

INTERNAL DEFENSE

Study of Coexistence between DVB-T2 & LTE Networks in the Digital Dividend Band in Nigeria

By

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Introduction

❖ Background / Motivation

- Growing interests in use of spectrum.
- Studies of interference between two services required.
- Previous studies failed to explore the Nigerian case.

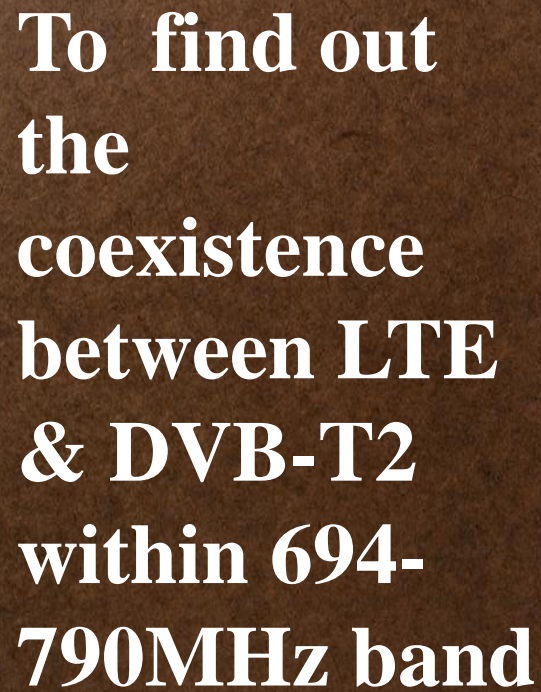
Introduction

❖ Statement of the Problem

➤ To investigate coexistence
between DVB-T2 & LTE



AIM



**To find out
the
coexistence
between LTE
& DVB-T2
within 694-
790MHz band**



Introduction

❖ Significance of the Study

- Provide ways to maximize the use of limited spectrum.
- Predict future scenarios & the consequences of deploying both services.
- Provide practical guidelines for efficient & reliable service in Nigeria

Introduction

❖ Objectives of the Study

- To investigate adjacent channel interference within Nigeria.
- To investigate co-channel interference between adjoining countries.
- Validate the field measurement results through simulation results.

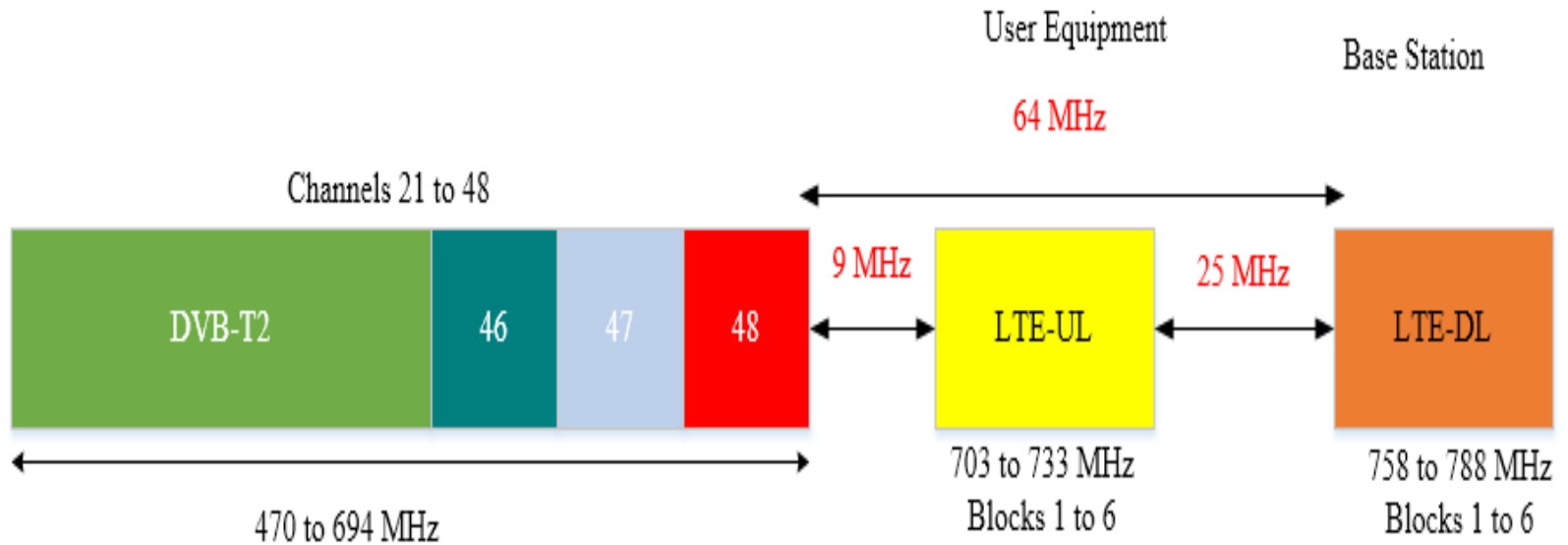
Related Studies

S/N	AUTHOR	WORK	RESULT	GAP
1	Okamoto et al [1]	Performance evaluation of DVB -T & LTE in 700MHz	The dominant effect is the blocking interference	The region 1 frequency plan was not considered, which resulted to limitation to region 3
2	Tekovic et al [7]	Analysis of adjacent channel interference of the LTE on DVB-T	DVB-T reception is more sensitive to eNodeB operating in idle mode	Only field measurement no simulation
3	Martinez et al [8]	Spectrum Sharing for LTE & DTT	Determined the appropriate EIRP for LTE to operate in frequencies adjacent	It only consider LTE downlink carrier as interferer to a DTT receiver, which are valid for the FDD mode
4	Ribadeneira-Ramirez et al [40]	Interference analysis between DTT & 4G LTE in digital dividend bands	It is very difficult to avoid interference in the worst-cases. The LTE interference depend on the level of useful DTT signals	Inadequate guard band between DVB-T & LTE

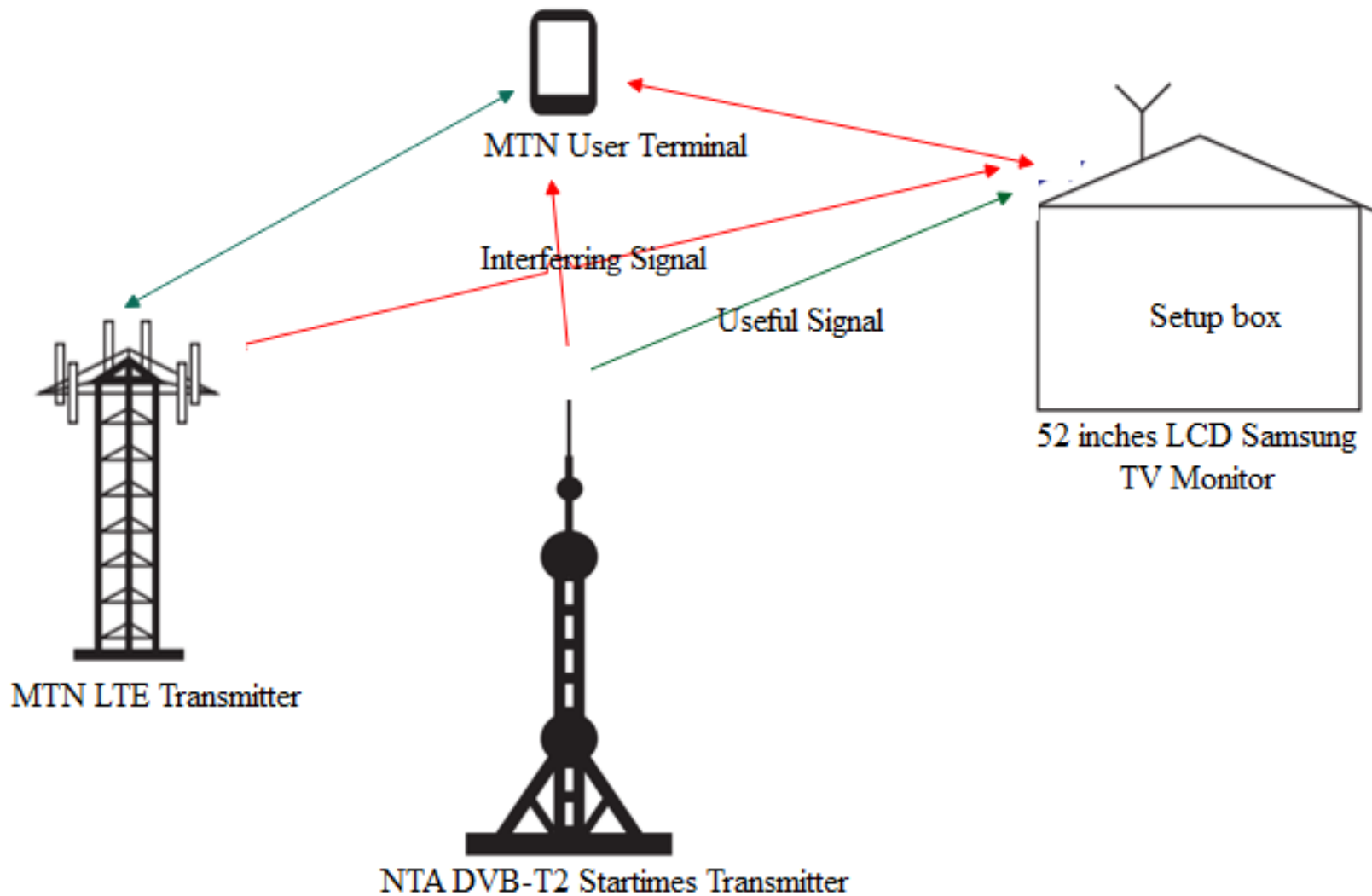
RESEARCH METHODOLOGY

❖ Field Measurement

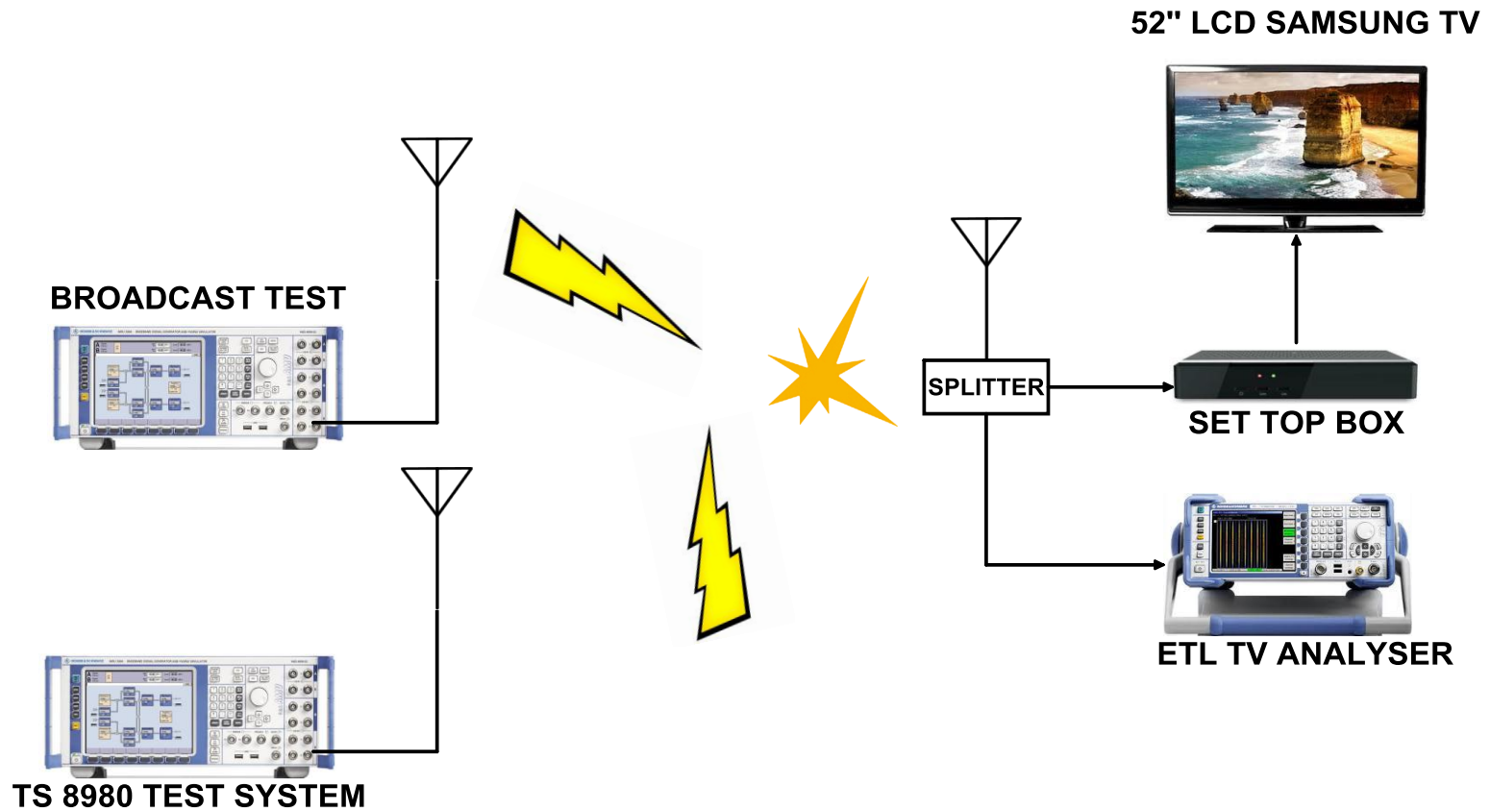
❖ The Spectrum Engineering Advanced Monte Carlo Analysis Tool (SEAMCAT)



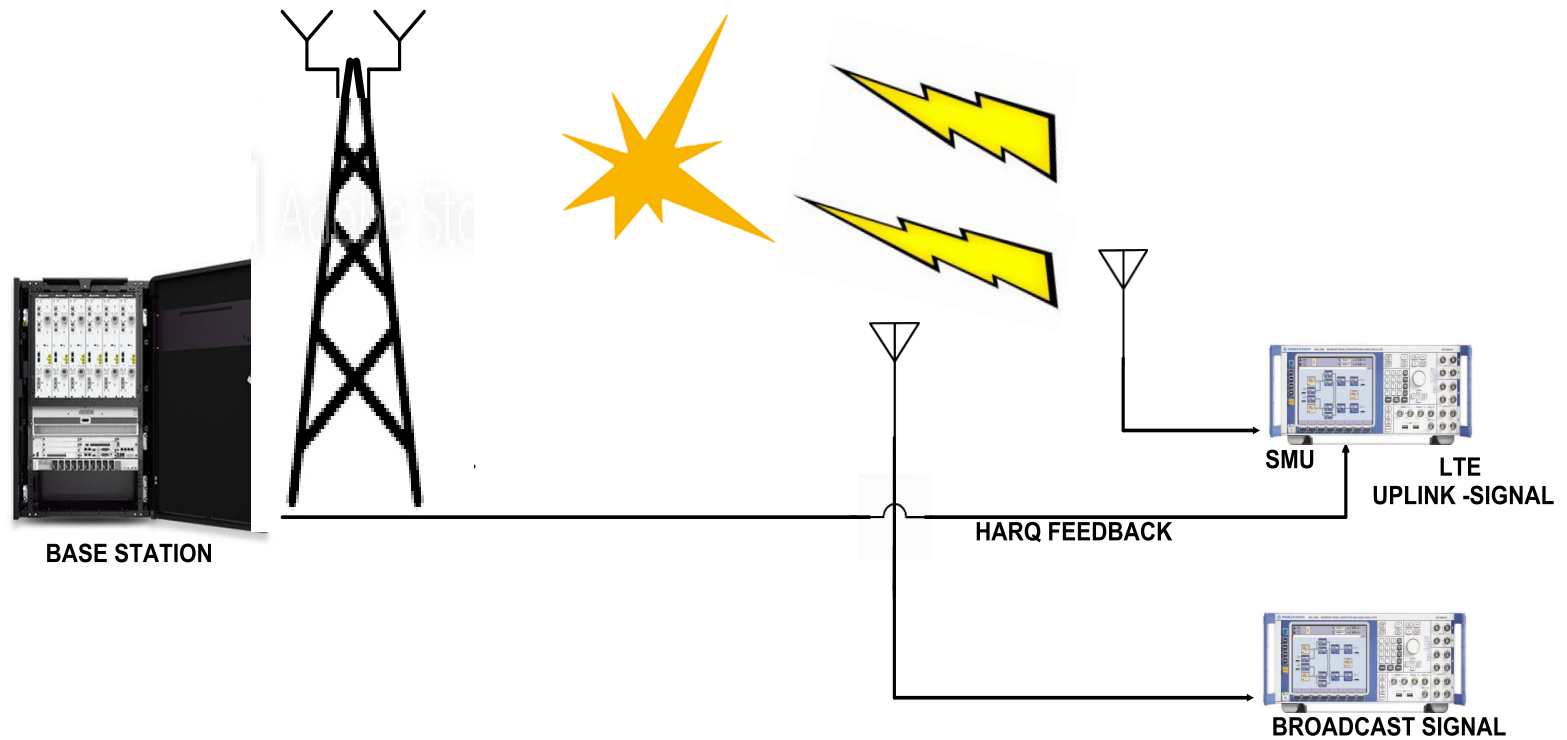
Spectrum Plan for 700MHz



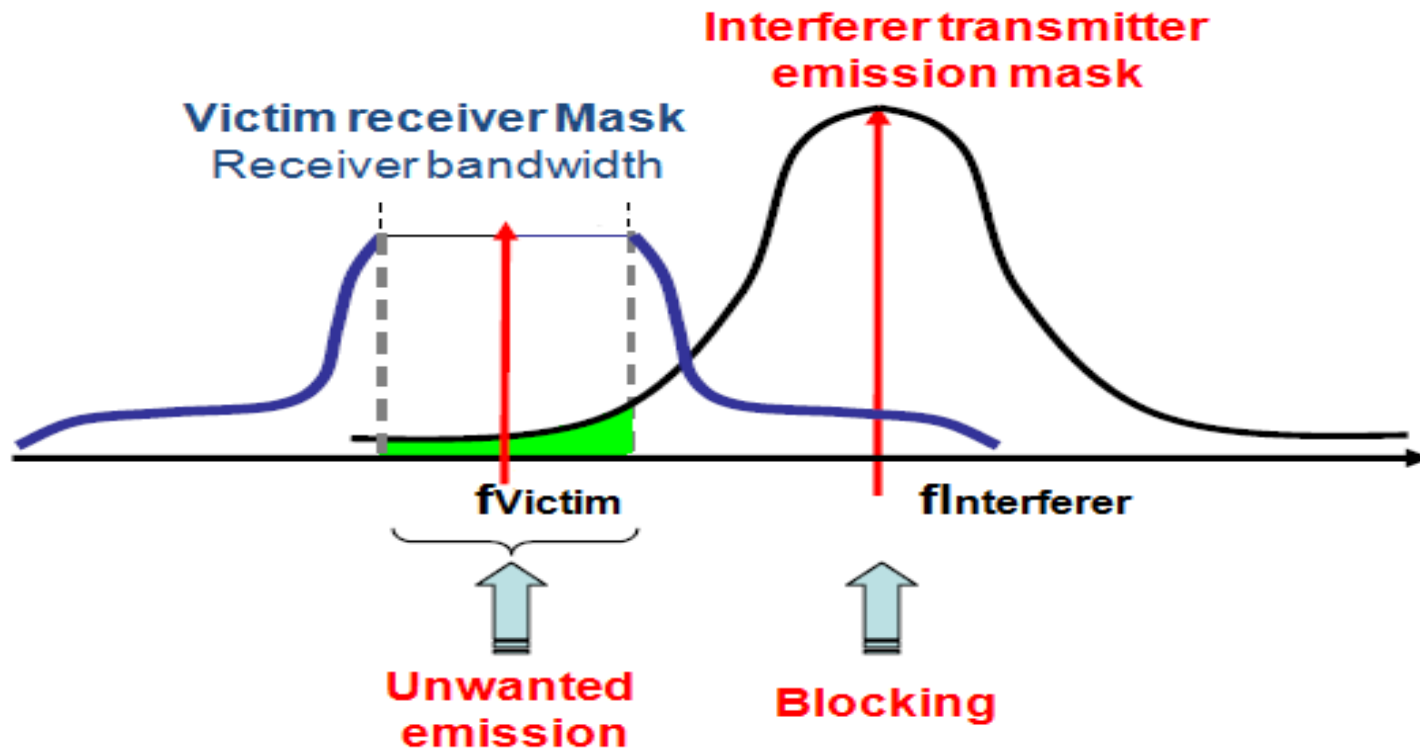
DVB-T2 & LTE Setup



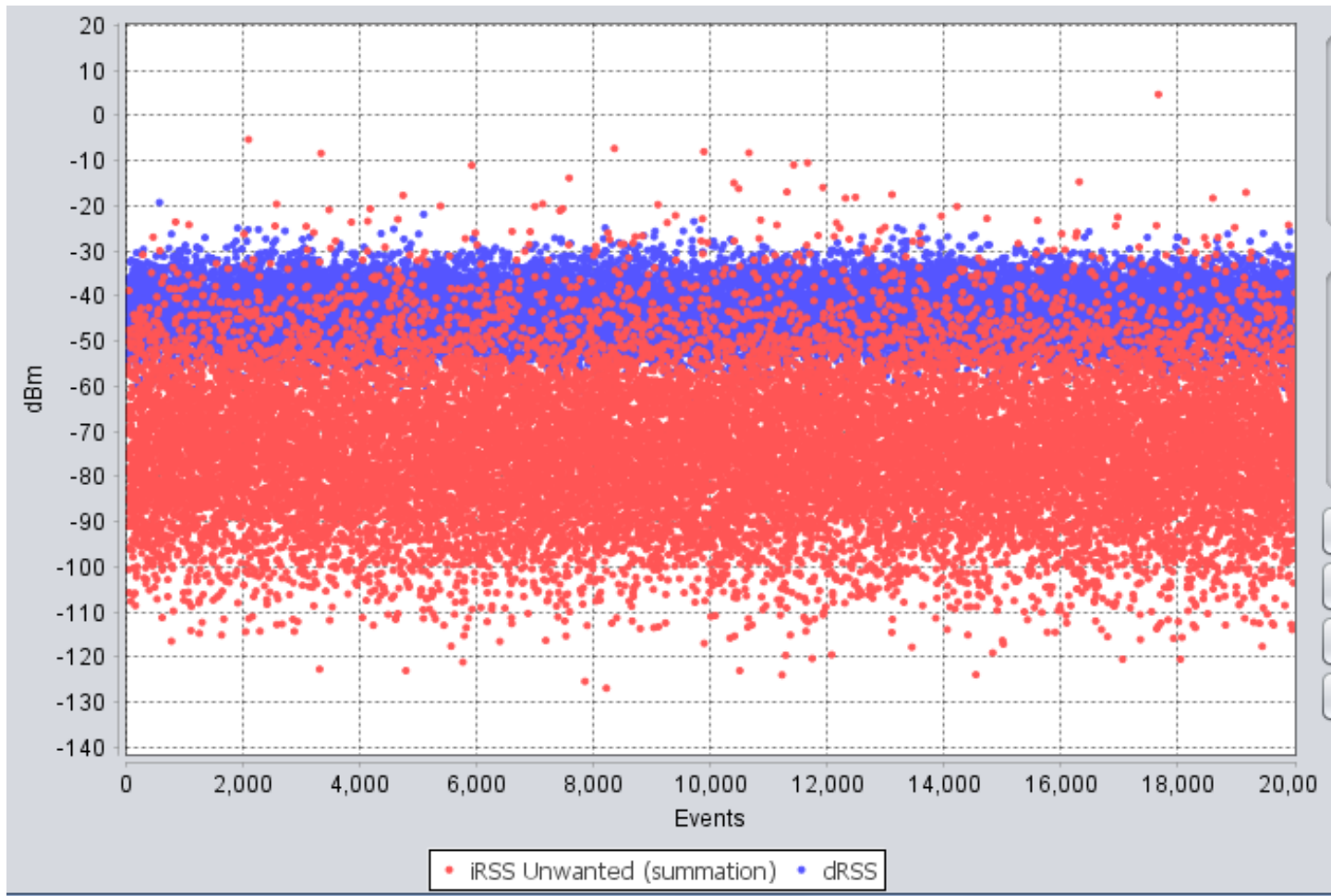
Field Measurement: Influence of LTE on DVB-T2



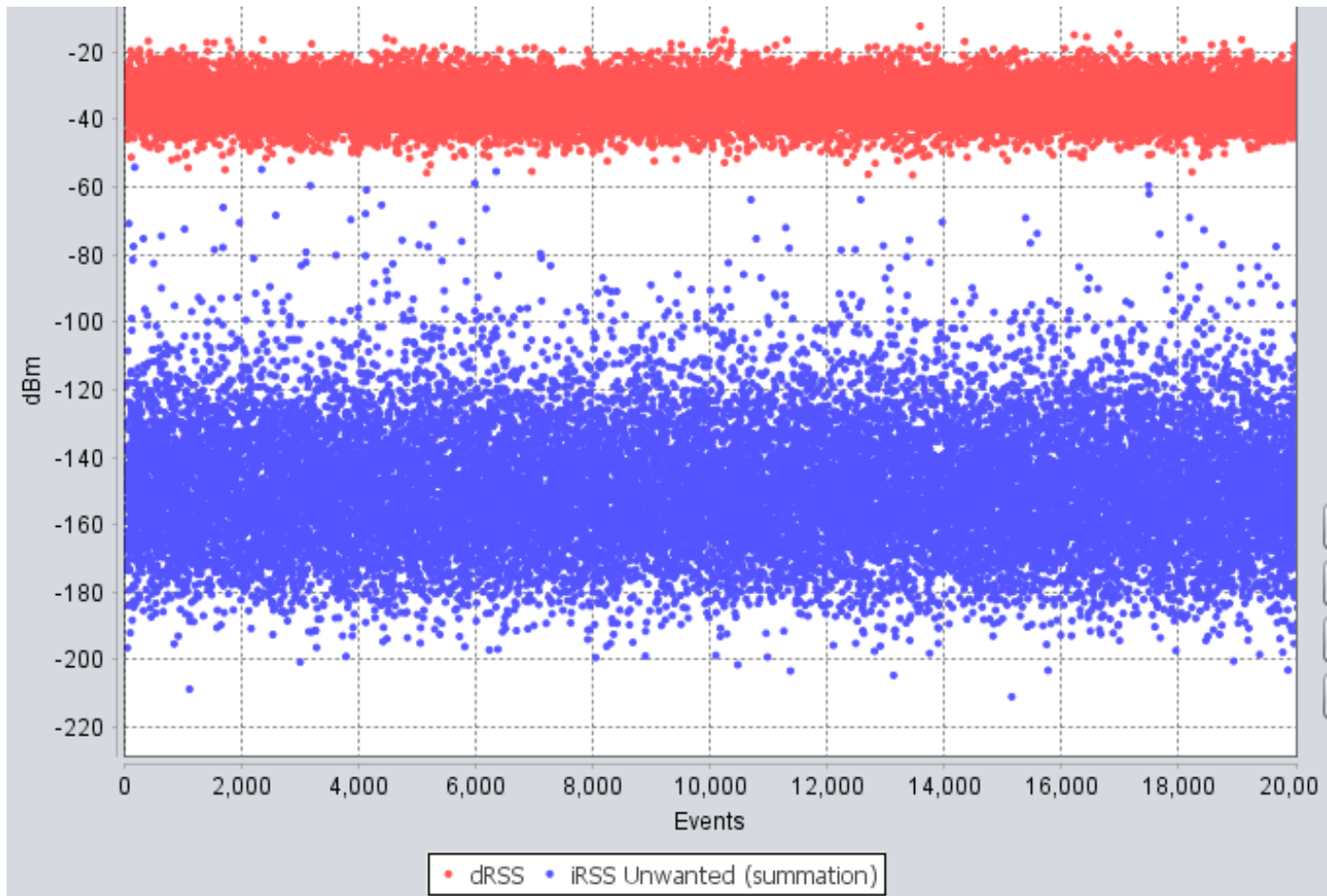
Field Measurement: Influence of DVB-T2 on LTE



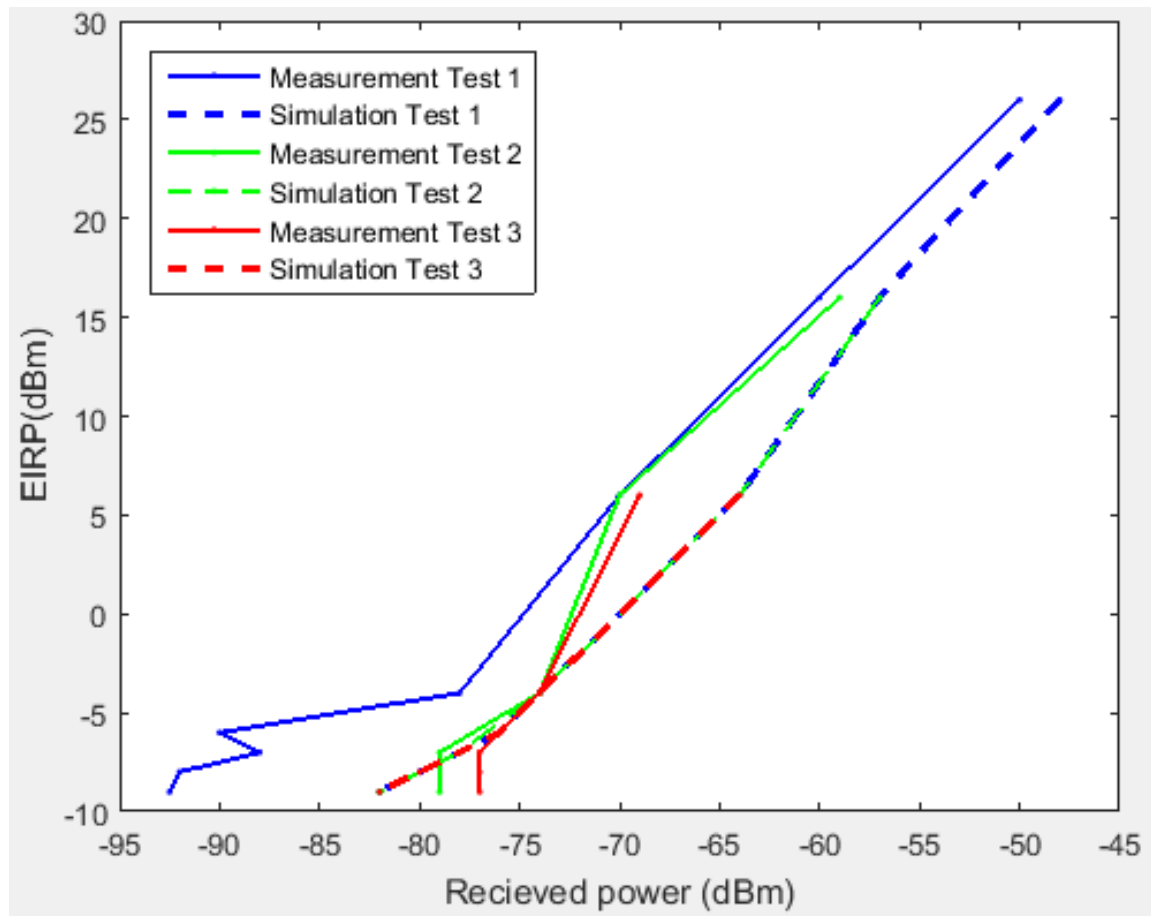
Findings: Field Measurement & Simulation



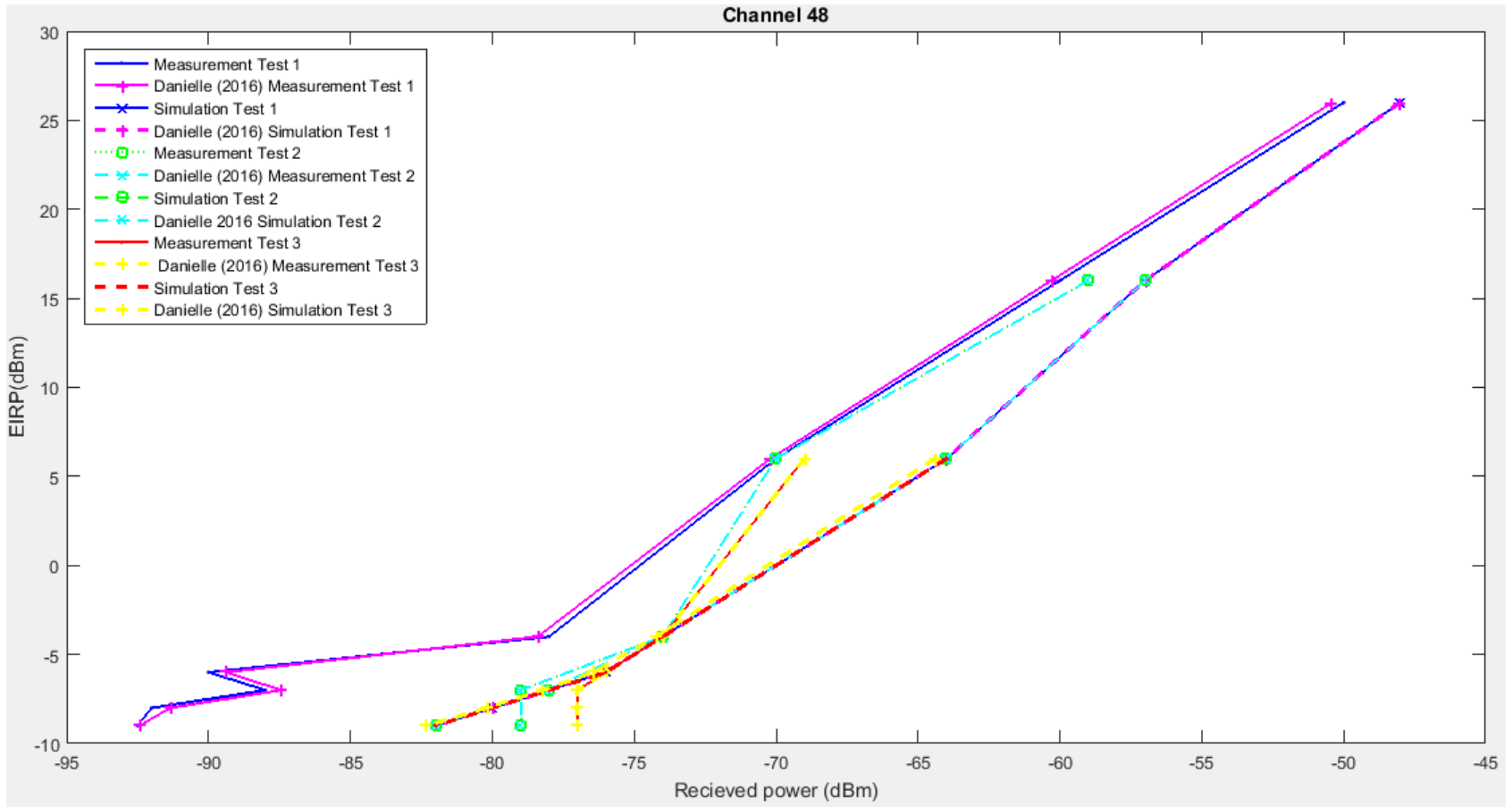
Simulation Measurement :TEST RESULTS



Findings: Adjustment of PR



Comparison of FM with Simulation



Comparison of FM with Simulation & [1]

Conclusion

❖ The protection ratio of DVB-T2 should be upheld for a flawless co-existence.

Recommendations

- ❖ NCC and NBC should enforce the protection ratios.
- ❖ SON, Nigerian Custom, NCC and NBC should work together to ensure only standard equipment are in Nigerian market.
- ❖ Capacity building on practical guide of co-existence.