

# **Report**

## **Research Conducted in Ghana**

### **To Study and Adopt Best Practices, and Platforms for**

### **Implementing Successful Universal Access in Liberia using Rural Telephony**

### **Projects in Ghana**

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### **i. Abbreviations and definition of Terms**

<b><i>Abbreviations/Terms</i></b>	<b><i>Definitions</i></b>
<i>FGD</i>	<i>Focus Group Discussion</i>
<i>GIFEC</i>	<i>Ghana Investment Fund for Electronic Communications</i>
<i>GSM</i>	<i>Global System for Mobile Communication</i>
<i>ICT</i>	<i>Internet Communications Technology</i>
<i>KII</i>	<i>Key Informant Interview</i>
<i>LTA</i>	<i>Liberia Telecommunications Authority</i>
<i>MNO</i>	<i>Mobile Network Operators</i>
<i>MOPT</i>	<i>Ministry of Post &amp; Telecommunications</i>
<i>NOC</i>	<i>Network Operations Center</i>
<i>PIU</i>	<i>Project Implementation Unit</i>
<i>RTP</i>	<i>Rural Telephony Projects</i>
<i>SOE</i>	<i>State Owned Enterprise</i>
<i>UAF</i>	<i>Universal Access Fund</i>
<i>VSAT</i>	<i>Very Small Aperture Terminal</i>

## **1. Introduction**

This report is based on findings from a Study Tour conducted in Accra, Ghana from April 7-14, 2019, by a team comprising Hon. Saah Joseph of the house of Senate, Commissioner Israel Akinsanya of the LT Board of Commissioners, The Deputy Minister for Technical Services of the MoPT, The LTA UAF Coordinator, The PIU Coordinator and the M&E Officer of the PIU. Due to the goal of the tour, the process was implemented as a typical research proposal with general and specific foci.

Generally, the report catalogues the method of data collection, the type of data collected and the format of the analysis of the data. Specifically, it serves two capacities first as formal minutes or report of the trip, and second, as a technical report intended to provide information and recommendations to inform decisions of LTA commissioners and the administrators of the UAF on best practices on the implementing of UAF projects in Liberia.

In addition to a brief abstract and background, the report is comprised of an executive summary which presents a compressed version of the conceptual framework that girds the whole research process, the findings and implications.

The executive summary is followed by a methods section, an analysis of the data collected and lessons learnt, and recommendations. An appendix section contains the relevant references and charts intended to explicate the analysis or meta-analysis of the data.

## 2. Background

In a bid to comply with its mandates to implement projects that provides universal access to ICT to all citizens of Liberia regardless of their locations, the Implementation Committee of the UAF, in 2018 planned a series of initiatives to herald its activities. To conduct a local assessment and an international assessment to collect data on best practices that would inform administrative decisions and stakeholders' interest stood out as priority.

It was to those ends that the PIU took a Study Tour to Ghana from Sunday April 7- to Sunday April 14, 2019, to conduct a research.

### *Purpose of study tour*

The general purpose of the study was to collect data on best practices regarding how the West African state of Ghana has implemented universal service and rural telephony projects supported by the Ghana Investment Fund for Electronic Communications (GIFEC). Two other telecommunications infrastructure and service providers (K-NET<sup>1</sup> and NRG Wireless) were studied. .

As a sequel to a previous local assessment conducted in eight of the 15 counties of Liberia, the Ghana research served as a complement to the data collection phase of the LTA/PIU RTP.

Contents of the report may therefore be digested either by reading the executive summary as a snapshot or looking at the details of the whole research; better still, a close study of the technical notes in the appendices, and a close scrutiny of the recommendations could substitute the later two approaches.

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<sup>1</sup> K-NET- a 100% Ghanaian company established in 1996 and based in Accra, serving the entire sub-Saharan Africa Region.

## 2.1 Composition and TOR of the Study Tour Team

Factors that determined the selection of members on the study tour team were hinged on professionalism, technical acumen, and diversity. By this, the team comprised of technicians and professional people who were at policy decision making levels.

Table 1: Chart of research/study tour team members

	<b>Name</b>	<b>Agency</b>	<b>Position</b>	<b>Role</b>
1	Hon. Israel Akinsanya	LTA	LTA Commissioner –Consumer Services	Team Leader
2	Hon. Prosper Brown	MOPT <sup>2</sup>	Deputy Minister for Post & Telecommunications-Liberia	Researcher
3	Elijah Glay	UAF/PIU	LTA-UAF Director	Researcher
4	James Monbo	LTA/PIU	Coordinator-LTA/PIU	Researcher
5	Moses Blonkanjay Jackson	PIU	M & E Officer-LTA/PIU	Senior Research

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<sup>2</sup> MOPT-Ministry of Posts and Telecommunications of Liberia that has oversight of all telecommunication matters and policies

### 3. Executive Summary

As sequel to the implementation of its rural telephony project the PIU of the LTA fielded a six man delegation to Accra, Ghana to collect data on ways forward. While in Ghana, the team met with the agency responsible for the UAF in Ghana referred to as the GIFEC, and two of its service prominent providers, K-NET and NIRG Wireless.

As a result of the study tour, the PIU/LTA gathered important facts and acquired insight and advice on how to proceed in the launching, implementing, and sustaining its pending rural telephony project.

- *Research Method*

The approach was qualitative based roundtable discussions with key informants, site visitations and market/product presentations.

K-NET led the team on a two day tour of three sites including its administrative headquarters. During the tour, information was provided to the team regarding the sites and their relevance to K-Net's operations.

At NRG Wireless, roundtable meetings were held with its key informants followed by a presentation and followed by a visit to one of its sites to demonstrate the efficiency of its gadgets.

The GIFEC visitation included only a roundtable at their national headquarters. As a regulator, GIFEC confirmed its role as a body that authenticates the work of various service providers in Ghana. GIFEC also confirmed its collaboration K-NET and NRG Wireless in their bid to provide services that ensure universal access and service.



- *Findings*

The research findings generally showed that the Liberian RTP should be carefully studied, with irreversible and responsible decisions taken, before launching.

The team also found that there are optional methods or approaches in implementing the RTP. In addition to the teleport approach, there is a Carlson approach, a Whitespace utilization approach, and a smart village approach.

While both methods are geared towards universal access, there are differences in the implementation process and cost of implementation.

- *Lesson Learnt*

A major lesson learnt and recommendations that emerged from the study is that the project can be implemented via the adoption of a hybrid approach meaning a combination of the products from the two main service providers on the one hand. On the other hand, Liberia could choose to work with one of the two entities.

#### 4. Research Approach and Data Collection Technique

The approach of the study tour was qualitative hence the basic data collection technique was via interviews and observations. Focus group discussions (FGD)<sup>3</sup> and key informant interviews (KII)<sup>4</sup> were held at various sites to glean the relevant information and data.

### 3.1 Data collection report 1: K-NET

- *About K-NET*

...Liberian RTP should be carefully studied, with irreversible and responsible decisions taken, before launching.

<sup>3</sup> FGD- Focus group discussions are held with groups of people with similar or interrelated skill sets or professions

<sup>4</sup> KII-Key informant interview is where conversations are held with top decision makers and opinion leaders on an issue; these meetings with authorities

K-NET is a 100% Ghanaian company established in 1996 and based in Accra, serving the entire sub-Saharan Africa Region. K-NET specializes in Connectivity Solutions on a Unified IP Communications Platform and delivering cutting edge services to today's and tomorrow's businesses dependent on Communications Infrastructure. These services include amongst others Data & Managed Networks, Internet Connectivity, K-NET Hosted Private Networks, IP Telephony, Hosting and Co-location, I.T. outsourcing, Signal carriage for digital transitions, Turnkey Solutions and a host of others.

Incorporated in 1999, K-NET is the only company in Ghana that has built its own one stop network infrastructure integrating three different platforms into a single centrally controlled network offering state of the art network management service. K-NET and its affiliates are properly licensed by the National Communications Authority and in good standing with all relevant statutory authorities.

K-NET has several products and services; several gateways; several platforms; many strategic partners; the best I.T. professionals and business managers in the industry with the appropriate multi-cultural balance. The company has its own 11.3m VSAT teleport and hub (amongst others) located in Accra, Ghana, where its VSAT traffic terminates; it has 8 out of the 27 banks in the country on its network for managed network and other connectivity services; it has in total over 400 corporate customer sites.

- *Data collection technique*

The data collection conducted with K-NET was in the form of roundtable discussions followed by tour of three of its facilities within two days.

**DAY ONE**                      **Monday April 8, 2019**

- *Tour of DDT Head-End Station*

The K-NET DDT site focuses on the monitoring of terrestrial television services in Ghana. It has 90 school projects that it conducts with selected schools. Through the Government of Ghana (GOG), it dictates all GSM operations and deals with voice data. The transmission is basically conducted via voice and television.

- *Tour of K-NET Network Operation Center (NOC)*

The NOC of K-NET is situated on the McCarthy Hill, the highest peak in Accra. It serves as K-NET's nerve center for TV, internet and radio transmission. Engineers are on standby 24/7 to solve transmission problems whenever or whenever they arise.

- *Roundtable at K-NET Admin Office*

The roundtable meeting was held with the CEO of K-NET and his senior staff, at the administrative building of K-NET. During the meeting, the team was given the opportunity to make a presentation on the purpose of its trip and the essence of selecting K-NET as one of its hosts.

K-NET in turn was given the opportunity to make a presentation of its administrative and operational capacity, the kind and quality of its products, and recommendations to the Liberia team regarding best practices and a "way forward"

## ***DAY TWO    Tue. April 9, 2019***

- *Tour of rural telephony (RTP) base station in Volta Region*

The team was taken on a tour of an actual *RTP* base station in Dorfor-Adidome across the Akosombo Bridge in the Volta region. The team observed the site and took note of its physical structure, the demography and history of the community, and the level of reception by the village residents.

Following an observation of the base station, the team visited the Dorfor-Adedome primary school where an e-learning device was installed in one of the classrooms. According to the classroom teacher Mercy Azumah, a teacher sitting in Accra could teach the students math and science without being physically present.

## **3.2    Data collection report 2:                    GIFEC**

### *About GIFEC*

### **Brief information on Ghana Investment Fund for Electronic Communications**

GIFEC as an autonomous Government of Ghana (GOG) state owned enterprise (SOE) is clothed with authorities such as awarding and evoking contracts with service providers in Ghana.

GIFEC's policy document was finalized in October 2000, at Akosombo for the approval of Cabinet. However, Parliament could not pass the Communications Bill before the then government went out of power. In September 2001, the incoming government organized another National Communications Policy Conference, at the Ghana Institute of Management and Public Administration (GIMPA), to review and update the Communication Policy Document formulated by the previous government in 1998.

The formulation of a comprehensive ICT<sup>5</sup> Policy, known as Ghana Information and Communication Technology for Accelerated Development (ICT4AD), was completed and the result is what is today referred to as Ghana ICT Policy for Accelerated Development. The legislation that strengthened the agency was promulgated in 2008 as the Electronic Communications Act 775, aimed at providing for electronic communications, broadcasting, and the use of the electro-magnetic spectrum and related facilities in Ghana.

The financial resource for GIFEC is provided by the telecommunications service providers who by law are required to contribute one percent of their annual revenue towards the operations of the Fund.

- *Data collection Technique*

The data collection conducted with GIFEC was in the form of roundtable discussion led by the Principal Manager for Programs, Michael Agyei Takyi

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<sup>5</sup> ICT-Internet Communication Technology

**DAY TWO** *Tue. April 9, 2019*

- *Roundtable at Ghana Investment Fund for Electronic Communication (GIFEC<sup>6</sup>) headquarters*

The meeting was focused on briefs of GIFEC's pivotal roles in the ICT terrain of Ghana, the leadership dynamics, and the legal instrument that authenticates its authority.

In addition to awarding contracts to service providers, GIFEC also operates rural telephony programs concurrently, and where providers have not yet reached the population.

**3.3 Data collection report 3: NRG Wireless**

About NRG Wireless

NRG Wireless is a 100% ICT agency that has branches in the USA, and several African countries. It has affiliations with other international agencies including Blue Town, Microsoft and Indigo Telecommunications.

Although NRG has been in Ghana for only 18 months, it has made tremendous impact within the ICT landscape. So far, NRG has five projects with GIFEC, and five hotspots from Burkina Faso to Ghana, and utilizes TV Whitespace Technology.

NRG's delivery capacity include services in e-Commerce, e-Learning, and e-Health; its basic approach in transmission and broadcasting is the utilization of "Whitespaces" and is purely focused on the internet side of things,

The data collection conducted with NRG Wireless was in the form of roundtable discussions following presentations of the products available for Liberia to select from.

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<sup>6</sup> GIFEC- Ghana Investment Fund for Electronic Communications is an autonomous Government of Ghana state owned enterprise (SOE) clothed with authorities such as awarding and evoking contracts with service providers in Ghana.

Whitemesh radio is the world's first mesh TVWS equipment. It supports topology on top of the traditional point-to-point and point-to-multi-point topologies;

### **DAY THREE & FOUR**      *Wed. & Thur. April 10-11, 2019*

- *Roundtable with NRG Wireless Senior Staff*

Technical details of NRG's operations were offered the Liberian team, followed by presentations and demonstrations of the advantages of the Carlson Kit and use of Whitemesh radio.

Whitemesh radio is the world's first mesh TVWS equipment. It supports topology on top of the traditional point-to-point and point-to-multi-point topologies; however, the advantage of Carlson kit is that it can accommodate 250 concurrent users.

## **5. LESSONS LEARNT**

While lessons learnt from the study tour were generally significant in equal proportions, each of the agencies possesses unique capacities that are useful to the Liberia Telecommunications terrain, and the RTP.

### **5.1 Lessons Learnt**

#### **K-NET experience**

Based on experience and best practice, K-NET has been successfully implementing its rural telephony program (RTP) in Ghana for five years.

- Teleport-to-base station approach for reaching un-served and underserved populations is necessary because service providers (GSM, MNO) are not usually willing to extend services to highly inaccessible areas where teleports can serve as alternative transmit data services.
- To ensure resounding success for telephony projects, it is not "best practice" begin abruptly by establishing "Centers of Excellence, and "Digital Labs", but rather in phases by first acquiring the services of K-NET to provide teleport services;

"... it is not "best practice" to begin a RTP abruptly by establishing "Centers of Excellence, and "Digital Labs..."  
K-NET 4/9/19

- K-NET is currently providing services from its base in Accra, Ghana, to the Liberia Broadcasting Corporation (LBS) in Liberia

## 5.2 Lessons Learnt

### NRG Wireless experience

NRG Wireless' basic approach in RTP is the utilization of TV Whitespace Technology. There are two can be deployed under this platform:

“Teleport-to-base station approach is appropriate for serving un-served locations; however, it is limited to number of people per space while Carlson kit deals with areas covered... NRG Wireless...” 4/10/19

1. The Carlson is the most robust platform available under the TV White Space technology. It is claimed by NRG Wireless that signals transmitted under the Carlson travels up to 60km
2. The Whiz, This is most energy efficient kit under the TV White Space Technology but falls significantly short of coverage range when compared to the Carlson.

These two platforms are compatible with 4G and 5G technologies. They are capable of 120 Mbps

- Teleport-to-base station approach is appropriate for serving un-served locations but it is limited to number of people while Carlson kit deals with areas;
- Teleport-to-base stations cannot easily penetrate densely vegetated and mountainous terrains which have barriers that can impede transmission;
- TV Whitespace can meander through challenging terrains
- Instead of individual towns, White devices can service group of towns using Whitespace mesh.
- Carlson and Whiz kits can provide wifi access via TV Whitespace, and community street lights
- NRG Wireless has exceptional strength in operating e-health, and e-learning

### 5.3.1 Lessons Learnt

#### GIFEC experience

GIFEC is both an authority and a service provider in the implementation of rural telephony programs. It has awarded K-NET contracts to do 45 sites and five to ICT projects to NRG.

- Creation of “Smart Rural Community Designs” is an approach that has proven highly impacting to GIFEC’s RTP initiatives’
- GIFEC identifies and works with three types of rural sites, namely, subsidized, smart subsidy (gives operators small incentives), and complete subsidy (true access-no profit, no cost)
- Challenges are constant change of technology, funding, difficult terrains such as inaccessibility and bad weather

## 6. CONCLUSIONS

Based on the analysis of the data collected from the trip coupled with the raw experiences, several conclusions were reached by the team.

On the one hand, while the K-NET RTP base station approach is adequate for the purpose of the UAF/PIU’s single most important goal to provide services to rural people and people at locations that are hard to reach it has limitations when it comes to penetration of difficult terrains and coverage range. Presently, the approach has proven to be completely adequate for the terrains where the villages are sparsely located. On the other hand, the NRG Wireless method, via the TV Whitespace (Open Spectrum), transmits signals that can accomplish more by covering more grounds robustly, thereby penetrating more difficult terrains, and accommodating greater number of end users at all times. *Making the for a Hybrid Approach*

...analysis of the data brings to bear the need for further discussions on the adoption of a “hybrid approach to the Liberia Telephony project”.

Although the Study Tour Team departed Accra with a rich repertoire of information and lessons learnt on how the Liberian RTP can be implemented with a resounding success. The team experienced a rude awakening that after all, RTP can be implemented using several methods simultaneously to ensure wider coverage of both voice and data via TV Whitespace and remote satellite links. The analysis of the data, situations and scenarios therefore brings to bear the need for further discussions on the adoption of a “hybrid approach to the Liberia Rural Telephony Project”.



## **7. RECOMMENDATIONS**

Based on the data collected from the study tour, the following are hereby recommended for the launch of Liberia's RTP:

1. Requests for proposal should be developed by interested or targeted service providers including K-NET and NRG Wireless;
2. Upon acceptance and signing of agreement, the selected contractors should conduct a proofs of concept in Liberia to determine the suitability of their products:
3. Priority for the proofs of concept should be placed on remote locations to authenticate the suitability of the concept to our remote terrains;
4. Instead of adopting a single service provider the UAF should consider adopting the hybrid of the K-NET's remote satellite links and NRG Wireless's TV Whitespace, where both prove suitable;
5. K-NET & NRG Wireless should demonstrate proficiency in accommodating Liberia's RTP by providing teleport services from Ghana as pilots for the various initiatives (school, e-learning, digital labs, centers of excellence and later construct/install a teleport in Liberia);
6. Timeline for the pilot should be within 45 days for the launching of the first base stations should be targeted
7. The national rollout of the RTP to the 15 counties should be done only upon adequate demonstration of capability by the service provider within a 45 day timeline.

## 8. APPENDICES

### Appendix 8.1 Data Analysis Format

	Agency	Service/Product description	Advantages (if selected)	Disadvantages (if selected)	Recommend (%)
1	GIFEC	Conducting base-station-base-station to villages in Ghana; collaborating with other service providers in rural telephony programs	Regulatory policies have been successful and emulative	GIFEC operates only in Ghana and does not provide services locations outside of Ghana	NA
2	K-NET	Connection of rural communities with 2G using satellite links from a teleport	It will provide voice services to unserved areas and very limited data to the community. low in power consumption.	Data service very poor. Range of available data limited only to 100m of base station. Service poor during intense weather (rainy and cloudy days)	60%
3	NRG Wireless	Connection of remote and difficult terrains with data services using TV Whitespace	Compatible with emerging technologies, provides very high data for all forms of e-services, low power consumption, unaffected by rough terrains and bad weather, requires only few installations for a wide terrain, very cheap to deploy	Does not provide traditional voice service and will require the use of only smart phones to use for voice	40%

**Legend:**

- A: What **services** are they proposing to sell to LTA?
- B: What are the **advantages** they have over the other proposers? In terms of location, cost, sustainability, etc. in implementing rural telephony program and enhancing LTA's efficiency?
- C: What are the **disadvantages** they have over the other proposers? In terms of location, cost, sustainability, etc. in implementing rural telephony program and enhancing LTA's efficiency?
- D: Your recommendation rating for the selection of this agency's RTP approach on a scale of 0 -100%?

**Appendix 8.2 Participants**

The table shows individuals who participated in interviews and discussions

Table 2 Table of participants

	Date	Agency	Discussants	Site	Comments
1	April 8, 2019	K-NET	Oscar Nchow & Dudley Eghan	Terrestrial Television (DTT)	Located in Kanda, Accra
2	April 8, 2019	K-NET	Peter Williams	Network Opn. Center (NOC)	McCarthy Hill, Accra
3	April 8, 2019	K-NET	Richard Hlomador / CEO	K-NET Headquarters	Roman Ridge, Accra
4	April 9, 2019	K-NET	Dudley Eghan & Teacher-Evelyn Azumah	Rural Telephone site (base station)	Dorfor Adidema village
5	April 9, 2019	GIFEC	Michael Agyei Takyi	GIFEC Headquarters	
6	April 10, 2019	NRG Wireless	Graham Gilmore & Rana Sahni	IRG Headquarters	IRG Headquarters
8	April 11-12, 2019	NRG Wireless	Graham Gilmore	Demonstration site	IRG Headquarters

### ***Appendix 8.3 General Research Question or Issue***

The issue to be addressed as a result of the study is “How to rollout rural telephony program in Liberia using a prototype of the Ghana (GIFEC-K-Net) approach”

#### 8.3.1 Conceptual/Developmental Steps

- What were the roles of the Government of Ghana, national and international development partners, the political sub-divisions, the communities, the sectors, the communities and individual consumers in the rollout?
- What were the political, economic, social, technological, legal, and environmental considerations before and during the launching of the projects?
- How did the construct of public-private-partnership (PPP) influence or impact the decision for the launching of the telephony project in Ghana?
- What were the supply-demand factors that informed the decision?

#### 8.3.2 Profile of specific projects under the UAF

- What specific projects are being implemented by K-Net<sup>7</sup> under the GIFEC?
- How do the projects differ? And how are they similar?
- What is the lifespan/timeline for the implementation of each of the projects?
- What were the specific situations that prompted decisions to launch a rural telephony program? Concisely,
- What are the yardsticks /benchmarks that guided the selection of beneficiaries, locations, and type of projects?
- How were the yardsticks /benchmarks determined?
- What are the components or projects under the Ghana telephony program?
- What are the focuses, TORs or SOPs of each project?

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<sup>7</sup> K-NET is a Ghanaian company established in 1996 and based in Accra, serving the entire sub-Saharan Africa Region. It is 100% Ghanaian business within the proper and complete context of indigene business enterprise development for Ghana. K-NET specializes in Connectivity Solutions on a Unified IP Communications Platform and delivering cutting edge services to today's and tomorrow's businesses dependent on Communications Infrastructure. These services include amongst others Data & Managed Networks, Internet Connectivity, K-NET Hosted Private Networks, IP Telephony, Hosting and Co-location, I.T. outsourcing, Turnkey Solutions and a host of others.

- What can you say demands the greatest costs/financing? (for instance, admin, logistics, operations, etc)
- What are the required staffing procedure, qualifications, and roles?
- How effective is your monitoring and evaluation plan?

#### 8.3.3 Challenges in implementing the projects (Risk factors)

- What were the major and minor challenges?
- How were they resolved or overcome?
- Which of the challenges evolved & which ones were inherited?

#### 8.3.4 Achievements (Success stories)

- What can you say is your prized achievement in implementing projects under the telephony program? Why?
- Which has produced minimum results? Why?

#### 8.3.5 Sustainability

- What are your sustainability strategies?
- What has been the impact of your sustainability strategy?
- What are the roles of the Government of Ghana, the political sub-divisions, the communities, the sectors, the communities and individual consumers in the sustainability aspect?
- How do you intend to phase out and transfer leadership/operations to the community partners on the platform?

#### 8.3.6 General Impression (optional)

- Considering the questions asked so far by the Liberian team, what could be a general advice regarding the rollout

## Pictorial from study tour in Ghana

### Day One: DTT, Kanda, Accra, Ghana



*Figure 1 Mr. Oscar Nchow in a discussion with Liberian Team at DTT in Accra, Ghana*



*Figure 2 Liberia Team engages with Mr. Nchow at DTT Center in Accra.*



*Figure 3 Liberia Team at the DTT in Accra*



*Figure 4 Mr. Williams presenting at the NOC in McCarthy Hill, Accra*





*Figure 5 Mr. Williams making a presentation to Liberia Team*



*Figure 6 At K-NET Network Operation Center*



*[Figure 7 Liberia Team takes a picture at McCarthy Hill](#)*

Day two: Adidome, Volta Region, Ghana



*Figure 8 GIFEC RTP in Adidome, Volta Region*



*Figure 9 Battery component at Base station in Adidome*



*[Figure 10 Liberia Team at GIFEC RTP in Adidome](#)*



*[Figure 11 Ms. Evelyn Azumah, of the Dorfor-Adidome D-A Primary school explains how the RTP supports e-Learning in the Volta Region](#)*



[Figure 12 At the Dorfor-Adidome Primary school in the Volta Region](#)

[Meeting with Stephane in pictures](#)



*Meeting with service provider Stephane Merires of Rohde & Schwarz*

