DIGITAL WE DAYS 2023

SIMPLIFY FILTER CALCULATION AND SELECTION WITH REDEXPERT EMI FILTER DESIGNER

WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

TODAY'S SPEAKERS

PRESENTATION
Robert Schillinger
Field Application Engineer

MODERATION
Markus Eberle
Marketing Department

INFORMATION ABOUT THE WEBINAR

You are muted during the webinar.
However, you can ask us questions using the chat function.

Duration of the presentation	30 Min
Q&A:	10 – 15 Min

Any questions?
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On our channel	Würth Elektronik Group
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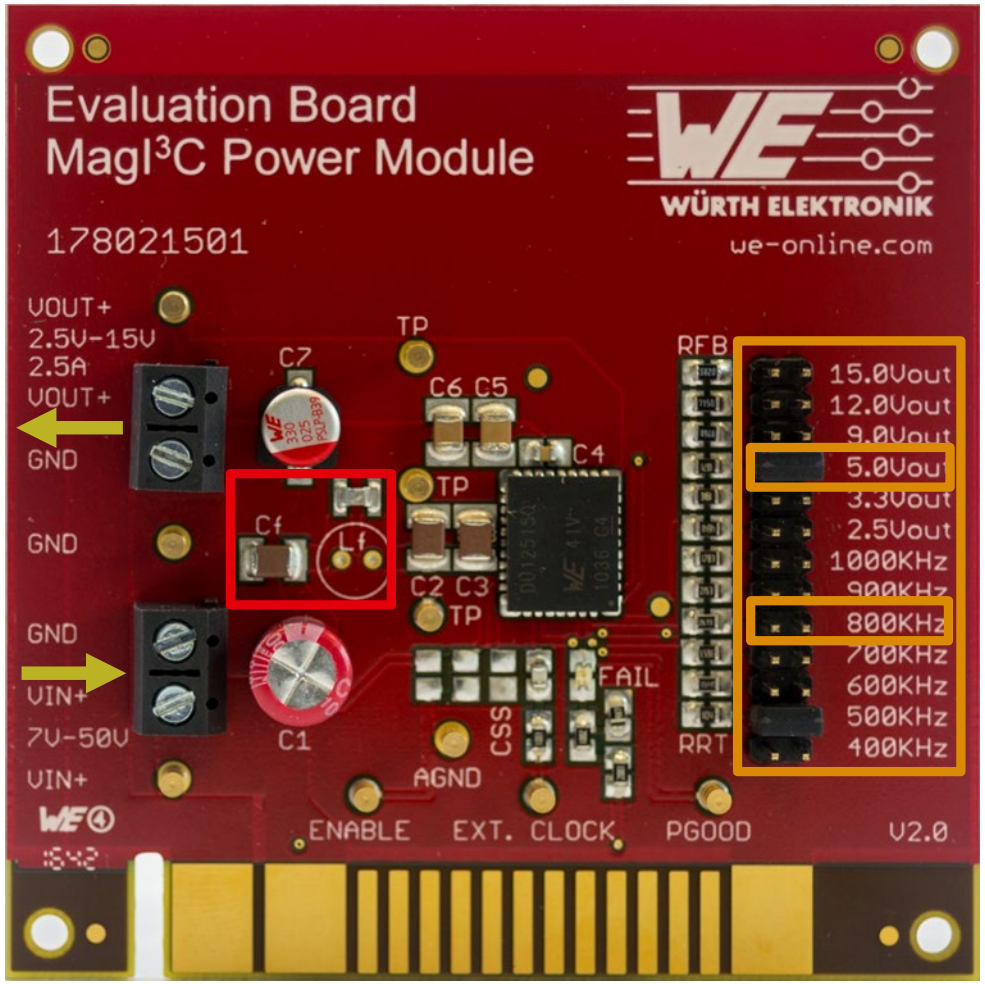
DEMO EVAL BOARD

VDRM QFN-41

Output: 2.5V-15V@2.5A

Input: 7V-50V



Configuration area for output voltage and switching frequency

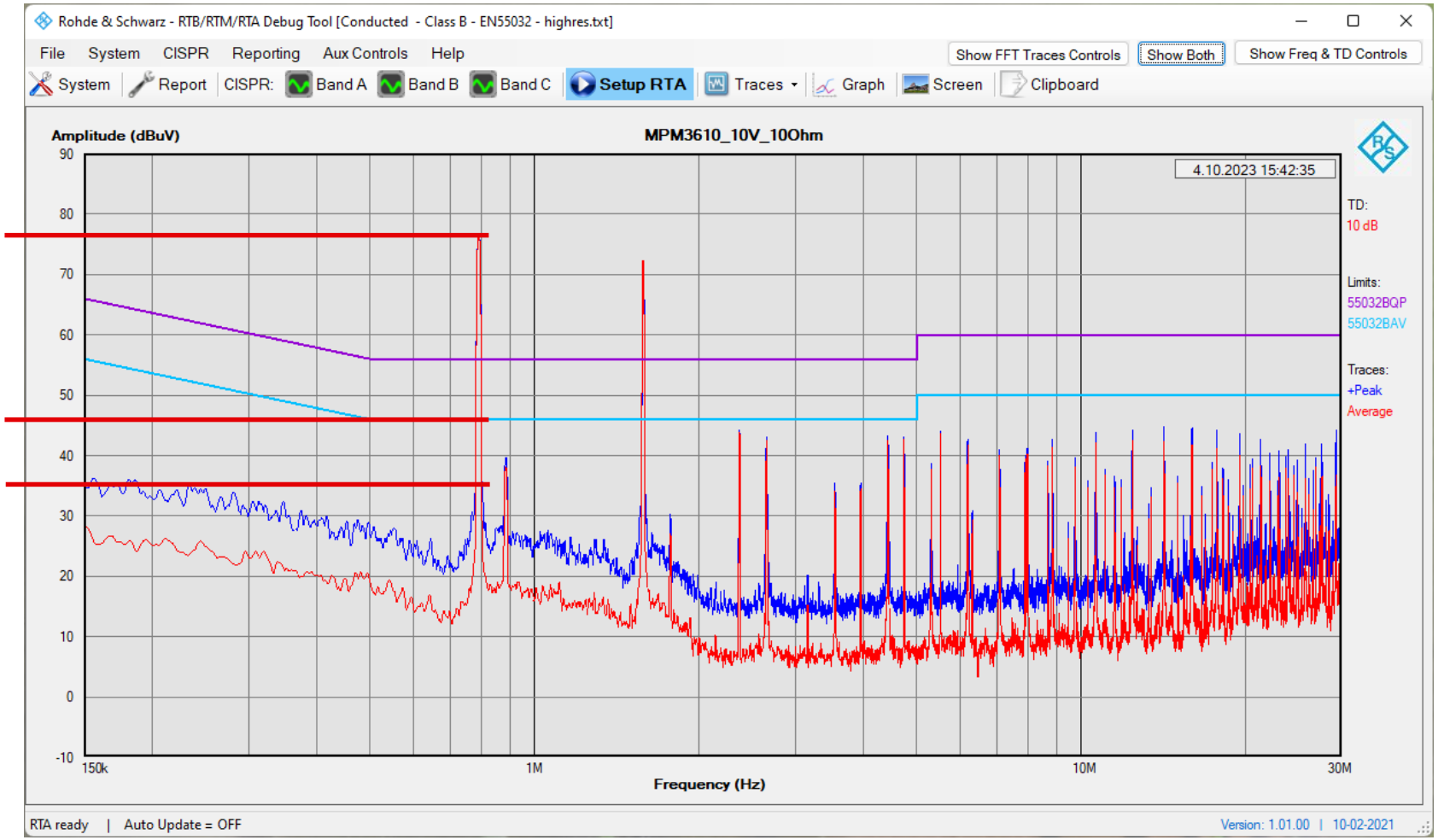
DEMO EVAL BOARD

Conducted emissions without filters

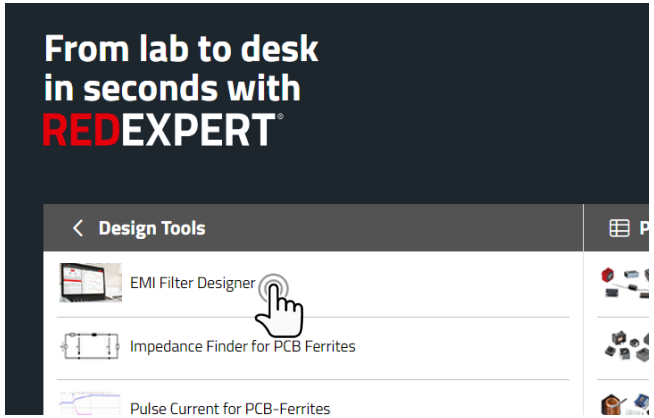
76dBuV@800kHz

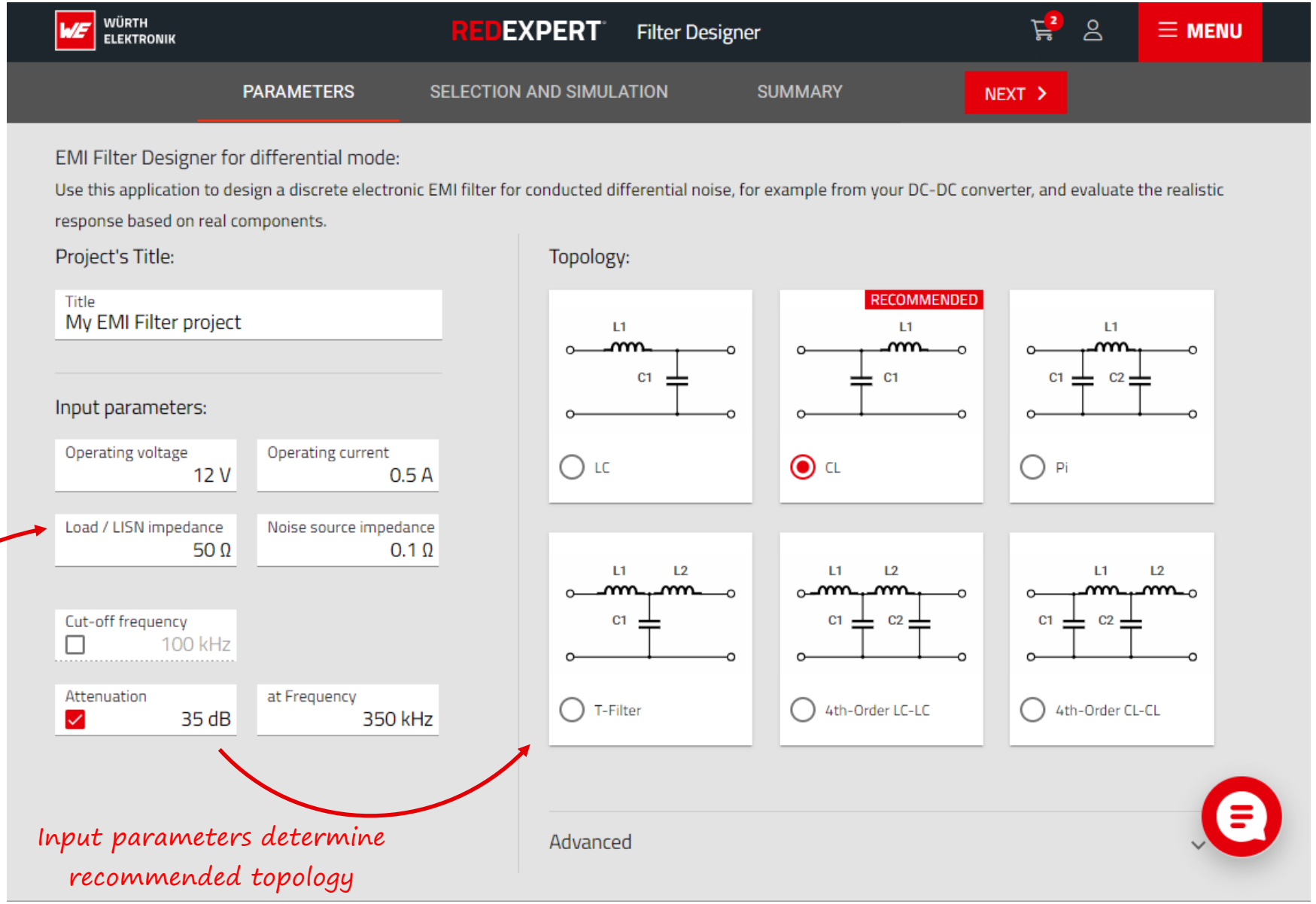
46dBuV avg. limit

36dBuV target



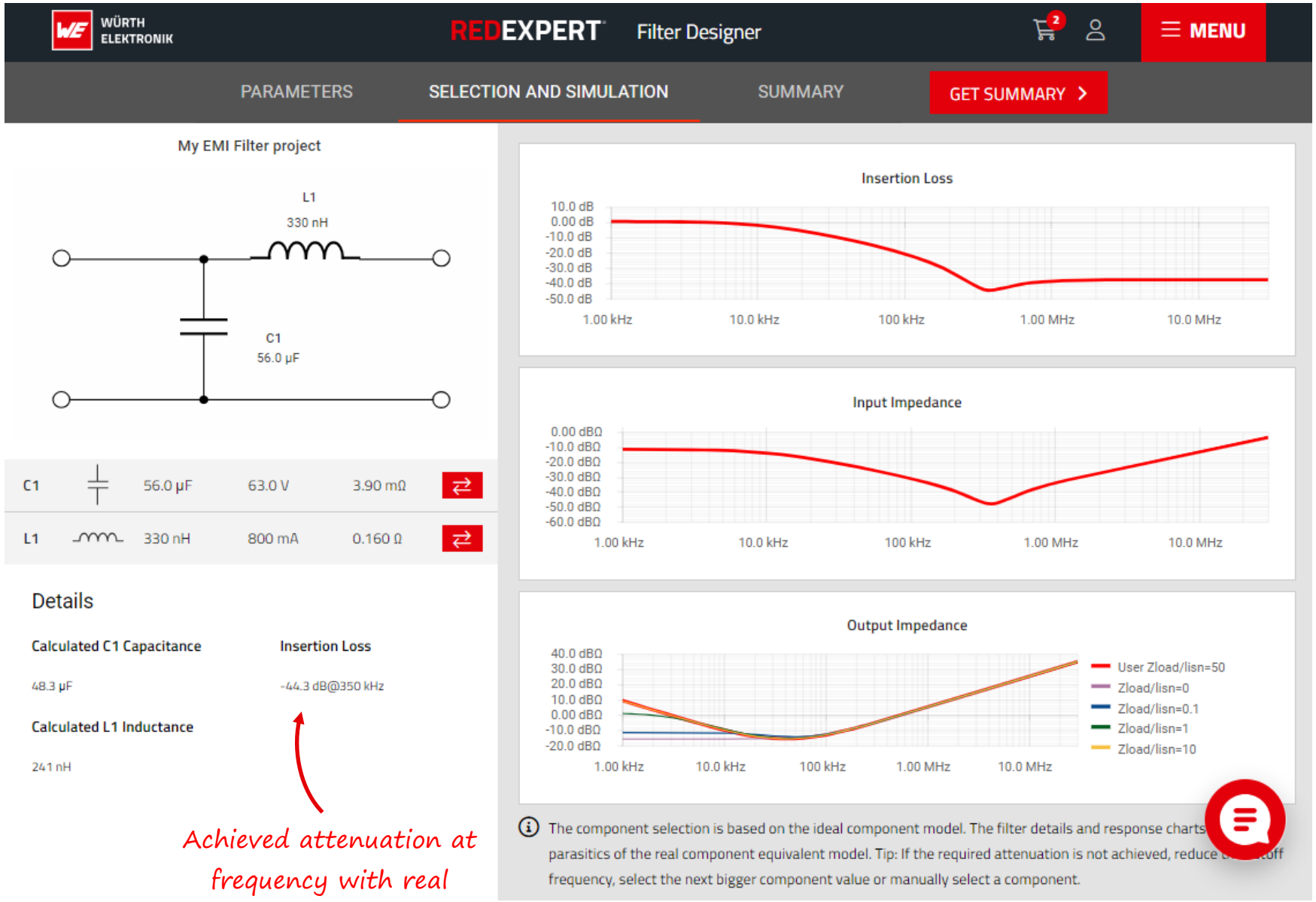
FILTER DESIGNER





System impedance is important for power transfer

Input parameters determine recommended topology



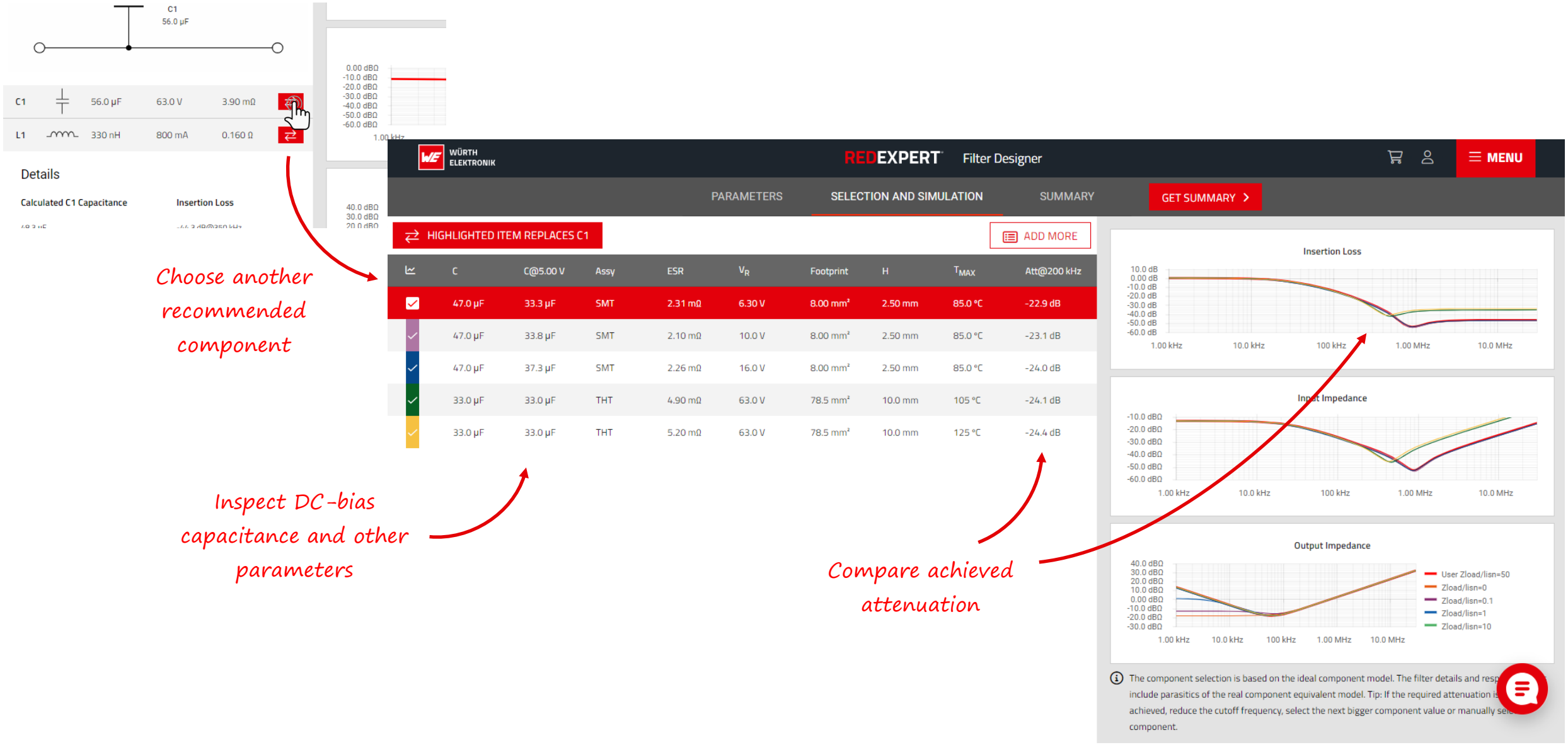
Selected real components

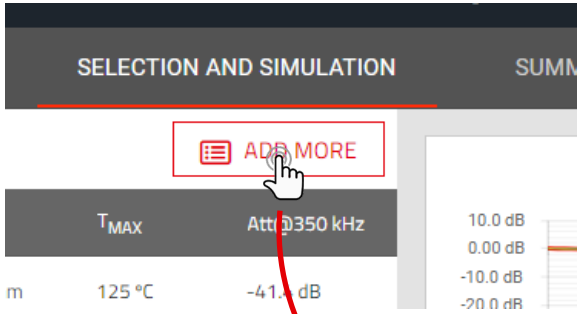
Calculated ideal components

Achieved attenuation at frequency with real components

Simulation with real components

Output impedance is important for stability with SMPS


C1
56.0 µF
C1 56.0 µF 63.0 V 3.90 mΩ
L1 330 nH 800 mA 0.160 Ω
Details
Calculated C1 Capacitance
Insertion Loss
WÜRTH ELEKTRONIK
REDEXPERT Filter Designer
MENU
PARAMETERS
SELECTION AND SIMULATION
SUMMARY
GET SUMMARY
HIGHLIGHTED ITEM REPLACES C1
ADD MORE
C C@5.00 V Assy ESR V_R Footprint H T_{MAX} Att@200 kHz
47.0 µF 33.3 µF SMT 2.31 mΩ 6.30 V 8.00 mm² 2.50 mm 85.0 °C -22.9 dB
47.0 µF 33.8 µF SMT 2.10 mΩ 10.0 V 8.00 mm² 2.50 mm 85.0 °C -23.1 dB
47.0 µF 37.3 µF SMT 2.26 mΩ 16.0 V 8.00 mm² 2.50 mm 85.0 °C -24.0 dB
33.0 µF 33.0 µF THT 4.90 mΩ 63.0 V 78.5 mm² 10.0 mm 105 °C -24.1 dB
33.0 µF 33.0 µF THT 5.20 mΩ 63.0 V 78.5 mm² 10.0 mm 125 °C -24.4 dB
Insertion Loss
Input Impedance
Output Impedance
User Zload/lisn=50
Zload/lisn=0
Zload/lisn=0.1
Zload/lisn=1
Zload/lisn=10
The component selection is based on the ideal component model. The filter details and resp
include parasitics of the real component equivalent model. Tip: If the required attenuation is
achieved, reduce the cutoff frequency, select the next bigger component value or manually sel
component.
Choose another recommended component
Inspect DC-bias capacitance and other parameters
Compare achieved attenuation



Add a part from complete portfolio

Add selected parts to simulation

Search part with custom filters

WÜRTH ELEKTRONIK | REDEXPERT Components | MENU

Rated Voltage = [5.00 V,3.00 kV] | Capacitance = [47.0 µF,220 µF] | Assembling Technology = SMT | ADD 2 SELECTED TO FILTER DESIGNER

Adding Filters

- Part Number
- Capacitance: Between 47 µF And 220 µF
- Assembling Technology: SMT, Screw Type, Snap-In, THT
- Rated Voltage: Between 5 V And 3 kV
- Product Series

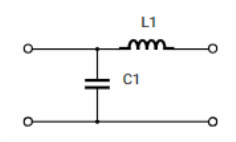
P/N	C	Assy	DF	V_R	Series	H	T_{MAX}	T_{MIN}	Size	ESR	Footprint	RMS	L	W
865060142003	47.0 µF	SMT	22.0%	6.30 V	WCAP-ASLL	5.50 mm	105 °C	-55.0 °C		0.610 Ω	28.1 mm²		5.30 mm	5.30 mm
865060143004	100 µF	SMT	22.0%	6.30 V	WCAP-ASLL	5.50 mm	105 °C	-55.0 °C		0.520 Ω	43.6 mm²		6.60 mm	6.60 mm
865060143005	150 µF	SMT	22.0%	6.30 V	WCAP-ASLL	5.50 mm	105 °C	-55.0 °C		0.430 Ω	43.6 mm²		6.60 mm	6.60 mm
865060145006	220 µF	SMT	22.0%	6.30 V	WCAP-ASLL	7.70 mm	105 °C	-55.0 °C		0.251 Ω	43.6 mm²		6.60 mm	6.60 mm
865060243003	47.0 µF	SMT	19.0%	10.0 V	WCAP-ASLL	5.50 mm	105 °C	-55.0 °C		0.330 Ω	43.6 mm²		6.60 mm	6.60 mm
865060243004	100 µF	SMT	19.0%	10.0 V	WCAP-ASLL	5.50 mm	105 °C	-55.0 °C		0.480 Ω	43.6 mm²		6.60 mm	6.60 mm
865060243005	150 µF	SMT	19.0%	10.0 V	WCAP-ASLL	5.50 mm	105 °C	-55.0 °C		0.490 Ω	43.6 mm²		6.60 mm	6.60 mm
865060245006	220 µF	SMT	19.0%	10.0 V	WCAP-ASLL	7.70 mm	105 °C	-55.0 °C		0.377 Ω	43.6 mm²		6.60 mm	6.60 mm
865060343004	47.0 µF	SMT	16.0%	16.0 V	WCAP-ASLL	5.50 mm	105 °C	-55.0 °C		0.358 Ω	43.6 mm²		6.60 mm	6.60 mm
865060343005	100 µF	SMT	16.0%	16.0 V	WCAP-ASLL	5.50 mm	105 °C	-55.0 °C		0.290 Ω	43.6 mm²		6.60 mm	6.60 m
865060345006	150 µF	SMT	16.0%	16.0 V	WCAP-ASLL	7.70 mm	105 °C	-55.0 °C		0.223 Ω	43.6 mm²		6.60 mm	6.60 mm

Print result to paper or PDF

WÜRTH ELEKTRONIK | REDEXPERT Filter Designer | MENU

PARAMETERS | SELECTION AND SIMULATION | SUMMARY

Circuit Schematic



Specifications

Edit

"My EMI Filter project"

TYPE: CL
V_{op}: 5.00 V
I_{op}: 200 mA
LOAD / LISN IMPEDANCE: 50.0 Ω
NOISE SOURCE IMPEDANCE: 100 mΩ
ILOSS -22.9 dB@200 kHz

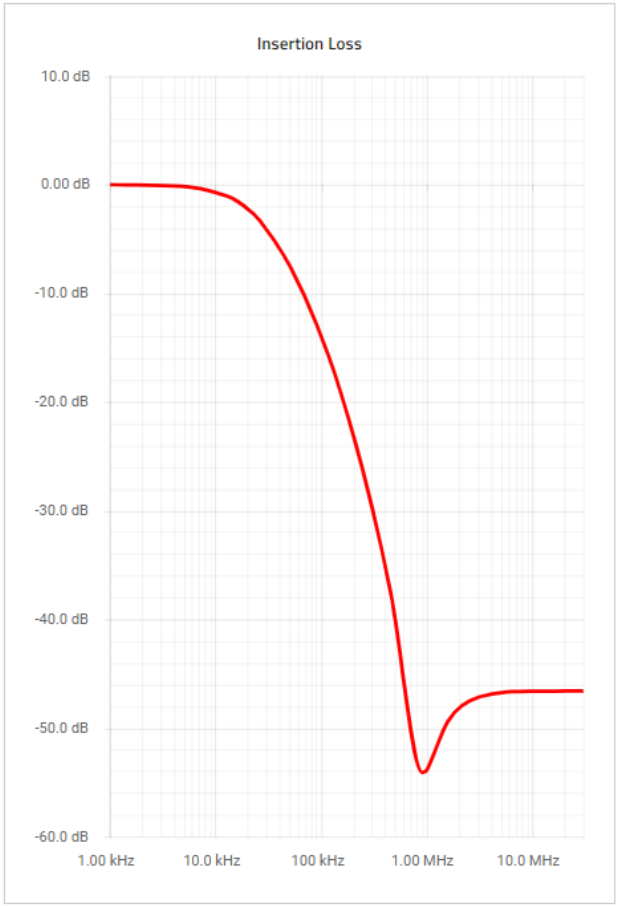
Bill Of Materials

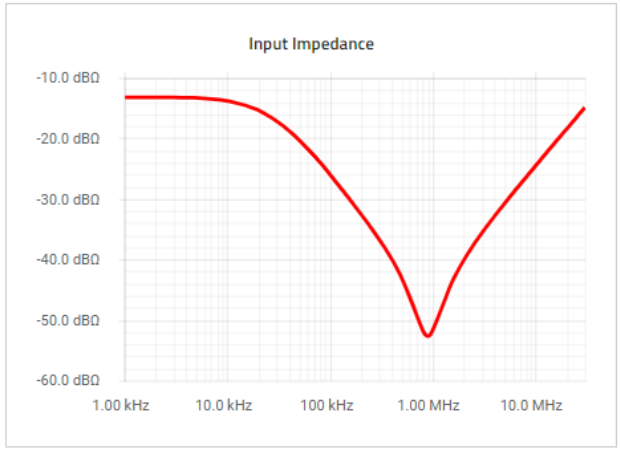
ADD

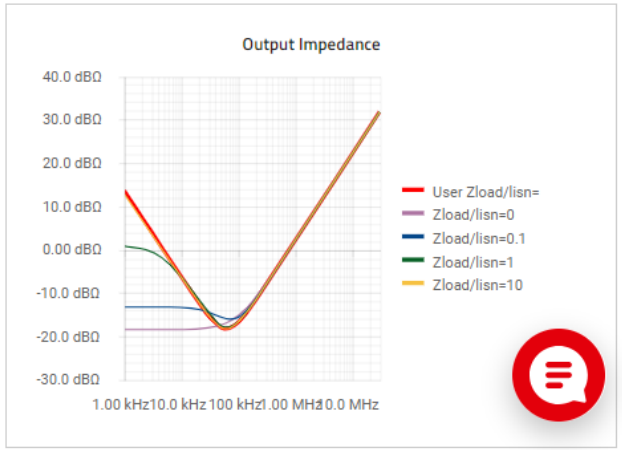
#	Ma...	Order Code	Value	Properties	Qty
1.	C1	885012109003	47.0 µF	Assembling Technology = SMT Capacitance = 47.0 µF Rated Voltage = 6.30 V Height = 2.50 mm	1
	L1	74479762122	220 nH	Inductance = 220 nH Rated Current = 900 mA	1

Add part to basket for free samples or sending via clipboard

Simulation Responses

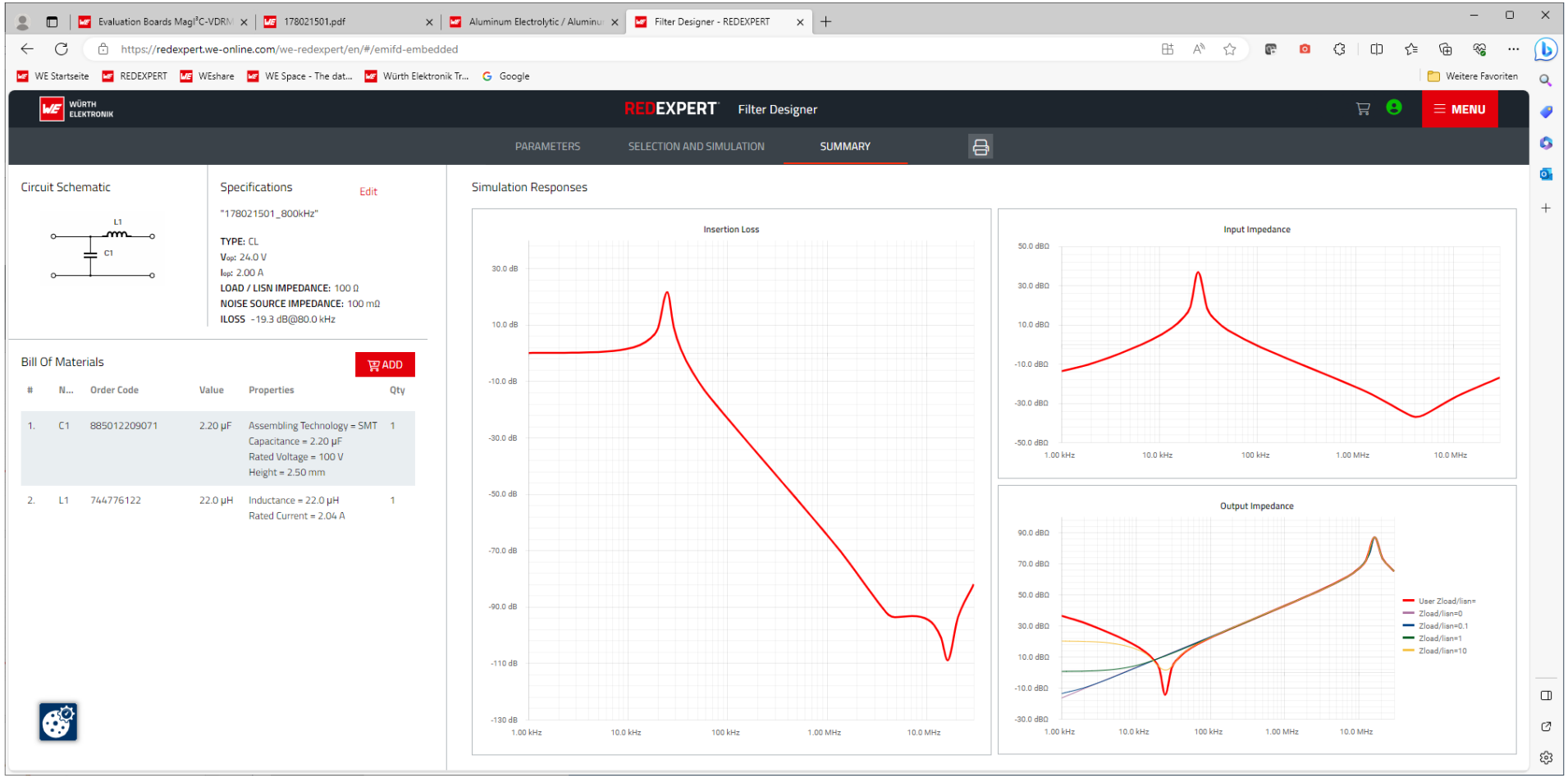






EMI FILTER DESIGNER

Demo eval board

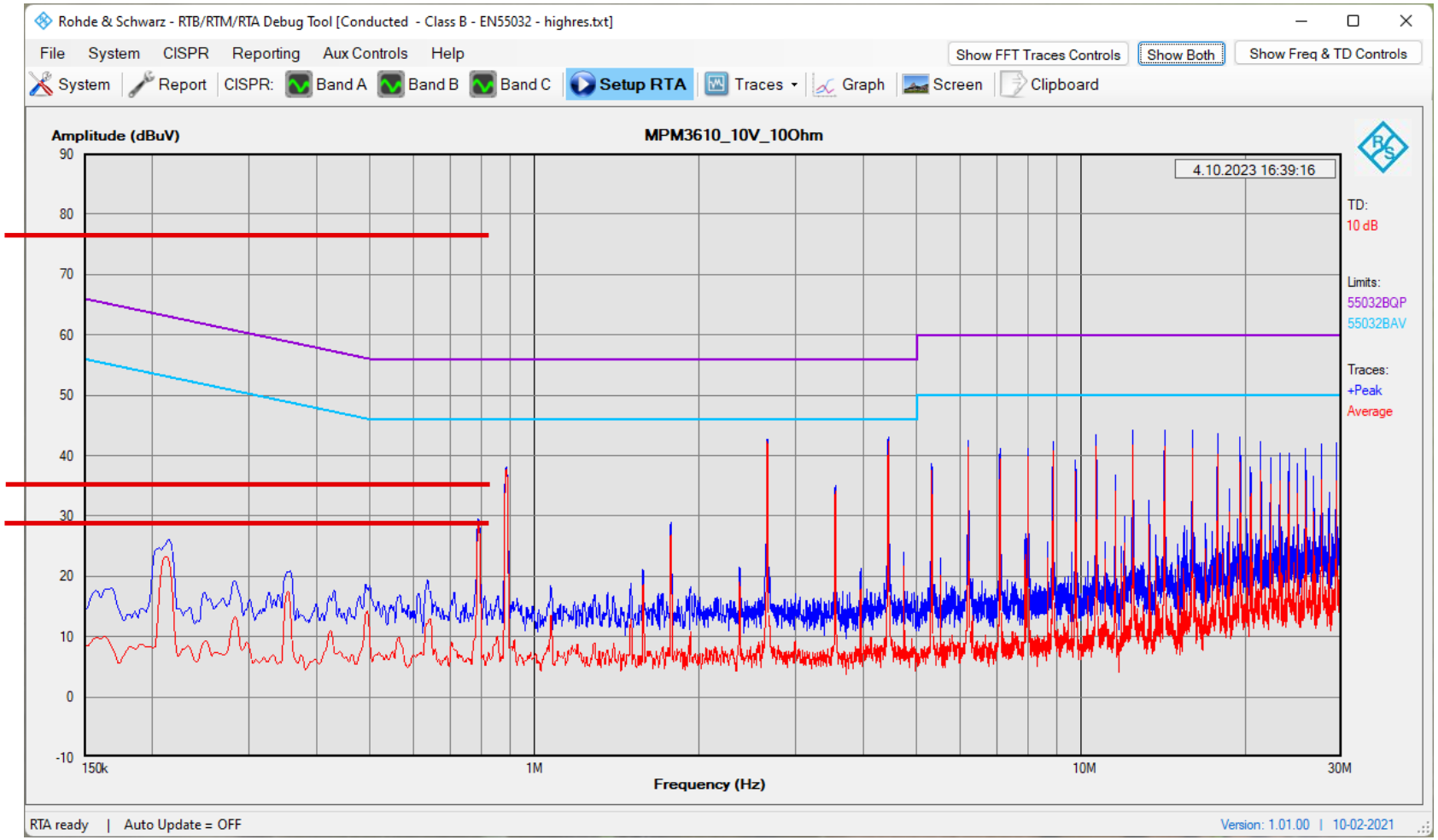


DEMO EVAL BOARD

Conducted emissions with filters

76dBuV@800kHz

36dBuV target
28dBuV with filters



Questions

& Answers

We are here for you now!
Ask us directly via our chat or via E-Mail.

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