See comparisons for previous and currently approved for purchase mobile devices & external Bluetooth receivers. See the similarities and differences in screen size, memory, speed, ruggedness, available sensors, and accuracy test results.
# S1 Mobile Device Specification Sheet

## Table of Contents

<table>
<thead>
<tr>
<th>Device Model</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samsung Galaxy Note 10</td>
<td>2</td>
</tr>
<tr>
<td>Samsung Galaxy S10+</td>
<td>3</td>
</tr>
<tr>
<td>Samsung Galaxy S10</td>
<td>4</td>
</tr>
<tr>
<td>Samsung Tab S5E</td>
<td>5</td>
</tr>
<tr>
<td>Samsung Tab A 8” (2019)</td>
<td>6</td>
</tr>
<tr>
<td>Samsung Tab A 10.1” (2019)</td>
<td>7</td>
</tr>
<tr>
<td>Samsung Galaxy S9</td>
<td>8</td>
</tr>
<tr>
<td>Samsung Tab Active 2</td>
<td>9</td>
</tr>
<tr>
<td>Samsung Galaxy Note8</td>
<td>10</td>
</tr>
<tr>
<td>Samsung Galaxy S8</td>
<td>11</td>
</tr>
<tr>
<td>Samsung Tab S2</td>
<td>12</td>
</tr>
<tr>
<td>Samsung Tab A 7” (2014)</td>
<td>13</td>
</tr>
<tr>
<td>Trimble R1 Bluetooth Receiver</td>
<td>14</td>
</tr>
<tr>
<td>Juniper Systems Geode Bluetooth Receiver</td>
<td>15</td>
</tr>
<tr>
<td>Summary of 2019 Device Accuracy results</td>
<td>16</td>
</tr>
<tr>
<td>Mobile Device Specs summary table</td>
<td>16</td>
</tr>
<tr>
<td>Relative Device size comparisons</td>
<td>19</td>
</tr>
<tr>
<td>Phones:</td>
<td>19</td>
</tr>
<tr>
<td>Tablets:</td>
<td>20</td>
</tr>
</tbody>
</table>
Samsung Galaxy Note 10

What does the IP68 rating mean?

- **Operating System**: Android 9.0 (Pie)
- **Ram**: 8GB
- **Internal Memory**: 256GB
- **External Memory**: Not supported
- **Location Source**: GPS, Galileo, BeiDou, GLONASS
- **Screen Size**: 6.3 inches
- **Camera Megapixel**: 16.0MP
- **Sensor Types**: Accelerometer, Gyroscope, Geo-Magnetic, Proximity, Barometer, compass, ultrasonic fingerprint, facial recognition
- **Accuracy Open Sky**: 5.0 meters
- **Accuracy Closed Canopy**: 6.7 meters
- **IP 68 Rated (Water/dust proof)**
- **Battery**: 3,500 mAh

*Note: The Note series devices come with the integrated S-pen, adding additional features*

Samsung Galaxy S10+

- **Operating System**: Android 9.0 (Pie)
- **Ram**: 8GB
- **Internal Memory**: 128, 512 GB options
- **External Memory**: Up to 512GB
- **Location Source**: GPS, Galileo, BeiDou, GLONASS
- **Screen Size**: 6.4 inches
- **Camera Megapixel**: 16.0MP
- **Sensor Types**: Accelerometer, Gyroscope, Geo-Magnetic, Proximity, Barometer, compass, ultrasonic fingerprint, facial recognition, heart rate
- **Accuracy Open Sky**: 3.7 meters
- **Accuracy Closed Canopy**: 9.3 meters
- **IP 68 Rated (Water/dust proof)**
- **Battery**: 4100 mAh

Samsung Galaxy S10

- **Operating System**: Android 9.0 (Pie)
- **RAM**: 8GB
- **Internal Memory**: 128, 512 GB options
- **External Memory**: Up to 512GB
- **Location Source**: GPS, Galileo, BeiDou, GLONASS
- **Screen Size**: 6.1 inches
- **Camera Megapixel**: 16.0MP
- **Sensor Types**: Accelerometer, Gyroscope, Geo-Magnetic, Proximity, Barometer, compass, ultrasonic fingerprint, facial recognition, heart rate
- **Accuracy Open Sky**: 5.3 meters
- **Accuracy Closed Canopy**: 8.6 meters
- **IP 68 Rated (Water/dust proof)**
- **Battery**: 3400 mAh

Samsung Tab S5E

- **Operating System:** Android 9.0 (Pie)
- **Ram:** 4GB
- **Internal Memory:** 64GB
- **External Memory:** MicroSD (Up to 512GB)
- **Location Source:** GPS, GLONASS, Galileo, BeiDou
- **Screen Size:** 10.5 inches
- **Camera Megapixel:** 13MP
- **Sensor Types:** Accelerometer, gyroscope, ambient light, facial recognition, fingerprint sensor
- **Accuracy Open Sky:** 3.2 meters
- **Accuracy Closed Canopy:** 12.5 meters
- **Battery:** 7040 mAh

*Note: This device uses a 64bit processor vs. a 32bit processor.*

Samsung Tab A 8” (2019)

- **Operating System:** Android 9.0 (Pie)
- **Ram:** 2GB
- **Internal Memory:** 32GB
- **External Memory:** MicroSD (Up to 512GB)
- **Location Source:** GPS, GLONASS
- **Screen Size:** 8.0 inches
- **Camera Megapixel:** 8.0MP
- **Sensor Types:** Accelerometer, gyroscope, ambient light
- **Accuracy Open Sky:** 3.4 meters
- **Accuracy Closed Canopy:** 9.5 meters
- **Battery:** 5100 mAh

Samsung Tab A 10.1” (2019)

- Operating System: Android 9.0 (Pie)
- Ram: 2GB
- Internal Memory: 32GB
- External Memory: MicroSD (Up to 512GB)
- Location Source: GPS, GLONASS, BeiDou
- Screen Size: 10.1 inches
- Camera Megapixel: 8.0MP
- Sensor Types: Accelerometer, gyroscope, ambient light
- Accuracy Open Sky: 3.0 meters
- Accuracy Closed Canopy: 11.6 meters
- Battery: 6150 mAh

Samsung Galaxy S9

• **Operating System:** Android 9.0 (Pie)

• **Internal Memory:** 64GB

• **Ram:** 4GB

• **External Memory:** MicroSD (Up to 400 GB)

• **Location Source:** GPS, Galileo, Glonass, BeiDou

• **Screen Size:** 5.6 inches

• **Camera Megapixel:** 12.0MP

• **Sensor Types:** Accelerometer, proximity sensor, barometer, gyro sensor, hall sensor, RGB sensor, heart rate, pressure sensor, geomagnetic sensor, fingerprint, facial recognition

• **Accuracy Open Sky:** 3.2m

• **Accuracy Closed Canopy:** 8.1m

• **IP 68 Rated (Water/dust proof)**

• **Battery:** 3,000mAh

Samsung Tab Active 2

- **Operating System**: Android 9.0 (Pie)
- **Ram**: 3GB
- **Internal Memory**: 16GB
- **External Memory**: MicroSD (Up to 256GB)
- **Location Source**: GPS, GLONASS
- **Screen Size**: 8 inches
- **Camera Megapixel**: 8.0MP
- **Sensor Types**: Accelerometer, Fingerprint, Gyroscope, Magnetic, Hall, RGB, Proximity, fingerprint, facial recognition
- **Accuracy Open Sky**: 4.2 meters
- **Accuracy Closed Canopy**: 13.1 meters
- **Milspec & IP68, (Water/dust proof) also better performance in harsh weather conditions (wet screens)**
- **Battery**: 4,450 mAh

*Note*: This device has added ruggedization, comes with an S-pen, and better performance in harsh condition. Also has face and fingerprint recognition options to ease field use and minimize excessive logins. Also has a user removable battery to allow battery replacements.

Samsung Galaxy Note8

- **Operating System:** Android 8.0.0 (Oreo)
- **Internal Memory:** 64GB
- **Ram:** 6GB
- **External Memory:** MicroSD (Up to 256GB)
- **Location Source:** A-GPS, GLONASS, BDS, GALILEO
- **Screen Size:** 6.2 inches
- **Camera Megapixel:** Dual camera 12.0MP
- **Sensor Types:** Accelerometer, proximity sensor, barometer, gyro sensor, hall sensor, RGB sensor, heart rate, pressure sensor, geomagnetic sensor
- **Accuracy Open Sky:** 3m
- **Accuracy Closed Canopy:** 26m
- **IP 68 Rated (Water/dust proof)**
- **Battery:** 3,300 mAh

Samsung Galaxy S8

- **Operating System:** Android 8.1 (Oreo)
- **Internal Memory:** 64GB
- **Ram:** 4GB
- **External Memory:** MicroSD (Up to 256GB)
- **Location Source:** GPS, Galileo, Glonass, BeiDou
- **Screen Size:** 5.6 inches
- **Camera Megapixel:** 12.0MP
- **Sensor Types:** Accelerometer, proximity sensor, barometer, gyro sensor, hall sensor, RGB sensor, heart rate, pressure sensor, geomagnetic sensor
- **Accuracy Open Sky:** 3 meters
- **Accuracy Closed Canopy:** 15 meters
- **IP 68 Rated (Water/dust proof)**
- **Battery:** 3,000 mAh

[https://www.samsung.com/us/mobile/phones/galaxy-s/galaxy-s8-64gb--verizon--midnight-black-sm-g950uzkavzw/](https://www.samsung.com/us/mobile/phones/galaxy-s/galaxy-s8-64gb--verizon--midnight-black-sm-g950uzkavzw/)
Samsung Tab S2

- **Operating System:** Android 6.0 (Marshmallow)
- **Internal Memory:** 32GB
- **External Memory:** MicroSD (Up to 400GB)
- **Location Source:** GPS, GLONASS
- **Screen Size:** 8 inches
- **Camera Megapixel:** 8.0MP
- **Sensor Types:** Accelerometer, Gyroscope, Magnetic
- **Accuracy Open Sky:** 3.7 meters
- **Accuracy Closed Canopy:** 13.6 meters
- **Battery:** 4,000 mAh

Samsung Tab A 7” (2014)

- **Operating System:** Android 5.1 (Lollipop)
- **Internal Memory:** 8GB
- **External Memory:** MicroSD (Up to 400GB)
- **Location Source:** GPS, GLONASS
- **Screen Size:** 7 inches
- **Camera Megapixel:** 5.0MP
- **Sensor Types:** Accelerometer, gyroscope, ambient light
- **Accuracy Open Sky:** 5.4 meters
- **Accuracy Closed Canopy:** 16.9 meters
- **Battery:** 4,000 mAh

Trimble R1 Bluetooth Receiver

- **Operating System:** Works with Android or iOS
- **Connectivity:** Bluetooth
- **Location Source:** GPS, GLONASS, SBAS, BeiDou, Galileo, QZSS
- **Size:** 4.4 in x 2.7 in x 1.1 in
- **Weight:** 6.5 oz
- **Accuracy Open Sky:** 2.2 meters
- **Accuracy Closed Canopy:** 4.5 meters

Juniper Systems Geode Bluetooth Receiver

- **Operating System:** Works with Android or iOS

- **Connectivity:** Bluetooth

- **Location Source:** GPS, GLONASS, SBAS

- **Size:** 4.4 in x 4.4 in x 1.7 in

- **Weight:** 12.7 oz

- **Accuracy Open Sky:** 3.2 meters

- **Accuracy Closed Canopy:** 5.3 meters

## Summary of 2019 Device Accuracy results

### Clackamas (Heavy Canopy) GPS Course Results Oct 3\(^{rd}\) 2019

<table>
<thead>
<tr>
<th>Device Name</th>
<th>1 point avg</th>
<th>5 point avg</th>
<th>60 point avg</th>
<th>Total Averaged Accuracy per device (m)</th>
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</thead>
<tbody>
<tr>
<td>Ipad Air</td>
<td>18.59</td>
<td>15.64</td>
<td>19</td>
<td>17.74</td>
</tr>
<tr>
<td>Ipad Mini</td>
<td>14.37</td>
<td>15.78</td>
<td>18</td>
<td>16.05</td>
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<tr>
<td>Note 10</td>
<td>7.2</td>
<td>5.64</td>
<td>7.21</td>
<td>6.68</td>
</tr>
<tr>
<td>S10</td>
<td>9.49</td>
<td>9.3</td>
<td>7.2</td>
<td>8.66</td>
</tr>
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<td>S10+</td>
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<td>9.4</td>
<td>10.4</td>
<td>9.30</td>
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<td>10.39</td>
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<td>10</td>
<td>15.2</td>
<td>11.60</td>
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</table>

### NOC (Open sky) Test Course Results Nov 2019

<table>
<thead>
<tr>
<th>Device Name</th>
<th>1 point avg</th>
<th>5 point avg</th>
<th>60 point avg</th>
<th>Total Averaged Accuracy per device (m)</th>
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</thead>
<tbody>
<tr>
<td>Ipad Air</td>
<td>4.11</td>
<td>5.66</td>
<td>4.43</td>
<td>4.73</td>
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<tr>
<td>Ipad Mini</td>
<td>3.94</td>
<td>3.85</td>
<td>5.27</td>
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<tr>
<td>Note 10</td>
<td>4.76</td>
<td>5.17</td>
<td>4.94</td>
<td>4.96</td>
</tr>
<tr>
<td>S10</td>
<td>5.48</td>
<td>4.99</td>
<td>5.44</td>
<td>5.30</td>
</tr>
<tr>
<td>S10+</td>
<td>2.73</td>
<td>4.44</td>
<td>3.87</td>
<td>3.68</td>
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<tr>
<td>TabA 8&quot;</td>
<td>3.45</td>
<td>3.93</td>
<td>3.03</td>
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<tr>
<td>TabA 10&quot;</td>
<td>4.21</td>
<td>3.68</td>
<td>3.01</td>
<td>3.63</td>
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Mobile Device Specs summary table
<table>
<thead>
<tr>
<th>Mobile Device Name</th>
<th>Accelerometer</th>
<th>Gyroscope</th>
<th>Magnetic</th>
<th>Proximity</th>
<th>Barometer</th>
<th>Operating System</th>
<th>Internal Memory</th>
<th>External Memory</th>
<th>Location Source</th>
<th>Screen Size (inches)</th>
<th>Camera Megapixel</th>
<th>Accuracy Open Sky</th>
<th>Accuracy Closed Canopy</th>
<th>Website for Device Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samsung Galaxy S10+</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Android 9.0 (Pie)</td>
<td>128 or 512 GB options</td>
<td>MicroSD (Up to 512GB)</td>
<td>GPS, GLONASS, Galileo, Beidou</td>
<td>6.4&quot;</td>
<td>16MP</td>
<td>3.7 meters</td>
<td>9.3 meters</td>
<td><a href="https://www.samsung.com/global/galaxy/galaxy-s10/specs/">https://www.samsung.com/global/galaxy/galaxy-s10/specs/</a></td>
</tr>
<tr>
<td>Samsung Galaxy S10</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Android 9.0 (Pie)</td>
<td>128 or 512 GB options</td>
<td>MicroSD (Up to 512GB)</td>
<td>GPS, GLONASS, Galileo, Beidou</td>
<td>6.1&quot;</td>
<td>16MP</td>
<td>5.3 meters</td>
<td>8.6 meters</td>
<td><a href="https://www.samsung.com/global/galaxy/galaxy-s10/specs/">https://www.samsung.com/global/galaxy/galaxy-s10/specs/</a></td>
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<td>✓</td>
<td>✓</td>
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<td>GPS, GLONASS, Galileo, Beidou</td>
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<td>12MP</td>
<td>3.4 meters</td>
<td>8.1 meters</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Android 8.0 (Oreo)</td>
<td>32GB</td>
<td>MicroSD (Up to 256GB)</td>
<td>GPS, GLONASS, Galileo, Beidou</td>
<td>5.8&quot;</td>
<td>12MP</td>
<td>3.2 meters</td>
<td>15 meters</td>
<td><a href="https://www.samsung.com/us/mobile/phones/galaxy-s/galaxy-s8-64gb--verizon--midnight-black-sm-g950uzkayw/">https://www.samsung.com/us/mobile/phones/galaxy-s/galaxy-s8-64gb--verizon--midnight-black-sm-g950uzkayw/</a></td>
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<tr>
<td>Bluetooth Device Name</td>
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<td>Gyroscope</td>
<td>Magnetic</td>
<td>Proximity</td>
<td>Barometer</td>
<td>Operating System</td>
<td>Internal Memory</td>
<td>External Memory</td>
<td>Location Source</td>
<td>Size (inches)</td>
<td>Weight (ounces)</td>
<td>Accuracy Open Sky</td>
<td>Accuracy Closed Canopy</td>
<td>Website for Device Specifications</td>
</tr>
<tr>
<td>---------------------------------------------</td>
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<td>----------------------------------</td>
</tr>
<tr>
<td>Trimble R1 Bluetooth Receiver</td>
<td>![Checkmark]</td>
<td>![Checkmark]</td>
<td>![Checkmark]</td>
<td>![Checkmark]</td>
<td>![Checkmark]</td>
<td>![Checkmark] Works with Android or iOS</td>
<td>NA</td>
<td>NA</td>
<td>GPS, GLONASS, SBAS, BeiDou, Galileo, QZSS</td>
<td>4.4” x 2.7” x 1.1”</td>
<td>6.5 oz</td>
<td>2.2 meters</td>
<td>4.5 meters</td>
<td><a href="https://geospatial.trimble.com/products-and-solutions/r1">https://geospatial.trimble.com/products-and-solutions/r1</a></td>
</tr>
</tbody>
</table>

Open sky and closed canopy accuracy values were derived by averaging five GPS positions using the National Standard for Spatial Data Accuracy. The NSSDA Horizontal Accuracy calculates to a 95% confidence level (95 out of 100 times the GPS accuracy will be equal to or better than NSSDA calculated distance from the true location).
Relative Device size comparisons

Phones:
Note: Not shown actual size.
Tablets:
Note: Not shown actual size.

Tab A 7"

Tab S2 8"

Tab Active 2

Tab A 8” (2019)

Tab A 10” (2019)