



ATKINS A9 MEASUREMENTS TEST 2021



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INTRODUCTION



ATKINS engaged Metricell to carry out performance and coverage measurements on the A9 in Scotland between the Inveralmond Roundabout outside Perth and the Raigmore roundabout near Inverness.

This report details the results of these measurements which were undertaken on the 18th of August 2021 by a Metricell test vehicle.

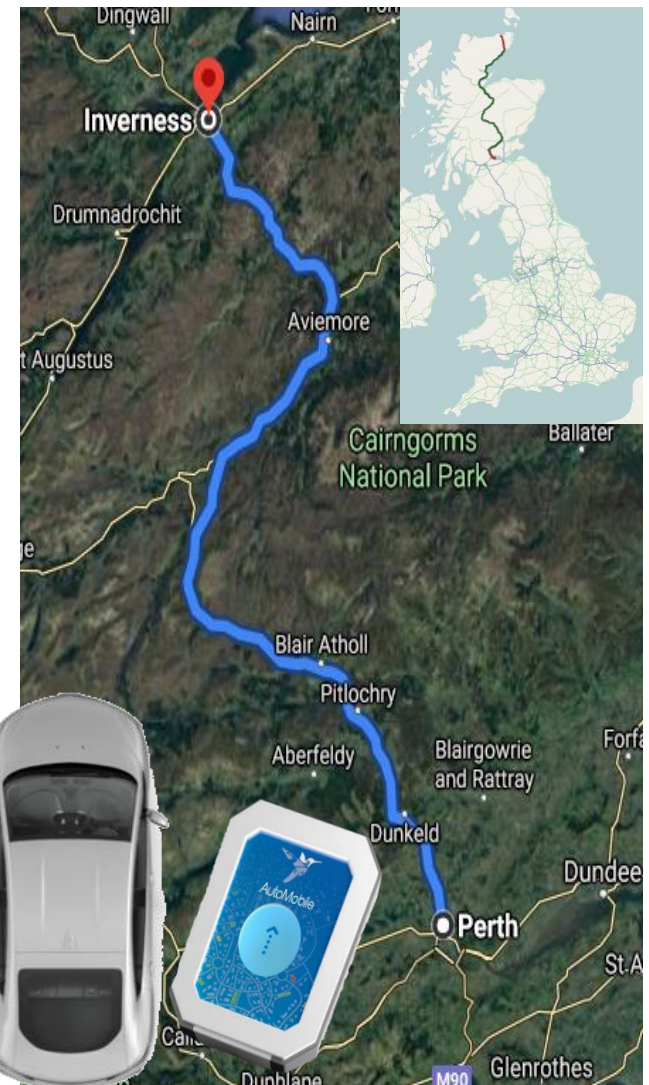
Improvement works are being carried out on the A9 in a significant road building programme.

A9 Drive Test & Analysis 2021

The aim of the testing was to gather performance, coverage and site data for mobile networks covering a key section of the A9 road in Scotland.

The **A9** is a major road running from the Falkirk council area in central Scotland to Scrabster Harbour, Thurso in the far north, via Stirling, Bridge of Allan, Perth and Inverness. At 273 miles (439 km), it is the longest road in Scotland and the fifth-longest A-road in the United Kingdom.

These measurements were carried out on the section of the A9 road starting from Perth (Inveralmond roundabout) to Inverness (Raigmore roundabout) and return. A total of 114 miles distance is covered from Perth to Inverness.



Key Highlights

Test Device	4 Samsung S7 units- (Android) 1 – PCTEL Scanner
Test Done	Call, Download, Upload, Ping
Test Type	Drive Test in Vehicle
Drive Test Date	18 th Aug 2021 (1 Day)

Key Findings

EXECUTIVE SUMMARY

Using standard PAYG SIMS in each handset we found that:

- EE had the best LTE coverage and data performance with good call results
- Other operators had slightly better call setup success rate but worse coverage and data performance

The scanner tests revealed that:

- H3G handset spent a lot of time on 3G and LTE in the 1800MHz band even though good LTE 800MHz was available over much of the route.

Call and Data Testing

- The EE, Vodafone and O2 handsets predominantly obtained LTE service. In contrast on the Three (H3G) network handset usage was more evenly split between LTE (4G) and WCDMA(3G).
- A few road sections were observed to have weak coverage on each network. The Vodafone and O2 handsets dropped to GSM (2G) on some short sections of road.
- Call tests show good results for all networks with no drop calls recorded on any network but a few call setup failures and out of service calls were recorded at different parts of the road.
- Standard "Pay as You Go" SIMS were used on each network. EE LTE calls were VoLTE whilst on the other networks voice calls on LTE were established using CSFB.
- Best Data test results were observed for EE network that had mainly 4G as dominant technology. Almost half of the data tests on H3G network used 3G

Calibrated Test Receiver (Scanner) Testing

- Scanner results show good GSM coverage for three network (EE, VF & O2). H3G has no GSM service.
- The strongest 3G channels on Vodafone and O2 networks were in the 900MHz band. EE and Three relied on 2100MHz 3G service.
- The scanner measurements revealed H3G had good LTE coverage in the 800MHz band along the route and patchy LTE coverage in the 1800MHz band. In practice the H3G handset tended to prioritise 1800MHz LTE and in areas where that was weaker tended to stay on WCDMA (3G)
- Only few measurements with weak signal strengths were picked for EE and VF channels on band LTE 2600MHz. No measurements were picked on O2 LTE 2300MHz channel.

Estimating Site Positions

- The LTE measurements of signal and timing advance were used to estimate positions for the major sites used by each operator to cover the A9.

TEST METHODOLOGY

Tests were conducted in a traditional benchmarking format to collect a range of measurements on the four operator networks, with 4 devices collected measurement on all three technologies (2G,3G,4G).

Note: Operator H3G does not have a 2G service.

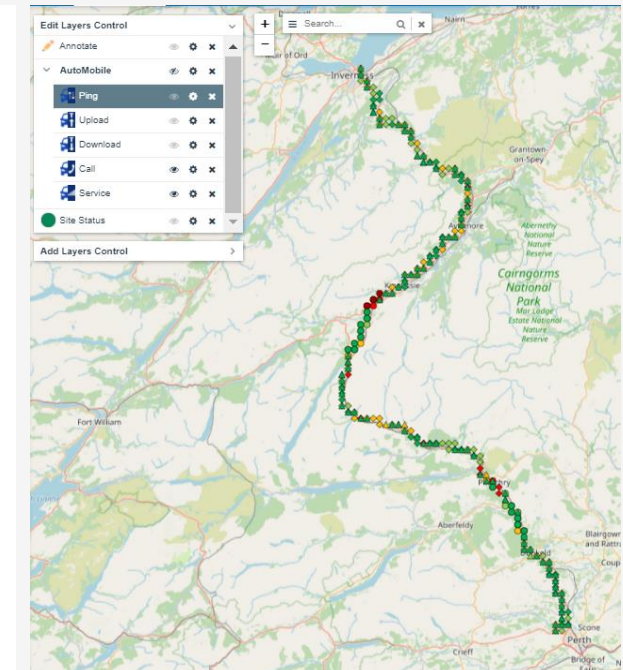
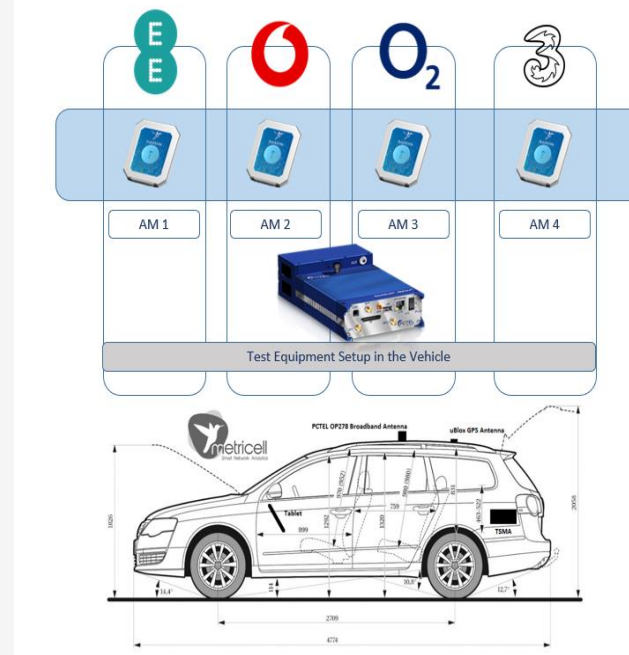
The units were not locked to any particular technology or frequency bands. They therefore followed the cell and technology reselection and handover instructions transmitted by each network

Additional test was done using a scanner, that collected results for designated frequencies of each operator.

Automobile units and Test Script Detail *(same tests were done on all four operators)*

AM Unit	Operator	MSISDN	Call & Data Test Script
AM1	EE	447508016533	4* Call Test (MSISDN.02038271744, Duration 20 sec Execution Time 25 sec Wait: duration 20 sec)
AM2	Vodafone	447442498960	DL Test https://tma.metricelltestcloud.com/SpeedTest/1GB.jpg- Duration 10s - Execution Time 25 sec - Wait 10s
AM3	O2	447543132932	UL Test https://tma.metricelltestcloud.com/UploadSpeedTest Duration 10s - Execution Time 25 sec - Wait 10s
AM4	H3G	447830739625	Ping Test https://tma.metricelltestcloud.com/SpeedTest/latency.txt Duration 10s- Execution Time 25 sec - Wait 10s

To keep track of the data and maintain integrity, the data was loaded onto Metricell platform. The device continuously measures network performance by conducting various network related tests at predefined intervals.



TEST METHODOLOGY CONTD..

The scanner data was collected using PCTEL IBFLEX scanner that was installed along side Metricell Automobile units and its antenna mounted on top of the DT vehicle.

DT engineer was able to check scanner results on the laptop using SEEHAWK collect software.

Table with Frequency Bands of each Operator by technology.

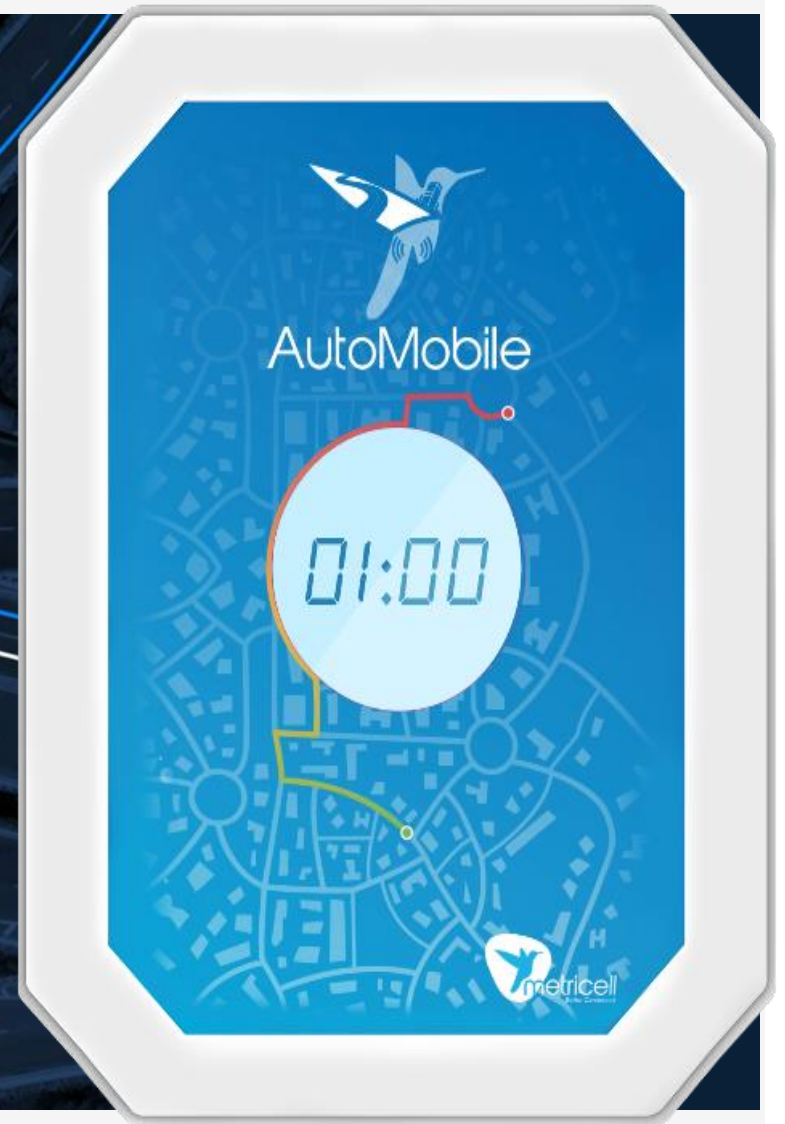
Operator	GSM	UMTS B1-B8	LTE B3	LTE B7	LTE B40	LTE B20
EE	1800	B1 2100	1800	2600		800
O2	900-1800	B1 2100 B8 900	1800		2300*	800
Vodafone	900-1800	B1 2100 B8 900	1800	2600		800
H3G		B1 2100	1800			800

* No measurements were picked on O2 LTE frequency band B40 during the drive test.

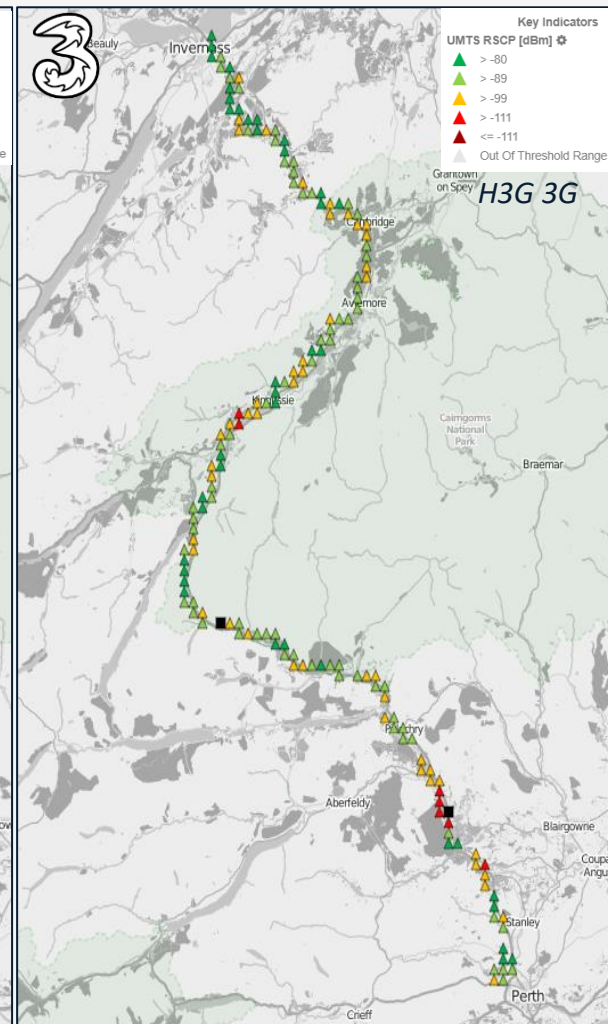
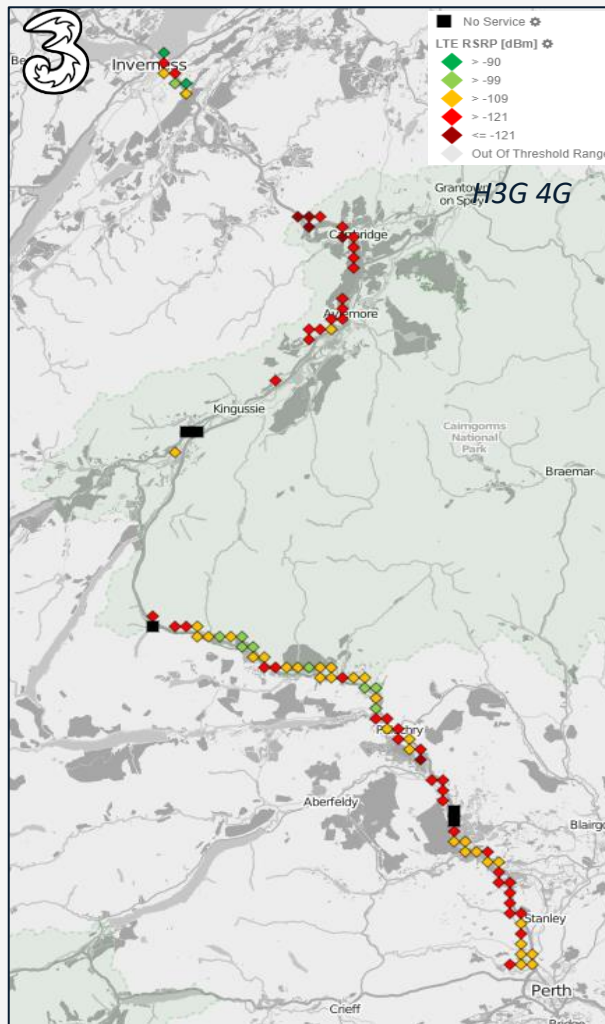
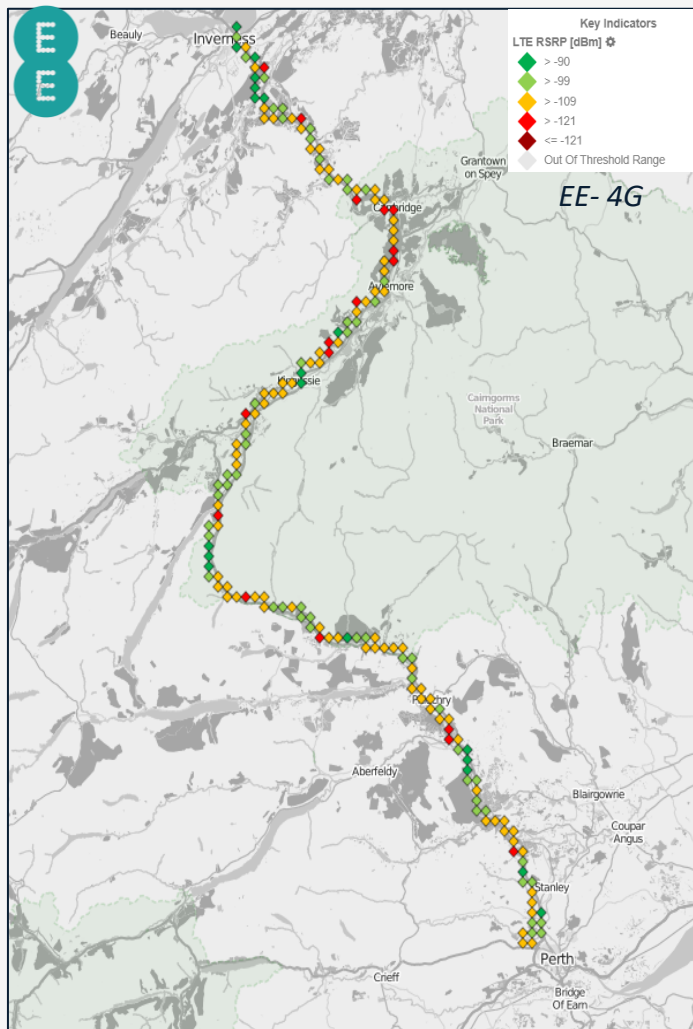
Operator Channels that were configured in the scanner.

GSM		LTE	
Band 900 MHz	Channel Nos.	Band 800MHz	Channel Nos.
VF	1 to 12	H3G	6175
O2	113 to 124	EE	6225
Band 1800MHz	Channel Nos.	VF	6300
EE	645 to 670	O2	6400
UMTS		Band 1800MHz	Channel Nos.
		O2	1226
Band 900MHz	Channel Nos.	VF	1288
VF	2938	H3G	1392
O2	2963	EE	1617
Band 2100MHz	Channel Nos.	Band 2300MHz	Channel Nos.
VF	10687	O2	39250
O2	10637	Band 2600MHz FDD	Channel Nos.
EE	10761	VF	2850
H3G	10564	EE	3350

AUTOMOBILE DRIVE TEST MEASUREMENTS



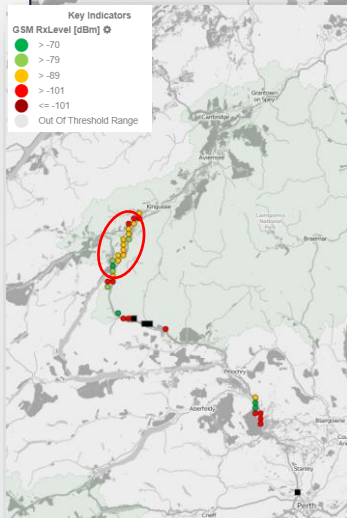
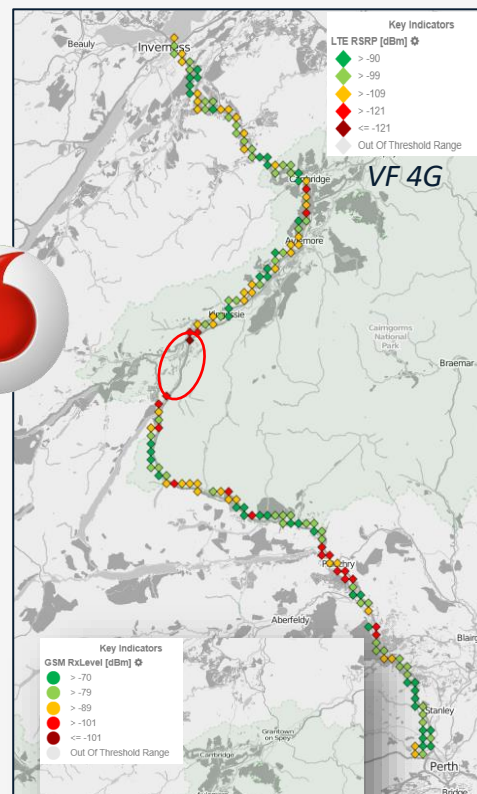
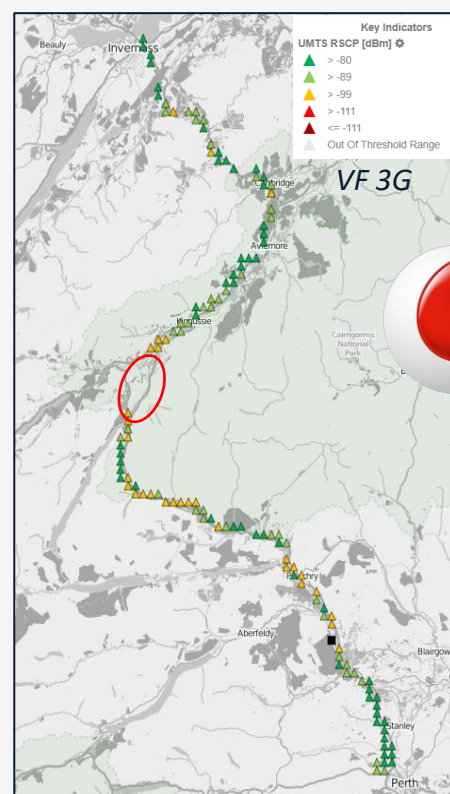
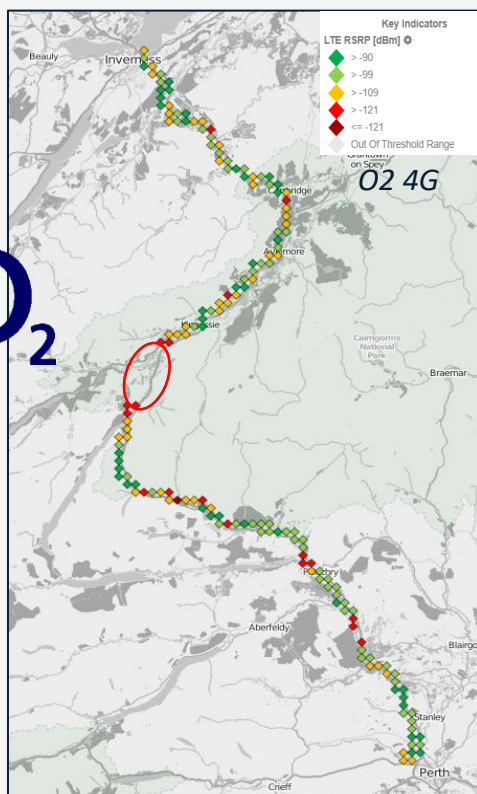
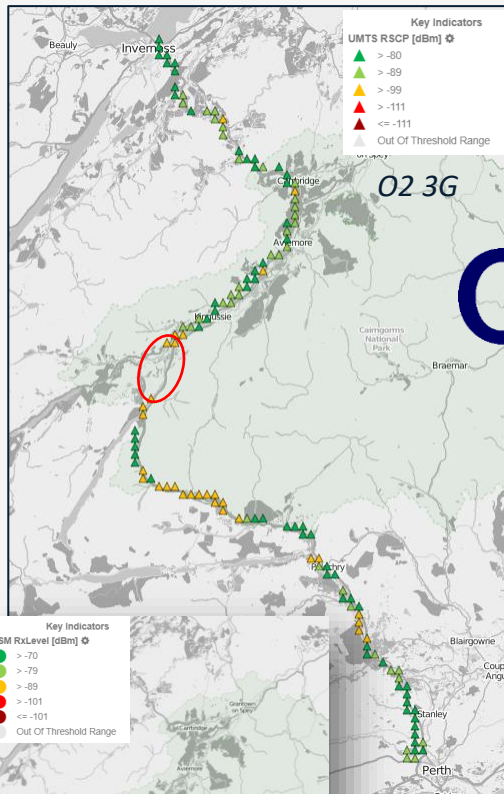
Automobile Service Measurements



4G observed as dominant technology of EE network where 3G is dominant for H3G.

LTE observed as the main dominant technology of EE Network. Very few 3G measurements were collected on EE that too at a single location. H3G dominant technology is UMTS where LTE is present mainly towards south starting from Perth and then near Inverness where the strength is observed relatively better.

Automobile Service Measurements



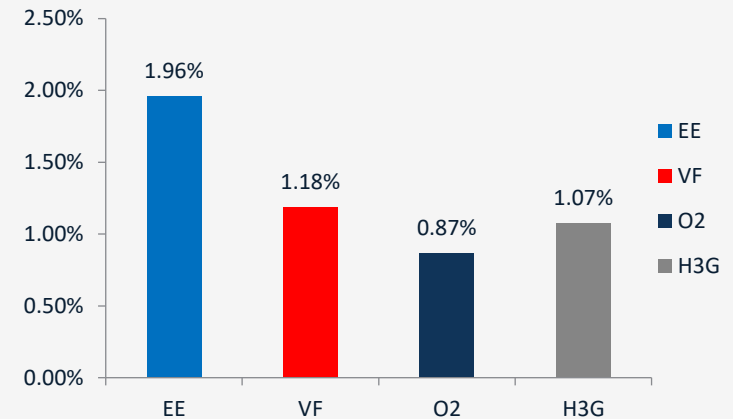
O2 & VF show mix and balanced dominance of both 3G & 4G.
 Both networks show similar pattern results for 2G coverage as well.
 The highlighted area in the images above show, the road section where no 3G or 4G coverage was recorded and just 2G measurements for both operators.

Automobile Service Measurements

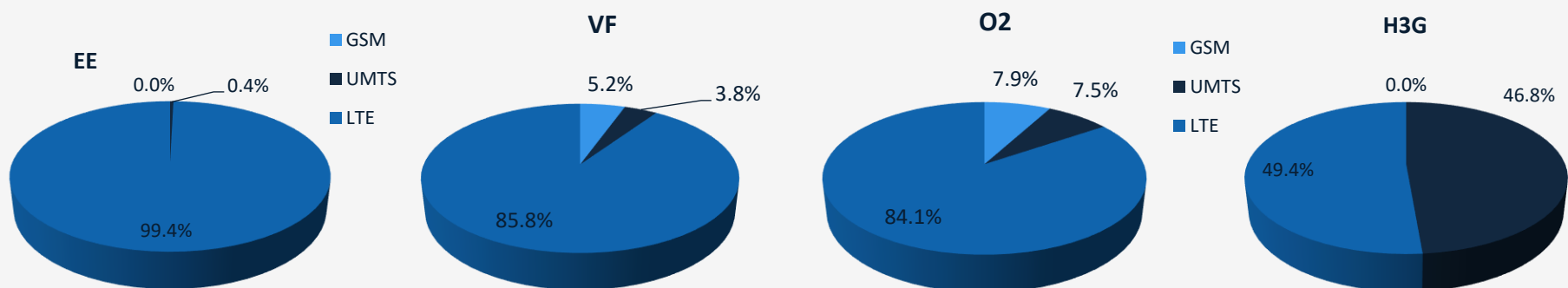
Technology	EE	VF	O2	H3G
GSM	0	1965	1555	0
UMTS	79	4449	4989	11171
LTE	19314	13416	13033	7546
No SERVICE	191	4	9	85
Emergency Service	193	231	161	117
TOTAL	19584	19834	19586	18802

Average Signal	EE	VF	O2	H3G
Average RxLev (dBm)	NA	-81.4	-84.1	NA
Average RSCP (dBm)	-90.5	-77.7	-84.1	-83.2
Average RSRP (dBm)	-97.2	-94.0	-94.1	-101.4
Average RSRQ (dB)	-7.7	-9.9	-10.3	-9.5

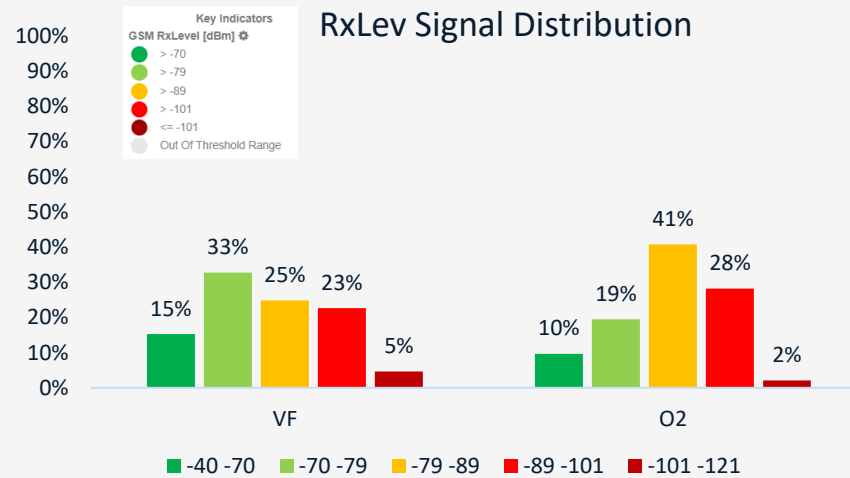
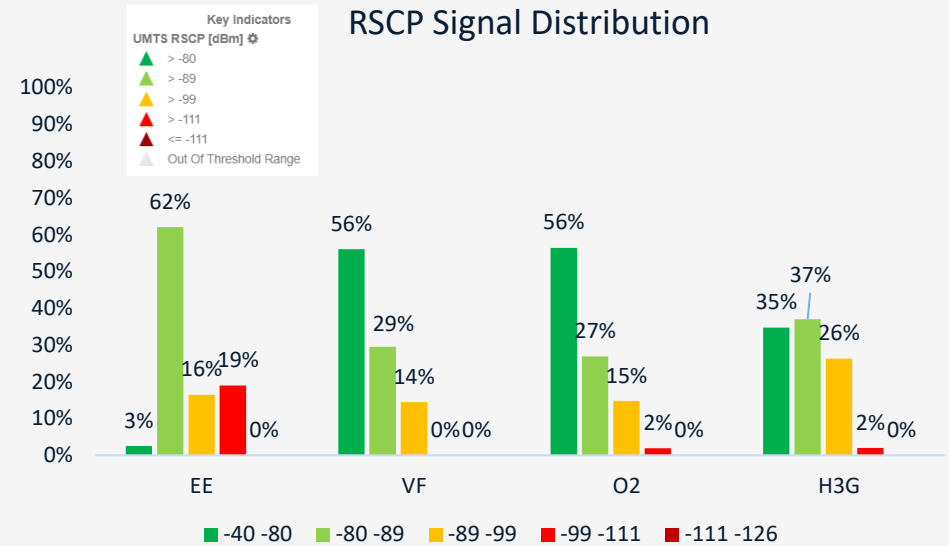
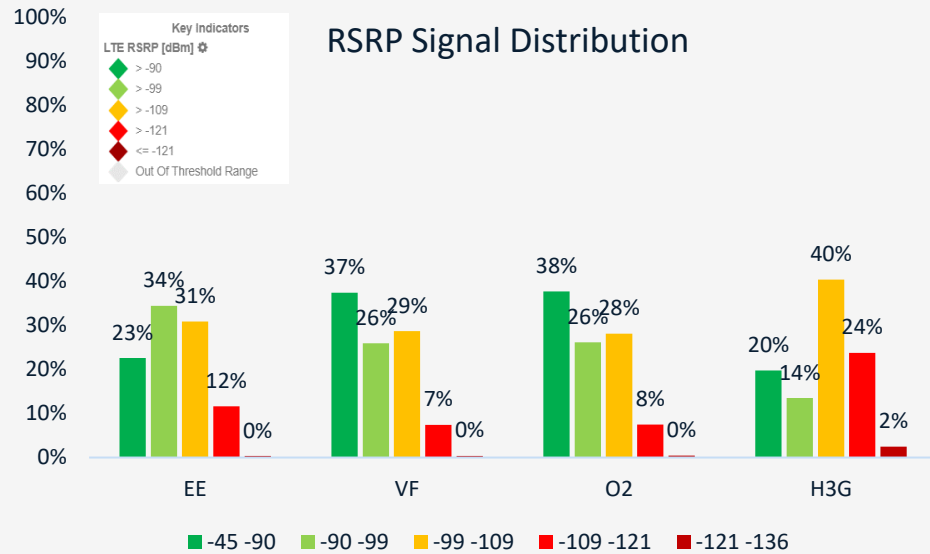
Network Unavailability



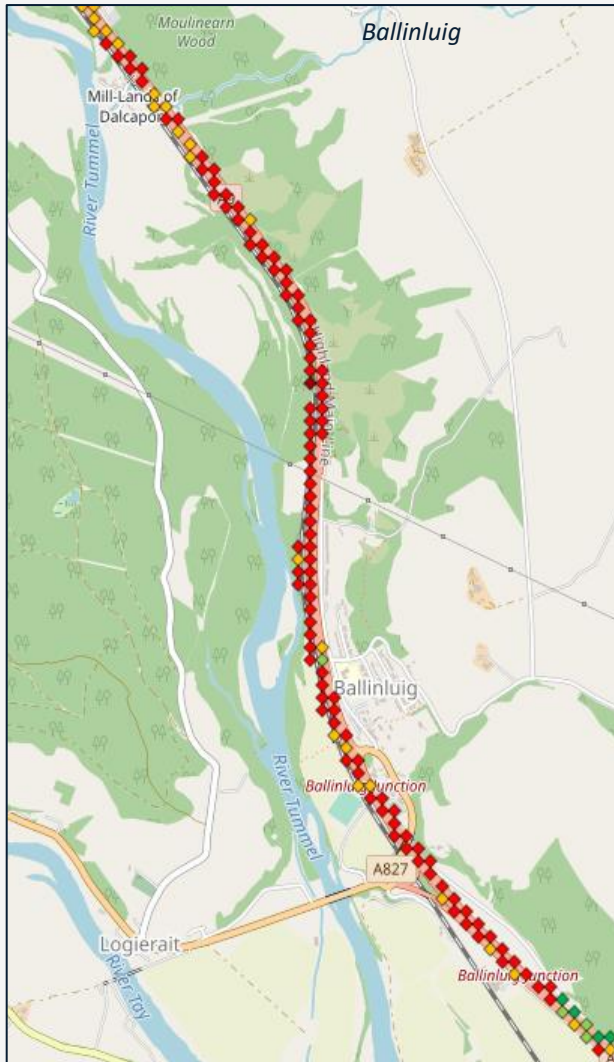
% Time on Technology by each Operator



Signal Distribution by Technology

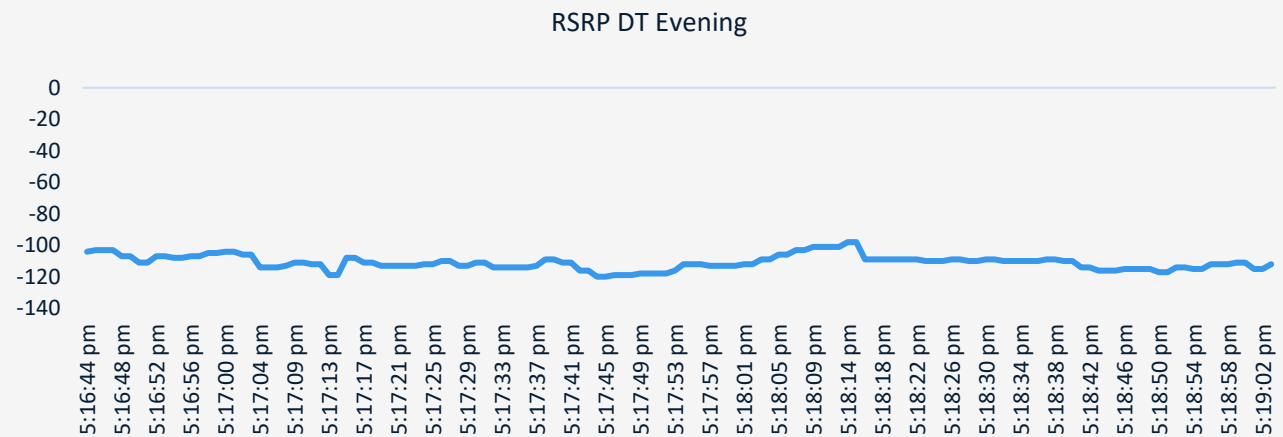
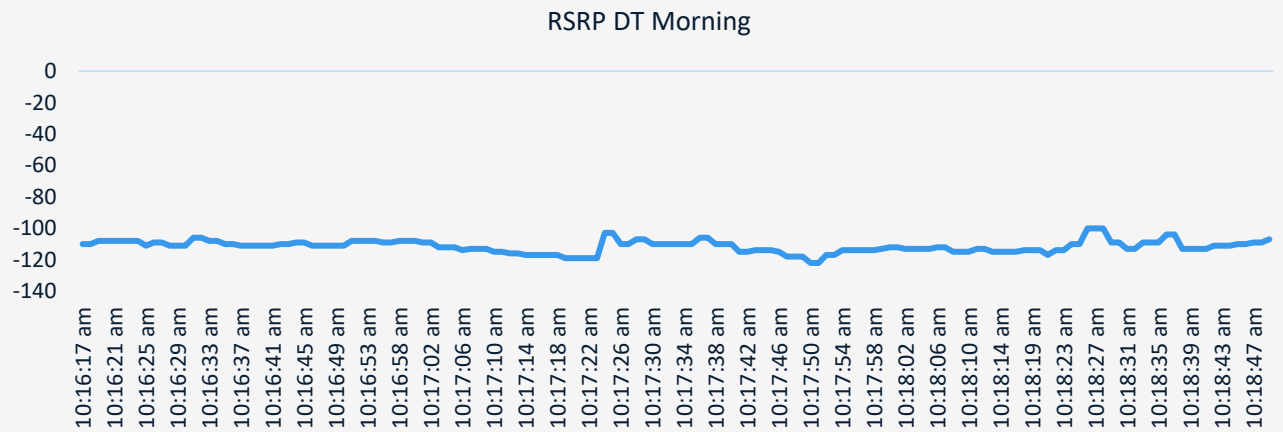


EE- Weak coverage sections on road A9

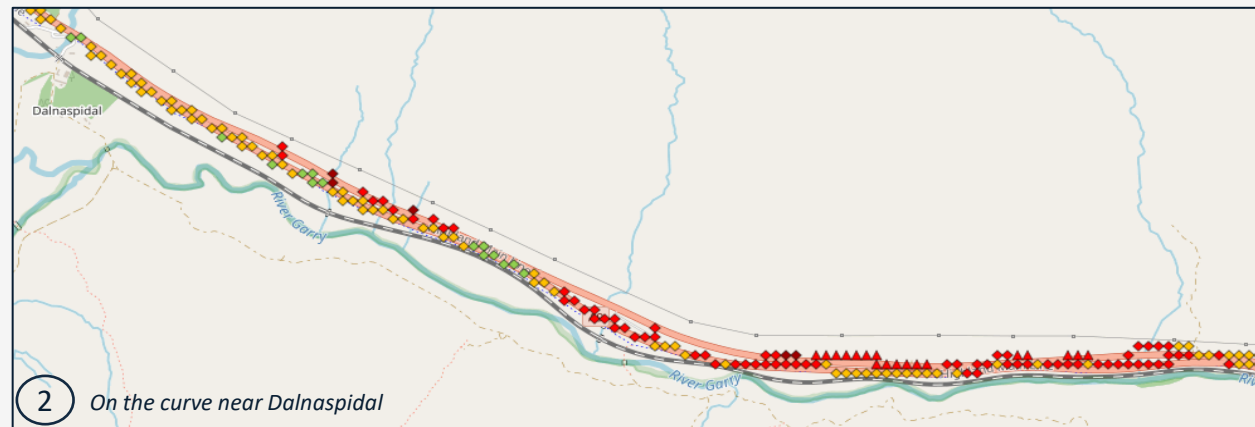
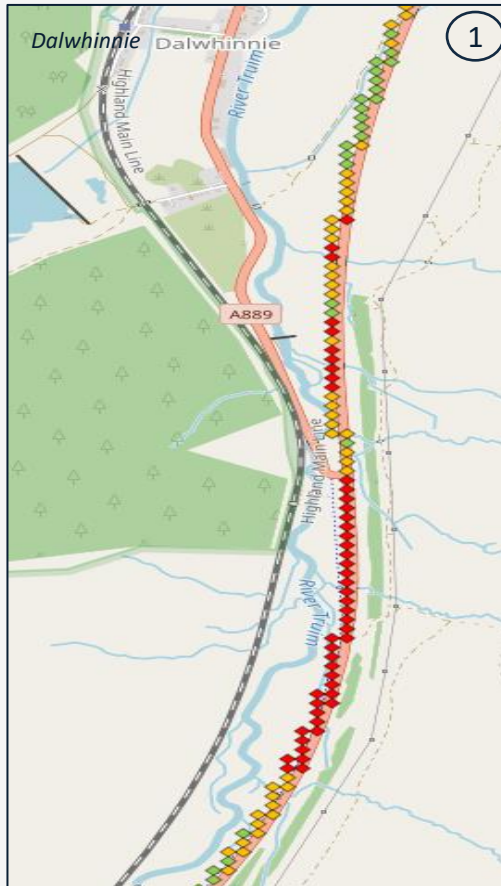


Weak coverage points for EE network were observed on different sections of the A9 road.

- A9 Road section crossing area Ballinluig.(a distance of 3km where LTE measurements were collected with an average of -111dBm)
- Coverage was observed weak to poor on road, with measurements recorded on different durations of the day. Graphs below show comparison of RSRP recorded in the morning drive moving towards Inverness and then in the evening drive back towards Perth.



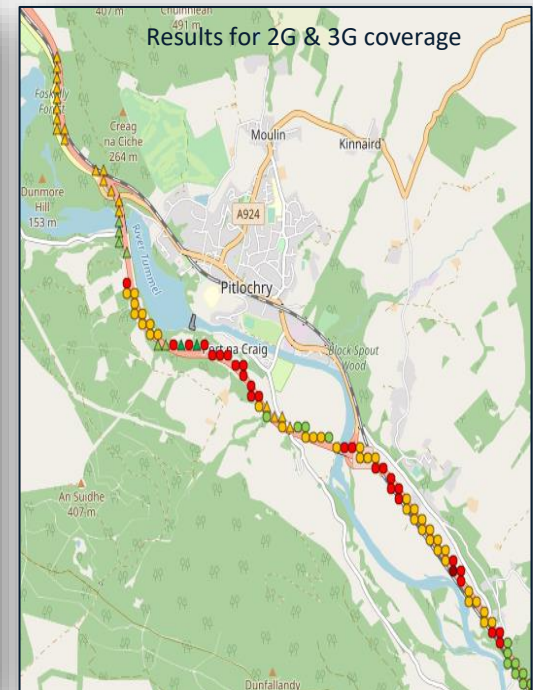
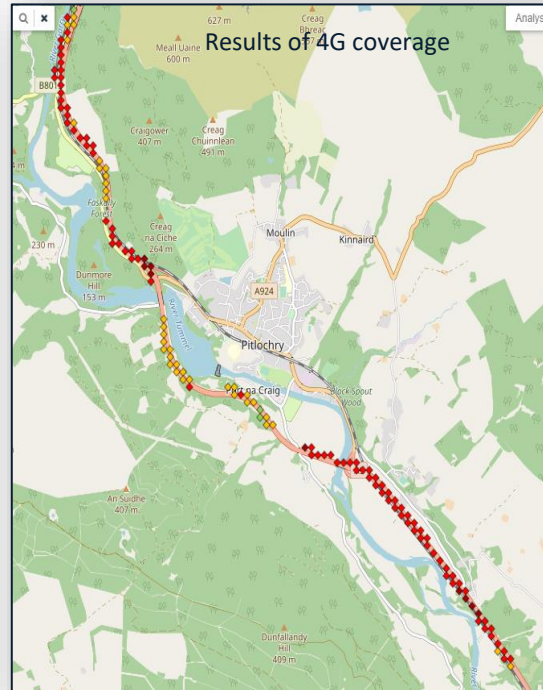
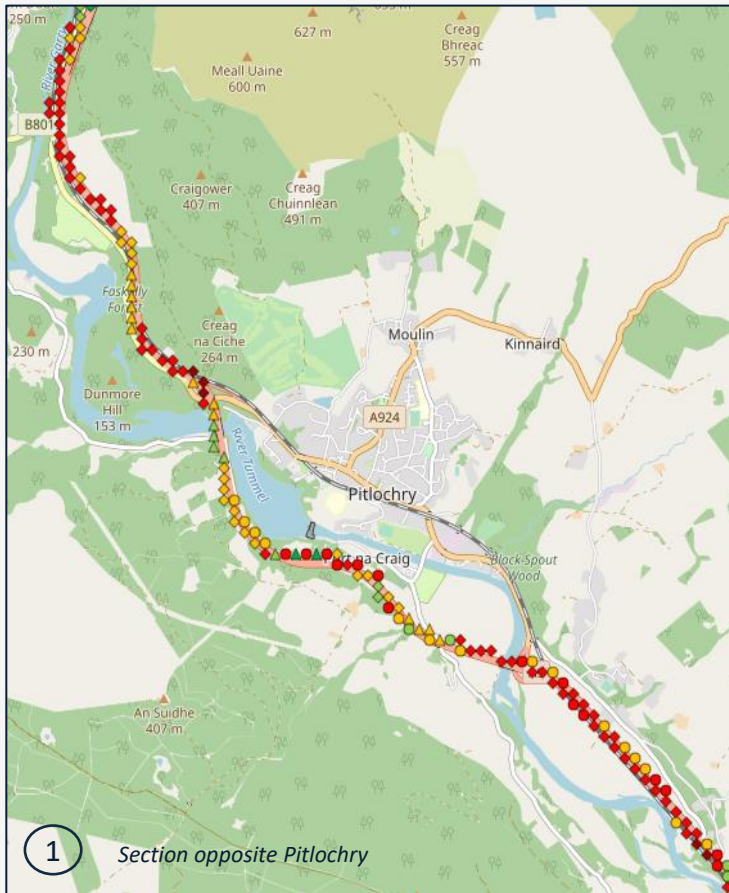
EE- Weak coverage sections on road A9



A few more weak coverage road sections observed for EE are listed below;

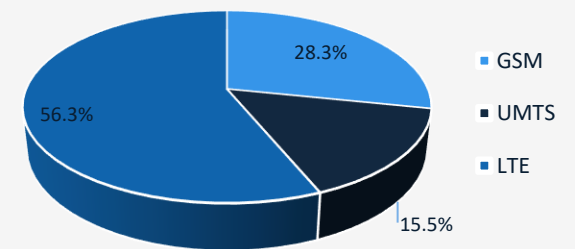
1. Road section opposite to Dalwhinnie. (with a distance of around 2.5km, LTE coverage is seen weak to poor)
2. On the curve near Dalnaspidal. (In morning while driving towards Inverness LTE coverage is observed weak on this section whereas on the way back the coverage is seen intermittent and falling to 3G coverage.)
3. Road section near Cairngorms National Park. (Road section of around 3km distance where coverage is observed weak)

Vodafone- Weak coverage sections on road A9

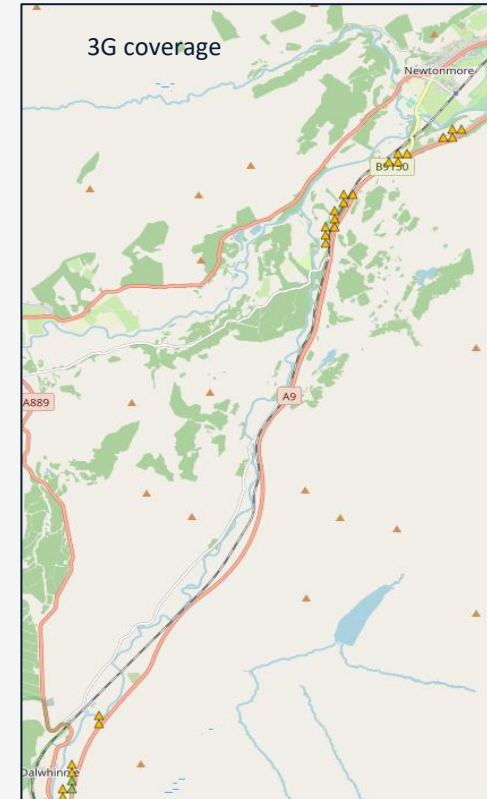
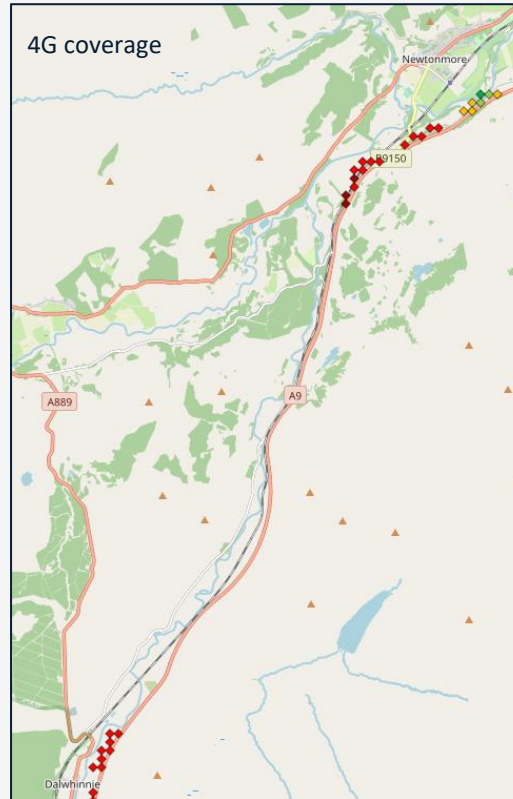
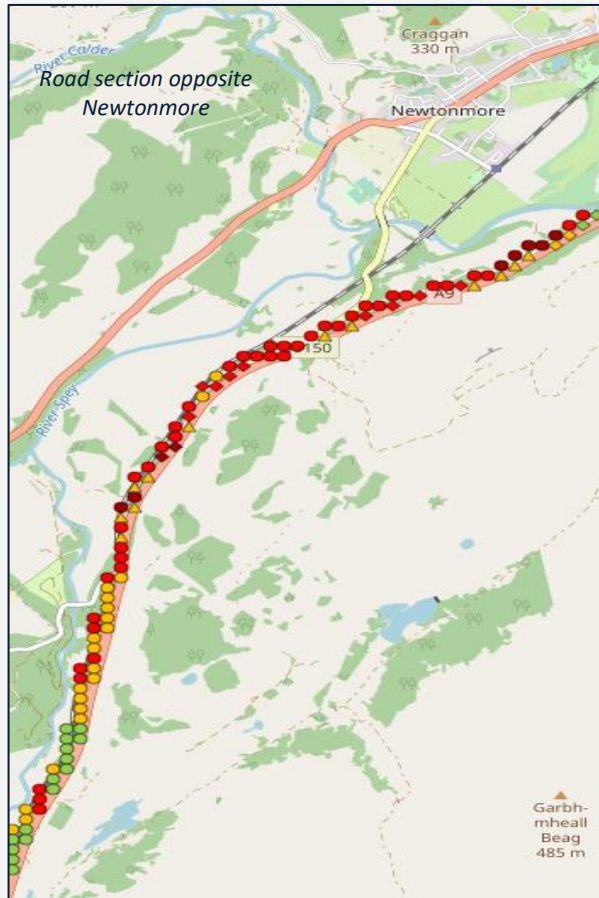


- Vodafone coverage was observed poor on different sections of the road A9 as listed below,
- 1- Road section opposite to Pitlochry town .
 - Most available technology was observed as 4G but with weak coverage. 3G signal strengths were better but technology shift was observed towards 4G.)
 - Average signal strengths (GSM = -85dBm, UMTS = -88dBm, LTE = -113dBm)

In Service Technology Measurements

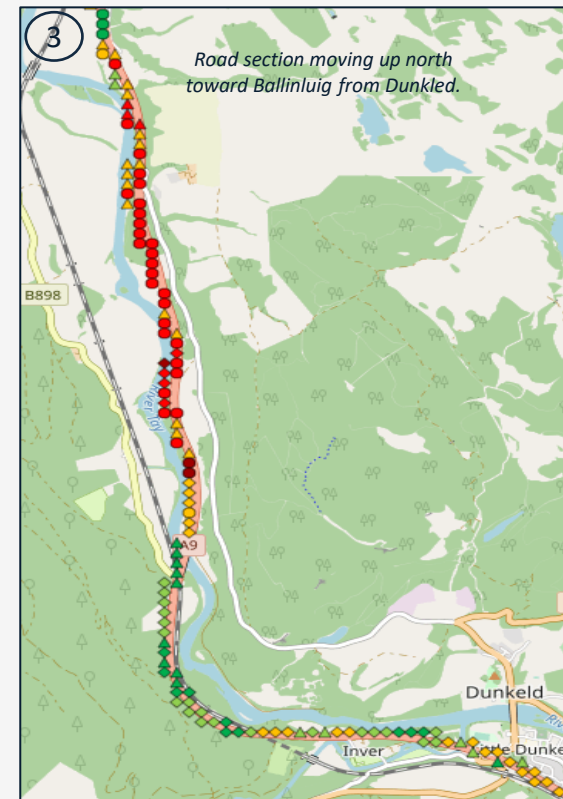
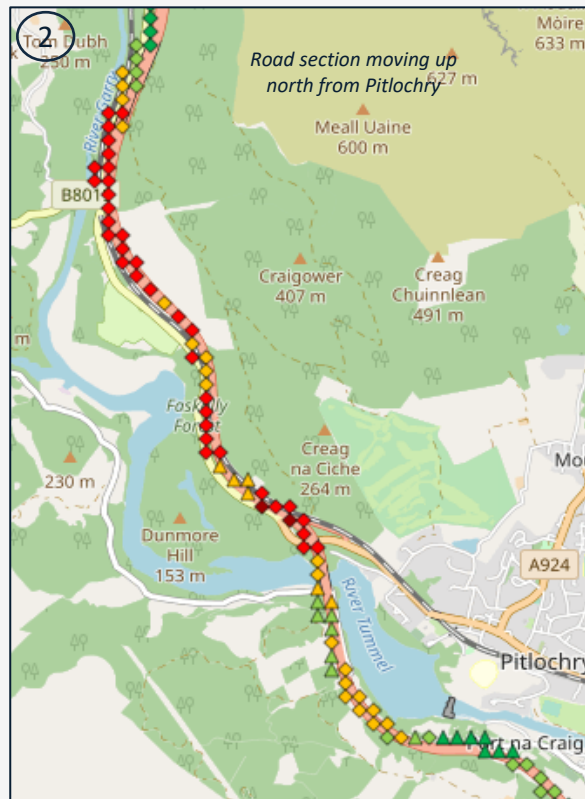
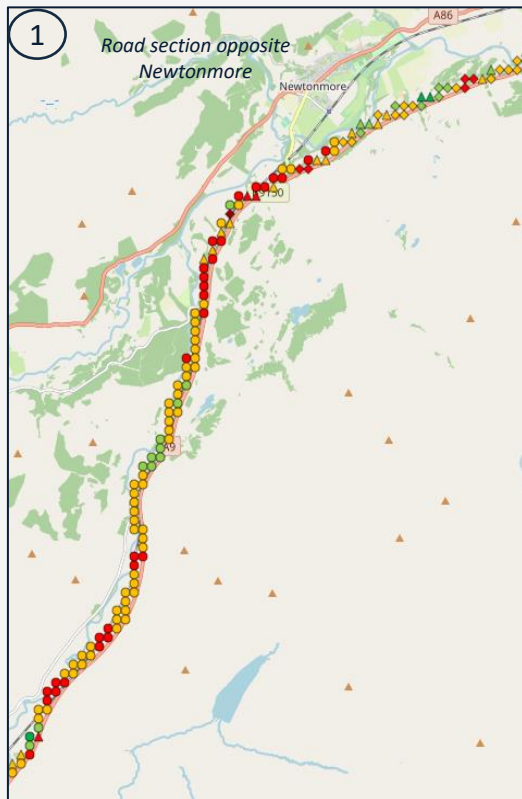


Vodafone- Weak coverage sections on road A9



Another weak coverage section on the road A9 for Vodafone network is the road section opposite to Newtonmore. On this section of road 3G & 4G coverage is intermittent and most of the measurements were recorded on 2G technology and that with weak signal strengths.

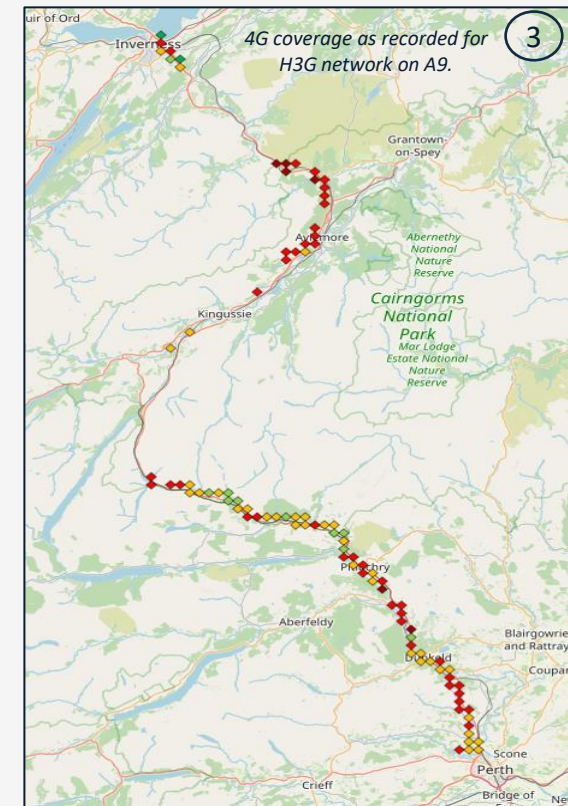
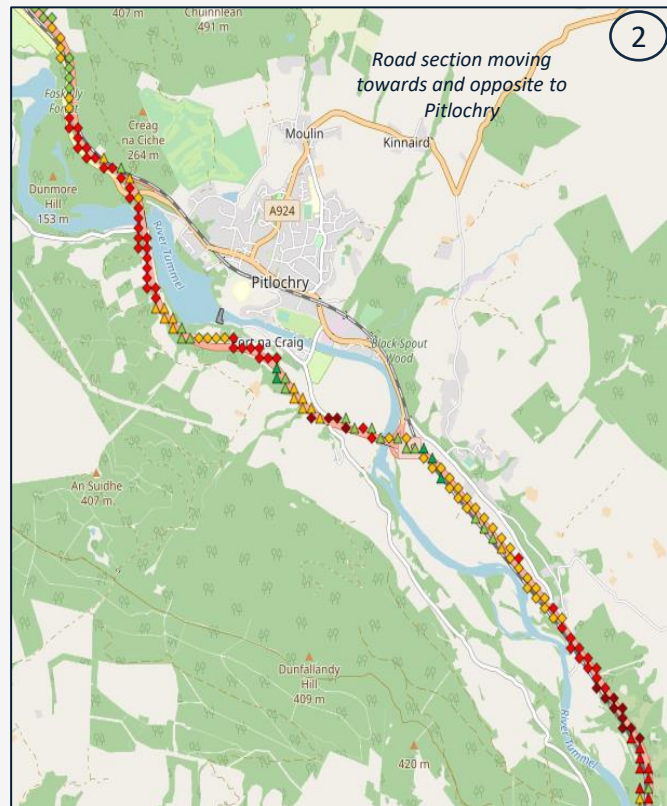
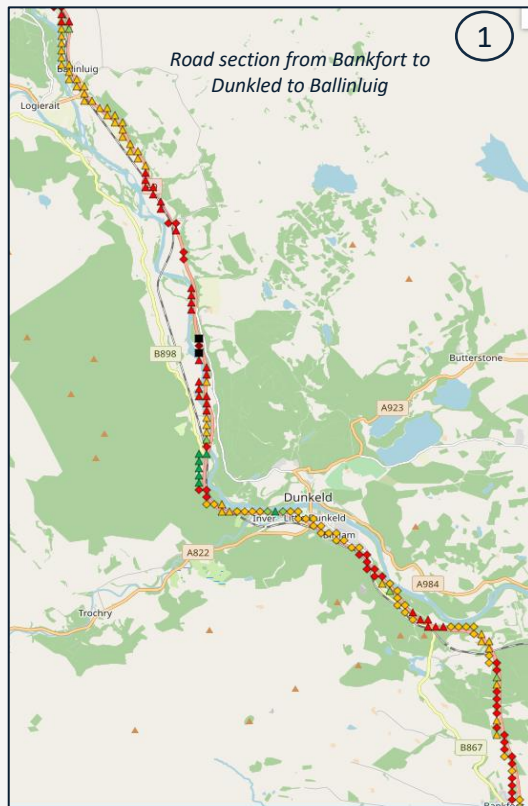
O2 Weak coverage sections on road A9



O2 network weak coverage sections on the road A9 as listed below;

1. Road section opposite to Newtonmore. (Operator coverage is mostly 2G on this section of the road)
2. Road section moving north from Pitlochry town. Most service measurements were recorded on 4G with weak signal strengths.
3. Road section moving towards Ballinluig from Dunkled had weak coverage points mainly on 2G technology.
4. Road section (up & down) near Cairngorms National Park. (weak to poor coverage was observed on this section)

H3G Weak coverage sections on road A9



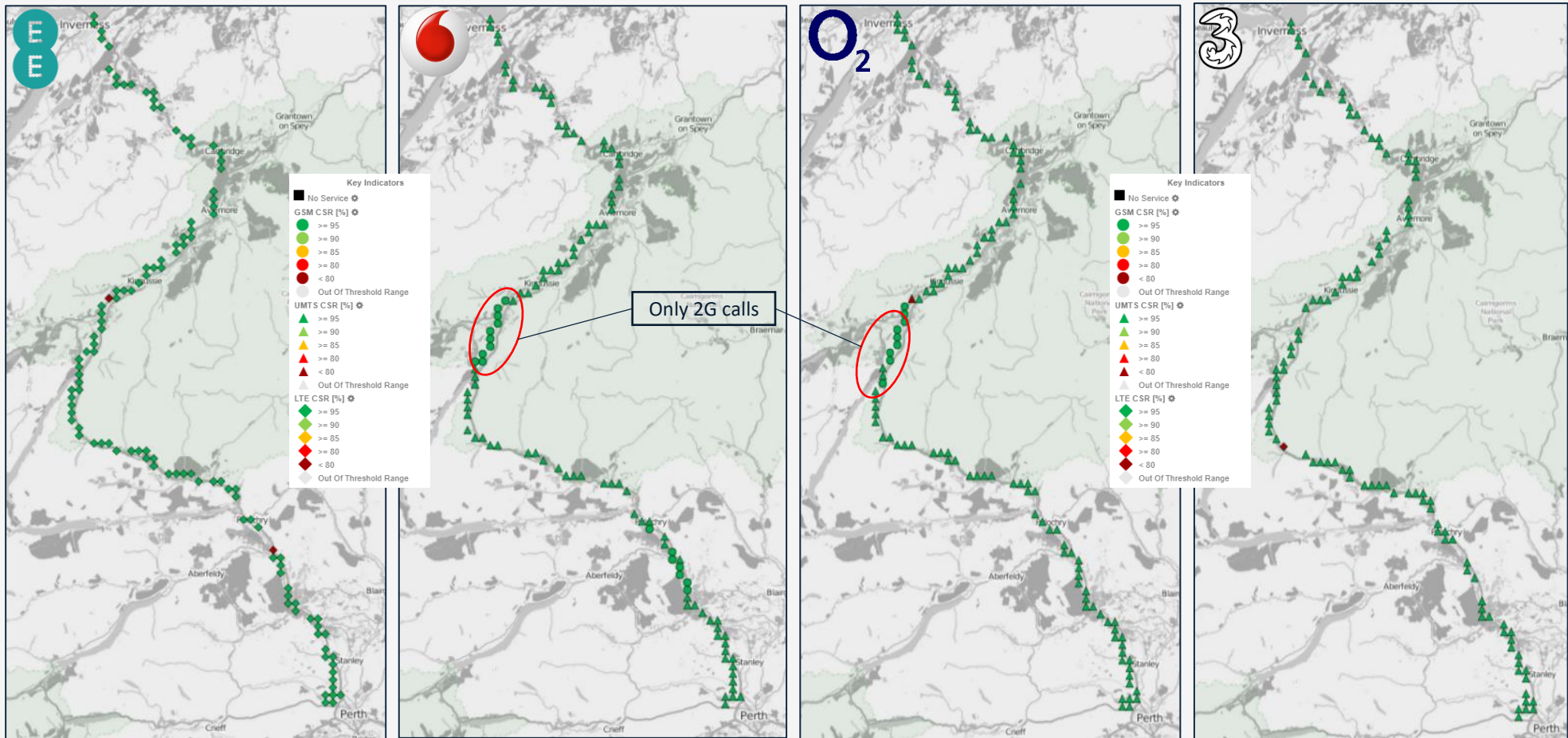
Weak coverage sections of road A9 on H3G network;

1. Road section moving from Bankfort to Dunkled and towards Ballinluig.
2. 4G Coverage is observed mainly weak on the road section opposite to Pitlochry and towards south.
3. 4G coverage is sporadic and 3G is observed as main available technology on the half section of the road A9 starting from Cairngorms National Park and moving towards north.

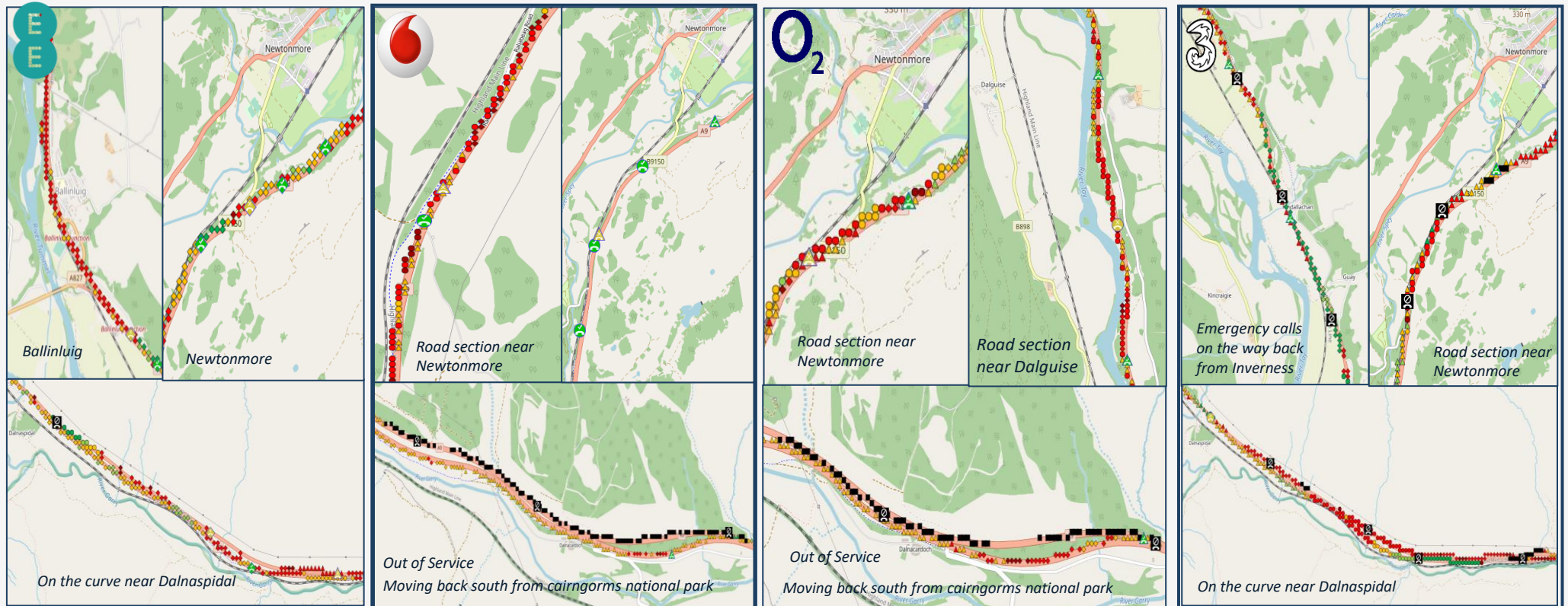
Call Test Results

Operator	Call Attempts	CSSR	DCR
EE	230	97.83	0
Vodafone	235	98.72	0
O2	230	99.13	0
Three	228	99.12	0

Most EE calls were VoLTE. The other operators used CSFB, the call being established on 3G. On O2 & VF some 2G calls were recorded in the section of road where no 3G or 4G coverage was recorded. There were no dropped calls reported. Call Setup Success Rate (CSSR) on EE was not as good as the other operators.



No Drop Calls But Call Setup Failures & Out of Service Calls



Although No Drop calls were registered on any of the operator but quite few call setup failures, out of service calls and emergency calls were seen registered by each operator that could be the result of hand over failures or no operator coverage in that area as observed in service section.

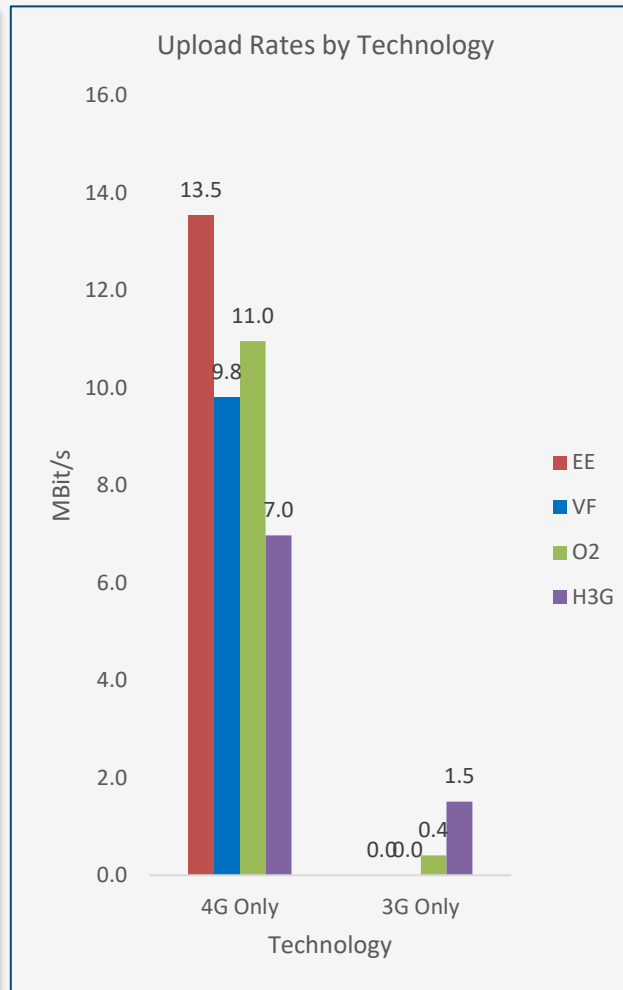
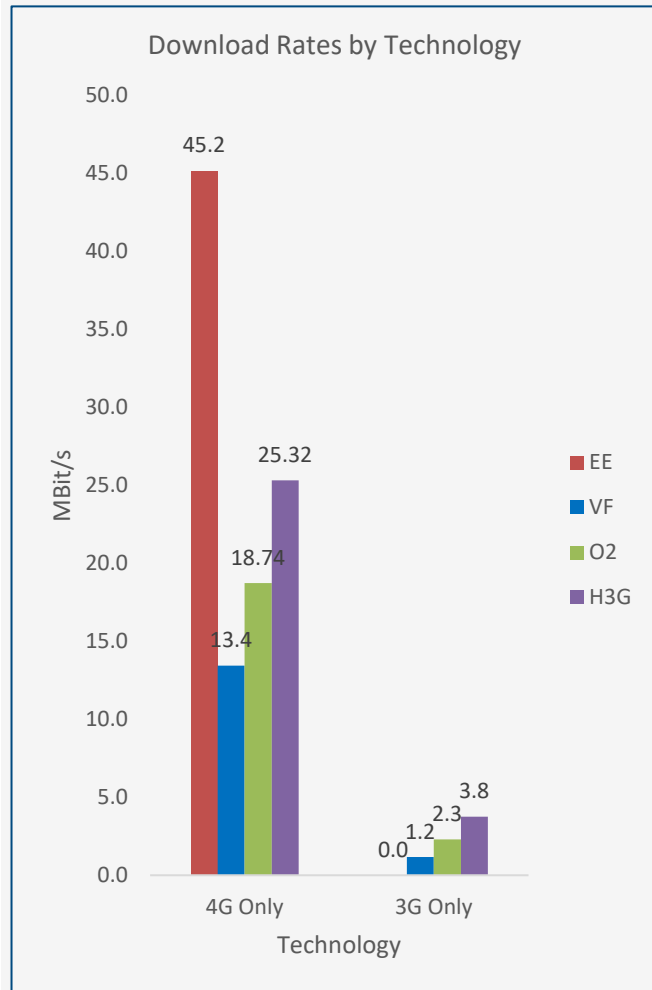
All these failures are recorded on the sections of road A9 as listed below;

- Road section opposite to Newtonmore .
- Road section near Ballinluig.
- Curve section of road A9 near Dalnaspidal.
- Road section near Dalguise
- Road section(up & down) near Cairngorms National Park.

Data Test Results

All Technologies	EE	VF	O2	H3G
Average Download Throuput (MB/s)	45.2	13.0	18.4	15.9
Average Upload Throuput (MB/s)	13.5	9.8	10.5	4.5
Average Ping (ms)	159.2	115.2	102.1	136.6
Average Jitter (ms)	22.5	26.6	12.7	95.875

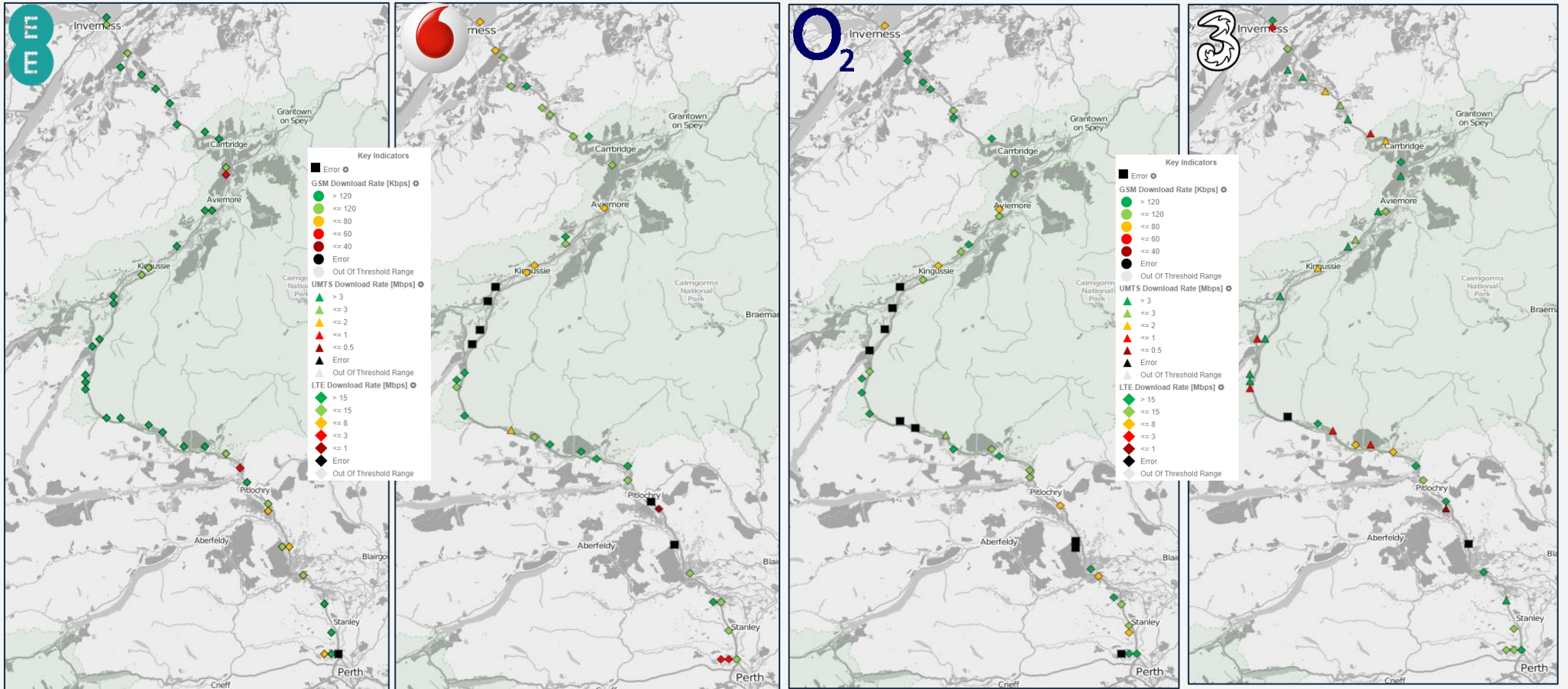
EE takes the lead with best average data throughput rates in comparison to other three operators, where all the data tests for EE were using LTE technology shows that EE has better LTE coverage on the road. H3G network has almost half of its data test registered on 3G technology.



4G Only	EE	VF	O2	H3G
No. of Download Attempts	56	50	49	32
Successful Downloads	55	50	47	31
No. of Upload Attempts	57	50	50	30
Successful Uploads	56	47	48	30
Download Success Rate (%)	98%	100%	96%	97%
Upload Success Rate (%)	98%	94%	96%	100%
3G Only	EE	VF	O2	H3G
No. of Download Attempts	0	1	2	25
Successful Downloads	0	1	1	24
No. of Upload Attempts	0	0	1	25
Successful Uploads	0	0	1	24
Download Success Rate (%)	0%	100%	50%	96%
Upload Success Rate (%)	0%	0%	100%	96%

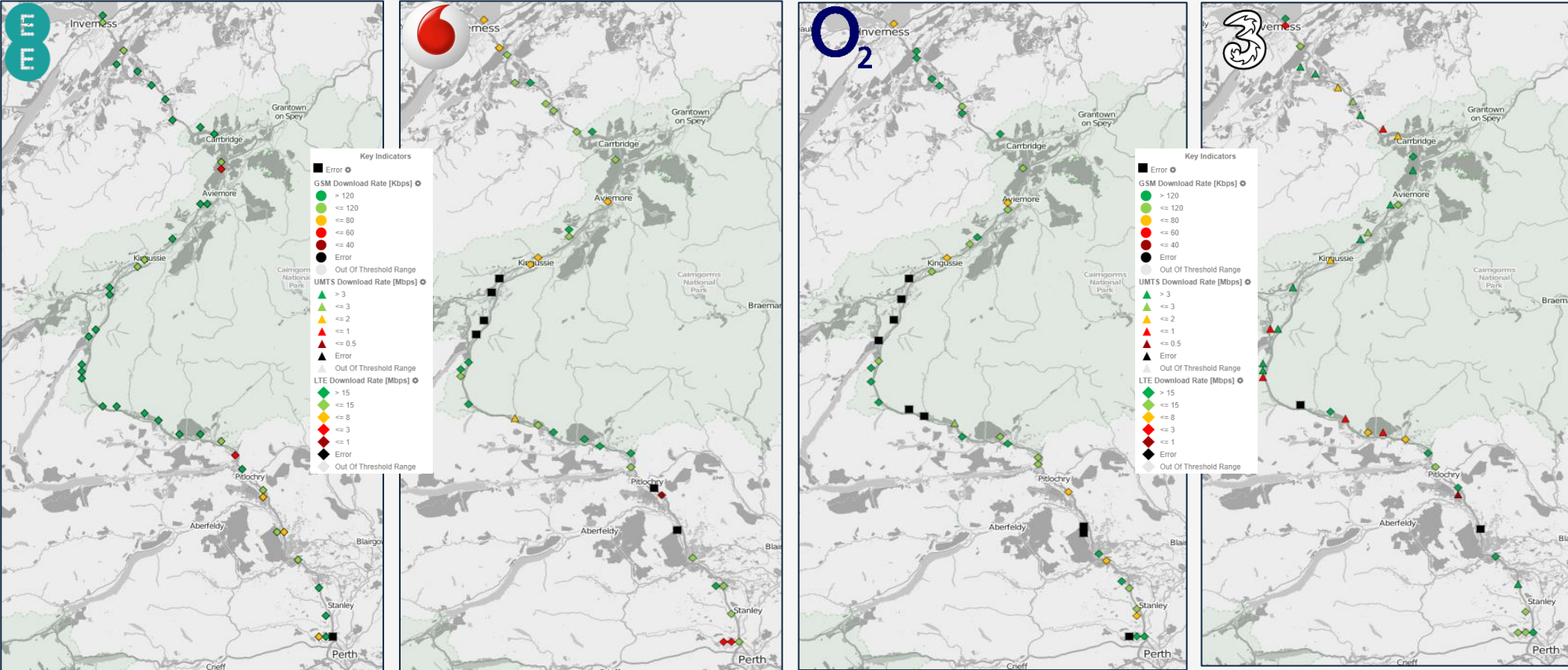
Data Test Results

Download Tests



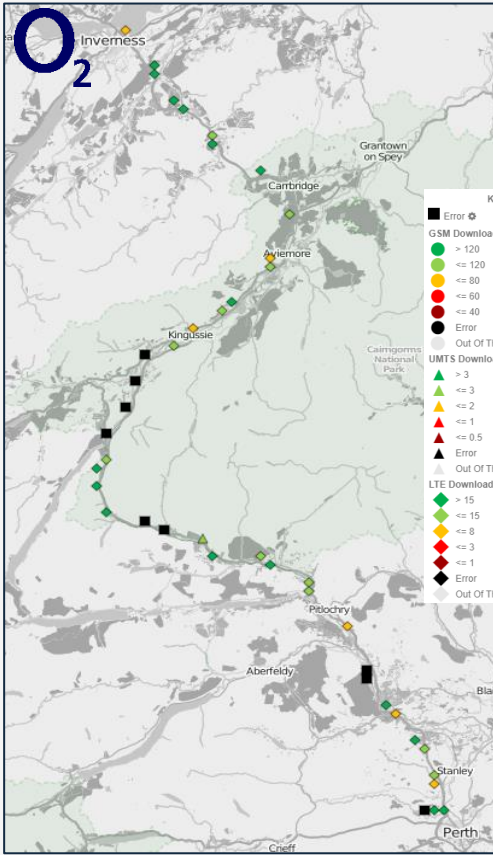
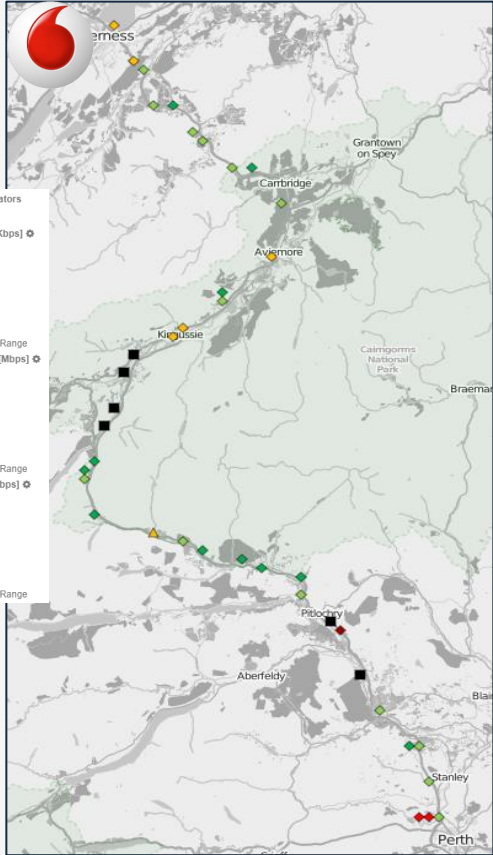
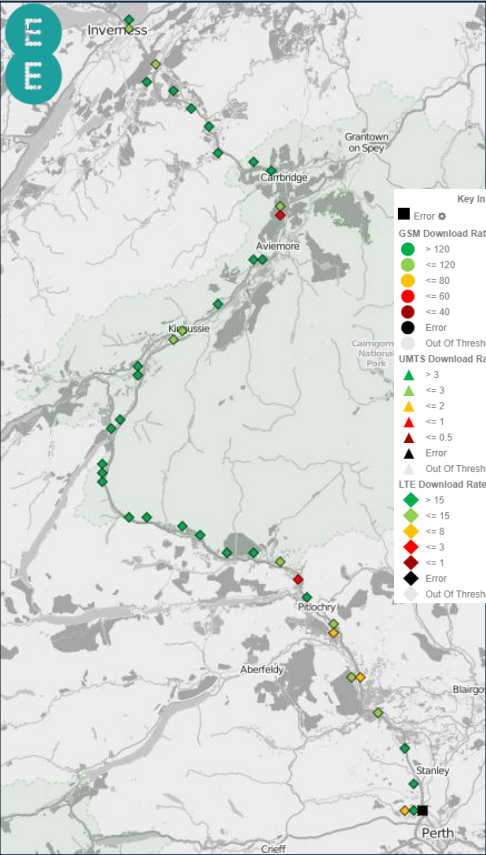
Data Test Results

Upload Tests



Data Test Results

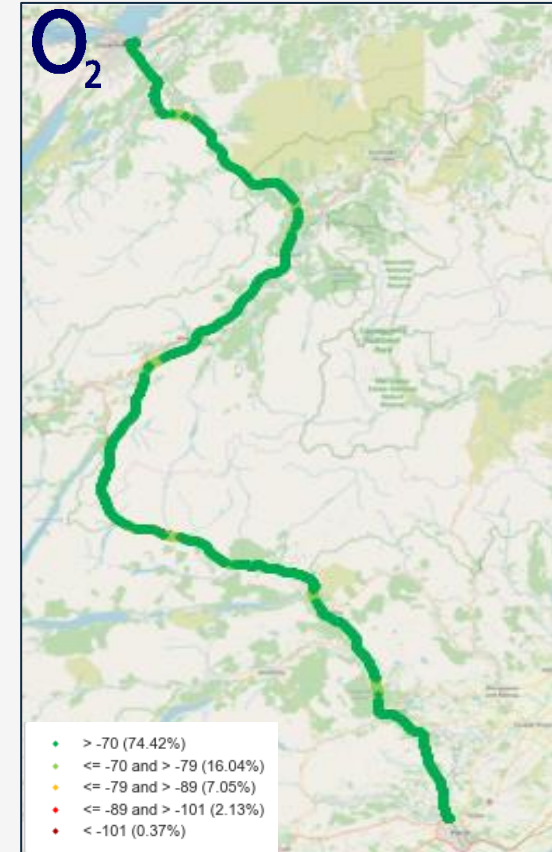
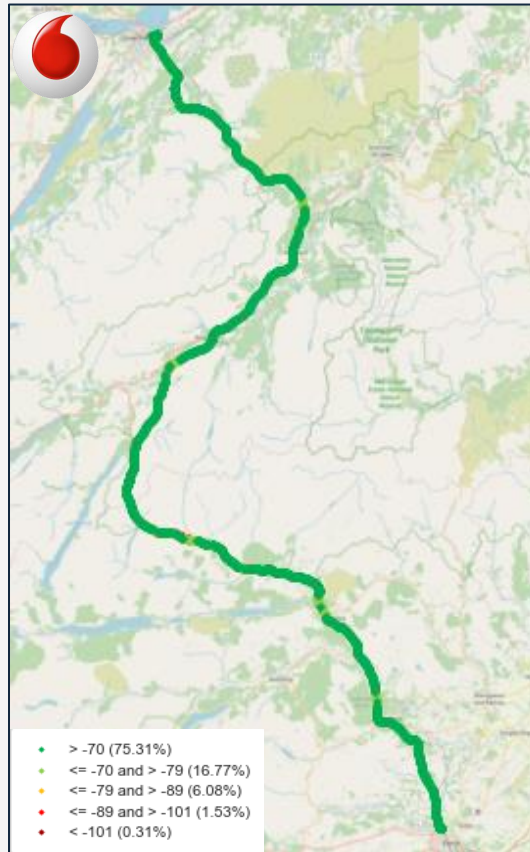
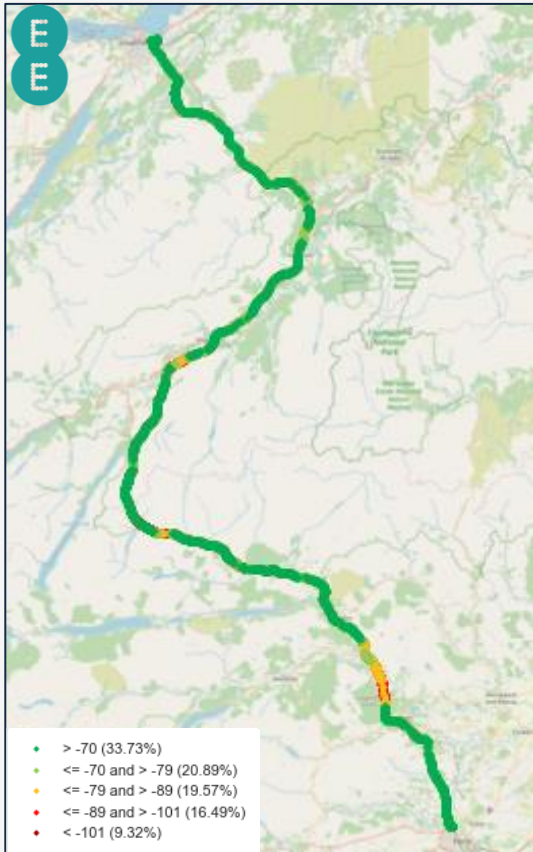
Ping Tests



SCANNER MEASUREMENTS



GSM Scan Results



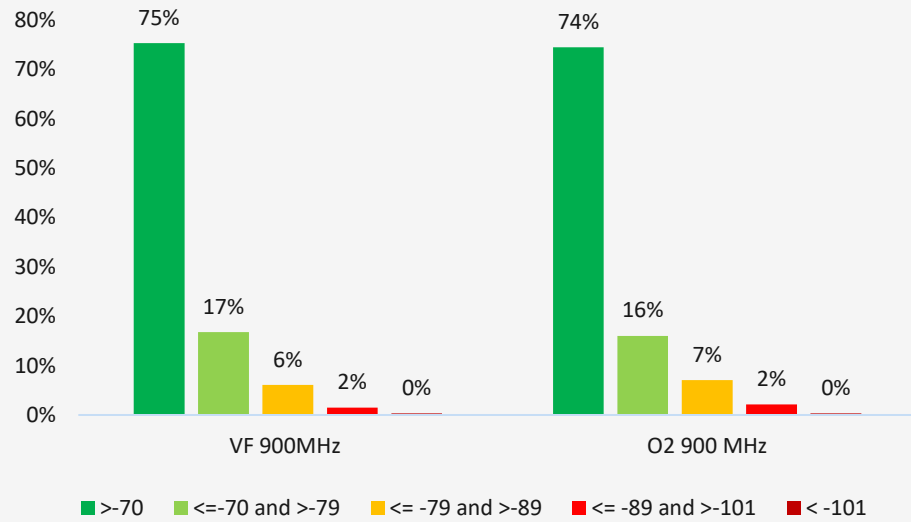
GSM	
Band 900 MHz	Channel Nos.
VF	1 to 12
O2	113 to 124
Band 1800MHz	Channel Nos.
EE	645 to 670

Mentioned channel ranges were configured in the scanner for GSM technology for three operators EE, VF and O2. The measurements are plotted on the map in a way that signal point with highest percentage gets plotted on top. The recorded measurements show all three operators have high percentage results for the strong signal strengths of >-70dbm. Operator H3G doesn't have a GSM service.

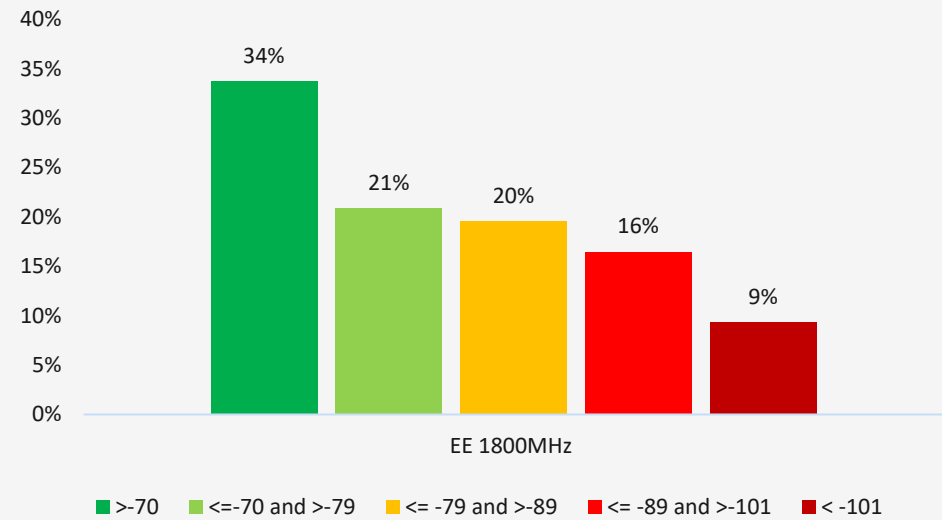
GSM Signal Distribution

- ◆ > -70
- ◆ ≤ -70 and > -79
- ◆ ≤ -79 and > -89
- ◆ ≤ -89 and > -101
- ◆ < -101

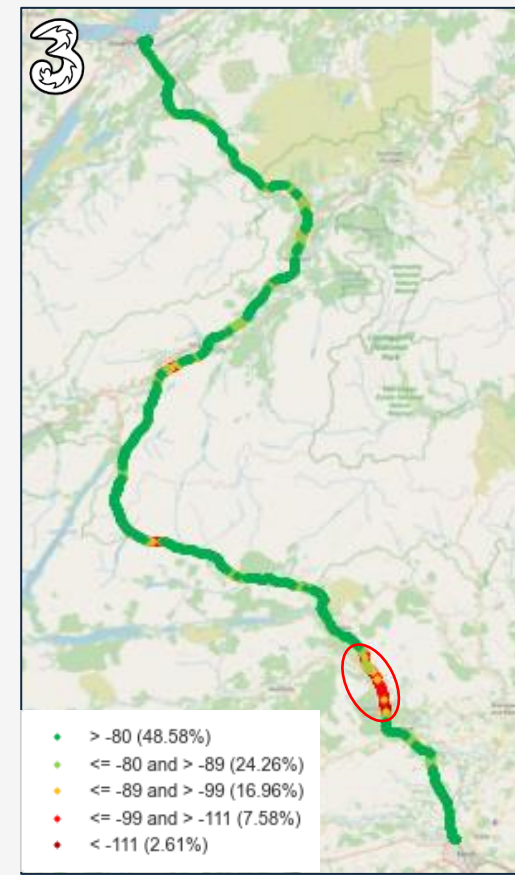
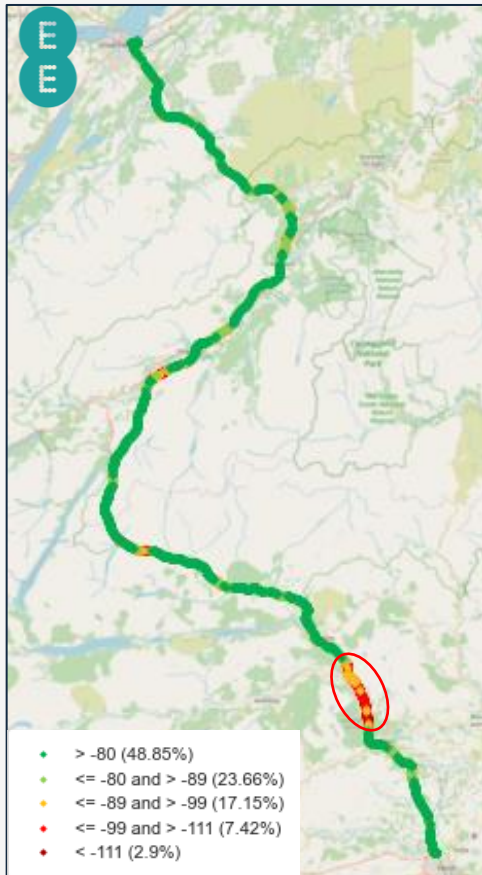
Signal Distribution- GSM Band 900MHz



Signal Distribution- GSM Band 1800MHz



UMTS Band 2100MHz Scan Results

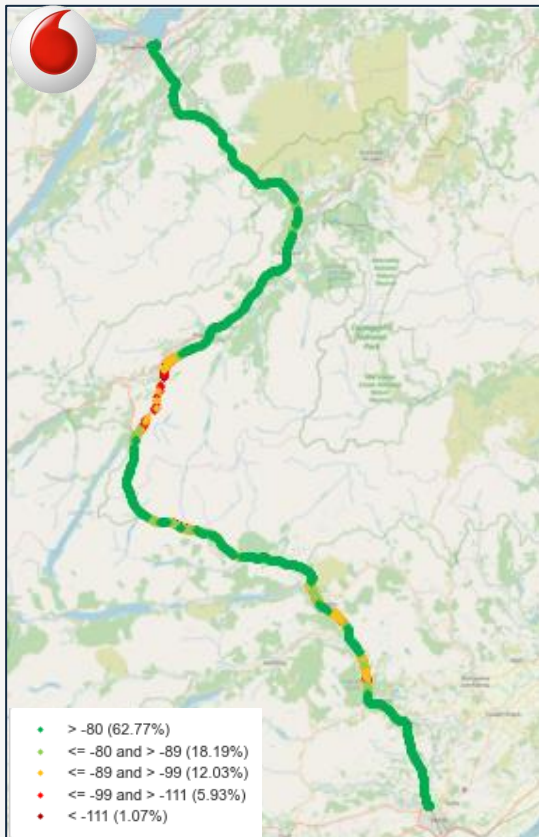


UMTS Band 2100MHz

Operator	Channel Nos.
EE	10761
VF	10687
O2	10637
H3G	10564

No 2100 band channel presence was recorded for operator O2. EE and H3G show best results on band 2100MHz apart from the section of road highlighted. Intermittent presence observed for Vodafone network on channel 10687.

UMTS Band 900MHz Scan Results



UMTS Band 900MHz

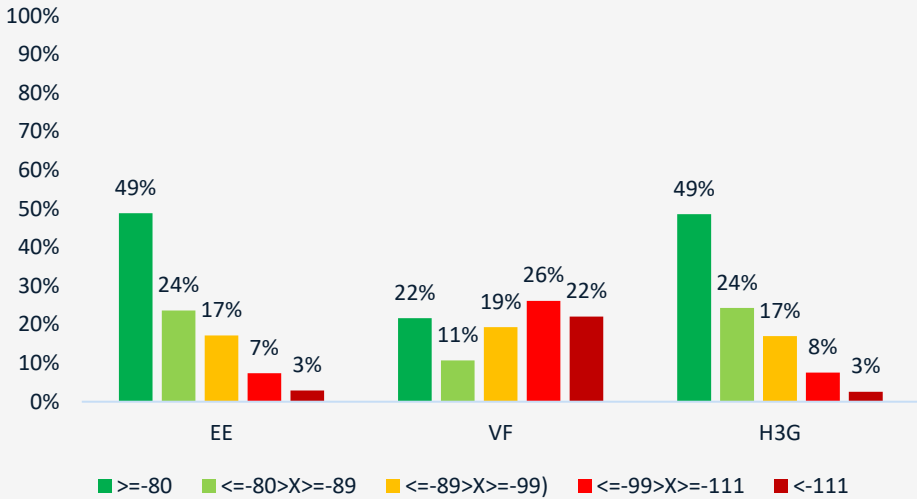
Operator	Channel Nos.
VF	2938
O2	2963

O2 has slightly better coverage results with its channel 2963 with a most of its signals falling in the range > -80dBm strengths. Vodafone service is generally better moving north from the mid of the road where road intersects towards A889 to Laggan (road area from location Cuaich to Newtonmore)

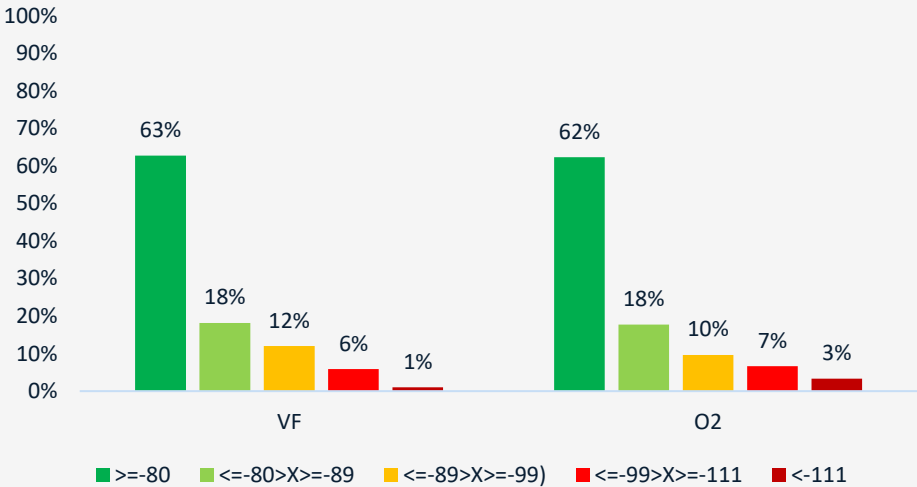
UMTS Signal Distribution



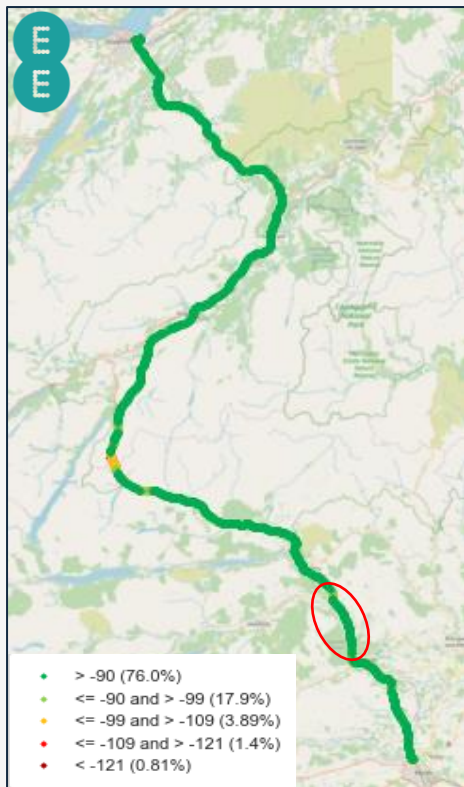
Signal Distribution - UMTS Band 2100MHz



Signal Distribution - UMTS Band 900MHz



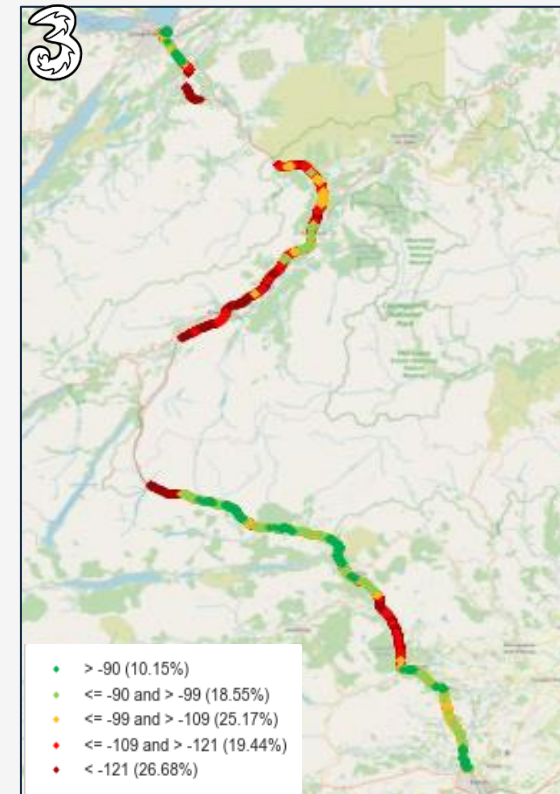
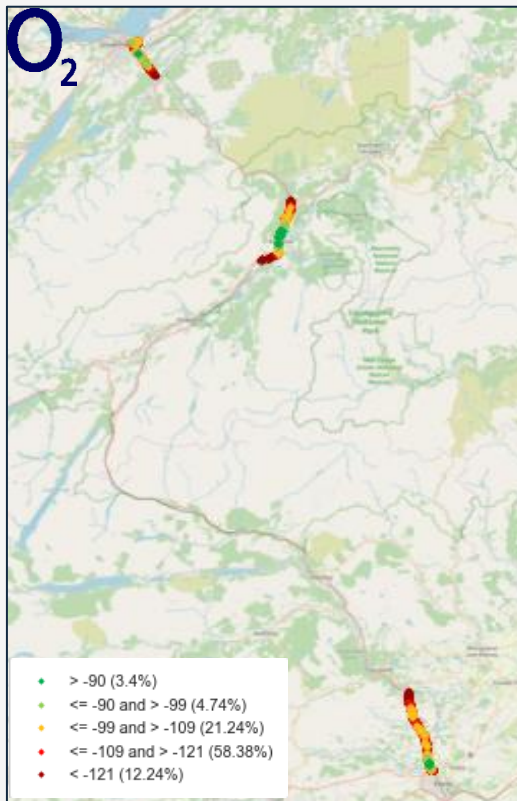
LTE Band 800MHz Scan Results



LTE Band 800MHz	
Operator	Channel Nos.
EE	6225
VF	6300
O2	6400
H3G	6175

Channels measurement for each operator on LTE band 800MHz, show EE and H3G having best results. Where EE channel service is seen particularly better at the road section highlighted where H3G channel strength is relatively weak. Both VF and O2 show weak to poor coverage on LTE on the road section which we have previously identified having mostly 2G coverage availability as picked by DT devices.

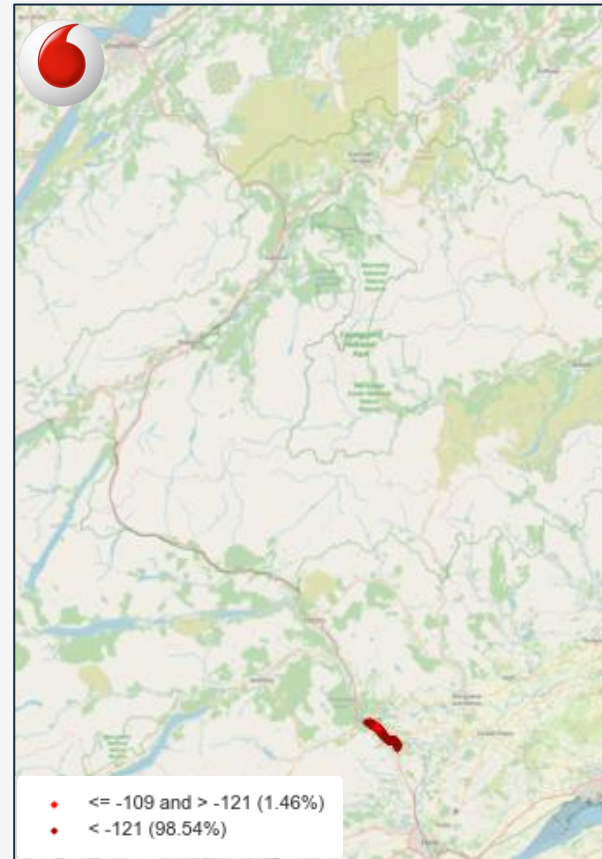
LTE Band 1800MHz Scan Results



LTE band 1800MHz	
Operator	Channel Nos.
EE	1617
VF	1288
O2	1226
H3G	1392

No measurements recorded for channel 1288 of Vodafone network, where some intermittent presence of channel 1226 of O2 network observed on different parts of the road. EE clearly appears to be the dominant server of LTE band 1800MHz on the road with its channel 1617 where H3G follows with some good coverage towards south of road and some section towards north near Inverness.

LTE Bands 2300MHz and 2600MHz Scan Results



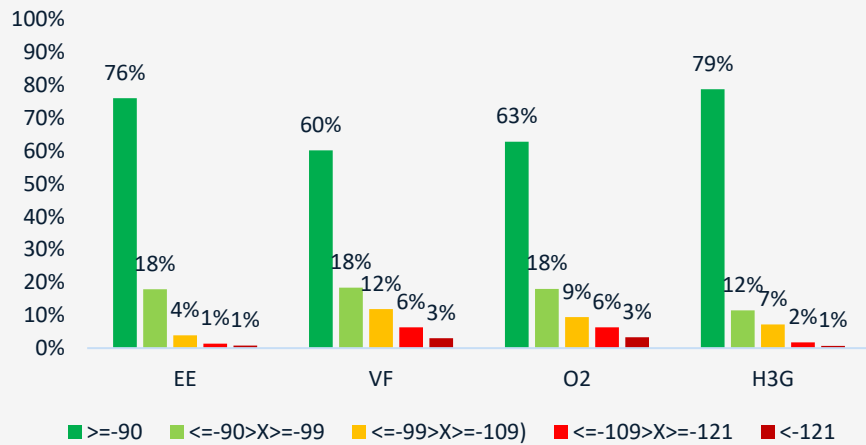
LTE	
Band 2300MHz	Channel Nos.
O2	39250
Band 2600MHz FDD	Channel Nos.
EE	3350
VF	2850

No measurements were recorded on the O2 band 2300MHz channel 39250. Both EE and Vodafone show a very minimal presence at a small section of the road where EE has slightly better coverage towards south with 2.5% of its measurements falling in the range of <= -99 to > -109dBm where Vodafone has weak signal strengths falling in the range of <= -109 to < -121 dBm.

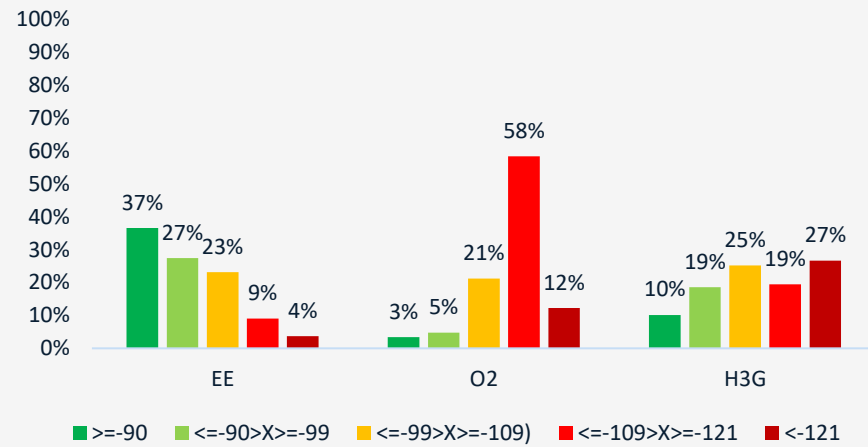
LTE Signal Distribution

- ◆ > -90
- ◆ <= -90 and > -99
- ◆ <= -99 and > -109
- ◆ <= -109 and > -121
- ◆ < -121

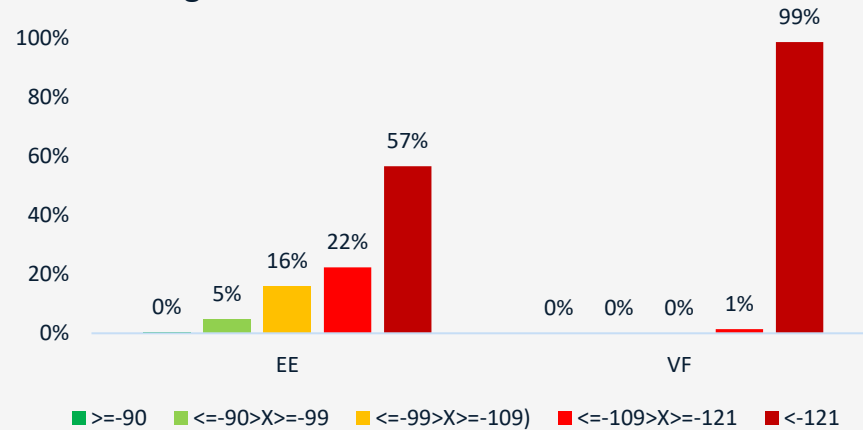
Signal Distribution- LTE Band 800MHz



Signal Distribution- LTE Band 800MHz



Signal Distribution- LTE Band 2600MHz



ESTIMATED SITE POSITIONING



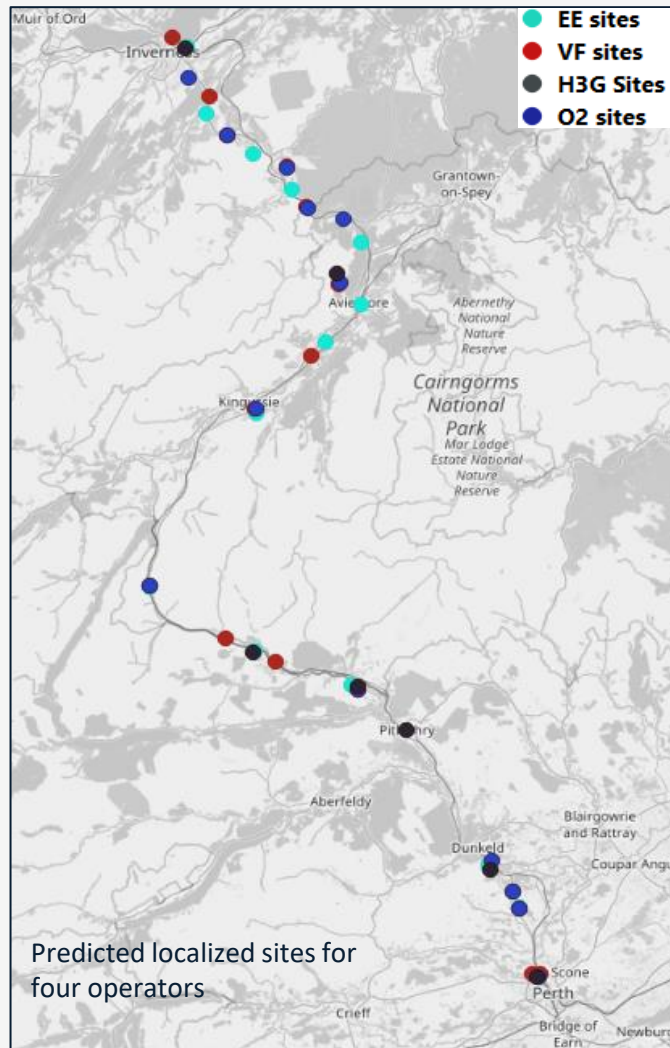
SITES POSITION ESTIMATION

Metricell Automobile are Android based devices that collect Timing Advance (TA) values.

(TA) in LTE is the timing offset between uplink and downlink radio frames at the user equipment (UE). The offset at the UE is necessary to ensure synchronisation at the eNodeB because of the time it takes for the radio messages to be transmitted over the radio path.

The LTE Base Station (eNodeB) measures the required timing advance based on the received UE signal arrival time, commanding the UE to adjust the transmission time in steps as it changes position relative to the site.

Operator	MSISDN	Distinct Cells
EE	447508016533	120
VF	447442498960	86
O2	447543132932	97
H3G	447830739625	66



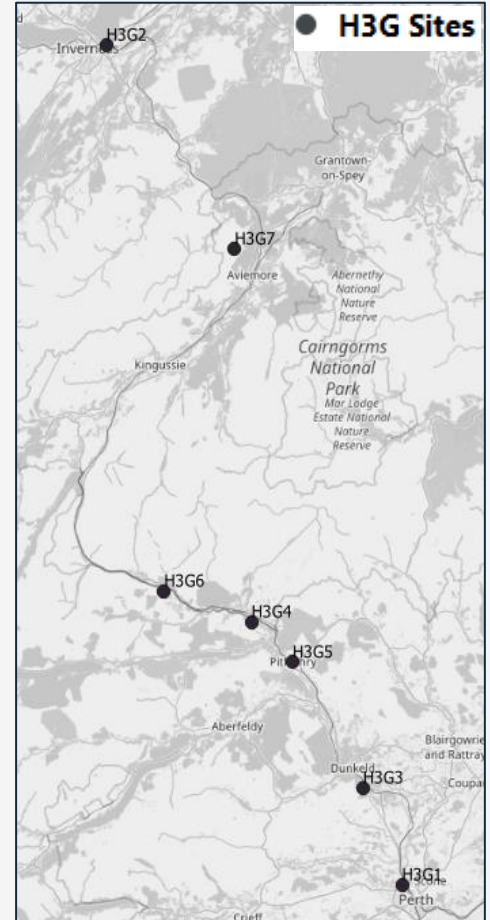
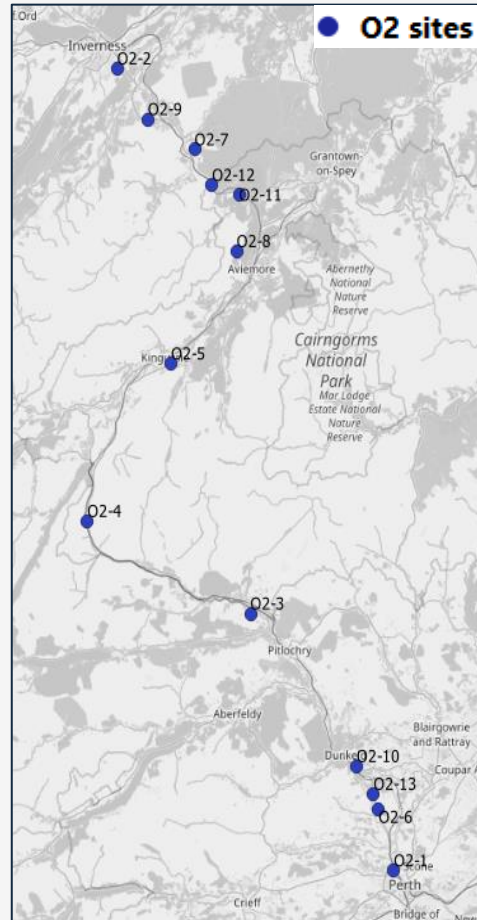
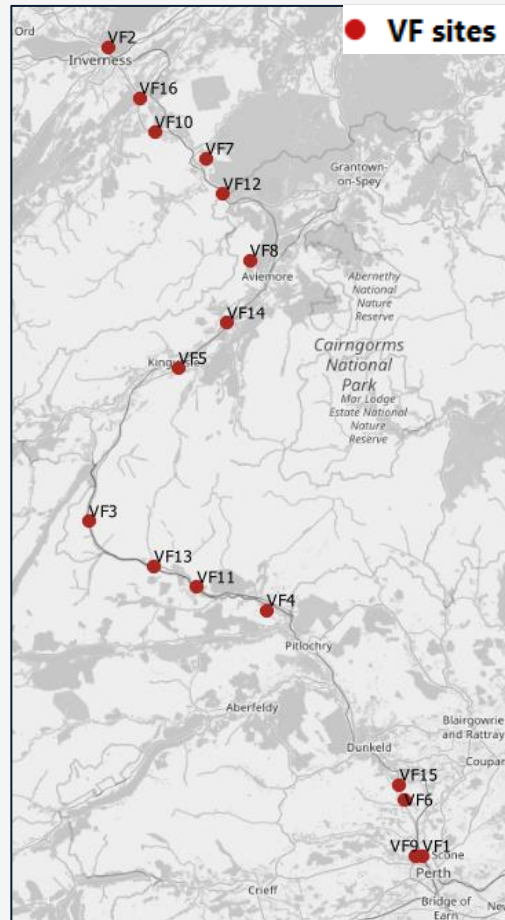
We take a range of measurements, group the data by calculated eNodeB identifiers and use multilateration technique applying our “Site position estimation algorithm” to output latitude and longitude points corresponding to the predicted location of the site. Measurement data was filtered to reduce the likelihood of inaccurate measurements affecting the output.

Results of candid locations were produced running algorithm on many measurements of different cells to produce latitude and longitude of most likely location. This allows us to close estimate site positioning of the competitor sites at a certain location and helps us identify useful information such as distinct cells and azimuths, technology band and channel nos. against each site and their azimuths.

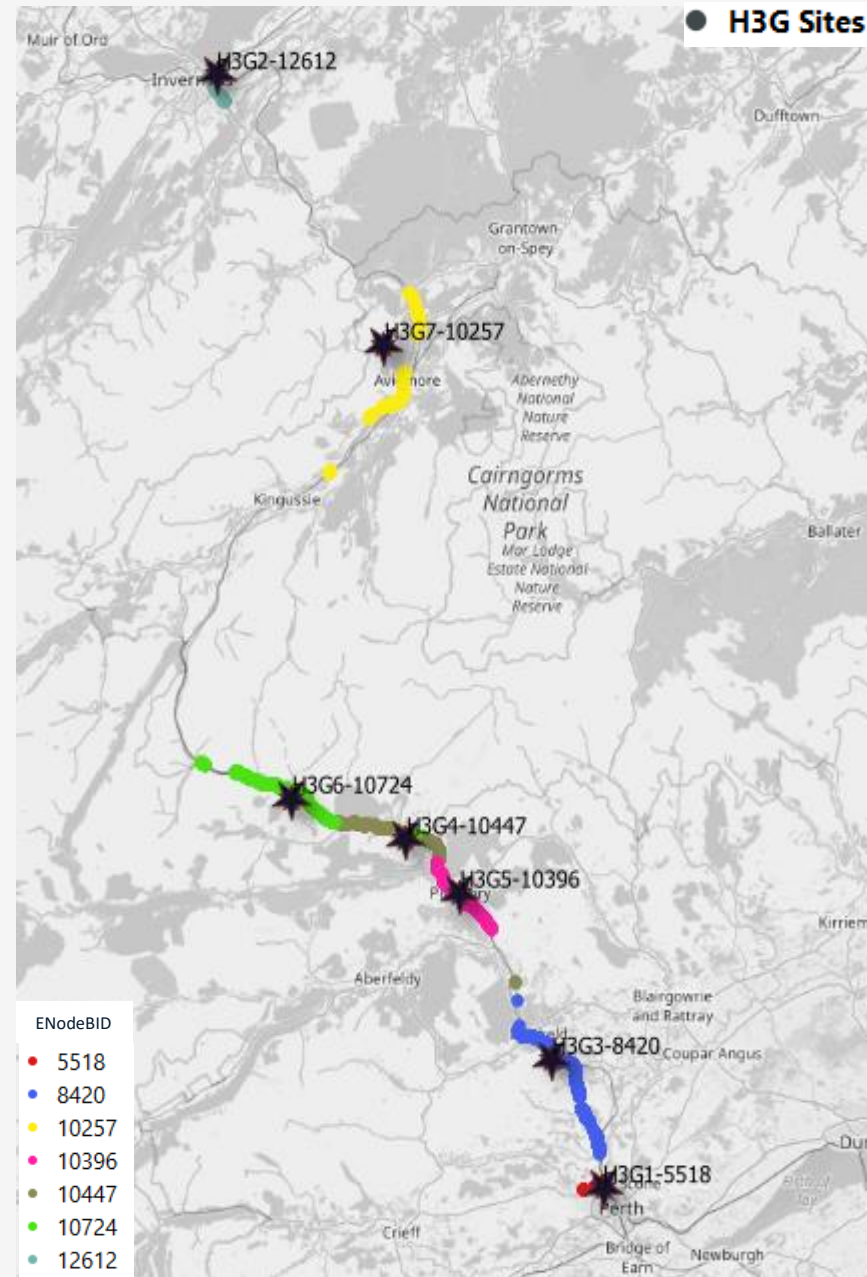
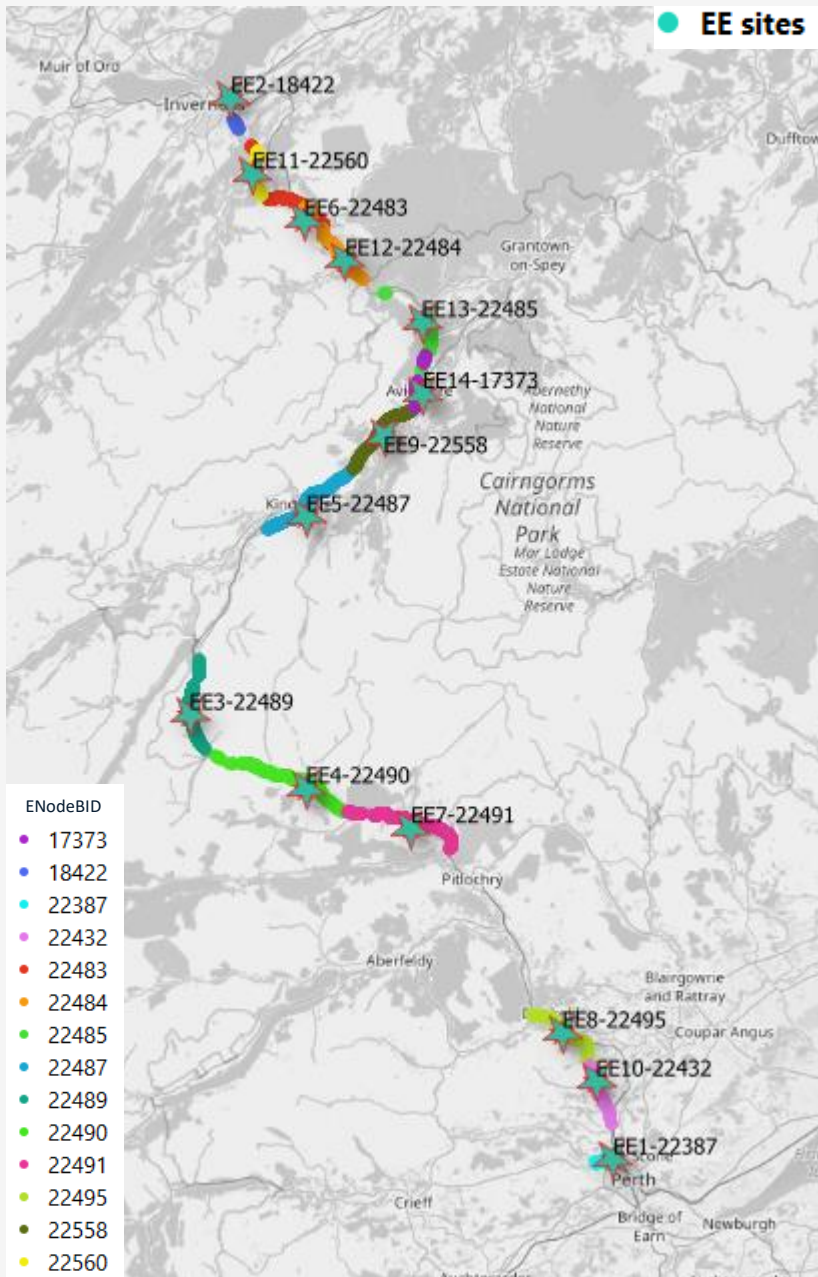
Operator Sites Estimate Positioning

Operator	MSISDN	Sites Positioned
EE	447508016533	14
VF	447442498960	16
O2	447543132932	13
H3G	447830739625	7

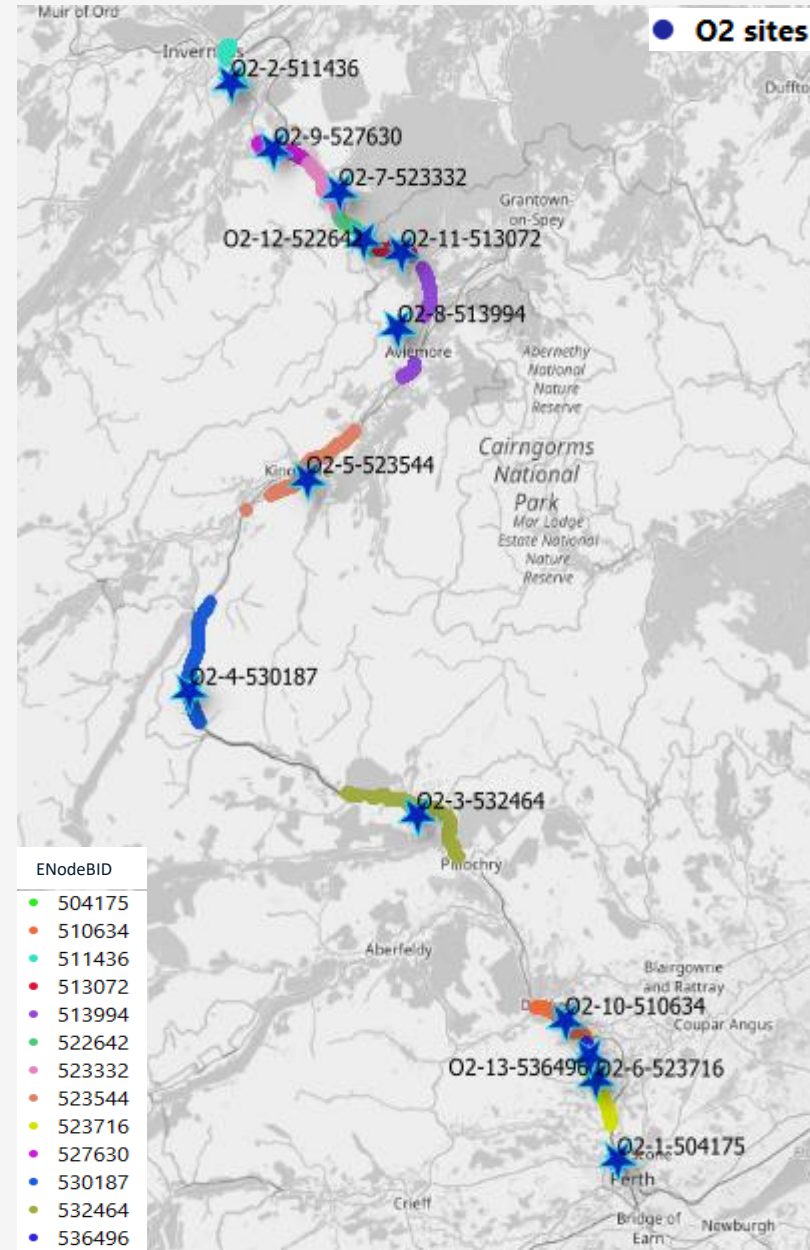
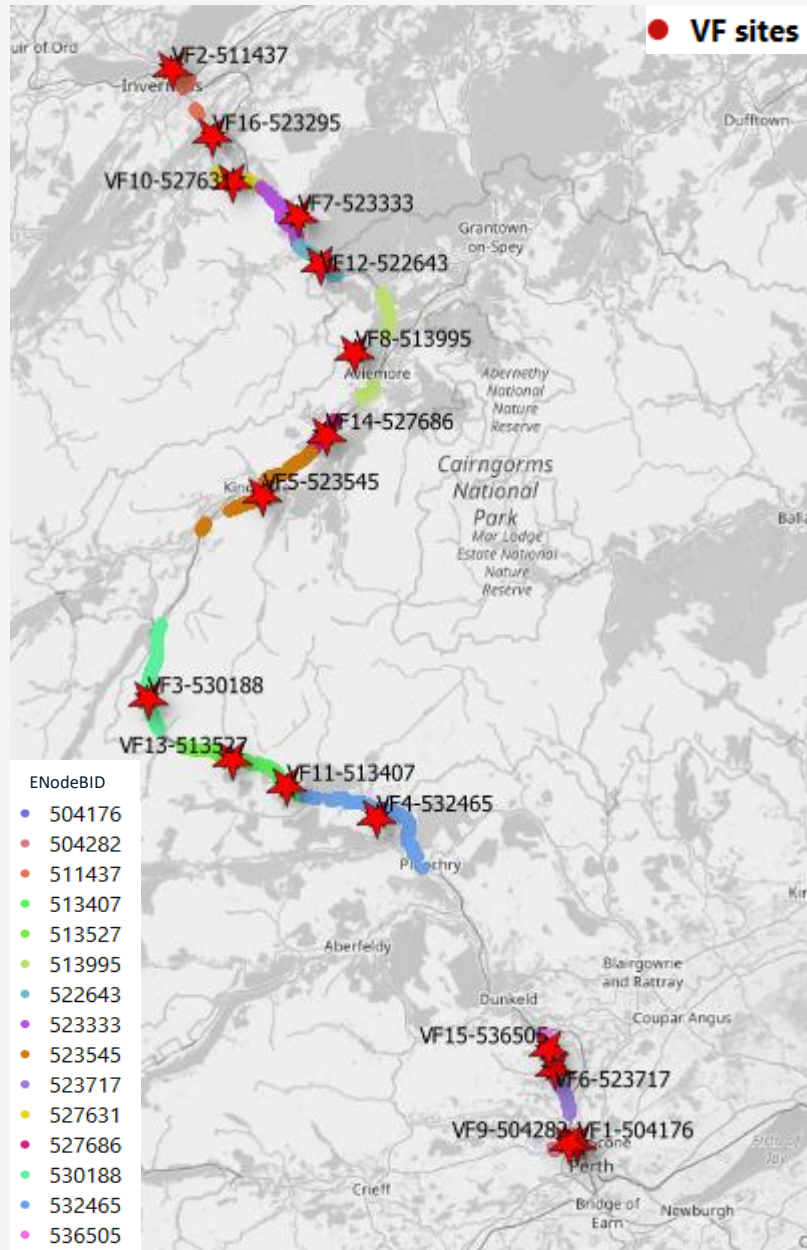
By taking the best calculation results we produced a table of 50 sites sorted on basis of count of EnodeB samples. The sites estimate positions are plotted on the map below for each operator. The breakdown of sites positioned for each operator are listed in the table on left.



Measurements served by each Site against ENodeB IDs



Measurements served by each Site against ENodeB IDs



EE - Estimated Positioned LTE Sites Details

enodeB	SiteID	Site Lat	Site Long	Distinct Cells Picked	Cell ID	CI	LTE Band	channel No	Predicted Azimuth	Positioning Samples	ENodeB Samples
22387	EE1	56.41617462	-3.471130866	3	5731072	0	1800	1617	35	11	2636
					5731073	1	1800	1617	85		
					5731074	2	1800	1617	271		
18422	EE2	57.48499149	-4.176771226	4	4716052	20	2100	522	184	16	1729
					4716037	5	1800	1761	186		
					4716034	2	1800	1617	200		
					4716033	1	1800	1617	169		
22489	EE3	56.86747539	-4.253416212	2	5757185	1	1800	1617	161	27	1054
					5757184	0	1800	1617	5		
22490	EE4	56.79318122	-4.038546291	3	5757440	0	1800	1617	298	26	1046
					5757441	1	1800	1617	111		
					5757452	12	800	6225	293		
22487	EE5	57.06699322	-4.037841725	4	5756674	2	1800	1617	355	18	993
					5756673	1	1800	1617	256		
					5756685	13	800	6225	258		
					5756672	0	1800	1617	37		
22483	EE6	57.36312542	-4.042005596	4	5755650	2	1800	1617	320	29	929
					5755649	1	1800	1617	116		
					5755662	14	800	6225	338		
22491	EE7	56.75298337	-3.844356288	3	5757698	2	1800	1617	300	26	926
					5757697	1	1800	1617	98		
					5757710	14	800	6225	285		
22495	EE8	56.54510041	-3.565165557	4	5758722	2	1800	1617	315	18	860
					5758733	13	800	6225	16		
					5758721	1	1800	1617	122		
					5758734	14	800	6225	302		
22558	EE9	57.14863946	-3.894809015	2	5774849	1	1800	1617	34	16	723
					5774850	2	1800	1617	231		
22432	EE10	56.49577717	-3.503069937	4	5742594	2	1800	1617	271	17	522
					5742593	1	1800	1617	167		
					5742592	0	1800	1617	330		
					5742605	13	800	6225	157		
22560	EE11	57.40976962	-4.137182839	2	5775360	0	1800	1617	15	14	413
					5775361	1	1800	1617	157		
22484	EE12	57.32329426	-3.965548014	4	5755905	1	1800	1617	142	17	408
					5755906	2	1800	1617	189		
					5755918	14	800	6225	214		
					5755904	0	1800	1617	322		
22485	EE13	57.26183282	-3.824330769	3	5756162	2	1800	1617	153	10	368
					5756160	0	1800	1617	326		
					5756172	12	800	6225	44		
17373	EE14	57.19050379	-3.822891988	2	4447490	2	1800	1617	222	7	279
					4447488	0	1800	1617	335		

VF - Estimated Positioned LTE Sites Details

enodeB	SiteID	Site Lat	Site Long	Distinct Cells Picked	Cell ID	CI	LTE Band	channel No	Predicted Azimuth	Positioning Samples	ENodeB Samples
504176	VF1	56.41885379	-3.459428785	2	129069086	30	800	6300	204	7	1849
					129069066	10	800	6300	210		
511437	VF2	57.49609786	-4.208277355	2	130927882	10	800	6300	126	2	1246
530188	VF3	56.86837015	-4.252935975	2	135728148	20	800	6300	163	39	998
					135728138	10	800	6300	7		
532465	VF4	56.74930364	-3.829771851	2	136311060	20	800	6300	300	35	981
					136311050	10	800	6300	114		
523545	VF5	57.07228778	-4.039811467	2	134027540	20	800	6300	244	26	686
					134027530	10	800	6300	41		
523717	VF6	56.49367301	-3.502142094	2	134071562	10	800	6300	159	18	562
					134071572	20	800	6300	327		
523333	VF7	57.34944963	-3.975583108	2	133973258	10	800	6300	183	21	529
					133973268	20	800	6300	283		
513995	VF8	57.21497649	-3.869696631	2	131582750	30	800	6300	159	11	462
					131582730	10	800	6300	43		
504282	VF9	56.41908722	-3.47624366	2	129096202	10	800	6300	72	5	440
					129096222	30	800	6300	250		
527631	VF10	57.38453701	-4.09616041	2	135073546	10	800	6300	91	13	431
					135073556	20	800	6300	283		
513407	VF11	56.78031519	-3.995709005	2	131432212	20	800	6300	312	15	334
					131432202	10	800	6300	124		
522643	VF12	57.30287265	-3.933681398	2	133796618	10	800	6300	133	16	326
					133796628	20	800	6300	315		
513527	VF13	56.80818295	-4.097836014	3	131462932	20	800	6300	284	11	308
					131462942	30	800	6300	287		
					131462922	10	800	6300	106		
527686	VF14	57.13230431	-3.924169791	3	135087636	20	800	6300	346	12	299
					135087626	10	800	6300	30		
					135087646	30	800	6300	229		
536505	VF15	56.51493915	-3.51400394	2	137345290	10	800	6300	170	10	293
					137345300	20	800	6300	346		

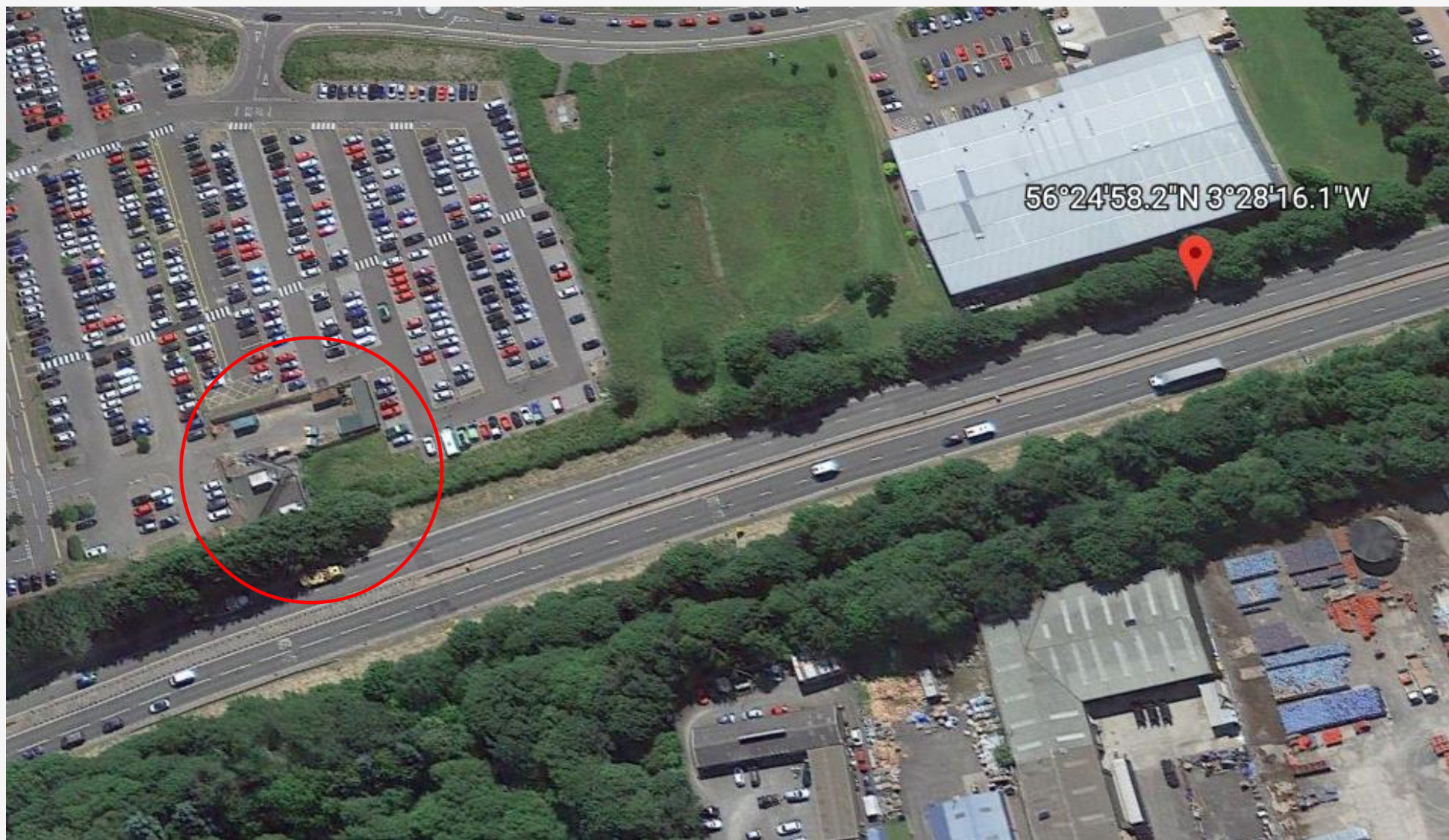
O2 - Estimated Positioned LTE Sites Details

enodeB	SiteID	Site Lat	Site Long	Distinct Cells Picked	Cell ID	CI	LTE Band	channel No	Predicted Azimuth	Positioning Samples	ENodeB Samples
504175	O2-1	56.41432616	-3.46189235	1	129068930	130	800	6400	8	5	1754
511436	O2-2	57.44972317	-4.17477857	6	130927736	120	800	6400	54	6	1185
					130927726	110	800	6400	357		
					130927741	125			358		
					130927728	112	900	3725	358		
					130927732	116	2300	39250	358		
532464	O2-3	56.74915541	-3.831721667	2	136310904	120	800	6400	304	29	978
					136310894	110	800	6400	116		
530187	O2-4	56.86894452	-4.251501911	2	135727982	110	800	6400	6	27	903
					135727992	120	800	6400	166		
523544	O2-5	57.07205505	-4.035631048	2	134027384	120	800	6400	247	28	701
					134027374	110	800	6400	38		
523716	O2-6	56.49341402	-3.501232409	2	134071416	120	800	6400	317	15	593
					134071406	110	800	6400	159		
523332	O2-7	57.3464535	-3.975378257	2	133973102	110	800	6400	184	15	504
					133973112	120	800	6400	281		
513994	O2-8	57.21630236	-3.866870625	2	131582594	130	800	6400	167	9	487
					131582574	110	800	6400	43		
527630	O2-9	57.38515268	-4.095579422	2	135073400	120	800	6400	280	14	451
					135073390	110	800	6400	95		
510634	O2-10	56.55062114	-3.55774577	3	130722424	120	800	6400	164	14	448
					130722434	130	800	6400	295		
					130722414	110	800	6400	132		
513072	O2-11	57.28814151	-3.860756699	2	131346542	110	800	6400	80	9	320
					131346552	120	800	6400	288		
522642	O2-12	57.30099436	-3.930259988	2	133796462	110	800	6400	128	8	284
					133796472	120	800	6400	315		
536496	O2-13	56.51438054	-3.514239167	2	137343096	120	800	6400	348	8	270
					137343086	110	800	6400	168		

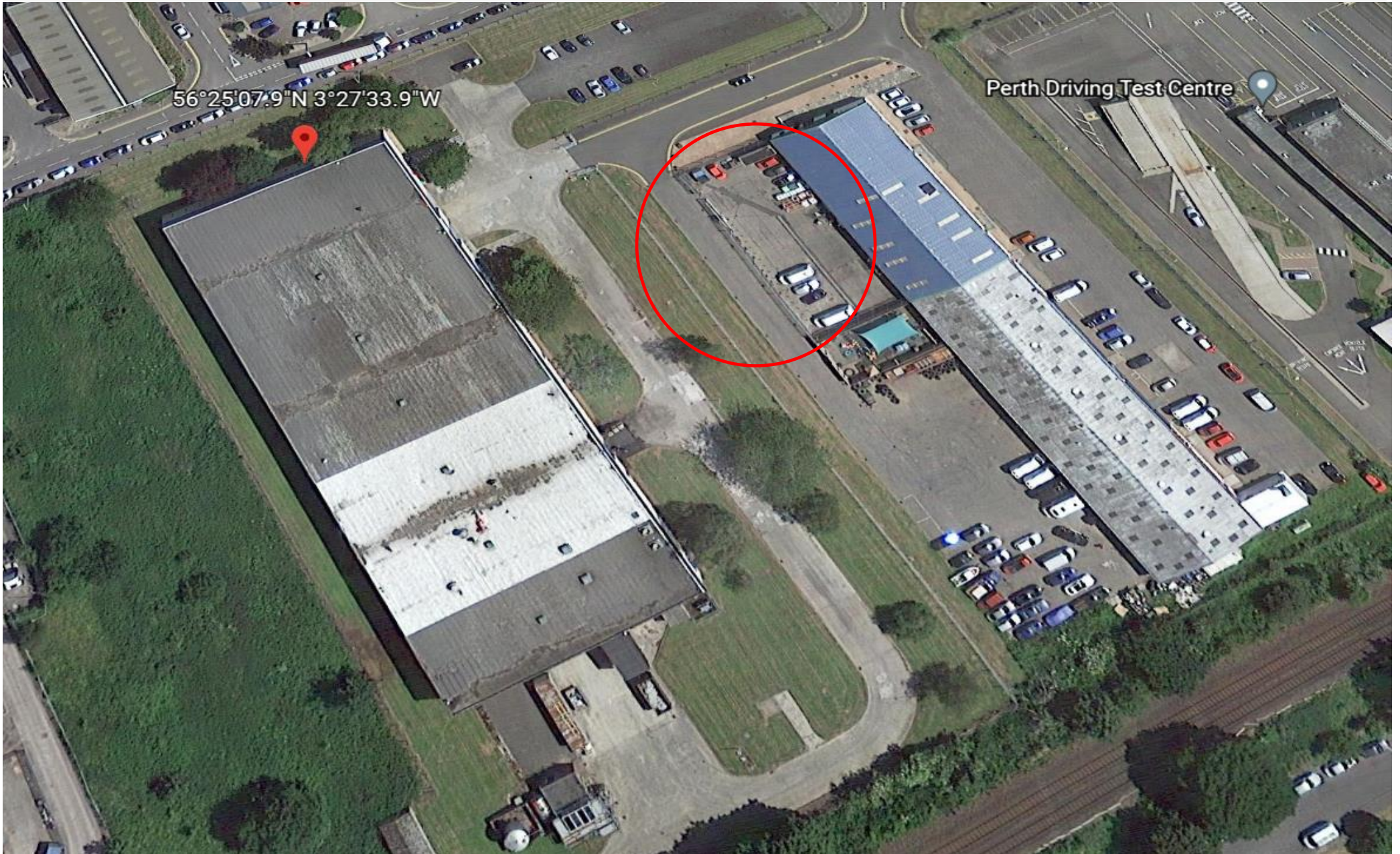
H3G - Estimated Positioned Sites Details

enodeB	SiteID	Site Lat	Site Long	Distinct Cells Picked	Cell ID	CI	LTE Band	channel No	Predicted Azimuth	Positioning Samples	ENodeB Samples
5518	H3G1	56.41516408	-3.467526198	3	1412608	0	1800	1392	12	7	2030
					1412609	1	1800	1392	67		
					1412610	2	1800	1392	275		
12612	H3G2	57.48344776	-4.180919913	2	3228674	2	1800	1392	95	12	1576
					3228673	1	1800	1392	172		
8420	H3G3	56.54019999	-3.561661426	3	2155521	1	1800	1392	322	33	1126
					2155520	0	1800	1392	138		
10447	H3G4	56.75292187	-3.830733208	3	2674432	0	1800	1392	104	23	630
		56.75292187	-3.830733208		2674433	1	1800	1392	292		
10396	H3G5	56.70143072	-3.731668895	3	2661376	0	1800	1392	314	13	500
					2661377	1	1800	1392	134		
10724	H3G6	56.79235022	-4.04150825	3	2745344	0	1800	1392	304	17	487
		56.79235022	-4.04150825		2745345	1	1800	1392	108		
		56.79235022	-4.04150825		2745350	6	800	6175	296		
10257	H3G7	57.22688651	-3.871239591	2	2625792	0	1800	1392	61	11	444
		57.22688651	-3.871239591		2625793	1	1800	1392	172		

EE Estimated Site EE1- Location as seen on Google earth, where actual site is seen in close distance



VF Estimated Site VF1- Location as seen on Google earth, where actual site is seen in close distance





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