Zebra Dimensioning

Certified Mobile Parcel

User Guide
for the United States

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About this Guide

The guide discusses the Zebra certified parcel dimensioning solution and the Mobile Dimensioning (MD) client. The MD Client provides dimension capture capabilities, demonstrating a line-of-business (LOB) app calling the dimensioning service using the MD application program interface (API). The MD Client is provided by default on select premium Zebra Android™ mobile computers.

For general information on how to use your Zebra mobile computer, refer to the product reference guide for your device.

Notational Conventions

The following conventions are used in this document:

- **Bold** text is used to highlight the following:
  - Dialog box, window, and screen names
  - Dropdown list and list box names
  - Checkbox and radio button names
  - Icons on a screen
  - Key names on a keypad
  - Button names on a screen
- Bullets (•) indicate:
  - Action items
  - List of alternatives
  - Lists of required steps that are not necessarily sequential.
- Sequential lists (for example, those that describe step-by-step procedures) appear as numbered lists.

Overview

The Zebra certified parcel dimensioning solution provides fast and accurate point-and-shoot dimensioning using an integrated time of flight sensor with no external snap-on sensors required.

The certified mobile parcel dimensioning solution provides software sealing features required for certification and adheres to Weights and Measures requirements. The solution can be used as legal-for-trade.

Parcel dimensioning is available for premium mobile computers that feature a time-of-flight (ToF) camera. The following models are supported:

- TC53 (Premium only)
- TC58 (Premium only)
- TC73 (Premium only)
- TC78 (Premium only)

A mobile dimensioning application comes pre-installed on supported models to demonstrate how a line-of-business (LOB) application can use the outputs from the mobile dimensioning framework.

Term Definitions

This section describes the terms used in this guide as they relate to the Zebra Parcel Dimensioning solution.

Dimension Capture
The process of aiming the dimensioning device at a parcel and obtaining length, width, and height dimensions.

Mobile Dimensioning (MD) Client
The MD Client is a demonstration of a LOB app calling the dimensioning service using the MD API. The app allows for testing and demonstration of dimension capture.

LOB App
An app developed using the MD API that is customized for a specific business need.

Dimensioning Service
The combination of software that performs the parcel measurement. When the dimensioning service is called by a LOB app, it presents a user interface that is active for the entire dimension capture.

Length
The larger of the horizontal dimensions of the parcel. It is represented in centimeters or inches and adheres to the Weights and Measures rounding rules.

Width

The smaller of the horizontal dimensions of the parcel. It is represented in centimeters or inches and adheres to the Weights and Measures rounding rules.

Height

The vertical dimension of the parcel above the supporting surface. It is represented in centimeters or inches and adheres to the Weights and Measures rounding rules.

Minimum Bounding Box (MBB)

A rectangular cuboidal construct represents the minimum cuboidal volume occupied by the parcel.

Out of Range

For certified parcel dimensioning, measurements are out of range when above or below the supported range.

The range is 12 - 100 cm (6 - 40 inches)

Place-in-Trade

The process of placing the device in trade by verifying the dimensioning performance of the device to the Type Approval Certificate specifications.

See Initial Place-in-Trade and Reverification terms for additional information

Reverification

Consult with local regulatory agencies for the correct reverification procedure.

Dimension Capture

For the optimal dimension capturing experience, the following sections provide information about dimensioning use cases, aiming methods, tips, and limitations of the framework.
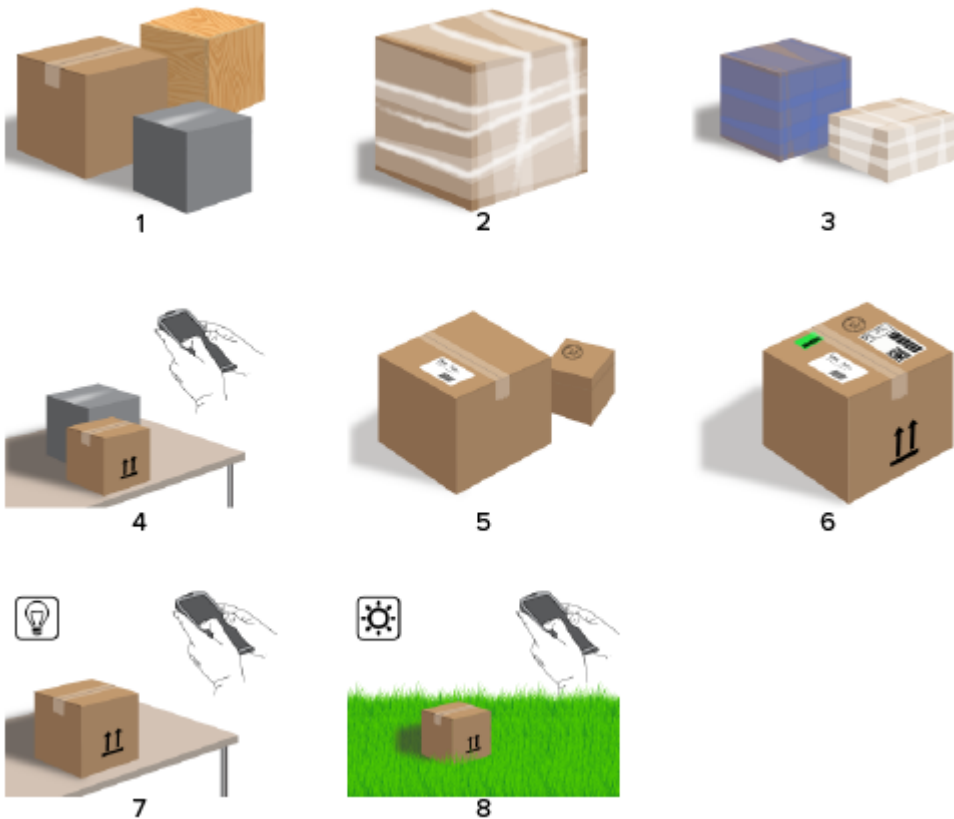
Parcel Use Cases

The Zebra parcel dimensioning solution only supports cuboidal parcels placed on a flat surface.

Supported Parcels and Environments

Supported parcels and environments include cuboidal parcels placed on a flat surface.

Figure 1   Supported Parcel Use Cases

1	Regular cuboid (cardboard, wood, plastic)
2	Clear wrap
3	Non-black wrap
4	Countertop
5	Multiple parcels
6	Label, tape, graphics
7	Indoor lighting
8	Outdoor lighting

Unsupported Parcels and Environments

Unsupported parcels and environments include irregular shapes, envelopes, and handheld parcels.

Figure 2   Unsupported Parcel Use Cases
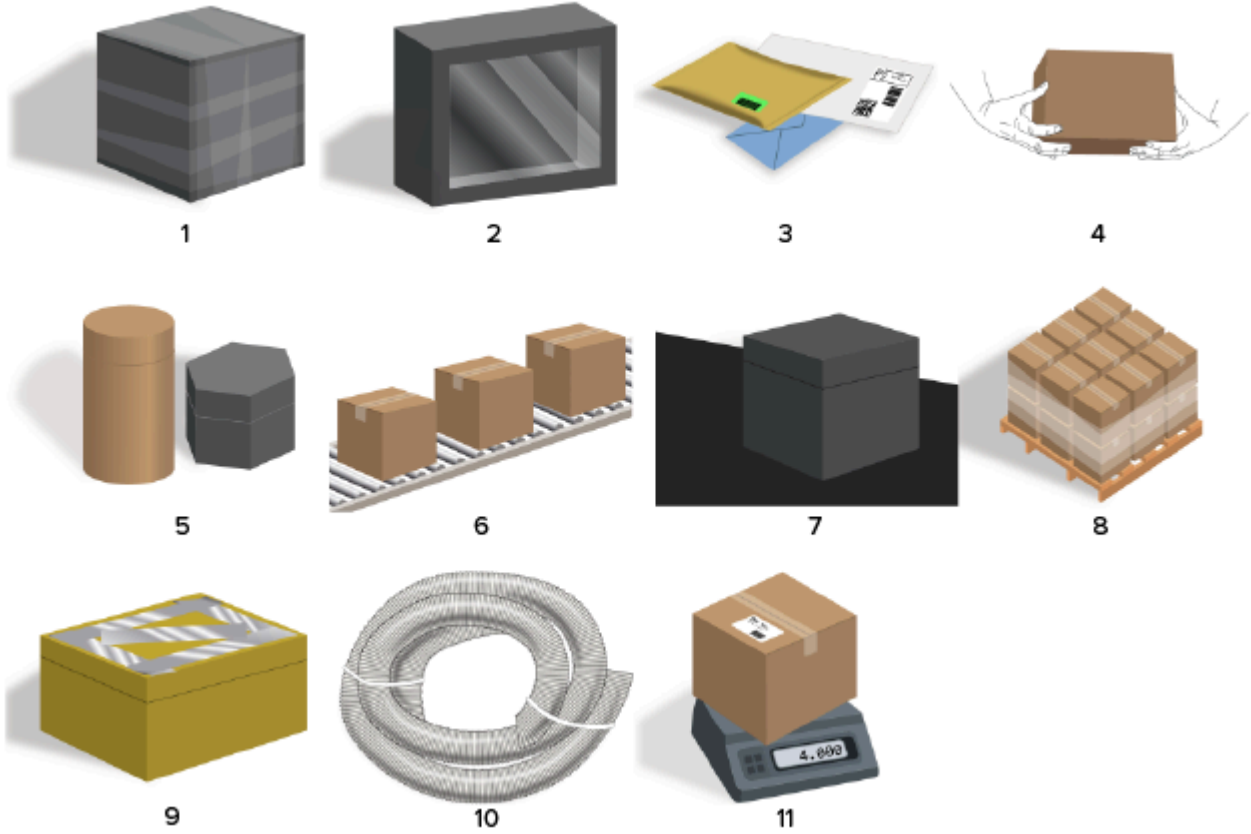
1	Black wrap or parcel
	Non-reflective surface
2	Transparent
3	Envelopes or flat parcels

4	Handheld parcels
5	Non-cuboidal
6	Conveyor belts
7	Black surfaces
8	Palletized freight
9	Metallic tape
	Highly reflective surface
10	Irregular shapes
11	Weight scale

Dimension Aiming Methods

For the optimal dimensioning results, always make sure that the entire parcel is visible in the Viewfinder.

Figure 3 Aiming Methods
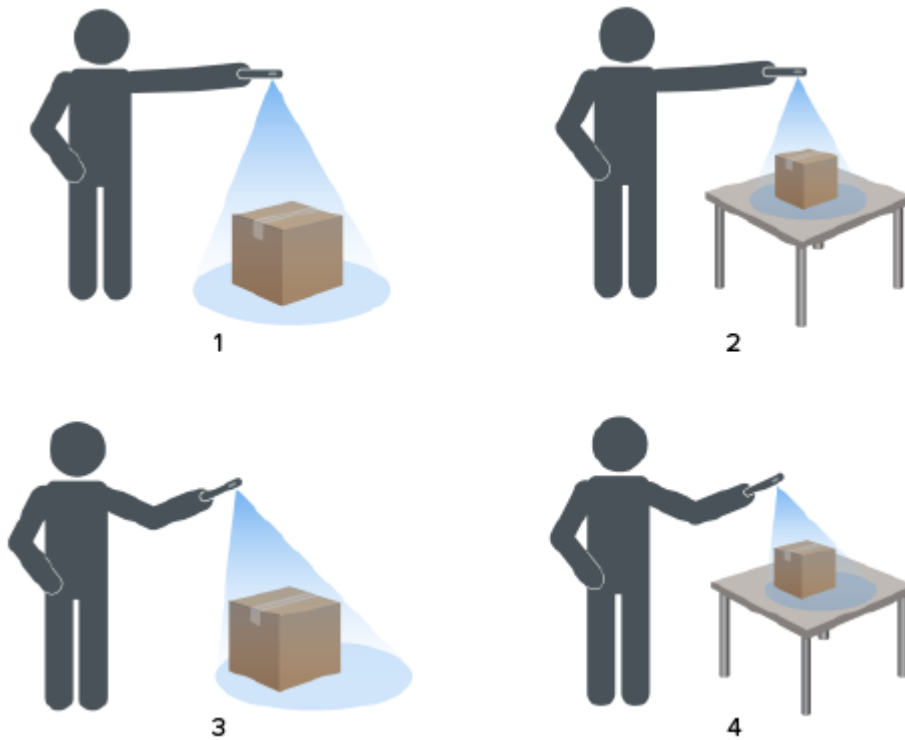
1	Top-down view on floor
2	Top-down view on countertop
3	Angled view on floor
4	Angled view on countertop

Viewfinder Orientation

- Make sure to align the longest edge of the parcel with the longest edge of the Viewfinder.

  - Use portrait mode when aiming at the smaller side of the parcel. For example, when dimensioning tall parcels.

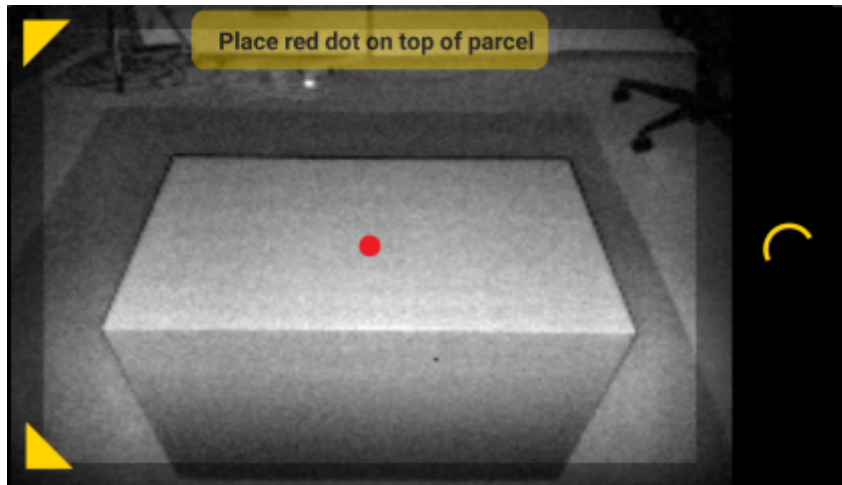 - Use landscape mode when facing the larger side of the parcel. For example, when dimensioning wide parcels.

    Figure 4   Landscape Orientation

- Change between portrait and landscape orientation by rotating the device. From the portrait orientation, rotate the device counterclockwise to change to landscape orientation. From landscape orientation, rotate the device clockwise to move back to portrait orientation.

- When the device orientation is changed, the user interface automatically rotates to the current orientation even if the auto-rotate setting is disabled on the device. This is required for dimensioning to function properly.
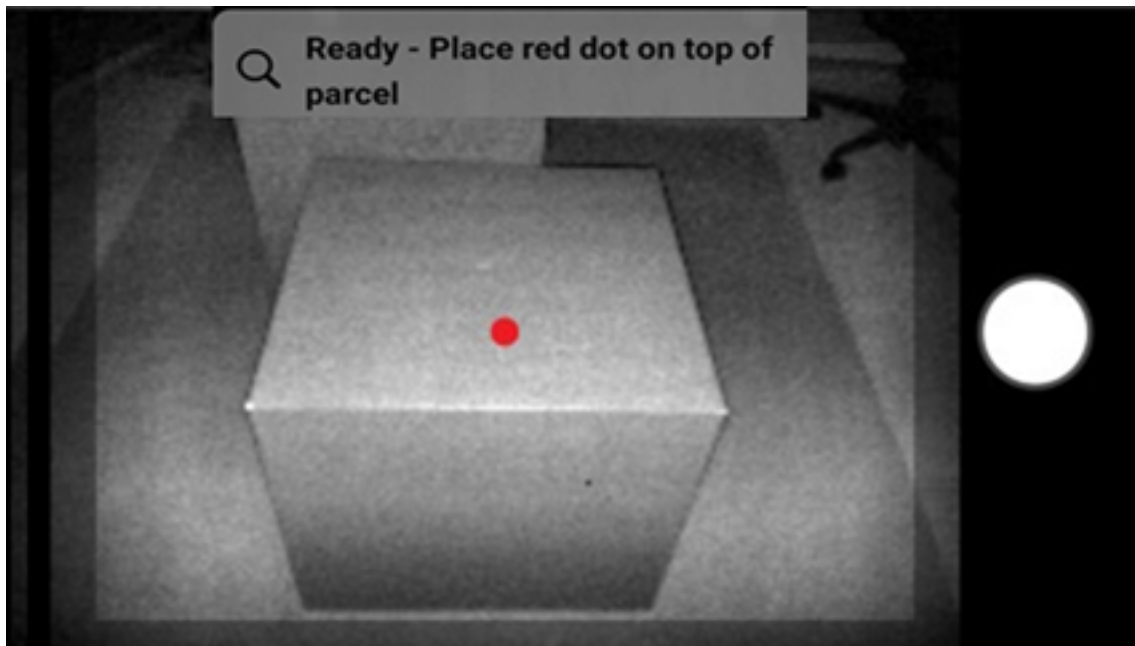
Top-Down Method

The preferred method for parcel dimensioning is to aim straight down from above the parcel.

- Place the on-screen aimer on the middle of the top surface of the parcel.

- Make sure that there is a minimum of 20 cm (7.9 in.) of floor or counter space visible around all sides of the target parcel.

- When multiple parcels are in the Viewfinder, use the on-screen aimer to identify the target parcel.

Figure 5   Multiple Parcels

- Avoid glare from parcel surfaces by tilting the device slightly.

Angled Method

When a top-down view of the parcel is not possible, dimensioning can be performed using an angled method. For this method, it is preferred to aim the Viewfinder at an angle that captures the top and one full side of the parcel.

- Place the on-screen aimer on the top surface of the parcel while keeping the entire parcel visible in the Viewfinder.

- Make sure that there is a minimum of 20 cm (7.9 in.) of floor or counter space around all visible sides of the target parcel.

- When multiple parcels are in the Viewfinder, use the on-screen aimer to identify the target parcel.

Tips for Optimal Dimensioning

To optimize your dimensioning performance, follow these recommended tips.

Minimum Range

It is recommended that the distance to a parcel be at least 40 cm (16 in.).

This is important when dimensioning small boxes. If aiming top-down at close range there may be too much IR glare directed at the dimensioning device. It is visible on the display as a light colored area.

When this happens, tilt the dimensioning device slightly to move the glare off of the parcel's top surface.

The glare spot is easily visible in the first image below. The second image shows the result of tilting the dimensioning device leading to a successful dimension in the third image.

Figure 6 Adjust for Glare
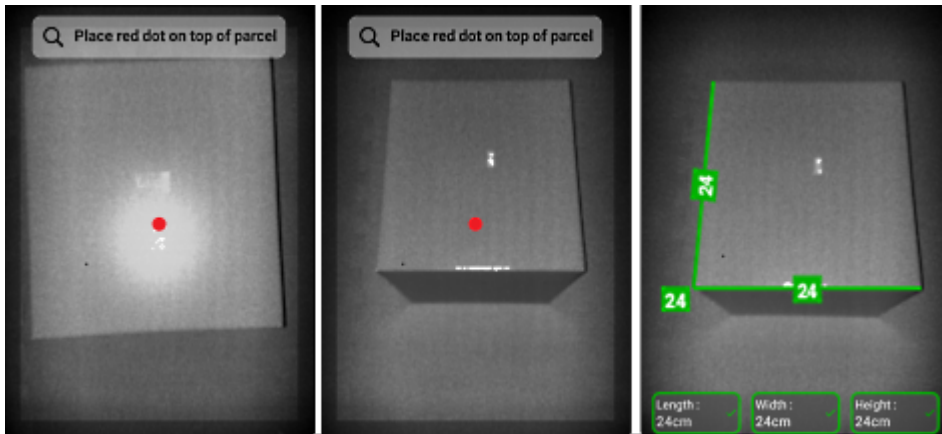
Tall Parcels and Countertop Dimensioning

To successfully dimension a parcel, point the on-screen aimer at the top of the parcel. Aim directly above the parcel as much as possible (within 50° of vertical).

If the parcel is very tall or the counter height makes it difficult for the user to fit the entire parcel within the viewfinder, rotate the parcel so that the smallest dimension is the height.

The following figure illustrates turning a box onto its side, allowing the user a better view of the parcel. The user is able to fit the entire parcel on the screen and point the on-screen aimer at the top of the parcel.

Figure 7 Rotate Parcel to fit in Viewfinder
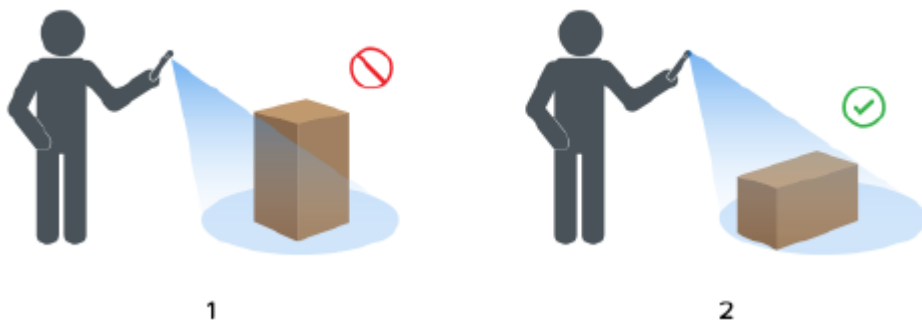
1	Entire parcel is not in the viewfinder
2	Entire parcel is in the viewfinder

Alignment of Parcels within the Viewfinder

The optimal results are obtained when the largest horizontal edge of the parcel is aligned with the largest dimension of the display. This is achieved by using the portrait device orientation when standing next to the smaller side of the parcel and using the landscape device orientation when standing next to the longer side of the parcel.

Figure 8   Parcel Alignment
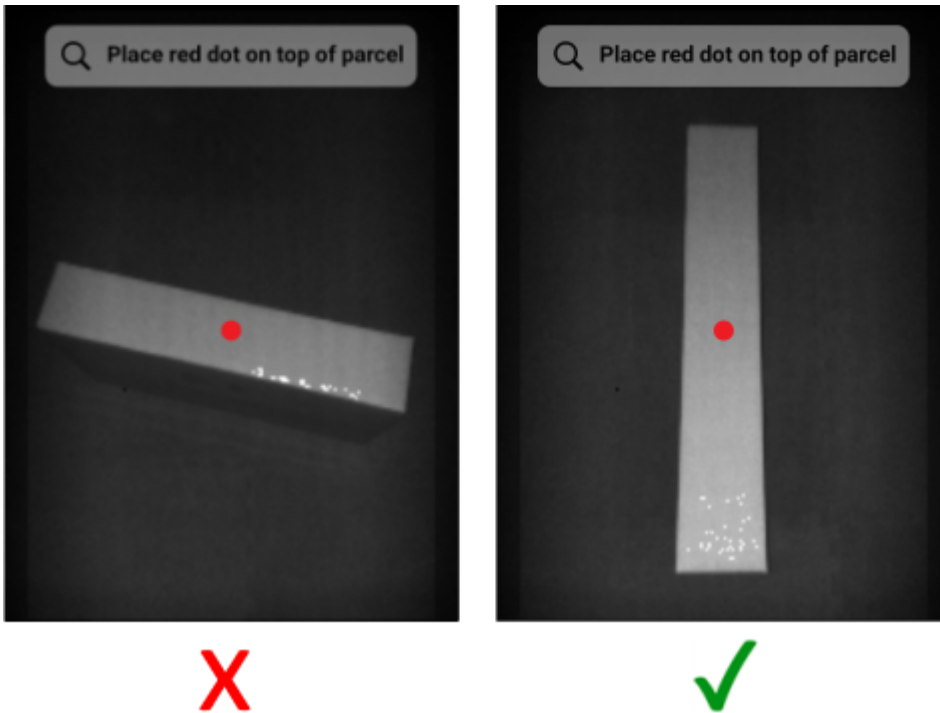
Dimensioning with Multiple Devices

When using multiple devices to perform dimensioning in close proximity, make sure not to overlap the field-of-views.

As part of the dimensioning process, the ToF camera uses illumination that is not visible to the naked eye. No dimensions are captured when the illumination coming from two or more nearby devices overlaps.

Figure 9   Dimensioning with Multiple Devices

1	Overlapping field-of-views
2	Separated field-of-views

Multiple Parcels in the Field-of-View

When more than one parcel is in the field-of-view, fill the screen as much as possible with the intended target. Ensure that the aimer is centered on top of the intended target during the dimensioning process.

Bounding Lines

Bounding lines that match the edges of the parcel indicate a good result. If bounding lines do not match the edges of the parcel, the user should retry.

Figure 10   Bounding Lines
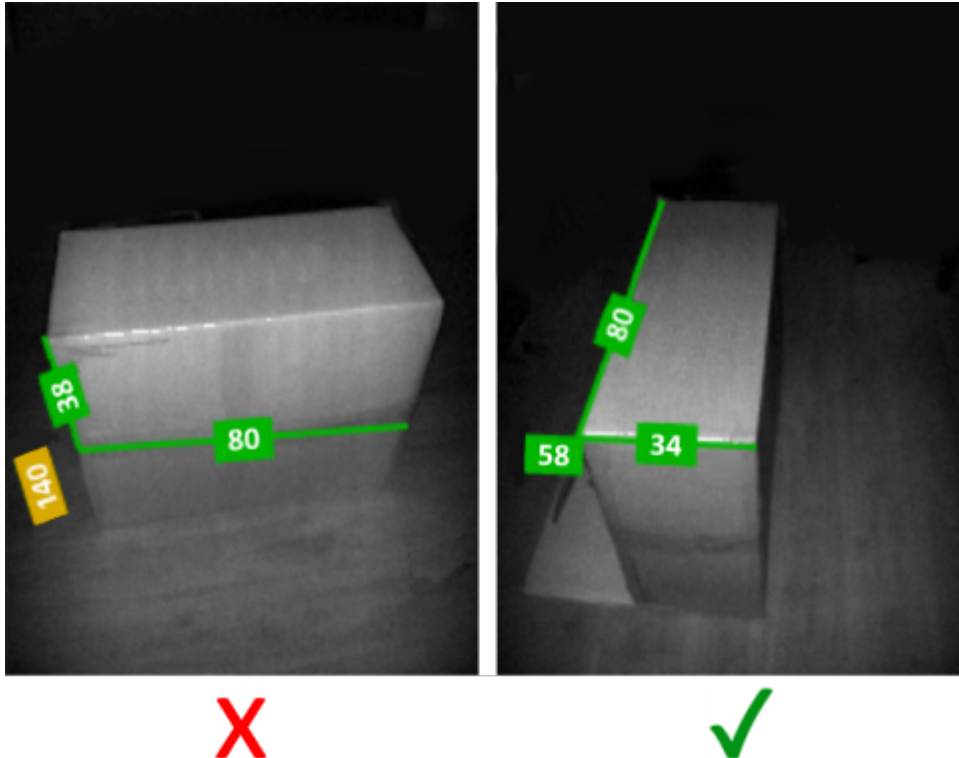
Operation in Sunlight

Avoid dimensioning a parcel where the sun is directly in front of you. Dimension with the sun at your back, place the parcel in the shade, or use a top-down view.

Distance to Other Objects

Make sure there is a minimum of 20 cm (7.9 in.) between the target parcel and walls or objects the same height or taller. For large parcels that require an angled view, the time-of-flight signal may be impacted by an adjacent wall or object that is too close to the target parcel.

Limitations

The dimensioning framework can handle a wide range of parcels, with the following limitations.

Black Surfaces

The 3D sensor cannot reliably detect black surfaces. Under the following conditions, parcel dimensioning attempts timeout to a `NoDim` (no dimension) result.

- Black parcels - This includes parcels wrapped in black material.

- Black floor - The floor must be recognized for dimensions to be calculated. Dimensioning on grey surfaces, such as asphalt, should be possible even in sunny conditions.

- Black tape - This applies to black tape on the top edges of the parcel. You can dimension parcels with black tape across the middle by making sure the aimer is not on the black tape. If the aimer is on the black tape, the parcel may not be dimensioned.

Highly Reflective Surfaces (Specular Reflection)

The 3D sensor cannot reliably dimension with highly reflective surfaces such as shiny metal walls or mirror-like reflective surfaces that produce a specular reflection. The user must dimension the targeted parcel with these surfaces outside the field-of-view of the camera (i.e., not within the viewfinder display).

- Shiny metal walls and floor — mostly unpainted bare metal that produces a mirror-like reflection

- Shiny containers — metal containers next to the target parcel

- Mirrored walls

- Metal tape — this applies to metal tape on the visible surfaces or edges of the parcel.

Long or Thin Parcels

Parcels where one dimension is near the maximum and one dimension is near the minimum may lead to a `NoDim` (no dimension) result.

For example, a parcel measuring 100 x 15 x 15 cm (40 x 6.0 x 6.0 inches) may not produce a dimensioning result. However, a parcel measuring 50 x 15 x 15 cm (20 x 6.0 x 6.0 inches) should produce a result.

Directional Feedback

To receive directional feedback, the dimensioning service must be able to identify that there is a parcel in the field-of-view.

- If the device is too close to the parcel, move further away until the entire parcel is visible in the Viewfinder. The ToF camera cannot dimension a parcel closer than the minimum range of the ToF camera (~40 cm or 16 inches). Also, when the device is too close to the parcel, it can cause glare, which can interfere with dimensioning.

- If the device is too far from the parcel, move closer and fill more of the display area with the parcel.

- If the dimensioning angle is too steep, move or tilt the device to keep the angle within 50° of the top-down (0%) position. The device provides tilt feedback when the angle is too steep.

Figure 11   Dimensioning Angles
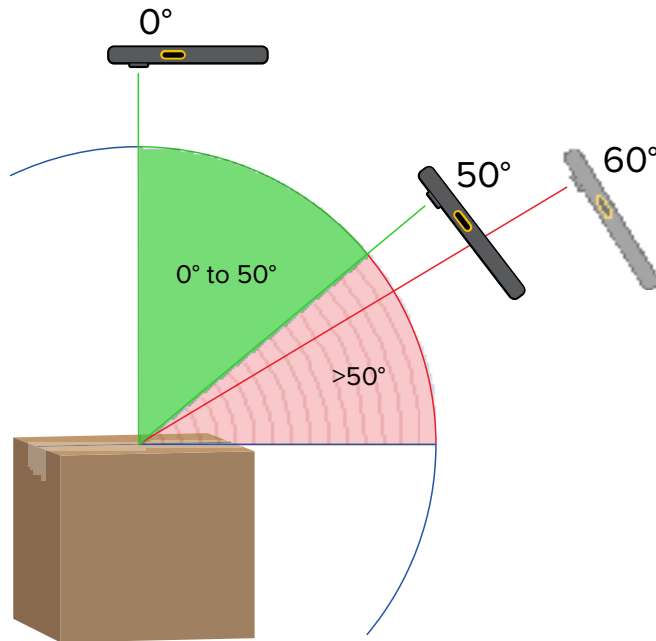
Application Interactions

- Google Voice Assistant - Google Voice Assistant will not launch when the dimensioning screen is active.

- Repeated Rotations - Repeatedly rotating the dimensioning device may cause the Mobile Dimensioning demonstration client Start Dimensioning button to be grayed out. Restart the application to clear the condition.

- Repeated Open/Close of the Mobile Dimensioning demonstration application - Repeated opening and closing of the application in quick succession may cause the Mobile Dimensioning demonstration client Start Dimensioning button to be grayed out. Restart the application to clear the condition.

- Split screen mode - Android Split Screen mode is not supported.

- Guest mode - Android Guest mode is not supported.

Mobile Dimensioning Client

The MD Client demonstrates parcel dimensioning and allows developers to test a sample LOB app that calls the dimensioning service using the MD API.

Mobile Dimensioning Client User Interface

The MD Client provides a sample user interface (UI) that allows end-users to perform dimensioning capture and view the dimension results.

The MD Client is an example of a line-of-business customer app and may only be used for demonstration and testing of the dimensioning solution.

Figure 12   Welcome Screen
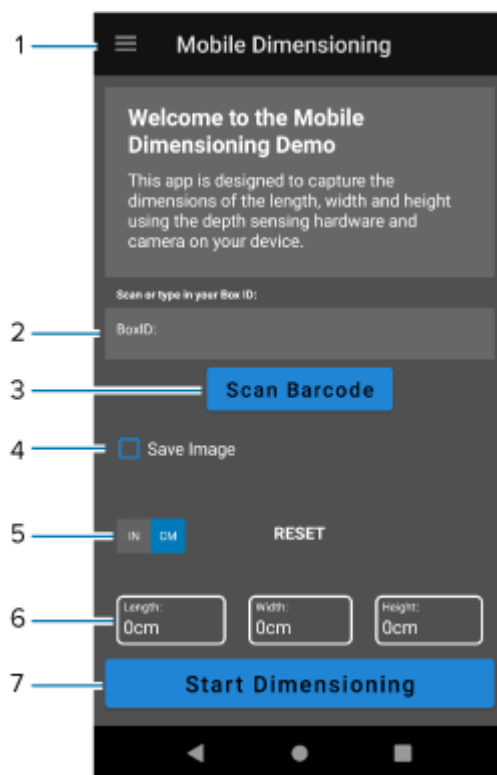
1	Menu - Select to display relevant information about the device, app, and framework.

| 2	BoxID - Displays optional box identification.
3	Scan Barcode button - Use to scan a barcode that fills the BoxID field with a barcode value.
4	Save Image checkbox - Use to save an image of the final dimensioning result.
5	Measurement units - Select to display dimensions in inches or centimeters. The default is based on the current location of the device and may not be available in all locations.
6	Dimensions - Displays the dimension values. • Zero values - Initial value before dimensioning begins. • Green checkmark ✓ - Indicates that dimensioning was successful. • Yellow caution symbol ⚠ - Indicates that the captured dimensions are out of range. The dimensions cannot be used as legal-for-trade. • Red caution symbol ▲ - Indicates that the time-out was reached before dimensioning was completed or dimensioning was canceled by the user.
7	Start Dimensioning button - Select to begin dimensioning a parcel.

Figure 13   Active Viewfinder Screens
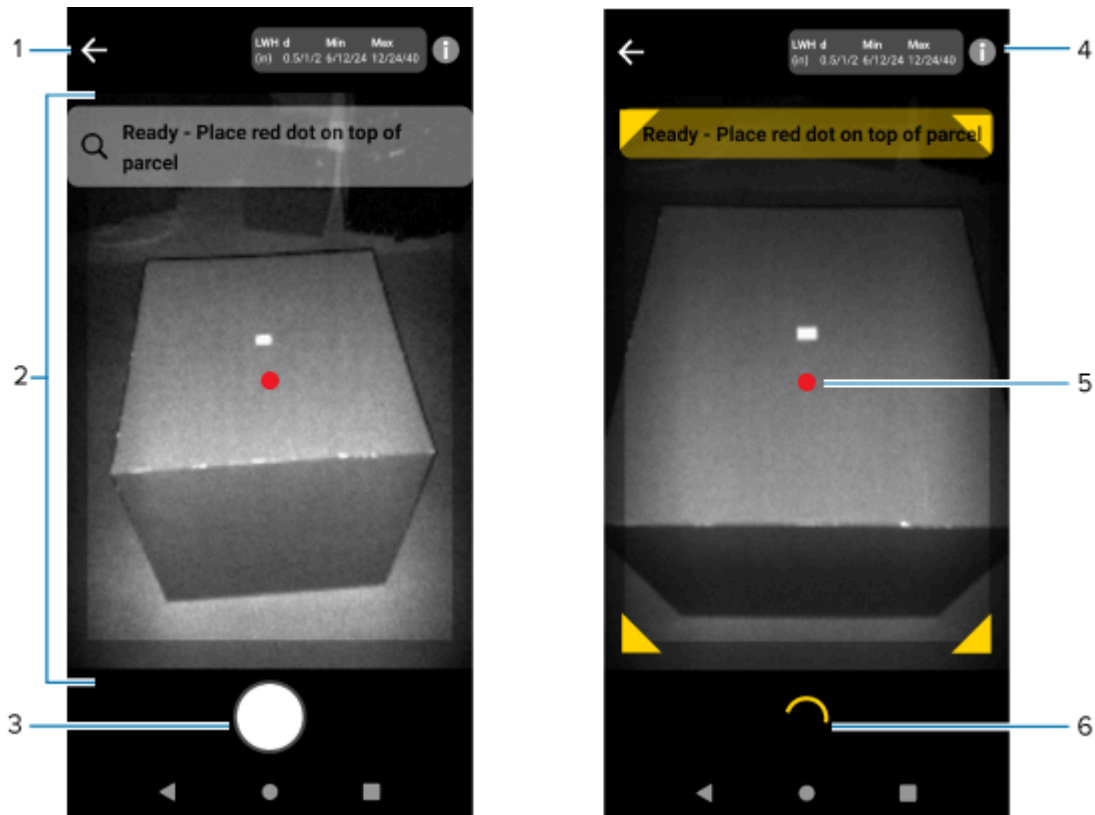
1	Back - Cancels the dimensioning capture.
2	Viewfinder - Use to aim at a parcel and navigate through the dimensioning process. Dimensioning tips display at the top of the Viewfinder.

3	Start button - Starts the dimensioning process.
4	Information - Select to display legal, configuration, and other relevant information.
5	On-screen aimer - Use to identify the target parcel.
6	Progress arc - Indicates that dimensioning is in progress.

Figure 14 Confirmation Screen
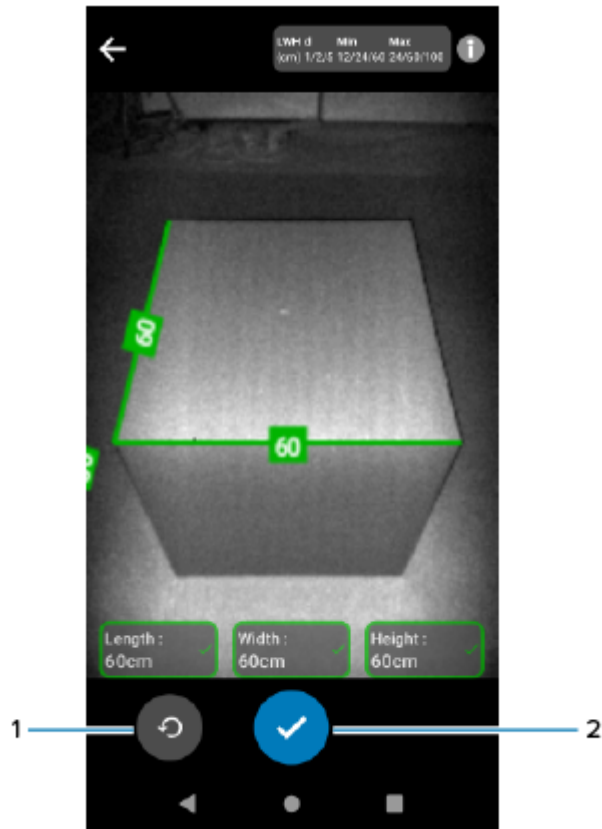
1	Retry - Restarts the dimensioning process.
2	Confirm - Ends the dimensioning process and displays dimension results on the Welcome screen.

Performing a Parcel Dimension

Use the MD Client to test the dimensioning service and understand the sample user interface (UI) of the app.
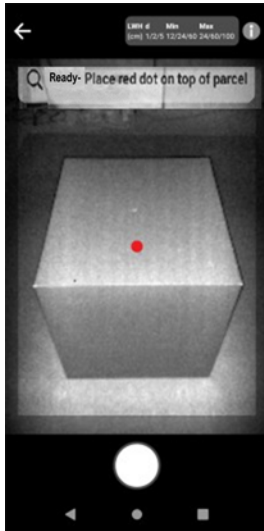
1. Open the MD Client app.

   The Welcome screen displays. Dimension values begin in a ready state as zeros.
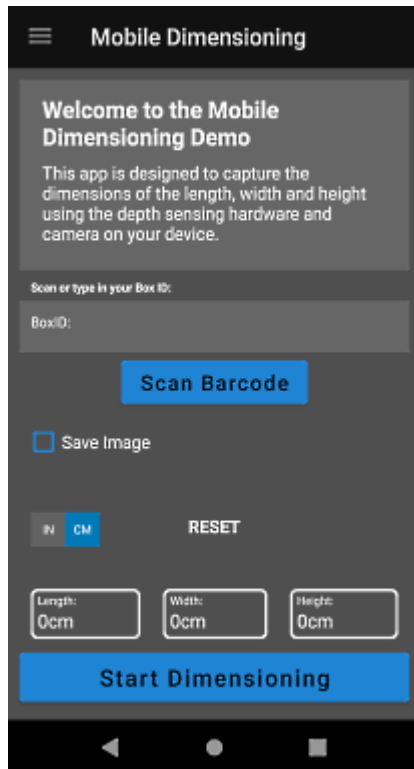
2. Scan a barcode, if required.

3. Select **Start Dimensioning**.

A request is sent to the dimensioning service. The Viewfinder becomes active, but dimensioning has not started.

4. Select the Start icon.

The Viewfinder remains active, and dimensions display as dashes. A progress arc rotates in place of the Start icon, indicating that dimensioning is active.

5. Use the Viewfinder to place the red on-screen aimer dot on the top surface of the parcel.

When dimensioning results are obtained, the length, width, and height dimensions replace the dashes, and then the Confirmation screen displays. On the Confirmation screen, the Viewfinder displays a static image of the parcel with the captured dimensions indicated on the parcel axes. The length and width dimensions on drawn on the top edges and the height dimension are drawn to the side.

6. Select an option on the Confirmation screen.

- Select the Retry button to return to the active Viewfinder screen and retry dimension capturing.

- Select **Confirm** to confirm and accept the current results.

- If dimensioning is not captured, the **Confirm** does not display. Select the Retry button to retry dimension capturing.

Results appearing in orange indicate that the measurement is out of the certified device range. See the definition for Out of Range.
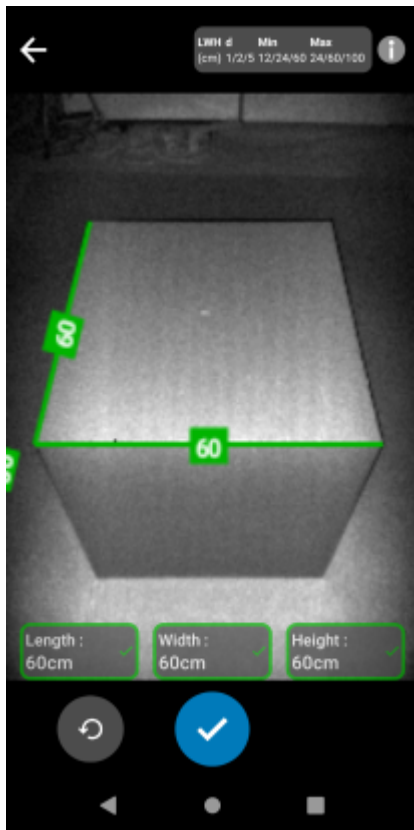
When the results are confirmed they display on the Welcome screen.
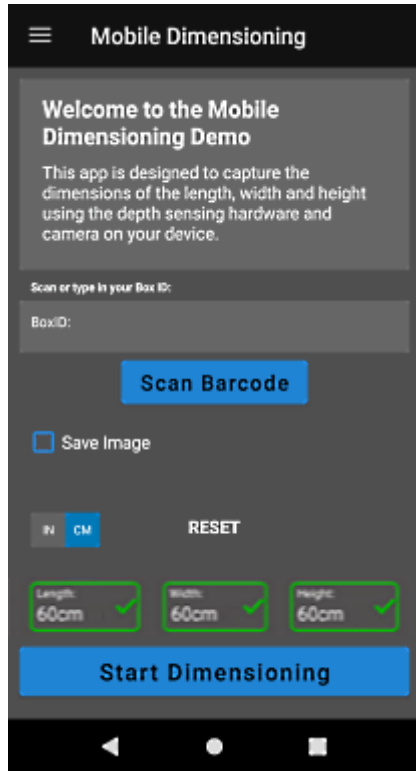
To begin a new dimensioning capture, select **RESET**. The dimensioning results are cleared.

Sample Feedback

The Framework provides helpful feedback to users during dimensioning and if dimensioning fails.

Positional Feedback

During dimensioning, the Framework provides positional feedback as arrows in the corners of the Viewfinder. Text feedback can be added to the LOB app.

The MD Client uses the following sample prompts and feedback during dimensioning.

Text	Description
Move Closer	Move the device closer. The parcel is too small in the Viewfinder's Field-of-View (FOV).
Move Farther Away	Move the device away. The parcel is overflowing the FOV.
Tilt upwards	Tilt the device up. The parcel is out-of-bounds of the FOV.
Tilt downwards	Tilt the device down. The parcel is out-of-bounds of the FOV.
Move Left	Move to the left. The parcel is out-of-bounds of the FOV.
Move Right	Move to the right. The parcel is out-of-bounds of the FOV.
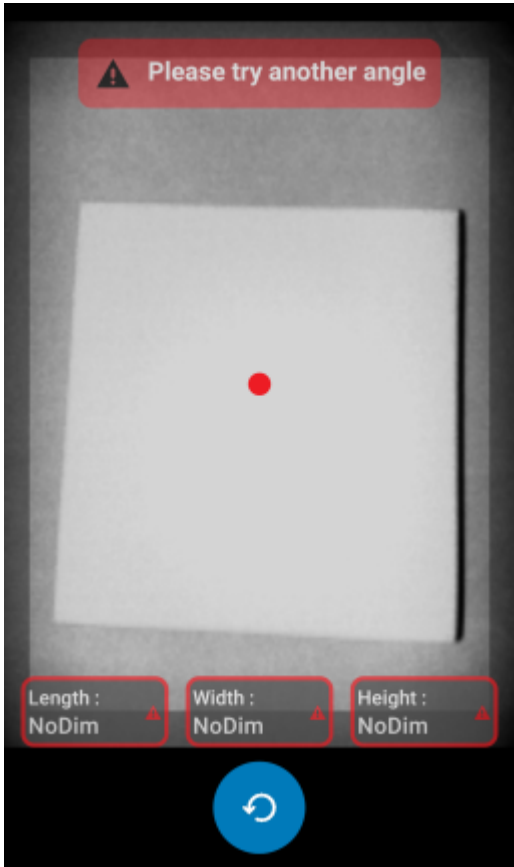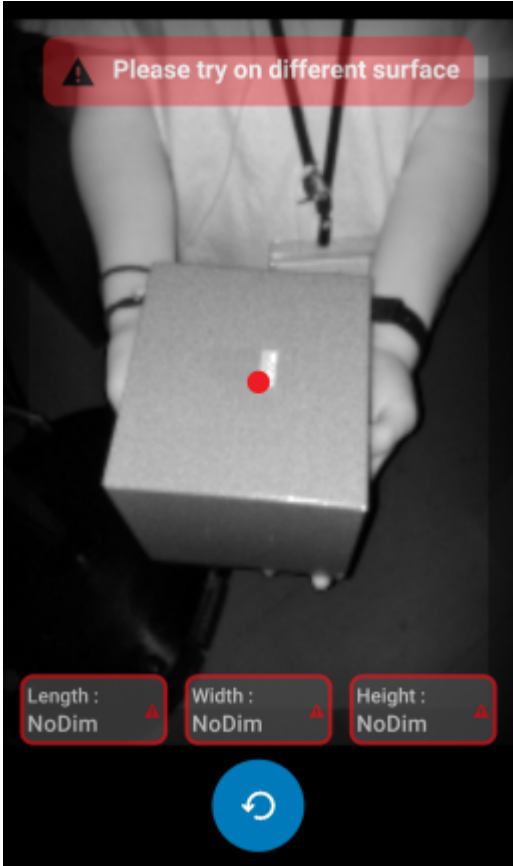
Text	Description
Timeout – Please retry or cancel	Retry or cancel the dimension capture. The parcel could not be dimensioned in the given timeframe.
Capturing… keep parcel in frame	Keep the parcel within the FOV while dimensioning is in progress.
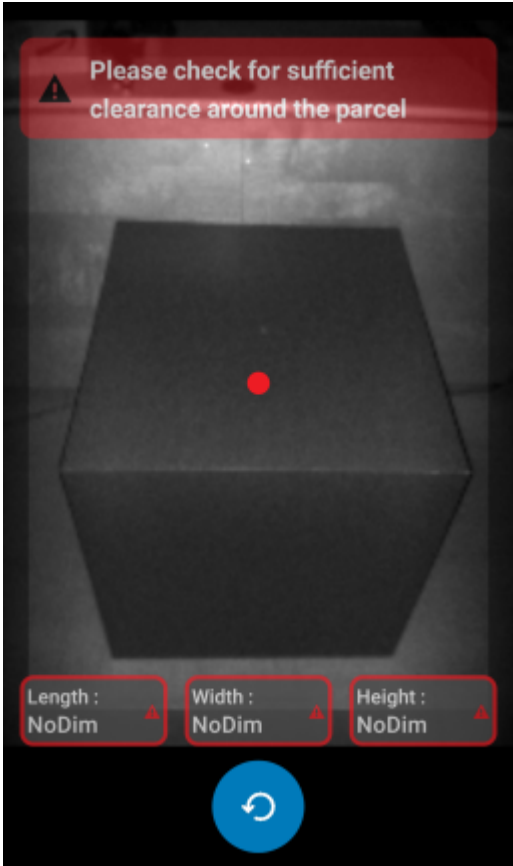
Advanced Feedback
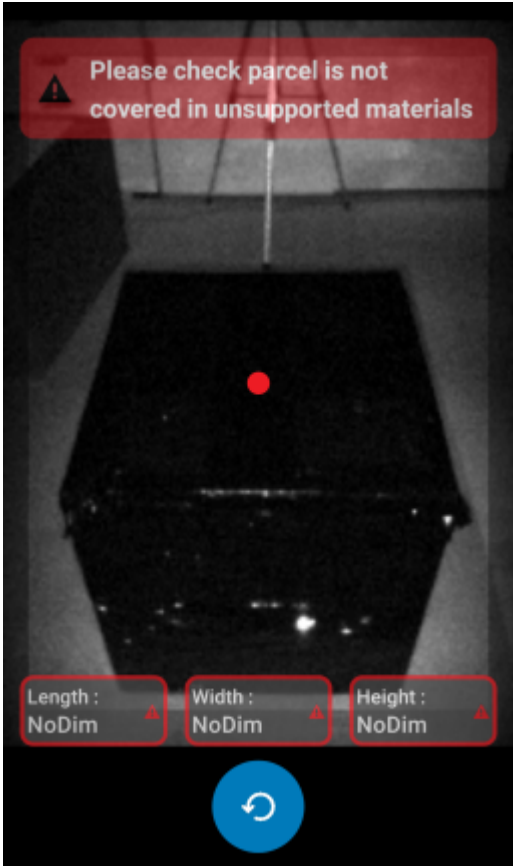
When NoDim indicators are returned to the app, the Framework provides advanced feedback at the top of the screen.

For unsuccessful dimensioning attempts, the MD Client uses the following feedback after dimensioning.

Feedback	Description
	Tilt the dimensioning device slightly. There is too much glare reflected back at the dimensioning device. For more information, see Minimum Range on page 12.

Feedback	Description
	Place the parcel on a flat surface. The parcel is currently located in an unsupported environment. For more information, see Unsupported Parcels and Environments on page 9.

Feedback	Description
	Make sure that there is a minimum of 12 cm (5 in.) of floor or counter space visible around all sides of the target parcel.

Feedback	Description
	Make sure that is parcel is not covered in an unsupported material. For more information, see Unsupported Parcels and Environments on page 9.

Dimensioning Flow

The MD Client demonstrates typical dimensioning flows.

Successful Dimension In Range

In this scenario, dimensioning is successful while the parcel is in range.

1. Dimension values are all zeros. The user selects **Start Dimensioning** and the Viewfinder becomes active.

2. The user successfully captures the parcel in the Viewfinder. Dimensions and indicators display on the screen.

3. The user selects **Confirm**. Dimensions, indicators, and control return to the calling app.

4. The user selects the Refresh button to set the dimension values back to all zeros.

Successful Dimension Out of Range

In this scenario, dimensioning is successful while the parcel dimension is out of range. The parcel is out of range when the captured dimensions are either below the minimum specification or above the maximum specification.

1. Dimension values are all zeros. The user selects the **Start Dimensioning** button and the Viewfinder becomes active.

2. Dimensions are captured. Dimensions and indicators return to the calling app indicating that one or more measurements are out of range.

3. The user presses Retry to try again or selects the Confirm button to continue.

4. After measurements are confirmed, control returns to the calling app.

5. The user selects the Refresh button to return to the Welcome screen and set dimension values back to all zeros.

Unsuccessful Dimension Time-Out

In this scenario, dimensioning is unsuccessful because a time-out occurs before dimensions are captured.

1. Dimension values are all zeros. The user selects the **Start Dimensioning** button and the Viewfinder becomes active.

2. Dimensioning time-out occurs. The dimensions are indicated as `NoDim`.

3. The user selects Retry to try again or touches the Android Back button again to cancel dimensioning.

    - If the user selects Retry, the Viewfinder becomes active, and dimensioning starts.

    - If the user stops dimensioning by touching the Android Back button, the Welcome screen displays. `NoDim` indicators are returned to the app, indicating that no dimensions were captured.

Canceled Dimension

In this scenario, dimensioning is canceled by the user.

1. Dimension values are all zeros. The user selects the **Start Dimensioning** button and the Viewfinder becomes active.

2. The user stops dimensioning by touching the Android back button.

3. The user selects Retry to try again or touches the Android Back button again to cancel dimensioning.

4. Control returns to the calling app and the Welcome screen displays with all dimension values set to `NoDim`.

5. `NoDim` indicators are returned to the app, indicating that no dimensions were captured. The app is notified that dimensioning was canceled.

Positional Feedback

In this scenario, the user is too close to the parcel.

1. Dimension values are all zeros. The user selects the **Start Dimensioning** button and the Viewfinder becomes active.

2. The user receives a notification indicating that they should move the device farther away from the parcel.

3. The user successfully captures the parcel in the Viewfinder.

4. The user selects the Confirm button. Dimensions and indicators return to the calling app.

5. Control returns to the calling app and the results screen displays.

6. The user selects the Retry button to set the dimension values back to all zeros.

Sealing and Regulatory Information

The certified parcel dimensioning solution provides software sealing features and regulatory information required by Weights and Measures authorities for device certification.

Device Labels

The following sections provide sample approval and sealing labels. These labels must only be placed or removed by an authorized representative that can verify the performance and sealing of the device.

Approval Label

The approval label identifies the certificate number issued by an authorized Weights and Measures authority.

As new versions of the software are released, the label may change. This label is tamper-evident and must only be removed or replaced by an authorized representative that can verify the performance and sealing of the device.

Figure 15   Sample Approval Label

Regulatory Information

Weights and Measures authorities use the regulatory information screen to compare legally relevant software parameters and versions to the Type Approval certificate.

Regulatory Information Example

To view the regulatory information screen select the information icon while dimensioning or select the three-line menu from the home screen. Your regulatory information will differ from what is shown in the following example.

Event Count	1
Region	XX
Approval	XX XXXX
DimensioningService	1.0.0.0
ParcelFramework	1.0.0.0
Regulatory	1.0.0.0
DepthCameraCore	1.0.0.0
DepthCameraWrapper	1.0.0.0
DepthCameraConfig	1.0
Camera Model	3000-0000-0000-0000-0000-00b1
Camera SN	A123-B456-C789-D010
IMU Module	BMI280
Temp Range	-20C - +50C

Limitation to use:
Rectangular (Cuboidal)
Not for use on non-reflective surfaces (<15%)

	Min(cm)	Max (cm)	d (cm)
Length	12/24/60	24/60/100	1/2/5
Width	12/24/60	24/60/100	1/2/5
Height	12/24/60	24/60/100	1/2/5

Event Log

Weights and Measures authorities use event log information to track the history of measurement changes and compare legally relevant parameters and versions to the Type Approval certificate.

The event log is initially written the first time dimensioning software runs on the device and includes a full list of legally relevant parameters and versions. This log cannot be erased and persists through device reboots, enterprise resets, and factory resets.

Exporting an Event Log

Export an event log from the Regulatory Information screen.

1. Touch the information icon to open the Regulatory Information screen.

2. From the bottom of the Regulatory Information screen, touch **Export Event Log**.

   The event log file name is:

   ```
   Timestamp_Event_Log.csv
   ```

   Where `Timestamp` is the current date and time.

   The event count on a new device depends on software or hardware changes made before the device leaves the factory or staging operation.

   The figures below illustrate the event log export process and the location of the exported event log. The exported event log is overwritten by a new export to ensure that the latest event log is captured. The internal event log cannot be overwritten.
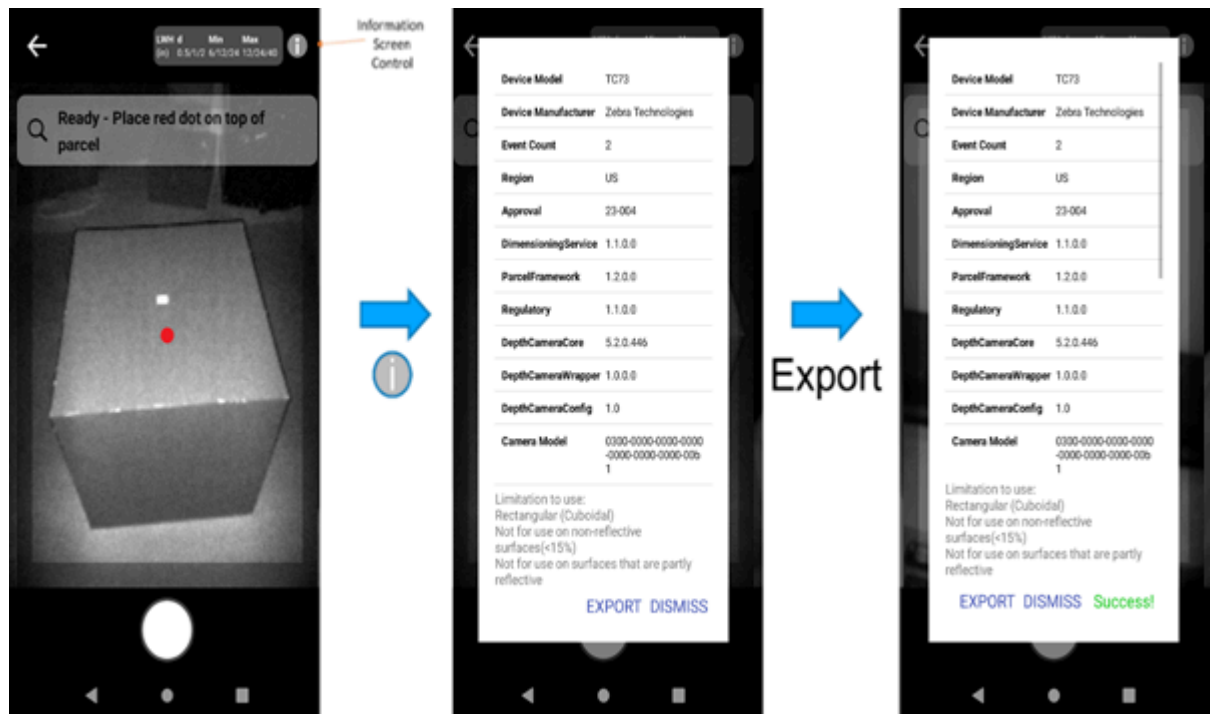
To print the event log, download it to a host computer. See the device product reference guide for information on transferring files to a host computer.

Event Log Example

To view the event log, export and transfer the file to a host computer. This file cannot be edited or deleted from the device.

The following example provides sample events and demonstrates how the resulting event log would look. Your actual event log results will vary.

- On August 4, 2021, the device was initialized. The event log displays the versions and parameters with the event count is set to `1`.

- On September 14, 2021, the software is reinstalled. No change was made to the version, so the time is updated, the note is `Non-Metrological Change`, and the event count stays at `1`.

- On October 22, 2021, the Dimensioning SDK and Regulatory APK were updated. This is a metrological change, so the time is updated, the note is `Metrological Change`, and the event count increases to `2`.

- On December 14, 2021, a software reinstallation was performed. No change was made to the version, so the time is updated, the note is `Non-Metrological Change`, and the event count stays at `2`.

- On September 18, 2022, the maximum values for length, width, and height were modified and included in the new regulatory APK. This is a metrological change, so the note is `Metrological Change`, and the event count increases to `3`.

Table 1 Event Log Example

Time (MM-DD-YYYY HH:MM)	Param ID	Value	Event Count	Note
08-04-2021 09:13	Hardware Initialization		1	New Entry
08-04-2021 09:13	Device Model	TC58	1	Metrological Change
08-04-2021 09:13	Approval	US XXXX	1	Metrological Change
08-04-2021 09:13	Region	US	1	Metrological Change
08-04-2021 09:13	DimensioningService	1.0.0.0	1	Metrological Change
08-04-2021 09:13	Parcel Dimensioning	1.0.0.0	1	Metrological Change
08-04-2021 09:13	DimensioningSDK	1.0.0.0	1	Metrological Change
08-04-2021 09:13	ParcelRegulatoryNTEP	1.0.0.0	1	Metrological Change
08-04-2021 09:13	Camera Core Version	5.2.0.446	1	Metrological Change
08-04-2021 09:13	Camera Wrapper Version	1.0.0.0	1	Metrological Change
08-04-2021 09:13	Camera Config Version	1.0.0.0	1	Metrological Change

Table 1   Event Log Example (Continued)

Time (MM-DD-YYYY HH:MM)	Param ID	Value	Event Count	Note
08-04-2021 09:13	Camera Module	3000-0000-0000-0000-0000-00b1	1	Metrological Change
08-04-2021 09:13	Camera Serial #	3fab-160b-af34-ab21	1	Metrological Change
08-04-2021 09:13	IMU Sensor Module	BMI160	1	Metrological Change
08-04-2021 09:13	Temperature Range MIN C	-20	1	Metrological Change
08-04-2021 09:13	Temperature Range MAX C	50	1	Metrological Change
08-04-2021 09:13	Reflectivity Range MIN%	15	1	Metrological Change
08-04-2021 09:13	Reflectivity Range MAX%	100	1	Metrological Change
08-04-2021 09:13	D Value 1 Length CM	1	1	Metrological Change
08-04-2021 09:13	D Value 2 Length CM	2	1	Metrological Change
08-04-2021 09:13	D Value 3 Length CM	5	1	Metrological Change
08-04-2021 09:13	D Value 1 MIN Length CM	12	1	Metrological Change
08-04-2021 09:13	D Value 1 MAX Length CM	24	1	Metrological Change
08-04-2021 09:13	D Value 2 MIN Length CM	24	1	Metrological Change
08-04-2021 09:13	D Value 2 MAX Length CM	60	1	Metrological Change
08-04-2021 09:13	D Value 3 MIN Length CM	60	1	Metrological Change
08-04-2021 09:13	D Value 3 MAX Length CM	100	1	Metrological Change
08-04-2021 09:13	D Value 1 Width CM	1	1	Metrological Change
08-04-2021 09:13	D Value 2 Width CM	2	1	Metrological Change
08-04-2021 09:13	D Value 3 Width CM	5	1	Metrological Change
08-04-2021 09:13	D Value 1 MIN Width CM	12	1	Metrological Change

Table 1 Event Log Example (Continued)

Time (MM-DD-YYYY HH:MM)	Param ID	Value	Event Count	Note
08-04-2021 09:13	D Value 1 MAX Width CM	24	1	Metrological Change
08-04-2021 09:13	D Value 2 MIN Width CM	24	1	Metrological Change
08-04-2021 09:13	D Value 2 MAX Width CM	60	1	Metrological Change
08-04-2021 09:13	D Value 3 MIN Width CM	60	1	Metrological Change
08-04-2021 09:13	D Value 3 MAX Width CM	100	1	Metrological Change
08-04-2021 09:13	D Value 1 Height CM	1	1	Metrological Change
08-04-2021 09:13	D Value 2 Height CM	2	1	Metrological Change
08-04-2021 09:13	D Value 3 Height CM	5	1	Metrological Change
08-04-2021 09:13	D Value 1 MIN Height CM	12	1	Metrological Change
08-04-2021 09:13	D Value 1 MAX Height CM	24	1	Metrological Change
08-04-2021 09:13	D Value 2 MIN Height CM	24	1	Metrological Change
08-04-2021 09:13	D Value 2 MAX Height CM	60	1	Metrological Change
08-04-2021 09:13	D Value 3 MIN Height CM	60	1	Metrological Change
08-04-2021 09:13	D Value 3 MAX Height CM	100	1	Metrological Change
09-14-2021 23:11	Software Re-Install		1	Non-Metrological Change
10-22-2021 13:11	DimensioningSDK	2.0.0.0	2	Metrological Change
10-22-2021 13:11	ParcelRegulatoryNTEP	2.0.0.0	2	Metrological Change
12-14-2021 23:08	Software Re-Install		2	Non-Metrological Change
04-26-2022 14:22	DimensioningSDK	2.1.0.0	2	Non-Metrological Change
09-18-2022 09:24	ParcelRegulatoryNTEP	2.0.0.0	3	Metrological Change

Table 1 Event Log Example (Continued)

Time (MM-DD-YYYY HH:MM)	Param ID	Value	Event Count	Note
09-18-2022 09:24	D Value 2 MAX Length CM	0	3	Metrological Change
09-18-2022 09:24	D Value 2 MAX Width CM	90	3	Metrological Change
09-18-2022 09:24	D Value 2 MAX Height CM	90	3	Metrological Change

Regulatory Feedback Messages

When sealing or regulatory information on the device changes, a message is displayed. These messages notify administrators that there is an issue with the device certification.

Table 2   Regulatory Feedback Messages

Message	Condition	Action Required
Failed sealing integrity check	Sealing integrity check failure. The software fails the sealing integrity configuration check for the device SKU. This is a metrological event, so the relevant event count is increased and an event log entry `Failed Integrity Check` is added.	Do one of the following: • Use the MD client to identify the last software that passed the integrity check and load that version of the dimensioning software on the device. • Follow place-in-trade procedures for the device.
Metrological change detected	Software is loaded containing versions or parameters that do not match the previously run version. The user must confirm this message. On confirmation, the event log is updated with the changes to the affected versions and parameters.	Update the sealing label to match the event count in the event log.

Integrity Check Notification

An integrity check is performed to ensure that the software and hardware configuration is a valid and certified combination.

Integrity Check is performed at one of two times:

• During the installation Process

  • update function performs an integrity check on the Integrity Check parameters.

  • Upon failure:

    • The software installation will stop and notify the user of the failure

    • installation will be logged in the event log.

  • Upon success:

    • The software installation will proceed

- During the Application Call to the Dimensioning Service

    - When the application enables the dimension, the software performs an integrity check on the Integrity Check parameters.

    - Upon failure:

        - The dimensioning function is disabled, and the integrity check failure is logged.

        - will be logged in the event log

    - Upon success:

        - Dimensioning will function normally.

Integrity Check parameters:

- MDMD SKU

- Camera Model version

- Camera library version

- IMU Model version

- Regulatory Module version

- Parcel Module version.

Figure 16   Integrity Check Failure Screens
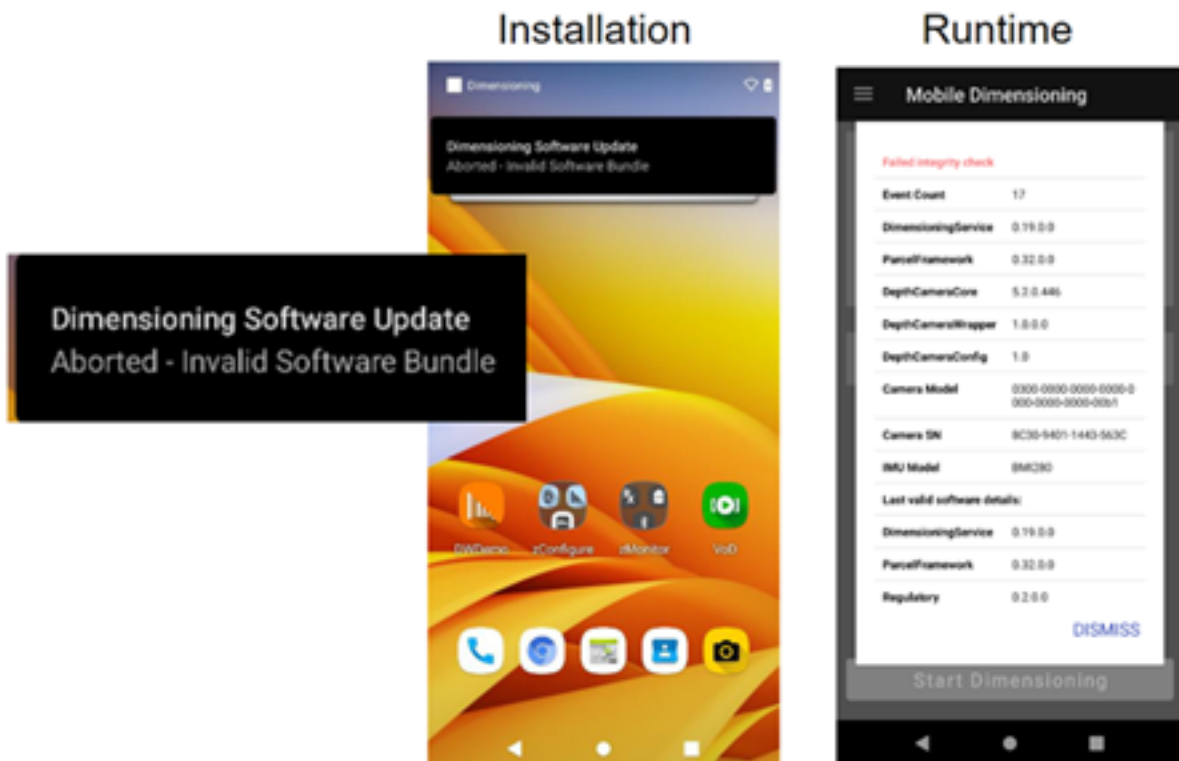
Metrological Change Notification

A Metrological Change notification is provided whenever a software update or hardware change is made that constitutes a metrological change.

Following a metrological change, the customer should access the Zebra Weights & Measures web site: zebra.com/weights-measures.

How does a customer/verifier configure the device for the verification test? See Place-in-Trade Certified Mobile Parcel Configuration Guide for Verification Test for more information.

Web link: zebra.com/us/en/support-downloads/software/productivity-apps/zebra-dimensioning-mobileparcel. html.

What if a customer asks about a metrological change detection dialog message on the device?

- The device will detect a metrological change and provide a message (see figure below)

- Since there is a metrological change, the device must undergo region-specific re-verification testing and PiT

- Care must be taken when rolling out new major versions of the solution bundle

- Once a new major version is rolled out, the re-verification and PiT requirement is triggered

- Customer can downgrade to the previous version, but the re-verification and PiT requirement still applies (no Undo)

Figure 17 Metrological Change Notification Screen
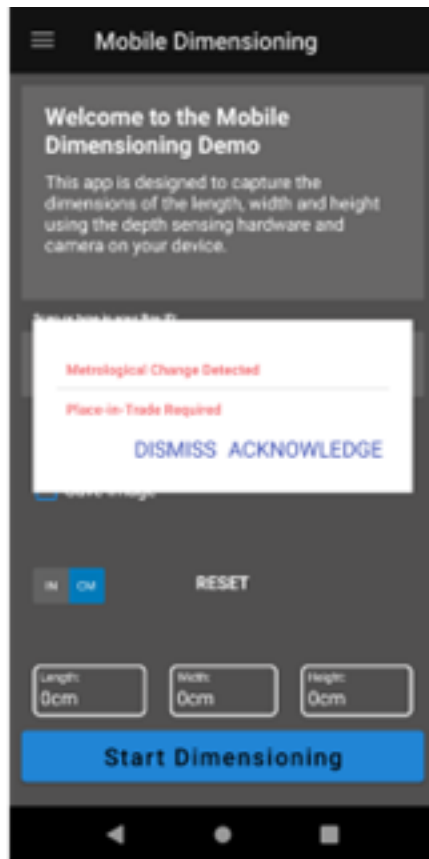
Dismiss: Dialog will reappear on every dimension attempt
Acknowledge: Logged in Event Log – Dialog will not reappear

Feedback and Error Codes

Numerical error codes are not used in favor of natural language feedback. All feedback and error messages are presented in the previous sections.