	99.64%	95.14%	99.98%	98.16%	100%	99.95%	100%	94.42%	100%	99.68%	100%
	Outdoor- in city (>= -95dBm)	Major Roads	99.42%	99.91%	99.31%	100%	99.56%	100%	99.86%	99.81%	100%	100%	99.25%	100%	100%	100%	100%	100%	99.96%	100%
		Highways	99.26%	100%	99.40%	100%	99.66%	100%	99.64%	100%	100%	100%	99.73%	100%	100%	100%	100%	100%	100%	100%
		Within City	98.56%	100%	99.72%	100%	99.50%	100%	99.67%	100%	100%	100%	99.50%	100%	100%	100%	99.96%	100%	99.94%	100%
		Overall SSA	98.98%	99.97%	99.54%	100%	99.55%	100%	99.72%	99.94%	100%	100%	99.47%	100%	100%	100%	99.98%	100%	99.96%	100%
6	Call Setup Success Rate (>=95%)	Major Roads	97.93%	100%	96.95%	100%	95.04%	96.77%	100%	100%	95.52%	100%	97.96%	100%	98.53%	100%	100%	100%	98.48%	100%
		Highways	96.30%	100%	97.78%	100%	97.75%	100%	98.94%	100%	94.44%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	99.54%	100%	99.12%	100%	93.33%	100%	99.15%	100%	94.51%	100%	97.91%	100%	98.81%	100%	100%	100%	99.60%	100%

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE 2015-DELHI METRO CIRCLE



SIN	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
			Overall SSA	98.42%	100%	98.22%	100%	94.68%	98.90%	99.35%	100%	94.78%	100%	98.35%	100%	98.95%	100%	100%	100%	99.38%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	98.78%	100%	91.10%	100%	80.50%	90.63%	100%	100%	92.69%	100%	99.28%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	99.30%	100%	97.92%	100%	95.26%	100%	100%	100%	94.69%	100%	98.32%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	98.58%	100%	97.46%	100%	81.60%	100%	99.77%	100%	96.93%	100%	99.02%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	98.78%	100%	95.74%	100%	83.76%	92.31%	99.89%	100%	95.27%	100%	98.94%	100%	100%	100%	100%	100%	100%	100%	100%

NA-Not Applicable

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

7.4 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 4

DRIVE TEST ROUTE OF APRIL TO JUNE 15 – DELHI METRO CIRCLE

Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
SDMC (South Delhi Municipal Area)	Apr-15	SDMC/104 km	<p>1)Within City Hauz khas metro station->Malviye Nagar->Arbindo College-> Ber Sarai-> Munirka-> RK Puram Sec-1 ->RK Puram Sec-8->Shanti Niketan->RK Puram Sec-13-> Hyatt Hotel-> Naroji Nagar-> Green Park->AIIMS-> South EX-I-> Moolchand Underpass -> Andrew Ganj-> LSR College->Kailash Colony metro station->Nehru Place->Pamposh Enclave->GK-III->Masjid Moth->Sangam Vihar->Govind Puri</p> <p>2)Major Road- Crown Plaza->Kalka Ji->Nehru Place->IIT Gate->Vasant Village->Moti Bagh South-> AIIMS->South Ex-II->Lajpat Nagar->Nehru Nagar->Sidharth Enclave->Defence Colony->Sarita Vihar->Mohan Coperative.</p> <p>Indoor: Crown Plaza & Bikaner (Mathura Road).</p>	SDMC/105 km	<p>1) Highway- Kashmiri Gate->Geeta Colony->Rajghat->ITO->IP->Pragati Maidan->Sunder Nagar.</p> <p>2) Major Road- Sunder Nagar->Nizamudin East->Bhogal->Sidharth Enclave->Lajpat Nagar->Defence Colony->Lodhi Road->Pragati Vihar->INA->Sarojni Nagar Market->Taj Palace->Akbar Road->Ashoka Road->Patel Chowk->GPO->Kalibari marg->Rajender Nagar->Shankar Road->Jhandewalan->New Delhi Rly Station->Pahar Ganj->CP Circle.</p> <p>3)Within city- Garhi Market->Deendayal Upadhyay Marg->Agrwal Chowk->ITO ->Ghata Masjid Road->Pataudi House->Daryaganj->Asafali Road->Shivaji Park->Minto Road->Shankar Road (CP)->Indira Chowk->Barakhamba Road->Shershah Road->Khan Market metro staion.</p> <p>Indoor: 3CS Mall Lajpat Nagar & Bikaner Lajpat Nagar</p>	SDMC/102 km	<p>1)Within City Hauz Khas-> Kalu Sarai Vill.->Savodya Enclave->Geetanjali Enclave->Vasant Kaur Marg->Savitri Vihar->Shekh Sarai Ph-I->Panchsheel Sarvopriya Vihar->Khirki Ext->Hauz Rani->Press Enclave Colony-> Saket Anupam Cinema->Saket G, H, J Block->Dakshin Puri Ext->Dr. Ambedkar Nagar-> Madan Giri Ph-II->Masjid Moth->GK-II->Narmada Appartments->Govind Puri Ext->Kalka Ji->CR Park->Pamposh Enclave->Crown Plaza->Okhla Ph-II->Jasola->Apollo Hospital ->Nehru Place.</p> <p>2) Major Road Nehru Place Flyover->Chirag dilli->Hauz khas->IIT->Adhchini Village->Lado sarai->Saket Crossing->Devli Crossing->Sangam Vihar->Hamdard University->Tugalkabad->Prem Nagar->Lal Quona->Surajkund Crossing->Rajiv Gandhi Stadium->Badarpur Thermal Plant (NTPC).</p>

DRIVE TEST ROUTE OF APRIL TO JUNE 15 – DELHI METRO CIRCLE

Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
							Indoor: PVR Satyam Nehru Place & Eross Hotel Nehru Place
NDMC (North Delhi Municipal Area)	May-15	NDMC/115 KM	<p>Within City/CM Residential Area:- Civil Lines metro station--Delhi Vishwa Vidhalaya --Postal accounts office-- 33 shamnath marg--Rajkiye Pratibha Vikas Vidhyalya</p> <p>Major Route:- Civil lines--Majnu ka tila--Gandhi Vihar-- Burari-- Mukundpur--Sanjay Enclave-- Jahanghir puri-- Libas pur-- Shamli --Narela -- Mamoorpur -- Narela Industrail Area-- Khara Kalan - Libaspur</p> <p>Highway:- Narela--Alipur--Bizapur--Budhpur-- Bhagat Singh Park--Libaspur--GT Karnal Road -- Mukarba chowk flyover-- Jahangir puri --SMA Industrial Area -- Jahangiri metro stn - Mahendera Park -- Sarai Pipalthala - Adharsh nagar metro stn -- Azadpur sabji mandi -- Model town --Model town metro stn -- Tagore park -- GTB nagar MG marg -- Hakikat Nagar -- Vishwavidhyalya -- Aruna Nagar -- Chandrawal Nagar -- Majnu-ka-tila-- Yamuna Bazar-- Nigam BodhGhat.</p>	NDMC/105 KM	<p>Within city Khan market -- subhramanyam marg -- pragati maidan -- supreme court -- Tilak bridge --Patiala court -- UPSC--Taj Mansingh hotel--Vigyan bhawan-- Nirman bhawan--Udyog bhawan metro stn-- Hotel Lemeridian-- Dr Rajender Prasad marg-- Man Singh road --Badoda house-- Doordarshan Kendera-- Mandi House-- Sansand Bhawan-- Patel Chowk-- Jantan Mantar--CP-- Baba Kharag Singh marg--Gurudwara bangla sahib-- Talkatora stadium.</p> <p>Major Road Talkatora stadium-- Shankar Road-- Pusa Road-- Guru Ravidas Road -- Gurudwara bangla sahib-- Panchkuuyia Road-- Rajendra Nagar-- Patel Nagar -- Shadipur -- Moti Nagar.</p> <p>Highway East Punjabi Nagar-- Moti Nagar-- Rohtak road-- Tees Hazari-- Kashmiri Gate-- MG marg-- Ring Road.</p> <p>Indoor: CP P Block & Mac Donald.</p>	NDMC/115 KM	<p>Highway Mukarba Chowk-- Haider pur-- Pitam Pura -- Neta Ji Subhashchander Place metro station-- Madhuban Choowk-- Mangol Puri-- Peeragarhi-- Udyog Nagar-- Nangloi-- Rajdhani Park-- Mundka.</p> <p>Major Road Mundka -- Karala road-- Madan pur-- Karala -- Kanjhawala Vill.-- Jonti Vill.-- Tatesar Vill.-- Punjab Khor -- Kutub Garh -- Darya pur -- Bwana -- Barwala vill -- Parahlad Pur -- Shahabad Dairy -- Rohini Sec-7-- Rohini Sec-11.</p> <p>Within City Rohini Sec-11--Rohini Sec-5 -- Vijay Vihar Ph-I & II-- Rithala Vill.- Rohini Avantika Sec-I & III-- Jaipur Golden Hospital-- Rohini Sec-8 -- Rohini Sec-14, 9,13,15 & 16 -- Prashant Vihar -- Mukarba Chowk.</p> <p>Indoor: G3S Mall & Dominos</p>

DRIVE TEST ROUTE OF APRIL TO JUNE 15 – DELHI METRO CIRCLE

Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
			Indoor: ICICI Bank & Pizza Byte				
East Delhi	Jun-15	EDMC/102Km	<p>1)Major Route Akshardha temple=> Pandav Nagar => Ganesh Nagar =>Nirman Vihar => Shastri Nagar =>Jheel Khureji =>Geeta Colony =>Akshardham => Ashok Nagar =>Mayur Vihar PH-I metro stn.</p> <p>2)Within City Mayur Vihar Ph-I => Trilok Puri => Kalyan Puri => Old Kundli => Mayur Vihar PH-III => Gahroli Village=> Gaji Pur => Gaji pur Dairy=> Anand Vihar terminal => Yojna Vihar => Vivek Vihar => Ram Vihar => Karkarduma => Preet Vihar => IP Ext-III & II =>Madhu Vihar => West Vinod Nagar =>East Vinod Nagar =>Jheel => Mother Dairy => Parpanganj.</p> <p>3) High way Parpanganj => Akshardham Setu =>Millennium Depot => Sarai Kale Khan => Indraprastha park => Ganesh Nagar => Gajipur => Nayur Vihar-I metro station => Pandav Nagar=> Akshardham metro station.</p> <p>Indoor: Cross River Mall & V3S Mall (Karkarduma)</p>	EDMC/105Km	<p>1) Major Route Akshardham temple => Vikas Marg => Rani Garden => Geeta Colony => Kailash Nagar => Gandhi Nagar => Seelam Pur Metro Station => Kanti Nagar => Azad Nagar => Anarkali Colony => Jagat Puri => Preet Vihar => Gaji Pur =>Anand Vihar Terminal => Yojna Vihar => Vivek Vihar => Dilshaad Garden .</p> <p>2) Highway Welcome => Jheelmil Colony => Seelam Pur => Shahdara</p> <p>3)Within city Shahadra => Vishwas Nagar => Vivek Vihar => Ram Vihar => Yojna Vihar => Vishwas Nagar => Shanti Vihar => Dayanand Vihar => Preet Vihar => Parpanganj Industrial Area => Vinod Nagar => IP Ext. => Akshardham => Pandav Nagar.</p> <p>Indoor: EDM Mall & Haldiram Restaurant (Kaushambi)</p>	EDMC/106Km	<p>1)Within City Dilshaad Garden => Dilshaad Colony => Tahar Pur => GTB Enclave => Nand Nagri => Jagat Puri => Jyoti Colony =>Mauzpur => New Jafarabad => E-Block Seelam Pur => New Seelam Pur => Shahadra.</p> <p>2) Major Road Loni Road Shahadra => Main Road Johari Pur => Preet Vihar => Karawal Nagar =>Sahadar Pur => Wazirabad => Yamuna Vihar => Bhajan Pura => Kartar Nagar => New Usman Pur => Shastri Park.</p> <p>3) Highway Shastri Park => Shahadra => Jheelmil => Dilshaad Garden => Vivek Vihar => Yojna Vihar =>Anand Vihar => Parpanganj => Gajipur => IP Ext => Akshardhaam.</p> <p>Indoor: Wah Ji Wah Restaurant & Madras Cafe Restaurant. (Yamuna Vihar)</p>

7.5 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 5

DRIVE TEST OBSERVATION OF SOUTH DELHI (MUNICIPAL) AREA – APRIL 15

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	SDMC	Poor Rx Level and Rx Quality Near Kailash Colony, Near Sarita Vihar Metro, Maszid Moth, Hauz Khas,	SDMC	Poor Rx Level and Rx Quality Near Sunder Nagar, Geeta Colony Flyover, Gole Market,	SDMC	Poor Rx Level and Rx Quality Near Shahpur Jat,
2	AIRTEL		Poor Rx Level and Rx Quality Near Govind Puri, Ami Chand Khand, Block AC, Giri Nagar, Kalkaji, 29 Street, Tughlakabad, NEAR Hamdard Nagar, Mahawat Khan Rd, Mata Sundari Railway Colony.		Poor Rx Level and Rx Quality Near Mandi House, Flyover near Sunder Nagar, Tees January marg, Shankar Road, New Delhi.		Poor Rx Level and Rx Quality Near Mandi House Metro Station, Block X, Diplomatic Enclave, Chanakyapuri, Birla Vidhya Niketan Marg.
3	MTNL		Poor Rx Level and Rx Quality Near Ber Sarai, Dayanand Lajpat Nagar, TCIL GK-I, Alakhnanda, Vasant Gaon Pashim Marg, Okhla Ph-I & III.		Poor Rx Level and Rx Quality Near Kailash colony, Anand Niketan, Malviye Nagar & part-III, Munirka Vill, Green park DMRC, Yusuf Sarai.		Poor Rx Level and Rx Quality Near Apollo hosp, Masjid Moth, Delhi High Court.
4	TATA CDMA		Poor Rx Level and Rx Quality Near Narouji Nagar & Defence Colony, Srinavas Puri Lajpat Nagar Nehru Palce2 & Nehru Enclave, Madan Puri, Khan pur, Shubhashkhand Govindpuram B Block Okhala2 Underpass okhala to sarita vihar.		Poor Rx Level and Rx Quality Near Tees Hazari-1172, Jhandewala Ext-1124, Bangla Sahib Rod, MG marg, Teen Murti Marg, Jesus and Mary Marg, Bhairo marg.		Poor Rx Level and Rx Quality Near Lotus Temple Rad, Mathura Road near Jasola Metro Stn.& Okhala State Marg, Maa AnandMai Marg, Saket, C-Block Khanpur, Mahroli Badarpur Road.
5	IDEA		Poor Rx Level and Rx Quality Near Delhi Blue Apartment		Poor Rx Level and Rx Quality Near South Avenue, Shanti Path, Mandir Marg, Rose garden, Bal Bhawan Complex, Minto Road, Sunder Nagar, Ajmeri Gate, Park Street Road.		Poor Rx Level and Rx Quality Near Kalkaji Flyover, Azad camp, Okhla PH II, Tuglakabad Village, Saket, Pushp Vihar, Adhchini, Nehru Place.

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
6	RCOM GSM		Poor Rx Level and Rx Quality Near Vasant Village & Vasant Vihar market, JNU, Jiasarai, A Block Kailash colony, Tugalkabad EXT gali No 32, Tughlaqabad Extn & D D A Flats Kalka Ji, Geetanjali Enclave & Adchini Village.		Poor Rx Level and Rx Quality Near South Ex & South Ext. Part 1, Puja Market, Haldi Ram Mohan Co-operative & Mohan Co-Operative-II, Talkatora Stadium, CP Bengali Mkt, Ansari road, Panchkuian Road Kalawati Saran, Blind Relief, Khan Market, Aurangzeb Road School, Chanakya Puri MP Bhawan, Maurya Sheraton, Chankya Puri NIDC, Sheela cinema, Vijay Ghat, Safdarjung factory Road.		Poor Rx Level and Rx Quality Near GK 2 M Block & GK2 Block S, Okhla Ph 3, Jasola, Kalkaji B Block, Ladosarai-I.
7	RCOM CDMA		Poor Rx Level and Rx Quality Near Andrew Ganj.		Poor Rx Level and Rx Quality Near Karol Bagh channa market, CP BhaiVeer Singh Marg, Defence ColonyDBlock & Jangpura Ext.		Poor FER Near Tughlakabad Ext.
8	MTS		Poor Rx Level and Rx Quality Near Sarojini mrkt.		Poor Rx Level and Rx Quality Near Jama Maszid.		Poor FER Near Apollo Hospital.
9	VODAFONE		Poor Rx Quality Near New Friends Colony and Vasant Gaon.		Poor Rx Level and Rx Quality Near Asharam, R T Ram marg, H. Nizamuddin, India Gate, Pragati medan, Pusa Road.		Poor Rx Level and Rx Quality Near M B Road, BRT Coridor, Pamposh Enclave.

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF NORTH DELHI & NDMC AREA (MAY-15)

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	NDMC	Poor Rx Level and Rx Quality Near Mukund Pur, Near NH1.	NDMC	Poor Rx Level and Rx Quality Near Sunder Nagar, Shankar Road, Tilak Lane Patiala house, Vandematram marg.	NDMC	Poor Rx Level and Rx Quality Near Akansh Hospital.
2	AIRTEL		Overall Good Coverage and Quality in SDCA Covered on Day 1.		Poor Rx Level and Rx Quality Near Outer ring road, Rohini Sec-7.		Poor Rx Level and Rx Quality Near Tis Hazari Road, Rajender Nagar.
3	MTNL		Poor Rx Level and Rx Quality Near Near Malkaganj, Alipur, Near Narela.		Poor Rx Level and Rx Quality Near Baroda House, Moti Nagar, Near Gole Market, Le Meridian.		Poor Rx Level and Rx Quality Near Bajidpur Village, Peeragarhi.
4	TATA CDMA		Poor Rx Level and Rx Quality Near Ch Ramdev Marg Near GT Road Narela, Libaspur Samali GT Road, Dr KB HegDewar Marg Outer Ring Road, Vishwavidhyalaya Marg,Chauburja Marg & Rajpur Road		Poor Rx Level and Rx Quality Near Geeta Colony Pusta Road, Gandhi Nagar, Silampur, Shahdara, Ghazipur Rd, Block A, Surya Nagar, Maharaja Surajmal Marg DDA Market, Block B, Surajmal Vihar Block H, Guru Nanak Pura, Lakshmi Nagar, Swami Dayanand Marg Madhu Vihar, IP Extension, Patparganj, Kalyanpuri NH-24		Poor Rx Level and Rx Quality Near Ghazipur Rd Block A, Surya Nagar Ghaziabad, Delhi, Chaudhari Charan Singh Marg Near ISBT.
5	IDEA		Poor Rx Quality Near Jahangirpuri, Khera Khurd, Singoha.		Poor Rx Level and Rx Quality Near Jhandewalan, Tal katora Indoor stadium, Gurudawara Bangala Sahib, Tis Hazari Metro station, Jhandewalan extn, RamDwara, Rakabganj GuruDwara, Liberty stadium, Patel Nagar Round		Poor Rx Level and Rx Quality Near Muhmmadpur Majari, Shalimar Place, Tikri Kalan.

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
6	RCOM GSM		Poor Rx Level and Rx Quality Near Sector-46 Narela, Rohini Ind. Area Bakoli Highway, Gopalpur Delhi, Timarpur, Mukundpur, Rajiv Nagar Swarup Nagar.		Poor Rx Level and Rx Quality Near Onkar nagar, Bara Hindu Rao, DAYAL CHOWK, Talkatora Stadium, Patodi House, Khan Market, RAJENDER NAGAR R-BLOCK, Patel Park, Sadik Nagar Metro Station, Bara Hindu Rao, Church Road, DAYAL CHOWK, Chuna Mandi PAHARGANJ.		Poor Rx Level and Rx Quality Near Bawana Industrial Area, Prehladpuri, SEC 8 ROHINI, Lad Pur, Kanjhawala-II, Mundka Village, Sector 9 Rohini, HAIDERPUR, Lad Pur, Mundka Village.
7	RCOM CDMA		Poor Rx Level and Rx Quality Near Malkaganj.		Poor Rx Level and Rx Quality Near Lawrence Road, VishwakarmaPark.		Overall Good Coverage and Quality in SDCA Covered on Day 3.
8	MTS		Poor Rx Level and Rx Quality Near Narela Industrial Area.		Poor Rx Level and Rx Quality Near Gole Market.		Poor Rx Level and Rx Quality Near Khorpunjab, Kanjhawala.
9	VODAFONE		Poor Rx Level and Rx Quality Near Jharoda Village, Gopalpur Village, Majnu ka Tila Ring Road,		Poor Rx Level and Rx Quality Near Basi, manocaha park, Rohtak road, Moti Nagar, kamal hotel anand parwat, RML Road, Talkatora Road, Delhi High Court.		Poor Rx Level and Rx Quality Near Qutubargh Village, DC Chowk Rohini Sec-9, Parhalad Pur Village.

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF EAST DELHI (MUNICIPAL AREA) – JUNE 15

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	EDMC	Poor Rx Level and Rx Quality Near Ram Prastha, Geeta Colony, Gazi Pur Village, Gazi Pur Dairy Farm, Sarai Kalen khan.	EDMC	Poor Rx Level and Rx Quality Near Gandhi Nagar, Vihwas Nagar, Seelam Pur, Preet Vihar, Patparganj, Ganesh Nagar.	EDMC	Poor Rx Level and Rx Quality Near Shreshta Vihar, Johri Pur, Dilshad Colony, Mayur Vihar.
2	AIRTEL		Poor Rx Level and Rx Quality Near Kondli, Trilok Puri Bock 36, Himmat Puri Block 33.		Poor Rx Level and Rx Quality Near IP Extension, Dayand Vihar.		Poor Rx Level and Rx Quality Near Jagat Puri Block A, Dilshad Garden, Old Shahadra bus stand.
3	MTNL		Poor Rx Level and Rx Quality Near Maharaja Suramal Marg, Gaji Pur Road NH-24 near underpass.		Poor Rx Level and Rx Quality Near Gagan Vihar , Shakur pur khas, Maharishi Valmiki Marg near shanti Vihar		Poor Rx Level and Rx Quality Near Durga Puri, Jyoti Nagar West Loni Road.
4	TATA CDMA		Poor Rx Level and Rx Quality Near Geeta Colony, Patparganj Road, Shrihanuman marg, Maharaja surajmal marg, Gajipur murga mandi, Noida link road(pandavnagar), Nizamuddin bridge, Najafgarh road, Sahakarita marg, Trilokpuri road		Poor Rx Level and Rx Quality Near Pushta Road, Kasturba road Jhilmil colony, Kalika mandir, Maharishi Valmiki marg, Phase 2 road Jhilmil colony, Ram street, vishwas nagar, Cross river mall road, Noida link, Road Yamuna Bank, Noida link road, Swami Dayanand Marg.		Poor Rx Level and Rx Quality Near Eastern Approach Road, Loni Road, Phase 2 Block N, Shahdara, GT Road, Gaji Pur Drain.
5	IDEA		Poor Rx Level and Rx Quality Near Vinod Nagar West, Engineers Estate Appartments, Nangali Raipur, Geeta Colony		Poor Rx Level and Rx Quality Near Paradise Appartments, Jheelmil Colony, Meerpur Turk		Poor Rx Level and Rx Quality Near Hindustan Appartments, Seema Puri Colony, Gokul Pur, Shastri Park.
6	RCOM GSM		Poor Rx Level and Rx Quality Near Patparganj, Patparganj Industrial Area, Madhu Vihar Ph-II, Himmat Puri, Nizamuddin, Pragati Bhawan, Hargovind Enclave, West Vinod Nagar		Poor Rx Level and Rx Quality Near Mayur Vihar Ph-I, Shanti Park, Kailash Nagar, Subhash Market, Mansarover Park, Arjun Nagar, Hargovind Enclave, Shreshta Vihar, Vinod Nagar, East Vinod Nagar		Poor Rx Level and Rx Quality Near West Karawal Nagar, Yamuna Vihar, Block B Ganga Vihar, Ashok Nagar, Seema Puri, Dilshad Garden, Block A Gajipur.
7	RCOM CDMA		Poor Rx Level and Rx Quality Near Geeta Colony, Statebank Colony, Himmat Puri.		Poor Rx Level and Rx Quality Near Ajit Nagar, Kaushik Puri, Seelam Puri, Vishwas Nagar		Poor Rx Level and Rx Quality Near Jeevan pura near johri pur, Bhajanpura chandbagh, GTB Enclave.

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
8	MTS		Poor Rx Level and Rx Quality Near CRPF Camp Mayur Vihar PH-III, Bharti public school Kundli Mayur Vihar, Yamuna river.		Poor Rx Level and Rx Quality Near Karkari road, Gandhi Nagar Pusta road.		Poor Rx Level and Rx Quality Near Bhajan pura Pusta road.
9	VODAFONE		Poor Rx Level and Rx Quality Near Preet Vihar, East Vinod Nagar near Bharti Chowk, Mother Dairy, Sanjay Jheel near Jheel Khureji.		Poor Rx Level and Rx Quality Near Vishwas Nagar Fun Mall, IP Extension.		Poor Rx Level and Rx Quality Near Gonda village.

7.6 KEY FINDINGS ON DRIVE TEST:

The drive tests conducted across different routes of **Delhi/NCR** region such as **South Delhi (Municipal Area), North Delhi & NDMC Area and East Delhi (Municipal Area)** given above in table-4, during three months of the quarter ended June, 2015, revealed that the performance of some of the service providers was not satisfactory as they remained non-complaints of different parameters in different areas of Delhi/NCR. The **overall non-compliance of the service providers on SSA level** with respect to the different parameters is summarized as follows:

April-2015: South Delhi (Municipal Area),

1. **MTNL:** Call Drop Rate: **5.32%** (outdoor) / **6.98%** (Indoor), Voice Quality: **93.54%** (outdoor), Call Setup success rate (CSSR): **91.67%** (outdoor) and Blocked call rate: **7.72%** (outdoor).
2. **Aircel, Idea, RCOM (GSM), Vodafone & RCOM (CDMA):** Remained under performed for parameter **Voice Quality** with their performance as **93.61%** (outdoor), **89.51%** (outdoor), **90.19%** (outdoor), **93.73%** (outdoor) and **94.14%** (Indoor) respectively.

May-2015: North Delhi & NDMC Area

1. **MTNL:** Call Drop rate: **6.88%** (outdoor), Voice Quality: **92.43%** and Blocked Call rate: **3.09%** (outdoor).
2. **Aircel, Idea, RCOM (GSM) & Vodafone:** Remained under performed for parameter **Voice Quality** with their performance as **92.54%** (outdoor), **91.54%** (outdoor), **92.52%** and **94.32%** (outdoor) respectively.
3. **RCOM(GSM): Block Call rate: 3.29%**

June-2015: East Delhi (Municipal Area)

1. **MTNL:** Call drop rate: **2.02%** (outdoor), Voice Quality: **94.37%** (outdoor), CSSR: **94.68%** (outdoor) and Blocked Call rate: **4.47%** (outdoor)
2. **Aircel, Idea, RCOM (GSM) & RCOM (CDMA):** Remained under performed for parameter **Voice Quality** with their performance as **89.40%** (outdoor), **88.59%** (outdoor), **89.67%** and **93.37%** (outdoor) respectively.
3. **RCOM (GSM): CSSR : 94.78%**

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

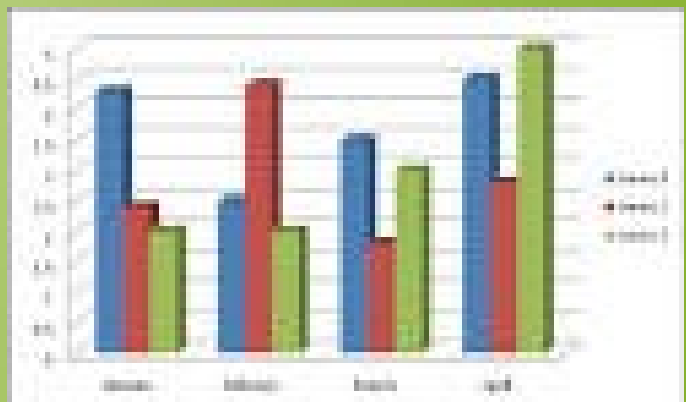
From the above, it was concluded that the performance of the service providers with respect to the parameter 'Voice Quality' remained main area of concern as majority of operators namely Aircel, Idea, RCOM(GSM), RCOM(CDMA), Vodafone and MTNL failed to comply with its bench mark. Apart from Voice Quality, MTNL also remained non-compliant in respect of other parameters also like Call Drop rate, Call setup success rate and Blocked Call rate and RCOM (GSM) could not do well in respect of the parameter CSSR / Blocked Call Rate in different areas of Delhi Service. These operators need to take corrective action to improve their networks.

GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

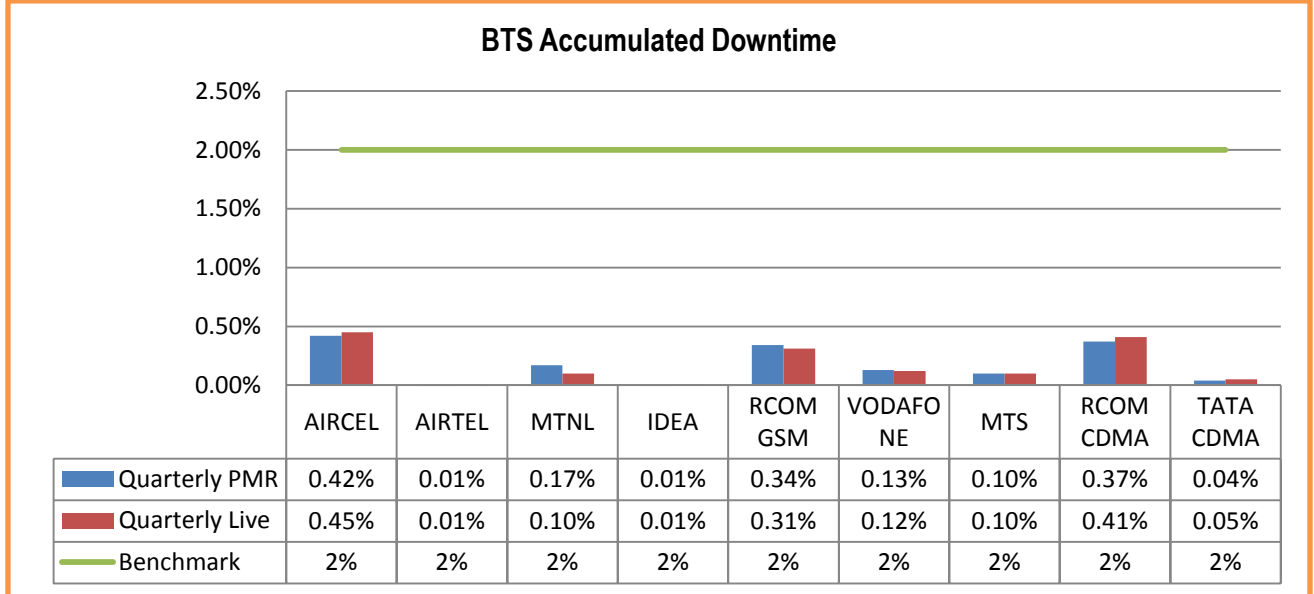
AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT



8) GRAPHICAL REPRESENTATION:

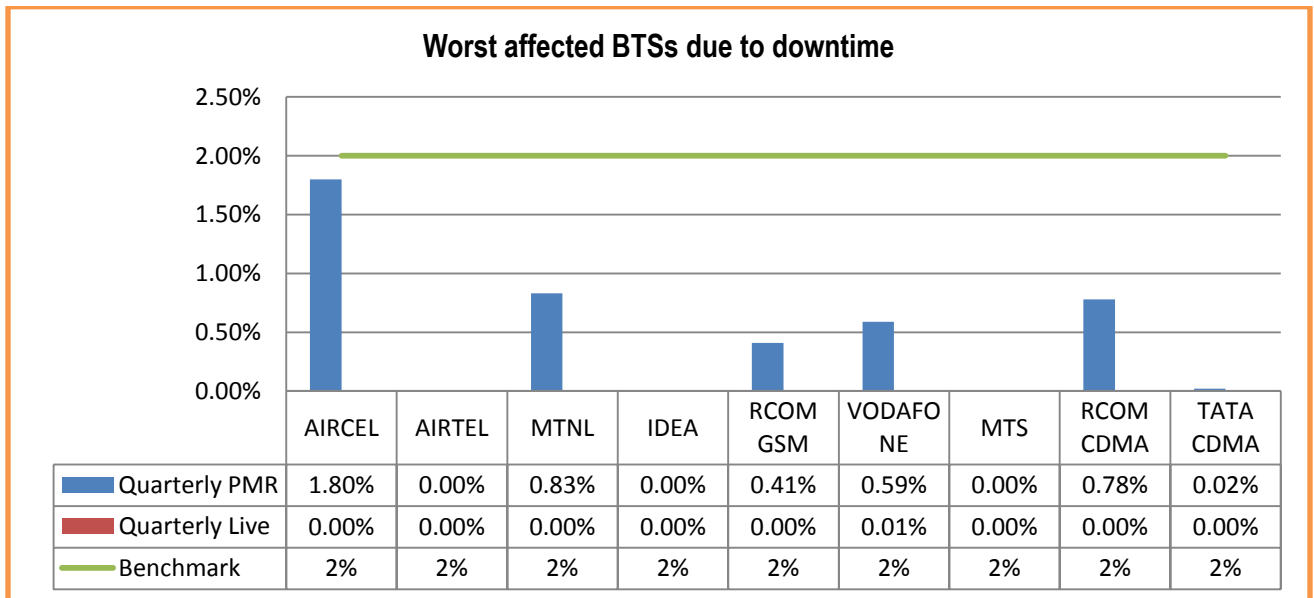
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

1. BTS ACCUMULATED DOWNTIME :



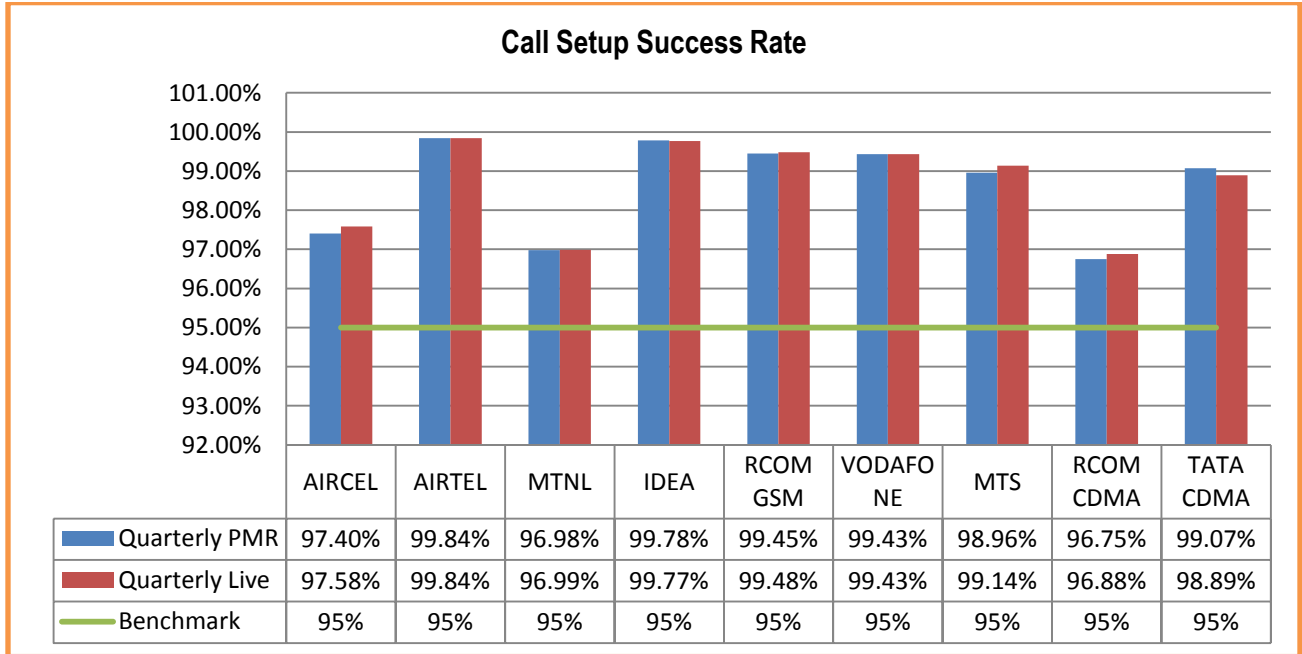
All operators are meeting the benchmarks.

2. WORST AFFECTED BTSs DUE TO DOWNTIME :



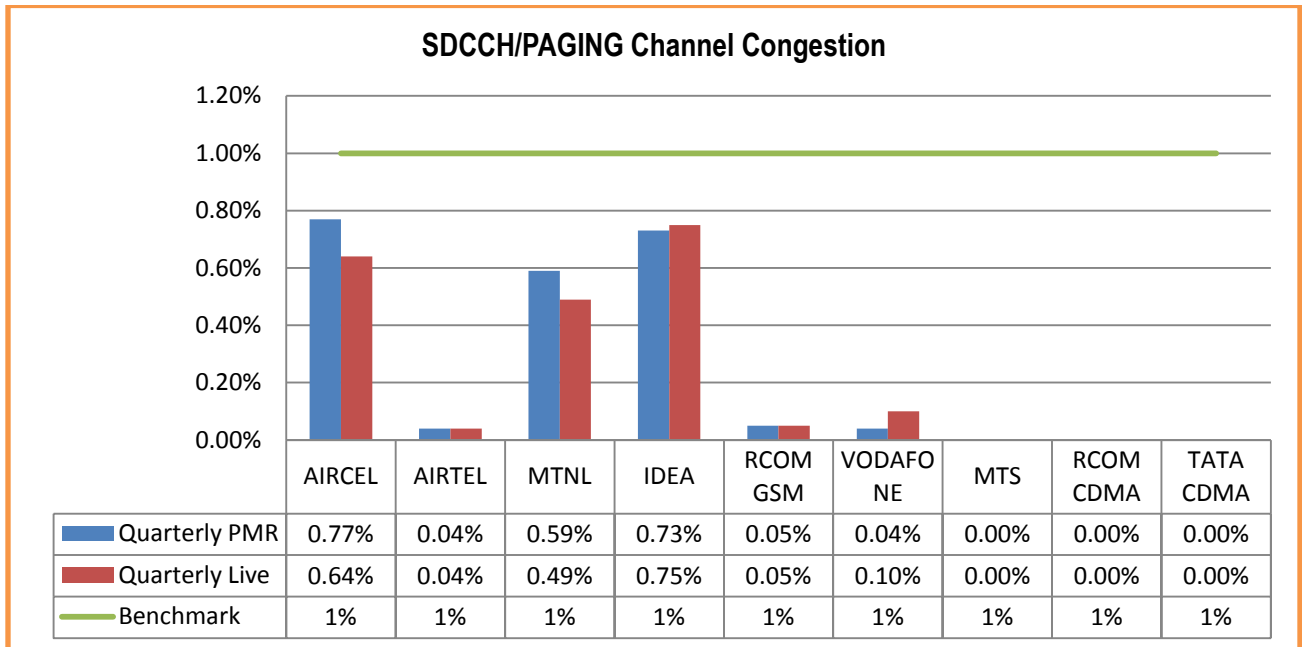
All operators are meeting the benchmarks.

3. CALL SETUP SUCCESS RATE :



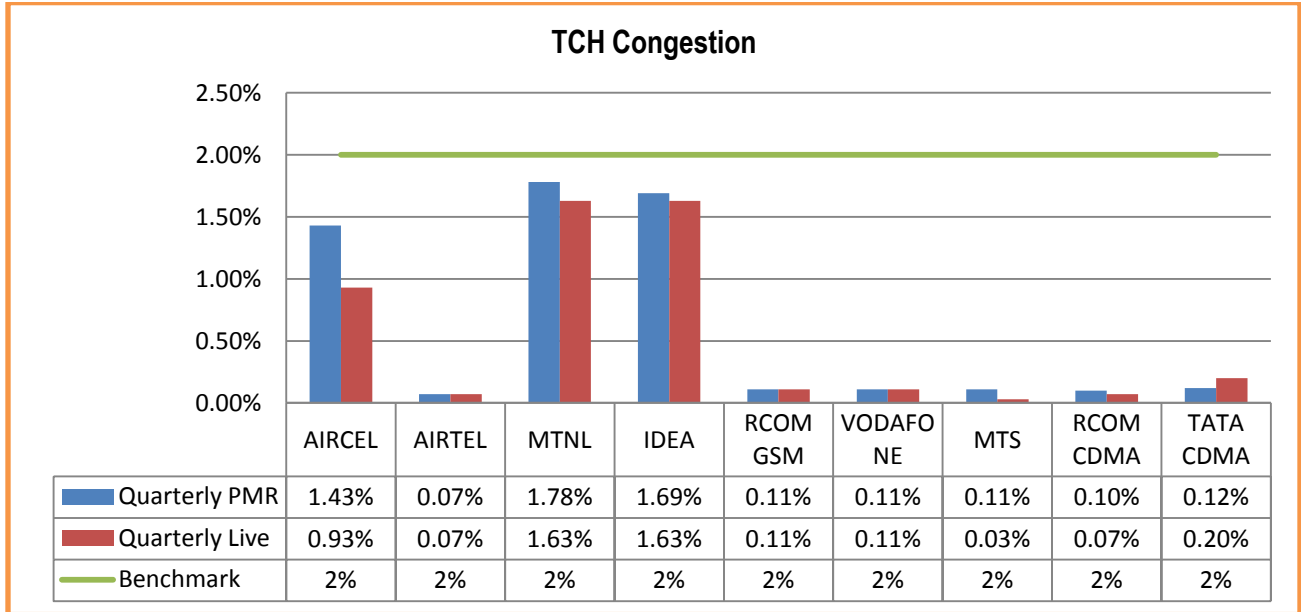
All operators are meeting the benchmarks.

4. SDCCH/PAGING CHANNEL CONGESTION :



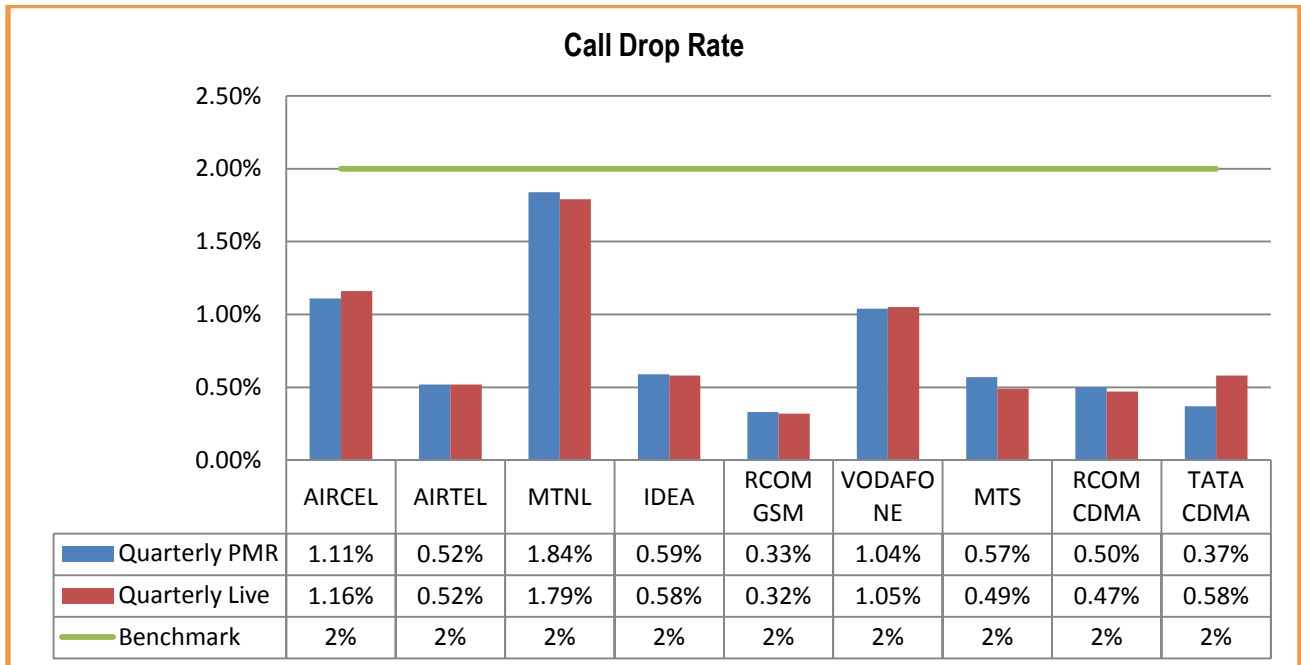
All operators are meeting the benchmarks.

5. TCH CONGESTION :



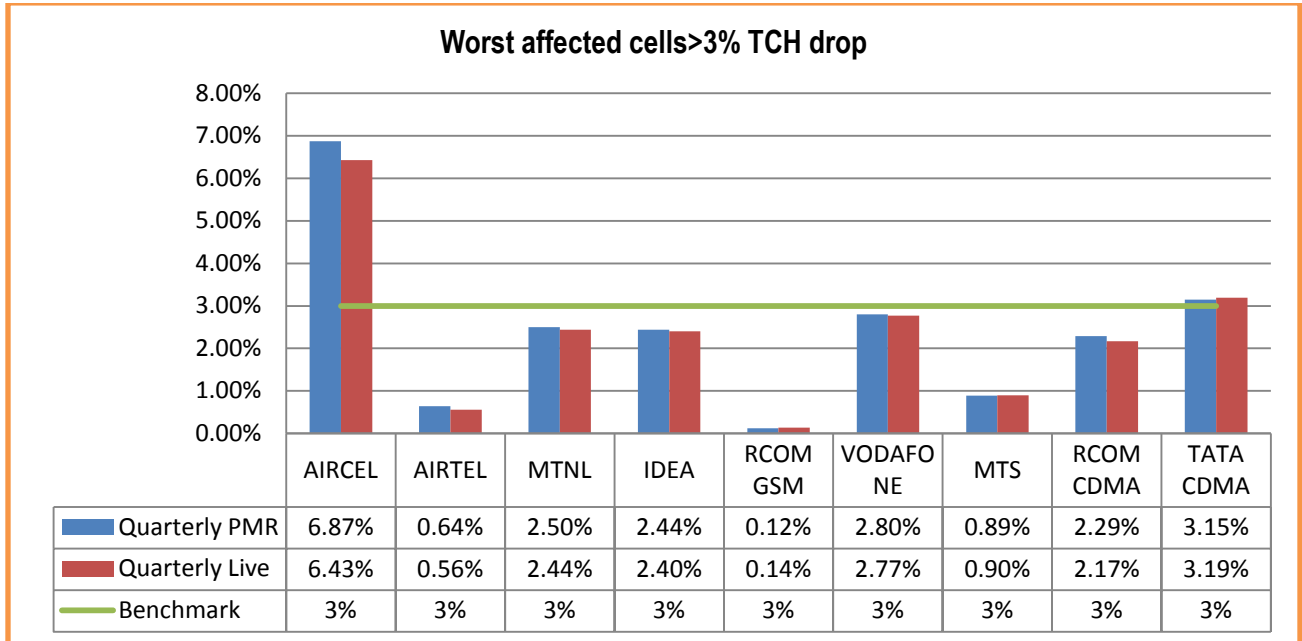
All operators are meeting the benchmarks.

6. CALL DROP RATE :



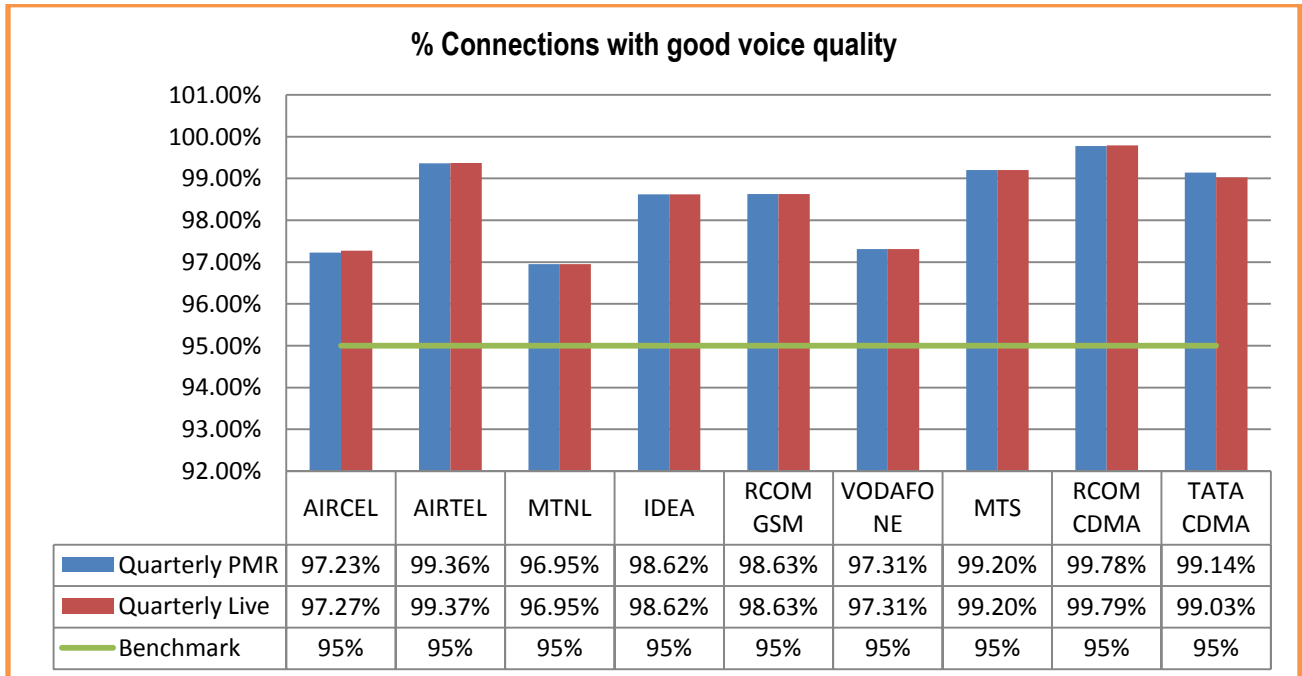
All operators are meeting the benchmarks.

7. WORST AFFECTED CELLS>3% TCH DROP :



All operators are meeting the benchmarks except Aircel & Tata CDMA.

8. PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY :



All operators are meeting the benchmarks.