

Cell Site Analysis and Expert Opinion

Exhibit Reference:	1026731/MST/1/270526/Cell Site Analysis
Client / Prepared for:	Omagh Bombing Inquiry
Expert:	Dr Matthew Stephen Tart
Lab Reference:	CCL1026731
Client Reference:	OBI
Date:	29 May 2026

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1 Expert Witness Declaration of Understanding

- 1.1. This report has been compiled from information provided to me by Omagh Bombing Inquiry. I reserve the right to re-examine my findings should any of the information furnished be incorrect or be the subject of change at any time in the future.
- 1.2. I, Dr Matthew Stephen Tart, am an expert in Cell Site Analysis and I have been requested to provide an analysis and statement. I produce my Report in accordance with Part 35 of the Civil Procedure Rules and in the knowledge that my evidence is impartial and independent.
- 1.3. In accordance with my duties of revelation, as documented in the guidance booklet, I Dr Matthew Stephen Tart DECLARE THAT:
 - 1.3.1. I understand that my duty is to help the Chairman to achieve the overriding objective by giving independent assistance by way of objective, unbiased opinion on matters within my expertise, both in preparing reports and giving oral evidence. I confirm that I have complied with and will continue to comply with that duty.
 - 1.3.2. I confirm that I have not entered into any arrangement where the amount or payment of my fees is in any way dependent on the outcome of the case.
 - 1.3.3. I know of no conflict of interest of any kind, other than any which I have disclosed in my report.
 - 1.3.4. I do not consider that any interest which I have disclosed affects my suitability as an expert witness on any issues on which I have given evidence.
 - 1.3.5. I have shown the sources of all information I have used.
 - 1.3.6. I have exercised reasonable care and skill in order to be accurate and complete in preparing this report.
 - 1.3.7. I have endeavoured to include in my report those matters, of which I have knowledge or of which I have been made aware, that might adversely affect the validity of my opinion. I have clearly stated any qualifications to my opinion.
 - 1.3.8. I will notify those instructing me immediately and confirm in writing if for any reason my existing report requires any correction or qualification.
- 1.4. I understand that:
 - 1.4.1. My report will form the evidence to be given under oath or affirmation and I may be required to attend to give oral evidence to the Inquiry.
- 1.5. CCL hold UKAS accreditation for Cell Site Analysis.
- 1.6. I confirm that the contents of this report are true to the best of my knowledge and belief and that I make this report knowing that, if it is tendered in evidence, I would be liable to prosecution if I have wilfully stated anything which I know to be false or that I do not believe to be true.
- 1.7. I confirm that I have made clear which facts and matters referred to in this report are within my own knowledge and which are not. Those that are within my own knowledge I confirm to be true.

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2. Author Background

- 2.1. I am Dr Matthew Tart FCSFS, a trained forensic scientist with expertise in the field of "Cell Site Analysis" and the interpretation of telecommunications data. I undertake work for both Defence and Prosecution and am independent of both. I confirm that I abide by the requirements of Criminal Practice Directions and Criminal Procedure Rules in the production of this report. I use validated methods and undertake regular competence assessments for my role. My academic qualifications and professional membership include:
- i) B.Sc. (Hons) in Applied Physics.
 - ii) PhD, with my Doctoral Thesis on "Forensic Inference from Telecommunication Records".
 - iii) Fellow of the Chartered Society of Forensic Sciences (FCSFS).
- 2.2. I have been a Forensic Scientist since 1993, initially joining the UK Home Office Forensic Science Service, immediately followed by CCL Forensics from 2010. Within this period:
- i) 1993-1997; FSS R&D. Physical Sciences Group
 - ii) 1997-2001; FSS R&D. Digital Group. Developing digital recovery techniques.
 - iii) 2001-2003; FSS National Development Manager, High-Tech Casework.
 - iv) 2003-2010; FSS Expert Witness/ R&D, Digital Evidence.
 - v) 2010-date; CCL Expert Witness/ R&D, Cell Site Analysis.
- 2.3. My training encompasses areas including assessment of uncertainty, use of forensic inference models and technical knowledge or skills relevant to specific areas of casework (e.g. telecommunication network operation or use of specific survey or mapping tools).
- 2.4. I routinely conduct R&D in the field. I am lead author on a range of scientific papers, primarily published in Elsevier's Q1 international journals "Science and Justice" and "Digital Investigation", collectively forming much of the academic foundation for Cell Site Analysis.
- i) I hold a "PW Allen Commendation" from the Chartered Society of Forensic Sciences for my paper "Opinion Evidence in Cell Site Analysis" as one of the "most meritorious" in forensic science that year based on "impact, novelty and the quality of the science".
- 2.5. I am focussed on Quality and standards, from detailed local application (developing, validating and implementing Methods and Competency Frameworks) to advising on the Home Office Forensic Science Regulator (FSR) Codes and International Standards (ISO 21043).
- i) I chaired the Cell Site Analysis sub-group (part of the Digital Evidence Group) advising on the development of the FSR Codes: FSR-C-135 "Appendix: Cell Site Analysis".
 - ii) I co-authored the consultation draft of FSR-G-218 "Method Validation in Digital Forensics".
 - iii) I am a member of the FSR Interpretation Group currently developing guidance for forensic inference, and lead the sub-group for Cell Site Analysis .
 - iv) I am a member of the British Standards Institute Forensic Science Module (BSI FSM/1).
- 2.6. I actively engage with the Forensic Science Community for example the Chartered Society of Forensic Sciences (CSFS), the Royal Statistical Society (RSS), Law Enforcement, for example via the Forensic Capability Network (FCN) and Practitioners (e.g. via the College of Policing).
- i) I am author of the "Cell Site Analysis" chapter in the Major Reference Work "*Elsevier Encyclopedia of Forensic Science (3rd Edition)*".

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3. Information and Data Received

- 3.1. I have previously listed material received between 08/01/2025 and 26/05/2026 in my previously issued report " INQ035080 References".

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4. Exhibits Produced

4.1. I have produced the following exhibit:

4.1.1. INQ042462 - Cell Site Maps and tables.

4.2. Whenever I mention a map or a table in this report, it is to be found in the above exhibit.

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5. Purpose

- 5.1. I have been commissioned by the Omagh Bombing Inquiry to set out and analyse the call data for phones 35387[PD]3980, 35387[PD]5585, 35386[PD]5430, 35387[PD]4259, 87[PD]0498, 87[PD]1076, 87[PD]0452, 87[PD]6456, 87[PD]9971 and 86[PD]2371.

12 to 14 August 1998

- 5.2. I have been asked to provide a general commentary of calls with cell usage of phone 87[PD]0498 for the period 22:00 on 12 August 1998 to 05:00 on 13 August 1998. I have also been asked to assess whether the data is of a type to be expected if phone 87[PD]0498 moving from the Dundalk area to the Carrickmacross and back to the Dundalk area during the period 22:00 on 12 August 1998 to 05:00 on 13 August 1998.

15 August 1998 I have been asked to

- 5.3. Consider whether phone 87[PD]1076 was used on this day, and if so when.
- 5.4. Provide general commentary of calls with cell usage of phone 35387[PD]3980, 35387[PD]5585, 35386[PD]5430, 35387[PD]4259, 87[PD]0452, 87[PD]6456 and 87[PD]9971 for the periods 08:00 to 14:28, 14:29 to 15:03 and immediately following 15:04.

I have also been asked to specifically assess whether the data is of a type to be expected if:

- 5.5. Phone 35387[PD]3980 and phone 35387[PD]5585

5.5.1.Moved from the Dundalk area to the Omagh area during the period 12:40 to 15:03.

5.5.2.Were together.

- 5.6. Phone 35386[PD]5430

5.6.1.Moved from the Dundalk area to the public callboxes at McGeough's Crossroads, Newry Road, Forkhill and/ or Loyes Crossroads, Newtownhamilton between 13:48 to 14:28.

5.6.2.Was in an area including the public callbox at McGeough's Crossroads, Newry Road, Forkhill and/ or Loyes Crossroads, Newtownhamilton between 14:29 and 14:31.

5.6.3.Moved to the Dundalk area between 14:31 and 15:03.

- 5.7. I have not been provided with alternative propositions. As an adopted alternative I have assessed whether there is data in conflict with the propositions laid out above. If an alternative explanation for the data is provided, I am prepared to consider it.

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6. Limitations to analysis

I lay out general caveats concerning my analysis in my report "[INQ042460] Cell Site Analysis Principles" and do not repeat them in full here. In addition to those general caveats:

- 6.1. UKAS currently only accredit opinions that reference survey data. I have not used survey data in my analysis and so, while CCL hold UKAS accreditation, the opinions I give fall outside of the scope of possible accreditation. I have, to the best of my knowledge and belief, complied with the FSR Code of Conduct for the entirety of my analysis.
- 6.2. In normal practice for "current" casework I would receive files in their original format as sent by the network. This has not been possible for this analysis. I have received a large amount of information spread over a large number of files (over 200 documents), many of which consisted of scanned paper copies from disparate sources. For example, both [INQ001616] and [INQ001617], provided in .pdf format, were both in excess of 500 pages long and were an amalgamation of scanned documents. Some of the documents considered contain call information of relevance to my analysis, and to use that data I have manually transcribed it; it is possible that transcription errors may have occurred in this process. It is also possible that I may have received data for some of the phones that I have not found within such material. My analysis has been checked to minimise this risk, but the risk cannot be fully mitigated.
- 6.3. The reliability of my conclusions are subject to the quality of the data on which I depend. Some data sources relied upon are the post-processed product from others. For example, while I have co-ordinates of some cells based Northern Ireland, I could not find co-ordinates for cells based in the Republic of Ireland. I have therefore estimated their locations from exhibits produced by others along with (where available) addresses. Likewise, the call data considered is transcribed from scanned records produced by others (i.e. not "original"). I am unable to verify this information and, if there are errors these will carry through into my analysis. While much of the detail I have used has been tested in previous proceedings this is not a normal situation for me (in fact it is unique for my casework to date). If any of the information I have considered changes, is added to, or is subsequently found to be unreliable, reassessment may be necessary.
- 6.4. The manner in which networks operate and store information has changed with time. There can be "features" in the data supplied by some networks. For example, on the (legacy) Orange network in the UK "other party" call data may have been included in the call data; such data has the capacity to mislead and, in my opinion, data expected given "other party" data was present in the call data contained in [O16] (please see section 9.1 of my report "[INQ042460] Cell Site Analysis Principles"). In my opinion, such data also exists in the additional material considered in the Republic of Ireland. Please see:

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- **Table_Calls_Both_Ends** [INQ042462]

The table illustrates calls between phones of interest where cellsite information is available for both parties. In each of the 16 calls the same cell information was presented for both the incoming and outgoing end of the call. Even if the phones were in the same general area, in my opinion it is reasonable that more than one cell may be available and so this leads me to believe that "other party" call data may be present in all incoming records where the calling number is known (and therefore listed). I therefore have excluded all "incoming" cellsite information from my analysis, and format these records in grey italics when presented in the tables I have produced. While I believe it is reasonable to exclude such data, I have not performed tests on the networks in the Republic of Ireland and, over 25 years after the call data considered, there is no opportunity to perform experiments to verify my understanding.

- 6.5. In a "normal" contemporaneous case I would conduct surveys to assess whether cells of interest served areas including specific locations and as a general test of the information contained in the call data (survey results can be used to verify mast locations and azimuths, for example). In my opinion there is no value in performing surveys 25 years after the calls considered as the current state of the networks will be far removed from that at the time of the call data considered.
- 6.6. My assessment is therefore a "desk exercise". This itself is subject to additional limitations that I do not encounter in contemporaneous casework. The cellsite density was far lower in 1998 than it currently is, and cell ranges would therefore be much larger than I would expect in current networks. To illustrate this point, I have illustrated the cellsites in Omagh in the material I have considered with those that were available from Ofcom in a dataset they published in 2012 in:

- **Map_Network_changes_Omagh** [INQ042462]

- 6.7. The presence of other cells is a primary factor in limiting the service area of a given cell; if there are very many cellsites in a given area, cell sizes tend to be smaller. Conversely, fewer cellsites usually results in larger cells. Between 1998 and 2012 there were major changes in all networks as new cellsites and technologies were introduced. Cellsite analysis can be comparatively far more precise in current cases than would have been possible in 1998.
- 6.8. For example, Cell ID 61451 ("Pigeon Top") was assessed as providing service at some locations to the full 35km of its possible range [INQ028453]. I have only rarely encountered such large service areas in my personal casework in the last twenty years or so (and only in one case, for cells serving into Dartmoor). The suburban Cell ID 46852 ("Omagh College") was reportedly measured as having a range of 5km [INQ028453], larger than I would expect for contemporaneous suburban cells. To illustrate the "real world" consequence of such

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(comparatively) large cell sizes, I have illustrated a radius of approximately 35km from the Pigeon Top mast, and approximately 5km from the Omagh College mast, in:

- **Map_Ranges** INQ042462

- 6.9. When using this map, it is important to clarify that there will be many areas within the 35km circle where no Pigeon Top cell will provide coverage. There will also be locations where there is coverage (i.e. a useable signal) from Pigeon Top but other cells provide stronger coverage and would be more likely to be selected (i.e. be used to service a call). This is difficult to reliably predict; while I would expect a phone close to (and potentially with line of sight to) the "Omagh College" mast to select a cell on it, there may also be parts of Omagh where for example buildings degrade the Omagh College signal sufficiently that the more distant Pigeon Top mast to be selected. It is normal in my experience for cell service areas to overlap quite considerably.
- 6.10. I do not have azimuths for the cells used, for example (except for Cell ID 61451, which I understand is assessed as 70° in some material that I have received). I have illustrated a radius of approximately 35km from the Pigeon Top mast along with an azimuth of 70° in

- **Map_61451** INQ042462

I would expect service to extend in the general direction of the azimuth and to each side, often to approximately 60° each side such that three sectors combined would make a whole circle. In reality from my experience of fully mapping thousands of cells in a range of environments there is often far wider service from a given sector, often up to 90° each side of the azimuth, and there can be "back lobes" of service for a hundred metres or more behind the mast. Nevertheless, I expect service from a given sector to be primarily in the direction of the azimuth. I do not, however, have the azimuth for any of the cells under consideration other than Cell ID 61451. This may be because the cells used were Omnicells (cells not pointed in any particular direction). For example, coverage maps for Cell ID 6135 (Aughnacloy, in INQ034429), Cell ID 462 (Cranlome, in INQ034431) and Cell ID 46852 (Omagh College, in INQ034430) do not show patterns that I would expect if the cells were sectors; they each radiate from the mast with no discernible preferred direction. Compared to Cell ID 61451 (Pigeon Top, in INQ034428) the difference is remarkable; Cell ID 61451 illustrates a clear pattern of coverage to the east of the mast with almost none to the west, as might be expected given an azimuth generally to the east (e.g. 70°). The coverage maps also give a general indication of expected cell sizes, although in my view should be treated with care in the detail and used as general indicators only. I do not know the settings of how the maps were generated, or the values assigned to the colour codes used. That said, the manner in which I am using them does not in my view require complete knowledge; I have assumed that no colour is no useable signal, and then useable signals range

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from blue to green (with green implying a stronger signal). There is no scale bar on the maps but some roads can be seen to give a general expectation of possible ranges. The main conclusions that I have drawn are that

- i) Pigeon Top was sectorised,
- ii) Omagh College was not sectorised
- iii) The coverage pattern for Cell ID 46852 Omagh College is far more constrained than for Cell ID 61451 Pigeon Top and lies entirely within that of Cell ID 61451.
- iv) Likewise, expected coverage of 6135 Aughnacloy appears to be almost entirely within that of Cell ID 462 Cranlome, the latter potentially providing coverage potentially 20km or more from the mast and on both sides of the border. Cranlome is over 20km from Omagh, but there may be some areas served by Cranlome toward Omagh, potentially close (but difficult to estimate how close).

6.11. I would not personally use coverage plots to demonstrate that there was definite service from a given cell at any specific location, but they can be used to provide a general indication of an approximate area in which it would be unwise to exclude a phone from having been.

6.12. Cellsites in Republic of Ireland.

6.12.1. The call data I have considered does not contain cells names or locations as part of the record. I have reviewed the material to find Site Names or mast locations for each Cell ID. Much of the material I have considered was processed (i.e. not in its original form as sent by the network but in a map or table produced to illustrate usage). Where possible, I have cross-correlated Cell ID and Cell Name data from different sources to check consistency.

6.12.2. I have only found one obvious misnaming in the material. Cell ID "035C" is described as "Ravensdale" in INQ000431, INQ000432 and INQ011952. In INQ000430, Cell ID "035C" is also described as "Ravensdale" on a number of occasions, but also (for a single instance) "Dundalk". I currently believe that the "Dundalk" label is a typographic error.

6.12.3. I have also found inconsistency concerning cells based at Clermont Carn, a hill north of Dundalk. I have found reference to Clermont Cain, Clermont Carns, Clermont Cairns etc. which I have assumed are misspellings of Clermont Carn.

6.12.4. I have not found co-ordinates for any of the mast locations in the Republic of Ireland in the material provided. The cellsite locations have, however, been illustrated in some exhibits, and I have had no other option but to estimate mast locations from this material. I show the origin of the data on which I have relied in section 12 ("Republic of Ireland

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Cellsite data"). I have illustrated the mast locations (either from co-ordinates or estimated using the process outlined above) of specific cells observed in the call data considered in:

- **Map_Cellsites** INQ042462

6.12.5. I did not find the names of all of the cells listed in the call data in the wider material considered. The missing cells, and their effect on my analysis, are as follows:

Number	Cells missing	Calls affected
086 2371	None	0
086 5430	520C	1
087 6456	None	0
087 4259	SHMV1	1
087 PD 9971	2C2D	1
087 5585	None	0
087 3980	None	0
087 1076	None	0
087 0498	c5219	3

- 6.13. The factors listed above, when combined, dramatically reduce the precision and potentially reliability of my findings. My assessments are therefore by necessity "Best Endeavours" with data that is apparently useable and for which I have no obvious reason to doubt.
- 6.14. I have presented International Mobile Equipment Identity (IMEI, identifying a handset) and International Mobile Subscriber Identity (IMSI, identifying the subscriber) for phones where those data are provided (subscriber details or summaries). I do not need the IMEI or IMSI to be able to perform Cell site analysis and present them for completeness. The IMEI and IMSI are provided by default in modern CDRs, and can also be requested as subscriber details via a Single Point of Contact (SPOC). I have never personally requested such data from a network (I am not, and have never been, a SPOC). I do not know why IMSIs and/ or IMEIs are available for some phones but not others. Possible explanations include but may not be restricted to that they are in the data but I have missed them (there is a lot of scanned material), they were requested but are not included in the material or they were never requested.
- 6.15. I have also presented the network of the phone where known. This enables me to assess whether a given phone was roaming and therefore at risk of having "other party" call data included in the records for it.
- 6.16. I lay out general caveats in section 13. These caveats are generic limitations that I routinely include in evidential reports. In summary, they make clear that:

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- i) There can be changes in networks and understanding of limitations of call data. My analysis is based on the information specified in the report. If any of this information changes, a re-analysis may be necessary. For this examination, no surveys were conducted so this caveat does not directly apply.
- ii) Clarification of language used (e.g. what "data of a type to be expected" means).
- iii) Expected cell sizes, and their effect on the precision of my analysis.
- iv) Disclosure information.

I have not seen caveats of this type in the analyses presented within the material I have reviewed. I review the reliability of Cell Site Analysis used in 1998 in section 12 of my report "INQ042460 Cell Site Analysis Principles". While these caveats are not presented, I have found no evidence that indicates the findings within those reports that I reviewed are unreliable.

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7. Phones considered and data used in analysis.

Phone for which, in my opinion, Cell Site Analysis is possible

7.1. **Phone 87 PD 0498 ("498")**

7.1.1. Call Data when using cellsites in the Republic of Ireland is contained in INQ001616 (page 222) and INQ001617 (pages 150 and 151). There was no call data for this phone present in INQ000433 ("0161"). I have transcribed the data that I have located and present it in:

- **Table_498** INQ042462

7.1.2. The phone had an IMEI of PD 1097 and was on Eircell (from INQ013549). I do not know the IMSI.

7.2. **Phone 87 PD 1076 ("076")**

7.2.1. Was on the Eircell network (INQ000430, INQ011952) and was "Ready To Go" ("RTG", which I understand is like Pay As You Go).

7.2.2. Call Data when using cellsites in the Republic of Ireland is contained in INQ001616 (page 224 and 309) and INQ001617 (page 158). There was no call data for this phone present in INQ000433 ("0161"). I have transcribed the data that I have located and present it in:

- **Table_076** INQ042462

7.2.3. The phone had an IMSI of PD 8441 (INQ039126). I do not know IMEI.

7.3. **Phone 35387 PD 3980 ("980").**

7.3.1. Was on the Eircell network (from documents INQ000430 & INQ011952).

7.3.2. Call Data when using cellsites in the Republic of Ireland is contained in INQ001616 (page 46) and INQ001617 (pages 5, 24, 25, 167 & 170). Call Data when roaming on the Northern Ireland Vodafone network is contained in INQ000433 ("0161", page 5). I have transcribed the data that I have located and present it in:

- **Table_980** INQ042462

7.3.3. The phone had an IMSI of PD 8896 and an IMEI of PD 1390 (from INQ012661).

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7.4. **Phone 35387 PD 5585 ("585")**

7.4.1. Call Data when using cellsites in the Republic of Ireland is contained in INQ001616 (page 316) and INQ001617 (pages 82 & 316). Call Data when roaming on the Northern Ireland Vodafone network, with data when doing so contained in INQ000433 ("0161", page 4).

I have transcribed the data that I have located and present it in:

- **Table_585** INQ042462

7.4.2. The phone had an IMSI of PD 9876 and an IMEI of PD 0315 (from INQ012661).

7.5. **Phone 87 PD 9971 ("971")**

7.5.1. Call Data when using cellsites in the Republic of Ireland is contained INQ001617 (pages 44 and 49). There was no call data for this phone present in INQ000433 ("0161"). I have transcribed the data that I have located and present it in:

- **Table_971** INQ042462

7.5.2. The phone had an IMSI of PD 1596 (INQ039126). I do not know IMEI.

7.6. **Phone 87 PD 6456 ("456")**

7.6.1. Call Data when using cellsites in the Republic of Ireland is contained INQ001617 (page 35). There was no call data for this phone present in INQ000433 ("0161"). I have transcribed the data that I have located and present it in:

- **Table_456** INQ042462

7.6.2. The phone had an IMSI of PD 6895 (INQ039126). I do not know IMEI.

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7.7. **Phone 35386 PD 5430 ("430")**

7.7.1. Was on the Esat Digifone network in the Republic of Ireland (INQ011952). I have received call data from a range of sources.

7.7.2. Within INQ039237, there is a range of data from Esat Digifone. I have used this as my primary source of cellsite data information. The data is out of order, and there appear to be some gaps but in my view the information is useable to relevant find call data. The data I have used (manually transcribed) for 15th August 1998 is between pages 32-35, 43-47 and 56-61. Within INQ039346, on page 30, there is an additional Toll Ticket Enquiry from Vodafone which provides details of a text message in Northern Ireland. I have transcribed details of calls on 15/08/1998 into:

- **Table_430_Network** INQ042462

7.7.3. Call Data when using cellsites in the Republic of Ireland is contained in INQ001617 (pages 27 and 28). Call Data was also listed in INQ000433 ({"016"1", page 2). I have only found incoming call data for this phone in all of the sources that I have located. In my opinion, there are occasions where the cell site information associated with calls that are "other party" (i.e. the listed cell sites may be those used by the calling phone). I include the table for clarity that there are differing sources of information available for consideration. I have transcribed the data that I have located and present it in:

- **Table_430_Additional** INQ042462

7.7.4. The phone had an IMSI of PD 6606 and an IMEI of PD 0710 (from INQ012661).

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7.8. **Phone 35387 PD 4259 ("259")**

7.8.1. Was on the Eircell network (INQ000430, INQ011952) and was "Ready To Go" ("RTG") which I understand is equivalent of "Pay As You Go".

7.8.2. Call Data when using cellsites in the Republic of Ireland is contained in INQ001616 (page 250) and INQ001616 (pages 26, 31 and 161). Call Data was listed in INQ000433 ("O161", page 3). I have only found incoming call data for this phone for 15/08/1998, although outgoing call data is present for other dates, e.g. 13/08/1998 and 16/08/1998. In my opinion, some cell site information that I have for this phone is potentially "other party" (i.e. the listed cell sites may be that used by the calling phone) when roaming in Northern Ireland ;I am unable to reliably perform cell site analysis for this phone when using sites in Northern Ireland at present. I have transcribed the data that I have located and present it in:

- **Table_259** INQ042462

7.8.3. Additional data may have been available for this phone, as usage is illustrated for example in INQ012963. Both calls were also in the data I had considered and flagged as potentially unreliable. I have transcribed the data that I have located and present it in:

- **Table_259_FMS** INQ042462

7.8.4. The phone had an IMSI of PD 4510 (INQ012661) and an IMEI of PD 1230 (INQ011952).

7.9. **Phone 86 PD 2371 ("371")**

7.9.1. Data is contained in INQ001616 (page 449) and INQ001617 (page 155). There was no call data for this phone present in INQ000433 ("O161"). I have only found incoming call data with cell or cellsite information for this phone in all of the sources that I have located (there are outgoing calls presented on p423 INQ013549, but this does not include cell site information). I have transcribed the data that I have located and present it in:

- **Table_371** INQ042462

7.9.2. I am informed that this phone was on ESAT (page 6 of INQ001616). I understand that ESAT Digifone was rebranded as O2 after 1998 (I understand in 2002) and phone 86 PD 2371 was listed as active in 1998 by O2 in 2005 (page 104 of INQ001616).

7.9.3. I do not know the IMSI or IMEI for this phone.

7.9.4. I do not know if I can trust "incoming" data when in the Republic of Ireland, it is possible it may reflect true cell usage, but I don't know for sure.

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Phones for which I am currently unable to progress Cell Site Analysis

7.10. **Phone 87 PD 0452 ("452")**

7.10.1. I have been unable to locate any call records for this phone in the data I have reviewed.

7.10.2. The phone had an IMSI of PD 8183 (INQ039126). I do not know the IMEI.

7.10.3. I believe that phone 87 PD 0452 was on Eircell in 1998, as it was listed as a number confirmed by Jim Faughnan on Vodafone (who acquired Eircell in 2001) on page 29 of INQ013549

7.10.4. I do not know if I can trust "incoming" data when in the Republic of Ireland, it is possible it may reflect true cell usage, but I don't know for sure.

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8. Analysis: 12 to 14 August 1998 (Phone 87[PD]0498 only)

8.1. **Phone 87[PD]0498.** I have been asked to assess whether the data is of a type to be expected if phone 87[PD]0498 moved from the Dundalk area to the Carrickmacross and back to the Dundalk area during the period 22:00 on 12 August 1998 to 05:00 on 13 August 1998. I have also been asked to provide a general indication of cellsite usage until 15/08/1998. Only cells based in the Republic of Ireland are in the call data considered for this phone in this period. All of the calls were outgoing (i.e. 498 was the "calling" number) and I currently understand that the listed cell that I have used in my analysis would have been that used by 498 at the indicated time.

8.2. The cells listed in the call data for phone 498 over the period considered were:

521A	Clermont Cairns (which I have assumed is the same mast as Clermont Carn)
0373	Dundalk
0374	Dundalk
0375	Dundalk
0270	Dundalk
5219	<i>Not found (listed for 3 call events)</i>

The cellsites at listed above, where known, are illustrated in:

- **Map_498** [INQ042462]

8.3. I do not know where any of the cells served and I have not found coverage predictions or reference to survey measurements. I have a general expectation that cells based at:

- Dundalk may serve up to approximately 5km from the mast, possibly further. There were multiple cells listed for this site, which implies sectorisation, but even if so I do not know the azimuth of each sector.
- Clermont Carn may serve much further, potentially even comparable to the 35km measured service of "Pigeon Top". The mast is on a hill and (from Google maps) there is a large mast on the top of that hill that may reasonably have been the same structure as in 1998. In the wider data (i.e. for all phones) here were multiple cells listed that implies sectorisation, but even if so I do not know the azimuth of each sector.

8.4. There was only one call event between 22:00 on 12 August 1998 to 05:00 on 13 August 1998. At 02:28:39, phone 87[PD]0498 made a 12 second call, handled by Cell 0374 ("Dundalk"). The previous call was at 16:42:24 on 12/08/1998 handled by Cell ID 0375 ("Dundalk"), and the following call was at 10:42:26 on 13/08/1998 handled by Cell ID 0374 ("Dundalk"). The cellsite at Dundalk is illustrated in:

- **Map_498_12-130898** [INQ042462]

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8.5. The town of Carrickmacross is approximately 20km west of the town of Dundalk.

- i) I would not expect a suburban cell to serve 20km away from the mast, but I do not know the azimuth of the cells, or height of the mast. That said, I would not expect the data if, at 02:28, the phone was in Carrickmacross.
- ii) From Google maps, driving between Dundalk and Carrickmacross takes less than 35 minutes by car. There was only one call event in the seven hour period considered, at 02:28. Even if the cells used at 16:42, 02:28 and 10:42 were oriented away from Carrickmacross, there is sufficient time to move from Dundalk to Carrickmacross and back again (or indeed to and from a much wider area). I therefore cannot exclude the possibility that the phone was in Carrickmacross at some time between approximately 22:00 on 12 August 1998 to 01:55 on 13 August 1998, or 03:00 to 05:00 on 13 August 1998, but there is no data that indicates such a journey took place.

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9. Analysis: 15 August 1998, 12:40 to 14:28

9.1. **Phone 35387[PD]3980 and phone 35387[PD]5585.** I have been asked to assess whether the data is of a type to be expected if phone 35387[PD]3980 and phone 35387[PD]5585

- i) Moved from the Dundalk area to the Omagh area during the period 12:40 to 15:03.
- ii) Were together.

9.1.2. In my opinion it is reasonable that there was "other party" cellsite data in the call records for both phone 35387[PD]3980 and phone 35387[PD]5585. I have excluded this data from consideration. I present the call data I have used in:

- **Table_585-980_150898** [INQ042462]

9.1.3. I have illustrated the cellsites used by phone 35387[PD]3980 and phone 35387[PD]5585 until 14:28 in:

- **Map_585-980_150898_Until_1428** [INQ042462]

Cells serving in Omagh.

9.1.4. Phone 35387[PD]3980 and phone 35387[PD]5585 used cells at times that, in my opinion, may reasonably be expected to serve in parts of Omagh (as well as a wider area)

- i) Cell ID 46852 (Omagh Technical College). A coverage map was generated for this cell (INQ034430) and it appears to have been an Omnicell (i.e. not pointed in a specific direction) with a more constrained area than other cells considered. In my opinion it is reasonable that Cell ID 46852 served over much of Omagh and was described as being measured serving up to 5km from the mast (INQ013303).
- ii) Cell ID 61451, based at Pigeon Top, with an azimuth of 70°, was measured and was serving up to 35km from the mast. A coverage map was generated for this cell (INQ034428) and the azimuth provided seems reasonable (i.e. there was obvious coverage to the east of the mast but very little to the west). Omagh is approximately 8km to the east of the mast and in my opinion Omagh was within the (very large) service area for this cell.
- iii) There may have been other cells that also provided service in Omagh not used by the phones under consideration.

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9.1.5. Phone 35387[PD]5585. Between 12:41 and 13:57 in my opinion the data is expected if phone 35387[PD]5585 moved northward from the Republic of Ireland (or potentially close to the border in Northern Ireland) to an area including parts of Omagh. Phone 35387[PD]5585 used cellsites at:

- i) 12:41, Castleblaney (Republic of Ireland, northeast of Dundalk) .
- ii) 13:13, Emyvale (further north in the Republic of Ireland).
- iii) 13:29, Aughnacloy (Northern Ireland)
- iv) 13:57, Omagh Technical College (Northern Ireland)
- v) 14:09, 14:10 & 14:19, Pigeon Top (Northern Ireland)

9.1.6. Phone 35387[PD]3980. Between 13:29 and 14:09 in my opinion the data is expected if phone 35387[PD]3980 also moved to an area including parts of Omagh in Northern Ireland. Phone 35387[PD]3980 used cellsites at:

- i) 13:29, Aughnacloy (Northern Ireland)
- ii) 13:57, Pigeon Top (Northern Ireland)
- iii) 14:09, Omagh Technical College (Northern Ireland)
- iv) 14:14 and 14:19, Pigeon Top (Northern Ireland)

There were calls to phone 35387[PD]3980 prior to 13:29, but the calls were incoming and I do not believe that I can reliably use the cellsite information in the records.

9.1.7. Contact between phones. Within the period considered:

- i) Phone 35387[PD]5585 called phone 35387[PD]3980 at 12:41, 13:13, 13:29 & 13:57.
- ii) Phone 35387[PD]3980 called phone 35387[PD]5585 at 14:09 & 14:19.

9.1.8. Assessment of alleged movement from Dundalk to Omagh and Colocation.

- i) I do not have reliable cellsite information for phone 35387[PD]3980 during the period when phone 35387[PD]5585 was using cellsite in the Republic of Ireland.
- ii) The first call event with useable cellsite information for 585 was at 12:41 using the Castleblaney cellsite. The data is not in conflict with the proposition that it was in Dundalk prior to this, but there is no data that demonstrates it was. No cellsite in Dundalk was in the call data for either phone. The following call, at 13:13 was handled by the Emyvale site, also in the Republic of Ireland. I do not know the azimuths of the cells used at 12:41 or 13:13. In my opinion it is reasonable that some cells based on these masts would serve areas including the N2 in the Republic of Ireland which runs

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through Castleblaney, Emyvale and on to Aughnacloy and this route suggests itself as an obvious possible explanation for the data; I cannot exclude the possibility that the phone may have, for example crossed the border into Northern Ireland earlier (e.g. via Middletown, not illustrated on map). Other explanations for the data may also be possible (i.e. these may not be the only possible routes).

- iii) While using cellsites in Northern Ireland, both phones used Cell ID 61350 based at Aughnacloy at 13:29, followed by cells in my opinion serving parts of Omagh. Usage of the "Pigeon Top" cell is not particularly discriminating in my view. In my opinion the Omagh Technical College Cell must have served at least parts of Omagh (as the mast is within the town) and is expected to have had a much smaller footprint; it is therefore a more reliable indicator that there was movement to the general area of Omagh. Phone 35387[PD]5585 used this site at 13:57 and phone 35387[PD]3980 used this site at 14:09. Both of these calls were between 585 and 980.
- iv) In my opinion, while the data is not in conflict with the phones being together, I note that all of the calls until 14:09 were contacts between 35387[PD]5585 and 35387[PD]3980. As a common sense expectation (i.e. non-expert opinion) it is not expected normal behaviour to call a person who is directly adjacent.
- v) Taken as a whole, the data is broadly in keeping with that which I might expect if the phones travelled between similar general areas in a similar period - as might be the case if they were in convoy - but the phones also could be many kilometres apart and I would not know from the call data.

9.2. **Phone 35386[PD]5430.** I have been asked to assess whether the data is of a type to be expected if phone 35386[PD]5430 moved from the Dundalk area to the public callboxes at McGeough's Crossroads, Newry Road, Forkhill and/ or Loyes Crossroads, Newtownhamilton between 13:48 to 14:28.

9.2.1. There is a map of the location at McGeough's Crossroads on page 500 of INQ001616. I have used this for my assessment.

9.2.2. There is a map of the location at Loyes Crossroads on page 10 of INQ029906. This appears to be the same location as a telephone kiosk shown on page 499 of INQ001616. I have used this for my assessment.

9.2.3. I have illustrated the cellsites in the data from the expert report for phone 35386[PD]5430 on 15/08/1998 along with the known and assumed locations of the telephone kiosks in:

- **Map_430** [INQ042462]

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9.2.4. Cell ID 3340 is listed for a text message at 14:30:33; the location of mast 334 is listed on page 36 of INQ001616. I have listed this site in red as I have made an assumption that Cell ID 3340 is based at Site 334 (due to the naming convention used by Vodafone).

9.2.5. Within the period under consideration, there were call events at 14:10 and 14:19, handled by the "Clermont Carn" cellsite in the Republic of Ireland. These were followed by additional call events from 14:30 which, while after the period considered is in my view relevant to my assessment. There was a call at 14:30 handled by a cellsite in Northern Ireland at Camlough Hill detailed above. The following calls at 14:37 and 14:38 were handled by cellsites in the Republic of Ireland again, but at Mullyash Mountain approximately 20km west of Camlough Hill and 25km northwest of Clermont Carn. At 14:47, the phone was again using the Clermont Carn site. Taken as a complete sequence, in less than 30 minutes 3 widely spaced cellsites were used, with one of those sites used while the phone was roaming.

9.2.6. For a phone to roam, I would expect it not have a useable signal from any cell on its home network in the Republic of Ireland. In my opinion this would be more likely to occur if the phone was closer to masts in Northern Ireland and further from those in the Republic of Ireland rather than the other way round. That said, this is not a definitive indicator that the phone must have been in Northern Ireland, as there may be places in the Republic of Ireland where the peculiarities of terrain enable service from the Camlough Hill mast while blocking closer sites in the Republic of Ireland.

9.2.7. All three sites appear to be high-points relative to their surroundings:

- i) Clermont Carn is approximately 500 metres high and has a large mast on it.
- ii) Camlough Hill is approximately 400 metres high and has a large mast on it.
- iii) Mullyash Mountain is approximately 300 metres high. I was unable to find a mast.

9.2.8. I do not know the service area of any of the cells used. There is no reference to them being measured, or for coverage prediction plots being generated. I do not know if the sites were sectorised and if so the azimuths of the cells used. In my opinion it is reasonable that cells based on all three of these masts would potentially have had extensive service areas, potentially over 20km in line with other cells considered during this examination.

9.2.9. McGeogh's Crossroad and Newtownhamilton are between Clermont Carn and Camlough Hill (to the east) and Mullyash Mountain (to the west). Both telephone kiosks are within 20km of all three cellsites. Given the call pattern between masts in my opinion it is

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reasonable that cells based on all three sites serve into the general area in which the telephone kiosks are located.

9.2.10. I do not know if any of the cells served specifically at either Telephone Kiosk. Whether or not they did, in my opinion it would be unreasonable to exclude them from serving close enough to enable movement from that service area of any of the cells based on the three masts considered to either kiosk within the general period considered.

9.2.11. My opinion is, by necessity, imprecise. In my opinion the data is not obviously in conflict with the proposition phone 430 moved to either telephone kiosk in the period considered (and indeed any location in a much wider area)

9.3. **Phone 87[PD]1076**

9.3.1. I have illustrated the cellsites used by phone 87[PD]1076 on 15/08/1998 in:

- **Map_076** [INQ042462]

9.3.2. Phone 87[PD]1076 used cellsites in the Republic of Ireland at 04:20 (Ardee East) and 10:58 (Clermont Cairns, which I have assumed is the same as Clermont Carn). Both of these call events were before the period during which 585 and 980 were using cellsites in Omagh.

9.4. **Phone 87[PD]9971**

9.4.1. I have illustrated the cellsites used by phone 87[PD]9971 on 15/08/1998 in:

- **Map_971** [INQ042462]

9.4.2. Phone 87[PD]9971 only used the Clermont Cairns mast (which I have assumed is the same as Clermont Carn) in this period including at 08:08, 12:13, 12:45, 13:44 and 13:48. The calls at 13:44 and 13:48 were in a period during which 585 and 980 were using cellsites in Omagh.

9.5. **Phone 87[PD]6456**

9.5.1. I have illustrated the cellsite used by phone 87[PD]6456 on 15/08/1998 in:

- **Map_456** [INQ042462]

9.5.2. Phone 87[PD]6456 used the "Dundalk" cellsite in the Republic of Ireland at 09:44. This call event was before period during which 585 and 980 were using cellsites in Omagh and also later on at 14:10 and 14:19 in the period that they were using cellsites in the general area of Omagh.

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9.6. **Phone 35387 PD 4259.** I have not been provided with a proposition for this phone.

9.6.1. There was an incoming call event handled by a cellsite based at Dundalk in the Republic of Ireland at 13:35:45. As the phone was not roaming, I currently believe I can trust this event.

9.6.2. There was an incoming call event with a listed time of 14:14:34 on "Pigeon Top" in Northern Ireland. I believe this may be "other party" data and cannot be relied upon.

9.7. **Phone 86 PD 2371.** There were no calls in this period.

9.8. **Phone 87 PD 0452.** I have not as yet identified any call data for phone 87 PD 0452.

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10. Analysis: 15 August 1998, 14:29 to 15:03

10.1. **Phone 35387 PD 5585**

10.2. There was only one call event in this period. At 14:38, phone 35387 PD 5585 used the "Cranlome" site in Northern Ireland over 20km east of Omagh. A coverage map for this site is provided in INQ034431; it appears to be an Omnicell, potentially with a large service area (possibly including into the Republic of Ireland). In my opinion, when combined with later call events at 15:13 (Stranooden) and 15:30 (Castleblaney), this pattern might be expected if phone 35387 PD 5585 was moving away from the general area of Omagh in this general period. I have illustrated the cellsites used by phone 35387 PD 3980 and phone 35387 PD 5585 after 14:28 in:

- **Map_585-980_150898_After_1415** INQ042462

10.3. **Phone 35387 PD 3980**

10.3.1. There were no call events involving phone 35387 PD 3980 in this period.

10.4. **Phone 35386 PD 5430**. My comments and opinions as laid out in section 9.2 also apply to call events in Northern Ireland this time period.

10.5. **Phone 87 PD 1076** ("076")

10.5.1. There were no call events involving phone 87 PD 1076 in this period.

10.6. **Phone 87 PD 9971**

10.6.1. There were no call events involving phone 87 PD 9971 in this period.

10.7. **Phone 87 PD 6456**. There were no call events involving phone 87 PD 6456 after 14:19.

10.8. **Phone 35387 PD 4259**. There were no call events in this period.

10.9. **Phone 86 PD 2371**. There were no call events in this period.

10.10. **Phone 87 PD 0452**. I have not as yet identified any call data for phone 87 PD 0452.

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11. Analysis: 15 August 1998, 15:04 and immediately following

11.1. **Phone 35387[PD]5585 and Phone 35387[PD]3980**

11.1.1. I have illustrated the cellsites used by phone 35387[PD]3980 and phone 35387[PD]5585 after 14:28 in:

- **Map_585-980_150898_After_1415** [INQ042462]

11.1.2. Phone 35387[PD]5585. Between 14:19 and 15:30 in my opinion the data is of a type I would expect if phone 35387[PD]5585 moved southeast toward and potentially into the Republic of Ireland. Phone 35387[PD]5585 used cellsites at:

- 14:19, Pigeon Top (Northern Ireland) - outside the period of interest but included for context.
- 14:38, Cranlome (Northern Ireland) - again outside the period of interest but included for context.
- 15:13, Stranooden (Republic of Ireland)
- 15:30, Castleblaney (Republic of Ireland)
- 17:23 Clermont Cairns (which I have assumed is the same mast as Clermont Carn) in the Republic of Ireland

11.1.3. Phone 35387[PD]3980. Between 14:19 and 16:00 in my opinion the data is of a type I would expect if phone 35387[PD]3980 also moved southeast to the Republic of Ireland. Phone 35387[PD]3980 used cellsites at:

- 14:19, Pigeon Top (Northern Ireland) - outside the period of interest but included for context.
- 15:41, Clontibret (Republic of Ireland)
- 16:00, Castleblaney (Republic of Ireland)
- 16:01, Tallanstown (Aclint Bridge) - Republic of Ireland
- 17:30, Dundalk (Republic of Ireland)

11.1.4. Contact between phones. Within the period considered:

- Phone 35387[PD]5585 called phone 35387[PD]3980 at 15:13.
- Phone 35387[PD]3980 called phone 35387[PD]5585 at 16:01.

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11.1.5. Assessment of alleged Colocation.

- i) At 14:19 phone 585 called 980. Both phones used Cell ID 61451 based at "Pigeon Top", a large cell serving an area including Omagh and far beyond.
- ii) Phone 585 used the Castleblaney site at 15:30 and only used cellsites in the Republic of Ireland from this time onward.
- iii) Phone 980 used the Clontibret site northwest of Castleblaney approximately ten minutes later, at 15:41 and also only used cellsites in the Republic of Ireland from this time onward. At 16:00 phone 980 used a cellsite at Castleblaney followed by a cellsite in Tallanstown to the south a minute later at 16:01. Clontibret is approximately 35km north of Tallanstown with Castleblaney between them.
- iv) I do not know the azimuths of any of the cells used and, given the large potential service areas involved, like much of my analysis, I am unable to make a precise assessment. In my opinion the data shows and overall pattern in keeping with both phones moving to the Republic of Ireland in a similar period, with 585 using cellsites further south than 980 but with sufficient time to move to a similar area between calls. The data is not obviously to be expected if the phones were together, but I cannot fully rule out the possibility they may have been.

11.2. **Phone 35386 PD 5430.** My comments and opinions as laid out in section 9.2 also apply to this time period.

11.3. **Phone 87 PD 1076 ("076")**

11.3.1. The closest call in time to this period was at 18:15, handled by a cellsite in Tallanstown (Aclint Bridge) in the Republic of Ireland.

11.4. **Phone 87 PD 9971**

11.4.1. Phone 87 PD 9971 continued to use the Clermont Cairns site at times between 15:22 and 16:18. This was followed by other cellsites in the Republic of Ireland (Dundalk, Clermont Cairns, Ardee East and another site whose name and location is unknown to me at this time) for the remainder of the day.

11.5. **Phone 87 PD 6456.** There were no call events involving phone 87 PD 6456 after 14:19.

11.6. **Phone 35387 PD 4259.** I have not been provided with a proposition for this phone. There were incoming call events handled by a cellsite based at Dundalk in the Republic of Ireland at 15:18:29 and 17:30:52. As the phone was not roaming, I currently believe I can trust this event.

Client Reference: OBI

Author:

Dr Matthew Stephen Tart

Laboratory Reference: CCL1026731

Exhibit Reference:

1026731/MST/1/270526/Cell Site

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11.7. **Phone 86 PD 2371.** I have not been provided with a proposition for this phone. There was an incoming call event handled by a cellsite based at Castleblaney in the Republic of Ireland at 15:30:37.

11.8. **Phone 87 PD 0452.** I have not as yet identified any call data for phone 87 PD 0452.

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12. Republic of Ireland Cellsite data

12.1. The cell name and mast locations on which I have relied were according to the documents as laid out below:

Cell ID	Name	Cell ID to Site Name	Mast Location illustration
2	1 Fourknocks	INQ011952	"Fourknocks" ~45km south of Dundalk
270	Dundalk	INQ011952	INQ011059
270	Dundalk	INQ038913	INQ011059
350	Clermont Carn	INQ011952	INQ011059
373	Dundalk	INQ000432	INQ011059
373	Dundalk	INQ038913	INQ011059
374	Dundalk	INQ000431	INQ011059
374	Dundalk	INQ000432	INQ011059
374	Dundalk	INQ011059	INQ011059
374	Dundalk	INQ011952	INQ011059
374	Dundalk	INQ038913	INQ011059
375	Dundalk	INQ000432	INQ011059
375	Dundalk	INQ011059	INQ011059
375	Dundalk	INQ011952	INQ011059
375	Dundalk	INQ038913	INQ011059
375	Rampart Road, Dundalk	p88 INQ001616	INQ011059
5216	Castlebellingham	INQ011952	Castlebellingham ~10km south of Dundalk
5218	Aclint Bridge	INQ000432	INQ011059
5218	Aclint Bridge	INQ000431	INQ011059
5218	Aclint, Ardee	p88 INQ001616	INQ011059
5218	Tallanstown	INQ000432	INQ011059
5218	Tallanstown (Aclint Bridge)	INQ000429	INQ000429
5218	Tallanstown (Aclint)	INQ011059	INQ011059
5218	Tallanstown (Aclint)	INQ011952	INQ011059
5218	Aclint Bridge Tallanstown	INQ038913	INQ011059
6592	Emyvale	INQ000429	INQ000429
6592	Emyvale	INQ000431	INQ000429
6592	Emyvale	INQ000432	INQ000429
6592	Emyvale (Ivyhill)	INQ011059	INQ011059
6592	Emyvale (Ivyhill)	INQ011952	INQ011059
6592	Emyvale	INQ038913	INQ011059
6594	Clontibret	INQ000429	INQ011059
6594	Clontibret	INQ000431	INQ011059
6594	Clontibret	INQ011059	INQ011059
6594	Clontibret	INQ011952	INQ011059
6594	Gallagh, Clontibret	p88 INQ001616	INQ011059
6598	Castleblaney	INQ000429	INQ000429

Client Reference: OBI**Author:**

Dr Matthew Stephen Tart

Laboratory Reference: CCL1026731**Exhibit Reference:**

1026731/MST/1/270526/Cell Site

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6598	Castleblaney	INQ000431	INQ000429
6598	Castleblaney	INQ000432	INQ000429
6598	Castleblaney	INQ011059	INQ000429
6598	Castleblaney	INQ011952	INQ000429
6598	Castleblaney	INQ038913	INQ000429
6599	Castleblaney	INQ000431	INQ000429
6599	Castleblaney	INQ011059	INQ000429
6599	Castleblaney Exchange	INQ011952	INQ011059
24043	Clermont Carn	INQ011059	INQ011059
27021	Mullyash Mountain	INQ011059	INQ012963
01d8	Stranooden	INQ000429	INQ000429
035c	Ravensdale	INQ000431	INQ012963
035c	Ravensdale	INQ000432	INQ012963
035c	Ravensdale	INQ011952	INQ012963
1d8	Cavanagarvan	INQ011059	INQ011059
1d8	Cavanagarvan	INQ011952	INQ011059
2ee7	Mohercrom	INQ011952	INQ012963
3b21	Ballymun	INQ011952	Ballymun in Dublin
3b21	Ballymun	INQ038913	Dublin 9
3bee	Swords	INQ011952	Swords just north of Dublin
3bef	Swords	INQ011952	Swords just north of Dublin
3c2d	1 The Ward	INQ011952	Unknown
520f	Ardee East	INQ011059	INQ011059
520f	Ardee East	INQ011952	INQ011059
521a	Clermont Cairns	INQ000432	INQ011059
521a	Clermont Cairns	INQ000431	INQ011059
521a	Clermont Carn	INQ011059	INQ011059
521a	Clermont Carn	INQ011952	INQ011059
521a	Clermont Carn	INQ038913	INQ011059
521b	Clermont Cairns	INQ000432	INQ011059
521b	Clermont Carn, Ravensale Park	p88 INQ001616	INQ011059
521b	Clermont Carn	INQ011952	INQ011059
ccnov1	Clermont Carn	INQ011952	INQ011059
dxk2v1	Dundalk	INQ011059	INQ011059
dxk2v1	Dundalk	INQ011952	INQ011059
DXK2VI	Dundalk	INQ000431	INQ011059
DXK2VI	Dundalk	INQ000432	INQ011059
DXK2VI	Dundalk	INQ038913	INQ011059
dxknov1	Dundalk	INQ011952	INQ011059
dxknov1	Dundalk	INQ038913	INQ011059
EO7F2	(listed as "?")	INQ000432	Unknown
shm	Sheimaliere	INQ011952	Unknown

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2c2d	Not found	Not found	Not found
SHMV1	Shanmalier	INQ038913	Co. Wexford
c5219	Not found	Not found	Not found
520c	Not found	Not found	Not found

OFFICIAL SENSITIVE

13. General Comments

- 13.1. My findings are based on the information currently available to me. Unless otherwise stated, I assume there have been no significant changes or faults that would have affected the data. If this information were to change then a new analysis of the data may be required, and I would consider for example changes to:
- 13.1.1. The reliability of the call data received.
 - 13.1.2. The network configuration in the area of my survey between the times of the call events considered and that of the surveys (if used).
- 13.2. Where I have used the phrase "the data is of a type I would expect" given the proposed scenario, there may be a number of alternative possible explanations for these findings. The stated proposition is that considered. I do not have a stated testable alternative proposition. I have therefore assessed whether there is data in conflict with that expected given the proposition under test (i.e. I have attempted to disprove the proposition). As an indication to the level of discrimination possible within my analysis, unless otherwise stated for a specific cell, a general expectation is that the distance a cellsite might be from a given location can vary from around:
- 13.2.1. Dense/Urban area - currently typically up to approximately 1km. In 1998, estimated up to 5km.
 - 13.2.2. Suburban area - currently typically less than 3km. In 1998, estimated potentially over 7km.
 - 13.2.3. Rural area - currently sometimes more than 10km. In 1998, estimated as above 20km and potentially up to 35km.
- 13.3. My ability to detect data that is not of a type to be expected (i.e. is in conflict) with propositions is limited by these expectations. It is feasible that the findings could be more, less, or equally probable if a proposition other than that tested were true, but in the absence of any such proposition, I am not able to evaluate the evidential strength of my findings. If a testable alternative proposition becomes available, I am prepared to consider it. Any reappraisal is more effective if carried out in advance of any trial and may not be possible in a court environment due to the quantity and type of data involved.
- 13.4. The electronic data have been retained in the raw format produced by the equipment used. The data have not been directly presented but are used to produce maps and tables; this data is available for further examination if required. A record of the work undertaken is contained in case notes and these are available for examination, if necessary, at the laboratory.

Report produced by: Dr Matthew Tart

Opinion checked by: Dr Iain Brodie

END OF REPORT