TRAI

REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICE

FOR

TELECOM REGULATORY AUTHORITY OF INDIA

NORTH ZONE – DELHI METRO SERVICE AREA

(APRIL 2014 – JUNE 2014)

PREPARED FOR:

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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 is 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 is also undertaken for Punjab, Rajasthan & Gujarat circles during the quarter April – June 2014.**

The Scope of work as per the Terms of Reference (TOR) includes the following:

i)   Preparation of Performance Monitoring reports (PMRs) and uploading in the system.

ii)   Live measurements of the performance of Service Providers (SPs) against the benchmarks for three days during each audit.

iii)   Monthly audit based on one month data of the SPs.

iv)   Drive test of the RF networks.

v)   Audit of the performance of call centers with respect to their accessibility and percentage of calls answered by the operators and random customer feedback by calling the customers to get feedback of the services provided by the service providers.

vi)   Transfer of data generated by the RF drive test/Live measurements / PMR/ monthly audit to the server located at TRAI premises on real time basis.

3. SAMPLE SIZE
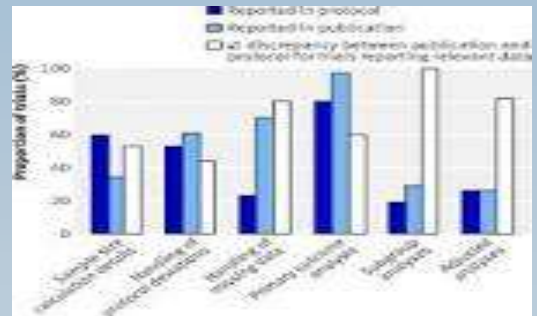
3) SAMPLE SIZE:

3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS

- 100% of the Gateway MSC's (GMSC's) and Mobile Switching Centers (MSC's) of all the Cellular Mobile Service Providers or Unified Access Service Providers (UASP) were covered for audit in specified circles/service areas. Following are the various operators covered in Delhi Metro circle

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location
		April-14	May-14	June-14	
GSM Operators					
1	AIRCEL	21 to 23 April-14	12 to 14 May-14	5 to 6, 9 June-14	MTNL Exchange Karol Bagh Near Rejendra Place Metro Stn.New Delhi.
2	AIRTEL	28 to 30 April-14	15 to 16, 19 May-14	19 to 20, 23 June-14	Plot No 16 Udhyog Vihar Ph-4 Gurgaon Haryana.
3	MTNL	19, 21 to 22 April-14	7 to 9 May-14	9 to 11 June-14	MTNL Exchange Karol Bagh Near Rajendra Place Metro Stn.New Delhi.
4	IDEA	17, 21 to 22 April-14	12 to 14 May-14	20, 23 to 24 June-14	Idea Cellular Limited, E-5, Sector-63, Noida (UP)
5	RCOM GSM	10 to 11, 14 April-14	8 to 9, 12 May-14	17 to 19 June-14	Reliance Center Maharaja Ranjit Singh Hotel, Maharaja Ranjit Singh Marg New Delhi.
6	VODAFONE	16 to 17, 21 April-14	9, 12 to 13 May-14	20, 23 to 24 June-14	A-19 Mohan Cooperative Industrial Estates, Mathura Road New Delhi.
CDMA Operators					
7	MTS	28 to 30 April-14	13 to 15 May-14	12 to 13, 14 June-14	A-194 Okhla Phase 1 New Delhi
8	RCOM CDMA	10 to 11, 14 April-14	8 to 9, 12 May-14	17 to 19 June-14	Reliance Center Maharaja Ranjit Singh Hotel, Maharaja Ranjit Singh Marg New Delhi.
9	TATA CDMA	14 to 16 April-14	13 to 15 May-14	11 to 13 June-14	TTSL 2 A Old Iswar Nagar Near NFC New Delhi

For all the above operators, audit was conducted in all the three months of the Quarter ended June 2014.

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. **However**, **QoS audit for basic (wire line) service was not required to be done for Delhi Metro Circle in the quarter ended June 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. However, **the QoS audit for Broadband service was not required to be done for Delhi Metro Circle in the quarter ended June 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:

(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** was non-compliant in respect of the parameters **'Worst affected BTSs due to down time', SDCCH Channel Congestion** and **'Worst affected Cells > 3% TCH Drop'** with its quarterly average performance as **2.88%, 1.38% and 7.03%** 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** with its performance as **6.50%** (average of the quarter). However on monthly basis, the performance of **Tata (CDMA)** and **RCOM (CDMA)** was **3.76%** (May-14) and **3.91%** (June-14), though their average performance on quarterly basis was well within the benchmark. **Aircel has shown the similar non compliance for this parameter in case of monthly audit also.**

(iii) With regard to the **Customer Service Quality Parameters,** all service providers were found in well compliance of most of the parameters on Metering and Billing Credibility, Response Time to Customers, Termination of Service and Time taken for refunds. However, **Airtel** and **RCOM (GSM)** were unable to meet the benchmark of **'calls answered by Operators (voice to voice) within 60 seconds'**. They achieved their performance as **73.40% and 73.03%** respectively that is much below the benchmark of >=90. With regard to the parameter '**Refund of deposits within 60 days of closure', MTS** remained extremely poorly performed operator with its achieved value as **0.00%** as it failed to settle even a single case of refund out of 145 cases due for refund and **Tata CDMA** also failed to meet the benchmark with its performance as **99.93%,** marginally below the benchmark of 100%.

In case of the parameters '**Termination/Closure'**, only **Aircel** failed to meet benchmark with its performance as **99.44%,** marginally below the benchmark of 100%.

In case of the parameters '**Resolution of Billing / Charging / Validity Complaints'**, only **Tata (CDMA)** failed to meet the benchmark with its performance as **99.93%,** marginally below the benchmark of 100%.

In case of the parameters '**Period of Applying Credit / Waiver/ Adjustment to Customers account from the data of resolution of Complaints'**, only **Airtel** failed to meet the benchmark with its performance as **99.95%,** marginally below the benchmark of 100%.

(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** 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.

5. PMR AUDIT REPORT

5) PMR AUDIT REPORTS:

5.1 MONTHLY PMR:

5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
GSM Operators			
1	AIRCEL	June-14	20:00 - 21:00
2	AIRTEL	June-14	19:00 - 20:00
3	MTNL	June-14	20:00 - 21:00
4	IDEA	June-14	20:00 - 21:00
5	RCOM GSM	June-14	19:00 - 20:00
6	VODAFONE	June-14	20:00 - 21:00
CDMA Operators			
7	MTS	June-14	20:00 - 21:00
8	RCOM CDMA	June-14	20:00 - 21:00
9	TATA CDMA	June-14	20:00 - 21:00

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	2961	NSN	NSN
2	AIRTEL	31	55	5473	Ericsson	Ericsson
3	MTNL	6	31	1119	NSN	NSN
4	IDEA	10	39	4661	NSN	NSN
5	RCOM GSM	4	14	2552	Huawei	Huawei
6	VODAFONE	15	53	5801	Ericsson	Ericsson
CDMA Operators						
7	MTS	1	5	945	ZTE	ZTE
8	RCOM CDMA	7	NA	999	Lucent & ZTE	Lucent
9	TATA CDMA	9	8	1494	Huawei	Huawei

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

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- APRIL-14 MONTH											
PMR Generation Data						GSM Operators					CDMA Operators	
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	<=2%	Apr-14	0.83%	0.01%	0.48%	0.00%	0.27%	0.02%	0.04%	0.12%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	Apr-14	**2.06%**	0.00%	1.69%	0.00%	0.39%	0.02%	0.11%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	97.55%	99.89%	96.06%	99.97%	99.59%	99.79%	99.08%	97.62%	99.11%
	b) SDCCH/PAGING Channel congestion	<=1%	Apr-14	0.65%	0.02%	0.55%	0.77%	0.02%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	1.63%	0.03%	1.72%	1.04%	0.07%	0.07%	0.11%	0.06%	0.03%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Apr-14	1.03%	0.47%	1.71%	0.49%	0.31%	0.66%	0.56%	0.31%	0.47%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Apr-14	**5.91%**	0.61%	2.45%	1.45%	0.02%	2.41%	1.83%	0.99%	**3.12%**
	c) Connections with good voice quality	>=95%	Apr-14	97.50%	99.36%	97.54%	98.67%	98.79%	97.62%	99.21%	99.80%	99.13%
4	**No. of POI's having >=0.5% POI congestion**	<=0.5%	Apr-14	0	0	0	0	0	0	0	0	0

5.1.4 QOS PERFORMANCE OF MONTHLY PMR – MAY-14 MONTH:

				AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- MAY-14 MONTH												
	PMR Generation Data	Bench- mark	Audit Period									
S/N	Name of Parameter			GSM Operators						CDMA Operators		
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	<=2%	May-14	0.54%	0.02%	0.45%	0.01%	0.33%	0.16%	0.21%	0.18%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	May-14	**2.08%**	0.00%	1.60%	0.00%	0.31%	0.26%	0.32%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	May-14	97.54%	99.86%	96.15%	99.96%	99.56%	99.74%	98.88%	97.13%	98.95%
	b) SDCCH/PAGING Channel congestion	<=1%	May-14	**2.48%**	0.04%	0.62%	**1.09%**	0.03%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	May-14	1.87%	0.04%	1.75%	0.94%	0.08%	0.11%	0.25%	0.08%	0.10%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	May-14	1.25%	0.51%	1.81%	0.49%	0.40%	0.69%	0.64%	0.45%	0.66%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	May-14	**6.78%**	0.71%	2.34%	1.53%	0.06%	2.67%	1.98%	1.22%	**3.08%**
	c) Connections with good voice quality	>=95%	May-14	97.36%	99.34%	97.08%	98.63%	98.74%	97.54%	99.19%	99.80%	99.04%
4	**No. of POI's having >=0.5% POI congestion**	<=0.5%	May-14	0	0	0	0	0	0	0	0	0

5.1.5 QOS PERFORMANCE OF MONTHLY PMR – JUNE-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- JUNE-14 MONTH											
PMR Generation Data	Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N **Name of Parameter**			**GSM Operators**						**CDMA Operators**		
Network Service Quality Parameter											
Network Availability											
1 a) BTS Accumulated Downtime	<=2%	Jun-14	0.65%	0.03%	0.42%	0.01%	0.48%	0.24%	0.35%	0.16%	0.09%
b) Worst affected BTSs due to downtime	<=2%	Jun-14	**4.49%**	0.00%	1.79%	0.00%	1.72%	1.71%	1.59%	0.30%	0.00%
Connection Establishment (Accessibility)											
2 a) CSSR (Call Setup Success Rate)	>=95%	Jun-14	97.35%	99.84%	96.08%	99.96%	99.60%	99.76%	98.62%	96.62%	98.94%
b) SDCCH/PAGING Channel congestion	<=1%	Jun-14	**1.01%**	0.06%	0.64%	0.81%	0.03%	0.04%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Jun-14	1.74%	0.06%	1.73%	0.91%	0.07%	0.08%	0.71%	0.12%	0.14%
Connection maintenance (Retainability)											
3 a) CDR (Call Drop Rate)	<=2%	Jun-14	1.41%	0.56%	1.87%	0.52%	0.38%	0.74%	0.66%	0.61%	0.59%
b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jun-14	**8.39%**	0.94%	2.32%	1.71%	0.30%	2.94%	1.90%	2.85%	2.50%
c) Connections with good voice quality	>=95%	Jun-14	97.16%	99.33%	96.82%	98.67%	98.81%	97.44%	99.19%	99..79%	99.09%
4 **No. of POI's having >=0.5% POI congestion**	<=0.5%	Jun-14	0	0	0	0	0	0	0	0	0

5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- JUNE-14 (APRIL TO JUNE MONTHS AUDITED DATA)

							GSM Operators						CDMA Operators	
	QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-JUNE-14) OF DELHI METRO CIRCLE													
S/N	PMR Generation Data / Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA		
	Network Service Quality Parameter													
	Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.67%	0.02%	0.45%	0.01%	0.36%	0.14%	0.20%	0.15%	0.06%		
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	**2.88%**	0.00%	1.69%	0.00%	0.81%	0.66%	0.67%	0.10%	0.00%		
	Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.48%	99.86%	96.10%	99.96%	99.58%	99.76%	98.86%	97.12%	99.00%		
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	**1.38%**	0.04%	0.60%	0.89%	0.03%	0.03%	0.00%	0.00%	0.00%		
	c) TCH congestion	<=2%	Quarterly	1.75%	0.04%	1.73%	0.96%	0.07%	0.09%	0.36%	0.09%	0.09%		
	Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.23%	0.51%	1.80%	0.50%	0.36%	0.70%	0.62%	0.46%	0.57%		
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	**7.03%**	0.75%	2.37%	1.56%	0.13%	2.67%	1.90%	1.69%	2.90%		
	c) Connections with good voice quality	>=95%	Quarterly	97.34%	99.34%	97.15%	98.66%	98.78%	97.53%	99.20%	99.80%	99.09%		
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 **except Aircel**. **Aircel** could not meet the benchmark for the parameter '**worst affected BTSs due to downtime'** with their performance of **2.06%** (April), **2.08%** (May) and **4.49%** (June), however on average for the quarter, Aircel could achieve **2.88%** against the benchmark of <=2%.

- ▪ **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 except **Aircel**. **Aircel** could not meet the benchmark for the parameter '**SDCCH Congestion'** with their performance of **2.48%** (May) and **1.01%** (June), however on average for the quarter, Aircel could achieve **1.38%** against the benchmark of <=1%.

Idea has also failed to comply with the benchmark for the parameter '**SDCCH Congestion'** in the month of **May-14** with its performance of **1.09%,** however on an average for the quarter, it remained well within the benchmark.

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 .36%) was for RCOM (GSM) during the quarter.

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

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

The audit results for this parameter indicate that all operators (**except Aircel)** have met the bench mark successfully during the quarter. Quarterly average performance of **Aircel** was **7.03%**, much beyond the benchmark of <=3%..

Tata CDMA have also failed to achieve the benchmark in the month of **April (3.12%)** and **May (3.08%),** however they have met the benchmark on an average for the quarter.

    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) – APRIL-14 MONTH:

	CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- APRIL-14 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	0.34%	0.01%	0.34%	0.00%	0.30%	0.02%	0.10%	0.18%	0.01%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.00%	0.00%	0.27%	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	97.68%	99.89%	96.38%	99.97%	99.58%	99.83%	99.10%	98.39%	99.13%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.88%	0.02%	0.52%	0.66%	0.02%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	1.47%	0.04%	1.83%	0.84%	0.07%	0.03%	0.11%	0.03%	0.04%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	1.03%	0.48%	1.69%	0.47%	0.26%	0.66%	0.35%	0.18%	0.44%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	5.46%	0.56%	2.48%	1.23%	0.04%	2.40%	1.63%	1.06%	1.96%
	c) Connections with good voice quality	**>=95%**	Live data	97.51%	99.34%	97.59%	98.70%	98.81%	97.59%	99.20%	99.80%	99.13%
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) – MAY-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- MAY-14 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	0.48%	0.02%	0.39%	0.00%	0.39%	0.04%	0.17%	0.18%	0.05%
	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	97.78%	99.89%	96.04%	99.97%	99.49%	99.81%	99.06%	96.37%	99.04%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	1.00%	0.02%	0.63%	0.54%	0.03%	0.00%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	1.14%	0.04%	1.72%	0.54%	0.09%	0.05%	0.10%	0.10%	0.03%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	0.99%	0.51%	1.85%	0.47%	0.38%	0.70%	0.61%	0.51%	0.65%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	5.93%	0.58%	2.41%	1.35%	0.08%	2.77%	1.47%	2.11%	3.76%
	c) Connections with good voice quality	**>=95%**	Live data	97.52%	99.33%	97.05%	98.66%	98.68%	97.56%	99.19%	99.79%	99.03%
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) – JUNE-14 MONTH:

								GSM Operators				CDMA Operators	

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- JUNE-14 MONTH

S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	**<=2%**	Live data	1.37%	0.02%	0.34%	0.00%	0.84%	0.08%	0.20%	0.15%	0.24%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.00%	0.00%	0.09%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	**>=95%**	Live data	97.40%	99.83%	96.32%	99.96%	99.57%	99.80%	98.33%	96.35%	99.04%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.90%	0.07%	0.71%	0.62%	0.04%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	1.66%	0.05%	1.75%	0.54%	0.08%	0.05%	0.65%	0.09%	0.04%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	1.23%	0.58%	1.81%	0.49%	0.38%	0.73%	0.67%	0.61%	0.54%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	**8.11%**	0.79%	2.25%	1.41%	0.35%	2.63%	1.33%	**3.91%**	2.40%
	c) Connections with good voice quality	**>=95%**	Live data	97.04%	99.30%	96.75%	98.85%	98.73%	97.53%	99.18%	99.78%	99.10%
4	**No. of POI having >=0.5% congestion**	**<0.5%**	Live data	0	0	0	0	0	0	0	0	0

5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF APRIL TO JUNE)

						GSM Operators				CDMA Operators		
QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE-JUNE-14) - 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											
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.73%	0.02%	0.36%	0.00%	0.51%	0.05%	0.16%	0.17%	0.10%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.00%	0.12%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.62%	99.87%	96.25%	99.97%	99.55%	99.81%	98.83%	97.04%	99.07%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.93%	0.04%	0.62%	0.61%	0.03%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	1.42%	0.04%	1.77%	0.64%	0.08%	0.04%	0.29%	0.07%	0.04%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.08%	0.52%	1.78%	0.48%	0.34%	0.70%	0.54%	0.43%	0.54%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	**6.50%**	0.64%	2.38%	1.33%	0.16%	2.60%	1.48%	2.36%	2.71%
	c) Connections with good voice quality	>=95%	Quarterly	97.36%	99.32%	97.13%	98.74%	98.74%	97.56%	99.19%	99.79%	99.09%
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 parameters except for the parameter 'Worst affected Cell having > 3% TCH drop' which could not be met by **Aircel** with its performance as **6.50%** (average of the quarter). However on monthly basis, the performance of **Tata (CDMA)** and **RCOM (CDMA)** was **3.76% (May-14)** and **3.91% (June-14)**, though their average performance on quarterly basis was well within the benchmark.

Aircel has 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
	Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle- April-14 month						GSM Operators			CDMA Operators		
Network Service Quality Parameter												
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		Apr-14	2908	5465	1126	4579	2568	5659	933	1000	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		Apr-14	17282	539	3867	86	5040	728	298	855	563
	c) BTS Accumulated Downtime	<=2%	Apr-14	0.83%	0.01%	0.48%	0.00%	0.27%	0.02%	0.04%	0.12%	0.05%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Apr-14	60	0	19	0	10	1	1	0	0
	e) Worst affected BTSs due to downtime	<=2%	Apr-14	2.06%	0.00%	1.69%	0.00%	0.39%	0.02%	0.11%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	97.55%	99.89%	96.06%	99.97%	99.59%	99.79%	99.08%	97.62%	99.11%
	b) SDCCH/PAGING Congestion	<=1%	Apr-14	0.65%	0.02%	0.55%	0.77%	0.02%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	1.63%	0.03%	1.72%	1.04%	0.07%	0.07%	0.11%	0.06%	0.03%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Apr-14	1.03%	0.47%	1.71%	0.49%	0.31%	0.66%	0.56%	0.31%	0.47%
	b) Worst affected cells>3% TCH drop	<=3%	Apr-14	5.91%	0.61%	2.45%	1.45%	0.02%	2.41%	1.83%	0.99%	3.12%
	c) % of connections with good voice quality	>=95%	Apr-14	97.50%	99.36%	97.54%	98.67%	98.79%	97.62%	99.21%	99.80%	99.13%
	d)Total No. of cells exceeding 3% TCH drop (call drop)		Apr-14	514	84	78	180	2	344	56	29	160
	e) Total no. of cells (Sector) in the licensed service area		Apr-14	8697	13770	3189	12416	7054	14241	3050	2950	5114
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		Apr-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Apr-14	0	0	0	0	0	0	0	0	0
5	**Network Data**											
	a) Equipped Capacity of Network in Erlang		Apr-14	116721	306085	NP	157447	96000	302517	42000	140000	307992
	b) Total traffic in TCBH in erlang (Avg.)		Apr-14	76428	202294	NP	152769	32677	233745	16552	117188	128016
	c) Total no. of customers served (as per VLR) on last day of the month		Apr-14	2390518	8110588	NP	5356927	1408316	8551851	442346	3018406	1762127

TABLE: 2

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- April-14 month												
						GSM Operators				CDMA Operators		
Network Service Quality Parameter												
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		Live data	2907	5465	1126	4563	2569	5659	933	1001	1490
	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	710	39	276	4	558	62	64	128	3
	c) BTS Accumulated Downtime	<=2%	Live data	0.34%	0.01%	0.34%	0.00%	0.30%	0.02%	0.10%	0.18%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	3	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.27%	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	97.68%	99.89%	96.38%	99.97%	99.58%	99.83%	99.10%	98.39%	99.13%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.88%	0.02%	0.52%	0.66%	0.02%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.47%	0.04%	1.83%	0.84%	0.07%	0.03%	0.11%	0.03%	0.04%
	Connection Maintenance (Retainability)											
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.03%	0.48%	1.69%	0.47%	0.26%	0.66%	0.35%	0.18%	0.44%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	5.46%	0.56%	2.48%	1.23%	0.04%	2.40%	1.63%	1.06%	1.96%
	c) % of connections with good voice quality	>=95%	Live data	97.51%	99.34%	97.59%	98.70%	98.81%	97.59%	99.20%	99.80%	99.13%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	476	77	79	154	3	344	50	31	100
	e) Total no. of cells (Sector) in the licensed service area		Live data	8725	13773	3189	12446	7056	14367	3062	2944	5113
	No. of POI's having >=0.5% POI congestion											
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

TABLE: 3

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle- May-14 month											
						GSM Operators				CDMA Operators		
	Network Service Quality Parameter											
1	**Network Availability**											
	a) Total no. of BTSs in the licensed service area		May-14	2933	5437	1125	4624	2568	5669	938	1001	1490
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		May-14	11885	749	3804	310	6324	6633	1444	1304	475
	c) BTS Accumulated Downtime	<=2%	May-14	0.54%	0.02%	0.45%	0.01%	0.33%	0.16%	0.21%	0.18%	0.04%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		May-14	61	0	18	0	8	15	3	0	0
	e) Worst affected BTSs due to downtime	<=2%	May-14	2.08%	0.00%	1.60%	0.00%	0.31%	0.26%	0.32%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	May-14	97.54%	99.86%	96.15%	99.96%	99.56%	99.74%	98.88%	97.13%	98.95%
	b) SDCCH/PAGING Congestion	<=1%	May-14	2.48%	0.04%	0.62%	1.09%	0.03%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	May-14	1.87%	0.04%	1.75%	0.94%	0.08%	0.11%	0.25%	0.08%	0.10%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	May-14	1.25%	0.51%	1.81%	0.49%	0.40%	0.69%	0.64%	0.45%	0.66%
	b) Worst affected cells>3% TCH drop	<=3%	May-14	6.78%	0.71%	2.34%	1.53%	0.06%	2.67%	1.98%	1.22%	3.08%
	c) % of connections with good voice quality	>=95%	May-14	97.36%	99.34%	97.08%	98.63%	98.74%	97.54%	99.19%	99.80%	99.04%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		May-14	595	98	75	191	4	377	61	36	158
	e) Total no. of cells (Sector) in the licensed service area		May-14	8772	13775	3191	12543	7054	14139	3072	2954	5119
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		May-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		May-14	0	0	0	0	0	0	0	0	0
5	**Network Data**											
	a) Equipped Capacity of Network in Erlang		May-14	117680	290656	NP	158619	96000	299666	42000	140000	291592
	b) Total traffic in TCBH in erlang (Avg.)		May-14	75027	193905	NP	146613	75018	224562	15541	99971	126103
	c) Total no. of customers served (as per VLR) on last day of the month		May-14	2370845	7848780	NP	5283332	4722846	8360535	440796	2870009	1639156

TABLE: 4

S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
top: **Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Delhi Metro Circle- May-14 month**												
						GSM Operators					CDMA Operators	
Network Service Quality Parameter												
	Network Availability												
1	a) Total no. of BTSs in the licensed service area		Live data	2912	5475	1126	4579	2567	5659	933	1001	1489
	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	1011	64	316	13	726	182	115	126	49
	c) BTS Accumulated Downtime	<=2%	Live data	0.48%	0.02%	0.39%	0.00%	0.39%	0.04%	0.17%	0.18%	0.05%
	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	97.78%	99.89%	96.04%	99.97%	99.49%	99.81%	99.06%	96.37%	99.04%
	b) SDCCH/PAGING Congestion	<=1%	Live data	1.00%	0.02%	0.63%	0.54%	0.03%	0.00%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.14%	0.04%	1.72%	0.54%	0.09%	0.05%	0.10%	0.10%	0.03%
	Connection Maintenance (Retainability)												
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.99%	0.51%	1.85%	0.47%	0.38%	0.70%	0.61%	0.51%	0.65%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	5.93%	0.58%	2.41%	1.35%	0.08%	2.77%	1.47%	2.11%	3.76%
	c) % of connections with good voice quality	>=95%	Live data	97.52%	99.33%	97.05%	98.66%	98.68%	97.56%	99.19%	99.79%	99.03%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	518	80	77	168	6	396	45	62	192
	e) Total no. of cells (Sector) in the licensed service area		Live data	8742	13785	3191	12501	7052	14273	3066	2951	5115
	No. of POI's having >=0.5% POI congestion												
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

TABLE: 5

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle- June-14 month											
						GSM Operators				CDMA Operators		
Network Service Quality Parameter												
1	**Network Availability**											
	a) Total no. of BTSs in the licensed service area		Jun-14	2961	5473	1119	4661	2552	5718	945	999	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		Jun-14	13879	1097	3411	370	8874	9941	2401	1162	984
	c) BTS Accumulated Downtime	<=2%	Jun-14	0.65%	0.03%	0.42%	0.01%	0.48%	0.24%	0.35%	0.16%	0.09%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jun-14	113	0	20	0	44	98	15	3	0
	e) Worst affected BTSs due to downtime	<=2%	Jun-14	**4.49%**	0.00%	1.79%	0.00%	1.72%	1.71%	1.59%	0.30%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Jun-14	97.35%	99.84%	96.08%	99.96%	99.60%	99.76%	98.62%	96.62%	98.94%
	b) SDCCH/PAGING Congestion	<=1%	Jun-14	**1.01%**	0.06%	0.64%	0.81%	0.03%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Jun-14	1.74%	0.06%	1.73%	0.91%	0.07%	0.08%	0.71%	0.12%	0.14%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Jun-14	1.41%	0.56%	1.87%	0.52%	0.38%	0.74%	0.66%	0.61%	0.59%
	b) Worst affected cells>3% TCH drop	<=3%	Jun-14	**8.39%**	0.94%	2.32%	1.71%	0.30%	2.94%	1.90%	2.85%	2.50%
	c) % of connections with good voice quality	>=95%	Jun-14	97.16%	99.33%	96.82%	98.67%	98.81%	97.44%	99.19%	99..79%	99.09%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Jun-14	744	129	74	217	21	417	59	84	128
	e) Total no. of cells (Sector) in the licensed service area		Jun-14	8864	13816	3184	12664	7016	14204	3096	2949	5130
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		Jun-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Jun-14	0	0	0	0	0	0	0	0	0
5	**Network Data**											
	a) Equipped Capacity of Network in Erlang		Jun-14	118446	303209	NP	160001	96000	302532	42000	140000	292084
	b) Total traffic in TCBH in erlang (Avg.)		Jun-14	76168	181292	NP	145328	77405	208862	17434	99395	120818
	c) Total no. of customers served (as per VLR) on last day of the month		Jun-14	2535903	8448125	NP	5329252	4781219	8733853	456709	2863438	1696555

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- June-14 month											
						GSM Operators					CDMA Operators	
	Network Service Quality Parameter											
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		Live data	2947	5467	1120	4640	2558	5675	940	998	1490
	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	2900	71	278	12	1541	336	135	107	255
	c) BTS Accumulated Downtime	<=2%	Live data	1.37%	0.02%	0.34%	0.00%	0.84%	0.08%	0.20%	0.15%	0.24%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	1	0	0	1	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.09%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.40%	99.83%	96.32%	99.96%	99.57%	99.80%	98.33%	96.35%	99.04%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.90%	0.07%	0.71%	0.62%	0.04%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.66%	0.05%	1.75%	0.54%	0.08%	0.05%	0.65%	0.09%	0.04%
	Connection Maintenance (Retainability)											
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.23%	0.58%	1.81%	0.49%	0.38%	0.73%	0.67%	0.61%	0.54%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	**8.11%**	0.79%	2.25%	1.41%	0.35%	2.63%	1.33%	**3.91%**	2.40%
	c) % of connections with good voice quality	>=95%	Live data	97.04%	99.30%	96.75%	98.85%	98.73%	97.53%	99.18%	99.78%	99.10%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	716	110	72	178	25	377	41	155	123
	e) Total no. of cells (Sector) in the licensed service area		Live data	8828	13831	3185	12679	7031	14300	3090	2949	5128
	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 JUNE-14:

5.3.1 CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-JUNE 2014):

S/ N	Name of Parameter	Bench-mark	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE JUNE-14 (averaged for quarter)											
							GSM Operators			CDMA Operators		
	Customer Service Quality Parameters											
1	**Metering & Billing Credibility -Post Paid**											
	A) No. of bills issued during the quarter		Delhi	52345	1446952	157405	681667	138453	1730881	800	304274	208321
	B) No. of bills disputed including billing complaints during the quarter		Delhi	27	367	53	321	134	1263	0	299	1
	C)% of billing complaints during the quarter	<= 0.1%	Delhi	0.05%	0.03%	0.03%	0.05%	0.10%	0.07%	0.04%	0.10%	0.00%
2	**Metering & Billing Credibility -Pre Paid**											
	A) Total No. of Pre-paid customers at the end of the quarter		Delhi	3948810	8487401	2063712	4794096	4551290	7360405	958597	2688520	2453752
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		Delhi	14	289	111	129	4545	1873	371	1281	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	Delhi	0.00%	0.00%	0.01%	0.0%	0.10%	0.03%	0.04%	0.05%	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	41	657	164	1815	4679	3136	372	1580	460
	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	41	656	164	1815	4679	3136	372	1580	460

	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 week	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	**99.93%**
	D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	Delhi	100.00%	**99.95%**	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
4	**Response time to customers for assistance**											
	A) Total no of calls attempted to customer care/Call center		Delhi	7090168	827856	393791	404651	9758974	9121053	948776	879011	99821
	B) Total no. of calls successfully established to customer care/Call center		Delhi	6946582	827856	392257	403060	9635049	9121053	936203	862587	99087
	C) % Accessibility of Call centre /customer Care (Total call successfully established *100/ Total call attempt)	>=95%	Delhi	97.97%	100.00%	99.61%	99.61%	98.73%	100.00%	98.67%	98.13%	99.27%
	D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)		Delhi	1305707	2808484	235703	2014126	989262	2776861	435108	228021	303302
	E) Total number of calls answered by the operator (Voice to voice) within 60 seconds		Delhi	1201087	2061523	229158	1982135	722433	2687076	415645	210236	290572
	F) % age of calls answered by operator (voice to voice) (Total call successfully established within 60 Sec *100/ Total call attempt.)	>=90%	Delhi	92.86%	**73.40%**	97.22%	98.41%	**73.03%**	96.77%	95.53%	92.20%	95.80%
5	**Termination/closure of service**											
	A) Total No. of requests for Termination / Closure of service received during the quarter		Delhi	472	9470	17	6823	2127	3375	3	2390	452
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		Delhi	469	9470	17	6823	2127	3375	3	2390	452
	C) % of Termination/ Closure of service within 7 days	<=7days	Delhi	**99.44%**	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	611	1818	39	2031	722	3521	88	833	902
	B) No. of Payments/ Refunds Cleared during the quarter		Delhi	611	1818	39	2031	722	3521	0	833	901
	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%	**0.00%**	100.00%	**99.93%**

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

S/N	Name of Parameter	Bench-mark	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
	CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE-JUNE-14											
	3 days live CSD Audit Data						GSM Operators				CDMA Operators	
	Response time to customers for assistance											
1	Total no of calls attempted to customer care/Call center		Delhi	730158	50673	37982	41033	775949	960655	97934	71230	10157
	Total no. of calls successfully established to customer care/Call center		Delhi	715720	50673	37905	40926	764324	960655	97425	69742	10097
	% Accessibility of Call centre /customer Care (Total Calls successfully established*100/ Total call attempts)	>=95%	Delhi	98.02%	100.00%	99.80%	99.74%	98.50%	100.00%	99.48%	97.91%	99.41%
	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		Delhi	131875	278403	21402	202699	64040	313031	45903	17071	263084
2	Total number of calls answered by the operator (Voice to voice) within 60 seconds		Delhi	119911	197349	20844	201530	61543	298223	44266	15661	261740
	% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.* 100 / Total call attempts)	>=90%	Delhi	90.93%	**70.89%**	97.39%	99.42%	96.10%	95.27%	96.43%	91.74%	99.49%

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 weeks except **Tata CDMA (99.93%)**. Apart from this, all service providers also have met the benchmark of 100% refund in one week except **Airtel (99.95%)**, where customers were due for credit / adjustment.

3. *Response Time to the Customer for assistance*

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

All service providers are in compliance with respect to the parameter 'accessibility of call center'. However, **Airtel** and **RCOM (GSM)** were unable to meet the benchmark of **'calls answered by Operators (voice to voice) within 60 seconds'**. They achieved their performance as **73.40% and 73.03%** respectively, that is much below the benchmark of >=90%.

4. *Termination/Closure of Service*

In case of this parameters also, all service providers **(except Aircel)** have settled the '**closure/termination**' within the benchmark of 7 days. The performance of **Aircel** was **99.44%,** marginally below the benchmark of 100%.

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

All operators were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure **except MTS and Tata CDMA**. The performance of MTS and Tata CDMA was **0.00% and 99.93%** respectively**. MTS** was failed to settle even a single case of refund out of 145 cases due for refund.

The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center'. However, in case of 'calls connection to operators (Voice to voice) within 60 seconds', performance of **Airtel** was **70.89% which is in sync with their quarterly non-complied performance.**

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 GSM	VODAFONE	MTS
AIRCEL	Delhi	--	100.00%	98.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
AIRTEL	Delhi	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
MTNL	Delhi	100.00%	100.00%	--	100.00%	98.00%	100.00%	100.00%	100.00%	100.00%
IDEA	Delhi	100.00%	100.00%	100.00%	--	99.00%	99.00%	100.00%	100.00%	100.00%
RCOM GSM	Delhi	100.00%	100.00%	99.00%	100.00%	--	100.00%	100.00%	100.00%	99.00%
RCOM CDMA	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%
TATA CDMA	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%
VODAFONE	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%
MTS	Delhi	99.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. However, when Calls attempted from Aircel to MTNL, the interconnection was 98% successful, MTNL to RCOM GSM was 98%, Idea to RCOM (GSM) & RCOM (CDMA) it was (99%), RCOM (GSM) to MTNL & MTS, it was (99%) and MTS to Aircel was 99%. Thus there was no much problem in interconnection from one operator to other operators.

6.2 CUSTOMER CARE / HELPLINE ASSESSMENT:

LIVE CALLING TO CALL CENTRE									
Parameter	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	*Delhi*	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	*Delhi*	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	*Delhi*	100	100	100	100	100	100	100	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 60 seconds	*Delhi*	98	100	95	100	95	100	100	97	98
*% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100 / Total calls attempts)*	*Delhi*	98.00%	100.00%	95.00%	100.00%	95.00%	100.00%	100.00%	97.00%	98.00%

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers. Aircel, MTNL, RCOM (GSM), RCOM (CDMA) and Tata (CDMA) could connect 98%, 95%, 95%, 97% and 98% of calls to the operator within 60 Seconds.

6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS:

PERFORMANCE (LIVE CALLING FOR BILLING COMPLAINTS)									
Parameter	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	*Delhi*	100	100	100	100	100	100	100	100	100
Total No. of calls Answered	*Delhi*	92	93	88	95	92	92	94	96	98
Cases resolved within 4 weeks	*Delhi*	92	93	88	95	92	92	94	96	98
%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. During live calling, some of the customers did not attend the calls while few others reported that they don't exactly remember about the resolution of complaints. 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	Name of SDCA	No. of calls made	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	RCOM CDMA	TATA CDMA	MTS	VODAFONE
100	Delhi	Gurgaon & Faridabad	NA	6	√	√	√	√	√	√	√	√	√
101	Delhi	Gurgaon & Faridabad	NA	6	√	√	√	√	√	√	√	√	√
102	Delhi	Gurgaon & Faridabad	NA	6	√	√	√	√	√	√	√	√	√
181	Delhi	Gurgaon & Faridabad	NA	6	√	√	√	√	√	√	√	√	√
1091	Delhi	Gurgaon & Faridabad	NA	6	√	√	√	√	√	√	√	√	√
1098	Delhi	Gurgaon & Faridabad	NA	6	√	√	√	√	√	√	√	√	√
1031	Delhi	Gurgaon & Faridabad	NA	6	√	√	√	√	√	√	√	√	√
1291	Delhi	Gurgaon & Faridabad	NA	6	√	√	√	√	√	√	√	√	√
1070	Delhi	Gurgaon & Faridabad	NA	6	√	√	√	√	√	√	√	√	√
100	Delhi	Noida & Ghaziabad	NA	6	√	√	√	√	√	√	√	√	√
101	Delhi	Noida & Ghaziabad	NA	6	√	√	√	√	√	√	√	√	√
102	Delhi	Noida & Ghaziabad	NA	6	√	√	√	√	√	√	√	√	√
181	Delhi	Noida & Ghaziabad	NA	6	√	√	√	√	√	√	√	√	√
1091	Delhi	Noida & Ghaziabad	NA	6	√	√	√	√	√	√	√	√	√
1098	Delhi	Noida & Ghaziabad	NA	6	√	√	√	√	√	√	√	√	√
1031	Delhi	Noida & Ghaziabad	NA	6	√	√	√	√	√	√	√	√	√
1291	Delhi	Noida & Ghaziabad	NA	6	√	√	√	√	√	√	√	√	√
1070	Delhi	Noida & Ghaziabad	NA	6	√	√	√	√	√	√	√	√	√
100	Delhi	South Delhi	NA	6	√	√	√	√	√	√	√	√	√
101	Delhi	South Delhi	NA	6	√	√	√	√	√	√	√	√	√
102	Delhi	South Delhi	NA	6	√	√	√	√	√	√	√	√	√
181	Delhi	South Delhi	NA	6	√	√	√	√	√	√	√	√	√
1091	Delhi	South Delhi	NA	6	√	√	√	√	√	√	√	√	√
1098	Delhi	South Delhi	NA	6	√	√	√	√	√	√	√	√	√
1031	Delhi	South Delhi	NA	6	√	√	√	√	√	√	√	√	√
1291	Delhi	South Delhi	NA	6	√	√	√	√	√	√	√	√	√
1070	Delhi	South Delhi	NA	6	√	√	√	√	√	√	√	√	√
Total calls per Operator				**162**									

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by various mobile service providers, total 162 calls for each service provider were made from mobile phones provided by them. In Delhi Metro service area, these services were found functional in the networks of all the service providers.

7. DRIVE TEST

7) OPERATOR ASSISTED DRIVE TEST

In terms of TRAI's letter dated 21st January, 2014, the drive tests were conducted for three consecutive days in one select SSA each month in each service area. Thus, the drive tests were carried out in three SSA's namely **Gurgaon / Faridabad, Noida & Ghaziabad and South Delhi (Municipal Area)** in the months of April, May and June 2014 respectively, the **total route Kms** covered during the drive tests in respective SSAs was **315 Kms, 310 Kms and 340 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: GURGAON / FARIDABAD AREA (APRIL-14)

DRIVE TEST TABLE: 1

S/N	Parameter	Days of drive test	Indoor locations	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA	
				OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
1	Call Attempts	Day 1	Fun City Mall, Crown Plaza	135	10	128	10	128	10	119	11	128	10	90	10	133	10	127	10	141	10
		Day 2	Grand Mall, Sahara Mall	133	10	122	10	77	11	116	10	119	11	97	10	106	10	117	10	132	10
		Day 3	Ansal Plaza, Palam Triangle	110	10	118	11	91	10	119	10	126	10	117	10	129	10	132	10	132	10
		Overall SSA		378	30	368	31	296	31	354	31	373	31	304	30	368	30	376	30	405	30
2	Blocked Call Rate	Day 1	Fun City Mall, Crown Plaza	1.48%	0.00%	0.00%	0.00%	4.69%	0.00%	0.00%	0.00%	1.56%	0.00%	2.22%	0.00%	0.75%	0.00%	0.00%	0.00%	1.42%	0.00%
		Day 2	Grand Mall, Sahara Mall	0.75%	0.00%	0.82%	0.00%	5.19%	0.00%	0.86%	0.00%	3.36%	0.00%	0.00%	0.00%	2.83%	0.00%	0.00%	0.00%	0.76%	0.00%
		Day 3	Ansal Plaza, Palam Triangle	0.91%	0.00%	0.85%	0.00%	5.49%	0.00%	0.84%	0.00%	6.35%	0.00%	0.00%	0.00%	0.78%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA		1.06%	0.00%	0.54%	0.00%	5.07%	0.00%	0.56%	0.00%	3.75%	0.00%	0.66%	0.00%	1.36%	0.00%	0.00%	0.00%	0.74%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Fun City Mall, Crown Plaza	0.79%	0.00%	0.00%	0.00%	0.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.52%	0.00%	0.79%	0.00%	0.00%	0.00%

S/N	Parameter	Days of drive test	Indoor locations	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 CDMA OUTDOOR	MTS CDMA INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
		Day 2	Grand Mall, Sahara Mall	0.00%	0.00%	0.00%	0.00%	1.37%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.71%	0.00%	0.00%	0.00%
		Day 3	Ansal Plaza, Palam Triangle	0.00%	0.00%	0.00%	0.00%	1.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.52%	0.00%	0.00%	0.00%
		Overall SSA		**0.27%**	**0.00%**	**0.00%**	**0.00%**	**1.09%**	**3.33%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.55%**	**0.00%**	**1.33%**	**0.00%**	**0.00%**	**0.00%**
	Percentage connections with good voice quality (=>95%)																				
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Fun City Mall, Crown Plaza	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.56%	99.79%	96.47%	94.69%	98.09%	97.50%
		Day 2	Grand Mall, Sahara Mall	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.00%	99.96%	95.31%	98.06%	98.90%	100.0%
		Day 3	Ansal Plaza, Palam Triangle	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.65%	100.0%	95.48%	100.0%	98.27%	100.0%
		Overall SSA		**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**99.07%**	**99.91%**	**95.77%**	**96.85%**	**98.43%**	**99.15%**
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Fun City Mall, Crown Plaza	90.67%	97.32%	95.69%	99.68%	92.68%	88.65%	95.07%	97.84%	91.67%	99.96%	95.79%	98.97%	NA	NA	NA	NA	NA	NA
		Day 2	Grand Mall, Sahara Mall	92.99%	98.61%	95.21%	99.76%	93.18%	98.38%	94.90%	98.02%	88.34%	99.00%	95.67%	96.98%	NA	NA	NA	NA	NA	NA
		Day 3	Ansal Plaza, Palam Triangle	92.76%	94.95%	95.83%	99.10%	92.45%	97.29%	95.62%	97.45%	91.71%	93.48%	96.12%	98.33%	NA	NA	NA	NA	NA	NA
		Overall SSA		**92.12%**	**96.97%**	**95.52%**	**99.50%**	**92.74%**	**94.67%**	**95.22%**	**97.77%**	**90.69%**	**97.43%**	**95.89%**	**98.07%**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

S/N	Parameter	Days of drive test	Indoor locations	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA	
				OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
5	**Service Coverage**																				
	In door (>= -75dBm)	Day 1	Fun City Mall, Crown Plaza	81.45%	94.58%	98.09%	100.0%	14.98%	2.04%	64.32%	46.82%	69.14%	100.0%	91.29%	100.0%	57.90%	96.89%	60.89%	90.20%	78.77%	91.37%
		Day 2	Grand Mall, Sahara Mall	79.08%	100.0%	96.45%	100.0%	34.91%	19.19%	67.04%	89.45%	64.73%	95.67%	89.28%	100.0%	89.38%	100.0%	81.10%	99.97%	76.22%	100.0%
		Day 3	Ansal Plaza, Palam Triangle	84.78%	95.93%	99.01%	100.0%	25.49%	4.39%	71.16%	51.86%	71.28%	85.54%	95.57%	100.0%	92.59%	100.0%	55.19%	100.0%	71.65%	99.23%
		Overall SSA		**81.61%**	**96.86%**	**97.79%**	**100.0%**	**23.95%**	**8.44%**	**67.75%**	**62.68%**	**68.46%**	**93.79%**	**92.27%**	**100.0%**	**79.58%**	**98.73%**	**65.37%**	**96.60%**	**75.62%**	**96.70%**
	In-vehicle (>= -85dBm)	Day 1	Fun City Mall, Crown Plaza	97.21%	99.37%	99.34%	100.0%	56.70%	39.59%	94.28%	97.81%	93.75%	100.0%	98.67%	100.0%	98.53%	100.0%	95.71%	96.52%	99.21%	96.94%
		Day 2	Grand Mall, Sahara Mall	96.76%	100.0%	99.30%	100.0%	72.06%	83.22%	94.52%	99.94%	89.78%	100.0%	98.54%	100.0%	99.93%	100.0%	97.83%	100.0%	96.04%	100.0%
		Day 3	Ansal Plaza, Palam Triangle	97.14%	99.23%	99.72%	100.0%	69.52%	84.88%	94.79%	96.66%	94.17%	99.71%	99.53%	100.0%	99.93%	100.0%	90.86%	100.0%	97.03%	100.0%
		Overall SSA		**97.03%**	**99.54%**	**99.44%**	**100.0%**	**65.11%**	**68.99%**	**94.55%**	**98.14%**	**92.64%**	**99.91%**	**98.96%**	**100.0%**	**99.44%**	**100.0%**	**94.77%**	**98.79%**	**97.45%**	**98.92%**
	Outdoor-in city (>= -95dBm)	Day 1	Fun City Mall, Crown Plaza	100.0%	100.0%	99.77%	100.0%	95.25%	95.94%	99.87%	100.0%	100.0%	100.0%	99.74%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

S/N	Parameter	Days of drive test	Indoor locations	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 CDMA OUTDOOR	MTS CDMA INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
		Day 2	Grand Mall, Sahara Mall	100.0%	100.0%	99.69%	100.0%	96.24%	99.75%	99.74%	100.0%	100.0%	100.0%	99.89%	100.0%	100.0%	100.0%	99.98%	100.0%	100.0%	100.0%
		Day 3	Ansal Plaza, Palam Triangle	100.0%	100.0%	99.88%	100.0%	97.14%	99.27%	99.53%	90.94%	100.0%	100.0%	99.86%	100.0%	100.0%	100.0%	99.99%	100.0%	100.0%	100.0%
		Overall SSA		100.0%	100.0%	99.77%	100.0%	96.13%	98.30%	99.70%	99.98%	100.0%	100.0%	99.84%	100.0%	100.0%	100.0%	99.99%	100.0%	100.0%	100.0%
6	Call Setup Success Rate (>=95%)	Day 1	Fun City Mall, Crown Plaza	93.33%	100.0%	100.0%	100.0%	91.41%	100.0%	100.0%	100.0%	98.44%	100.0%	97.78%	100.0%	99.25%	100.0%	100.0%	100.0%	98.58%	100.0%
		Day 2	Grand Mall, Sahara Mall	99.25%	100.0%	99.18%	100.0%	94.81%	90.91%	99.14%	100.0%	96.64%	100.0%	100.0%	100.0%	97.17%	100.0%	100.0%	100.0%	99.24%	100.0%
		Day 3	Ansal Plaza, Palam Triangle	99.09%	100.0%	99.15%	100.0%	93.41%	100.0%	99.16%	100.0%	93.65%	100.0%	100.0%	100.0%	99.22%	100.0%	100.0%	100.0%	100.0%	100.0%
		Overall SSA		97.09%	100.0%	99.46%	100.0%	92.91%	96.77%	99.44%	100.0%	96.25%	100.0%	99.34%	100.0%	98.64%	100.0%	100.0%	100.0%	99.26%	100.0%
7	Hand Over Success Rate (HOSR)	Day 1	Fun City Mall, Crown Plaza	98.34%	100.0%	98.34%	100.0%	95.92%	66.67%	99.62%	100.0%	100.0%	100.0%	97.13%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Day 2	Grand Mall, Sahara Mall	99.47%	100.0%	99.36%	100.0%	76.64%	100.0%	99.38%	100.0%	99.14%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

S/N	Parameter	Days of drive test	Indoor locations	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA	
				OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
		Day 3	Ansal Plaza, Palam Triangle	99.44%	100.0%	100.0%	100.0%	90.17%	100.0%	100.0%	100.0%	98.01%	100.0%	99.69%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Overall SSA		**99.08%**	**100.0%**	**99.22%**	**100.0%**	**88.74%**	**85.71%**	**99.66%**	**100.0%**	**99.09%**	**100.0%**	**99.10%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

- **NA-Not Applicable**

7.2 OPERATOR ASSISTED DRIVE TEST: NOIDA & GHAZIABAD AREA (MAY-14)

DRIVE TEST TABLE: 2

S/N	Parameter	Classification of routes covered	Indoor locations	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 CDMA OUTDOOR	MTS CDMA INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
1	Call Attempts	Major Road	Grand Pearl Mall, Pacific Mall	67	30	63	30	78	62	63	30	62	31	55	30	56	30	50	30	68	31
		Highway	Spice Mall, Haldiram	33	30	27	31	28	32	26	30	22	31	32	30	26	30	32	30	35	31
		Within City	GIP Mall, Life Style	305	30	306	30	202	32	339	30	279	30	396	30	328	30	344	30	291	31
		Overall SSA		**405**	**90**	**396**	**91**	**308**	**126**	**428**	**90**	**363**	**92**	**483**	**90**	**410**	**90**	**426**	**90**	**394**	**93**
2	Blocked Call Rate	Major Road	Grand Pearl Mall, Pacific Mall	1.49%	0.00%	3.17%	0.00%	3.85%	22.58%	0.00%	0.00%	3.23%	0.00%	3.64%	0.00%	0.00%	0.00%	0.00%	0.00%	1.47%	0.00%
		Highway	Spice Mall, Haldiram	3.03%	0.00%	0.00%	0.00%	3.57%	0.00%	0.00%	0.00%	9.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.86%	0.00%
		Within City	GIP Mall, Life Style	1.31%	0.00%	0.65%	0.00%	7.92%	0.00%	2.65%	0.00%	3.58%	0.00%	1.77%	0.00%	1.52%	0.00%	0.00%	0.00%	2.41%	0.00%
		Overall SSA		**1.48%**	**0.00%**	**1.01%**	**0.00%**	**6.49%**	**11.11%**	**2.10%**	**0.00%**	**3.86%**	**0.00%**	**1.86%**	**0.00%**	**1.22%**	**0.00%**	**0.00%**	**0.00%**	**2.28%**	**0.00%**

S/N	Parameter	Classification of routes covered	Indoor locations	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 CDMA OUTDOOR	MTS CDMA INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
3	Dropped Call Rate (<=2%)	Major Road	Grand Pearl Mall, Pacific Mall	1.54%	0.00%	0.00%	0.00%	5.97%	0.00%	0.00%	0.00%	5.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Highway	Spice Mall, Haldiram	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	GIP Mall, Life Style	0.66%	0.00%	0.00%	0.00%	4.24%	9.38%	0.30%	0.00%	1.86%	0.00%	0.00%	0.00%	0.00%	0.00%	0.60%	0.00%	0.35%	0.00%
		Overall SSA		**0.75%**	**0.00%**	**0.00%**	**0.00%**	**4.25%**	**3.13%**	**0.24%**	**0.00%**	**2.29%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.48%**	**0.00%**	**0.26%**	**0.00%**
4	**Percentage connections with good voice quality (=>95%)**																				
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Road	Grand Pearl Mall, Pacific Mall	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.91%	99.87%	94.08%	99.46%	96.60%	98.53%
		Highway	Spice Mall, Haldiram	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.07%	99.99%	93.65%	91.06%	97.92%	98.45%
		Within City	GIP Mall, Life Style	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.78%	99.99%	95.31%	90.03%	96.96%	98.87%
		Overall SSA		**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**98.02%**	**99.95%**	**95.05%**	**91.57%**	**97.02%**	**98.61%**
	(b) 0-5 (with frequency hopping	Major Road	Grand Pearl Mall, Pacific	89.05%	87.82%	90.40%	99.01%	93.83%	93.78%	90.79%	96.51%	92.03%	99.04%	96.13%	97.16%	NA	NA	NA	NA	NA	NA

S/N	Parameter	Classification of routes covered	Indoor locations	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 CDMA OUTDOOR	MTS CDMA INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
	for GSM Operators)		Mall																		
		Highway	Spice Mall, Haldiram	87.81%	92.68%	88.64%	95.37%	79.59%	96.91%	89.36%	93.86%	92.05%	96.34%	95.60%	97.62%	NA	NA	NA	NA	NA	NA
		Within City	GIP Mall, Life Style	90.43%	89.38%	96.05%	94.47%	91.70%	86.74%	91.72%	96.36%	93.82%	93.23%	96.38%	96.98%	NA	NA	NA	NA	NA	NA
		Overall SSA		**90.00%**	**89.96%**	**95.22%**	**96.26%**	**91.12%**	**92.78%**	**91.46%**	**95.59%**	**93.39%**	**95.99%**	**96.31%**	**97.15%**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
5	**Service Coverage**																				
	In door (>= -75dBm)	Major Road	Grand Pearl Mall, Pacific Mall	82.90%	95.46%	97.70%	100.0%	37.91%	68.33%	47.80%	43.47%	83.71%	54.73%	94.67%	100.0%	65.02%	99.43%	86.25%	100.0%	97.88%	100.0%
		Highway	Spice Mall, Haldiram	77.07%	96.23%	95.19%	100.0%	10.97%	31.50%	38.64%	62.70%	86.00%	93.92%	94.86%	96.85%	99.37%	97.75%	34.06%	98.68%	53.74%	55.26%
		Within City	GIP Mall, Life Style	87.57%	99.93%	97.07%	99.53%	30.82%	28.15%	45.02%	25.55%	85.50%	34.29%	96.11%	100.0%	83.19%	100.0%	67.81%	15.97%	79.94%	75.95%
		Overall SSA		**85.94%**	**97.21%**	**97.04%**	**99.89%**	**30.04%**	**44.95%**	**45.06%**	**43.62%**	**85.19%**	**53.75%**	**95.86%**	**99.28%**	**81.75%**	**99.06%**	**67.37%**	**71.34%**	**97.77%**	**74.69%**
	In-vehicle (>= -85dBm)	Major Road	Grand Pearl Mall, Pacific Mall	97.25%	99.91%	98.84%	100.0%	79.58%	98.23%	93.20%	98.67%	96.82%	94.41%	97.97%	100.0%	100.0%	100.0%	99.80%	100.0%	99.87%	100.0%
		Highway	Spice Mall, Haldiram	95.99%	99.45%	99.12%	100.0%	41.86%	93.49%	89.21%	98.91%	97.00%	99.64%	98.41%	100.0%	100.0%	100.0%	77.30%	100.0%	84.98%	98.79%

S/N	Parameter	Classification of routes covered	Indoor locations	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 CDMA OUTDOOR	MTS CDMA INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
		Within City	GIP Mall, Life Style	96.95%	100.0%	99.39%	99.53%	73.81%	75.91%	92.78%	98.29%	98.25%	89.92%	99.14%	100.0%	96.43%	100.0%	93.59%	99.99%	96.02%	100.0%
		Overall SSA		**96.93%**	**99.79%**	**99.27%**	**99.89%**	**71.06%**	**90.23%**	**92.64%**	**98.62%**	**97.90%**	**93.40%**	**98.95%**	**100.0%**	**97.12%**	**100.0%**	**93.05%**	**100.0%**	**95.41%**	**99.50%**
	Outdoor-in city (>= -95dBm)	Major Road	Grand Pearl Mall, Pacific Mall	100.0%	100.0%	99.49%	100.0%	97.89%	99.90%	99.96%	100.0%	100.0%	100.0%	98.91%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Highway	Spice Mall, Haldiram	100.0%	100.0%	99.92%	100.0%	85.17%	99.85%	99.85%	100.0%	100.0%	100.0%	99.47%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Within City	GIP Mall, Life Style	100.0%	100.0%	99.71%	99.63%	96.28%	99.69%	99.74%	99.98%	100.0%	100.0%	99.73%	100.0%	100.0%	100.0%	99.99%	100.0%	100.0%	100.0%
		Overall SSA		**100.0%**	**100.0%**	**99.69%**	**99.91%**	**95.22%**	**99.82%**	**99.78%**	**99.99%**	**100.0%**	**100.0%**	**99.62%**	**100.0%**	**100.0%**	**100.0%**	**99.99%**	**100.0%**	**100.0%**	**100.0%**
6	**Call Setup Success Rate (>=95%)**	Major Road	Grand Pearl Mall, Pacific Mall	97.01%	100.0%	95.24%	100.0%	85.90%	52.23%	100.0%	100.0%	96.77%	100.0%	92.73%	100.0%	100.0%	100.0%	100.0%	100.0%	98.53%	100.0%
		Highway	Spice Mall, Haldiram	96.97%	100.0%	100.0%	100.0%	96.43%	96.88%	100.0%	100.0%	90.91%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	97.14%	100.0%
		Within City	GIP Mall, Life Style	98.69%	100.0%	98.38%	100.0%	81.68%	100.0%	97.35%	100.0%	96.42%	100.0%	97.47%	100.0%	98.48%	100.0%	100.0%	100.0%	97.59%	100.0%
		Overall SSA		**98.27%**	**100.0%**	**97.98%**	**100.0%**	**84.09%**	**76.19%**	**97.90%**	**100.0%**	**96.14%**	**100.0%**	**97.10%**	**100.0%**	**98.78%**	**100.0%**	**100.0%**	**100.0%**	**97.72%**	**100.0%**

S/N	Parameter	Classification of routes covered	Indoor locations	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA	
				OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
7	Hand Over Success Rate (HOSR)	Major Road	Grand Pearl Mall, Pacific Mall	99.15%	100.0%	97.75%	100.0%	66.15%	13.71%	100.0%	100.0%	95.63%	100.0%	99.42%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Highway	Spice Mall, Haldiram	100.0%	100.0%	96.83%	100.0%	80.95%	98.68%	100.0%	100.0%	95.12%	98.11%	98.84%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Within City	GIP Mall, Life Style	99.18%	100.0%	99.85%	100.0%	73.48%	68.60%	98.58%	100.0%	97.21%	97.62%	97.89%	100.0%	99.98%	100.0%	100.0%	100.0%	100.0%	100.0%
		Overall SSA		**99.23%**	**100.0%**	**99.21%**	**100.0%**	**71.27%**	**40.98%**	**98.91%**	**100.0%**	**96.80%**	**98.06%**	**98.13%**	**100.0%**	**99.98%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

- **NA-Not Applicable**

7.3 OPERATOR ASSISTED DRIVE TEST: SOUTH DELHI MUNICIPAL AREA (JUNE-14)

DRIVE TEST TABLE: 3

S/N	Parameter	Classification of routes covered	Indoor locations	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 CDMA OUTDOOR	MTS CDMA INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
1	Call Attempts	Major Road	McDonald	242	20	261	21	233	20	257	20	259	20	218	20	271	20	266	20	195	20
		Highway	Jor Bagh Fire Station	70	40	89	43	78	40	79	40	86	41	78	40	74	40	86	40	78	39
		Within City	Haryana Power House	165	20	170	20	147	20	178	20	203	23	177	20	187	20	182	20	178	21
		Overall SSA		**477**	**80**	**520**	**84**	**458**	**80**	**514**	**80**	**548**	**84**	**473**	**80**	**532**	**80**	**534**	**80**	**451**	**80**
2	Blocked Call Rate	Major Road	McDonald	1.24%	0.00%	0.77%	0.00%	5.15%	0.00%	0.39%	0.00%	3.86%	0.00%	0.92%	0.00%	0.74%	0.00%	0.00%	0.00%	0.00%	0.00%
		Highway	Jor Bagh Fire Station	2.86%	0.00%	0.00%	0.00%	2.56%	0.00%	1.27%	0.00%	1.16%	0.00%	0.00%	0.00%	1.35%	0.00%	0.00%	0.00%	2.56%	2.56%
		Within City	Haryana Power House	1.21%	0.00%	1.18%	0.00%	2.72%	0.00%	0.56%	0.00%	0.00%	0.00%	0.56%	0.00%	1.60%	0.00%	0.00%	0.00%	1.69%	0.00%
		Overall SSA		**1.47%**	**0.00%**	**0.77%**	**0.00%**	**3.93%**	**0.00%**	**0.58%**	**0.00%**	**2.01%**	**0.00%**	**0.63%**	**0.00%**	**1.13%**	**0.00%**	**0.00%**	**0.00%**	**1.11%**	**1.25%**
3	Dropped Call Rate (<=2%)	Major Road	McDonald	0.42%	0.00%	0.00%	0.00%	3.79%	0.00%	0.39%	0.00%	1.61%	0.00%	0.00%	0.00%	0.00%	0.00%	1.88%	0.00%	0.51%	0.00%
		Highway	Jor Bagh Fire Station	0.00%	0.00%	0.00%	0.00%	1.33%	0.00%	1.28%	0.00%	1.18%	0.00%	0.00%	0.00%	0.00%	0.00%	2.33%	2.50%	0.00%	0.00%
		Within City	Haryana Power House	0.00%	0.00%	0.00%	0.00%	2.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.10%	0.00%	1.14%	0.00%
		Overall SSA		**0.21%**	**0.00%**	**0.00%**	**0.00%**	**2.82%**	**0.00%**	**0.39%**	**0.00%**	**0.93%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**1.69%**	**1.25%**	**0.67%**	**0.00%**
4	Percentage connections with good voice quality (=>95%)																				

S/N	Parameter	Classification of routes covered	Indoor locations	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 CDMA OUTDOOR	MTS CDMA INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Road	McDonald	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.82%	100%	97.69%	95.10%	96.72%	99.75%
		Highway	Jor Bagh Fire Station	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.82%	93.42%	97.46%	95.35%	94.90%	97.72%
		Within City	Haryana Power House	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.89%	100%	98.48%	90.14%	96.26%	99.92%
		Overall SSA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.21%	96.73%	97.90%	94.50%	96.23%	98.82%
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Road	McDonald	91.25%	89.02%	95.05%	93.66%	92.60%	96.92%	92.72%	95.95%	92.65%	98.90%	96.17%	99.54%	NA	NA	NA	NA	NA	NA
		Highway	Jor Bagh Fire Station	90.54%	98.03%	94.80%	96.32%	95.08%	99.27%	91.35%	90.55%	89.67%	98.18%	96.59%	96.36%	NA	NA	NA	NA	NA	NA
		Within City	Haryana Power House	91.91%	96.38%	95.68%	93.70%	95.11%	95.46%	92.85%	90.66%	93.40%	96.83%	96.23%	97.44%	NA	NA	NA	NA	NA	NA
		Overall SSA		91.37%	95.38%	95.17%	95.06%	93.91%	97.72%	92.58%	91.92%	92.40%	98.02%	96.27%	97.41%	NA	NA	NA	NA	NA	NA
5	**Service Coverage**																				
	In door (>= -75dBm)	Major Road	McDonald	79.80%	96.40%	91.31%	100%	32.48%	32.30%	49.53%	85.57%	81.45%	70.77%	97.65%	100%	91.57%	100%	91.42%	100%	76.33%	100%
		Highway	Jor Bagh Fire Station	90.32%	80.80%	95.62%	100%	28.51%	38.90%	56.69%	15.82%	75.83%	99.81%	97.20%	100%	90.99%	0.07%	96.57%	99.45%	92.98%	3.71%
		Within City	Haryana Power House	83.83%	97.90%	94.13%	100%	29.03%	34.50%	42.00%	49.99%	78.84%	97.55%	97.08%	100%	84.65%	100%	97.43%	94.80%	78.32%	100%
		Overall SSA		82.80%	88.93%	92.98%	100%	30.65%	36.12%	47.89%	42.18%	79.66%	90.51%	97.38%	100%	89.01%	50.51%	94.20%	98.53%	79.94%	53.82%
	In-vehicle (>= -85dBm)	Major Road	McDonald	95.98%	100%	98.34%	100%	77.68%	96.20%	90.43%	98.96%	97.84%	98.48%	99.54%	100%	99.88%	100%	99.82%	100%	95.34%	100%
		Highway	Jor Bagh Fire Station	98.16%	99.40%	99.07%	100%	80.80%	90.50%	92.94%	91.74%	96.23%	100%	99.39%	100%	99.92%	51.02%	99.99%	100%	99.20%	95.91%

S/N	Parameter	Classification of routes covered	Indoor locations	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 CDMA OUTDOOR	MTS CDMA INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
		Within City	Haryana Power House	97.28%	100%	98.85%	100%	79.34%	91.50%	90.15%	97.50%	97.55%	98.34%	99.66%	100%	99.71%	100%	99.98%	100%	98.24%	100%
		Overall SSA		96.76%	99.70%	98.63%	100%	78.77%	92.20%	90.68%	95.06%	97.47%	99.16%	99.56%	100%	99.83%	75.75%	99.90%	100%	97.12%	98.04%
	Outdoor-in city (>= -95dBm)	Major Road	McDonald	99.23%	100%	99.64%	100%	98.23%	100%	99.45%	100%	100%	100%	99.77%	100%	100%	100%	100%	100%	99.94%	100%
		Highway	Jor Bagh Fire Station	99.49%	99.90%	99.75%	100%	98.57%	100%	99.72%	99.99%	100%	100%	99.88%	100%	100%	100%	100%	100%	99.95%	100%
		Within City	Haryana Power House	99.53%	100%	99.63%	100%	98.51%	99.80%	99.60%	100%	100%	100%	99.94%	100%	100%	100%	100%	100%	99.99%	100%
		Overall SSA		99.37%	99.95%	99.66%	100%	98.38%	99.95%	99.54%	99.99%	100%	100%	99.85%	100%	100%	100%	100%	100%	99.96%	100%
6	Call Setup Success Rate (>=95%)	Major Road	McDonald	98.76%	100%	98.47%	100%	90.56%	100%	99.61%	100%	96.14%	100%	99.08%	100%	99.26%	100%	100%	100%	100%	100%
		Highway	Jor Bagh Fire Station	97.14%	100%	98.88%	100%	96.15%	100%	98.73%	100%	98.84%	100%	100%	100%	98.65%	100%	100%	100%	97.44%	97.44%
		Within City	Haryana Power House	98.79%	100%	98.24%	100%	94.56%	100%	99.44%	100%	100%	100%	99.44%	100%	98.40%	100%	100%	100%	98.31%	100%
		Overall SSA		98.53%	100%	98.46%	100%	92.79%	100%	99.42%	100%	97.99%	100%	99.37%	100%	98.87%	100%	100%	100%	98.89%	98.75%
7	Hand Over Success Rate (HOSR)	Major Road	McDonald	98.79%	100%	97.97%	100%	94.39%	100%	99.35%	100%	97.91%	100%	99.20%	100%	100%	100%	100%	100%	100%	100%
		Highway	Jor Bagh Fire Station	99.21%	100%	99.51%	100%	92.86%	94.94%	98.55%	100%	97.59%	100%	99.59%	100%	100%	100%	100%	100%	100%	100%
		Within City	Haryana Power House	98.58%	100%	98.90%	100%	91.81%	98.18%	99.63%	100%	98.31%	100%	99.13%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA		98.80%	100%	98.53%	100%	93.70%	95.82%	99.31%	100%	97.98%	100%	99.25%	100%	100%	100%	100%	100%	100%	100%

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
Gurgaon / Faridabad	**Apr-14**	Gurgaon / Faridabad – **97Km**	Badarpur toll, NHPC Chowk, Manav Rachna University, Sec-21D, Railway Road NIT, NIT Sec-3, Main Bus Stand NIT, Hardware Chowk, Sanjay Colony, Jawahar Colony, New Janta Colony, Parvatiya Colony, Saroorpur, Sohna Road, Mathura Road, Murarilal Chowk, D.C Residence, Khedipul, Sec30 Bypass.	Gurgaon / Faridabad – **120 Km**	Sikandarpur Metro, Dronacharya Metro, DLF Phase-3, Micromax Moulsari Avenue, Hero Honda Chowk, Manesar Industrial Area, Manesar Village, Rajiv Chowk, Subhash Chowk, M.G Road, Huda City Center, Sushant Lok, Golf Course Road, Badshapur, Sec-42, Sec-45.	Gurgaon / Faridabad – **98Km**	Chatarpur, Gurudronacharya, Basai Gaon, Railway Road Sec7, Bheem Nagar, Mahaveerpura, Ram Kisan Katariya Marg, Daultabad Chungi, Bajhghera Road, Palam vihar Phase 3, Kapasheda Crossing, Dundaheda, Air Force Station, Rajiv Nagar, Sec 22, Jwala Mill Phase 4, Cyber City, Guru dronacharya
Noida and Ghaziabad	**May-14**	Noida and Ghaziabad – **100Km**	Kaushambhi, Indirapuram, Jaipuriya Mall, Sahibabad, Ramprastha, Suryanagar, Hindun Airbase, Shalimar Garden, Mohan Nagar, Santosh Hospital, Malibada, Turab Nagar, Industrial Area(BSR), Kavi Nagar, Rajnagar, District Court, Shastri Nagar, Govindpuram, Indargadi, Mahrauli Village, Lal Kuan, Crossing Republic, Kaushambi	Noida and Ghaziabad - **103Km**	Sec-15, Rajnigandha Chowk, Sec-18, Golf Cource, Noida City Center, Sec-61,54, NTPC, Nithari Village, Sec-18,15,20(BSNL Chowk), 12-22 Chowk, Sec-57,58,60, Mamura Chowk, Sec-65, 63, 67, 62, Khoda Gaon, Labour Chowk, Sec-55, 6, Harola Market, Spice Mall, Sec-28, 29, 30, ONGC Colony, Sec-36, 50, 40, Sec-18.	Noida and Ghaziabad - **107Km**	Sec-15, Express Way, Sec-125, 93, 94,136, 137, 129, 130, 135, Shadra Gaon, Sec-144,156, Galgotia Institute, Pari Chowk, Honda City, Eco Tech-1,2, Swarn Nagari, City Park(GN), Sec-36,37(GN), Alfa 1,2, Betta 1,2, Delta 1,2, Gamma 1,2, LG, Moser Baer, Yamaha, Surajpur Industrial Area, Kulishra, Phase-2 Industrial Area, Sec-82, Bhangale, Barola, Sadarpur Village, Sec-37, Sec-18.
South Delhi (Municipal Area)	**Jun-14**	South Delhi (Municipal Area) – **120Km**	Kashmere Gate, Nawab ganj, Kamla Market, Delhi Gate, ITO Road, Jor Bagh, INA, Hauz Khas, Khan Pur, Sangam Vihar, Badarpur, Okhla, Govindpuri, Kalkaji, Lajpat Nagar, Defence Colony, South Ext., Nehru Nagar, Delhi Agra Highway	South Delhi (Municipal Area) - **107Km**	Race Course, Moti Bagh, R>K Puram, Naroji Nagar, AIIMS, Arjun Path, Mahipalpur,Vasant Kunj, Chatarpur, Sultanpur, Arjan Garh, Gurgaon To Dhaulakuan Highway, vasant vihar, katwariya sarai, Jia Sarai, Sarojni nagar, Jor Bagh.	South Delhi (Municipal Area) – **113Km**	Rohtak Highway, Tikri Kalan, Jharoda Kalan, Najafgarh, Dwarka mor, Dwarka Sec-13,12,11,19,20,21, sec-6 10 Market, Dabri Crossing, Janakpuri, District park, Ganesh Nagar, Tilak Nagar, Ashok Nagar, Hari nagar, Mayapuri crossing, Punjabi bagh.

7.5 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 5

DRIVE TEST OBSERVATION OF GURGAON / FARIDABAD AREA - APRIL-14

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Faridabad	Poor Level & Quality near Escort	Gurgaon	Poor Level & Quality near Jharsa	Gurgaon	Poor level & Quality near Gitorni
2	AIRTEL		Poor Quality near Escort & Sec-15		Poor Quality near Sahrol & Sec 17		Poor level & Quality near Bijwasan & GGN Sec-4
3	MTNL		Poor Level & Quality near Dabua Colony, Poor quality near Sec-17		Poor Quality near Sahrol & Sec 17		Poor level & Quality near Palm Vihar & GGN Sec-4, 12, Gitorni
4	TATA CDMA		Poor Level & Quality near Sarai Chowk		Poor Quality near Islampur & Sec 4		Poor Quality near Sec-4
5	IDEA		Poor level near Sec-13, 14 and Poor Quality near Sec-17		Poor Level near Sultanpur and Poor Quality near Maukheda, Sikandarpur		Poor Level near Plam Vihar, Sukhrali & Muleakhera anfd Poor Quality near Railwat Station, Sukhrali
6	RCOM GSM		Poor Level & Quality near Surajknd Bardal RD, Bypas RD Faridabad, Sanjay Colony, Sec-25		Poor Level & Quality near Hero Hinda Chowk, Sushant Lok, Sec-35 and Poor Quality near Malikhera, Nathupur, Manesar		Poor Level & Quality near Palm Vihar & Aava Nagar andd Poor Quality near Laxman Vihar, Sukhrali, Sec-17
7	RCOM CDMA		Poor Quality near CITM & Dabua Colony		Poor Quality near Badshapur, South City, Sec-53		Poor Level near Ashok Vihar
8	MTS		Poor Level near Sec-25		Poor Quality patch near Udhyog Vihar6		Poor Quality near Sec-5
9	VODAFONE		Poor Level near Sec-6		---		---

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF NOIDA & GHAZIABAD AREA (MAY-14)

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Gaziabad	Poor Quality near Shastri Nagar, Jassipura, Budh Vihar, Khanpur	Noida	Poor Quality & Level near Noida Sec-29, Poor Quality near Abufazal Enclave, Sec-60, 62, Khora	Greater Noida	Poor level & Quality near Mohiapur
2	AIRTEL		Poor Quality near Hapur Border		Poor Quality near Sec-62		Poor level & Quality near Mohiapur
3	MTNL		Poor Level & Quality near new Shalimar Garden, Vijay Nagar, Jassipur, Makanpur		Poor Level & Quality near Noida Sec-31, 60, 10, Khora		Poor Level & Quality near Greater Noida Expressway, Dadrird
4	TATA CDMA		Poor Quality near Bulandsahar RD, Crossing Republic, Industrial Area		Poor Quality near Sec-72, 2		Poor Quality near greater Noda Expressway
5	IDEA		Poor Quality near Lalkuan, Indirapuram, Chhajarsi, Sangam Vihar		Poor Quality near Sec-10, 25, 33, Atta, Khora		Poor Quality near Mahiapur, Surajpur
6	RCOM GSM		Poor Level & Quality near indirapuram, Govingpuram Block A, Dundhera		Poor Level near Film City, Sec-37 and Poor Quality near Sec-26, 63 ,64, 11, 33, Khora, morna Village, Chhalhera Bangar		Poor & Quality Level near Sec-93, 49
7	RCOM CDMA		Poor Quality near Vaishali Sec-9, Dayanand Nagar, makanpur		Poor Level & quality near Sec-3, 59 , Sharafad Village		Poor Quality & Level near Sec-37, 93, Greater Noida
8	MTS		Poor Level & Quality near Crossing republic		Poor Quality near Labopur Chowk, Mathi marg, Rajnigandha Chowk, Sec-18		Poor Level near Haldauni Bus Stop, G Noida Bus Depot, Sec-82 and Poor Quality near Lotus Vally Scgool, Sec-93A, greater Noida Expressway
9	VODAFONE		Poor Quality near NH 24, masauri RD		---		---

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF SOUTH DELHI (MUNICIPAL AREA) - JUNE-14

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	South Delhi	Poor Level & Quality near Mathura Rd, Mehrauli-Badarpur RD	South Delhi	Poor Quality near Satyaniketan, Cant, Motibagh, RK Puram Sec-1, rangpuri, yashwant Place	South Delhi	Poor Quality near Shayam Vihar, Dwarka Sec-5
2	AIRTEL		Poor Level & Quality near Nizamudin, Tuglakabad		Poor Level & Quality near Plam, Munirka		Poor Level & Quality near Dwarka Sec6, 59
3	MTNL		Poor Quality near Tuglakabad, Jorbag, Srinivaspuri, Defence Colony		Poor Level & Quality near Vasant Gaon, Mothibag, Mahipalpur, Garden East		Poor Level & Quality near Dwarka Sec-4, 21, Jharodakalan
4	TATA CDMA		Poor Quality near Vijay Ghat, Jorbag		Poor Quality near Delhi Cant, Stya marg		Poor Quality near Kakrola, Jharoda kalan
5	IDEA		Poor Level near Jorbag, tuglkabag, Yamuna river Ring RD		Poor Level & Quality Subroto Park, RK Puram, Ashoka Hotel, Mahipalpur, Dear park, Sikandarpur		Poor Level & Quality near Jharoda Kalan, Dwarka Sec-10
6	RCOM GSM		Poor Level near Nizamudin, Tglakabad, Mohan Co-operative, Lado Sarai and Poor Quality near Yamuna Bazar Sitram Bazar, Tuglakabad, Bhavisya Nidhi, Sadiq Nagar		Poor Level near NCC camp, Vasant Vihar, Dhaula Kaun, Sultanpur and Poor Quality Laxmi Bai Nagar, Vasant Lok, Hyatt, Dhaula Kaun, Vasant Kunj, Sultanpur, DLF -1		Poor Level near Tilkri Kalan, Jharoda Kalan, Dwarka Sec-22 and Poor Quality near Tikri Kalan, Bali Nagar, pratap Nagar, Hari Nagar, Dwarka Sec-17, 22, Bank Enclave
7	RCOM CDMA		Poor Quality near Jorbag, Daryaganj, Btra Hospital		Poor Quality near Chankya puri, Jorbag, Safdarjung, IRCON, Sarhol, Sikandarpur		Poor Quality near Jharoda Kalan, Mayapuri -2
8	MTS		Poor Quality near DB Gupta RD, Kashmere Gate, Ring RD, Sunder Nagar, Sunlight Colony		Poor Quality near Panchseel marg		Poor Quality near Sdwarka Sec-22, 18
9	VODAFONE		----		Poor Level & Quality near Cant, RK Puram		Poor Level & Quality near Jharoda Kalan, Dwarka Sec-21

7.6 KEY FINDINGS ON DRIVE TEST:

The drive tests conducted in different parts of Delhi/NCR region such as **Gurgaon / Faridabad, Noida / Ghaziabad** and **South Delhi** on various routes given above in table-4, during three months of the quarter ended June 2014 revealed that the performance of some of the service providers was not satisfactory as they remained non-compliant of different parameters in different areas of Delhi/NCR. The **overall non-compliance of the service providers on SSA level** with respect to the different parameters is summarized as follows:

April-2014: (Gurgaon/Faridabad)

1. **MTNL:** Call Drop Rate: **3.33%** (Indoor), Voice Quality: **92.74%** (Outdoor) / **94.67%** (Indoor), Call Setup success rate (CSSR): **92.91%** and Blocked call rate: **5.07%**.

2. **Aircel:** Could not perform well in respect of parameter' Voice Quality' as it remained under performed with its performance of **92.12%**.

3. **RCOM (GSM):** Remained under performed for parameter Voice Quality with its performance as **90.69%** and Blocked Call Rate as **3.75%**.

May-2014 (Noida /Ghaziabad)

1. **MTNL:** Call Drop rate: **4.25%** (Outdoor) / **3.13%** (Indoor), Voice Quality: **91.12%** (Outdoor) / **92.78%** (Indoor), CSSR: **84.09%** (outdoor) / **76.19%** (Indoor) and Blocked Call rate: **6.49%** (Outdoor) / **11.11%** (Indoor).

2. **RCOM (GSM):** Failed to meet the benchmark of Call Drop rate: **2.29%**, Voice Quality: **93.39%** and Blocked Call rate: **3.86%**.

3. **Aircel:** Aircel also remained under performed for the parameter Voice quality with its performance as **90.00%** (Outdoor) / **89.96%** (Indoor).

4. **Idea:** The performance of Idea Cellular was not up to the benchmark for parameter Voice Quality **(91.46%)**.

5. **RCOM (CDMA):** failed to meet the benchmark of Voice Quality **(91.57%)**.

June -2014 (South Delhi) :

1. **MTNL:** Call drop rate: **2.82%**, Voice Quality: **93.91%**, CSSR: **92.79%**, Blocked Call rate: **3.93%**.

2. **Aircel:** Voice Quality: **91.37%**.

3. **Idea:** Voice Quality: **92.58%**(Outdoor) / **91.92%**(Indoor)

4. **RCOM(GSM):** Voice Quality: **92.40%**

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

*From the above, it was concluded that the performance of the service providers with respect to the parameter '**Voice Quality'** remained main area of concern as **majority of operators** failed to comply with its bench mark. However, apart from Voice Quality, **MTNL** remained non- compliant in respect of other parameters also like **Dropped Call 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
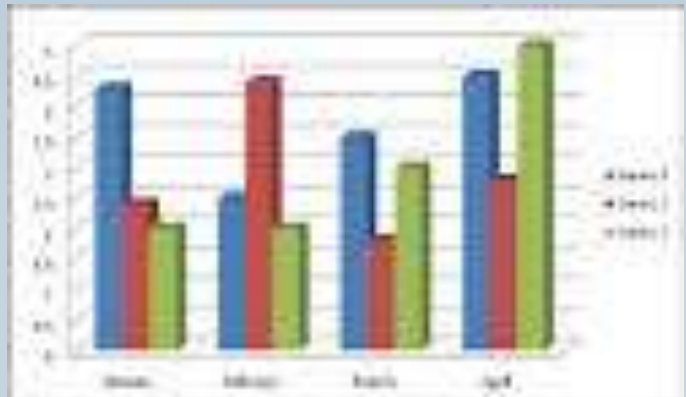
8) GRAPHICAL REPRESENTATION:

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	0.67%	0.02%	0.45%	0.01%	0.36%	0.14%	0.20%	0.15%	0.06%
Quarterly Live	0.73%	0.02%	0.36%	0.00%	0.51%	0.05%	0.16%	0.17%	0.10%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
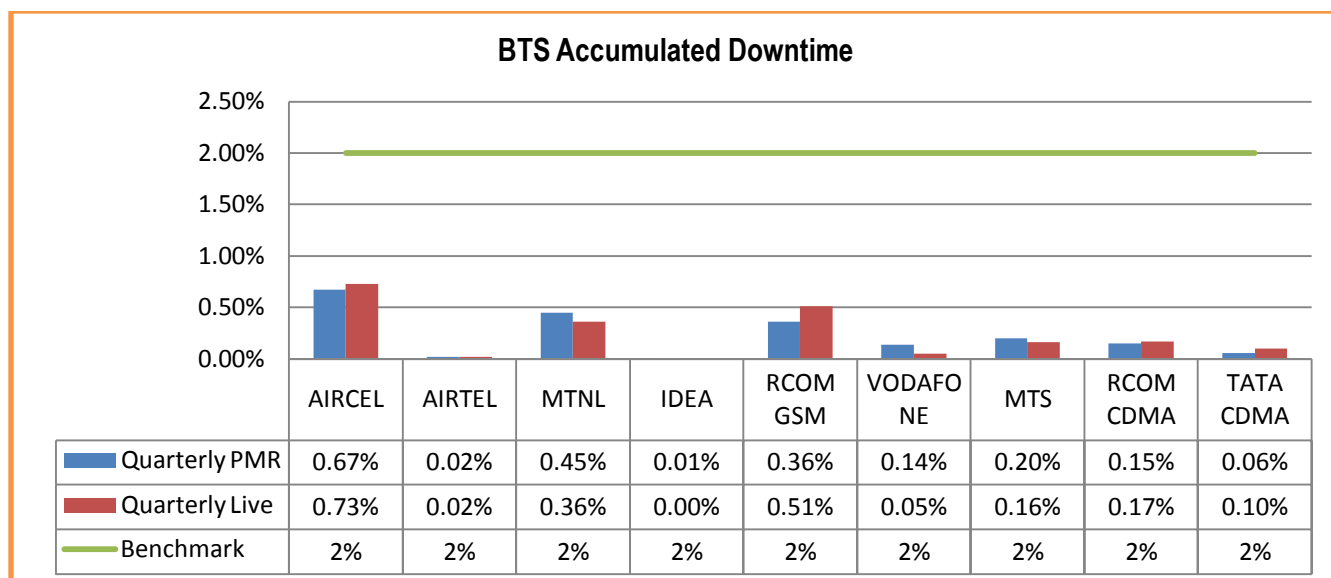
All operators are meeting the benchmarks.

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	2.88%	0.00%	1.69%	0.00%	0.81%	0.66%	0.67%	0.10%	0.00%
Quarterly Live	0.00%	0.00%	0.12%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
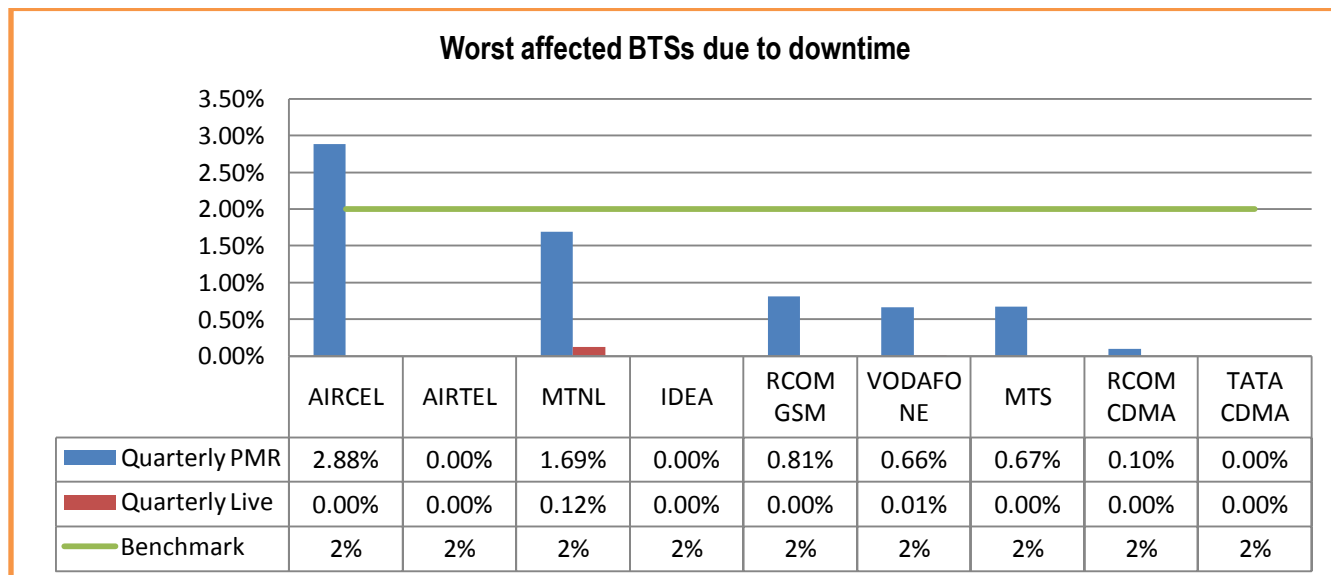
All operators are meeting the benchmarks except Aircel.

3. CALL SETUP SUCCESS RATE :

Call Setup Success Rate

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAF ONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	97.48%	99.86%	96.10%	99.96%	99.58%	99.76%	98.86%	97.12%	99.00%
Quarterly Live	97.62%	99.87%	96.25%	99.97%	99.55%	99.81%	98.83%	97.04%	99.07%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%
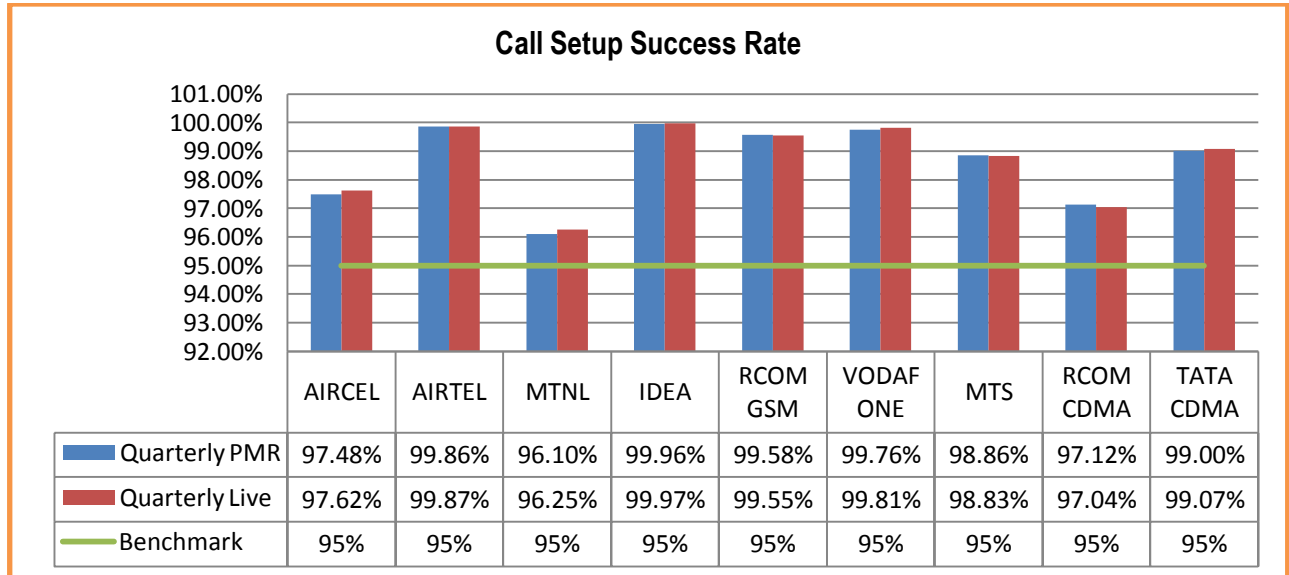
All operators are meeting the benchmarks.

4. SDCCH/PAGING CHANNEL CONGESTION :

SDCCH/PAGING Channel Congestion

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFO NE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	1.38%	0.04%	0.60%	0.89%	0.03%	0.03%	0.00%	0.00%	0.00%
Quarterly Live	0.93%	0.04%	0.62%	0.61%	0.03%	0.01%	0.00%	0.00%	0.00%
Benchmark	1%	1%	1%	1%	1%	1%	1%	1%	1%
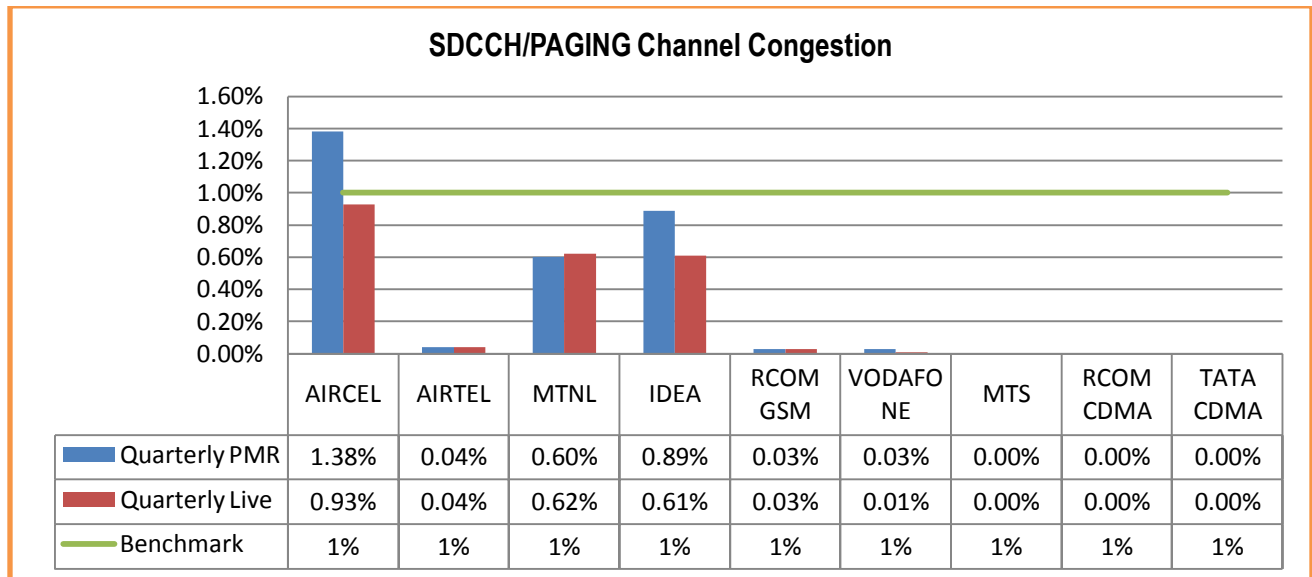
All operators are meeting the benchmarks except Aircel.

5. TCH CONGESTION :

TCH Congestion

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	1.75%	0.04%	1.73%	0.96%	0.07%	0.09%	0.36%	0.09%	0.09%
Quarterly Live	1.42%	0.04%	1.77%	0.64%	0.08%	0.04%	0.29%	0.07%	0.04%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
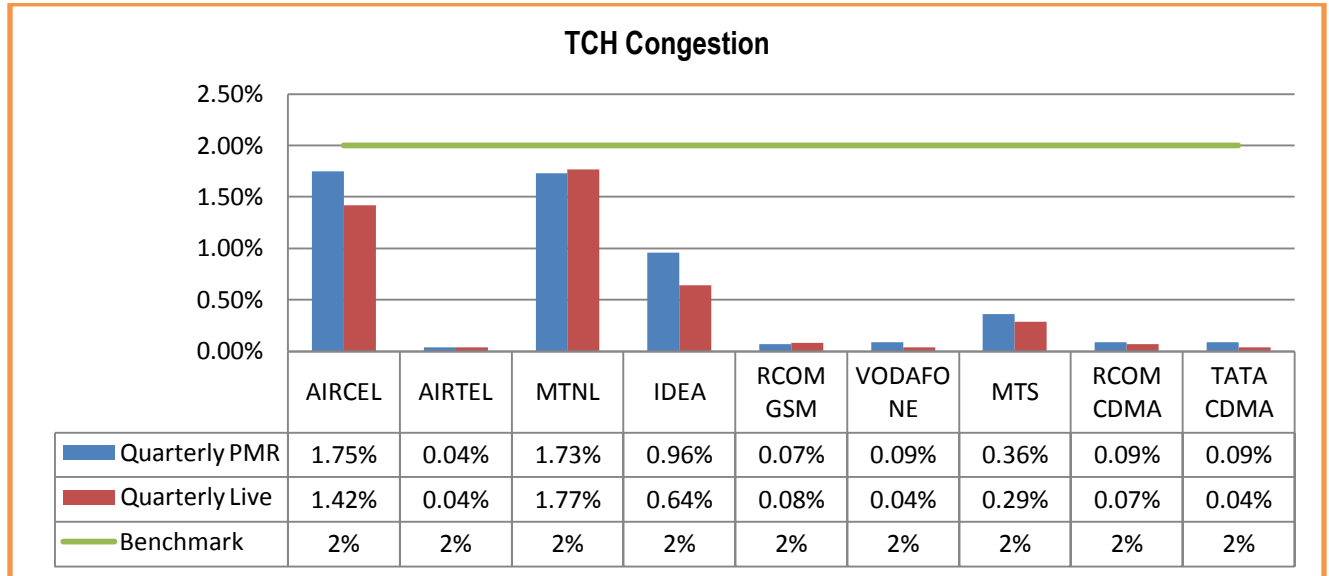
All operators are meeting the benchmarks.

6. CALL DROP RATE :

Call Drop Rate

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	1.23%	0.51%	1.80%	0.50%	0.36%	0.70%	0.62%	0.46%	0.57%
Quarterly Live	1.08%	0.52%	1.78%	0.48%	0.34%	0.70%	0.54%	0.43%	0.54%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
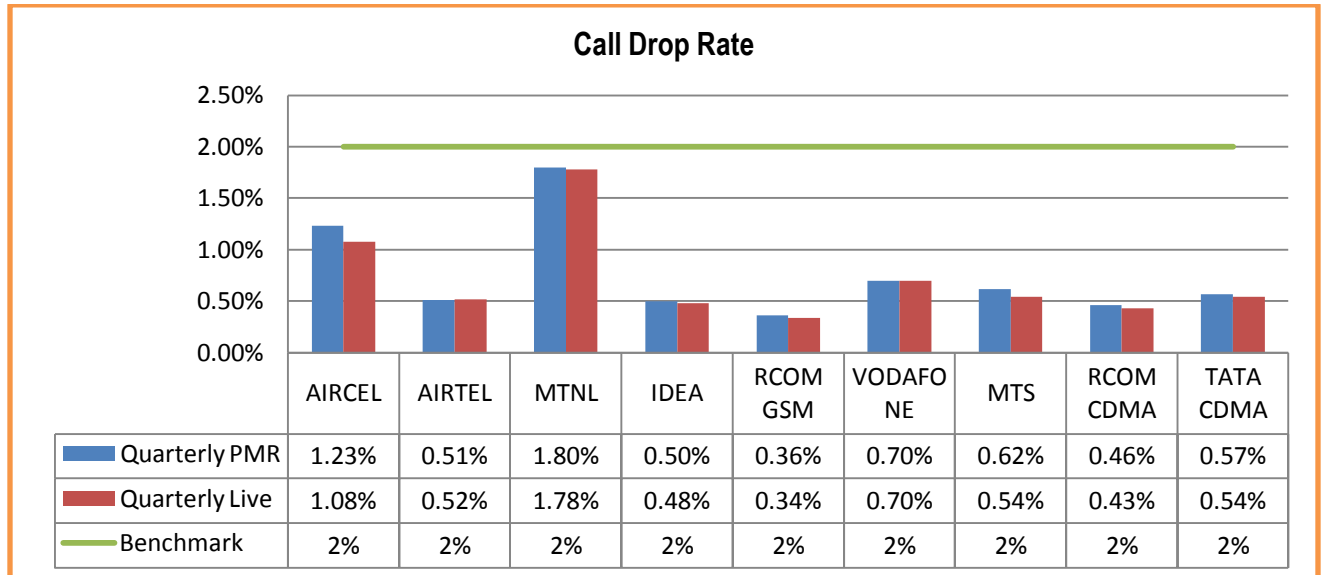
All operators are meeting the benchmarks.

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	7.03%	0.75%	2.37%	1.56%	0.13%	2.67%	1.90%	1.69%	2.90%
Quarterly Live	6.50%	0.64%	2.38%	1.33%	0.16%	2.60%	1.48%	2.36%	2.71%
Benchmark	3%	3%	3%	3%	3%	3%	3%	3%	3%
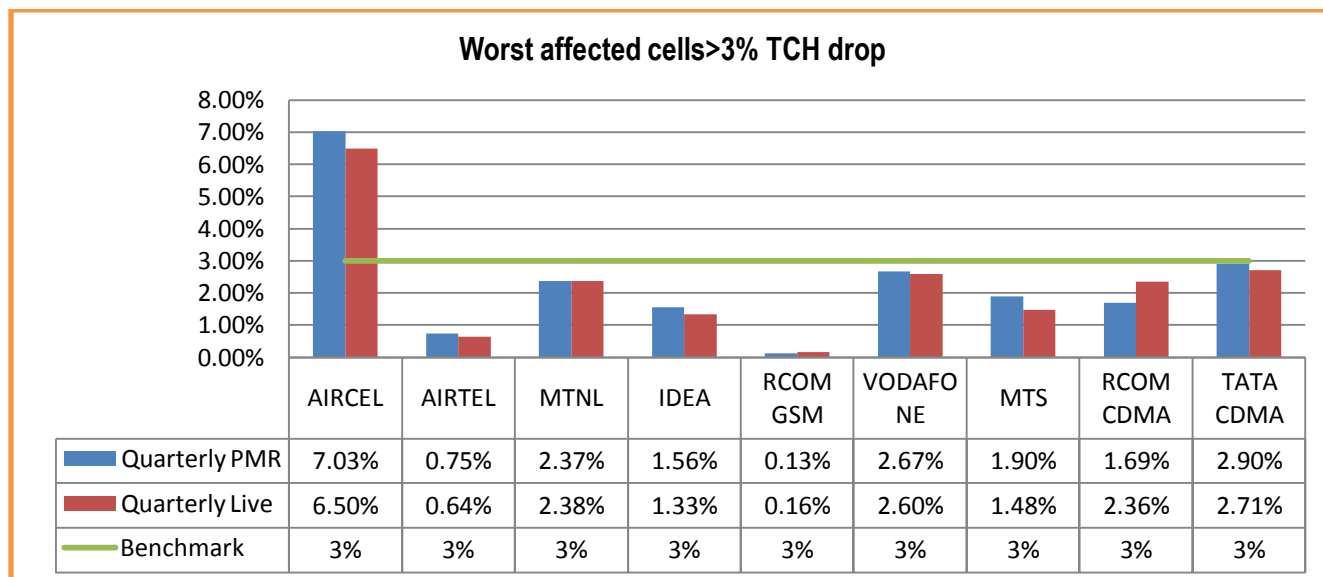
All operators are meeting the benchmarks except Aircel.

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	97.34%	99.34%	97.15%	98.66%	98.78%	97.53%	99.20%	99.80%	99.09%
Quarterly Live	97.36%	99.32%	97.13%	98.74%	98.74%	97.56%	99.19%	99.79%	99.09%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%

All operators are meeting the benchmarks.