

# Codes of Practice and Conduct

## Appendix: Digital Forensics – Cell site analysis

### FSR-C-214

### Consultation draft

This is a consultation draft and therefore should not be regarded or used as a standard. This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication, the consultation will run from 18 December 2015 to 5 February 2016. Comments should be sent to [FSRConsultation2@homeoffice.gsi.gov.uk](mailto:FSRConsultation2@homeoffice.gsi.gov.uk) using the form available from <https://www.gov.uk/government/organisations/forensic-science-regulator> and should be submitted by 5 February 2016. This mailbox is not for general correspondence and is not routinely monitored so no acknowledgement will normally be sent.

THIS DRAFT IS NOT CURRENT BEYOND 5 FEBRUARY 2016.

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## 1. INTRODUCTION

1.1.1 The provider of cell site analysis (the provider) shall comply with the *Codes of Practice and Conduct for Forensic Science Providers and Practitioners in the Criminal Justice System* (the Codes) and be accredited to BS EN ISO/IEC17025:2005 or BS EN ISO/IEC17020:2012 (referred to as ISO17025 and ISO17020 from this point) as outlined in the Codes.<sup>1</sup>

1.1.2 This appendix should be read alongside the Codes, the appendix to the Codes Digital Forensics (FSR-C-107<sup>2</sup>), ISO17025 and the International Laboratory Accreditation Cooperation (ILAC) publication *Modules in a Forensic Science Process*, ILAC-G19:08/2014,<sup>3</sup> and will generally follow the heading titles used in the Codes with cross references to ISO17025 given in parentheses.

## 2. SCOPE

2.1.1 Cell site analysis relies upon the acquisition of communications data, the processing of that data usually with a radio frequency propagation survey followed by its presentation in the form of maps/tables either with a factual or expert report. This appendix covers the provider's work as applicable to the scope of accreditation:

- a. Request and/or normalise call data records in order to present call data in the form of maps/tables and or to produce an investigative report (or SFR1)<sup>4</sup> as a factual report or with an expert summary.
- b. Radio frequency (RF) propagation survey:
  - i. To conduct RF scene preservation with only incident location information.
  - ii. To undertake survey to indicate the area over which it is reasonable a specific cell serves.

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<sup>1</sup> An accreditation pilot will determine if the inspection standard ISO/IEC17020:2012 is more appropriate if an organisation is applying for radio frequency propagation survey only, however as BS EN ISO/IEC17025:2005 clauses apply for testing cross references have only been made to this standard.

<sup>2</sup> Available from <https://www.gov.uk/government/collections/forensic-science-providers-codes-of-practice-and-conduct> [Accessed 8/8/15]

<sup>3</sup> Available at: <http://ilac.org/news/ilac-g19082014-published/> [Accessed 8/8/15]

<sup>4</sup> SFR stands for Streamlined Forensic Reporting, the SFR1 is not a witness statement or an expert's report.

- c. Cell site analysis, including acquisition of communications data, processing of that data and the presentation of an expert report.

### 3. INDEPENDENCE, IMPARTIALITY AND INTEGRITY

- 3.1.1 The provider shall ensure that all of its practitioners adhere to the Regulator's Code of Conduct in respect of their independence, impartiality and integrity, and that the organisational structure, policies and procedures support this rather than hinder it.
- 3.1.2 Whether the practitioner is likely to be acting as a expert or not, all analyses shall be conducted in an unbiased manner. For example, only considering a prosecution hypothesis when there is a defence hypothesis available, or optimising likelihood of detecting all serving cells when surveying a location highlighted by the instructing agency while providing a cursory examination of alternative scenarios, for example an alibi location. Furthermore, any organisation being assessed against ISO17025 must *'have arrangements to ensure that its management and personnel are free from any undue internal and external commercial, financial and other pressures and influences that may adversely affect the quality of their work'*.
- 3.1.3 All providers are required to demonstrate that they meet these requirements which shall include the following:
  - a. The documentation and adherence by staff to the Regulator's Code of Conduct.
  - b. The consideration of one or more alternative hypotheses.
  - c. Terminology used in reports shall be clearly defined and imply no bias, phrases such as "in the vicinity of" may only be used if qualified, phrases such a 'consistent with' should not be used in reports unless it is clear what else this result would be consistent with.<sup>5</sup>
  - d. While cell site analysis may be used to propose investigative avenues (i.e. form a hypothesis), if used evidentially, any questions to be addressed shall

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<sup>5</sup> See glossary.

always be concerning the likelihood of the evidence, never the likelihood of the scenario.<sup>6</sup>

- e. The use of peer review of casework, including, where appropriate, that this is done independently without prior knowledge of the original outcome.
- f. The use of appropriate quality assurance including where appropriate blind re-examination/blind proficiency testing.
- g. The documentation and review of individual specific case assessments and strategies.

3.1.4 Forensic organisations can further demonstrate that they meet these requirements in a variety of more general ways, include the following.

- a. The engendering of a culture of technical challenge between scientific staff.
- b. Critically reviewing and subsequently documenting their organisational structure, with specific emphasis on the suitability of reporting lines and shared departmental responsibilities.
- c. Physical separation of departments or groups with potentially conflicting priorities.
- d. Staff remuneration not being based on the outcome or throughput of casework.
- e. The availability of procedures to follow if a lack of impartiality or independence is perceived or if staff feel that an attempt has been made to compromise their independence or impartiality.

#### 4. **SERVICE TO THE CUSTOMER (ILAC-G19 4.7)**

4.1.1 As part of service to the customer and contract review the provider shall ensure that the customer is made aware of any limitations or caveats that are already known to apply to this type of analysis.

4.1.2 For example, analysis of Call Data Records may demonstrate the phone will have been within the area which a specific cell serves at that time of the beginning and or end of the call, the customer must made aware that although

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<sup>6</sup> This is also known as transposing the conditional or the prosecutors fallacy.

locations of interest may be surveyed, pin pointing the phone to a specific location is almost always impossible.<sup>7</sup> Where a location of interest and an alternative location are so geographically close.

**5. SETTING FORENSIC STRATEGY (ILAC-G19, 4.1, 4.2 AND 4.3, CODES 5.1.1 AND 5.1.2)**

5.1.1 There shall be a procedure defining the setting of forensic strategy. The procedure shall include the following.

- a. Case circumstances;
- b. The data available (Call Data Records, cell information etc.);
- c. The limitations of that data (e.g. the type of data, such as of General Packet Radio Service (GPRS) or that it is unlikely the technique will enable discrimination of usage between the prosecution scenario and that of the defence and is therefore of little use);
- d. The suspect's personal situation (e.g. place of work, home address);
- e. Known or suspected attribution of phones (and how attributed); and
- f. Survey requirements:
  - i. Location survey (including potential requirements for elevation, e.g. high floors in tower blocks).
  - ii. Area survey, to distinguish whether service between two or more locations can be differentiated.
  - iii. Cell Mapping, to measure the service area of a given cell.

5.1.2 Plotting of locations of interest (scene, mast locations and other specified addresses) may be conducted to provide an overview of the mobile telecommunications aspects of the case. These maps may be used to inform a more detailed surveying strategy or serve as the output in their own right (i.e. a theory based 'desk exercise') including the following.

- a. Identify potential survey locations.
- b. Identify the relevant network(s) to survey.

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<sup>7</sup> There may be rare exceptions with an indoor cell or femtocell, see 9.1.5.

c. Identify any variations from the scope as detailed in the quote/briefing sheet.

5.1.3 Although plotting of mast locations and estimated coverage (e.g. sectors, or arcs) may be used in the planning process, any estimations shall be marked up as such and estimations shall not be presented on maps prepared for court.

5.1.4 There are many ways in which analyses may be undertaken, case circumstances vary and so the methods used may also vary, the strategy shall therefore detail the rationale for the approach taken with reference to the survey type (e.g. location, area survey, cell mapping) and mode selected (e.g. idle, connected).

5.1.5 Where the case strategy or generated maps and charts were provided to rather than created by the practitioner (or created under their direction), the practitioner shall do the following.

- a. Assess whether the question to be addressed is valid or may be prejudicial; if overly specific questions have been posed that, in the view of the practitioner, are so restricted that to answer them without additional commentary may be misleading, this shall be highlighted and a more balanced approach taken in the analysis.
- b. Review the strategy adopted to answer the question and highlight any areas in which they believe they are constrained (i.e. highlight the differences between the approach they have been committed to and that which they would have adopted if they had set the strategy themselves).
- c. Highlight any parts of the process (e.g. conversion of call data, mapping, surveys etc.) which they have not personally verified as accurate. If a third party has performed these tasks, and the practitioner has checked them and is confident they are accurate, the practitioner may take ownership of the product, but still needs to record who undertook the original work.

## **6. CONTROL OF RECORDS (CODES 15)**

### **6.1 Checking and review**

6.1.1 The provider shall ensure that methods that require calculations (including those embedded in spreadsheets) and/or critical data transfers that do not form part of a validated process include checks carried out by a second person. A

policy/procedure shall define the nature of the transfers and the checking procedure which shall consider the following.

a. Call Data Records:

- i. The Call Data Records are the foundation of cell site analysis. Call data is supplied in varying formats (according to network) and in a format that requires reformatting and/or normalisation.
- ii. Call data known to be unreliable has been correctly excluded
- iii. Format of data (e.g. call event nomenclature, time, date, hexadecimal to decimal conversion).
- iv. Normalisation of data (e.g. conversion of latitude/ longitude to British National Grid, postcode to a co-ordinate system).

b. Mapping:

- i. Presented data (e.g. Cell site locations, locations of interest, scale bar) are correctly positioned and labelled.
- ii. If a period of call data is illustrated, the map illustrates all of that data or, if an incomplete selection is presented, it is declared as such.

c. Survey:

- i. Does the data correspond to the location of interest.
- ii. If serving cell data is presented, is that data an accurate reflection of the survey data (e.g. correct network and protocol, correct cell id).
- iii. Is there sufficient data to adequately answer the question presented.

6.1.2 For example, in normalising call data records, an automated process may be tested by analysis of data sets of varying structure and complexity while a manual process may be via verification of given record by a second competent individual.

## 6.2 Critical Findings Check (ILAC-G19 4.7.5)

6.2.1 The provider shall have a procedure for carrying out checks on critical findings, designated staff authorised to carry out such checks and records shall indicate that each critical finding has been checked and agreed, and by whom and when



the checks were performed. The procedure shall include a process for resolving any non-conforming results or findings.

6.2.2 The procedure for carrying out checks shall then establish if work carried out conformed to the following.

- a. Is appropriate to the requirements of the case as defined in the case strategy:
  - i. Has the question presented been addressed;
  - ii. Is the process adopted to answer the question legitimate and limitations declared;
    - a. Is the method used applicable to the purpose? For example, a limited survey may demonstrate service of a cell at a given location at the time of that survey, but may not be robust enough to highlight all legitimately serving cells.
  - iii. If a conclusion has been reached, is the question presented within the expertise of the examiner, does the evidence support the conclusion drawn (i.e. Are the supporting summary of findings correct and relevant). For example;
    - a. It may not be possible to legitimately address whether it is likely a person used a phone (rather than whether the data for a phone would be expected given that a specific person used it).
    - b. Just because a cell was not detected serving at a location doesn't mean it didn't serve (e.g. Was the cell on air at the time of the survey, is there sufficient data to draw such a conclusion, is the method used appropriate to draw such a conclusion).
- b. Is fully documented in the case notes, with appropriate checks on critical findings, calculations and data transfers;
- c. Produced in compliance with the provider's documented policies and procedures; and
- d. Is consistent with the contents of the report or statement.

6.2.3 Where a critical findings check is the only quality control procedure, then this check shall be performed without knowledge of the original result and this independence shall be identifiable from the records.

**7. COMPETENCE (ILAC-G19 3.3)**

7.1.1 Each role in the examination shall be defined in the procedure including the requirements for knowledge, training, experience and any specific qualifications for the tasks assigned to each role.

7.1.2 For analysts involved in handling call data records the training records shall define the role and following competences to be addressed shall include the following.

- a. Acquisition of communications data.
- b. Normalising data.
- c. Quality assurance stages.
- d. Accepted practices for differentiating between estimated coverage plotted for planning purposes and factual plotted data.
- e. Request and/or in order to present call data in the form of maps/tables and or to produce an investigative or streamlined forensic report SFR 1

7.1.3 Staff conducting radio frequency propagation survey shall be assessed to demonstrate the following.

- a. Ability to contribute to the development of a survey strategy or implement given or standardised strategies.
- b. The competence of the individual to:
  - i. select the survey method:
    - a. idle mode;
    - b. dynamic mode;
    - c. location survey;
    - d. area survey;
    - e. cell mapping.
  - ii. apply the survey method;
  - iii. correctly interpret the output of the survey.

- c. Use of survey equipment in idle and connected modes.
- d. Understanding of limitations of survey types.<sup>8</sup>
- e. Where part of the role, knowledge of WiFi or other RF communications standards.
- f. Understanding the responsibilities of expert witnesses and the role of assistants and analysts.
- g. Preparation of reports.

7.1.4 The provider shall demonstrated ongoing competency, this may involve reviewing technical records and technical interviews or a witnessing procedure to ensure that those conducting radio frequency propagation survey retain competence (ILAC G19 – 3.8).

7.1.5 Training programmes shall include legal awareness training to include an overview of the following.

- a. Criminal Procedure Rules, specifically Parts 1,3,16, and 19;
- b. Criminal Practice Directions Part 19;
- c. Regulation of Investigatory Powers Act 2000; and
- d. Criminal Procedure and Investigations Act 1996.

7.1.6 Evaluative evidence in cell site analysis includes assessments of whether, given a Call Data Record, that record would be expected if a specific sequence of events took place, or whether a person may have been the user of a device which is contested. As well as the skill and competence required to conduct radio frequency propagation surveys in 7.1.5, training programmes for staff involved in this activity shall include the following.

- a. Development of a forensic strategy.
- b. Assessment and interpretation skills:
  - i. Formulating and testing hypotheses;
  - ii. Awareness of the risk of transposing conditionals; and

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<sup>8</sup> This shall be specific to the survey equipment in use as well as the generic types derived from the information collated or produced in the validation study.

- iii. Appropriate terminology (e.g. see glossary).
  - c. Suitable theory training on survey strengths and limitations, validation data and appropriate knowledge of 2G, 3G and 4G.
  - d. Awareness of cognitive bias.
  - e. Preparation of reports and statements.
- 7.1.7 Where staff are expected to give evidence in court, training programmes shall also include training in the presentation of evidence.<sup>9</sup>
- 7.1.8 Expressing opinions on the facts is the role of the expert witness, this includes provision of evaluative evidence. Personnel interpreting results shall have been assessed and deemed competent before reporting statements including interpretation and opinions of results and findings. Also see section 10.1 on reporting requirements.
- 8. VALIDATION (CODES 7 AND 8)**
- 8.1 Selection of methods**
- 8.1.1 All methods of examination/testing shall be fit for purpose; in demonstrating this, the provider will need to refer to appropriate validation/verification data.
- 8.1.2 The overall method selected shall be validated. Cell site analysis can be comprised of sub-methods, selected as required and each of these sub-methods (e.g. survey) can be validated as separate entities. The most appropriate method should be selected based on the strengths and limitations of those available to answer the needs of the customer.
- 8.1.3 Cell site analysis may include some or all of the following technical sub-processes:
- a. Call Data Record conversion/ normalisation;
  - b. Cell site mapping ;
  - c. Radio frequency propagation survey;

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<sup>9</sup> In addition to an understanding of the Criminal Practice Directions Part 19, training material may include reference to the information document FSR-I-400 on legal obligations.

- i. Location survey (including potential requirements for elevation, e.g. high floors in tower blocks).
  - ii. Area survey, to distinguish whether service between two or more locations can be differentiated.
  - iii. Cell Mapping, to measure the service area of a given cell.
- d. Production (potentially including opinion) of a report.

## 8.2 Validation of Methods

- 8.2.1 It is a requirement that validation of methods shall have been undertaken prior to use in evidence. The whole process (i.e. from request/receipt call data through to provision of final opinion) shall be validated for the method to be acceptable; if any aspect has not been validated, this shall be explicitly highlighted as a limitation in the accompanying report so that a court may have a view on admissibility.
- 8.2.2 Validation is about providing objective evidence that the method is fit-for-purpose. Objective evidence to demonstrate aspects of the end-user's requirements may be drawn in part from literature review, this objective evidence should be evaluated against acceptance criteria and any limitations of the method or components are captured in the risk assessment.
- 8.2.3 Objective evidence can be drawn from the practitioner community, academic studies, collaborative trials or data collated by training establishments using defined sceneries.
- 8.2.4 The validation procedure shall include where relevant, but is not limited to the following.
- a. Determining the end-user's requirements and specification.
  - b. Risk assessment of the method.
  - c. A review of the end-user's requirements and specification.
  - d. The acceptance criteria.
  - e. The validation plan.
  - f. The outcomes of the validation exercise.

- g. Assessment of acceptance criteria compliance.
- h. Validation report.
- i. Statement of validation completion.
- j. Implementation plan.

8.2.5 The Codes describe in detail the requirements of all the above, however some introductory words on the end-user requirement and further information on risk assessment requirements is given in the following sub-sections.

### 8.3 **Determining the End-User's Requirements and Specification**

8.3.1 The end-user requirements includes interim user requirements but should be framed to the end-user being the wider CJS.

8.3.2 This is about the method not the requirements of the specific equipment used, it is not a re-iteration on the user manual of survey equipment or phone emulator. The requirements and specification are used to gauge the scale of validation study based upon the acceptance criteria defined.

### 8.4 **Risk Assessment of a Method**

8.4.1 A risk assessment is required and is used to determine the hazards of a method. The validation shall test the mitigation strategy to control them the identified risks. The test employed may vary according to the method.

8.4.2 Within the CJS, some risks may be defined as:

- a. false positives (e.g. stating that a phone was, or may have been, in an area where it could not); or
- b. false negatives (e.g. stating that a phone could not have been in an area where it could).

8.4.3 The risk assessment is used to develop the validation plan, risks identified should be tested against the overall method. The method is more than the test or survey equipment, for instance the method may require additional activity to give assurance that the risk of identified types of false negatives are managed that testing of the instrumentation alone would not give (e.g. in section 9.1.6).

8.4.4 The risk analysis shall assess all of the stages that have occurred that may contribute in these risks being realised. Examples include the following.

a. Call Data Record normalisation:

- i. Transcription errors.
- ii. Inclusion of incorrect information (e.g. "other party" cell site) without recognising it as such.
- iii. Exclusion of legitimate information (e.g. transcription errors).
- iv. Use of GPRS without recognising limitations.

b. Mapping:

- i. Misrepresentation of a cell site in the wrong location, labelled with incorrect time of usage and/or cell id for example.

c. Survey:

- i. Failing to detect a legitimately serving cell (static survey methods are prone to this).
- ii. Failing to recognise that there may have been a network change (e.g. not checking that a cell of interest is off air at the time of the survey).

d. Interpretation:

- i. Conformational bias.
- ii. Over estimation or stating of the strength of the evidence.
- iii. Inadequate quality management of any of the risks above.

## 8.5 Statement of Validation Completion

8.5.1 The Codes require that a statement of validation completion is prepared, where the organisation conducts radio frequency propagation survey as a separate service (such as for scene preservation) to cell site analysis although aspects of the validation study may be shared, separate statements of validation completion may be appropriate.

## 9. UNCERTAINTY IN MEASUREMENT

9.1.1 There are inherent uncertainties within cell site analysis no matter which methods have been applied. ISO17025 accepts "the nature of the test method

may preclude rigorous calculation of uncertainty of measurement” but still expects that the providers attempts to “identify all the components of uncertainty and make a reasonable evaluation of their magnitude”.

- 9.1.2 Networks can change over time and there may be differences in network operation between the time activity took place and the time that activity is analysed in the context of an investigation. Some aspects may be physical changes (e.g. cells being added, removed or reoriented) or organisational (for example routing or location area boundaries that may affect cell boundaries). There may also be temporary equipment faults.
- 9.1.3 Full cell site sector surveys should be used to enable greater precision in assessing service areas, but even a survey is not definitive. Uncertainty within surveys may result from the following.
- a. Time will have elapsed since the event of interest and survey.
  - b. Survey equipment may not adequately reflect the operation of the questioned device.
  - c. Interpretation of the data (false positives/ negatives).
  - d. Network changes.
  - e. Height at which survey was undertaken compared to the actual location and height original connection was made to the cell site in question (time cell id was recorded).
- 9.1.4 Given these uncertainties, cell site analysis will not pinpoint the location of the device terminology used in reports shall reflect this when referring to specific locations assessed, for example phrases such as “the cell used was detected providing service over the serving cell area including” [the location of interest] may be appropriate.
- 9.1.5 For example, a practitioner with appropriate competencies may be able to comment on the general anticipated service area of cells of interest to give the context of a finding. For example if assessing the expected service area of a cell, from the network information if it is:



- a. an indoor cell (in which case usage implies the user was within the building – a very precise assessment);
- b. a 3 metre street works dwarfed by the surrounding buildings (in which case the service area may only be that and possibly a few adjoining streets, again, a relatively precise assessment);
- c. a large rural macro cell based on the top of a 60 metre tower (which may provide service over a large area, perhaps ten or twenty kilometres from the mast and thus much lower precision and potentially of lesser evidential impact).

9.1.6 There shall be a policy or procedure that includes additional activity that are undertaken if it has been concluded that a cell does not serve at a specific location. This shall include one or more of the following.

- a. Visiting the mast location to see if the cell is on air;
- b. Review of neighbour data to see if the frequency on which the cell is on is visible or used by a different cell;
- c. Review of neighbour data to see if the frequency on which the cell is on is visible or used by a different cell;
- d. Assessment of antenna point direction;
- e. The path profile between mast and location to check for obvious terrain obstructions etc.

## 10. TEST REPORTS, STATEMENTS AND PRESENTATION OF EVIDENCE

### 10.1 Reports and statements to the CJS

10.1.1 Reports to investigators or to courts from cell site analysis and radio frequency propagation surveys may be factual, produced by technical staff acting as professional witnesses, or evaluative, including interpretation and/or opinion by staff competent to provide expert evidence.

10.1.2 Providers shall ensure that all staff who provide factual evidence based on scientific methodology are additionally able to demonstrate, if required the following.

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- a. Whether there is a body of specialised literature relating to the field;
- b. That the principles, techniques and assumptions they have relied on are valid; and
- c. The impact that the uncertainty of measurement associated with the application of a given method could have on any conclusion.

10.1.3 Providers shall ensure that all staff who provide expert evidence based on their practical experience and/or their professional knowledge are additionally able to provide: the following.

- a. An explanation of their methodology and reasoning;
- b. Reference to a body of specialised literature relating to the field of expertise and the extent to which this supports or undermines their methodology and reasoning;
- c. That any database they have relied on is sufficient in size and quality to justify the nature and breadth of inferences drawn from it, that the inferences are logically sound and that alternative hypotheses in the investigative mode and alternative propositions in the evaluative mode have been properly considered;
- d. Their methodology, assumptions and reasoning have been considered by other practitioners and are regarded as sound, or where challenged, the concerns have been satisfactorily addressed;
- e. An assessment of the extent to which their methodology and reasoning are now accepted by their peers, together with details of any outstanding concerns;
- f. Relevant information to support claims of expertise, as well as anything that may adversely affects credibility or competence (e.g. adverse judicial findings); and
- g. In England and Wales, that they have complied with Part 19 of the Criminal Procedure Rules.

10.1.4 The language used in all reports whether considered factual, investigative or evaluative shall be consistent with the needs of the courts to be informative,

unbiased and not misleading. The Glossary and Terminology in Section 0 of this document provide an overview of key terms used in reports, statements and oral testimony as well as how they should be qualified.

- 10.1.5 Term such as area or vicinity should be defined in terms of what the report's author is considering them to mean in terms of distance etc.

## **11. REVIEW**

- 11.1.1 When published, this document will be subject to review at regular intervals.
- 11.1.2 This version is a consultation draft so any comments please send them to [FSRConsultation2@homeoffice.gsi.gov.uk](mailto:FSRConsultation2@homeoffice.gsi.gov.uk) as instructed on the front cover.

## **12. BIBLIOGRAPHY**

### **Standards and related documents**

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## Other documents

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<https://www.judiciary.gov.uk/publications/criminal-practice-directions-2015/>.

*Criminal Procedure Rules* (2015). Published by the Ministry of Justice on behalf of the Criminal Procedure Rule Committee. Accessed 07/12/15 from:

<http://www.legislation.gov.uk/ukxi/2015/1490/contents/made>.

FSR (2015) *Legal Obligations: Issue 3. FSR-I-400*. Forensic Science Regulator:

Birmingham Accessed 09/12/15: <https://www.gov.uk/government/collections/fsr-legal-guidance>.

## 13. GLOSSARY & TERMINOLOGY

### Attribution.

Attribution is the process of attempting to assign a device to an individual and may be progressed via a number of different methods, each method having different risks. Cell site analysis may be one method by which patterns of usage may be assessed against that expected if a given device were used by a specific person.

### Best Serving Cell

“Best Serving Cell” is an engineering term referring to the cell selected by a device at a given time for service disregarding other cells which may also serve. The use of this phrase is misleading in the forensic arena, as it implies only a single cell would normally be selected for service at any given location. Caution should be given if this phrase is encountered and it should not be used in reports unless a full description of the limitations of usage of it is provided.

### Consistent with

The word consistent or phrase “consistent with” should be avoided where possible, and shall only be used if alternative scenarios are also considered (e.g. “consistent with being at the scene, also consistent with being anywhere within the service area of the cell, which may mean the phone was many kilometres away”). Without clarification “Consistent with” can easily be misinterpreted by a lay person as the word “is” as the context or limitations of the finding are unknown. If the data would be expected given a number of considered or expected scenarios, clearly being

consistent with one of them is not discriminating or useful. For example if there is usage of a cell that serves both the alleged and alibi locations, stating that usage is consistent with the device being at one and not mentioning the other is clearly misleading; likewise if a cell serves the alibi location and stating that this is consistent with movement toward the scene without mentioning it is also consistent with being at the alibi location is also misleading (and not impartial)

### **Evaluative Evidence**

Evaluative evidence in cell site analysis include assessments of whether, given a Call Data Record, that record would be expected if a specific sequence of events took place, or whether a person may have been the user of a device which is contested.

### **Expert Evidence**

The crucial difference with an expert witness and a factual witness is that an expert is entitled to express opinions on the facts. However, an expert is not entitled to give opinion outside their expertise nor venture into matters that remain the realm of juror. A cell site expert above cannot offer any greater expertise than a juror in matters such as (but not restricted to):

- whether movement of a person is likely or unlikely
- how many other randomly selected people may have moved from one area to another in the same period as the phone under consideration
- While comments can be made to highlight relevant wider information so that others – e.g. the jury - can take a view, assessments which could be considered ‘common sense’ should be separated from assessments which are expert opinion
- How fast a person/device could have moved/travelled from one area to another.

### **Fact Evidence**

Evidence of fact is essentially reporting on the survey conducted by the person such as reporting the that a given cell was shown to be serving at the time of the survey, such witnesses must not give or be drawn into giving opinion. The High Court ruling

in *R. (on the application of Wright) v CPS* [2015] EWHC 628 (Admin) reiterates the provisions of the Criminal Procedure Rules apply to all forms of expert evidence that no witness should give evidence outside their knowledge or expertise and that individuals acting as professional witnesses must not stray into giving expert opinion.

### **Femtocell**

Generally a femtocell is a low-power cellular base station serving a small area such as home, office or small business.

### **GPRS**

General Packet Radio Service is a data service on 2G and 3G cellular communication systems.

### **Location**

The location of a mobile device derived using cell site analysis shall only ever be presented as an area. Terminology used in reports shall reflect this when referring to specific locations assessed, for example phrases such as “the cell used was detected providing service over an area including” [the location of interest] may be appropriate, however if a alternative location (e.g. alibi location) is known and is also covered this is neutral evidence and should be presented accordingly.

### **Prosecutor’s fallacy**

The prosecutor's fallacy or the “fallacy of the transposed conditional” is a fallacy of reasoning. For example, if a cell demonstrably provides service over an area that includes a location of interest, comments such as “the data is of a type to be expected if the phone were at the location of interest” are valid and are not the same as “the phone is expected to have been at the location of interest” which is not.

### **Provider**

The term is used to include all providers of forensic science, whether commercial, public sector or internal to the police service (e.g. scenes of crime, fingerprint bureau).

## Radio frequency propagation survey

A survey captures details of cells that can be detected at specific locations using a range of equipment ranging from phones with specific applications, phone emulators to scanners. The closer to the time of the event of interest and the survey strategy may dictate the overall usefulness of the survey to the investigation.

## SFR

Streamlined Forensic Reporting.

## Vicinity

Vicinity is an ill-defined word which, if used, must be quantitatively defined (i.e. given a specific value). There are also dangers with inconsistent usage, for example, stating that ‘the cell was detected in the vicinity of the location’ and then stating ‘I would expect the device to be in the vicinity of the location’

- 200 metres, for example, is a specific distance whereas “vicinity” has no specific value:
  - ‘the cell was detected in the vicinity of the location’; the vicinity may be quantitatively definable as the practitioner wishes (e.g. 50 metres).
  - ‘I would expect the device to be in the vicinity of the location’ – the vicinity is quantitatively definable as the service area of the cell, which could be many kilometres from the mast (i.e. include many other vicinities!).

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