1. Introduction

Measurement results of EMC tests are not always using the same amplitude units. Conducted emission limits are specified in dBµV when applying the voltage method and in dBµA when applying the current method. Radiated emissions are measured in dBµV/m, and disturbance power is measured in dBpW. All these measurements are done with a spectrum analyzer or measurement receiver, which typically delivers results in dBm or dBµV. EMCview labels the Y-Axis in dBµV and dBµA. This is nothing but a label however. In reality, you can display any logarithmic unit using a correction file representing a transducer or a conversion offset.

Offset based amplitude conversion

This application note is not going into details concerning the concept of logarithmic units. The World Wide Web is full of excellent articles such as for example "dB or not dB" from Rohde & Schwarz:
https://www.rohde-schwarz.com/us/applications/db-or-not-db-educational-note_230850-15534.html
conversion tables or online conversion calculators:
http://www.cantwellengineering.com/calculator

Amplitude conversions which are not involving special transducers are frequency independent and can be done by simply applying an offset. See a few examples below:

dBm to dBµV

Add 107dB to convert from dBm to dBµV
+10 dBm = 117 dBµV
0 dBm = 107 dBµV
-10 dBm = 97 dBµV
-20 dBm = 87 dBµV ……

dBµV to dBpW

Subtract 17 dB to convert from dBµV to dBpW
10 dBµV = -7 dBpW
0 dBµV = -17 dBpW
-10 dBµV = -27 dBpW

The list of examples above could be extended to any other logarithmic unit. Simply check an online conversion table or calculator to find the applicable offset.

Transducer based amplitude conversion

Conducted noise measurements according to the current method require an RF current probe as a transducer. The conversion of dBµV delivered by the spectrum analyzer or measurement receiver to dBµA is based on the transfer impedance of the current probe.
Radiated emission measurements require an antenna as a transducer. The conversion of dBµV delivered by the spectrum analyzer or measurement receiver to dBµV/m is based on the antenna factor of the involved antenna.
These conversions are typically frequency dependent and need conversion factors given in the data sheets of the respective transducers. These conversions are treated in detail in separate application notes of Tekbox.

2. Implementation in EMCview

Carrying out an offset based amplitude conversion requires the creation of a suitable correction file. Any of the correction files within EMCview can be used. However, we would recommend using the amplitude correction file. In case that this file is already in use to compensate for an amplifier or attenuator, use any

other correction file, which is not required to characterize the measurement set up. If all of them are used, you can add the offset to the amplitude correction factors of the limiter or amplifier.

Assuming you want to convert from dBµV to dBpW and assuming that the amplitude correction file is not used, create following text file and save it in the SRC – directory of EMCview:

The file tells EMCview to subtract 17dB from every measurement value in the frequency range 9 kHz to 3 GHz. If you have a conversion, which needs the conversion factor to be added, enter it with negative sign. The reason for the inversion of the sign comes from the way, attenuators and amplifiers are treated by EMCview. As amplifier gain in the signal chain is entered with positive sign, it needs to be subtracted to obtain the real measurement value.

After creation of the conversion file and storing it in the SRC – directory, load it to your project. The y-axis unit is be displayed in dBpW then.

Version	Date		Author	Changes
V 1.0	28.04.2018		Mayerhofer	Creation of the document