CUS1000M

EVALUATION DATA

TDK-Lambda

CA936-53-01

INDEX

2. Characteristics PAGE

Terminology used

	Definition	
Vin	.....	Input voltage
Vout	.....	Output voltage
Iin	.....	Input current
Iout	.....	Output current
Ta	.....	Ambient temperature
f	.....	Frequency
PG	.....	Power good signal
Vstb	.....	Output voltage of standby
Istb	.....	Output current of standby

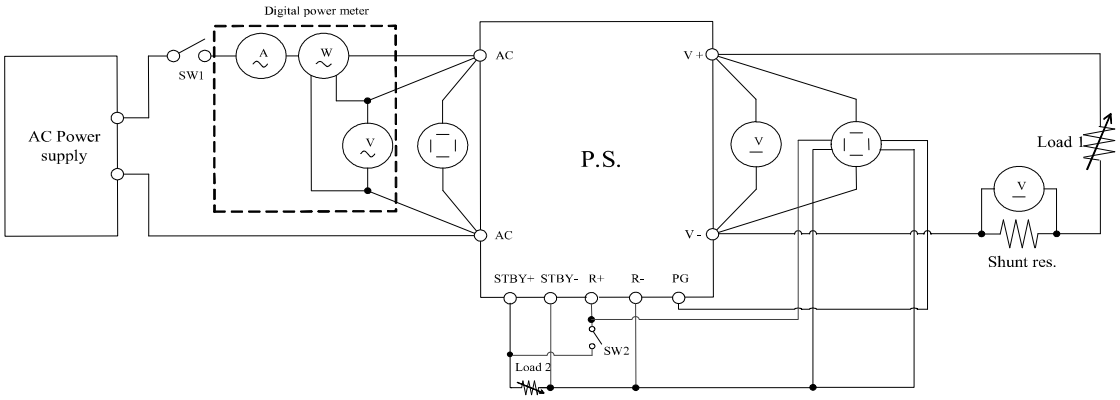
※ Test results are reference data based on our measurement condition.

1. Evaluation Method

1-1. Circuit used for determination

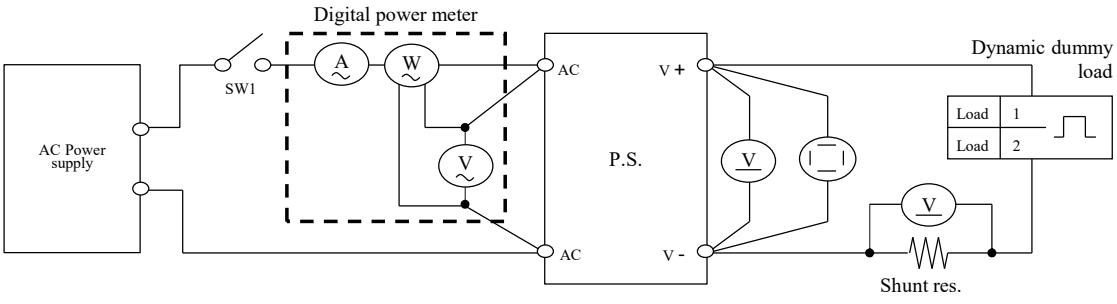
Circuit 1 used for determination

- Steady state data
- Warm up voltage drift characteristics
- Hold up time characteristics
- Output rise characteristics
- Output fall characteristics
- Over current protection (OCP) characteristics
- Over voltage protection (OVP) characteristics
- Response to brown out characteristics
- Various signal

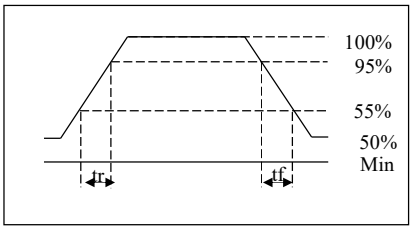


Circuit 2 used for determination

- Dynamic load response characteristics

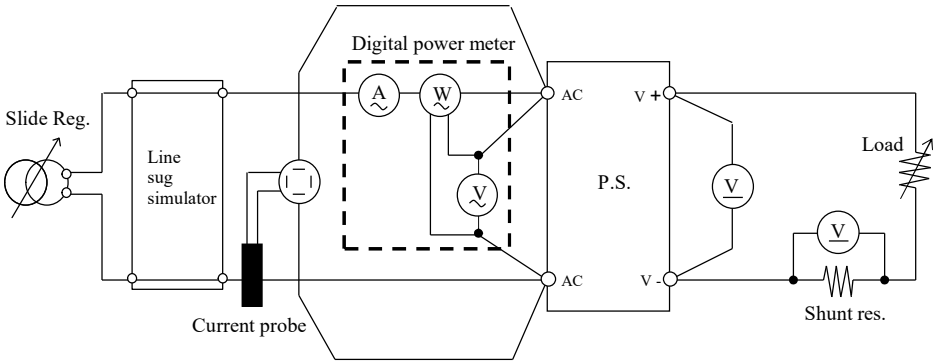


Output current waveform
Iout 50% <==> 100%



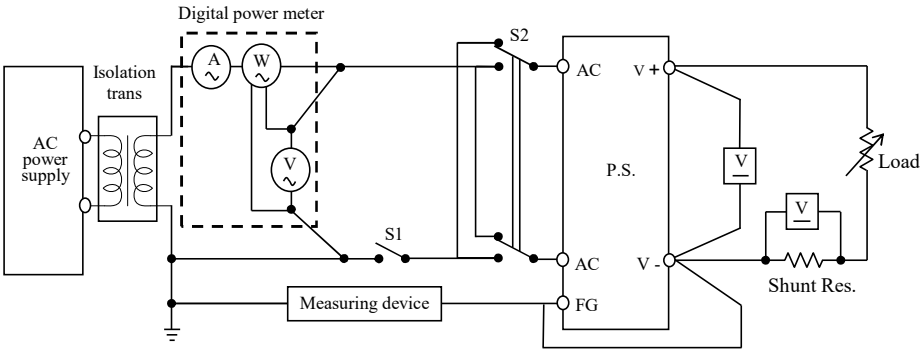
Circuit 3 used for determination

・Inrush current waveform



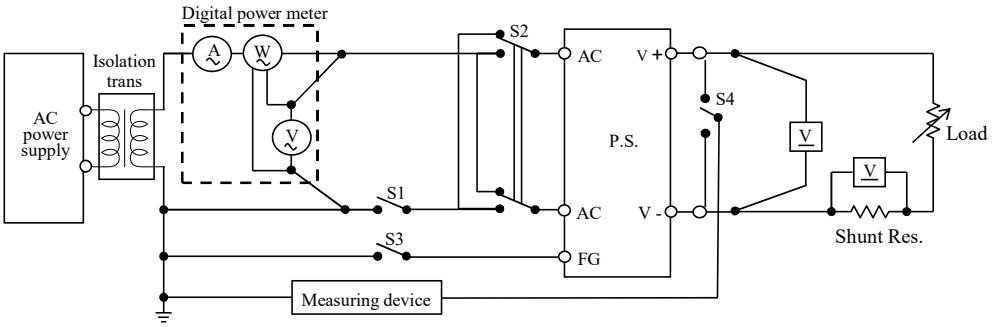
Circuit 4 used for determination

・Earth leakage current characteristics



Measure in all possible combination of position of S2 with :
S1 closed (normal condition), and S1 open (single fault condition)

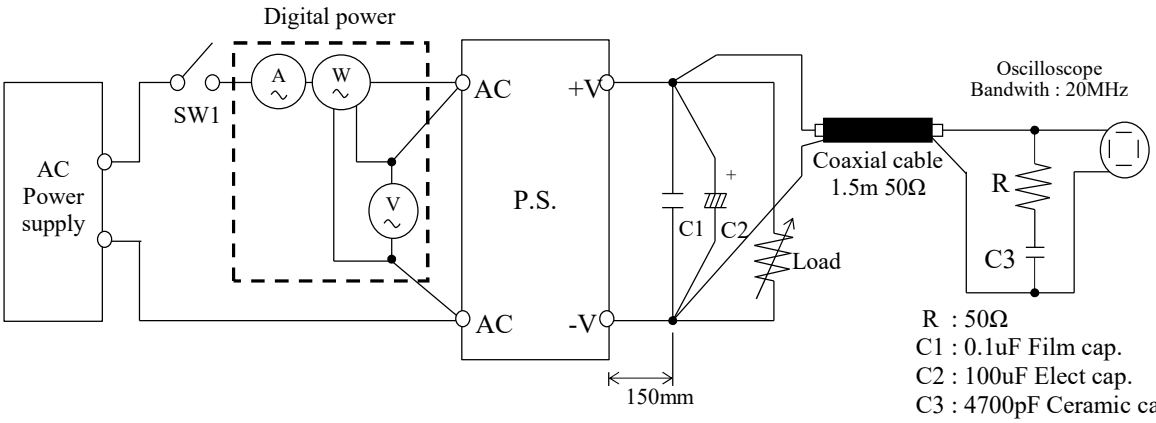
・Patient leakage current



CLASS I equipment:
S1, S3 closed, measure under all possible position of S2 & S4.
Single fault condition: S1 open with S3 close or S1 close with S3 open.

Circuit 5 used for determination

・Output ripple and noise waveform

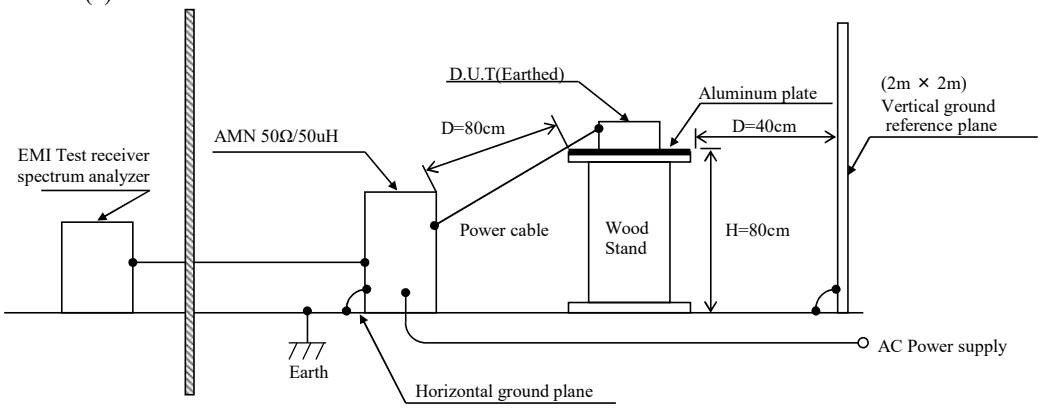


R : 50Ω
C1 : 0.1uF Film cap.
C2 : 100uF Elect cap.
C3 : 4700pF Ceramic cap.

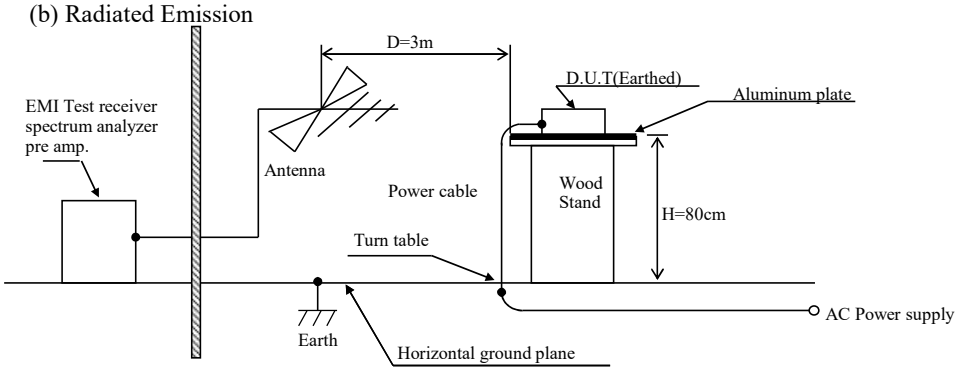
Configuration used for determination

・Electro-Magnetic Interference characteristics

(a) Conducted Emission



(b) Radiated Emission



1-2. List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DLM2054
2	DIGITAL MULTIMETER	KEYSIGHT	34970A
3	DIGITAL POWER METER	YOKOGAWA ELECT.	WT310
4	CURRENT PROBE	YOKOGAWA ELECT.	701930
5	POWER SUPPLY	YOKOGAWA ELECT.	701934
6	DYNAMIC DUMMY LOAD	CHROMA	63030/63203A/63640
7	AC SOURCE	KIKUSUI	PCR4000LE
8	EARTH LEAKAGE CURRENT METER	SIMPSON	228
9	PATIENT LEAKAGE CURRENT METER	SIQ	SIQ16042
10	CONTROLLED TEMP. CHAMBER	TABAI-ESPEC	SH-662
11	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESR3
12	LISN	ROHDE & SCHWARZ	ENV216
13	BROADBAND ANTENNA	SCHWARZBECK	VULB9163
14	LINE SUG SIMULATOR	TAKAMISAWA	PSA-210

1-3. Load conditions

Vin	Iout	12V	24V	36V	48V
85 - 265VAC	50%	33.35A	20.85A	13.9A	10.45A
85VAC	90%	60.03A	37.53A	25.02A	18.81A
90 - 265VAC	100%	66.7A	41.7A	27.8A	20.9A
85 - 265VAC	50%Peak	41.7A	20.85A	13.9A	10.45A
85 - 265VAC	Peak	83.4A	41.7A	27.8A	20.9A

*Vstb=5V, Istb=2A(100%)

2. Characteristics

2-1. Steady state data

(1) Regulation - line and load, Temperature drift / Start up voltage and Drop out voltage

12V

1. Regulation - line and load

Condition Ta : 25 °C
Iout : 100 % (66.7A)
Istb : 0 %

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	Line regulation	
0%	12.034V	12.033V	12.033V	12.032V	2mV	0.017%
50%	12.018V	12.015V	12.016V	12.015V	3mV	0.025%
100%	-	12.003V	12.001V	12.001V	2mV	0.017%
Peak	-	11.998V	11.997V	11.998V	1mV	0.008%
Load regulation	16mV	35mV	36mV	34mV		
	0.133%	0.292%	0.300%	0.283%		

2. Temperature drift

Condition Vin : 115 VAC
Iout : 100 % (66.7A)
Istb : 0 %

Ta	-20°C	+25°C	+40°C	Temperature stability	
Vout	11.986V	11.995V	11.999V	13mV	0.108%

3. Start up voltage and Drop out voltage

Condition Ta : 25 °C
Iout : Peak (83.4A)
Istb : 0 %

Start up voltage (Vin)	79.2VAC
Drop out voltage (Vin)	77.8VAC

24V

1. Regulation - line and load

Condition Ta : 25 °C
Iout : 100 % (41.7A)
Istb : 0 %

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	Line regulation	
0%	23.996V	23.995V	23.995V	23.995V	1mV	0.004%
50%	23.978V	23.978V	23.979V	23.976V	3mV	0.013%
100%	-	23.961V	23.964V	23.959V	5mV	0.021%
Load regulation	18mV	34mV	31mV	36mV		
	0.075%	0.142%	0.129%	0.150%		

2. Temperature drift

Condition Vin : 115 VAC
Iout : 100 % (41.7A)
Istb : 0 %

Ta	-20°C	+25°C	+40°C	Temperature stability	
Vout	23.964V	23.965V	23.965V	1mV	0.004%

3. Start up voltage and Drop out voltage

Condition Ta : 25 °C
Iout : 100 % (41.7A)
Istb : 0 %

Start up voltage (Vin)	79.2VAC
Drop out voltage (Vin)	77.8VAC

(1) Regulation - line and load, Temperature drift / Start up voltage and Drop out voltage

36V 1. Regulation - line and load

Condition Ta : 25 °C
Iout : 100 % (27.8A)
Istb : 0 %

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	Line regulation	
0%	36.019V	36.018V	36.021V	36.022V	4mV	0.011%
50%	36.004V	36.002V	36.005V	36.004V	3mV	0.008%
100%	-	35.992V	35.995V	35.995V	3mV	0.008%
Load regulation	15mV	26mV	26mV	27mV		
	0.042%	0.072%	0.072%	0.075%		

2. Temperature drift

Condition Vin : 115 VAC
Iout : 100 % (27.8A)
Istb : 0 %

Ta	-20°C	+25°C	+40°C	Temperature stability	
Vout	35.957V	35.983V	35.983V	26mV	0.072%

3. Start up voltage and Drop out voltage

Condition Ta : 25 °C
Iout : 100 % (27.8A)
Istb : 0 %

Start up voltage (Vin)	79.2VAC
Drop out voltage (Vin)	77.8VAC

48V 1. Regulation - line and load

Condition Ta : 25 °C
Iout : 100 % (20.9A)
Istb : 0 %

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	Line regulation	
0%	48.050V	48.055V	48.050V	48.050V	5mV	0.010%
50%	48.026V	48.034V	48.023V	48.024V	11mV	0.023%
100%	-	48.028V	48.015V	48.016V	13mV	0.027%
Load regulation	24mV	27mV	35mV	34mV		
	0.050%	0.056%	0.073%	0.071%		

2. Temperature drift

Condition Vin : 115 VAC
Iout : 100 % (20.9A)
Istb : 0 %

Ta	-20°C	+25°C	+40°C	Temperature stability	
Vout	47.975V	48.019V	48.023V	48mV	0.100%

3. Start up voltage and Drop out voltage

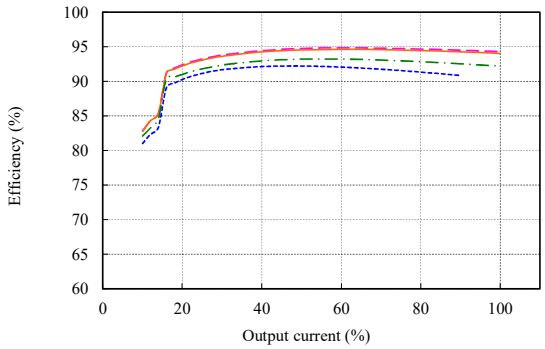
Condition Ta : 25 °C
Iout : 100 % (20.9A)
Istb : 0 %

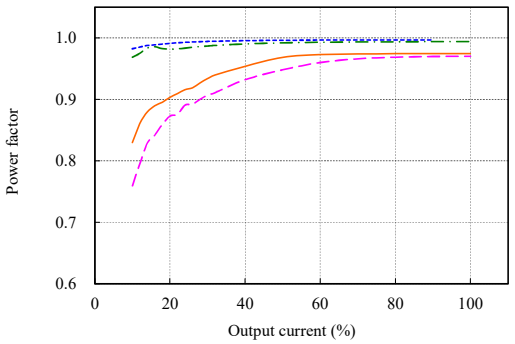
Start up voltage (Vin)	79.2VAC
Drop out voltage (Vin)	77.8VAC

(2) Efficiency and Power factor vs. Output current

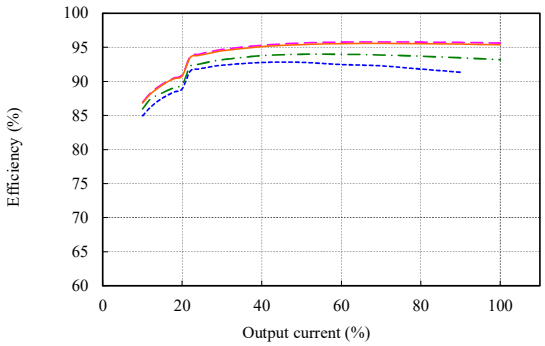
Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 °C
Istb : 0 %

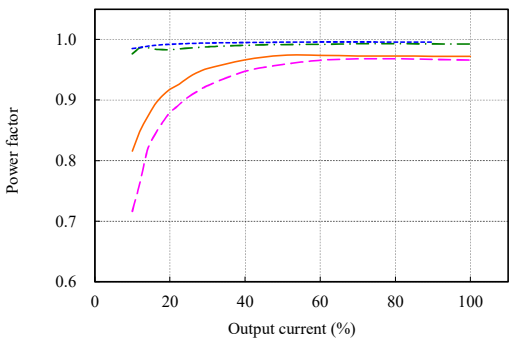
12V



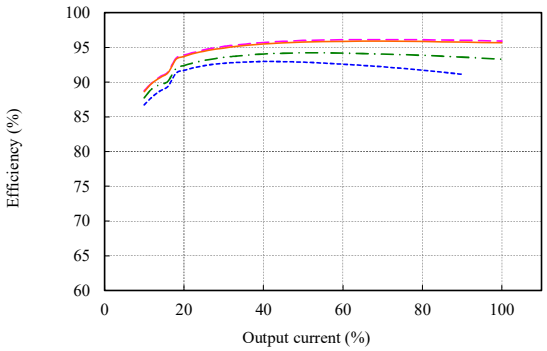


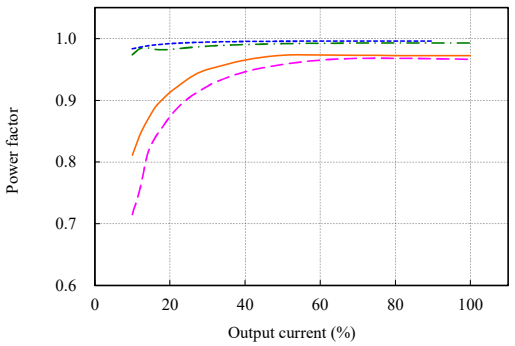
24V



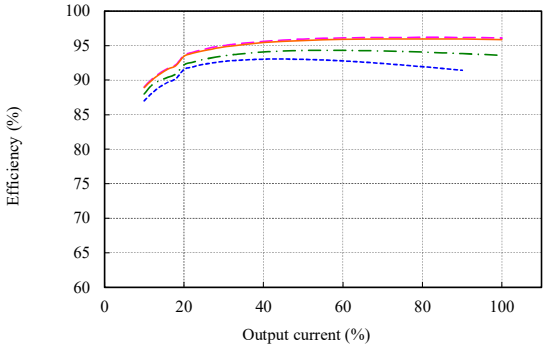


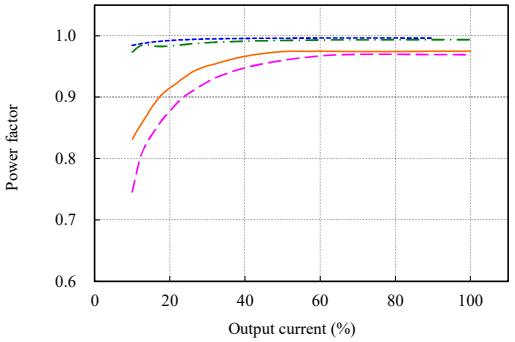
36V





48V



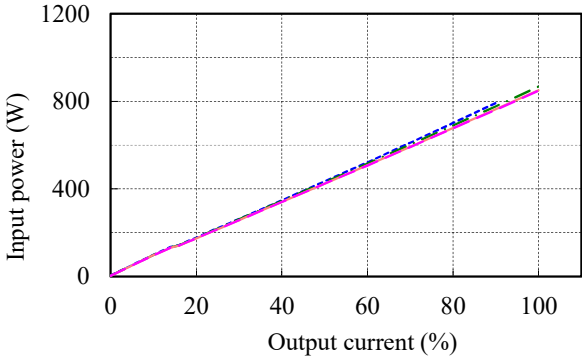


(3) Input power vs. Output current

Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 °C
Istb : 0 %

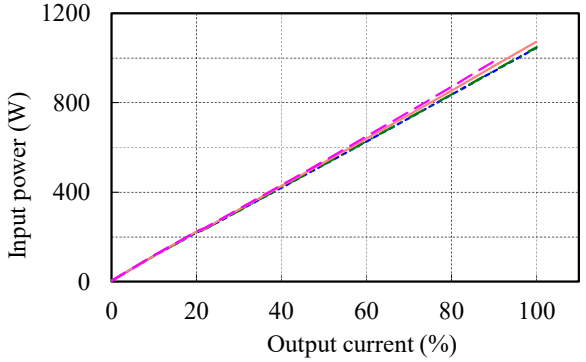
12V

Vin	Input power	
	Iout : 0%	Remote OFF
85VAC	4.2W	0.30W
115VAC	3.8W	0.34W
230VAC	2.9W	0.60W
265VAC	2.8W	0.71W



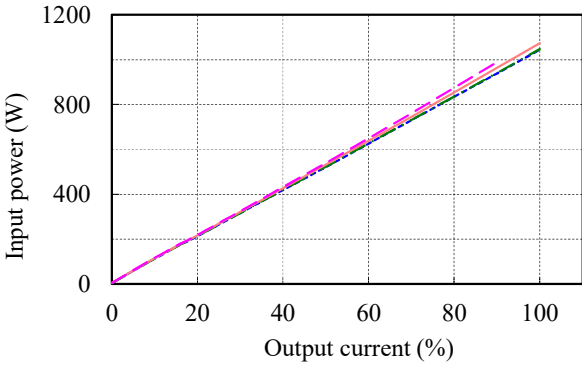
24V

Vin	Input power	
	Iout : 0%	Remote OFF
85VAC	4.3W	0.30W
115VAC	4.1W	0.34W
230VAC	3.1W	0.60W
265VAC	3.1W	0.71W



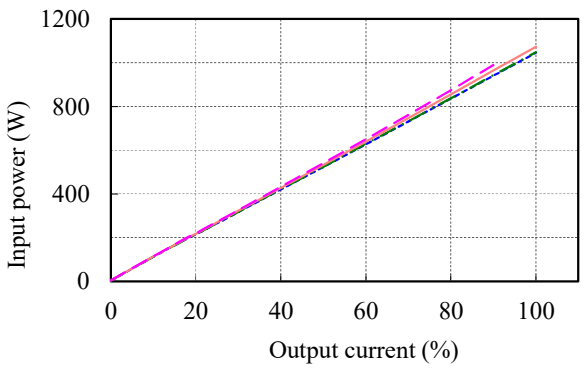
36V

Vin	Input power	
	Iout : 0%	Remote OFF
85VAC	4.5W	0.30W
115VAC	4.1W	0.34W
230VAC	3.4W	0.60W
265VAC	3.9W	0.71W



48V

Vin	Input power	
	Iout : 0%	Remote OFF
85VAC	4.6W	0.30W
115VAC	4.2W	0.34W
230VAC	3.4W	0.60W
265VAC	3.4W	0.71W

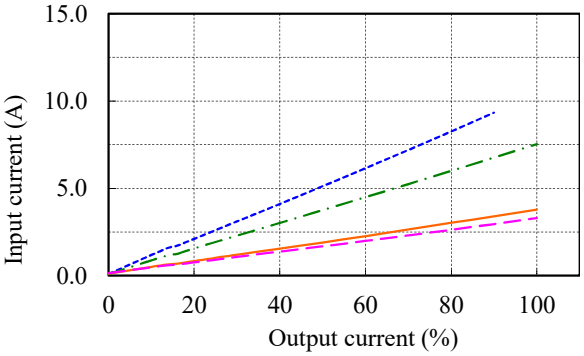


(4) Input current vs. Output current

Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 °C
Istb : 0 %

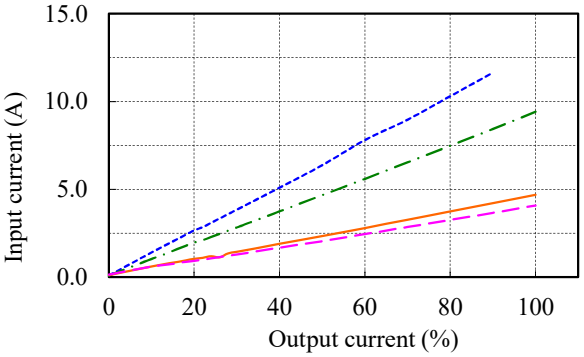
12V

Vin	Input current	
	Iout : 0%	Remote OFF
85VAC	0.09A	0.05A
115VAC	0.09A	0.07A
230VAC	0.12A	0.10A
265VAC	0.14A	0.12A



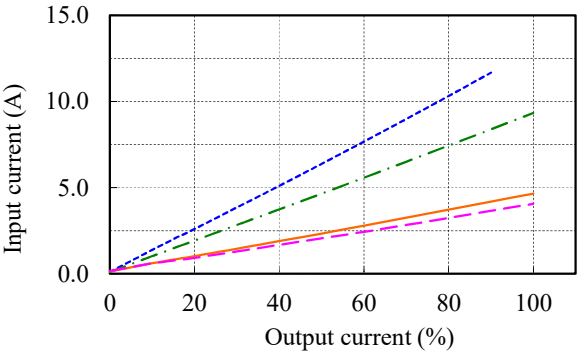
24V

Vin	Input current	
	Iout : 0%	Remote OFF
85VAC	0.10A	0.05A
115VAC	0.09A	0.07A
230VAC	0.12A	0.10A
265VAC	0.15A	0.12A



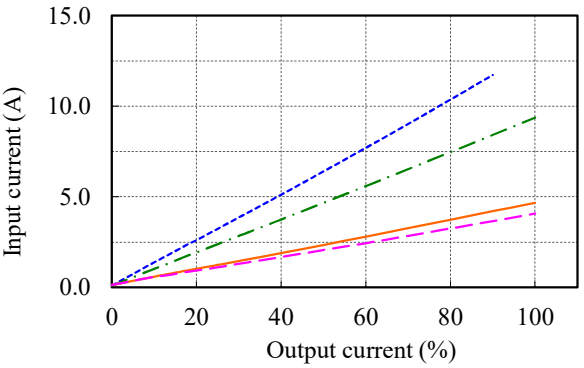
36V

Vin	Input current	
	Iout : 0%	Remote OFF
85VAC	0.10A	0.05A
115VAC	0.09A	0.07A
230VAC	0.12A	0.10A
265VAC	0.15A	0.12A



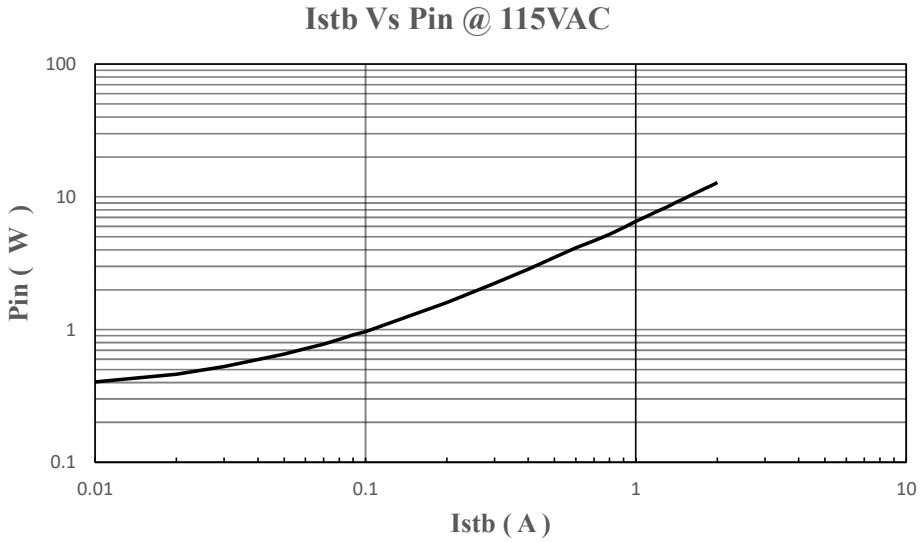
48V

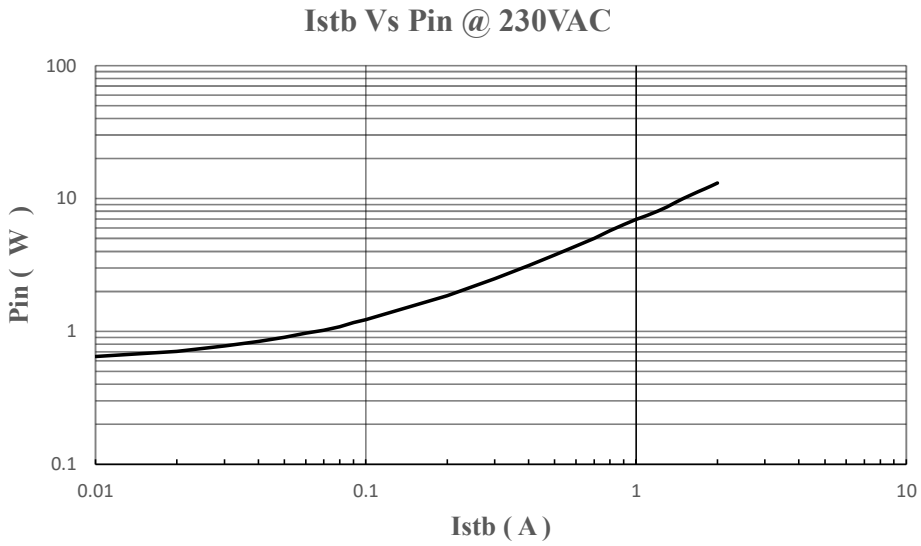
Vin	Input current	
	Iout : 0%	Remote OFF
85VAC	0.10A	0.05A
115VAC	0.09A	0.07A
230VAC	0.13A	0.10A
265VAC	0.15A	0.12A



(5) Input power vs. Output current @ Remote OFF

Condition Remote OFF

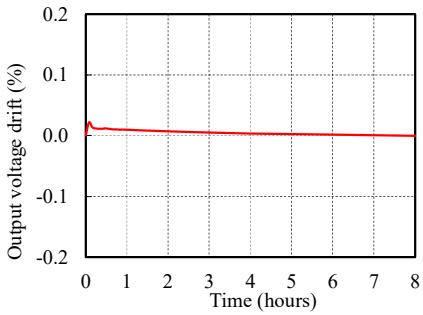




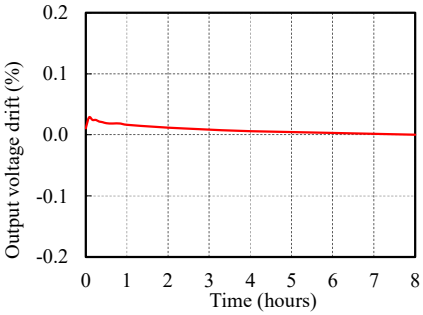
2-2. Warm up voltage drift characteristics

Conditions Vin : 115 VAC
Iout : 100 %
Ta : 25 °C
Istb : 100%

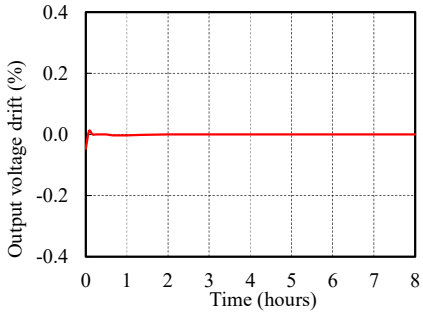
12V



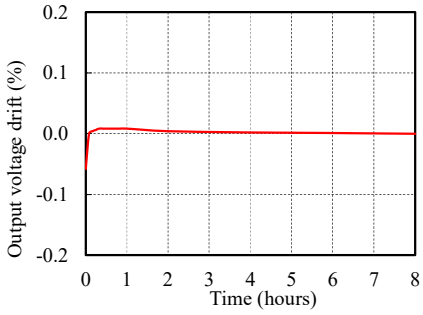
24V



36V

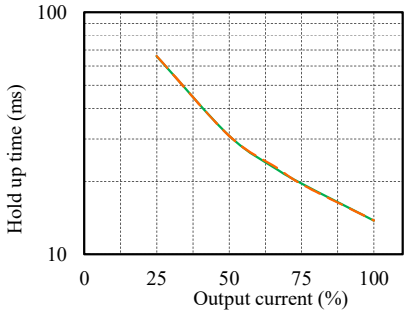


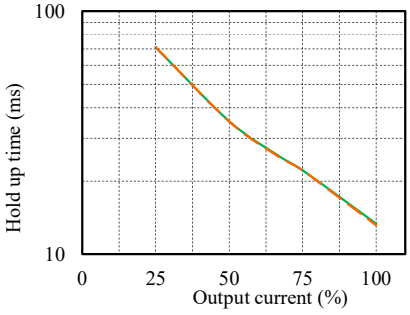
48V

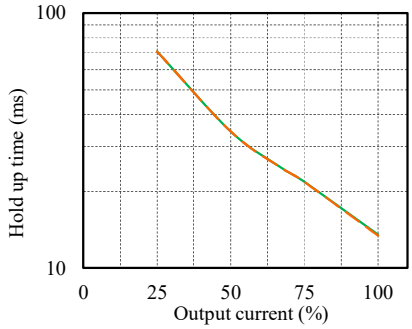


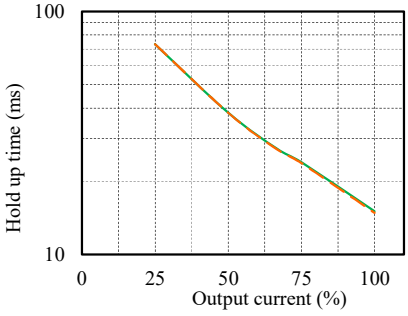
2-3. Hold up time characteristics

Conditions Vin : 115 VAC
230 VAC
Ta : 25 °C
Istb : 100%







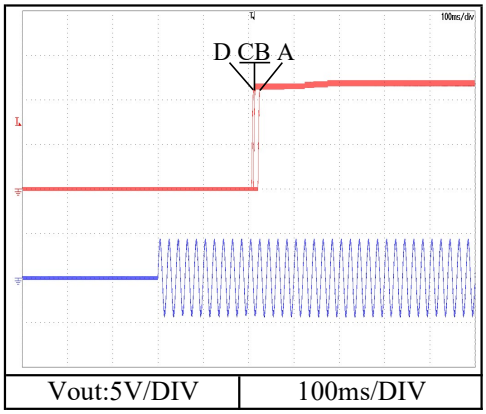


2-4. Output rise characteristics

Conditions Vin : 85 VAC (A)
115 VAC (B)
230 VAC (C)
265 VAC (D)
Istb : 100 %
Ta : 25 °C

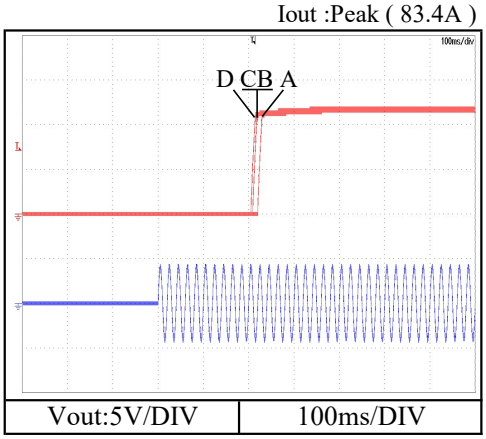
12V

Iout : 0%



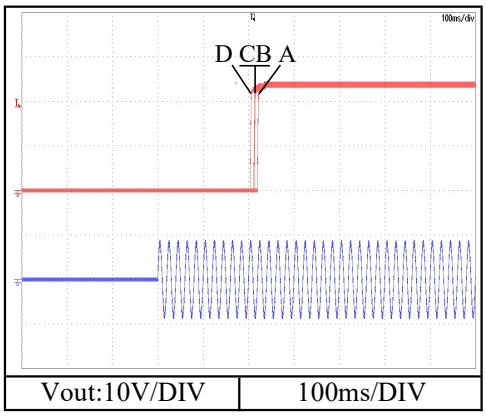
← Vout →
← 0V →
← Vin →

Iout :Peak (83.4A)



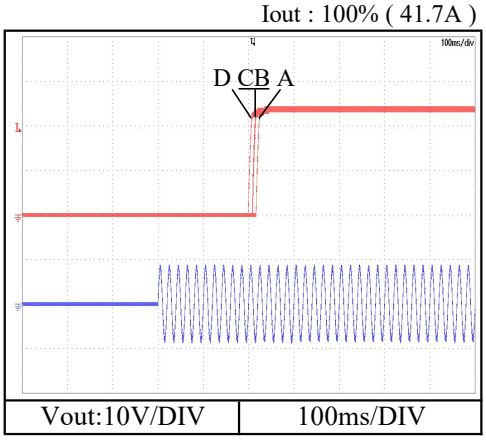
24V

Iout : 0%



← Vout →
← 0V →
← Vin →

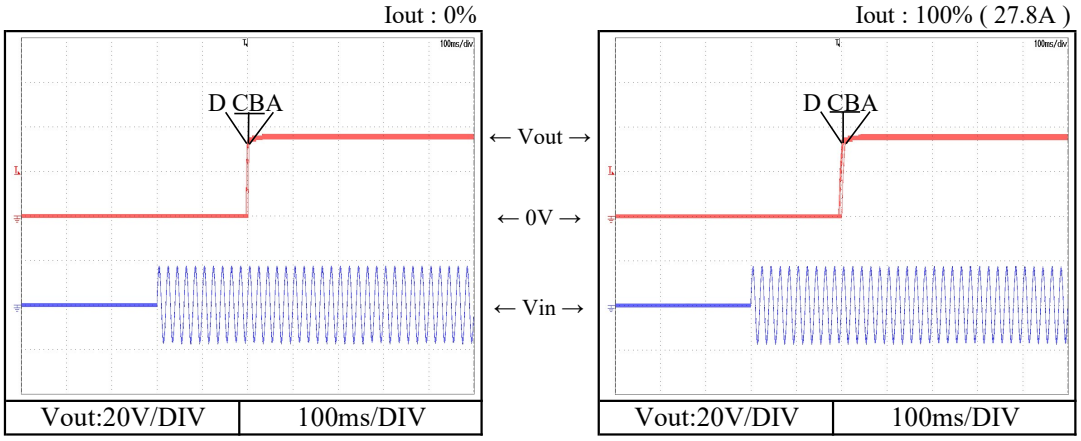
Iout : 100% (41.7A)



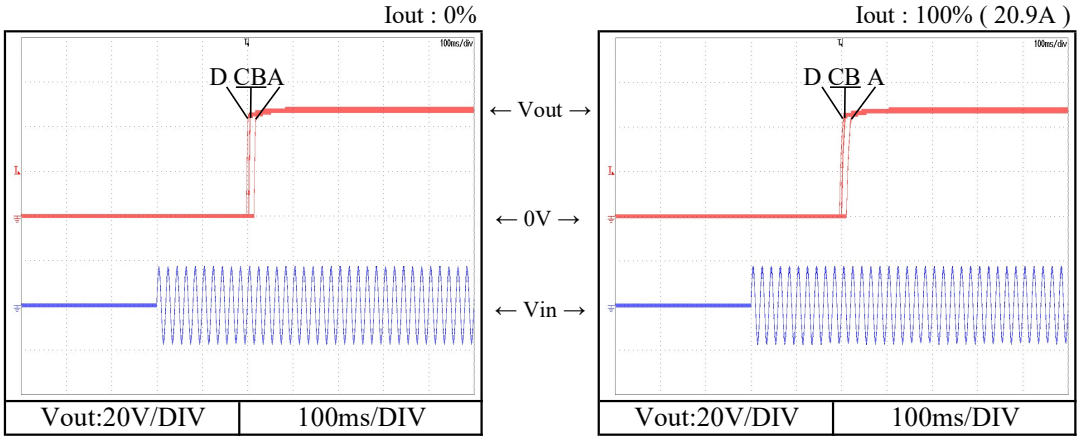
2-4. Output rise characteristics

Conditions Vin : 85 VAC (A)
115 VAC (B)
230 VAC (C)
265 VAC (D)
Istb : 100 %
Ta : 25 °C

36V



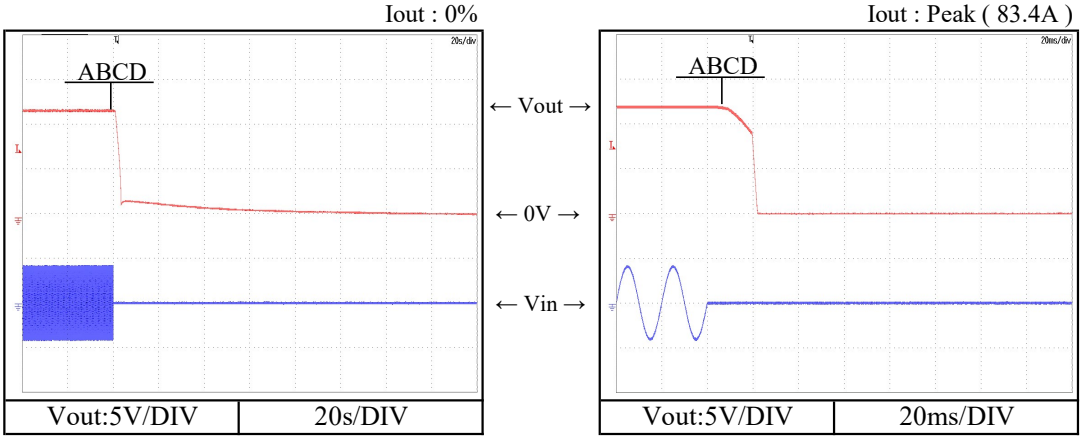
48V



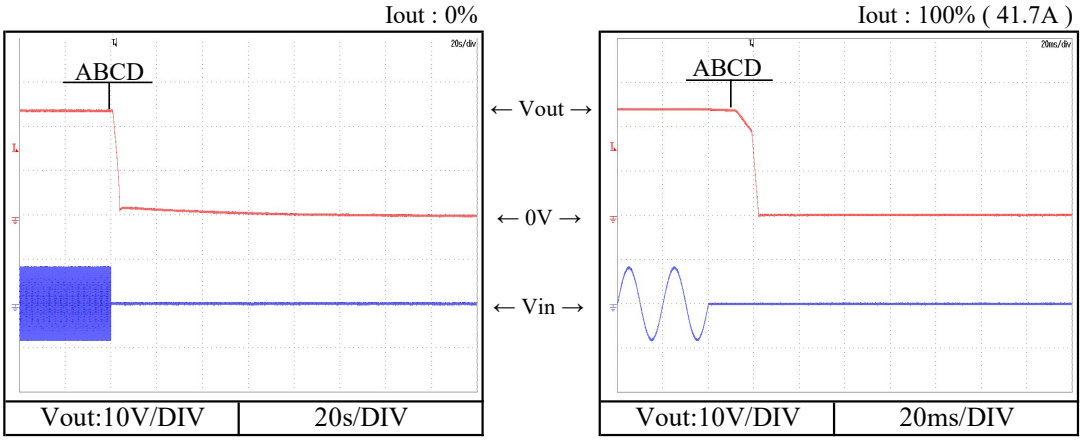
2-5. Output fall characteristics

Conditions Vin : 85 VAC (A)
115 VAC (B)
230 VAC (C)
265 VAC (D)
Istb : 100 %
Ta : 25 °C

12V



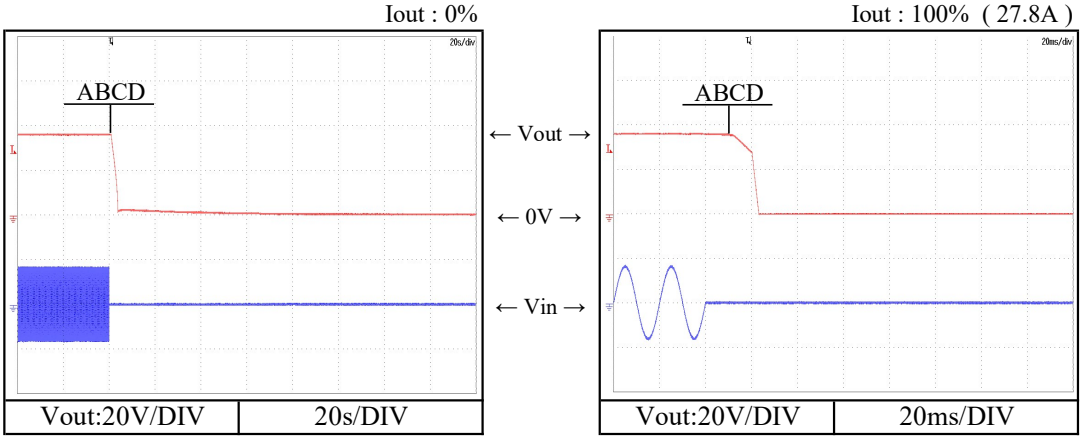
24V



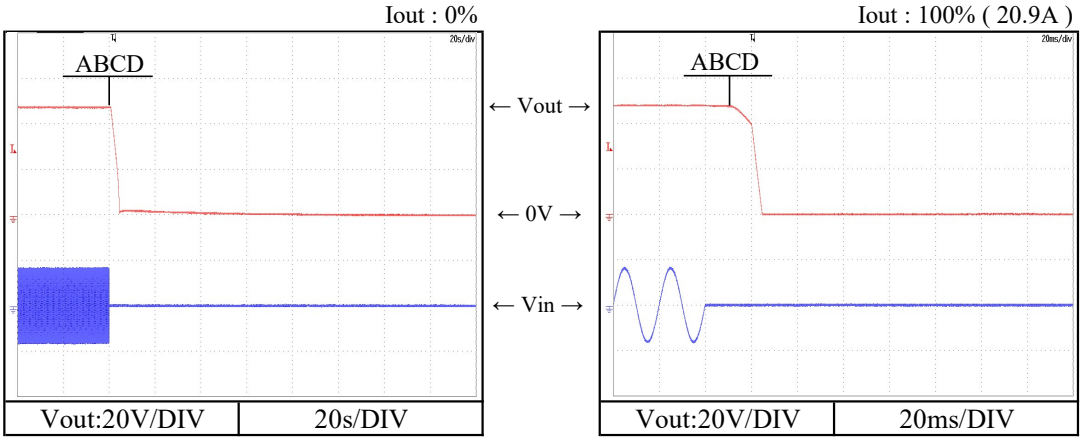
2-5. Output fall characteristics

Conditions Vin : 85 VAC (A)
115 VAC (B)
230 VAC (C)
265 VAC (D)
Istb : 100 %
Ta : 25 °C

36V



48V

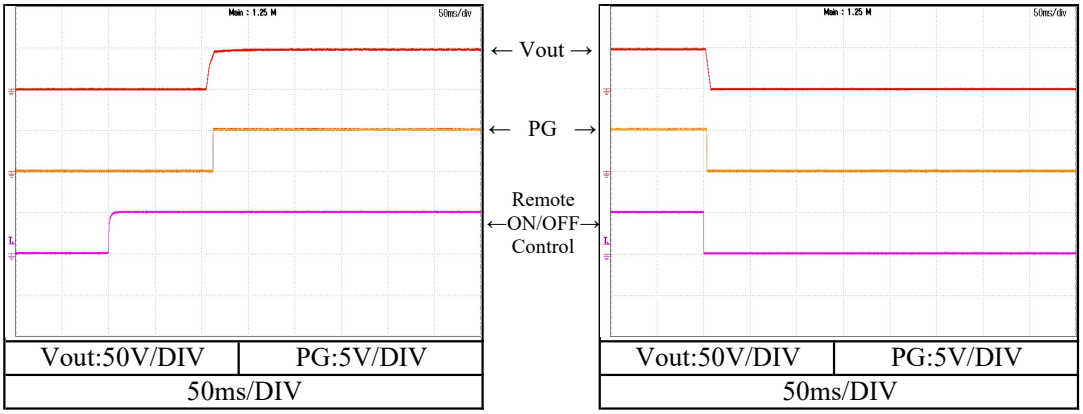


2-6. Various signal

Conditions Vin : 115 VAC
Iout : 100 %
Istb : 100 %
Ta : 25 °C

Output rise, fall characteristics with Remote ON/OFF Control

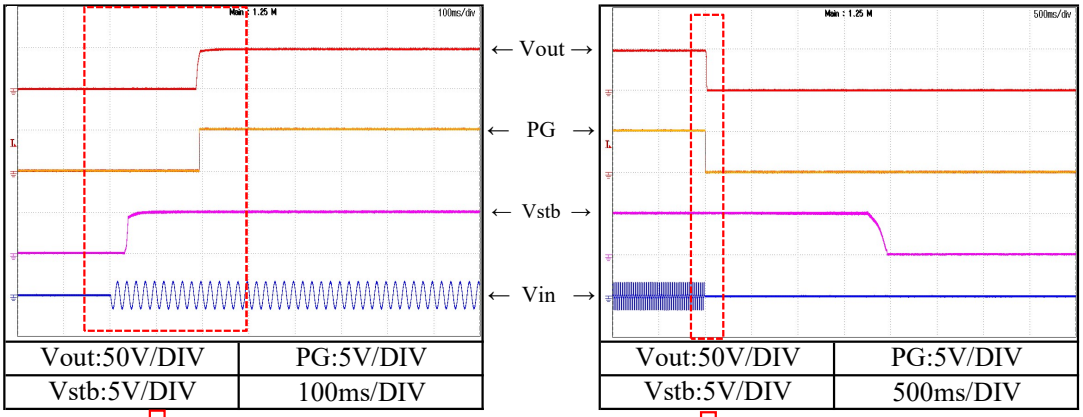
48V



Vout:50V/DIV	PG:5V/DIV
50ms/DIV	

Vout:50V/DIV	PG:5V/DIV
50ms/DIV	

Output rise, fall characteristics with Input voltage ON/OFF

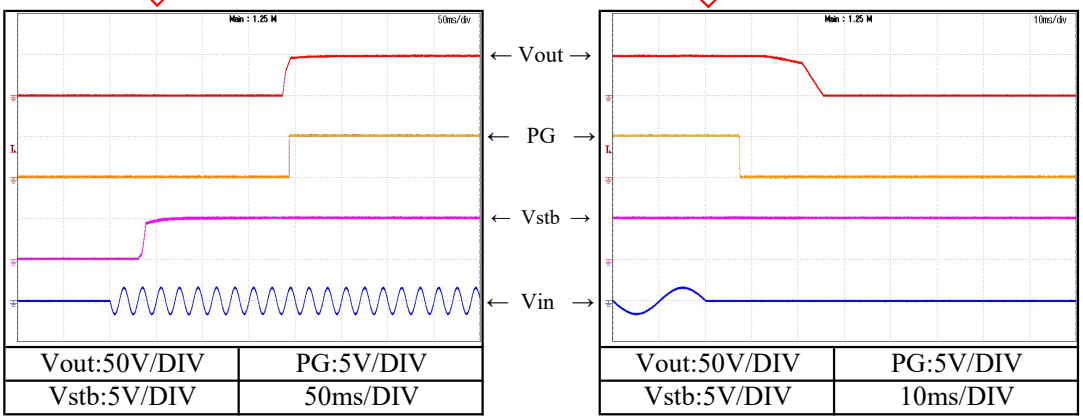


Vout:50V/DIV	PG:5V/DIV
Vstb:5V/DIV	100ms/DIV

Vout:50V/DIV	PG:5V/DIV
Vstb:5V/DIV	500ms/DIV

Zoom

Zoom



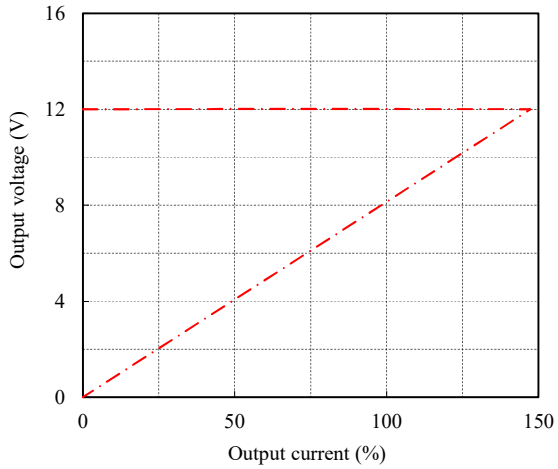
Vout:50V/DIV	PG:5V/DIV
Vstb:5V/DIV	50ms/DIV

Vout:50V/DIV	PG:5V/DIV
Vstb:5V/DIV	10ms/DIV

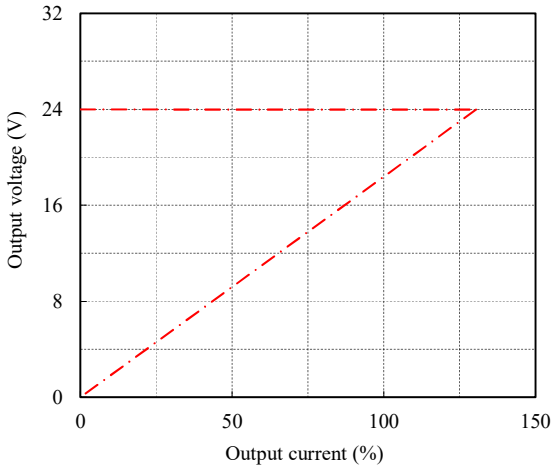
2-7. Over current protection (OCP) characteristics

Conditions Vin : 115 VAC
Istb : 100 %
Ta : 25 °C

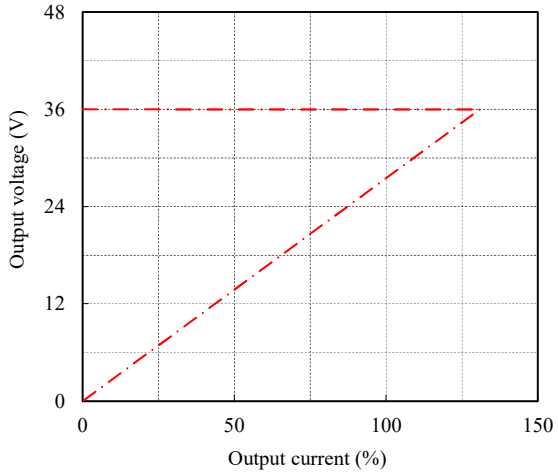
12V



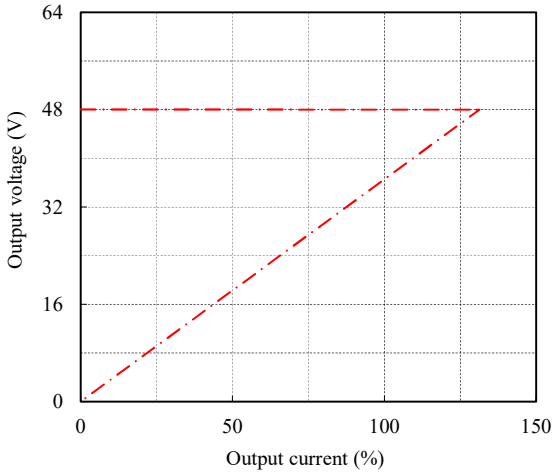
24V



36V



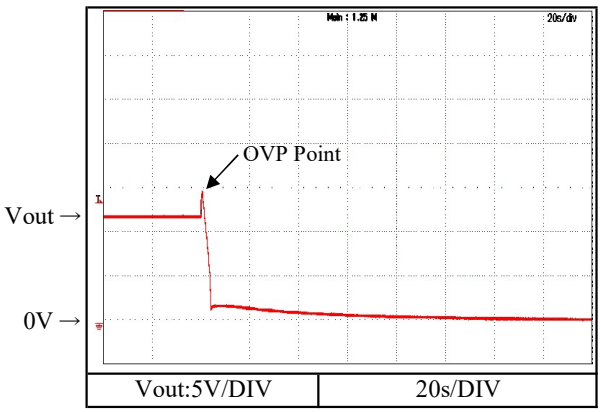
48V



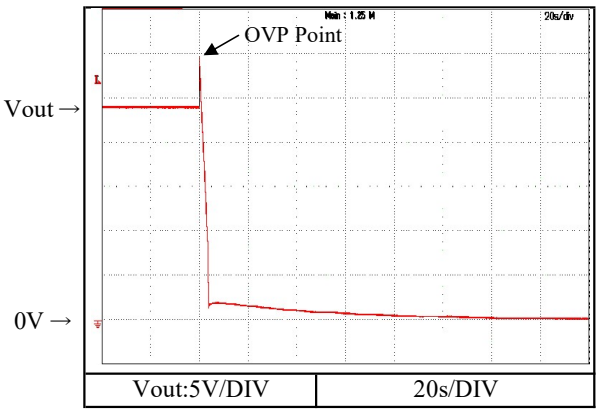
2-8. Over voltage protection (OVP) characteristics

Conditions Vin : 115 VAC
Iout : 0 %
Istb : 0 %
Ta : 25 °C

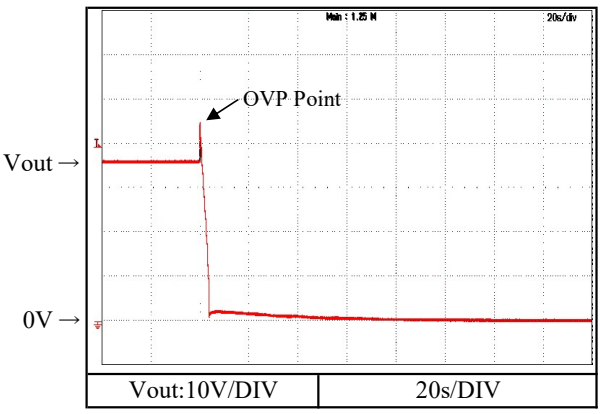
12V



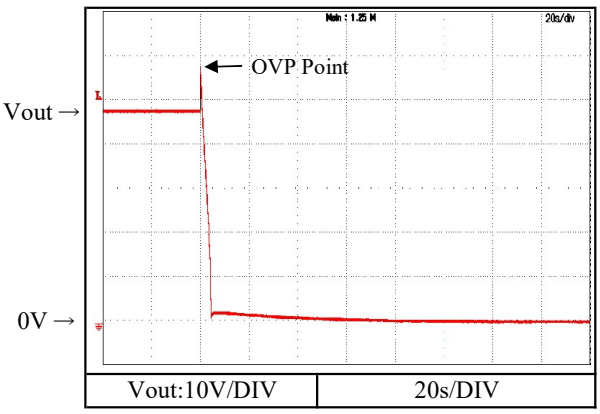
24V



36V



48V

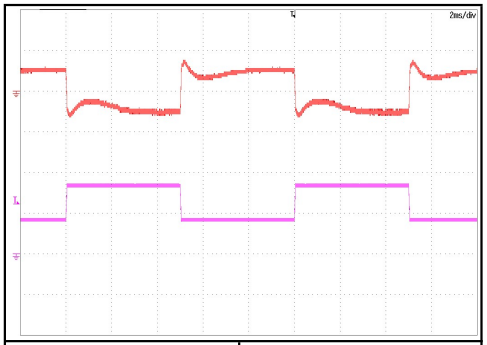


2-9. Dynamic load response characteristics

Conditions Vin : 115 VAC
Iout : 50 % ⇔ 100 % (Peak)
(tr = tf = 50us)
Istb : 100 %
Ta : 25 °C

12V

f = 100Hz

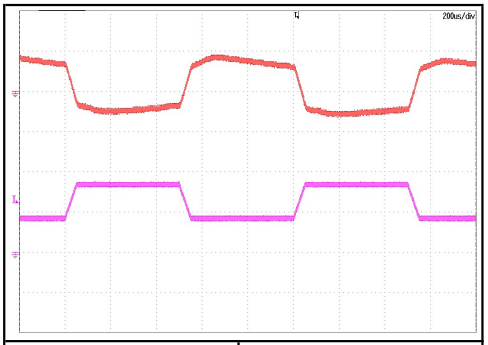


Vout:100mV/DIV	Iout:50A/DIV
2ms/DIV	
+0.63%	-0.53%

←Vout→

←Iout→
←Iout:0%→

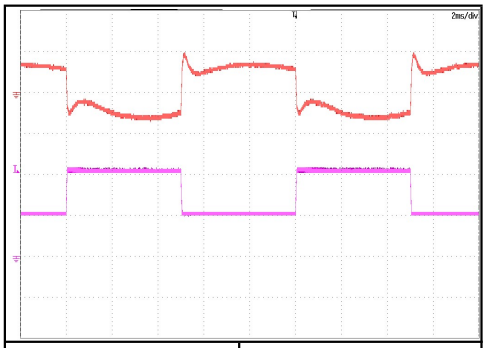
f = 1kHz



Vout:100mV/DIV	Iout:50A/DIV
200µs/DIV	
+0.76%	-0.55%

24V

f = 100Hz

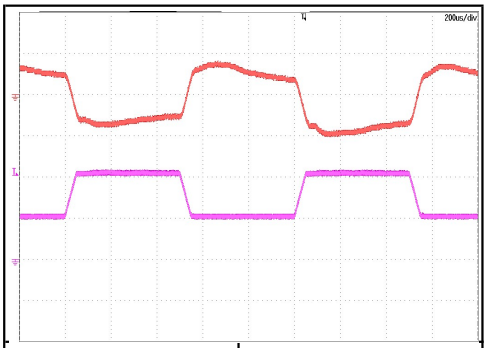


Vout:100mV/DIV	Iout:20A/DIV
2ms/DIV	
+0.40%	-0.30%

←Vout→

←Iout→
←Iout:0%→

f = 1kHz



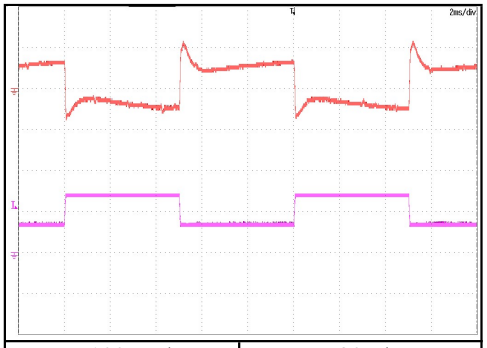
Vout:100mV/DIV	Iout:20A/DIV
200µs/DIV	
+0.34%	-0.43%

2-9. Dynamic load response characteristics

Conditions Vin : 115 VAC
Iout : 50 % ⇔ 100 %
(tr = tf = 50us)
Istb : 100 %
Ta : 25 °C

36V

f = 100Hz

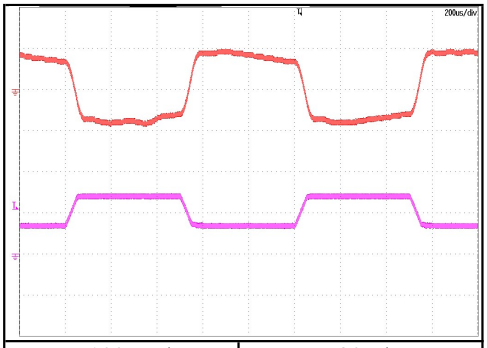


Vout:100mV/DIV	Iout:20A/DIV
2ms/DIV	
+0.32%	-0.21%

←Vout→

←Iout→
←Iout:0%→

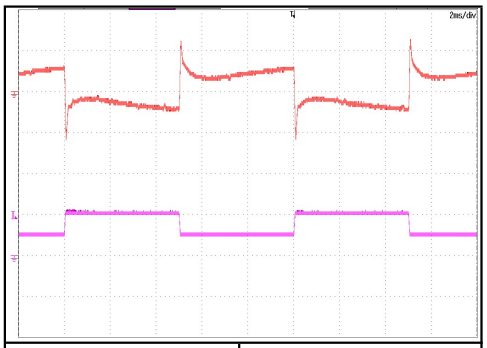
f = 1kHz



Vout:100mV/DIV	Iout:20A/DIV
200us/DIV	
+0.27%	-0.25%

48V

f = 100Hz

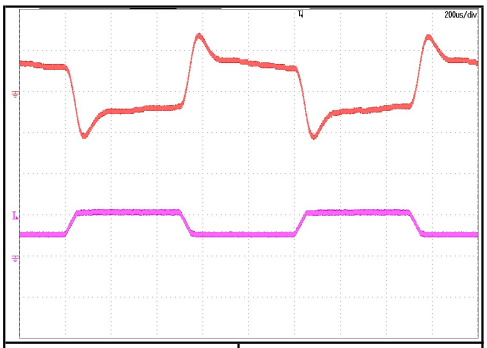


Vout:100mV/DIV	Iout:20A/DIV
2ms/DIV	
+0.27%	-0.24%

←Vout→

←Iout→
←Iout:0%→

f = 1kHz



Vout:100mV/DIV	Iout:20A/DIV
200us/DIV	
+0.30%	-0.25%

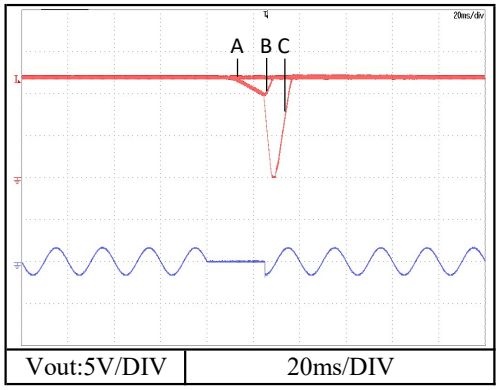
2-10. Response to brown out characteristics

Conditions Iout : 100 %
Istb : 100 %
Ta : 25 °C

Interruption time
A : Output voltage does not drop.
B : Output voltage drop down to 20~40% of the nominal output voltage.
C : Output voltage drops until 0V.

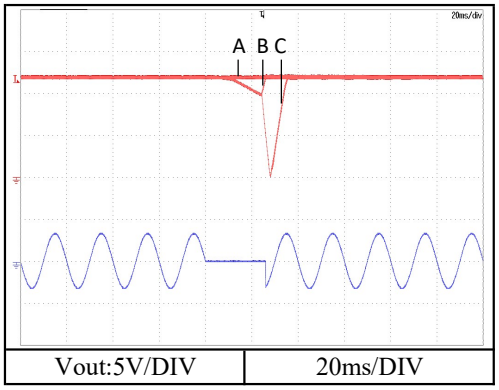
12V

Vin : 115VAC
A = 12ms, B = 24ms, C = 25ms



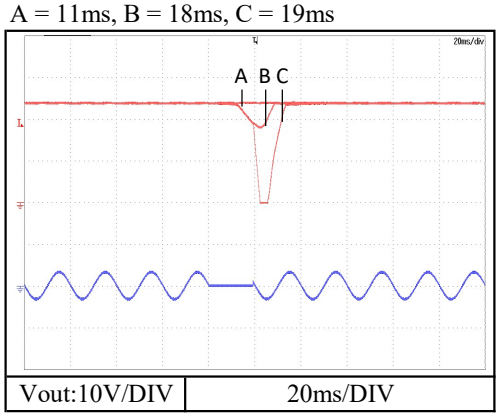
←Vout→
←0V→
←Vin→

Vin : 230VAC
A = 12ms, B = 25ms, C = 26ms



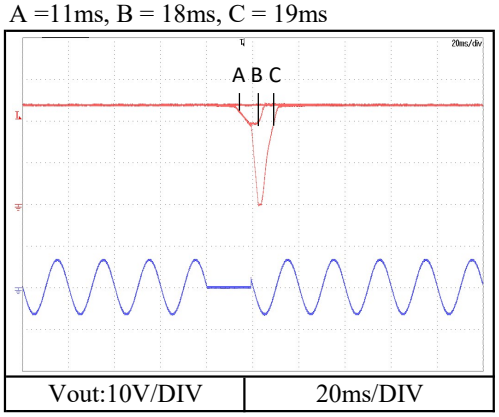
24V

Vin : 115VAC
A = 11ms, B = 18ms, C = 19ms



←Vout→
←0V→
←Vin→

Vin : 230VAC
A =11ms, B = 18ms, C = 19ms



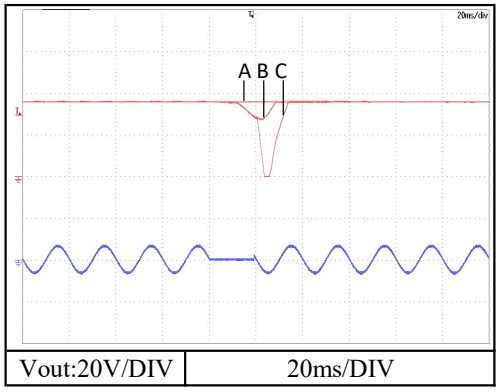
2-10. Response to brown out characteristics

Conditions Iout : 100 %
Istb : 100 %
Ta : 25 °C

Interruption time
A : Output voltage does not drop.
B : Output voltage drop down to 20~40% of the nominal output voltage.
C : Output voltage drops until 0V.

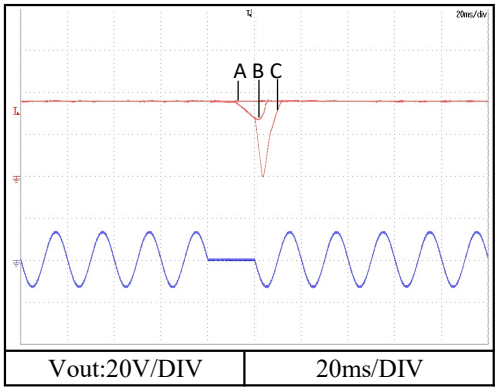
36V

Vin : 115VAC
A = 12ms, B = 25ms, C = 26ms



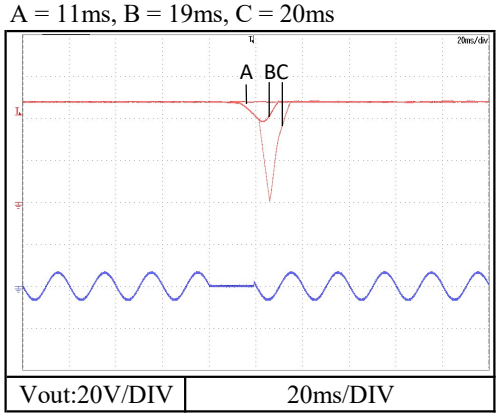
←Vout→
←0V→
←Vin→

Vin : 230VAC
A = 12ms, B = 25ms, C = 26ms



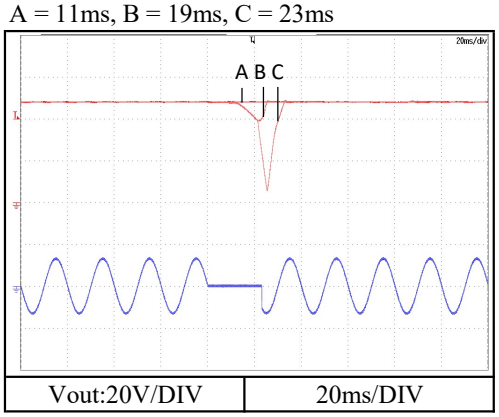
48V

Vin : 115VAC
A = 11ms, B = 19ms, C = 20ms



←Vout→
←0V→
←Vin→

Vin : 230VAC
A = 11ms, B = 19ms, C = 23ms

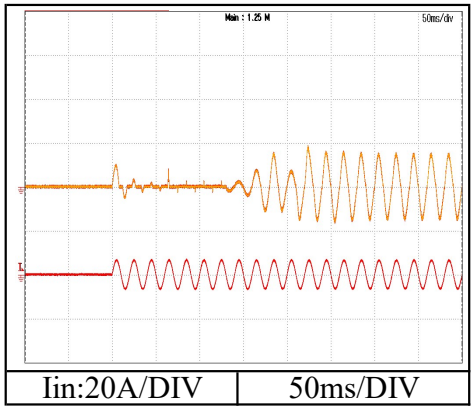


2-11. Inrush current waveform

Conditions Vin : 115 VAC
Iout : 100 % (20.9A)
Istb : 100 %
Ta : 25 °C

48V

Switch on phase angle of input AC voltage
ϕ = 0°

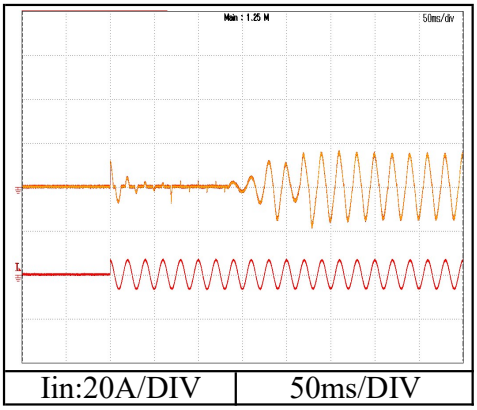


Iin:20A/DIV	50ms/DIV

← Iin →

← Vin →

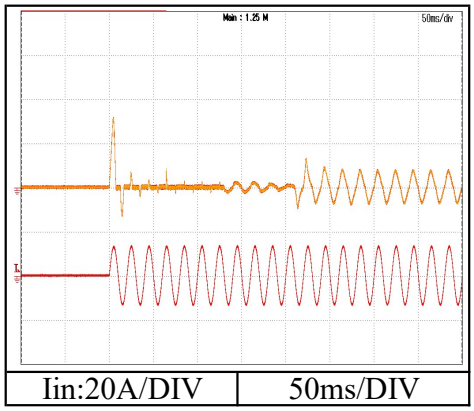
Switch on phase angle of input AC voltage
ϕ = 90°



Iin:20A/DIV	50ms/DIV

Conditions Vin : 230 VAC
Iout : 100 % (20.9A)
Istb : 100 %
Ta : 25 ℃

Switch on phase angle of input AC voltage
ϕ = 0°

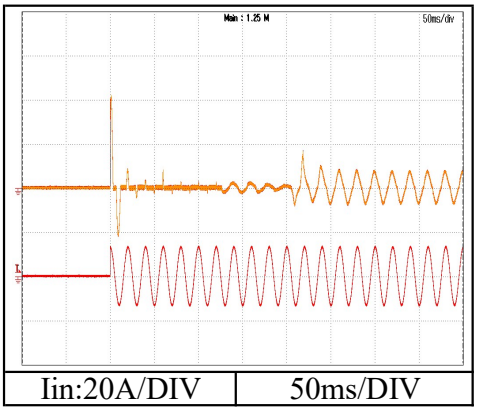


Iin:20A/DIV	50ms/DIV

← Iin →

← Vin →

Switch on phase angle of input AC voltage
ϕ = 90°

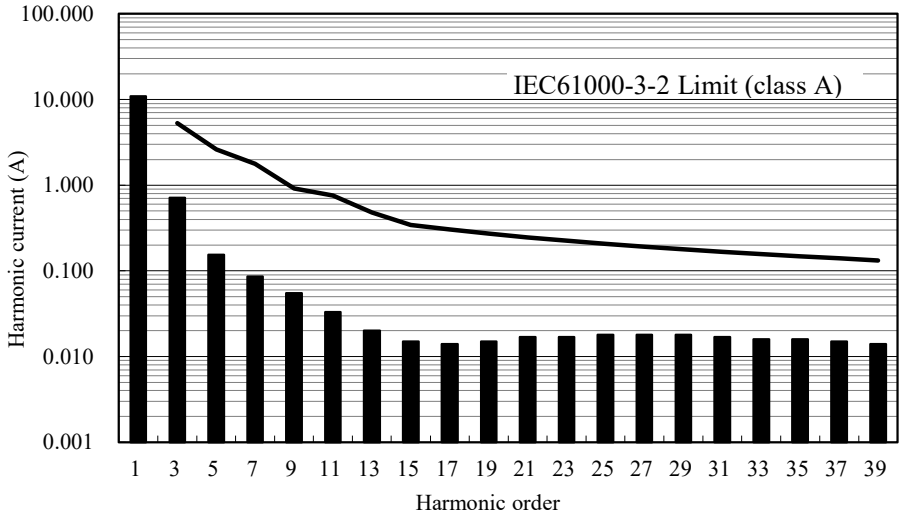


Iin:20A/DIV	50ms/DIV

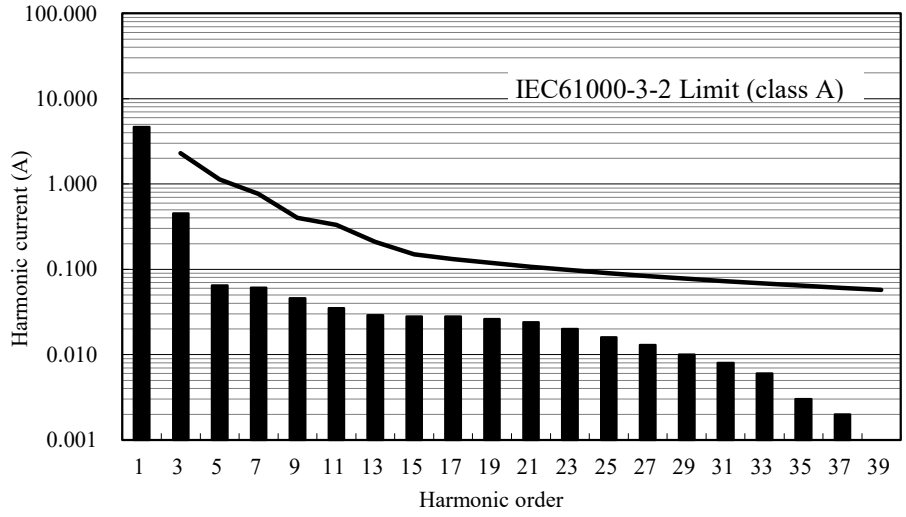
2-12. Input current harmonics

Conditions
Vin : 100 VAC
Iout : 20.9 A (100%)
Istb : 100 %
Ta : 25 °C

48V



Conditions
Vin : 230 VAC
Iout : 20.9 A (100%)
Istb : 100 %
Ta : 25 ℃

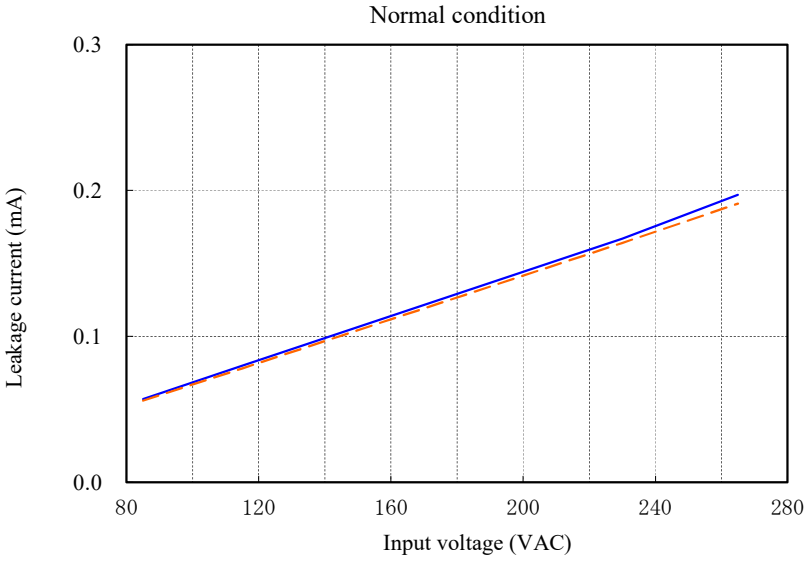


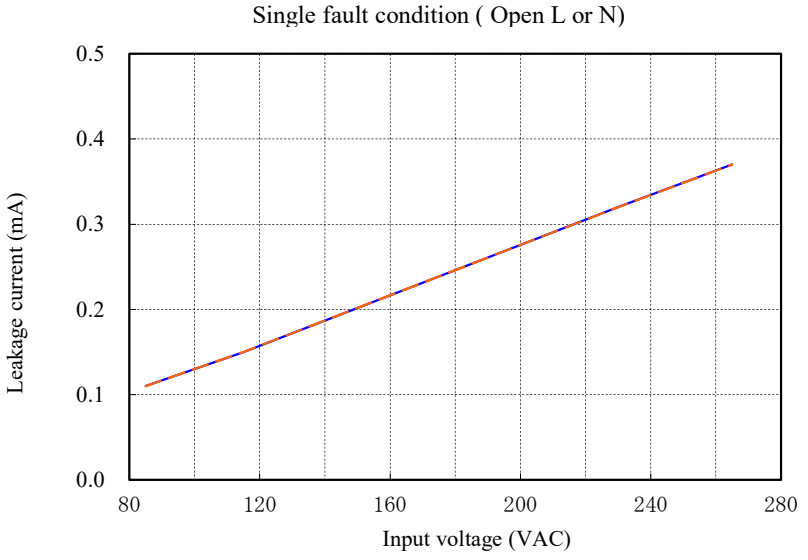
2-13. Leakage current characteristics

Earth leakage current of CLASS I equipment

Conditions Iout : 0 % ——
100 % - - - -
Ta : 25 °C
Istb : 100 %
f : 60 Hz

48V





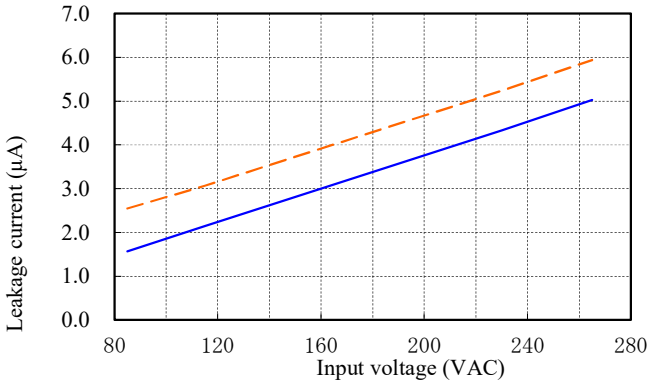
2-13. Leakage current characteristics

Patient leakage current of CLASS I equipment

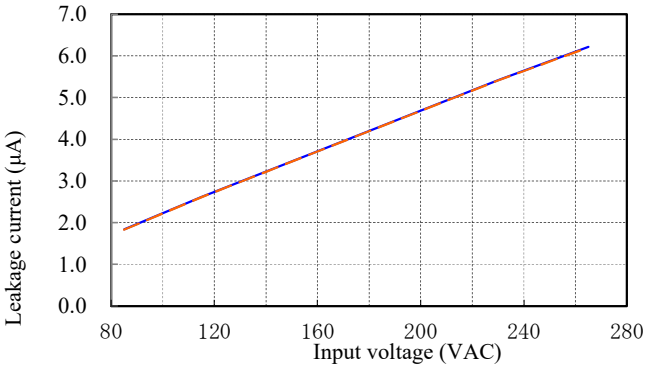
Conditions Iout : 0 % —— 100 % - - - -
Ta : 25 °C
Istb : 100 %
f : 60 Hz

48V

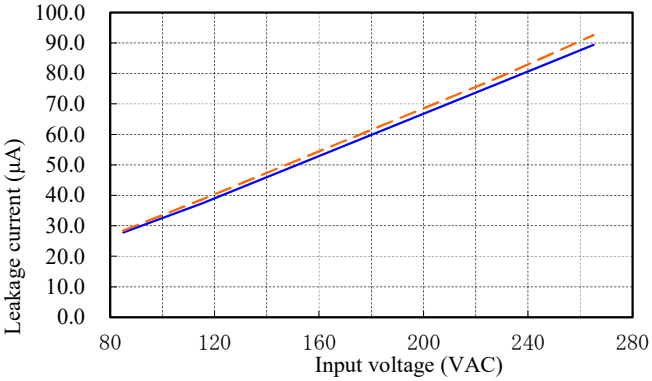
Normal condition



Single fault condition (Open L or N)



Single fault condition (Open FG)

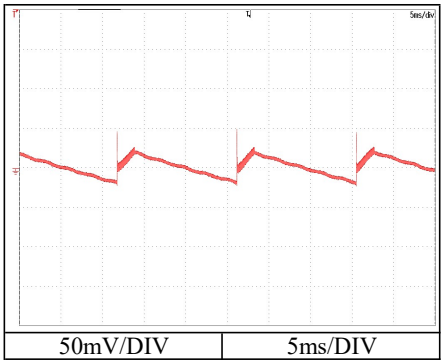


2-14. Output ripple and noise waveform

Conditions Vin : 115 VAC
Istb : 100 %
Ta : 25 °C

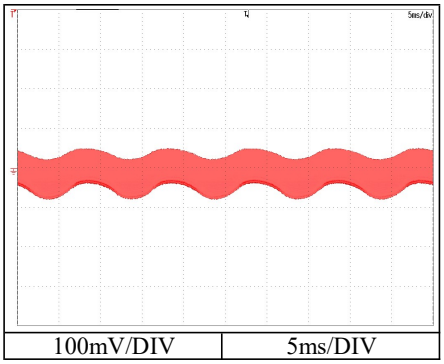
12V

Iout : 0 %



50mV/DIV | 5ms/DIV

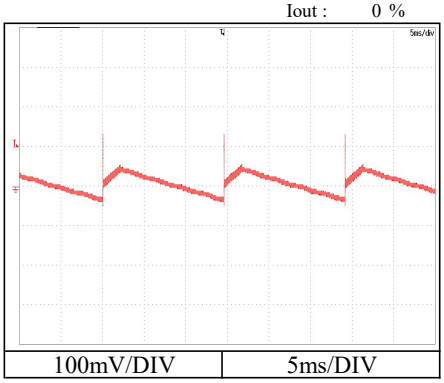
Iout : 100 %



100mV/DIV | 5ms/DIV

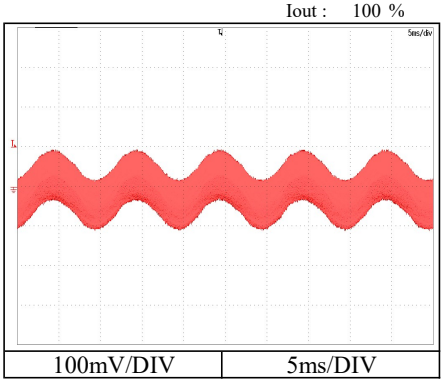
24V

Iout : 0 %



100mV/DIV | 5ms/DIV

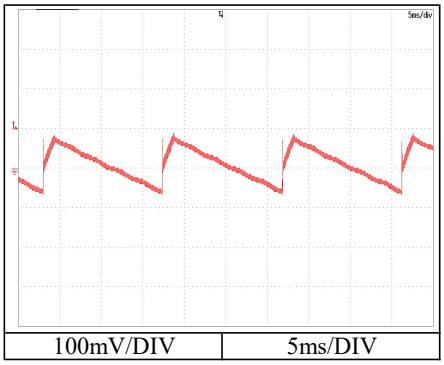
Iout : 100 %



100mV/DIV | 5ms/DIV

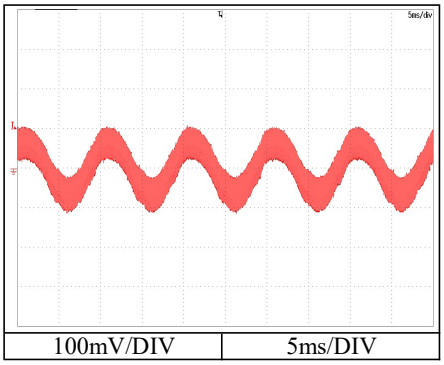
36V

Iout : 0 %



100mV/DIV | 5ms/DIV

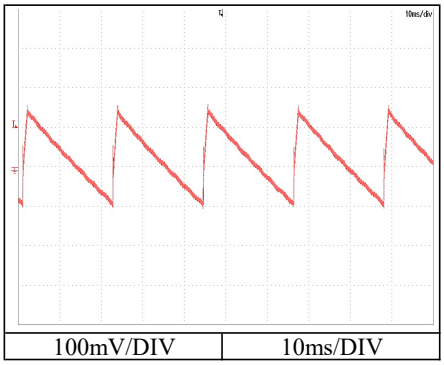
Iout : 100 %



100mV/DIV | 5ms/DIV

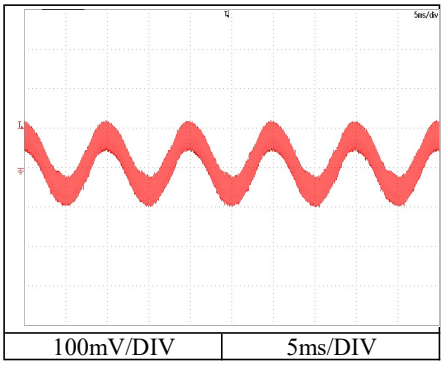
48V

Iout : 0 %



100mV/DIV | 10ms/DIV

Iout : 100 %



100mV/DIV | 5ms/DIV

2-15. Electro-Magnetic Interference characteristics

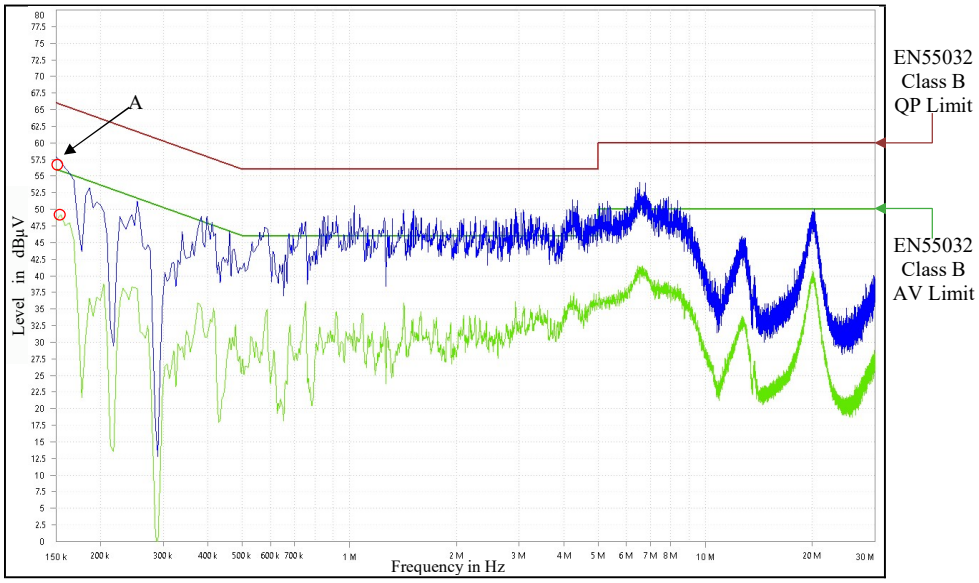
Conditions Vin : 115 VAC
Iout : 66.7 A (100%)
Istb : 100 %
Ta : 25 ℃

Conducted Emission

12V

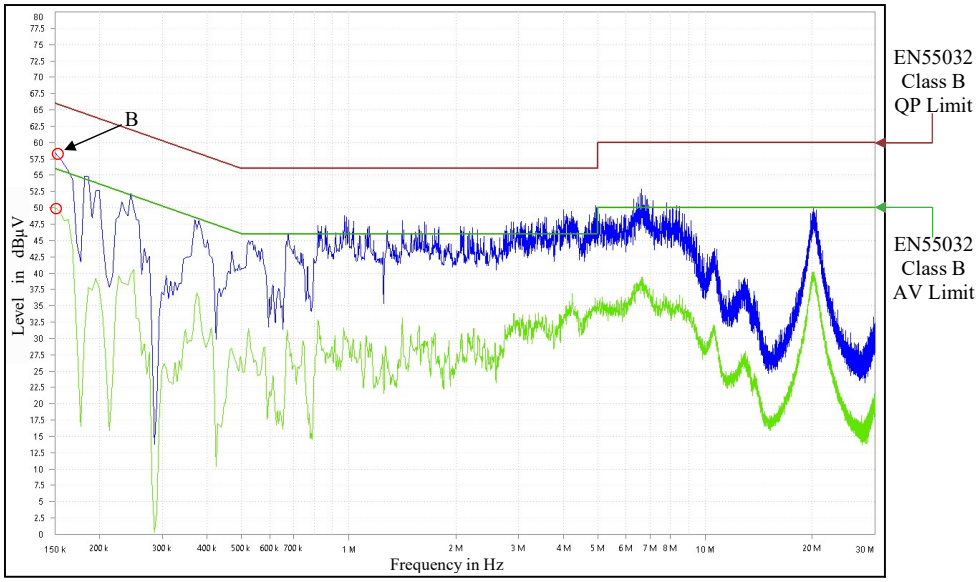
Phase : L

Ref. Data	Point A (155kHz) Limit (dB)	Measure (dB)
QP	65.8	56.8
AV	55.8	49.1



Phase : N

Ref. Data	Point B (150kHz) Limit (dB)	Measure (dB)
QP	66.0	57.8
AV	56.0	49.7



Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

2-15. Electro-Magnetic Interference characteristics

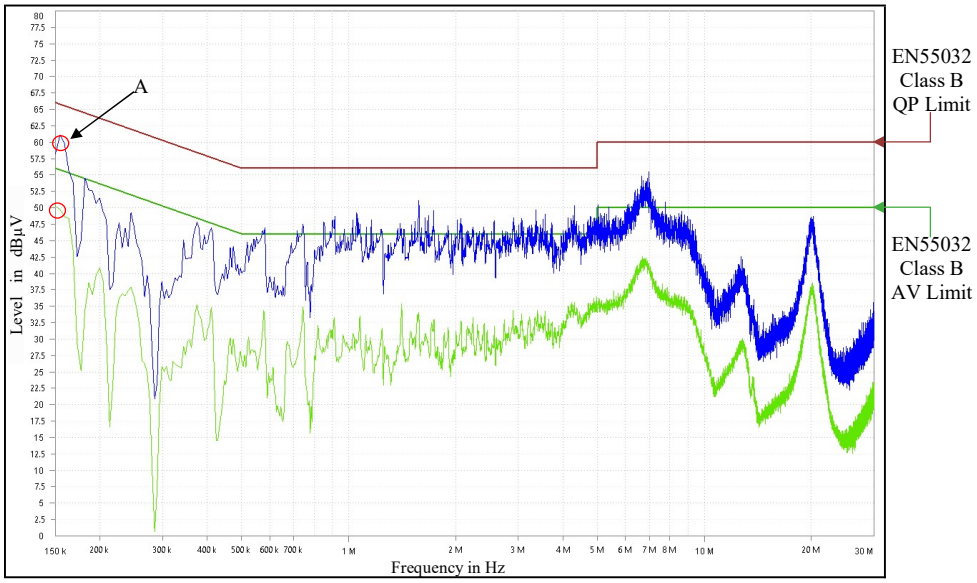
Conditions Vin : 230 VAC
Iout : 66.7 A (100%)
Istb : 100 %
Ta : 25 ℃

Conducted Emission

12V

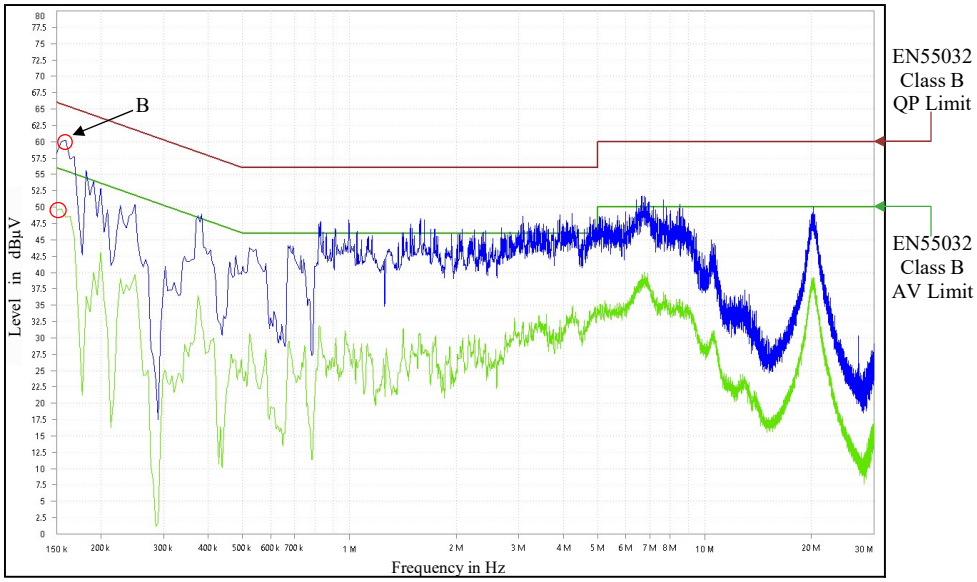
Phase : L

Ref. Data	Point A (155kHz) Limit (dB)	Measure (dB)
QP	65.8	59.4
AV	56.0	49.9



Phase : N

Ref. Data	Point B (159kHz) Limit (dB)	Measure (dB)
QP	65.5	58.6
AV	55.8	49.5



Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

2-15. Electro-Magnetic Interference characteristics

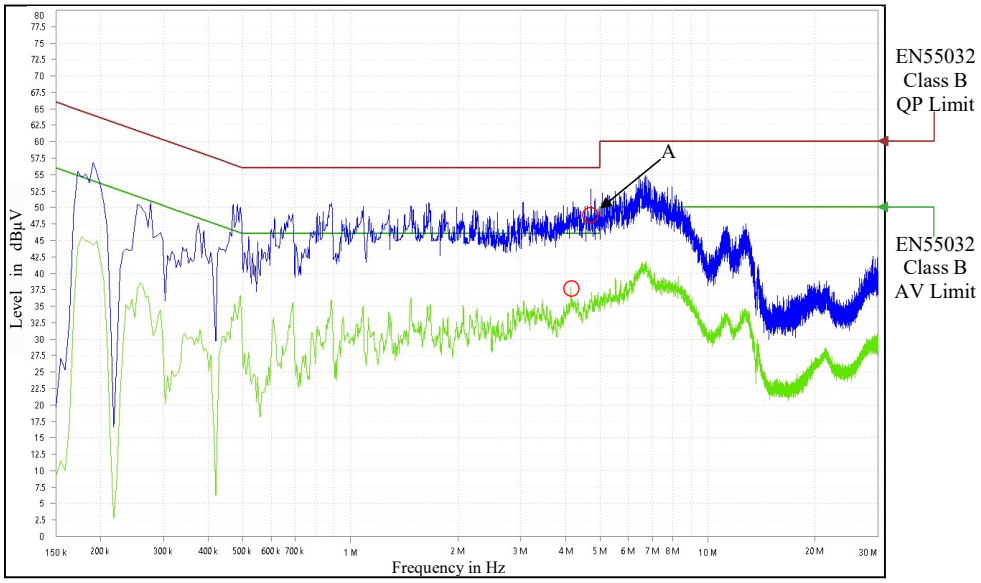
Conditions Vin : 115 VAC
Iout : 41.7 A (100%)
Istb : 100 %
Ta : 25 ℃

Conducted Emission

24V

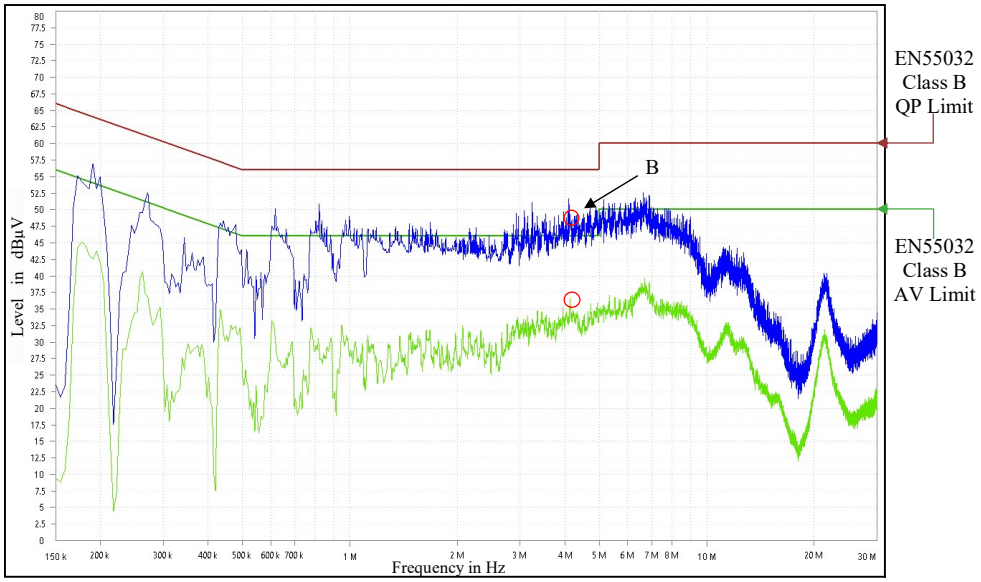
Phase : L

Ref. Data	Point A (4.5MHz) Limit (dB)	Measure (dB)
QP	56.0	47.3
AV	46.0	37.3



Phase : N

Ref. Data	Point B (4.1MHz) Limit (dB)	Measure (dB)
QP	56.0	47.0
AV	46.0	35.8



Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

2-15. Electro-Magnetic Interference characteristics

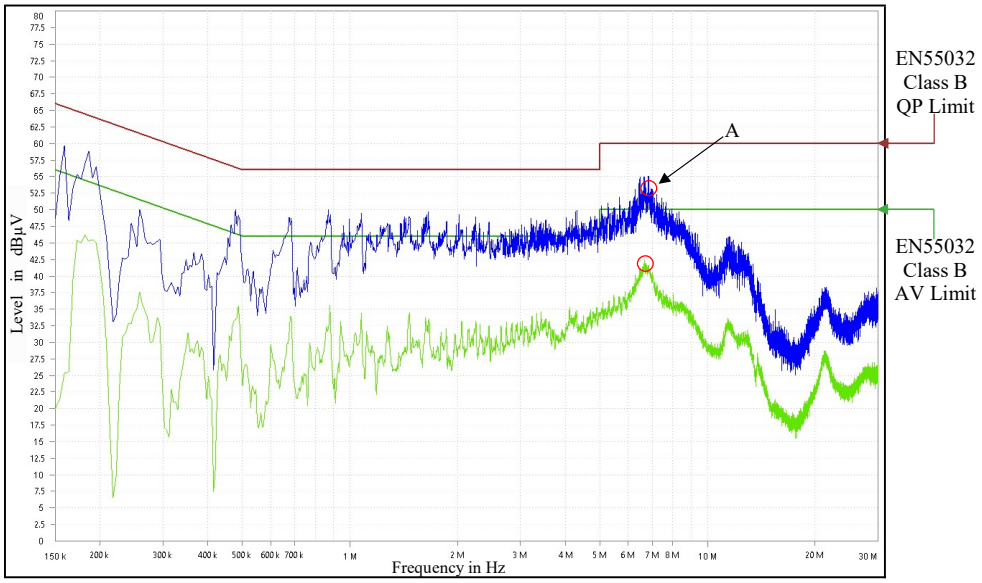
Conditions Vin : 230 VAC
Iout : 25 A (100%)
Istb : 100 %
Ta : 25 ℃

Conducted Emission

24V

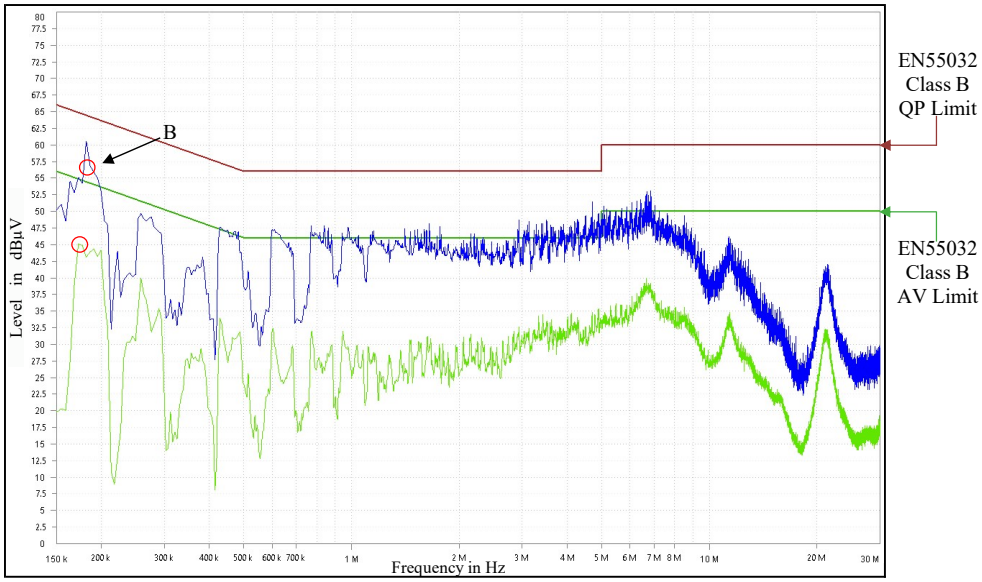
Ref. Data	Point A (6.8MHz) Limit (dB)	Measure (dB)
QP	60.0	51.0
AV	50.0	41.5

Phase : L



Ref. Data	Point B (182KHz) Limit (dB)	Measure (dB)
QP	64.4	55.6
AV	54.0	44.8

Phase : N



Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

2-15. Electro-Magnetic Interference characteristics

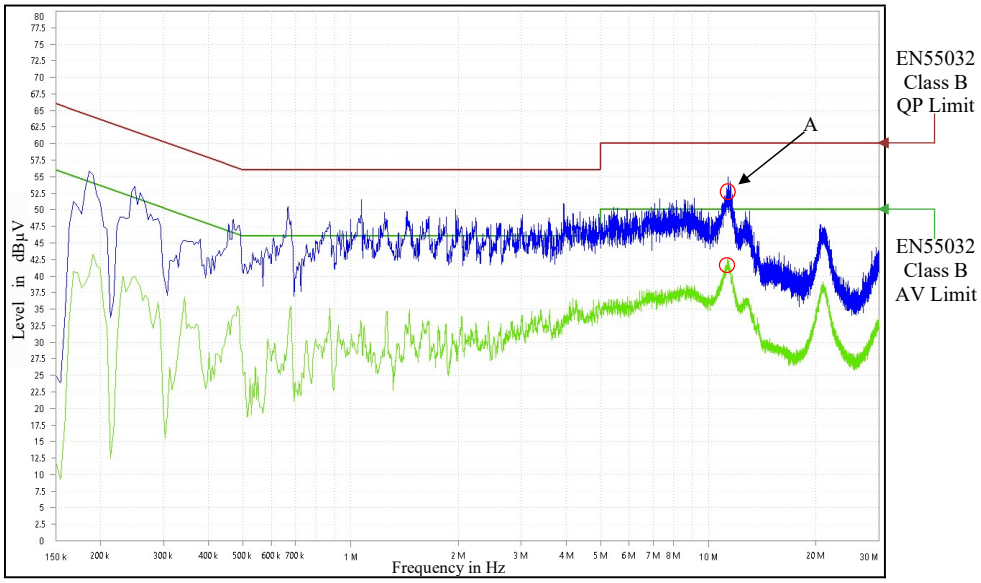
Conditions Vin : 115 VAC
Iout : 27.8 A (100%)
Istb : 100 %
Ta : 25 ℃

Conducted Emission

36V

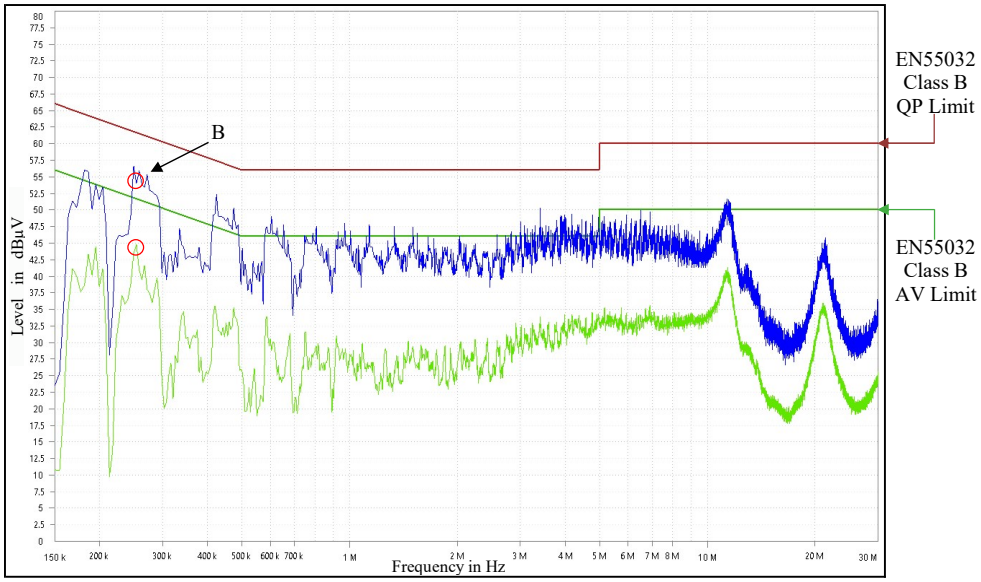
Phase : L

Ref. Data	Point A (11MHz) Limit (dB)	Measure (dB)
QP	60.0	50.9
AV	50.0	41.3



Phase : N

Ref. Data	Point B (249KHz) Limit (dB)	Measure (dB)
QP	61.8	53.8
AV	51.6	43.9



Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

2-15. Electro-Magnetic Interference characteristics

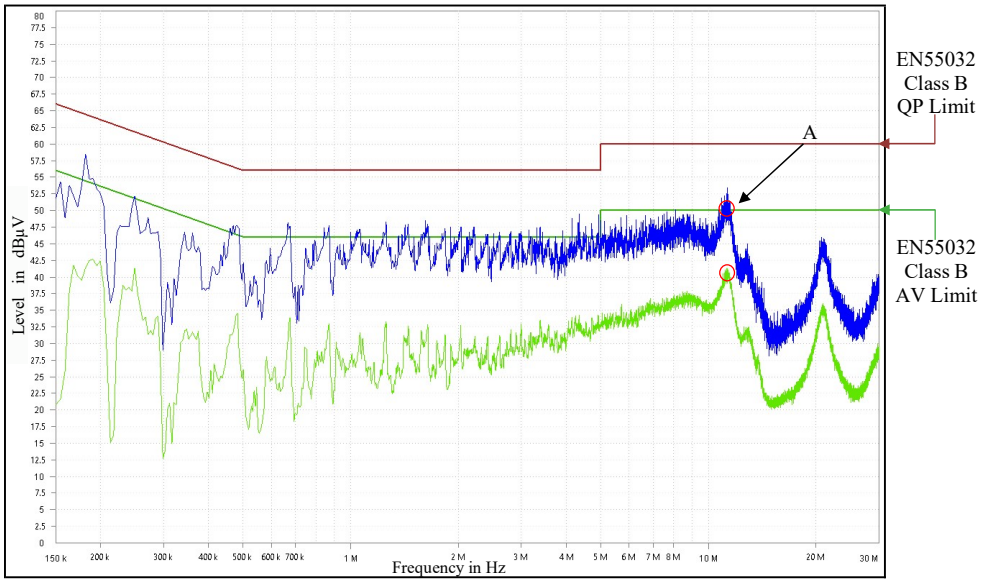
Conditions Vin : 230 VAC
Iout : 27.8 A (100%)
Istb : 100 %
Ta : 25 ℃

Conducted Emission

36V

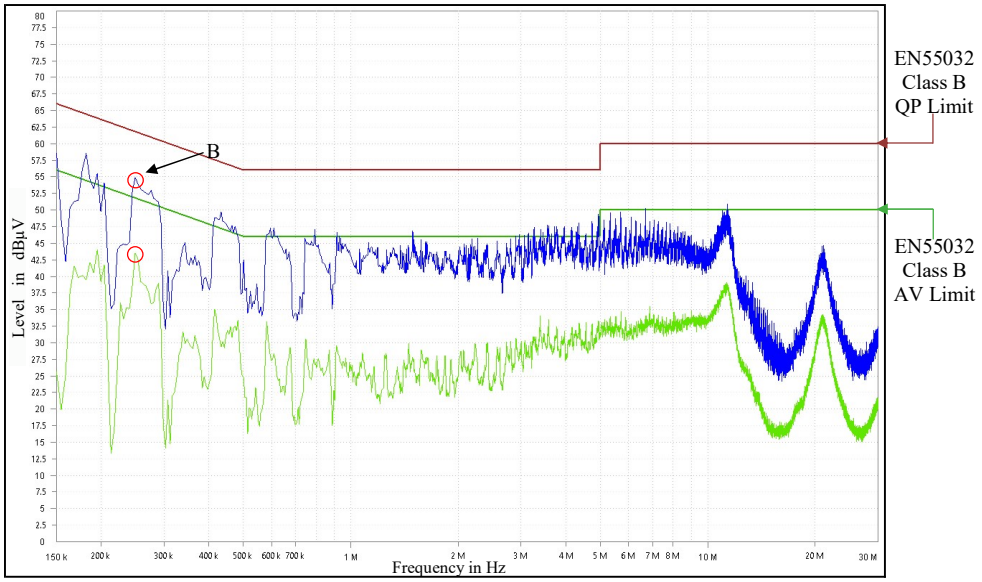
Phase : L

Ref. Data	Point A (11MHz) Limit (dB)	Measure (dB)
QP	60.0	50.3
AV	50.0	40.1



Phase : N

Ref. Data	Point B (249KHz) Limit (dB)	Measure (dB)
QP	61.8	53.6
AV	51.8	43.0



Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

2-15. Electro-Magnetic Interference characteristics

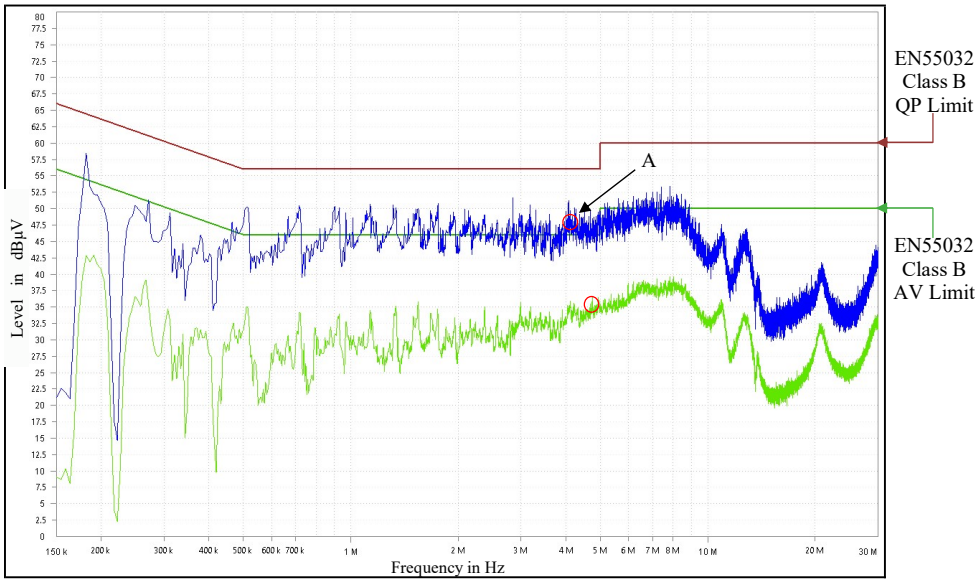
Conditions Vin : 115 VAC
Iout : 20.9 A (100%)
Istb : 100 %
Ta : 25 ℃

Conducted Emission

48V

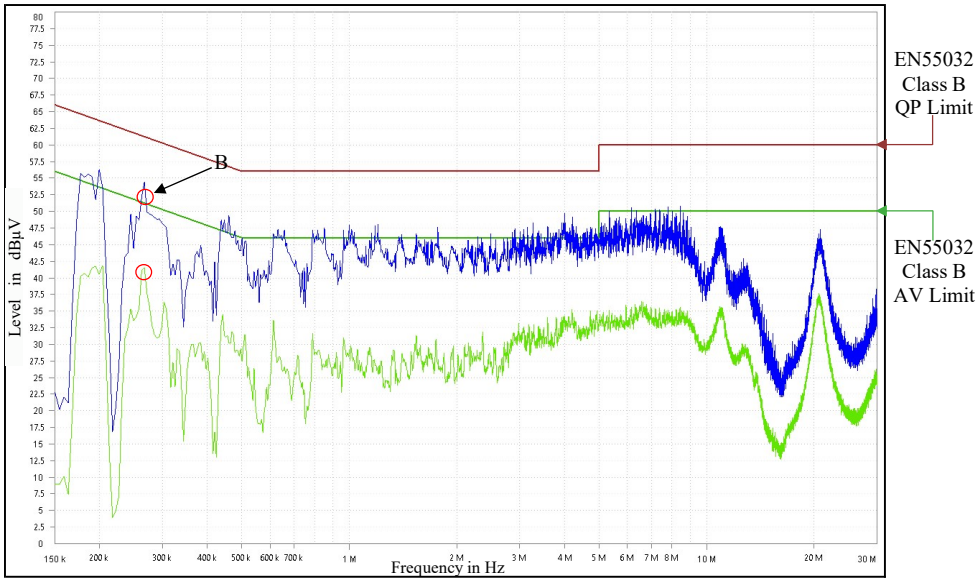
Phase : L

Ref. Data	Point A 4.5MHz Limit (dB)	Measure (dB)
QP	56.0	46.3
AV	46.0	35.2



Phase : N

Ref. Data	Point B (267KHz) Limit (dB)	Measure (dB)
QP	61.2	52.3
AV	51.2	40.8



Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

2-15. Electro-Magnetic Interference characteristics

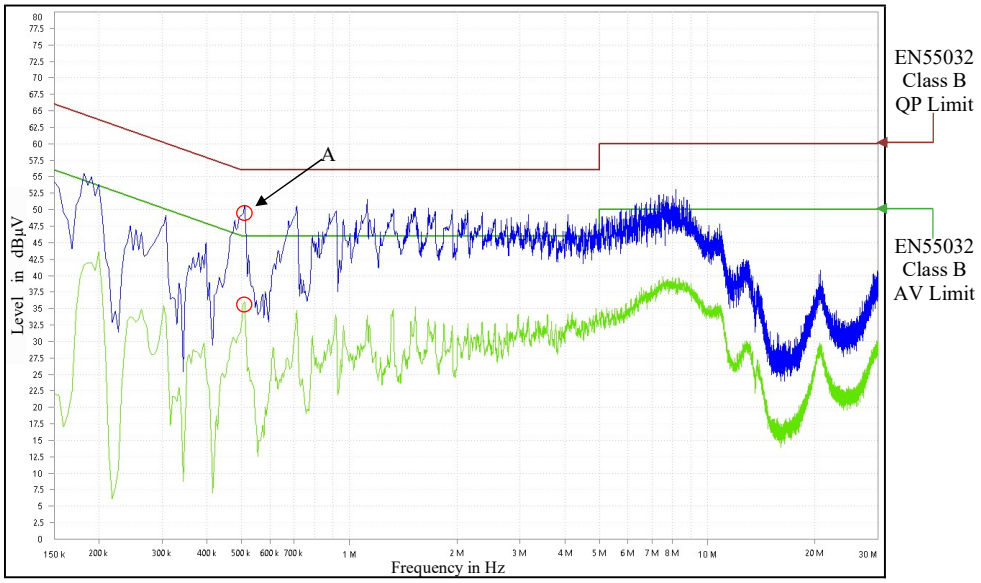
Conditions Vin : 230 VAC
Iout : 20.9 A (100%)
Istb : 100 %
Ta : 25 ℃

Conducted Emission

48V

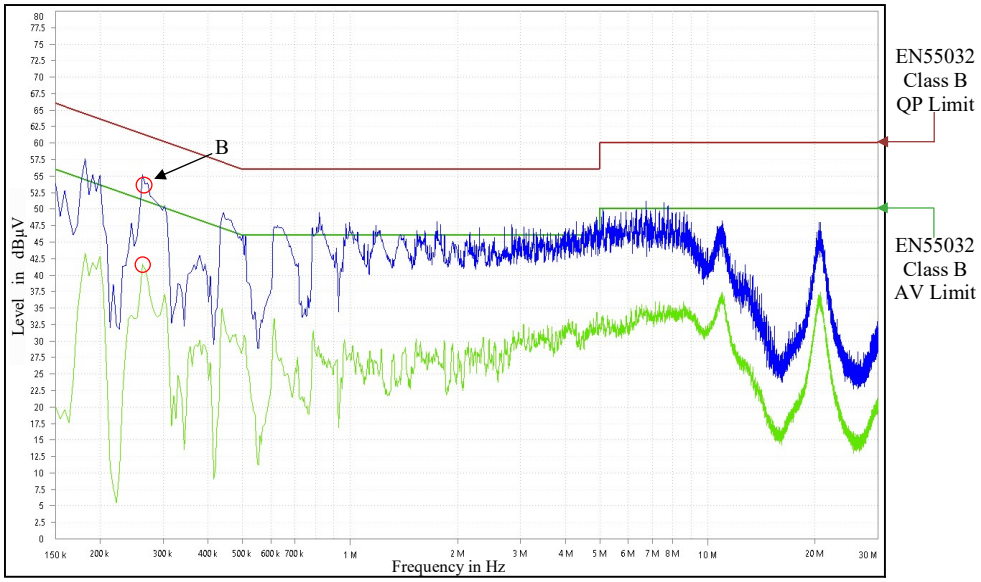
Phase : L

Ref. Data	Point A (510KHz) Limit (dB)	Measure (dB)
QP	56.0	49.1
AV	46.0	35.6



Phase : N

Ref. Data	Point B (263kHz) Limit (dB)	Measure (dB)
QP	61.4	52.7
AV	51.4	41.6



Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

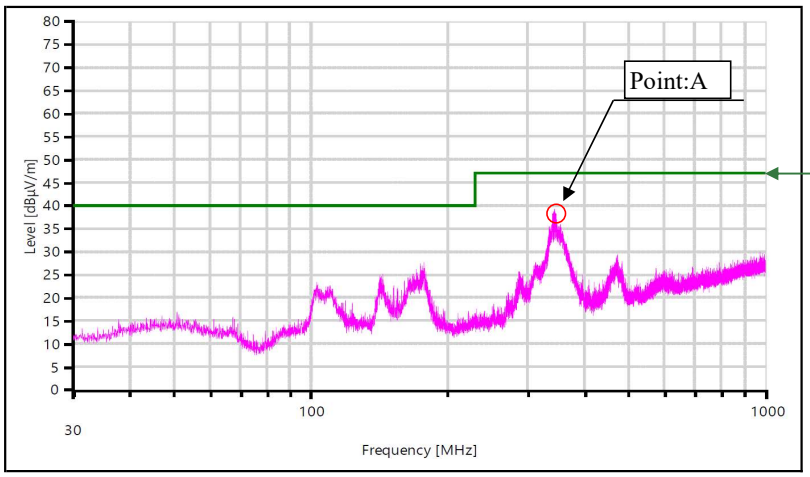
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 115 VAC
Iout : 66.7 A (100%)
Istb : 100 %
Ta : 25 ℃

Radiated Emission

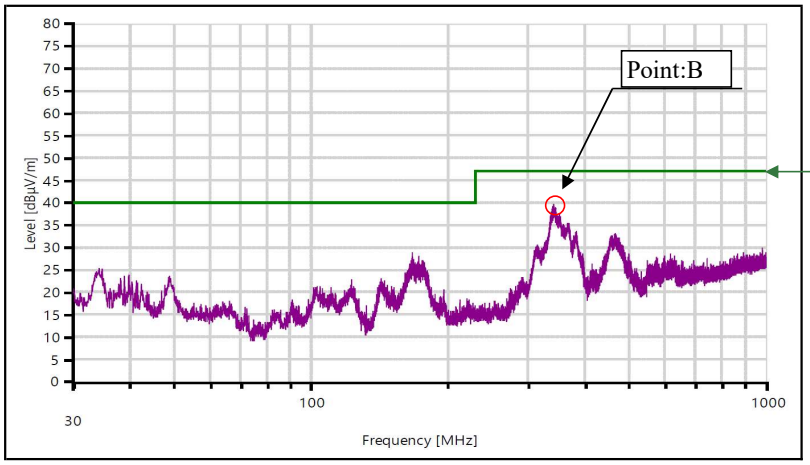
12V

HORIZONTAL



Ref. Data	Point A (344MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	39.35

VERTICAL



Ref. Data	Point B (341MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	39.71

Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

Indication is peak values.

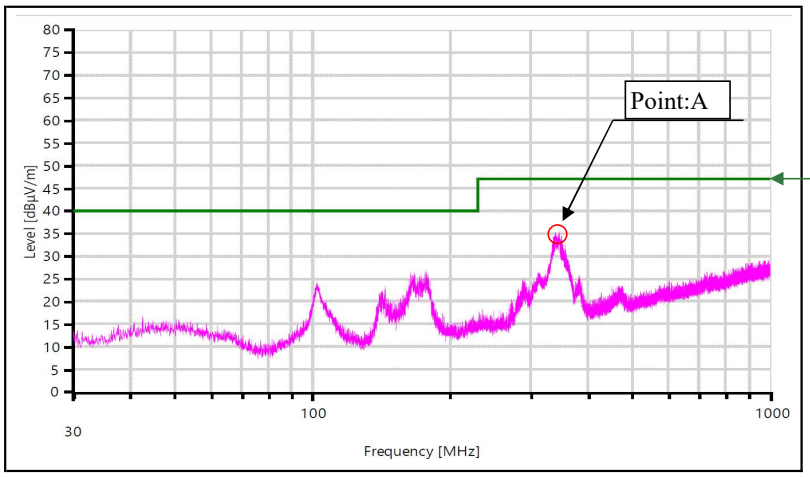
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 66.7 A (100%)
Istb : 100 %
Ta : 25 ℃

Radiated Emission

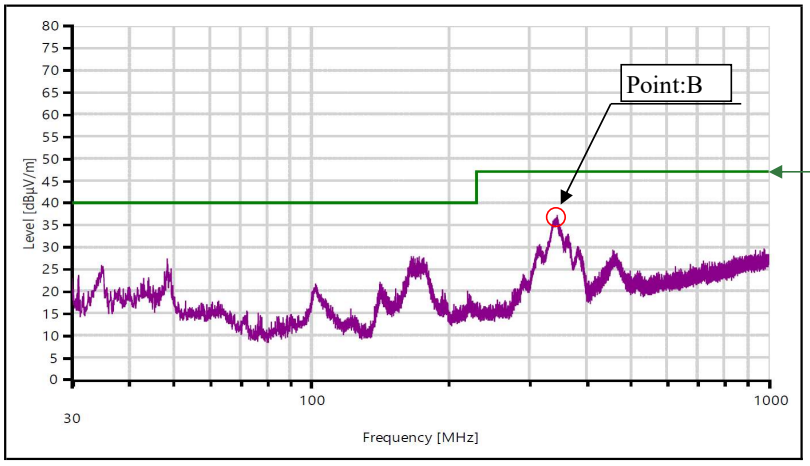
12V

HORIZONTAL



Ref. Data	Point A (344MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	35.0

VERTICAL



Ref. Data	Point B (354MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	37.1

Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

Indication is peak values.

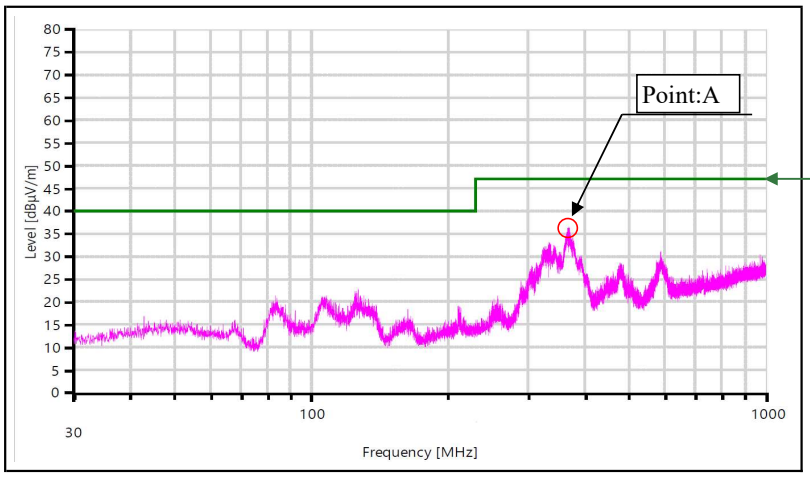
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 115 VAC
Iout : 41.7 A (100%)
Istb : 100 %
Ta : 25 ℃

Radiated Emission

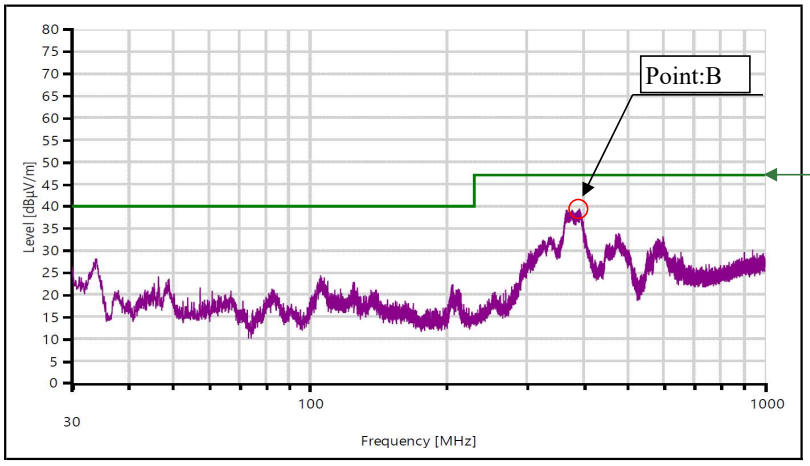
24V

HORIZONTAL



Ref. Data	Point A (369MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	36.5

VERTICAL



Ref. Data	Point B (391MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	39.6

Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

Indication is peak values.

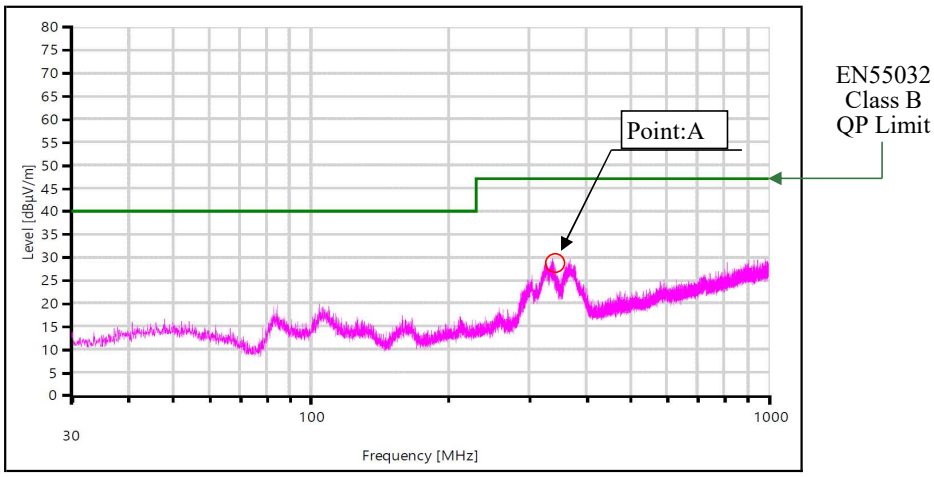
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 41.7 A (100%)
Istb : 100 %
Ta : 25 ℃

Radiated Emission

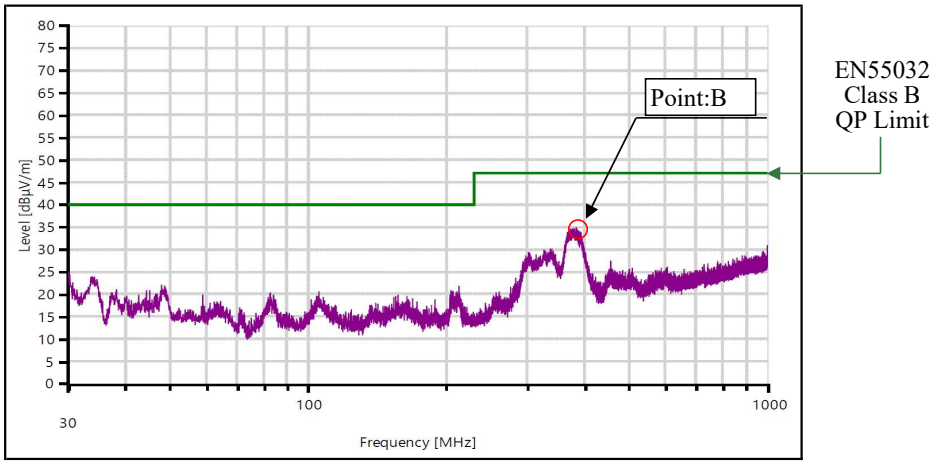
24V

HORIZONTAL



Ref. Data	Point A (344MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	29.8

VERTICAL



Ref. Data	Point B (384MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	35.1

Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

Indication is peak values.

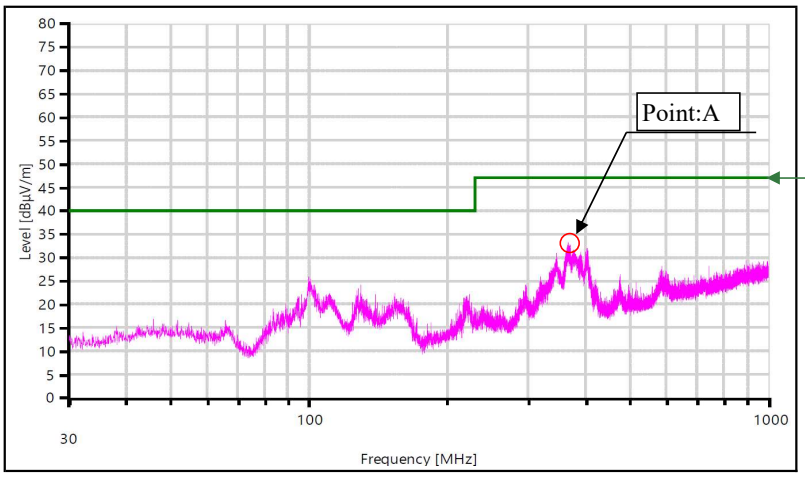
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 115 VAC
Iout : 27.8 A (100%)
Istb : 100 %
Ta : 25 ℃

Radiated Emission

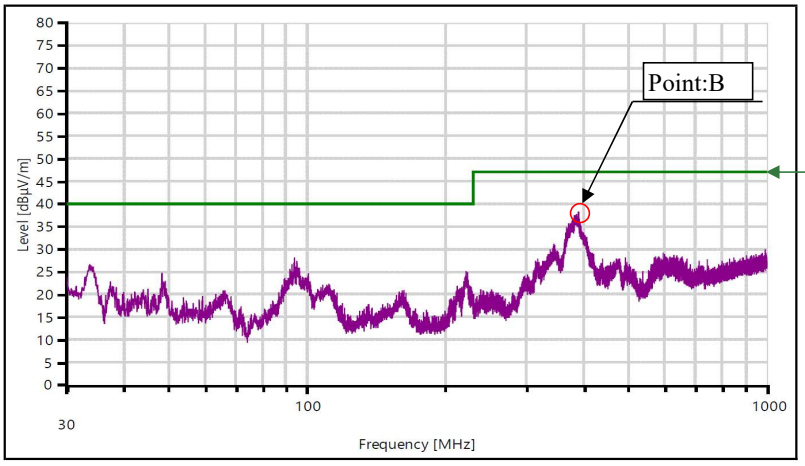
36V

HORIZONTAL



Ref. Data	Point A (367MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	33.1

VERTICAL



Ref. Data	Point B (390MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	38.3

Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

Indication is peak values.

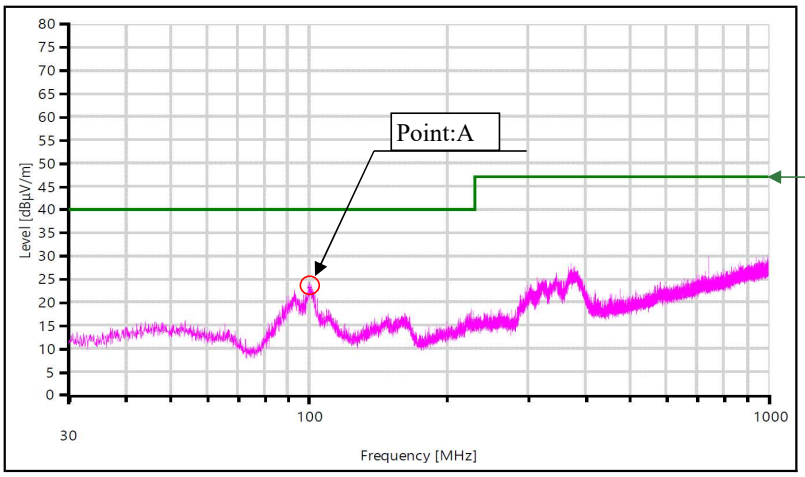
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 27.8 A (100%)
Istb : 100 %
Ta : 25 ℃

Radiated Emission

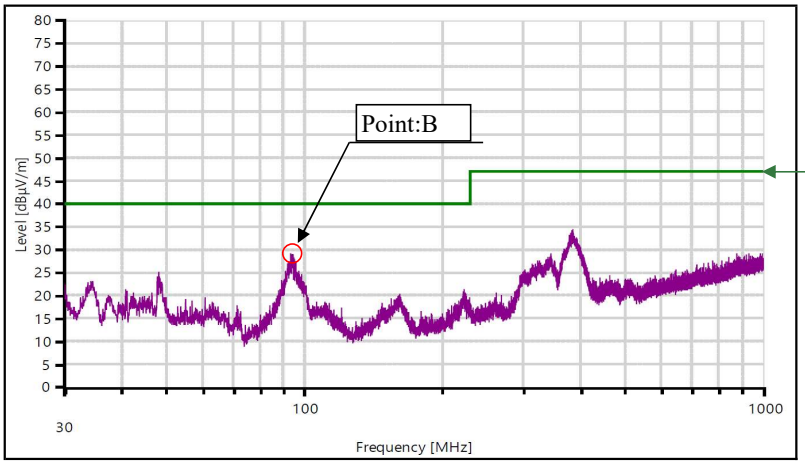
36V

HORIZONTAL



Ref. Data	Point A (100MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	24.4

VERTICAL



Ref. Data	Point B (93MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	29.3

Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

Indication is peak values.

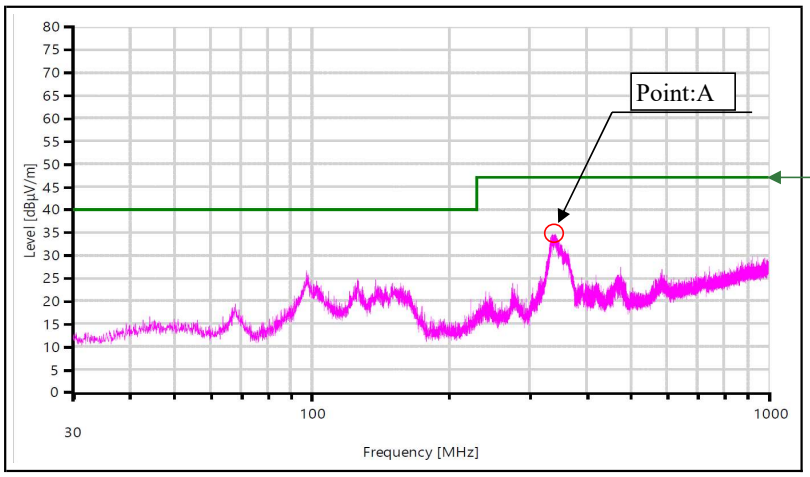
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 115 VAC
Iout : 20.9 A (100%)
Istb : 100 %
Ta : 25 ℃

Radiated Emission

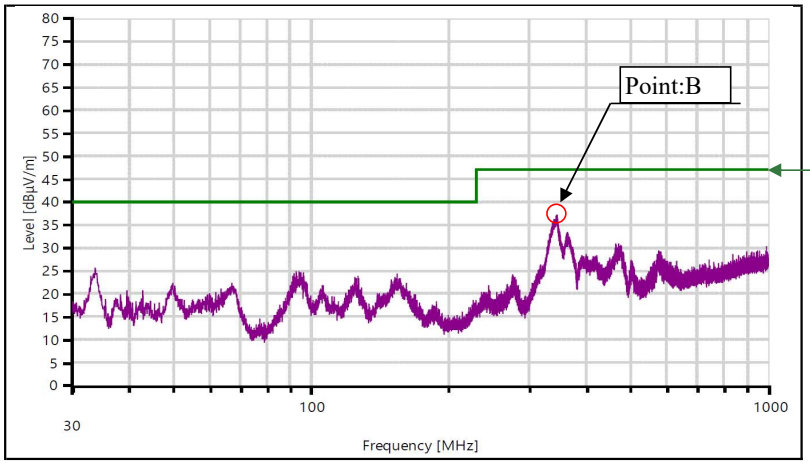
48V

HORIZONTAL



Ref. Data	Point A (337MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	35.4

VERTICAL



Ref. Data	Point B (346MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	37.3

Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

Indication is peak values.

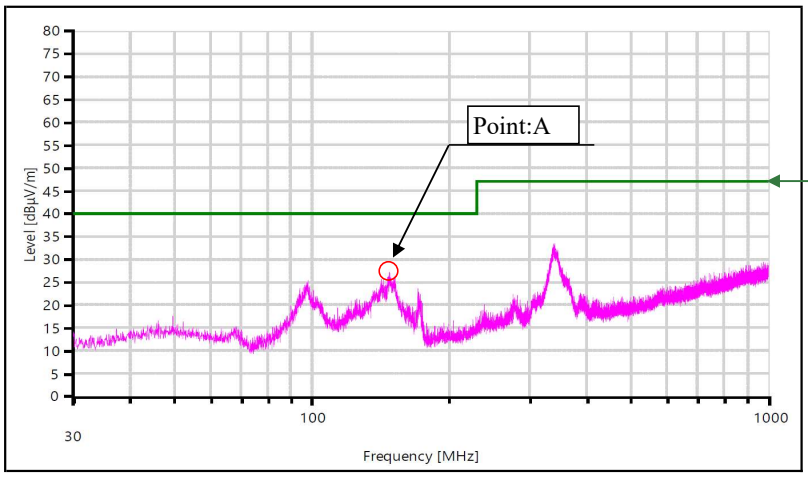
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 20.9 A (100%)
Istb : 100 %
Ta : 25 ℃

Radiated Emission

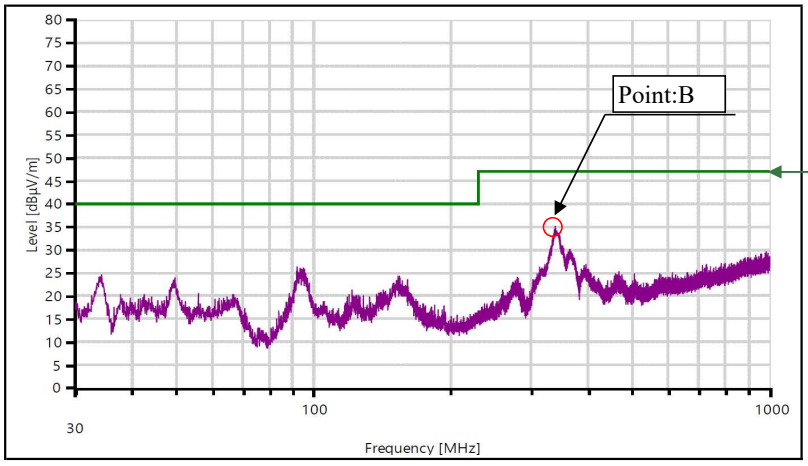
48V

HORIZONTAL



Ref. Data	Point A (148MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	27.2

VERTICAL



Ref. Data	Point B (339MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	35.1

Limit of EN55011-B,FCC-Class B are same as its EN55032-B.

Indication is peak values.