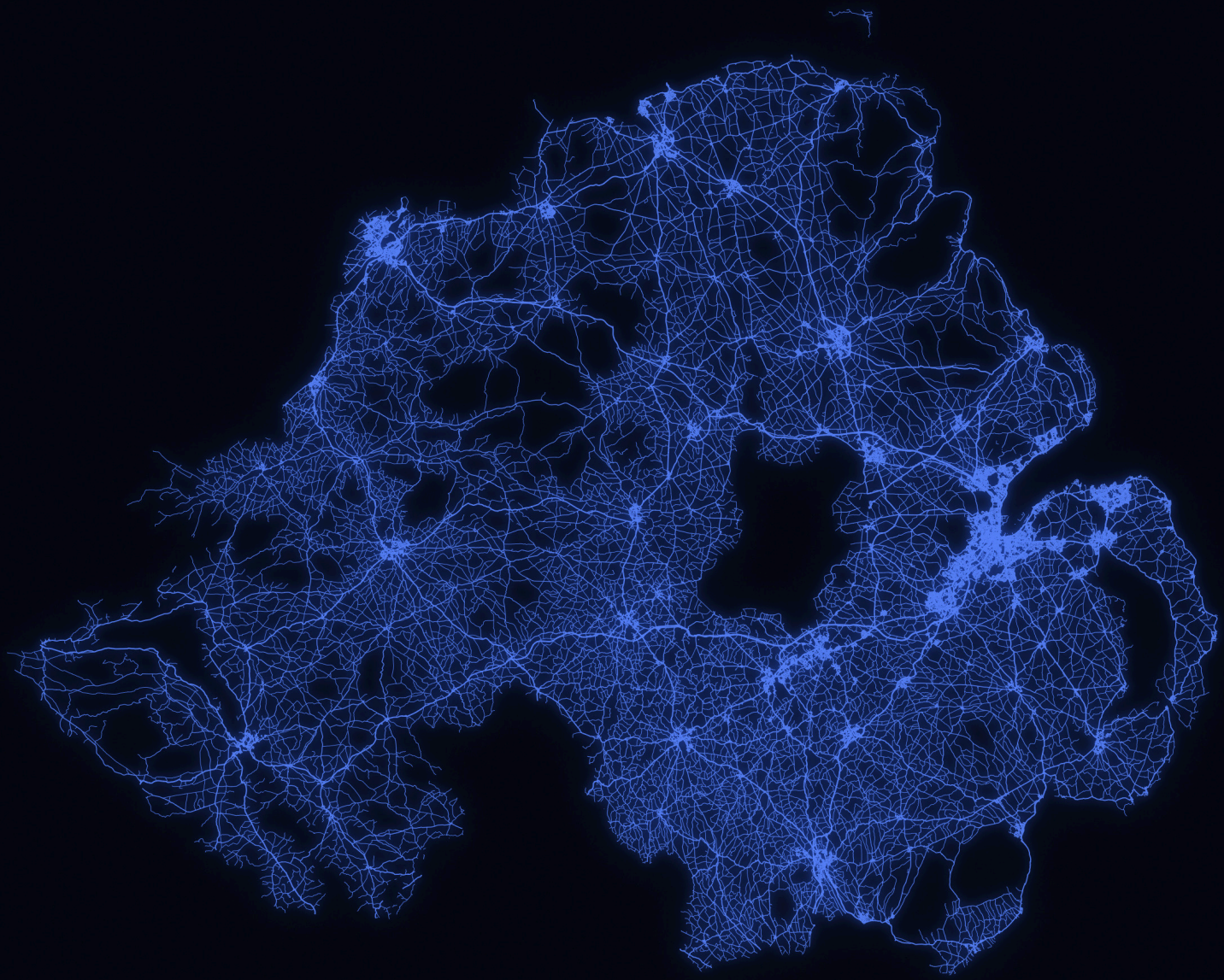
Urban vs Rural Mobile Network Performance

How Northern Ireland's Urban and Rural Areas Compare

Based on over 20,000 km of road driven and 4.4 million test cycles on EE, O2, Vodafone and Three.

November 2026



Prepared by

streetwave®

Disclaimer

This report has been prepared by Streetwave. Its findings are based on drive tests between September 2025 and June 2026, using the methods described in How We Measured.

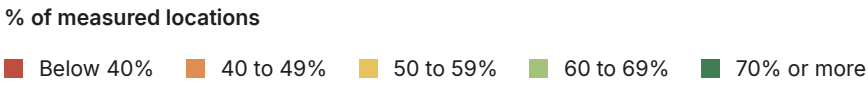
Measurements reflect conditions at specific locations and times, taken in vehicles on the roads, and may not represent every user's experience. They show what was measured on the roads, not network performance in all circumstances.

The report uses third-party data, including Northern Ireland Statistics and Research Agency (NISRA) settlement classifications and Small Area boundaries, Ordnance Survey of Northern Ireland (OSNI) council boundaries and OpenStreetMap map data. No representation or warranty, express or implied, is made as to the accuracy, completeness or suitability of the information.

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How to Read This Report

Good Performance	A download speed of at least 5 megabits per second (Mbps), an upload speed of at least 1.5 Mbps and a round trip latency of 100 milliseconds (ms) or less. At this level a user can stream video and make video calls without noticeable delay.
Basic Performance	At least 1 Mbps down, at least 0.5 Mbps up and a round trip latency of 200 ms or less. Enough for calls over data and everyday web use such as email.
Latency	Round trip latency (RTT): the time data takes to reach a server from the phone and come back, in milliseconds. Every latency figure in this report is a round trip latency. Lower is better.
Urban and rural	Urban areas are NISRA 2015 settlement bands A to E: Belfast, Derry~Londonderry and every town of 5,000 people or more. Rural areas are bands F to H: settlements of under 5,000 people and open countryside.
Measured location	One cell of Uber's H3 grid at resolution 11 [1]: a hexagon with sides of about 29 m, roughly 50 m across, covering a short stretch of road.
Colours	Every performance percentage is the share of measured locations that meet the standard, shaded from red for the weakest to green for the strongest.



Key Findings

This is the largest independent survey of Northern Ireland's mobile networks. Between September 2025 and June 2026, the test vehicles drove over 20,000 km, more than three quarters of the public roads [2], and ran 4.4 million test cycles across all four networks.

1 Northern Ireland has a clear urban and rural divide in mobile performance.

Averaged across the four networks, **66% of measured urban locations reach Good Performance, against only 39% of rural ones**, a gap of 27 percentage points. The divide appears on every network, at 23 to 29 points.

2 A third or more of measured locations miss Basic Performance.

Every network missed Basic Performance at 34% or more of measured locations. On rural roads, networks missed it at 39% to 54% of measured locations.

3 The most rural council areas come last.

Fermanagh and Omagh and Mid Ulster, where urban areas cover 3% of the land or less, **have the two lowest results on every network**. Belfast leads on all four.

4 EE and Vodafone lead the four networks, while Three trails.

EE and Vodafone each reached Good Performance at 49% of measured locations, against 36% for Three. Three's median upload, 0.95 Mbps, was the lowest of the four.

5 Streaming from police bodycams is far less dependable in rural areas.

Police commanders use these streams to monitor incidents remotely and give officers tactical advice sooner [3]. **Averaged across the four networks, the network was Ready for bodycam streaming at 58% of urban locations, against only 33% of rural ones.**

Percentages are the share of measured locations that meet each standard. Page 1 defines Good and Basic Performance and the colours used.

Urban vs Rural

The study found a clear urban and rural divide. Urban areas cover only about 7% of Northern Ireland's land, and across the rural 93%, Good Performance is far less common.

How Much We Tested			
Over 20,000 km of road driven	**Over ¾** of Northern Ireland's public roads [2]	**4.4 million** test cycles on four networks	**10 months** September 2025 to June 2026

% of Measured Locations Meeting Good Performance, Average of All Four Networks

Urban areas

66%

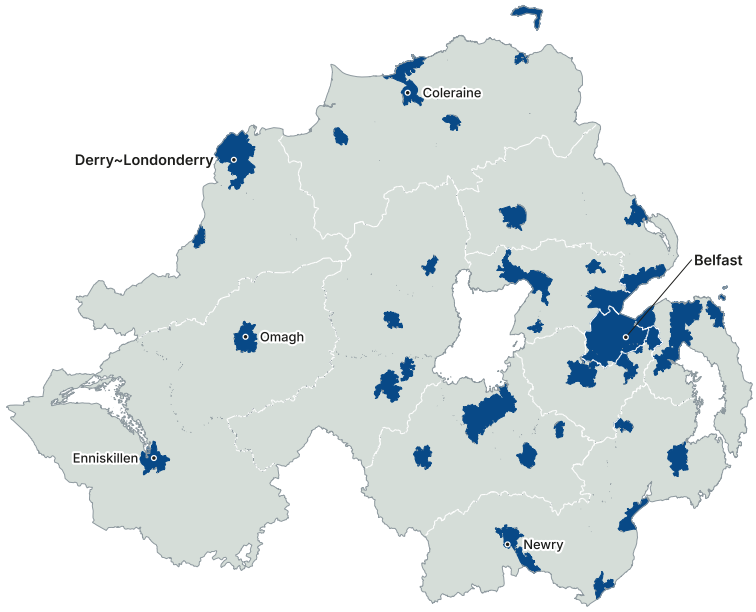
Rural areas

39%

Gap

27

Percentage points, urban minus rural



Urban: settlement bands A to E

Rural: settlement bands F to H

Council boundary

Figure 1 Urban and rural areas by NISRA 2015 settlement band [4, 5]. Boundaries: NISRA, OSNI. Loughs: © OpenStreetMap contributors.

How the Four Networks Compare Across Northern Ireland

Network	Good Performance (% of measured locations)	Basic Performance (% of measured locations)	Median Download (Mbps)	Median Upload (Mbps)	Median Latency (ms)
EE	49%	64%	11.05	2.01	54
O2	44%	60%	6.55	1.91	66
Vodafone	49%	66%	8.07	2.21	58
Three	36%	52%	7.67	0.95	82

Table 1 Results by network, urban and rural combined. Medians are taken across measured locations, not individual tests.

Urban and Rural, Network by Network

All four networks perform worse in rural areas, for both Good Performance and Basic Performance, and the Good Performance gap is between 23 and 29 points on every network.

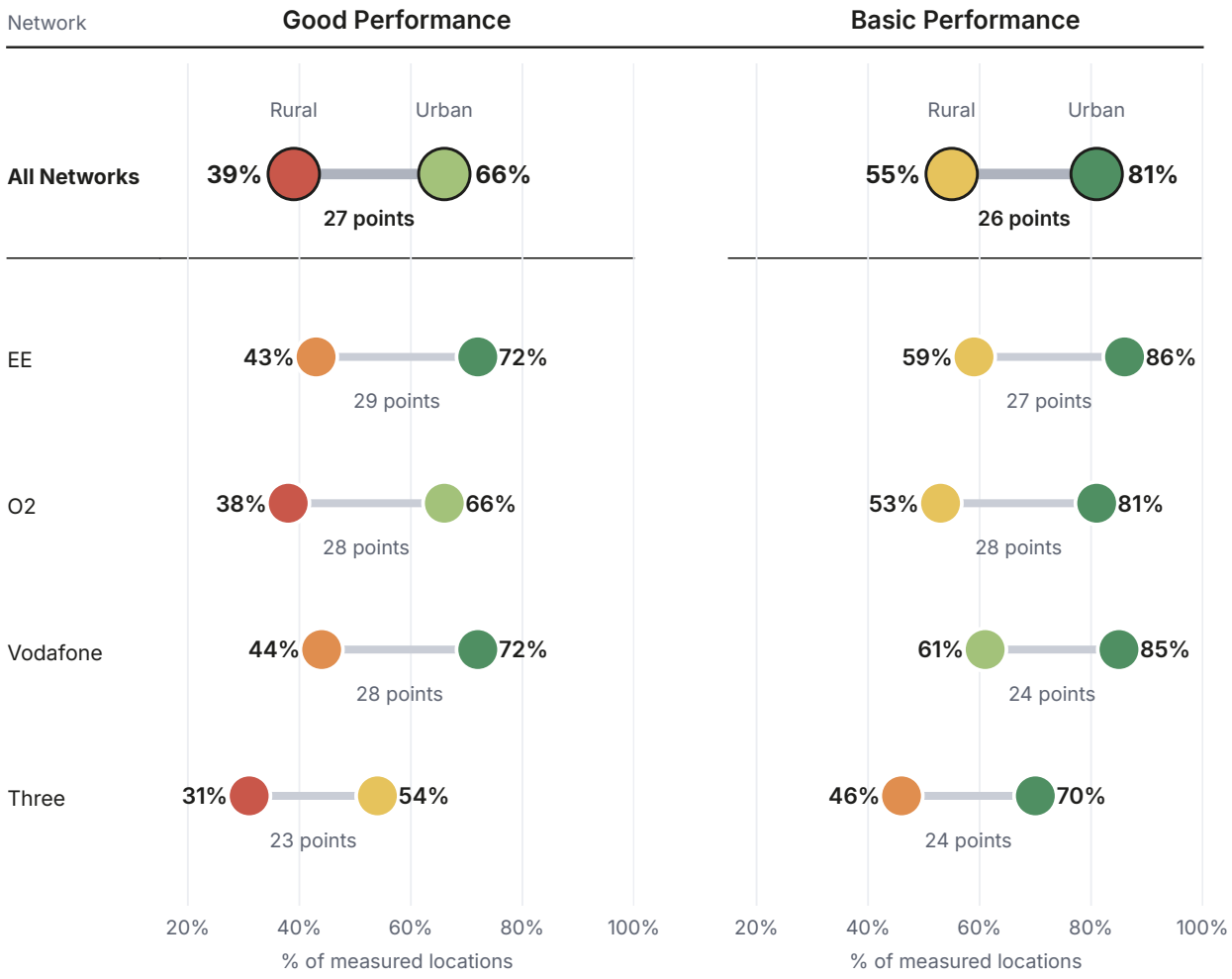


Figure 2 Good and Basic Performance in urban and rural areas by network, % of measured locations; gap in percentage points.

The divide holds on Basic Performance too. Basic Performance asks only for enough capacity for calls over data and browsing, yet on rural roads 46% to 61% of measured locations reach it, depending on the network.

The order of the networks hardly changes between urban and rural areas. Across all locations (Table 1, page 3), EE has the fastest median download and the lowest latency, and Vodafone the fastest median upload.

How Council Areas Compare

The two council areas with the smallest share of urban land have the weakest results on every network.

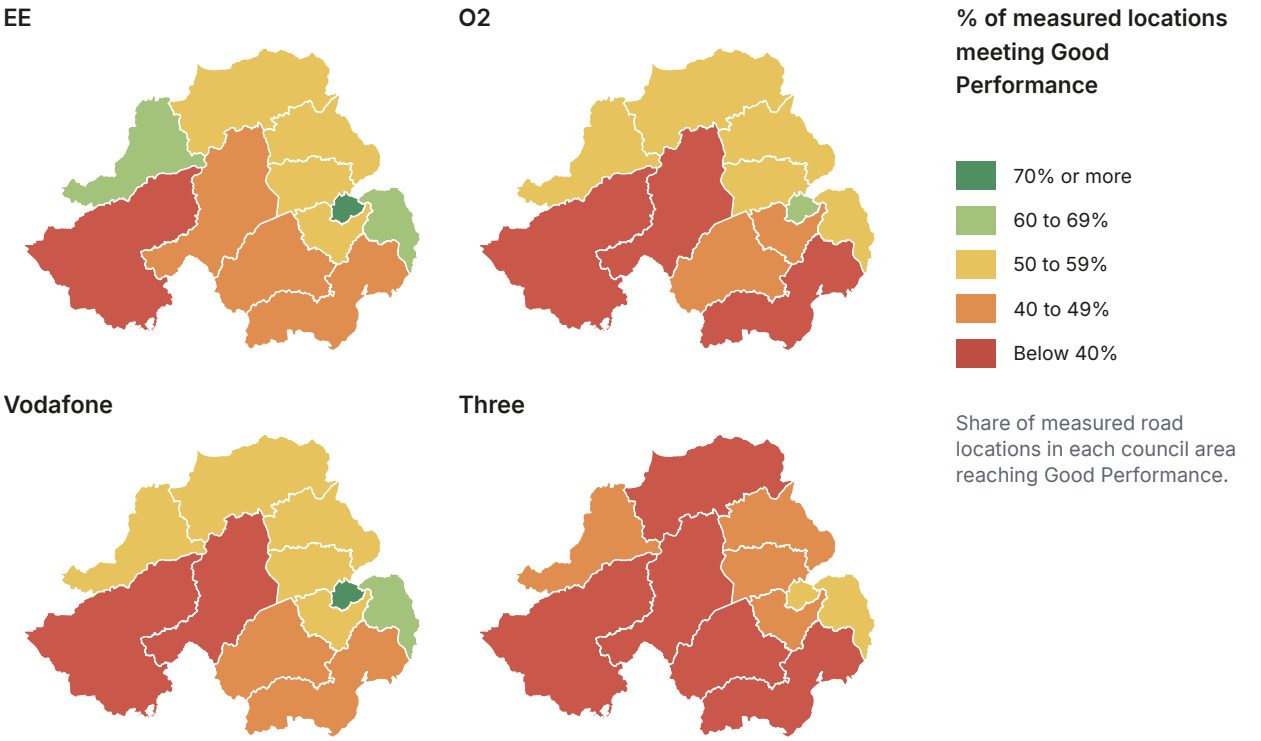
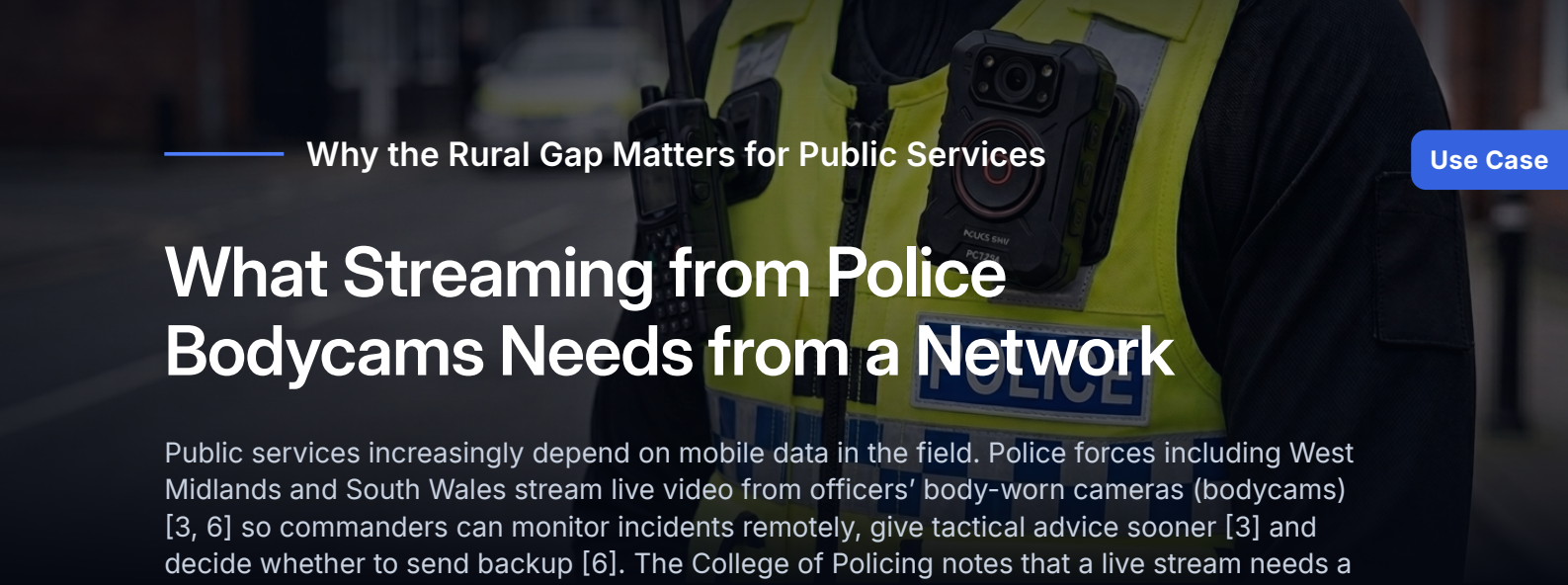


Figure 3 Good Performance by council and network, % of measured locations. Boundaries: OSNI Open Data, Crown copyright, Open Government Licence.

The gap between council areas is wider than the gap between networks. In Fermanagh and Omagh and in Mid Ulster, no network reaches Good Performance at more than 40% of measured locations, while in Belfast every network passes 50%.

	Good Performance				Basic Performance			
Council area	EE	O2	Vodafone	Three	EE	O2	Vodafone	Three
Belfast	73	66	72	54	88	81	85	70
Ards and North Down	67	59	65	51	82	75	79	66
Derry City and Strabane	64	52	59	47	74	65	73	64
Antrim and Newtownabbey	58	56	58	47	75	71	78	65
Lisburn and Castlereagh	57	49	57	45	76	66	75	61
Mid and East Antrim	58	50	55	44	73	66	70	60
Causeway Coast and Glens	54	52	58	36	70	67	74	51
Armagh City, Banbridge and Craigavon	42	46	49	32	61	64	65	48
Newry, Mourne and Down	41	38	43	39	56	54	58	55
Mid Ulster	40	35	38	22	55	49	54	35
Fermanagh and Omagh	39	29	37	25	54	43	56	41

Table 2 Good and Basic Performance by council and network, % of measured locations, ordered by average Good Performance.



What Streaming from Police Bodycams Needs from a Network

Public services increasingly depend on mobile data in the field. Police forces including West Midlands and South Wales stream live video from officers' body-worn cameras (bodycams) [3, 6] so commanders can monitor incidents remotely, give tactical advice sooner [3] and decide whether to send backup [6]. The College of Policing notes that a live stream needs a strong, stable signal and may be unreliable where connectivity is poor [3].

1 What It Needs

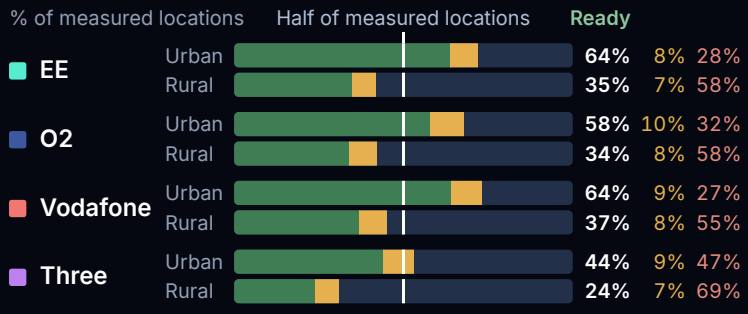
The camera sends a continuous stream up to a control room, so the network's upload speed and latency (RTT) matter most.

Ready	**Upload ≥ 3 Mbps, RTT ≤ 200 ms**	Enough for a high definition stream at a medium frame rate [7].
Marginal	**Upload ≥ 2 Mbps, RTT ≤ 300 ms**	Covers the roughly 2 Mbps a streaming camera uses [8].
Not Ready	**Below Marginal**	Picture quality drops or the stream may fail.

Each level describes the mobile network at a measured location. Thresholds and sources [7, 8, 9]: page 7.

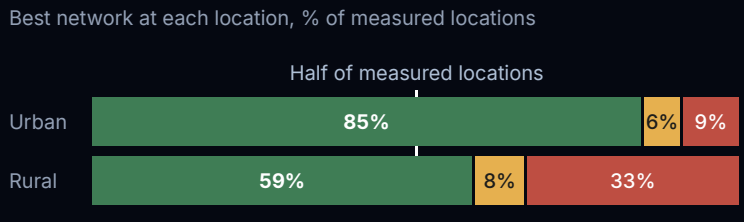
2 Using One Network

A single network was Ready at 44% to 64% of measured urban locations, against 24% to 37% of rural ones.



3 Using the Best Network

Here a location counts as Ready if at least one of the four networks was Ready there. That was true at 85% of urban and 59% of rural measured locations.



Each network figure is for one consumer SIM without priority. Step 3 shows the most a service could achieve if it could switch to whichever network works best at each location.

Each network, and the best network at each location, was Ready for bodycam streaming at a smaller share of rural than urban measured locations. Even the best network at each location was Not Ready at 33% of rural measured locations.

How We Measured

The test vehicles drove Northern Ireland's public roads between September 2025 and June 2026, measuring all four mobile networks side by side.

Sample

4.4 million
test cycles across the four networks

Over 20,000 km
of road driven

Equipment and Setup

The drive tests covered over 20,000 km of Northern Ireland's roads. Each vehicle carried four smartphones with modern chipsets, one on each of EE, O2, Vodafone and Three, so every network was tested at the same place and the same moment, using Streetwave's own Android app. They used standard consumer SIM cards with no data limits or speed caps, and none had traffic prioritisation. Roaming was switched off for the whole campaign, because the study set out to measure UK networks only. The SIMs had 5G Non-Standalone (5G NSA) on and 5G Standalone (5G SA) off, the service most customers have today. Results may differ on 5G SA.

What Each Test Measured

While the vehicles were moving, each phone repeated the same automated cycle: a download and an upload of a fixed file size, each with a 7 second timeout, and a latency test with a 2 second timeout. Test cycles that occurred during no service are counted and contribute to the results.

How We Judged Good and Basic Performance

Good Performance means at least 5 Mbps down, 1.5 Mbps up and a latency of 100 ms or less. Basic Performance applies the same test at 1 Mbps, 0.5 Mbps and 200 ms. A measured location is one cell of Uber's H3 grid at resolution 11 [1]: a hexagon with sides of about 29 m, roughly 50 m across, covering a short stretch of road. For locations with multiple tests, the median of those results is judged against the thresholds.

How We Defined Urban and Rural

Every measurement was matched to the Census 2011 Small Area it fell in [4] and took that area's NISRA 2015 settlement band [5]. Bands A to E, Belfast, Derry~Londonderry and every town of 5,000 people or more, count as urban. Bands F to H, settlements of under 5,000 people and open countryside, count as rural.

What the Results Do Not Cover

The results describe the roads, measured from inside moving vehicles, to represent the experience of a front seat passenger. They do not cover homes, workplaces or land away from the road, where signal can be better or worse. Each road was measured when a vehicle passed along it, so the figures are a snapshot of conditions between September 2025 and June 2026 and not a promise of service at any given time.

Roads Included
All classes of public road: motorway, A, B and C roads, minor and residential roads, in all 11 council areas.

Vodafone and Three
Vodafone and Three merged in 2025 to form VodafoneThree. We treat them as separate networks until they are fully merged, and tested a Vodafone SIM and a Three SIM throughout.

How the Figures Are Built
Performance percentages are shares of measured locations. Each location takes the result of the tests there and is classed as urban or rural. Median download, upload and latency also count each measured location once. Locations are spread evenly along the roads, so both are weighted by road length. All Networks figures are simple means of the four networks, rounded to the nearest whole number, with halves rounded up.

Thresholds at a Glance

	Good	Basic
Download (Mbps)	≥ 5	≥ 1
Upload (Mbps)	≥ 1.5	≥ 0.5
Latency (RTT, ms)	≤ 100	≤ 200

Network Thresholds for Bodycams

	Ready	Marginal
Upload (Mbps)	≥ 3	≥ 2
Latency (RTT, ms)	≤ 200	≤ 300

Ready and Marginal describe the mobile network at a measured location. Upload limits: TCCA for a high definition stream at a medium frame rate [7], Axon for a streaming camera [8]. Latency limits double the 3GPP one way budgets of 100 and 150 ms (5QI 67 and 71) [9], assuming equal delay each way, so they are approximate.

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Data Sources and Licences

Source	Used for	Terms
Streetwave drive tests	Every performance figure in this report	Streetwave
NISRA Small Areas (Census 2011)	The small areas drawn on the urban and rural map, each with its own boundary	Open Government Licence
NISRA 2015 settlement lookup	Each small area’s settlement band, A to H, which sets it as urban or rural	Contains NISRA data, Crown copyright, Open Government Licence v3.0
OSNI Local Government Districts (2012)	Council boundaries and council results	Crown copyright, Open Government Licence
OpenStreetMap	Cover roads and loughs on the urban and rural map	© OpenStreetMap contributors, Open Database License (ODbL)