National Communications Authority

December 2018©

NCA's

Contribution in 2018 Towards

Ghana's Digital Agenda

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H.E. President Nana Addo Dankwa Akufo-Addo,
cutting the sod to commission the NCA-CERT, Common Platform
and the Communications Monitoring Centre at the NCA Tower in Accra on 22nd October, 2018

Foreword

The Government of Ghana through the Ministry of Communications is playing a pivotal role in the development of a robust framework to support the digitisation of the Ghanaian economy in a manner that captures and benefits every citizen. The Digital Ghana Agenda seeks to digitise Government services, build a biometric National Identity register, deploy digital property addressing, money number interoperability and institutionalize paperless port operations among others.

Undergirding the implementation of this vision are Information and Communication Technologies (ICTs). The National Communications Authority (NCA), the regulator for the electronic communications sector, has a key role in creating the enabling environment for the ubiquitous deployment of ICTs to facilitate the digitisation of the economy.

In the year 2018, the Authority completed the following projects critical to the attainment of Government objectives in the ICT sector:

1. NCA Computer Emergency Response Team (NCA-CERT) for the telecommunications sector – established primarily to coordinate detection, prevention and rapid response to cyber security incidents and issues. NCA-CERT, one of the sectoral CERTs under CERT-GH, works in collaboration with industry players and stakeholders. The NCA-CERT also monitors and reports incidents on critical communications infrastructure within Ghana for rapid response by appropriate institutions. Inaugurated by H.E. President Nana Addo Dankwa Akufo-Addo on 22nd October 2018, the NCA-CERT is one of the first sectoral CERTs in Africa.

2. Common Platform for the monitoring of Government revenues in the telecom sector – established through a collaboration with the Ghana Revenue Authority (GRA) under the auspices of the Ministry of Finance and Ministry of Communications pursuant to Section 7 of the Communications Service (Amendment) Act, 2013, Act 864. The Common Platform was also inaugurated by His Excellency the President on 22nd October, 2018. It provides telecom traffic monitoring, revenue assurance monitoring, mobile money monitoring and a fraud management system to combat the fraudulent termination of international traffic as local calls in Ghana.

3. NCA Conformance and Type Approval Testing Laboratories – established to provide a means to verify the compliance of telecom and broadcasting consumer products to the approved international and national standards for performance as well as health and safety. The labs, commissioned by the Hon. Ursula Owusu-Ekuful, Minister of Communications and Mr. Brahima Sanou, the Director of the ITU's Telecommunications Development Bureau on 18th July 2018, provide test facilities for testing Radio Frequency (RF) and Signaling; Electromagnetic Field strength (EMF); Specific Absorption Rate (SAR) of mobile devices; and Digital Terrestrial Television (DTT) Receivers.

4. Broadcast Monitoring Centre – established to provide a mechanism for the continuous real time monitoring of the compliance of FM radio and Television transmissions to the technical standards for broadcasting in Ghana. The automatic logging of deviations from the authorized thresholds of the various transmission parameters provides evidence based enforcement capabilities to the Authority whilst providing reliable data for optimization of Digital Terrestrial Television (DTT) infrastructure.

5. Communications Monitoring Centre – a centralized monitoring centre for assessing performance of telecom networks against Quality of Service (QoS) requirements. This complements the field measurements of QoS parameters from the consumer perspective to provide a 360 degree view of telecom network quality issues.

It is our expectation that these projects deployed within the regulatory environment for electronic communications, will enhance protection and security of ICT consumers to facilitate confidence in the increased use of digital products and services in Ghana. This will provide the needed boost to the national agenda to digitise Government services to afford efficiency and convenience to the citizenry.

The NCA is thrilled to be making such contributions towards the growth of Ghana, and we are happy to contribute towards Ghana's Digital Agenda.

Joe Anokye
Director General

1. NCA-CERT

(NCA - Computer Emergency Response Team)

Ghana's Digital Agenda brings increased productivity and efficiency to the country's people, businesses, organizations, and economy. However, there are unavoidable risks as we connect, digitize, and computerize systems. Cyber Security is important in protecting our valuable assets and services. As the Fire Service prevents and deals with fires, a Computer Emergency Response Team (CERT) also known as a Computer Security Incident Response Team (CSIRT) prevents and deals with cyber security incidents. Cyber security incidents may arise from malicious use of ICTs, vulnerabilities in ICTs, human mistakes, and even natural disasters.
A CERT is responsible for receiving reports, analyzing information on incidents, coordinating and supporting stakeholders to reduce the number and impact of incidents on computer systems, data, information, and services.
The President, H.E. President Akufo-Addo, inaugurated the NCA-Computer Emergency Response Team (NCA-CERT) on the 22nd of October 2018. The NCA-CERT works with stakeholders to address incidences that affect the telecommunications sector to ensure a safer communications space. The NCA-CERT is one of the Sectoral CERTs under CERT-GH.

The NCA-CERT uses both proactive and reactive approaches towards ensuring a secure telecommunications space. The NCA-CERT constituents are the licence and authorization holders regulated by the NCA. Some of these constituents are Mobile Network Operators (MNO), Internet Service Providers (ISPs) and Broadband Wireless Access providers (BWAs).

On being proactive, the NCA-CERT has discussions and meetings with the various companies or providers to understand their cyber security operations, and provides feedback, guidance, or recommendations on cyber security.

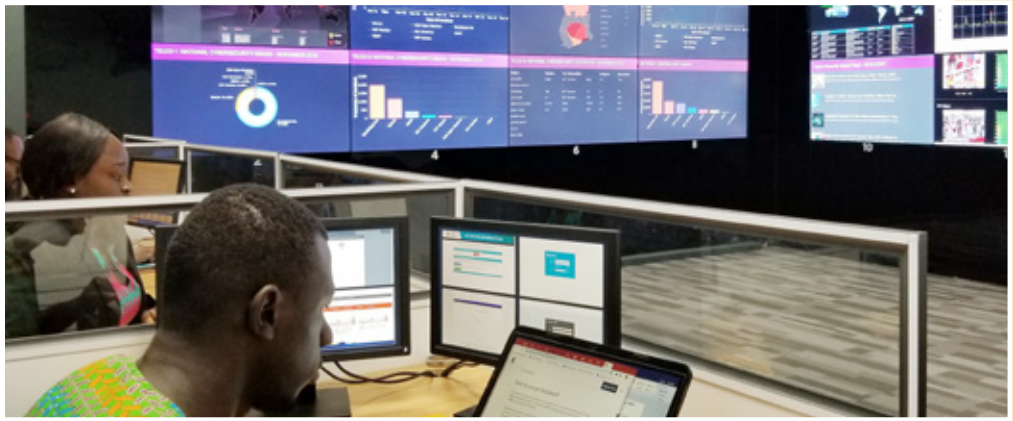
The NCA-CERT also receives reports, from organizations such as CERT-GH, on malicious activity and vulnerabilities relating to the public networks such as those used by organizations, businesses, and customers. Cyber Security Analysis is done on these reports to determine the category, impact, services affected, and advisories shared with the constituents concerned including information on identifying and resolving the cyber security incidents or issues. The NCA-CERT continues with follow-ups to progressively reduce the number of potentially malicious actors and vulnerable systems on public telecommunications networks.

Cyber Security is collaborative, and the NCA-CERT works with other divisions, such as Engineering and Regulatory Administration, in securing Critical National Infrastructure. The NCA-CERT monitors and reports incidents on critical information infrastructure within Ghana including the aviation band, the digital terrestrial television (DTT) network, network and service availability of selected locations.

As part of operations, the NCA-CERT builds relationships with other computer emergency response teams, with assistance from CERT-GH, to exchange information and build capability in areas such as communications, incident management and cyber security analysis. The NCA-CERT has systems to receive, visualize, analyze, and communicate with respect to cyber security incidents and issues.

Key Benefits

- Computer Security Incident Response (Reactive) function helps in responding to cyber threats within Ghana's telecommunication space including attacks on our constituents.
- Computer Security Incident Prevention (Proactive) function provides advisory services that assist in the prevention of potential cyber-attacks.



Snapshot of the monitoring screens at the NCA-CERT with some staff at work

Quick Facts

NCA-CERT was:

- Designed by the NCA
- Funded by the NCA
- Installed by the NCA
- Manned by the NCA

• Operates under the leadership of the Ministry of Communications (MOC) with support from CERT-GH and the National Cyber Security Secretariat

NCA-CERT Service areas include the following:

- Incident Management
- Cyber Security Analysis
- Communications and Outreach
- Research and Development
- Information Assurance
- Capability Development
- Situational Awareness

"Cyber security requires a collaborative and continuous effort involving all stakeholders"

- Kwadwo Osafo-Maafo

The cyberspace and technology continue to change and improve. However, what was secure today may not be secure tomorrow as we learn more about the systems we have and the increasing scope and complexities of vulnerabilities or attacks. Cyber security requires a collaborative and continuous effort involving all stakeholders.

It starts with doing the basics, having cyber security awareness, appreciating the issues, leadership buy-in, communications between all involved, and a continuous effort to value and keep systems secure.

At NCA, we are continuously learning and building cyber security capability to ensure that we play our role in making a safer Ghana in advancement of Ghana's digital agenda.

Kwadwo Osafo-Maafo,
Acting Head, Cyber security Division

Director General of the NCA, Joe Anokye,
emonstrating the functions of the NCA-CERT to H.E. the President
and other dignitaries at the NCA Tower on 22nd October, 2018

H.E. President Nana Addo Dankwa Akufo-Addo
speaking at the commissioning of the NCA-CERT and the Common Platform
at the NCA Tower on 22nd October 2018

"These projects are essential building blocks for the realisation of Government's vision of a digitised Ghana"

- President Akufo-Addo

Over the past year or so, we have seen the start of a lot of initiatives that feed into the government's digitisation agenda. The Vice President is leading this drive and he has reported a number of these at various fora. I am delighted that we have not left out what could potentially be one of the most vital components of the digitisation agenda – cyber security.
In an ever changing global world where a young boy or girl living in a cottage in some far away country can, with the support of a device as small as a mobile phone, undertake an activity with rippling effects on countries big and large, economies humongous and small, it is absolutely important that we deploy the appropriate mechanism to protect our country, its people, their businesses and ways of life.

I commend the National Communications Authority and the Ghana Revenue Authority for taking steps to guarantee the revenues of government, and also ensure that regulators and telecommunication operators work together to this end.
The commissioning of the two projects are essential building blocks for the realisation of Government's vision of a digitised Ghana. They represent key milestones in our nation's journey towards becoming well-resourced, self-reliant, efficient and secure, within the context of cyberspace, telecommunications traffic management, and revenue assurance. In execution of the protocols for the Computer Emergence Response Team Centre and the Revenue Assurance and Traffic Monitoring Centre, we should see to the transfer of knowledge to enhance learning and the acquisition of skills by Ghanaians to man these projects.

***(H.E. Nana Addo Dankwa Akufo-Addo,** President of the Republic of Ghana speaking at the commissioning of the NCA-CERT, Common Platform and the Communication Monitoring Centre – October 22, 2018)*

Hon. Ursula Owusu-Ekuful (MP),
Minister of Communications speaking at the commissioning of the NCA-CERT and the Common Platform at the NCA Tower in Accra on 22nd October 2018

"I congratulate the Director General, the Board, Management and Staff of the NCA for providing another first for telecoms regulation in the sub-region and the continent"

- Hon. Ursula Owusu-Ekuful (MP), Minister of Communications

I am delighted that this day has dawned on us and the President has graced us with his presence to launch the Common Platform and the Computer Emergency Response Centre (Team) for the Communication sector.

The communication sector is a critical national information infrastructure, as any cyber-attack on voice, data communications and ICT will disable the entire government from functioning properly. An additional coordinated layer of protection is vital and necessary.

Active support and cooperation are needed to make this a success, as an attack on one Mobile Network Operator (MNO) is an attack on all, and we need to intensify the effort to cooperate and reduce competition in this area.

I congratulate the Director General, the Board, Management and Staff of the NCA for providing another first for telecoms regulation in the sub-region and the continent.

NCA - the Drive towards a World Class Regulator

Formation of NCA

The National Communications Authority (NCA) was set up in 1996.

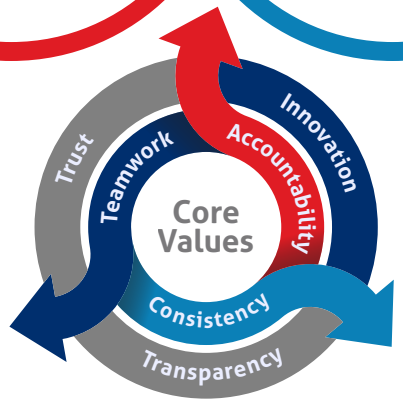
Established the National Communications Authority as the central body to license and regulate communications activities and services in Ghana and to provide for related purposes.

VISION

A world-class communications Regulator that facilitates innovative, reliable and sustainable communication solutions to meet stakeholders' expectations.

MISSION

Regulate the communications industry in a forward-looking and transparent manner that promotes fair and sustainable competition, stimulates innovation, encourages investment, protects stakeholders' interests and facilitates universal access to quality communications services for national development.



Our Staff

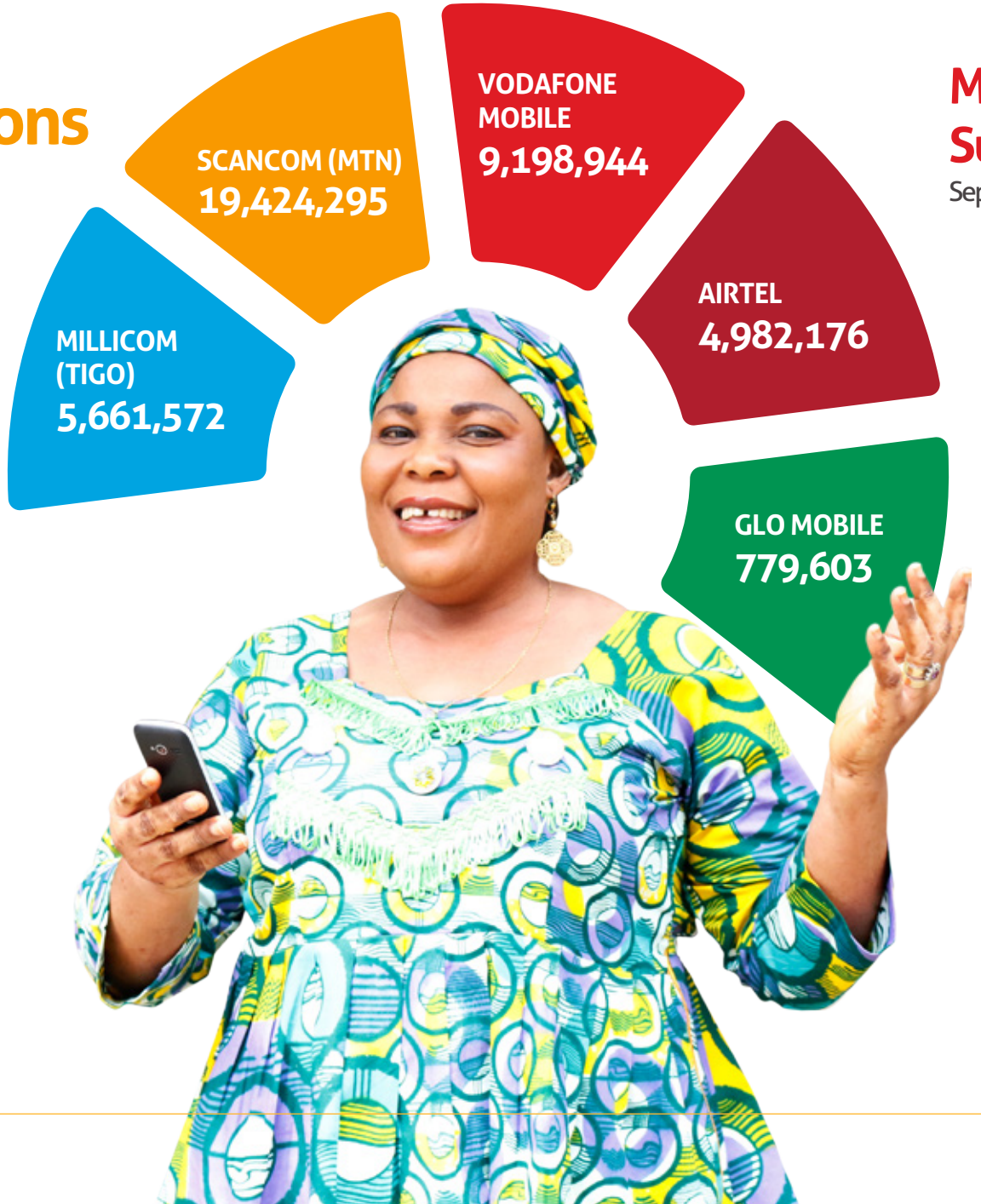
Our most valued resource

With human resource at the centre of its work, the NCA commits itself to training staff to equip them in the delivery of its mandate.

These have seen staff of the Authority receiving various trainings

- *Internal training*
- *External training*
- *Professional training*
- *Academic training*

Industry Subscriptions



Mobile Voice Subscriptions

September 2018

Total Mobile

40,046,590

Month Over Month Growth

0.30%

2. Common Platform (CP)

The Communication Service Tax (Amendment) Act, 2013, Act 864, mandated the Minister of Finance to collaborate with the Minister responsible for Communications to use a common platform as a mechanism to verify the actual revenue that accrue to service providers for the purpose of computing taxes due the Government and revenues accruing from levies under the Electronic Communications (Amendment) Act 2009, (Act 786).

In pursuance of this statutory provision, the Ministers directed the National Communications Authority and Ghana Revenue Authority to establish the Common Platform in conjunction with a solution provider, KelniGVG.

The Common Platform as established has four (4) main sub-systems:

- **Traffic Monitoring** – for independent monitoring of all voice call traffic volumes to facilitate independent verification of Government revenue on international inbound voice calls and to provide control information to verify the completeness of revenue assurance data.

- **Revenue Assurance** – for independent assessment of all network related revenues of every telco for the purpose of computing CST, VAT, NHIL and the 1% of revenue due the NCA and GIFEC.

Ing. Edmund Fianko taking H.E. the President and other guests through the operations of the Common Platform at the NCA Tower in Accra (22nd October, 2018)

Members of the Parliamentary Select Committee on Communications visited the NCA on December 6, 2018. The team included it's Chairman, Hon. Kennedy Agyapong, and Vice Chairman Hon. Bintin Charles Binipom.

- **Fraud Management** – involves about 5000 daily calls from about 57 countries to monitor how they are terminated in Ghana. When these international calls are terminated as local calls, it confirms the fraudulent use of SIM boxes to bypass the authorised international gateways. The numbers used to perpetrate SIM box fraud are sent to operators to block and to provide data to facilitate the geographical location (geolocation) of SIM boxes.

- **Mobile Money Monitoring** – for monitoring the volumes and values of mobile money transactions to facilitate the independent verification of revenues accruing to telcos from mobile money transaction fees.

The Common Platform provides the government with an accurate, independent and comprehensive view of revenues in the telecom sector to provide assurance that tax returns and those of other levies are actually what they should be. The fraud management system will help curtail revenue losses for both Government and telecom operators.

Benefits of the

Common Platform (CP)

The CP will among others:

- Provide Government with timely and reliable information about revenues accruing to it in the telecom sector in a transparent manner.

- Protect revenues for both Government and telcos alike through the mechanism provided by the CP to combat fraudulent international traffic termination.

Quick Facts

- ***Main functions of the CP are:***

- Traffic Monitoring – where we see for ourselves the various traffic flows on real-time basis.

- Revenue Assurance – where we see the revenues made and assure ourselves of what we are making

- Mobile Money Monitoring – get information on the volumes and value of transactions

- Fraud Management (SIM BOX Tracking and Geo-location) – detect and locate SIM boxers so we are able to reduce revenue losses

- The Common Platform is managed by the National Communications Authority on behalf of the Ministry of Communications, and the Ghana Revenue Authority (GRA) on behalf of the Ministry of Finance.

- The Communication Service Tax (Amendment) Act, 2013, Act 864 (amendment of Section 14 of Act 754) enjoins the Minister of Finance to collaborate with the Minister responsible for Communications to:

- Establish a mechanism to verify the actual revenue that accrue to vendors for the purpose of computing taxes due the Government under this Act;

- Be given physical access to the physical network nodes of the vendors' network at an equivalent point in the network where the network providers' billing systems are connected, and

- Ensure that a common platform is used for the purpose of verifying revenues under the Act as well as revenues accruing from levies under the Electronic Communications (Amendment) Act 2009, (Act 786).

"The Common Platform provides independent verification of Government revenue in the telecom sector whilst curtailing fraudulent SIM box activity."

– Ing. Edmund Fianko

We are happy to be able to implement the law mandating the establishment of the Common Platform to verify Government revenues. The Common Platform provides independent verification of Government revenue in the telecom sector whilst curtailing fraudulent SIM box activity. It has provided a lot of insight into the operations of the telecom service providers which will enhance regulatory decision making for the NCA.

The CP has provided a mechanism for the Ghana Revenue Authority to independently verify tax returns from the telecom operators in a reliable way. The data collected by the CP can facilitate any tax audits that may be necessitated in the future.

Ing. Edmund Yirenkyi Fianko,
Deputy Director, Engineering Division

Staff and analysts working at the Common Platform (November, 2018)

3. Conformance & Type Approval

Testing Laboratories

With the Conformance and Type Approval Laboratories, the NCA is ensuring that terminal equipment such as mobile phones, laptops and television sets function as per health and safety, radio frequency and signaling requirements. They also ensure that electromagnetic emissions from radio frequency radiating sources are within the required limits that will ensure the safety of the public.

The National Communications Authority (NCA) is mandated under Sections 66 and 67 of the Electronic Communications (EC) Act of 2008, Act 775 and Regulations 78 and 79 of the Electronic Communications Regulations, 2011 L.I. 1991 to ensure that all Electronic Communications Equipment (ECE) manufactured or imported into Ghana for sale or use are in compliance with Health and Safety, Electromagnetic Compatibility (EMC) and Radio Frequency requirements. Subsequent to this, the Authority per Act 775 introduced a Type Approval Regime to ensure that all Electronic Communication Equipment used in Ghana comply with our technical and regulatory standards as spelt out in the Type Approval Guidelines.

Type Approval is an official confirmation by a government or a regulatory body that a manufactured product meets minimum set of regulatory, technical and safety standards. These technical and safety standards are normally based on International standards.

Joe Anokye leads the Minister of Communications, Ursula Owusu-Ekuful and the Director of the Telecommunications Development Bureau of the ITU, Brahima Sanou and other guests on a tour of the SAR Lab (July 2018)

Roland Kudozia *of the Regulatory Administration Division explaining the operations of the RF Signaling Lab to the Minister of Communications and guests during the launch at the NCA Type Approval labs in July 2018*

Key Benefits

of the Type Approval Laboratory to the Manufacturer, Consumer and NCA

- Facilitate easy entry of Electronic Communication Equipment onto the market.
- Maintain quality and safety of Electronic Communication Equipment.
- Promote the development and usage of safe and standardized equipment.
- Reduce the effects of sub-standard ECEs on our environment.
- Prevent harmful interference caused to essential services, dangers posed to users, networks and infrastructure and national security.
- Addresses public health and safety concerns regarding emissions especially from unsafe telecommunication equipment.
- Ensure all communications equipment entering into the country adhere to stipulated safety directives for the benefit of the end user.
- Facilitate the availability of quality devices to the public.

Quick Facts

The NCA Conformance and Type Approval Testing Laboratories consists of:

1. The Specific Absorption Rate (SAR) Lab for measuring the amount of radiation absorbed by the body tissue when using a wireless electronic communication equipment such as mobile phones, tablets, wireless routers, laptops etc.
2. The Radio Frequency and Signalling (RF Lab) for measuring the technical requirements and protocols used in wireless technologies such as WLAN (also known as wifi), WCDMA (also known as 3G), GSM (also known as 2G), LTE (also known as 4G) and Bluetooth.
3. The Electromagnetic Field Strength (EMF) Lab for measuring the radiations from Telecommunications Base stations, Television and FM transmission sites and compare to international safety limits.
4. The Digital Terrestrial Television Testing lab for testing the various requirements needed as Ghana gears up for a full DTT roll-out to enable Ghana migrate from analogue to digital television broadcasting.

Peter Onyekwere of the Regulatory Administration Division explaining some aspects of the SAR lab to a guest during the launch of the Type Approval Lab in July, 2018

Members of the Parliamentary Select Committee on Communications visited the SAR Lab on December 6, 2018.

Some radio frequency signaling equipment in the RF Lab

"The aim here is to facilitate easy entry of Electronic Communication Equipment onto the market for consumers to know that whatever device they purchase is safe to use and will not present them with any difficulty"

- Isaac Boateng

The aim here is to facilitate easy entry of Electronic Communication Equipment onto the market for consumers to know that whatever device they purchase is safe to use and will not present them with any difficulty. The Type Approval Labs are to ensure that the electronic communications equipment conform to the standards set or adopted by the Authority.

This is done by running the devices through series of tests and comparing results to the standards set in collaboration with the Ghana Standards Authority (GSA). We have done a good job so far. It is important that consumers have faith in the work we do, including concerns about emissions from base stations and transmitter sites are addressed.

Isaac Boateng,
Deputy Director, Regulatory Administration

Director of the Telecommunications Development Bureau of the ITU, Brahima Sanou assisting the Minister of Communications and the Director General of the NCA to commission the labs (July, 2018)

H.E. President Akufo-Addo with some management staff of the NCA shortly after commissioning the NCA-CERT and CP. Also present are Minister of Communications Ursula Owusu-Ekuful, Board Chairman of the NCA, Kwaku Sakyi-Addo, the Executive Chair of the State Enterprises Commission, Stephen Asamoah-Boateng and the GRA Commissioner General, Emmanuel Kofi Nti

4. The Broadcast Monitoring Centre

The Broadcast Monitoring Centre was set up to monitor the technical requirements of FM and TV authorisation holders. The Centre enables the NCA to see at first hand the technical operations of authorisation holders and to respond promptly to infractions of same. Engineers from the regulator are able to get overviews on National DTT Network Coverage, National DTT Network Multi-viewer, FM Stations Location Distribution, FM Stations Detailed Monitoring, Monitor Receiver Interface and Direction Find (DF) Metric.

The monitors at the Broadcast Monitoring Centre

Engineers at work at the Broadcast Monitoring Centre

Key Benefits

For the Broadcast Monitoring Centre, the benefits to the consumer and regulator include:

- The consumer gets the desirable technical service they require from their TV or FM station.
- Having real-time view of the technical operations of authorisation holders to ensure they are aligned to set standards.
- Solving incidences of infractions faster as they are seen on real-time basis to give a good customer experience.
- Recording programs of TV stations for future references if need be.
- Making appropriate regulation for the sector.
- To the consumer, it also means that getting the best technical output from TV and radio stations as any infractions on the technical output are detected and the stations made to rectify.
- Offers the consumer better quality of broadcast services.

Quick Facts

- The Centre is situated within the NCA Head Office at Airport City.
- Regional monitoring centres are being set up in the regional/zonal offices.
- Engineers are able to determine the quality of pictures and sound from TV and radio stations.
- The Centre shows the location distribution as well as coverage of the transmission sites in the national DTT network.
- It gives real-time multi-view of the national multiplex of the national DTT network.
- The location distribution of all FM stations in the country is monitored.
- System provides a pictorial view of the locations and spread of all FM stations in the country, and shows areas with adequate representation, areas with little representation as well as areas with no FM radio presence.
- System assists the NCA to conduct Direct Find activities when tracking illegal FM Stations and also identifying the location of interfering signals.

Beyond giving out authorisations for broadcasting, we care about adherence to technical requirements which eventually enhances the consumer's experience"

– Naa Amorkor Asihene

The engineers here at the NCA have put in a lot of hard work to ensure that the monitoring centres are up and running. Beyond giving out authorisations for broadcasting, we care about adherence to technical requirements which eventually enhances the consumer's experience.

That is what excites us most about our broadcast monitoring capabilities. It is important as the regulator to be able to independently verify the technical output of authorisation holders and we are able to do so. Other regulators who have paid working visits here have given us the thumbs up and that means a lot.

Naa Amorkor Asihene,
Principal Manager, Engineering Division

Delegates at the Regional Development Forum for Africa of the International Telecommunications Union paid a visit to the NCA in July 2018 where they visited various facilities including the Broadcast Monitoring Centre

5. Communications Monitoring Centre

The NCA is keen to ensure that Telecommunications Operators deliver the required quality of service to enhance the quality of experience of users. The National Communications Authority's Communication Monitoring Centres have been set up to monitor regulatory adherence by service providers. The Authority has three separate installations which are collectively called the Communications Monitoring Centres;

Billing Verification System

This involves a process where test runs are done against the tariffs published by the mobile network operators. These tests are done to verify that tariff rates on all services within specific period intervals and every billable mobile activity a customer engages in are accurate. NCA staff additionally undertake these tests from consumer perspectives where they sign on to various payment plans and packages from all MNOs. They monitor the various measurable attributes and report on them.

Quality of Service Monitoring System

This is done via drive-tests using vehicles equipped with monitoring tools. The service attributes monitored include coverage obligations, voice quality and data quality as stated in the Mobile Network Operators (MNOs) licence conditions and with specific Key Performance Indicators (KPIs). The Authority also monitors Key Performance Indicators such as Call Completion Rate, Call Drop Rate, Peak Hour Traffic Utilization, Data Service Availability, Data Service Failure Rate, all in order to assess the performance levels of licence holders.

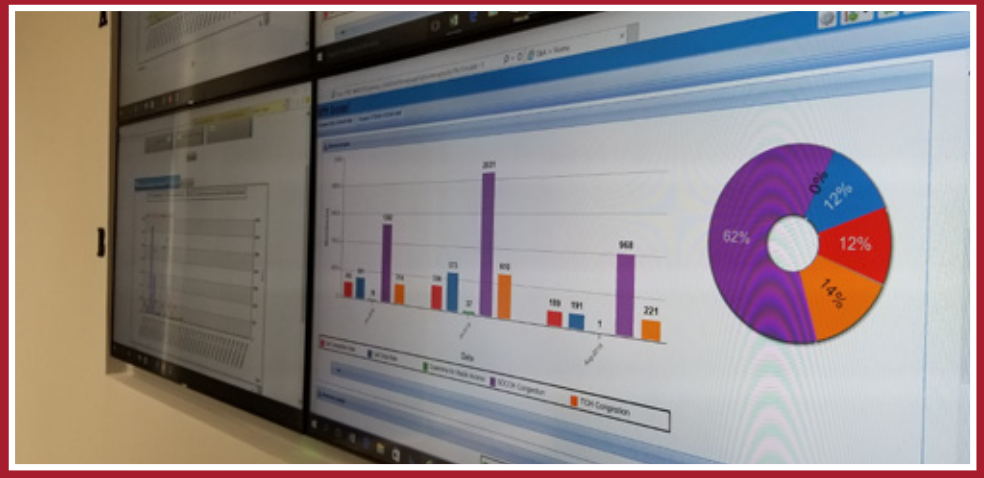
Network Monitoring System

It is a platform for monitoring service quality among mobile network operators and facilitates the diagnosis of what may account for service quality disruptions. The system has oversight of 3G and 4G licence holders, that is the mobile network operators; 2G, 3G & Broadband Wireless Access networks and Network Incidence Monitoring. Engineers from the NCA are able to have complete oversight over mobile network operators' technical operations.

Key Benefits

of the Communication Monitoring Centre

- Ensures that mobile phone and Internet users receive a good quality of service and experience when they use their phones or the internet.
- NCA is able to enforce its regulatory duties.
- Consumer protection is enhanced as drops in Quality of Service are quickly detected and rectification effected.
- Operators are able to detect infractions in their network service delivery quickly to rectify same.
- To ensure value for money by encouraging fair competition on good quality among service providers.
- The consumer is able to make well informed choices.
- Offers the consumer better quality of services.



Some monitors at the Network Monitoring System

Quick Facts

- QoS refers to all the requirements a telecom service needs to meet consumers' implied and stated expectations of a service they are receiving. These include:
  - *Network elements*
  - *User device (phone, modems, laptops, etc)*

- It is the process of assessing service providers to ensure they meet required licence conditions.

- The QoS Monitoring System is a platform for monitoring service quality among mobile network operators and facilitates the diagnosis of what may account for service quality disruptions.

The System used by the Authority:

- *interfaces with the operators' networks,*
- *collects live feed of performance management data,*
- *generates KPI statistics reports and*
- *benchmarks against predefined Licence thresholds.*

- This method of monitoring is referenced from ITU-T Recommendation E.802, is performed under real traffic conditions and therefore is expected to give a more realistic vision of the QoS as practically experienced by users of mobile network services in Ghana.

"The Communication Monitoring Systems we have here is by far one of the best in the world and I am happy to know that the work we put in has produced results."

– Kwame Baah-Acheamfour

Our Job as an Authority ultimately benefits the consumer and the end user. It is important for us that consumers know that we are here to make sure that their quality of experience is good, we have an oversight of the network system, and that the billing systems of telcos are fair to both the consumer and the operators.

The Communication Monitoring Systems we have here are comparable to what you will find anywhere in the world and it is personally gratifying to me to know that the work we put in has produced these results. Additionally, the NCA has seen a number of peer visits from across the continent and they all want to learn from us.

Kwame Baah-Acheamfour,
Deputy Director - Regulatory Administration

Appreciations and Forging Ahead

This year (2018) has been a lot of hard work and seen a lot of drive aimed at establishing the National Communications Authority (NCA) as a world class regulator which is up to the task in regulating the twenty-seven different services under its mandate. All our activities this year have been geared towards strengthening the framework for Ghana's Digital Agenda, and helping carve out a practical understanding of the government's Ghana Beyond Aid mantra.

We have proved that the Authority has indeed what it takes to be a world class regulator which lives the mantra of 'Ghana Beyond Aid'.

On behalf of the management of the Authority I wish to express our appreciation to the following for their varied contributions towards our continuous success and growth as a telecommunications regulator:

- His Excellency the President, Nana Addo Dankwa Akufo-Addo
- His Excellency the Vice President, Dr. Mahamadu Bawumia
- The Chief of Staff, Madam Frema Osei-Opare
- The Minister of Communications, Hon. Ursula Owusu-Ekuful and the Ministry of Communications
- The Minister of Finance, Hon. Ken Ofori-Atta, and the Ministry of Finance
- The Minister of Information, Hon. Kojo Oppong-Nkrumah, and the Ministry of Information
- Minister for National Security, Hon. Albert Kan-Dapaah
- The Chairman of the Parliamentary Select Committee on Communications, Hon. Kennedy Agyapong and Members of the Committee
- Board Chair of the NCA Board of Directors, Kwaku Sakyi-Addo, and Members of the Board
- The Commissioner General of the Ghana Revenue Authority, Emmanuel Kofi Nti, and the GRA
- The Inspector General of Police, David Asante-Appeatu
- Chief of Defense Staff, Lt. Gen. Obed Akwa
- The National Cyber Security Advisor, Albert Antwi-Boasiako
- Mobile Network Operators and other Service Providers
- Management and Staff of the National Communications Authority, my team has done a great job to see us achieve this much within this window
- And Consumers of various telecommunications services.

There is no way the NCA would have succeeded in these achievements without your various support.

On the international front, I would also like to express my appreciation to:
The Secretary-General of the International Telecommunications Union (ITU), Mr. Houlin Zhao, Deputy Secretary-General Malcom Johnson, the Director of the Telecommunications Development Bureau, Brahima Sanou, Andrew Rugege, the Regional Director for Africa and the ITU fraternity, The African Telecommunications Union (ATU) and the West African Telecommunications Regulators Association (WATRA). We have benefitted from the sharing of experiences and will continue to contribute to the global discussions and developments on communications.

The National Communications Authority will continue to execute its mandate as professionally as possible for the growth of the industry, Ghana and the rest of the continent.

Joe Anokye,
Director General

Who are we?

The National Communications Authority is the central body mandated to license and regulate electronic communication activities in Ghana.

Services Regulated

The Authority currently regulates 27 services. These include;

1. Cellular mobile services/2G
2. Radio FM Broadcasting
3. TV Broadcasting License
4. 4G/BWA
5. Mobile Virtual Network Operations
6. Submarine cable
7. Fixed Licence
8. Terrestrial Fibre Optic Infrastructure Licence
9. International Wholesale Carrier Licence
10. Value Added Services Licence
11. Dealership Licence
12. Infrastructure (Masts and Towers)
13. UMTS-900 Authorisation
14. 3G Licence/UMTS
15. Interconnect Clearing House
16. International Inbound Traffic
17. DTT Conformance Certification
18. Internet/Public Data Service Provision
19. VSAT Licences
20. Numbering (SIM, M2M, Short Codes etc.)
21. Type Approval
22. Microwave Authorisation
23. Public Radio Equipment (PRE) or Land Mobile Services
24. Landing Rights Licence
25. Amateur Radio
26. Communications and Managed Support Services Licence
27. Aeronautical Radio Services

This bulletin was produced by the
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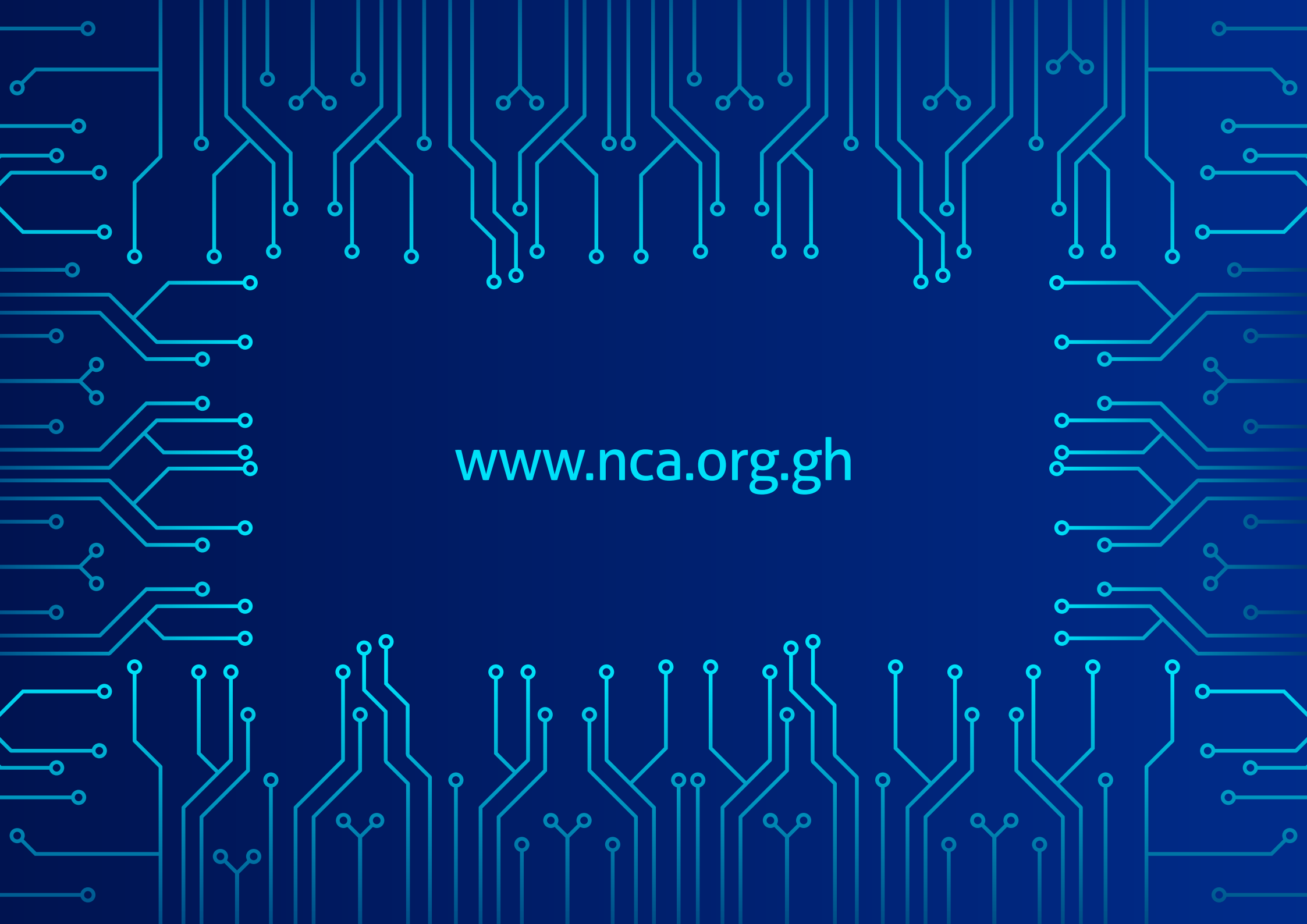
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