

# Mobile Network Performance Benchmarking

**Governorate of  
North Al Sharqiyah**

Regulatory & Compliance Unit  
Quality of Service Department



# Contents

1. Background
2. Test Methodology
3. Performance Indicators Definition
4. Results
5. Conclusion

# 1. Background

A comprehensive field test was conducted independently by TRA to assess and benchmark the performance of Omantel and Ooredoo mobile voice and data networks in North Al Sharqiyah Governorate.

Field Survey Date & Time: 28<sup>th</sup>, 29<sup>th</sup> February & 1<sup>st</sup> March 2016 from 9:00 A.M. to 08:00 P.M.

## Services Tested

Network	Service	Technology
Omantel	Voice	2G, 3G
	Data	2G, 3G, 4G
Ooredoo	Voice	2G, 3G
	Data	2G, 3G, 4G

## Test Area

Governorate	Wilayat
North Al Sharqiyah	Dima-wa-Attayin, Mudhaybi, Ibra, Al Qabil, Biddiya, Wadi Bani Khalid

## 2. Test Methodology

The following test configuration was used for measurements:

Service Tested	Technology Mode	Objective	Test sequence	KPIs measured
Omantel- Mobile voice	Open (2G, 3G)	To check network accessibility, retain-ability, mobility, service integrity and coverage	Calls of 90 sec duration with a 20 sec idle wait time between them to allow for cell reselection from 2G to 3G mode, where applicable.	CSSR, CDR, CSR, RxLev, RSCP.
Omantel- Mobile data	Open (2G, 3G, 4G)	To check data network performance and coverage	FTP, HTTP file download from the service providers network and ping test.	Latency, Ping Packet Success Rate, Avg. downlink throughput, RSCP, RSRP.
Ooredoo- Mobile voice	Open (2G, 3G)	To check network accessibility, retain-ability, mobility service integrity and coverage	Calls of 90 sec duration with a 20 sec idle wait time between them to allow for cell reselection from 2G to 3G mode, where applicable.	CSSR, CDR, CSR, RxLev, RSCP.
Ooredoo- Mobile data	Open (2G, 3G,4G)	To check data network performance and coverage	FTP, HTTP file download from the service providers network and ping test.	Latency, Ping Packet Success Rate, Avg. downlink throughput, RSCP, RSRP.

### 3. Key Performance Indicators Definition

**Mobile voice** performance was measured based on the following set of KPIs:

**Call Setup Success Rate (CSSR)**– This indicator is used to measure the percentage of calls successfully established without facing blockage in the network as a ratio of the total number of call attempts made to access and establish a voice call. [\(to check network accessibility\)](#)

**Call Drop Rate (CDR)** – This indicator is used to measure the percentage of calls dropped due to technical problems or coverage gaps in the service provider’s network as a ratio of the total number of calls successfully established. [\(to check network retain-ability\)](#)

**Call Success Rate (CSR)** – This indicator is used to measure the percentage of calls successfully established without facing blockage in the network as a ratio of the total number of call attempts made to access and establish a voice call and then successfully terminated from the user-end without being dropped or disconnected from the network side due to a technical irregularity. [\(to check service integrity\)](#)

**Mobile data** performance was measured based on the following set of KPIs:

**Packet Latency** - Packet delay, which represents the time taken for data packets to pass through the GPRS bearer in a round-trip time from the mobile to the server in the service provider’s core network and back to the mobile. [\(to check delay in the network\)](#)

**Ping Packet Success Rate** is the percentage of packets lost between designated routes in the network. It is used to indicate the loss of data packets during transmission over a telecommunications network. [\(to check data integrity\)](#)

**HTTP Average downlink throughput** - This is the average downlink throughput (rate at which data/bits are transferred to the user) experienced by a user while downloading content from the Internet. [\(to check download speed\)](#)

## Performance Indicators Definition continued

**Coverage** is assessed based on the following radio parameters:

**Reference Signal Received Power (RSRP)** – This indicator measures the linear average of the received power on reference signal resource elements in the downlink during the drive test ([to check 4G coverage](#)).

**Received Signal Code Power (RSCP)** – This indicator measures the received signal code power of the pilot channel in the downlink during the drive test ([to check 3G coverage](#)).

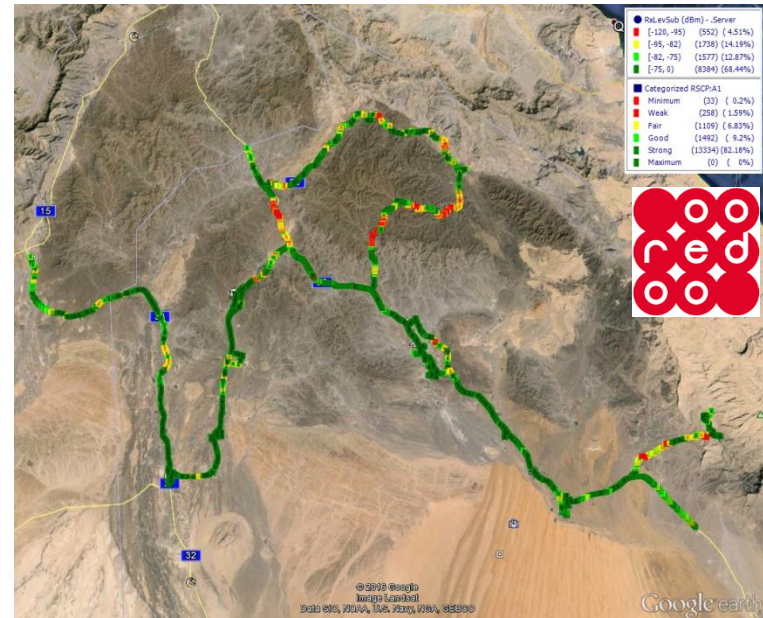
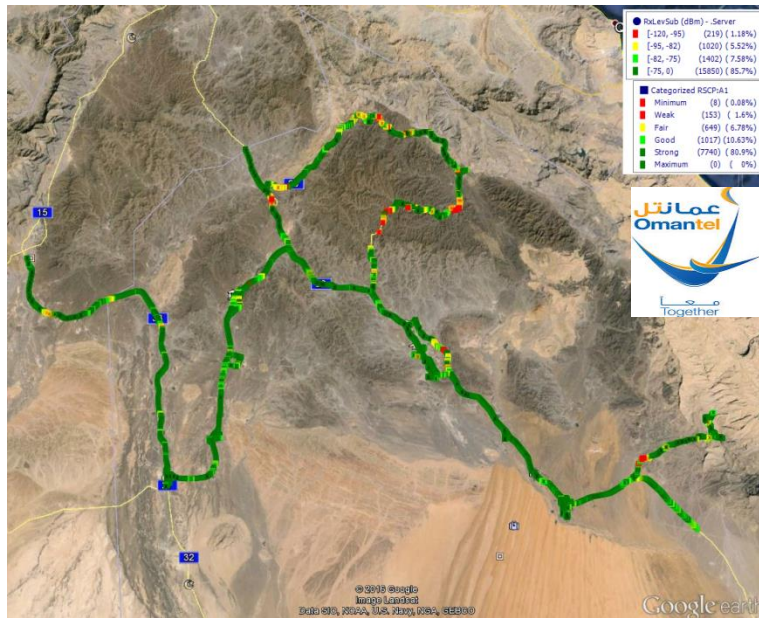
**Received Signal Level (RxLevSub)** - This indicator measures the received signal strength in downlink during the drive tests ([to check 2G coverage](#)).

The following convention is used for the coverage plot.

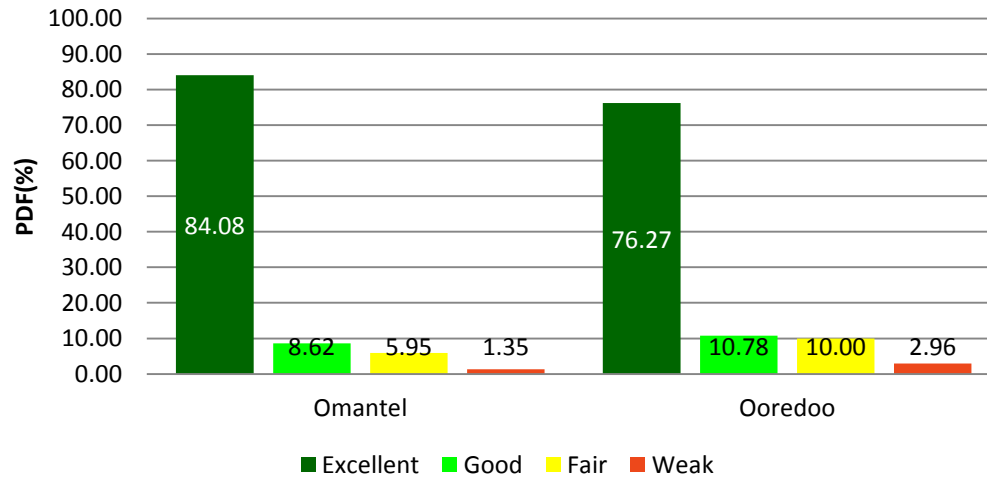
4G/LTE Serving Cell RSRP (dBm)		3G/WCDMA CPICH RSCP (dBm)		2G/GSM RxLevSub (dBm)		Classification	Penetration
	Range		Range		Range		
	$\geq -85$		$\geq -80$		$\geq -75$	Excellent	Indoor
	$\geq -95$ and $< -85$		$\geq -87$ and $< -80$		$\geq -82$ and $< -75$	Good	
	$\geq -105$ and $< -95$		$\geq -100$ and $< -87$		$\geq -95$ and $< -82$	Fair	In-Car
	$\geq -120$ and $< -105$		$< -100$		$< -95$	Weak	Outdoor Only

# 4. Results

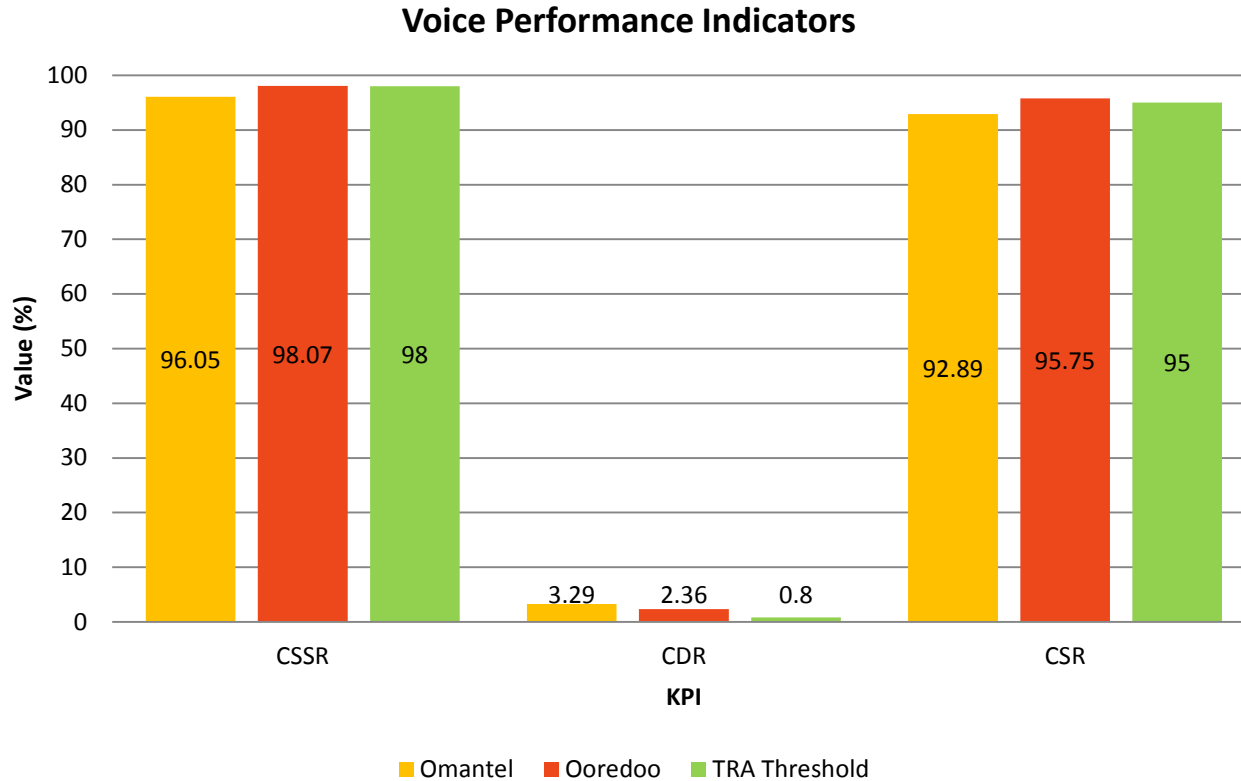
## 4.1 Mobile Voice Coverage



Voice Coverage Distribution



## 4.2 Mobile Voice Performance



**CSSR:** Call Setup Success Rate (Higher is better)

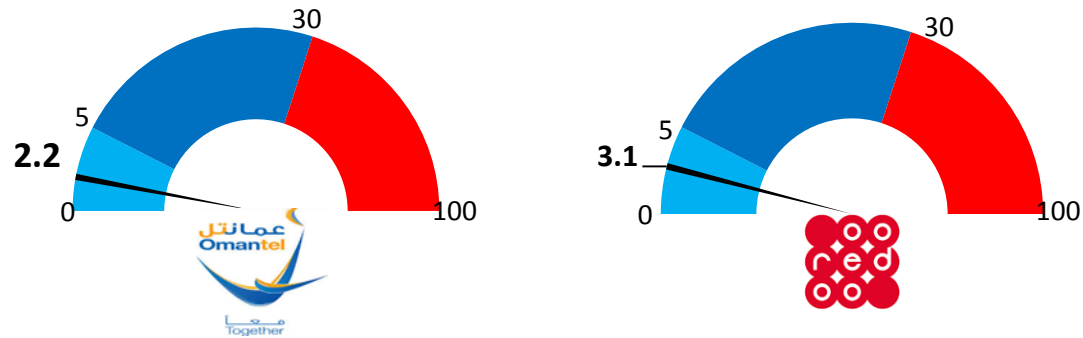
**CDR:** Call Drop Rate (Lower is Better)

**CSR:** Call Success Rate (Higher is better)



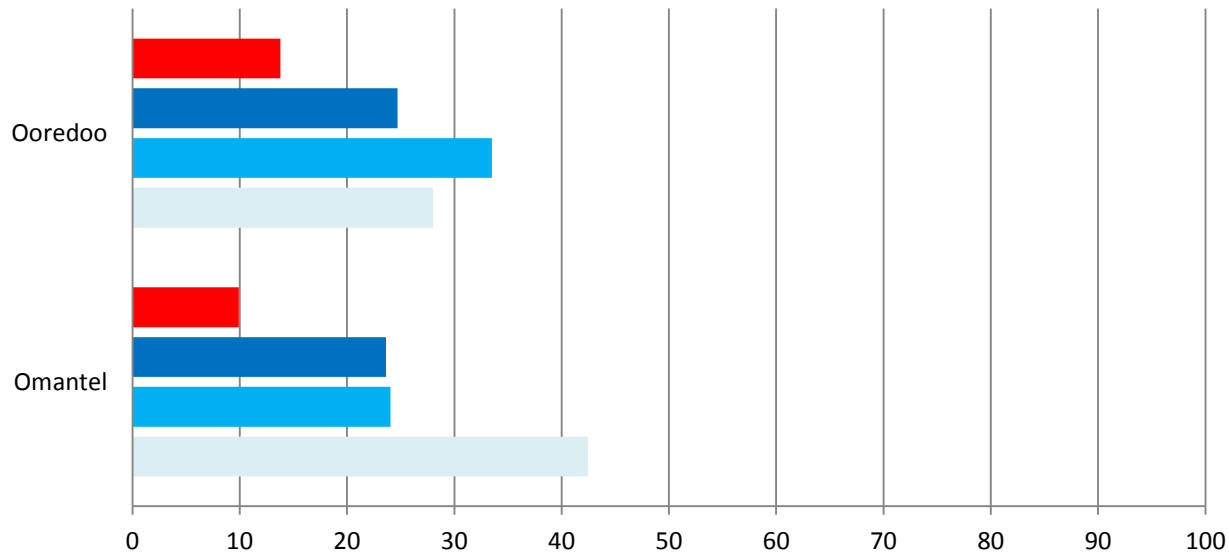
## 4.3 Mobile Data Download Speed

Overall Avg. Download Speed (Mbps)

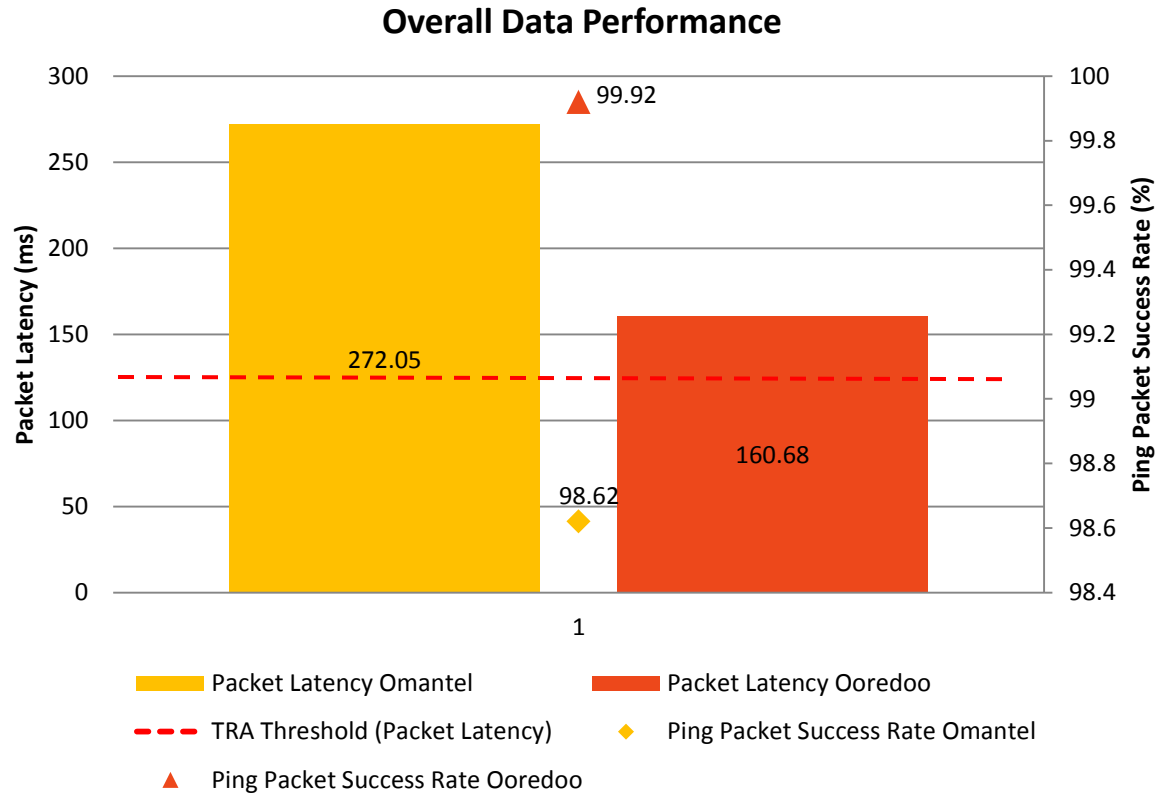


Speed Distributon (Mbps)

■ Very Fast (5 to 100)  
 ■ Fast (2 to 5)  
 ■ Fair (0.5 to 2)  
 ■ Slow (0 to 0.5)

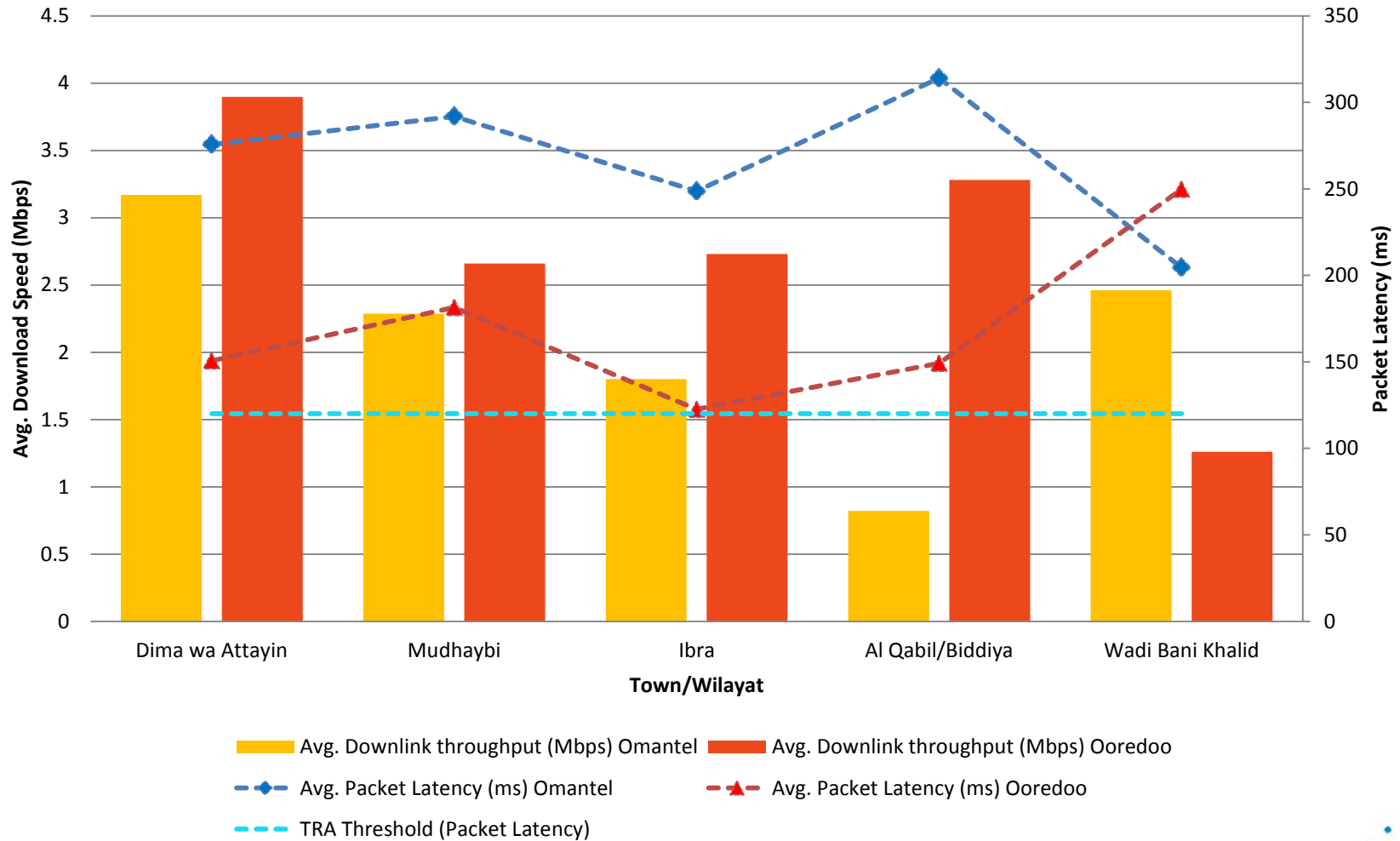


## 4.4 Mobile Data Performance



Packet Latency (ms): Lower is Better, Ping Packet Success Rate: Higher is Better

## 4.5 Mobile Data Performance Per Town/Wilayat



## 5 Conclusion

- In General, Omantel mobile network exhibits stronger voice coverage than Ooredoo throughout the Governorate of North Al Sharqiyah.
- The percentage of indoor voice coverage for Omantel is 93% as compared to Ooredoo's 87%, this includes Wilayat Centers and Highways.
- Ooredoo mobile network exhibits excellent voice performance with all KPIs meeting the TRA thresholds in contrast to Omantel.
- In terms of overall download speed, Ooredoo mobile data network exhibits faster download speed than Omantel.
- Omantel mobile data network exhibits high delay (packet latency) in most Wilayats of North Al Sharqiyah.

### **Basis of results and conclusion**

- The coverage information is based on the geographical drive test route used during the measurement exercise.
  - The exercise has been conducted independently by the Authority without sharing any information with the service providers about the date, time, type of tests being performed or test location.
  - The results of the exercise are based on the data collected from the field at a certain instance of time and day; network behaviour may vary with traffic variations over time and events.
  - Industry standard tools and work best practices are ensured during the data collection process.
- 