# Royal Prince Alfred Hospital Redevelopment (RPAH Redevelopment)

## Construction Noise and Vibration Monitoring Report 21

## Client Doc. No. RPA-ACO-ACL-RPT-MW-000024 - Rev A

| | |
|---|---|
| Project ID | 20230239.17 |
| Document Title | Construction Noise and Vibration Monitoring Report |
| Attention To | CPB Contractors Pty Limited |

| Revision | Date | Document Reference | Prepared By | Checked By | Approved By |
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| | | | | | |

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# 1 INTRODUCTION

This report presents the results of the noise and vibration monitoring conducted by Acoustic Logic during the site establishment works for the RPA Hospital redevelopment, located at 50 Missenden Road, Camperdown. Details presented in this report include monitoring locations, relevant noise and vibration objectives, measured noise and vibration levels over the presented monitoring period and a discussion of results where applicable.

This report covers the twenty-first fortnight since the beginning of construction monitoring, being between Monday 16th September, 2024 and Sunday 29th September, 2024.

Unattended noise and vibration monitoring has been undertaken to satisfy the requirements of Condition B26 of SSD-47662959's Development Consent, in conjunction with the noise and vibration management levels established within the *Early Works Construction Noise and Vibration Management Plan*, prepared by this office, and as they are so updated throughout the construction process where necessitated (Ref: 20230239.9/0610A/R1/LA). Condition B26 of SSD-47662959's Development Consent is provided below for reference:

> *"**Environmental Management Plan Requirements***
>
> ***B26**. Management plans required under this consent must be prepared having regard to the relevant guidelines, including but not limited to the Environmental Management Plan Guideline: Guideline for Infrastructure Projects (DPIE April 2020).*
>
> *Notes:*
>
> *The Environmental Management Plan Guideline is available on the Planning Portal at: https://www.planningportal.nsw.gov.au/major-projects/assessment/post-approval.*
>
> *The Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans."*

## 2 SITE DESCRIPTION

The site is maintained on Lot 1000 DP 1159799, and is bound by the existing operational RPA Hospital to the west, the Centenary Institute to the north, and University of Sydney's Bruce William Pavilion and Susan Wakil Health Building to the east and south respectively. The site is surrounded by various residential, commercial, hospital, university, research and active recreation sensitive receivers generally.

The works maintained within Early Works and Site Establishment pertain specifically to works along Lambie Dew Drive and John Hopkins Drive.

The surrounding affected sensitive receivers that are investigated within the contents of this monitoring assessment are as presented below:

**Table 1 – Surrounding Sensitive Receivers**

| ID No. | Receiver Description | Receiver Category |
|---|---|---|
| H1 | RPA Hospital Main Building | Hospital |
| Re1 | Centenary Institute | Research Facilities |
| E1 | CreateSpace and Susan Wakil Health Building | Education |
| E2 | Charles Perkins Centre | |

See an aerial photo in Figure 1 below for detailed receiver locations.

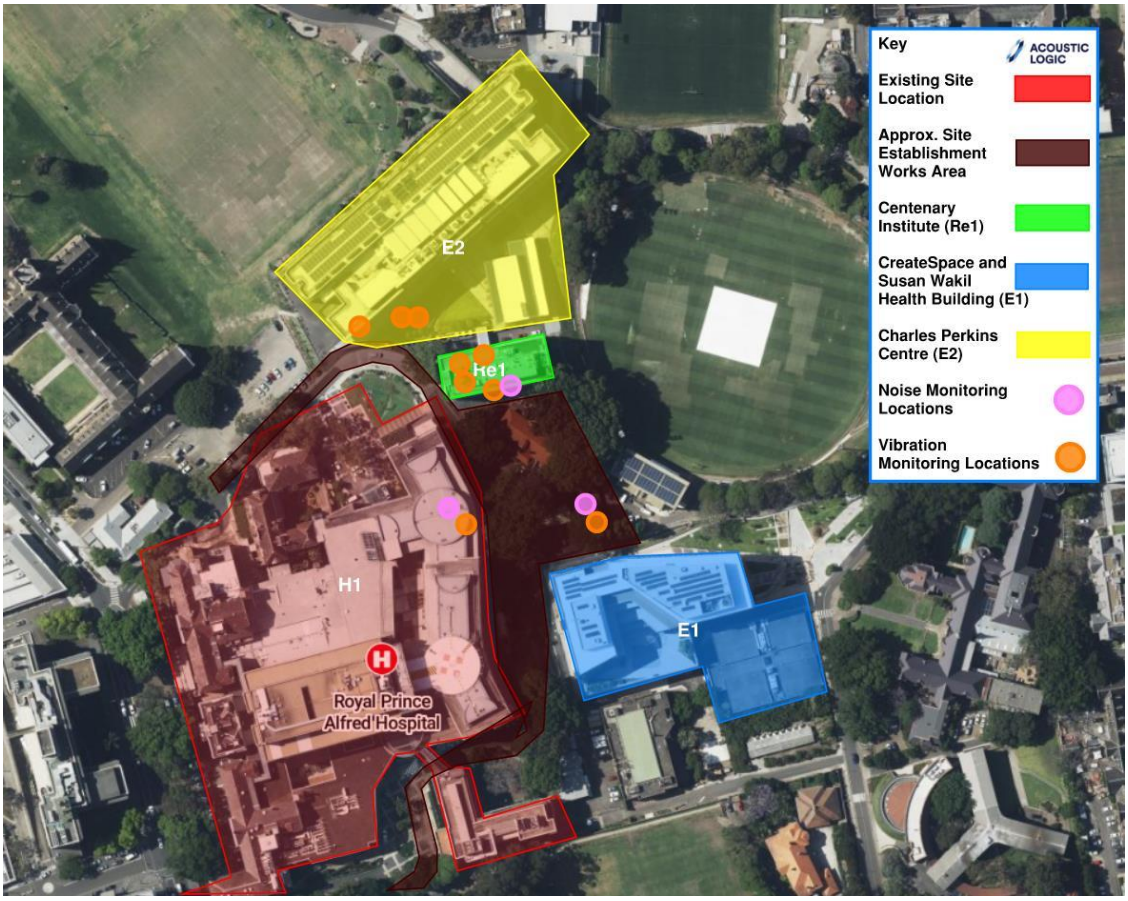



**Figure 1: Aerial Site Map with Nearest Sensitive Receivers (Sourced from Sixmaps)**

# 3 NOISE AND VIBRATION MANAGEMENT LEVELS

The following section details the relevant construction noise and vibration requirements assessed throughout the monitoring period.

## 3.1 NOISE MANAGEMENT LEVELS

Noise Management levels relevant to the contents of this report are summarised in the table below, as provided within the *Early Works Construction Noise and Vibration Management Plan*, prepared for the project by this office (Ref: 20230239.9/0610A/R1/LA). Note that based upon measurements and discussions with relevant stakeholders on 12/03/2024, the Noise Management Level for the Animal Housing, Breeding and Observation Rooms within Centenary Institute will be reduced to 62dB(A) $L_{eq(15\ min)}$, and this will be adopted within this report, as well as further subsequent assessments:

**Table 2 – Noise Management Levels**

| Receiver | Room Usage | Noise Management Level dB(A) $L_{eq(15min)}$ |
|---|---|---|
| H1 | NICU | 60 (Internally) |
| E1 and E2 | All | 45 (Internally) |
| R1 | Animal Housing / Breeding / Observation Rooms | 62 (Internally) |
| | Rat Operating Room | 48 (Internally) |

## 3.2 PROJECT VIBRATION CRITERIA

Relevant project vibration criteria to the contents of this report are provided within the table below. Vibration criteria presented for spaces within Re1 and E2 have been updated based upon the conclusion of the "Baseline Monitoring Results," report, as well as the "Construction Noise and Vibration Monitoring Report 1," both of which were prepared by this office for the project (Ref: 20230239.17/0412A/R1/LA and 20230239.17/2301A/R0/LA). Supplementarily, further correspondence between Charles Perkins Centre and the project team on 20/02/2024 has resulted in the reduction of criteria within the animal spaces on B2 to VC-A criteria, and this is reflected within the table below and has been in effect through this monitoring period:

**Table 3 – Summarised Proposed Project Vibration Limits**

| Receiver | Location | Vibration Criteria ($\mu ms^{-1}$) |
|---|---|---|
| Re1<br>Centenary Institute | L3 Fish Tank Room | 400 $\mu ms^{-1}$<br>Peak Particle Velocity |
| | L4 – Animal Behaviour / Holding / Breeding Rooms | VC-A (ASHRAE Handbook)<br>(50 $\mu ms^{-1}$)<br>RMS Velocity |
| E1<br>Createspace and Susan Wakil Health Building | All spaces | DIN 4150-3 Type 1 Criteria<br>(20,000 $\mu ms^{-1}$ / 20$mms^{-1}$)<br>Peak Particle Velocity |
| E2<br>Charles Perkins Centre | Imaging Equipment (Southern Wing Corridor) | VC-B (ASHRAE Handbook)<br>(25 $\mu ms^{-1}$)<br>RMS Velocity |
| | Animal Behaviour / Holding / Breeding Rooms | VC-A (ASHRAE Handbook)<br>(50 $\mu ms^{-1}$)<br>RMS Velocity |
| H1<br>RPA Hospital Main Building | Operating Theatres (Level 3) | 100 $\mu ms^{-1}$<br>RMS Velocity |

# 4 MONITORING EQUIPMENT AND LOCATIONS

## 4.1 NOISE MONITORING EQUIPMENT AND LOCATIONS

Unattended noise monitoring was conducting using Acoustic Research Laboratories Pty Ltd noise loggers. The loggers were programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of each measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

Three individual noise monitors have been installed surrounding the site at the following locations:

- Centenary Institute Level 4 Surgery (Southern Façade).
- RPA Hospital Main Building – Level 03 NICU.
- Outside Susan Wakil Health Building, on grade.

Please refer to Figure 1 for detailed monitoring locations.

## 4.2 VIBRATION MONITORING EQUIPMENT AND LOCATIONS

Vibration monitoring was conducted using either Texcel ETM vibration monitors with external Tri-axial Geophones, or Bruel and Kjaer Type 4450 vibration monitors.

Three Texcel ETM monitors have been placed surrounding the site at the following locations:

- Centenary Institute Level 3, Fish Tanks.
- Charles Perkins Centre Level B1, Southern Wing Observation Room E (Note that this monitor has been installed at this location to send alert messages at 100 $\mu ms^{-1}$ PPV vibration events, due to the limited reception achieved within the B2 area from the Bruel and Kjaer Type 4450 monitor installed to assess vibration impacts with respect to the VC-A vibration criteria curve within the animal holding area.
- Outside Susan Wakil Health Building, on grade.

Additionally, six Bruel and Kjaer Type 4450 Vibration monitors have been installed surrounding the site at the following locations:

- Centenary Institute:
    - Level 4 Surgery (Southern Façade).
    - Level 4 Change Rooms (Northern Façade)
    - Level 4 South-eastern Experimentation Room.
- Charles Perkins Centre:
    - Level B1, Southern Wing Corridor.
    - Level B1, Southern Wing Observation Room E
- RPA Hospital Main Building Level 3 NICU.

Please refer to Figure 1 for detailed monitoring locations.

# 5 RESULTS

Appendix A presents the results of the noise monitoring, whilst Appendix B presents the results of the vibration monitoring where exceedances occurred during the monitoring period as presented within the contents of this report.

A discussion pertaining the findings of the noise and vibration monitoring undertaken during this monitoring period is provided within the proceeding sections.

## 5.1 NOISE MONITOING RESULTS DISCUSSION

Noise monitoring conducted throughout the monitoring period shows general adherence to the noise management levels provided within Section 3 of this letter.

For the Holding, Breeding and Observation Rooms

- Monitoring equipment was not operational between 25/09 and 02/10/24, and hence data has not been collated between 25/09 and 29/09 within this monitoring period.
- Of the dates where data was collated during the monitoring period, noise levels were observed to be above the NML within the surgery room on 18/09/2024.
- It was confirmed by CI that the noise events measured on 18/09 were related to internal operation, and were not generated by construction works within the RPA construction zone.
- No other exceedances were noted throughout the monitoring period.
- Ongoing monitoring to continue within the holding/breeding/observation spaces.

For RPAH Main Building L03 NICU

- The monitor is located underneath a benchtop and against two individual walls within the NICU area on Level 03 of the hospital main building. Due to the reflections experienced at the monitoring location due to this, a 5dB correction has been conservatively applied to the noise levels measured at the monitoring station.
- Noise levels were observed to be measured above the NML within the NICU space on the following dates:
    - 17/09/2024.
    - 20/09/2024.
    - 27/09/2024.
- Noise levels during construction hours were never observed to be above the NML for longer than one 15-minute period at a time, and hence it is likely that these events were caused by internal operational activity within the space, as opposed to construction works, noting that construction works are typically continuous in nature.
- Ongoing monitoring to continue within the NICU space.

For the Susan Wakil Health Building

- The monitor located outside of the Susan Wakil Health Building is within the demolition site boundary and approximately 15m closer to the area of the works than the façade of the Susan Wakil Health Building.
- Noting this increased distance attenuation, in conjunction with the transmission loss experienced through the inoperable façade of the Susan Wakil Health Building when comparing internal and external noise levels, Acoustic Logic expect that, at minimum, there is a 30dB reduction between the measured noise levels by the monitor, when compared with the resultant internal noise levels within the receiver.
- This reduction is considered conservative due to the distance between the monitor and the building, and hence, the noise impacts would be further reduced than what is outlined below in reality.
- Of the data collated during the monitoring period presented within the report, noise levels measured at the monitoring station were found to be above the Susan Wakil NML on the following dates:
    - 16/09/2024
    - 18/09/2024
    - 19/09/2024.
    - 21/09/2024.
    - 23/09/2024.
    - 24/09/2024.
    - 27/09/2024.
- Generally, where noise levels were found to be above the NML, these levels were marginal across the monitoring period ($\leq$ 3dB).
- Generally, noise levels were limited to one 15-minute period above the NML before returning to being below the NML across the period. The longest sustained measured levels above the NML was for a period of 1 hour on 16/09/2024.
- Noise levels impacting Susan Wakil will be continued to be monitored throughout the early works construction to assess the impact to this receiver.

## 5.2 VIBRATION MONITORING RESULTS DISCUSSION

With regards to the vibration measured vibration levels during the monitoring period, we note the following:

- Note that the graphs presented within the Appendix of this document show the maximum recorded velocity for each individual frequency within a given day's monitoring period.
- Data has only been provided for days in which exceedances attributed to vibration works have been experienced at the monitoring station.
- The following section provides discussion pertaining to the measured exceedances observed throughout the period at individual monitoring locations:

### 5.2.1 Centenary Institute:

- Level 1 – Laser Imaging Room (Electrical Cupboard):
  - Precision imaging equipment such as the laser scanning apparatus investigated by this monitoring station are impacted by vibration through impacts on output results.
  - This would hence be observed by operators of the equipment, whereby the system would not be operating correctly/results of the system would be impacted.
  - To the knowledge of this office, no impacts on the results output of the equipment have been reported by Centenary Institute throughout the early works construction period.
  - Further, and based upon onsite inspections and testing, AL note that the Laser room is subject to various sources of ambient vibration from the operation of the facility which contribute to the levels measured during construction, inclusive of refrigerant plant maintained within the basement of the facility.
  - Where any changes to the operation / results of the laser scanning apparatus are observed by the operators of the equipment, this is to be relayed to this office for investigation and alignment with construction activity to appropriately assess and mitigate impacts.
- Level 3 – Fish Tanks:
  - No exceedances were measured at this monitoring station throughout the monitoring period.
- Level 4 – Surgery Room (Southern Façade), Clean Changeroom (Southern Façade) and Bathroom (Northern Façade):
  - One exceedance event was measured by all three monitoring stations on 20/09/2024 at approximately 3.30pm, and was measured as a maximum recorded value of 120$\mu ms^{-1}$ (140%) at the Surgery Room monitoring station.
  - An exceedance was measured by both the Surgery Room and Northern Bathroom monitors on 27/09/2024 @ 4.30pm – Marginal maximum recorded value of 60$\mu ms^{-1}$ (20%).
  - An exceedance was measured by both the Surgery Room and Southern Changeroom monitors on 19/09/2024 @ 9.30am – Maximum recorded value of 66$\mu ms^{-1}$ (32%).

- Exceedances were measured by the monitor within the Southern Changeroom only on the following dates:
    - 16/09/2024 – 7.45am (Marginal, <10% exceedance).
    - 17/09/2024 – 8.30am (Marginal, <7% exceedance).
    - 23/09/2024 – 7.00pm (92% exceedance).
    - 24/09/2024 – 9.00am (175% exceedance).
    - 25/09/2024 – 8.30am (Marginal, <1% exceedance).
- Generally, of the measured exceedance events within the monitoring period from any of the monitoring stations on the L4 floorplate, many of these measured exceedances for the period would be considered marginal exceedances (≤20% of applicable criteria.) The maximum recorded result by any of the monitors on the floorplate during the period was 138$\mu ms^{-1}$, measured in the Southern Bathroom on 24/09/2024.
- Based upon site investigation, it was determined that exceedances throughout the monitoring period were associated with the use of the following plant items at different stages throughout the monitoring period:
    - Hydraulic hammering of in-ground concrete within piling locations.
    - Use of the vibratory roller for preparing piling areas.
- Alternative methodologies to hammering were discussed, however due to the short duration of the works, in conjunction with the limited use of the equipment, alternative methodology was not implemented.
- After resultant exceedances, use of the vibratory function on the roller was ceased, and vibration impacts from the compaction works were hence limited.

### 5.2.2 Charles Perkins Centre:

- Southern Corridor (Imaging):
    - Exceedances of B2 VC-B criteria which display characteristics consistent with construction activity were observed at the monitoring station on all dates over the monitoring period.
    - Exceedances are generally within 30% of the conservative VC-B criteria.
    - The maximum level measured during the monitoring period was 75$\mu ms^{-1}$ on 03/09/2024.
    - Exceedances are generally observed at 12.5Hz, likely to be the natural frequency of the CPC suspended slab. Exceedances at frequencies exclusive of 12.5Hz, 16Hz and 20Hz are rarely observed.
    - With regards to the monitoring period within the CPC Basement, we note the following:
        - Exceedances throughout the monitoring period may have been associated with the use of hydraulic hammers and vibratory rollers.
        - With respect to hammering, the attachment size of the hammer has been reduced where practical in order to reduce the overall force impact of the works, reducing the level and frequency of exceedances observed from the use of this item throughout the monitoring period.

- When comparing the results of the B2 monitoring location with other surrounding monitors, we note that the B2 monitor is located on a suspended slab, and hence it is possible that significant amplification of the vibration impacts from these works is occurring and resulting in exceedances at the monitoring location.
- For many of the measured exceedances there is a lack of correlation between the southern corridor monitor and the other monitoring stations surrounding the project site. Therefore, it is likely that some or most of these spikes have been caused by factors exclusive of the construction activity within the RPA Hospital project area.
- It is prudent to note that CPC is undergoing a façade refurbishment exclusive to the scope of the construction activity assessed within this report, and it is likely that these works attributed to some of the exceedances observed throughout the period.
- It is also prudent to note that there were significant exceedances observed within the monitoring period which were outside of hours of works throughout the period, noting that various repeated exceedances were observed after 5.00pm and on weekend days during the period. These events have not been attributed to the impacts of the construction.

- Observation Room E (Adjoining corridor):
  - An exceedance of the PPV trigger level of the Texcel monitor within the animal testing facility was observed on the following dates:
    - 16/09/2024.
    - 18/09/2024.
    - 24/09/2024.
    - 29/09/2024 (Sunday, no works).
  - The more sensitive BnK monitor located within the observation room E corridor did not detect these events.
  - This is not indicative of construction vibration, noting that construction-borne vibration would be expected to impact the monitors equally and similar results would be measured.
  - As the Texcel monitor is operating at it's floor of measurement, it is possible that a small perturbation measured by both of the monitors was artificially inflated by the Texcel monitor due to it's relatively lower accuracy and the relatively low vibration levels measured.
  - Alternatively, this may have been caused by operational activity within the facility such as a step or a trolley movement, which occurred closer to the texcel monitor however did not register an exceedance at the B & K monitor.
  - Also, the measured exceedances were recorded at frequencies which do not align with the resonant frequency response frequency for the animal's abdomen (27-29Hz), and hence the impacts of these measured values would be less perceivable to the animals than compared with measured values at frequencies closer to those listed above.
  - Exclusive of the above, there were no further exceedances measured throughout the monitoring period.

### 5.2.3 RPA Hospital Main Building – Level 03 NICU:

- No exceedances were measured throughout the monitoring period.

### 5.2.4 Susan Wakil Health Building:

- No exceedances of criteria were observed due to construction works during the monitoring period.

# 6 CONCLUSION

Noise and vibration monitoring has been conducted by Acoustic Logic for the Early Works being undertaken for SSD-47662959, the RPA Hospital Redevelopment, located at 50 Missenden Road, Camperdown.

This report covers the twenty-first fortnight since the beginning of construction monitoring, being between Monday 16th September, 2024 and Sunday 29th September, 2024.

Monitoring results have been provided with reference to the Noise and Vibration Management Levels established within the *Early Works Construction Noise and Vibration Management Plan*, prepared by this office, or as they have been updated throughout the construction process, specifically pertaining to the recommendations of the *Baseline Monitoring Results* and *Construction Noise and Vibration Monitoring Report 1*, both also prepared by this office (Ref: 20230239.9/0610A/R1/LA, 20230239.17/0412A/R1/LA and 20230239.17/2301A/R0/LA).

Noise monitoring results have been provided within Appendix A, whilst vibration monitoring results have been provided throughout Appendix B of this letter.

We trust this information is satisfactory. Please contact us should you have any further queries.

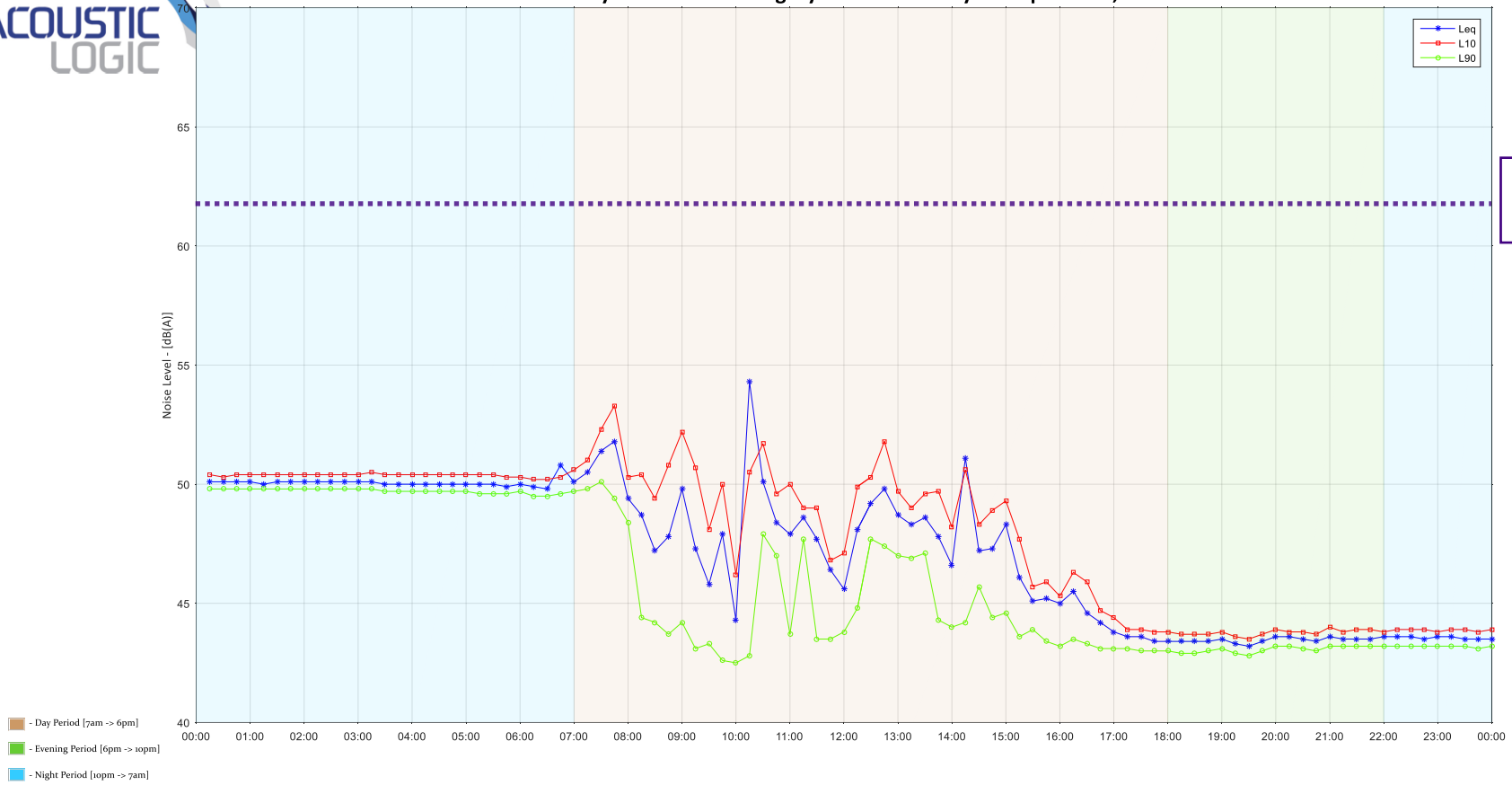
Yours faithfully,

Acoustic Logic Pty Ltd
Lachlan Abood

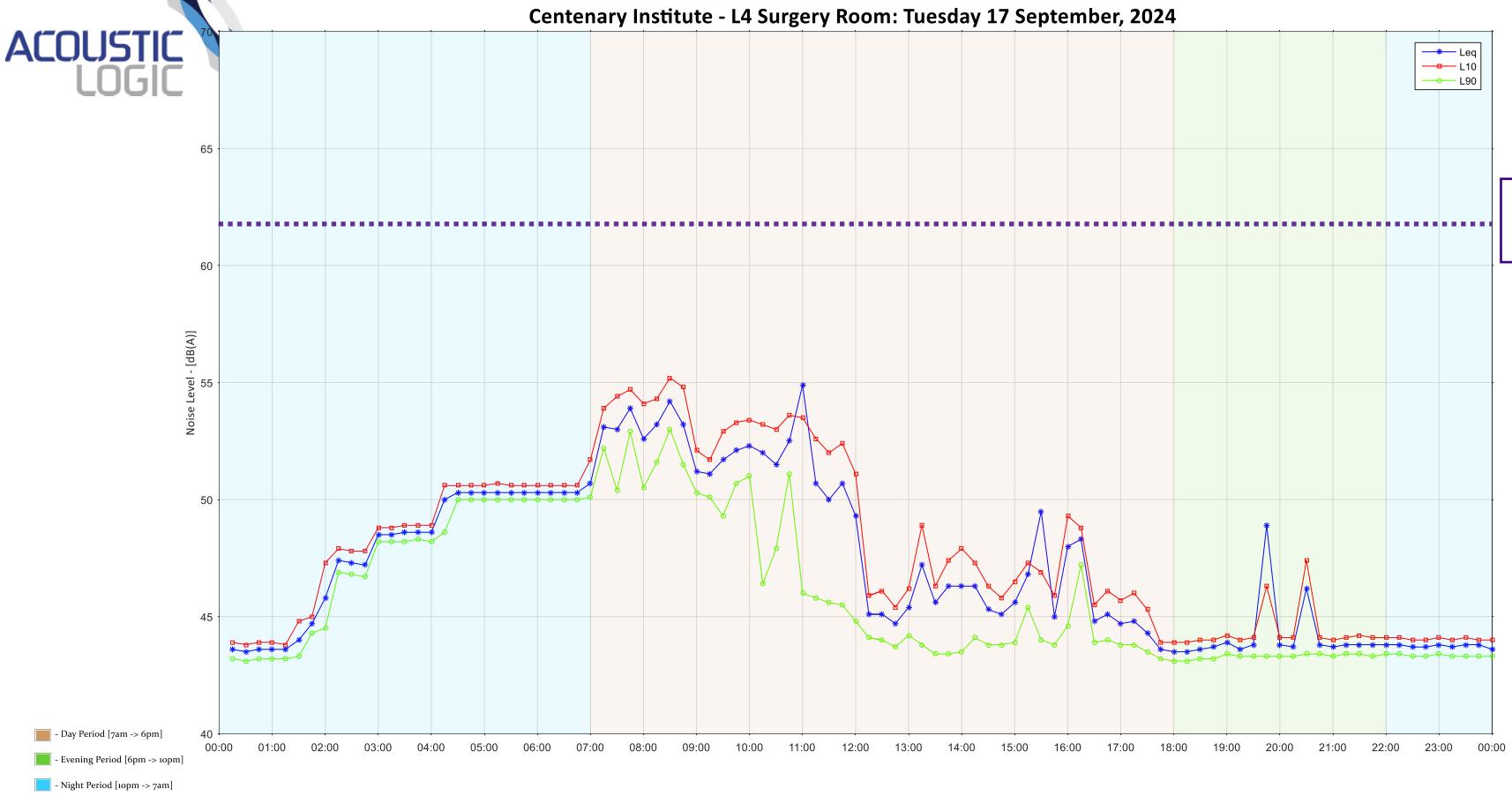
# APPENDIX A – NOISE MONITORING RESULTS

## CENTENARY INSTITUTE – LEVEL 4 SURGERY ROOM (SOUTHERN FAÇADE)

## Centenary Institute - L4 Surgery Room: Monday 16 September, 2024



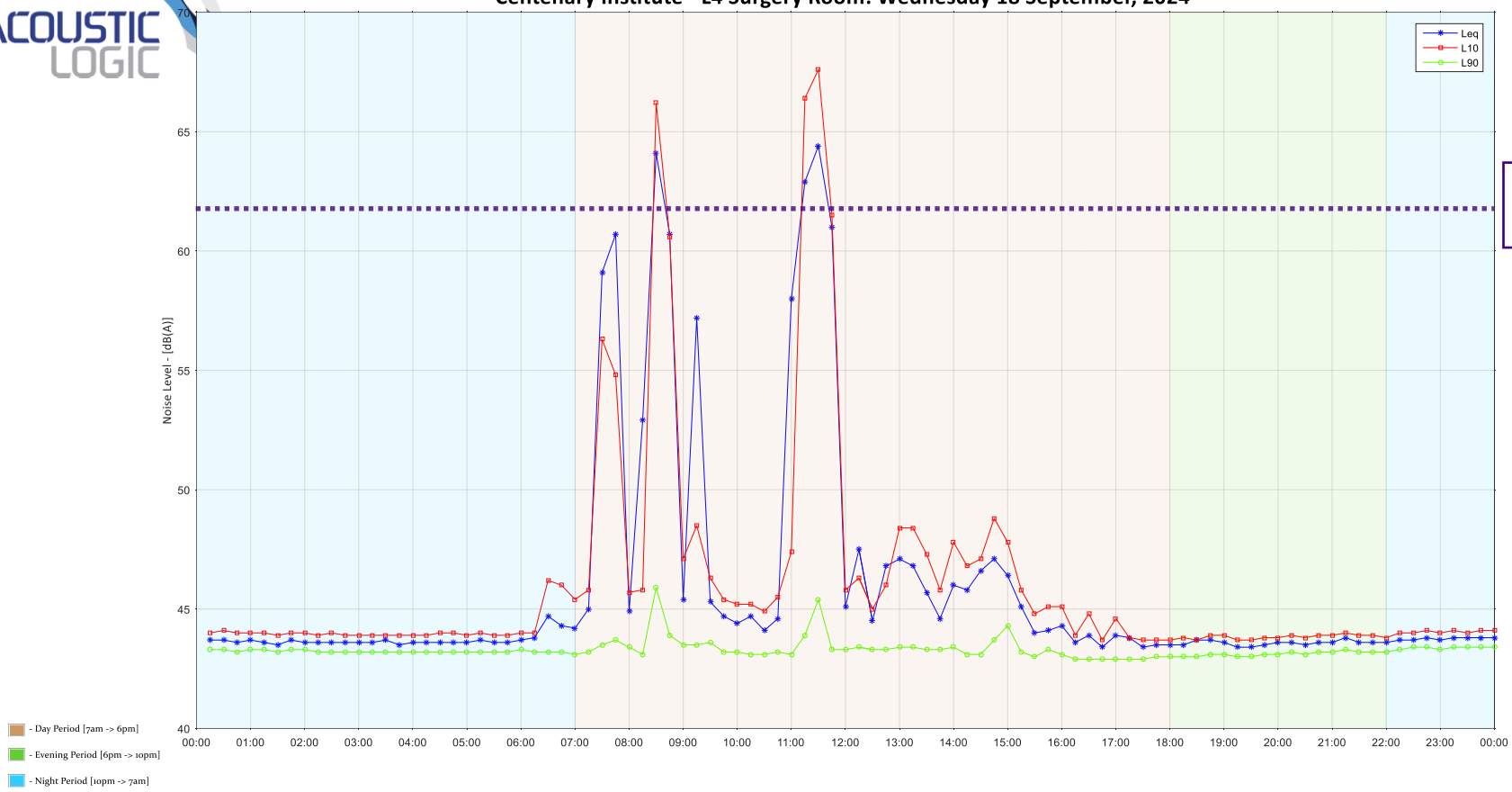

**Animal Housing / Breeding / Observation Room NML**
**$\leq$ 62dB(A)$L_{eq}$**



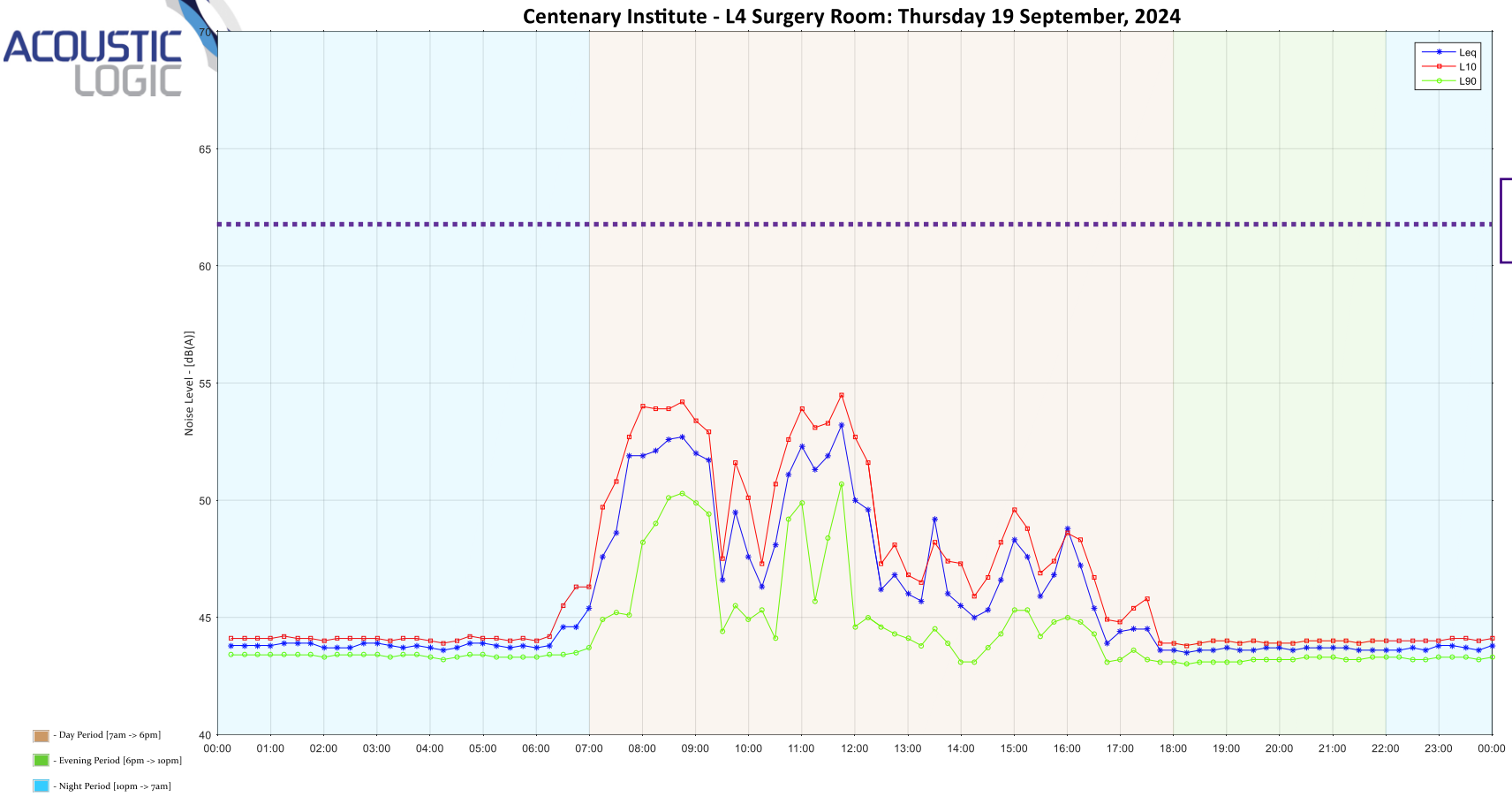

**Animal Housing / Breeding / Observation Room NML**
**≤ 62dB(A)$L_{eq}$**

ACOUSTIC LOGIC

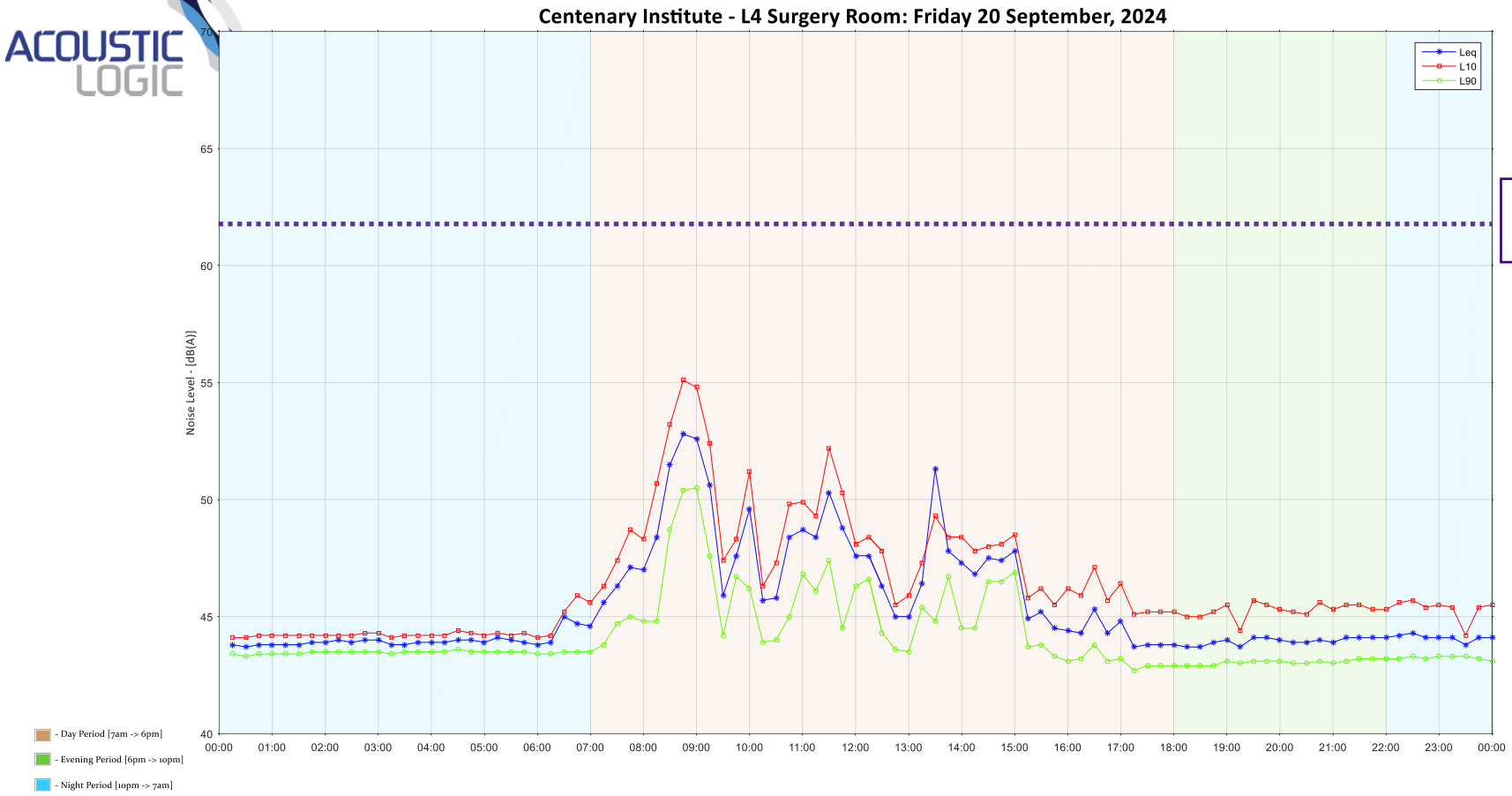
## Centenary Institute - L4 Surgery Room: Wednesday 18 September, 2024




**Animal Housing / Breeding / Observation Room NML**
**≤ 62dB(A)$L_{eq}$**




**Animal Housing / Breeding / Observation Room NML**
**≤ 62dB(A)$L_{eq}$**




**Animal Housing / Breeding / Observation Room NML**
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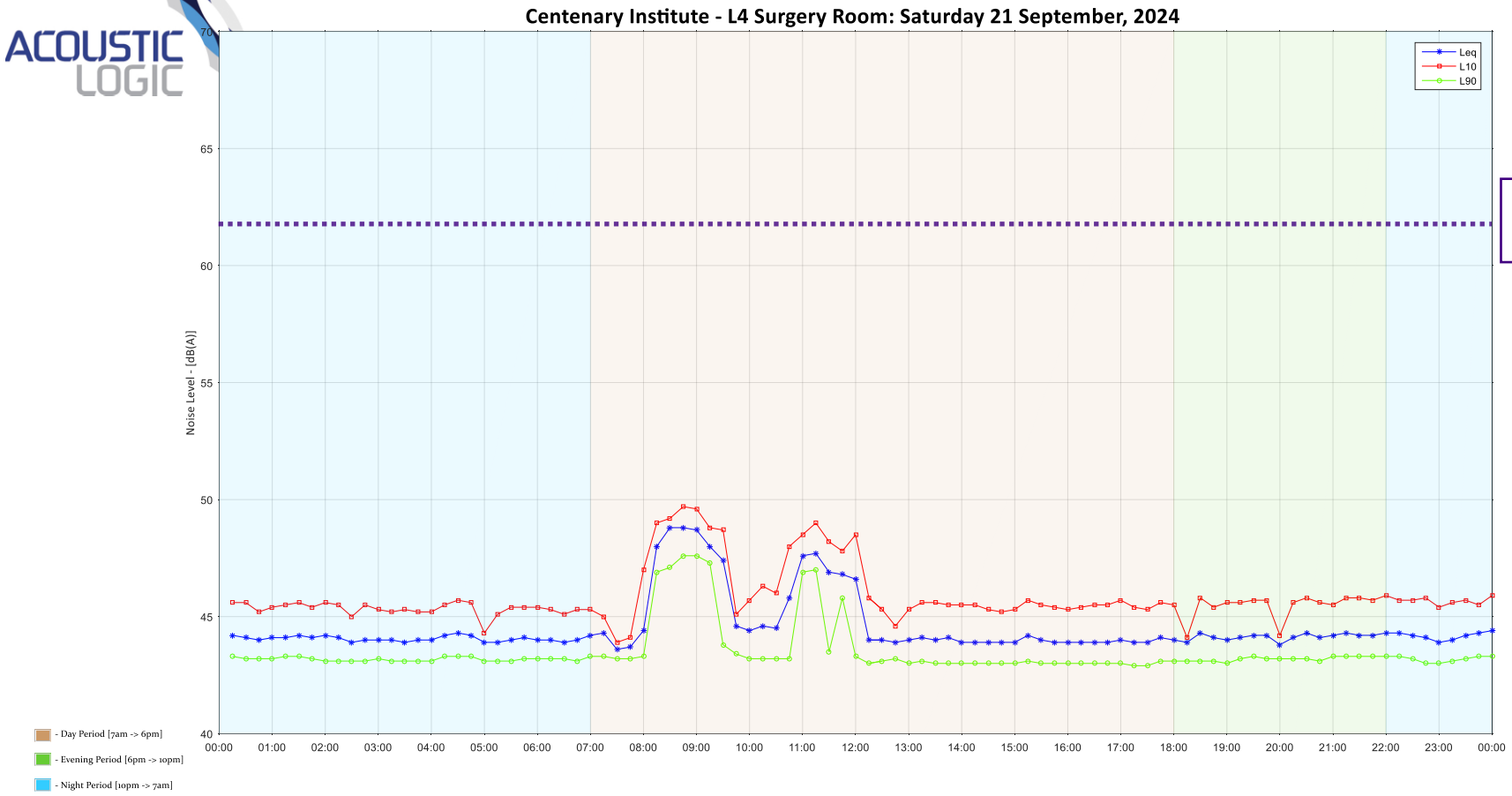
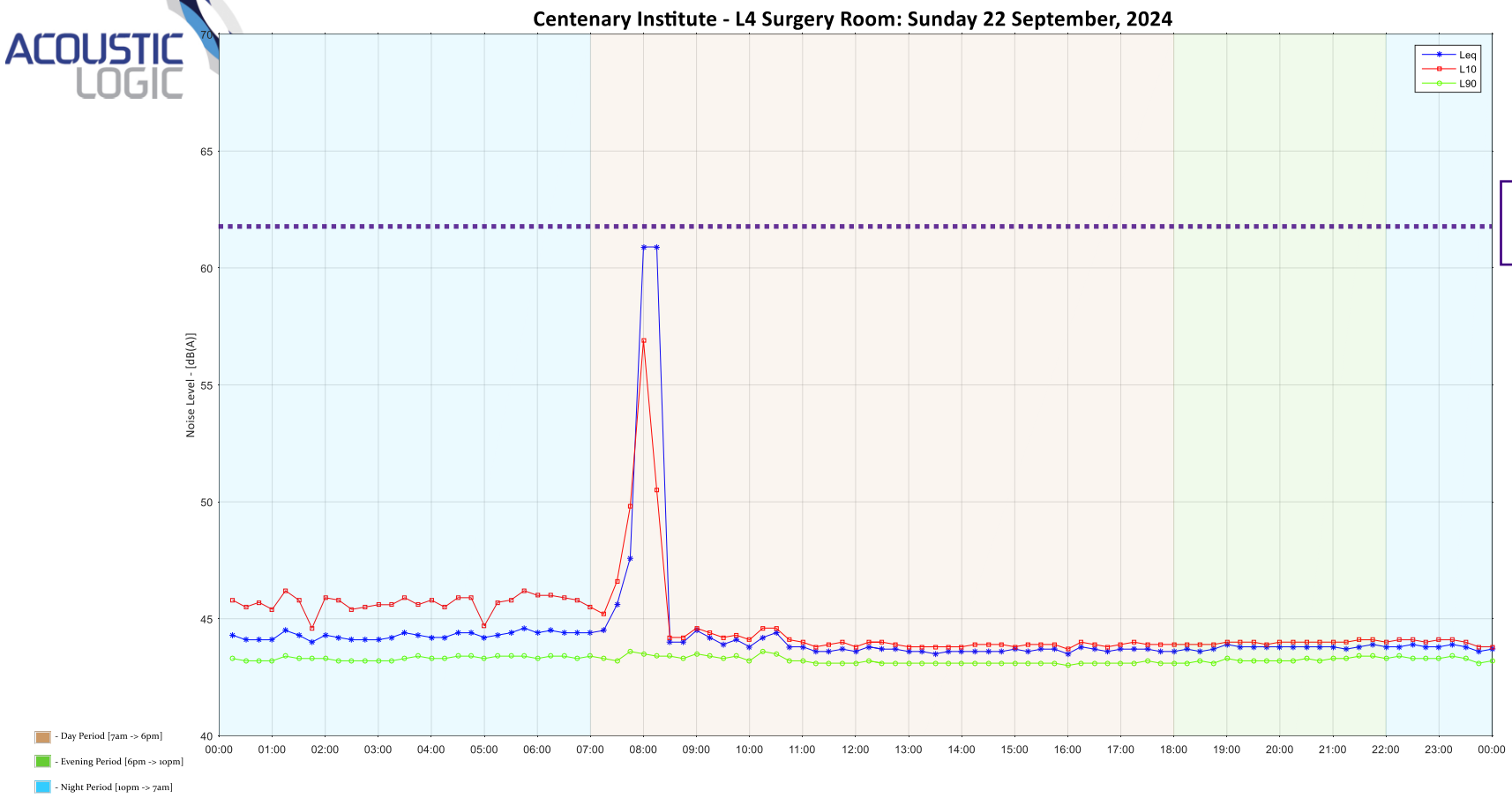


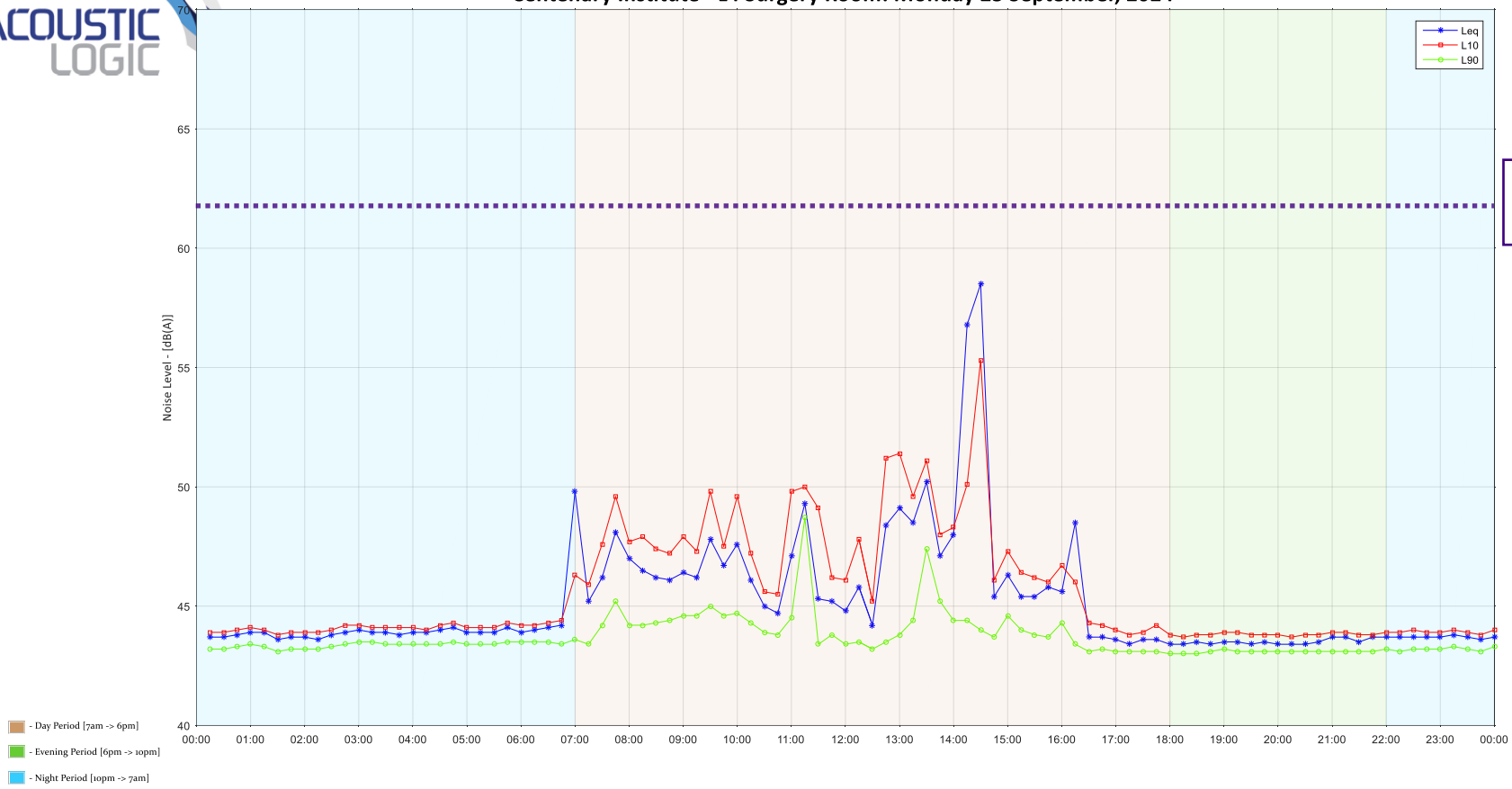

**Animal Housing / Breeding / Observation Room NML**
**$\leq$ 62dB(A)$L_{eq}$**



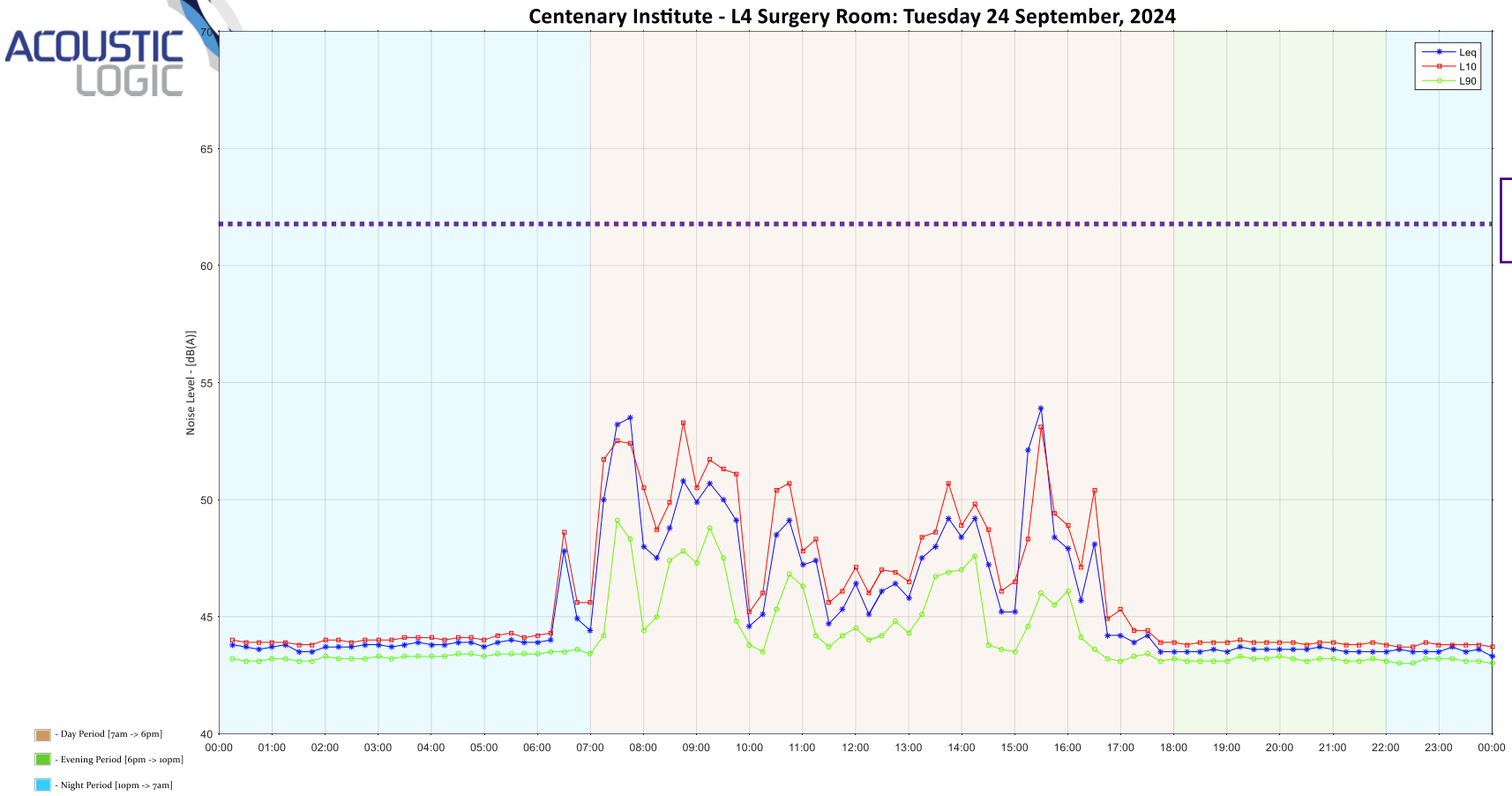

**Animal Housing / Breeding / Observation Room NML**
**≤ 62dB(A)$L_{eq}$**

ACOUSTIC LOGIC

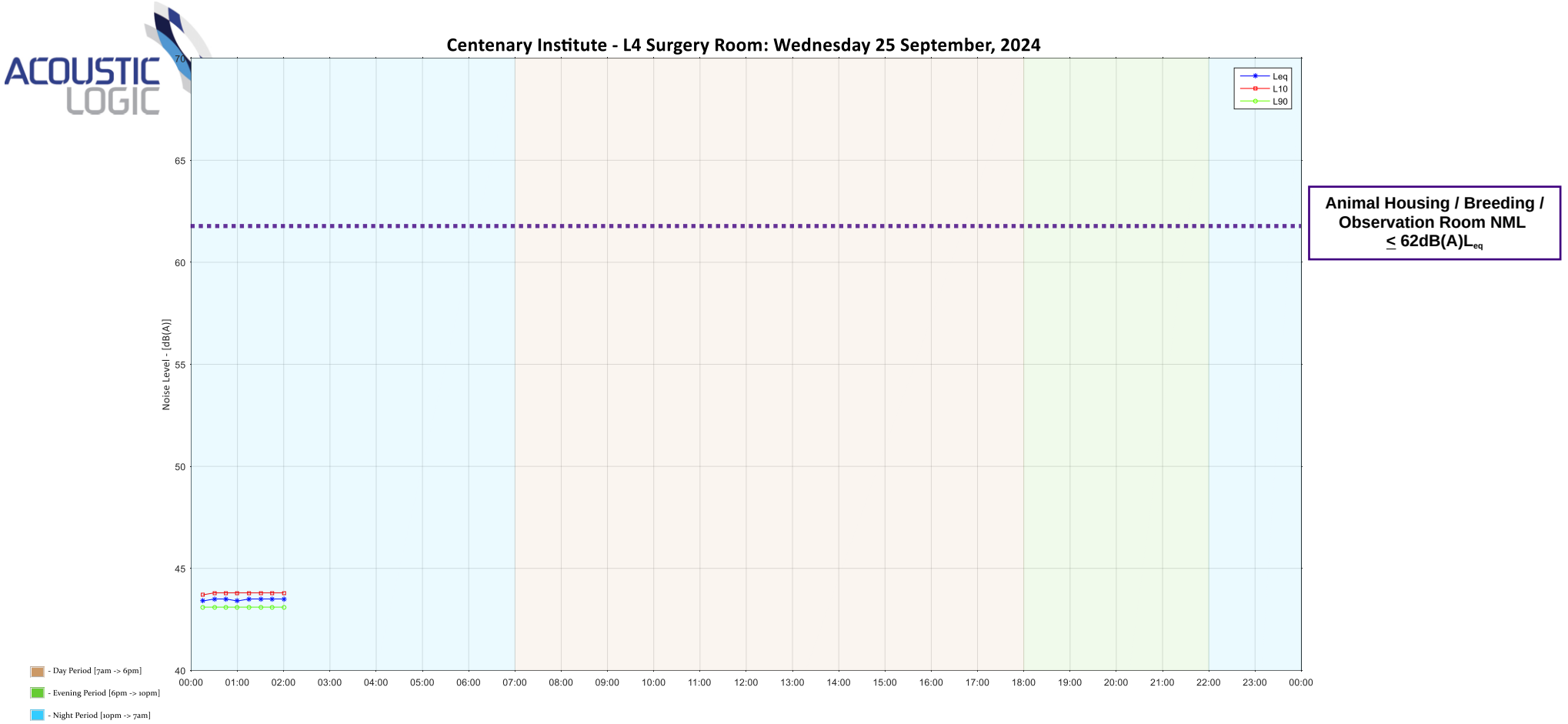
## Centenary Institute - L4 Surgery Room: Monday 23 September, 2024




**Animal Housing / Breeding / Observation Room NML**
**$\leq$ 62dB(A)$L_{eq}$**



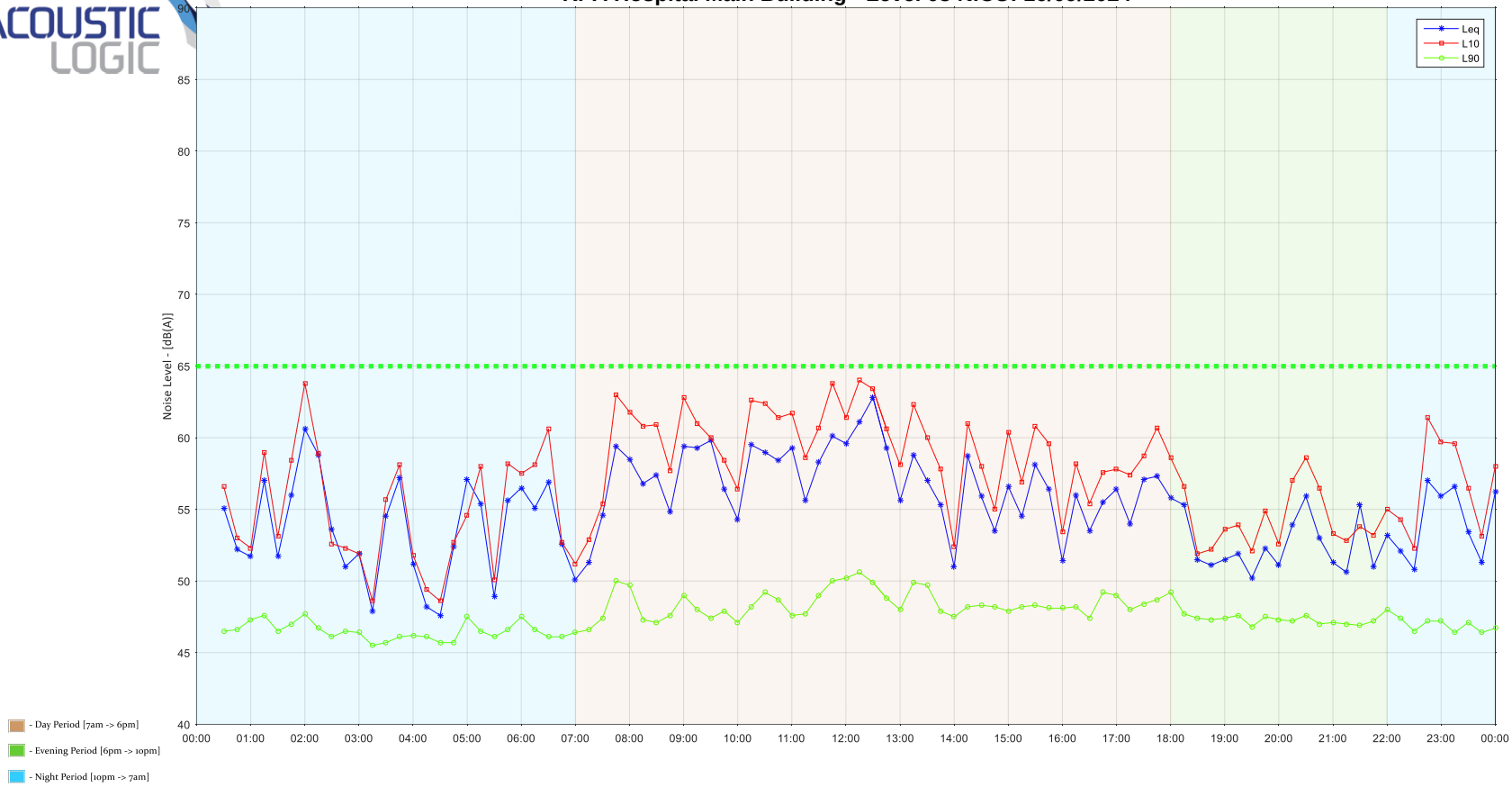

**Animal Housing / Breeding / Observation Room NML**
**$\leq$ 62dB(A)$L_{eq}$**




**Animal Housing / Breeding / Observation Room NML**
**≤ 62dB(A)$L_{eq}$**

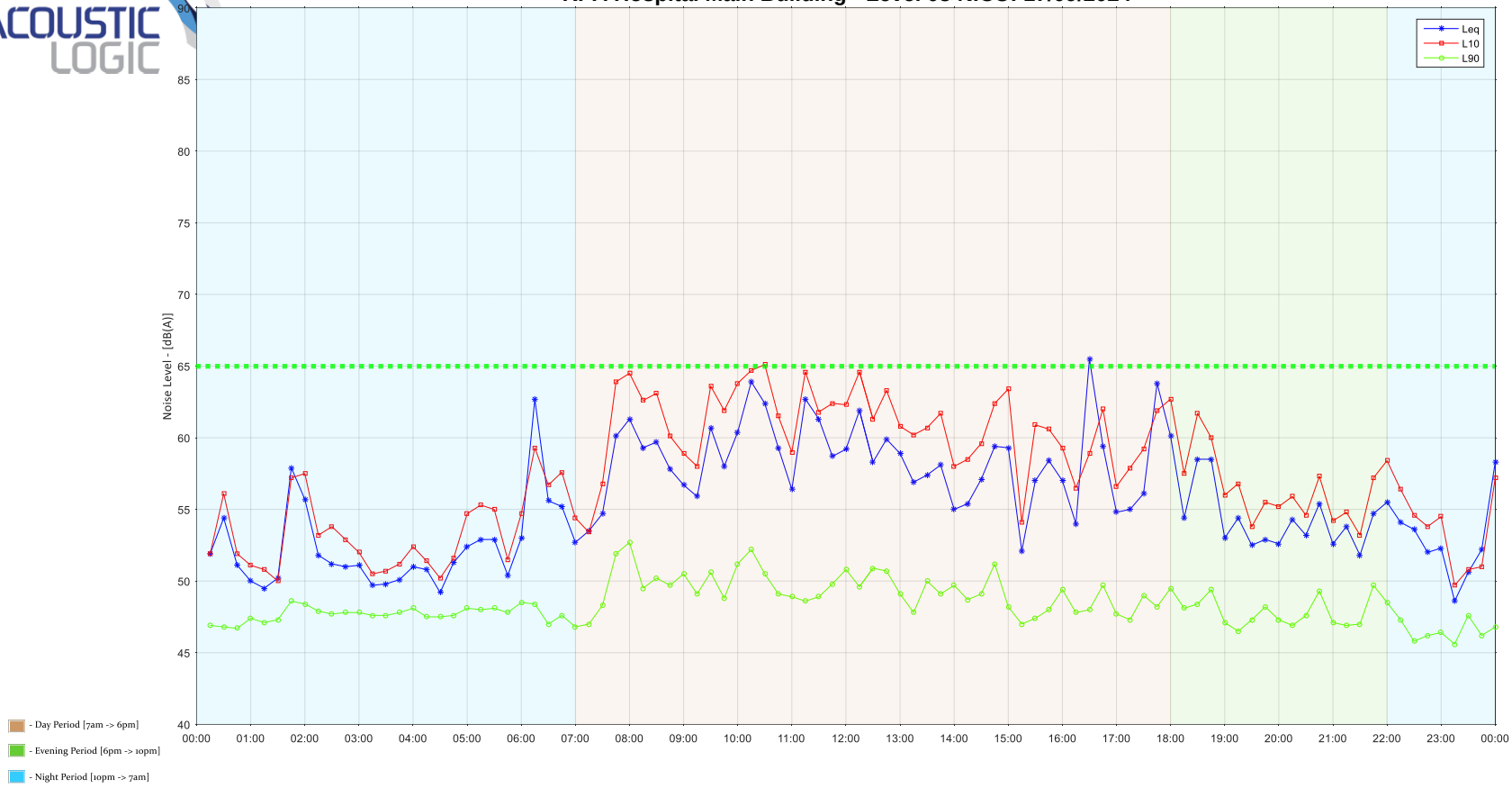
## RPA HOSPITAL MAIN BUILDING – LEVEL 3 NICU

# RPA Hospital Main Building - Level 03 NICU: 16/09/2024



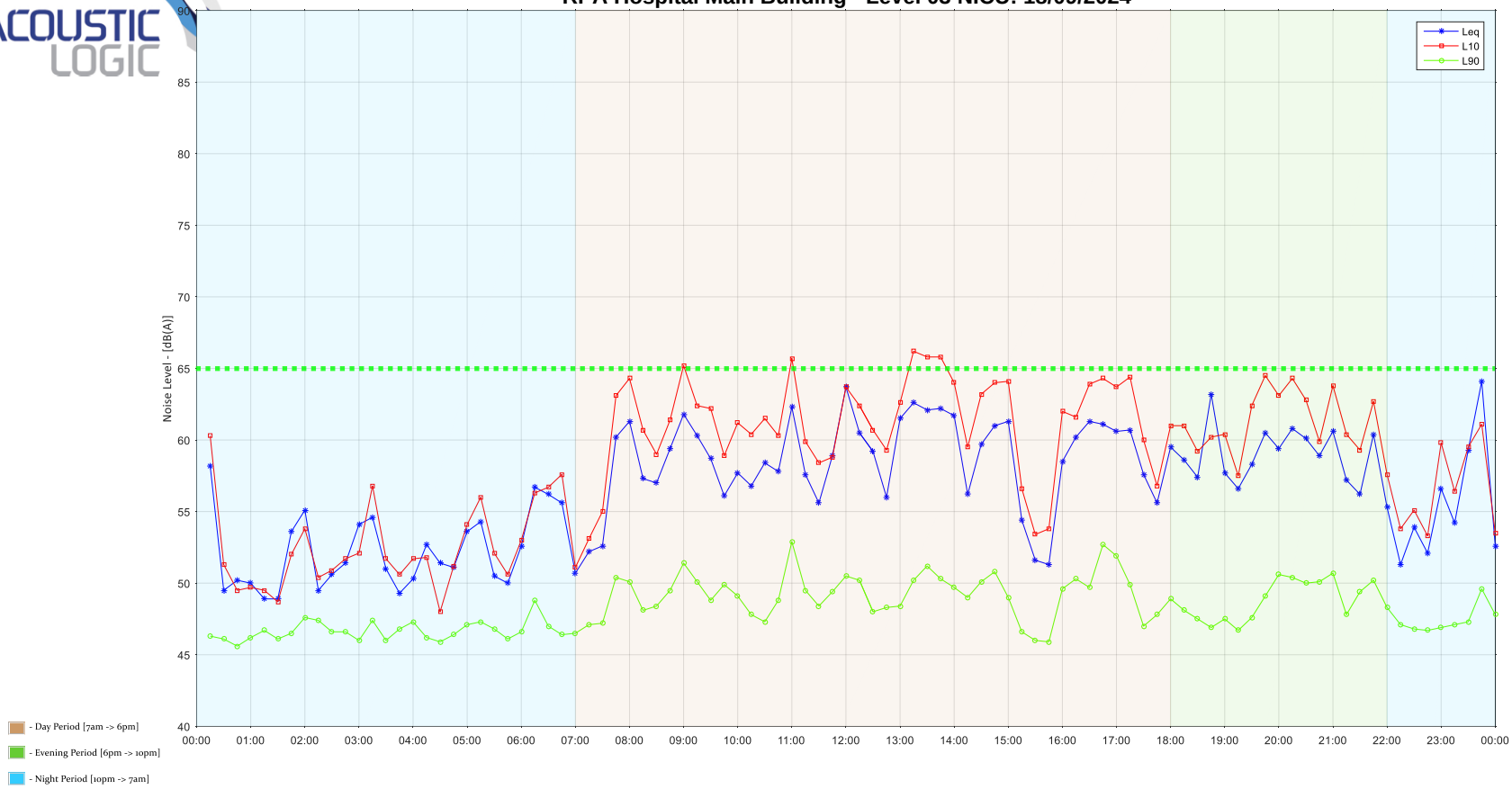

**NICU NML (Including correction) ≤ 65dB(A)$L_{eq}$**

# RPA Hospital Main Building - Level 03 NICU: 17/09/2024



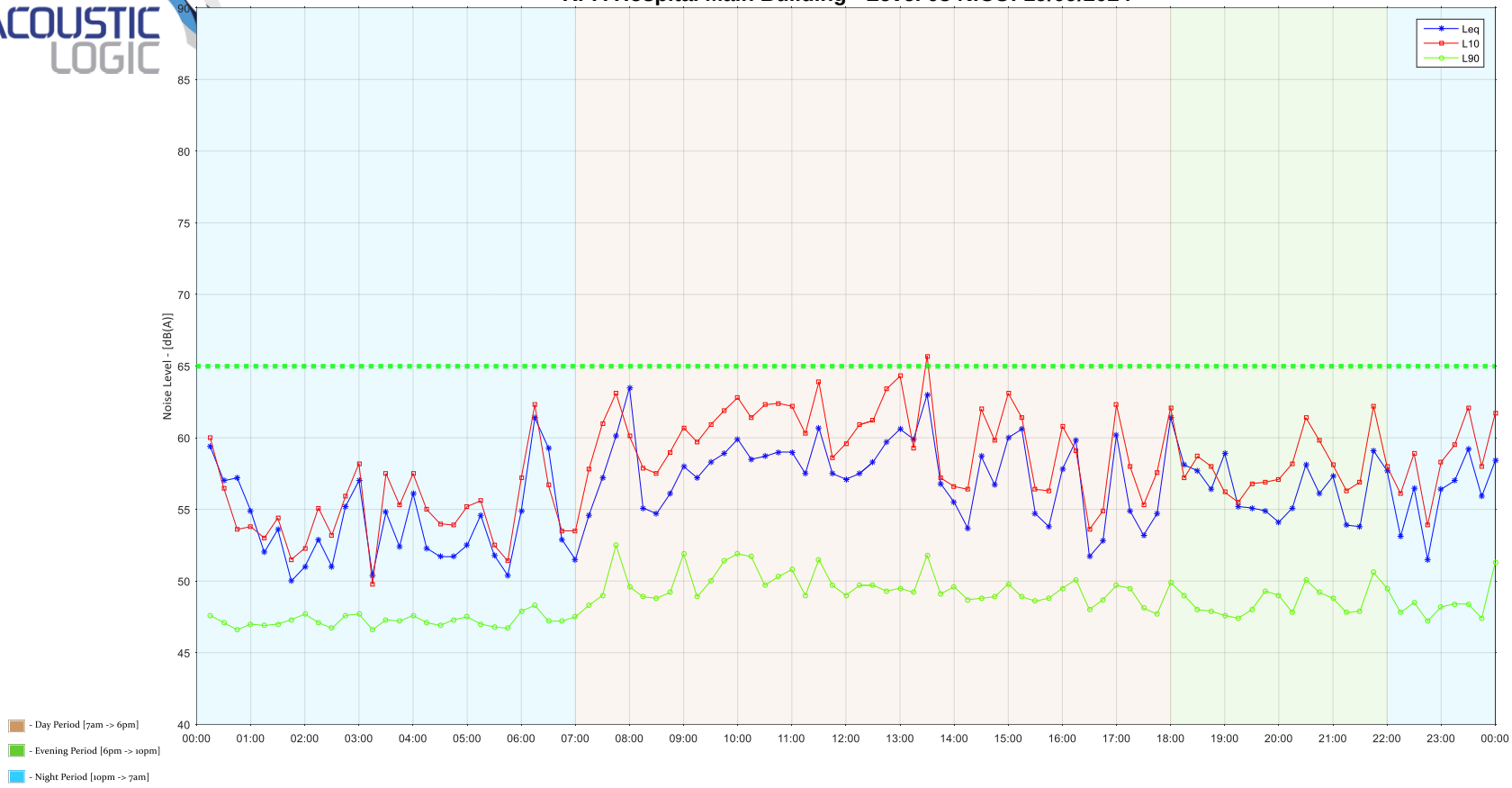

**NICU NML (Including correction) ≤ 65dB(A)$L_{eq}$**

# RPA Hospital Main Building - Level 03 NICU: 18/09/2024




**NICU NML (Including correction) ≤ 65dB(A)$L_{eq}$**

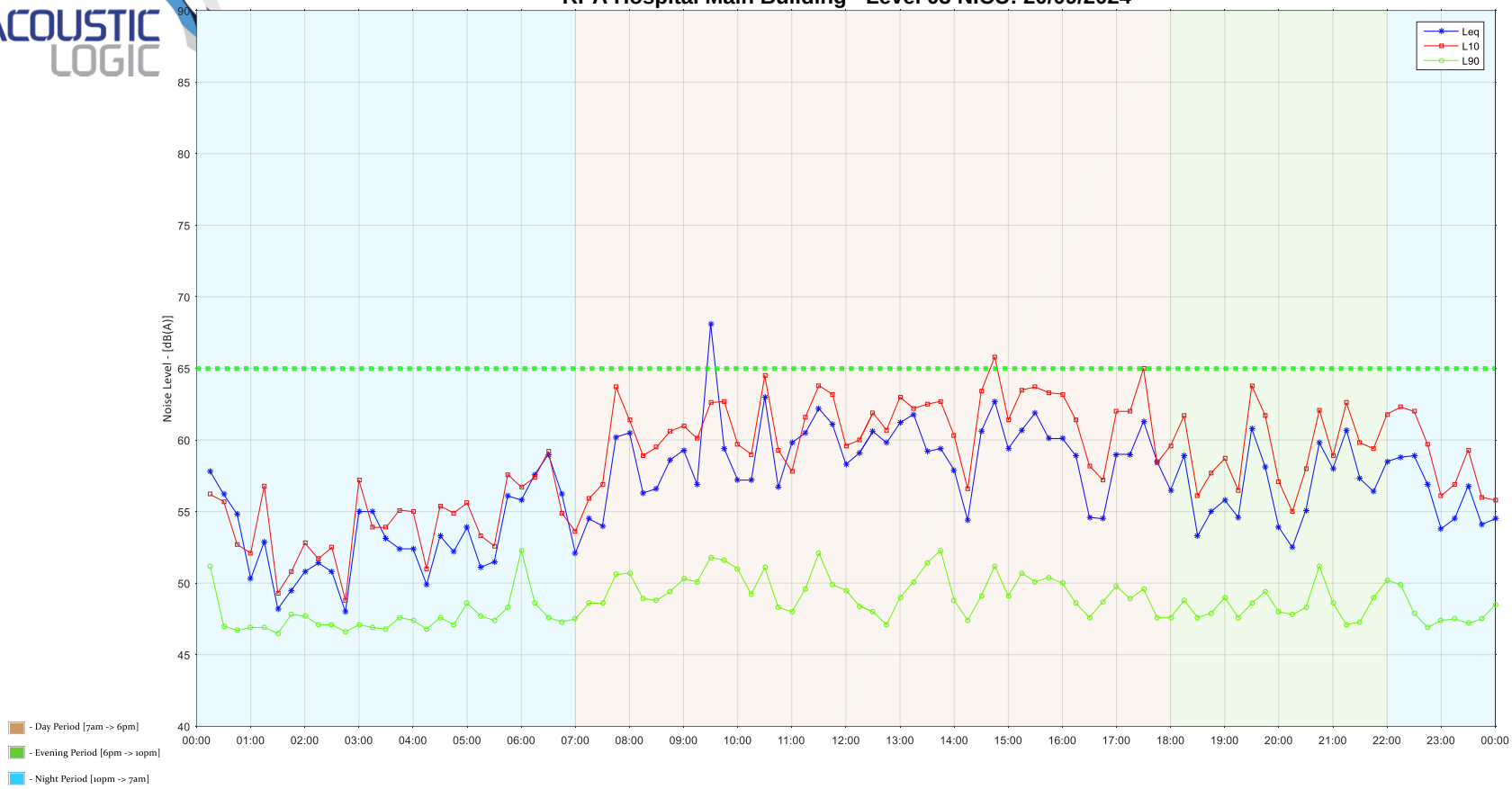
# RPA Hospital Main Building - Level 03 NICU: 19/09/2024




**NICU NML**
**(Including correction)**
**≤ 65dB(A)$L_{eq}$**

ACOUSTIC LOGIC

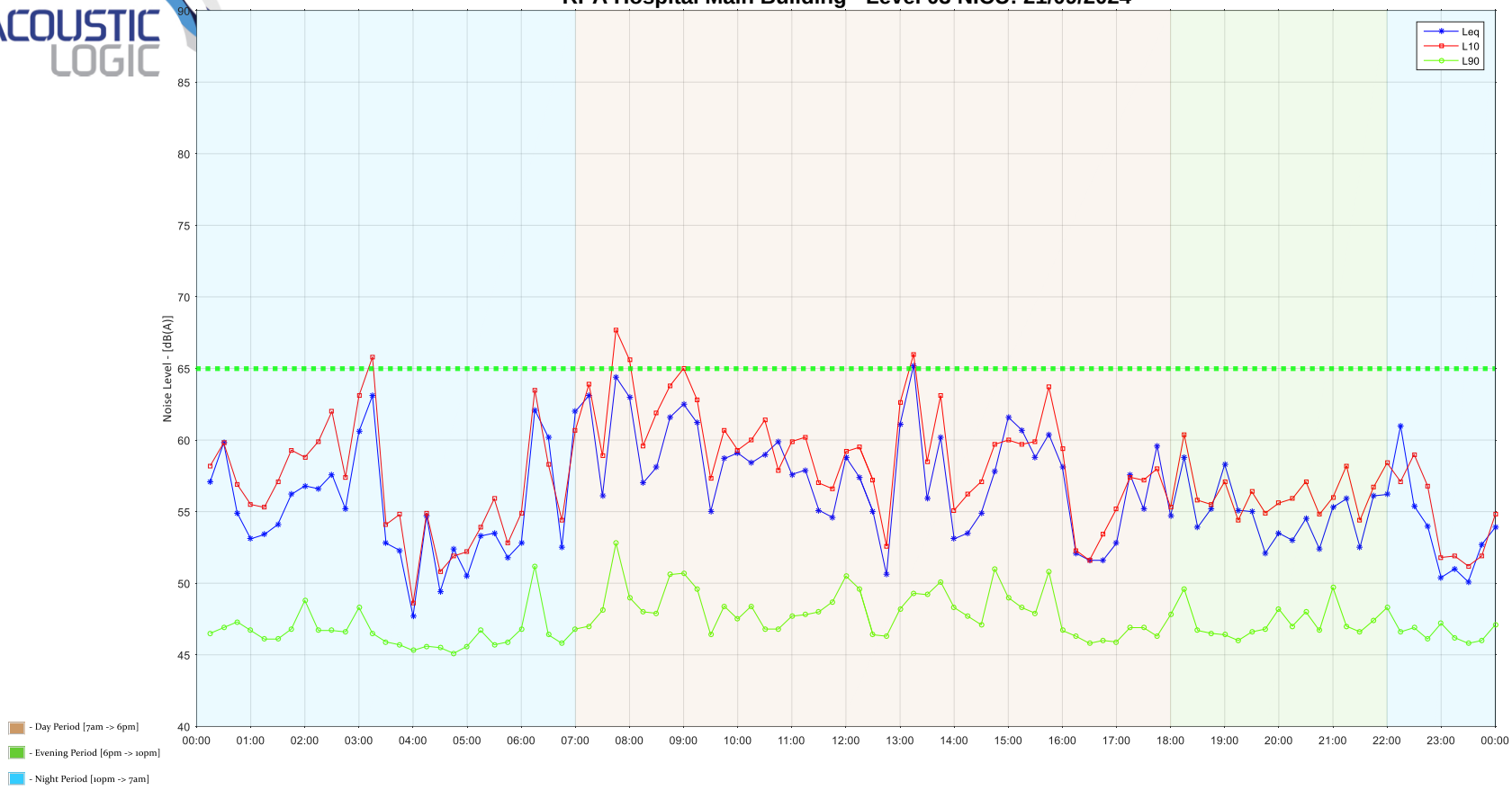
# RPA Hospital Main Building - Level 03 NICU: 20/09/2024




**NICU NML (Including correction) ≤ 65dB(A)$L_{eq}$**

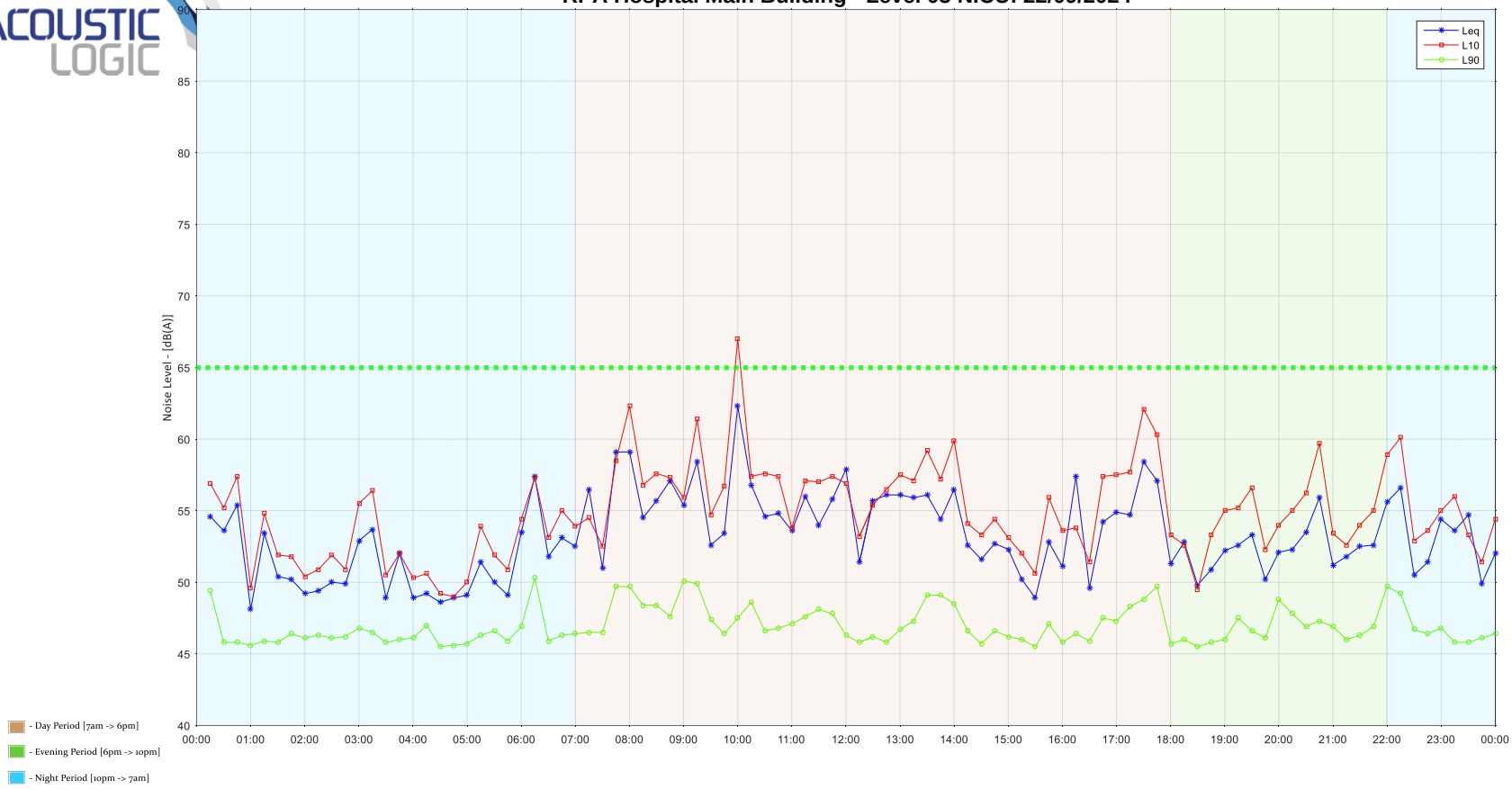
ACOUSTIC LOGIC

# RPA Hospital Main Building - Level 03 NICU: 21/09/2024



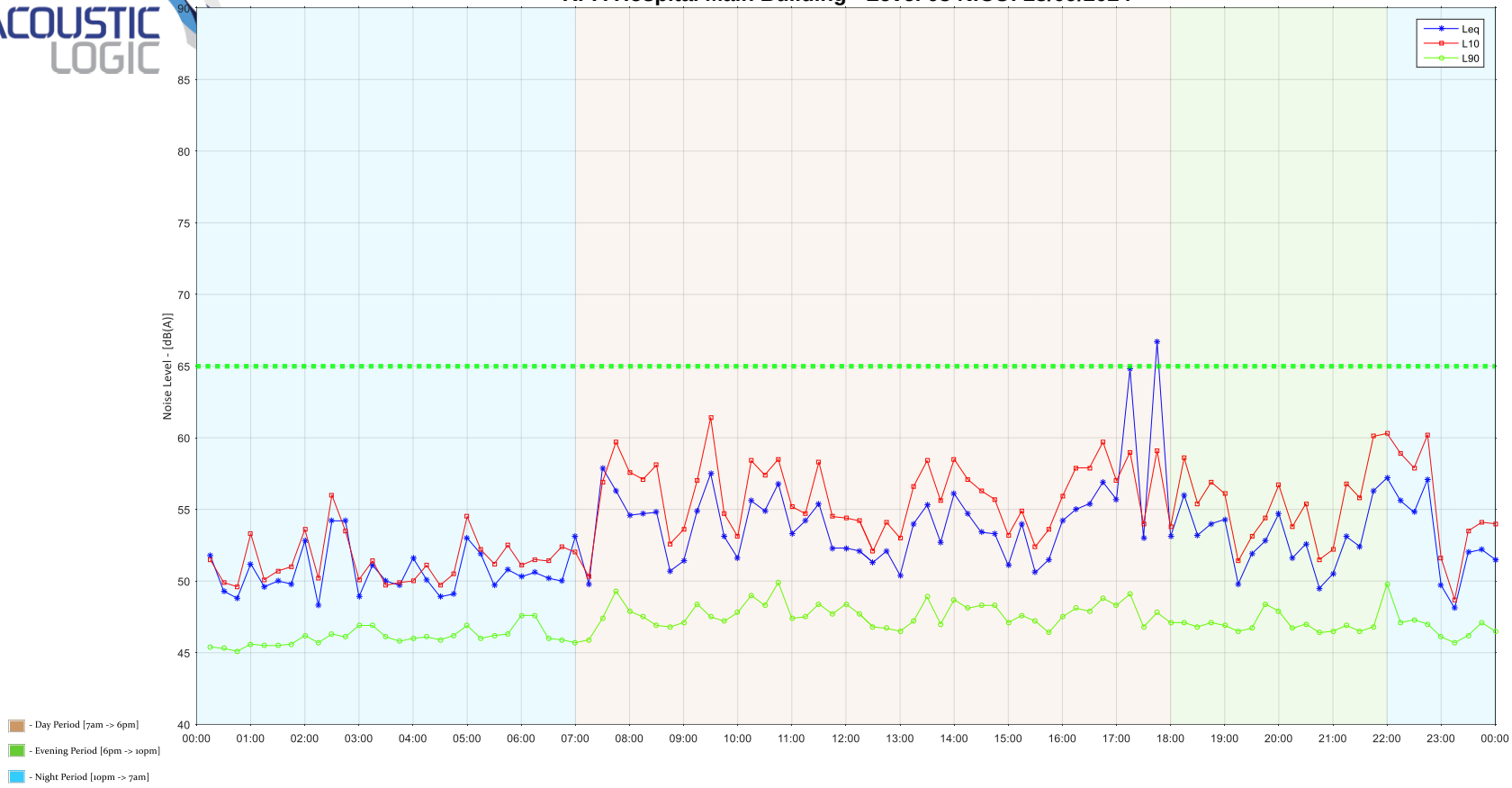

**NICU NML**
**(Including correction)**
**≤ 65dB(A)$L_{eq}$**

# RPA Hospital Main Building - Level 03 NICU: 22/09/2024



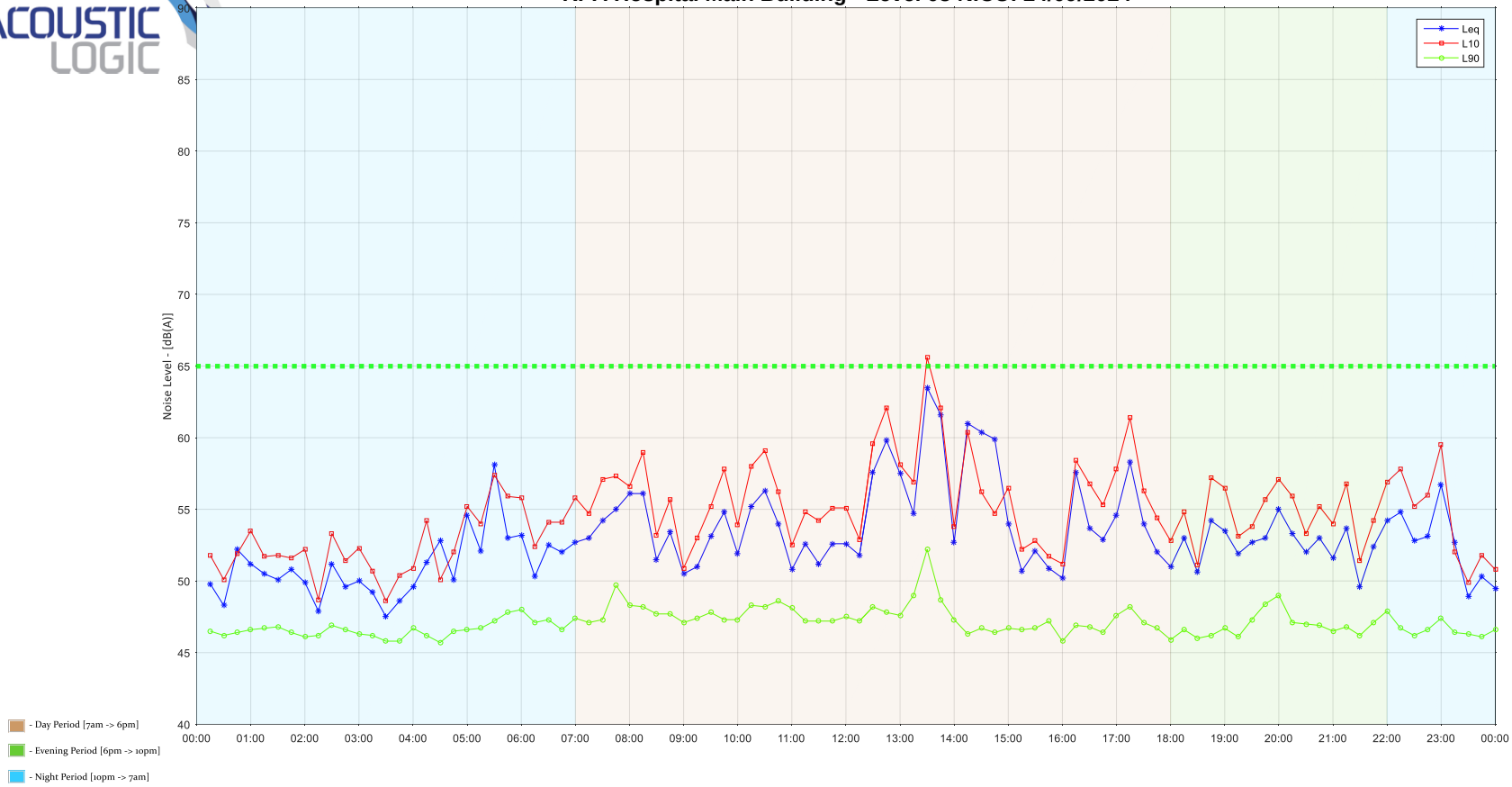

**NICU NML (Including correction) ≤ 65dB(A)$L_{eq}$**

# RPA Hospital Main Building - Level 03 NICU: 23/09/2024



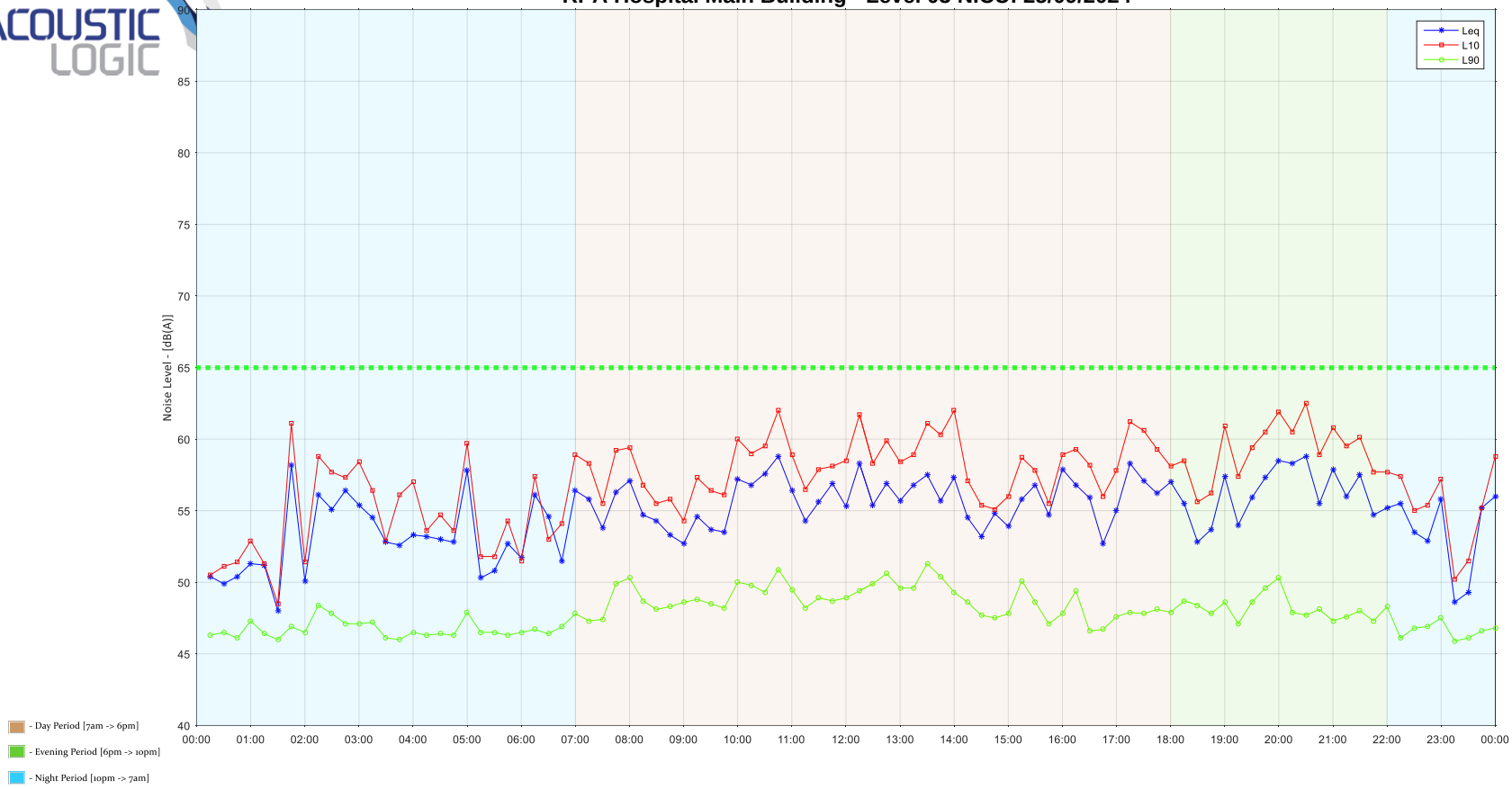

**NICU NML (Including correction) ≤ 65dB(A)$L_{eq}$**

# RPA Hospital Main Building - Level 03 NICU: 24/09/2024




**NICU NML**
**(Including correction)**
**≤ 65dB(A)$L_{eq}$**

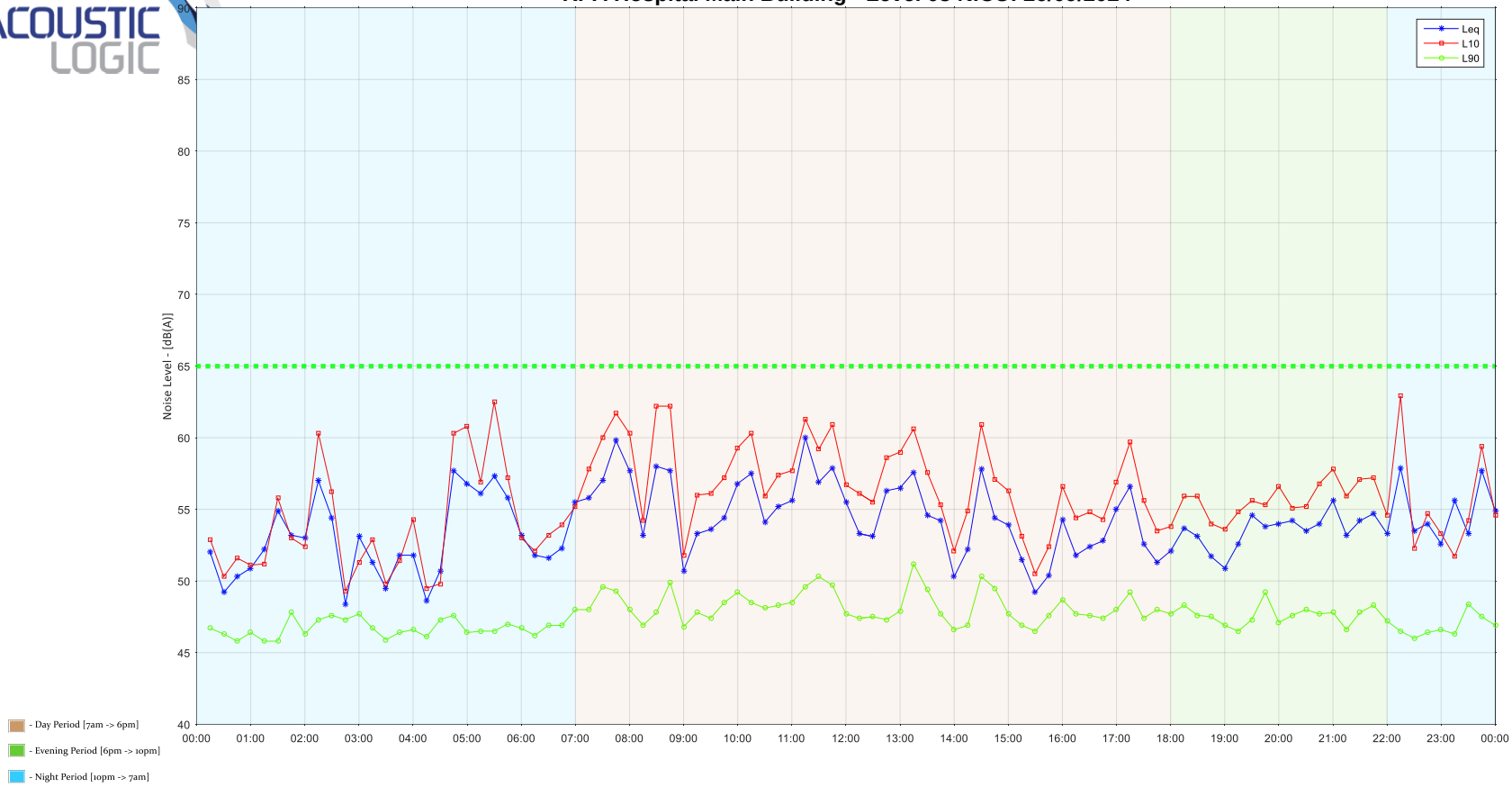
# RPA Hospital Main Building - Level 03 NICU: 25/09/2024




**NICU NML (Including correction) ≤ 65dB(A)$L_{eq}$**

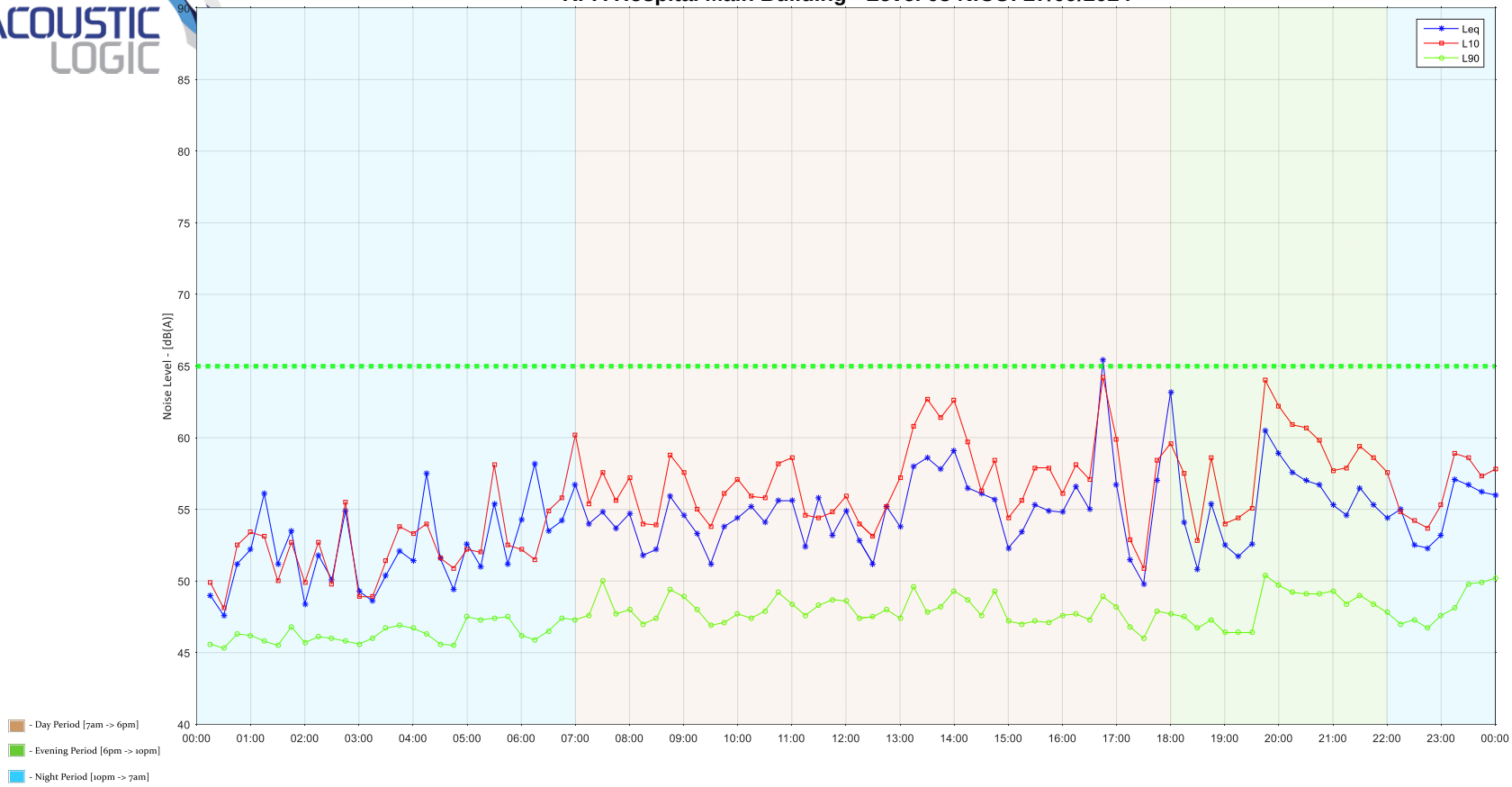
ACOUSTIC LOGIC

# RPA Hospital Main Building - Level 03 NICU: 26/09/2024

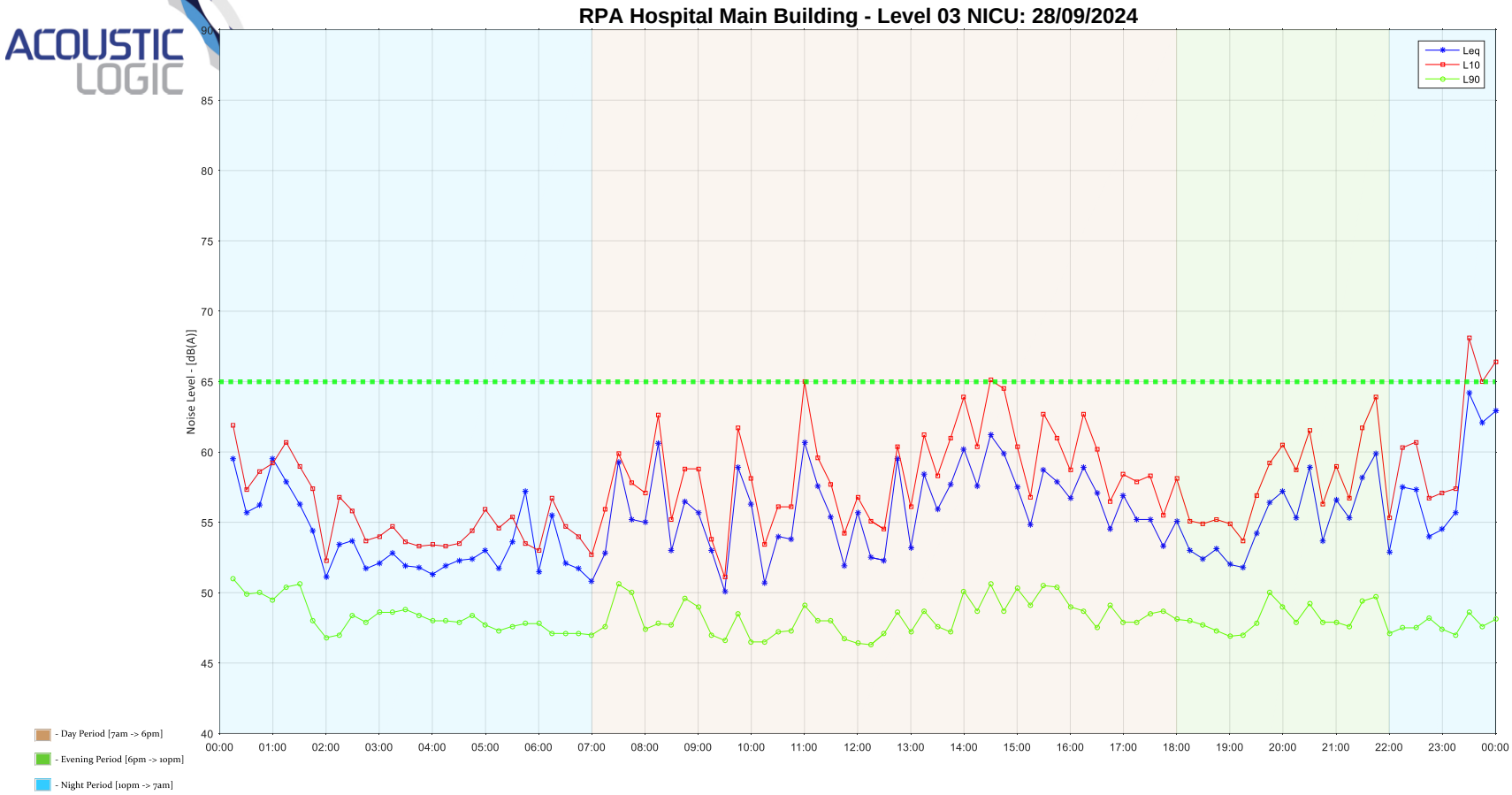



**NICU NML (Including correction) ≤ 65dB(A)$L_{eq}$**

# RPA Hospital Main Building - Level 03 NICU: 27/09/2024



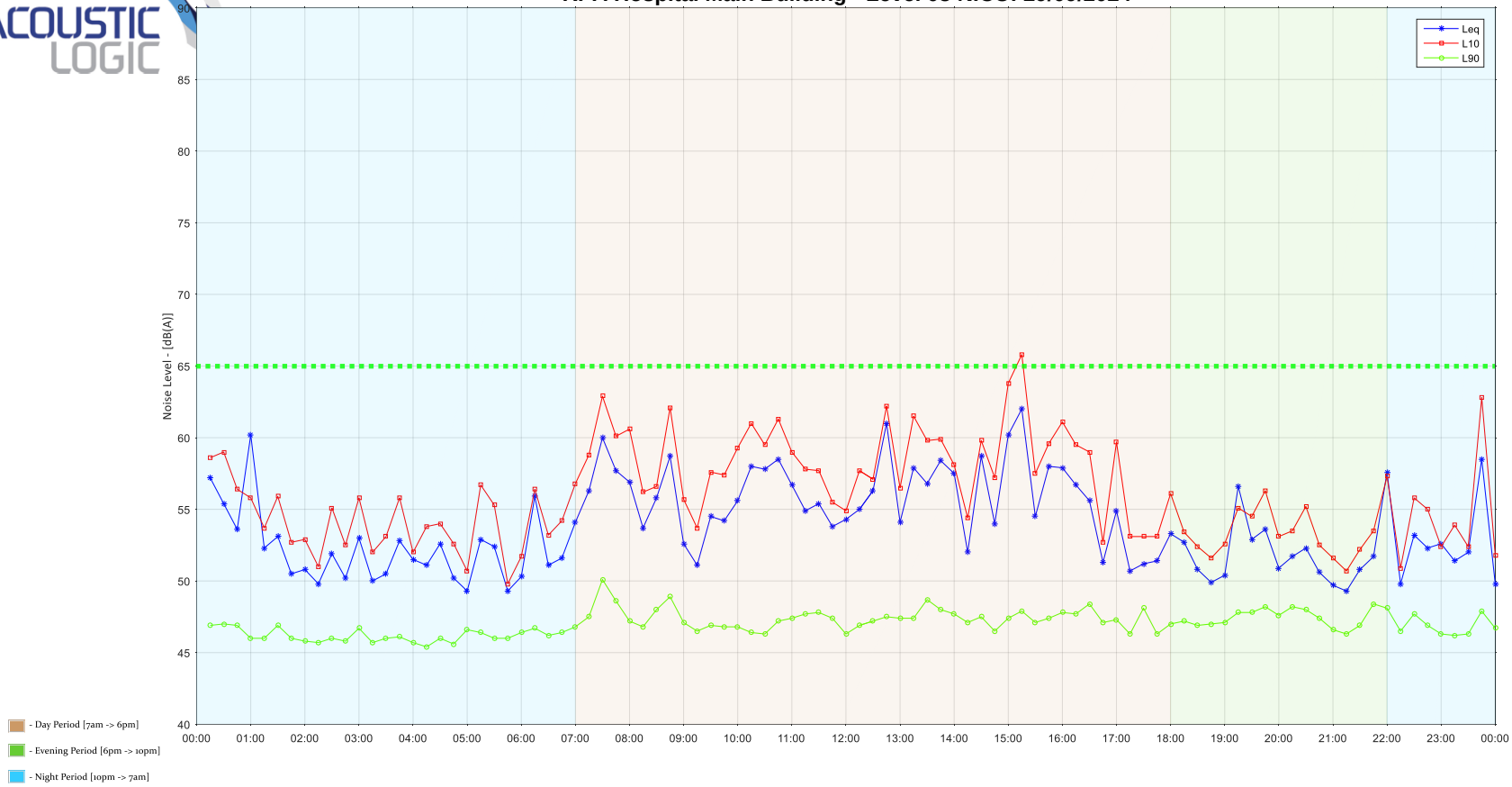

**NICU NML (Including correction) ≤ 65dB(A)$L_{eq}$**




**NICU NML (Including correction) ≤ 65dB(A)$L_{eq}$**

ACOUSTIC LOGIC

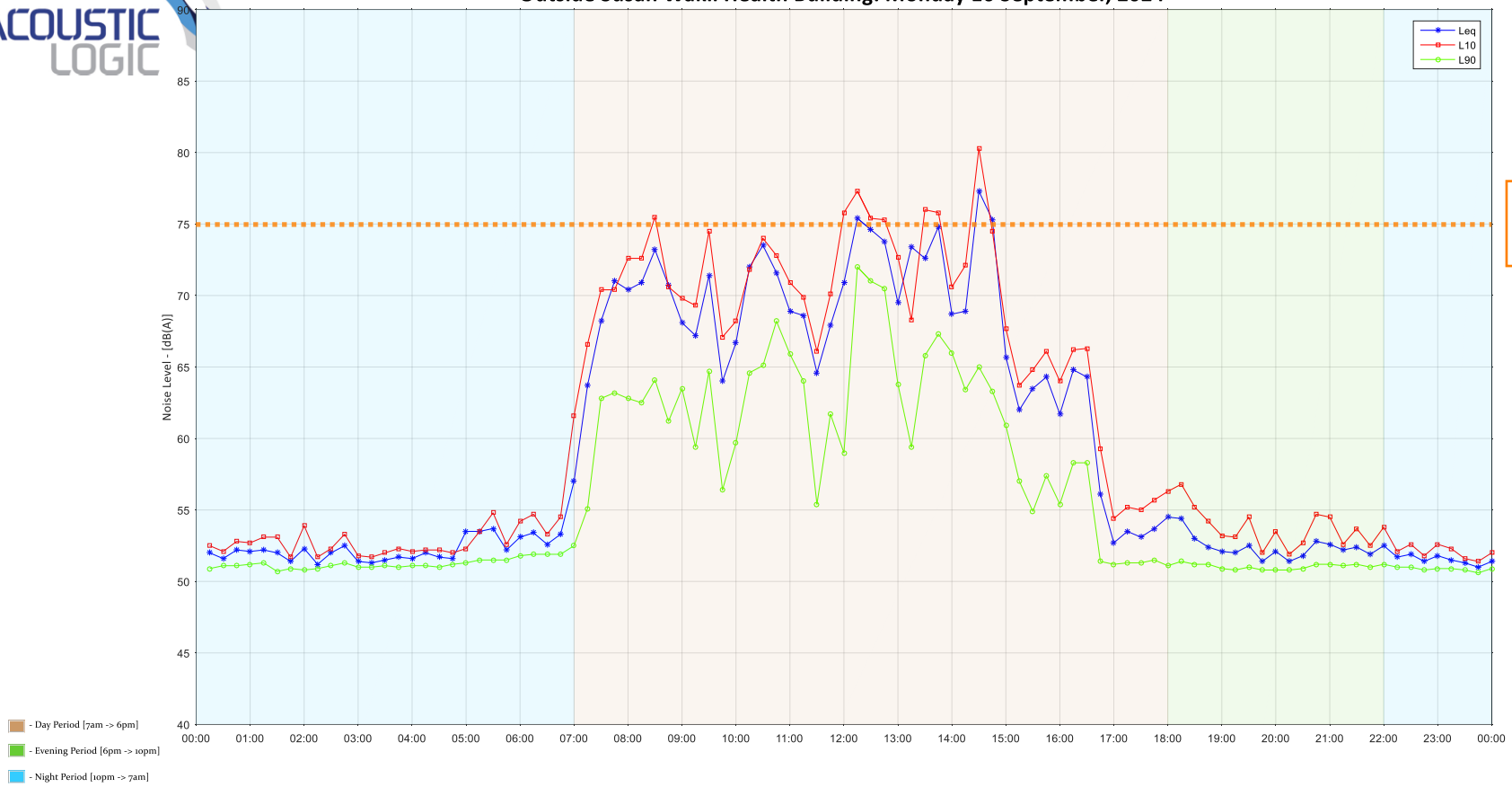
# RPA Hospital Main Building - Level 03 NICU: 29/09/2024




**NICU NML (Including correction) ≤ 65dB(A)$L_{eq}$**

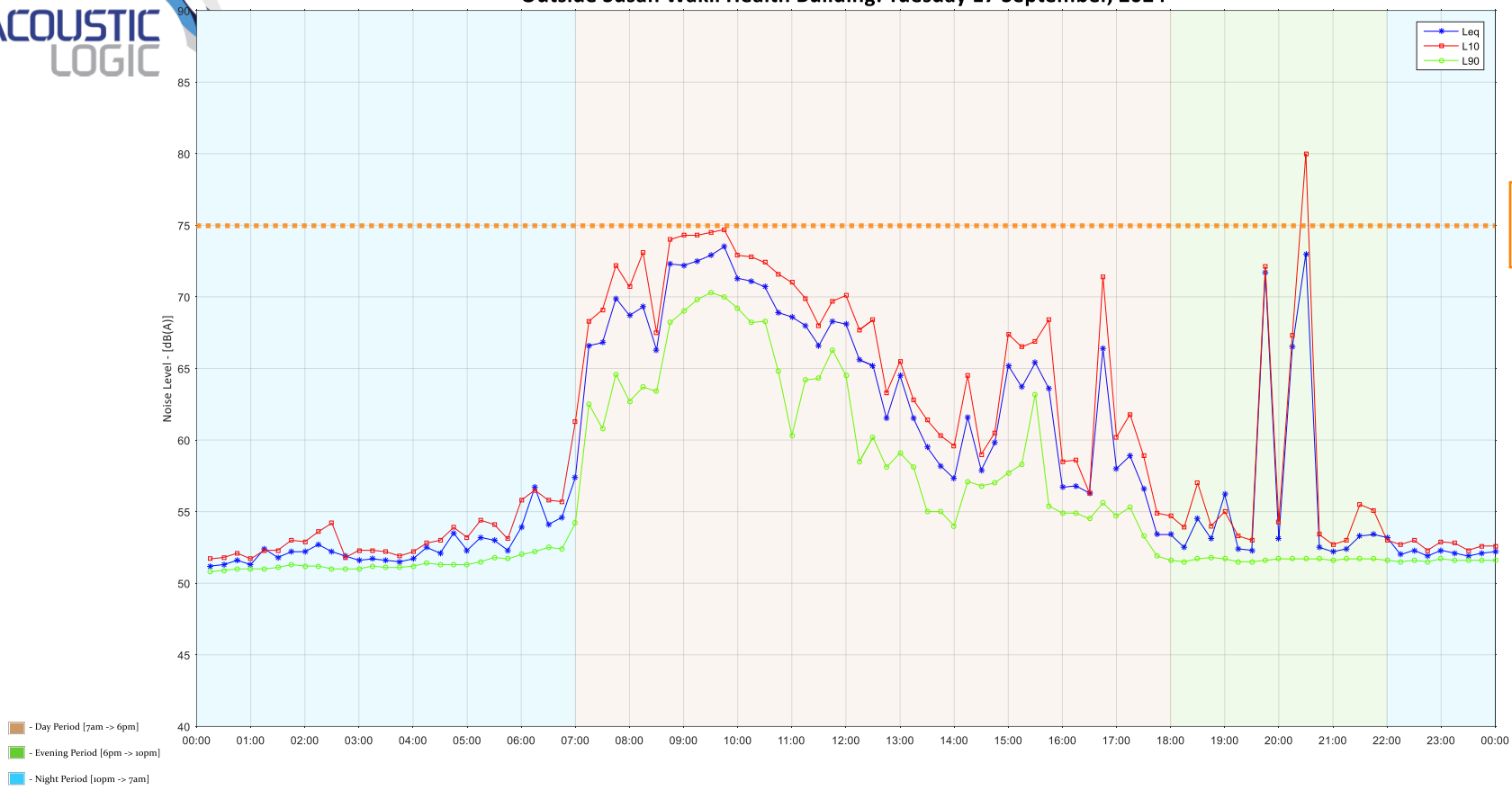
## OUTSIDE SUSAN WAKIL HEALTH BUILDING

## Outside Susan Wakil Health Building: Monday 16 September, 2024

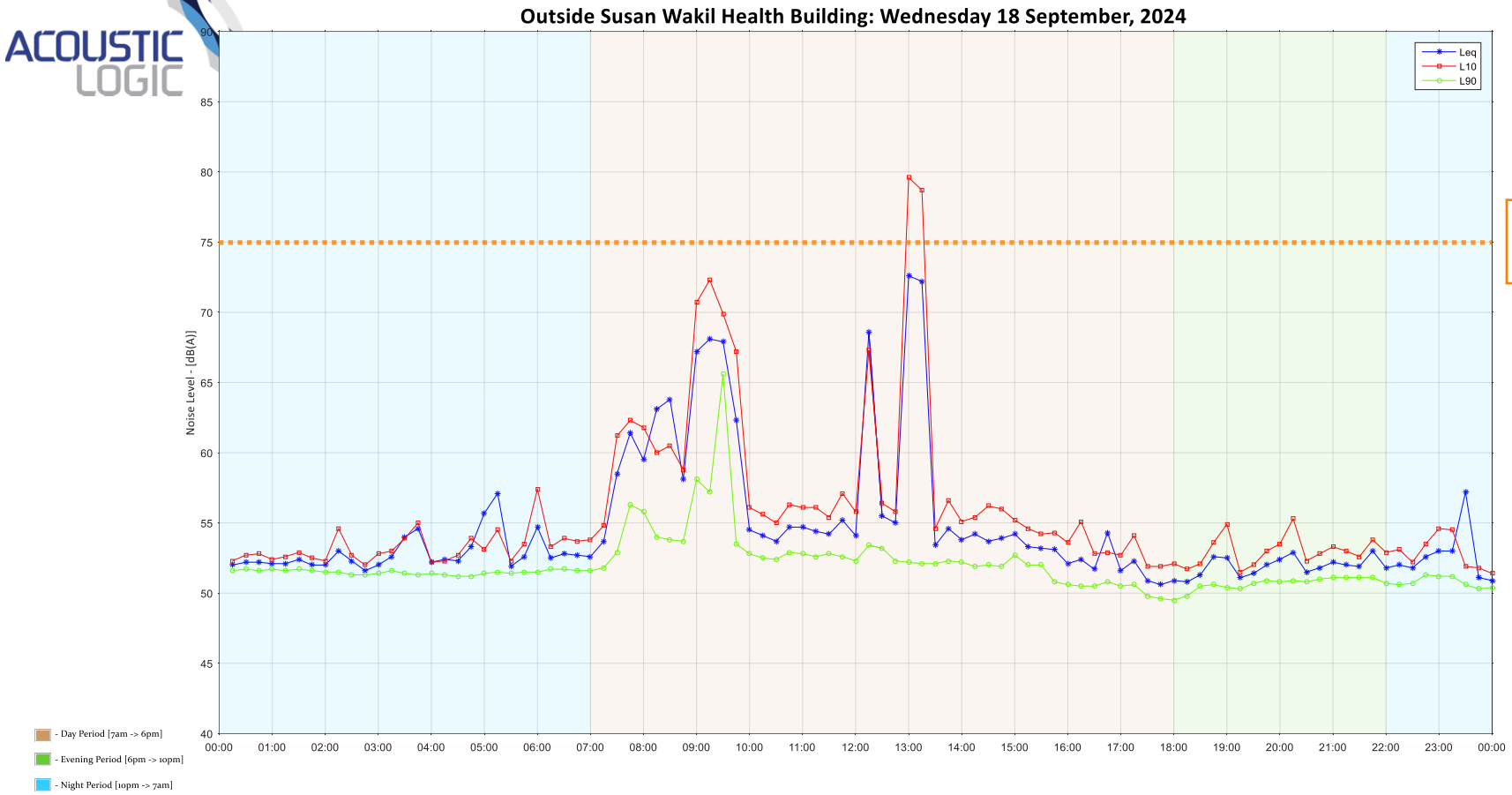



**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## Outside Susan Wakil Health Building: Tuesday 17 September, 2024

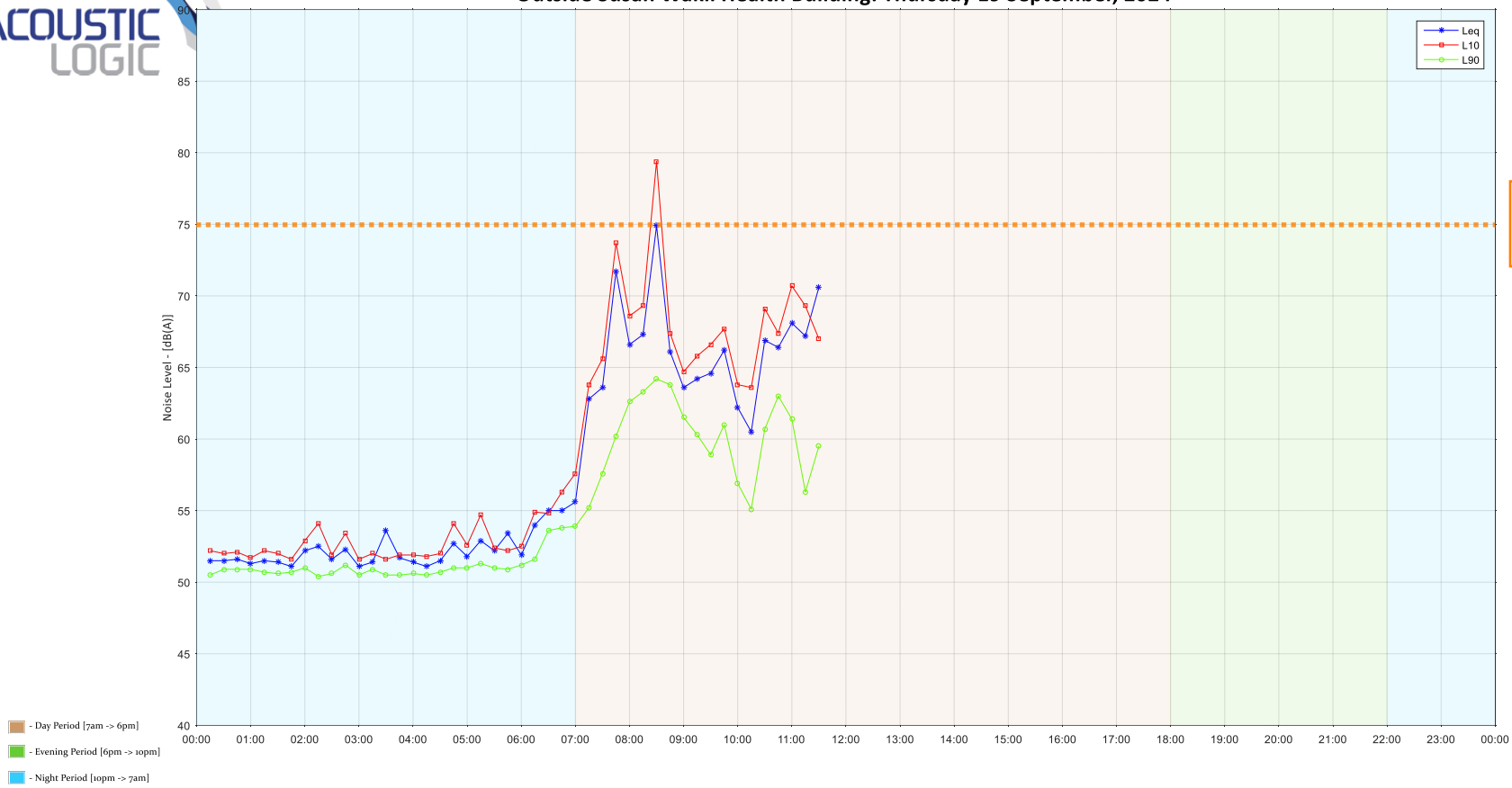



**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**



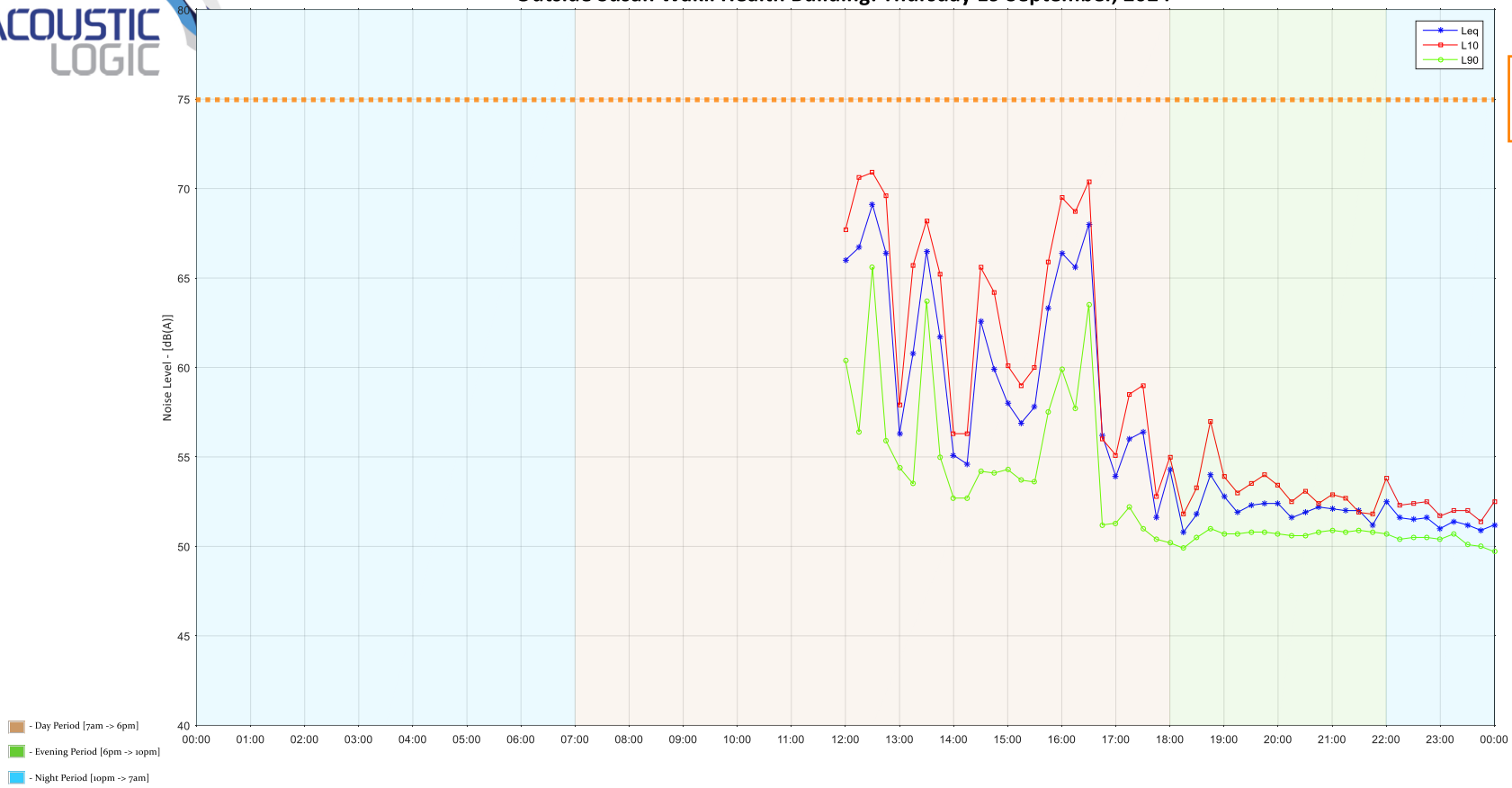

**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## Outside Susan Wakil Health Building: Thursday 19 September, 2024

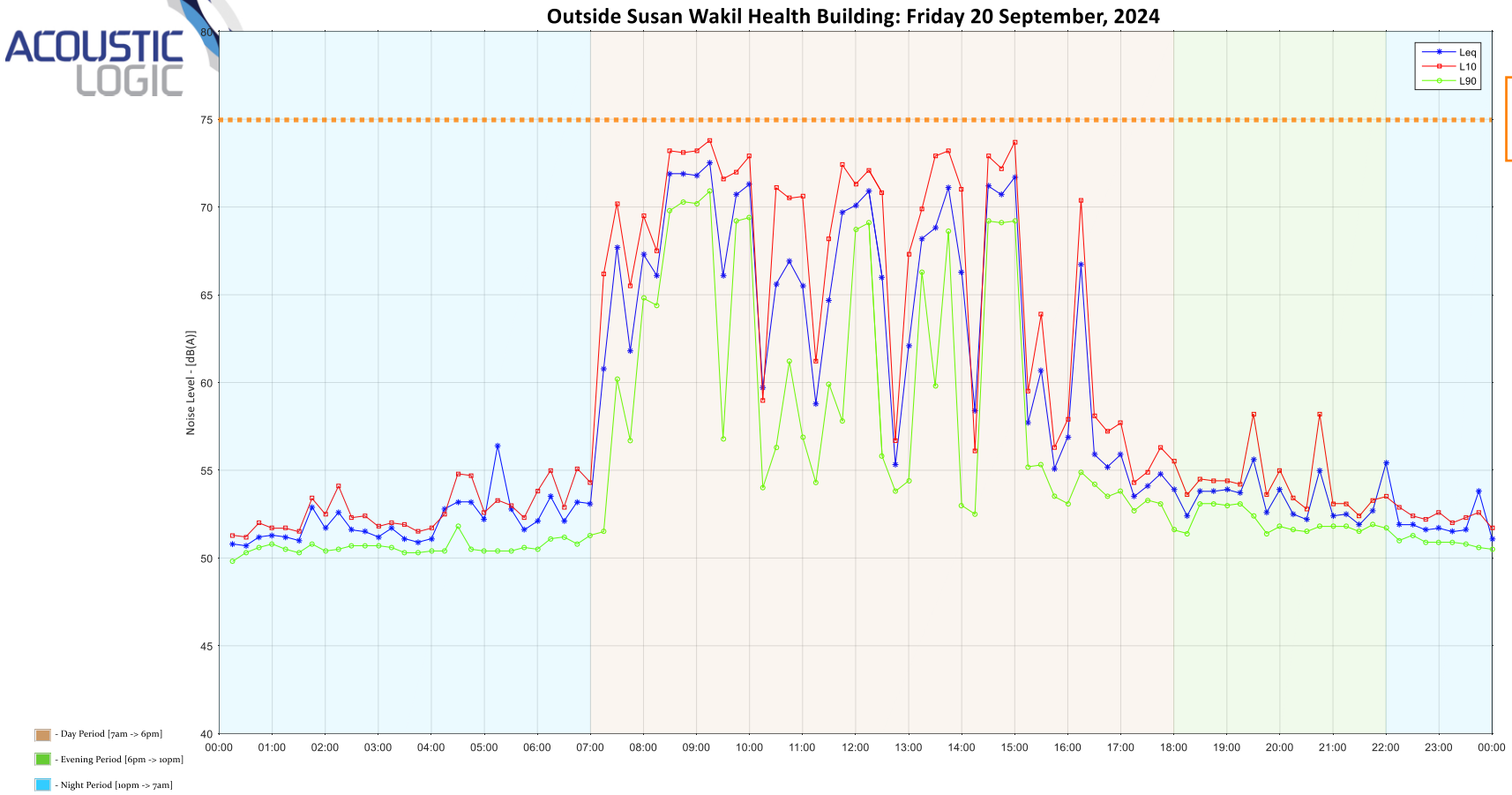



**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## Outside Susan Wakil Health Building: Thursday 19 September, 2024

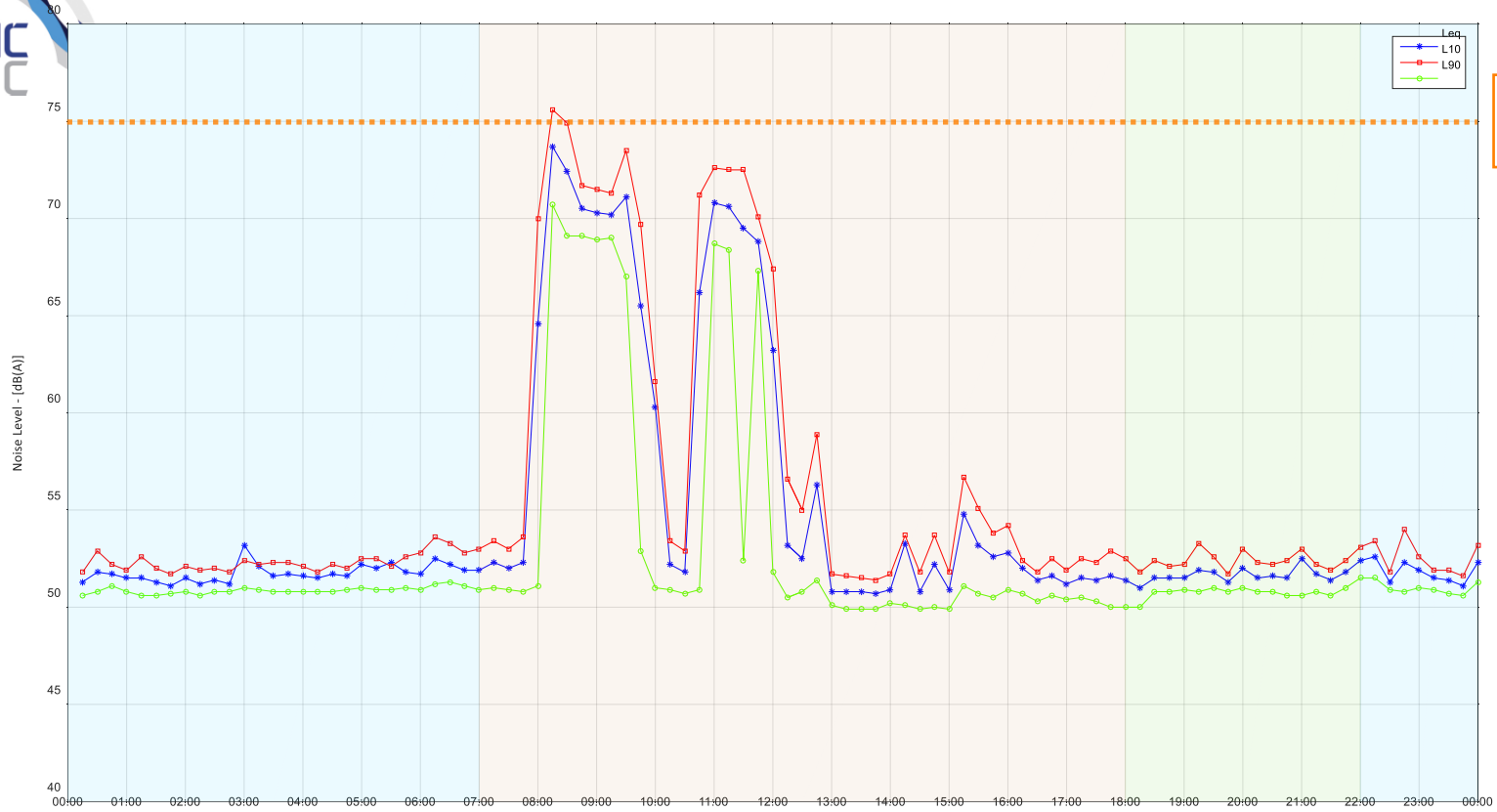



**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**



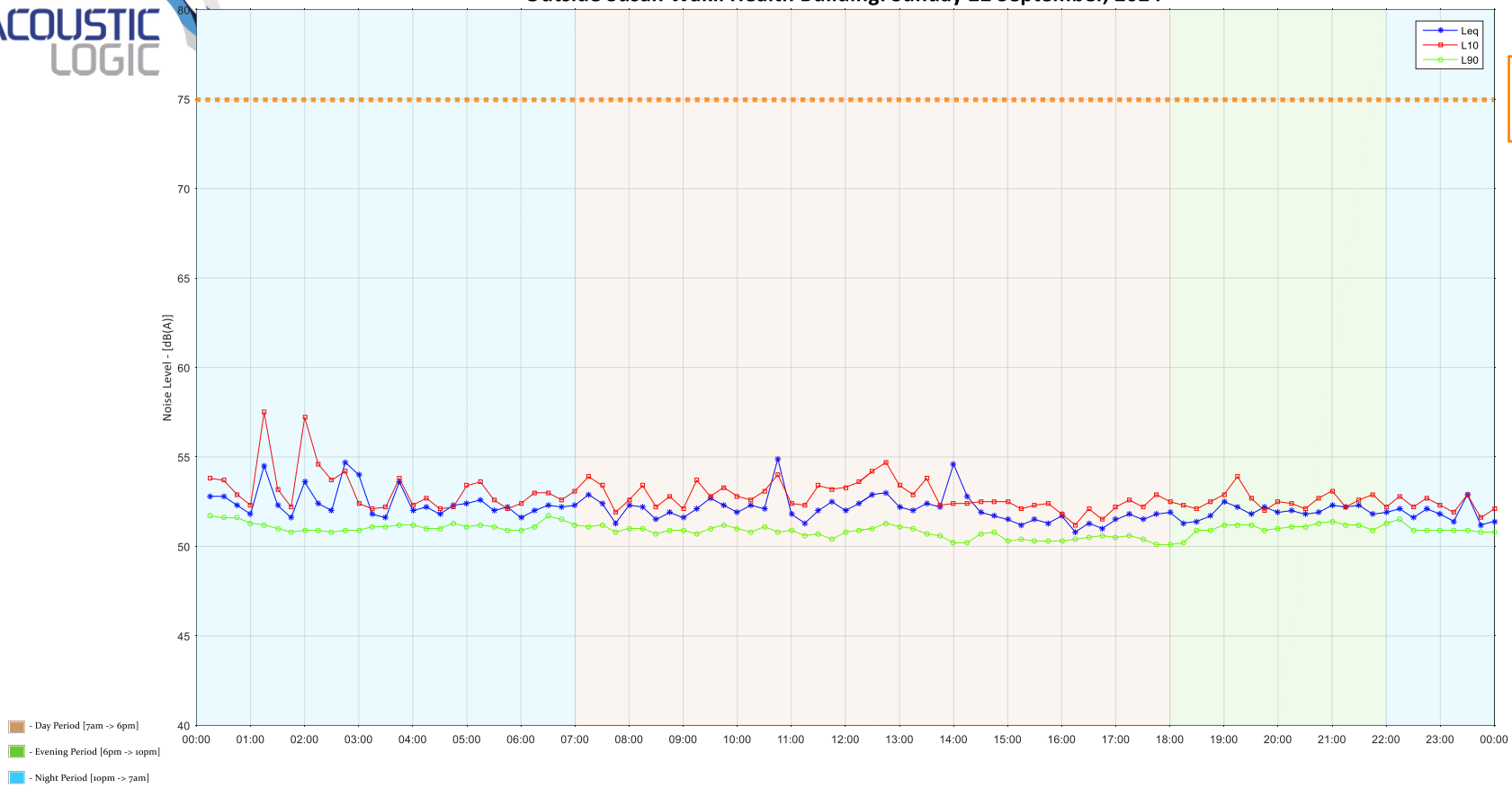

**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## Outside Susan Wakil Health Building: Saturday 21 September, 2024



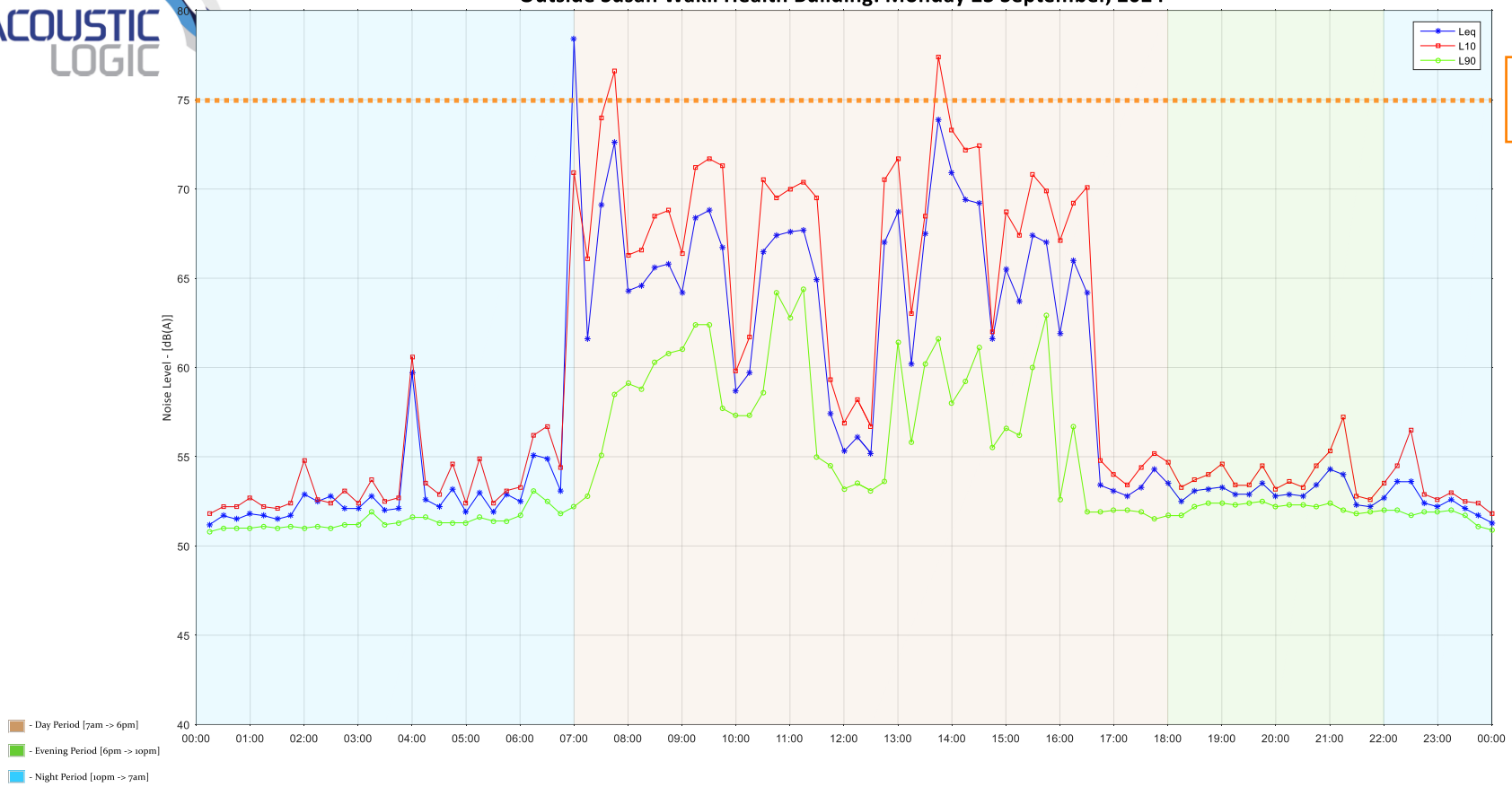

**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## Outside Susan Wakil Health Building: Sunday 22 September, 2024



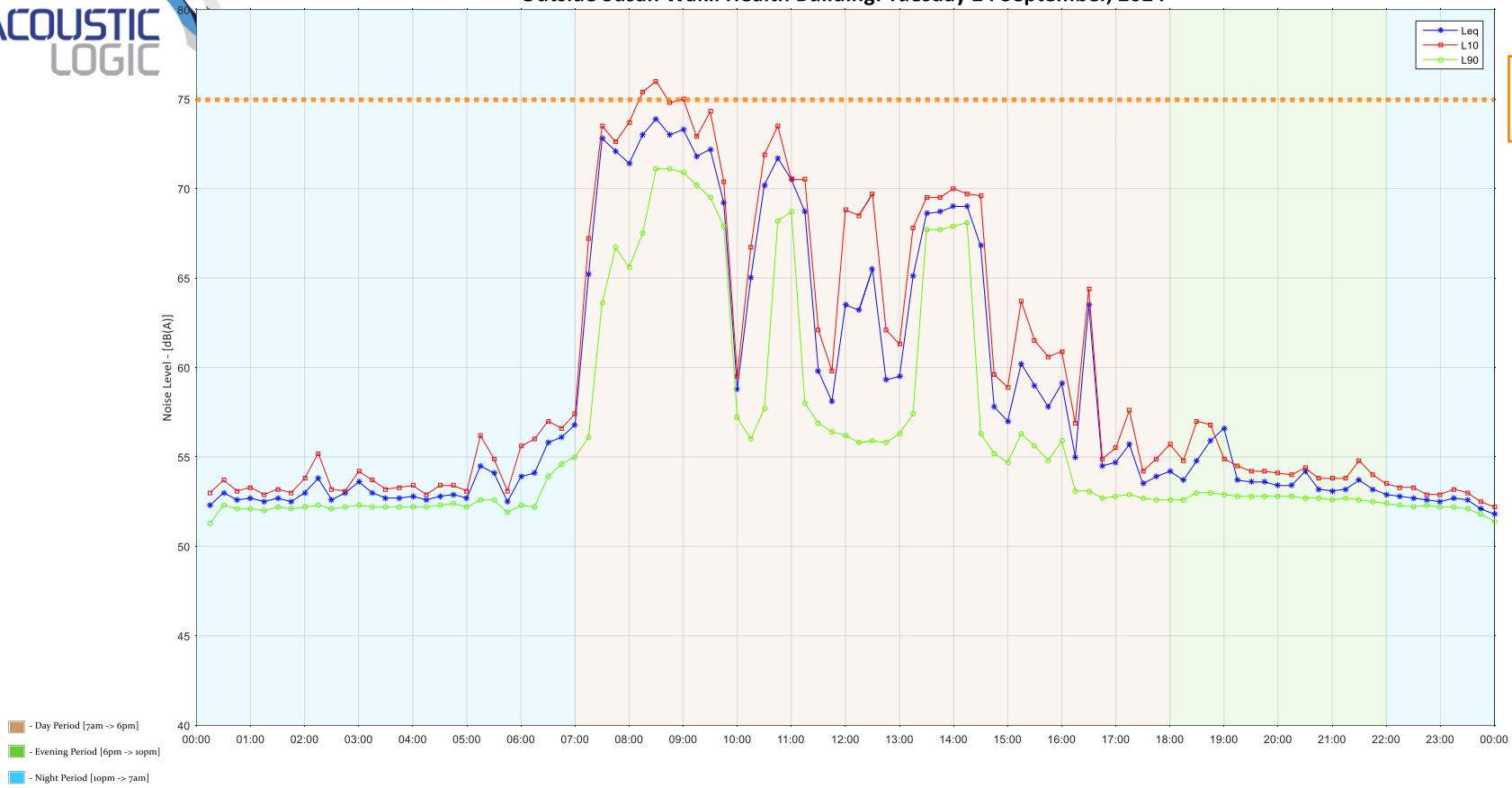

**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## Outside Susan Wakil Health Building: Monday 23 September, 2024



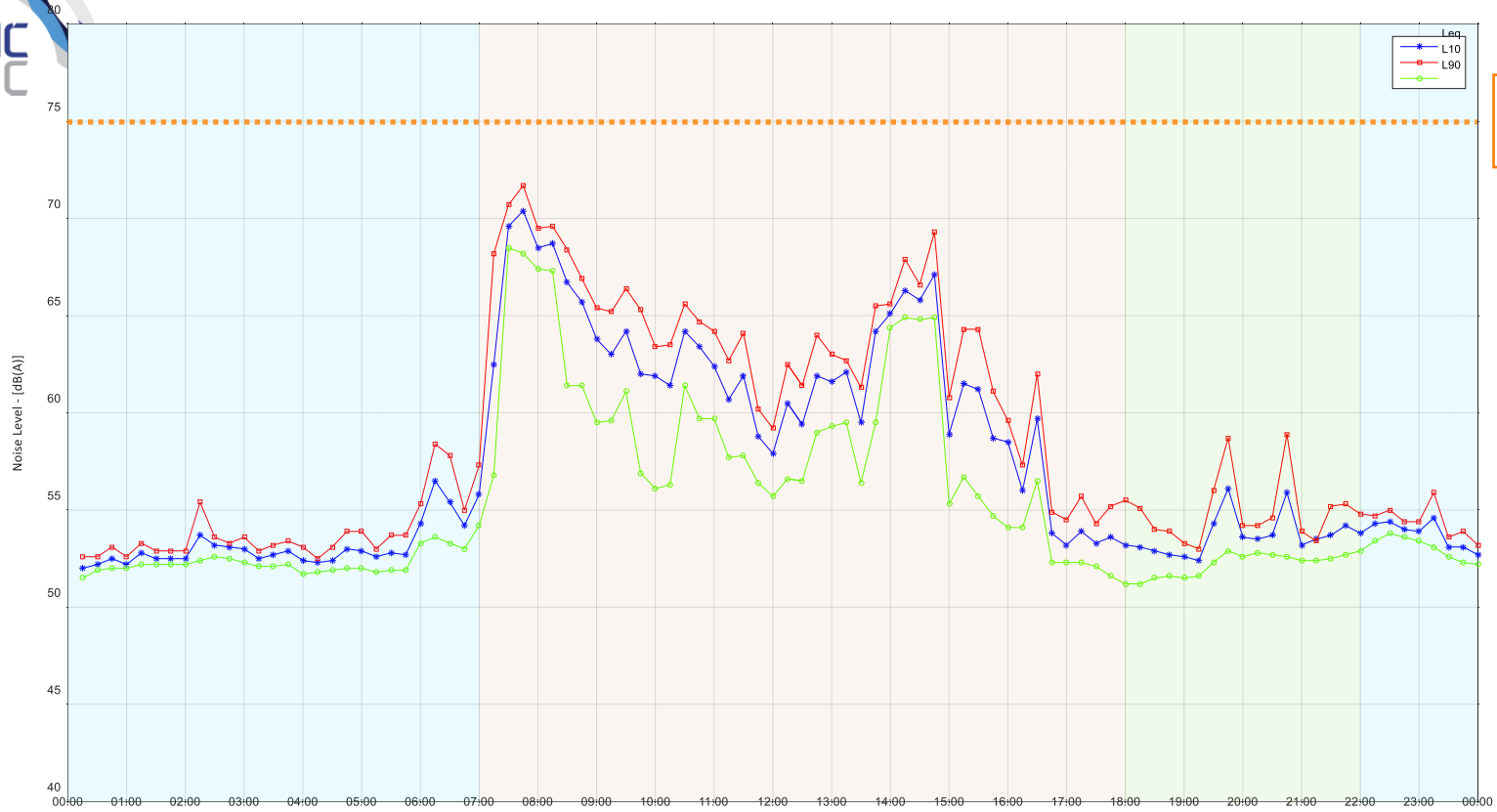

**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## Outside Susan Wakil Health Building: Tuesday 24 September, 2024



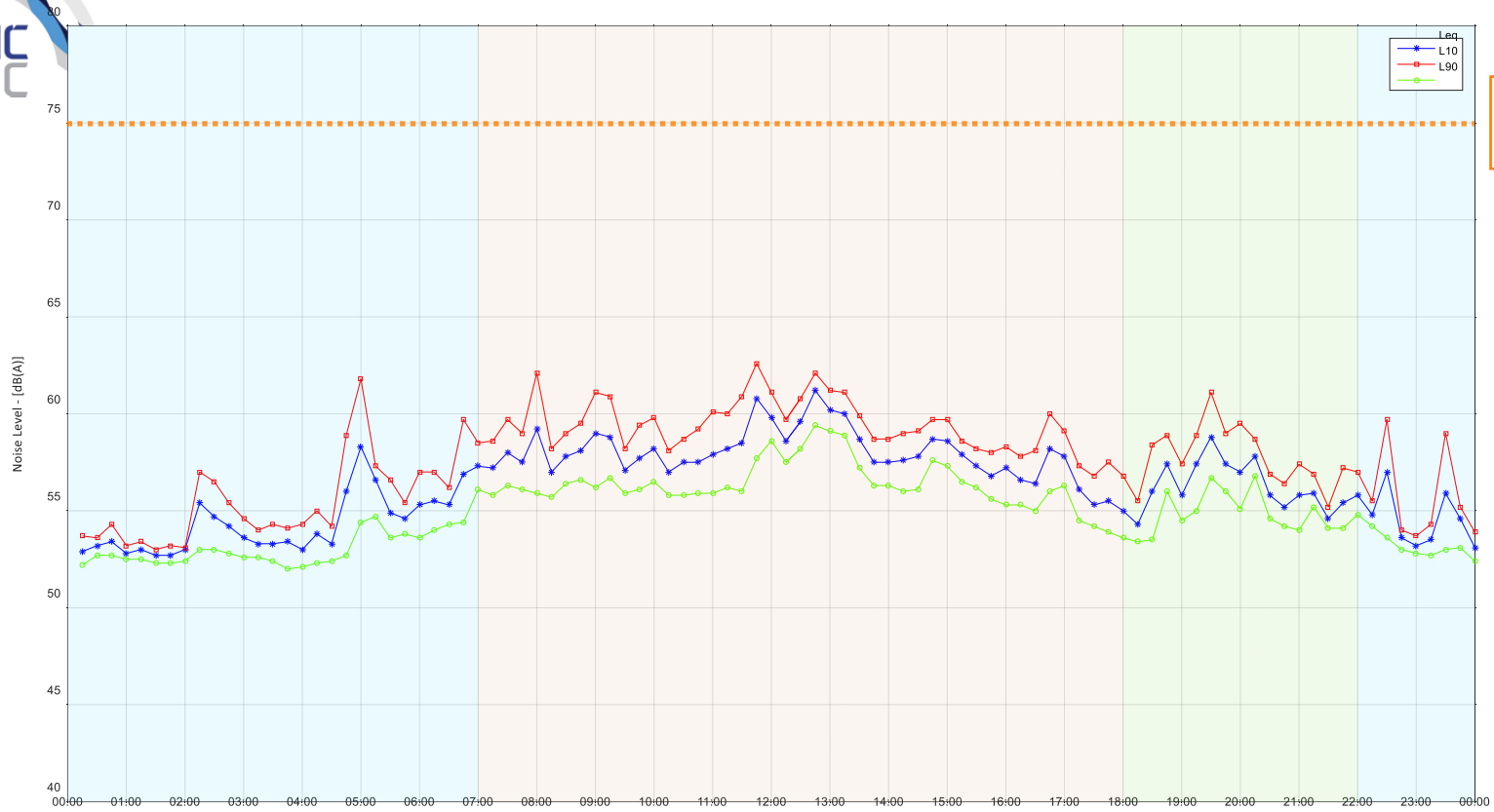

**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## Outside Susan Wakil Health Building: Wednesday 25 September, 2024



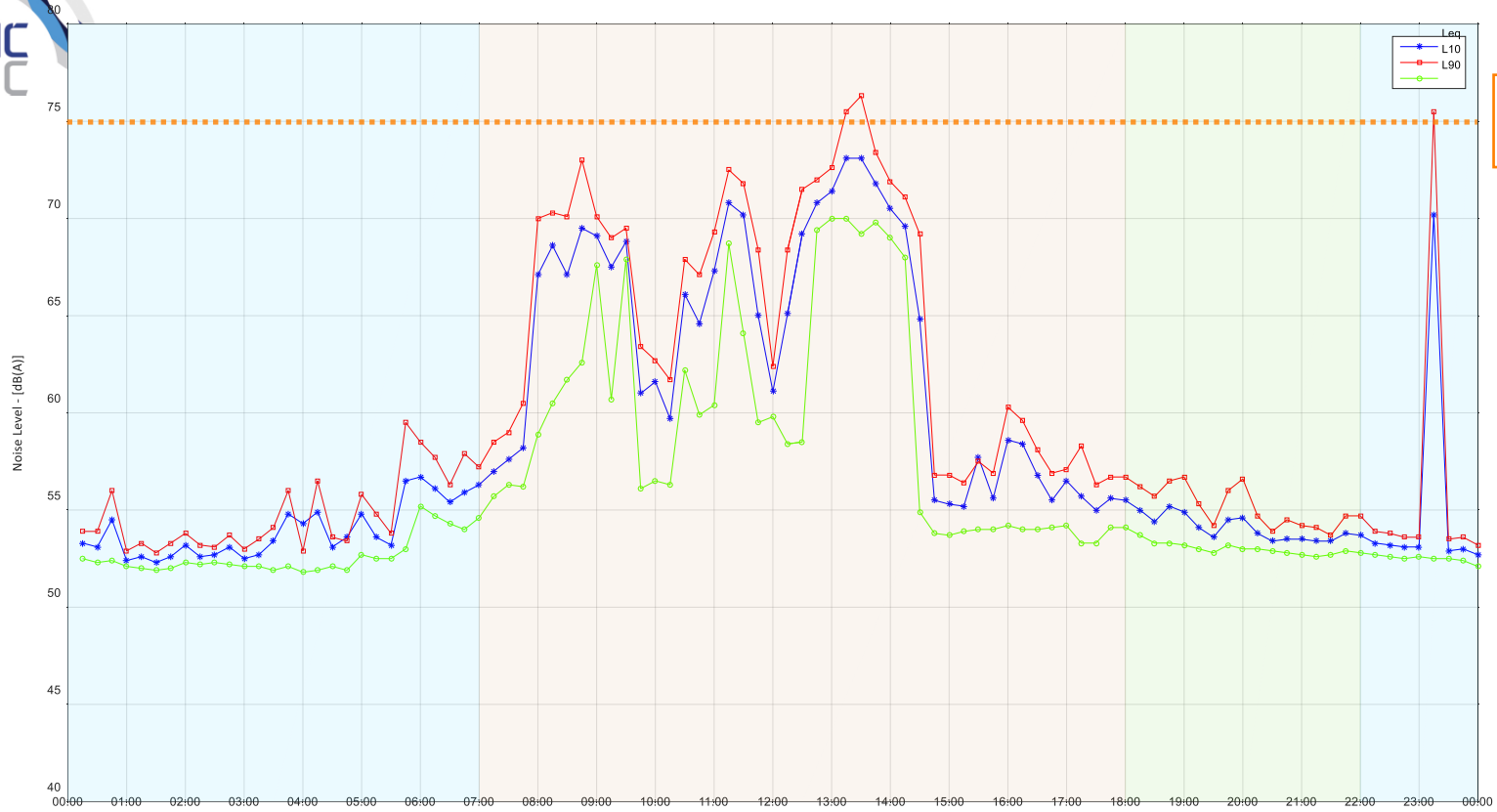

**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## Outside Susan Wakil Health Building: Thursday 26 September, 2024



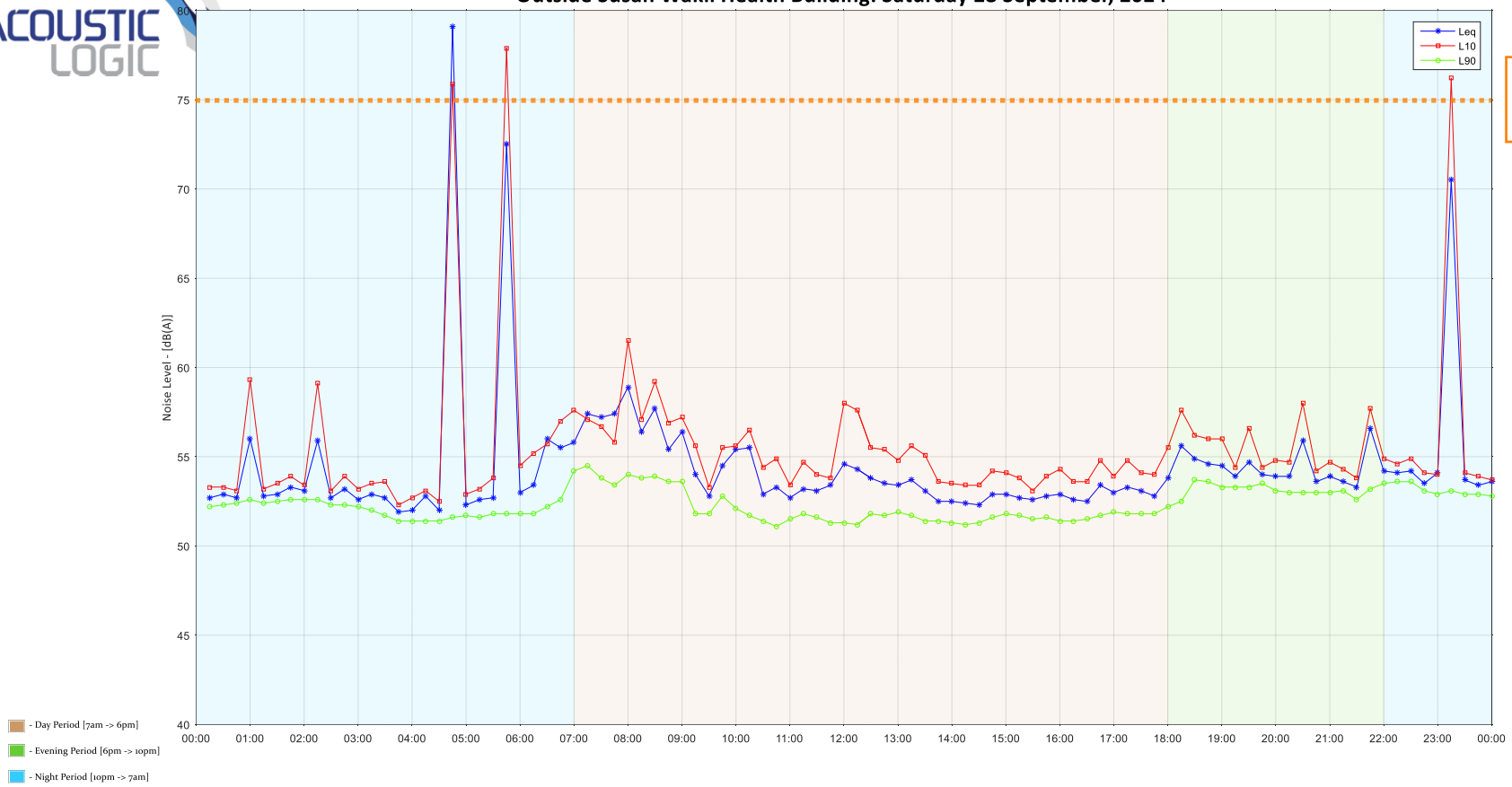

**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## Outside Susan Wakil Health Building: Friday 27 September, 2024



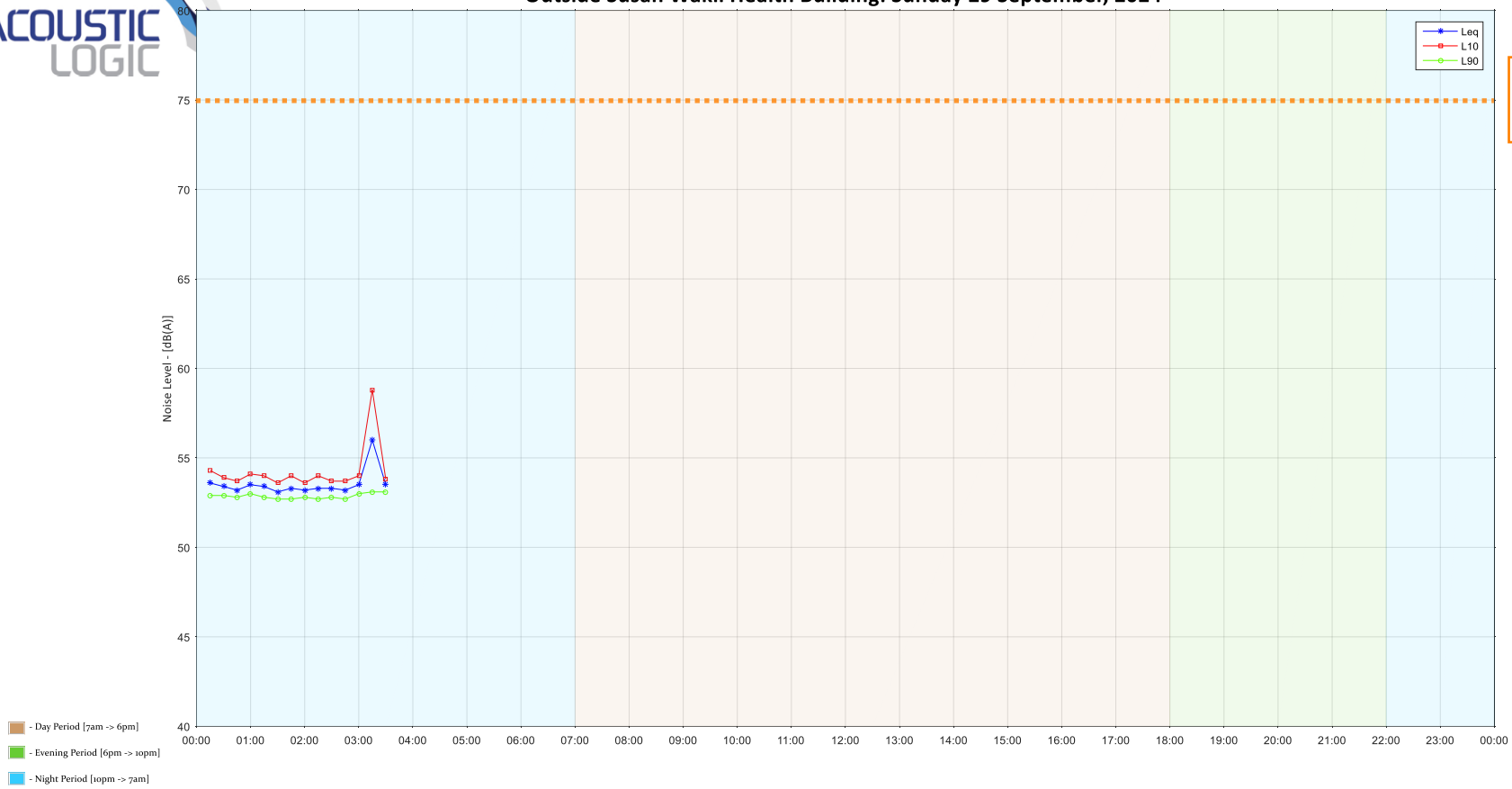

**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## Outside Susan Wakil Health Building: Saturday 28 September, 2024




**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## Outside Susan Wakil Health Building: Sunday 29 September, 2024




**Education NML (Including correction) ≤ 75dB(A)$L_{eq}$**

## APPENDIX B – VIBRATION MONITORING RESULTS

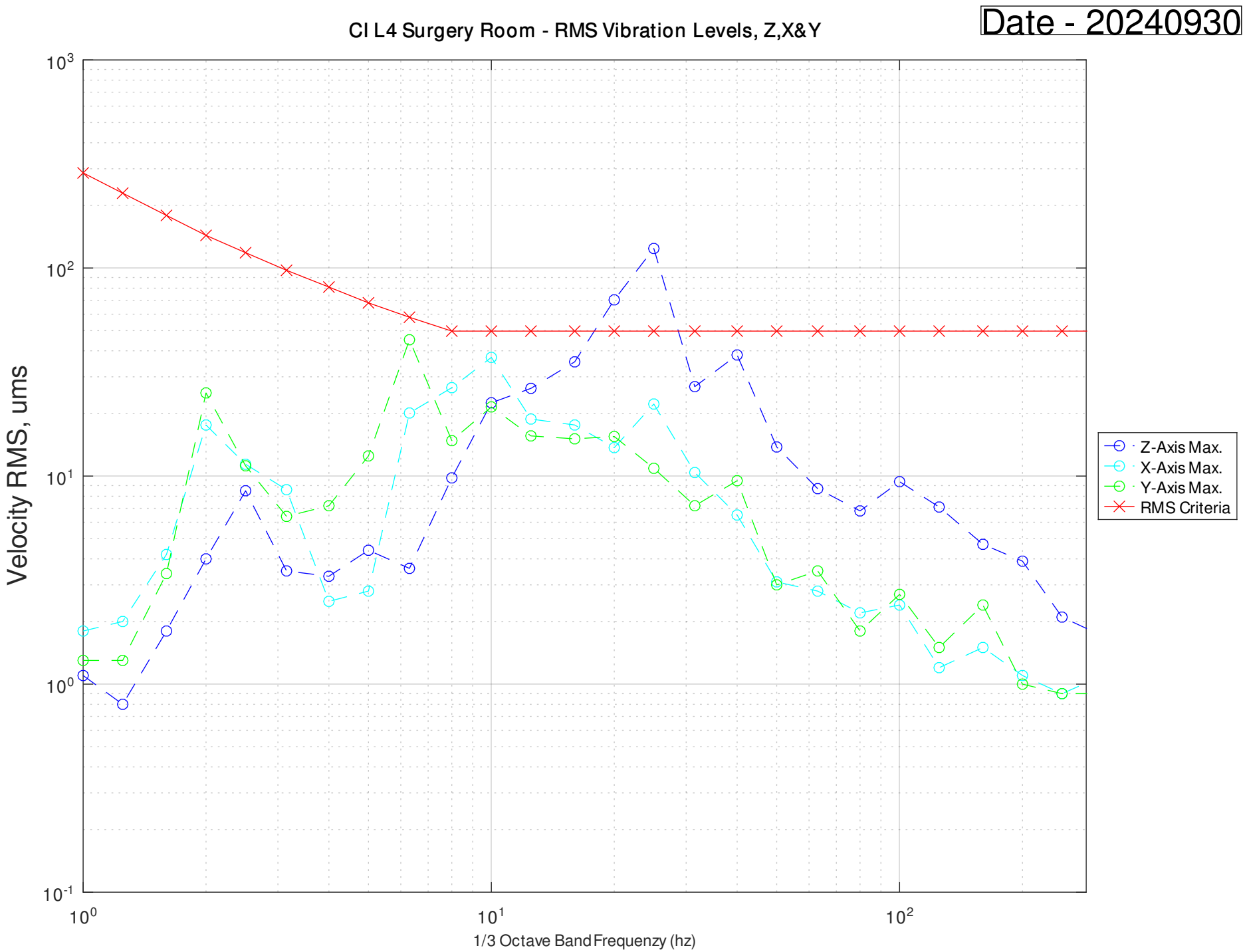
Note that only dates where exceedances of events were experienced have been provided as per discussion with relevant stakeholders.

### CENTENARY INSTITUTE – LEVEL 3 FISH TANKS

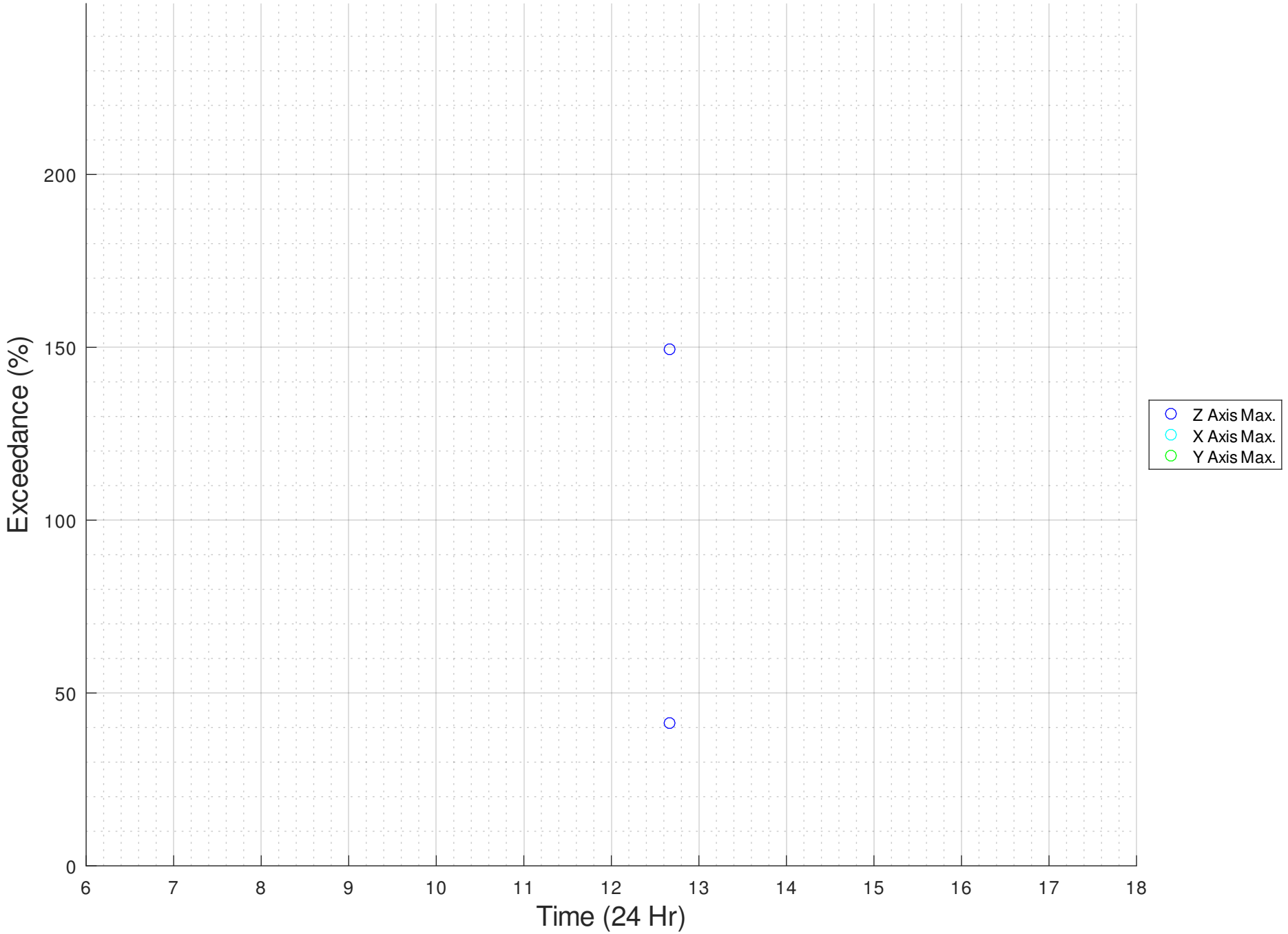
No exceedances of criteria were observed throughout the monitoring period.

## CENTENARY INSTITUTE – LEVEL 4 SURGERY ROOM (SOUTHERN FAÇADE)

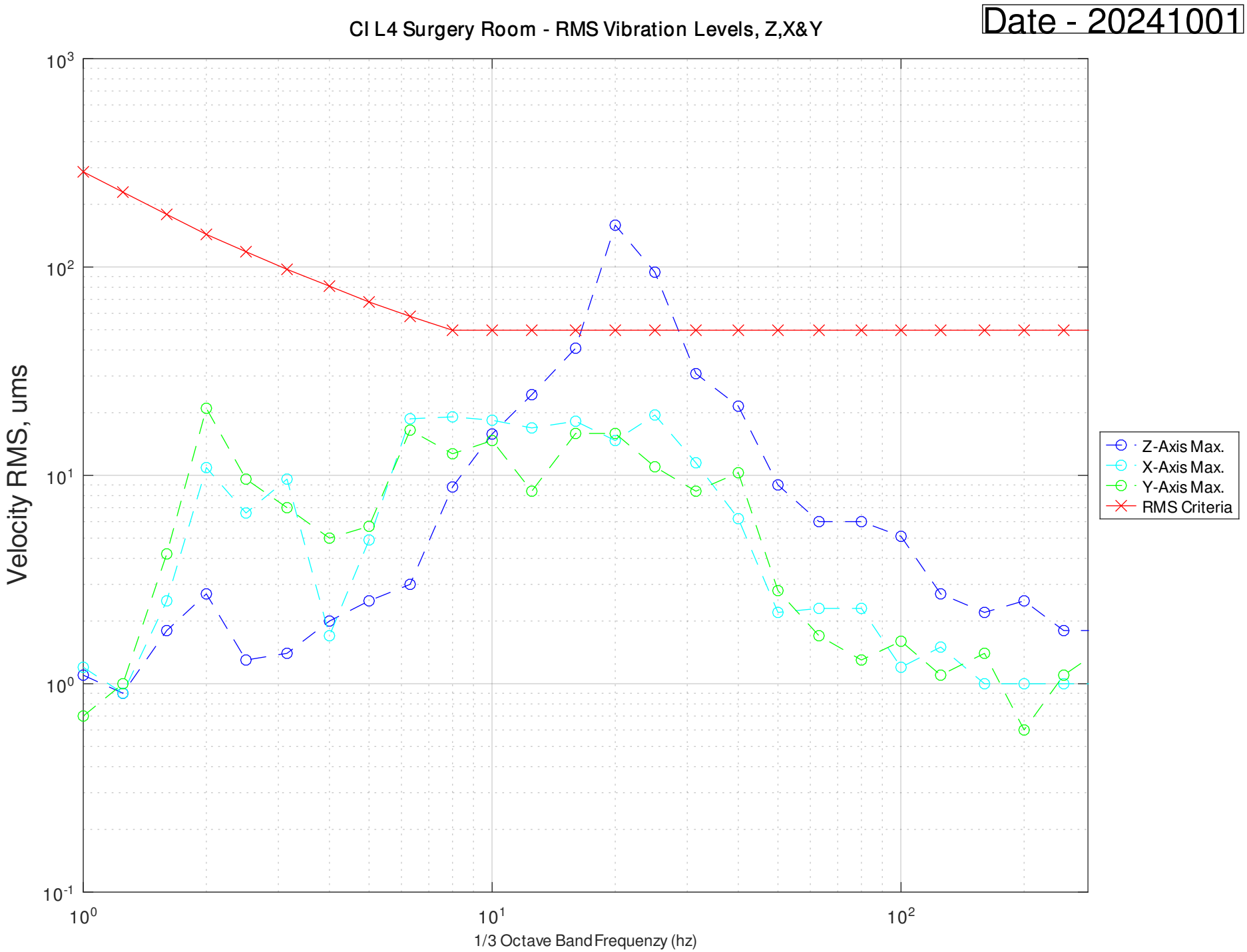
Date - 20240930



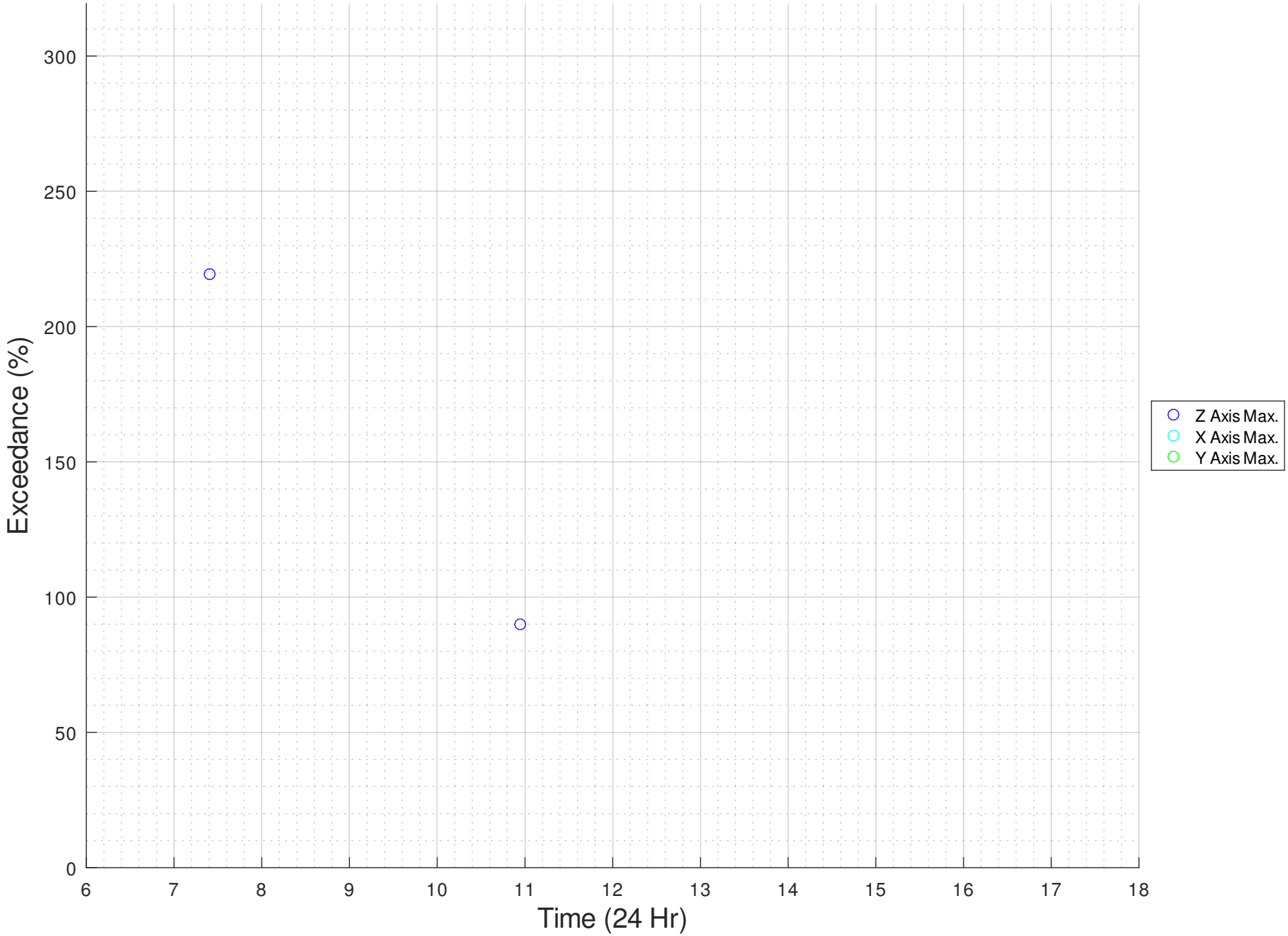
Date - 20240930



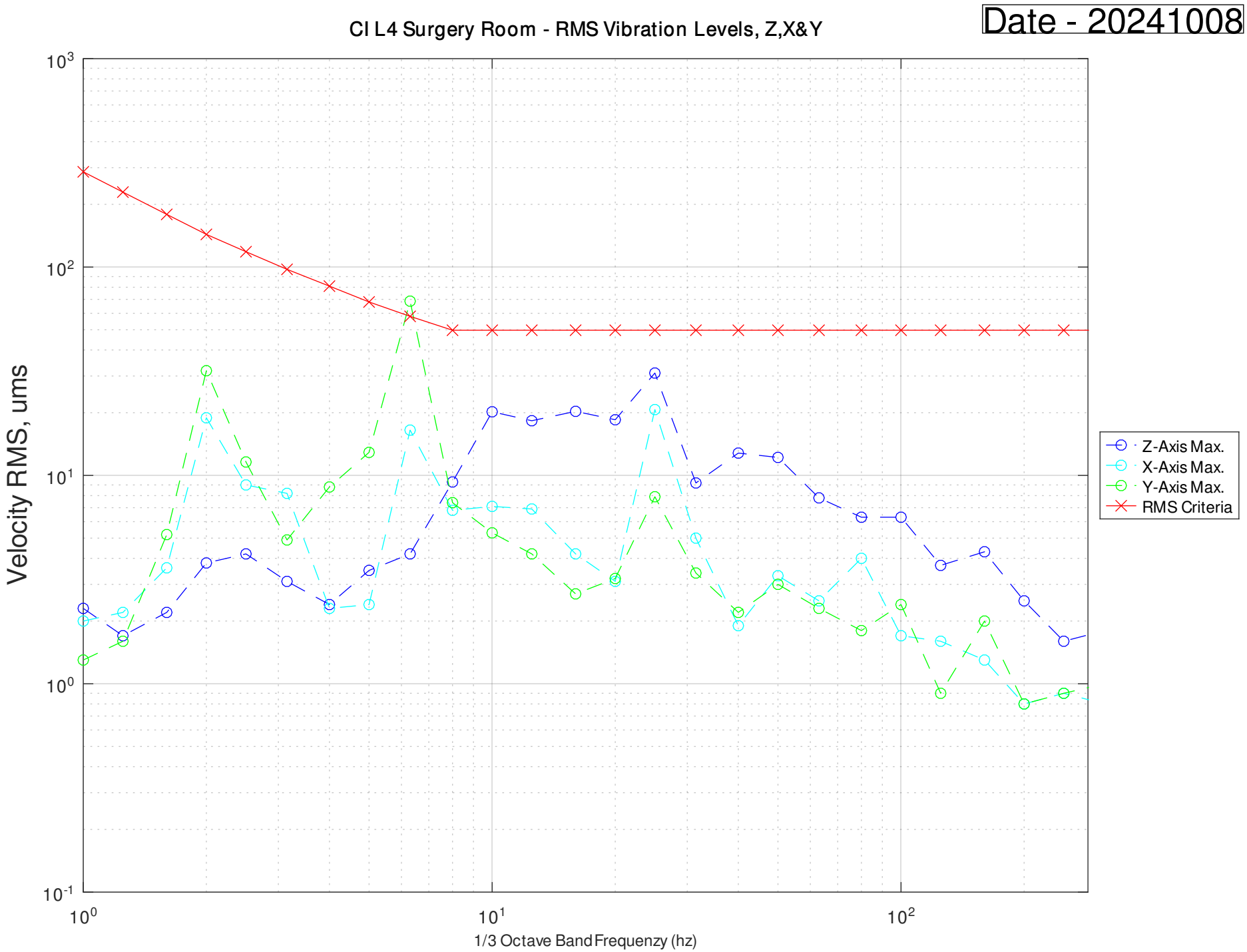
Date - 20241001



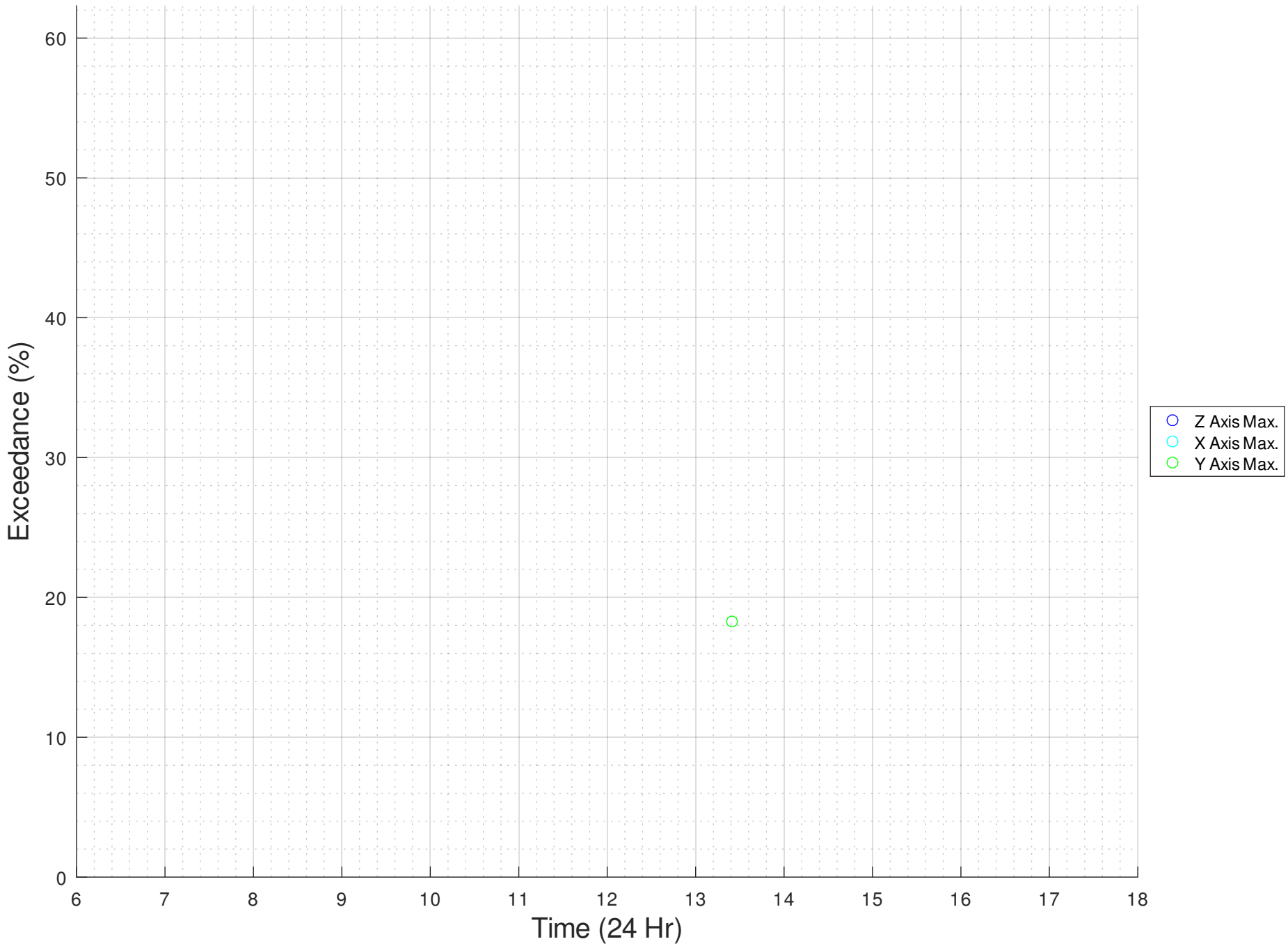
Date - 20241001



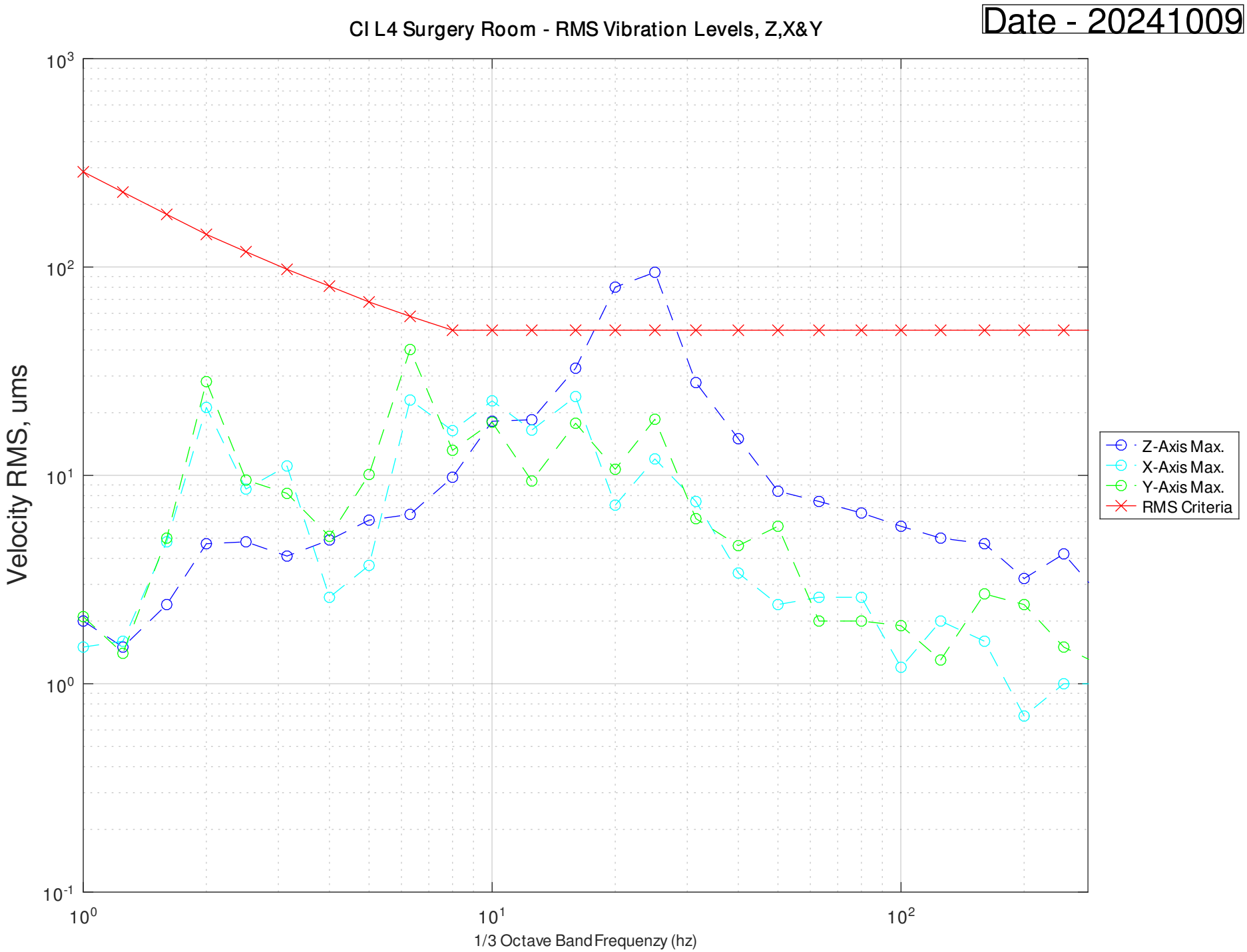
Date - 20241008



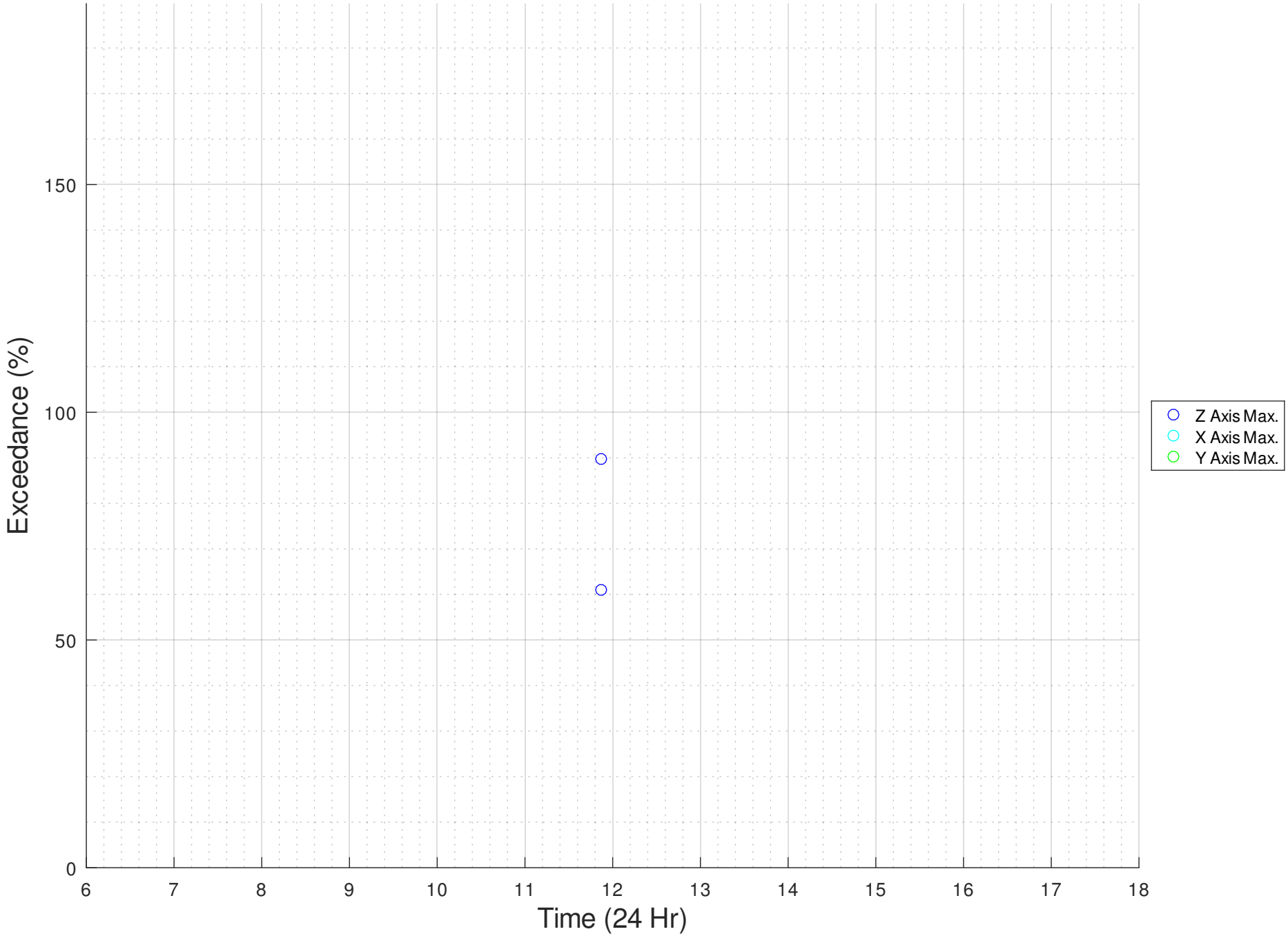
Date - 20241008



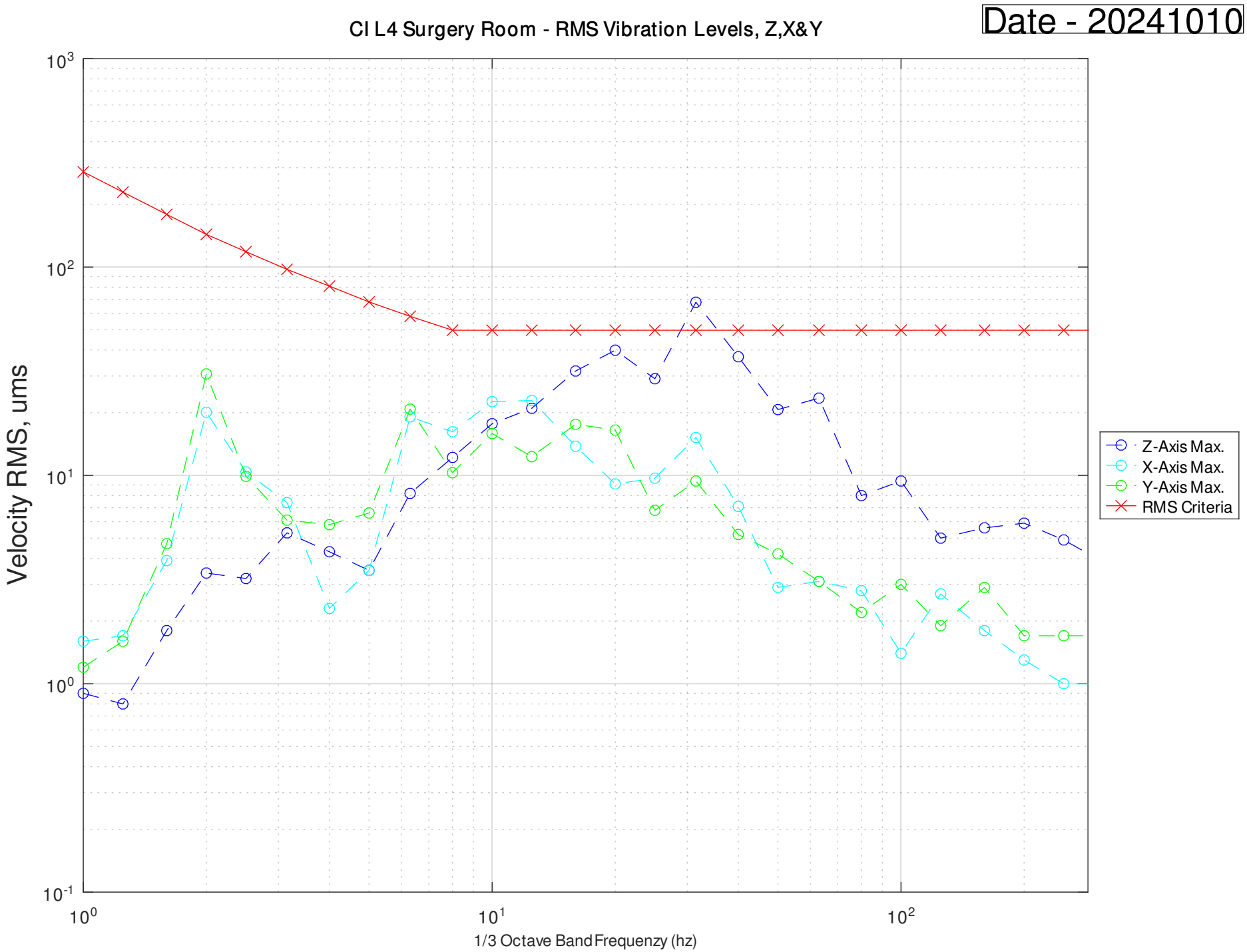
Date - 20241009



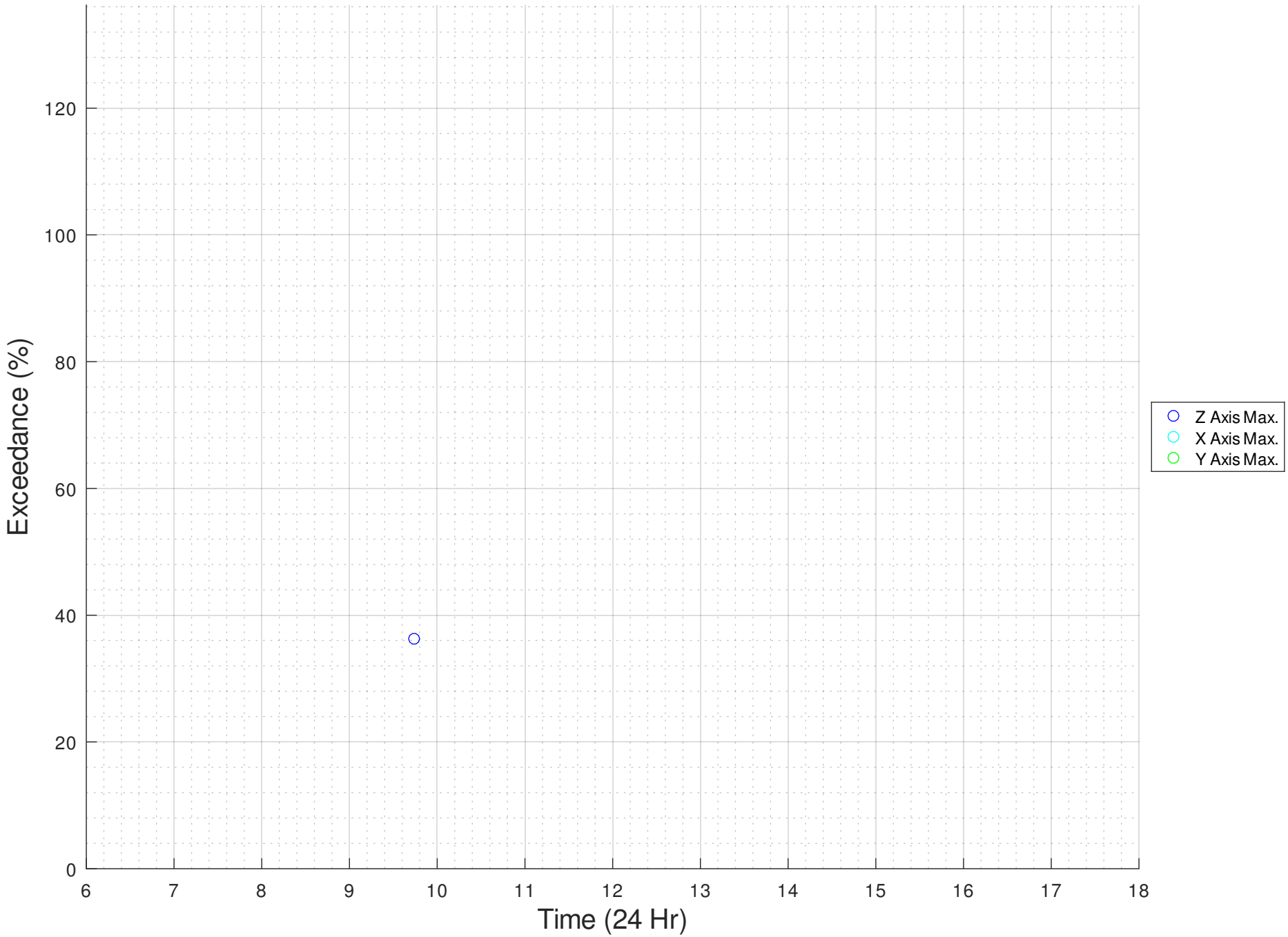
Date - 20241009



Date - 20241010

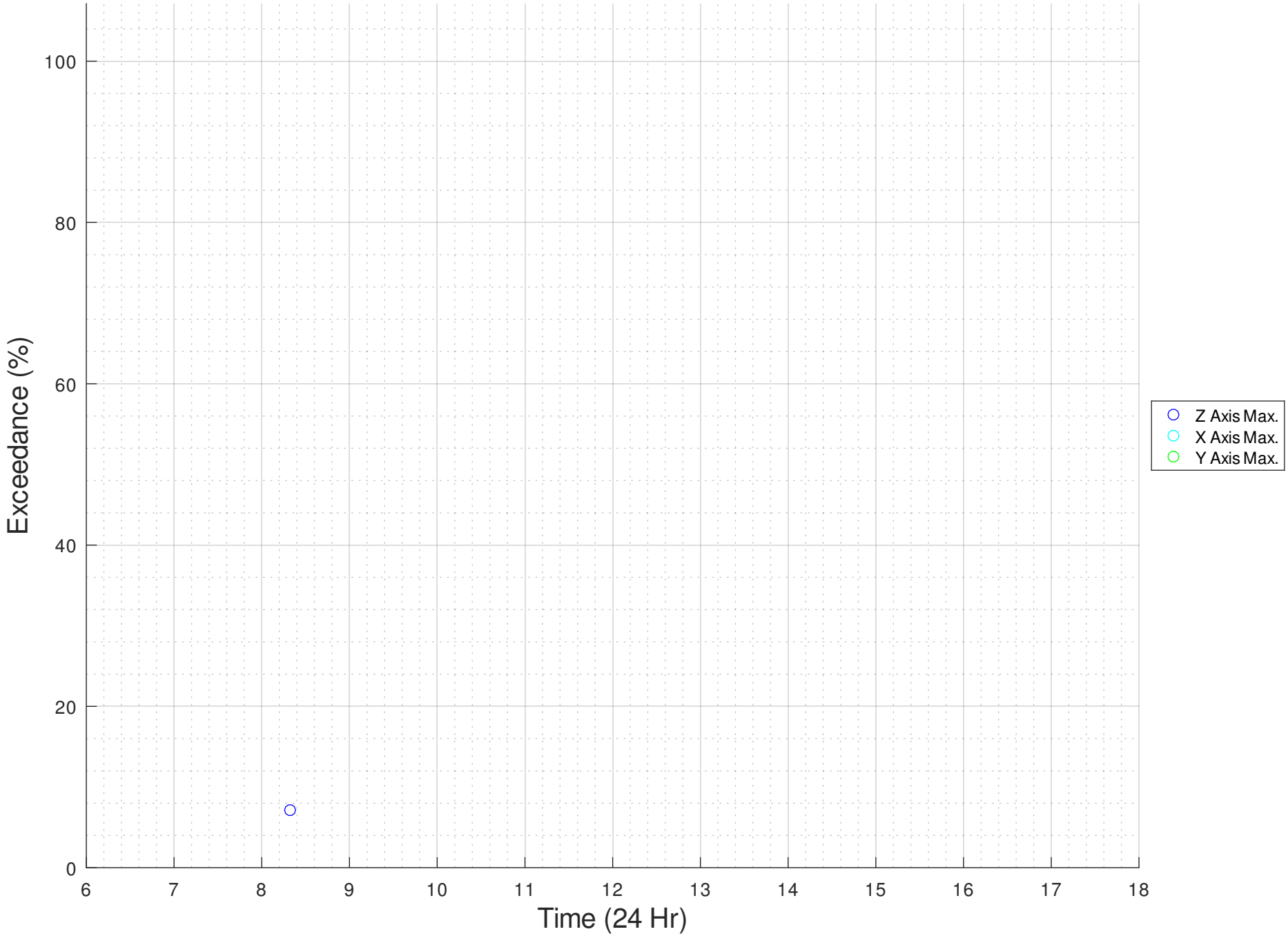


Date - 20241010



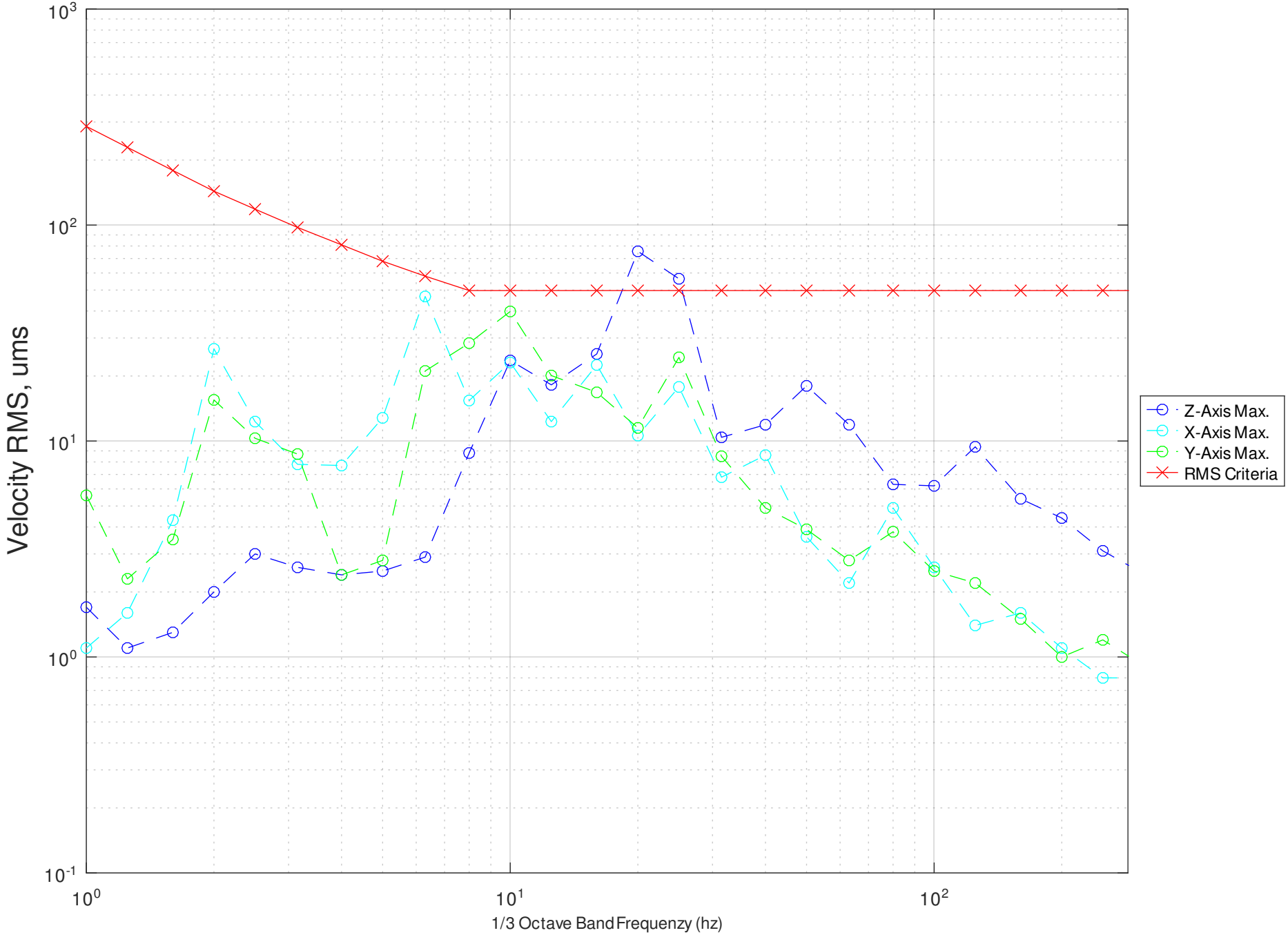
Date - 20241011

Date - 20241011

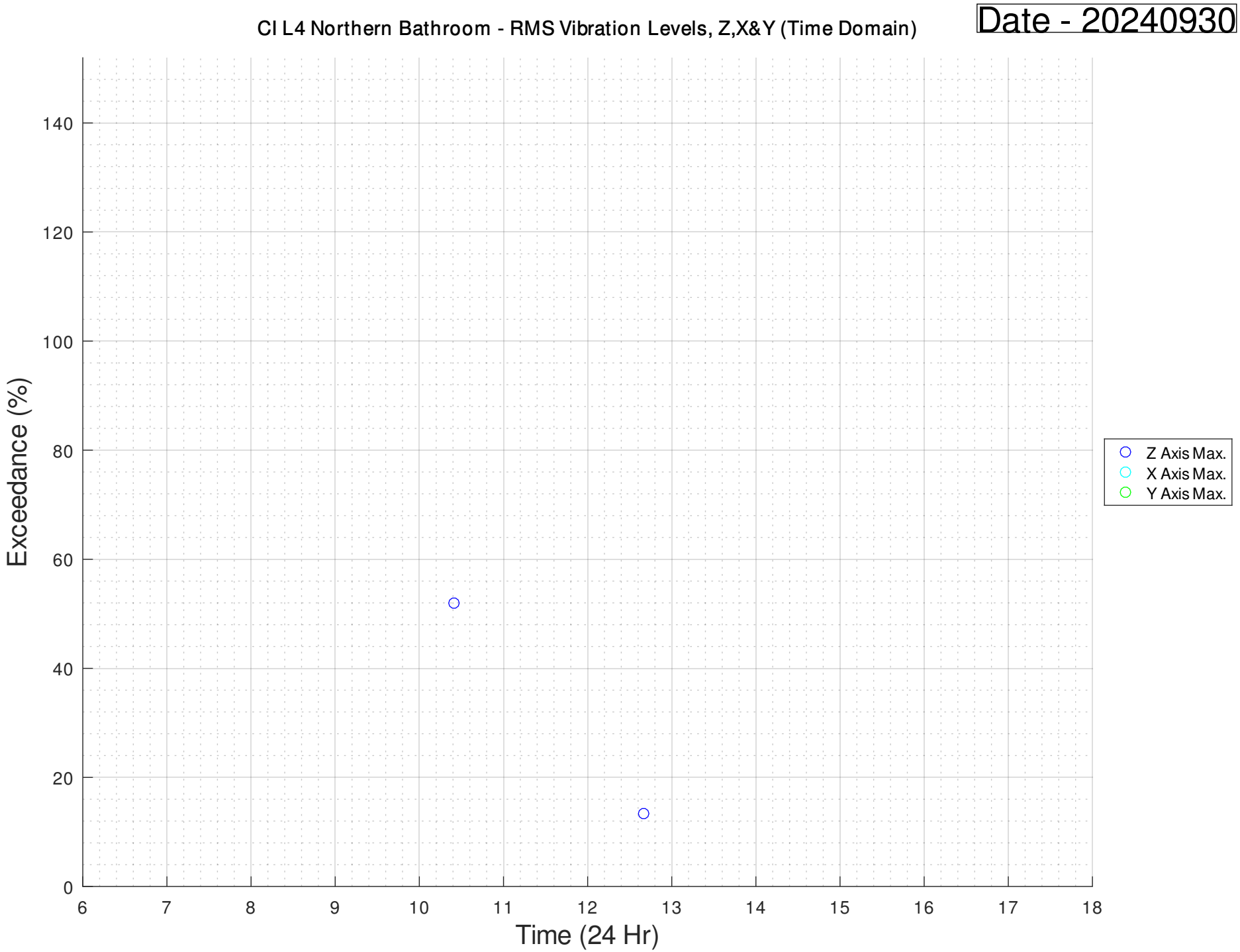


## CENTENARY INSTITUTE – LEVEL 4 BATHROOM (NORTHERN FAÇADE)

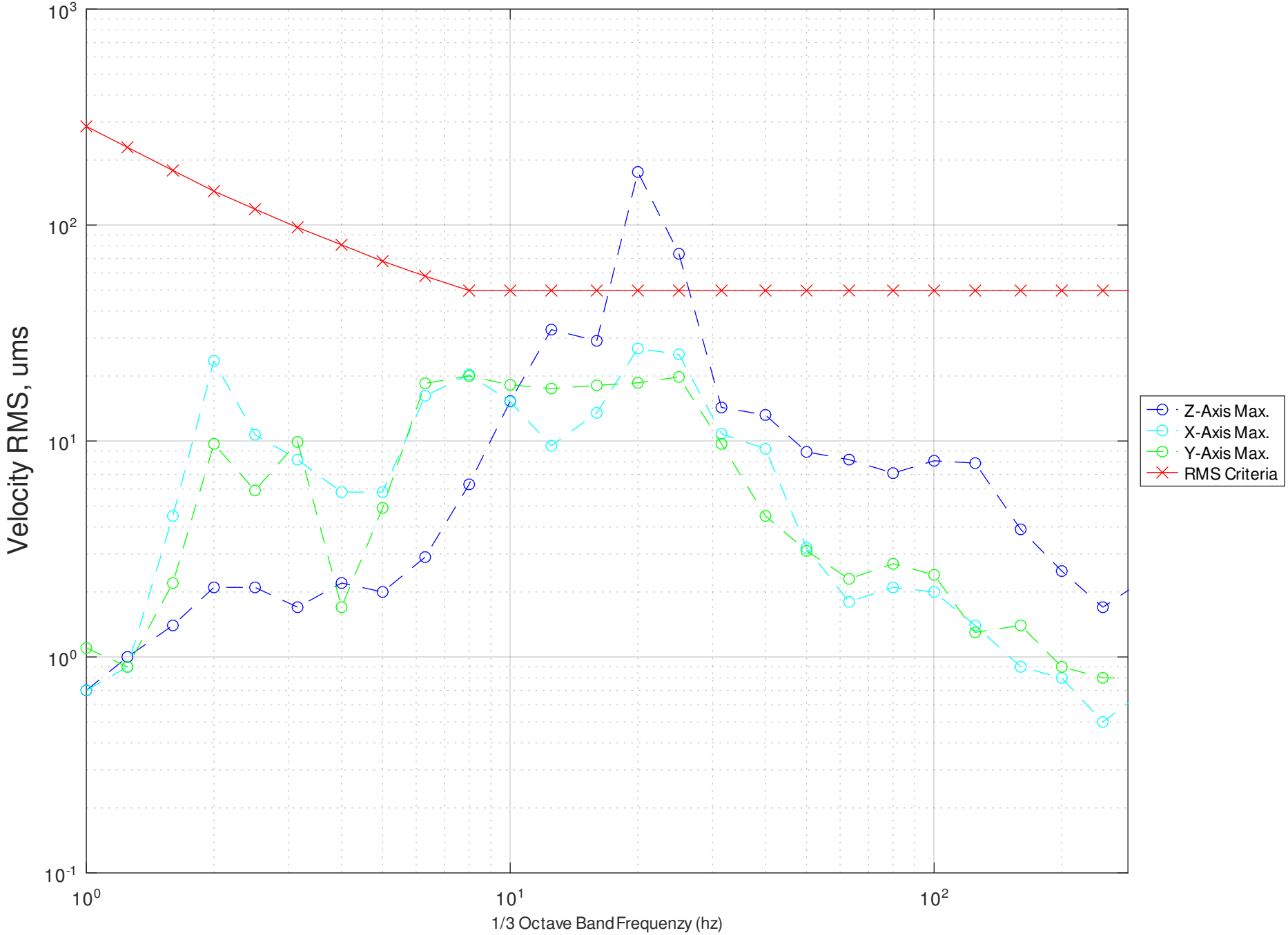
Date - 20240930

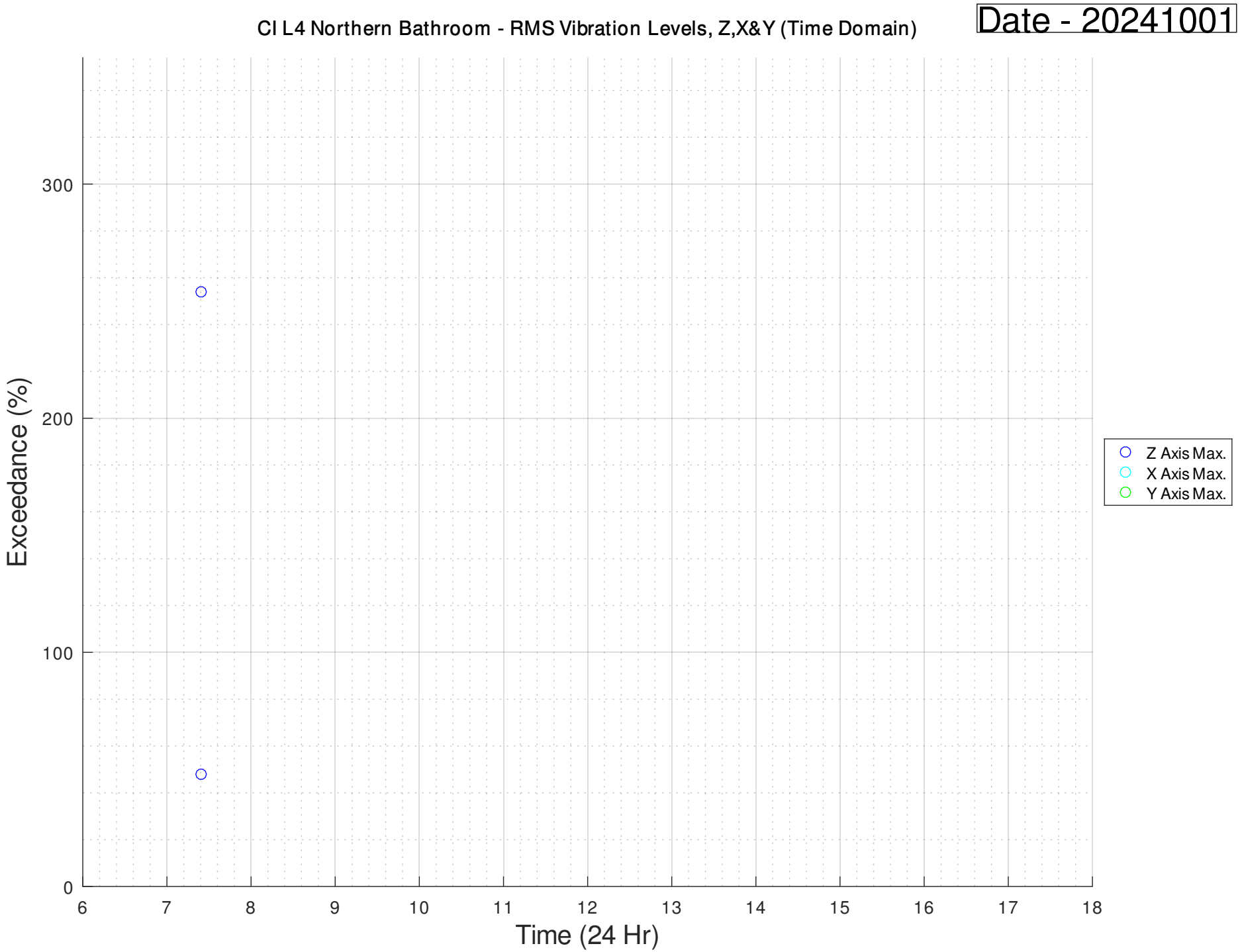


Date - 20240930

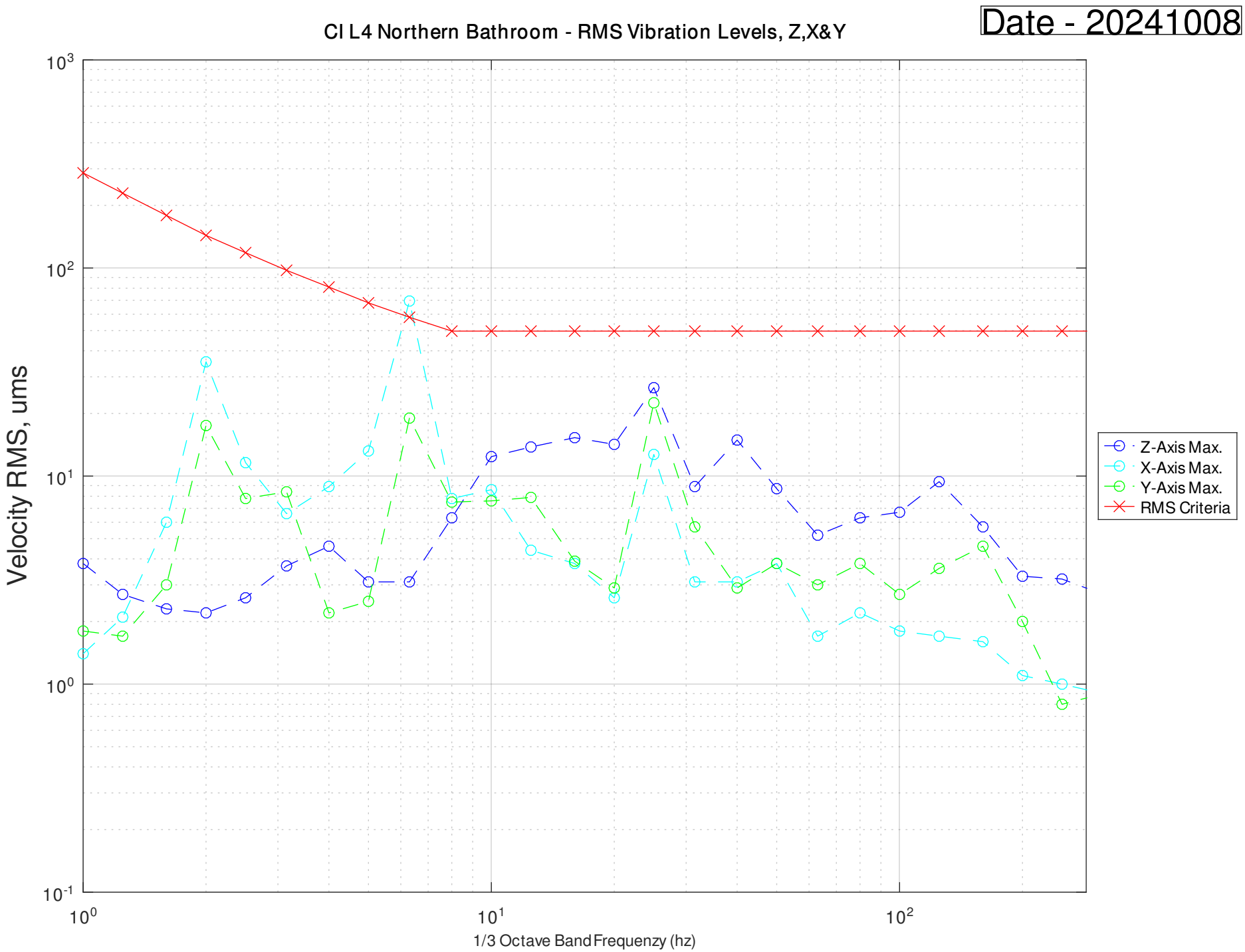


Date - 20241001

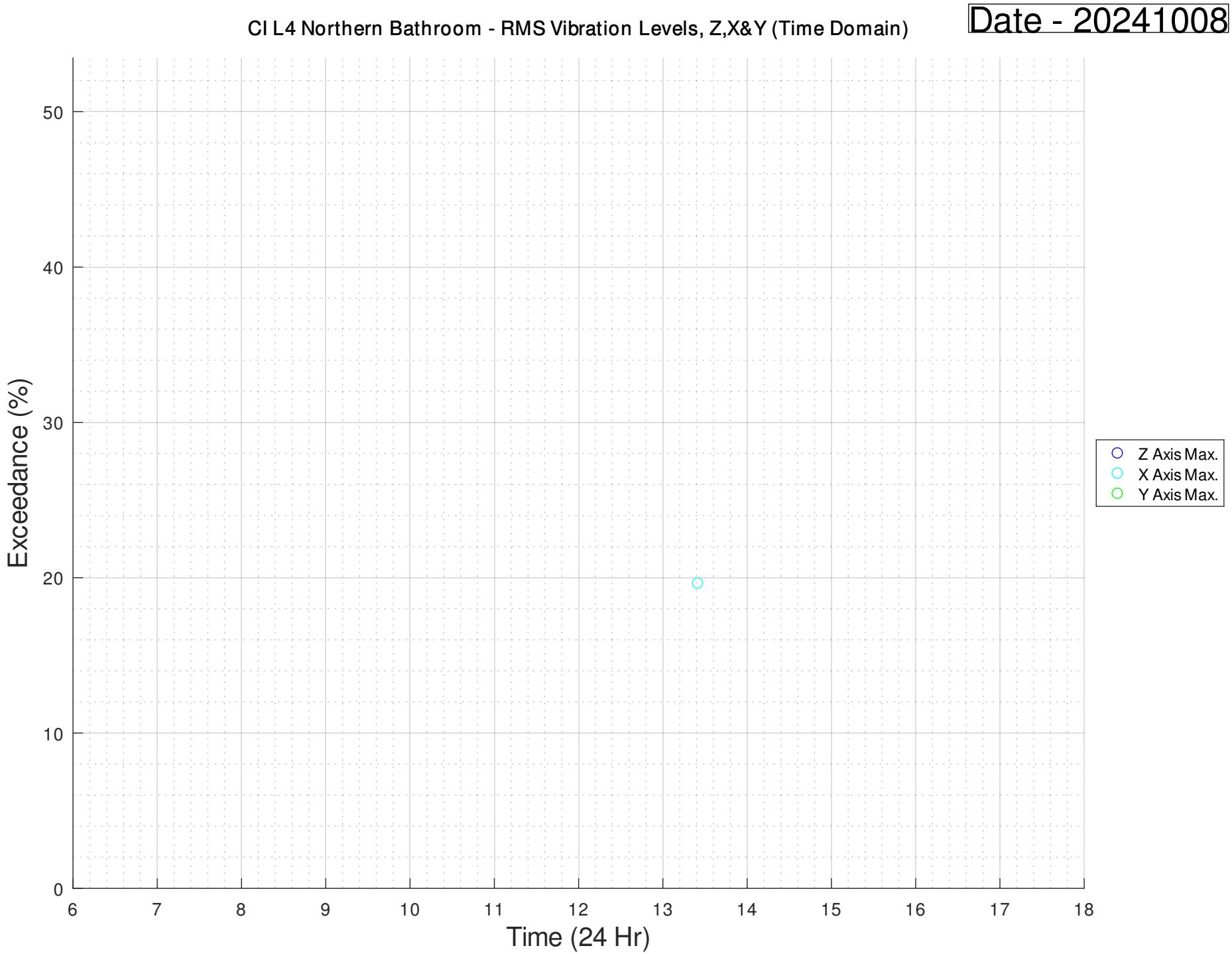



Cl L4 Northern Bathroom - RMS Vibration Levels, Z,X&Y (Time Domain)
Date - 20241001
Exceedance (%)
300
200
100
0
6
7
8
9
10
11
12
13
14
15
16
17
18
Time (24 Hr)
Z Axis Max.
X Axis Max.
Y Axis Max.

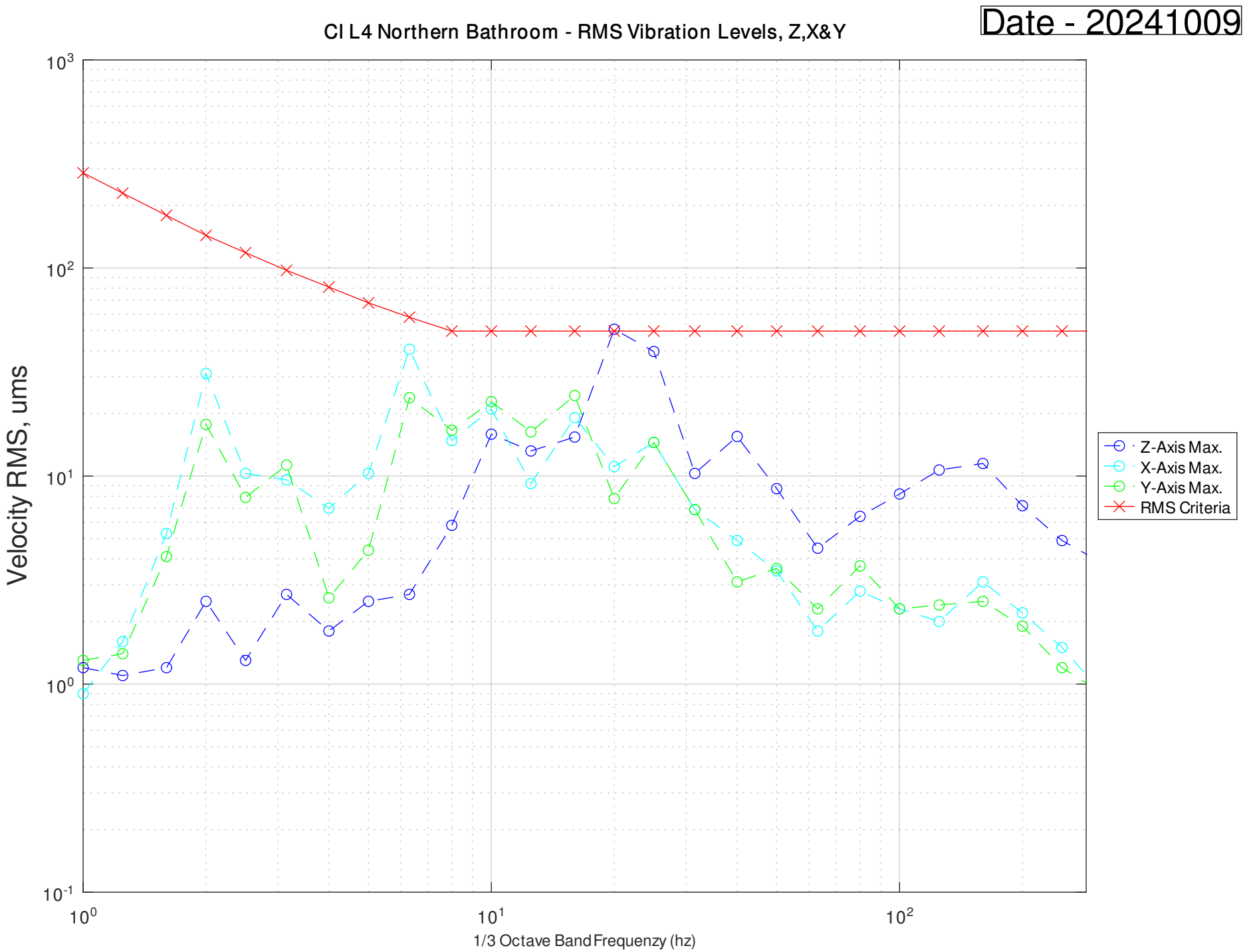
Date - 20241008



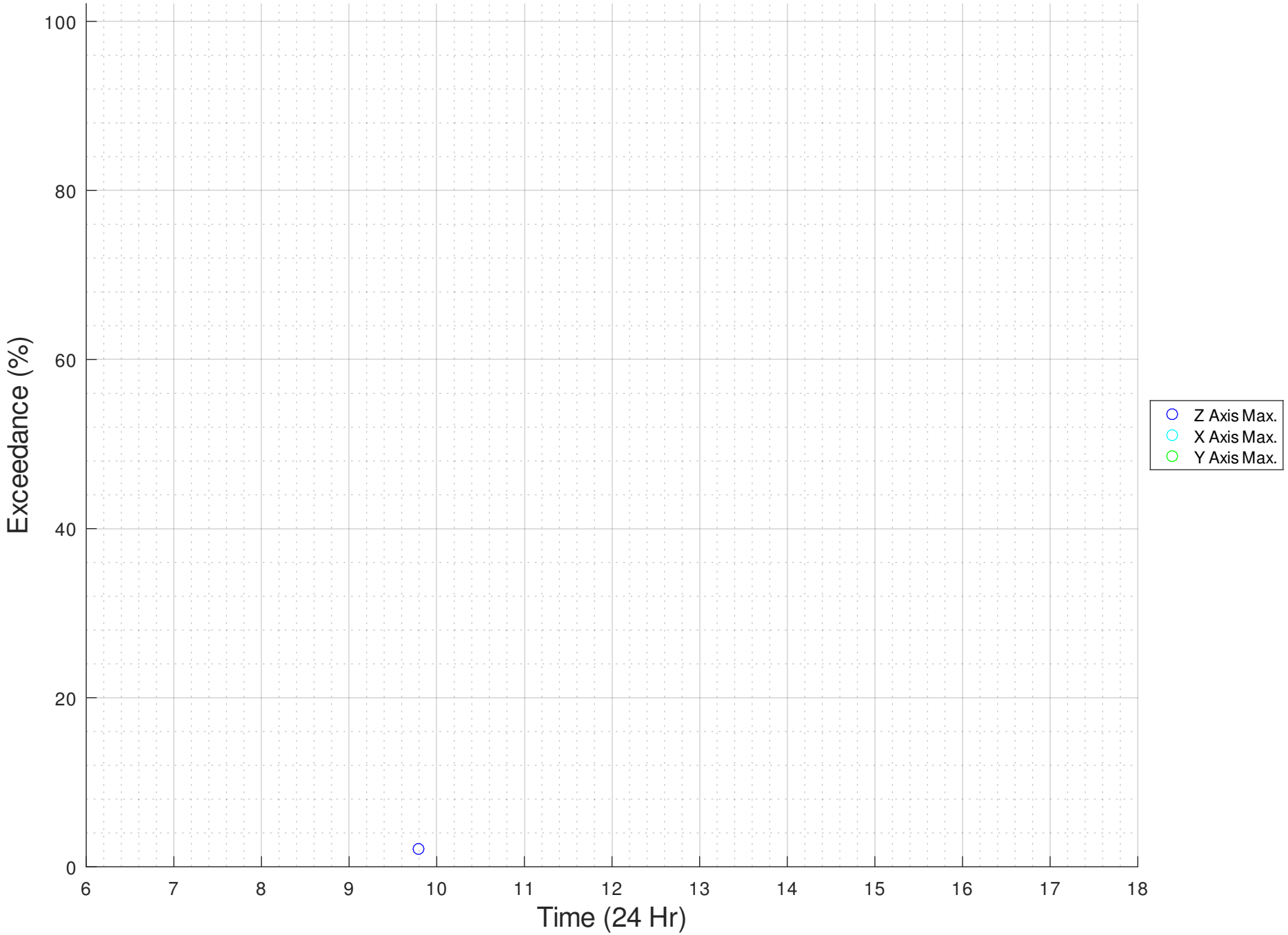
Date - 20241008



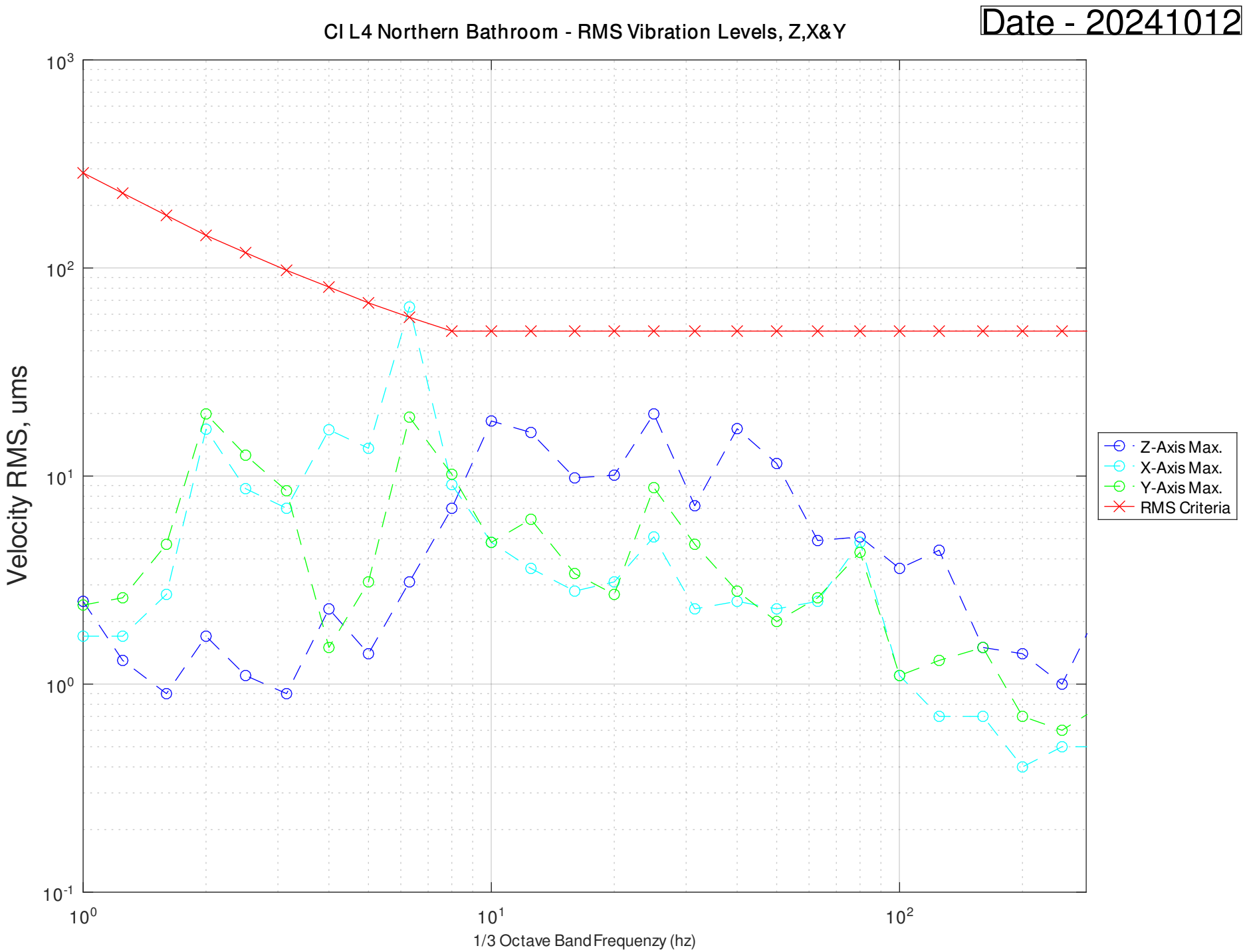
Date - 20241009



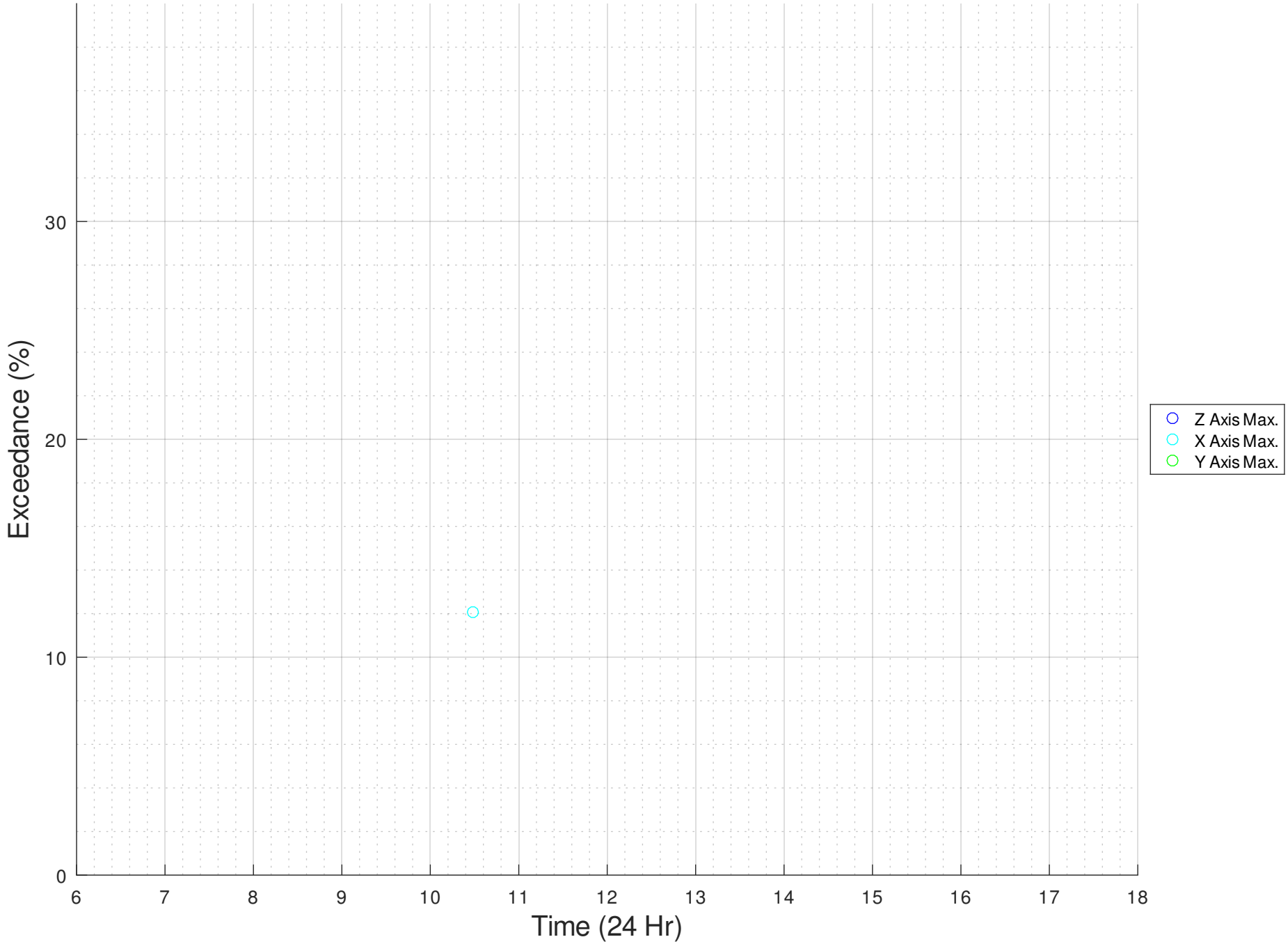
Date - 20241009



Date - 20241012

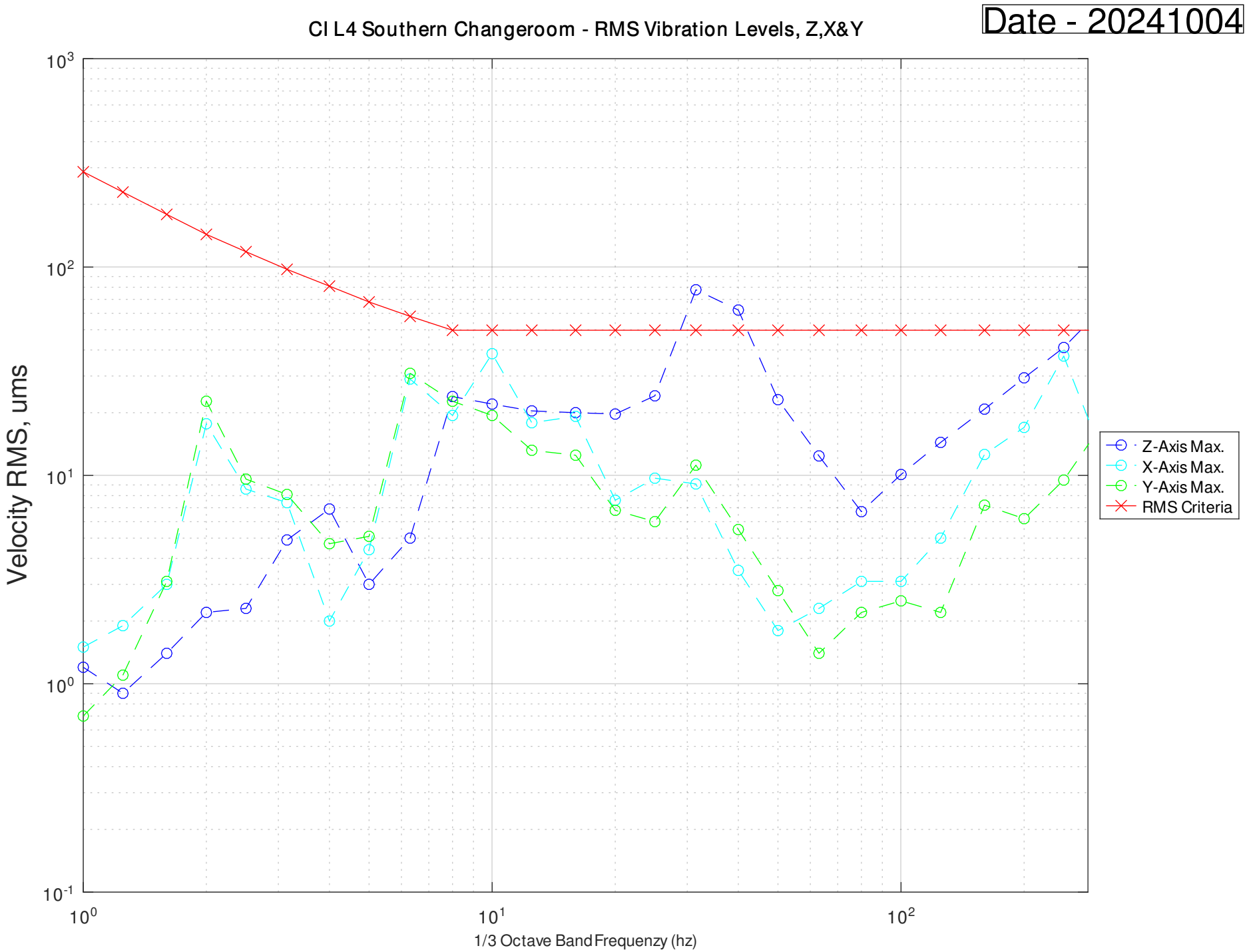


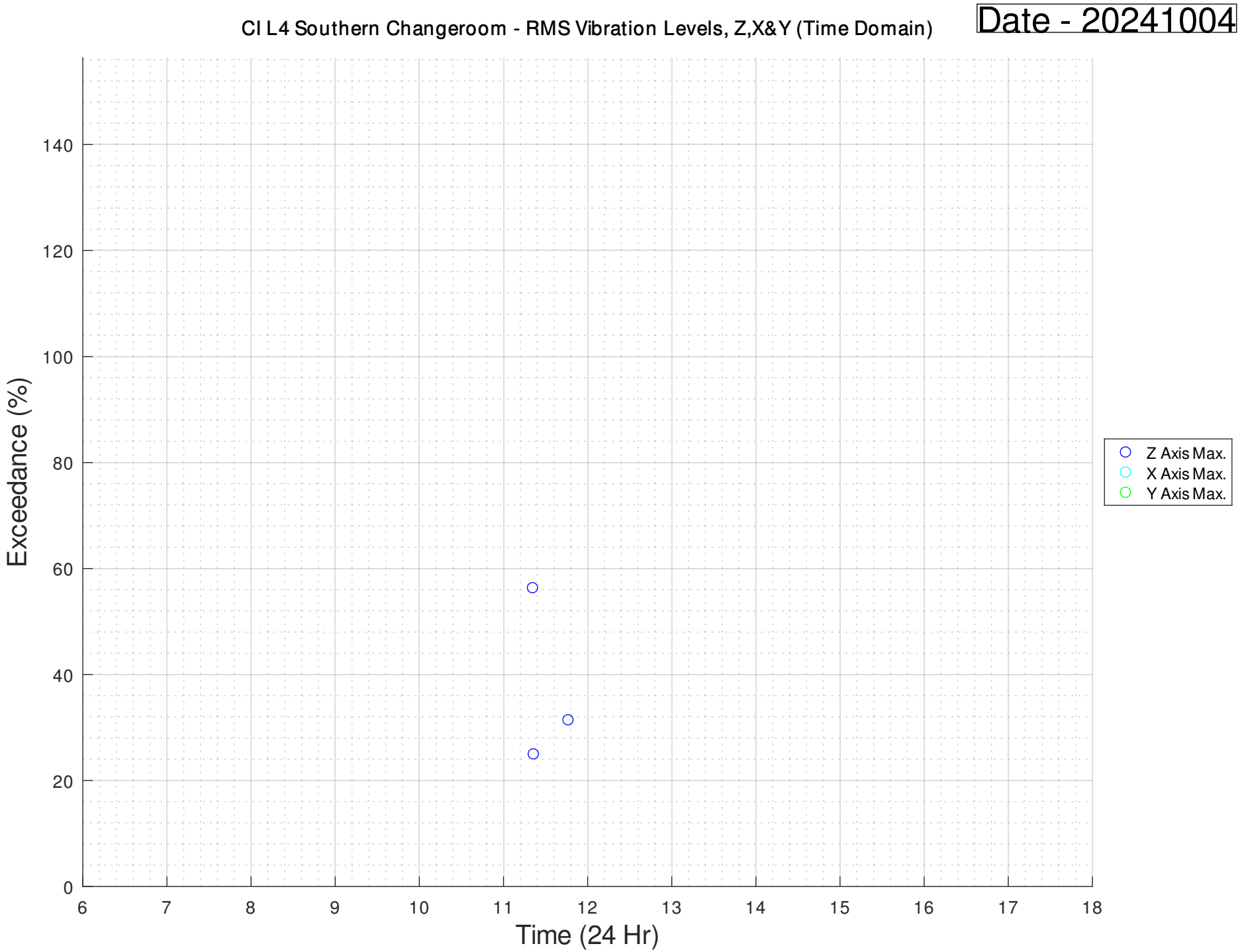
Date - 20241012



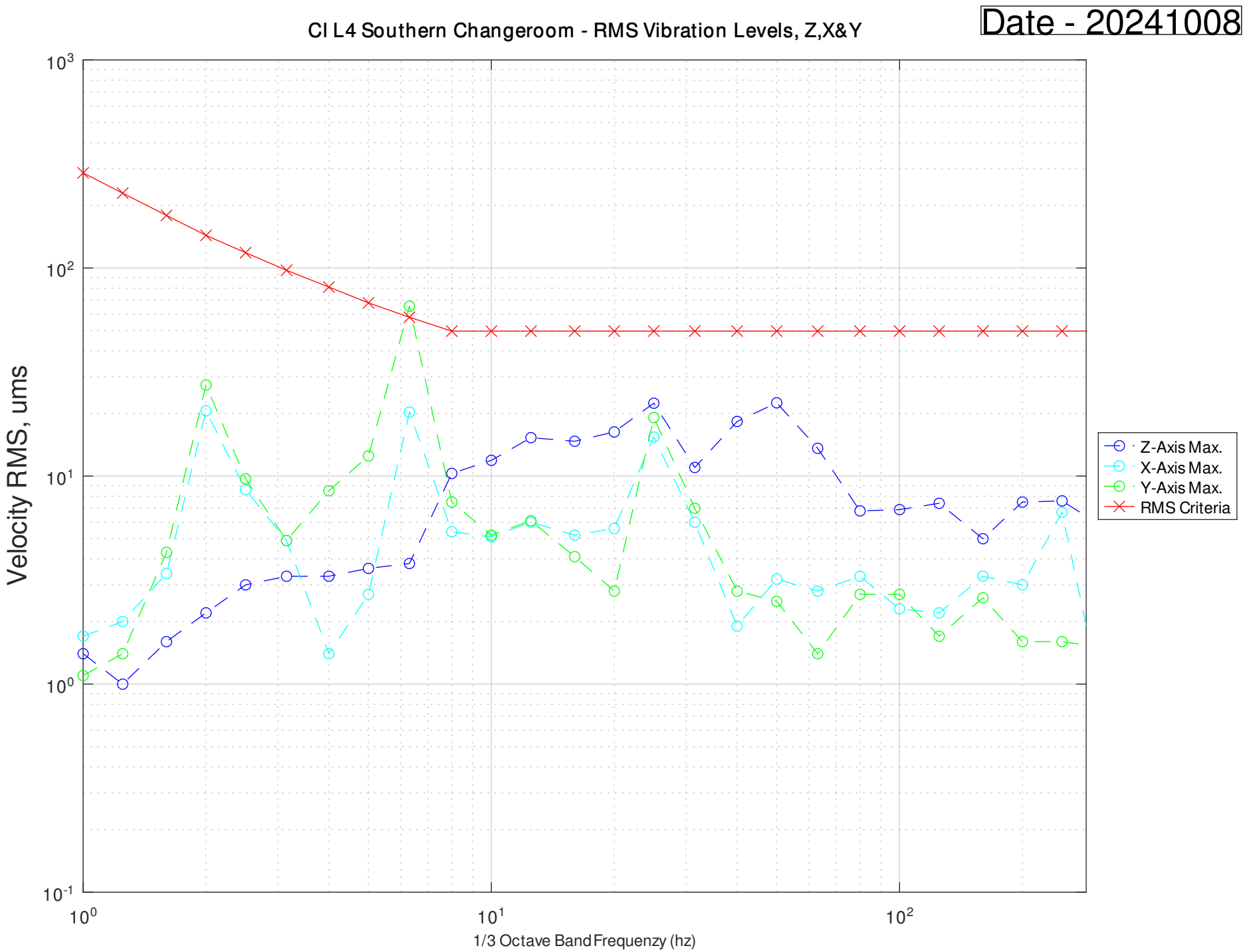
## CENTENARY INSTITUTE – LEVEL 4 CLEAN CHANGEROOM (SOUTHERN FAÇADE)

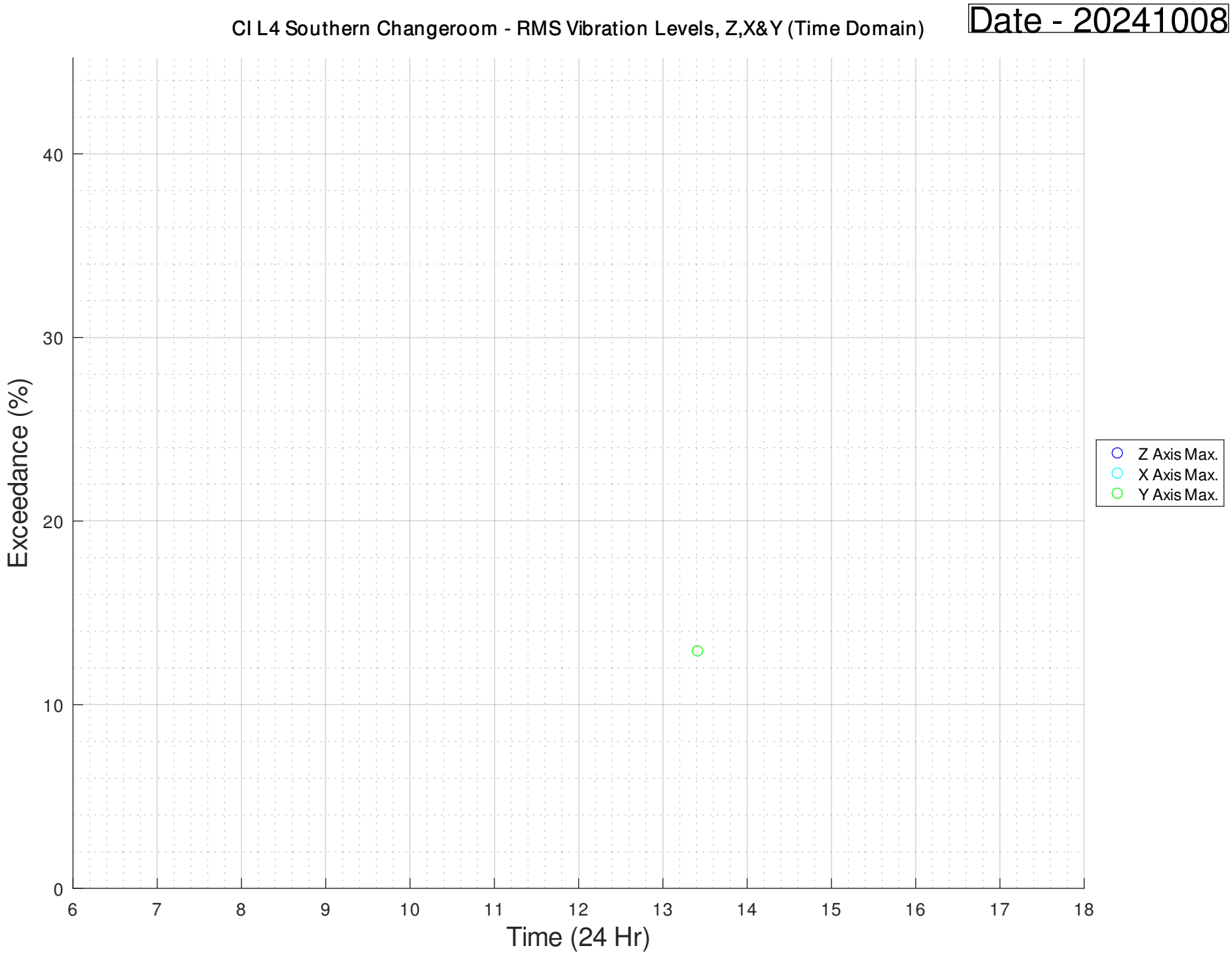
Date - 20241004



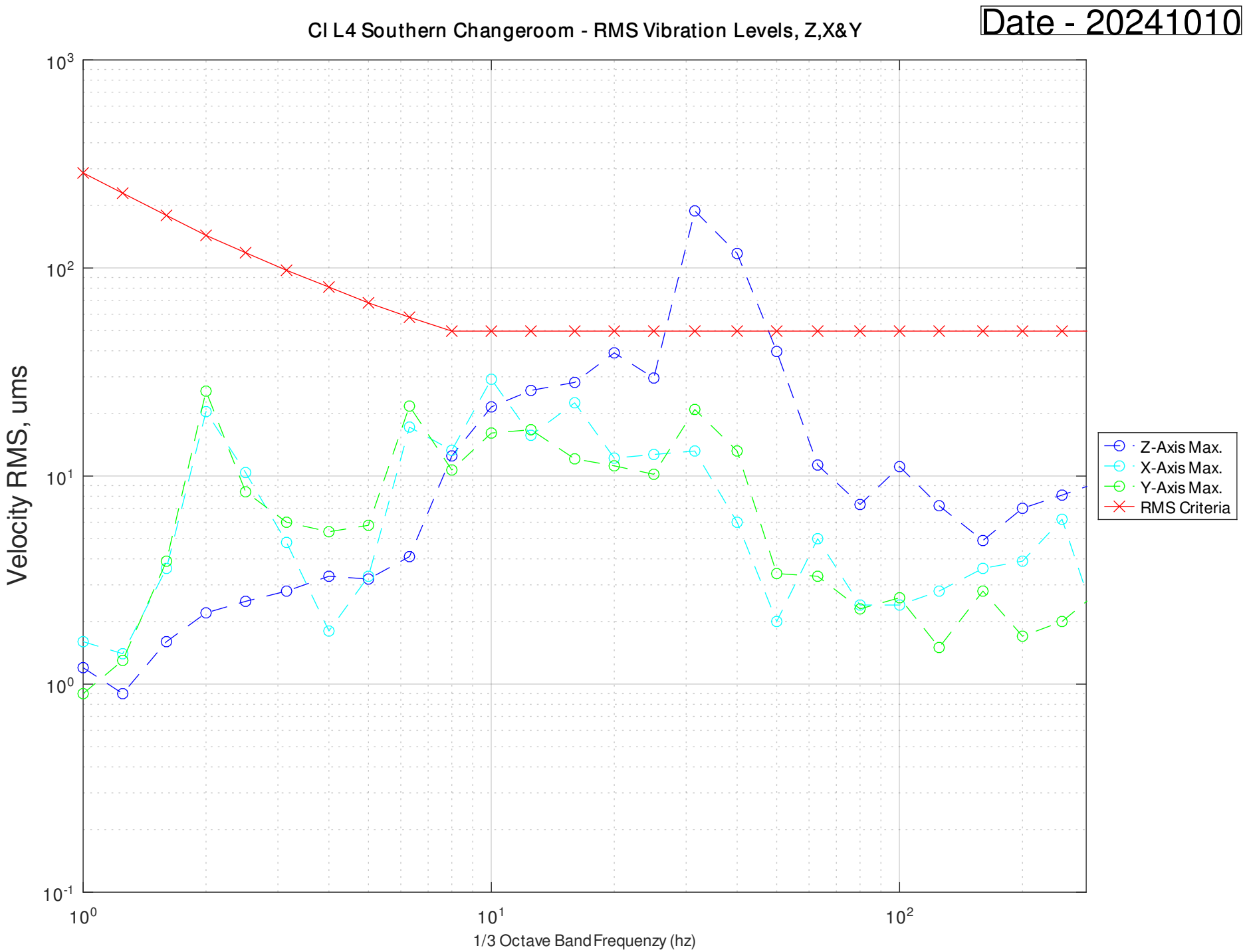

CI L4 Southern Changeroom - RMS Vibration Levels, Z,X&Y (Time Domain)
Date - 20241004
Exceedance (%)
Time (24 Hr)
0
20
40
60
80
100
120
140
6
7
8
9
10
11
12
13
14
15
16
17
18
Z Axis Max.
X Axis Max.
Y Axis Max.

Date - 20241008

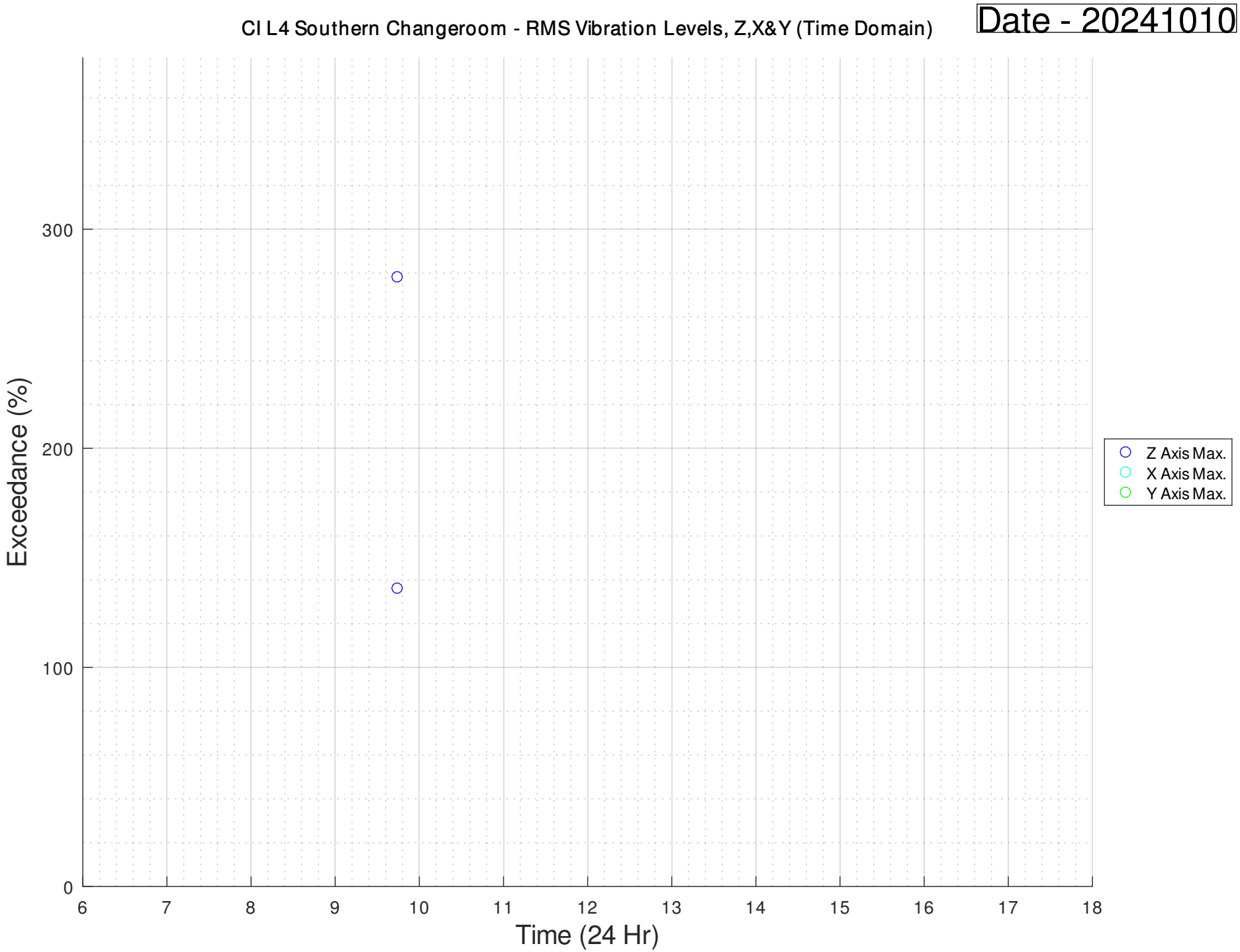



CI L4 Southern Changeroom - RMS Vibration Levels, Z,X&Y (Time Domain)
Date - 20241008
Exceedance (%)
0
10
20
30
40
6
7
8
9
10
11
12
13
14
15
16
17
18
Time (24 Hr)
Z Axis Max.
X Axis Max.
Y Axis Max.

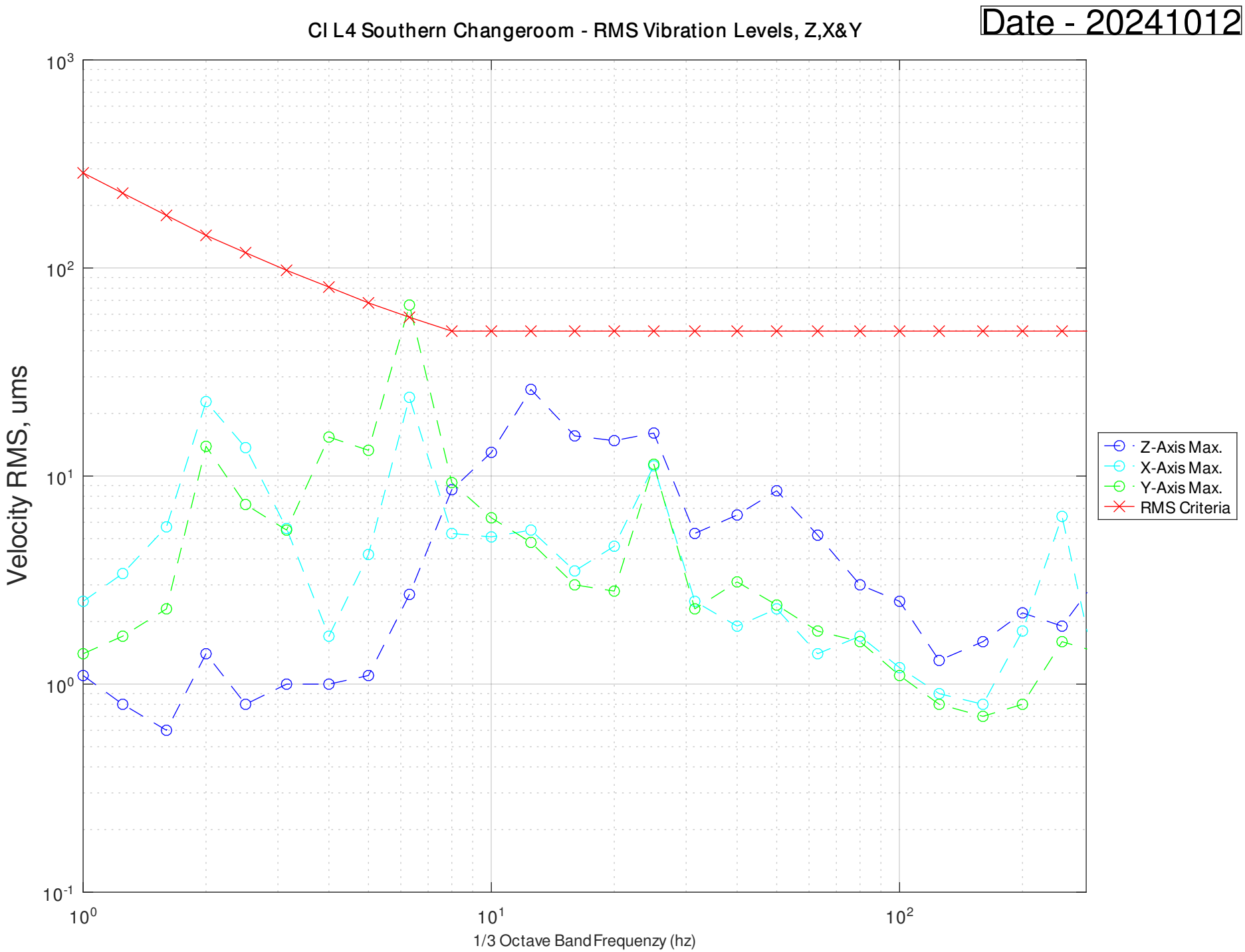
Date - 20241010

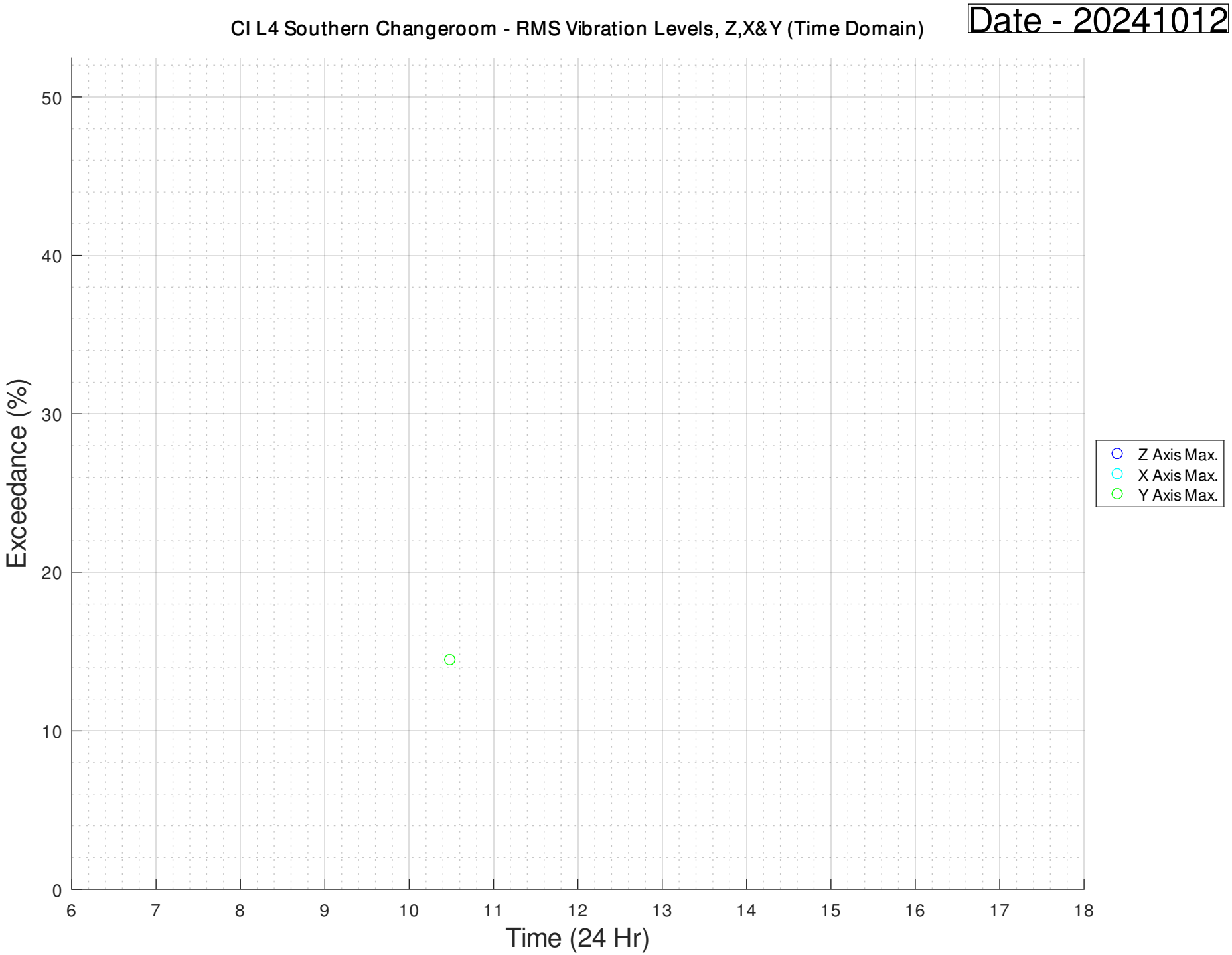


Date - 20241010



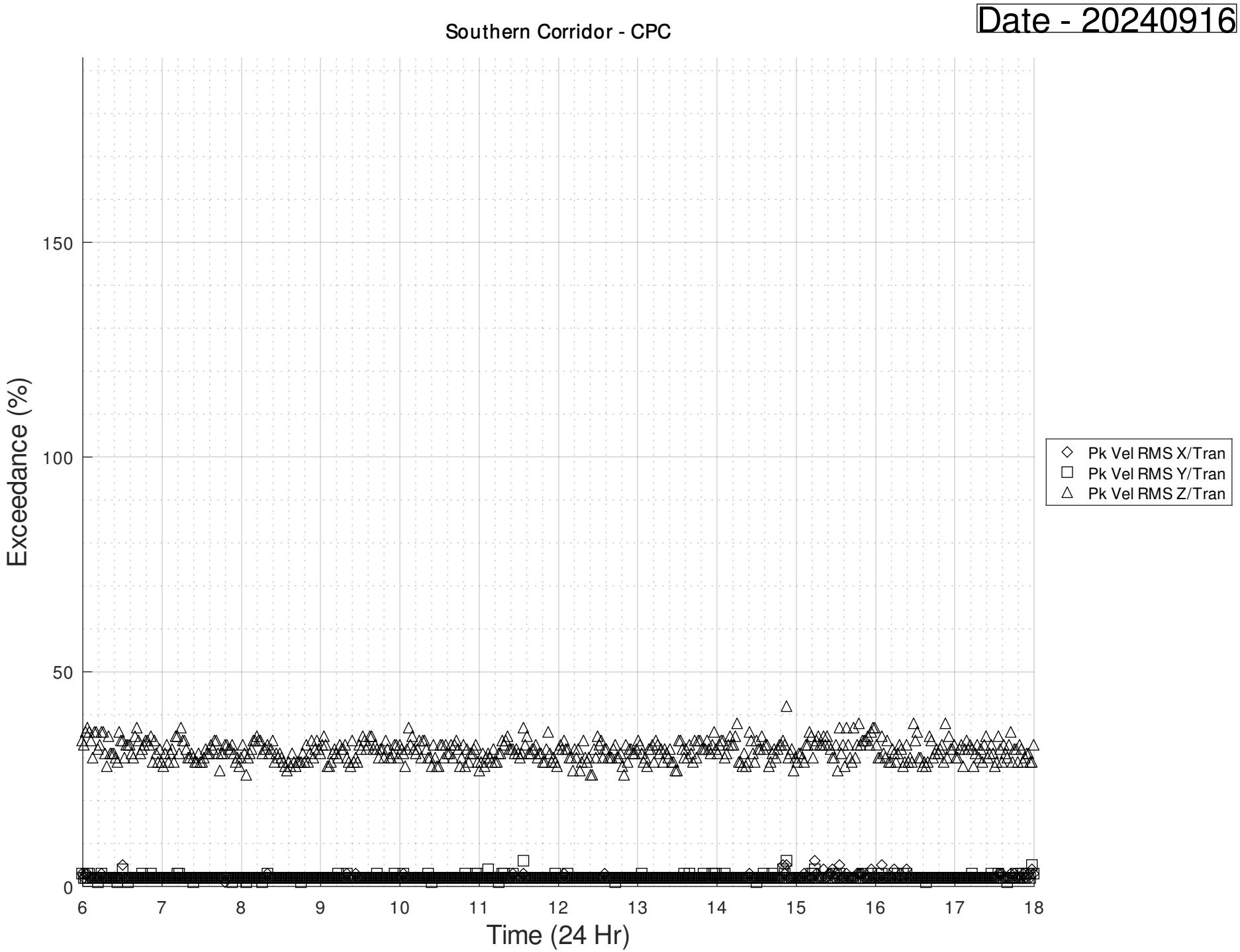
Date - 20241012



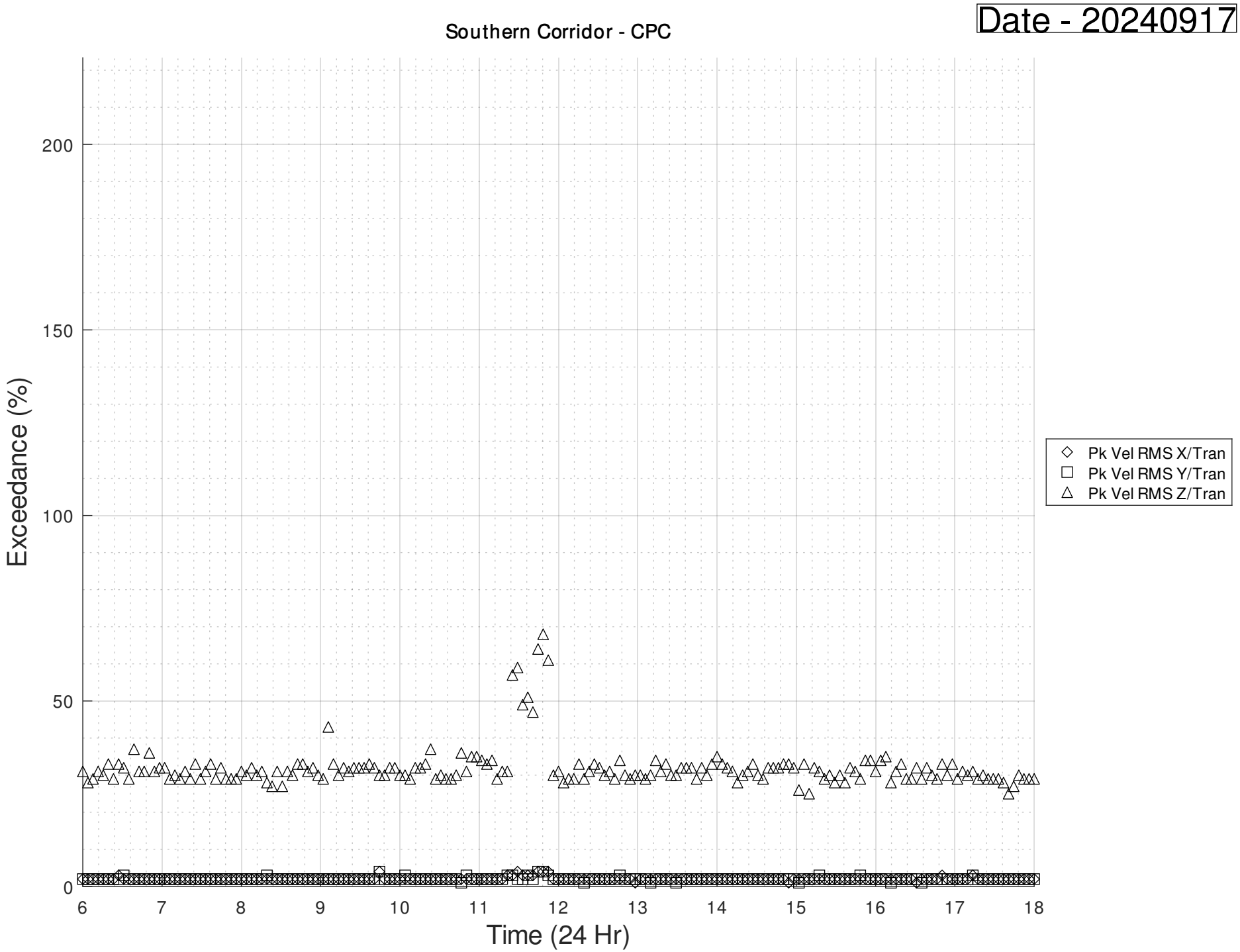

CI L4 Southern Changeroom - RMS Vibration Levels, Z,X&Y (Time Domain)
Date - 20241012
Exceedance (%)
0
10
20
30
40
50
6
7
8
9
10
11
12
13
14
15
16
17
18
Time (24 Hr)
Z Axis Max.
X Axis Max.
Y Axis Max.

## CHARLES PERKINS CENTRE – LEVEL B1 SOUTHERN CORRIDOR

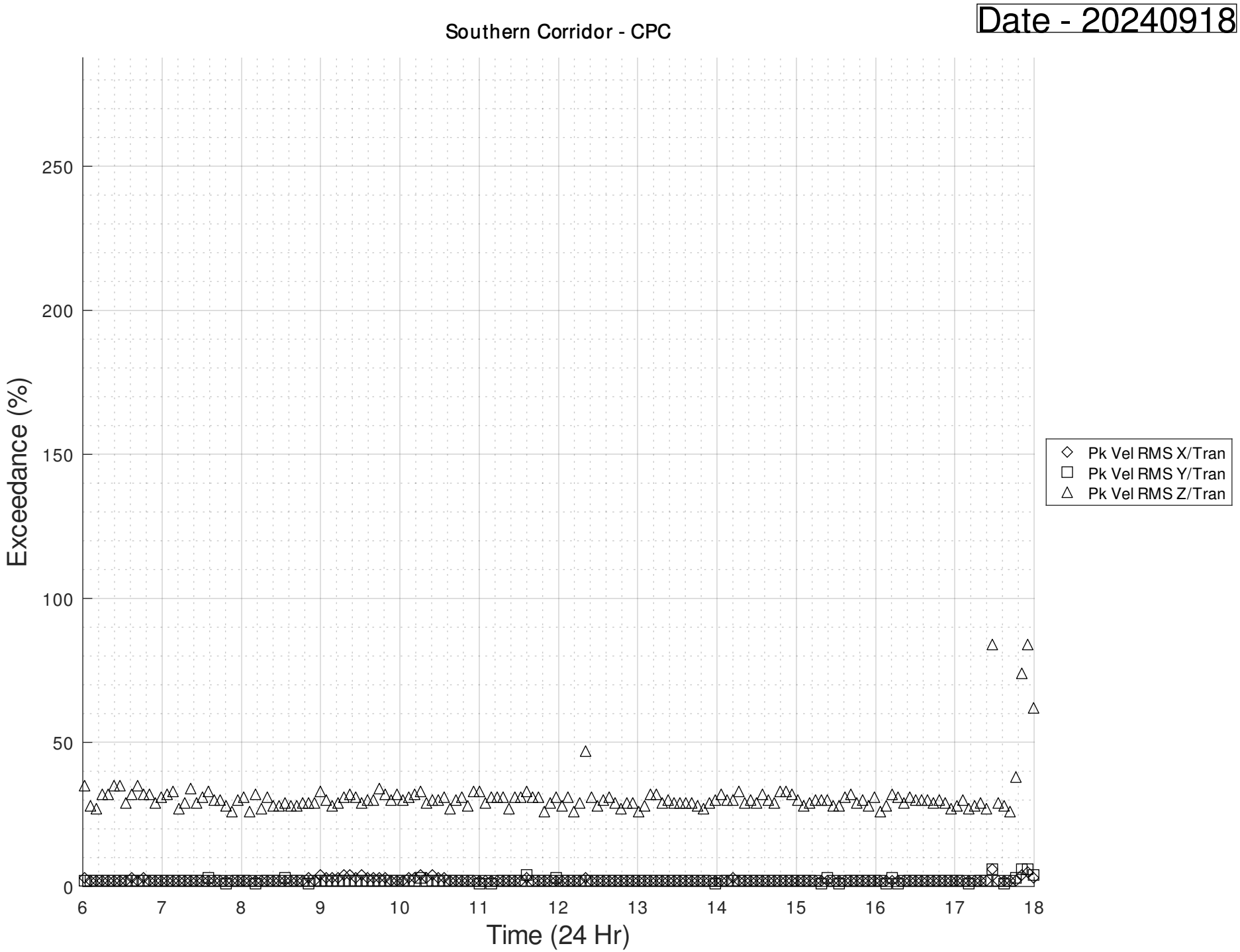
Date - 20240916



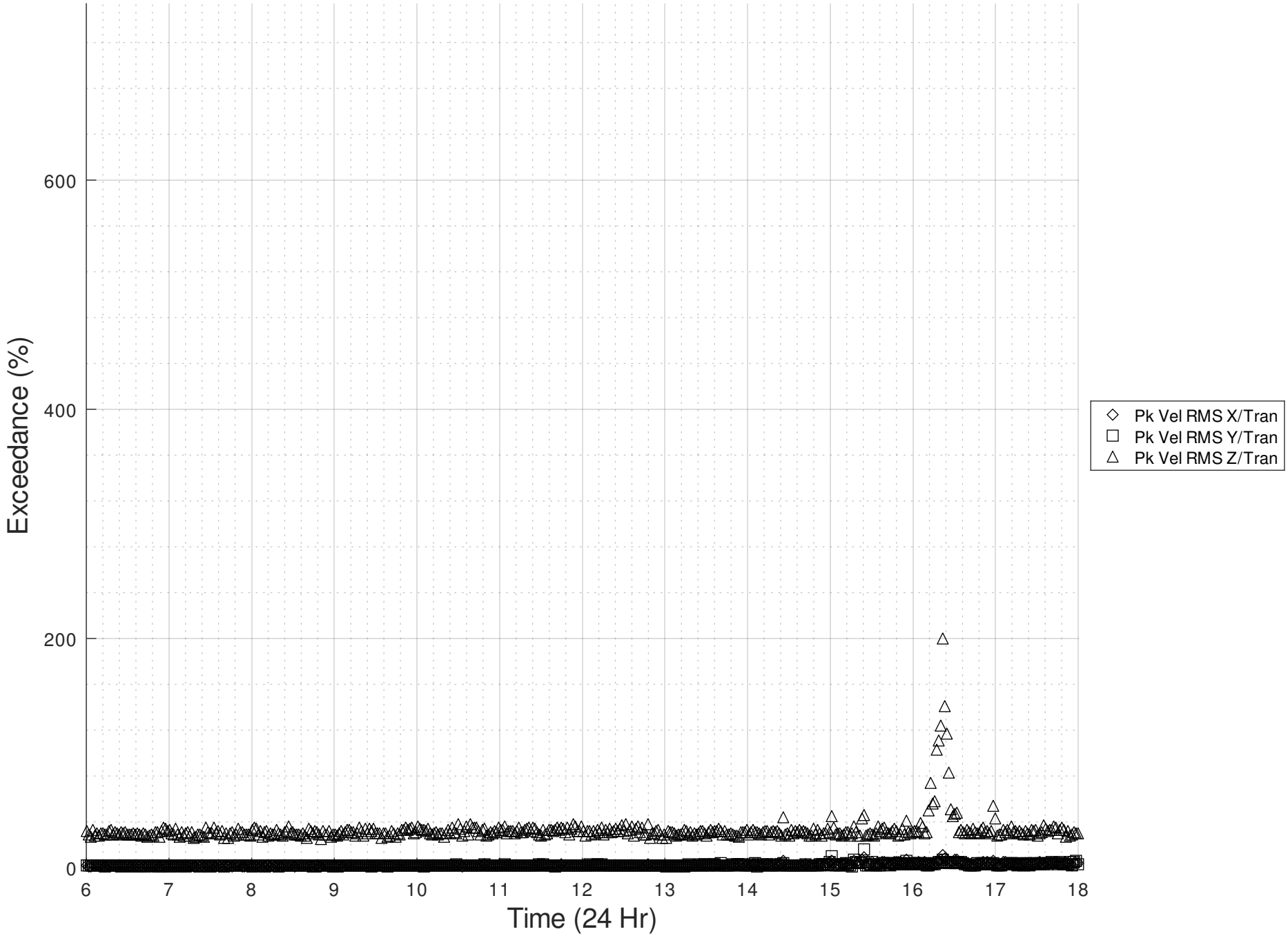
Date - 20240917



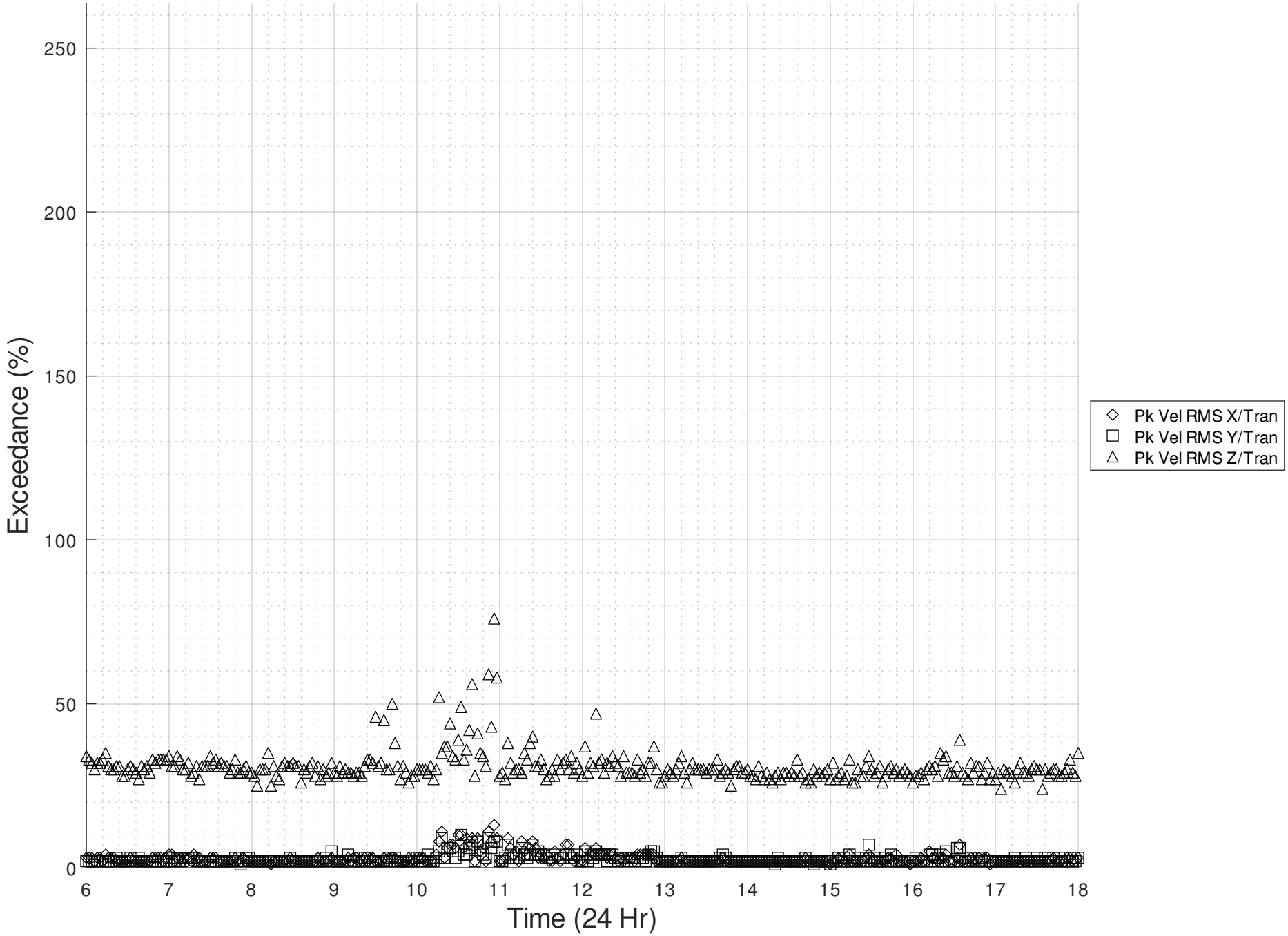
Date - 20240918



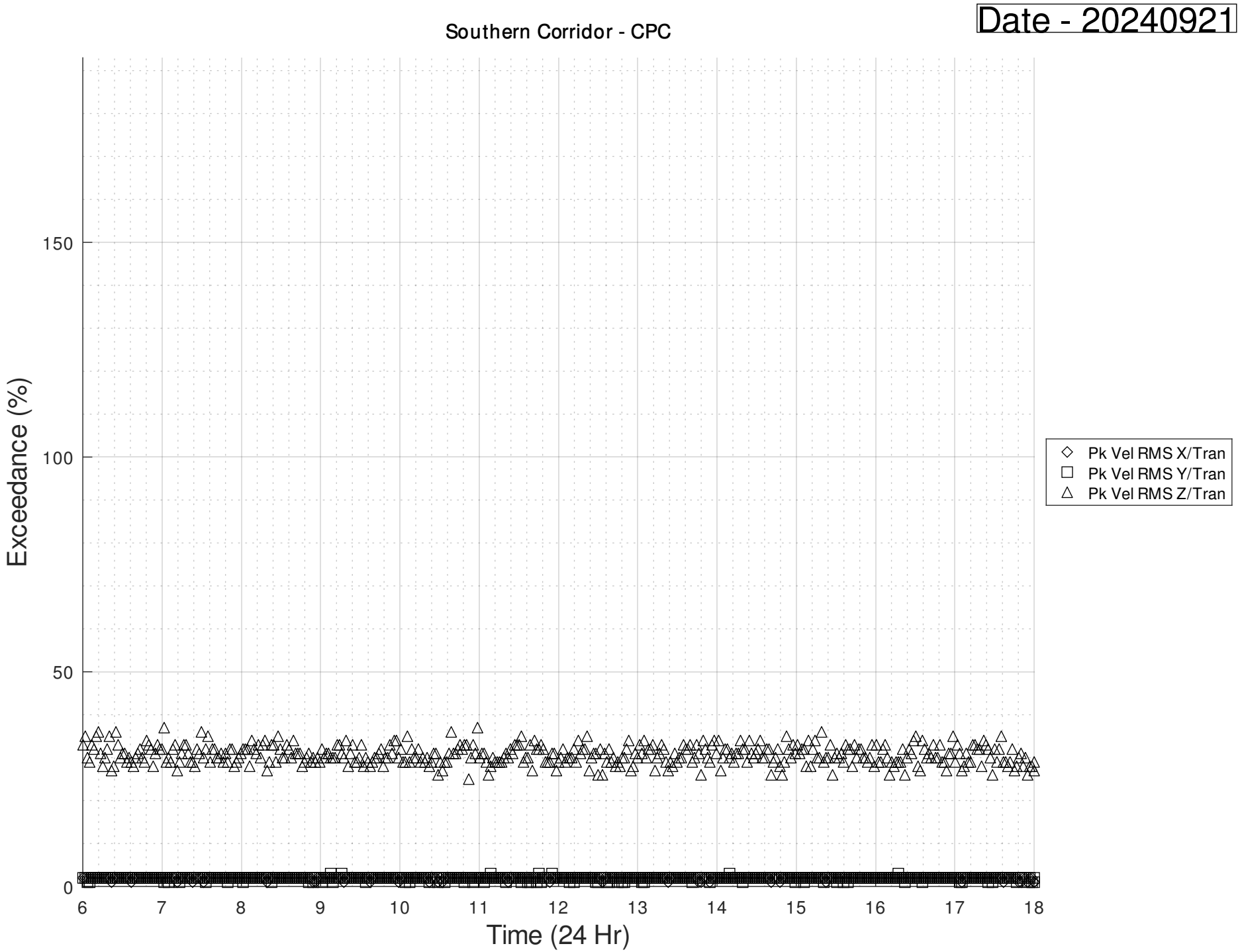
Date - 20240919



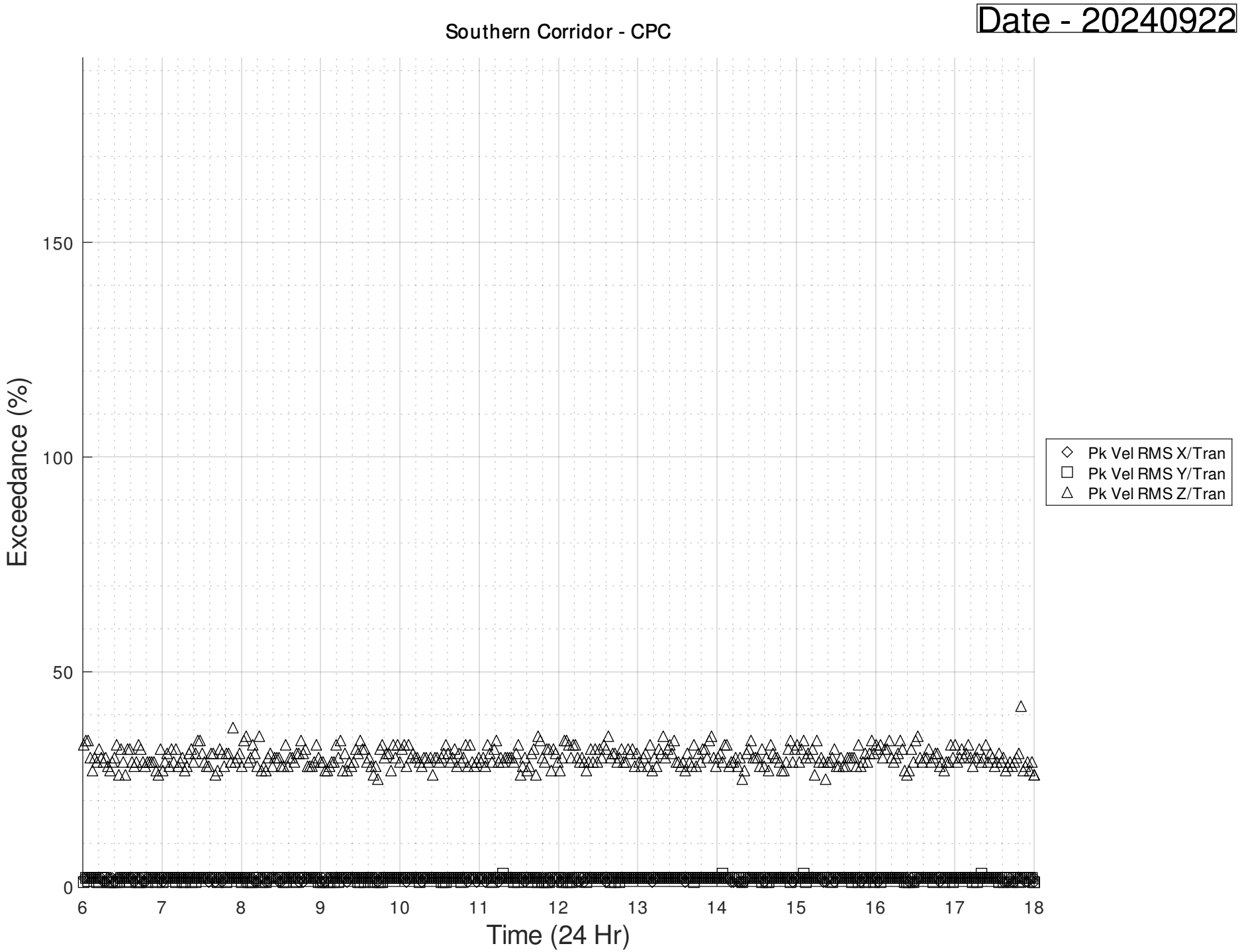
Date - 20240920



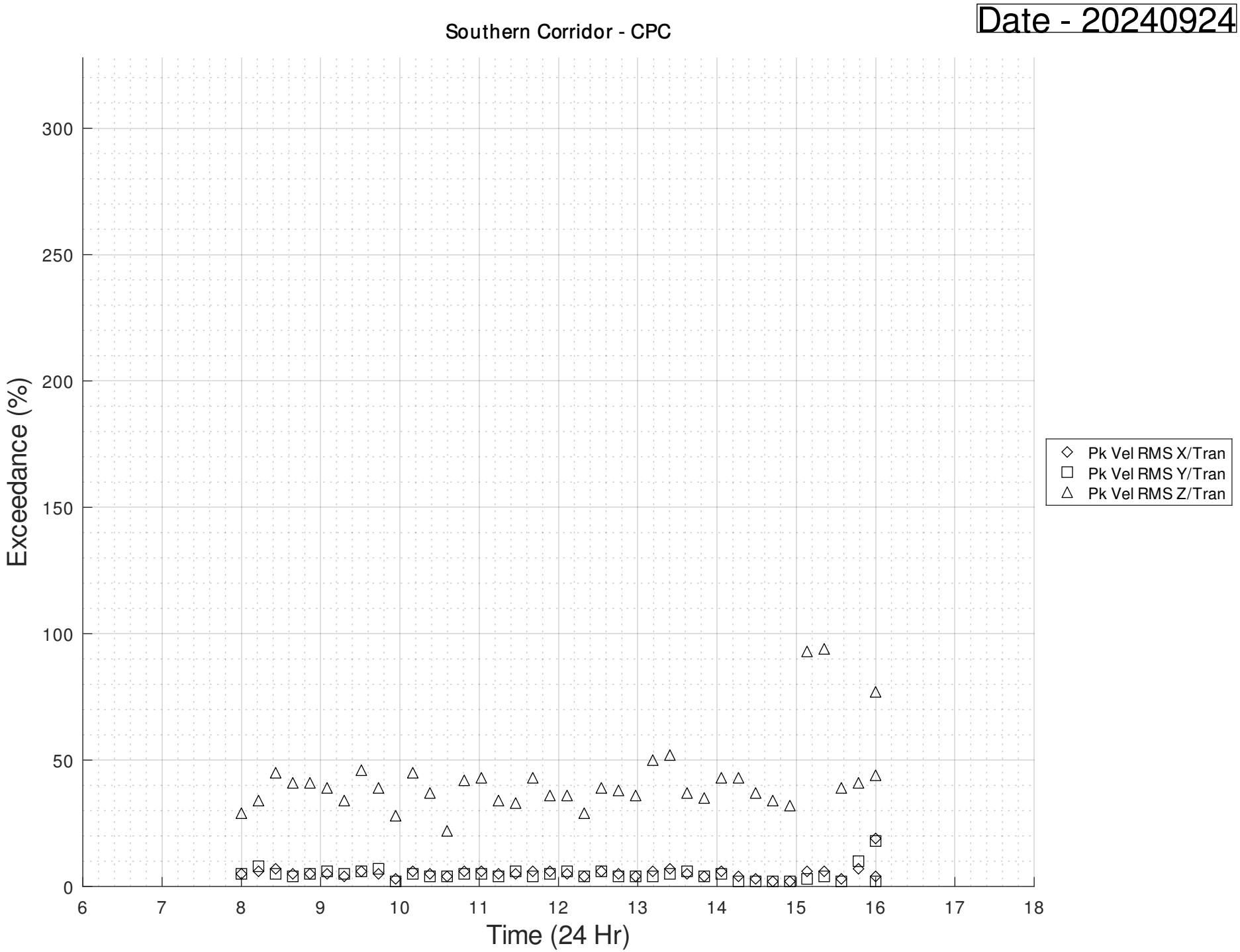
Date - 20240921



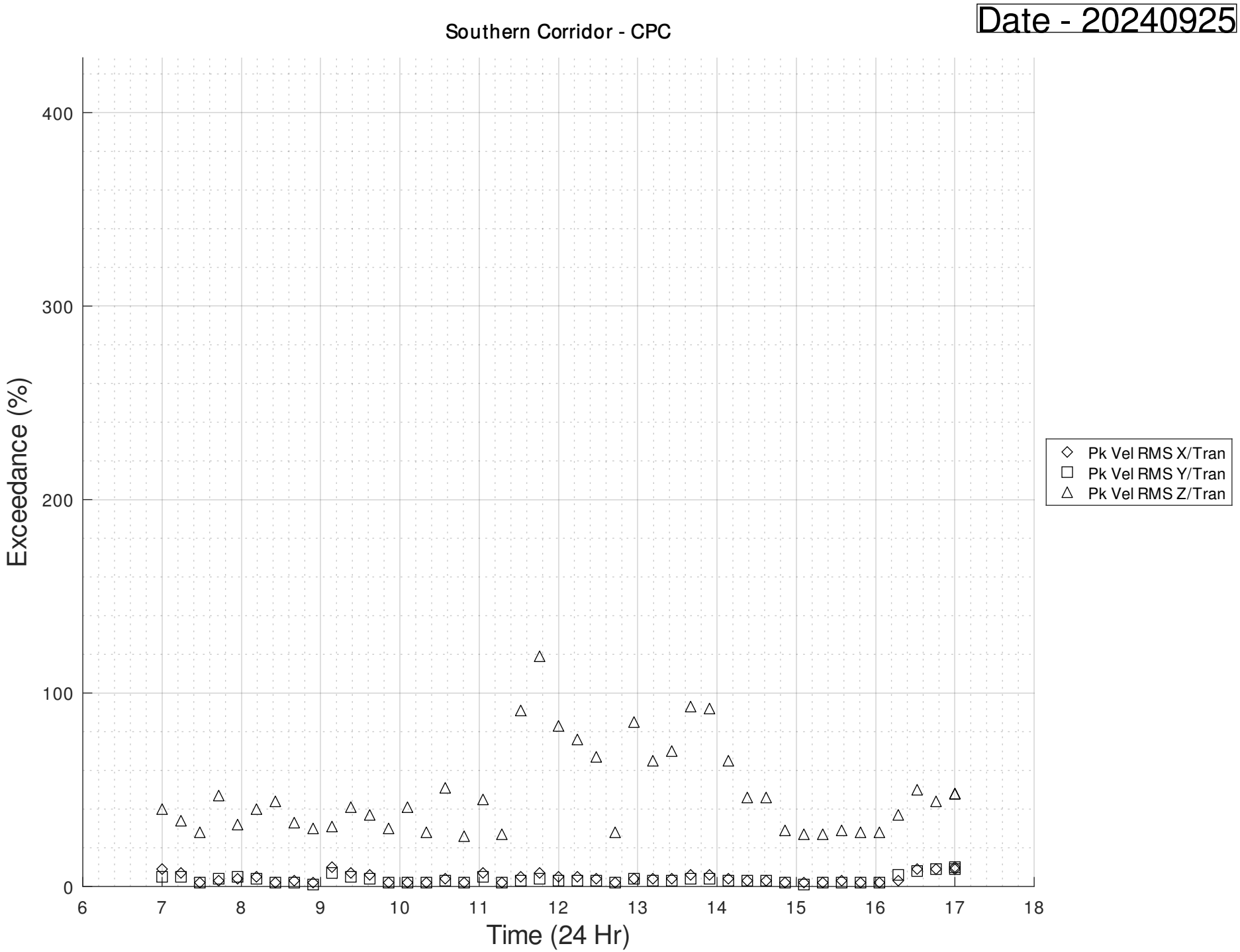
Date - 20240922



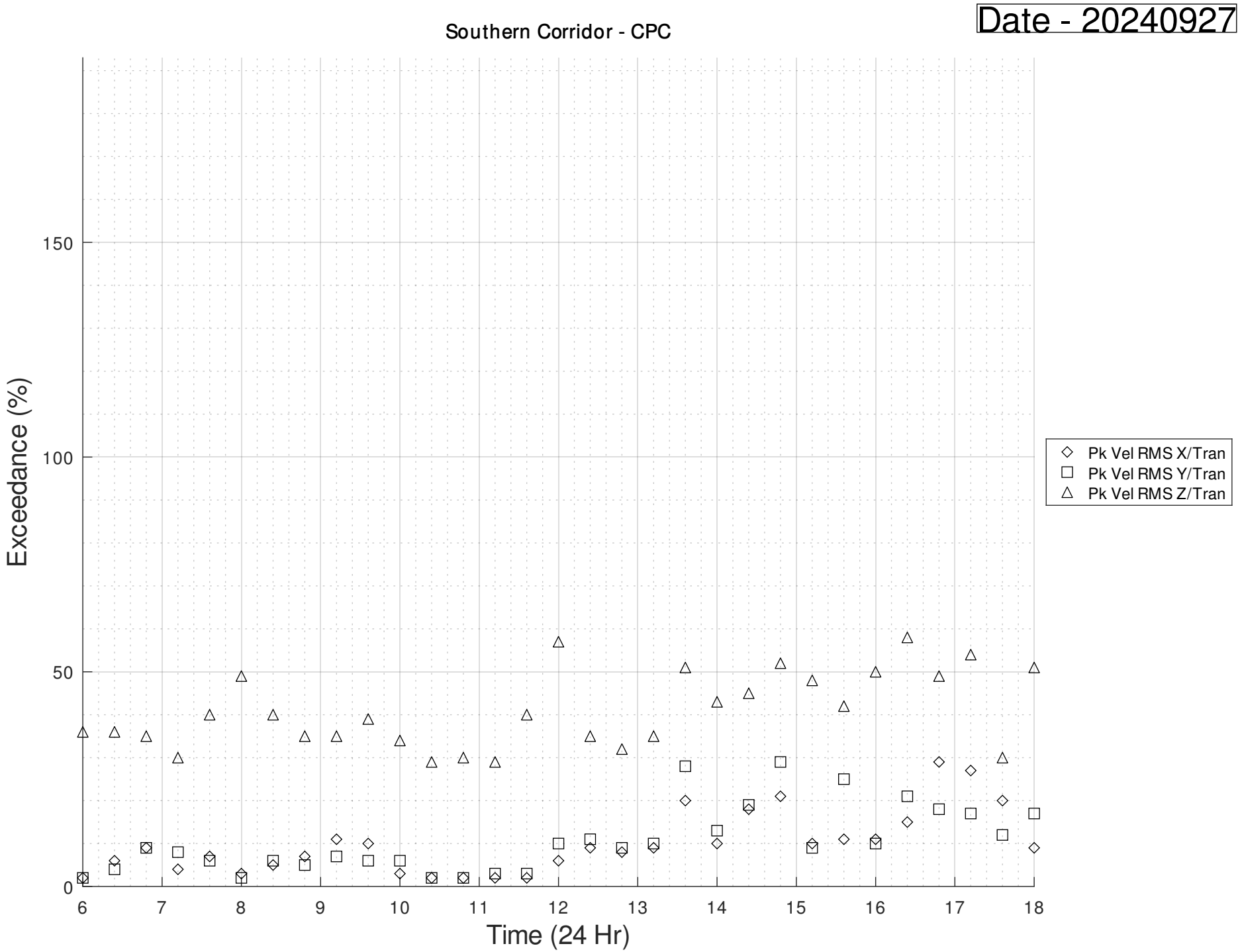
Date - 20240924



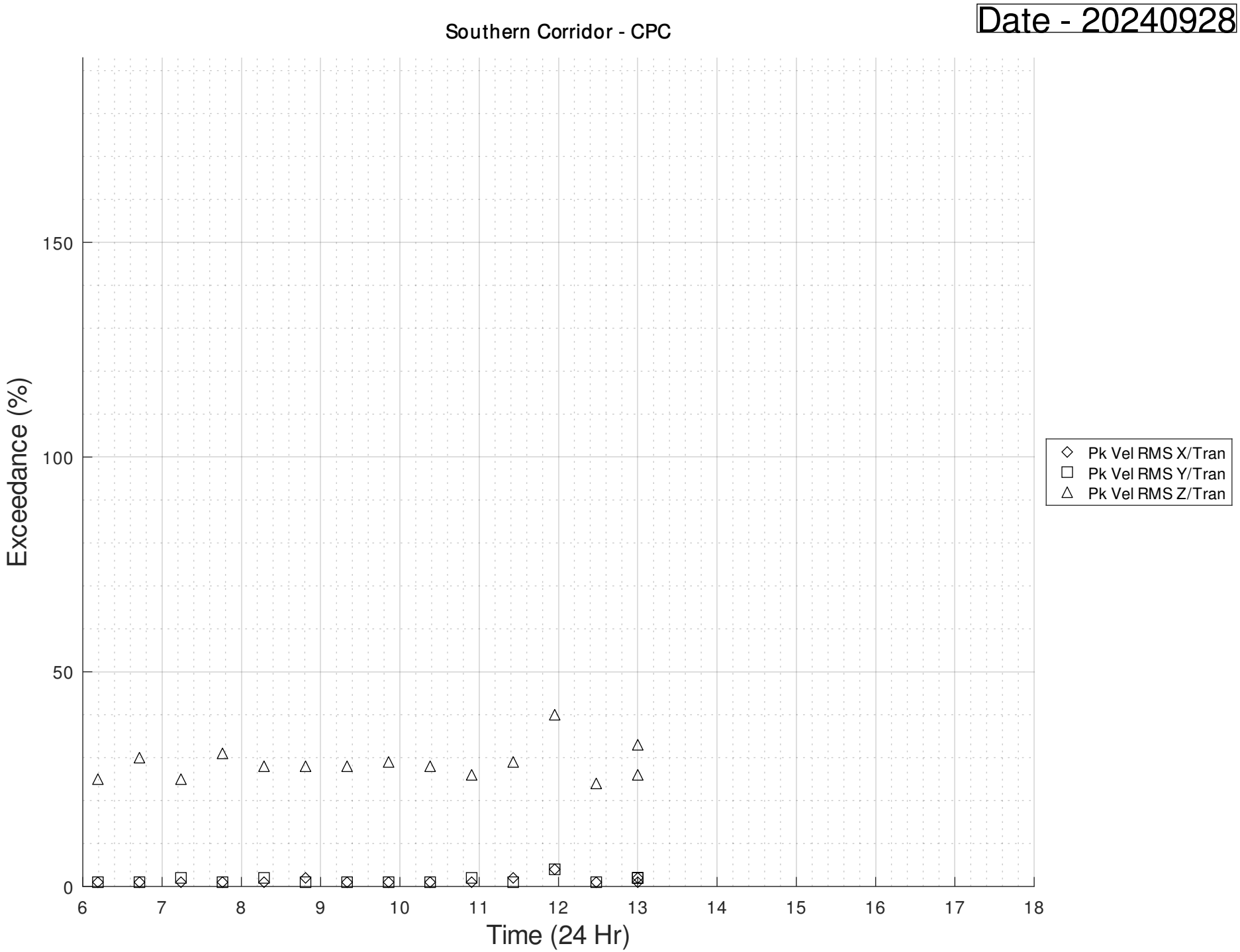
Date - 20240925



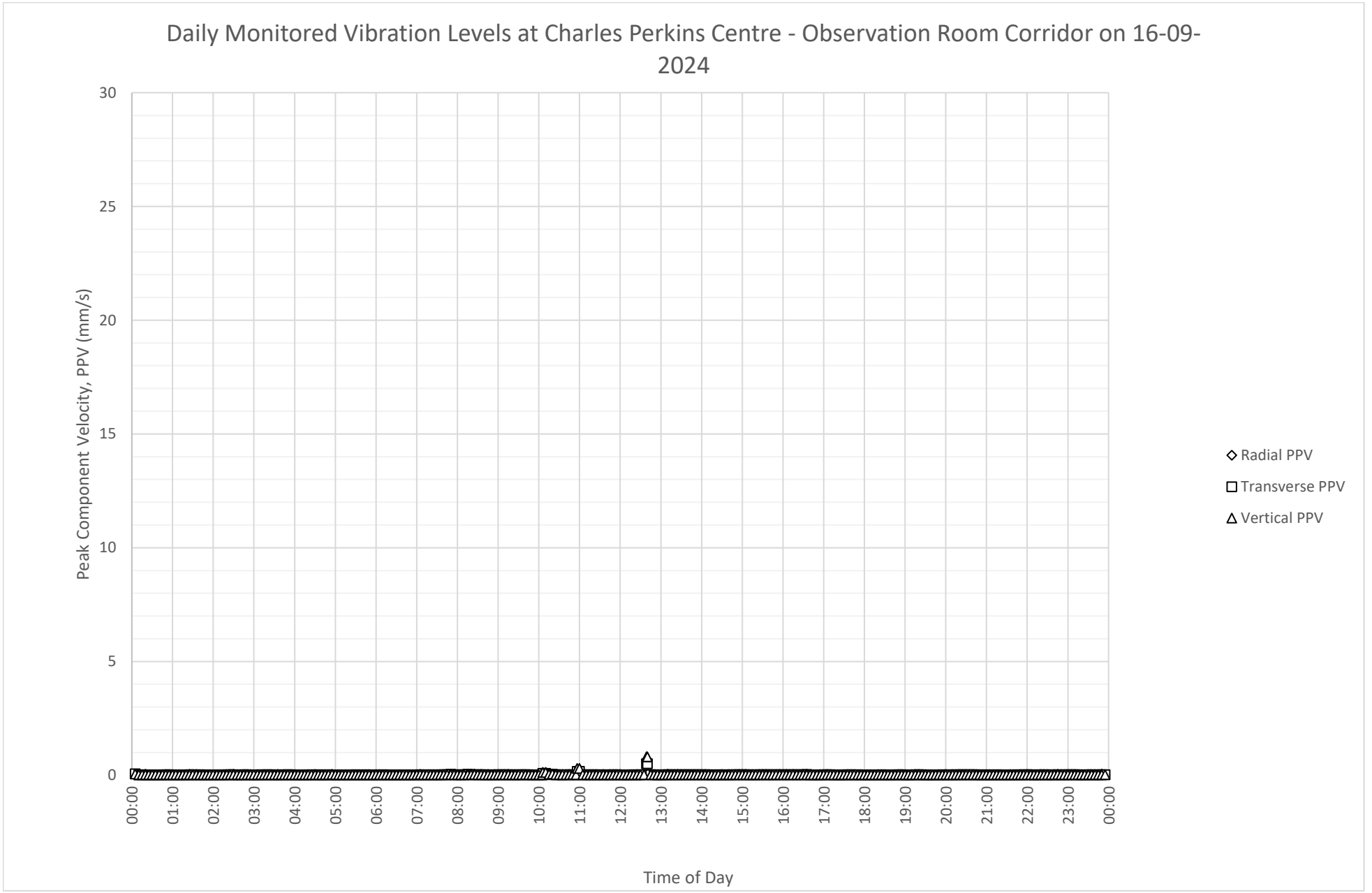
Date - 20240927

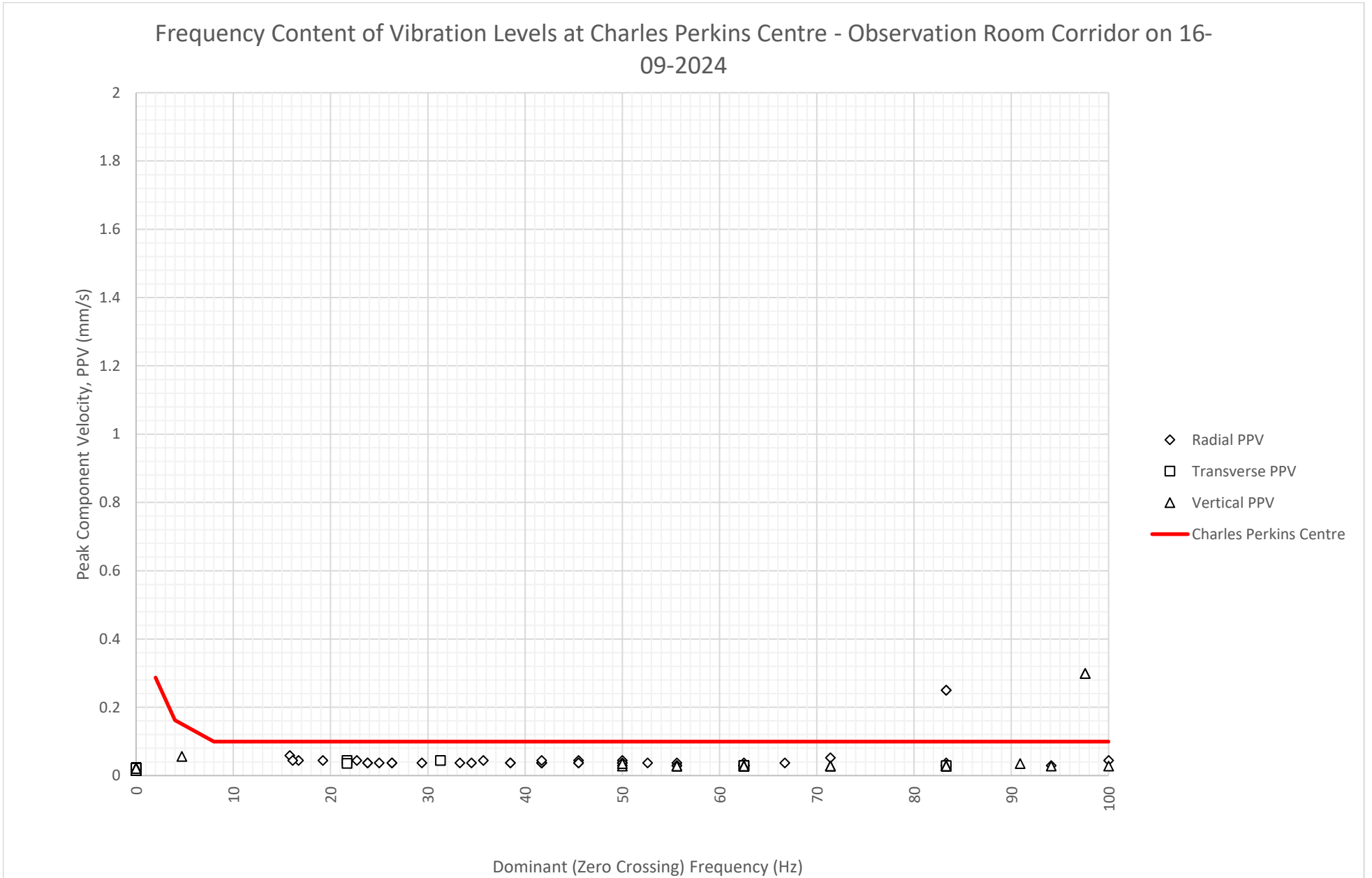


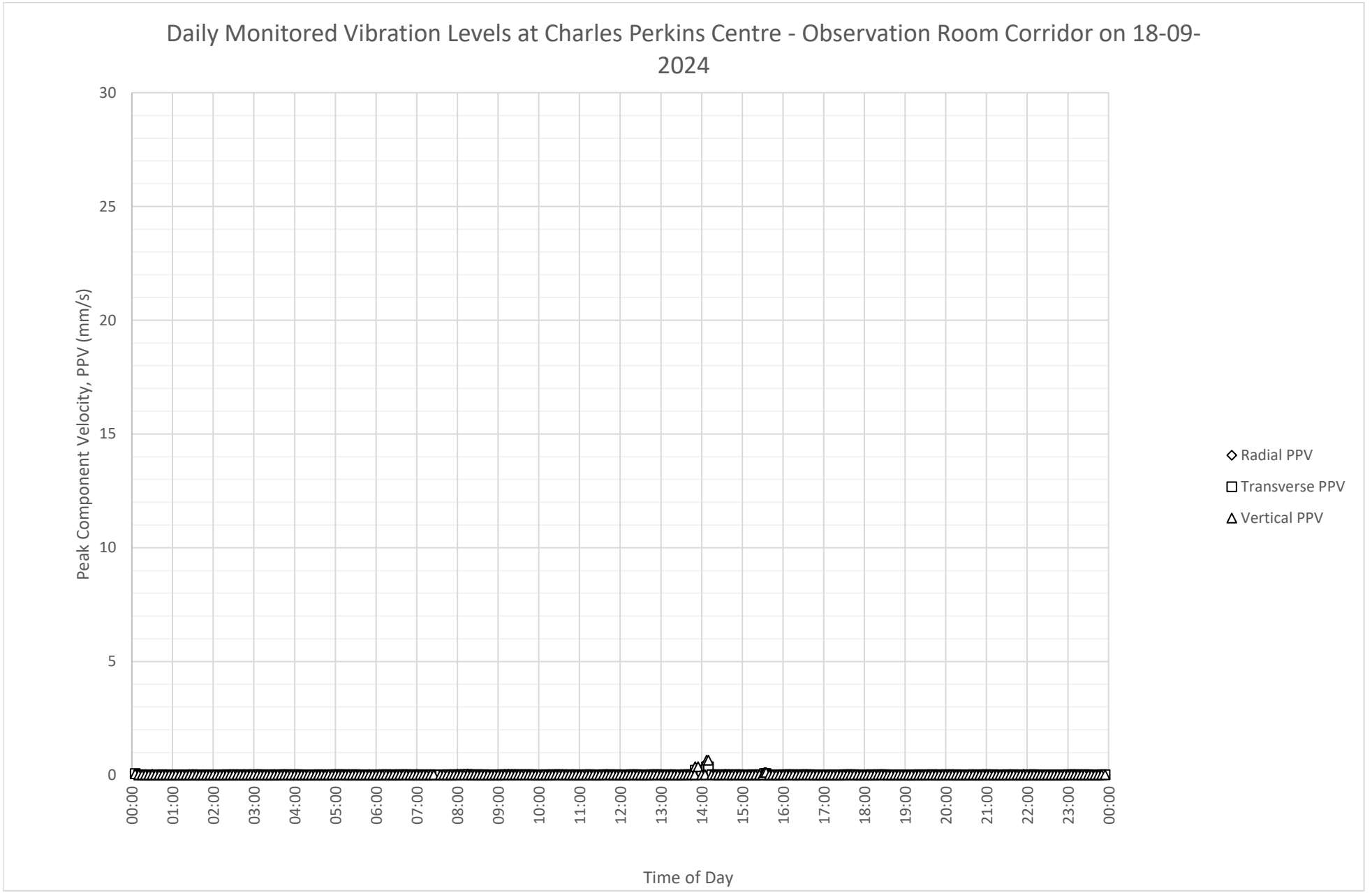
Date - 20240928

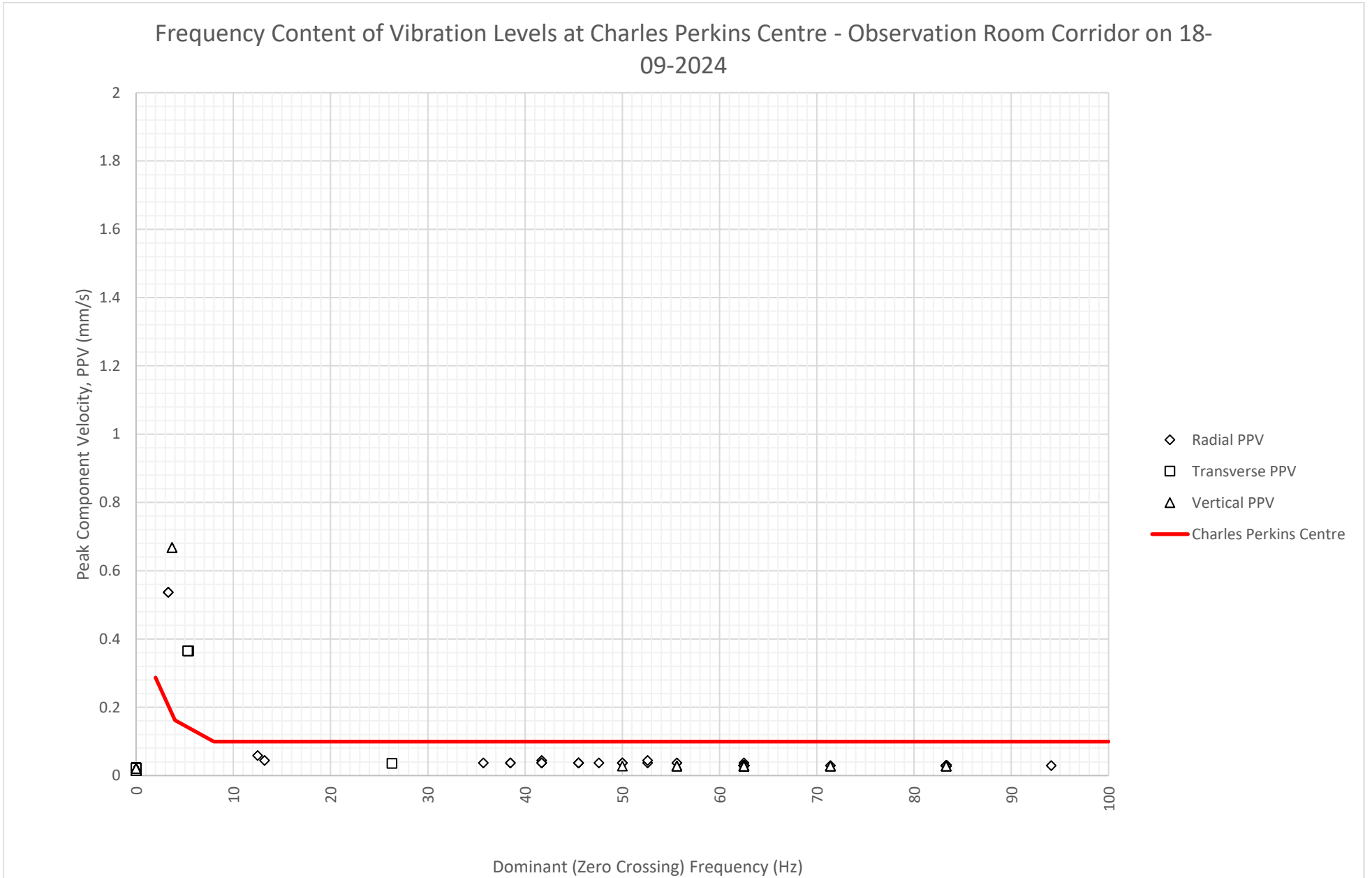


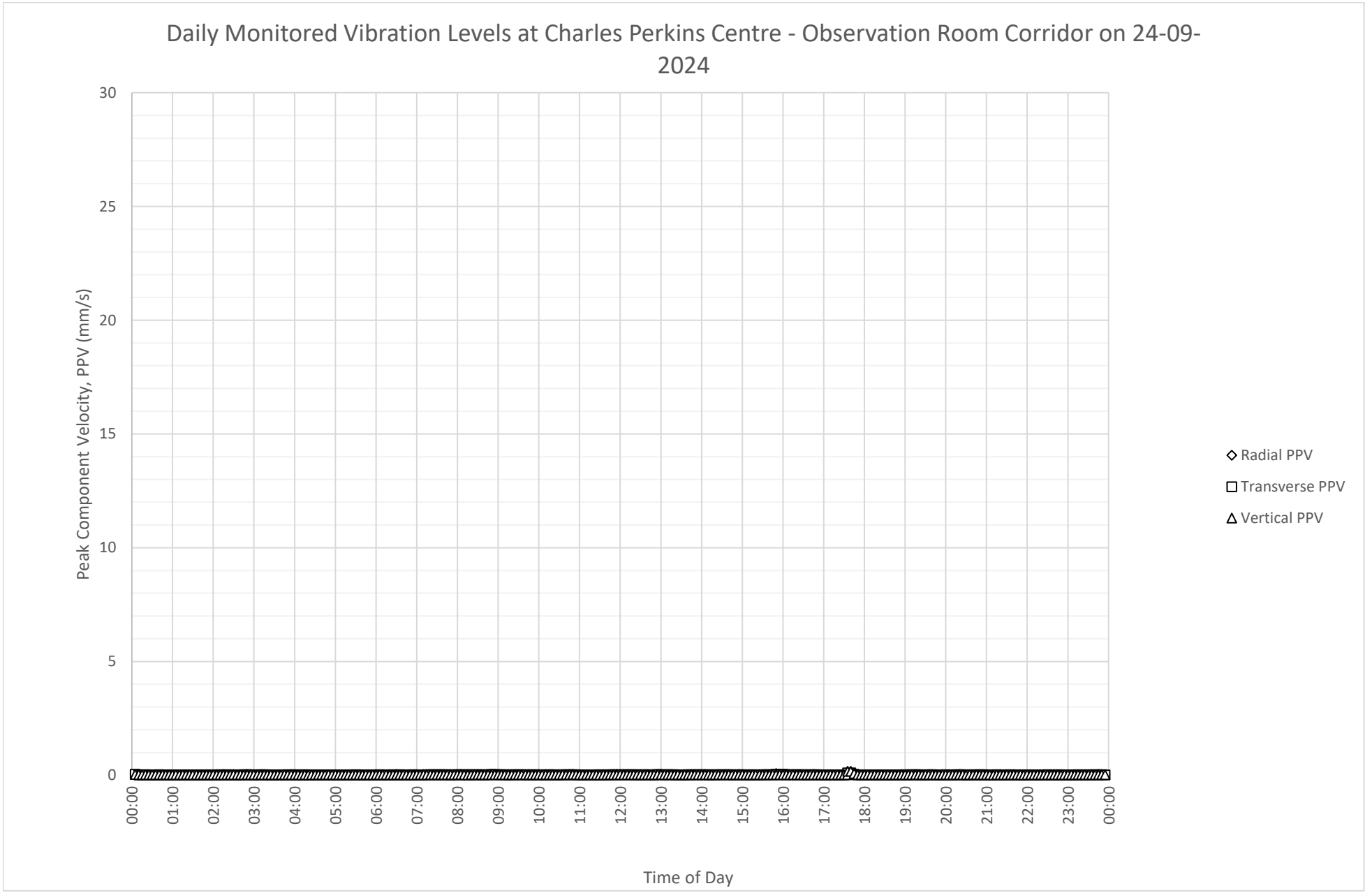
## CHARLES PERKINS CENTRE – LEVEL B1 SOUTHERN WING OBSERVATION ROOM CORRIDOR

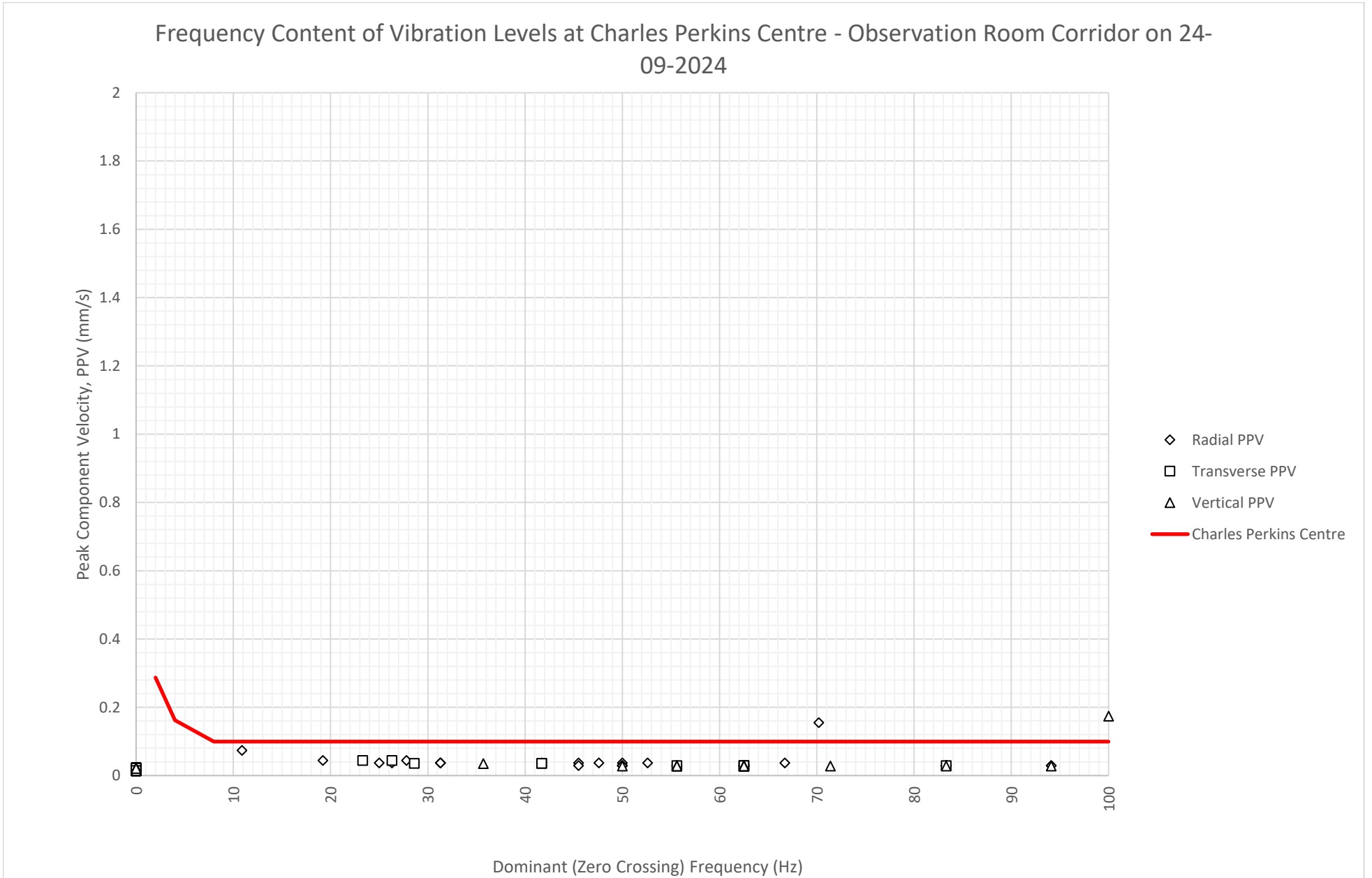

Daily Monitored Vibration Levels at Charles Perkins Centre - Observation Room Corridor on 16-09-2024
Peak Component Velocity, PPV (mm/s)
30
25
20
15
10
5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
00:00
Time of Day
Radial PPV
Transverse PPV
Vertical PPV

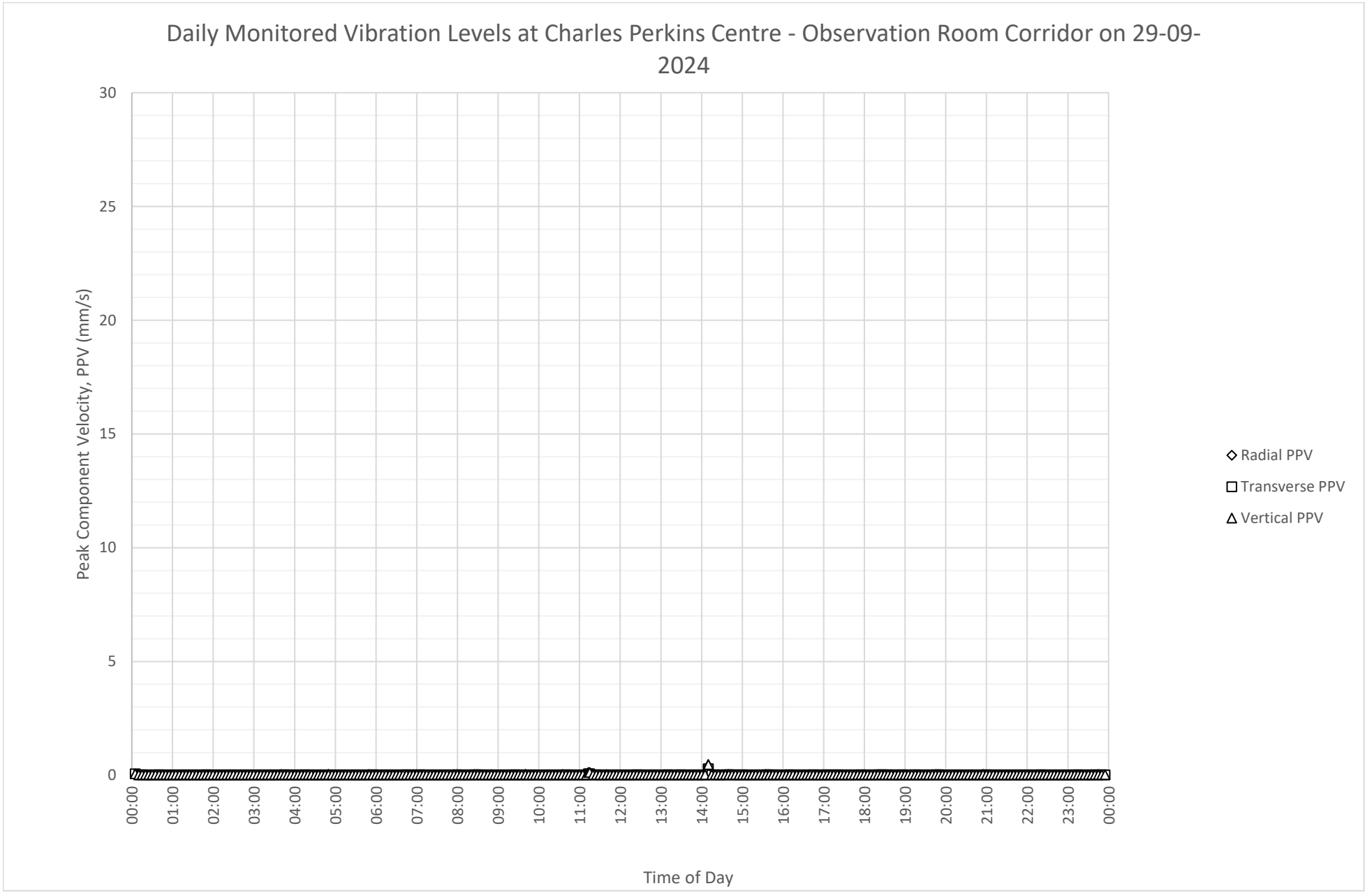

Frequency Content of Vibration Levels at Charles Perkins Centre - Observation Room Corridor on 16-09-2024
Peak Component Velocity, PPV (mm/s)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
10
20
30
40
50
60
70
80
90
100
Dominant (Zero Crossing) Frequency (Hz)
Radial PPV
Transverse PPV
Vertical PPV
Charles Perkins Centre

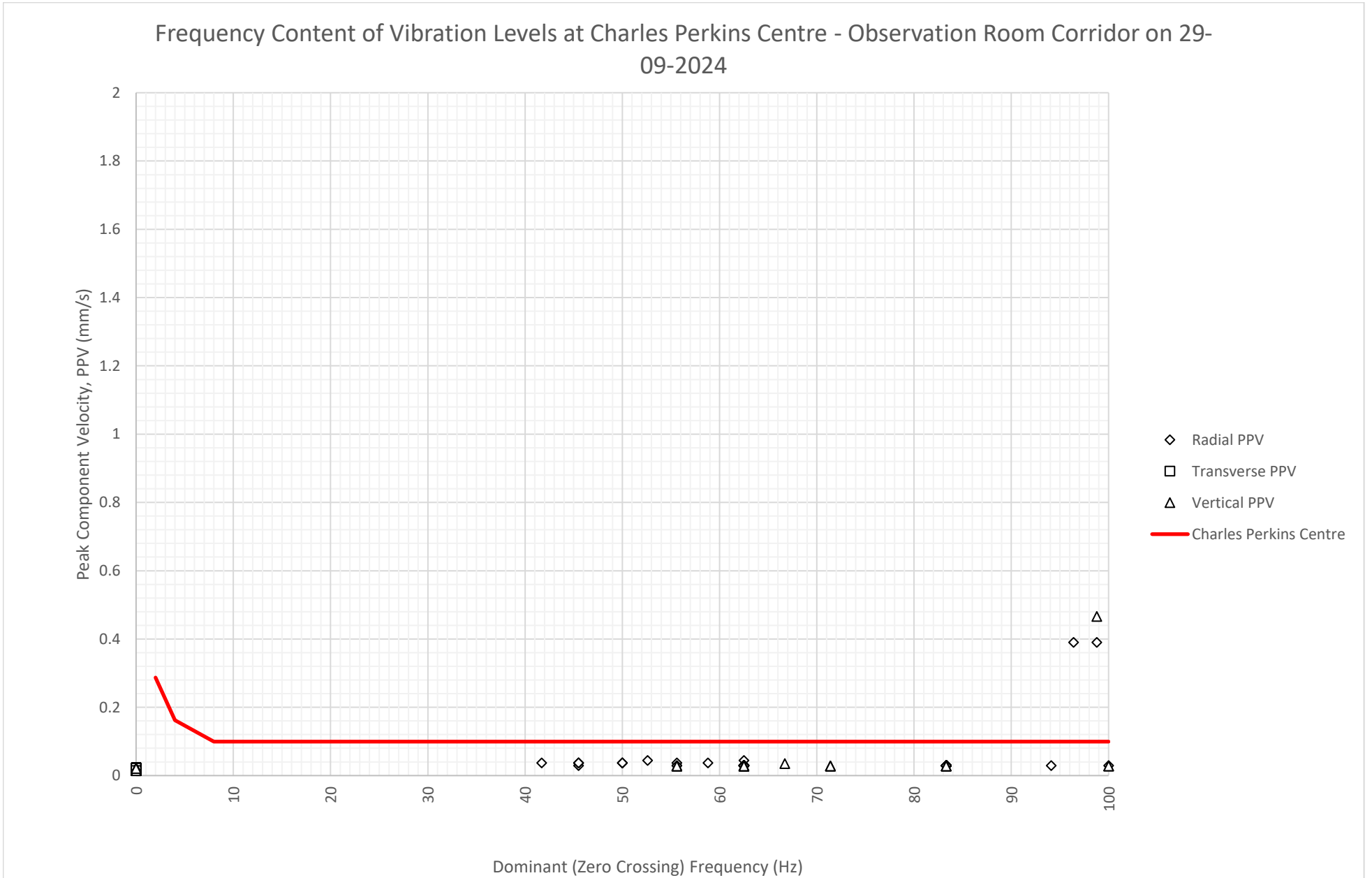

Daily Monitored Vibration Levels at Charles Perkins Centre - Observation Room Corridor on 18-09-2024
Peak Component Velocity, PPV (mm/s)
30
25
20
15
10
5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
00:00
Time of Day
Radial PPV
Transverse PPV
Vertical PPV


Frequency Content of Vibration Levels at Charles Perkins Centre - Observation Room Corridor on 18-09-2024
Peak Component Velocity, PPV (mm/s)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
10
20
30
40
50
60
70
80
90
100
Dominant (Zero Crossing) Frequency (Hz)
Radial PPV
Transverse PPV
Vertical PPV
Charles Perkins Centre


Daily Monitored Vibration Levels at Charles Perkins Centre - Observation Room Corridor on 24-09-2024
Peak Component Velocity, PPV (mm/s)
30
25
20
15
10
5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
00:00
Time of Day
Radial PPV
Transverse PPV
Vertical PPV


Frequency Content of Vibration Levels at Charles Perkins Centre - Observation Room Corridor on 24-09-2024
Peak Component Velocity, PPV (mm/s)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
10
20
30
40
50
60
70
80
90
100
Dominant (Zero Crossing) Frequency (Hz)
Radial PPV
Transverse PPV
Vertical PPV
Charles Perkins Centre


Daily Monitored Vibration Levels at Charles Perkins Centre - Observation Room Corridor on 29-09-2024
Peak Component Velocity, PPV (mm/s)
30
25
20
15
10
5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
00:00
Time of Day
Radial PPV
Transverse PPV
Vertical PPV


Frequency Content of Vibration Levels at Charles Perkins Centre - Observation Room Corridor on 29-09-2024
Peak Component Velocity, PPV (mm/s)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
10
20
30
40
50
60
70
80
90
100
Dominant (Zero Crossing) Frequency (Hz)
Radial PPV
Transverse PPV
Vertical PPV
Charles Perkins Centre

## RPA HOSPITAL MAIN BUILDING – LEVEL 03 NICU

No exceedances of criteria were observed throughout the monitoring period.

## OUTSIDE SUSAN WAKIL HEALTH BUILDING

No exceedances of criteria were observed throughout the monitoring period.