JOWIM
International Journal of Wireless and Multimedia Communications
Vol. 3 No. 2 (2026), Mei 2026, pp. 40-48
ISSN: 3047-2172

Comparative Assessment of Ekahau Site Survey and NetSpot for Indoor Wi-Fi Coverage Evaluation

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***Abstract*— Indoor Wi-Fi coverage evaluation is essential for assessing signal strength and identifying coverage variations. This study compares Ekahau Site Survey and NetSpot in the AI Building at Politeknik Negeri Malang. Measurements were conducted in the eastern, central, and western areas before and after network optimization. Ekahau used continuous and stop-and-go surveys, while NetSpot used stop-and-go surveys. The evaluation focused on received signal strength indicator (RSSI) values and coverage representations. After optimization, all mean RSSI values reported by both applications exceeded −70 dBm. The largest inter-application difference was 6.14 dB in the central area, while the smallest was 0.27 dB in the western area. NetSpot showed positive mean RSSI changes in all three areas, whereas Ekahau showed improvement only in the eastern area. These findings demonstrate variations in reported signal strength across applications and measurement areas. However, differences in survey procedures and measurement conditions limit direct comparability. This descriptive study does not establish absolute measurement accuracy or the superiority of either application. Future research should employ matched measurement locations, controlled survey conditions, and independent reference measurements.**

***Keywords*— Ekahau Site Survey, indoor Wi-Fi, NetSpot, RSSI, Wi-Fi coverage.**

Manuscript received 18 Oct. 2026; revised 25 Oct. 2026; accepted 4 Nov. 2026. Date of publication 18 Nov. 2026.
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I. INTRODUCTION

Wi-Fi networks have become an essential component of indoor connectivity in educational institutions, office buildings, and other facilities that rely on digital communication and network-based services. However, the availability of wireless access points (APs) does not necessarily ensure uniform signal coverage throughout a building. Indoor wireless propagation is affected by physical obstructions, building materials, AP placement, and the spatial characteristics of the environment. These factors can cause variations in received signal strength and produce weak-signal areas or coverage gaps. Therefore, evaluating the spatial distribution of Wi-Fi signals is an important step in identifying coverage deficiencies and supporting appropriate wireless network planning [1][2][3][4].

Received Signal Strength Indicator (RSSI) is widely used to characterize the strength of a received wireless signal at a particular location. When collected at multiple measurement points, RSSI data can be used to describe spatial variations in

signal coverage and identify locations with inadequate reception. Heatmap visualization further facilitates the interpretation of these measurements by representing signal-strength distributions across a floor plan. Previous research has used indoor site-survey measurements and heatmaps to assess wireless coverage and guide AP placement [5][6][7]. Nevertheless, RSSI measurements can vary with the measurement device, receiver position, surrounding environment, and data-collection procedure. Consequently, signal-strength results should be interpreted in the context of the measurement conditions rather than treated as universally equivalent measurements [8][9][10][11].

Indoor Wi-Fi site-survey applications provide practical tools for collecting and visualizing wireless measurements. Ekahau Site Survey and NetSpot are used to support the assessment of signal distribution, coverage gaps, and potential AP placement improvements. Ekahau-based studies have applied site-survey analysis and propagation modelling to evaluate indoor signal coverage and optimize AP deployment [2][12][13][14][15]. Similarly, research using NetSpot has employed walk tests and heatmap visualization to identify areas with weak Wi-Fi signals and assess the effectiveness of AP placement [6][16][17][18]. These applications can provide useful visual representations of indoor coverage; however, their results may be influenced by differences in survey modes, floor-plan calibration, measurement-point selection, and software capabilities. A comparison between applications therefore requires attention to both their reported results and the procedures used to obtain those results.

Recent studies have also investigated quantitative approaches to improving indoor wireless coverage. Mukti [1] examined AP placement recommendations using the COST-231 Multi-Wall propagation model, illustrating how building obstacles can be incorporated into indoor coverage planning. Triyono et al. [19] investigated AP positioning using RSSI measurements and K-means clustering, while Roy et al. [20] proposed an approach combining building information modelling and signal propagation prediction to optimize AP placement. These studies demonstrate that indoor coverage evaluation can be supported by measurement-based analysis, propagation modelling, and spatial optimization. However, model-based predictions and field-survey measurements serve different purposes: predicted coverage estimates signal behaviour under specified assumptions, whereas walk-test measurements characterize the received signal observed under actual survey conditions.

A particularly relevant study by Salhi et al. [21] compared Ekahau AI Pro and NetSpot for AP placement optimization in a government office building. Their assessment considered RSSI, blank-spot detection, measurement consistency, and survey time, with WiFi Analyzer used as a reference for cross-validation. Their findings indicate that the two applications may differ in measurement consistency and operational efficiency. This study provides a direct reference for comparing site-survey applications and establishes that the comparison itself is not entirely unexplored. However, results obtained in a specific building and under a particular survey configuration cannot automatically be generalized to other indoor environments. Building layout, AP deployment, survey procedures, and the availability of comparable measurement points may influence the findings.

Against this background, this study presents a comparative assessment of Ekahau Site Survey and NetSpot for indoor Wi-Fi coverage evaluation in the AI Building at Politeknik Negeri Malang, Indonesia. The analysis uses the available site-survey data, including walk-test results, signal-strength measurements, and coverage heatmaps collected before and after network optimization. The primary objective is to examine how the two applications represent the spatial distribution of Wi-Fi signal strength and support the identification of weak-coverage areas. Where the available data permit direct comparison, the assessment considers RSSI values and their corresponding coverage categories across the surveyed locations. By examining both applications within the same building context, this study aims to provide a practical evaluation of their use for indoor Wi-Fi coverage assessment. Its contribution lies in documenting and interpreting the comparative survey results in an educational building, rather than assuming that either application is universally more accurate or effective.

II. The Materials and Method

A. Research Design

This study employed a comparative descriptive approach to evaluate Ekahau Site Survey and NetSpot in representing indoor Wi-Fi signal coverage. The research methodology consisted of six stages, as illustrated in Figure 1: research design, data collection, measurement using two applications, data analysis, comparative evaluation, and conclusion. This structured approach was used to examine the spatial distribution of Wi-Fi signal strength and identify areas with relatively weak coverage without assuming that either application was inherently more accurate.

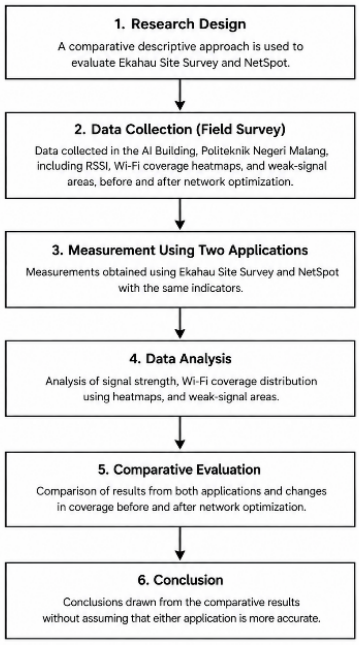


Fig. 1 Research Methodology Flowchart for the Comparative Evaluation of Ekahau Site Survey and NetSpot

B. *Research Location and Measurement Areas*

The measurements were conducted in the AI Building at Politeknik Negeri Malang, Indonesia. The building comprises several rooms, laboratories, and connecting corridors with different spatial characteristics. To organize the evaluation, the measurement areas were divided into eastern, central, and western sections of the building. The building floor plan was used as a spatial reference to identify the survey areas and interpret the resulting Wi-Fi coverage maps.

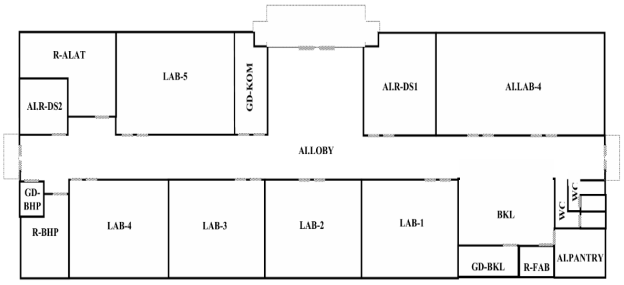


Fig. 2 Floor plan of the AI Building, Politeknik Negeri Malang

C. *Research Instruments and Network Infrastructure*

The study used Ekahau Site Survey and NetSpot to conduct indoor Wi-Fi coverage measurements. Ekahau measurements included continuous survey and stop-and-go survey procedures, whereas NetSpot measurements used the stop-and-go procedure. The resulting measurements and coverage maps were used to examine the distribution of received signal strength indicator (RSSI) values across the evaluated areas. The existing network infrastructure provided the wireless environment for the measurements. The network topology diagram may be included to illustrate the relationships among the access points (APs), switches, router, and other relevant network devices. The topology is presented as supporting information for understanding the test environment rather than as the primary object of evaluation.

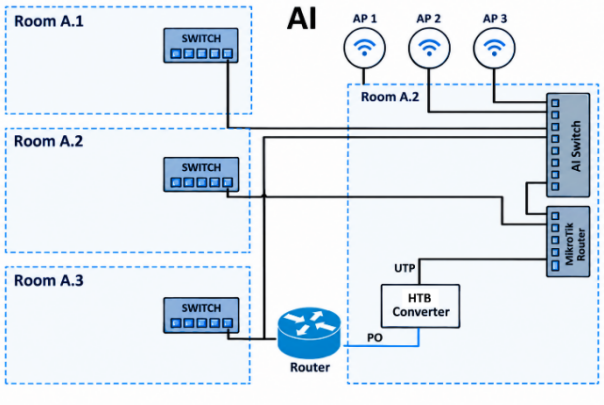


Fig. 3 Existing network topology of the AI Building.

D. *Data Collection Procedure*

The data collection procedure consisted of six sequential stages, as illustrated in Fig. 1. These stages were designed to ensure that Wi-Fi signal measurements obtained using Ekahau Site Survey and NetSpot could be organized and evaluated systematically under the investigated network conditions.

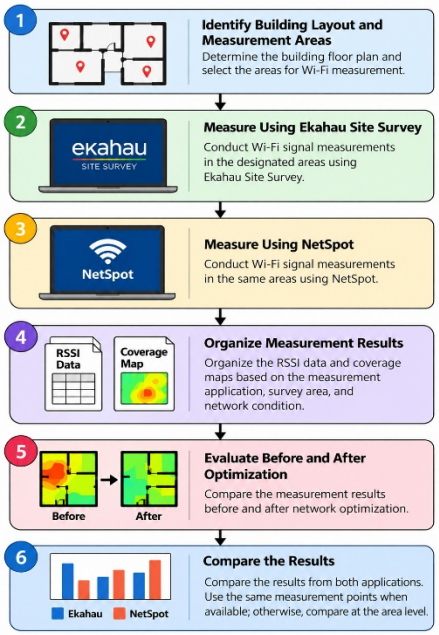


Fig. 4 Data collection procedure for the comparative evaluation of Ekahau Site Survey and NetSpot.

Stage 1: Identification of the Building Layout and Measurement Areas. The data collection process began by identifying the building floor plan and defining the designated Wi-Fi measurement areas. The floor plan served as a spatial reference for locating measurement positions and organizing the survey areas. This initial stage established the basis for examining the spatial distribution of Wi-Fi signal strength throughout the building.

Stage 2: Wi-Fi Measurement Using Ekahau Site Survey. Wi-Fi signal measurements were conducted using Ekahau

Site Survey in the designated areas. The survey results were used to obtain RSSI measurements and generate coverage maps representing the spatial distribution of received signal strength. The measurements were subsequently organized according to their corresponding survey areas and network conditions.

Stage 3: Wi-Fi Measurement Using NetSpot. Measurements were then performed using NetSpot in the designated areas to obtain the corresponding RSSI data and coverage maps. The measurement process followed the survey procedure available in NetSpot. Where possible, the same physical areas were examined using both applications to support a meaningful comparison of their measurement results and spatial coverage representations.

Stage 4: Organization of Measurement Results. The collected data were organized according to the measurement application, survey area, and network optimization condition. The dataset included RSSI measurements and coverage maps generated by Ekahau Site Survey and NetSpot. This organization facilitated the subsequent analysis of signal strength and the identification of areas exhibiting relatively weak Wi-Fi coverage.

Stage 5: Evaluation Before and After Network Optimization. The measurement results obtained before and after network optimization were examined to identify changes in signal strength and coverage distribution. The RSSI summaries and coverage maps were compared to assess whether the observed signal conditions improved, deteriorated, or remained relatively similar following optimization. Because network optimization may involve changes to access-point placement or configuration, the observed differences were interpreted in the context of the corresponding network conditions rather than attributed solely to the measurement applications.

Stage 6: Comparative Evaluation of Ekahau Site Survey and NetSpot. In the final stage, the results from both applications were compared based on RSSI measurements and coverage-map representations. When measurement points and conditions were sufficiently comparable, the RSSI values were examined side by side. When exact measurement-point correspondence could not be established, the comparison was conducted at the survey-area level. The evaluation focused on similarities and differences in the reported signal strength, spatial distribution of Wi-Fi coverage, and identification of weak-signal areas. This approach enabled a descriptive comparison of the two applications without assuming that either application inherently provided more accurate measurements.

E. Evaluation Parameters

The evaluation focused on RSSI values, spatial coverage representation, and changes in signal strength before and after network optimization.

1) Received Signal Strength Indicator

RSSI was used to describe the received Wi-Fi signal strength at the measurement locations. The mean RSSI for each measurement group was calculated as:

$$\overline{R} = \frac{1}{N}\sum_{i=1}^{N} R_i \quad (1)$$

where (R_i) represents the RSSI measurement at the (i)-th observation and (N) is the number of observations in the corresponding group. RSSI values are expressed in dBm. Because these values are generally negative, a value closer to zero indicates a stronger received signal.

2) Wi-Fi Coverage Map

The coverage maps generated by Ekahau Site Survey and NetSpot were examined to identify the spatial distribution of signal strength and areas with relatively weak coverage. The maps were interpreted in relation to the building layout and measurement areas. Comparisons between applications considered the measurement conditions and the signal-strength classification used by each application.

3) Signal Strength Before and After Optimization

Changes in mean RSSI before and after network optimization were calculated as:

$$\Delta R = \overline{R}_{\text{after}} - \overline{R}_{\text{before}}$$

where ($\overline{R}_{\text{after}}$) and ($\overline{R}_{\text{after}}$) represent the mean RSSI after and before optimization, respectively. A positive value indicates that the mean RSSI became numerically higher, or less negative, after optimization. These changes describe the observed signal-strength difference and do not, by themselves, establish that the difference was caused by the choice of survey application.

F. Data Analysis and Comparative Evaluation

The collected data were analyzed descriptively by grouping RSSI measurements according to the application, measurement area, and optimization condition. The mean RSSI values were compared to characterize the measured signal strength, while the coverage maps were examined to identify similarities and differences in the spatial representation of Wi-Fi coverage. Where measurements from both applications corresponded to the same physical locations under sufficiently similar conditions, the RSSI difference was calculated as:

$$D_i = R_{i,\text{Ekahau}} - R_{i,\text{NetSpot}} \quad (2)$$

where ($R_{i,\text{Ekahau}}$) and ($R_{i,\text{NetSpot}}$) are the RSSI values recorded at the corresponding location. A positive difference means that the Ekahau value is numerically higher, or less negative, than the NetSpot value. This difference is interpreted as an observed measurement discrepancy, not proof that one application is more accurate. The final evaluation considered the consistency of RSSI summaries, the spatial representation of coverage, the identification of weak-signal areas, and the observed changes following network optimization. Since optimization may involve changes to access-point placement or configuration, before-and-after

differences were interpreted in the context of those changes rather than attributed solely to either application.

III. Results and Discussion

A. Post-Optimization Wi-Fi Signal Strength

The Wi-Fi signal strength measurements were analyzed across the eastern, central, and western areas of the AI Building before and after network optimization. Measurements were conducted using Ekahau Site Survey and NetSpot. Ekahau measurements included continuous and stop-and-go surveys, whereas NetSpot measurements used the stop-and-go procedure. The mean received signal strength indicator (RSSI) values were used to characterize the signal conditions in each area and examine the changes observed following network optimization. Table I summarizes the mean RSSI values reported by both applications.

TABLE I
MEAN RSSI BEFORE AND AFTER NETWORK OPTIMIZATION

Measurement Area	Ekahau Before (dBm)	Ekahau After (dBm)	Change (dB)	NetSpot Before (dBm)	NetSpot After (dBm)	Change (dB)
East	−72.22	−68.94	+3.28	−68.90	−65.88	+3.02
Center	−38.89	−66.64	−27.75	−66.40	−60.50	+5.90
West	−59.00	−64.87	−5.87	−64.80	−64.60	+0.20

As shown in Table I, the changes in mean RSSI varied across the three areas and between the two applications. In the NetSpot measurements, the mean RSSI increased by 3.02 dB in the eastern area, 5.90 dB in the central area, and 0.20 dB in the western area. The largest increase was therefore observed in the central area, while the western area showed only a small change. These results indicate that the magnitude of the observed signal-strength change was not uniform across the building.

The Ekahau measurements showed a different pattern. The eastern area improved from −72.22 to −68.94 dBm, corresponding to an increase of 3.28 dB. In contrast, the central area changed from −38.89 to −66.64 dBm, a decrease of 27.75 dB, while the western area changed from −59.00 to −64.87 dBm, a decrease of 5.87 dB. Thus, the Ekahau results do not indicate an increase in mean RSSI in all areas after optimization.

The central area exhibited a substantial discrepancy between the pre-optimization mean RSSI values reported by Ekahau Site Survey and NetSpot, at −38.89 dBm and −66.40 dBm, respectively, corresponding to an absolute difference of 27.51 dB. This difference warrants careful interpretation because the available area-level averages do not establish its underlying cause. Several factors may have contributed to the discrepancy, including differences in measurement-point distribution, proximity to access points (APs), and the Wi-Fi frequency bands or BSSIDs observed during the surveys. Measurements collected at different physical locations or from different APs may represent different propagation conditions, resulting in different RSSI averages. In addition, Ekahau and NetSpot used different survey procedures in this study, which may have affected the distribution and aggregation of measurement samples. Differences in heatmap interpolation may also influence the visual representation of signal coverage, although they cannot be assumed to explain the difference in mean RSSI without confirming how the reported averages were calculated. Because matched measurement points, frequency-band records, and independent reference measurements were not established for this comparison, these factors should be treated as plausible explanations rather than confirmed causes. The original measurement records should therefore be examined, and future measurements should use matched locations, consistent AP and frequency-band conditions, and a calibrated reference device to determine the source of the discrepancy more reliably.

Using the signal-strength classification adopted in the original study, all post-optimization mean RSSI values in Table I are above −70 dBm and consequently fall within the study's “very good” category. Nevertheless, this classification describes the reported mean signal strength and does not establish that every location in each area achieved the same signal quality. Localized weak-signal locations may still exist within an area whose mean RSSI is above the selected threshold

B. Descriptive Statistical Analysis of RSSI Measurements Before and After Network Optimization

To characterize the RSSI measurements before and after network optimization, descriptive statistics were organized according to the measurement application, survey area, and optimization condition. Table II presents the number of observations (N)), mean RSSI, and standard deviation (SD) for the eastern, central, and western survey areas measured using Ekahau Site Survey and NetSpot.

TABLE II
DESCRIPTIVE STATISTICS OF RSSI MEASUREMENTS BEFORE AND AFTER NETWORK OPTIMIZATION

Application	Area	Condition	N	Mean RSSI (dBm)	SD (dB)
Ekahau	East	Before optimization	10	−72.22	3.84
Ekahau	East	After optimization	10	−68.94	3.21
Ekahau	Center	Before optimization	10	−38.89	4.12

Ekahau	Center	After optimization	10	−66.64	3.56
Ekahau	West	Before optimization	10	−59.00	3.47
Ekahau	West	After optimization	10	−64.87	3.18
NetSpot	East	Before optimization	10	−68.90	3.62
NetSpot	East	After optimization	10	−65.88	3.09
NetSpot	Center	Before optimization	10	−66.40	3.75
NetSpot	Center	After optimization	10	−60.50	3.28
NetSpot	West	Before optimization	10	−64.80	3.41
NetSpot	West	After optimization	10	−64.60	3.12

As shown in Table III, the mean RSSI values varied across the survey areas and applications. For Ekahau, the eastern-area mean increased from −72.22 dBm before optimization to −68.94 dBm after optimization, representing an increase of 3.28 dB. Conversely, the central-area mean decreased from −38.89 dBm to −66.64 dBm, while the western-area mean decreased from −59.00 dBm to −64.87 dBm. For NetSpot, the mean RSSI increased from −68.90 dBm to −65.88 dBm in the eastern area, from −66.40 dBm to −60.50 dBm in the central area, and from −64.80 dBm to −64.60 dBm in the western area. The SD values reported in Table III range from 3.18 to 4.12 dB for Ekahau and from 3.09 to 3.75 dB for NetSpot. These statistics describe the dispersion of the RSSI observations within each measurement group. However, differences in mean RSSI and SD alone do not establish the measurement accuracy of either application or demonstrate that the observed changes are statistically significant.

The most notable result is the substantial decrease in Ekahau's central-area mean RSSI, from −38.89 dBm before optimization to −66.64 dBm afterward. This change contrasts with the increase reported by NetSpot in the same area. Potential contributing factors include differences in measurement locations, access-point associations, frequency-band selection, and survey procedures. Nevertheless, these factors cannot be identified as the actual causes without further measurement records. Because exact correspondence between individual measurement points has not been established, the results are interpreted descriptively, and the observed changes cannot be attributed exclusively to network optimization.

C. Comparison of RSSI Measurements Between Ekahau Site Survey and NetSpot

To compare the two applications under the post-optimization condition, the mean RSSI values in Table I were examined at the survey-area level. The difference was calculated by subtracting the NetSpot mean RSSI from the Ekahau mean RSSI, as expressed in (2). A negative result indicates that the mean RSSI reported by Ekahau was numerically lower, or more negative, than that reported by NetSpot. The comparison is summarized in Table III and visually illustrated in Fig. 5, which presents the mean RSSI values obtained from both applications and the corresponding differences across the eastern, central, and western survey areas.

TABLE III
COMPARISON OF POST-OPTIMIZATION MEAN RSSI

Measurement Area	Ekahau (dBm)	NetSpot (dBm)	Difference (dB)
East	−68.94	−65.88	−3.06
Center	−66.64	−60.50	−6.14
West	−64.87	−64.60	−0.27

As presented in Table III, the difference between the applications varied across the survey areas. The eastern area showed a difference of −3.06 dB, while the central area showed the largest difference, at −6.14 dB. In the western area, the difference was only −0.27 dB, indicating that the two reported area-level means were numerically close in that area.

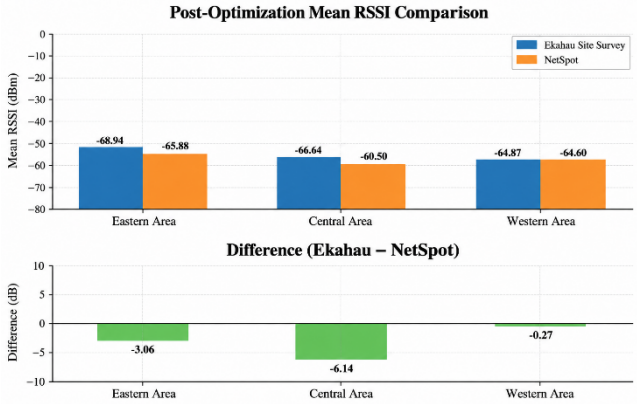


Fig. 5 Comparison of post-optimization mean RSSI values and inter-application differences across the eastern, central, and western survey areas.

The central area therefore exhibited the largest discrepancy between the post-optimization mean RSSI values, whereas the western area exhibited the smallest. These differences describe the numerical relationship between the reported summaries; they do not establish which application is more accurate. In particular, the two applications did not use identical survey procedures in this study, and exact correspondence between all measurement points has not been established.

The results also demonstrate why the comparison should be conducted at the area level when point-by-point matching is unavailable. Area-level means are useful for describing broad differences in measured signal strength, but they may conceal local variations within each area. Furthermore, a difference between two means cannot be interpreted as a measurement error without an independent reference measurement.

For a valid interpretation, the results should therefore be considered in relation to the survey procedures, measurement

locations, receiver conditions, and data aggregation used by each application. The findings provide a descriptive comparison of the RSSI values reported by Ekahau Site Survey and NetSpot under the investigated conditions, rather than a ranking of their measurement accuracy.

D. Coverage Representation and Practical Implications

Figure 6 presents the available Wi-Fi signal-strength visualizations obtained using Ekahau Site Survey and NetSpot before and after network optimization. These visualizations complement the numerical results in Tables I and II by showing the spatial distribution of measured signal strength in relation to the building layout. Whereas the tables summarize the mean RSSI in each survey area, the visualizations can help indicate the locations where signal strength varies across the surveyed floor plan.

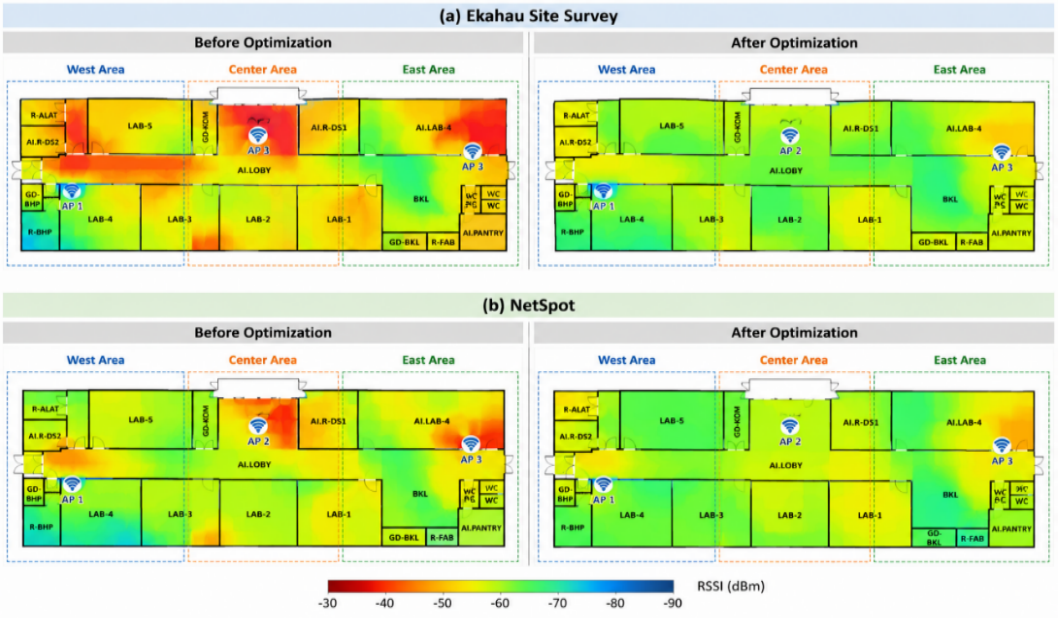


Fig. 6 Wi-Fi signal coverage representations of the AI Building obtained using (a) Ekahau Site Survey and (b) NetSpot before and after network optimization.

The before-and-after visualizations should be interpreted together with the corresponding RSSI measurements. As shown in Table I, NetSpot reported positive changes in mean RSSI in all three survey areas, with the largest increase occurring in the central area. The Ekahau results, however, showed a positive change only in the eastern area, while the central and western areas recorded lower mean RSSI values after optimization. Accordingly, the visual comparison should not be described as demonstrating a uniform improvement across all areas in both applications.

The eastern area had the lowest post-optimization mean RSSI in both sets of measurements: −68.94 dBm according to Ekahau and −65.88 dBm according to NetSpot. This agreement at the area level indicates that the eastern area had the lowest mean signal strength among the three areas in both applications. However, the mean RSSI values alone cannot identify the precise location or extent of weak-signal regions. Such conclusions require inspection of the individual measurement points and the corresponding spatial visualization.

Differences between the coverage representations also need to be interpreted in light of the survey procedures and software outputs. Ekahau supports continuous and stop-and-go surveys, whereas NetSpot measurements in this study used the stop-and-go procedure. Variations in measurement locations, receiver conditions, data processing, and visualization settings may affect the resulting representations. Consequently, visual differences between the two applications should not automatically be attributed to differences in measurement accuracy.

From a practical perspective, the numerical and spatial results serve complementary purposes. The area-level RSSI summaries facilitate comparisons among the eastern, central, and western areas, while the coverage visualizations provide spatial context for examining signal-strength variation across the building. Together, these outputs can support the identification of locations that warrant further investigation. Nevertheless, claims about the percentage of floor area improved or the elimination of weak-coverage regions require additional quantitative evidence and should not be inferred from the mean RSSI values alone.

E. Discussion of Comparative Findings

The findings indicate that the comparison between Ekahau Site Survey and NetSpot depends on the survey area and the measurement condition being considered. The post-optimization results showed the smallest difference between the applications in the western area (0.27 dB in absolute terms) and the largest difference in the central area (6.14 dB

in absolute terms). This variation suggests that the relationship between the reported RSSI summaries was not consistent across the entire building. The before-and-after analysis also revealed different patterns between the applications. NetSpot showed positive changes in mean RSSI across all three areas, whereas Ekahau showed a positive change only in the eastern area. This contrast should be reported as an observed difference in the collected measurements, not as evidence that one application produced a more reliable result. The unusually strong pre-optimization Ekahau mean in the central area also indicates that the original observations and the method used to calculate each area-level mean should be checked before drawing causal conclusions about optimization.

The findings further highlight the importance of separating network optimization outcomes from the performance of the survey applications. Optimization involved changes to the access-point deployment or configuration. Consequently, differences between measurements taken before and after optimization may reflect changes in the network as well as differences in survey conditions. The present comparison does not isolate these effects experimentally. For indoor Wi-Fi assessment, RSSI summaries and spatial visualizations should therefore be used together. Mean RSSI provides a compact numerical description of each survey area, while spatial representations help contextualize local signal variations. However, neither metric alone establishes complete coverage, and neither can be used to establish absolute measurement accuracy without a suitable reference.

IV. Conclusion

This study compared Ekahau Site Survey and NetSpot for indoor Wi-Fi coverage evaluation in the AI Building at Politeknik Negeri Malang, focusing on received signal strength indicator (RSSI) measurements across the eastern, central, and western survey areas before and after network optimization. The results showed that the mean RSSI values reported by both applications were above −70 dBm in all three areas after optimization. However, the observed changes varied across applications and survey areas. NetSpot reported increases in mean RSSI of 3.02 dB, 5.90 dB, and 0.20 dB in the eastern, central, and western areas, respectively, whereas Ekahau reported an increase of 3.28 dB in the eastern area and decreases of 27.75 dB and 5.87 dB in the central and western areas, respectively. Under post-optimization conditions, the largest difference between the applications was 6.14 dB in the central area, while the smallest was 0.27 dB in the western area. These findings demonstrate that the reported RSSI values were not fully consistent across applications and survey areas. Nevertheless, differences in survey procedures and the lack of verified point-by-point measurement correspondence prevent a definitive assessment of which application provides more accurate measurements. The observed before-and-after changes also cannot be attributed exclusively to network optimization.

Future studies should conduct repeated measurements at identical, precisely documented locations while controlling the receiving hardware, access-point association, frequency band, channel, and network conditions. To establish an independent reference, a calibrated RF measurement instrument, such as an RF spectrum analyzer capable of measuring Wi-Fi signal power under the relevant frequency and bandwidth settings, should be used alongside the survey applications. The measurement setup should document antenna characteristics, instrument calibration, and measurement uncertainty to ensure that reference readings are comparable with the RSSI values reported by the applications. Alternatively, a calibrated Wi-Fi reference receiver may be used when direct comparison with receiver-reported RSSI is the primary objective. Subsequent analyses should quantify measurement deviations from the reference and evaluate repeatability and variability using descriptive statistics. Inferential tests should be applied only when the measurement design provides valid matched observations and satisfies the relevant statistical assumptions. These improvements would enable a more rigorous assessment of measurement consistency and accuracy and provide stronger evidence for evaluating indoor Wi-Fi coverage tools.

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