



**EAST
ZONE**

TRAI AUDIT WIRELESS REPORT-WEST BENGAL CIRCLE- AMJ QUARTER, 2014

Prepared By -



Prepared For-



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2 INTRODUCTION

2.1 ABOUT TRAI

TRAI's mission is to create and nurture conditions for growth of telecommunications in the country in a manner and at a pace that will enable India to play a leading role in the emerging global information society. One of the main objectives of TRAI is to provide a fair and transparent policy environment which promotes a level playing field and facilitates fair competition.

In pursuance of above objective, TRAI has been issuing regulations, order and directives to deal with the issues or complaints raised by the operators as well as the consumers. These regulations, order and directives have helped the nurture the growth of multi operator multi service- an open competitive market from a government owned monopoly. Also, the directions, orders and regulations issued cover a wide range of subjects including tariff, interconnection and quality of service as well as governance of the Authority.

TRAI initiated a regulation- The Standard of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service regulations, 2009 (7 of 2009) dated the March 20, 2009 and Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated the October 6, 2006 provide for benchmarks for the parameters on customer perception of service to be achieved by service provider.

In order to assess the above regulations TRAI has commissioned a third party agency to conduct the audit of the service providers and check the performance of the operators on the various benchmarks set by Telecom Regulatory Authority of India (TRAI).

2.2 OBJECTIVES

The primary objective of the Audit module is to-

- Audit and Assess the Quality of Services being rendered by Basic (Wireline), Cellular Mobile (Wireless), and Broadband service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified by in the respective regulations published by TRAI).

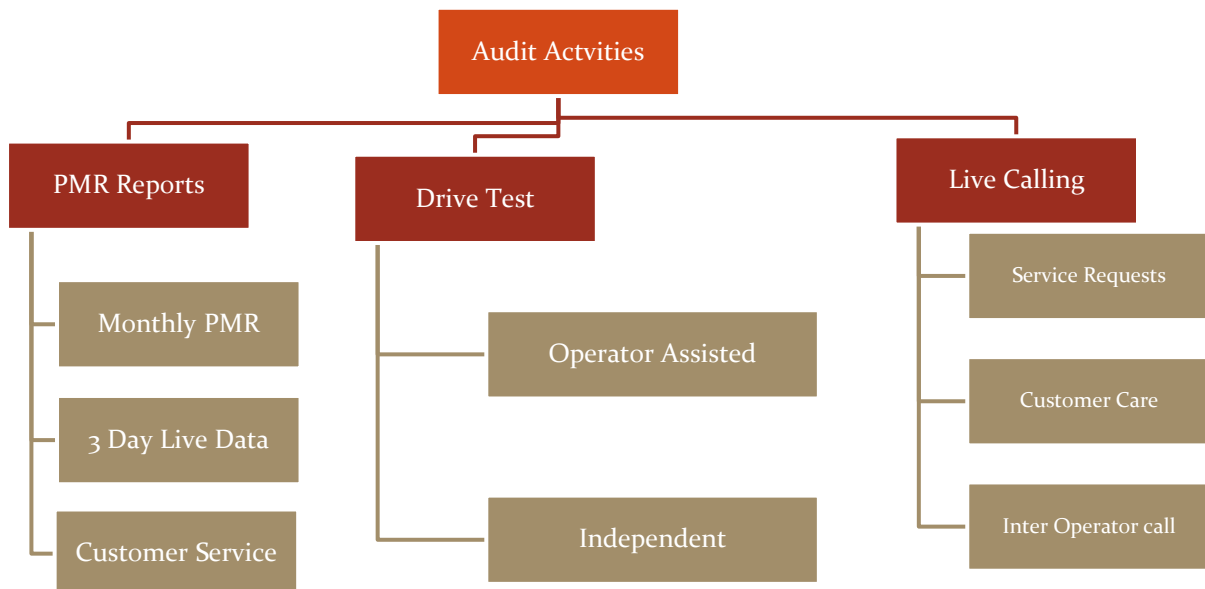
2.3 COVERAGE

The audit was conducted in West Bengal circle covering all the SSAs (Secondary Switching Areas).



Image Source: BSNL website

2.4 FRAMEWORK USED



Let's discuss each of the activity in detail and the methodology adopted for each of the module.

2.4.1 PMR REPORTS

2.4.1.1 SIGNIFICANCE AND METHODOLOGY

PMR or Performance Monitoring Reports are generated by operators to assess the various Quality of Service parameters involved in the mobile telephony service, which indicate the overall health of service for an operator.

The PMR is extracted in the following three formats.

- ↪ Monthly PMR (Network Parameters)
- ↪ 3 Day Live Measurement Data (Network Parameters)
- ↪ Customer Service Data

During audit, PMR is extracted from the server/NOC/exchange etc. in the presence of the auditor. All the calculations are done during the audit by the operators and IMRB auditors verify the calculations done by the operators.

The verified PMR reports are then submitted in hard copy by the operators to the auditor with authorized signatures of the operator personnel. Sometimes, operators also submit a soft copy of the same report along with hard copy for the sake of convenience.

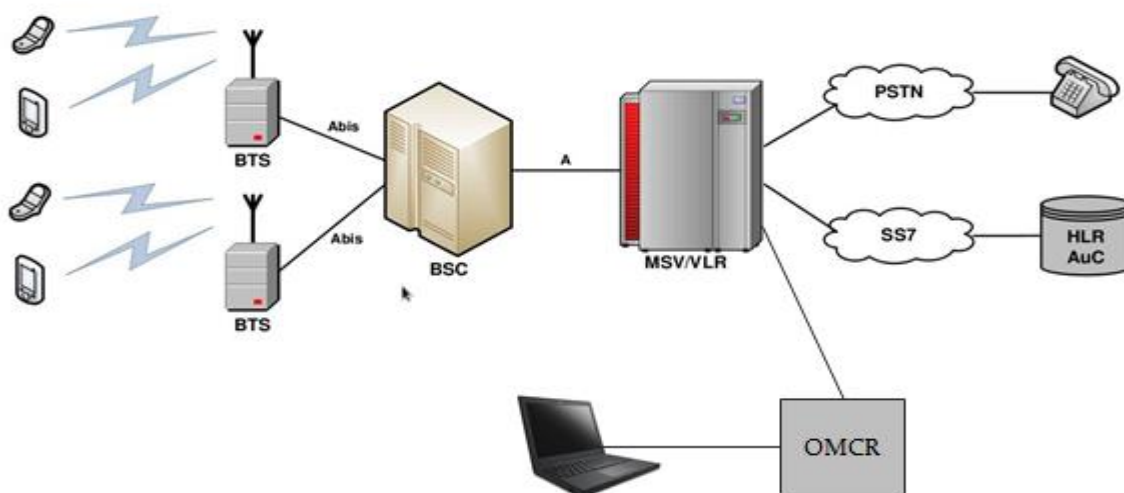
The PMR report for network parameters is taken for each month of the audit quarter and is generally extracted and verified in the first week of the subsequent month of the audit month. For example, June 2014 audit data was collected in the month of July 2014.

The PMR report for customer service parameters is extracted and verified once every quarter in the subsequent month of the last month of the quarter. For example, data for quarter ending June 2014 (AMJ'14) was collected in the month of July 2014.

The operators are duly informed in advance about the audit schedule.

2.4.1.2 POINT OF DATA EXTRACTION

The data is extracted from a terminal/computer connected to OMCR on the operator network.



2.4.1.3 STEP BY STEP AUDIT PROCEDURE

The key steps followed for extraction of reports at the operator premises are given below.



Data has been extracted and calculated as per the counter details.

2.4.1.4 MONTHLY PMR

This involved calculation of the various Quality of Service network parameters through monthly Performance Monitoring Reports (PMR's). The PMR reports were extracted in presence of IMRB representative from the operator's premises for the month of April, May and June. The performance of operators on various parameters was assessed against the benchmarks. Parameters include-

Network Availability

- BTS accumulated downtime
- Worst affected BTS due to downtime

Connection Establishment (Accessibility)

- Call Set Up success Rate (CSSR)

Network Congestion Parameters

- SDCCH/Paging Channel Congestion
- TCH Congestion
- Point of Interconnection

Connection Maintenance

- Call Drop rate
- Worst affected cells having more than 3% TCH drop

Voice Quality

- % Connections with good voice quality

All the parameters have been described in detail along with key findings of the parameter in section 4.

2.4.1.5 AUDIT PARAMETERS

Let us now look at the various parameters involved in the audit reports.

Network Related

Network Availability	
BTSs Accumulated downtime (not available for service)	≤ 2%
Worst affected BTSs due to downtime	≤ 2%
Connection Establishment (Accessibility)	
Call Set-up Success Rate (within licensee's own network)	≥ 95%
SDCCH/ Paging Channel Congestion	≤ 1%
TCH Congestion	≤ 2%
Connection Maintenance (Retainability)	
Call Drop Rate	≤ 2%
Worst affected cells having more than 3% TCH drop (call drop) rate	≤ 3%
Connections with good voice quality	≥ 95%
Point of Interconnection	
(POI) Congestion (on individual POI)	≤ 0.5%

Customer Service Quality-

Response Time to the Customer form Assistance	
Accessibility of call centre/customer care	≥ 95%
Percentage of calls answered by the operators (voice to voice) within 60 seconds	≥ 90%
Termination/ closure of service	≤ 7 days
Time taken for refund of deposits after closures within 60 days	100%

2.4.1.6 3 DAY LIVE DATA

The main purpose of 3 day live measurement is to evaluate the network parameters on intraday basis. While the monthly PMR report provides day end values, the 3 day live data is created by taking dump of network parameters on hourly basis. All the calculations are then done on the basis of that dump of 3 days.

The 3 day live data provides a sample of 9 days in a quarter (3 days each month of a quarter) with hourly performance, which enables the auditor to identify and validate intraday issues for an operator on the QoS network parameters. For example, network congestion being faced by an operator during busy/peak hours

Network related parameters were evaluated for a period of 3 days in each month. 3 day live audit was conducted for 3 consecutive weekdays for each month. The data was extracted from each operator's server at the end of the 3rd day. The extracted data was analyzed to assess the various QoS parameters.

2.4.1.7 CUSTOMER SERVICE PARAMETERS

The PMR report for customer service parameters is extracted at the operator premises and verified once every quarter in the subsequent month of the last month of the quarter. For example, data for quarter ending June 2014 (AMJ'14) was collected in the month of July 2014.

The operators are duly informed in advance about the audit schedule.

The Customer Service Quality Parameters include response time to the customer for assistance, termination/closure of service and time taken for refund of security deposit after closures. All the customer service parameters were calculated on the quarterly basis.

All the parameters have been described in detail along with key findings of the parameter in section 5.

2.4.2 LIVE CALLING

2.4.2.1 SIGNIFICANCE AND METHODOLOGY

The main purpose of live calling is to verify the performance of various customer service parameters by doing test calls to the subscribers/ specific numbers.

The IMRB auditor visits each operator premises to do live calling. The operators provide the data dump of customer service complaints and also the list of customer service numbers to be verified through live calling.

IMRB auditors then make live calls using operator SIM to a random sample of subscribers from the dump provided to verify the resolution of complaints.

The auditors also verify the performance of call center. Using operator SIM, the auditors also make test calls to subscribers of other operators to assess the inter-operator call connectivity in the same licensed service area.

Live calling activity was carried out during the period of July 2014. The data considered for live calling was for the month prior to the month in which the live calling activity was being conducted. In this case, data of June'14 was considered for live calling activity conducted in July 2014.

A detailed explanation of each parameter is explained below.

2.4.2.2 SERVICE COMPLAINTS REQUESTS

“Service request” means a request made to a service provider by its consumer pertaining to his account, and includes.

- ↻ A request for change of tariff plan
- ↻ A request for activation or deactivation of a value added service or a supplementary service or a special pack
- ↻ A request for activation of any service available on the service provider's network
- ↻ A request for shift or closure or termination of service or for billing details

All the complaints other than billing were covered. A total of 100 calls per service provider for each service in licensed service area were done by the IMRB auditors.

2.4.2.3 CUSTOMER CARE

Overall sample size is 2*50 calls per service provider per circle at different points of time, to be evenly distributed across the selected exchanges – 50 calls between 10:00 hours to 13:00 hours and 50 calls between 15:00 hours to 17:00 hours.

The time taken to answer the call through IVR and Customer Care is recorded by the audit agency.

TRAI Benchmark- Response time to the customer for assistance:

- (a) Accessibility of call center/customer care/IVR >= 95%
- (b) % age of calls answered by the operator (voice to voice): within 60 seconds = 90%

2.4.2.4 INTER OPERATOR CALL ASSESEMENT

A total of 100 calls per service provider to all the other service providers in a licensed service area were done for the purpose of audit.

2.4.3 DRIVE TEST

2.4.3.1 SIGNIFICANCE AND METHODOLOGY

Drive test, as its name suggests, is conducted to measure the outdoor coverage in a moving vehicle in a specified network coverage area.

The main purpose of the drive test is to check the health of the mobile network of various operators in the area in terms of coverage (signal strength), voice quality, call drop rate, call set up success rate etc.

To assess the indoor coverage, the test is also conducted at two static indoor locations in each SSA, such as Malls, office buildings, shopping complexes, government buildings etc.

IMRB conducted two types of drive tests as mentioned below.

- ↵ Operator Assisted Drive Test
- ↵ Independent Drive Test

The main difference between the two is that in the operator assisted, operators participate in the drive test along with their hardware, software, phones etc. while in the independent drive test IMRB conducts the drive test on solitary basis and uses its own hardware. Operators generally do not have any knowledge of the drive test being conducted.

A detailed explanation of the two methodologies has been provided below.

2.4.3.2 OPERATOR ASSISTED DRIVE TEST

A total of 3 SSA were selected and audited in each quarter, 1 SSA in each month. The methodology adopted for the drive test-

- ↵ 3 consecutive days drive test in one SSA every month. SSA would be defined as per BSNL and month wise SSA list will be finalized by regional TRAI office.
- ↵ On an average, a minimum of 100 kilometers were covered each day
- ↵ Route map was designed in such a way that all the major roads, highways and all the important towns and villages were covered as part of audit.
- ↵ Special emphasis was given to those areas where the number of complaints received were on the higher side, if provided by TRAI.
- ↵ The route is defined in a way that we cover maximum area in the SSA and try to cover maximum villages and cities within the SSA. The route is designed such that there is no overlap of roads and we can start from the point from where we had left last day (if possible).
- ↵ The route was classified as-
 - With In city
 - Major Roads
 - Highways
 - Shopping complex/ Mall & Office Complex/ Government Building
- ↵ There were no fixed calls which we need to do for within city, major roads and highways, but a minimum of 30 calls in each route, i.e., within city, major roads and highways on each day. For indoors, 20 calls each for shopping and office complex each day preferably in relatively bigger city.
- ↵ The drive test covered selected cities and adjoining towns/rural areas where the service provider has commenced service, including congested areas and indoor sites.
- ↵ The drive test of each mobile network was conducted between 10 am and 8 pm on weekdays.
- ↵ The Vehicle used in the drive tests was equipped with the test tool that automatically generates calls on the mobile telephone networks.
- ↵ The speed of the vehicle was kept at around 30 km/hr.
- ↵ The holding period of each test call was 120 seconds.
- ↵ A test call was generated 10 seconds after the previous test call is completed.
- ↵ Height of the antenna was kept uniform in case of all service providers.

2.4.3.3 INDEPENDENT DRIVE TEST

The number of independent drive tests to be conducted and their locations are decided basis TRAI recommendation.

- ↪ A minimum of 100 kilometers was traversed during the independent drive test in a SSA. The SSA would be defined as per BSNL and SSA list will be finalized by regional TRAI office.
- ↪ Route map was designed in such a way that all the major roads, highways and all the important towns and villages were covered as part of audit.
- ↪ Special emphasis was given to those areas where the number of complaints received were on the higher side, if provided by TRAI.
- ↪ The route is defined in a way that we cover maximum area in the SSA and try to cover maximum villages and cities within the SSA. The route is designed such that there is no overlap of roads (if possible).
- ↪ The route was classified as-
 - With In city
 - Major Roads
 - Highways
 - Shopping complex/ Mall & Office Complex/ Government Building
- ↪ There were no fixed calls which we need to do for within city, major roads and highways, but a minimum of 30 calls in each route, i.e., within city, major roads and highways on each day. For indoors, 20 calls each for shopping and office complex each day preferably in relatively bigger city.
- ↪ The drive test covered selected cities and adjoining towns/rural areas where the service provider has commenced service, including congested areas and indoor sites.
- ↪ The drive test of each mobile network was conducted between 10 am and 8 pm on weekdays.
- ↪ The Vehicle used in the drive tests was equipped with the test tool that automatically generates calls on the mobile telephone networks.
- ↪ The speed of the vehicle was kept at around 30 km/hr.
- ↪ The holding period of each test call was 120 seconds.
- ↪ A test call was generated 10 seconds after the previous test call is completed.
- ↪ Height of the antenna was kept uniform in case of all service providers.

2.4.3.4 PARAMETERS EVALUATED DURING DRIVE TEST

The parameters which were captured during the drive test include. Below are the parameters which are captured for the GSM and CDMA operators.

- ↪ Coverage-Signal strength (GSM)
 - ✓ Total calls made (A)
 - ✓ Number of calls with signal strength between 0 to -75 dBm
 - ✓ Number of calls with signal strength between 0 to -85 dBm
 - ✓ Number of calls with signal strength between 0 to -95 dBm
- ↪ Coverage-Signal strength (CDMA)
 - ✓ Total Ec/Io BINS (A)
 - ✓ Total Ec/Io BINS with less than -15 (B)
 - ✓ Low Interference = $[1 - (B/A)] \times 100$
- ↪ Voice quality (GSM)

- ✓ Total RxQual Samples- A
- ✓ RxQual samples with 0-5 value - B
- ✓ %age samples with good voice quality = $B/A \times 100$
- ↪ Voice quality (CDMA)
 - ✓ Total FER BINs (forward FER) - A
 - ✓ FER BINs with 0-2 value (forward FER) - B
 - ✓ FER BINs with 0-4 value (forward FER) - C
 - ✓ %age samples with FER bins having 0-2 value (forward FER) = $B/A \times 100$
 - ✓ %age samples with FER bins having 0-4 value (forward FER) = $C/A \times 100$
 - ✓ No. of FER samples with value $> 4 = [A-C]$
- ↪ Call setup success rate
 - ✓ Total number of call attempts - A
 - ✓ Total Calls successfully established - B
 - ✓ Call success rate (%age) = $(B/A) \times 100$
- ↪ Blocked calls
 - ✓ 100% - Call Set up Rate
- ↪ Call drop rate
 - ✓ Total Calls successfully established - A
 - ✓ Total calls dropped after being established - B
 - ✓ Call Drop Rate (%age) = $(B/A) \times 100$

2.5 OPERATORS COVERED

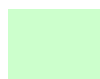
June'14 VLR data was considered for the number of subscribers.

Name of Operator	Number of Subscriber as per VLR
Aircel(DWL)	3064979
Airtel	10340921
BSNL	1399000
Idea	3318411
MTS	1236389
Reliance CDMA	848936
Reliance GSM	6287656
TATA CDMA	9149
TATA GSM	514108
Vodafone	13030769

2.6 COLOUR CODES TO READ THE REPORT



Not Meeting the benchmark



Best Performing Operator

3 EXECUTIVE SUMMARY

3.1 PMR DATA – 3 MONTHS- CONSOLIDATED

The objective assessment of Quality of Service (QoS) carried out by IMRB gives an insight into the overall performance of various operators in the West Bengal circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.10%	1.85%	96.45%	0.96%	1.94%	1.60%	2.95%	95.38%
Airtel	0.05%	0.05%	98.58%	0.29%	1.68%	1.09%	1.50%	95.76%
BSNL	5.06%	25.46%	98.99%	0.58%	0.56%	1.92%	12.76%	95.04%
Idea	0.22%	1.25%	98.60%	0.13%	0.56%	0.43%	1.83%	96.09%
MTS	0.32%	0.00%	99.01%	0.00%	0.44%	0.81%	2.08%	99.72%
Reliance CDMA	0.47%	1.21%	98.55%	0.00%	0.06%	0.25%	0.84%	99.68%
Reliance GSM	0.39%	1.57%	98.73%	0.03%	0.22%	0.61%	0.07%	98.38%
TATA CDMA	0.03%	0.00%	98.53%	0.00%	0.08%	0.62%	2.19%	97.99%
TATA GSM	0.01%	0.00%	98.63%	0.24%	0.52%	0.62%	3.12%	97.94%
Vodafone	0.05%	0.33%	99.25%	0.18%	0.75%	0.80%	1.58%	95.40%

Following are the parameter wise observations for Wireless Operators for West Bengal circle:

BTSS Accumulated Downtime:

The audit results showed that all the operators met the TRAI specified criteria for the outage due to downtime of the base transceiver stations (BTS) except BSNL at 5.06%. TATA GSM at 0.01% performed the best with no downtime reported closely followed by TATA CDMA at 0.01% whereas Vodafone and Airtel are in the same rate at 0.05%.

Worst Affected BTSS Due to Downtime:

All the operators met the benchmark specified by TRAI except BSNL at 25.46%. MTS, TATA CDMA and TATA GSM at 0.00% performed the best with no downtime reported.

Call Set-up Success Rate (CSSR):

All the operators comfortably met the TRAI benchmark. The best performance was recorded for the operator Vodafone at 99.25% CSSR followed by MTS at 99.01. All the operators were found to be calculating the parameter as per the norm specified by TRAI.

Network Congestion parameters:

SDCCH / Paging Channel Congestion, TCH and POI are part of the network congestion parameters. All the operators are meeting the TRAI specified benchmarks on the congestion parameters. Reliance GSM was performing the best in SDCCH congestion of 0.03% and Reliance CDMA in TCH congestion of 0.06%. The calculation methodology of these parameters was found to be in complete accordance with what has been specified by TRAI.

Call Drop Rate:

During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines. The call drop rate was measured as the ratio of total calls dropped to the total number of call attempts for all operators. All of service providers were found to be meeting the TRAI specified benchmarks with Reliance CDMA at 0.25% performing the best vis-à-vis other operator.

Worst Affected Cells Having More than 3% TCH Drop:

During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines. All the operators were comfortably meeting the benchmark on this parameter except BSNL at 12.76% and TATA GSM at 3.12% as call drop. Reliance GSM at 0.07% was performing the best when compared to other service providers.

Voice Quality:

During the audit it was found that all the service providers were meeting the benchmark specified by TRAI. MTS performed the best having 99.72% as %age of connections with good voice quality.

3.2 3 DAY DATA - CONSOLIDATED

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/Paging Chl. Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.80%	1.42%	96.46%	0.83%	1.88%	1.61%	4.20%	95.11%
Airtel	0.04%	0.00%	98.70%	0.21%	1.59%	1.17%	1.58%	95.50%
BSNL	5.61%	3.07%	98.97%	0.65%	0.54%	1.92%	13.81%	95.08%
Idea	0.20%	0.15%	99.46%	0.06%	0.19%	0.36%	0.08%	96.82%
MTS	0.30%	0.00%	99.67%	0.00%	0.06%	0.60%	2.40%	NA
Reliance CDMA	0.30%	0.00%	98.69%	0.00%	0.05%	0.22%	1.31%	99.68%
Reliance GSM	0.30%	0.00%	98.99%	0.02%	0.09%	0.52%	0.07%	98.16%
TATA CDMA	0.00%	0.00%	98.56%	0.00%	0.05%	0.51%	3.51%	97.86%
TATA GSM	0.03%	0.00%	99.16%	0.04%	0.13%	0.61%	3.10%	98.08%
Vodafone	0.01%	0.00%	99.77%	0.18%	0.23%	0.65%	NA	96.33%

BTs Accumulated Downtime:

The audit results showed that all the operators met the TRAI specified criteria for the outage due to downtime of the base transceiver stations (BTS) except BSNL which recorded accumulated downtime of 5.61%. TATA CDMA at 0.00% performed the best of the lot with near negligible downtime reported, followed by the BTS for Airtel at 0.04%, TATA GSM at 0.03% and Vodafone at 0.01%.

Worst Affected BTs Due to Downtime:

During the audit it was found that all the operators met the benchmark specified by TRAI except BSNL at 3.07%.

Call Set-up Success Rate (CSSR):

All the operators comfortably met the TRAI benchmark. The best performance was recorded for the operator Vodafone at 99.77% CSSR closely followed by Idea at 99.46% and TATA GSM at 99.16%. All the operators were found to be calculating the parameter as per the norm specified by TRAI.

Network Congestion parameters:

SDCCH / Paging Channel Congestion, TCH and POI are part of the network congestion parameters. All the operators are meeting the TRAI specified benchmarks on the congestion parameters. Reliance GSM at 0.02% was performing the best on SDCCH congestion parameter and Reliance CDMA at 0.05% on TCH congestion parameter. The calculation methodology of these parameters was found to be in complete accordance with what has been specified by TRAI.

Call Drop Rate:

During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines. The call drop rate was measured as the ratio of total calls dropped to the total number of call attempts for all operators. Also, all of service providers were found to be meeting the TRAI specified benchmark. Reliance CDMA was observed to have the lowest call drop rate of 0.22%.

Worst Affected Cells Having More than 3% TCH Drop:

During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines. All the operators were comfortably meeting the benchmark on this parameter except Aircel at 4.20% BSNL at 13.81%, TATA CDMA at 3.51%, and TATA GSM at 3.10% as call drop. Reliance GSM at 0.07% was performing the best when compared to other service providers.

Voice Quality:

During the audit it was found that all the service providers were meeting the benchmark specified by TRAI. Reliance CDMA performed the best having 99.68% as %age of connections with good voice quality.

3.3 LIVE CALLING DATA - CONSOLIDATED

Name of Service Provider	Service Requests	Response time to customer for assistance	
	Complaint /Request attended to Satisfaction	Accessibility of call centre/ customer care	Percentage of calls answered by the operators (voice to voice) within 60 seconds
Benchmark		≥ 95%	≥ 90%
Aircel(DWL)	98.00%	100.00%	100.00%
Airtel	97.00%	100.00%	99.00%
BSNL	80.00%	98.00%	96.00%
Idea	91.00%	100.00%	100.00%
MTS	99.00%	100.00%	100.00%
Reliance CDMA	95.00%	100.00%	100.00%
Reliance GSM	98.00%	100.00%	100.00%
TATA CDMA	96.00%	100.00%	100.00%
TATA GSM	87.00%	100.00%	100.00%
Vodafone	100.00%	100.00%	100.00%

Complaint/Request Attended to Satisfaction

All the operators performed satisfactorily in terms of satisfaction to the customers for service requests. All service requests for Vodafone at 100% were attended to complete satisfaction.

Accessibility of Call Centre/Customer Care-IVR

For the IVR aspect all the service providers meet the TRAI benchmark with 100% accessibility of all call center/customer care center which was much above the TRAI benchmark of 95%.

Customer Care / Helpline Assessment

It was seen all the operators comfortably exceeded the TRAI benchmark of 90% of calls answered by the centres within 60 seconds.

3.4 CUSTOMER CARE - CONSOLIDATED

Name of Service Provider	Customer care	
	Percentage of calls answered by the operators IVR within 60 seconds	Percentage of calls answered by the operators (voice to voice) within 60 seconds
Benchmark	≥ 95%	≥ 90%
Aircel(DWL)	98.89%	89.10%
Airtel	100.00%	90.00%
BSNL	100.00%	62.83%
Idea	98.80%	94.58%
MTS	99.21%	91.04%
Reliance CDMA	99.18%	88.02%
Reliance GSM	98.99%	88.02%
TATA CDMA	98.12%	98.27%
TATA GSM	95.61%	89.78%
Vodafone	100.00%	90.76%

Customer Care Percentage of calls answered by the operators IVR within 60 seconds

From the audit it can be seen that on an average 98.88% of the calls were answered by the operators IVR within 60 seconds. Operators Airtel, BSNL and Vodafone at 100% performed much better than their counterparts.

Customer Care Percentage of calls answered by the operators (Voice to Voice) within 60 seconds

For the voice to voice calls, on an average 88.24% of the calls were answered within 60 seconds. TATA CDMA at 98.27% had the highest percentage of calls being answered. Whereas BSNL at 62.83% had failed to meet the TRAI benchmark.

3.5 INTER OPERATOR CALL ASSESSMENT – CONSOLIDATED

Inter operator call Assessment To↓ From→	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Aircel(DWL)	NA	100.00%	100.00%	100.00%	99.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Airtel	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
BSNL	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Idea	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
MTS	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%
Reliance CDMA	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%
Reliance GSM	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
TATA CDMA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%
TATA GSM	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%
Vodafone	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA



Maximum Problem faced by the calling operator to other operator

In the inter-operator call assessment, calls were made from the test SIMs of service provider whose audit was being conducted to all the providers. All operators were comfortably able to connect with each other were having 100% connectivity.

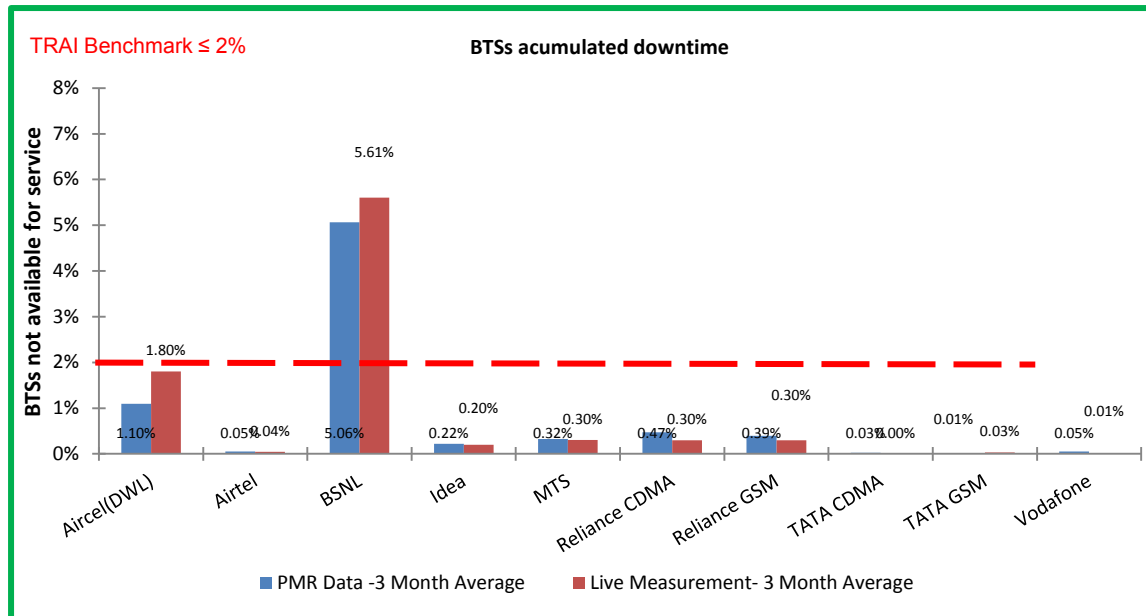
4 PARAMETER DESCRIPTION & DETAILED FINDINGS - COMPARISON BETWEEN PMR DATA, 3 DAY LIVE DATA AND LIVE CALLING DATA

4.1 BTS ACCUMULATED DOWNTIME

4.1.1 PARAMETER DESCRIPTION

- The parameter of network availability would be measured from following sub-parameters
 1. BTSs Accumulated downtime (not available for service)
 2. Worst affected BTSs due to downtime
- 1. **Definition - BTSs accumulated downtime** (not available for service) shall basically measure the downtime of the BTSs, including its transmission links/circuits during the period of a month, but excludes all planned service downtime for any maintenance or software up gradation. For measuring the performance against the benchmark for this parameter the downtime of each BTS lasting more than 1 hour at a time in a day during the period of a month were considered.
- 2. **Computation Methodology -**
BTS accumulated downtime (not available for service) = Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month / (24 x Number of days in a month x Number of BTSs in the network in licensed service area) x 100
- 3. **TRAI Benchmark -**
 - a. BTSs Accumulated downtime (not available for service) $\leq 2\%$
- 4. **Audit Procedure -**
 - The fault alarm details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) was audited
 - All the BTS in service area were considered. Planned outages due to network up gradation, routine maintenance were not considered.
 - Any outage as a result of force majeure were not considered at the time of calculation
 - Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.
 - List of operating sites with cell details and ids are taken from the operator.
 - When there is any outage a performance report gets generated in line with that cell resulting and master base of the Accumulated downtime and worst affected BTS due to downtime.

4.1.2 KEY FINDINGS



All operators met the TRAI benchmark of having BTS downtime less than 2% except BSNL. The data in both PMR and Live measurement is similar for all operators.

4.2 WORST AFFECTED BTS DUE TO DOWNTIME

4.2.1 PARAMETER DESCRIPTION

- Definition – Worst Affected BTS due to downtime** shall basically measure percentage of BTS having downtime greater than 24 hours in a month. Planned outages were not considered as part while computing.

For measuring the parameter “Percentage of worst affected BTSs due to downtime” the downtime of each BTS lasting for more than 1 hour at a time in a day during the period of a month was considered.

- Computation Methodology –**

Worst affected BTSs due to downtime = $\left(\frac{\text{Number of BTSs having accumulated downtime greater than 24 hours in a month}}{\text{Number of BTS in Licensed Service Area}} \right) * 100$

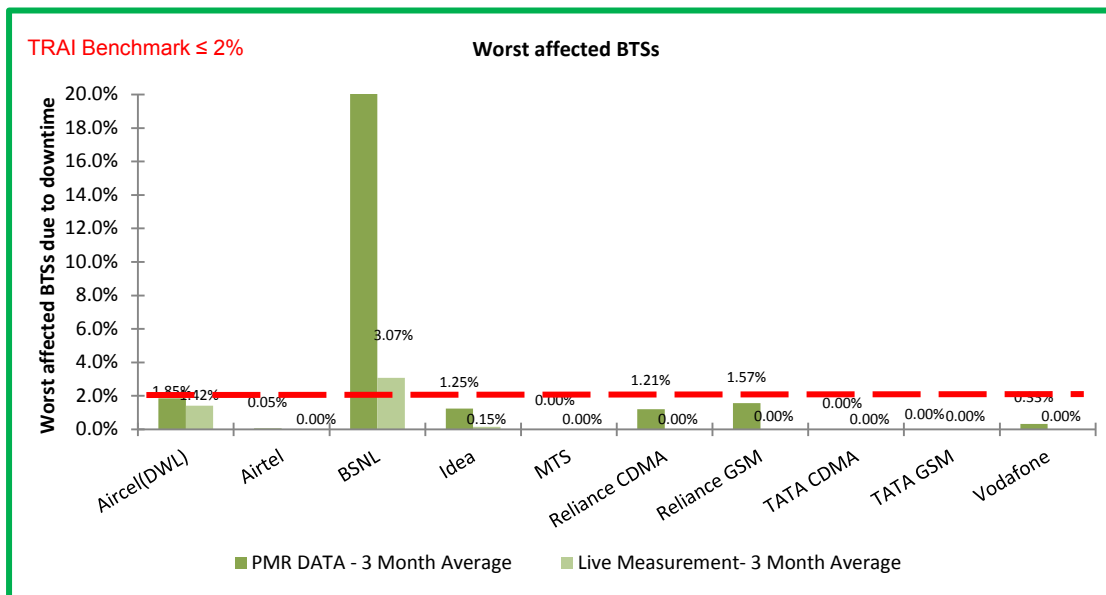
- TRAI Benchmark –**

- Worst affected BTSs due to downtime $\leq 2\%$

4. Audit Procedure –

- i. The fault alarm details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) was audited
- ii. All the BTS in service area were considered. Planned outages due to network up gradation, routine maintenance were not considered.
- iii. Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.
- iv. Any outage as a result of force majeure was not considered at the time of calculation.
- v. List of operating sites with cell details and ids are taken from the operator.
- vi. All the BTS having down time greater than 24 hours is assessed and values of BTS accumulated downtime is computed in accordance.

4.2.2 KEY FINDINGS



All operators meet the benchmark for the worst affected BTS due to downtime except BSNL. BSNL had a significant difference between PMR and Live Measurement data.

4.3 CALL SET UP SUCCESS RATE

4.3.1 PARAMETER DESCRIPTION

- 1. **Definition:** The ratio of calls established to total calls is known Call Set-Up Success Rate (CSSR).
- 2. **Computation Methodology-**

(Calls Established / Total Call Attempts) * 100

Call Established means the following events have happened in call setup:-

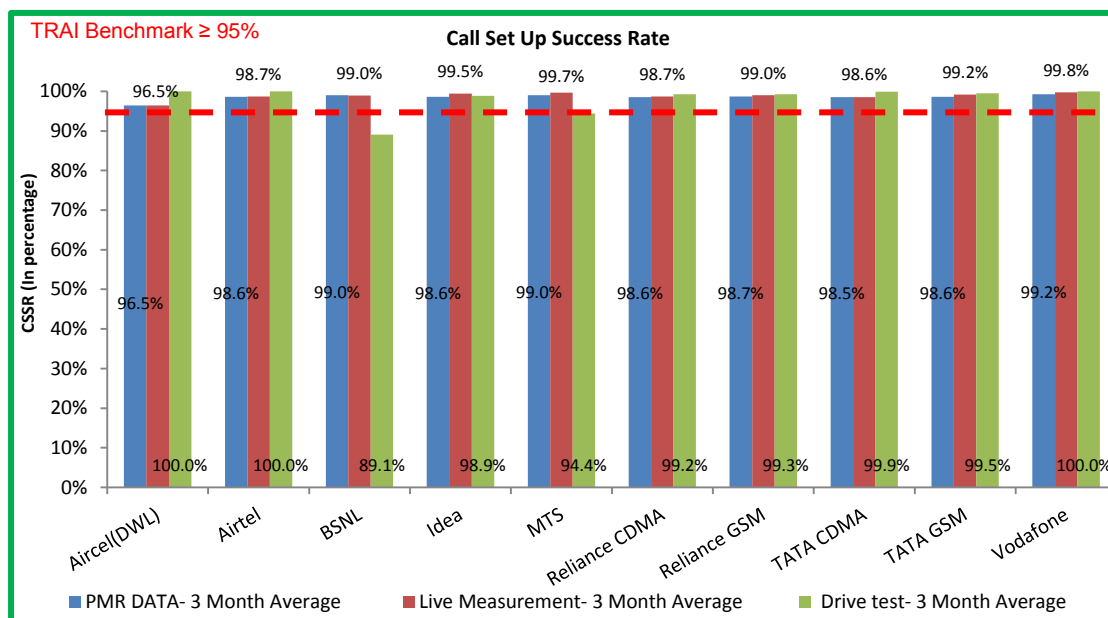
- ↳ call attempt is made
- ↳ the TCH is allocated
- ↳ the call is routed to the outward path of the concerned MSC

3. TRAI Benchmark ≥ 95%

4. Audit Procedure -

- ↳ The cell-wise data generated through counters/ MMC available in the switch for traffic measurements
- ↳ CSSR calculation should be measured using OMC generated data only
- ↳ Measurement should be only in Time Consistent Busy Hour (CBBH) period for all days of the week
- ↳ Counter data is extracted from the NOC of the operators.
- ↳ Total calls established include all calls established excluding Signaling blocking, TCH Drop and TCH blocking.
- ↳ The numerator and denominator values are derived from adding the counter values from the MSC.

4.3.2 KEY FINDINGS



All operators met the TRAI specified benchmark.

4.4 NETWORK CHANNEL CONGESTION- PAGING CHANNEL /TCH CONGESTION/POI

4.4.1 PARAMETER DESCRIPTION

- 1. Definition:** It means a call is not connected because there is no free channel to serve the call attempt. This parameter represents congestion in the network. It happens at three levels:

- ↳ SDCCH Level: Stand-alone dedicated control channel
- ↳ TCH Level: Traffic Channel
- ↳ POI Level: Point of Interconnect

- 2. Computational Methodology:**

- ↳ **SDCCH / TCH Congestion%** = $[(A_1 \times C_1) + (A_2 \times C_2) + \dots + (A_n \times C_n)] / (A_1 + A_2 + \dots + A_n)$

- Where:- A_1 = Number of attempts to establish SDCCH / TCH made on day 1
- C_1 = Average SDCCH / TCH Congestion % on day 1
- A_2 = Number of attempts to establish SDCCH / TCH made on day 2
- C_2 = Average SDCCH / TCH Congestion % on day 2
- A_n = Number of attempts to establish SDCCH / TCH made on day n
- C_n = Average SDCCH / TCH Congestion % on day n

- ↳ **POI Congestion%** = $[(A_1 \times C_1) + (A_2 \times C_2) + \dots + (A_n \times C_n)] / (A_1 + A_2 + \dots + A_n)$

- Where:- A_1 = POI traffic offered on all POIs (no. of calls) on day 1
- C_1 = Average POI Congestion % on day 1
- A_2 = POI traffic offered on all POIs (no. of calls) on day 2
- C_2 = Average POI Congestion % on day 2
- A_n = POI traffic offered on all POIs (no. of calls) on day n
- C_n = Average POI Congestion % on day n

- 3. Benchmark:**

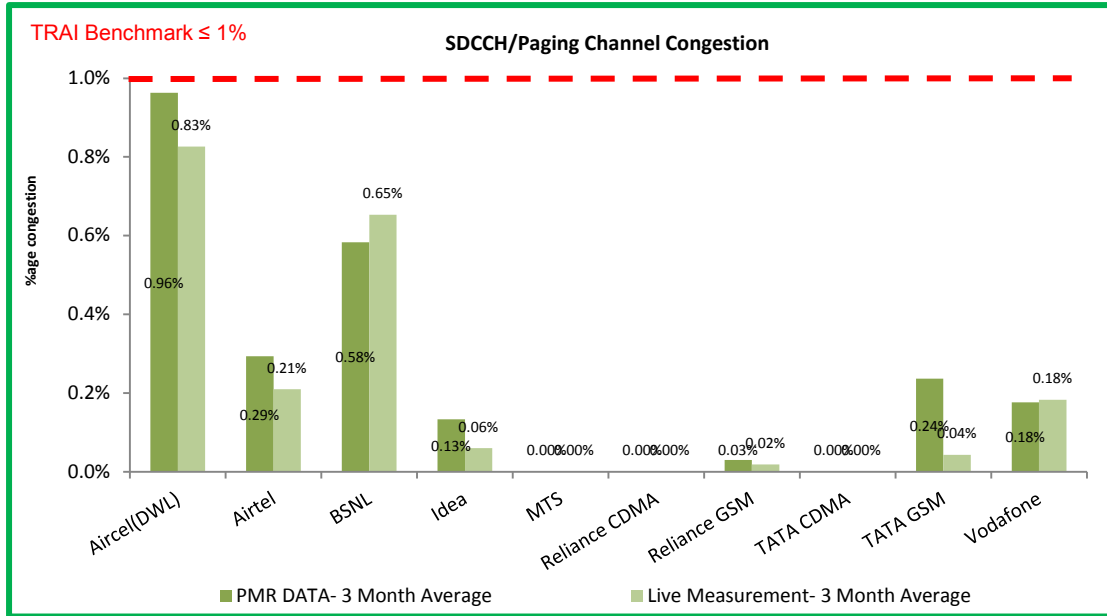
- ↳ SDCCH Congestion: $\leq 1\%$, TCH Congestion: $\leq 2\%$, POI Congestion: $\leq 0.5\%$

- 4. Audit Procedure –**

- ↳ Audit of the details of SDCCH and TCH congestion percentages computed by the operator (using OMC–Switch data only) would be conducted

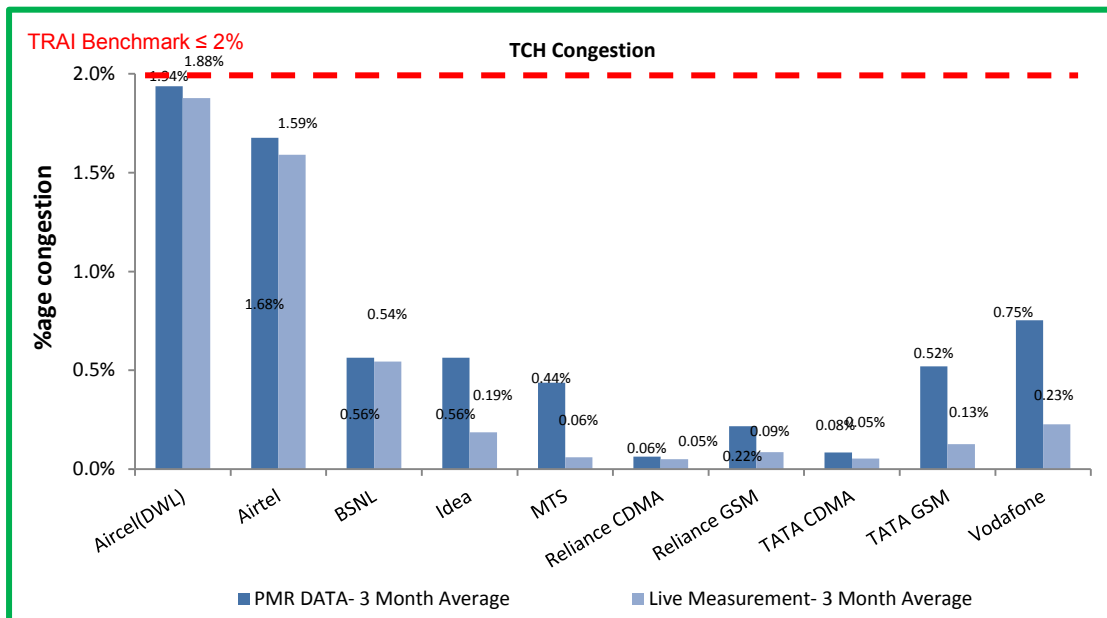
The operator should be measuring this parameter during Time consistent busy hour (TCBH) only SDCCH

4.4.2 KEY FINDINGS - SDCCH/PAGING CHANNEL CONGESTION



All the operators met the benchmark. Aircel reported maximum SDCCH congestion.

4.4.3 KEY FINDINGS – TCH CONGESTION



All the operators met the benchmark. Aircel and Airtel reported high TCH congestion.

4.4.4 KEY FINDINGS – POI CONGESTION

Audit Results for POI Congestion											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		54	37	81	111	36	21	45	63	22	44
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		62305	132008	93104	119395	55616	7851	37066	14191	7979	313119
Traffic served for all POIs (B)- in erlangs		39165	81858	20168	62389	31099	3302	25036	3803	2472	192605
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Live Measurement Results for POI Congestion											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		54	37	81	111	36	21	45	63	23	44
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		60964	393066	93525	120993	55551	7851	37066	14217	8097	311159
Traffic served for all POIs (B)- in erlangs		40071	251948	16246	62285	31044	3304	25085	3849	2418	184138
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

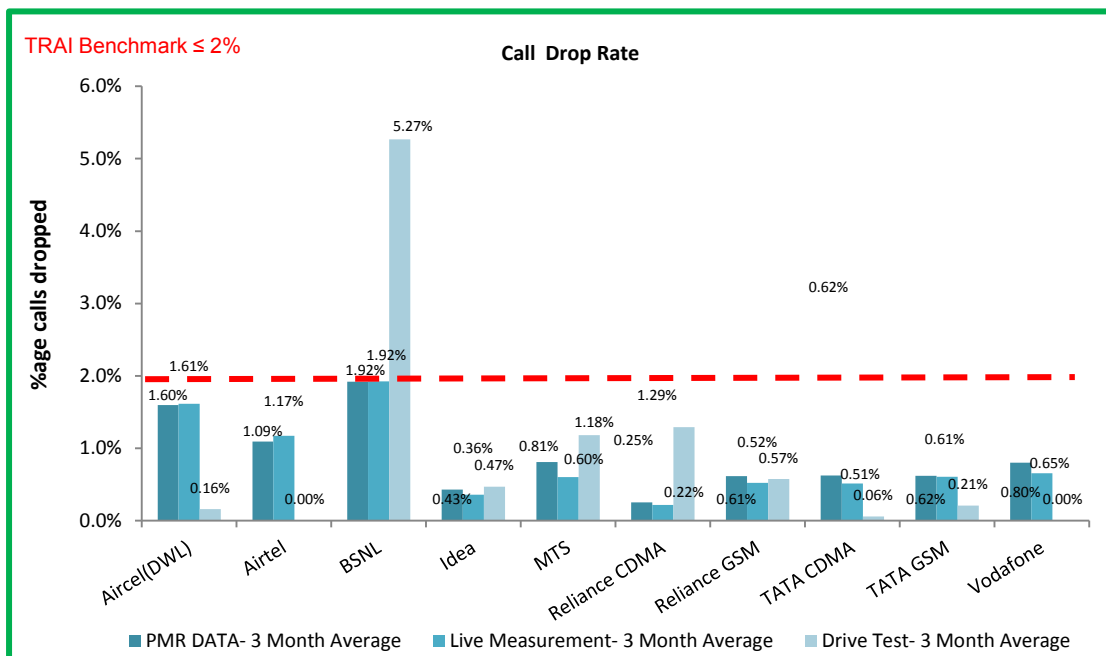
All the operators met the benchmark of POI congestion as per audit data.

4.5 CALL DROP RATE

4.5.1 PARAMETER DESCRIPTION

- Definition** - The dropped call rate is the ratio of successfully originated calls that were found to drop to the total number of successfully originated calls that were correctly released.
 - ↳ **Total calls dropped** = All calls ceasing unnaturally i.e. due to handover or due to radio loss
 - ↳ **Total calls established** = All calls that have TCH allocation during busy hour
- Computational Methodology:** $(\text{Total Calls Dropped} / \text{Total Calls Established}) \times 100$
- TRAI Benchmark** –
 - ↳ Call drop rate $\leq 2\%$
- Audit Procedure** –
 - ↳ Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR was used
 - ↳ The operator should only be considering those calls which are dropped during Time consistent busy hour (TCBH) for all days of the relevant quarter.

4.5.2 KEY FINDINGS



All operators meet the benchmark during audit. BSNL, however, showed high call drop rate during drive tests.

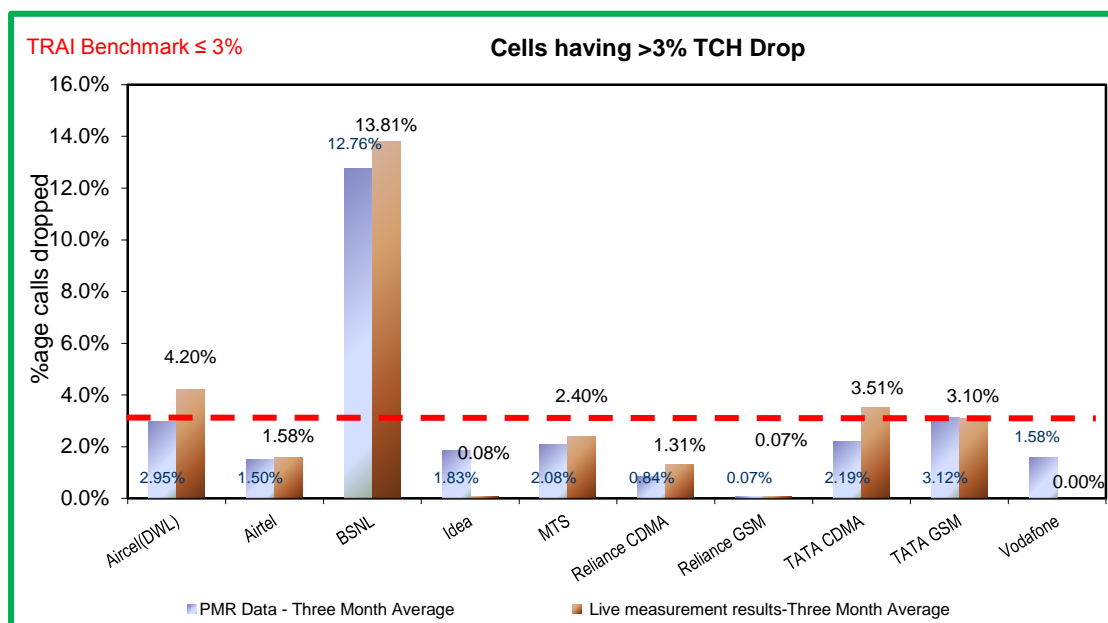
4.6 CELLS HAVING GREATER THAN 3% TCH DROP

4.6.1 PARAMETER DESCRIPTION

1. **Definition- Worst Affected Cells having more than 3% TCH drop** shall measure the ratio of total number of cells in the network to the ratio of cells having more than 3% TCH drop.
2. **Computational Methodology:** $(\text{Total number of cells having more than 3\% TCH drop} / \text{Total number of cells in the network}) \times 100$
3. **TRAI Benchmark –**
 - ↪ Worst affected cells having more than 3% TCH drop rate $\leq 3\%$
4. **Audit Procedure –**
 - ↪ Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR would be conducted.

The operator should only be considering those calls which are dropped during Cell Bouncing Busy hour (CBBH) for all days of the relevant quarter.

4.6.2 KEY FINDINGS



BSNL failed to meet the benchmark during audit.

4.7 VOICE QUALITY

4.7.1 PARAMETER DESCRIPTION

1. Definition:

- ↳ for GSM service providers the calls having a value of 0 –5 are considered to be of good quality (on a seven point scale)
- ↳ For CDMA the measure of voice quality is Frame Error Rate (FER). FER is the probability that a transmitted frame will be received incorrectly. Good voice quality of a call is considered when its FER value lies between 0 – 4 %

2. Computational Methodology:

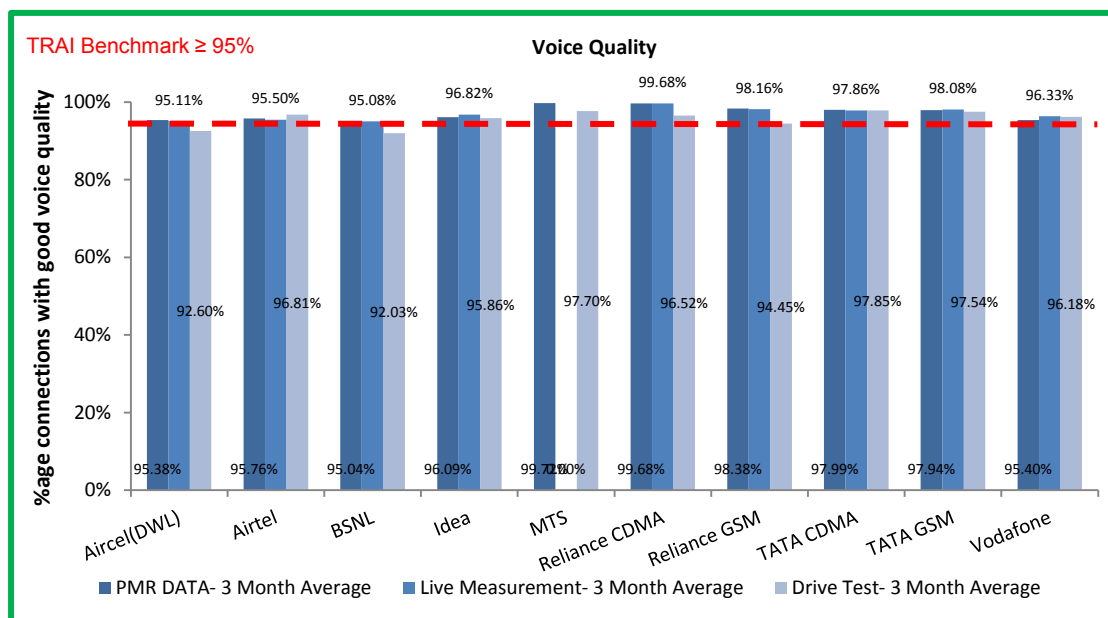
- ↳ **% Connections with good voice quality = (No. of voice samples with good voice quality / Total number of samples) x 100**

3. TRAI Benchmark: $\geq 95\%$

4. Audit Procedure –

- a. A sample of calls would be taken randomly from the total calls established.
- b. The operator should only be considering those calls which are meeting the desired benchmark of good voice quality

4.7.2 KEY FINDINGS



All operators met the benchmark for voice quality during the audit.

Live measurement data for Voice quality was not provided by MTS.

5 PARAMETER DESCRIPTION AND DETAILED FINDINGS – NON-NETWORK PARAMETERS

5.1 CALL CENTRE PERFORMANCE-IVR

5.1.1 PARAMETER DESCRIPTION

➤ Computational Methodology:

↪ **Call centre performance IVR = (Number of calls connected and answered by IVR/ All calls attempted to IVR) * 100**

➤ TRAI Benchmark: $\geq 95\%$

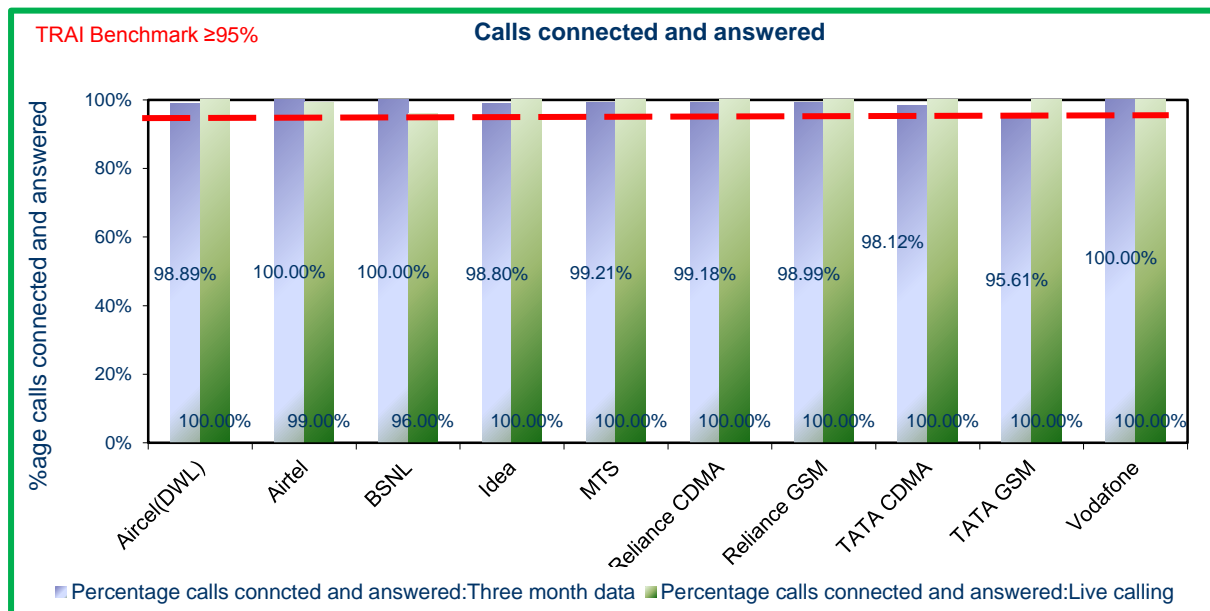
➤ Audit Procedure:

↪ Operator to provide details of:-

- Total calls connected and answered by IVR
- Total calls attempted to IVR

↪ Also live calling is done to test the calls connected and answered by IVR

5.1.2 KEY FINDINGS



All operators met the TRAI specified benchmark.

5.2 CALL CENTRE PERFORMANCE-VOICE TO VOICE

5.2.1 PARAMETER DESCRIPTION

➤ Computational Methodology:

↳ **Call centre performance Voice to Voice = (Number of calls answered by operator within 60 seconds/ All calls attempted to connect to the operator) * 100**

↳ The calculation excludes the calls dropped before 60 seconds

➤ TRAI Benchmark: >= 90%

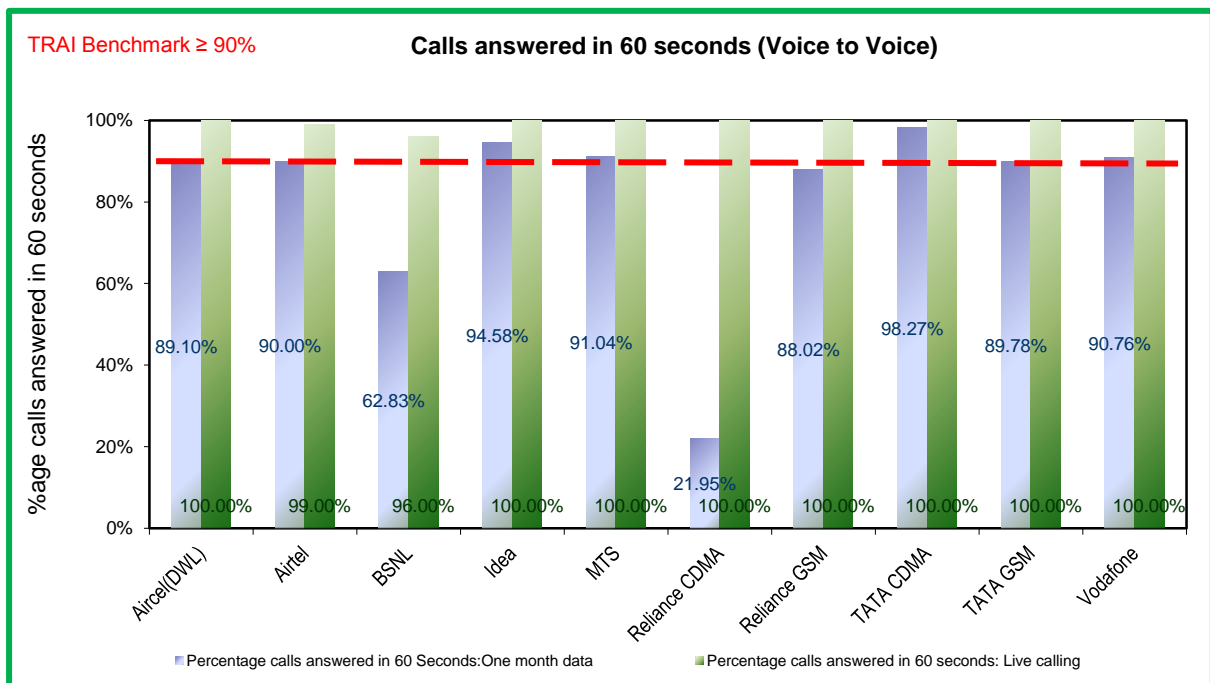
➤ Audit Procedure:

↳ Operator to provide details of:-

- Total calls connected and answered by operator within 60 seconds
- Total calls attempted to connect to the operator

↳ Also live calling is done to test the calls answered within 60 seconds by the operator

5.2.2 KEY FINDINGS



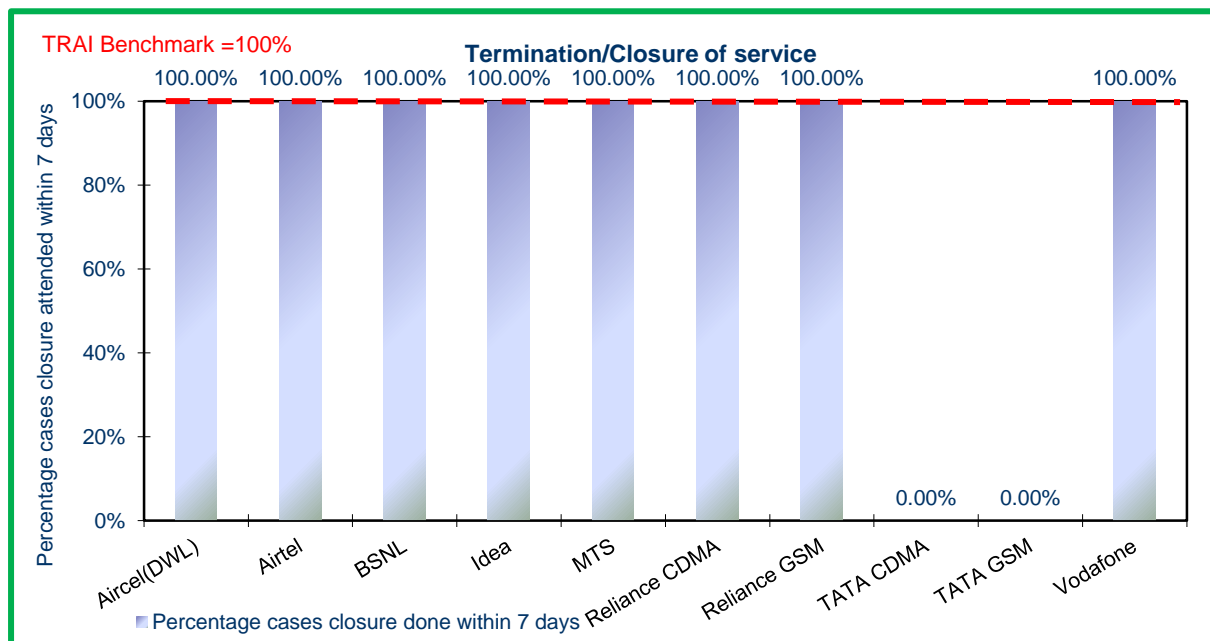
Aircel, BSNL, Reliance CDMA, Reliance GSM and TATA GSM failed to meet the benchmark during audit.

5.3 TERMINATION/CLOSURE OF SERVICE

5.3.1 PARAMETER DESCRIPTION

- Computational Methodology:
 - ↳ **Time taken for closure of service = (number of closures done within 7 days/ total number of closure requests) * 100**
- TRAI Benchmark:
 - ↳ Termination/Closure of Service: <=7 days
- Audit Procedure:
 - ↳ Operator to provide details of:-
 - Dates of lodging of all closure requests
 - Dates of closure of service

5.3.2 KEY FINDINGS



All operators met the benchmark.

Note: TATA does not have postpaid service in West Bengal

5.4 REFUND OF DEPOSITS AFTER CLOSURE

5.4.1 PARAMETER DESCRIPTION

➤ Computational Methodology:

↪ **Time taken for refund for deposit after closures = (number of cases of refund after closure done within 60 days/ total number of cases of refund after closure) * 100**

↪ Any case where the operators need to return the amount back to consumers post closure of service in form of cheque/cash is considered to be refund.

➤ TRAI Benchmark:

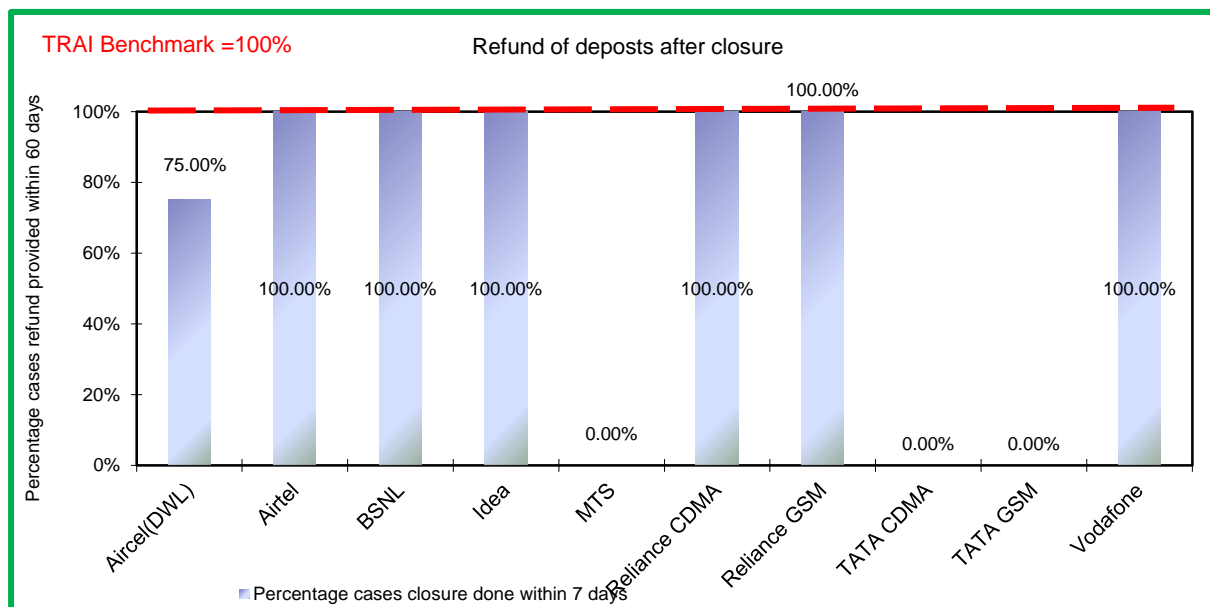
↪ Time taken for refund for deposit after closures: 100% within 60 days

➤ Audit Procedure:

↪ Operator to provide details of:-

- ▶ Dates of lodging of all closure request resolved resulting in requirement of a refund by the operator.
- ▶ Dates of refund pertaining to all closure request received during the relevant quarter

5.4.2 KEY FINDINGS



NA: Not Applicable for MTS since there are no postpaid subscribers.

All the operators meet the benchmark except Airtel.

6 DETAILED FINDINGS - DRIVE TEST DATA

6.1 OPERATOR ASSISTED DRIVE TEST

The drive test was conducted simultaneously for all the operators present in the West Bengal circle. As per the new directive given by TRAI headquarters, drive test for the month of April, May and June, 2014 were conducted at a SSA level. Drive test was conducted for three days in each SSA and the selection of routes ensured that the maximum towns, villages, highways are covered as part of drive test. The routes were selected on basis of the complaints received from the customers. IMRB auditors were present in vehicles of every operator. The holding period for all test calls was 120 seconds and the gap between calls was 10 seconds.

For measuring voice quality RxQual samples for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. RxQual greater than 5 meant that the sample was not of appropriate voice quality and for CDMA operators FERs of more than 4 were considered 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 with strength > -75dbm for indoor, -85 dbm for in-vehicle and > -95 dbm outdoor routes.

Below is the schedule of the drive test for the West Bengal circle-

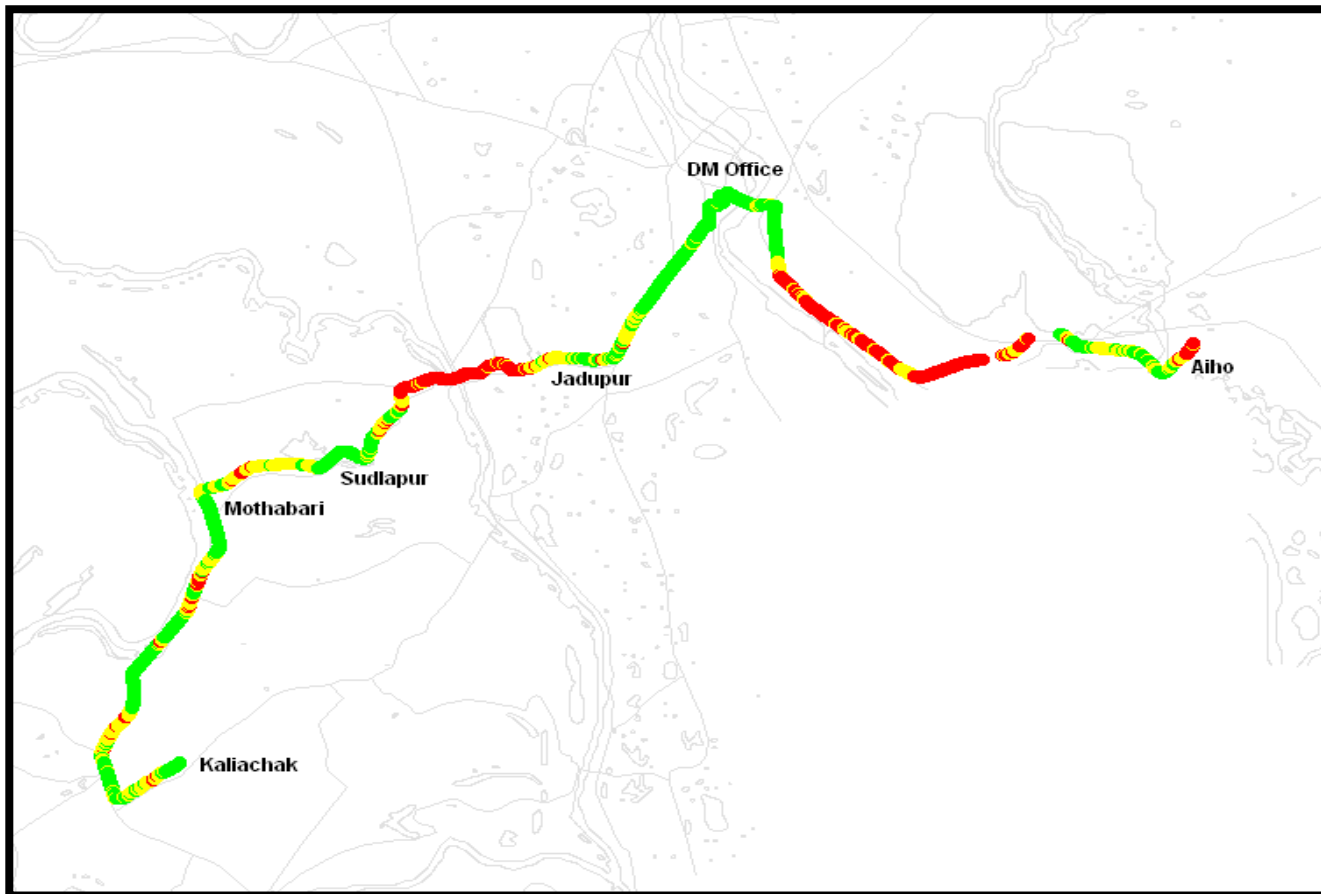
Month	Name of SSA Covered	Date of Drive Test
April	Malda	9th to 11th April
May	Coochbehar	21st to 23rd May
June	Purulia	18th to 20th June
Year	2014	

6.1.1 APRIL - MALDA

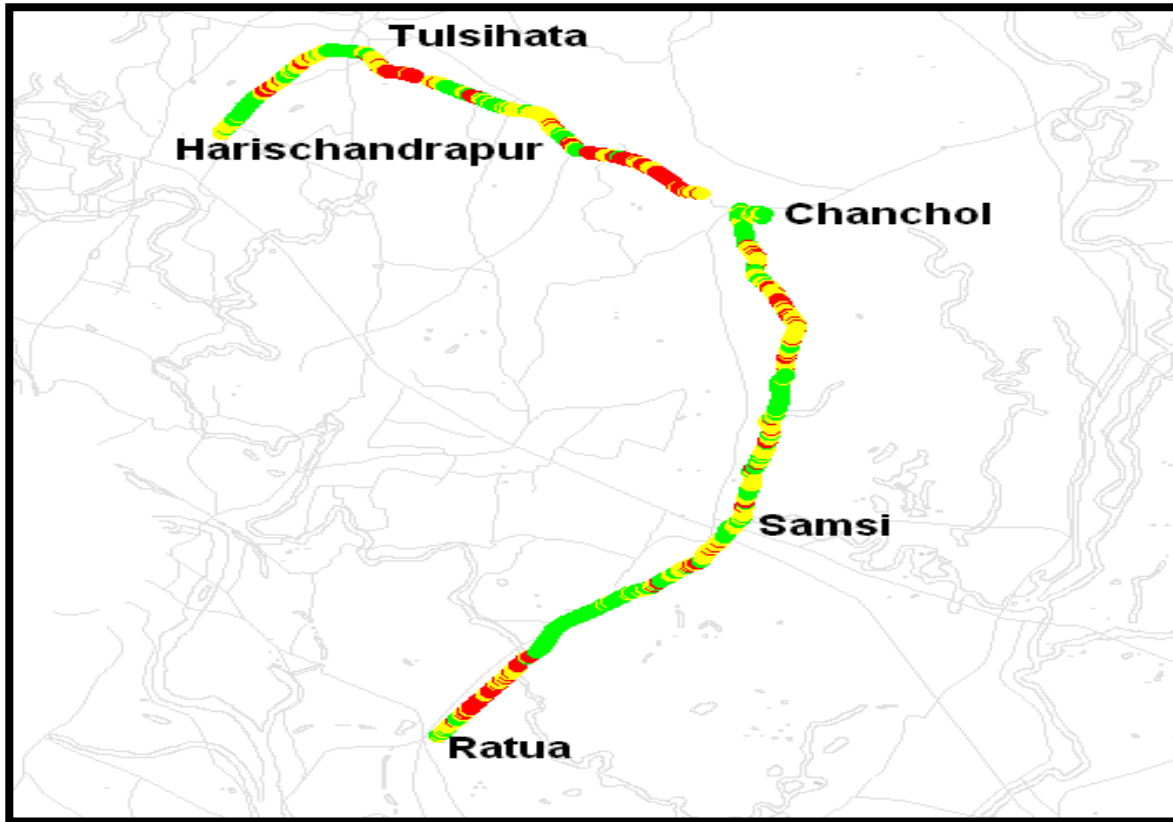
6.1.1.1 ROUTE DETAILS - MALDA SSA

		April		
		Malda		
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads	1 Kaliyachok to Aiho	Ratua to harischadrapur	Gajol to Kumarganj
	Highways	Malda station to kaliyachok	D.M.Office to ratua	D.M.Office to Gajol
	Within the City	Aiho to Kendpukur and kendpukur to bamanagile	Chanchal to Kaligaon,Harischandrapur road ,samshi to Bagawanpur	Old malda to malanchpally to DM Office
Indoor	Office complex	Netaji more Market(hotel)	Chanchal Market	Hotel Banfool,gajol
	Shopping complex	B.D.O Kaliyachok	S.D.O Chanchal	D.M office,Malda

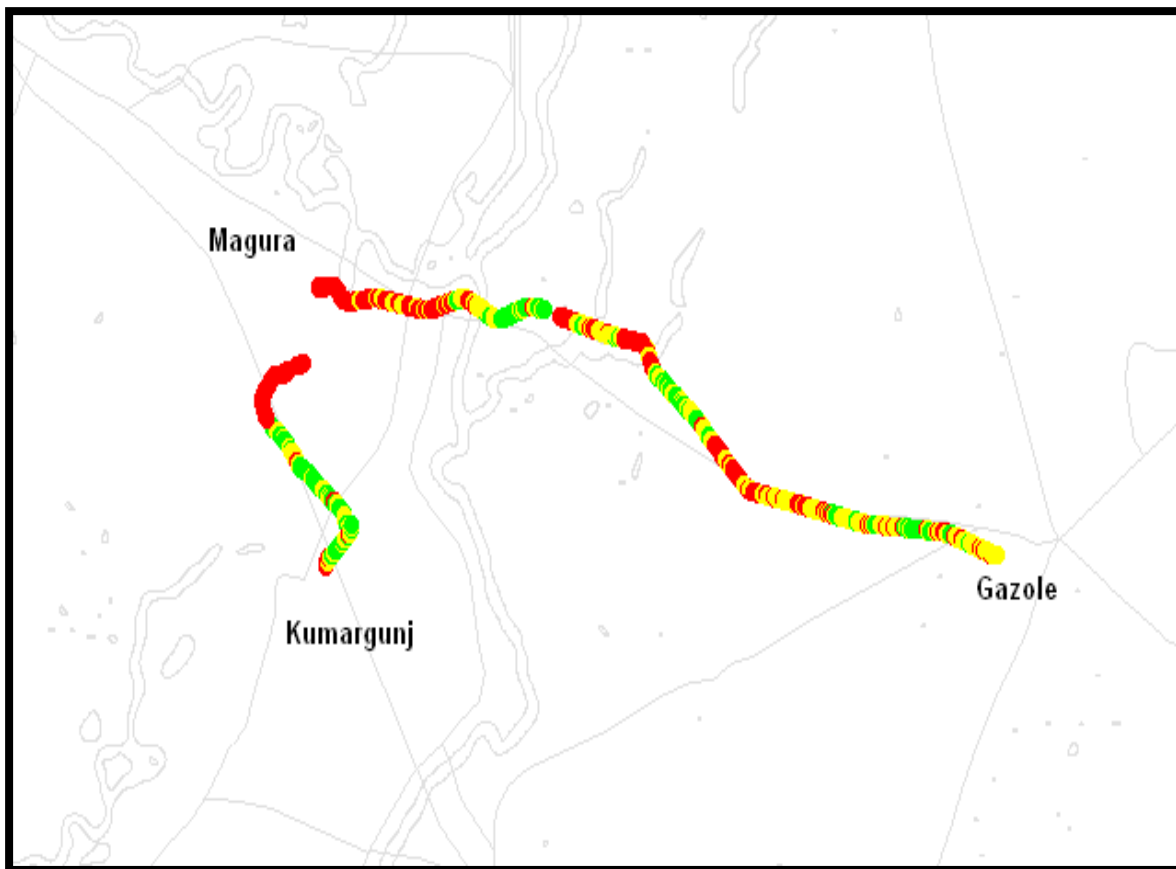
6.1.1.2 ROUTE MAP MALDA DAY 1



6.1.1.3 ROUTE MAP MALDA DAY 2



6.1.1.4 ROUTE MAP MALDA DAY 3



6.1.1.5 DRIVE TEST RESULTS – MALDA SSA

Name of SSA	Malda	Month	April	Consolidated																	
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
>= -75dBm		0.00%	40.92%	100.00%	88.75%	23.07%	34.83%	65.00%	61.10%	65.53%	54.70%	46.89%	71.47%	41.98%	47.74%	96.36%	68.12%	79.47%	49.72%	73.22%	81.45%
>= -85dBm		43.26%	77.77%	100.00%	100.00%	87.82%	70.88%	90.83%	85.40%	89.98%	77.76%	88.96%	94.96%	81.18%	84.41%	100.00%	87.56%	99.46%	86.08%	93.88%	97.51%
>= -95dBm		100.00%	100.00%	100.00%	100.00%	99.44%	95.21%	100.00%	100.00%	99.66%	94.92%	99.75%	98.68%	97.73%	97.50%	100.00%	97.99%	100.00%	99.03%	100.00%	100.00%
Voice quality	≥ 95%	97.29%	95.20%	98.60%	96.72%	97.16%	94.11%	97.68%	95.58%	99.93%	97.51%	97.95%	96.84%	96.79%	95.28%	99.62%	97.91%	96.60%	95.80%	97.84%	96.54%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	98.41%	88.22%	100.00%	99.59%	100.00%	99.10%	100.00%	99.81%	100.00%	100.00%	100.00%	99.74%	100.00%	98.20%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	11.78%	0.00%	0.41%	0.00%	0.90%	0.00%	0.19%	0.00%	0.00%	0.00%	0.26%	0.00%	1.80%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	1.77%	0.00%	0.22%	0.00%	0.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	99.61%	66.67%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Voice quality:

In Malda, BSNL at 94.11% in outdoor areas was not able to meet the benchmark set by TRAI on Voice quality. The benchmark for voice quality is 95%.

CSSR:

All the operators met the benchmark except BSNL at 88.22%.

Call drop rate:

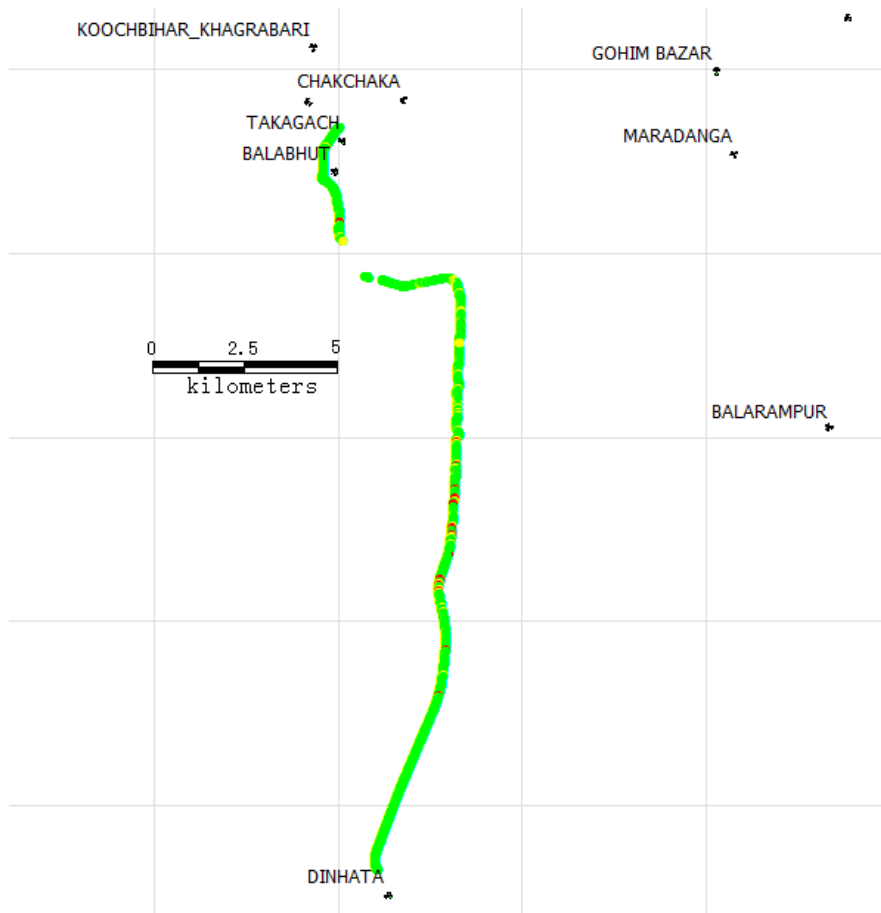
All the operators met the benchmark.

6.1.2 MAY - COOCHBEHAR

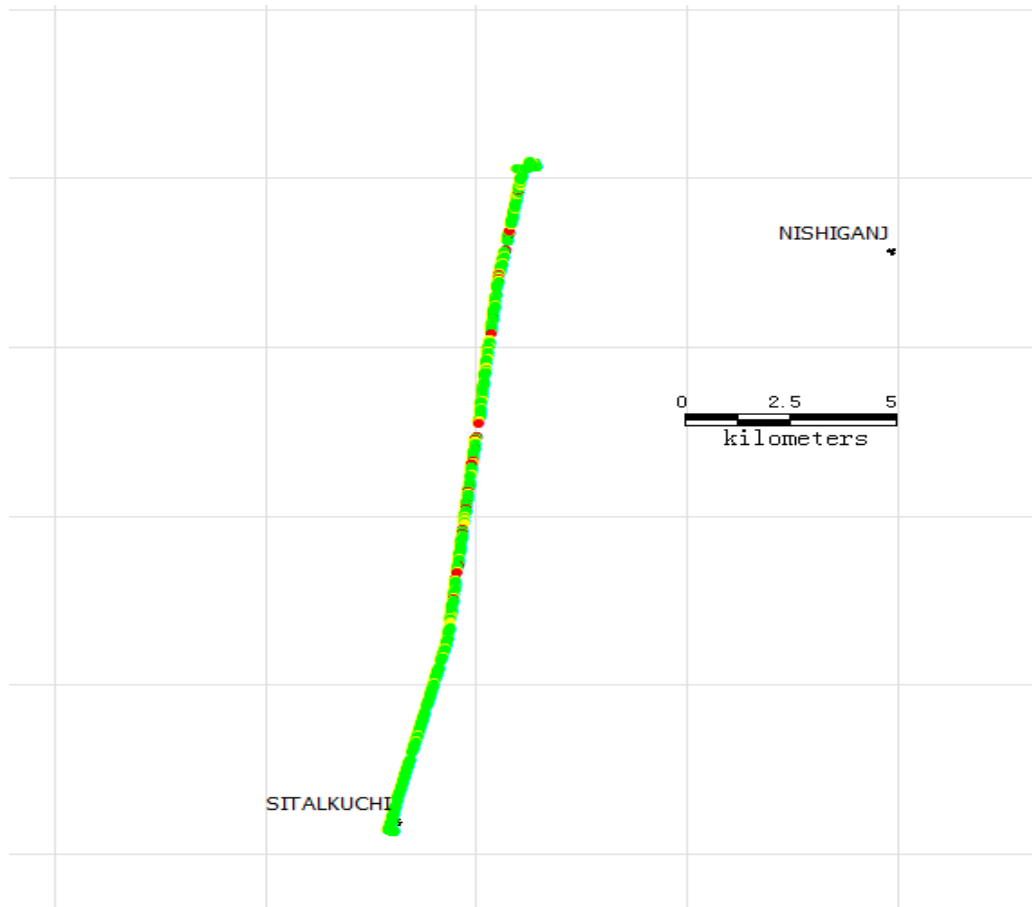
6.1.2.1 ROUTE DETAILS – MALDA SSA

		May		
		Coochbehar		
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads	DinhataRoad-Dewanhat-Ghetaguri-Dinhata	Sitalkuchi-Mathabhanga	CoochBehar-Alipur Rd-Vivekananda Street-Rly Gumti-Minibus Stand-Khagrabari
	Highways	CoochBeharRlystn-Jhinaidanga-Tolliguri-Maruganj-Tufangunj-Dewanhat-Dinhata	CoochBehar-Mathabhanga-Sitalkuchi-Mekhligunj	Baneswar-Bokali-Kholta
	Within the City	Ghughumari-Dinhatta ByePass, Tufangunj Lambapara	Mekhligunj Purana Bazar, Mathabhanga-Shikharpur	Khagrabari-Takagach-PoliceLine-Kacharimore-Goalapatty-Shibjogyo Rd-Gorosthan, Natunbazar-Newtown-Hazrapara-Bank Chatra Road-Kalighat Road-Golbagan-Magazine Road
Indoor	Office complex	Kargil Shopping Complex,Tufangunj	Sitalkuchi Post Office	WBSEB Office, Coochbehar
	Shopping complex	Tufangunj Govt. High School	Mathabhanga Shopping Complex	Cooch Behar Shopping Complex

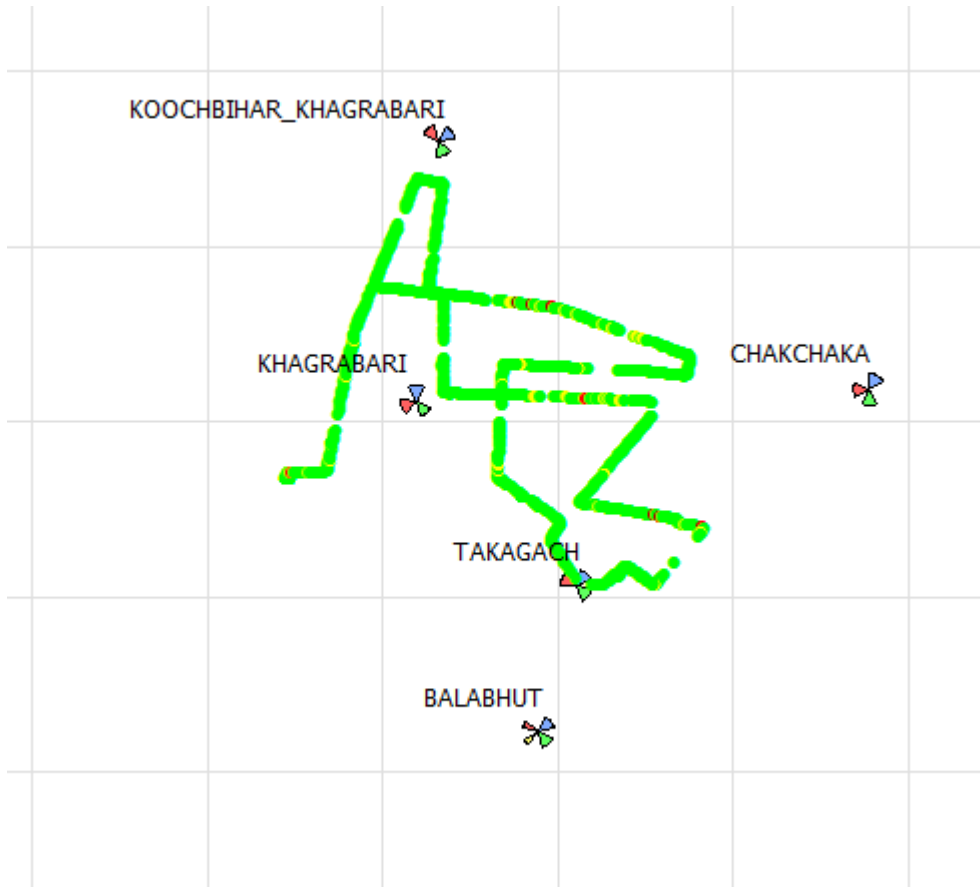
6.1.2.2 COOCHBEHAR ROUTE MAP DAY 1



6.1.2.3 COOCHBEHAR ROUTE MAP DAY 2



6.1.2.4 COOCHBEHAR ROUTE MAP DAY 3



6.1.2.5 DRIVE TEST RESULTS – COOCHBEHAR SSA

Name of SSA	Coochbehar	Month	May	Consolidated																	
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
>= -75dBm		38.60%	62.76%	100.00%	77.45%	53.69%	32.09%	47.33%	35.16%	52.87%	40.74%	95.65%	65.35%	85.22%	78.78%	77.62%	50.41%	86.65%	60.91%	58.09%	58.12%
>= -85dBm		94.30%	91.30%	100.00%	99.34%	86.24%	75.26%	74.07%	66.90%	72.72%	63.58%	99.83%	91.66%	95.89%	94.54%	99.91%	80.30%	98.66%	90.95%	97.81%	95.42%
>= -95dBm		99.98%	98.50%	100.00%	99.34%	100.00%	100.00%	100.00%	100.00%	90.97%	79.72%	100.00%	96.62%	100.00%	100.00%	100.00%	98.49%	99.91%	99.52%	99.98%	99.80%
Voice quality	≥ 95%	98.21%	91.75%	100.00%	97.10%	92.62%	88.55%	99.24%	96.71%	98.68%	96.83%	99.30%	96.94%	97.63%	95.66%	99.12%	97.87%	98.22%	99.75%	97.96%	95.80%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	94.61%	93.61%	100.00%	99.17%	100.00%	91.36%	100.00%	99.80%	100.00%	99.89%	100.00%	99.76%	100.00%	99.14%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	5.39%	6.39%	0.00%	0.83%	0.00%	8.64%	0.00%	0.20%	0.00%	0.11%	0.00%	0.24%	0.00%	0.86%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	3.25%	0.83%	0.49%	0.00%	1.35%	0.00%	0.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	99.80%	100.00%	99.93%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.89%	100.00%	100.00%

Voice Quality

In Coochbehar, Aircel at 91.75% in outdoor areas and BSNL at 92.62% indoor and 88.55% in outdoor areas failed to meet the benchmark.

CSSR:

BSNL at 94.61% in indoor and at 93.61% in outdoor areas did not meet the benchmark while MTS at 91.36% missed the benchmark in outdoor areas.

Call drop rate:

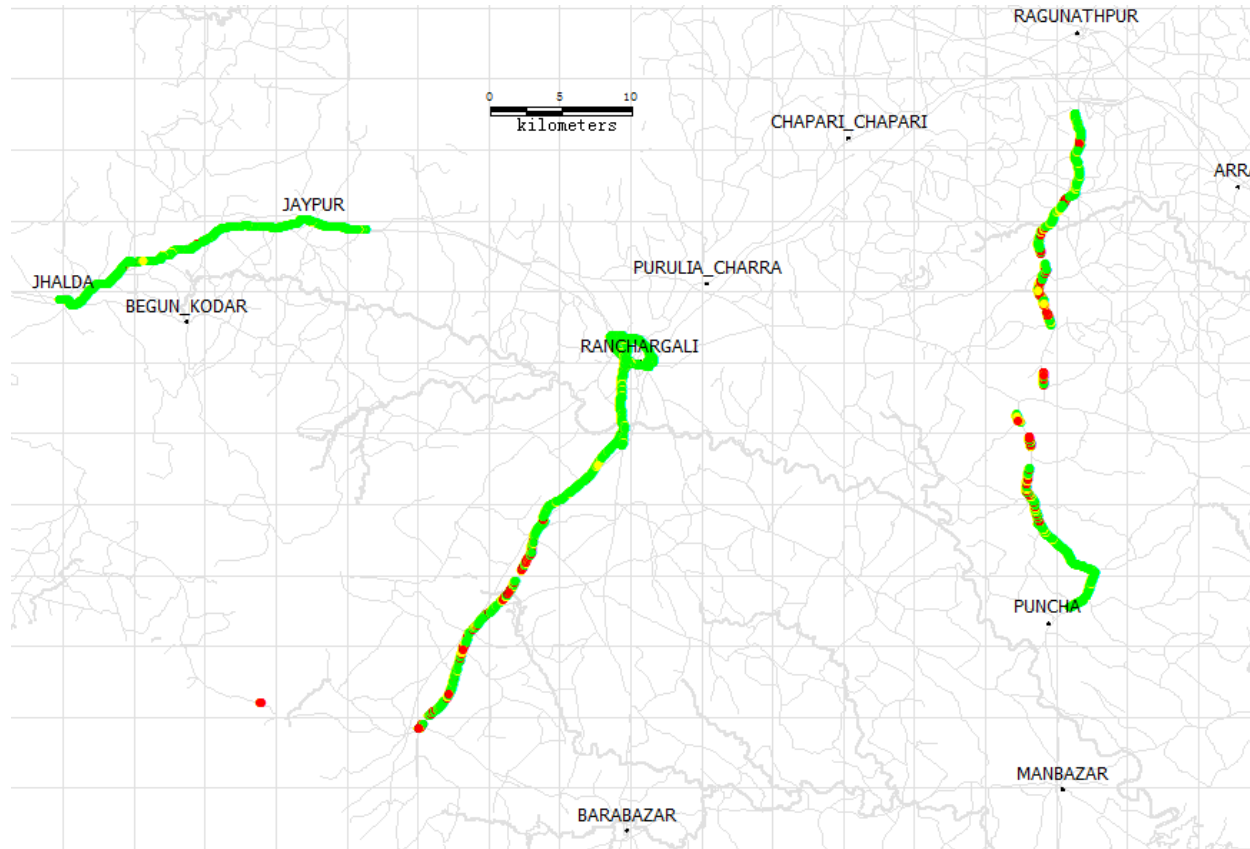
BSNL at 3.25% failed to meet the benchmark in outdoor areas.

6.1.3 JUNE - PURULIA

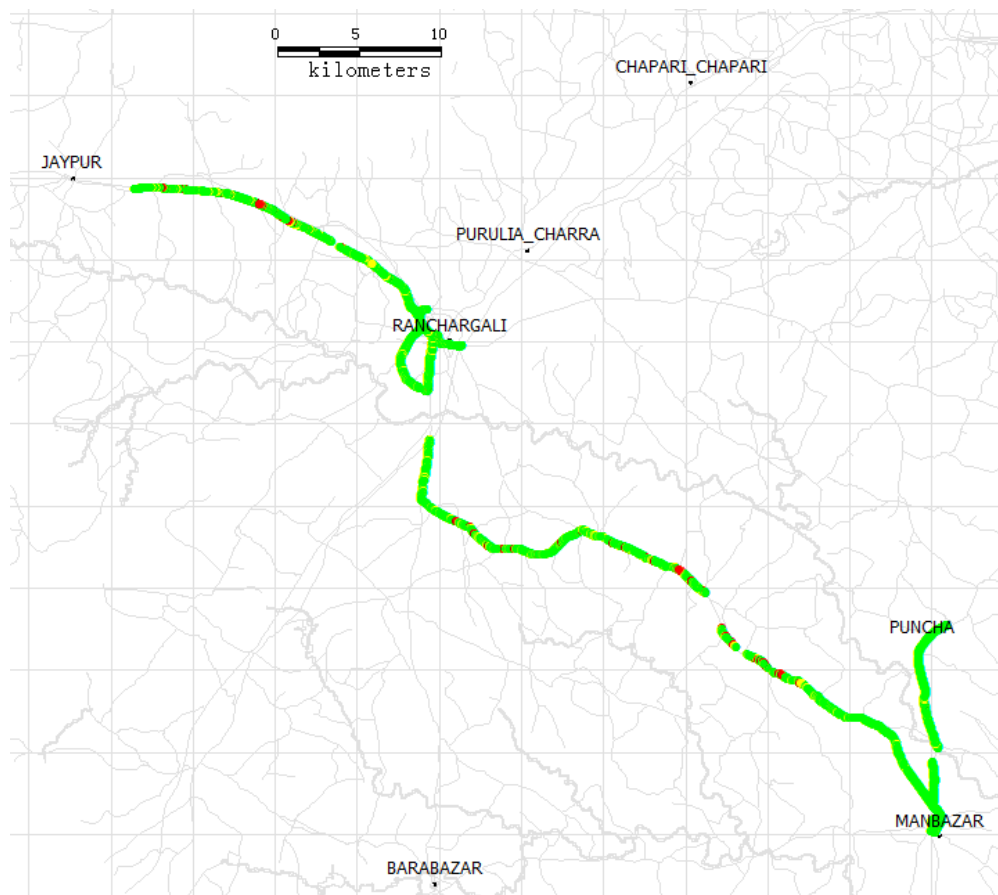
6.1.3.1 ROUTE DETAILS – PURULIA SSA

		June		
		Purulia		
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads	Jaipur – Jhalda – Kalomati – Bagmundi – Balarampur – Purulia.	Kashipur – Nupari – Gopal Nagar.	Overbridge – Bankuramore – Jaikhanamore - M.S.Maidan.
	Highways	Purulia – Chasmore – Jaipur - Jhalda.	Purulia – Pancha – Manbazar - Hura.	Raghavpurmore - Ranchi Rd. – Lake Town - Tata Road.
	Within the City	Jhalida – Ichaj - Suisa.	Adra – Raghunathpur - Santaldihi.	Hotel Akash - Old Manbazar - Cholibazar Main Rd - Barakar Rd. – Rathtalla – Railway Colony - B.B.Das Rd. – Bhagabandhpar.
Indoor	Office complex	Nataraj Restaurant, Jhalda.	Sainik Hotel, Manbazar	Hotel Akash, Purulia
	Shopping complex	Jhalda Municipal Office.	Nupara High School	Purulia Zilla Parishad

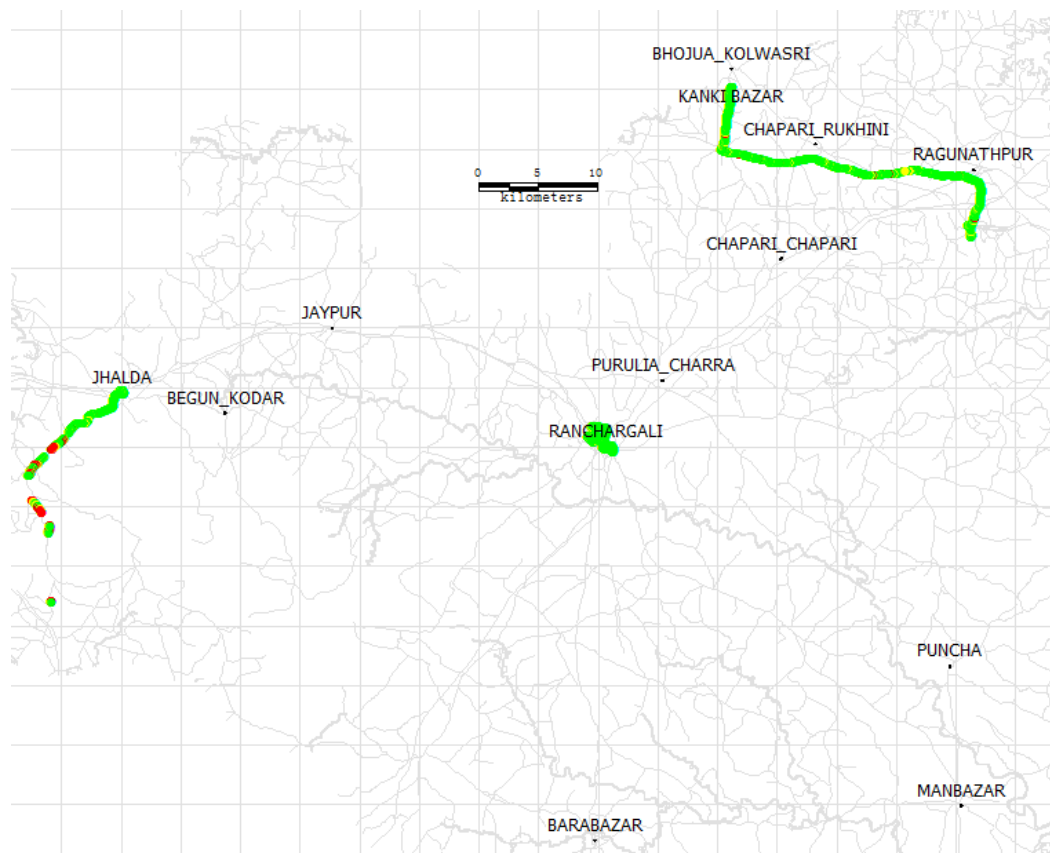
6.1.3.2 PURULIA ROUTE MAP DAY 1



6.1.3.3 PURULIA ROUTE MAP DAY 2



6.1.3.4 PURULIA ROUTE MAP DAY 3



6.1.3.5 DRIVE TEST RESULTS – PURULIA SSA

Name of SSA	Purulia	Month	June	Consolidated																	
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
>= -75dBm		10.65%	6.81%	100.00%	85.64%	12.17%	5.88%	39.75%	26.83%	42.21%	52.44%	32.80%	23.62%	30.60%	23.60%	27.71%	23.53%	24.64%	18.86%	16.99%	19.24%
>= -85dBm		44.89%	46.06%	100.00%	100.00%	54.99%	25.96%	78.55%	57.10%	77.18%	72.43%	66.39%	60.80%	65.24%	58.87%	57.66%	59.74%	62.14%	55.89%	56.95%	57.29%
>= -95dBm		100.00%	100.00%	100.00%	100.00%	91.19%	61.52%	100.01%	100.00%	96.45%	91.04%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%
Voice quality	≥ 95%	96.37%	89.99%	98.08%	96.41%	96.66%	88.47%	94.30%	95.00%	100.00%	100.00%	98.70%	94.39%	97.30%	90.89%	98.65%	96.27%	98.13%	97.06%	98.44%	95.45%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	92.78%	81.49%	100.00%	97.35%	100.00%	90.80%	100.00%	98.29%	100.00%	98.32%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	6.44%	18.51%	0.00%	2.65%	0.00%	9.20%	0.00%	1.71%	0.00%	1.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	2.00%	0.00%	0.00%	0.00%	0.00%	14.65%	0.00%	0.40%	0.00%	2.50%	0.00%	3.21%	0.00%	1.37%	0.00%	0.21%	0.00%	0.67%	0.00%	0.00%
Hands off success rate		100.00%	99.62%	100.00%	99.88%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.71%	100.00%	100.00%	100.00%	99.72%	100.00%	99.84%

Voice Quality

In Purulia, Aircel at 89.99% BSNL at 88.47%, Reliance CDMA at 94.93% and Reliance GSM at 90.89% failed to meet the benchmark in outdoor areas while Idea at 94.30% did not meet the benchmark in indoor areas.

CSSR:

BSNL at 92.78% in indoor areas and at 81.49% in outdoor areas missed the benchmark for CSSR while MTS at 90.8% failed to meet the benchmark in outdoor areas.

Call drop rate:

Aircel at 2.00% missed the benchmark in indoor locations while BSNL at 14.65%, MTS at 2.50% and Reliance CDMA at 3.21% missed the benchmark in outdoor areas.

6.2 INDEPENDENT DRIVE TEST

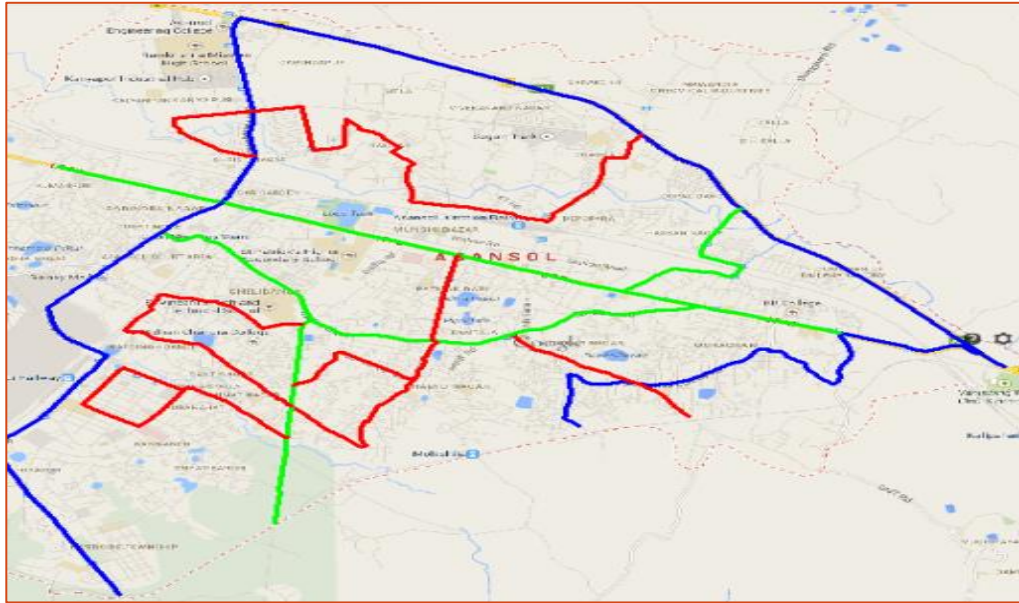
The independent drive test was conducted for all the operators present in the Assam circle. As per the new directive given by TRAI headquarters, drive test were conducted at a SSA level. A minimum of 100 kilometers were traversed in each SSA and the selection of routes ensured that the maximum towns, villages, highways are covered as part of drive test. The routes were selected post discussion with TRAI advisors. The holding period for all test calls was 120 seconds and gap between calls was 10 seconds.

For measuring voice quality RxQual samples for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. RxQual greater than 5 meant that the sample was not of appropriate voice quality and for CDMA operators FERs of more than 4 were considered 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 with strength > -75 dbm for indoor, -85 dbm for in-vehicle and > -95 dbm outdoor routes.

6.2.1 ASANSOL

Name of the City	Asansol
Date of Drive Test	12th & 13th May' 14
Name of the circle	West Bengal

Independent Drive Test Route Details – ASANSOL SSA



Blue colour road represents Periphery of the city
Red colour road represents Congested Area
Green colour road represents Across the city

Asansol	Outdoor Routes			Indoor Routes	
	Periphery of the City	Congested area	Across the City	Office Complex	Shopping Complex
Route Details	Dharma Bus Stand, Asansol Engineering College, Damohani Railway Colony, Damodar River, Ramakundu Pond	Sitaram Post Office, Sitaram Railway	Bidhan Chandra Collge, St. Patricks School	Office of Chief Mining Officer	Market Hot Spot

Independent Drive Test Results – Asansol SSA

	B'mark	Aircel		Airtel		BSNL		Idea		Vodafone		Reliance GSM		MTS		Reliance CDMA		TATA CDMA	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		57.70%	36.67%	93.65%	57.87%	93.50%	64.63%	98.15%	72.23%	35.35%	46.07%	69.95%	43.60%	99.57%	68.20%	96.88%	44.53%	97.03%	55.67%
Signal Strength - 0 to -85 dBm		97.15%	80.17%	99.85%	94.90%	99.65%	96.43%	99.95%	96.30%	96.40%	90.83%	98.80%	87.17%	100.00%	97.51%	99.99%	77.44%	99.96%	86.68%
Signal Strength - 0 to -95 dBm		100.00%	100.00%	100.00%	99.93%	100.00%	100.00%	99.95%	100.00%	99.90%	100.00%	100.00%	100.00%	100.00%	99.96%	100.00%	99.96%	99.96%	99.90%
Voice quality	≥ 95%	82.70%	78.55%	83.78%	87.39%	91.21%	87.95%	93.18%	84.91%	95.42%	93.22%	96.26%	84.32%	99.29%	98.16%	99.69%	90.35%	99.84%	97.55%
CSSR	≥ 95%	94.12%	98.06%	97.14%	98.94%	94.24%	95.51%	100.00%	98.97%	98.61%	100.00%	100.00%	99.26%	100.00%	97.80%	100.00%	96.26%	100.00%	98.91%
%age Blocked calls		5.88%	1.94%	2.86%	1.06%	5.76%	4.49%	0.00%	1.03%	1.39%	0.00%	0.00%	0.74%	0.00%	2.20%	0.00%	3.74%	0.00%	1.09%
Call drop rate	≤ 2%	0.00%	1.33%	0.00%	0.51%	0.00%	0.00%	0.00%	0.00%	0.00%	1.13%	0.00%	0.76%	0.00%	0.00%	0.00%	2.83%	0.00%	0.00%
Hands off success rate		83.33%	94.79%	100.00%	99.10%	100.00%	97.20%	100.00%	100.00%	100.00%	100.00%	100.00%	97.78%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Voice Quality

Aircel, Airtel, BSNL and Idea failed to meet the benchmark in indoor as well as outdoor areas. Vodafone, Reliance GSM and Reliance CDMA missed the benchmark in outdoor areas.

Call Set Success Rate (CSSR)

Aircel and BSNL failed to meet the benchmark for CSSR.

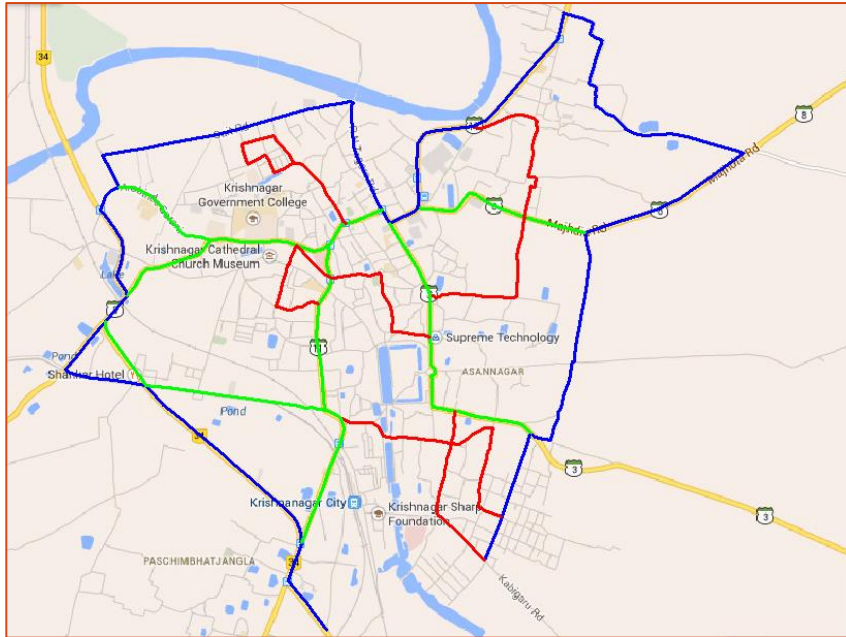
Call Drop Rate

Reliance CDMA 2.83% failed to meet the benchmark in outdoor areas.

6.2.2 KRISHNA NAGAR

Name of the City	Krishna nagar
Date of Drive Test	9th May' 14
Name of the circle	West Bengal

Independent Drive Test Route Details – Krishna Nagar SSA



Blue colour road represents Periphery of the city
 Red colour road represents Congested Area
 Green colour road represents Across the city

Krishna nagar	Outdoor Routes			Indoor Routes	
	Periphery of the City	Congested area	Across the City	Office Complex	Shopping Complex
Route Details	PWD More - Water Tank - Krishnanagar Jail - Ghumi - Palpara More	UCO Bank - Mallick Math - Sarkar Telecom	Hotel Haveli - Sadar District Hospital - Khounis Park - Anandamayi Tala Kali Mandir	FC Govt. Office	Station Market

Independent Drive Test Results – Krishna Nagar SSA

	B'mark	Aircel		Airtel		BSNL		Idea		Vodafone		Reliance GSM		TATA GSM		MTS		Reliance CDMA		TATA CDMA	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		12.30%	12.77%	19.25%	37.47%	72.95%	33.37%	9.25%	21.73%	27.95%	26.97%	45.55%	28.43%	14.35%	24.23%	96.74%	73.59%	67.77%	25.80%	97.06%	63.43%
Signal Strength - 0 to -85 dBm		91.60%	68.63%	85.75%	85.60%	99.15%	84.47%	73.45%	60.40%	91.35%	84.67%	90.25%	72.93%	65.70%	74.73%	100.00%	99.15%	99.02%	60.70%	100.00%	97.91%
Signal Strength - 0 to -95 dBm		100.00%	100.00%	100.00%	99.97%	99.95%	99.97%	99.95%	100.00%	100.00%	100.00%	99.95%	100.00%	100.00%	99.97%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%
Voice quality	≥ 95%	85.42%	86.32%	89.31%	90.10%	97.47%	91.02%	73.97%	81.99%	98.25%	95.10%	96.64%	93.90%	93.78%	94.34%	97.90%	96.76%	99.87%	95.38%	98.85%	97.20%
CSSR	≥ 95%	100.00%	99.52%	97.06%	95.54%	95.86%	91.88%	98.48%	98.54%	100.00%	99.48%	98.53%	98.97%	94.12%	97.85%	100.00%	97.72%	100.00%	99.54%	98.48%	99.54%
%age Blocked calls		0.00%	0.48%	2.94%	4.46%	4.14%	8.12%	1.52%	1.46%	0.00%	0.52%	1.47%	1.03%	5.88%	2.15%	0.00%	2.28%	0.00%	0.46%	1.52%	0.46%
Call drop rate	≤ 2%	0.00%	0.49%	1.56%	2.34%	0.00%	1.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	79.76%	89.82%	100.00%	97.65%	99.55%	100.00%	100.00%	99.32%	98.52%	99.22%	98.53%	99.25%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Voice Quality

Aircel, Airtel, Idea and TATA GSM failed to meet the benchmark in indoor as well as outdoor areas. BSNL & Reliance GSM missed the benchmark in outdoor areas.

Call Set Success Rate (CSSR)

BSNL failed to meet the benchmark in outdoor areas while TATA GSM did not meet the benchmark in indoor areas.

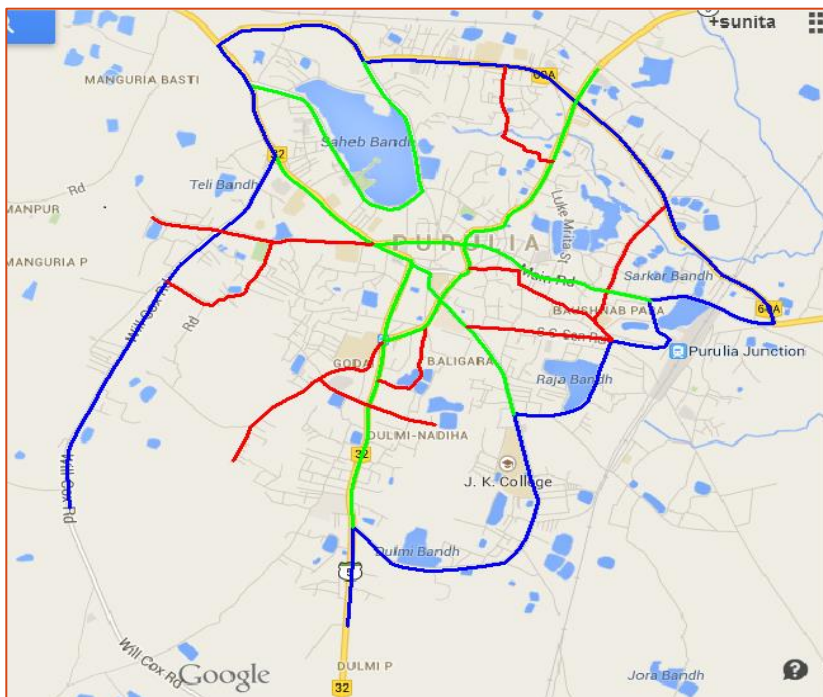
Call Drop Rate

Airtel failed to meet the benchmark in outdoor areas.

6.2.3 PURULIA

Independent Drive Test Route Details – PURULIA SSA

Name of the City	PURULIA
Date of Drive Test	15th & 16th May' 14
Name of the circle	West Bengal



Blue colour road represents Periphery of the city
 Red colour road represents Congested Area
 Green colour road represents Across the city

Purulia	Outdoor Routes			Indoor Routes	
	Periphery of the City	Congested area	Across the City	Office Complex	Shopping Complex
Route Details	District Magistrate Bunglow, Wild Coax road, SBI bank, J.k college, Highland garden	Purulia Junction, Christian graveyard, Radha Krishna temple	Govt Girls High school, Manbhumi Victoria institute, Post office of Dhulin Nadhia, Ranchi road, district School	Police station	Purulia main market

Independent Drive Test Results – PURULIA SSA

	B'mark	Aircel		Airtel		BSNL		Idea		Vodafone		Reliance GSM		TATA GSM		MTS		Reliance CDMA		TATA CDMA	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		19.20%	31.77%	46.75%	67.20%	53.25%	38.80%	7.95%	44.97%	32.65%	52.97%	35.50%	44.77%	25.05%	69.23%	7.47%	49.39%	46.28%	24.72%	18.01%	31.17%
Signal Strength - 0 to -85 dBm		50.10%	84.67%	68.20%	96.20%	88.05%	80.17%	50.55%	88.00%	93.30%	95.80%	95.75%	86.13%	89.20%	97.23%	85.89%	71.87%	95.99%	67.22%	72.59%	57.63%
Signal Strength - 0 to -95 dBm		100.00%	99.93%	100.00%	99.97%	99.95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.97%	100.00%	100.00%	99.96%	100.00%	99.98%	99.98%	99.99%	99.99%
Voice quality	≥ 95%	47.12%	85.13%	67.88%	85.33%	91.92%	91.46%	88.98%	88.22%	96.34%	89.69%	91.21%	92.53%	95.28%	92.93%	98.57%	99.31%	99.85%	97.80%	98.46%	96.88%
CSSR	≥ 95%	93.84%	95.27%	95.45%	97.08%	95.54%	94.94%	100.00%	99.40%	98.78%	99.35%	100.00%	95.25%	100.00%	99.43%	98.53%	99.38%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		6.16%	4.73%	4.55%	2.92%	4.46%	5.06%	0.00%	0.60%	1.22%	0.65%	0.00%	4.75%	0.00%	0.57%	1.47%	0.62%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	4.89%	3.11%	0.00%	0.64%	7.81%	5.44%	0.00%	0.00%	0.00%	0.62%	0.00%	2.72%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		99.61%	93.80%	79.22%	98.31%	100.00%	91.48%	100.00%	99.10%	95.45%	100.00%	94.54%	99.36%	97.44%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Voice Quality

Aircel, Airtel, BSNL, Idea and Reliance GSM failed to meet the benchmark in indoor and outdoor areas. TATA GSM did not meet the benchmark in outdoor areas.

Call Set Success Rate (CSSR)

BSNL failed to meet the benchmark in outdoor areas while Aircel missed the benchmark in indoor areas.

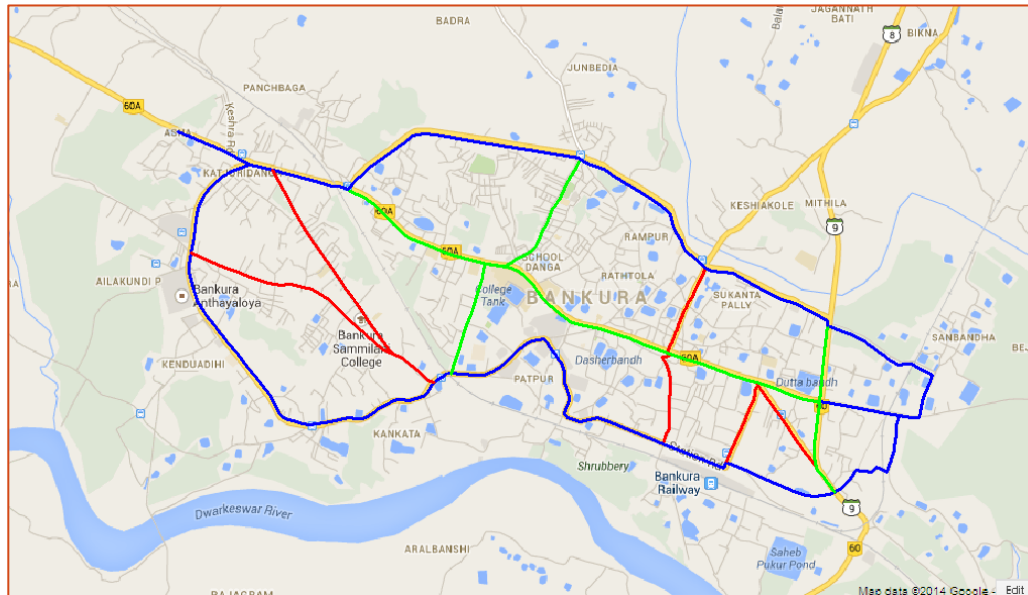
Call Drop Rate

Aircel and Airtel failed to meet the benchmark in both indoor and outdoor areas while Reliance GSM did not meet the benchmark in outdoor areas.

6.2.4 BANKURA

Independent Drive Test Route Details – Bankura SSA

Name of the City	Bankura
Date of Drive Test	7th & 8th April' 14
Name of the circle	West Bengal



Blue colour road represents Periphery of the city
 Red colour road represents Congested Area
 Green colour road represents Across the city

Bankura	Outdoor Routes			Indoor Routes	
	Periphery of the City	Congested area	Across the City	Office Complex	Shopping Complex
Route Details	Station Road - Lalbazar - Katjuridanga & Nutanchati Bypass	TG Samanta Road - Fire staion - Bankura Sammilani College - Bankura Station - Lalbazar	Nutanchati Bypass More - Lalbazar Harimela - Junbedia Bus Stop - Zilla Parishad - Bhariabsthan	BSNL Office	Machantar

Independent Drive Test Results – Bankura SSA

	B'mark	Aircel		Airtel		BSNL		Idea		Vodafone		Reliance GSM		TATA GSM		MTS		Reliance CDMA		TATA CDMA	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		69.85%	61.93%	74.95%	47.22%	73.75%	57.93%	77.20%	80.40%	79.35%	30.28%	37.30%	53.77%	42.90%	57.40%	59.70%	72.29%	68.63%	37.69%	27.19%	76.16%
Signal Strength - 0 to -85 dBm		99.85%	95.60%	98.85%	87.68%	99.35%	93.77%	89.85%	97.07%	97.65%	80.68%	88.50%	93.63%	83.50%	93.43%	99.45%	98.60%	99.65%	76.63%	99.66%	98.14%
Signal Strength - 0 to -95 dBm		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.95%	99.97%	99.90%	100.00%	99.95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Voice quality	≥ 95%	92.80%	84.46%	93.58%	89.71%	96.21%	87.70%	96.73%	94.22%	98.83%	91.87%	98.33%	91.54%	99.47%	89.86%	98.56%	98.46%	99.68%	99.17%	98.43%	98.20%
CSSR	≥ 95%	100.00%	99.48%	100.00%	98.83%	98.53%	98.38%	100.00%	98.17%	100.00%	98.78%	100.00%	99.38%	96.67%	97.49%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.52%	0.00%	1.17%	1.47%	1.62%	0.00%	1.83%	0.00%	1.22%	0.00%	0.62%	3.33%	2.51%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	1.52%	1.62%	1.39%	0.00%	0.00%	0.57%	1.61%	1.25%	0.00%	0.00%	1.67%	0.00%	0.00%	0.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	98.87%	100.00%	98.77%	100.00%	97.82%	100.00%	98.77%	100.00%	100.00%	50.00%	99.47%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Voice Quality

Aircel and Airtel failed to meet the benchmark in indoor as well as outdoor areas. BSNL, Idea, Vodafone, Reliance GSM and TATA GSM did not meet the voice quality benchmark in outdoor areas.

Call Set Success Rate (CSSR)

All operators met the TRAI benchmark.

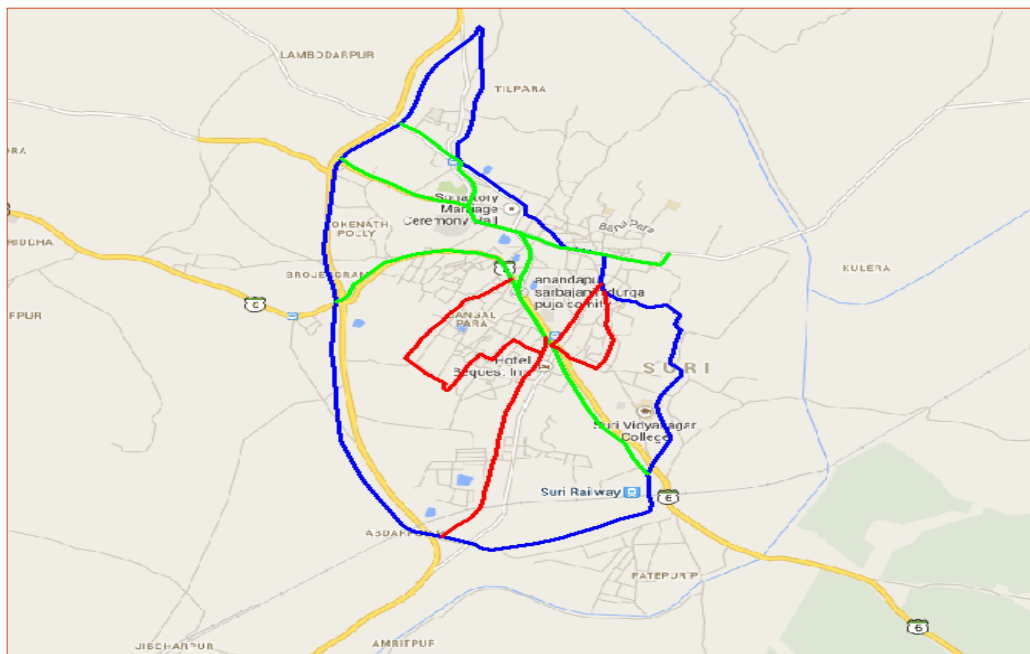
Call Drop Rate

All operators met the TRAI benchmark.

6.2.5 SURI

Name of the City	Suri
Date of Drive Test	9th & 10th April' 14
Name of the circle	West Bengal

Independent Drive Test Route Details – Suri SSA



Blue colour road represents Periphery of the city
 Red colour road represents Congested Area
 Green colour road represents Across the city

Suri	Outdoor Routes						Indoor Routes			
	Periphery of the City		Congested area		Across the City		Office Complex		Shopping Complex	
Route Details	Tilpara-SP More Bus stop-Railway Station-Abdarpur-Brojergram-Araipur P-Motel chutti		Dangalpara-Netaji Subhas bus stand, JL banerjee road-Joy durga nurshing home-Sonatore para		Siuri staion-Netaji Subhas bus stand-District jail-Tantul tala more, Suri-dutta pukur-Suri district Hospital		BSNL office		Subhas Market	

Independent Drive Test Results – Suri SSA

	B'mark	Airtel		Airtel		BSNL		Idea		Vodafone		Reliance GSM		TATA GSM		MTS		Reliance CDMA		TATA CDMA	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		10.70%	43.03%	45.10%	35.13%	36.05%	21.37%	49.05%	51.43%	49.10%	35.93%	23.30%	49.70%	24.95%	26.40%	50.02%	57.76%	50.97%	32.26%	49.78%	64.58%
Signal Strength - 0 to -85 dBm		76.80%	95.23%	91.40%	90.67%	85.20%	79.97%	62.75%	87.93%	97.95%	87.00%	62.25%	94.30%	67.25%	78.83%	98.81%	92.62%	99.68%	59.73%	67.33%	94.59%
Signal Strength - 0 to -95 dBm		100.00%	100.00%	99.95%	99.93%	100.00%	100.00%	99.95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Voice quality	≥ 95%	84.26%	82.47%	92.27%	96.11%	90.09%	92.80%	97.66%	92.61%	94.73%	90.46%	91.47%	93.22%	99.70%	96.90%	98.14%	98.68%	99.59%	99.93%	98.46%	98.77%
CSSR	≥ 95%	97.06%	99.37%	96.96%	96.53%	96.82%	93.33%	98.48%	99.39%	95.79%	98.98%	95.21%	100.00%	98.48%	98.11%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		2.94%	0.63%	3.04%	3.47%	3.18%	6.67%	1.52%	0.61%	4.21%	1.02%	4.79%	0.00%	1.52%	1.89%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	1.86%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	1.91%	1.52%	0.94%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	98.14%	100.00%	95.11%	100.00%	100.00%	0.00%	98.98%	100.00%	97.96%	98.00%	100.00%	100.00%	98.31%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Voice Quality

Airtel, BSNL, Vodafone and Reliance GSM failed to meet the benchmark in indoor as well as outdoor areas. Airtel and Idea missed the benchmark in outdoor areas.

Call Set Success Rate (CSSR)

BSNL failed to meet the benchmark in outdoor areas.

Call Drop Rate

All operators met the TRAI benchmark.

6.3 COMPARISON BETWEEN OPERATOR ASSISTED AND INDEPENDENT DRIVE TEST – PURULIA SSA

The comparison has been made between operator assisted and independent drive tests respectively conducted in Purulia SSA in the AMJ'14 quarter.

The operator assisted drive test happened for three days from 18th to 20th June 2014 covering majority of Purulia SSA. However, the independent drive test was conducted with a focus on Purulia city area and adjoining areas on 15th and 16th May 2014.

The results of the comparison between the two will be indicative and parameters for the two drive tests may not comply with each other due to following reasons.

- The distance covered in operator assisted drive test was a minimum of 300 kilometers over 3 days while the independent drive test was conducted for a minimum of 100 kilometers
- The route travelled was different for the two drive tests
- The drive tests were conducted on different days

Let us now look at the comparison between the two drive tests.

6.3.1 ROUTE DETAILS

Operator Assisted Drive Test

Name of the SSA	PURULIA
Dates of Drive Test	18th & 20th June'14
Name of the circle	West Bengal

Independent Drive Test

Name of the City	PURULIA
Date of Drive Test	15th & 16th May'14
Name of the circle	West Bengal

Route Details – Operator Assisted Drive Test – Purulia SSA

		June		
		Purulia		
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads	Jaipur – Jhalda – Kalomati – Bagmundi – Balarampur – Purulia.	Kashipur – Nupari – Gopal Nagar.	Overbridge – Bankuramore – Jaikhanamore - M.S.Maidan.
	Highways	Purulia – Chasmore – Jaipur - Jhalda.	Purulia – Puncha – Manbazar - Hura.	Raghavpurmore - Ranchi Rd. – Lake Town - Tata Road.
	Within the City	Jhalida – Ichaj - Suisa.	Adra – Raghunathpur - Santaldihi.	Hotel Akash - Old Manbazar - Cholibazar Main Rd - Barakar Rd. – Rathtalla – Railway Colony - B.B.Das Rd. – Bhagabandhpar.
Indoor	Office complex	Nataraj Restaurant, Jhalda.	Sainik Hotel, Manbazar	Hotel Akash, Purulia
	Shopping complex	Jhalda Municipal Office.	Nupara High School	Purulia Zilla Parishad

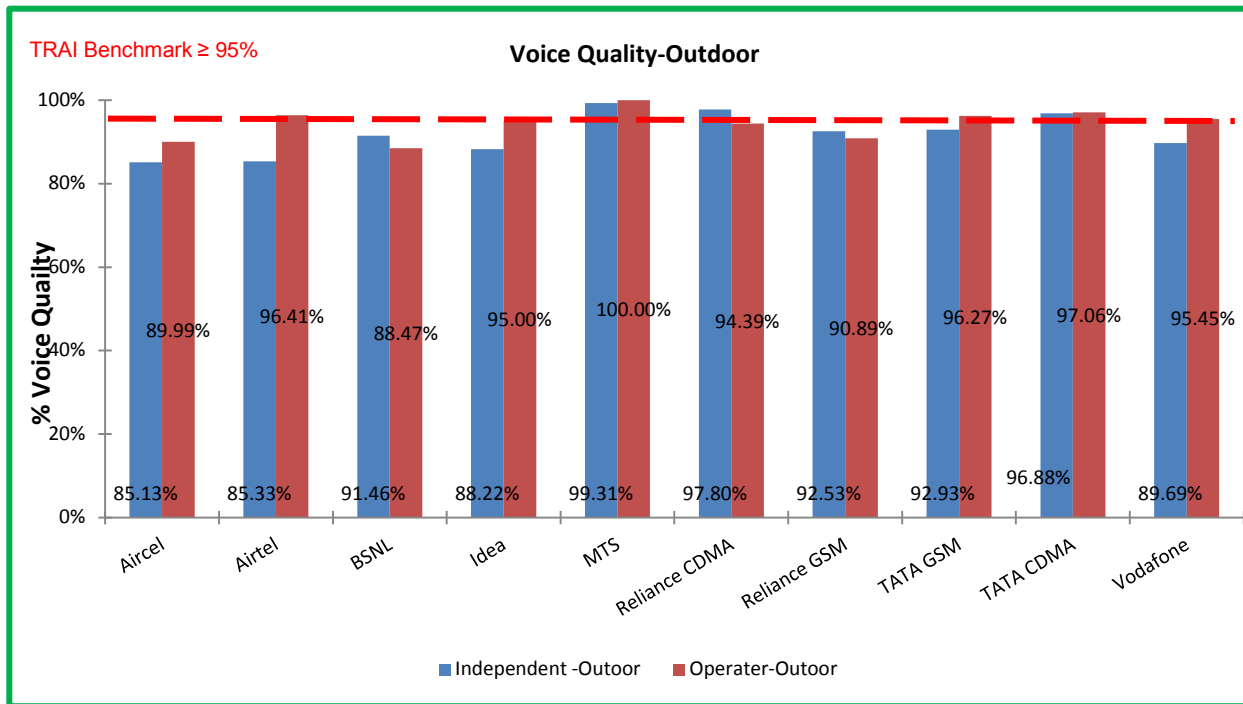
Route Details – Independent Drive Test – Purulia City

Purulia	Outdoor Routes			Indoor Routes	
	Periphery of the City	Congested area	Across the City	Office Complex	Shopping Complex
Route Details	District Magistrate Bunglow, Wild Coax road, SBI bank, J.k college, Highland garden	Purulia Junction, Christian graveyard, Radha Krishna temple	Govt Girls High school, Manbhumi Victoria institute, Post office of Dhulin Nadhia, Ranchi road, district School	Police station	Purulia main market

6.3.2 COMPARISON CHARTS AND ANALYSIS

6.3.2.1 VOICE QUALITY

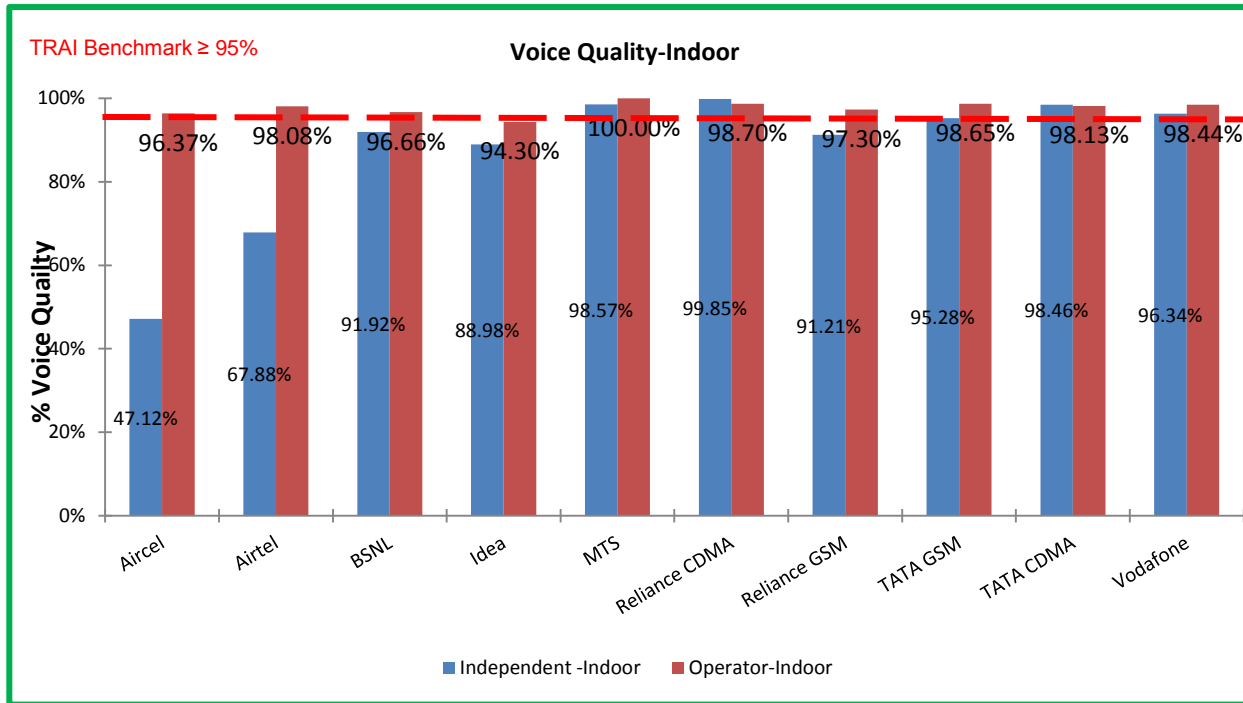
Outdoor Locations



In outdoor locations, Aircel, BSNL and Reliance GSM failed to meet the benchmark in both the drive tests.

Airtel, Idea, Tata GSM and Vodafone missed the benchmark during independent drive test but were able to meet the benchmark during operator assisted drive test. On the contrary, Reliance CDMA missed the benchmark during operator assisted drive test but met the benchmark during independent drive test.

Indoor Locations

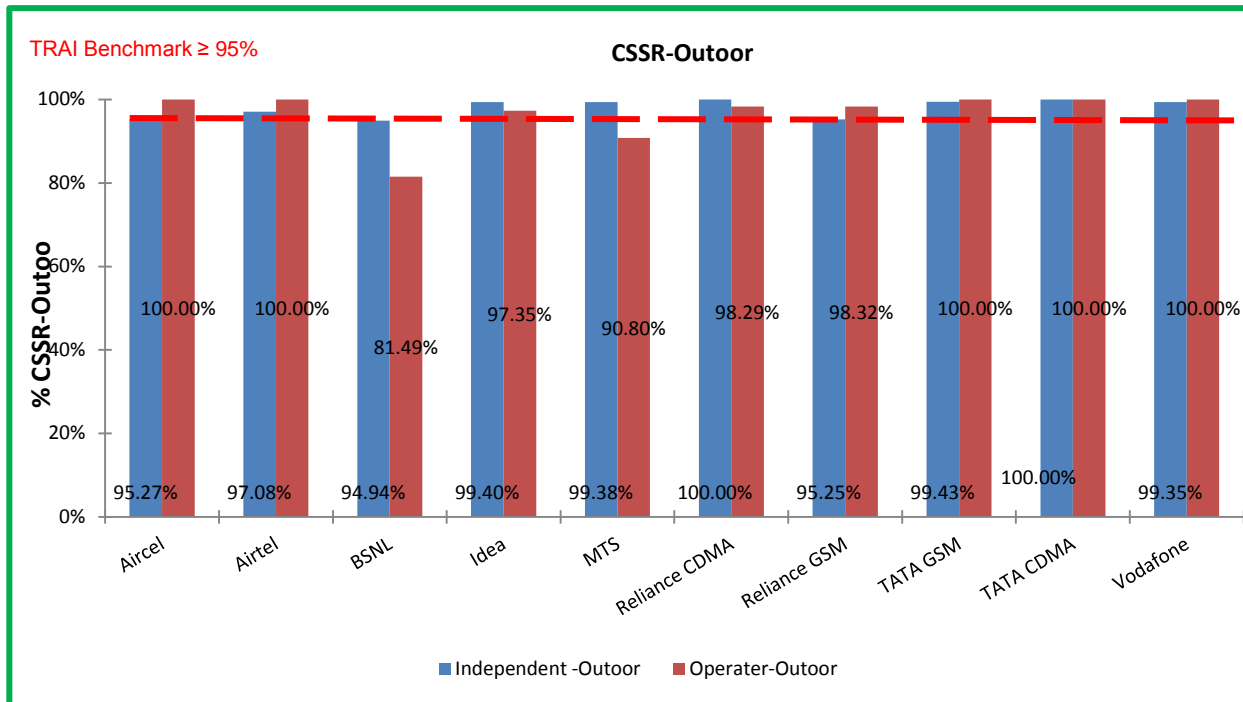


In indoor locations, Idea failed to meet the benchmark in both the drive tests.

Aircel, Airtel, BSNL and Reliance GSM missed the benchmark during independent drive test but were able to meet the benchmark during operator assisted drive test.

6.3.2.2 CALL SETUP SUCCESS RATE

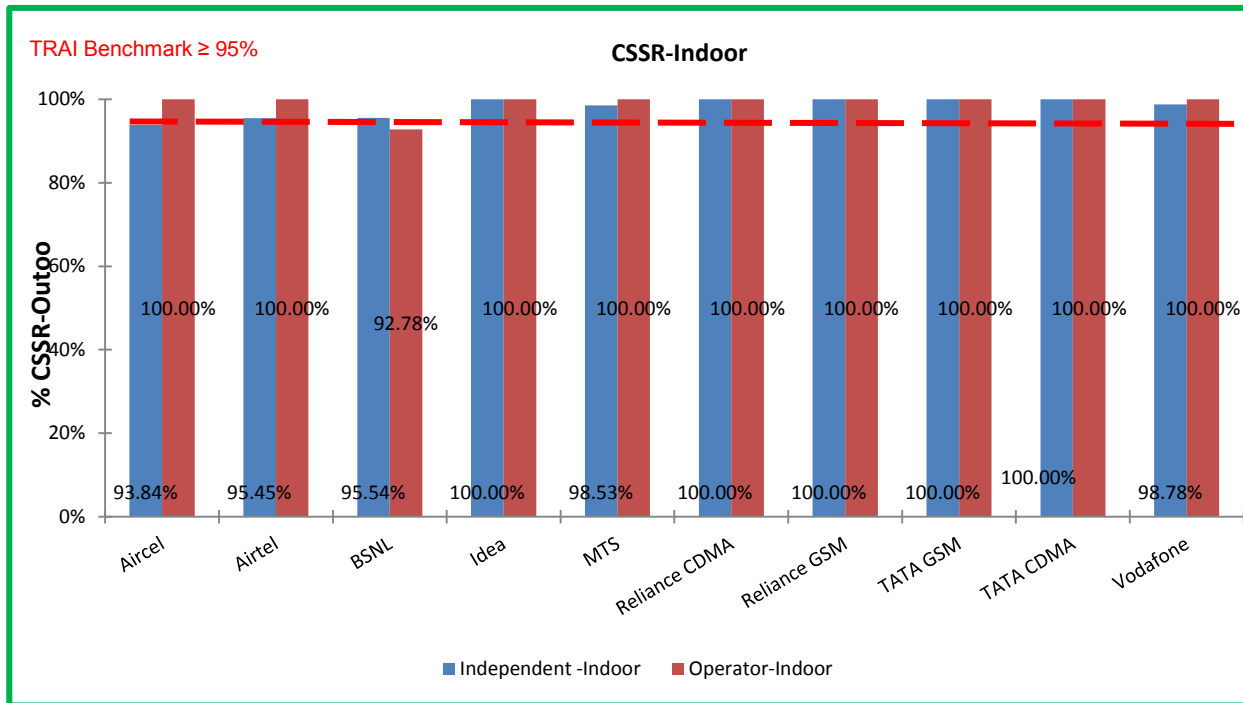
Outdoor Locations



In outdoor locations, BSNL failed to meet the benchmark in both the drive tests.

MTS missed the benchmark during operator assisted drive test but met the benchmark during independent drive test.

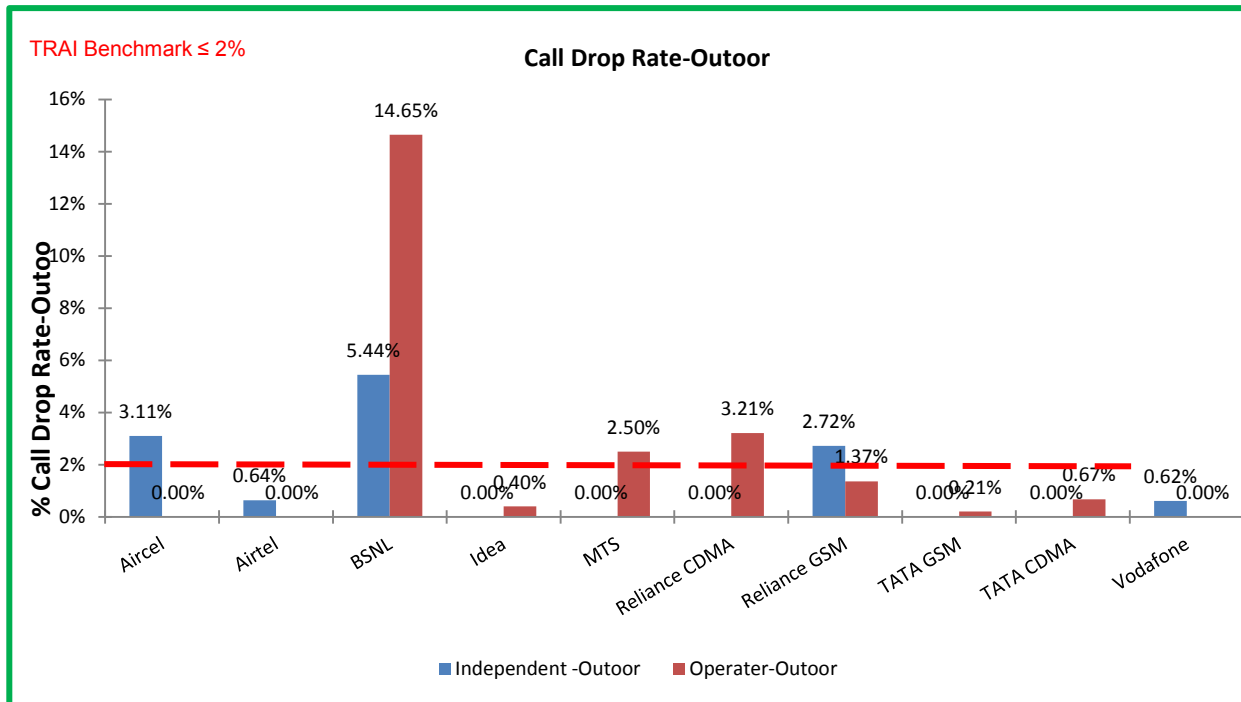
Indoor Locations



In indoor locations, BSNL failed to meet the benchmark during operator assisted drive test while Aircel missed the benchmark during independent drive test.

6.3.2.3 CALL DROP RATE

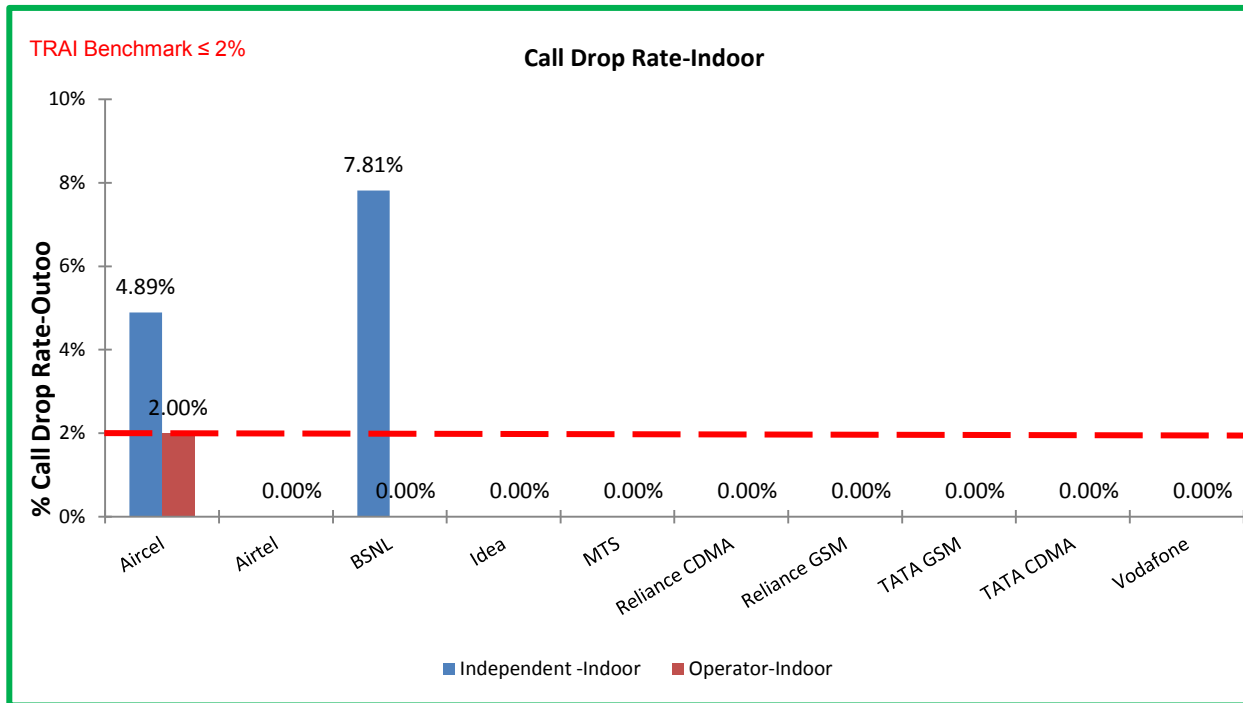
Outdoor Locations



In outdoor locations, BSNL failed to meet the benchmark in both the drive tests.

Aircel and Reliance GSM missed the benchmark during independent drive test but were able to meet the benchmark during operator assisted drive test. On the contrary, MTS and Reliance CDMA missed the benchmark during operator assisted drive test but met the benchmark during independent drive test.

Indoor Locations



In indoor locations, Aircel failed to meet the benchmark in both the drive tests.

BSNL failed to meet the benchmark during independent drive test but was able to meet the benchmark during operator assisted drive test.

7 CRITICAL FINDINGS

PMR Consolidated (Network Parameters)

BSNL did not meet the benchmark for BTS Downtime, Worst Affected BTS due to Downtime and Worst Affected Cells Having More than 3% TCH Drop.

Tata GSM also failed to meet the benchmark for Worst Affected Cells Having More than 3% TCH Drop.

3 Day Live Measurement (Network Parameters)

BSNL did not meet the benchmark for BTS Downtime, Worst Affected BTS due to Downtime and Worst Affected Cells Having More than 3% TCH Drop.

Aircel, Tata CDMA and Tata GSM also failed to meet the benchmark for Worst Affected Cells Having More than 3% TCH Drop.

Live Calling

Airtel, BSNL, Idea and Tata GSM failed to meet the benchmark for complaints resolved within 4 weeks.

PMR (Customer Service Parameters)

BSNL performing the worst among operators on customer service parameters as it failed to meet the benchmark for prepaid billing disputes, resolution of billing complaints within 4 weeks.

Calls answered by the operators (Voice to Voice) within 60 seconds key concern in the circle as Aircel, BSNL, Reliance CDMA, Reliance GSM and Tata GSM have failed to meet the TRAI benchmark for this parameter.

Drive Test (Operator Assisted)

BSNL failed to meet the benchmark for Voice Quality during all the drive tests, especially in outdoor areas.

High call drop rate observed in Purulia for Aircel, BSNL, MTS and Reliance GSM failed to meet the benchmark for Voice Quality in North Kolkata.

Drive Test (Independent)

During all the drive tests, it was observed that Voice Quality has remained below benchmark for most of the operators in all SSAs. Only MTS met the TRAI benchmark for this parameter in both the independent drive tests.

8.2 CONNECTION ESTABLISHMENT (ACCESSIBILITY)

Audit Results for CSSR, SDCCH and TCH congestion											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	96.45%	98.58%	98.99%	98.60%	99.01%	98.55%	98.73%	98.53%	98.63%	99.25%
SDCCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.96%	0.29%	0.58%	0.13%	0.00%	0.00%	0.03%	0.00%	0.24%	0.18%
TCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
TCH congestion	≤ 2%	1.94%	1.68%	0.56%	0.56%	0.44%	0.06%	0.22%	0.08%	0.52%	0.75%

Live measurement results for CSSR, SDCCH and TCH congestion											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	96.46%	98.70%	98.97%	99.46%	99.67%	98.69%	98.99%	98.56%	99.16%	99.77%
SDCCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.83%	0.21%	0.65%	0.06%	0.00%	0.00%	0.02%	0.00%	0.04%	0.18%
TCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
TCH congestion	≤ 2%	1.88%	1.59%	0.54%	0.19%	0.06%	0.05%	0.09%	0.05%	0.13%	0.23%

Drive test results for CSSR (Average of three drive tests) and blocked calls											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		453	656	466	513	641	679	635	528	442	555
Total number of successful calls established		453	656	419	508	605	673	630	527	441	555
CSSR	≥ 95%	100.00%	100.00%	89.12%	98.88%	94.44%	99.25%	99.26%	99.94%	99.53%	100.00%
Blocked calls	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
%age blocked calls		0.00%	0.00%	10.88%	1.12%	5.56%	0.75%	0.74%	0.06%	0.47%	0.00%

8.3 CONNECTION MAINTENANCE (RETAINABILITY)

Audit Results for Call drop rate and for number of cells having more than 3% TCH											
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		126651458	372858753	80939339	122756578	59917604	19524769	124205666	454343	16480558	452984172
Total number of calls dropped		2024441	4059740	1554166	522247	484360	48095	754987	2846	101779	3626060
Call drop rate	≤ 2%	1.60%	1.09%	1.92%	0.43%	0.81%	0.25%	0.61%	0.62%	0.62%	0.80%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		8014	18286	7063	320914	3136	3006	8262	76	1602	20107
Total number of cells having more than 3% TCH		237	274	901	5863	65	24	6	2	50	318
Worst affected cells having more than 3% TCH	≤ 3%	2.95%	1.50%	12.76%	1.83%	2.08%	0.84%	0.07%	2.19%	3.12%	1.58%

Live measurement results for Call drop rate and for number of cells having more than 3% TCH											
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		13191035	37043680	8024305	130993330	73268703	2094910	138339138	607545	19433550	510185666
Total number of calls dropped		212969	433912	155057	473012	440501	4476	719232	3121	117451	3326887
Call drop rate	≤ 2%	1.61%	1.17%	1.92%	0.36%	0.60%	0.22%	0.52%	0.51%	0.61%	0.65%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		13359	54695	7063	761472	3135	3006	8295	76	1602	NA
Total number of cells having more than 3% TCH		641	862	976	589	75	35	6	3	50	NA
Worst affected cells having more than 3% TCH	≤ 3%	4.20%	1.58%	13.81%	0.08%	2.40%	1.31%	0.07%	3.51%	3.10%	NA

Drive test results for Call drop rate (Average of three drive tests)											
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		453	656	419	508	605	673	630	527	441	555
Total number of calls dropped		1	0	17	2	7	10	4	0	1	0
Call drop rate	≤ 2%	0.16%	0.00%	5.27%	0.47%	1.18%	1.29%	0.57%	0.06%	0.21%	0.00%

8.4 VOICE QUALITY

Audit Results for Voice quality											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		20688161348	103337274524	7162	15283285088	59917604	NA	18941134857	46691088	3071844289	74415296768
Total number of calls with good voice quality		19732182824	98956763829	6807	14685618315	59751547	NA	18636703548	45750185	3008516136	70995727816
%age calls with good voice quality	≥ 95%	95.38%	95.76%	95.04%	96.09%	99.72%	99.68%	98.38%	97.99%	97.94%	95.40%
Live measurement results for Voice quality											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		2063924587	15965327570	745	15556224451	NA	NA	21182187289	24119585	3478759018	76661734403
Total number of calls with good voice quality		1963075953	15236729512	708	15061083784	NA	NA	20791798689	23602814	3412201378	73847432014
%age calls with good voice quality	≥ 95%	95.11%	95.50%	95.08%	96.82%	NA	99.68%	98.16%	97.86%	98.08%	96.33%
Drive test results for Voice quality (Average of three drive tests)											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		530248	144027	677152	818441	35217	60521	471602	41283	467136	951651
Total number of calls with good voice quality		492363	139405	623129	785797	34414	58572	450423	40276	457735	915744
%age calls with good voice quality	≥ 95%	92.60%	96.81%	92.03%	95.86%	97.70%	96.52%	94.45%	97.85%	97.54%	96.18%

Note: - Reliance CDMA has not shared the bases for calculating the voice quality, as per the operator it is not feasible to fetch the parameters from the current equipment being used. A supporting document for the same has been appended in the annexure.

8.5 POI CONGESTION

Audit Results for POI Congestion											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		54	37	81	111	36	21	45	63	22	44
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		62305	132008	93104	119395	55616	7851	37066	14191	7979	313119
Traffic served for all POIs (B)- in erlangs		39165	81858	20168	62389	31099	3302	25036	3803	2472	192605
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Live Measurement Results for POI Congestion											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		54	37	81	111	36	21	45	63	23	44
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		60964	393066	93525	120993	55551	7851	37066	14217	8097	311159
Traffic served for all POIs (B)- in erlangs		40071	251948	16246	62285	31044	3304	25085	3849	2418	184138
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

8.6 TOTAL CALLS MADE –VOICE QUALITY

April										
Voice quality	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls	551019	115784	773979	778129	37541	100079	165166	30970	535442	1084121
May										
Voice quality	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls	758286	145198	848348	1018434	34264	29695	1072400	26616	803251	993421
June										
Voice quality	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls	281438	171098	409128	658759	33846	51788	177239	66264	62715	777412

Note: - IMRB International, ensures minimum of 100 km is travelled on each day.

8.7 CUSTOMER CARE

Audit results for customer care (IVR and voice-to-Voice)											
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts to customer care for assistance		11659396.00	4474690.00	1572538.00	1594443.00	8001358.00	2046252.00	12074809.00	15989.00	294501.00	23744984.00
Number of calls getting connected and answered (electronically)		11530149.00	4471087.00	789458.00	1575319.00	7937900.00	2029403.00	11952255.00	15688.00	281574.00	23744623.00
Percentage calls getting connected and answered	≥ 95%	98.89%	100.00%	100.00%	98.80%	99.21%	99.18%	98.99%	98.12%	95.61%	100.00%
Number of calls getting transferred to the operator (voice to voice)		3872358.00			4514633.00	3248458.00	209382.00	3712193.00	13450.00	260090.00	8029953.00
Number of calls answered by operator (voice to voice) within 60 seconds		3450128.00	9644582.00		4269879.00	2957493.00	45949.00	3267460.00	13217.00	233497.00	7288164.00
Percentage calls answered within 60 seconds (V2V)	≥ 90%	89.10%	90.00%	62.83%	94.58%	91.04%	21.95%	88.02%	98.27%	89.78%	90.76%
Live calling results for customer care (IVR)											
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts to customer care for assistance		100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Number of calls getting connected and answered (electronically)		100.00	100.00	147.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Percentage calls getting connected and answered	≥ 95%	100.00%	100.00%	98.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Live calling results for customer care (Voice to Voice)											
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls received		100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Number of calls getting connected and answered		100.00	99.00	144.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Percentage calls getting connected and answered	≥ 95%	100.00%	99.00%	96.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

8.8 TERMINATION / CLOSURE OF SERVICE

Audit results for termination / closure of service											
Termination	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of closure request		11.00	445.00	181.00	192.00	281.00	100.00	341.00	NA	NA	11482.00
Number of requests attended within 7 days		11.00	445.00	181.00	192.00	281.00	100.00	341.00	NA	NA	11482.00
Percentage cases in which termination done within 7 days	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%

Note: -TATA CDMA and TATA GSM do have any postpaid customers hence termination and closure of service is Not Applicable.

8.9 TIME TAKEN FOR REFUND OF DEPOSITS AFTER CLOSURE

Audit results for refund of deposits											
Refund	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cases requiring refund of deposits		8.00	99.00		62.00	0.00	186.00	208.00	NA	NA	1872.00
Total number of cases where refund was made within 60 days		6.00	99.00		62.00	0.00	186.00	208.00	NA	NA	1872.00
Percentage cases in which refund was receive within 60 days	100.00%	75.00%	100.00%	100.00%	100.00%	0.00%	100.00%	100.00%	NA	NA	100.00%

Note: -MTS, TATA CDMA and TATA GSM do have any postpaid customers hence refund of deposits is Not Applicable.

8.10 ADDITIONAL NETWORK RELATED PARAMETERS

Audit Results for Total Traffic Handled in Erlang											
Traffic in Erlang		Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Equipped capacity of the network		145390.00	283001.46	156000.00	107249.00	109200.00	118000.00	174000.00	6232.00	29535.00	340993.00
Total traffic handled in erlang during TCBH		103713.00	256951.47	81113.79	91704.00	50898.00	27148.00	94718.00	328.01	12372.18	352287.00
Total number of customers as per VLR											
		Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total no. of customers served (as per VLR)		3064979.00	10340921.00	1399000.00	3318411.00	1236389.00	848936.00	6287656.00	9149.00	514108.00	13030769.00

Live calling results for resolution of service requests											
Resolution of service requests	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls made		100.00	100.00	40.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Number of cases resolved to satisfaction		98.00	97.00	32.00	91.00	99.00	95.00	98.00	96.00	87.00	100.00
Percentage cases resolved in four weeks		98.00%	97.00%	80.00%	91.00%	99.00%	95.00%	98.00%	96.00%	87.00%	100.00%

8.11 COMPARISON OF IMRB & OPERATOR PMR REPORTS – NETWORK RELATED PARAMETERS

Name of Service Area	Name of Service Provider	Network Related Parameters																	
		Network Availability				Connection Establishment (Accessibility)						Connection Maintenance (Retainability)						POI	
		Operator	IMRB	Operator	IMRB	Operator	IMRB	Operator	IMRB	Operator	IMRB	Operator	IMRB	Operator	IMRB	Operator	IMRB	Operator	IMRB
		BTSs Accumulated downtime (not available for service) (%age)	BTSs Accumulated downtime (not available for service) (%age)	Worst affected BTSs due to downtime (%age)	Worst affected BTSs due to downtime (%age)	Call Set-up Success Rate (within licensee's own network)	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion (%age)	SDCCH/ Paging Chl. Congestion (%age)	TCH Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop (call drop) rate (%age)	Worst affected cells having more than 3% TCH drop (call drop) rate (%age)	Connection with good voice quality	Connection with good voice quality	Point of Interconnection (POI) Congestion (No. of POIs not meeting the benchmark)	Point of Interconnection (POI) Congestion (No. of POIs not meeting the benchmark)
		≤ 2%	≤ 2%	≤ 2%	≤ 2%	≥ 95%	≥ 95%	≤ 1%	≤ 1%	≤ 2%	≤ 2%	≤ 2%	≤ 2%	≤ 3%	≤ 3%	≥ 95%	≥ 95%	≤ 0.5%	≤ 0.5%
WB	Aircel	1.12	1.10	1.85	1.85	96.45	96.45	0.96	0.96	1.94	1.94	1.60	1.60	2.95	2.95	95.38	95.38	0	0.00
	Airtel	0.05	0.05	0.05	0.05	98.58	98.58	0.29	0.29	1.68	1.68	1.09	1.09	1.52	1.50	95.76	95.76	0	0.00
	BSNL	2.95	5.06	13.52	25.46	98.67	98.99	0.47	0.58	0.63	0.56	1.90	1.92	7.07	12.76	95.93	95.04	0	0.00
	Idea	0.23	0.22	1.25	1.25	98.60	98.60	0.13	0.13	0.56	0.56	0.43	0.43	1.83	1.83	96.09	96.09	0	0.00
	MTS	0.33	0.32	0.00	0.00	99.01	99.01	0.00	0.00	0.44	0.44	0.81	0.81	2.08	2.08	99.73	99.72	0	0.00
	RCOM CDMA	0.48	0.47	1.21	1.21	98.56	98.55	0.00	0.00	0.06	0.06	0.25	0.25	0.83	0.84	99.68	99.68	0	0.00
	RTL	0.40	0.39	1.54	1.57	98.67	98.73	0.03	0.03	0.22	0.22	0.61	0.61	0.07	0.07	98.38	98.38	0	0.00
	TATA CDMA	0.03	0.03	0.00	0.00	98.53	98.53	0.00	0.00	0.08	0.08	0.62	0.62	0.61	2.19	97.99	97.99	0	0.00
	TATA GSM	0.01	0.01	0.00	0.00	98.64	98.63	0.24	0.24	0.52	0.52	0.62	0.62	0.74	3.12	97.94	97.94	0	0.00
Vodafone	0.05	0.05	0.33	0.33	99.25	99.25	0.18	0.18	0.75	0.75	0.80	0.80	1.92	1.58	95.40	95.40	0	0.00	

Value calculated by Operators and IMRB match		Value calculated by Operators and IMRB do not match	
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8.12 COMPARISON OF IMRB & OPERATOR PMR REPORTS – CUSTOMER SERVICE QUALITY PARAMETERS

Name of Service Area	Name of Service Provider	Customer Service Quality Parameters							
		Response time to the customer for assistance				Termination / closure of service			
		Operator	IMRB	Operator	IMRB	Operator	IMRB	Operator	IMRB
		Accessibility of call centre/ customer care	Accessibility of call centre/ customer care	Percentage of calls answered by the operators (voice to voice) within 60 seconds	Percentage of calls answered by the operators (voice to voice) within 60 seconds	%age requests for Termination / Closure of service	%age requests for Termination / Closure of service	Time taken for refund of deposits after closures	Time taken for refund of deposits after closures
		≥ 95%	≥ 95%	≥ 90%	≥ 90%	100% within 7 days	100% within 7 days	100% within 60 days	100% within 60 days
WB	Aircel	98.89	98.89	89.10	89.10	100.00	100.00	75.00	75.00
	Airtel	100.00	100.00	90.00	90.00	100.00	100.00	100.00	100.00
	BSNL	100.00	100.00	81.40	62.83	95.03	100.00	100.00	100.00
	Idea	98.80	98.80	94.58	94.58	100.00	100.00	100.00	100.00
	MTS	99.21	99.21	91.04	91.04	100.00	100.00	100.00	0.00
	RCOM CDMA	99.18	99.18	21.95	21.95	100.00	100.00	100.00	100.00
	RTL	98.99	98.99	88.02	88.02	100.00	100.00	100.00	100.00
	TATA CDMA	98.12	98.12	98.27	98.27	NA	NA	NA	NA
	TATA GSM	95.61	95.61	89.78	89.78	NA	NA	100.00	NA
Vodafone	100.00	100.00	90.76	90.76	100.00	100.00	100.00	100.00	

Value calculated by Operators and IMRB match		Value calculated by Operators and IMRB do not match	
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8.13 SUPPORTING DOCUMENTS

8.13.1 RELIANCE CDMA –VOICE QUALITY OPERATOR COMMENTS

- In CDMA system, there is no Numerator and Denominator for calculation of Voice quality.

FER for voice quality is directly derived in CDMA System and same has been explained to TRAI.

9 ANNEXURE – APRIL

1. Network Availability

Audit Results for Network Availability- PMR data

	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2688	5704	2418	3499	906	1096	2815	26	533	6640
Sum of downtime of BTSs in a month (in hours)		20451	1924	84069	4687	1506	3336	6226	6	4	588
BTSs accumulated downtime (not available for service)	≤ 2%	1.02%	0.05%	4.67%	0.18%	0.22%	0.41%	0.30%	0.03%	0.00%	0.01%
Number of BTSs having		51	5	533	21	0	13	37	0	0	2

accumulated downtime >24 hours											
Worst affected BTSs due to downtime	≤ 2%	1.90%	0.09%	22.04%	0.60%	0.00%	1.19%	1.31%	0.00%	0.00%	0.03%

Live Measurement Results for Network Availability- 3 Day live data

	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2684	5714	2418	3494	906	1096	2815	26	533	6640
Sum of downtime of BTSs in a month (in hours)		3514	273	5665	388	230	127	339	0	0	36
BTSs accumulated downtime (not available for service)	≤ 2%	1.82%	0.07%	3.25%	0.15%	0.35%	0.16%	0.17%	0.00%	0.00%	0.01%
Number of BTSs having accumulated downtime >24 hours		40	0	18	3	0	0	0	0	0	0
Worst affected BTSs due to downtime	≤ 2%	1.49%	0.00%	0.74%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

2. Connection Establishment (Accessibility)

Audit Results for CSSR, SDCCH and TCH congestion- PMR data

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	96.48%	98.67%	98.95%	98.11%	99.30%	98.81%	98.76%	98.34%	98.60%	99.49%

SDCCH congestion	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.97%	0.25%	0.76%	0.12%	0.00%	0.00%	0.03%	0.00%	0.05%	0.16%

TCH congestion	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
TCH congestion	≤ 2%	1.98%	1.50%	0.56%	0.61%	0.36%	0.03%	0.16%	0.21%	0.53%	0.51%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data

CSSR	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	96.75%	98.73%	98.95%	99.30%	99.54%	99.17%	98.98%	97.78%	99.19%	99.82%

SDCCH congestion	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.55%	0.18%	0.48%	0.05%	0.00%	0.00%	0.02%	0.00%	0.04%	0.19%

TCH congestion	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
TCH congestion	≤ 2%	1.98%	1.38%	0.54%	0.24%	0.07%	0.01%	0.07%	0.13%	0.13%	0.18%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		388	634	537	584	653	601	444	554	356	600
Total number of successful calls established		388	634	475	582	649	600	444	553	351	600
CSSR	≥ 95%	100.00%	100.00%	88.45%	99.66%	99.39%	99.83%	100.00%	99.82%	98.60%	100.00%

Blocked calls	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
%age blocked calls		0.00%	0.00%	11.55%	0.34%	0.61%	0.17%	0.00%	0.18%	1.40%	0.00%

3. Connection Maintenance (Retainability)

Audit Results for Call drop rate and for number of cells having more than 3% TCH-PMR data

Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		124367234	371784177	90208253	130247302	60619130	20013592	144044288	471172	16536902	463063688
Total number of calls dropped		1945026	4507635	1784765	559420	532193	40530	801476	3452	101573	3814444
Call drop rate	≤ 2%	1.56%	1.21%	1.98%	0.43%	0.88%	0.20%	0.56%	0.73%	0.61%	0.82%

Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
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Total number of cells in the network		8015	18213	7063	315807	3144	3285	8437	76	1602	19966
Total number of cells having more than 3% TCH		269	272	988	6495	71	21	6	2	47	195
Worst affected cells having more than 3% TCH	≤ 3%	3.36%	1.49%	13.99%	2.06%	2.26%	0.64%	0.07%	2.63%	2.93%	0.98%

Live measurement results for Call drop rate and for number of cells having more than 3% TCH- 3 Day data

Call drop rate	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		12906959	37099149	8936088	130861297	74550652	2150371	157891663	631241	19644433	507694825
Total number of calls dropped		230029	497324	184320	502877	488867	4114	799656	3595	117476	3465335
Call drop rate	≤ 2%	1.78%	1.34%	2.06%	0.38%	0.66%	0.19%	0.51%	0.57%	0.60%	0.68%

Cells having more than 3% TCH	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		24033	54754	7063	758304	3144	3285	8437	76	1602	NA
Total number of cells having more than 3% TCH		1369	874	1159	636	84	24	8	3	21	NA
Worst affected cells having more than 3% TCH	≤ 3%	5.70%	1.60%	16.41%	0.08%	2.67%	0.73%	0.09%	3.95%	1.31%	NA

Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data

Call drop rate	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
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Total number of calls established		388	634	475	582	649	600	444	553	351	600
Total number of calls dropped		0	0	7	1	4	0	0	0	0	0
Call drop rate	≤ 2%	0.00%	0.00%	1.47%	0.17%	0.62%	0.00%	0.00%	0.00%	0.00%	0.00%

4. Voice quality

Audit Results for Voice quality -PMR Data

Voice quality	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		20231736791	106611221703	7140	14928924287	60619130	NA	21395854555	48104253	3084632829	73198671643
Total number of calls with good voice quality		19284153118	102042140793	6787	14302840367	60561935	NA	21076177109	47093988	3021579397	69680050670
%age calls with good voice quality	≥ 95%	95.32%	95.71%	95.06%	95.81%	99.91%	99.68%	98.51%	97.90%	97.96%	95.19%

Live measurement results for Voice quality-3 Day data

Voice quality	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		2105871225	9402653466	756	15192959350	NA	NA	24323388064	24719488	3541985978	77023918611
Total number of calls with good voice quality		2004088795	8982868666	719	14707718042	NA	NA	23884511811	24180180	3475510786	74172480846
%age calls with good voice quality	≥ 95%	95.17%	95.54%	95.11%	96.81%	NA	99.68%	98.20%	97.82%	98.12%	96.30%

Drive test results for Voice quality (Average of three drive tests) - DT data

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		551019	115784	773979	778129	37541	100079	165166	30970	535442	1084121
Total number of calls with good voice quality		525542	112007	731764	744940	36861	98098	157166	30405	513839	1049652
%age calls with good voice quality	≥ 95%	95.38%	96.74%	94.55%	95.73%	98.19%	98.02%	95.16%	98.18%	95.97%	96.82%

5. POI Congestion

Audit Results for POI Congestion- PMR data

POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		55	37	81	111	36	21	44	65	24	44
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		65121.34	130636.91	93525.00	157388.00	55243.11	7851.00	36567.00	14685.36	8950.24	311236.00
Traffic served for all POIs (B)- in erlangs		38987	82569	20021	70245	31957	3480	27671	3926	2869	187252
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data

POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance	Reliance	TATA	TATA	Vodafone
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	ark	L)					e CDMA	GSM	CDMA	GSM	
Total number of working POIs		53	37	81	111	36	21	44	65	25	44
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		60421.03	391627.67	93525.00	161774.00	55233.08	7851.00	36567.00	14779.97	10455.86	310184.00
Traffic served for all POIs (B)- in erlangs		39804	247172	18696	71368	32214	3383	26920	3996	2882	184226
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

10 ANNEXURE – MAY

1. Network Availability

Audit Results for Network Availability- PMR data

	Benchm ark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Relianc e CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2690	5726	2418	3530	899	1096	2805	26	533	6666
Sum of downtime of BTSs in a month (in hours)		24539	2809	103373	7613	2348	4188	9501	7	11	2776
BTSs accumulated downtime (not available for service)	≤ 2%	1.23%	0.07%	5.75%	0.29%	0.35%	0.51%	0.46%	0.04%	0.00%	0.06%
Number of BTSs having accumulated downtime >24		48	2	743	69	0	12	45	0	0	23

hours											
Worst affected BTSs due to downtime	≤ 2%	1.78%	0.03%	30.73%	1.95%	0.00%	1.09%	1.60%	0.00%	0.00%	0.35%

Live Measurement Results for Network Availability- 3 Day live data

	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2688	5674	2418	3499	899	1096	2805	26	533	6640
Sum of downtime of BTSs in a month (in hours)		3524	167	12388	472	95	249	576	0	10	33
BTSs accumulated downtime (not available for service)	≤ 2%	1.82%	0.04%	7.12%	0.19%	0.15%	0.32%	0.29%	0.00%	0.03%	0.01%
Number of BTSs having accumulated downtime >24 hours		40	0	137	6	0	0	0	0	0	0
Worst affected BTSs due to downtime	≤ 2%	1.49%	0.00%	5.67%	0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

2. Connection Establishment (Accessibility)

Audit Results for CSSR, SDCCH and TCH congestion- PMR data

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	96.48%	98.58%	99.00%	98.78%	99.22%	98.59%	98.76%	98.87%	98.64%	99.20%

SDCCH congestion	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.98%	0.31%	0.55%	0.16%	0.00%	0.00%	0.03%	0.00%	0.58%	0.19%

TCH congestion	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
TCH congestion	≤ 2%	1.86%	1.55%	0.62%	0.48%	0.36%	0.06%	0.30%	0.03%	0.56%	0.80%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data

CSSR	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	96.70%	98.70%	99.01%	99.55%	99.73%	98.62%	98.92%	98.90%	99.19%	99.77%

SDCCH congestion	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.98%	0.22%	1.12%	0.04%	0.00%	0.00%	0.02%	0.00%	0.04%	0.15%

TCH congestion	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
TCH congestion	≤ 2%	1.74%	1.57%	0.54%	0.16%	0.06%	0.03%	0.11%	0.03%	0.16%	0.23%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data

CSSR	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance	Reliance	TATA	TATA	Vodafone
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	ark	L)					e CDMA	GSM	CDMA	GSM	
Total number of call attempts		547	611	553	585	639	664	689	454	484	634
Total number of successful calls established		547	611	519	580	588	663	688	454	484	634
CSSR	≥ 95%	100.00%	100.00%	93.85%	99.15%	92.02%	99.85%	99.85%	100.00%	100.00%	100.00%

Blocked calls	Benchm ark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Relianc e CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
%age blocked calls		0.00%	0.00%	6.15%	0.85%	7.98%	0.15%	0.15%	0.00%	0.00%	0.00%

3. Connection Maintenance (Retainability)

Audit Results for Call drop rate and for number of cells having more than 3% TCH-PMR data

Call drop rate	Benchm ark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Relianc e CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		12727178 2	379463653	797951 25	12724937 1	617121 14	201177 83	12153460 7	452906	1695294 0	45756253 3
Total number of calls dropped		1987467	3869097	148229 6	518354	453914	43461	785596	2552	101390	3412390
Call drop rate	≤ 2%	1.56%	1.02%	1.86%	0.41%	0.74%	0.22%	0.65%	0.56%	0.60%	0.75%

Cells having more than 3% TCH	Benchm ark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Relianc e CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
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Total number of cells in the network		8004	18293	7063	327050	3123	3285	8407	76	1602	20044
Total number of cells having more than 3% TCH		234	270	824	5508	60	21	3	1	46	227
Worst affected cells having more than 3% TCH	≤ 3%	2.92%	1.48%	11.67%	1.68%	1.92%	0.64%	0.04%	1.32%	2.87%	1.13%

Live measurement results for Call drop rate and for number of cells having more than 3% TCH- 3 Day data

Call drop rate	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		12846735	37485370	7645996	131770814	72889773	2194065	126710709	600331	19890965	510386058
Total number of calls dropped		189029	428195	137824	405829	405698	3156	679658	2872	109232	3201467
Call drop rate	≤ 2%	1.47%	1.14%	1.80%	0.31%	0.56%	0.14%	0.54%	0.48%	0.55%	0.63%

Cells having more than 3% TCH	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		8016	54483	7063	759384	3123	3285	8437	76	1602	NA
Total number of cells having more than 3% TCH		308	891	842	447	59	15	5	3	52	NA
Worst affected cells having more than 3% TCH	≤ 3%	3.84%	1.64%	11.92%	0.06%	1.89%	0.46%	0.06%	3.95%	3.25%	NA

Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data

Call drop rate	Benchmark	Aircel(DW L)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
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Total number of calls established		547	611	519	580	588	663	688	454	484	634
Total number of calls dropped		0	0	13	4	6	2	0	0	0	0
Call drop rate	≤ 2%	0.00%	0.00%	2.50%	0.69%	1.02%	0.30%	0.00%	0.00%	0.00%	0.00%

4. Voice quality

Audit Results for Voice quality -PMR Data

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		20986204 632	102598744 466	7351	15084115 677	617121 14	NA	18707667 442	465089 56	3152116 095	75676570 171
Total number of calls with good voice quality		20024133 007	982141622 79	6985	14534045 775	614617 28	NA	18408701 738	455961 89	3088542 526	72393836 272
%age calls with good voice quality	≥ 95%	95.42%	95.73%	95.02%	96.35%	99.59%	NA	98.40%	98.04%	97.98%	95.66%

Live measurement results for Voice quality-3 Day data

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		20929354 28	101451305 70	744	15697192 292	NA	NA	19109110 544	240698 69	3529912 610	76273704 251
Total number of calls with good voice quality		19901763 40	969993001 9	707	15213104 824	NA	NA	18771134 772	235564 79	3463203 801	73501257 299
%age calls with good voice quality	≥ 95%	95.09%	95.61%	95.03%	96.92%	NA	99.68%	98.23%	97.87%	98.11%	96.37%

Drive test results for Voice quality (Average of three drive tests) - DT data

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		758286	145198	848348	1018434	34264	29695	1072400	26616	803251	993421
Total number of calls with good voice quality		696769	141353	762725	987356	33333	28990	1030917	26212	798376	952617
%age calls with good voice quality	≥ 95%	91.89%	97.35%	89.91%	96.95%	97.28%	97.63%	96.13%	98.48%	99.39%	95.89%

5. POI Congestion

Audit Results for POI Congestion- PMR data

POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		53	37	81	111	36	21	44	65	24	44
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		60556	131922	93525	99732	55463	7851	37316	14560	8950	313061
Traffic served for all POIs (B)- in erlangs		39184	82166	20578	59789	30676	3259	24709	3921	2842	201307
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data

POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance	Reliance	TATA	TATA	Vodafone
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	ark	L)					e CDMA	GSM	CDMA	GSM	
Total number of working POIs		53	37	81	111	36	21	44	65	24	44
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		60675	393786	93525	99878	55493	7851	37316	14560	7798	309025
Traffic served for all POIs (B)- in erlangs		40618	254337	14411	60050	30411	3373	24788	4015	2694	184553
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

11 ANNEXURE - JUNE

1. Network Availability

Audit Results for Network Availability- PMR data

	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2688	5742	2418	3578	905	815	2650	26	533	6675
Sum of downtime of BTSs in a month (in		20894	1270	85758	5410	2677	2946	8320	2	109	4162

hours)											
BTSs accumulated downtime (not available for service)	≤ 2%	1.04%	0.03%	4.77%	0.20%	0.40%	0.49%	0.42%	0.01%	0.03%	0.08%
Number of BTSs having accumulated downtime >24 hours		50	1	571	43	0	11	48	0	0	41
Worst affected BTSs due to downtime	≤ 2%	1.86%	0.02%	23.61%	1.20%	0.00%	1.35%	1.81%	0.00%	0.00%	0.61%

Live Measurement Results for Network Availability- 3 Day live data

	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2685	5734	2418	3533	904	815	2671	26	533	6719
Sum of downtime of BTSs in a month (in hours)		3422	76	11233	659	264	246	824	0	28	38
BTSs	≤ 2%	1.77%	0.02%	6.45%	0.26%	0.41%	0.42%	0.43%	0.00%	0.07%	0.01%

accumulated downtime (not available for service)											
Number of BTSs having accumulated downtime >24 hours		34	0	68	7	0	0	0	0	0	0
Worst affected BTSs due to downtime	≤ 2%	1.27%	0.00%	2.81%	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

2. Connection Establishment (Accessibility)

Audit Results for CSSR, SDCCH and TCH congestion- PMR data

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	96.39%	98.49%	99.01%	98.91%	98.52%	98.26%	98.68%	98.37%	98.64%	99.05%

SDCCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.94%	0.32%	0.44%	0.12%	0.00%	0.00%	0.03%	0.00%	0.08%	0.18%

TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance	Reliance	TATA	TATA GSM	Vodafone
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congestion	k						CDMA	GSM	CDMA		
TCH congestion	≤ 2%	1.97%	1.98%	0.51%	0.60%	0.59%	0.10%	0.19%	0.01%	0.47%	0.95%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	95.92%	98.68%	98.94%	99.53%	99.73%	98.28%	99.06%	99.00%	99.11%	99.73%

SDCCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.95%	0.23%	0.36%	0.09%	0.00%	0.00%	0.02%	0.00%	0.05%	0.21%

TCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
TCH congestion	≤ 2%	1.91%	1.82%	0.55%	0.16%	0.06%	0.11%	0.07%	0.00%	0.09%	0.27%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		424	722	308	370	630	772	773	575	487	430
Total number of successful calls		424	722	262	362	579	757	757	575	487	430

established											
CSSR	≥ 95%	100.00%	100.00%	85.06%	97.84%	91.90%	98.06%	97.93%	100.00%	100.00%	100.00%
Blocked calls	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
%age blocked calls		0.00%	0.00%	14.94%	2.16%	8.10%	1.94%	2.07%	0.00%	0.00%	0.00%

3. Connection Maintenance (Retainability)

Audit Results for Call drop rate and for number of cells having more than 3% TCH-PMR data

Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		128315358	367328429	72814640	110773062	57421567	18442931	107038102	438950	15951831	438326296
Total number of calls dropped		2140830	3802487	1395437	488967	466972	60295	677889	2534	102374	3651346
Call drop rate	≤ 2%	1.67%	1.04%	1.92%	0.44%	0.81%	0.33%	0.63%	0.58%	0.64%	0.83%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of		8022	18353	7063	319884	3142	2448	7942	76	1602	20312

cells in the network											
Total number of cells having more than 3% TCH		207	280	892	5585	65	30	9	2	57	533
Worst affected cells having more than 3% TCH	≤ 3%	2.58%	1.53%	12.63%	1.75%	2.07%	1.23%	0.11%	2.63%	3.56%	2.62%

Live measurement results for Call drop rate and for number of cells having more than 3% TCH- 3 Day data

Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		13819410	36546520	7490830	130347879	72365683	1940293	130415041	591063	18765253	512476116
Total number of calls dropped		219848	376217	143027	510329	426938	6159	678383	2897	125645	3313858
Call drop rate	≤ 2%	1.59%	1.03%	1.91%	0.39%	0.59%	0.32%	0.52%	0.49%	0.67%	0.65%

Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		8027	54847	7063	766728	3138	2448	8012	76	1602	NA
Total		246	822	926	685	83	67	4	2	76	NA

number of cells having more than 3% TCH											
Worst affected cells having more than 3% TCH	≤ 3%	3.06%	1.50%	13.11%	0.09%	2.64%	2.74%	0.05%	2.63%	4.74%	NA

Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data

Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		424	722	262	362	579	757	757	575	487	430
Total number of calls dropped		2	0	31	2	11	27	13	1	3	0
Call drop rate	≤ 2%	0.47%	0.00%	11.83%	0.55%	1.90%	3.57%	1.72%	0.17%	0.62%	0.00%

4. Voice quality

Audit Results for Voice quality -PMR Data

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
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Total number of sample calls		208465426 21	1008018574 04	6994	158368152 99	5742156 7	NA	167198825 75	4546005 5	297878394 4	743706484 91
Total number of calls with good voice quality		198882623 46	9661398841 4	6648	152199688 04	5723097 8	NA	164252317 97	4456037 7	291542648 6	709132965 07
%age calls with good voice quality	≥ 95%	95.40%	95.85%	95.05%	96.10%	99.67%	99.67%	98.24%	98.02%	97.87%	95.35%

Live measurement results for Voice quality-3 Day data

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		199296710 8	2834819867 5	735	157785217 10	NA	NA	201140632 59	2356939 7	336437846 5	766875803 46
Total number of calls with good voice quality		189496272 3	2702738985 0	699	152624284 87	NA	NA	197197494 85	2307178 4	329788954 8	738685578 98
%age calls with good voice quality	≥ 95%	95.08%	95.34%	95.10%	96.73%	NA	99.67%	98.04%	97.89%	98.02%	96.32%

Drive test results for Voice quality (Average of three drive tests) - DT data

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
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Total number of sample calls		281438	171098	409128	658759	33846	51788	177239	66264	62715	777412
Total number of calls with good voice quality		254777	164854	374898	625096	33047	48628	163187	64211	60991	744962
%age calls with good voice quality	≥ 95%	90.53%	96.35%	91.63%	94.89%	97.64%	93.90%	92.07%	96.90%	97.25%	95.83%

5. POI Congestion

Audit Results for POI Congestion- PMR data											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		54	37	81	111	36	21	46	60	19	44
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		61235.77	133465.00	92263.12	101064.00	56142.61	7851.00	37316.00	13326.85	6037.59	315061.00
Traffic		39324	80839	19906	57134	30663	3167	22727	3561	1706	189255

served for all POIs (B)- in erlangs											
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data

POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		56	37	81	111	36	21	46	60	19	44
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		61794.51	393785.59	93525.00	101328.00	55926.61	7851.00	37316.00	13310.69	6037.59	314268.00
Traffic served for all POIs (B)- in erlangs		39792	254337	15632	55437	30507	3155	23546	3538	1678	183636
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%



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