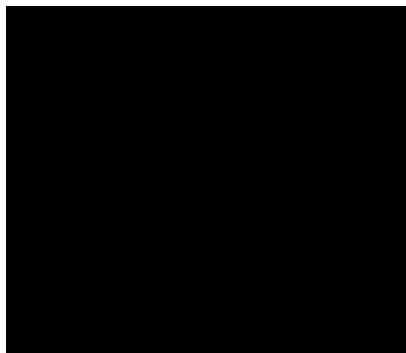

ICC v YEKATOM & NGAÏSSONA

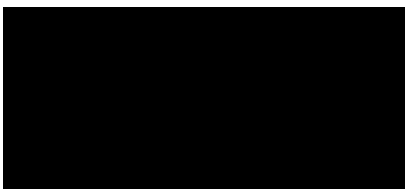
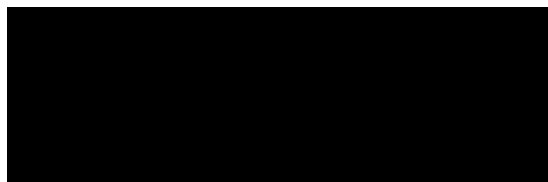
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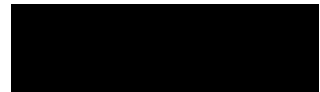
Duncan Brown

Reference:



On instructions of:
NGAÏSSONA defence team





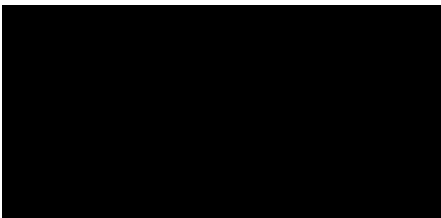
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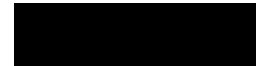
Annex 1 – Curriculum Vitae of Duncan Brown

Annex 2 – Terms of Reference

Annex 3 – Glossary of Terms used in Telecommunications Analysis

Annex 4 – Abbreviations used for mobile phone Networks.





1. Annex 1 – Curriculum Vitae of Duncan Brown

- Expert Witness in Cell-Site Analysis and telephone attribution.
- 19 years working as a full time Expert Witness.
- Extensive experience of presenting expert evidence.
- Equally experienced at both Prosecution and Defence Cases.
- International Criminal Court and Special Tribunals experience.

[Redacted]

2009 to 2023

[Redacted]

[Redacted]

2004 to 2023

[Redacted]

[Redacted]

2002 to 2004

[Redacted]

[Redacted]

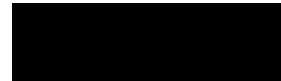
1990 to 2002

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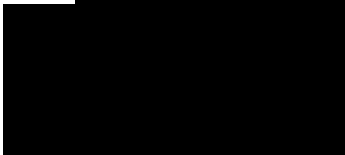
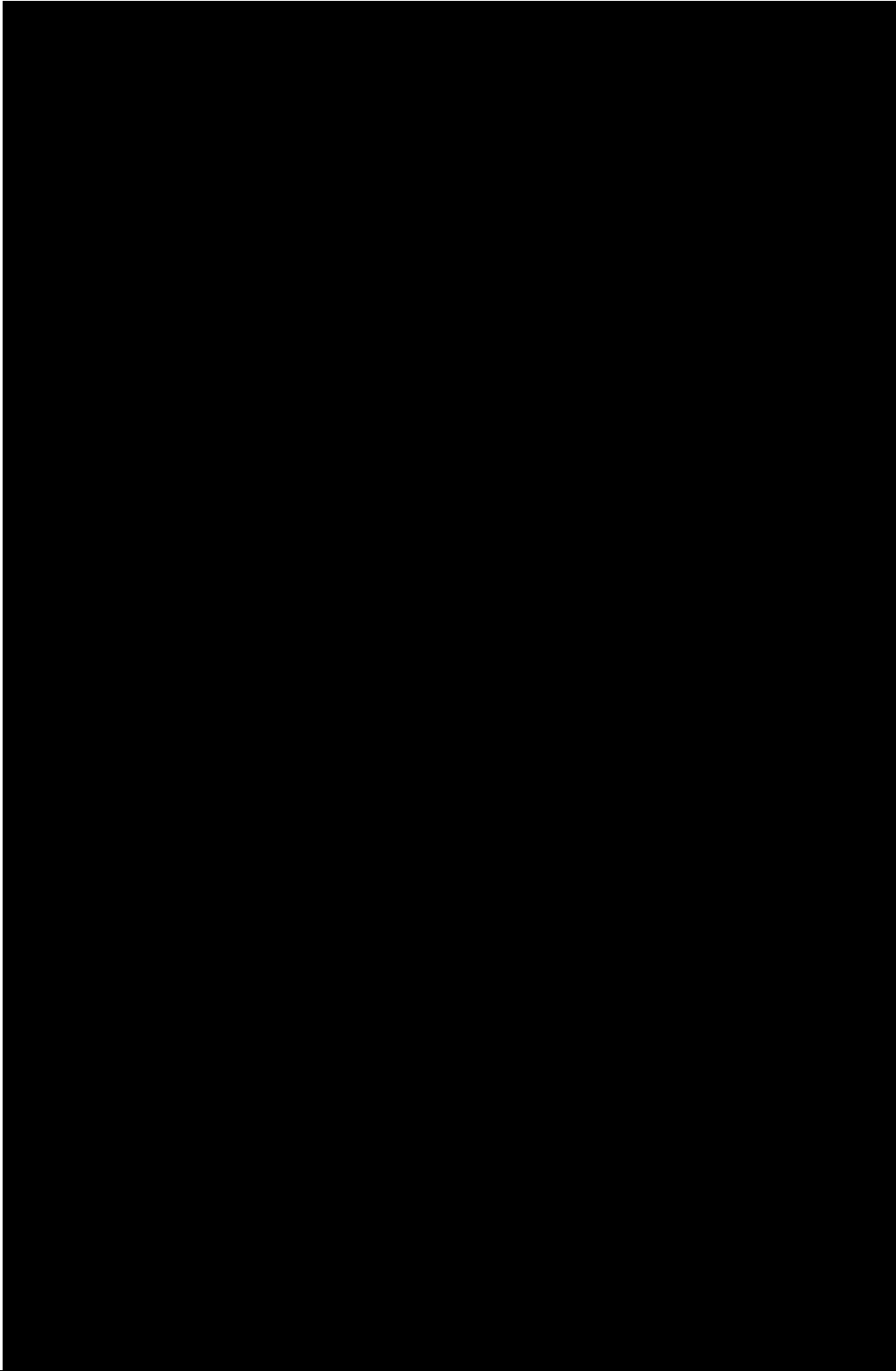
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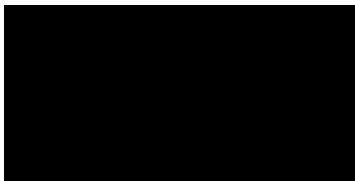
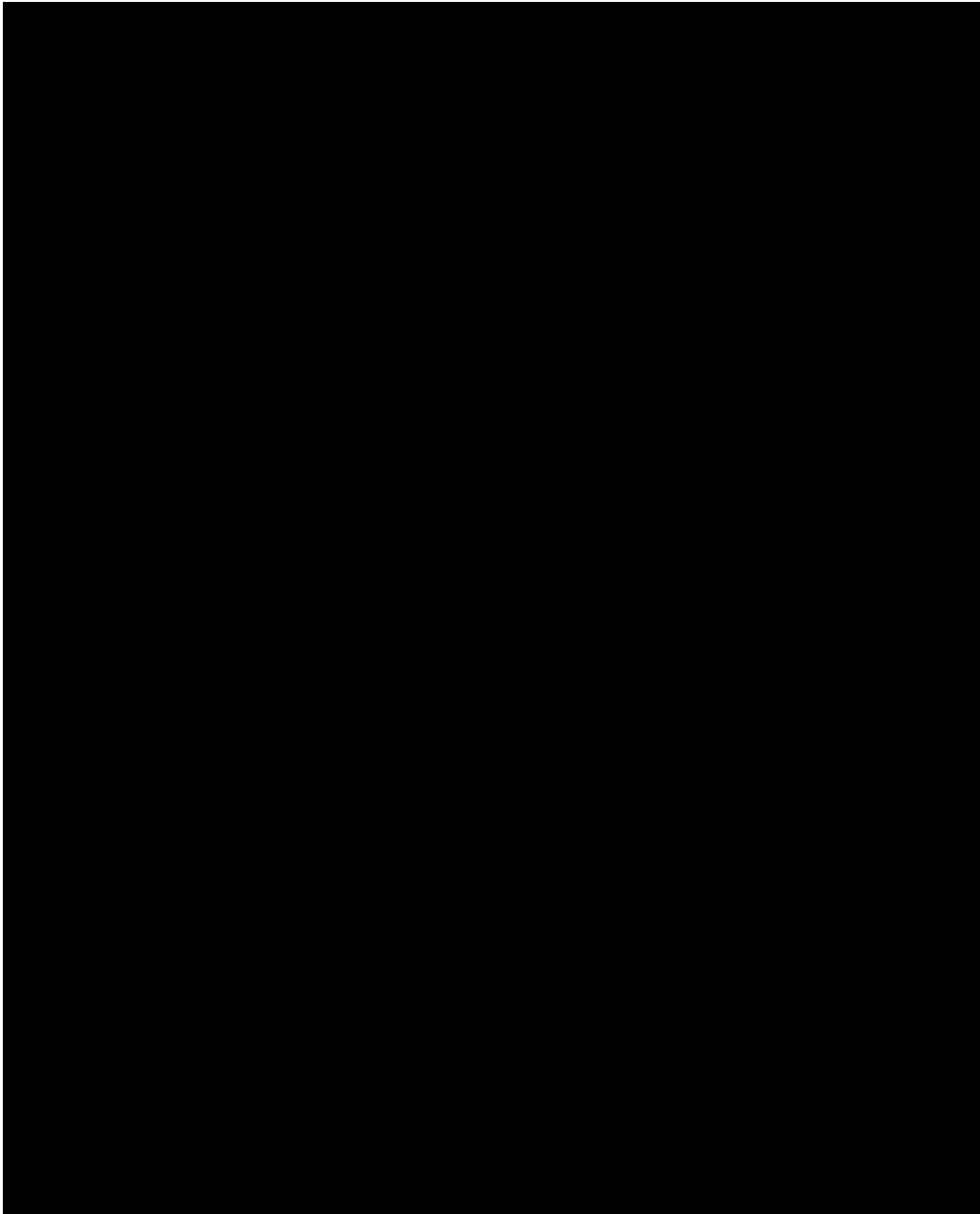
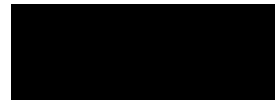
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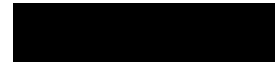
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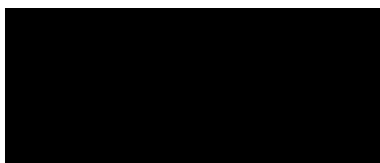
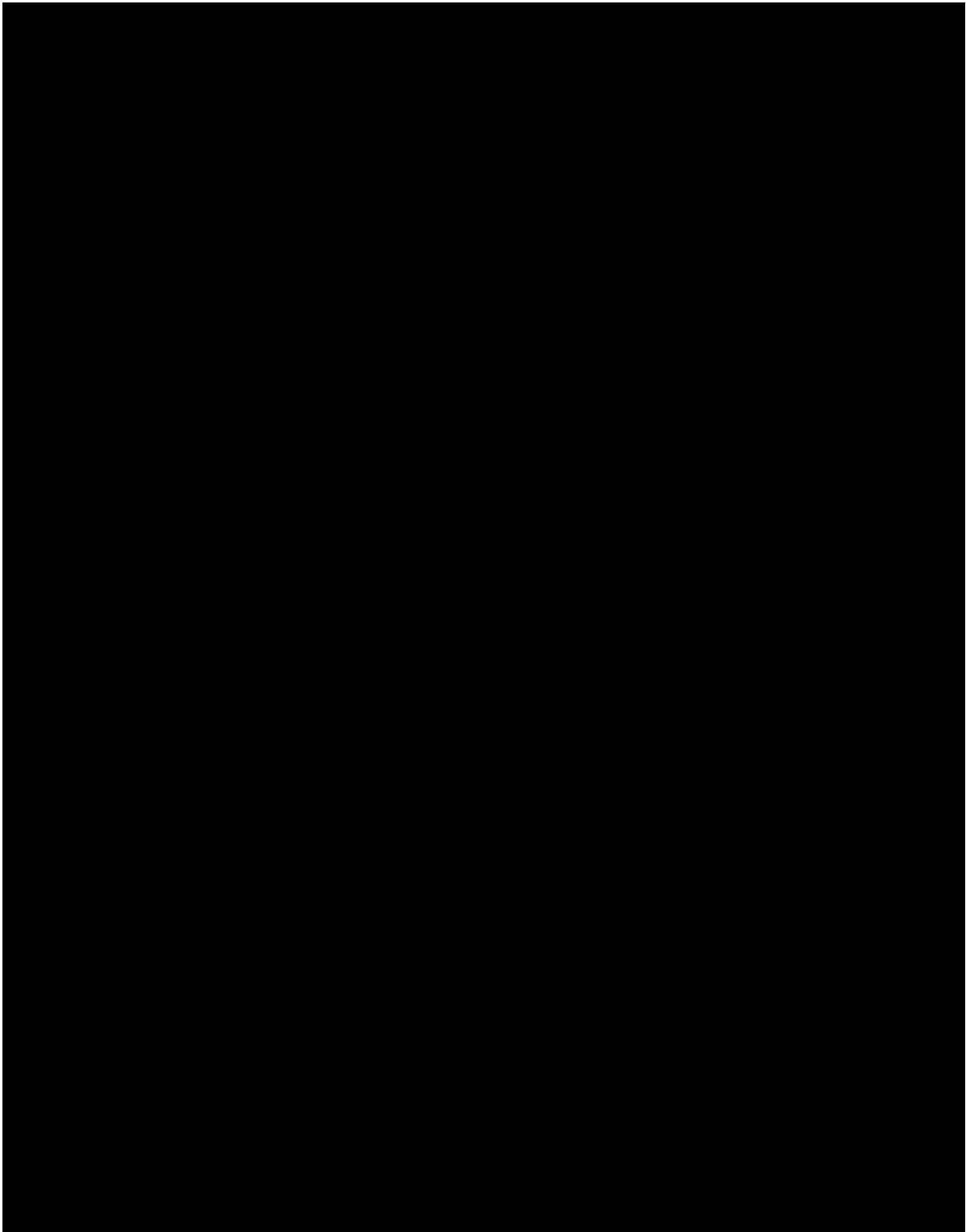
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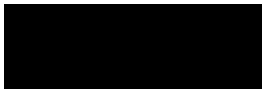




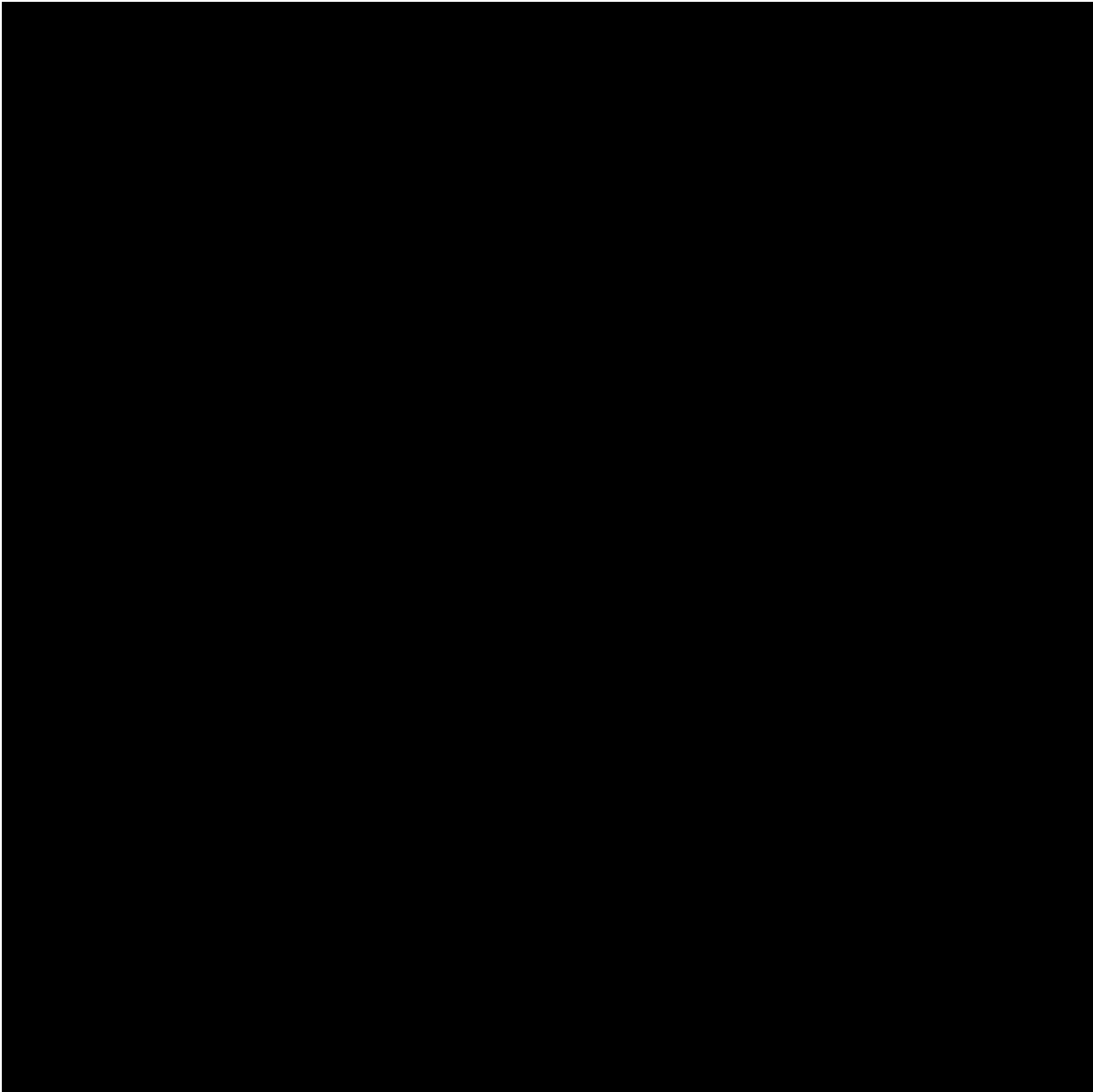


Notable Defence Cases:

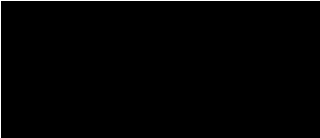
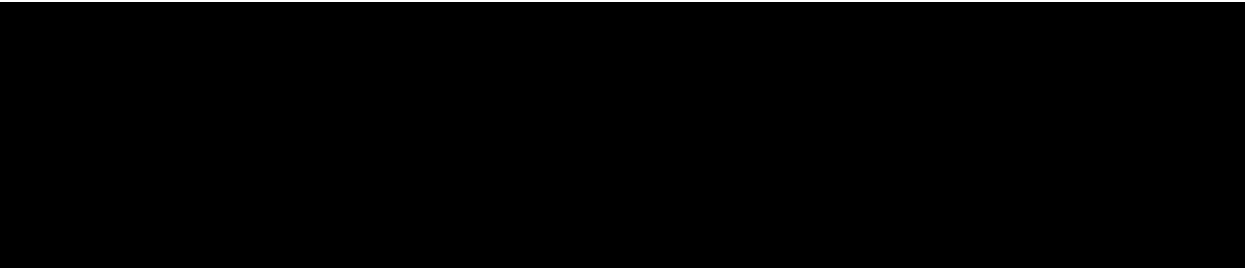


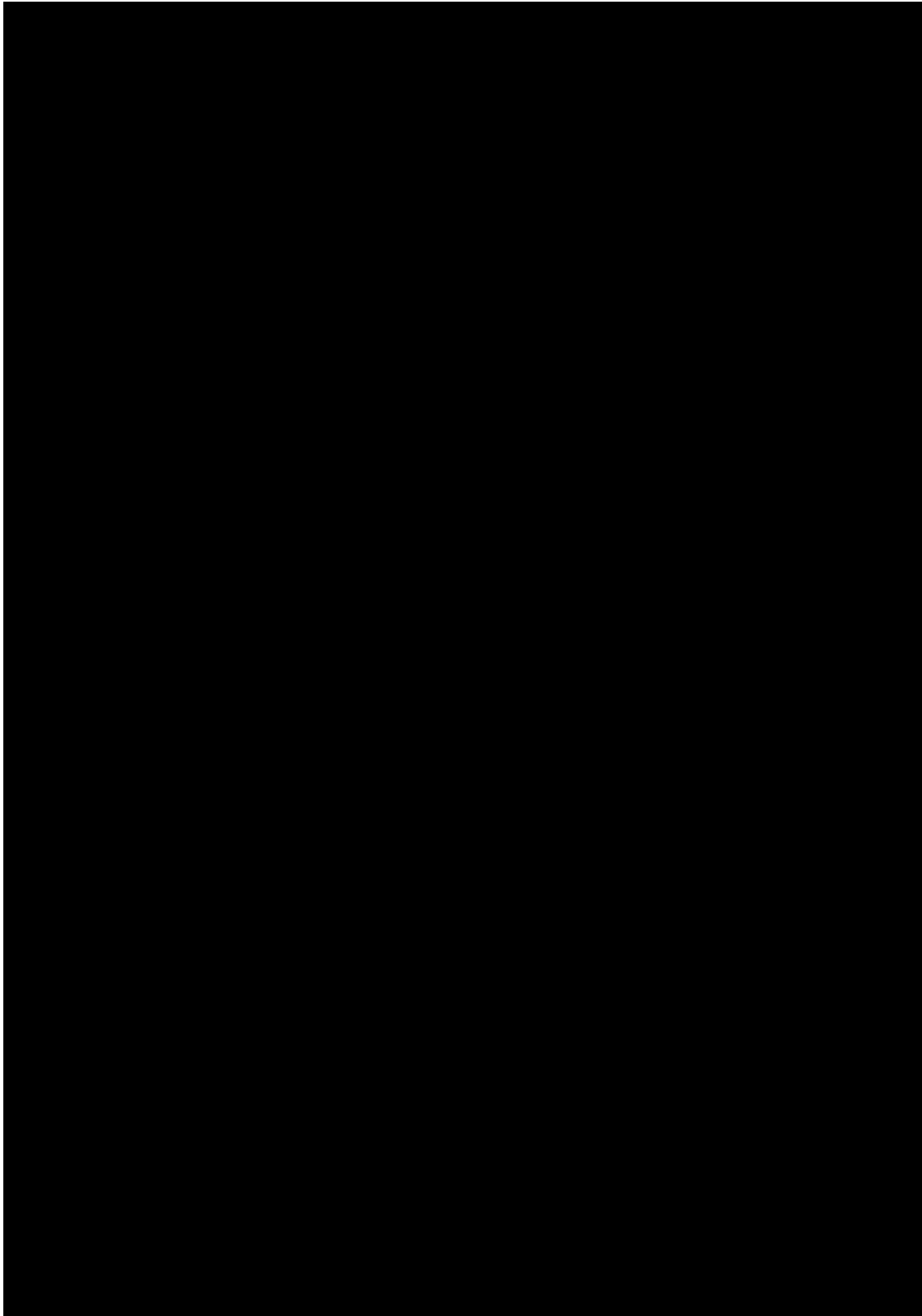


2. Annex 2 - Terms of Reference



Specific matters to address





3. Annex 3 - Glossary of Terms used in Telecommunications Analysis

Antenna(s)	Also called aerials, they are designed to transmit or receive radio signals in a particular range of frequencies and in a particular pattern.
Attribution	The process of connecting a named individual to a mobile phone number.
Azimuth	The direction in which the antennas are pointed. Usually given as a compass bearing.
Base-station	See Cell-site.
Beamwidth	Directional antennas are designed to radiate their signal in an arc. This is most commonly 120° but 60° antennas are also used by some networks.
Bearing	The compass bearing on which the antennas are pointing.
Best- Server	The 'Cell' determined by the network to be the best one to serve that location. This would normally be the strongest cell signal being received.
Best-server coverage	Best server coverage is the area or areas from a particular cell where that cell is most likely to be chosen by the network to provide service to that area or areas.
Billing Records	These are collected by the networks to record usage and enable them to produce customer's bills.
Call Data Records	Also called Call Detail Records, they are collected by the networks to assist with billing and management of the network.
Call Pattern Analysis	Using sets of call records to establish the routines of the user – can then be used for comparative purposes.
Cell	The basic unit of network coverage produced by the antenna/s of a single sector.
Cell radius/range	The maximum distance to which a cell provides a usable signal. Technically a maximum of 35km for 2G GSM but normally 1-2km in cities, 3-8km in suburban areas and 10-20km in rural areas .
Cell-site	The location for the networks' transmission equipment and antennas. A steel tower may be used to carry the antennas with equipment below or the cell-site may be located on a rooftop.
Colocation	The technique for considering if two phones are in the same area at the same time and therefore if the users are together or if it is the same user with two phones.
Directed retry	A capability in many networks to connect a call to a weaker cell signal because the stronger one is already at full capacity (congested).
Down-tilt	Antennas can be mechanically tilted by a few degrees towards the ground to reduce their coverage area. This can also be achieved electronically within the antenna.
Frequency	That part of the electromagnetic spectrum used for mobile telephone transmissions.

IMEI number	International Mobile Equipment Identity number. A number unique to every handset produced, visible on the handset or by dialing *#06# on the handset.
IMEI analysis	Using phone records to assess if one phone handset is being used by multiple SIM cards or one SIM card has been used in multiple handsets.
IMSI number	International Mobile Subscriber Identity number. A number used by the SIM card to identify itself to the network, which is in turn related to the customer's telephone number.
Network Operator	The companies licensed by national governments to operate a mobile telephone network in that region.
Radio Survey	A survey undertaken with a mobile phone or similar equipment that measures the strength of every cell signal received to identify the cell serving at a specific location or if driven around to identify the general extent of coverage of a cell.
Sector	A typical cell-site has three 'sectors' of antennas each covering an arc of 120 degrees and arranged so that between them they provide a full 360 degrees of coverage around that location.
Service Provider	The organisation providing the customers service and acting as the interface between the Network Operator and the individual customer.
SIM/SIM card	Subscriber Identity Module – A smart card which holds the subscription to the network and the IMSI.
Site-sharing	Multiple Network operators use the same building or tower for their antennas.
Tower/Mast	The pylon or lamppost like structure normally used to carry three sets of antennas.
Virtual Network Operator	Companies that buy network minutes wholesale to repackage and sell to their own retail customers.

4. Annex 4 – Abbreviations used for mobile telephone networks

- **1G** – *First Generation* – the original analogue mobile phone technology now defunct.
- **2G** – *Second Generation* – the second generation of mobile technology that introduced digital communications services including voice calls and text messages (See also **GSM**)
- **3G** – *Third Generation* – The name used to describe mobile systems able to support a wide range of internet services, operating with greater bandwidth. (See also **UMTS**).
- **4G** – *Fourth Generation* – even greater bandwidth and capacity (See also **LTE**)
- **5G** – *Fifth Generation* – the latest generation of technology for yet more bandwidth and capacity (See also **NR**)
- **A-party** – the originator of the call event (Calling Party) (See also B-party)
- **AuC** – *Authentication Centre* – A network security computer which checks that the customer can legitimately use the network.
- **B-party** – the terminating party of the call event (Receiver or Called Party) (See also A-party)
- **BSC** – *Base Station Controller* – Part of the network infrastructure that supervises the functioning and control of multiple BTS equipments.
- **BTS** – *Base Transceiver Station* – The aerial and equipment site which transmits and receives radio signals to and from the mobile telephone. (Also known as Radio Base Station).
- **CELL** – *Cell site* – the uniquely identified aerial and equipment that provides coverage in a defined area by the direction the antennas are pointing.
- **CGI** – *Cell Global Identity* - a globally unique identifier for a single cell in a mobile network
- **CLI** – *Calling Line Identification* – A service available on many networks to allow the receiver to see the calling number – usually possible for the sender to choose to hide their number before calling.
- **EDGE** – *Enhanced Data rates for Global Evolution* – A technology that gives GSM a similar capacity to handle 3G type data services.
- **EIR** – *Equipment Identity Register* – A database used to verify the validity of handsets being used on mobile networks.
- **ETSI** – *European Telecommunications Standards Institute* – defines the standards in telecommunications for both European and global markets.
- **GGSN** – *Gateway GPRS Support Node* – The data (GPRS/EDGE) networks connection to the Internet (See also **SGSN**)
- **GSM** – *Global System for Mobile communication* – The international standard for second generation (2G) mobile telephones using digital technology.

- **GPRS** – General Packet Radio Service - An enhancement to GSM networks that provides packet data transmission giving users access to data type services.
- **HLR** – *Home Location Register* – Stores information about subscribers and related features and services.
- **IMEI** – *International Mobile Equipment Identity* – The 15 or 16 digit serial number which identifies the physical handset.
- **IMSI** – *International Mobile Subscriber Identity* – A number used by the SIM card to identify itself to the network, which is in turn related to the customer's telephone number.
- **ISDN** – *International Services Digital Network* - communication standards that use digital transmission to make phone calls etc. over traditional networks.
- **IP** – *Internet Protocol* – The data protocol used in the Internet.
- **LTE** – *Long Term Evolution* - the 4th generation (4G) technology for high capacity
- **MMS** – *Multi-Media Service* – Enables sending and receiving of photo messages.
- **MSC** – *Mobile Switching Centre* – The telephone exchange which routes the calls within, or to other, telephone networks.
- **MSISDN** – *Mobile Station International ISDN number* – The telephone number which is dialled to contact the mobile user (e.g. 07836 201234 etc).
- **NR** – *New Radio* - 5G – The 5th generation of higher capacity network.
- **PCU** – *Package Control Unit* – The data (GPRS) networks equivalent of the BTS.
- **PLMN** – *Public Land Mobile Network* – A mobile phone network operator e.g. Vodafone, O2, T-Mobile etc.
- **PSTN** – *Public Switched Telephone Network* – The land line networks e.g. BT
- **RAN** – *Radio Access Network* – The cell-sites and cell-site controllers – BTSs and BSCs.
- **SIM/SIMcard** - *Subscriber Identity Module* – A smart card which holds the subscription to the network and the IMSI.
- **SGSN** – *Serving GPRS Support Node* – The data (GPRS) networks equivalent of the MSC. (See also **GGSN**)
- **SMS** – *Short Message Service* – Mobile telephone text messaging service.
- **SMSC** – *Short Message Service Centre* – Controls routing/delivery of text messages.
- **UMTS** – *Universal Mobile Telecommunications System* – The 3G standard.
- **VOIP** – *Voice over Internet Protocol* – a way to carry voice calls over the internet.
- **VLR** – *Visitor Location Register* – A database of information about visiting (roaming) mobiles from other networks (e.g. current location etc).