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

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

(January 2015 – March 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 6thOctober, 2006 on zonal basis for **North Zone and West Zone** comprising of the following Telecom Circles/Metro Service Areas":

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

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

The Audit exercise would assess the Quality of Service of telecom operators providing Basic (Wire line), Cellular Mobile (Wireless) and Broadband services by auditing the relevant QoS records maintained by the operators, conducting drive tests as well as live measurements and comparing them with quality of service benchmarks stipulated by TRAI. The audit would be carried out by **TUV-SUD South Asia** every quarter across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. However, in respect of Basic telephone service (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 Himanchal Pradesh, J&K and Maharashtra & Goa circles during the quarter January 2015 – March 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
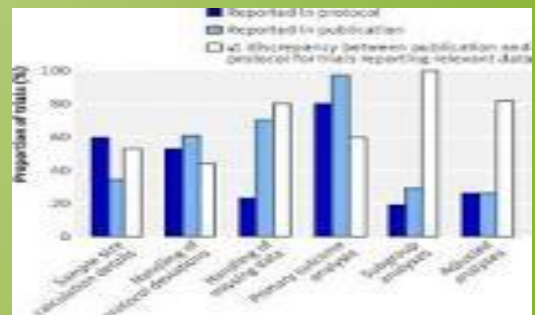
3) SAMPLE SIZE:

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

SI. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location
	GSM Operators	**January-15**	**February-15**	**March-15**	
1	**AIRCEL**	21 to 23 Jan-15	11 to 13 Feb-15	18 to 20 Mar-15	Aircel Ltd, Near Sarita Vihar Metro Station, New Delhi
2	**AIRTEL**	13 to 15 Jan-15	19, 20 & 23 Feb-15	12, 13 & 16 Mar-15	Plot No 16 Udhyog Vihar Ph-4 Gurgaon Haryana.
3	**MTNL**	21 to 23 Jan-15	18 to 20 Feb-15	13 to 25 Mar-15	MTNL Exchange Karol Bagh Near Rajendra Place Metro Stn.New Delhi.
4	**IDEA**	7 to 9 Jan-15	24 to 26 Feb-15	17 to 19 Mar-15	Idea Cellular Limited, E-5, Sector-63, Noida (UP)
5	**RCOM GSM**	14 to 16 Jan-15	16, 18 & 21 Feb-15	13, 16 & 17 Mar-15	Reliance Center Maharaja Ranjit Singh Hotel, Maharaja Ranjit Singh Marg New Delhi.
6	**VODAFONE**	6 to 8 Jan-15	10 to 12 Feb-15	16 to 18 Mar-15	A-19 Mohan Cooperative Industrial Estates, Mathura Road New Delhi.
	CDMA Operators				
7	**MTS**	15, 16 & 19 Jan-15	6, 9 & 10 Feb-15	13, 16 & 17 Mar-15	A-194 Okhla Phase 1 New Delhi
8	**RCOM CDMA**	14 to 16 Jan-15	17, 18 & 21 Feb-15	13, 16 & 17 Mar-15	Reliance Center Maharaja Ranjit Singh Hotel, Maharaja Ranjit Singh Marg New Delhi.
9	**TATA CDMA**	14 to 16 Jan-15	11 to 13 Feb-15	16 to 18 Mar-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 March 2015.

The data generated by monthly PMR and 3-days live measurements audit for the period January 2015 to March 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 March- 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 March- 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 Vodafone** were non-complaints in respect of the parameter **'Worst affected Cells > 3% TCH Drop'** with their quarterly average performance as **7.33%, and 4.34%** 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 parameters except for the parameter '**Worst affected Cell having > 3% TCH drop'** which could not be met by **Aircel** and **Vodafone** with their performance as **7.58%** and **4.67%** (average of the quarter).

  Aircel and Vodafone 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. Only **Idea** could not meet the benchmark of 100% cases of credit/waver within one week, marginally with its performance as **99.80%**

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. However, **Aircel** failed to meet the benchmark of **Accessibility** with its performance as **91.04%.** Further, **Airtel** could not meet the benchmark of **'calls answered by Operators (voice to voice) within 90 seconds** having achieved its performance as **89.57%** against the benchmark of >=95%.

The results for three days live measurements revealed that most of the operators have met the benchmarks for the parameters 'Accessibility to call center 'and 'calls connection to operators (Voice to voice) within 90 seconds'. Only **Aircel**, has not met the benchmark of **Accessibility** with its performance as **93.50% ,** whereas **Airtel and Vodafone** lagged behind the benchmark for **'calls answered by Operators (voice to voice) within 90 seconds** having achieved their performance as **90.94% and 91.01%** 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 Aircel, MTNL, Idea, RCOM(GSM), RCOM(CDMA) and Tata (CDMA)** failed to comply with its bench mark. Apart from Voice Quality, **MTNL** remained non-compliant in respect of other parameters also like **Call Drop rate, Call setup success rate and Blocked Call rate**, in different areas of Delhi /NCR region. 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	March-15	20:00 - 21:00
2	AIRTEL	March-15	19:00 - 20:00
3	MTNL	March-15	20:00 - 21:00
4	IDEA	March-15	20:00 - 21:00
5	RCOM GSM	March-15	19:00 - 20:00
6	VODAFONE	March-15	20:00 - 21:00
CDMA Operators			
7	MTS	March-15	20:00 - 21:00
8	RCOM CDMA	March-15	20:00 - 21:00
9	TATA CDMA	March-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	23	3569	NSN	NSN
2	AIRTEL	35	54	5927	Ericsson	Ericsson
3	MTNL	6	31	1122	NSN	NSN
4	IDEA	11	38	4702	NSN	NSN
5	RCOM GSM	4	14	2522	Huawei	Huawei
6	VODAFONE	15	54	6090	Ericsson	Ericsson
CDMA Operators						
7	MTS	1	5	1019	ZTE	ZTE
8	RCOM CDMA	7	NA	989	Lucent & ZTE	Lucent
9	TATA CDMA	8	8	1501	Huawei	Huawei

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JANUARY 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- JANUARY 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%	Jan-15	0.37%	0.01%	0.14%	0.01%	0.29%	0.13%	0.06%	0.17%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Jan-15	1.79%	0.00%	0.53%	0.00%	0.55%	0.62%	0.00%	0.20%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Jan-15	97.14%	99.82%	96.56%	99.89%	99.60%	99.17%	99.03%	98.04%	98.93%
	b) SDCCH/PAGING Channel congestion	<=1%	Jan-15	0.55%	0.03%	0.49%	0.48%	0.02%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-15	1.96%	0.10%	1.68%	0.64%	0.05%	0.24%	0.06%	0.03%	0.05%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Jan-15	1.26%	0.64%	1.88%	0.61%	0.41%	1.35%	0.56%	0.26%	0.43%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jan-15	**7.85%**	0.76%	2.52%	1.94%	0.03%	**6.44%**	0.71%	1.37%	**3.36%**
	c) Connections with good voice quality	>=95%	Jan-15	97.11%	99.25%	97.13%	98.69%	98.70%	96.95%	99.21%	99.78%	99.08%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Jan-15	0	0	0	0	0	0	0	0	0

5.1.4 QOS PERFORMANCE OF MONTHLY PMR – FEBRUARY 15 MONTH:

	CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE - FEBRUARY 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%	Feb-15	0.24%	0.01%	0.15%	0.02%	0.26%	0.09%	0.05%	0.25%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Feb-15	0.89%	0.00%	0.62%	0.00%	0.36%	0.33%	0.00%	0.41%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Feb-15	97.33%	99.83%	96.77%	99.92%	99.54%	99.41%	99.02%	97.99%	99.02%
	b) SDCCH/PAGING Channel congestion	<=1%	Feb-15	0.52%	0.03%	0.54%	0.40%	0.03%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-15	1.76%	0.11%	1.77%	0.93%	0.08%	0.13%	0.06%	0.04%	0.08%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Feb-15	1.18%	0.57%	1.87%	0.57%	0.41%	1.08%	0.52%	0.26%	0.42%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Feb-15	**6.72%**	0.64%	2.55%	1.94%	0.08%	**3.67%**	0.67%	1.30%	2.39%
	c) Connections with good voice quality	>=95%	Feb-15	97.21%	99.33%	96.94%	98.68%	98.64%	97.35%	99.21%	99.78%	99.08%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Feb-15	0	0	0	0	0	0	0	0	0

5.1.5 QOS PERFORMANCE OF MONTHLY PMR – MARCH 15 MONTH:

	CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE - MARCH 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%	Mar-15	0.31%	0.01%	0.15%	0.01%	0.37%	0.20%	0.10%	0.42%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	Mar-15	1.09%	0.00%	0.80%	0.00%	0.56%	1.25%	0.20%	1.72%	0.13%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Mar-15	97.35%	99.83%	96.88%	99.84%	99.51%	99.36%	99.09%	97.65%	98.97%
	b) SDCCH/PAGING Channel congestion	<=1%	Mar-15	0.59%	0.03%	0.59%	0.54%	0.04%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-15	1.56%	0.11%	1.75%	1.22%	0.09%	0.15%	0.04%	0.04%	0.15%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Mar-15	1.25%	0.53%	1.85%	0.63%	0.43%	1.17%	0.57%	0.34%	0.46%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Mar-15	**7.41%**	0.65%	2.47%	2.25%	0.10%	2.91%	0.77%	1.82%	2.60%
	c) Connections with good voice quality	>=95%	Mar-15	97.28%	99.35%	96.99%	98.60%	98.60%	97.22%	99.21%	99.78%	99.06%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Mar-15	0	0	0	0	0	0	0	0	0

5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- MARCH 15 (JAN TO MAR. 2015 MONTHS AUDITED DATA)

	QUARTERLY QOS PERFORMANCE (AVERAGE OF QE- MARCH 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	0.31%	0.01%	0.15%	0.01%	0.31%	0.14%	0.07%	0.28%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	1.26%	0.00%	0.65%	0.00%	0.49%	0.73%	0.07%	0.78%	0.04%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.27%	99.83%	96.74%	99.88%	99.55%	99.31%	99.05%	97.89%	98.97%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.55%	0.03%	0.54%	0.47%	0.03%	0.06%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	1.76%	0.11%	1.73%	0.93%	0.07%	0.17%	0.05%	0.04%	0.09%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.23%	0.58%	1.87%	0.60%	0.42%	1.20%	0.55%	0.29%	0.44%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	**7.33%**	0.68%	2.51%	2.04%	0.07%	**4.34%**	0.72%	1.50%	2.78%
	c) Connections with good voice quality	>=95%	Quarterly	97.20%	99.31%	97.02%	98.66%	98.65%	97.17%	99.21%	99.78%	99.07%
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 pegging channel in CDMA system.

With respect to this parameter, the performance of the operators is quite satisfactory as **all operators met the TRAI specified benchmarks** on 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 0.29%) was for RCOM (CDMA) during the quarter.

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

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

The audit results for this parameter indicate that all operators **(except Aircel and Vodafone)** have met the bench mark successfully during the quarter. Quarterly average performance of **Aircel** and **Vodafone** was **7.33%** and **4.34%** 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 >=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 MEASURMENT DATA (3-DAYS) – JANUARY 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE – JANUARY 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	0.41%	0.01%	0.13%	0.01%	0.17%	0.14%	0.07%	0.09%	0.00%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	**>=95%**	Live data	97.30%	99.83%	96.81%	99.79%	99.59%	99.22%	99.09%	98.24%	98.81%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.32%	0.03%	0.41%	0.51%	0.02%	0.08%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	1.19%	0.08%	1.61%	0.43%	0.04%	0.20%	0.10%	0.02%	0.13%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	1.33%	0.65%	1.84%	0.64%	0.41%	1.60%	0.55%	0.31%	0.48%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	**8.16%**	0.65%	2.50%	1.85%	0.03%	**7.47%**	0.58%	1.21%	**3.20%**
	c) Connections with good voice quality	**>=95%**	Live data	97.02%	99.25%	96.96%	98.72%	98.67%	96.62%	99.21%	99.78%	99.04%
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 MEASURMENT DATA (3-DAYS) – FEBRUARY 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE - FEBRUARY 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	0.24%	0.01%	0.15%	0.02%	0.17%	0.06%	0.04%	0.14%	0.01%
	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%	99.83%	96.87%	99.86%	99.56%	99.45%	99.04%	98.40%	99.10%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.47%	0.03%	0.50%	0.27%	0.03%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	1.55%	0.11%	1.79%	0.87%	0.08%	0.07%	0.15%	0.02%	0.08%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	1.20%	0.56%	1.78%	0.58%	0.40%	1.10%	0.51%	0.24%	0.34%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	**7.51%**	0.52%	2.48%	2.60%	0.08%	**3.70%**	0.61%	1.47%	1.55%
	c) Connections with good voice quality	**>=95%**	Live data	97.00%	99.34%	96.95%	98.67%	98.64%	97.35%	99.21%	99.77%	99.12%
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 MEASURMENT DATA (3-DAYS) – MARCH 15 MONTH:

	CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- MARCH 15 MONTH											
	Live measurement Data	**Bench- mark**	**Average of 3 Days**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**RCOM CDMA**	**TATA CDMA**
				GSM Operators						**CDMA Operators**		
S/N	**Name of Parameter**											
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	**<=2%**	Live data	0.36%	0.01%	0.10%	0.01%	0.56%	0.12%	0.06%	0.54%	0.03%
	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	97.51%	99.85%	96.64%	99.81%	99.53%	99.34%	99.14%	98.19%	98.87%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.60%	0.02%	0.67%	0.39%	0.04%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	1.28%	0.09%	1.62%	1.42%	0.08%	0.17%	0.03%	0.02%	0.26%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	1.26%	0.52%	1.84%	0.61%	0.43%	1.17%	0.56%	0.31%	0.45%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	**7.07%**	0.58%	2.55%	2.20%	0.09%	2.84%	0.45%	1.74%	2.38%
	c) Connections with good voice quality	**>=95%**	Live data	97.26%	99.34%	96.79%	98.63%	98.59%	97.23%	99.21%	99.77%	99.04%
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 JANUARY TO MARCH 2015 MONTHS AUDITED DATA)

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE- MAR 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	0.34%	0.01%	0.13%	0.01%	0.30%	0.11%	0.06%	0.26%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.40%	99.84%	96.77%	99.82%	99.56%	99.34%	99.09%	98.28%	98.93%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.46%	0.03%	0.53%	0.39%	0.03%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	1.34%	0.09%	1.67%	0.91%	0.07%	0.15%	0.09%	0.02%	0.16%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.26%	0.58%	1.82%	0.61%	0.41%	1.29%	0.54%	0.29%	0.42%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	**7.58%**	0.58%	2.51%	2.22%	0.07%	**4.67%**	0.55%	1.47%	2.38%
	c) Connections with good voice quality	>=95%	Quarterly	97.09%	99.31%	96.90%	98.67%	98.63%	97.07%	99.21%	99.77%	99.07%
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 **Vodafone** with their performance as **7.58%** and **4.67%** (average of the quarter).

Aircel and Vodafone 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

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		Jan-15	3399	5728	1122	4691	2529	5847	998	990	1501
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Jan-15	9361.48	283.41	1153.00	244.54	5377.83	5696.65	478.84	1227.98	229.62
	c) BTS Accumulated Downtime	<=2%	Jan-15	0.37%	0.01%	0.14%	0.01%	0.29%	0.13%	0.06%	0.17%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jan-15	61	0	6	0	14	36	0	2	0
	e) Worst affected BTSs due to downtime	<=2%	Jan-15	1.79%	0.00%	0.53%	0.00%	0.55%	0.62%	0.00%	0.20%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Jan-15	97.14%	99.82%	96.56%	99.89%	99.60%	99.17%	99.03%	98.04%	98.93%
	b) SDCCH/PAGING Congestion	<=1%	Jan-15	0.55%	0.03%	0.49%	0.48%	0.02%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-15	1.96%	0.10%	1.68%	0.64%	0.05%	0.24%	0.06%	0.03%	0.05%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Jan-15	1.26%	0.64%	1.88%	0.61%	0.41%	1.35%	0.56%	0.26%	0.43%
	b) Worst affected cells>3% TCH drop	<=3%	Jan-15	7.85%	0.76%	2.52%	1.94%	0.03%	6.44%	0.71%	1.37%	3.36%
	c) % of connections with good voice quality	>=95%	Jan-15	97.11%	99.25%	97.13%	98.69%	98.70%	96.95%	99.21%	99.78%	99.08%
	d)Total No. of cells exceeding 3% TCH drop (call drop)		Jan-15	766	112	81	248	2	927	25	40	174
	e) Total no. of cells (Sector) in the licensed service area		Jan-15	9762	14644	3197	12812	6962	14398	3518	2920	5180
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		Jan-15	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Jan-15	0	0	0	0	0	0	0	0	0
5	**Network Data**											
	a) Equipped Capacity of Network in Erlang		Jan-15	130575	283357	100000	155275	96000	270125	93614	140000	288129
	b) Total traffic in TCBH in erlang (Avg.)		Jan-15	91888	211986	22685	137844	77219	217853	14623	93064	107317
	c) Total no. of customers served (as per VLR) on last day of the month		Jan-15	3284689	9203577	1129557	5419813	5159414	9674308	478619	2687450	1392946

Table title: Detailed Network Data Assessment of Cellular Mobile Telephone Services - Delhi Metro Circle – January 15 month

TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Delhi Metro Circle- January 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	3381	5723	1122	4690	2539	5825	993	989	1502
	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	1007.99	27.22	101.00	28.24	313.98	587.81	47.47	64.12	4.78
	c) BTS Accumulated Downtime	<=2%	Live data	0.41%	0.01%	0.13%	0.01%	0.17%	0.14%	0.07%	0.09%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	0	0	0	3	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.30%	99.83%	96.81%	99.79%	99.59%	99.22%	99.09%	98.24%	98.81%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.32%	0.03%	0.41%	0.51%	0.02%	0.08%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.19%	0.08%	1.61%	0.43%	0.04%	0.20%	0.10%	0.02%	0.13%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Live data	1.33%	0.65%	1.84%	0.64%	0.41%	1.60%	0.55%	0.31%	0.48%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	**8.16%**	0.65%	2.50%	1.85%	0.03%	**7.47%**	0.58%	1.21%	**3.20%**
	c) % of connections with good voice quality	>=95%	Live data	97.02%	99.25%	96.96%	98.72%	98.67%	96.62%	99.21%	99.78%	99.04%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	797	95	80	239	2	1036	20	35	166
	e) Total no. of cells (Sector) in the licensed service area		Live data	9774	14651	3196	12935	6960	13882	3518	2918	5180
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: 3

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		Feb-15	3472	5812	1122	4702	2519	5846	1007	987	1501
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Feb-15	5611.76	265.25	1162.00	542.15	4351.43	3372.35	368.31	1674.00	251.88
	c) BTS Accumulated Downtime	<=2%	Feb-15	0.24%	0.01%	0.15%	0.02%	0.26%	0.09%	0.05%	0.25%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Feb-15	31	0	7	0	9	19	0	4	0
	e) Worst affected BTSs due to downtime	<=2%	Feb-15	0.89%	0.00%	0.62%	0.00%	0.36%	0.33%	0.00%	0.41%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Feb-15	97.33%	99.83%	96.77%	99.92%	99.54%	99.41%	99.02%	97.99%	99.02%
	b) SDCCH/PAGING Congestion	<=1%	Feb-15	0.52%	0.03%	0.54%	0.40%	0.03%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-15	1.76%	0.11%	1.77%	0.93%	0.08%	0.13%	0.06%	0.04%	0.08%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Feb-15	1.18%	0.57%	1.87%	0.57%	0.41%	1.08%	0.52%	0.26%	0.42%
	b) Worst affected cells>3% TCH drop	<=3%	Feb-15	**6.72%**	0.64%	2.55%	1.94%	0.08%	**3.67%**	0.67%	1.30%	2.39%
	c) % of connections with good voice quality	>=95%	Feb-15	97.21%	99.33%	96.94%	98.68%	98.64%	97.35%	99.21%	99.78%	99.08%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Feb-15	667	95	82	244	5	558	24	38	124
	e) Total no. of cells (Sector) in the licensed service area		Feb-15	9916	14783	3203	12571	6932	15226	3565	2911	5178
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		Feb-15	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Feb-15	0	0	0	0	0	0	0	0	0
5	**Network Data**											
	a) Equipped Capacity of Network in Erlang		Feb-15	133692	287166	100000	149460	96000	286447	95119	140000	271999
	b) Total traffic in TCBH in Erlang (Avg.)		Feb-15	100676	228210	24292	141851	78609	112501	15197	100599	224227
	c) Total no. of customers served (as per VLR) on last day of the month		Feb-15	3296549	9311436	1114528	5383420	5212903	1396384	489391	2681183	9771335

Title row above table:
Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle - February 15 month

TABLE: 4

	Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live - Delhi Metro Circle – February 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	3413	5774	1122	4691	2519	5847	998	987	1501
	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	599.87	27.87	119.00	58.32	302.10	231.85	26.97	100.62	13.83
	c) BTS Accumulated Downtime	<=2%	Live data	0.24%	0.01%	0.15%	0.02%	0.17%	0.06%	0.04%	0.14%	0.01%
	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	97.38%	99.83%	96.87%	99.86%	99.56%	99.45%	99.04%	98.40%	99.10%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.47%	0.03%	0.50%	0.27%	0.03%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.55%	0.11%	1.79%	0.87%	0.08%	0.07%	0.15%	0.02%	0.08%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Live data	1.20%	0.56%	1.78%	0.58%	0.40%	1.10%	0.51%	0.24%	0.34%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	**7.51%**	0.52%	2.48%	2.60%	0.08%	**3.70%**	0.61%	1.47%	1.55%
	c) % of connections with good voice quality	>=95%	Live data	97.00%	99.34%	96.95%	98.67%	98.64%	97.35%	99.21%	99.77%	99.12%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	742	77	79	328	6	539	22	43	80
	e) Total no. of cells (Sector) in the licensed service area		Live data	9874	14818	3202	12624	6932	14580	3555	2911	5176
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

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle- March 15 month											
								GSM Operators			CDMA Operators	
Network Service Quality Parameter												
1	**Network Availability**											
	a) Total no. of BTSs in the licensed service area		Mar-15	3569	5927	1122	4702	2522	5840	1019	989	1494
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Mar-15	8153.97	288.07	1283.00	419.89	6981.32	8656.74	763.86	3057.88	625.35
	c) BTS Accumulated Downtime	<=2%	Mar-15	0.31%	0.01%	0.15%	0.01%	0.37%	0.20%	0.10%	0.42%	0.06%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Mar-15	39	0	9	0	14	73	2	17	2
	e) Worst affected BTSs due to downtime	<=2%	Mar-15	1.09%	0.00%	0.80%	0.00%	0.56%	1.25%	0.20%	1.72%	0.13%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Mar-15	97.35%	99.83%	96.88%	99.84%	99.51%	99.36%	99.09%	97.65%	98.97%
	b) SDCCH/PAGING Congestion	<=1%	Mar-15	0.59%	0.03%	0.59%	0.54%	0.04%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-15	1.56%	0.11%	1.75%	1.22%	0.09%	0.15%	0.04%	0.04%	0.15%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Mar-15	1.25%	0.53%	1.85%	0.63%	0.43%	1.17%	0.57%	0.34%	0.46%
	b) Worst affected cells>3% TCH drop	<=3%	Mar-15	7.41%	0.65%	2.47%	2.25%	0.10%	2.91%	0.77%	1.82%	2.60%
	c) % of connections with good voice quality	>=95%	Mar-15	97.28%	99.35%	96.99%	98.60%	98.60%	97.22%	99.21%	99.78%	99.06%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Mar-15	754	98	79	282	7	444	28	53	134
	e) Total no. of cells (Sector) in the licensed service area		Mar-15	10181	15066	3210	12557	6941	15256	3637	2917	5158
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		Mar-15	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Mar-15	0	0	0	0	0	0	0	0	0
5	**Network Data**											
	a) Equipped Capacity of Network in Erlang		Mar-15	137755	288922	100000	144590	96000	279032	96571	140000	285379
	b) Total traffic in TCBH in erlang (Avg.)		Mar-15	99485	212369	23064	136289	66028	219863	14852	100519	108442
	c) Total no. of customers served (as per VLR) on last day of the month		Mar-15	3393573	9361753	1115680	5477850	5444194	9771252	495620	2666725	1360843

TABLE: 6

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live - Delhi Metro Circle – March 15 month						GSM Operators				CDMA Operators	
Network Service Quality Parameter												
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		Live data	3520	5857	1122	4702	2519	5846	1016	988	1494
	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	910.57	28.17	83.00	47.59	1021.55	488.66	46.80	384.50	29.92
	c) BTS Accumulated Downtime	<=2%	Live data	0.36%	0.01%	0.10%	0.01%	0.56%	0.12%	0.06%	0.54%	0.03%
	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	97.51%	99.85%	96.64%	99.81%	99.53%	99.34%	99.14%	98.19%	98.87%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.60%	0.02%	0.67%	0.39%	0.04%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.28%	0.09%	1.62%	1.42%	0.08%	0.17%	0.03%	0.02%	0.26%
	Connection Maintenance (Retainability)											
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.26%	0.52%	1.84%	0.61%	0.43%	1.17%	0.56%	0.31%	0.45%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	**7.07%**	0.58%	2.55%	2.20%	0.09%	2.84%	0.45%	1.74%	2.38%
	c) % of connections with good voice quality	>=95%	Live data	97.26%	99.34%	96.79%	98.63%	98.59%	97.23%	99.21%	99.77%	99.04%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	721	88	82	285	6	433	16	51	123
	e) Total no. of cells (Sector) in the licensed service area		Live data	10196	15041	3211	12940	6933	15237	3643	2913	5156
	No. of POI's having >=0.5% POI congestion											
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

CUSTOMER SERVICE QUALITY (CSD) PARAMETERS

5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS-QE MAR.-15:

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

							GSM Operators				CDMA Operators		
S/ N	**Name of Parameter**	**Bench-mark**	**Circle Name**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**RCOM CDMA**	**TATA CDMA**
header: **QUARTERLY CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE MARCH 15**													
	Customer Service Quality Parameters											
	Metering & Billing Credibility -Post Paid											
1	A) No. of bills issued during the quarter		Delhi	224379	4971790	366822	2611544	437263	5837793	915	710235	403742
	B) No. of bills disputed including billing complaints during the quarter		Delhi	74	1660	179	2247	385	5660	0	647	2
	C)% of billing complaints during the quarter	<= 0.1%	Delhi	**0.03%**	**0.03%**	**0.05%**	**0.09%**	**0.09%**	**0.10%**	**0.00%**	**0.09%**	**0.00%**
	Metering & Billing Credibility -Pre Paid											
2	A) Total No. of Pre-paid customers at the end of the quarter		Delhi	4986594	8711676	2116255	5071929	5295387	7625366	1008236	2711284	2501628
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		Delhi	63	109	232	1240	4587	3699	251	2049	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	Delhi	**0.001%**	**0.001%**	**0.01%**	**0.02%**	**0.09%**	**0.05%**	**0.02%**	**0.08%**	**0.00%**
3	**Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints**											
	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		Delhi	137	1769	411	16598	4972	9359	251	2696	713
	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	137	1769	411	16595	4972	9359	251	2696	713

	QUARTERLY CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE MARCH 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*	137	1769	411	16598	4972	9359	251	2696	713
	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%**	**99.98%**	**100.00%**	**100.00%**	**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%**	**99.80%**	**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*	26215190	3698023	1007249	17959908	28509444	28169976	1755196	5957658	518910
	B) Total no. of calls successfully established to customer care/Call center.		*Delhi*	23865490	3627758	960345	17867070	28177463	28169976	1740762	5890826	498252
	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	*>=95%*	*Delhi*	**91.04%**	**98.10%**	**95.34%**	**99.48%**	**98.84%**	**100.00%**	**99.18%**	**98.88%**	**96.02%**
	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		*Delhi*	4435995	8113058	545735	6103283	1609212	8570185	1113703	300609	646913
	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		*Delhi*	4342168	7266538	537228	6046709	1555490	8444883	1096442	292956	621939
	F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts)	*>=95%*	*Delhi*	**97.88%**	**89.57%**	**98.44%**	**99.07%**	**96.66%**	**98.54%**	**98.45%**	**97.45%**	**96.14%**
5	**Termination/closure of service**											

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

S/ N	Quarterly CSD Audit Data / Name of Parameter	Bench-mark	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
	A) Total No. of requests for Termination / Closure of service received during the quarter		Delhi	2947	14268	10	22142	6359	15011	10	5924	4630
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		Delhi	2947	14268	10	22142	6359	15011	10	5924	4630
	C) % of Termination/ Closure of service within 7 days	<=7days	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
6	Time taken for refunds of deposits after closures.											
	A) No. of Payments/ Refunds due during the quarter		Delhi	2189	3382	127	7564	4065	23708	3	3012	1719
	B) No. of Payments/ Refunds Cleared during the quarter		Delhi	2189	3382	127	7564	4065	23708	3	3012	1719
	C) Time taken for refunds of deposits after closures.	100% within 60 days	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

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

	CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES – QE – MARCH 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	839961	137584	37949	574887	521478	985811	56550	111147	205978
	B) Total no. of calls successfully established to customer care/Call center.		Delhi	785381	137584	36520	571650	511543	985811	56084	109030	204630
	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	>=95%	Delhi	93.50%	100.00%	96.23%	99.44%	98.09%	100.00%	99.18%	98.10%	99.35%
	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		Delhi	145066	252937	19052	200364	30555	324229	51209	6360	18678
2	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		Delhi	143188	230025	18781	199347	29333	295094	50473	6279	18485
	F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts)	>=95%	Delhi	98.71%	90.94%	98.58%	99.49%	96.00%	91.01%	98.56%	98.73%	98.97%

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 <=0.1 %.

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. Only **Idea** failed to meet the benchmark marginally with its achieved level as **99.80 %** refund within one week.

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 **Aircel** are in compliance with respect to the parameter **Accessibility of call center. Aircel** failed to meet the benchmark with its performance as **91.04%.** Further, **Airtel** could not meet the benchmark of **'calls answered by Operators (voice to voice) within 90 seconds** having achieved its performance as **89.57%** against the benchmark of >=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. .

5. Time Taken for Refund of deposits after closures

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

Live Measurements

The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center 'and 'calls connection to operators (Voice to voice) within 90 seconds'. Only **Aircel** has not met the benchmark of **Accessibility with its performance as 93.50%, whereas Airtel and Vodafone also lagged behind the benchmark of 'calls answered by Operators (voice to voice) within 90 seconds'** having achieved their performance as **90.94% and 91.01%** respectively against the benchmark of >=95%.

6. LIVE CALLING ASSESSMENT

6) LIVE CALLING ASSESSMENT:

6.1 INTER OPERATOR CALLS ASSESSMENT:

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in 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:

Parameter	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
LIVE CALLING TO CALL CENTRE										
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	100	100
% Accessibility of Call centre /customer Care (Total calls successfully established * 100 / Total call attempts)	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	Delhi	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 90 seconds	Delhi	98	100	96	100	94	96	97	95	100
% age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100 / Total calls attempts)	Delhi	98.00%	100.00%	96.00%	100.00%	94.00%	96.00%	97.00%	95.00%	100.00%

In case of calls answered by operators (voice to voice) within 90 seconds when test calls were made to the call centers, Aircel, MTNL, RCOM (GSM), Vodafone, MTS and RCOM (CDMA) could connect 98%, 96%, 94%, 96%, 97% and 95% of calls to the operator .

6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS:

Parameter	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
PERFORMANCE (LIVE CALLING FOR BILLING COMPLAINTS)										
Total No. of calls Attempted	Delhi	137	123	154	139	159	122	144	111	128
Total No. of calls Answered	Delhi	100	100	100	100	100	100	100	100	100
Cases resolved within 4 weeks	Delhi	100	100	100	100	100	100	100	100	100
%age of cases resolved	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

To test the Service Providers performance on billing related complaints and their resolutions, TUV-SUD auditors conducted a customer feedback calling for about random 100 nos. of customers. However, in some cases, the number of customers contacted for verification was very less due to less number of billing complaints. During live calling, some of the customers did not attend the calls, so shortfall was made good by taking other complaints to make verification of 100 Complaints. Some of the complainants reported that they didn't exactly remember about the resolution of complaints. However, majority of the customers reported that the billing complaints were resolved to their satisfaction.

6.4 LEVEL -1 CALLING ASSESSMENT:

LEVEL 1 LIVE CALLING												
Emergency no.	Circle Name	SSA Name	No. of calls made	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	RCOM CDMA	TATA CDMA	MTS	VODAFONE
100	Delhi	East Delhi	3	√	√	√	√	√	√	√	√	√
101			3	√	√	√	√	√	√	√	√	√
102			3	√	√	√	√	√	√	√	√	√
1098			3	√	√	√	√	√	√	√	√	√
1091			3	√	√	√	√	√	√	√	√	√
1070			3	X	√	√	√	X	X	√	√	X
181			3	√	√	√	√	√	√	√	√	√
100	Delhi	Gurgaon & Faridabad	3	√	√	√	√	√	√	√	√	√
101			3	√	√	√	√	√	√	√	√	√
102			3	√	√	√	√	√	√	√	√	√
1098			3	√	√	√	√	√	√	√	√	√
1091			3	√	√	√	√	√	√	√	√	√
1070			3	X	X	√	√	X	X	√	√	√
181			3	√	√	√	√	√	√	√	√	√
100	Delhi	Noida & Ghaziabad	3	√	√	√	√	√	√	√	√	√
101			3	√	√	√	√	√	√	√	√	√
102			3	√	√	√	√	√	√	√	√	√
1098			3	√	√	√	√	√	√	√	√	√
1091			3	√	√	√	√	X	√	√	√	√
1070			3	√	√	√	√	√	√	√	√	√
181			3	√	√	√	√	√	√	√	√	√

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 **East Delhi (Municipal Area), Gurgaon/Faridabad and Noida & Ghaziabad** in the months of January, February and March 2015 respectively, the total route Kms covered during the drive tests in respective SSAs was **294 Kms, 312 Kms and 310 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: EAST DELHI (MUNICIPAL AREA) – JANUARY 15

DRIVE TEST TABLE: 1

S/N	Parameter	Classification of routes covered	AIRCEL OUTDOOR	AIRCEL INDOOR	AIRTEL OUTDOOR	AIRTEL INDOOR	MTNL OUTDOOR	MTNL INDOOR	IDEA OUTDOOR	IDEA INDOOR	RCOM GSM OUTDOOR	RCOM GSM INDOOR	VODAFONE OUTDOOR	VODAFONE INDOOR	MTS OUTDOOR	MTS INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
1	Call Attempts	Major Roads	164	30	154	30	155	30	144	30	150	30	164	42	165	30	144	29	178	30
		Highways	85	30	90	30	88	33	90	30	76	30	68	30	85	30	68	30	99	31
		Within City	245	30	218	30	246	35	244	31	227	30	242	30	241	30	245	30	246	31
		Overall SSA	**494**	**90**	**462**	**90**	**489**	**98**	**478**	**91**	**453**	**90**	**474**	**102**	**491**	**90**	**457**	**89**	**523**	**92**
2	Blocked Call Rate	Major Roads	0.61%	0.00%	3.25%	0.00%	10.97%	0.00%	1.39%	0.00%	2.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Highways	0.00%	0.00%	3.33%	0.00%	1.14%	6.06%	1.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.41%	0.00%	0.92%	0.00%	4.47%	2.86%	2.05%	0.00%	2.20%	3.33%	0.83%	0.00%	1.66%	0.00%	0.00%	0.00%	0.41%	0.00%
		Overall SSA	**0.40%**	**0.00%**	**2.16%**	**0.00%**	**5.93%**	**3.06%**	**1.67%**	**0.00%**	**1.77%**	**1.11%**	**0.42%**	**0.00%**	**0.81%**	**0.00%**	**0.00%**	**0.00%**	**0.19%**	**0.00%**
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	19.38%	0.00%	0.00%	0.00%	2.04%	0.00%	0.61%	0.00%	0.00%	0.00%	0.00%	0.00%	2.81%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	5.95%	26.92%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.03%	0.00%
		Within City	0.41%	0.00%	0.00%	0.00%	7.69%	10.34%	0.00%	0.00%	0.45%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.03%	0.00%
		Overall SSA	**0.20%**	**0.00%**	**0.00%**	**0.00%**	**10.83%**	**11.76%**	**0.00%**	**0.00%**	**0.90%**	**0.00%**	**0.21%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**2.49%**	**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	97.21%	99.93%	95.26%	84.23%	93.49%	100%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.17%	99.96%	93.27%	96.00%	94.80%	99.43%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.28%	99.69%	96.27%	92.15%	94.33%	100%
		Overall SSA	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**97.24%**	**99.86%**	**95.56%**	**86.80%**	**94.13%**	**99.81%**

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
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	**88.69%**	**94.24%**	96.39%	97.33%	**92.59%**	97.89%	**86.76%**	97.22%	**87.84%**	99.68%	95.82%	97.92%	NA	NA	NA	NA	NA	NA
		Highways	**89.97%**	95.84%	97.36%	97.20%	95.81%	**88.05%**	**89.71%**	98.31%	**88.50%**	**94.59%**	96.69%	99.54%	NA	NA	NA	NA	NA	NA
		Within City	**90.15%**	96.25%	96.60%	97.84%	**94.19%**	**93.67%**	**91.63%**	98.35%	**88.05%**	99.43%	95.13%	99.36%	NA	NA	NA	NA	NA	NA
		Overall SSA	**89.63%**	**95.44%**	**96.71%**	**97.45%**	**94.08%**	**93.75%**	**89.70%**	**97.95%**	**88.05%**	**97.87%**	**95.63%**	**98.87%**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
	Service Coverage																			
	In door (>= -75dBm)	Major Roads	93.00%	96.06%	97.54%	99.77%	64.52%	36.12%	57.40%	47.29%	63.24%	99.21%	92.84%	99.94%	97.74%	75.65%	85.34%	99.36%	98.76%	100%
		Highways	98.46%	75.05%	98.22%	100%	67.20%	39.76%	52.64%	32.37%	74.54%	82.87%	93.73%	100%	98.67%	100%	98.99%	100%	99.97%	100%
		Within City	90.80%	97.68%	98.24%	97.16%	68.90%	52.68%	49.75%	15.40%	57.82%	99.56%	91.83%	99.61%	94.86%	100%	90.41%	100%	99.57%	100%
		Overall SSA	**92.92%**	**89.69%**	**98.00%**	**98.98%**	**67.31%**	**42.94%**	**52.76%**	**31.69%**	**62.36%**	**93.95%**	**92.50%**	**99.85%**	**96.44%**	**91.83%**	**89.81%**	**99.79%**	**99.37%**	**100%**
5	**In-vehicle (>= -85dBm)**	Major Roads	97.25%	99.95%	99.00%	100%	91.92%	94.70%	95.96%	94.74%	91.42%	100%	98.20%	99.98%	99.94%	100%	99.42%	100%	99.89%	100%
		Highways	99.50%	99.84%	99.36%	100%	94.86%	93.24%	96.51%	97.12%	94.87%	99.43%	98.78%	100%	100%	100%	100%	100%	99.98%	100%
		Within City	97.90%	100%	99.38%	99.23%	95.13%	94.84%	92.64%	83.99%	89.82%	100%	98.67%	100%	99.88%	100%	99.64%	100%	99.96%	100%
		Overall SSA	**97.97%**	**99.93%**	**99.25%**	**99.74%**	**94.15%**	**94.32%**	**94.42%**	**91.88%**	**91.18%**	**99.81%**	**98.53%**	**99.99%**	**99.92%**	**100%**	**99.61%**	**100%**	**99.94%**	**100%**
	Outdoor- in city (>= -95dBm)	Major Roads	98.38%	100%	99.64%	100%	99.07%	99.98%	99.88%	99.80%	100%	100%	99.62%	100%	100%	100%	100%	100%	99.96%	100%
		Highways	99.82%	100%	99.81%	100%	99.85%	99.16%	99.92%	100%	100%	100%	99.38%	100%	100%	100%	100%	100%	99.99%	100%
		Within City	99.19%	100%	99.82%	99.84%	99.51%	99.62%	99.61%	99.72%	100%	100%	99.78%	100%	100%	100%	100%	100%	99.98%	100%
		Overall SSA	**99.03%**	**100%**	**99.76%**	**99.95%**	**99.45%**	**99.61%**	**99.75%**	**99.84%**	**100%**	**100%**	**99.66%**	**100%**	**100%**	**100%**	**100%**	**100%**	**99.98%**	**100%**
6	**Call Setup Success Rate (>=95%)**	Major Roads	98.17%	100%	96.75%	100%	**83.23%**	100%	98.61%	100%	98.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	96.67%	100%	95.45%	**78.79%**	98.89%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	98.78%	100%	98.17%	100%	**89.84%**	**82.86%**	97.95%	100%	97.80%	96.67%	98.76%	100%	98.34%	100%	100%	100%	99.59%	100%

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
		Overall SSA	98.79%	100%	97.40%	100%	88.75%	86.73%	98.33%	100%	98.23%	98.89%	99.37%	100%	99.19%	100%	100%	100%	99.81%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	98.65%	96.08%	97.11%	100%	86.32%	25.00%	100%	100%	93.64%	100%	98.80%	98.48%	100%	100%	100%	100%	100%	100%
		Highways	99.29%	100%	97.50%	100%	93.72%	79.14%	100%	100%	97.06%	98.57%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	98.83%	100%	97.83%	100%	81.93%	47.01%	99.50%	100%	95.05%	100%	99.22%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	98.84%	96.43%	97.50%	100%	85.27%	57.14%	99.77%	100%	94.80%	98.67%	99.19%	99.06%	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: GURGAON & FARIDABAD – FEBRUARY 15

DRIVE TEST TABLE: 2

S/N	Parameter	Classification of routes covered	AIRCEL OUTDOOR	AIRCEL INDOOR	AIRTEL OUTDOOR	AIRTEL INDOOR	MTNL OUTDOOR	MTNL INDOOR	IDEA OUTDOOR	IDEA INDOOR	RCOM GSM OUTDOOR	RCOM GSM INDOOR	VODAFONE OUTDOOR	VODAFONE INDOOR	MTS OUTDOOR	MTS INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
1	Call Attempts	Major Roads	154	30	172	31	155	31	178	30	161	30	160	30	138	31	178	30	170	32
		Highways	74	30	79	30	84	33	92	30	81	30	69	30	83	32	94	30	99	31
		Within City	220	30	195	30	208	30	210	31	224	30	200	30	259	36	231	30	234	31
		Overall SSA	**448**	**90**	**446**	**91**	**447**	**94**	**480**	**91**	**466**	**90**	**429**	**90**	**480**	**99**	**503**	**90**	**503**	**94**
2	Blocked Call Rate	Major Roads	0.65%	0.00%	0.58%	0.00%	2.58%	3.23%	0.00%	0.00%	3.11%	0.00%	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Highways	1.35%	0.00%	2.53%	0.00%	2.38%	0.00%	0.00%	0.00%	2.47%	0.00%	1.45%	0.00%	1.20%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.45%	0.00%	1.54%	0.00%	7.21%	0.00%	0.48%	0.00%	2.68%	0.00%	1.00%	0.00%	0.39%	0.00%	0.00%	0.00%	0.43%	0.00%
		Overall SSA	**0.67%**	**0.00%**	**1.35%**	**0.00%**	**4.70%**	**1.06%**	**0.21%**	**0.00%**	**2.79%**	**0.00%**	**1.17%**	**0.00%**	**0.42%**	**0.00%**	**0.00%**	**0.00%**	**0.20%**	**0.00%**
3	Dropped Call Rate (<=2%)	Major Roads	1.34%	0.00%	0.00%	0.00%	8.22%	0.00%	0.00%	0.00%	0.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.59%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	7.89%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	8.20%	0.00%	0.00%	0.00%	0.46%	0.00%	0.00%	0.00%	0.00%	0.00%	1.30%	0.00%	0.43%	0.00%
		Overall SSA	**0.46%**	**0.00%**	**0.00%**	**0.00%**	**8.15%**	**0.00%**	**0.00%**	**0.00%**	**0.44%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.60%**	**0.00%**	**0.40%**	**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	98.99%	99.91%	98.04%	100%	94.36%	99.91%		
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.30%	99.99%	97.50%	97.92%	98.38%	100%		
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.10%	99.94%	97.88%	99.25%	98.55%	100%		
		Overall SSA	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**99.10%**	**99.94%**	**97.87%**	**99.08%**	**97.09%**	**99.97%**		

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
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	93.48%	96.88%	96.23%	99.64%	94.46%	88.77%	92.52%	98.08%	91.70%	98.20%	94.89%	96.95%	NA	NA	NA	NA	NA	NA
		Highways	91.57%	97.97%	97.00%	98.09%	94.67%	99.53%	89.36%	97.82%	89.93%	99.76%	93.73%	99.53%	NA	NA	NA	NA	NA	NA
		Within City	93.66%	98.98%	96.19%	99.72%	94.31%	98.97%	92.83%	94.54%	92.92%	96.18%	96.08%	99.68%	NA	NA	NA	NA	NA	NA
		Overall SSA	93.23%	97.94%	96.38%	99.16%	94.43%	95.95%	92.05%	96.85%	92.03%	98.01%	95.25%	98.69%	NA	NA	NA	NA	NA	NA
	Service Coverage																			
	In door (>= -75dBm)	Major Roads	87.97%	85.94%	98.43%	100%	58.16%	49.50%	63.38%	64.02%	72.53%	90.33%	93.46%	99.88%	82.11%	11.62%	90.82%	100%	95.04%	100%
		Highways	87.56%	60.75%	98.62%	100%	62.52%	69.30%	58.93%	45.94%	69.15%	100%	94.34%	98.83%	71.16%	63.61%	97.53%	9.04%	99.64%	100%
		Within City	86.85%	94.99%	97.96%	100%	59.30%	69.20%	51.63%	95.92%	71.57%	94.69%	91.98%	98.79%	78.35%	100%	78.62%	100%	98.12%	100%
		Overall SSA	87.36%	80.57%	98.25%	100%	59.49%	63.07%	57.27%	68.08%	71.49%	95.19%	92.95%	99.15%	78.51%	60.16%	86.85%	68.37%	97.37%	100%
5	In-vehicle (>= -85dBm)	Major Roads	96.19%	99.77%	99.62%	100%	91.32%	91.30%	97.04%	99.02%	95.77%	99.97%	98.83%	100%	99.53%	54.60%	99.76%	100%	100%	100%
		Highways	96.91%	99.73%	99.51%	100%	93.20%	96.30%	97.63%	95.59%	96.02%	100%	98.98%	98.96%	99.29%	97.91%	99.95%	99.74%	100%	100%
		Within City	97.23%	100%	99.60%	100%	90.63%	95.00%	94.34%	100%	95.01%	99.72%	99.27%	99.64%	99.26%	100%	96.67%	100%	99.99%	100%
		Overall SSA	96.82%	99.83%	99.59%	100%	91.34%	94.31%	95.95%	98.16%	95.44%	99.89%	99.06%	99.51%	99.35%	84.94%	98.43%	99.91%	99.99%	100%
	Outdoor- in city (>= -95dBm)	Major Roads	99.33%	100%	99.87%	100%	99.20%	99.00%	99.94%	100%	100%	100%	99.72%	100%	100%	100%	100%	100%	100%	100%
		Highways	99.03%	99.99%	99.84%	100%	99.33%	100%	99.96%	99.87%	100%	100%	99.65%	99.04%	100%	100%	100%	100%	100%	100%
		Within City	99.44%	100%	99.88%	100%	99.30%	100%	99.79%	100%	100%	100%	99.78%	99.04%	100%	100%	99.85%	100%	99.99%	100%
		Overall SSA	99.33%	100%	99.87%	100%	99.27%	99.69%	99.88%	99.96%	100%	100%	99.73%	99.66%	100%	100%	99.93%	100%	100%	100%
6	Call Setup Success Rate (>=95%)	Major Roads	96.75%	100%	98.84%	100%	94.19%	93.55%	100%	100%	96.89%	100%	98.75%	100%	100%	100%	100%	100%	100%	100%
		Highways	97.30%	100%	97.47%	100%	90.48%	100%	100%	100%	97.53%	100%	98.55%	100%	98.80%	100%	100%	100%	100%	100%
		Within City	96.82%	100%	98.46%	100%	87.98%	100%	99.52%	100%	97.32%	100%	99.00%	100%	99.61%	100%	100%	100%	99.57%	100%

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
		Overall SSA	96.88%	100%	98.43%	100%	90.60%	97.87%	99.79%	100%	97.21%	100%	98.83%	100%	99.58%	100%	100%	100%	99.80%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	98.68%	100%	98.42%	100%	92.42%	55.65%	99.69%	100%	96.49%	100%	99.52%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	97.80%	100%	91.09%	100%	99.31%	100%	98.01%	100%	98.62%	100%	100%	100%	100%	100%	100%	100%
		Within City	99.63%	100%	99.44%	100%	84.72%	100%	100%	100%	97.33%	100%	98.14%	100%	99.97%	100%	100%	100%	100%	100%
		Overall SSA	99.37%	100%	98.72%	100%	88.73%	61.81%	99.77%	100%	97.12%	100%	98.72%	100%	99.99%	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: NOIDA & GHAZIABAD AREA (MARCH 15)

DRIVE TEST TABLE: 3

S/N	Parameter	Classification of routes covered	AIRCEL OUTDOOR	AIRCEL INDOOR	AIRTEL OUTDOOR	AIRTEL INDOOR	MTNL OUTDOOR	MTNL INDOOR	IDEA OUTDOOR	IDEA INDOOR	RCOM GSM OUTDOOR	RCOM GSM INDOOR	VODAFONE OUTDOOR	VODAFONE INDOOR	MTS OUTDOOR	MTS INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
1	Call Attempts	Major Roads	162	30	112	32	117	30	136	30	115	30	146	31	150	30	142	29	151	31
		Highways	129	30	139	31	141	30	136	30	143	30	146	30	124	30	143	30	135	30
		Within City	165	31	203	30	171	33	195	30	214	30	178	30	209	36	204	30	210	32
		Overall SSA	**456**	**91**	**454**	**93**	**429**	**93**	**467**	**90**	**472**	**90**	**470**	**91**	**483**	**96**	**489**	**89**	**496**	**93**
2	Blocked Call Rate	Major Roads	2.47%	0.00%	2.68%	0.00%	7.69%	0.00%	1.47%	0.00%	1.74%	0.00%	1.37%	0.00%	0.00%	0.00%	0.00%	0.00%	1.99%	0.00%
		Highways	1.55%	0.00%	0.72%	0.00%	4.96%	0.00%	0.74%	0.00%	3.50%	0.00%	0.00%	0.00%	0.81%	0.00%	0.00%	0.00%	0.74%	0.00%
		Within City	1.21%	0.00%	0.00%	0.00%	8.77%	9.09%	0.00%	0.00%	2.34%	0.00%	0.56%	0.00%	0.48%	0.00%	0.00%	0.00%	0.48%	0.00%
		Overall SSA	**1.75%**	**0.00%**	**0.88%**	**0.00%**	**7.23%**	**3.23%**	**0.64%**	**0.00%**	**2.54%**	**0.00%**	**0.64%**	**0.00%**	**0.41%**	**0.00%**	**0.00%**	**0.00%**	**1.01%**	**0.00%**
3	Dropped Call Rate (<=2%)	Major Roads	0.65%	0.00%	0.00%	0.00%	6.60%	0.00%	0.00%	0.00%	0.00%	0.00%	0.71%	0.00%	0.67%	0.00%	0.00%	0.00%	0.68%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	5.97%	0.00%	0.00%	0.00%	0.72%	0.00%	0.00%	0.00%	1.61%	0.00%	0.00%	0.00%	3.73%	3.33%
		Within City	0.00%	0.00%	0.00%	0.00%	4.49%	0.00%	0.00%	0.00%	0.48%	0.00%	0.00%	0.00%	0.48%	0.00%	0.49%	0.00%	1.44%	0.00%
		Overall SSA	**0.23%**	**0.00%**	**0.00%**	**0.00%**	**5.56%**	**0.00%**	**0.00%**	**0.00%**	**0.43%**	**0.00%**	**0.22%**	**0.00%**	**0.83%**	**0.00%**	**0.20%**	**0.00%**	**1.83%**	**1.08%**
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	98.32%	99.97%	97.31%	100%	96.98%	100%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.34%	99.91%	96.94%	100%	93.15%	99.72%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.47%	99.97%	96.43%	100%	98.10%	99.99%
		Overall SSA	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**98.65%**	**99.95%**	**96.85%**	**100%**	**96.42%**	**99.90%**

S/N	Parameter	Classification of routes covered	AIRCEL OUTDOOR	AIRCEL INDOOR	AIRTEL OUTDOOR	AIRTEL INDOOR	MTNL OUTDOOR	MTNL INDOOR	IDEA OUTDOOR	IDEA INDOOR	RCOM GSM OUTDOOR	RCOM GSM INDOOR	VODAFONE OUTDOOR	VODAFONE INDOOR	MTS OUTDOOR	MTS INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	92.42%	98.41%	96.54%	98.26%	91.90%	98.97%	88.34%	97.24%	89.45%	99.54%	95.46%	97.73%	NA	NA	NA	NA	NA	NA
		Highways	93.47%	98.79%	96.69%	99.82%	92.17%	96.05%	91.30%	96.76%	90.37%	99.44%	96.96%	99.56%	NA	NA	NA	NA	NA	NA
		Within City	93.12%	96.08%	96.80%	99.37%	93.03%	98.84%	90.21%	96.13%	93.14%	98.84%	95.86%	99.46%	NA	NA	NA	NA	NA	NA
		Overall SSA	92.98%	97.96%	96.69%	99.14%	92.44%	97.98%	89.99%	96.69%	91.36%	99.27%	96.08%	98.88%	NA	NA	NA	NA	NA	NA
	Service Coverage																			
	In door (>= -75dBm)	Major Roads	80.87%	98.48%	98.39%	100%	70.58%	64.24%	81.07%	98.49%	57.93%	99.88%	95.99%	99.97%	95.67%	100%	98.35%	100%	87.29%	100%
		Highways	91.26%	88.97%	97.25%	100%	59.25%	43.24%	83.51%	54.12%	47.23%	99.82%	95.21%	100%	84.52%	100%	99.87%	100%	81.12%	100%
		Within City	86.89%	65.37%	97.96%	100%	54.34%	59.69%	78.93%	100%	63.96%	99.89%	93.80%	100%	94.69%	97.58%	95.32%	100%	90.84%	100%
		Overall SSA	85.79%	86.21%	97.85%	100%	60.17%	55.82%	80.93%	84.54%	57.36%	99.86%	94.98%	99.99%	92.39%	99.22%	97.53%	100%	87.15%	100%
5	In-vehicle (>= -85dBm)	Major Roads	97.23%	99.96%	99.54%	100%	95.48%	98.83%	98.22%	99.91%	91.83%	100%	99.23%	100%	99.94%	100%	100%	100%	99.60%	100%
		Highways	97.89%	99.90%	99.25%	100%	93.33%	93.94%	97.80%	97.54%	88.66%	100%	99.07%	100%	99.97%	100%	99.99%	100%	99.75%	100%
		Within City	96.97%	99.38%	99.32%	100%	90.79%	93.21%	97.64%	100%	90.49%	100%	99.14%	100%	100%	100%	99.92%	100%	99.91%	100%
		Overall SSA	97.32%	99.78%	99.35%	100%	92.84%	95.31%	97.88%	99.17%	90.29%	100%	99.15%	100%	99.97%	100%	99.97%	100%	99.77%	100%
	Outdoor- in city (>= -95dBm)	Major Roads	98.92%	100%	99.86%	100%	99.72%	100%	99.72%	100%	100%	100%	99.76%	100%	100%	100%	100%	100%	100%	100%
		Highways	99.67%	100%	99.76%	100%	99.69%	99.61%	99.65%	99.98%	100%	100%	99.88%	100%	100%	100%	100%	100%	99.99%	100%
		Within City	98.80%	100%	99.81%	100%	98.93%	99.92%	99.88%	100%	100%	100%	99.76%	100%	100%	100%	100%	100%	99.98%	100%
		Overall SSA	99.08%	100%	99.81%	100%	99.38%	99.84%	99.76%	99.99%	100%	100%	99.80%	100%	100%	100%	100%	100%	99.99%	100%
6	Call Setup Success Rate (>=95%)	Major Roads	94.44%	100%	97.32%	100%	90.60%	100%	98.53%	100%	98.26%	100%	95.89%	100%	100%	100%	100%	100%	98.01%	100%
		Highways	97.67%	100%	99.28%	100%	95.04%	100%	99.26%	100%	96.50%	100%	98.63%	100%	99.19%	100%	100%	100%	99.26%	100%
		Within City	97.58%	96.77%	99.01%	100%	91.23%	90.91%	100%	100%	97.66%	100%	98.88%	100%	99.52%	100%	100%	100%	99.52%	100%

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
		Overall SSA	96.49%	98.90%	98.68%	100%	92.31%	96.77%	99.36%	100%	97.46%	100%	97.87%	100%	99.59%	100%	100%	100%	98.99%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	97.50%	100%	96.92%	100%	82.02%	97.30%	99.34%	100%	97.90%	100%	99.46%	100%	99.96%	100%	100%	100%	100%	100%
		Highways	94.35%	100%	94.41%	100%	85.00%	90.32%	100%	100%	97.29%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	93.95%	100%	98.93%	100%	77.17%	100%	99.70%	100%	98.06%	100%	99.26%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	95.36%	100%	97.24%	100%	81.36%	94.07%	99.62%	100%	97.80%	100%	99.56%	100%	99.98%	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

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**
East Delhi	**Jan-15**	**East Delhi /95KM**	Geeta colony, Krishan Nagar Ext., Khureji Khas, Nirman Vihar, South Ganesh Nagar, Mayur Vihar Phase1, Acharya Niketan (Mayur Vihar Phase1), Trilokpuri, Vashundra Enclave, Mayur Vihar Phase-3, Dalupura, New Kondli, Gazipur, IP ext-2, Madhu Vihar, Preet vihar, Mandawli, Patpadganj, IP Ext.(Mother Dairy Crossing), East Vinod Nagar, IP Park, CWG Village, Akshardham. **Indoor:** EDM Mall, Pacific Mall.	**East Delhi/98KM**	Dilshad Garden, Jhilmil, Welcome, Seelampur, Shastipark, Kailash Nagar, Gandhi Nagar, Laxmi Nagar, Madhuban Chowk, Vikas Marg, Jagatpuri, Dayanand Vihar, Karkardooma, Dr. Hedgewar Arogya Sansthan, Soorajmal, Kasturba Nagar, Viswas Nagar, Surya Niketan, Yamuna Sports Complex, Vivek Vihar, Jhilmil colony, Cross River Mall, Yojna Vihar, Anand Vihar, Seemapuri, Tahirpur, GTB Chowk, Ramprastah Crossing **Indoor:** Cross River Mall, Galaxy Mall.	**East Delhi/101KM**	Dilshad Garden, Jhilmil, Welcome, Seelampur, Shastipark, Bhajanpura, Yamuna Vihar, Gokalpur, Jawahar Nagar, New Shanti Nagar, Balram Nagar, Karawal Nagar, Pusta Road, Jyoti Nagar, Kabool Nagar, Shadra Metro, Seelampur, Jafrabad, Yamuna Vihar (C Block), Gownda Chowk, Maujpur, Nand Nagari, Balbir Nagar Ext., Dilshad Garden. **Indoor:** Dilshad Garden Metro, GTB Hospital.
Gurgaon& Faridabad	**Feb-15**	**Faridabad /107KM**	Badarpur, Sarai Karwaja, Badkal Chowk, EF3 Mall, Ballabhgarh, Sec-24, Bata Flyover, Sini Village, Sec-9, Sec-14, Sec-15, Sec-16, Sec-19, Old Faridabad, Sec-28 (Ralendra colony, Sec-31, SLF Mall, Bypass Sec-28,29, BPTP Chowk, Shiv colony, Ambedkar chowk, Mathura Road, Sec-23, Hardware Chowk, NIT3, NIT5, Neelam Chowk, Badarpur. **Indoor:** Crown Interior Mall, City Plaza	**Gurgaon /102KM**	Guru Dronacharya, Sikandarpur,MG road Metro, IFFCO chowk, Rajiv Chowk, Khandsa(NH-8), udyog Vihar Infinity Honda, Toll (NH-8), Sec-46, Sec-51, Sec-52, Paras hospital (Sec-42-43), DLF Phase-1, Shara Mall, DLF Phase-4, Huda City Center, Cyber Park, Jhandsa Village,Rajiv Chowk, Islampur Village, Sec-49, Sec-50, sec-51, Main Jhandsa Road, DLF PH-2, Gurudronacharya . **Indoor:** DLF Mega Mall, JMD Plaza.	**Gurgaon /103KM**	Gurudronacharya, Sikandarpur, Airtel, Lanco, Rajoukri Farm, Kapasheda, Dundahera, Sec-21, Sec-22, Sec-23, Huda Garden, kartarpuri village, Palam Vihar, Park View Resedency, Ashok Vihar PH-3, sec-5, Sec-3, Laxman Vihar, Phase-1(Dhanwapur Road), sec-4, Sec-7, Sec-9(Basai Road), Devilal Nagar, New Railway road, Civil lines, District library, Rose garden(Sec-15), rajiv Chowk, Jail

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
							Road (Sohna Chowk), Bada bazaar (Sohna Chowk), Pataudi Road, Kadi pur, Sec-10, Shivaji park mod, Sadar Bazar, Old delhi road, Katariya Chowk, Sheetla mata Mandir, Old Nh-8, Gurudronacharya. **Indoor:** Sahara Mall, Nathu's.
Noida & Ghaziabad	**Mar-15**	**Ghaziabad /102KM**	Dilshad Garden, GT Road(NH-10), Rajender Nagar, Raj Nagar Ext. crossing, GT Road Flyover, GT Nagar, BS Road, Lal Quan, Raddison, Vaishali, Indrapuram, Jaipuria school of business, Vasundhara, Judge Colony, Sahibabad (Industrial Area), Mohan Nagar, Rajender Nagar, Shalimar Garden Ext-II (Sahibabad), Dilshad Garden. **Indoor:** Mahagun Mall, Mega Mall	**Noida/103KM**	Sec-15, Sec16, Sec-18, Sec-37, Sec-45, Sec-71 (Mamura Village), Fortis Hospital (Sec-62), Sec-55, Sec-12-22 (Chowda), Sec-8, Bangel Village, Sec-49, Sec-37, Mahamaya Flyover, Ambedkar Park, Sec-8, Sec-10, Sec-15, Sec-34, Sec51, Sec-56, Sec-64, Sec-71, Bangela Village, Nithari Road, Harola, Sec-15. **Indoor:** Shoppix Mall, Vishal Mega Mart.	**Greater Noida/105KM**	Noida Sec-15, Mahamaya park, Amity university (Sec-125), Sec-93 (ATS Village), Sec-129, Panchshil Balak Inter College, Sec-132, Safipur Sec-148, India Expo Mart, NRI City, Pari Chowk, Radisson Hotel, Ecotech-I, Swarn Nagri, Delta-I, Eta-I, Delta-III, Gamma-II, Ryan International School, DPS Greater Noida, LG Chowk, Sharda University, Knowledge Park-III, Alpha-I, Alpha-III, Beta-III, Beta-II, Omicrone, Grand Heritage Hotel, City park, Kasna tower-I, Kailash Hospital (KP-I), Suraj Pur, Gamma-I, LG Chowk, Moser Baer, Suraj Pur Chowk, Yahamaha, Sutyana Village, Kulesra Village, Noida Ph-II, NSEZ, Bangel Village, Sec-49. **Indoor:** Ansal Plaza Mall, Pind Balluchi.

7.5 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 5

DRIVE TEST OBSERVATION OF EAST DELHI (MUNICIPAL) AREA – JANUARY 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	East Delhi Municipal Area	Poor Rx Level and quality Near Geeta Colony Road, Near Preeti Vihar, Near Chilla Saroda, Near Hasanpur Village, Near Mayur Vihar, Near New Kondli.	East Delhi Municipal Area	Poor Rx Level and Quality Near Maharaja Soorajmal Marg, Karkardooma, Preet Vihar, Gandhi Nagar.	East Delhi Municipal Area	Poor Rx Level Near Jafrabad, Poor Rx Quality Near Pusta Road, Mustafabad, Amar Colony, Jaffrabad.
2	AIRTEL		Poor Rx Level Near Ganesh Nagar, Gazipur, Poor Rx Quality Near Ganesh Nagar, Gazipur, Ashok Nagar, Kondli		Poor Rx Level Near Mayur Vihar, Poor Rx Quality Near New Seelampur, Mayur Vihar.		Poor Rx Level Near Saboli, Poor Rx Quality Near Nehru Vihar, Yamuna Vihar, GTB.
3	MTNL		Poor Rx Level Near Geeta Colony, Vikas Marg, Poor Rx Quality Near Ramdas Nagar, Gwari Mohalla, Shakarpur, Ganesh Nagar, Madhu Vihar, Mayur Vihar, Gazipur, Gagan Vihar.		Poor Rx Level Near Shastri Park, Vikas Marg, Shadra. Poor Rx Quality Near Yojana Vihar, Shastri Nagar, Gagan Vihar, Shakarpur, Ganesh Nagar, Karkarduma, Nandnagari.		Poor Rx Level Near Loni Road, Pusta B Block. Poor Rx Quality Near Loni Road, Balraj Nagar, Bhajanpura, Durgapuri, Pusta B Block, Shastri Park, Jagrati Enclave, Gazipur, Ganesh Nagar, Mayur Vihar.
4	TATA CDMA		Poor Rx Level Near Geeta Colony. Poor Rx Quality Near Geeta Colony, Ganesh Nagar, Shakrpur, Mayur Vihar, Ashok Nagar, Chilla Saroda, Khora Colony, Kondli, Madhu Vihar, Kalyanpuri, Preet Vihar, Gazipur Village, Trilokpuri.		Poor Rx Quality Near Geeta Colony, Pusta Road, Gandhi Nagar, Silampur, Shadra, Gazipur Road Block A, Surya Nagar, Maharaja Soorajmal Marg DDA Market, Block B Surajmal Vihar, Guru Nanak Pura, Laxmi Nagar, Swami Dayananad Marg Madhu Vihar, IP Extension, Patparganj, Kalyanpuri NH_24.		Poor Rx Quality Near Mangal Pandey Marg, Yamuna Vihar, Gokalpur, Kotwal Dhan Singh Gurjar Road Harijan Basti, Rajnagar, Ram Nagar Market Ramnagar, Shahdra, Mandoli Road.
5	IDEA		Poor Rx Level Near C Block Preeti Vihar, Anamika Apartment, Patparganj, Kalyanpuri, Trilokpuri, West Vinod Nagar. Poor Rx Quality Near Rajghat, Madhu Vihar, Patparganj, Hasanpur Village, Khora, Ganesh Nagar, CWG Apartment.		Poor Rx Level Near Seelampur, Surajmal Vihar. Poor Rx Quality Near Seelampur, Laprosy Colony, NCR Shalimar Garden, NCR Ramprastha, Hasanpur Village, Laxmi Nagar.		Poor Rx Level Near Sonia Vihar, Yojana Vihar Sahadra, GTB, Patpar Ganj. Poor Rx Quality Near Nehru Vihar, shiv Vihar, Patparganj, Loni Road, Saraswati kunj Apartment, Yojna Vihar, Sahadra, Saboli, Seelampur.

6	RCOM GSM		Poor Rx Level Near West Vinod Nagar, Madhu Vihar, Patparganj Industrial Area, Himmatpuri, Chilla Saroda, Ashok Nagar, Mayur Vihar, IP Extension. Poor Rx Quality Near Madhu Vihar, Shakarpur Khas, Vinod Nagar West, Patparganj, Patparganj Industrial Area, Preet Vihar, Hasanpur Village, Gazipur, Khora Colony, Himmatpuri, Ashok Nagar, Chilla Saroda, Pragati Bhawan		Poor Rx Level Near Viswas Nagar, Jwala Nagar, Nandnagari, Dilshad Garden, Surya Nagar, Madhu Vihar, Patparganj, Vinod Nagar. Poor Rx Quality Near Gandhi Nagar, Shastri Nagar, Viswas Nagar, Gagan Vihar, Sunder Nagari, Madhi Vihar, Patparganj, Patparganj Industrial Area, State Bank Colony.		Poor Rx Level Near Tukmeerpur, Balrampur, Laxmi Garden, Nandnagari, Dilshad Nagar. Poor Rx Quality Near Nand Nagari, Sahadra Tikona Park.
7	RCOM CDMA		Poor Rx Quality Near Govindpura Parwana Road, Laxmi Nagar, Gazipur, Himmatpuri, Khora Colony.		Poor Rx Quality Near Seelampur, Gandhi Nagar, Gagan Vihar, Yojna Vihar.		Poor Rx Quality Near Karawal Nagar, Mukund Vihar, Gonda Patti, Loni Road, Yamuna Vihar, Ajit Nagar.
8	MTS		Poor Rx Quality Near Gazipur Village, Patparganj, Kondli, Mayur Vihar, Laxmi Nagar,		Poor Rx Level Near Anand Vihar, New Ramprastha, Dilshad Garden. Poor Rx Quality Near Shahdra Colony, Preet Vihar Chowk, Nirman Vihar Metro, Gandhi Nagar, Pusta Road.		Poor Rx Quality Near Seelampur, Bhajanpura.
9	VODAFONE		Poor Rx Quality Near Kalyanpuri, Mayur Vihar.		Poor Rx Quality Near Jwala Nagar, Gandhi Nagar.		Poor Rx Quality Near Sonia Vihar, Sahadra.

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF GURGAON / FARIDABAD (FEBRUARY-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	Faridabad	Poor Rx Coverage and Rx Quality Near Prem Nagar, Sec-9, Sec-15, Dabua Colony.	Gurgaon	Poor Rx Coverage and Rx Quality Near Sec-46, Sahamaspur. Poor Rx Quality Near NH-8.	Gurgaon	Poor Rx Coverage Near Garden Estate, Jaffrabad. Poor Rx Quality Near Shankar Chowk, Sec-9 Gurgaon.
2	AIRTEL		Poor Rx Coverage Near Old faridabad. Poor Rx Quality Near Badarpur, Sec-15.		Poor Rx Quality Near Sec-12, Nathupur.		Poor Rx Quality Near Sec-24.
3	MTNL		Poor Rx Coverage and Rx Quality Near Sec-29, Sec-15, Sec-17, Ballabhgarh, NIT-4, Sanjay colony.		Poor Rx Coverage Near Islampur Gurgaon.Poor Rx Quality Near Sushant Lok, Sec-29, Sohna Road.		Poor Rx Coverage and Rx Quality Near Palam Vihar, Udyog Vihar-4, Udyog Vihar-5, Sec-4, DLF PH-3.
4	TATA CDMA		Poor Rx Quality Near Sec-21A, Daultabad, NH-2, D Block NIT, Saheed Bhagat Singh Marg, Sec-12, Anuvart Marg, Sihi Village, Ambedkar Chowk, Agrsen chowk.		Poor Rx Quality Near Sec-15 NH-8, B-Block,Huda City Center South City Gurgaon, Telecom House Sohna, Sec-38.		Poor Rx Quality Near New Palam Vihar, Sec-22 Old Delhi Gurgaon Road, Udyog Vihar PH-2, Sarhauli Abadi Old Delhi Gurgaon Road.
5	IDEA		Poor Rx Quality Near Sec-9, Sec-11, Sec-18.		Poor Rx Coverage Near Samashpur, Sec-39, South City. Poor Qulaity Near DLF PH-32, PH-53, Sec-39, South City.		Poor Rx Coverage and Rx Quality Near Sec-212, Sec-93, Sec-71, Palam Vihar, Sec-5.
6	RCOM GSM		Poor Rx Coverage Near Sec-9, Sec-6, sihi Village. Poor Rx Quality Near Sec-11, Sec-9, Ballabhgarh.		Poor Rx Coverage and Rx Quality Sec-18, Sec-12, Sushant Lok, Islampur Gurgaon, Sec-47.		Poor Rx Coverage and Rx Quality Near Palam Vihar, Sarhauli Abadi, Palam Vihar, Molhera Village, Sec-18.
7	RCOM CDMA		Poor Rx Coverage and Rx Quality Near Faridabad Sec-6.		Poor Rx Coverage Near Sohna Road.		Poor Rx Quality Near Rajendra Park, Hiranagar.
8	MTS		Poor Rx Quality Near Sec-16 Faridabad, Jawahar Colony.		Poor Rx Quality Near Ph-6 Gurgaon.		Poor Rx Quality Near Inayatpur.
9	VODAFONE		Poor Rx Coverage and Rx Quality Sec-9, Sec-18, Sec-6.		Poor Rx Quality Near Sec-29, Islampur. Poor Rx Coverage Near Jharsa.		Poor Covearge and Quality Near Dundhera Village, Udyog Vihar PH-4, Palam Vihar.

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF NOIDA & GHAZIABAD – MARCH 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	Gaziabad	Poor Rx Coverage Near Vikram Enclave (Sahibabad), Vashundra Sec-9, Arya Nagar, Vijay Nagar. Poor Rx Quality Near Geeta Colony Road, Sanjay Nagar, Budh Vihar, Vashundra Sec-9.	Noida	Poor Rx Coverage and Rx Quality Near Sec-62, Sec-60 Noida.	Greater Noida	Poor Rx Quality Near Beta Sec, Noida Expressway.
2	AIRTEL		Poor Rx Coverage and Rx Quality Near Shyam Park Gaziabad, Dasna Gate.		Poor Rx Coverage and Rx Quality Near Sec-35, Khora Colony.		Poor Rx Coverage and Rx Quality Near Beeta-2 Sec.
3	MTNL		Poor Rx Quality Near Shalimar Garden, Sahibabad, Vashundra Sec-9, Makanpur, Gian Kund, RK Alloys (GT Road), Village Dundhera.		Poor Rx Coverage and Rx Quality Near Sec-62, Adarsh Nagar, Khora Colony, Sec-60, Sec-55, Sec-30, Sec-9, Sec-18, Sec-51.		Poor Rx Coverage and Rx Quality Near Noida Expressway, In Greater Noida.
4	TATA CDMA		Poor Rx Quality Near NH_91, Mahamaya Stadium, Hindon Motel, Mata Ka Mandir , NH-24 near Sec-63, Ghanta Ghar, Shahpur Village.		Poor Rx Quality Near Mayur Vihar PH-2, Bishanpura, Sec-55,23, Gijihor Village Chauraha, DSC Marh Sec-2, Sec-50 Near D- Block.		Poor Rx Quality Near TCS Sec-135, Nalagarh Taj Expressway.
5	IDEA		Poor Rx Coverage Near Raj Nagar. Poor Rx Quality Near LBS Hockey Stadium, Ganga Vihar, Jhandpur Village.		Poor Rx Coverage Near DND Toll Plaza. Poor Rx Quality Near Sec-63, Sec-51, DND Toll Plaza, Sec-40, Spice World Mall, Khora Colony.		Poor Rx Coverage Near Nagla Nagli. Poor Rx Quality Near Safipur, Harsh Mall, Sec-40, Janta Apartmaent, DND Toll Plaza.
6	RCOM GSM		Poor Covearge and Quality Near Rajendra Gar, Sahibabad, Bulendsher Road, Niti Khand, Indirapuram. Poor Rx Quality Near Rampuri, Budh Vihar, Adarsh Nagar.		Poor Rx Coverage and Rx Quality Near Sec-19, NTPC, Sec-60, Sec-62, Sec-50, Barauta, Sec-31, Sec-35, Sec-5, Sec-16, Sec-18. Poor Rx Quality Near Azad Vihar, Khora Village, Sec-41, Sec-51, Sec-37.		Poor Rx Coverage and Rx Quality Near Sec-16, Filmcity, Sec-41, Barula Bhangel, Dadri Road, Surajpur, Kasana Mor.
7	RCOM CDMA		Poor Rx Quality Near Bazaria, Indirapuram.		Poor Rx Quality Near Khora Colony, Sec-51, Sec-50, Nagarjuna Appartment.		Poor Rx Quality Nera Greater Noida Beat Sec.
8	MTS		Poor Rx Quality Near Rajnagar B Block, Vashundra.		Poor Rx Quality Near Sec-47.		Poor Rx Quality Near Gamma-1.
9	VODAFONE		Poor Rx Quality Near Malviya Marg, Lal Kuan Industrial Area.		Poor Rx Quality Near Sec-6, Sec-19, Sec-18, Sec-56.		Poor Rx Quality Near Beeta-2.

DRIVE TEST TABLE: 8

NO NETWORK COVERAGE STATUS OF DRIVE TEST – JANUARY TO MARCH 15

S No	Month of Drive Test	Circle	Name of Operators	SSA	Total SDCA Covered	Status of no network coverage area	ICR Status
1	Jan'15	Delhi	AIRCEL	East Delhi	East Delhi	No Coverage Issue	NO
			AIRTEL			No Coverage Issue	NO
			MTNL			No Coverage Issue	NO
			IDEA			No Coverage Issue	NO
			RCOM (GSM)			No Coverage Issue	NO
			VODAFONE			No Coverage Issue	NO
			MTS			No Coverage Issue	NO
			RCOM (CDMA)			No Coverage Issue	NO
			TATA (CDMA)			No Coverage Issue	NO
2	Feb'15	Delhi	AIRCEL	Gurgaon and Faridabad	Gurgaon and Faridabad	No Coverage Issue	NO
			AIRTEL			No Coverage Issue	NO
			MTNL			No Coverage Issue	NO
			IDEA			No Coverage Issue	NO
			RCOM (GSM)			No Coverage Issue	NO
			VODAFONE			No Coverage Issue	NO
			MTS			No Coverage Issue	NO
			RCOM (CDMA)			No Coverage Issue	NO
			TATA (CDMA)			No Coverage Issue	NO
3	Mar'15	Delhi	AIRCEL	Noida and Ghaziabad	Noida and Ghaziabad	Film City, Sec-71, Mahamaya Park	NO
			AIRTEL			No Coverage Issue	NO
			MTNL			No Coverage Issue	NO
			IDEA			No Coverage Issue	NO
			RCOM (GSM)			No Coverage Issue	NO
			VODAFONE			No Coverage Issue	NO
			MTS			No Coverage Issue	NO
			RCOM (CDMA)			No Coverage Issue	NO
			TATA (CDMA)			No Coverage Issue	NO

7.6 KEY FINDINGS ON DRIVE TEST:

The drive tests conducted across different routes of **Delhi/NCR** region such as **East Delhi, Gurgaon & Faridabad and Ghaziabad, Noida, Greater Noida,** given above in table-4, during three months of the quarter ended March 2015, revealed that the performance of some of the service providers was not satisfactory as they remained non-compliants 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:

January-2015: (East Delhi)

1. **MTNL:** Call Drop Rate: **10.83%** (Outdoor) / **11.76%** (Indoor), Voice Quality: **94.08%** (Outdoor) / **93.75%** (Indoor), Call Setup success rate (CSSR): **88.75%** (outdoor) / **86.73%** (Indoor) and Blocked call rate: **5.93%** (outdoor).

2. **Aircel, Idea, RCOM (GSM) & RCOM (CDMA):** Remained under performed for parameter **Voice Quality** with their performance as **89.63%** (Outdoor), **89.70%** (Outdoor), **88.05% (**Outdoor) and **86.80%** (Indoor) respectively.

3. **Tata (CDMA):** Call Drop Rate (**2.49%) ,** Voice Quality: **94.13%**

February-2015 (Gurgaon & Faridabad)

1. **MTNL:** Call Drop rate: **8.15%** (Outdoor), Voice Quality: **94.43%,** CSSR: **90.60%** (outdoor) and Blocked Call rate: **4.70%** (Outdoor).

2. **Aircel, Idea and RCOM (GSM):** Remained under performed for parameter **Voice Quality** with their performance as **93.23%** (Outdoor), **92.05%** (Outdoor) and **92.03%** (Outdoor) respectively.

March-2015 (Ghaziabad, Noida & Greater Noida):

1. **MTNL:** Call drop rate: **5.56%** (Outdoor), Voice Quality: **92.44%** (Outdoor), CSSR: **92.31%** (Outdoor) and Blocked Call rate: **7.23%** (Outdoor) / **3.23%** (Indoor).

2. **Aircel, Idea and RCOM GSM:** Remained under performed for parameter **Voice Quality** with their performance as **92.98%** (Outdoor), **89.99%** (Outdoor) and **91.36%** (Outdoor) respectively.

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.

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

*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** failed to comply with its bench mark. However, apart from Voice Quality, **MTNL** remained non- compliant in respect of other parameters also like **Call Drop rate, Call setup success rate and Blocked Call rate**, in different areas of Delhi./NCR region. These operators need to take corrective action to improve their networks.*

8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT
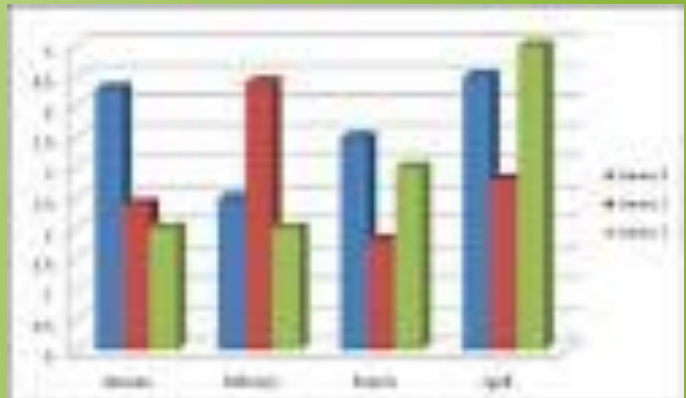
8) GRAPHICAL REPRESENTATION:

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

1. **BTS ACCUMULATED DOWNTIME :**

BTS Accumulated Downtime

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	0.31%	0.01%	0.15%	0.01%	0.31%	0.14%	0.07%	0.28%	0.03%
Quarterly Live	0.34%	0.01%	0.13%	0.01%	0.30%	0.11%	0.06%	0.26%	0.01%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
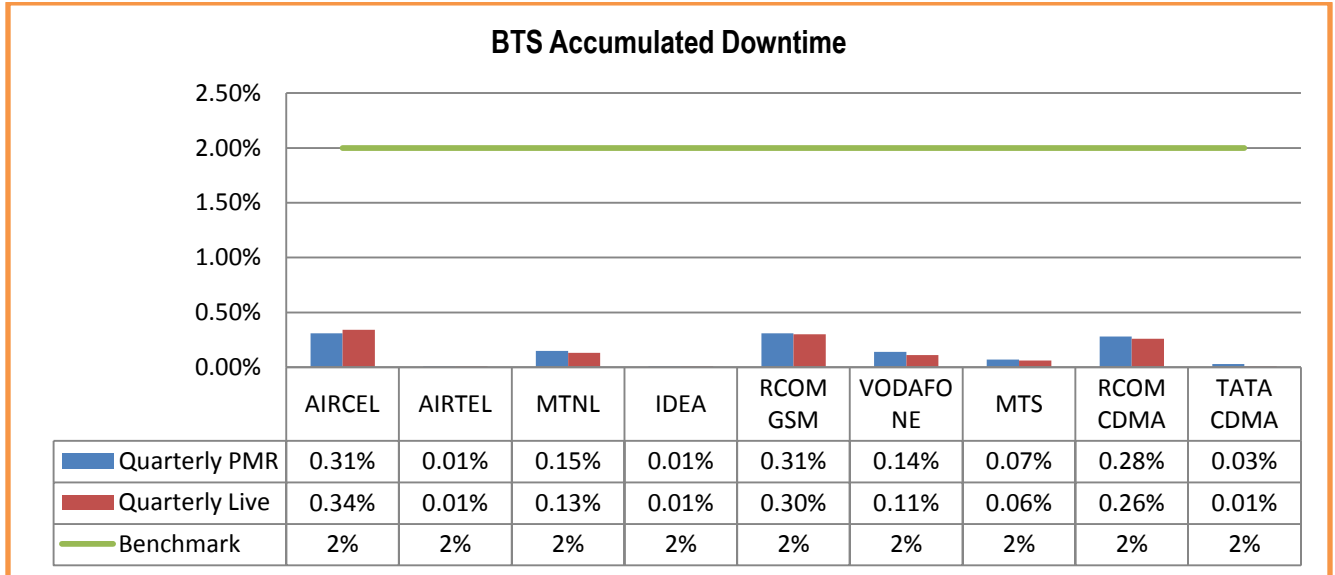
All operators are meeting the benchmarks.

2. **WORST AFFECTED BTSs DUE TO DOWNTIME :**

Worst affected BTSs due to downtime

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	1.26%	0.00%	0.65%	0.00%	0.49%	0.73%	0.07%	0.78%	0.04%
Quarterly Live	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
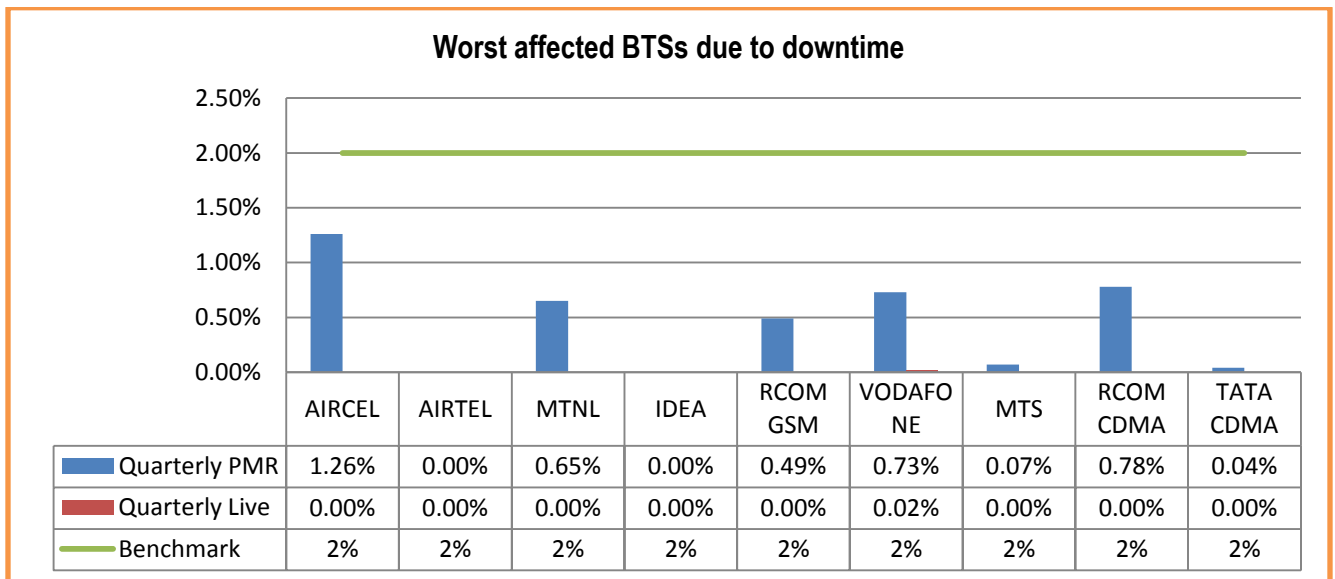
All operators are meeting the benchmarks.

3. CALL SETUP SUCCESS RATE :

Call Setup Success Rate

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	97.27%	99.83%	96.74%	99.88%	99.55%	99.31%	99.05%	97.89%	98.97%
Quarterly Live	97.40%	99.84%	96.77%	99.82%	99.56%	99.34%	99.09%	98.28%	98.93%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%
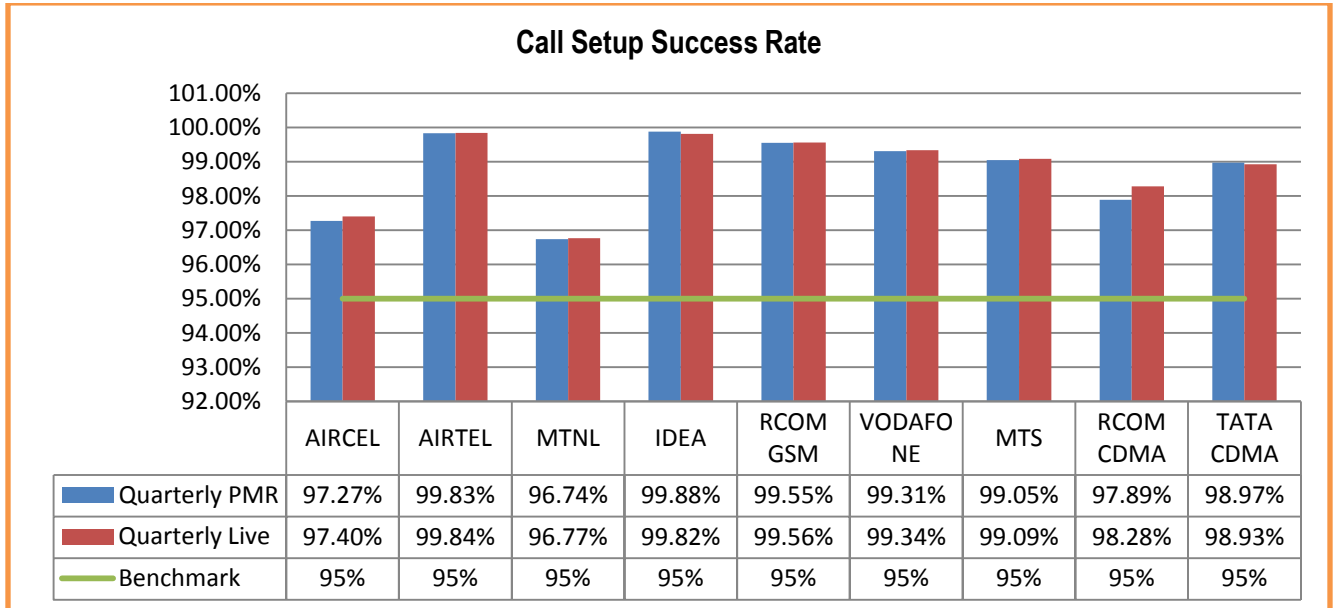
All operators are meeting the benchmarks.

4. SDCCH/PAGING CHANNEL CONGESTION :

SDCCH/PAGING Channel Congestion

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	0.55%	0.03%	0.54%	0.47%	0.03%	0.06%	0.00%	0.00%	0.00%
Quarterly Live	0.46%	0.03%	0.53%	0.39%	0.03%	0.05%	0.00%	0.00%	0.00%
Benchmark	1%	1%	1%	1%	1%	1%	1%	1%	1%
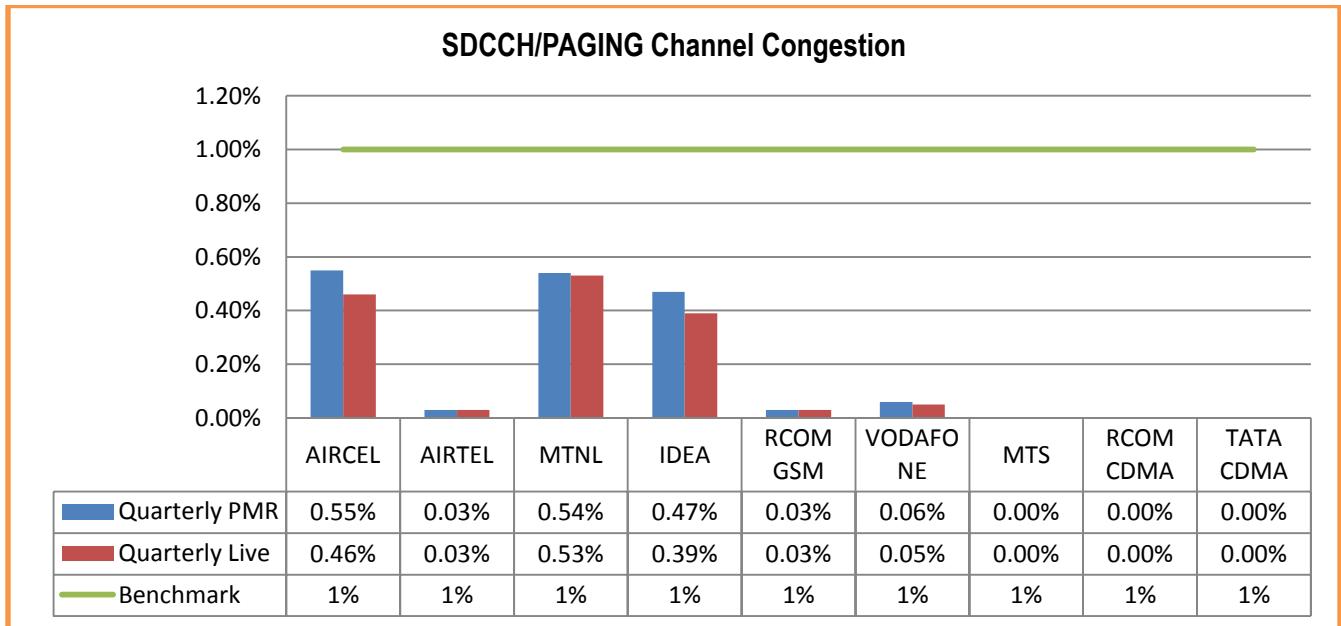
All operators are meeting the benchmarks.

5. TCH CONGESTION :

TCH Congestion

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFO NE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	1.76%	0.11%	1.73%	0.93%	0.07%	0.17%	0.05%	0.04%	0.09%
Quarterly Live	1.34%	0.09%	1.67%	0.91%	0.07%	0.15%	0.09%	0.02%	0.16%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
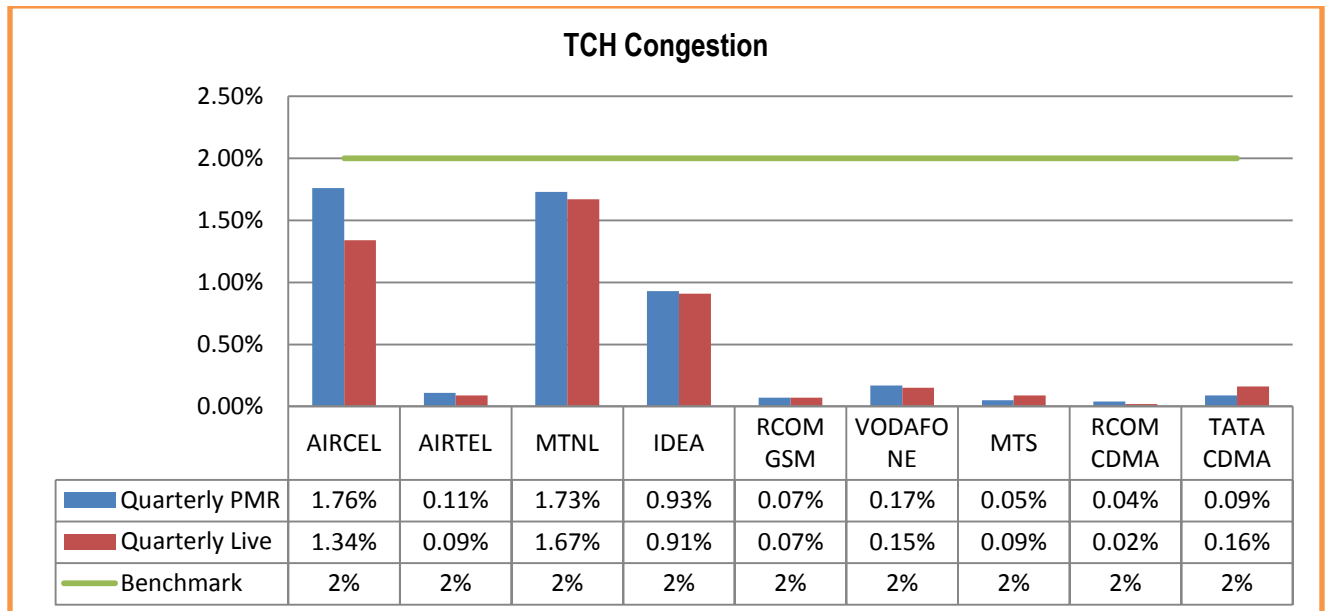
All operators are meeting the benchmarks.

6. CALL DROP RATE :

Call Drop Rate

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFO NE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	1.23%	0.58%	1.87%	0.60%	0.42%	1.20%	0.55%	0.29%	0.44%
Quarterly Live	1.26%	0.58%	1.82%	0.61%	0.41%	1.29%	0.54%	0.29%	0.42%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
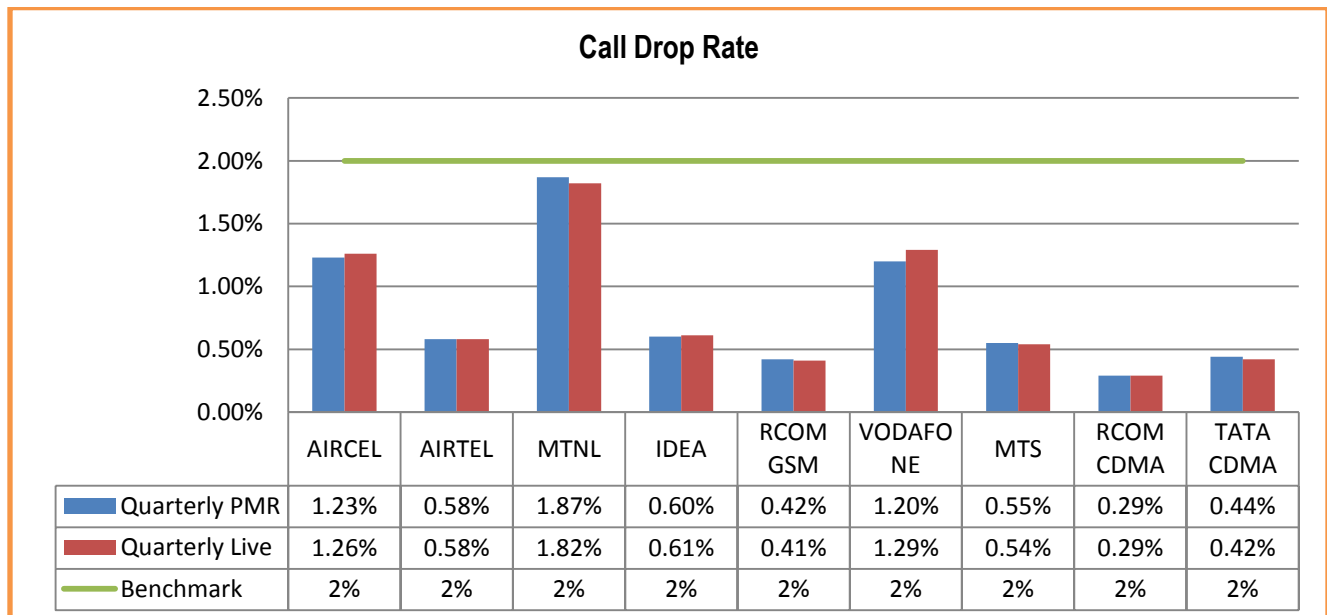
All operators are meeting the benchmarks.

7. WORST AFFECTED CELLS>3% TCH DROP :

Worst affected cells>3% TCH drop

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	7.33%	0.68%	2.51%	2.04%	0.07%	4.34%	0.72%	1.50%	2.78%
Quarterly Live	7.58%	0.58%	2.51%	2.22%	0.07%	4.67%	0.55%	1.47%	2.38%
Benchmark	3%	3%	3%	3%	3%	3%	3%	3%	3%
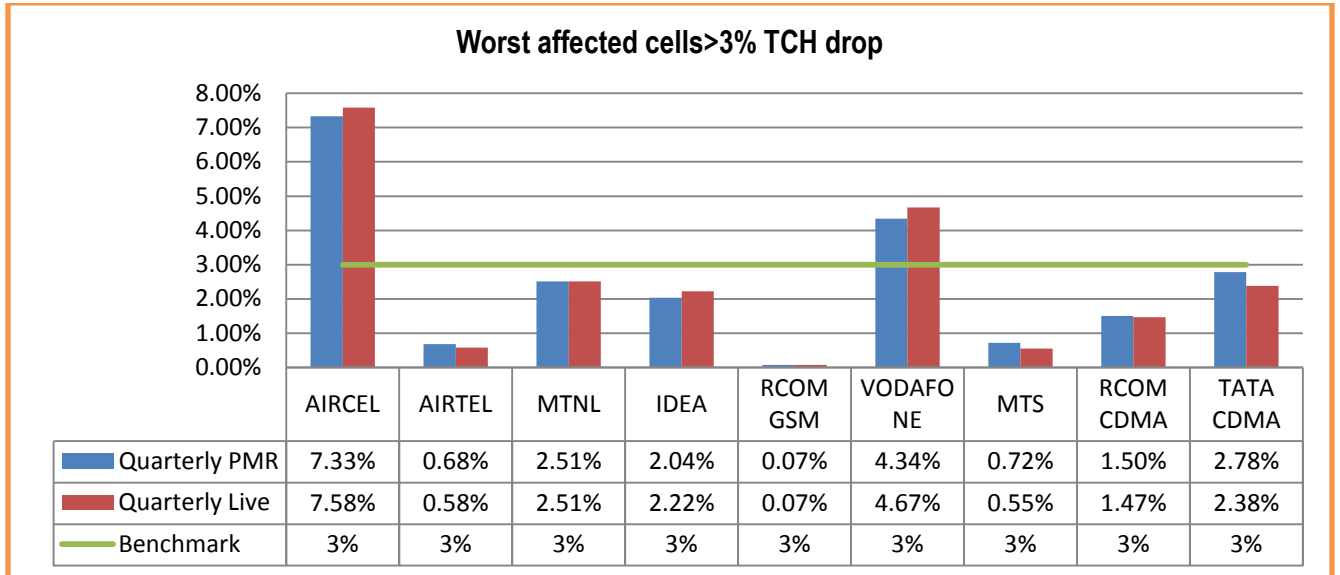
All operators are meeting the benchmarks except Aircel & Vodafone.

8. PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY :

% Connections with good voice quality

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	97.20%	99.31%	97.02%	98.66%	98.65%	97.17%	99.21%	99.78%	99.07%
Quarterly Live	97.09%	99.31%	96.90%	98.67%	98.63%	97.07%	99.21%	99.77%	99.07%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%

All operators are meeting the benchmarks.