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October 14, 2025

Board of Commissioners of Public Utilities
Prince Charles Building
120 Torbay Road, P.O. Box 21040
St. John's, NL A1A 5B2

Attention: Jo-Anne Galarneau
Executive Director and Board Secretary

Re: *Reliability and Resource Adequacy Study Review* – Avalon Remedial Action Scheme Feasibility Study

Please find enclosed Newfoundland and Labrador Hydro's ("Hydro") Avalon Remedial Action Scheme ("RAS") Feasibility Study, provided in accordance with the 2024 Resource Adequacy Plan Settlement Agreement.[1]

As outlined in Hydro's response to Question 11 of the additional information[2] filed within the 2025 Build Application proceeding, Hydro had indicated that it would file this report along with the Transmission Expansion Feasibility Study after its completion in Q4 2025. In the interest of regulatory efficiency, Hydro has advanced the filing of its Avalon RAS Feasibility Study to provide more information on the solution for transmission constraints within the Avalon 230 kV corridor.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

Shirley A. Walsh
Senior Legal Counsel, Regulatory
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Encl.

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[1] "2025 Build Application – Bay d'Espoir Unit 8 and Avalon Combustion Turbine," Newfoundland and Labrador Hydro, March 21, 2025, sch. 2.
[2] "2025 Build Application – Request to Hydro to Provide Additional Information – Hydro's Reply," Newfoundland and Labrador Hydro, September 11, 2025.

Avalon Remedial Action Scheme Feasibility Study

Overview

October 14, 2025

A report to the Board of Commissioners of Public Utilities

newfoundland labrador hydro

Contents

List of Attachments

1.0 Context within the RRA Study Review

Newfoundland and Labrador Hydro ("Hydro") filed the initial "Reliability and Resource Adequacy Study" ("RRA Study") with the Board of Commissioners of Public Utilities ("Board") in November 2018 ("2018 Filing").[1] Since the 2018 Filing, throughout the continued *Reliability and Resource Adequacy Study Review* proceeding ("*RRA Study Review*"), Hydro has filed regular updates to the RRA Study, including numerous technical notes, additional studies, and third-party reports. The regulatory record for this proceeding is robust, with good reason. The provincial electrical grid is in the midst of unprecedented change—it is evolving from an isolated to an interconnected system, some of the assets the province has historically relied on most are aging and nearing retirement, there are significant new assets integrated into the electrical system and being proven reliable, and the province is facing an increase in demand driven by electrification.

Hydro's most recent study submitted to the Board on July 9, 2024, is its 2024 Resource Adequacy Plan,[2] containing Hydro's recommended Minimum Investment Required Expansion Plan. Subsequent to filing its 2024 Resource Adequacy Plan, Hydro and its experts participated in a series of technical conferences in the fall of 2024 with Board staff and intervening parties, along with their experts. These technical conferences provided an opportunity for fulsome discussion and enhanced understanding of Hydro's *RRA Study Review* and Expansion Plans. As a result of these proceedings, Hydro and the Intervenors gained consensus on a number of issues ("Settled Issues") which were enumerated in a Settlement Agreement.[3] The Settled Issues include agreement that the recommendation to build a new 150 MW unit at Bay d'Espoir (Unit 8) and a 150 MW Combustion Turbine ("CT") on the Avalon Peninsula ("Avalon CT") is appropriate as part of the first step in addressing the requirements for additional capacity for the Island Interconnected System, and applications for these projects should be filed for evaluation. In line with the Settled Issues, Hydro filed its 2025 Build Application for both of these assets in March 2025; the regulatory proceeding is ongoing.

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[1] "Reliability and Resource Adequacy Study," Newfoundland and Labrador Hydro, rev. September 6, 2019 (originally filed November 16, 2018).

[2] "2024 Resource Adequacy Plan – An Update to the Reliability and Resource Adequacy Study," Newfoundland and Labrador Hydro, rev. August 26, 2024 (originally filed July 9, 2024).

[3] "2025 Build Application – Bay d'Espoir Unit 8 and Avalon Combustion Turbine ("2025 Build Application")," Newfoundland and Labrador Hydro, March 21, 2025 , sch. 2.

The *RRA Study Review* has included numerous rounds of requests for information and technical conferences, providing for ample discourse and exchange of information between Hydro, the Board, and the parties.

In the coming years and decades, beginning with the recommended assets within its Minimum Investment Required portfolio, Hydro will have to make significant investments to maintain its legislative obligation of the provision of safe, least-cost, reliable electrical service in an environmentally responsible manner to the province.[4] As such, through the *RRA Study Review*, Hydro is modelling its system expansion in consideration of various forecast scenarios and within the context of continuously evolving energy policy. The numerous studies that Hydro has completed and planned are all necessary to validate and justify the information that Hydro inputs into its models, which produce critical information on which timely, prudent decisions are to be made.

While the enclosed study provides valuable, necessary information, it cannot and should not be considered independent of the rest of the studies and analyses ongoing through the *RRA Study Review*. Rather, the study is an input that will—along with other studies completed and ongoing—inform Hydro's broader system resource planning process now and into the future.

2.0 Background

The Avalon Remedial Action Scheme ("RAS") Feasibility Study, provided as Attachment 1, was performed by TransGrid Solutions Inc. to determine the technical viability of the Avalon RAS to facilitate increased power flow from Bay d'Espoir ("BDE") to Soldiers Pond ("SOP") during a Labrador-Island Link ("LIL") bipole outage. The cost of the Avalon RAS is expected to be significantly lower than that of constructing a new transmission line,[5] which was previously identified as a potential upgrade requirement to the Minimum Investment Required Expansion Plan; however, additional load shedding would be required in the event that an AC[6] transmission line contingency were to occur during a bipole outage in periods of elevated load. The goal of the study was to assess the feasibility of the Avalon RAS by ensuring that it would provide an acceptable response to system contingencies.

[4] *Electrical Power Control Act*, 1994, SNL 1994, c E-5.1, s 3(b)(iii).
[5] A new transmission line between Western Avalon ("WAV") Terminal Station and SOP Terminal Station was estimated to cost approximately $150 million (Association for the Advancement of Cost Engineering Class 5 estimate).
[6] Alternating current ("AC").

The majority of electrical load on the Island Interconnected System is consumed on the Avalon Peninsula and is supplied by three 230 kV lines (TL202, TL206 and TL267) originating at BDE, the LIL, the Holyrood Thermal Generating Station ("Holyrood TGS") and the existing Holyrood CT.[7] Figure 1 is a diagram depicting the BDE–SOP 230 kV transmission System.

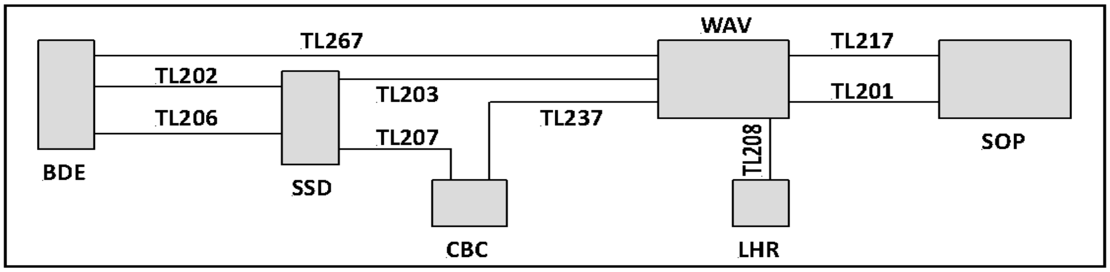

Figure 1: BDE–SOP Transmission System

The 230 kV power flow from BDE to SOP is typically low during normal operation, or could even flow in the opposite or western direction (SOP–BDE), when LIL imports and/or Holyrood TGS generation are high. The power transfer capacity of the BDE–SOP transmission system while the LIL is in operation is 680 MW as measured at BDE. As shown in the 2025 Newfoundland and Labrador System Operator Annual Assessment Report,[8] the expected power flow east out of BDE is only anticipated to be 340 MW during normal operation when the LIL is in service during the 2034/2035 peak season. Therefore, it can be concluded that there are no BDE–SOP transmission system violations while operating under normal conditions during a peak scenario for the foreseeable future.

During a LIL bipole outage (or "LIL Shortfall Scenario"), there would be increased power flow from BDE to SOP, since there would be no supply from the LIL to help serve the Avalon load. The BDE–SOP power transfer would further increase at higher Avalon loads and/or if less generation is dispatched on the Avalon in the form of thermal generation, Fermeuse Wind or Newfoundland Power Inc. ("Newfoundland Power") Generation.[9] The extended outage scenario is considered Hydro's worst-case scenario, and

[7] The Avalon RAS study assumed 39 MW of Newfoundland Power Avalon Generation and 6 MW of wind generation at Fermeuse. The analysis assumed the retirement of the Hardwoods Gas Turbine.
[8] "NLSO Report – 2025 Annual Planning Assessment – Doc # TP-R-092," Newfoundland and Labrador Hydro, May 6, 2025, app. B.
[9] Avalon RAS Study assumed 39 MW of Newfoundland Power Avalon Generation and 6 MW of wind generation at Fermeuse.

assumes a cascading failure of towers,[10] which results in the LIL being unavailable for six weeks[11] during the coldest period of the year (i.e., January and February). To date, Hydro has experienced incidents of damage caused by icing on tower components of the LIL, but it has not experienced a complete tower failure. As a result, Hydro considers this scenario unlikely; however, it is prudent to plan for the worst-case scenario, and Hydro is ensuring its readiness should it occur.

Table 1 provides a summary of the 230 kV line contingencies between BDE–SOP during a LIL Shortfall Scenario while experiencing peak load conditions. The table provides the percentage of the Avalon load that can be served during peak conditions. It is noted that in the scenario presented in Table 1, the LIL is out of service, and the system must be re-postured to guard against the next contingency. The transmission lines are not fully loaded prior to 230 kV line contingencies; however, power transfer must be limited to ensure that thermal overloads do not occur in the event of the next contingency. The result is that additional Avalon load must be pre-emptively shed.

A transmission line thermal overload must be avoided as it causes the conductor to sag beyond the critical clearance distance, which poses a safety and fire risk to the public. It is evident from Table 1 that Avalon peak load can not be fully served during a LIL Shortfall Scenario without avoiding thermal overloads following any 230 kV line contingency between BDE–SOP. The thermal overloads can be mitigated by applying transmission reinforcements between BDE–SOP or implementing an RAS, where the 230 kV transmission lines would be protected from overloads by automatic load shedding.

[10] The LIL extended outage is intended to simulate an icing situation that causes a tower collapse in a remote segment of the transmission line; however, the extended outage scenario could generally apply to any prolonged outage event.
[11] Hydro used the output of the assessments completed by Haldar in combination with the information provided in the Emergency Response and Restoration Plan as the basis for considering the potential length of a significant outage of the LIL. Please refer to "Reliability and Resource Adequacy Study – 2022 Update," Newfoundland and Labrador Hydro, October 3, 2022, vol. III, sec. 5.2.

Table 1: BDE–SOP 230 kV Contingencies – LIL Shortfall Scenario

Contingency	Limiting Criteria	Avalon Load That Can Be Served During Peak[12] (%)	Required Avalon Load Shedding Amount During Peak[13] (MW)
TL217	TL201 Overload	70	284
TL207	TL203 Overload	75	234
TL206/TL202	TL202/TL206 Overload	77	218
TL237	TL202/TL203/TL206 Overload	77	218
TL201	TL217 Overload	85	138
TL203	TL207 Overload	90	96

These violations were addressed in the Minimum Investment Required Expansion Plan proposed within the 2024 Resource Adequacy Plan by constructing a new transmission line.[14] The scope of the transmission reinforcements included the following:

- Construct a third line from the WAV Terminal Station to SOP to run in parallel with TL201 and TL217; and
- Implementing Dynamic Line Ratings (“DLR”) on various 230 kV lines between BDE to SOP.

The purpose of the Avalon RAS Feasibility Study was to investigate the technical viability of a RAS in preventing the overloads presented in Table 1. The Avalon RAS would be a lower-cost solution in comparison to the transmission investment assumed for the Minimum Investment Required Expansion Plan proposed in the 2024 Resource Adequacy Plan.

3.0 Hydro’s Emergency Transmission Planning Criteria

Hydro’s Transmission Planning department is responsible for the planning of the Island and Labrador interconnected transmission systems. This involves the development and completion of appropriate studies to determine transmission and terminal equipment requirements to maintain a reliable supply of power and energy for customers at the lowest possible cost, today and into the future. This involves

[12] Assumed Island Peak of 1,835 MW.
[13] Assumed Island Peak of 1,835 MW.
[14] “2024 Resource Adequacy Plan – An Update to the Reliability and Resource Adequacy Study,” Newfoundland and Labrador Hydro, rev. August 26, 2024 (originally filed July 9, 2024), app. C, sec. 7.3.2.

comparing the present capability of each interconnected transmission system against load forecasts and predetermined planning criteria by means of load flow, short circuit and power stability analysis.

The transmission planning process requires the use of computer software to perform power system studies in order to demonstrate that the power system meets planning criteria for the present and future states of the system. When the simulations of the power system indicate that the system is not meeting the stated planning criteria, the transmission planning process is used to develop cost-effective transmission system enhancements to ensure the system meets the planning criteria. The adherence to stated transmission planning criteria is critical in ensuring a long-term, reliable transmission system.

Within the electric utility industry, the North American Electric Reliability Corporation and the Northeastern Power Coordinating Council standards provide the North American and regional reliability standards and criteria, respectively. While not a registered member of either entity, Hydro aligns its planning criteria with the recognized reliability organizations where practicable for the Island and Labrador Interconnected System. Hydro's Transmission Planning Criteria sets out the specific acceptable pre- and post-contingency (n-0 and n-1) responses of the elements within the Newfoundland and Labrador Interconnected System rated 46 kV and above.[15]

Hydro has developed Emergency Transmission Planning Criteria in the event of a LIL bipole outage following the retirement of the Holyrood TGS. In such a scenario, elevated power flows in the corridor between BDE and SOP would result in violations of normal Transmission Planning Criteria. The application of normal Transmission Planning Criteria would therefore trigger a requirement for extensive transmission system upgrades. Further, these upgrades cannot be readily confirmed as they would be contingent on the magnitude and location of future generation additions.

On this basis, Emergency Transmission Planning Criteria have been developed with the goal of ensuring an acceptable level of reliability in a severe operating scenario that considers a reasonably low probability of a LIL bipole outage and a low probability of further contingencies occurring during a bipole outage, particularly during peak load conditions. The Emergency Planning Criteria makes the following exceptions to the Transmission Planning Criteria:

[15] NLSO Standard TP-S-007 - Transmission Planning Criteria is available on the OASIS website: https://www.oasis.oati.com/woa/docs/NLSO/NLSOdocs/TP-S-007.pdf.

- **Steady State Voltage Levels:**
  - Pre-contingency limits: All bus voltages shall be maintained between 90% and 110%.[16]
  - Post-contingency limits: For contingency, there are no restrictions for bus voltage levels, assuming the system remains stable and voltage collapse is avoided.[17]
- **Transient Under-Voltage Criteria:**
  - Violation of the transient under-voltage criteria[18] is deemed acceptable following a contingency event, assuming the system remains stable.
- **Three-Phase Faults:**
  - System instability is deemed acceptable following a three-phase fault, given the rarity of such an event and the cost associated with mitigating.
- **Thermal Overloads:**
  - Marginal temporary thermal overloads may be deemed acceptable and would be assessed on a case-by-case basis to ensure no risk to public safety.
- **Under/Over Frequency Criteria:**
  - Frequency must remain above 58 Hz following a contingency event.
  - Frequency must remain below 63 Hz following a contingency event.

4.0 Avalon RAS Feasibility Study

4.1 Assumptions

This study simulated the contingencies in Table 1 to see if the allowable pre-contingency power flow could be increased such that peak demand could be served with a corresponding RAS that would cross-trip a sufficient amount of load on the Avalon. The following were the key assumptions for the Avalon RAS Study:

- **<u>Base Case Assumptions:</u>**
  - The proposed Avalon CT and the existing Holyrood CT are in service.

[16] Hydro's Transmission Planning Criteria states that all bus voltages shall be maintained between 95% and 105%.
[17] Hydro's Transmission Planning Criteria states that all bus voltages shall be maintained between 90% and 110% following a contingency event.
[18] Hydro's Transmission Planning Criteria states that post-fault recovery voltages on the AC system shall be as follows: (i) transient under voltages following fault clearing should not drop below 70%; and (ii) the duration of the voltage below 80% following fault clearing should not exceed 20 cycles.

- The analysis was performed with and without the Maritime Link frequency controller support.
- The analysis was performed on the 2025 peak (1,850 MW) and the 2033 peak (2,000 MW) cases.

- **Sensitivity Analysis:**
  - **The 123.5 MW Holyrood CT is unavailable.** The third SOP synchronous condenser ("SC") was put online for this scenario.
  - **The proposed Avalon CT is unavailable**. Two SOP SCs were online for this scenario.

4.2 Results

The Avalon RAS Feasibility Study results, including the RAS load shed requirements to prevent post-contingency thermal overloads, are summarized in Table 2. The highlighted rows represent the base case scenarios, and the other rows represent multiple-contingency scenarios where on-Avalon CT generation is not available, which are more unlikely to occur.

Table 2: Avalon RAS Feasibility Study Results

Island Demand (MW)	Avalon CT (IN/OUT)	Holyrood CT (IN/OUT)	Range of Load Shedding Requirement for 230 kV Transmission Line Contingencies (MW)[19]	Worst Contingency[20]
1,835	IN	IN	0–**179**	TL202/TL206
		OUT	72–**288**	TL202/TL206
1,800 to 1,840[21]	OUT	IN	76–**302**	TL202/TL206
2,000	IN	IN	41–**291**	TL202/TL206
		OUT	Maximum demand limited to 1835 MW due to steady state pre-contingency voltage at Sunnyside ("SSD"), with TL201 thermal loading also nearing 100%.	

The results demonstrate that the Avalon RAS is an effective solution in a LIL Shortfall Scenario, as all Emergency Transmission Planning Criteria can be met in all cases. As stated above, Hydro believes that reasonable controlled load shedding, as outlined in Table 2, is an acceptable outcome in the event of a

[19] The amount of load shed is dependent on which 230 kV line is tripped.
[20] Worst contingency means the contingency requiring the largest amount of load shed, not the most restrictive contingency.
[21] Reactive power support is required in the SSD/Come By Chance ("CBC") area to avoid voltage collapse for the loss of TL267. Preliminary analysis suggests a minimum of a 50 MVAr STATCOM would be required.

LIL bipole outage to balance the cost of additional transmission upgrades and reliability for customers, given the rarity of the multiple-contingency scenario.

The implementation of the RAS would enable increased flows to the Avalon Peninsula to meet Island peak demand of up to 2,000 MW in the event of a LIL bipole outage with the proposed Avalon CT online, and when activated in the event of a further contingency, it would ensure that the system remains intact and that there is no risk to equipment. Such a solution could be implemented in concert with BDE Unit 8 and the Avalon CT to eliminate the need for additional transmission upgrades in the Minimum Investment Required Case. However, increased dynamic voltage support would likely be needed if Hydro were not to develop the Avalon CT.

Based on the developments regarding the RAS, Hydro will not need to pursue the construction of a new transmission line in the corridor between BDE–SOP at this time. While transmission line construction will not be required in support of the proposed projects in the 2025 Build Application, Hydro will continue with its commitment to work with a consultant on the Transmission Feasibility Study to refresh cost estimates.

The following are the key takeaways from the Avalon RAS Study results:

- **When Holyrood CT and proposed Avalon CT are online:**
    - 1,835 MW Island Demand can be served during a LIL bipole outage with a maximum load shed amount of 179 MW.
    - 2,000 MW Island Demand can be served during a LIL bipole outage with a maximum load shed amount of 291 MW.
    - No reactive power support is required in the SSD/CBC area at an Island Demand level of less than or equal to 2,000 MW.
- **When Holyrood CT is offline and the proposed Avalon CT is online:**
    - 1,835 MW Island Demand can be served during a LIL bipole outage with a maximum load shed amount of 288 MW.[22]

[22] A peak demand of 1,900 MW may be achievable under this scenario. Further analysis would be required to confirm.

- No reactive power support is required in the SSD/CBC area at an Island Demand level of less than or equal to 1,835 MW. Reactive power support would be required in SSD/CBC to facilitate a 2,000 MW under this scenario.

- **When Holyrood CT is online and the proposed Avalon CT is offline:**
  - 1,800 to 1,840 MW Island Demand can be served during a LIL bipole outage with a maximum load shed amount of 302 MW.
  - Reactive power support would be required in SSD/CBC to facilitate a 2,000 MW under this scenario.
  - A STATCOM of approximately 50 MVAR is required in the SSD area to maintain system stability for a 1P fault trip of TL202 or TL206.

- **When Maritime Link frequency controller support is not available:** There are three contingencies in the 2,000 MW peak demand scenario—TL267, TL202 or TL206—that result in system frequency greater than 63 Hz due to the amount of RAS load shed required. The loss of TL202 or TL206 results in cross-tripping of two BDE units, while the loss of TL267 results in cross-tripping of one BDE unit. The BDE generating units (Units 1–6) can restore the system frequency to a maximum peak of 63 Hz.

- **When the proposed Avalon CT is out-of-service**: The frequency goes just above 63 Hz (to 63.07 Hz) following a trip of TL202 or TL206 with the RAS load shed. Tripping 1 BDE unit brings the frequency below 63 Hz.

5.0 Conclusion

The Avalon RAS Study confirmed the technical viability of the Avalon RAS as an effective solution in a LIL Shortfall Scenario, as all Emergency Transmission Planning Criteria can be met in all cases. Therefore, the Avalon RAS constitutes an alternative solution to address transmission constraints at a cost that is expected to be significantly lower than that of constructing a new transmission line,[23] which was previously identified as a potential upgrade requirement for the Minimum Investment Required

[23] While cost estimates have not yet been developed, it is understood that implementation will involve modifications to protection and controls relaying. A new transmission line between WAV Terminal Station and SOP Terminal Station was estimated to cost approximately $150 million.

Expansion Plan. As a result, Hydro will not need to pursue the construction of a new transmission line in the corridor between BDE–SOP at this time.

Analysis was performed as part of the Avalon RAS Study to determine the maximum amount of automatic load shedding required following each 230 kV line contingency during a LIL bipole outage while experiencing peak load conditions. The largest amount of load shed would be 290 MW for the loss of TL202 or TL206, assuming an Island peak of 2,000 MW, assuming the existing Holyrood CT and proposed Avalon CT are online at full capacity. The required amount of load shedding to avoid thermal overloads increases with less generation dispatched on the Avalon Peninsula. This provides further justification for the construction of the new Avalon CTs to help reduce BDE–SOP power transfer to minimize customer impact for loss of a 230 kV line during a LIL bipole outage over peak.

The study also determined that as the Island demand increases and/or Avalon generation is reduced, there could eventually be a requirement for additional reactive power support in the SSD/CBC area to maintain acceptable voltage levels to avoid a violation of Hydro's Emergency Transmission Planning Criteria. Reactive power support in the SSD/CBC area would be required to facilitate the Avalon RAS if the proposed Avalon CT is not installed.

6.0 Next Steps

The following are the next steps as they pertain to the implementation of the Avalon RAS:

- Hydro will continue to engage Newfoundland Power on how the RAS can be implemented on its electrical system. Consideration will be given to balancing the complexity of implementation with refinements that would allow for reduced customer impact.
- Hydro to develop a cost estimate and schedule for the Avalon RAS project. Hydro is recommending advancing the submittal of the Avalon RAS proposal prior to the retirement of the Holyrood TGS. Although the Avalon RAS is not mandatory until the retirement of the Holyrood TGS, it would provide some immediate value as it could reduce Hydro's dependency on Holyrood TGS generation in helping to offload the BDE–SOP transmission system during a LIL bipole outage while experiencing higher Island Demands.
- Hydro to investigate the potential reduction of load shedding associated with the Avalon RAS with the implementation of DLR on the 230 kV lines between BDE and SOP.

Attachment 1

Avalon Remedial Action Scheme (RAS) Feasibility Study

TransGrid Solutions Inc.

newfoundland labrador hydro

Report for:

Avalon Remedial Action Scheme (RAS) Feasibility Study

NEWFOUNDLAND & LABRADOR HYDRO

Attention: Matthew Carter
Technical Note no.: TN1943.01.05
Date of issue: October 7, 2025

Prepared By:
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Disclaimer

This technical note was prepared by TransGrid Solutions Inc.(part of Ramboll) ("TGS"), whose responsibility is limited to the scope of work as shown herein. TGS disclaims responsibility for the work of others incorporated or referenced herein. This technical note has been prepared exclusively for Newfoundland & Labrador Hydro and the project identified herein and must not be reused or modified without the prior written authorization of TGS.

Revisions

Project Name:	Avalon Remedial Action Scheme (RAS) Feasibility Study
Document Title:	Avalon Remedial Action Scheme (RAS) Feasibility Study
Document Type:	Technical Note
Document No.:	TN1943.01.05
Last Action Date:	October 7, 2025

Rev. No.	Status	Prepared By	Checked By	Date	Comments
00	DFC	R. Brandt	R. Ostash	November 20, 2024	Preliminary draft for review.
01	DFC			June 2, 2025	Updated draft for review – with 3x50 MW HRD units as base case assumption
02	DFC			July 30, 2025	Updated draft for review – added sensitivity with 3x50 MW HRD units off-line
03	IFA			July 31, 2025	Updated report to include results related to 3PFs in its own Section 6.
04	IFA			August 15, 2024	Updated report to address final set of NLH comments.
05				October 7, 2025	Updated report to read "2025" peak instead of "2023" peak.

Legend of Document Status:

Approved by Client	ABC
Draft for Comments	DFC
Issued for Comments	IFC
Issued for Approval	IFA

Table of Contents

1. Executive Summary

The Bay d'Espoir (BDE) to Soldiers Pond (SOP) 230 kV transmission system is critical to the Island Interconnected System (IIS), in particular when the Labrador Island Link (LIL) is unavailable. Once the Holyrood (HRD) thermal generating station and Hardwoods (HRD) gas turbine are retired, the BDE-SOP transmission system must supply the majority of the Avalon Peninsula demand since there are no LIL imports delivered to SOP. A previous study[1] identified appreciable transmission constraints that will limit the amount of BDE-SOP flow, as shown in Table 1-1. These constraints are defined based on single contingency events causing thermal overloads or low voltage conditions. The contingencies listed in Table 1-1 are in order from most restrictive (TL217) to least restrictive. This will result in customer impact at higher Avalon loads when the LIL is unavailable.

Table 1-1. BDE eastward power flow limits during a LIL bipole outage

Contingency	Limiting Criteria	Power transfer Eastward out of BDE (MW)	Power transfer TL201+TL217 (MW)	HRD CT[2] (MW)	Island Demand (MW)
TL217	Rate C TL201	603	343	123.5	1285
TL207	Rate C TL203	659	384	123.5	1375
TL206/TL202	Rate C TL202/TL206	679	396	123.5	1400
TL237	Rate C TL203	679	396	123.5	1400
TL267	Rate C TL202 & TL206 & TL203	683	398	123.5	1410
TL201	Rate C TL217	780	459	123.5	1550
TL203	Rate C TL207	836	493	123.5	1630

This report evaluates the feasibility of a Remedial Action Scheme (RAS) that aims at mitigating thermal overloads and low voltage conditions that limit BDE-SOP flow when the LIL is out of service. The objective of the RAS is to shed load on the Avalon in the event of a 230 kV line contingency between BDE-SOP in order to offload the lines remaining in service to avoid thermal overloads or abnormal voltage conditions. This RAS will be referred to as the "Avalon RAS" and will only be armed to facilitate more power flow to Avalon during a LIL bipole outage.

This study simulated the contingencies[3] listed in Table 1-1 to see if the allowable pre-contingency power flow could be increased such that peak demand could be served with a corresponding RAS that would cross-trip a sufficient amount load on the Avalon. The goal was to determine the amount of load shed that would be needed such that the Avalon RAS would successfully mitigate all post-contingency thermal

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[1] TGS report TN1817.01.05 "Assessment of the BDE/SOP Transmission Constraints", dated October 25, 2023.
[2] The new 3x50 MW HRD CTs were not considered in the previous study. These limits refer to today's system.
[3] This study focused primarily on the effectiveness of the RAS to overcome the transmission line ratings concerns and to demonstrate acceptable performance for line trips and 1P faults. 3P faults during a LIL bipole outage are expected to be exceedingly rare, and for this reason, dynamic performance criteria are not applicable for this type of fault. For information purposes, Section 6 of this report summarizes the system's response to 3P faults in the 230 kV BDE-SOP corridor.

overloads and steady state voltage violations while maintaining system stability and avoiding overfrequencies greater than 63 Hz when the load is cross-tripped via the Avalon RAS.

The following important study assumptions are noted:

- Base case assumptions:
    - The new 3x50 MW HRD CTs[4] and the existing 123.5 MW HRD CT are in-service.
    - The analysis was performed with and without the Maritime Link (ML) frequency controller support.
    - The analysis was performed on the 2025 peak (1850 MW) and the 2033 peak (2000 MW) cases.
- Sensitivity analysis was performed to evaluate the impact under the following scenarios:
    - **The 123.5 MW HRD CT is unavailable.** The 3rd SOP synchronous condenser (SC) was put on-line for this scenario.
    - **The new 3x50 MW HRD CTs are unavailable**. Two SOP SCs were on-line for this scenario.

1.1 Conclusions

The Avalon RAS study results, including the RAS load shed requirements to prevent post-contingency thermal overloads and the approximate STATCOM size needed to maintain stability, are summarized in Table 1-2.

Table 1-2. RAS study results at peak demand scenarios

Demand (MW)	HRD 3x50 MW in/out	HRD 123.5 MW in/out	Thermal loading		Stability	
			Loadshed to prevent overload on adjacent line (MW)*	Worst Contingency[5]	STATCOM needed for no fault or 1P fault trip (MVAR)	Worst Contingency
1835	IN	IN	0 - 179	TL202 or TL206	0	TL267
		OUT	72 - 288	TL202 or TL206	0	TL267
1800-1840*	OUT	IN	76 - 302	TL202 or TL206	50	TL267
2000	IN	IN	41 - 291	TL202 or TL206	0	TL267
		OUT	Maximum demand limited to 1835 MW due to steady state pre-contingency voltage at SSD, with TL201 thermal loading also nearing 100%.			

*depends on the contingency

[4] A preliminary version of this study was first performed in November 2024 without the new 3x50 MW HRD CTs in-service. The results of this study are preliminary and are included in Appendix 2 for information only.
[5] Worst contingency means the contingency requiring the largest amount of loadshed.

With the RAS in place, the following observations are made:

- **If the HRD 123.5 MW CT is in-service**:
    - It is possible to serve 2000 MW demand during a LIL bipole outage with a maximum load shed amount of 291 MW.
- **If the HRD 123.5 MW CT is out-of-service:**
    - It is possible to serve 1835 MW[6] demand during a LIL bipole outage with a maximum load shed amount of 288 MW. Pre-contingency voltage at SSD (0.935 pu) is the limiting factor, with TL201 nearing 100% loading being the next limiting factor (93% loading).
- **If the HRD new 3x50 MW CTs are out-of-service:**
    - It is possible to serve 1800-1840 MW demand during a LIL bipole outage with a maximum load shed amount of 302 MW. Pre-contingency voltage at SSD (0.93 pu) is the limiting factor, with TL201 nearing 100% loading being the next limiting factor (95% loading).
    - A STATCOM of approximately 50 MVAR is required in the SSD area to maintain system stability for a 1P fault trip of TL202 or TL206.
- **If the ML frequency controller support is not available,** there are three contingencies in the 2000 MW peak demand scenario (TL267, TL202 or TL206) that result in frequency > 63 Hz due to the amount of RAS loadshed required. Cross-tripping 2 BDE units (loss of TL202 or TL206) or 1 BDE unit (loss of TL267) BDE generating units (from units 1-6) can bring the system frequency back to a maximum peak of 63 Hz.
    - **Additionally, if the HRD new 3x50 MW CTs are out-of-service**, the frequency goes just above 63 Hz (to 63.07 Hz) following a trip of TL202 or TL206 with the RAS load shed. Tripping 1 BDE unit brings the frequency below 63 Hz.

[6] It may be possible to serve 1900 MW demand with the addition of an extra capacitor at CBC, at which point SSD pre-contingency voltage becomes 0.927 pu and TL201 is loaded to 100% Rate C pre-contingency. Further analysis would be required to confirm.

2. Study Cases & Criteria

2.1 Study Cases

The power flow cases were set up from the 2033-34 base cases.

Please note the following key assumptions related to power flow case setup:

- Extended LIL bipole outage.
- New HRD CTs 3x50 MW are in-service. Sensitivity analysis is performed with the HRD CTs 3x50 MW unavailable.
- HRD U3 available as only a SC.
- No real power supplied by HRD thermal units.
- The HRD CT is assumed available at maximum power of 123.5 MW. Sensitivity analysis is performed with the HRD CT unavailable.
- HWD CT available as only a SC.
- All 230kV lines are in-service pre-contingency.
- Two SOP SCs are in-service unless otherwise noted.
- ML is adjusted as needed to help meet system demand. ML frequency controller enabled. Sensitivity analysis is performed with ML frequency controller disabled.

2.2 Criteria

The applicable Transmission Planning Criteria for this study is summarized below:

- Steady state voltage: 0.95 pu – 1.05 pu during n-0 conditions
- Steady state voltage: 0.90 pu – 1.1 pu during n-1 conditions
- Post fault recovery voltages on the ac system shall be as follows:
    - Transient undervoltages following fault clearing should not drop below 70%
    - The duration of the voltage below 80% following fault clearing should not exceed 20 cycles
    - Under normal operating scenarios, no single contingency event should lead to system instability, including a 3PF
    - Under emergency operating scenarios (e.g. LIL bipole outage during higher load conditions), system instability or voltage collapse is allowed following a 3PF.
- Post fault system frequencies shall not drop below 59 Hz and shall not rise above 63 Hz

3. Study Methodology

The following process was followed for the Avalon RAS Study.

1) Set up the cases at 1850 MW demand (2025 peak) and 2000 MW demand (2033 peak). **Assume 3x50 MW new HRD CTs and the 123.5 MW HRD CT are in-service**.

2) Ensure there are no pre-contingency steady state voltage or thermal violations.

3) Perform dynamic analysis of the 230 kV line contingencies between BDE and SOP, with the RAS in place to cross-trip Avalon load to determine the amount of loadshed required to prevent thermal overloading (Rate C[7]) of the line adjacent to the tripped line.

4) The dynamic analysis of each 230 kV line contingency is performed without a fault, with a SLGF (no autoreclose for simplicity), and with a 3PF to monitor the system frequency and stability.

5) If stability issues (i.e. voltage collapse near SSD) are observed, determine the approximate size of STATCOM needed to maintain stability.

6) Repeat steps (2) to (5) with **ML F/C disabled.** When applicable, make recommendations for generation rejection to avoid frequency from exceeding 63 Hz (use BDE units).

7) Repeat steps (2) to (4) with **HRD 123.5 MW CT unavailable and 3 SOP SCs in-service**.

8) Repeat steps (2) to (4) with **HRD new 3x50 MW CTs unavailable and 2 SOP SCs in-service.**

[7] Rate A and B are not applicable for the SPS because system and weather conditions (i.e. higher demand conditions) will not be there when SPS is armed.

4. Study Results

The goal of the analysis was to increase the allowable BDE-SOP power flow such that the IIS demand could reach peak by applying a sufficient amount of RAS load shed for the 230 kV contingencies in the corridor.

The following steps were taken to perform the study:

- No fault and 1PF tripping of the 230 kV corridor lines were simulated, followed by corresponding RAS load shed 250 ms later, and results were recorded.
- 3PFs were also simulated but for information only. These results are summarized in Section 6 “Special Considerations”.
- Mitigation was evaluated where needed.
- Analysis was repeated with ML frequency controller out-of-service to observe worsened impact to system overfrequency.
- Analysis was repeated with HRD 123.5 MW CT unavailable and 3 SOP SCs in-service.
- Analysis was repeated with HRD 3x50 MW CTs unavailable and 2 SOP SCs in-service.

The main issues observed in the study are summarized below:

- Load shed requirements ranged widely depending on the contingency, demand level and status of HRD CTs:
    - 1835 MW peak – 0 to 179 MW (HRD 123.5 MW CT in-service)
    - 1835 MW peak – 72 to 288 MW (HRD 123.5 MW CT unavailable)
    - 2000 MW peak – 41 to 291 MW (HRD 123.5 MW CT in-service)
    - 1800-1840 MW peak - 76 to 302 MW (3x50 MW new CTs unavaliable, HRD 123.5 MW CT in-service)
- Overfrequencies greater than 63 Hz were observed in some scenarios after the RAS load shed occurred with the ML frequency controller disabled, for which tripping of BDE unit(s) was evaluated as mitigation.

Appendix 1 contains the full tables of study results and the plots corresponding to these results.

4.1 Base Case Results – HRD 123.5 MW CT In-service

The base case study results with the HRD 3x50 MW and 123.5 MW CTs in-service are given in Table 4-1.

With the RAS in place, it is possible to serve the 2000 MW peak demand during a LIL bipole outage.

Table 4-1. Base Case HRD 123.5 MW in-service - RAS results at peak demand scenarios

Contingency	Loadshed to prevent overload on adjacent line (MW)	Maximum frequency (Hz)			STATCOM needed (MVAR)
		ML F/C In	ML F/C Out	Generation Cross-trip (MW)	
1850 MW demand (2025 peak)					
TL217	129	60.78	61.95	-	0
TL201	0	60.05	60.05	-	0
TL207	111	60.76	61.77	-	0
TL237	75	60.66	61.13	-	0
TL203	0	60.03	60.03	-	0
TL202/TL206	179	61.02	62.75	-	0
TL267*	116	60.8	61.76	-	0
2000 MW demand (2033 peak)					
TL217	193	61.19	62.87	-	0
TL201	52	60.6	60.78	-	0
TL207	180	61.17	62.88	-	0
TL237	150	60.91	62.48	-	0
TL203	41	60.55	60.62	-	0
TL202/TL206	291	62.83	64.24	2 BDE units	0
TL267	228	61.94	63.45	1 BDE unit	0

The results are summarized as follows:

- The amount[8] of RAS load shed needed to keep thermal loading on the line adjacent to the tripped line at or below 100% of Rate C depends on the demand level and contingency:
  - 1835 MW demand: load shed ranges from 0 to 179 MW
  - 2000 MW demand: load shed ranges from 41 to 291 MW
- If the ML frequency controller support is not available, there are three contingencies in the 2000 MW peak demand scenario (loss of TL267, TL202 or TL206) that result in frequency > 63 Hz due to the larger amount of RAS loadshed required. Cross-tripping 2 (TL202 or TL206) or 1 (TL267)

[8] Please note the RAS activation thresholds will require adjustments as system load increases.

BDE generating units (from units 1-6) can bring the system frequency back to a maximum peak of 63 Hz.

4.2 Sensitivity Case Results – HRD 123.5 MW Unavailable

The sensitivity analysis study results with the 123.5 MW HRD CT unavailable (and 3 SOP SCs in-service) are summarized in Table 4-2.

In this scenario with the RAS in place, a maximum demand of around 1835 MW can be served. The limiting factor is the pre-contingency steady state voltage at SSD which is 0.935 pu. Additionally, TL201 is loaded to 93% which is approaching its thermal rating and is the next limiting factor.

It may be possible to increase the maximum demand to 1900 MW if an additional 38.45 MVAR capacitor is installed at Come by Change (CBC). In this case the pre-contingency SSD voltage becomes 0.927 pu and TL201 is fully loaded at 100% of its rating. Further analysis would be required to confirm the RAS requirement for the 1900 MW peak demand scenario with additional reactive power support at CBC.

Table 4-2. HRD 123.5 MW unavailable - RAS results at 1835 MW peak demand scenario

Contingency	Loadshed to prevent overload on adjacent line (MW)	Maximum frequency (Hz) ML F/C In	STATCOM needed (MVAR)
1850 MW demand (2025 peak)[3]			
TL217	216	61.52	0
TL201	82	60.69	0
TL207	209	61.63	0
TL237	177	61.16	0
TL203	72	60.68	0
TL202/TL206	288	62.75	0
TL267	236	61.96	0

The results are summarized as follows:

- RAS load shed requirements for the 1835 MW peak case with the HRD 123.5 MW CT unavailable range from 72 MW to 288 MW and are significantly increased compared to the case with the 123.5 MW HRD CT in-service.

4.3 Sensitivity Case Results – HRD 3x50 MW Unavailable

The sensitivity analysis study results with the 3x50 MW HRD CT unavailable and the 123.5 MW HRD CT in-service (and 2 SOP SCs in-service) are summarized in Table 4-3. The results are very similar to the scenario with 3x50 MW HRD CT in-service and the 123.5 MW HRD CT unavailable.

In this scenario with the RAS in place, a maximum demand of around 1800-1840 MW can be served. The limiting factor is the pre-contingency steady state voltage at SSD which is around 0.93 pu. Additionally, TL201 is loaded to approximately 95% which is approaching its thermal rating and is the next limiting factor.

Table 4-3. HRD 3x50 MW new CTs unavailable - RAS results at 1800-1840 MW peak demand

Contingency	Loadshed to prevent overload on adjacent line (MW)	Maximum frequency (Hz) ML F/C In	STATCOM needed (MVAR)
1800-1850 MW demand (2025 peak)[3]			
TL217	236	62.0	0
TL201	96	60.78	0
TL207	226	62.1	10
TL237	194	61.5	10
TL203	87	60.78	10
TL202/TL206	288	62.75	50
TL267	236	61.96	10

The results are summarized as follows:

- RAS load shed requirements for the 1800-1840 MW peak cases with the HRD new 3x50 MW CTs off-line range from 76 MW to 302 MW, which are similar when compared to the case with the 123.5 MW HRD CT unavailable.
- Loss of TL202 or TL206 due to a 1PF[9] requires a 50 MVAR STATCOM in the SSD area to maintain system stability.

[9] No single pole autoreclose was simulated in this study. It was simply simulated as a high impedance fault with line tripping. Future investigations will perform a more detailed investigation into the reactive power requirements for all types of faults and outages.

5. Conclusions

The Avalon RAS study results, including the RAS load shed requirements to prevent post-contingency thermal overloads and the approximate STATCOM size needed to maintain stability, are summarized in Table 5-1.

Table 5-1. RAS study results at peak demand scenarios

<table>
<tr><th rowspan="2">Demand (MW)</th><th rowspan="2">HRD 3x50 MW in/out</th><th rowspan="2">HRD 123.5 MW in/out</th><th colspan="2">Thermal loading</th><th colspan="2">Stability</th></tr>
<tr><th>Loadshed to prevent overload on adjacent line (MW)*</th><th>Worst Contingency</th><th>STATCOM needed for no fault or 1P fault trip (MVAR)</th><th>Worst Contingency</th></tr>
<tr><td rowspan="2">1835</td><td rowspan="2">IN</td><td>IN</td><td>0 - 179</td><td>TL202 or TL206</td><td>0</td><td>TL267</td></tr>
<tr><td>OUT</td><td>72 - 288</td><td>TL202 or TL206</td><td>0</td><td>TL267</td></tr>
<tr><td>1800-1840*</td><td>OUT</td><td>IN</td><td>76 - 302</td><td>TL202 or TL206</td><td>50</td><td>TL267</td></tr>
<tr><td rowspan="2">2000</td><td rowspan="2">IN</td><td>IN</td><td>41 - 291</td><td>TL202 or TL206</td><td>0</td><td>TL267</td></tr>
<tr><td>OUT</td><td colspan="4">Maximum demand limited to 1835 MW due to steady state pre-contingency voltage at SSD, with TL201 thermal loading also nearing 100%.</td></tr>
</table>

*depends on the contingency

With the RAS in place, the following observations are made:

- **If the HRD 123.5 MW CT is in-service**:
  - It is possible to serve 2000 MW demand during a LIL bipole outage with a maximum load shed amount of 291 MW.
- **If the HRD 123.5 MW CT is unavailable:**
  - It is possible to serve 1835 MW[10] demand during a LIL bipole outage with a maximum load shed amount of 288 MW. Pre-contingency voltage at SSD (0.935 pu) is the limiting factor, with TL201 nearing 100% loading being the next limiting factor (93% loading).
- **If the HRD new 3x50 MW CTs are unavailable:**
  - It is possible to serve 1800-1840 MW demand during a LIL bipole outage with a maximum load shed amount of 302 MW. Pre-contingency voltage at SSD (0.93 pu) is the limiting factor, with TL201 nearing 100% loading being the next limiting factor (95% loading).

[10] It may be possible to serve 1900 MW demand with the addition of an extra capacitor at CBC, at which point SSD pre-contingency voltage becomes 0.927 pu and TL201 is loaded to 100% Rate C pre-contingency. Further analysis would be required to confirm.

- A STATCOM of approximately 50 MVAR is required in the SSD area to maintain system stability for a 1P fault trip of TL202 or TL206.

- **If the ML frequency controller support is not available,** there are three contingencies in the 2000 MW peak demand scenario (TL267, TL202 or TL206) that result in frequency > 63 Hz due to the amount of RAS loadshed required. Cross-tripping 2 BDE units (loss of TL202 or TL206) or 1 BDE unit (loss of TL267) BDE generating units (from units 1-6) can bring the system frequency back to a maximum peak of 63 Hz.
    - **Additionally, if the HRD new 3x50 MW CTs are out-of-service**, the frequency goes just above 63 Hz (to 63.07 Hz) following a trip of TL202 or TL206 with the RAS load shed. Tripping 1 BDE unit brings the frequency below 63 Hz.

6. Special Considerations

This section of the report is for information only as it pertains to the system's performance following 3P faults (3PFs) during a LIL bipole outage. These faults are expected to be exceedingly rare, and for this reason, dynamic performance criteria are not applicable.

However, for information purposes, 3PFs were simulated in this study to observe the system's response to this rare event.

The following observations are made regarding 3PFs during a LIL bipole outage:

- While operating under emergency conditions of a LIL bipole outage, a line trip due to 3PF was found to be significantly more limiting than a no-fault or 1P fault trip and required a large amount of dynamic reactive support to maintain system stability. The stability issue arises because the voltage near Sunnyside (SSD) violates transient undervoltage criteria and/or collapses after this fault is cleared. This is worst during high demand and high BDE-SOP power flow.
- The table below lists the approximate STATCOM sizes needed to maintain system stability if a 3PF occurs. The worst case fault location is a 3PF on line TL267.

Demand (MW)	HRD 3x50 MW CTs in/out	HRD 123.5 MW CT in/out	STATCOM needed for 3PF (MVAR)		
			TL267/TL202/TL206 corridor	TL203/TL207/TL237 corridor	TL201/TL217 corridor
1835	IN	IN	350	0	0
		OUT	>400	200->400	10
1800-1840*	OUT	IN	>400	220-290	0
2000	IN	IN	350	50-120	0

*depends on contingency

- Please note that this study only evaluated the approximate STATCOM size needed to maintain system stability. Further evaluation of other reactive power support solutions (including capacitors, synchronous condensers, etc.) would be warranted in a future study.

It is noted that Hydro will not need to invest to resolve the issue of the 3PF response at this time as it is outside of Hydro's criteria. Hydro will continue to monitor this issue and explore solutions. It is possible that as new sources of supply are added or as new wind proponents are interconnected, there may be opportunities presented to support system voltages and mitigate this issue.

APPENDIX 1

TABLES & PLOTS OF STUDY RESULTS

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Results with SPS Action (ML F/C Disabled)- 3 x 50 MW HRD On-line / 123.5 MW HRD CT On-line / 2 SOP SCs On-line

Intial Case Setup

	230 kV Voltages (pu)												Pre-contingency Loading (%)								Post-contingency Loading (%)								SPS	Intial Case Setup							
Case	Max Voltage (Transient)	Bus	Min Voltage (Transient)	Bus	Max Voltage (Steady State)	Bus	Min Voltage (Steady State)	Bus	Max Freqency (Hz)	Bus	Min Frequency (Hz)	Bus	TL201	TL217	TL202	TL206	TL267	TL207	TL237	TL203	TL201	TL217	TL202	TL206	TL267	TL207	TL237	TL203	Load Shed (MW)	ML (MW)	Voltage (SOP)	Spinning Reserve	Power East Out of BDE	Island Demand	Avalon Load	Fault / Type	STATCOM*
01_2033-34_Base-Peak_TL217-TL201_1800MW_3x50MW	1.072	195221	0.947	195229	1.024	195221	0.972	195229	61.95	195249	60	195249	71	52.9	80	80.1	56.7	55.1	43.3	65.6	99.9	0	70.2	70.3	48.6	46.5	34.9	52.5	116.9	-200	0.975	64.6	855.2	1847.5	969.2	no fault	
01_2033-34_Base-Peak_TL217-TL201_1800MW_3x50MW	1.072	195221	0.967	195229	1.024	195221	0.972	195229	61.94	195249	60.06	195221	71	52.9	80	80.1	56.7	55.1	43.3	65.6	100	0	70.2	70.3	48.6	46.5	34.9	52.5	120.8	-200	0.975	64.6	855.2	1847.5	969.2	SLGF	
01_2033-34_Base-Peak_TL217-TL201_1800MW_3x50MW	1.094	195221	0.94	195229	1.024	195221	0.972	195229	61.92	195221	60.08	195221	71	52.9	80	80.1	56.7	55.1	43.3	65.6	100	0	70.2	70.3	48.6	46.6	34.9	52.5	118.3	-200	0.975	64.6	855.2	1847.5	969.2	3PF	
01_2033-34_Base-Peak_TL217-TL201_2000MW_3x50MW	1.082	195221	0.903	195229	1.033	195221	0.965	195229	62.87	195249	59.91	195221	82.7	61.6	90.3	90.4	64.4	60.9	48.6	73.9	99.9	0	74.1	74.2	51.2	46.9	35	52.9	176.2	-320	0.975	86.23	955.8	2002.3	1044.1	no fault	
01_2033-34_Base-Peak_TL217-TL201_2000MW_3x50MW	1.081	195221	0.921	195229	1.033	195221	0.965	195229	62.86	195249	59.91	195221	82.7	61.6	90.3	90.4	64.4	60.9	48.6	73.9	99.9	0	74.1	74.2	51.2	46.9	35.1	52.9	181.9	-320	0.975	86.23	955.8	2002.3	1044.1	SLGF	
01_2033-34_Base-Peak_TL217-TL201_2000MW_3x50MW	1.116	195249	0.852	195229	1.032	195221	0.964	195229	62.84	195249	59.94	195221	82.7	61.6	90.3	90.4	64.4	60.9	48.6	73.9	100	0	74.1	74.2	51.2	46.9	35.1	52.9	174.6	-320	0.975	86.23	955.8	2002.3	1044.1	3PF	
02_2033-34_Base-Peak_TL207-TL203_1800MW_3x50MW	1.063	195221	0.935	195222	1.019	195221	0.955	195222	61.77	195221	60.02	195221	70.3	52.4	79.5	79.6	56.3	54.7	42.9	65	56.9	42.4	67.3	67.4	56.3	0	13.9	100.2	101	-220	0.975	94.37	849.2	1837.2	963.8	no fault	
02_2033-34_Base-Peak_TL207-TL203_1800MW_3x50MW	1.069	195221	0.918	195222	1.019	195221	0.955	195222	61.76	195221	60.02	195221	70.3	52.4	79.5	79.6	56.3	54.7	42.9	65	56.9	42.4	67.3	67.4	56.3	0	13.9	100.2	101.8	-220	0.975	94.37	849.2	1837.2	963.8	SLGF	
02_2033-34_Base-Peak_TL207-TL203_1800MW_3x50MW	1.122	195227	0.787	195222	1.018	195221	0.954	195222	61.75	195221	60.04	195221	70.3	52.4	79.5	79.6	56.3	54.7	42.9	65	57	42.4	67.3	67.4	56.3	0	13.9	100.2	95.4	-220	0.975	94.37	849.2	1837.2	963.8	3PF	
02_2033-34_Base-Peak_TL207-TL203_2000MW_3x50MW	1.069	195221	0.895	195222	1.03	195221	0.949	195222	62.88	195249	59.89	195221	82.7	61.6	90.3	90.4	64.5	60.8	48.6	73.8	56.6	42.1	71	71.1	58.7	0	13.5	100.2	169.9	-320	0.975	87.91	955.5	2000.5	1043.8	no fault	
02_2033-34_Base-Peak_TL207-TL203_2000MW_3x50MW	1.085	195221	0.837	195222	1.03	195221	0.949	195222	62.88	195249	59.9	195221	82.7	61.6	90.3	90.4	64.5	60.8	48.6	73.8	56.6	42.2	71	71.1	58.7	0	13.5	100.2	167.6	-320	0.975	87.91	955.5	2000.5	1043.8	SLGF	
02_2033-34_Base-Peak_TL207-TL203_2000MW_3x50MW_STATCOM	1.177	195249	0.514	195222	1.029	195221	0.945	195222	62.86	195249	60.01	195221	82.2	61.3	90.1	90.3	64.2	60.5	48.5	73.7	56.9	42.3	70.9	71	58.7	0	13.5	100.4	148.9	-320	0.975	89.18	954.6	1999.3	1043.4	3PF	110
03_2033-34_Base-Peak_TL206-TL202_1800MW_3x50MW	1.076	195221	0.925	195222	1.038	195221	0.973	195229	62.75	195221	59.87	195221	69.8	52	78.9	79	55.9	54.5	42.8	64.7	44.6	33.2	100	0	62.1	36.2	21.4	32.2	173	-220	0.975	99.79	843.7	1831.6	961.1	no fault	
03_2033-34_Base-Peak_TL206-TL202_1800MW_3x50MW	1.087	195221	0.896	195222	1.038	195221	0.973	195229	62.74	195221	59.87	195221	69.8	52	78.9	79	55.9	54.5	42.8	64.7	44.6	33.2	100	0	62.1	36.2	21.4	32.2	173.5	-220	0.975	99.79	843.7	1831.6	961.1	SLGF	
03_2033-34_Base-Peak_TL206-TL202_1800MW_3x50MW	1.18	195227	0.657	195222	1.036	195221	0.972	195229	62.74	195249	59.92	195221	69.8	52	78.9	79	55.9	54.5	42.8	64.7	44.5	33.2	99.8	0	62	36.3	21.3	32.1	159.2	-220	0.975	99.79	843.7	1831.6	961.1	3PF	
03_2033-34_Base-Peak_TL206-TL202_2000MW_3x50MW	1.095	195221	0.852	195222	1.036	195221	0.967	195229	64.24	195249	59.99	195249	82.8	61.7	90.4	90.5	64.5	60.8	48.6	73.9	39.4	29.3	99.9	0	61.5	35	18.4	28.1	272.1	-320	0.975	86.64	956.3	2001.7	1044.3	no fault	
03_2033-34_Base-Peak_TL206-TL202_2000MW_3x50MW	1.138	195249	0.729	195222	1.034	195221	0.967	195229	64.24	195249	59.99	195249	82.8	61.7	90.4	90.5	64.5	60.8	48.6	73.9	39.4	29.3	99.7	0	61.4	35.1	18.4	28.1	264	-320	0.975	86.64	956.3	2001.7	1044.3	SLGF	
03_2033-34_Base-Peak_TL206-TL202_2000MW_3x50MW	ar STATCOM and increased load shed																																			3PF	
04_2033-34_Base-Peak_TL237-TL203_1800MW_3x50MW	1.061	195221	0.933	195229	1.021	195221	0.951	195229	61.13	195221	60.01	195249	69.9	52.1	79.1	79.2	56	54.6	42.8	64.7	62	46.2	70	70.1	57.4	13.8	0	100.4	66.1	-220	0.975	99.33	845.5	1832	961.1	no fault	
04_2033-34_Base-Peak_TL237-TL203_1800MW_3x50MW	1.064	195221	0.928	195229	1.021	195221	0.951	195229	61.12	195249	60.05	195221	69.9	52.1	79.1	79.2	56	54.6	42.8	64.7	62	46.2	70	70.1	57.4	13.8	0	100.4	66.8	-220	0.975	99.33	845.5	1832	961.1	SLGF	
04_2033-34_Base-Peak_TL237-TL203_1800MW_3x50MW	1.093	195221	0.835	195222	1.02	195221	0.951	195229	61.11	195249	60.04	195221	69.9	52.1	79.1	79.2	56	54.6	42.8	64.7	62.1	46.2	70	70.1	57.4	13.8	0	100.4	63.6	-220	0.975	99.33	845.5	1832	961.1	3PF	
04_2033-34_Base-Peak_TL237-TL203_2000MW_3x50MW	1.061	195221	0.906	195222	1.03	195221	0.946	195229	62.48	195249	59.73	195221	82.8	61.7	90.4	90.6	64.5	60.8	48.6	73.9	62.1	46.3	74.5	74.6	60.3	13.3	0	100	142.2	-320	0.975	76.39	956.6	2002.1	1044.5	no fault	
04_2033-34_Base-Peak_TL237-TL203_2000MW_3x50MW	1.08	195221	0.854	195222	1.03	195221	0.946	195229	62.48	195249	59.73	195221	82.8	61.7	90.4	90.6	64.5	60.8	48.6	73.9	62.2	46.3	74.5	74.6	60.3	13.3	0	100	140.7	-320	0.975	76.39	956.6	2002.1	1044.5	SLGF	
04_2033-34_Base-Peak_TL237-TL203_2000MW_3x50MW_STATCOM	1.162	195249	0.559	195222	1.029	195221	0.944	195229	62.46	195249	59.81	195221	82.3	61.3	90.2	90.3	64.3	60.5	48.6	73.7	62.4	46.5	74.3	74.4	60.3	13.2	0	100	125.6	-320	0.975	77.84	955.5	2000.7	1044.1	3PF	60
05_2033-34_Base-Peak_TL267WAV-1800MW_3X50MW	1.071	195221	0.872	195222	1.016	195221	0.951	195222	61.76	195249	59.96	195249	70.8	52.8	78.4	78.5	55.7	55.4	43.2	65.4	57.5	42.9	100	100.1	0	70.1	57.1	86.6	110.9	-310	0.983	193.9	840.2	1802	941.4	no fault	
05_2033-34_Base-Peak_TL267WAV-1800MW_3X50MW	1.075	195221	0.863	195222	1.016	195221	0.951	195222	61.76	195249	60.01	195249	70.8	52.8	78.4	78.5	55.7	55.4	43.2	65.4	57.6	42.9	100	100.1	0	70.1	57.1	86.7	112.3	-310	0.983	193.9	840.2	1802	941.4	SLGF	
05_2033-34_Base-Peak_TL267WAV-1800MW_3X50MW_STATCOM	1.157	195249	0.598	195222	1.013	195221	0.947	195222	61.67	195249	60.06	195249	71.3	53.1	78.5	78.6	55.9	55.8	43.2	65.5	58	43.2	100.2	100.4	0	70.4	57.2	86.9	104.4	-310	0.983	192.83	840.8	1803.1	941.7	3PF	20
05_2033-34_Base-Peak_TL267WAV-2000MW_3X50MW_STATCOM	1.132	195221	0.726	195222	1.029	195221	0.952	195222	63.43	195249	59.94	195249	83.2	62	90.3	90.4	64.4	61.3	48.7	74	50.9	37.9	99.9	100.1	0	66.6	53.2	80.9	214.4	-320	0.983	86.17	956.9	2002.9	1044.7	no fault	20
05_2033-34_Base-Peak_TL267WAV-2000MW_3X50MW_STATCOM	1.206	195249	0.581	195222	1.027	195221	0.949	195222	63.45	195249	59.97	195249	83.2	62	90.3	90.4	64.4	61.3	48.7	74	51.2	38.2	99.9	100.1	0	66.7	53.2	81	214.2	-320	0.983	86.17	956.9	2002.9	1044.7	SLGF	30
05_2033-34_Base-Peak_TL267WAV-2000MW_3X50MW_STATCOM	1.102	195221	0.636	195222	1.029	195221	0.942	195222	63.34	195249	60.02	195249	83.2	62	90.3	90.4	64.4	61.3	48.7	74	52.1	38.8	100.3	100.4	0	67.1	53.4	81.3	209.5	-320	0.983	86.16	956.9	2002.9	1044.7	3PF	370
06_2033-34_Base-Peak_TL201-TL217_1800MW_3x50MW	1.026	195221	0.91	195229	1.017	195221	0.942	195229	60.05	195249	59.88	195249	69	51.4	78.3	78.4	55.4	54.1	42.4	64.1	0	92.5	79.1	79.2	56.2	53.4	43.1	65	0	-220	0.975	110.73	837.2	1820.1	955	no fault	
06_2033-34_Base-Peak_TL201-TL217_1800MW_3x50MW	1.027	195221	0.926	195229	1.017	195221	0.942	195229	60.09	195249	59.88	195249	69	51.4	78.3	78.4	55.4	54.1	42.4	64.1	0	92.5	79.1	79.2	56.2	53.4	43.1	65	0	-220	0.975	110.73	837.2	1820.1	955	SLGF	
06_2033-34_Base-Peak_TL201-TL217_1800MW_3x50MW	1.067	195221	0.916	195229	1.018	195221	0.943	195229	60.38	195249	59.84	195249	69	51.4	78.3	78.4	55.4	54.1	42.4	64.1	0	92.5	79.2	79.3	56.2	53.4	43.2	65.1	0	-220	0.975	110.73	837.2	1820.1	955	3PF	
06_2033-34_Base-Peak_TL201-TL217_2000MW_3x50MW	1.043	195221	0.842	195229	1.003	195221	0.903	195229	60.78	195249	59.96	195249	82.8	61.7	90.4	90.5	64.5	60.8	48.6	73.8	0	100.2	87.3	87.4	62	55.9	45.8	69.3	46.5	-320	0.975	91.75	956.1	2001.3	1044.2	no fault	
06_2033-34_Base-Peak_TL201-TL217_2000MW_3x50MW	1.039	195221	0.869	195229	1.003	195221	0.903	195229	60.77	195249	60.04	195249	82.8	61.7	90.4	90.5	64.5	60.8	48.6	73.8	0	100.2	87.3	87.4	62	55.9	45.8	69.3	48	-320	0.975	91.75	956.1	2001.3	1044.2	SLGF	
06_2033-34_Base-Peak_TL201-TL217_2000MW_3x50MW	1.089	195249	0.82	195229	0.999	195221	0.899	195229	60.76	195249	60.07	195221	82.8	61.7	90.4	90.5	64.5	60.8	48.6	73.8	0	100.7	87.6	87.7	62.3	56	45.8	69.4	46.1	-320	0.975	91.75	956.1	2001.3	1044.2	3PF	
07_2033-34_Base-Peak_TL203-TL207_1800MW_3x50MW	1.024	195221	0.933	195229	1.019	195221	0.951	195229	60.03	195249	59.91	195249	69.1	51.5	78.3	78.4	55.4	54.1	42.4	64.1	70.4	52.5	74.2	74.2	64.1	93	84.2	0	0	-220	0.975	110.09	837.7	1820.7	955.4	no fault	
07_2033-34_Base-Peak_TL203-TL207_1800MW_3x50MW	1.036	195221	0.935	195229	1.019	195221	0.951	195229	60.09	195249	59.9	195249	69.1	51.5	78.3	78.4	55.4	54.1	42.4	64.1	70.4	52.5	74.2	74.2	64.1	93	84.2	0	0	-220	0.975	110.09	837.7	1820.7	955.4	SLGF	
07_2033-34_Base-Peak_TL203-TL207_1800MW_3x50MW	1.082	195227	0.845	195222	1.019	195221	0.951	195229	60.32	195249	59.88	195249	69.1	51.5	78.3	78.4	55.4	54.1	42.4	64.1	70.5	52.5	74.2	74.3	64.1	93.1	84.3	0	0	-220	0.975	110.09	837.7	1820.7	955.4	3PF	
07_2033-34_Base-Peak_TL203-TL207_2000MW_3x50MW	1.033	195221	0.896	195229	1.004	195221	0.925	195229	60.61	195249	59.98	195249	82.9	61.8	90.5	90.6	64.6	60.8	48.7	73.9	78.9	58.8	82.4	82.5	71.5	100.2	90.6	0	38.6	-320	0.975	75.7	957.1	2002.8	1044.8	no fault	
07_2033-34_Base-Peak_TL203-TL207_2000MW_3x50MW	1.047	195221	0.852	195222	1.004	195221	0.925	195229	60.62	195249	60.02	195249	82.9	61.8	90.5	90.6	64.6	60.8	48.7	73.9	78.8	58.7	82.4	82.5	71.4	100.2	90.5	0	38.3	-320	0.975	75.7	957.1	2002.8	1044.8	SLGF	
07_2033-34_Base-Peak_TL203-TL207_2000MW_3x50MW_STATCOM	1.124	195249	0.587	195227	1.004	195221	0.929	195229	60.64	195249	59.96	195249	82.4	61.4	90.3	90.4	64.3	60.5	48.6	73.8	78.3	58.3	82.2	82.3	71	100	90.8	0	34.6	-320	0.975	77.19	956	2001.4	1044.4	3PF	

Results with SPS Action (ML F/C Enabled)- 3 x 50 MW HRD On-line / 123.5 MW HRD CT On-line / 2 SOP SCs On-line

Intial Case Setup

	230 kV Voltages (pu)												Pre-contingency Loading (%)								Post-contingency Loading (%)								SPS									
Case	Max Voltage (Transient)	Bus	Min Voltage (Transient)	Bus	Max Voltage (Steady State)	Bus	Min Voltage (Steady State)	Bus	Max Freqency (Hz)	Bus	Min Frequency (Hz)	Bus	TL201	TL217	TL202	TL206	TL267	TL207	TL237	TL203	TL201	TL217	TL202	TL206	TL267	TL207	TL237	TL203	Load Shed (MW)	ML (MW)	Voltage (SOP)	Spinning Reserve	Power East Out of BDE	Island Demand	Avalon Load	Fault / Type	STATCOM*
01_2033-34_Base-Peak_TL217-TL201_peakMW_3x50MW	1.074	195221	0.949	195229	1.028	195221	0.976	195229	60.78	195249	60	195249	71	52.9	80	80.1	56.7	55.1	43.3	65.6	99.7	0	69.9	69.9	48.4	46.6	35.1	52.7	124.3	-200	0.975	64.6	855.2	1847.5	969.2	No Fault	-
01_2033-34_Base-Peak_TL217-TL201_peakMW_3x50MW	1.075	195221	0.961	195229	1.028	195221	0.976	195229	60.78	195249	60.08	195249	71	52.9	80	80.1	56.7	55.1	43.3	65.6	99.6	0	69.9	69.9	48.4	46.6	35.1	52.7	128.4	-200	0.975	64.6	855.2	1847.5	696.2	SLGF	-
01_2033-34_Base-Peak_TL217-TL201_peakMW_3x50MW	1.095	195221	0.942	195229	1.028	195221	0.976	195229	60.76	195249	60.27	195221	71	52.9	80	80.1	56.7	55.1	43.3	65.6	99.6	0	69.9	70	48.4	46.6	35.1	52.7	125.8	-200	0.975	64.6	855.2	1847.5	969.2	3PF	-
01_2033-34_Base-Peak_TL217-TL201_2000MW_3x50MW	1.079	195221	0.905	195229	1.026	195221	0.962	195229	61.2	195249	60	195249	82.7	61.6	90.3	90.4	64.4	60.9	48.6	73.9	99.8	0	73.5	73.6	50.8	47.2	35	52.9	186.6	-320	0.975	86.23	955.8	2002.3	1044.1	No Fault	-
01_2033-34_Base-Peak_TL217-TL201_2000MW_3x50MW	1.081	195221	0.923	195229	1.026	195221	0.962	195229	61.19	195249	60.09	195249	82.7	61.6	90.3	90.4	64.4	60.9	48.6	73.9	99.8	0	73.5	73.6	50.8	47.2	35	52.9	192.6	-320	0.975	86.23	955.8	2002.3	1044.1	SLGF	-
01_2033-34_Base-Peak_TL217-TL201_2000MW_3x50MW	1.118	195249	0.855	195229	1.026	195221	0.961	195229	61.11	195249	60.32	195221	82.7	61.6	90.3	90.4	64.4	60.9	48.6	73.9	99.8	0	73.5	73.6	50.8	47.2	35	52.9	184.5	-320	0.975	86.23	955.8	2002.3	1044.1	3PF	-
02_2033-34_Base-Peak_TL207-TL203_1800MW_3x50MW	1.065	195221	0.937	195222	1.021	195221	0.958	195222	60.75	195221	60.02	195249	70.3	52.4	79.5	79.6	56.3	54.7	42.9	65	56.1	41.8	66.6	66.7	55.7	0	14.1	99.6	109.9	-220	0.975	94.37	849.2	1837.2	963.8	No Fault	-
02_2033-34_Base-Peak_TL207-TL203_1800MW_3x50MW	1.07	195221	0.92	195222	1.021	195221	0.958	195222	60.76	195249	60.06	195221	70.3	52.4	79.5	79.6	56.3	54.7	42.9	65	56.1	41.8	66.6	66.7	55.7	0	14.1	99.6	110.8	-220	0.975	94.37	849.2	1837.2	963.8	SLGF	-
02_2033-34_Base-Peak_TL207-TL203_1800MW_3x50MW	1.124	195227	0.789	195222	1.021	195221	0.958	195222	60.78	195249	60.05	195221	70.3	52.4	79.5	79.6	56.3	54.7	42.9	65	56.1	41.8	66.6	66.7	55.7	0	14.1	99.6	103.8	-220	0.975	94.37	849.2	1837.2	963.8	3PF	-
02_2033-34_Base-Peak_TL207-TL203_2000MW_3x50MW	1.068	195221	0.897	195222	1.018	195221	0.942	195222	61.17	195249	60.03	195249	82.7	61.6	90.3	90.4	64.5	60.8	48.6	73.8	56.9	42.4	70.4	70.5	58.3	0	13.7	100.4	179.3	-320	0.975	87.91	955.5	2000.5	1043.8	No Fault	-
02_2033-34_Base-Peak_TL207-TL203_2000MW_3x50MW	1.086	195221	0.839	195222	1.018	195221	0.942	195222	61.17	195249	60.07	195221	82.7	61.6	90.3	90.4	64.5	60.8	48.6	73.8	56.8	42.3	70.4	70.5	58.3	0	13.7	100.4	176.9	-320	0.975	87.91	955.5	2000.5	1043.8	SLGF	-
02_2033-34_Base-Peak_TL207-TL203_2000MW_3x50MW_STATCOM	1.174	195249	0.535	195222	1.018	195221	0.943	195222	61.07	195249	60.02	195249	82.2	61.3	90.1	90.3	64.2	60.5	48.5	73.7	56.8	42.3	70.2	70.3	58.2	0	13.7	100.3	157.1	-320	0.975	89.18	954.6	1999.3	1043.4	3PF	110 MVAr
03_2033-34_Base-Peak_TL206-TL202_1800MW_3x50MW	1.077	195221	0.926	195222	1.024	195221	0.969	195229	61.02	195249	60	195249	69.8	52	78.9	79	55.9	54.5	42.8	64.7	45	33.5	99.6	0	61.9	36.7	21.5	32.5	179	-220	0.975	99.79	843.7	1831.6	961	No Fault	-
03_2033-34_Base-Peak_TL206-TL202_1800MW_3x50MW	1.088	195221	0.897	195222	1.024	195221	0.97	195229	61.03	195249	60.06	195249	69.8	52	78.9	79	55.9	54.5	42.8	64.7	45	33.5	99.6	0	61.9	36.7	21.5	32.4	179.4	-220	0.975	99.79	843.7	1831.6	961	SLGF	-
03_2033-34_Base-Peak_TL206-TL202_1800MW_3x50MW	1.181	195227	0.661	195222	1.024	195221	0.969	195229	61.02	195249	60.04	195249	69.8	52	78.9	79	55.9	54.5	42.8	64.7	45.1	33.6	99.7	0	61.9	36.8	21.5	32.5	164.7	-220	0.975	99.79	843.7	1831.6	961	3PF	-
03_2033-34_Base-Peak_TL206-TL202_2000MW_3x50MW	1.097	195221	0.862	195222	1.058	195221	0.976	195229	62.83	195249	59.99	195249	82.8	61.7	90.4	90.5	64.5	60.8	48.6	73.9	37.2	27.7	99.8	0	61.2	33.9	18.2	27.2	290.9	-320	0.975	86.64	956.3	2001.7	1044.3	No Fault	-
03_2033-34_Base-Peak_TL206-TL202_2000MW_3x50MW	1.139	195249	0.741	195222	1.059	195221	0.976	195229	62.84	195249	60	195249	82.8	61.7	90.4	90.5	64.5	60.8	48.6	73.9	37.2	27.7	99.9	0	61.2	33.8	18.2	27.2	282.3	-320	0.975	86.64	956.3	2001.7	1044.3	SLGF	-
03_2033-34_Base-Peak_TL206-TL202_2000MW_3x50MW_STATCOM	1.183	195249	0.593	195222	1.058	195221	0.954	195222	66.12	195249	59.94	195249	82.3	61.3	90.2	90.3	64.3	60.5	48.6	73.7	24.3	18	82	0	49.8	34.8	11.1	19.4	457.2	-320	0.975	87.95	955.4	2000.4	1044	3PF	320 MVAr
04_2033-34_Base-Peak_TL237-TL203_1800MW_3x50MW	1.063	195221	0.935	195229	1.02	195221	0.951	195229	60.66	195249	60.02	195249	69.9	52.1	79.1	79.2	56	54.6	42.8	64.7	61.8	46.1	69.9	70	57.3	13.9	0	100.1	73.9	-220	0.975	99.33	845.5	1832	961.1	No Fault	-
04_2033-34_Base-Peak_TL237-TL203_1800MW_3x50MW	1.066	195221	0.93	195229	1.02	195221	0.951	195229	60.66	195249	60.05	195221	69.9	52.1	79.1	79.2	56	54.6	42.8	64.7	61.8	46.1	69.9	70	57.3	13.9	0	100.1	74.7	-220	0.975	99.33	845.5	1832	961.1	SLGF	-
04_2033-34_Base-Peak_TL237-TL203_1800MW_3x50MW	1.094	195221	0.837	195222	1.02	195221	0.951	195229	60.68	195249	60.04	195221	69.9	52.1	79.1	79.2	56	54.6	42.8	64.7	61.8	46.1	69.9	70	57.3	13.9	0	100.1	71.1	-220	0.975	99.33	845.5	1832	961.1	3PF	-
04_2033-34_Base-Peak_TL237-TL203_2000MW_3x50MW	1.063	195221	0.908	195222	1.015	195221	0.94	195229	60.91	195249	60.03	195249	82.8	61.7	90.4	90.6	64.5	60.8	48.6	73.9	62.4	46.5	73.4	73.4	59.6	13.3	0	99.9	150.2	-320	0.975	76.39	956.6	2002.1	1044.5	No Fault	-
04_2033-34_Base-Peak_TL237-TL203_2000MW_3x50MW	1.081	195221	0.856	195222	1.015	195221	0.94	195229	60.93	195249	60.06	195221	82.8	61.7	90.4	90.6	64.5	60.8	48.6	73.9	62.4	46.5	73.4	73.4	59.6	13.3	0	99.9	148.7	-320	0.975	76.39	956.6	2002.1	1044.5	SLGF	-
04_2033-34_Base-Peak_TL237-TL203_2000MW_3x50MW_STATCOM	1.177	195249	0.519	195222	1.015	195221	0.941	195229	60.96	195249	60.03	195249	82.3	61.3	90.2	90.3	64.3	60.5	48.6	73.7	62.3	46.4	73.2	73.3	59.4	13.4	0	99.8	132	-320	0.975	77.83	955.5	2000.7	1044.1	3PF	50 MVAr
05_2033-34_Base-Peak_TL267WAV-1800MW_3X50MW	1.072	195221	0.875	195222	1.016	195221	0.953	195222	60.79	195249	59.96	195249	70.8	52.8	78.4	78.5	55.7	55.4	43.2	65.4	57.3	42.7	99.5	99.7	0	70	57	86.5	114.6	-310	0.983	193.9	840.2	1802	941.4	No Fault	-
05_2033-34_Base-Peak_TL267WAV-1800MW_3X50MW	1.076	195221	0.865	195222	1.016	195221	0.952	195222	60.8	195249	60.01	195249	70.8	52.8	78.4	78.5	55.7	55.4	43.2	65.4	57.3	42.7	99.6	99.7	0	70	57	86.5	116.1	-310	0.983	193.9	840.2	1802	941.4	SLGF	-
05_2033-34_Base-Peak_TL267WAV-1800MW_3X50MW	1.185	195249	0.529	195222	1.017	195221	0.956	195222	60.85	195249	60.06	195249	70.8	52.8	78.4	78.5	55.7	55.4	43.2	65.4	55.8	41.6	98.2	98.3	0	69.1	56	85	114.9	-310	0.983	193.9	840.2	1802	941.4	3PF	-
05_2033-34_Base-Peak_TL267WAV-2000MW_3X50MW	1.095	195221	0.79	195222	1.038	195221	0.961	195222	61.94	195249	59.94	195249	83.1	61.9	90.3	90.4	64.4	61.2	48.7	74	49.5	36.9	99.9	100	0	65.9	52.8	80.2	228.1	-320	0.983	86.36	956.7	2002.7	1044.7	No Fault	-
05_2033-34_Base-Peak_TL267WAV-2000MW_3X50MW	1.139	195249	0.668	195222	1.039	195221	0.961	195222	61.89	195249	59.96	195249	83.1	61.9	90.3	90.4	64.4	61.2	48.7	74	49.5	36.9	99.9	100.1	0	65.9	52.8	80.2	226.2	-320	0.983	86.36	956.7	2002.7	1044.7	SLGF	-
05_2033-34_Base-Peak_TL267WAV-2000MW_3X50MW_STATCOM	1.124	195249	0.558	195222	1.034	195221	0.943	195222	62.03	195249	60.01	195249	83.2	62	90.3	90.4	64.4	61.3	48.7	74	50.6	37.6	99	99.2	0	66.3	52.4	79.8	227.5	-320	0.983	86.17	956.9	2002.9	1044.7	3PF	350 MVAr
06_2033-34_Base-Peak_TL201-TL217_1800MW_3x50MW	1.026	195221	0.91	195229	1.017	195221	0.942	195229	60.05	195249	59.88	195249	69	51.4	78.3	78.4	55.4	54.1	42.4	64.1	0	92.5	79.1	79.2	56.2	53.4	43.1	65	0	-220	0.975	110.73	837.2	1820	955	No Fault	-
06_2033-34_Base-Peak_TL201-TL217_1800MW_3x50MW	1.027	195221	0.926	195229	1.017	195221	0.942	195229	60.09	195249	59.88	195249	69	51.4	78.3	78.4	55.4	54.1	42.4	64.1	0	92.5	79.1	79.2	56.2	53.4	43.1	65	0	-220	0.975	110.73	837.2	1820	955	SLGF	-
06_2033-34_Base-Peak_TL201-TL217_1800MW_3x50MW	1.067	195221	0.916	195229	1.018	195221	0.943	195229	60.38	195249	59.84	195249	69	51.4	78.3	78.4	55.4	54.1	42.4	64.1	0	92.5	79.2	79.3	56.2	53.4	43.2	65.1	0	-220	0.975	110.73	837.2	1820	955	3PF	-
06_2033-34_Base-Peak_TL201-TL217_2000MW_3x50MW	1.047	195221	0.845	195229	0.995	195221	0.899	195229	60.6	195249	59.96	195249	82.8	61.7	90.4	90.5	64.5	60.8	48.6	73.8	0	99.7	86.8	86.9	61.6	55.7	45.3	68.6	50.2	-320	0.975	91.75	956.1	2001.3	1044.2	No Fault	-
06_2033-34_Base-Peak_TL201-TL217_2000MW_3x50MW	1.043	195221	0.873	195229	0.995	195221	0.899	195229	60.6	195249	60.05	195249	82.8	61.7	90.4	90.5	64.5	60.8	48.6	73.8	0	99.6	86.8	86.9	61.6	55.7	45.3	68.6	51.9	-320	0.975	91.75	956.1	2001.3	1044.2	SLGF	-
06_2033-34_Base-Peak_TL201-TL217_2000MW_3x50MW	1.09	195249	0.821	195229	0.996	195221	0.901	195229	60.62	195249	60.21	195249	82.8	61.7	90.4	90.5	64.5	60.8	48.6	73.8	0	99.4	86.7	86.8	61.5	55.6	45.2	68.5	49.8	-320	0.975	91.75	956.1	2001.3	1044.2	3PF	-
07_2033-34_Base-Peak_TL203-TL207_1800MW_3x50MW	1.024	195221	0.933	195229	1.019	195221	0.951	195229	60.03	195249	59.91	195249	69.1	51.5	78.3	78.4	55.4	54.1	42.4	64.1	70.4	52.5	74.2	74.2	64.1	93	84.2	0	0	-220	0.975	110.09	837.7	1820.7	944.4	No Fault	-
07_2033-34_Base-Peak_TL203-TL207_1800MW_3x50MW	1.036	195221	0.935	195229	1.019	195221	0.951	195229	60.09	195249	59.9	195249	69.1	51.5	78.3	78.4	55.4	54.1	42.4	64.1	70.4	52.5	74.2	74.2	64.1	93	84.2	0	0	-220	0.975	110.09	837.7	1820.7	944.4	SLGF	-
07_2033-34_Base-Peak_TL203-TL207_1800MW_3x50MW	1.082	195227	0.845	195222	1.019	195221	0.951	195229	60.32	195249	59.88	195249	69.1	51.5	78.3	78.4	55.4	54.1	42.4	64.1	70.5	52.5	74.2	74.3	64.1	93.1	84.3	0	0	-220	0.975	110.09	837.7	1820.7	944.4	3PF	-
07_2033-34_Base-Peak_TL203-TL207_2000MW_3x50MW	1.036	195221	0.898	195229	1.001	195221	0.924	195229	60.55	195249	59.98	195249	82.9	61.8	90.5	90.6	64.6	60.8	48.7	73.9	78.7	58.7	82.1	82.2	71.2	100	90.3	0	41.1	-320	0.975	75.7	957.1	2002.8	1044.8	No Fault	-
07_2033-34_Base-Peak_TL203-TL207_2000MW_3x50MW	1.048	195221	0.853	195222	1.001	195221	0.924	195229	60.56	195249	60.02	195249	82.9	61.8	90.5	90.6	64.6	60.8	48.7	73.9	78.7	58.7	82.2	82.3	71.2	100	90.3	0	40.7	-320	0.975	75.7	957.1	2002.8	1044.8	SLGF	-
07_2033-34_Base-Peak_TL203-TL207_2000MW_3x50MW_STATCOM	1.125	195249	0.591	195227	1.003	195221	0.929	195229	60.63	195249	59.96	195249	82.4	61.4	90.3	90.4	64.3	60.5	48.6	73.8	77.9	58.1	81.9	82	70.7	99.7	90.4	0	36.8	-320	0.975	77.21	956	2001.3	1044.4	3PF	120 MVAr

* may be able to adjust statcom/load shed ratio

Results with SPS Action (ML F/C Enabled)- 3 x 50 MW HRD On-line / 123.5 MW HRD CT Off-line / 3 SOP SCs On-line

Initial Case Setup

	230 kV Voltages (pu)												Pre-contingency Loading (%)								Post-contingency Loading (%)								SPS	Initial Case Setup								
Case	Max Voltage (Transient)	Bus	Min Voltage (Transient)	Bus	Max Voltage (Steady State)	Bus	Min Voltage (Steady State)	Bus	Max Freqeuncy (Hz)	Bus	Min Frequency (Hz)	Bus	TL201	TL217	TL202	TL206	TL267	TL207	TL237	TL203	TL201	TL217	TL202	TL206	TL267	TL207	TL237	TL203	Load Shed (MW)	ML (MW)	Voltag e (SSD)	Voltage (SOP)	Spinning Reserve	Power East Out of BDE	Island Demand	Avalon Load	Fault / Type	STATCOM*
01_2033-34_Base-Peak_TL217-TL201_1800MW_3SOPSC	1.086	195221	0.906	195229	1.041	195221	0.976	195229	61.52	195249	60	195249	86.7	64.6	90.3	90.4	65	62.8	51.1	77.5	100.5	0	71.8	71.9	49.8	47.2	35.9	54	209.7	-320	0.936	0.975	72.14	958.2	1832.5	945.2	no fault	
01_2033-34_Base-Peak_TL217-TL201_1800MW_3SOPSC	1.088	195221	0.909	195229	1.041	195221	0.976	195229	61.51	195249	60.06	195249	86.7	64.6	90.3	90.4	65	62.8	51.1	77.5	100.5	0	71.8	71.9	49.8	47.2	35.9	54	216.4	-320	0.936	0.975	72.14	958.2	1832.5	945.2	SLGF	
01_2033-34_Base-Peak_TL217-TL201_1800MW_3SOPSC	1.159	195249	0.755	195229	1.041	195221	0.976	195229	61.48	195249	60.22	195221	86.7	64.6	90.3	90.4	65	62.8	51.1	77.5	100.6	0	71.9	72	49.9	47.2	36	54	201.2	-320	0.936	0.975	72.14	958.2	1832.5	945.2	3PF	
02_2033-34_Base-Peak_TL207-TL203_1800MW_3SOPSC	1.076	195221	0.9	195222	1.036	195221	0.963	195229	61.63	195249	60.03	195249	87	64.8	90.5	90.6	65.2	62.9	51.2	77.6	55.6	41.4	68.1	68.1	56.8	0	14	100	209.3	-320	0.935	0.975	70.4	960.5	1834.3	946.7	no fault	
02_2033-34_Base-Peak_TL207-TL203_1800MW_3SOPSC	1.091	195221	0.825	195222	1.036	195221	0.962	195229	61.62	195249	60.05	195249	87	64.8	90.5	90.6	65.2	62.9	51.2	77.6	55.6	41.4	68.1	68.2	56.8	0	14	100.1	206.1	-320	0.935	0.975	70.4	960.5	1834.3	946.7	SLGF	
02_2033-34_Base-Peak_TL207-TL203_1800MW_3SOPSC_STATCOM	1.156	195249	0.582	195222	1.035	195221	0.947	195222	61.65	195249	59.93	195249	86.6	64.6	90.4	90.5	65	62.7	51.1	77.5	56.4	42	68	68.1	57.1	0	13.8	100.4	190.8	-320	0.939	0.975	71.35	959.8	1833.4	946.4	3PF	220
03_2033-34_Base-Peak_TL206-TL202_1800MW_3SOPSC	1.093	195221	0.859	195222	1.062	195221	0.977	195249	62.74	195249	59.99	195249	87.1	64.9	90.6	90.7	65.3	63	51.2	77.7	41.7	31.1	100	0	61.9	35.2	21	31.2	287.8	-320	0.935	0.975	69.02	961.5	1835.8	947.4	no fault	
03_2033-34_Base-Peak_TL206-TL202_1800MW_3SOPSC	1.14	195227	0.69	195222	1.063	195221	0.977	195249	62.75	195249	59.95	195249	87.1	64.9	90.6	90.7	65.3	63	51.2	77.7	41.7	31	100	0	61.9	35.2	21	31.2	280.1	-320	0.935	0.975	69.02	961.5	1835.8	947.4	SLGF	
03_2033-34_Base-Peak_TL206-TL202_1800MW_3SOPSC	Still unstable with 400+ Mvar STATCOM and increased load shed																																				3PF	
04_2033-34_Base-Peak_TL237-TL203_1800MW_3SOPSC	1.072	195221	0.911	195229	1.022	195221	0.948	195229	61.16	195249	60.02	195249	87.1	64.9	90.6	90.7	65.3	63	51.2	77.7	61.5	45.8	70.6	70.7	57.9	13.7	0	100.2	177	-320	0.935	0.975	69.04	961.5	1835.7	947.3	no fault	
04_2033-34_Base-Peak_TL237-TL203_1800MW_3SOPSC	1.086	195221	0.844	195222	1.022	195221	0.948	195229	61.16	195249	60.04	195221	87.1	64.9	90.6	90.7	65.3	63	51.2	77.7	61.5	45.8	70.6	70.7	57.8	13.7	0	100.2	174.9	-320	0.935	0.975	69.04	961.5	1835.7	947.3	SLGF	
04_2033-34_Base-Peak_TL237-TL203_1800MW_3SOPSC	Still unstable with 400+ Mvar STATCOM and increased load shed																																				3PF	
05_2033-34_Base-Peak_TL267WAV_1800MW_3SOPSC_STATCOM	1.074	195221	0.864	195222	1.041	195221	0.951	195222	61.96	195249	59.95	195249	87.9	65.5	90.5	90.6	65.2	63.4	51.1	77.6	54.4	40.5	99.9	100	0	68.4	55.1	83.7	236.1	-320	0.939	0.983	70.67	962	1834	946.7	no fault	
05_2033-34_Base-Peak_TL267WAV_1800MW_3SOPSC_STATCOM	1.088	195221	0.798	195222	1.041	195221	0.951	195222	61.94	195249	59.96	195249	87.9	65.5	90.5	90.6	65.2	63.4	51.1	77.6	54.3	40.5	99.9	100	0	68.4	55.1	83.7	235.7	-320	0.939	0.983	70.67	962	1834	946.7	SLGF	
05_2033-34_Base-Peak_TL267WAV_1800MW_3SOPSC_STATCOM	Still unstable with 400+ Mvar STATCOM and increased load shed																																				3PF	
06_2033-34_Base-Peak_TL201-TL217_1800MW_3SOPSC	1.067	195221	0.85	195229	1.005	195221	0.915	195229	60.69	195249	59.97	195249	87.3	65.1	90.8	90.9	65.4	63	51.2	77.7	0	99.8	84.6	84.7	60.3	56.1	45.8	69.3	79.3	-320	0.935	0.975	68.67	963.4	1836.1	947.5	no fault	
06_2033-34_Base-Peak_TL201-TL217_1800MW_3SOPSC	1.065	195221	0.871	195229	1.006	195221	0.915	195229	60.69	195249	60.01	195249	87.3	65.1	90.8	90.9	65.4	63	51.2	77.7	0	99.7	84.5	84.6	60.3	56.1	45.8	69.3	81.9	-320	0.935	0.975	68.67	963.4	1836.1	947.5	SLGF	
06_2033-34_Base-Peak_TL201-TL217_1800MW_3SOPSC_STATCOM	1.139	195249	0.61	195229	1.006	195221	0.918	195229	60.73	195249	60.09	195249	87	64.8	90.7	90.8	65.2	62.8	51.2	77.6	0	99.6	84.5	84.6	60.2	56.1	45.9	69.4	76	-320	0.939	0.975	69.74	962.6	1835	947.2	3PF	10
07_2033-34_Base-Peak_TL203-TL207_1800MW_3SOPSC	1.057	195221	0.908	195229	1.008	195221	0.934	195229	60.65	195249	59.99	195249	86.9	64.8	90.4	90.5	65.1	62.9	51	77.4	77.6	57.8	79.3	79.4	69.2	99.8	90.4	0	72.4	-320	0.936	0.975	73.52	959.8	1831.1	945	no fault	
07_2033-34_Base-Peak_TL203-TL207_1800MW_3SOPSC	1.071	195221	0.848	195222	1.008	195221	0.934	195229	60.68	195249	60.01	195221	86.9	64.8	90.4	90.5	65.1	62.9	51	77.4	77.6	57.8	79.3	79.4	69.2	99.8	90.4	0	71.6	-320	0.936	0.975	73.52	959.8	1831.1	945	SLGF	
07_2033-34_Base-Peak_TL203-TL207_1800MW_3SOPSC_STATCOM	1.139	195249	0.588	195227	1.008	195221	0.933	195229	60.67	195249	59.87	195221	86.7	64.6	90.3	90.4	65	62.7	51	77.3	77.7	57.9	79.1	79.2	69.2	99.8	90.4	0	66.6	-320	0.939	0.975	74.22	959.3	1830.4	944.8	3PF	200

* may be able to adjust statcom/load shed ratio

IIS demand in these cases is ~1825 MW. Pre-contingency voltage at SSD is 0.93 pu, and TL201 loading is
Tried to increase the demand, however, at around 1850 MW demand you have further voilated steady state voltage near SSD and have nearly reached 100% loading on TL201.
We added an additional 38 MVAR cap bank at CBC, and could increase demand to 1900 MW. With the additional CBC cap bank, voltage is 0.927 pu @ SSD and TL201 loading is at 100%.

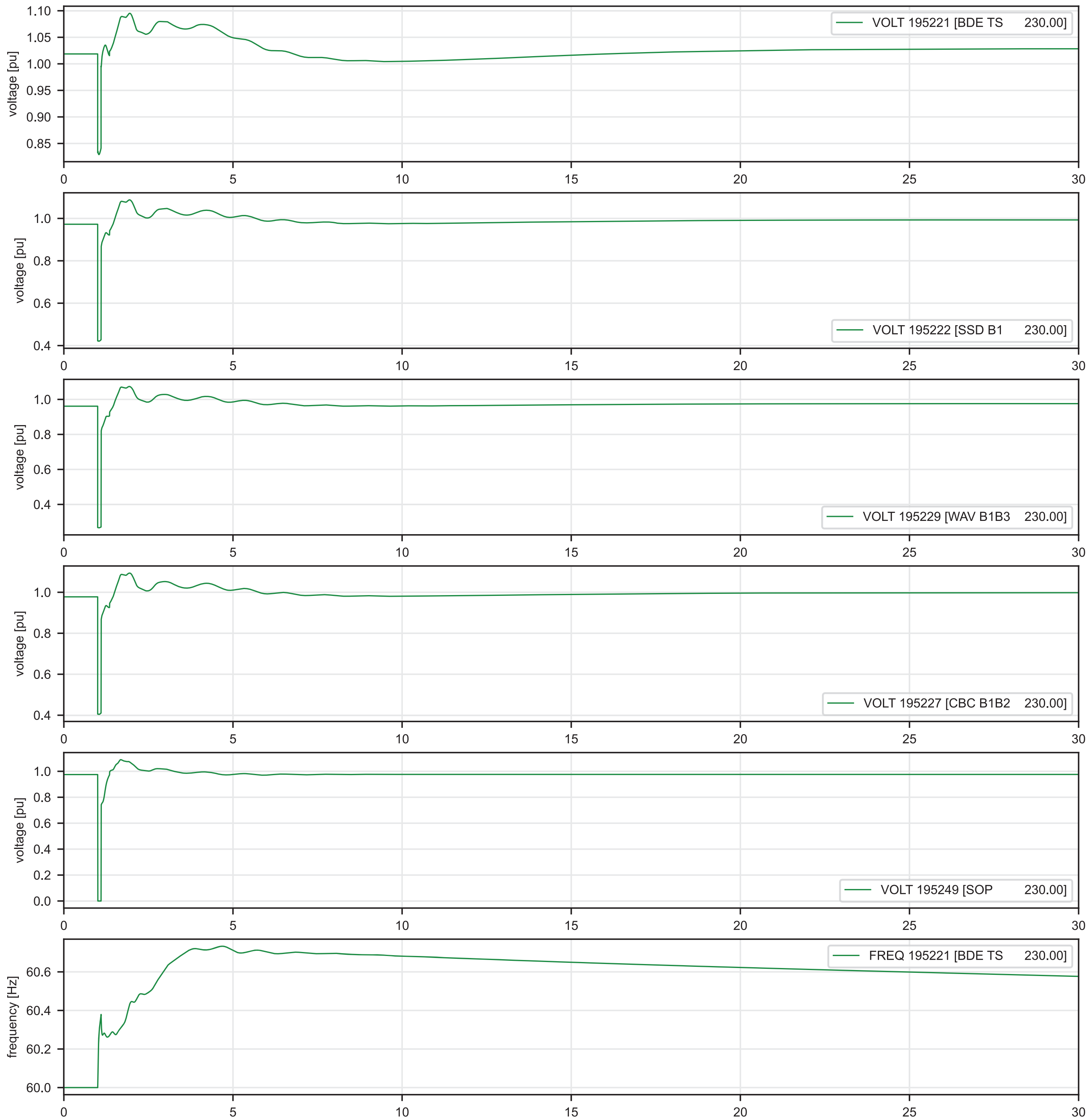
For now, we have only run the analysis at the 1825 MW demand level since it is nearly peaked in capability pre-contingency.

Results with SPS Action (ML F/C Enabled)- 3 x 50 MW HRD Off-line / 123.5 MW HRD CT On-line / 2 SOP SCs On-line

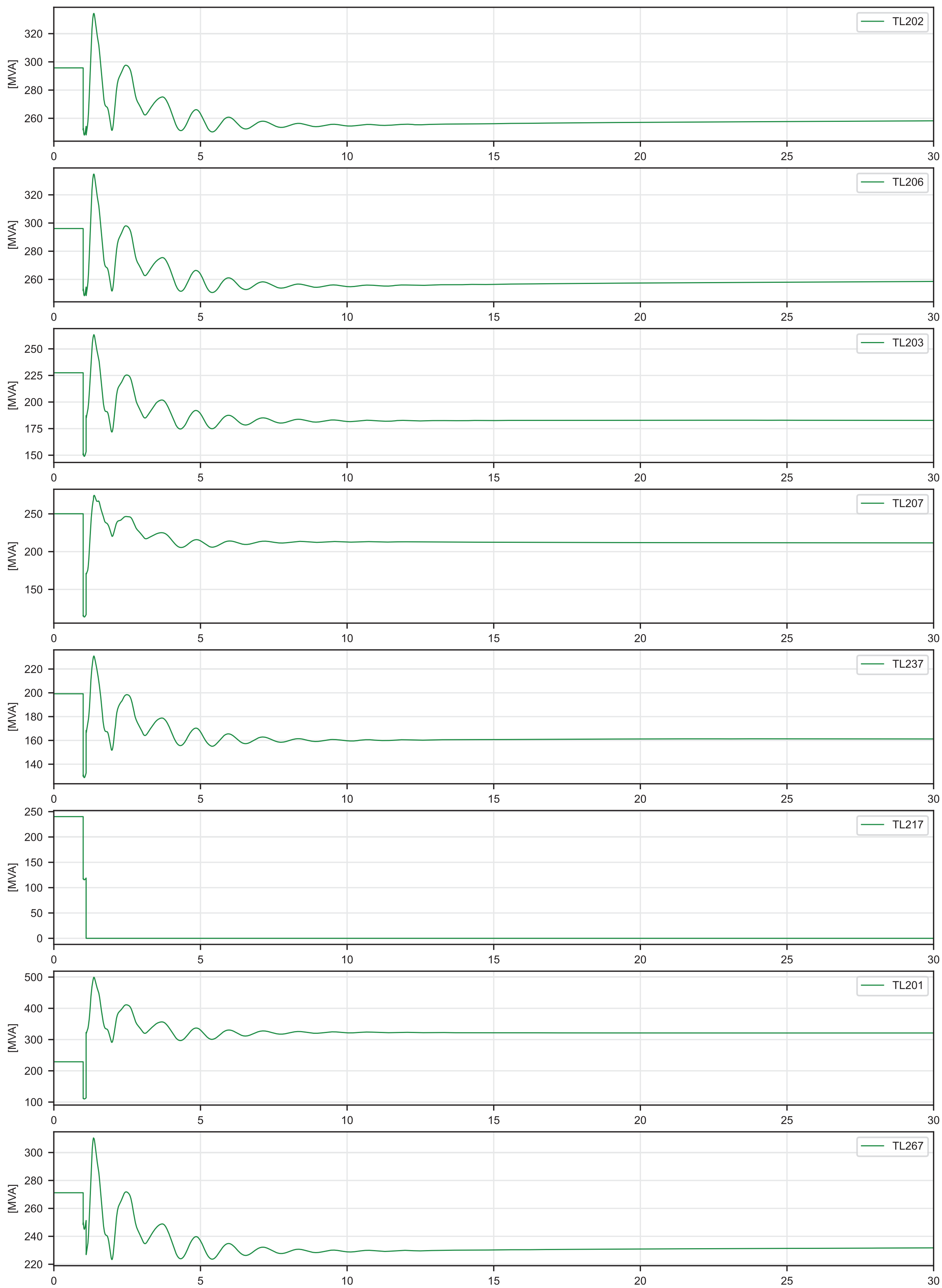
	230 kV Voltages (pu)												Pre-contingency Loading (%)								Post-contingency Loading (%)								SPS	Initial Case Setup								
Case	Max Voltage (Transient)	Bus	Min Voltage (Transient)	Bus	Max Voltage (Steady State)	Bus	Min Voltage (Steady State)	Bus	Max Freqeuncy (Hz)	Bus	Min Frequency (Hz)	Bus	TL201	TL217	TL202	TL206	TL267	TL207	TL237	TL203	TL201	TL217	TL202	TL206	TL267	TL207	TL237	TL203	Load Shed (MW)	ML (MW)	Voltage (SOP)	Spinning Reserve	Power East Out of BDE	Island Demand	Avalon Load	Fault / Type	STATCOM*	
01_2033-34_Base-Peak_TL217-TL201_1800MW	1.091	195221	0.894	195229	1.052	195221	0.978	195249	62.01	195249	60	195249	97.9	73	93.1	93.2	67.1	69.5	56.4	86.2	100	0	72.3	72.4	50.1	46.9	35.8	53.7	229.5	-320	0.975	45.14	984.2	1842	947.5	no fault		
01_2033-34_Base-Peak_TL217-TL201_1800MW	1.098	195221	0.897	195229	1.051	195221	0.978	195249	62	195249	60.08	195249	97.9	73	93.1	93.2	67.1	69.5	56.4	86.2	100.1	0	72.3	72.4	50.1	46.9	35.8	53.7	235.5	-320	0.975	45.14	984.2	1842	947.5	SLGF		
01_2033-34_Base-Peak_TL217-TL201_1800MW	1.198	195249	0.702	195229	1.052	195221	0.978	195249	61.94	195249	60.15	195249	97.9	73	93.1	93.2	67.1	69.5	56.4	86.2	100.1	0	72.3	72.4	50.1	46.9	35.8	53.7	215.8	-320	0.975	45.14	984.2	1842	947.5	3PF		
02_2033-34_Base-Peak_TL207-TL203_1800MW_STATCOM	1.082	195221	0.901	195222	1.038	195221	0.965	195229	62.1	195249	60.04	195249	96	71.5	92.4	92.5	66.4	67.9	55.7	84.8	55.5	41.4	68.2	68.3	56.8	0	14.1	99.8	226.1	-320	0.975	47.27	983.5	1840	947.9	no fault	10	
02_2033-34_Base-Peak_TL207-TL203_1800MW_STATCOM	1.13	195227	0.802	195222	1.039	195221	0.965	195229	62.09	195221	60.08	195249	96	71.5	92.4	92.5	66.4	67.9	55.7	84.8	55.5	41.3	68.3	68.3	56.8	0	14.1	99.8	218.2	-320	0.975	47.27	983.5	1840	947.9	SLGF	10	
02_2033-34_Base-Peak_TL207-TL203_1800MW_STATCOM	1.187	195249	0.56	195229	1.036	195221	0.947	195222	62.09	195249	60.01	195249	96	71.5	92.4	92.5	66.4	67.9	55.7	84.8	56.6	42.1	68.3	68.4	57.3	0	13.9	100.3	192	-320	0.975	47.27	983.5	1840	947.9	3PF	290	
03_2033-34_Base-Peak_TL206-TL202_1800MW_STATCOM	1.106	195249	0.842	195222	1.061	195221	0.976	195229	63.07	195249	59.97	195249	96.7	72.1	92.6	92.7	66.7	68.8	56	85.4	41.3	30.8	99.8	0	61.8	35.4	20.5	30.6	298.7	-320	0.975	50.12	981.3	1836.9	945.7	no fault	10	
03_2033-34_Base-Peak_TL206-TL202_1800MW_STATCOM	1.097	195221	0.864	195222	1.045	195221	0.971	195229	62.38	195249	59.94	195249	96.7	72.1	92.6	92.7	66.7	68.8	56	85.4	42.3	31.5	99.5	0	61.7	36.1	20.5	31	301.5	-320	0.975	50.12	981.3	1836.9	945.7	no fault	10	trip 1 BDE unit
03_2033-34_Base-Peak_TL206-TL202_1800MW_STATCOM	1.197	195249	0.63	195222	1.06	195221	0.967	195229	63.07	195249	59.92	195249	96.7	72.1	92.6	92.7	66.7	68.8	56	85.4	42.5	31.7	99.9	0	62.2	37.1	20	30.9	283.6	-320	0.975	50.12	981.3	1836.9	945.7	SLGF	50	
03_2033-34_Base-Peak_TL206-TL202_1800MW_STATCOM	1.162	195249	0.726	195222	1.044	195221	0.962	195229	62.41	195249	59.91	195249	96.7	72.1	92.6	92.7	66.7	68.8	56	85.4	43.7	32.5	99.5	0	62.1	37.8	20.3	31.5	288.3	-320	0.975	50.12	981.3	1836.9	945.7	SLGF	50	trip 1 BDE unit
03_2033-34_Base-Peak_TL206-TL202_1800MW_STATCOM	Still unstable with 400+ Mvar STATCOM and increased load shed																																			3PF		
04_2033-34_Base-Peak_TL237-TL203_1800MW_STATCOM	1.077	195221	0.908	195229	1.029	195221	0.952	195229	61.5	195249	60.04	195249	95.8	71.4	92.2	92.3	66.3	67.9	55.6	84.6	61.4	45.7	71.4	71.5	58.2	13.9	0	100.3	193.9	-320	0.975	49.85	981.6	1837.3	946.5	no fault	10	
04_2033-34_Base-Peak_TL237-TL203_1800MW_STATCOM	1.106	195249	0.829	195222	1.029	195221	0.952	195229	61.49	195249	60.08	195221	95.8	71.4	92.2	92.3	66.3	67.9	55.6	84.6	61.4	45.8	71.5	71.6	58.2	13.9	0	100.3	188.7	-320	0.975	49.85	981.6	1837.3	946.5	SLGF	10	
04_2033-34_Base-Peak_TL237-TL203_1800MW_STATCOM	1.181	195249	0.572	195229	1.026	195221	0.944	195229	61.47	195249	60.02	195249	95.8	71.4	92.2	92.3	66.3	67.9	55.6	84.6	62.6	46.6	71.3	71.4	58.7	13.4	0	100.1	166	-320	0.975	49.85	981.6	1837.3	946.5	3PF	220	
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_1800MW_STATCOM	1.104	195221	0.783	195222	1.038	195221	0.962	195222	61.9	195249	59.93	195249	94.1	70.2	89.9	90	64.8	67.8	54.3	83	54.7	40.7	100.3	100.4	0	68.7	55.8	84.7	222	-310	0.983	69.81	960.1	1806	931	no fault	10	
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_1800MW_STATCOM	1.174	195249	0.614	195222	1.037	195221	0.955	195222	61.82	195249	59.92	195249	94.1	70.2	89.9	90	64.8	67.8	54.3	83	55.2	41.1	100.4	100.5	0	69	55.9	84.9	219.3	-310	0.983	69.81	960.1	1806	931	SLGF	30	
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_1800MW_STATCOM	Still unstable with 400+ Mvar STATCOM and increased load shed																																			3PF		
06_2033-34_Base-Peak_TL201-TL217_1800MW	1.074	195221	0.838	195229	1.004	195221	0.911	195229	60.78	195249	59.96	195249	97.7	72.8	92.9	93.1	67	69.4	56.3	86	0	100.4	85.1	85.2	60.7	56.2	46	69.6	93.1	-320	0.975	47.6	983.3	1839.4	946.8	no fault		
06_2033-34_Base-Peak_TL201-TL217_1800MW	1.075	195221	0.853	195229	1.004	195221	0.91	195229	60.78	195249	60.04	195249	97.7	72.8	92.9	93.1	67	69.4	56.3	86	0	100.5	85.2	85.3	60.8	56.2	46	69.6	95.5	-320	0.975	47.6	983.3	1839.4	946.8	SLGF		
06_2033-34_Base-Peak_TL201-TL217_1800MW	1.171	195249	0.605	195229	1.008	195221	0.921	195229	60.99	195249	60.12	195249	97.7	72.8	92.9	93.1	67	69.4	56.3	86	0	96.9	83.3	83.4	59.2	55.2	44.7	67.5	103	-320	0.975	47.6	983.3	1839.4	946.8	3PF		
07_2033-34_Base-Peak_TL203-TL207_1800MW_STATCOM	1.064	195221	0.908	195229	1.009	195221	0.935	195229	60.71	195249	60	195249	95.2	70.9	91.7	91.8	65.9	67.7	55.3	84.2	77.7	57.9	79.4	79.5	69.2	99.9	90.7	0	86.5	-320	0.975	56.93	976.3	1847.5	942.8	no fault	10	
07_2033-34_Base-Peak_TL203-TL207_1800MW_STATCOM	1.08	195221	0.832	195222	1.009	195221	0.935	195229	60.78	195249	60.04	195221	95.2	70.9	91.7	91.8	65.9	67.7	55.3	84.2	77.6	57.8	79.4	79.5	69.2	99.9	90.7	0	84.4	-320	0.975	56.93	976.3	1847.5	942.8	SLGF	10	
07_2033-34_Base-Peak_TL203-TL207_1800MW_STATCOM	1.148	195249	0.583	195229	1.008	195221	0.933	195229	60.74	195249	60.02	195249	95.2	70.9	91.7	91.8	65.9	67.7	55.3	84.2	77.9	58.1	79.4	79.5	69.4	100	90.6	0	75.7	-320	0.975	56.93	976.3	1847.5	942.8	3PF	250	

IIS demand in these cases is ~1840 MW. Pre-contingency voltage at SSD is 0.925 pu, and TL201 loading is 95%.

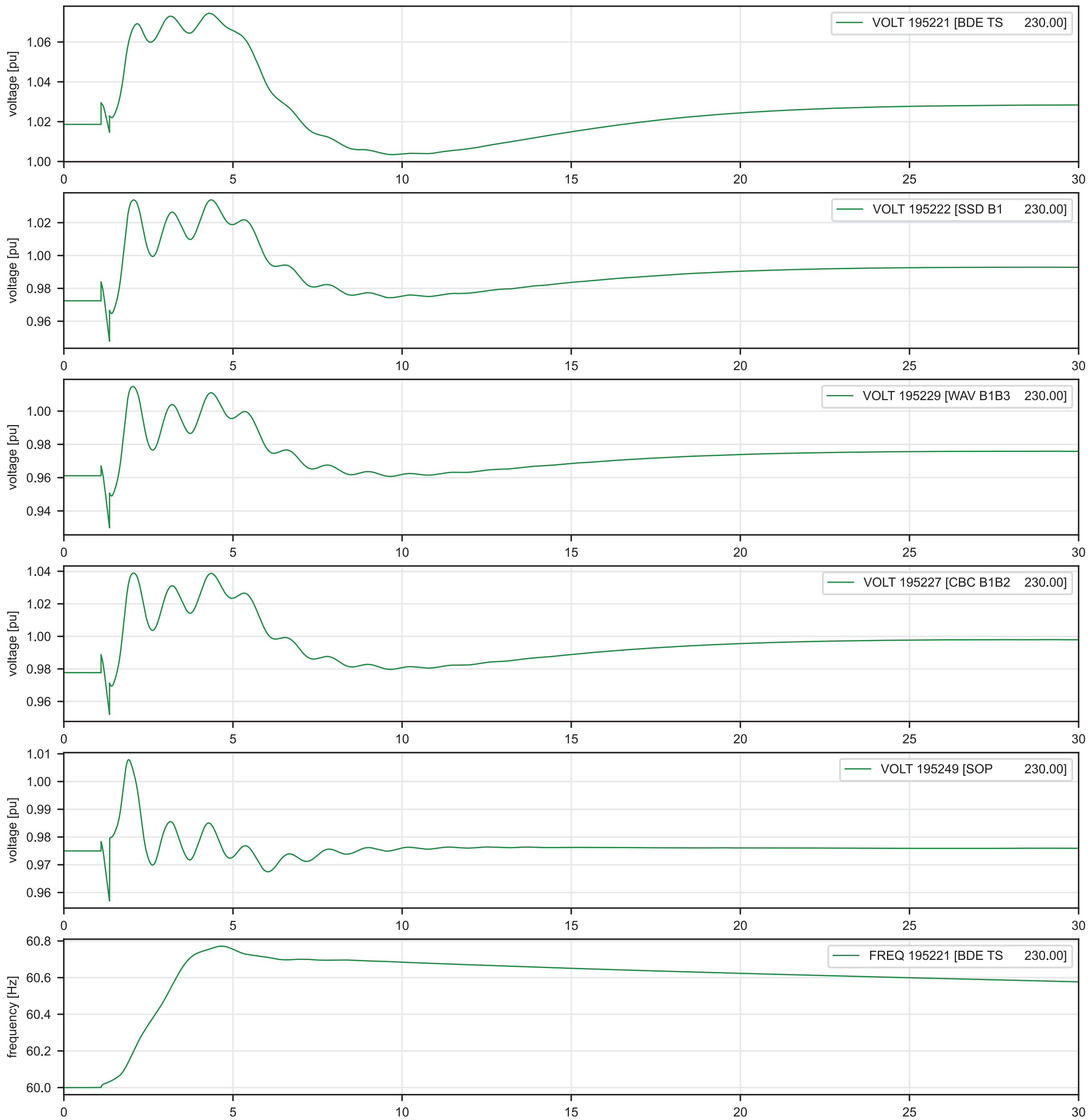
01_2033-34_Base-Peak_TL217-TL201_1800MW_3x50MW
Loss of TL217 - 3PF | Voltage / Frequency



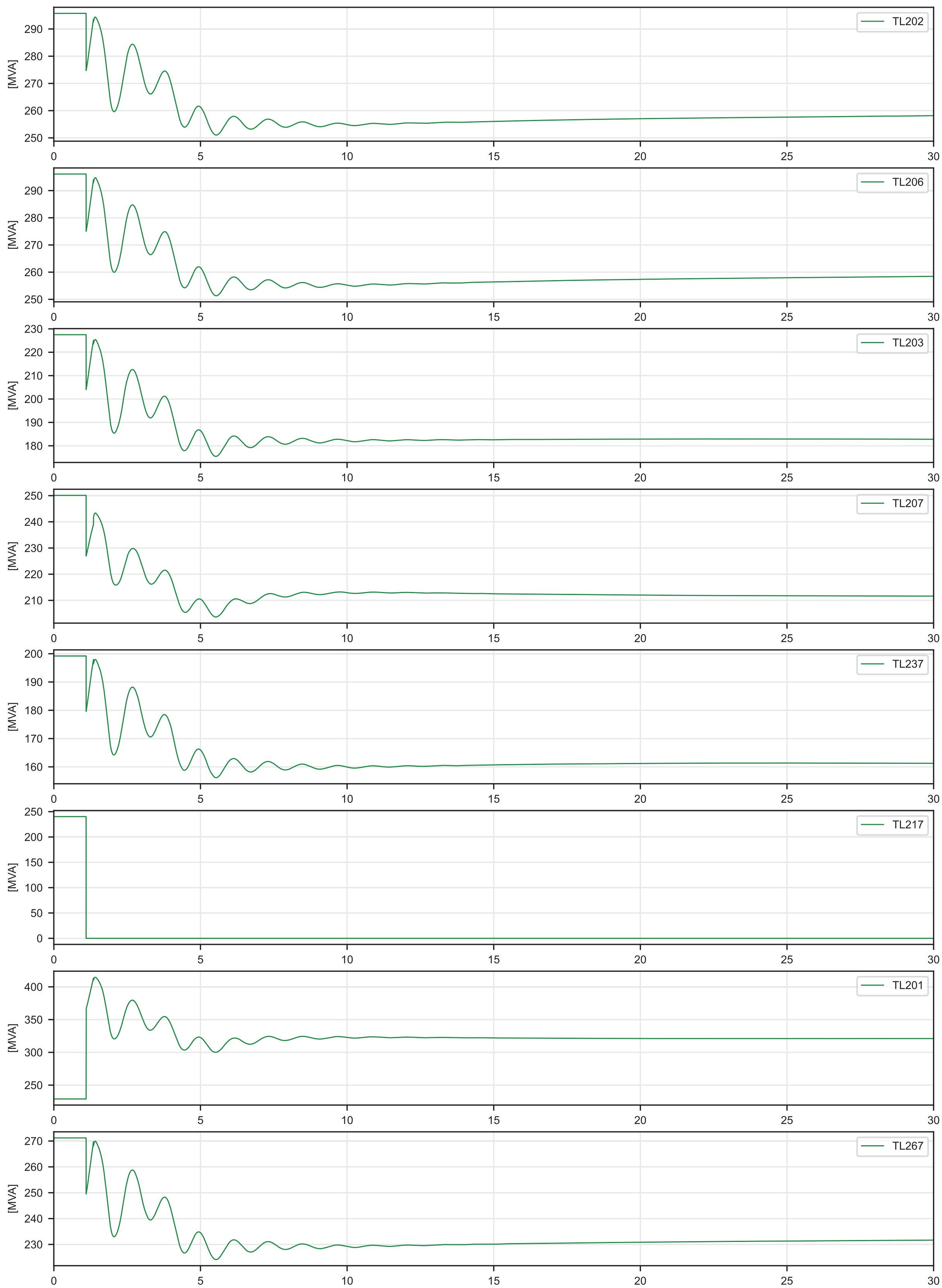
01_2033-34_Base-Peak_TL217-TL201_1800MW_3x50MW
Loss of TL217 - 3PF | 230 kV Power Flow



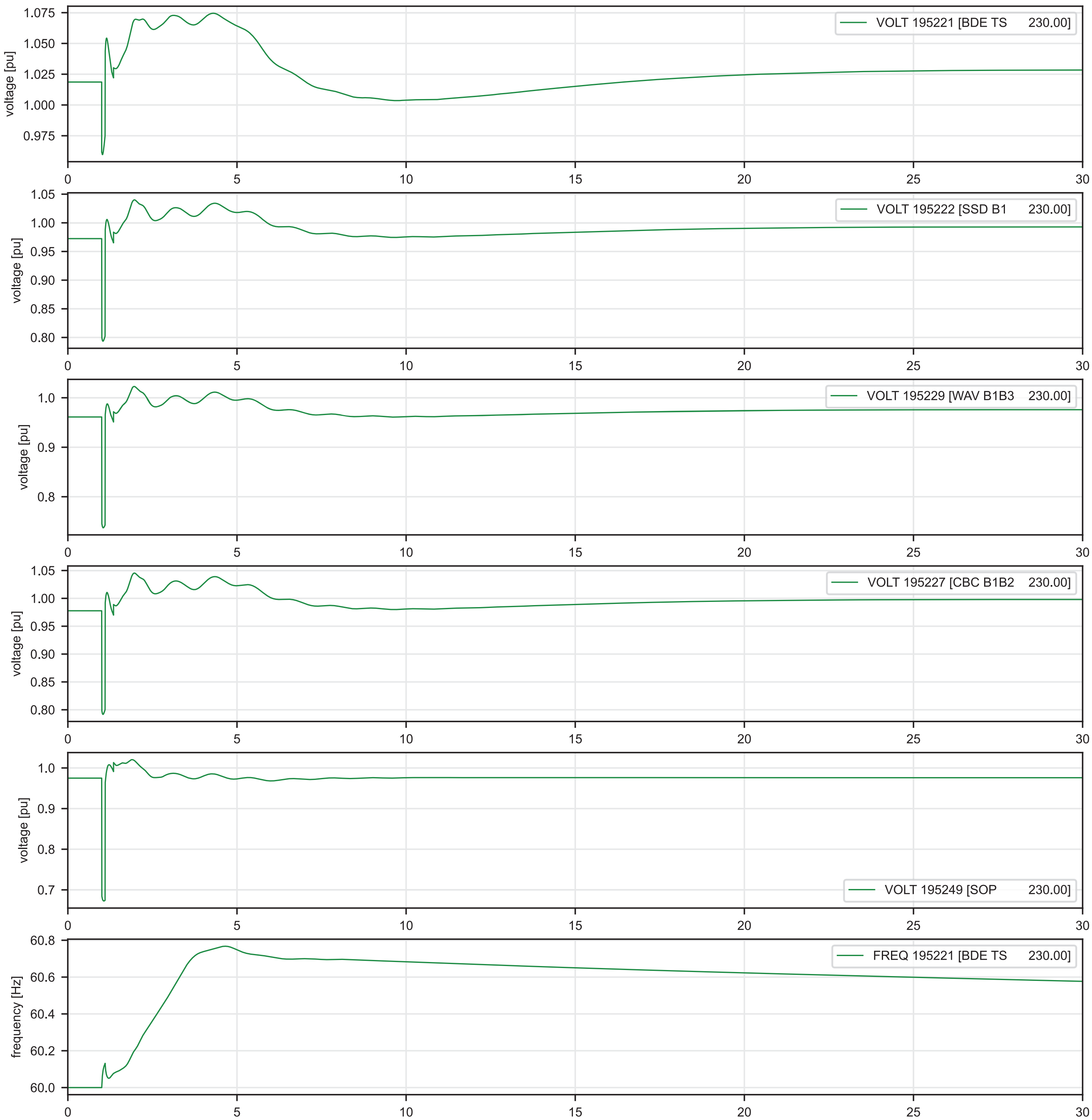
01_2033-34_Base-Peak_TL217-TL201_1800MW_3x50MW
Loss of TL217 - no fault | Voltage / Frequency



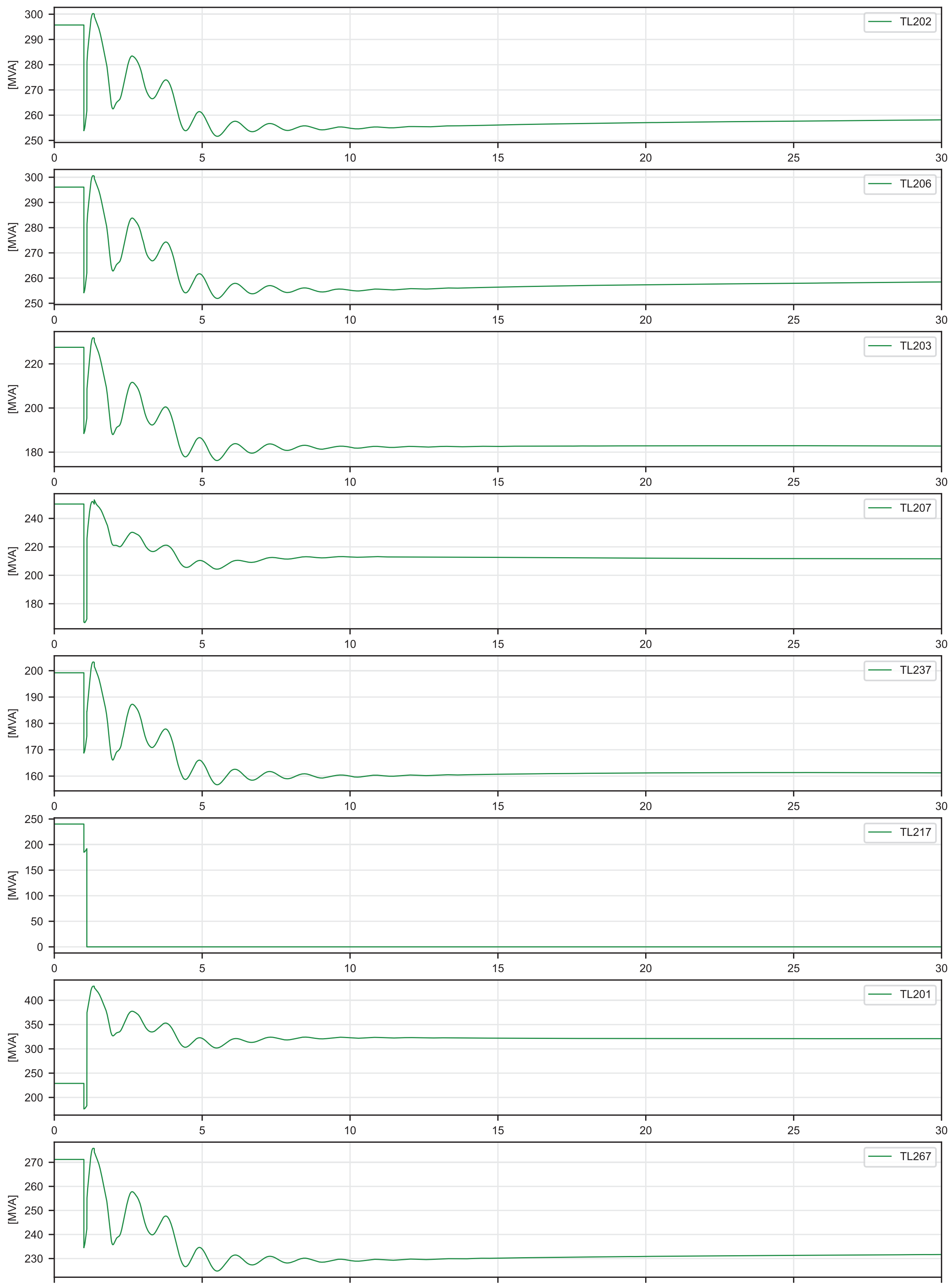
01_2033-34_Base-Peak_TL217-TL201_1800MW_3x50MW
Loss of TL217 - no fault | 230 kV Power Flow



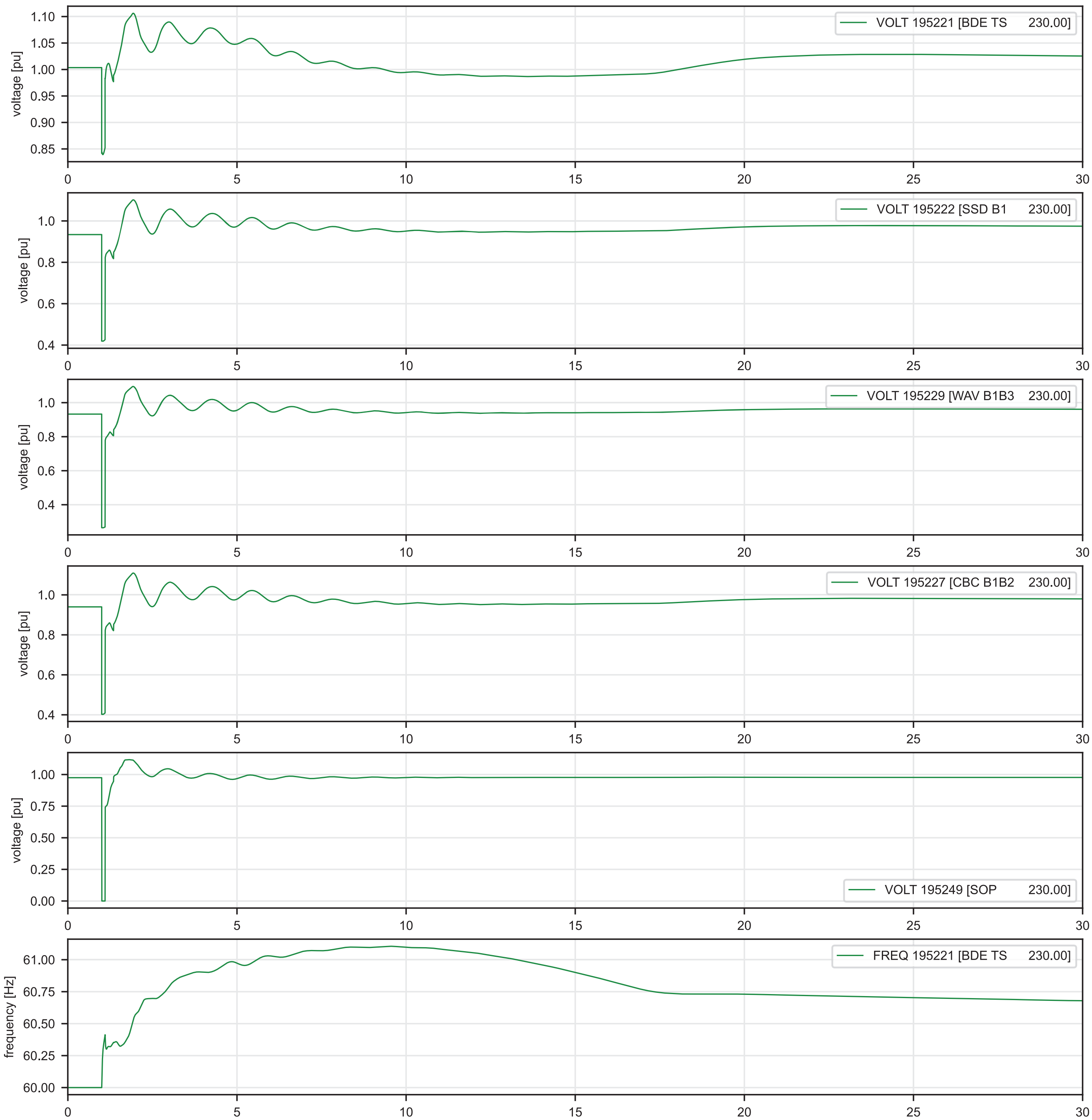
01_2033-34_Base-Peak_TL217-TL201_1800MW_3x50MW
Loss of TL217 - SLGF | Voltage / Frequency



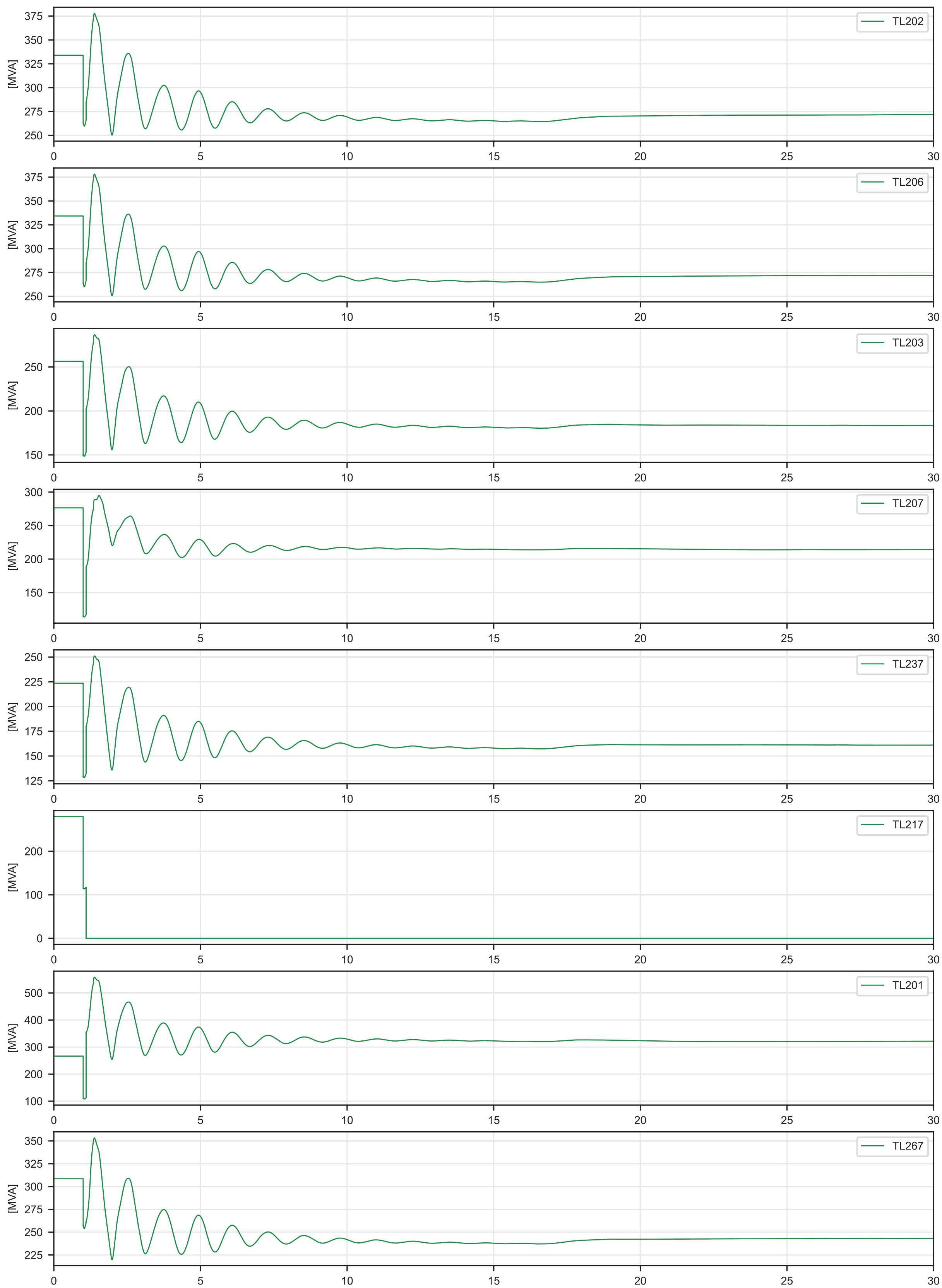
01_2033-34_Base-Peak_TL217-TL201_1800MW_3x50MW
Loss of TL217 - SLGF | 230 kV Power Flow



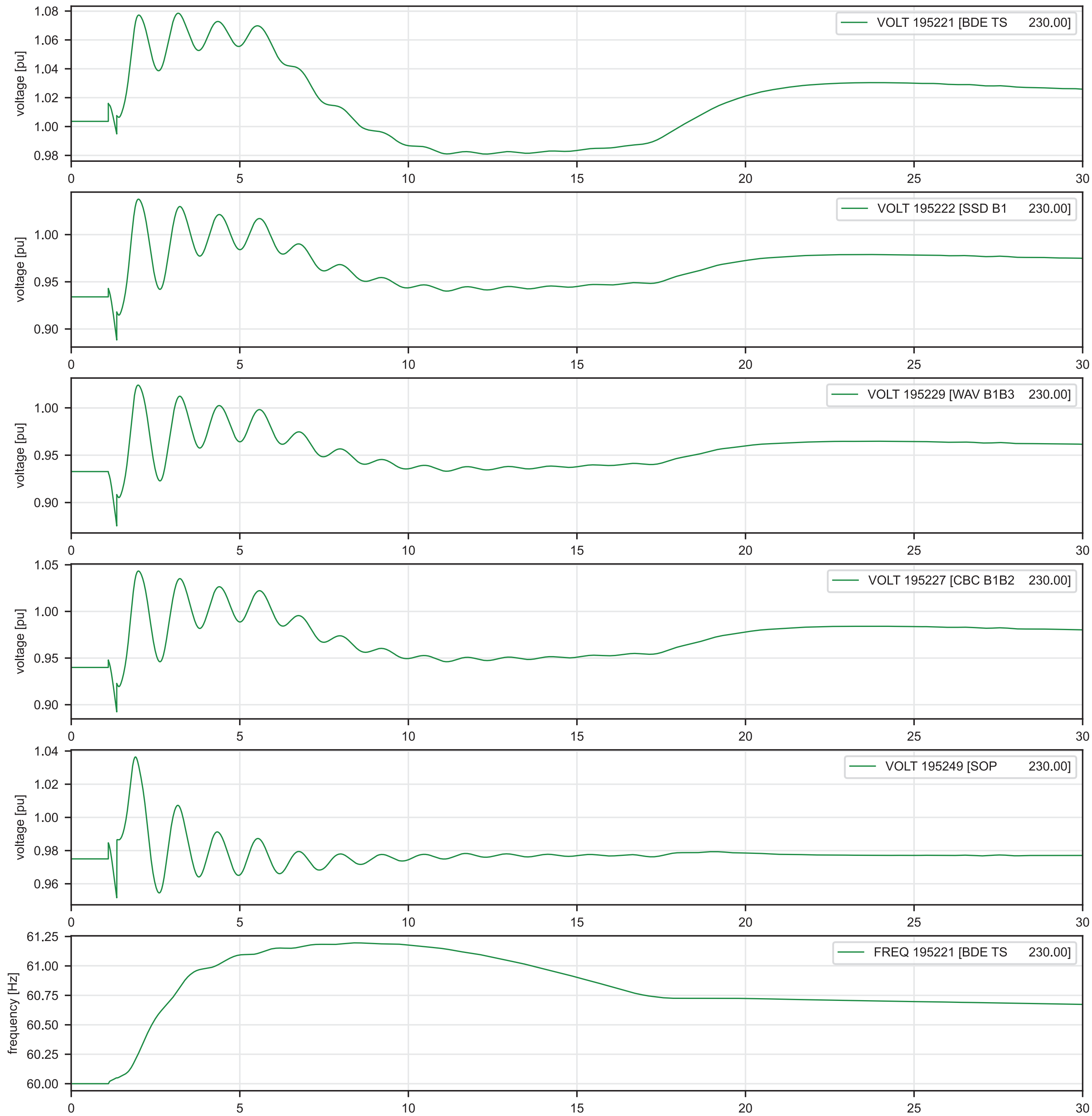
01_2033-34_Base-Peak_TL217-TL201_2000MW_3x50MW
Loss of TL217 - 3PF | Voltage / Frequency



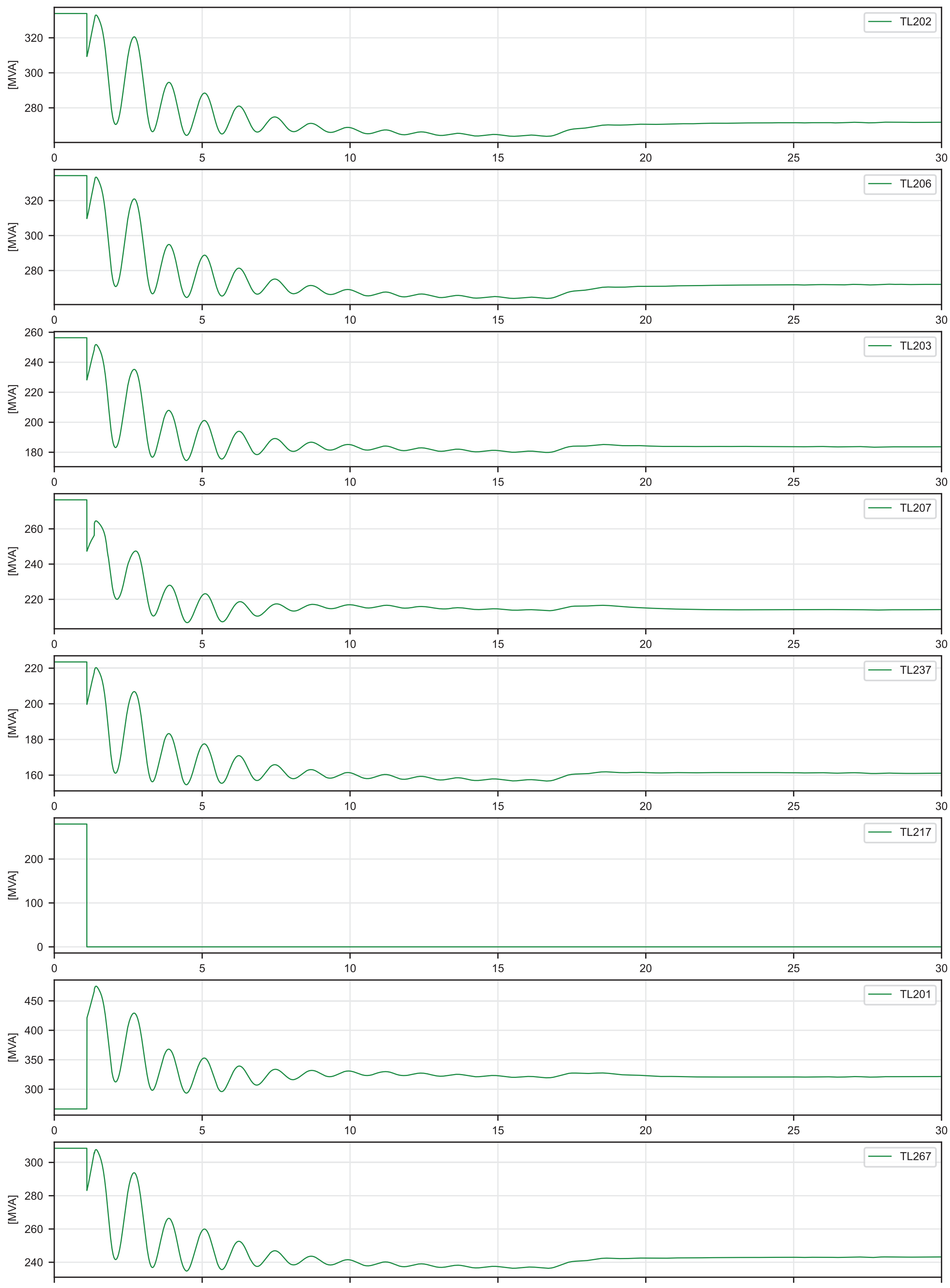
01_2033-34_Base-Peak_TL217-TL201_2000MW_3x50MW
Loss of TL217 - 3PF | 230 kV Power Flow



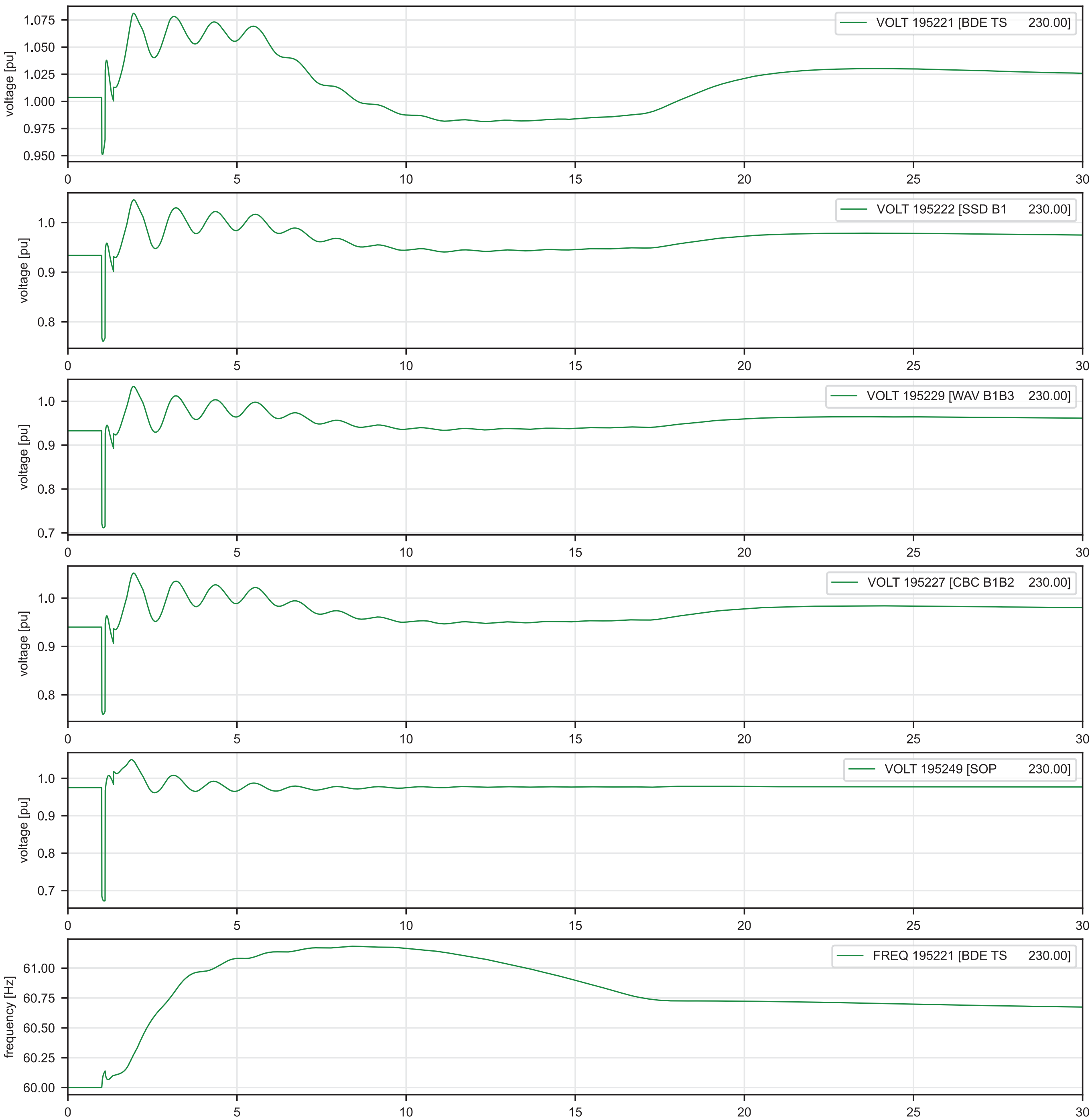
01_2033-34_Base-Peak_TL217-TL201_2000MW_3x50MW
Loss of TL217 - no fault | Voltage / Frequency



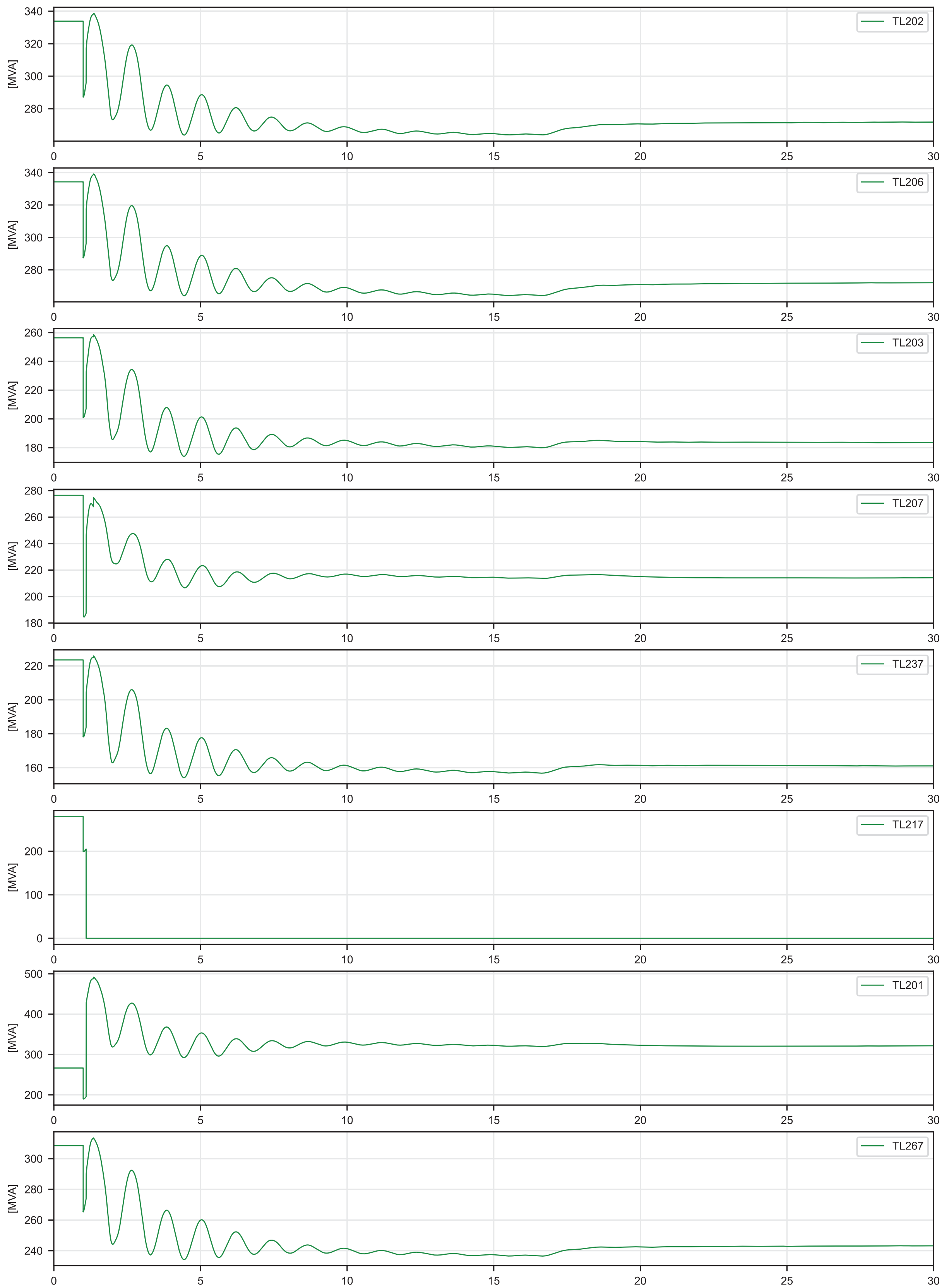
01_2033-34_Base-Peak_TL217-TL201_2000MW_3x50MW
Loss of TL217 - no fault | 230 kV Power Flow



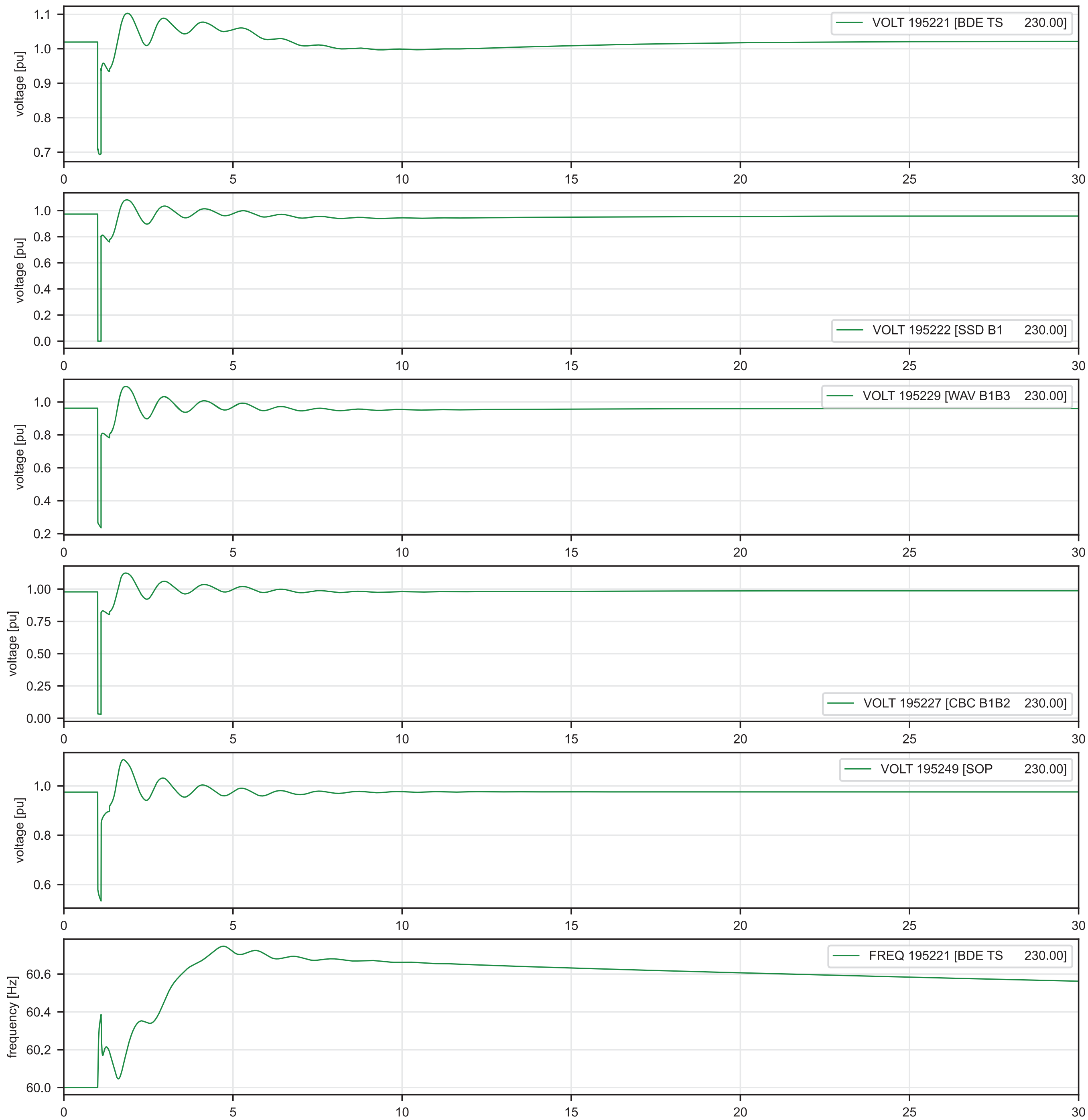
01_2033-34_Base-Peak_TL217-TL201_2000MW_3x50MW
Loss of TL217 - SLGF | Voltage / Frequency



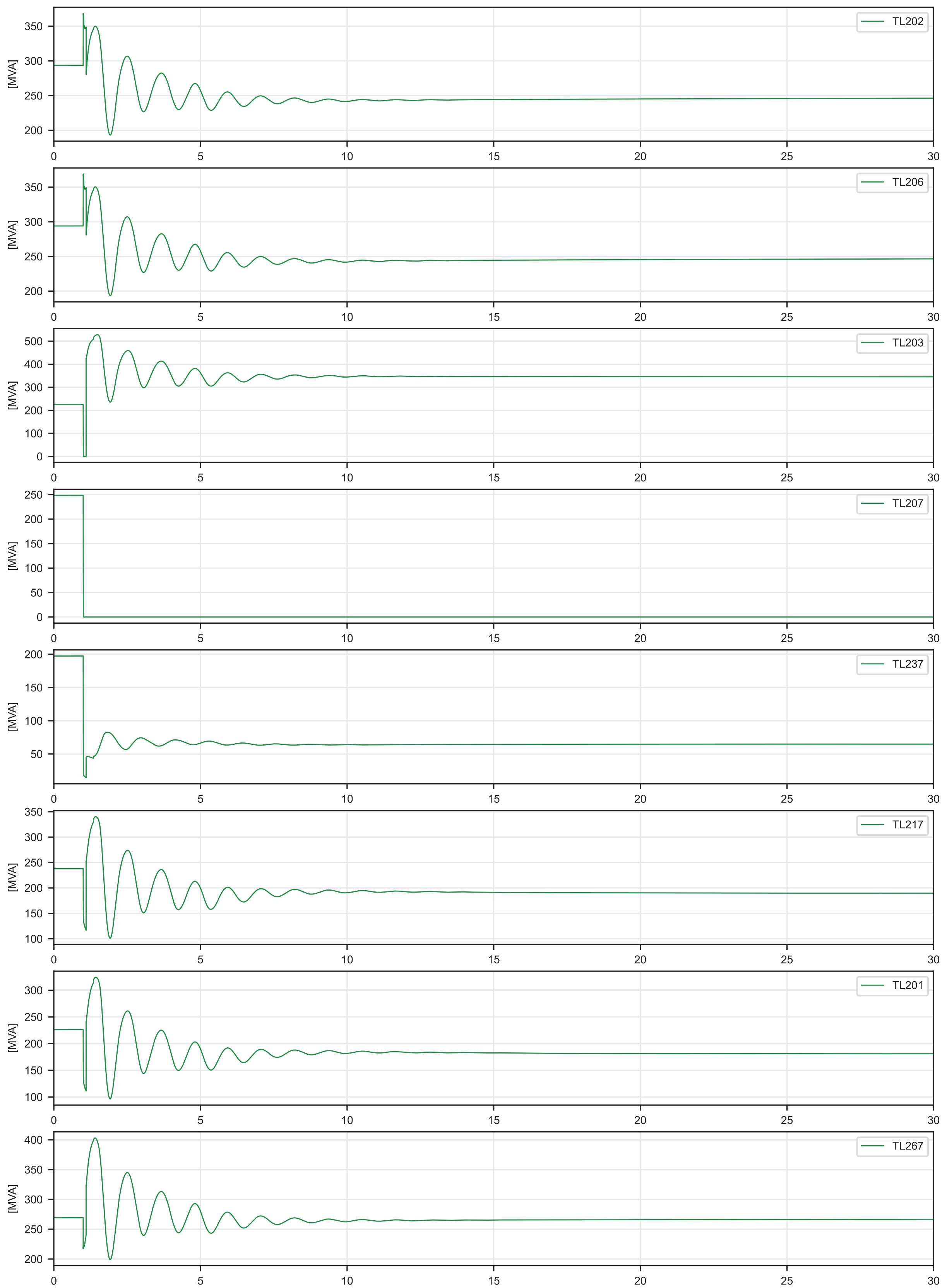
01_2033-34_Base-Peak_TL217-TL201_2000MW_3x50MW
Loss of TL217 - SLGF | 230 kV Power Flow



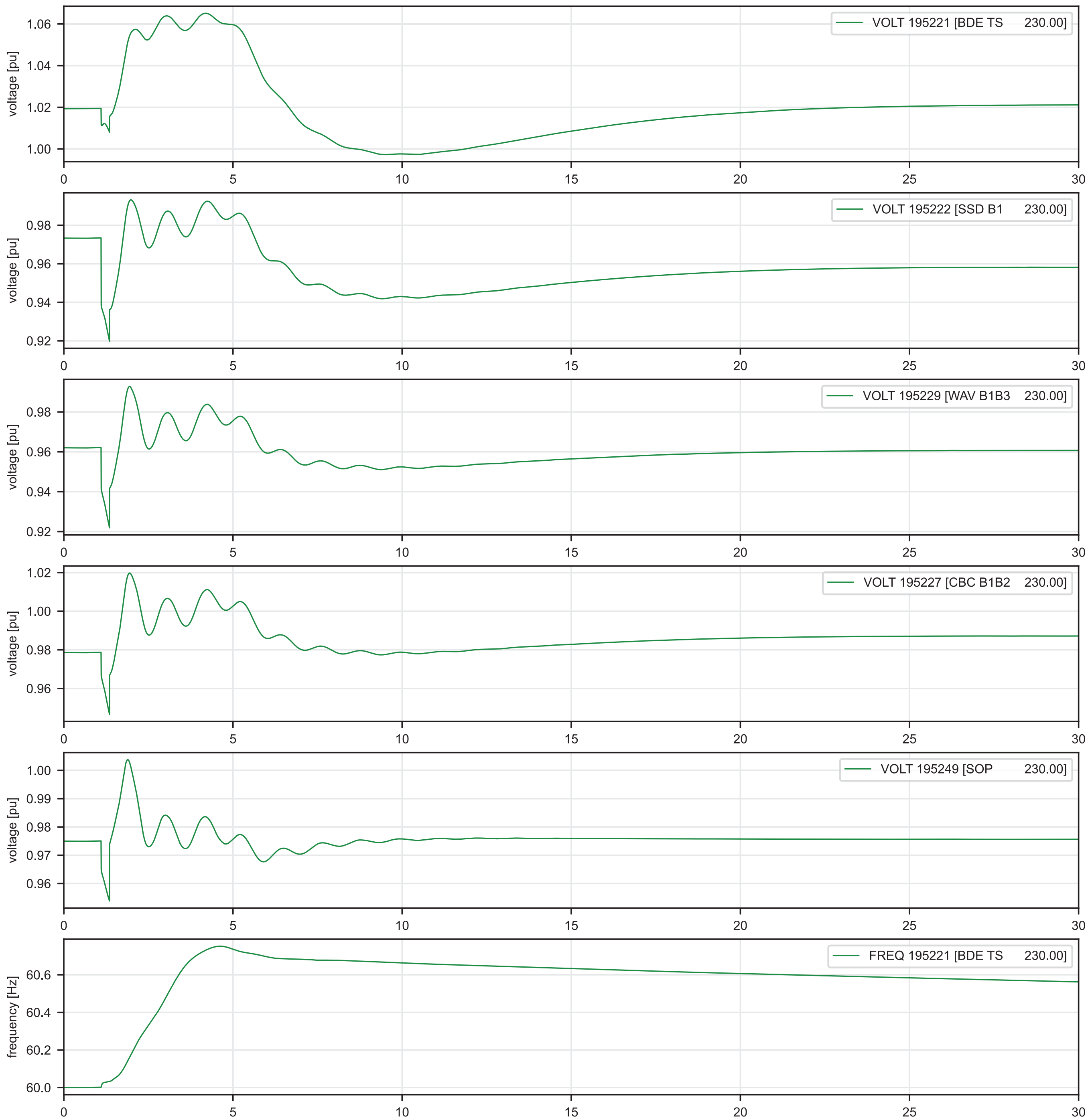
02_2033-34_Base-Peak_TL207-TL203_1800MW_3x50MW
Loss of TL207 - 3PF | Voltage / Frequency



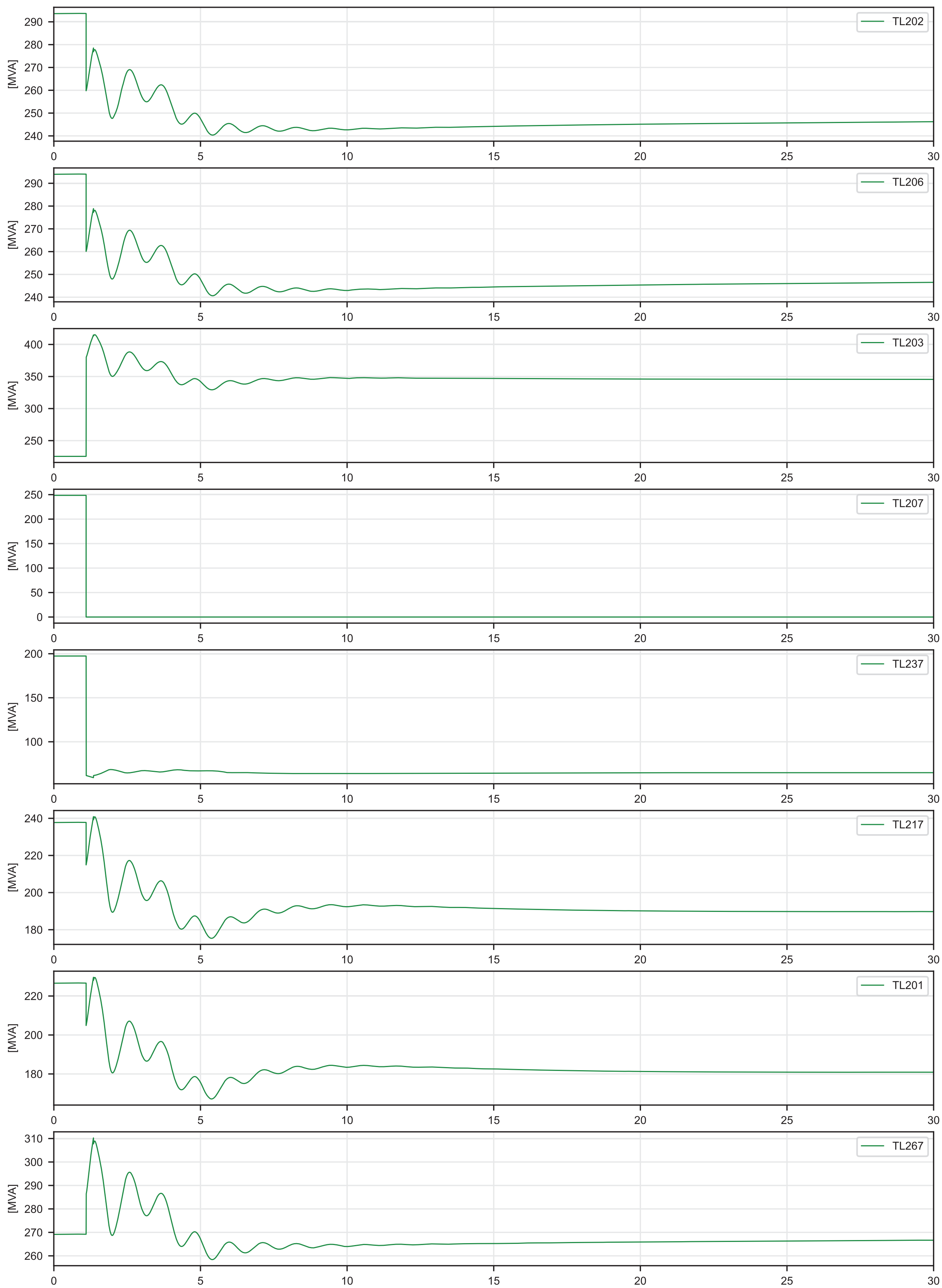
02_2033-34_Base-Peak_TL207-TL203_1800MW_3x50MW
Loss of TL207 - 3PF | 230 kV Power Flow



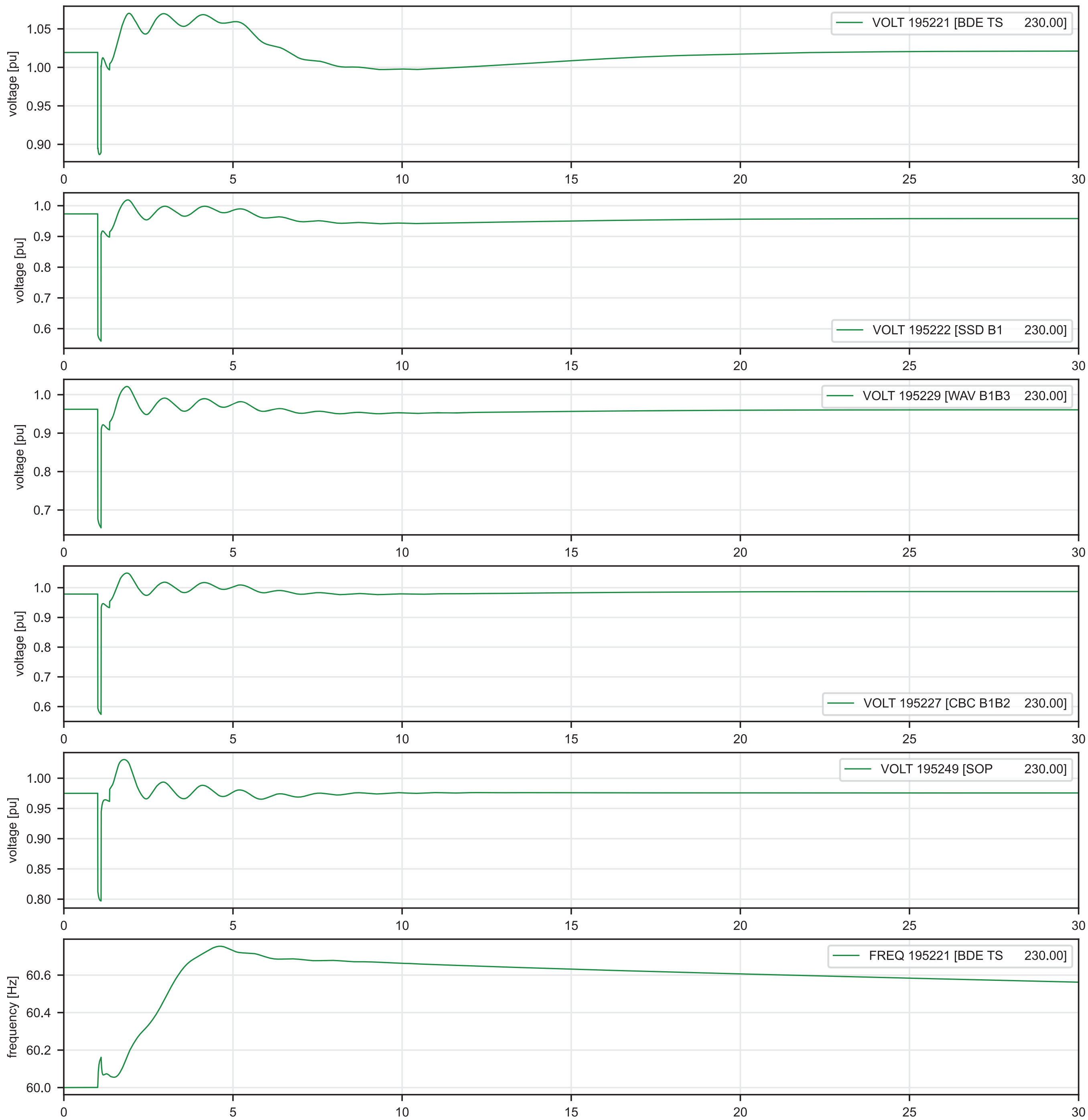
02_2033-34_Base-Peak_TL207-TL203_1800MW_3x50MW
Loss of TL207 - no fault | Voltage / Frequency



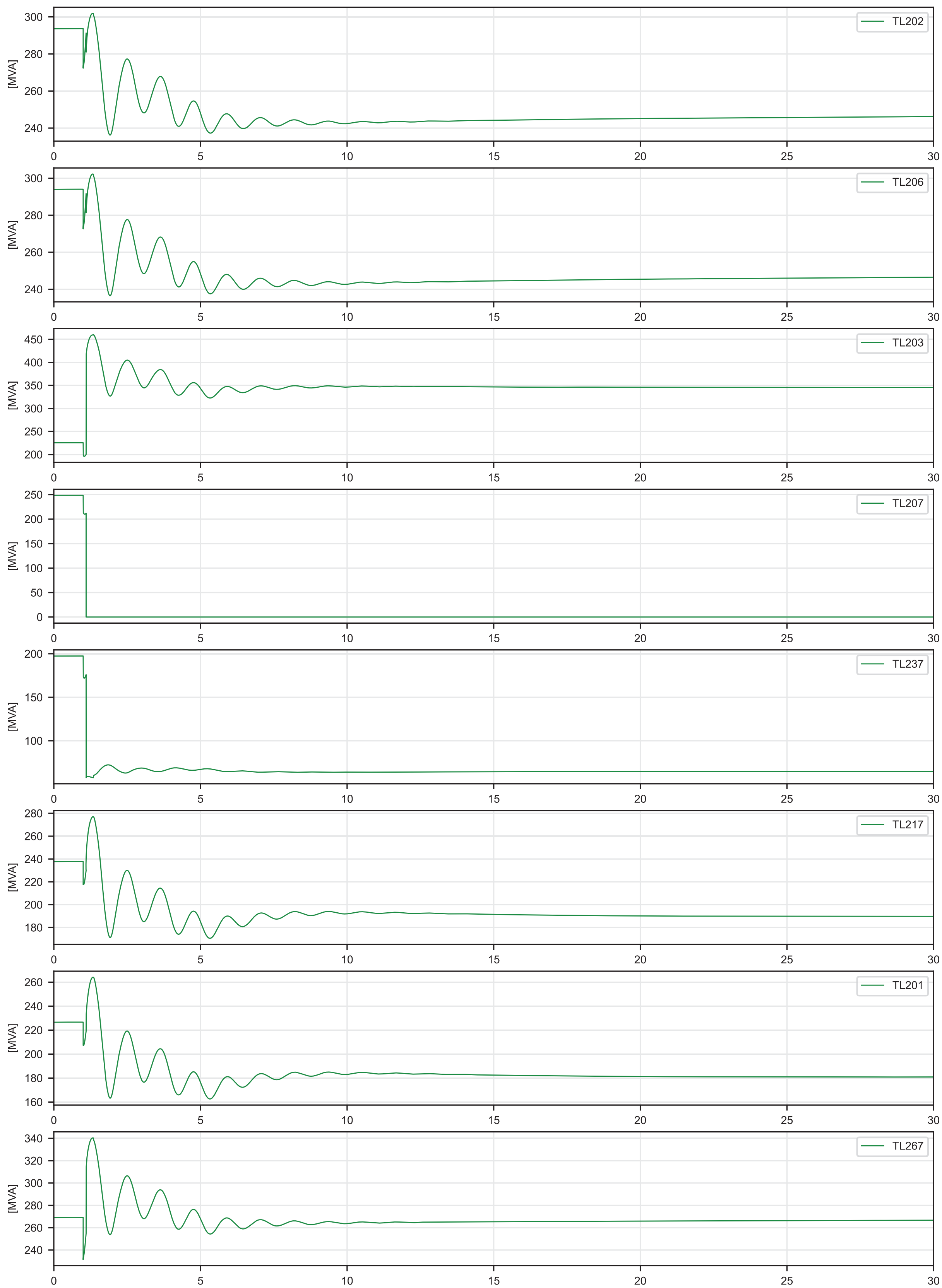
02_2033-34_Base-Peak_TL207-TL203_1800MW_3x50MW
Loss of TL207 - no fault | 230 kV Power Flow



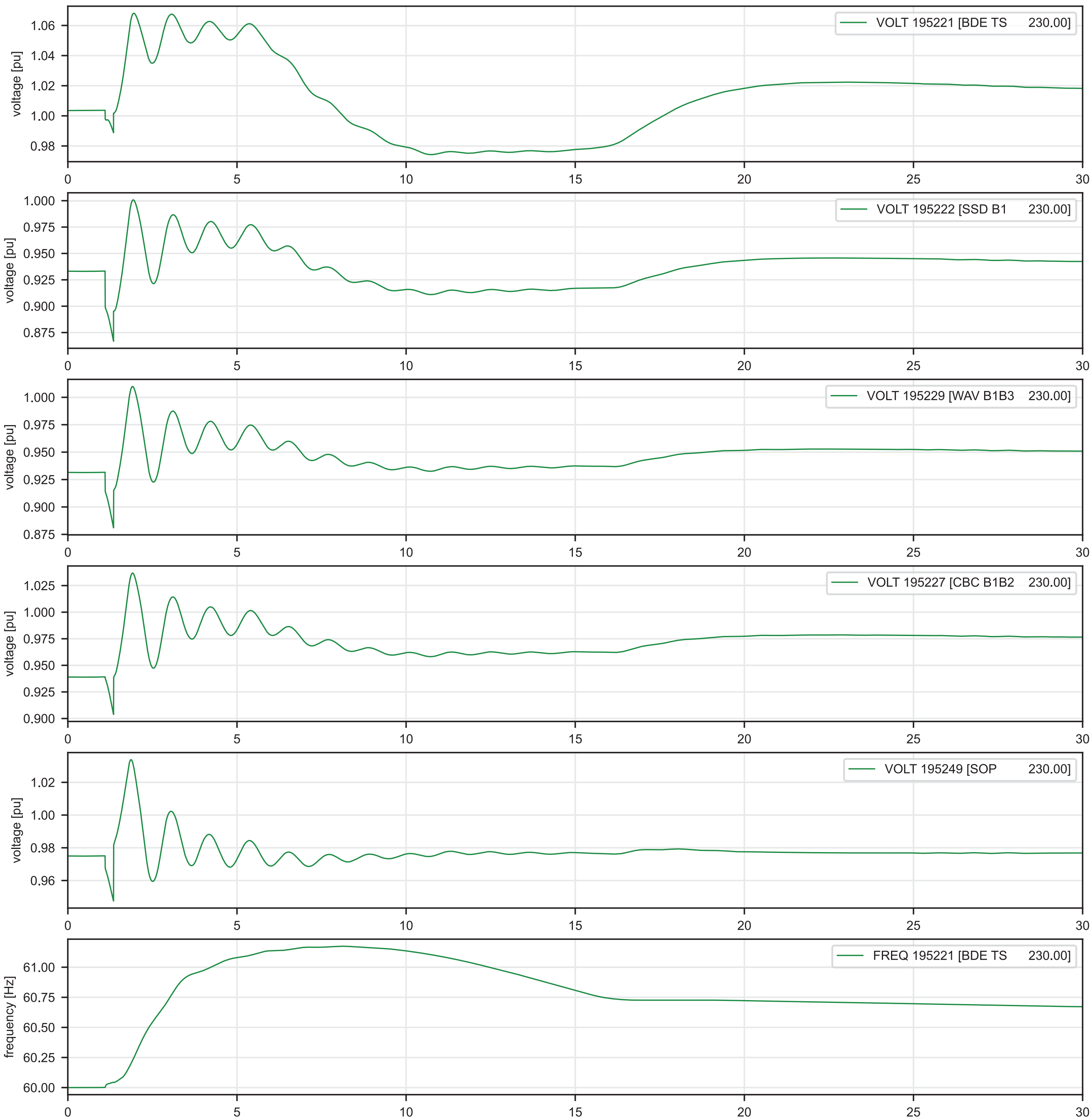
02_2033-34_Base-Peak_TL207-TL203_1800MW_3x50MW
Loss of TL207 - SLGF | Voltage / Frequency



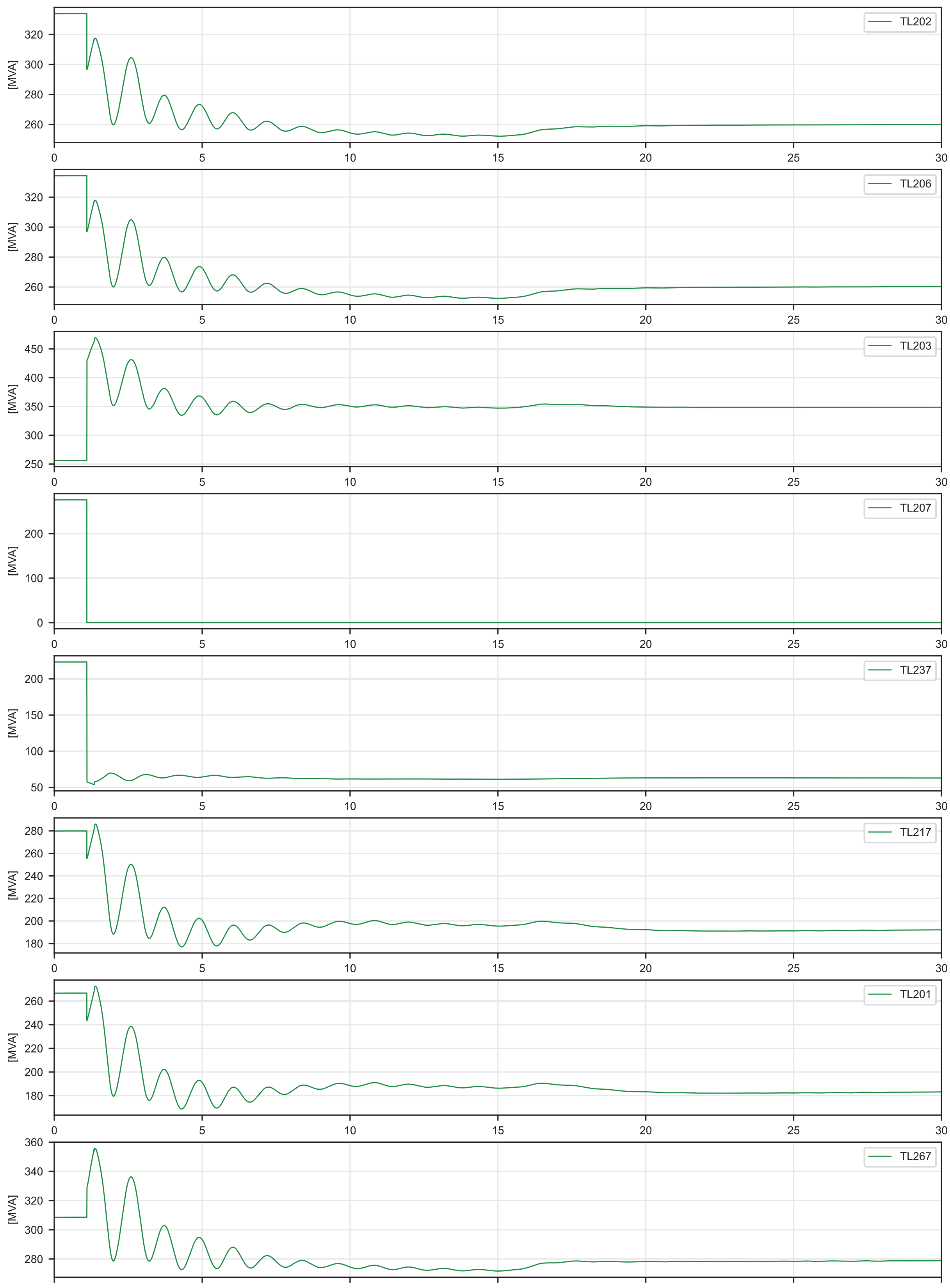
02_2033-34_Base-Peak_TL207-TL203_1800MW_3x50MW
Loss of TL207 - SLGF | 230 kV Power Flow



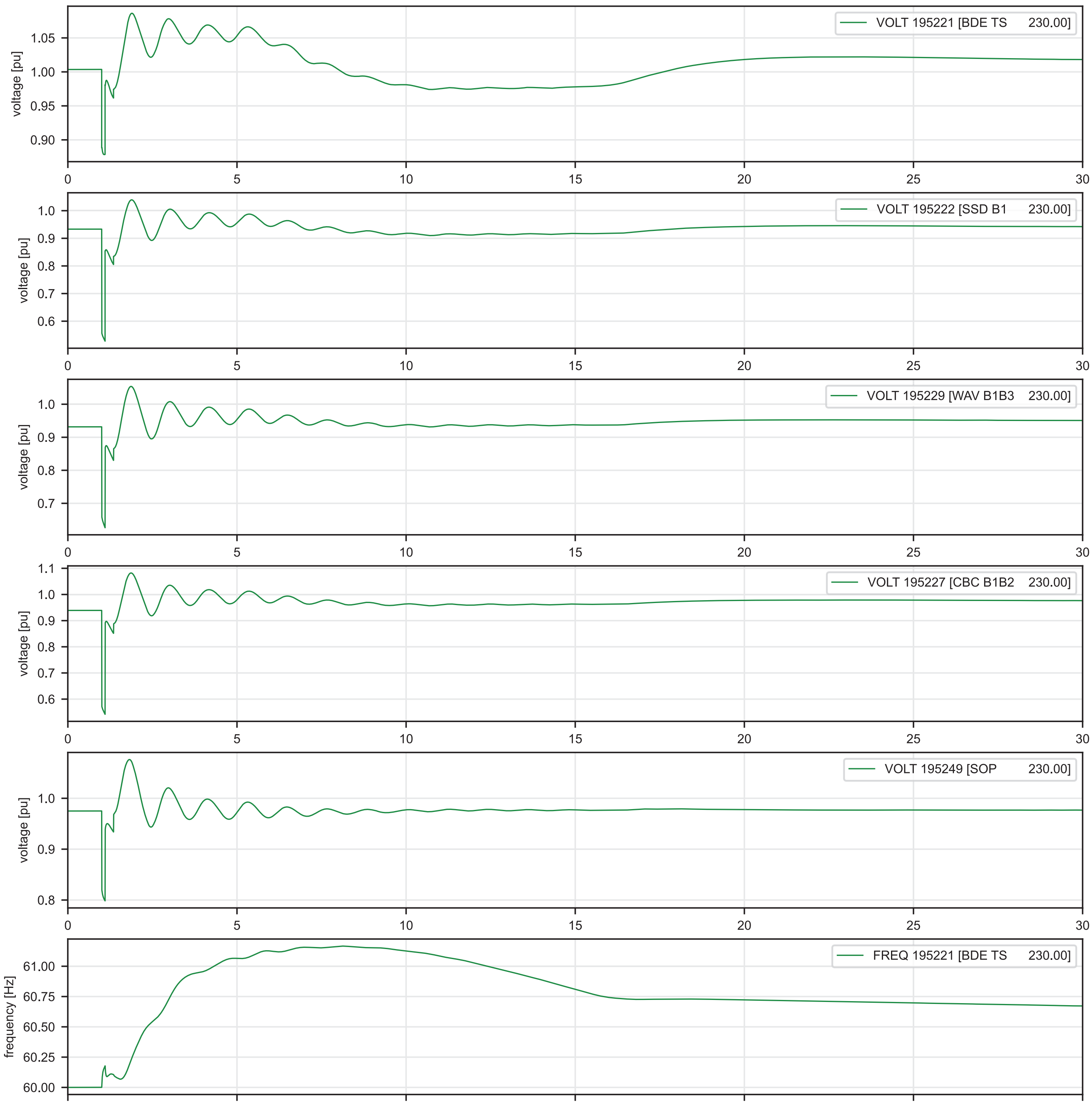
02_2033-34_Base-Peak_TL207-TL203_2000MW_3x50MW
Loss of TL207 - no fault | Voltage / Frequency



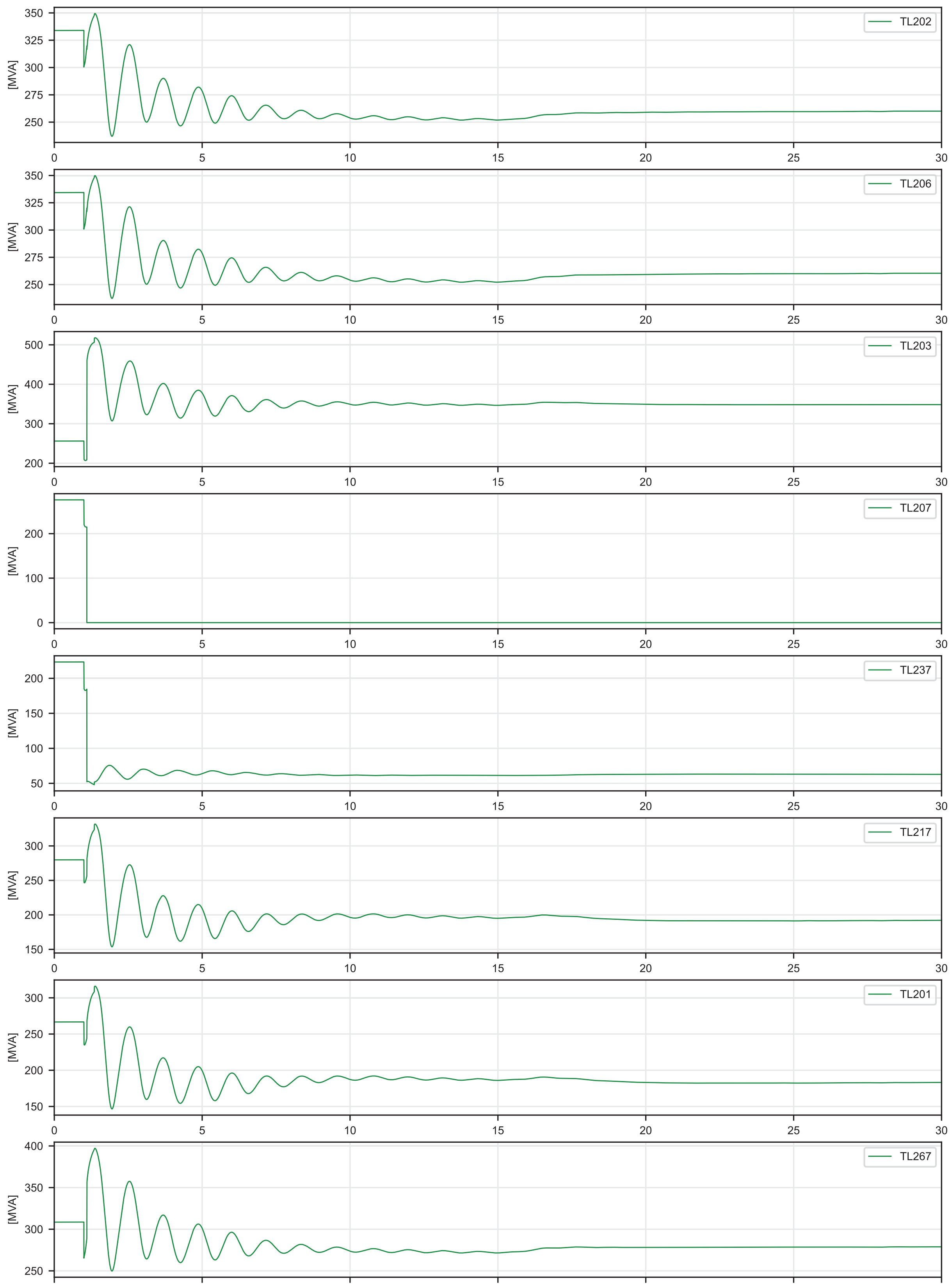
02_2033-34_Base-Peak_TL207-TL203_2000MW_3x50MW
Loss of TL207 - no fault | 230 kV Power Flow



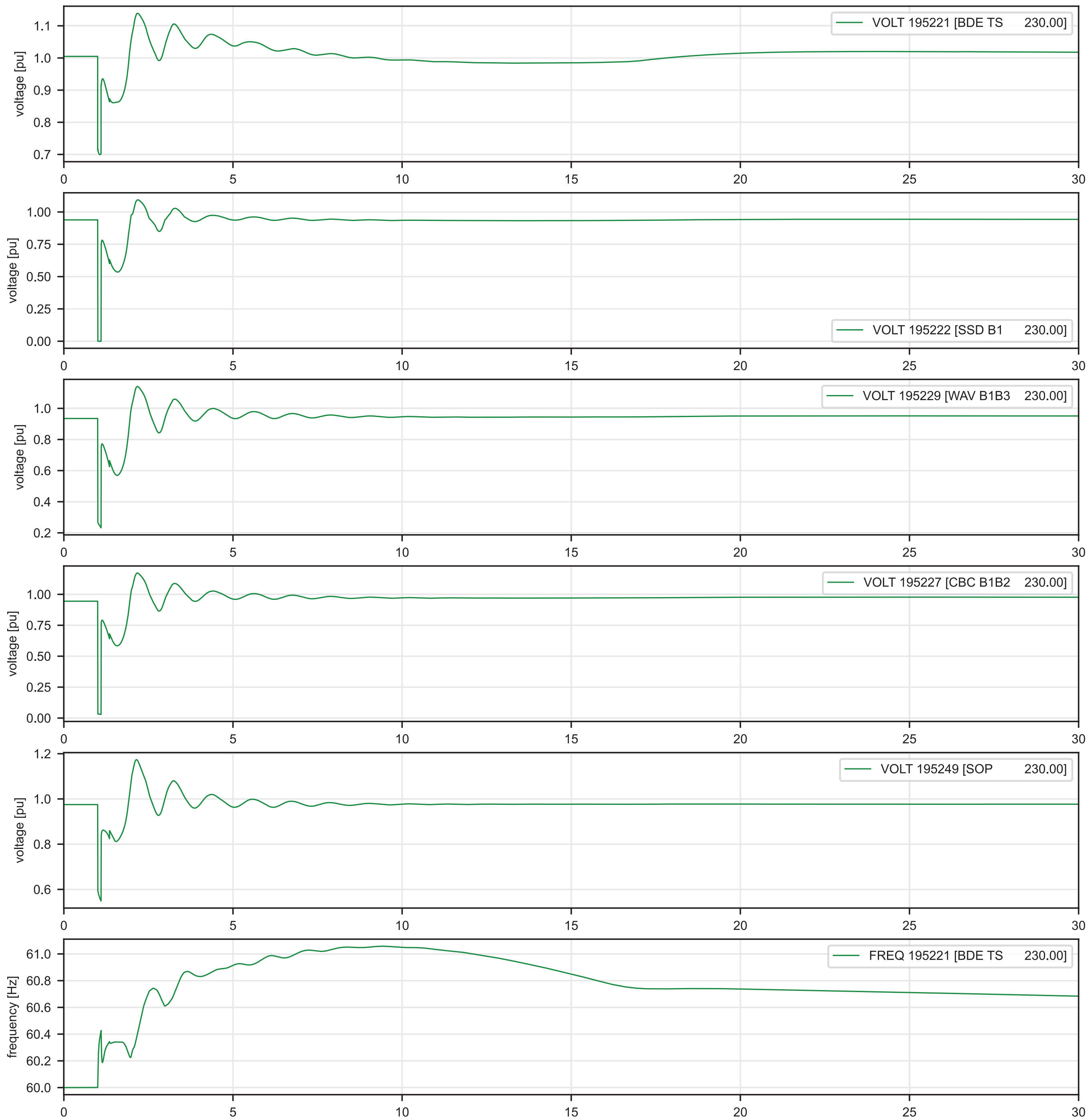
02_2033-34_Base-Peak_TL207-TL203_2000MW_3x50MW
Loss of TL207 - SLGF | Voltage / Frequency



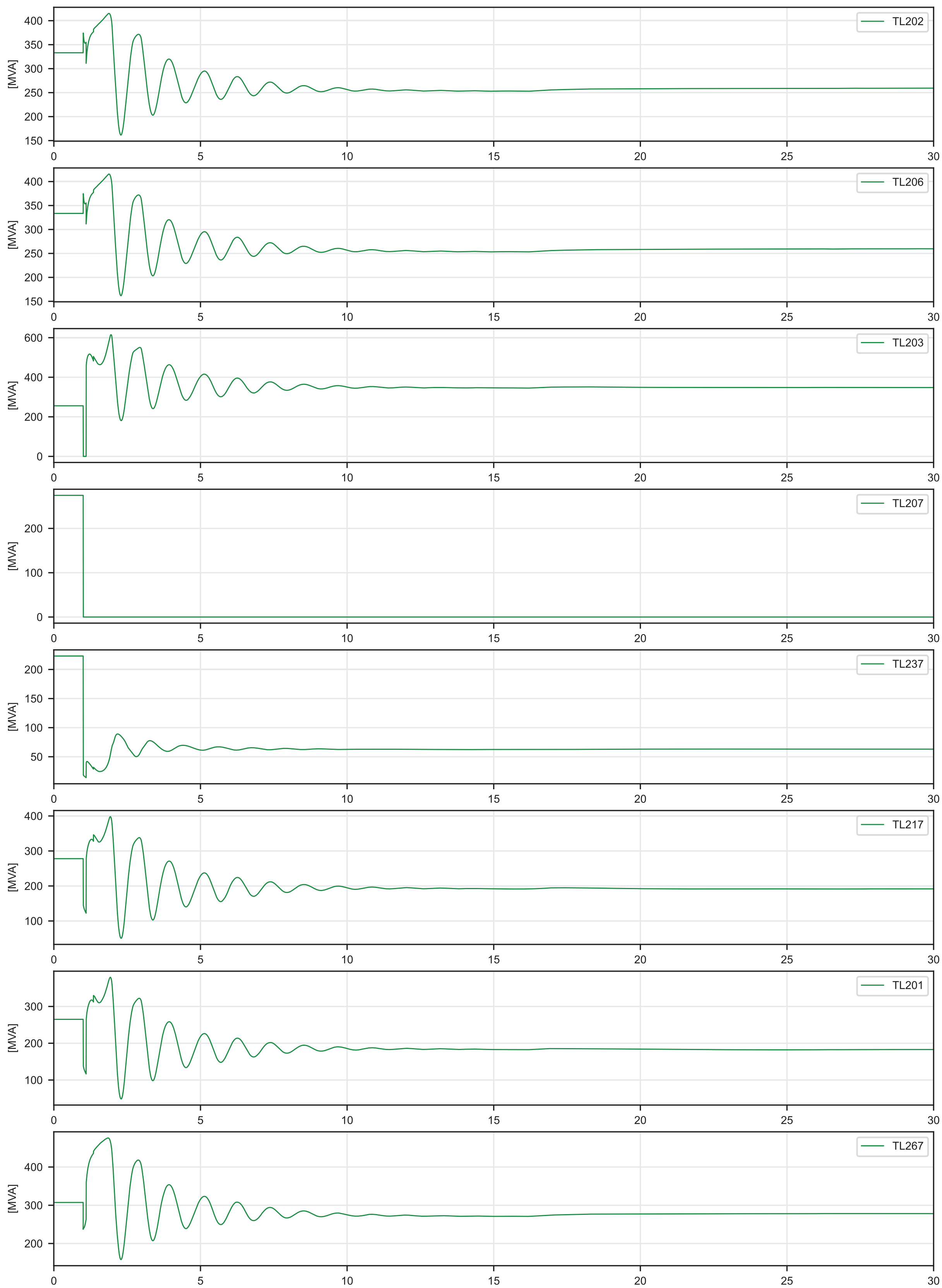
02_2033-34_Base-Peak_TL207-TL203_2000MW_3x50MW
Loss of TL207 - SLGF | 230 kV Power Flow



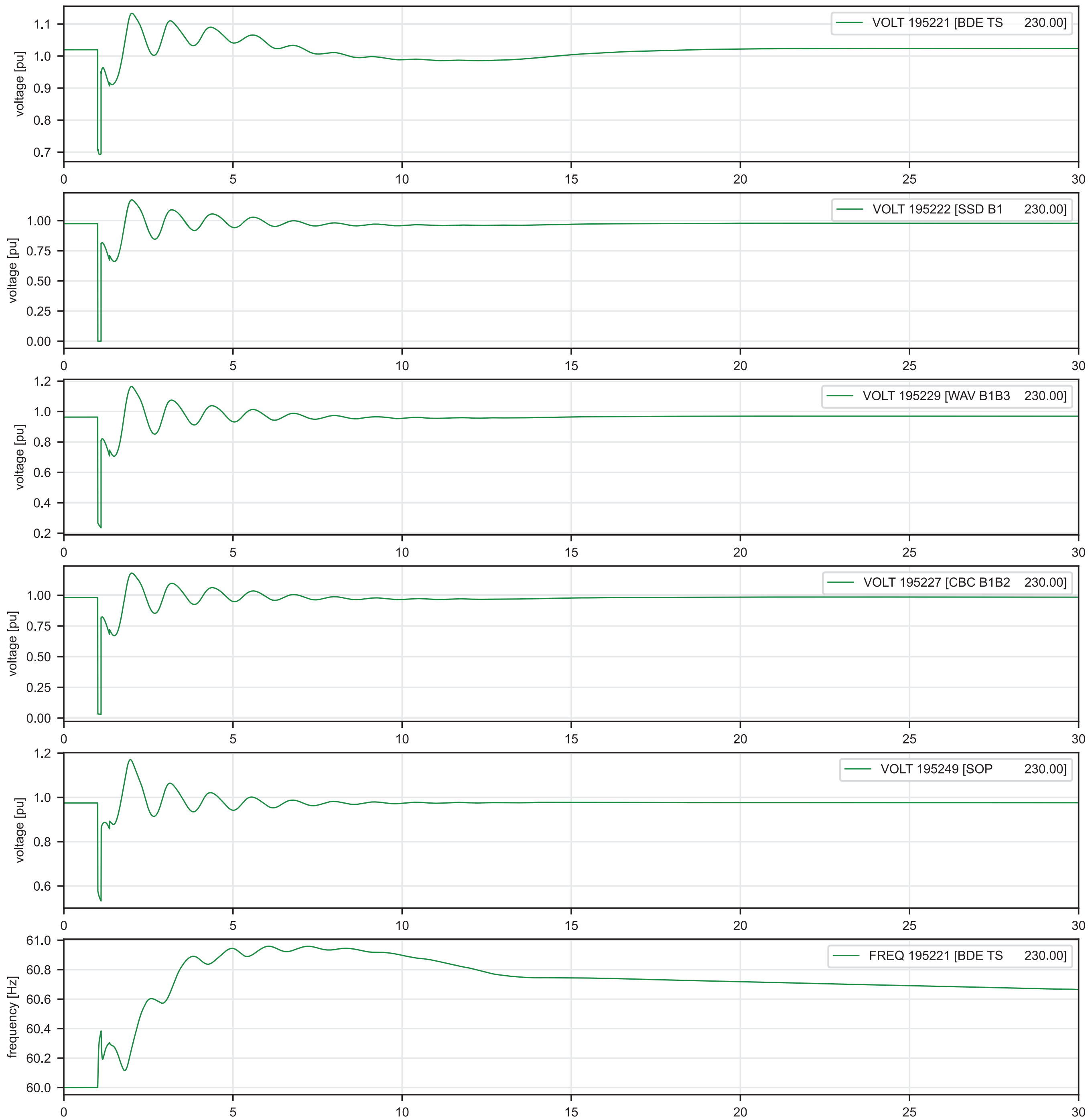
02_2033-34_Base-Peak_TL207-TL203_2000MW_3x50MW with STATCOM
Loss of TL207 - 3PF | Voltage / Frequency



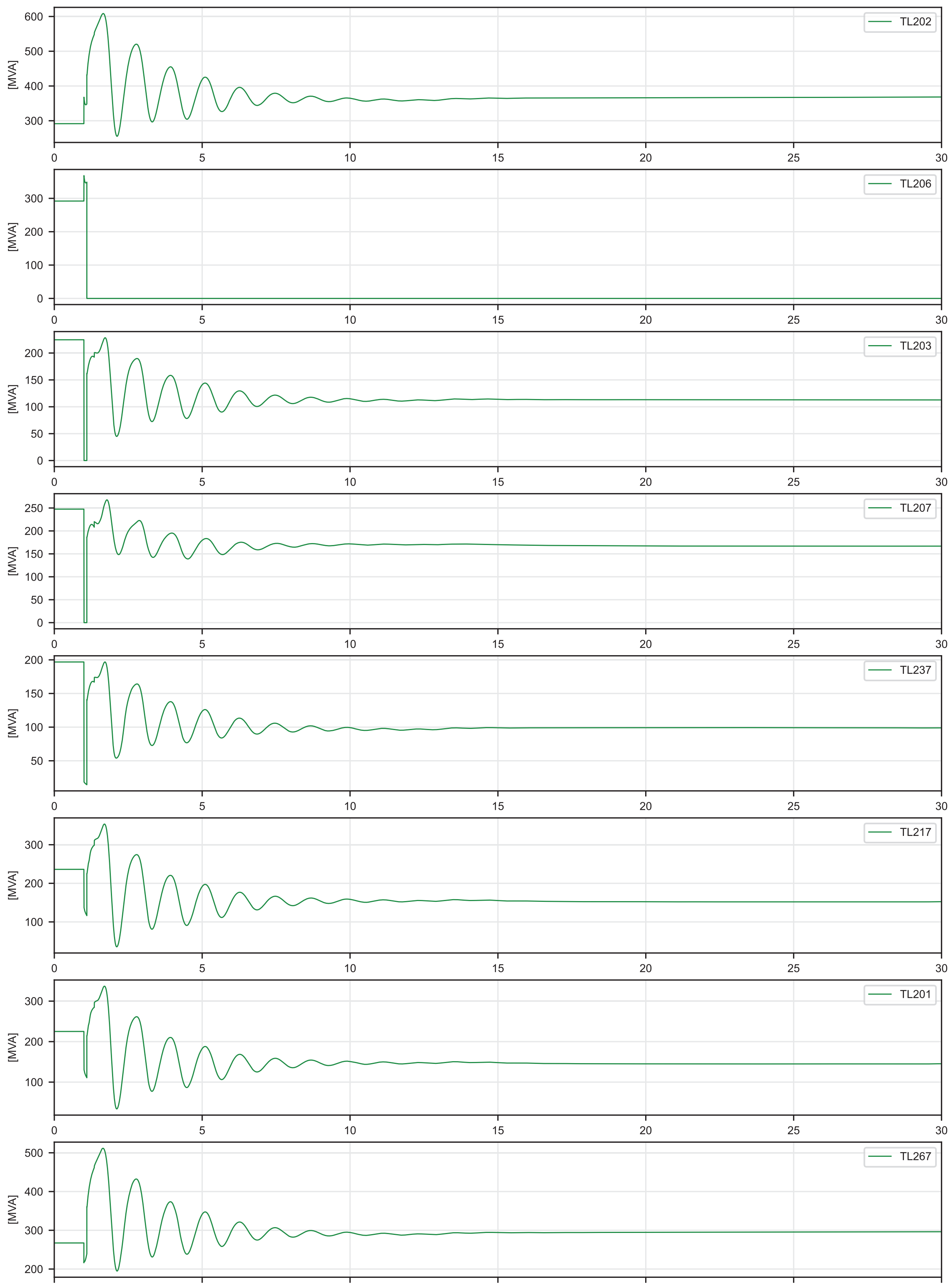
02_2033-34_Base-Peak_TL207-TL203_2000MW_3x50MW with STATCOM
Loss of TL207 - 3PF | 230 kV Power Flow



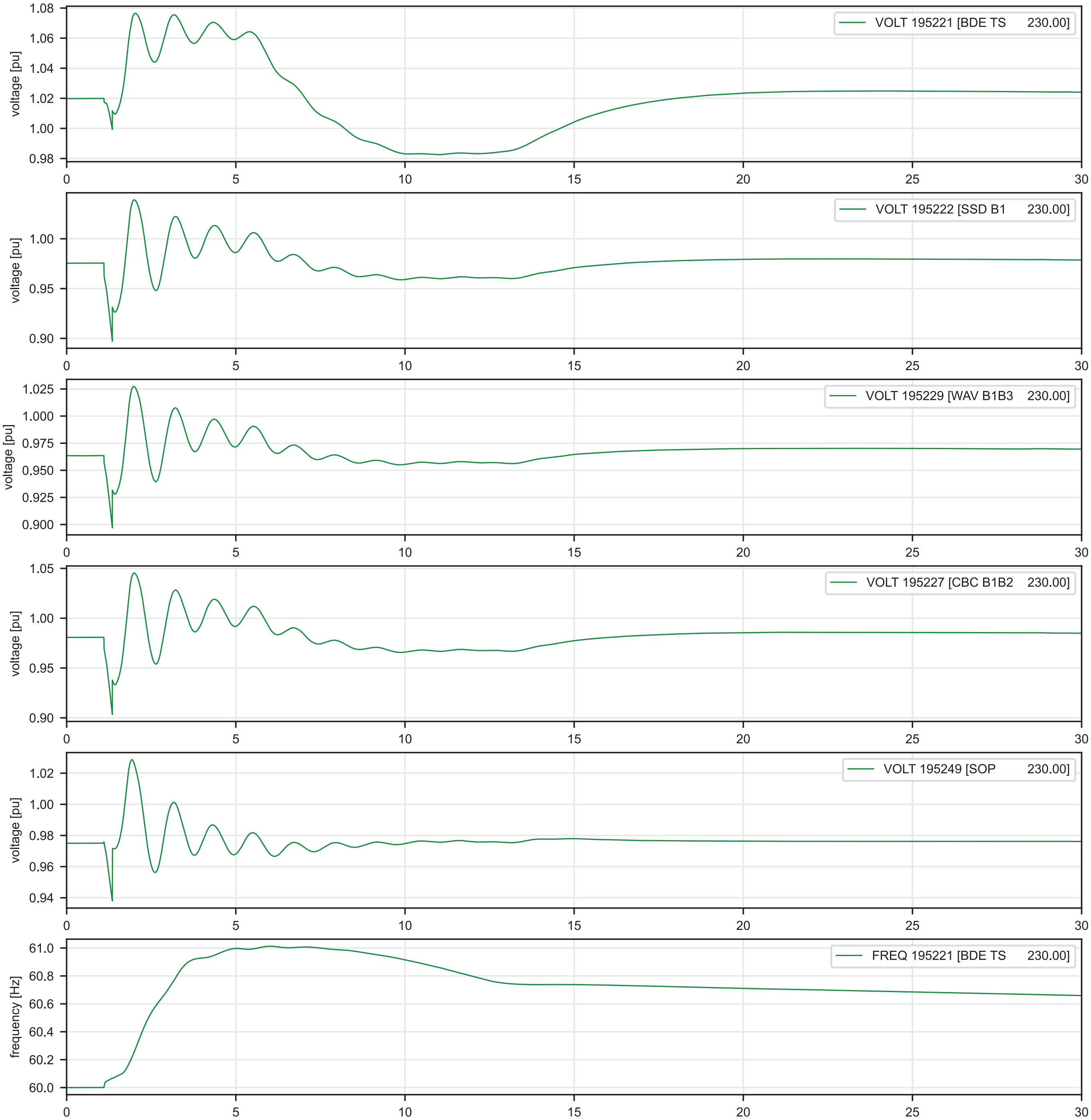
03_2033-34_Base-Peak_TL206-TL202_1800MW_3x50MW
Loss of TL206 - 3PF | Voltage / Frequency



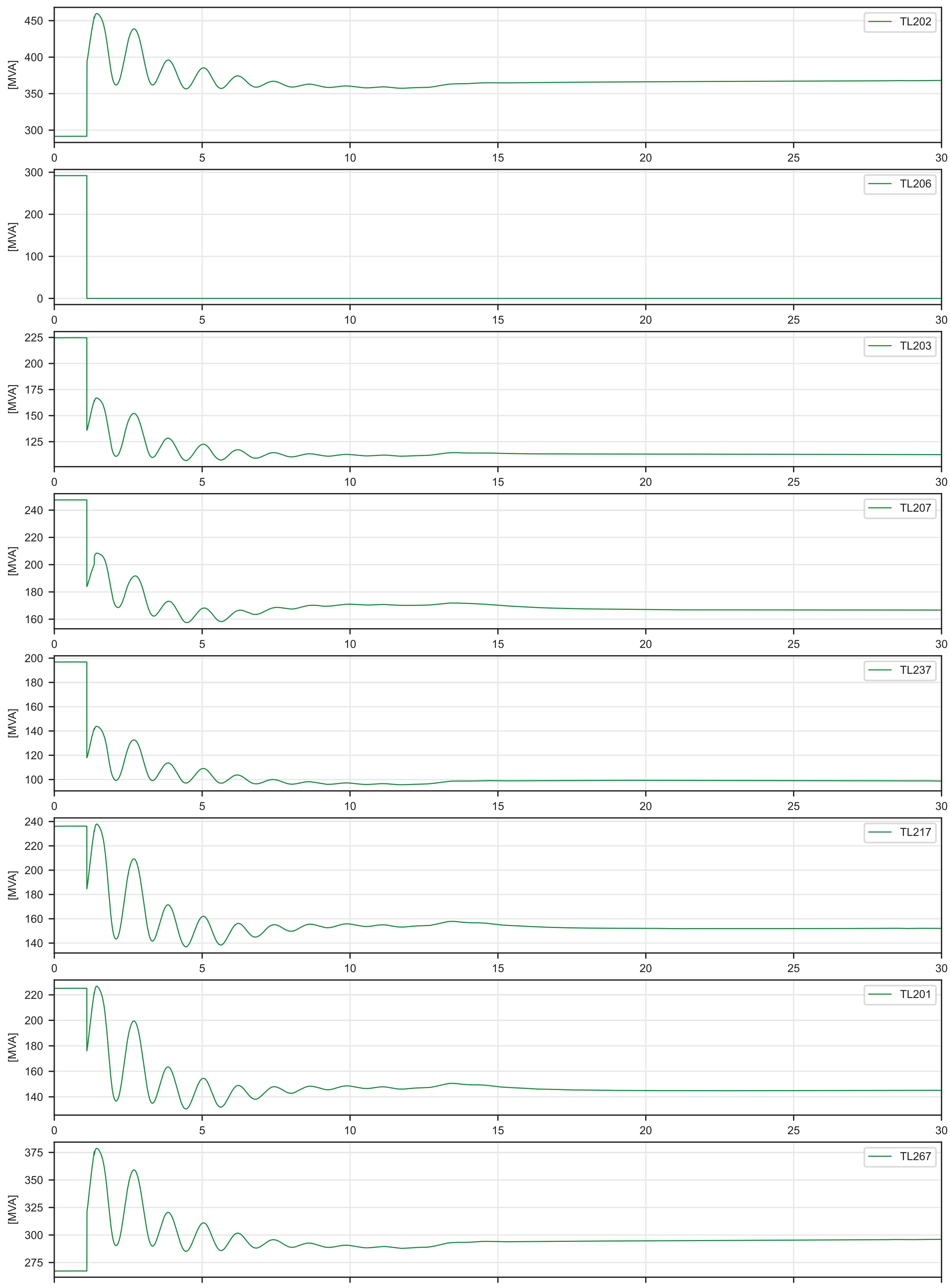
03_2033-34_Base-Peak_TL206-TL202_1800MW_3x50MW
Loss of TL206 - 3PF | 230 kV Power Flow



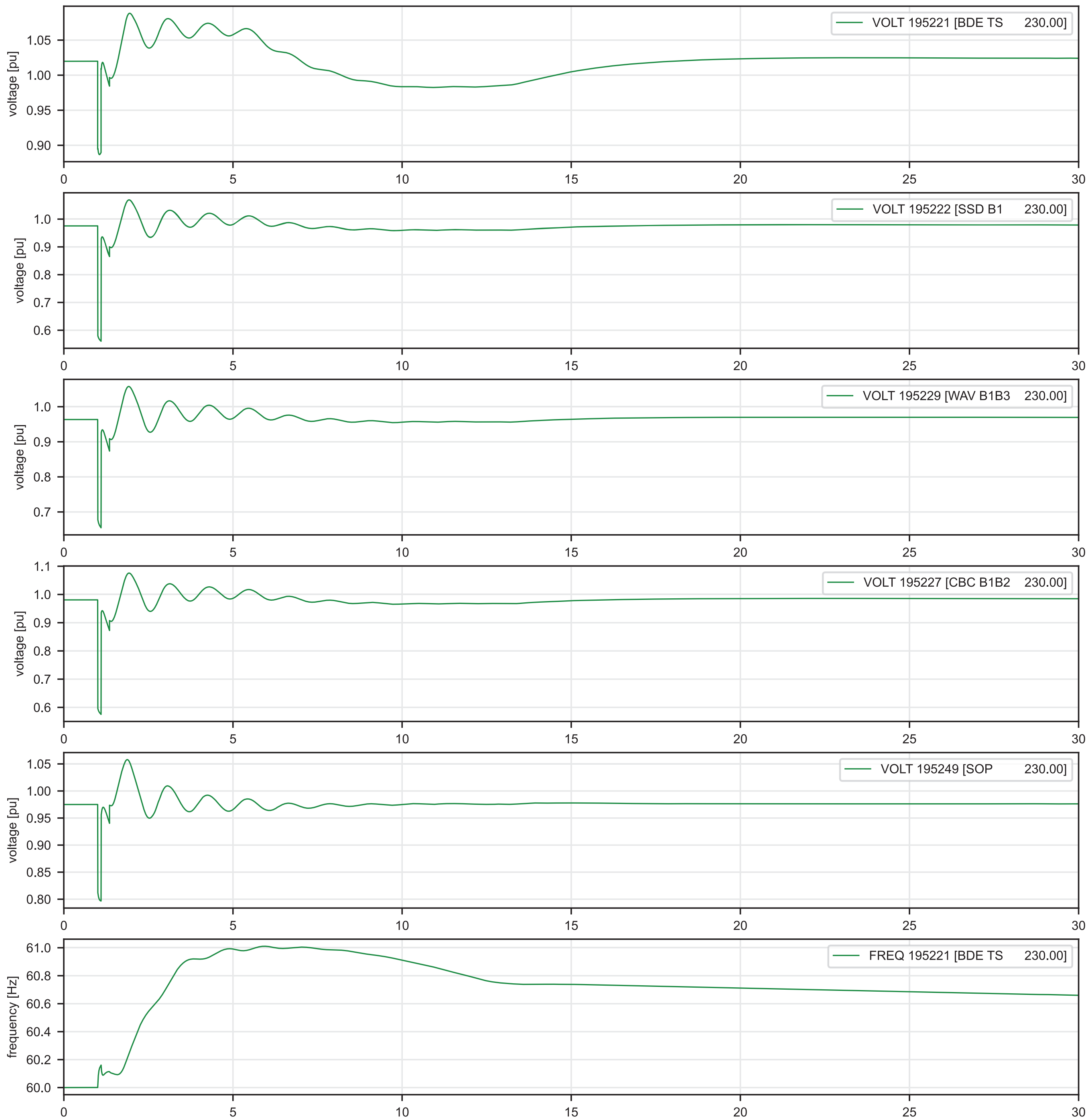
03_2033-34_Base-Peak_TL206-TL202_1800MW_3x50MW
Loss of TL206 - no fault | Voltage / Frequency



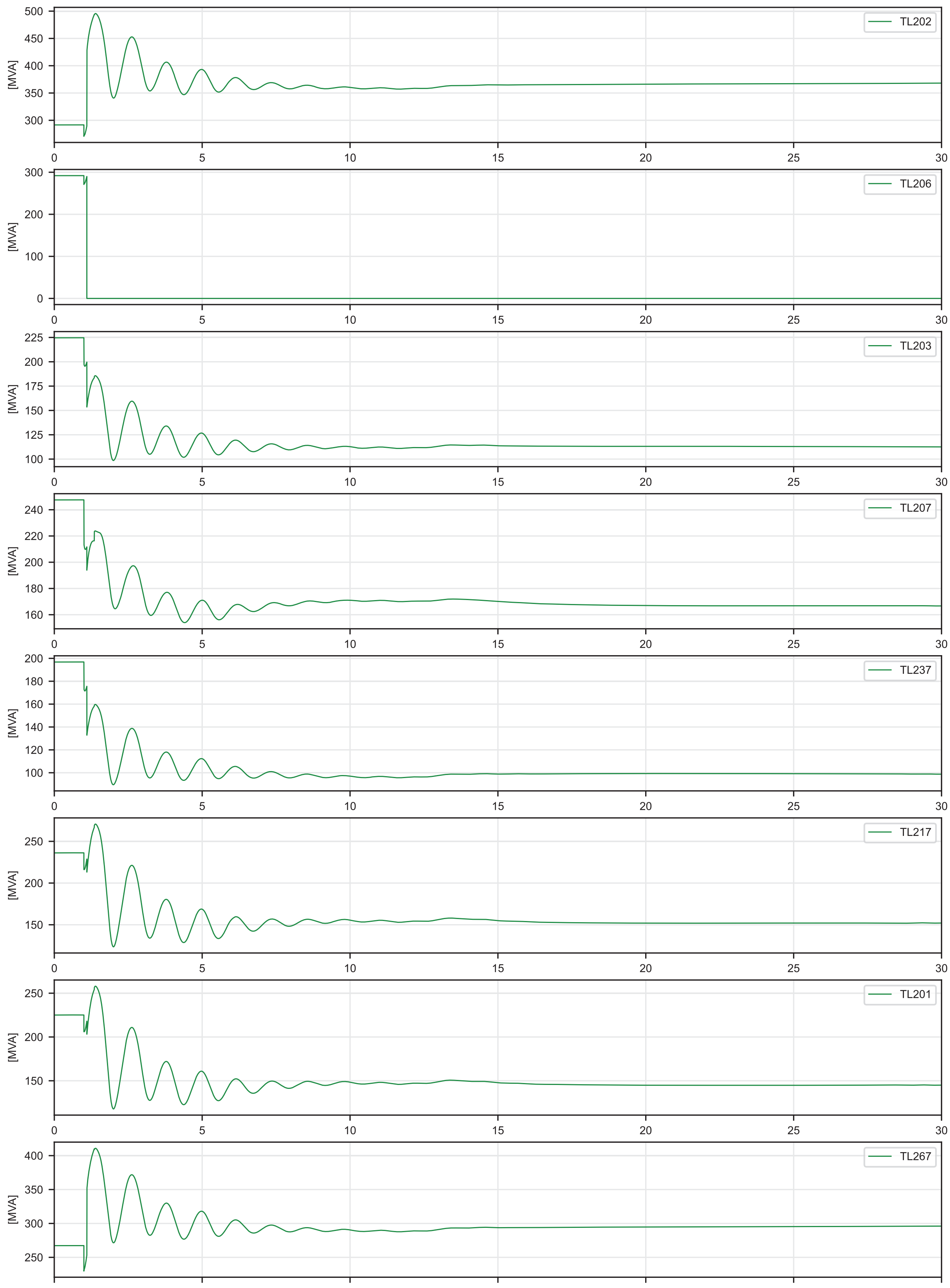
03_2033-34_Base-Peak_TL206-TL202_1800MW_3x50MW
Loss of TL206 - no fault | 230 kV Power Flow



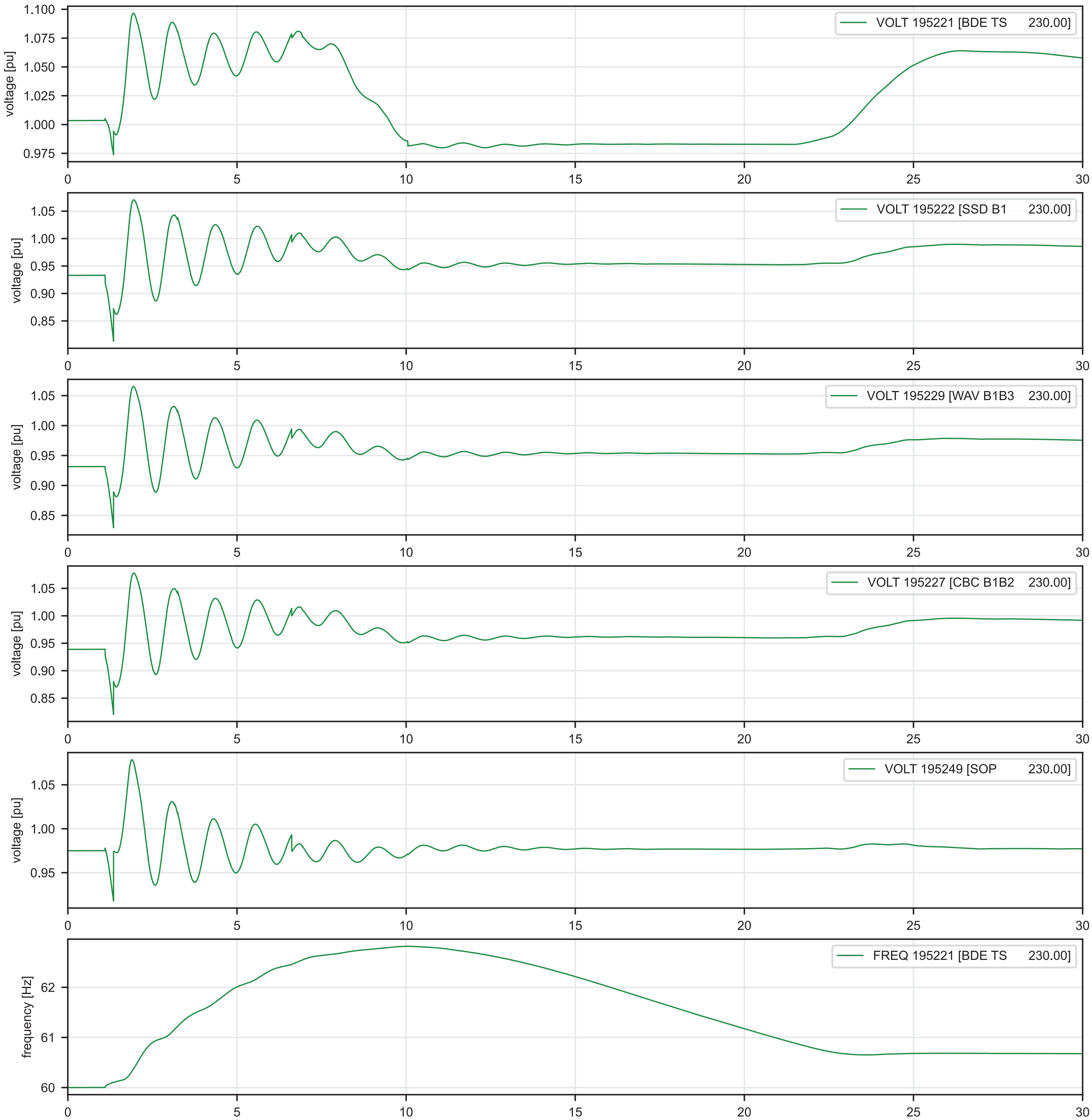
03_2033-34_Base-Peak_TL206-TL202_1800MW_3x50MW
Loss of TL206 - SLGF | Voltage / Frequency



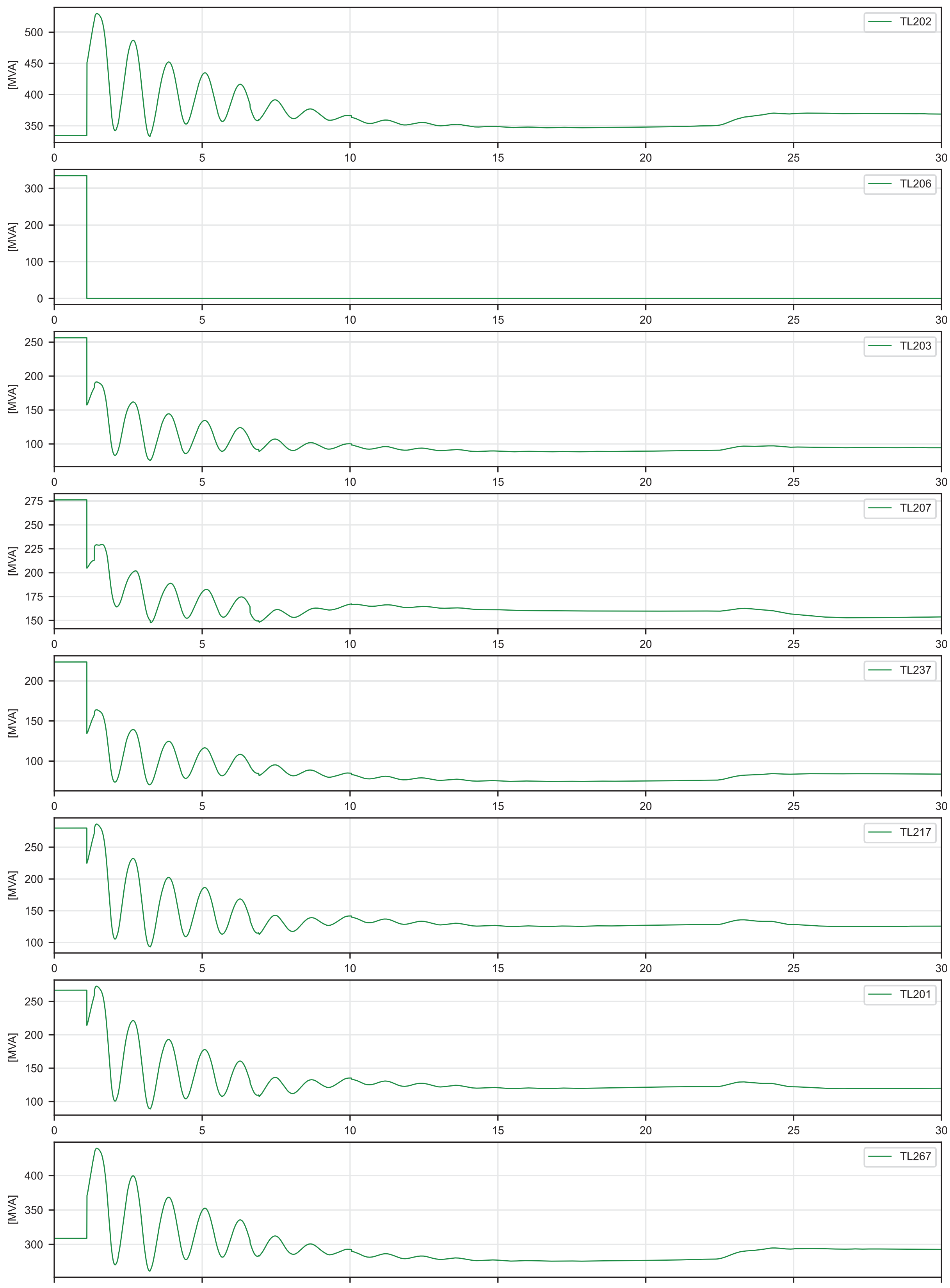
03_2033-34_Base-Peak_TL206-TL202_1800MW_3x50MW
Loss of TL206 - SLGF | 230 kV Power Flow



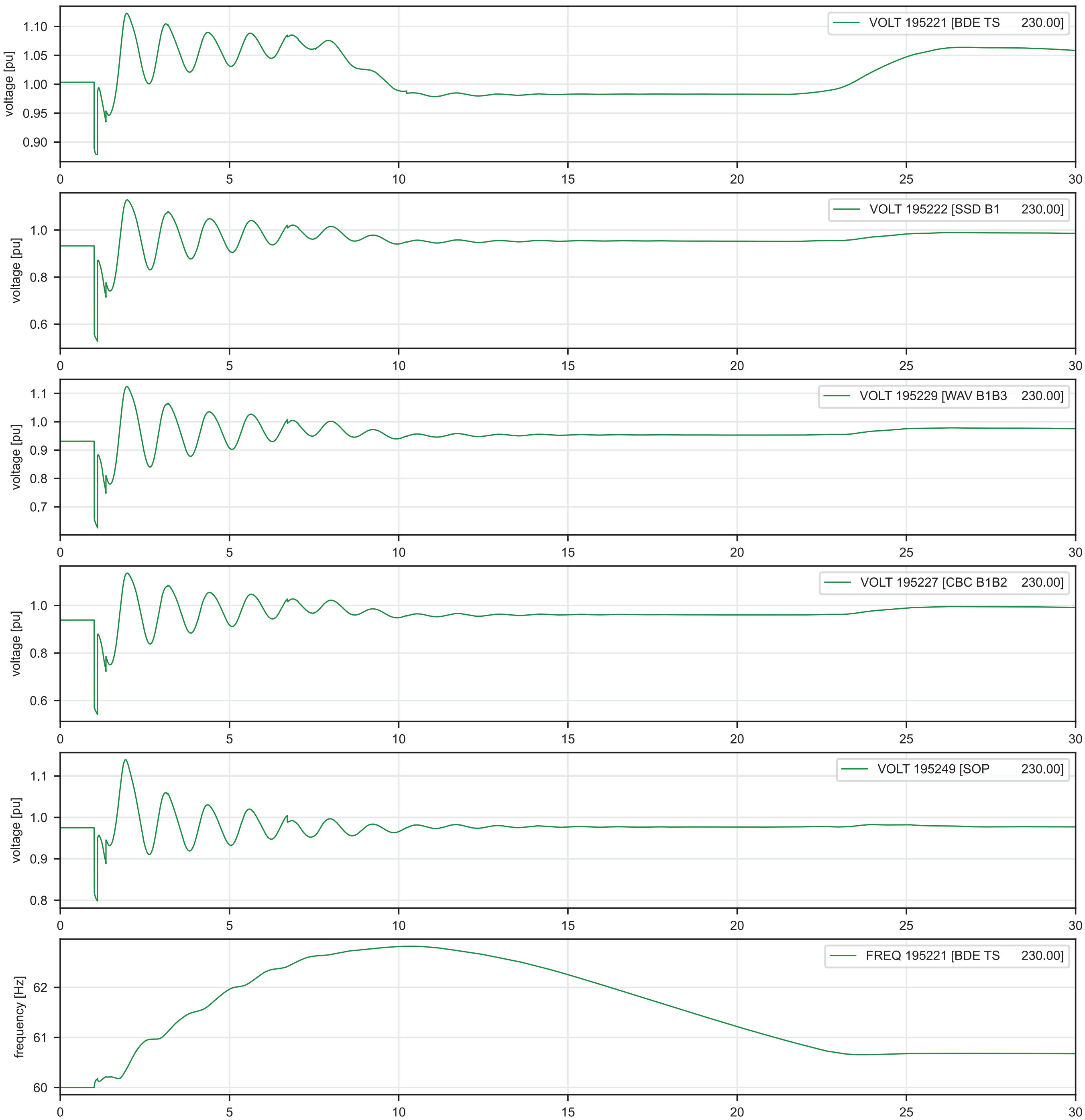
03_2033-34_Base-Peak_TL206-TL202_2000MW_3x50MW
Loss of TL206 - no fault | Voltage / Frequency



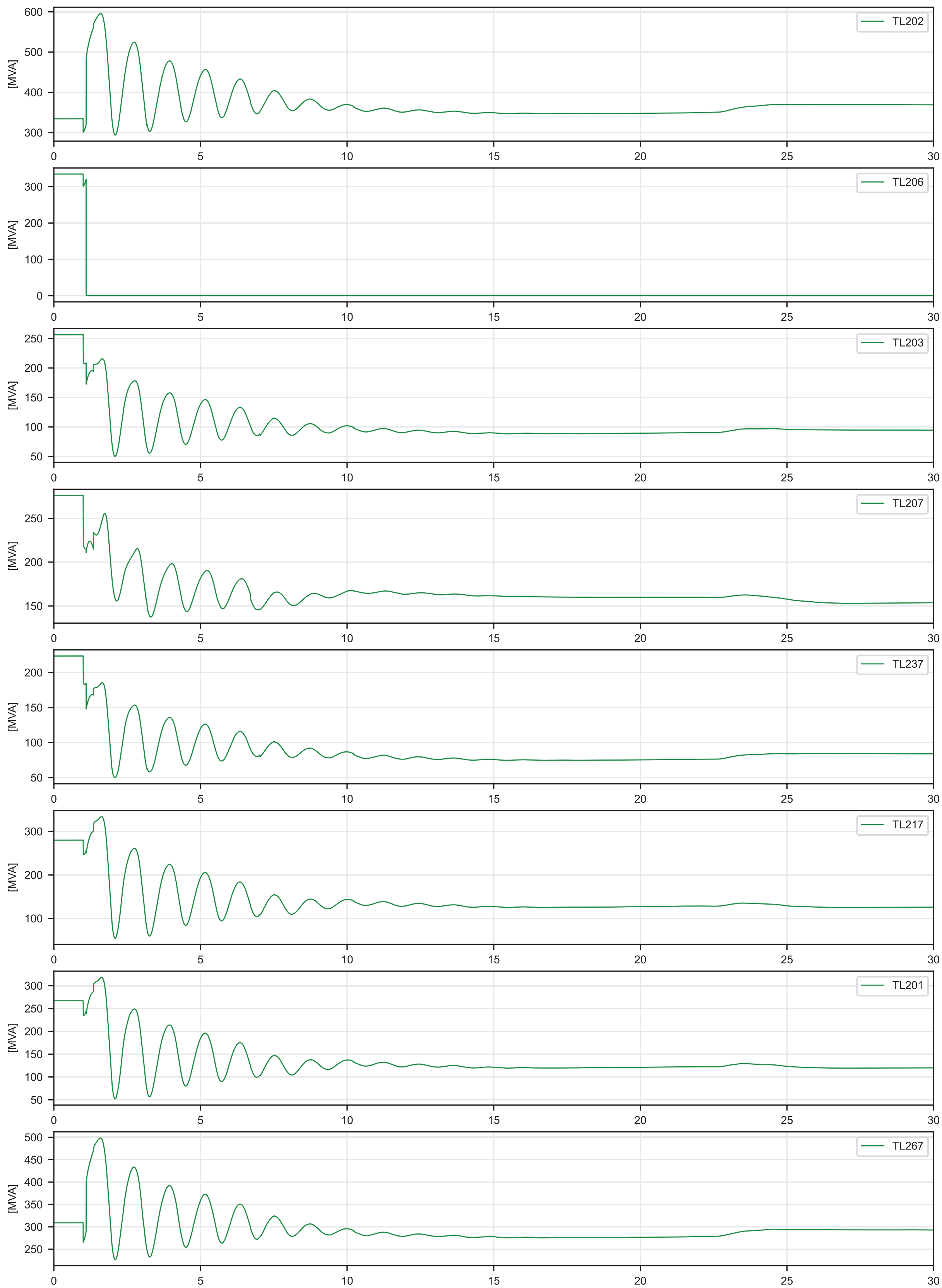
03_2033-34_Base-Peak_TL206-TL202_2000MW_3x50MW
Loss of TL206 - no fault | 230 kV Power Flow



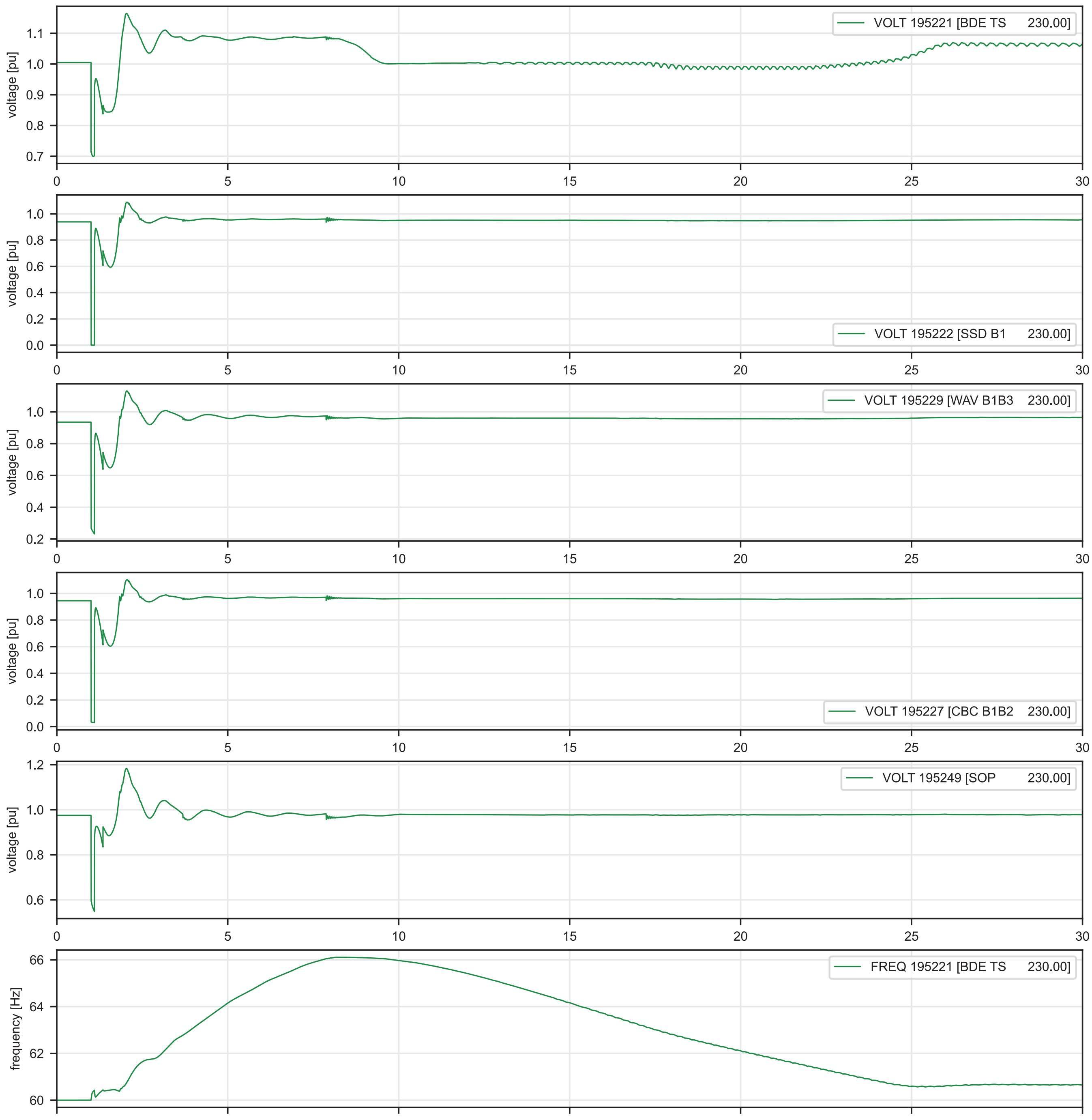
03_2033-34_Base-Peak_TL206-TL202_2000MW_3x50MW
Loss of TL206 - SLGF | Voltage / Frequency



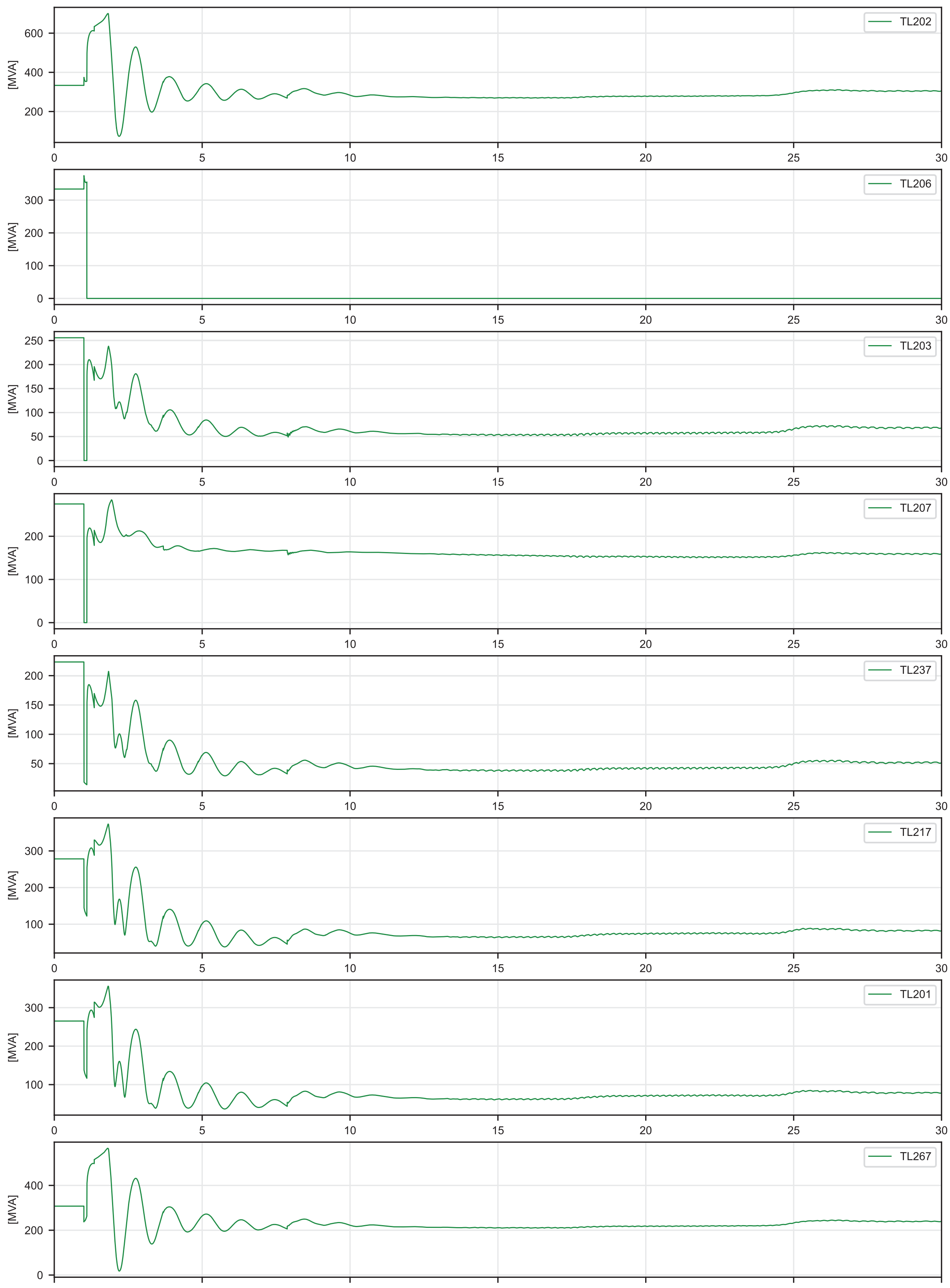
03_2033-34_Base-Peak_TL206-TL202_2000MW_3x50MW
Loss of TL206 - SLGF | 230 kV Power Flow



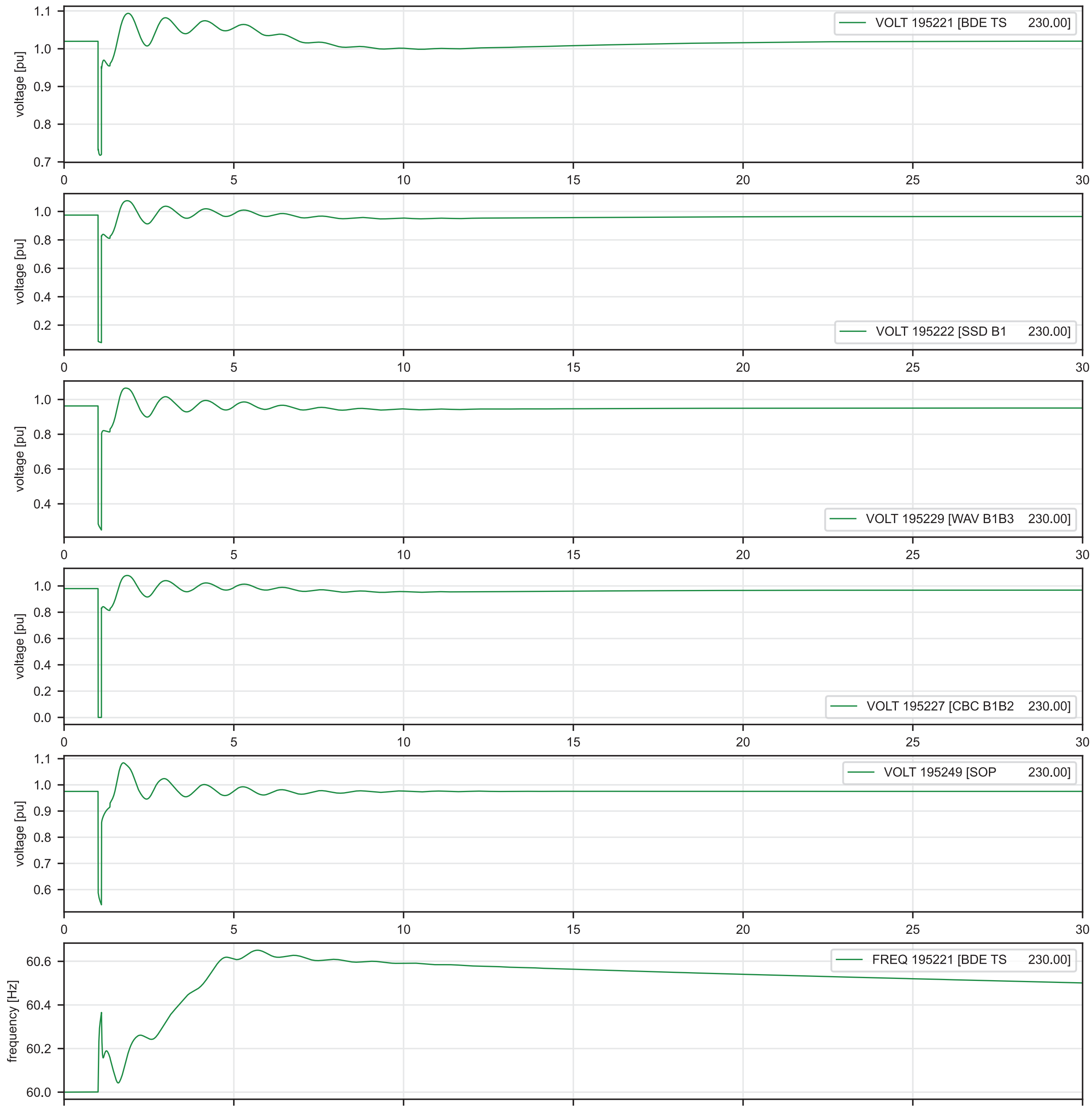
03_2033-34_Base-Peak_TL206-TL202_2000MW_3x50MW with STATCOM
Loss of TL206 - 3PF | Voltage / Frequency



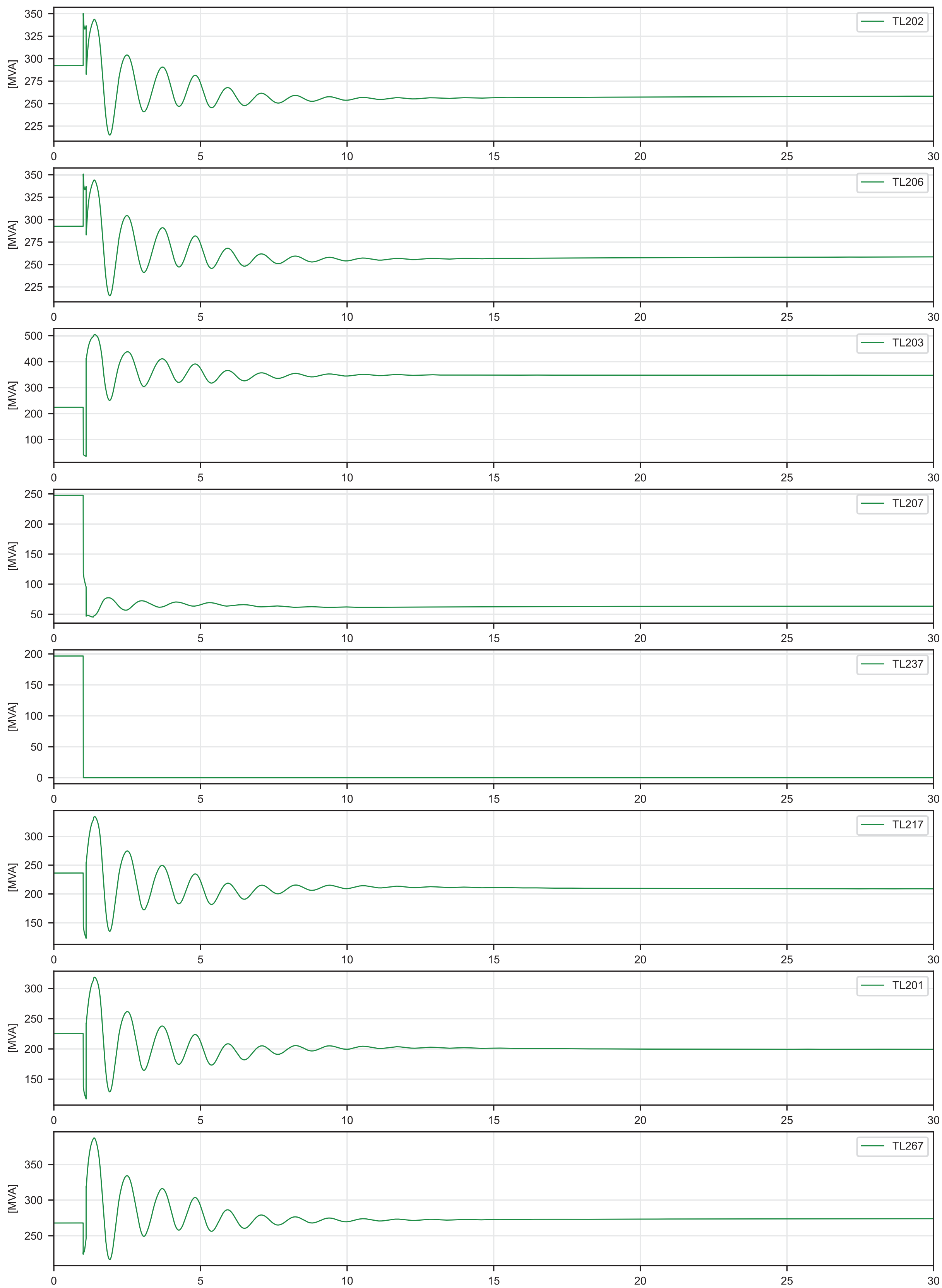
03_2033-34_Base-Peak_TL206-TL202_2000MW_3x50MW with STATCOM
Loss of TL206 - 3PF | 230 kV Power Flow



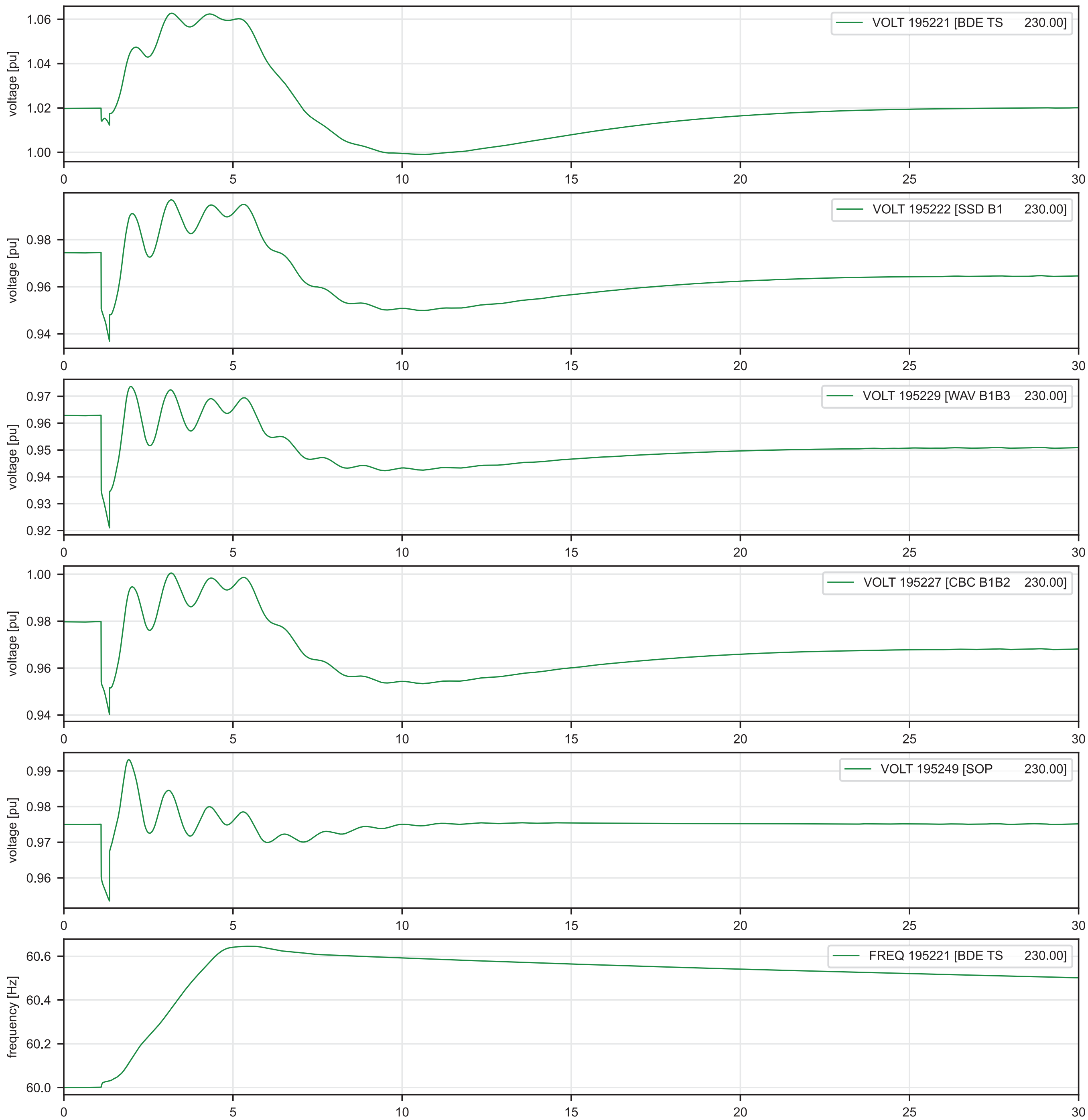
04_2033-34_Base-Peak_TL237-TL203_1800MW_3x50MW
Loss of TL237 - 3PF | Voltage / Frequency



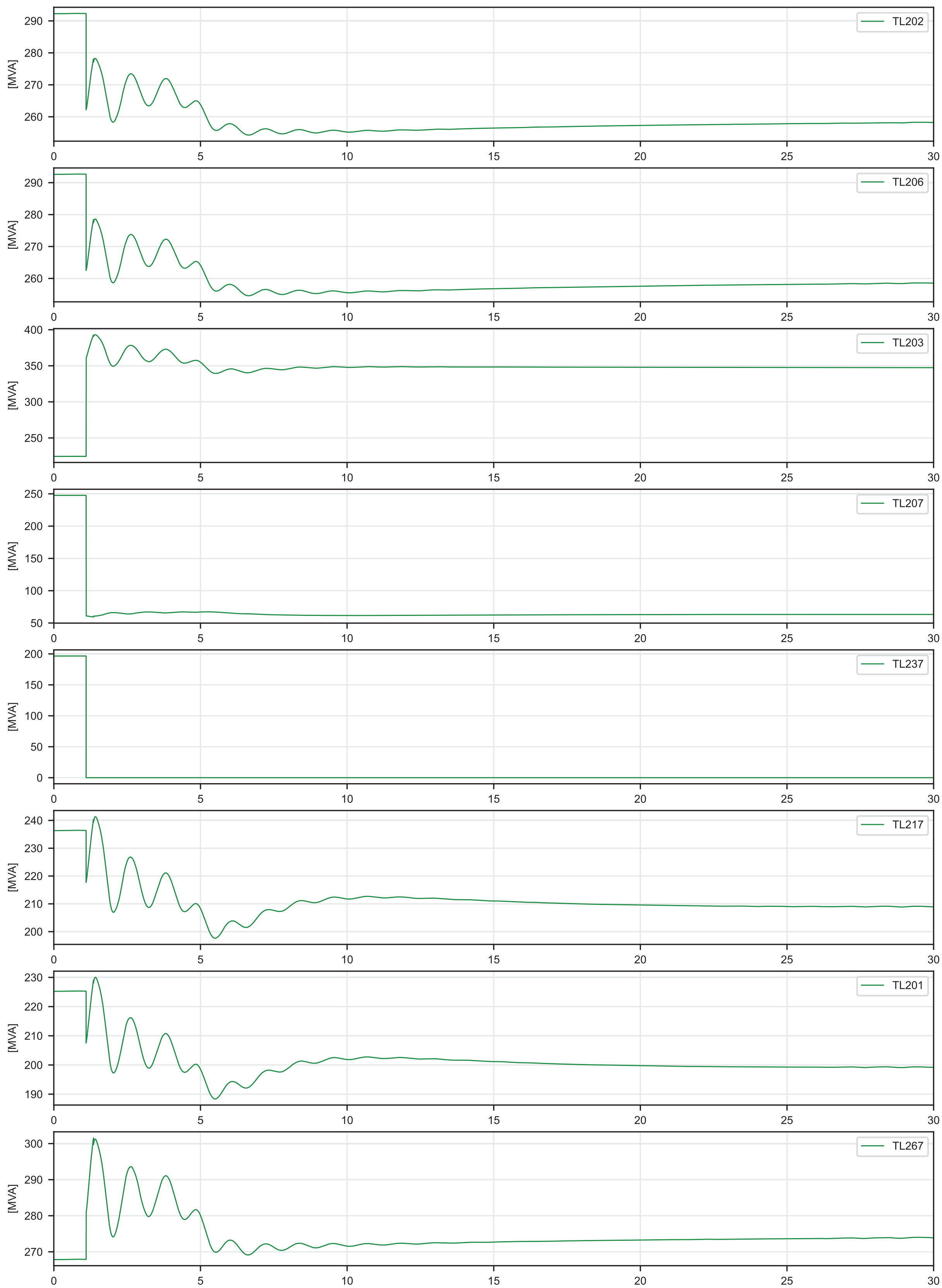
04_2033-34_Base-Peak_TL237-TL203_1800MW_3x50MW
Loss of TL237 - 3PF | 230 kV Power Flow



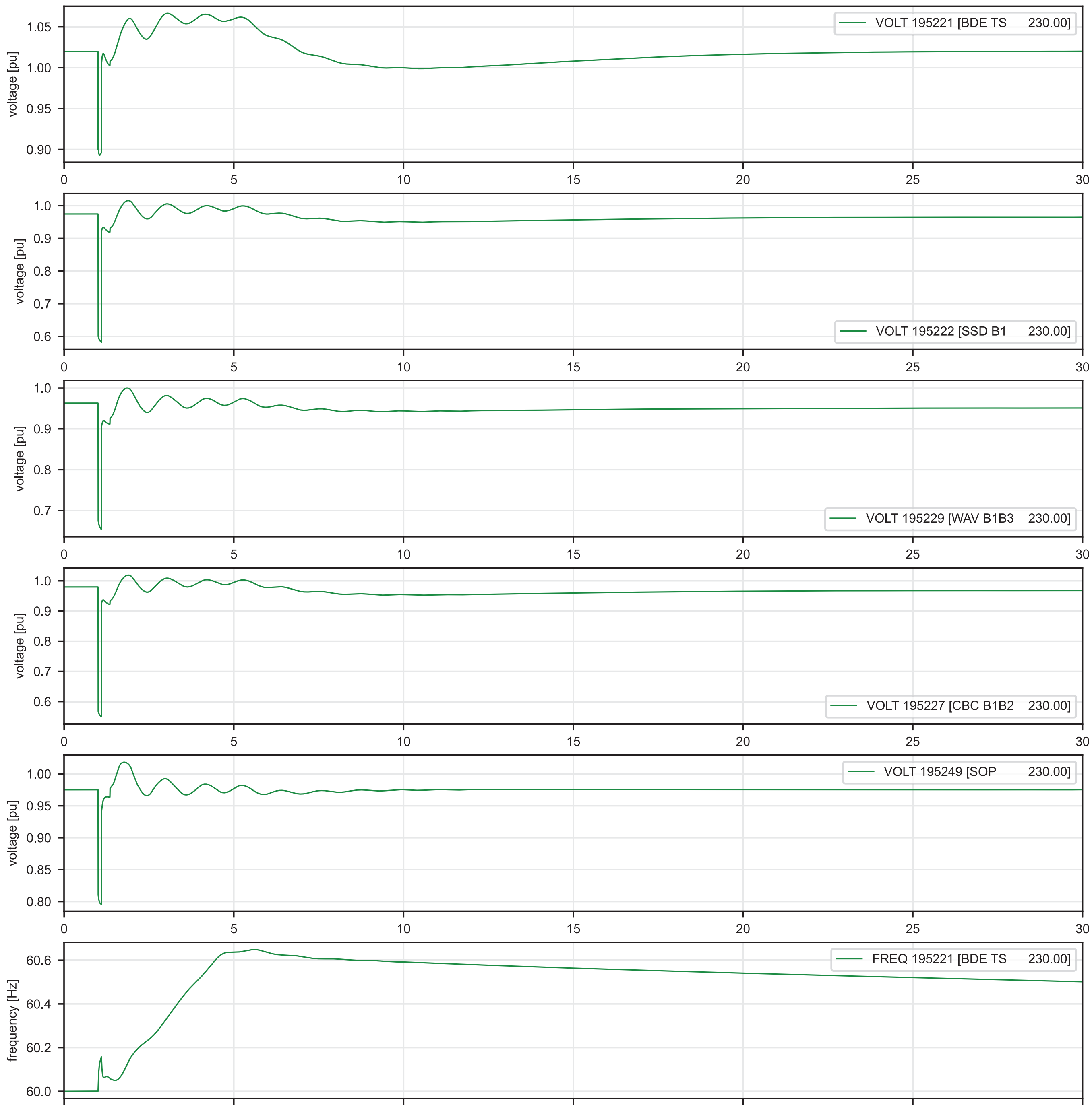
04_2033-34_Base-Peak_TL237-TL203_1800MW_3x50MW
Loss of TL237 - no fault | Voltage / Frequency



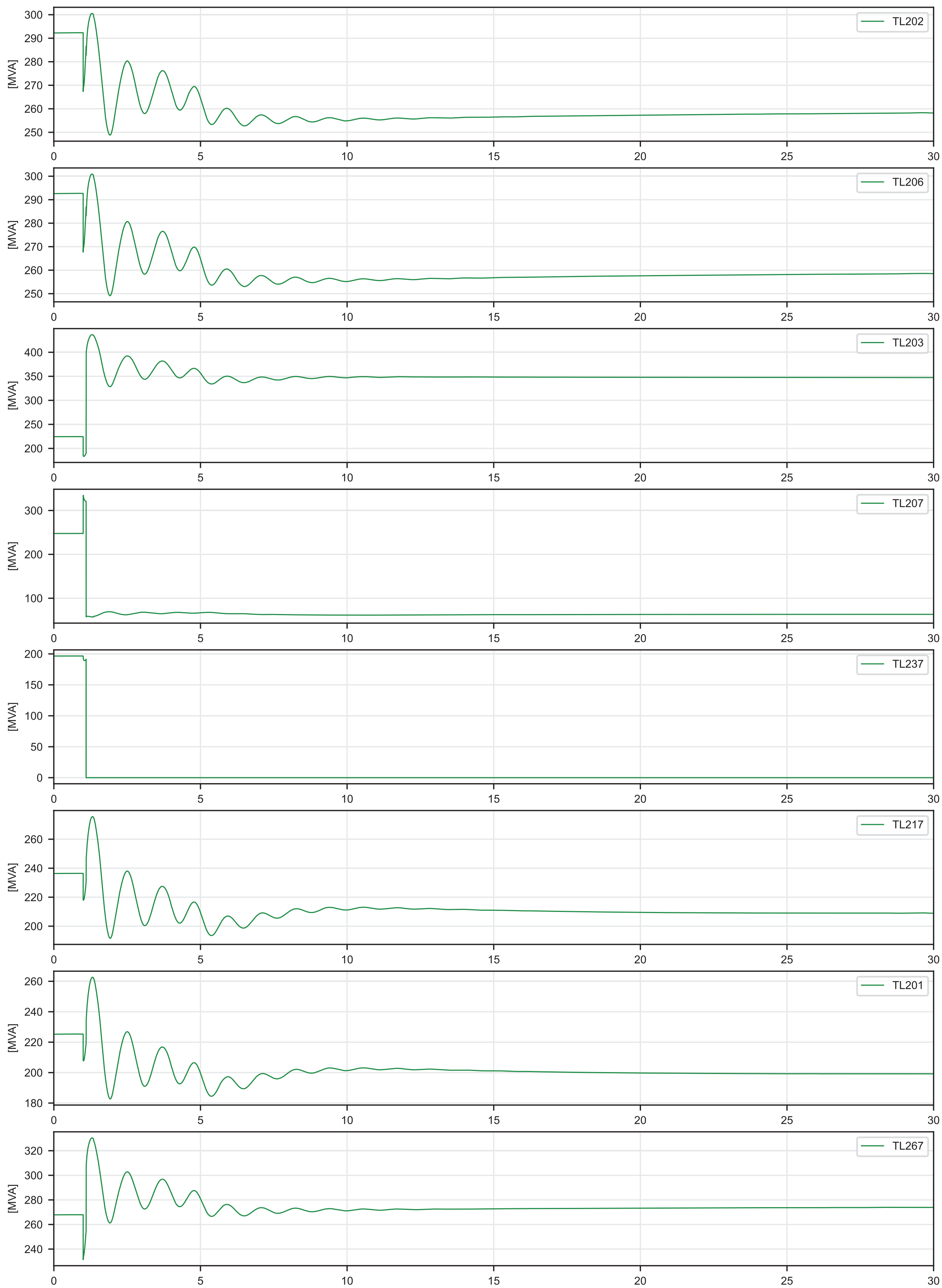
04_2033-34_Base-Peak_TL237-TL203_1800MW_3x50MW
Loss of TL237 - no fault | 230 kV Power Flow



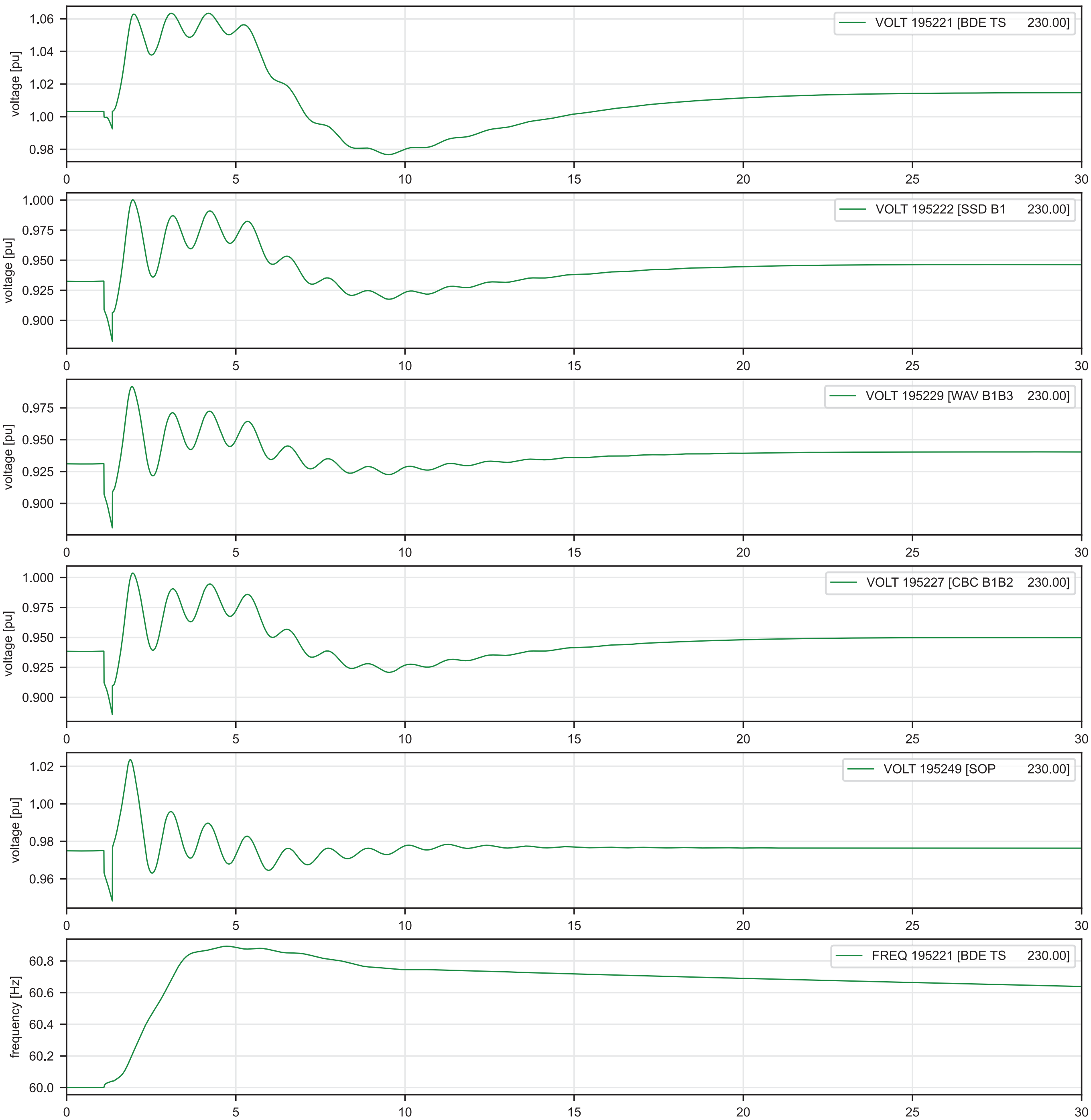
04_2033-34_Base-Peak_TL237-TL203_1800MW_3x50MW
Loss of TL237 - SLGF | Voltage / Frequency



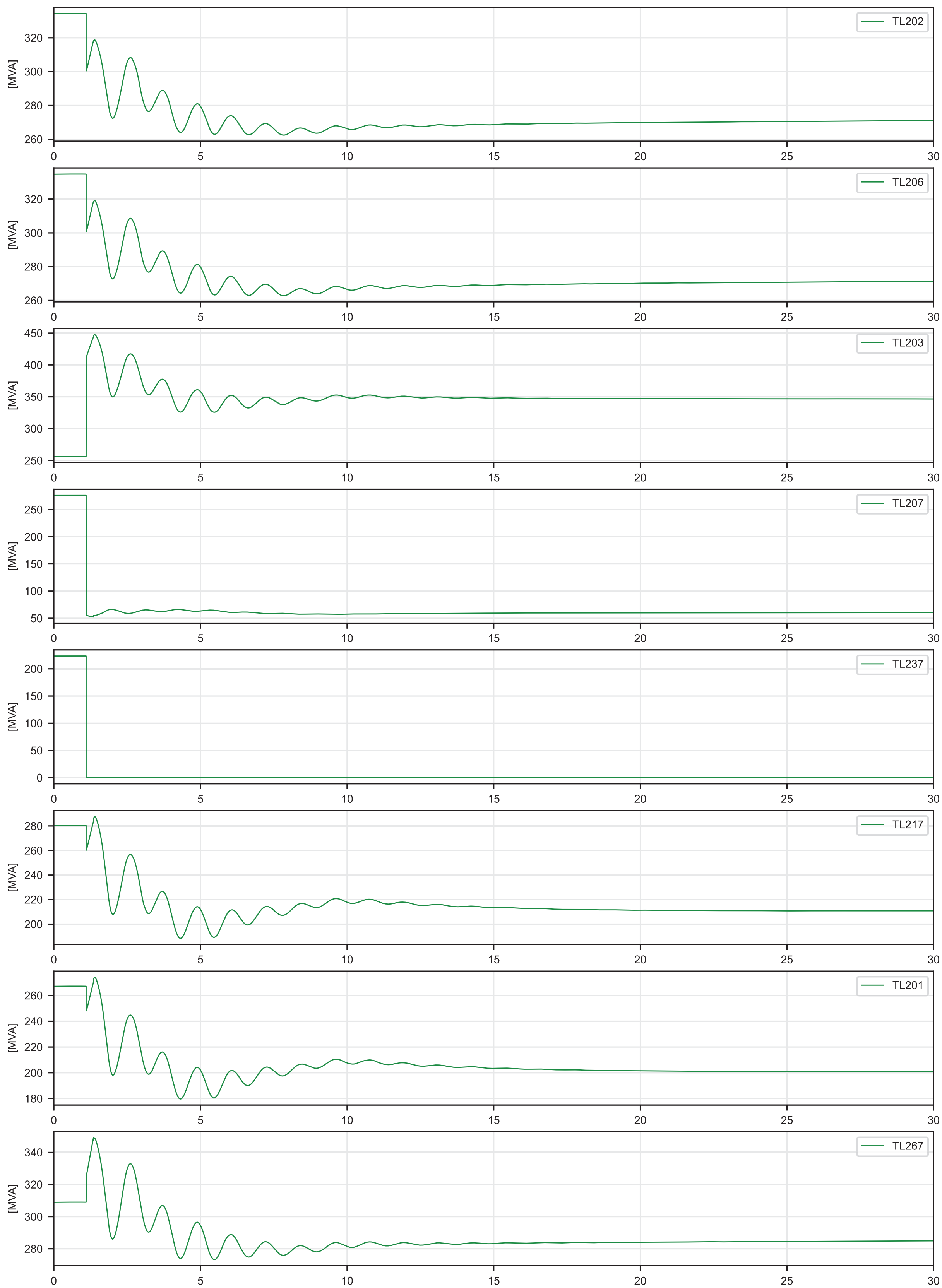
04_2033-34_Base-Peak_TL237-TL203_1800MW_3x50MW
Loss of TL237 - SLGF | 230 kV Power Flow



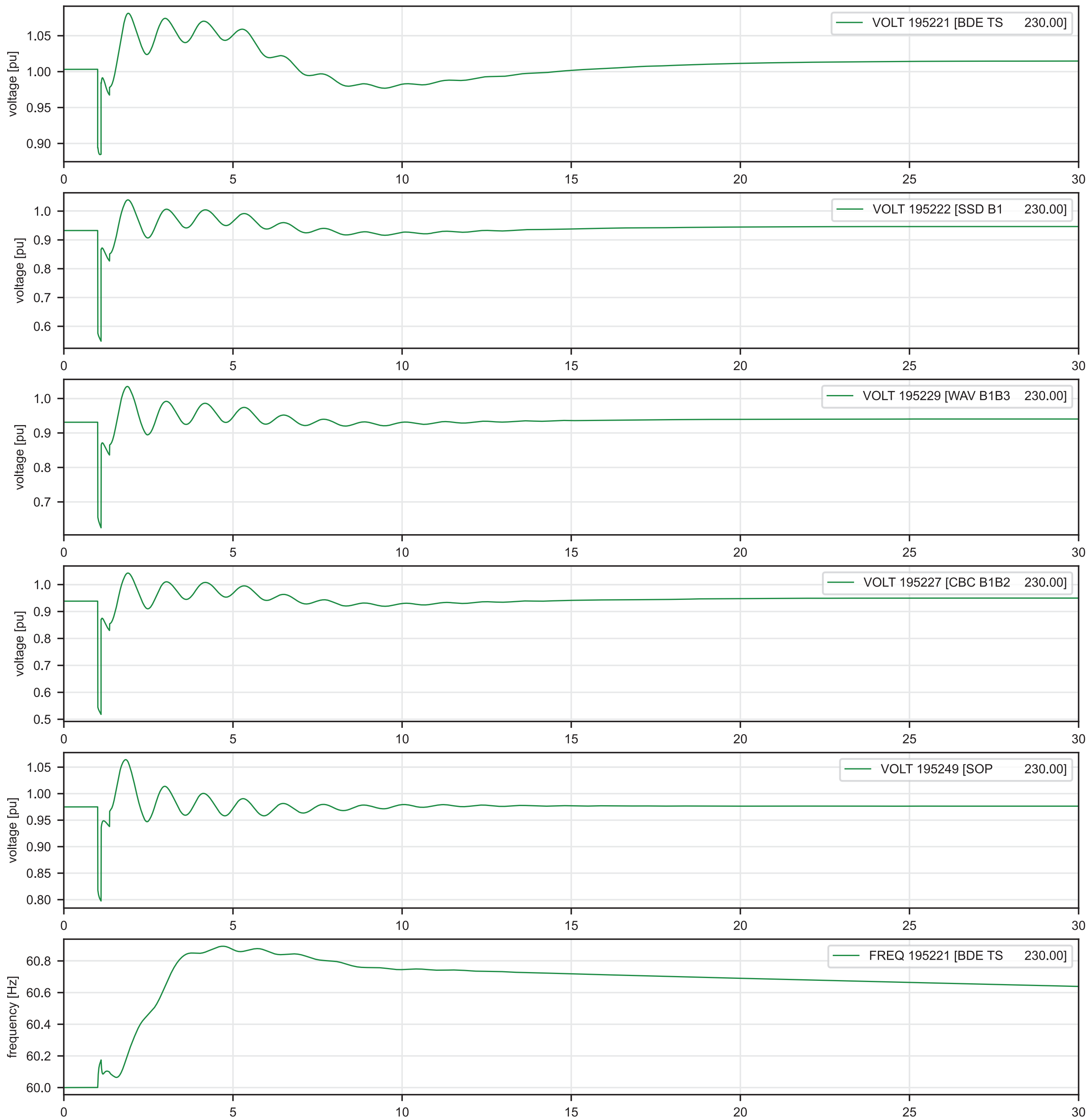
04_2033-34_Base-Peak_TL237-TL203_2000MW_3x50MW
Loss of TL237 - no fault | Voltage / Frequency



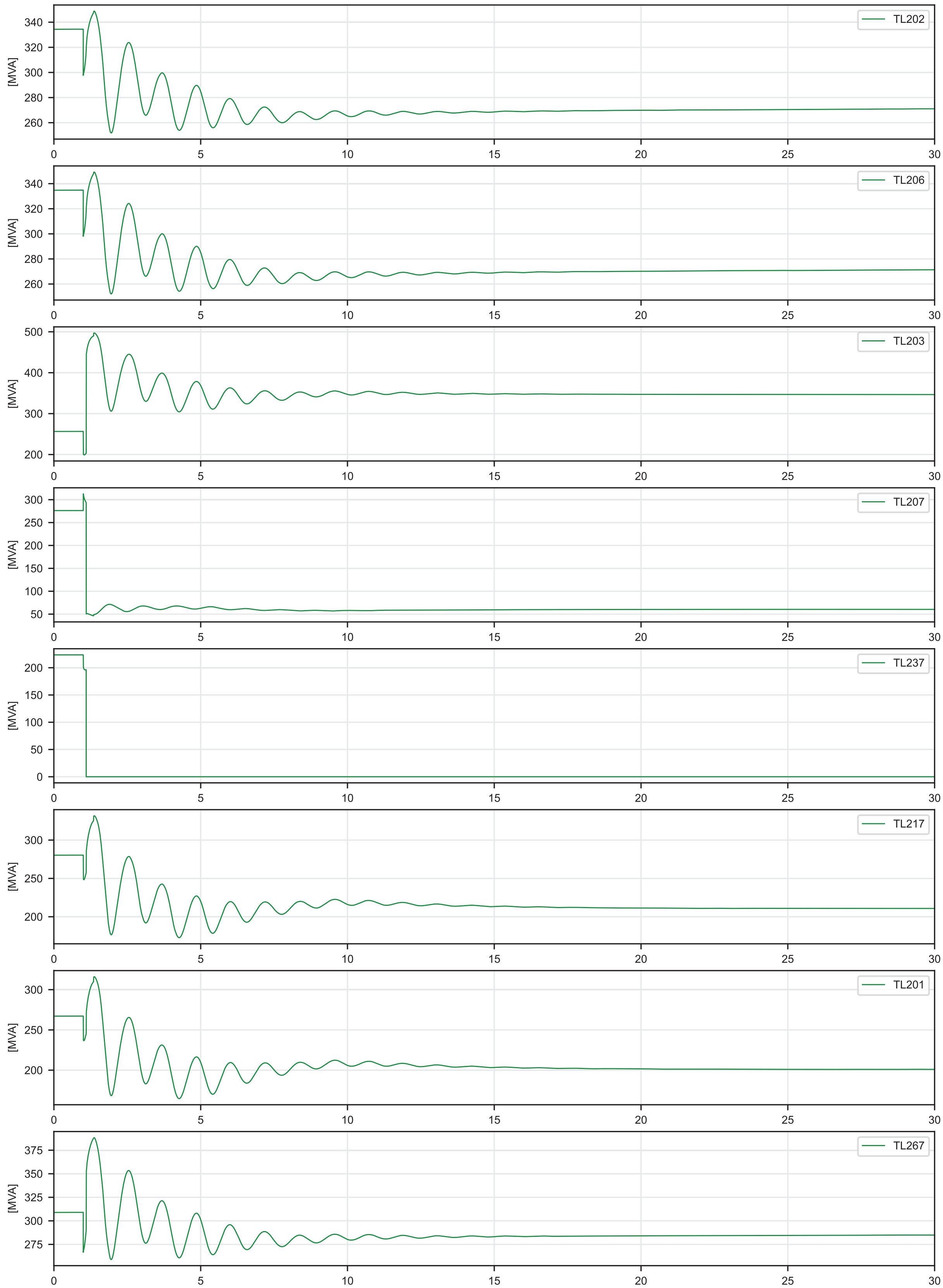
04_2033-34_Base-Peak_TL237-TL203_2000MW_3x50MW
Loss of TL237 - no fault | 230 kV Power Flow



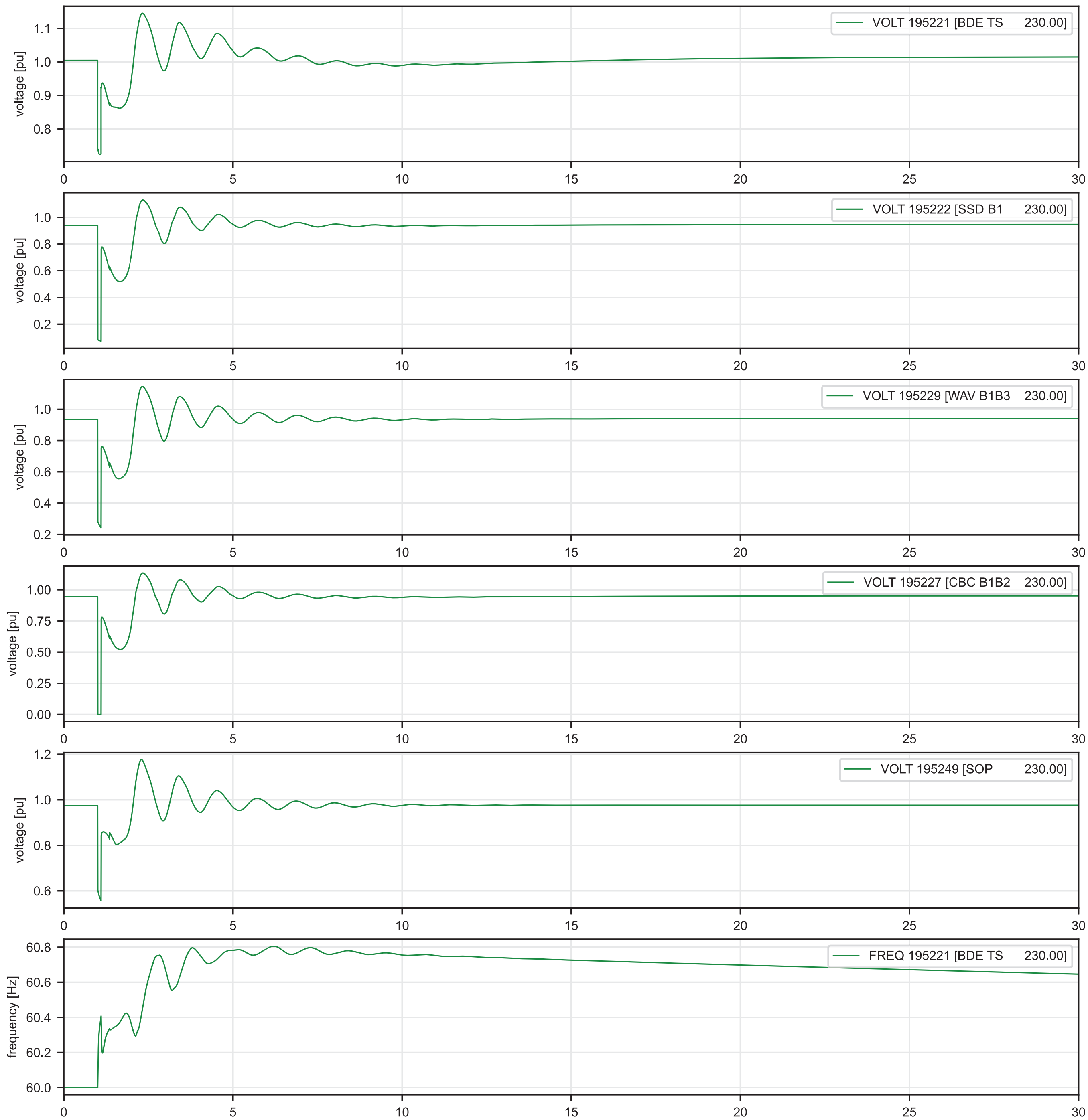
04_2033-34_Base-Peak_TL237-TL203_2000MW_3x50MW
Loss of TL237 - SLGF | Voltage / Frequency



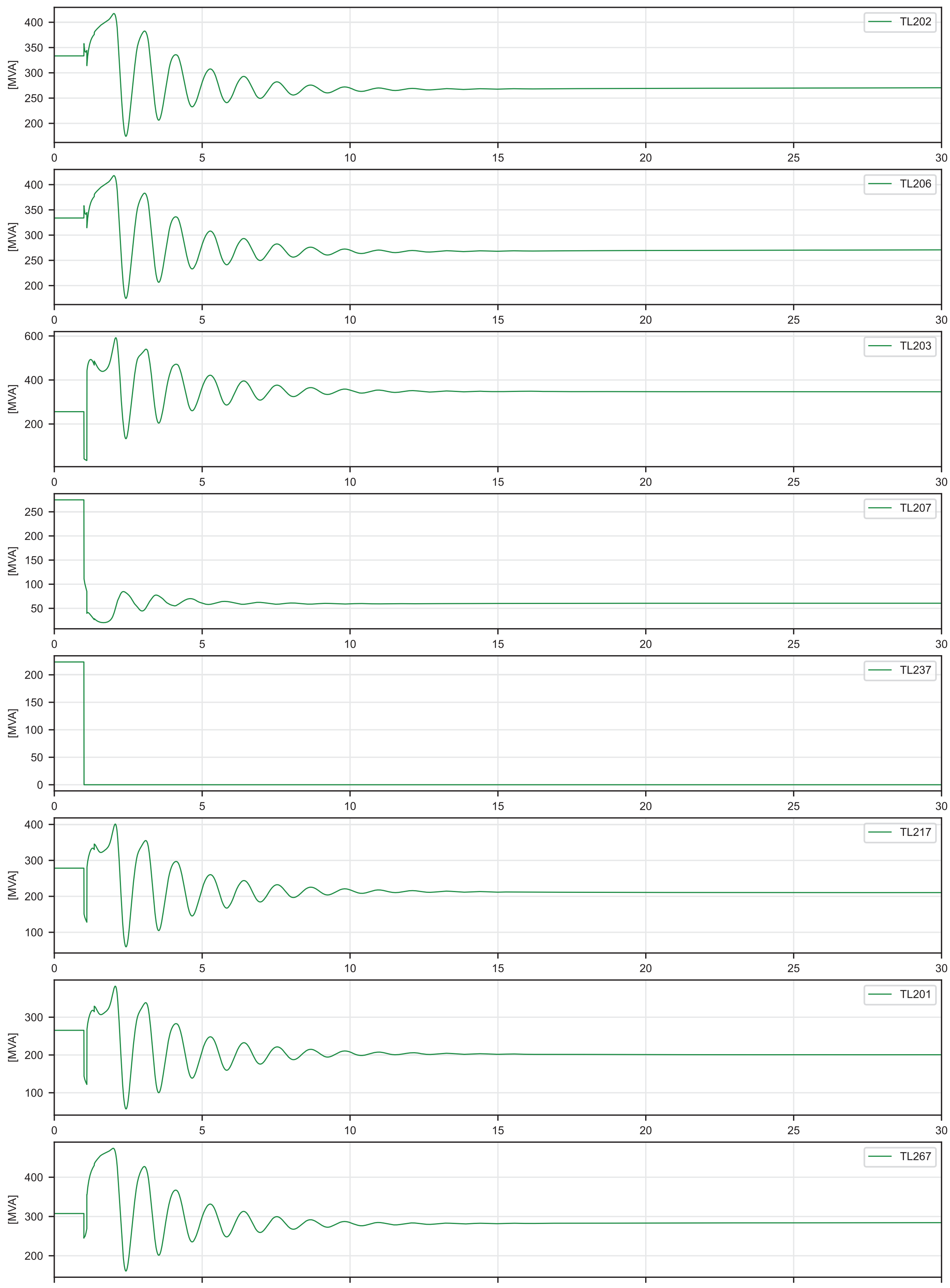
04_2033-34_Base-Peak_TL237-TL203_2000MW_3x50MW
Loss of TL237 - SLGF | 230 kV Power Flow



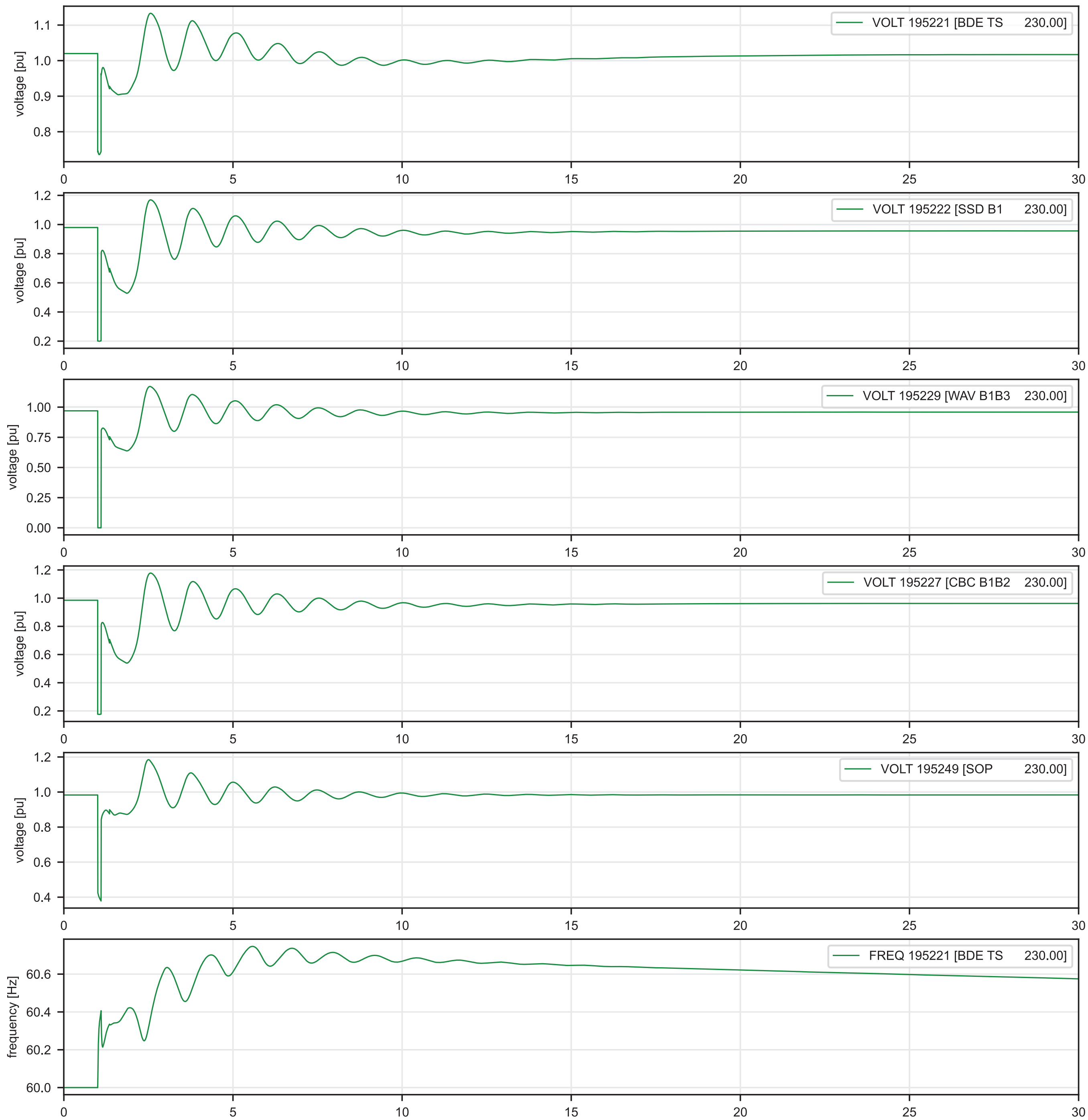
04_2033-34_Base-Peak_TL237-TL203_2000MW_3x50MW with STATCOM
Loss of TL237 - 3PF | Voltage / Frequency



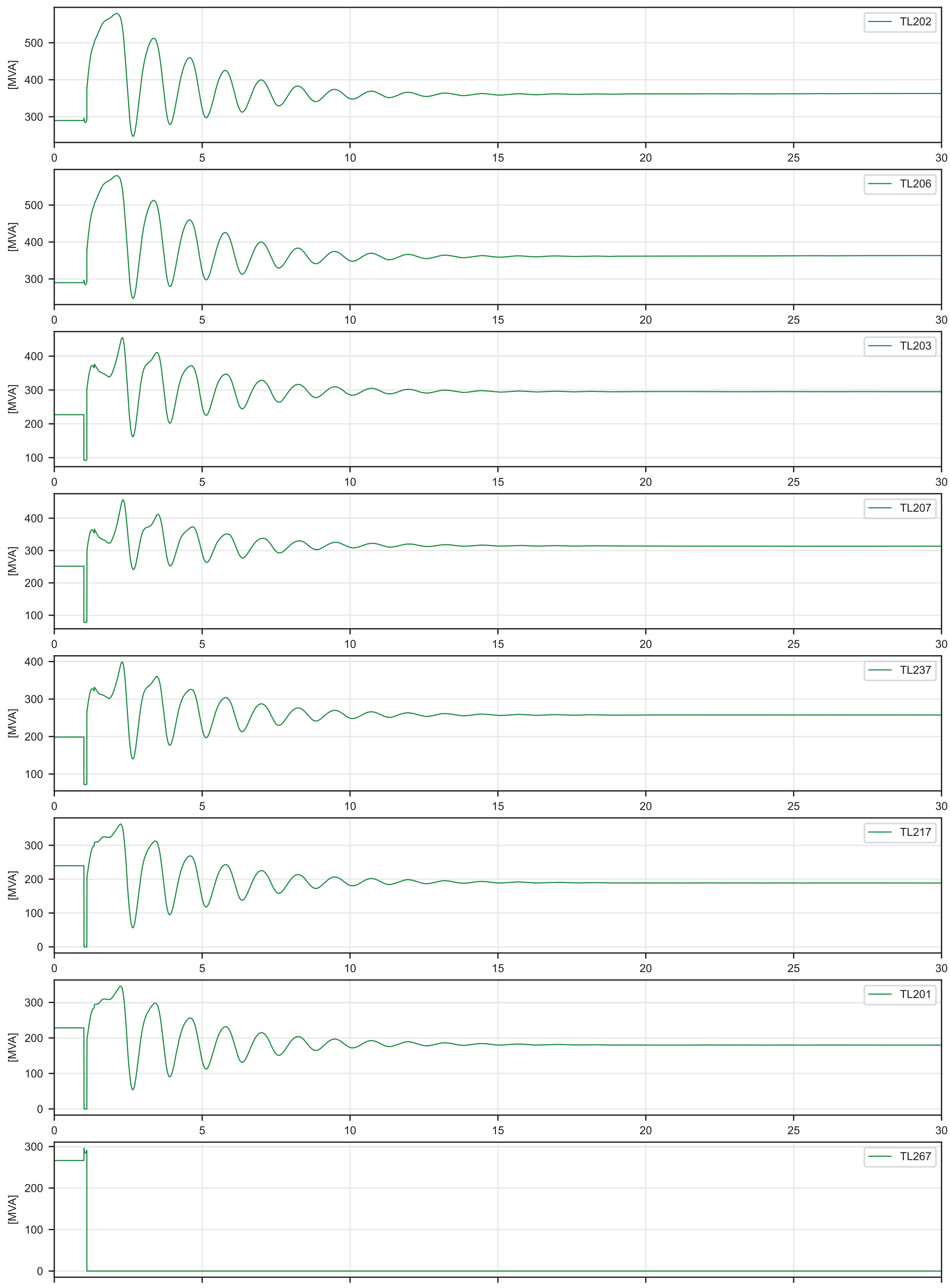
04_2033-34_Base-Peak_TL237-TL203_2000MW_3x50MW with STATCOM
Loss of TL237 - 3PF | 230 kV Power Flow



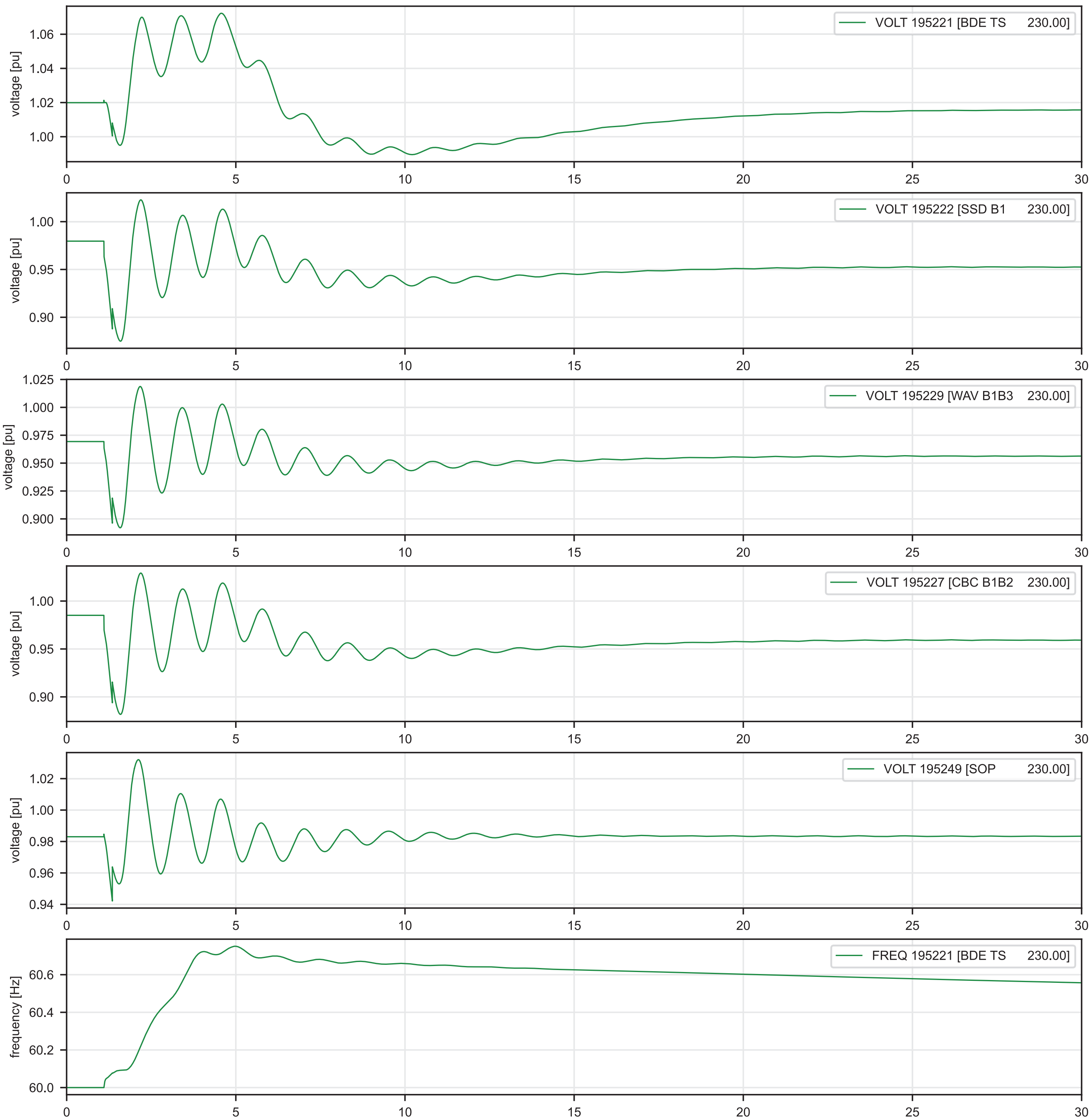
05_2033-34_Base-Peak_TL267WAV-1800MW_3X50MW
Loss of TL267 - 3PF | Voltage / Frequency



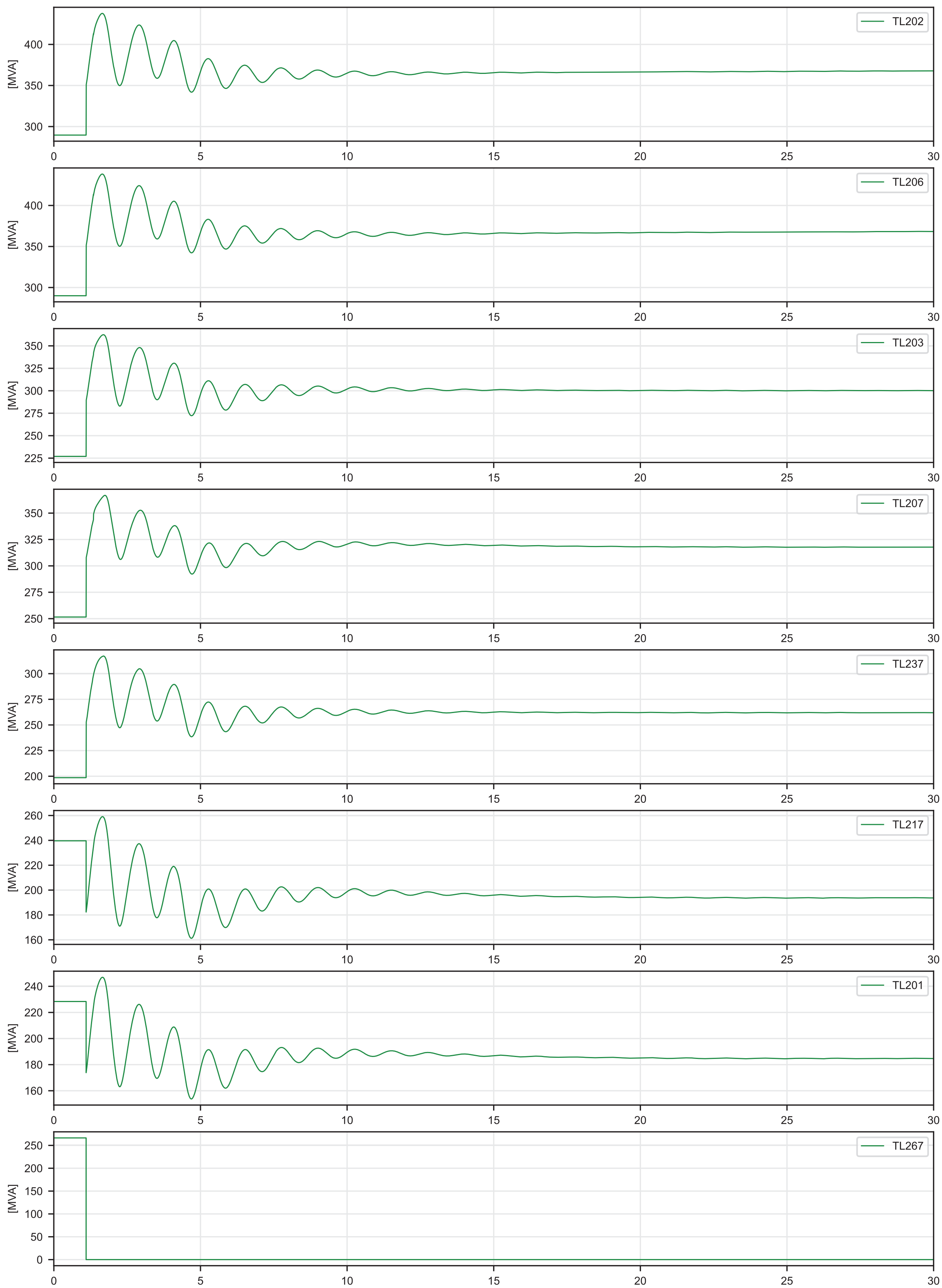
05_2033-34_Base-Peak_TL267WAV-1800MW_3X50MW
Loss of TL267 - 3PF | 230 kV Power Flow



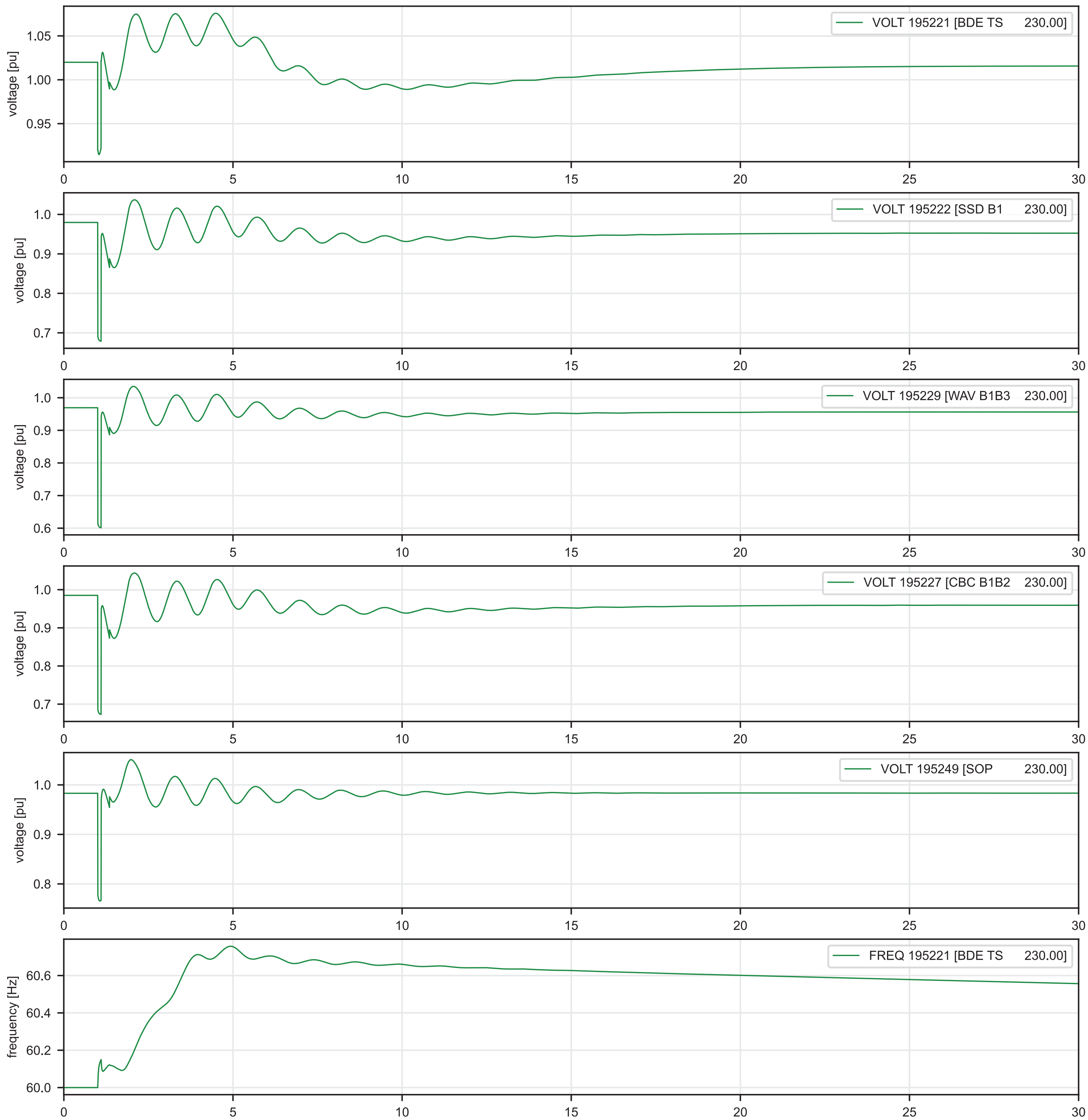
05_2033-34_Base-Peak_TL267WAV-1800MW_3X50MW
Loss of TL267 - no fault | Voltage / Frequency



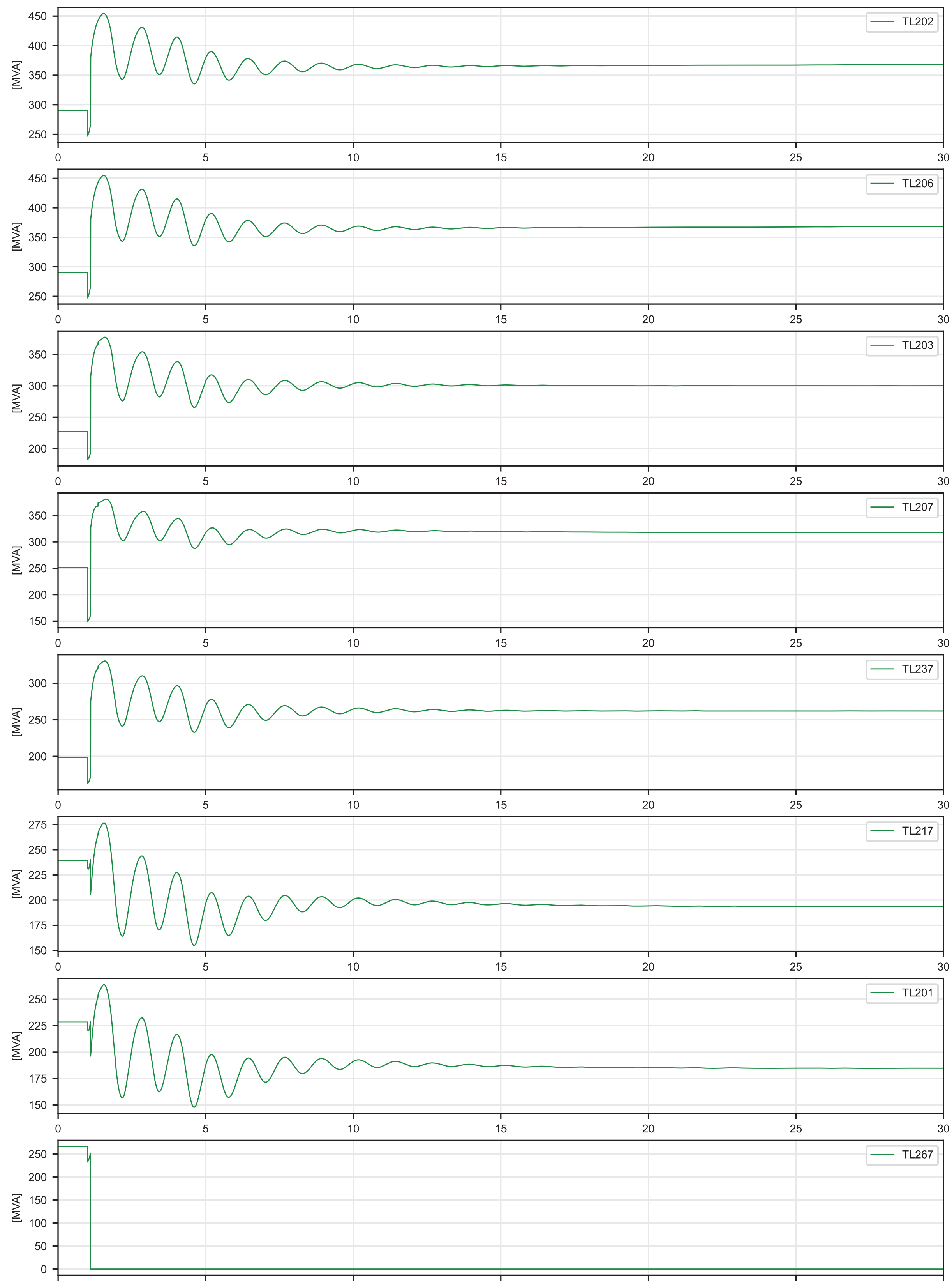
05_2033-34_Base-Peak_TL267WAV-1800MW_3X50MW
Loss of TL267 - no fault | 230 kV Power Flow



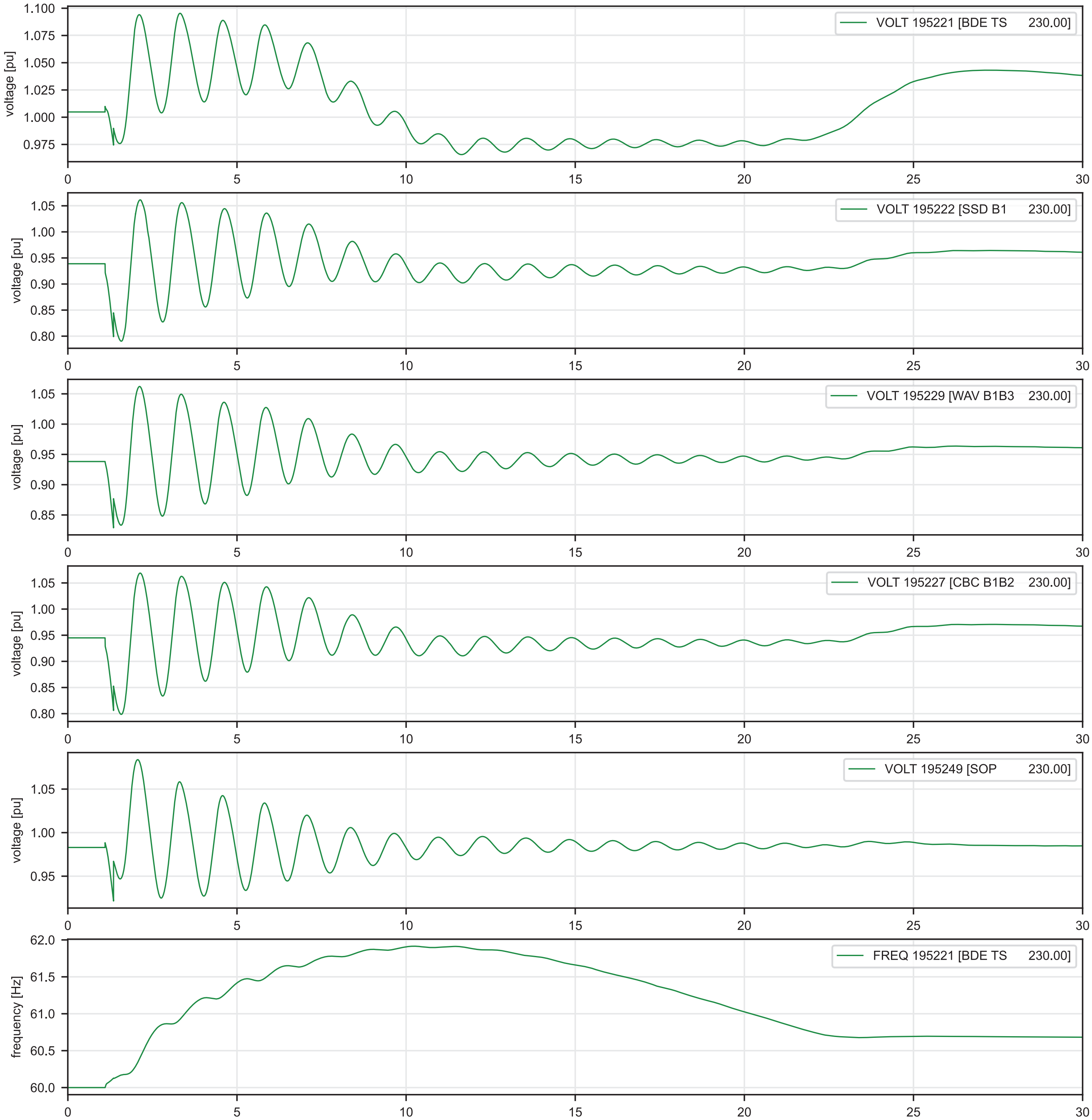
05_2033-34_Base-Peak_TL267WAV-1800MW_3X50MW
Loss of TL267 - SLGF | Voltage / Frequency



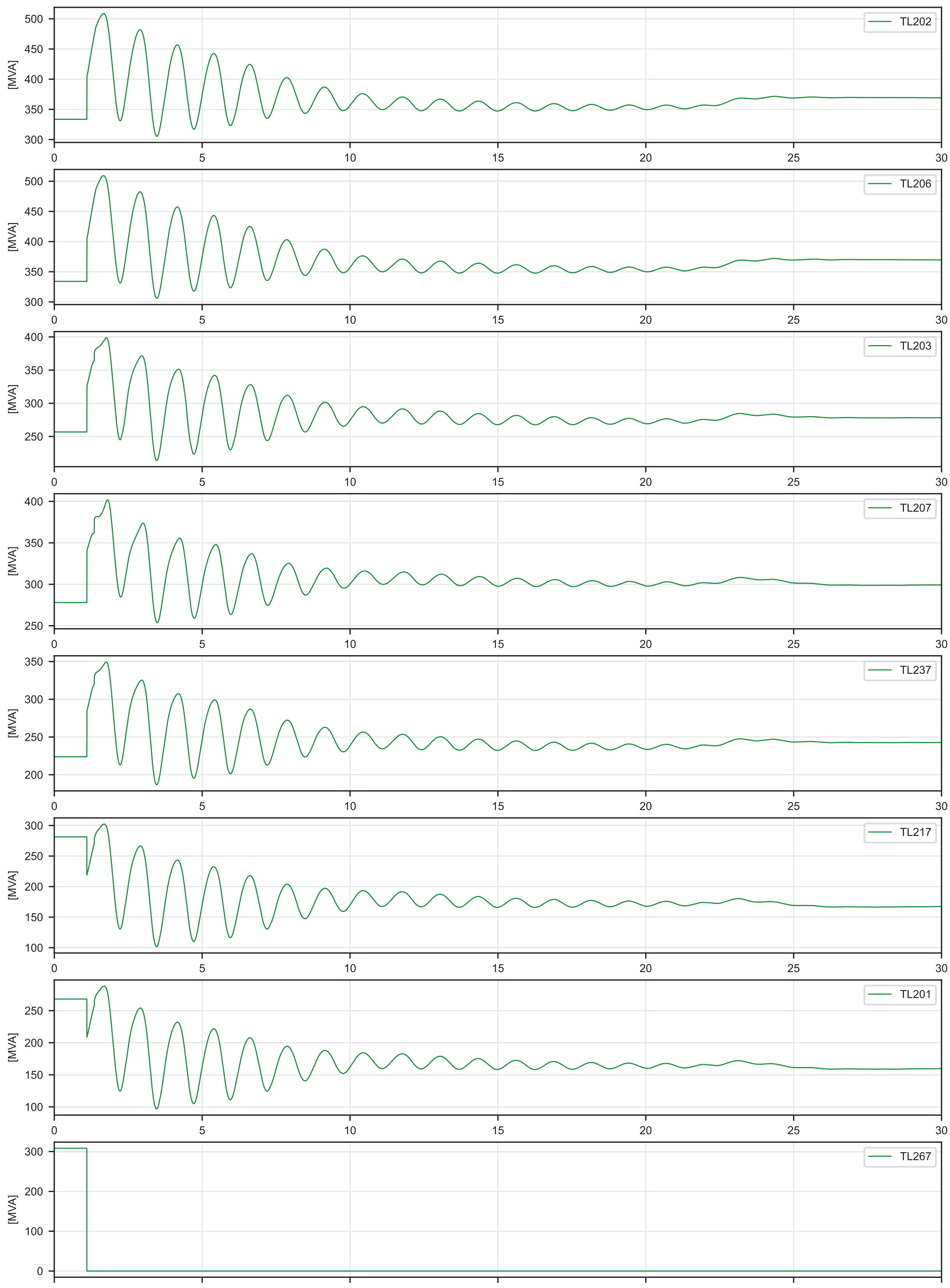
05_2033-34_Base-Peak_TL267WAV-1800MW_3X50MW
Loss of TL267 - SLGF | 230 kV Power Flow



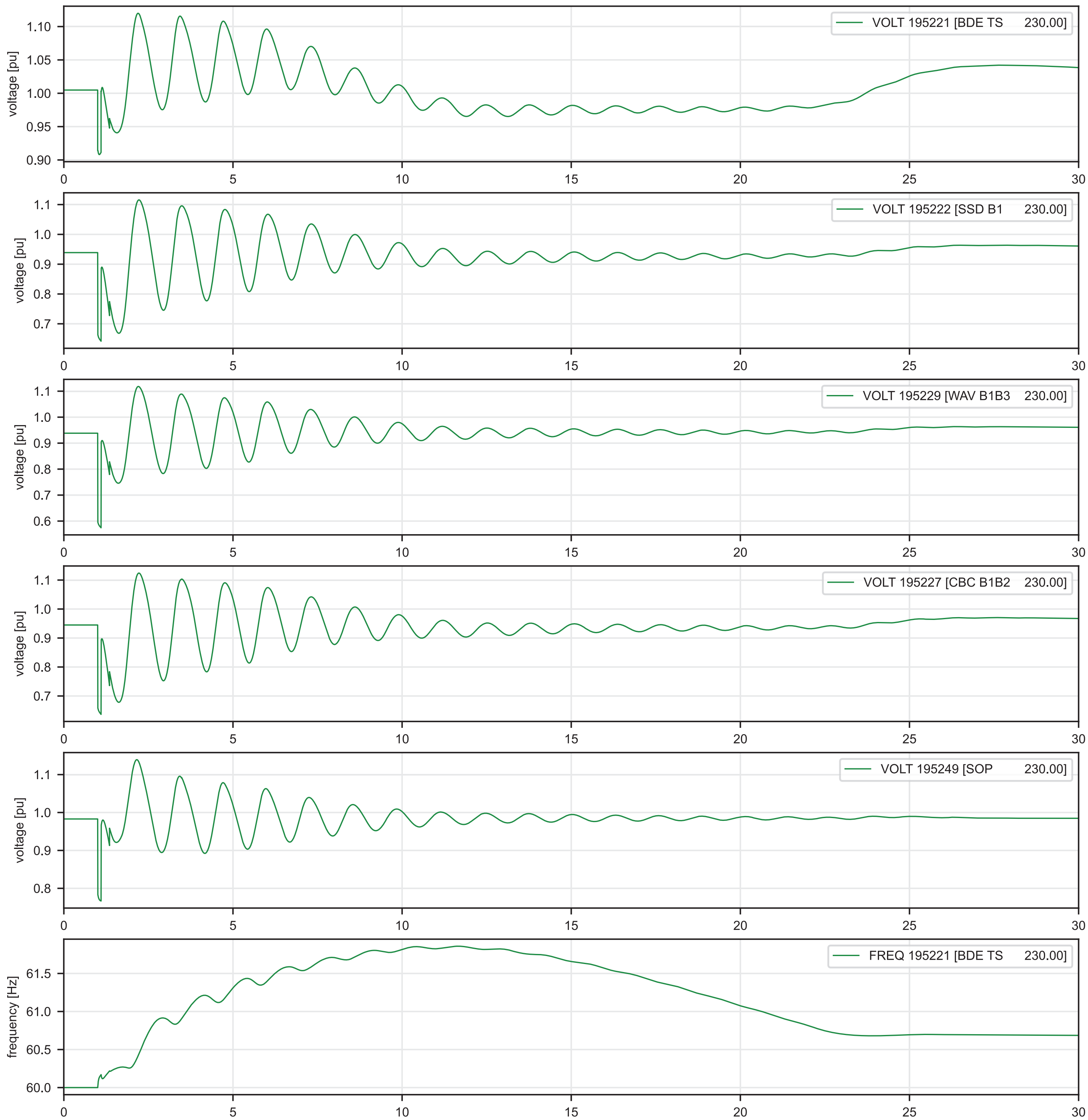
05_2033-34_Base-Peak_TL267WAV-2000MW_3X50MW
Loss of TL267 - no fault | Voltage / Frequency



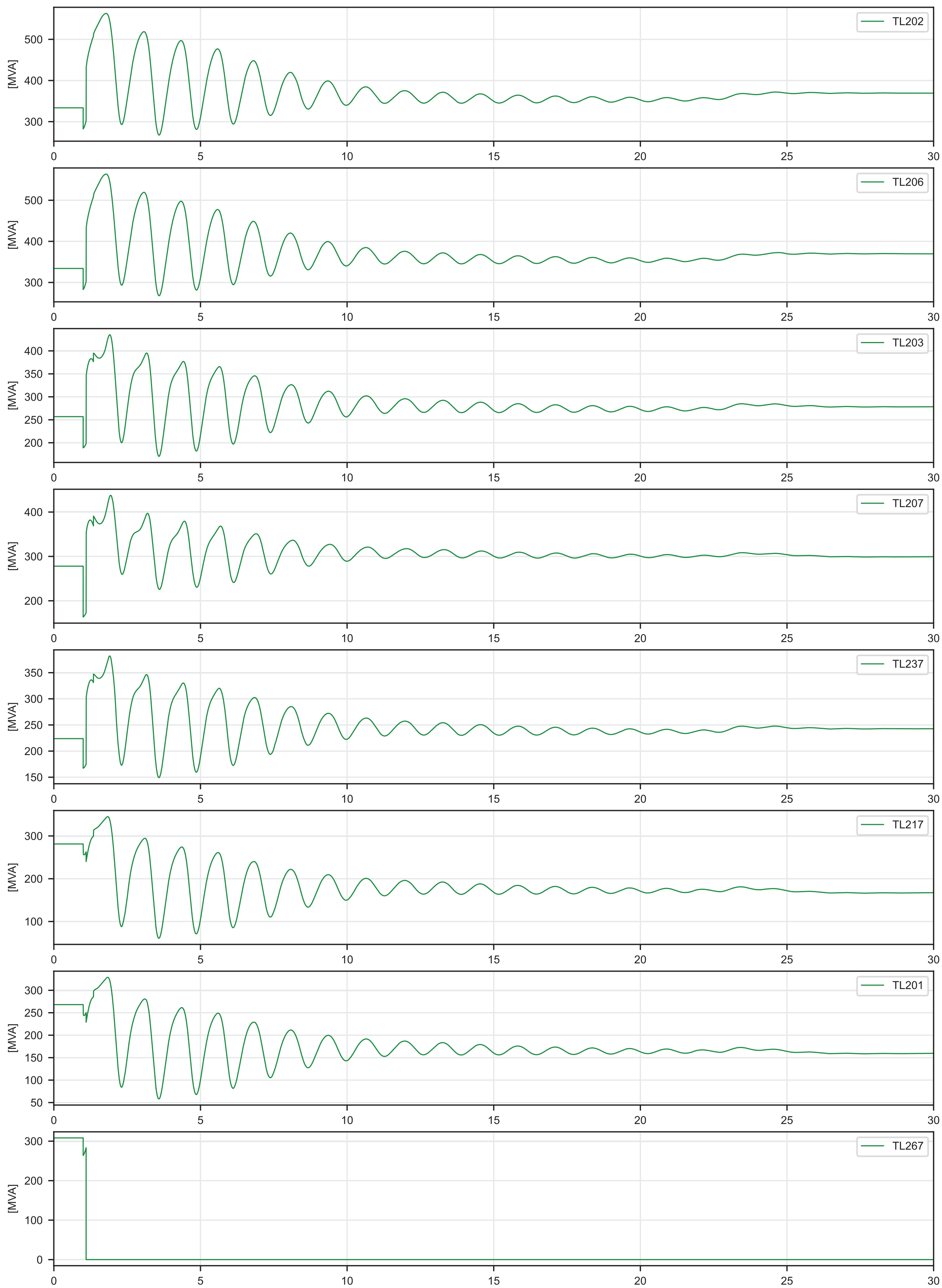
05_2033-34_Base-Peak_TL267WAV-2000MW_3X50MW
Loss of TL267 - no fault | 230 kV Power Flow



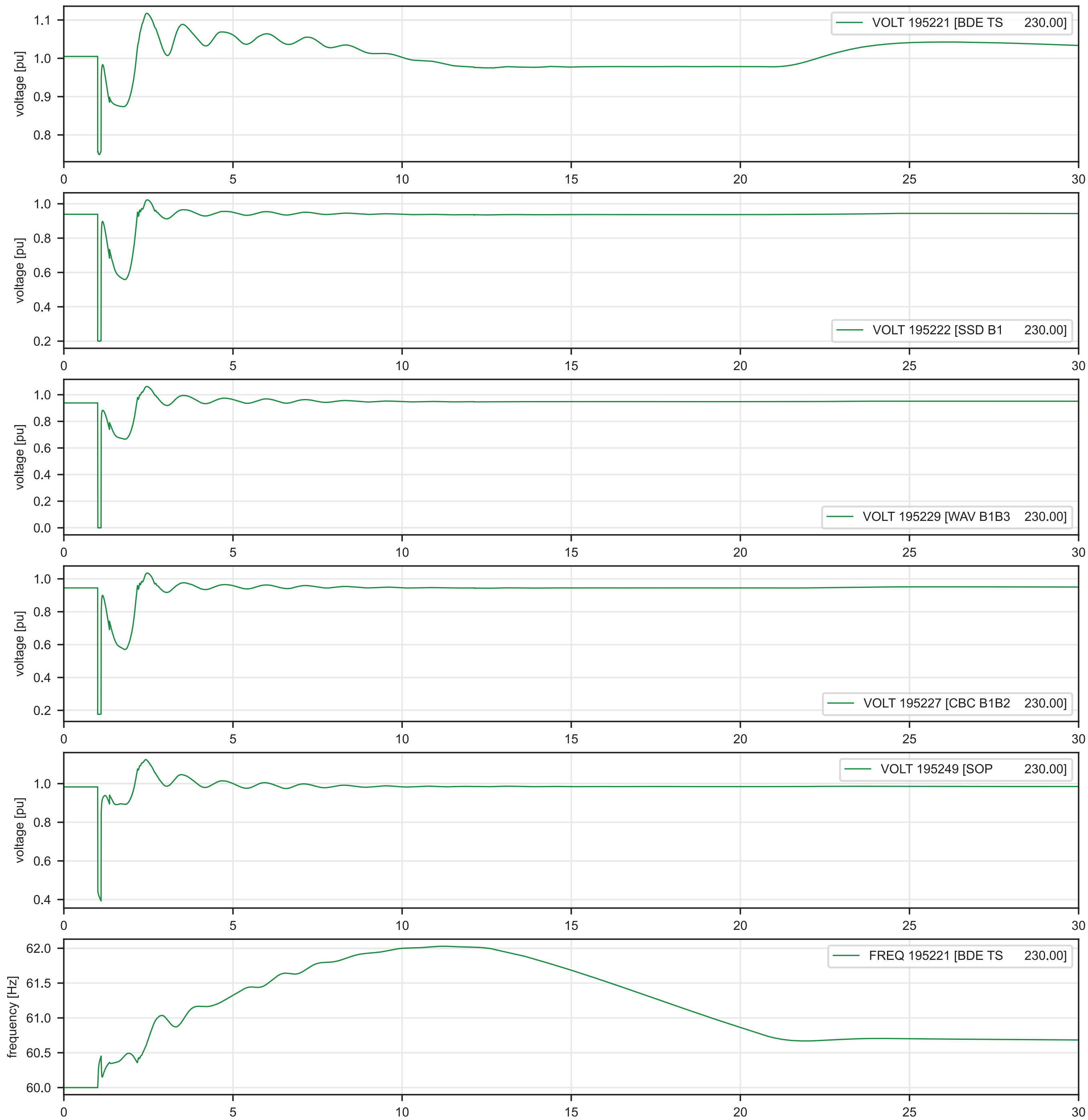
05_2033-34_Base-Peak_TL267WAV-2000MW_3X50MW
Loss of TL267 - SLGF | Voltage / Frequency



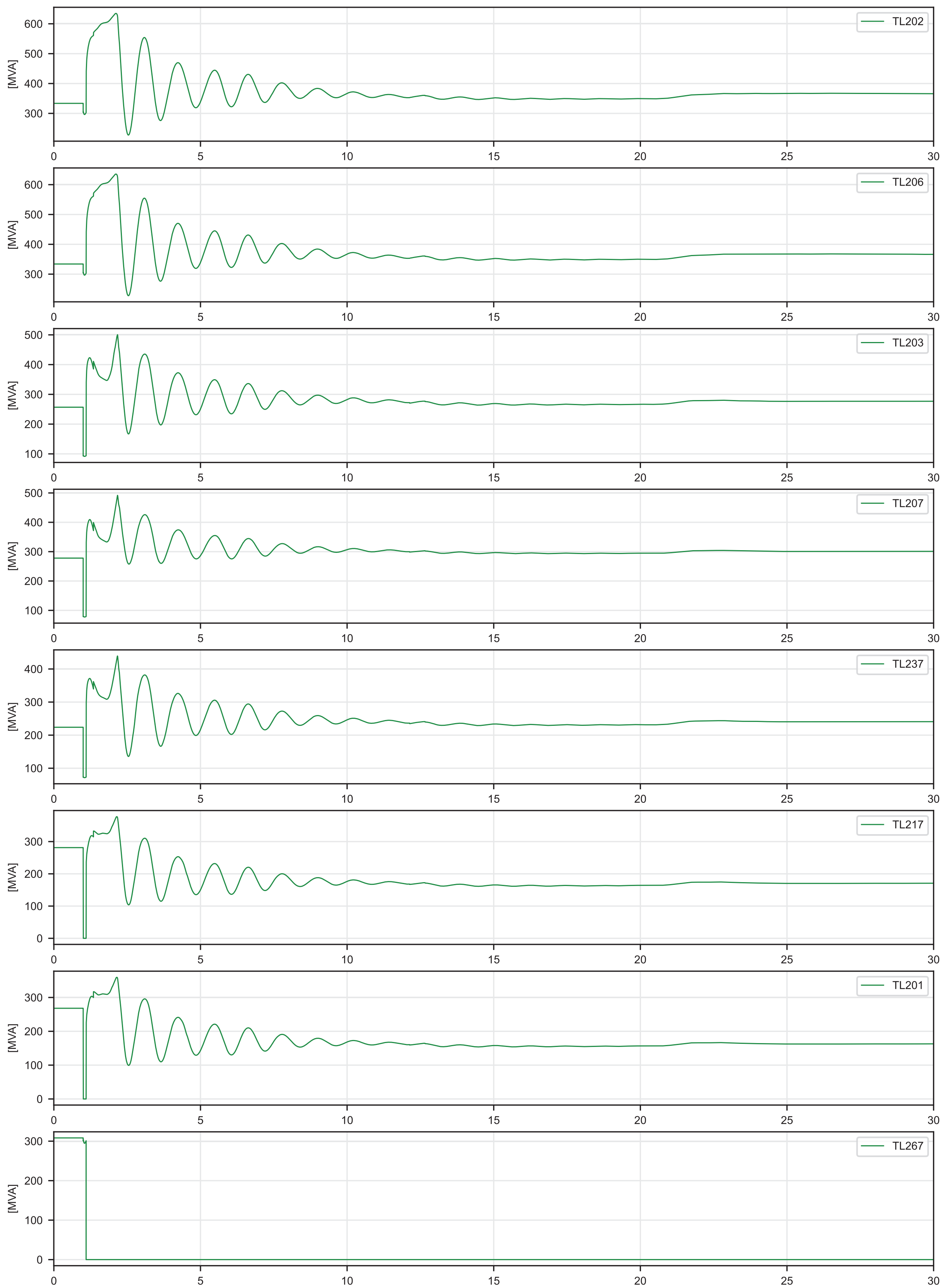
05_2033-34_Base-Peak_TL267WAV-2000MW_3X50MW
Loss of TL267 - SLGF | 230 kV Power Flow



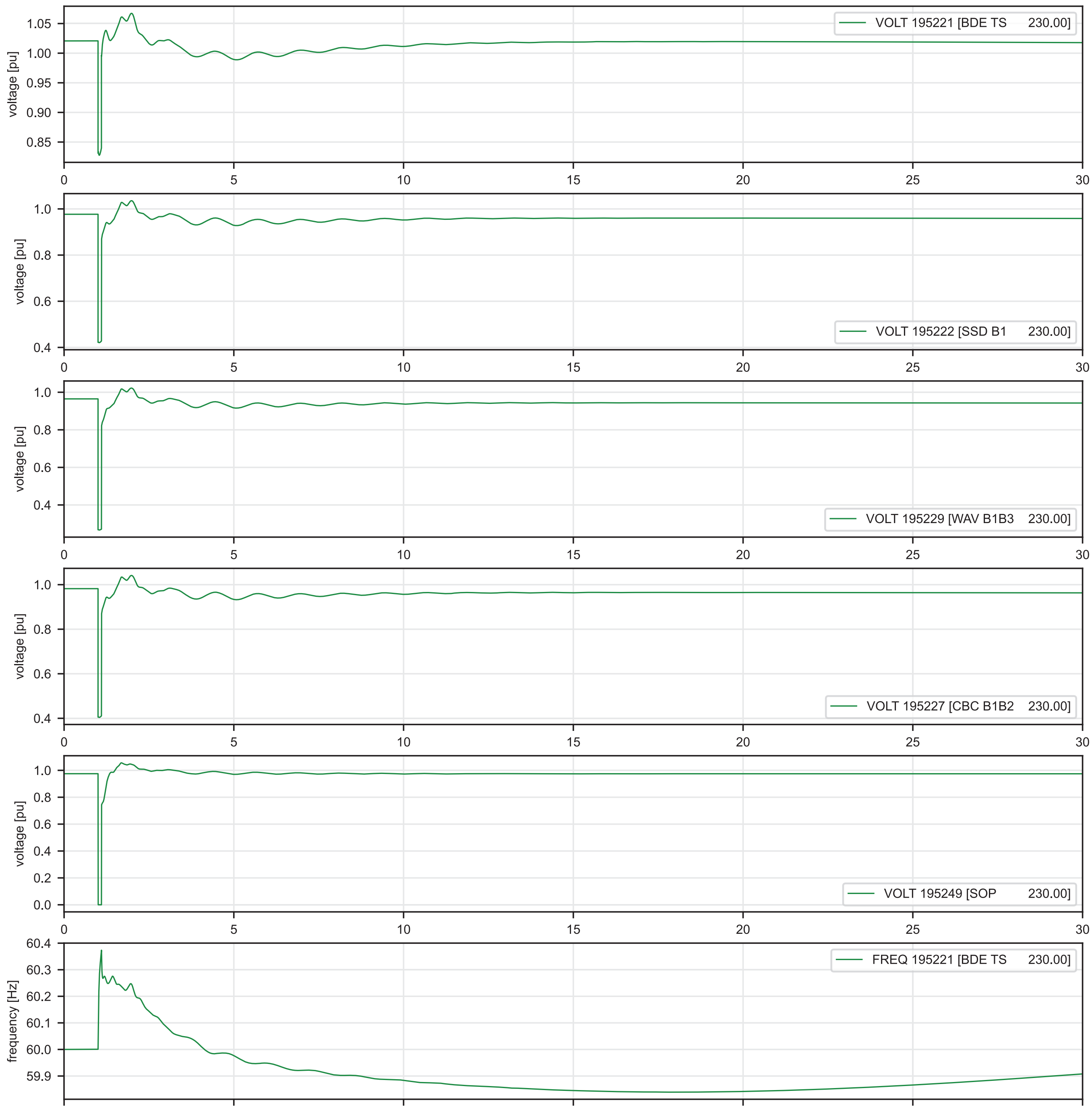
05_2033-34_Base-Peak_TL267WAV-2000MW_3X50MW with STATCOM
Loss of TL267 - 3PF | Voltage / Frequency



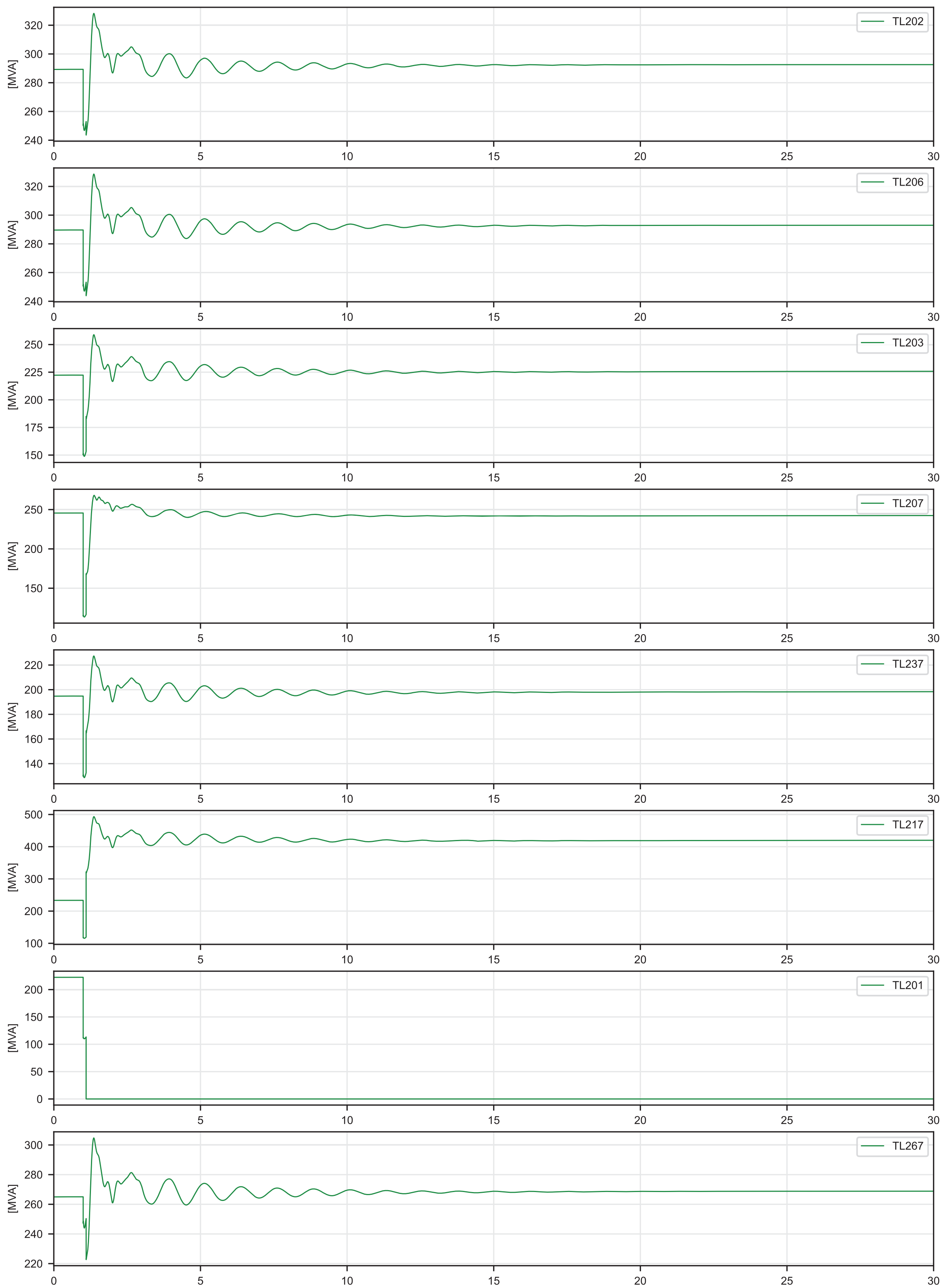
05_2033-34_Base-Peak_TL267WAV-2000MW_3X50MW with STATCOM
Loss of TL267 - 3PF | 230 kV Power Flow



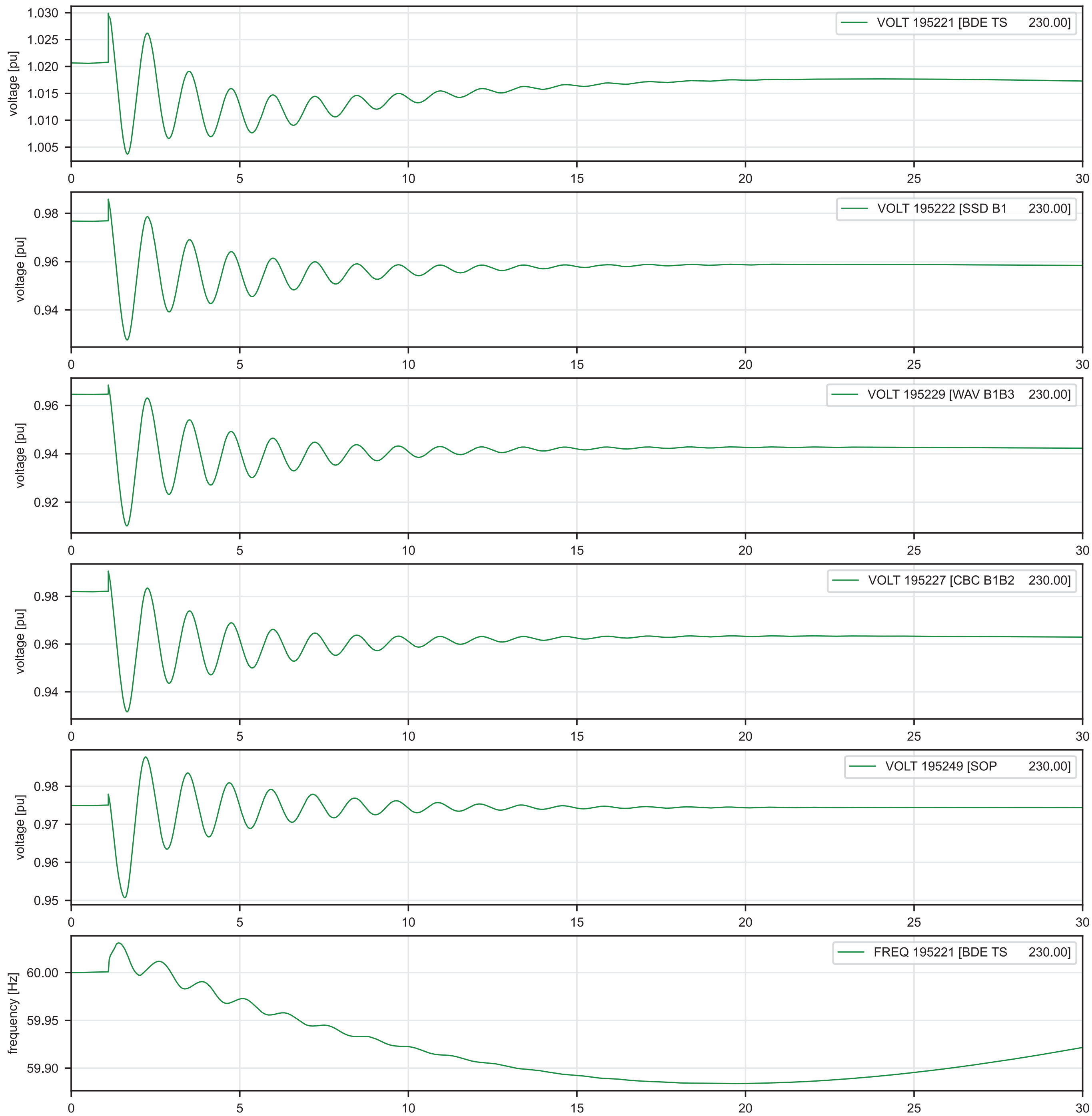
06_2033-34_Base-Peak_TL201-TL217_1800MW_3x50MW
Loss of TL201 - 3PF | Voltage / Frequency



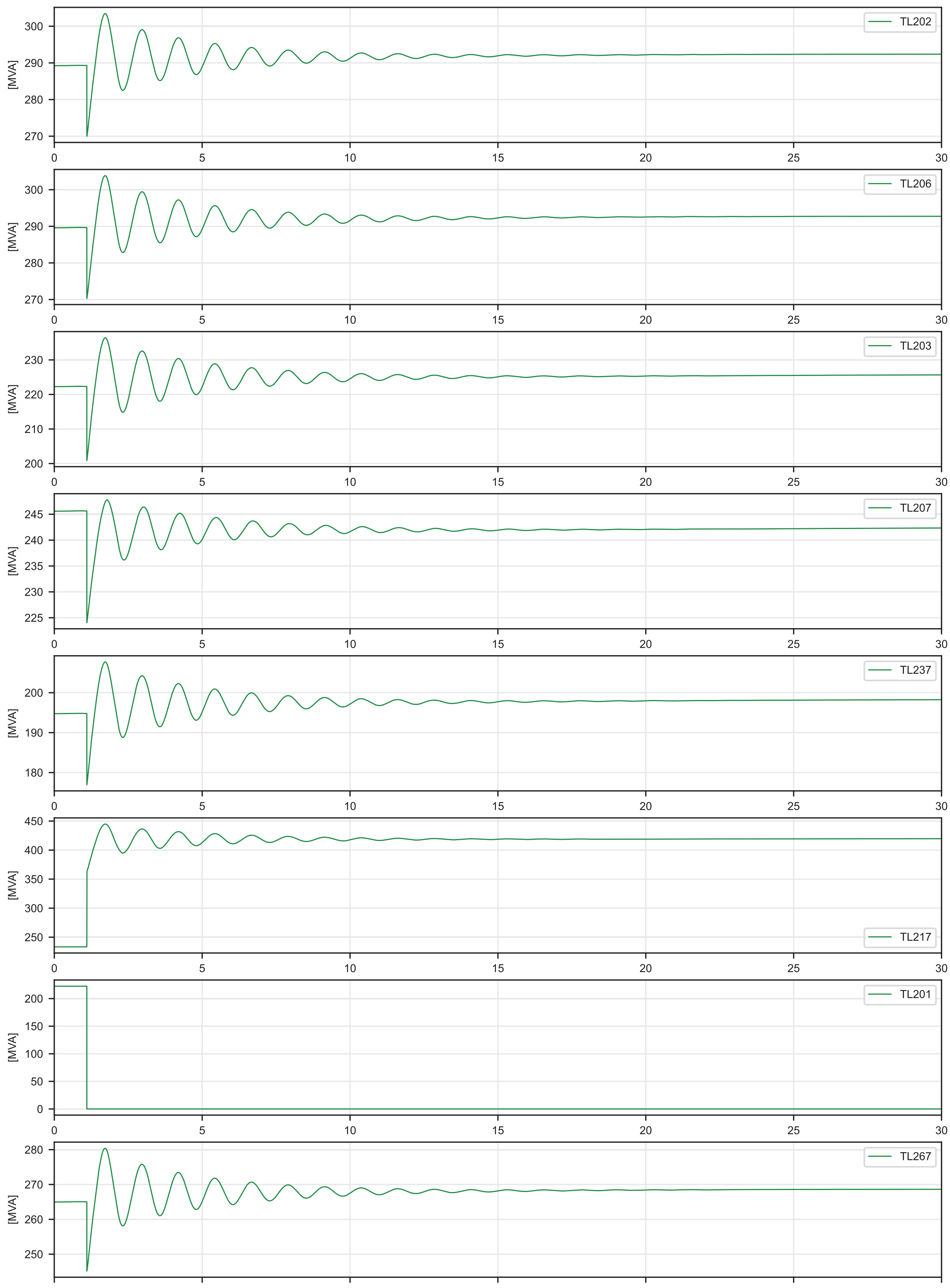
06_2033-34_Base-Peak_TL201-TL217_1800MW_3x50MW
Loss of TL201 - 3PF | 230 kV Power Flow



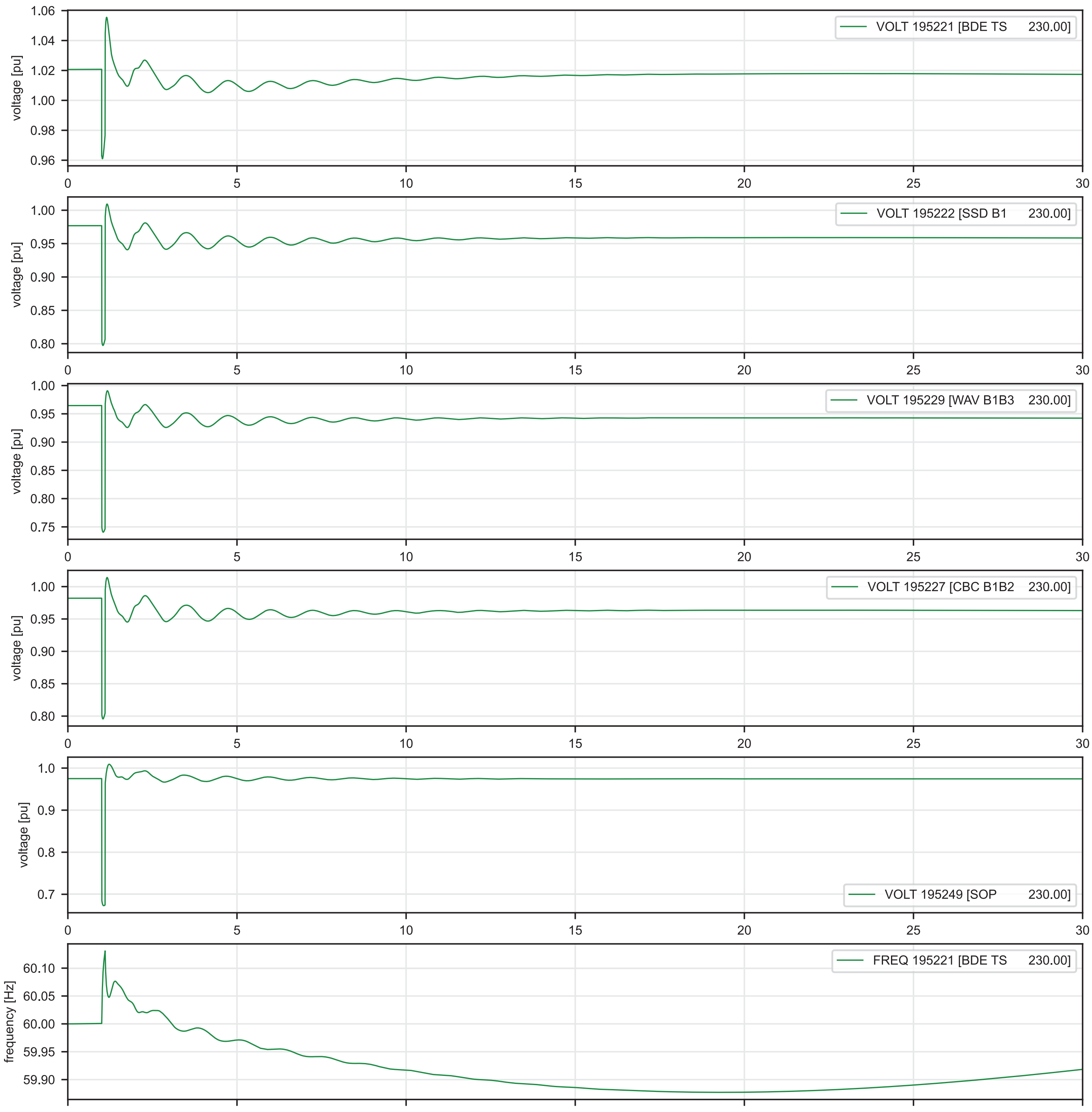
06_2033-34_Base-Peak_TL201-TL217_1800MW_3x50MW
Loss of TL201 - no fault | Voltage / Frequency



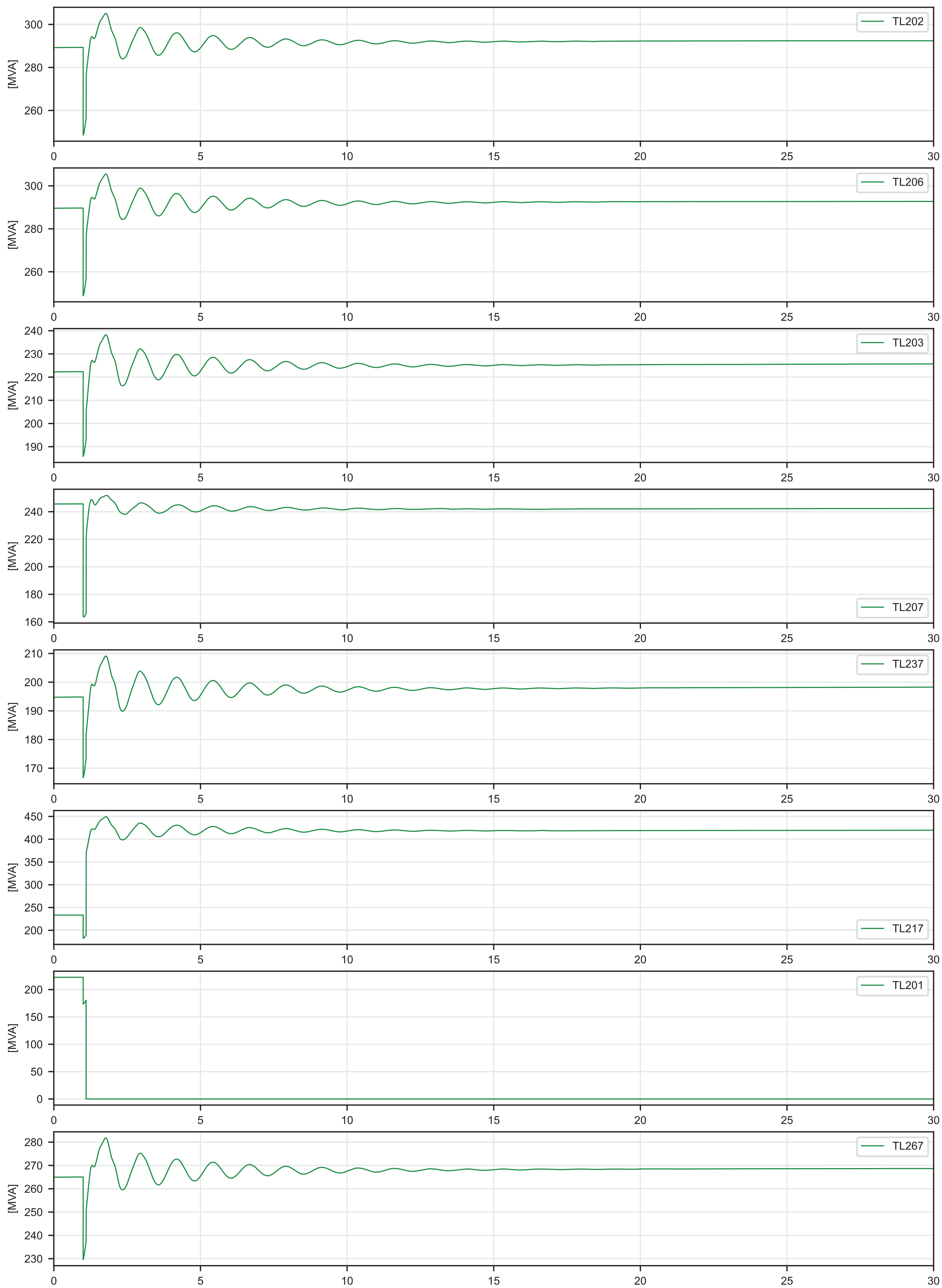
06_2033-34_Base-Peak_TL201-TL217_1800MW_3x50MW
Loss of TL201 - no fault | 230 kV Power Flow



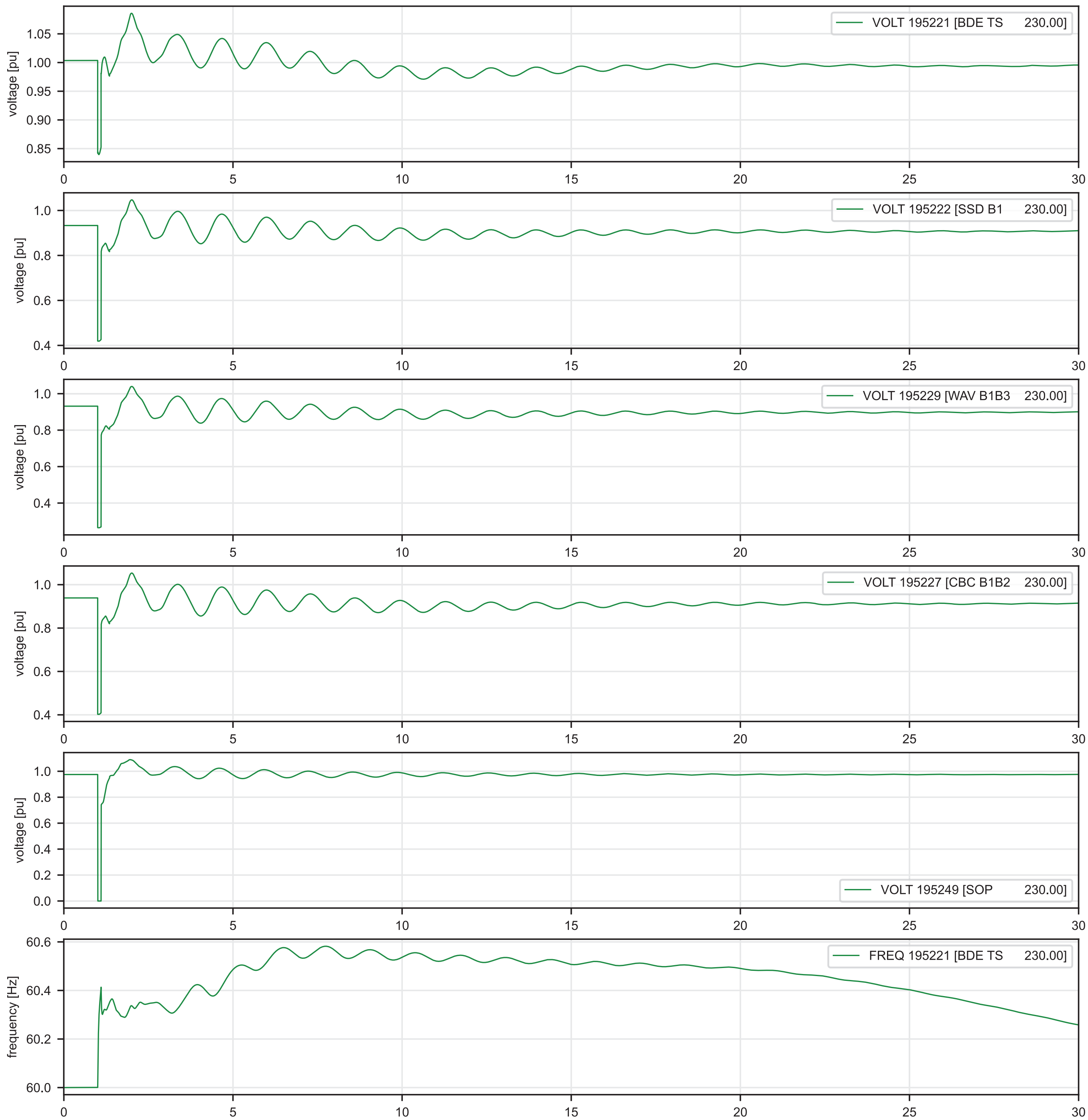
06_2033-34_Base-Peak_TL201-TL217_1800MW_3x50MW
Loss of TL201 - SLGF | Voltage / Frequency



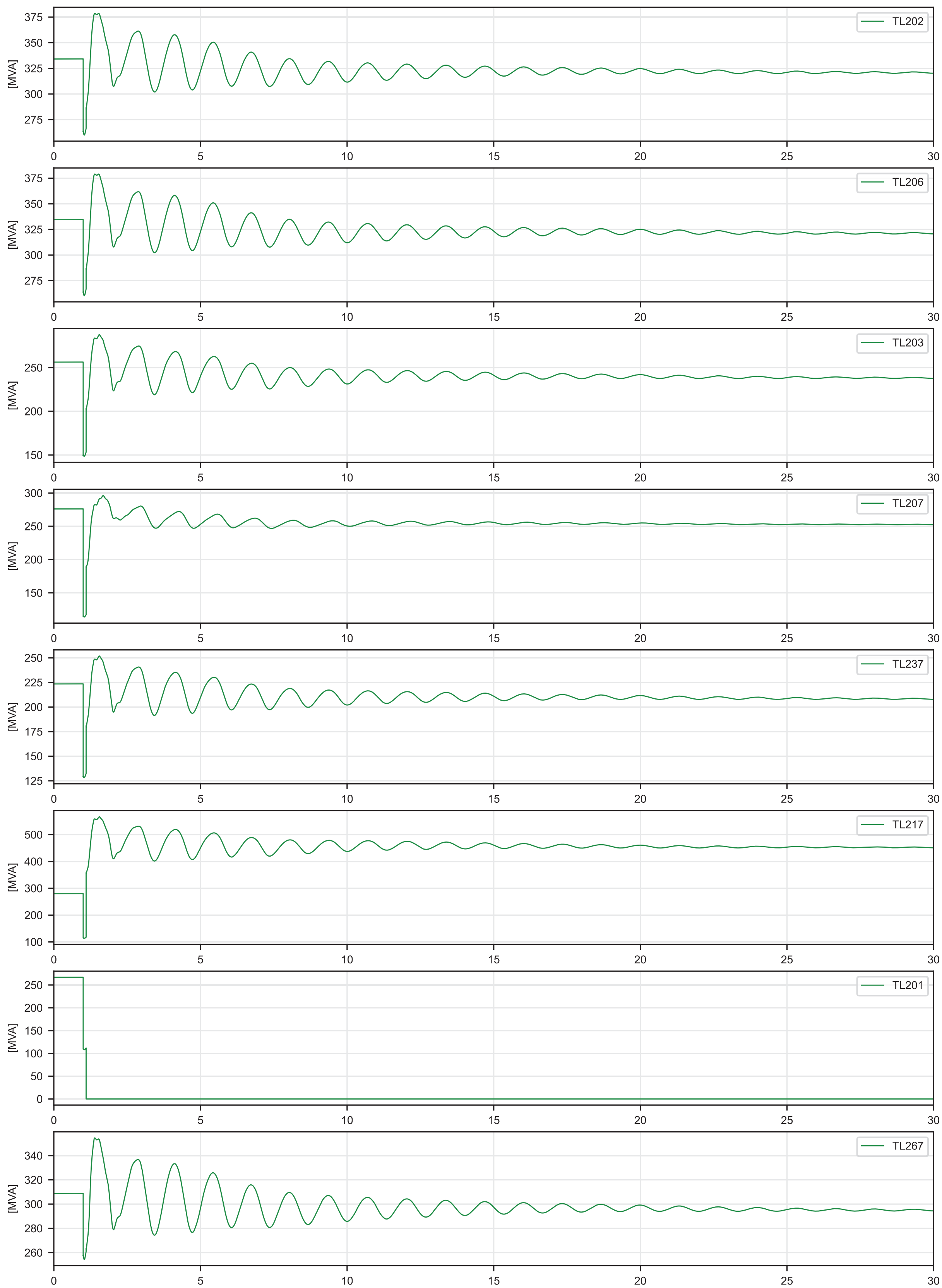
06_2033-34_Base-Peak_TL201-TL217_1800MW_3x50MW
Loss of TL201 - SLGF | 230 kV Power Flow



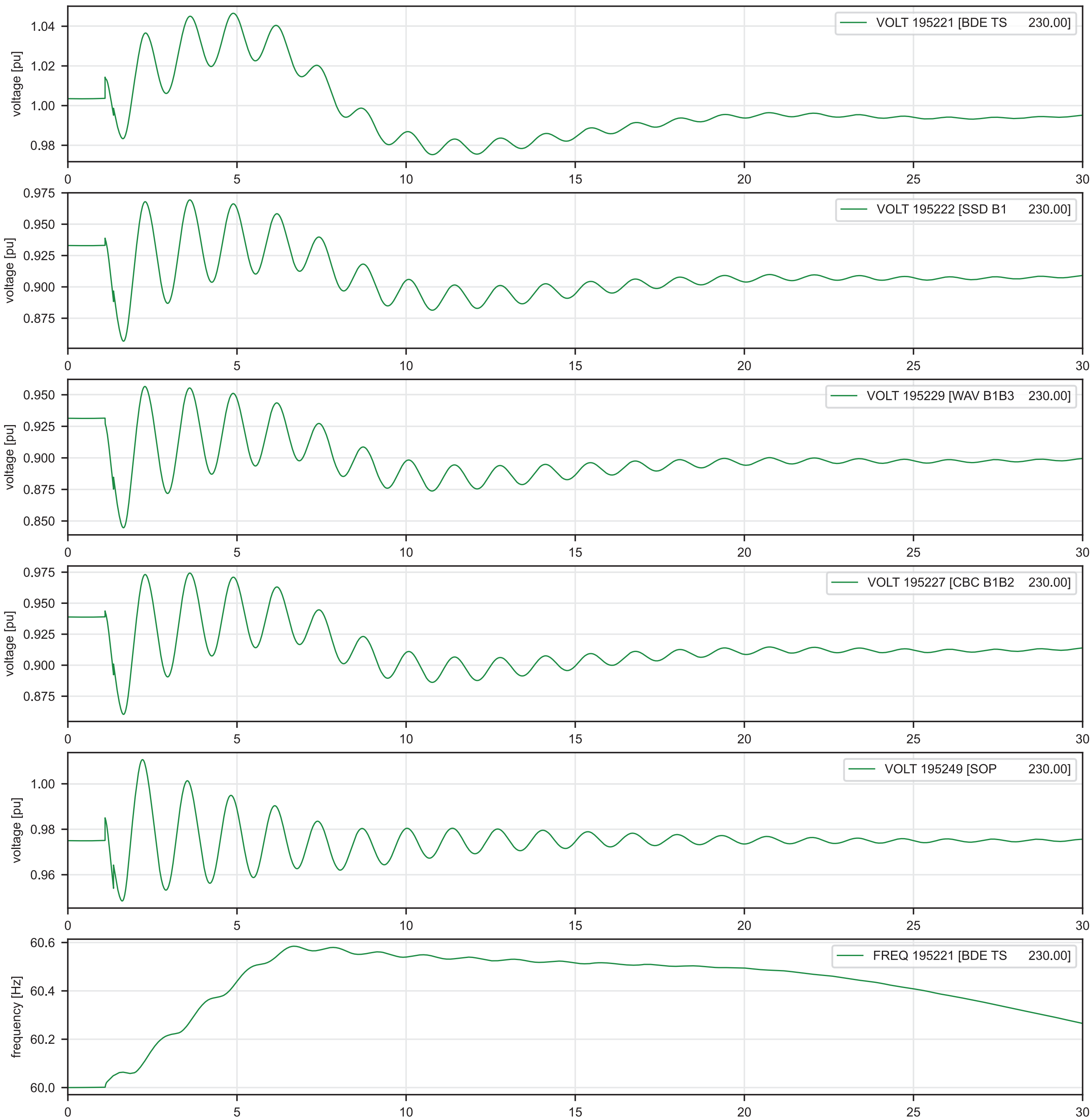
06_2033-34_Base-Peak_TL201-TL217_2000MW_3x50MW
Loss of TL201 - 3PF | Voltage / Frequency



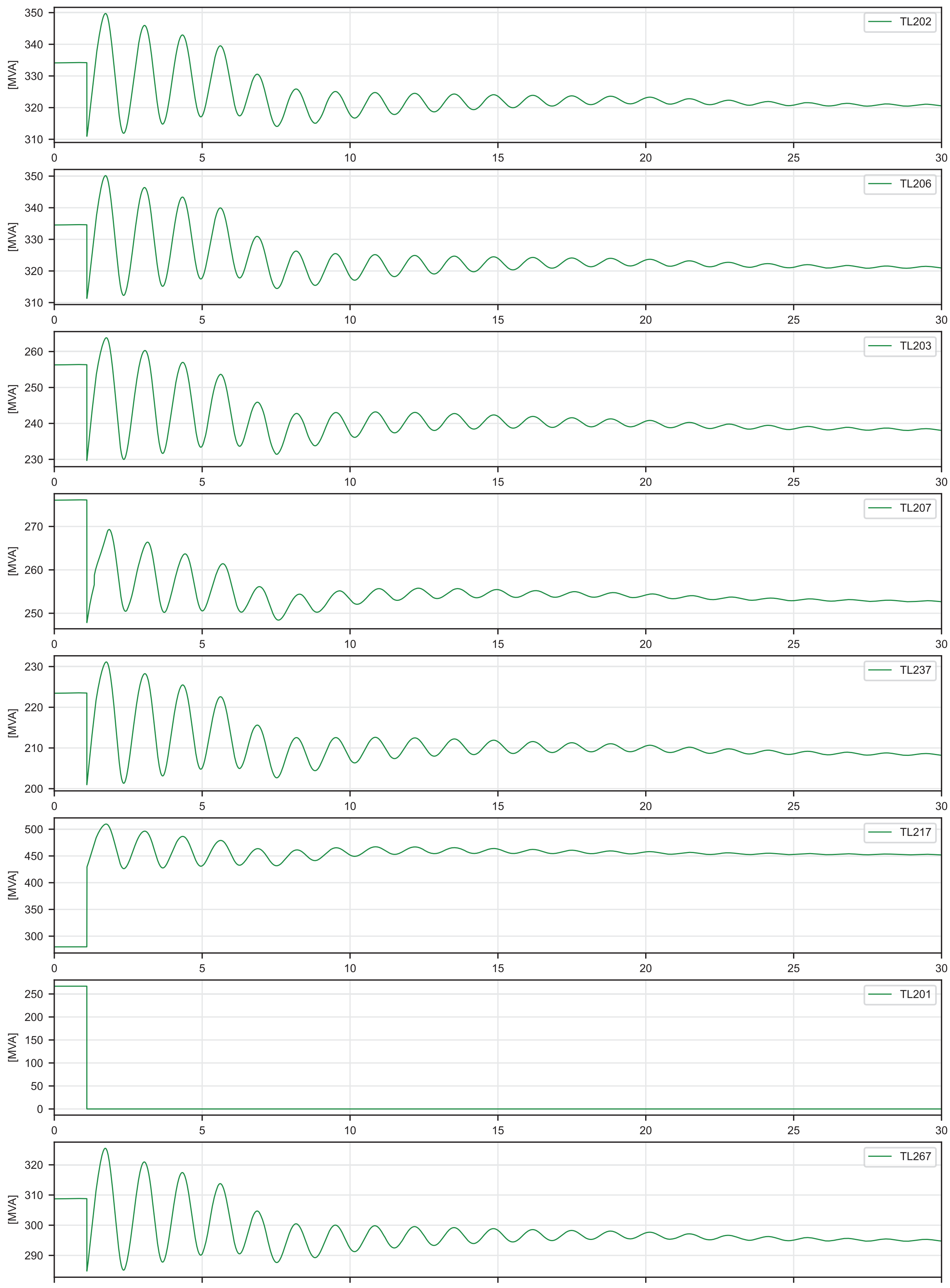
06_2033-34_Base-Peak_TL201-TL217_2000MW_3x50MW
Loss of TL201 - 3PF | 230 kV Power Flow



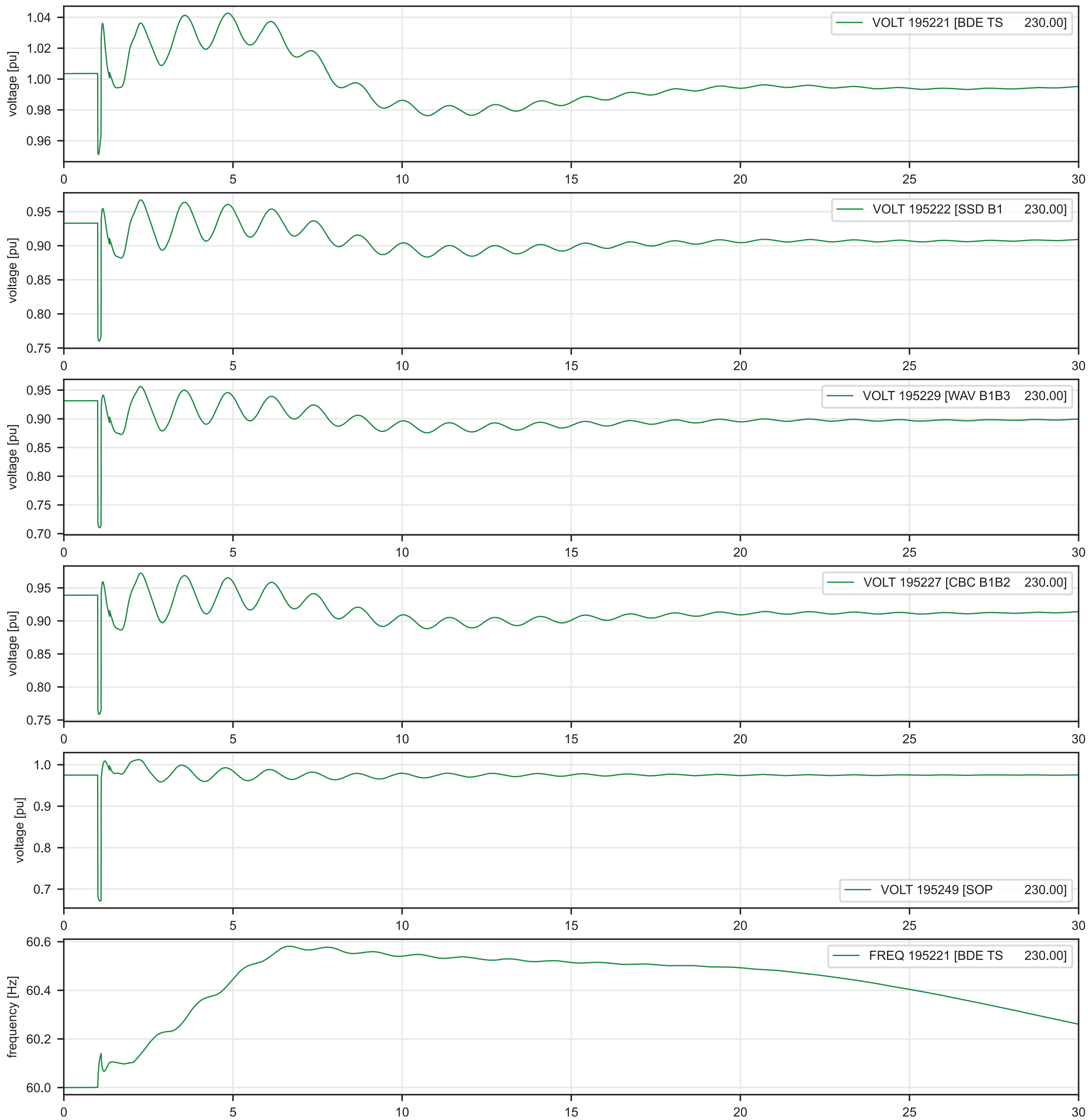
06_2033-34_Base-Peak_TL201-TL217_2000MW_3x50MW
Loss of TL201 - no fault | Voltage / Frequency



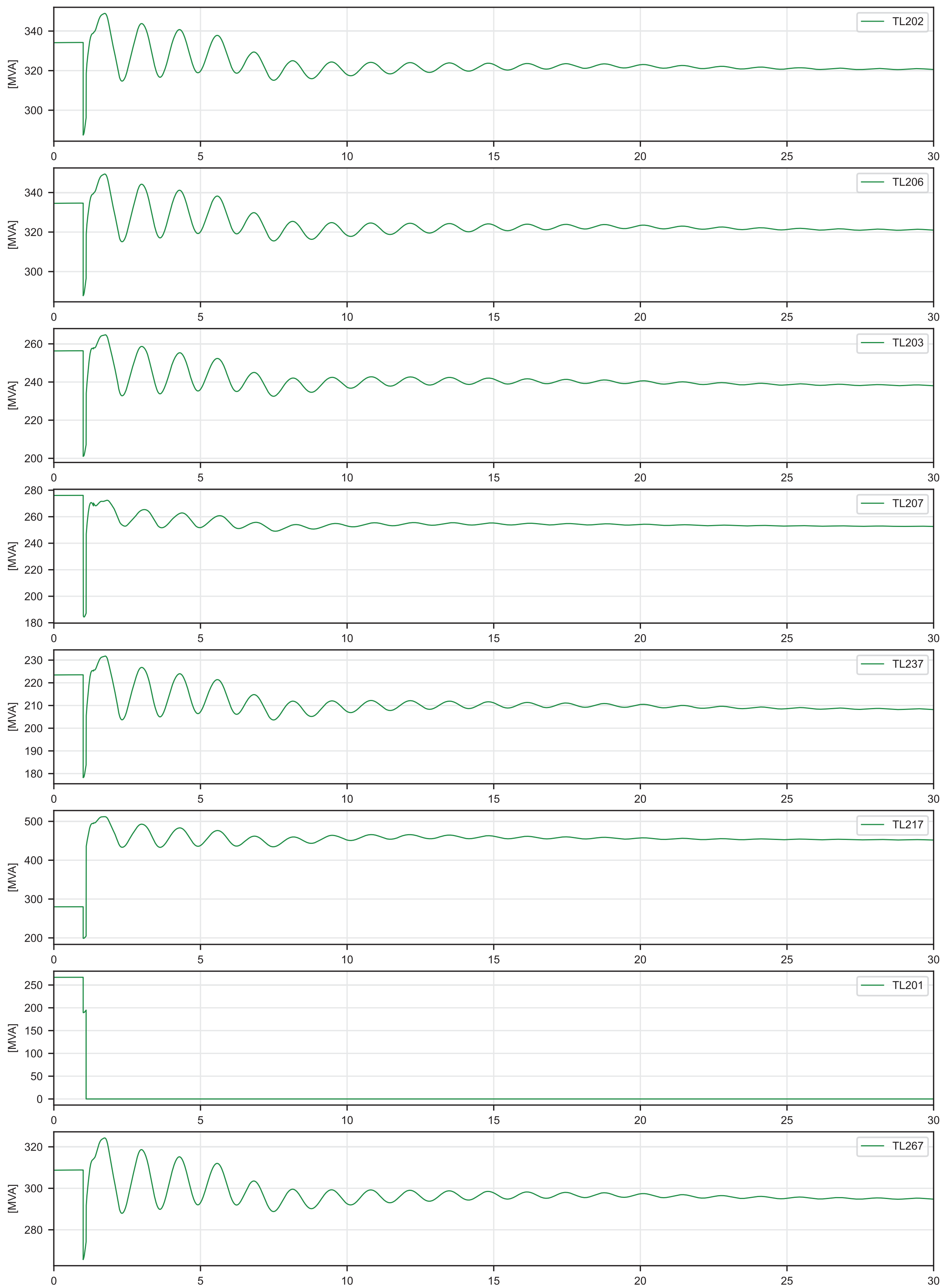
06_2033-34_Base-Peak_TL201-TL217_2000MW_3x50MW
Loss of TL201 - no fault | 230 kV Power Flow



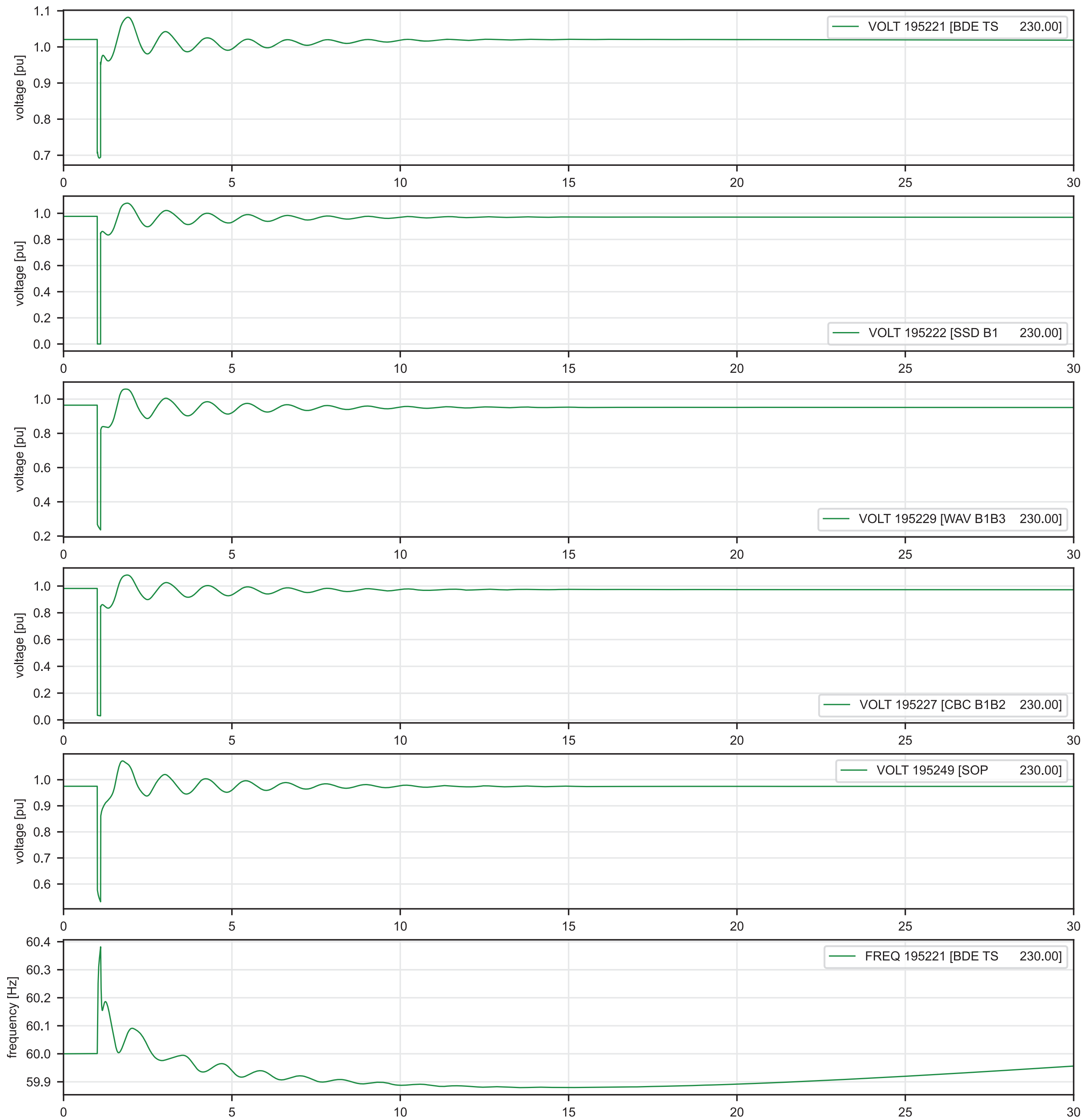
06_2033-34_Base-Peak_TL201-TL217_2000MW_3x50MW
Loss of TL201 - SLGF | Voltage / Frequency



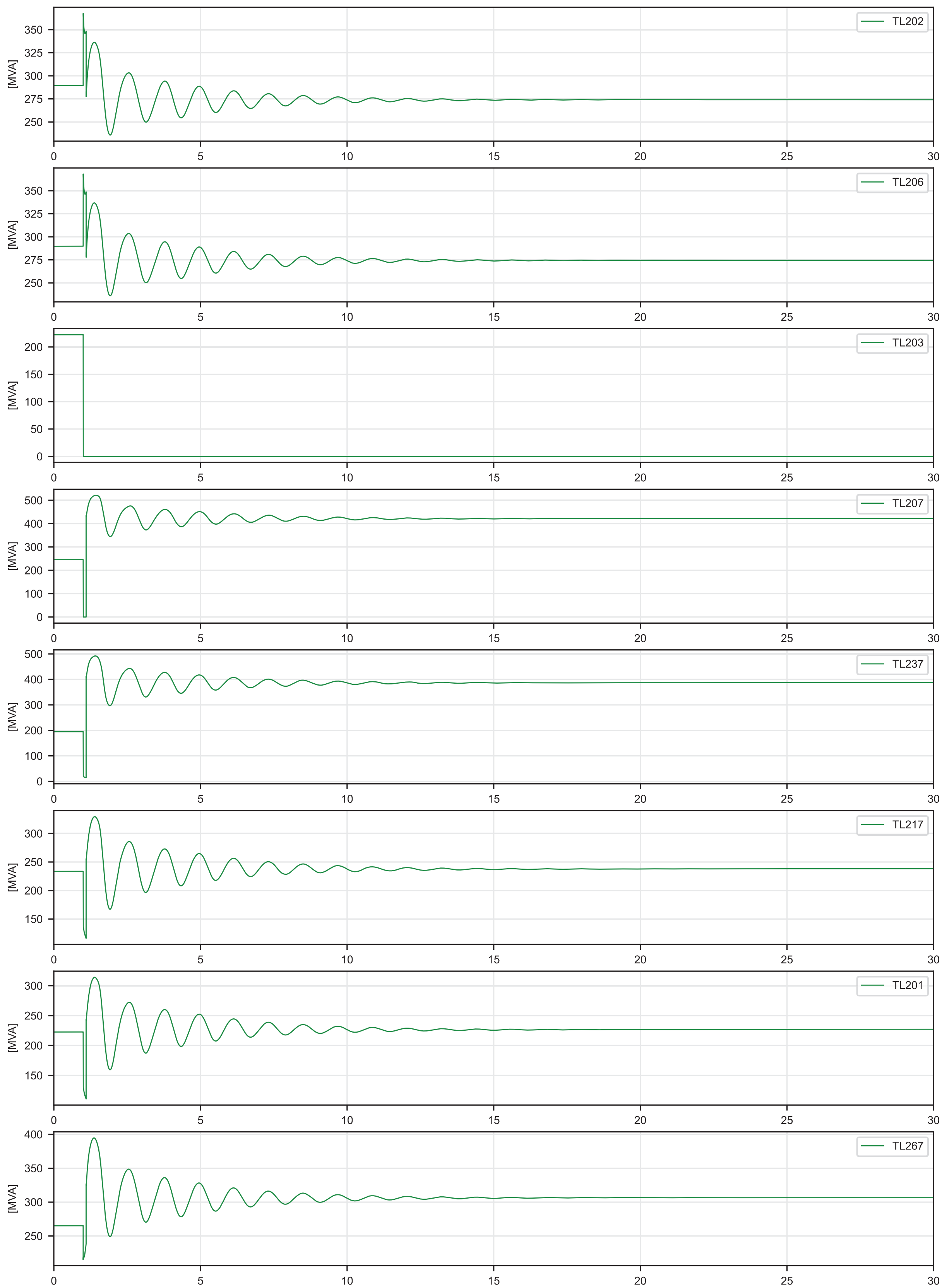
06_2033-34_Base-Peak_TL201-TL217_2000MW_3x50MW
Loss of TL201 - SLGF | 230 kV Power Flow

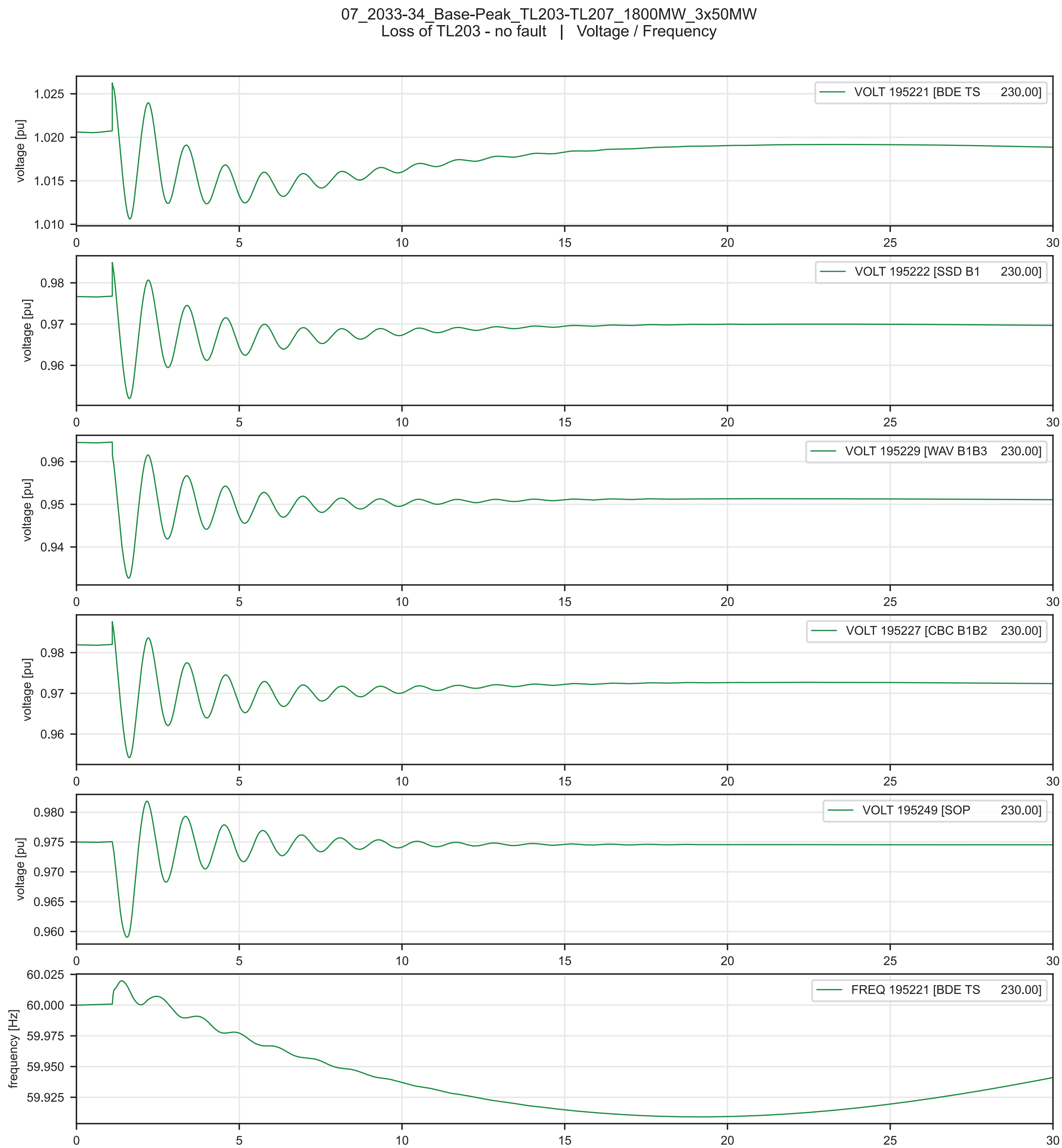


07_2033-34_Base-Peak_TL203-TL207_1800MW_3x50MW
Loss of TL203 - 3PF | Voltage / Frequency

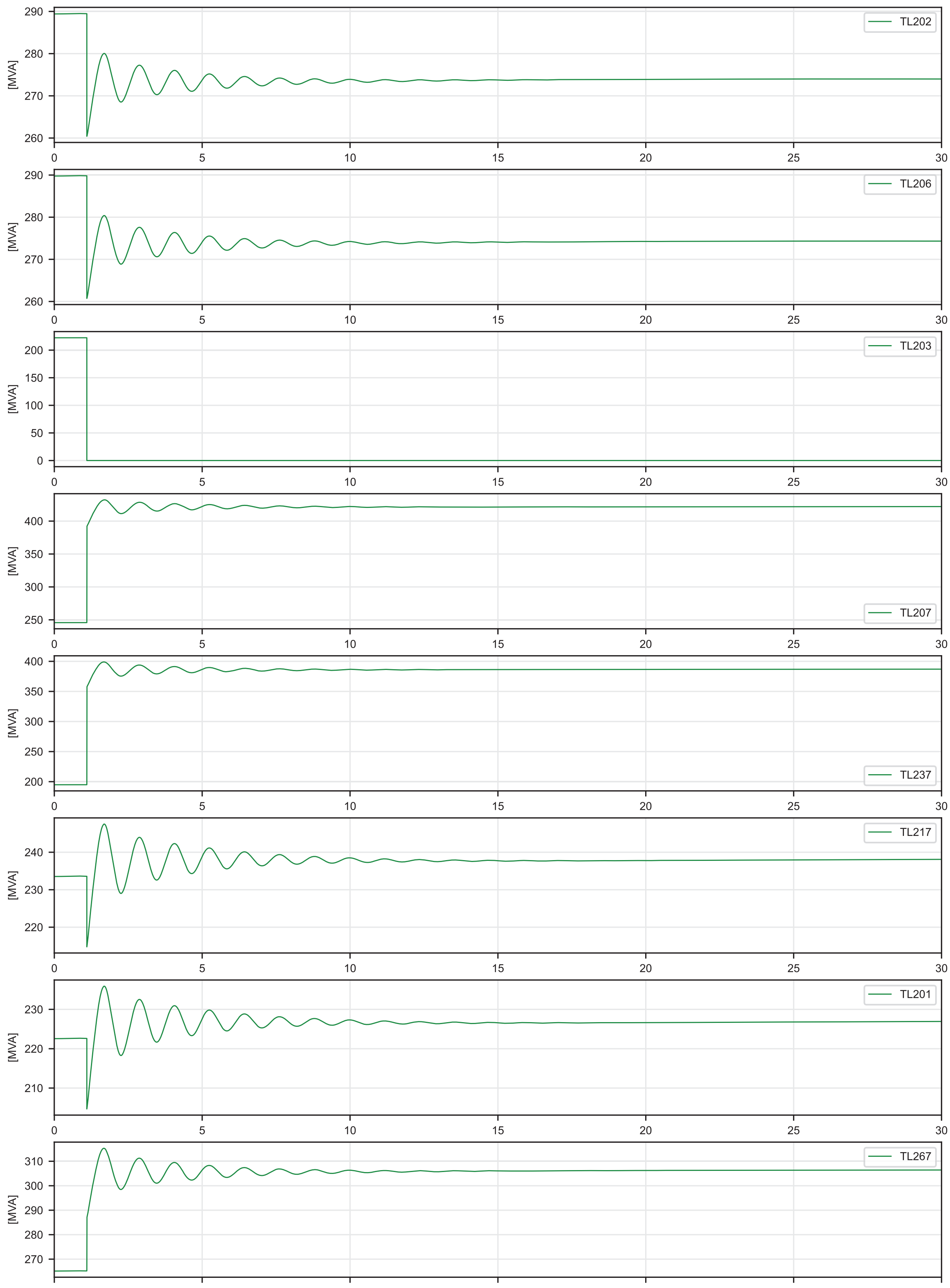


07_2033-34_Base-Peak_TL203-TL207_1800MW_3x50MW
Loss of TL203 - 3PF | 230 kV Power Flow

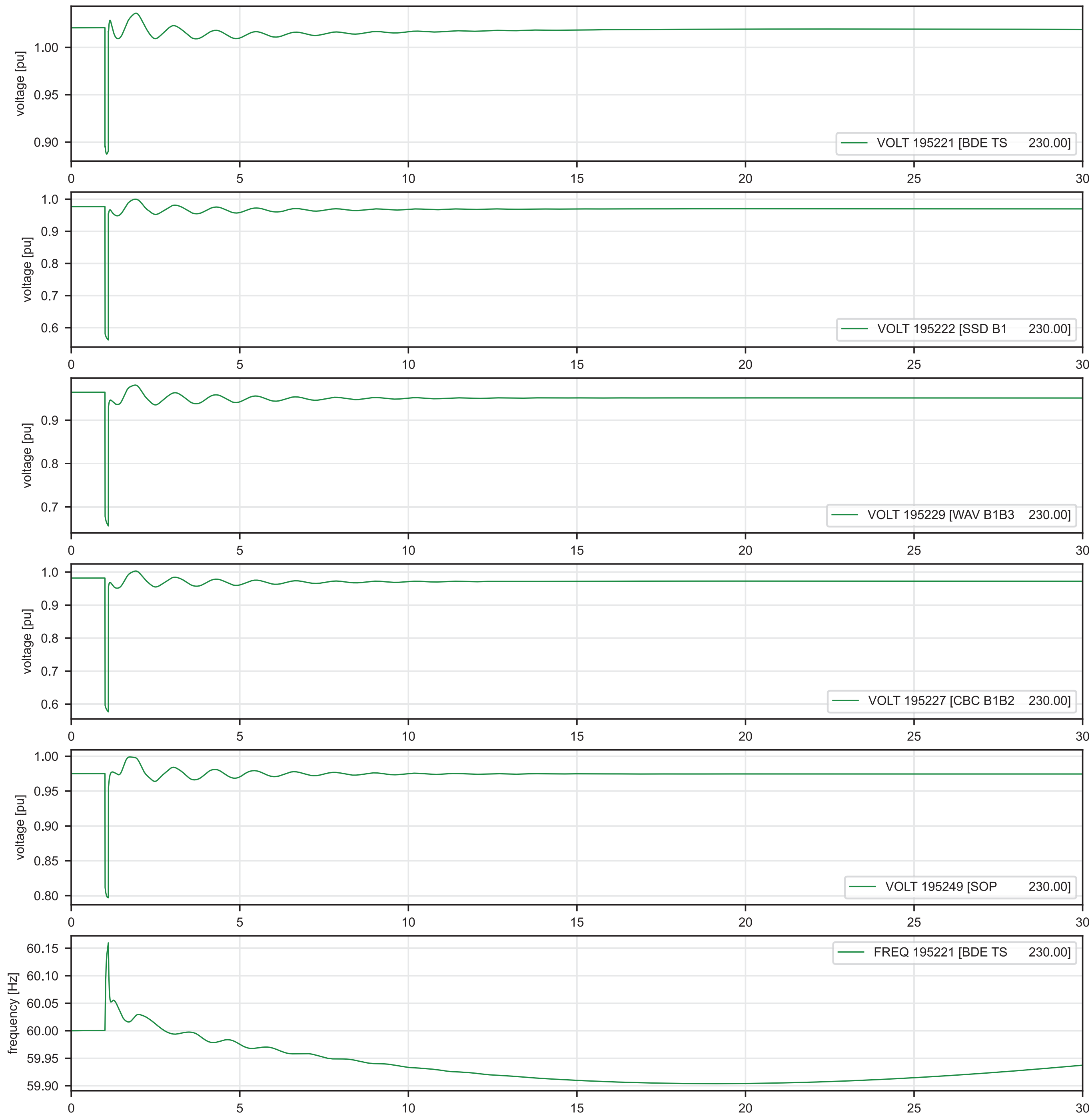



07_2033-34_Base-Peak_TL203-TL207_1800MW_3x50MW
Loss of TL203 - no fault | Voltage / Frequency
VOLT 195221 [BDE TS 230.00]
VOLT 195222 [SSD B1 230.00]
VOLT 195229 [WAV B1B3 230.00]
VOLT 195227 [CBC B1B2 230.00]
VOLT 195249 [SOP 230.00]
FREQ 195221 [BDE TS 230.00]
voltage [pu]
frequency [Hz]

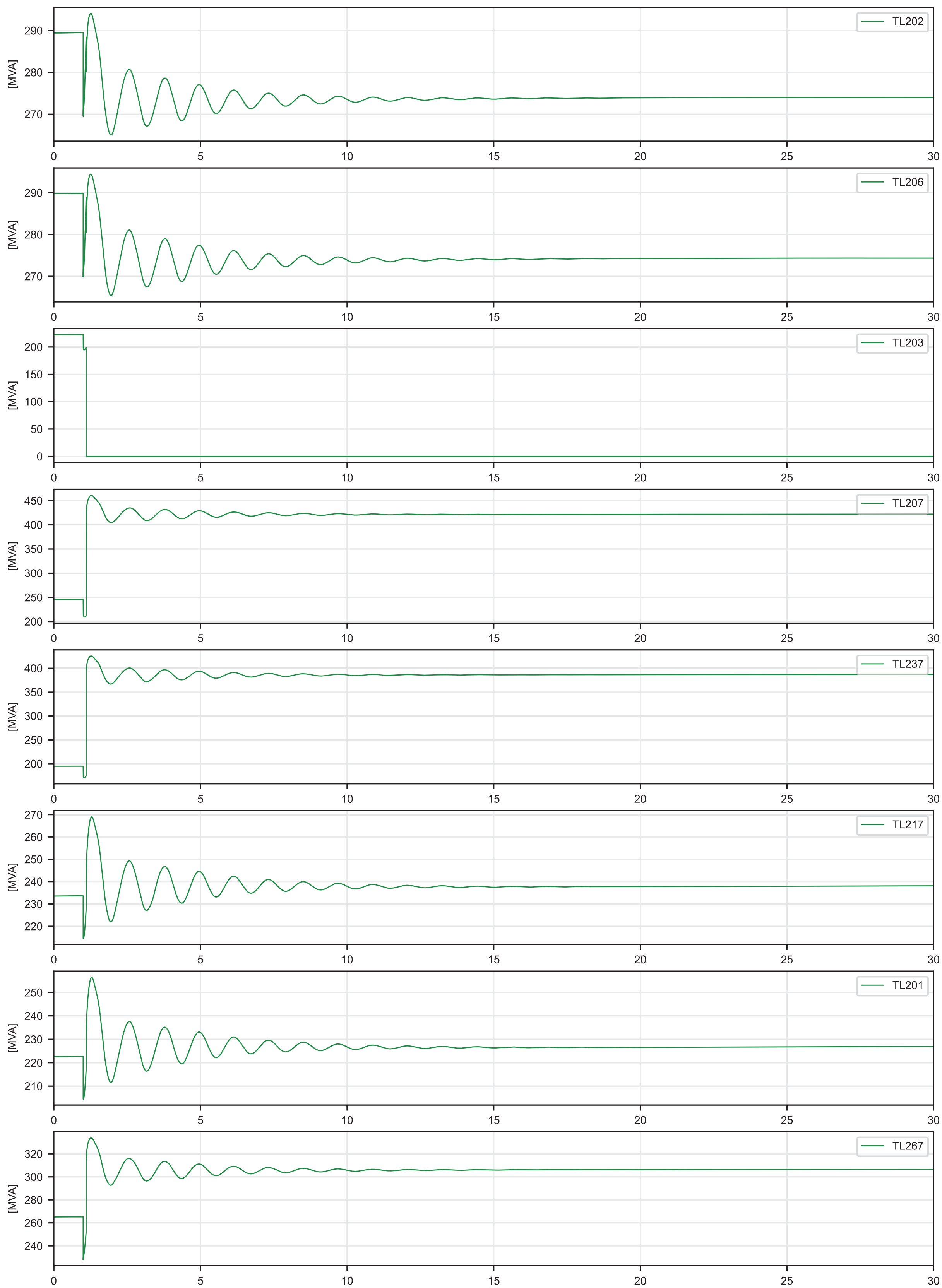
07_2033-34_Base-Peak_TL203-TL207_1800MW_3x50MW
Loss of TL203 - no fault | 230 kV Power Flow



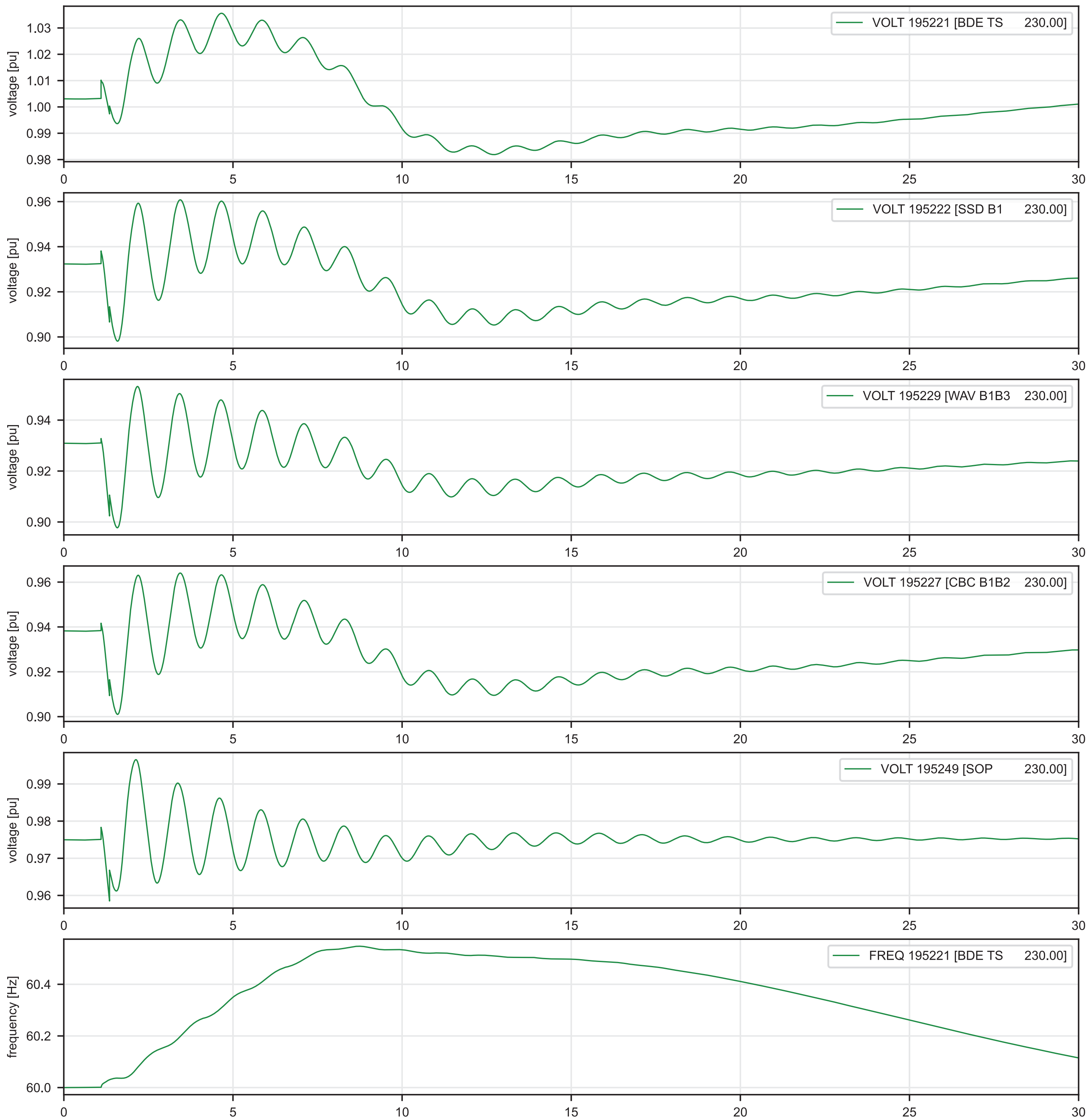
07_2033-34_Base-Peak_TL203-TL207_1800MW_3x50MW
Loss of TL203 - SLGF | Voltage / Frequency



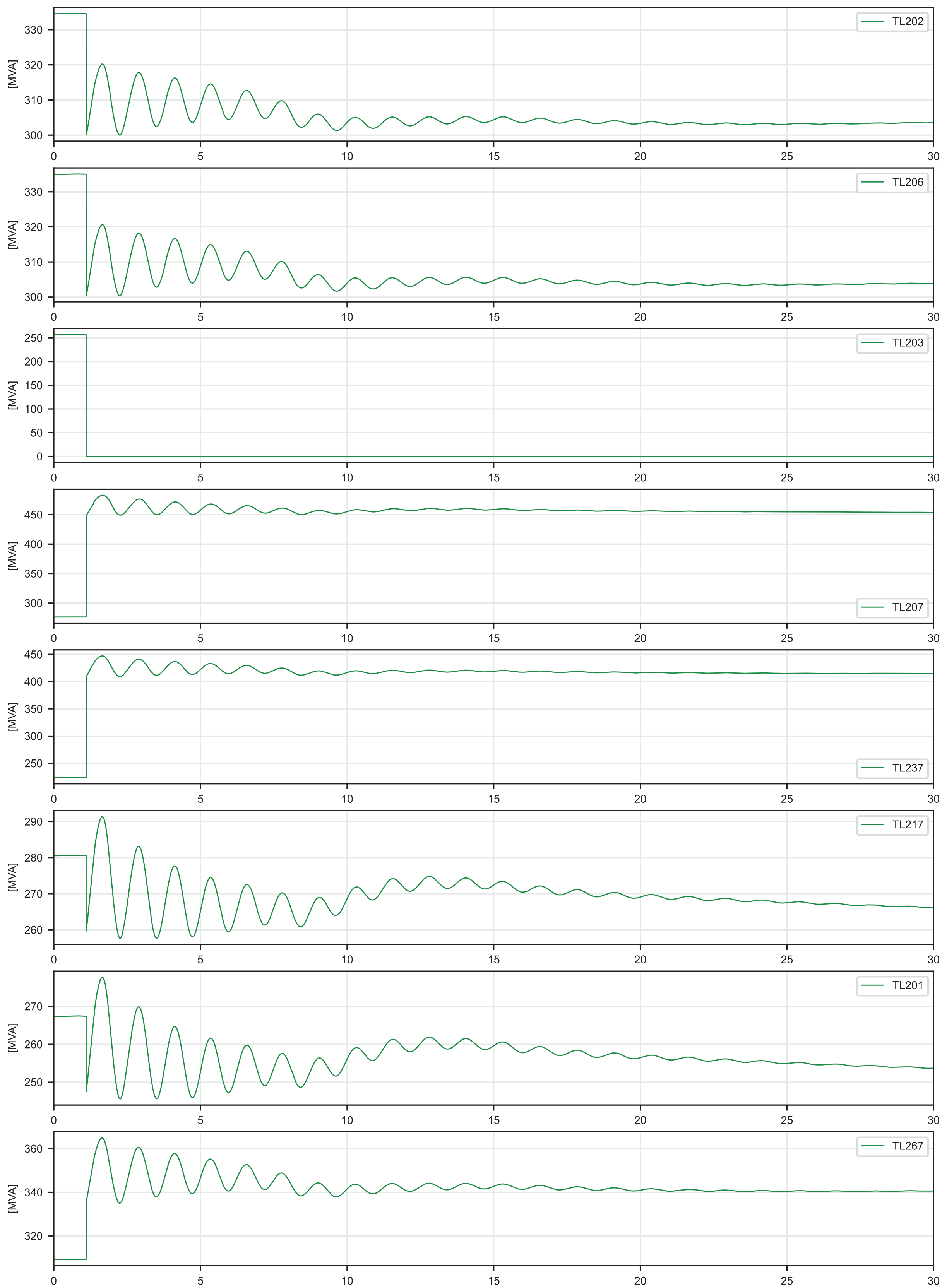
07_2033-34_Base-Peak_TL203-TL207_1800MW_3x50MW
Loss of TL203 - SLGF | 230 kV Power Flow



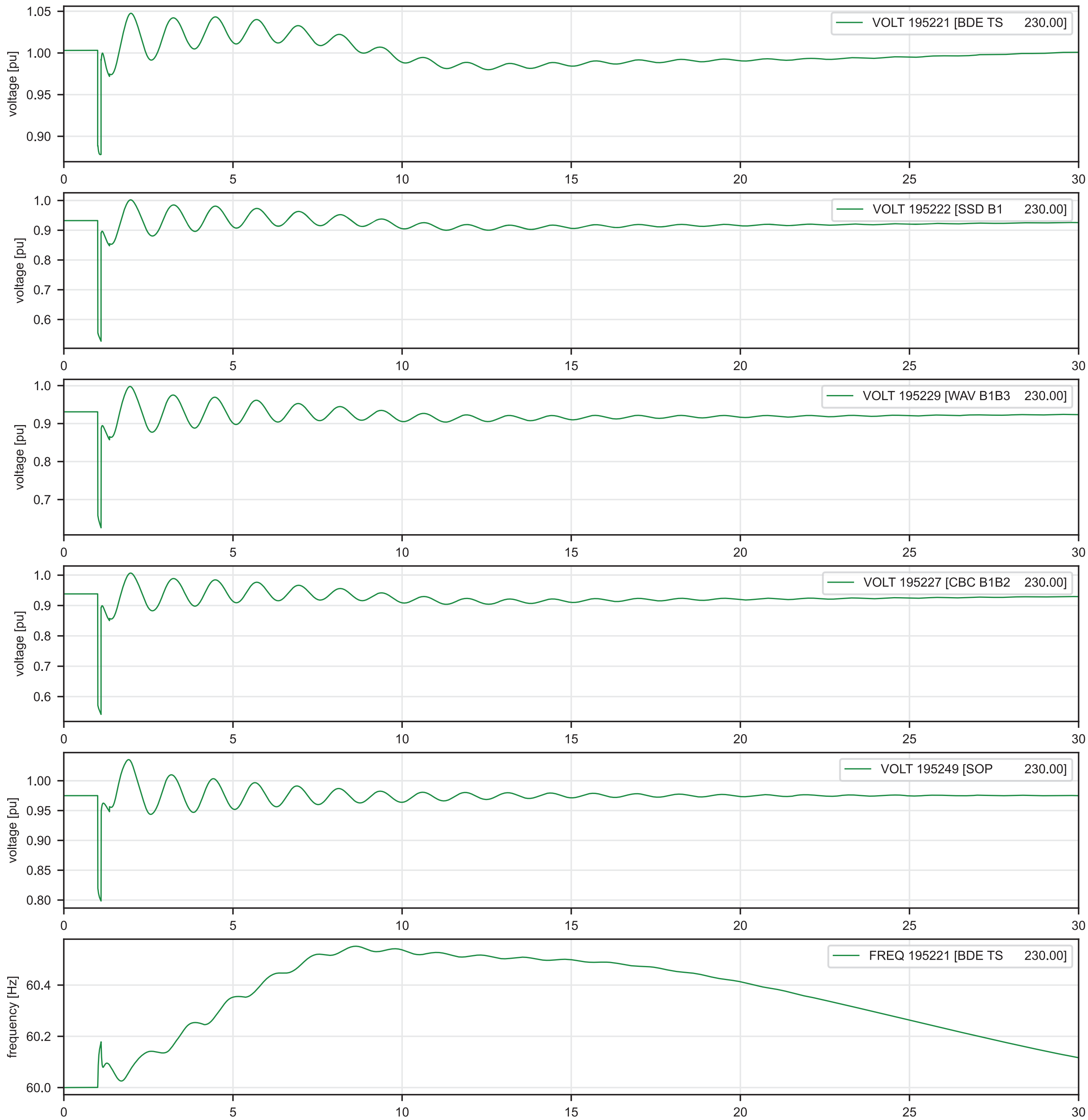
07_2033-34_Base-Peak_TL203-TL207_2000MW_3x50MW
Loss of TL203 - no fault | Voltage / Frequency



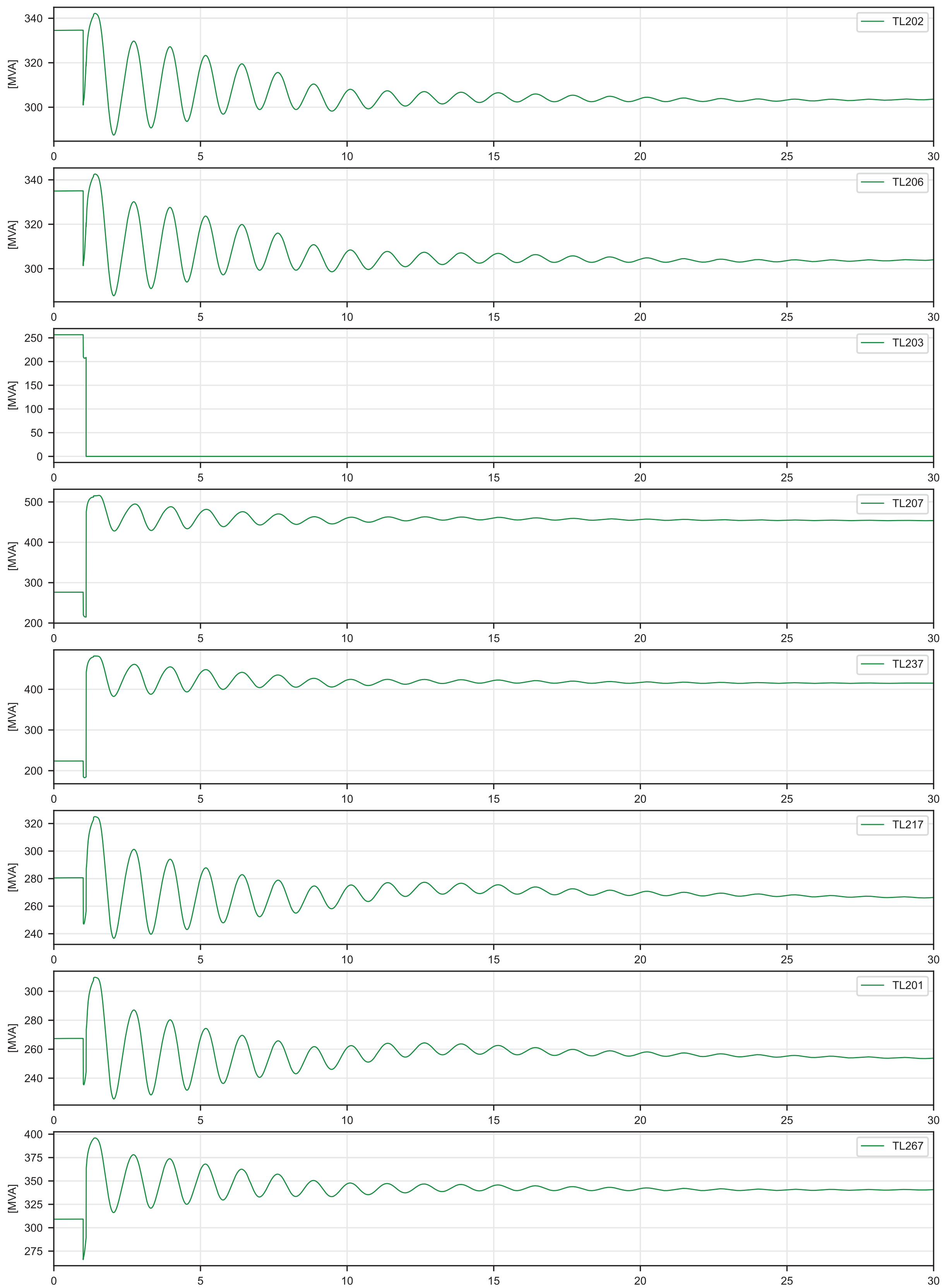
07_2033-34_Base-Peak_TL203-TL207_2000MW_3x50MW
Loss of TL203 - no fault | 230 kV Power Flow



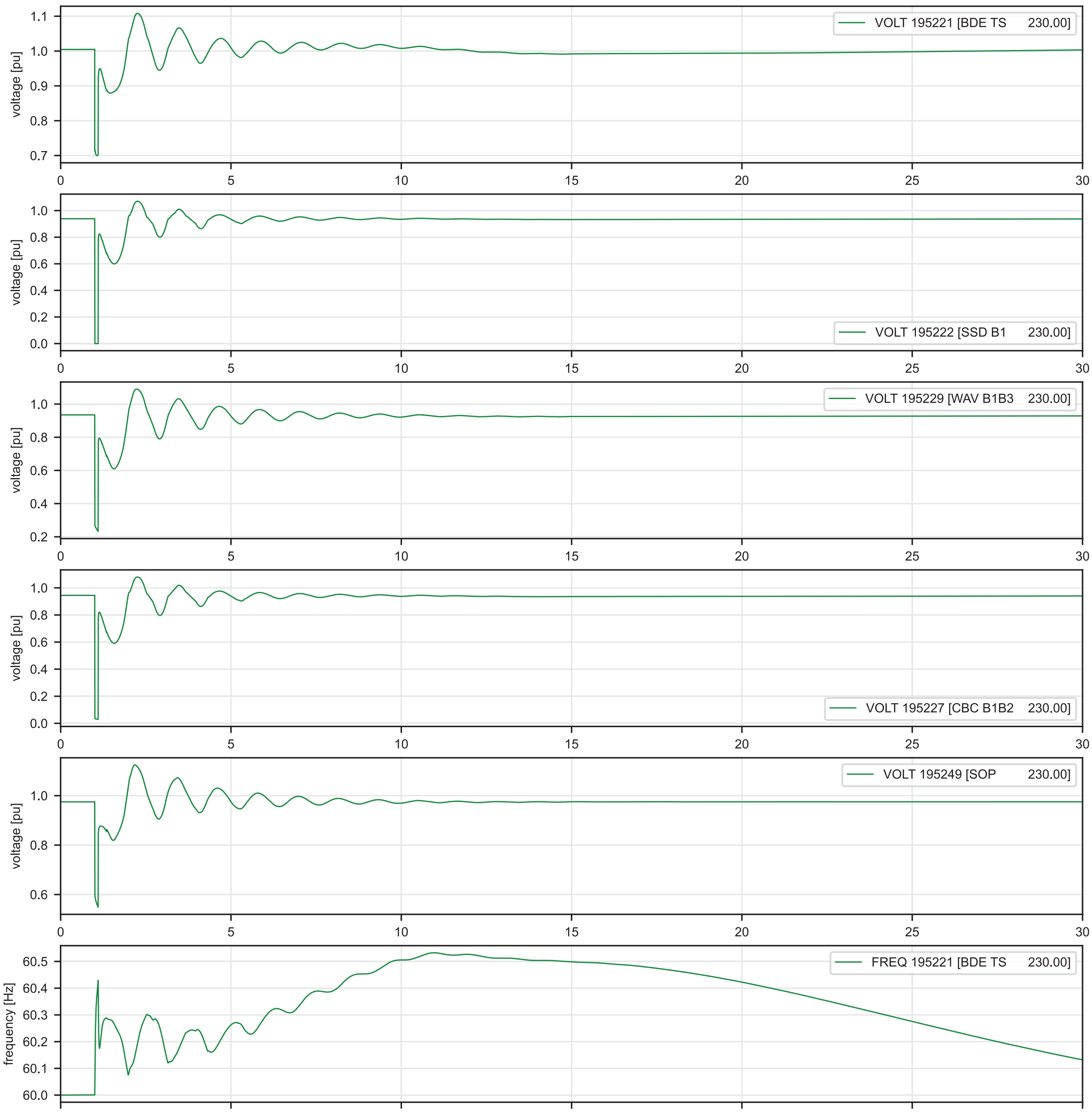
07_2033-34_Base-Peak_TL203-TL207_2000MW_3x50MW
Loss of TL203 - SLGF | Voltage / Frequency



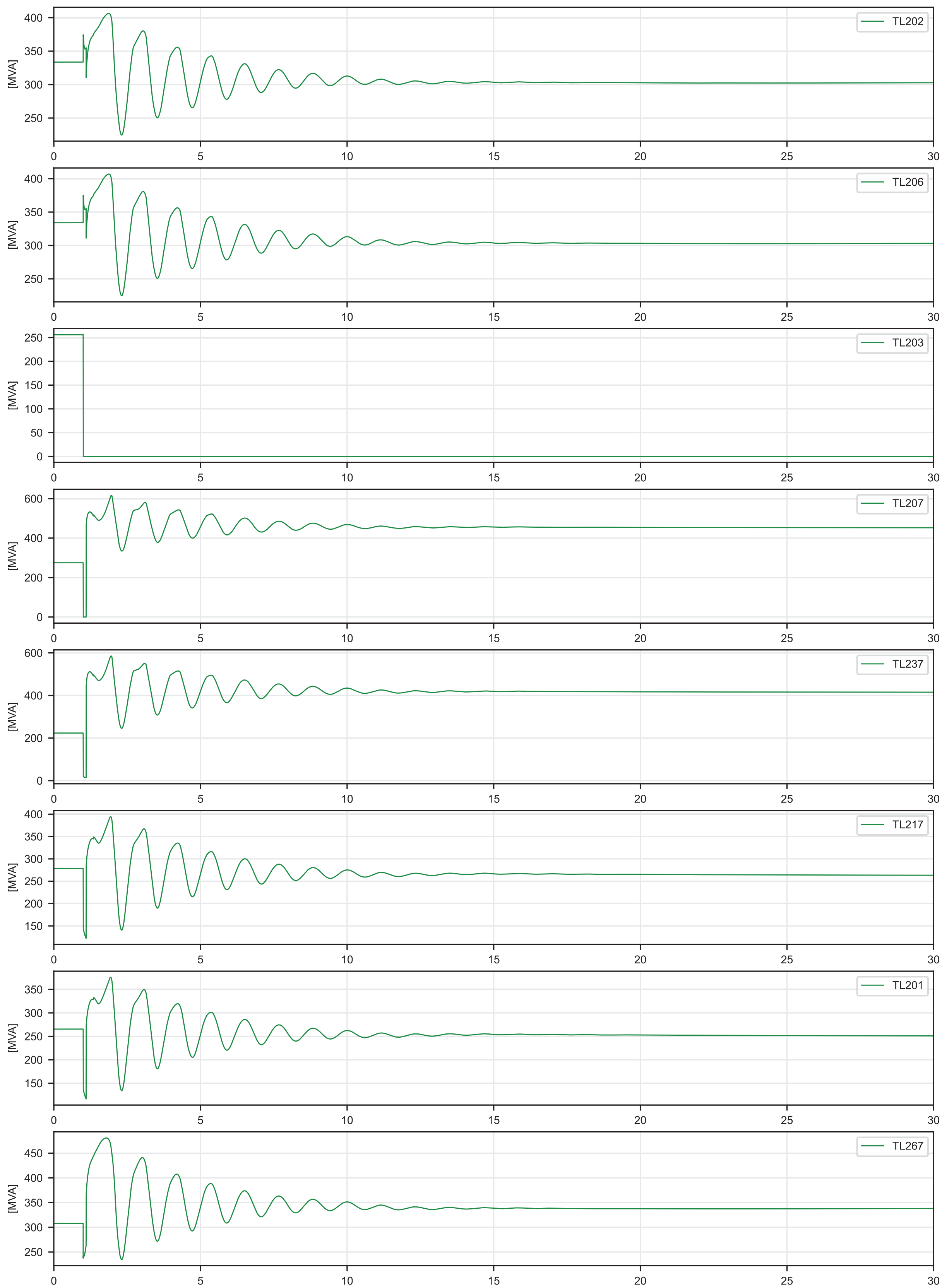
07_2033-34_Base-Peak_TL203-TL207_2000MW_3x50MW
Loss of TL203 - SLGF | 230 kV Power Flow



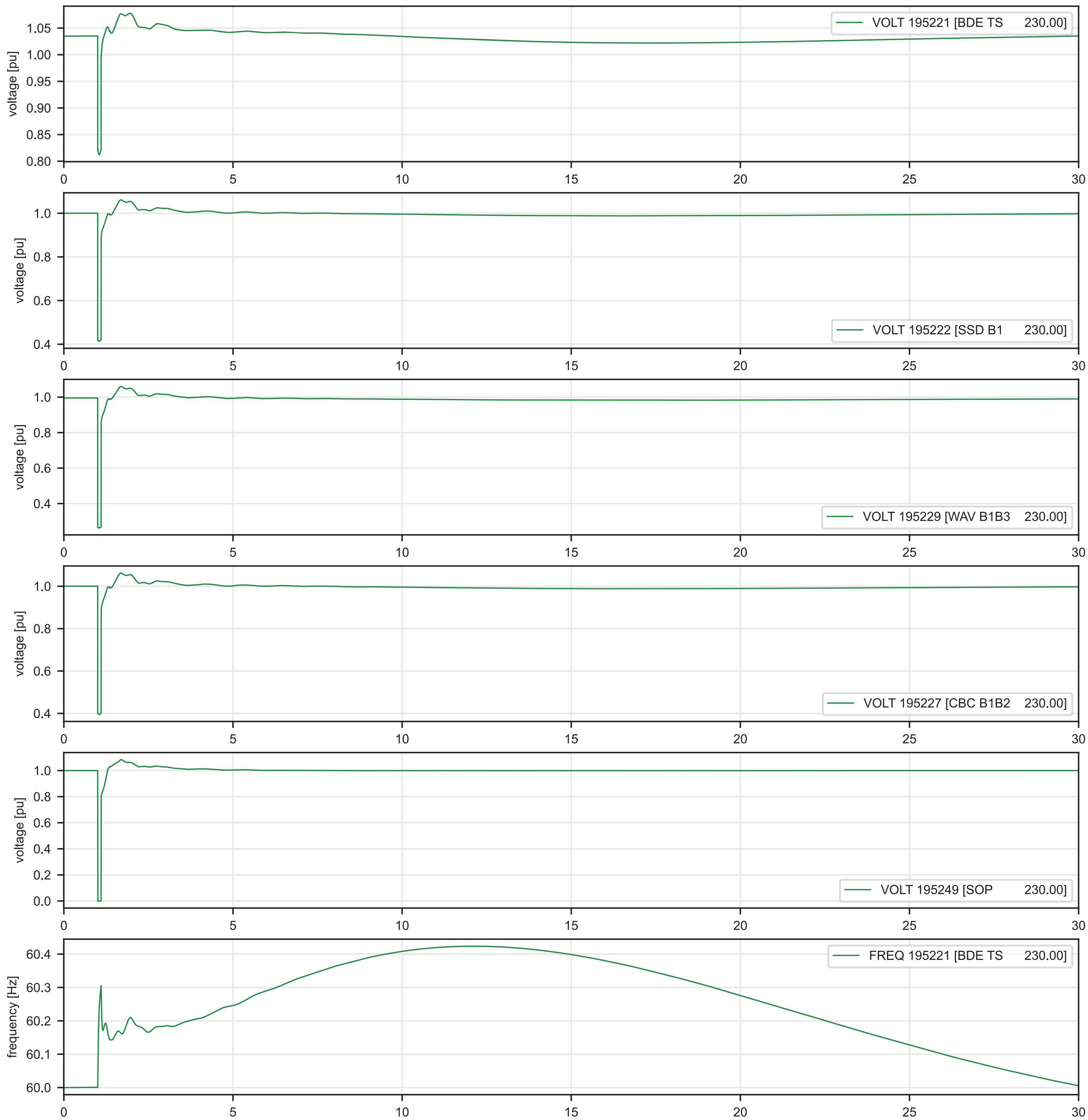
07_2033-34_Base-Peak_TL203-TL207_2000MW_3x50MW with STATCOM
Loss of TL203 - 3PF | Voltage / Frequency



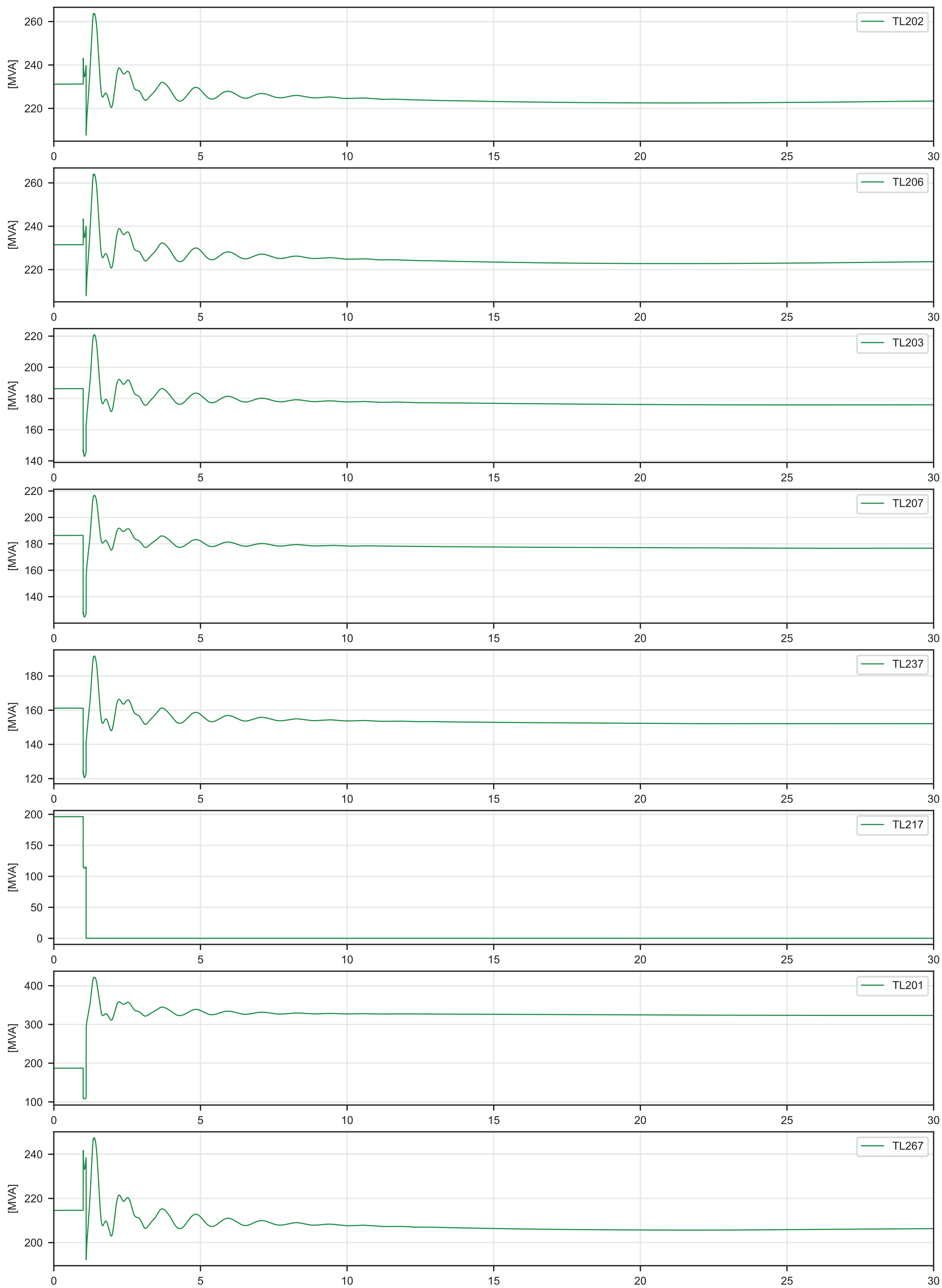
07_2033-34_Base-Peak_TL203-TL207_2000MW_3x50MW with STATCOM
Loss of TL203 - 3PF | 230 kV Power Flow



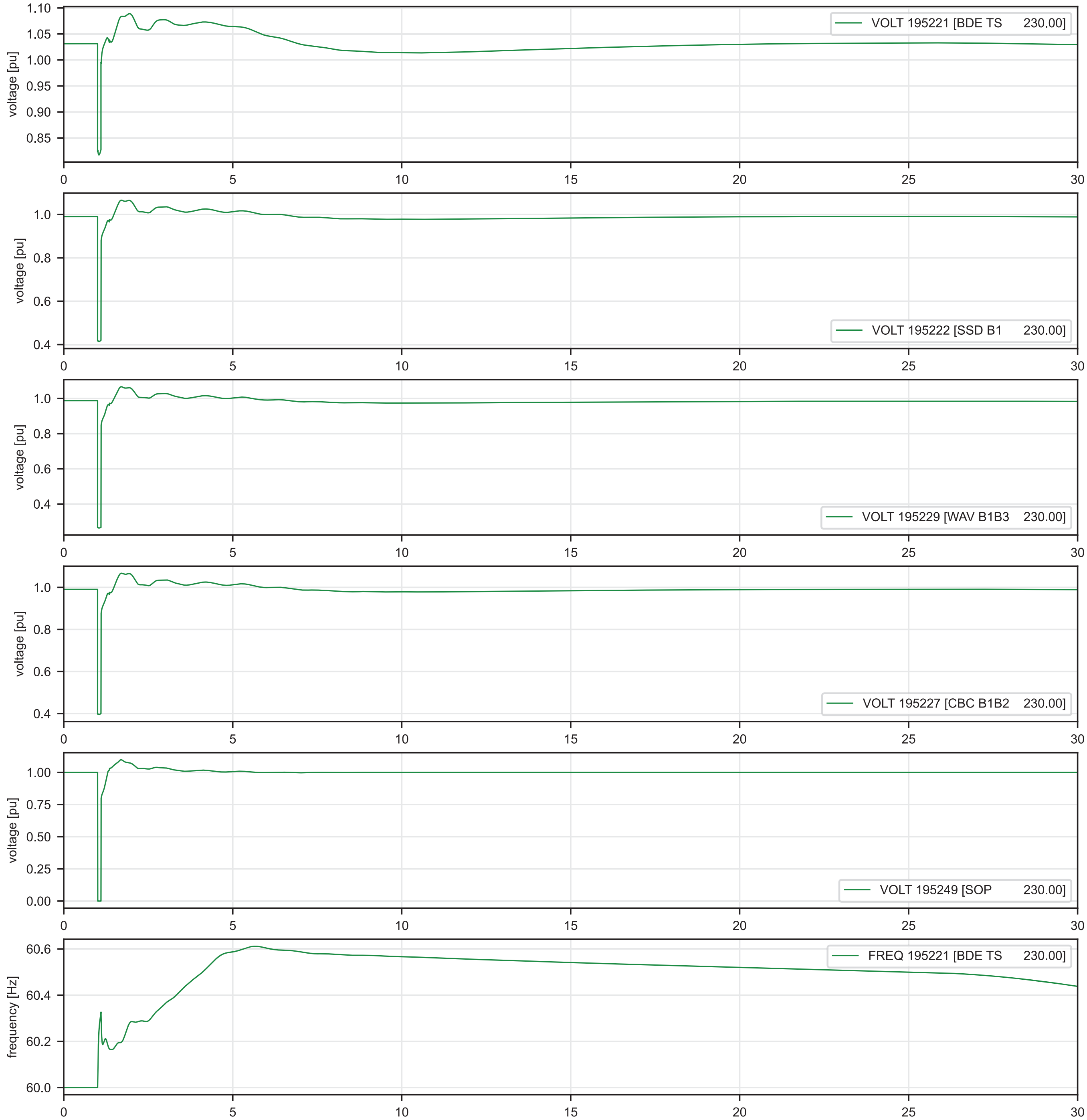
01_2033-34_Base-Peak_TL217-TL201_050MW
Loss of TL217 | Voltage / Frequency



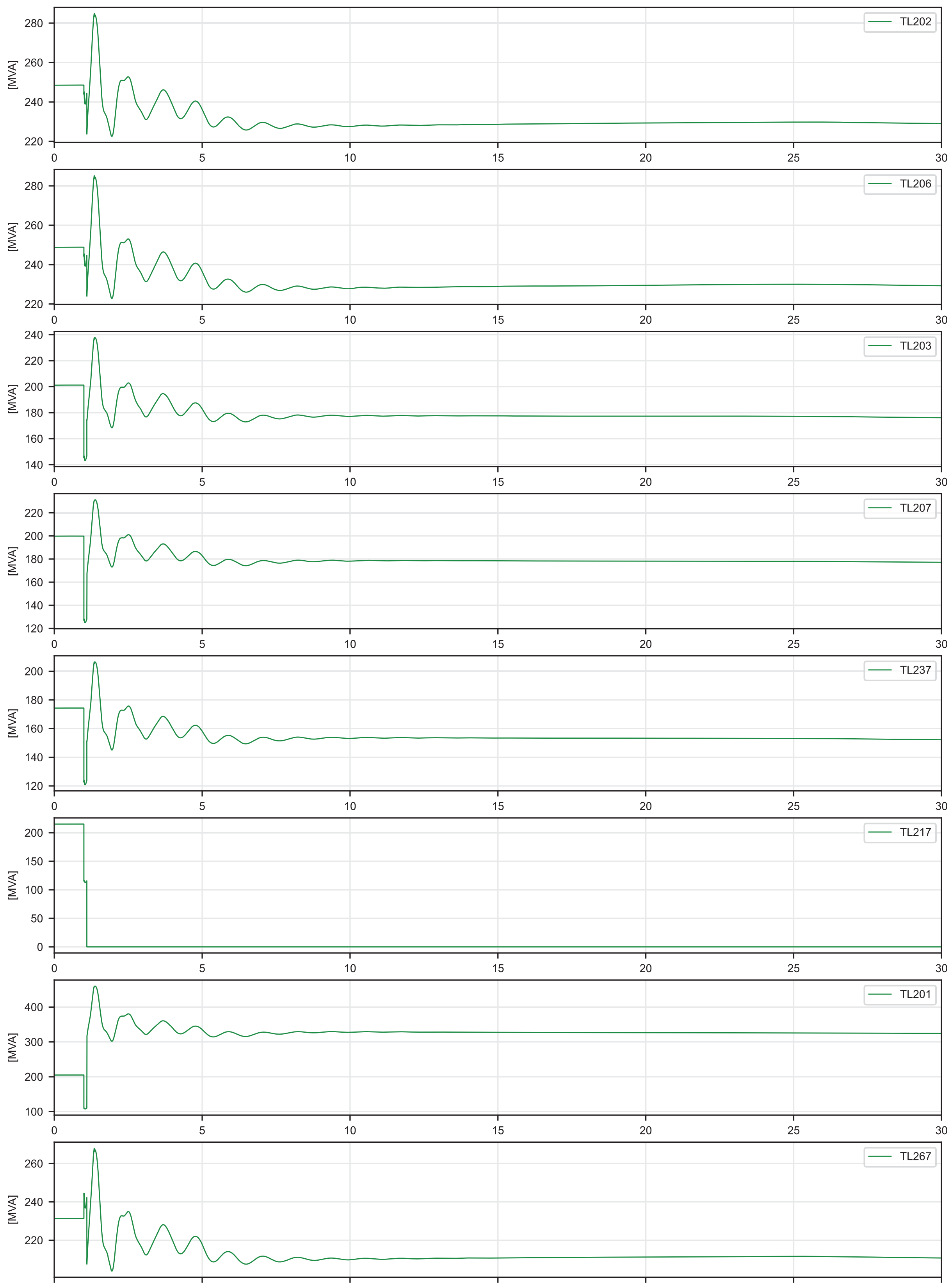
01_2033-34_Base-Peak_TL217-TL201_050MW
Loss of TL217 | 230 kV Power Flow



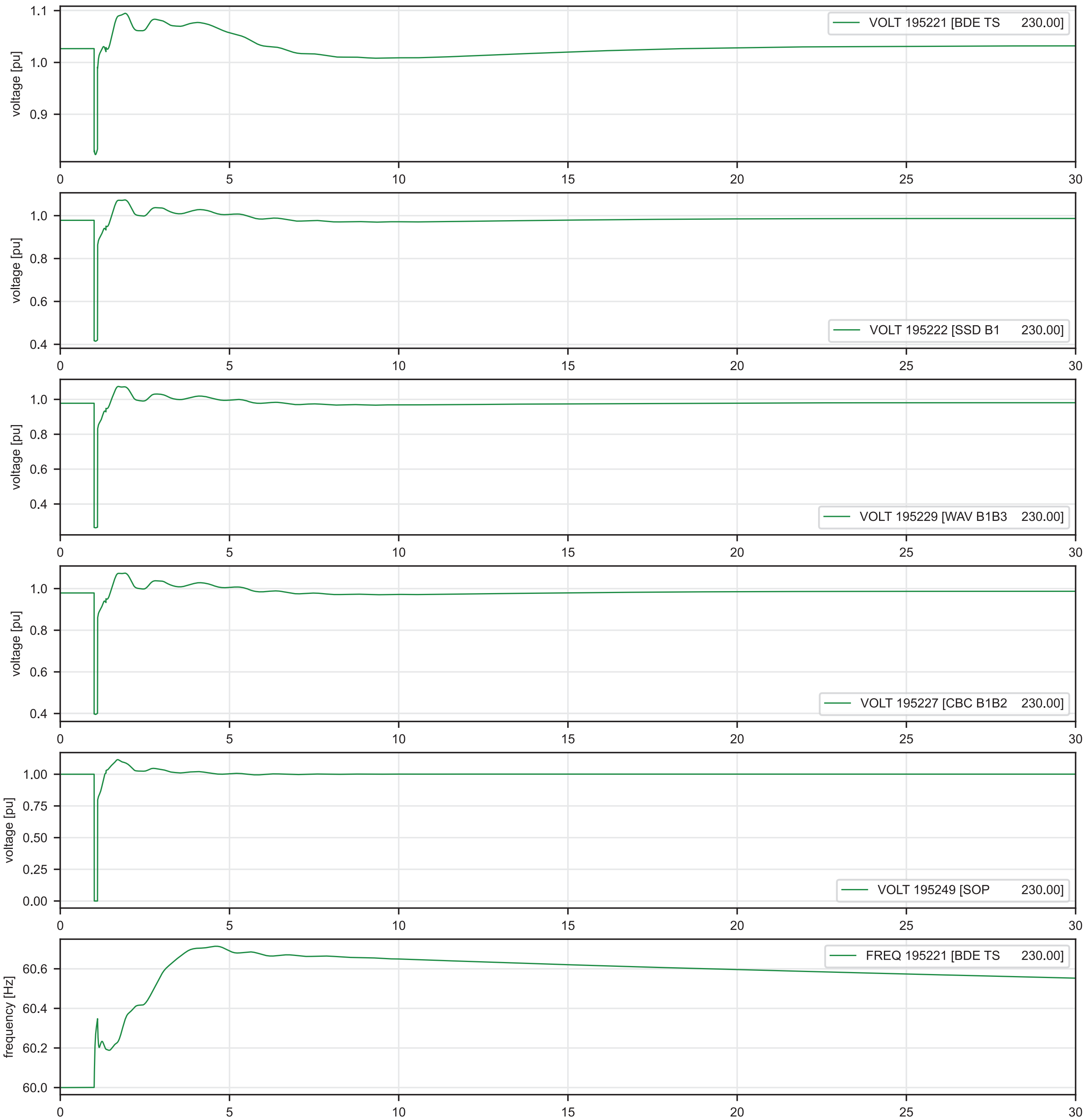
01_2033-34_Base-Peak_TL217-TL201_100MW
Loss of TL217 | Voltage / Frequency



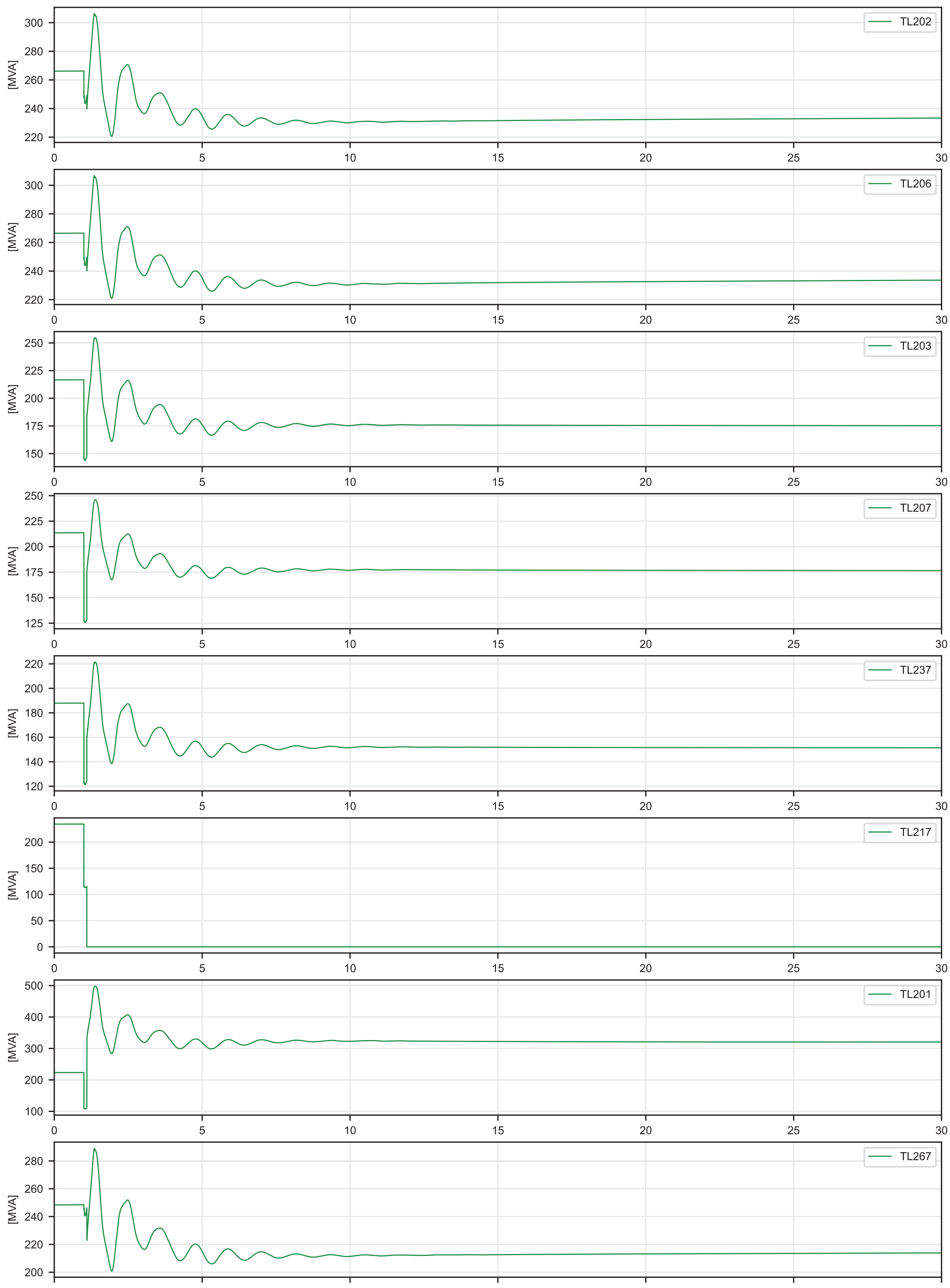
01_2033-34_Base-Peak_TL217-TL201_100MW
Loss of TL217 | 230 kV Power Flow



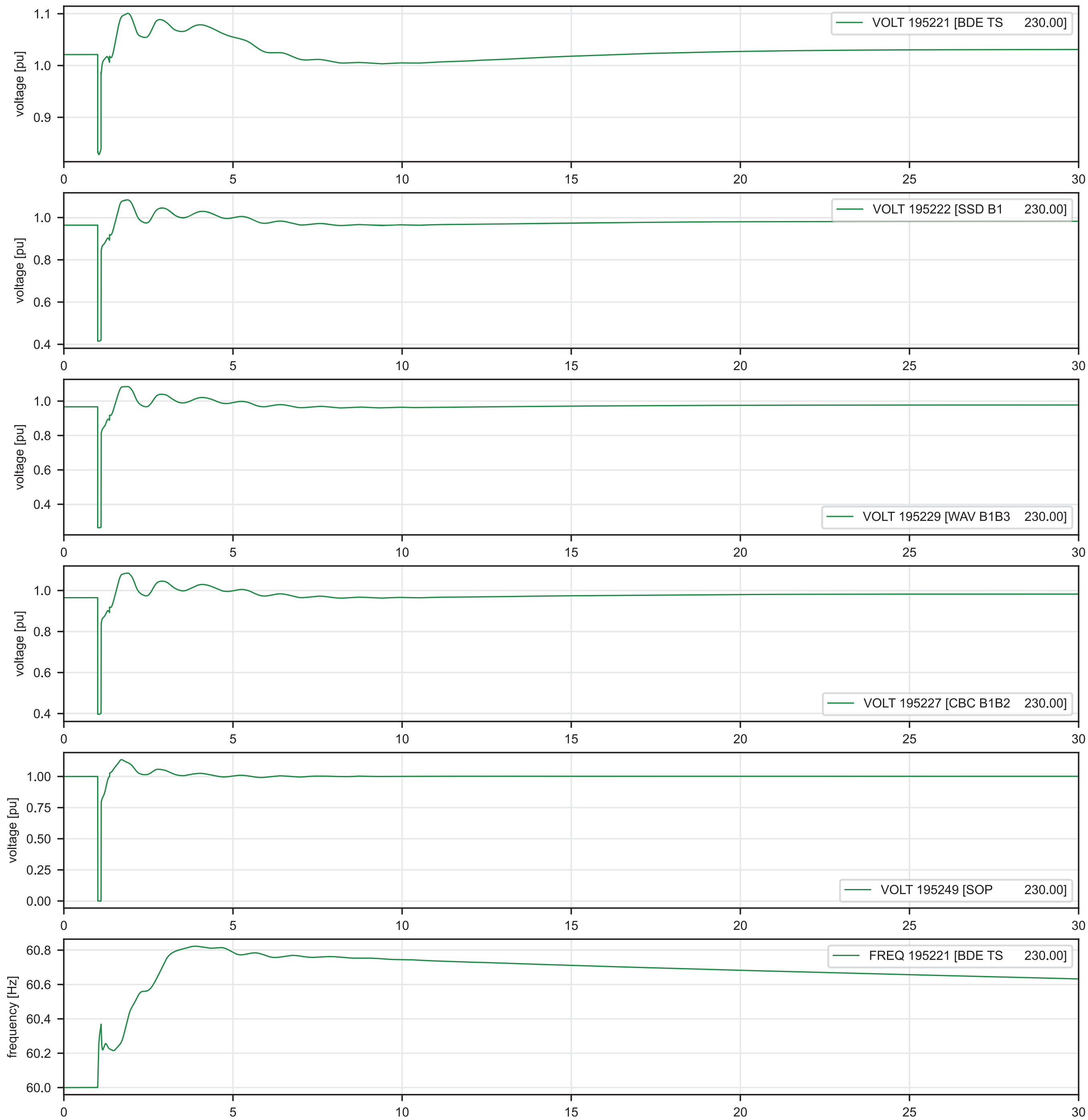
01_2033-34_Base-Peak_TL217-TL201_150MW
Loss of TL217 | Voltage / Frequency



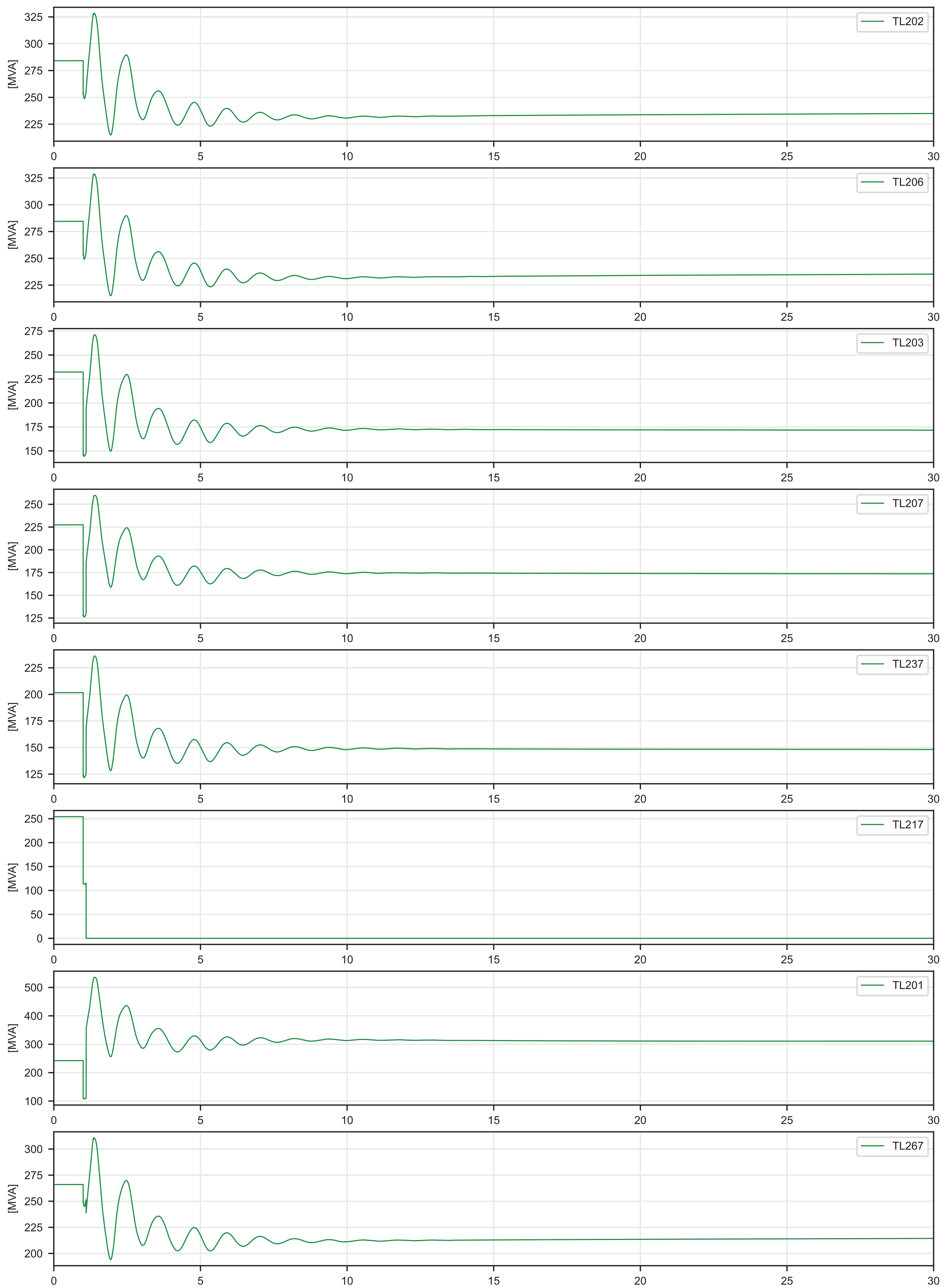
01_2033-34_Base-Peak_TL217-TL201_150MW
Loss of TL217 | 230 kV Power Flow



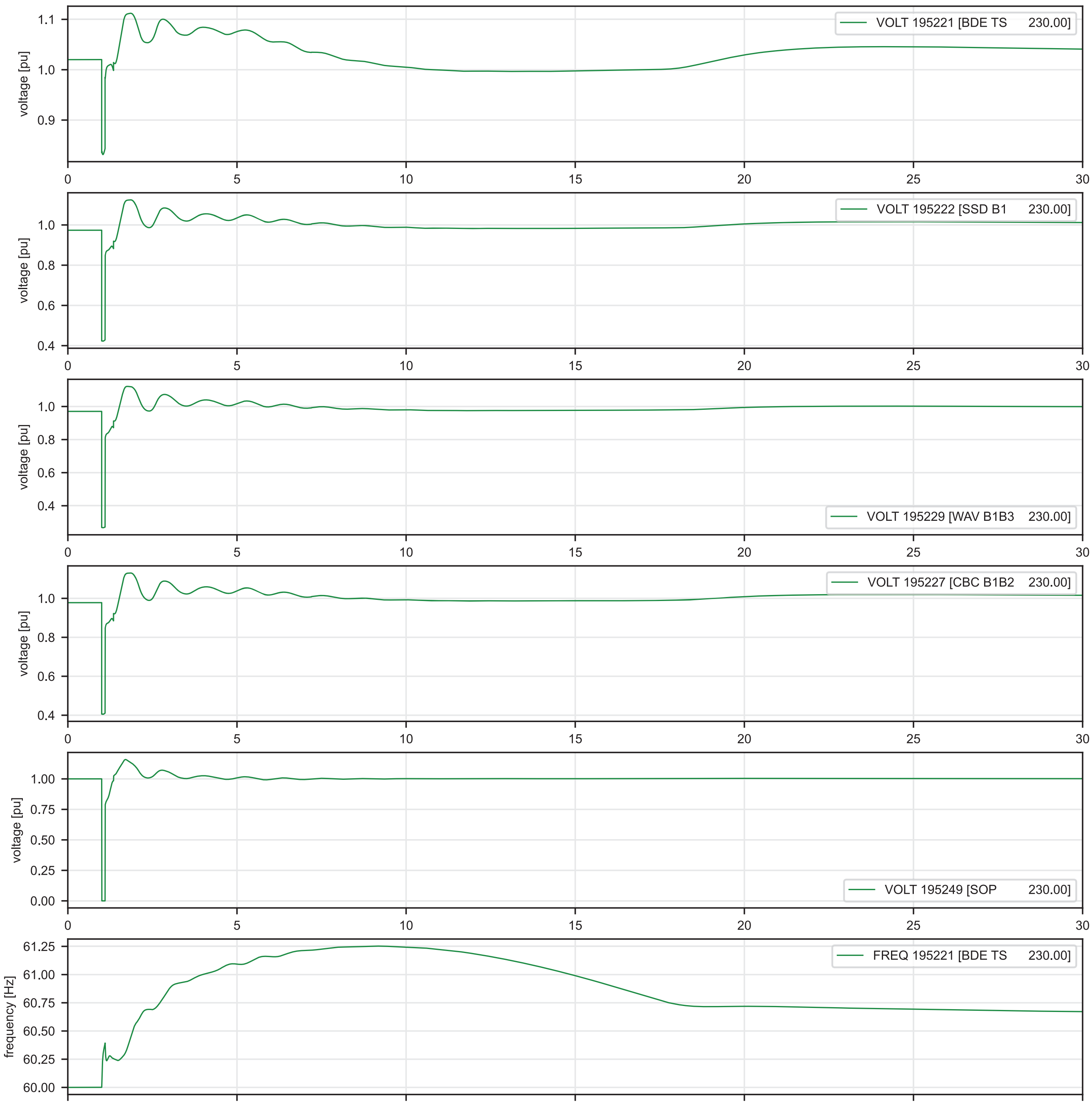
01_2033-34_Base-Peak_TL217-TL201_200MW
Loss of TL217 | Voltage / Frequency



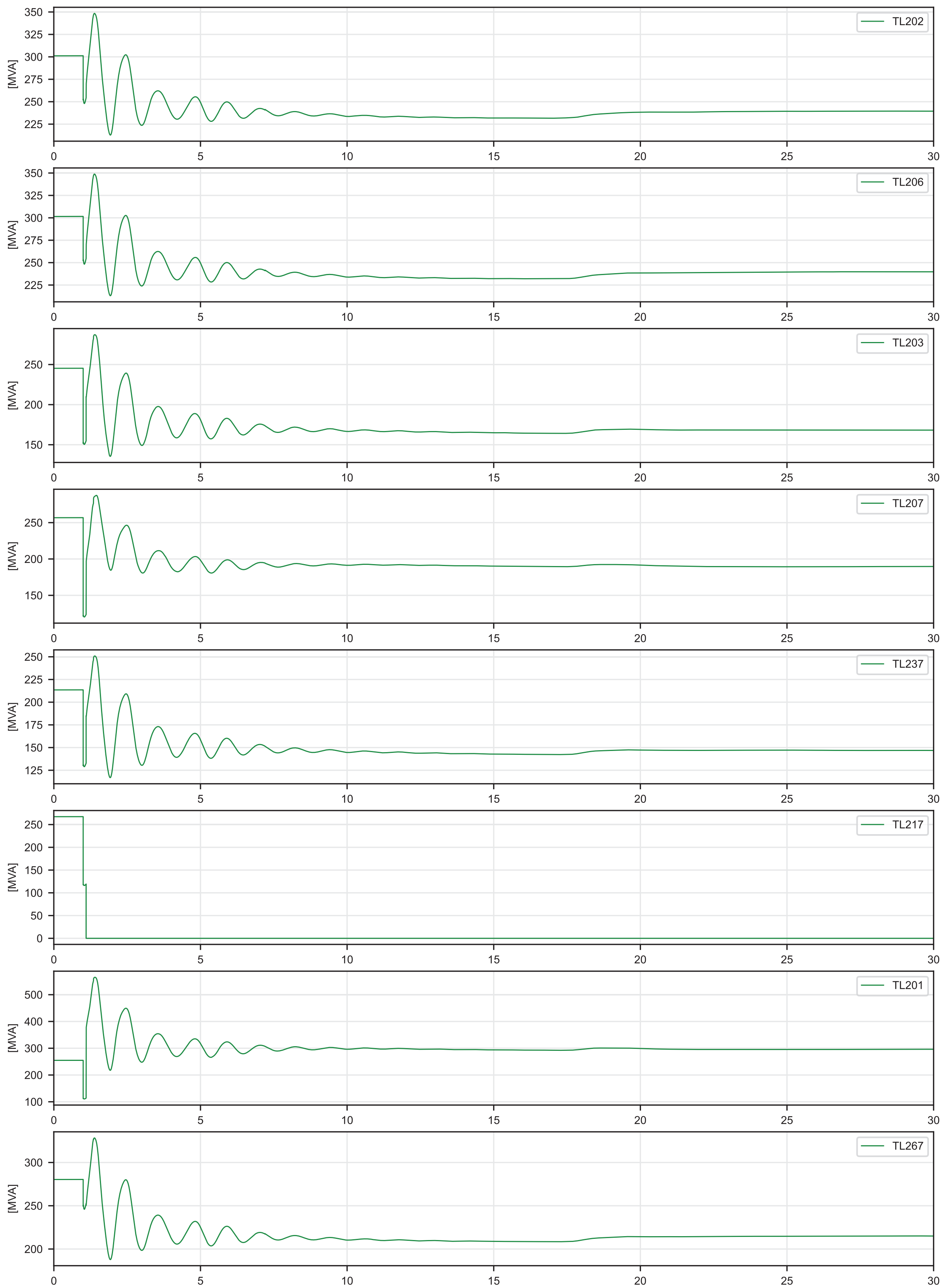
01_2033-34_Base-Peak_TL217-TL201_200MW
Loss of TL217 | 230 kV Power Flow



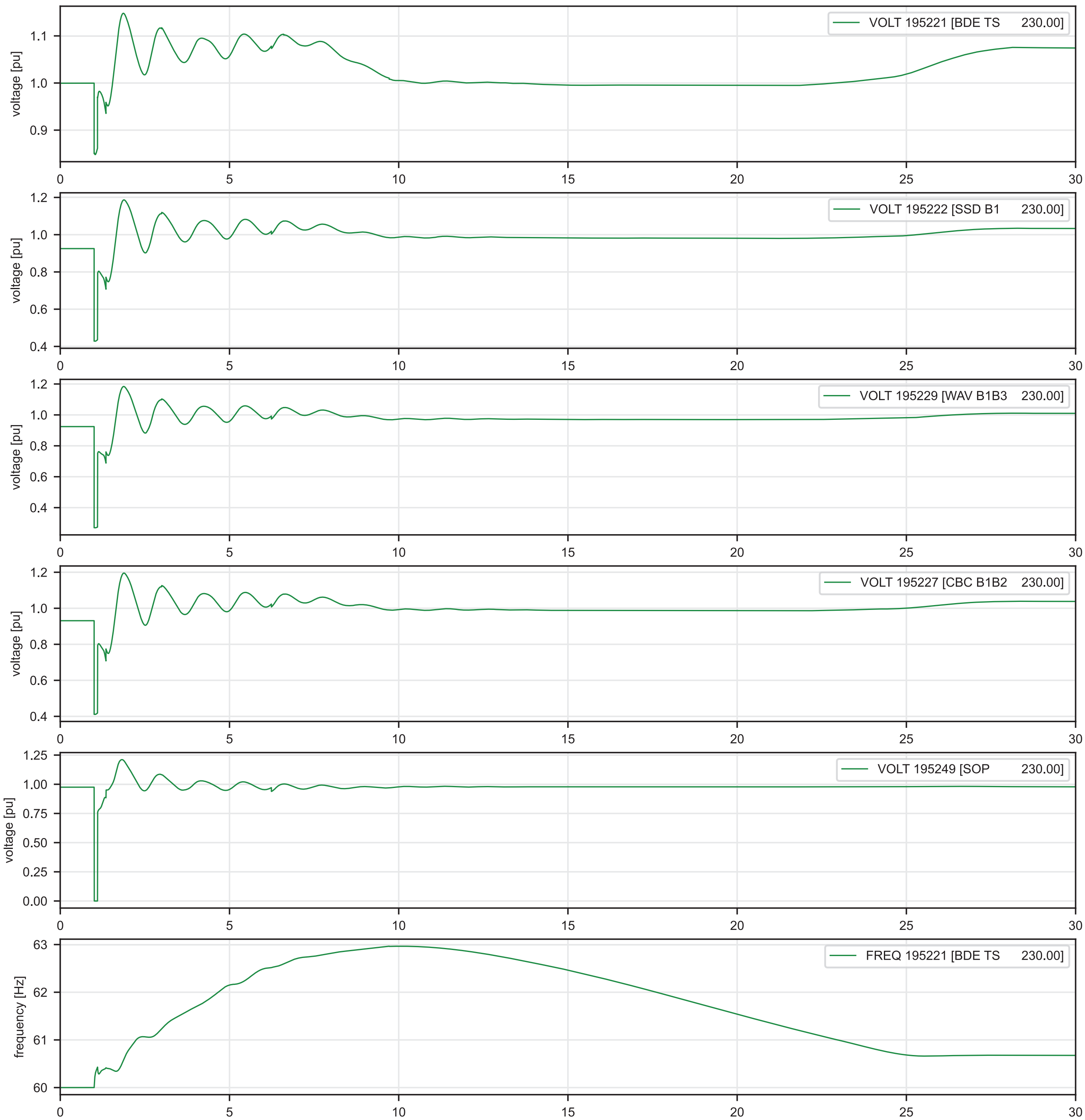
01_2033-34_Base-Peak_TL217-TL201_250MW
Loss of TL217 | Voltage / Frequency



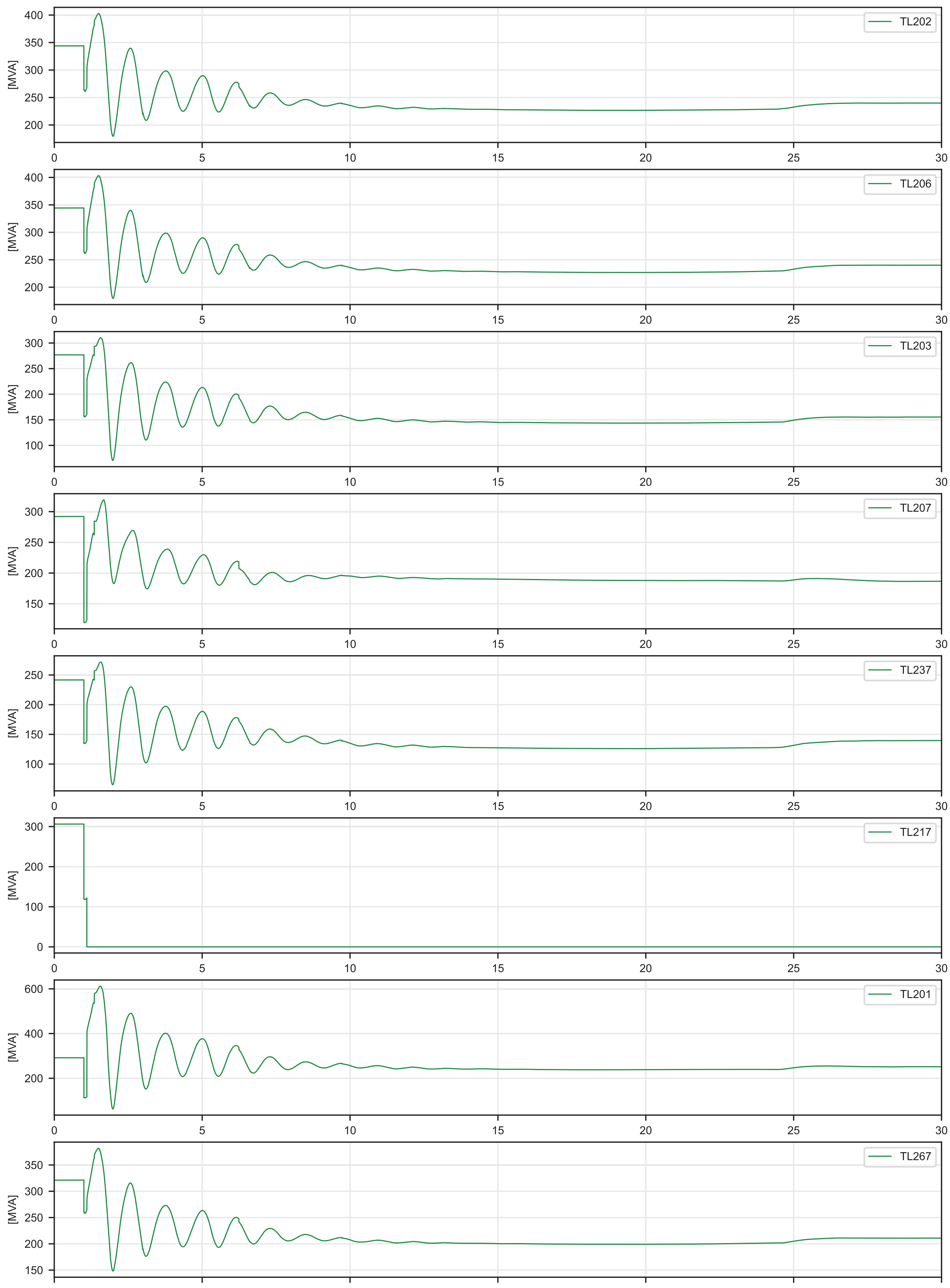
01_2033-34_Base-Peak_TL217-TL201_250MW
Loss of TL217 | 230 kV Power Flow



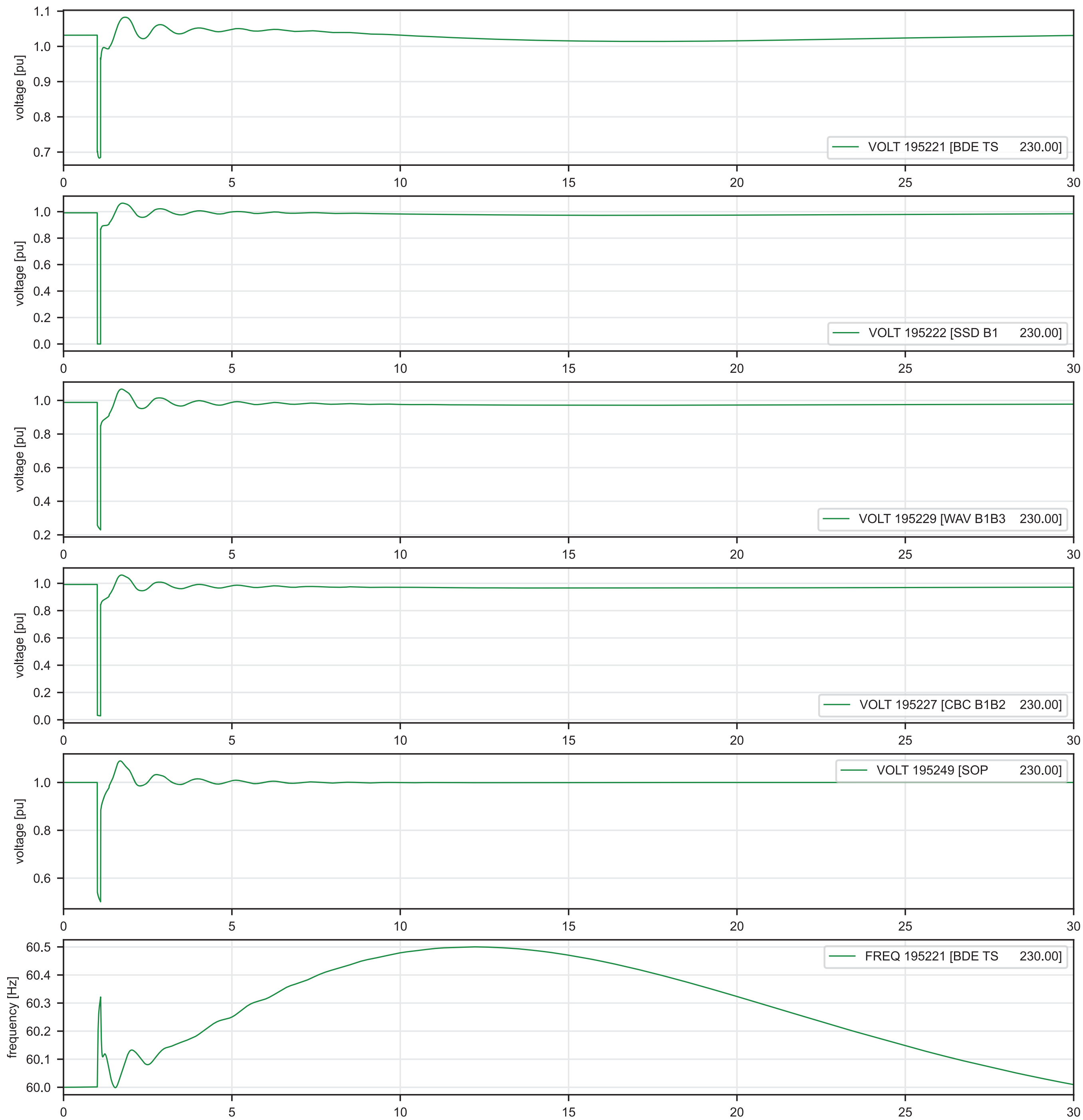
01_2033-34_Base-Peak_TL217-TL201_peakMW
Loss of TL217 | Voltage / Frequency



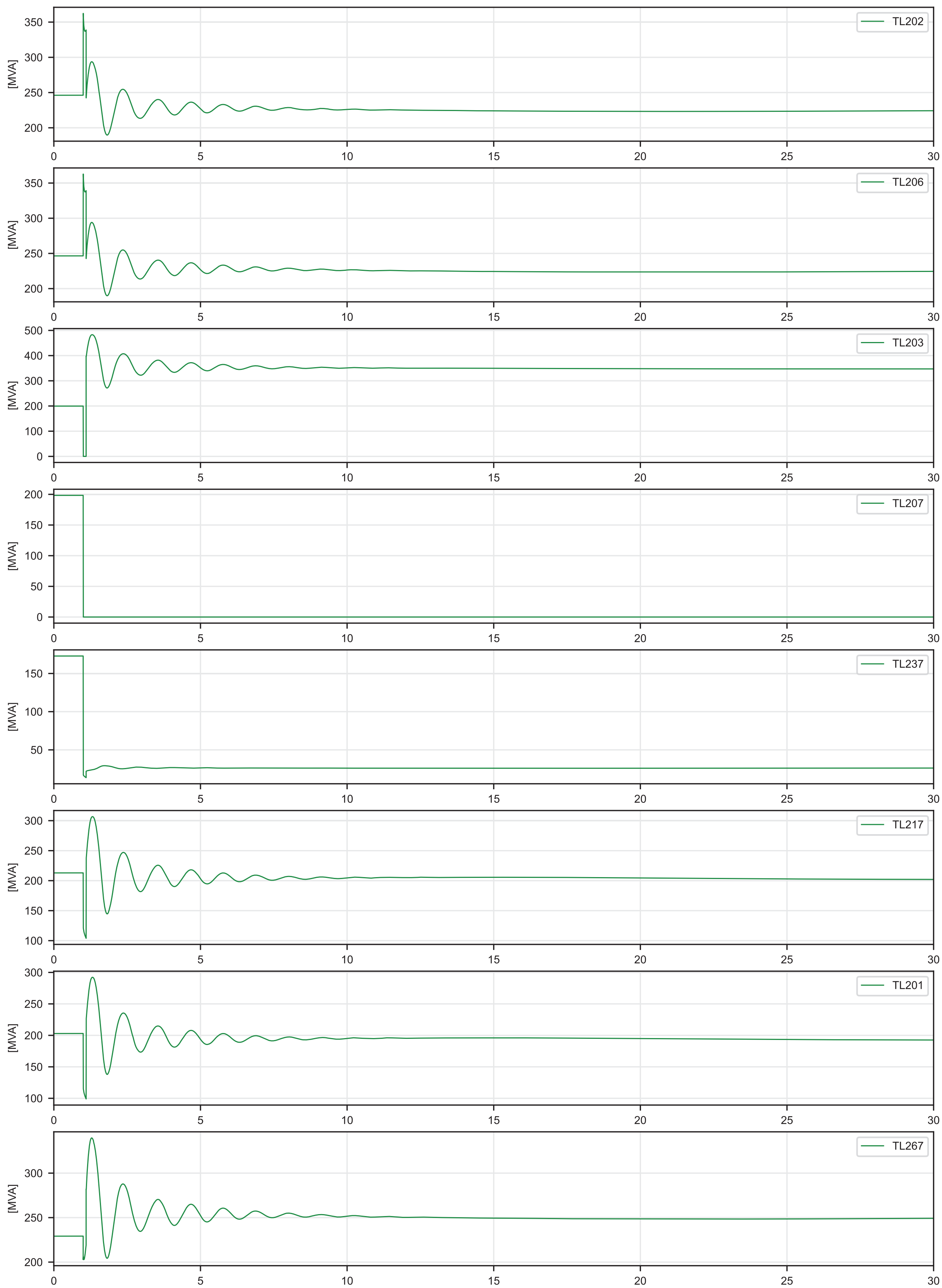
01_2033-34_Base-Peak_TL217-TL201_peakMW
Loss of TL217 | 230 kV Power Flow



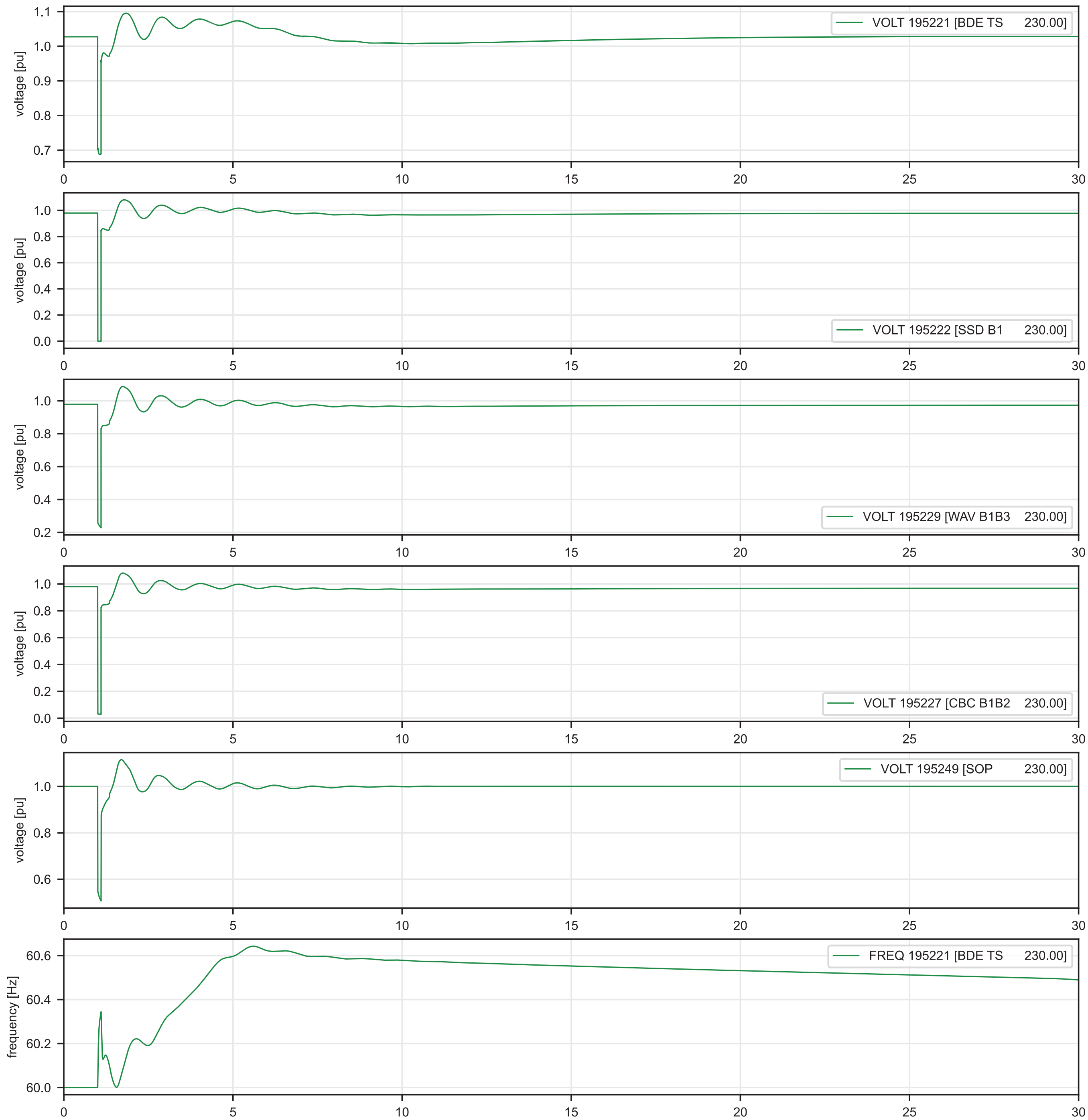
02_2033-34_Base-Peak_TL207-TL203_050MW
Loss of TL207 | Voltage / Frequency



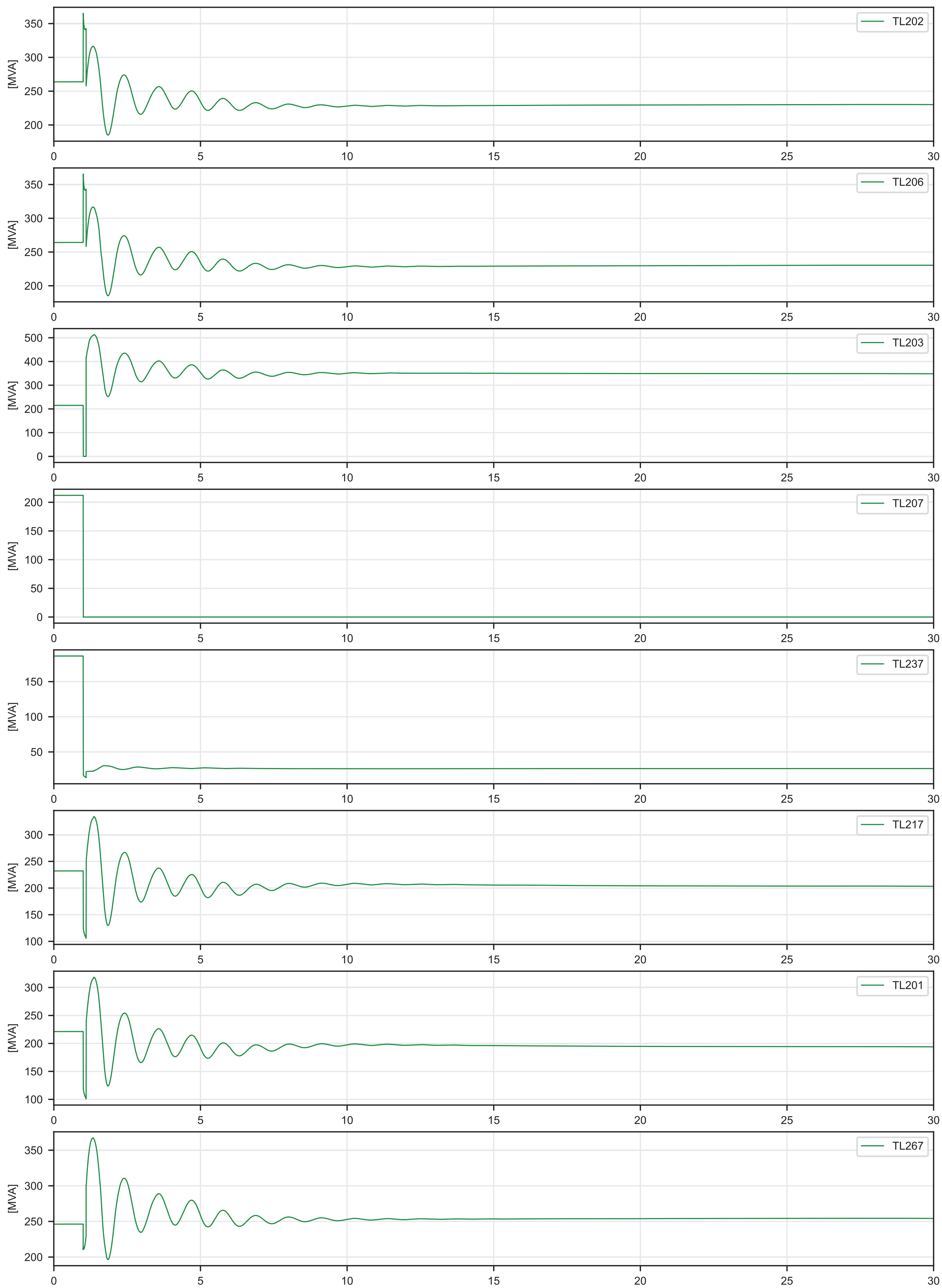
02_2033-34_Base-Peak_TL207-TL203_050MW
Loss of TL207 | 230 kV Power Flow



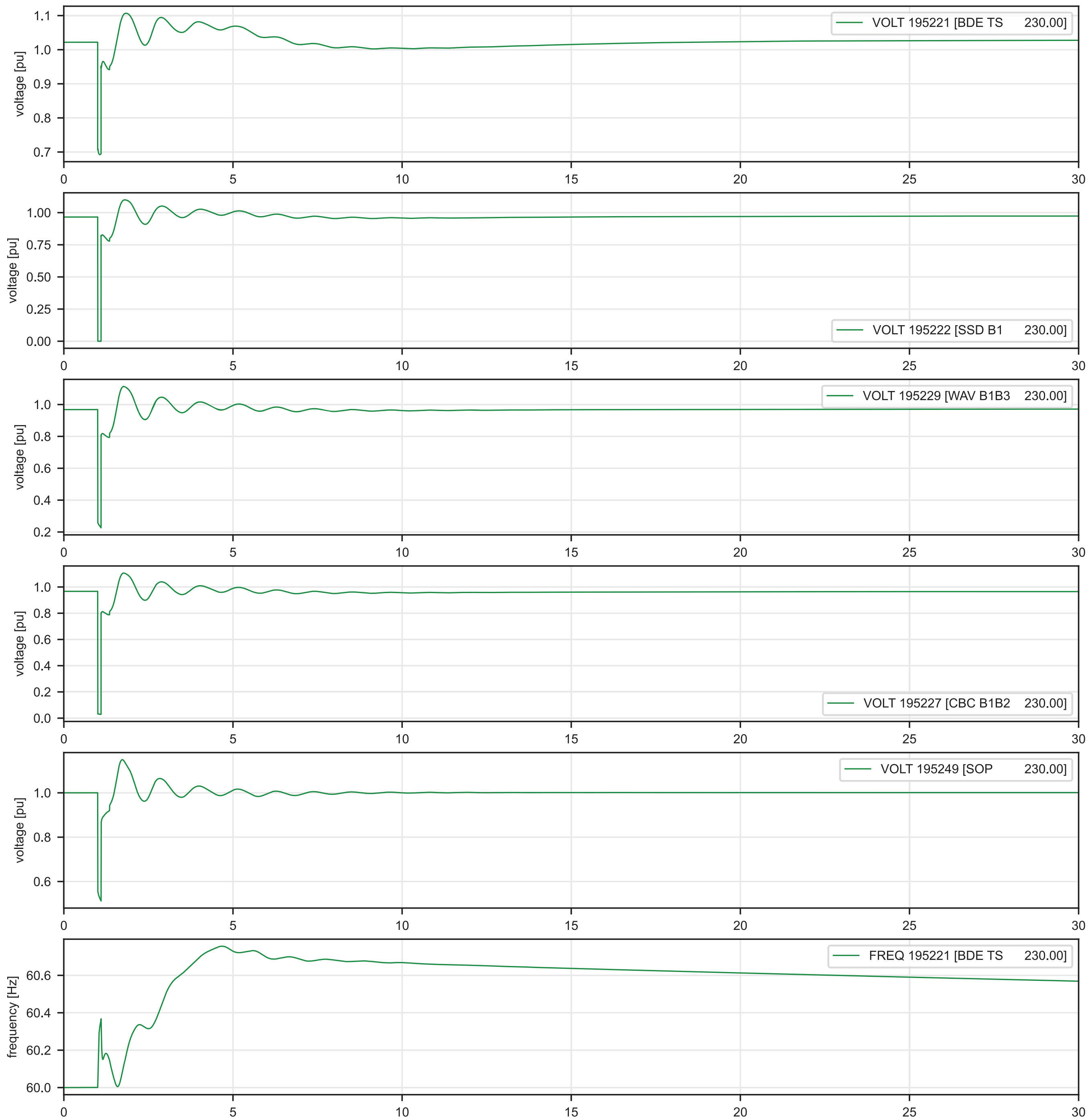
02_2033-34_Base-Peak_TL207-TL203_100MW
Loss of TL207 | Voltage / Frequency



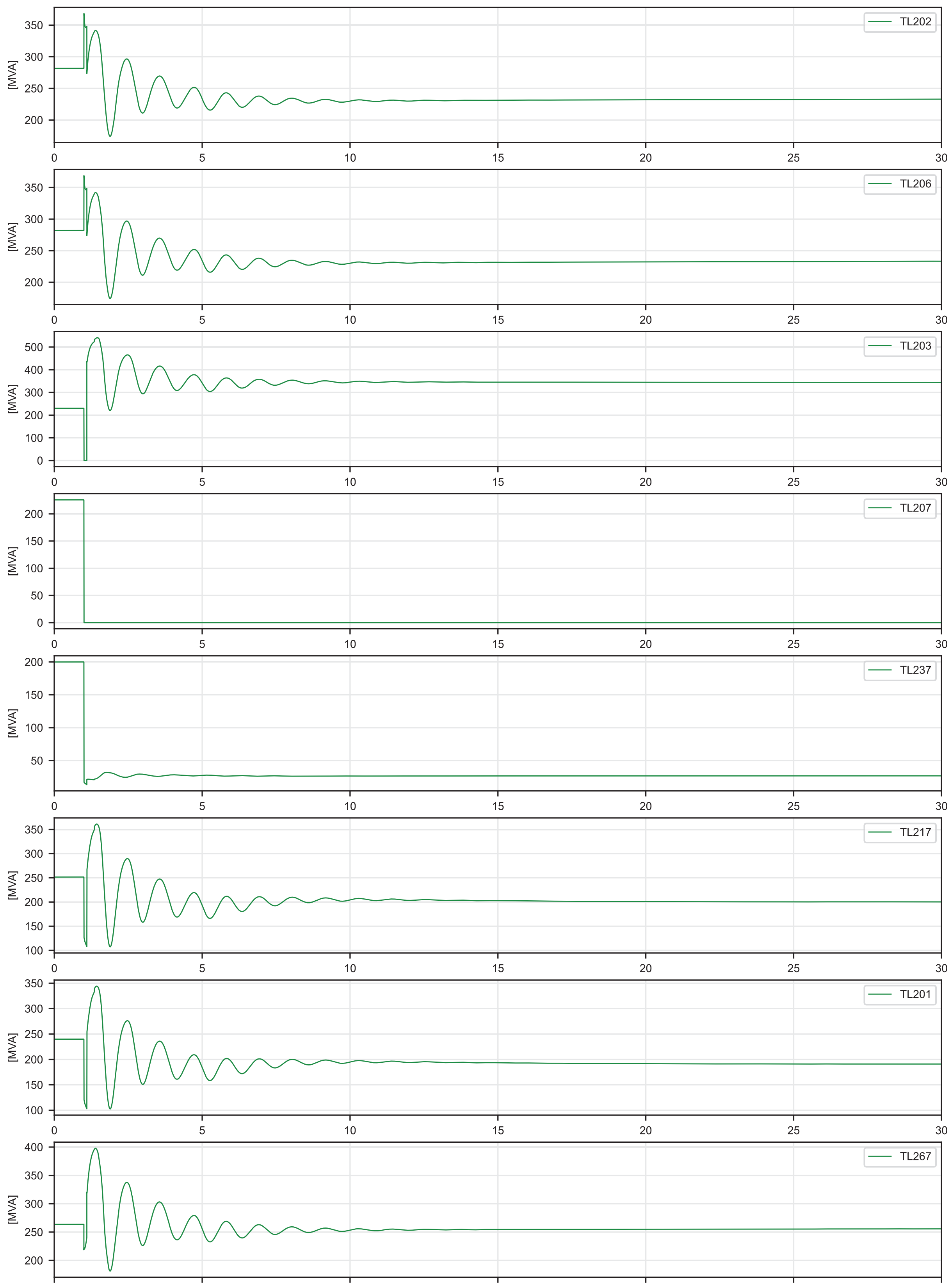
02_2033-34_Base-Peak_TL207-TL203_100MW
Loss of TL207 | 230 kV Power Flow



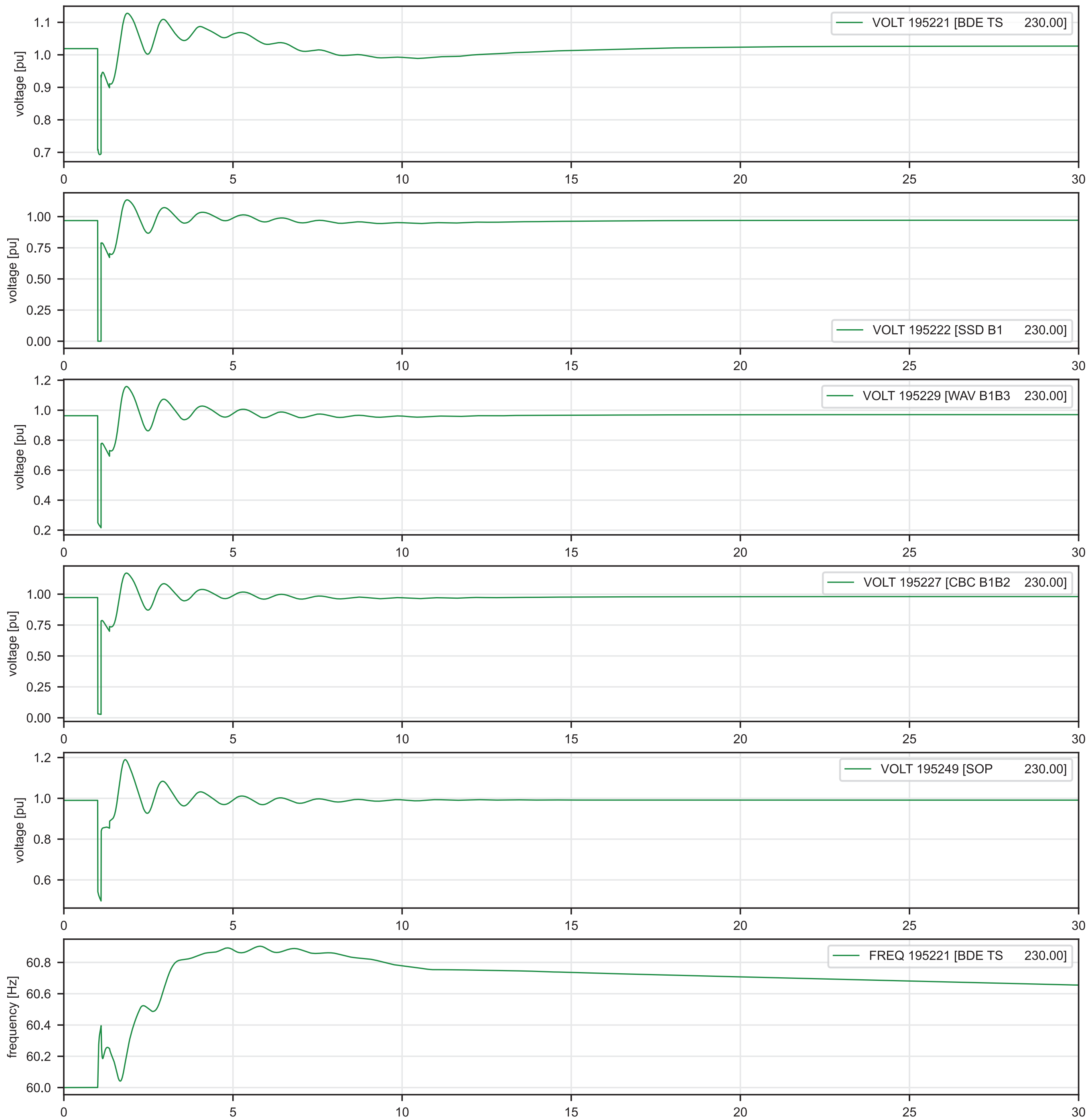
02_2033-34_Base-Peak_TL207-TL203_150MW
Loss of TL207 | Voltage / Frequency



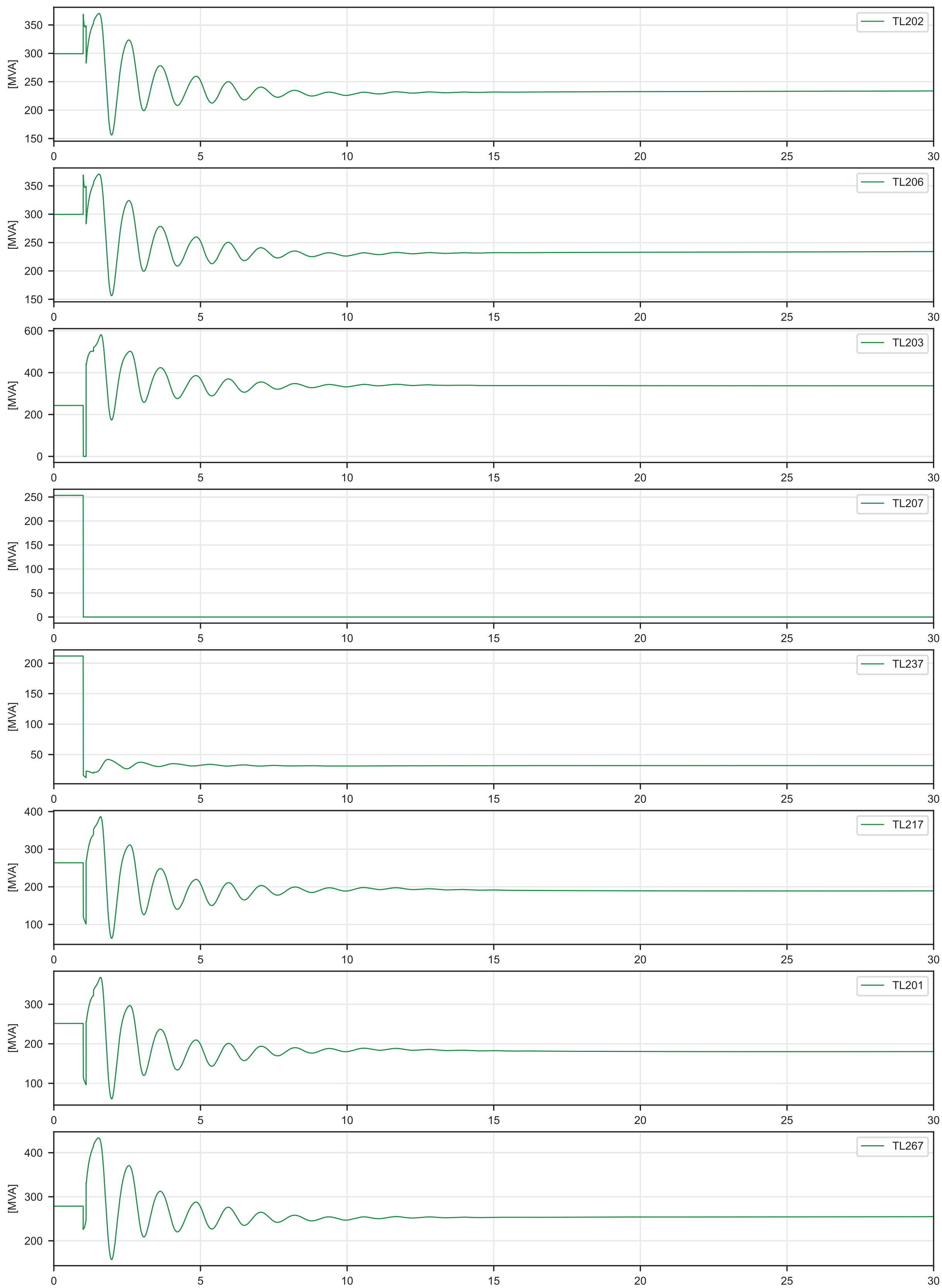
02_2033-34_Base-Peak_TL207-TL203_150MW
Loss of TL207 | 230 kV Power Flow



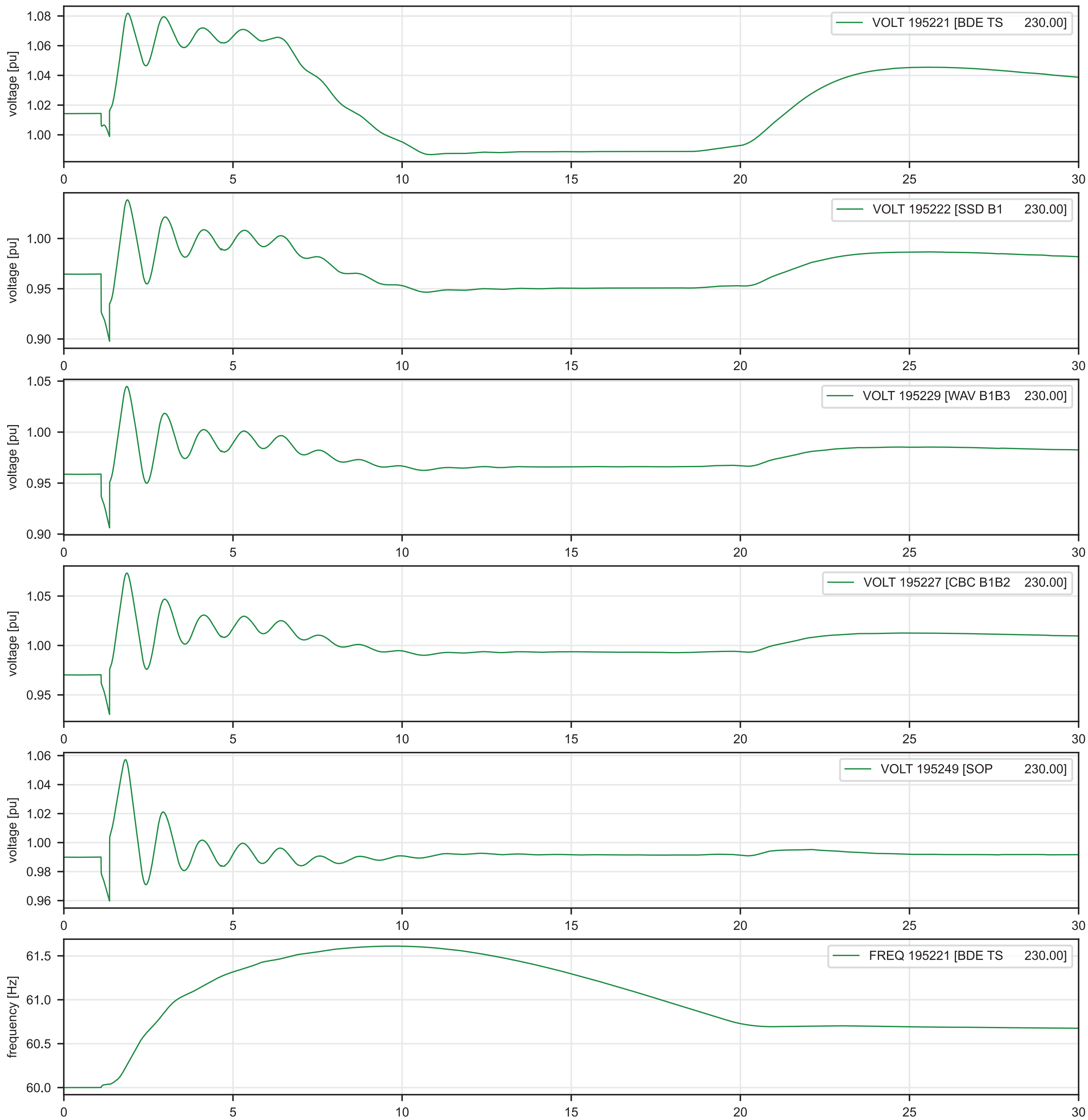
02_2033-34_Base-Peak_TL207-TL203_200MW
Loss of TL207 | Voltage / Frequency



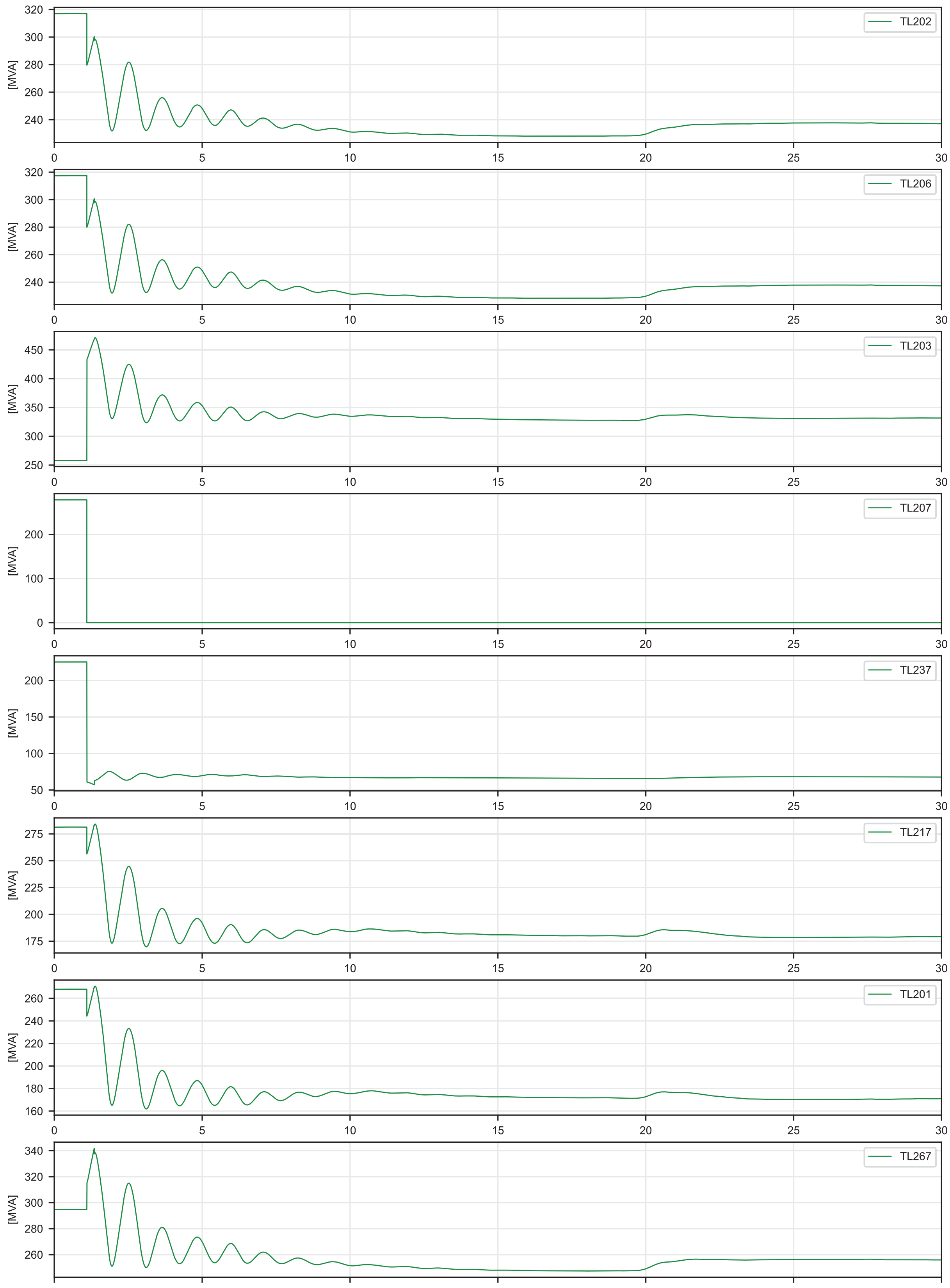
02_2033-34_Base-Peak_TL207-TL203_200MW
Loss of TL207 | 230 kV Power Flow



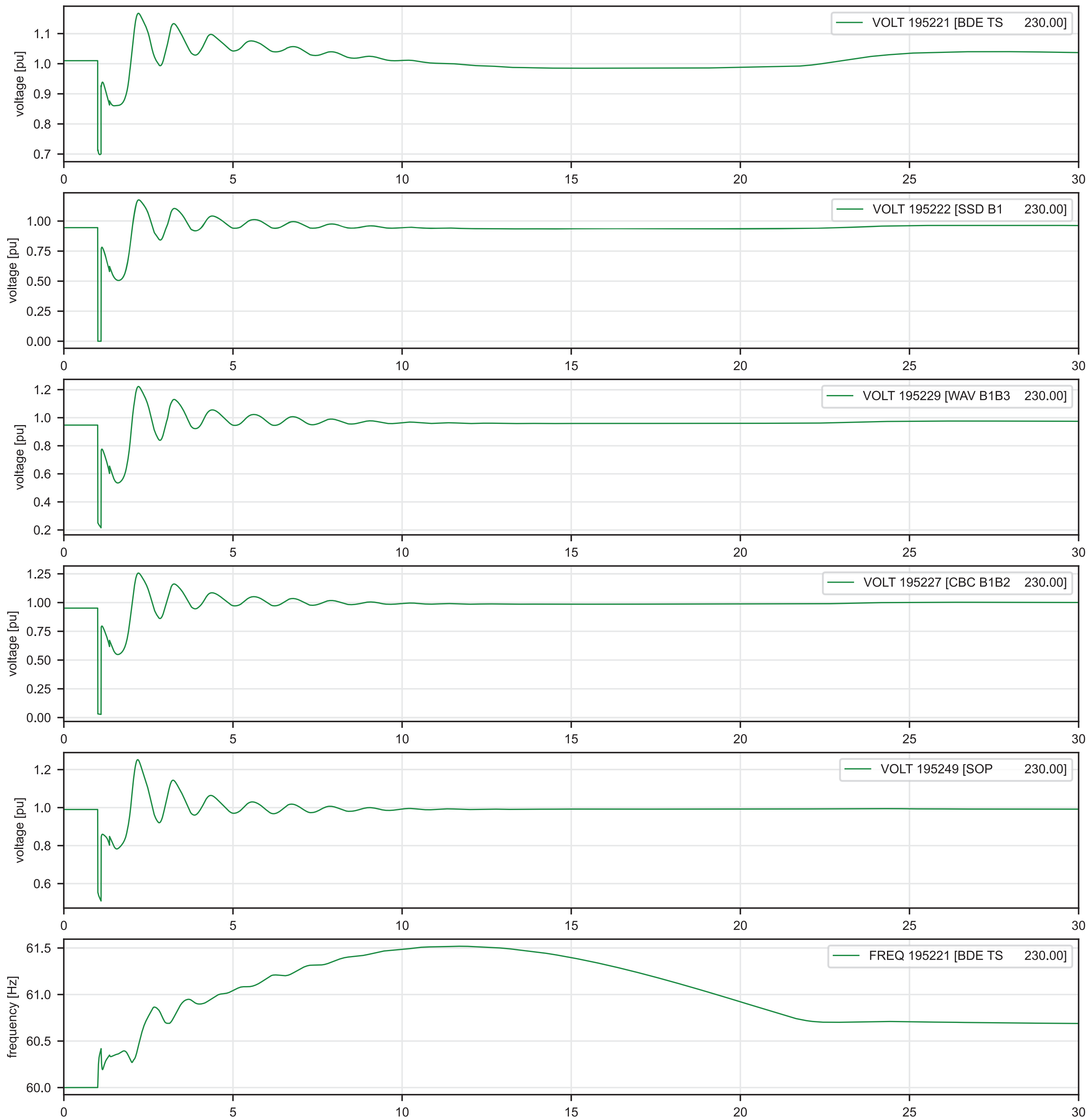
02_2033-34_Base-Peak_TL207-TL203_250MW
Loss of TL207 | Voltage / Frequency



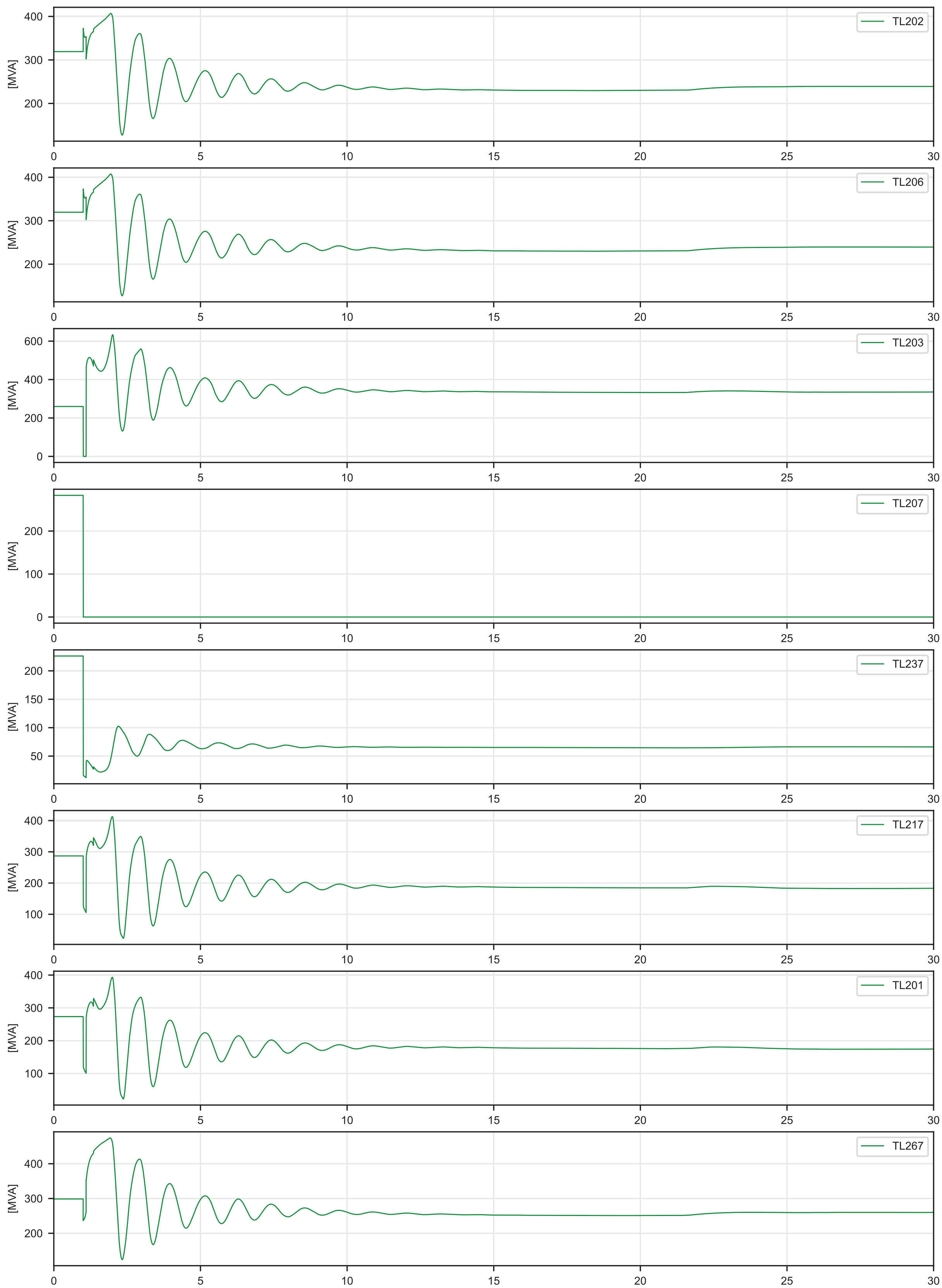
02_2033-34_Base-Peak_TL207-TL203_250MW
Loss of TL207 | 230 kV Power Flow



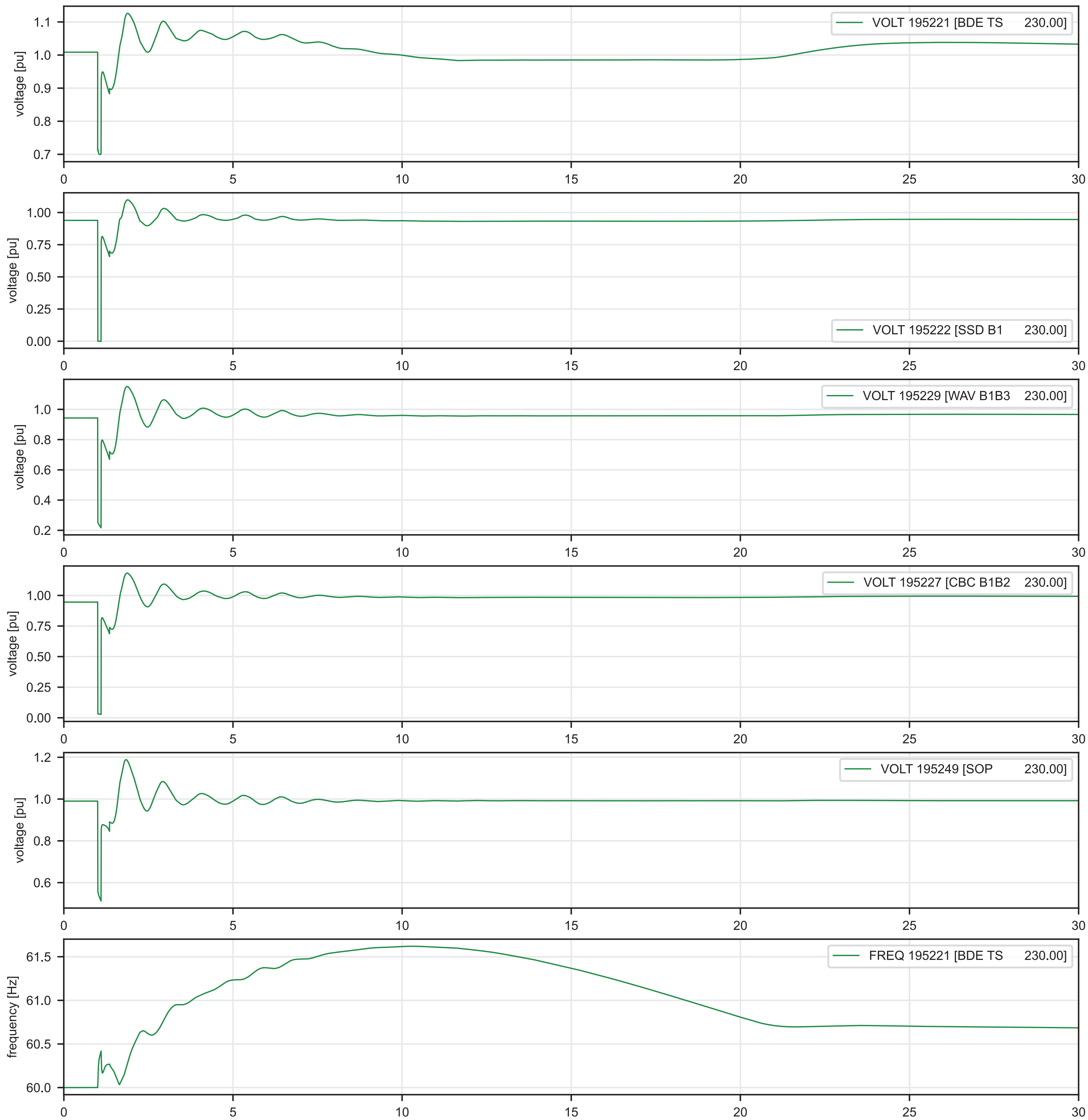
02_2033-34_Base-Peak_TL207-TL203_250MW with STATCOM (violates voltage criteria)
Loss of TL207 | Voltage / Frequency



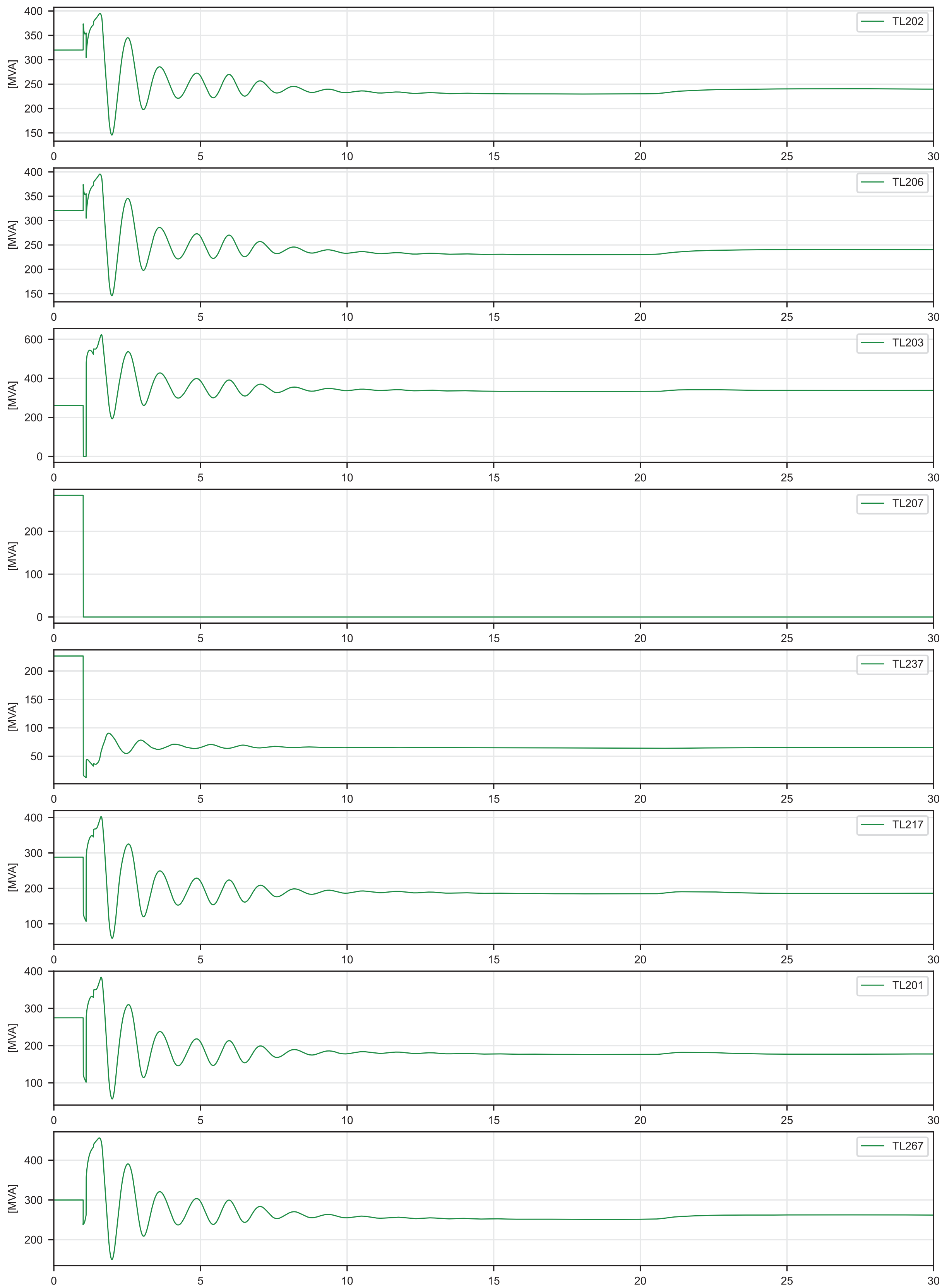
02_2033-34_Base-Peak_TL207-TL203_250MW with STATCOM (violates voltage criteria)
Loss of TL207 | 230 kV Power Flow



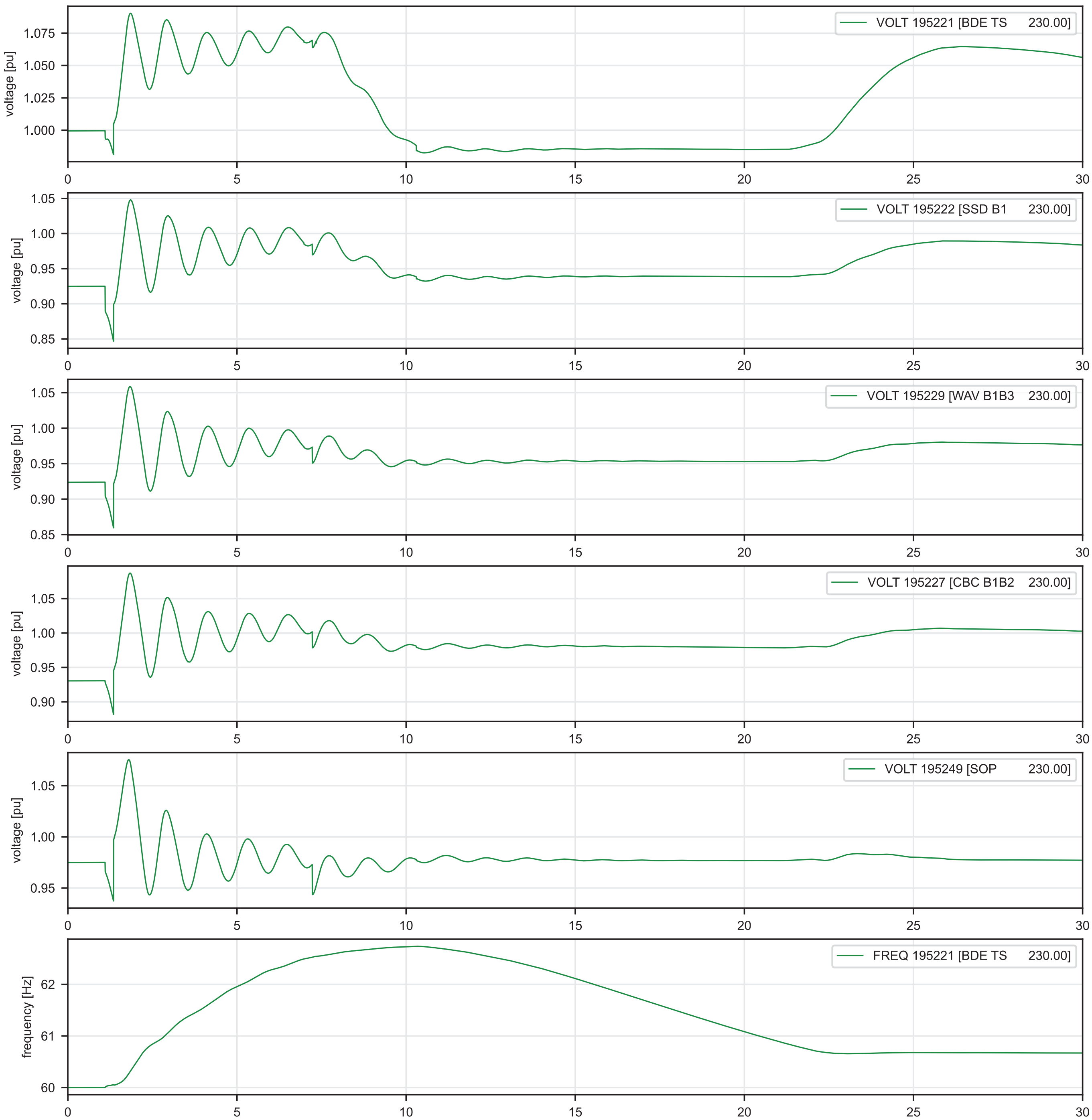
02_2033-34_Base-Peak_TL207-TL203_250MW with STATCOM (meets voltage criteria)
Loss of TL207 | Voltage / Frequency



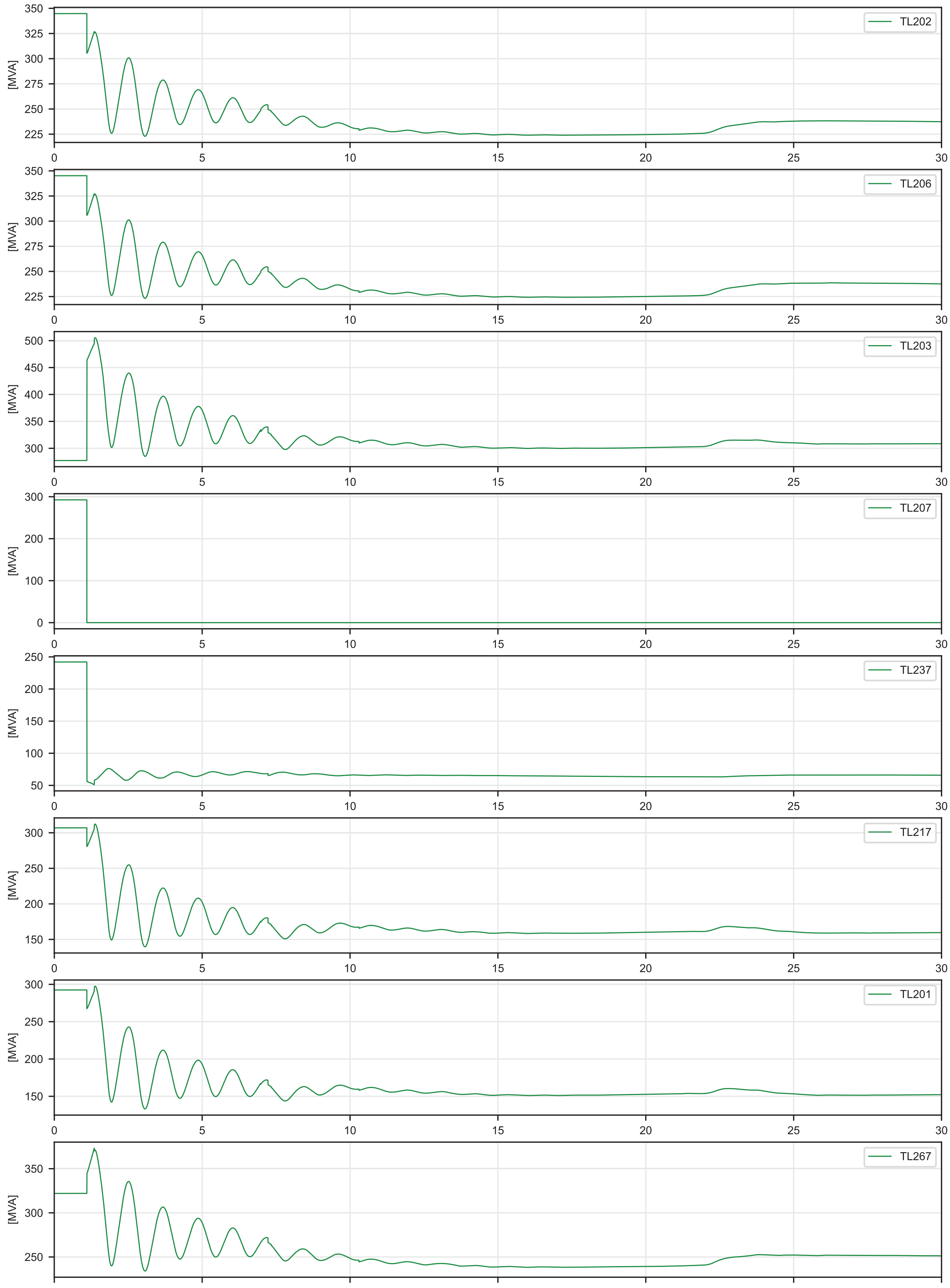
02_2033-34_Base-Peak_TL207-TL203_250MW with STATCOM (meets voltage criteria)
Loss of TL207 | 230 kV Power Flow



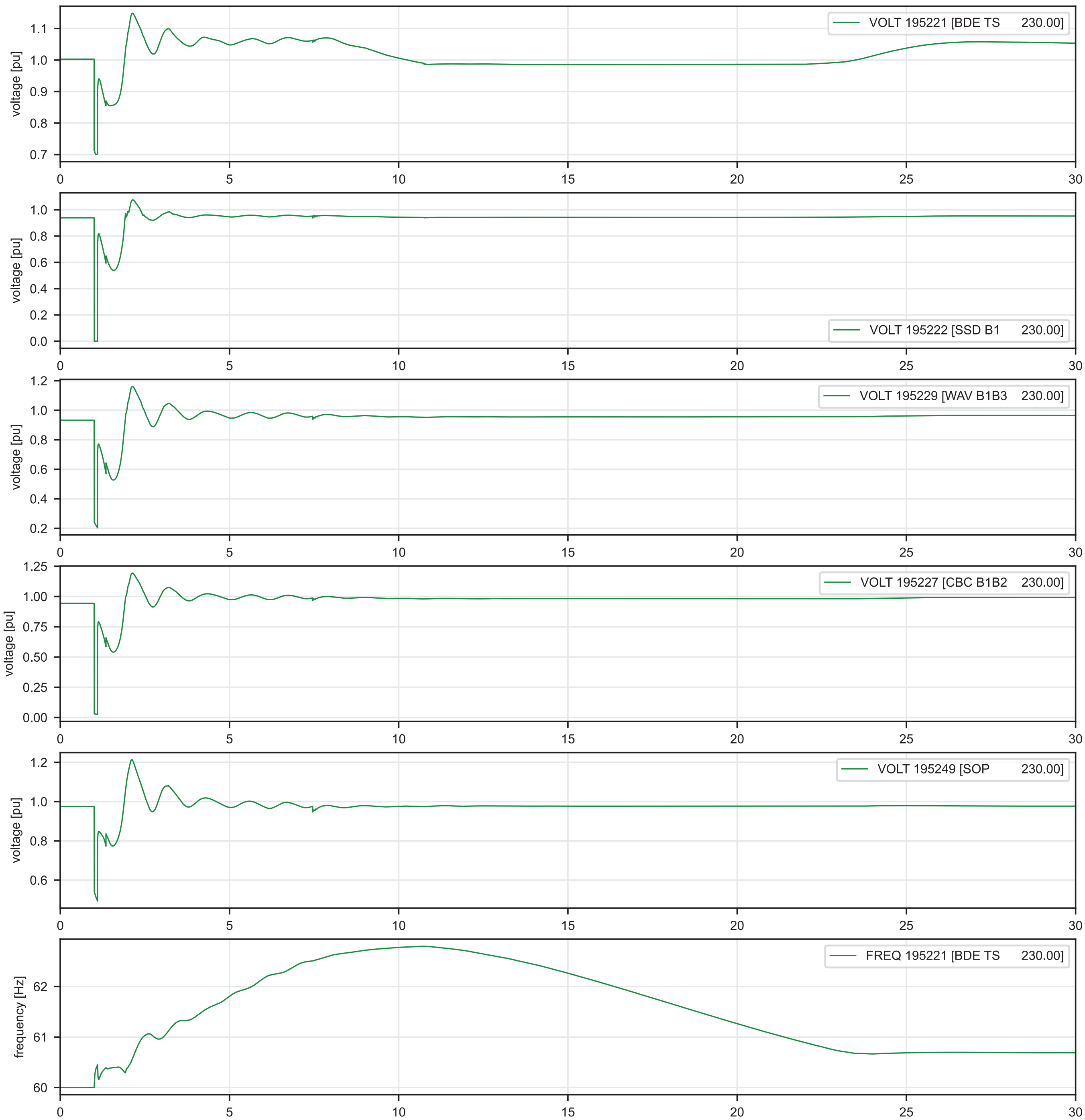
02_2033-34_Base-Peak_TL207-TL203_peakMW
Loss of TL207 | Voltage / Frequency



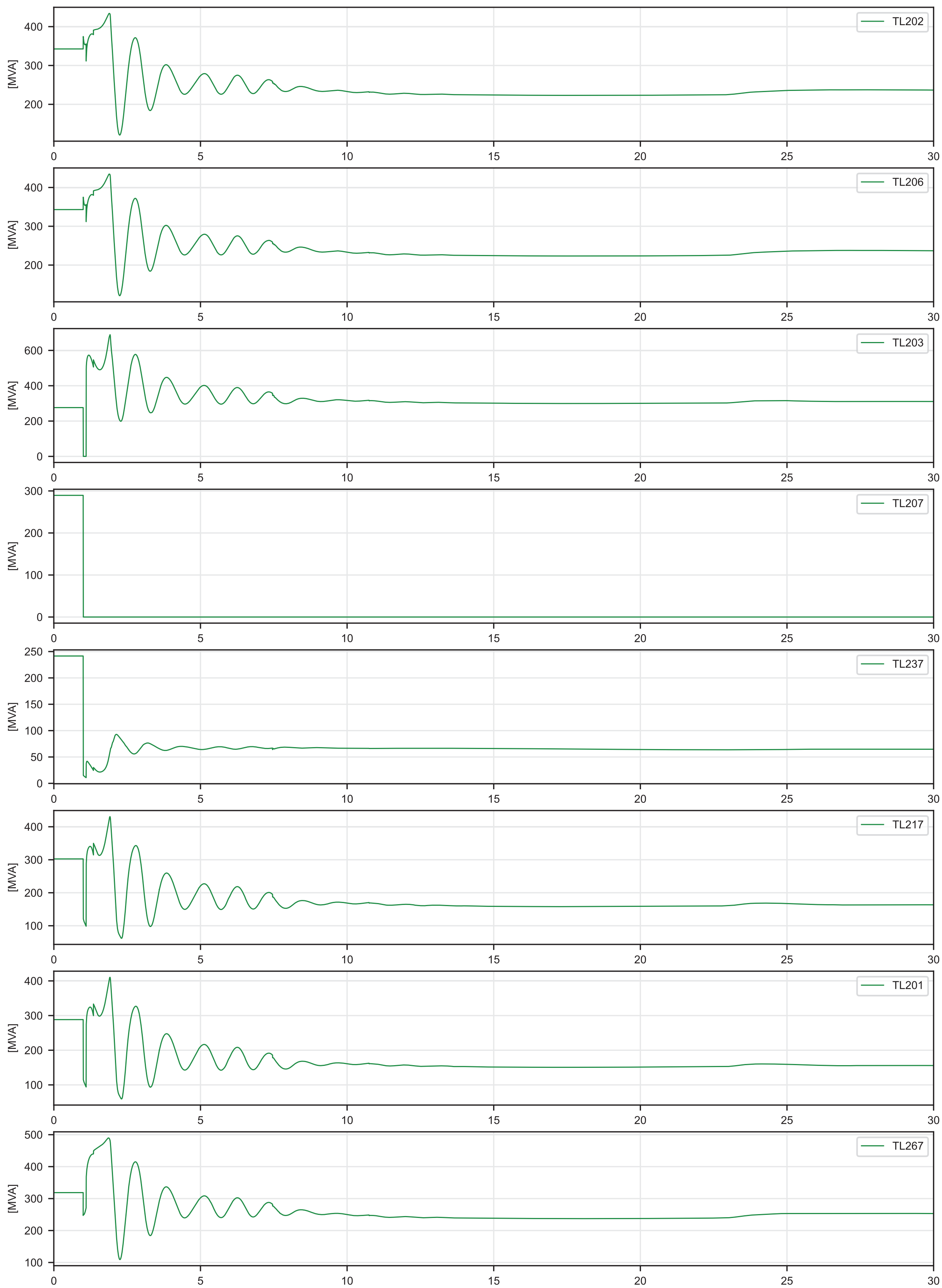
02_2033-34_Base-Peak_TL207-TL203_peakMW
Loss of TL207 | 230 kV Power Flow

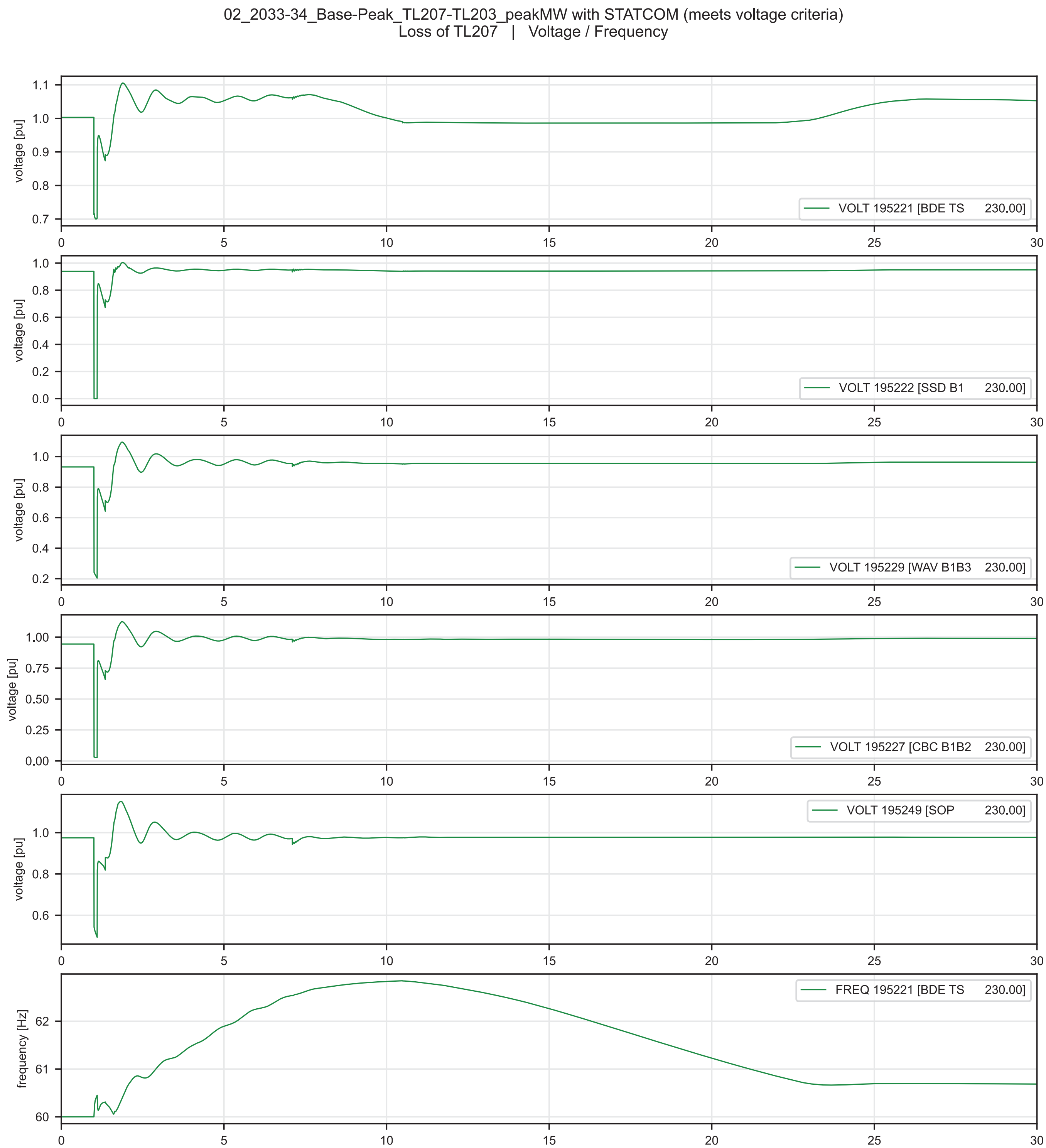


02_2033-34_Base-Peak_TL207-TL203_peakMW with STATCOM (violates voltage criteria)
Loss of TL207 | Voltage / Frequency

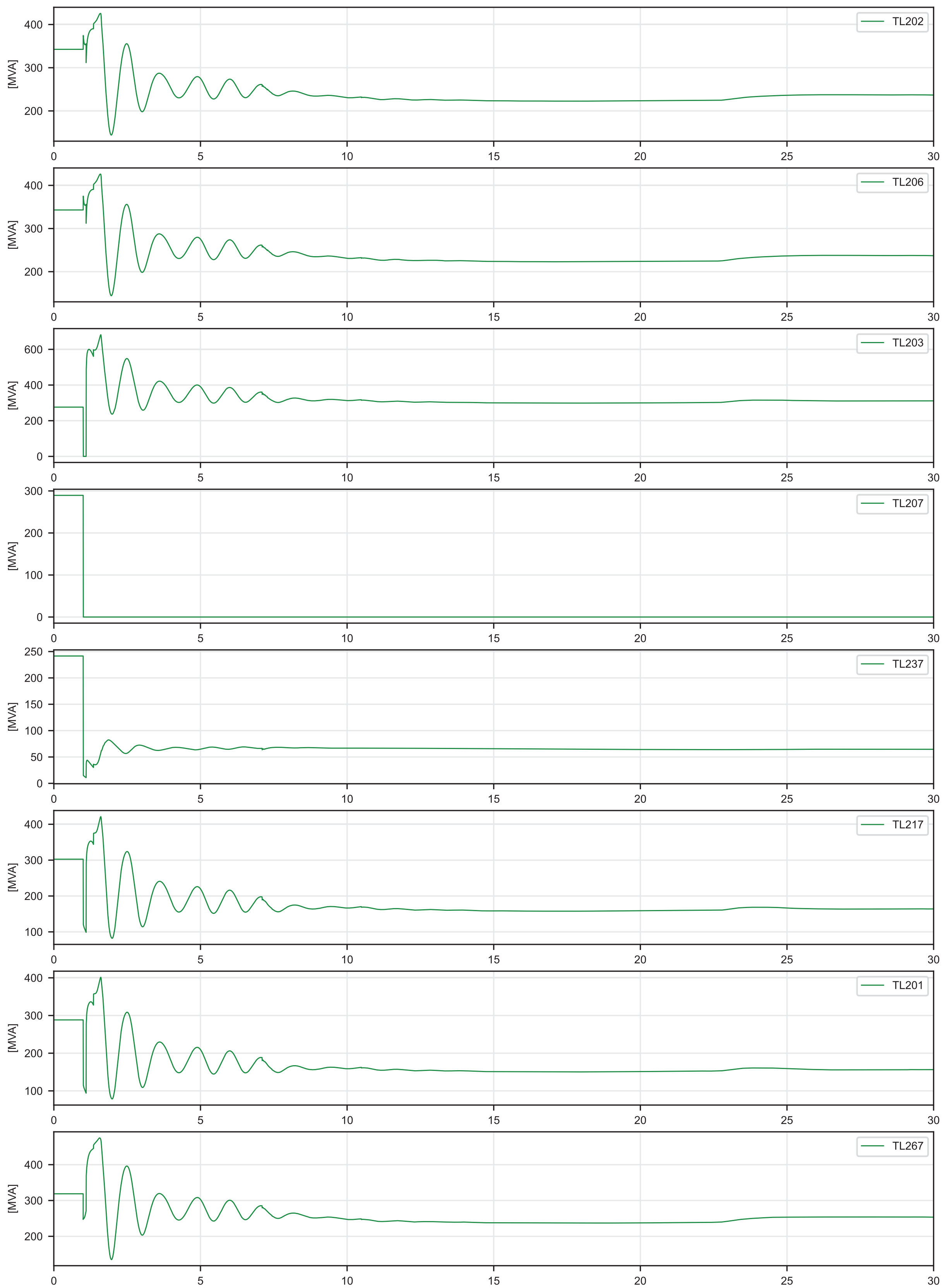


02_2033-34_Base-Peak_TL207-TL203_peakMW with STATCOM (violates voltage criteria)
Loss of TL207 | 230 kV Power Flow

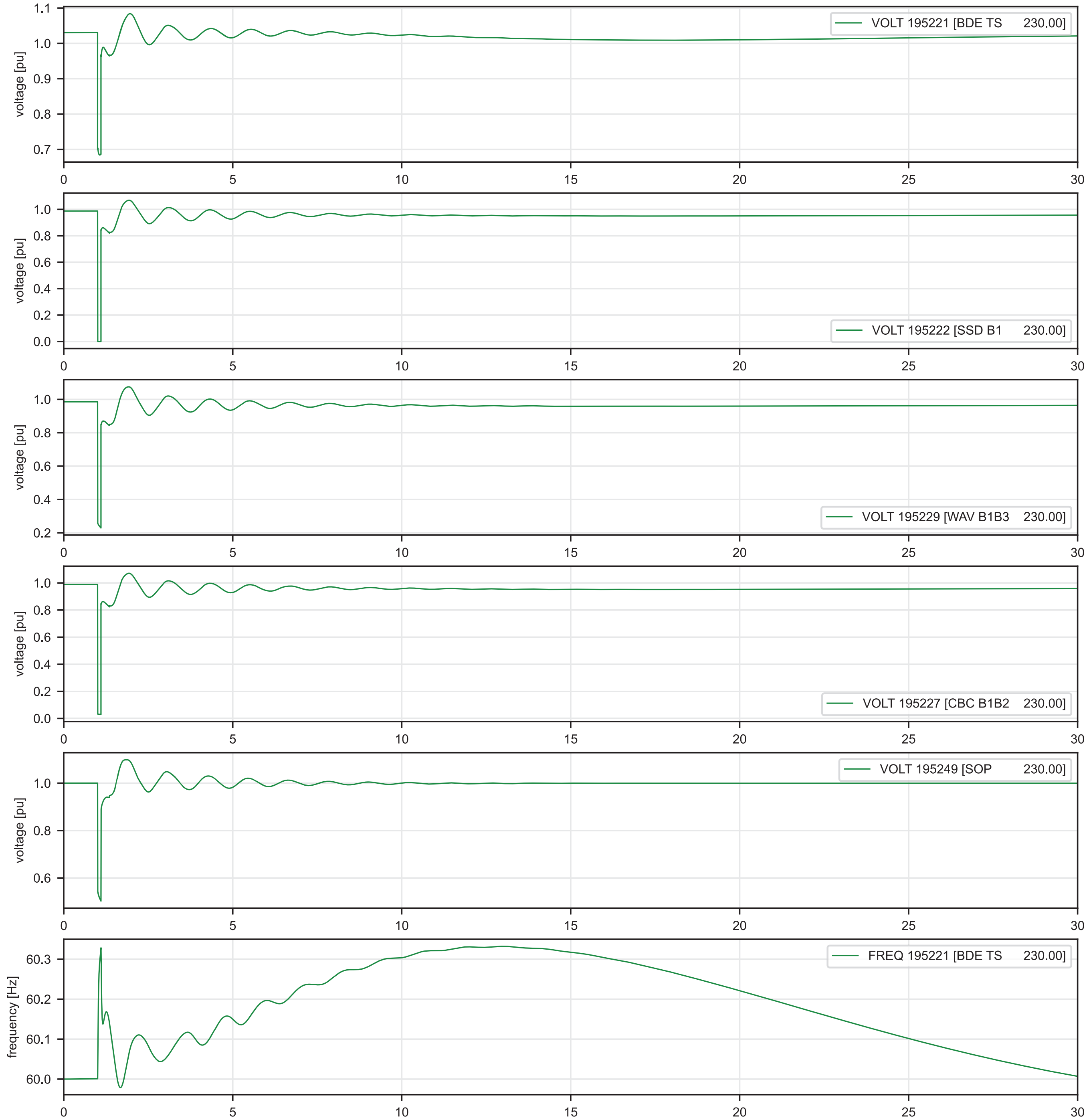



02_2033-34_Base-Peak_TL207-TL203_peakMW with STATCOM (meets voltage criteria)
Loss of TL207 | Voltage / Frequency
voltage [pu]
VOLT 195221 [BDE TS 230.00]
voltage [pu]
VOLT 195222 [SSD B1 230.00]
voltage [pu]
VOLT 195229 [WAV B1B3 230.00]
voltage [pu]
VOLT 195227 [CBC B1B2 230.00]
voltage [pu]
VOLT 195249 [SOP 230.00]
frequency [Hz]
FREQ 195221 [BDE TS 230.00]

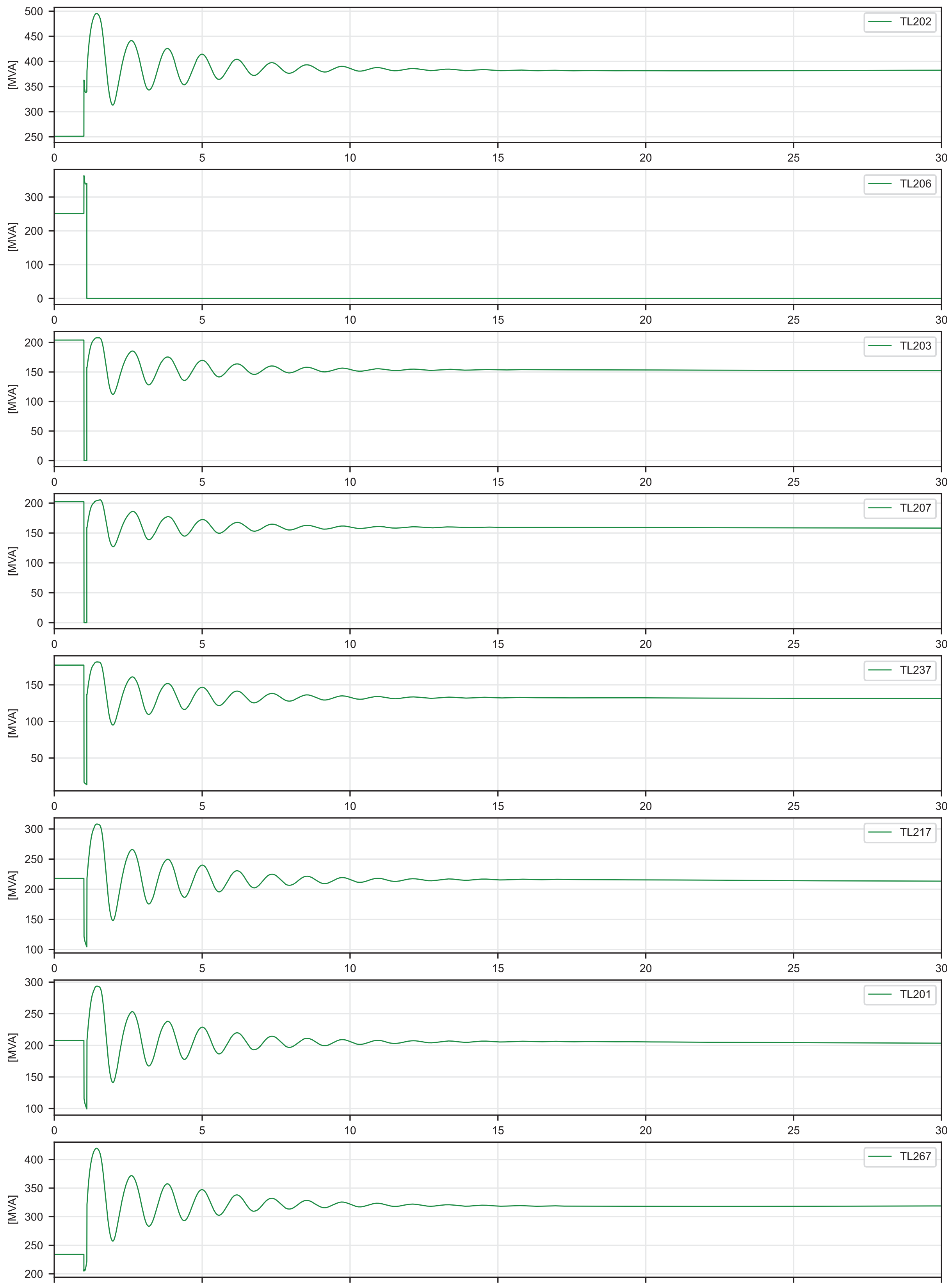
02_2033-34_Base-Peak_TL207-TL203_peakMW with STATCOM (meets voltage criteria)
Loss of TL207 | 230 kV Power Flow



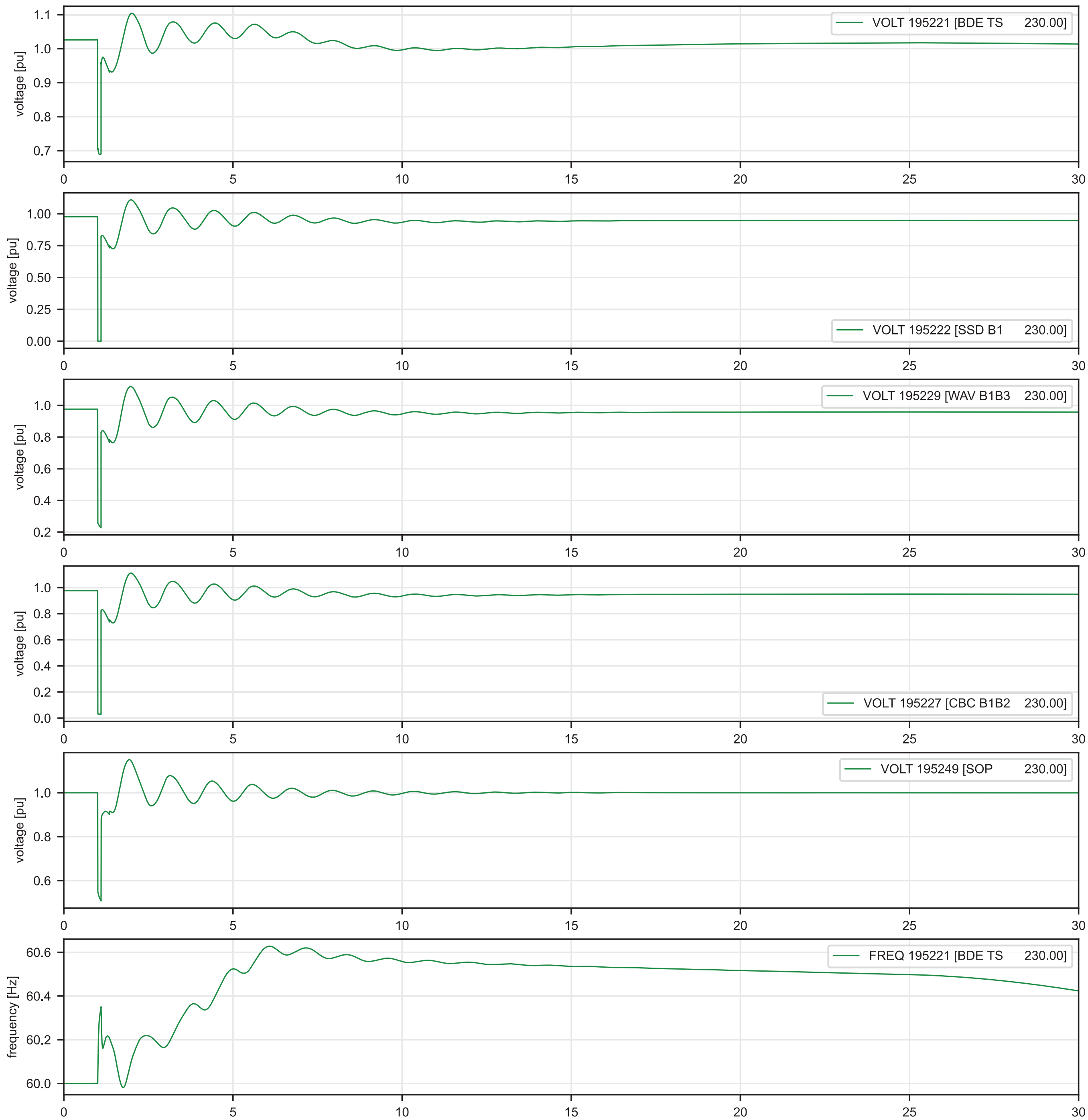
03_2033-34_Base-Peak_TL206-TL202_050MW
Loss of TL206 | Voltage / Frequency



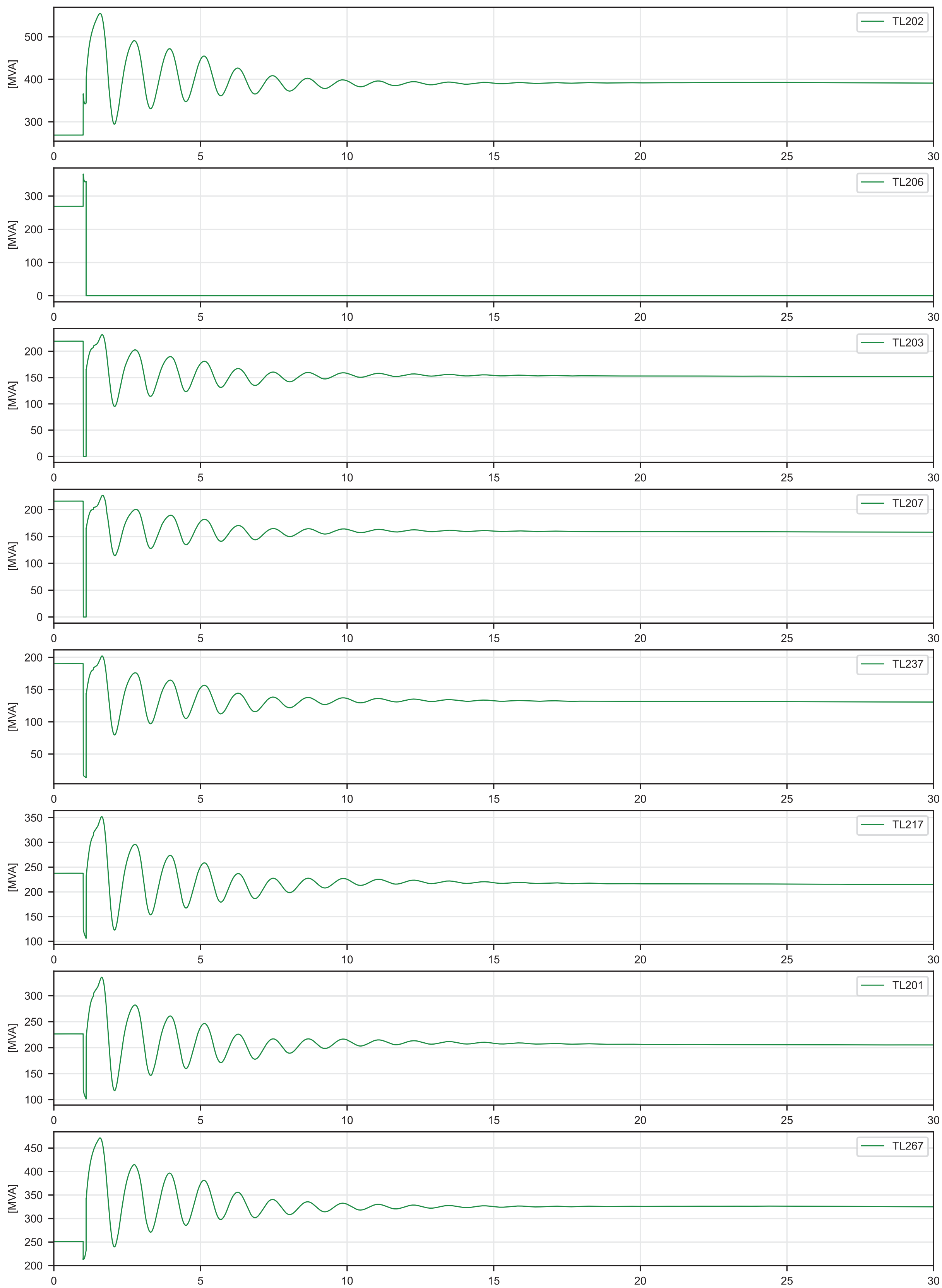
03_2033-34_Base-Peak_TL206-TL202_050MW
Loss of TL206 | 230 kV Power Flow



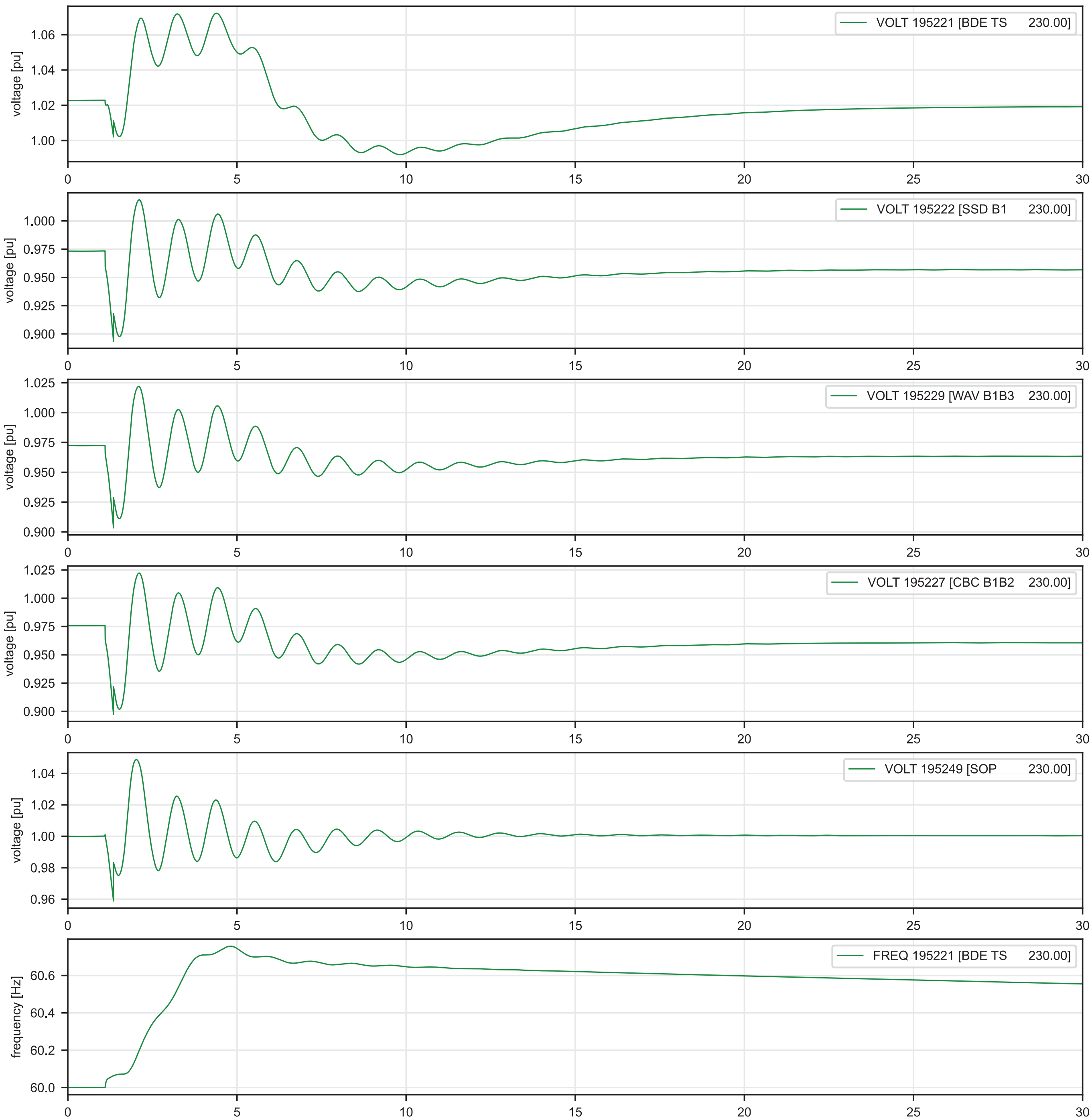
03_2033-34_Base-Peak_TL206-TL202_100MW
Loss of TL206 | Voltage / Frequency



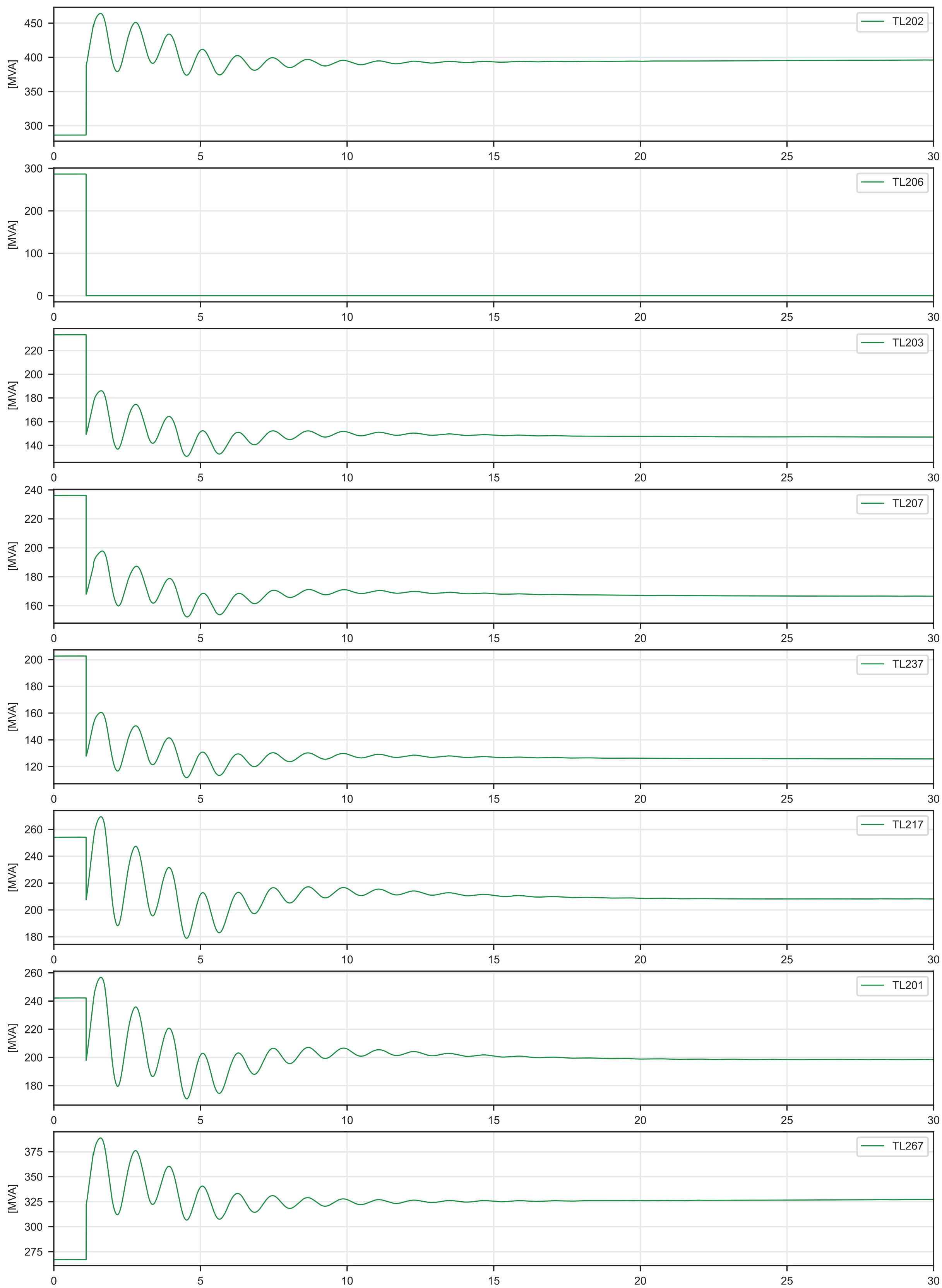
03_2033-34_Base-Peak_TL206-TL202_100MW
Loss of TL206 | 230 kV Power Flow



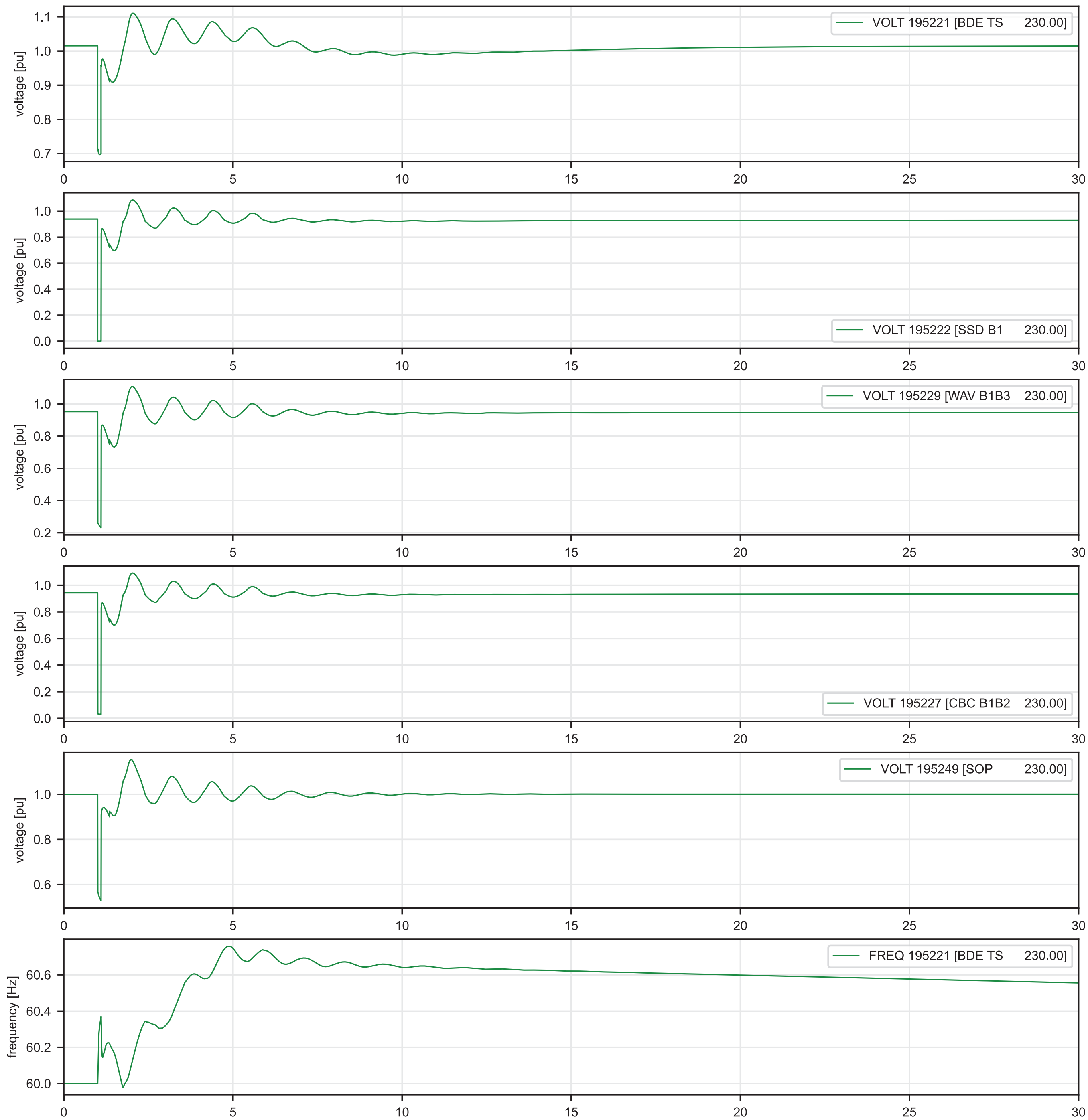
03_2033-34_Base-Peak_TL206-TL202_150MW
Loss of TL206 | Voltage / Frequency



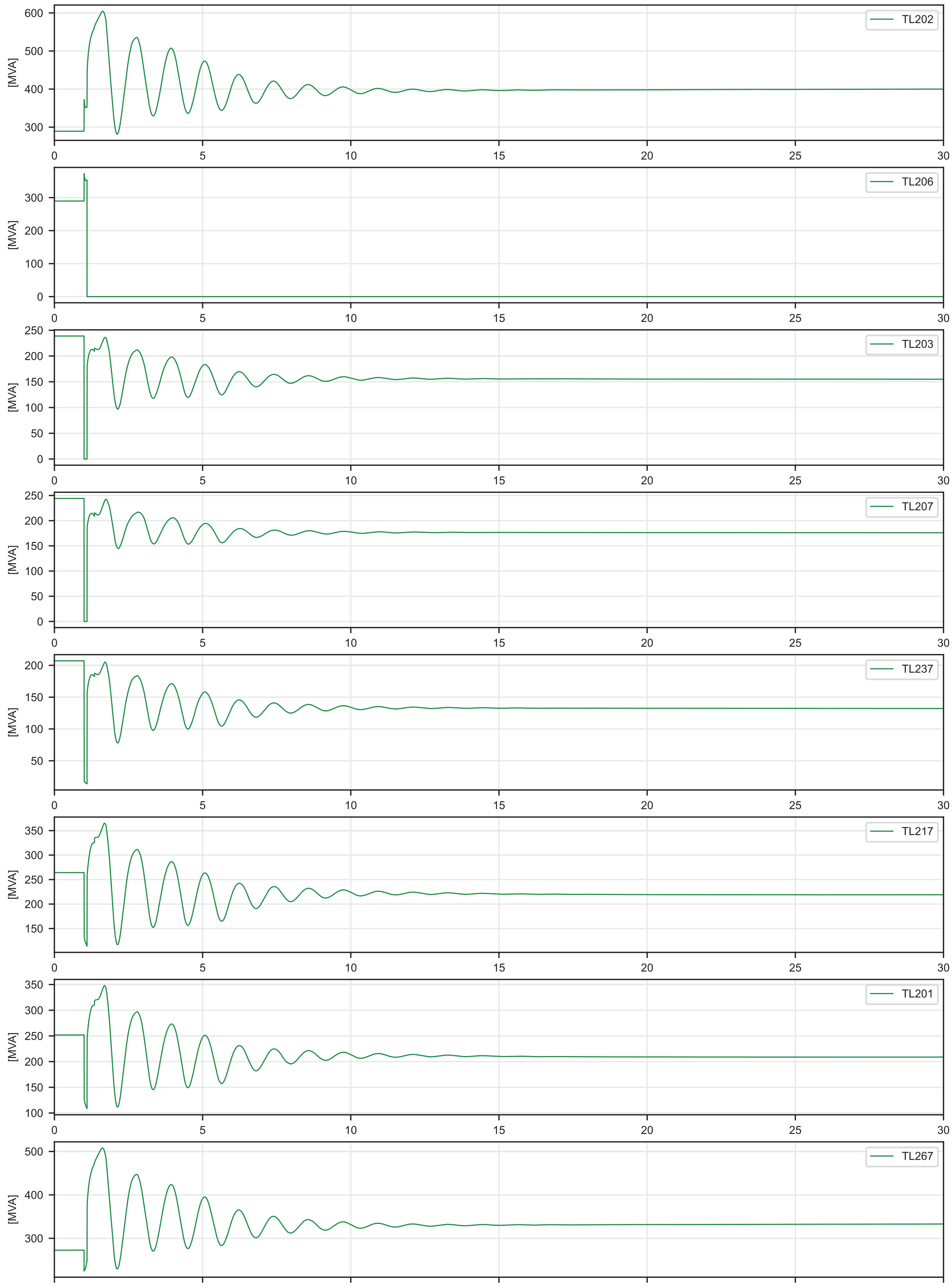
03_2033-34_Base-Peak_TL206-TL202_150MW
Loss of TL206 | 230 kV Power Flow



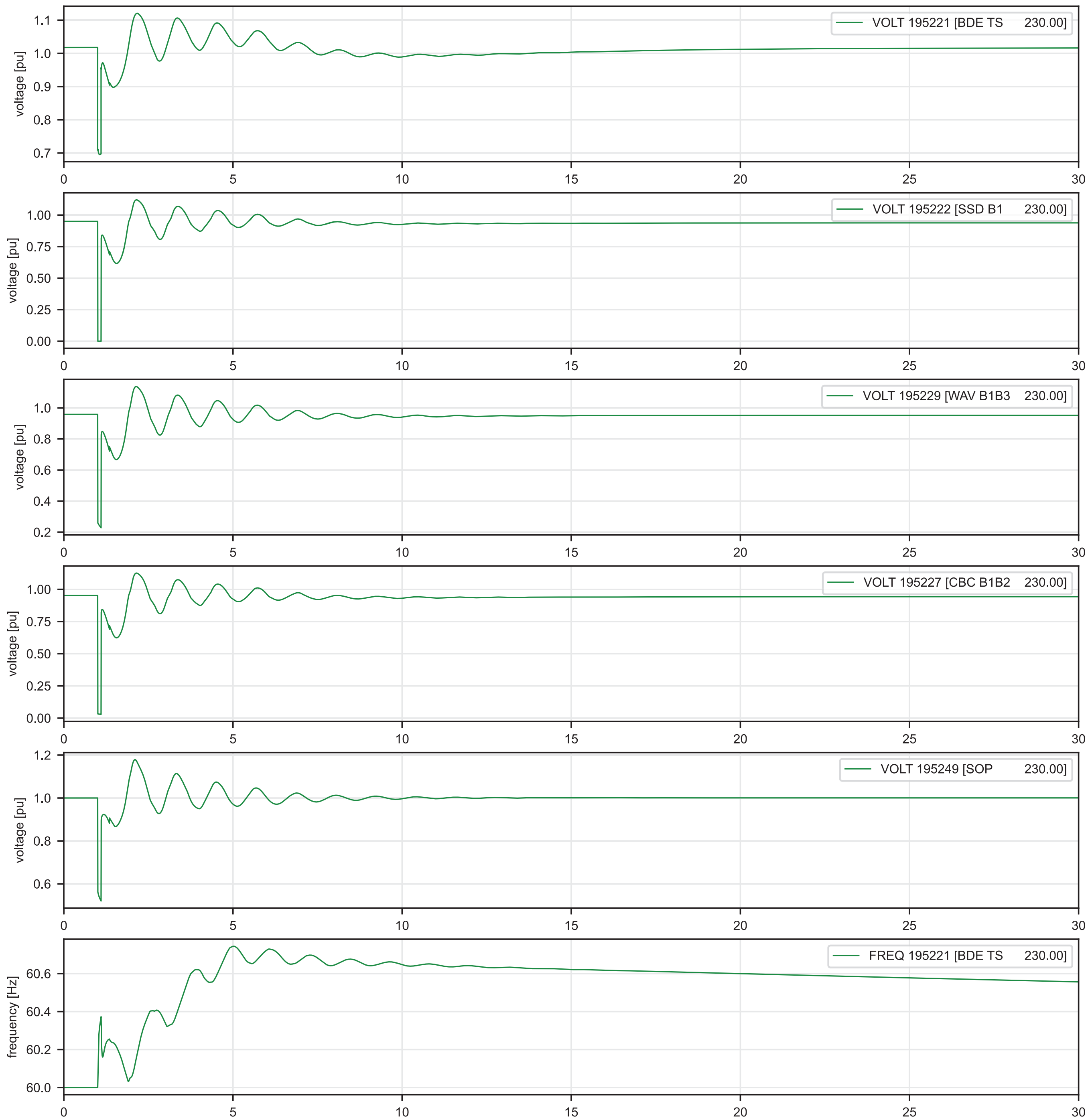
03_2033-34_Base-Peak_TL206-TL202_150MW with STATCOM (violates voltage criteria)
Loss of TL206 | Voltage / Frequency



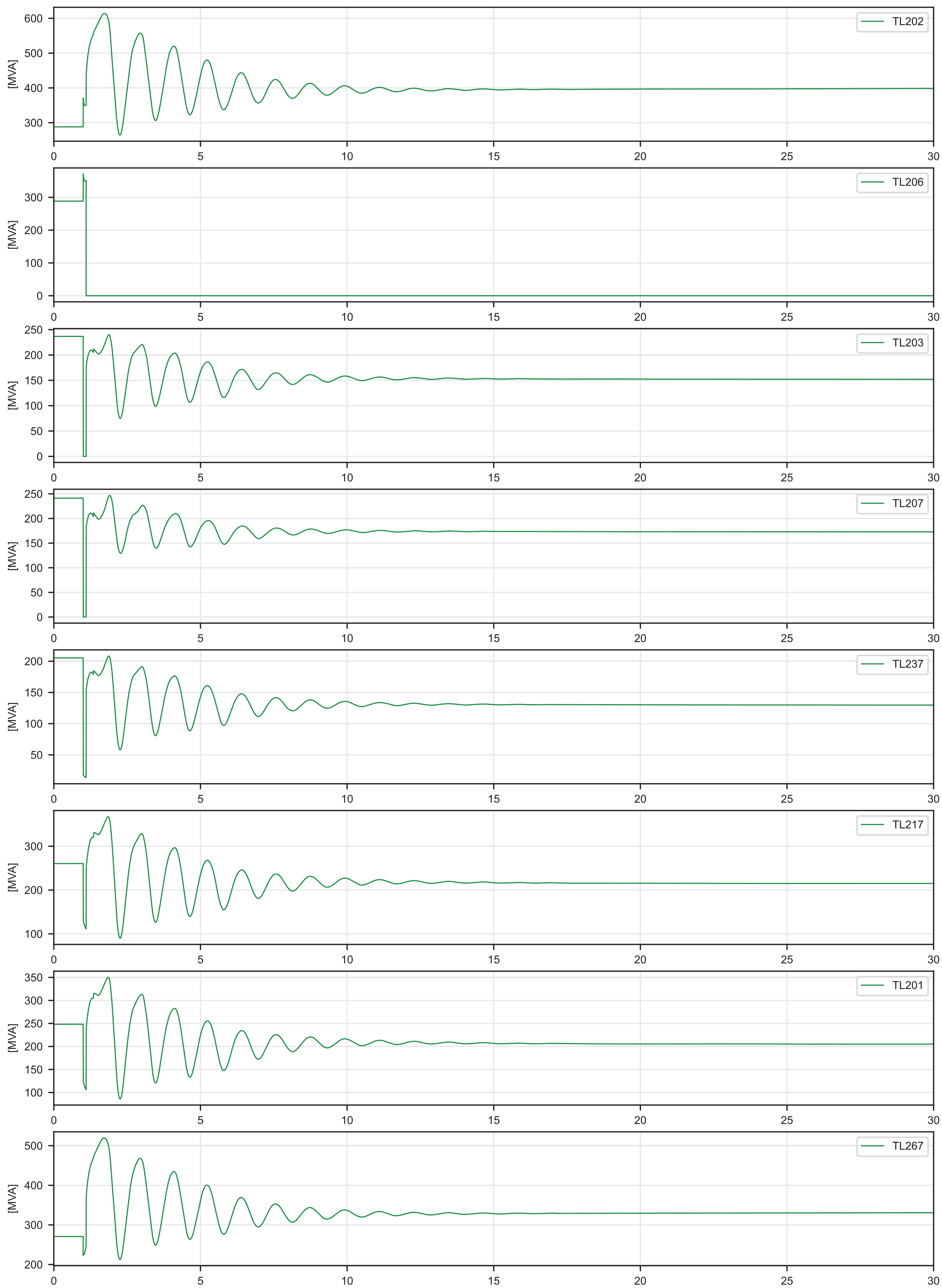
03_2033-34_Base-Peak_TL206-TL202_150MW with STATCOM (violates voltage criteria)
Loss of TL206 | 230 kV Power Flow



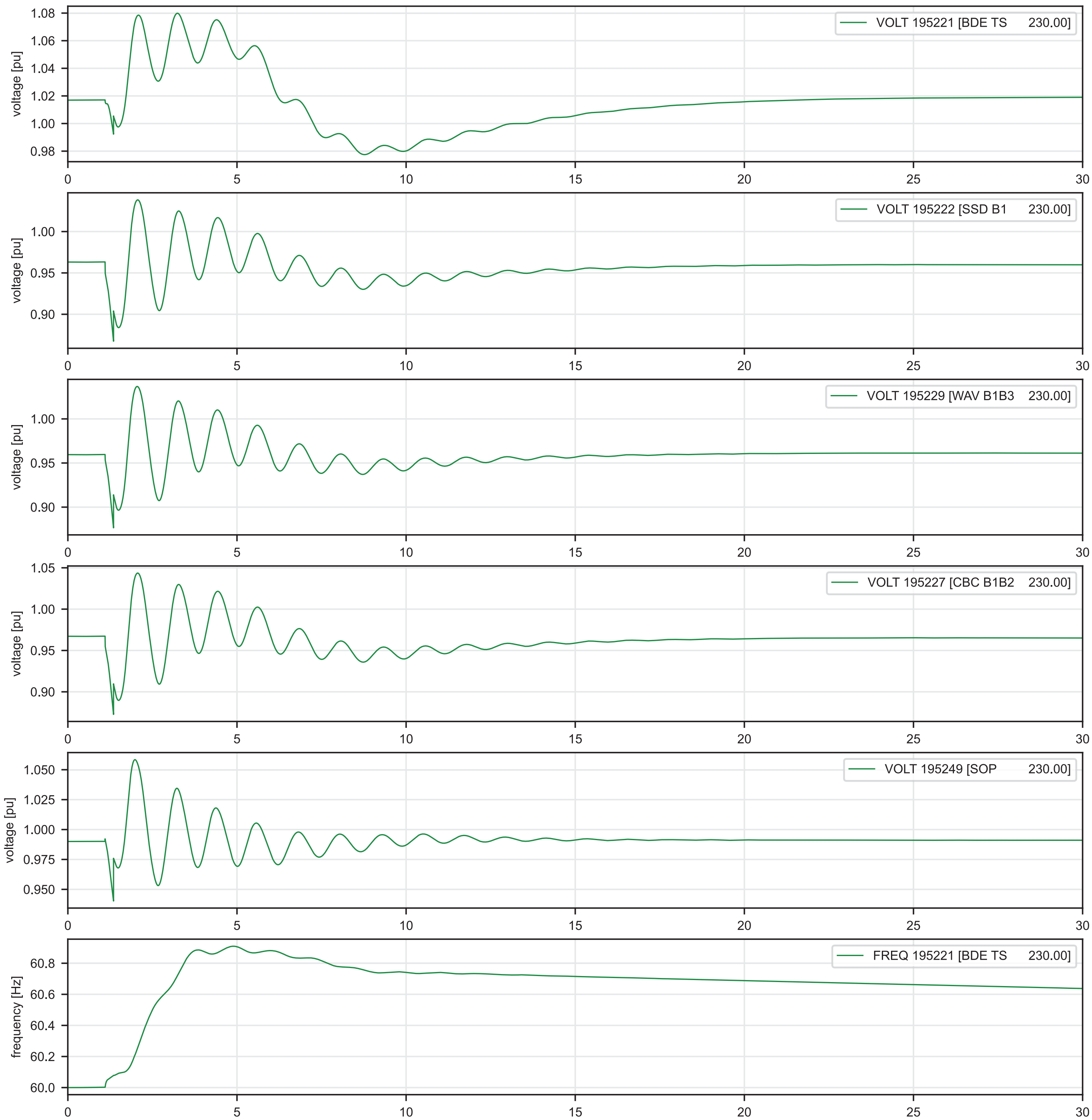
03_2033-34_Base-Peak_TL206-TL202_150MW with STATCOM (meets voltage criteria)
Loss of TL206 | Voltage / Frequency



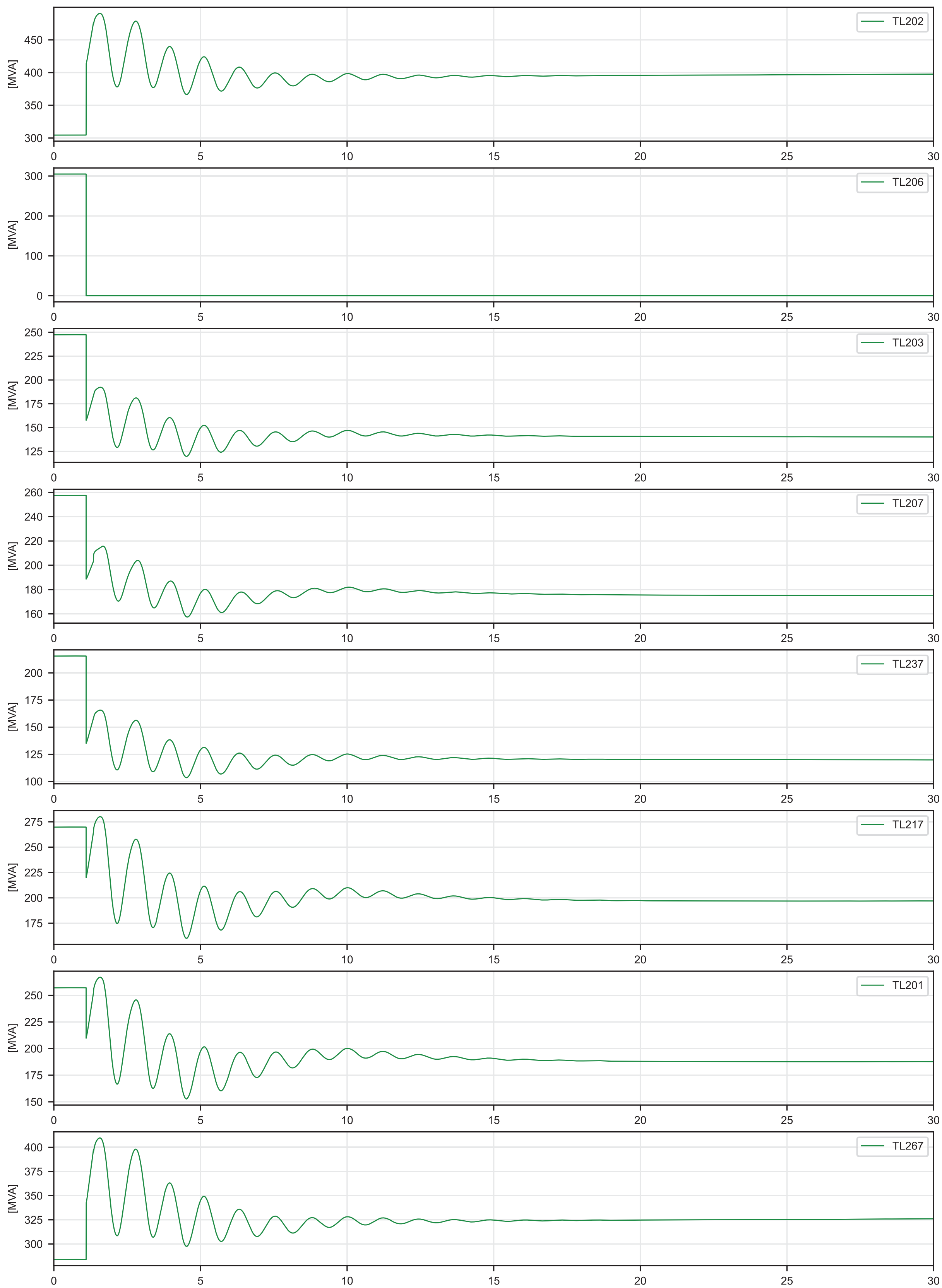
03_2033-34_Base-Peak_TL206-TL202_150MW with STATCOM (meets voltage criteria)
Loss of TL206 | 230 kV Power Flow



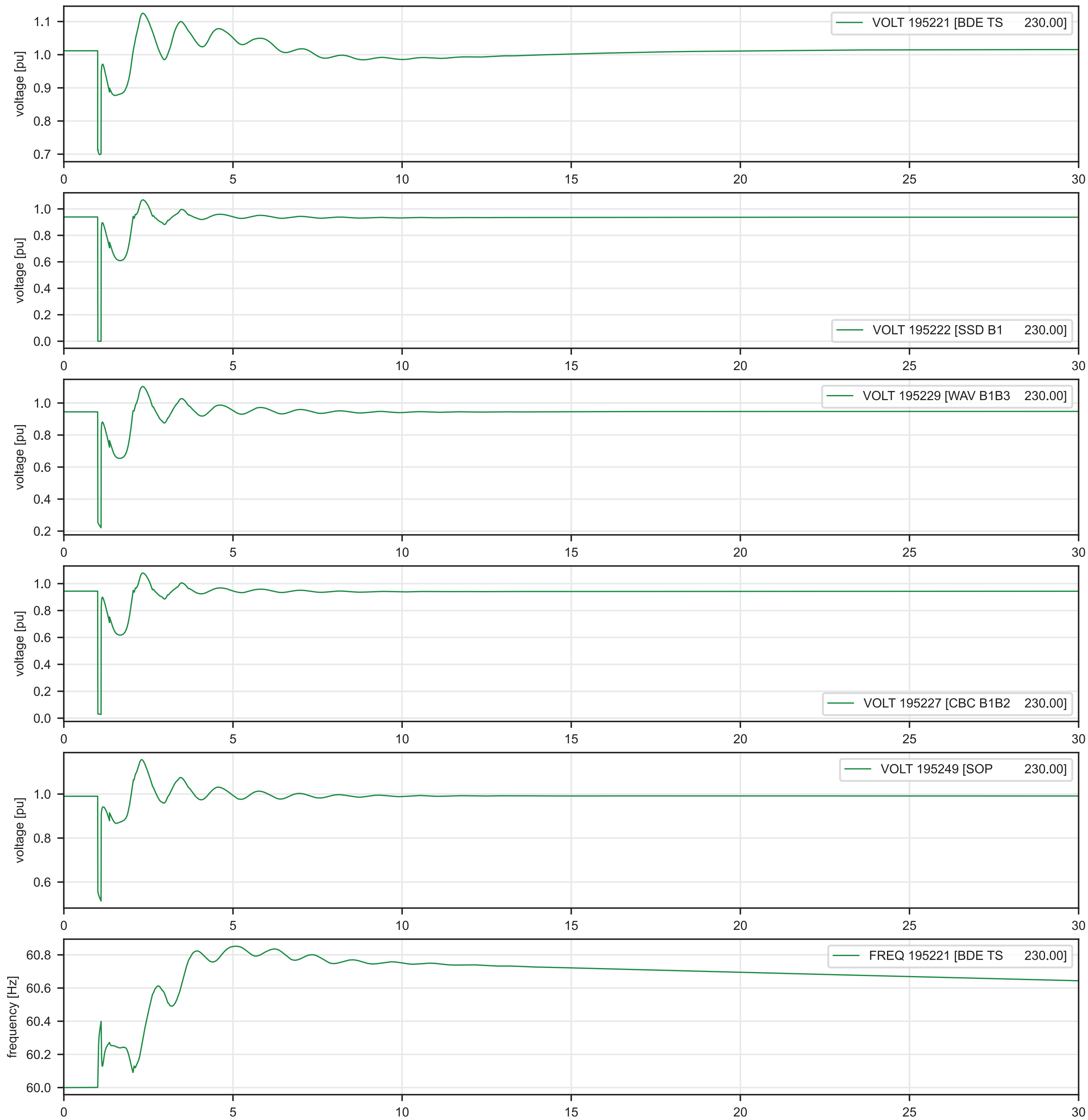
03_2033-34_Base-Peak_TL206-TL202_200MW
Loss of TL206 | Voltage / Frequency



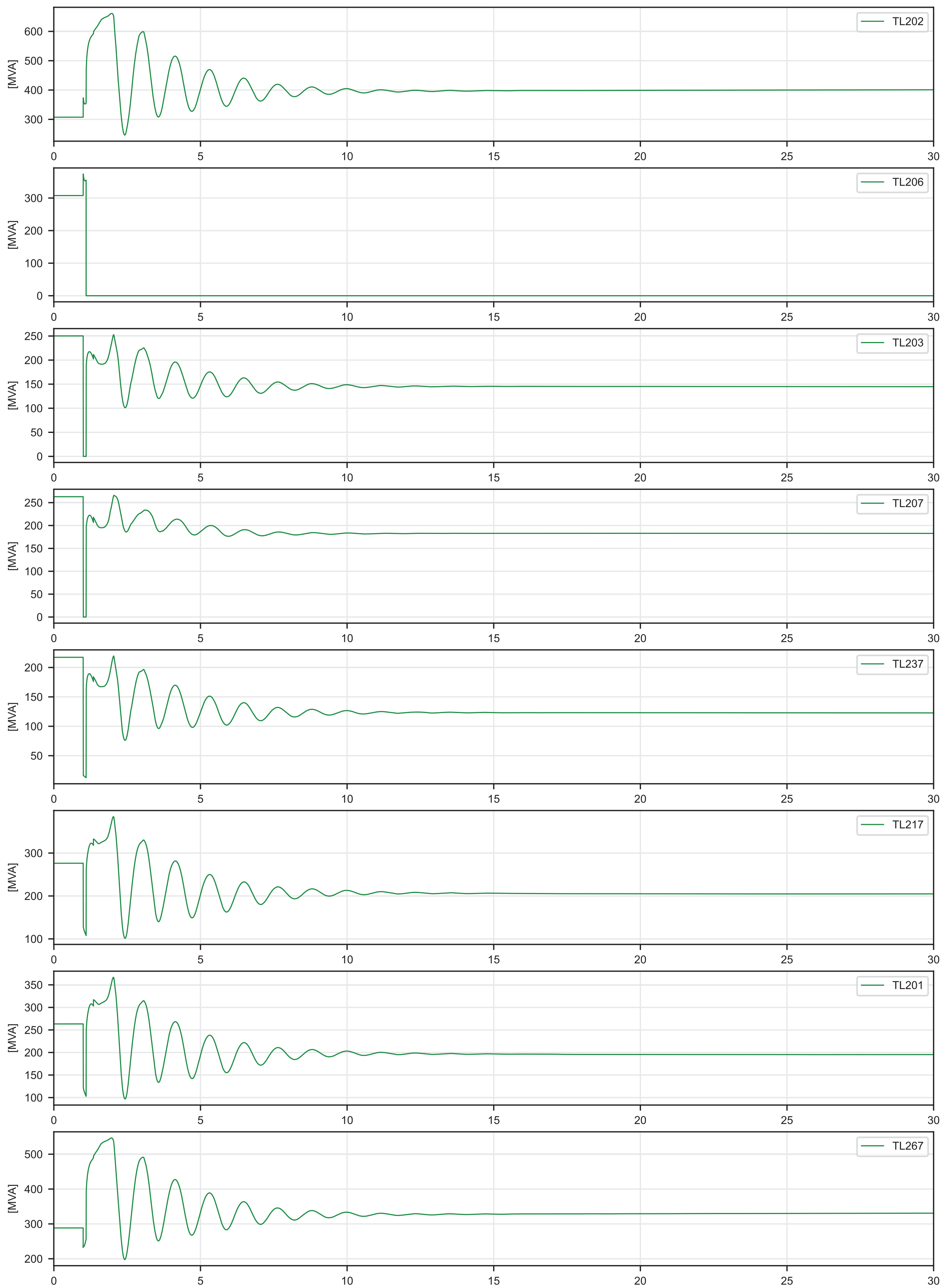
03_2033-34_Base-Peak_TL206-TL202_200MW
Loss of TL206 | 230 kV Power Flow



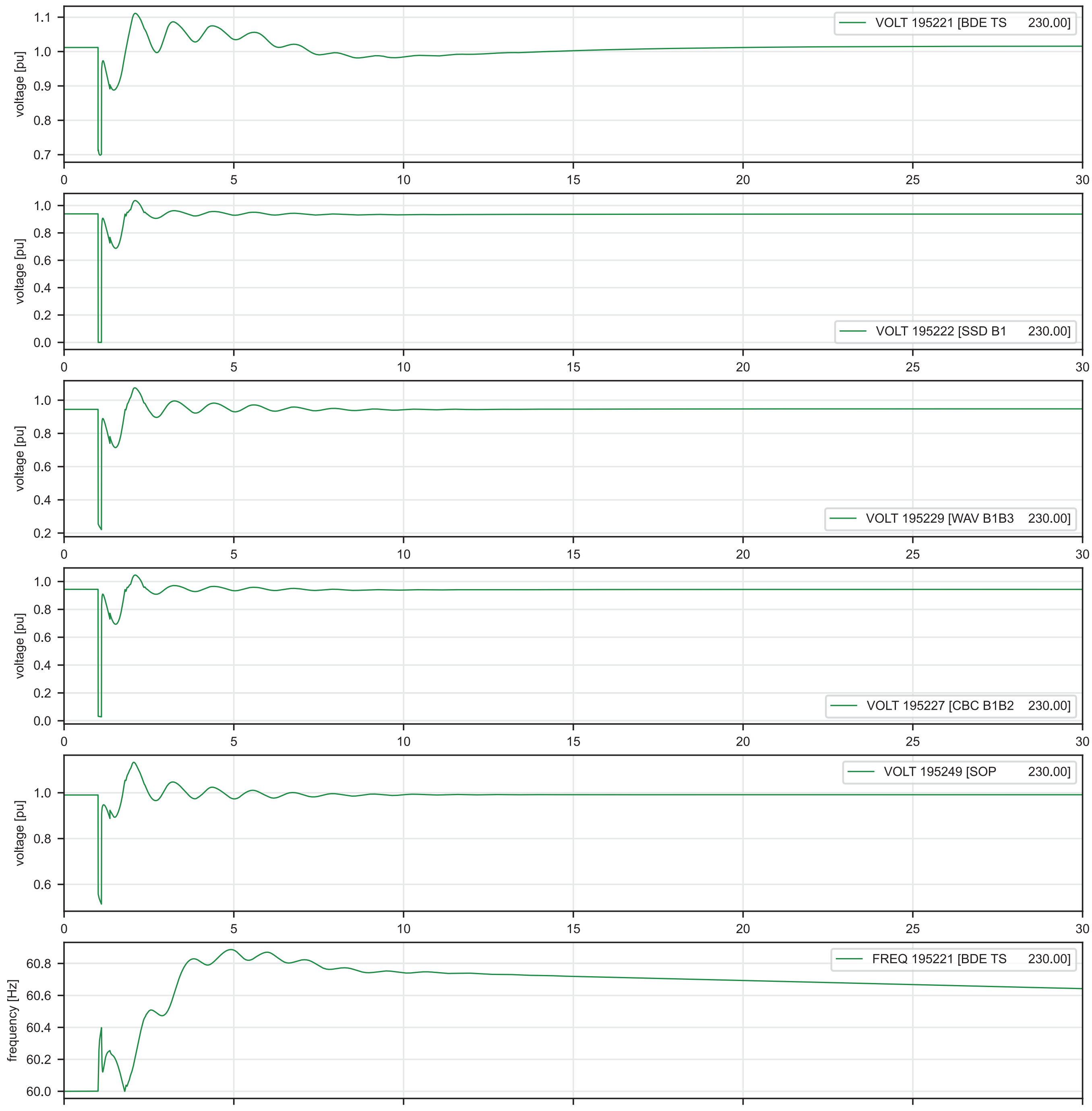
03_2033-34_Base-Peak_TL206-TL202_200MW with STATCOM (violates voltage criteria)
Loss of TL206 | Voltage / Frequency



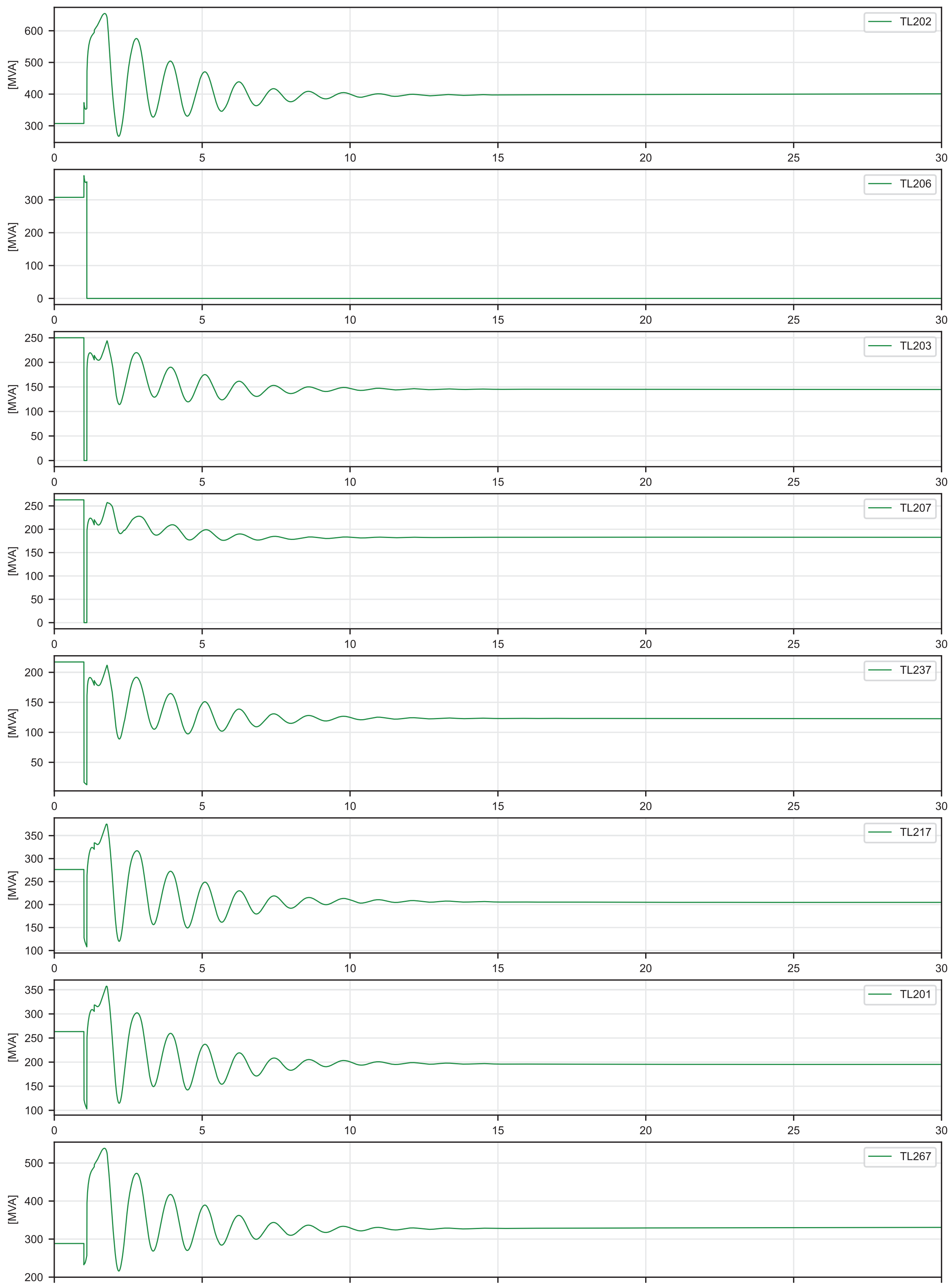
03_2033-34_Base-Peak_TL206-TL202_200MW with STATCOM (violates voltage criteria)
Loss of TL206 | 230 kV Power Flow



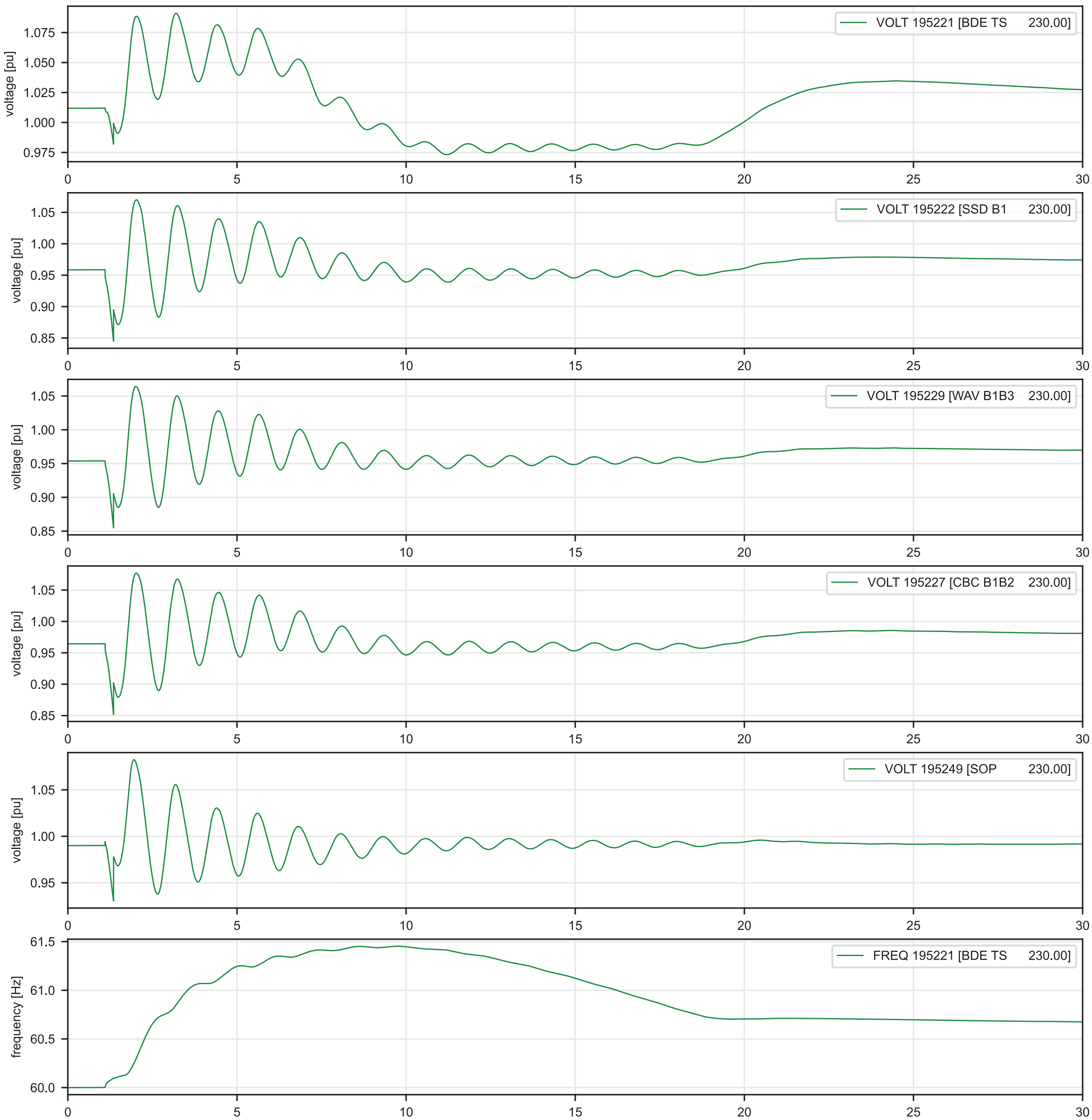
03_2033-34_Base-Peak_TL206-TL202_200MW with STATCOM (meets voltage criteria)
Loss of TL206 | Voltage / Frequency



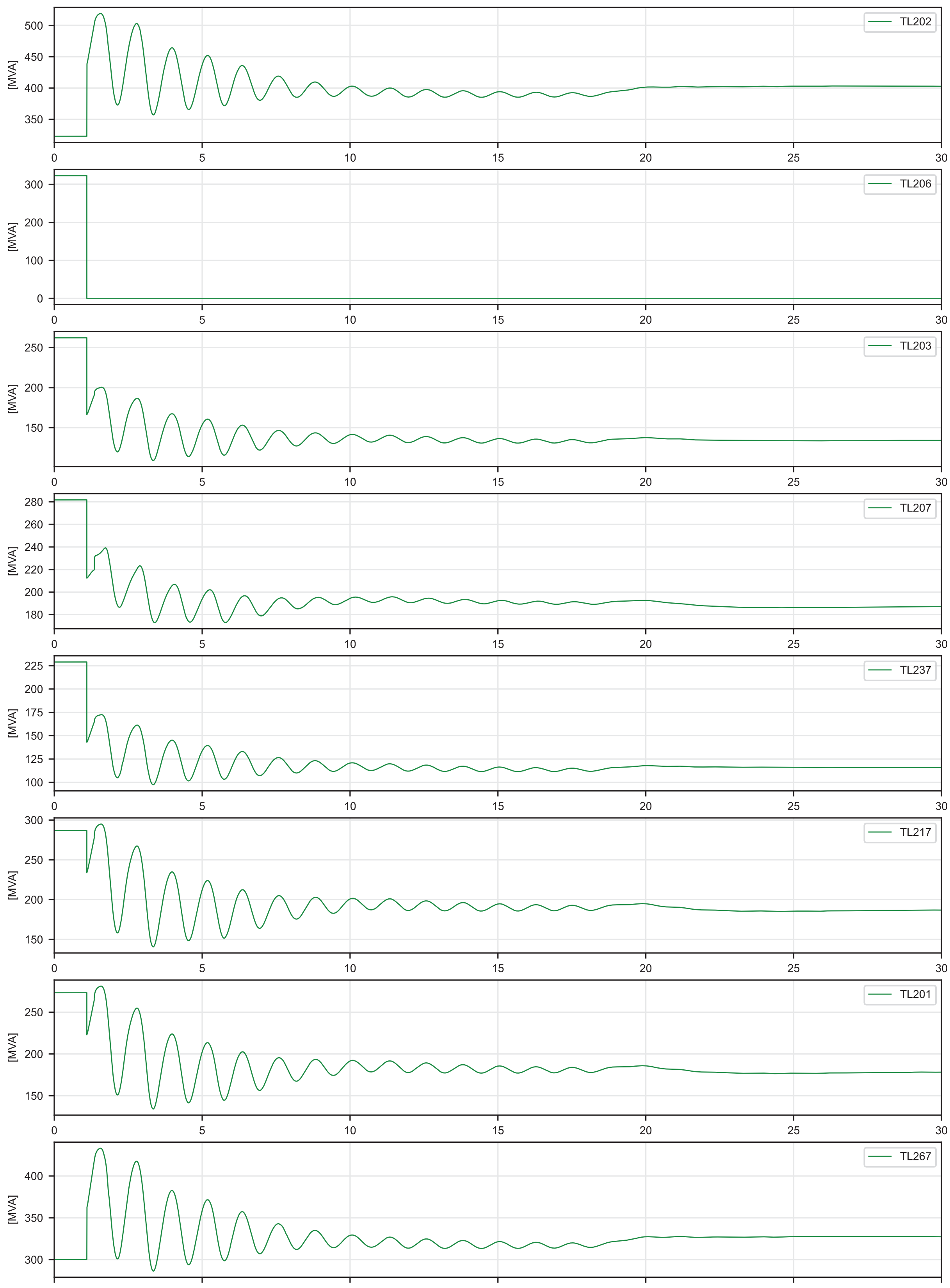
03_2033-34_Base-Peak_TL206-TL202_200MW with STATCOM (meets voltage criteria)
Loss of TL206 | 230 kV Power Flow



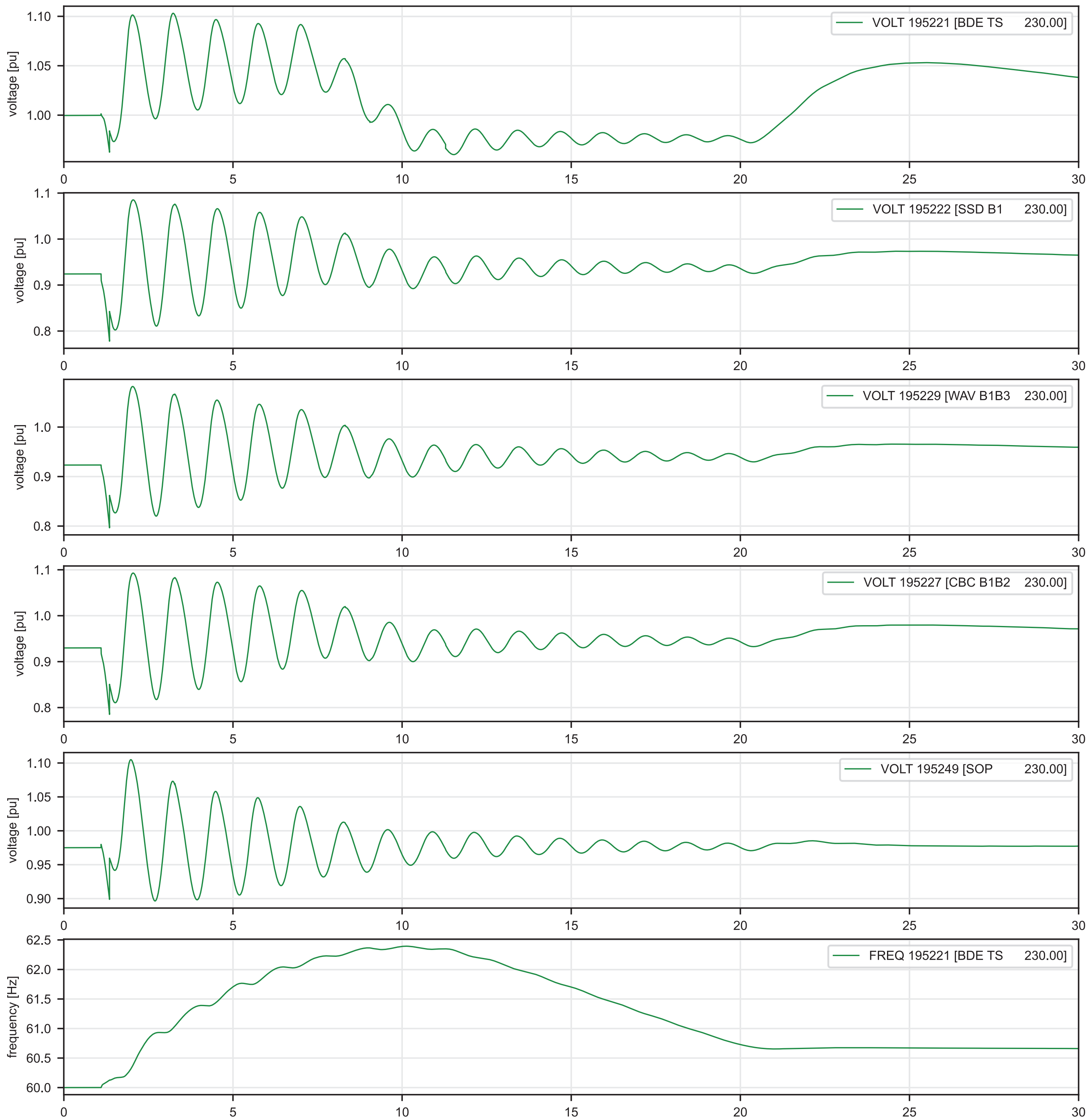
03_2033-34_Base-Peak_TL206-TL202_250MW
Loss of TL206 | Voltage / Frequency



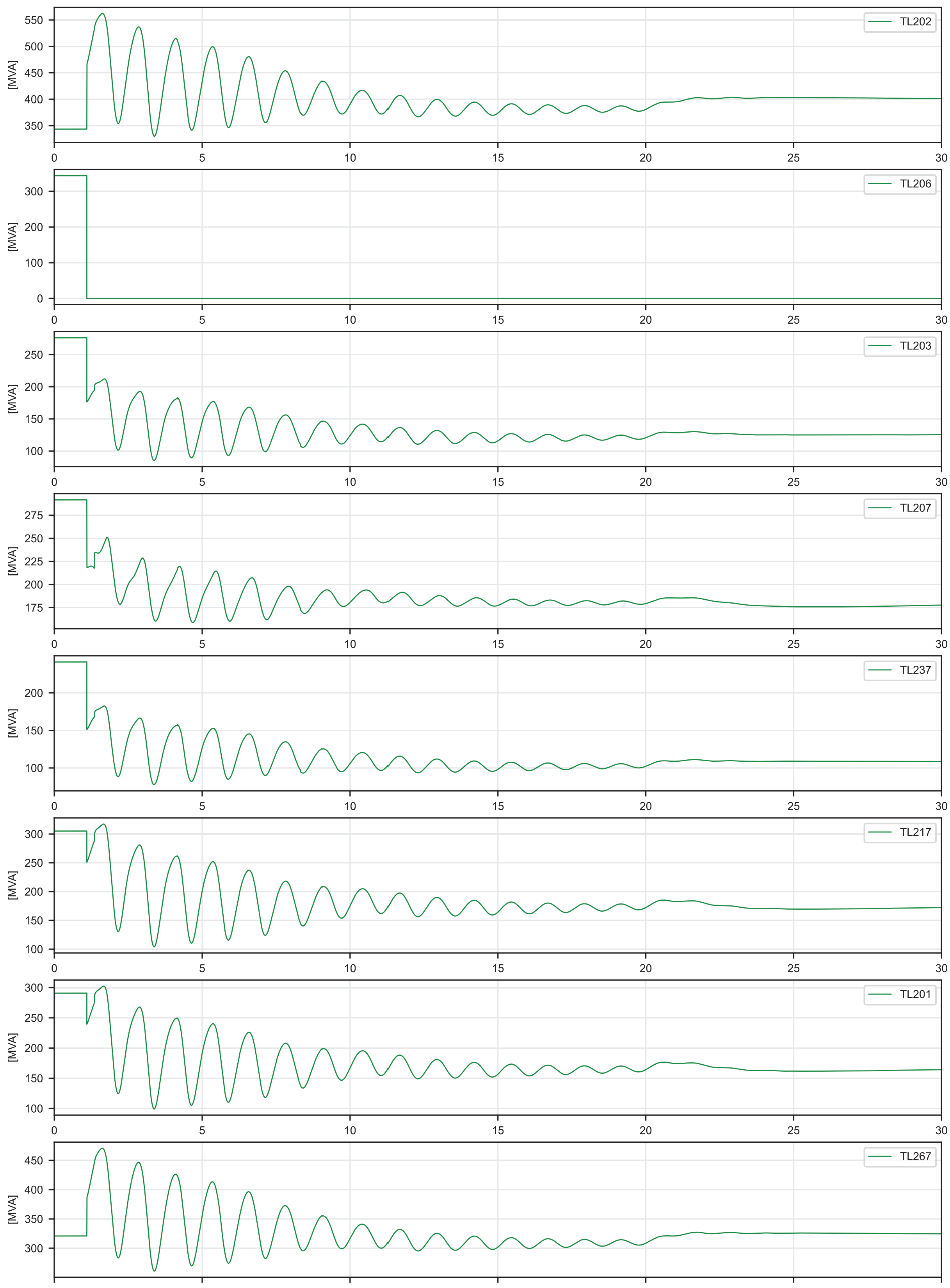
03_2033-34_Base-Peak_TL206-TL202_250MW
Loss of TL206 | 230 kV Power Flow



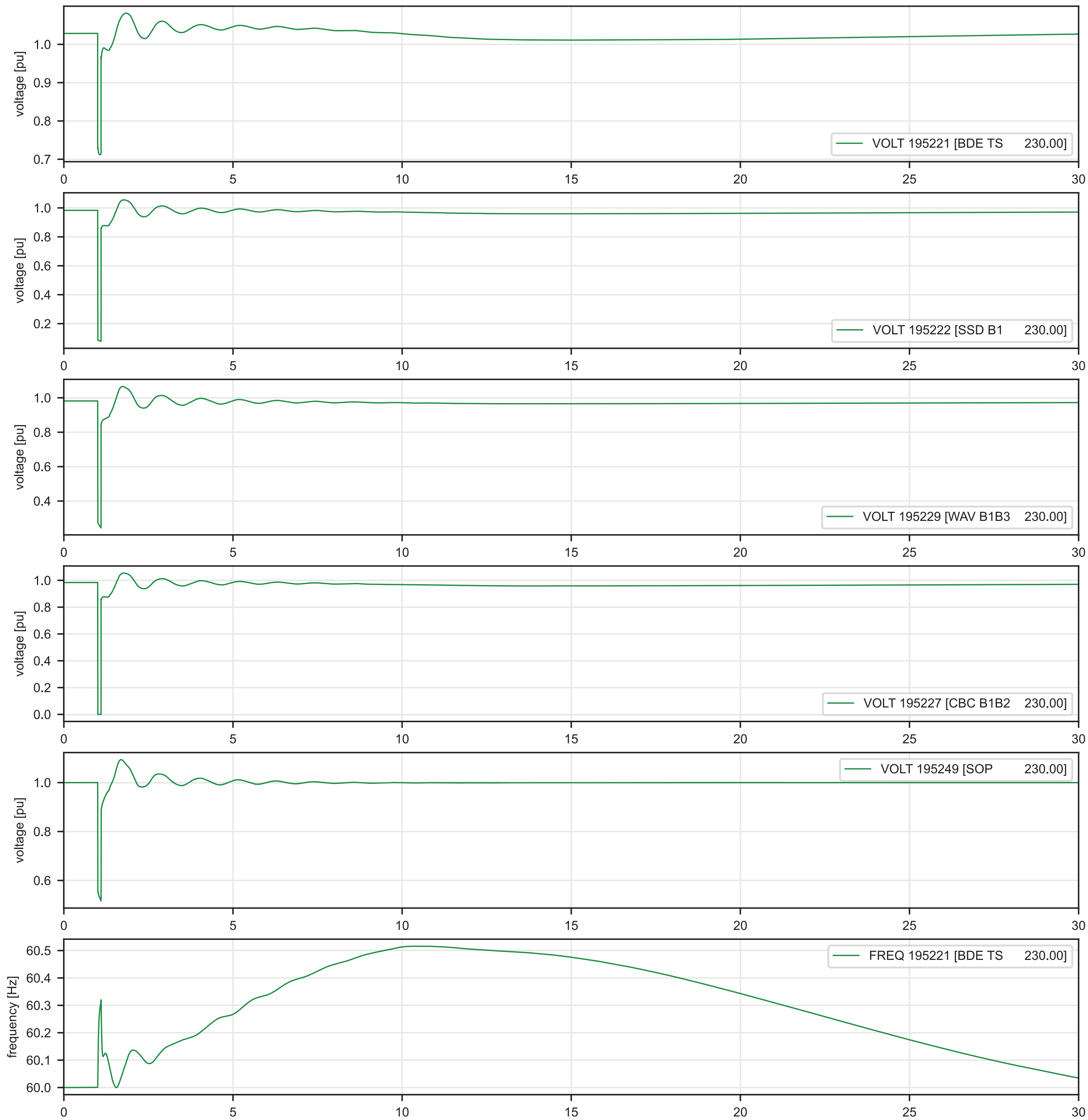
03_2033-34_Base-Peak_TL206-TL202_peakMW
Loss of TL206 | Voltage / Frequency



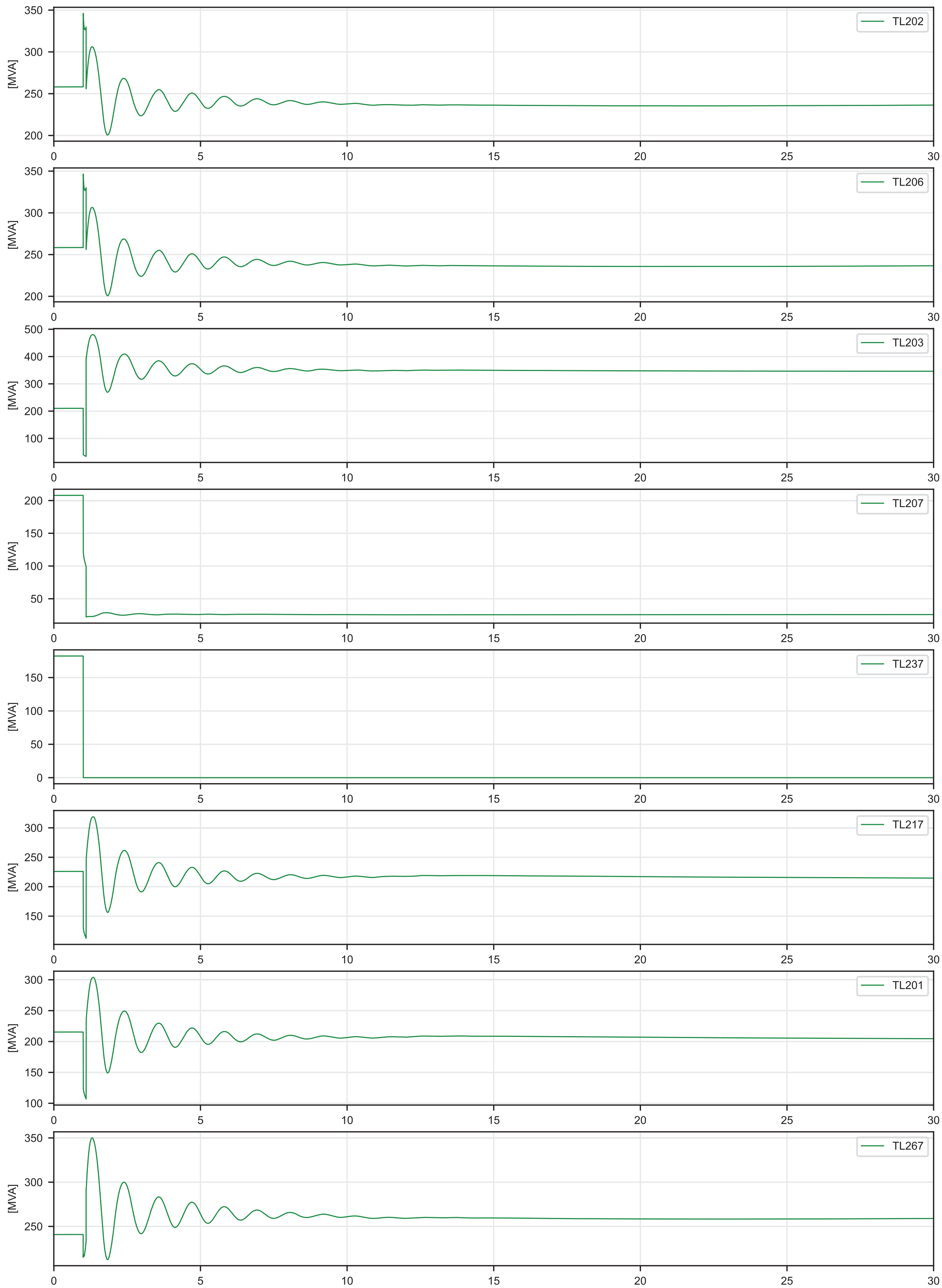
03_2033-34_Base-Peak_TL206-TL202_peakMW
Loss of TL206 | 230 kV Power Flow



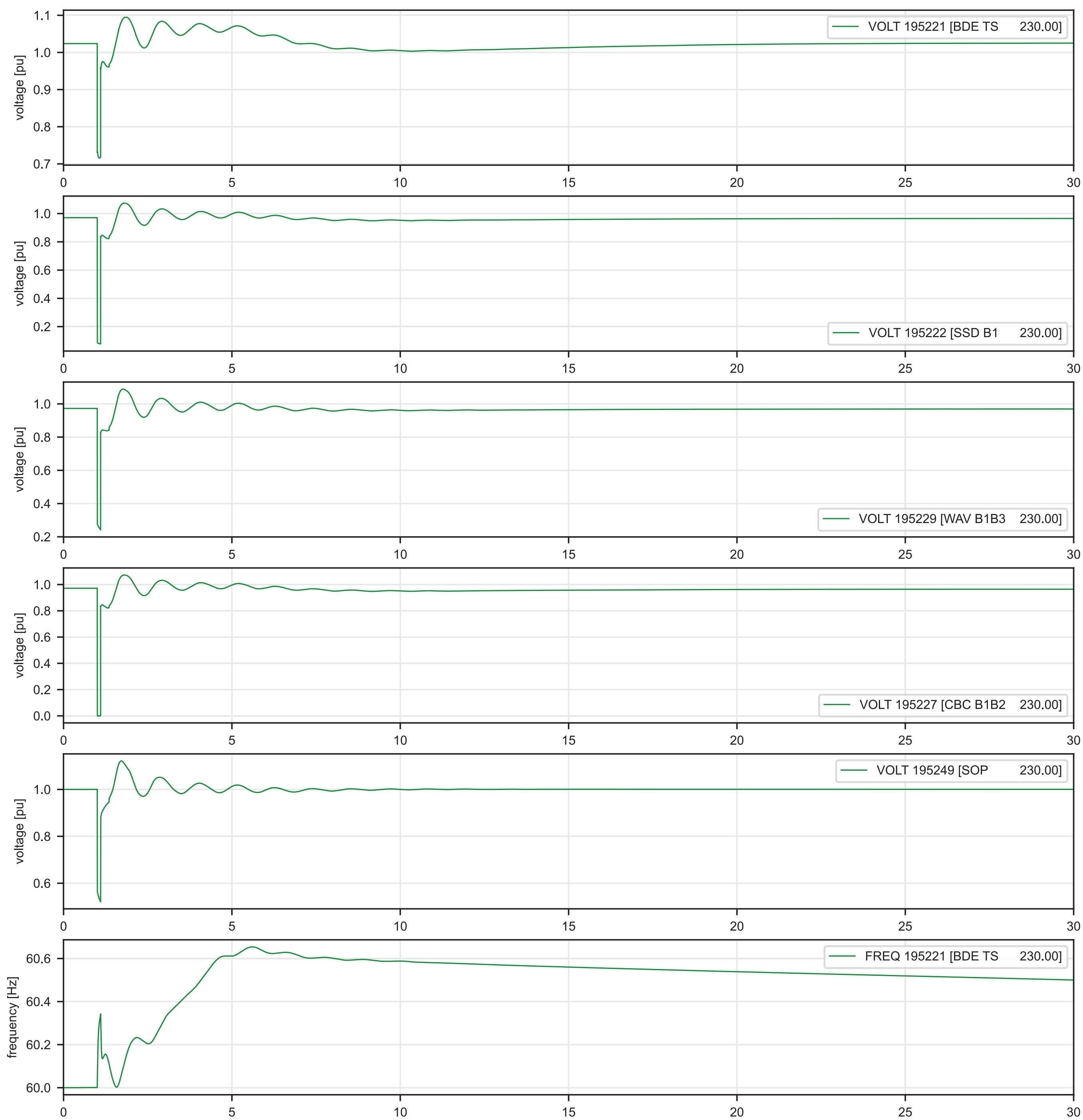
04_2033-34_Base-Peak_TL237-TL203_050MW
Loss of TL237 | Voltage / Frequency



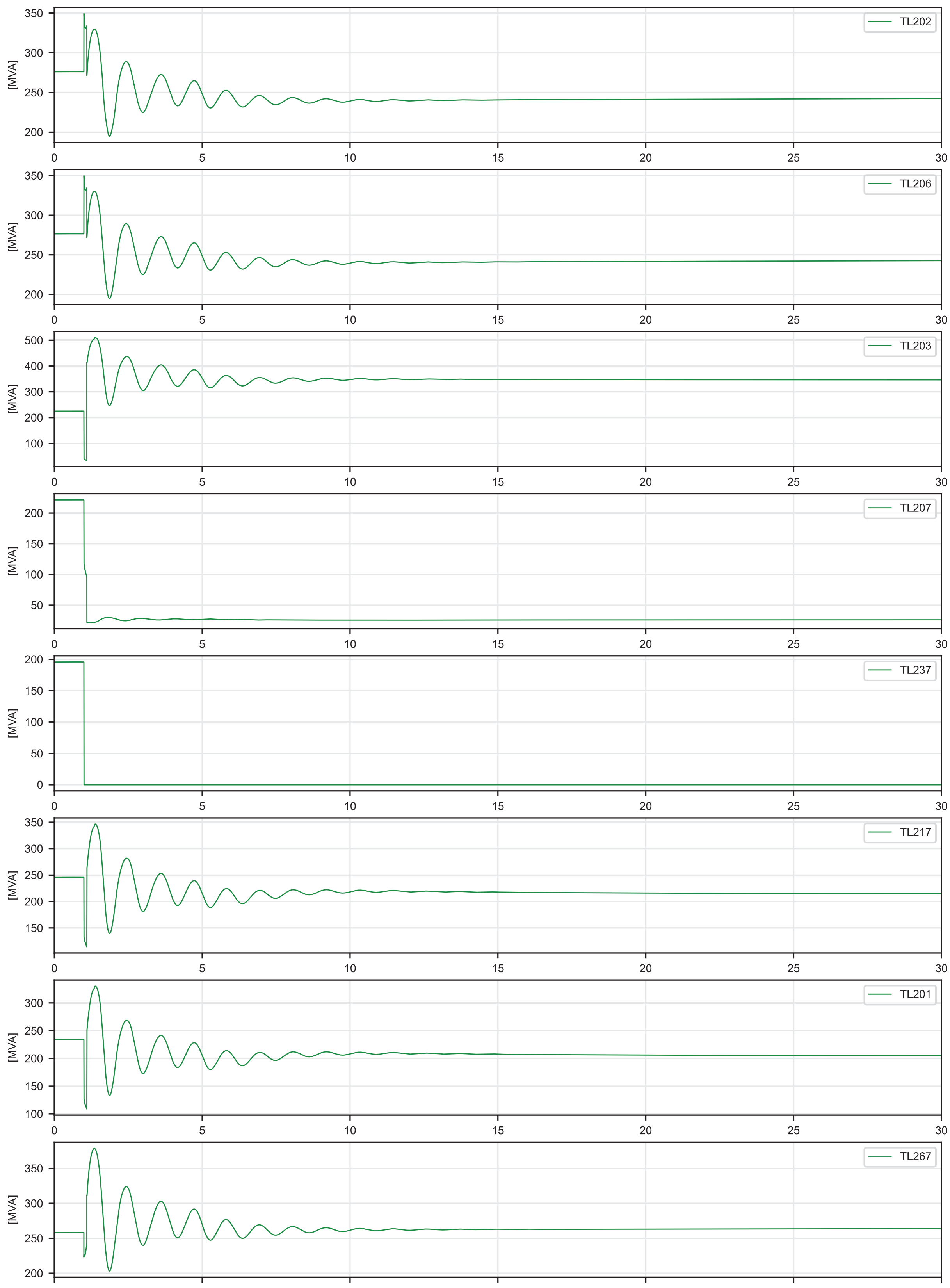
04_2033-34_Base-Peak_TL237-TL203_050MW
Loss of TL237 | 230 kV Power Flow



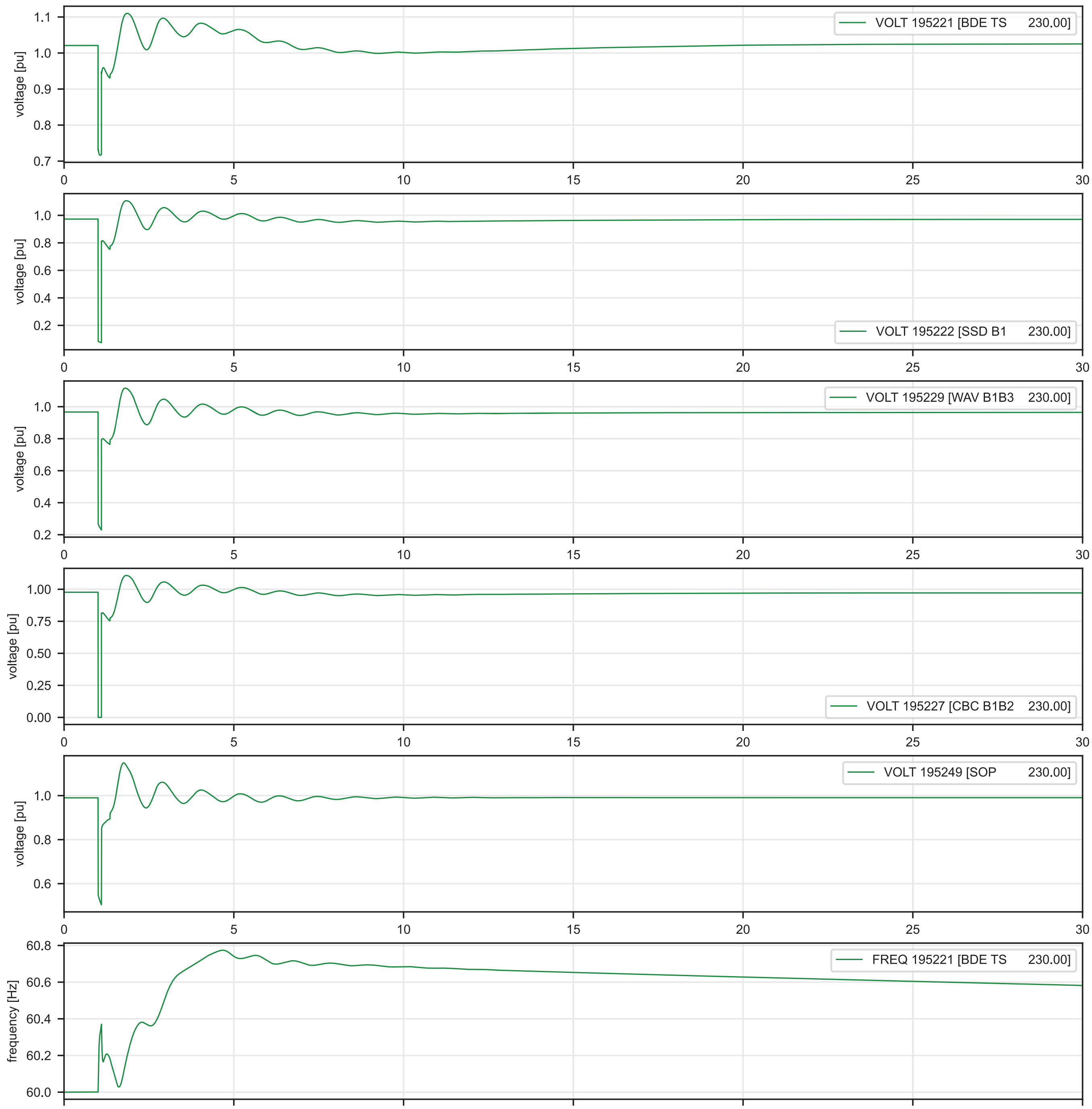
04_2033-34_Base-Peak_TL237-TL203_100MW
Loss of TL237 | Voltage / Frequency



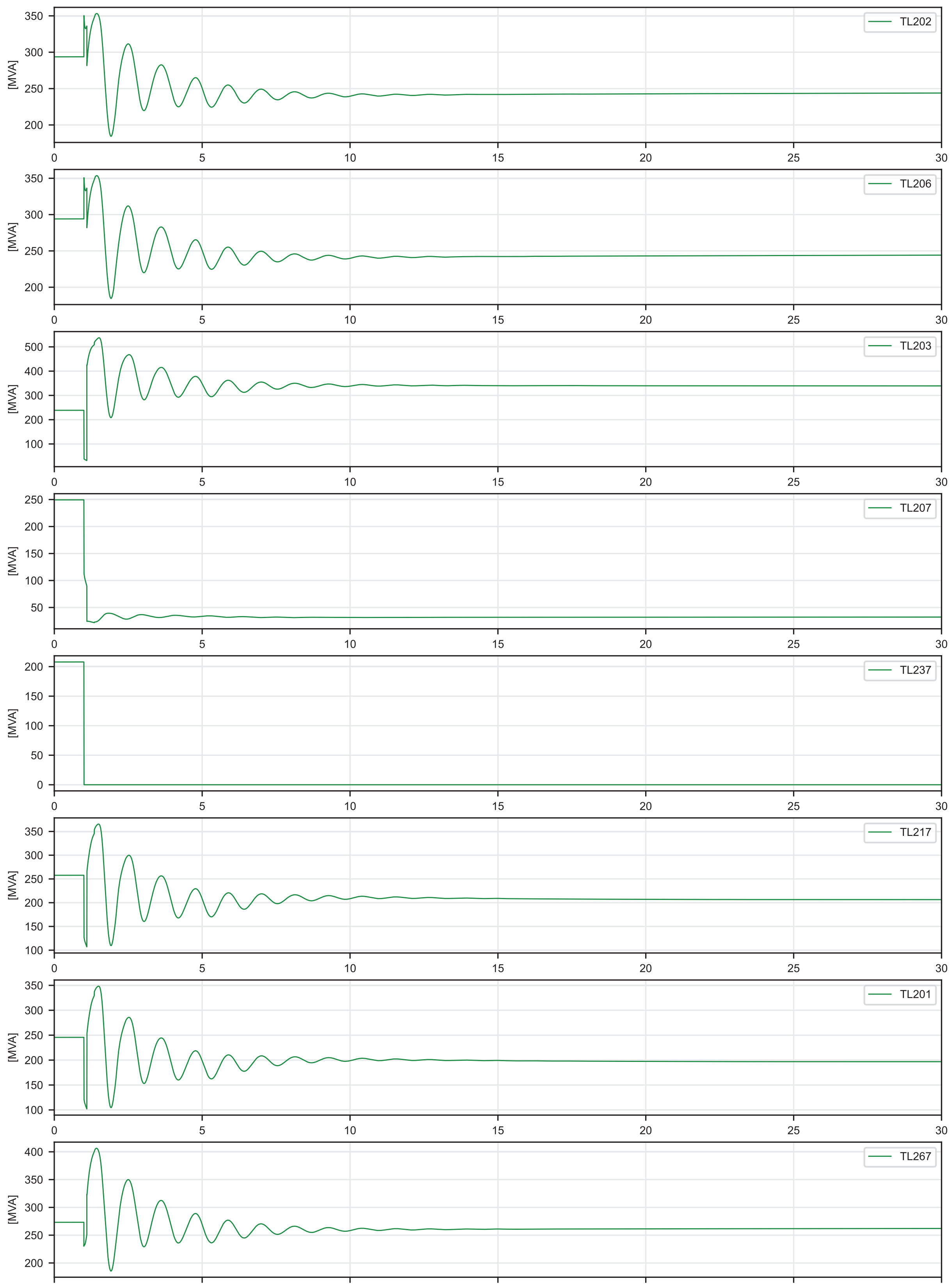
04_2033-34_Base-Peak_TL237-TL203_100MW
Loss of TL237 | 230 kV Power Flow



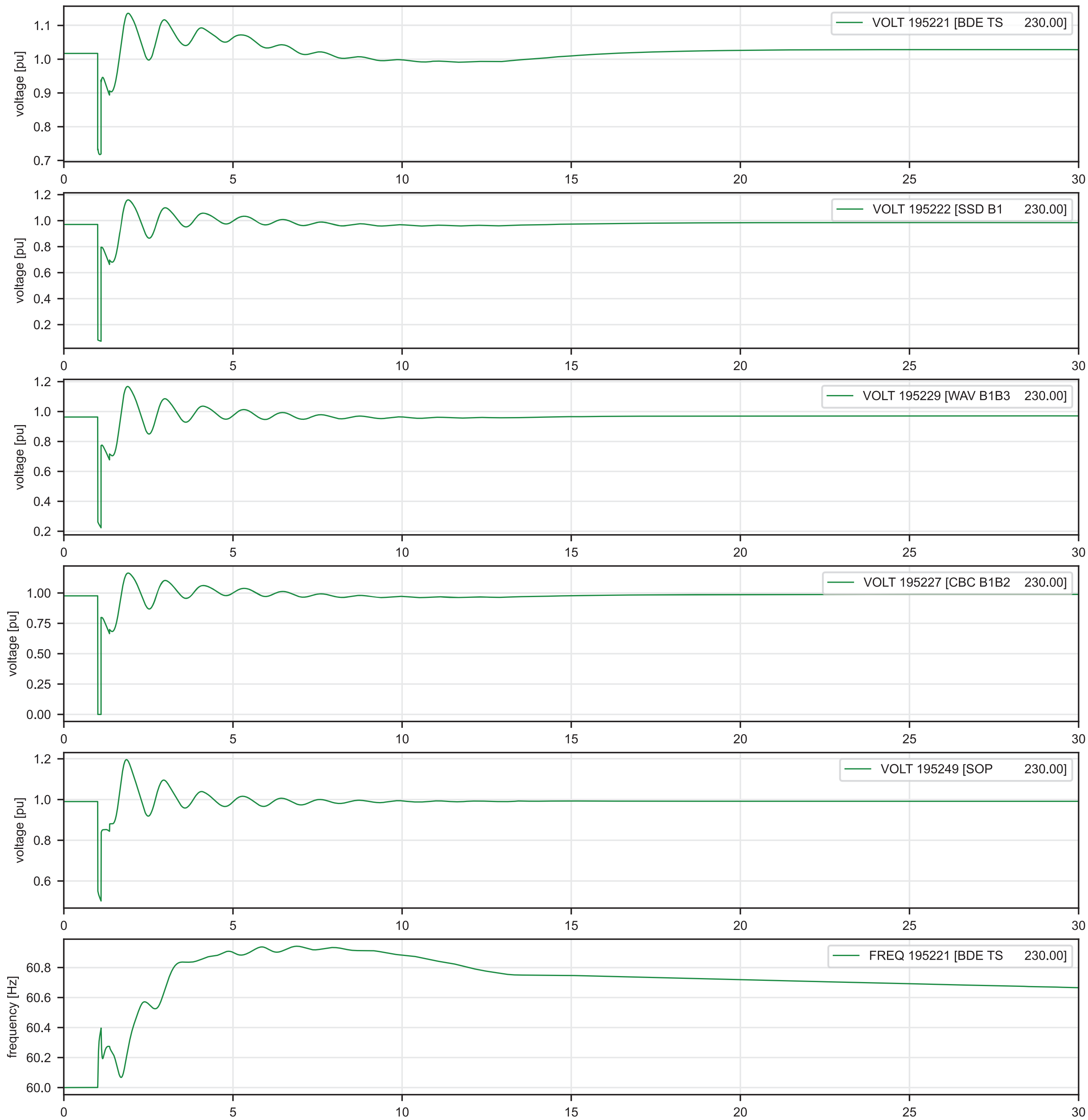
04_2033-34_Base-Peak_TL237-TL203_150MW
Loss of TL237 | Voltage / Frequency



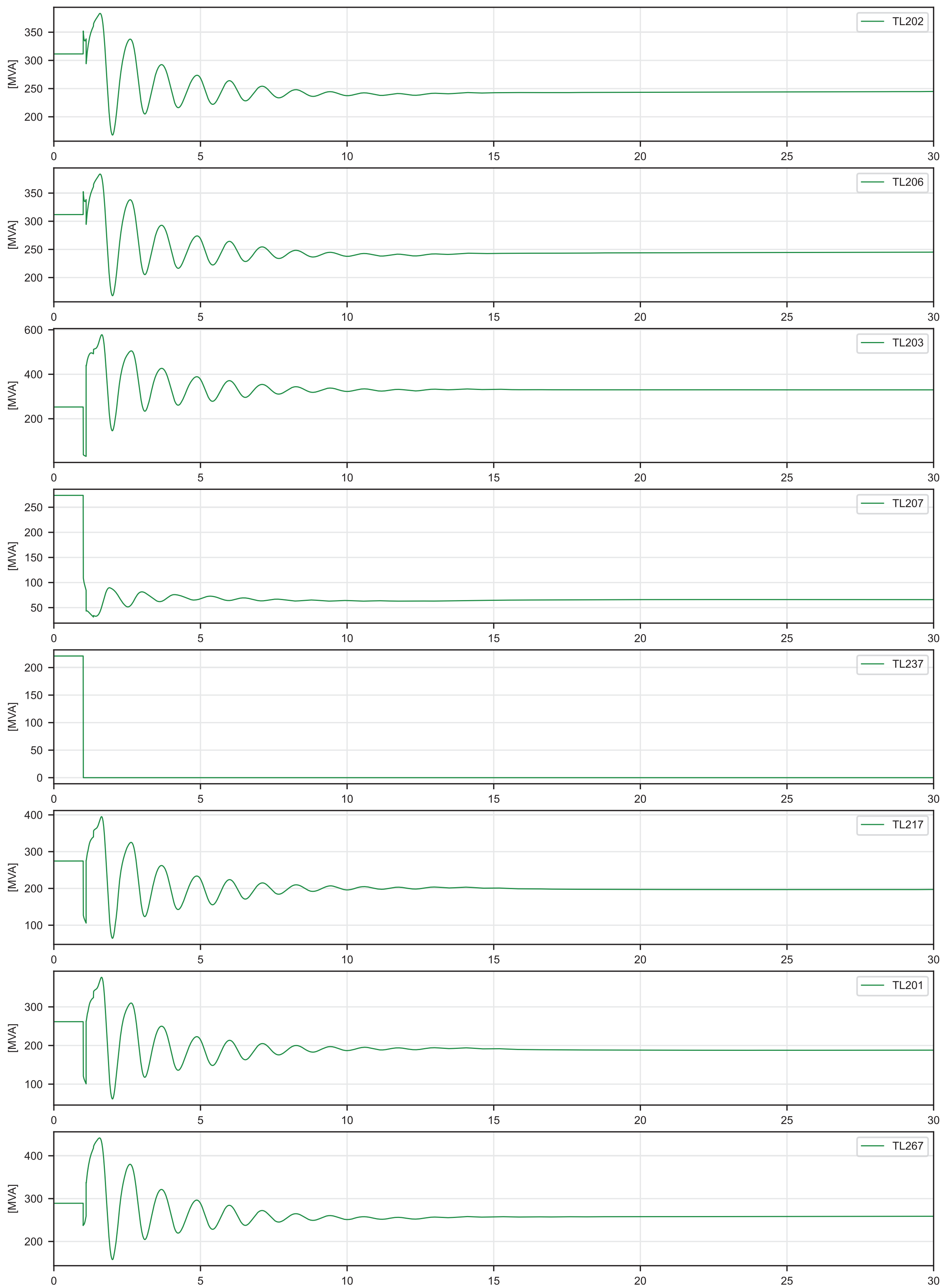
04_2033-34_Base-Peak_TL237-TL203_150MW
Loss of TL237 | 230 kV Power Flow



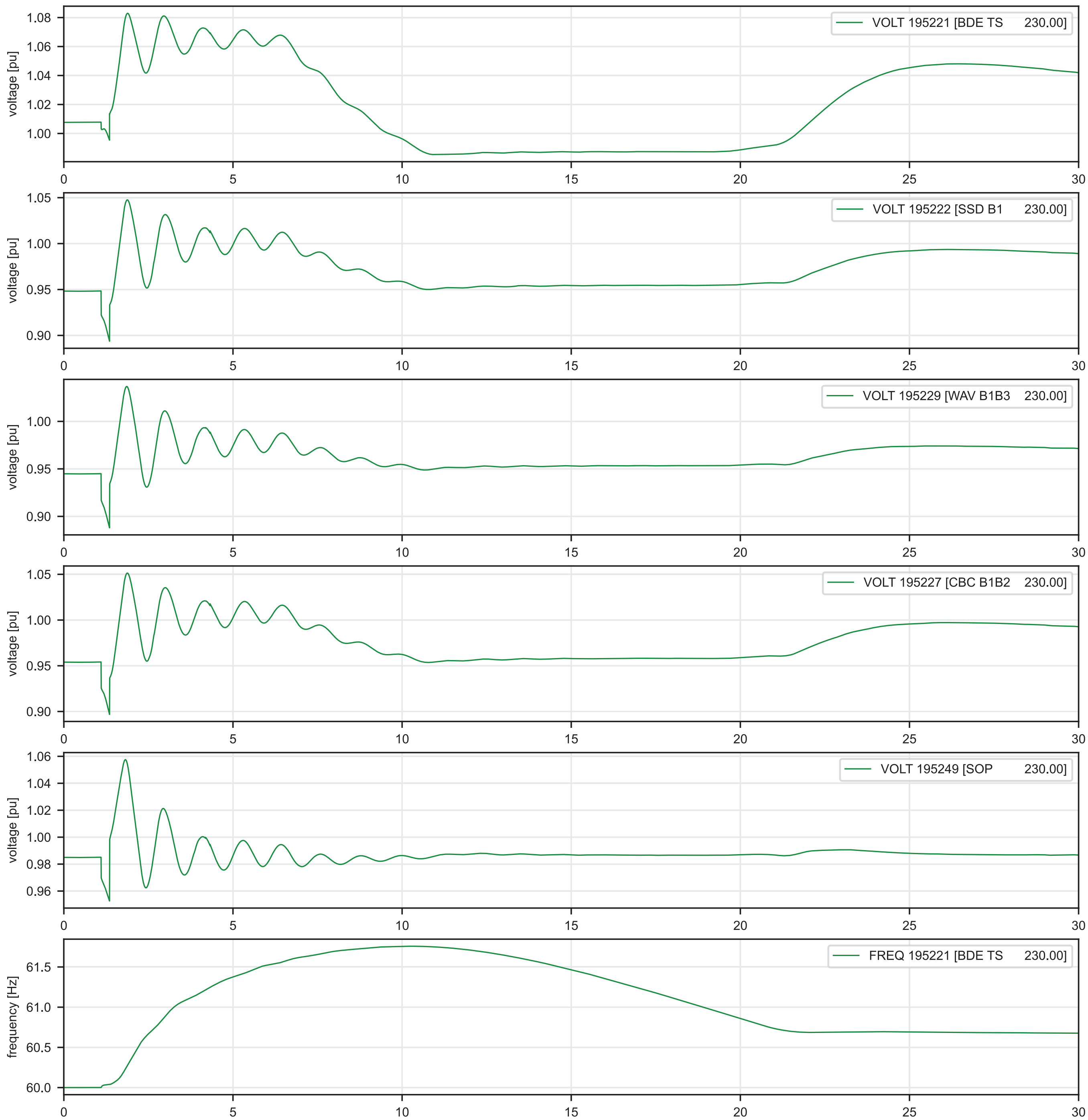
04_2033-34_Base-Peak_TL237-TL203_200MW
Loss of TL237 | Voltage / Frequency

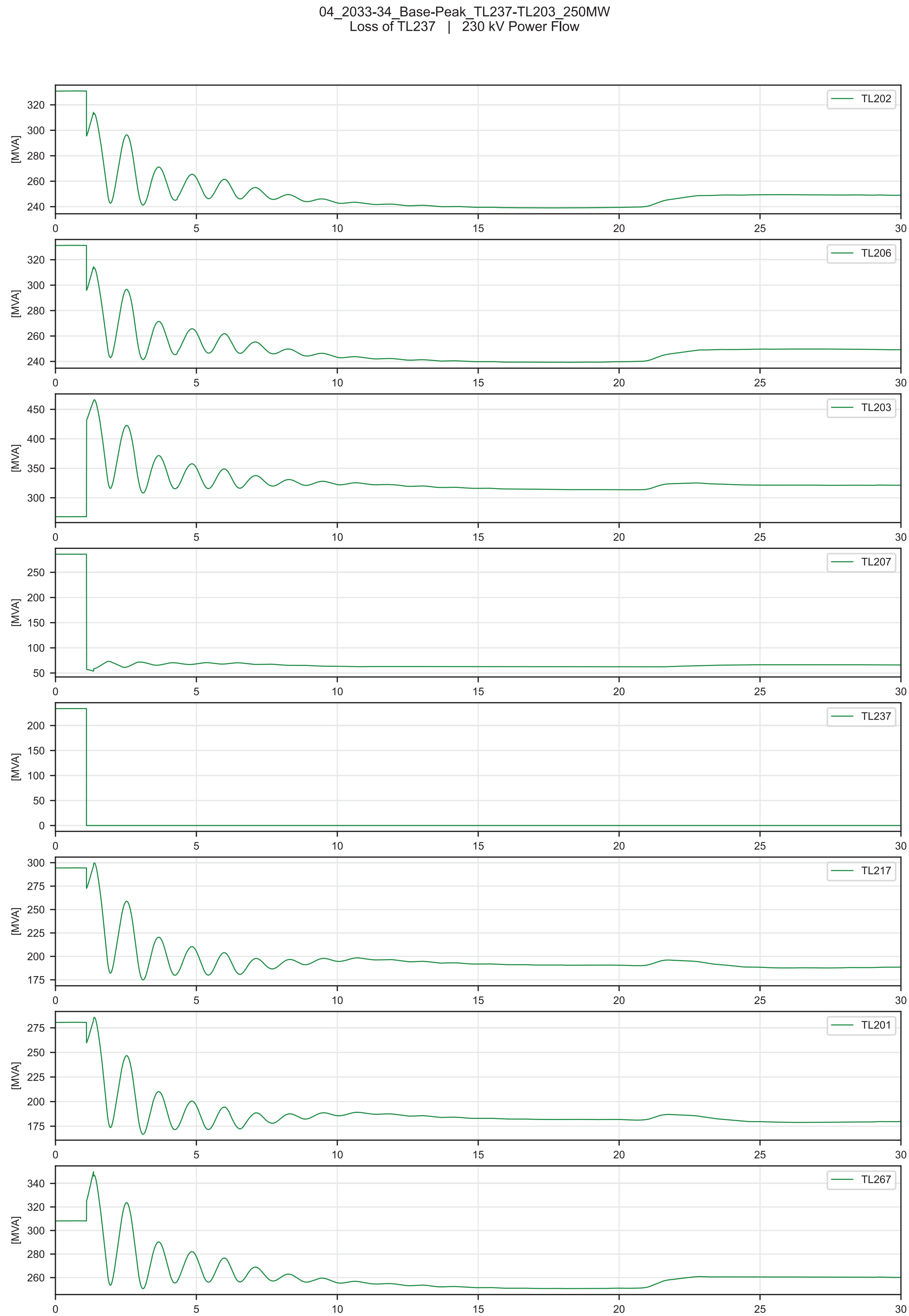


04_2033-34_Base-Peak_TL237-TL203_200MW
Loss of TL237 | 230 kV Power Flow



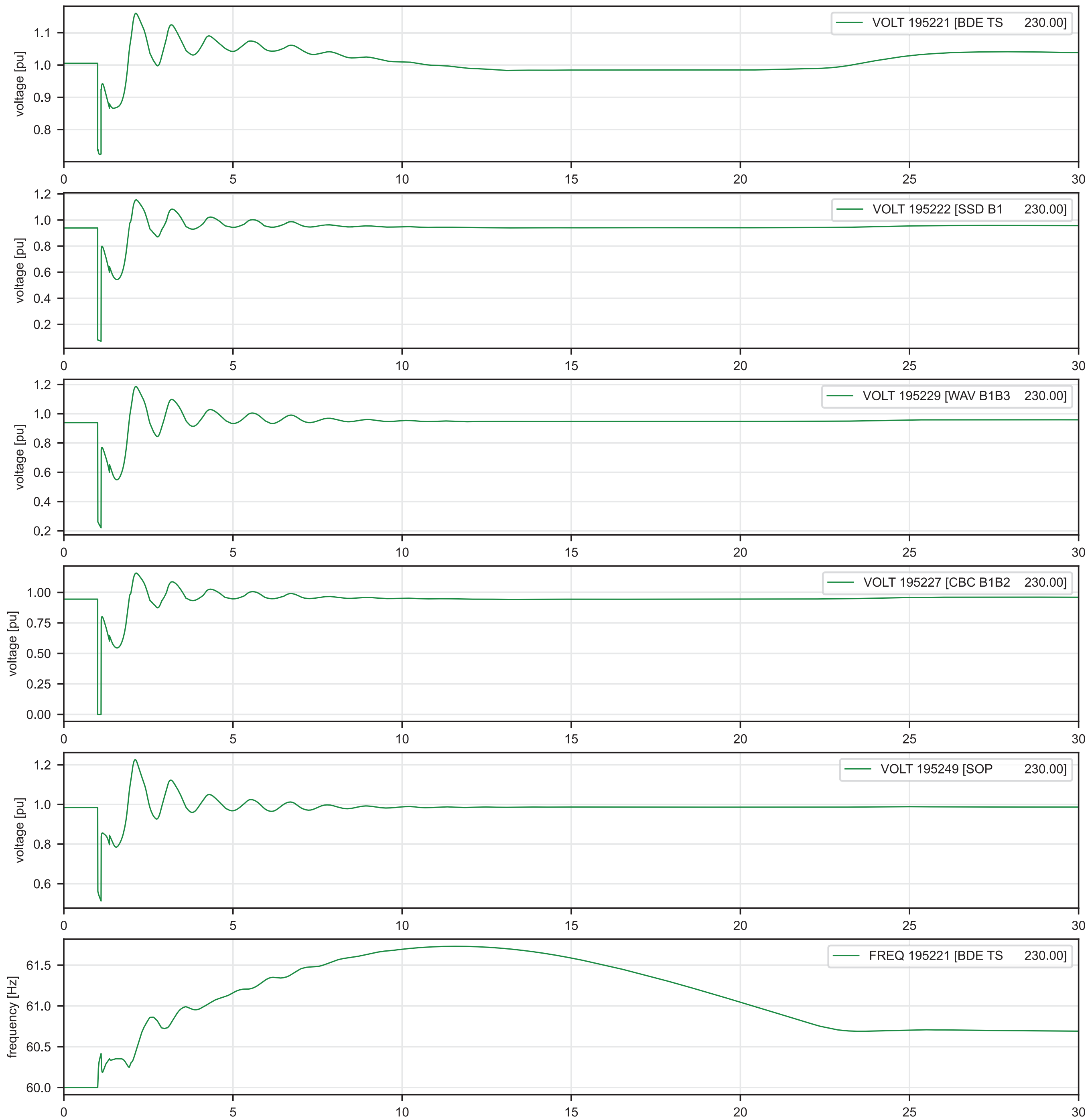
04_2033-34_Base-Peak_TL237-TL203_250MW
Loss of TL237 | Voltage / Frequency



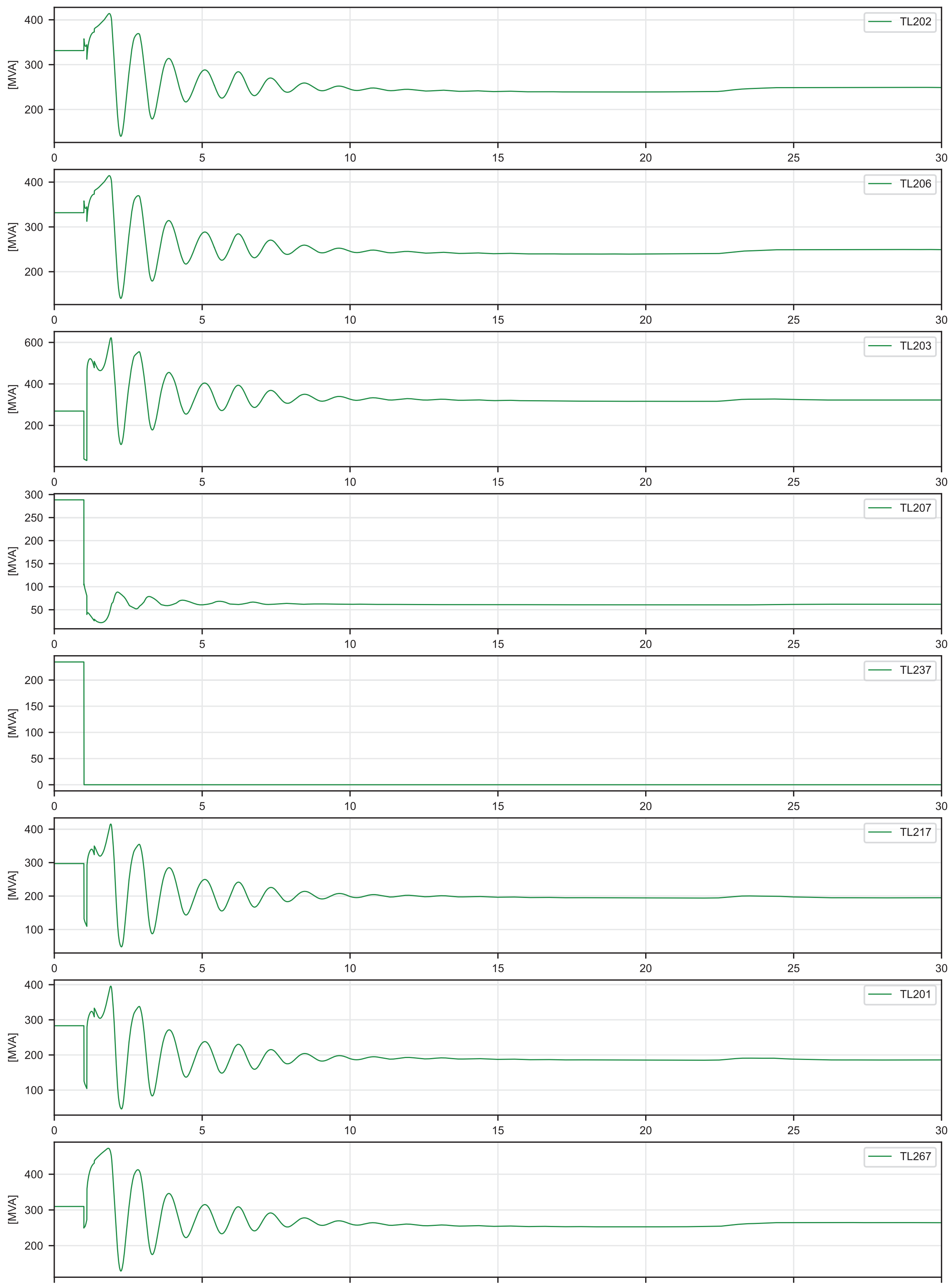


04_2033-34_Base-Peak_TL237-TL203_250MW
Loss of TL237 | 230 kV Power Flow
[MVA]
TL202
TL206
TL203
TL207
TL237
TL217
TL201
TL267
0
5
10
15
20
25
30

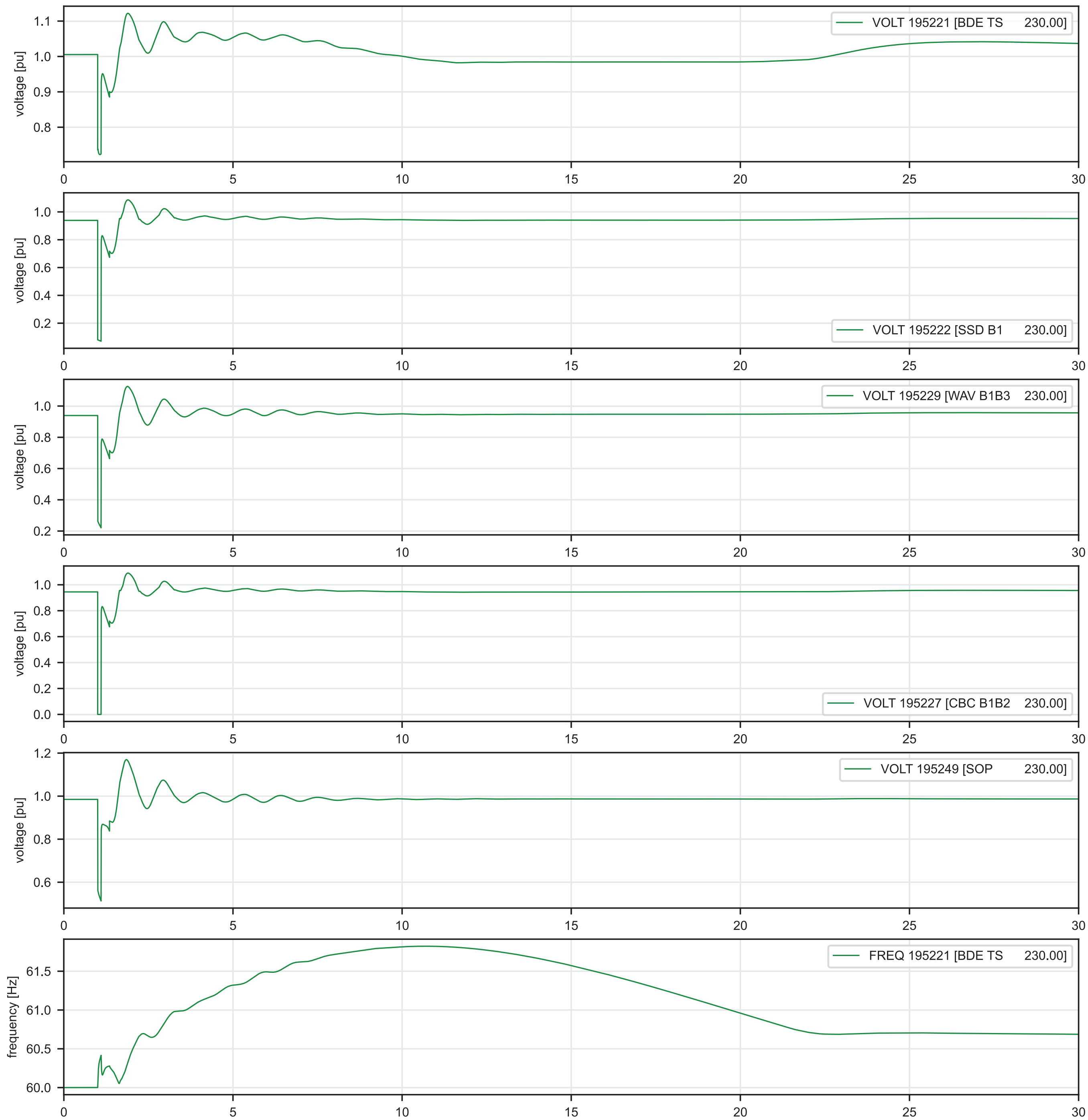
04_2033-34_Base-Peak_TL237-TL203_250MW with STATCOM (violates voltage criteria)
Loss of TL237 | Voltage / Frequency



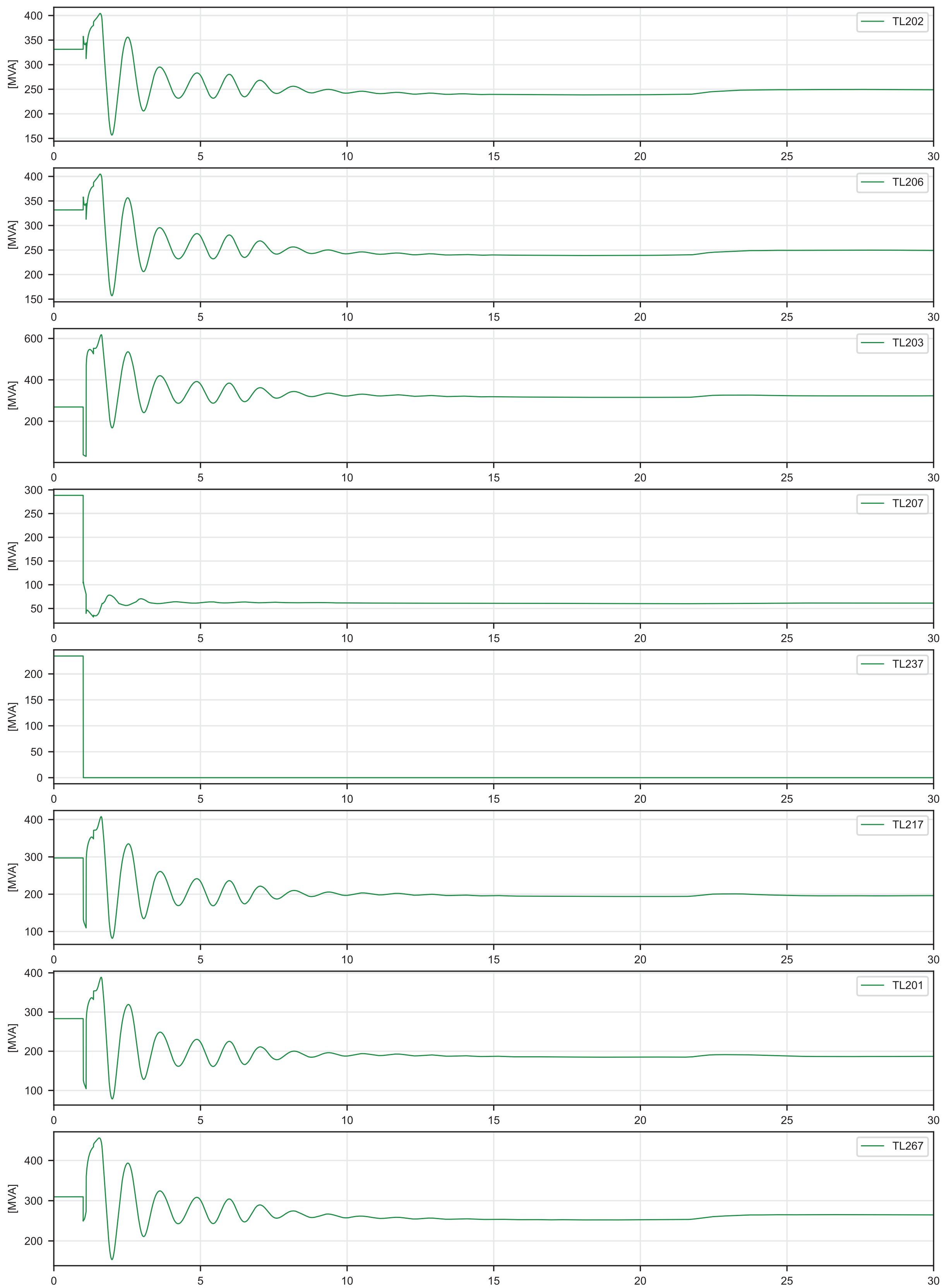
04_2033-34_Base-Peak_TL237-TL203_250MW with STATCOM (violates voltage criteria)
Loss of TL237 | 230 kV Power Flow



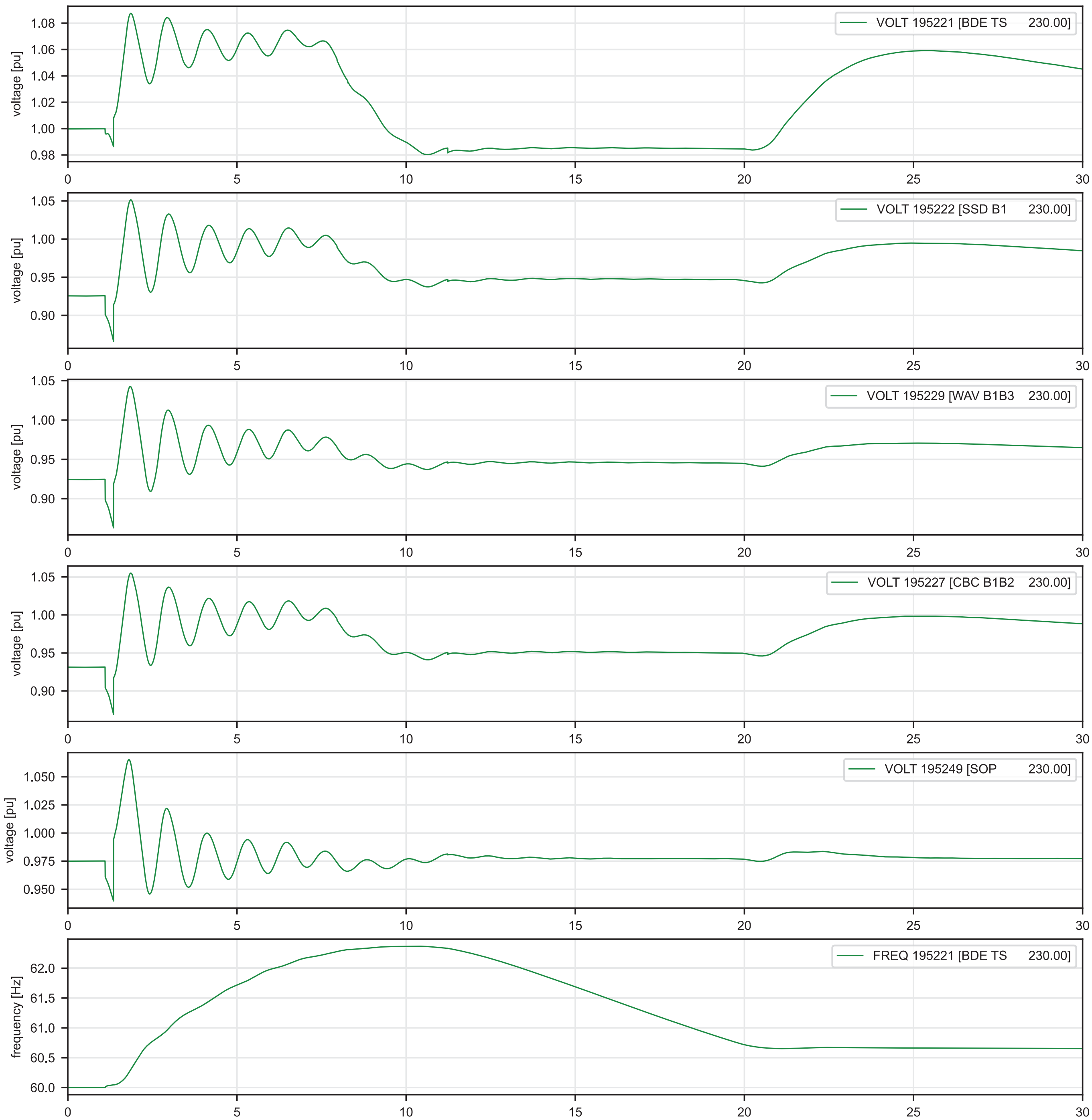
04_2033-34_Base-Peak_TL237-TL203_250MW with STATCOM (meets voltage criteria)
Loss of TL237 | Voltage / Frequency



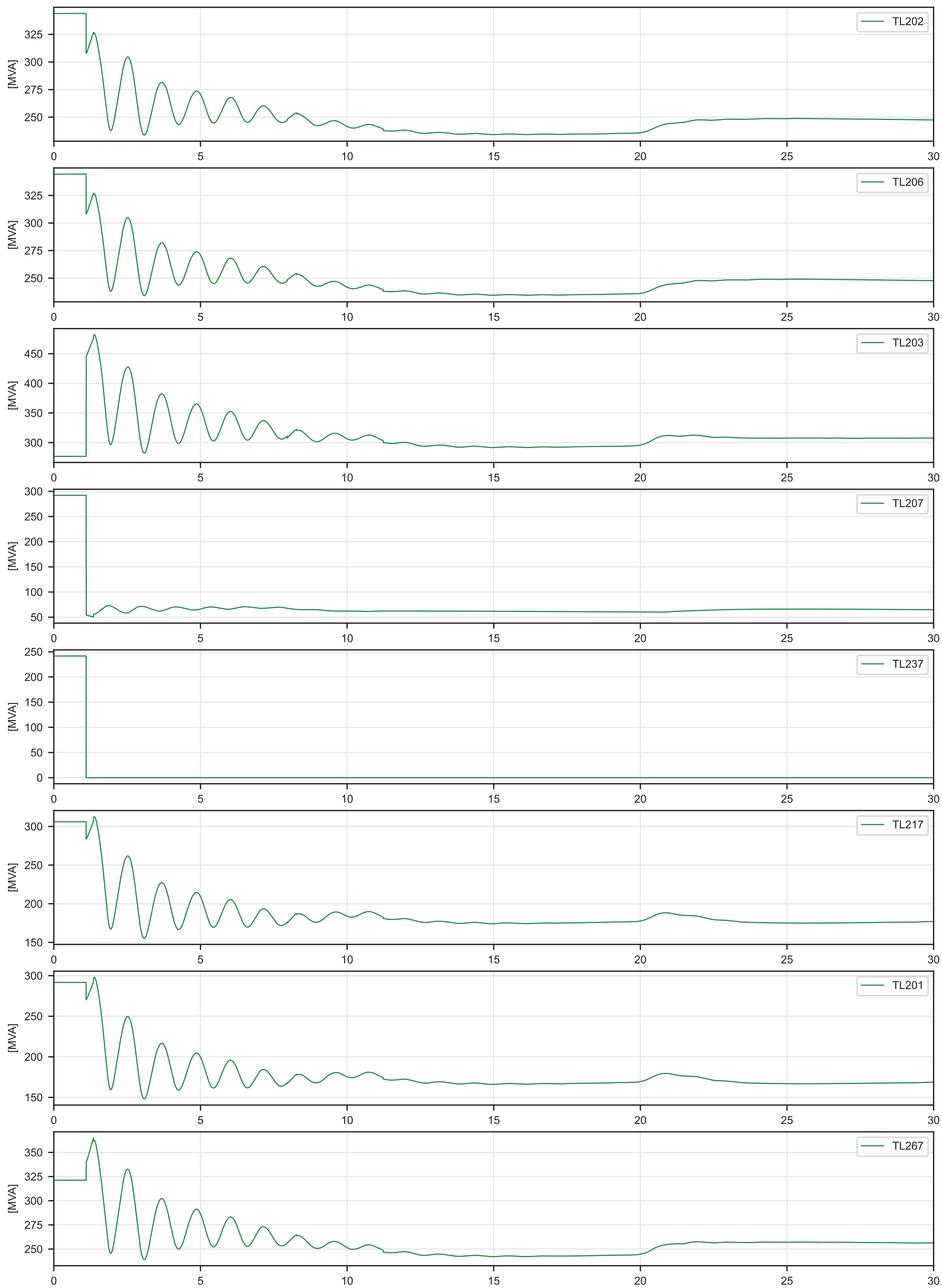
04_2033-34_Base-Peak_TL237-TL203_250MW with STATCOM (meets voltage criteria)
Loss of TL237 | 230 kV Power Flow



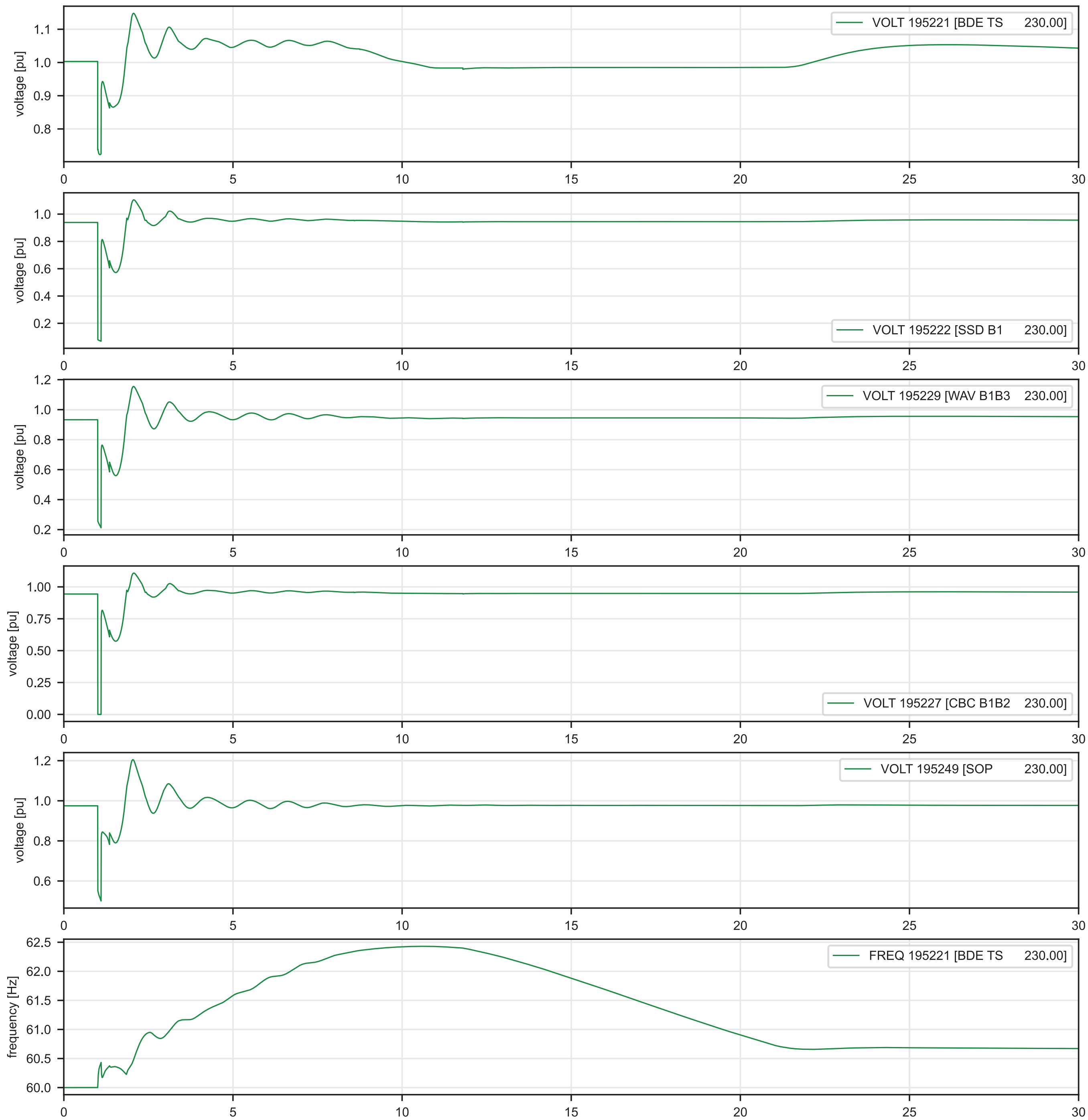
04_2033-34_Base-Peak_TL237-TL203_peakMW
Loss of TL237 | Voltage / Frequency



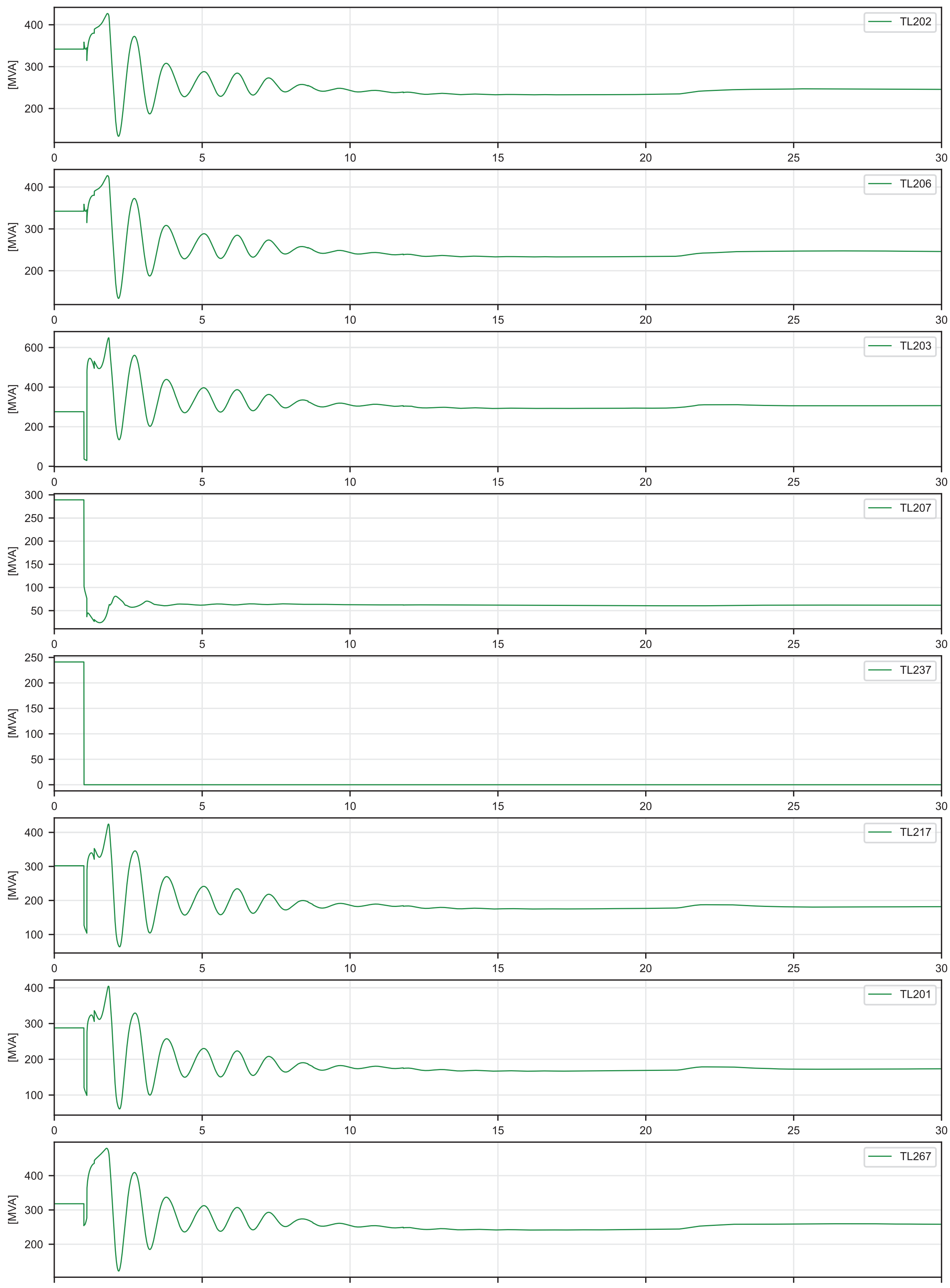
04_2033-34_Base-Peak_TL237-TL203_peakMW
Loss of TL237 | 230 kV Power Flow



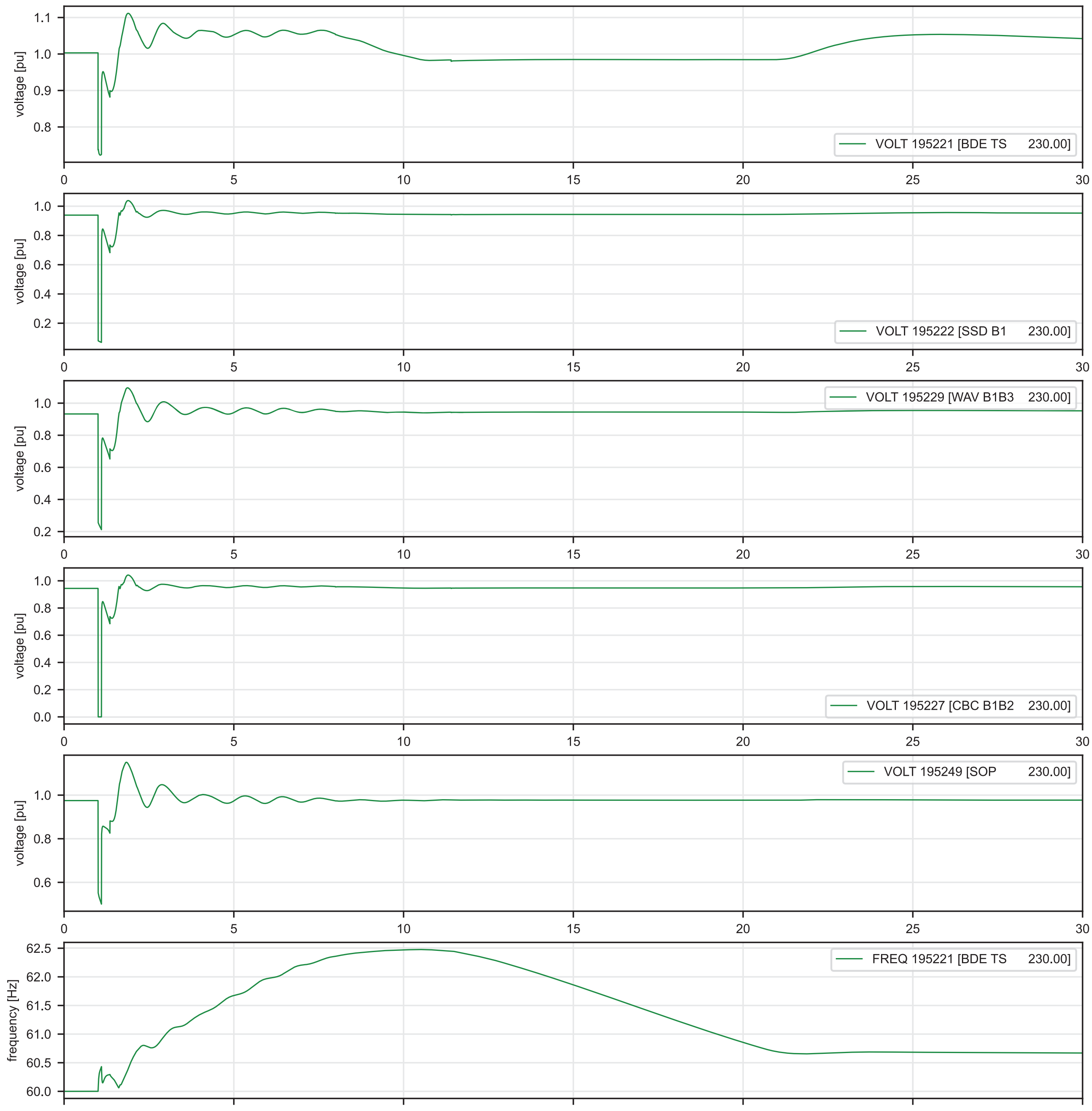
04_2033-34_Base-Peak_TL237-TL203_peakMW with STATCOM (violates voltage criteria)
Loss of TL237 | Voltage / Frequency



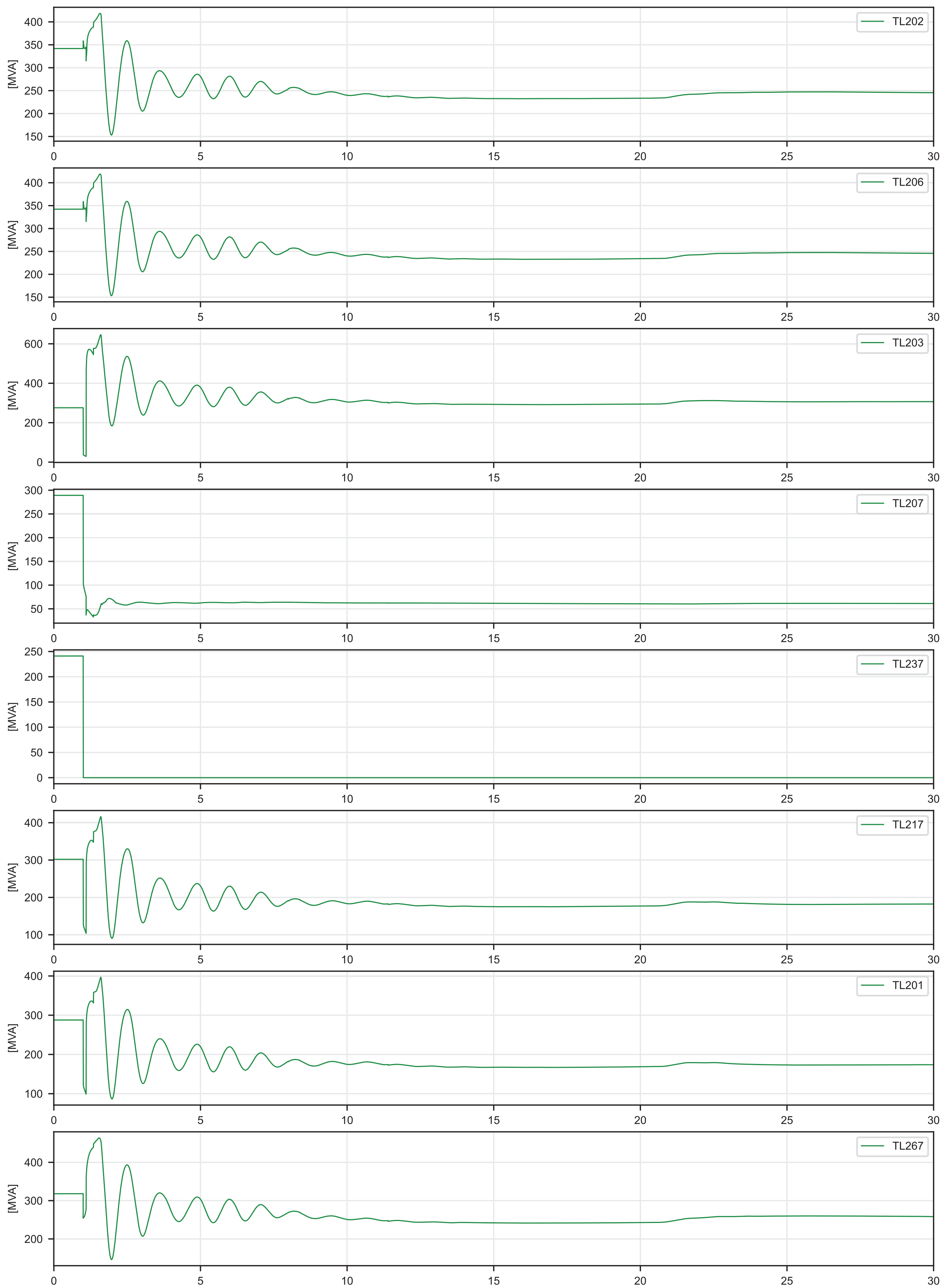
04_2033-34_Base-Peak_TL237-TL203_peakMW with STATCOM (violates voltage criteria)
Loss of TL237 | 230 kV Power Flow



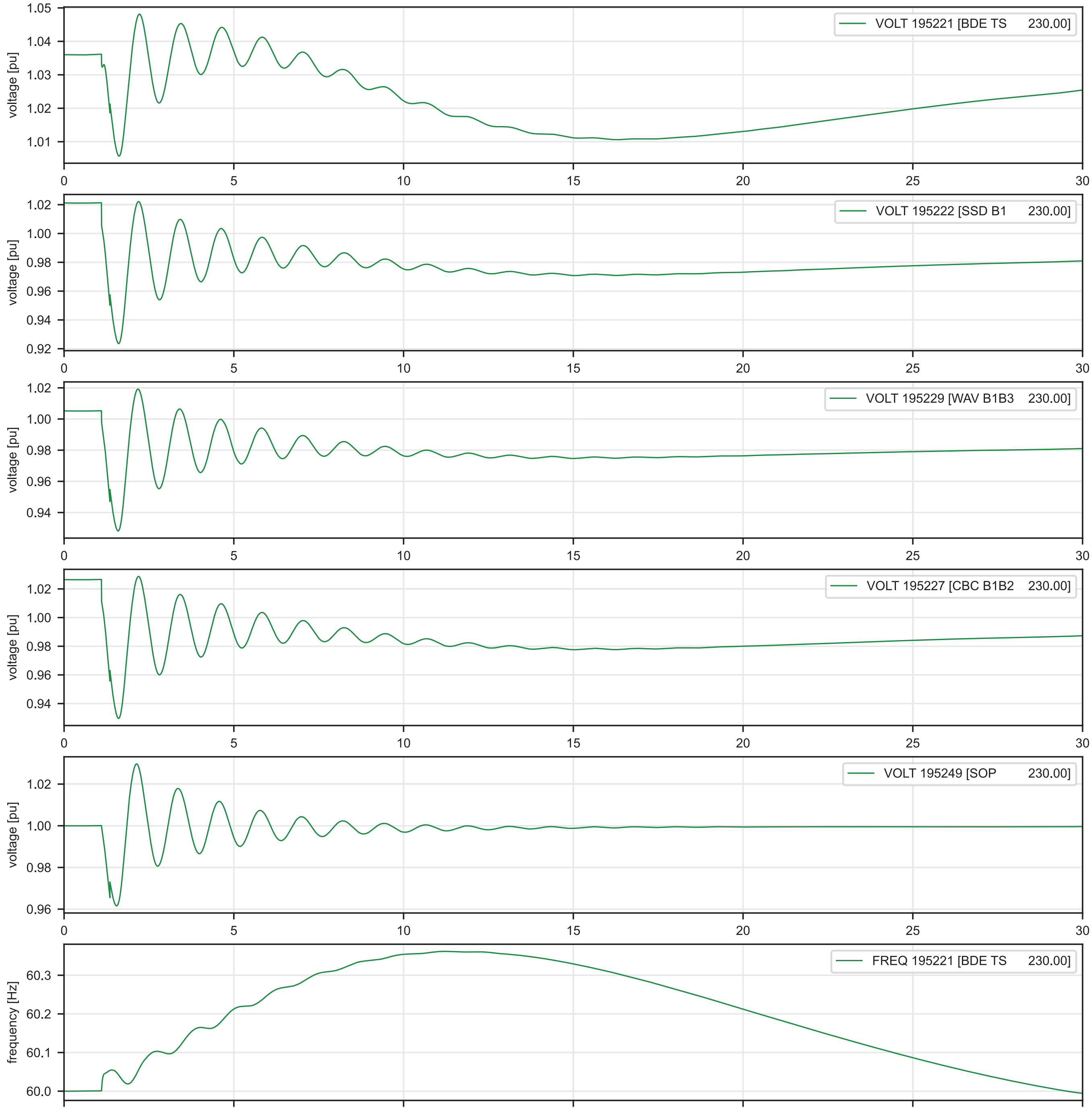
04_2033-34_Base-Peak_TL237-TL203_peakMW with STATCOM (meets voltage criteria)
Loss of TL237 | Voltage / Frequency



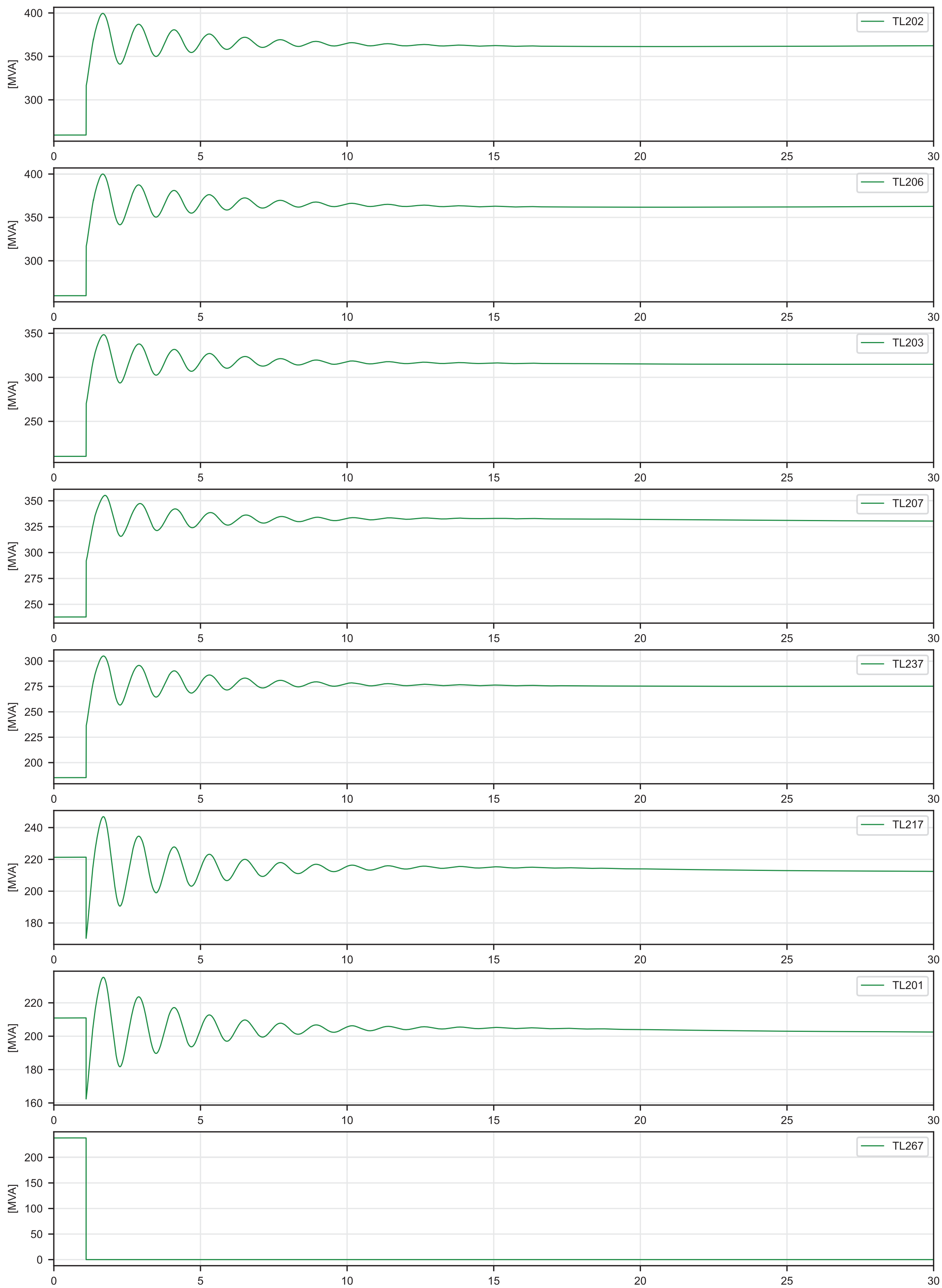
04_2033-34_Base-Peak_TL237-TL203_peakMW with STATCOM (meets voltage criteria)
Loss of TL237 | 230 kV Power Flow



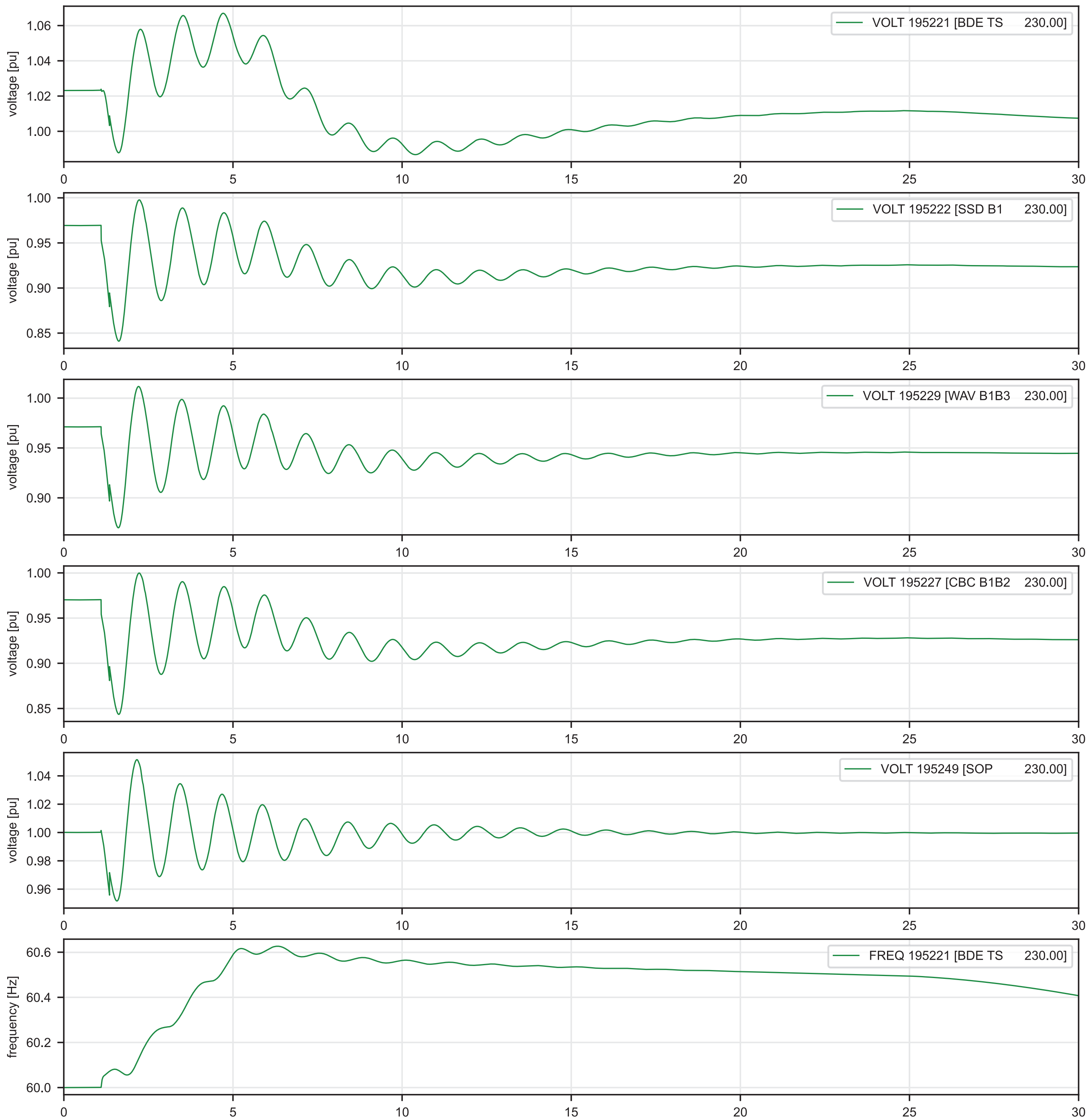
05_2033-34_Base-Peak_TL267-TL202-203-206_050MW
Loss of TL267 | Voltage / Frequency



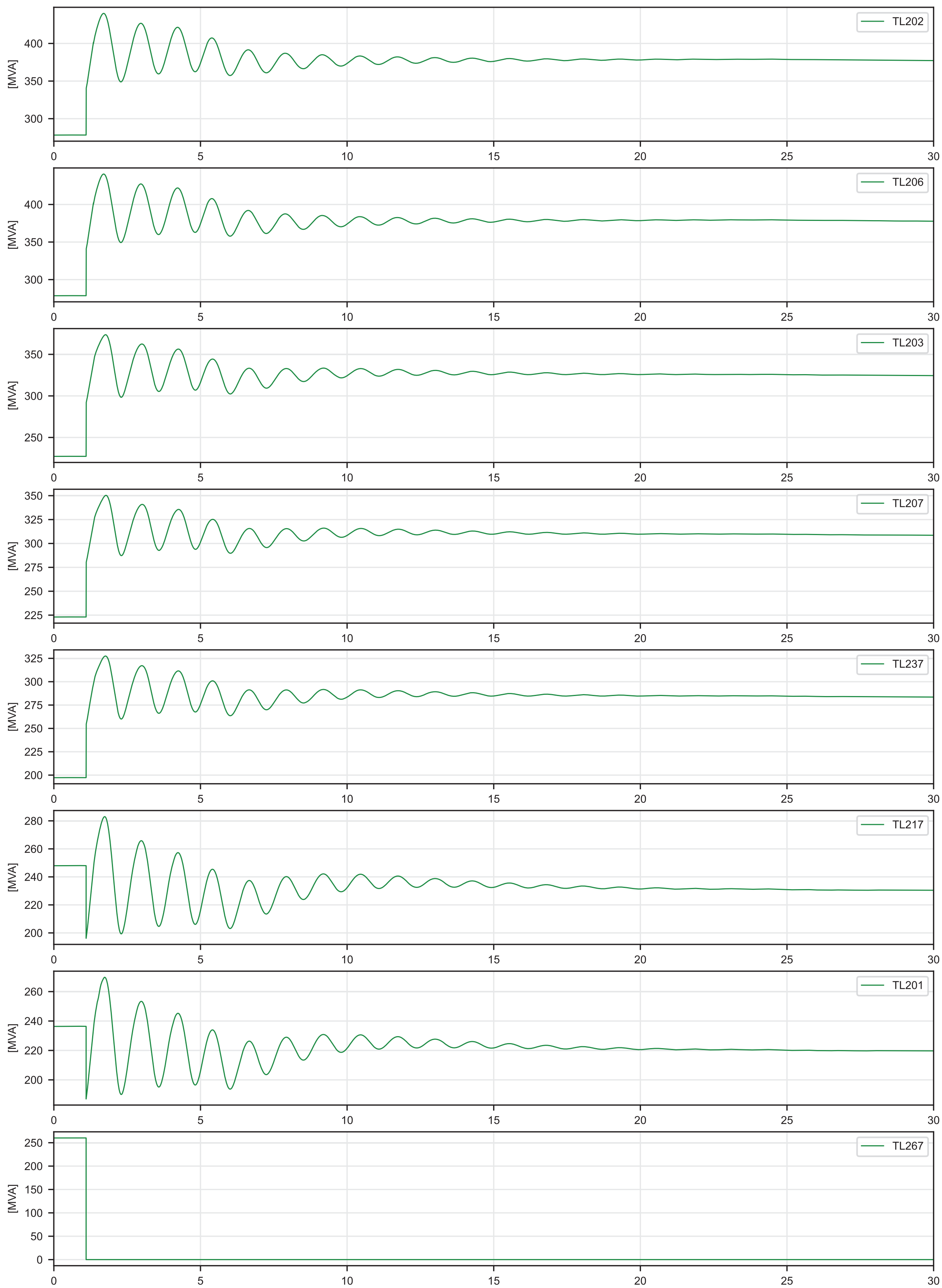
05_2033-34_Base-Peak_TL267-TL202-203-206_050MW
Loss of TL267 | 230 kV Power Flow



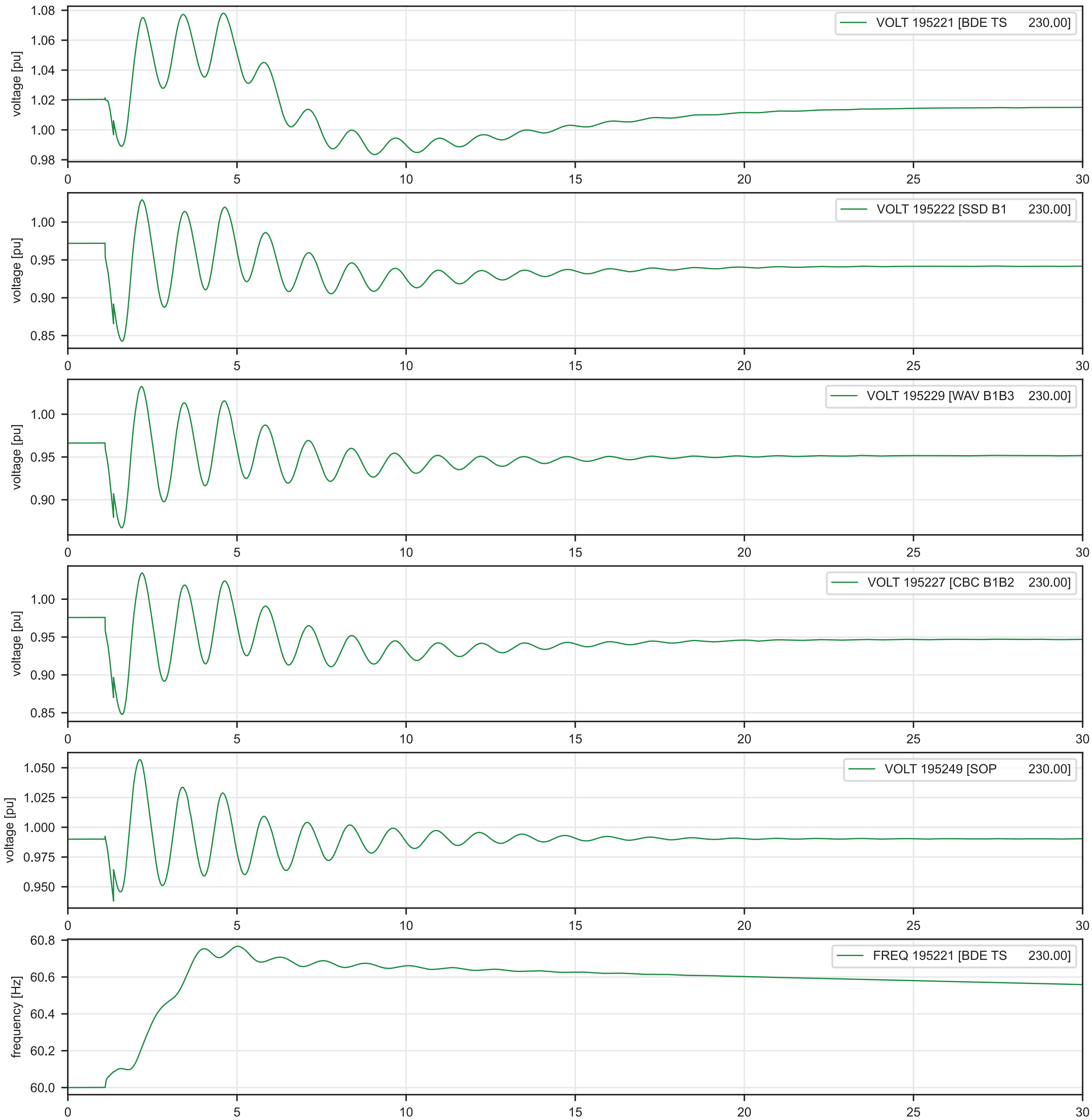
05_2033-34_Base-Peak_TL267-TL202-203-206_100MW
Loss of TL267 | Voltage / Frequency



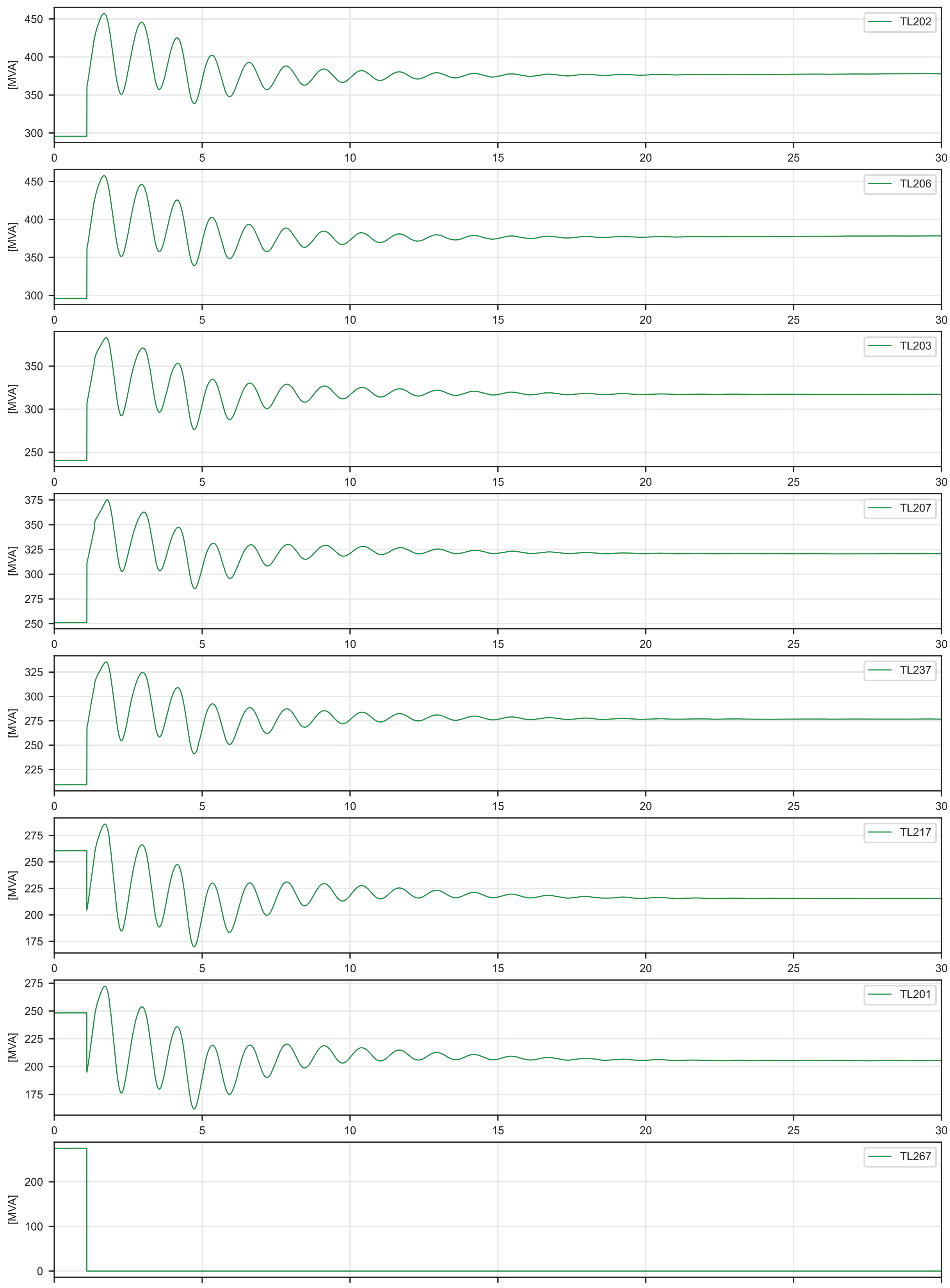
05_2033-34_Base-Peak_TL267-TL202-203-206_100MW
Loss of TL267 | 230 kV Power Flow



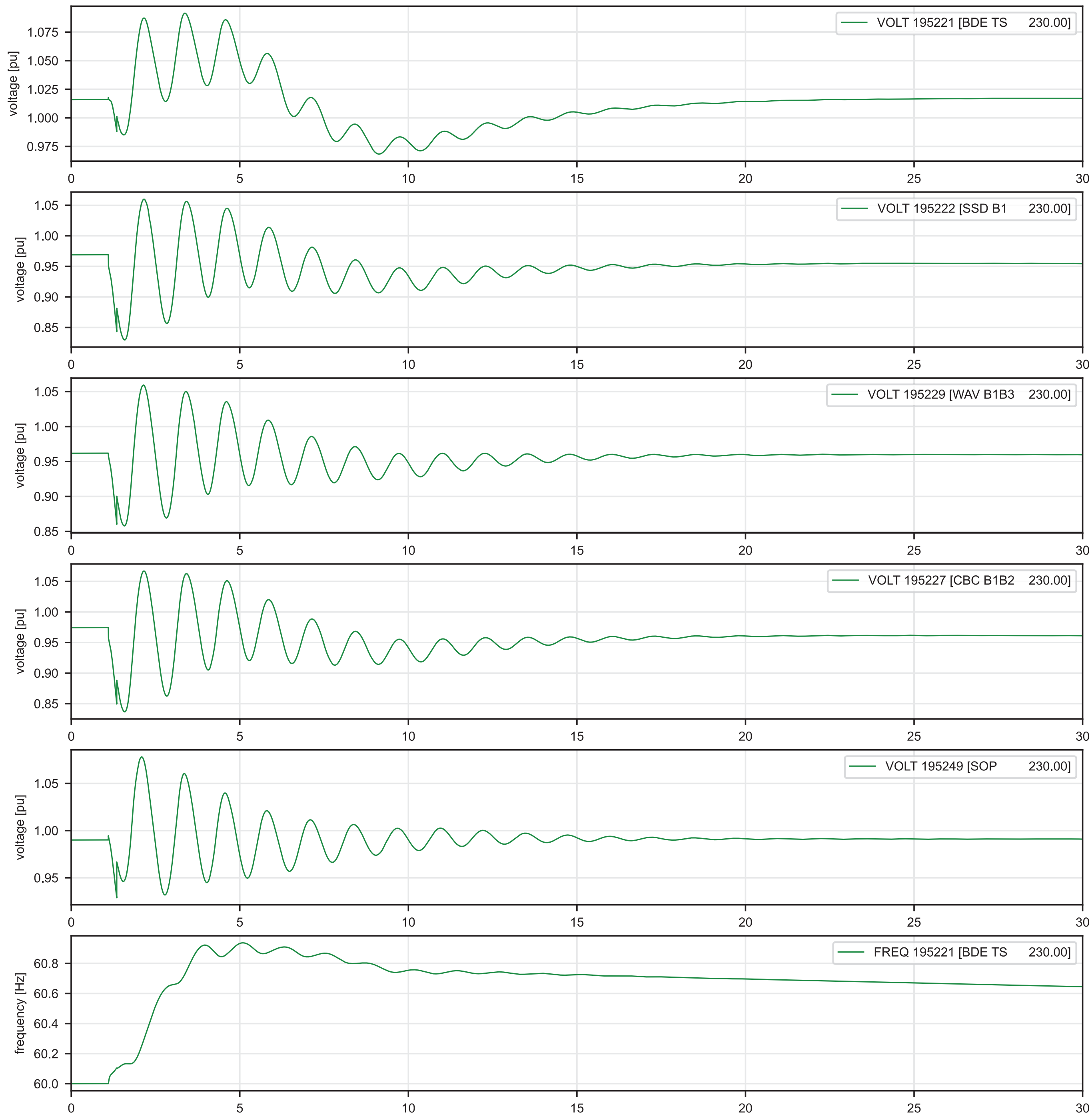
05_2033-34_Base-Peak_TL267-TL202-203-206_150MW
Loss of TL267 | Voltage / Frequency



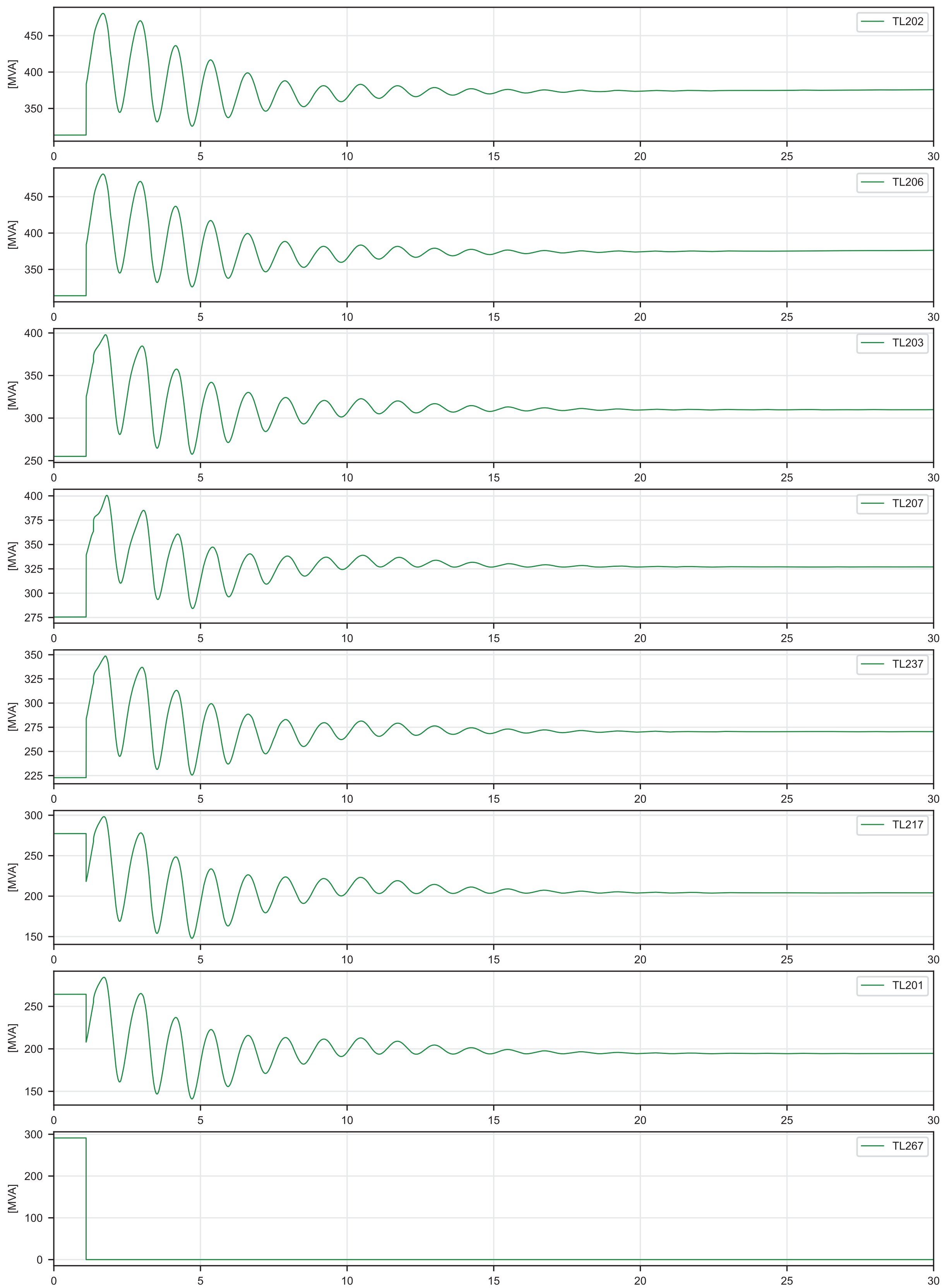
05_2033-34_Base-Peak_TL267-TL202-203-206_150MW
Loss of TL267 | 230 kV Power Flow



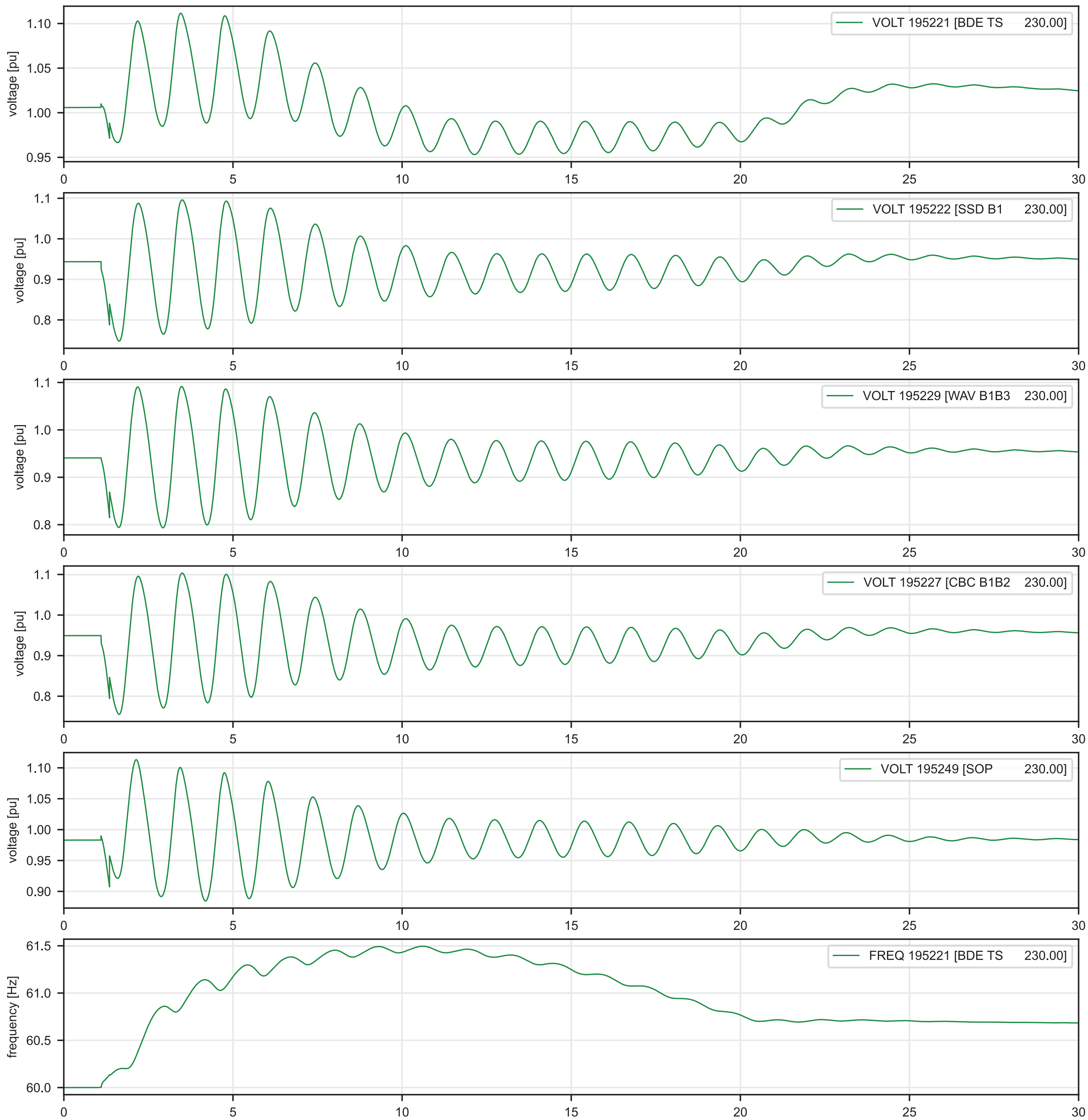
05_2033-34_Base-Peak_TL267-TL202-203-206_200MW
Loss of TL267 | Voltage / Frequency



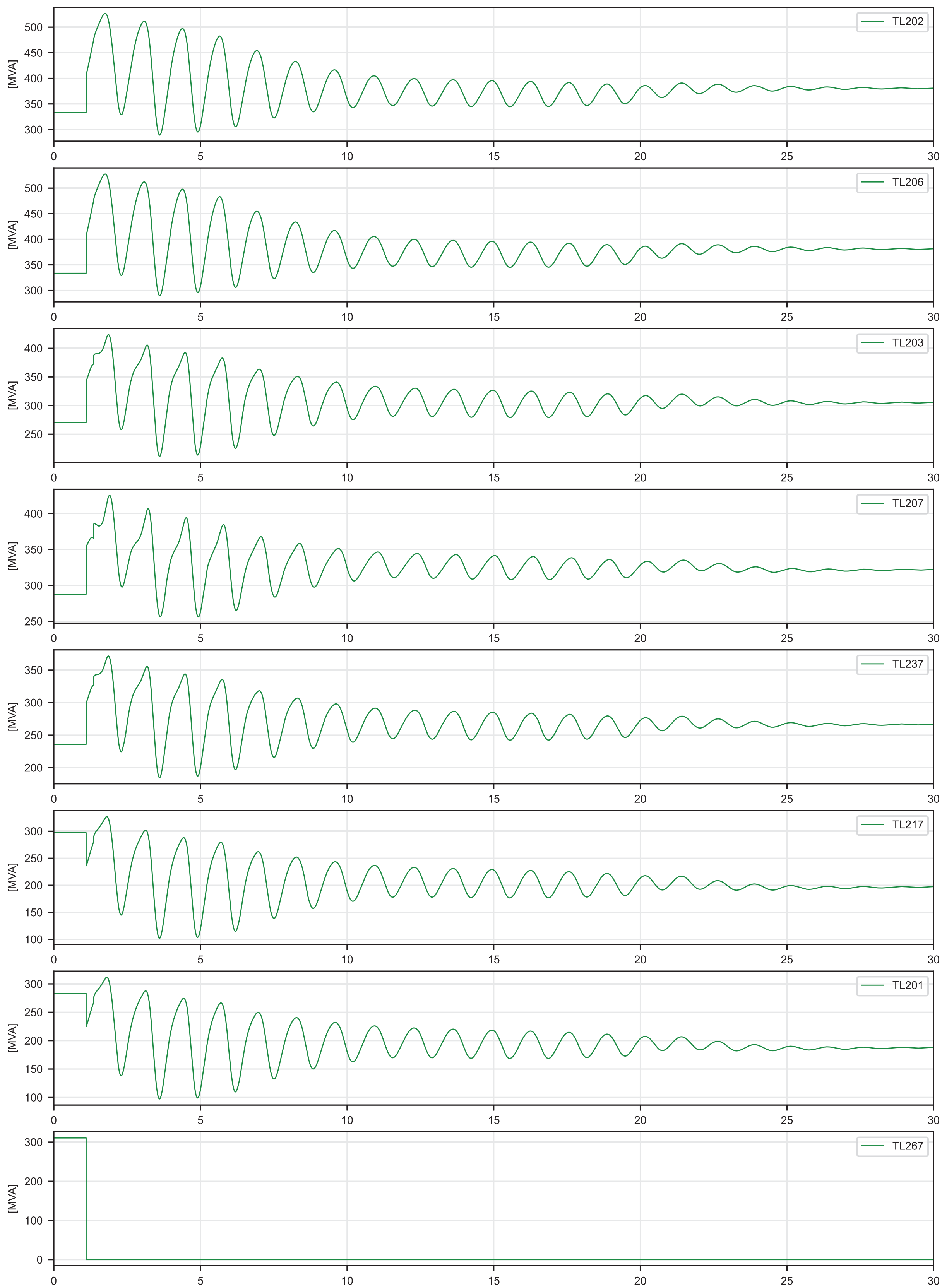
05_2033-34_Base-Peak_TL267-TL202-203-206_200MW
Loss of TL267 | 230 kV Power Flow



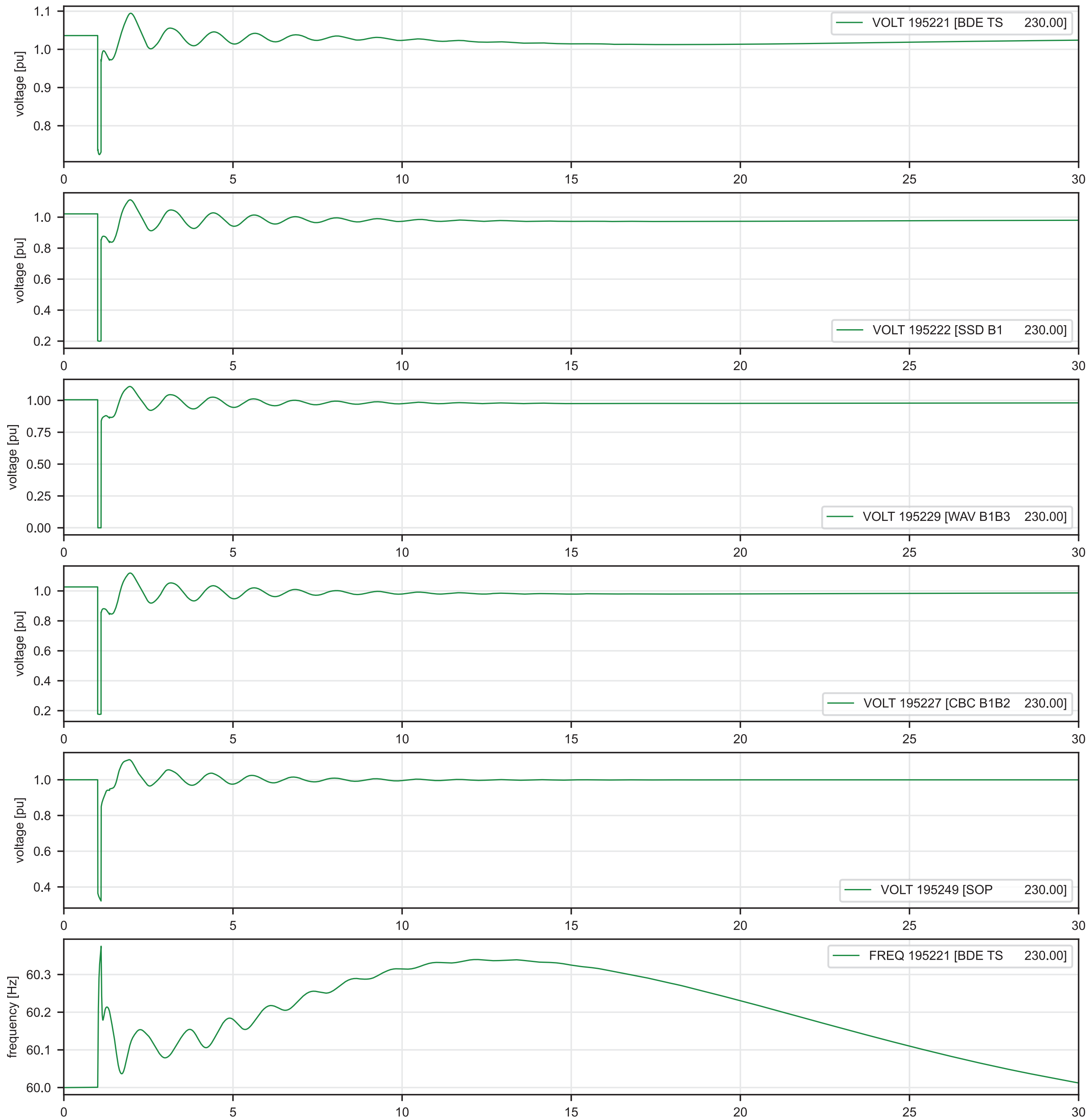
05_2033-34_Base-Peak_TL267-TL202-203-206_250MW
Loss of TL267 | Voltage / Frequency



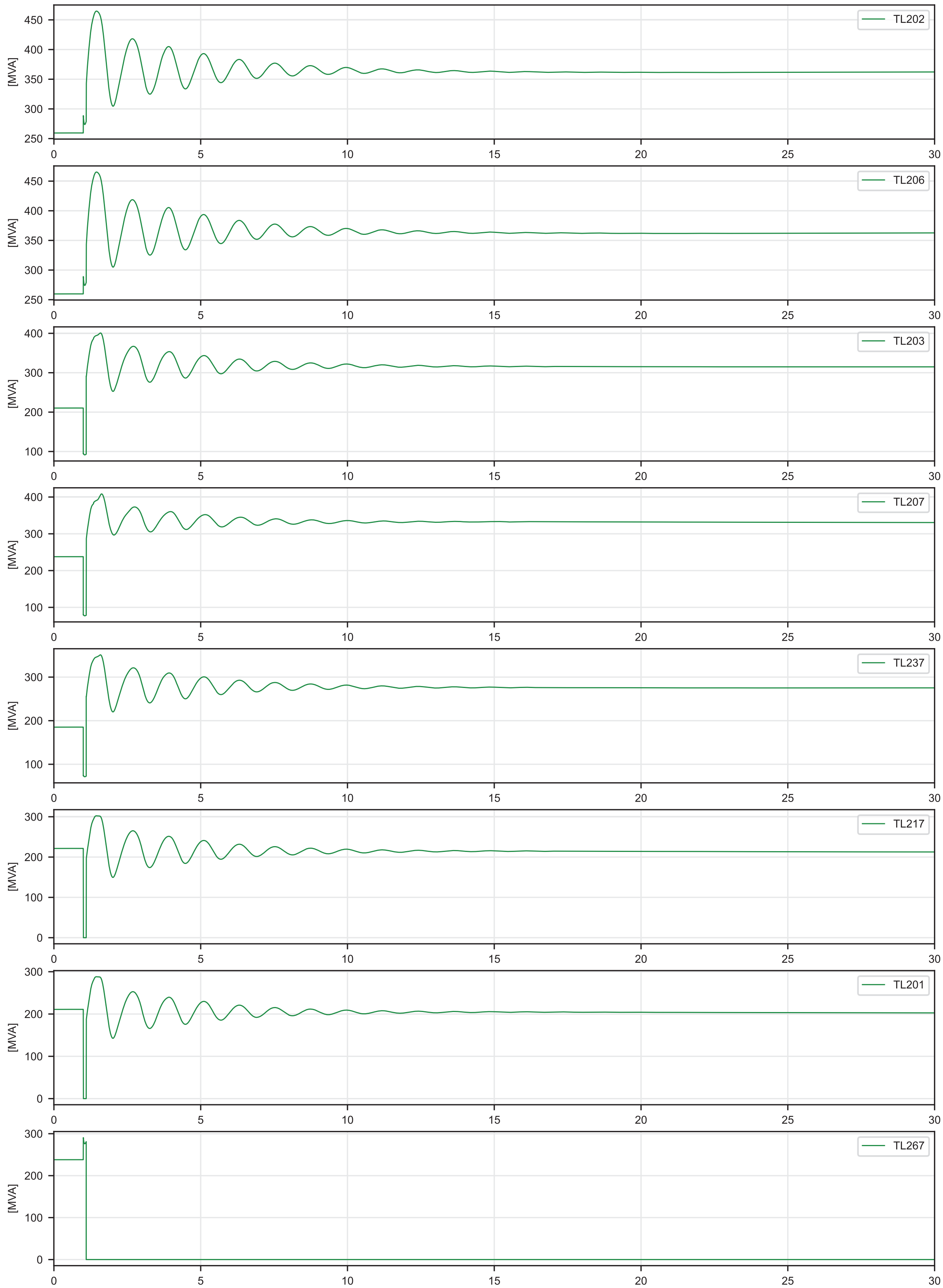
05_2033-34_Base-Peak_TL267-TL202-203-206_250MW
Loss of TL267 | 230 kV Power Flow



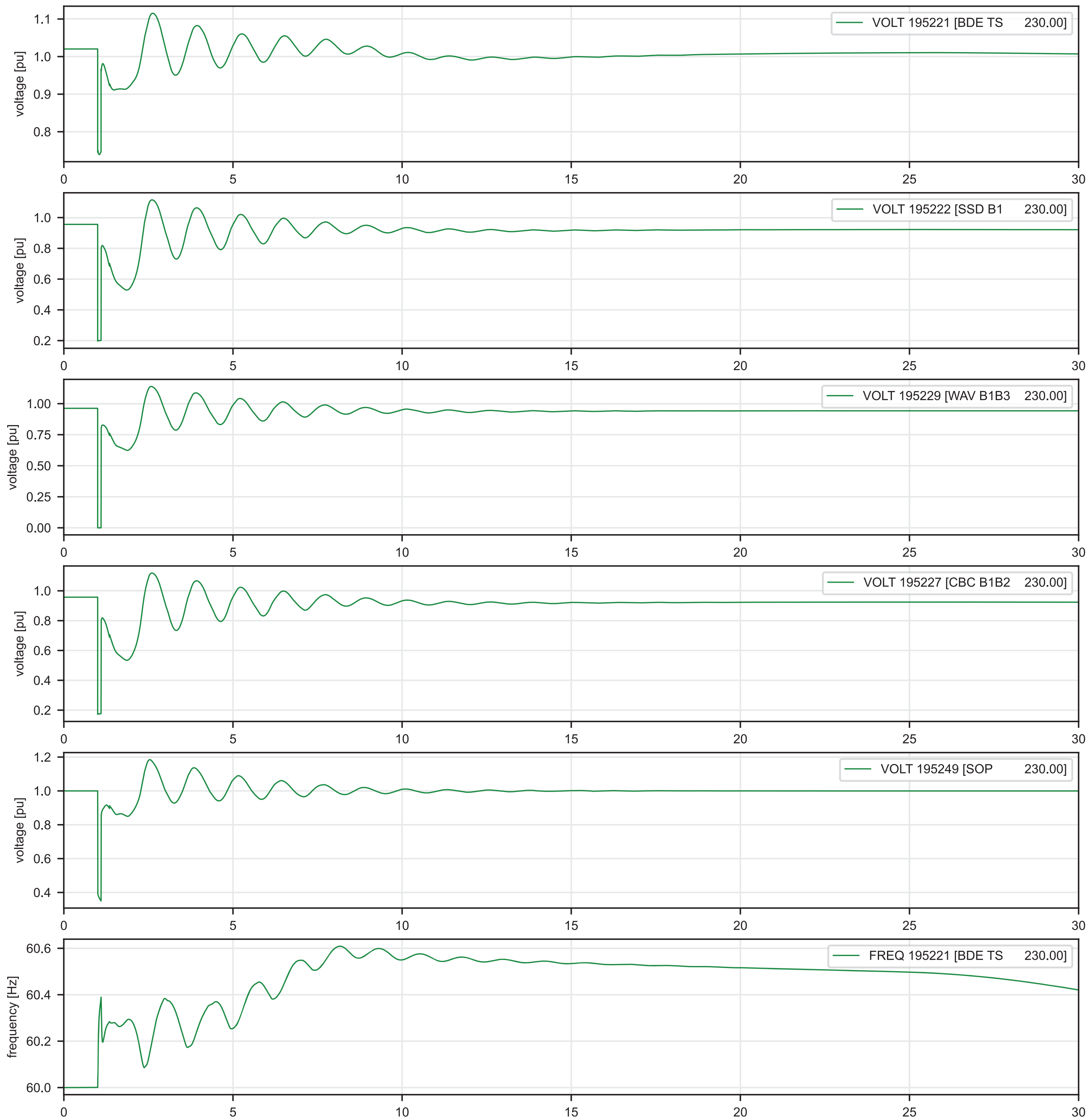
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_050MW
Loss of TL267 | Voltage / Frequency



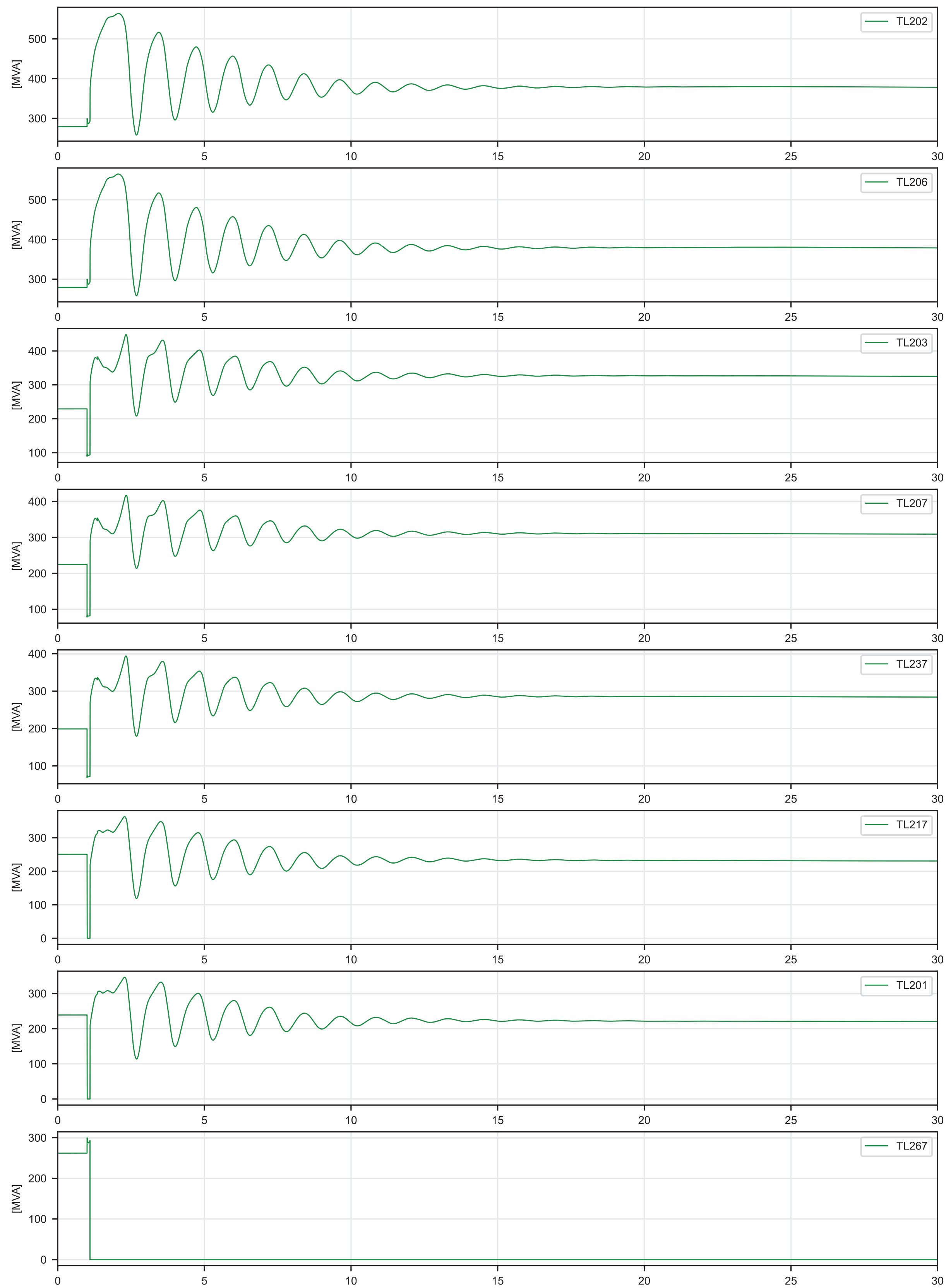
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_050MW
Loss of TL267 | 230 kV Power Flow



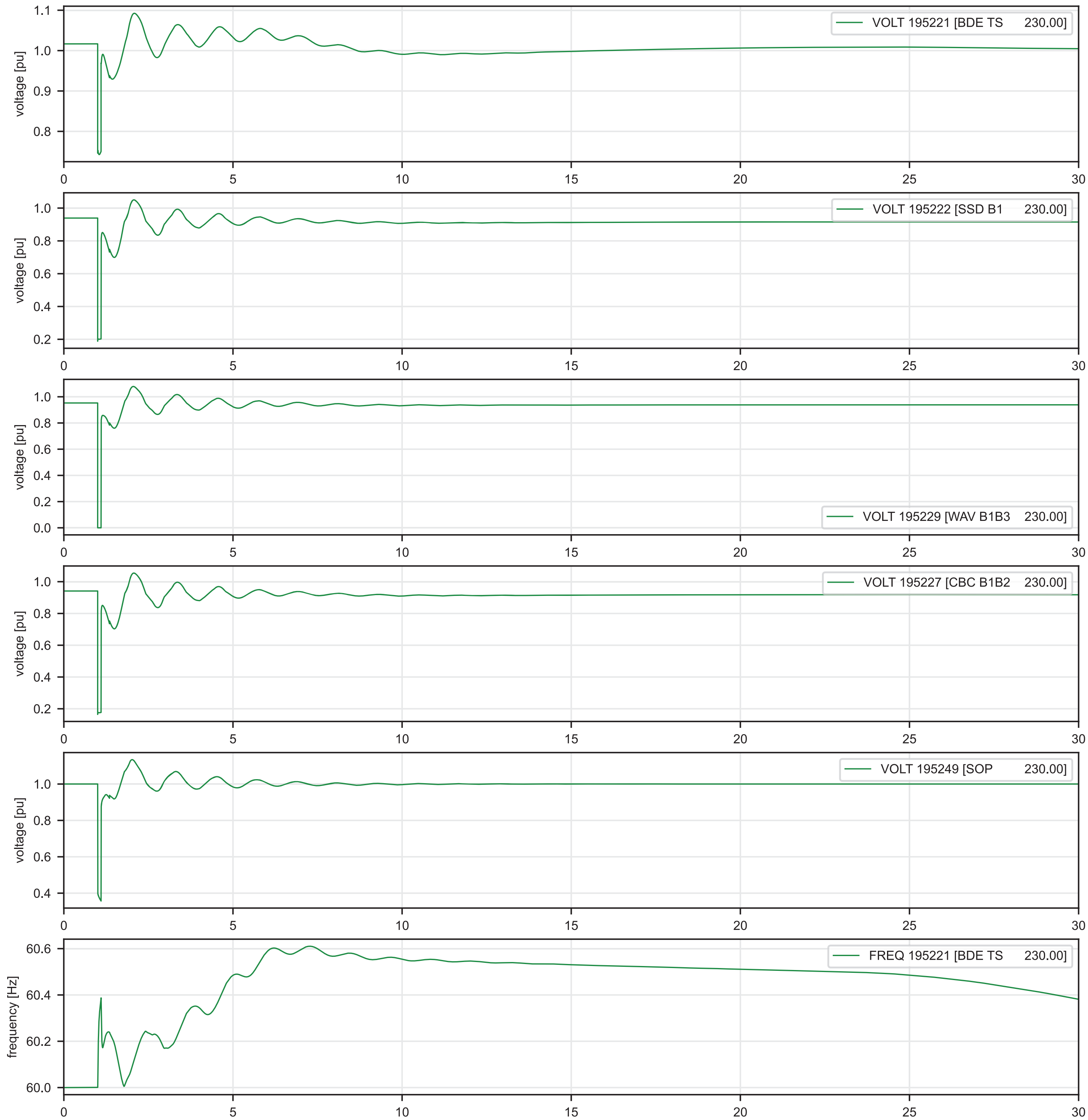
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_100MW with STATCOM (violates voltage criteria)
Loss of TL267 | Voltage / Frequency



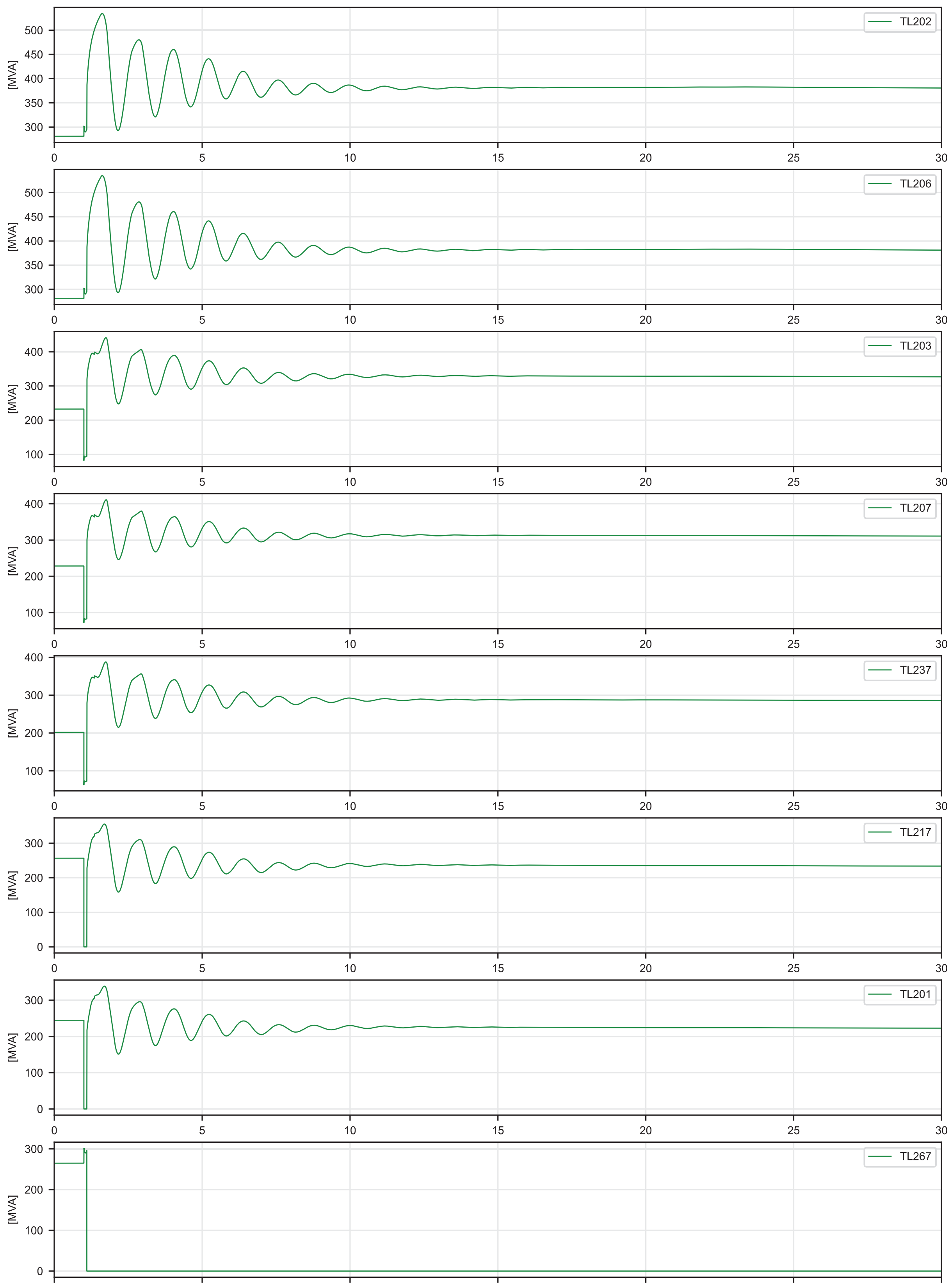
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_100MW with STATCOM (violates voltage criteria)
Loss of TL267 | 230 kV Power Flow



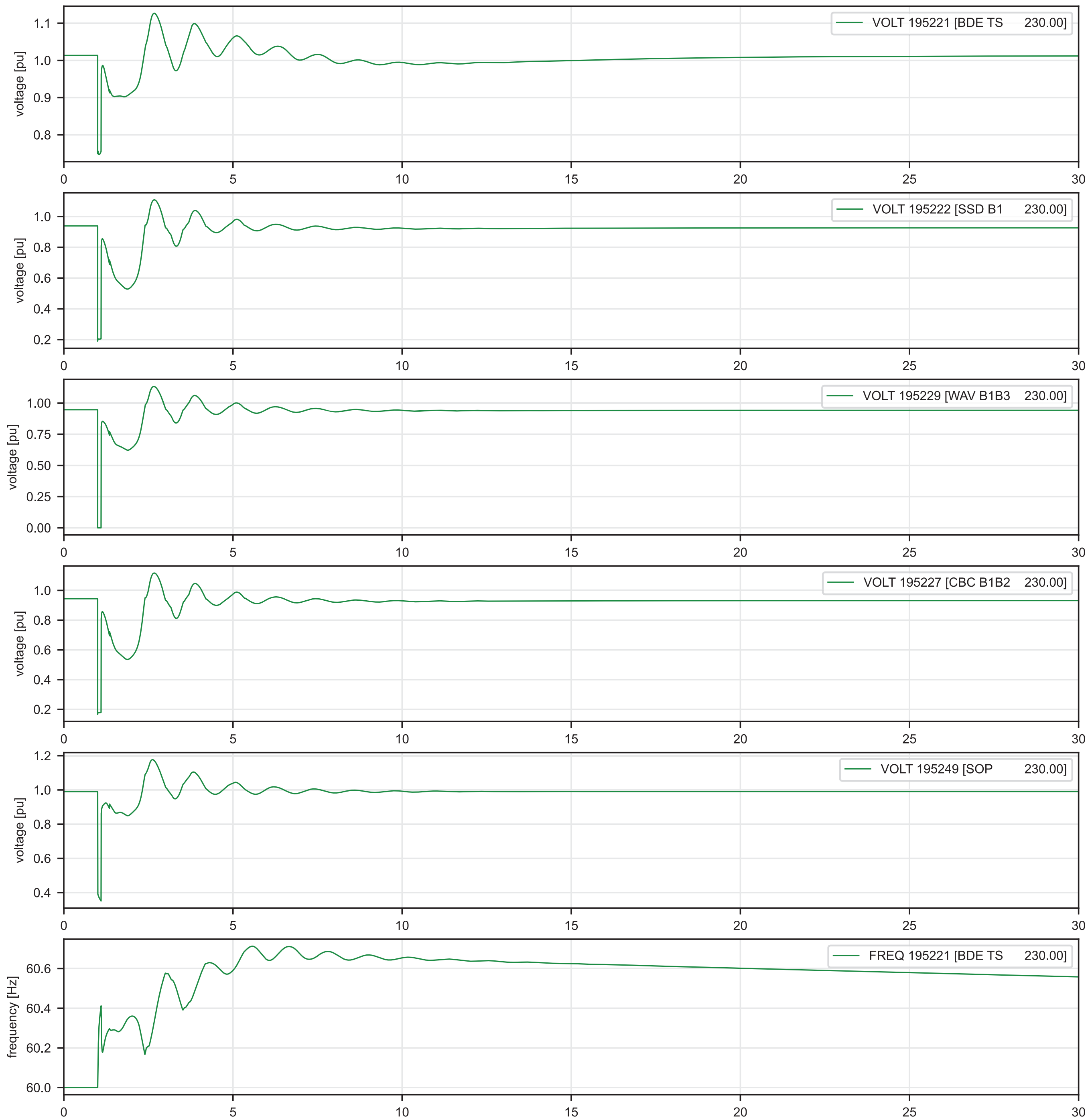
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_100MW with STATCOM (meets voltage criteria)
Loss of TL267 | Voltage / Frequency



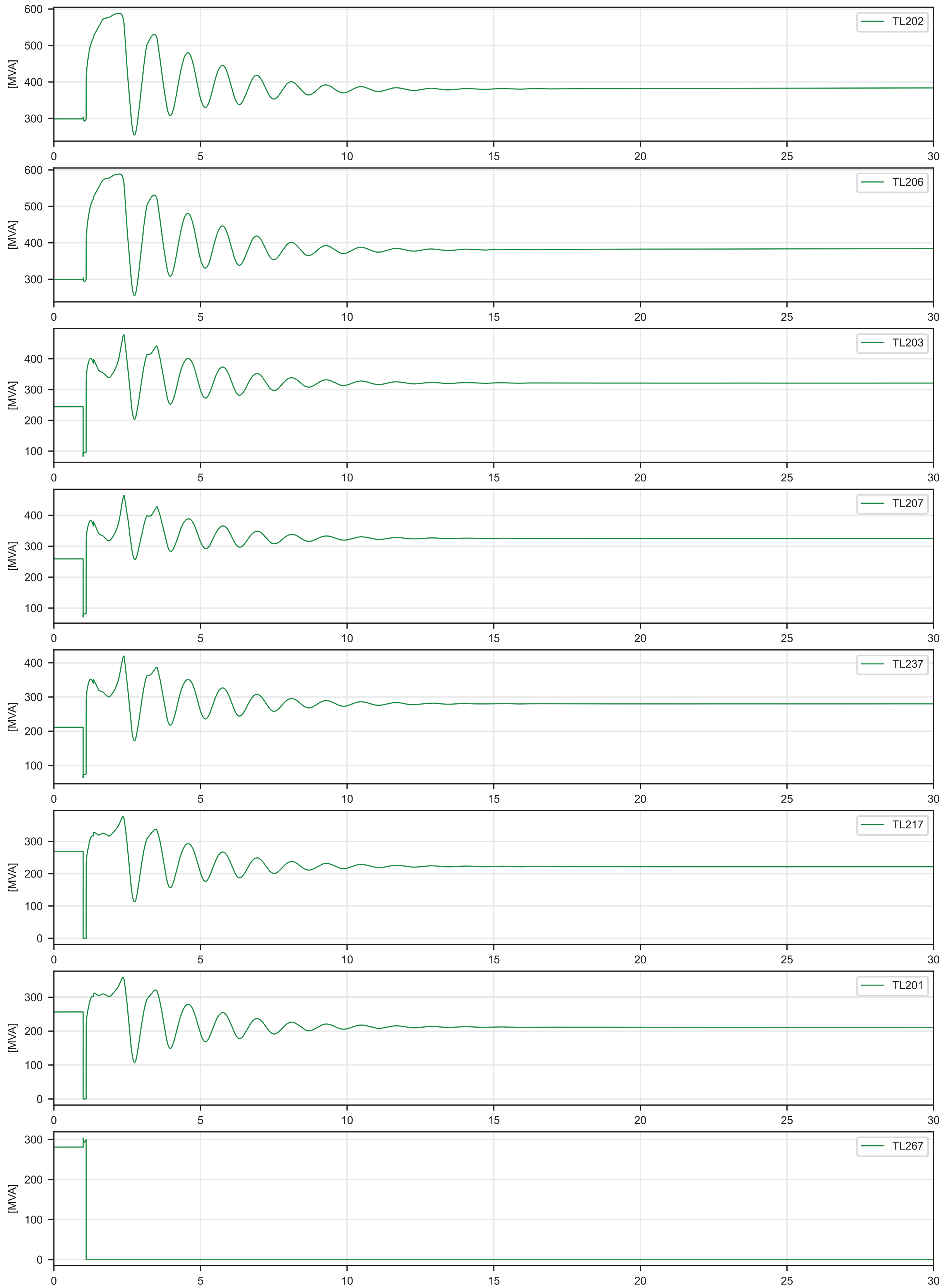
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_100MW with STATCOM (meets voltage criteria)
Loss of TL267 | 230 kV Power Flow



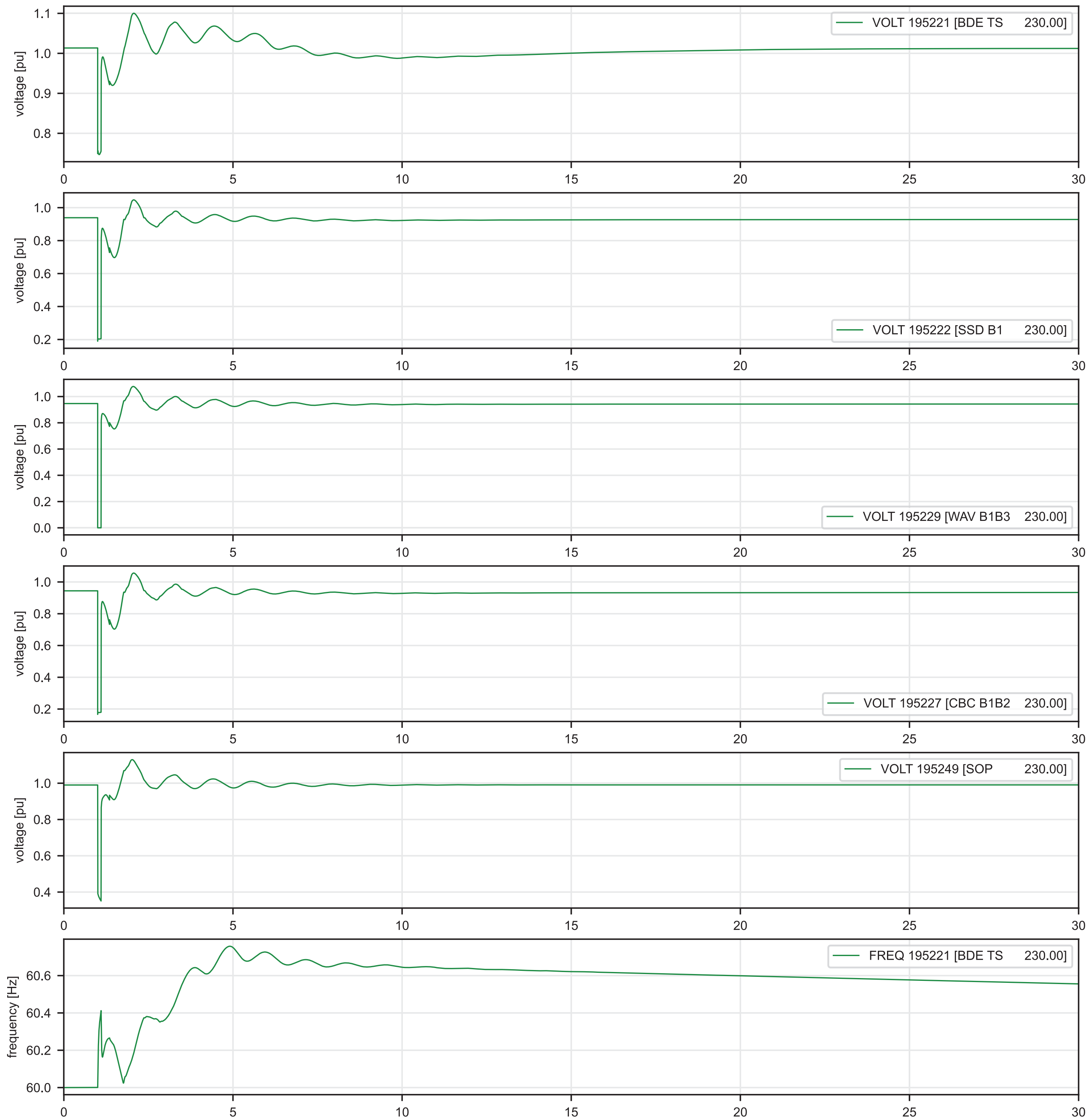
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_150MW with STATCOM (violates voltage criteria)
Loss of TL267 | Voltage / Frequency



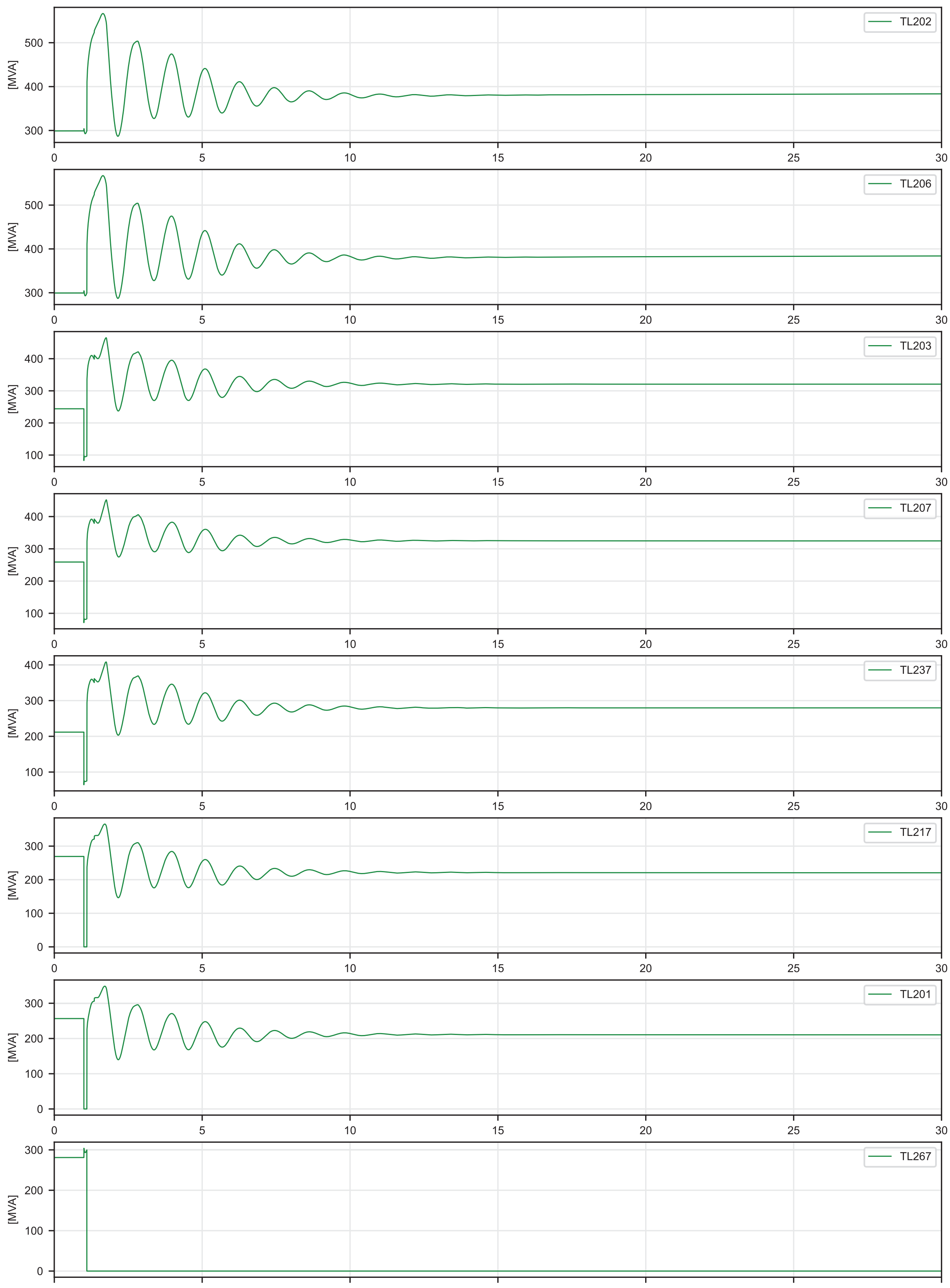
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_150MW with STATCOM (violates voltage criteria)
Loss of TL267 | 230 kV Power Flow



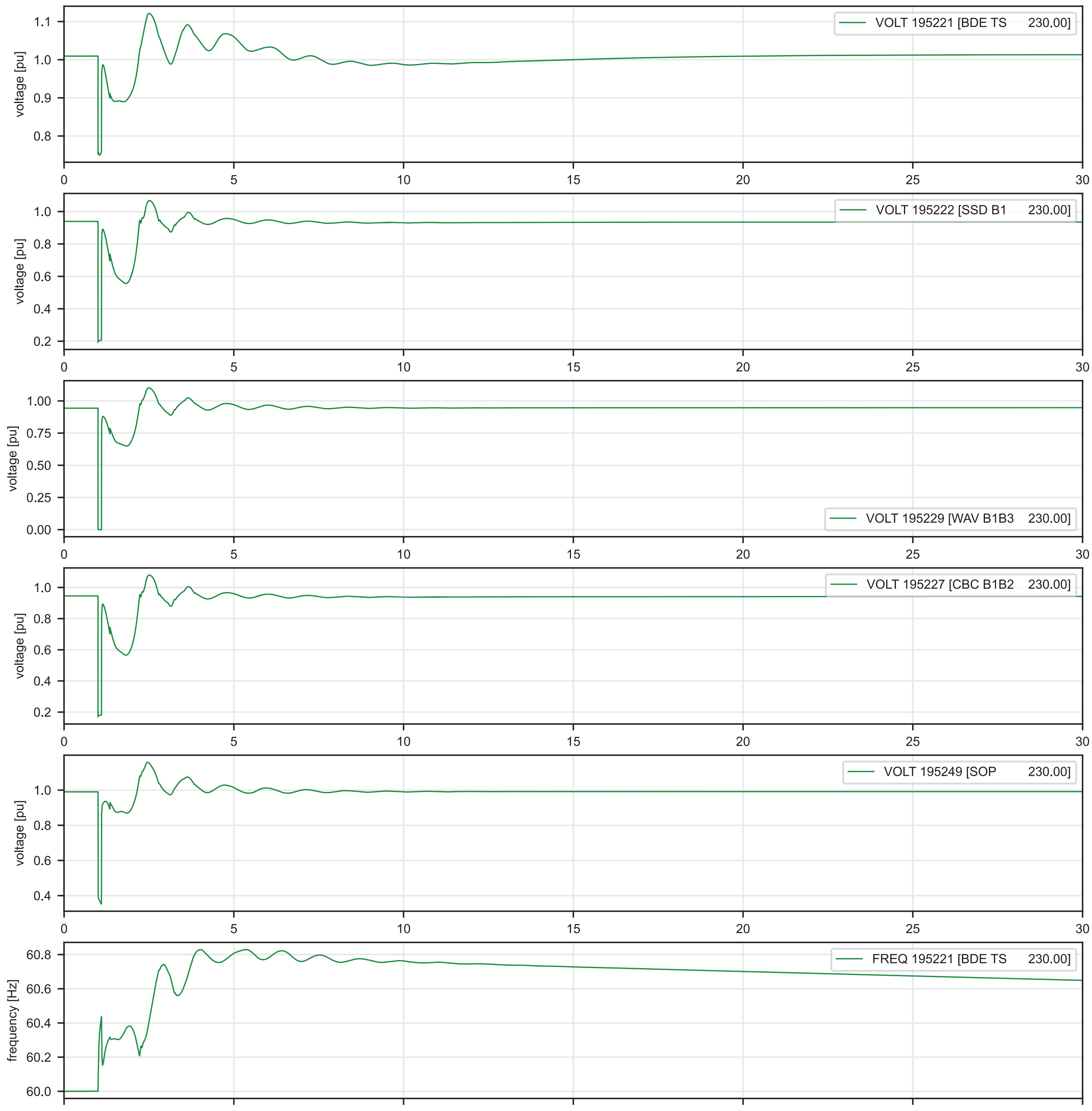
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_150MW with STATCOM (meets voltage criteria)
Loss of TL267 | Voltage / Frequency



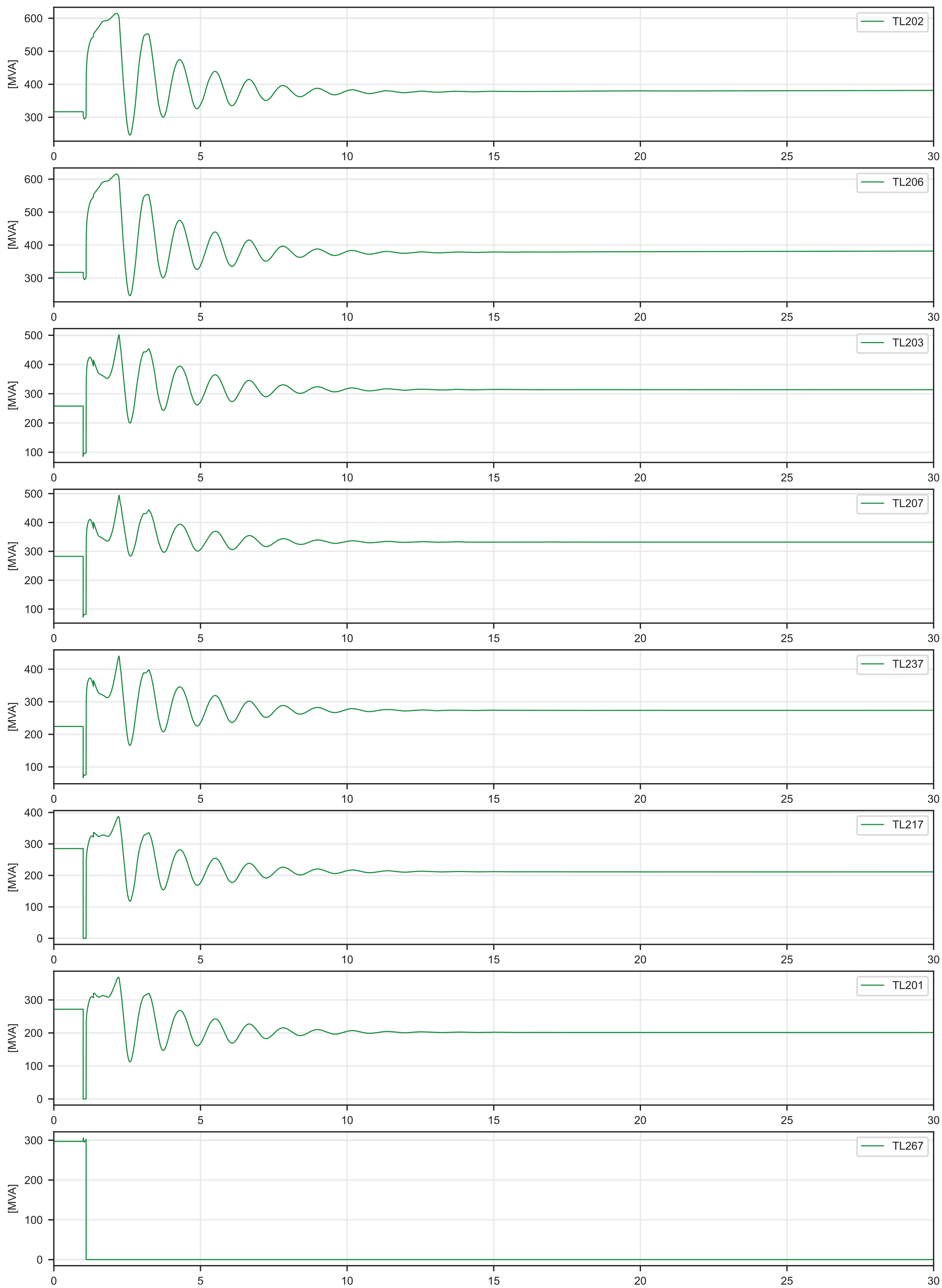
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_150MW with STATCOM (meets voltage criteria)
Loss of TL267 | 230 kV Power Flow



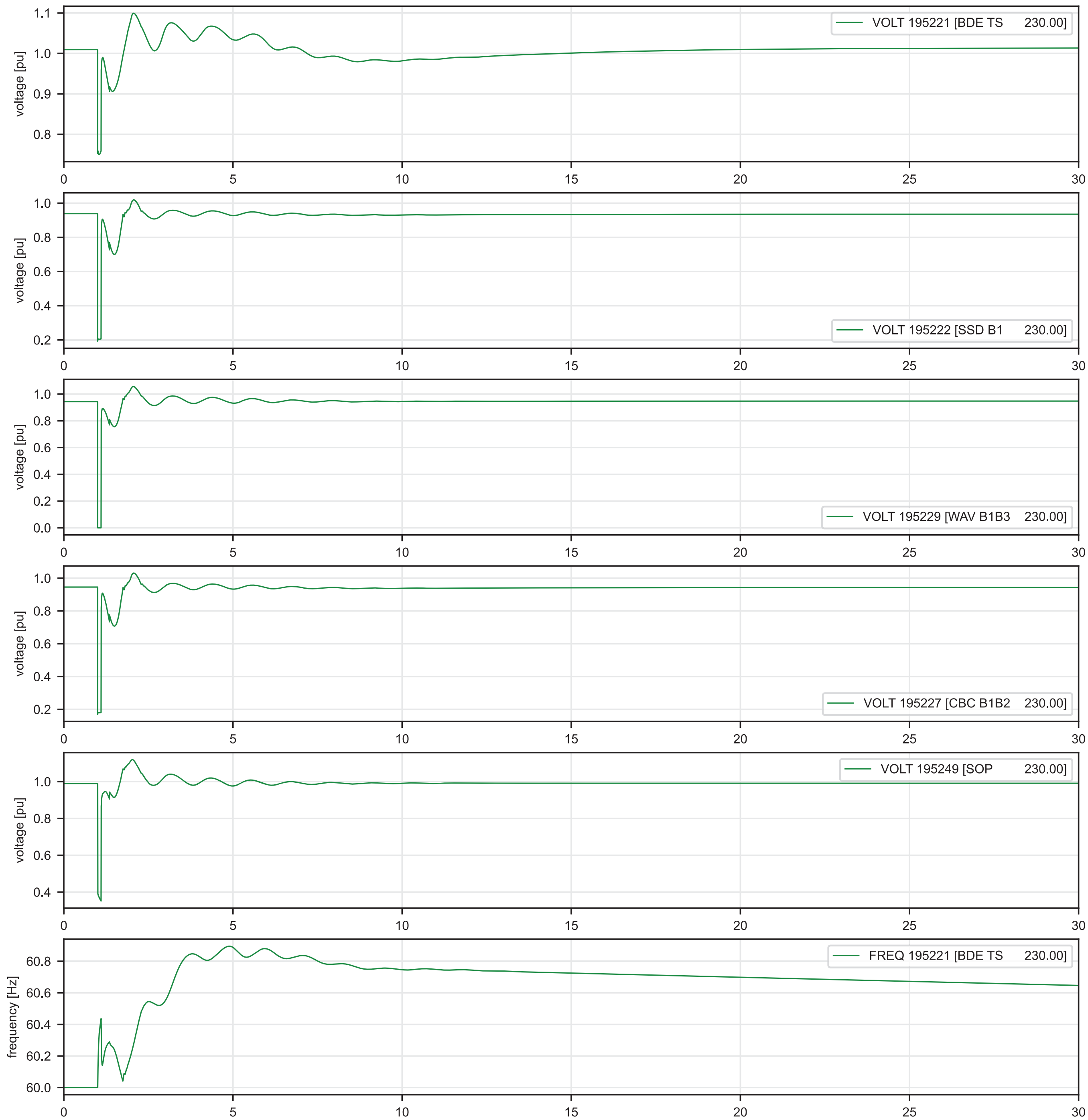
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_200MW with STATCOM (violates voltage criteria)
Loss of TL267 | Voltage / Frequency



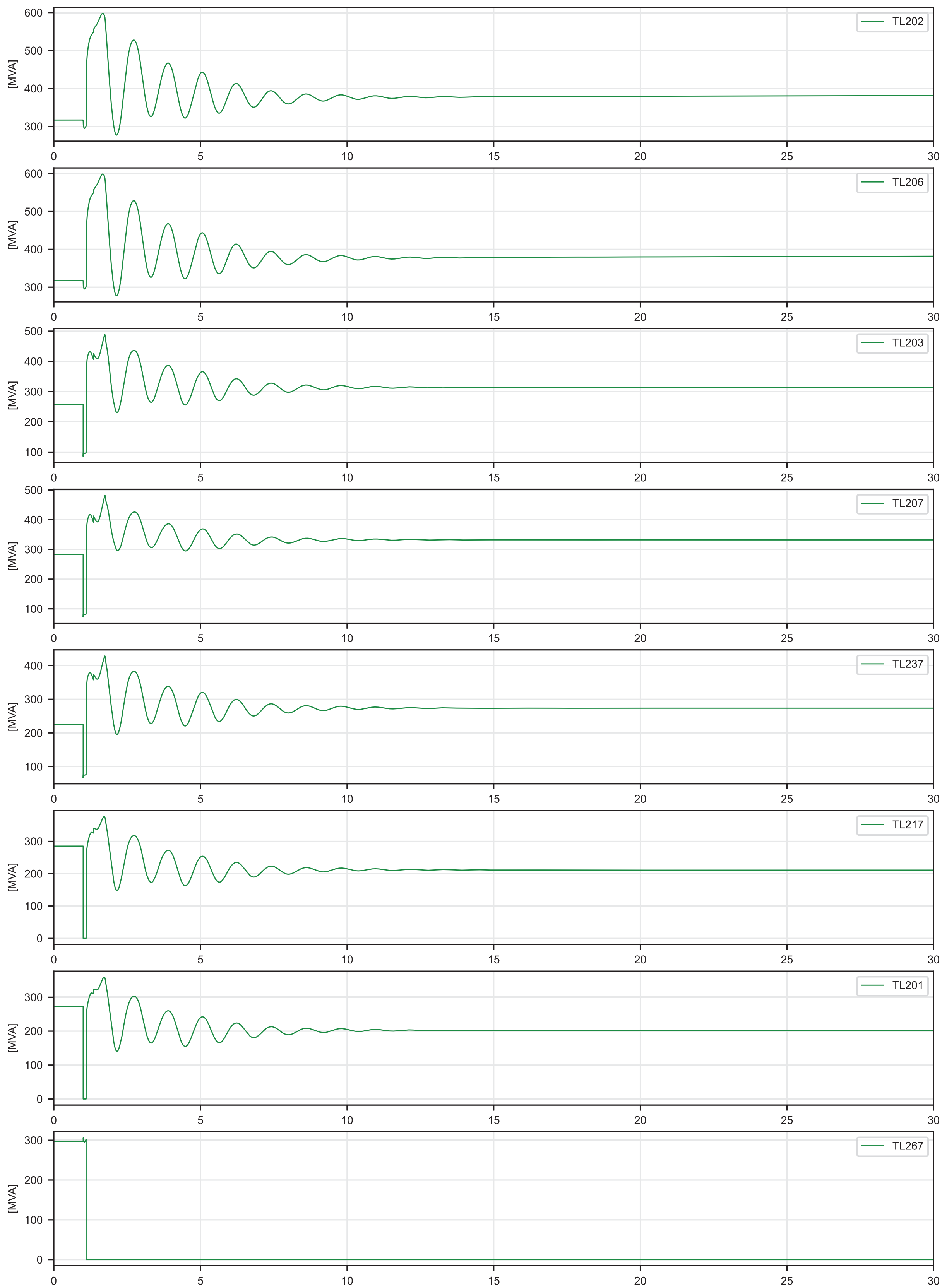
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_200MW with STATCOM (violates voltage criteria)
Loss of TL267 | 230 kV Power Flow



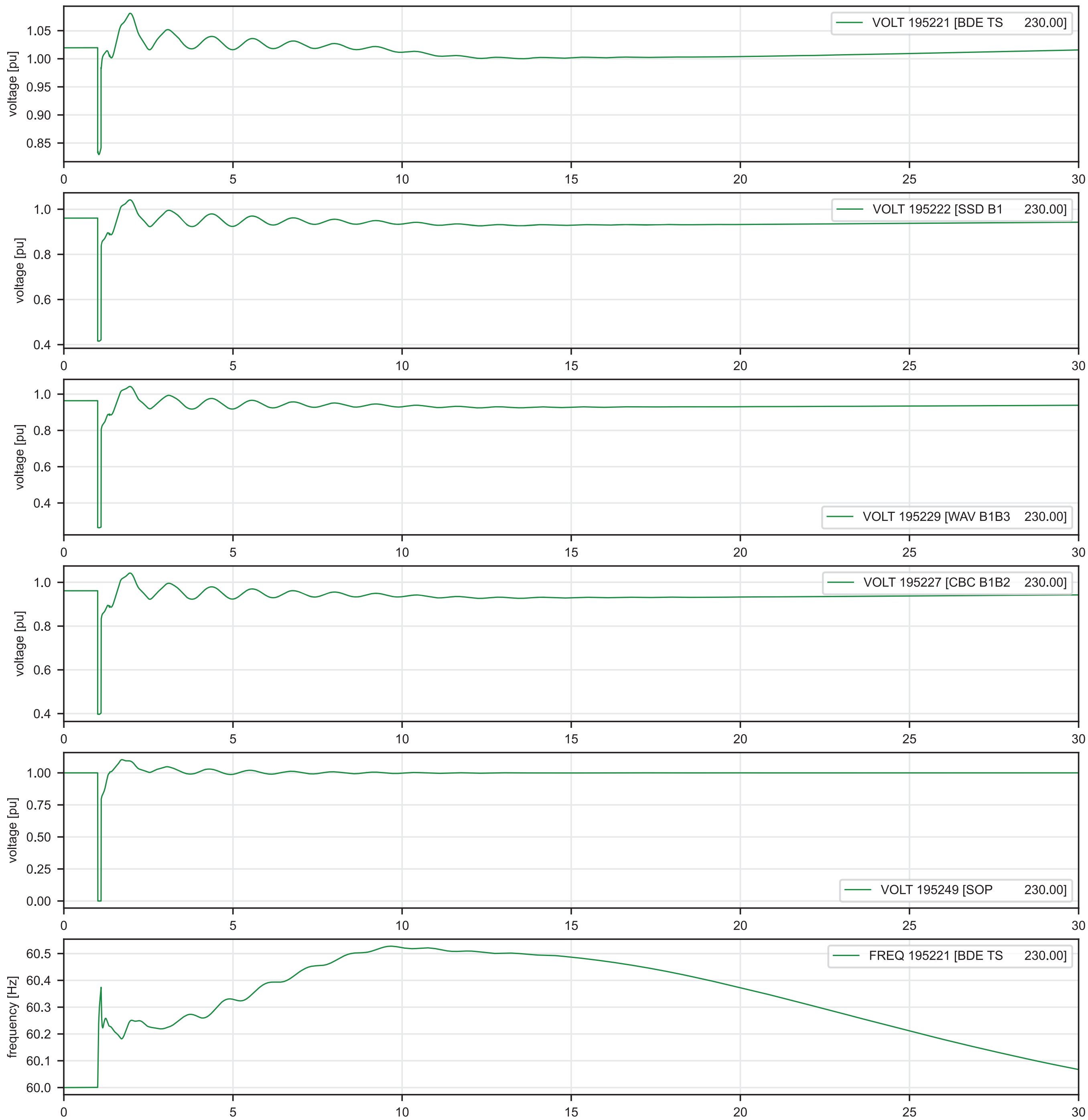
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_200MW with STATCOM (meets voltage criteria)
Loss of TL267 | Voltage / Frequency



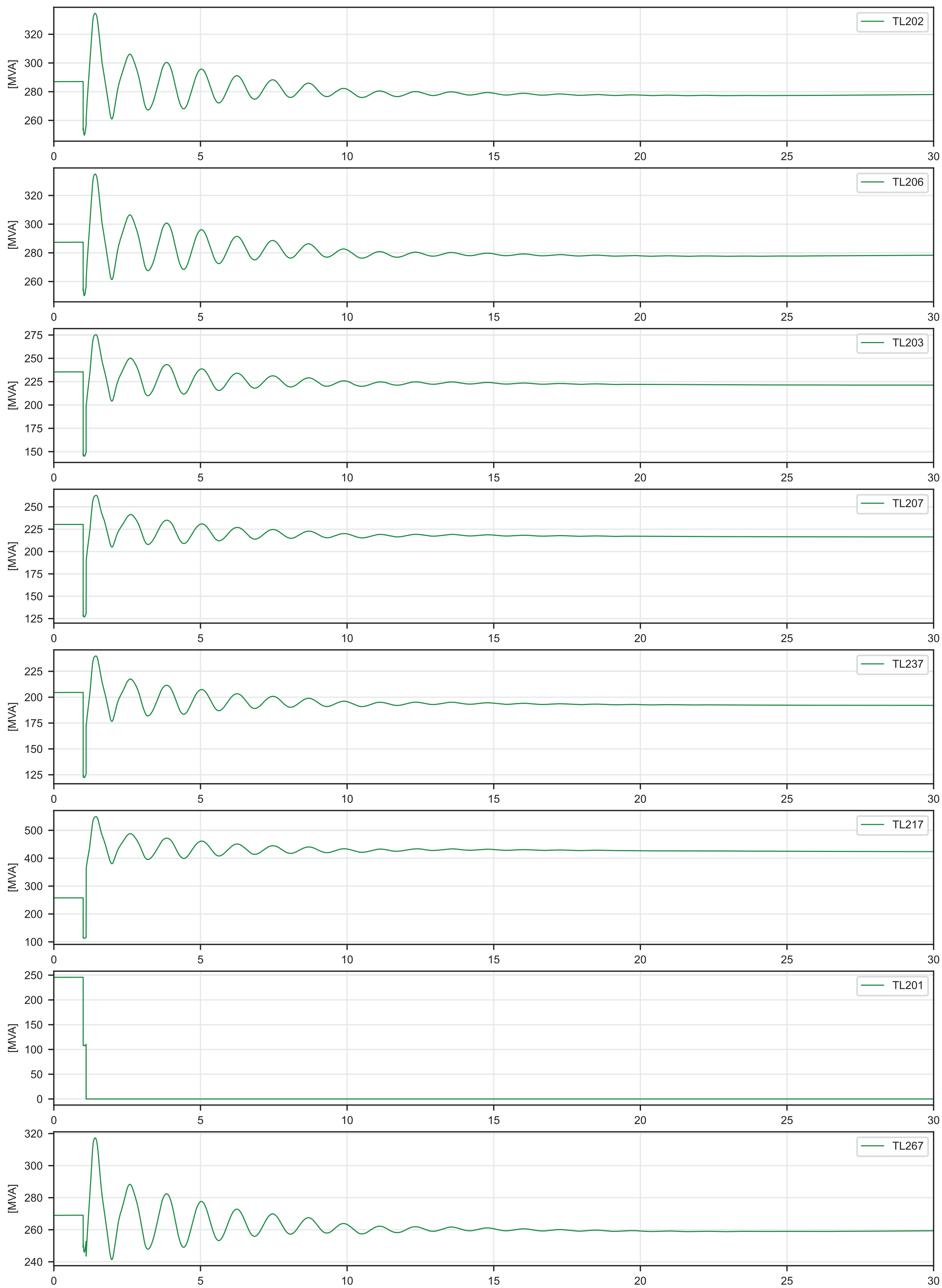
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_200MW with STATCOM (meets voltage criteria)
Loss of TL267 | 230 kV Power Flow



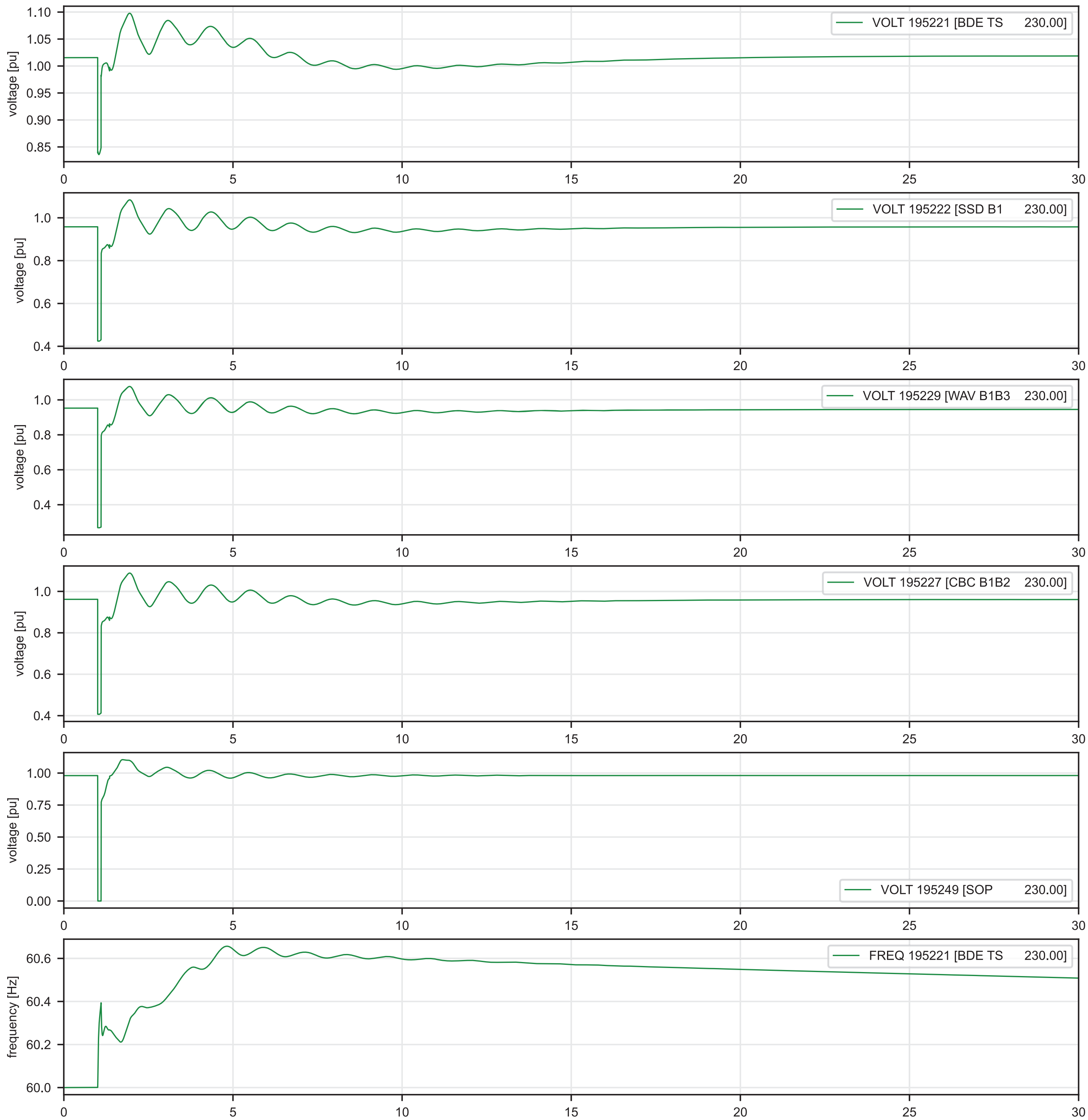
06_2033-34_Base-Peak_TL201-TL217_050MW
Loss of TL201 | Voltage / Frequency



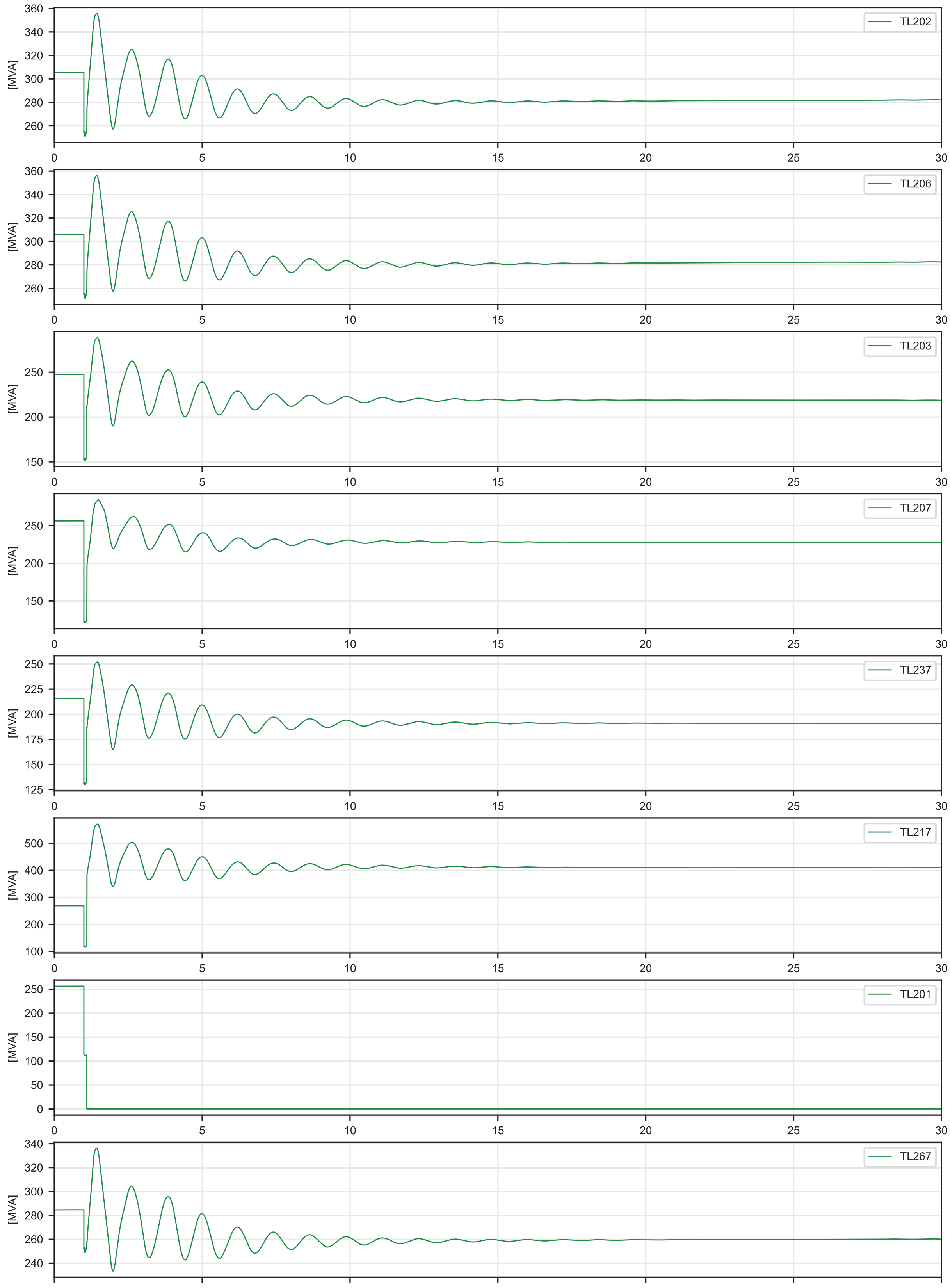
06_2033-34_Base-Peak_TL201-TL217_050MW
Loss of TL201 | 230 kV Power Flow



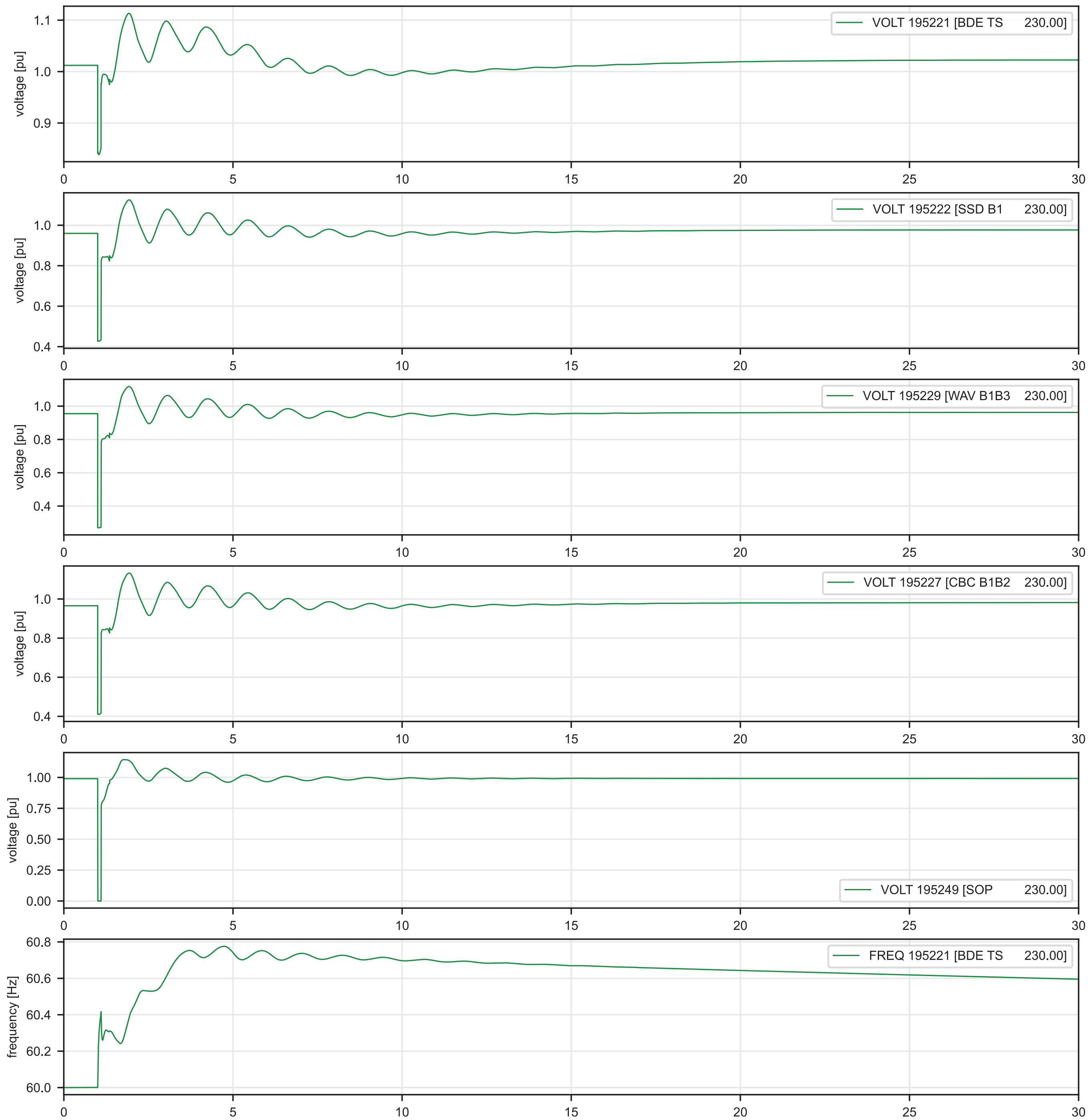
06_2033-34_Base-Peak_TL201-TL217_100MW
Loss of TL201 | Voltage / Frequency



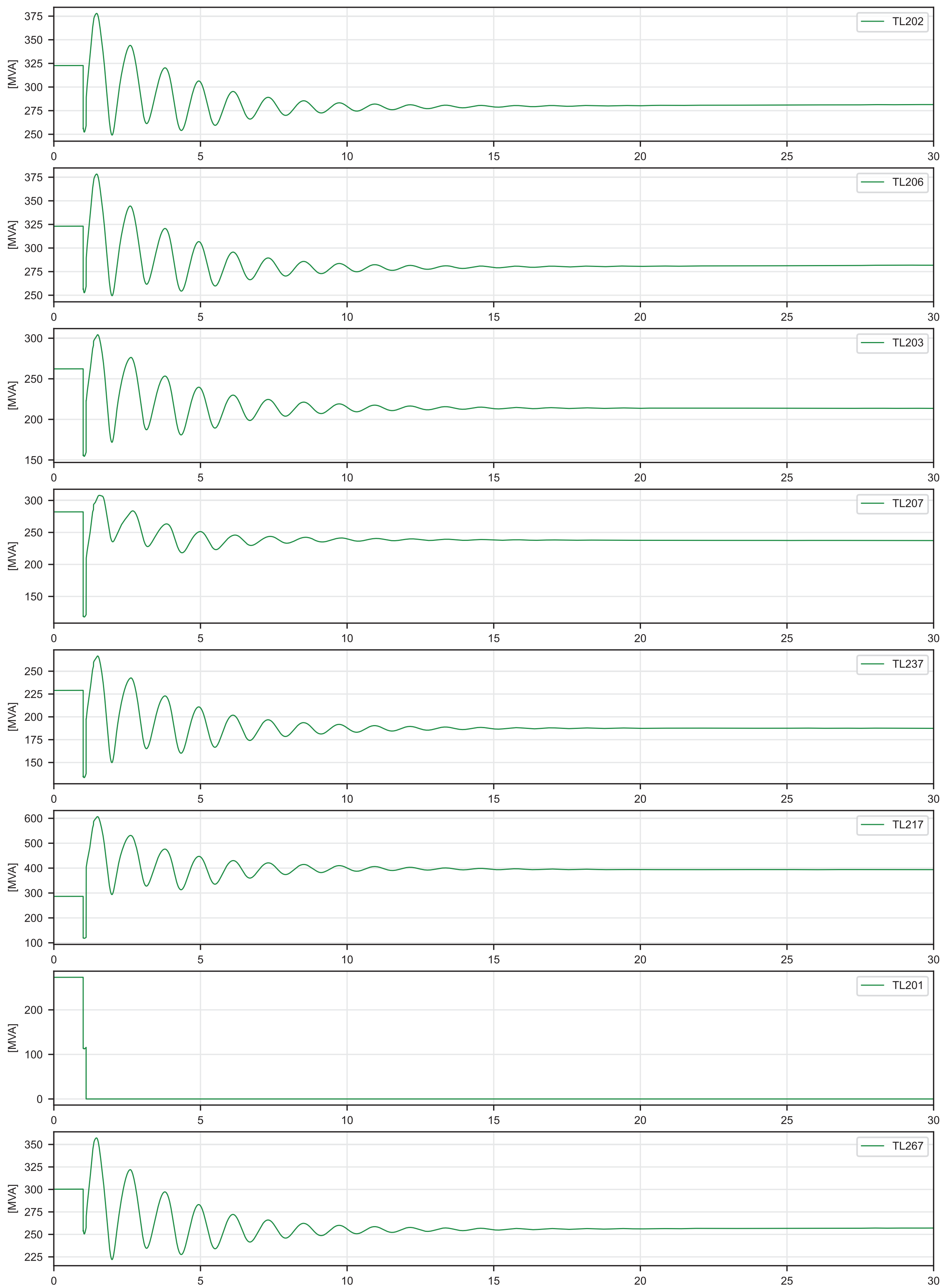
06_2033-34_Base-Peak_TL201-TL217_100MW
Loss of TL201 | 230 kV Power Flow



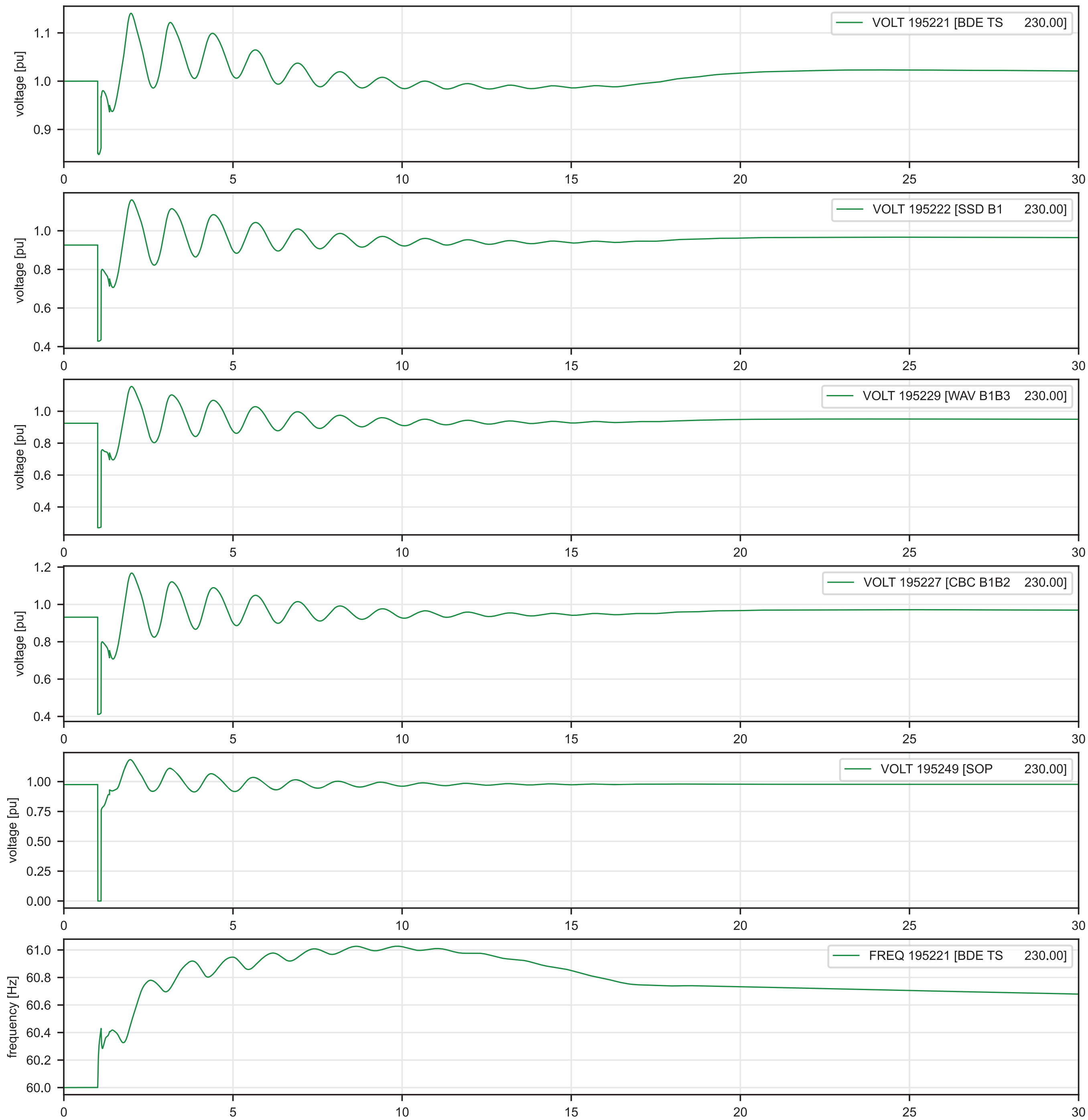
06_2033-34_Base-Peak_TL201-TL217_150MW
Loss of TL201 | Voltage / Frequency



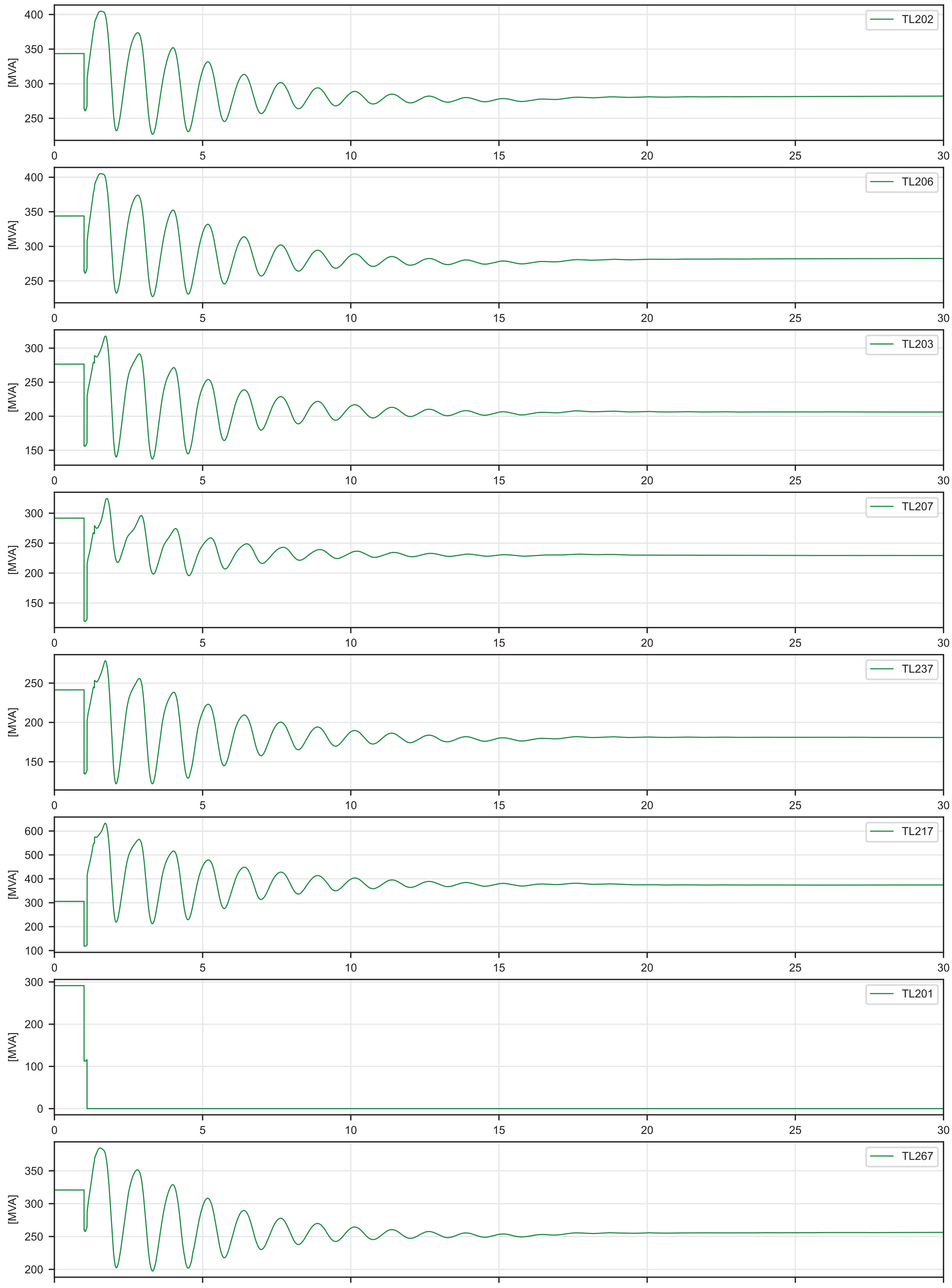
06_2033-34_Base-Peak_TL201-TL217_150MW
Loss of TL201 | 230 kV Power Flow



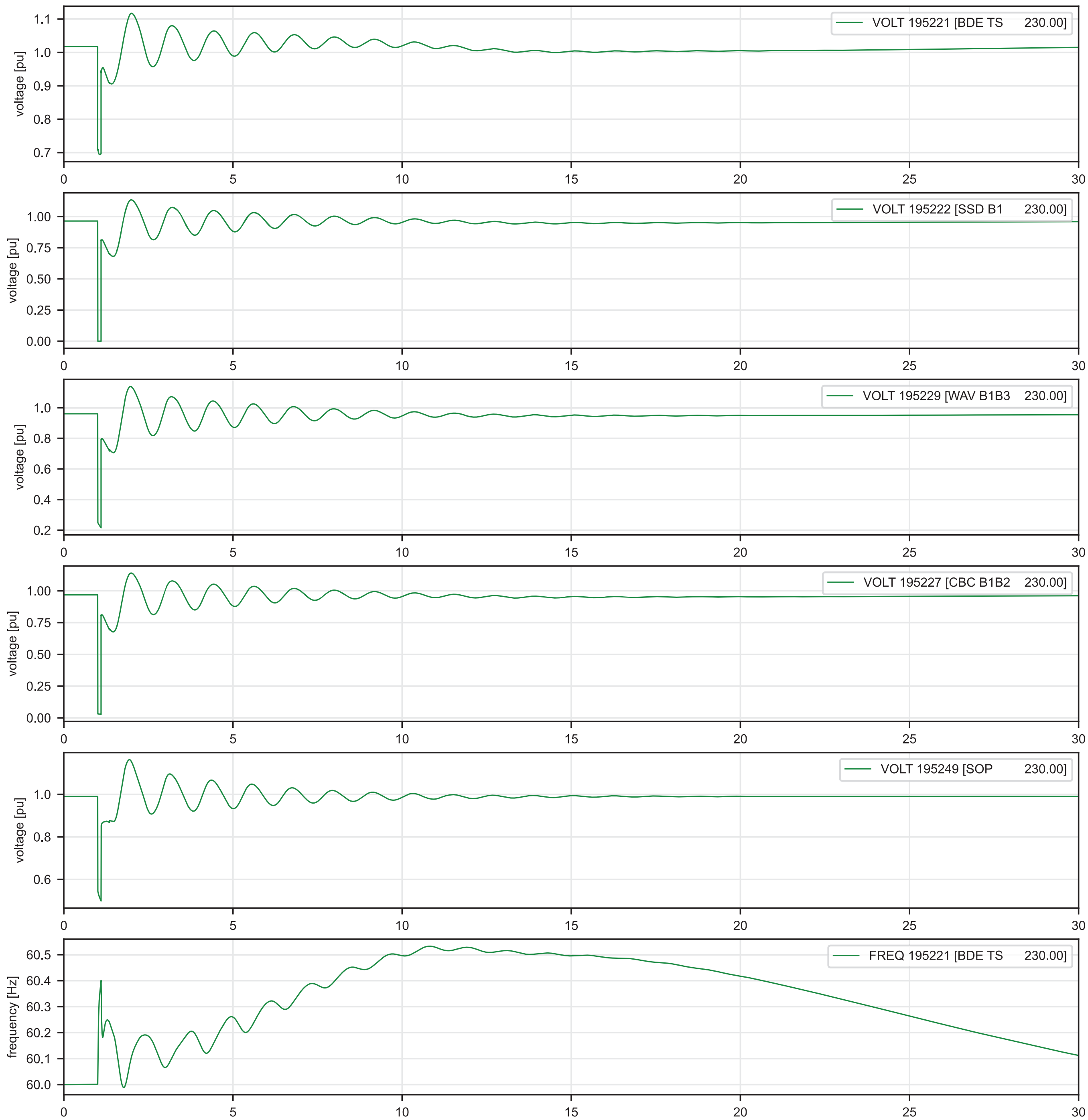
06_2033-34_Base-Peak_TL201-TL217_200MW
Loss of TL201 | Voltage / Frequency



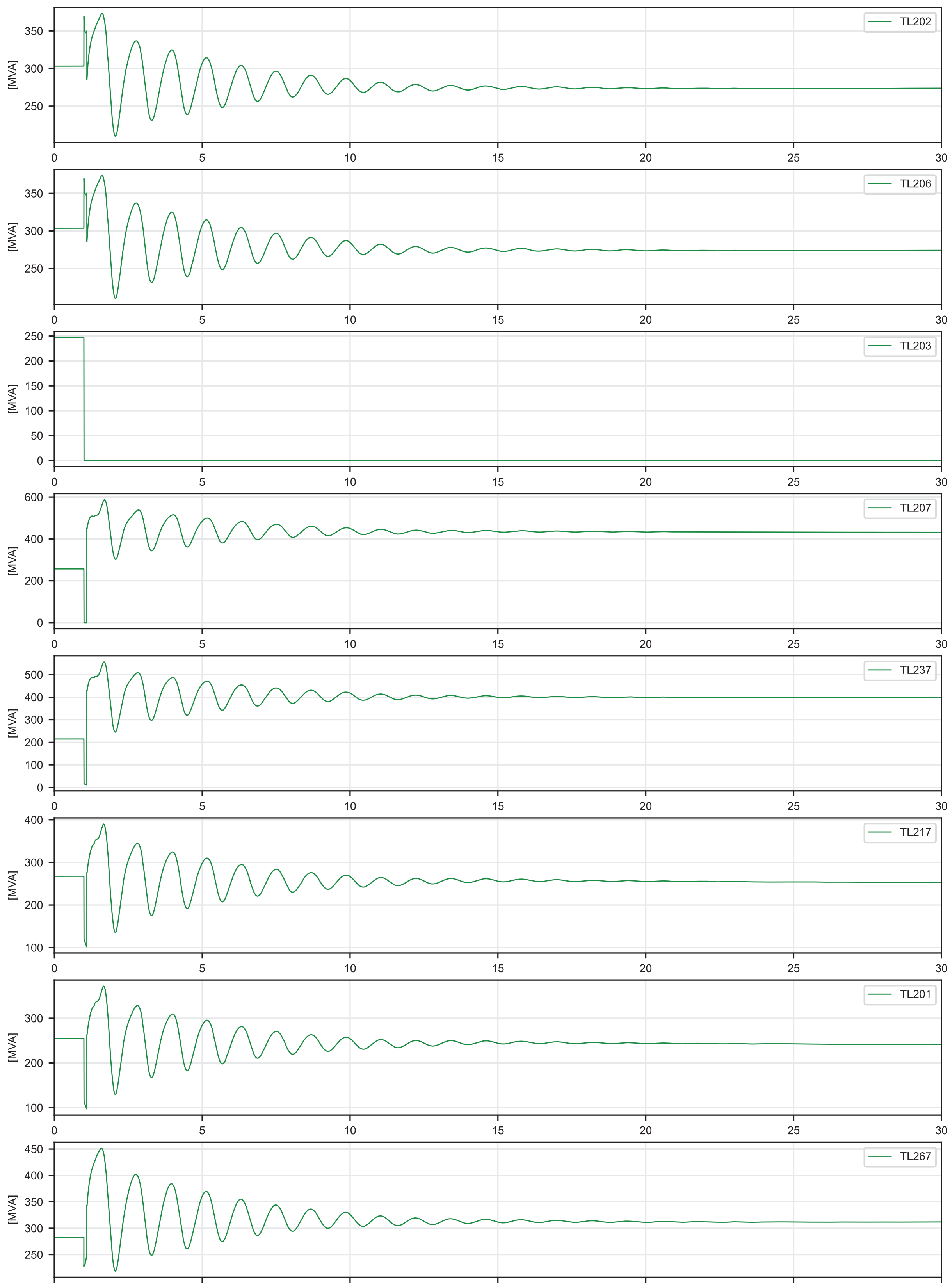
06_2033-34_Base-Peak_TL201-TL217_200MW
Loss of TL201 | 230 kV Power Flow



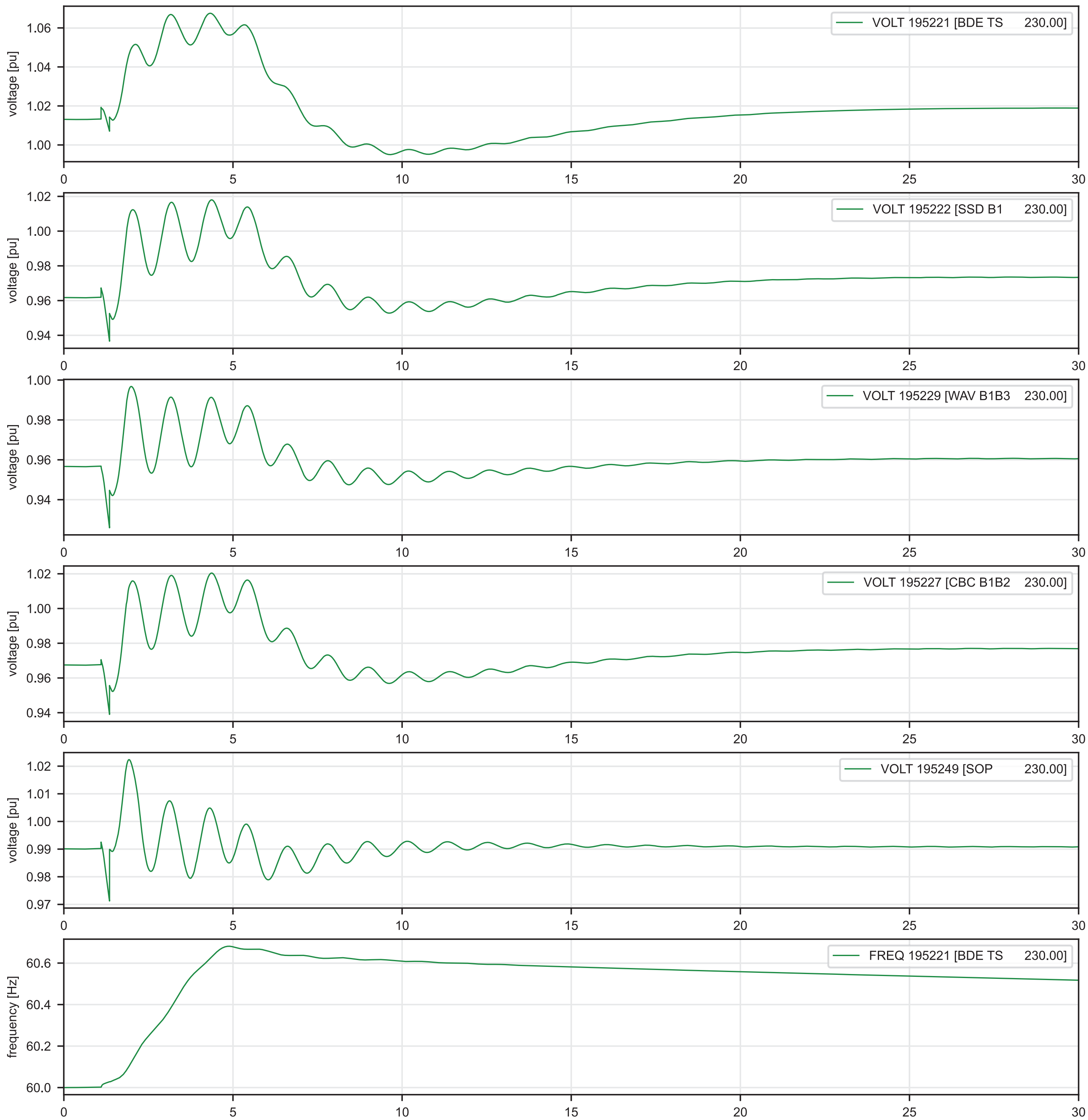
07_2033-34_Base-Peak_TL203-TL207_050MW
Loss of TL203 | Voltage / Frequency



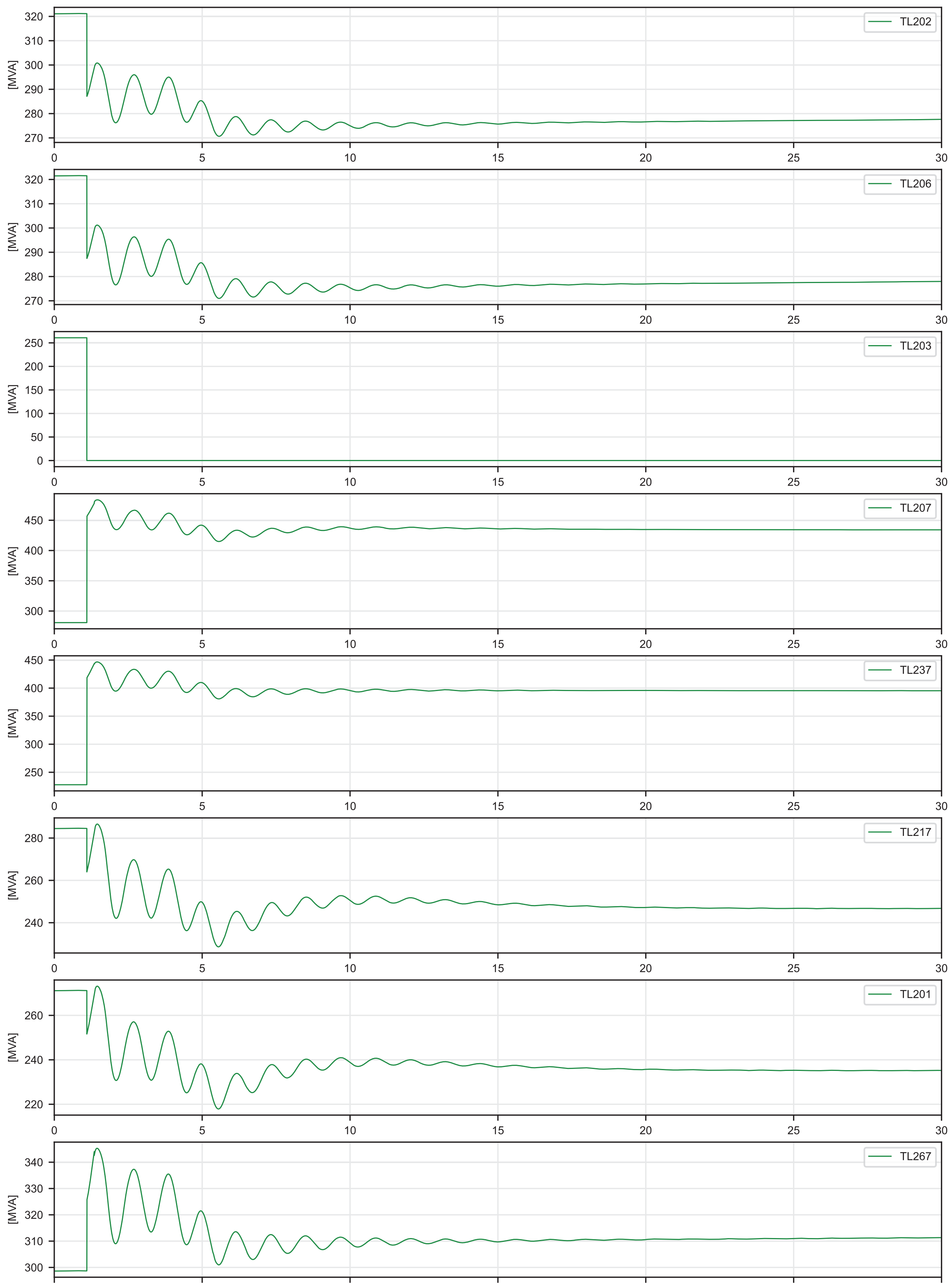
07_2033-34_Base-Peak_TL203-TL207_050MW
Loss of TL203 | 230 kV Power Flow

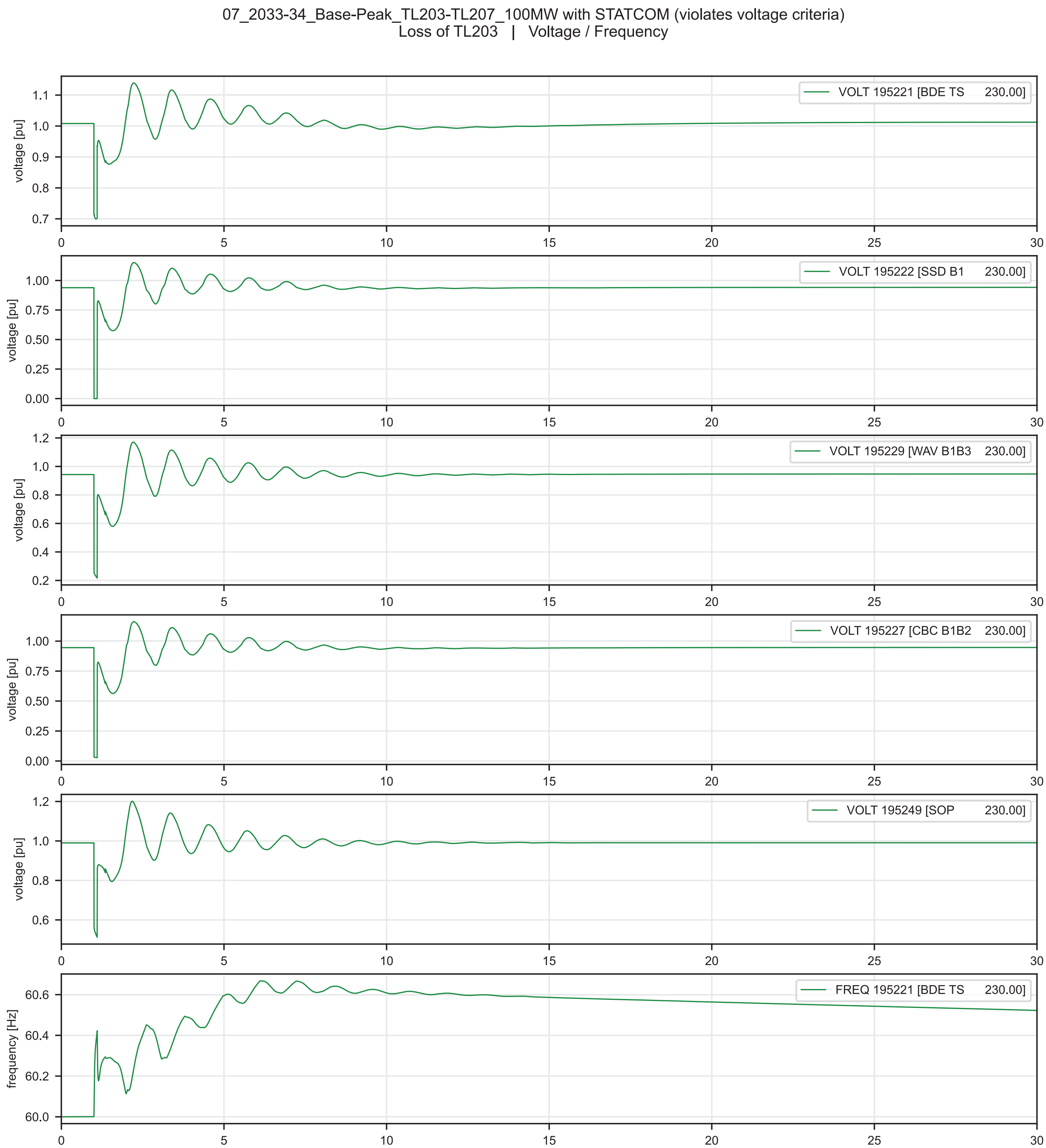


07_2033-34_Base-Peak_TL203-TL207_100MW
Loss of TL203 | Voltage / Frequency

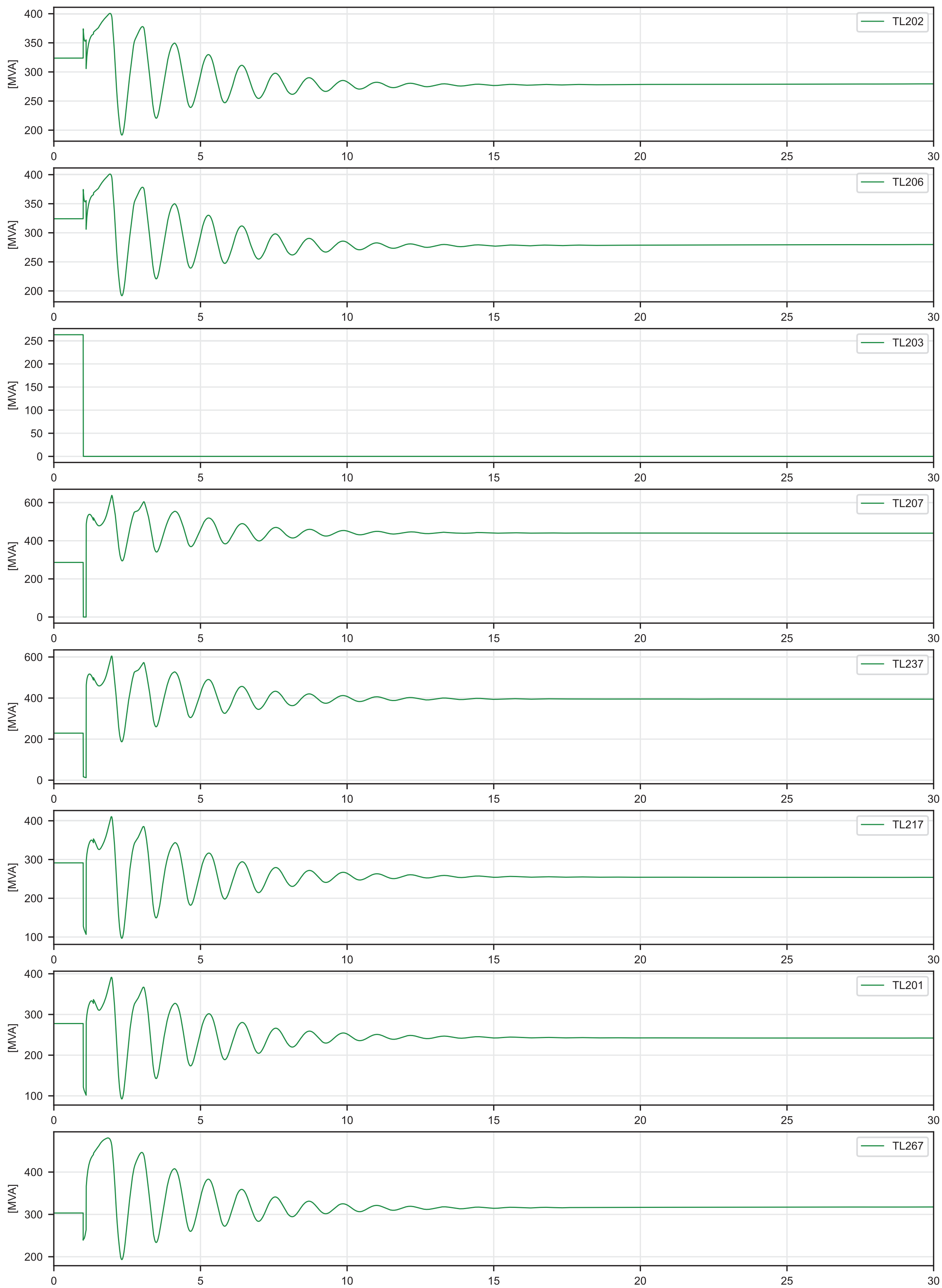


07_2033-34_Base-Peak_TL203-TL207_100MW
Loss of TL203 | 230 kV Power Flow

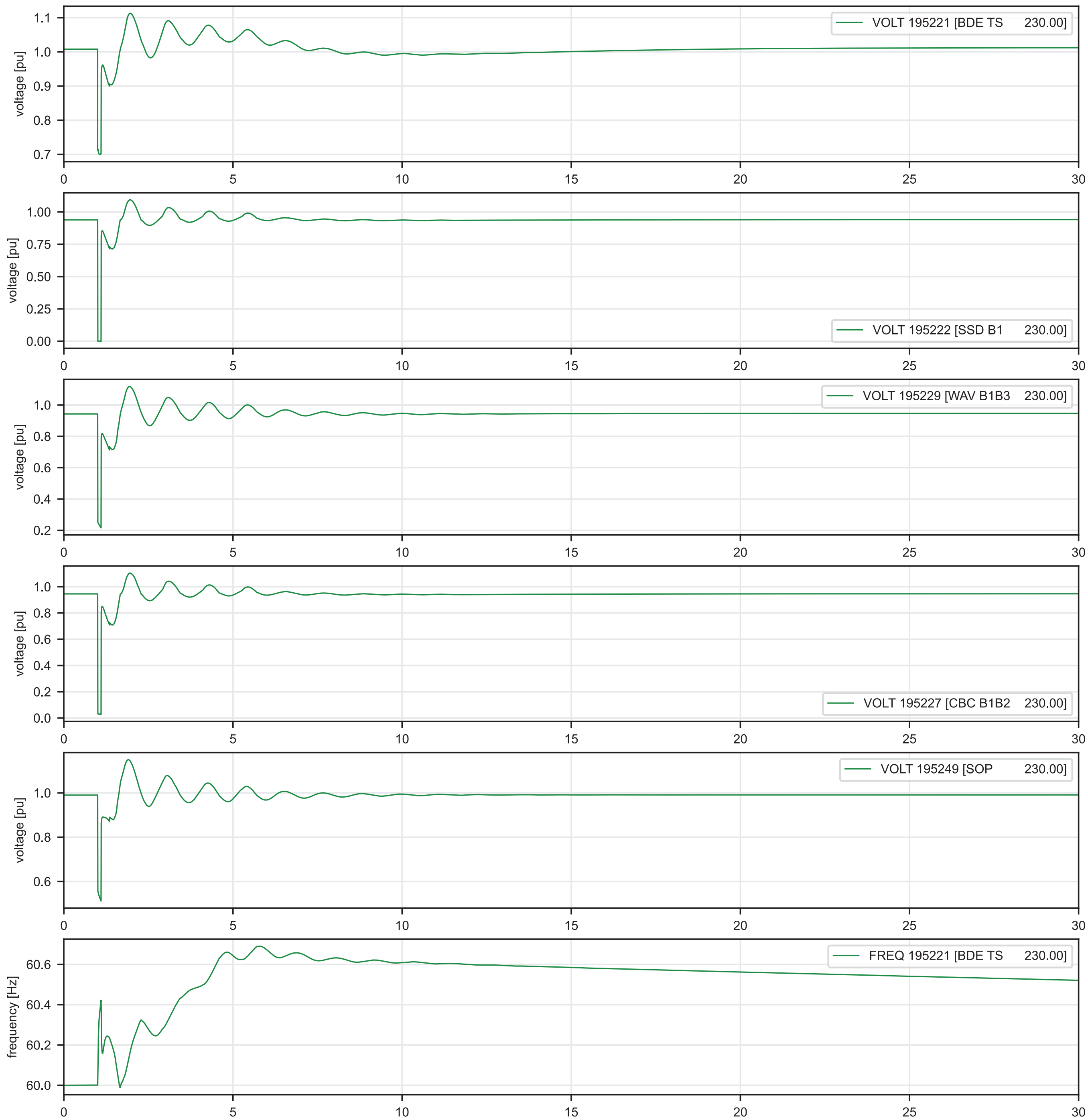



07_2033-34_Base-Peak_TL203-TL207_100MW with STATCOM (violates voltage criteria)
Loss of TL203 | Voltage / Frequency
VOLT 195221 [BDE TS 230.00]
VOLT 195222 [SSD B1 230.00]
VOLT 195229 [WAV B1B3 230.00]
VOLT 195227 [CBC B1B2 230.00]
VOLT 195249 [SOP 230.00]
FREQ 195221 [BDE TS 230.00]
voltage [pu]
frequency [Hz]

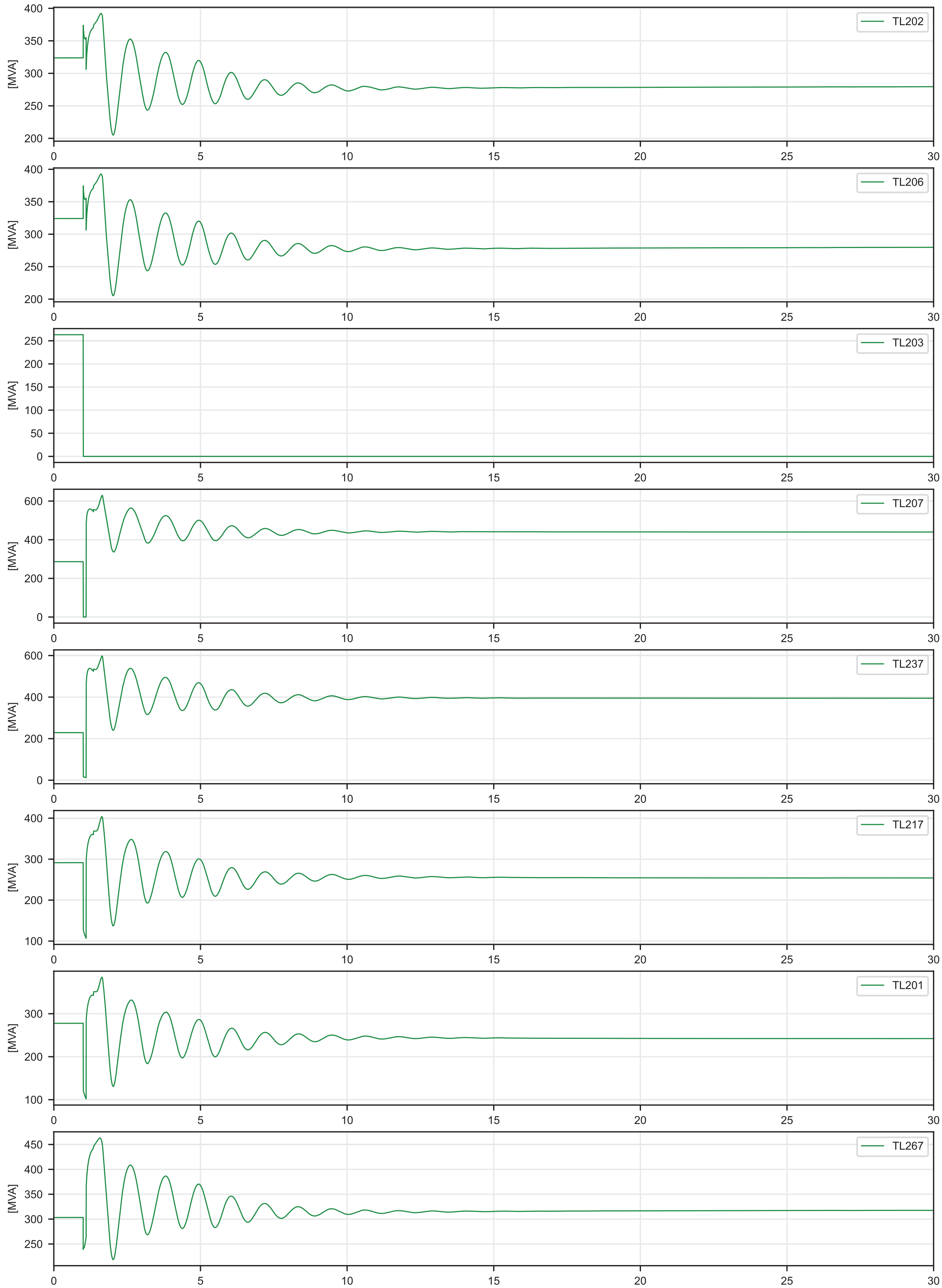
07_2033-34_Base-Peak_TL203-TL207_100MW with STATCOM (violates voltage criteria)
Loss of TL203 | 230 kV Power Flow



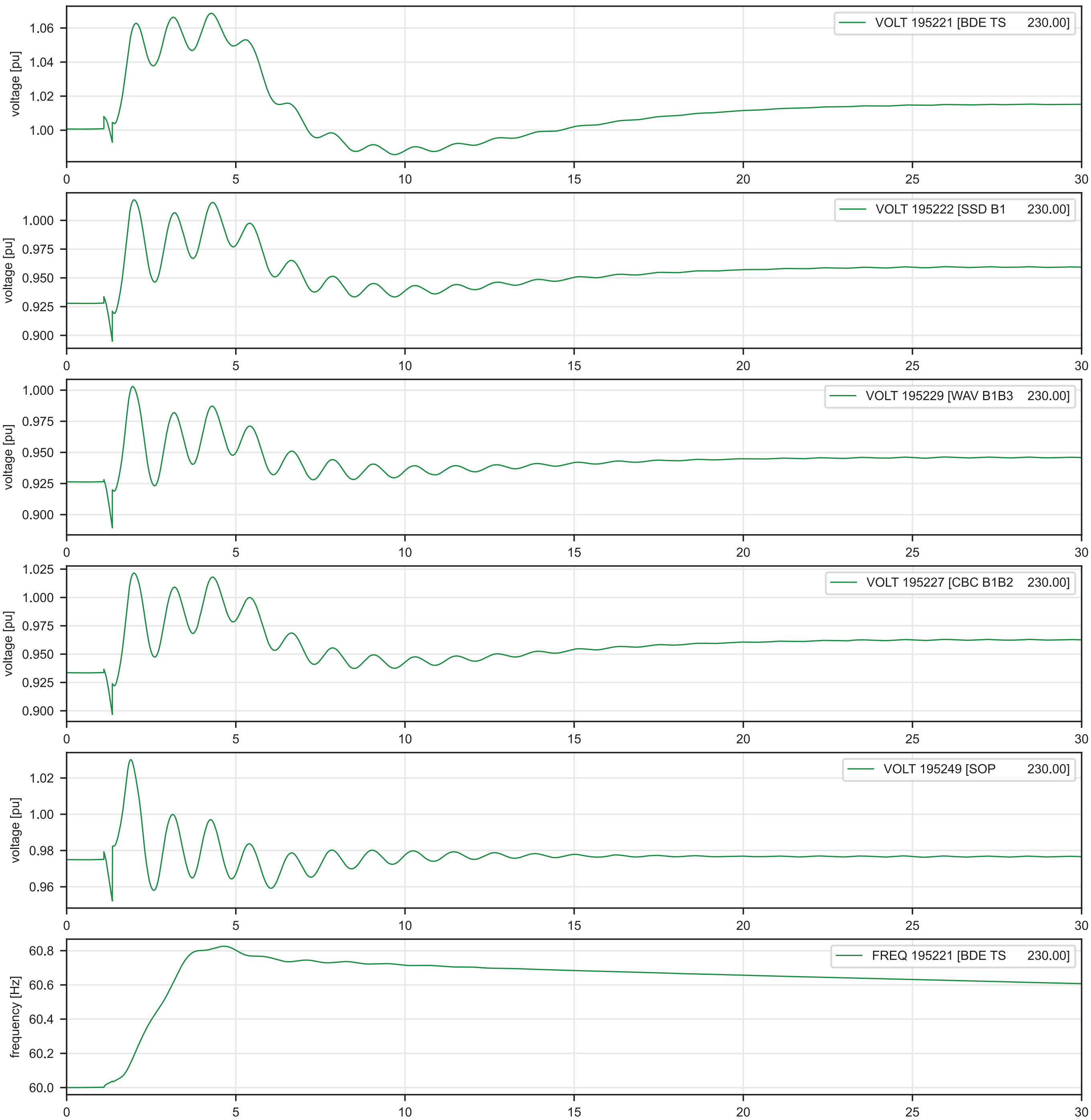
07_2033-34_Base-Peak_TL203-TL207_100MW with STATCOM (meets voltage criteria)
Loss of TL203 | Voltage / Frequency



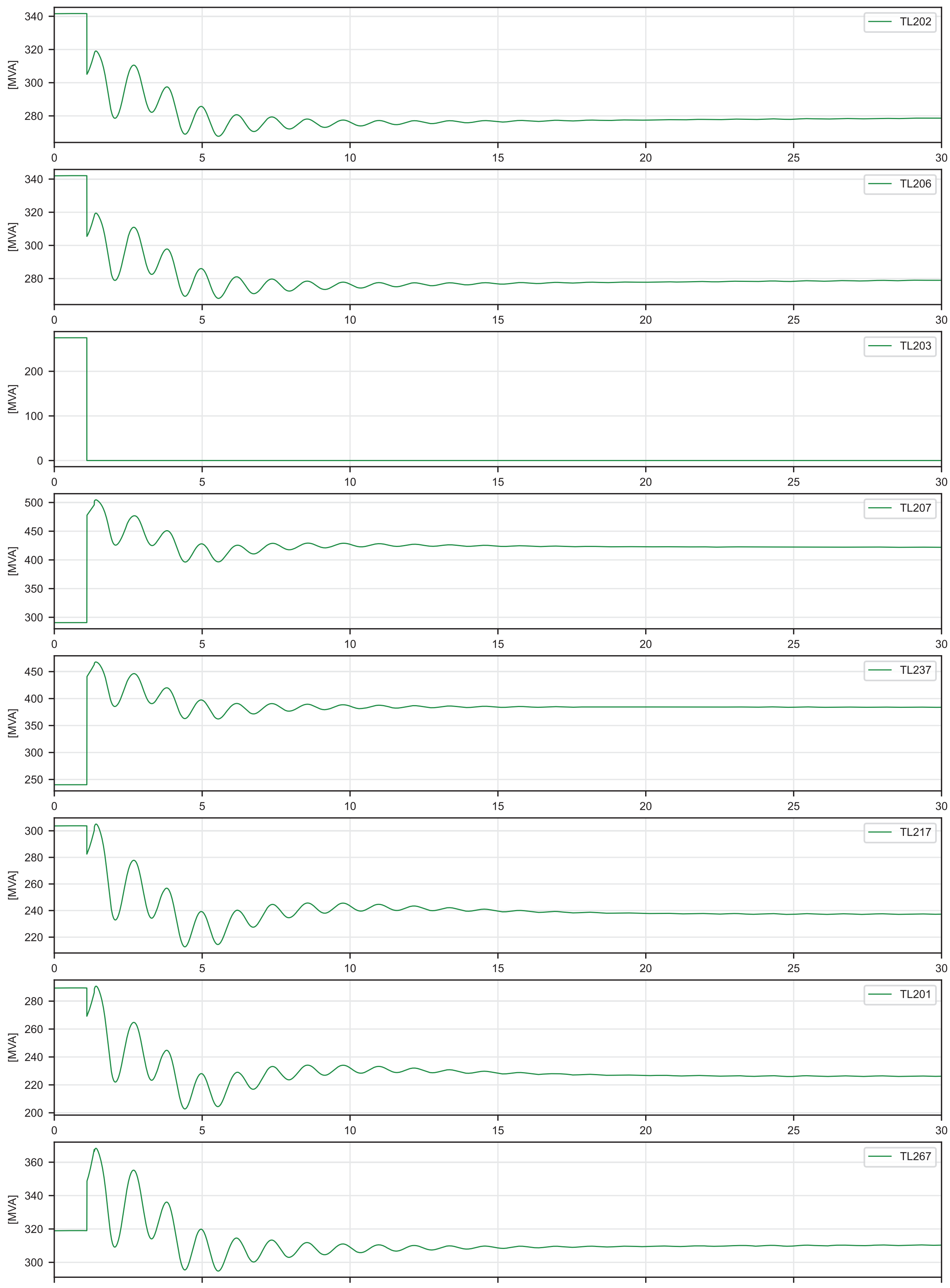
07_2033-34_Base-Peak_TL203-TL207_100MW with STATCOM (meets voltage criteria)
Loss of TL203 | 230 kV Power Flow



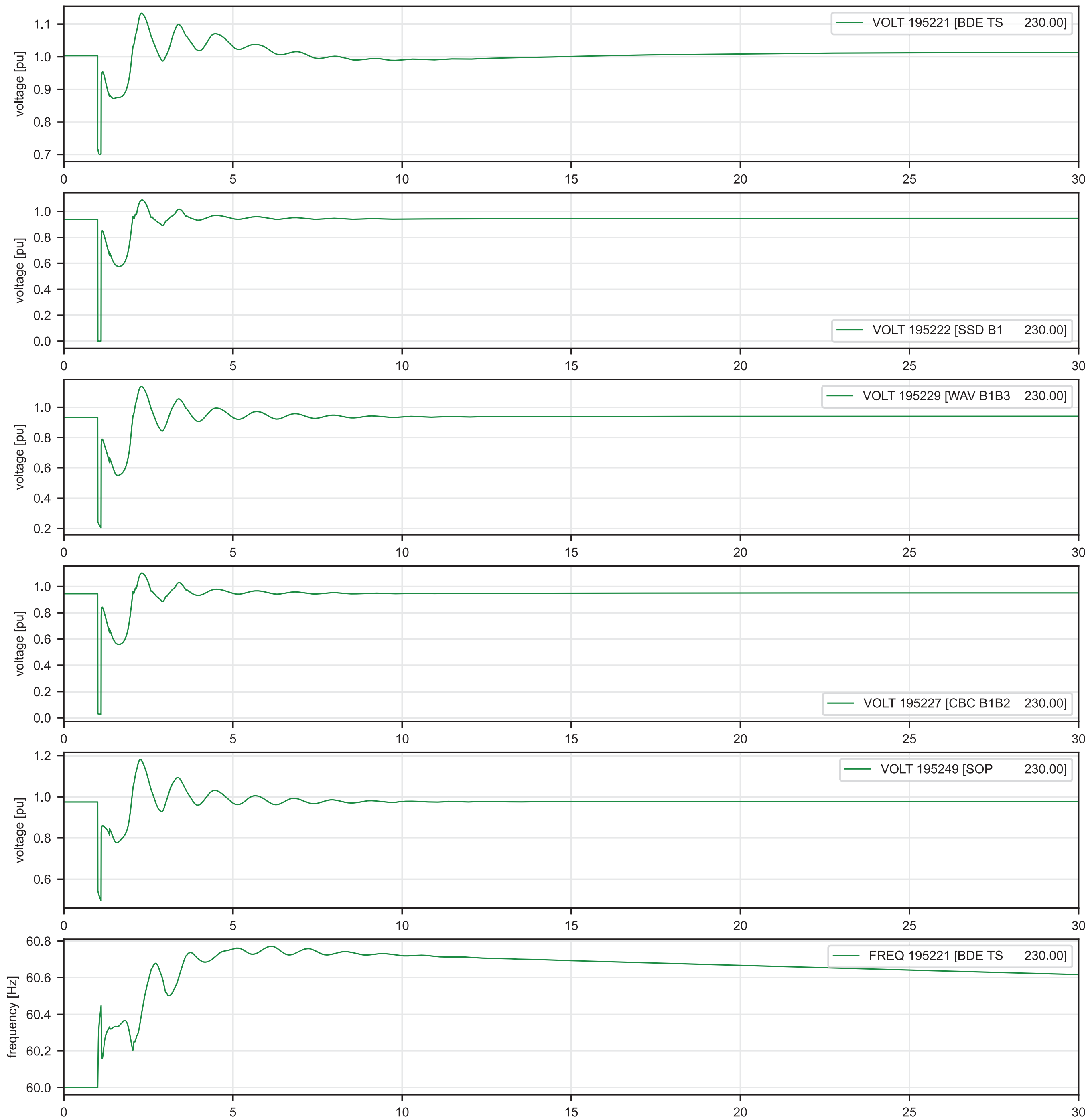
07_2033-34_Base-Peak_TL203-TL207_150MW
Loss of TL203 | Voltage / Frequency



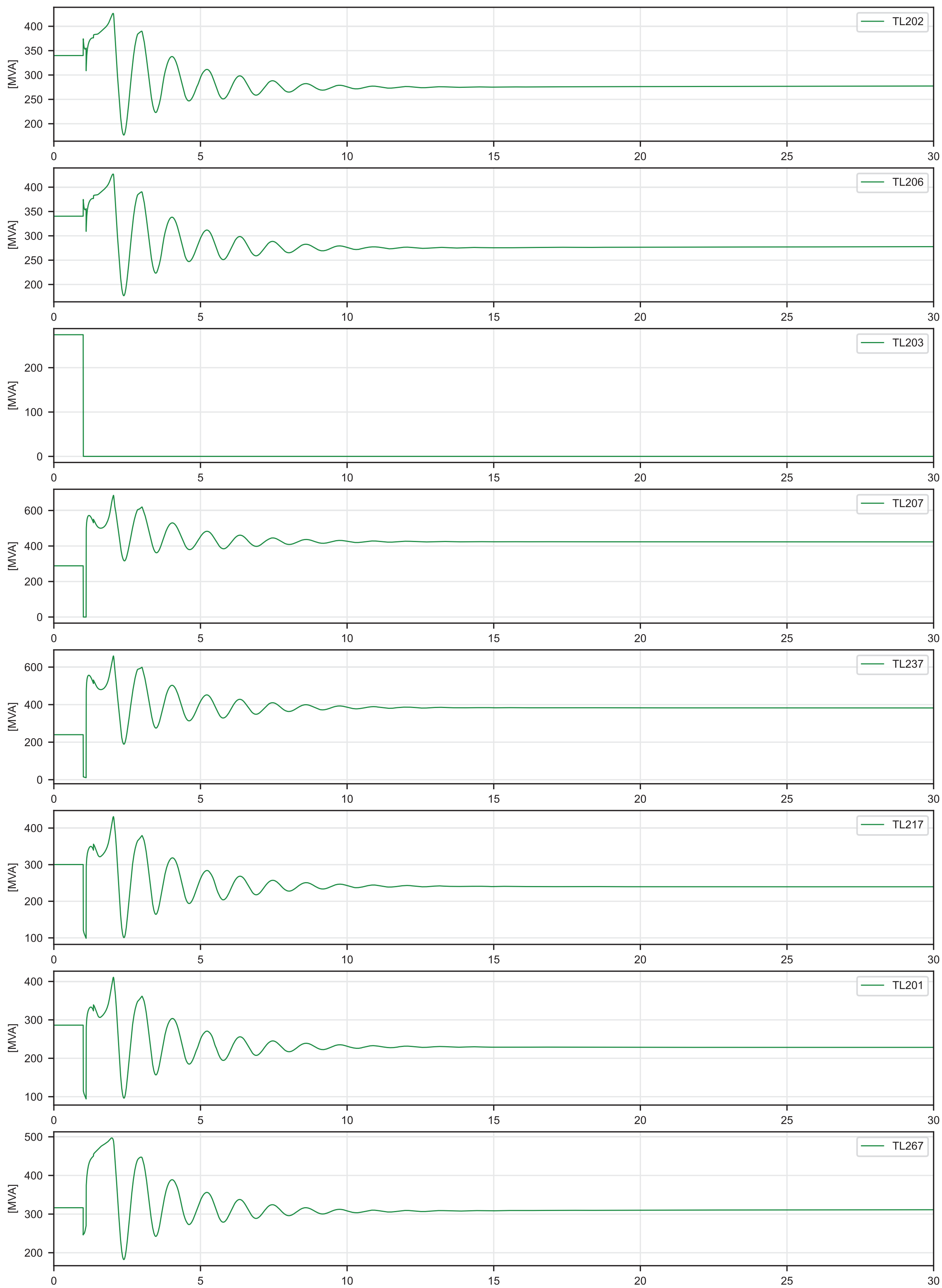
07_2033-34_Base-Peak_TL203-TL207_150MW
Loss of TL203 | 230 kV Power Flow



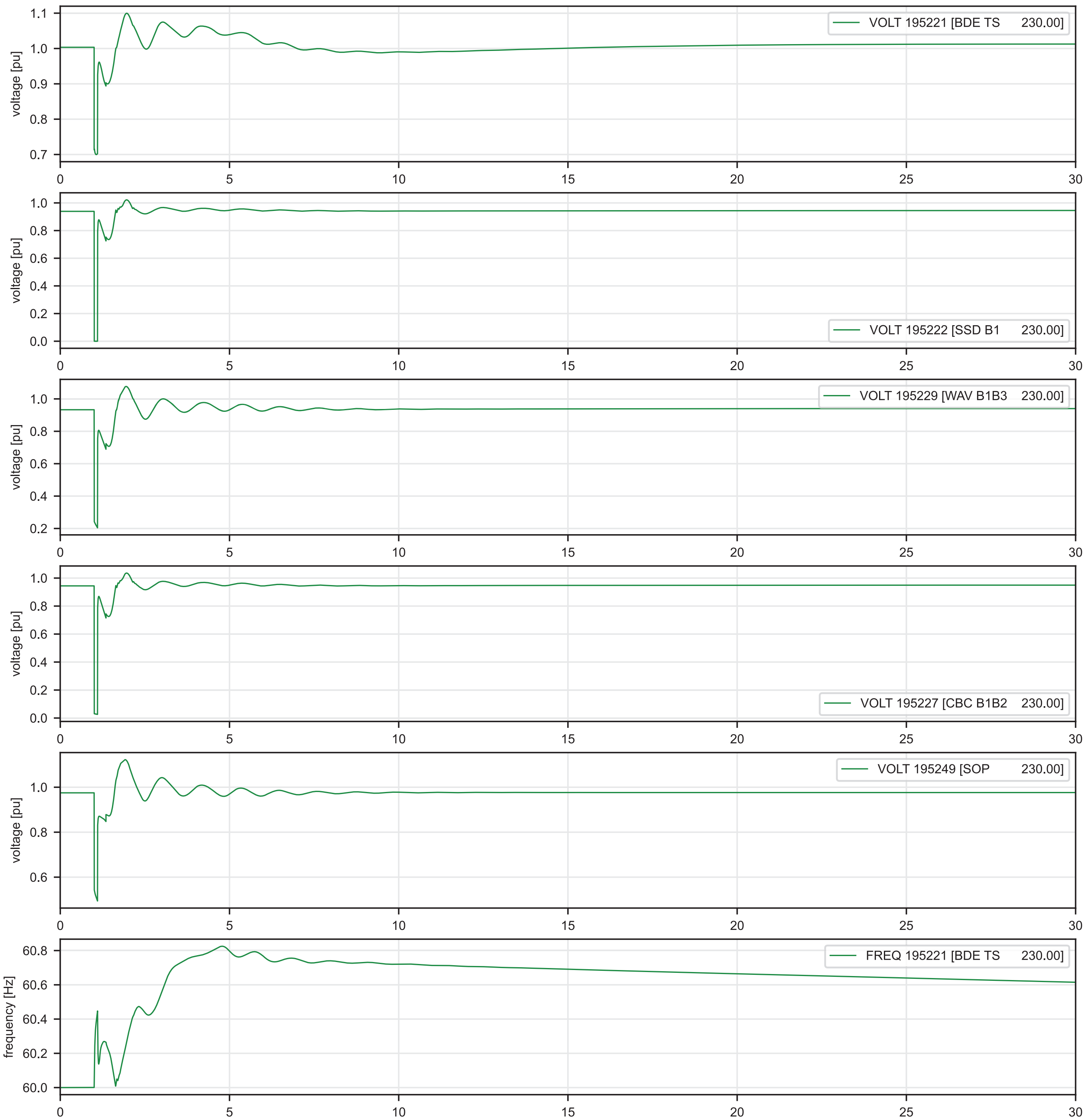
07_2033-34_Base-Peak_TL203-TL207_150MW with STATCOM (violates voltage criteria)
Loss of TL203 | Voltage / Frequency



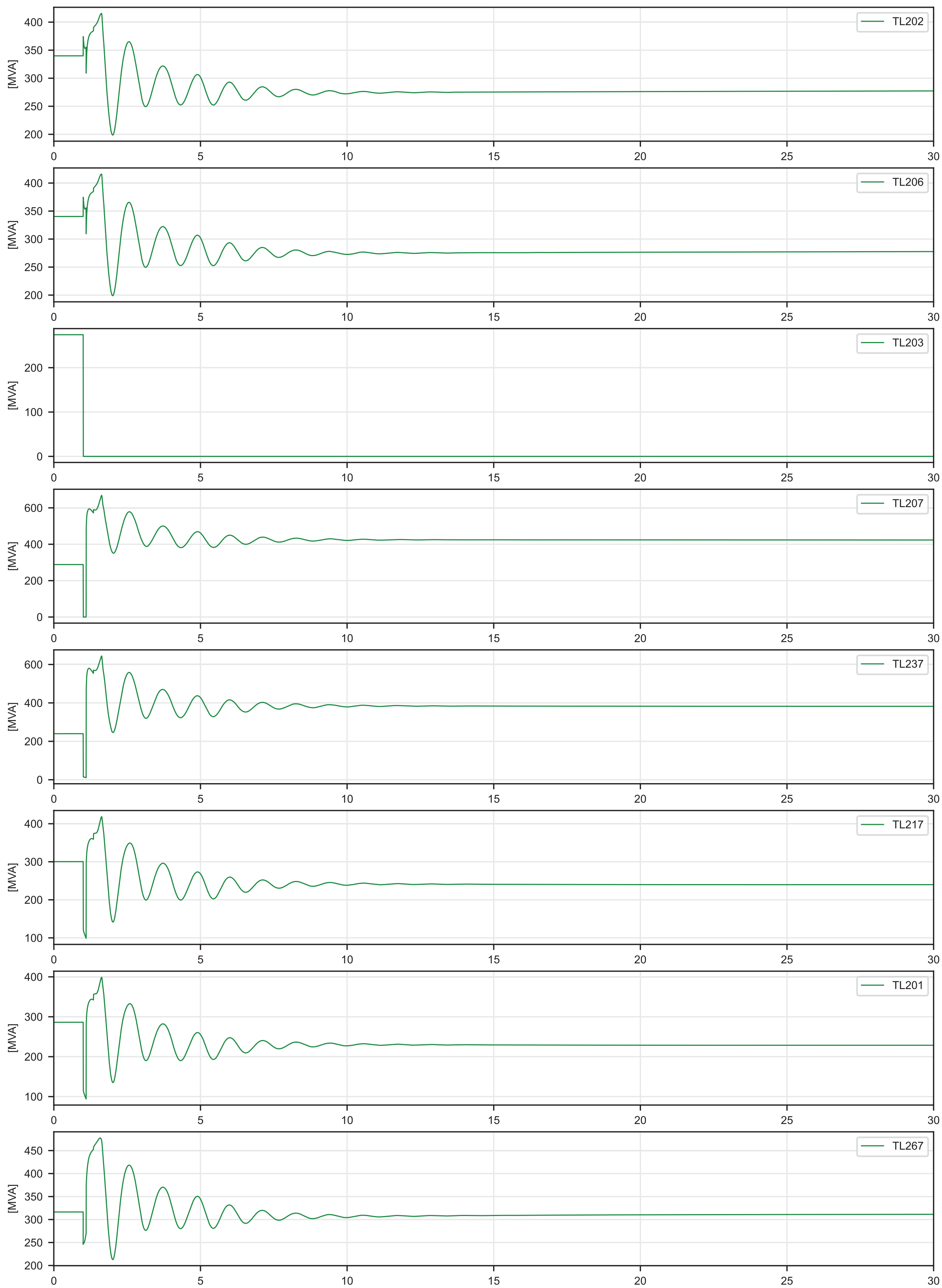
07_2033-34_Base-Peak_TL203-TL207_150MW with STATCOM (violates voltage criteria)
Loss of TL203 | 230 kV Power Flow



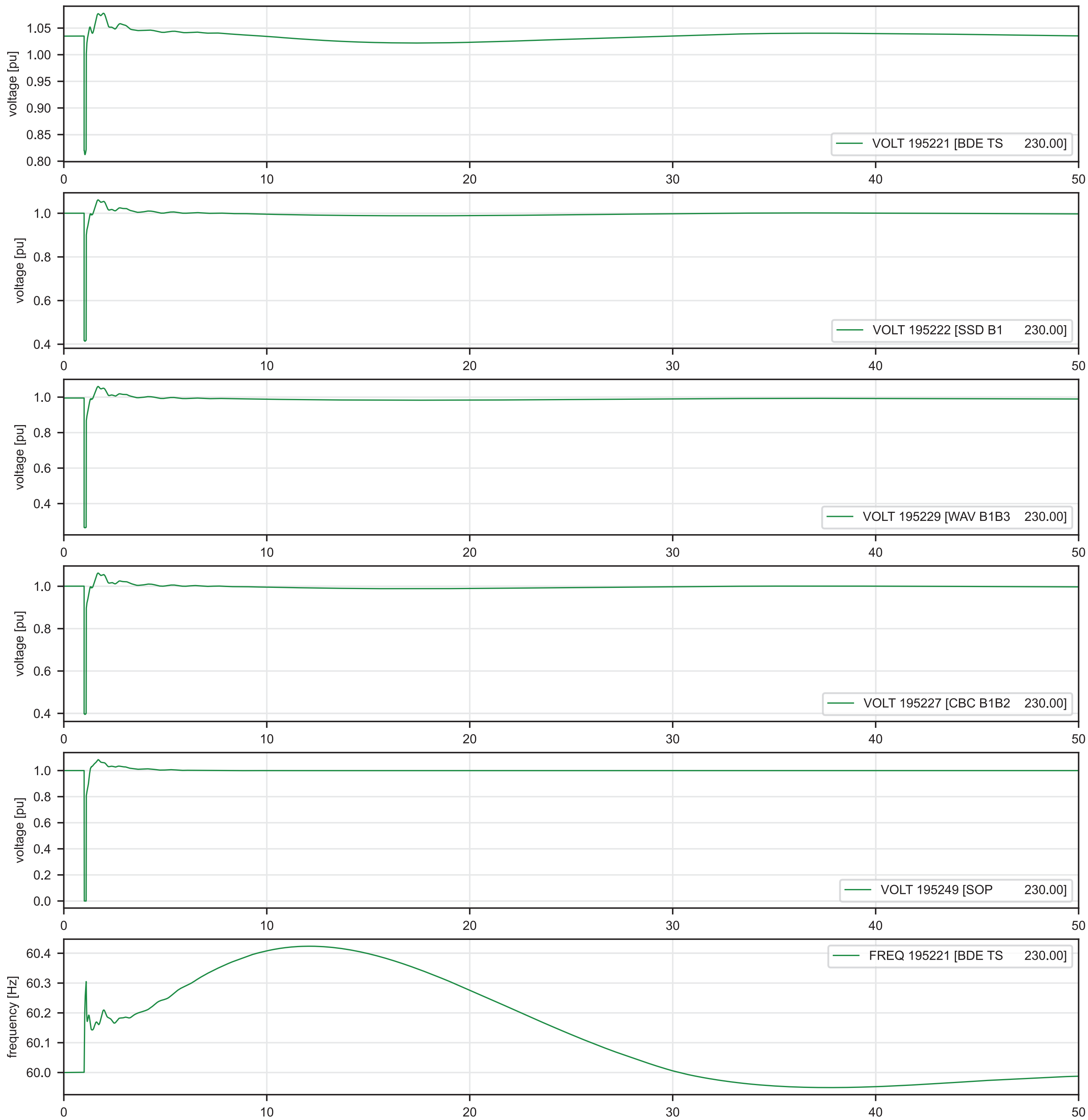
07_2033-34_Base-Peak_TL203-TL207_150MW with STATCOM (meets voltage criteria)
Loss of TL203 | Voltage / Frequency



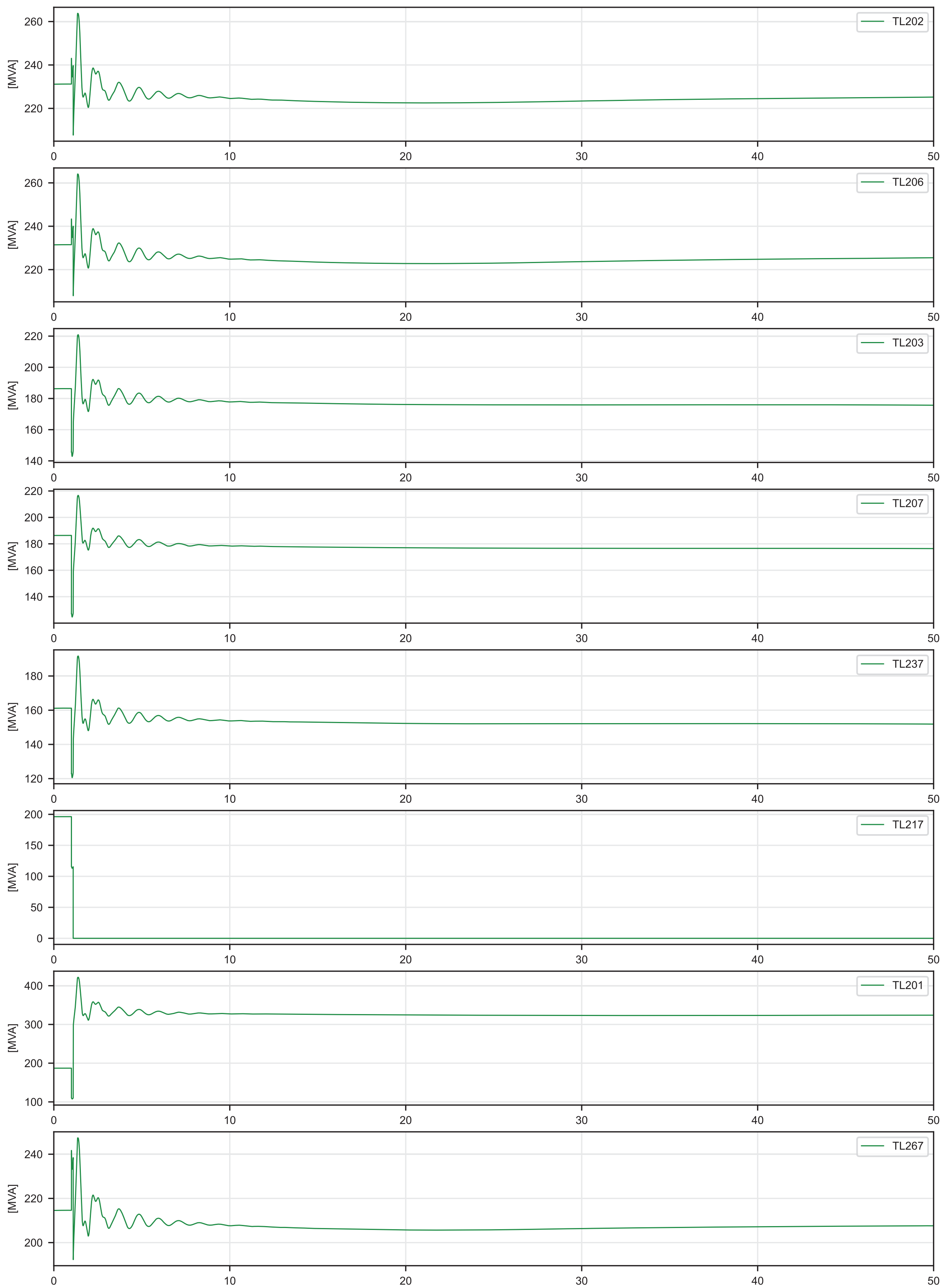
07_2033-34_Base-Peak_TL203-TL207_150MW with STATCOM (meets voltage criteria)
Loss of TL203 | 230 kV Power Flow



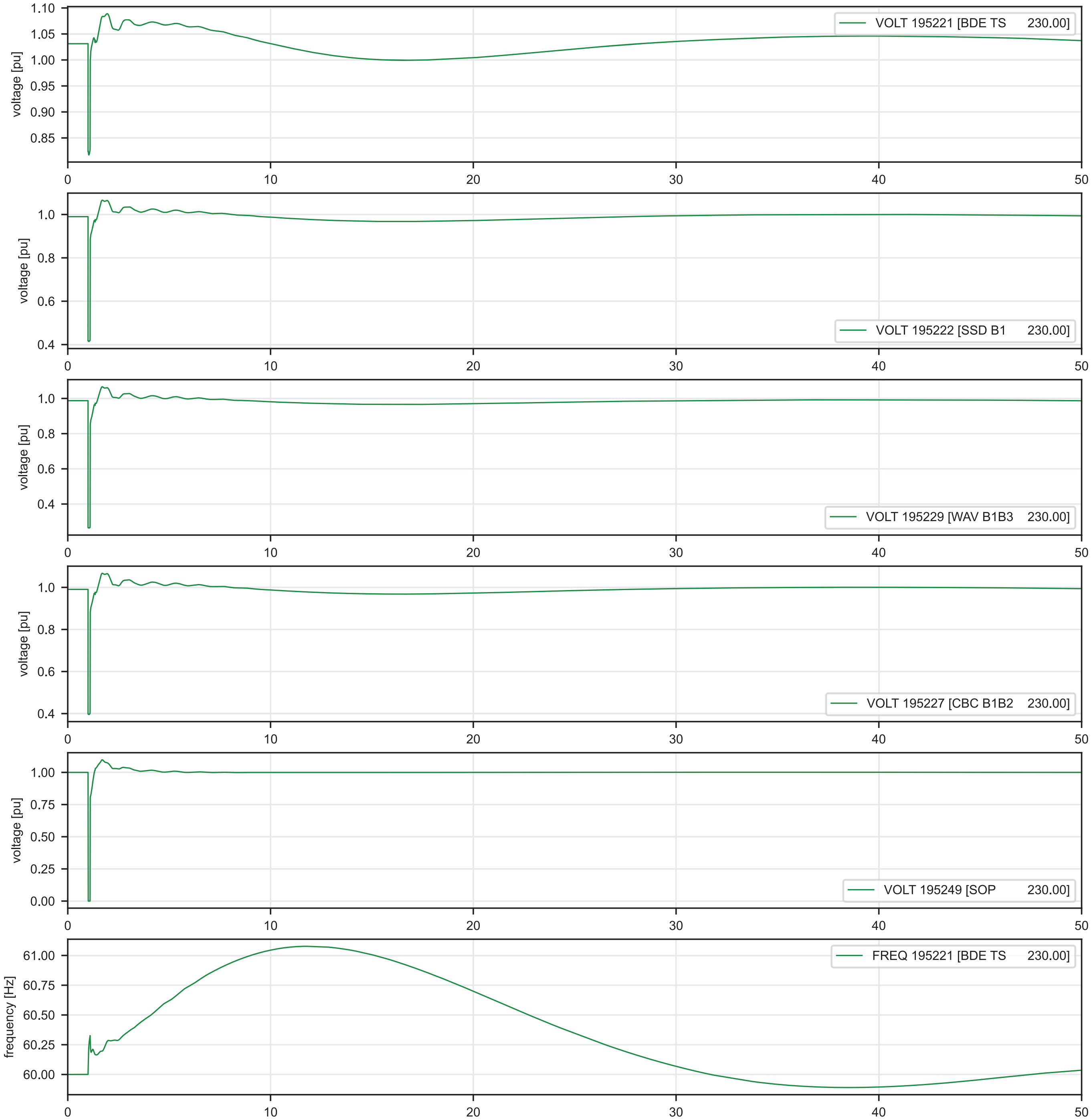
01_2033-34_Base-Peak_TL217-TL201_050MW_MLFC_off
Loss of TL217 | Voltage / Frequency



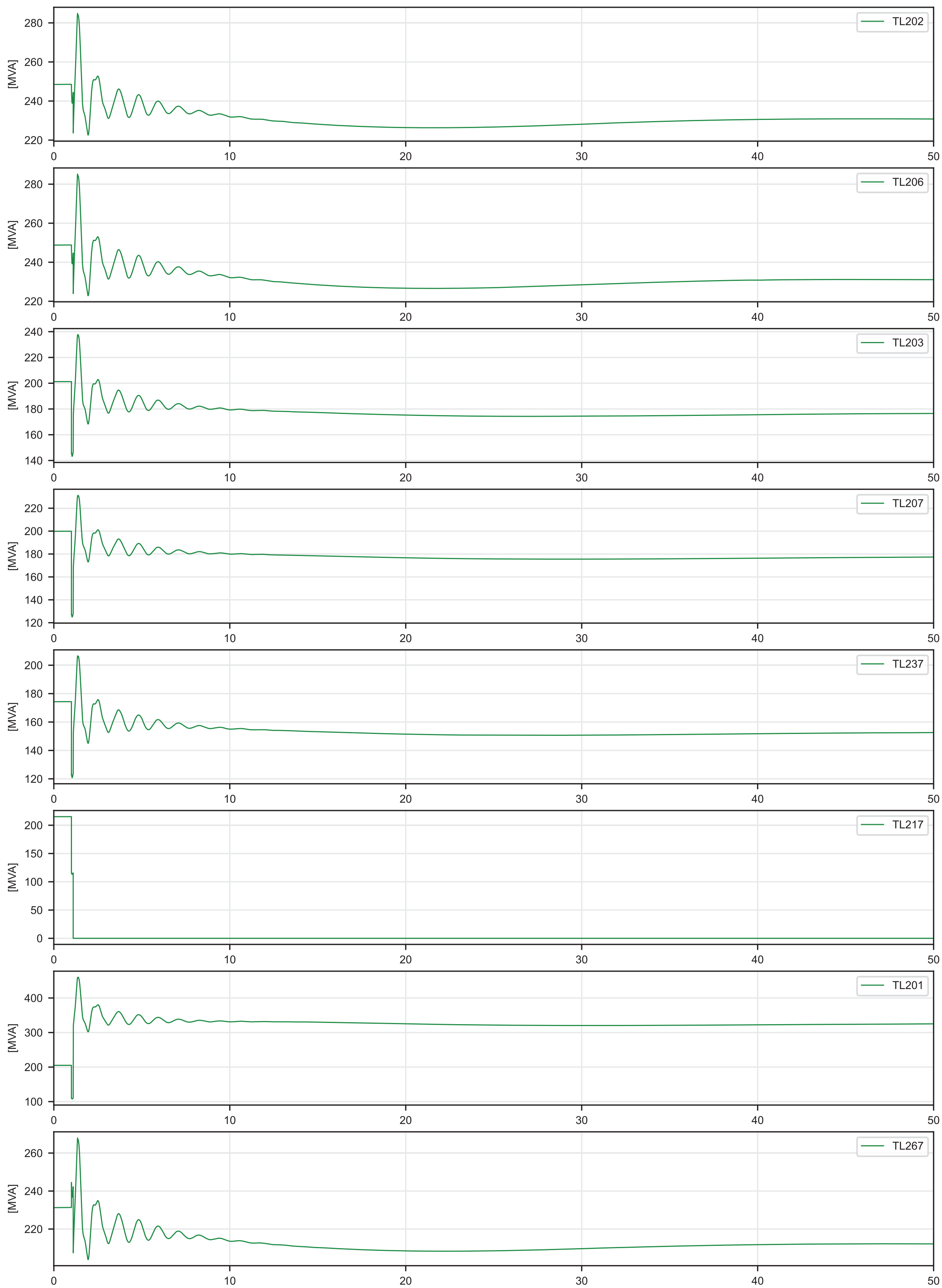
01_2033-34_Base-Peak_TL217-TL201_050MW_MLFC_off
Loss of TL217 | 230 kV Power Flow



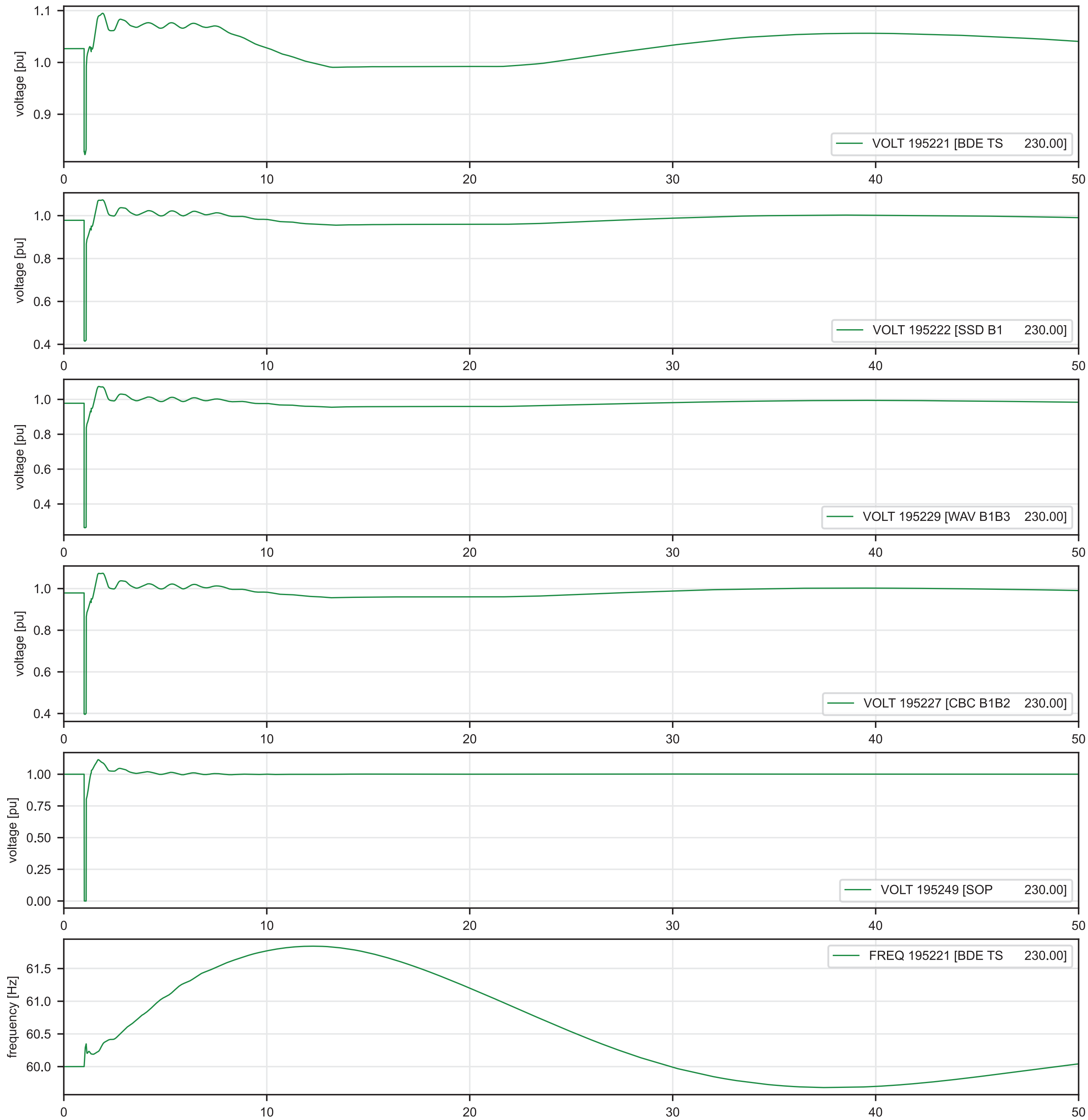
01_2033-34_Base-Peak_TL217-TL201_100MW_MLFC_off
Loss of TL217 | Voltage / Frequency



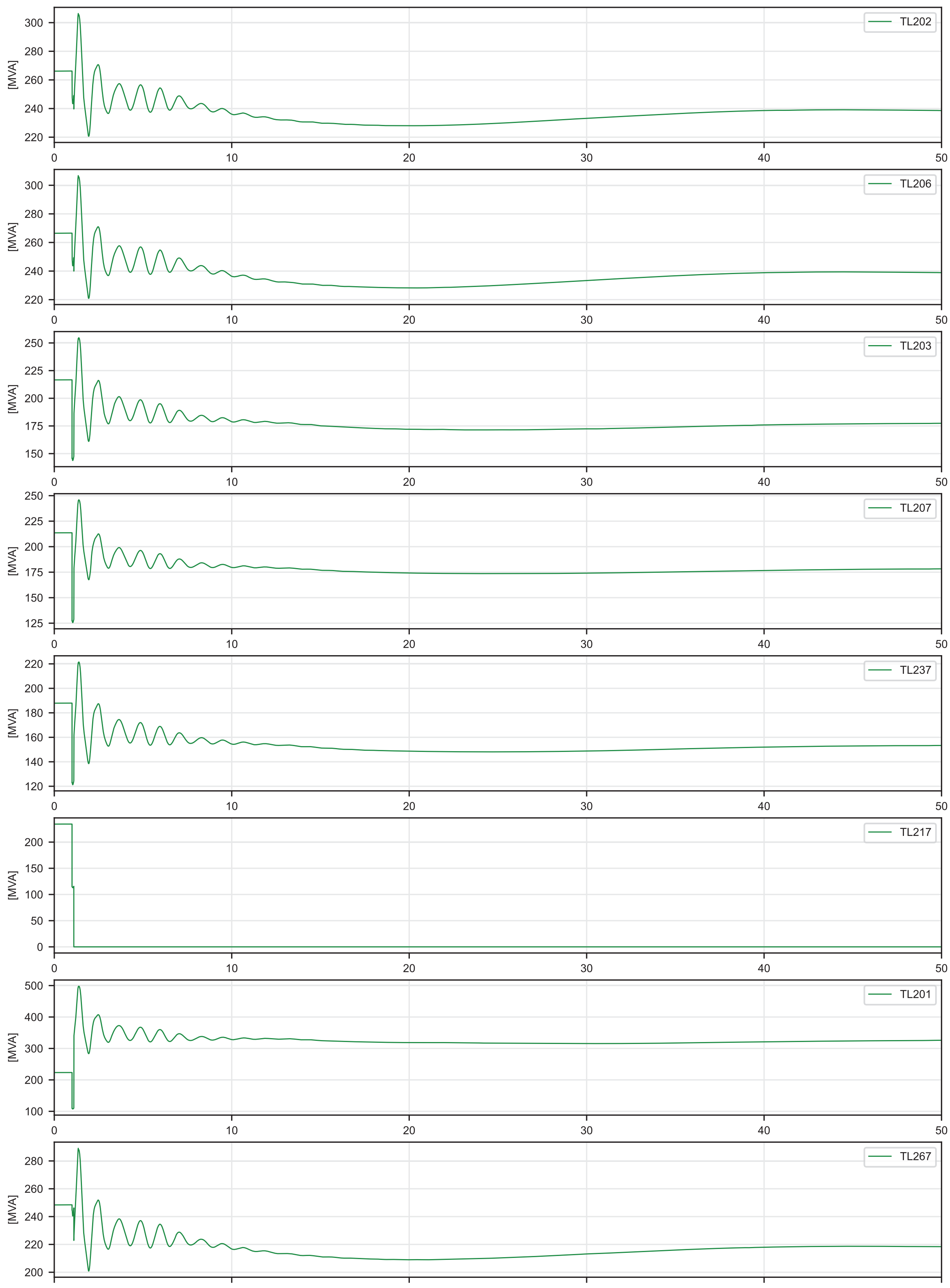
01_2033-34_Base-Peak_TL217-TL201_100MW_MLFC_off
Loss of TL217 | 230 kV Power Flow



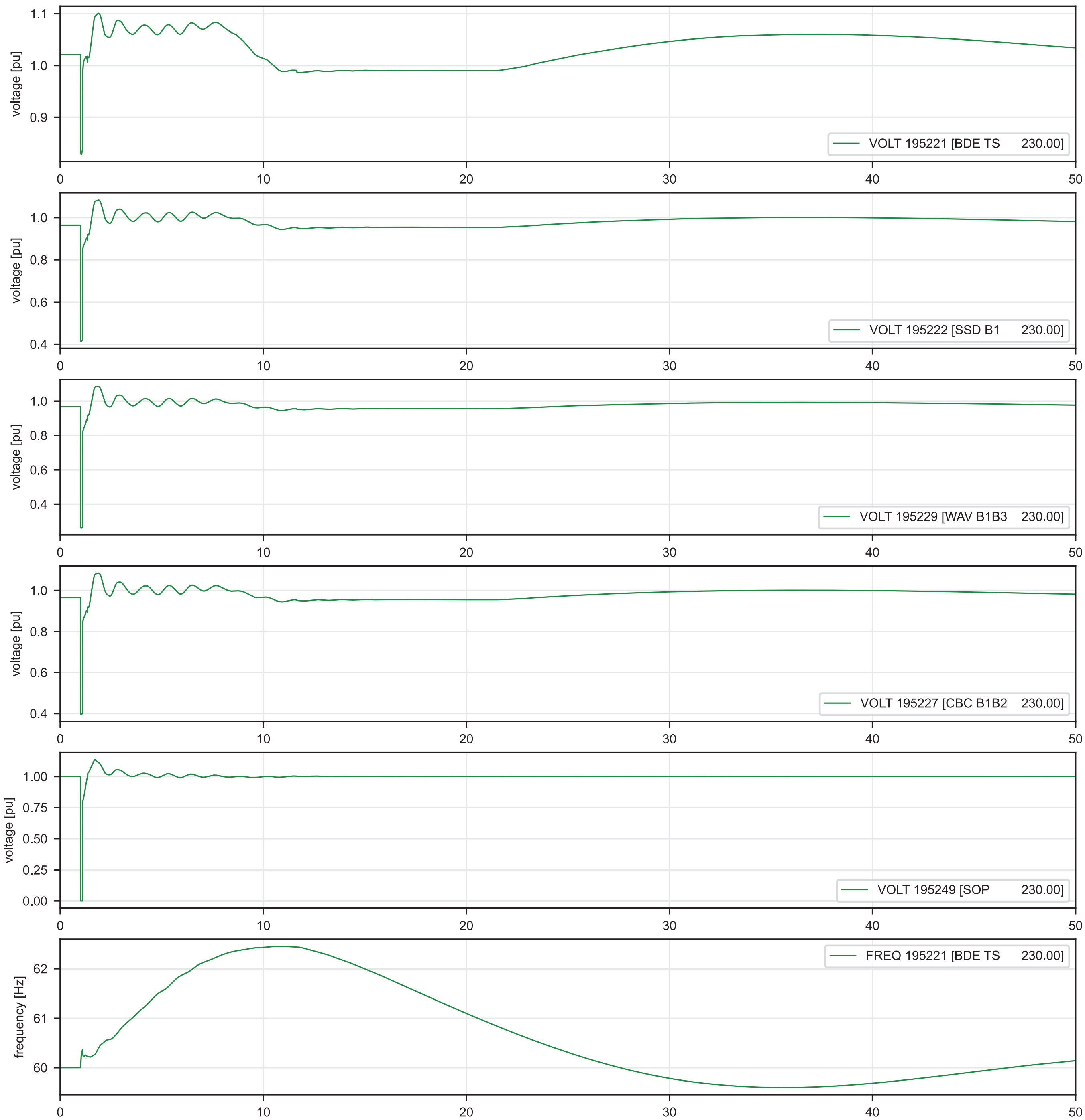
01_2033-34_Base-Peak_TL217-TL201_150MW_MLFC_off
Loss of TL217 | Voltage / Frequency



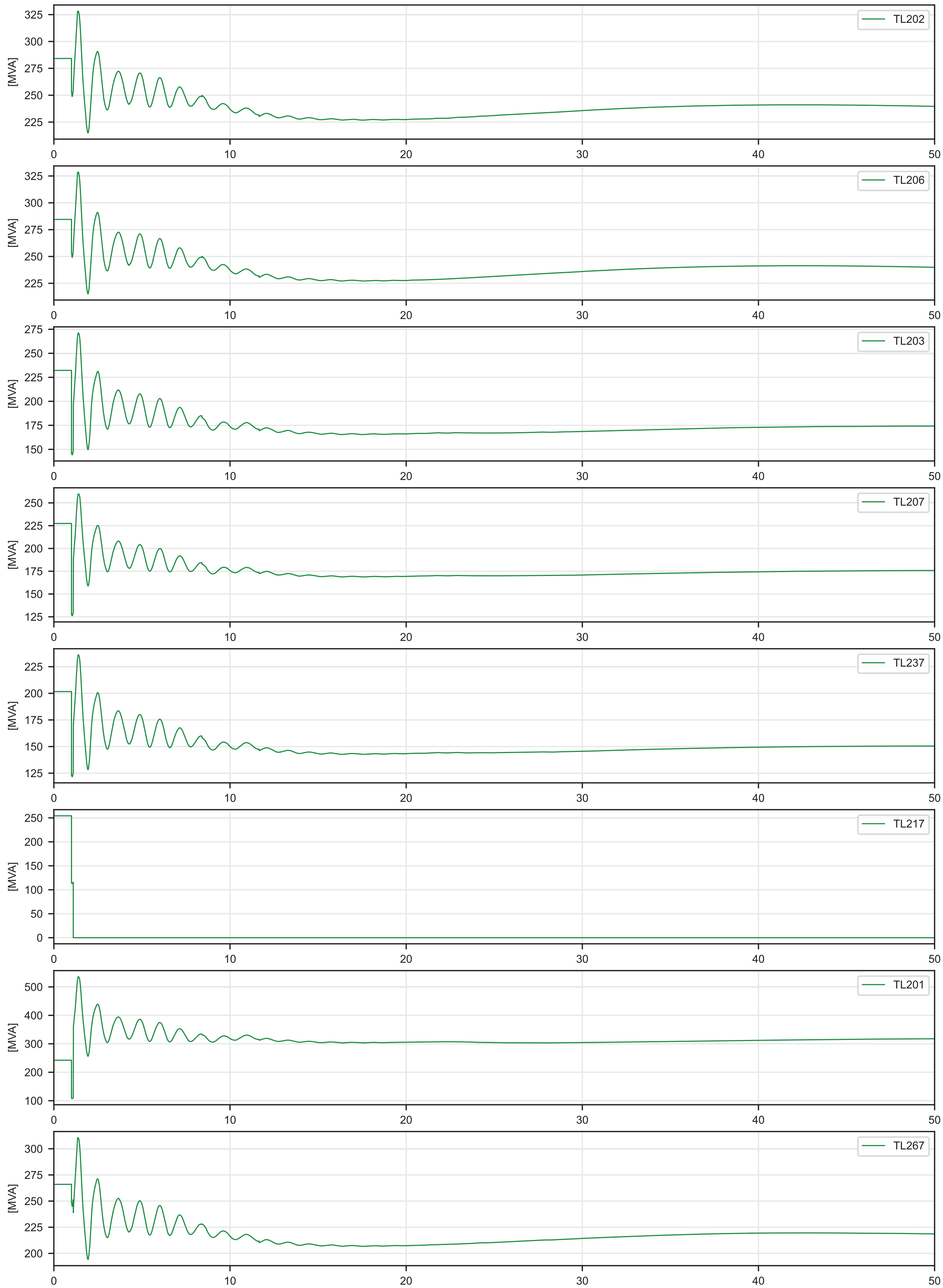
01_2033-34_Base-Peak_TL217-TL201_150MW_MLFC_off
Loss of TL217 | 230 kV Power Flow



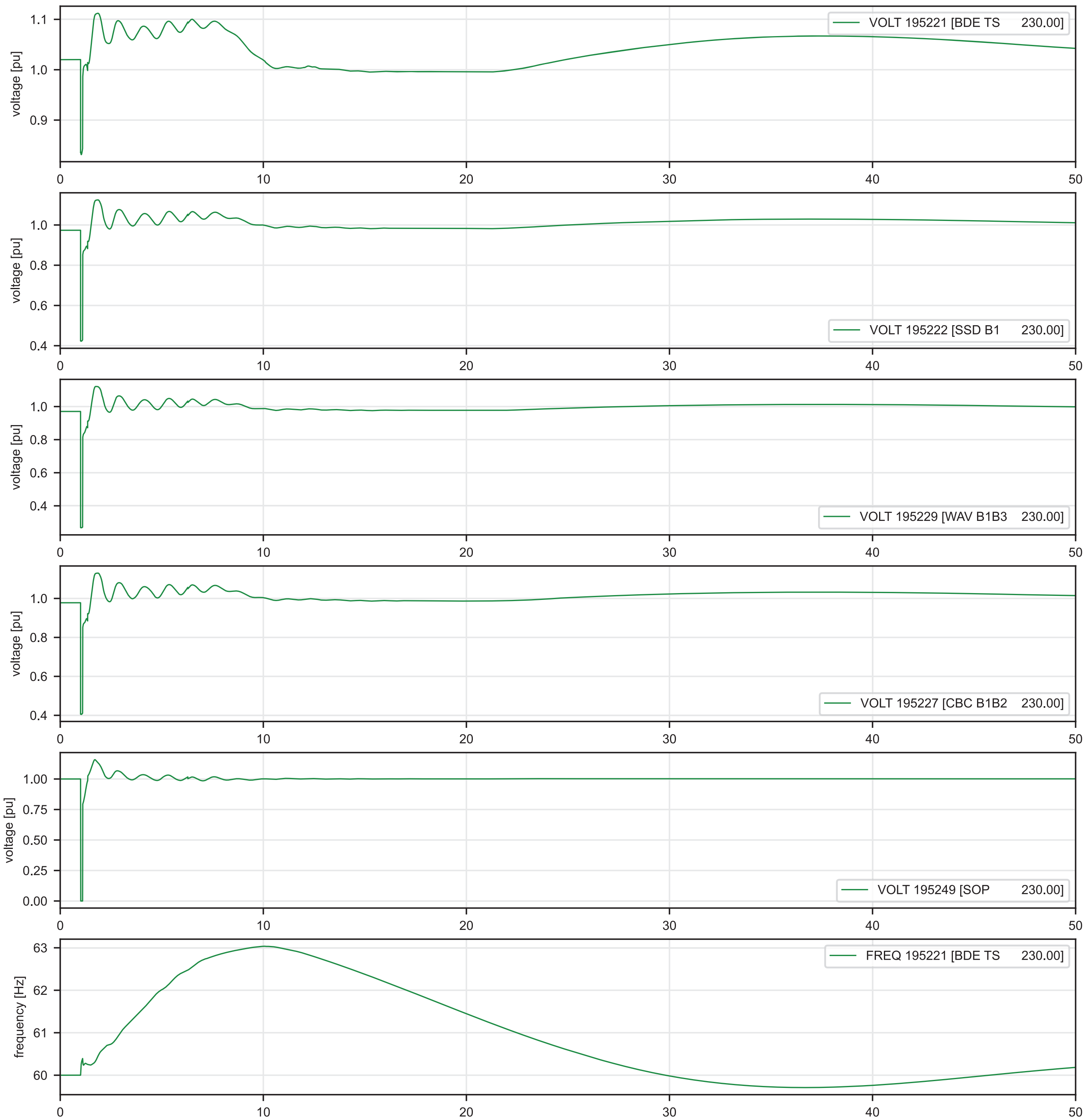
01_2033-34_Base-Peak_TL217-TL201_200MW_MLFC_off
Loss of TL217 | Voltage / Frequency



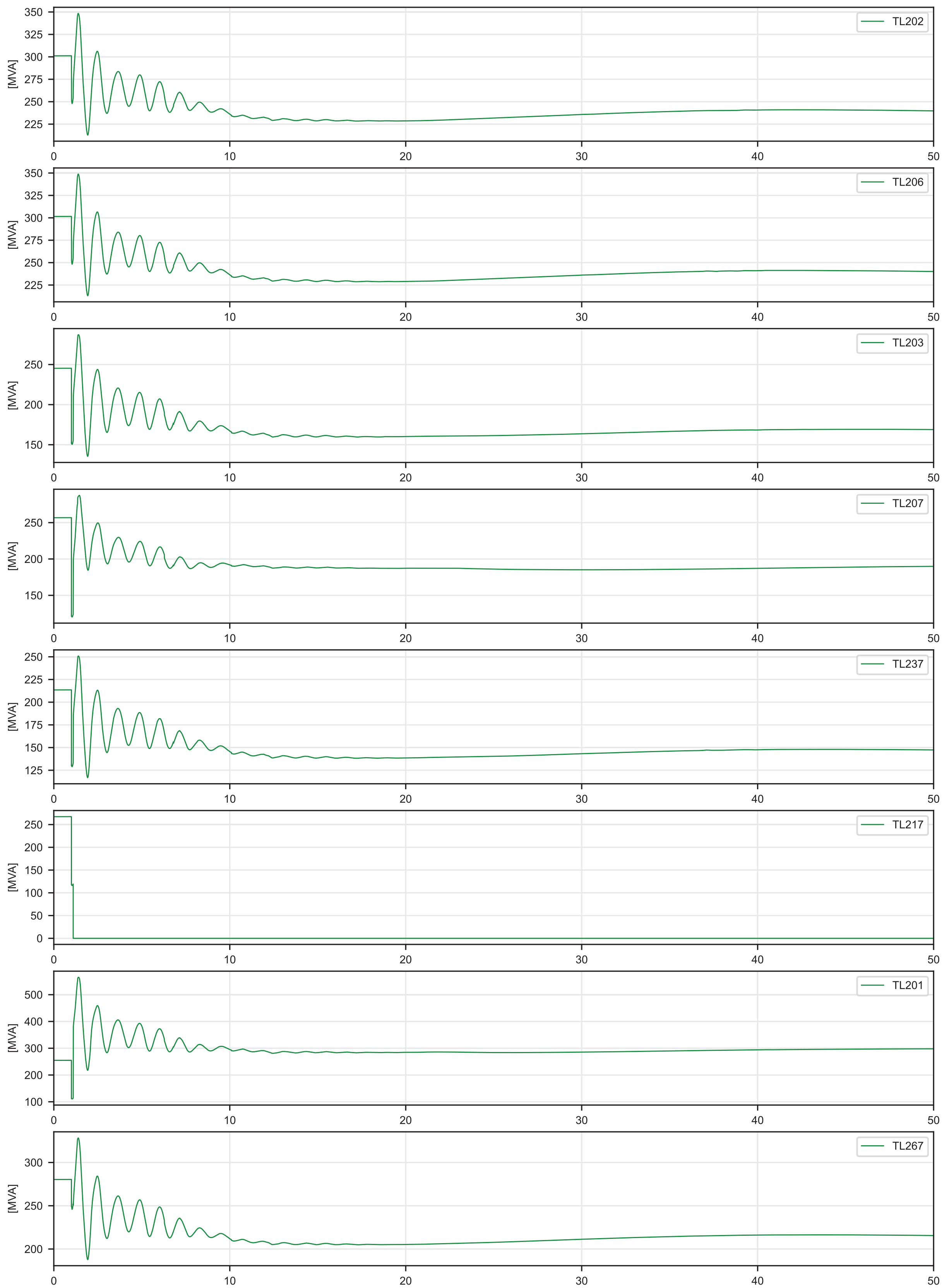
01_2033-34_Base-Peak_TL217-TL201_200MW_MLFC_off
Loss of TL217 | 230 kV Power Flow



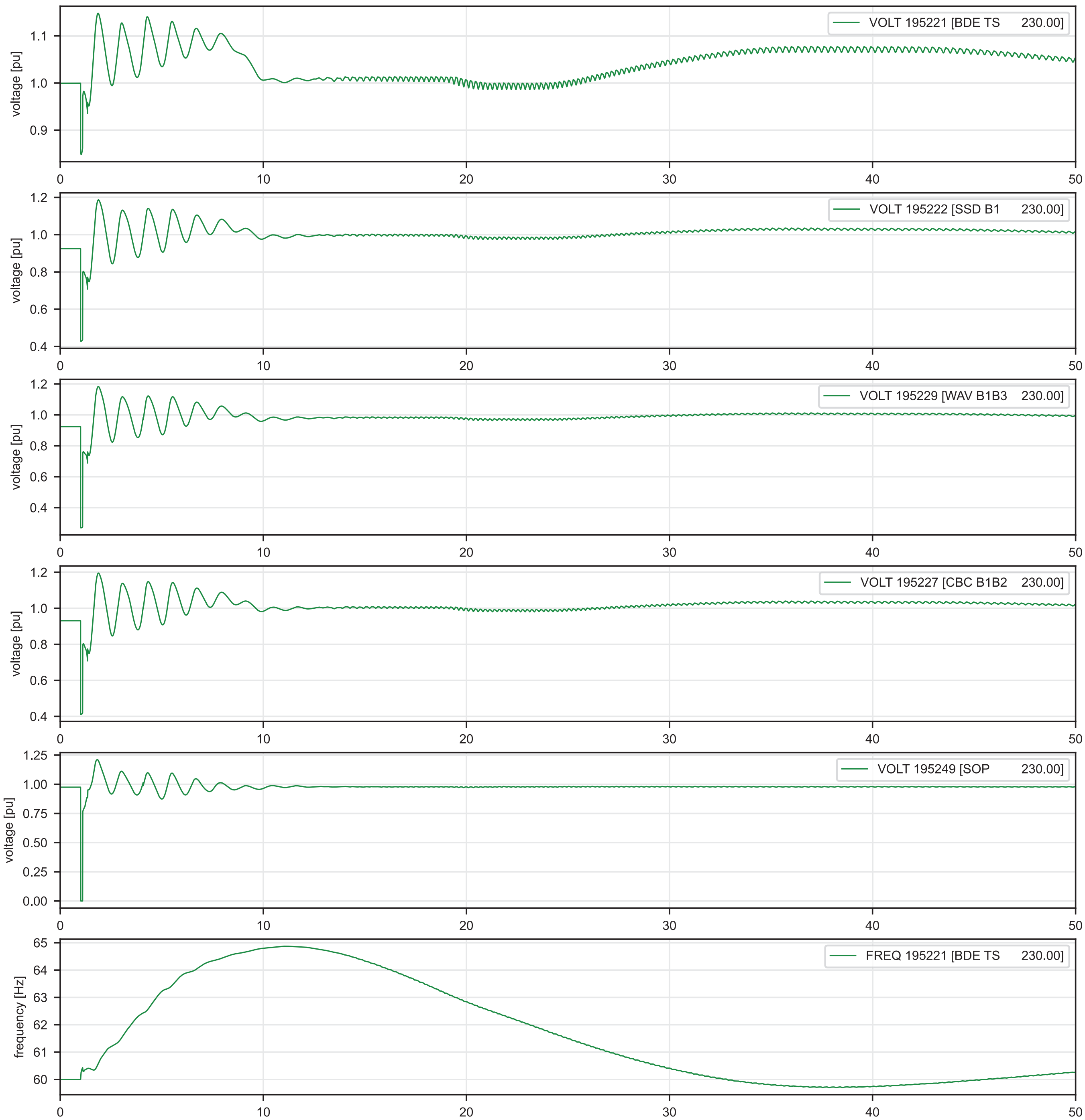
01_2033-34_Base-Peak_TL217-TL201_250MW_MLFC_off
Loss of TL217 | Voltage / Frequency

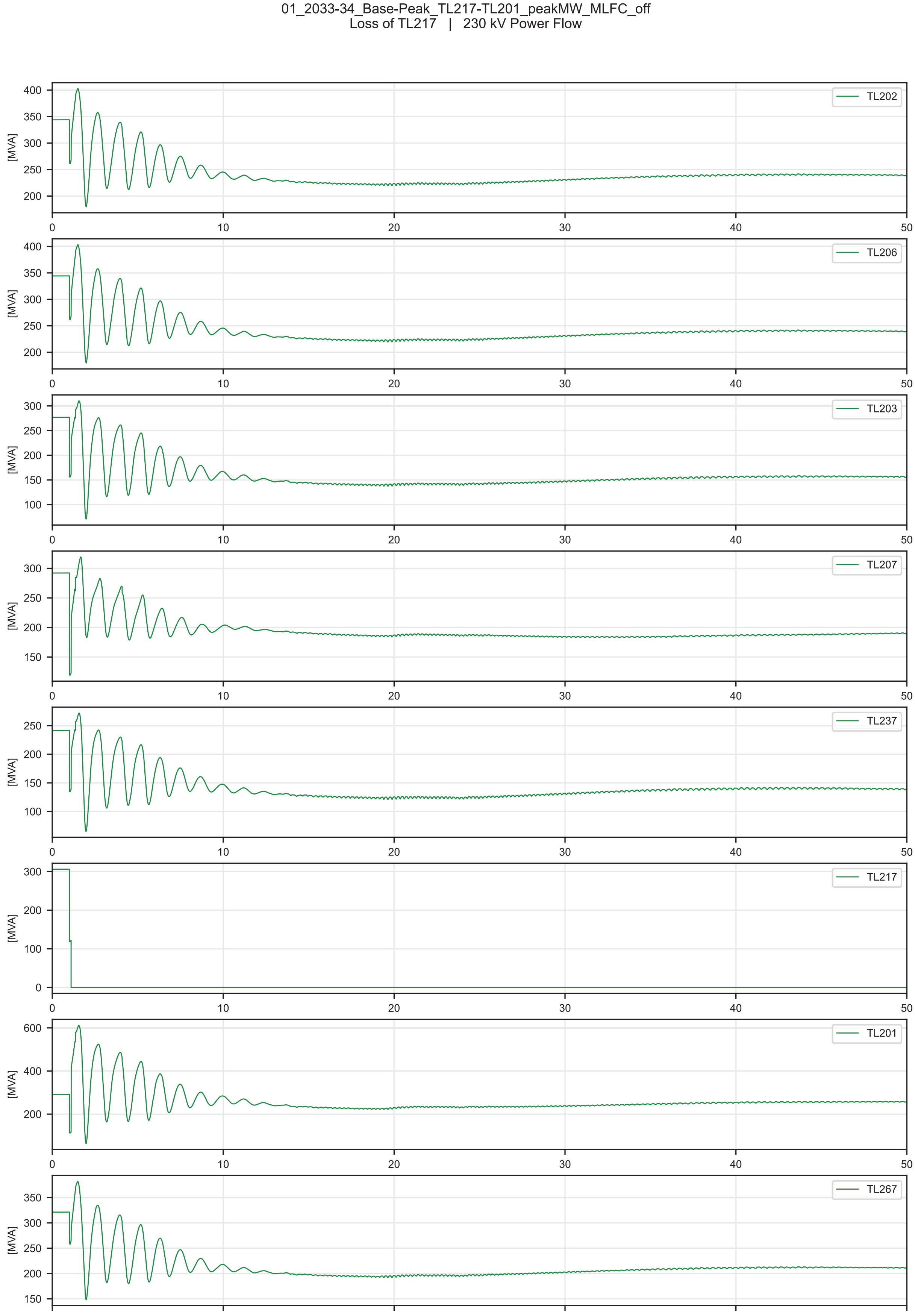


01_2033-34_Base-Peak_TL217-TL201_250MW_MLFC_off
Loss of TL217 | 230 kV Power Flow

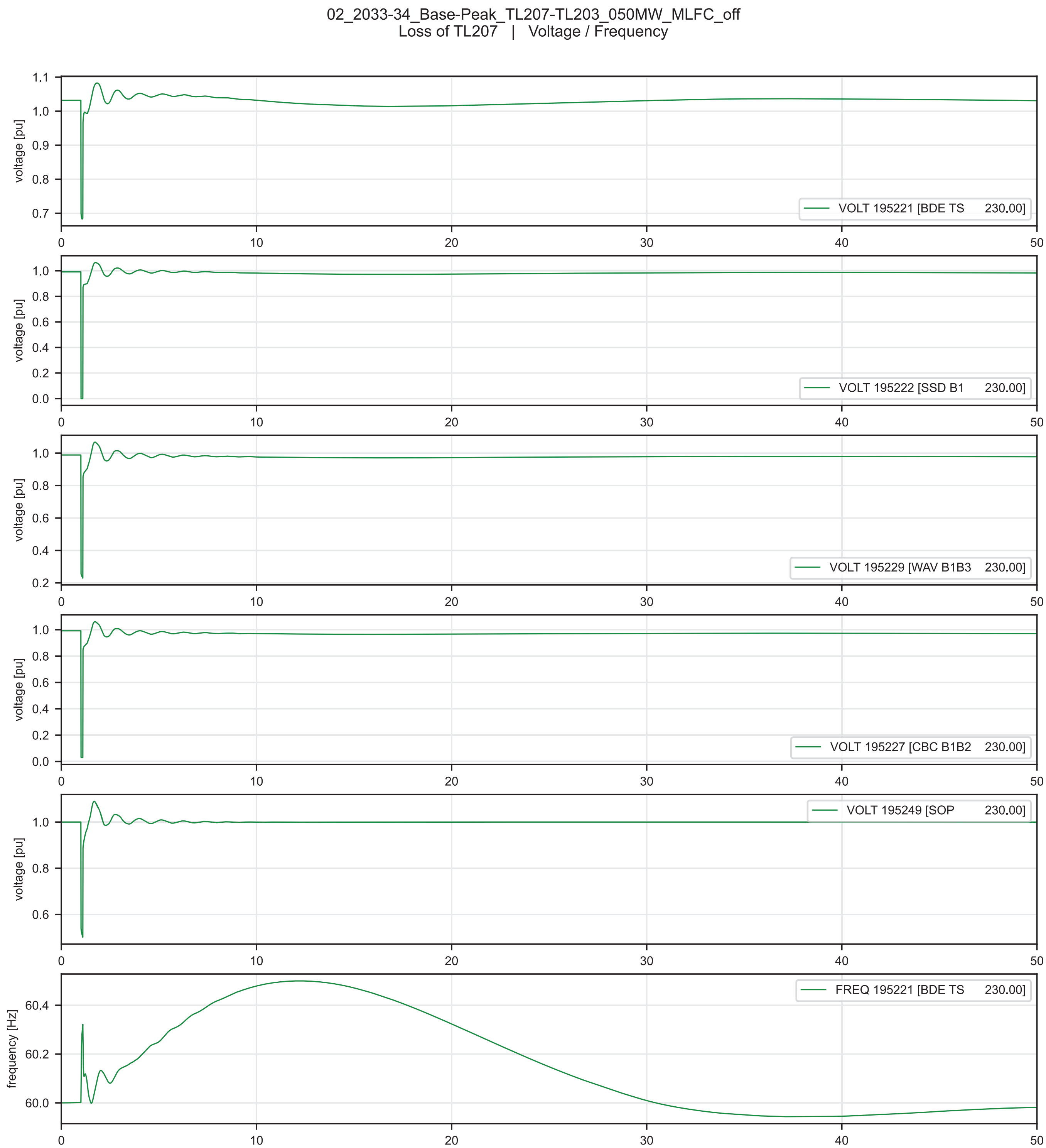


01_2033-34_Base-Peak_TL217-TL201_peakMW_MLFC_off
Loss of TL217 | Voltage / Frequency



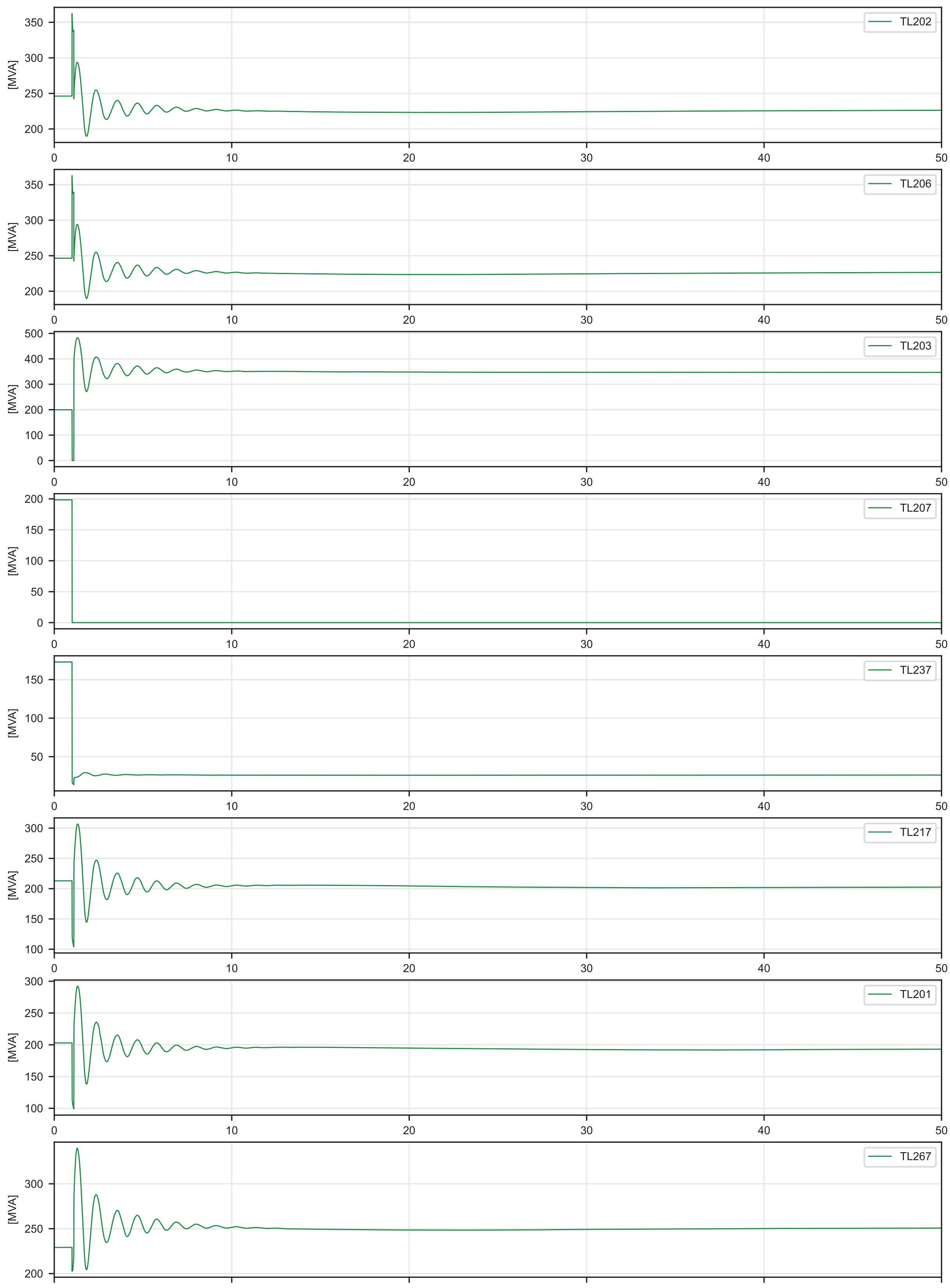


01_2033-34_Base-Peak_TL217-TL201_peakMW_MLFC_off
Loss of TL217 | 230 kV Power Flow
TL202
TL206
TL203
TL207
TL237
TL217
TL201
TL267
[MVA]

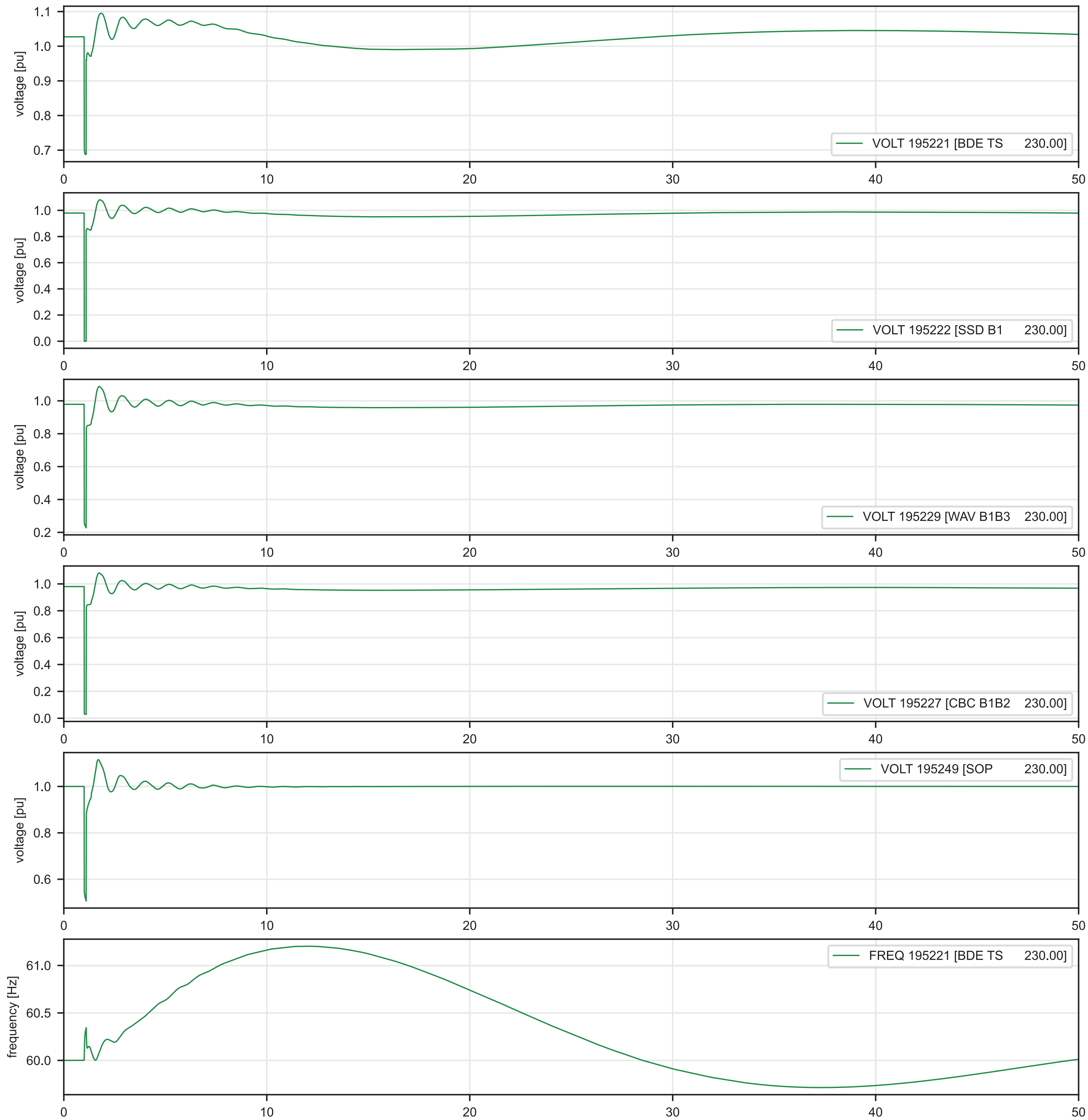


02_2033-34_Base-Peak_TL207-TL203_050MW_MLFC_off
Loss of TL207 | Voltage / Frequency
voltage [pu]
VOLT 195221 [BDE TS 230.00]
VOLT 195222 [SSD B1 230.00]
VOLT 195229 [WAV B1B3 230.00]
VOLT 195227 [CBC B1B2 230.00]
VOLT 195249 [SOP 230.00]
frequency [Hz]
FREQ 195221 [BDE TS 230.00]

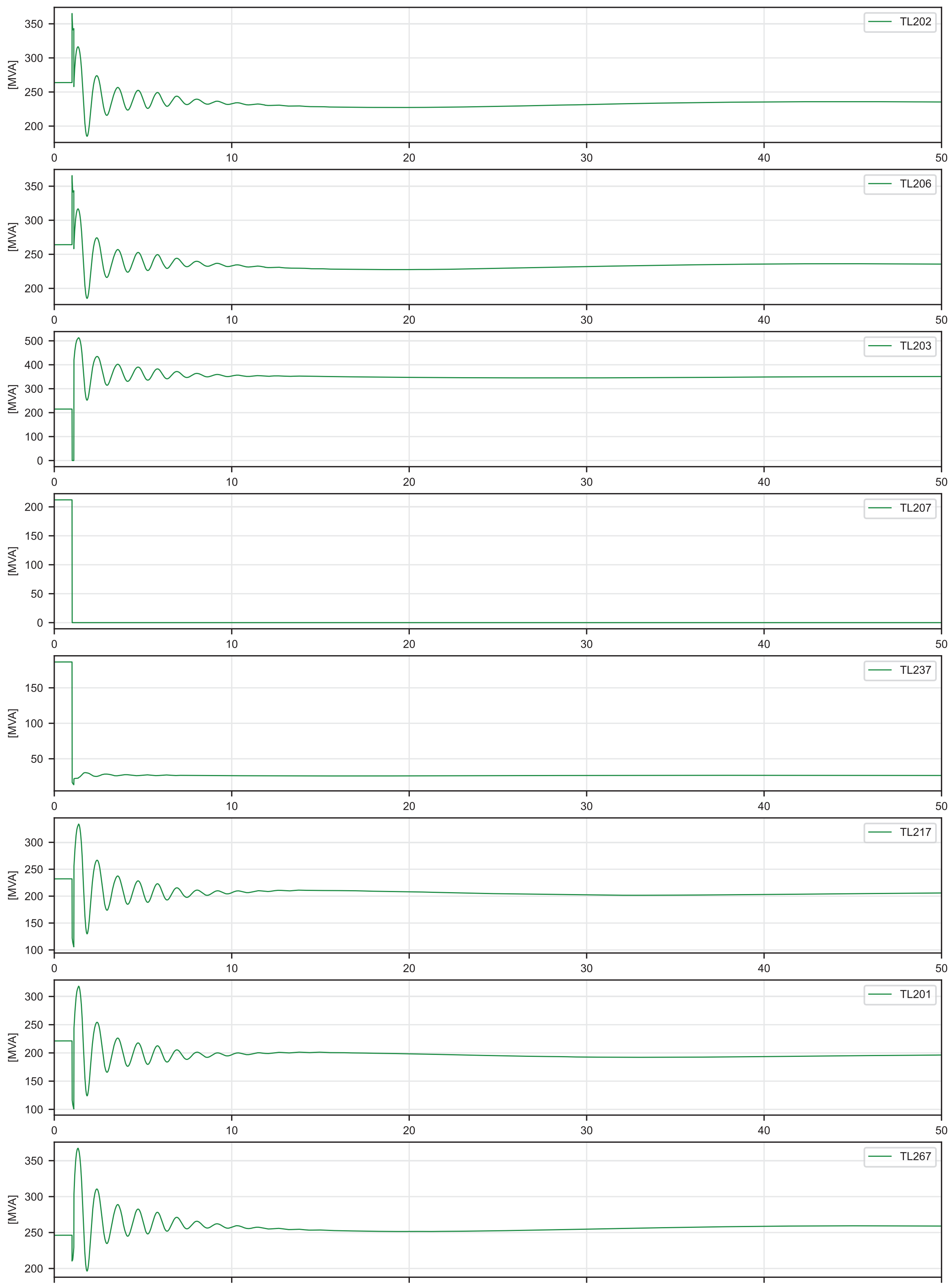
02_2033-34_Base-Peak_TL207-TL203_050MW_MLFC_off
Loss of TL207 | 230 kV Power Flow



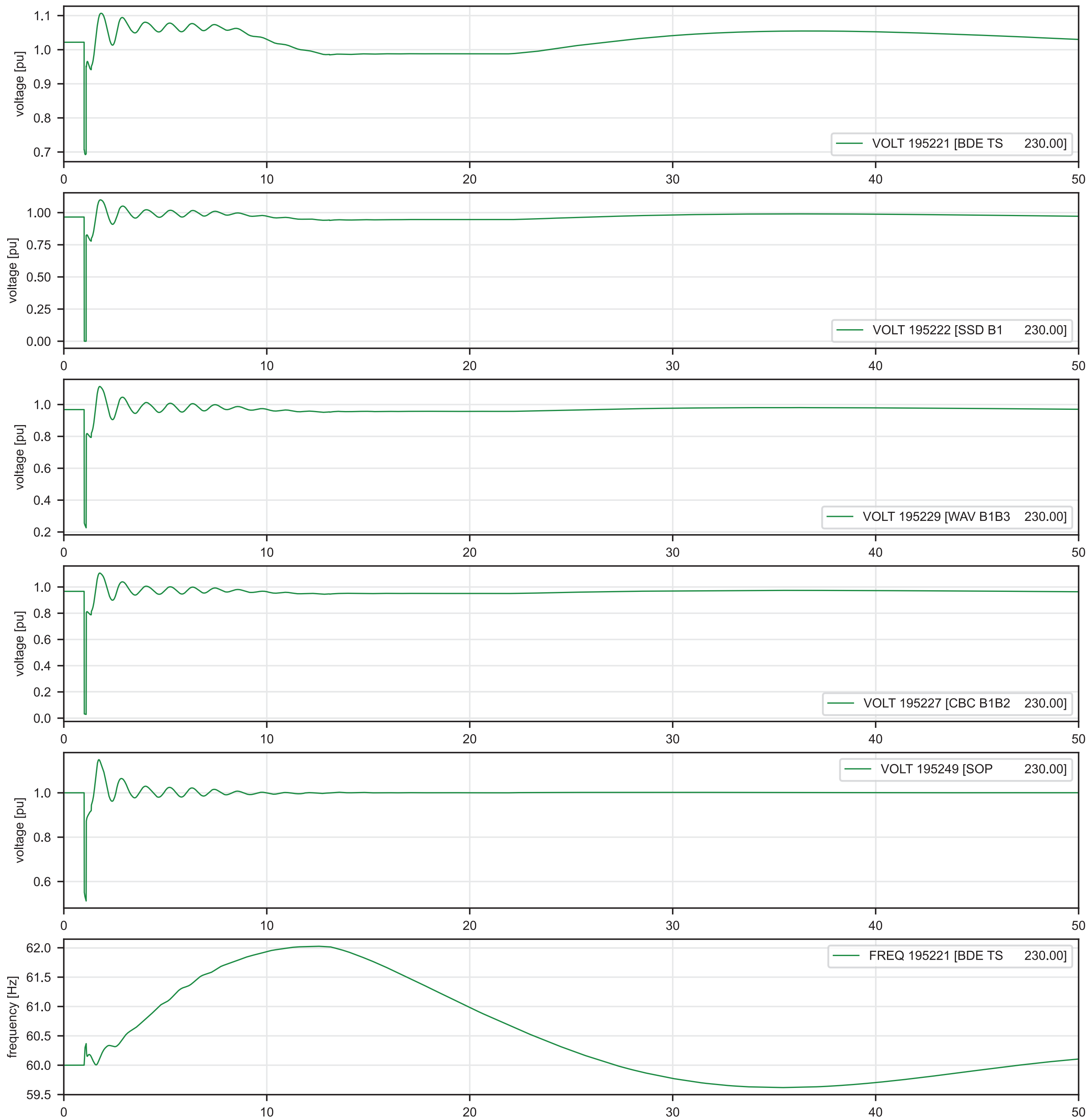
02_2033-34_Base-Peak_TL207-TL203_100MW_MLFC_off
Loss of TL207 | Voltage / Frequency



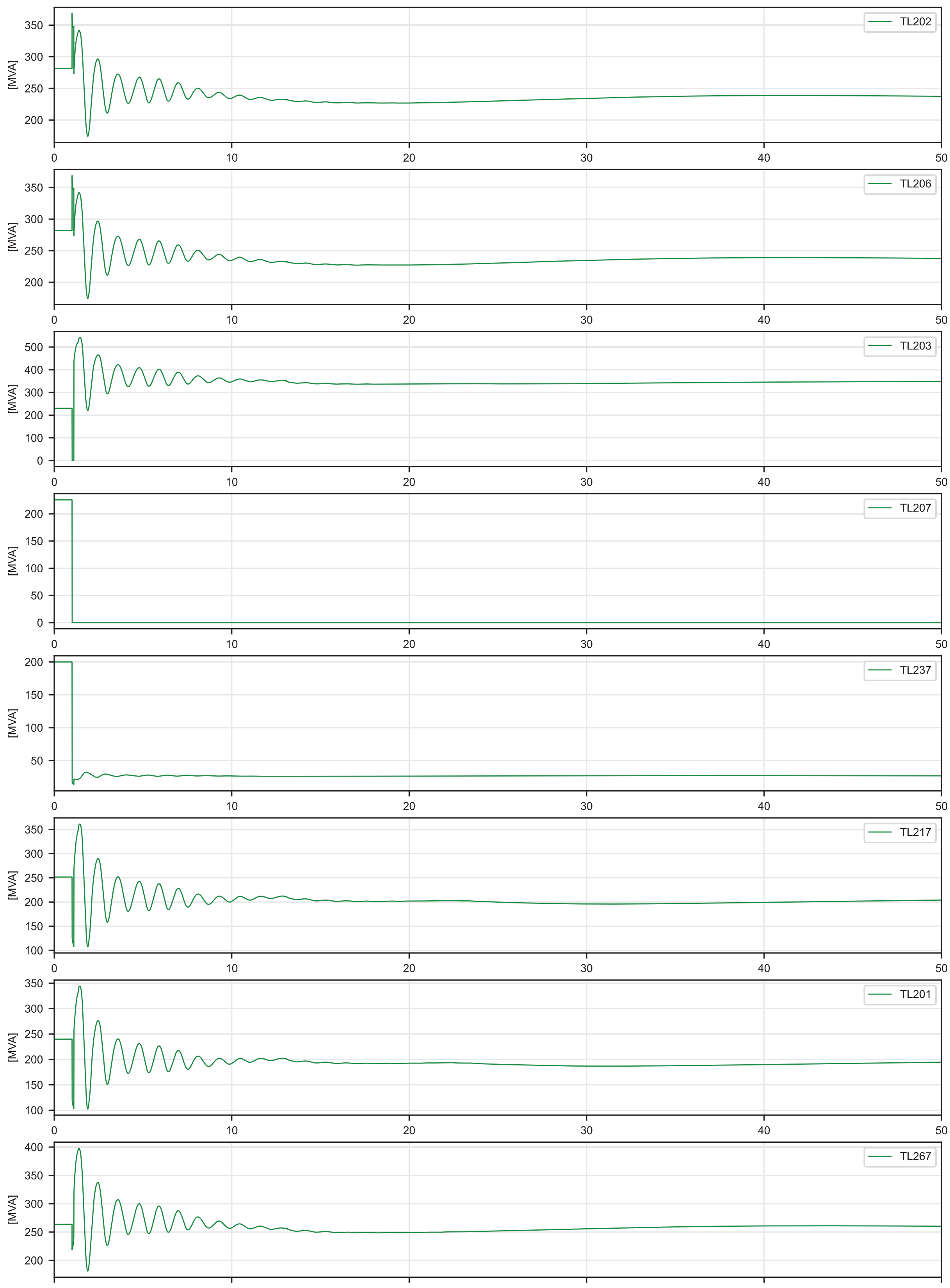
02_2033-34_Base-Peak_TL207-TL203_100MW_MLFC_off
Loss of TL207 | 230 kV Power Flow



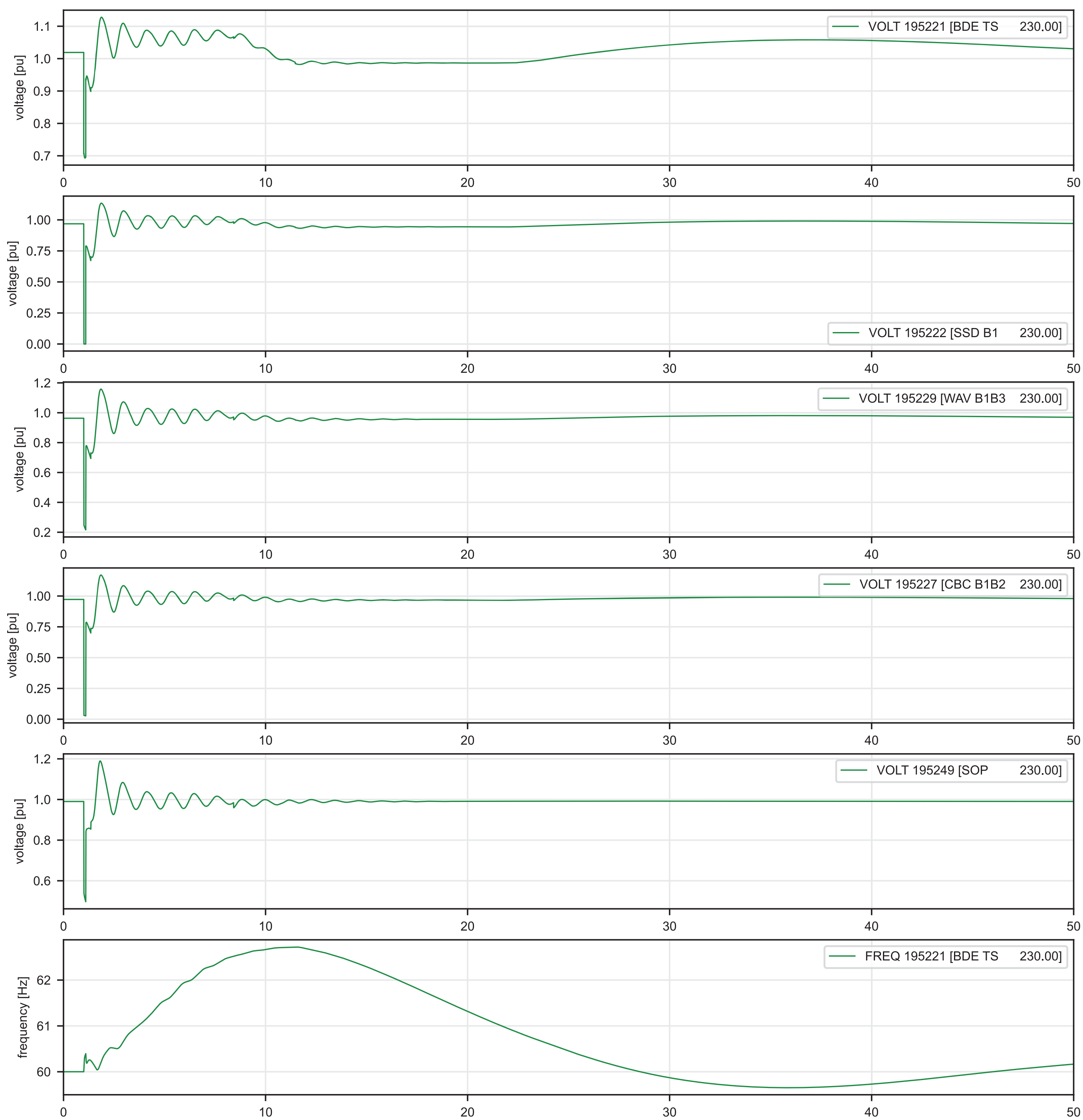
02_2033-34_Base-Peak_TL207-TL203_150MW_MLFC_off
Loss of TL207 | Voltage / Frequency



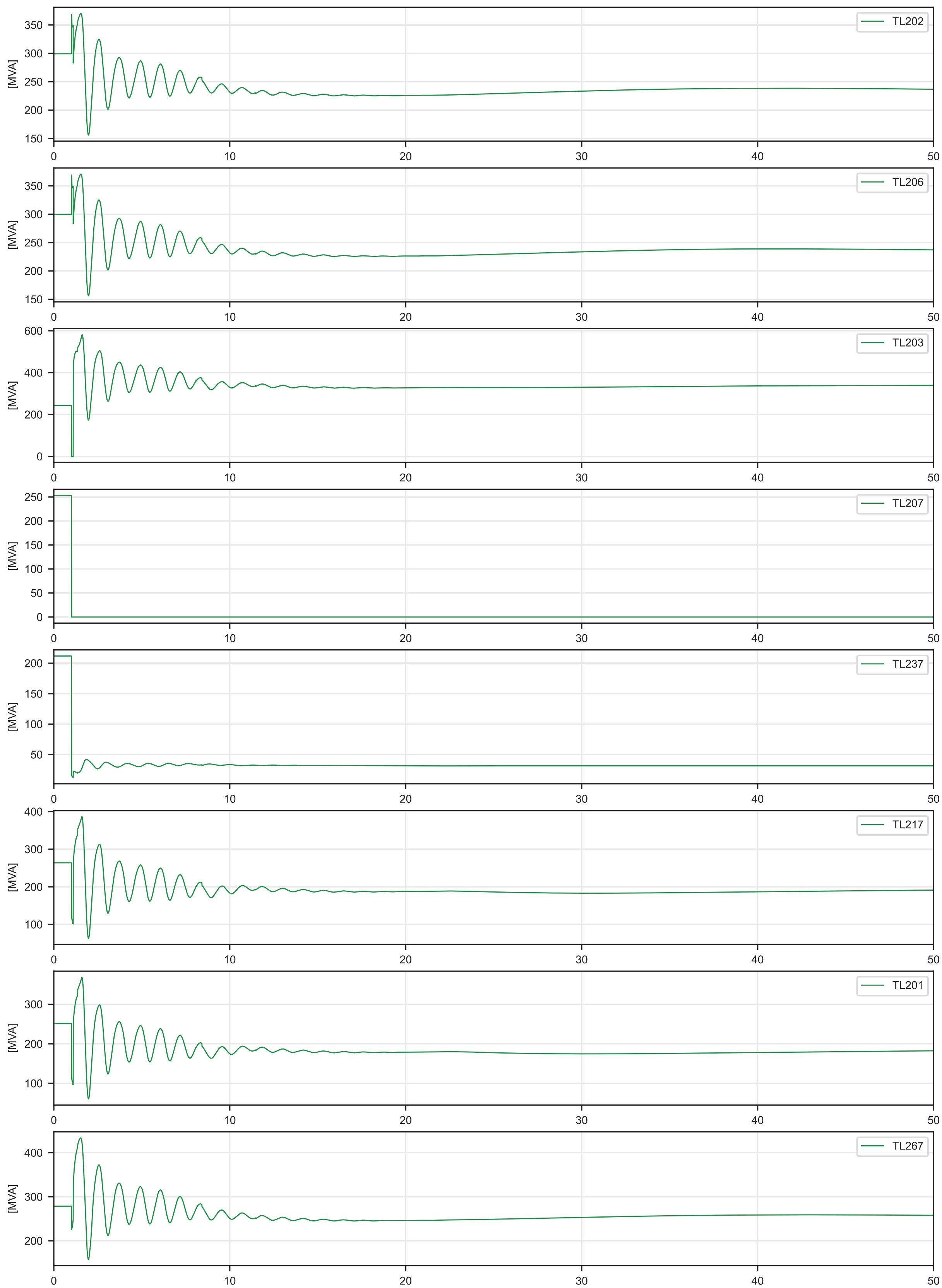
02_2033-34_Base-Peak_TL207-TL203_150MW_MLFC_off
Loss of TL207 | 230 kV Power Flow



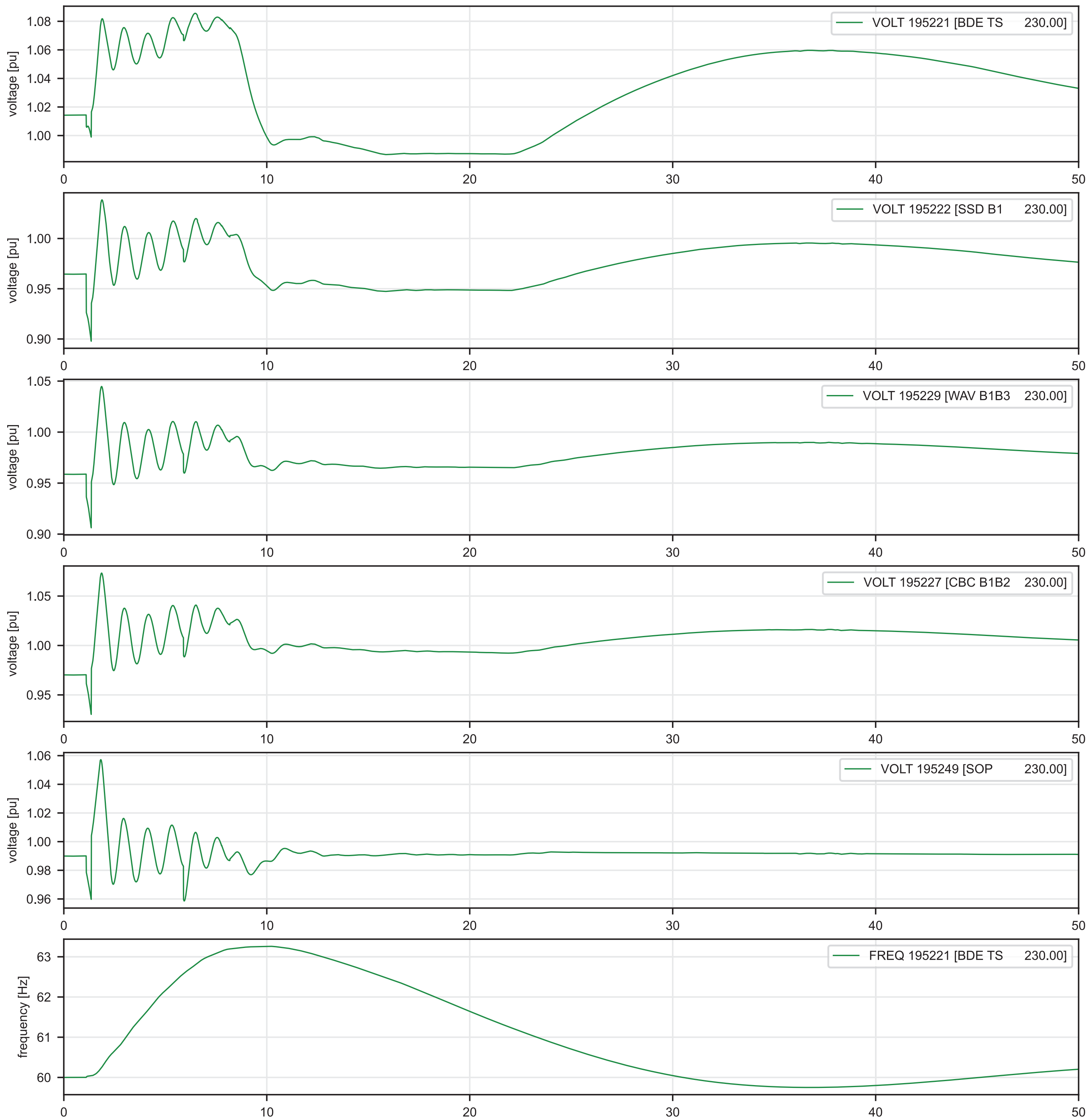
02_2033-34_Base-Peak_TL207-TL203_200MW_MLFC_off
Loss of TL207 | Voltage / Frequency



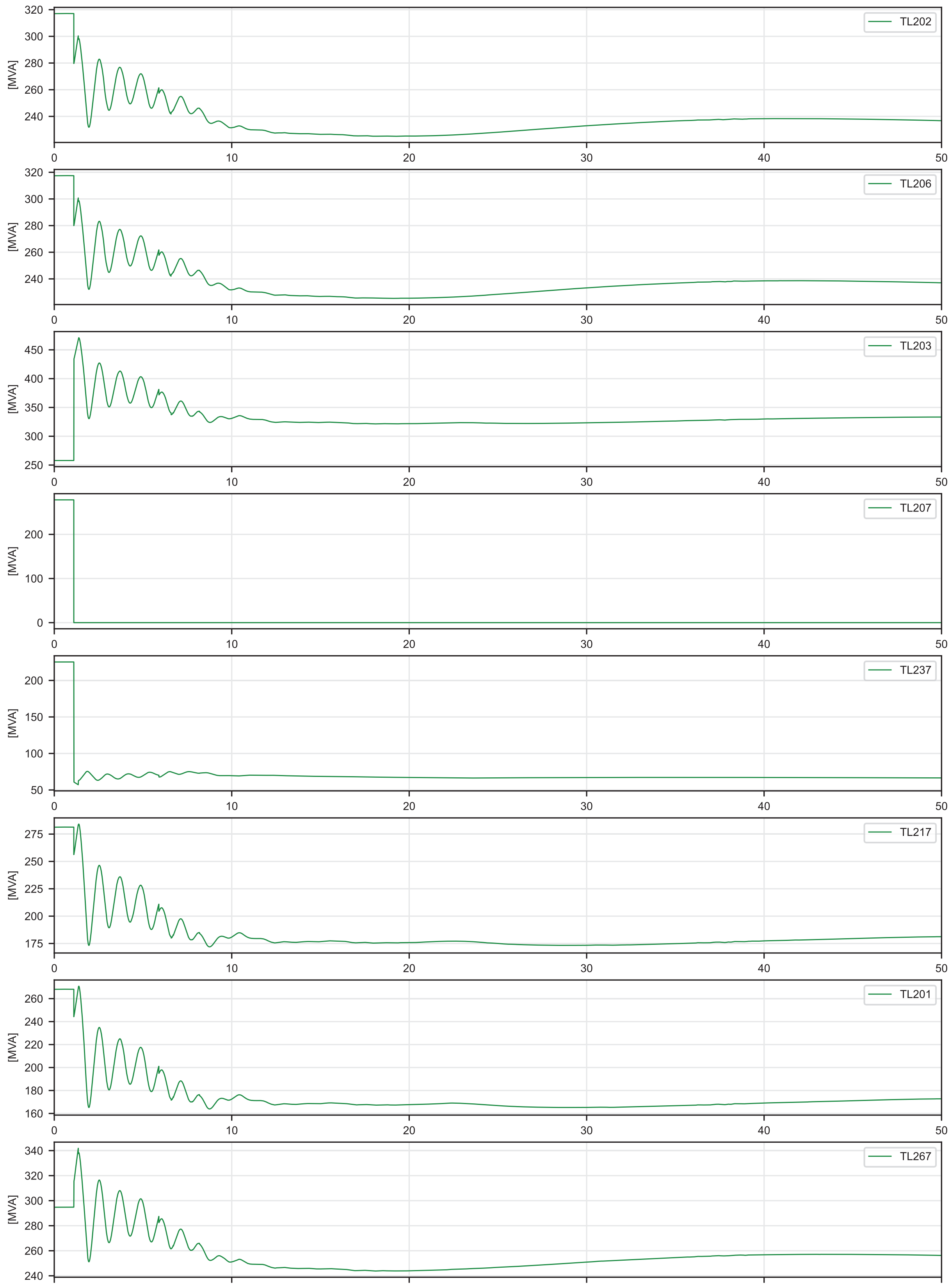
02_2033-34_Base-Peak_TL207-TL203_200MW_MLFC_off
Loss of TL207 | 230 kV Power Flow



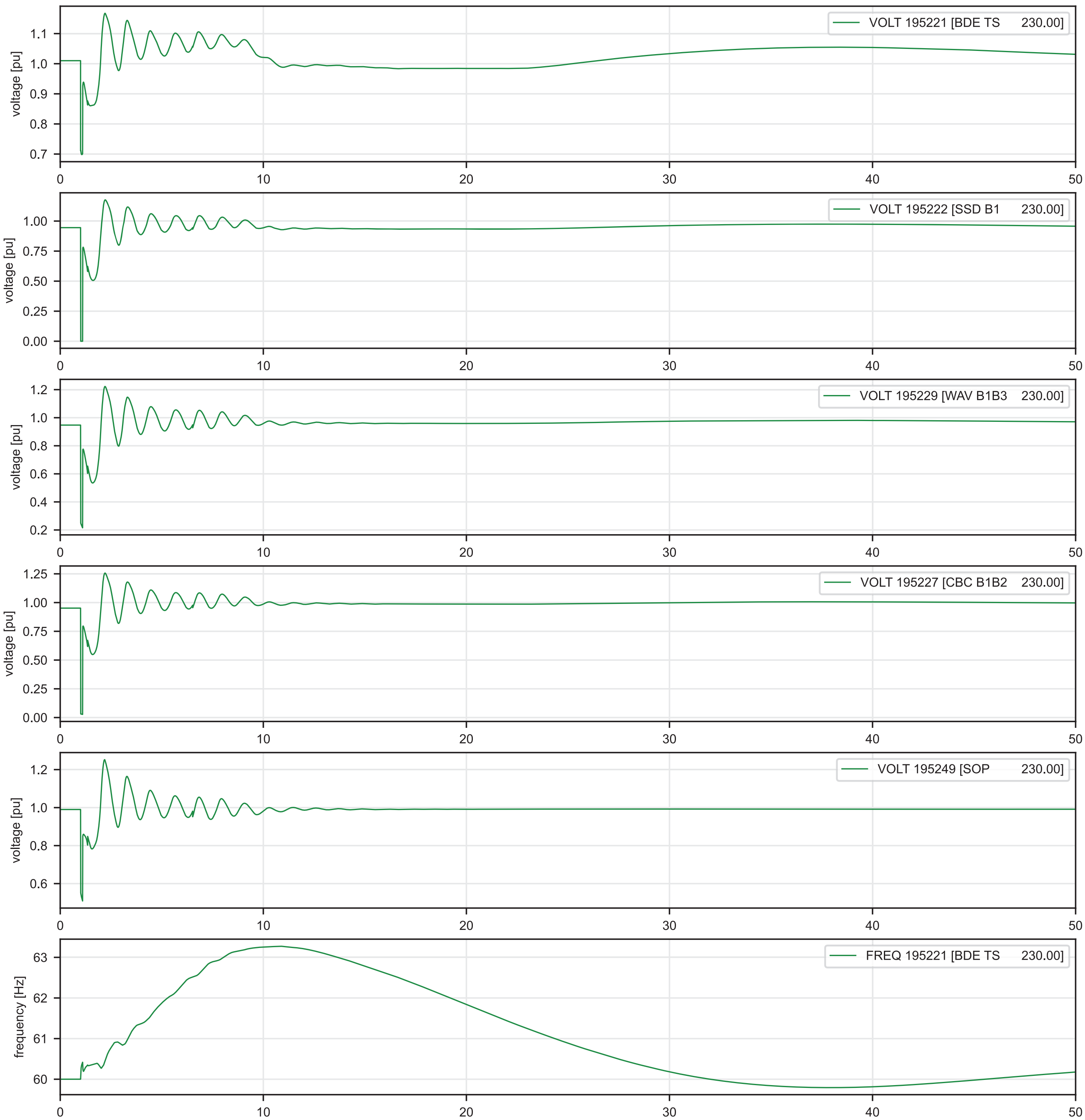
02_2033-34_Base-Peak_TL207-TL203_250MW_MLFC_off
Loss of TL207 | Voltage / Frequency



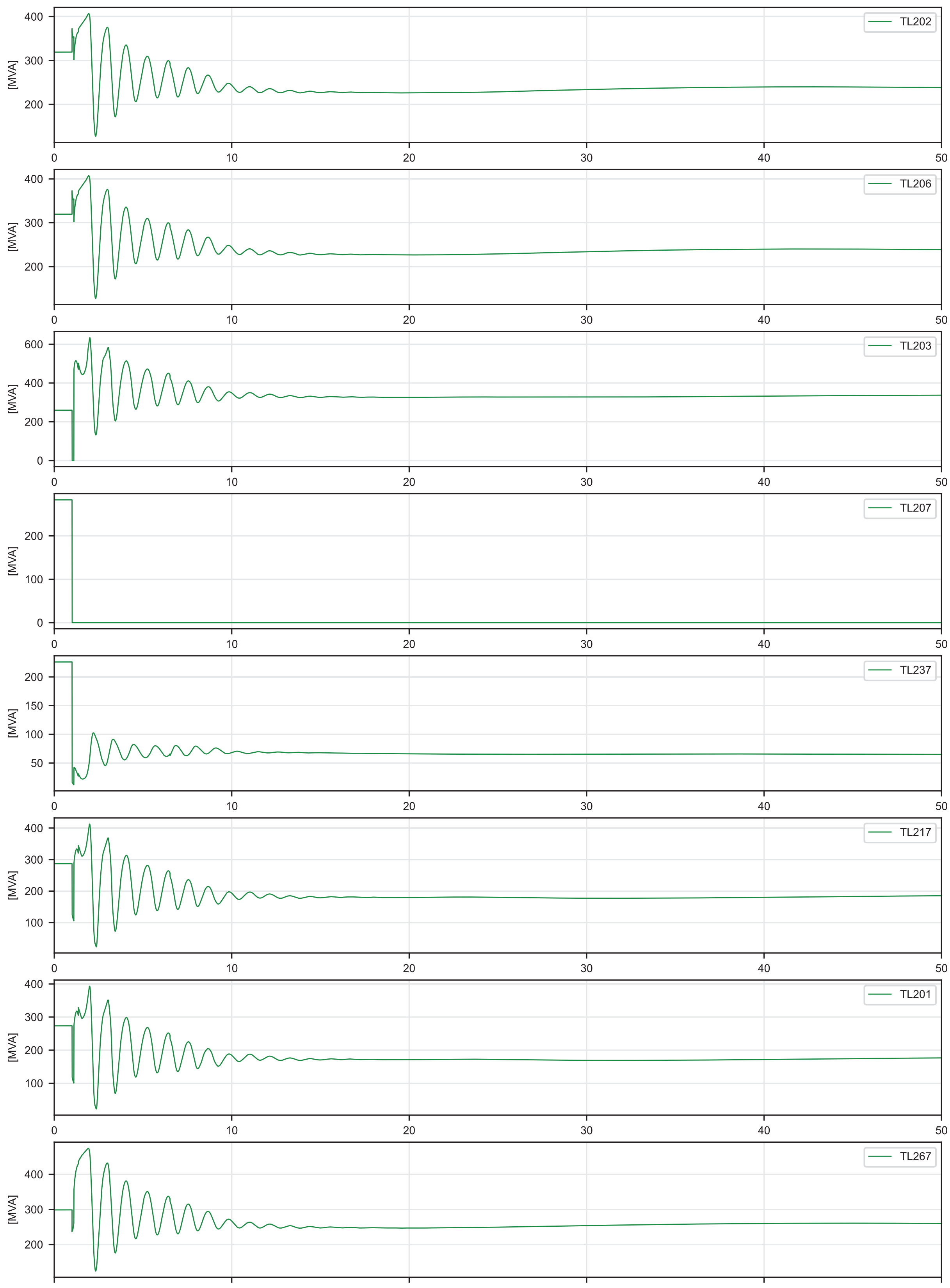
02_2033-34_Base-Peak_TL207-TL203_250MW_MLFC_off
Loss of TL207 | 230 kV Power Flow



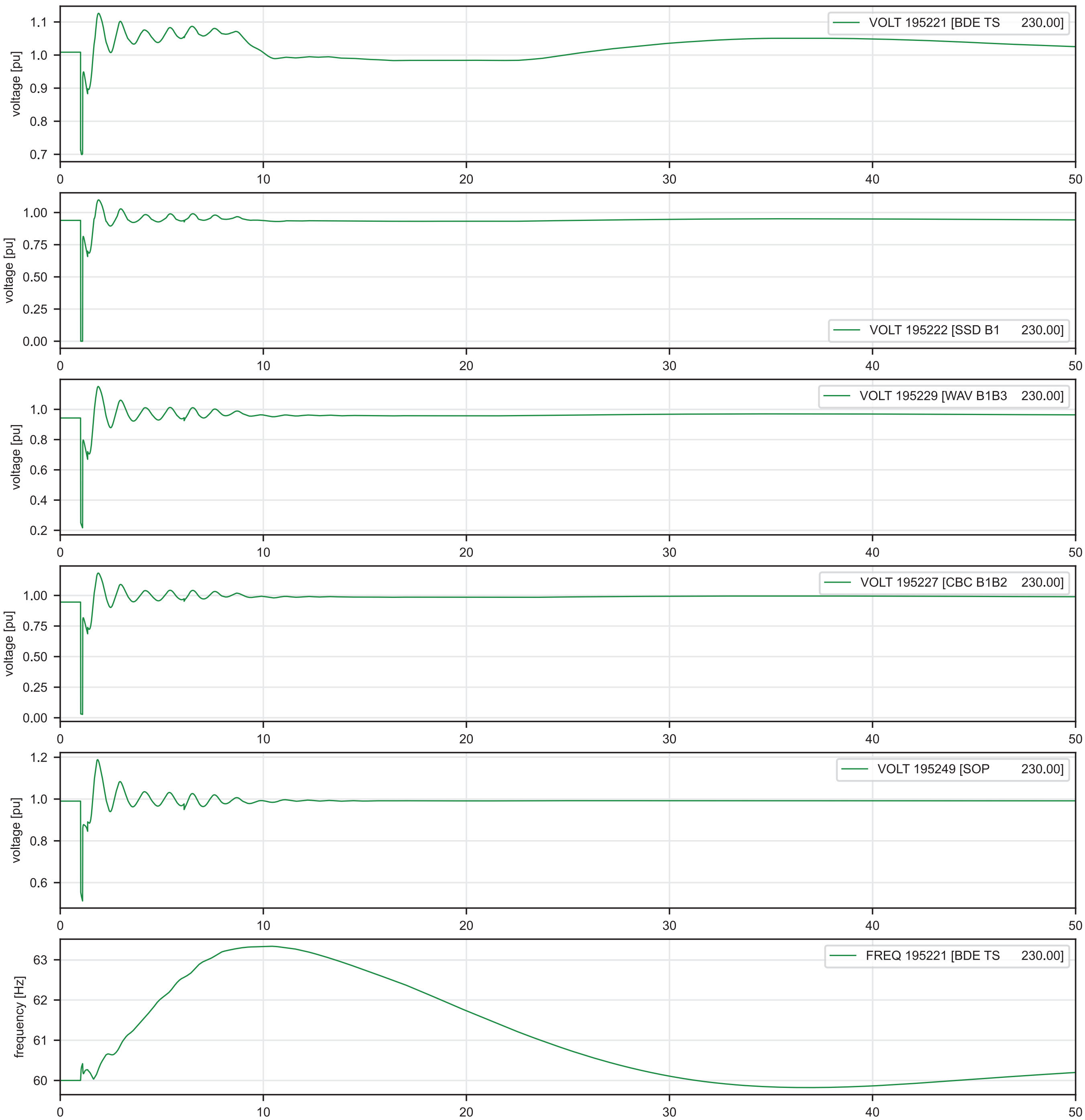
02_2033-34_Base-Peak_TL207-TL203_250MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL207 | Voltage / Frequency



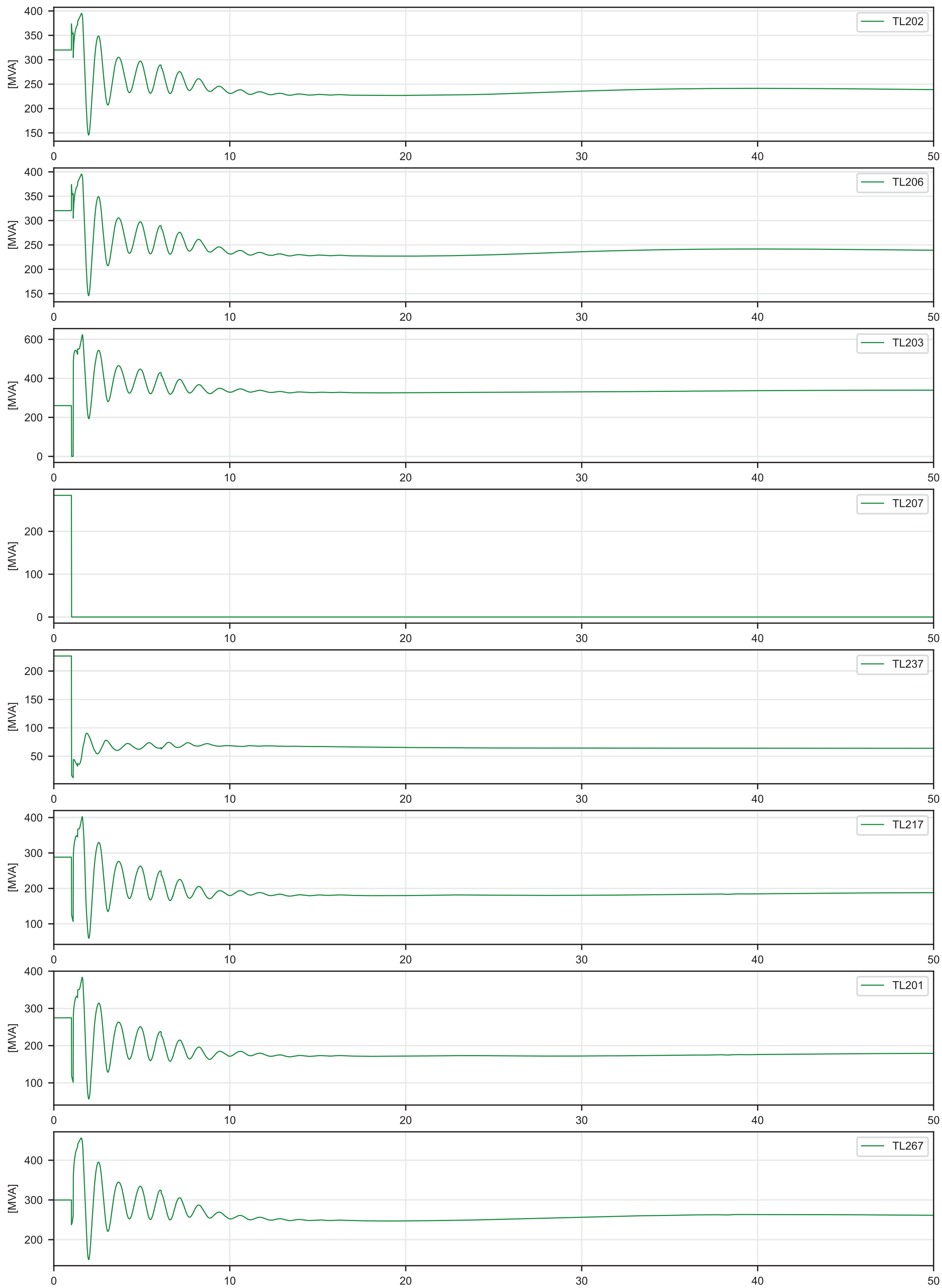
02_2033-34_Base-Peak_TL207-TL203_250MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL207 | 230 kV Power Flow



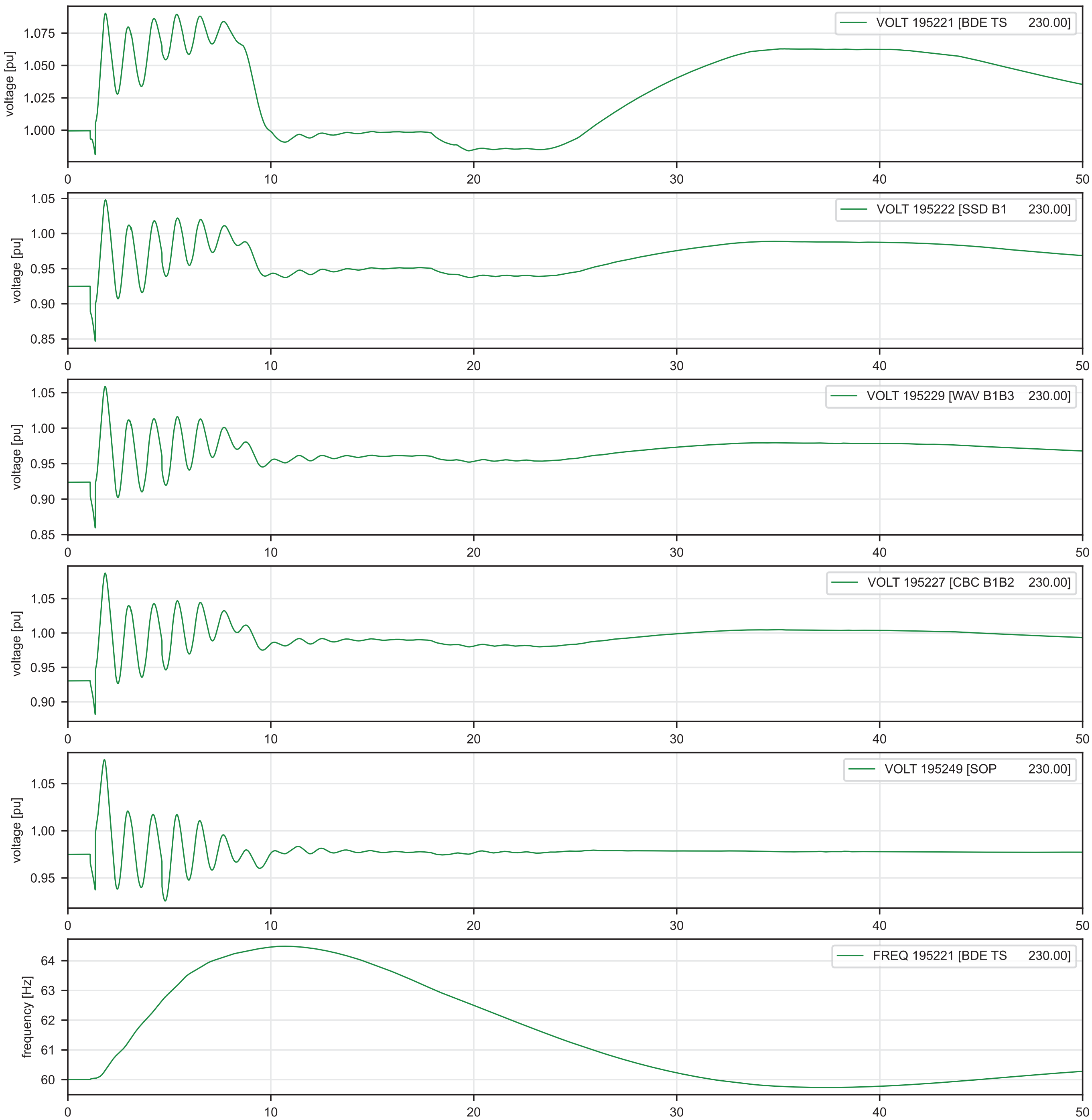
02_2033-34_Base-Peak_TL207-TL203_250MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL207 | Voltage / Frequency



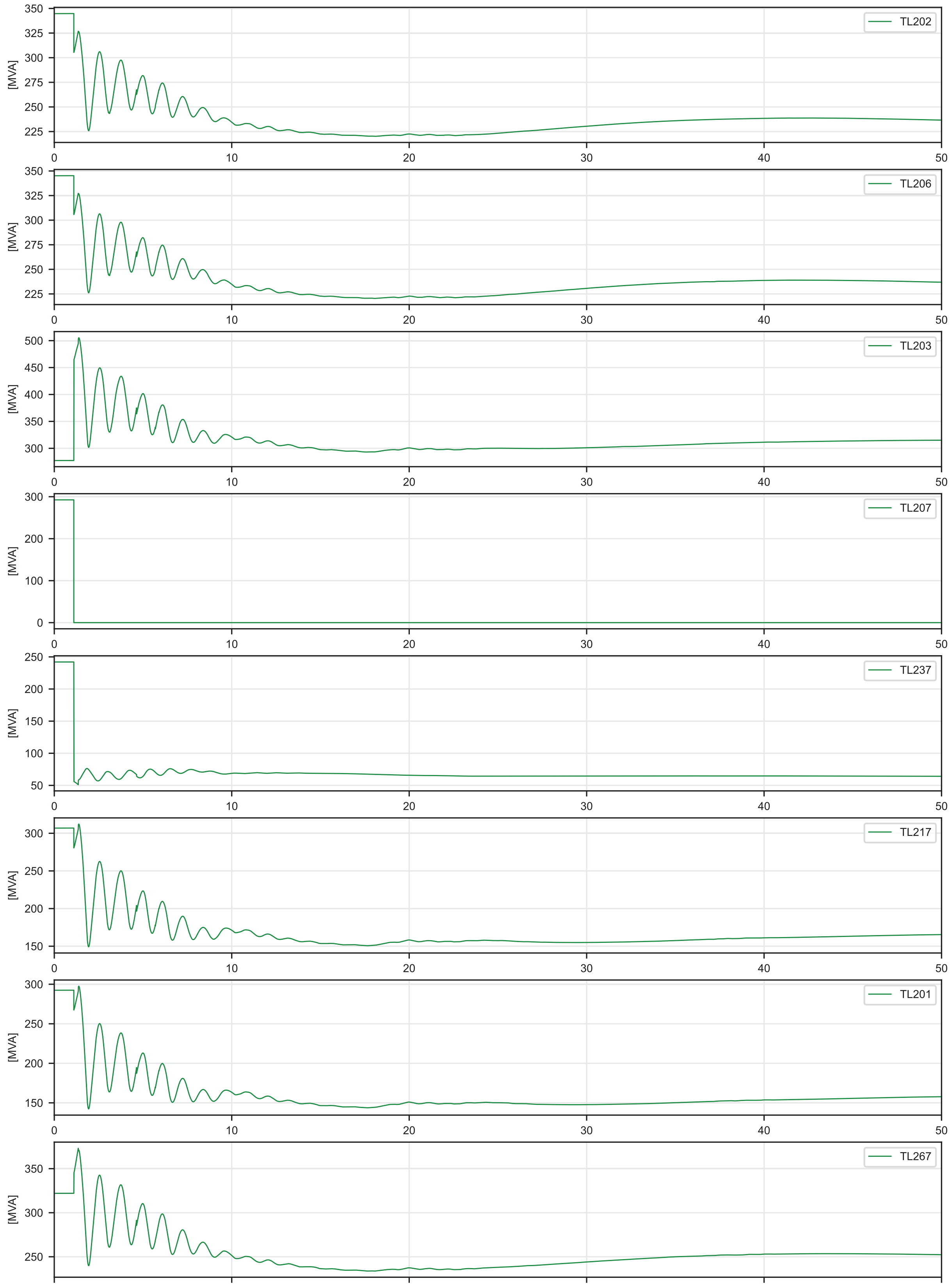
02_2033-34_Base-Peak_TL207-TL203_250MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL207 | 230 kV Power Flow



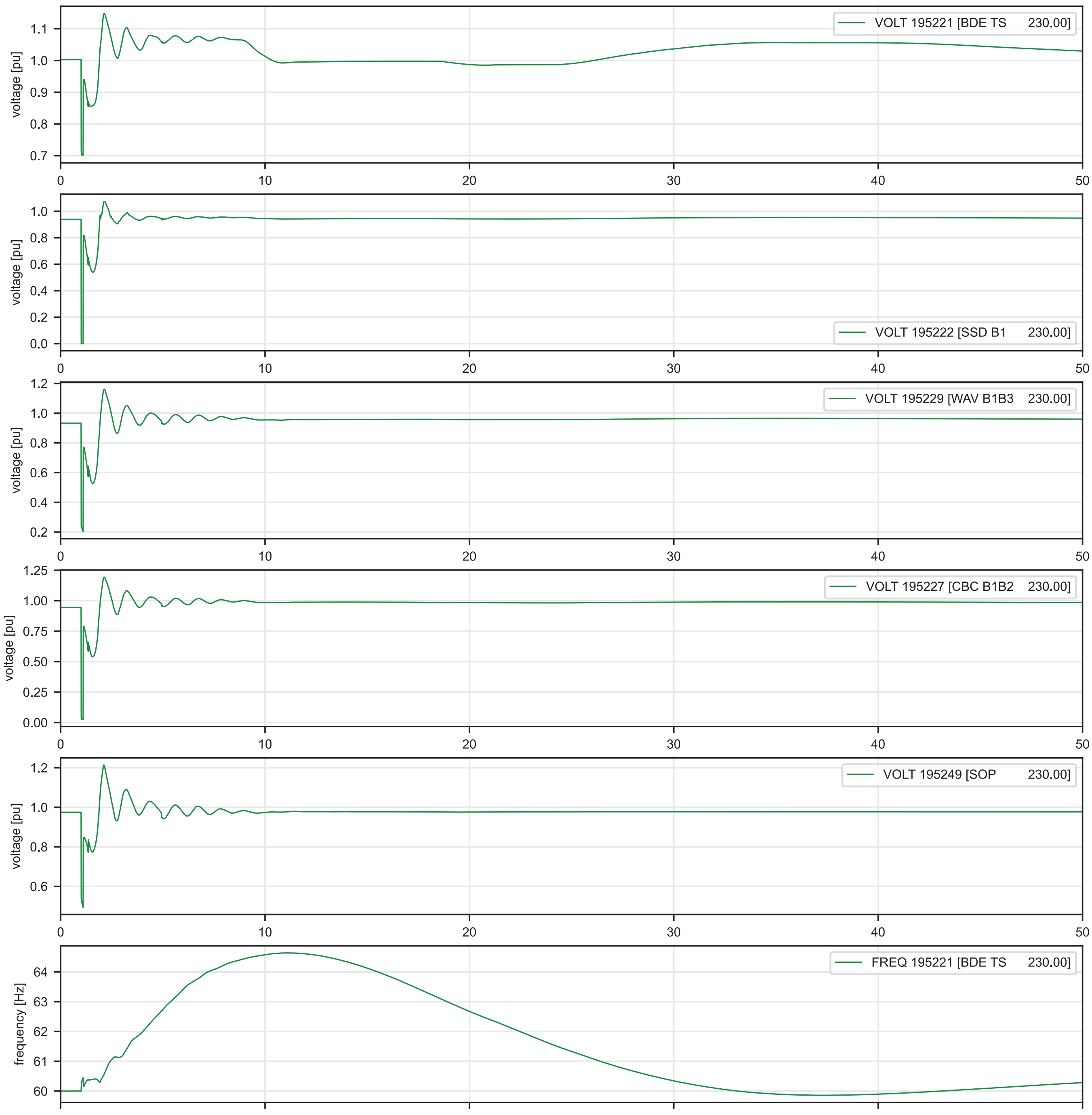
02_2033-34_Base-Peak_TL207-TL203_peakMW_MLFC_off
Loss of TL207 | Voltage / Frequency



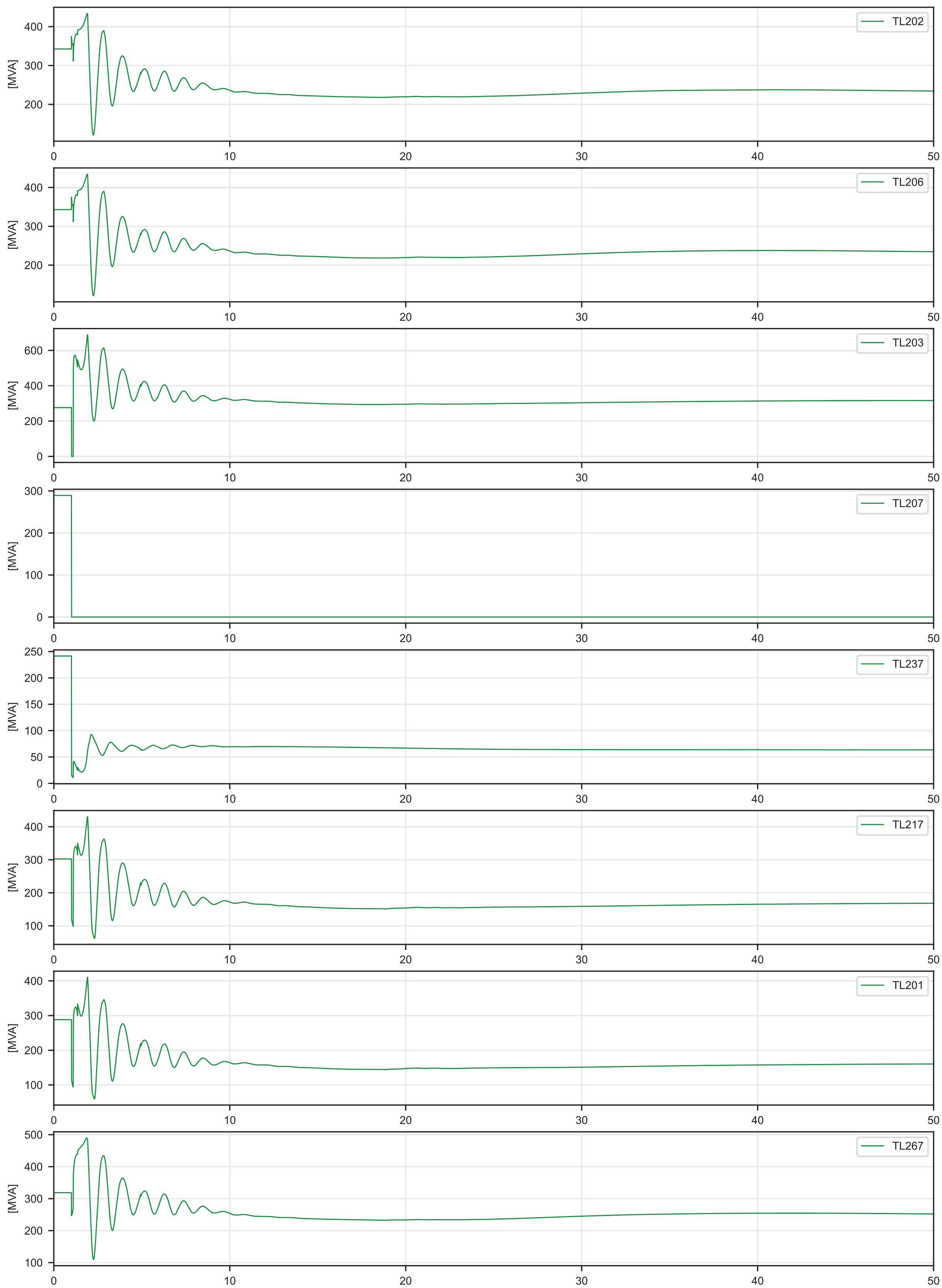
02_2033-34_Base-Peak_TL207-TL203_peakMW_MLFC_off
Loss of TL207 | 230 kV Power Flow



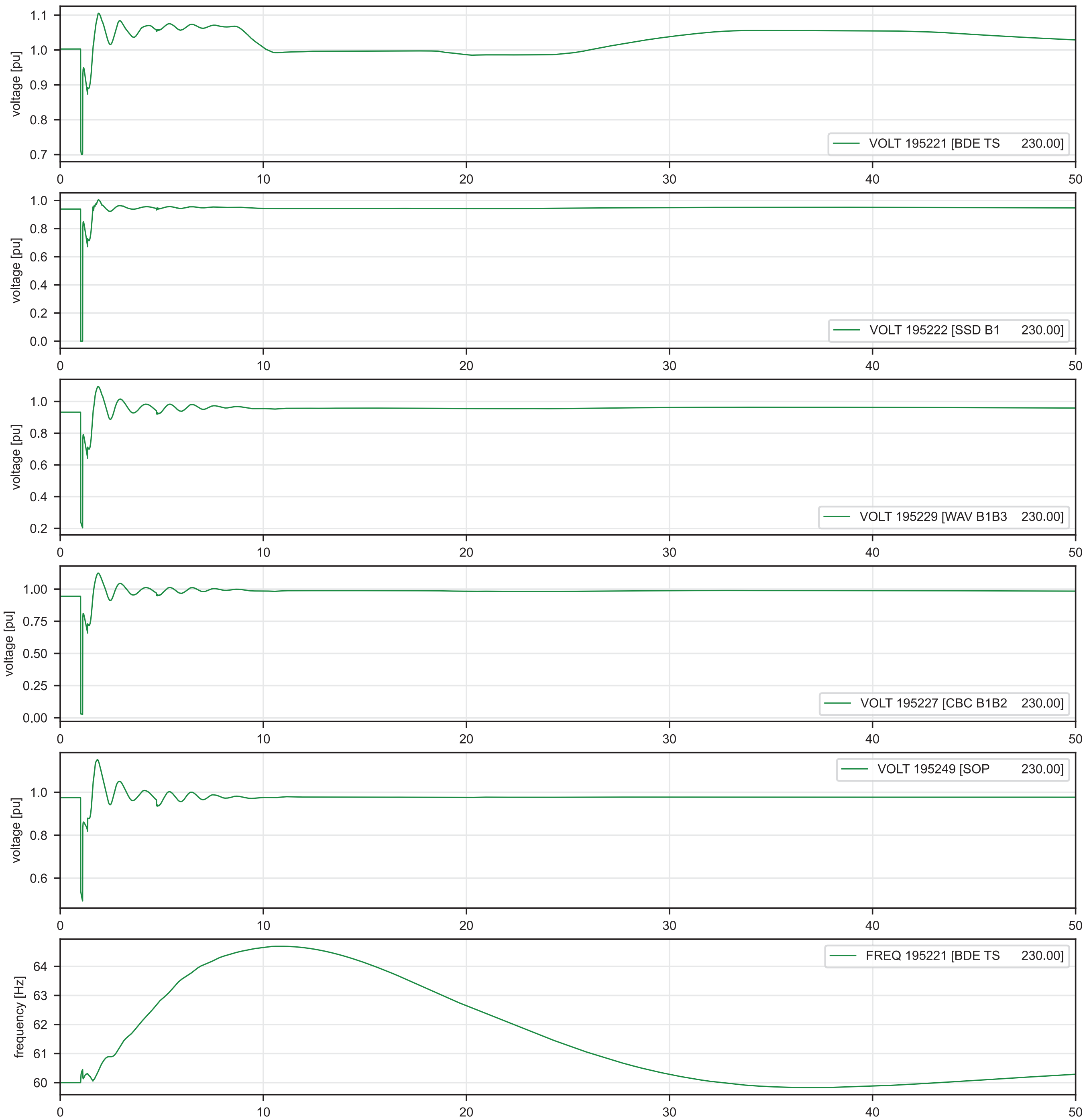
02_2033-34_Base-Peak_TL207-TL203_peakMW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL207 | Voltage / Frequency



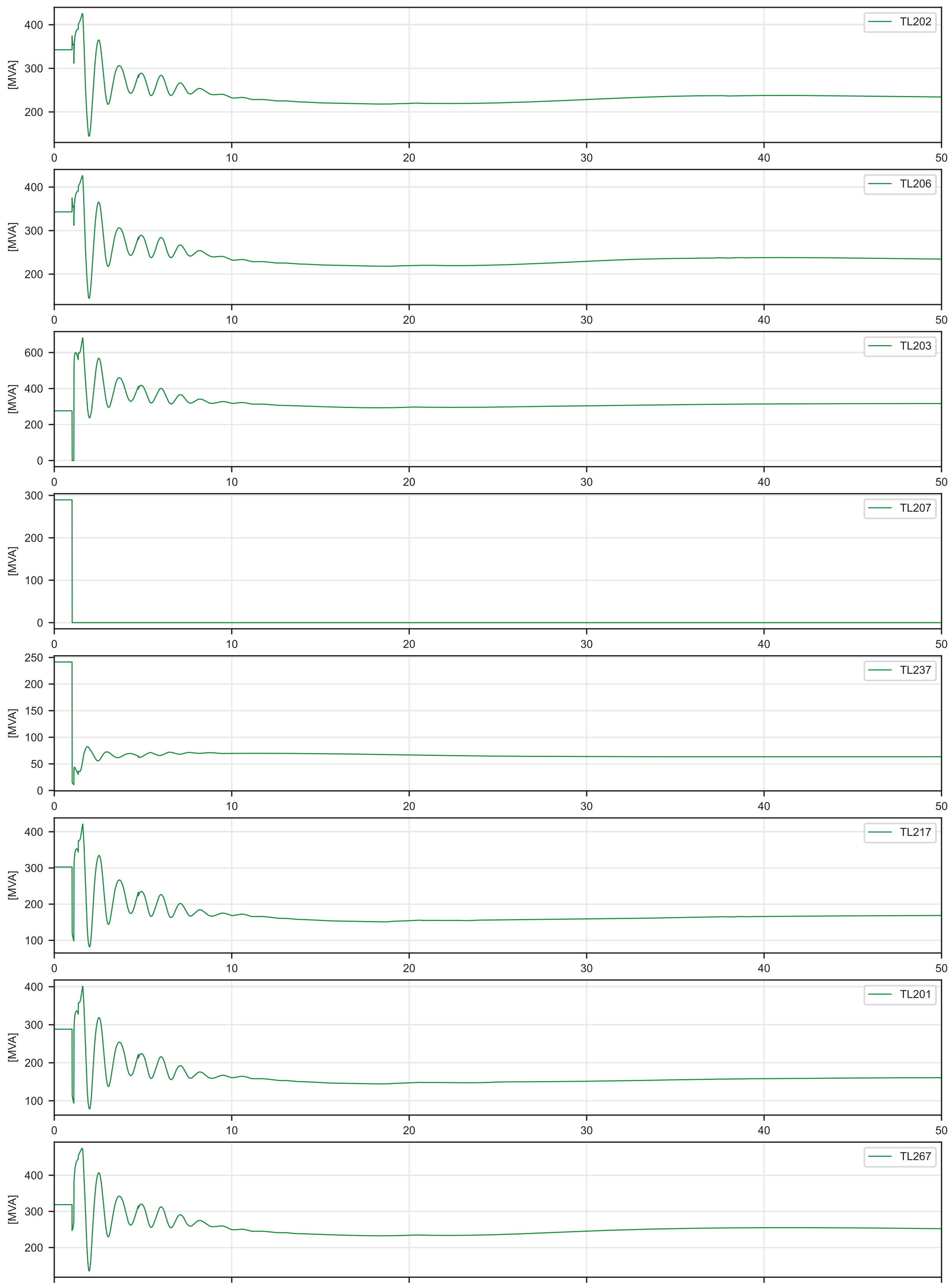
02_2033-34_Base-Peak_TL207-TL203_peakMW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL207 | 230 kV Power Flow



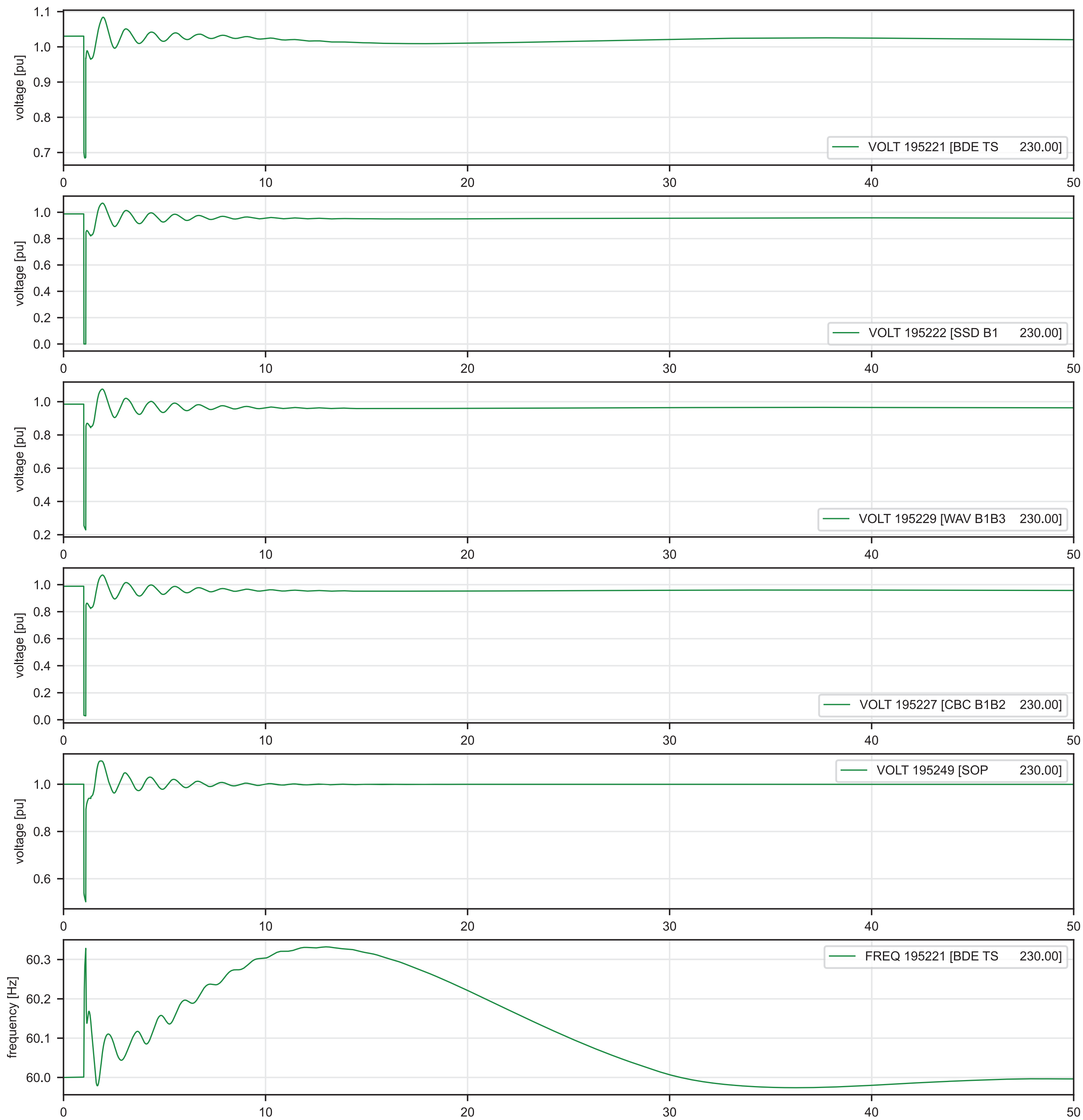
02_2033-34_Base-Peak_TL207-TL203_peakMW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL207 | Voltage / Frequency



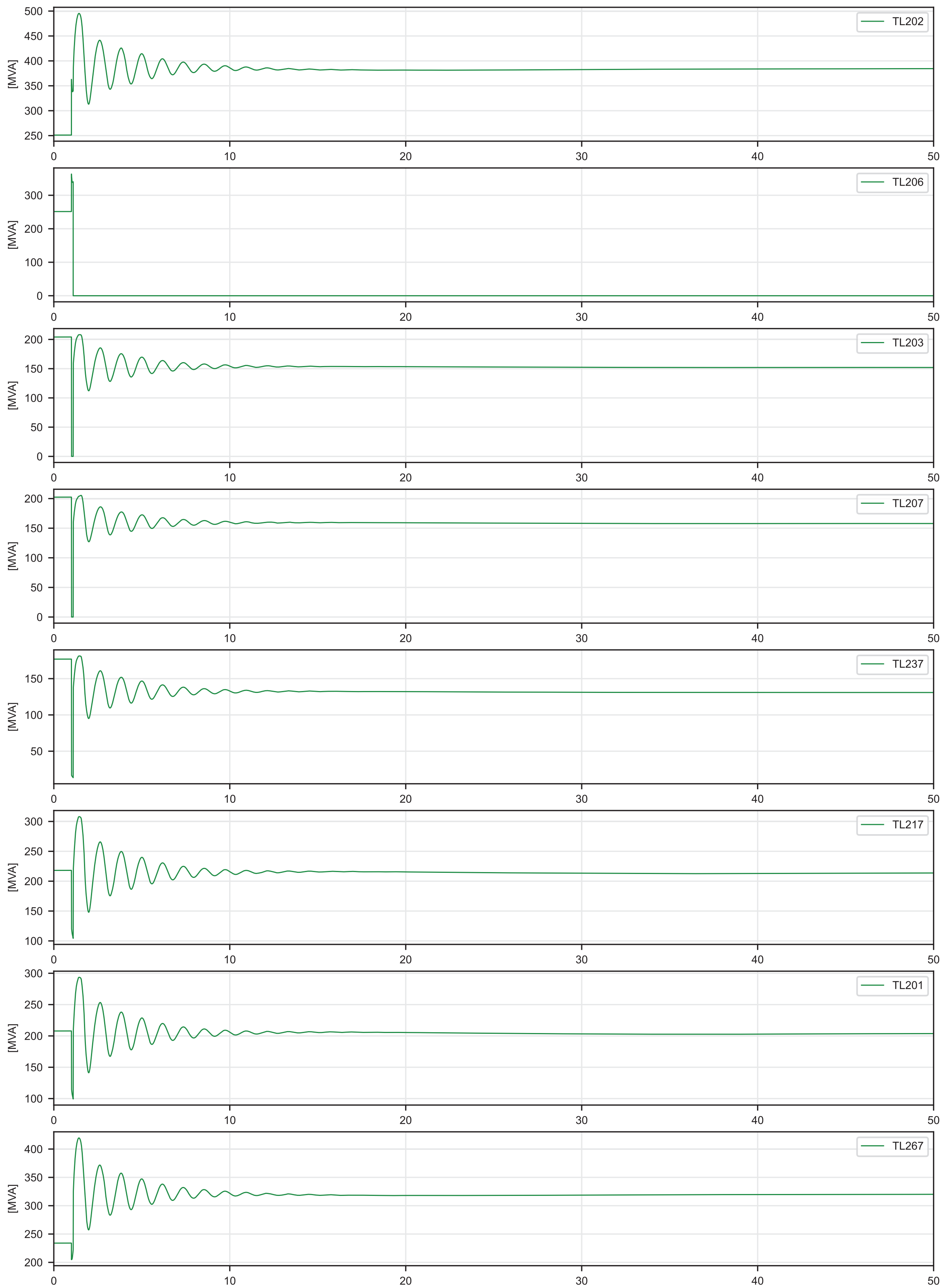
02_2033-34_Base-Peak_TL207-TL203_peakMW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL207 | 230 kV Power Flow



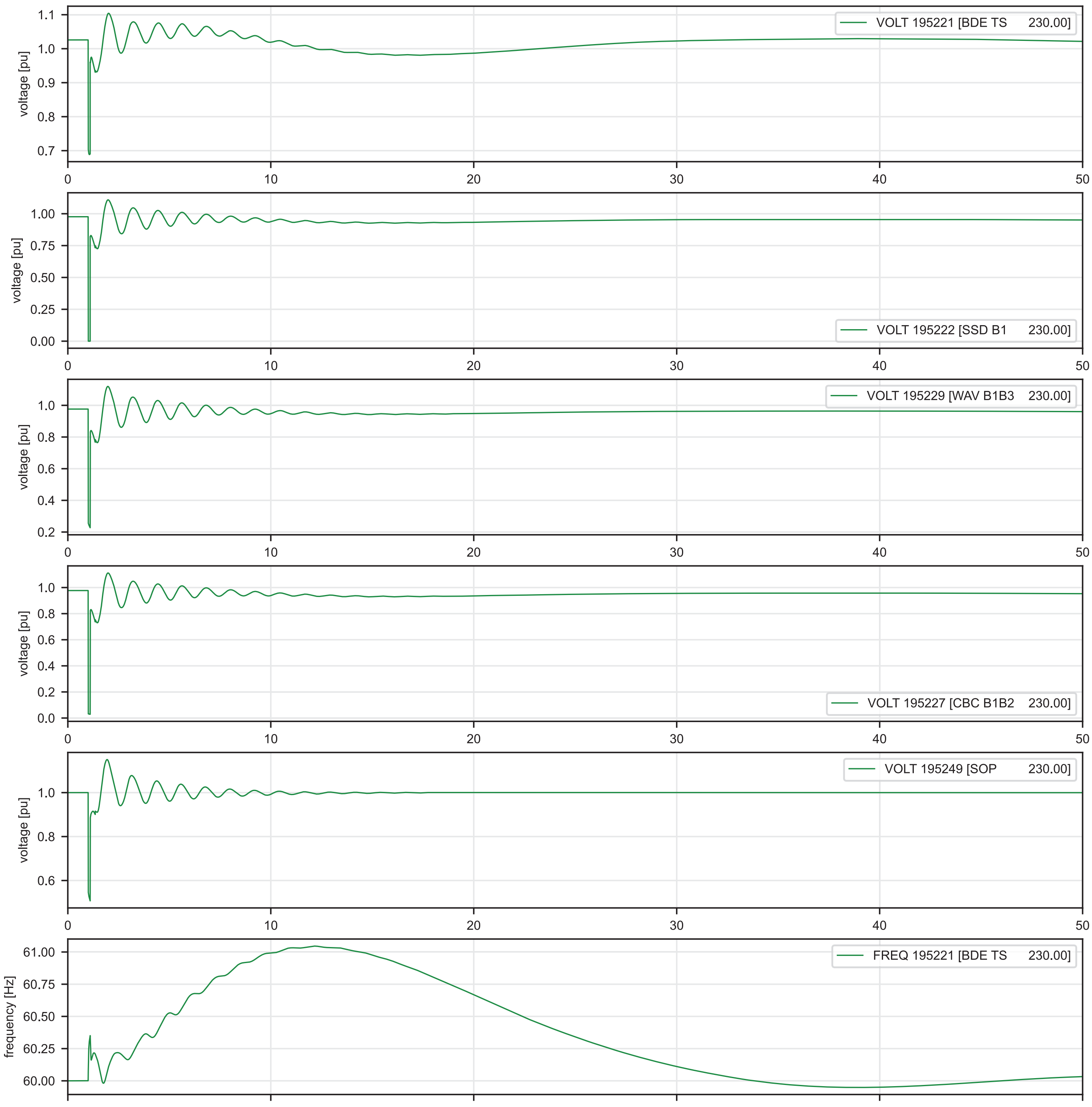
03_2033-34_Base-Peak_TL206-TL202_050MW_MLFC_off
Loss of TL206 | Voltage / Frequency



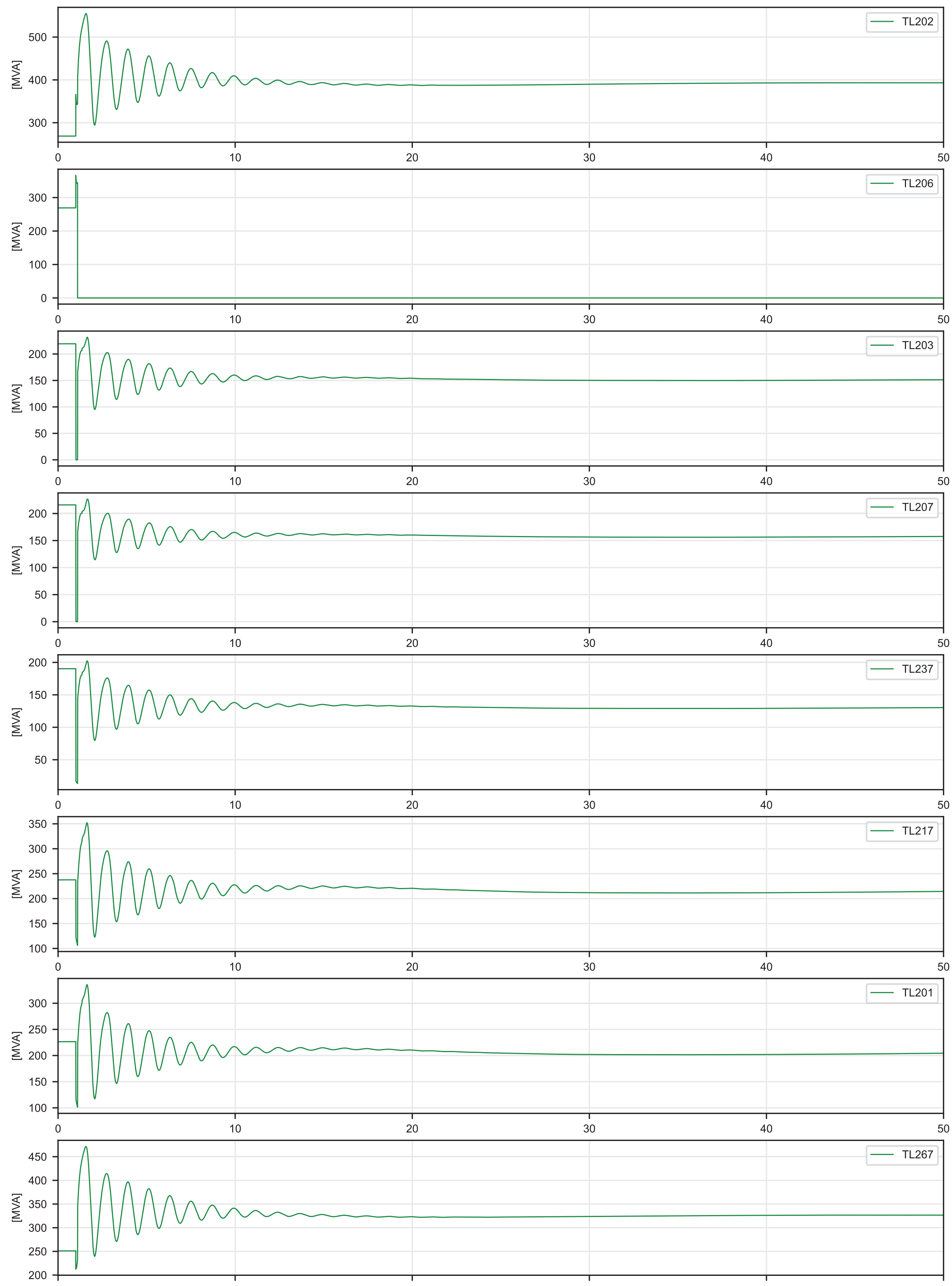
03_2033-34_Base-Peak_TL206-TL202_050MW_MLFC_off
Loss of TL206 | 230 kV Power Flow



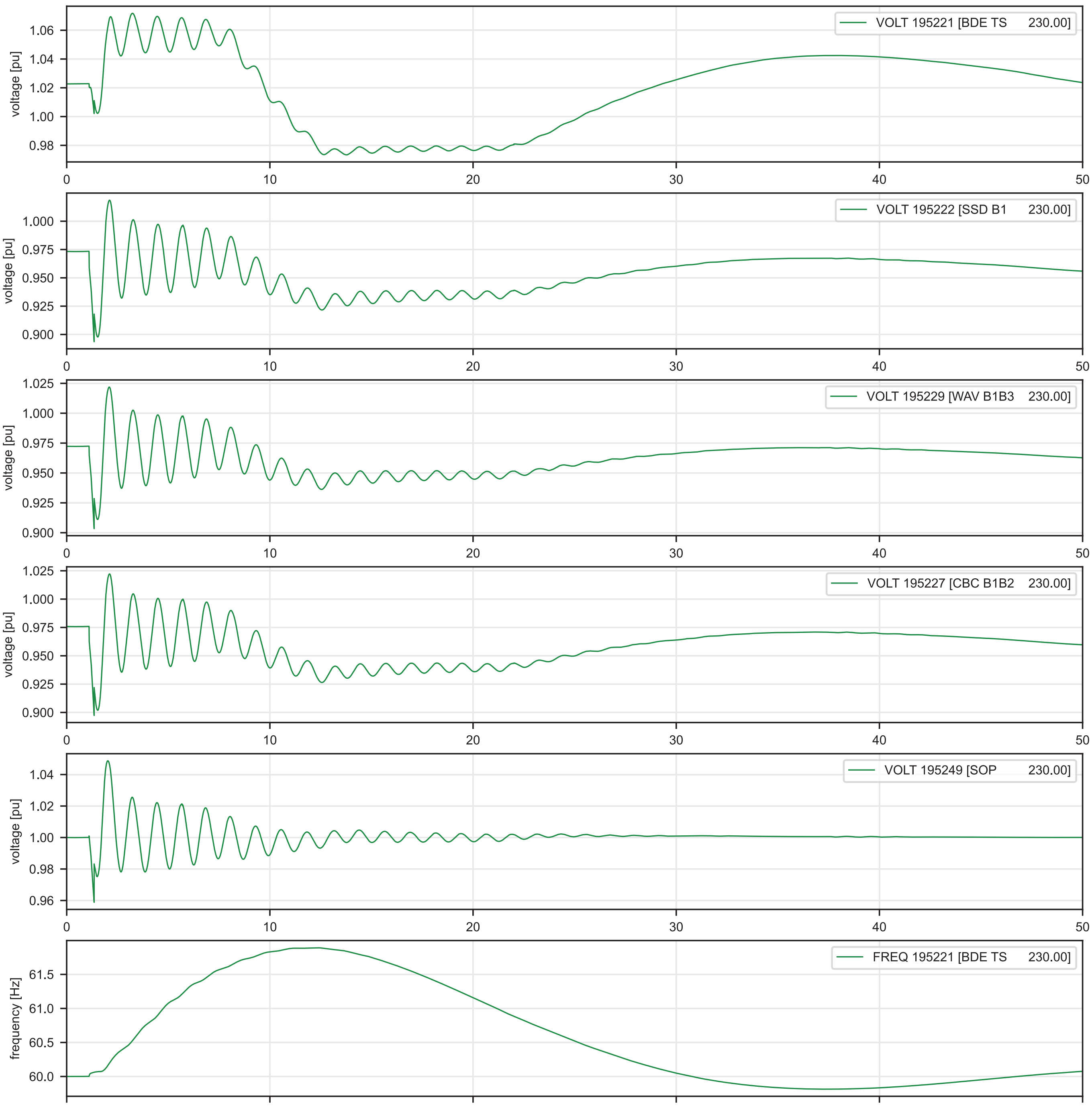
03_2033-34_Base-Peak_TL206-TL202_100MW_MLFC_off
Loss of TL206 | Voltage / Frequency



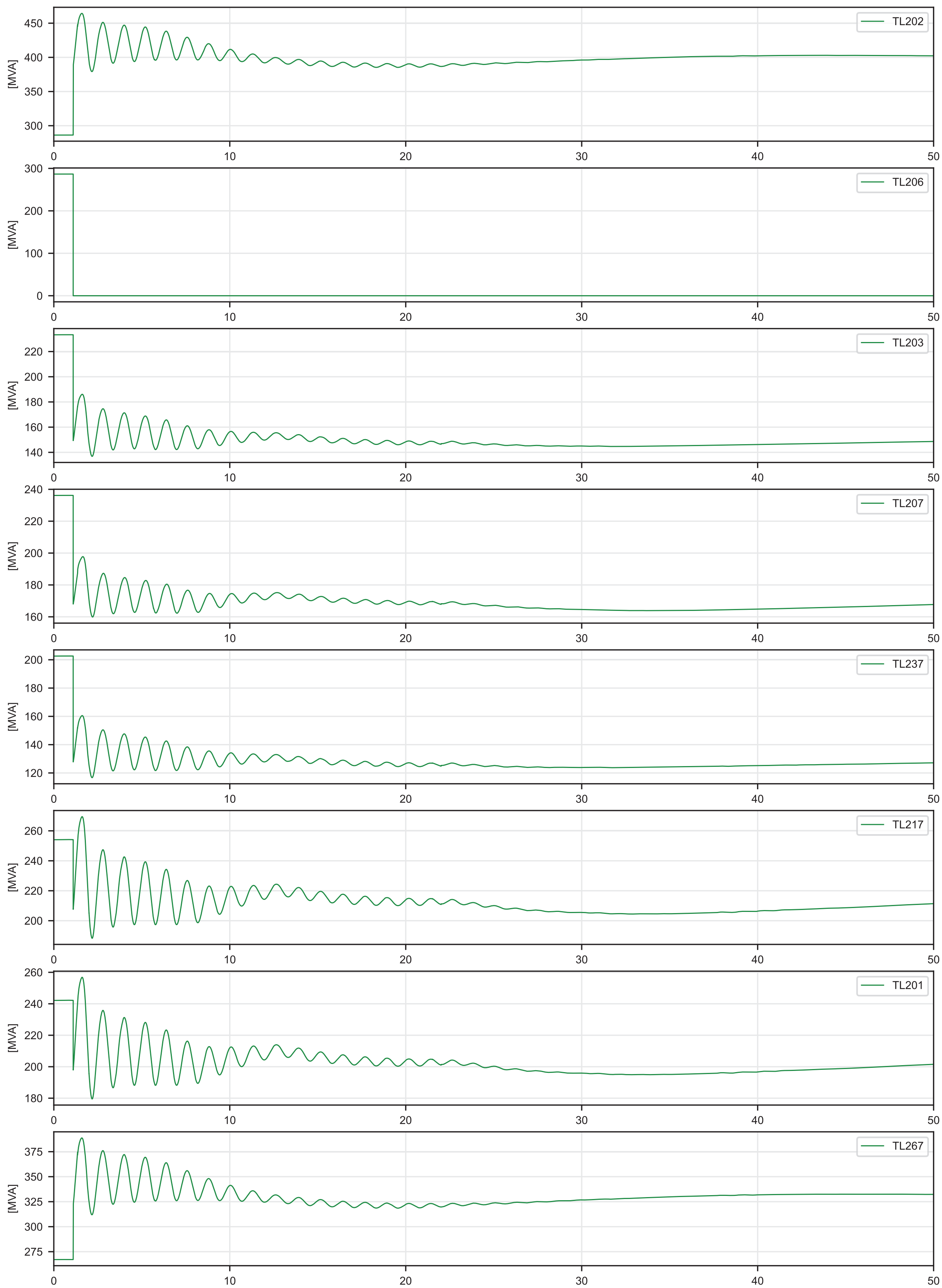
03_2033-34_Base-Peak_TL206-TL202_100MW_MLFC_off
Loss of TL206 | 230 kV Power Flow



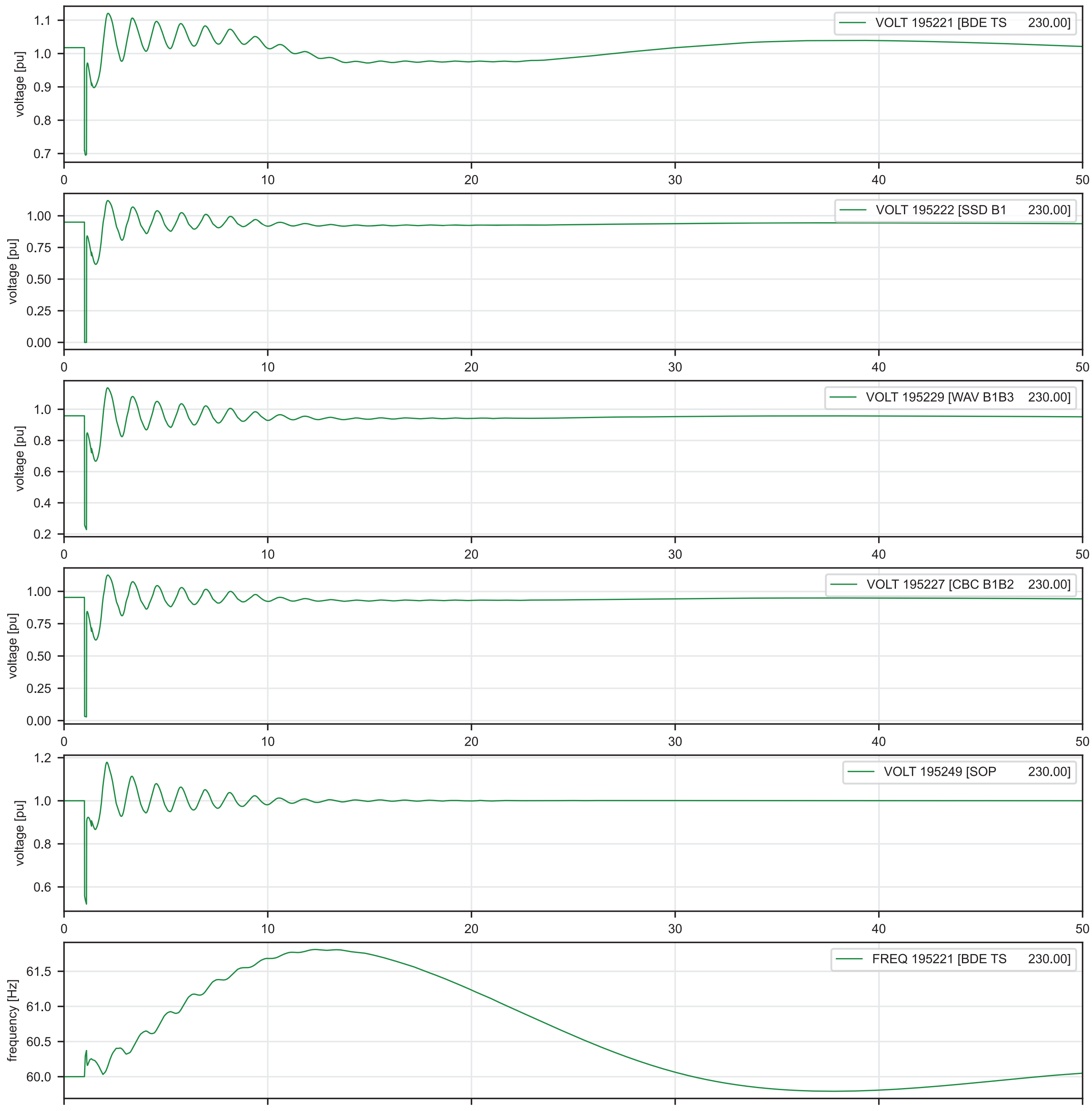
03_2033-34_Base-Peak_TL206-TL202_150MW_MLFC_off
Loss of TL206 | Voltage / Frequency



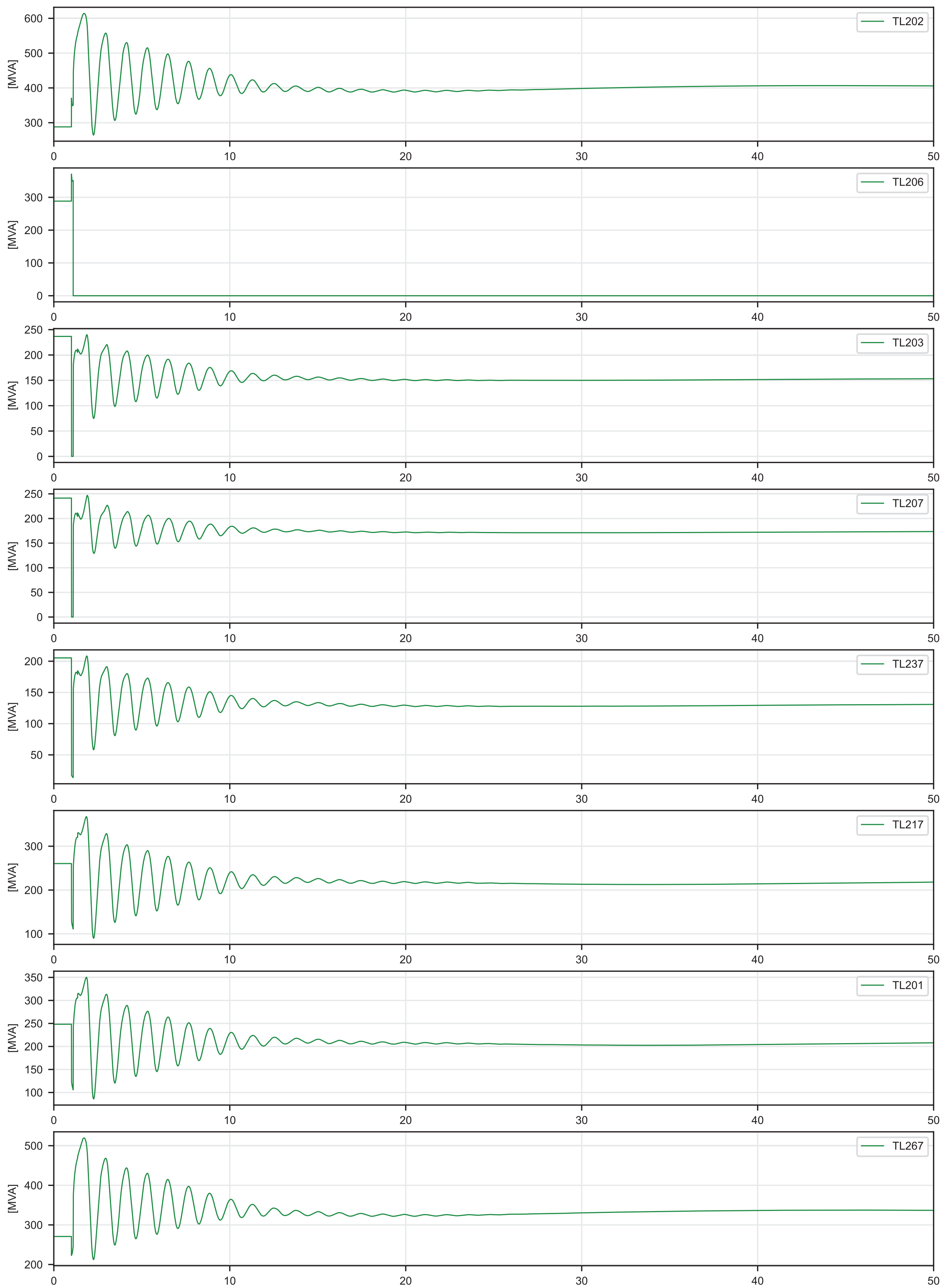
03_2033-34_Base-Peak_TL206-TL202_150MW_MLFC_off
Loss of TL206 | 230 kV Power Flow



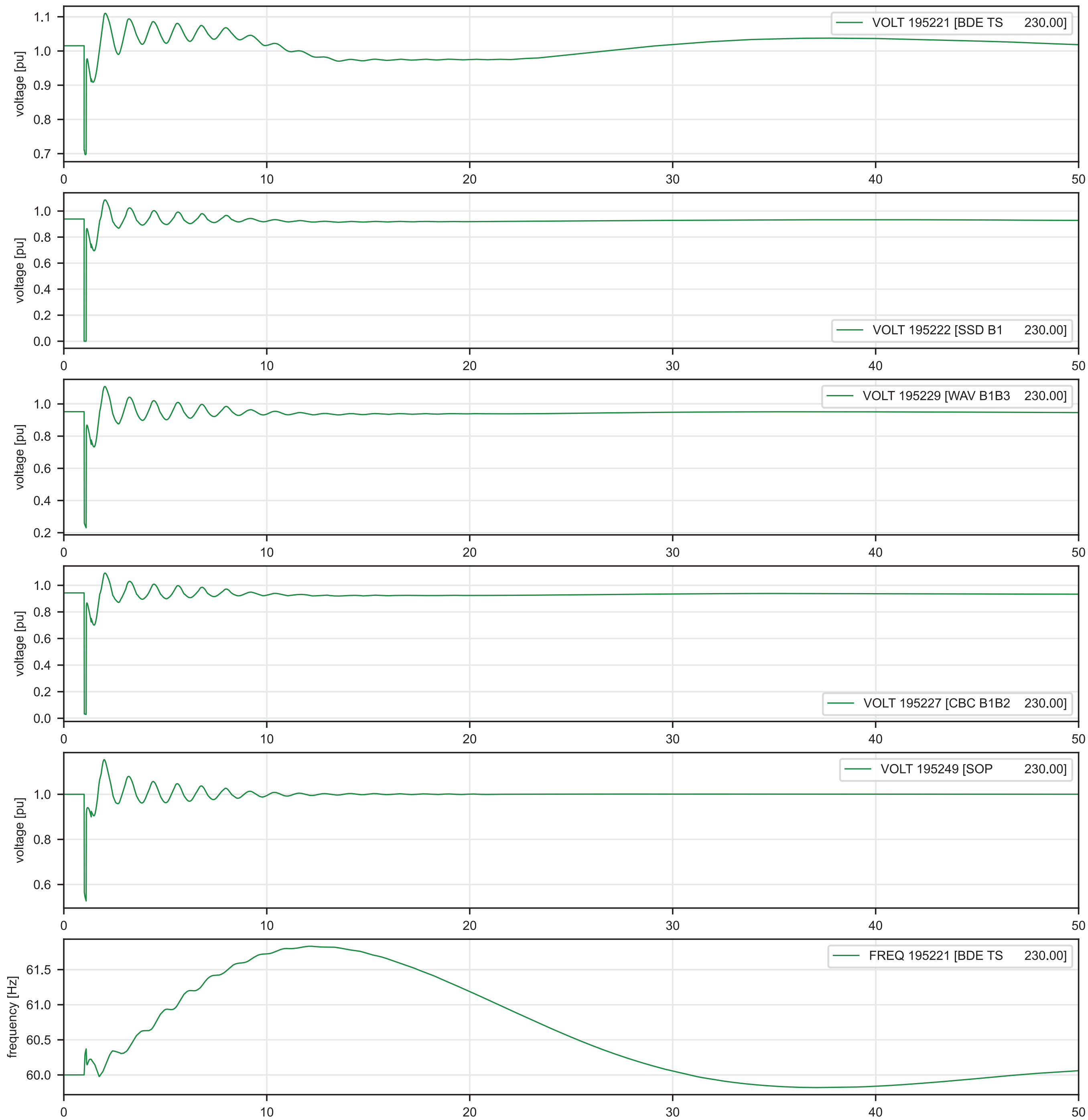
03_2033-34_Base-Peak_TL206-TL202_150MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL206 | Voltage / Frequency



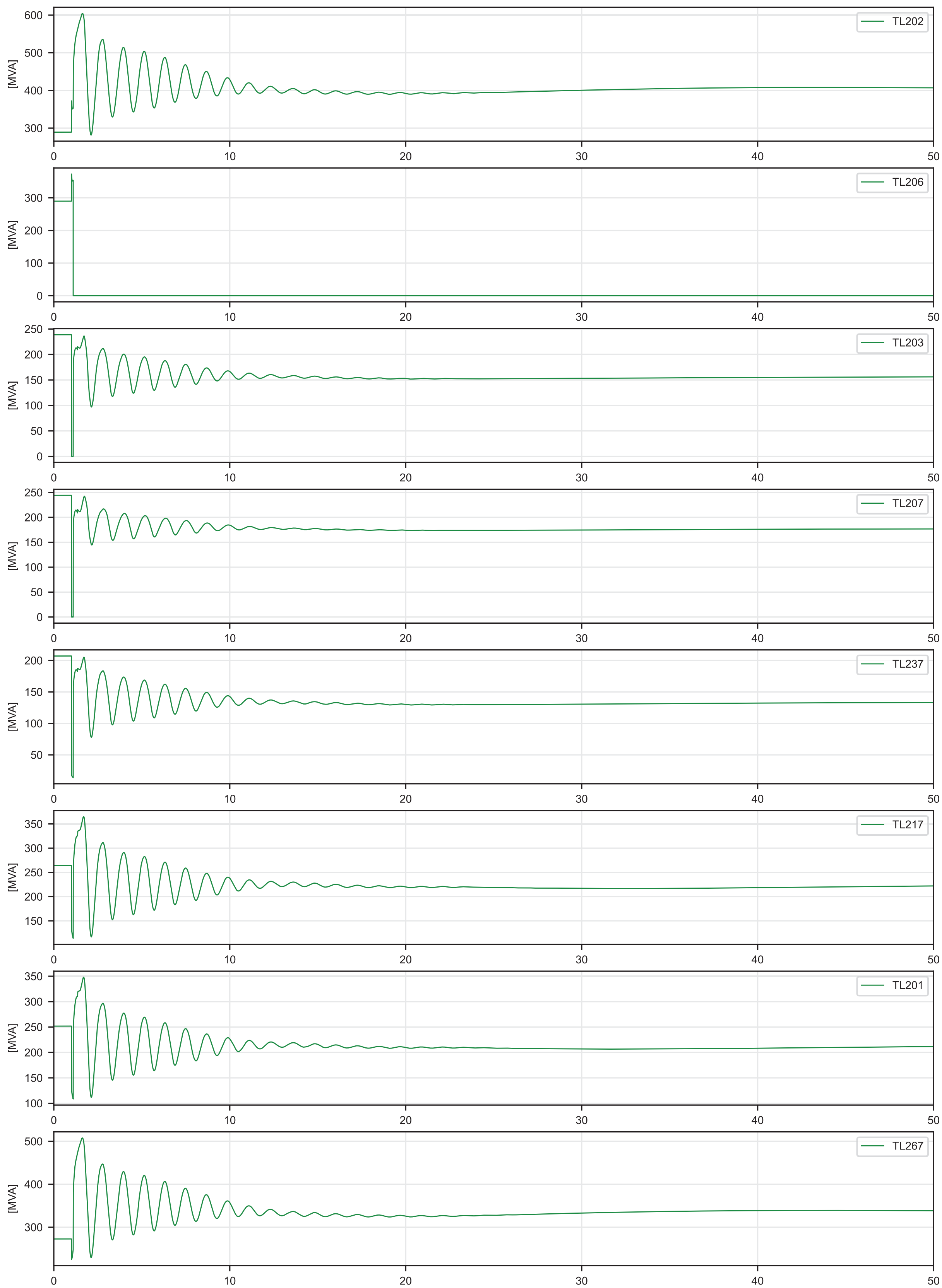
03_2033-34_Base-Peak_TL206-TL202_150MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL206 | 230 kV Power Flow



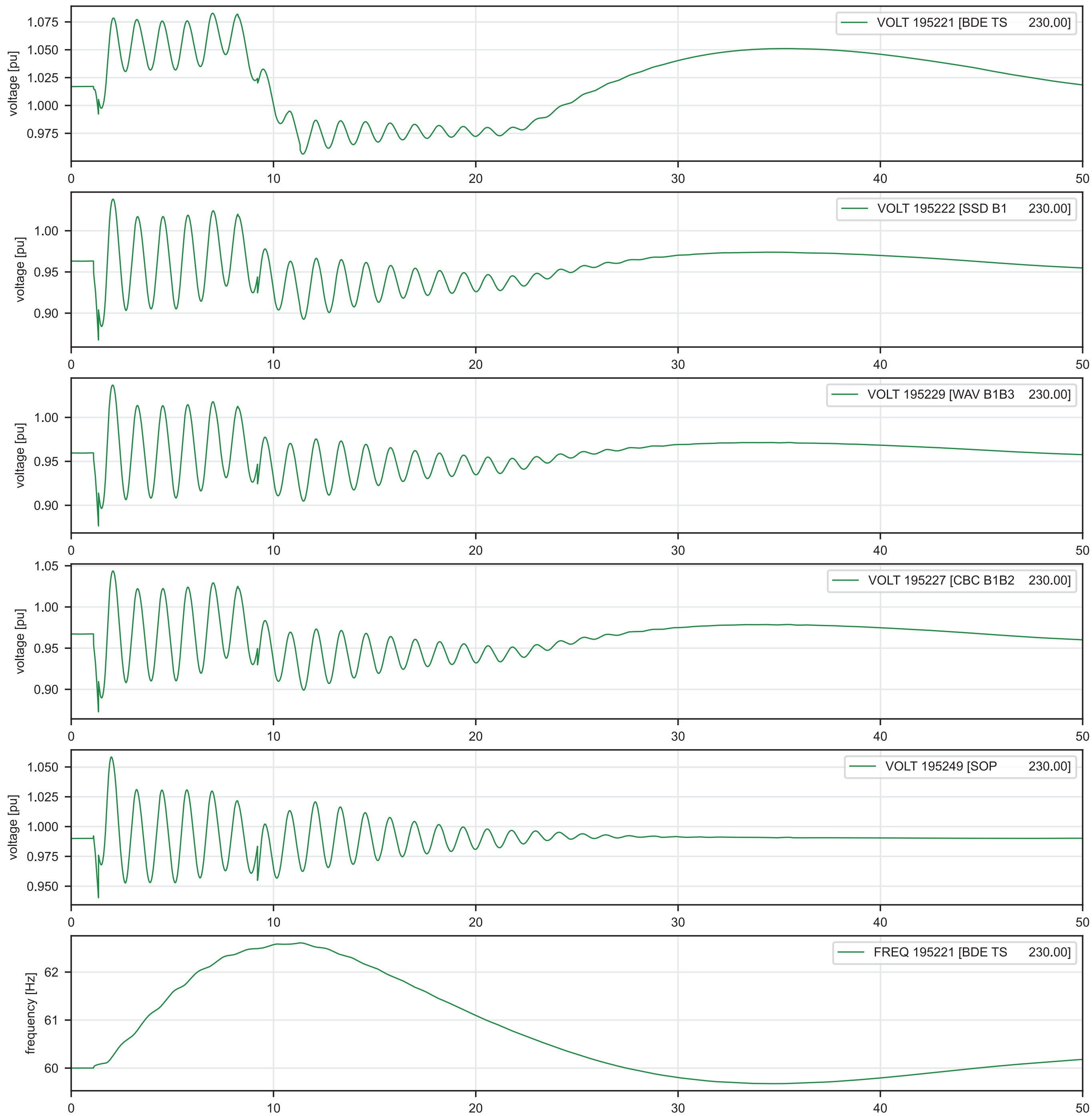
03_2033-34_Base-Peak_TL206-TL202_150MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL206 | Voltage / Frequency



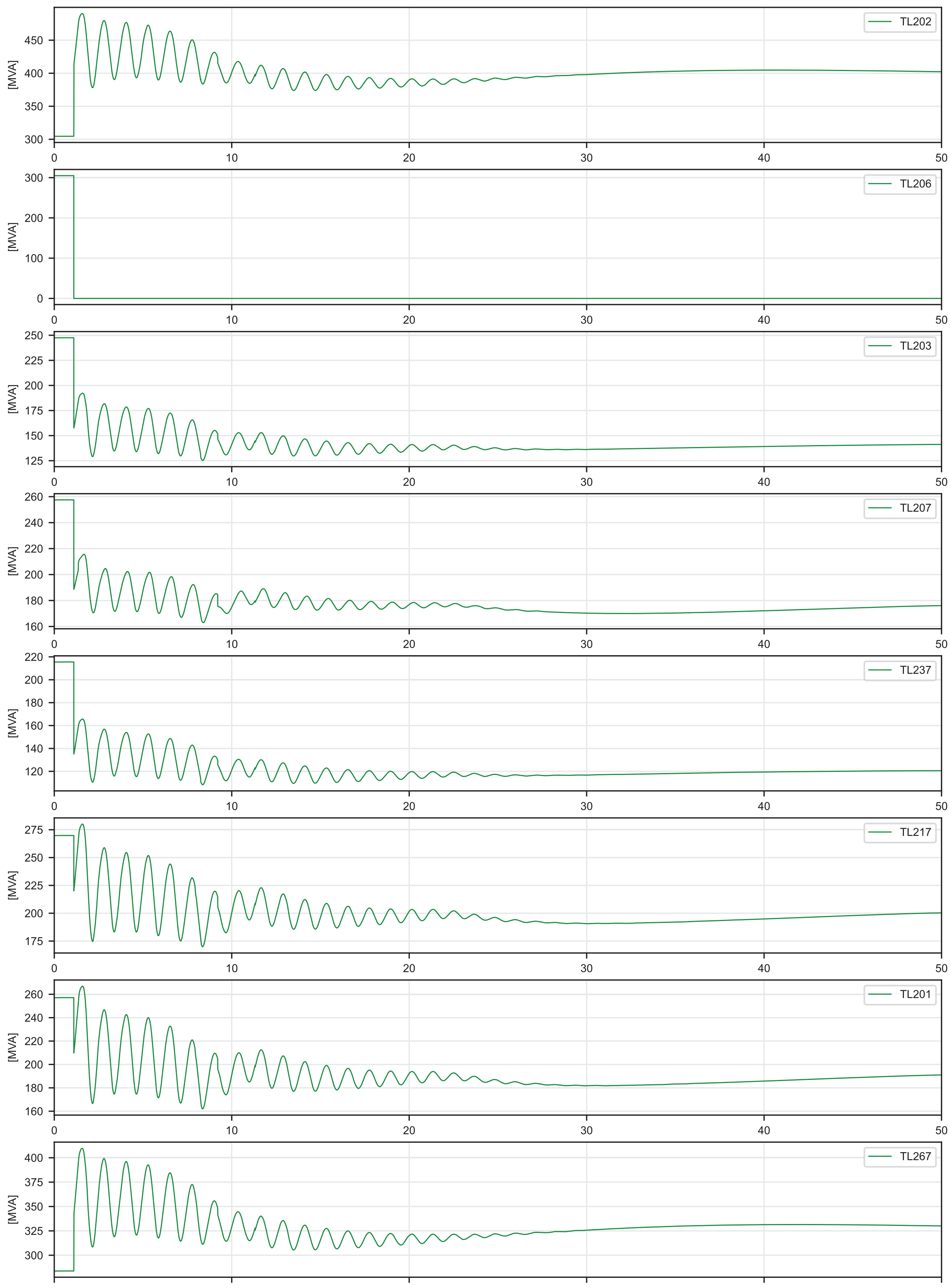
03_2033-34_Base-Peak_TL206-TL202_150MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL206 | 230 kV Power Flow



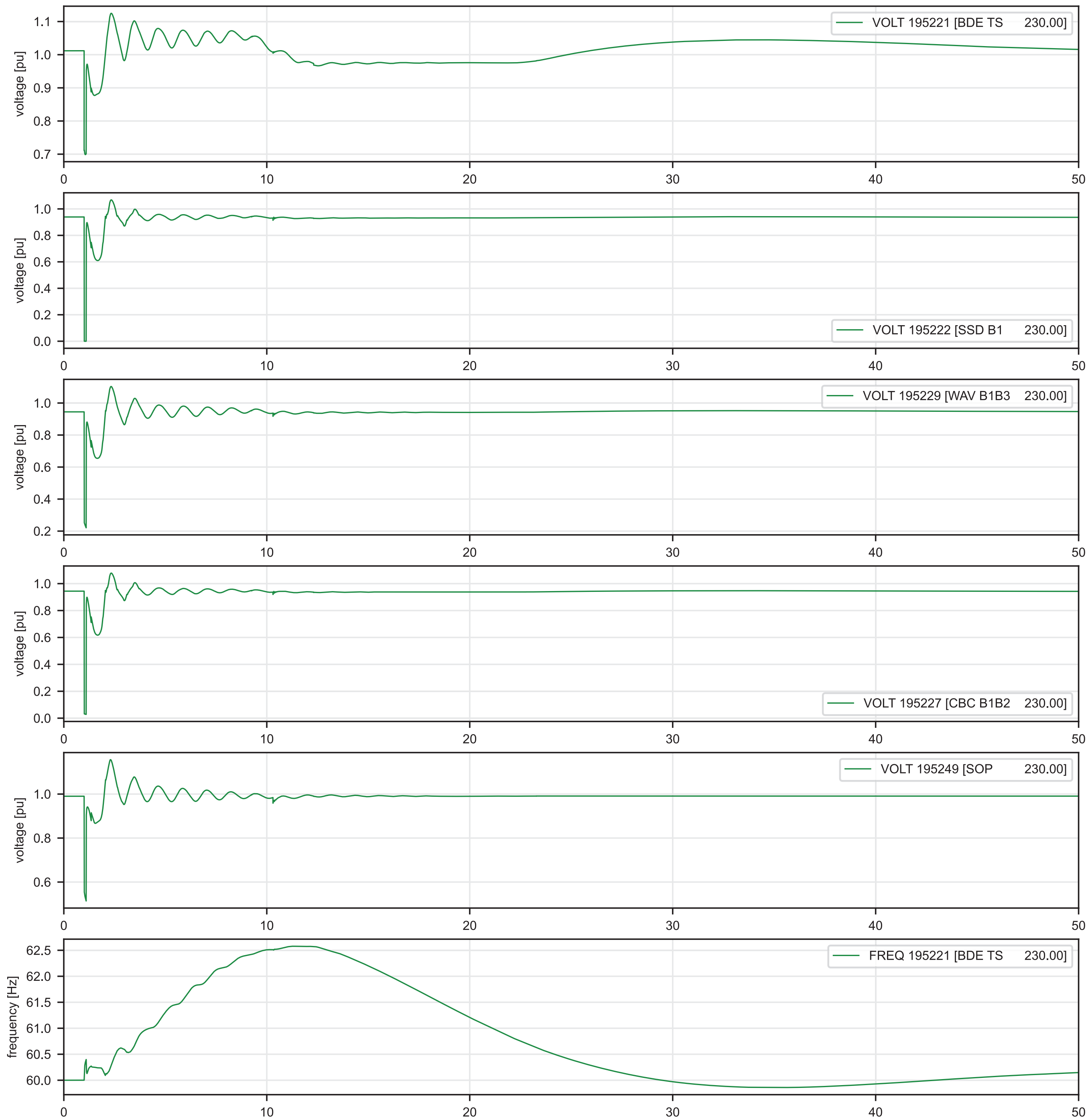
03_2033-34_Base-Peak_TL206-TL202_200MW_MLFC_off
Loss of TL206 | Voltage / Frequency



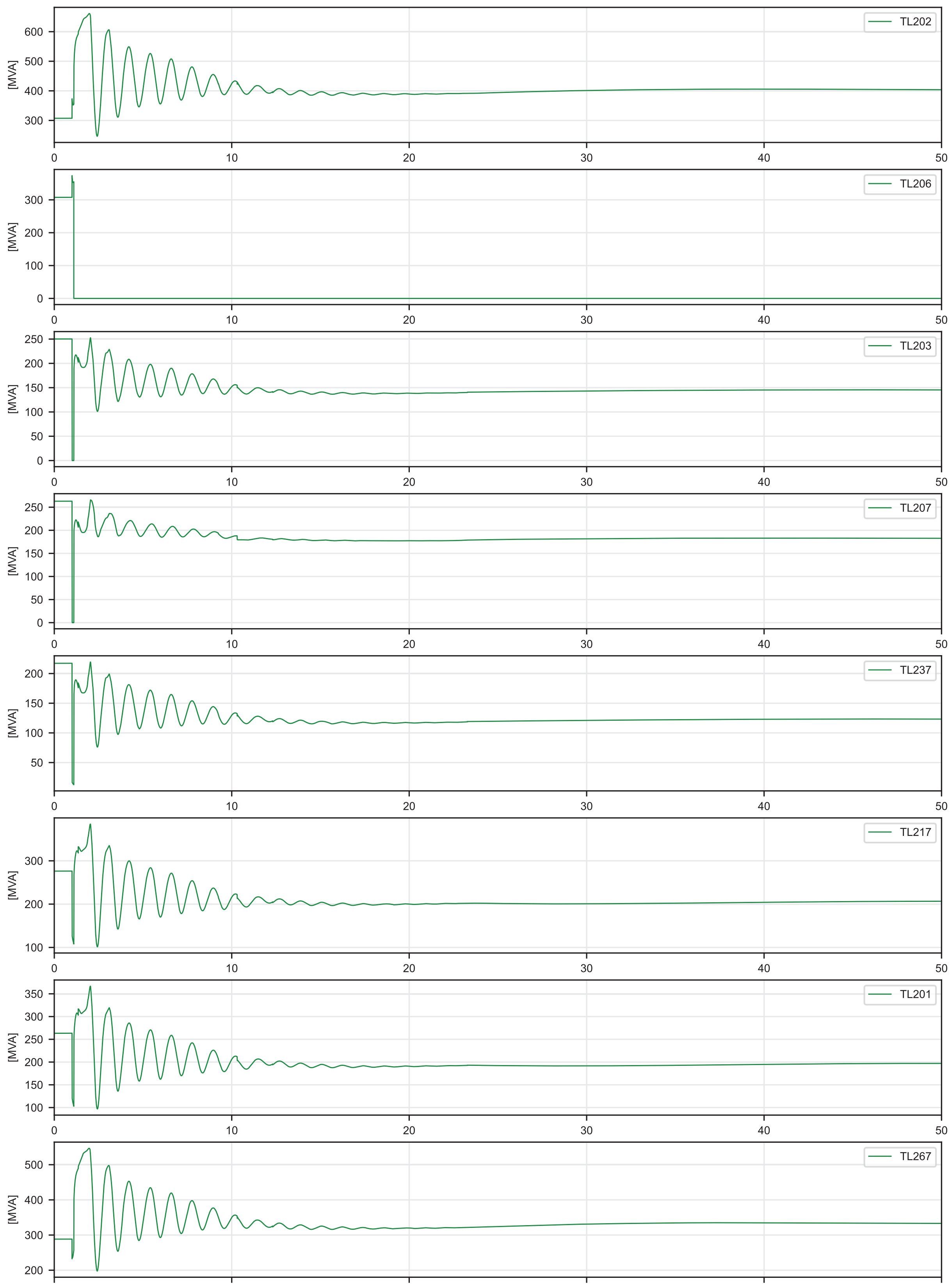
03_2033-34_Base-Peak_TL206-TL202_200MW_MLFC_off
Loss of TL206 | 230 kV Power Flow



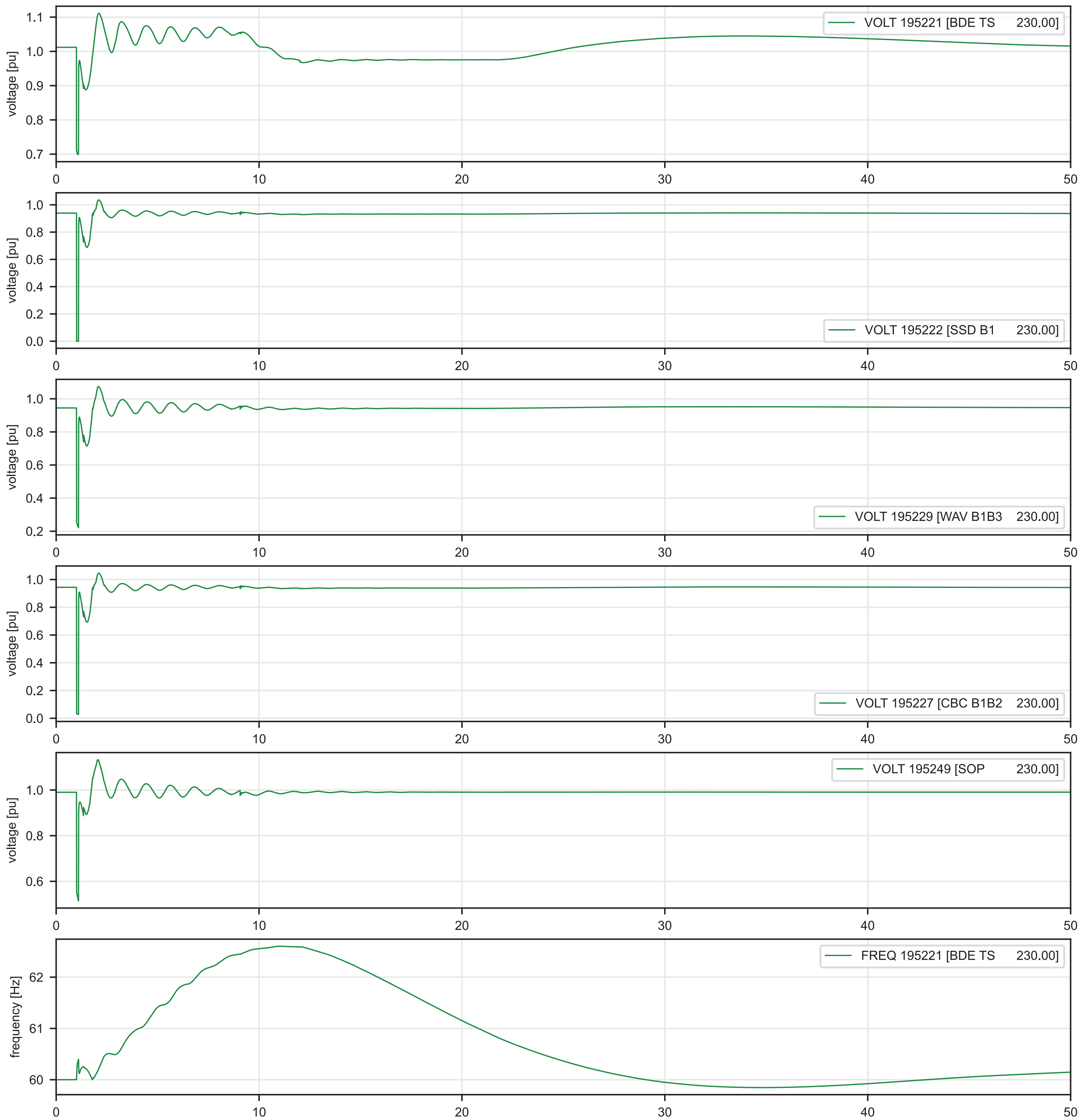
03_2033-34_Base-Peak_TL206-TL202_200MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL206 | Voltage / Frequency



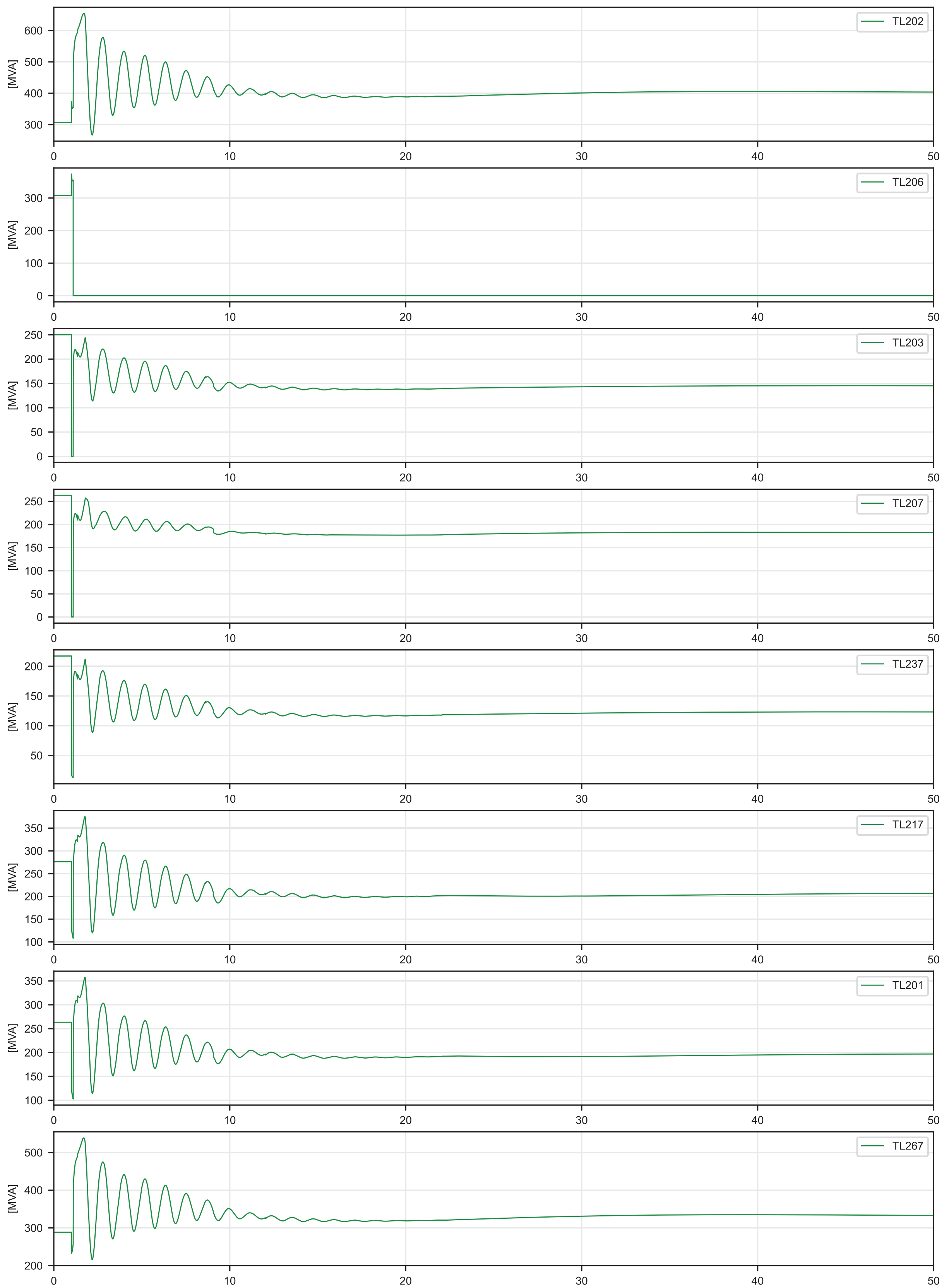
03_2033-34_Base-Peak_TL206-TL202_200MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL206 | 230 kV Power Flow



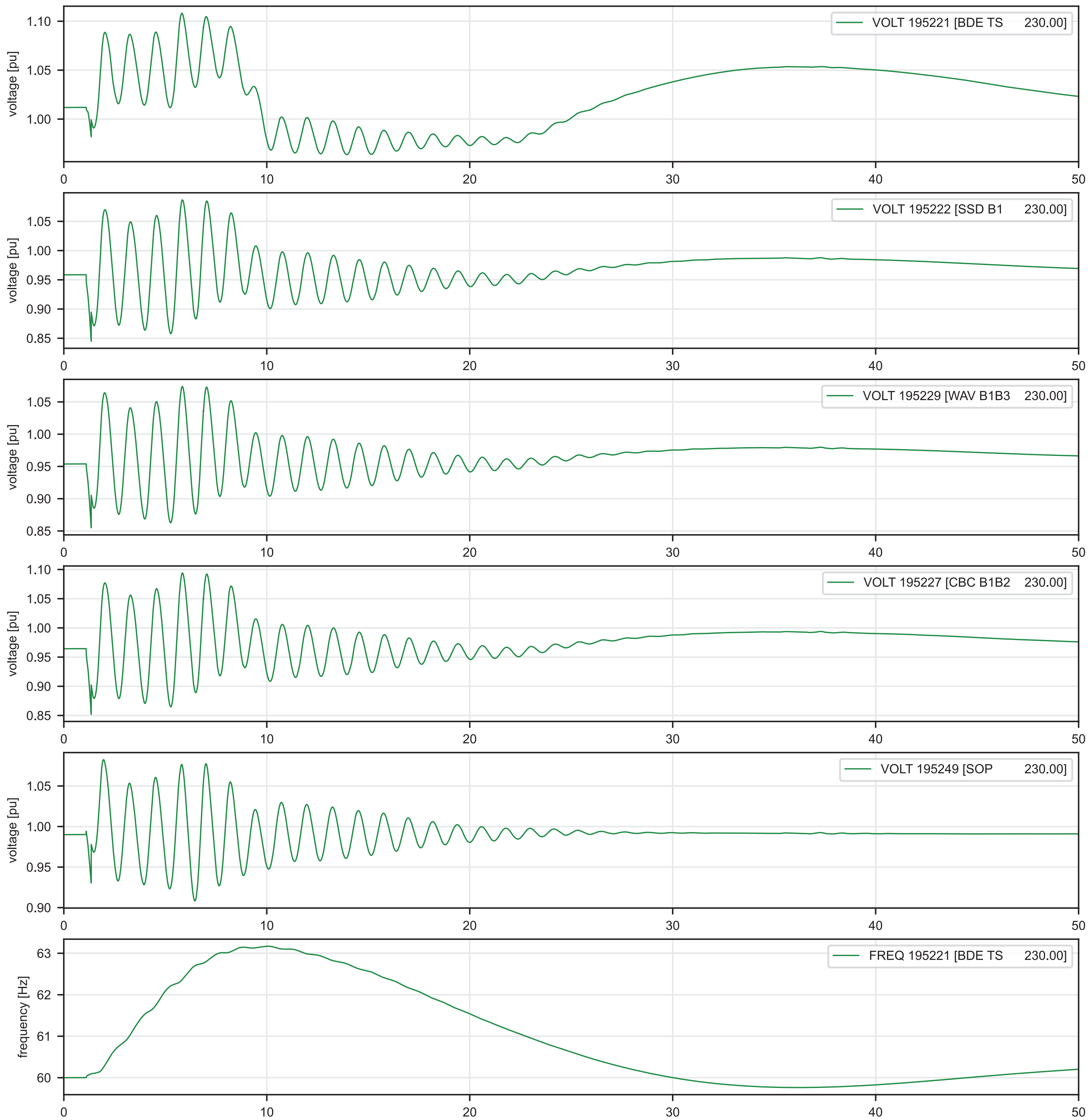
03_2033-34_Base-Peak_TL206-TL202_200MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL206 | Voltage / Frequency



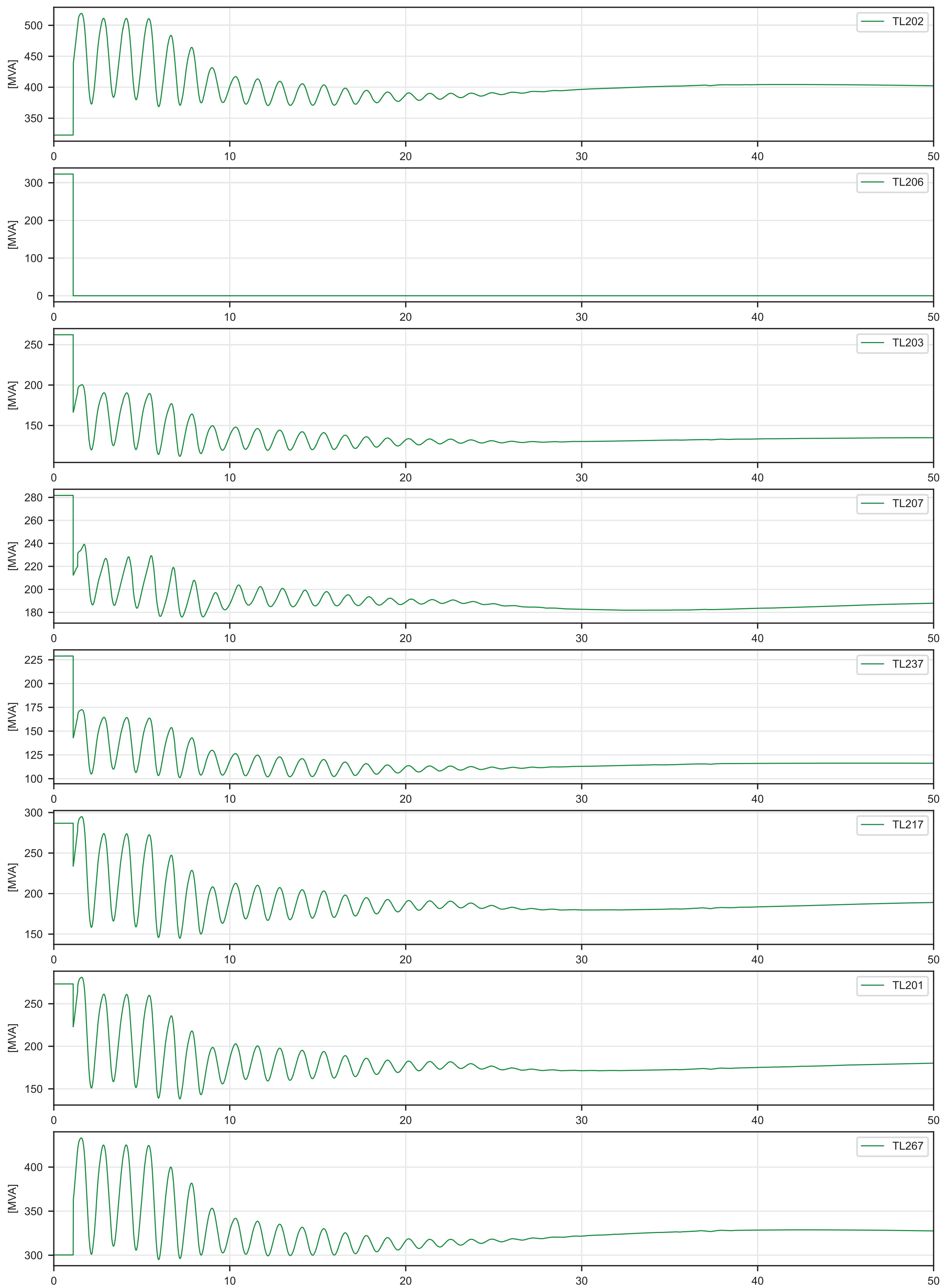
03_2033-34_Base-Peak_TL206-TL202_200MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL206 | 230 kV Power Flow



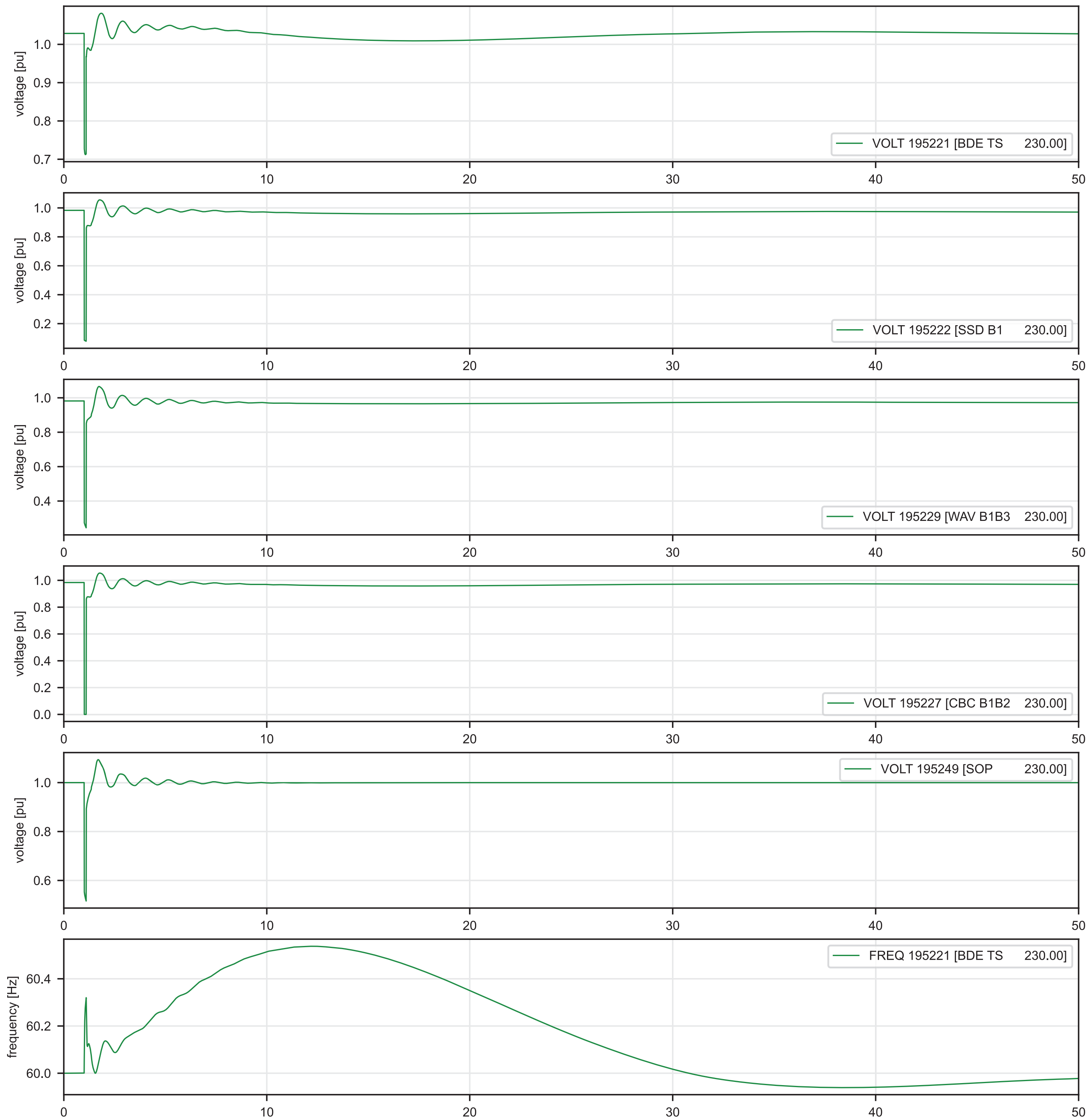
03_2033-34_Base-Peak_TL206-TL202_250MW_MLFC_off
Loss of TL206 | Voltage / Frequency



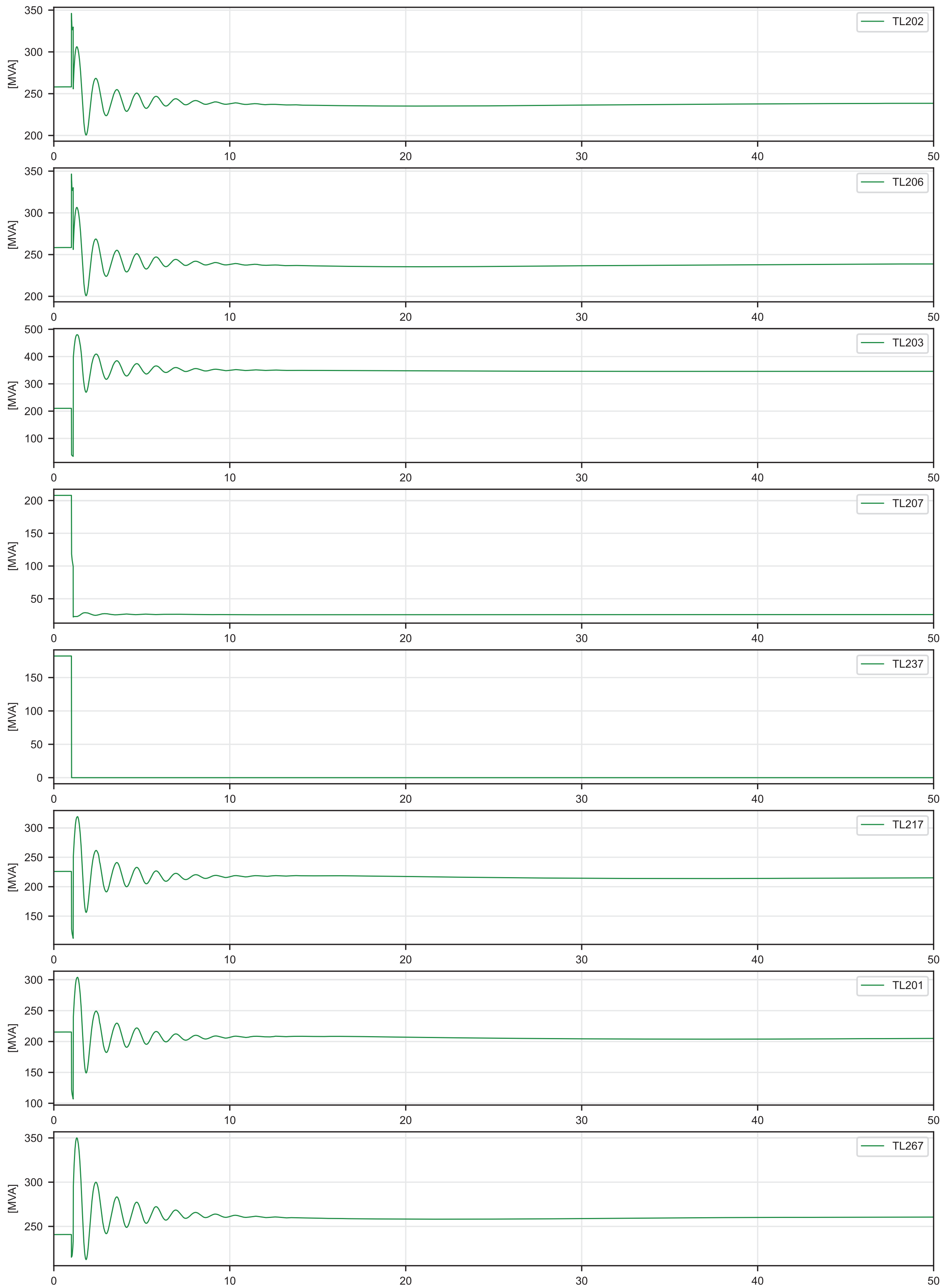
03_2033-34_Base-Peak_TL206-TL202_250MW_MLFC_off
Loss of TL206 | 230 kV Power Flow



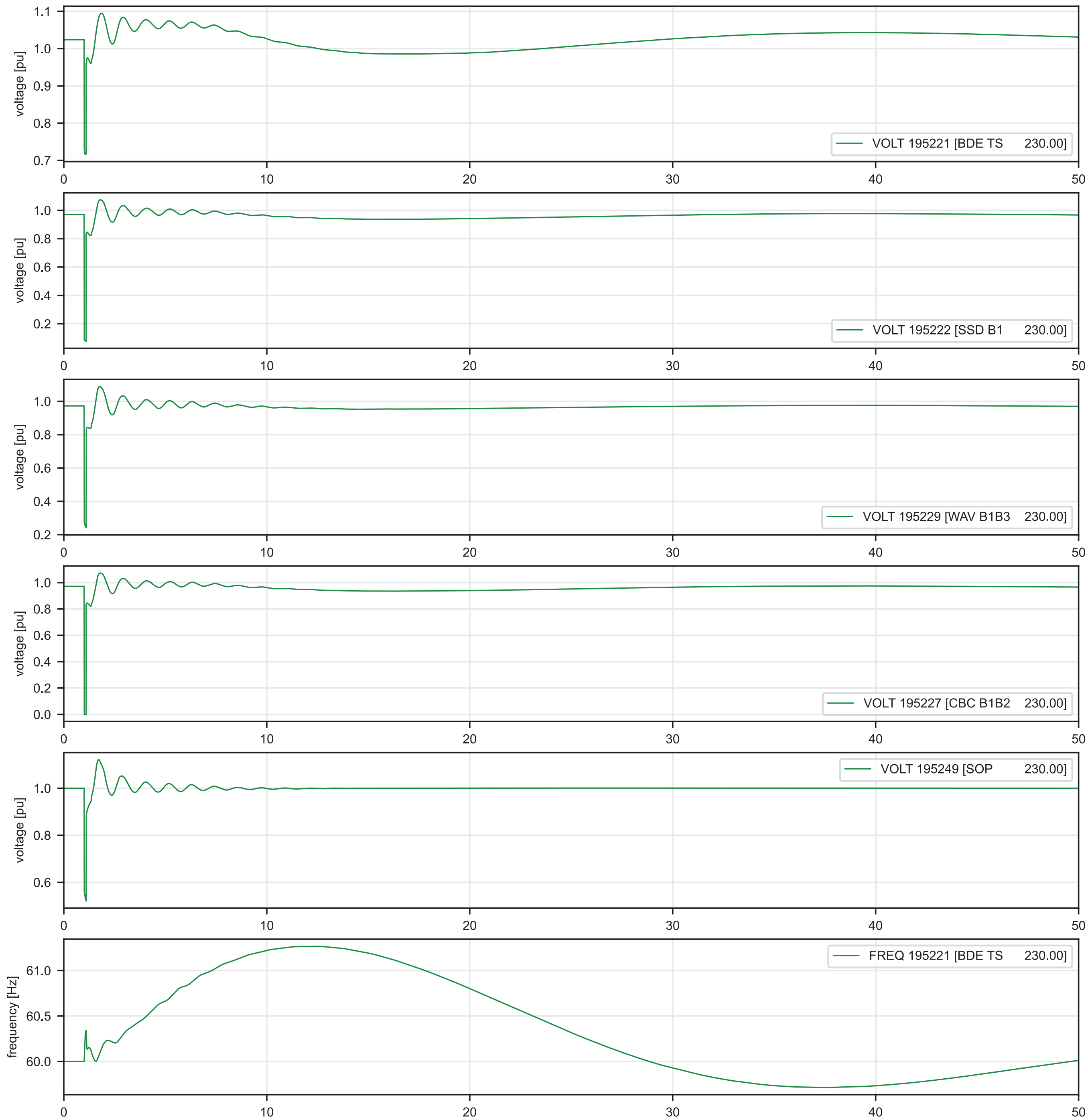
04_2033-34_Base-Peak_TL237-TL203_050MW_MLFC_off
Loss of TL237 | Voltage / Frequency



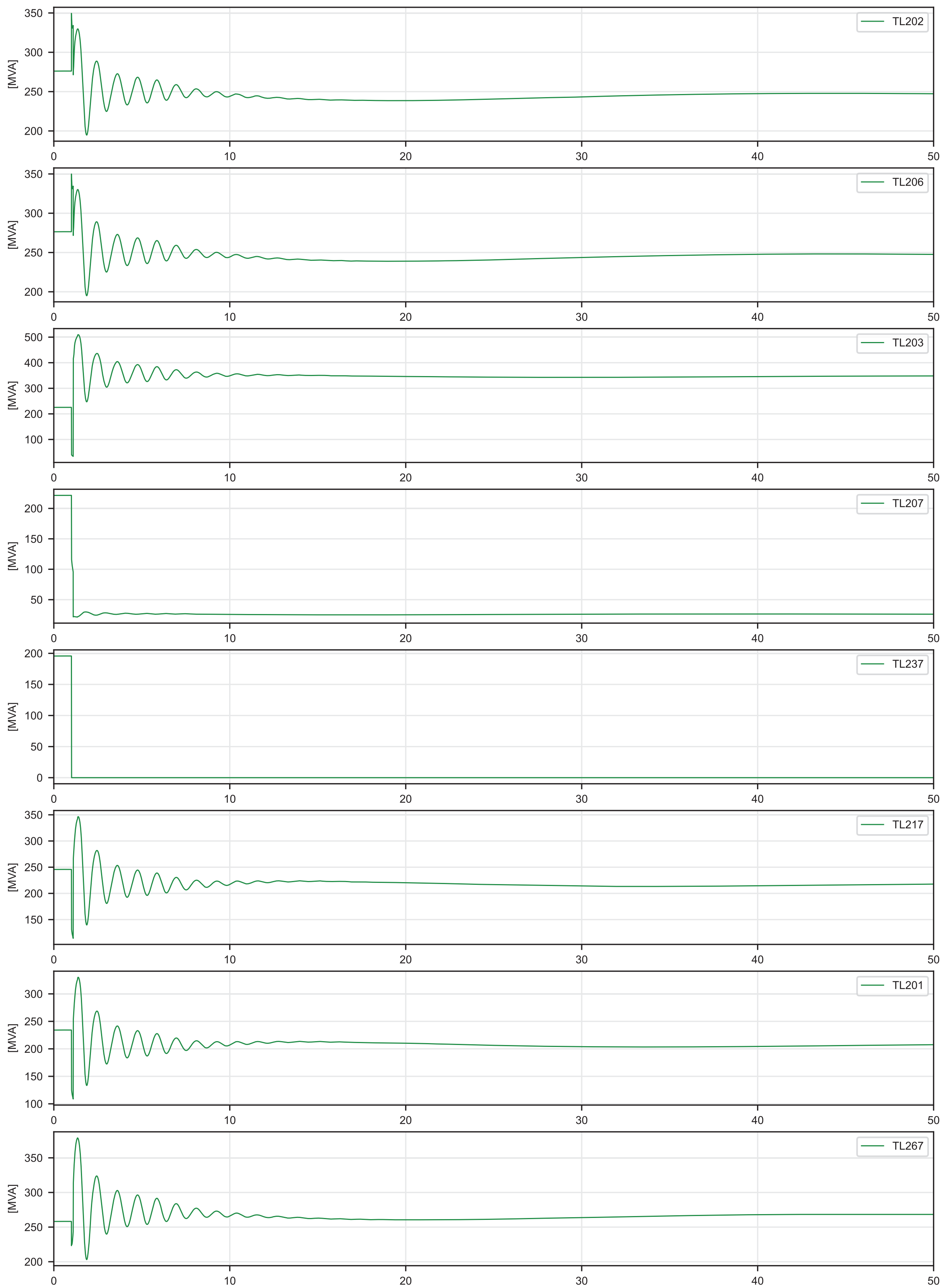
04_2033-34_Base-Peak_TL237-TL203_050MW_MLFC_off
Loss of TL237 | 230 kV Power Flow



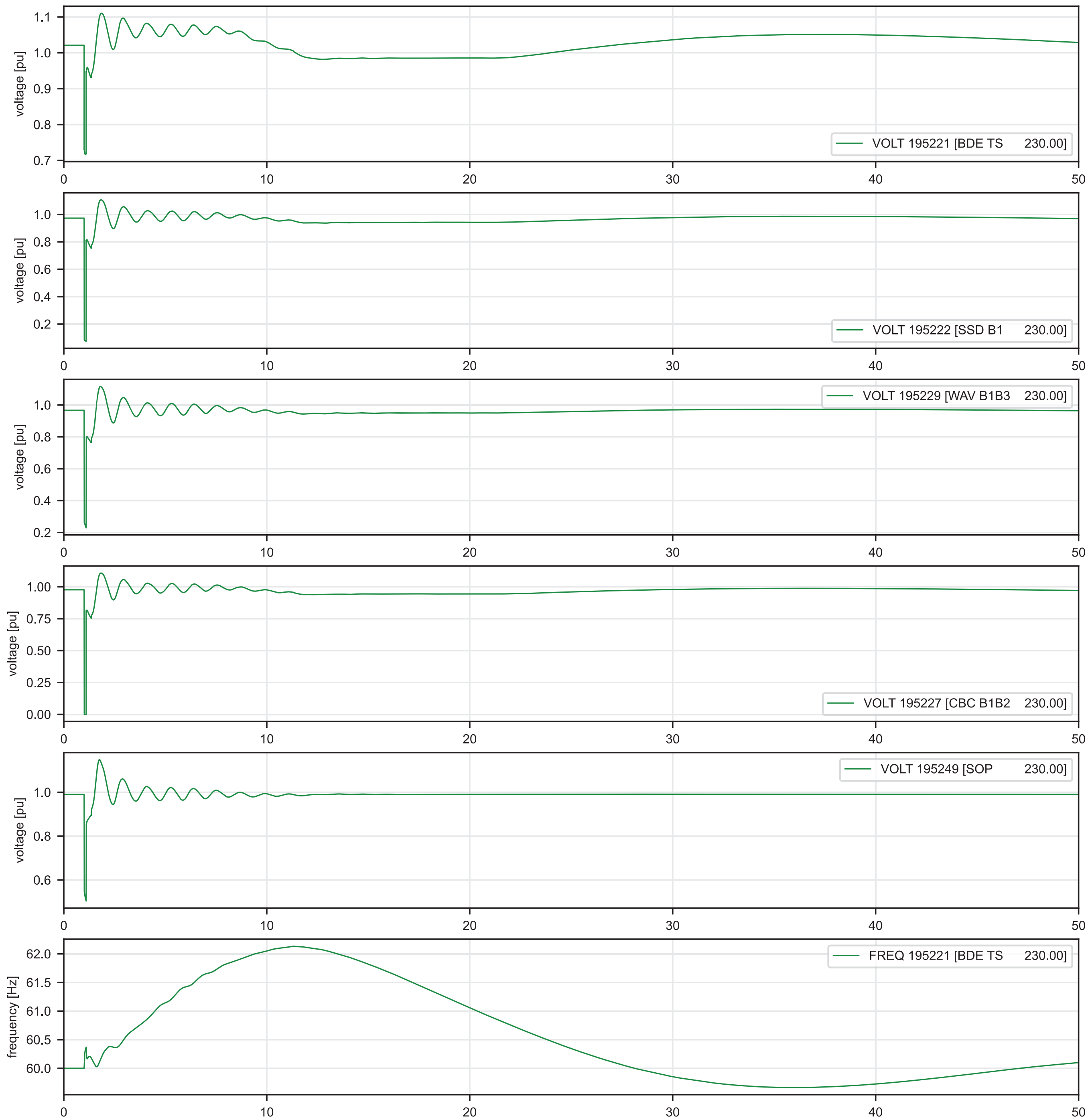
04_2033-34_Base-Peak_TL237-TL203_100MW_MLFC_off
Loss of TL237 | Voltage / Frequency



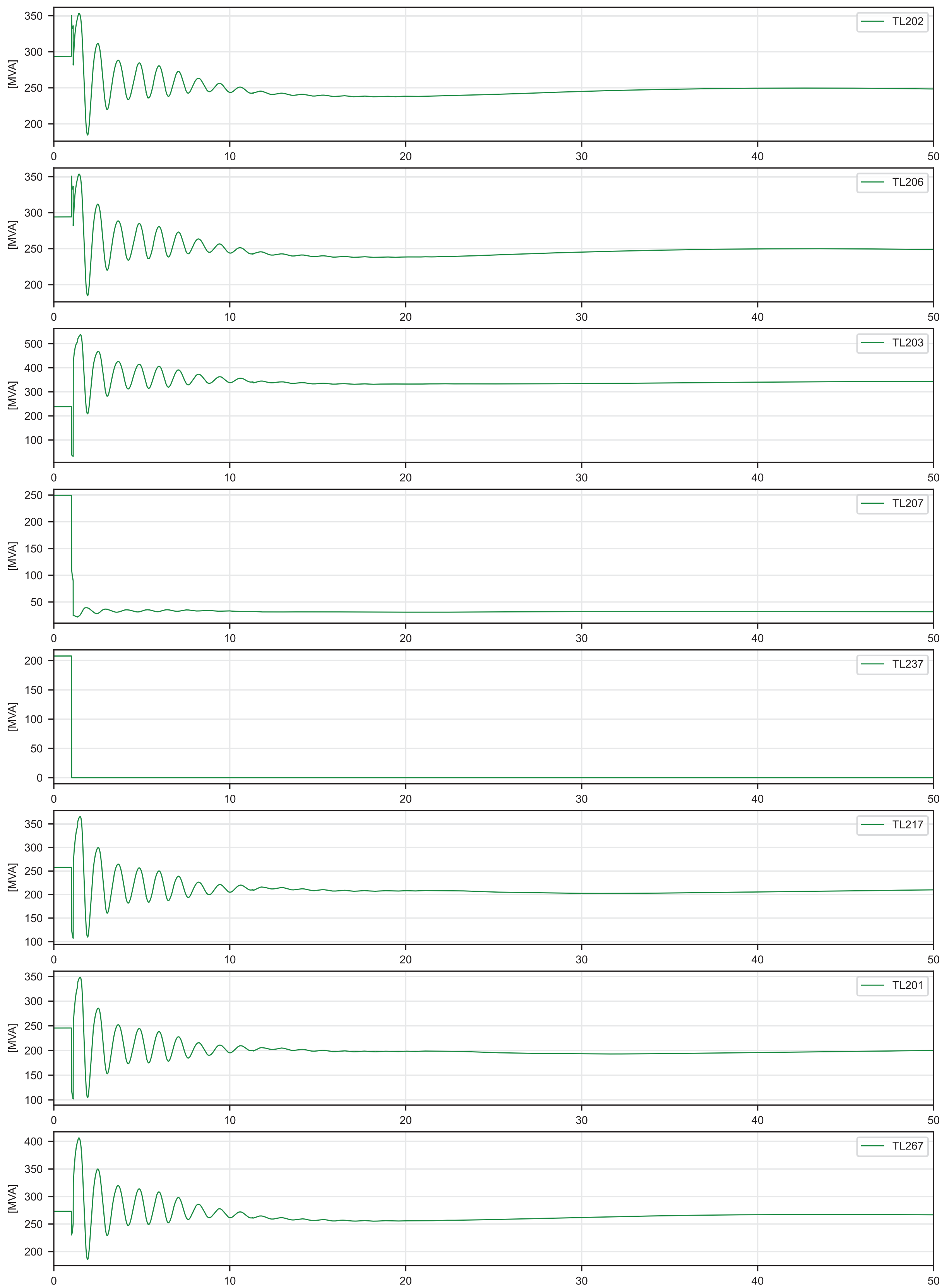
04_2033-34_Base-Peak_TL237-TL203_100MW_MLFC_off
Loss of TL237 | 230 kV Power Flow



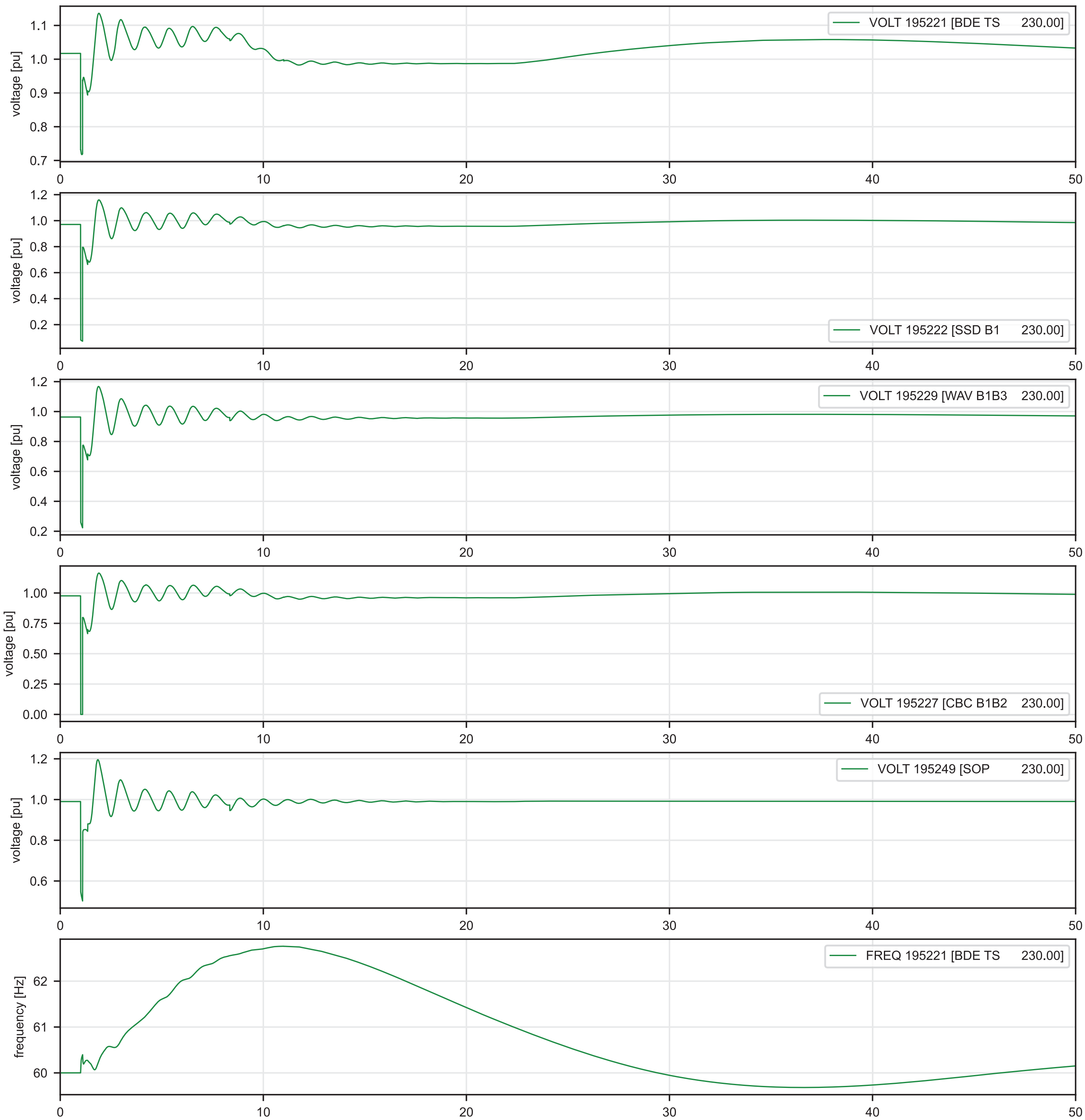
04_2033-34_Base-Peak_TL237-TL203_150MW_MLFC_off
Loss of TL237 | Voltage / Frequency



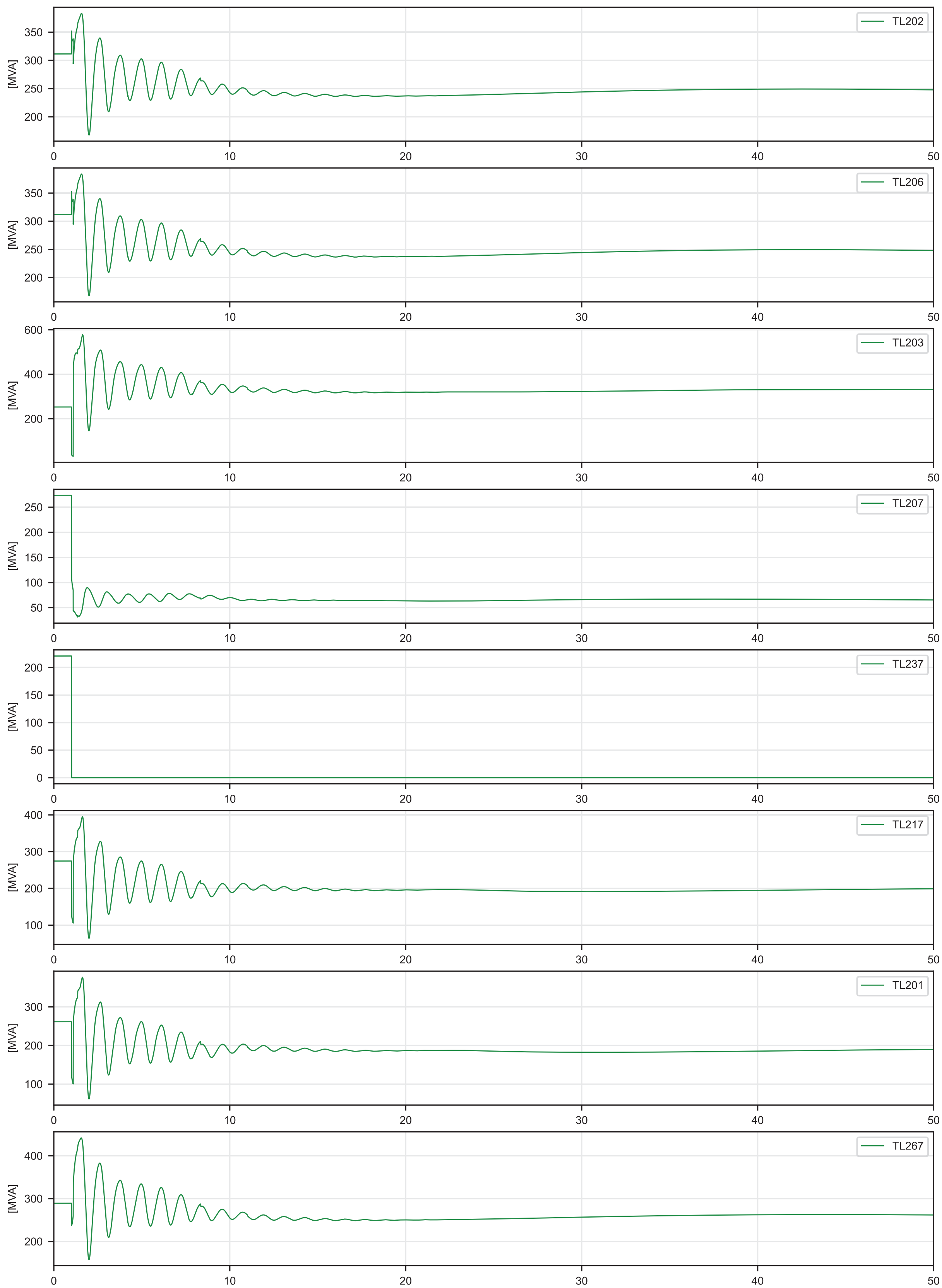
04_2033-34_Base-Peak_TL237-TL203_150MW_MLFC_off
Loss of TL237 | 230 kV Power Flow



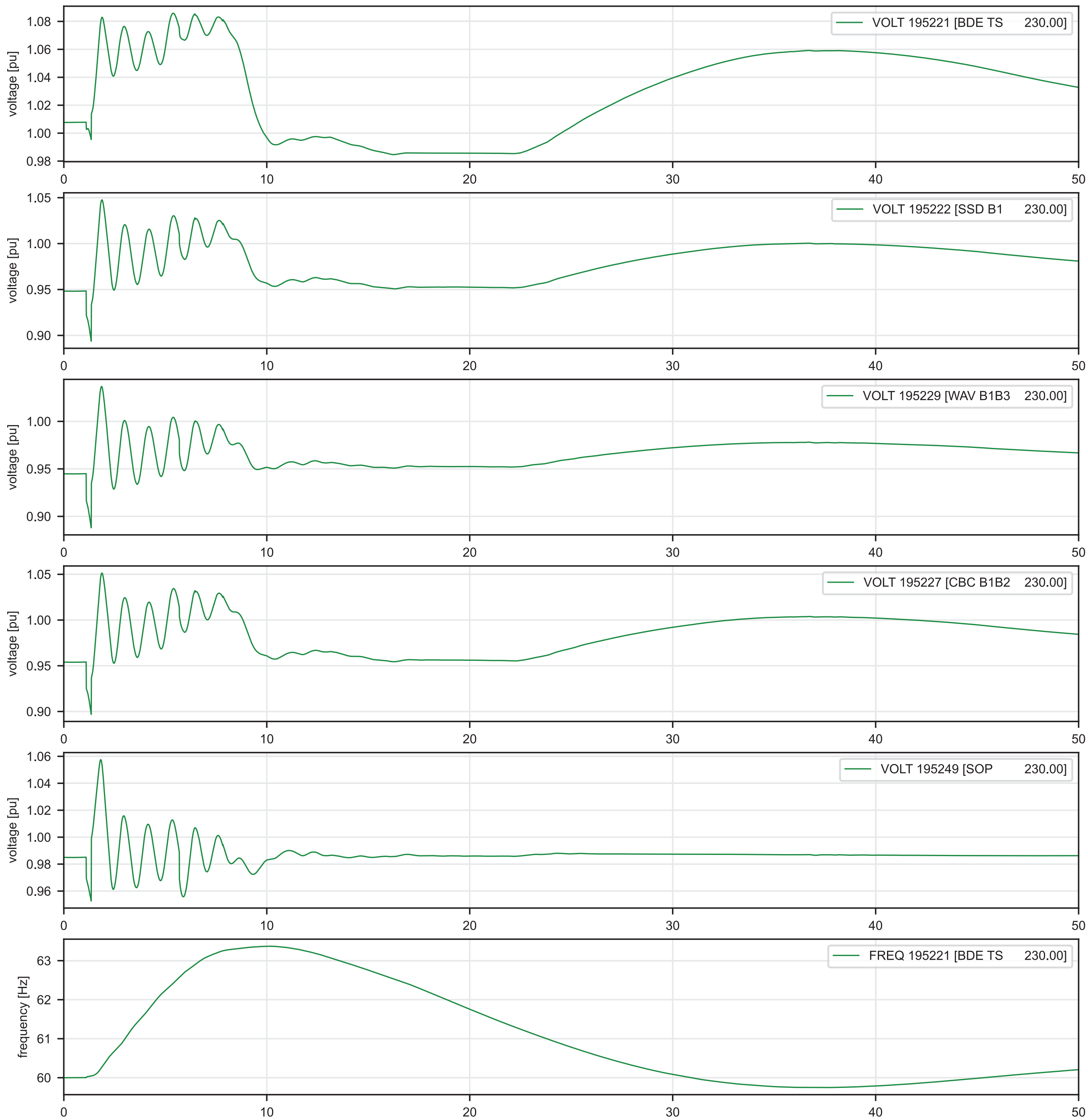
04_2033-34_Base-Peak_TL237-TL203_200MW_MLFC_off
Loss of TL237 | Voltage / Frequency



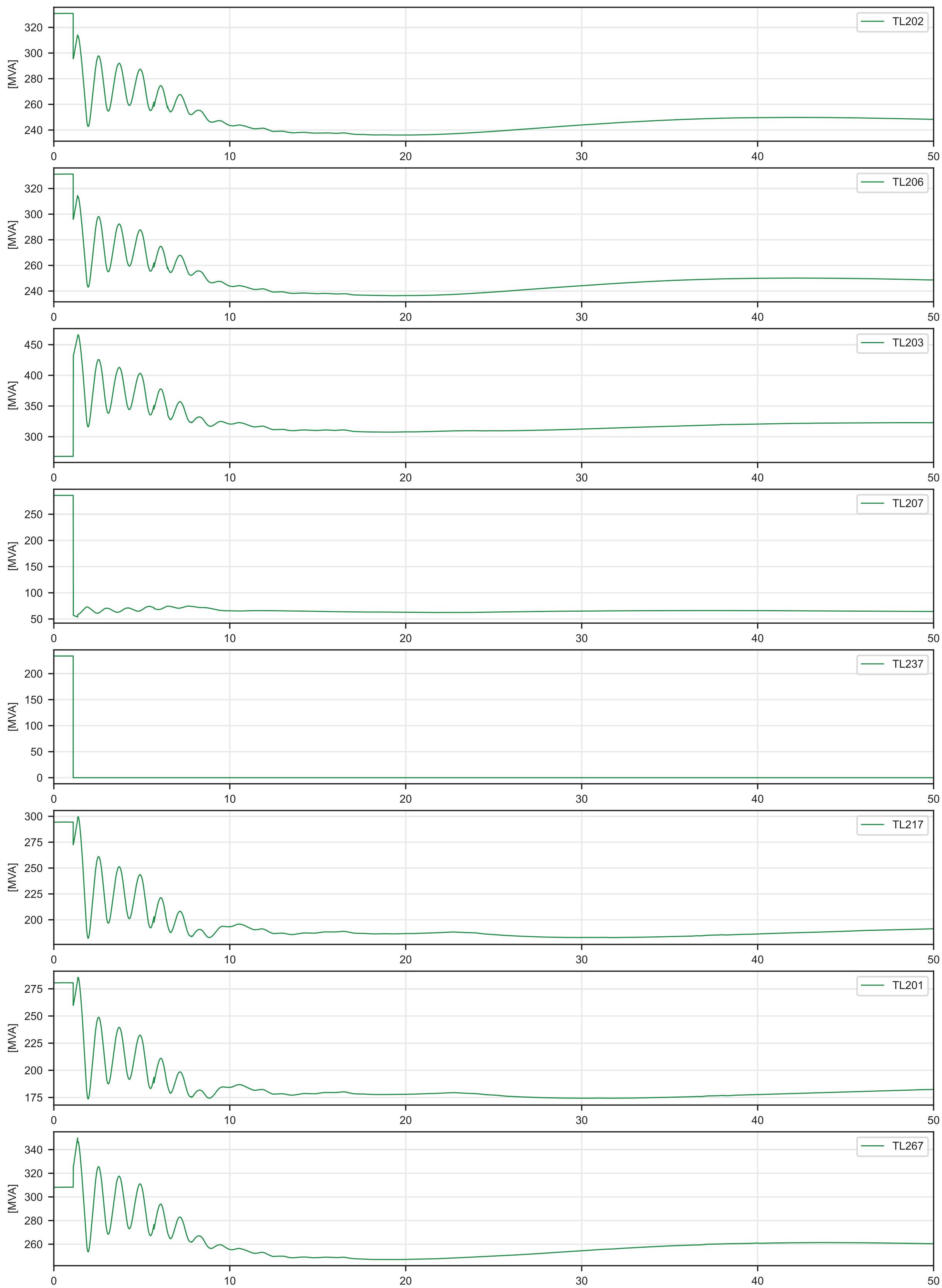
04_2033-34_Base-Peak_TL237-TL203_200MW_MLFC_off
Loss of TL237 | 230 kV Power Flow



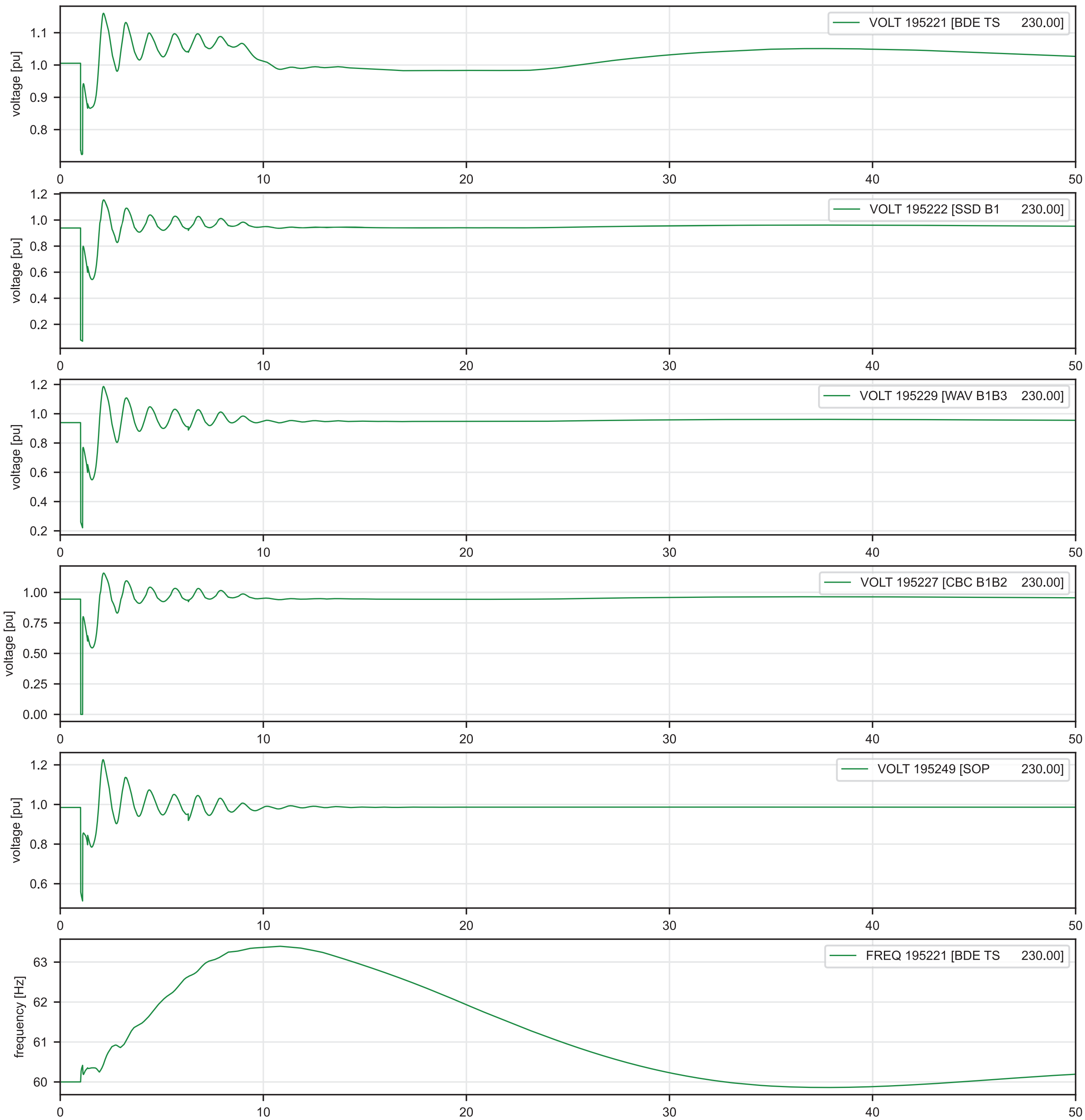
04_2033-34_Base-Peak_TL237-TL203_250MW_MLFC_off
Loss of TL237 | Voltage / Frequency



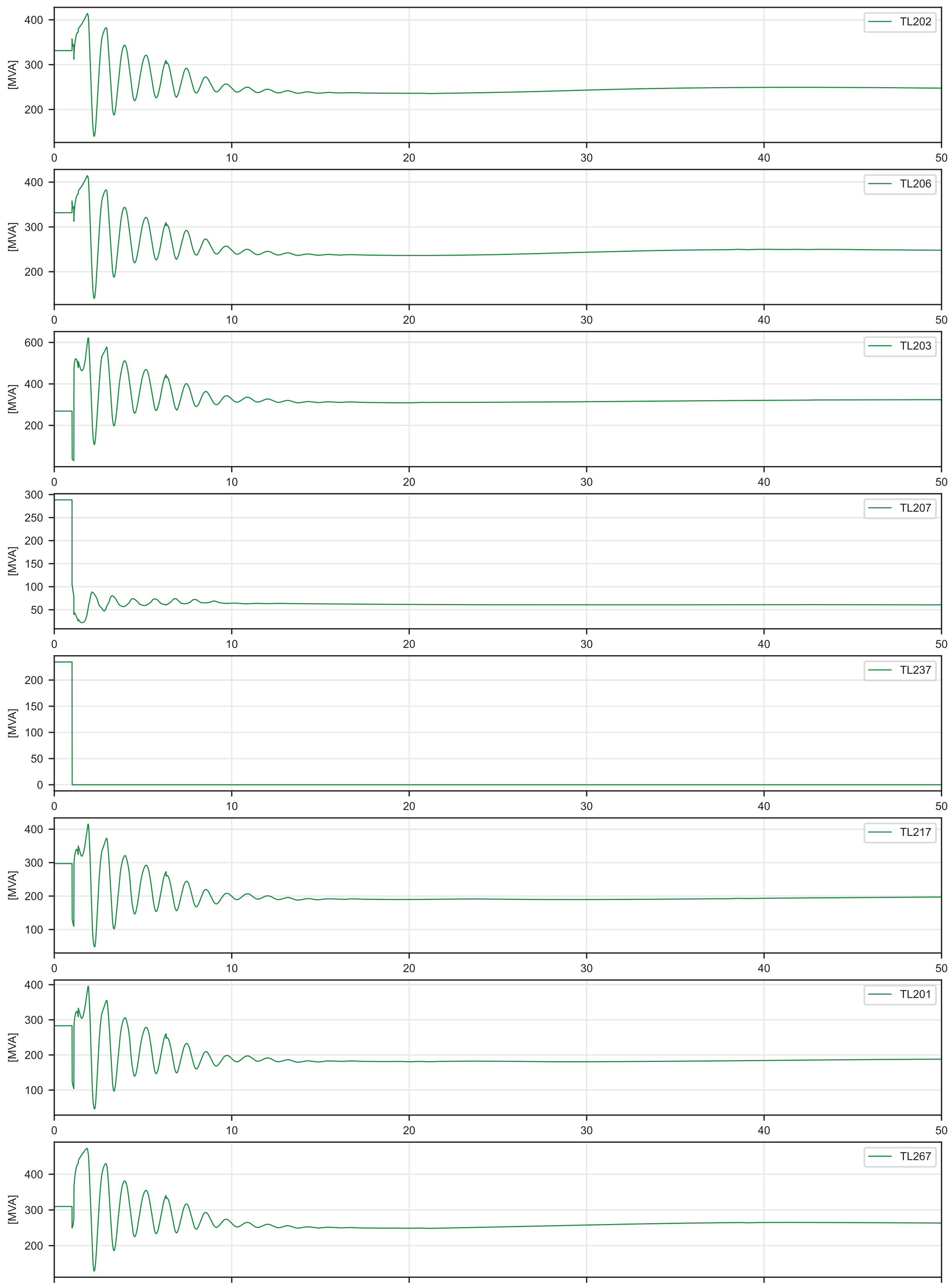
04_2033-34_Base-Peak_TL237-TL203_250MW_MLFC_off
Loss of TL237 | 230 kV Power Flow



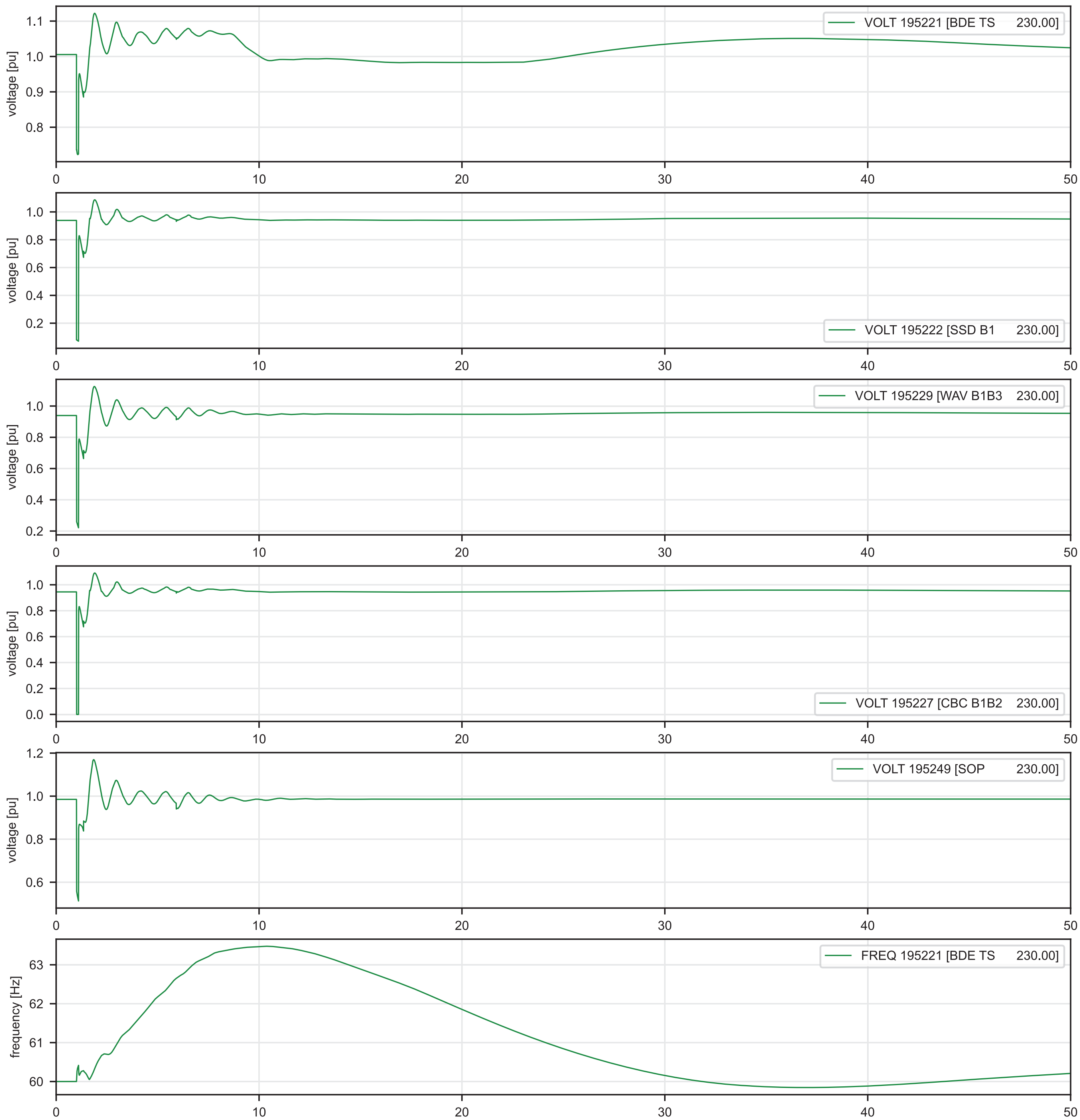
04_2033-34_Base-Peak_TL237-TL203_250MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL237 | Voltage / Frequency



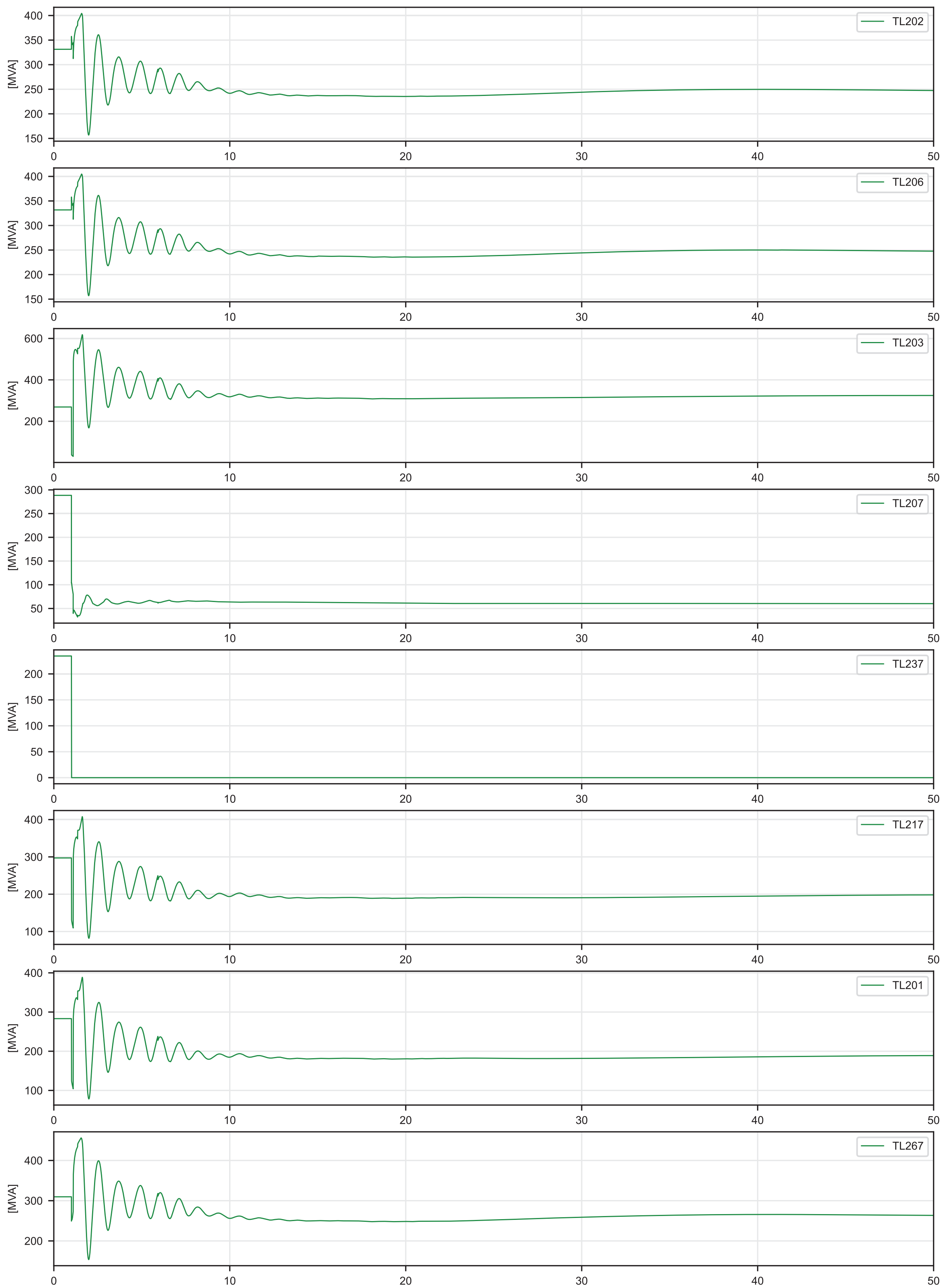
04_2033-34_Base-Peak_TL237-TL203_250MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL237 | 230 kV Power Flow



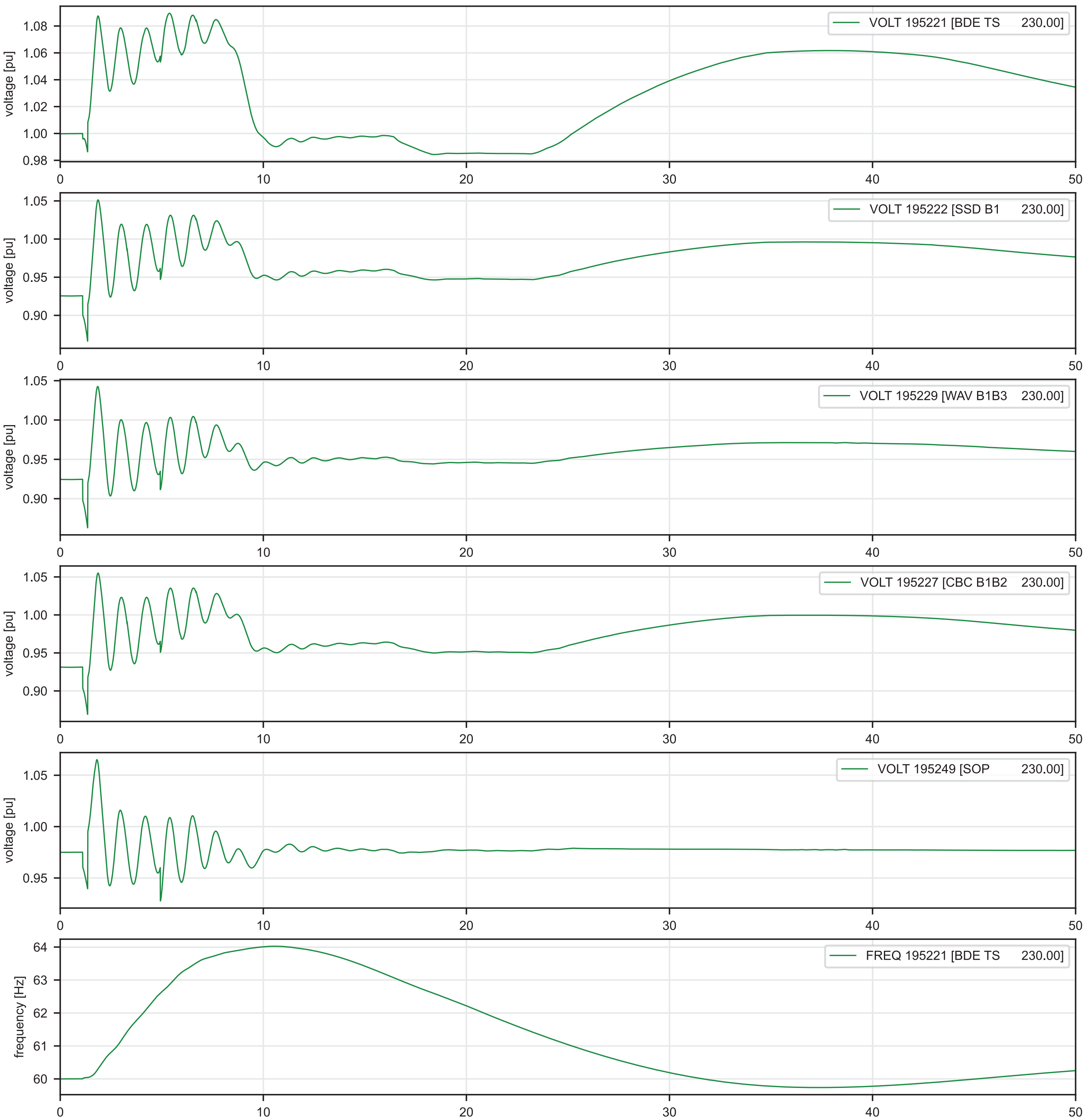
04_2033-34_Base-Peak_TL237-TL203_250MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL237 | Voltage / Frequency



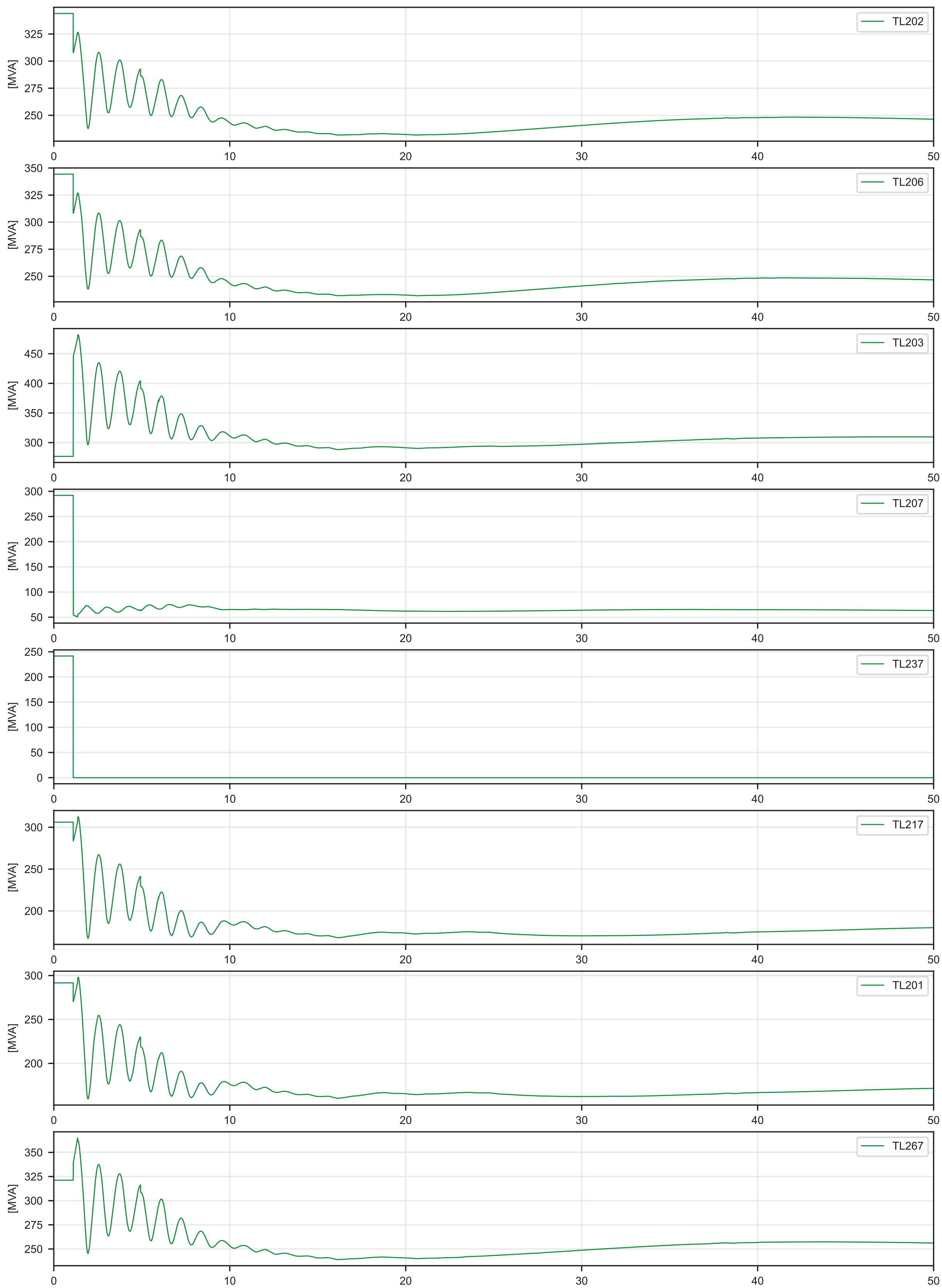
04_2033-34_Base-Peak_TL237-TL203_250MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL237 | 230 kV Power Flow



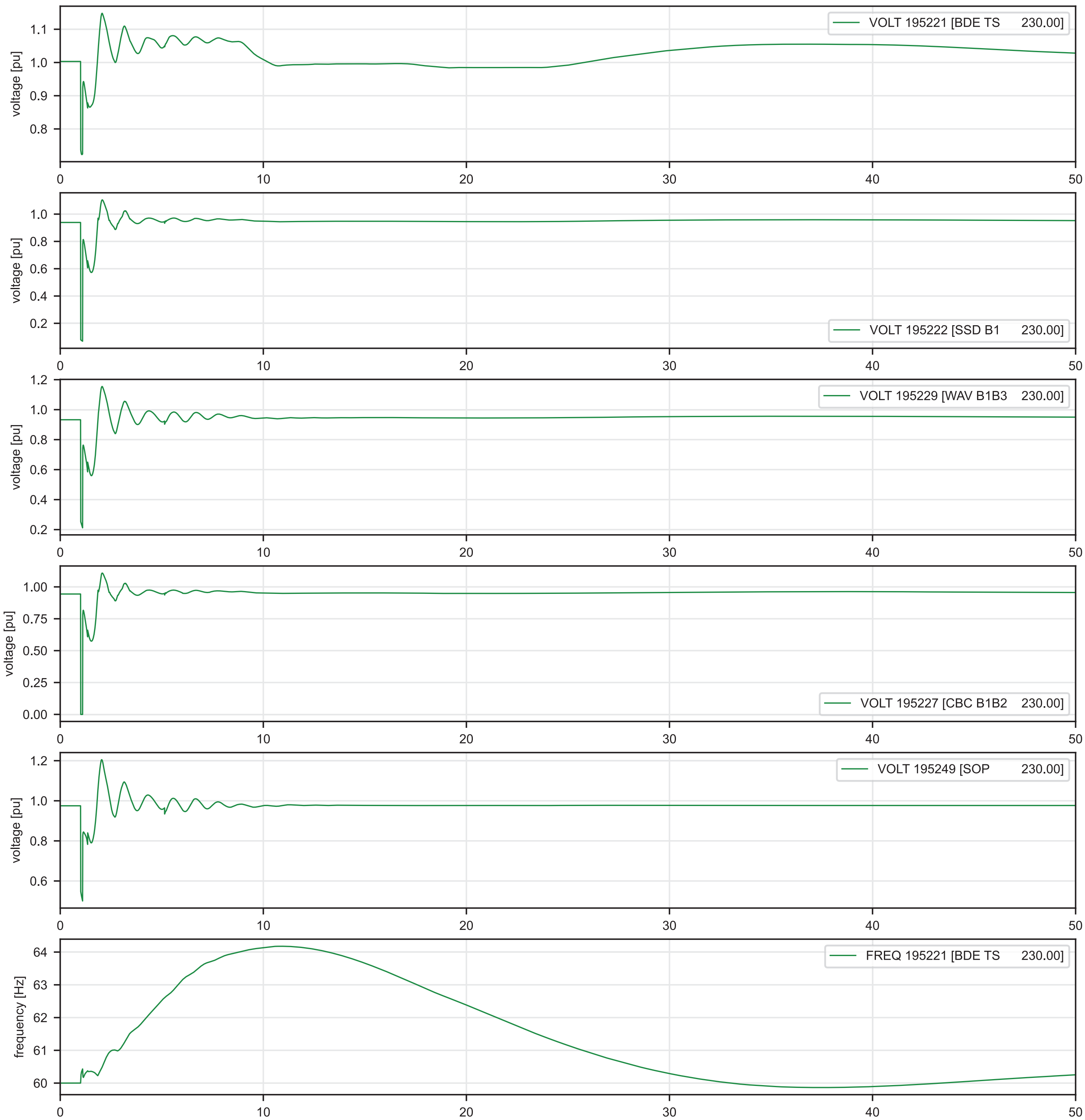
04_2033-34_Base-Peak_TL237-TL203_peakMW_MLFC_off
Loss of TL237 | Voltage / Frequency



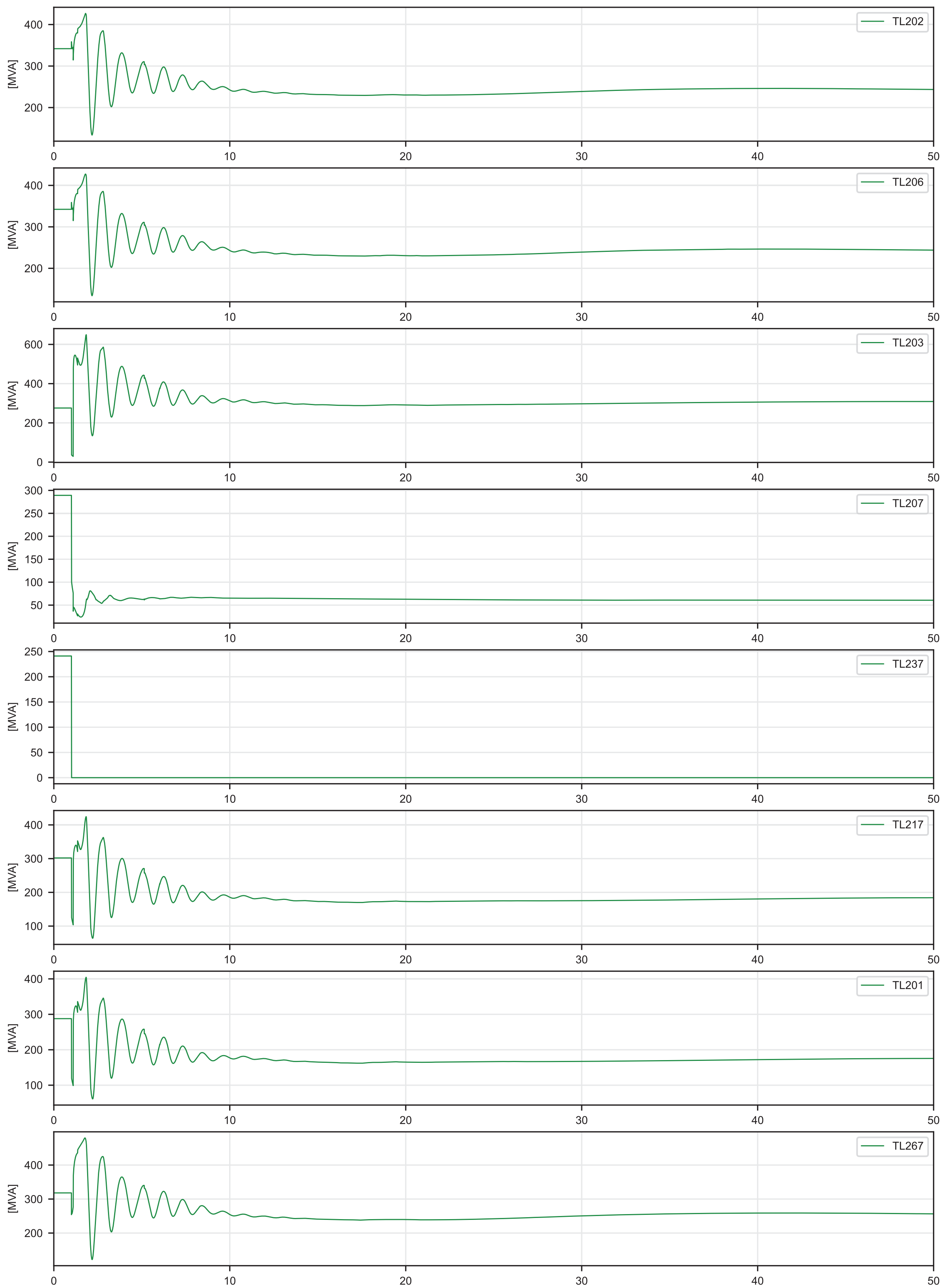
04_2033-34_Base-Peak_TL237-TL203_peakMW_MLFC_off
Loss of TL237 | 230 kV Power Flow



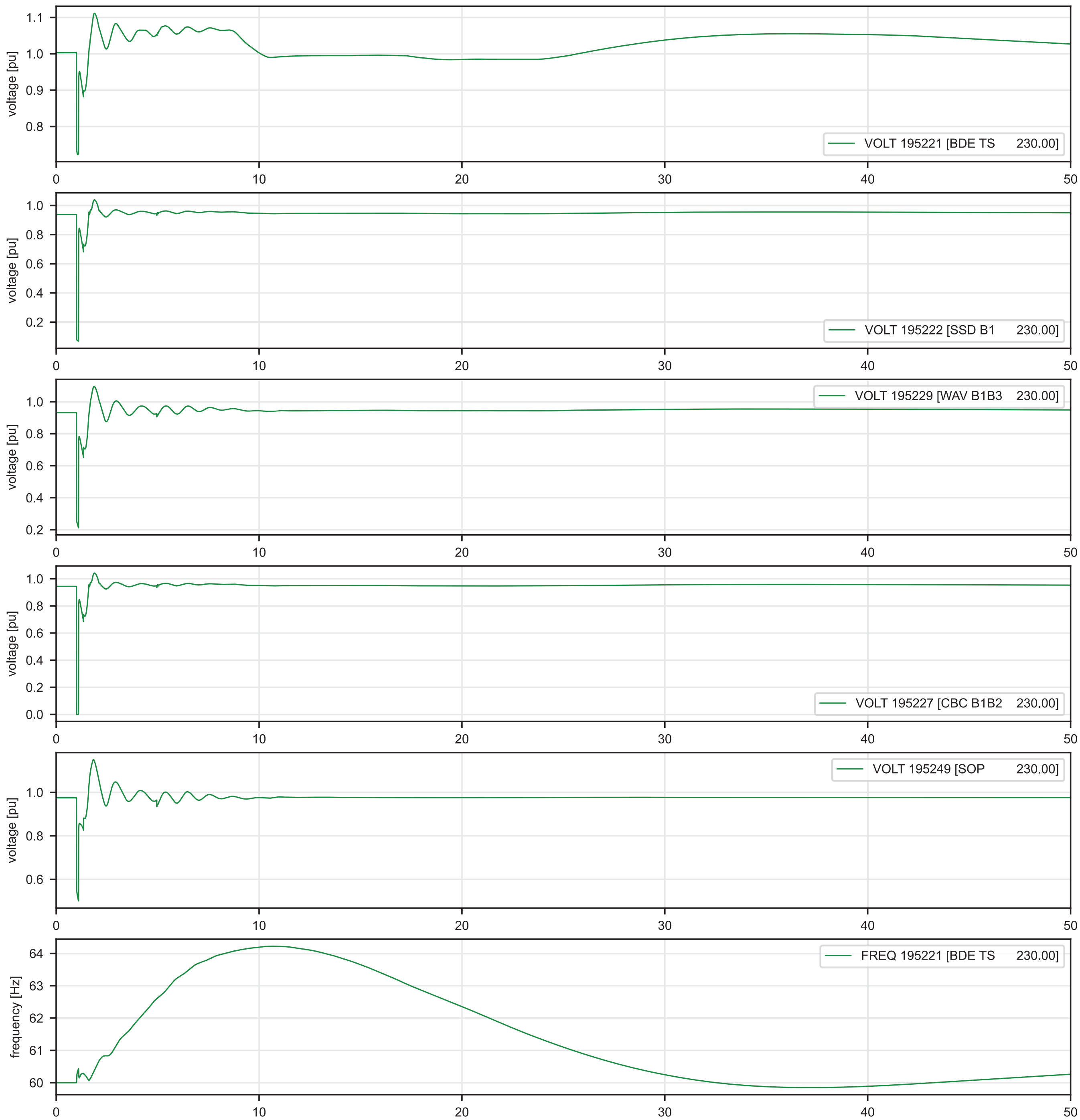
04_2033-34_Base-Peak_TL237-TL203_peakMW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL237 | Voltage / Frequency



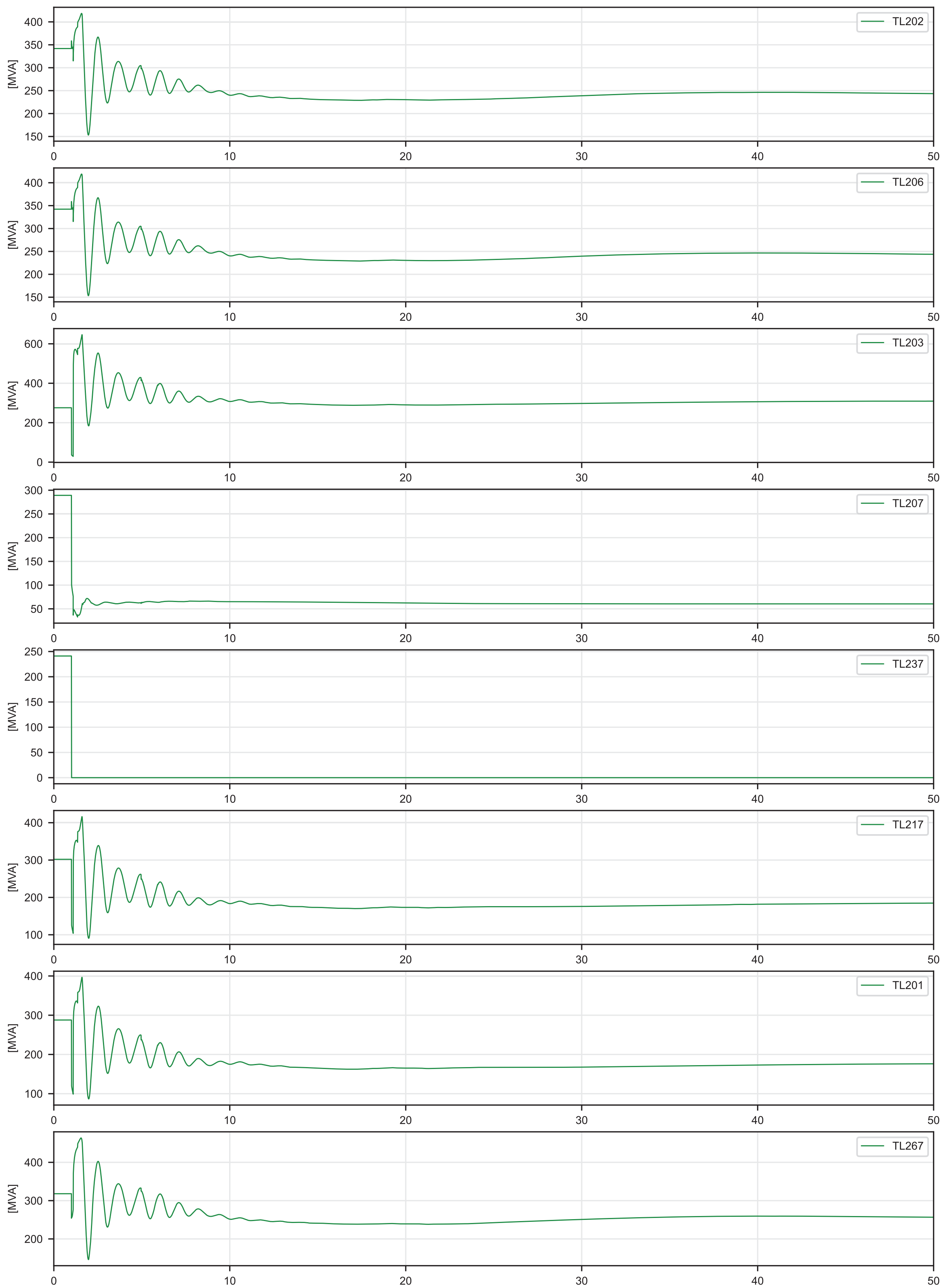
04_2033-34_Base-Peak_TL237-TL203_peakMW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL237 | 230 kV Power Flow



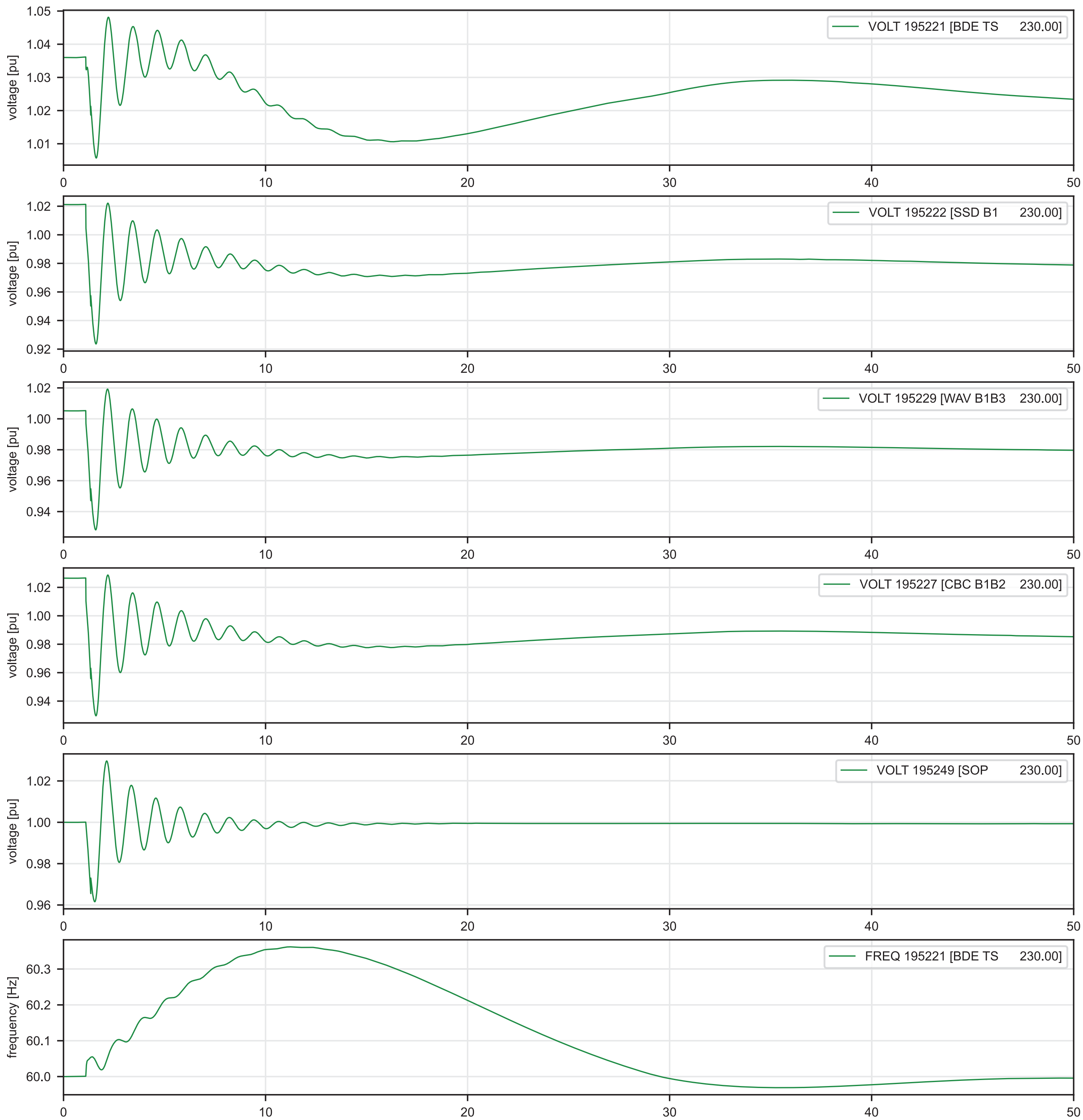
04_2033-34_Base-Peak_TL237-TL203_peakMW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL237 | Voltage / Frequency



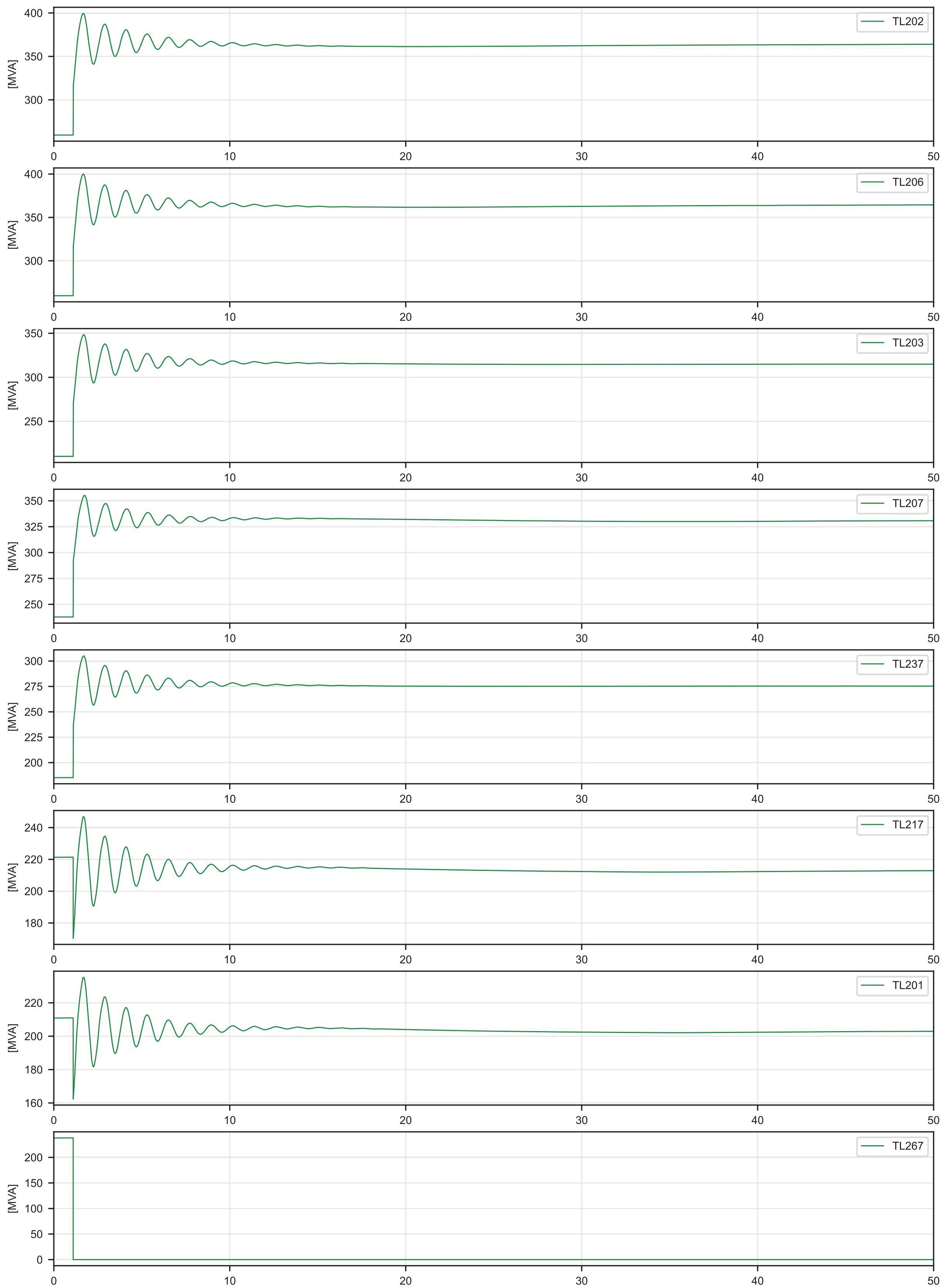
04_2033-34_Base-Peak_TL237-TL203_peakMW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL237 | 230 kV Power Flow



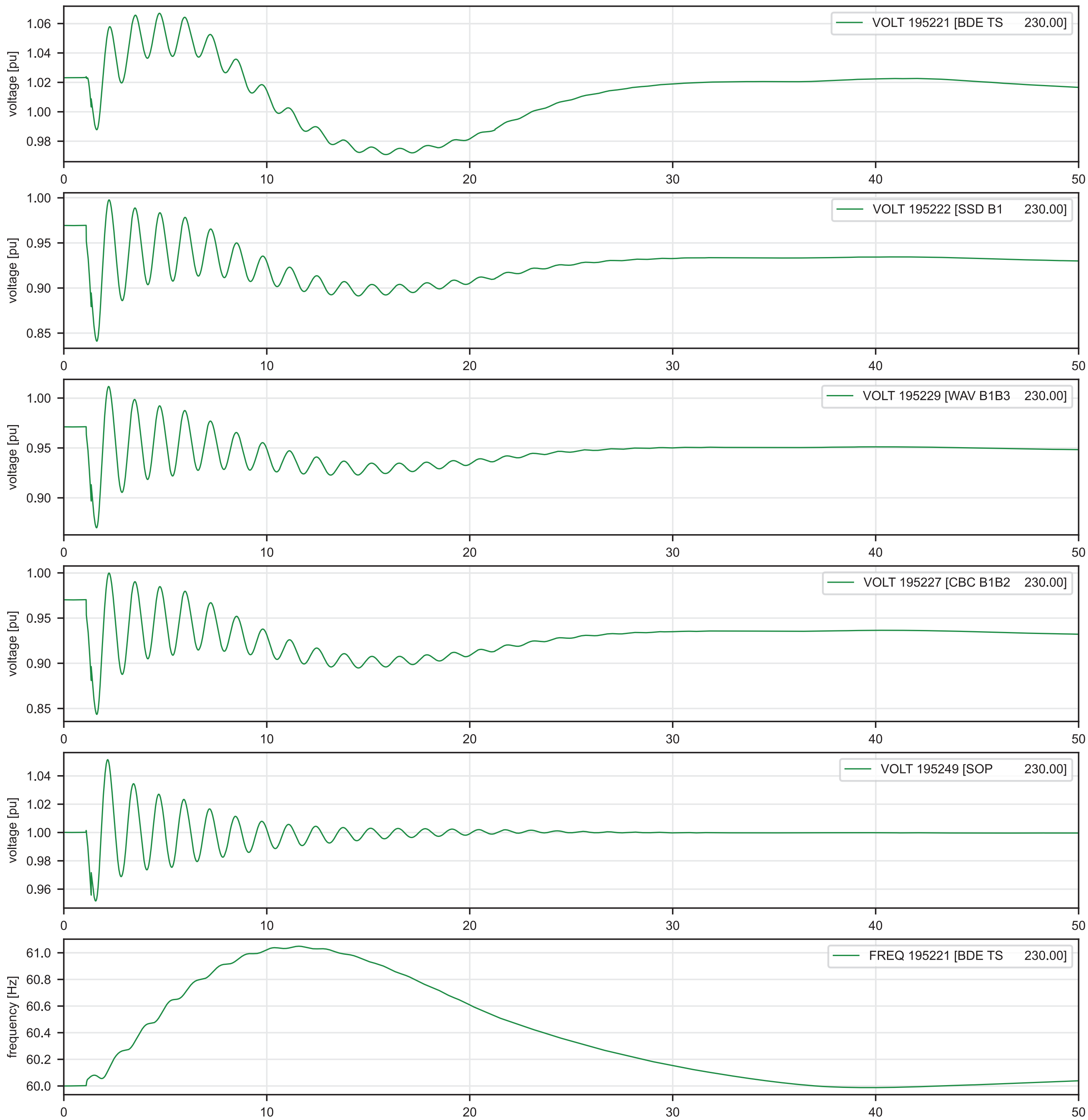
05_2033-34_Base-Peak_TL267-TL202-203-206_050MW_MLFC_off
Loss of TL267 | Voltage / Frequency



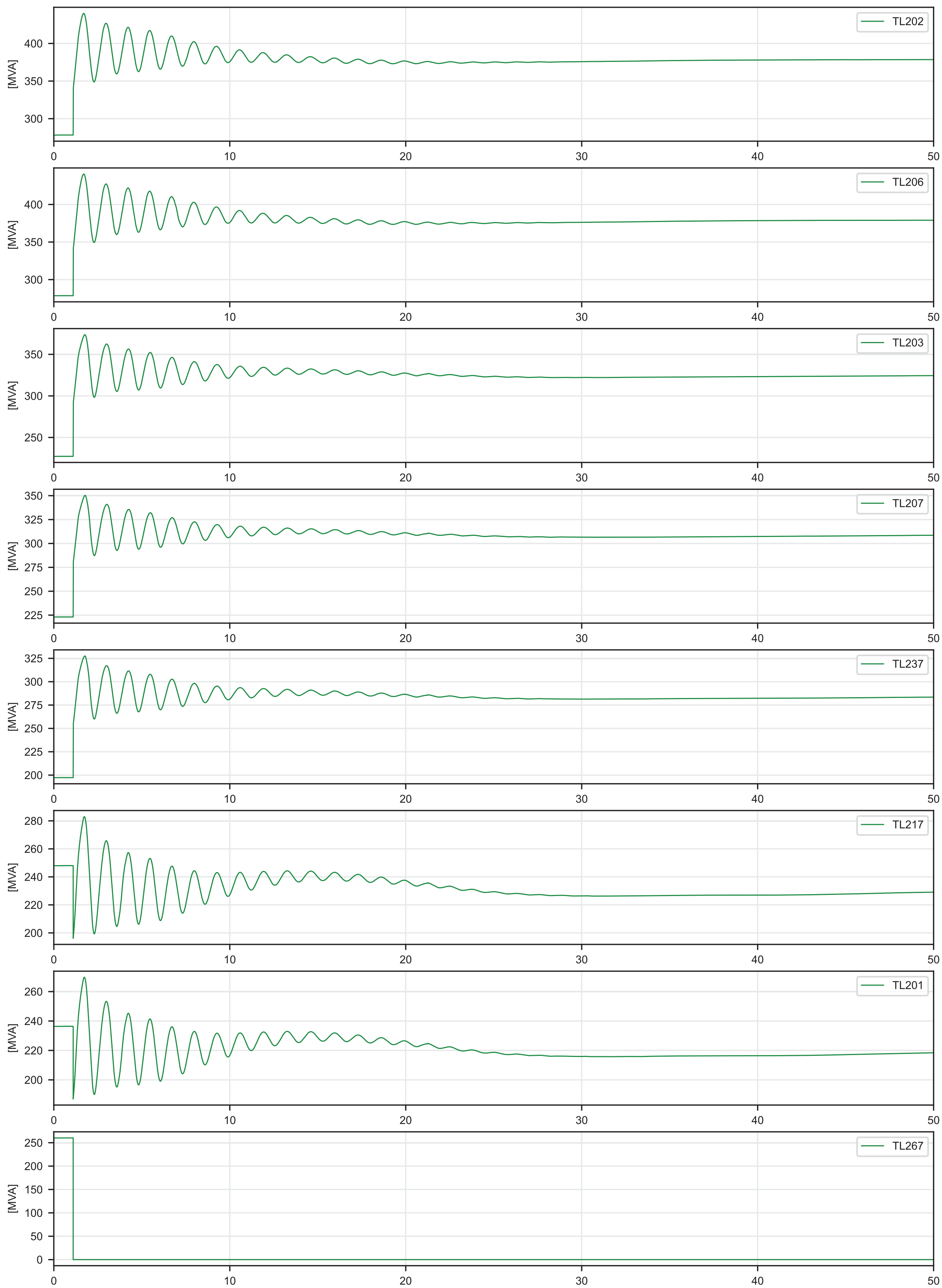
05_2033-34_Base-Peak_TL267-TL202-203-206_050MW_MLFC_off
Loss of TL267 | 230 kV Power Flow



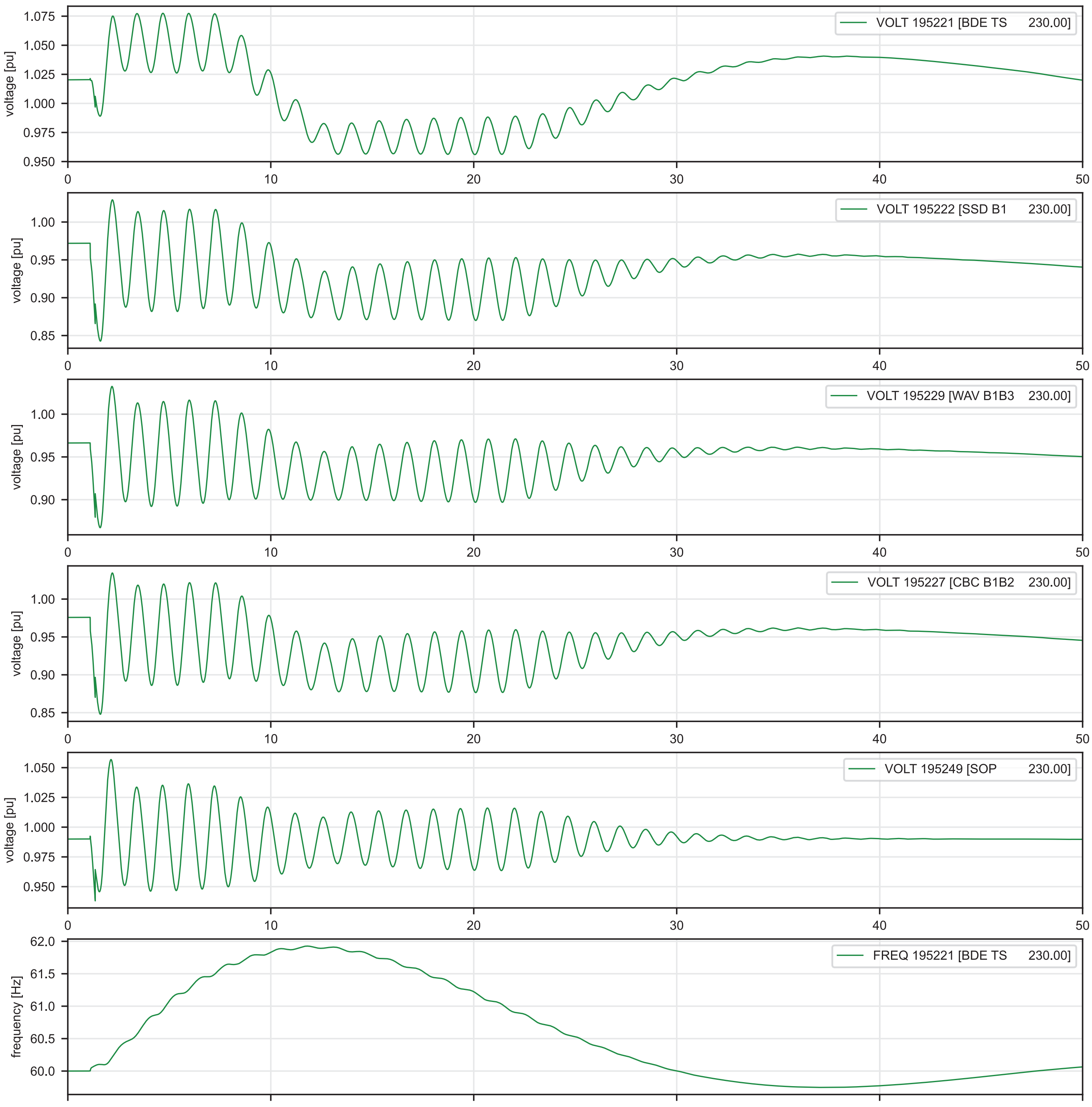
05_2033-34_Base-Peak_TL267-TL202-203-206_100MW_MLFC_off
Loss of TL267 | Voltage / Frequency



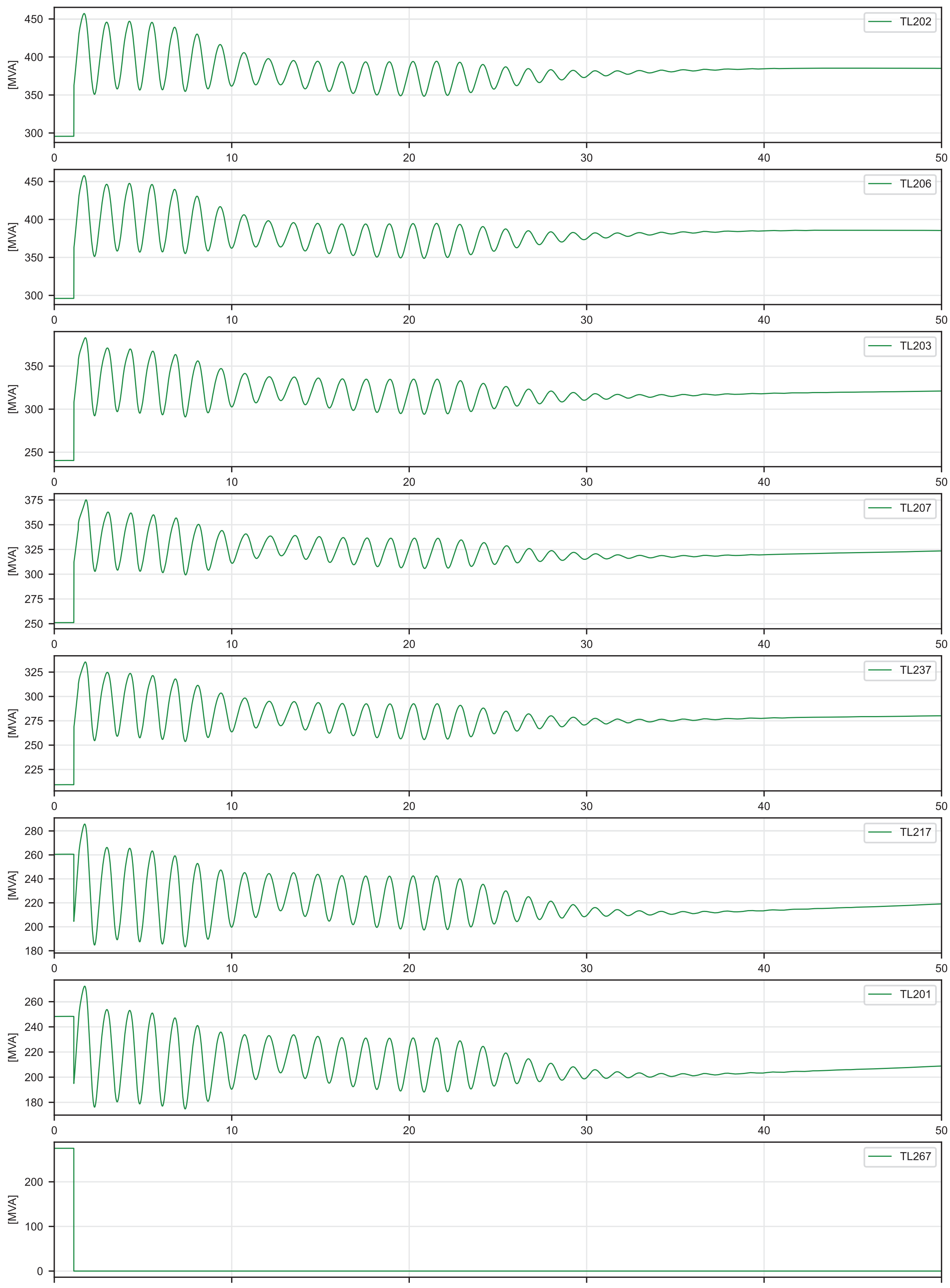
05_2033-34_Base-Peak_TL267-TL202-203-206_100MW_MLFC_off
Loss of TL267 | 230 kV Power Flow



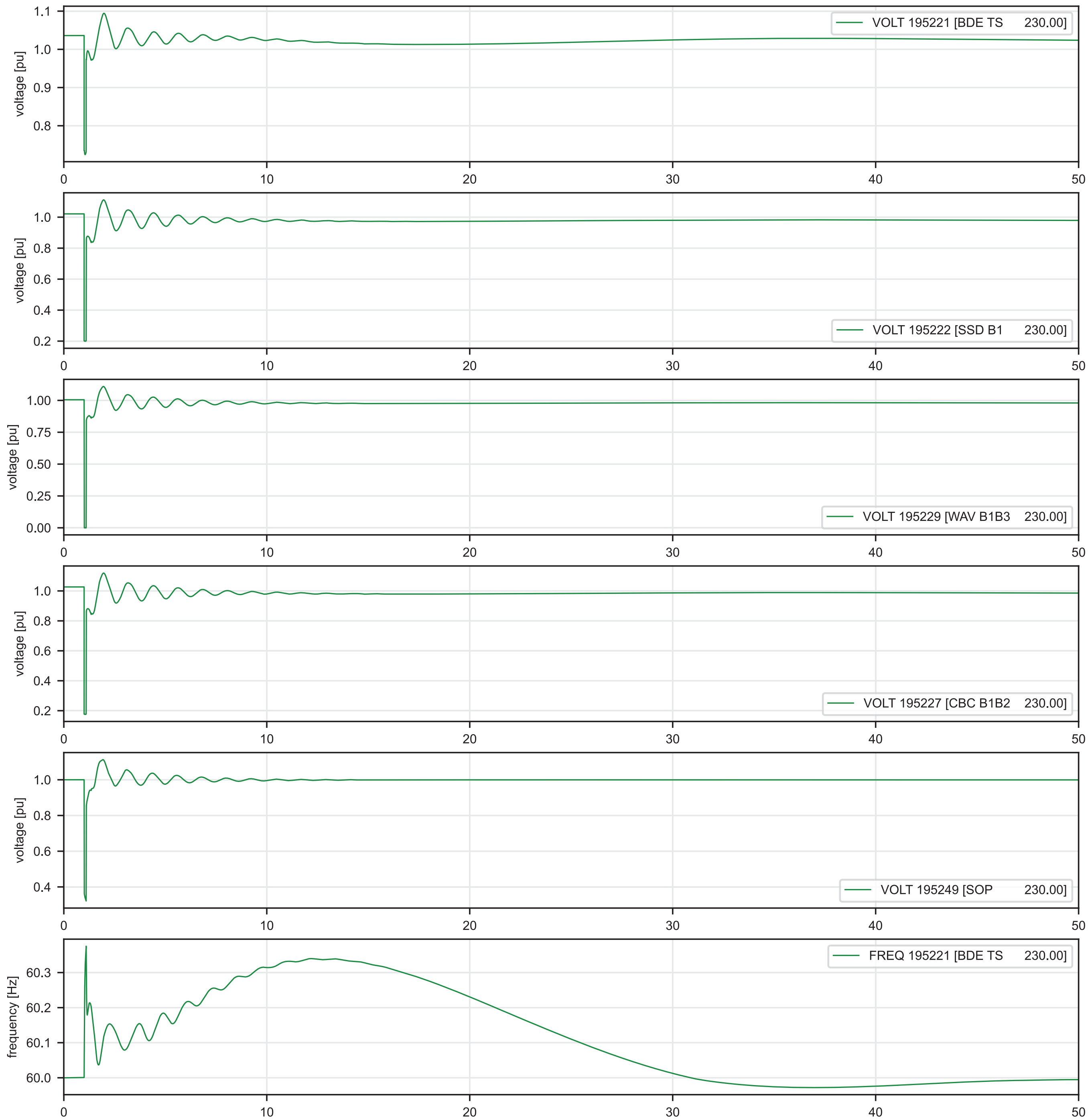
05_2033-34_Base-Peak_TL267-TL202-203-206_150MW_MLFC_off
Loss of TL267 | Voltage / Frequency



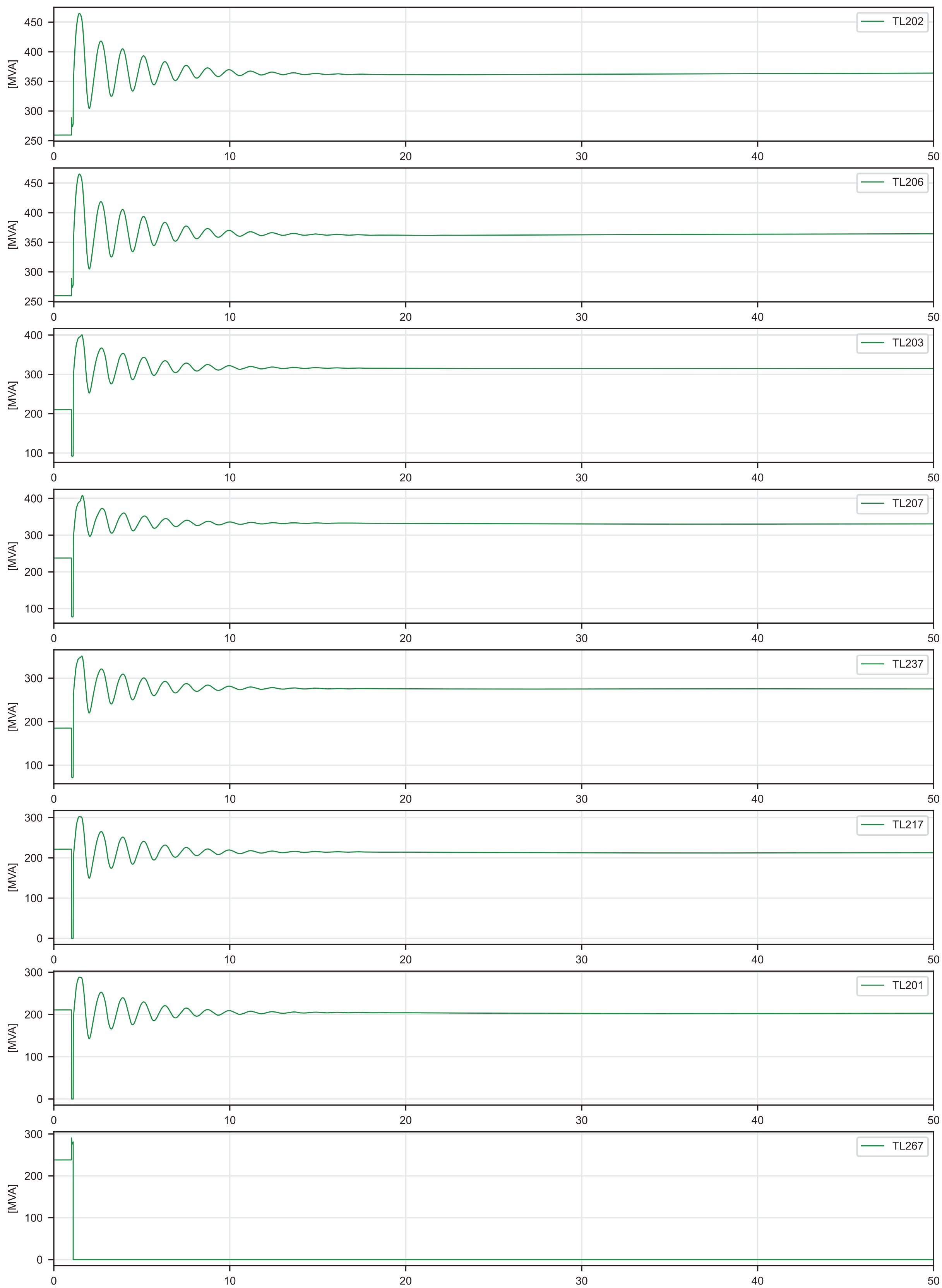
05_2033-34_Base-Peak_TL267-TL202-203-206_150MW_MLFC_off
Loss of TL267 | 230 kV Power Flow



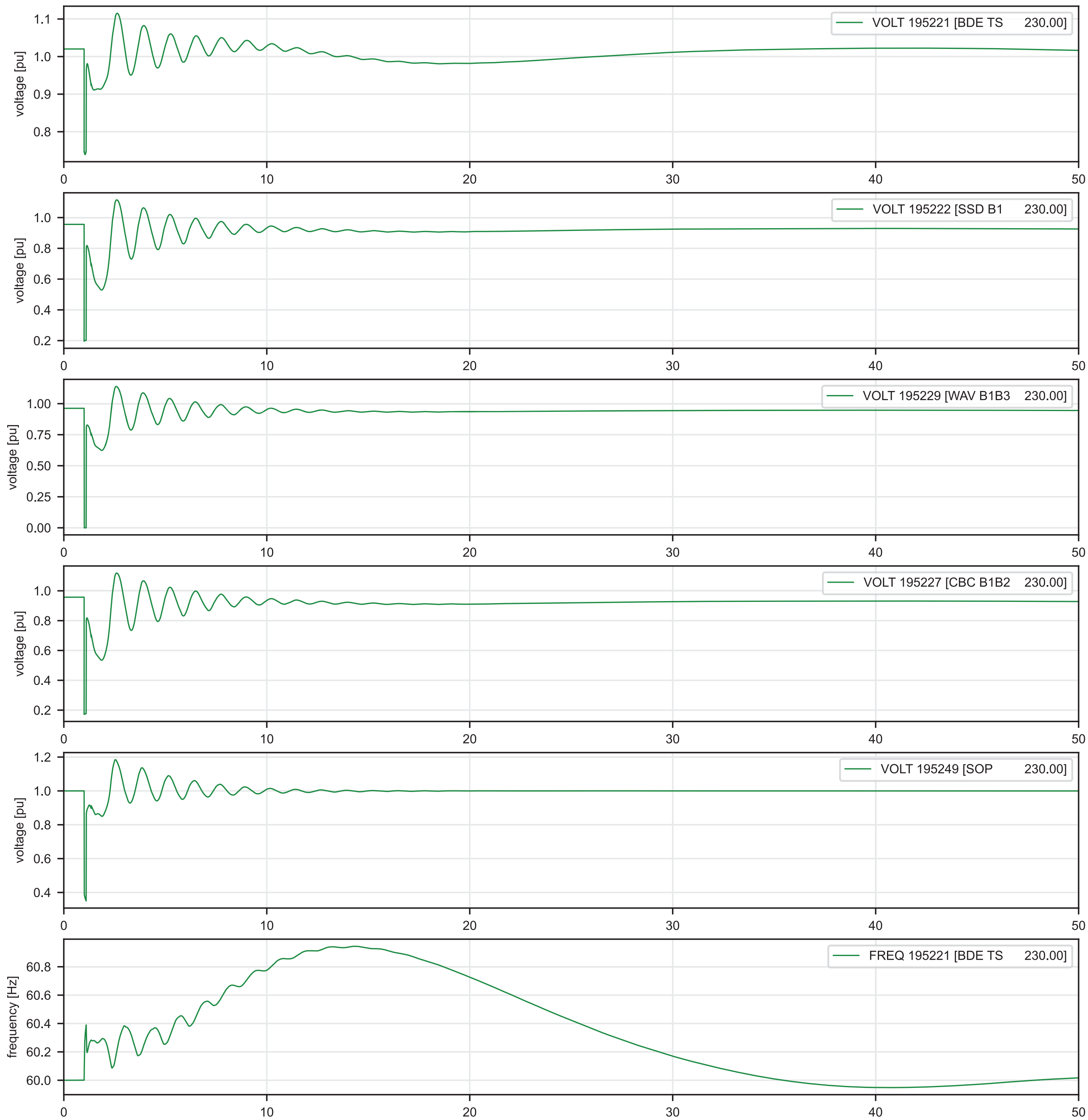
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_050MW_MLFC_off
Loss of TL267 | Voltage / Frequency



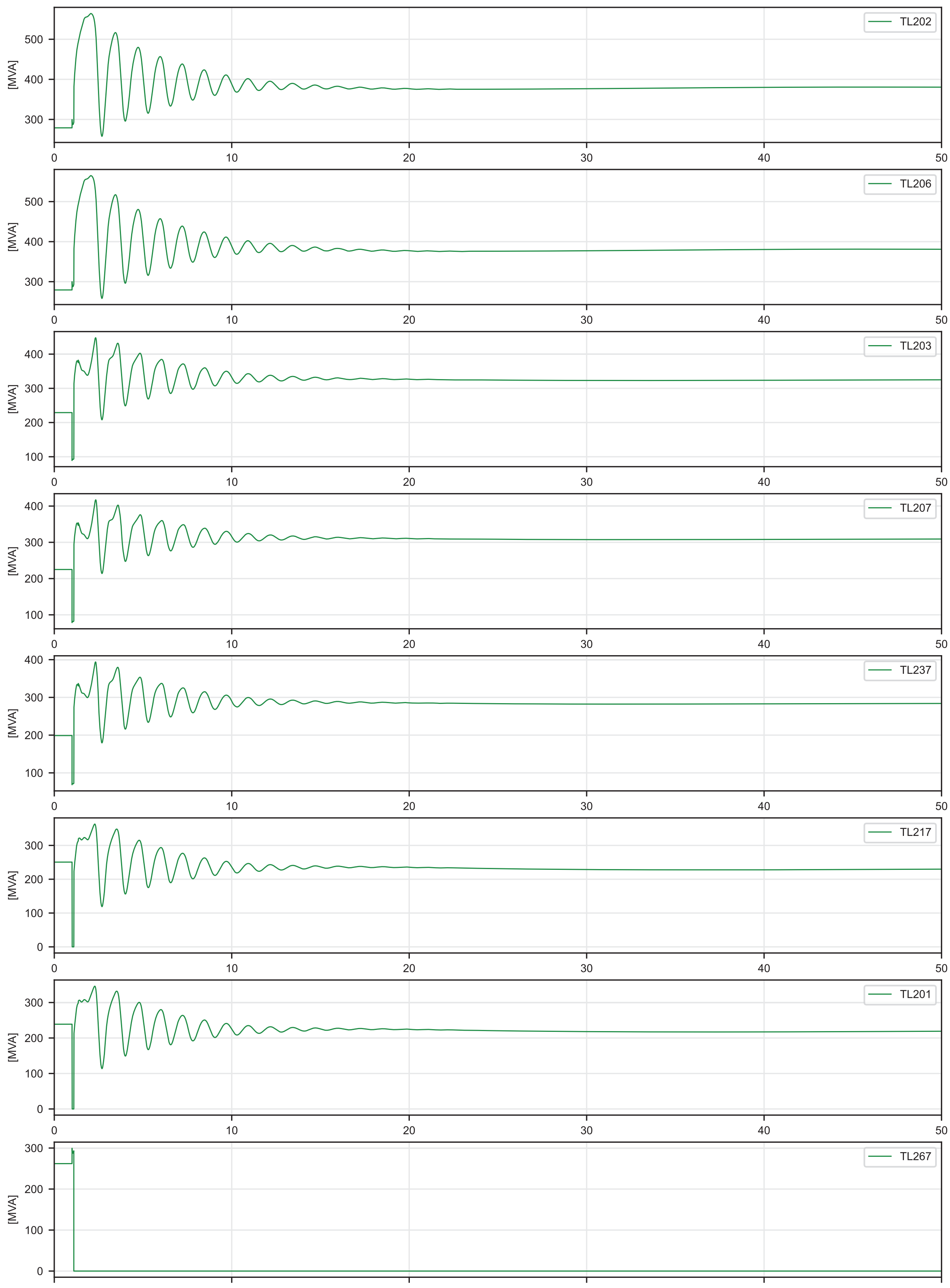
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_050MW_MLFC_off
Loss of TL267 | 230 kV Power Flow



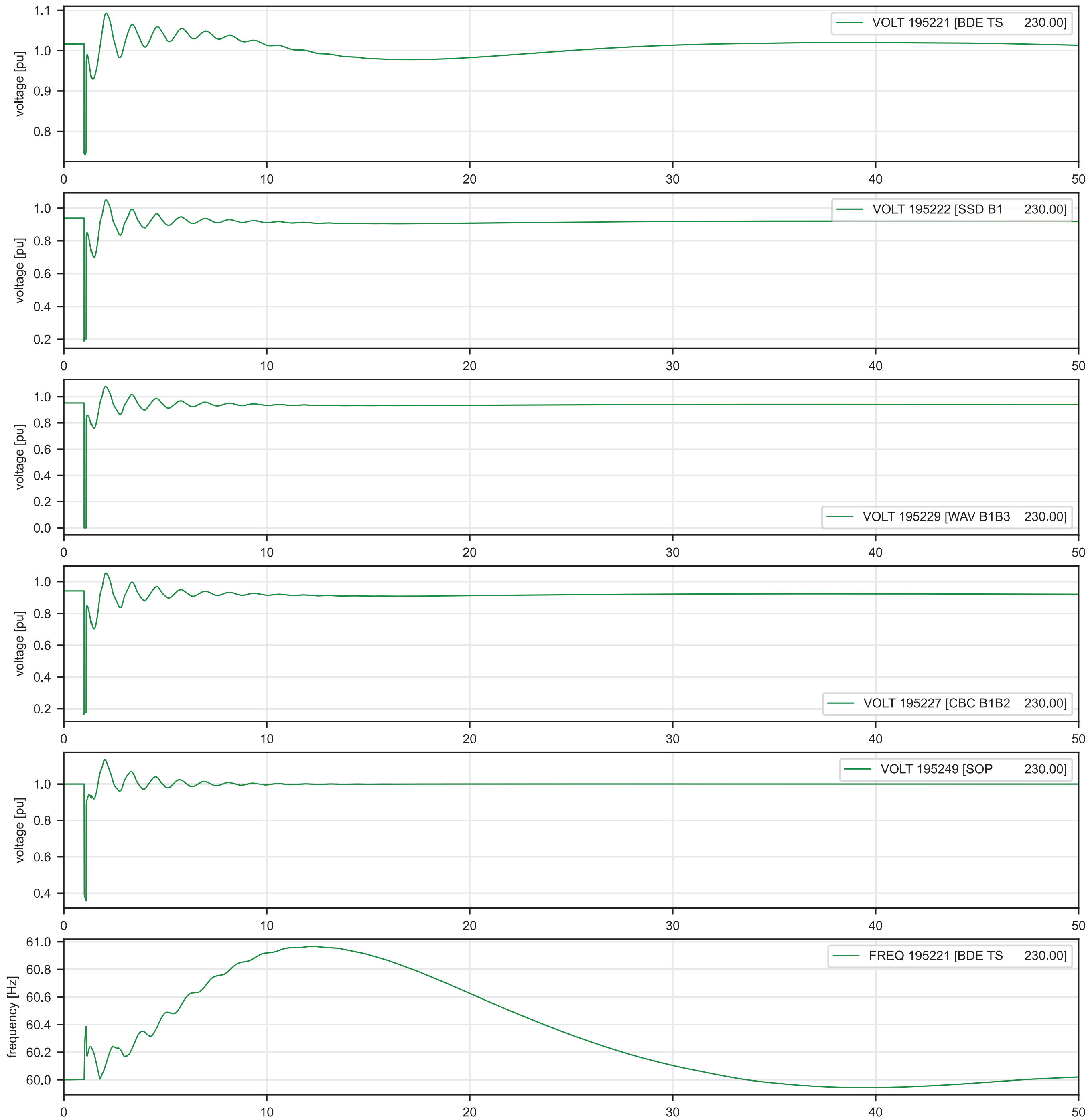
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_100MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL267 | Voltage / Frequency



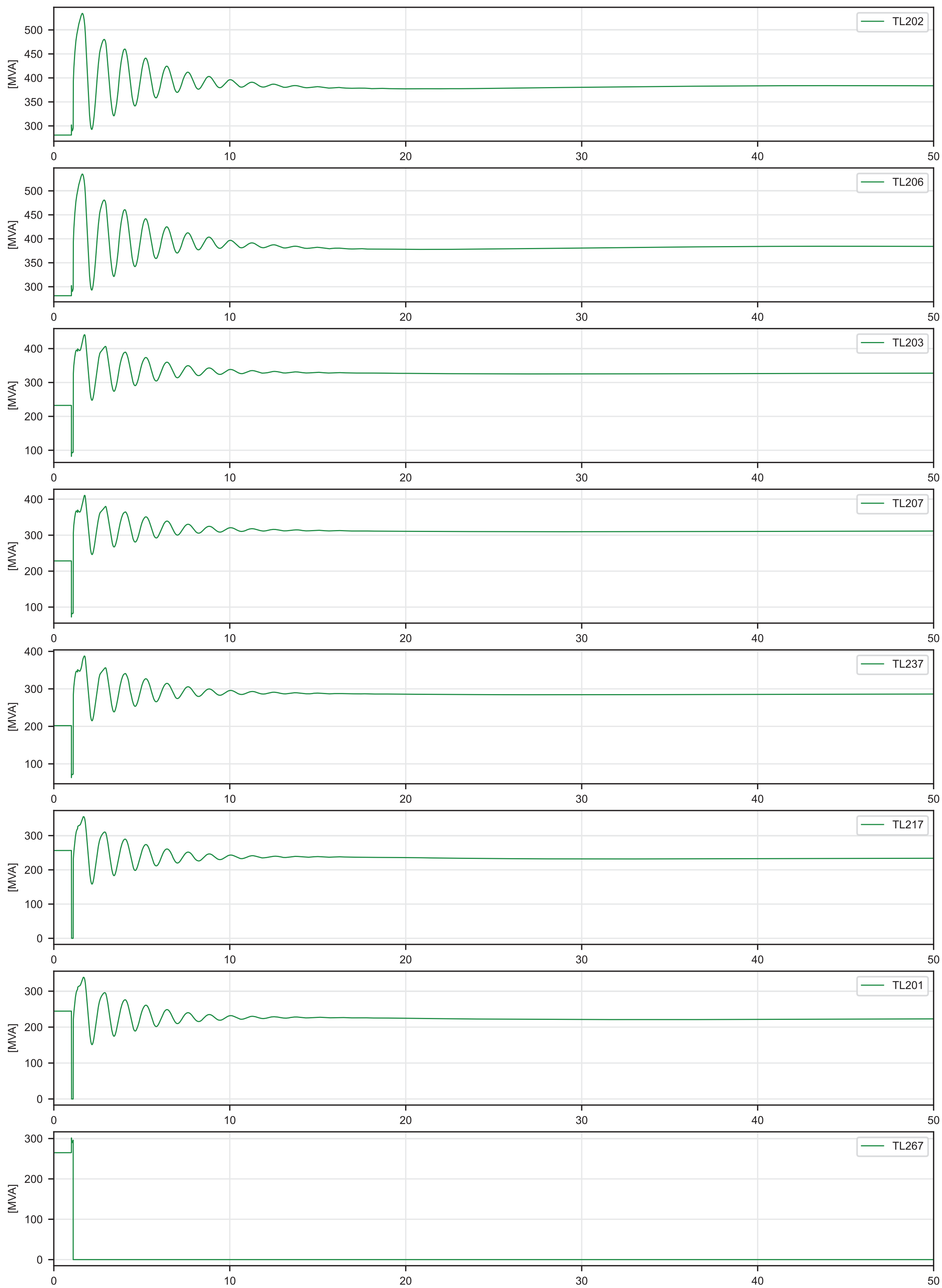
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_100MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL267 | 230 kV Power Flow



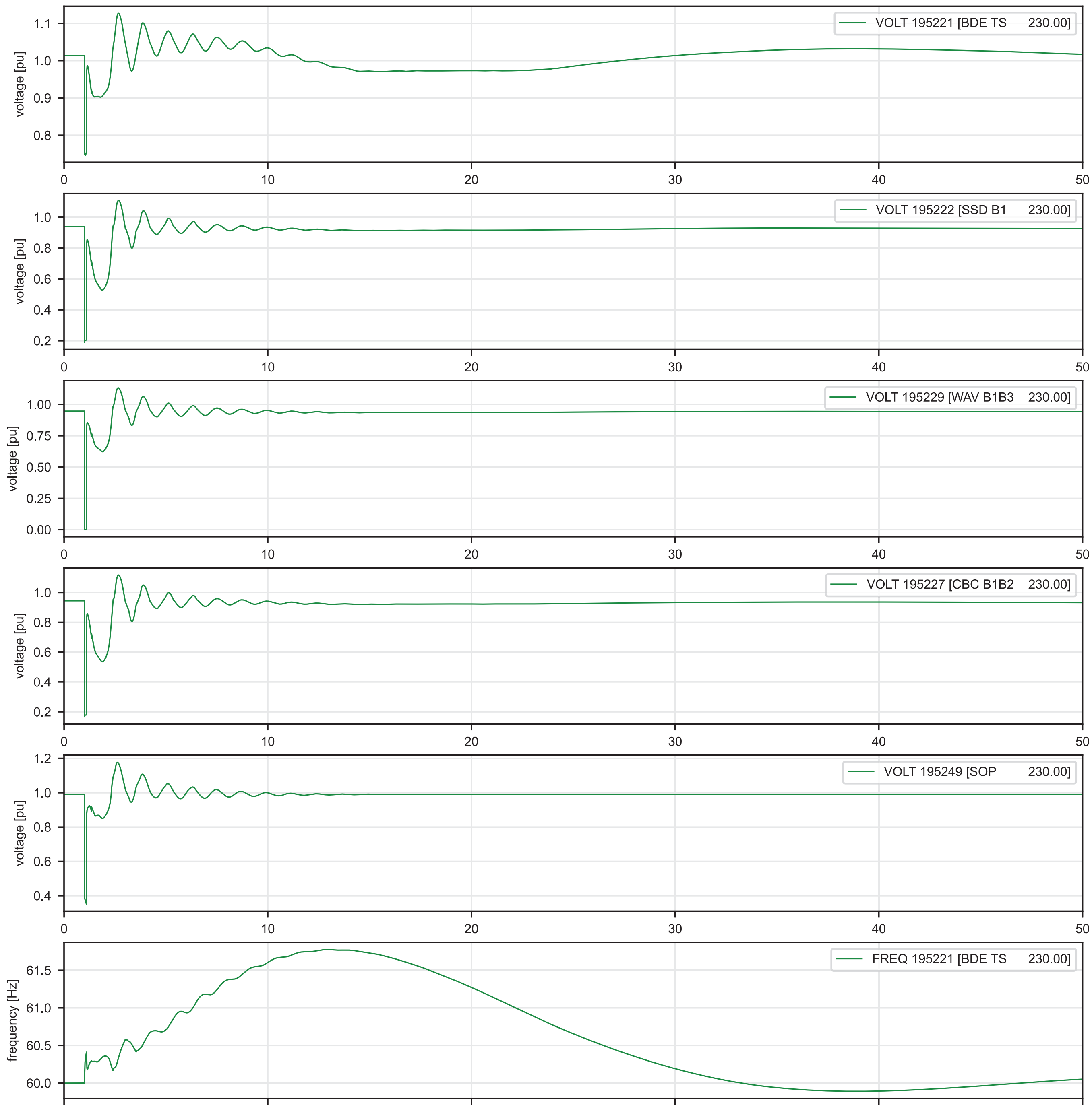
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_100MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL267 | Voltage / Frequency



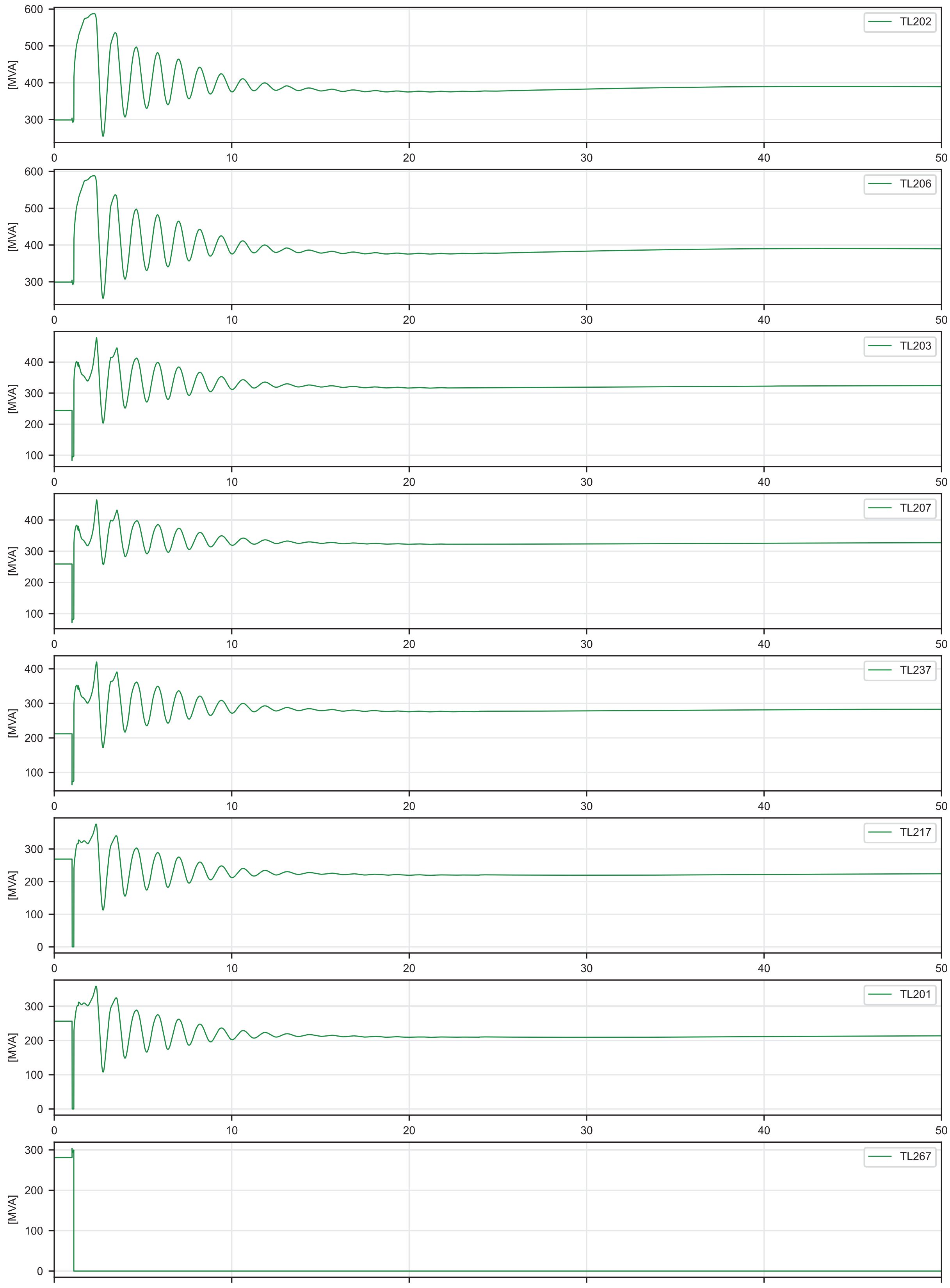
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_100MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL267 | 230 kV Power Flow



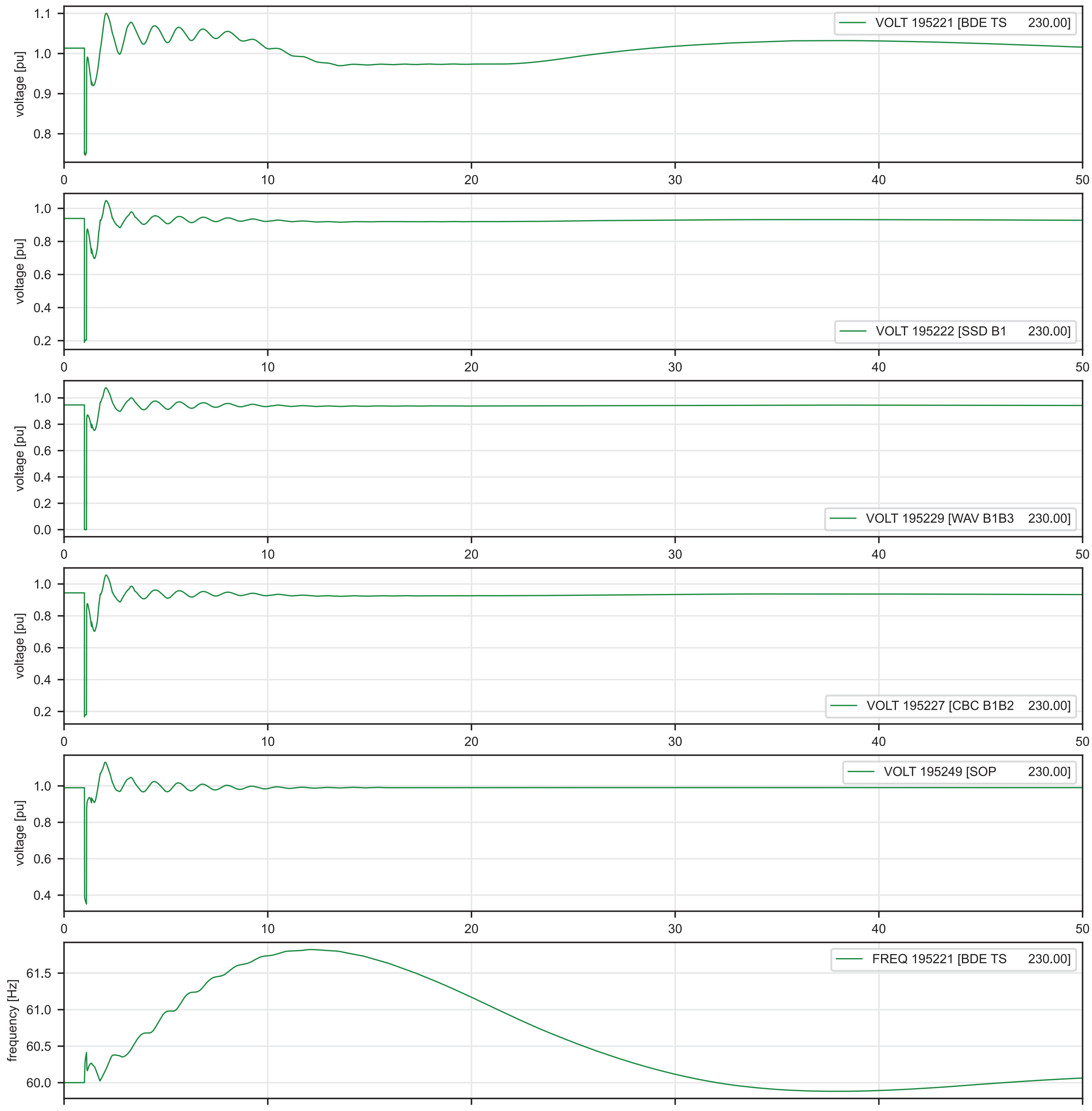
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_150MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL267 | Voltage / Frequency



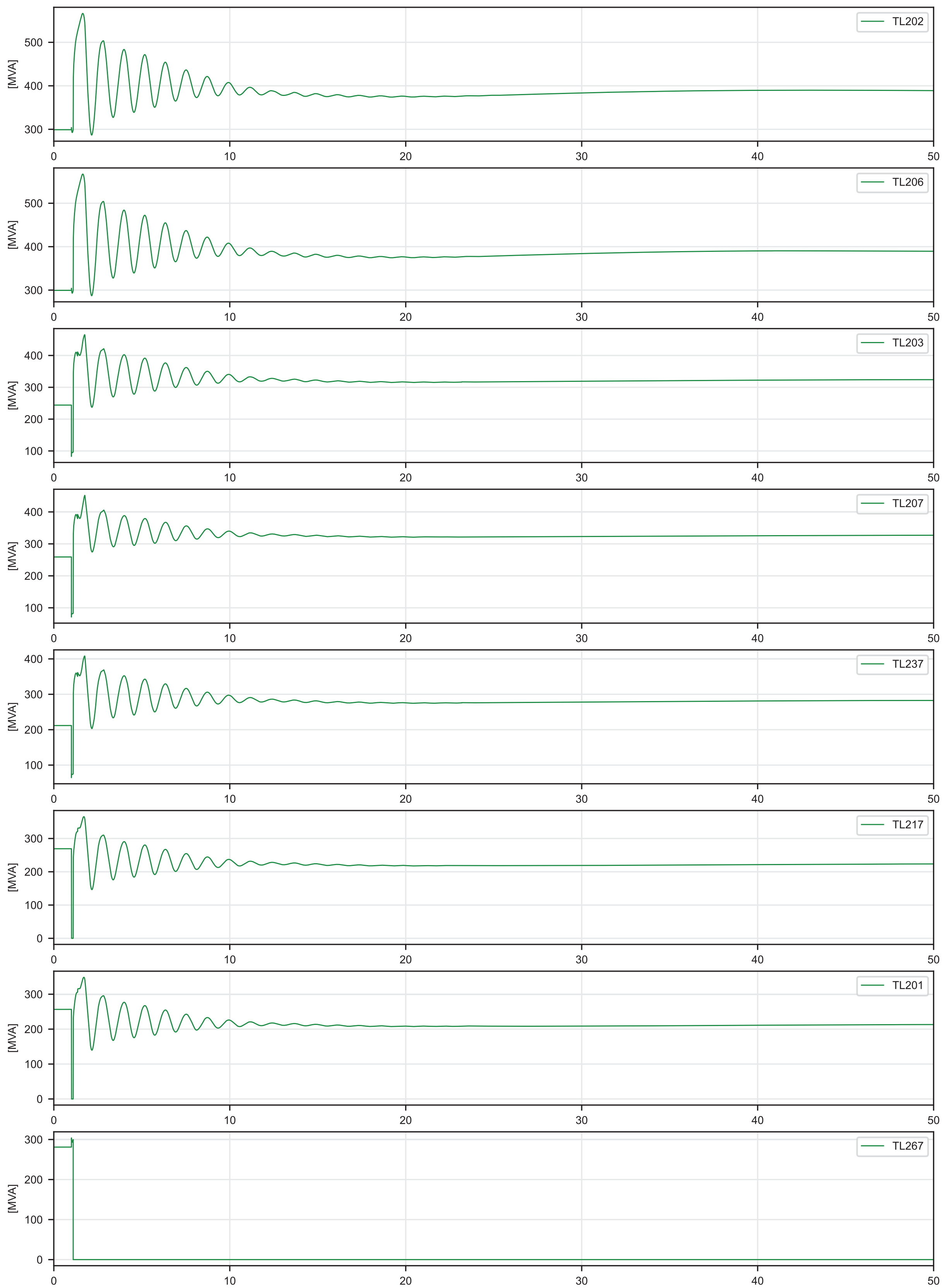
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_150MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL267 | 230 kV Power Flow



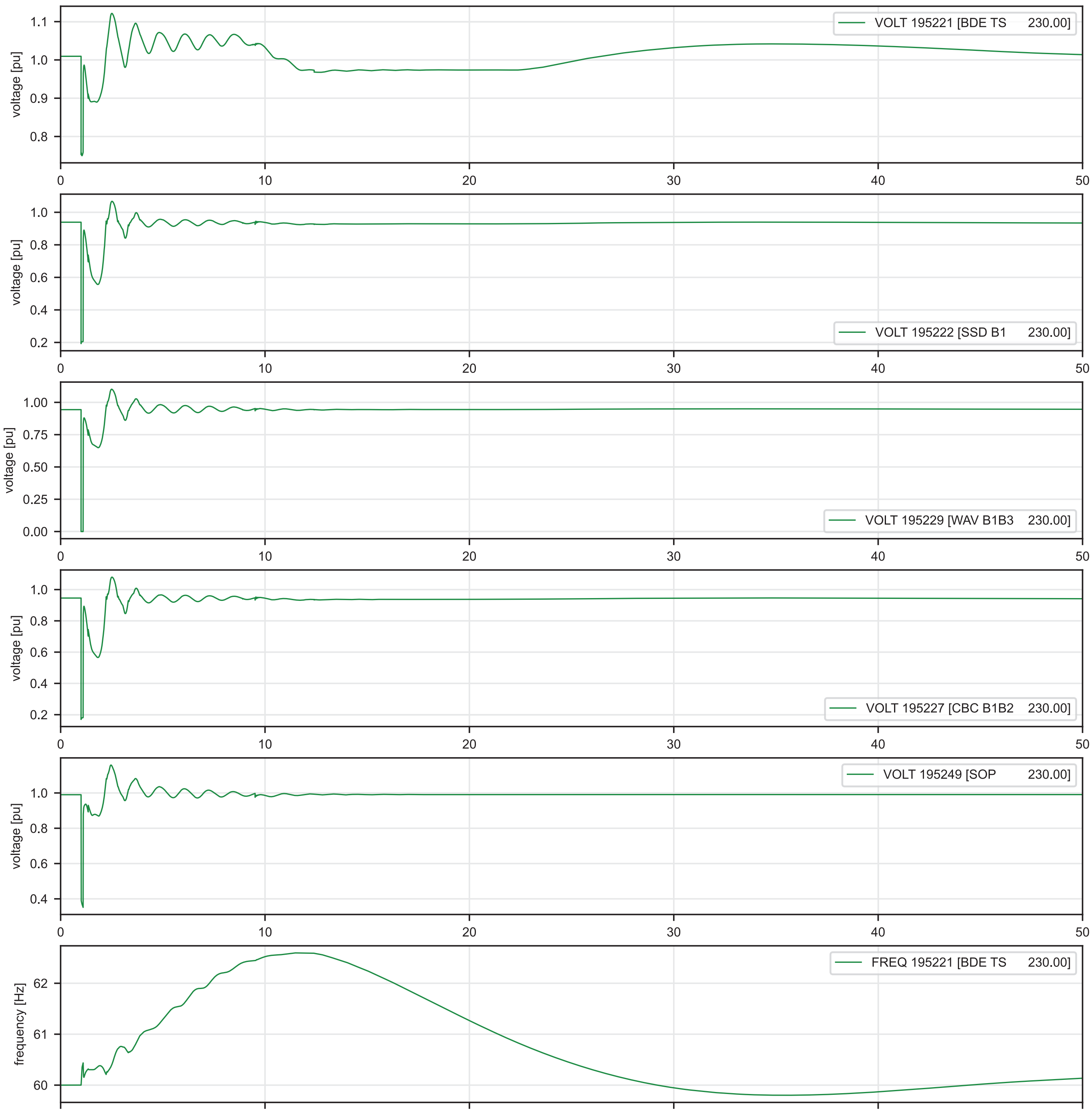
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_150MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL267 | Voltage / Frequency



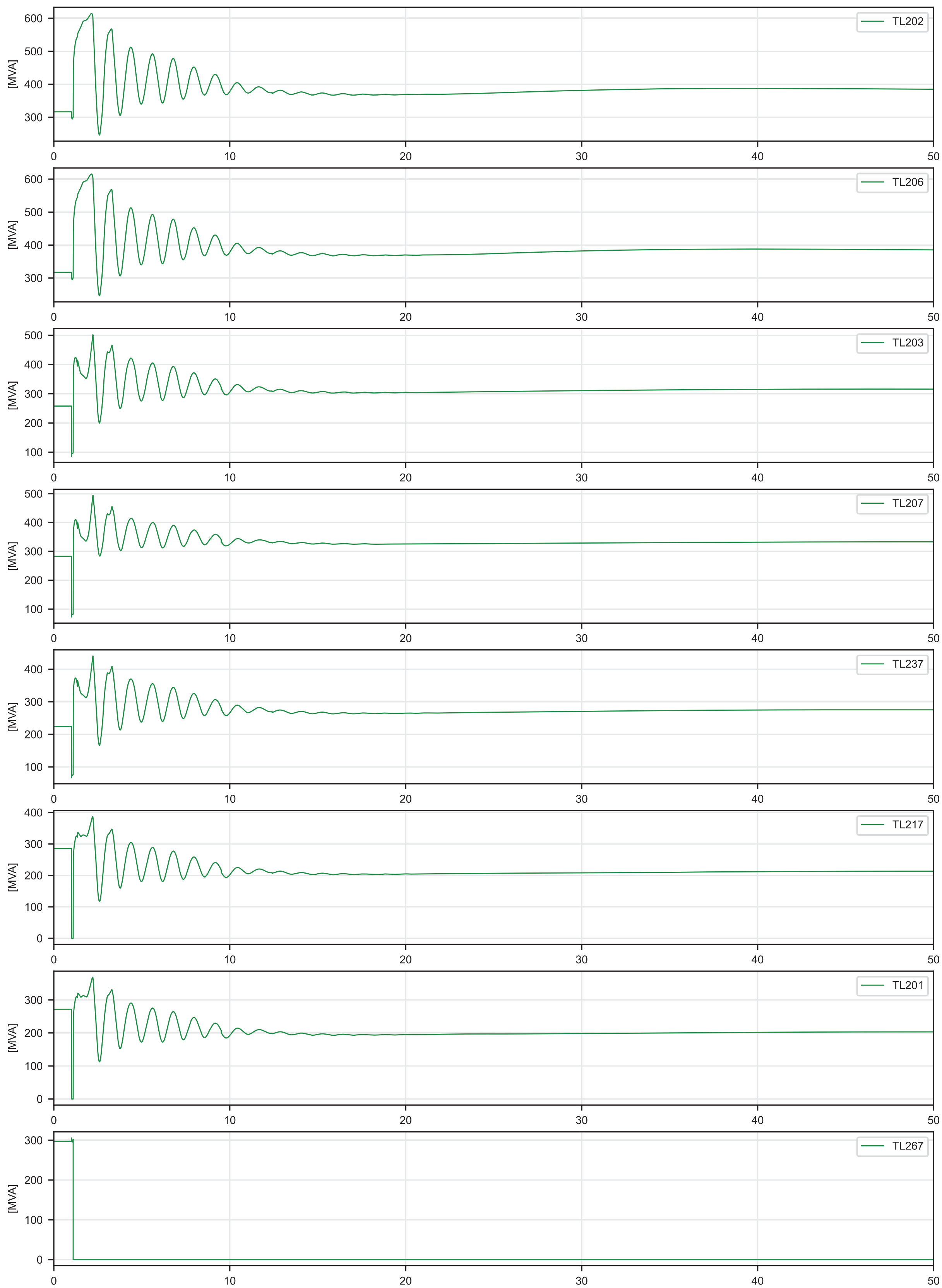
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_150MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL267 | 230 kV Power Flow



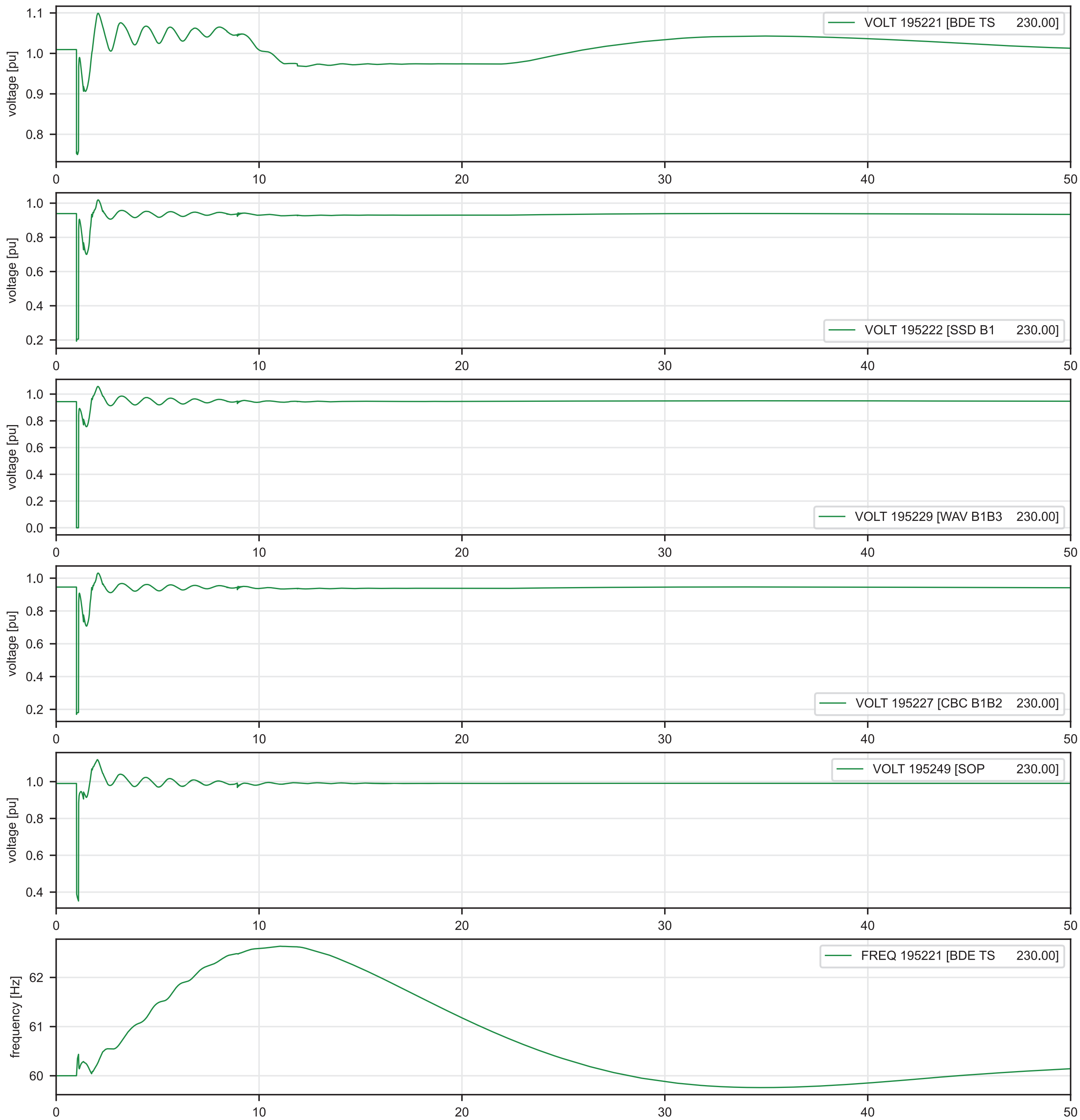
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_200MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL267 | Voltage / Frequency



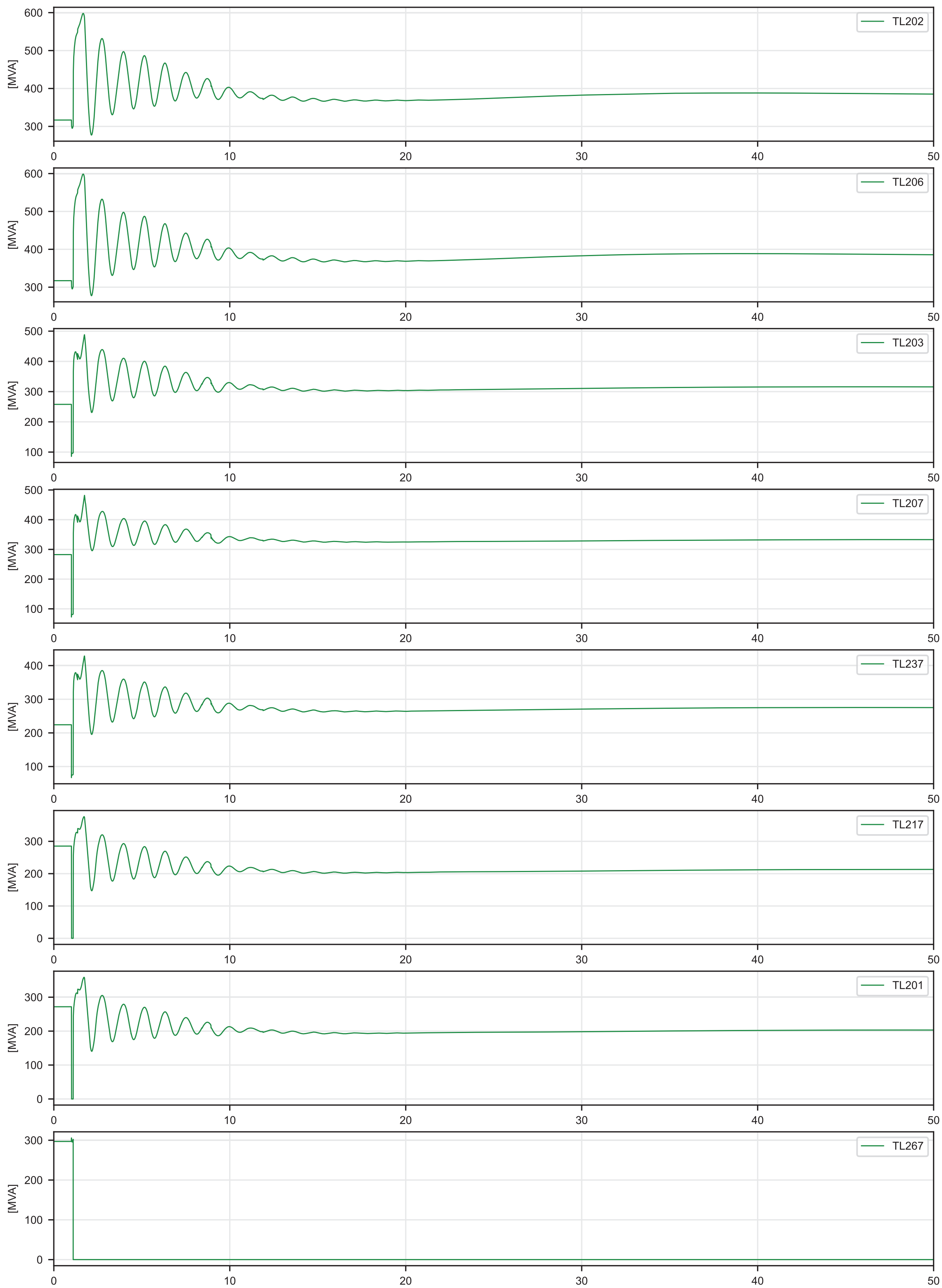
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_200MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL267 | 230 kV Power Flow



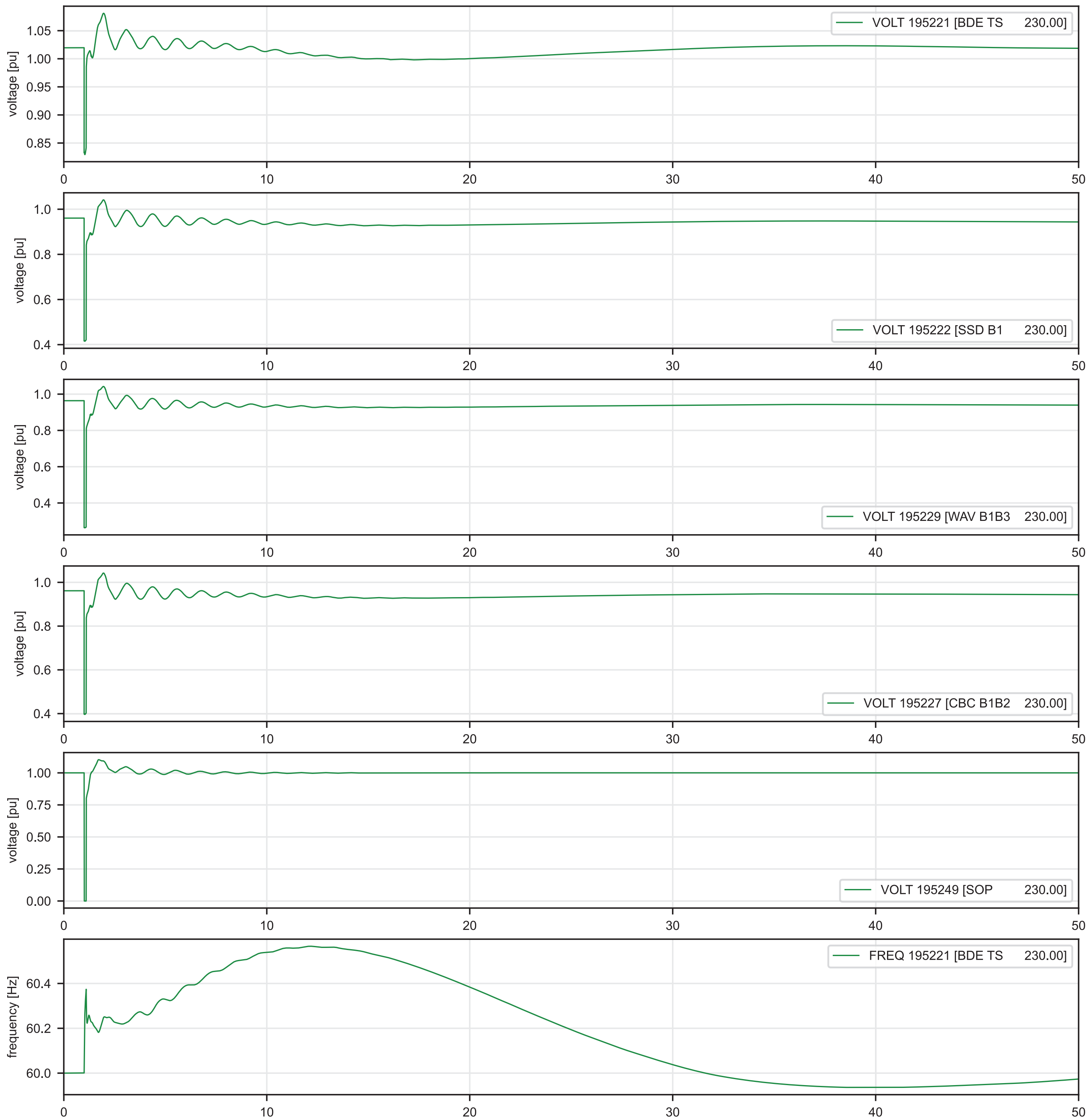
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_200MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL267 | Voltage / Frequency



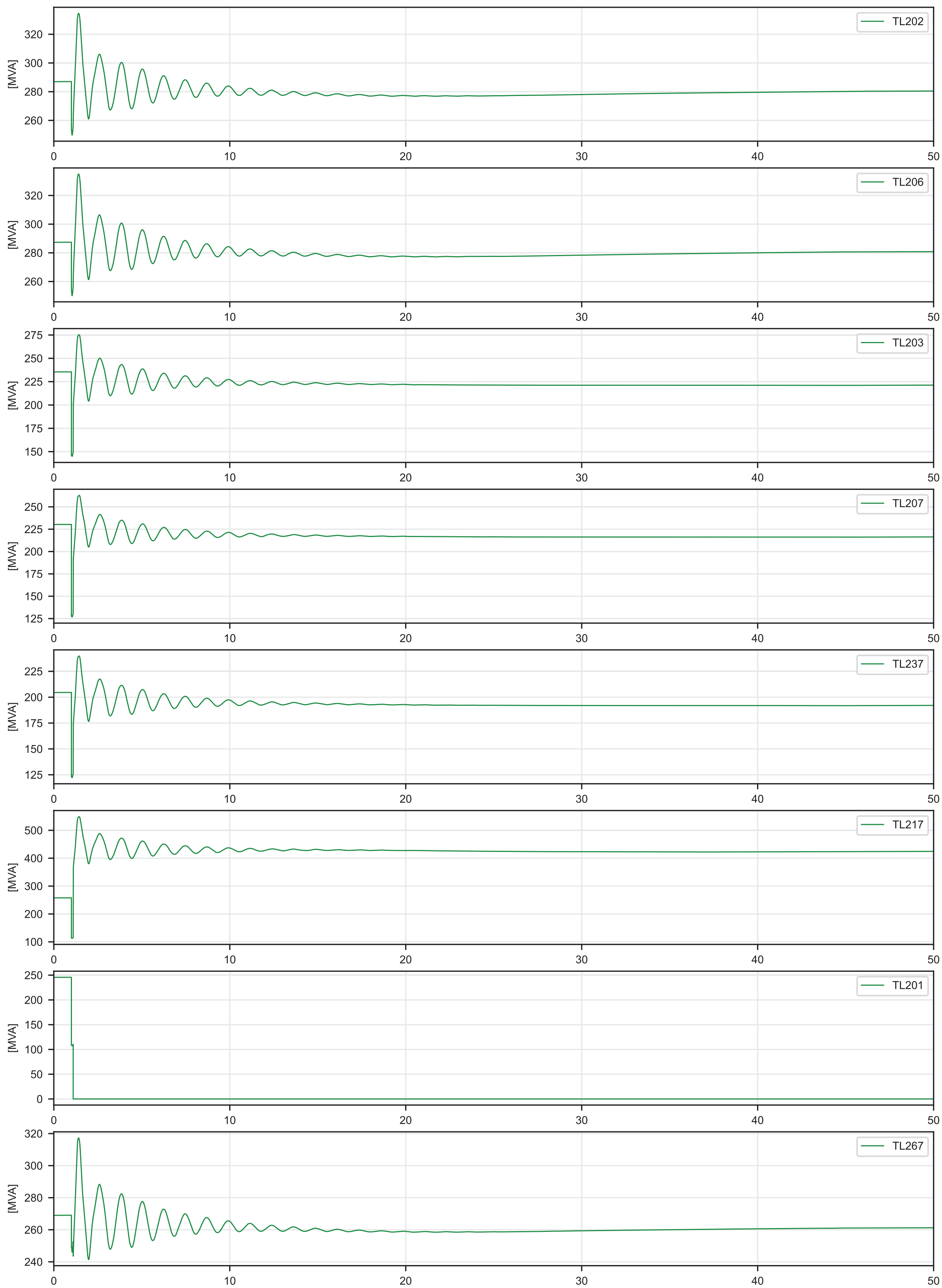
05_2033-34_Base-Peak_TL267WAV-TL202-203-206_200MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL267 | 230 kV Power Flow



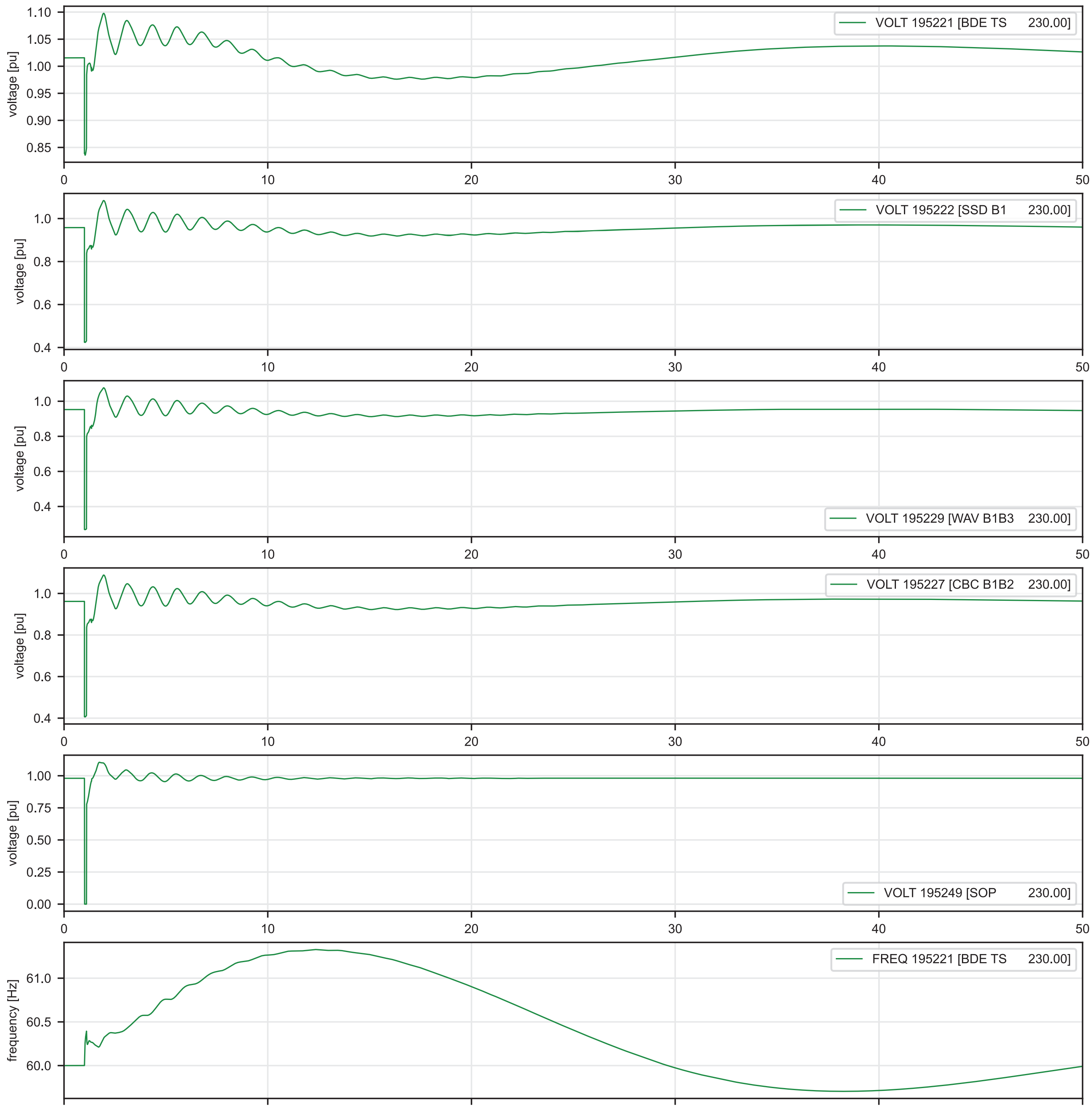
06_2033-34_Base-Peak_TL201-TL217_050MW_MLFC_off
Loss of TL201 | Voltage / Frequency



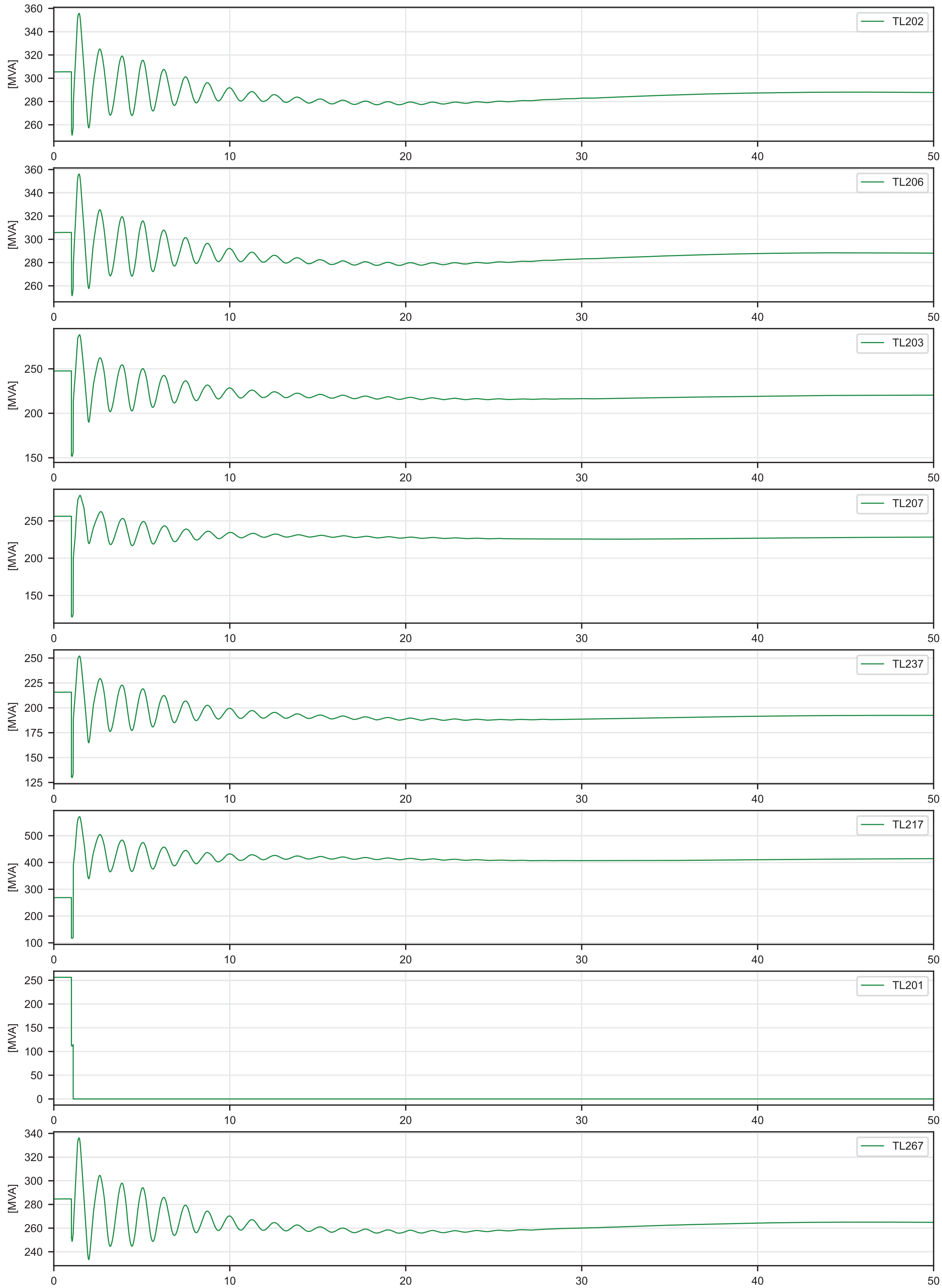
06_2033-34_Base-Peak_TL201-TL217_050MW_MLFC_off
Loss of TL201 | 230 kV Power Flow



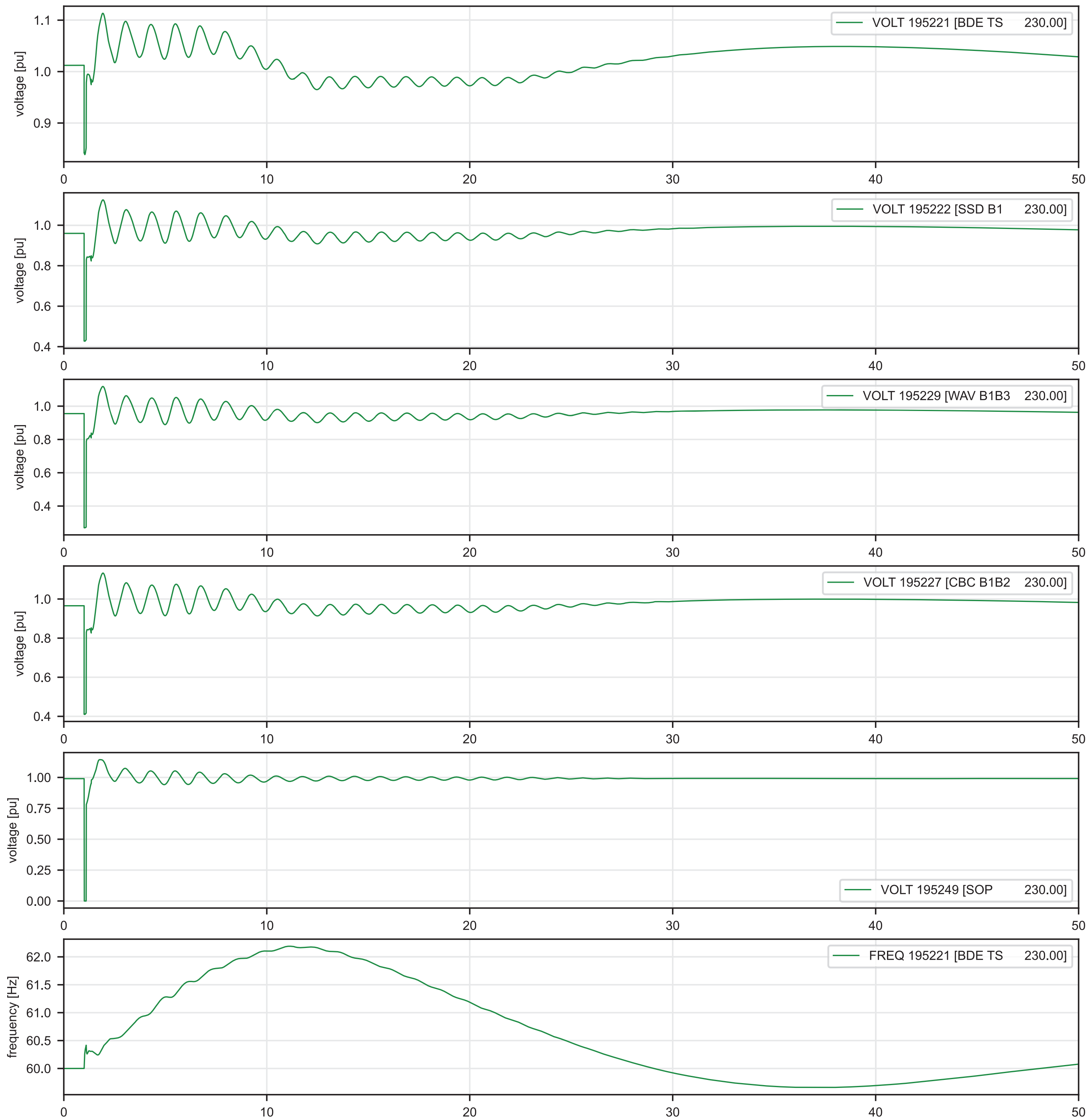
06_2033-34_Base-Peak_TL201-TL217_100MW_MLFC_off
Loss of TL201 | Voltage / Frequency



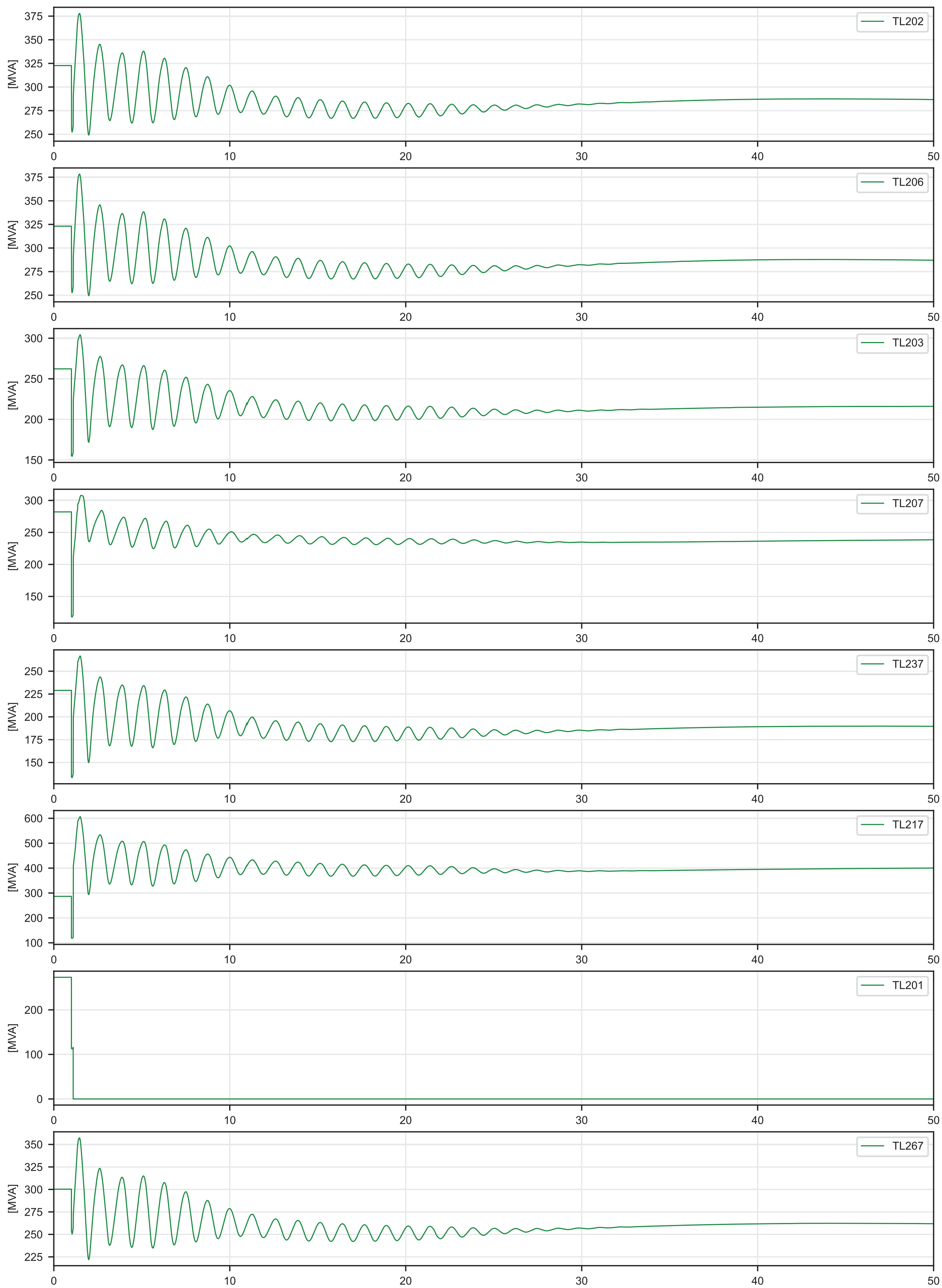
06_2033-34_Base-Peak_TL201-TL217_100MW_MLFC_off
Loss of TL201 | 230 kV Power Flow



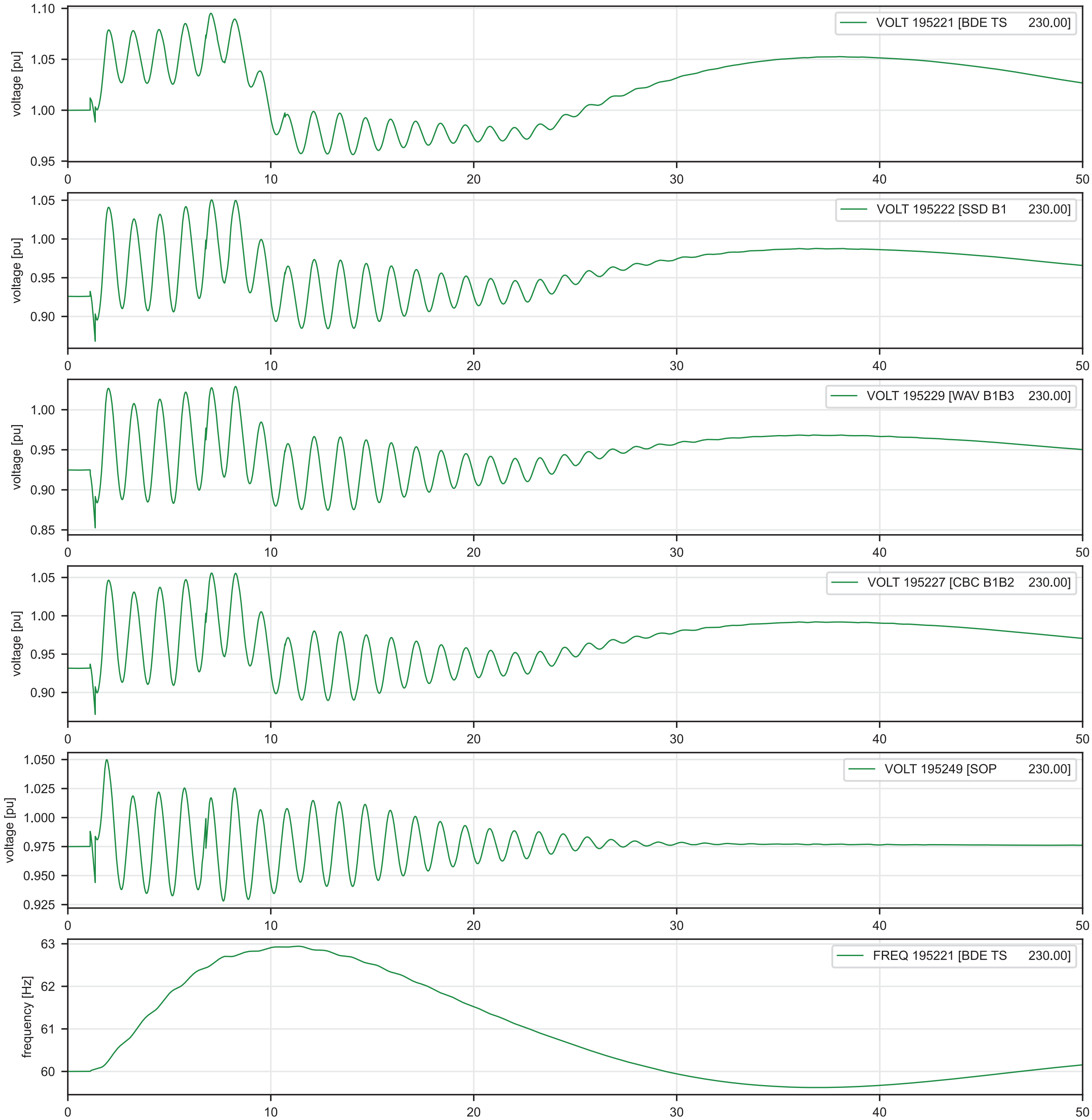
06_2033-34_Base-Peak_TL201-TL217_150MW_MLFC_off
Loss of TL201 | Voltage / Frequency



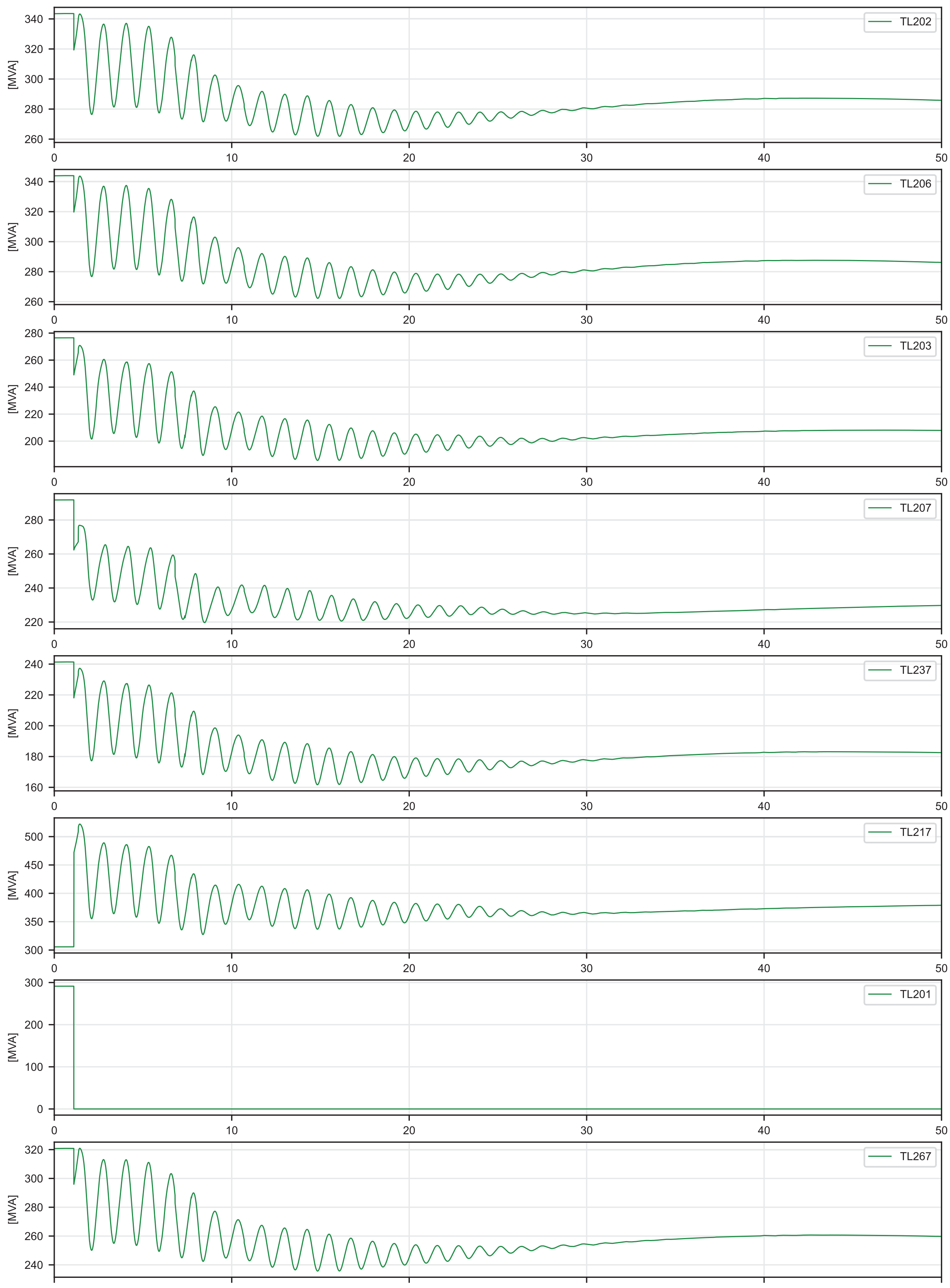
06_2033-34_Base-Peak_TL201-TL217_150MW_MLFC_off
Loss of TL201 | 230 kV Power Flow



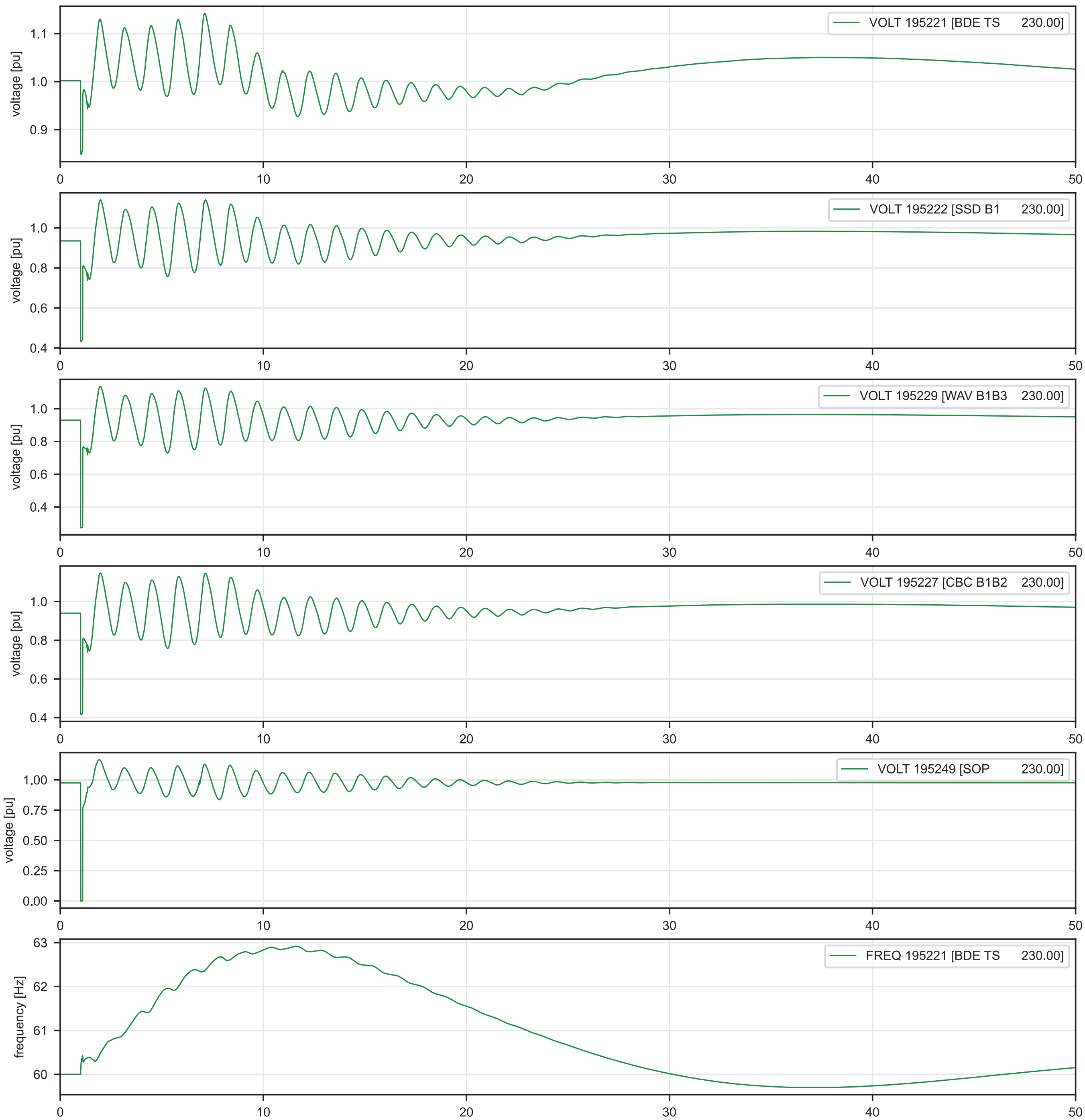
06_2033-34_Base-Peak_TL201-TL217_200MW_MLFC_off
Loss of TL201 | Voltage / Frequency



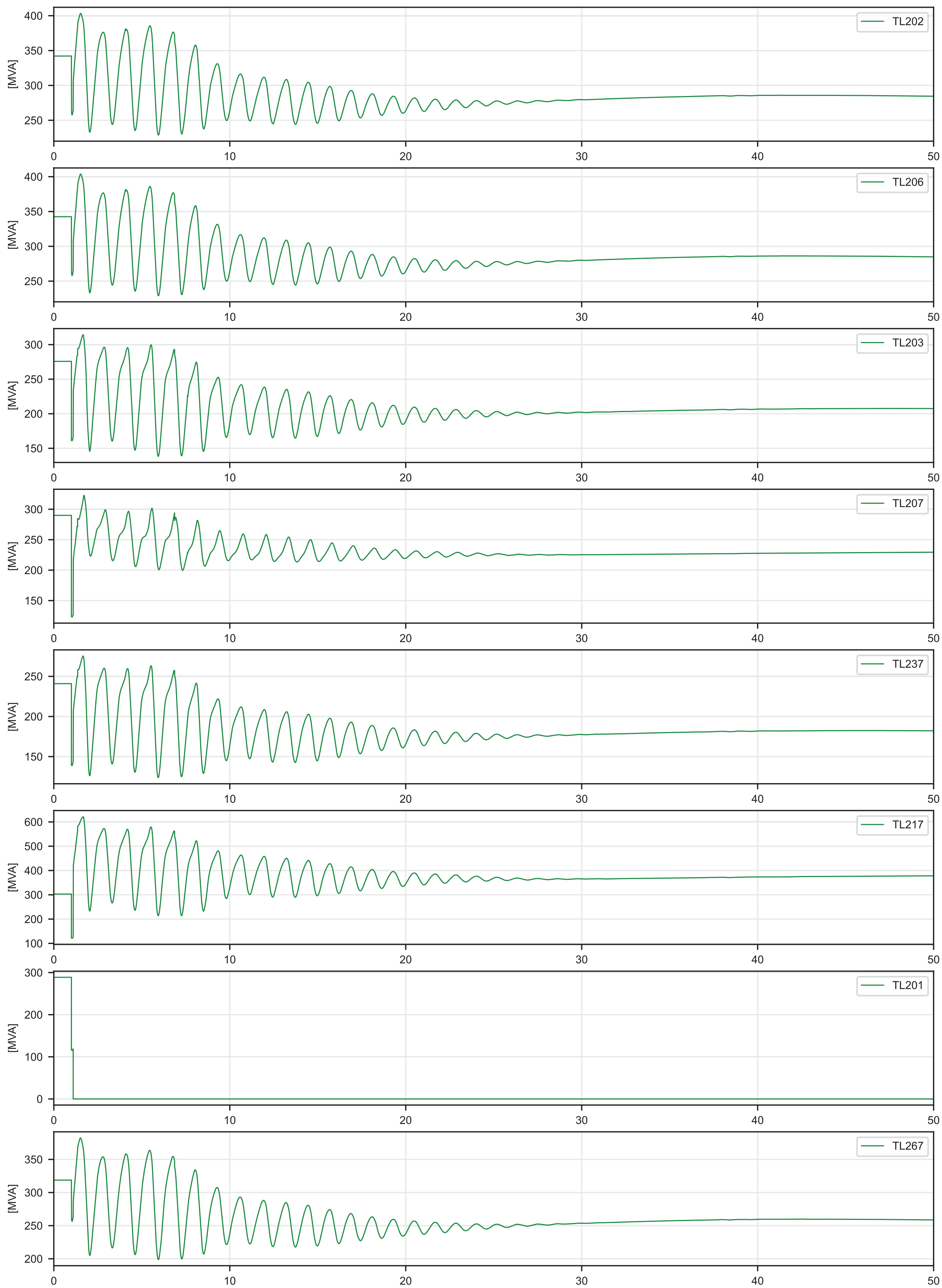
06_2033-34_Base-Peak_TL201-TL217_200MW_MLFC_off
Loss of TL201 | 230 kV Power Flow



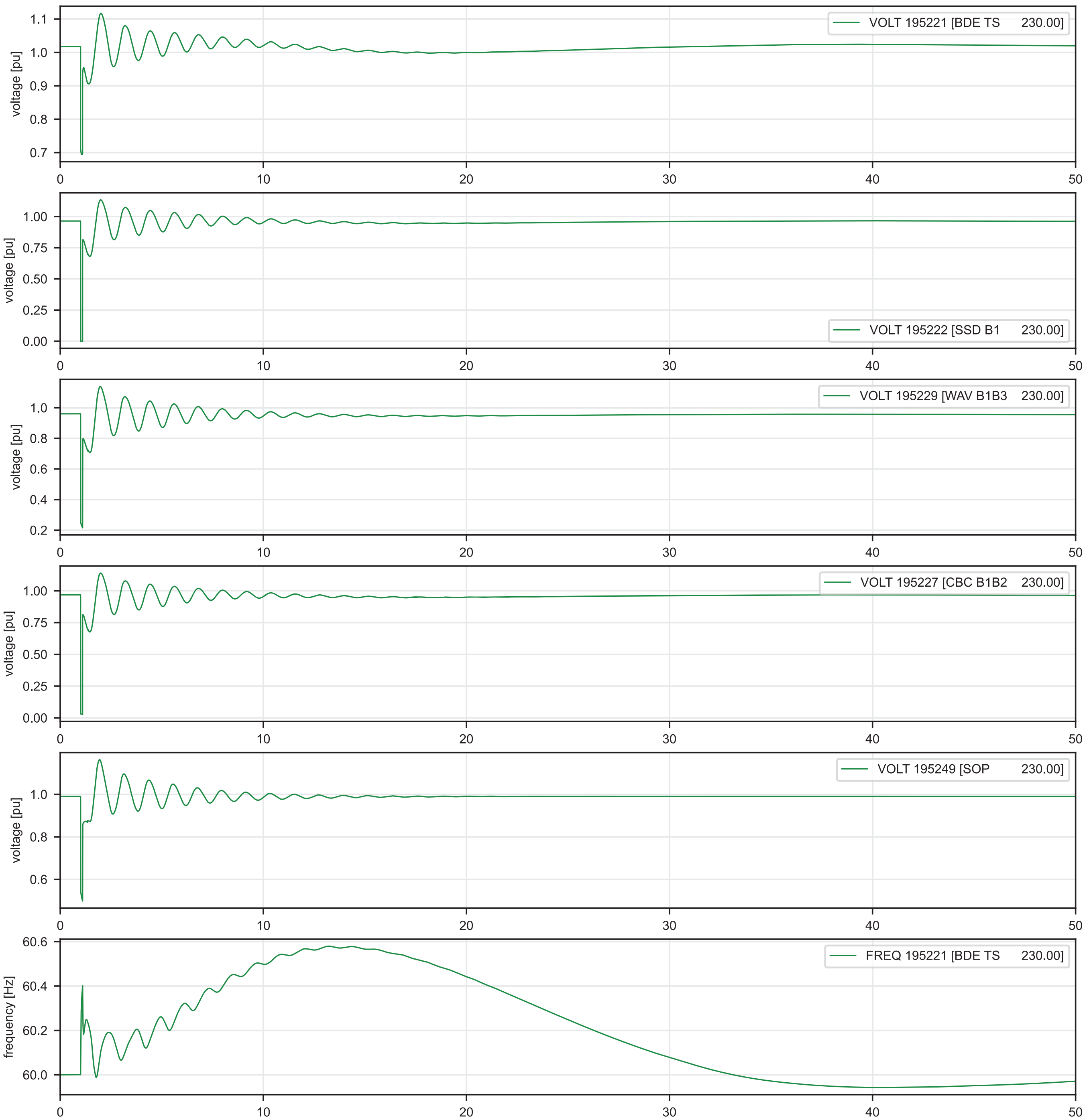
06_2033-34_Base-Peak_TL201-TL217_200MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL201 | Voltage / Frequency



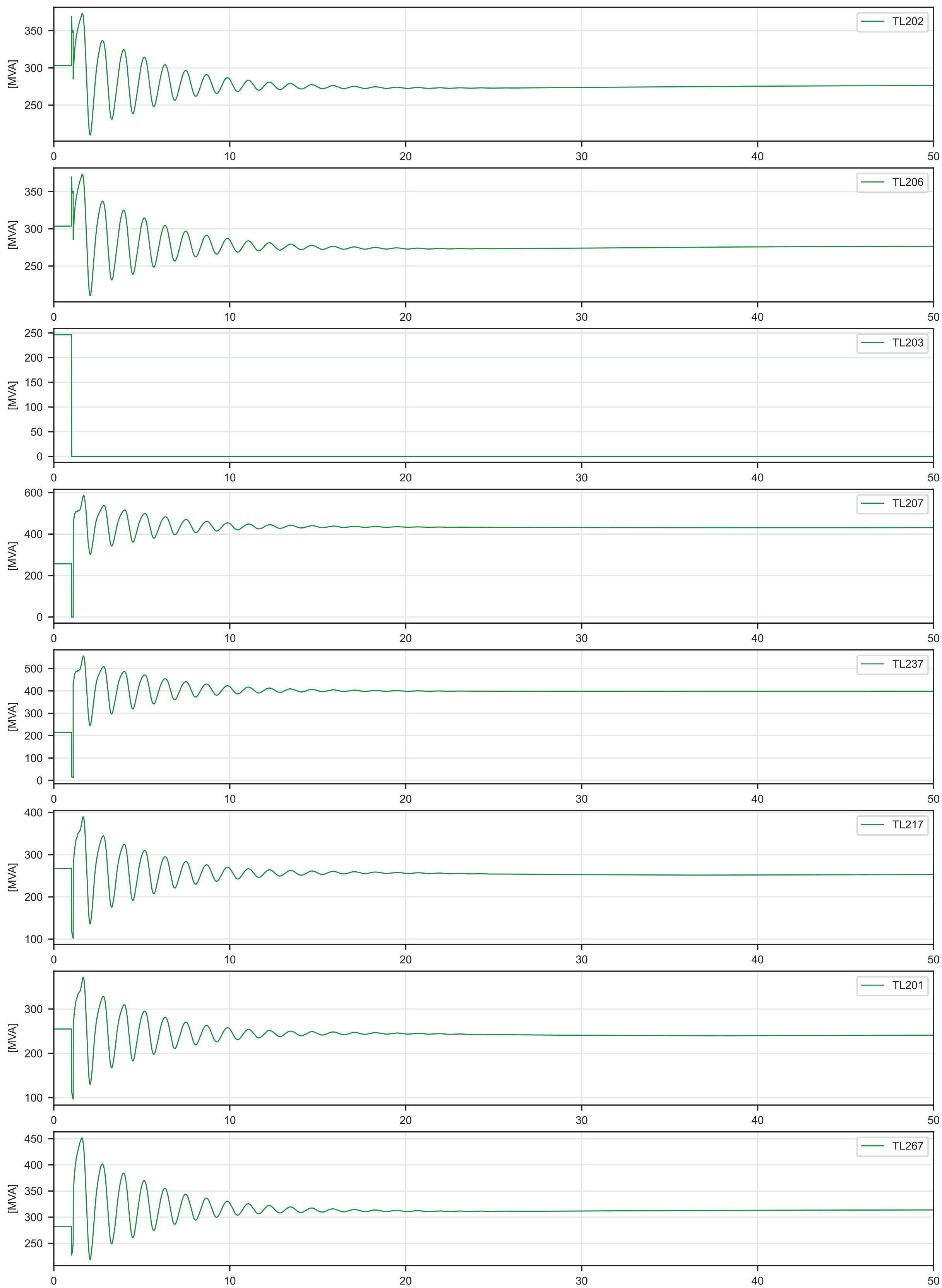
06_2033-34_Base-Peak_TL201-TL217_200MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL201 | 230 kV Power Flow



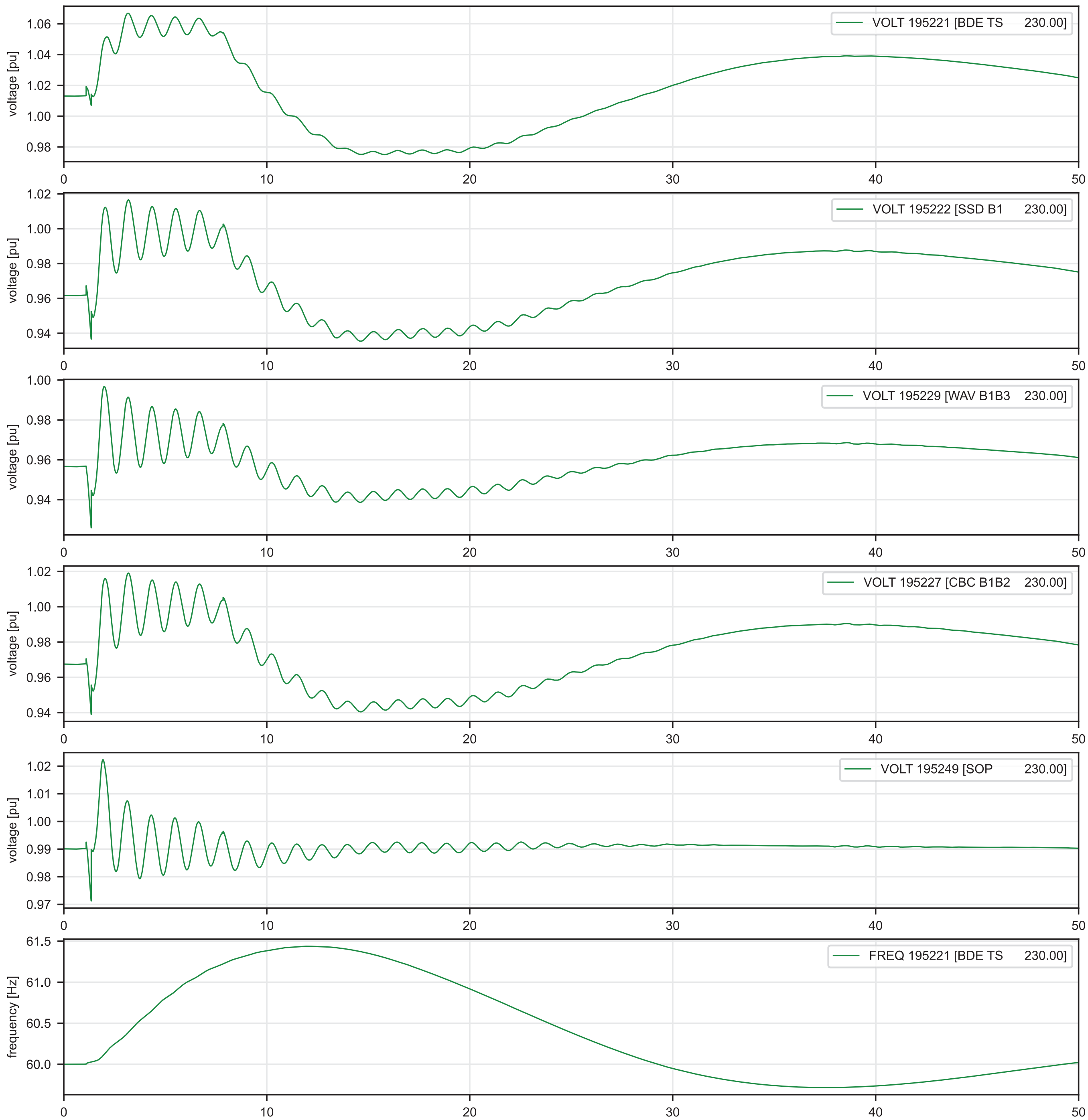
07_2033-34_Base-Peak_TL203-TL207_050MW_MLFC_off
Loss of TL203 | Voltage / Frequency



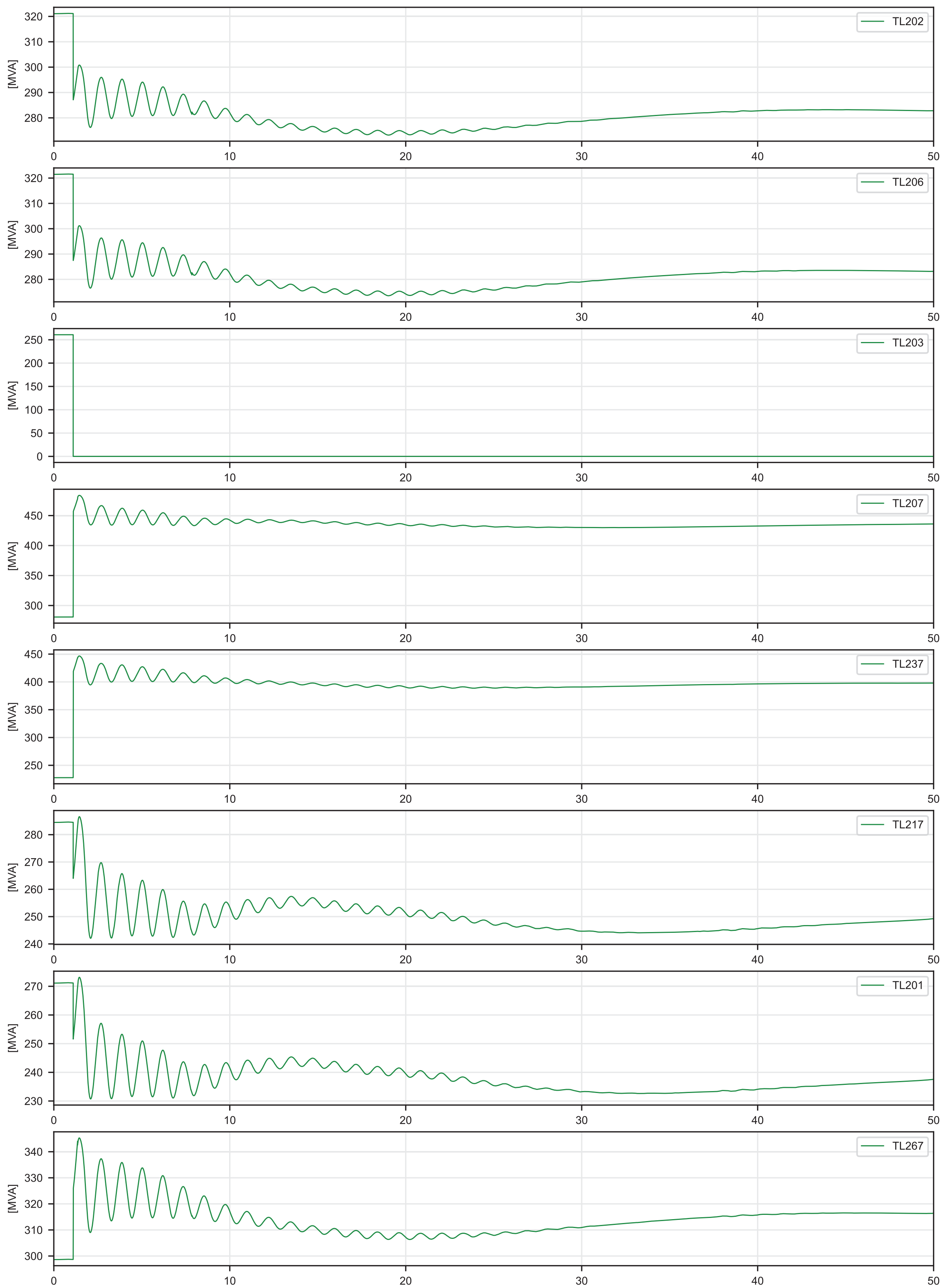
07_2033-34_Base-Peak_TL203-TL207_050MW_MLFC_off
Loss of TL203 | 230 kV Power Flow



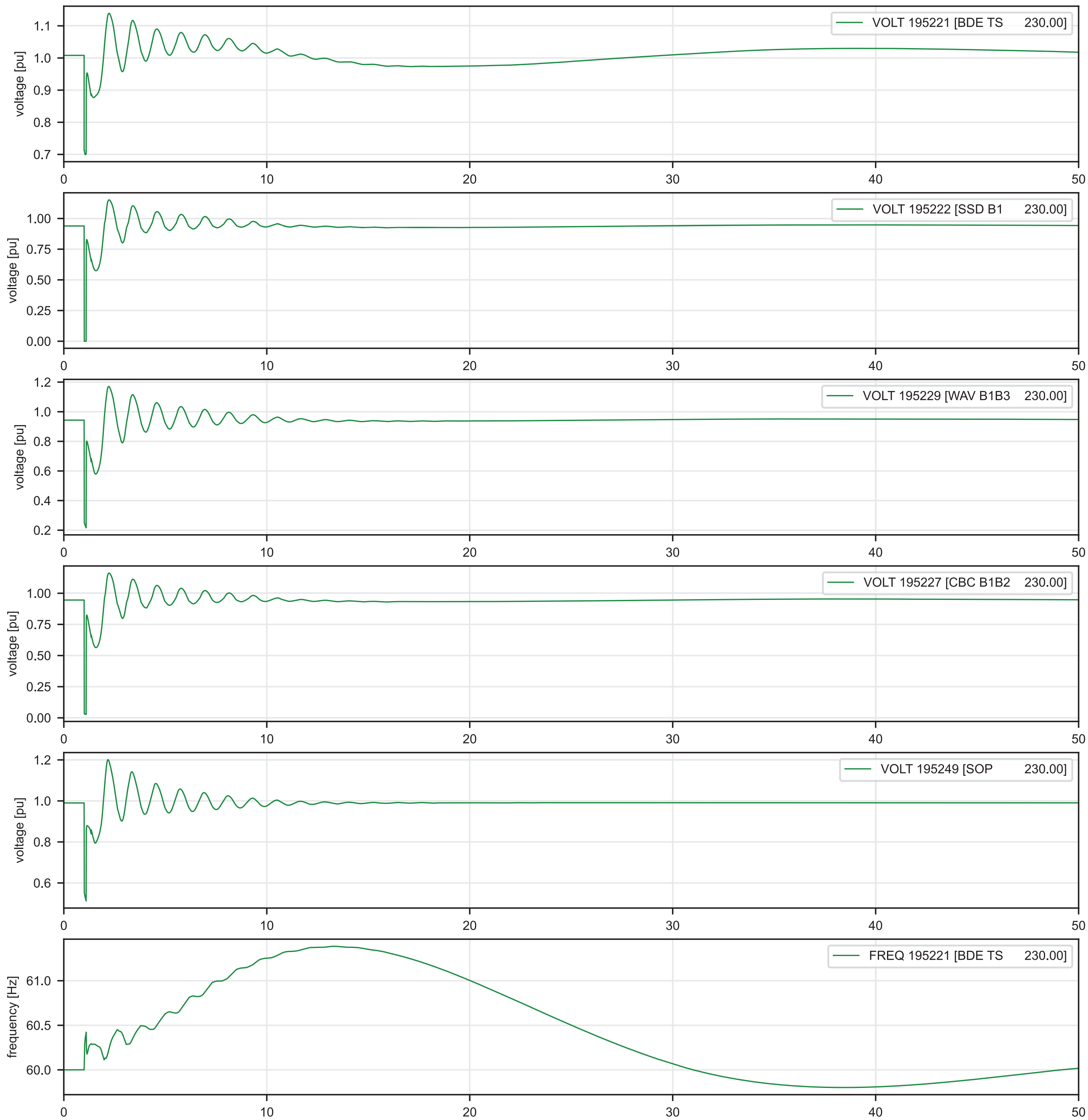
07_2033-34_Base-Peak_TL203-TL207_100MW_MLFC_off
Loss of TL203 | Voltage / Frequency



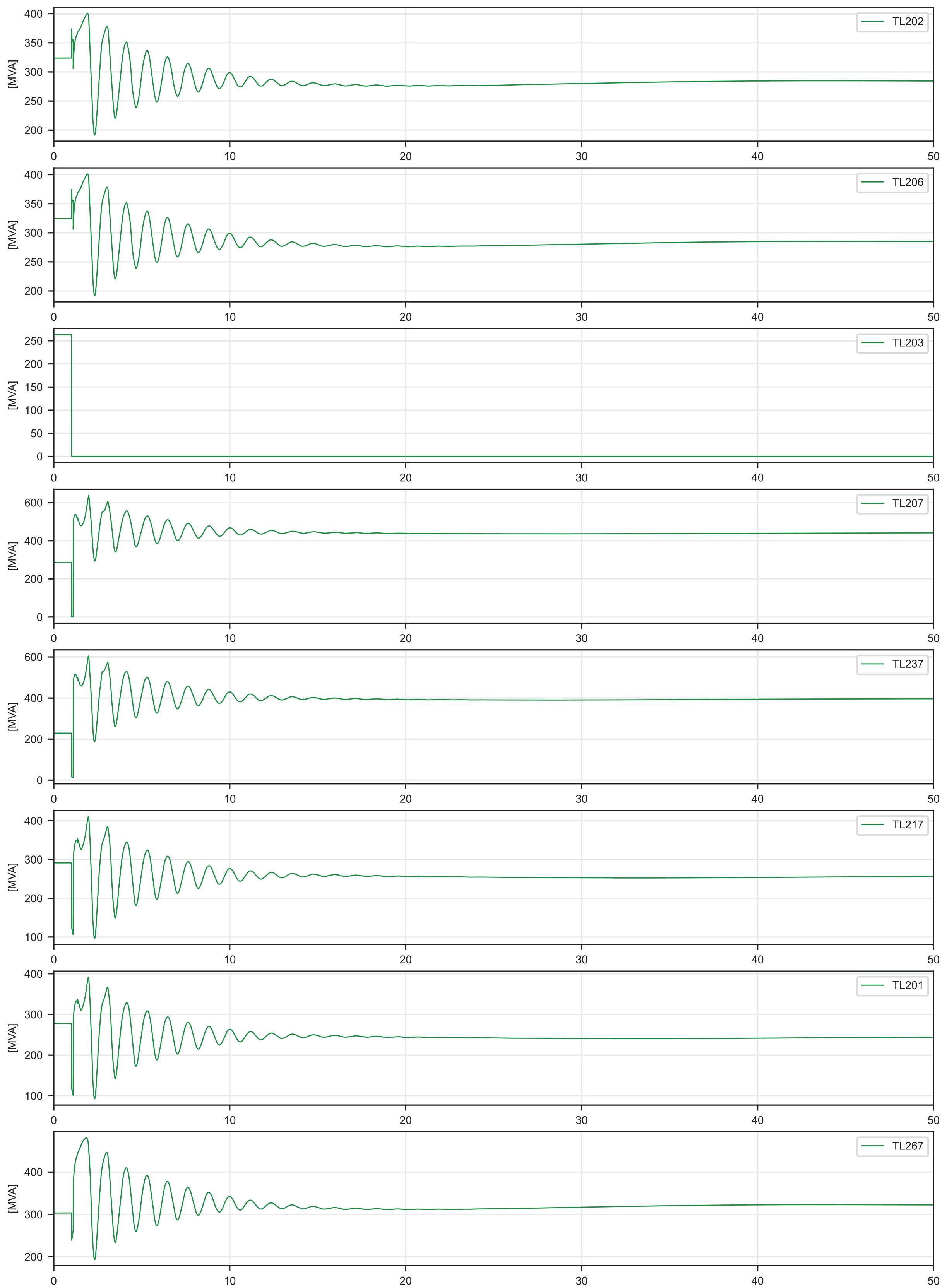
07_2033-34_Base-Peak_TL203-TL207_100MW_MLFC_off
Loss of TL203 | 230 kV Power Flow



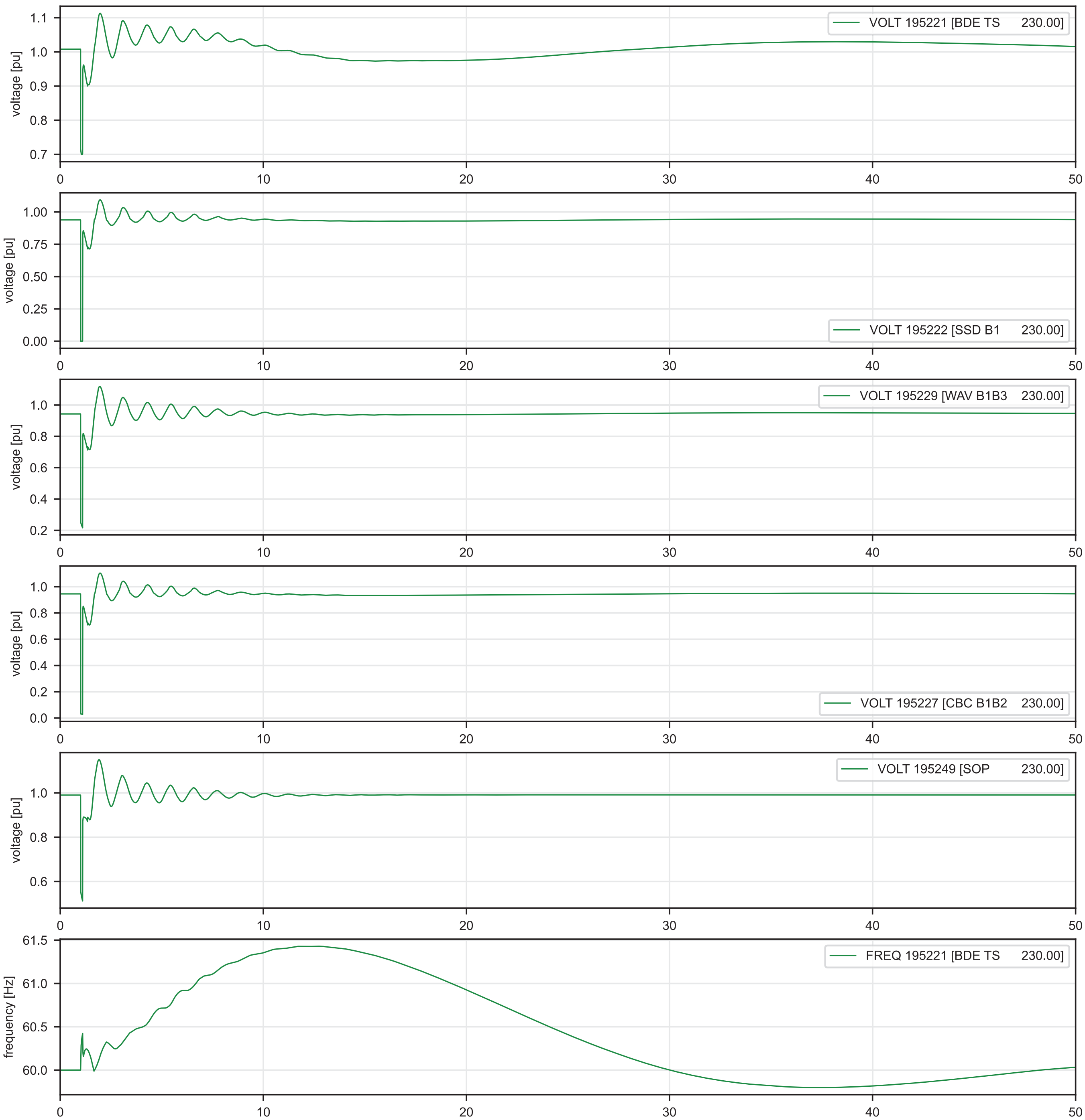
07_2033-34_Base-Peak_TL203-TL207_100MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL203 | Voltage / Frequency



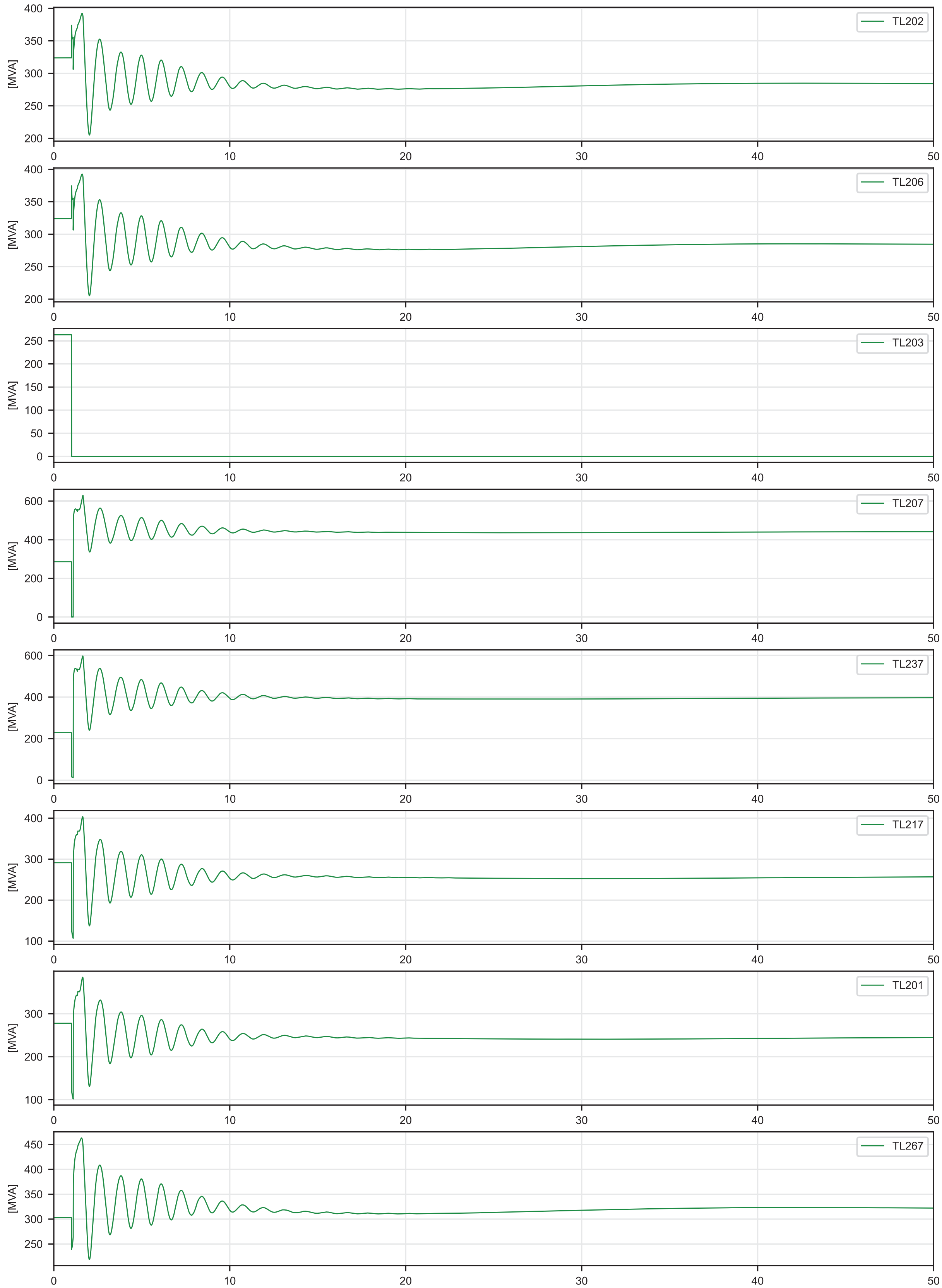
07_2033-34_Base-Peak_TL203-TL207_100MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL203 | 230 kV Power Flow



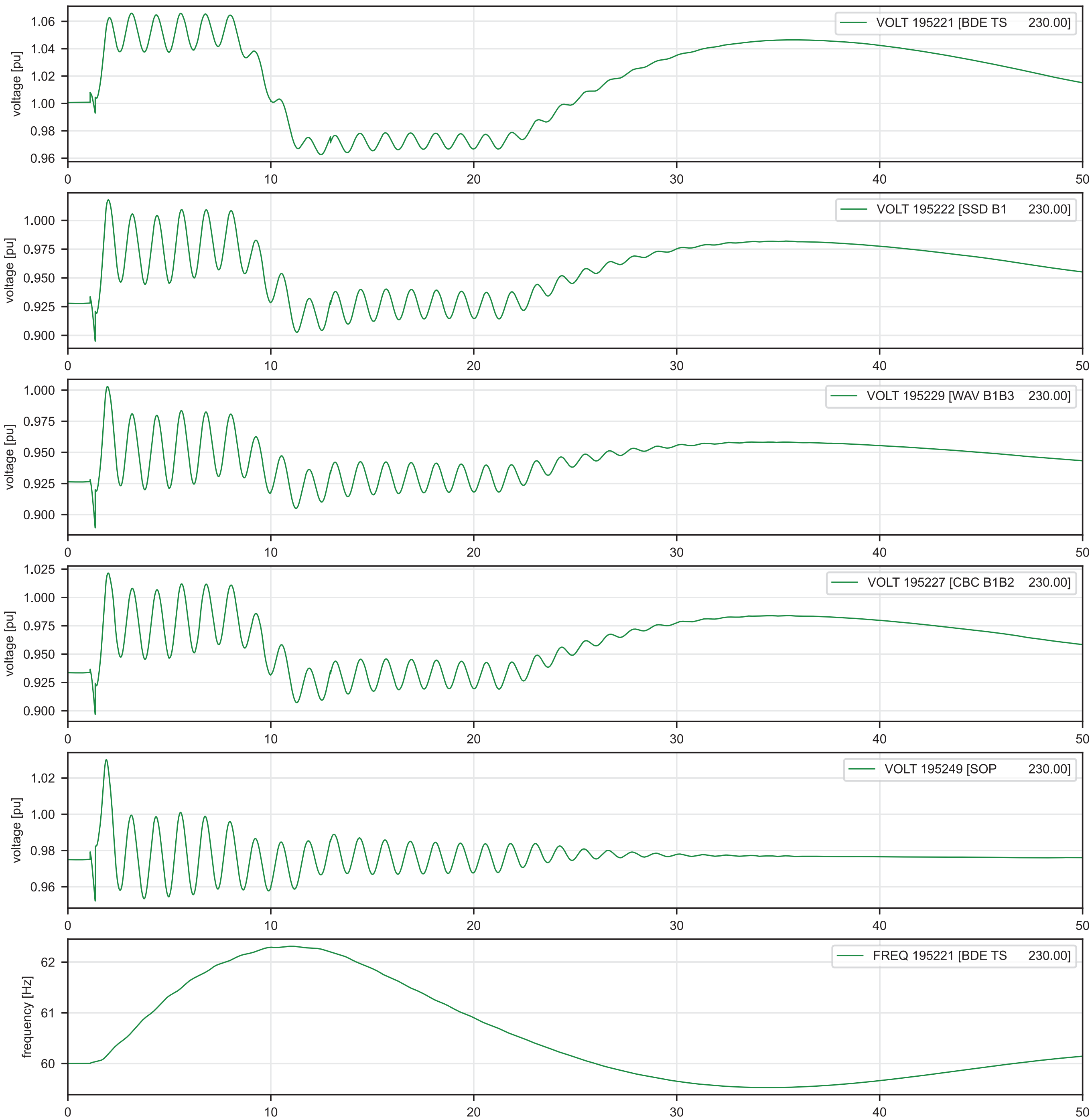
07_2033-34_Base-Peak_TL203-TL207_100MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL203 | Voltage / Frequency



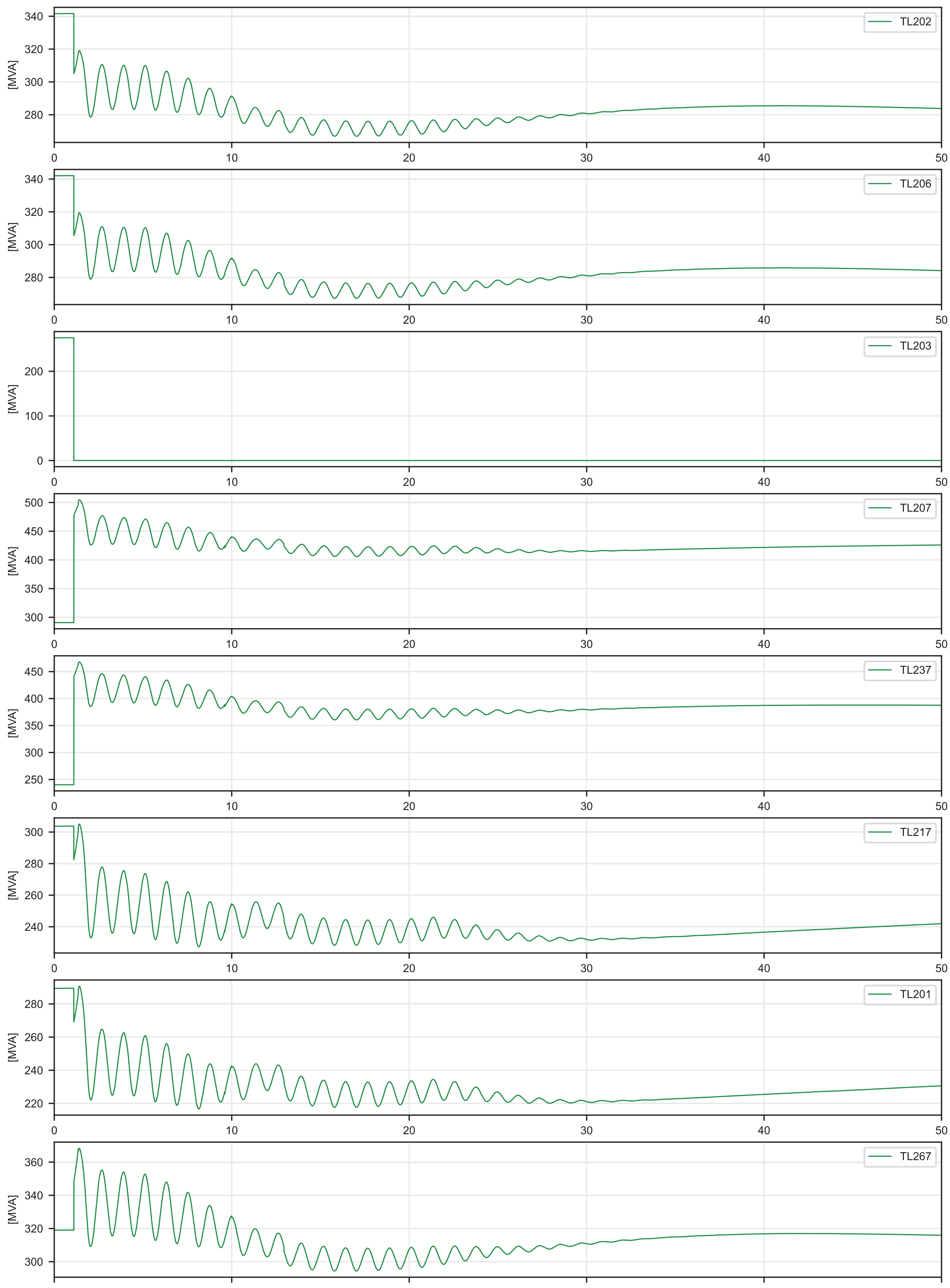
07_2033-34_Base-Peak_TL203-TL207_100MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL203 | 230 kV Power Flow



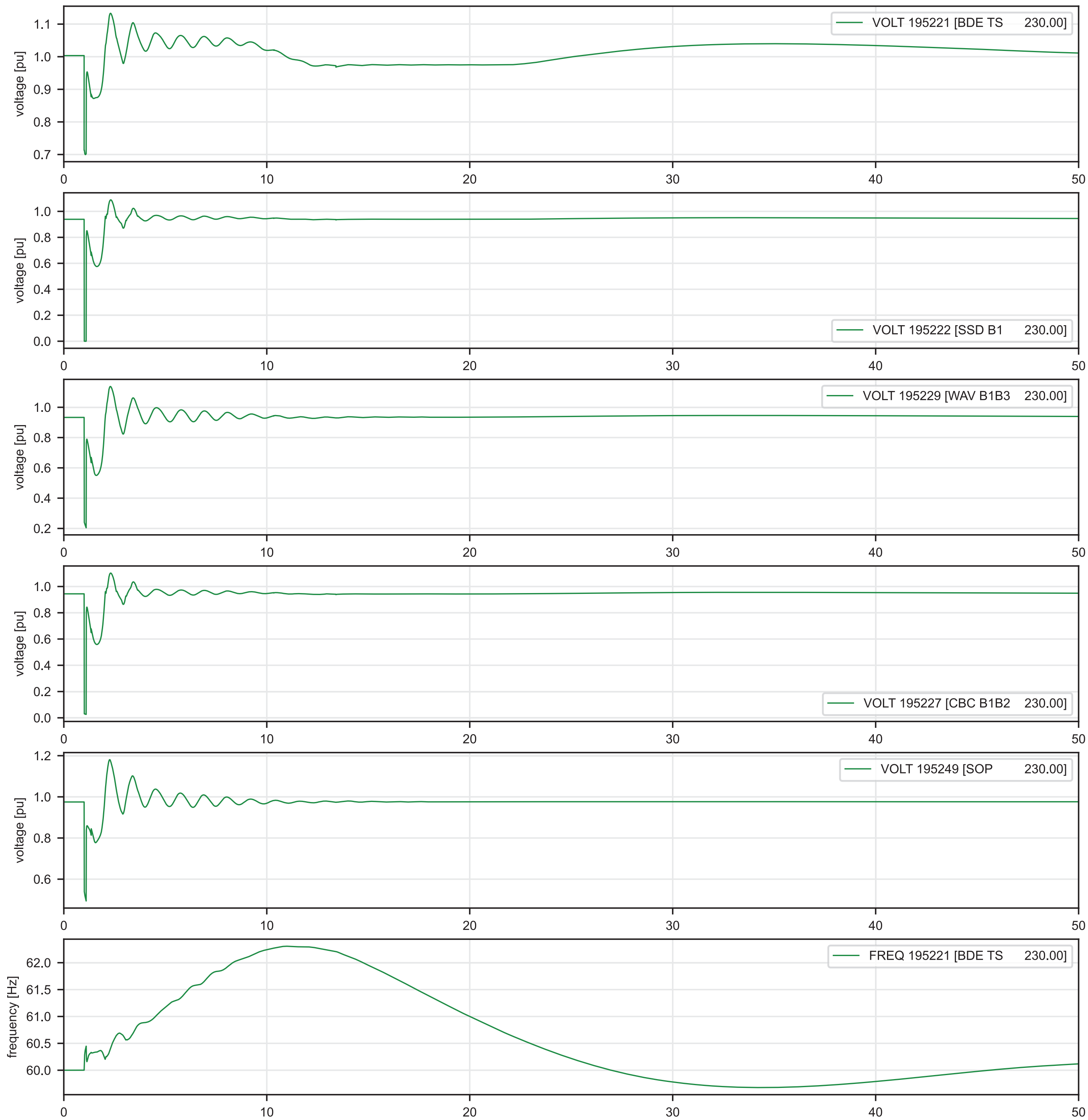
07_2033-34_Base-Peak_TL203-TL207_150MW_MLFC_off
Loss of TL203 | Voltage / Frequency



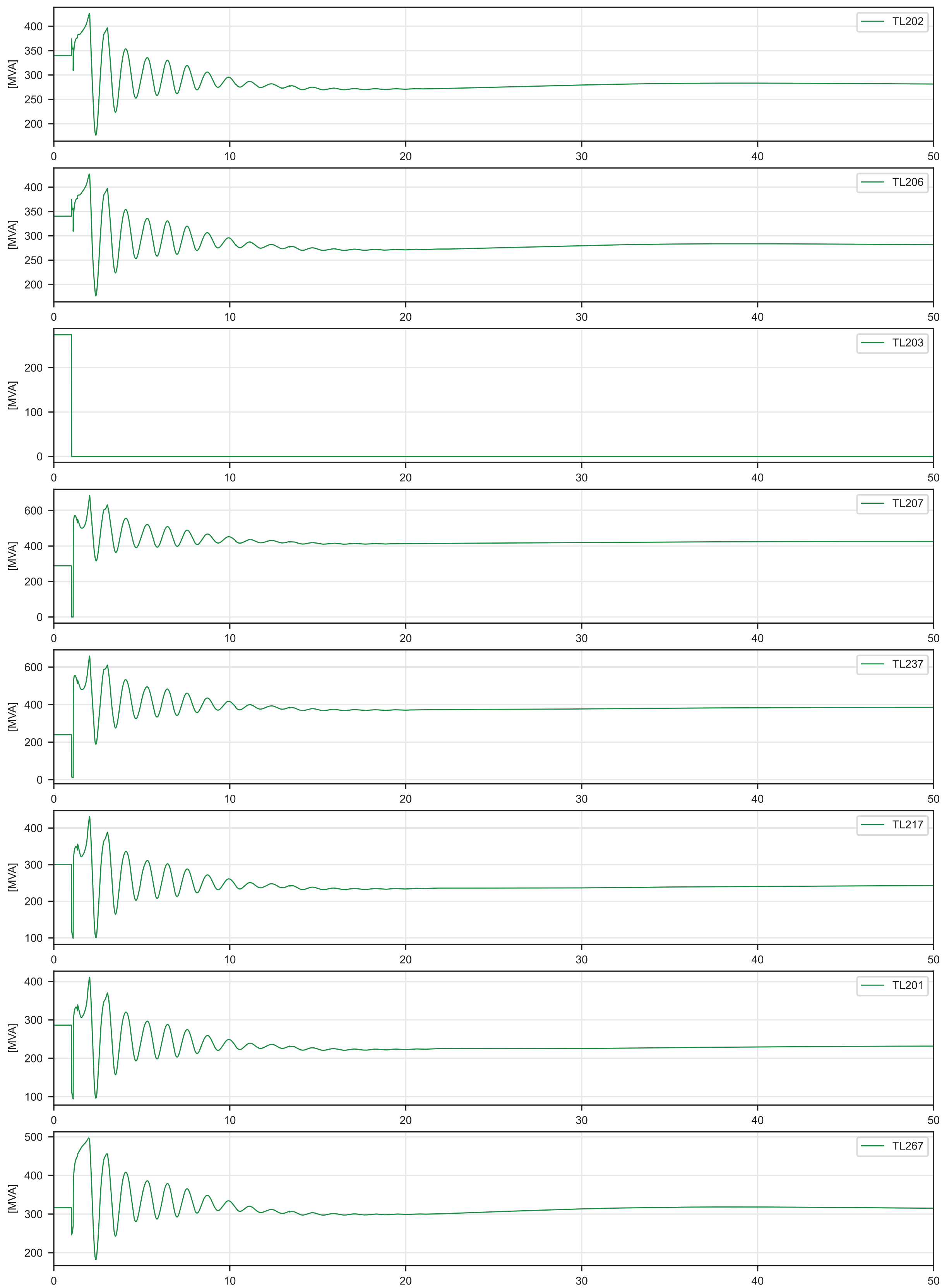
07_2033-34_Base-Peak_TL203-TL207_150MW_MLFC_off
Loss of TL203 | 230 kV Power Flow

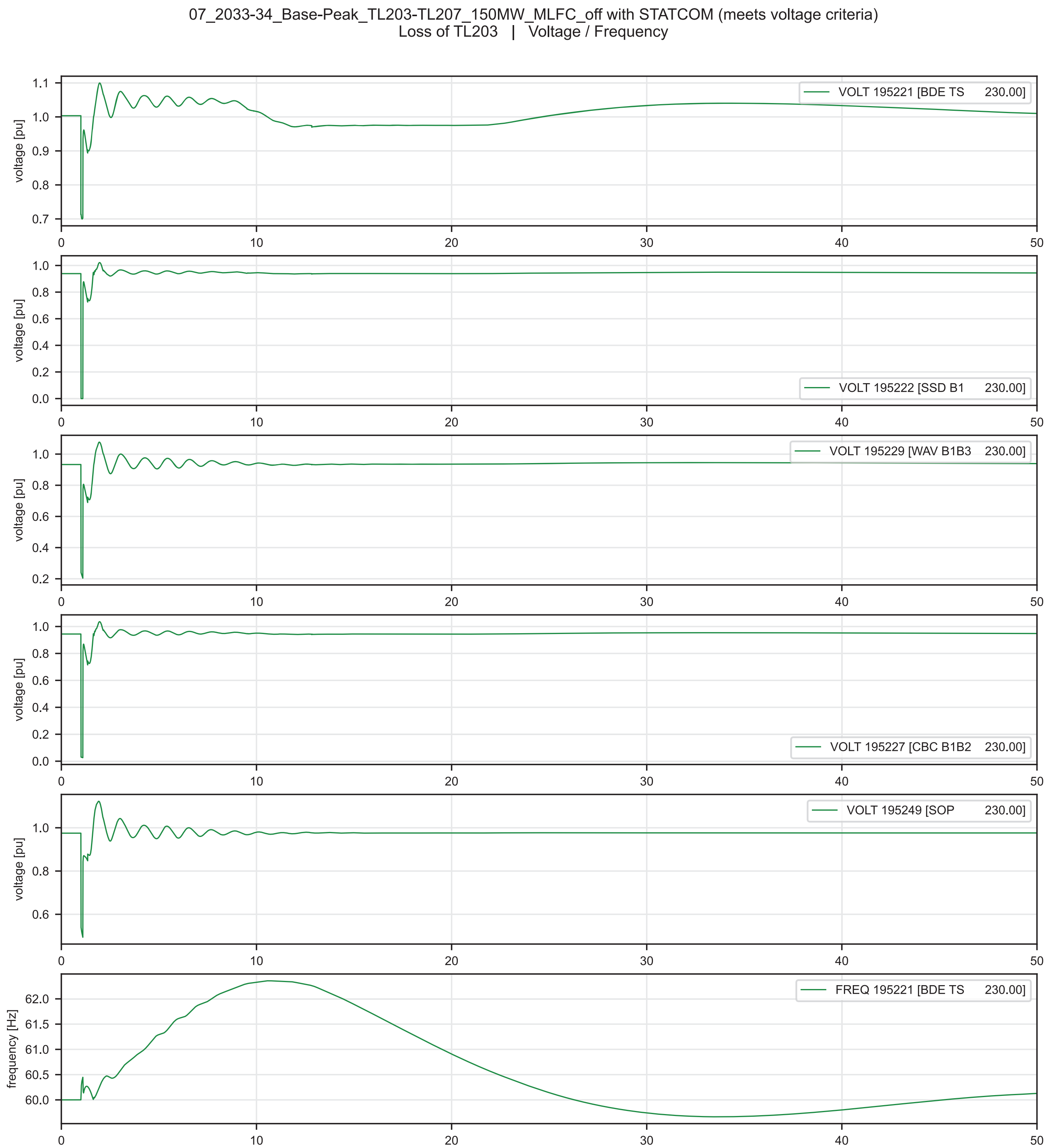


07_2033-34_Base-Peak_TL203-TL207_150MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL203 | Voltage / Frequency

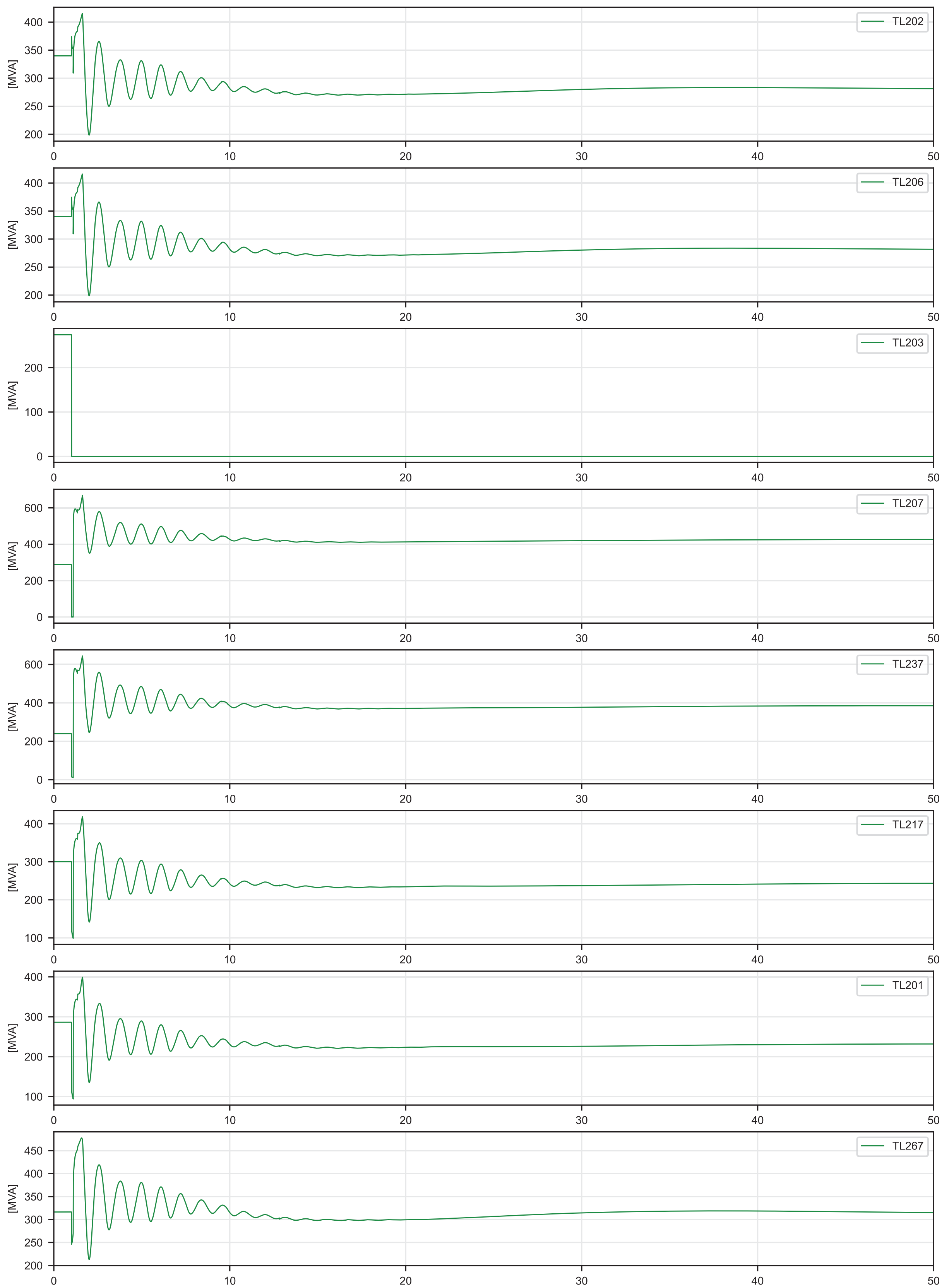


07_2033-34_Base-Peak_TL203-TL207_150MW_MLFC_off with STATCOM (violates voltage criteria)
Loss of TL203 | 230 kV Power Flow

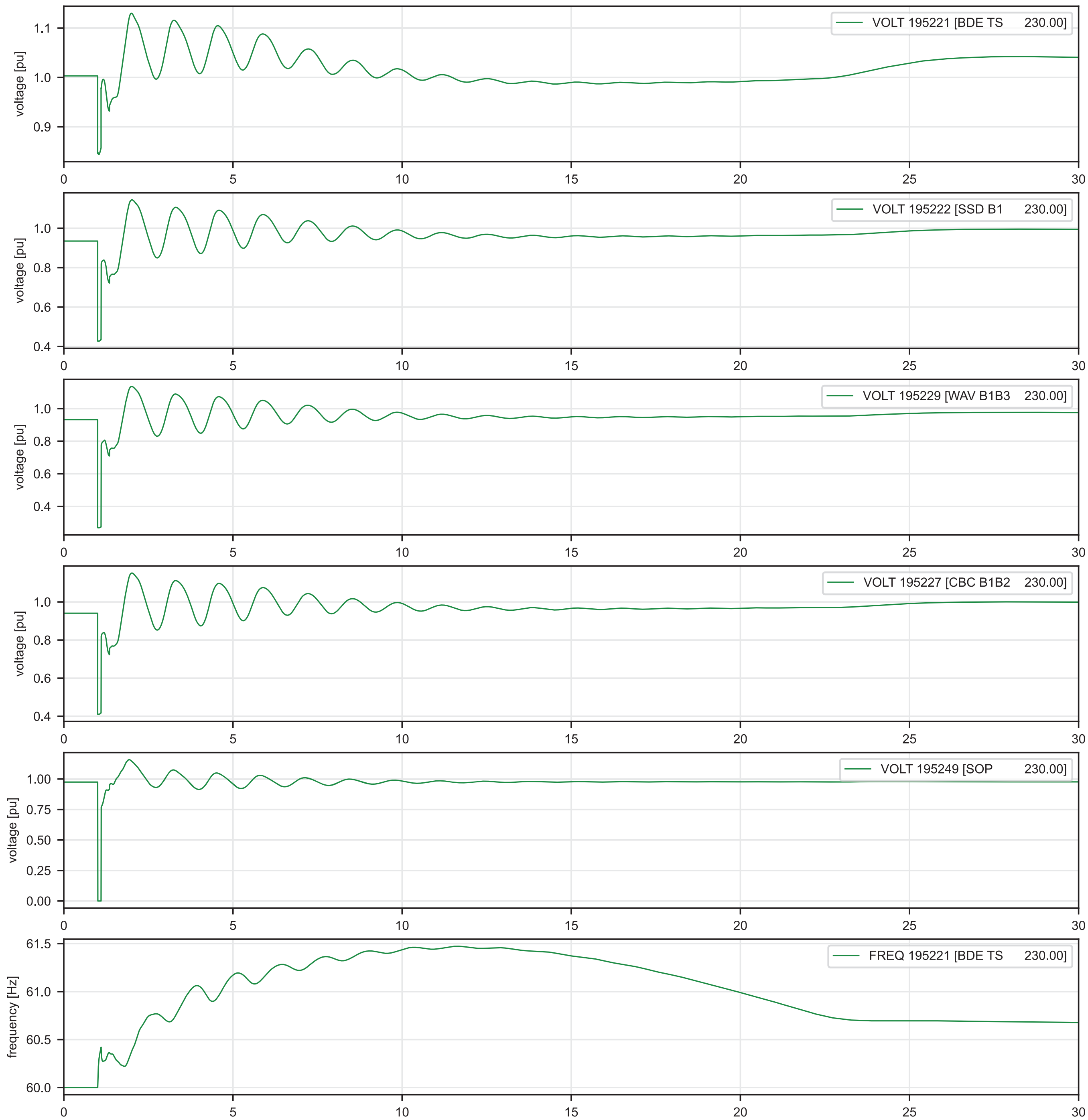



07_2033-34_Base-Peak_TL203-TL207_150MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL203 | Voltage / Frequency
VOLT 195221 [BDE TS 230.00]
VOLT 195222 [SSD B1 230.00]
VOLT 195229 [WAV B1B3 230.00]
VOLT 195227 [CBC B1B2 230.00]
VOLT 195249 [SOP 230.00]
FREQ 195221 [BDE TS 230.00]
voltage [pu]
frequency [Hz]

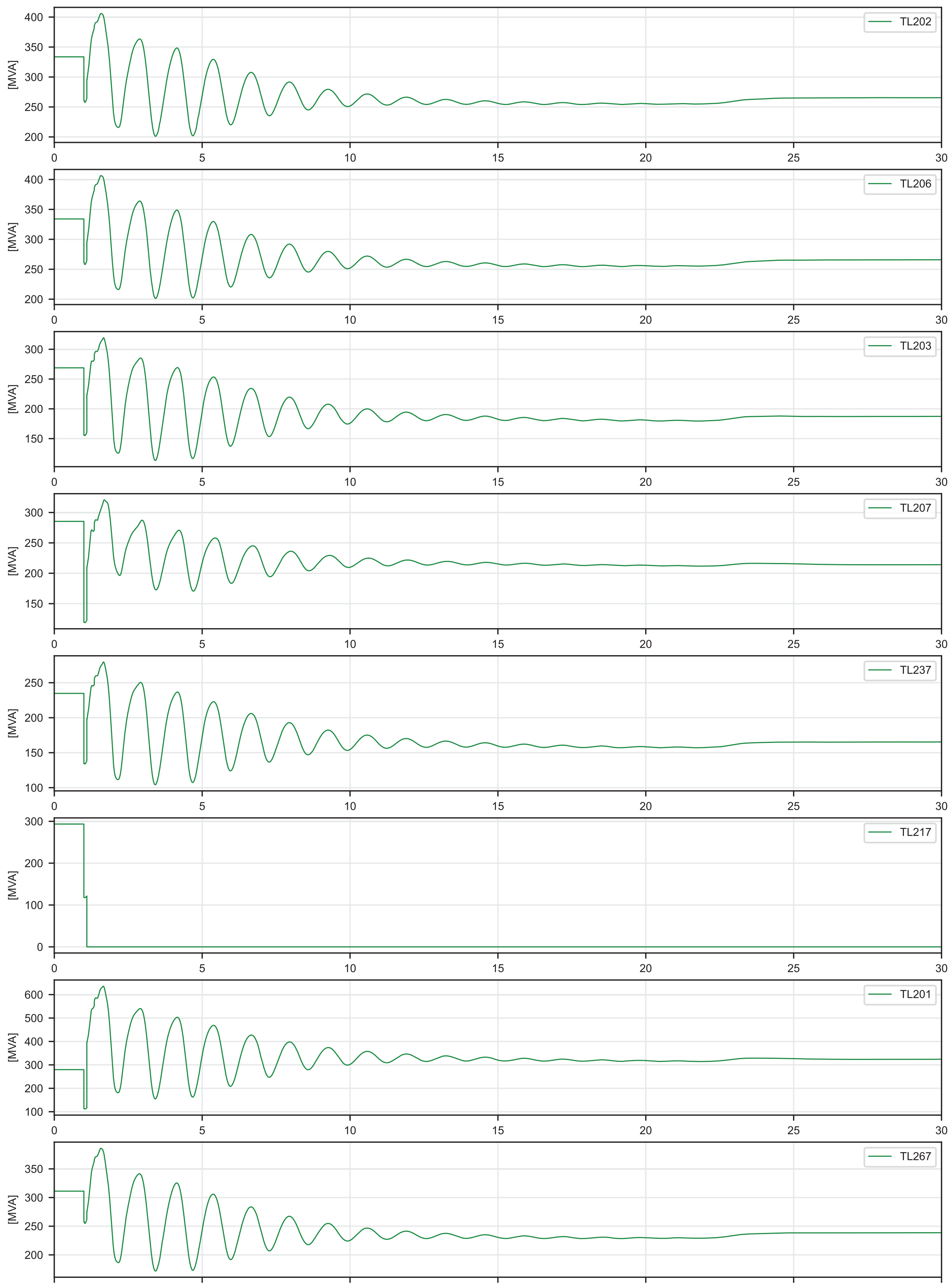
07_2033-34_Base-Peak_TL203-TL207_150MW_MLFC_off with STATCOM (meets voltage criteria)
Loss of TL203 | 230 kV Power Flow



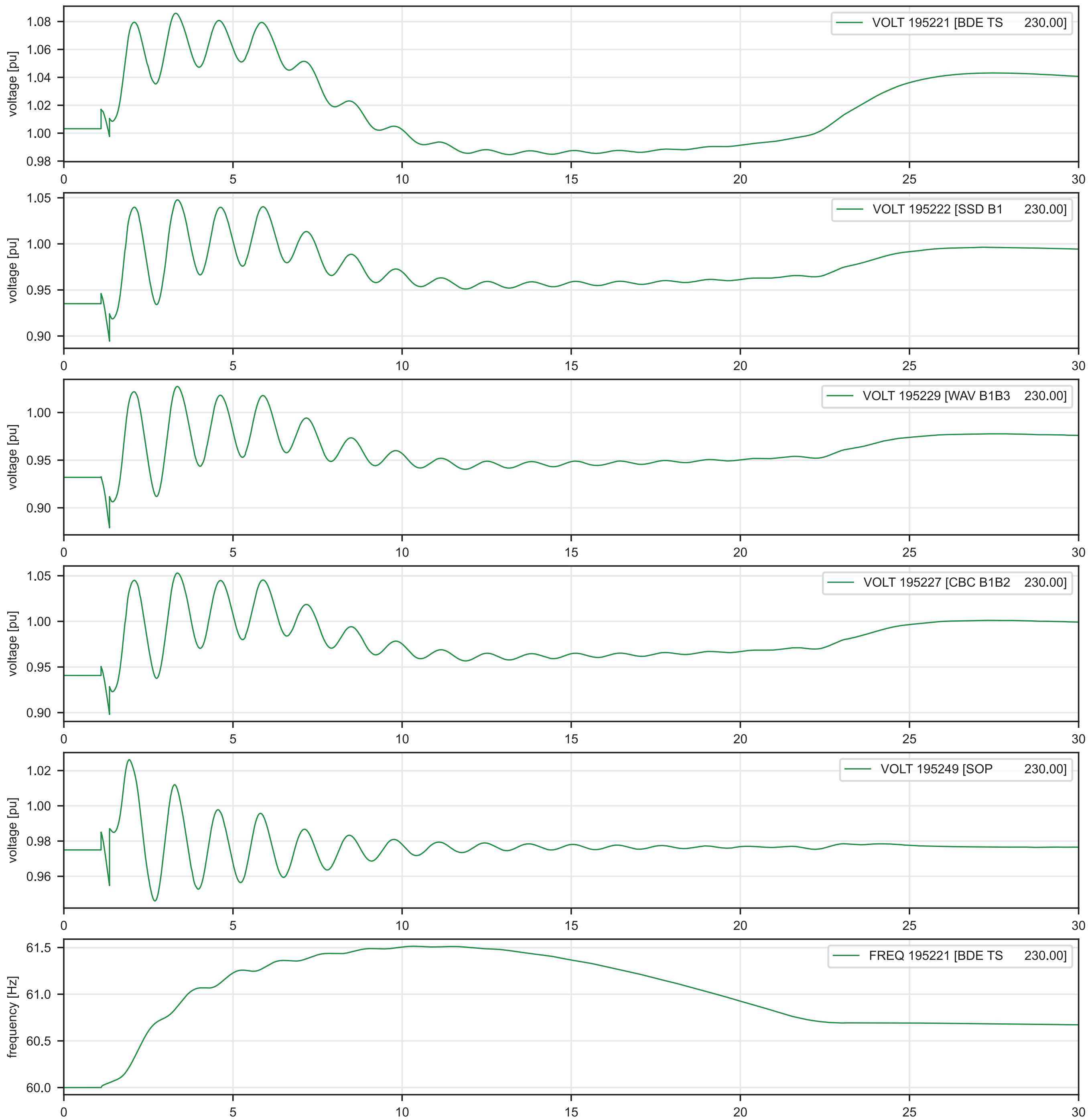
01_2033-34_Base-Peak_TL217-TL201_1800MW_3SOPSC
Loss of TL217 - 3PF | Voltage / Frequency



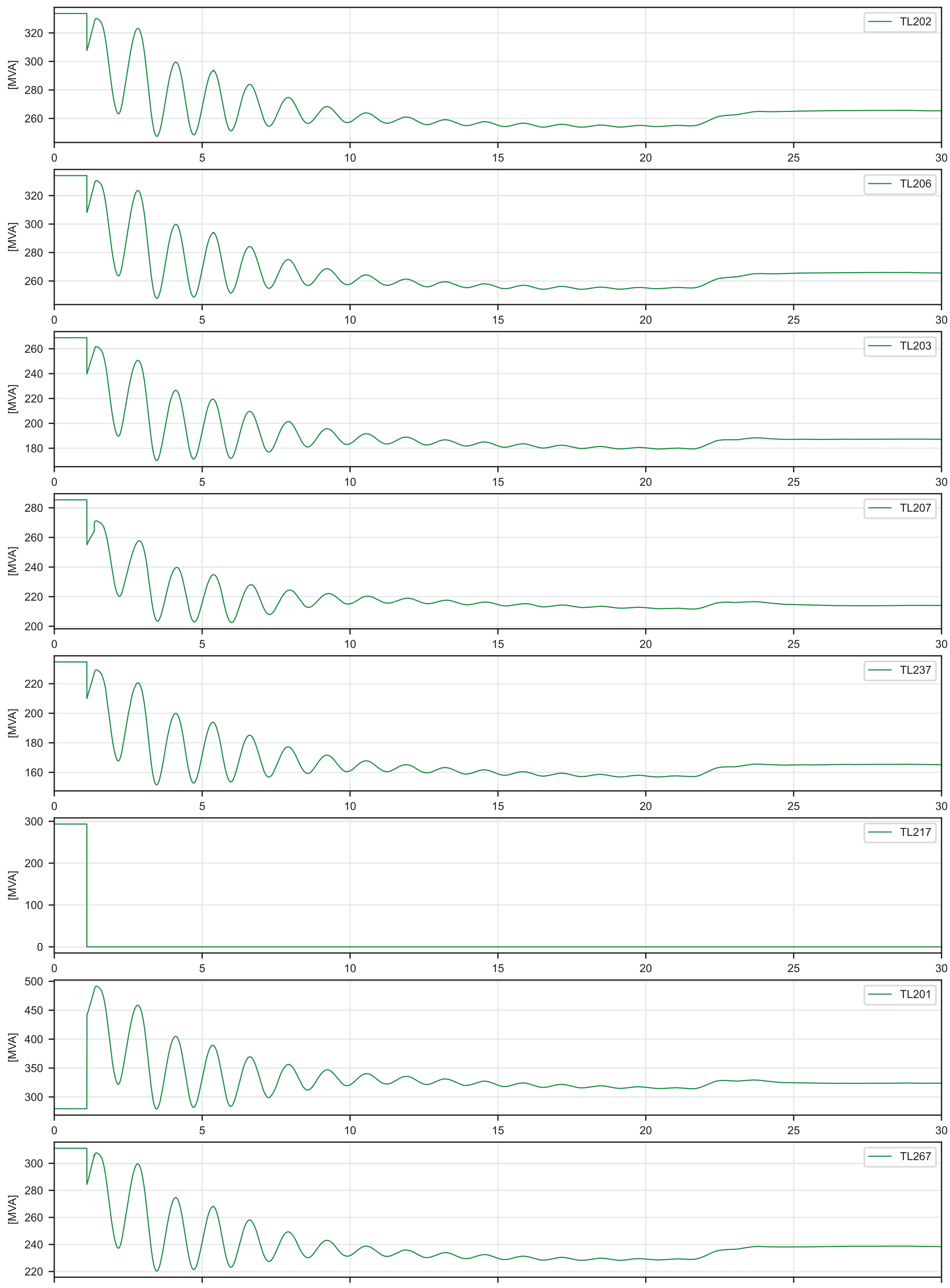
01_2033-34_Base-Peak_TL217-TL201_1800MW_3SOPSC
Loss of TL217 - 3PF | 230 kV Power Flow



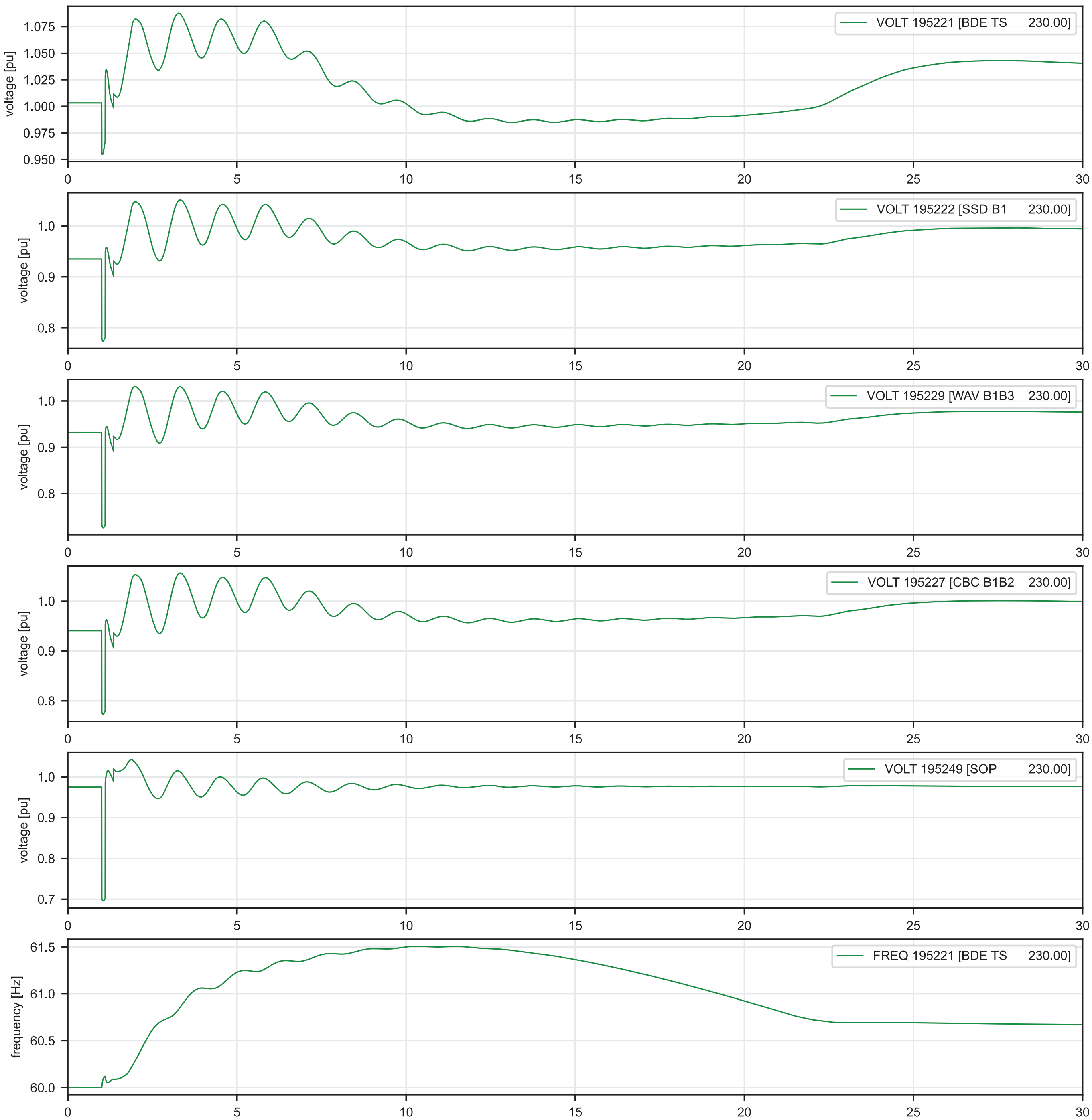
01_2033-34_Base-Peak_TL217-TL201_1800MW_3SOPSC
Loss of TL217 - no fault | Voltage / Frequency



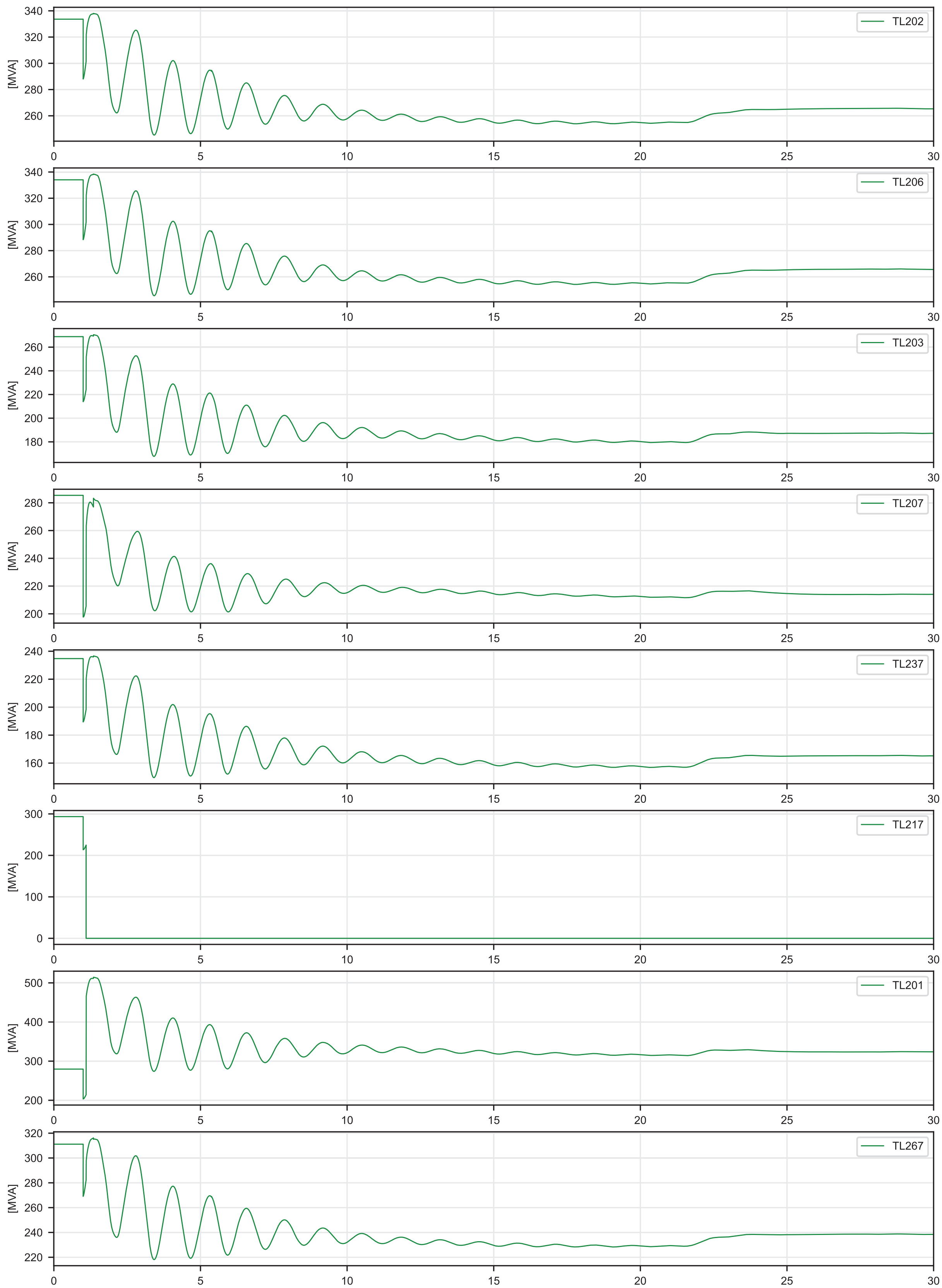
01_2033-34_Base-Peak_TL217-TL201_1800MW_3SOPSC
Loss of TL217 - no fault | 230 kV Power Flow



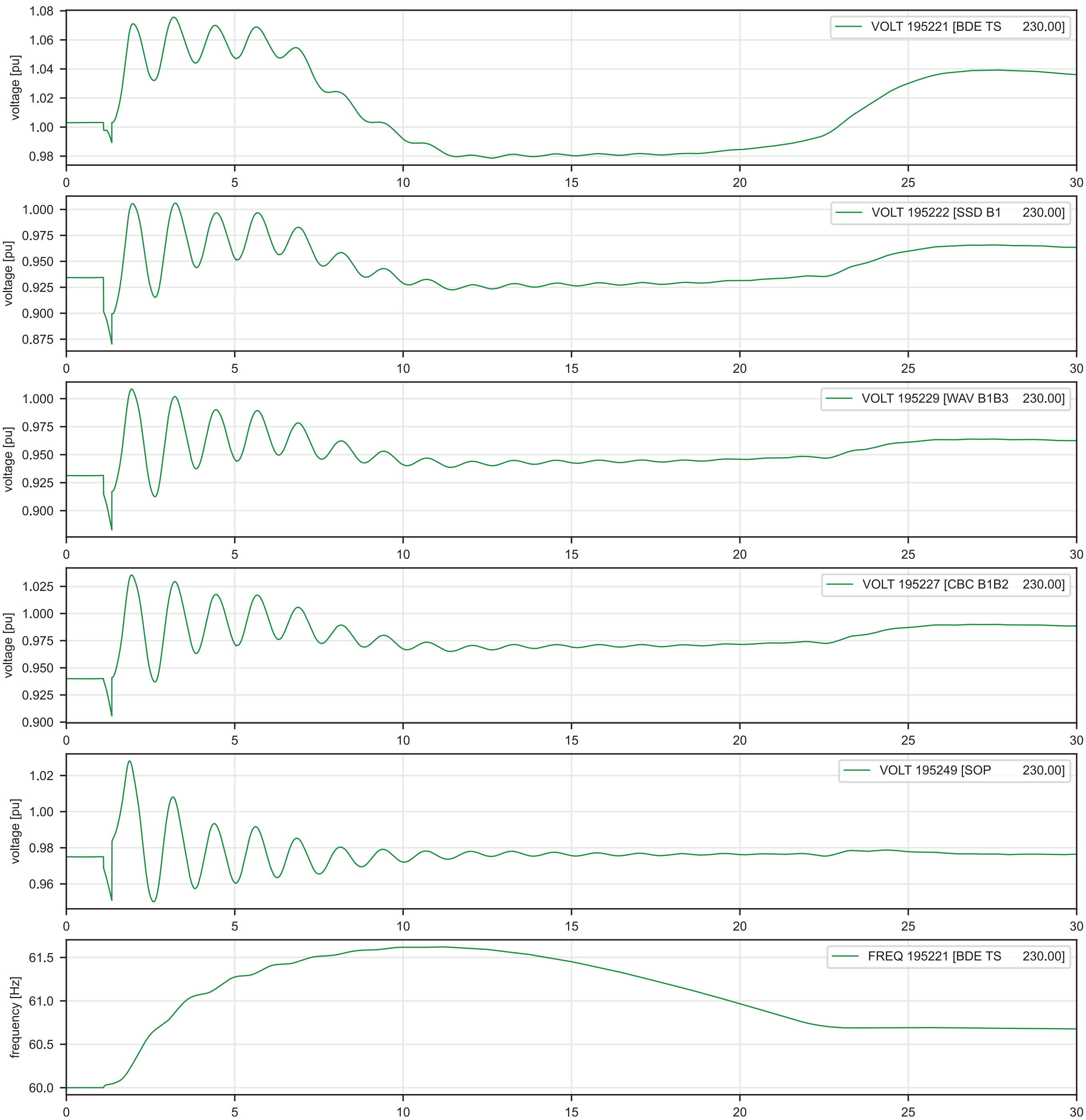
01_2033-34_Base-Peak_TL217-TL201_1800MW_3SOPSC
Loss of TL217 - SLGF | Voltage / Frequency



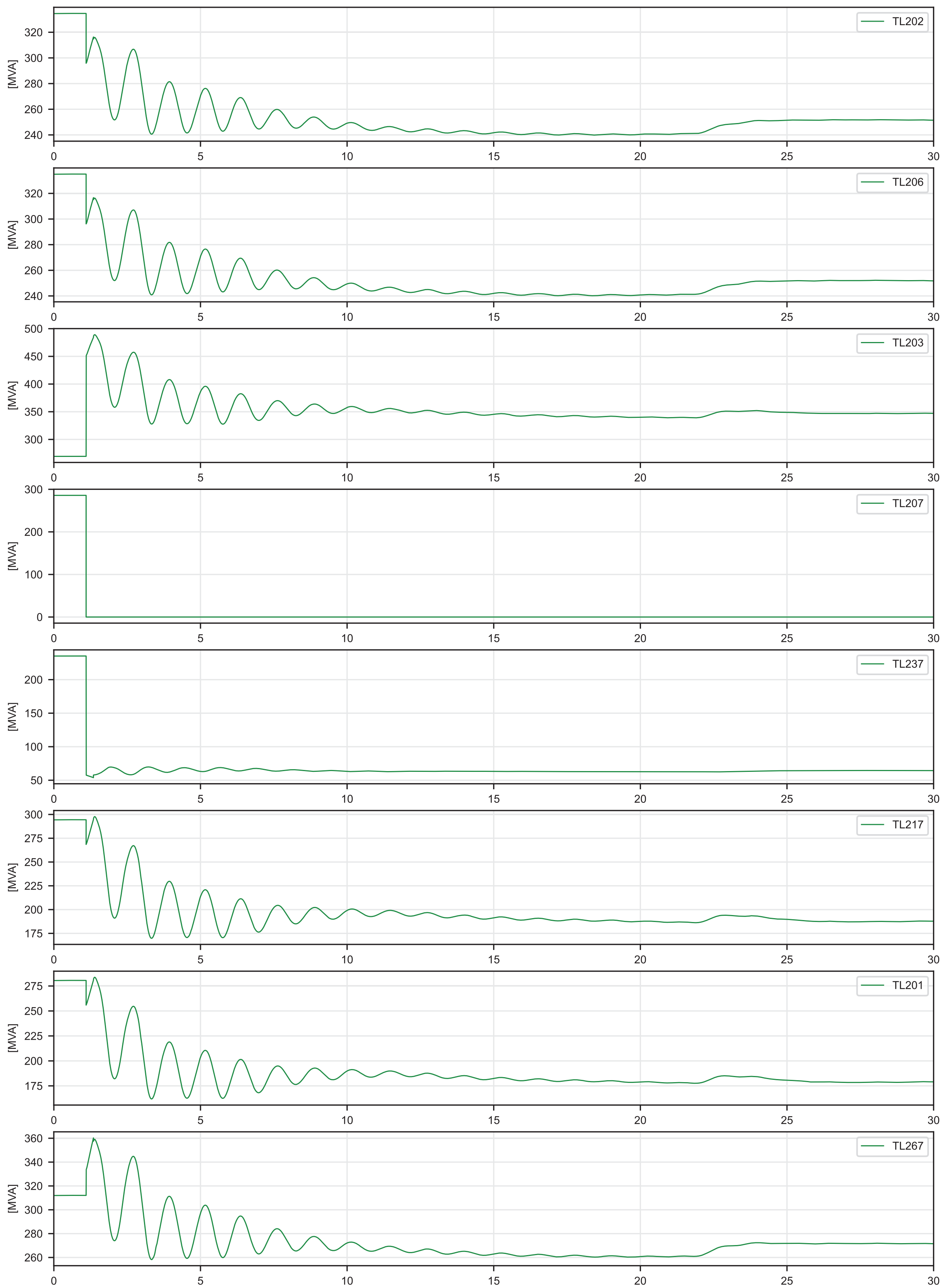
01_2033-34_Base-Peak_TL217-TL201_1800MW_3SOPSC
Loss of TL217 - SLGF | 230 kV Power Flow



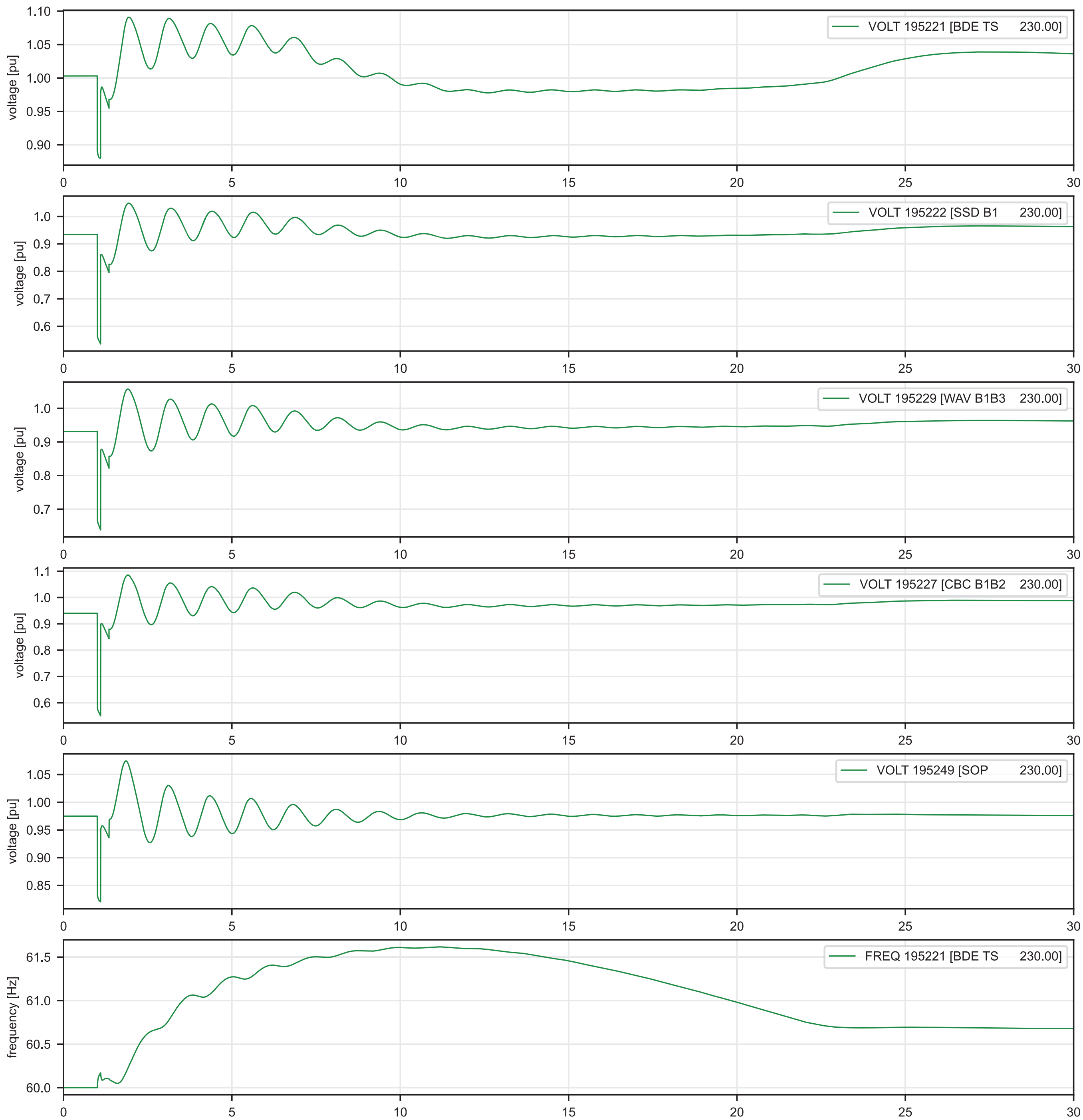
02_2033-34_Base-Peak_TL207-TL203_1800MW_3SOPSC
Loss of TL207 - no fault | Voltage / Frequency



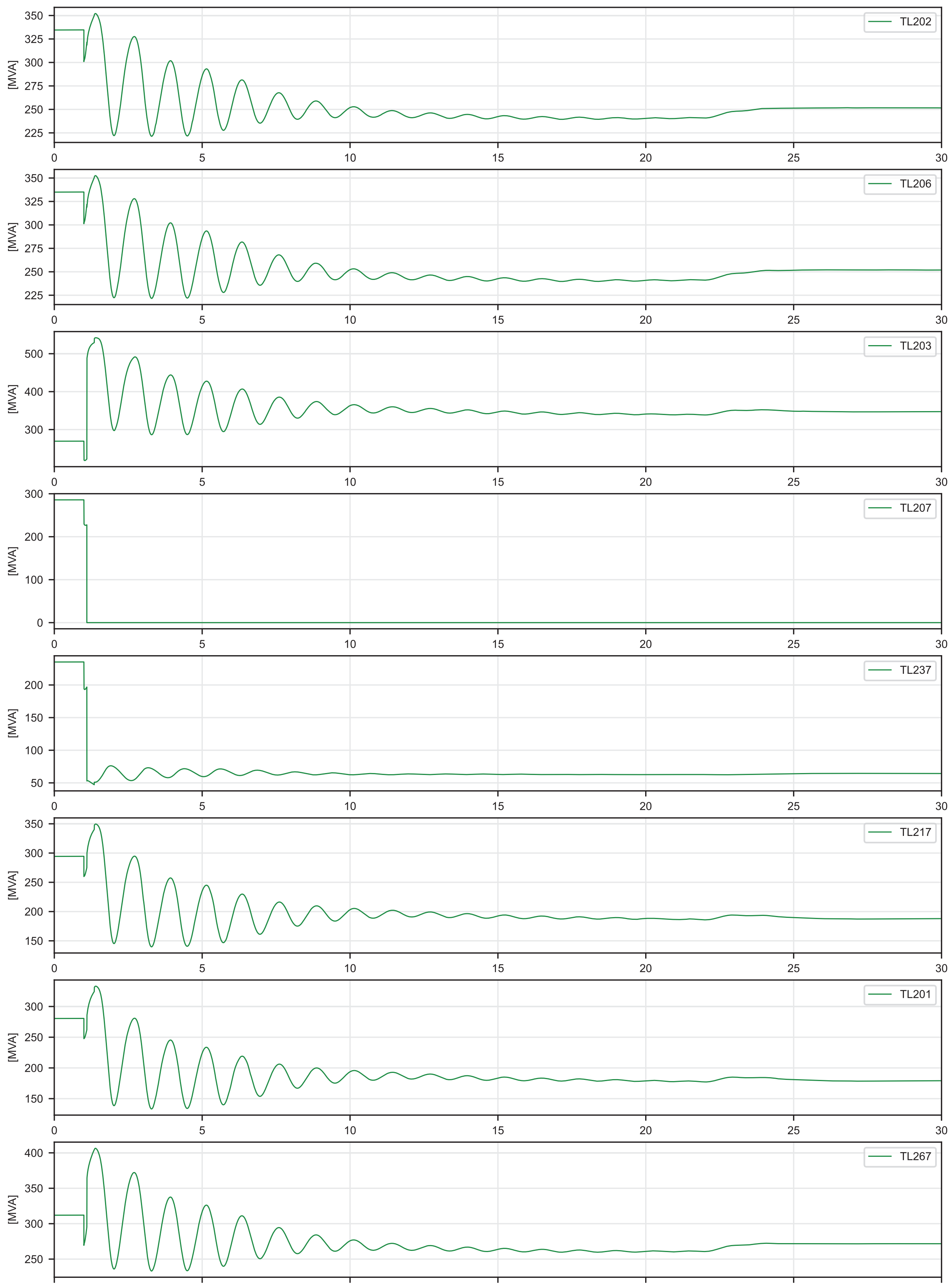
02_2033-34_Base-Peak_TL207-TL203_1800MW_3SOPSC
Loss of TL207 - no fault | 230 kV Power Flow



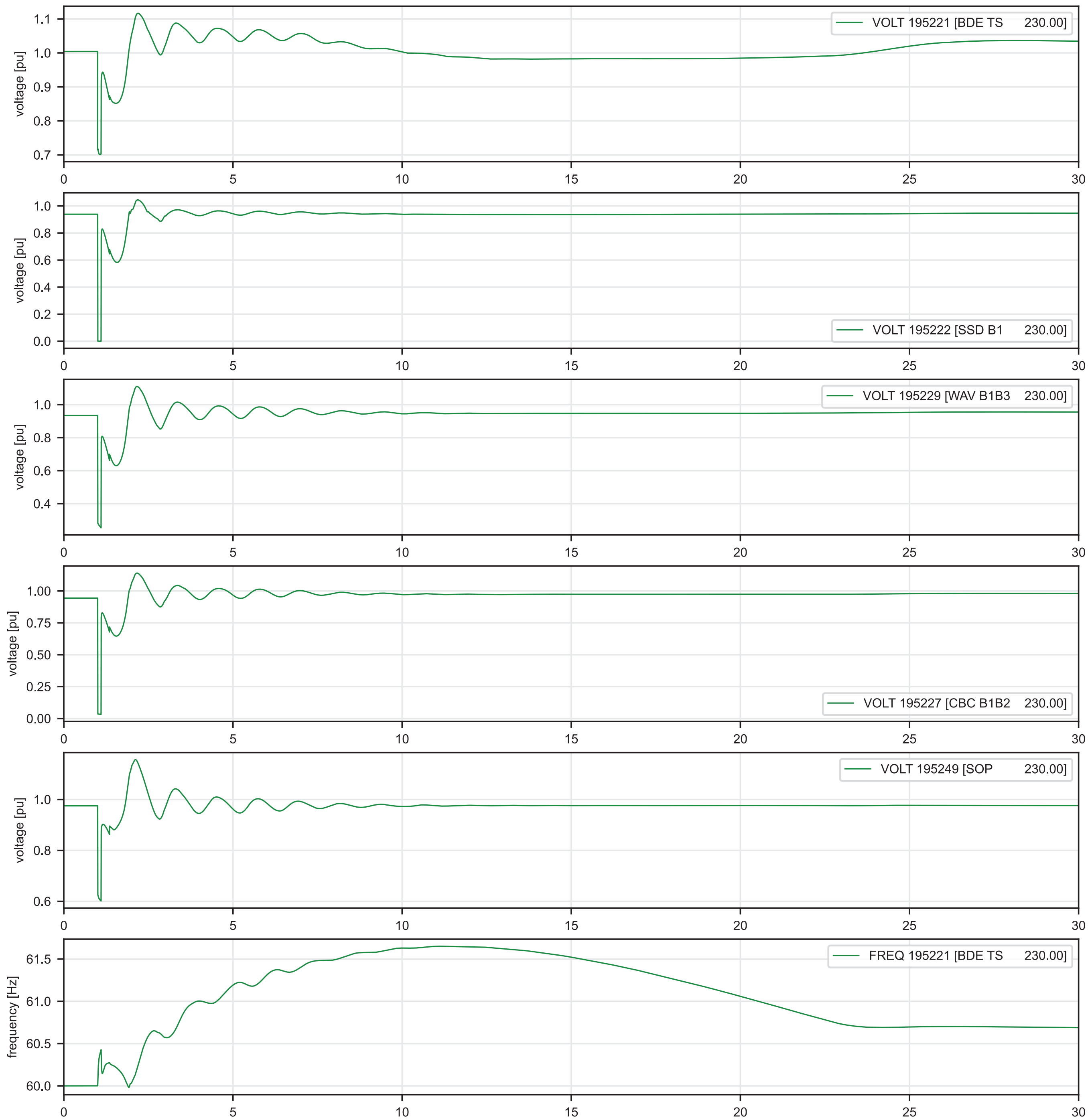
02_2033-34_Base-Peak_TL207-TL203_1800MW_3SOPSC
Loss of TL207 - SLGF | Voltage / Frequency



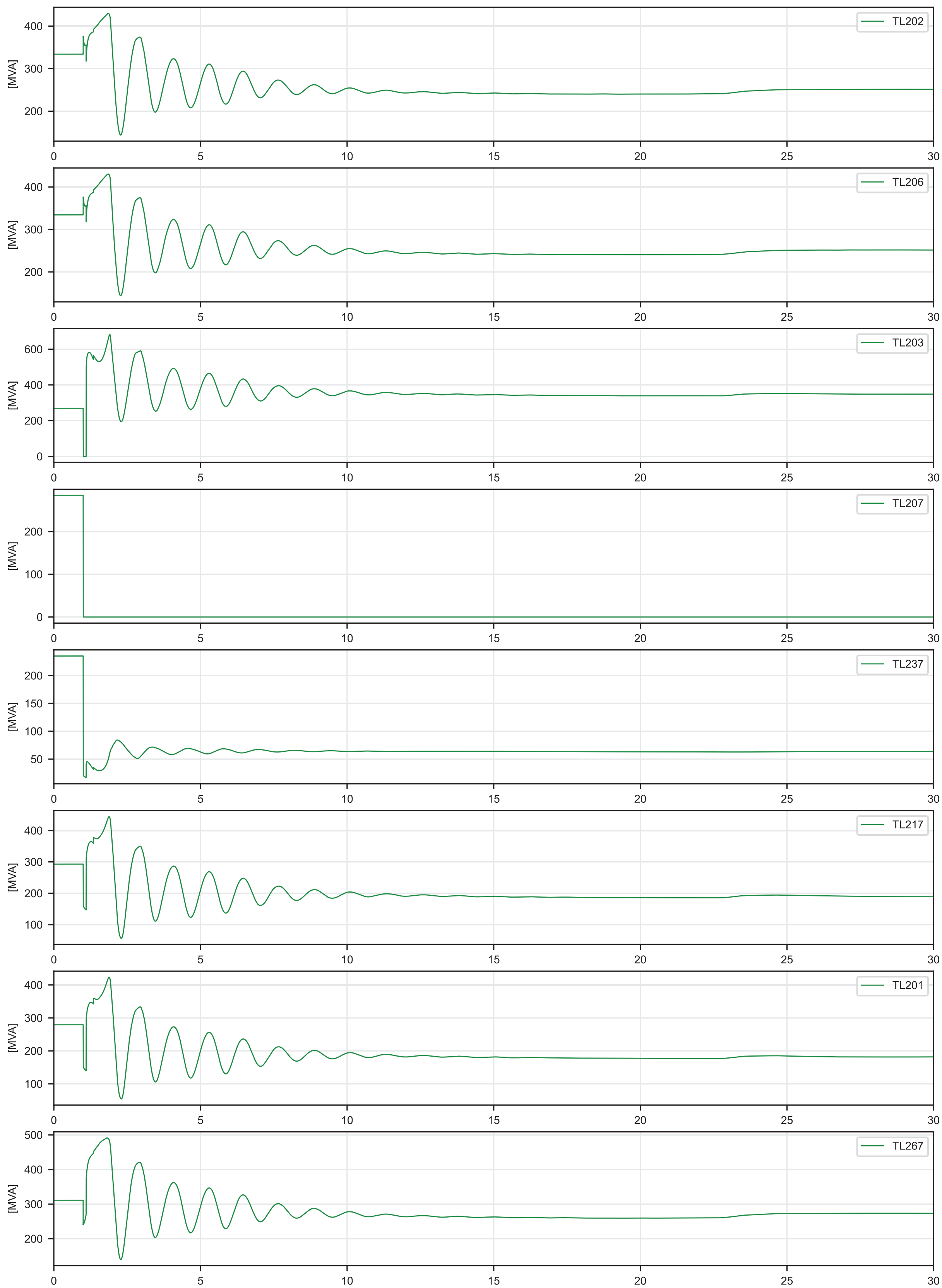
02_2033-34_Base-Peak_TL207-TL203_1800MW_3SOPSC
Loss of TL207 - SLGF | 230 kV Power Flow



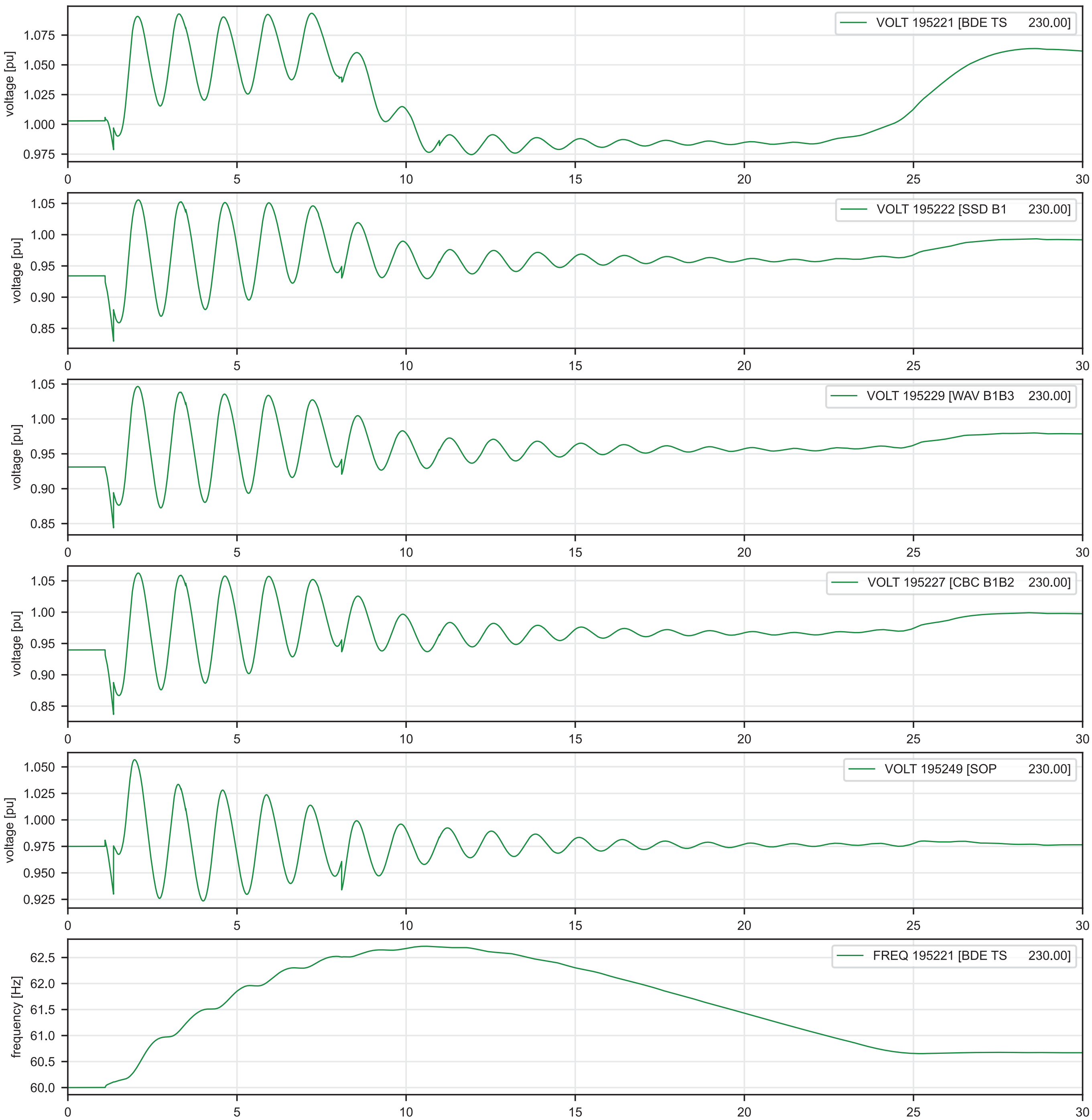
02_2033-34_Base-Peak_TL207-TL203_1800MW_3SOPSC with STATCOM
Loss of TL207 - 3PF | Voltage / Frequency



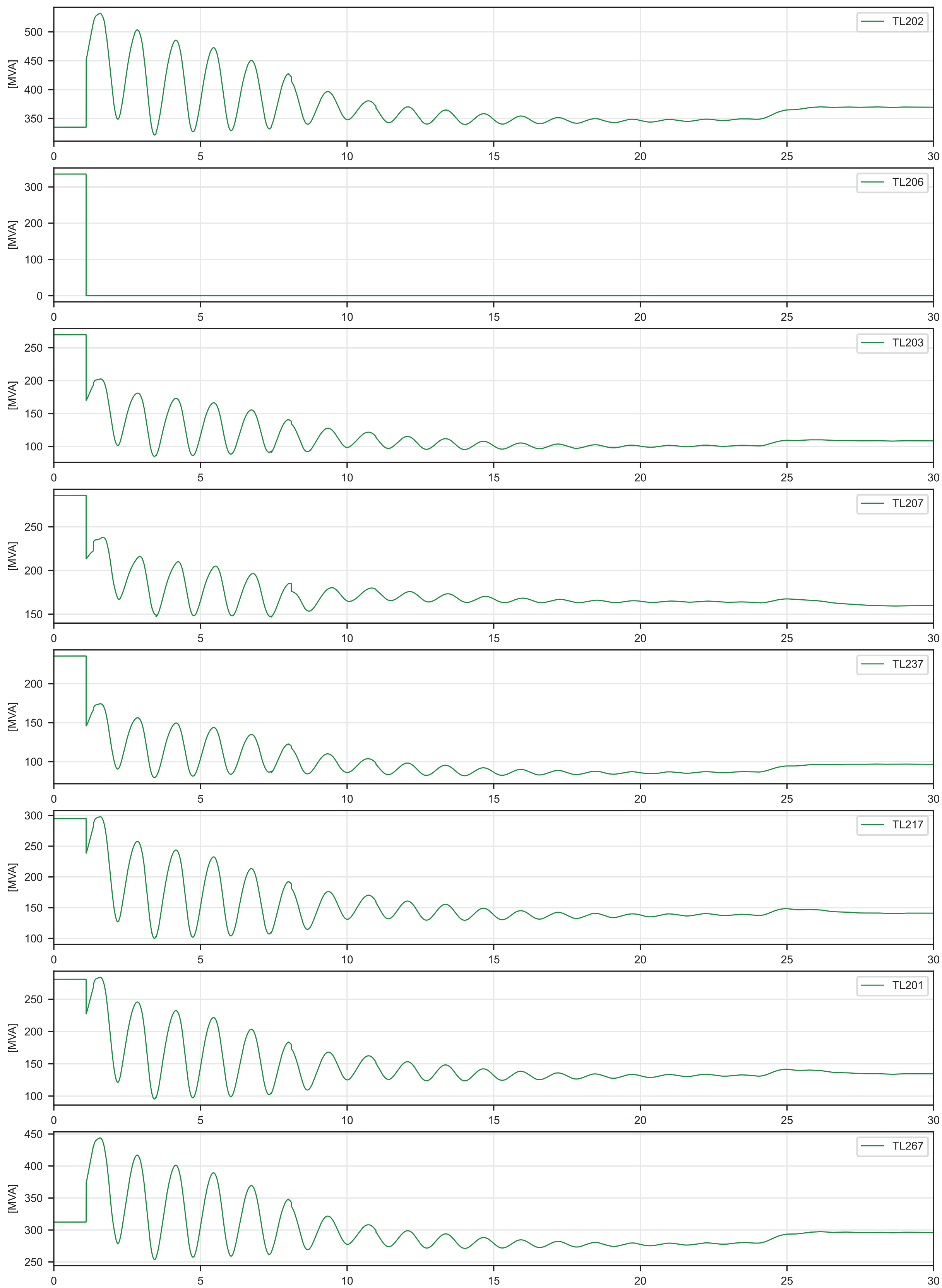
02_2033-34_Base-Peak_TL207-TL203_1800MW_3SOPSC with STATCOM
Loss of TL207 - 3PF | 230 kV Power Flow



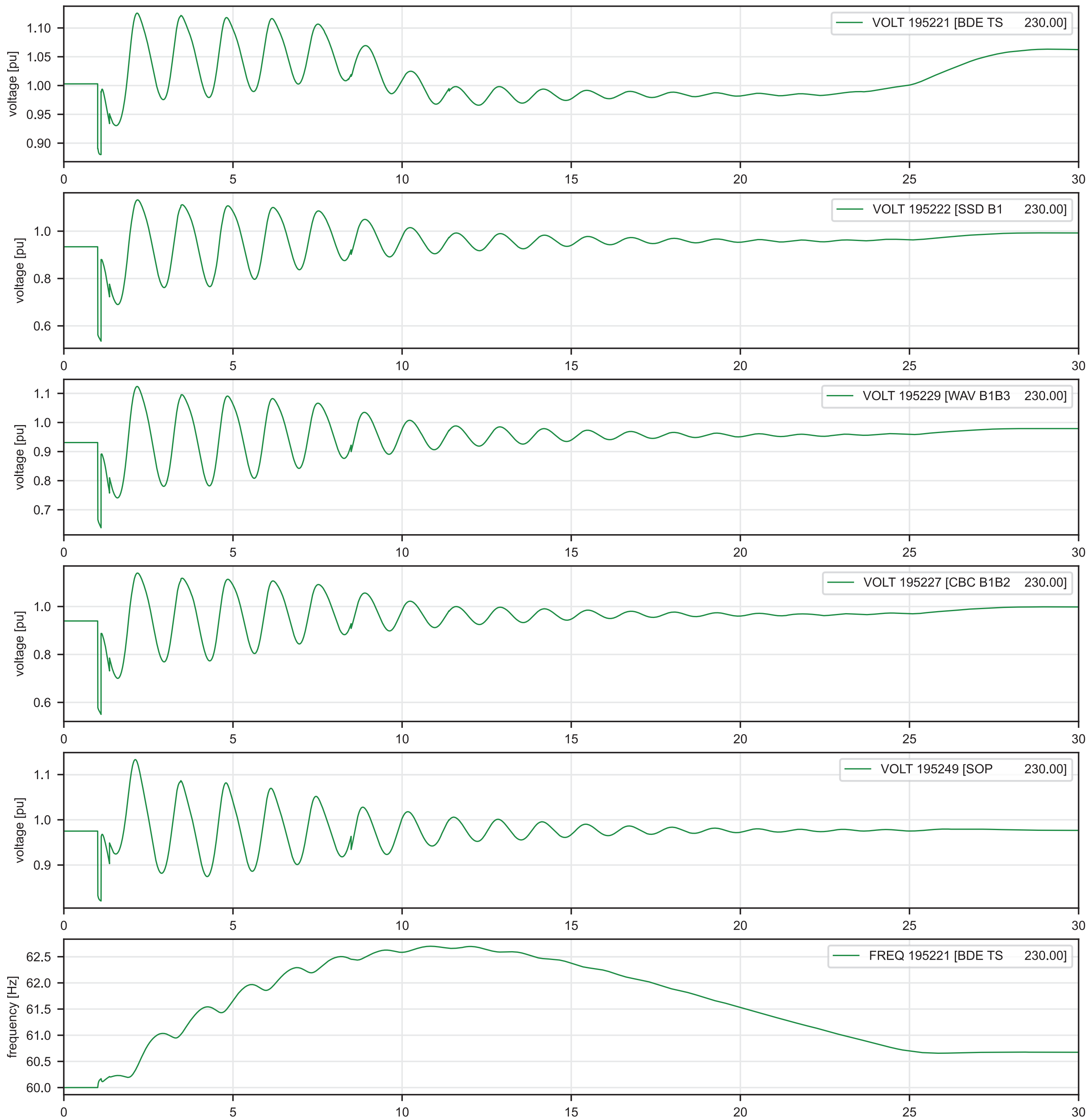
03_2033-34_Base-Peak_TL206-TL202_1800MW_3SOPSC
Loss of TL206 - no fault | Voltage / Frequency



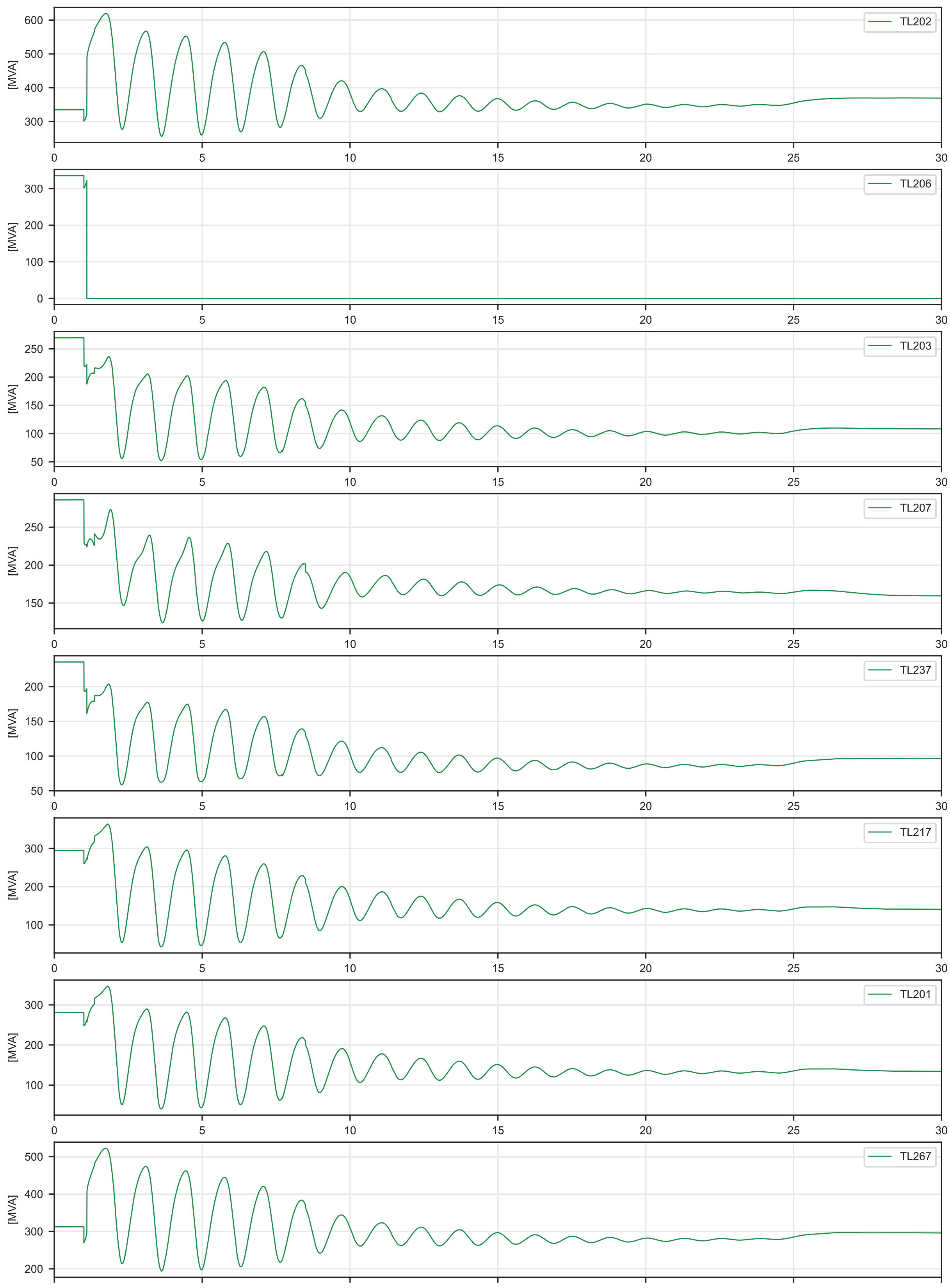
03_2033-34_Base-Peak_TL206-TL202_1800MW_3SOPSC
Loss of TL206 - no fault | 230 kV Power Flow



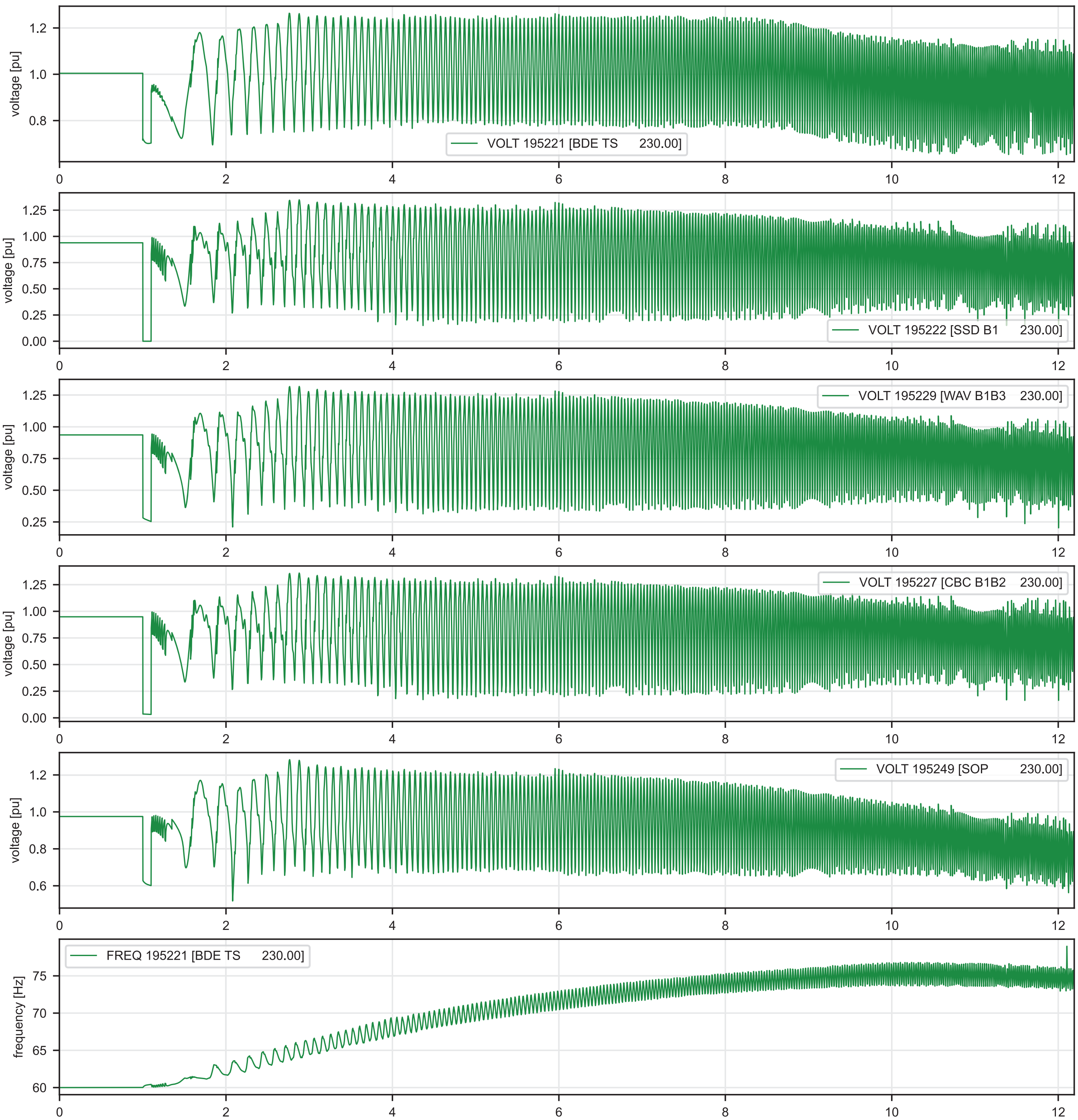
03_2033-34_Base-Peak_TL206-TL202_1800MW_3SOPSC
Loss of TL206 - SLGF | Voltage / Frequency



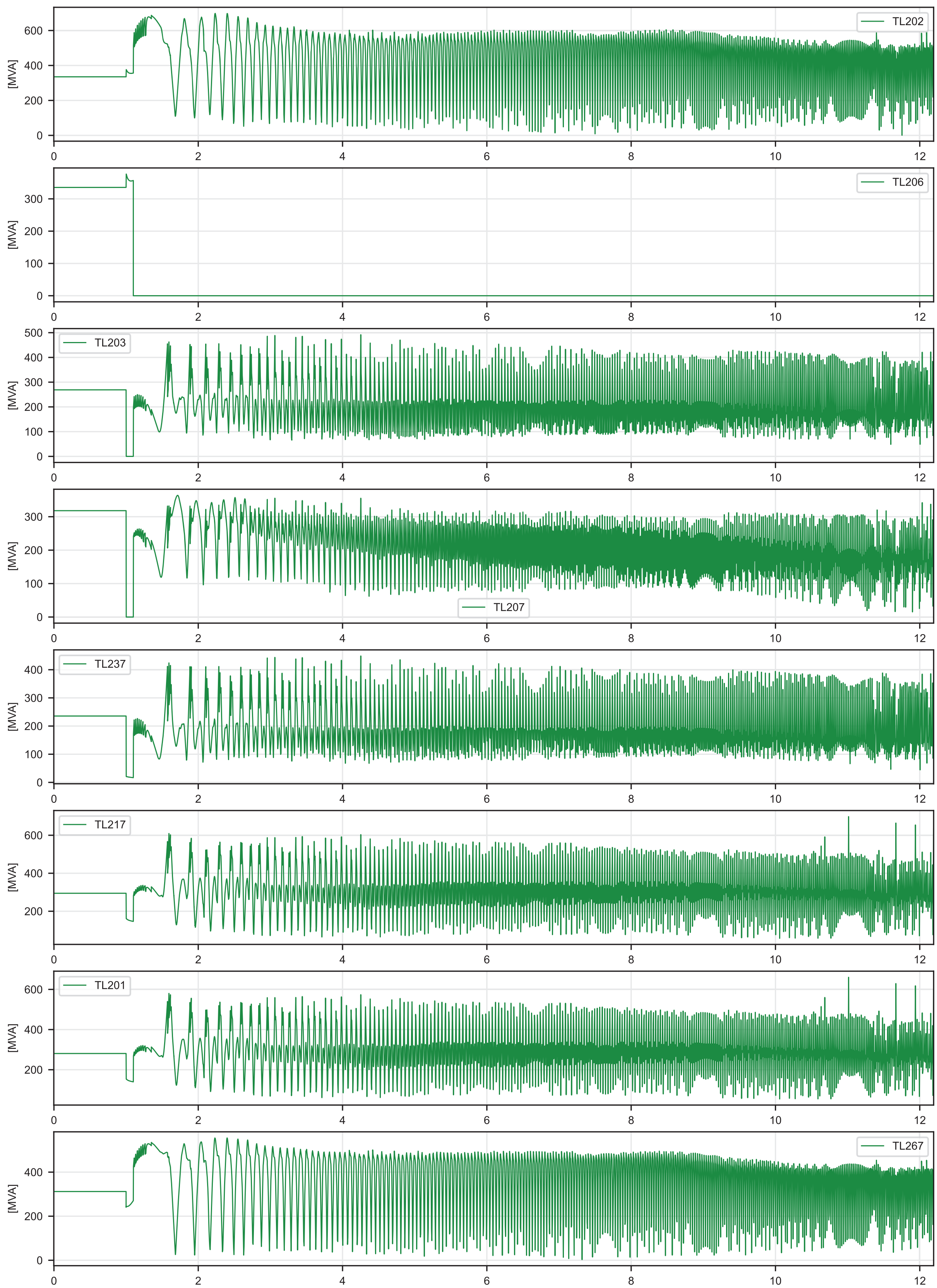
03_2033-34_Base-Peak_TL206-TL202_1800MW_3SOPSC
Loss of TL206 - SLGF | 230 kV Power Flow



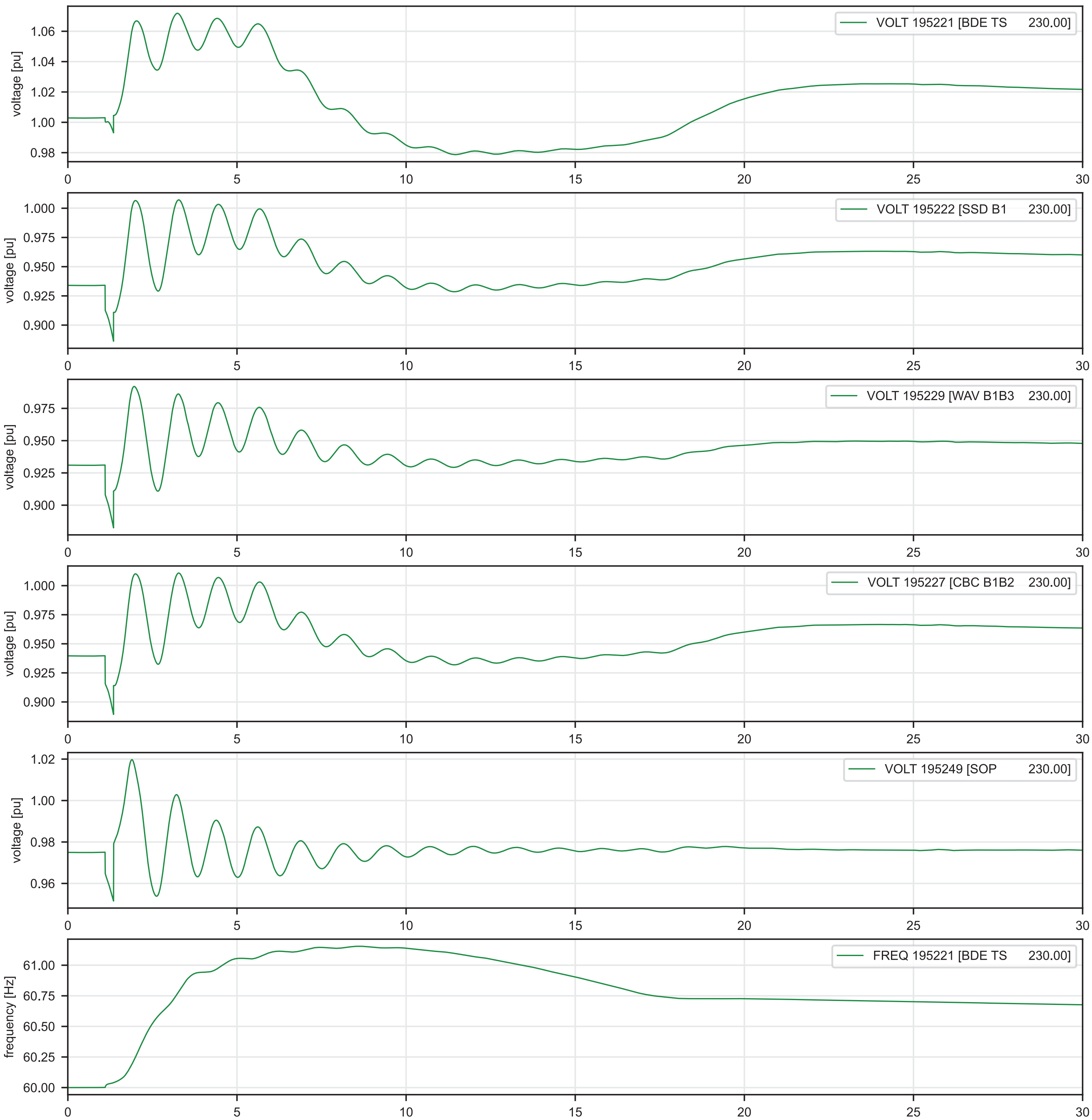
03_2033-34_Base-Peak_TL206-TL202_1800MW_3SOPSC with STATCOM
Loss of TL206 - 3PF | Voltage / Frequency



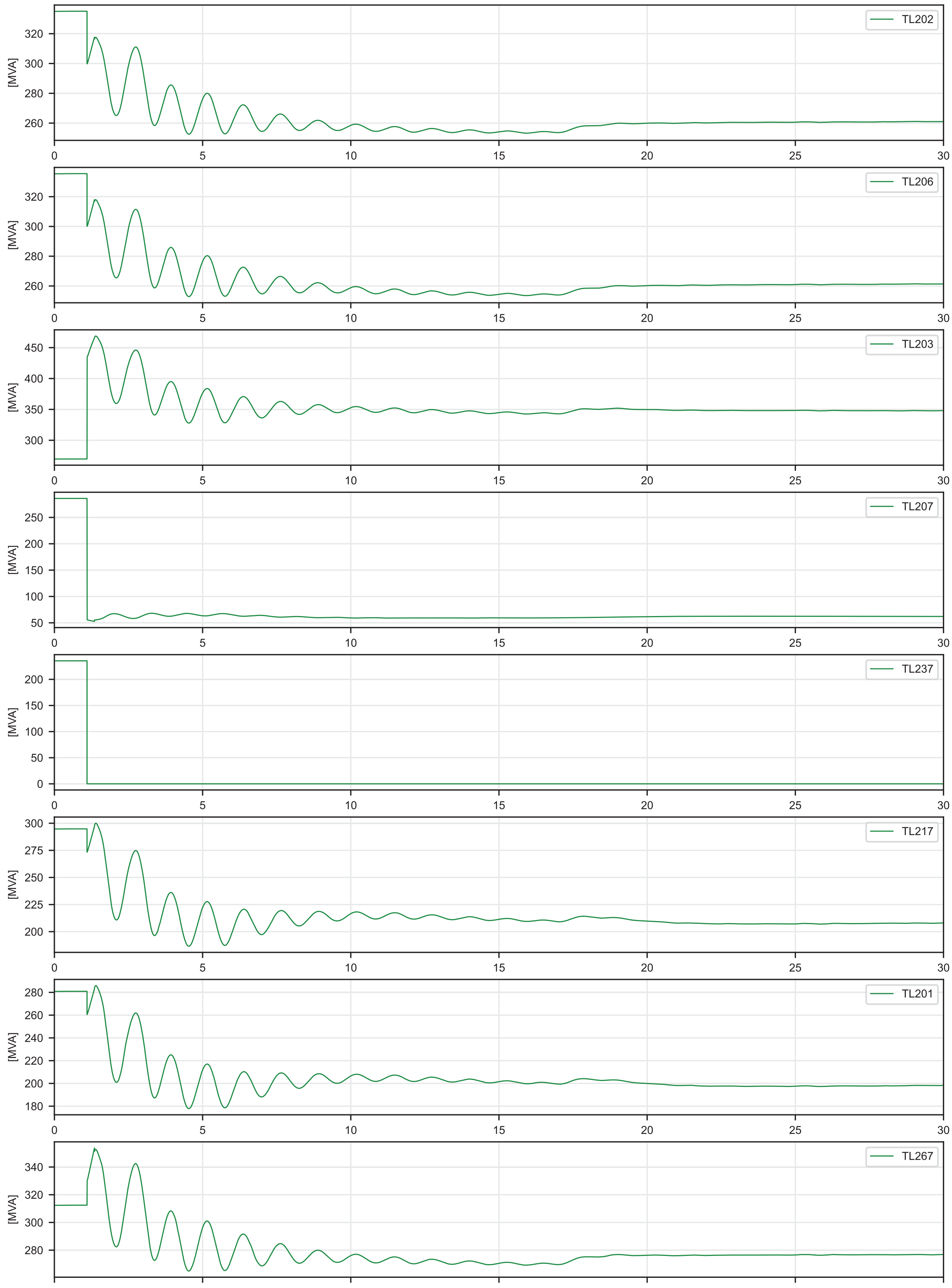
03_2033-34_Base-Peak_TL206-TL202_1800MW_3SOPSC with STATCOM
Loss of TL206 - 3PF | 230 kV Power Flow



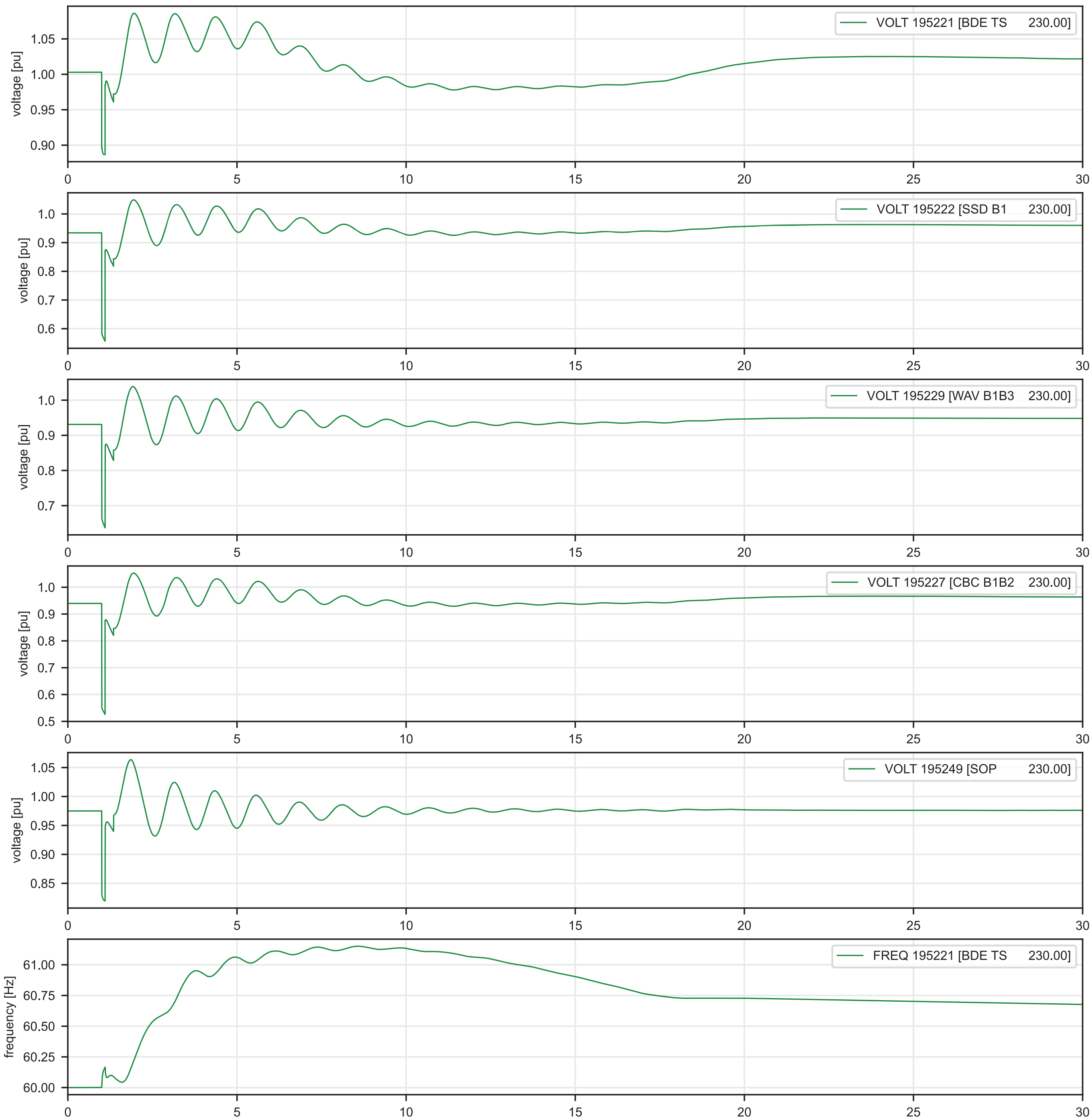
04_2033-34_Base-Peak_TL237-TL203_1800MW_3SOPSC
Loss of TL237 - no fault | Voltage / Frequency



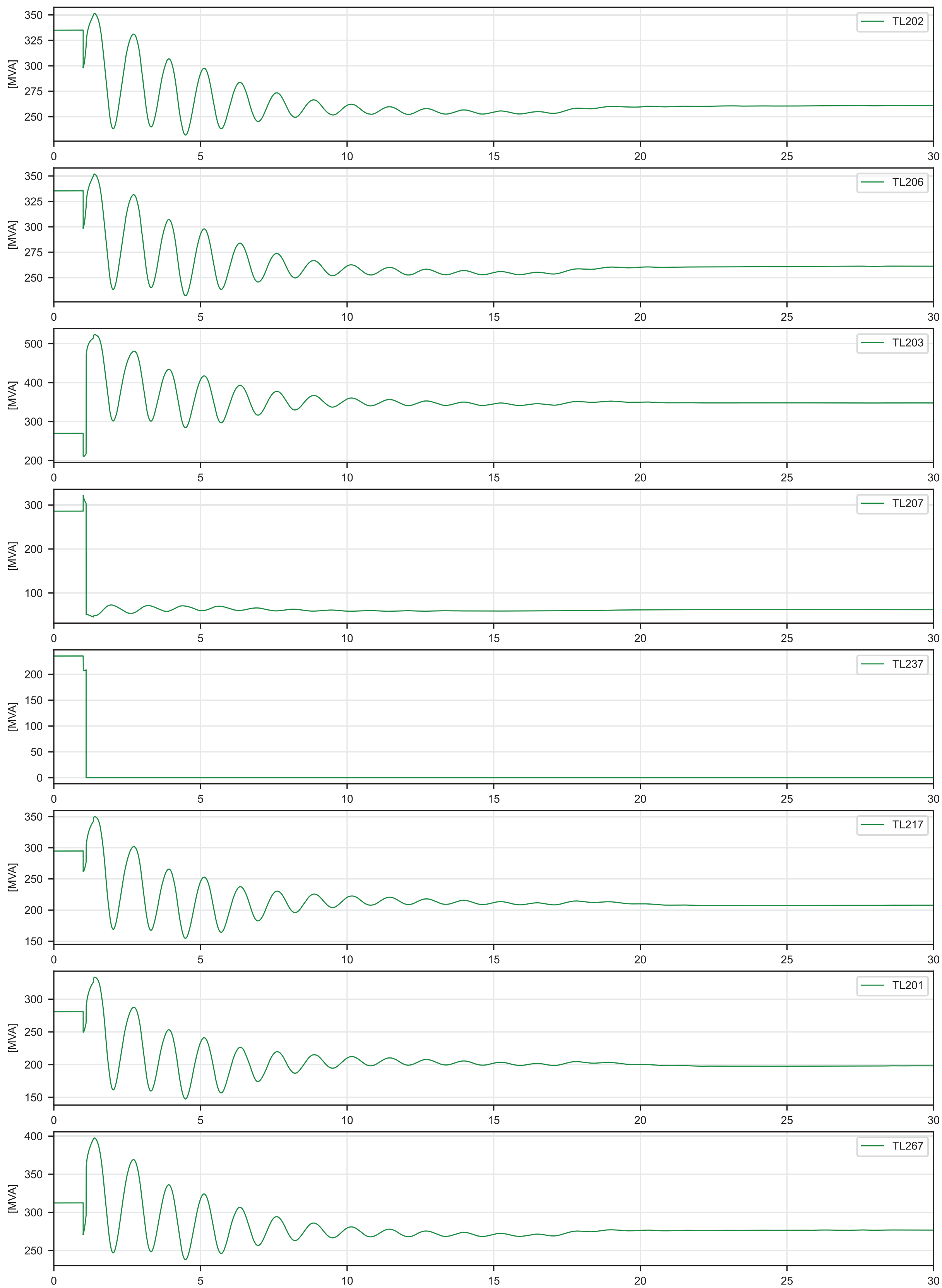
04_2033-34_Base-Peak_TL237-TL203_1800MW_3SOPSC
Loss of TL237 - no fault | 230 kV Power Flow



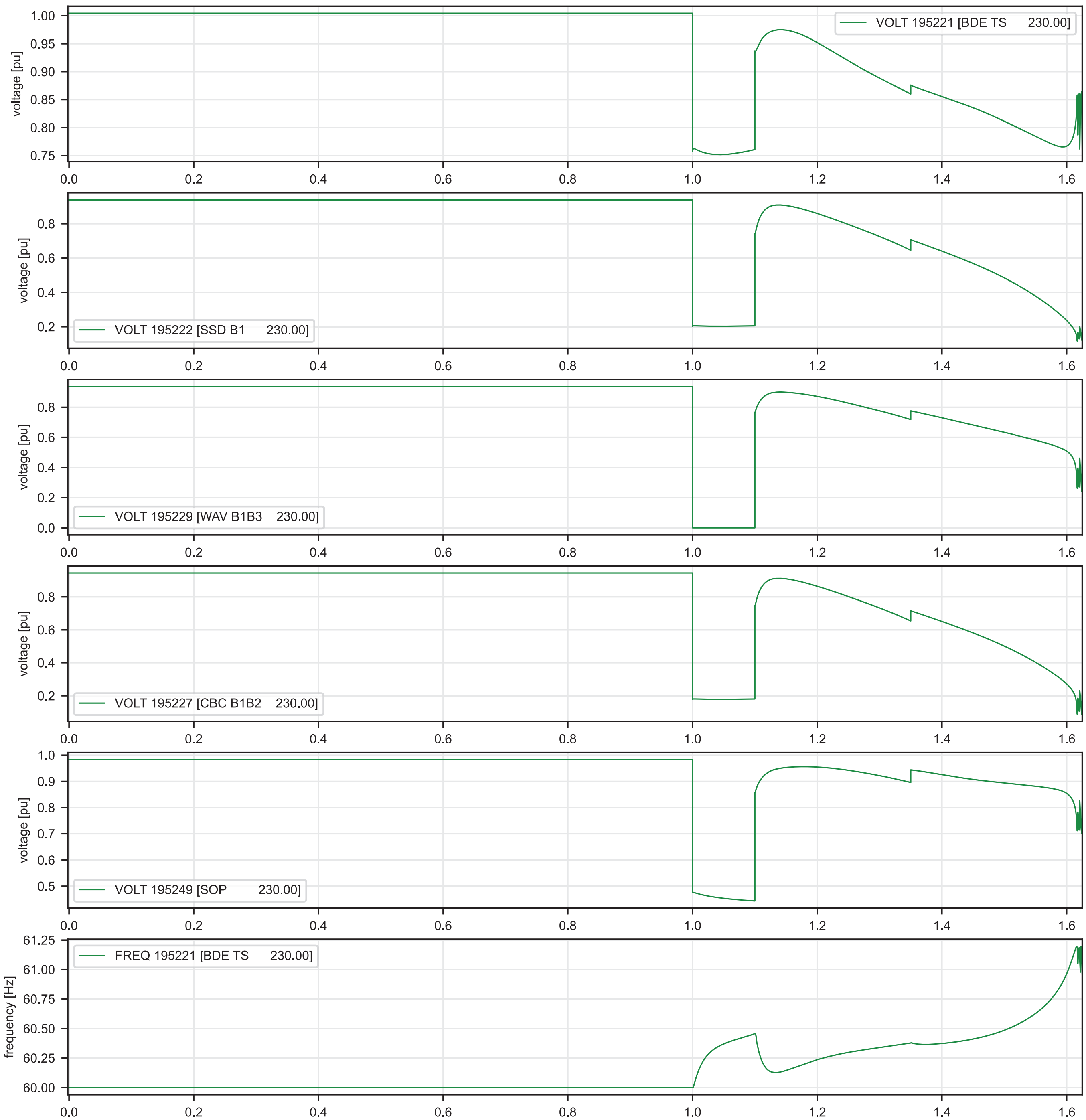
04_2033-34_Base-Peak_TL237-TL203_1800MW_3SOPSC
Loss of TL237 - SLGF | Voltage / Frequency



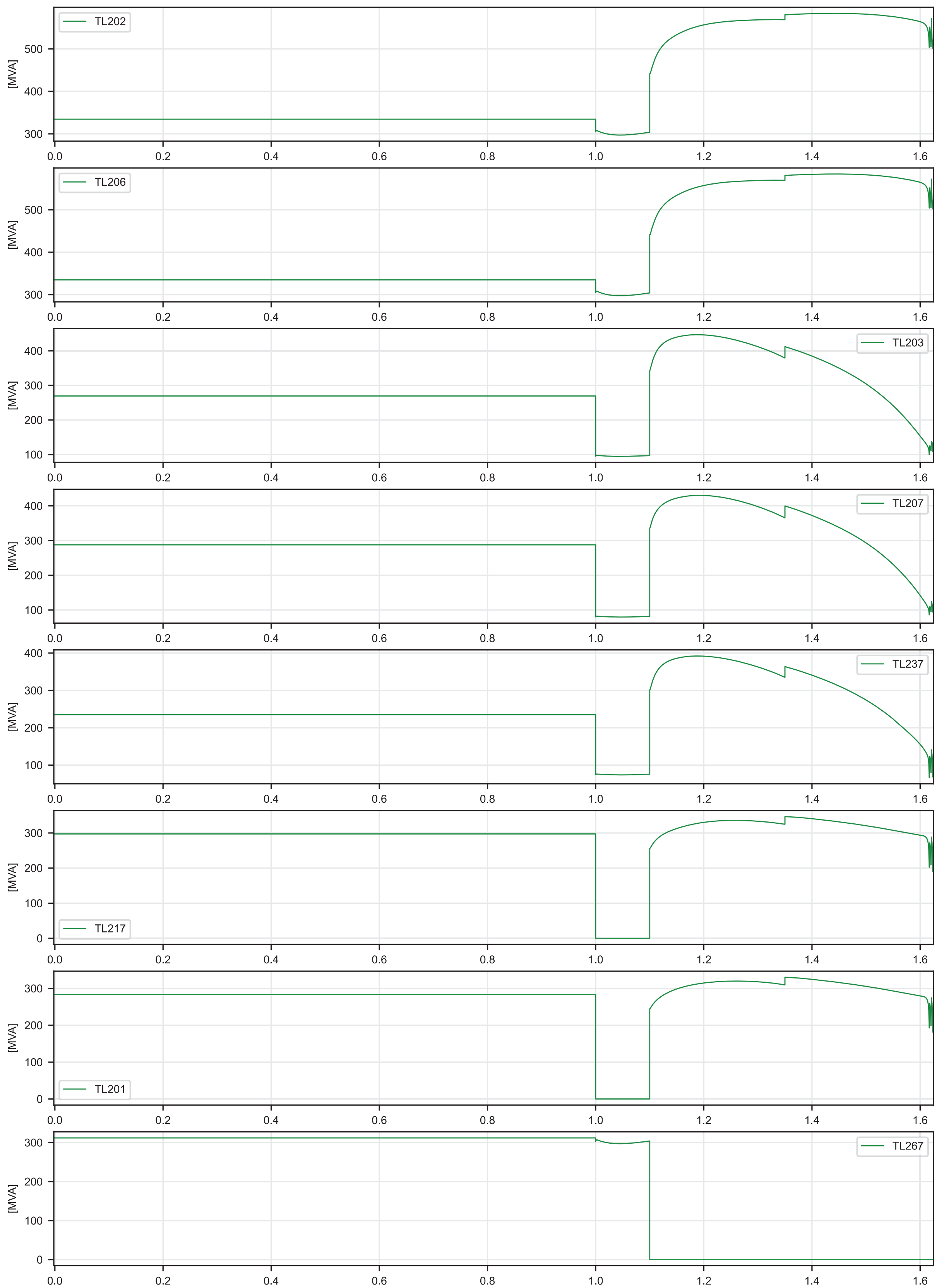
04_2033-34_Base-Peak_TL237-TL203_1800MW_3SOPSC
Loss of TL237 - SLGF | 230 kV Power Flow



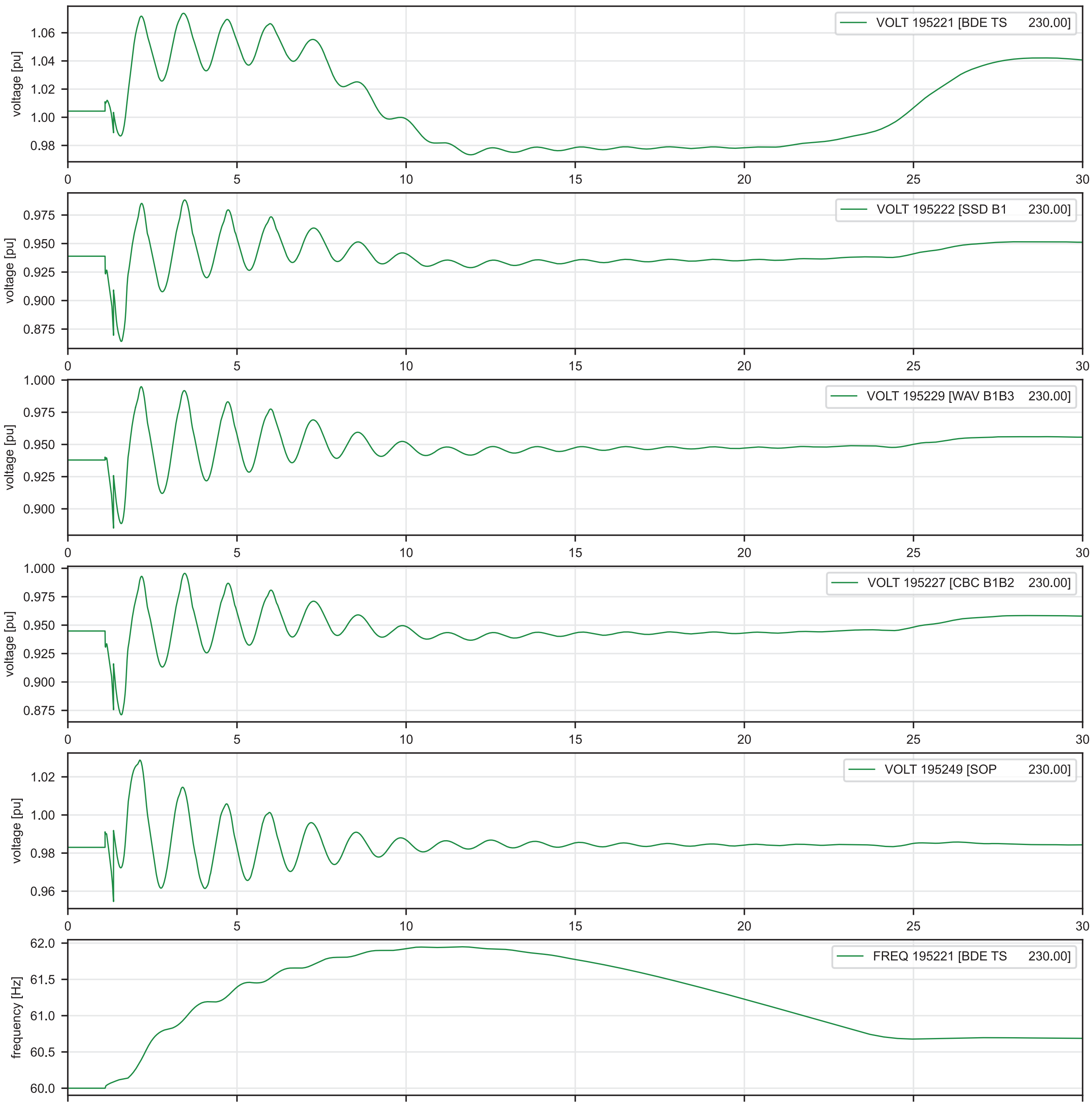
05_2033-34_Base-Peak_TL267WAV_1800MW_3SOPSC with STATCOM
Loss of TL267 - 3PF | Voltage / Frequency



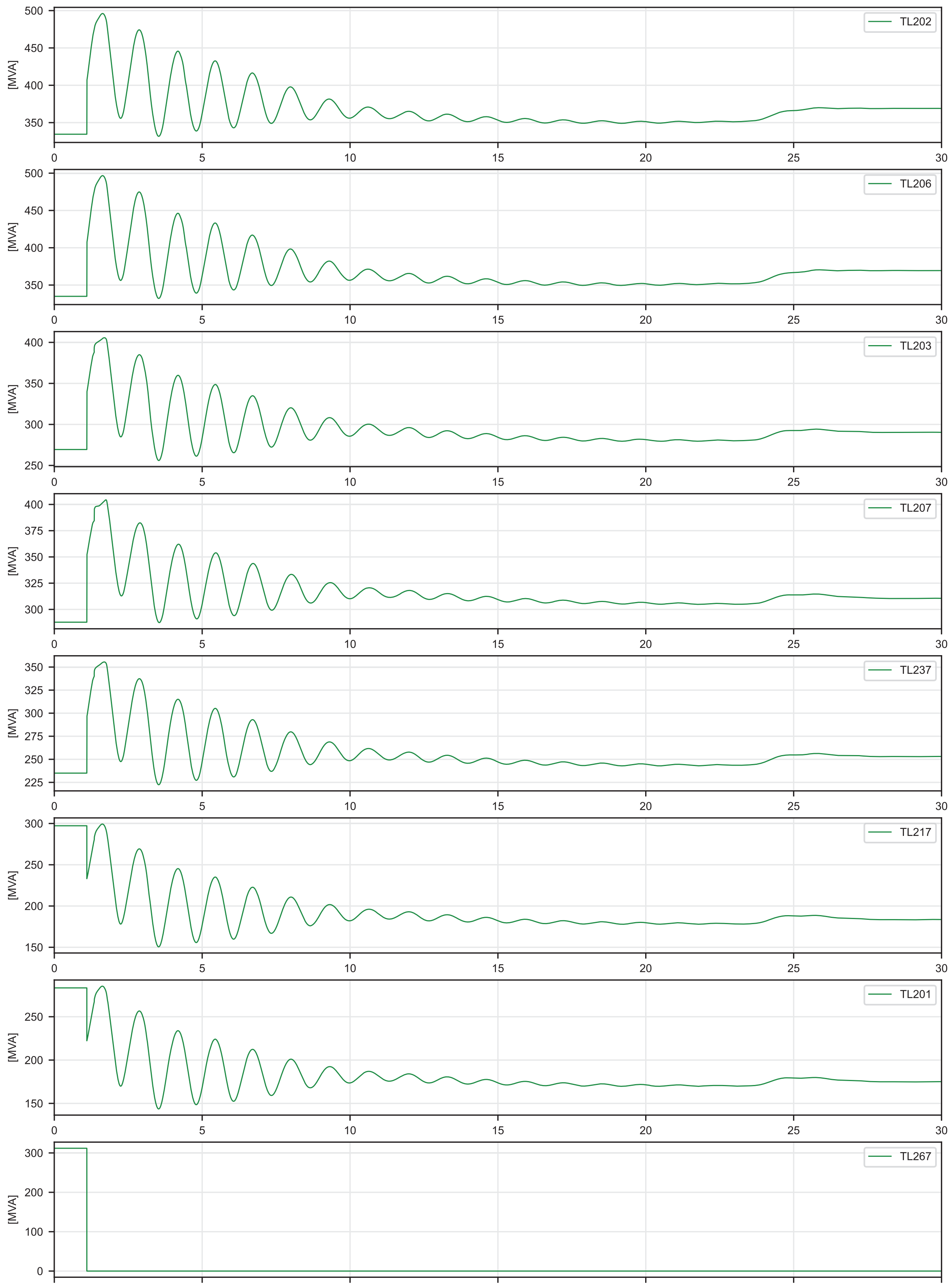
05_2033-34_Base-Peak_TL267WAV_1800MW_3SOPSC with STATCOM
Loss of TL267 - 3PF | 230 kV Power Flow



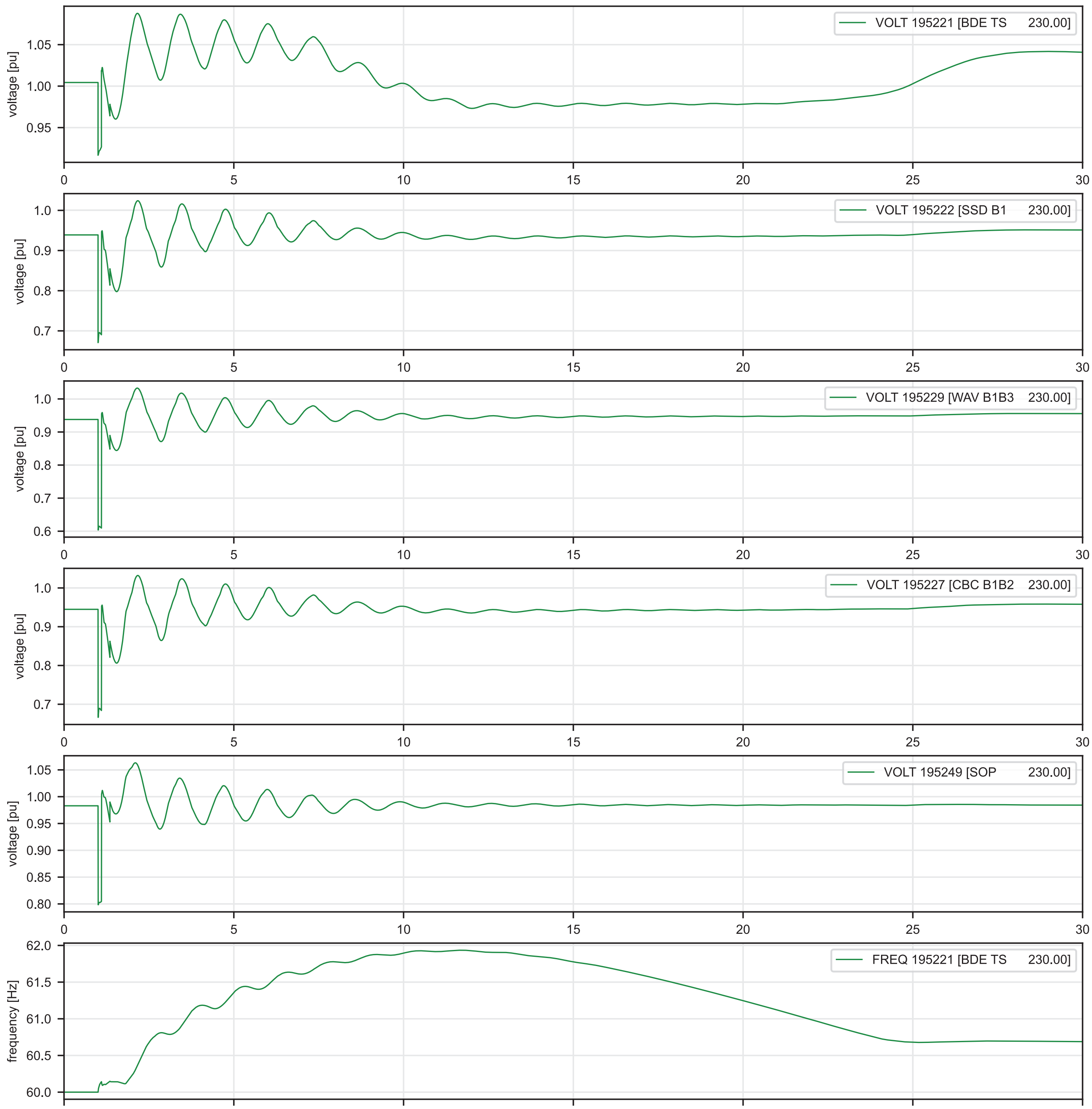
05_2033-34_Base-Peak_TL267WAV_1800MW_3SOPSC with STATCOM
Loss of TL267 - no fault | Voltage / Frequency



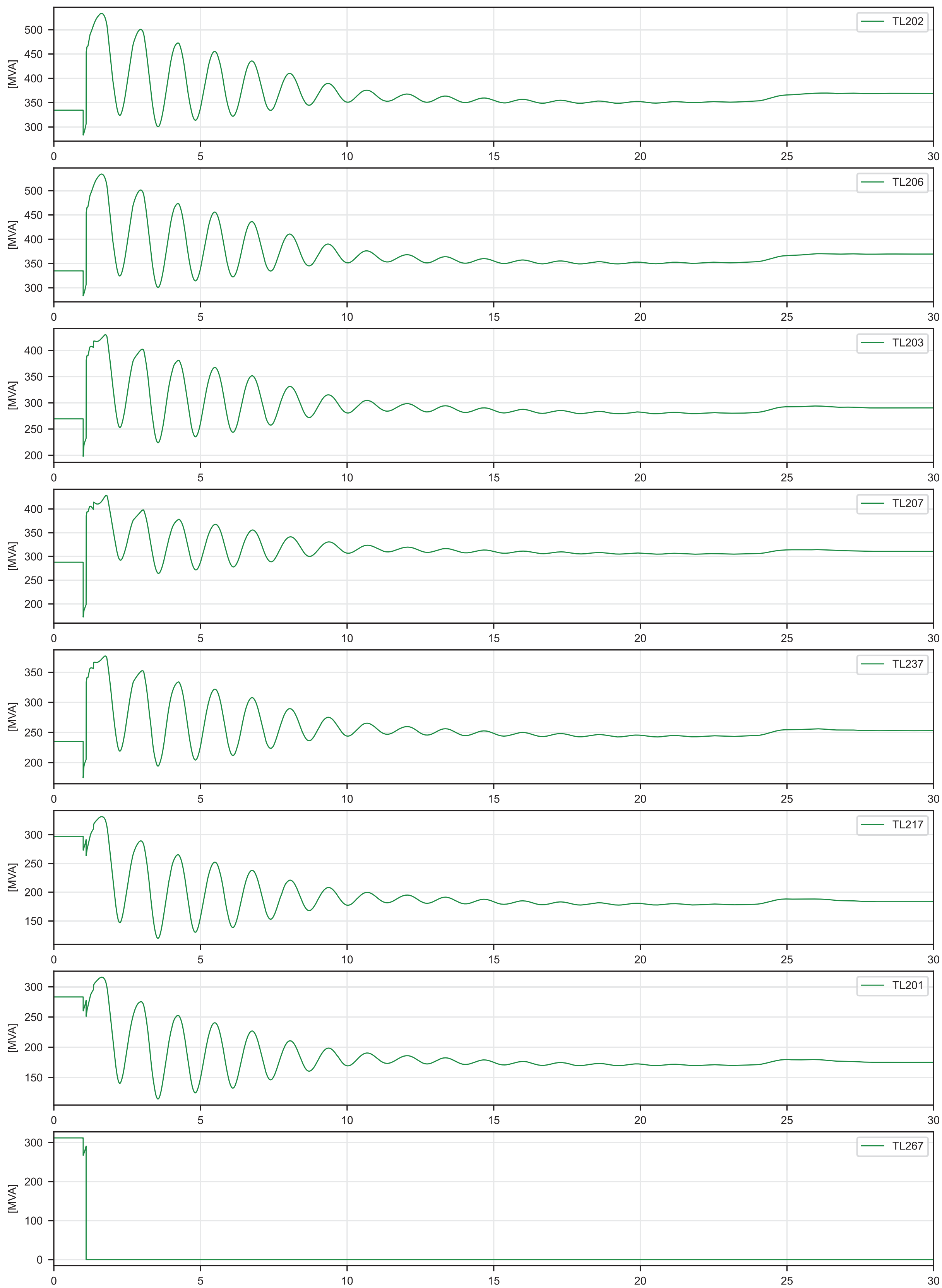
05_2033-34_Base-Peak_TL267WAV_1800MW_3SOPSC with STATCOM
Loss of TL267 - no fault | 230 kV Power Flow



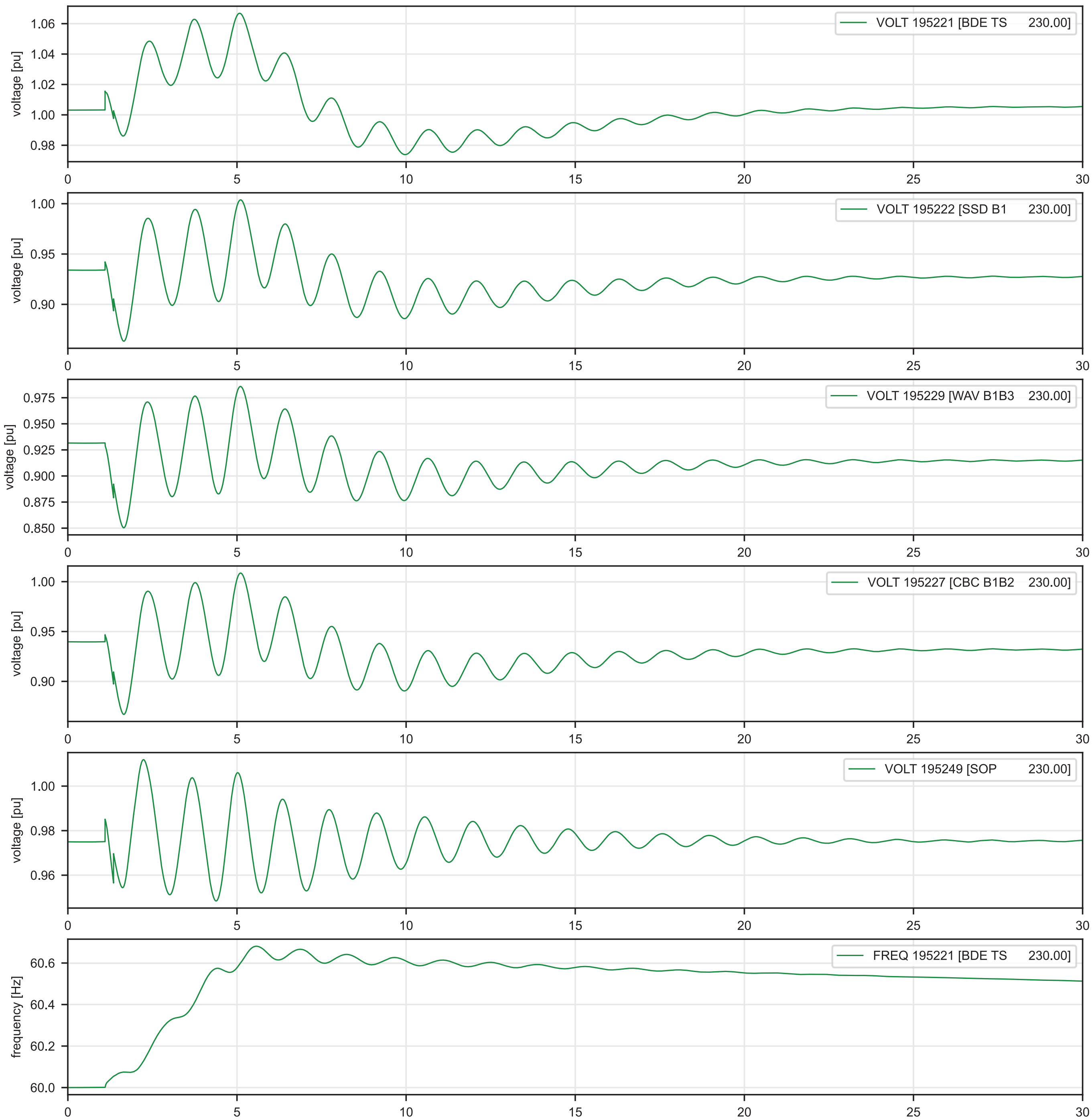
05_2033-34_Base-Peak_TL267WAV_1800MW_3SOPSC with STATCOM
Loss of TL267 - SLGF | Voltage / Frequency



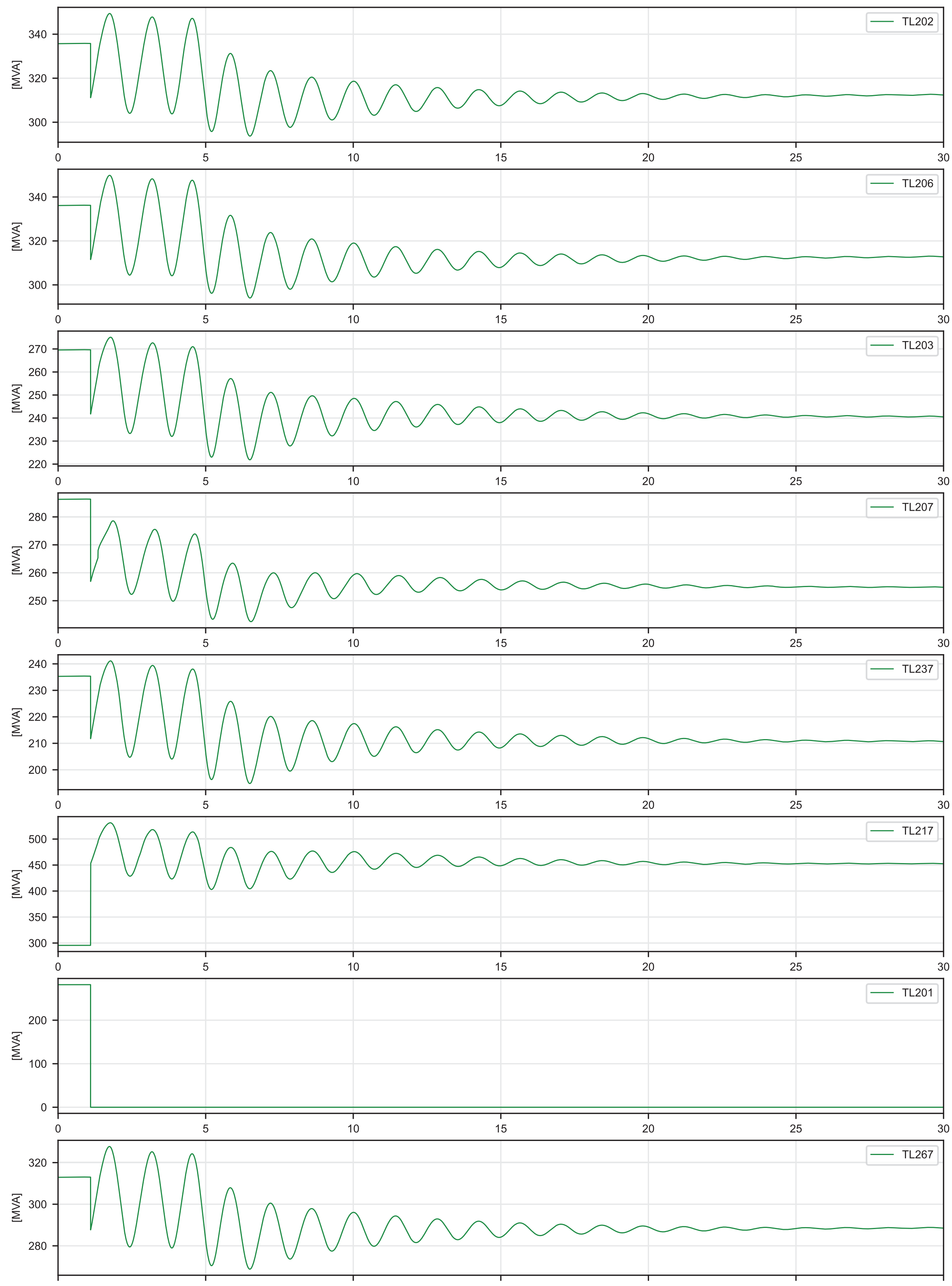
05_2033-34_Base-Peak_TL267WAV_1800MW_3SOPSC with STATCOM
Loss of TL267 - SLGF | 230 kV Power Flow



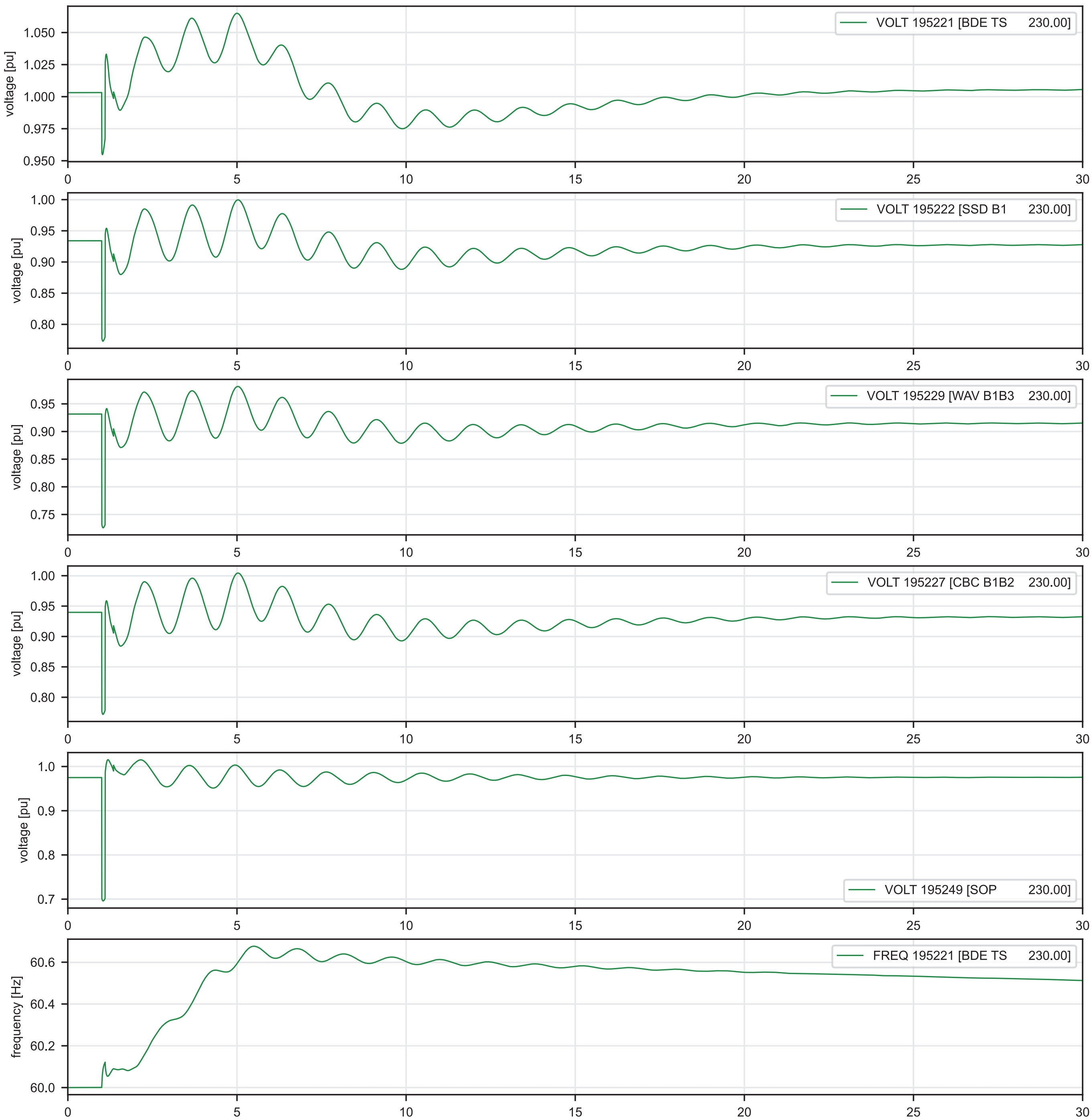
06_2033-34_Base-Peak_TL201-TL217_1800MW_3SOPSC
Loss of TL201 - no fault | Voltage / Frequency



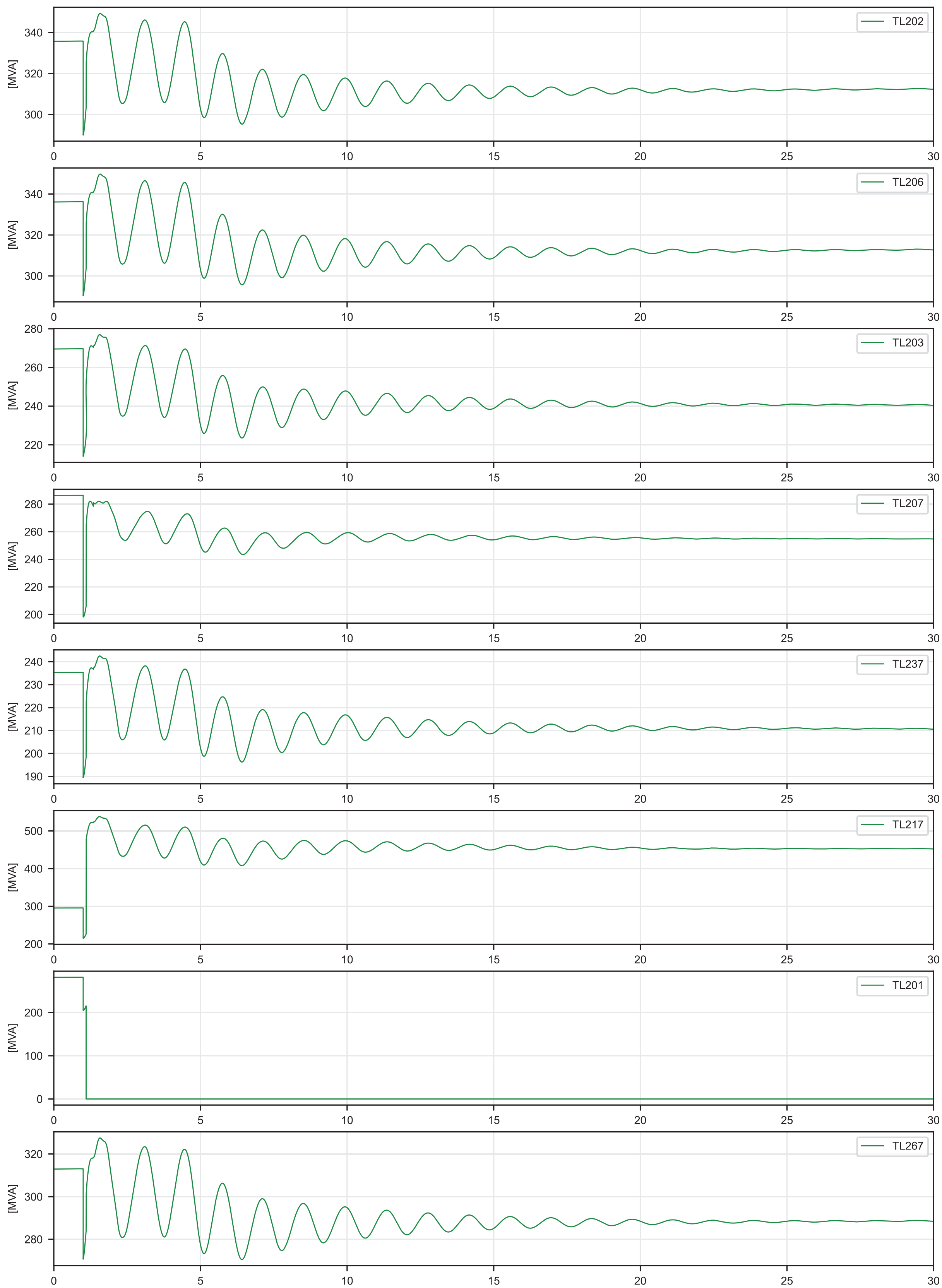
06_2033-34_Base-Peak_TL201-TL217_1800MW_3SOPSC
Loss of TL201 - no fault | 230 kV Power Flow



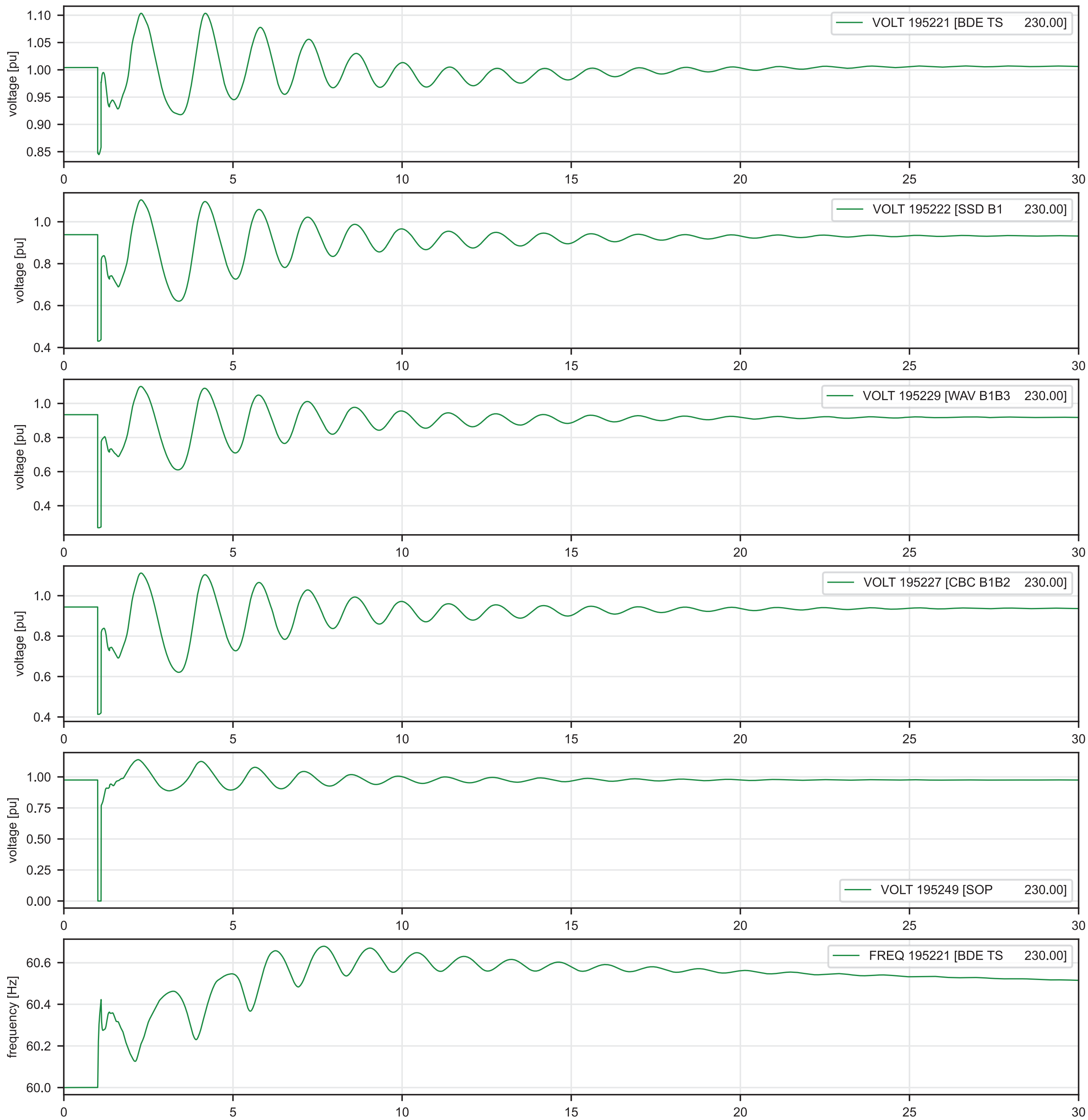
06_2033-34_Base-Peak_TL201-TL217_1800MW_3SOPSC
Loss of TL201 - SLGF | Voltage / Frequency



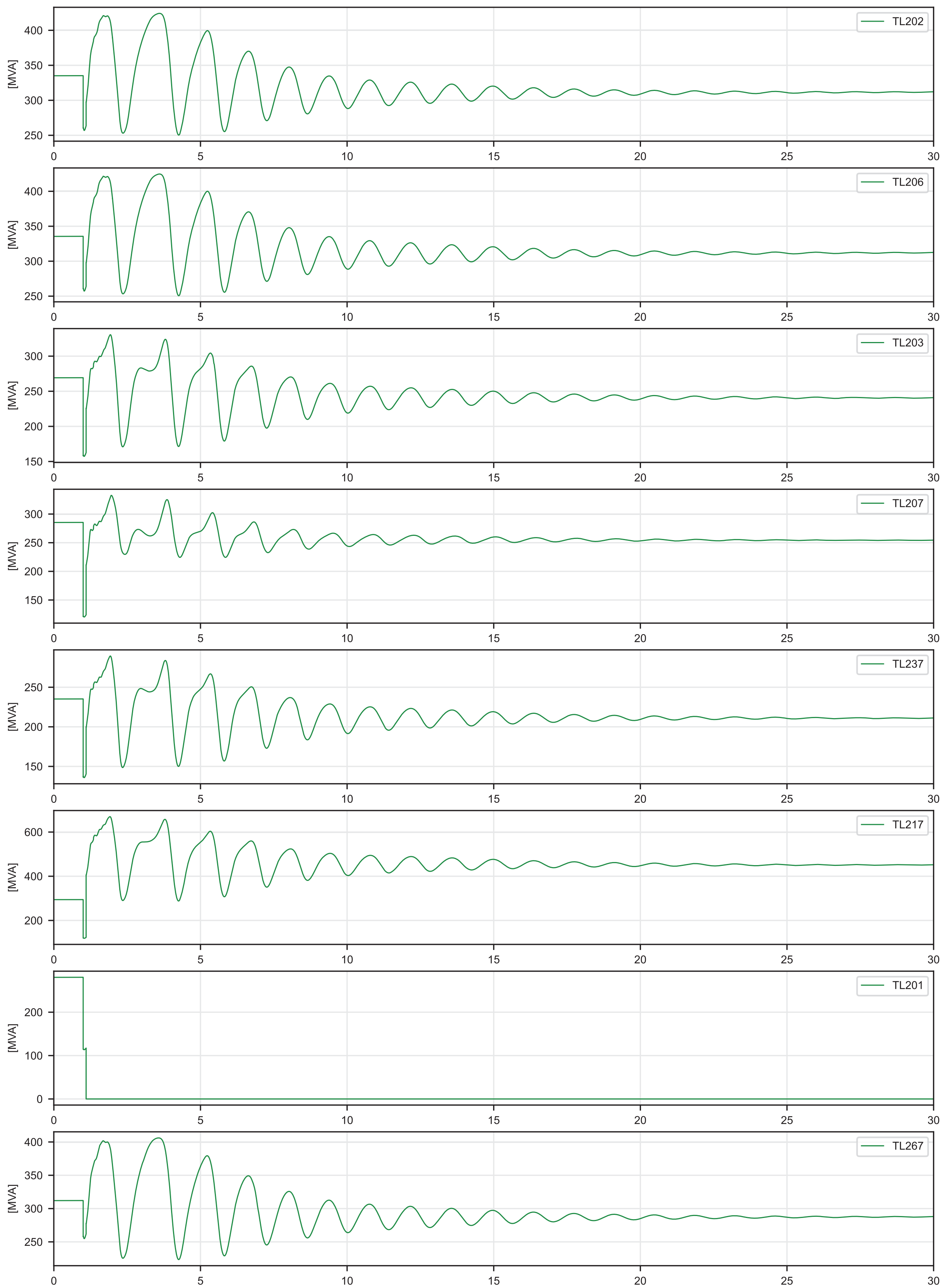
06_2033-34_Base-Peak_TL201-TL217_1800MW_3SOPSC
Loss of TL201 - SLGF | 230 kV Power Flow



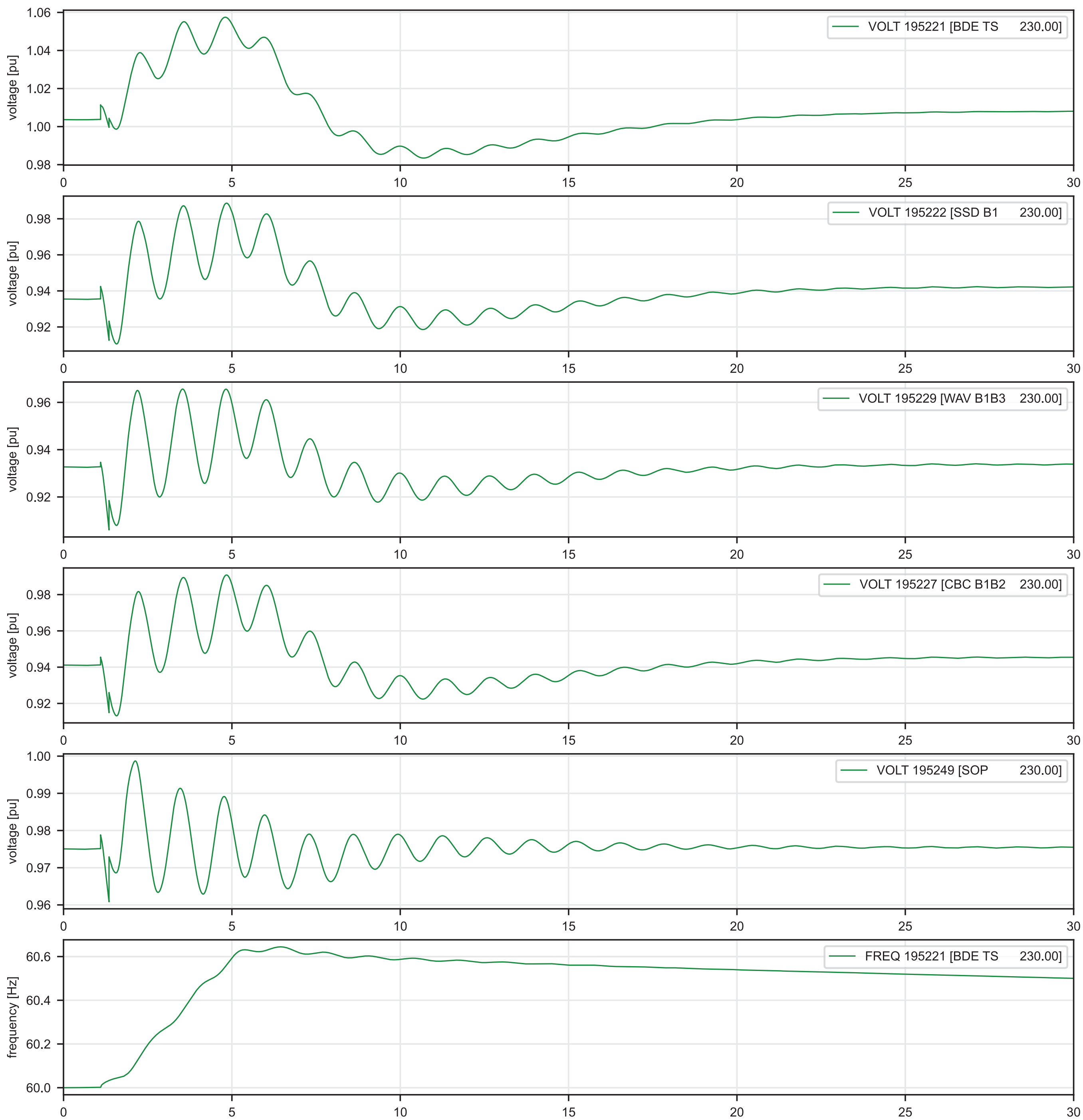
06_2033-34_Base-Peak_TL201-TL217_1800MW_3SOPSC with STATCOM
Loss of TL201 - 3PF | Voltage / Frequency



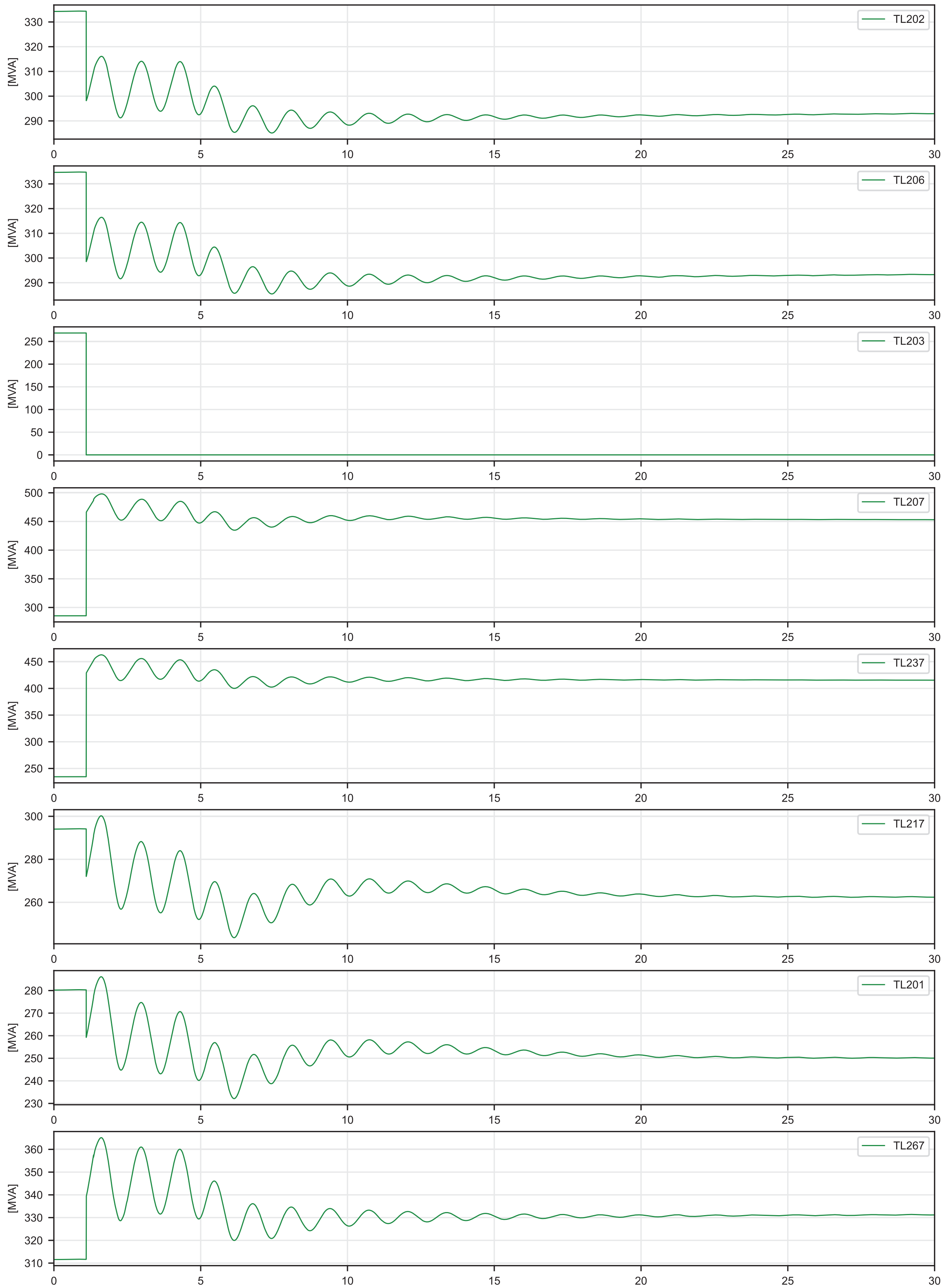
06_2033-34_Base-Peak_TL201-TL217_1800MW_3SOPSC with STATCOM
Loss of TL201 - 3PF | 230 kV Power Flow



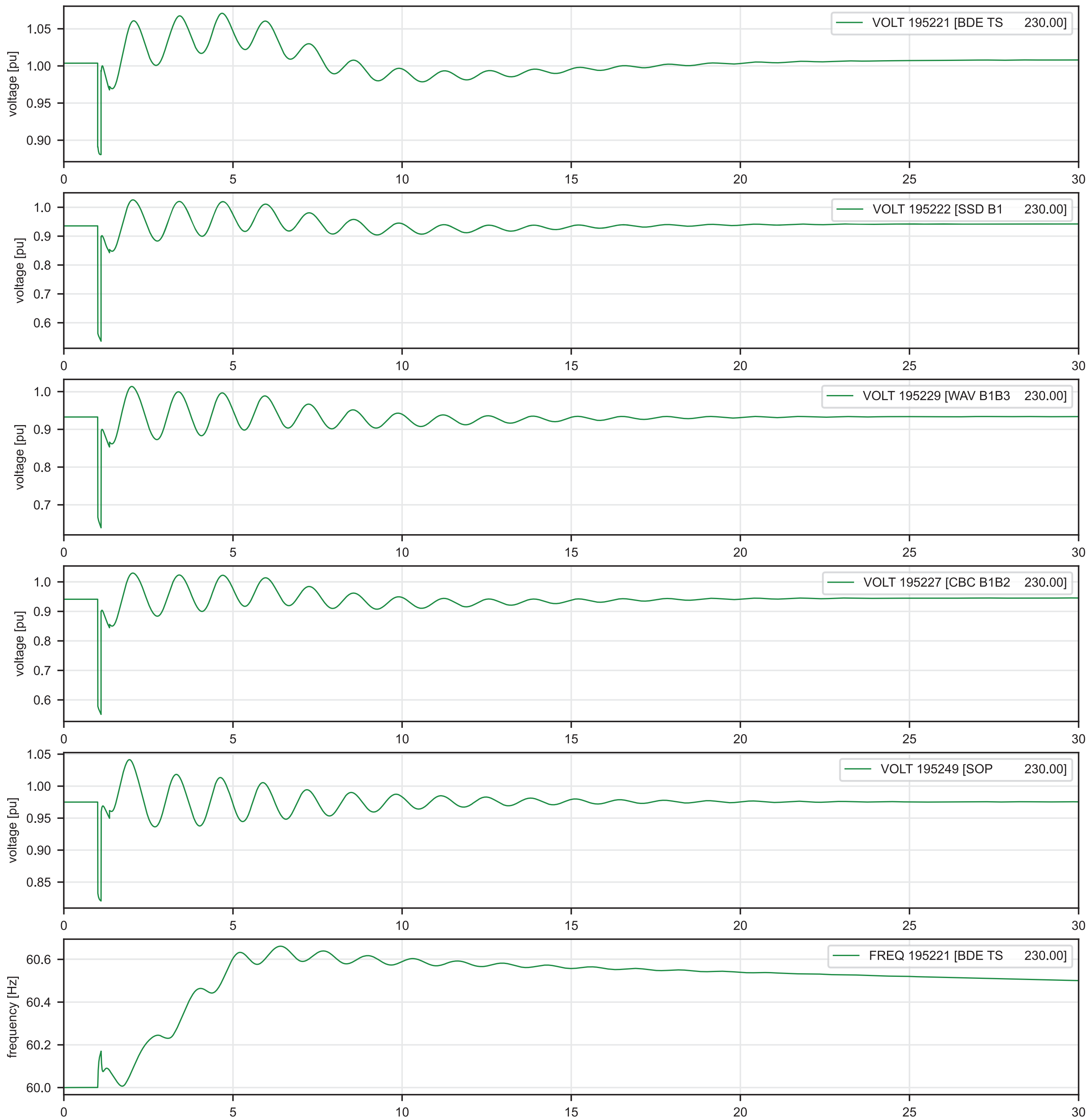
07_2033-34_Base-Peak_TL203-TL207_1800MW_3SOPSC
Loss of TL203 - no fault | Voltage / Frequency



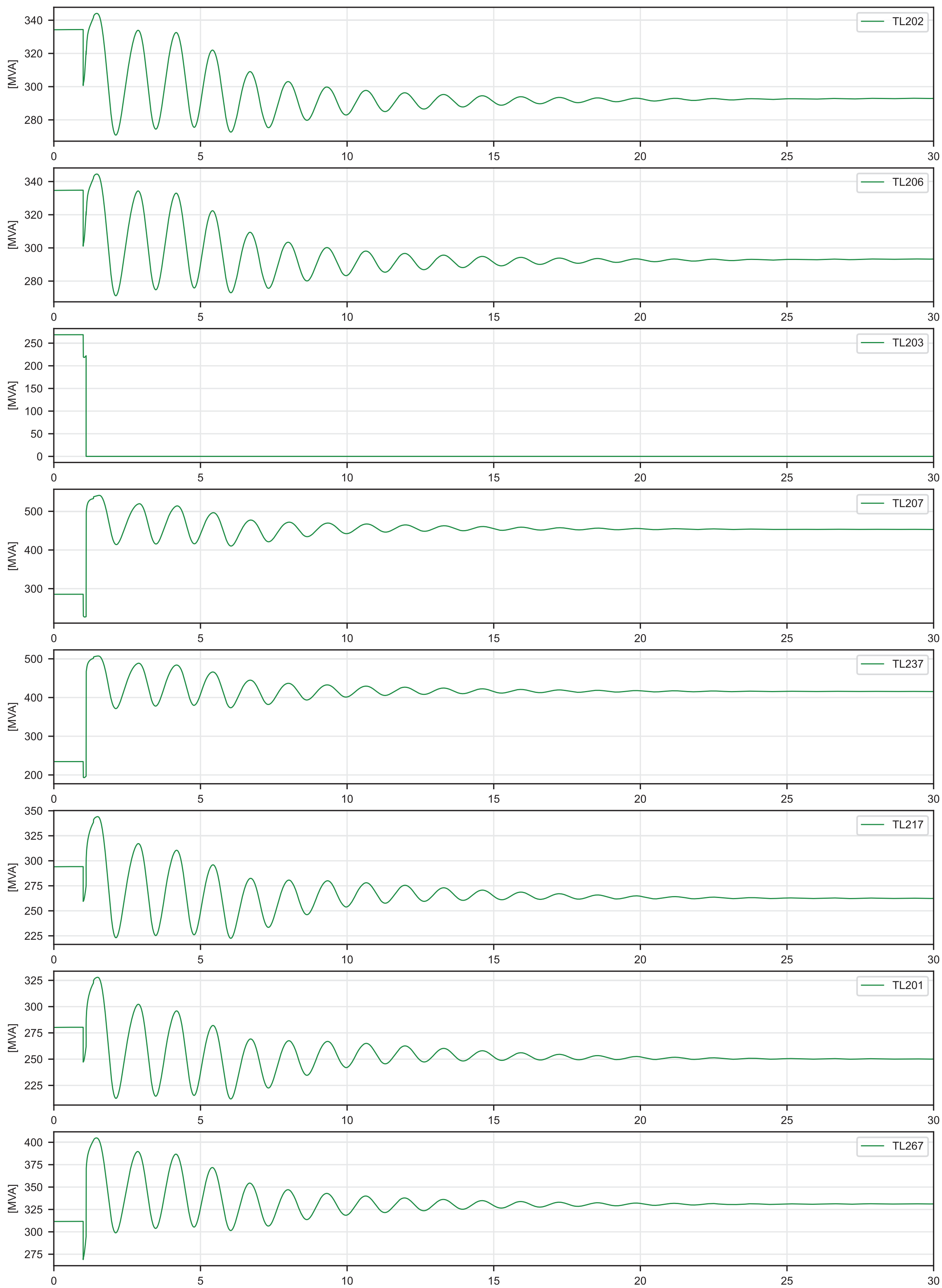
07_2033-34_Base-Peak_TL203-TL207_1800MW_3SOPSC
Loss of TL203 - no fault | 230 kV Power Flow



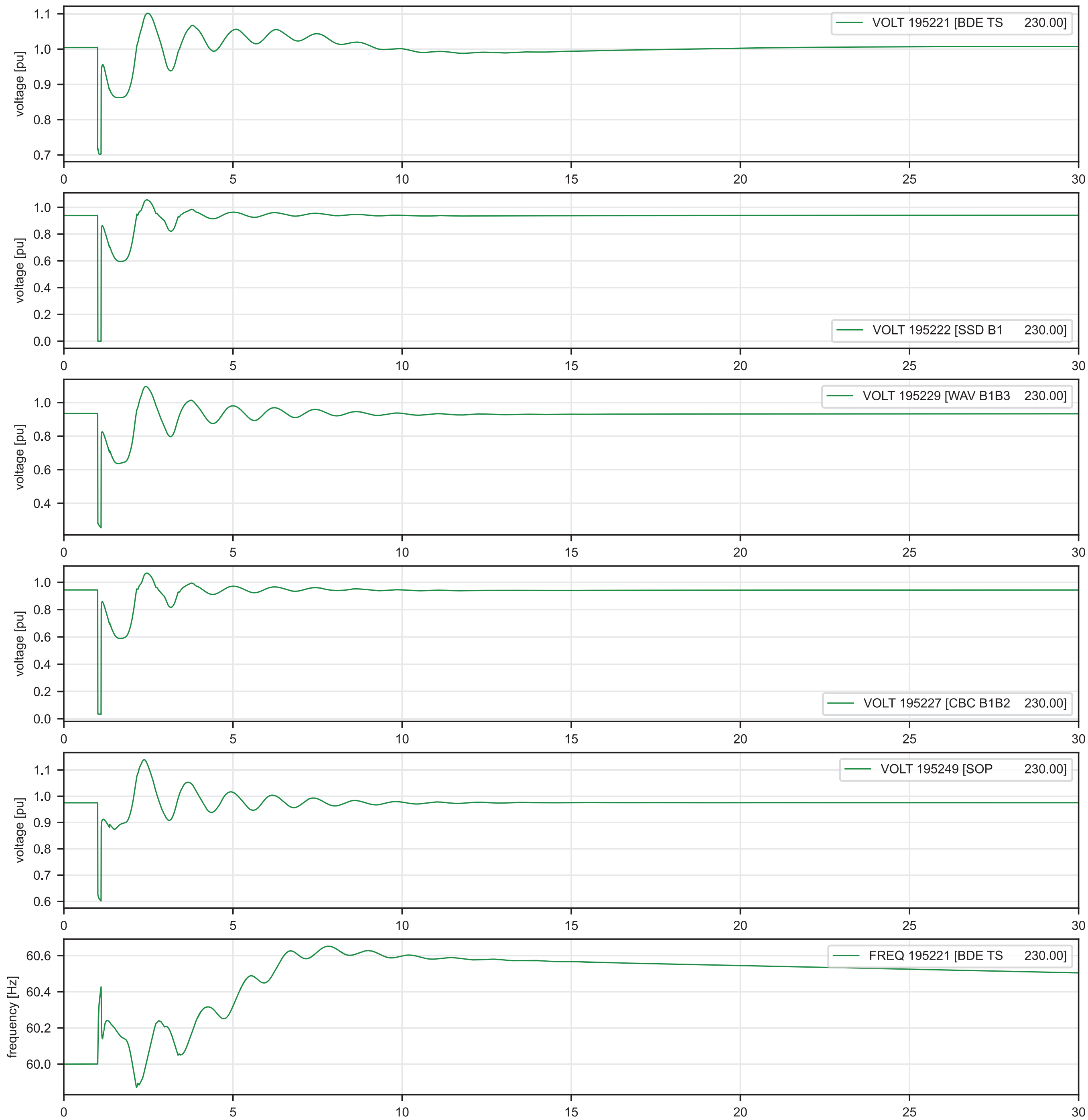
07_2033-34_Base-Peak_TL203-TL207_1800MW_3SOPSC
Loss of TL203 - SLGF | Voltage / Frequency



07_2033-34_Base-Peak_TL203-TL207_1800MW_3SOPSC
Loss of TL203 - SLGF | 230 kV Power Flow



07_2033-34_Base-Peak_TL203-TL207_1800MW_3SOPSC with STATCOM
Loss of TL203 - 3PF | Voltage / Frequency



07_2033-34_Base-Peak_TL203-TL207_1800MW_3SOPSC with STATCOM
Loss of TL203 - 3PF | 230 kV Power Flow