



commsquare

A Systemics Group Company

Proximus Mobile Network Benchmark

Nov 2018

KPI Validated Results

Publication date: 24 Jan 2019, v1.0

Setup

2018-Q4 Test setup

- » 3 mobile networks tested
 - Proximus, Orange and Telenet
- » Drive tests with 2 cars
 - Voice calls between phones in 2 different cars
- » Phones mounted in ski-box
 - Attenuation simulating “indoor coverage” conditions



Test mode	2018 Q4 – Test phone model
Voice CSFB-CSFB	Sony Z5 & Samsung S8
Voice VoLTE-VoLTE	Samsung S8
Data LTE	Sony XZ2 & Sony XZ Premium
Coverage	Scanner PcTel MX



Campaign description

- » Test made from 07/Nov to 28/Nov/2018
- » 250 hours of measurements
- » 10,200km driven
- » 82,000 bins of 100x100m traversed
- » 7,300 calls per phone and operator
- » 3,900 data test sessions per operator

"Golden" Big Cities

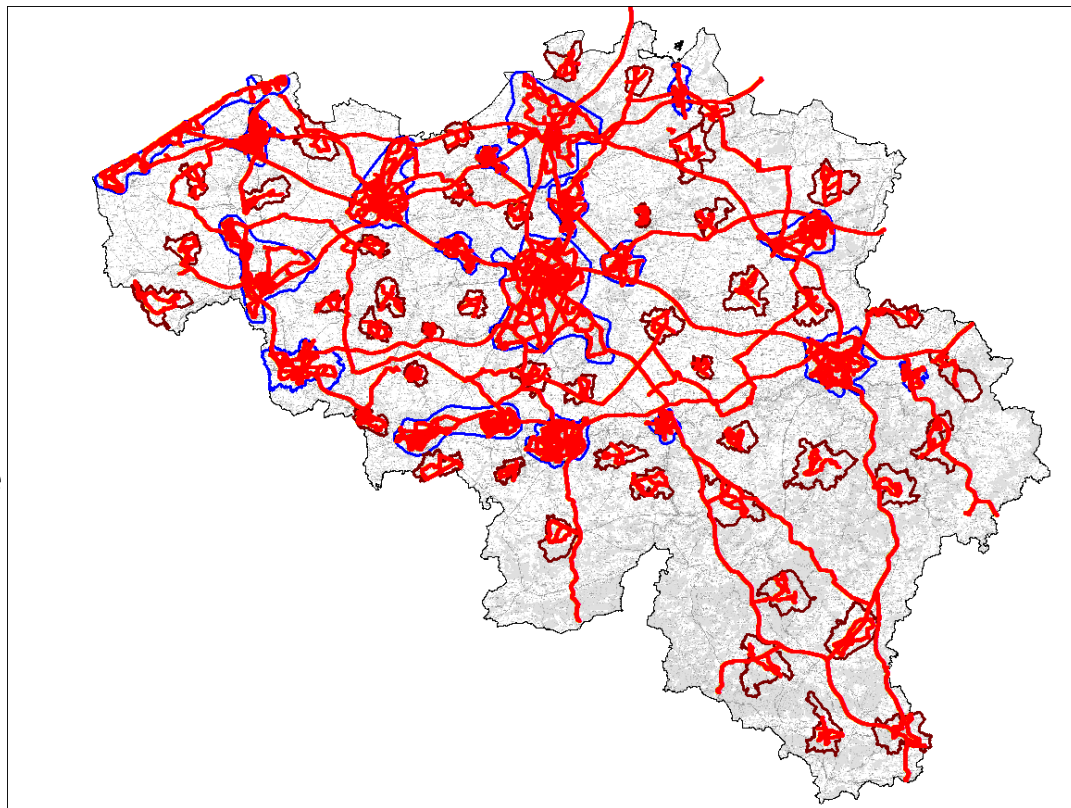
Antwerpen
Brussels
Charleroi
Gent
Liege

"Silver" Medium-size Cities

Aalst	Mons-La Louviere
Brugge	Namur
Coast	Sint-Niklaas
Hasselt-Genk	Tournai
Kortrijk	Turnhout
Leuven	Verviers
Mechelen	

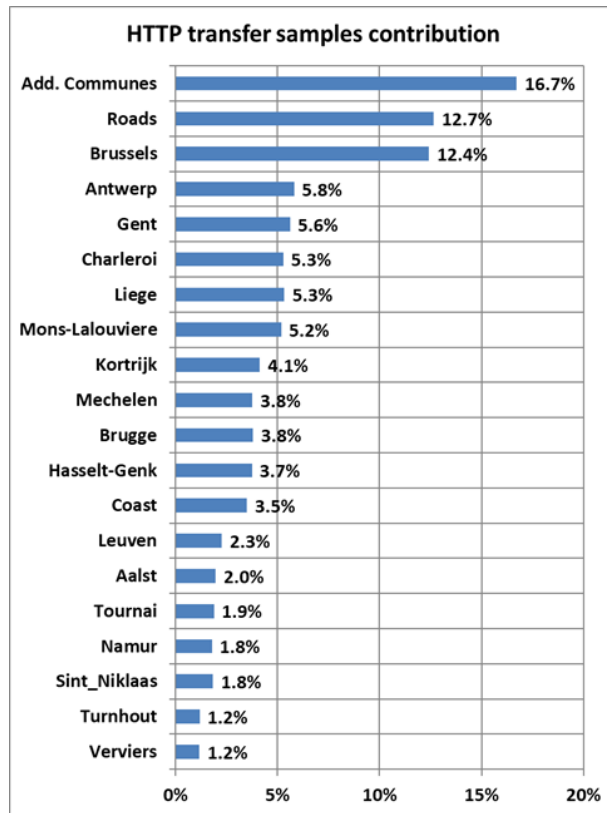
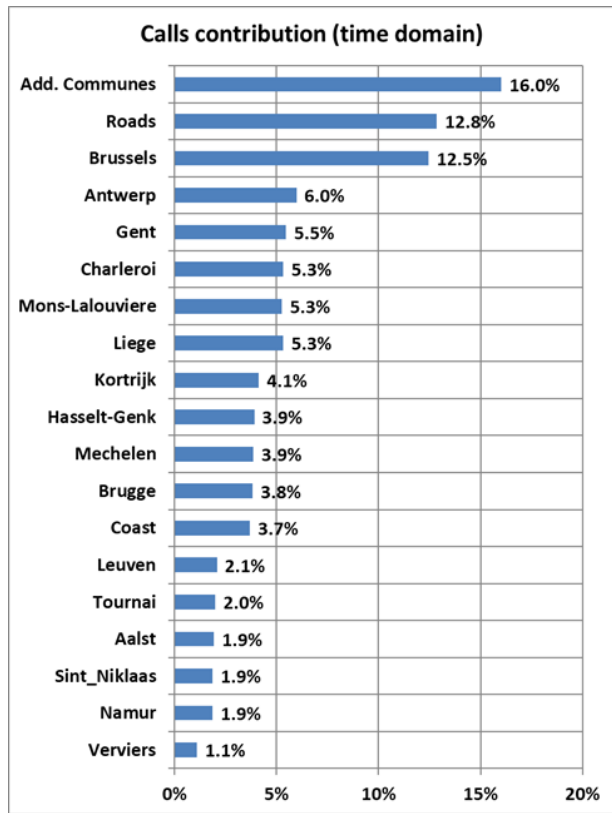
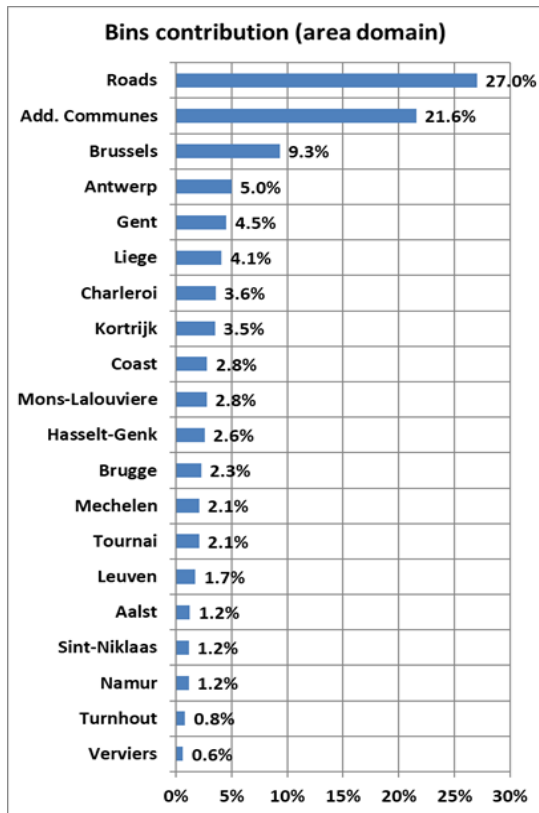
Communes

46 spread across the country





Polygon contribution



Validated KPIs



Voice (CSFB-to-CSFB)

Mobile-to-mobile calls between two 4G phones Sony Z5

Voice Summary		Proximus	Orange	Telenet
Success Rates				
Call setup success rate	%	99.4%	99.5%	99.5%
Call completion rate	%	99.2%	99.3%	99.2%
Uninterrupted call rate	%	98.6%	98.6%	99.2%
Voice Speech Quality				
Voice Quality Score	Average	3.9	3.8	3.0
Voice Quality Score low samples	10% lowest	3.3	3.0	2.6
Call Setup Time				
Call Setup Time (s)	Average	4.1	4.4	4.8
Call Setup Time (s) long samples	10% longest	5.3	5.3	5.6

*Test setup:
Sony Z5 calling
Sony Z5
4G preferred to
4G preferred*

Call setup success rate: calls with ringing tone, i.e. considered a "successful call setup"

Call completion rate: calls reaching the call end, configured as 90s call time (includes calls with and without interruption)

Uninterrupted call rate: calls reaching the call end without an interruption (technically: without a call re-establishment)

Voice quality based on Super-wideband POLQA algorithm

Call setup time is the time between pressing the Dial button and the ringing tone at the caller side ("to Alerting")



LTE voice (VoLTE)

Mobile-to-mobile calls between 2 Samsung S8 phones

Voice Summary		Samsung S8 calling Samsung S8 VoLTE versus CSFB performance				
		Proximus VoLTE		Proximus CSFB	Orange CSFB	Telenet CSFB
Success Rates						
Call setup success rate	%	99.4%		99.2%	99.5%	99.2%
Call completion rate	%	98.9%		98.9%	99.2%	98.8%
Uninterrupted call rate	%	N/A		98.3%	98.3%	98.7%
Voice Speech Quality						
Voice Quality Score	Average	3.7		3.5	3.5	3.2
Voice Quality Score low samples	10% lowest	3.1		2.5	2.7	2.7
Call Setup Time						
Call Setup Time (s)	Average	2.7		4.3	4.4	5.0
Call Setup Time (s) long samples	10% longest	3.5		6.5	5.9	5.8

- VoLTE tests were not possible for Orange and Telenet (Test phone or SIM limitations at time of testing)
- "Uninterrupted calls" are not relevant for VoLTE: interruptions much shorter as for CSFB, typically <1s for VoLTE

Test setup: Samsung S8 calling Samsung S8

- *VoLTE preferred to VoLTE preferred (Proximus)*
- *4G preferred to 4G preferred (Proximus non-VoLTE, Orange, Telenet)*



LTE data

Summary

Data Summary			Proximus	Orange	Telenet
Throughput					
HTTP DL fixed duration	DL throughput (Mbps)	Average	75.3	58.5	71.9
		Slowest 10%	10.7	8.7	12.5
HTTP UL fixed duration	UL throughput (Mbps)	Average	20.1	19.8	21.6
		Slowest 10%	3.6	3.2	2.7
File Transfer					
HTTP DL fixed size 10MB	DL time (s)	Median	1.7	3.0	2.9
		Success rate (%)	99.1%	99.2%	97.7%
HTTP UL fixed size 5MB	UL time (s)	Median	2.6	2.7	2.5
		Success rate (%)	99.0%	98.2%	96.8%
Web Browsing					
All pages (blended KPI)	Web browsing time (s)	Median	1.8	1.9	1.7
		Success rate (%)	99.3%	99.4%	98.9%
YouTube Video					
YouTube – buffered streaming	Success Rate full video play-out	%	99.5%	99.3%	99.1%
	Success Rate without interruption	%	98.3%	97.3%	97.2%
	Time to 1 st picture (s)	Average	1.4	1.6	1.5
	Video Quality	Average	4.4	4.4	4.4
Facebook					
Facebook	Success Rate	%	98.6%	98.5%	99.0%
	Total time (s)	Average	1.7	1.8	1.7

Blended KPI
for 3 web
pages



LTE coverage

Based on drive tests

- » Coverage results based on drive test
 - KPI indicates the percentage of 100x100m coverage bins exceeding the coverage threshold
 - Results based on a scanner measuring the downlink Reference Signal Received Power (RSRP)
 - KPI doesn't indicate population coverage

LTE Coverage Summary		Proximus	Orange	Telenet
Coverage level	RSRP threshold			
Deep Indoor	≥ -86 dBm	88.3%	78.8%	76.4%
Indoor	≥ -100 dBm	98.8%	98.2%	97.3%
Outdoor	≥ -112 dBm	99.8%	99.8%	99.5%

- » Results & conclusions in this report are valid for the measurement period
 - The measurement dates for data collection: 07 – 28/Nov/2018

- » Results are considered statistically relevant at the level of Belgium
 - Results are not relevant per commune or 100x100m bin