

MIL ChiP DCM2322 EMI Test Report

Input Voltage Range : 14 – 72V, 43V (Nominal Line)
Output Voltage : 28V (Nominal)
EMI Filtering : CE101, CE102

Summary:

EMI

Input Voltage	EMI Filter	Output Capacitor (C_{OUT-EXT}) Min, Max Cap	Result
14 V	Two Stage	470uF, 5000uF	PASS
43 V	Two Stage	470uF, 5000uF	PASS
72 V	Two Stage	470uF, 5000uF	PASS

Prepared by:
Vamshi Domudala
Applications Engineering
Date: 6/4/2020

Model Details:

ChiP DCM: DCM2322T72S31A0T60

EMI tests performed as per MIL-STD-461:

CE101

CE102

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BOARD REVISION NOTES

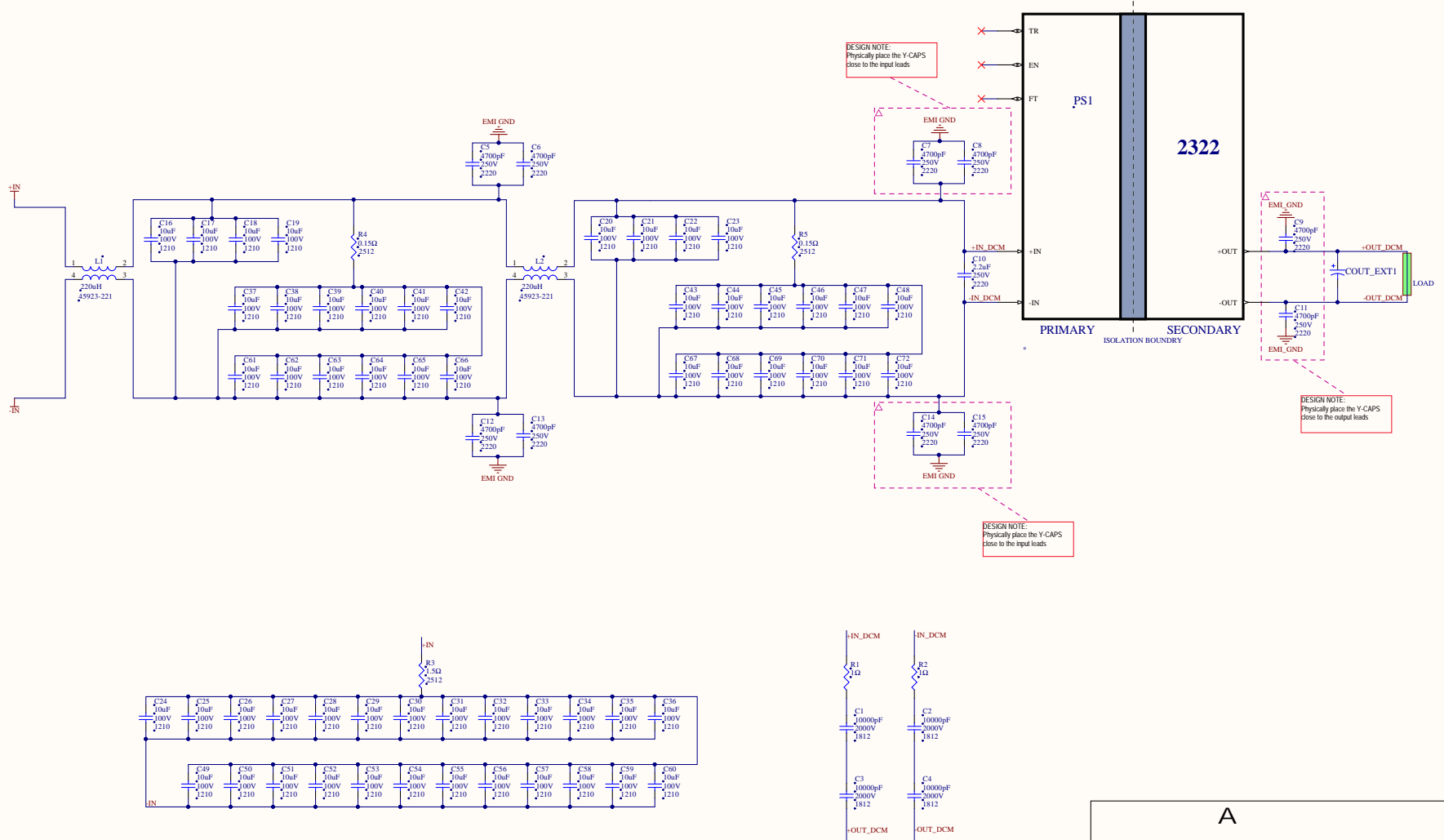
REVISION NOTES:

1 - Redraw based on existing schematic; 5/22/2020

SHEET TO DO

TO DO:

REV	DESCRIPTION	DATE	APPROVED
1	APPLICATIONS ENGINEERING	5/22/2020	VD



A

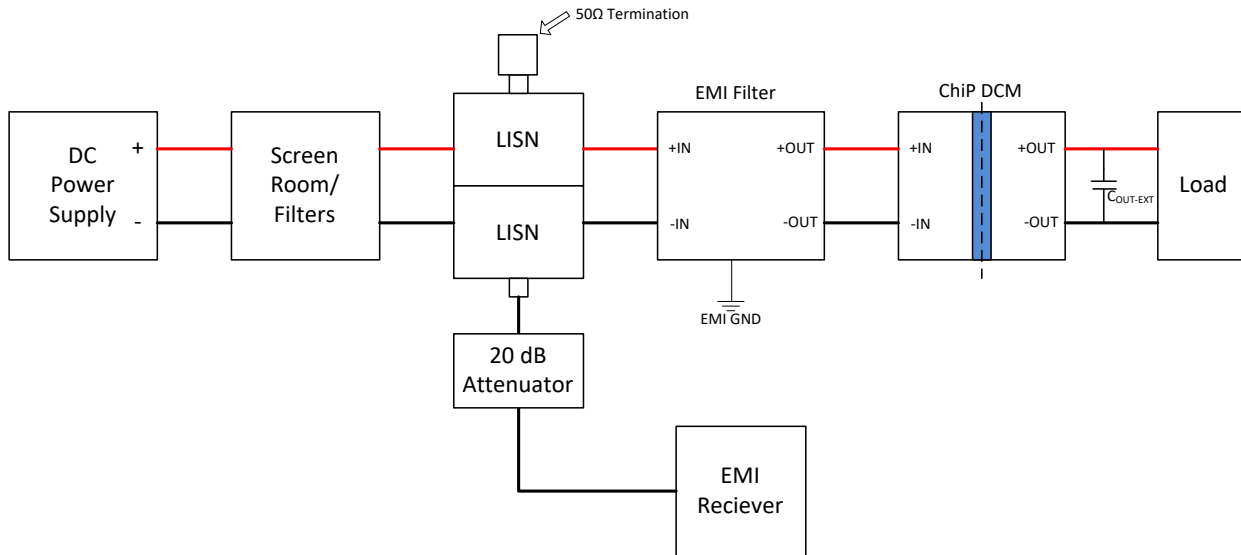
SCHEMATIC

2322 ChiP DCM MIL Ref Design for 14 - 72Vin, 28Vout

APPLICATION: Altium Designer	SIZE: C	FSCM NO.	DWG NO.	REV
FILENAME: X:\Co-op sheet\Yak1\2\Reference Design\MIL LV 2322 REF\MIL_EMI_Ref_Design_43Vin_28Vout_SchDoc			43Vin_28Vout-SCH	#1
DRAWN: Vamshi Domidala	DATE: 5/22/2020	SCALE:	SHEET 1 OF 1	

REFERENCE DESIGNATOR	DESCRIPTION	MFG PART NUMBER	MANUFACTURER	QUANTITY	VALUE NOM	RATING NOM
C1, C2, C3, C4	Capacitor	C1812C103KGRCTU	KEMET Corporation	4	10000pF	2000V
C5 - C9, C11 - C15	Capacitor	GA355DR7GF472KW01L	Murata Manufacturing	10	4700pF	250V
C10	Capacitor	C5750X7T2E225M250KA	TDK	1	2.2uF	250V
C16 - C72	Capacitor	GRM32EC72A106KE05L	Murata Manufacturing	57	10uF	100V
COUT_EXT1	Min/Max from the ChiP DCM datasheet			1		
L1, L2	Ind Com Mode 7065	45923-221	Vicor	2	220uH	10.5A
PS1	DCM2322 14 - 72Vin	DCM2322	Vicor	1		
R1, R2	Resistor	RC1206FR-101RL	Yageo	2	1Ω	
R3	Resistor	ERJ-1TRQJ1R5U	Panasonic	1	1.5Ω	
R4, R5	Resistor	ERJ-1TRSJR15U	Panasonic	2	0.15Ω	

**Test setup details:
EMI Filter**



A 50Ω termination is used for LISN and voltage across the RED and BLACK leads are measured at various load conditions.

LISN Part Number:

Solar Electronics Company
TYPE 8028-50-BP-24-BNC

Clamp-On Current Probe

Extech /380947
Serial # 00004085

EMI Receiver:

Rohde & Schwarz
Model #
ESIB7.1088.7490.07
Serial # M002397

HP DC power supply Model 6015A

Pasternack

20dB Attenuator

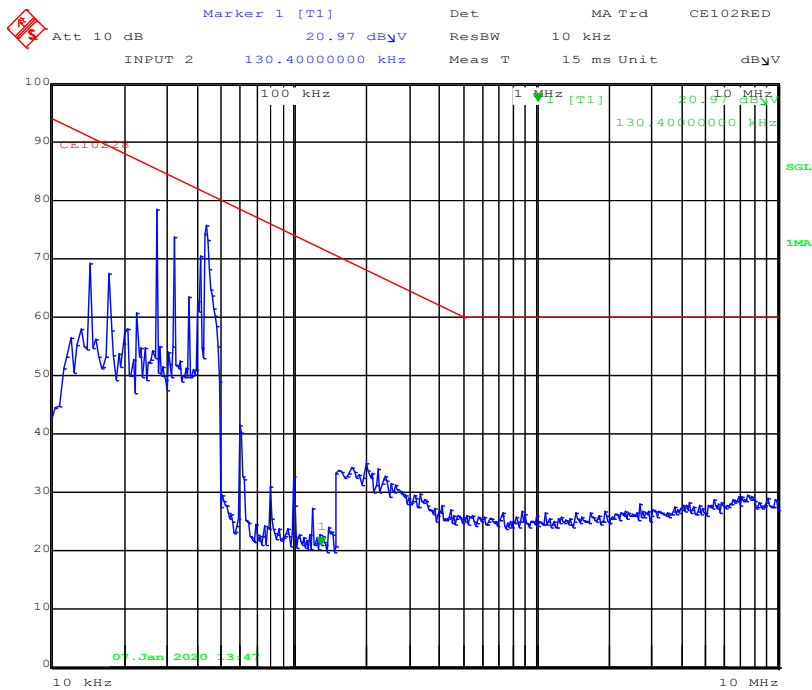
Electronic Load

Kikusui
PLZ1003WH
3504

EMI Base Scan with a 15Ω resistive load:

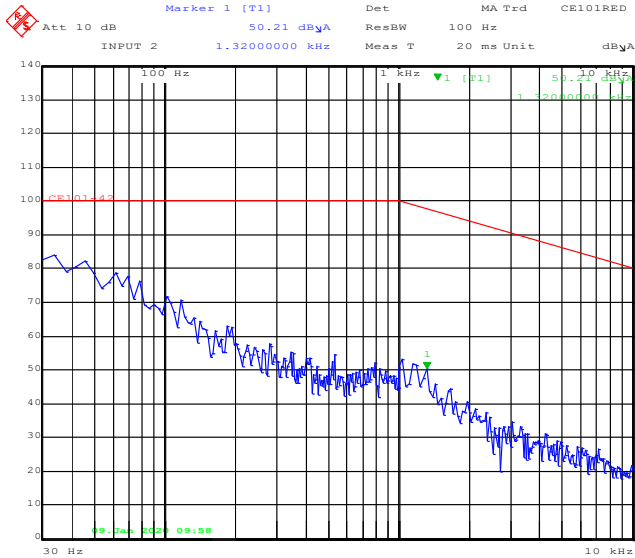
Note that there is a low frequency noise in the range of 10 - 15 kHz is present in the EMI screen room. For a base line of the low frequency noise, shown in the below EMI scan, the power supplies is loaded with 15Ω resistive load.

Low frequency noise can be observed in all the CE102 scans, please note that the DUT under test (DCM) is not the source of the low frequency noise.



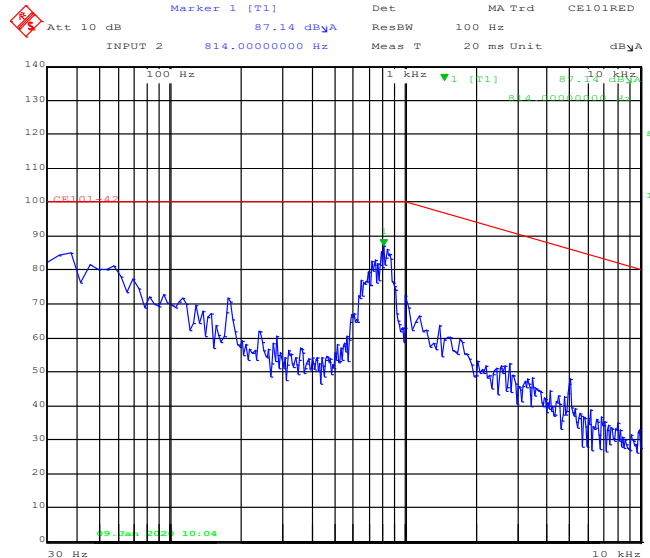
Title: Peak
 Comment B: 30Vin_CE102_15OHM_RED_BASE
 Date: 7.JAN.2020 13:47:25

CE101 Test Results: RED LEAD



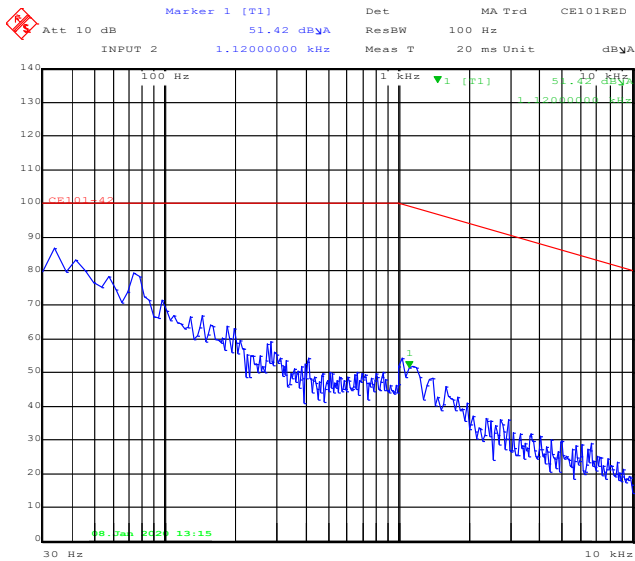
Title: Peak
 Comment B: 14Vin_28Vout_RED_CE101_OL
 Date: 9.JAN.2020 09:58:44

Figure 1: Vin 14V, Vout 28V, Load 0%, Cout 470uF



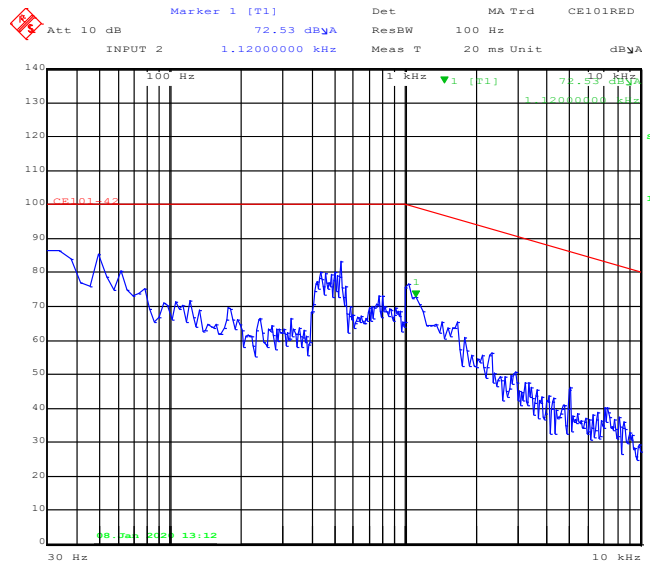
Title: Peak
 Comment B: 14Vin_28Vout_RED_CE101_100L
 Date: 9.JAN.2020 10:04:42

Figure 2: Vin 14V, Vout 28V, Load 100%, Cout 470uF



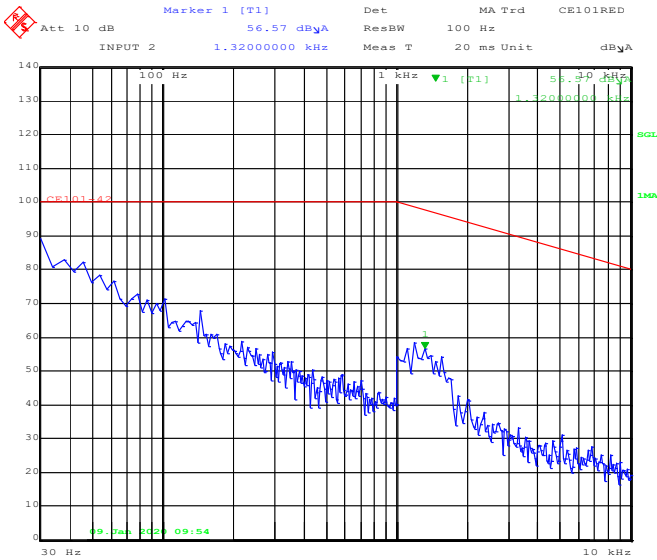
Title: Peak
 Comment B: CE101_14Vin_28Vout_RED_0L_CER
 Date: 8.JAN.2020 13:15:48

Figure 3: Vin 14V, Vout 28V, Load 0%, Cout 5000uF



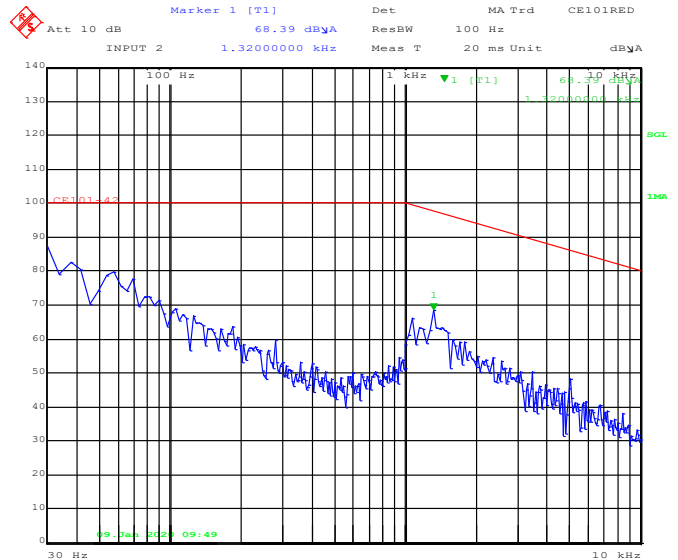
Title: Peak
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 Date: 8.JAN.2020 13:12:07

Figure 4: Vin 14V, Vout 28V, Load 100%, Cout 5000uF



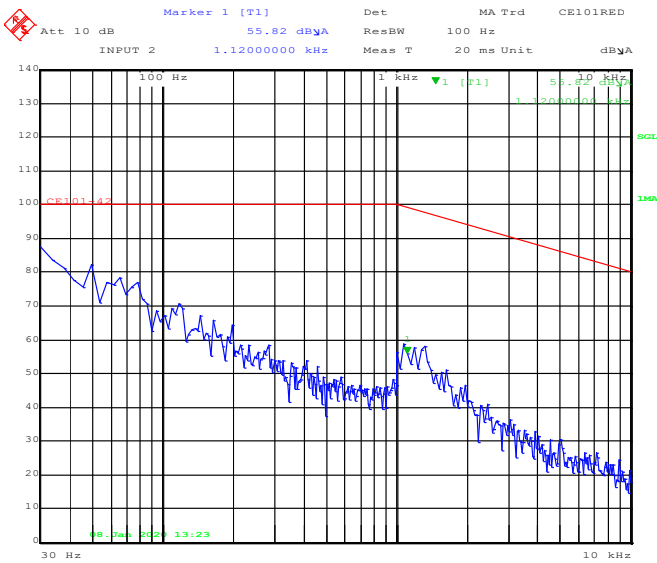
Title: Peak
 Comment B: 43Vin_28Vout_RED_CE101_0L
 Date: 9.JAN.2020 09:54:19

Figure 5: Vin 43V, Vout 28V, Load 0%, Cout 470uF



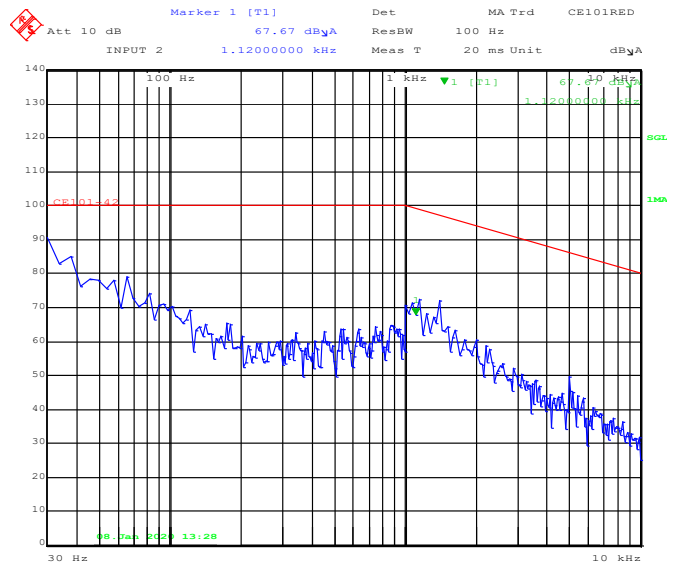
Title: Peak
 Comment B: 43Vin_28Vout_RED_CE101_100L
 Date: 9.JAN.2020 09:49:45

Figure 6: Vin 43V, Vout 28V, Load 100%, Cout 470uF



Title: Peak
 Comment B: CE101_43Vin_28Vout_RED_100L_CER
 Date: 8.JAN.2020 13:23:14

Figure 7: Vin 43V, Vout 28V, Load 0%, Cout 5000uF



Title: Peak
 Comment B: CE101_43Vin_28Vout_RED_100L_CER
 Date: 8.JAN.2020 13:28:23

Figure 8: Vin 43V, Vout 28V, Load 100%, Cout 5000uF

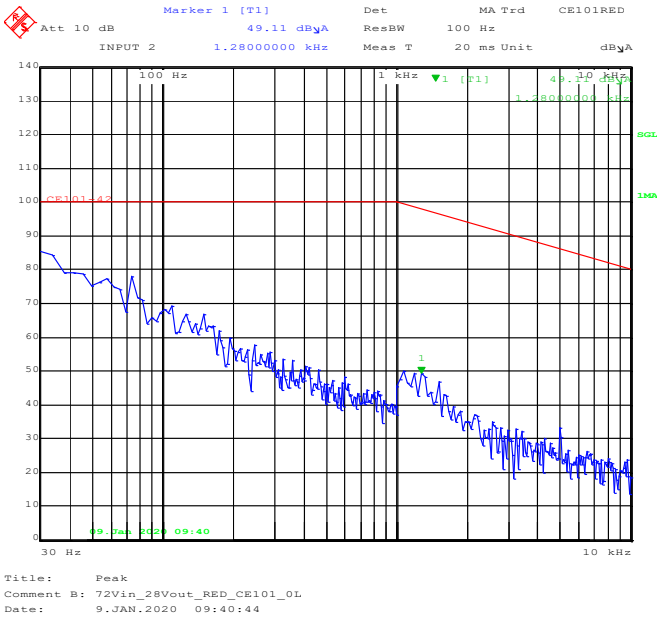


Figure 9: Vin 72V, Vout 28V, Load 0%, Cout 470uF

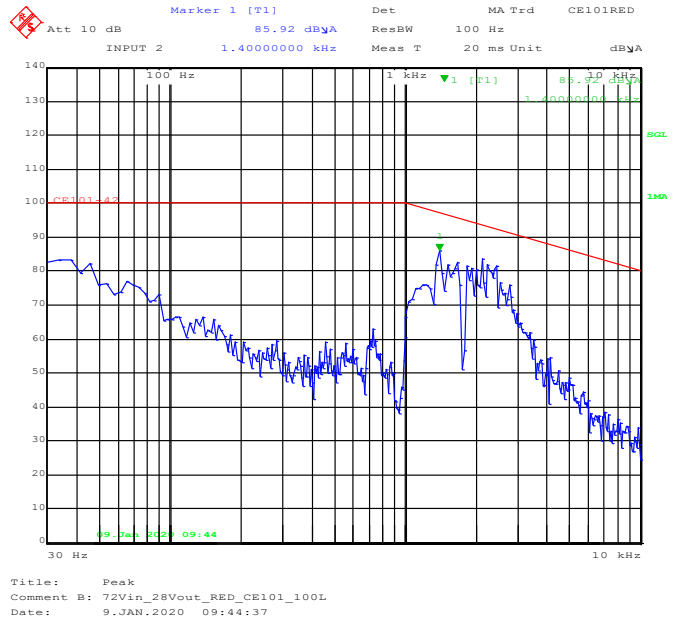


Figure 10: Vin 72V, Vout 28V, Load 100%, Cout 470uF

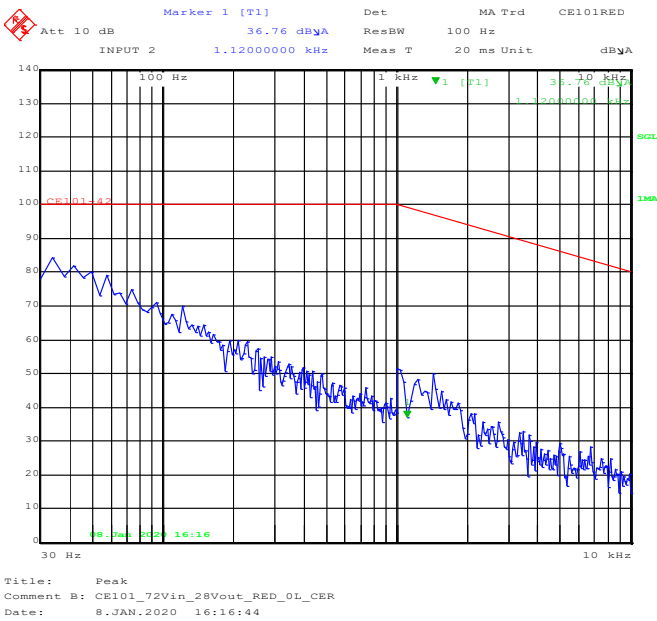


Figure 11: Vin 72V, Vout 28V, Load 0%, Cout 5000uF

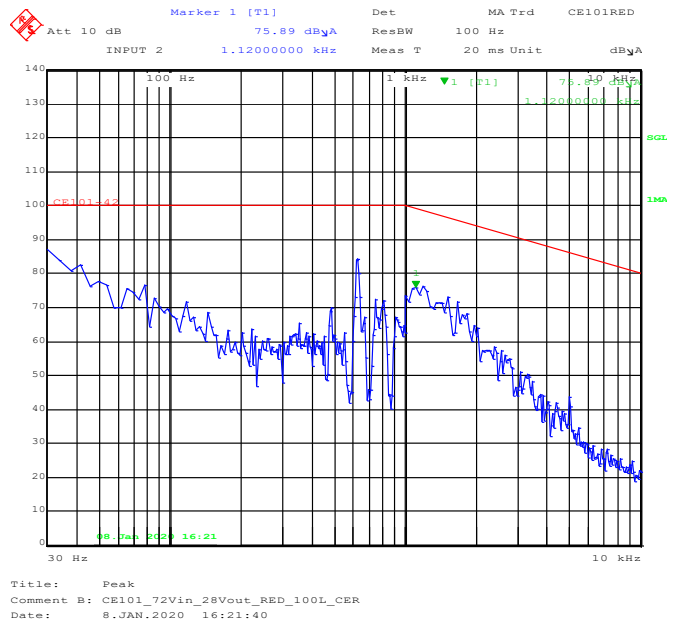
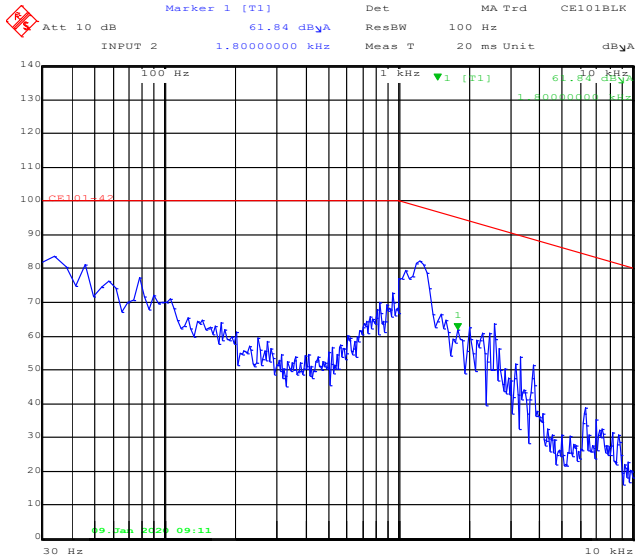


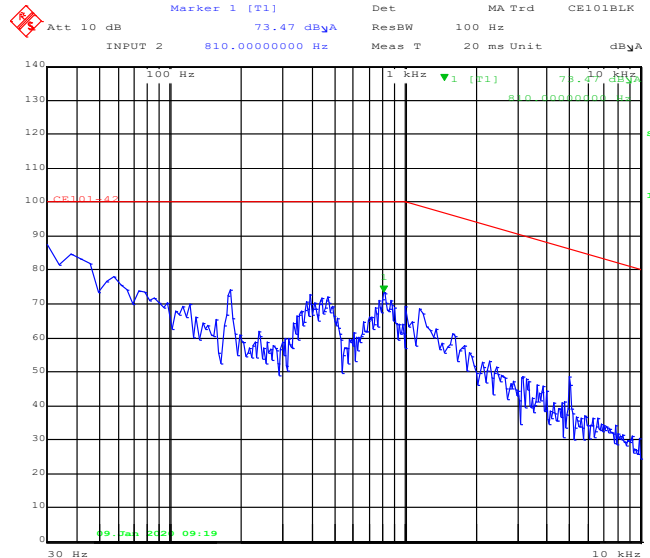
Figure 12: Vin 72V, Vout 28V, Load 100%, Cout 5000uF

CE101 Test Results: BLACK LEAD



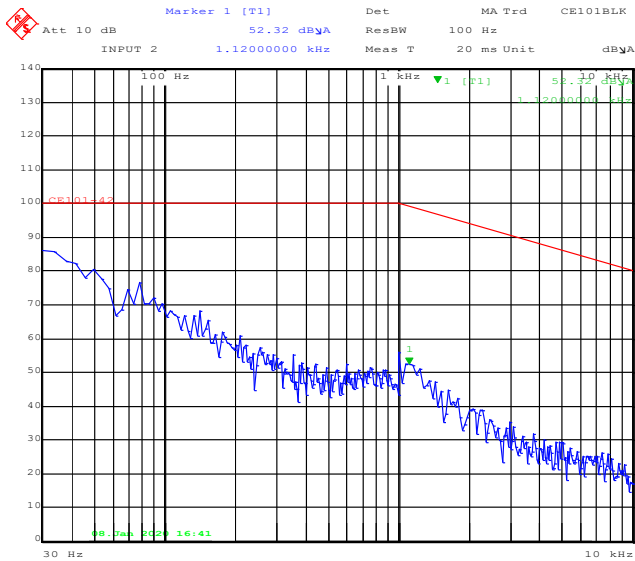
Title: Peak
 Comment B: 14Vin_28Vout_BLK_CE101_OL
 Date: 9.JAN.2020 09:11:16

Figure 13: Vin 14V, Vout 28V, Load 0%, Cout 470uF



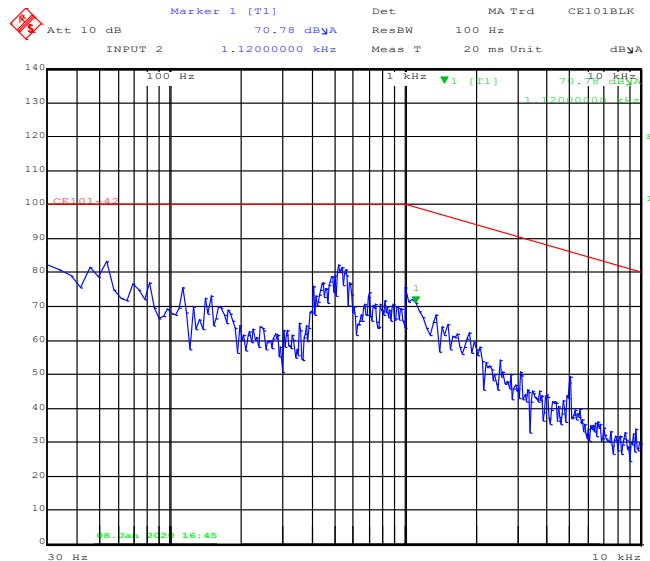
Title: Peak
 Comment B: 14Vin_28Vout_BLK_CE101_100L
 Date: 9.JAN.2020 09:19:42

Figure 14: Vin 14V, Vout 28V, Load 100%, Cout 470uF



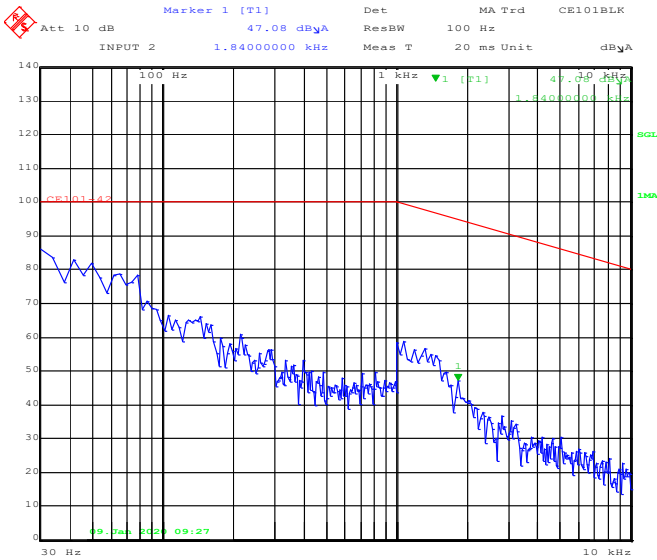
Title: Peak
 Comment B: CE101_14Vin_28Vout_BLK_0L_CER
 Date: 8.JAN.2020 16:41:24

Figure 15: Vin 14V, Vout 28V, Load 0%, Cout 5000uF



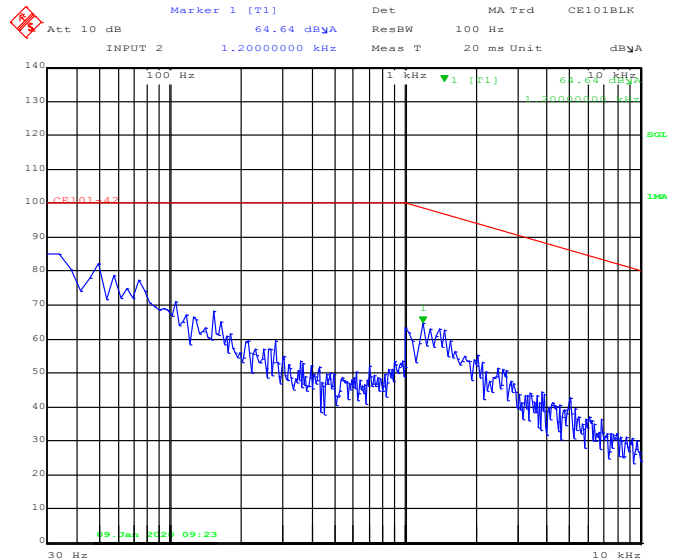
Title: Peak
 Comment B: CE101_14Vin_28Vout_BLK_100L_CER
 Date: 8.JAN.2020 16:45:04

Figure 16: Vin 14V, Vout 28V, Load 100%, Cout 5000uF



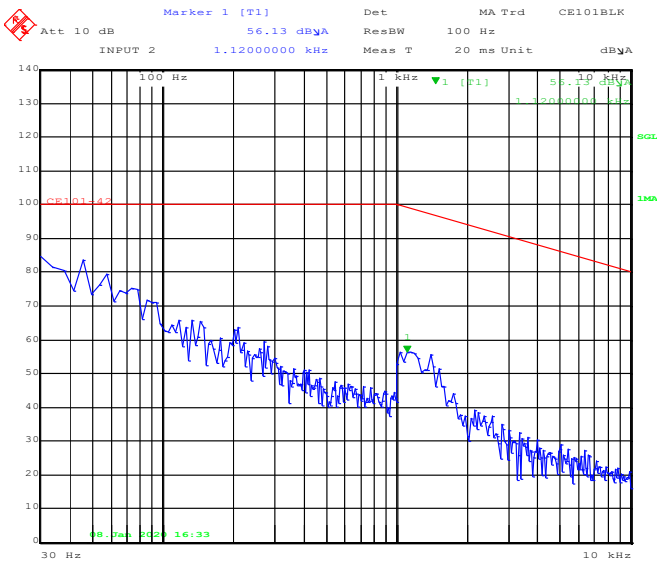
Title: Peak
 Comment B: 43Vin_28Vout_BLK_CE101_0L
 Date: 9.JAN.2020 09:27:48

Figure 17: Vin 43V, Vout 28V, Load 0%, Cout 470uF



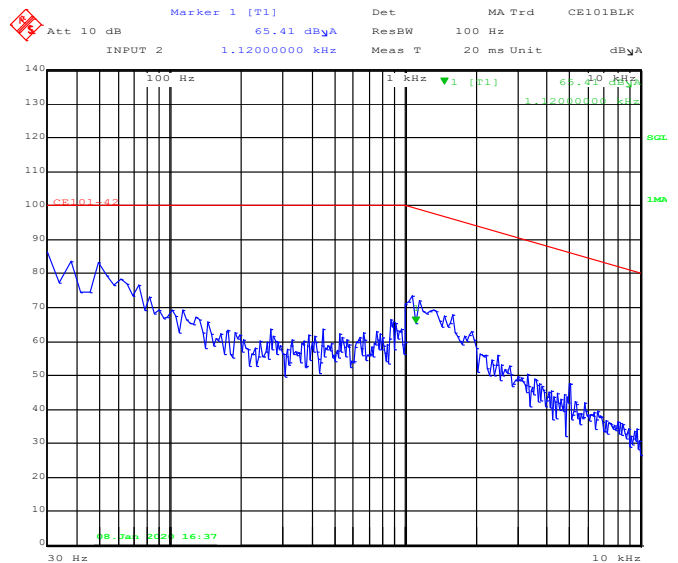
Title: Peak
 Comment B: 43Vin_28Vout_BLK_CE101_100L
 Date: 9.JAN.2020 09:23:50

Figure 18: Vin 43V, Vout 28V, Load 100%, Cout 470uF



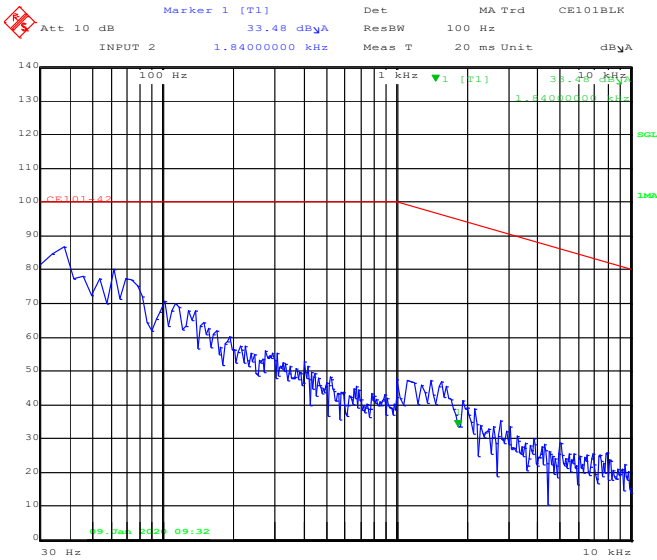
Title: Peak
 Comment B: CE101_43Vin_28Vout_BLK_0L_CER
 Date: 8.JAN.2020 16:33:51

Figure 19: Vin 43V, Vout 28V, Load 0%, Cout 5000uF



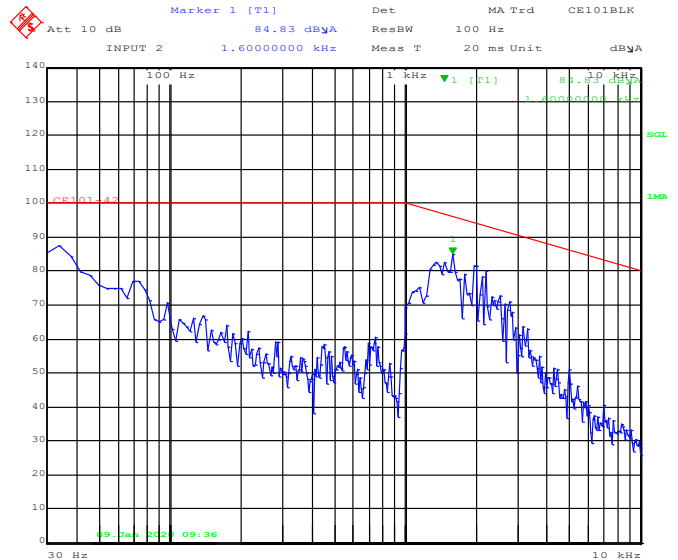
Title: Peak
 Comment B: CE101_43Vin_28Vout_BLK_100L_CER
 Date: 8.JAN.2020 16:37:32

Figure 20: Vin 43V, Vout 28V, Load 100%, Cout 5000uF



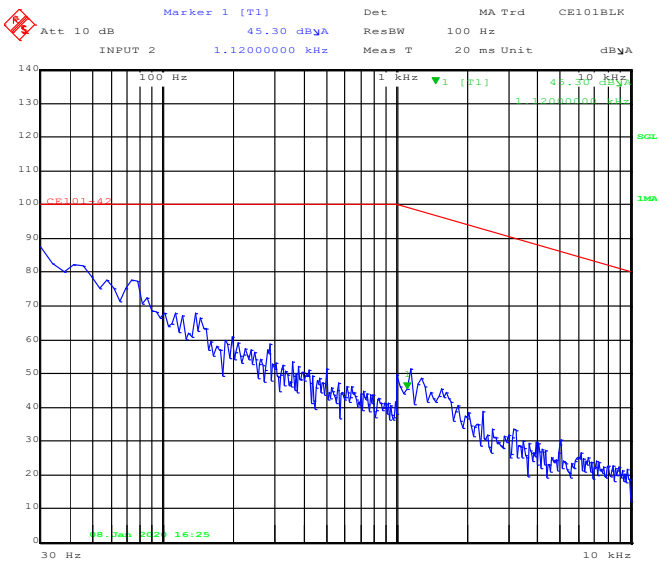
Title: Peak
 Comment B: 72Vin_28Vout_BLK_CE101_0L
 Date: 9.JAN.2020 09:32:07

Figure 21: Vin 72V, Vout 28V, Load 0%, Cout 470uF



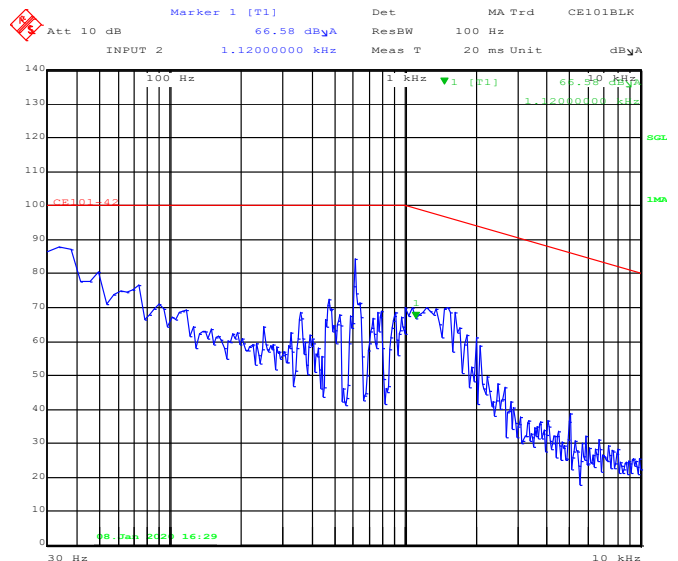
Title: Peak
 Comment B: 72Vin_28Vout_BLK_CE101_100L
 Date: 9.JAN.2020 09:36:15

Figure 22: Vin 72V, Vout 28V, Load 100%, Cout 470uF



Title: Peak
 Comment B: CE101_72Vin_28Vout_BLK_100L_CER
 Date: 8.JAN.2020 16:25:51

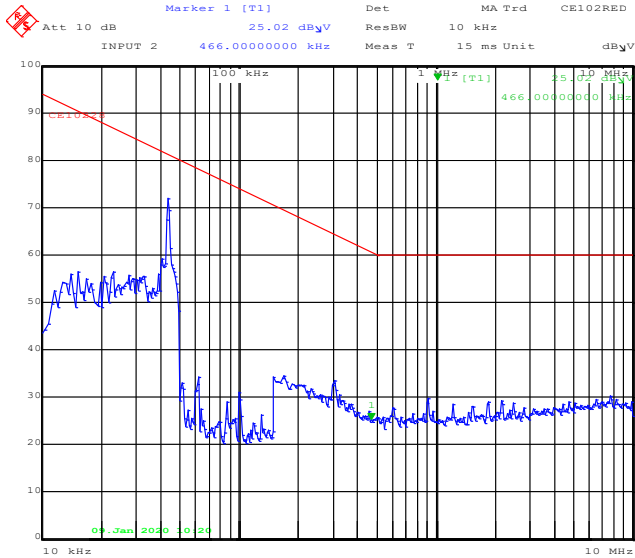
Figure 23: Vin 72V, Vout 28V, Load 0%, Cout 5000uF



Title: Peak
 Comment B: CE101_72Vin_28Vout_BLK_100L_CER
 Date: 8.JAN.2020 16:29:42

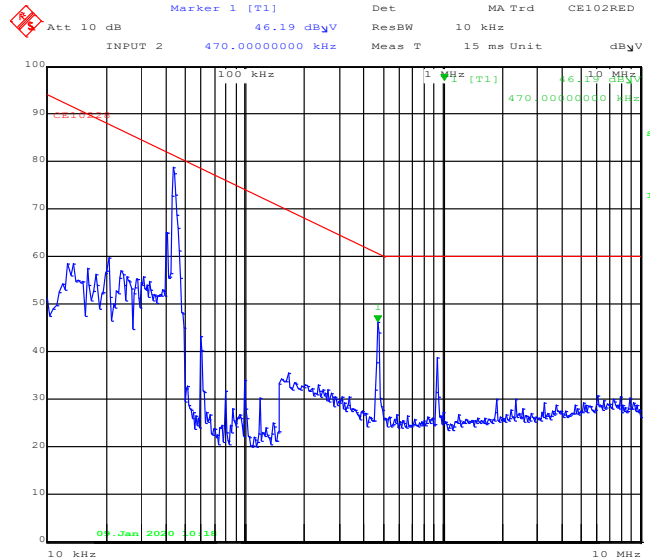
Figure 24: Vin 72V, Vout 28V, Load 100%, Cout 5000uF

CE102 Test Results: RED LEAD



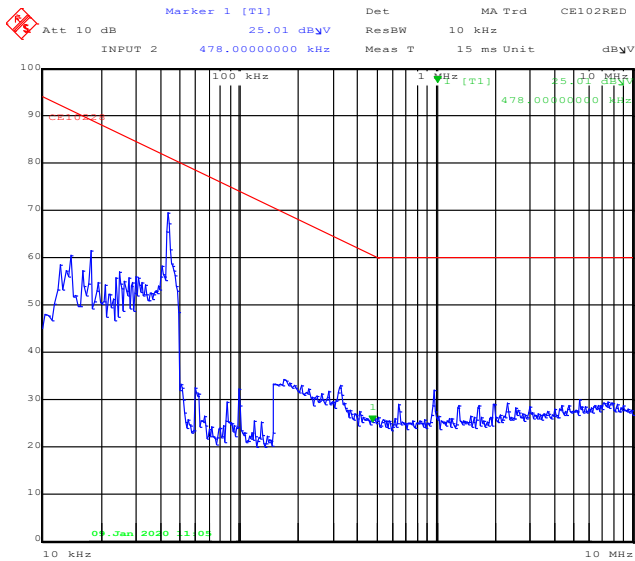
Title: Peak
 Comment B: 14Vin_28Vout_RED_CE102_0L
 Date: 9.JAN.2020 10:20:01

Figure 3: Vin 14V, Vout 28V, Load 0%, Cout 470uF



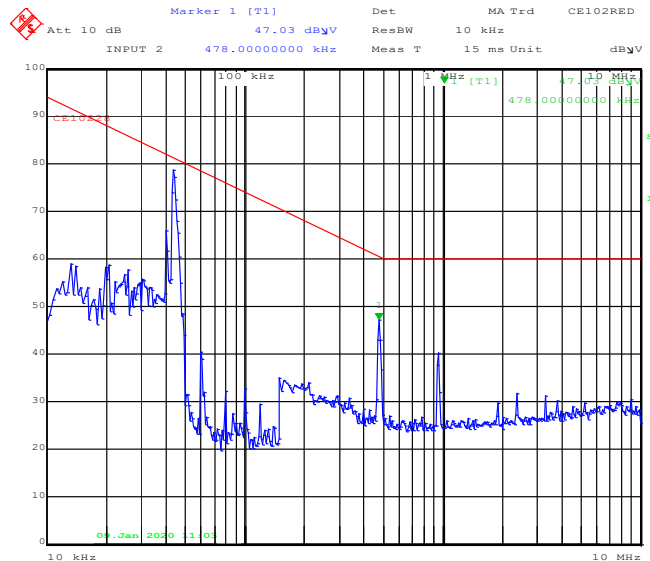
Title: Peak
 Comment B: 14Vin_28Vout_RED_CE102_100L
 Date: 9.JAN.2020 10:18:26

Figure 4: Vin 14V, Vout 28V, Load 100%, Cout 470uF



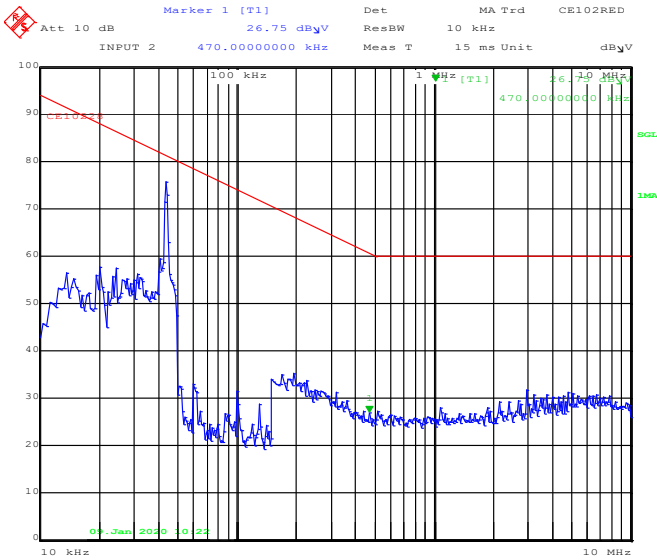
Title: Peak
 Comment B: 14Vin_28Vout_RED_CE102_0L
 Date: 9.JAN.2020 11:05:28

Figure 3: Vin 14V, Vout 28V, Load 0%, Cout 5000uF



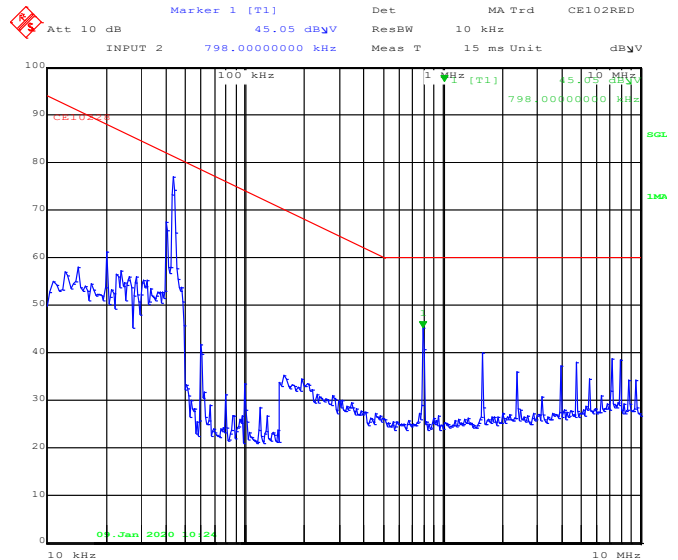
Title: Peak
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 Date: 9.JAN.2020 11:03:30

Figure 4: Vin 14V, Vout 28V, Load 100%, Cout 5000uF



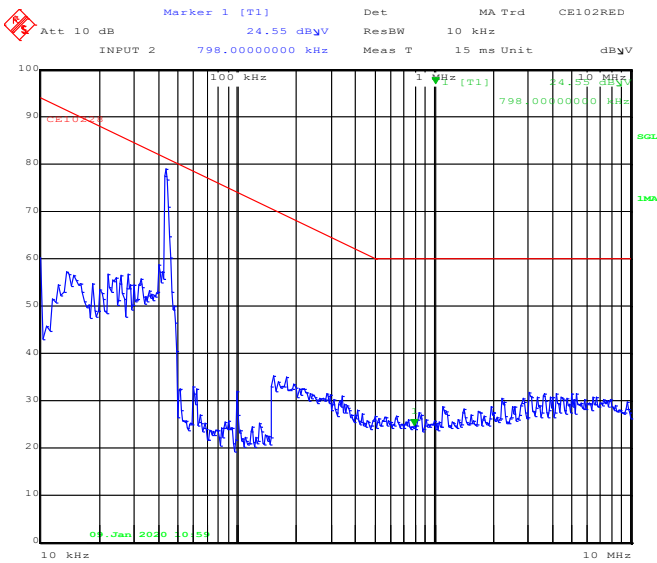
Title: Peak
 Comment B: 43Vin_28Vout_RED_CE102_0L
 Date: 9.JAN.2020 10:22:28

Figure 5: Vin 43V, Vout 28V, Load 0%, Cout 470uF



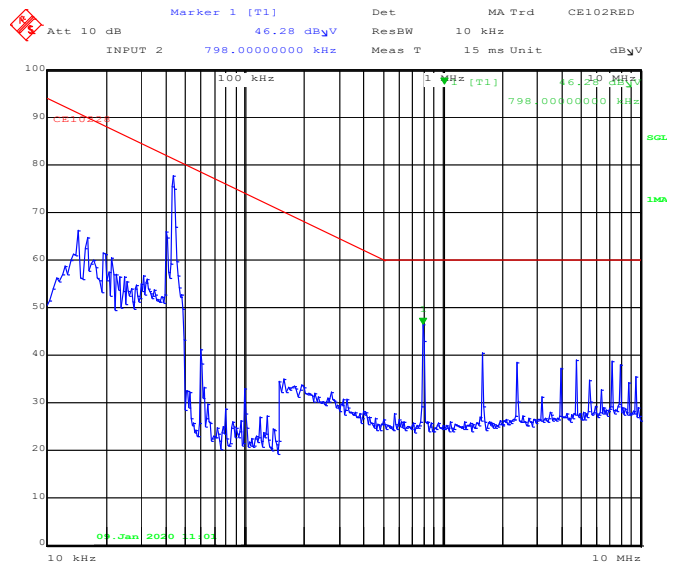
Title: Peak
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 Date: 9.JAN.2020 10:24:06

Figure 6: Vin 43V, Vout 28V, Load 100%, Cout 470uF



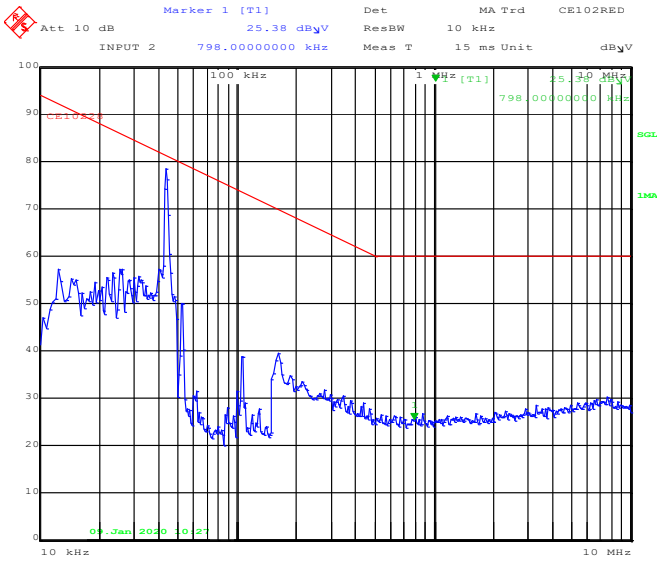
Title: Peak
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 Date: 9.JAN.2020 10:59:57

Figure 7: Vin 43V, Vout 28V, Load 0%, Cout 5000uF



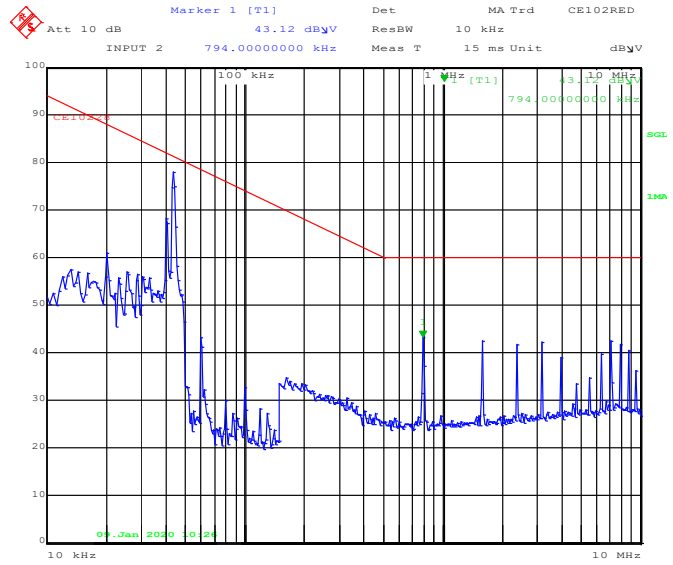
Title: Peak
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 Date: 9.JAN.2020 11:01:37

Figure 8: Vin 43V, Vout 28V, Load 100%, Cout 5000uF



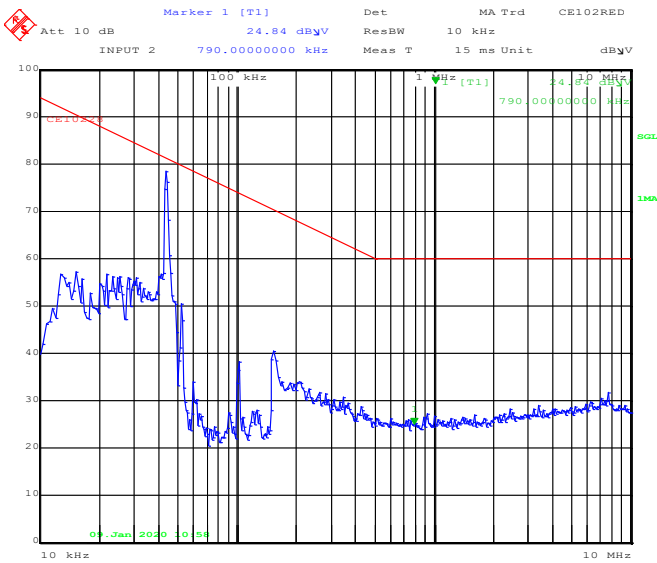
Title: Peak
 Comment B: 72Vin_28Vout_RED_CE102_0L
 Date: 9.JAN.2020 10:27:39

Figure 9: Vin 72V, Vout 28V, Load 0%, Cout 470uF



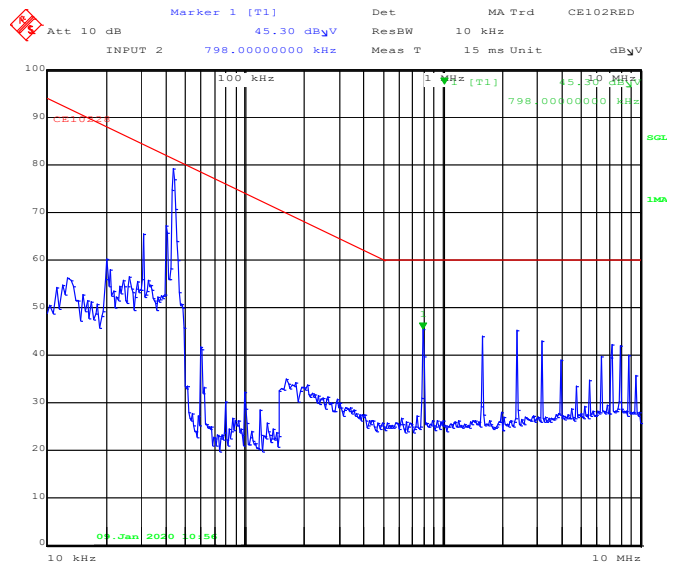
Title: Peak
 Comment B: 72Vin_28Vout_RED_CE102_100L
 Date: 9.JAN.2020 10:26:14

Figure 10: Vin 72V, Vout 28V, Load 100%, Cout 470uF



Title: Peak
 Comment B: 72Vin_28Vout_RED_CE102_0L
 Date: 9.JAN.2020 10:58:10

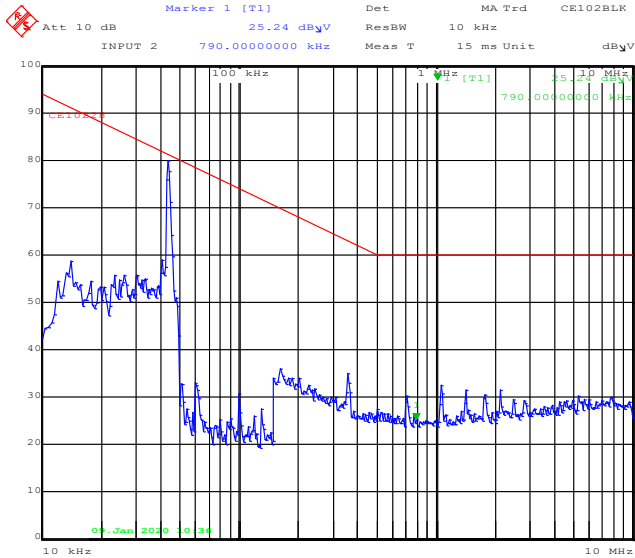
Figure 11: Vin 72V, Vout 28V, Load 0%, Cout 5000uF



Title: Peak
 Comment B: 72Vin_28Vout_RED_CE102_100L
 Date: 9.JAN.2020 10:56:40

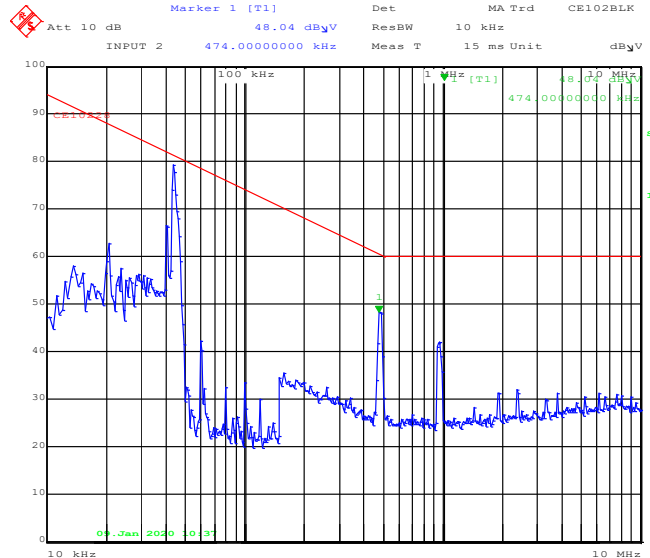
Figure 12: Vin 72V, Vout 28V, Load 100%, Cout 5000uF

CE102 Test Results: BLACK LEAD



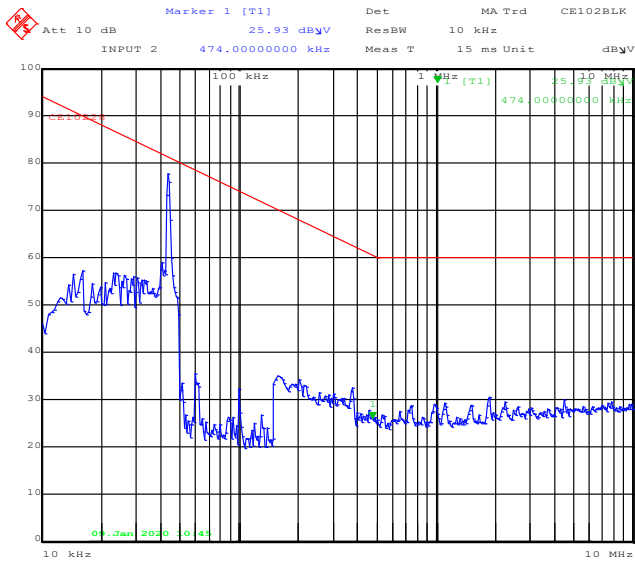
Title: Peak
Comment B: 14Vin_28Vout_BLK_CE102_0L
Date: 9.JAN.2020 10:36:20

Figure 13: Vin 14V, Vout 28V, Load 0%, Cout 470uF



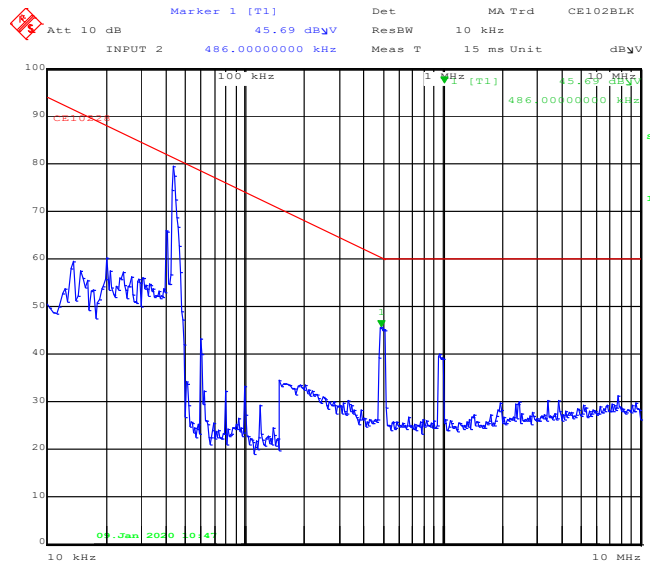
Title: Peak
Comment B: 14Vin_28Vout_BLK_CE102_100L
Date: 9.JAN.2020 10:37:55

Figure 14: Vin 14V, Vout 28V, Load 100%, Cout 470uF



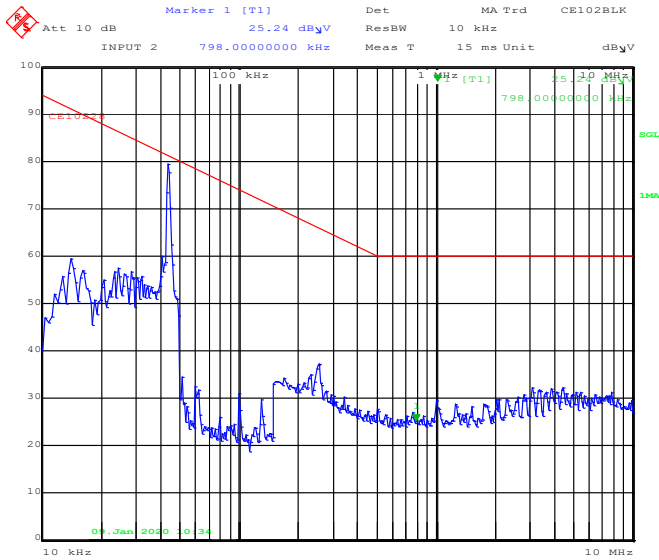
Title: Peak
Comment B: 14Vin_28Vout_BLK_CE102_0L
Date: 9.JAN.2020 10:45:14

Figure 15: Vin 14V, Vout 28V, Load 0%, Cout 5000uF



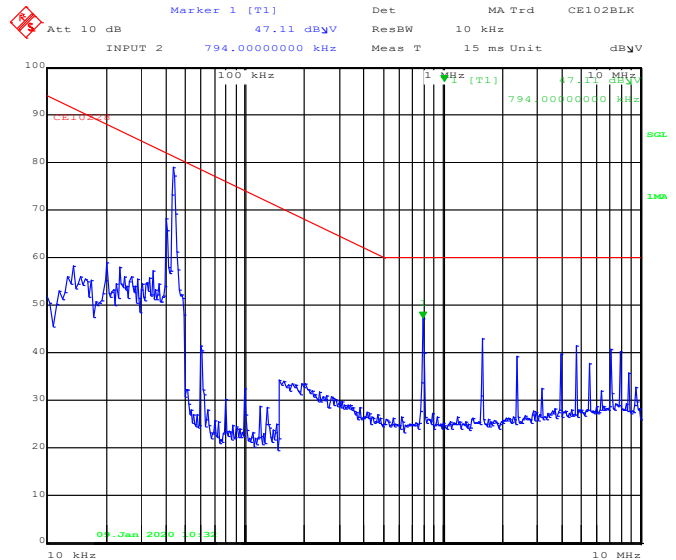
Title: Peak
Comment B: 14Vin_28Vout_BLK_CE102_100L
Date: 9.JAN.2020 10:47:33

Figure 16: Vin 14V, Vout 28V, Load 100%, Cout 5000uF



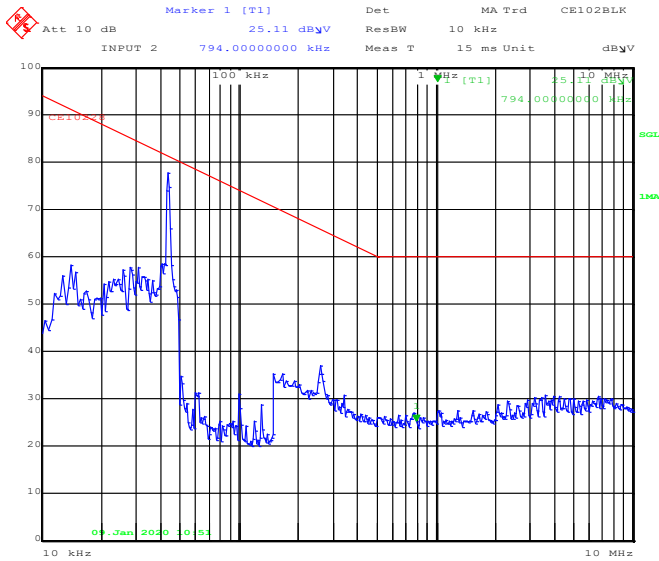
Title: Peak
 Comment B: 43Vin_28Vout_BLK_CE102_0L
 Date: 9.JAN.2020 10:34:32

Figure 17: Vin 43V, Vout 28V, Load 0%, Cout 470uF



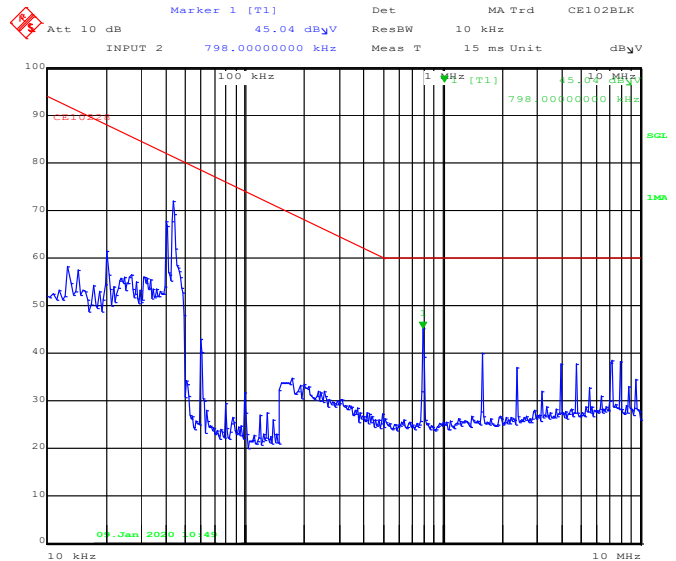
Title: Peak
 Comment B: 43Vin_28Vout_BLK_CE102_100L
 Date: 9.JAN.2020 10:32:59

Figure 18: Vin 43V, Vout 28V, Load 100%, Cout 470uF



Title: Peak
 Comment B: 43Vin_28Vout_BLK_CE102_0L
 Date: 9.JAN.2020 10:51:25

Figure 19: Vin 43V, Vout 28V, Load 0%, Cout 5000uF



Title: Peak
 Comment B: 43Vin_28Vout_BLK_CE102_100L
 Date: 9.JAN.2020 10:49:53

Figure 20: Vin 43V, Vout 28V, Load 100%, Cout 5000uF

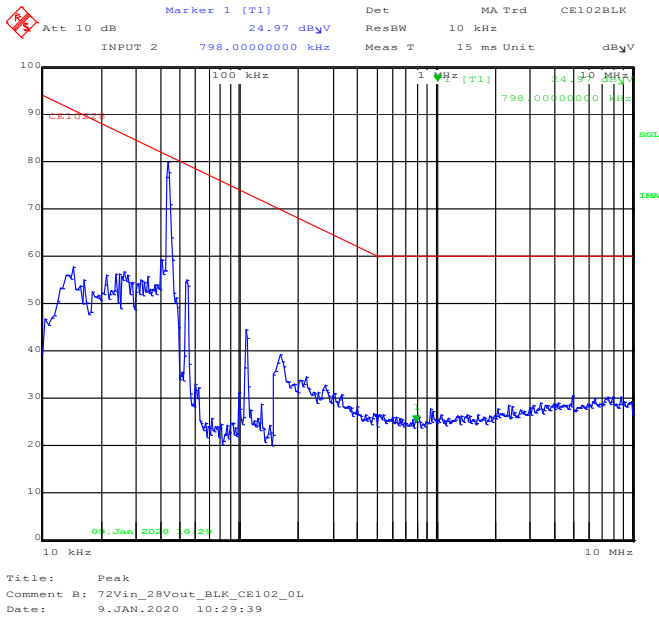


Figure 21: Vin 72V, Vout 28V, Load 0%, Cout 470uF

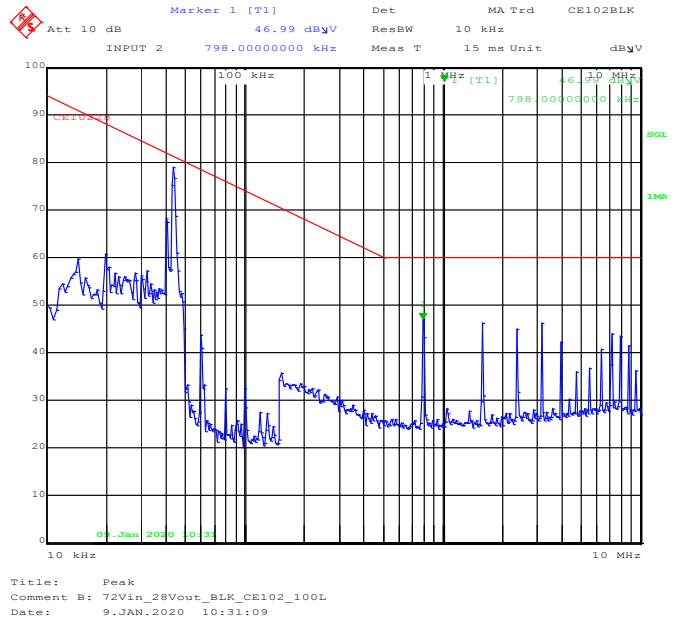


Figure 22: Vin 72V, Vout 28V, Load 100%, Cout 470uF

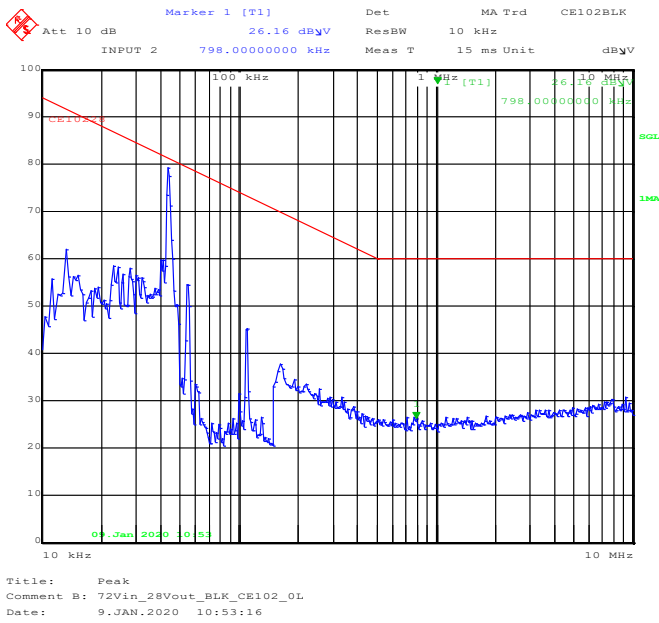


Figure 23: Vin 72V, Vout 28V, Load 0%, Cout 5000uF

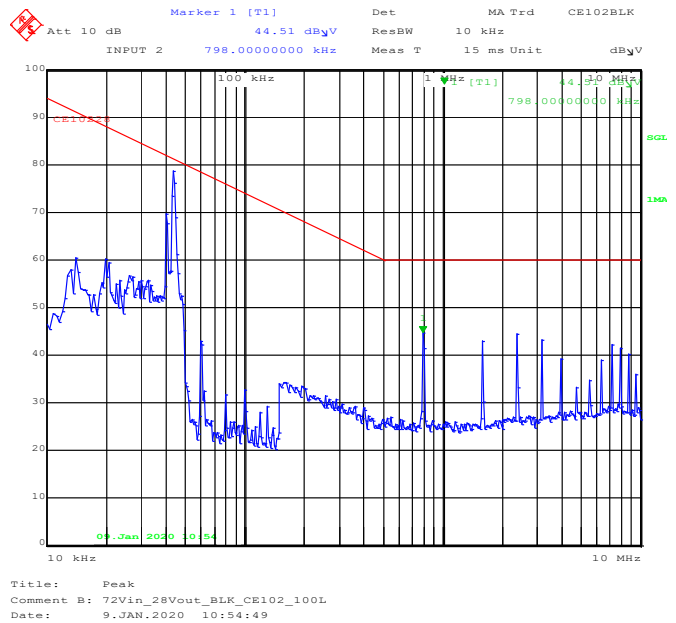


Figure 24: Vin 72V, Vout 28V, Load 100%, Cout 5000uF