The RSA306 and SignalVu-PC FAQs

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Tektronix®

What are the PC hardware requirements to run the RSA306 with SignalVu-PC or the API?

A PC with Windows 7, Windows 8/ 8.1 64-bit operating system and a USB 3.0 connection is required for operation of the RSA306. 8 GB RAM and 20 GB free drive space is required for installation of SignalVu-PC. For full performance of the real time features of the RSA306, an Intel i7 4th generation processor is required. Storage of streaming data requires that the PC be equipped with a drive capable of streaming storage rates of 300 MB/sec, which is only possible with solid state drives or arrays of spin drives

What happens if I don't meet all of the requirements with my PC?

Processors of lower performance can be used, with reduced real time performance. This means that the minimum signal duration for 100% probability of intercept will increase, and the performance of AM/FM demodulation and listening will be degraded.

What PC should I get to work with the RSA306?

Any PC that meets the performance requirements should work. Tektronix doesn't make a specific recommendation, but a list of models we've evaluated is shown below. In one case, we've found an Intel core i5-based tablet (Surface 3 Pro) that does meet minimum signal duration specifications.

Manufacturer	Model	Processor	Meets minimum signal duration specification?	Meets streaming data requirement?
Dell	XPS15-6842sLV	Intel corei7-4702HQ 2.2GHz	Yes	No (spin drive)
Lenovo	Yoga 2 Pro	Intel corei7-4500U 1.8GHz	Yes	No (spin drive)
Microsoft	Surface 3 Pro	Intel core i7-5650U @ 1.7-2.3 GHz	Yes	Yes (Solid-state drive)
Microsoft	Surface 3 Pro	Intel corei5-4300U CPU @ 1.7-2.5 GHz	Yes	Yes (Solid-state drive)
Motion Computing	F5te	Intel core i7-3667 CPU @ 2.00 GHz	Yes	Yes (Solid-state drive)
Toshiba	Satellite s55t-B	Intel Core i7-4710HQ 2.5GHz	Yes	No (spin drive)
Lenovo	Think Pad	Intel corei7 3632QM 2.2 GHz	Yes	No (spin drive)

What if my disk drive doesn't meet the write-speed requirement?

If a disk drive with streaming storage rates <300 MB/sec is used, you will not be able to stream data to the drive without gaps. The unit will still write to the drive, but it will not be seamless. All other functions will work, including capturing and storing up to 1 second of data with SignalVu-PC. There are no spin-drives that meet the requirement for write speed. Many solid-state drives meet the requirement. The write speed of your drive can be determined from the manufacturer's specifications.

SignalVu-PC SVE Option SVE used to be a pay-for option in the software. What happened to it? How do I get it?

SignalVu-PC SVE Option SVE is now standard in the SignalVu-PC-SVE installation. No option key is needed for the functions in the old Option SVE.

What about all the other options on SignalVu-PC SVE? Do I need them? What has changed?

All other options to SignalVu-PC remain as before, but their prices have been reduced substantially.

The installation asks if I would like to install TekVISA. What is TekVISA?

TekVISA is the Tektronix implementation of the Virtual Instrument Software Architecture (VISA). VISA is a widely used application programming interface used in the test and measurement industry for communicating with instruments from a PC. The VISA standard includes specifications for communication with instruments via interfaces such as GPIB, VXI, LAN, USB and other interfaces.

Is TekVISA required? Why would I want to install TekVISA?

TekVISA is not required for manual operation of SignalVu-PC, or for communication with the API. However, if you would like to programmatically control SignalVu-PC, TekVISA is required. Also, SignalVu-PC Option MAP communicates to the SignalVu-PC software via TekVISA.

Where do I get the USB driver for the RSA306?

It is installed when you install SignalVu-PC SVE or the application programming interface. The driver is also available separately on the USB thumb-drive included with the RSA306 .

SignalVu-PC Live Link cannot find my RSA306

After installation of SignalVu-PC and the Tektronix RSA306 USB driver, I cannot get the instrument to be found with SignalVu-PC Live Link.

In older PCs, the latest manufacturer's drivers for the PC and for the processor may need to be installed. Check on the website of your PC manufacturer and at the Intel website for the latest drivers for your PC.

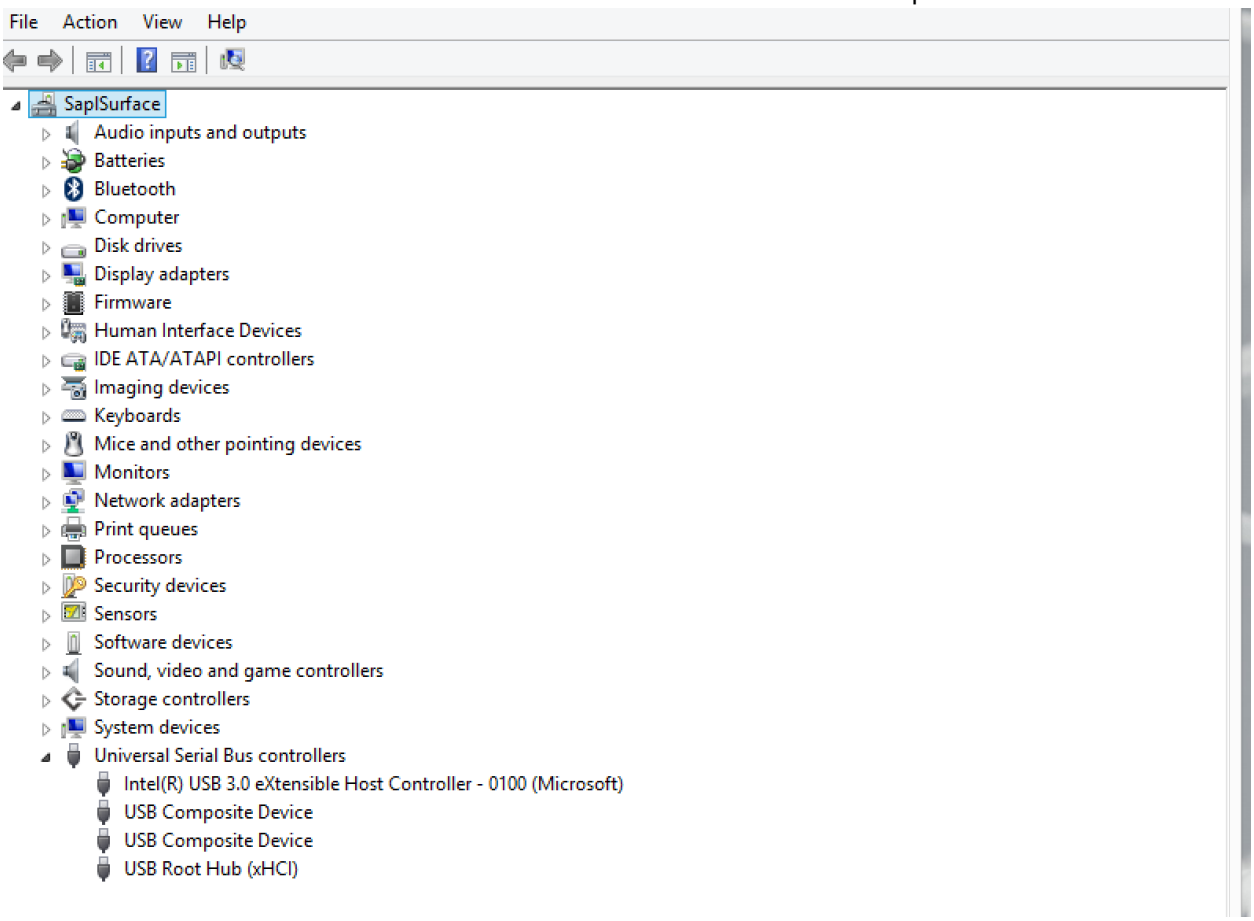
What USB cable can I use with the RSA306? What's the longest USB cable I can use?

The instrument ships with a 1M USB 3.0 cable. If a longer cable is needed, take care to purchase a high quality cable. The instrument is powered by the cable, and draws about 800 milliamps when operating. Lower quality cables will have higher resistance, and the voltage drop that results may cause the unit to be unable to operate. We have successfully used the Amazon basics 9 foot USB cable with several laptops. However, the laptop used must have a robust USB power supply to operate over a long cable.

How can I tell if my PC is USB 3.0? What are the USB 3.0 markings on the connectors?

The best way is to ask Windows. In Windows 7, from the Start button, open Control Panel and select Device Manager. In Windows 8, search on 'Device Manager', select it and look for USB 3.0 as shown below

The USB installation is detailed in Universal Serial Bus Controllers. An example is shown below.



It may be that not all of your USB connections are USB 3.0. Frequently (but not always), the USB connector is blue and/or has the 'SS' or '3.0'designator written on it. There are four internal lines on the connector, but some USB 2.0 connectors also have 4 lines. You may also see a 'lightning bolt' printed near the connector: The lightning bolt does not designate USB 3.0, it just means that the port is powered and can charge devices when the PC is powered off.

How can I tell if the RSA306 is connected?

When first plugged in, the RSA306 status light is red. When a successful connection is made and the instrument boots, the light turns green. This takes about 5 seconds. When SignalVu-PC searches for and connects to the RSA306, it forces a re-boot of the instrument, and you will see the light cycle to red, then green again.

What do the red/green lights on the RSA306 indicate?

Solid Green: Instrument has finished boot-up up and is ready to connect or operate.
Red: Unable to power up, or re-booting the instrument
Flashing green: Transferring data

Is there a declassification procedure for the RSA306? What data, if any, would persist through a factory calibration?

Declassification procedure is on Tek.com, search on RSA306 declassification. No user data is stored in the instrument, only calibration data. User data IS stored in the PC running SignalVu-PC or the API.

Can you run multiple versions of SignalVu-PC or the API each hosting 1 RSA306 on a single PC?

You can run multiple RSA306 on a single PC with multiple USB 3.0 ports, but SignalVu-PC or the API can run only one of them at a time. Tektronix has not tried to run multiple instances of SignalVu-PC or the API on a single PC.

What is the Spectrum Update rate for the instrument?

For the DPX spectrum display at 40 MHz span, RBW=auto, the spectrum update rate is 10,000/second. As the resolution bandwidth is reduced, the spectrum processing rate slows. This affects the minimum signal duration for 100% probability of intercept. You can see the minimum signal duration by selecting DPX Spectrum Settings:Pref:Show Parameter Readouts. The instrument must be connected for this menu to appear in SignalVu-PC.
For the standard spectrum analyzer, the spectrum update rate can be as fast as 50/sec for spans of 40 MHz, RBW=Auto, depending upon your PC. For full-range sweeps of 6.2 GHz in auto-RBW, the sweep rate is generally greater than 1.7 GHz/sec, depending upon the PC used.

What causes the RSA306 to trigger on signals that aren't shown in the display?

The trigger in the RSA306 sees the entire 40 MHz intermediate frequency bandwidth of the instrument, independent of the displayed spectrum span or selected measurement bandwidth. If a signal is present above the trigger level in the IF, it will cause the instrument to trigger.

How do I quickly save a screen shot from the RSA306?

In SignalVu-PC, navigate to File: Save As: Save as Type: Picture, and select .png or .bmp. Or, use the Windows Snipping Tool.

How do I use SignalVu-PC to re-analyze data collected with a second PC?

To save data acquired with the RSA306 and SignalVu-PC, use File: Save As: and select .tiq or .mat. .tiq is the native format for SignalVu-PC, and .mat is Level 5 Matlab file format. Either of these can be opened by any SignalVu-PC installation. Files saved as .Mat can be opened with Matlab

What is the difference between an RSA306, MDO3000B and an RSA5106B?

The RSA306 has amazing performance for its price. The MDO3000B combines 6 instruments in a single unit for unmatched versatility. The RSA5106 costs more, and you get more. A quick comparison is shown below.

	RSA306	MDO3000B Opt SA	RSA5106B
Input Frequency	9 kHz to 6.2 GHz	9 kHz to 3.0 GHz	1 Hz to 6.2 GHz
Frequency accuracy	±3 ppm (18 to 28 °C ambient, after 20 minute warm up, + aging)	±10 ppm	± 1 x 10 -6 after 10 minute warm up + aging ± 1 x 10 -7 (Opt PFR)
External frequency reference input	10 MHz ±10 Hz	10 MHz	Every 1 MHz from 1 to 100 MHz plus 1.2288 MHz, 4.8 MHz, and 19.6608 MHz.
RF Input			
VSWR	≤ 1.8:1 (10 MHz to 6200 MHz, reference level ≥ +10 dBm, typical)	Not specified	< 1.2 (10 MHz to 2 GHz, RF ATT=10 dB, Preamp OFF) < 1.4 (>2 GHz to 3 GHz, RF ATT=10 dB, Preamp OFF) < 1.5 (>3 GHz to 6.2 GHz, RF ATT=10 dB, Preamp OFF)
Max. Input, no damage	DC voltage ±40 VDC +23 dBm (Reference level ≥ –10 dBm) +15 dBm (Reference level < –10 dBm) (continuous or peak)	DC maximum ±20 V DC +30 dBm (1 W) (pulse) +45 dBm (32 W) (<10 µs pulse width, <1% duty cycle, and reference level of ≥ +10 dBm)	DC Voltage +5V + 30 dBm (RF Input, RF ATT≧10dB, Pre-amp Off) + 20 dBm (RF Input, RF ATT≧10dB, Pre-amp On) + 50 Watts peak (RF Input, RF ATT≧30dB, (<10 µs, 1% Duty Cycle repetitive Pulses))
Amplitude Accuracy Typical (95% confidence) (18 °C to 28 °C)			
9 kHz - < 3 GHz	±1.25 dB	< ±0.6 dB (80% confidence)	±0.3 dB (10 MHz to 3 GHz)
≥ 3 GHz – 6.2 GHz	±2.0 dB	< ±0.6 dB (80% confidence)	±0.5 dB

	RSA306	MDO3000B Opt SA	RSA5106B
Intermediate frequency and acquisition system			
IF Bandwidth	40 MHz	1 GHz	25/40/85/165 MHz BW
Sample rate, bits	112 MS/s, 14 bit	10 GS/s, 8 bit	16 bits, 200 MS/s (Std & Option B40) 16 bits, 200 MS/s & 14 bits, 400 MS/s (OptB85/ B16x)
Noise and Distortion			
Displayed Average Noise Level	DANL (dBm/Hz), typical	DANL (dBm/Hz), typical, with/without TPA-N-PRE	DANL (dBm/Hz), typical, Preamp Off/On
100 kHz	-133	-130/-140	-150 dBm/Hz (10 kHz to 32 MHz, LF Band)
5 MHz	-148	-130/-140	-139/-160
1.0 GHz	-163	-140/-150	-157/-167
2.0 GHz	-161	-140/-150	-157/-167
4.0 GHz	-158	NA	-155/-164
6.2 GHz	-153	NA	-153/-164
Phase Noise at specified offset, dBc/Hz, typical			
1 kHz	-88		-107
10 kHz	-87	-85	-113
100 kHz	-92	-101	-117
1 MHz	-120	-122	-139
Input related spurious response	< -50 dBc, typical	Not specified	<-75 dBc, typical
3rd-Order Intercept (typical)	+14 dBm	Not specified	+18 dBm
Other			
Weight	0.59 kg (1.3 lb)	4.2 kg (9.2 lb.)	24.8 kg (54.5 lb)
Temperature Ranges	Operating -10 C to +55 C Non-operating -51 C to +71 C	Operating -10 ºC to +55 ºC Nonoperating -40 ºC to +71 ºC	Operating: 5 °C to +40 °C Non-operating: -20 °C to +60 °C

	RSA306	MDO3000B Opt SA	RSA5106B
Real Time Signal Analysis Features			
Maximum span	40 MHz real-time 9 kHz - 6.2 GHz swept	1 GHz? Acquisition (not real time processing) 9 kHz – 3.0 GHz swept	25/40/85/165 MHz real time 1 Hz – 6.2 GHz swept
Maximum acquisition time	1.0 s, acquisition bandwidth span-independent, 40 MHz max	NA	19 sec at 40 MHz bandwidth, longer at lower bandwidths
DPX spectrum display		NA	
Available Displays	Spectrum, Spectrogram	NA	Spectrum, Spectrogram, Amplitude, Frequency, Phase
Spectrums/sec	10,000 (40 MHz span, RBW=Auto)	NA	390,625 per second (Span Independent)
Minimum signal duration, 100% probability of intercept	100 us, span= 40 MHz, RBW=Auto	NA	23.3 us (std), 10.5 us (opt. 09), span=40 MHz, RBW=auto 2.7 us (165 MHz, Option 09, RBW=20 MHz)
Minimum resolution bandwidth	1 kHz (DPX spectrum) 10 Hz (standard spectrum)	NA (DPX spectrum) 20 Hz (standard spectrum)	0.1 Hz (DPX spectrum) 0.1 Hz (standard spectrum)
Triggers (RF/IF)	IF Level (40 MHz BW)	NA	IF Level (1 kHz-165 MHz BW) Frequency Mask Frequency Edge Density Time-qualified and runt
Triggers (Other)	External	Any analog (scope) channel input, Edge, Sequence, Pulse Width, Timeout, Runt, Logic, Setup and Hold, Rise/Fall, Video Aux in (External) Line	External (2) Line
Modulation Analysis Residual EVM			
1 MS/s QPSK	1.1%	NA	0.35%
802.11b	2.0%	NA	1.0%
802.11n	-35 dB	NA	-48 dB
APCO P25 HDQPSK	2.5%	NA	0.4%
APCO25 P25 C4FM	1.3%	NA	1.0%

	RSA306	MDO3000B Opt SA	RSA5106B
Other Features			
	Basic AM/FM analysis, AM/FM Audio listening Frequency-Mask Limit/Act on violation *SignalVu-PC Options* for AM/FM/PM/Direct Audio Frequency/phase settling Pulse measurements GP Mod. Analysis WLAN analysis APCO P25	6-in-1 integrated oscilloscope that includes an integrated spectrum analyzer, arbitrary function generator, logic analyzer, protocol analyzer, and digital voltmeter/counter Models for 100/200/350/500 MHz oscilloscope channels, Application modules for Aerospace, Audio, Automotive, Computer, Embedded Serial, FlexRay, USB, Power analysis and limit/mask testing	Basic AM/FM analysis, AM/FM Audio listening *Internal Options* for AM/FM/PM/Direct Audio Frequency/phase settling Phase Noise/Jitter Noise Figure Pulse measurements GP Mod. Analysis WLAN analysis APCO P25

What type of map formats does RSA Map Support ?

Supported map types Pitney Bowes MapInfo (*.mif), Bitmap (*.bmp)
Map file used for the measurements: Google Earth KMZ file
Recallable results files (trace and setup files): MapInfo-compatible MIF/MID files

Can I use RSA Map indoors, or without GPS installed?

Yes. You manually place the measurements you make on the map you have created and selected.

Do I have to create a map to collect data with RSA Map?

Yes. To create a Geo-referenced map, follow the directions in the Word document below. To create a simple map on which you can manually place your measurements, save any map in .jpg format, import it into the RSA Map program.

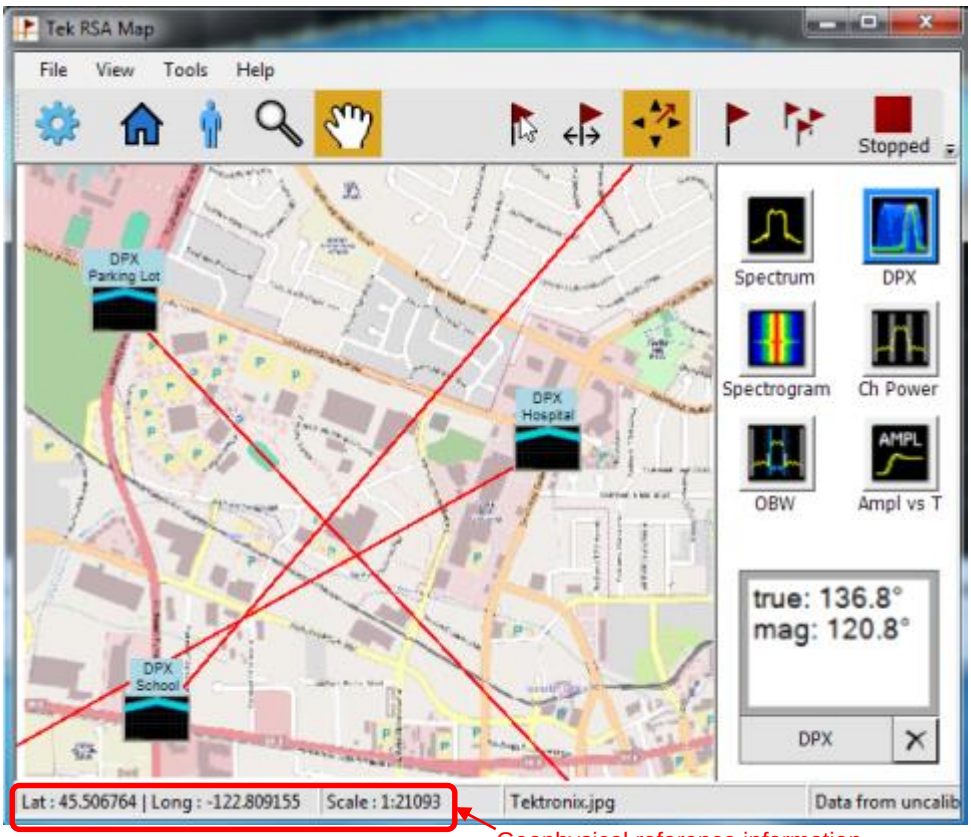
How to Create a Geo-referenced Map for RSA MAP

This guide shows how to create a geo-referenced map to load into RSA Map

The example in this Demo guide uses a free online mapping source OpenStreetMap to capture maps.

OpenStreetMap: http://www.openstreetmap.org/

Same map conversion technique could be used for scanned paper maps.



Overview:

The RSA Map tool lets you use an on-screen map to record the location and value of measurements. With RSA Map you can use a GPS receiver (customer supplied) to automatically position measurements at your current location on maps with geophysical reference information.

The map format supported by RSA Map tool includes MapInfo format map files (.mif), Windows bitmap files (.bmp), and JPEG interchange format file (.JPEG or .JPG). The .bmp and .JPEG format map files can be either geo-referenced (using world map file format to specify geographic location) or non geo- referenced (which does not have geographic location information). To perform repeat measurements, GPS must be enabled and locked. The map used must be a geo-referenced map.

What Are In a Geo-referenced Map?

A geo-referenced map is made of two files:

- Bitmap file
- World file (Geo-reference information file)

How to Create a Geo-referenced Map?

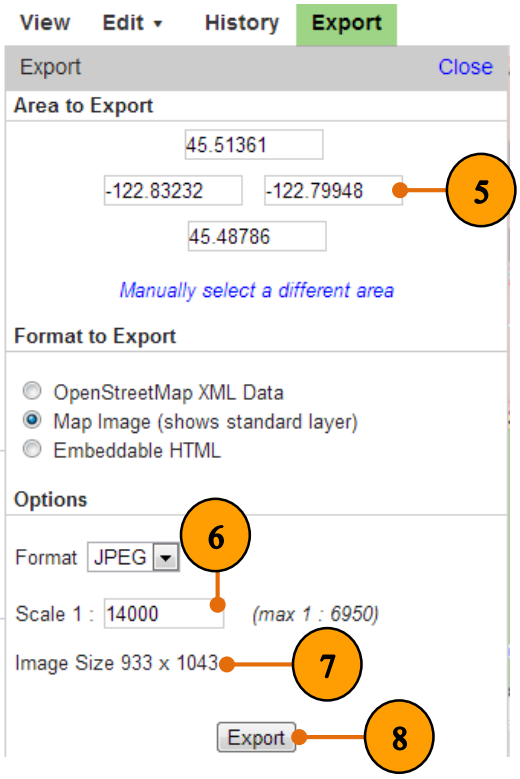
Step 1: Capture a Bitmap File:

OpenStreetMap is a collaborative project to create a free editable map of the world. It can capture a map anywhere in the world and can export it in its native format, bitmap image, and embeddable HTML. At this moment, RSA Map does not support the native format but can import a bitmap image file.

1. Open http://www.openstreetmap.org/
2. Once the user locates the map, select **Export** tab.
3. Select **Map Image**.

4. Choose the **Format** to be.JPEG.

5. Record the **Latitude** and **Longitude** information.
6. Adjust the **Scale** of the map.
7. Record the **Image Size**.
8. Click **Export** to save the map.



Quick Tip:

- Sometimes the web server is busy and the user needs to try several times.
- OpenStreetMap seems to require the credit on the map when you distribute the map.
- Smaller scale ratio provides more details, but generates larger file.

Step 2: Create a World File:

The created world file needs to be located in the same directory as the bitmap file.

To prepare for a world file, we need to calculate map parameters by using the recorded data from OpenStreetMap, then use text editor to create the world file.

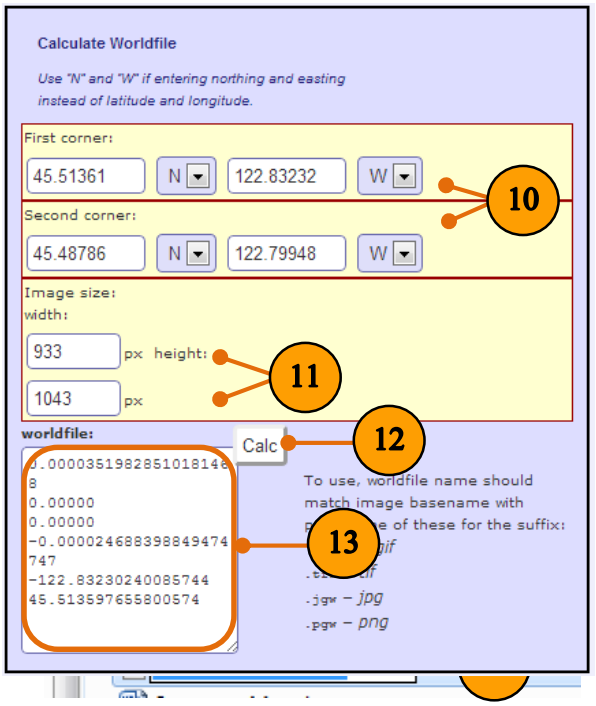
9. Open http://egb13.net/2009/03/worldfile-calculator/

10. Enter the **Latitude** and **Longitude** two of corners recorded in 5.

11. Enter the **Width** and **Height** of the map recorded in 7. The first box is Width, and the second is Height.

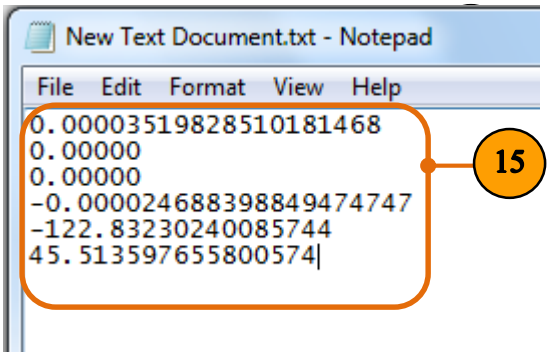
12. Click **Calc** to calculate the map parameters.

13. Copy the parameters.



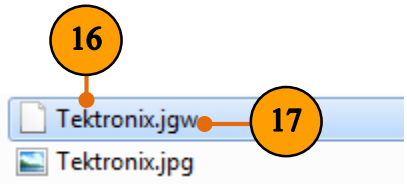
14. Create a **Text Document** and open.

15. Copy the calculated parameters in 13 to the text editor.



16. Save it to the same folder as the Bitmap file exported from OpenStreetMap, and use the same name.

17. Change .txt to the matched file extension.

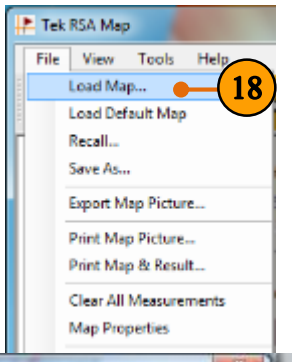


Bitmap Extension	World File Extension
bmp	bpw
jpg	jgw

Quick Tip:

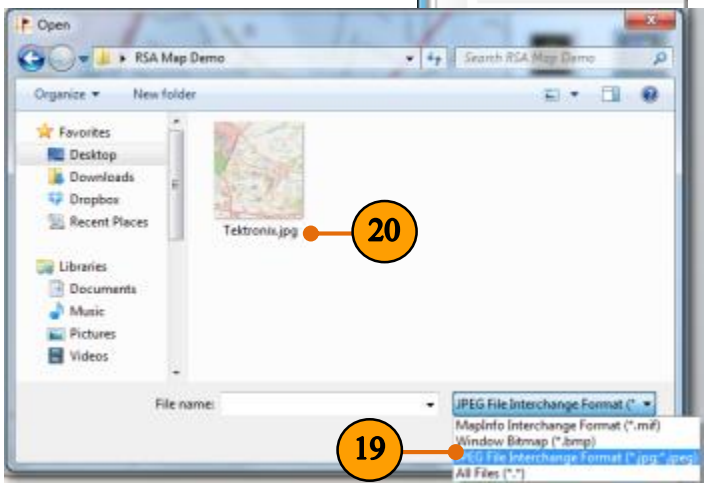
- The bitmap file and the world file have to be located in the same directory.
- OpenStreetMap uses + and – to present North/South and East/West, but this map parameter calculator uses N/S and E/W to indicate direction. Do not enter the negative number.
- Inversed width and height of map may cause error in SPECMON.

18. Click **Load map** in Tek RSA Map



19. Choose the map file type.

20. Select the map you created.



21. The selected map will be loaded into RSA Map.