HCM-MS (C# implementation)

Quick Start Guide

16.04.2026

Foreword

The document describes how to install and use the new HCM software. Follow the steps below to install and operate the application. If you have questions or remarks, please contact the following e-mail addresses:

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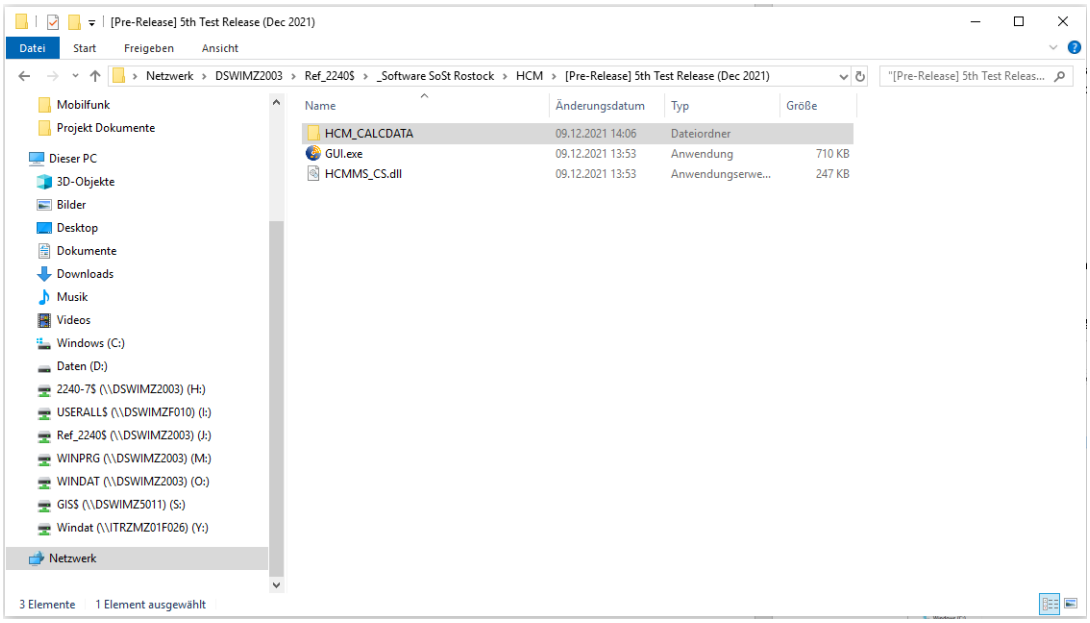
Installation

1. Unzip the “HCMMS_CS vx.x.zip” in a directory of your choice (with the appropriate rights to run
   applications).

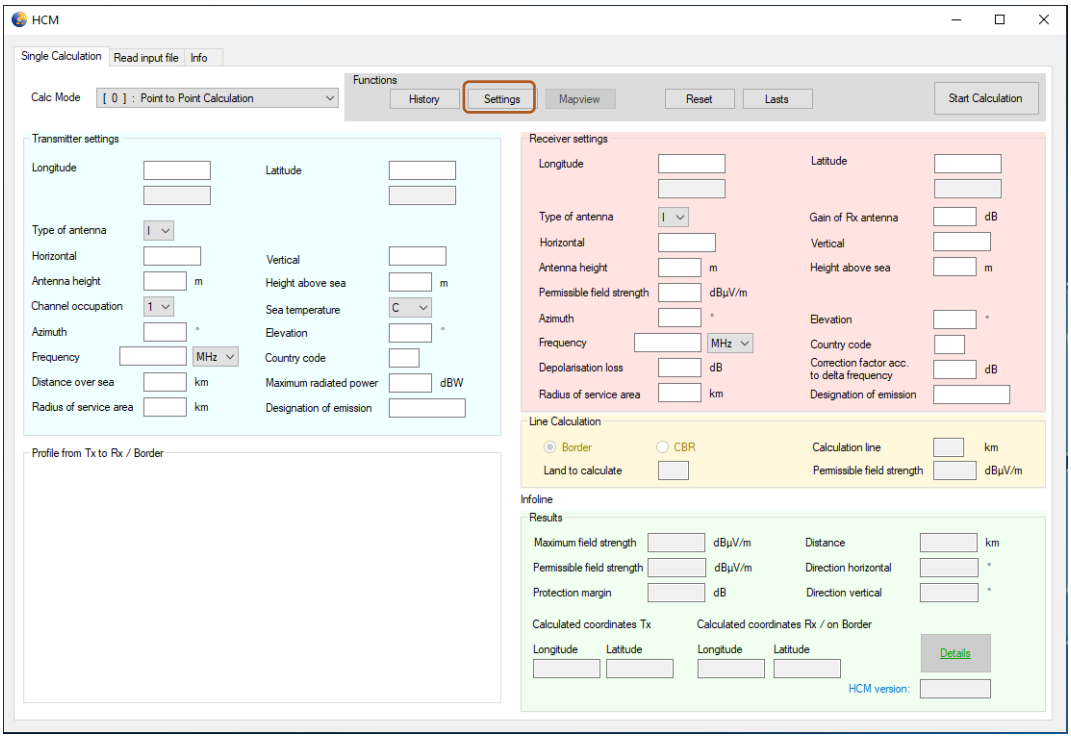
2. Start the application by running the **GUI.exe.**



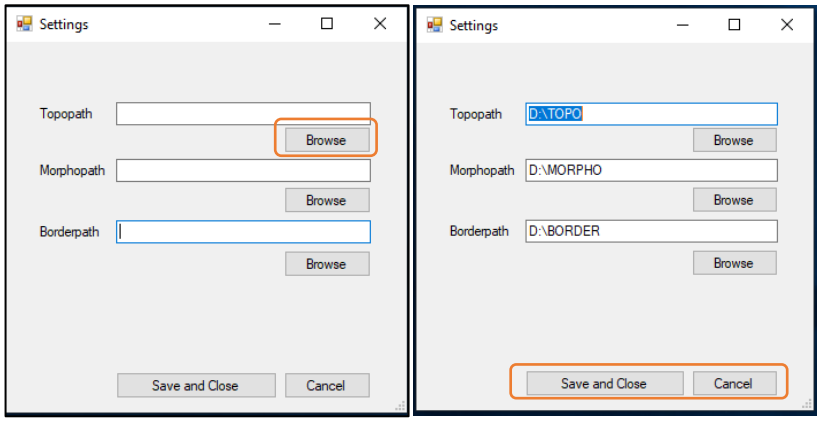
First Start – Configuration

On first use BORDER, TOPO and MORPHO paths must be set.

1. Press the **Settings** button.



2. In the Settings window, select the path for the respective data type by pressing the **Browse** button. If you haven't installed the data locally, it is possible to download it from the HCM homepage.



3. If you have defined all file paths, confirm the selection by pressing the **Save and Close** button.

   The window will close automatically.

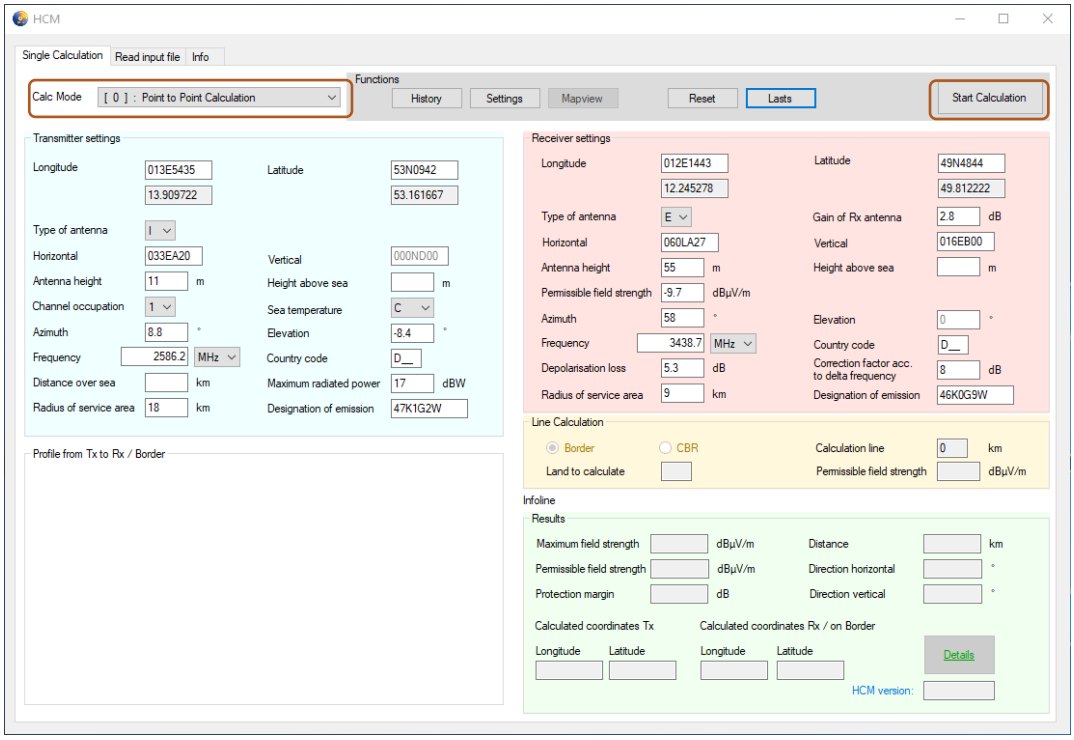
4. If you want to quit the action, press the **Cancel** button.

The location of calculation output files (folder "CALCDATA") depends on your system configuration. By useing the **Open the folder for Calculation data** button, you have access to the CALC DATA files. The button **Open the folder for Calculation data** is to be found on the info-tab.

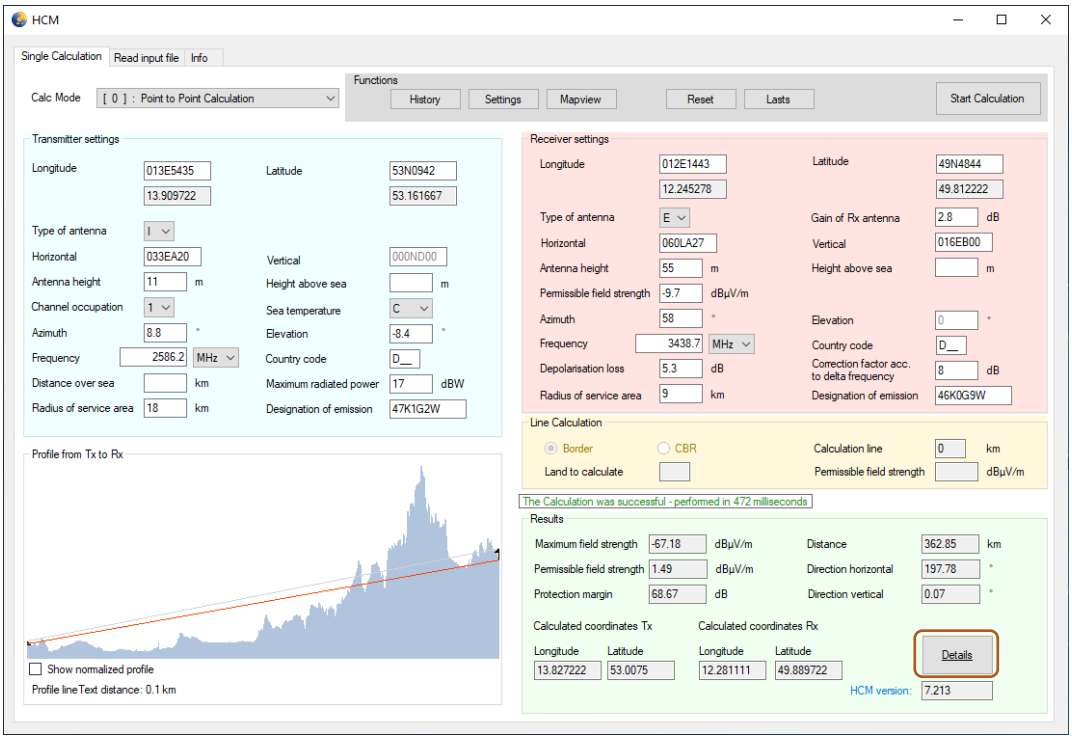
Single Calculation

1. First, determine whether it is a point-to-point or point-to-line calculation by selecting the respective **Calculation Mode**.

   An example for each Calculation mode is deposited. When you have entered all parameters, press the **Start Calculation** button.

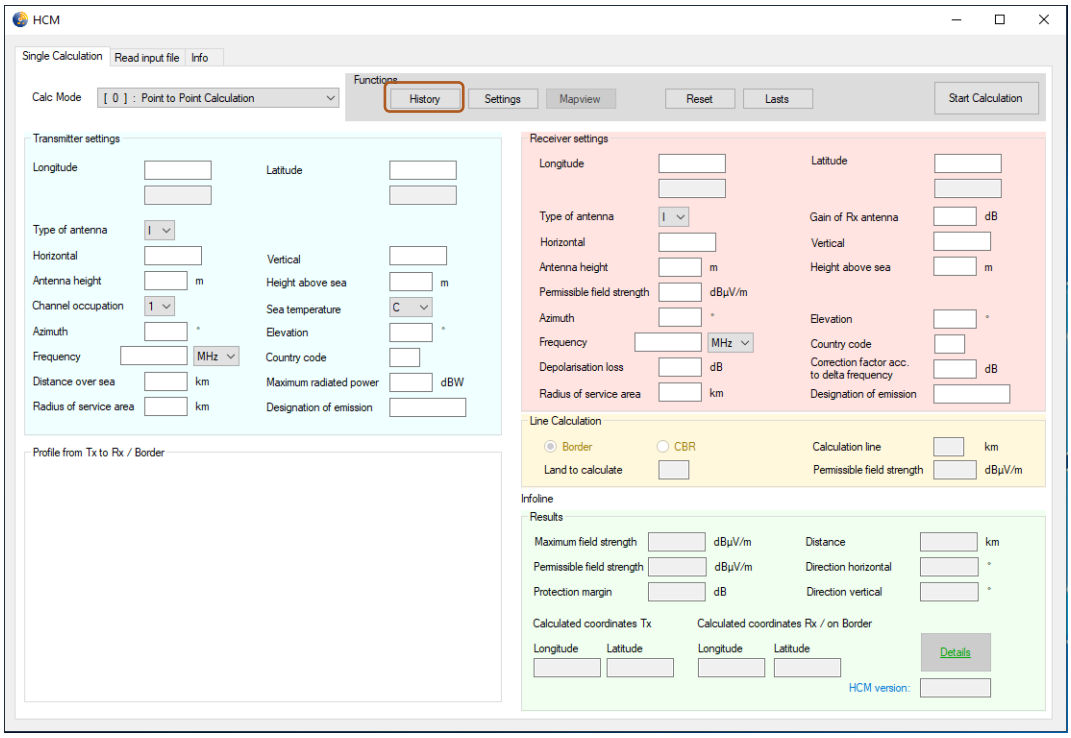


2. The result is displayed in the green box “Results”. If you want to see all the output and input parameters, press the **Details** button. In case of errors a description of the error is given above the result box.

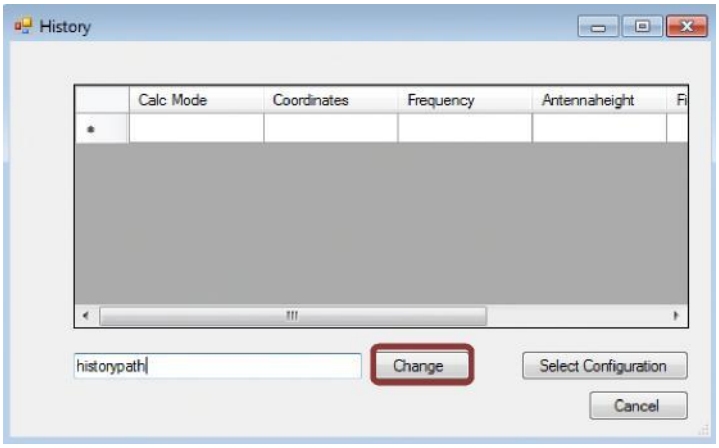


Use of catalogue data

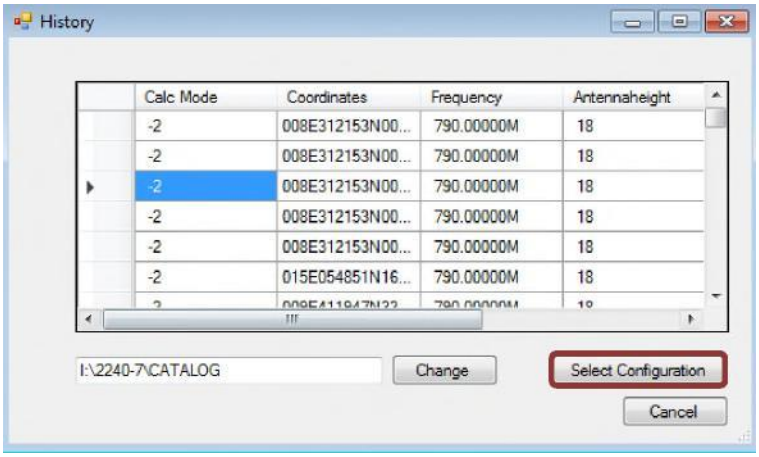
1. Press the **History** button.



2. Press the **Change** button to select the path for CATALOG folder. (*Note: It is possible to select the CATALOG folder from the "old" HCM.exe).*

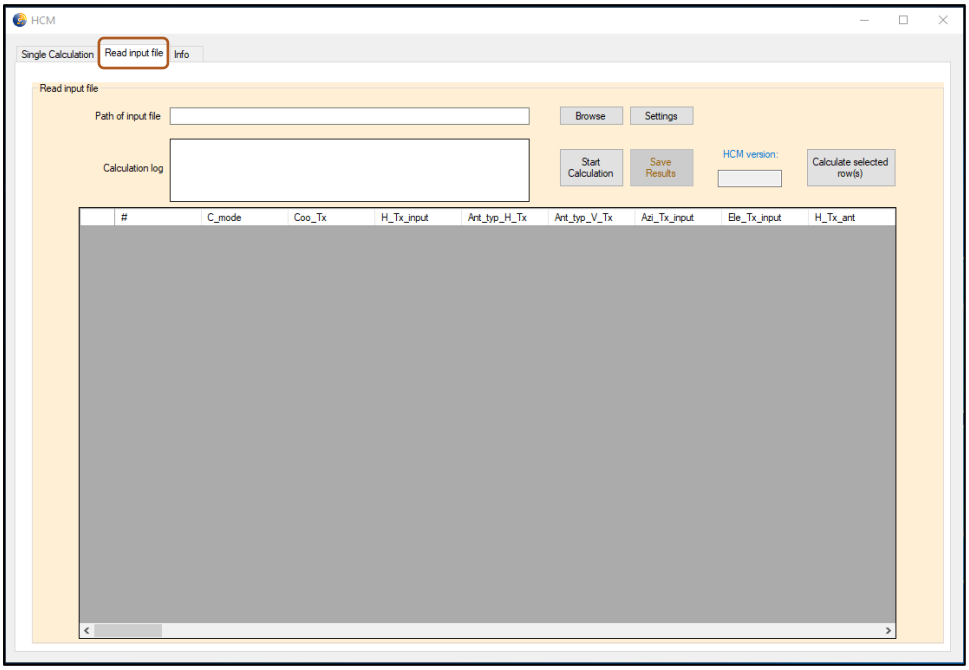


3. After confirmation, a table should appear. This table lists all former configurations. If you want to re-calculate one of these predictions, you will mark the line or a value of this line. Then push the **Select Configuration** button to fill the user interface with the specific data.

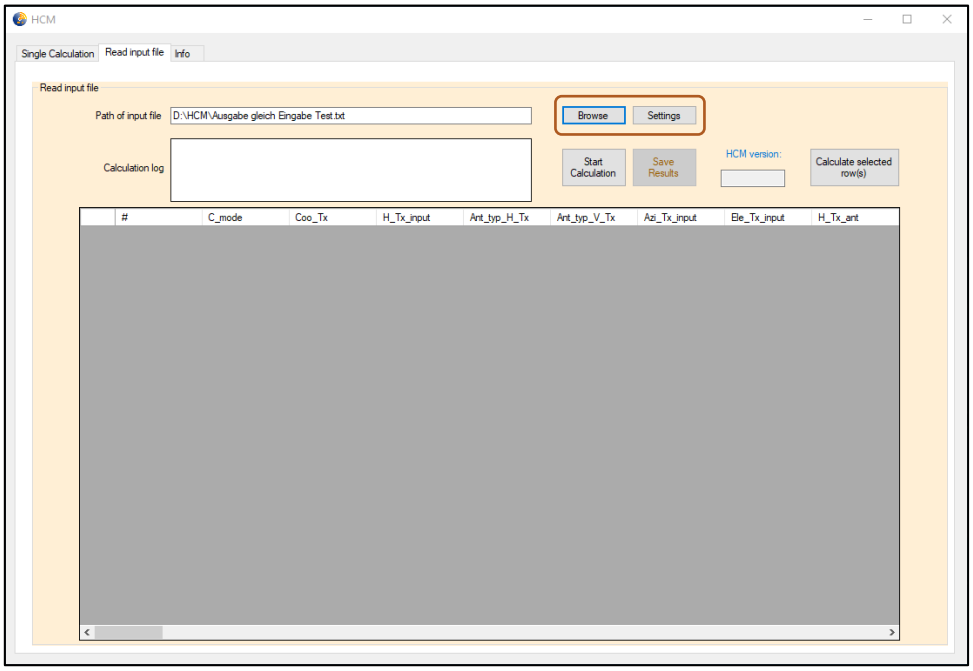


Read input file for calculation

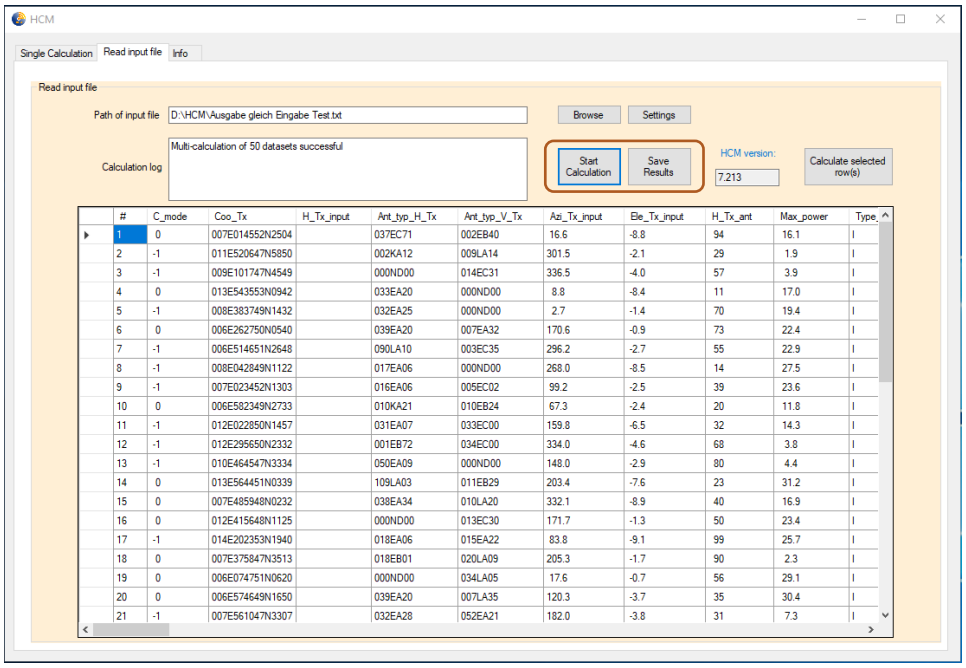
1. To execute a multiple calculation choose the Page **Read input file**.



2. Press the **Browse** button to select a file. If you have not configured the settings yet, you will have to do so now by pressing the **Settings** button.



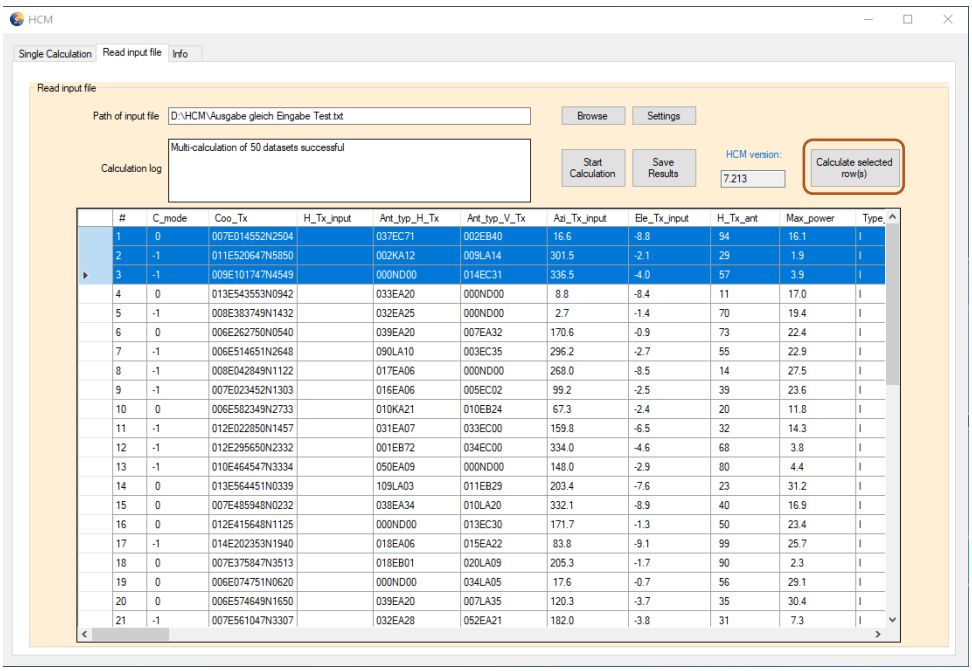
3. To start the calculation push the **Start Calculation** button.



#	C_mode	Coo_Tx	H_Tx_input	Ant_typ_H_Tx	Ant_typ_V_Tx	Azi_Tx_input	Ele_Tx_input	H_Tx_ant	Max_power	Type
1	0	007E014552N2504		037EC71	002EB40	16.6	-8.8	94	16.1	I
2	-1	011E520647N5850		002KA12	009LA14	301.5	-2.1	29	1.9	I
3	-1	009E101747N4549		000ND00	014EC31	336.5	-4.0	57	3.9	I
4	0	013E543553N0942		033EA20	000ND00	8.8	-8.4	11	17.0	I
5	-1	008E383749N1432		032EA25	000ND00	2.7	-1.4	70	19.4	I
6	0	006E262750N0540		039EA20	007EA32	170.6	-0.9	73	22.4	I
7	-1	006E514651N2648		090LA10	003EC35	296.2	-2.7	55	22.9	I
8	-1	008E042849N1122		017EA06	000ND00	268.0	-8.5	14	27.5	I
9	-1	007E023452N1303		016EA06	005EC02	99.2	-2.5	39	23.6	I
10	0	006E582349N2733		010KA21	010EB24	67.3	-2.4	20	11.8	I
11	-1	012E022850N1457		031EA07	033EC00	159.8	-6.5	32	14.3	I
12	-1	012E295650N2332		001EB72	034EC00	334.0	-4.6	68	3.8	I
13	-1	010E464547N3334		050EA09	000ND00	148.0	-2.9	80	4.4	I
14	0	013E564451N0339		109LA03	011EB29	203.4	-7.6	23	31.2	I
15	0	007E485948N0232		038EA34	010LA20	332.1	-8.9	40	16.9	I
16	0	012E415648N1125		000ND00	013EC30	171.7	-1.3	50	23.4	I
17	-1	014E202353N1940		018EA06	015EA22	83.8	-9.1	99	25.7	I
18	0	007E375847N3513		018EB01	020LA09	205.3	-1.7	90	2.3	I
19	0	006E074751N0620		000ND00	034LA05	17.6	-0.7	56	29.1	I
20	0	006E574649N1650		039EA20	007LA35	120.3	-3.7	35	30.4	I
21	-1	007E561047N3307		032EA28	052EA21	182.0	-3.8	31	7.3	I

4. If you want to safe the results, you can use the **Save Results** button to generate a txt file and a csv file.

5. By pressing the **Calculate selected row(s) button**, the checked lines will be calculated and shown in the table.



#	C_mode	Coo_Tx	H_Tx_input	Ant_typ_H_Tx	Ant_typ_V_Tx	Azi_Tx_input	Ele_Tx_input	H_Tx_ant	Max_power	Type
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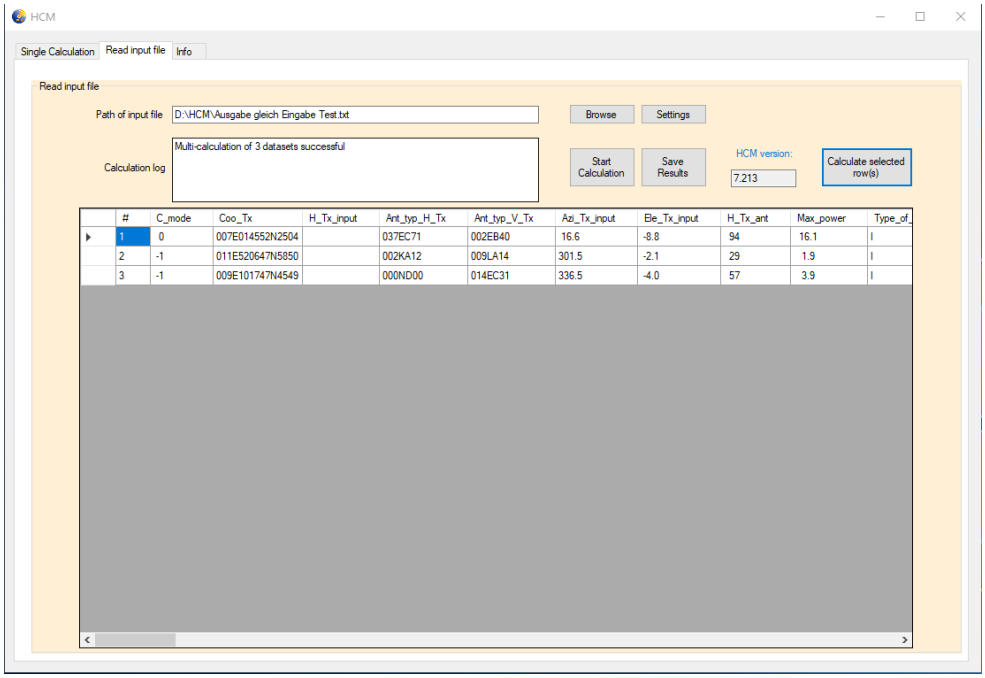
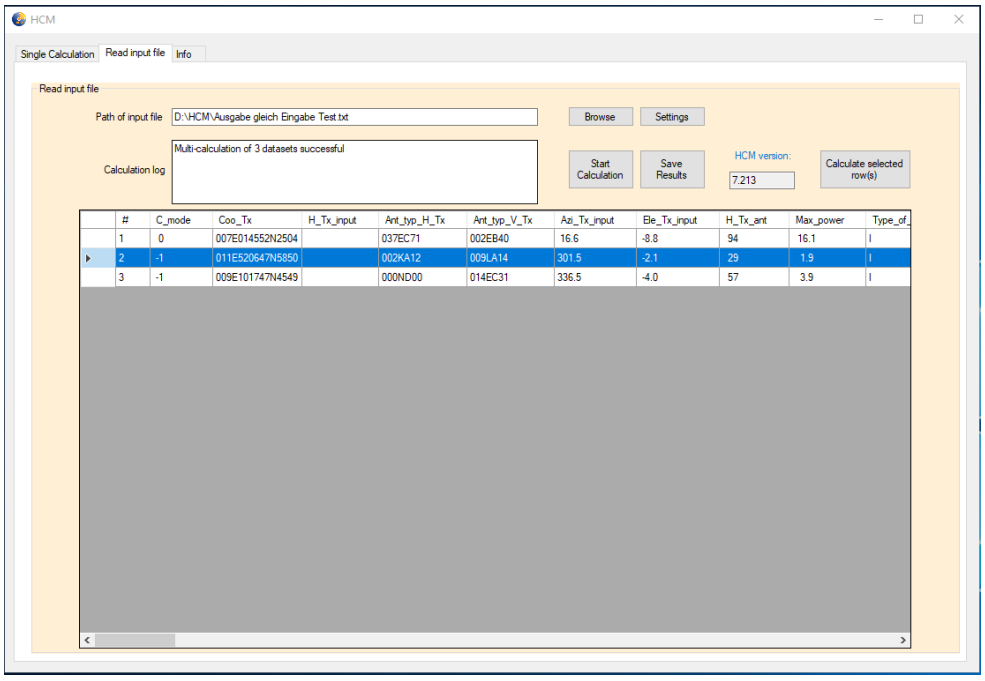
2	-1	011E520647N5850		002KA12	009LA14	301.5	-2.1	29	1.9	I
3	-1	009E101747N4549		000ND00	014EC31	336.5	-4.0	57	3.9	I
4	0	013E543553N0942		033EA20	000ND00	8.8	-8.4	11	17.0	I
5	-1	008E383749N1432		032EA25	000ND00	2.7	-1.4	70	19.4	I
6	0	006E262750N0540		039EA20	007EA32	170.6	-0.9	73	22.4	I
7	-1	006E514651N2648		090LA10	003EC35	296.2	-2.7	55	22.9	I
8	-1	008E042849N1122		017EA06	000ND00	268.0	-8.5	14	27.5	I
9	-1	007E023452N1303		016EA06	005EC02	99.2	-2.5	39	23.6	I
10	0	006E582349N2733		010KA21	010EB24	67.3	-2.4	20	11.8	I
11	-1	012E022850N1457		031EA07	033EC00	159.8	-6.5	32	14.3	I
12	-1	012E295650N2332		001EB72	034EC00	334.0	-4.6	68	3.8	I
13	-1	010E464547N3334		050EA09	000ND00	148.0	-2.9	80	4.4	I
14	0	013E564451N0339		109LA03	011EB29	203.4	-7.6	23	31.2	I
15	0	007E485948N0232		038EA34	010LA20	332.1	-8.9	40	16.9	I
16	0	012E415648N1125		000ND00	013EC30	171.7	-1.3	50	23.4	I
17	-1	014E202353N1940		018EA06	015EA22	83.8	-9.1	99	25.7	I
18	0	007E375847N3513		018EB01	020LA09	205.3	-1.7	90	2.3	I
19	0	006E074751N0620		000ND00	034LA05	17.6	-0.7	56	29.1	I
20	0	006E574649N1650		039EA20	007LA35	120.3	-3.7	35	30.4	I
21	-1	007E561047N3307		032EA28	052EA21	182.0	-3.8	31	7.3	I

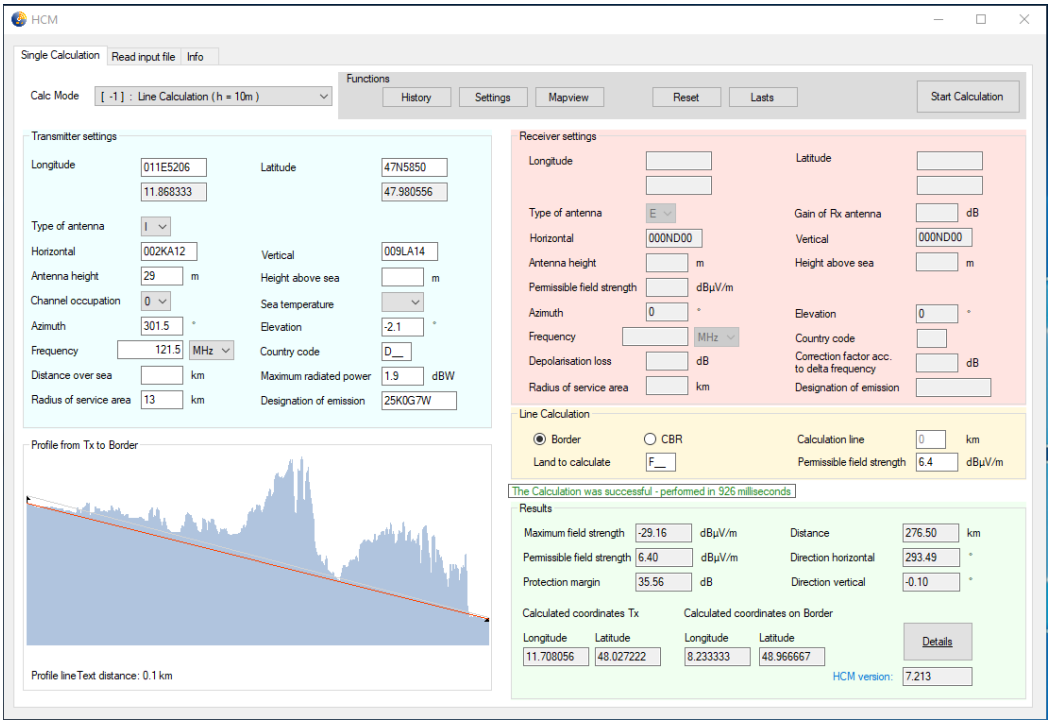
6. Result as shown.



7. If there is only one line checked, the whole configuration will be transformed in the Single Calculation window by pressing the Calculate selected row(s) button.

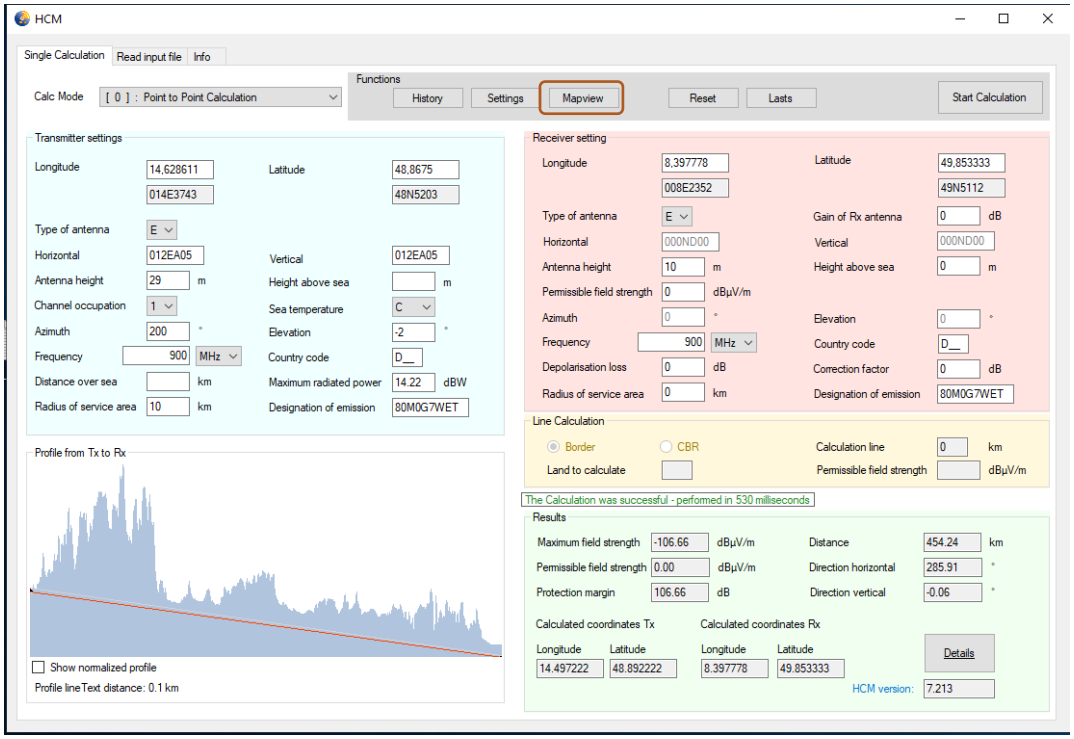


8. Result as shown.



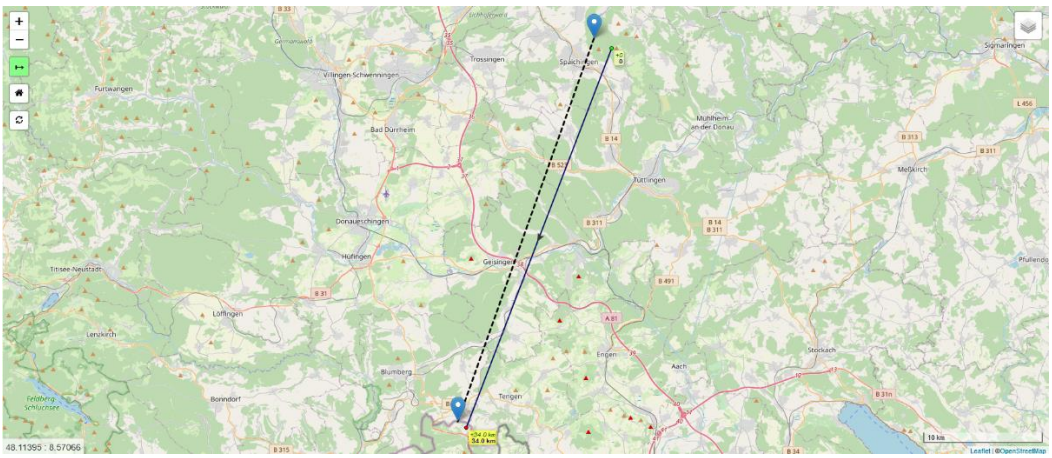
Map View

1. To display the points of the calculation in a map, press the button **Mapview.** When this button is activated, the web browser window opens and shows the current calculated configuration. A working internet connection is required to use the map feature.



2. To measure the distance, use the  button.
   To reset the view, use the  button.
   To update the points on the map, use the  button.
   To change the background-map, use  button. Open Street Map (basic view) and satellite map are available.

Satellite-view



Measure-Tool with Tooltip to add or delete points

DLL for C/C++ programs (or any other languages that don't use CLR)

Direct integration of the C#-DLL (*HCMMS_CS.dll*) is only possible for .NET programs. Programs written in other languages need some extra code to use the C#-DLL, e.g. a wrapper.

The test release now contains another DLL (*HCMMS_UMB.dll*) that can be used as bridge between surrounding programs written in C/C++ or other languages and the C#-DLL (see figure below).

HCMMS_UMB.dll shall provide the same interface as the Fortran-DLL and can (together with the C#-DLL) be used to replace the Fortran-DLL without writing extra code. Put both DLLs (*HCMMS_CS.dll* AND *HCMMS_UMB.dll*) in the same folder where the Fortran-DLL resides and reference the *HCMMS_UMB.dll* in your program / code.

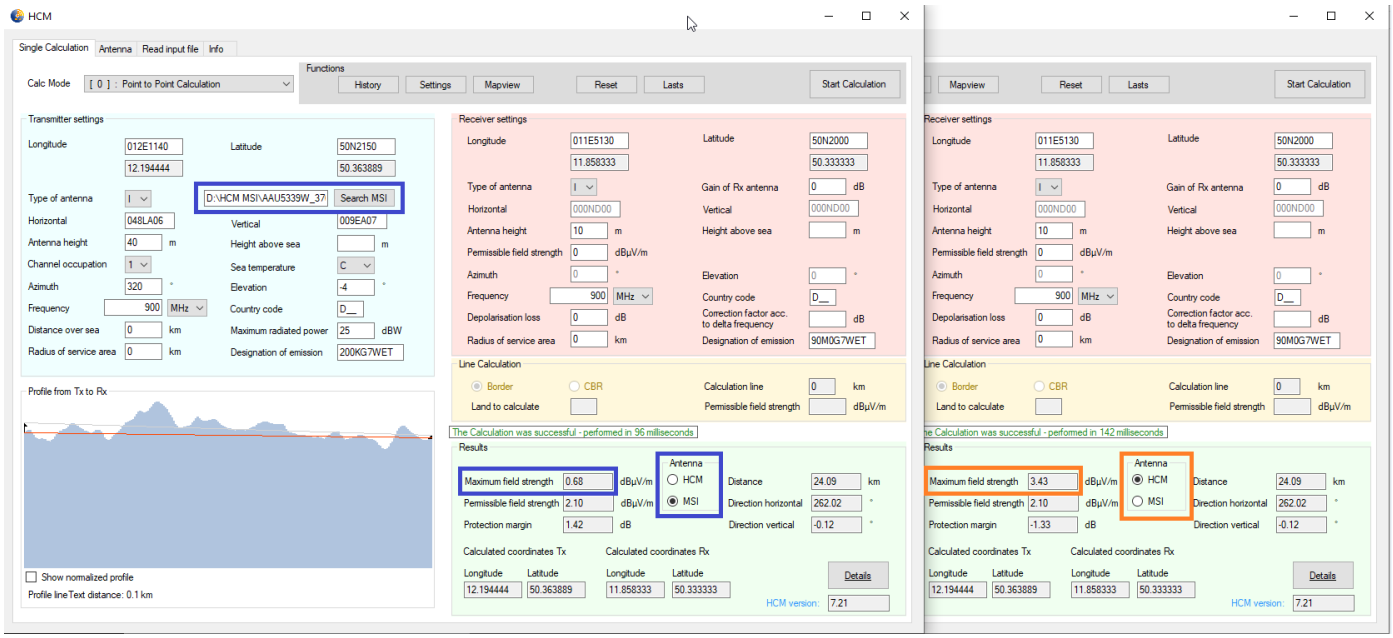
Data flow between surrounding program and C#-DLL

The interface to HCMMS_UMB.dll is part of official HCM-MS documentation and can be downloaded from the HCM homepage. Additionally the header file of the HCMMS_UMB.dll is included in the interface documentation of the C#-DLL that can be found on the HCM homepage (programs\mobile_service\Test version\CSharp Implementation\Interface documentation.pdf).

Usage of MSI antenna pattern for HCM calculation

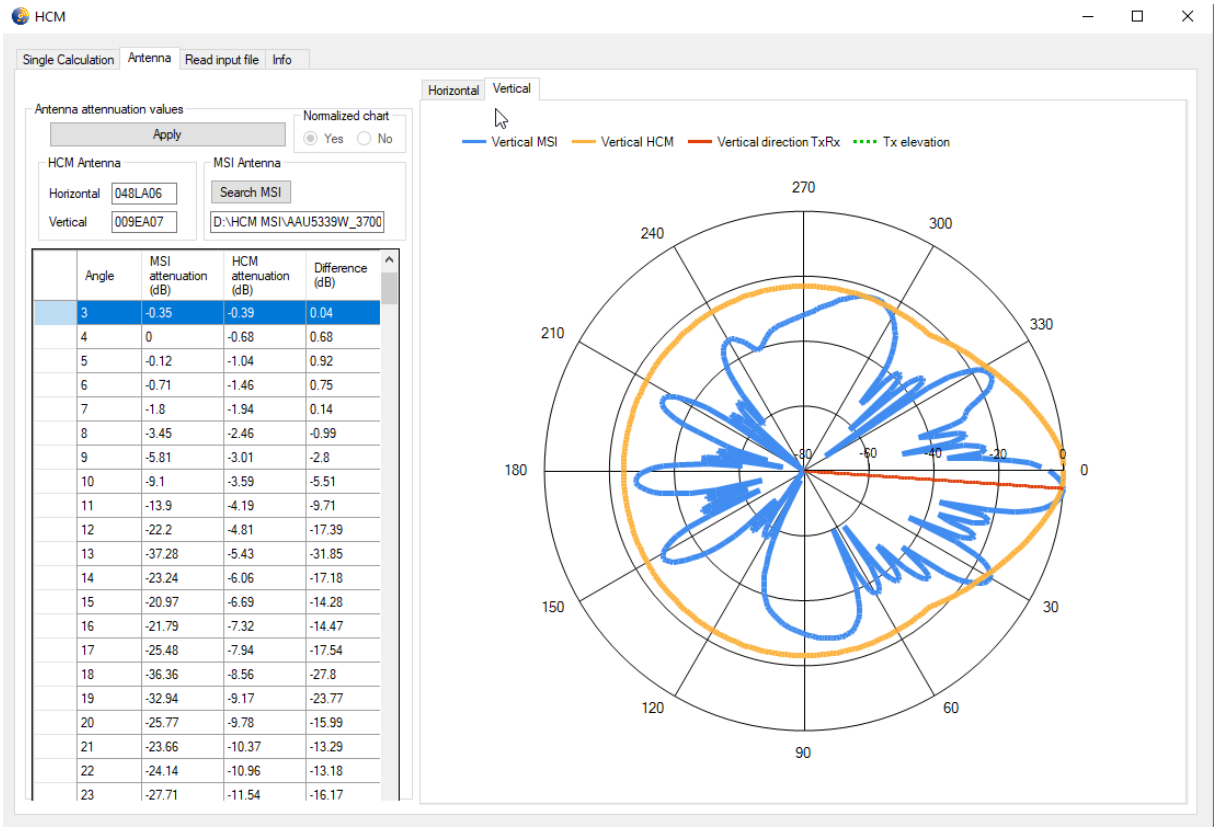
It is possible to load and use a MSI file for HCM calculation. The MSI file contains the antenna gain values in dBd. There must be 360 values for each degree in horizontal and vertical direction.

The program calculates the field strength for HCM and MSI antenna pattern. It is possible to switch between the calculated values in the GUI:

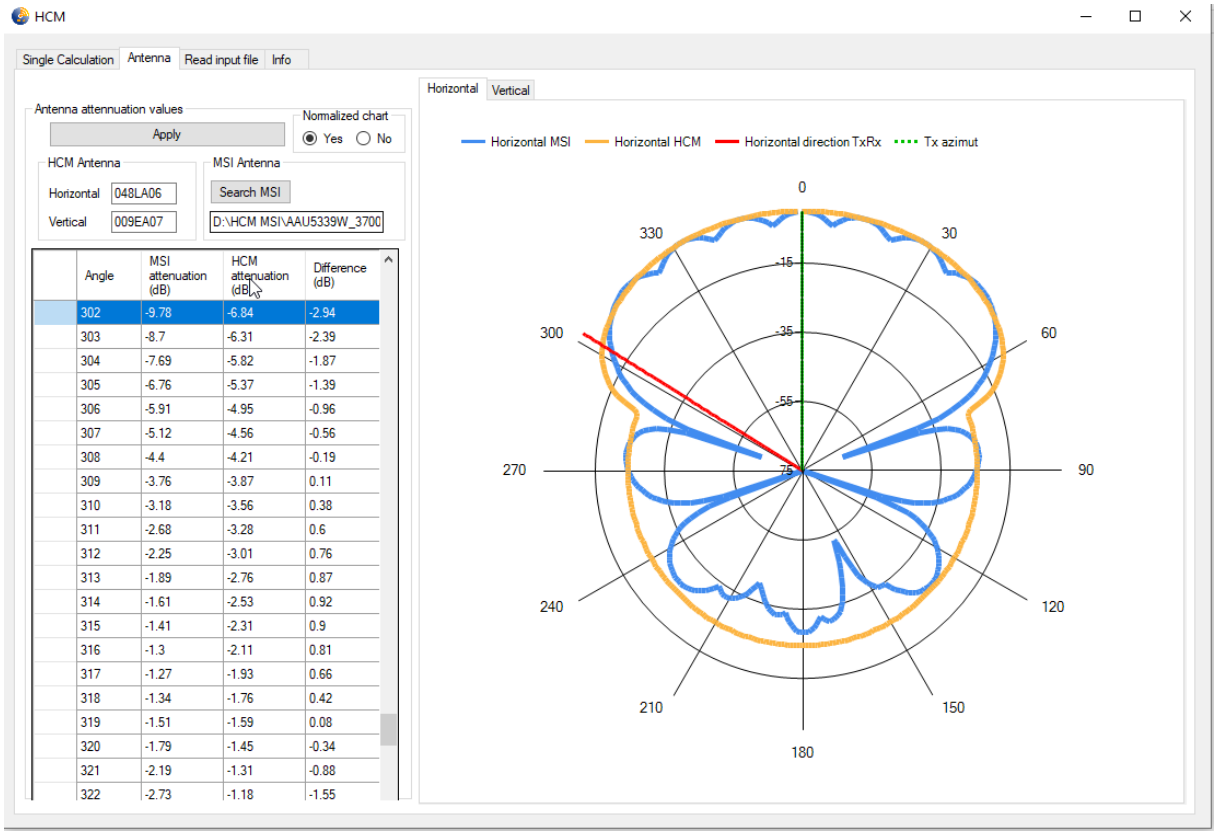


Display of calculated field strengths for HCM and MSI antenna patterns

For a detailed view on the used antenna patterns, it is possible to display them in the tab "*Antenna*":



Display of comparison between HCM and MSI antenna pattern in vertical direction



Display of comparison between HCM and MSI antenna pattern in horizontal direction

The right diagram visualizes the gain values for the used antenna pattern (horizontal and vertical):

- The orange line displays the gain values of the HCM antenna pattern
- The blue line displays the gain values of the MSI antenna pattern
- The straight red line indicates the calculated direction between Tx and Rx
- The straight green line indicates the azimuth of Tx

On the left table you can see the used antenna attenuation values for the calculated directions and also the difference between HCM and MSI.

In case you want to check other antenna pattern, it is possible to load a new MSI file by selecting the "Search MSI" button or edit the data fields for the horizontal/vertical HCM antenna patterns.