MIL ChiP DCM2322 (30Vin-28Vout) EMI Test Report

Input Voltage Range : 9-50V, 30V (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**
9 V	Two Stage	220uF, 2200uF	PASS
30 V	Two Stage	220uF, 2200uF	PASS
50 V	Two Stage	220uF, 2200uF	PASS

Prepared by:
Vamshi Domudala
Applications Engineering
Date: 1/22/2020

Model Details:

ChiP DCM: DCM2322T50T3160T60

EMI tests performed as per MIL-STD-461:

CE101
CE102

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REV	DESCRIPTION	DATE	APPROVED
1	APPLICATIONS ENGINEERING	5/29/2020	VD

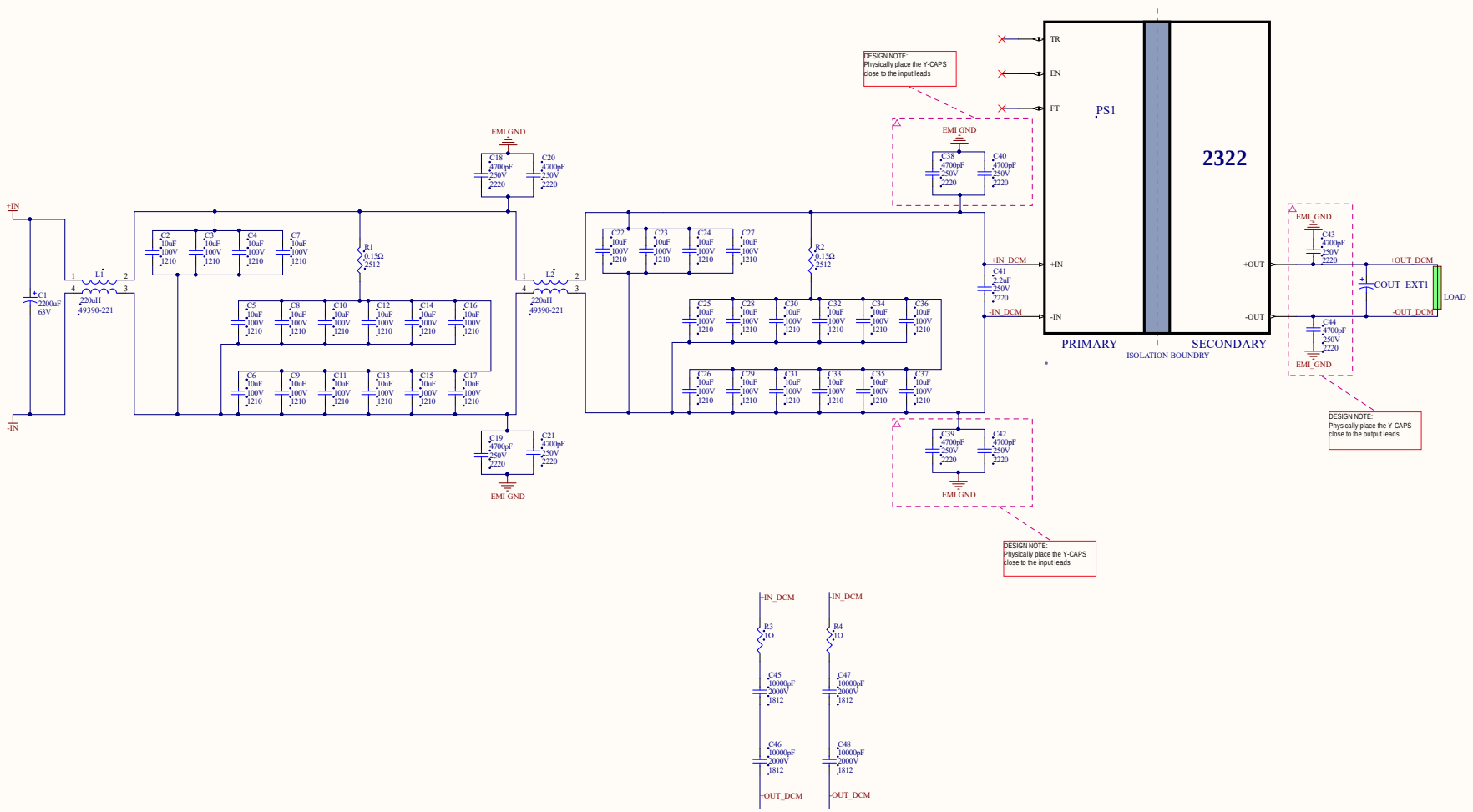
BOARD REVISION NOTES

REVISION NOTES:

1 - Redraw based on existing schematic; 5/29/2020

SHEET TO DO

TO DO:



A

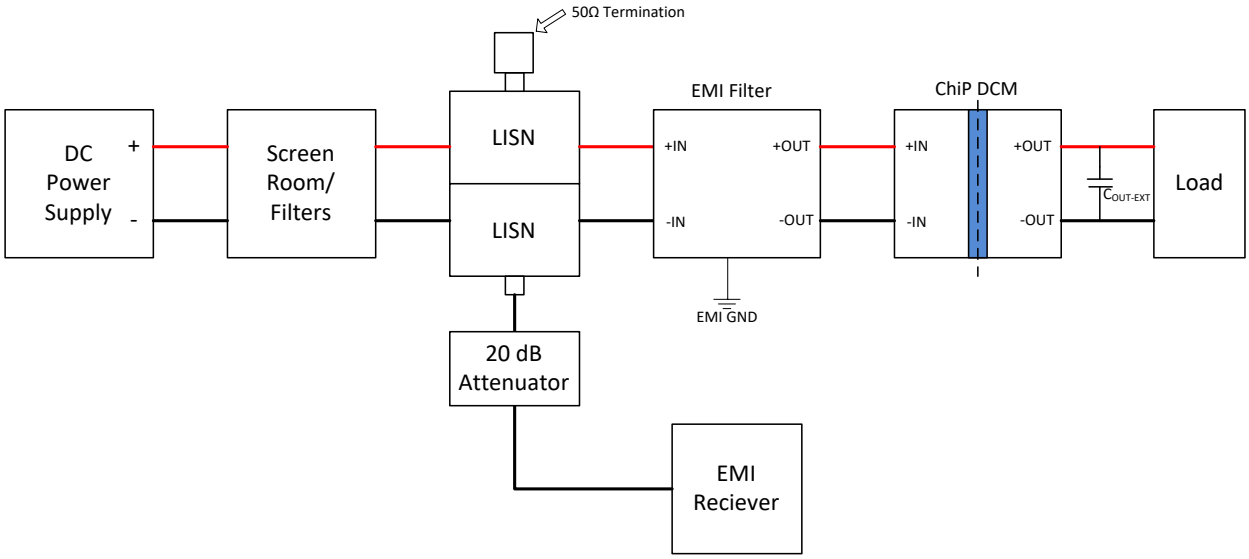
SCHEMATIC

2322 ChiP DCM MIL Ref Design for 9 - 50 Vin, 28Vout

APPLICATION: Altium Designer		SIZE: C	FSCM NO.	DWG NO. 30Vin_28Vout-SCH	REV #1
DRAWN: Vamshi Domudala	DATE: 5/29/2020	SCALE:	SHEET 1 OF 1		

REFERENCE DESIGNATOR	DESCRIPTION	MFG PART NUMBER	MANUFACTURER	QUANTITY	VALUE NOM	RATING NOM
C1	Capacitor	UPW1J222MHD	Nichicon	1	2200uF	63V
C45-48	Capacitor	C1812C103KGRACTU	KEMET Corporation	4	10000pF	2000V
C18-21, C38-40, C42, C43, C44	Capacitor	GA355DR7GF472KW01L	Murata Manufacturing	10	4700pF	250V
C41	Capacitor	C5750X7T2E225M250KA	TDK	1	2.2uF	250V
C2-C17, C22-C37	Capacitor	GRM32EC72A106KE05L	Murata Manufacturing	32	10uF	100V
COUT_EXT1	Min/Max from the ChiP DCM datasheet			1		
L1, L2	Ind Com Mode 7065	49390-221	Vicor	2	220uH	10.5A
PS1	DCM2322 9 - 50Vin	DCM2322	Vicor	1		
R1, R2	Resistor	ERJ-1TRSJR15U	Panasonic	2	0.15Ω	
R3, R4	Resistor	RC1206FR-101RL	Yageo	2	1Ω	

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

EMI Receiver:
Rohde & Schwarz
Model #
ESIB7.1088.7490.07
Serial # M002397

Pasternack
20dB Attenuator

Electronic Load
Kikusui
PLZ1003WH
3504

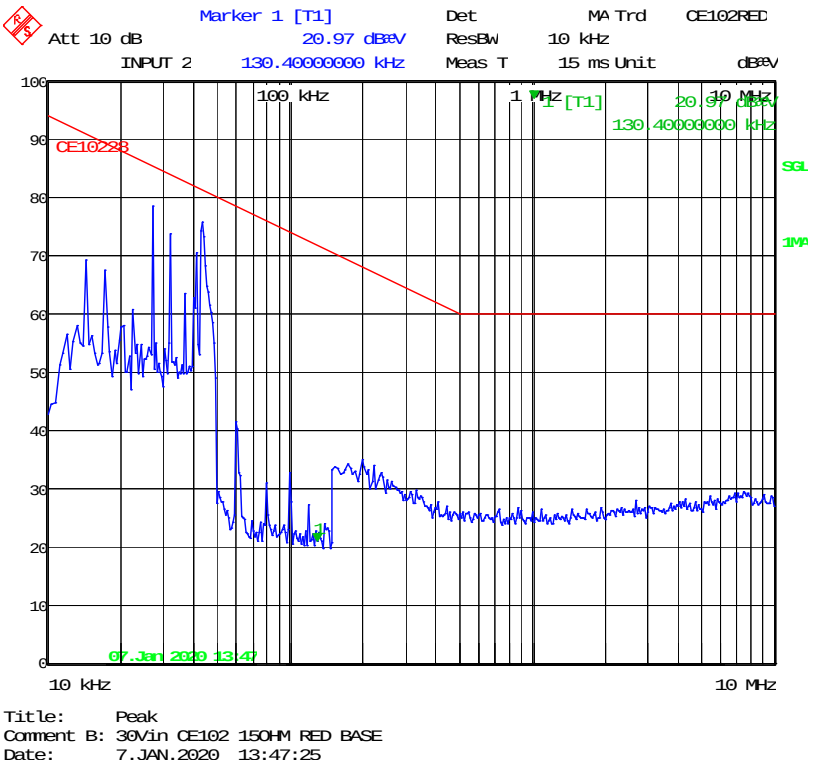
Clamp-On Current Probe
Extech /380947
Serial # 00004085

HP DC power supply Model 6015A

EMI Base Scan with a 15Ω resistive load:

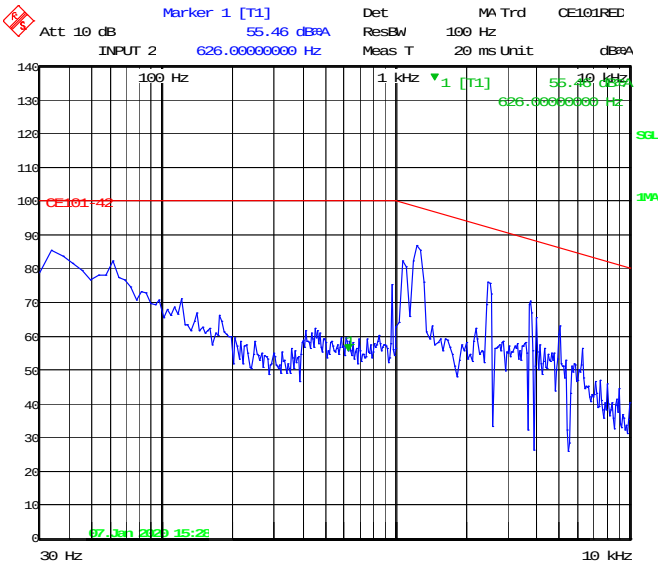
Note that there is a low frequency noise in the range of 10 - 15 kHz is present in the EMI screen room. For a base line of the low frequency noise, shown in the below EMI scan, the power supplies is loaded with 15Ω resistive load.

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.



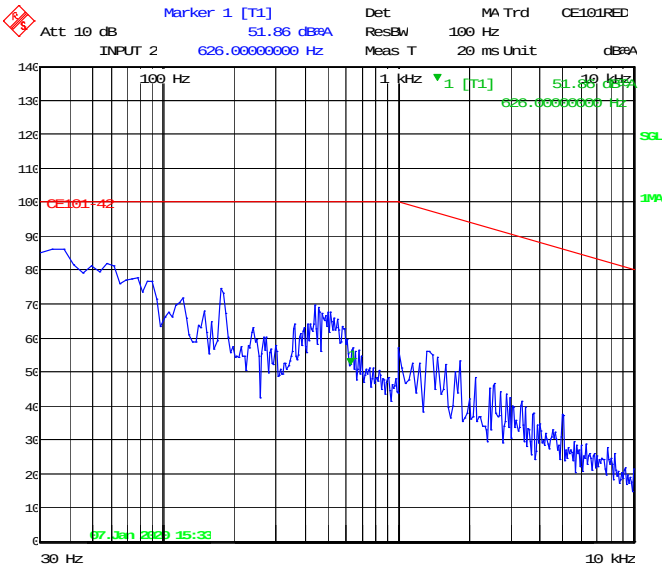
Title: Peak
Comment B: 30Vin CE102 150HM RED BASE
Date: 7.JAN.2020 13:47:25

CE101 Test Results: RED LEAD



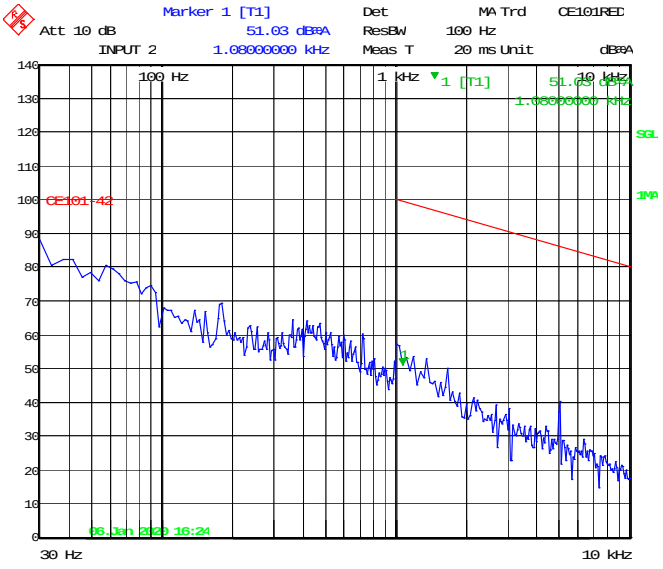
Title: Peak
Comment B: 9Vin CE101 28Vout RED 0L
Date: 7.JAN.2020 15:28:24

Figure 1: Vin 9V, Vout 28V, Load 0%, Cout 220uF



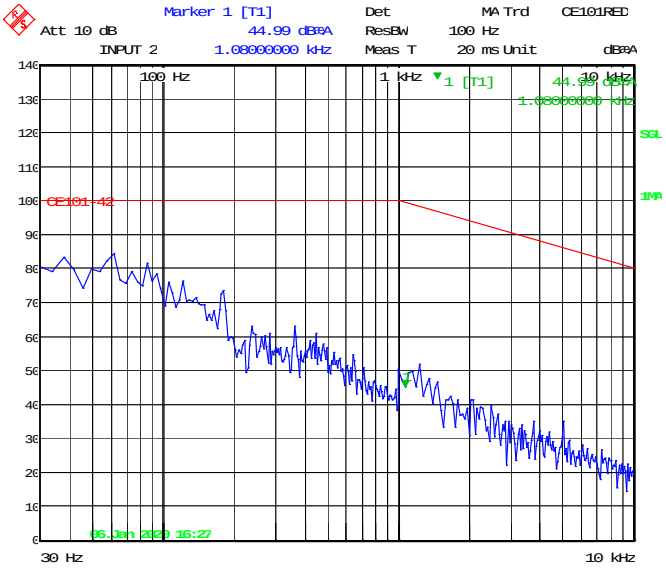
Title: Peak
Comment B: 9Vin CE101 28Vout RED 100L
Date: 7.JAN.2020 15:33:13

Figure 2: Vin 9V, Vout 28V, Load 100%, Cout 220uF



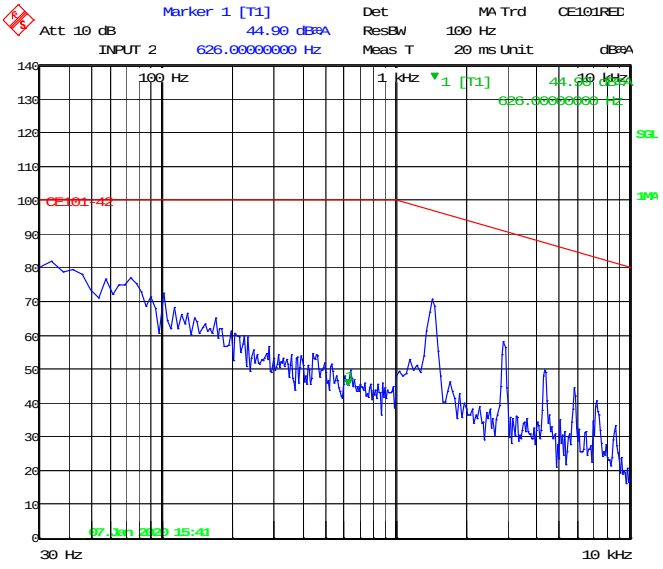
Title: Peak
Comment B: CE101 9Vin 28Vout RED 10L
Date: 6.JAN.2020 16:24:03

Figure 3: Vin 9V, Vout 28V, Load 10%, Cout 2200uF



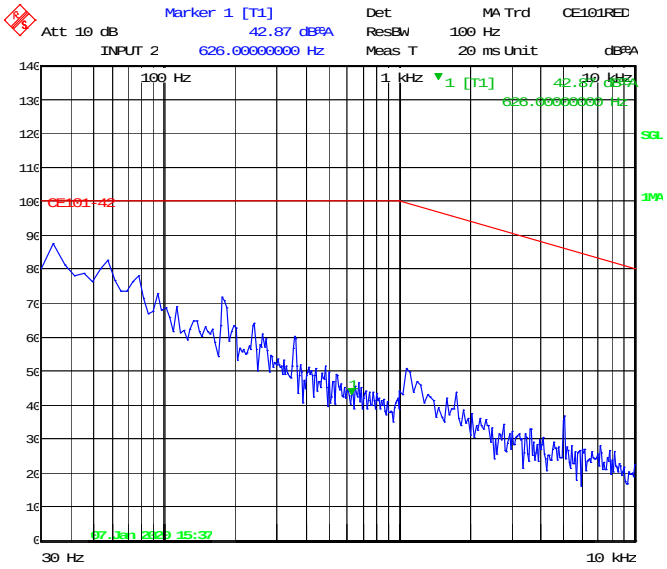
Title: Peak
Comment B: CE101 9Vin 28Vout RED 100L
Date: 6.JAN.2020 16:27:50

Figure 4: Vin 9V, Vout 28V, Load 100%, Cout 2200uF



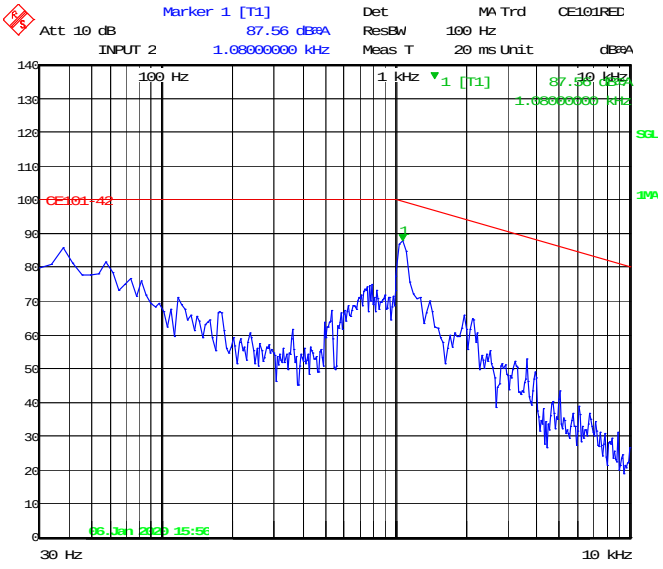
Title: Peak
Comment B: 30Vin CE101 28Vout RED 0L
Date: 7.JAN.2020 15:41:11

Figure 5: Vin 30V, Vout 28V, Load 0%, Cout 220uF



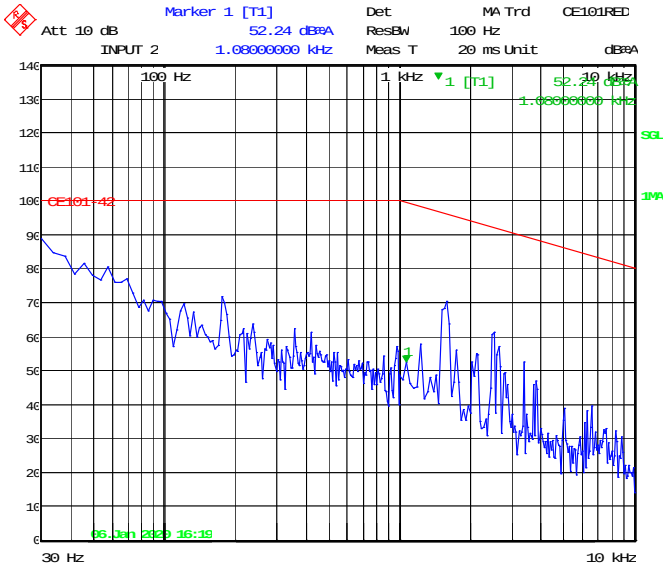
Title: Peak
Comment B: 30Vin CE101 28Vout RED 100L
Date: 7.JAN.2020 15:37:26

Figure 6: Vin 30V, Vout 28V, Load 100%, Cout 220uF



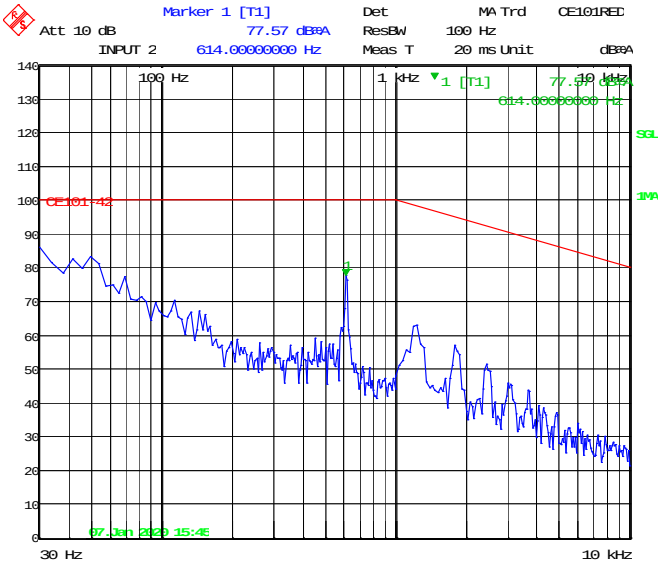
Title: Peak
Comment B: CE101 30Vin 28Vout RED 10L
Date: 6.JAN.2020 15:56:34

Figure 7: Vin 30V, Vout 28V, Load 10%, Cout 2200uF



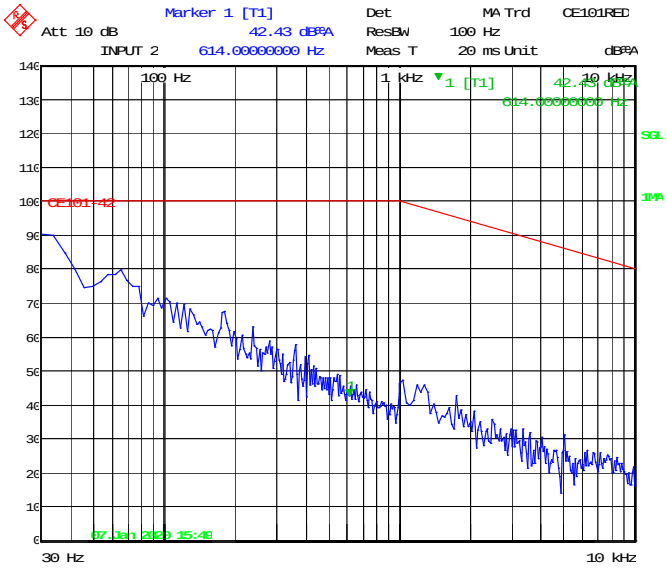
Title: Peak
Comment B: CE101 30Vin 28Vout RED 100L
Date: 6.JAN.2020 16:19:31

Figure 8: Vin 30V, Vout 28V, Load 100%, Cout 2200uF



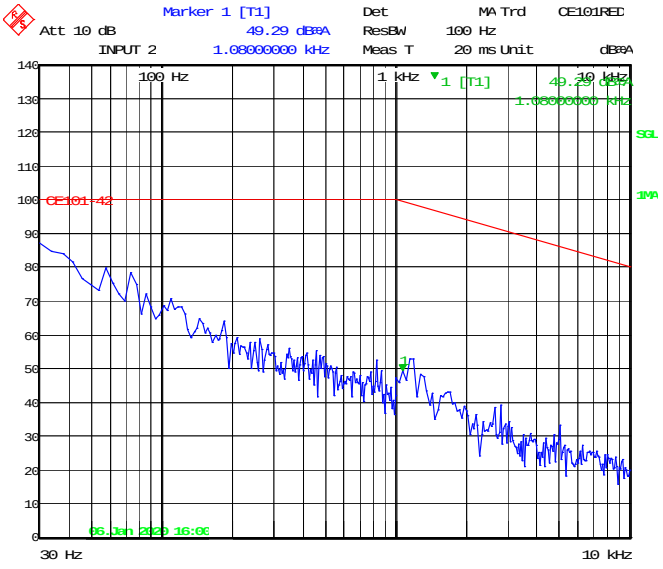
Title: Peak
Comment B: 50Vin CE101 28Vout RED 0L
Date: 7.JAN.2020 15:45:54

Figure 9: Vin 50V, Vout 28V, Load 0%, Cout 220uF



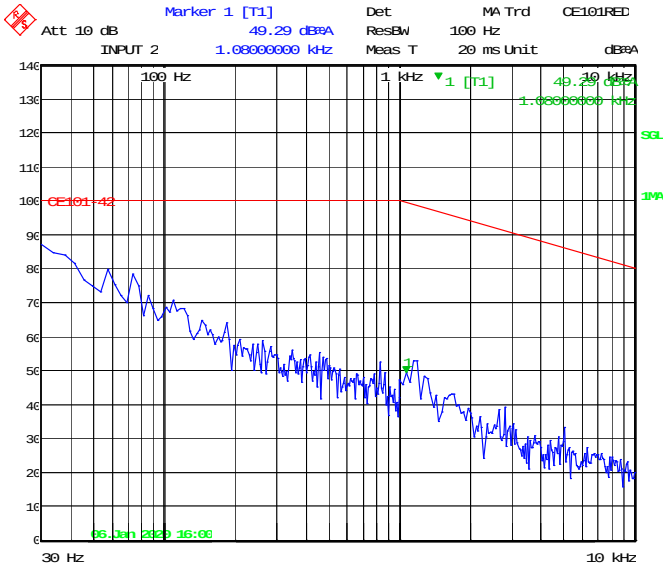
Title: Peak
Comment B: 50Vin CE101 28Vout RED 100L
Date: 7.JAN.2020 15:49:43

Figure 10: Vin 50V, Vout 28V, Load 100%, Cout 220uF



Title: Peak
Comment B: CE101 50Vin 28Vout RED 10L
Date: 6.JAN.2020 16:00:35

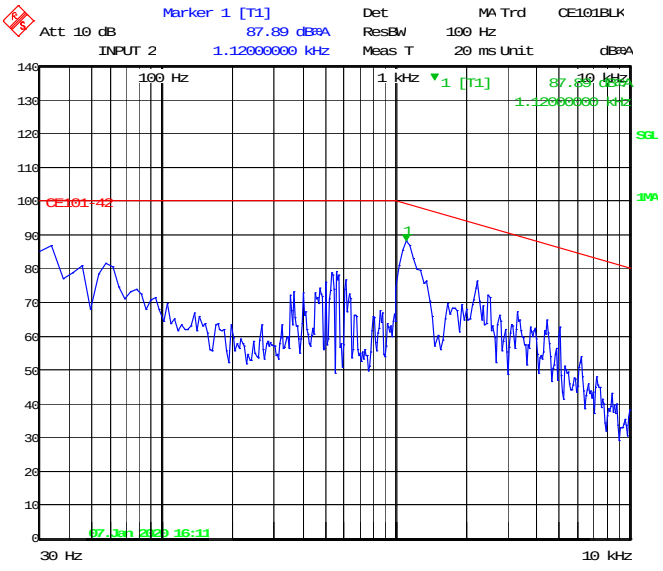
Figure 11: Vin 50V, Vout 28V, Load 10%, Cout 2200uF



Title: Peak
Comment B: CE101 50Vin 28Vout RED 10L
Date: 6.JAN.2020 16:00:35

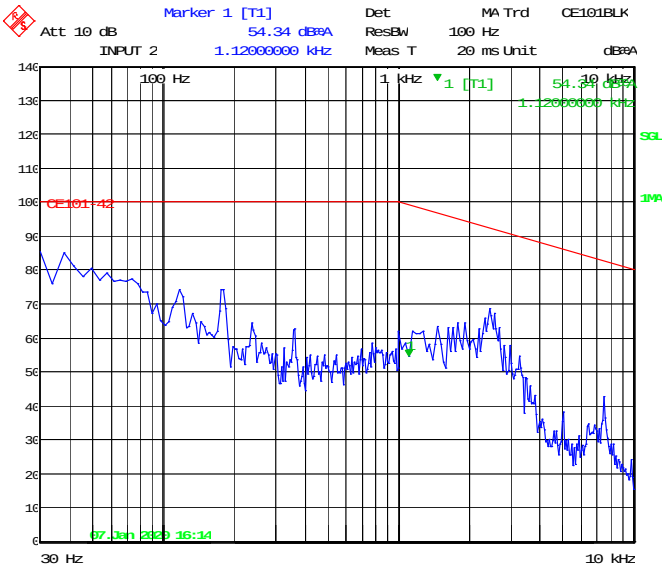
Figure 12: Vin 50V, Vout 28V, Load 100%, Cout 2200uF

CE101 Test Results: BLACK LEAD



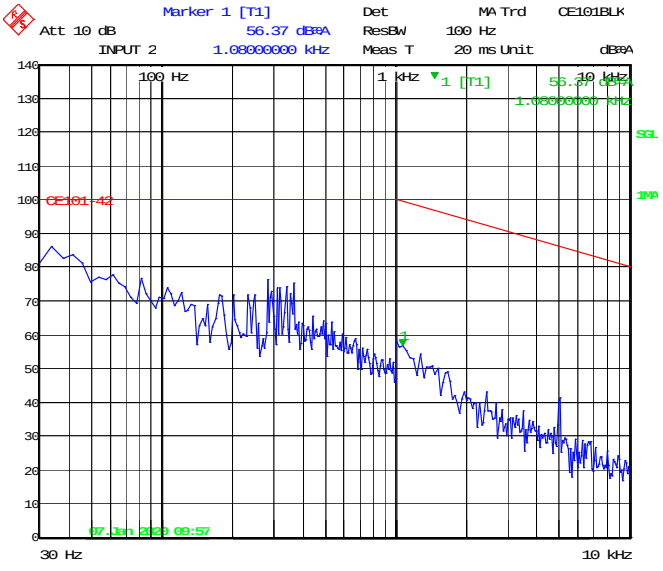
Title: Peak
Comment B: 9Vin CE101 28Vout BLK 0L
Date: 7.JAN.2020 16:11:01

Figure 13: Vin 9V, Vout 28V, Load 0%, Cout 220uF



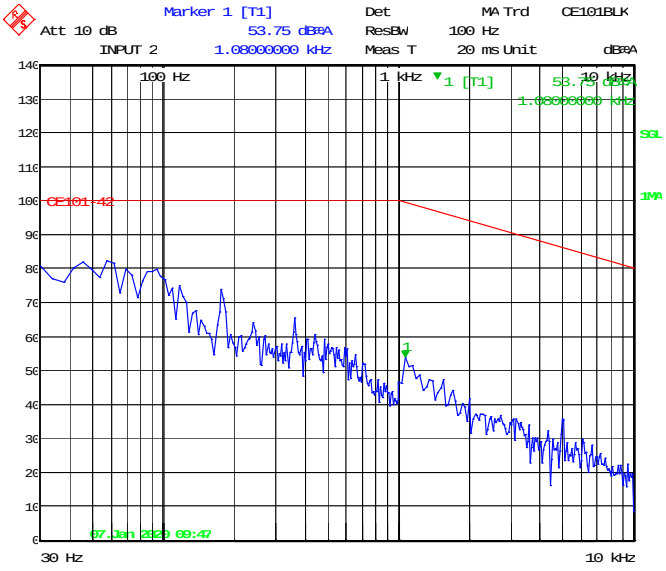
Title: Peak
Comment B: 9Vin CE101 28Vout BLK 100L
Date: 7.JAN.2020 16:14:42

Figure 14: Vin 9V, Vout 28V, Load 100%, Cout 220uF



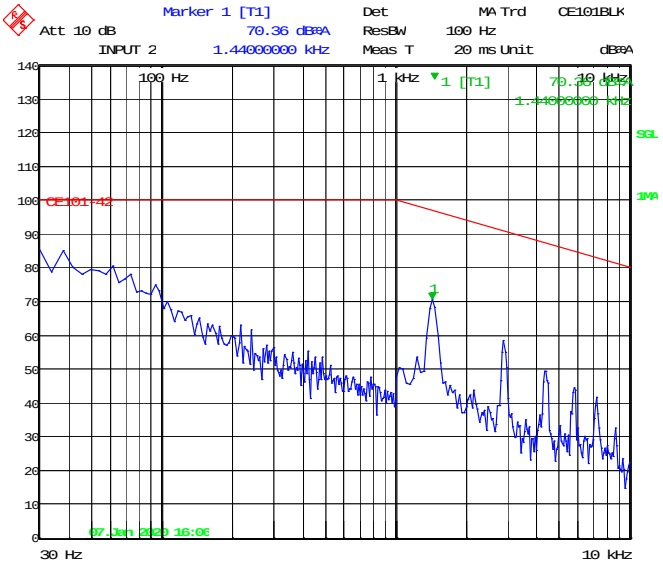
Title: Peak
Comment B: 9Vin CE101 28Vout BLK 10L
Date: 7.JAN.2020 09:57:14

Figure 15: Vin 9V, Vout 28V, Load 10%, Cout 2200uF



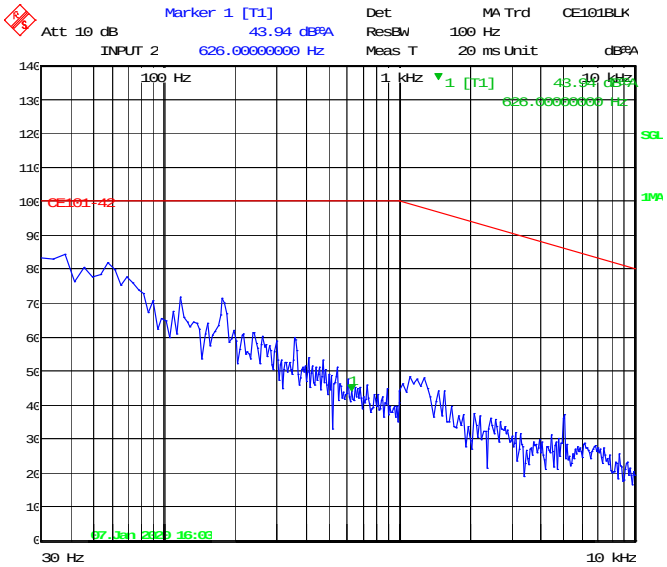
Title: Peak
Comment B: 9Vin CE101 28Vout BLK 100L
Date: 7.JAN.2020 09:47:41

Figure 16: Vin 9V, Vout 28V, Load 100%, Cout 2200uF



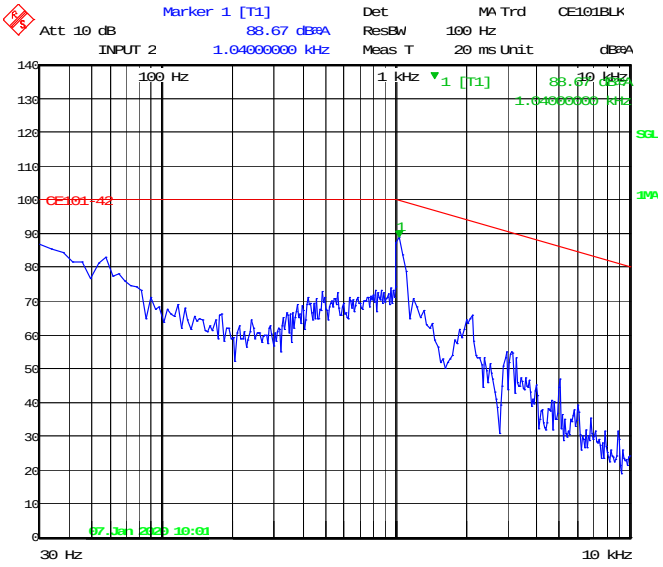
Title: Peak
Comment B: 30Vin CE101 28Vout BLK 0L
Date: 7.JAN.2020 16:06:59

Figure 17: Vin 30V, Vout 28V, Load 0%, Cout 220uF



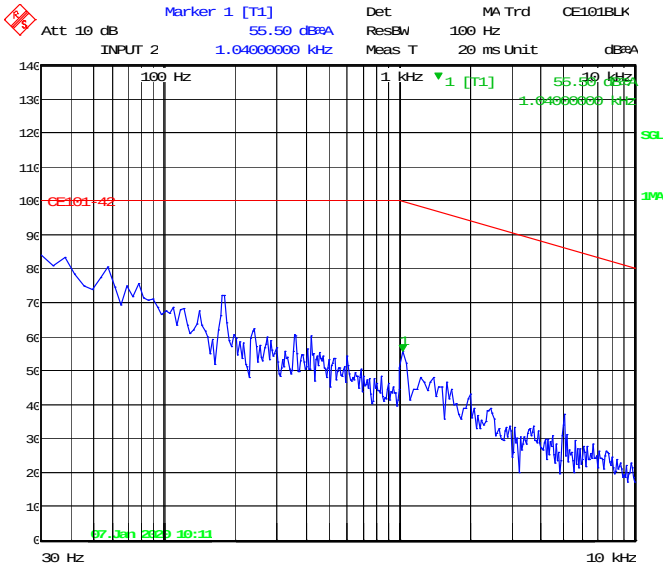
Title: Peak
Comment B: 30Vin CE101 28Vout BLK 100L
Date: 7.JAN.2020 16:03:15

Figure 18: Vin 30V, Vout 28V, Load 100%, Cout 220uF



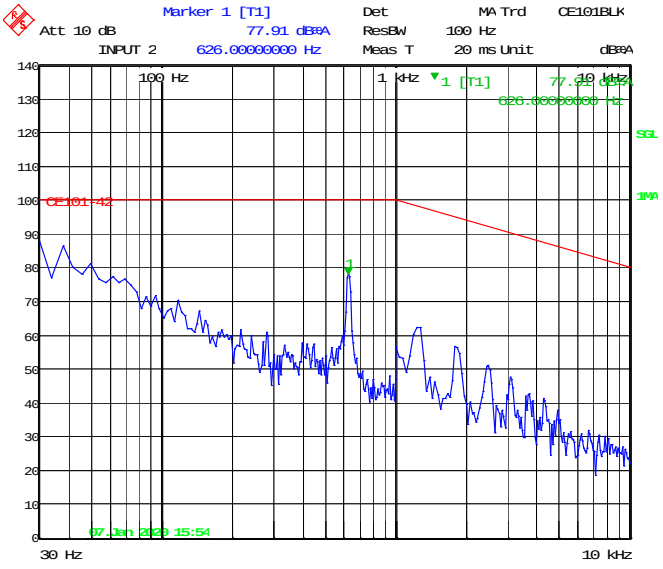
Title: Peak
Comment B: 30Vin CE101 28Vout BLK 10L
Date: 7.JAN.2020 10:01:29

Figure 19: Vin 30V, Vout 28V, Load 10%, Cout 2200uF



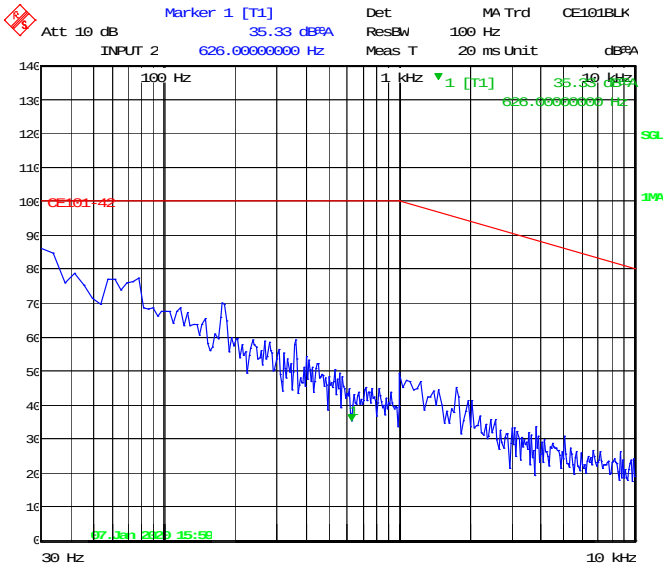
Title: Peak
Comment B: 30Vin CE101 28Vout BLK 100L
Date: 7.JAN.2020 10:11:41

Figure 20: Vin 30V, Vout 28V, Load 100%, Cout 2200uF



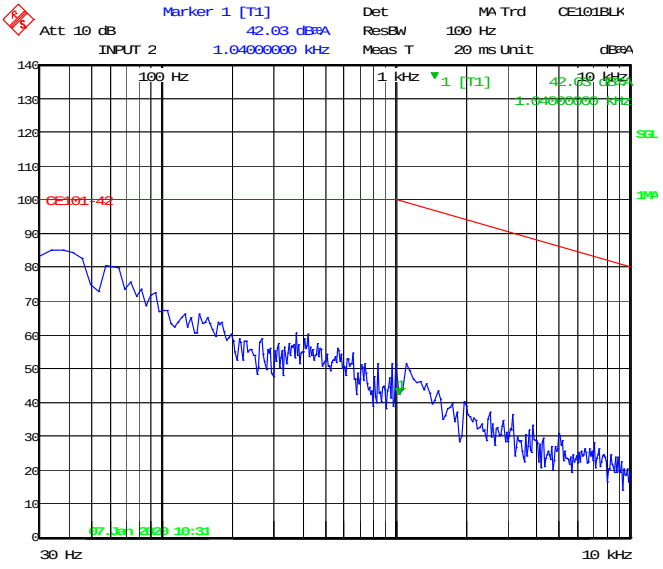
Title: Peak
Comment B: 50Vin CE101 28Vout BLK 0L
Date: 7.JAN.2020 15:54:09

Figure 21: Vin 50V, Vout 28V, Load 0%, Cout 220uF



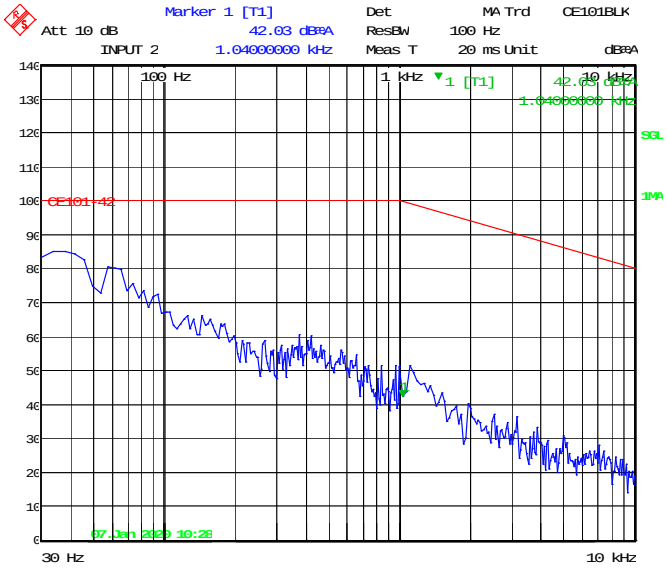
Title: Peak
Comment B: 50Vin CE101 28Vout BLK 100L
Date: 7.JAN.2020 15:59:09

Figure 22: Vin 50V, Vout 28V, Load 100%, Cout 220uF



Title: Peak
Comment B: 50Vin CE101 28Vout BLK 10L
Date: 7.JAN.2020 10:31:36

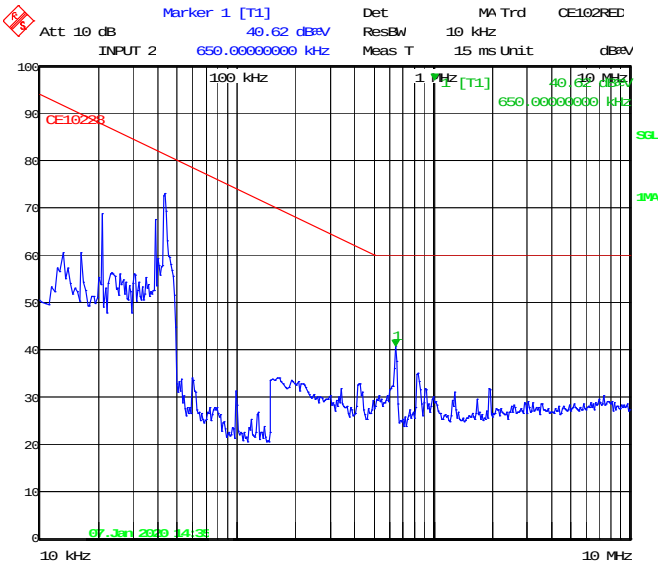
Figure 23: Vin 50V, Vout 28V, Load 10%, Cout 2200uF



Title: Peak
Comment B: 50Vin CE101 28Vout BLK 100L
Date: 7.JAN.2020 10:28:29

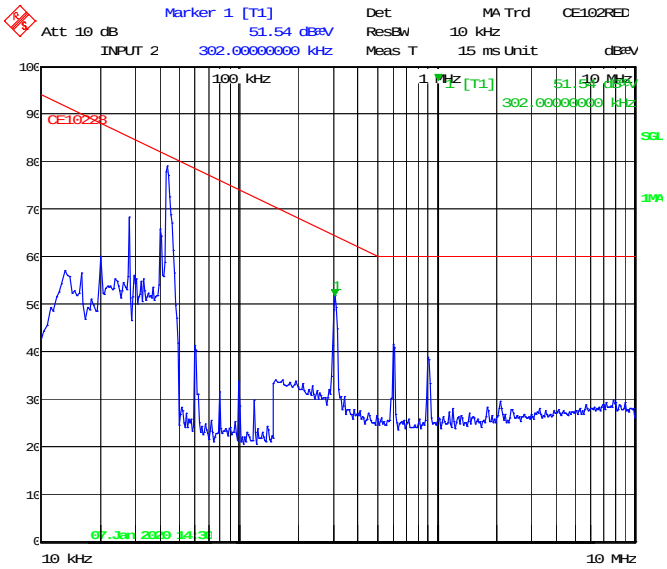
Figure 24: Vin 50V, Vout 28V, Load 100%, Cout 2200uF

CE102 Test Results: RED LEAD



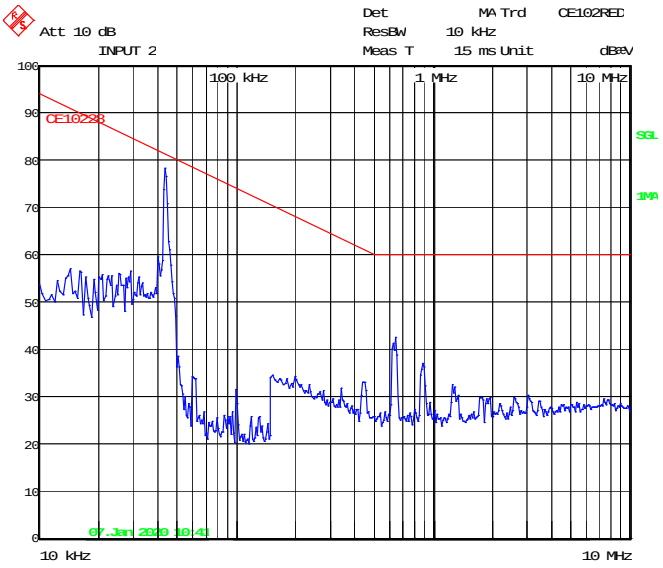
Title: Peak
Comment B: 9Vin CE102 28Vout RED 0L
Date: 7.JAN.2020 14:35:58

Figure 3: Vin 9V, Vout 28V, Load 0%, Cout 220uF



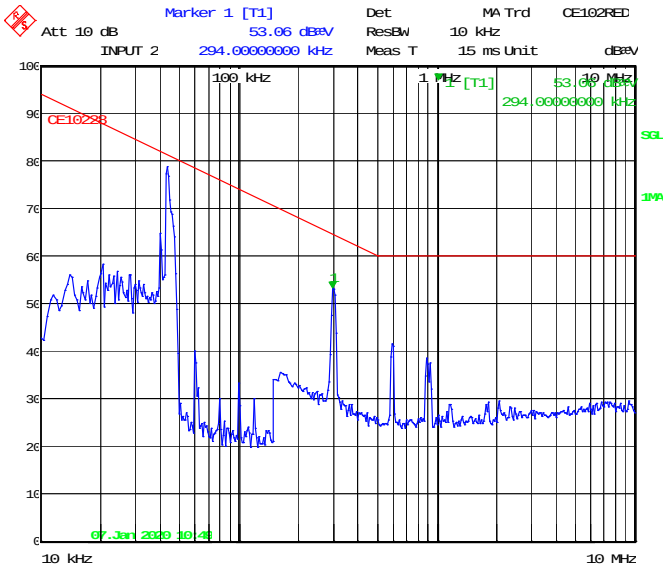
Title: Peak
Comment B: 9Vin CE102 28Vout RED 100L
Date: 7.JAN.2020 14:30:50

Figure 4: Vin 9V, Vout 28V, Load 100%, Cout 220uF



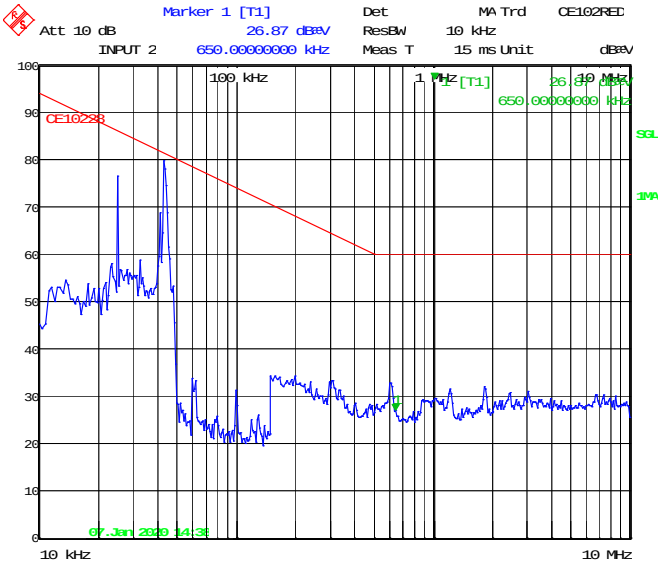
Title: Peak
Comment B: 9Vin CE102 28Vout RED 0L
Date: 7.JAN.2020 10:41:52

Figure 3: Vin 9V, Vout 28V, Load 0%, Cout 2200uF



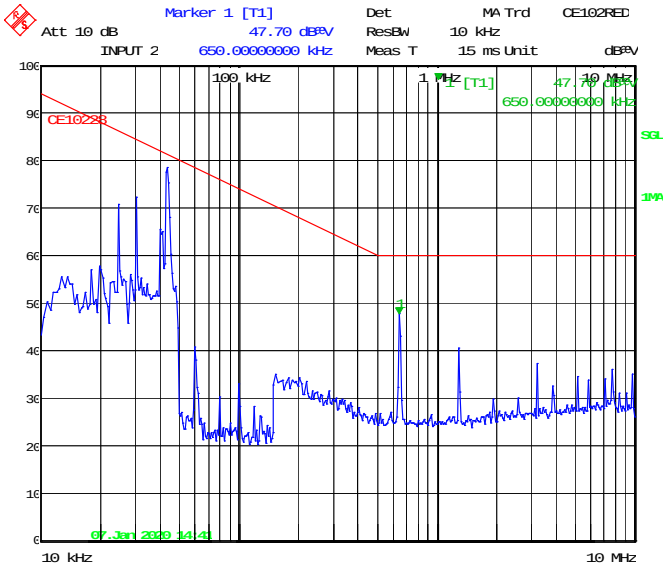
Title: Peak
Comment B: 9Vin CE102 28Vout RED 100L
Date: 7.JAN.2020 10:49:38

Figure 4: Vin 9V, Vout 28V, Load 100%, Cout 2200uF



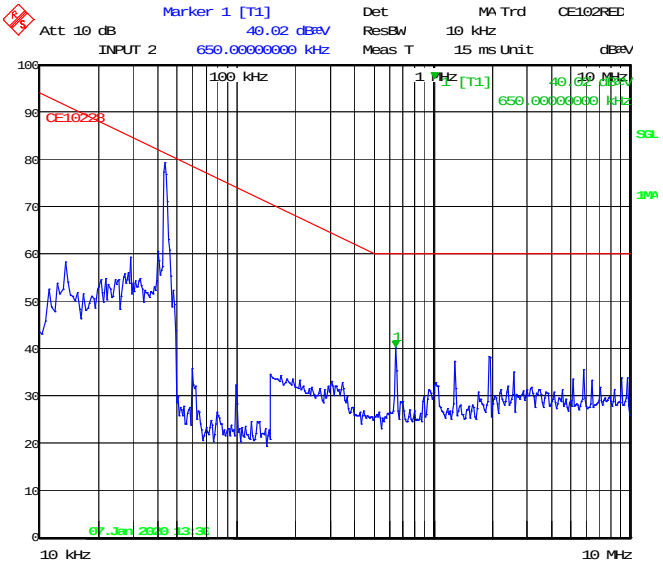
Title: Peak
Comment B: 30Vin CE102 28Vout RED 0L
Date: 7.JAN.2020 14:38:09

Figure 5: Vin 30V, Vout 28V, Load 0%, Cout 220uF



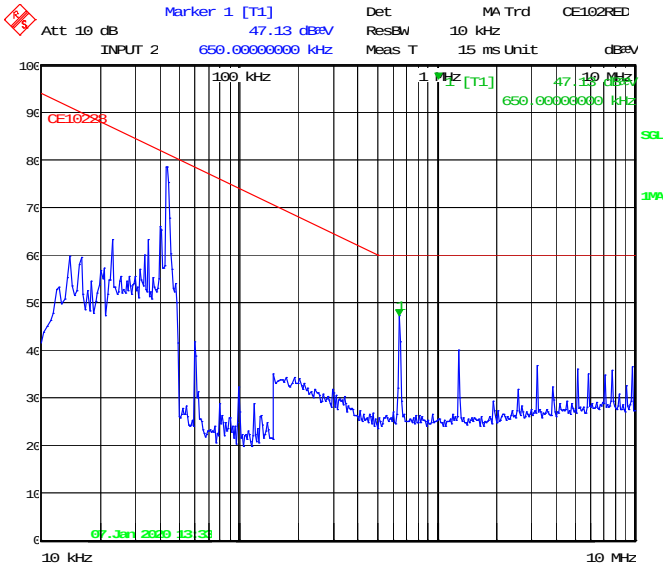
Title: Peak
Comment B: 30Vin CE102 28Vout RED 100L
Date: 7.JAN.2020 14:41:35

Figure 6: Vin 30V, Vout 28V, Load 100%, Cout 220uF



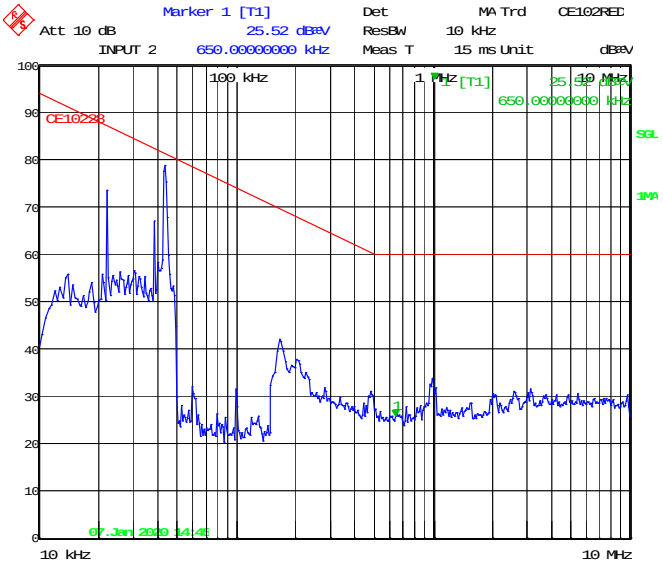
Title: Peak
Comment B: 30Vin CE102 28Vout RED 0L
Date: 7.JAN.2020 13:30:23

Figure 7: Vin 30V, Vout 28V, Load 0%, Cout 2200uF



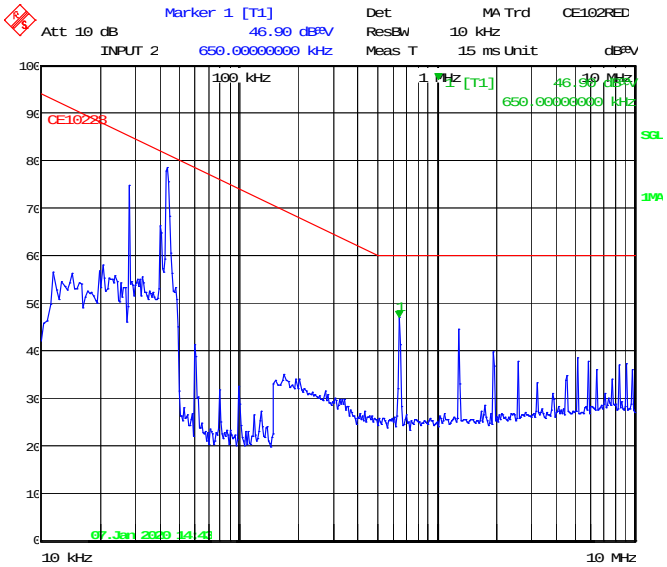
Title: Peak
Comment B: 30Vin CE102 28Vout RED 100L
Date: 7.JAN.2020 13:33:58

Figure 8: Vin 30V, Vout 28V, Load 100%, Cout 2200uF



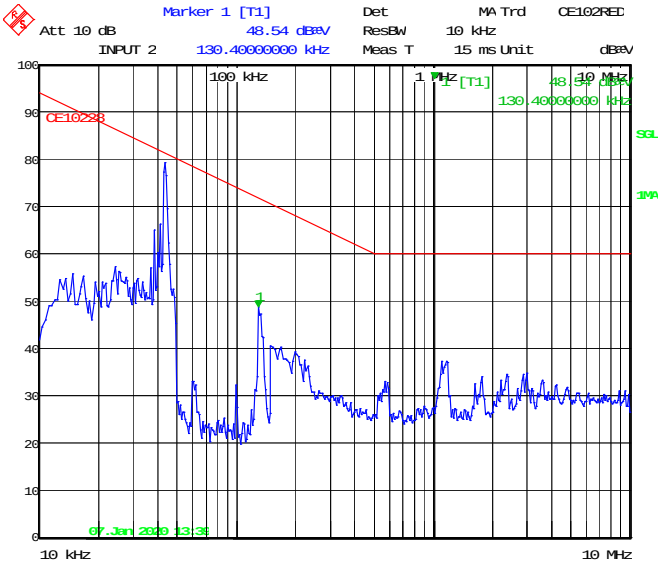
Title: Peak
Comment B: 50Vin CE102 28Vout RED 0L
Date: 7.JAN.2020 14:45:14

Figure 9: Vin 50V, Vout 28V, Load 0%, Cout 220uF



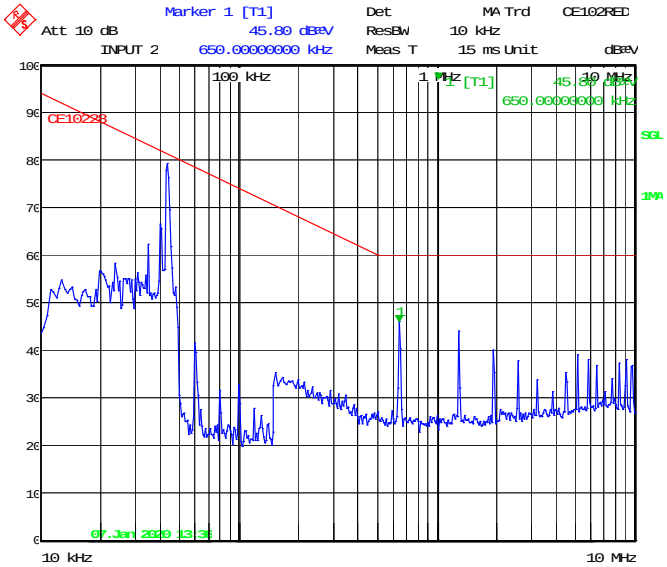
Title: Peak
Comment B: 50Vin CE102 28Vout RED 100L
Date: 7.JAN.2020 14:43:29

Figure 10: Vin 50V, Vout 28V, Load 100%, Cout 220uF



Title: Peak
Comment B: 50Vin CE102 28Vout RED 0L
Date: 7.JAN.2020 13:39:37

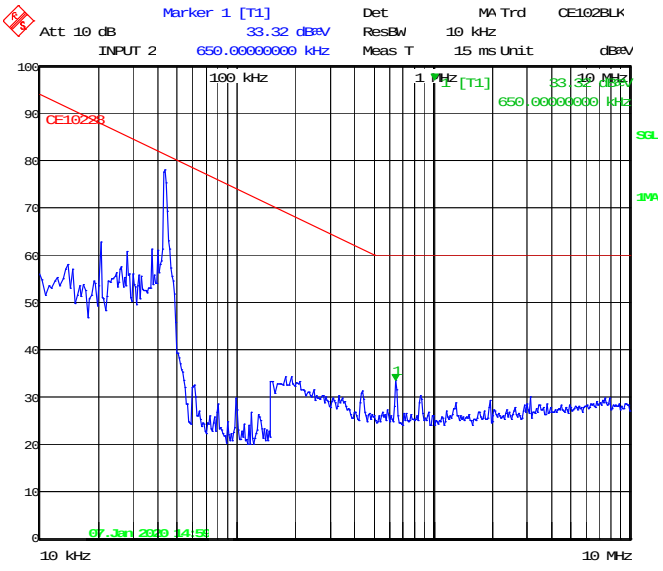
Figure 11: Vin 50V, Vout 28V, Load 0%, Cout 2200uF



Title: Peak
Comment B: 50Vin CE102 28Vout RED 100L
Date: 7.JAN.2020 13:36:10

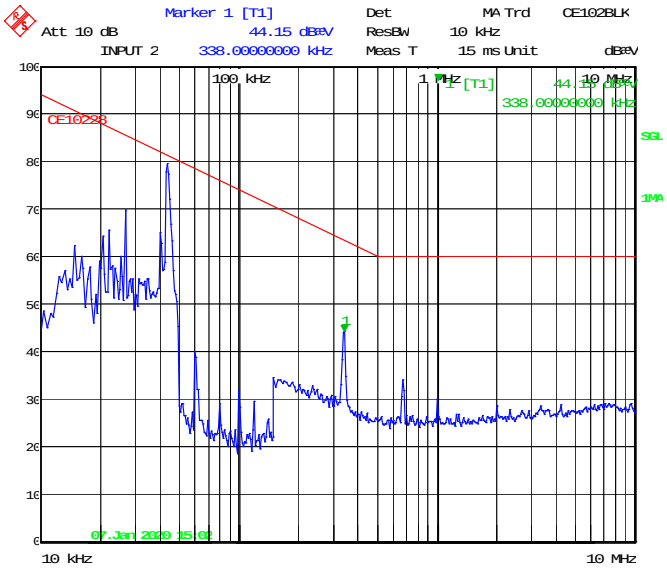
Figure 12: Vin 50V, Vout 28V, Load 100%, Cout 2200uF

CE102 Test Results: BLACK LEAD



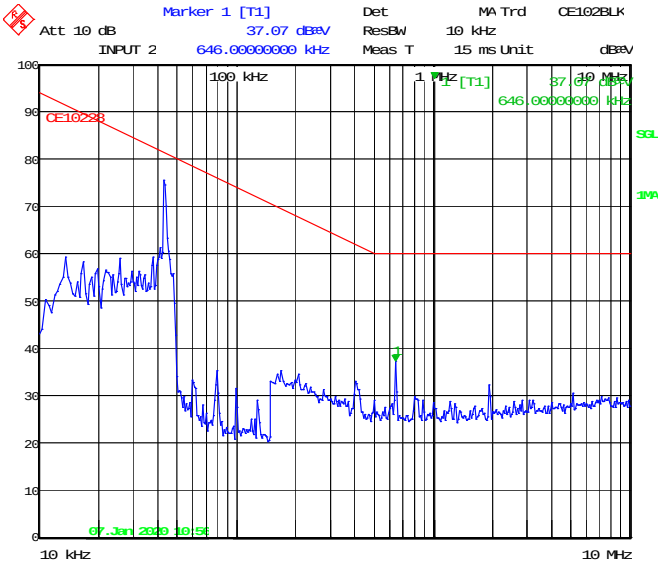
Title: Peak
Comment B: 9Vin CE102 28Vout BLK 0L
Date: 7.JAN.2020 14:59:30

Figure 13: Vin 9V, Vout 28V, Load 0%, Cout 220uF



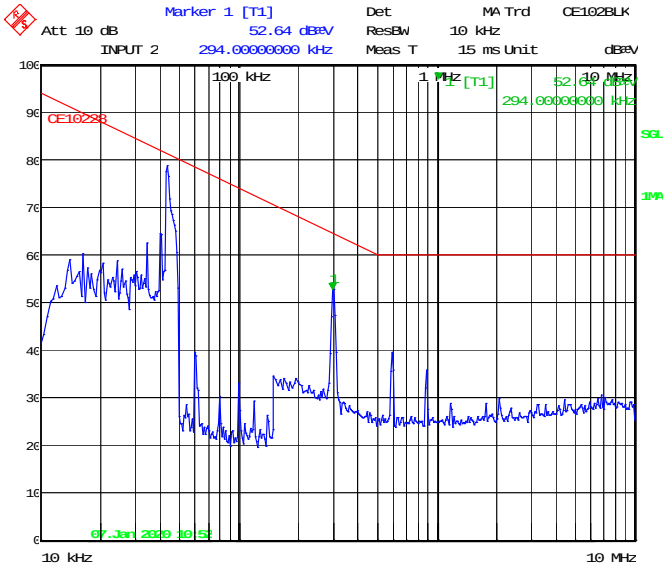
Title: Peak
Comment B: 9Vin CE102 28Vout BLK 100L
Date: 7.JAN.2020 15:02:37

Figure 14: Vin 9V, Vout 28V, Load 100%, Cout 220uF



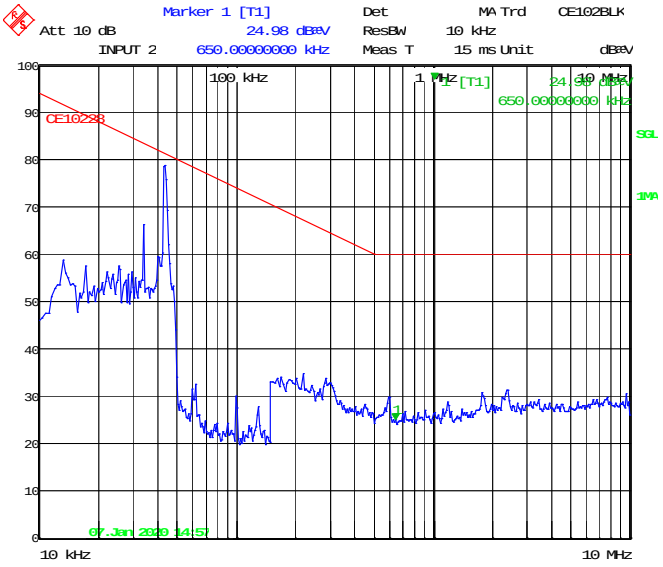
Title: Peak
Comment B: 9Vin CE102 28Vout BLK 0L
Date: 7.JAN.2020 10:56:13

Figure 15: Vin 9V, Vout 28V, Load 0%, Cout 2200uF



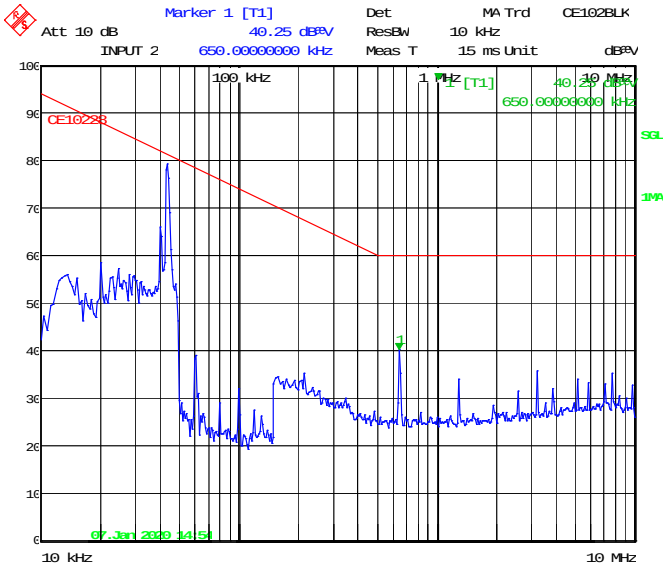
Title: Peak
Comment B: 9Vin CE102 28Vout BLK 100L
Date: 7.JAN.2020 10:52:15

Figure 16: Vin 9V, Vout 28V, Load 100%, Cout 2200uF



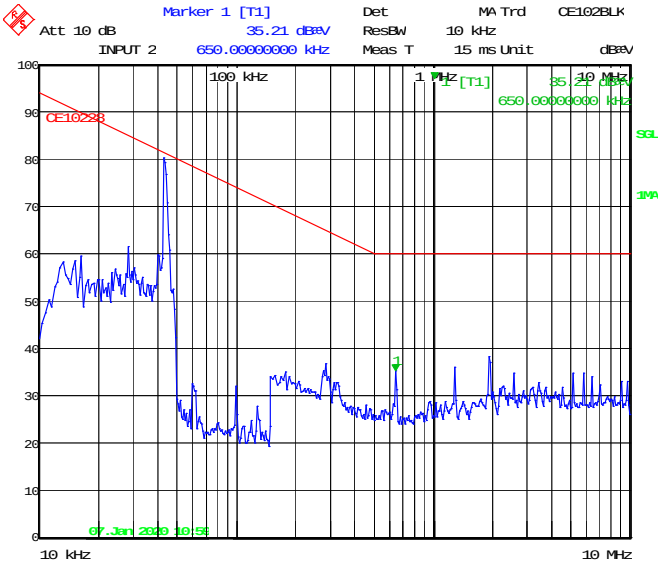
Title: Peak
Comment B: 30Vin CE102 28Vout BLK 0L
Date: 7.JAN.2020 14:57:43

Figure 17: Vin 30V, Vout 28V, Load 0%, Cout 220uF



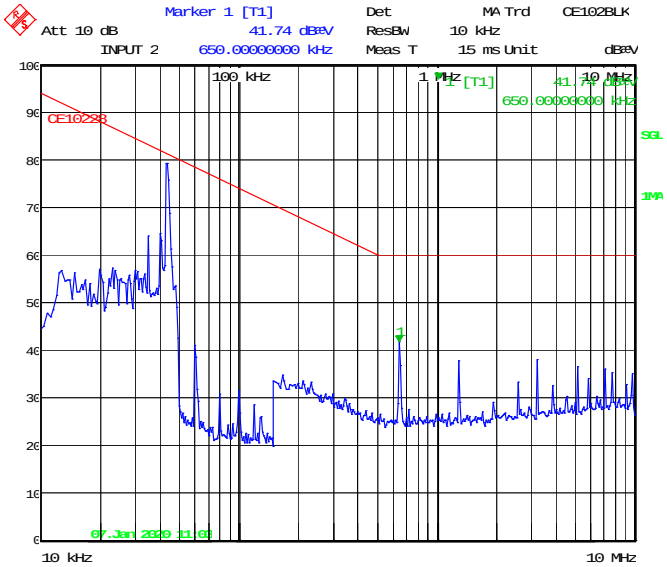
Title: Peak
Comment B: 30Vin CE102 28Vout BLK 100L
Date: 7.JAN.2020 14:54:34

Figure 18: Vin 30V, Vout 28V, Load 100%, Cout 220uF



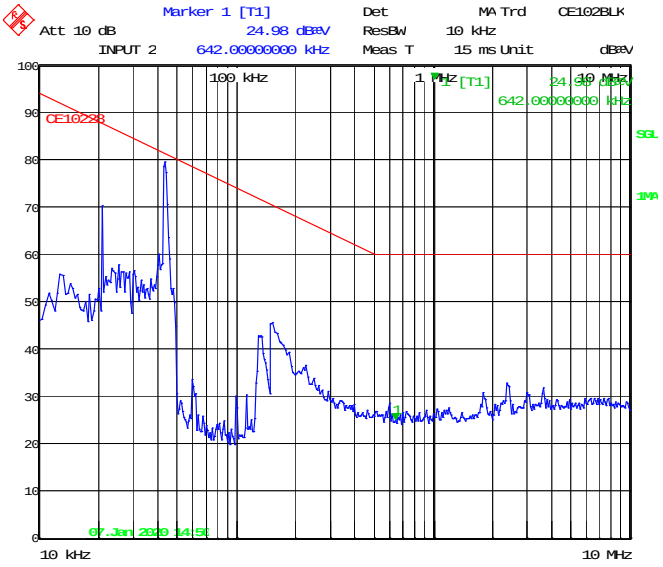
Title: Peak
Comment B: 30Vin CE102 28Vout BLK 0L
Date: 7.JAN.2020 10:59:23

Figure 19: Vin 30V, Vout 28V, Load 0%, Cout 2200uF



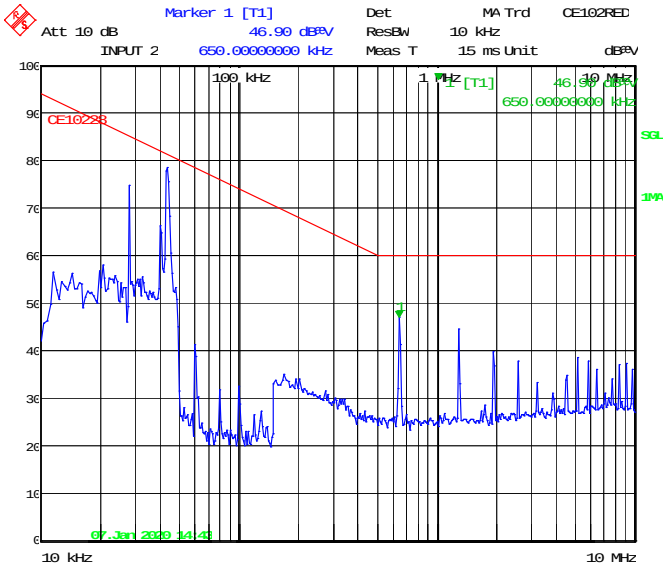
Title: Peak
Comment B: 30Vin CE102 28Vout BLK 100L
Date: 7.JAN.2020 11:03:07

Figure 20: Vin 30V, Vout 28V, Load 100%, Cout 2200uF



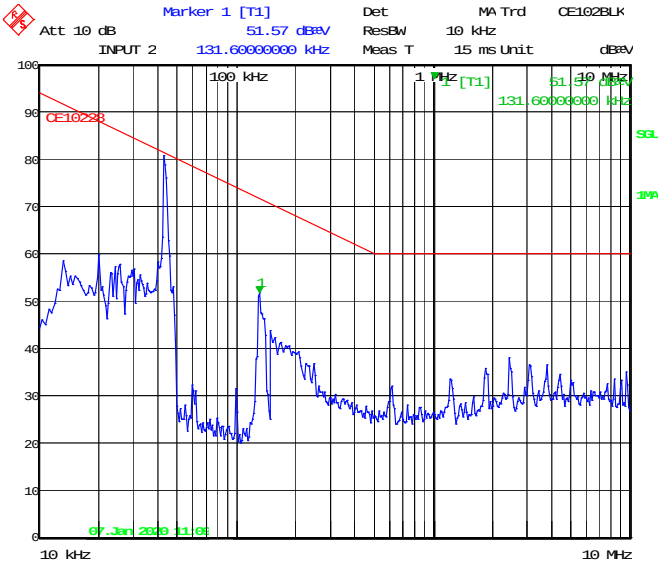
Title: Peak
Comment B: 50Vin CE102 28Vout BLK 0L
Date: 7.JAN.2020 14:50:38

Figure 21: Vin 50V, Vout 28V, Load 0%, Cout 220uF



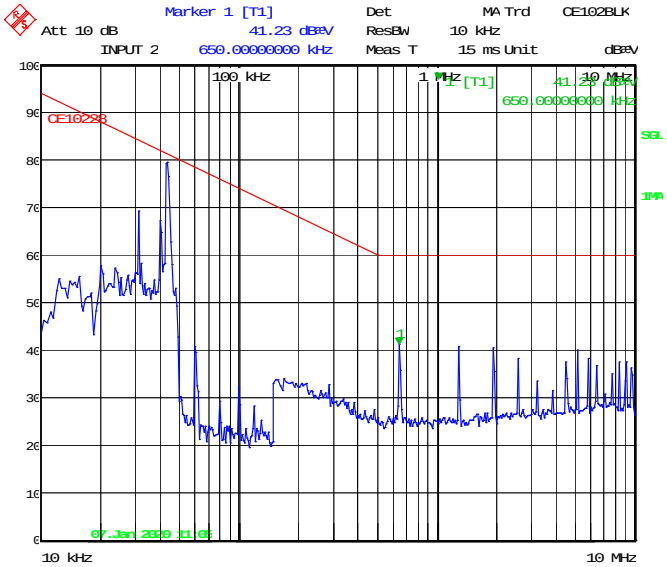
Title: Peak
Comment B: 50Vin CE102 28Vout RED 100L
Date: 7.JAN.2020 14:43:29

Figure 22: Vin 50V, Vout 28V, Load 100%, Cout 220uF



Title: Peak
Comment B: 50Vin CE102 28Vout BLK 0L
Date: 7.JAN.2020 11:09:40

Figure 23: Vin 50V, Vout 28V, Load 0%, Cout 2200uF



Title: Peak
Comment B: 50Vin CE102 28Vout BLK 100L
Date: 7.JAN.2020 11:05:39

Figure 24: Vin 50V, Vout 28V, Load 100%, Cout 2200uF