Oscillation Escheme - Report of Actuation in a Real Event
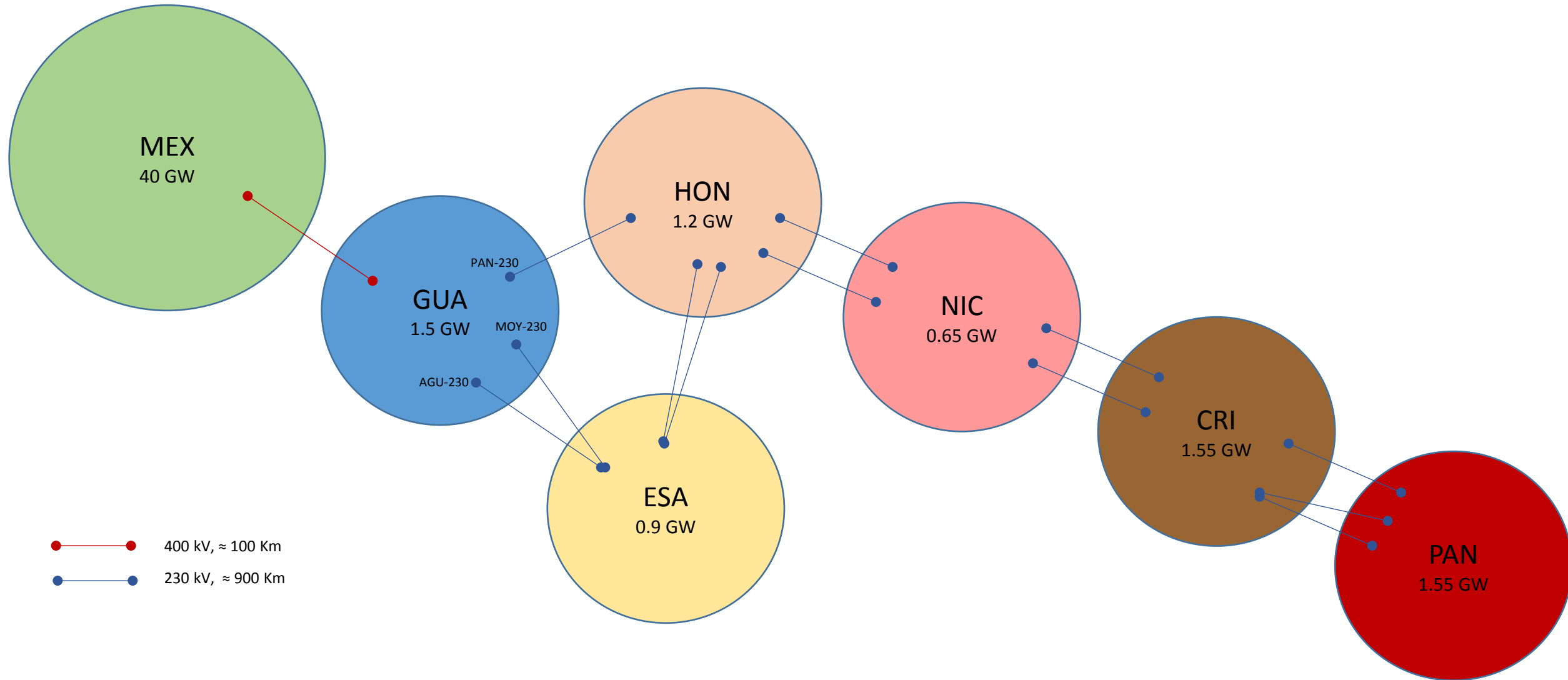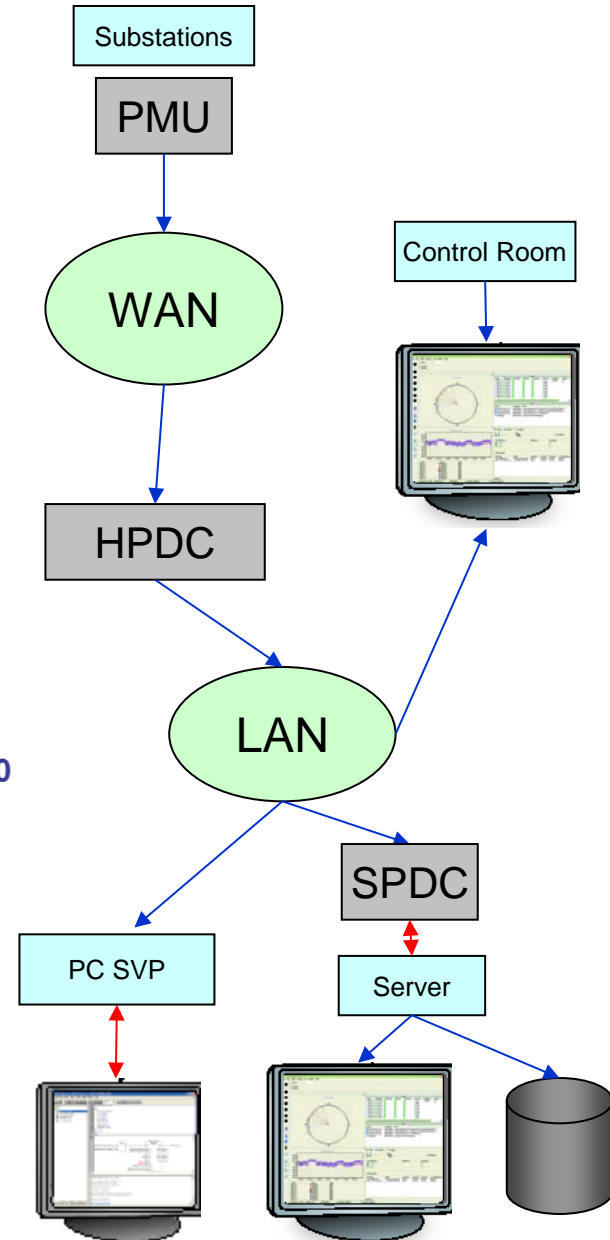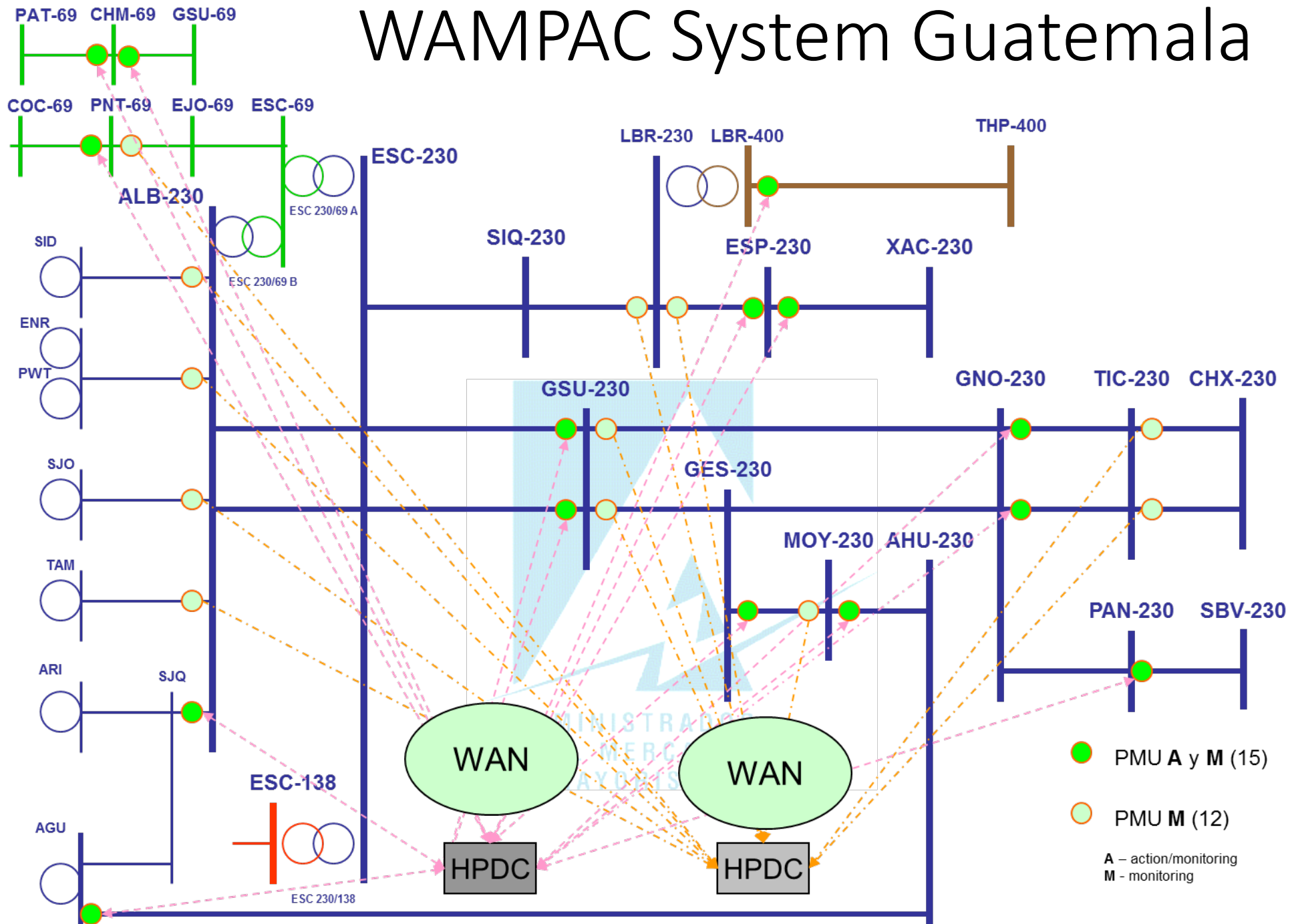
WAMPAC System – Guatemala's Grid

CONTENT

- Guatemala's interconections
- WAMPAC Guatemala
- Oscillation Scheme
- Graphs of a Real Event – Report of Actuation, October 20, 2014
  - ✓ Behavior of the Power Flows
  - ✓ Oscillation Frequency vrs. Power Flows
  - ✓ Oscillation Damping Ratio vrs. Power Flows
  - ✓ Oscilation Amplitude
  - ✓ Oscillation Amplitude vrs Damping Ratio
  - ✓ Trigger condition and Tripp Bit
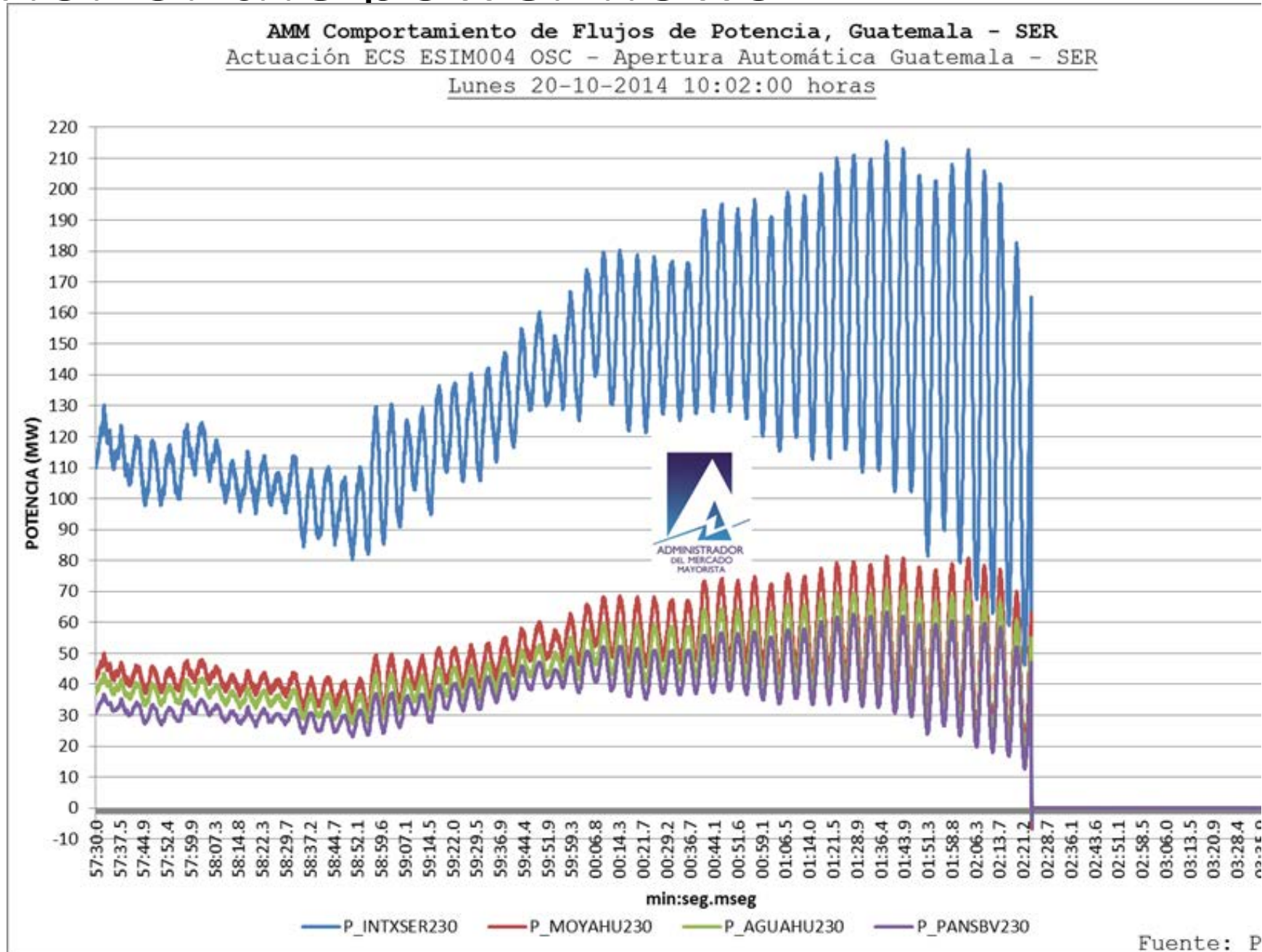 - ✓ Isolated systems Frequency behavior

Guatemala's Inteconections
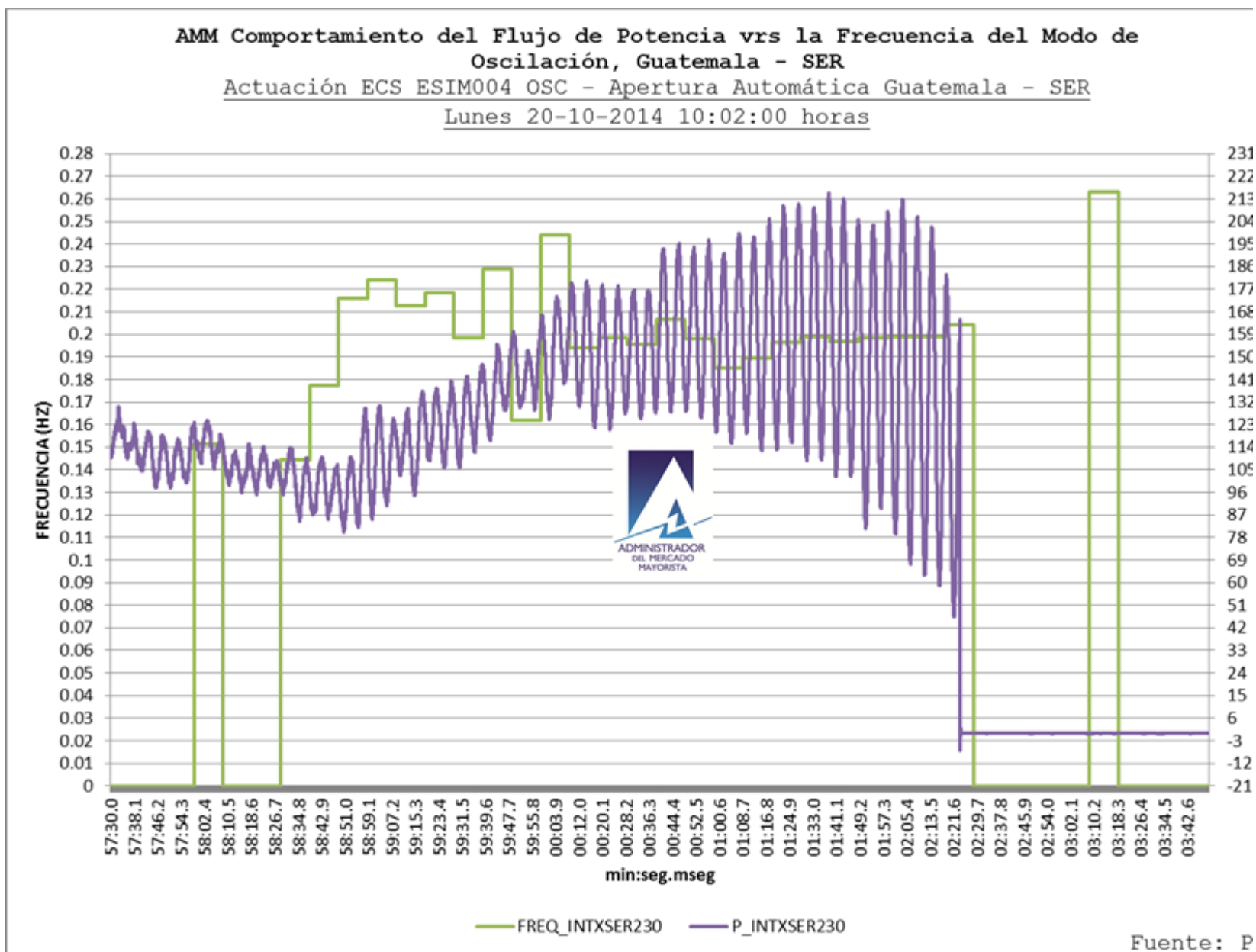
WAMPAC System Guatemala

Oscillation Scheme

✓ Prony Analysis, on a obervation window and sliding window, 15 oscillation modes.

✓ Modal Analysis: amplitude, damping, frequency and phase of the modes.

✓ Running Modal Analysis (MA) on:

- Power Flow P of transmission line Moyuta – Ahuachapán 230 kV.
- Power Flow P of transmission line Aguacapa – Ahuachapán 230 kV.
- Power Flow P of transmission line Panaluya – San Nicolas 230 kV.
- Power Flow P of Σ (Moyuta – Ahuachapán 230 kV + Aguacapa – Ahuachapán 230 kV + Panaluya – San Nicolas 230 kV)

✓ Two different bandwith observed, 0.1 - 0.3 Hz and 0.5 – 0.9 Hz.

✓ Base on real oscillation occurred, algorithms:

- Negative damping, sustained amplitude, time delay.
- Negative damping, increasing amplitude, time delay.
- Damping Ratio under 5%, amplitude greater than 60 MW, time delay.

✓ Trigger bit sent to the PMU's within C37.118 packet, simultaneously to the 3 PMU's.
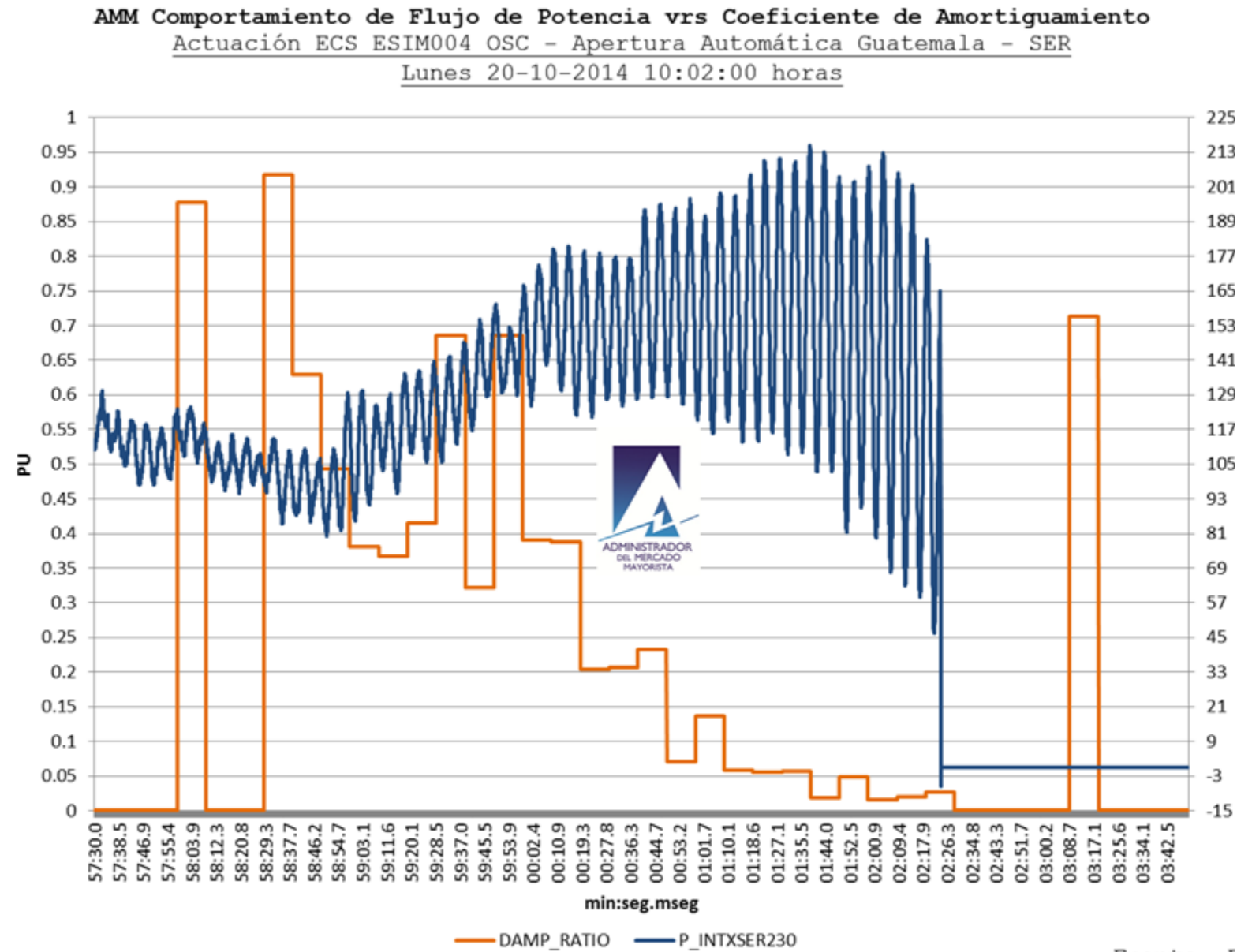
✓ Recording the algorithms conditions and the trigger bit.

Behavior of the power flows

AMM Comportamiento de Flujos de Potencia, Guatemala - SER
Actuación ECS ESIM004 OSC – Apertura Automática Guatemala – SER
Lunes 20-10-2014 10:02:00 horas

Oscillation Frequency vrs. Power Flows

AMM Comportamiento del Flujo de Potencia vrs la Frecuencia del Modo de Oscilación, Guatemala – SER
Actuación ECS ESIM004 OSC – Apertura Automática Guatemala – SER
Lunes 20-10-2014 10:02:00 horas

Oscillation Damping Ratio vrs. Power Flows

AMM Comportamiento de Flujo de Potencia vrs Coeficiente de Amortiguamiento
Actuación ECS ESIM004 OSC – Apertura Automática Guatemala – SER
Lunes 20-10-2014 10:02:00 horas

Oscillation Amplitude

AMM Comportamiento de la Amplitud del Modo de Oscilación
Actuación ECS ESIM004 OSC – Apertura Automática Guatemala – SER
Lunes 20-10-2014 10:02:00 horas
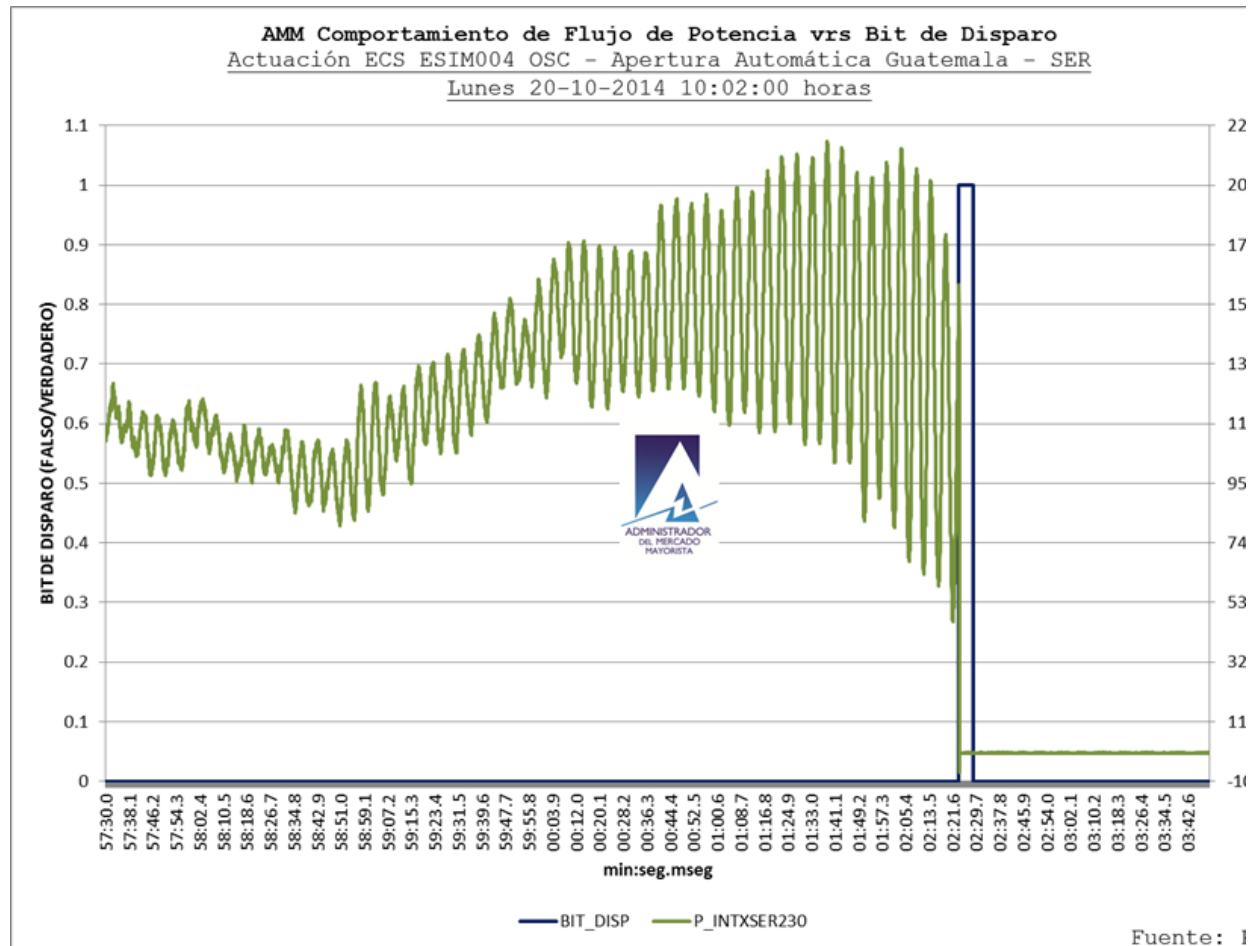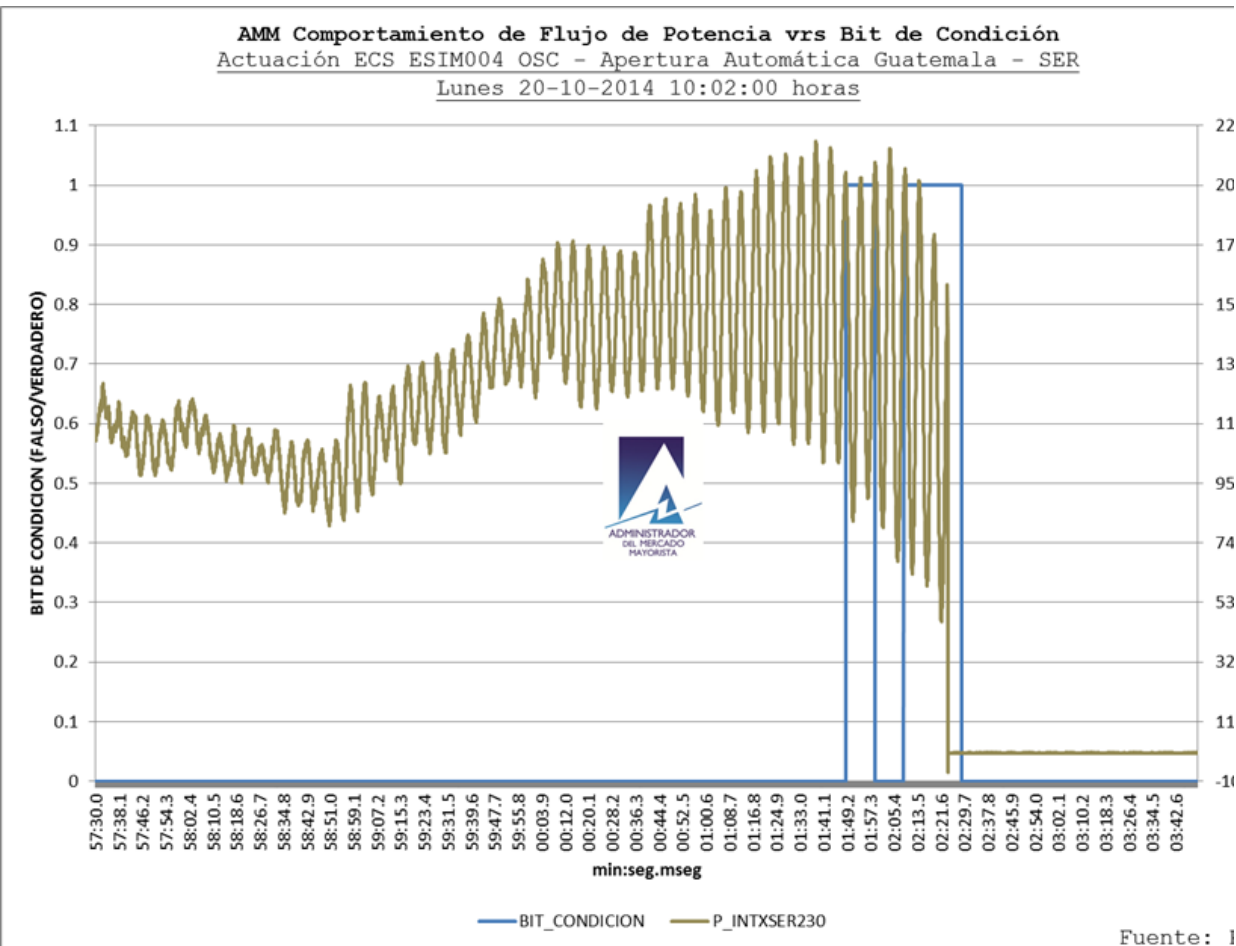
Oscillation Amplitude vrs Damping Ratio

Trigger condition and Tripp Bit

Isolated systems Frequency behavior

AMM Comportamiento de la Frecuencia SNI
Actuación ECS ESIM004 OSC - Apertura Automática Guatemala - SER
Lunes 20-10-2014 10:02:00 horas

MEX + GUA

System splitted

ESA + HON + NIC + CRI + PAN

System reconnected

FREQ_AGUAHU230   FREQ_ALBSJQ230