CUS800M

EVALUATION DATA

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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

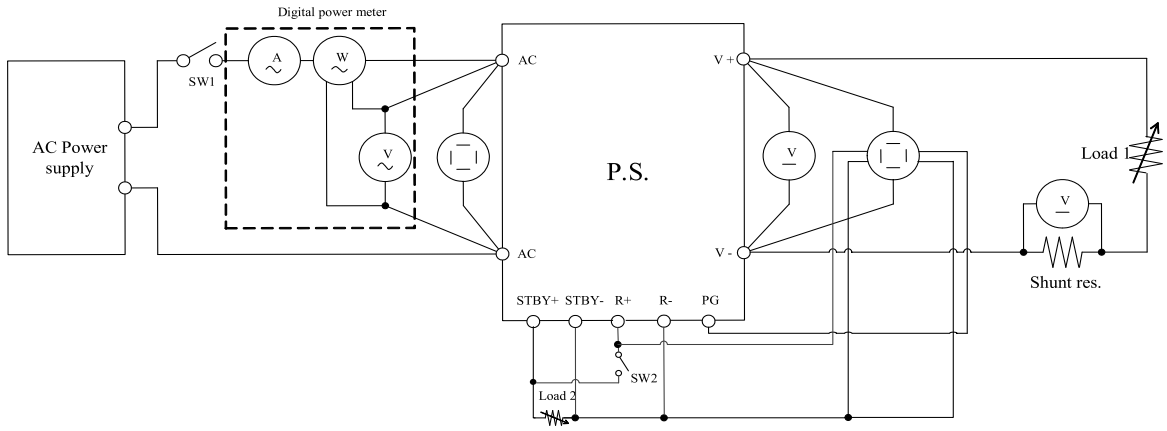
※ Test results are reference data based on our measurement condition.

1. Evaluation Method

1-1. Circuit used for determination

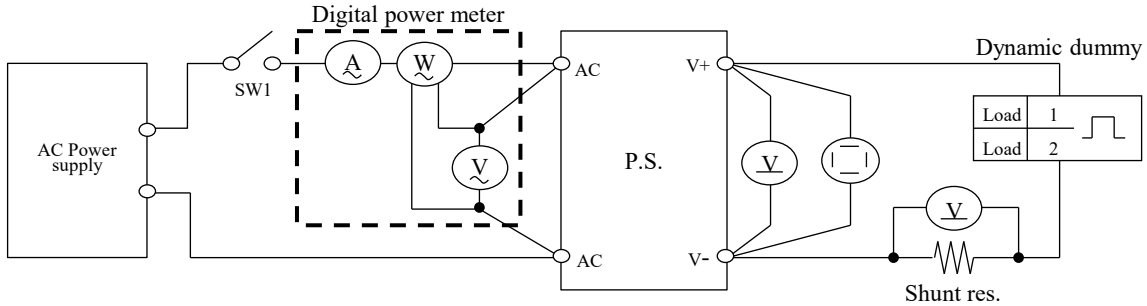
Circuit 1 used for determination

- 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

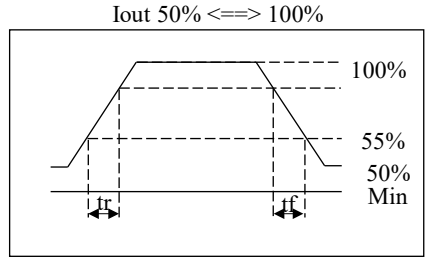


Circuit 2 used for determination

- Dynamic load response characteristics

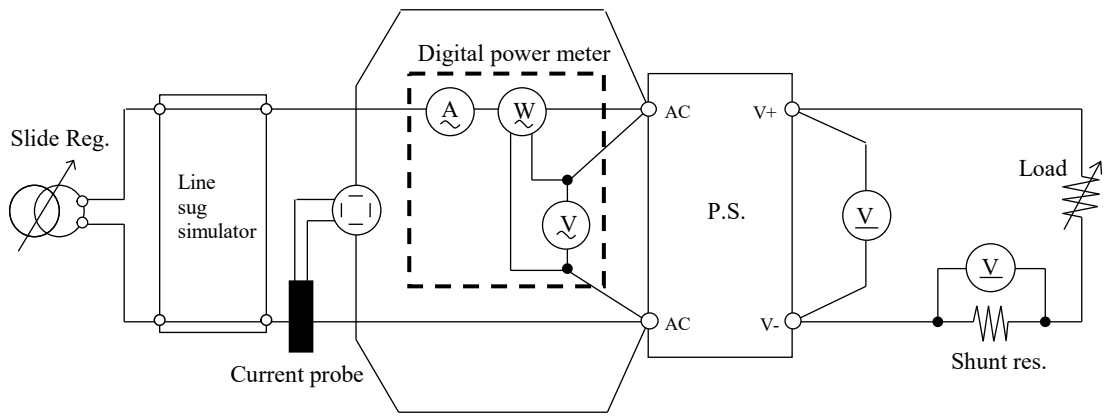


Output current waveform
Iout 50% <==> 100%



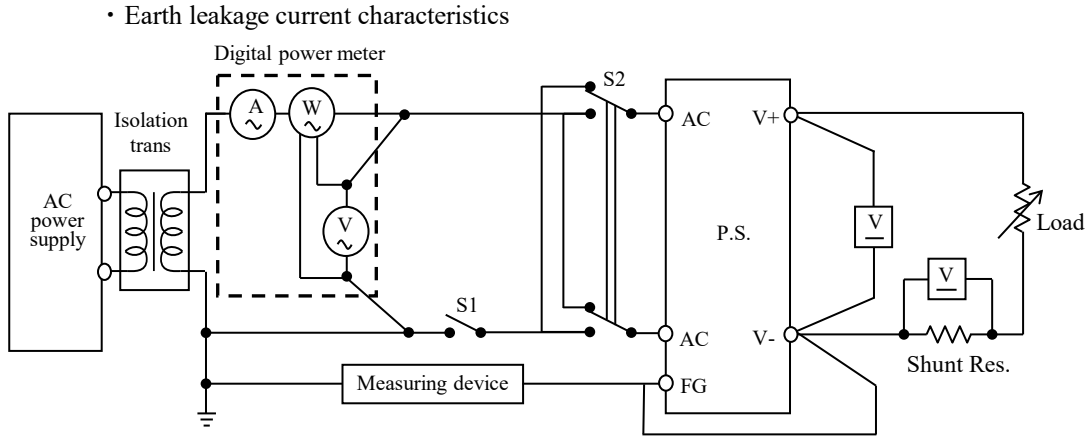
Circuit 3 used for determination

・Inrush current waveform



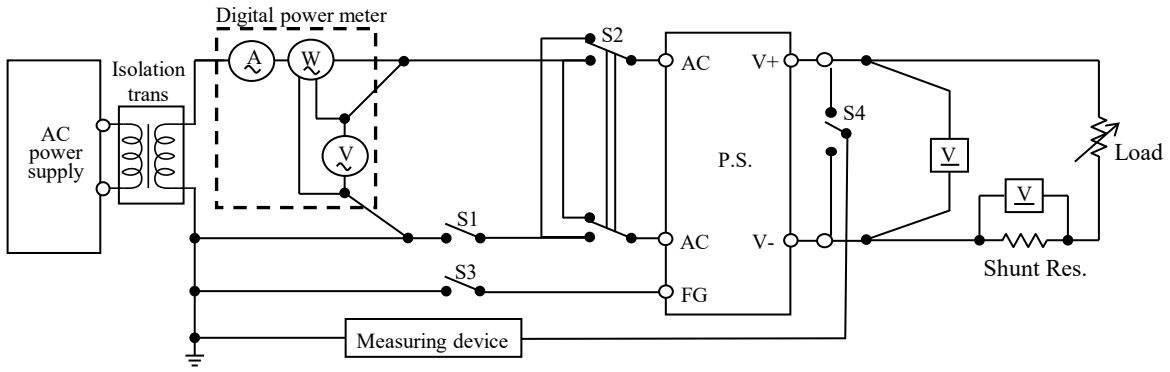
Circuit 4 used for determination

・Earth leakage current characteristics



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

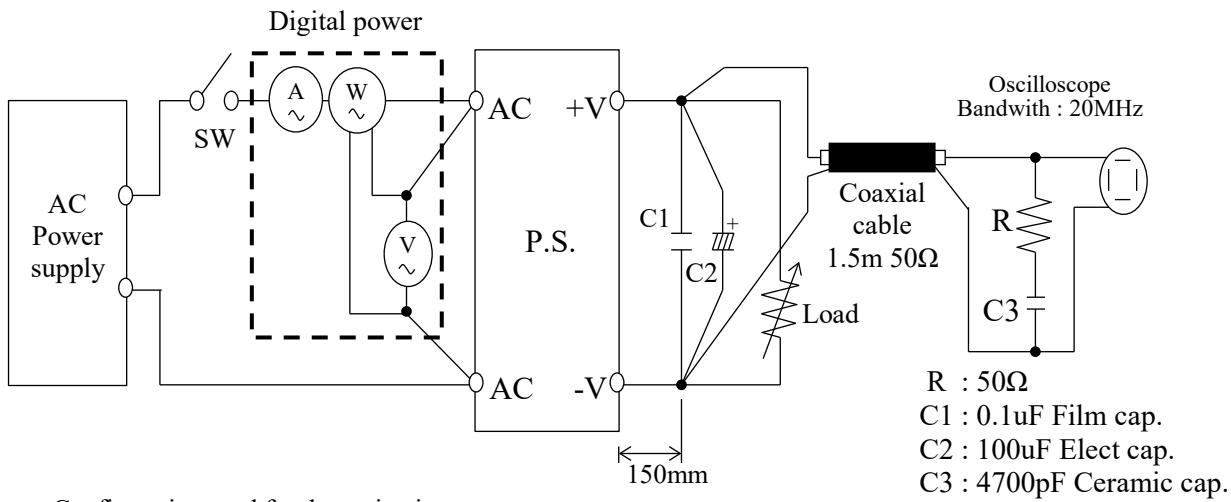
・Patient leakage current



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

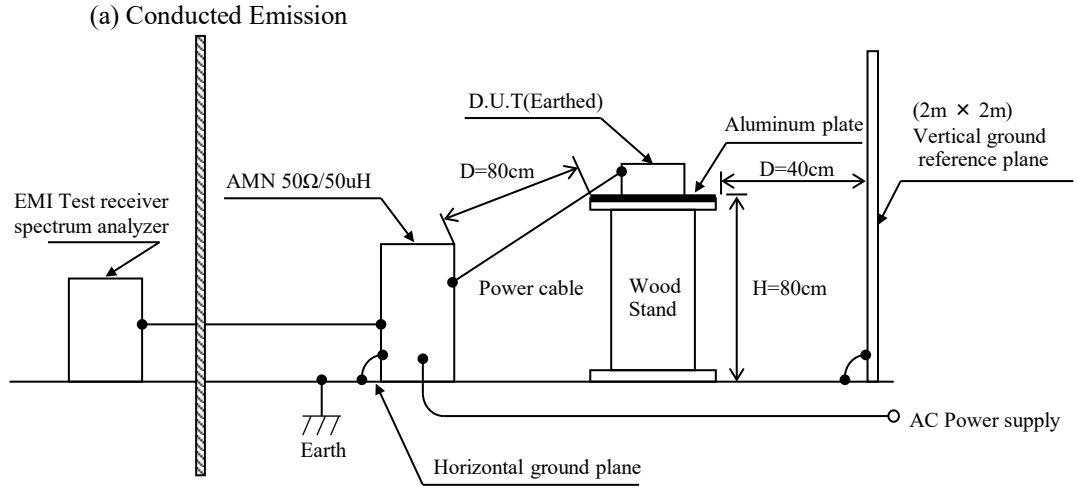


R : 50Ω
C1 : 0.1uF Film cap.
C2 : 100uF Elect cap.
C3 : 4700pF Ceramic cap.

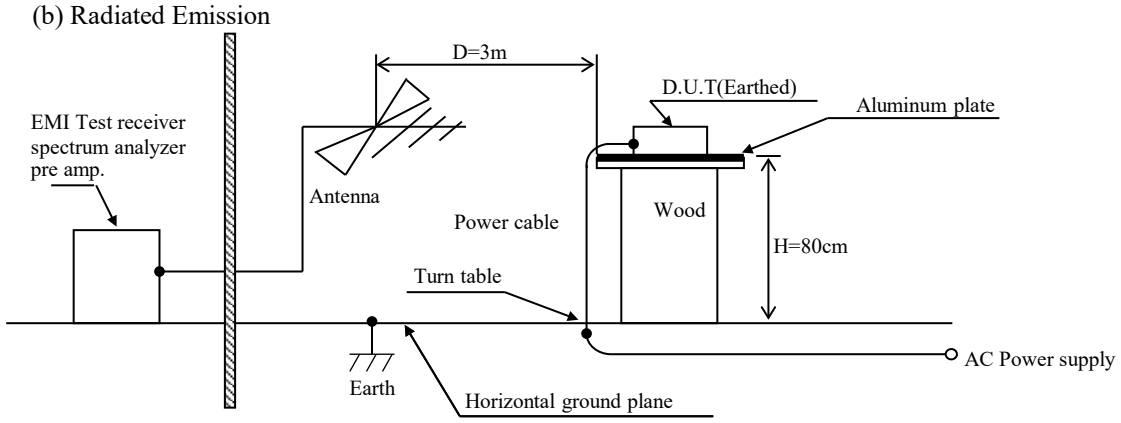
Configuration used for determination

・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%	28.35A	16.7A	11.1A	8.35A
85VAC	90%	51.03A	30.06A	19.98A	15.03A
90 - 265VAC	100%	56.7A	33.4A	22.2A	16.7A
85 - 265VAC	50%Peak	33.35A	16.7A	11.1A	8.35A
85 - 265VAC	Peak	66.7A	33.4A	22.2A	16.7A

*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 % (56.7A)
Istb : 0 %

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	Line regulation	
0%	12.028V	12.025V	12.025V	12.024V	4mV	0.033%
50%	12.010V	12.010V	12.010V	12.009V	1mV	0.008%
100%	-	11.996V	11.996V	11.996V	0mV	0.000%
Peak	-	11.976V	11.976V	11.976V	0mV	0.000%
Load	18mV	29mV	29mV	28mV		
	0.150%	0.242%	0.242%	0.233%		

2. Temperature drift

Condition Vin : 115 VAC
Iout : 100 % (56.7A)
Istb : 0 %

Ta	-20°C	+25°C	+55°C	Temperature stability	
Vout	11.987V	11.996V	11.996V	9mV	0.075%

3. Start up voltage and Drop out voltage

Condition Ta : 25 °C
Iout : Peak (66.7A)
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 % (33.4A)
Istb : 0 %

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	Line regulation	
0%	24.048V	24.045V	24.046V	24.044V	4mV	0.017%
50%	24.025V	24.024V	24.025V	24.024V	1mV	0.004%
100%	-	24.017V	24.017V	24.016V	1mV	0.004%
Load	23mV	28mV	29mV	28mV		
	0.096%	0.117%	0.121%	0.117%		

2. Temperature drift

Condition Vin : 115 VAC
Iout : 100 % (33.4A)
Istb : 0 %

Ta	-20°C	+25°C	+55°C	Temperature stability	
Vout	23.985V	24.017V	24.022V	37mV	0.154%

3. Start up voltage and Drop out voltage

Condition Ta : 25 °C
Iout : 100 % (33.4A)
Istb : 0 %

Start up voltage (Vin)	79.1VAC
Drop out voltage (Vin	78.0VAC

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

36V 1. Regulation - line and load

Condition Ta : 25 ℃
Iout : 100 % (22.2A)
Istb : 0 %

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	Line regulation	
0%	36.084V	36.085V	36.052V	36.080V	33mV	0.092%
50%	36.045V	36.045V	36.045V	36.045V	0mV	0.000%
100%	-	36.037V	36.037V	36.037V	0mV	0.000%
Load	39mV	48mV	15mV	43mV		
	0.108%	0.133%	0.042%	0.119%		

2. Temperature drift

Condition Vin : 115 VAC
Iout : 100 % (22.2A)
Istb : 0 %

Ta	-20°C	+25°C	+55°C	Temperature stability	
Vout	36.002V	36.037V	36.036V	35mV	0.097%

3. Start up voltage and Drop out voltage

Conc Ta : 25 ℃
Iout : 100 % (22.2A)
Istb : 0 %

Start up voltage (Vin)	78.7VAC
Drop out voltage (Vin	77.8VAC

48V 1. Regulation - line and load

Condition Ta : 25 ℃
Iout : 100 % (16.7A)
Istb : 0 %

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	Line regulation	
0%	48.081V	48.094V	48.094V	48.082V	13mV	0.027%
50%	48.039V	48.039V	48.039V	48.038V	1mV	0.002%
100%	-	48.032V	48.032V	48.032V	0mV	0.000%
Load	42mV	62mV	62mV	50mV		
	0.088%	0.129%	0.129%	0.104%		

2. Temperature drift

Condition Vin : 115 VAC
Iout : 100 % (16.7A)
Istb : 0 %

Ta	-20°C	+25°C	+55°C	Temperature stability	
Vout	47.976V	48.032V	48.044V	68mV	0.142%

3. Start up voltage and Drop out voltage

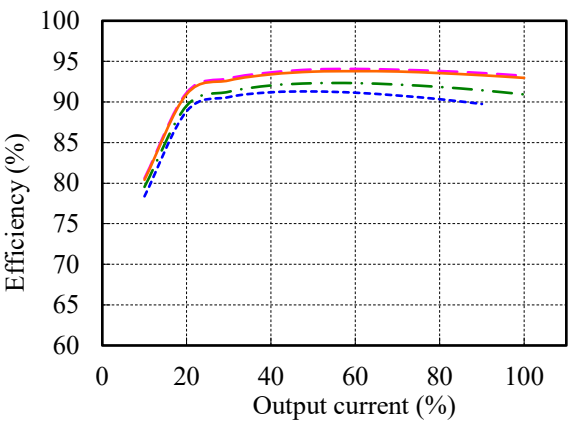
Condition Ta : 25 ℃
Iout : 100 % (16.7A)
Istb : 0 %

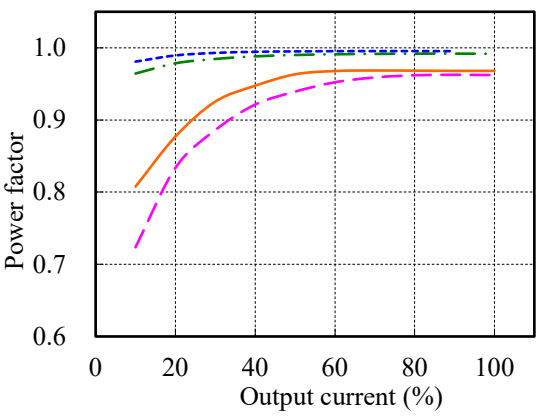
Start up voltage (Vin)	79.4VAC
Drop out voltage (Vin	78.3VAC

(2) Efficiency and Power factor vs. Output current

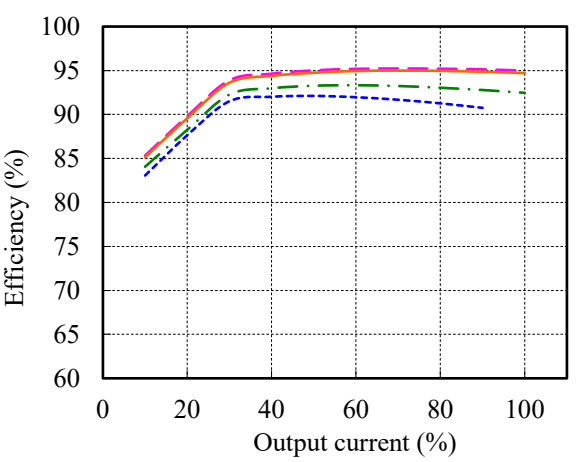
Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 °C
Istb : 0 %

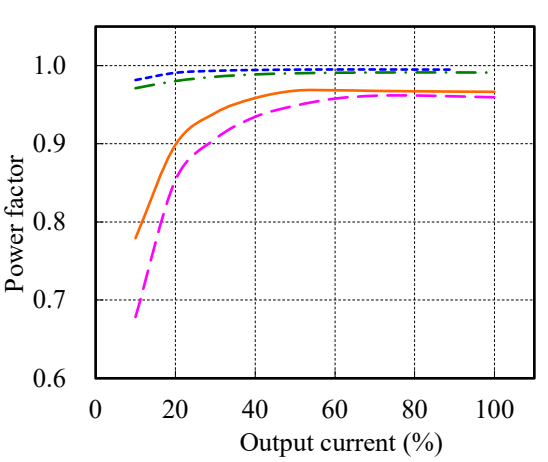
12V



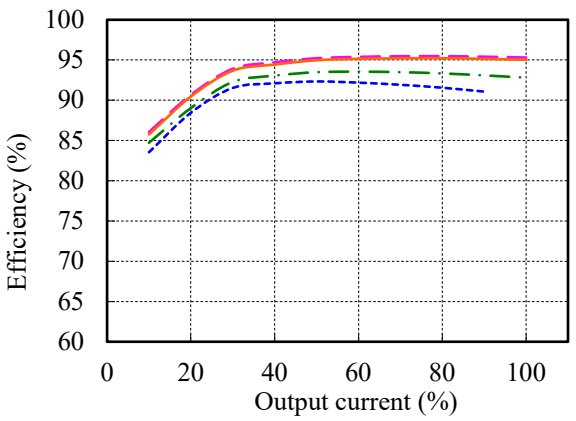


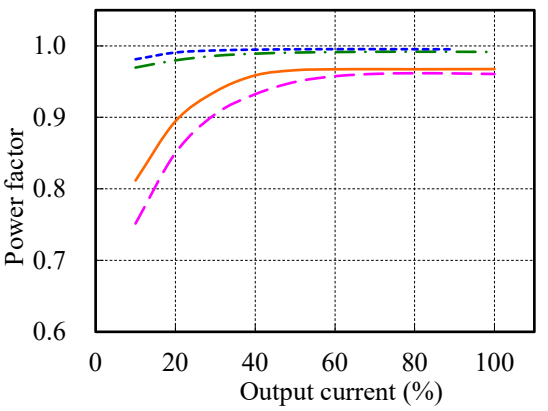
24V



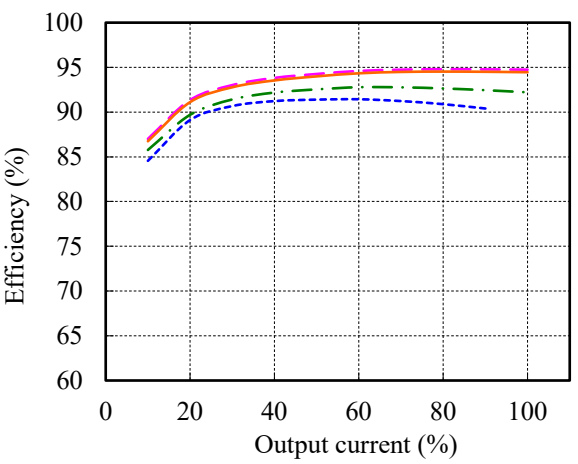


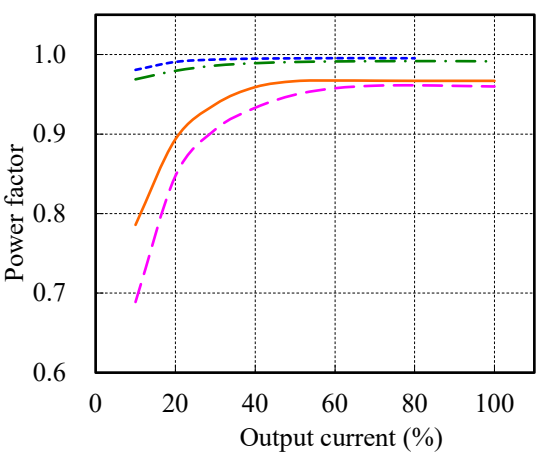
36V





48V



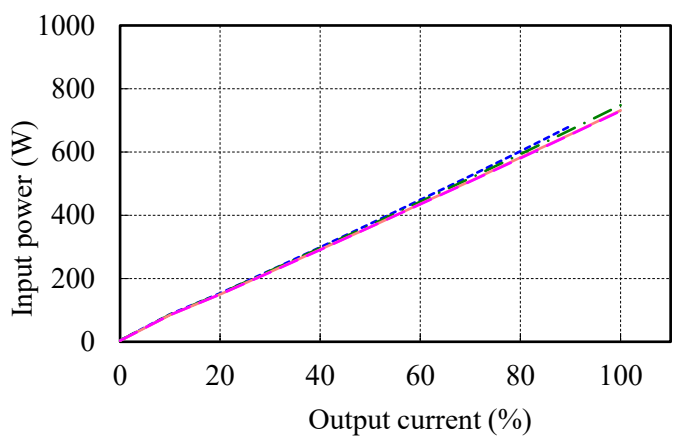


(3) Input power vs. Output current

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

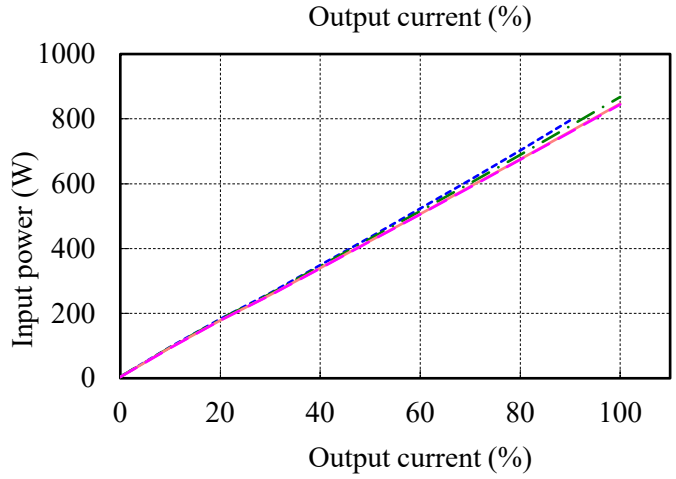
12V

Vin	Input power	
	Iout : 0%	Remote OFF
85VAC	4.4W	0.30W
115VAC	4.4W	0.34W
230VAC	3.2W	0.60W
265VAC	3.5W	0.72W



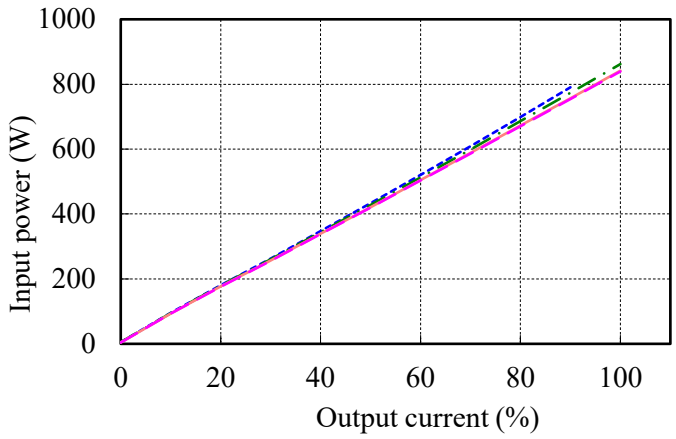
24V

Vin	Input power	
	Iout : 0%	Remote OFF
85VAC	4.7W	0.30W
115VAC	5.0W	0.34W
230VAC	3.9W	0.60W
265VAC	3.9W	0.72W



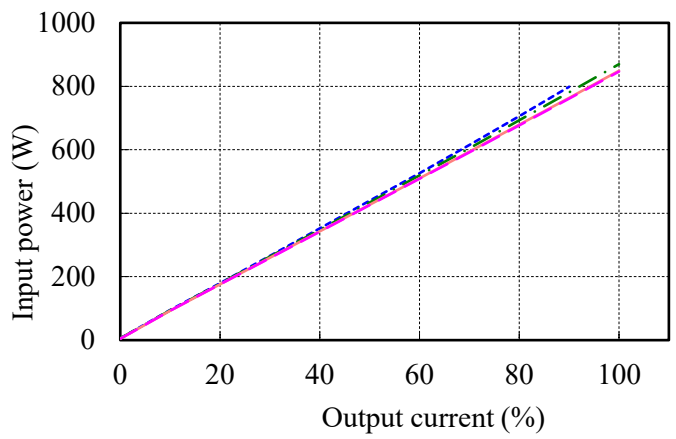
36V

Vin	Input power	
	Iout : 0%	Remote OFF
85VAC	5.0W	0.31W
115VAC	5.4W	0.34W
230VAC	4.0W	0.61W
265VAC	4.0W	0.73W



48V

Vin	Input power	
	Iout : 0%	Remote OFF
85VAC	5.6W	0.30W
115VAC	5.8W	0.34W
230VAC	4.4W	0.60W
265VAC	4.4W	0.72W

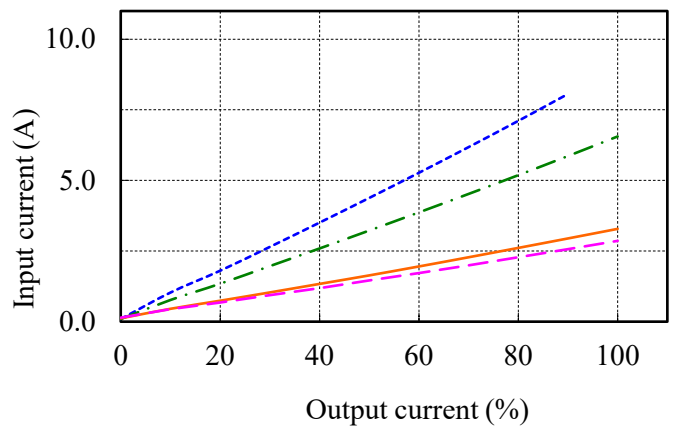


(4) Input current vs. Output current

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

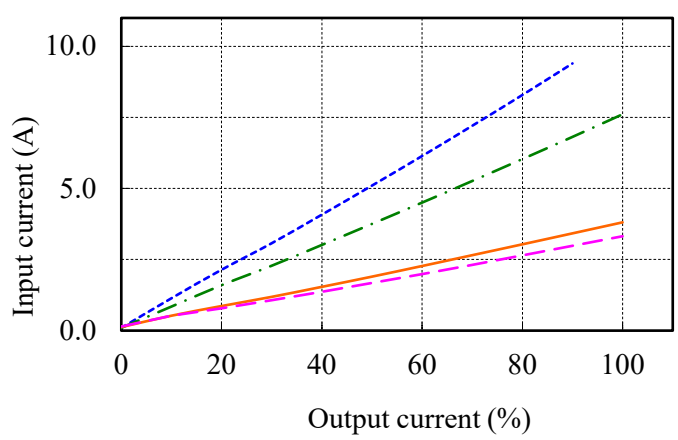
12V

Vin	Input current	
	Iout : 0%	Remote OFF
85VAC	0.09A	0.04A
115VAC	0.09A	0.05A
230VAC	0.12A	0.11A
265VAC	0.14A	0.12A



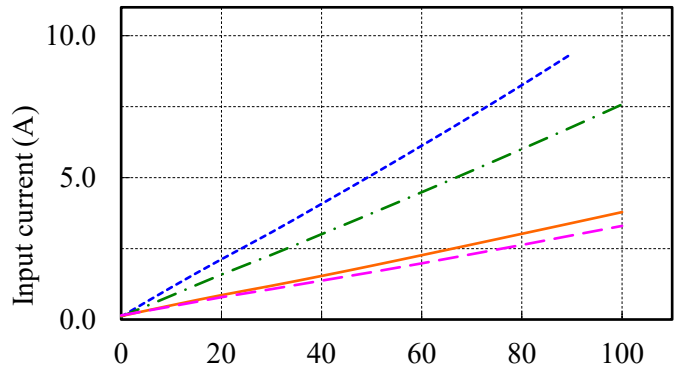
24V

Vin	Input current	
	Iout : 0%	Remote OFF
85VAC	0.10A	0.04A
115VAC	0.10A	0.05A
230VAC	0.12A	0.11A
265VAC	0.15A	0.12A



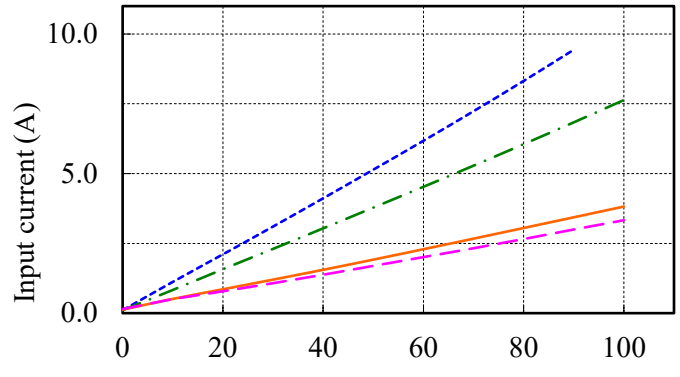
36V

Vin	Input current	
	Iout : 0%	Remote OFF
85VAC	0.10A	0.04A
115VAC	0.10A	0.05A
230VAC	0.12A	0.11A
265VAC	0.15A	0.12A



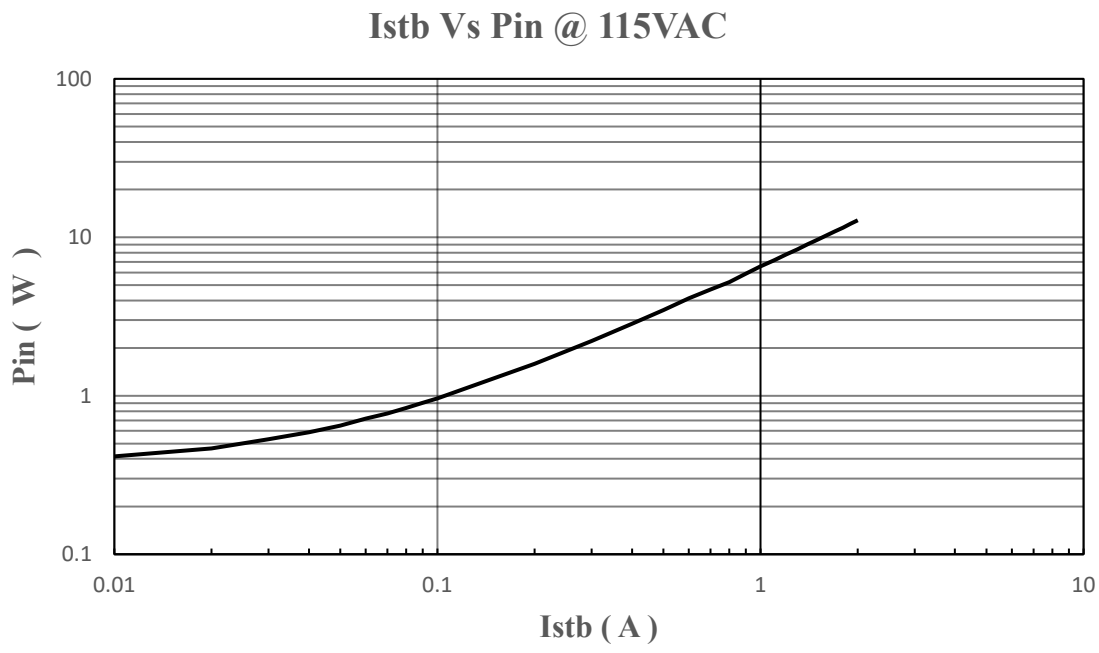
48V

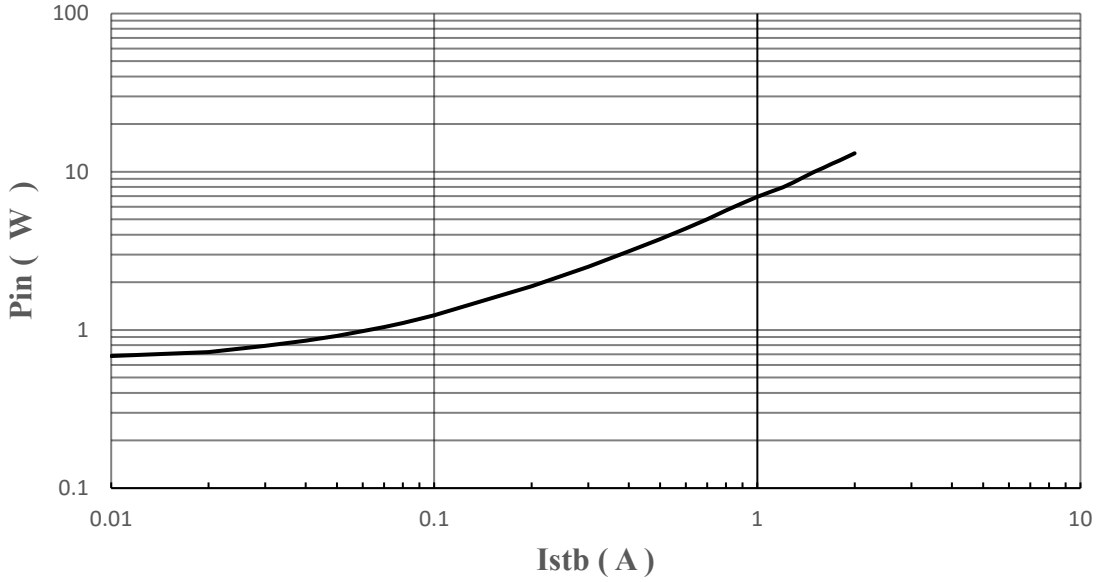
Vin	Input current	
	Iout : 0%	Remote OFF
85VAC	0.11A	0.04A
115VAC	0.11A	0.05A
230VAC	0.13A	0.11A
265VAC	0.15A	0.12A



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

Condition : Remote OFF

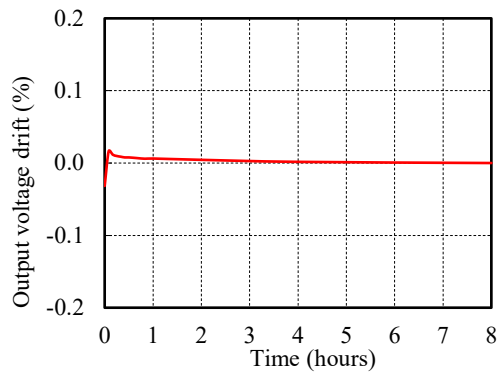




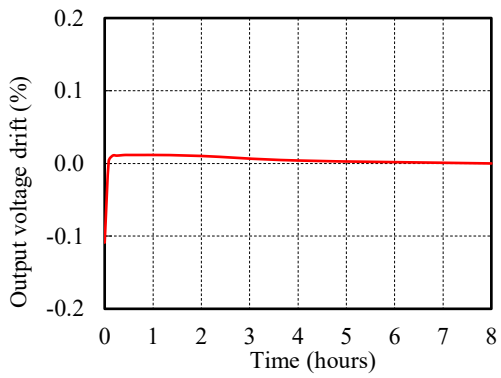
2-2. Warm up voltage drift characteristics

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

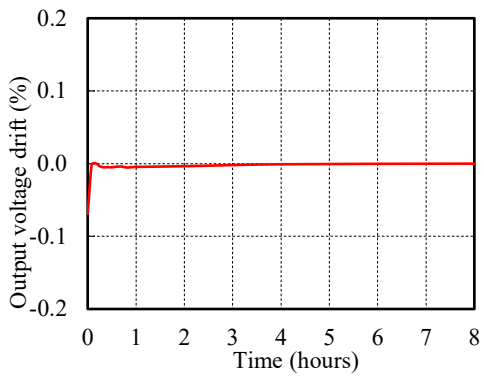
12V



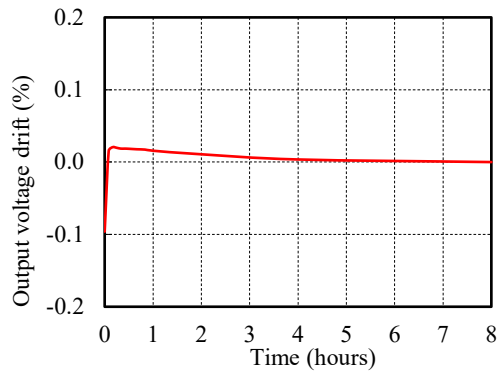
24V



36V

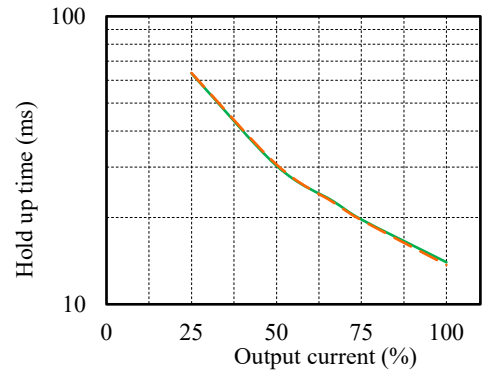


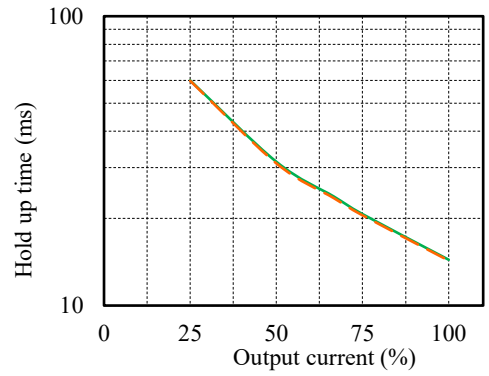
48V

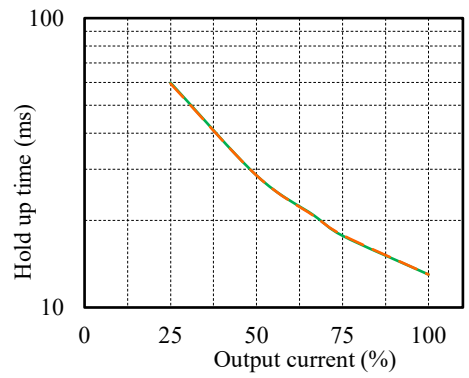


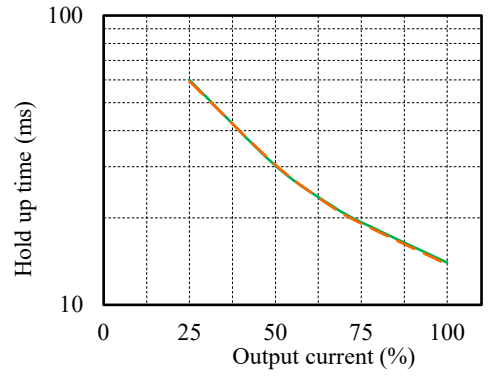
2-3. Hold up time characteristics

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





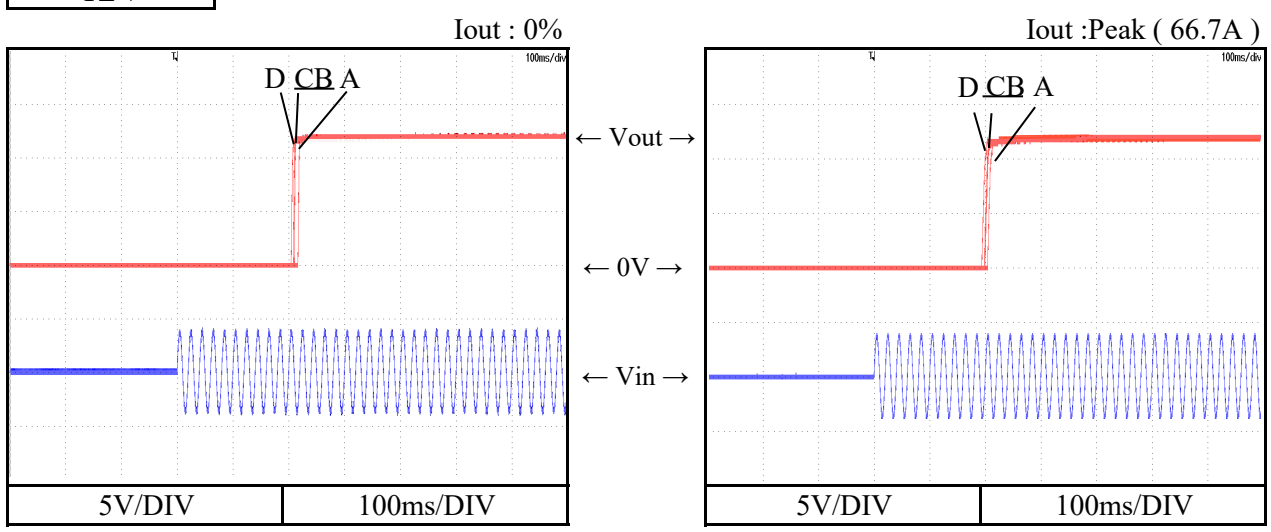




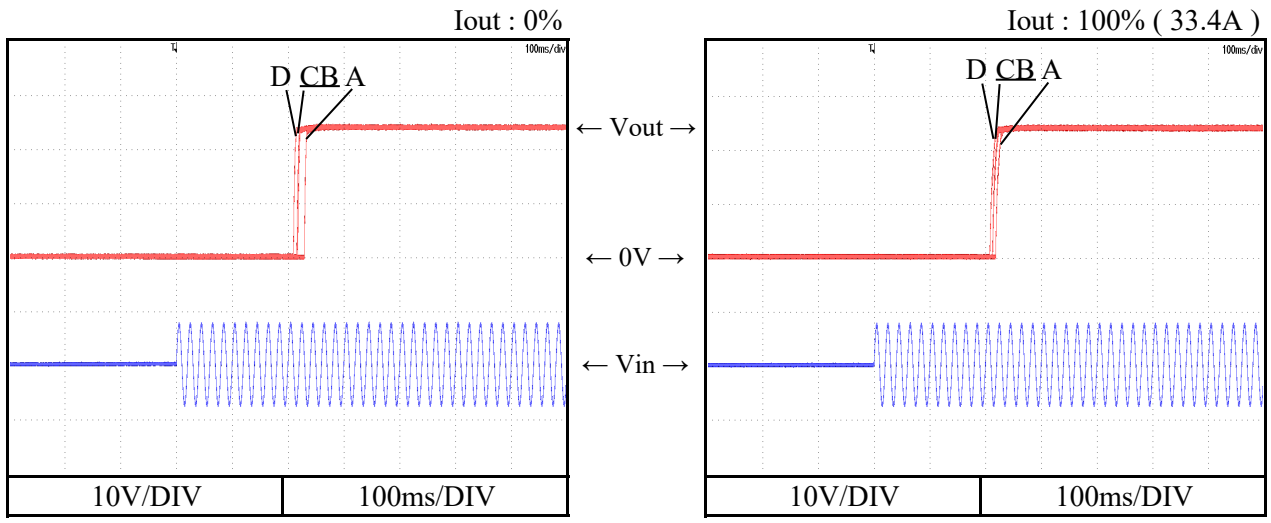
2-4. Output rise characteristics

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

12V



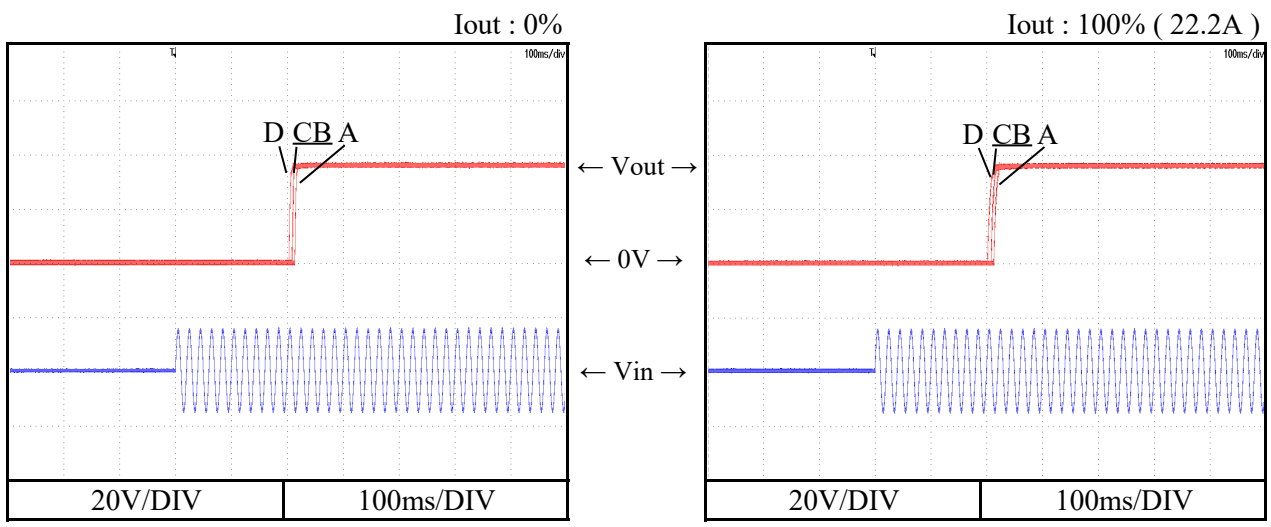
24V



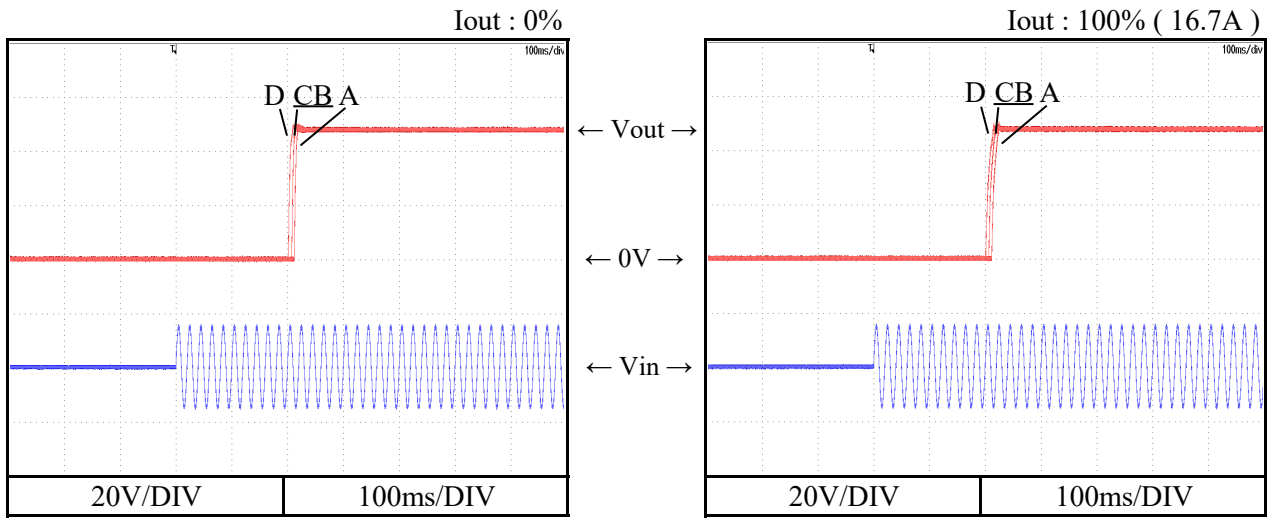
2-4. Output rise characteristics

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

36V



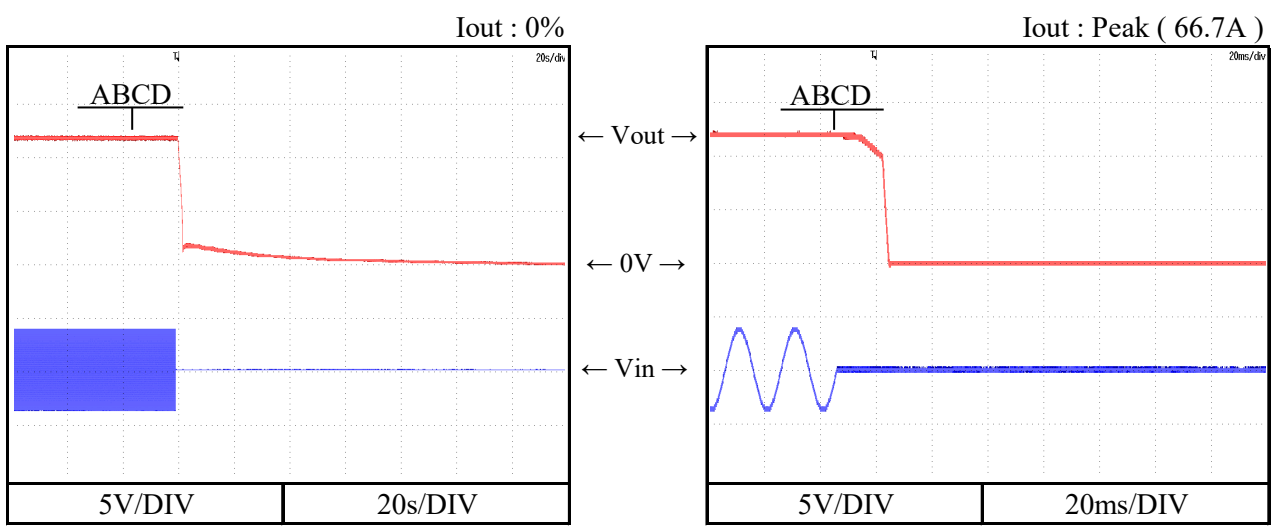
48V



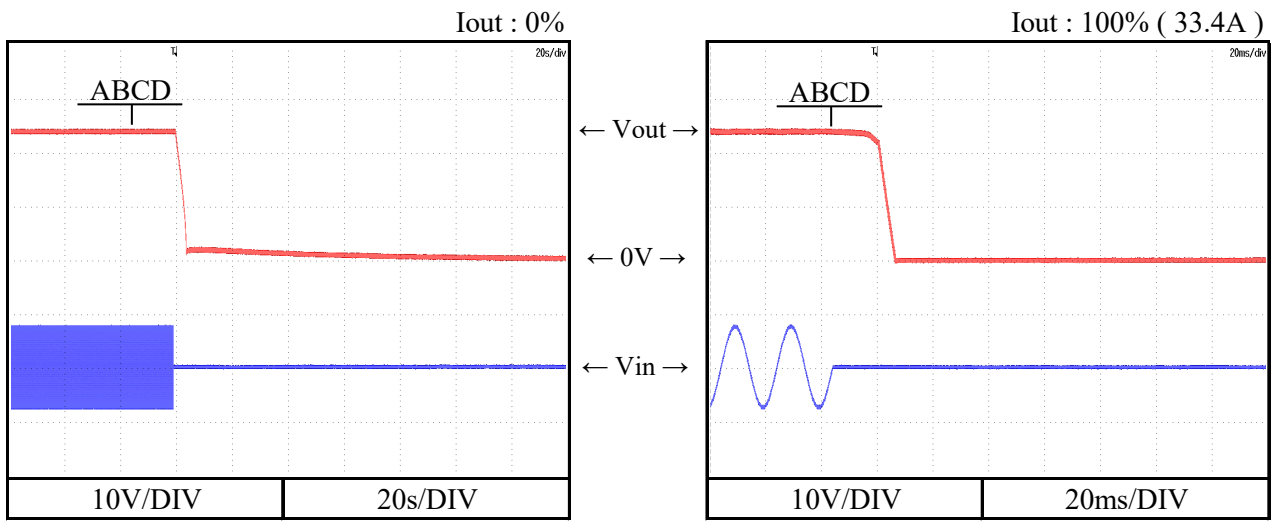
2-5. Output fall characteristics

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

12V



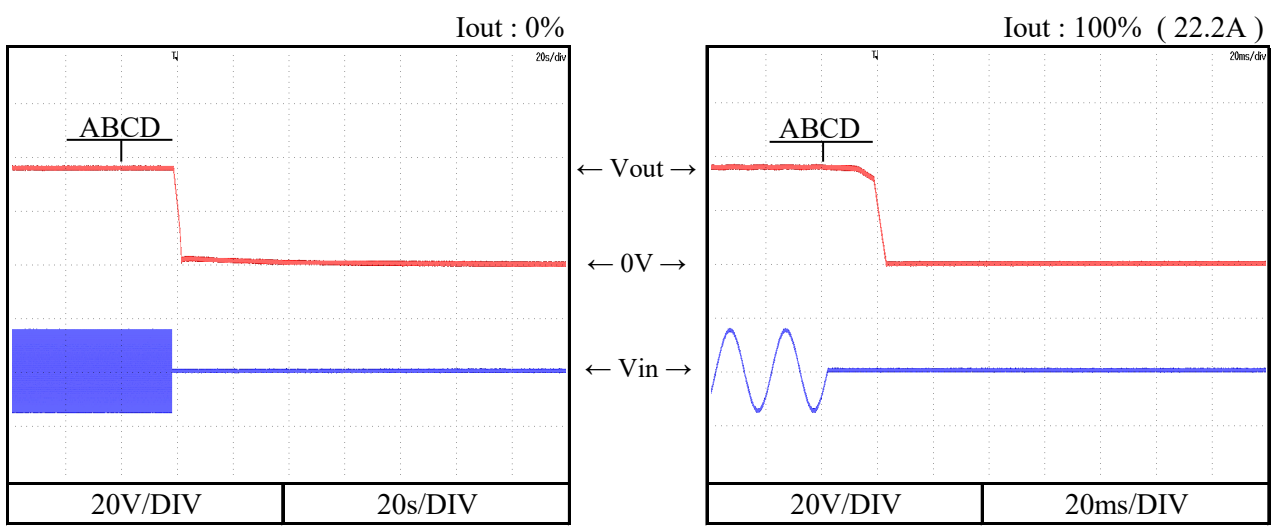
24V



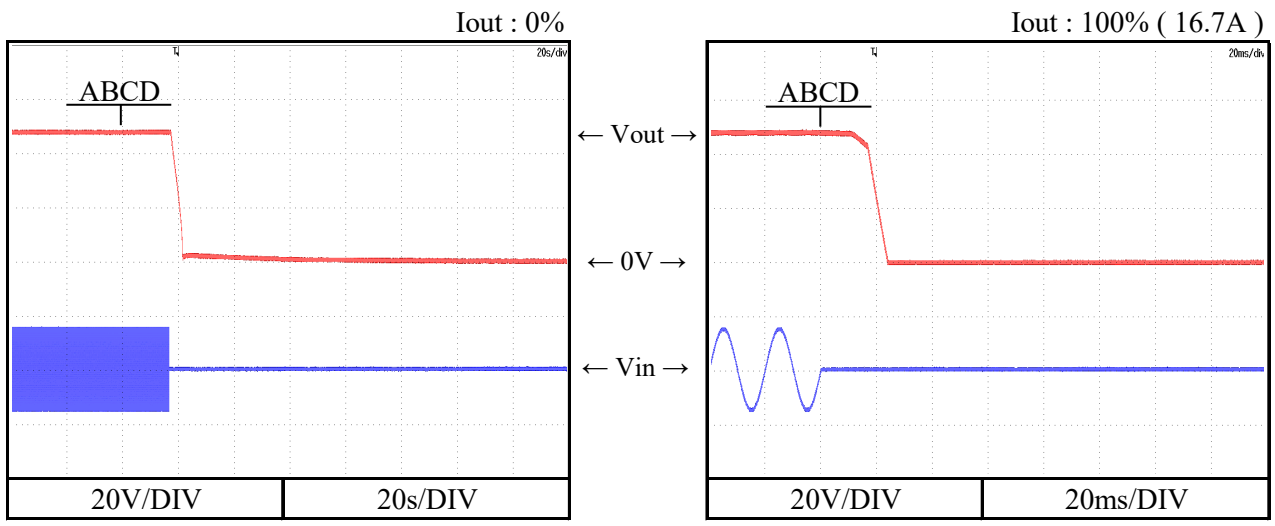
2-5. Output fall characteristics

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

36V



48V

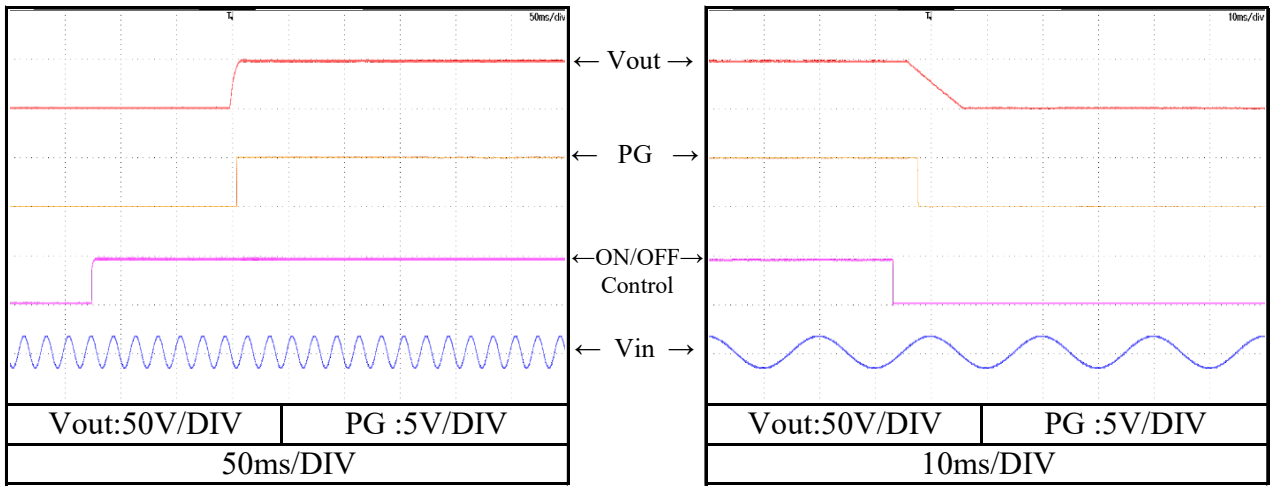


2-6. Various signal

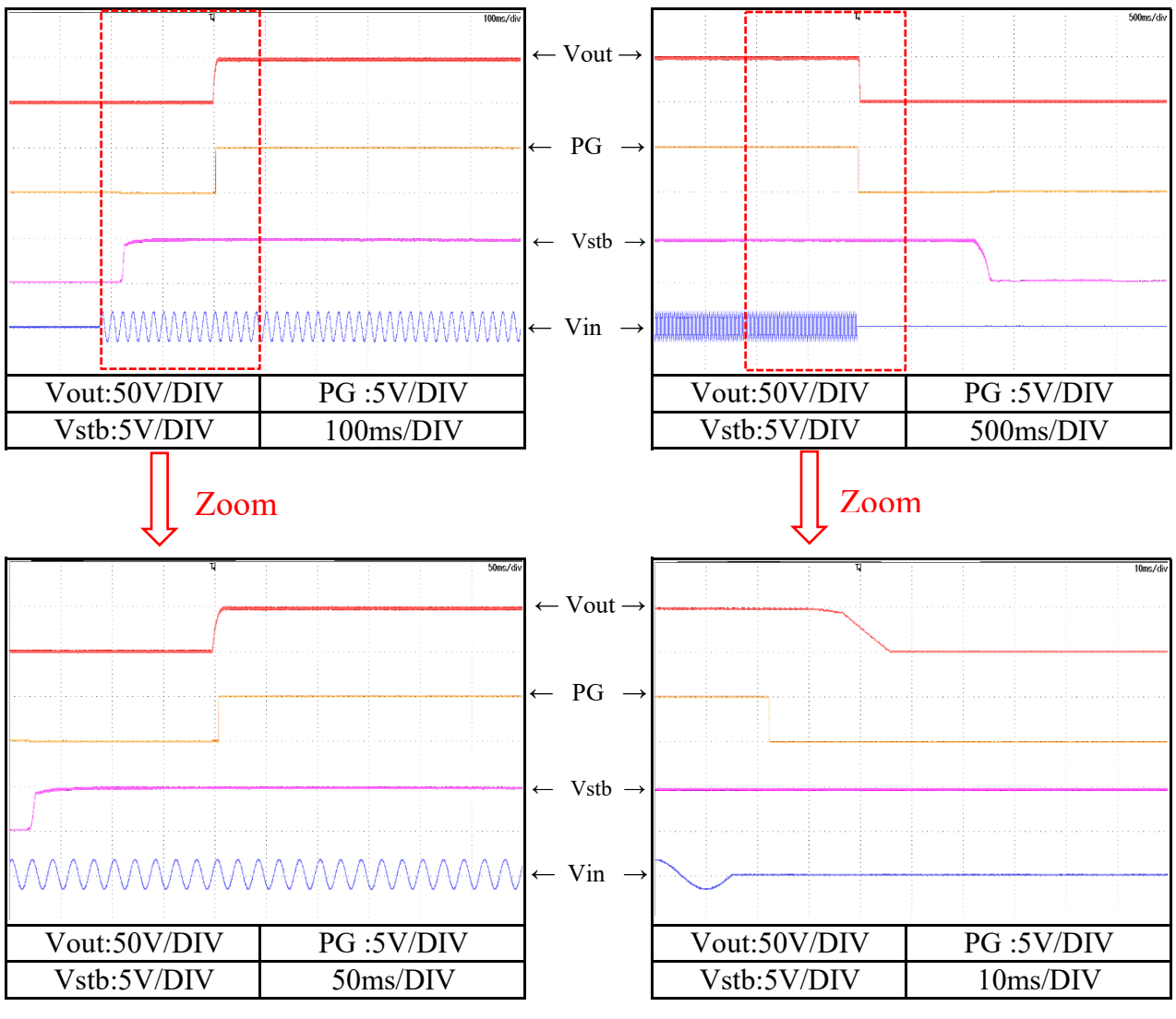
Conditions Vin : 115 VAC
Iout : 100 %
Istb : 100 %
Ta : 25 °C

Output rise, fall characteristics with Remote ON/OFF Control

48V



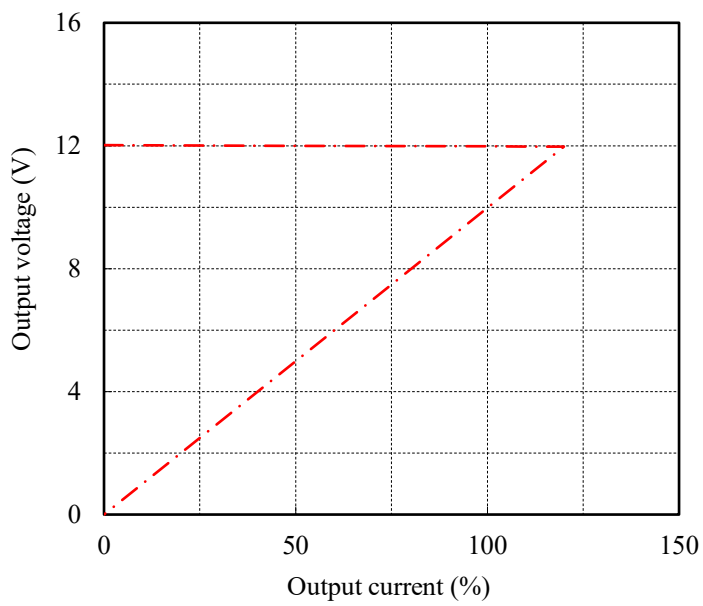
Output rise, fall characteristics with Input voltage ON/OFF



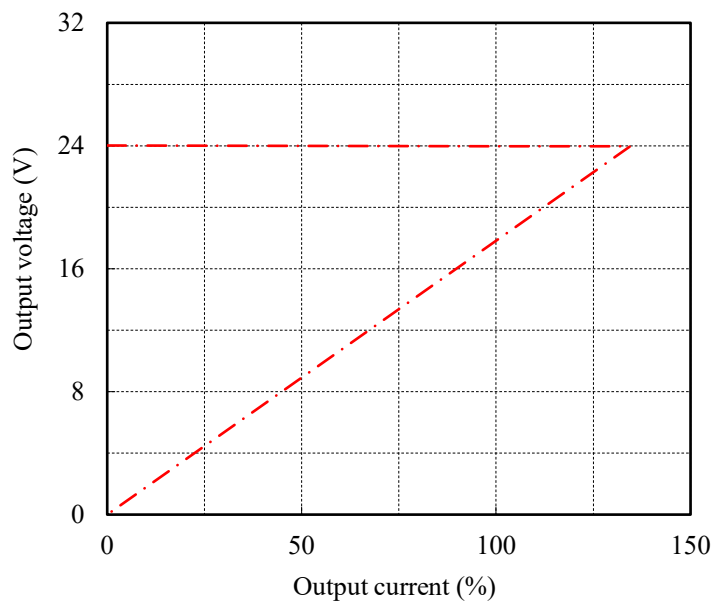
2-7. Over current protection (OCP) characteristics

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

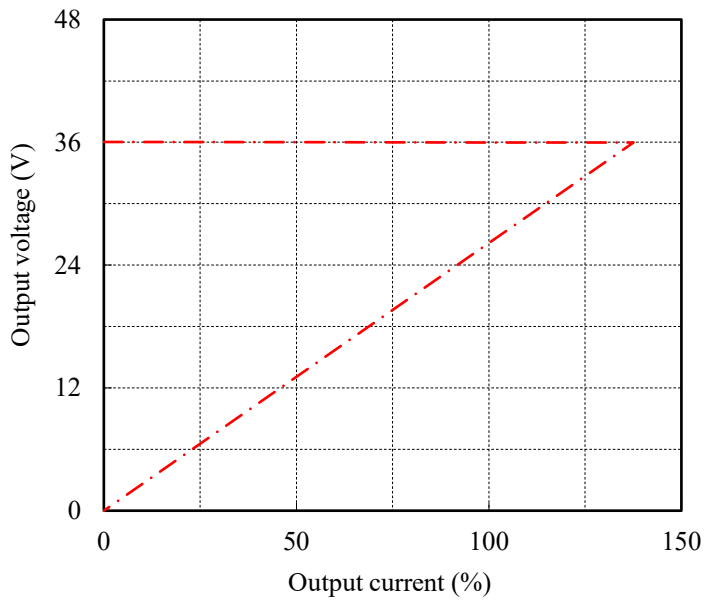
12V



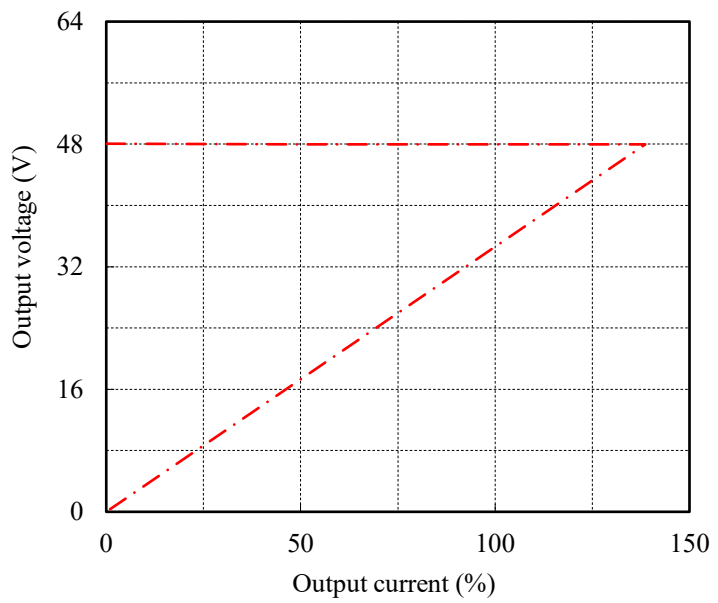
24V



36V



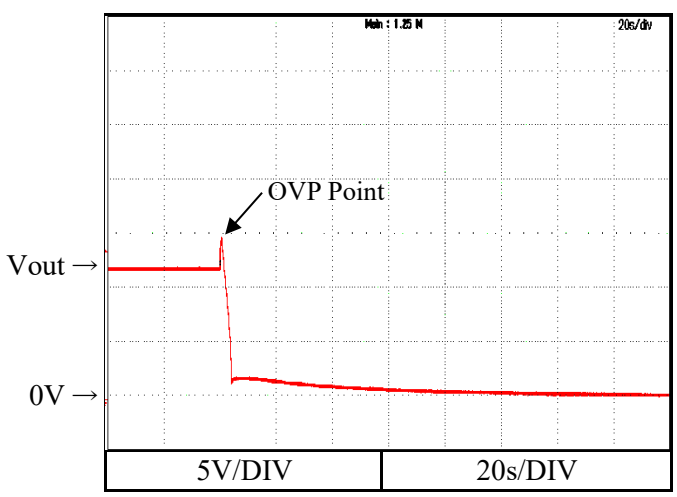
48V



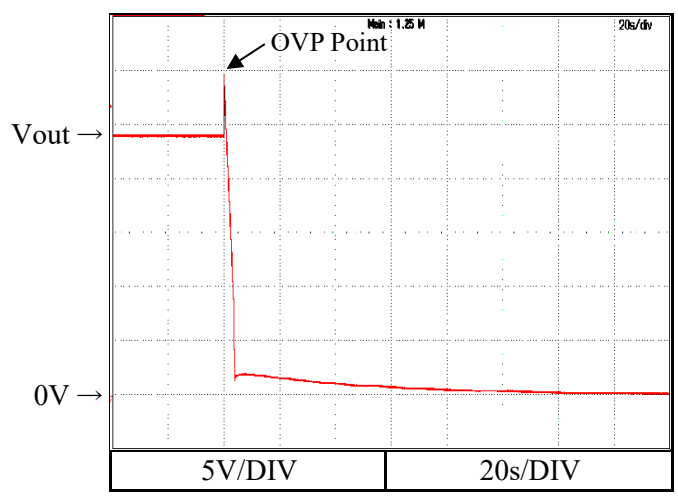
2-8. Over voltage protection (OVP) characteristics

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

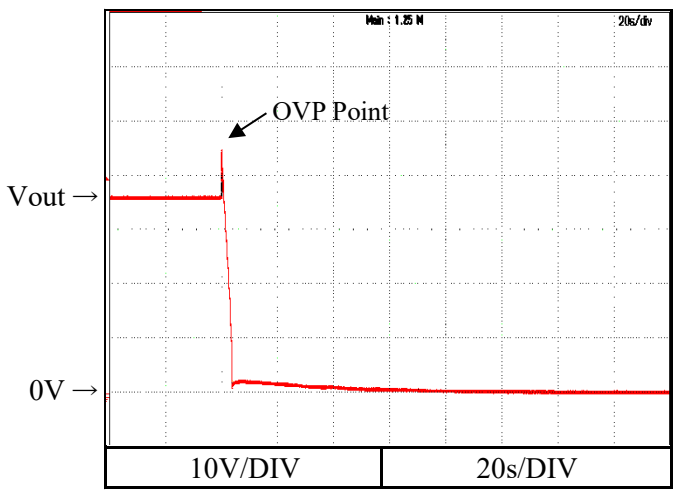
12V



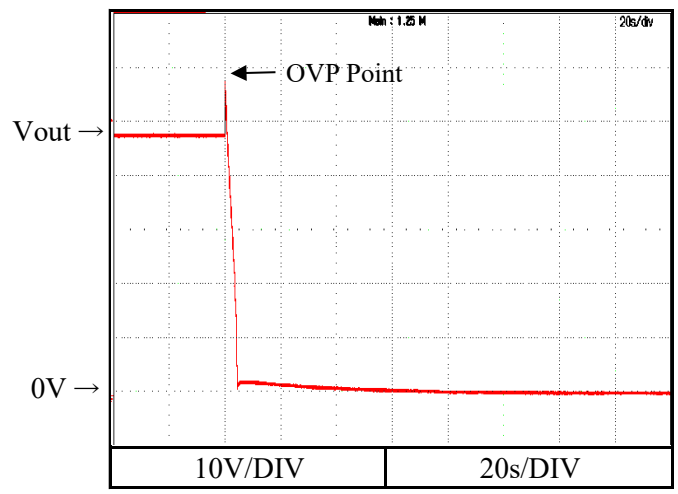
24V



36V



48V

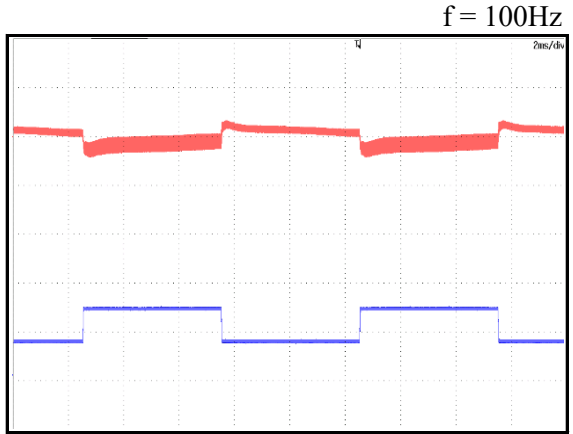


2-9. Dynamic load response characteristics

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

12V

f = 100Hz



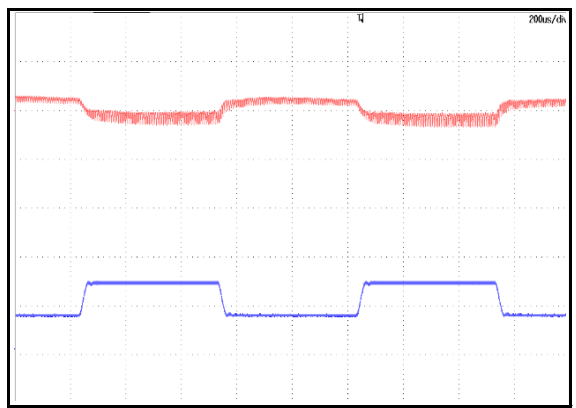
500mV/DIV	2ms/DIV
2ms/DIV	
+1.37%	-1.75%

←Vout →

←Iout→

←Iout:0%→

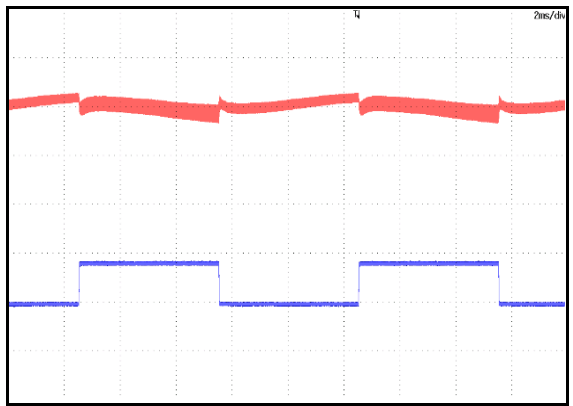
f = 1kHz



500mV/DIV	200µs/DIV
200µs/DIV	
+1.23%	-1.44%

24V

f = 100Hz



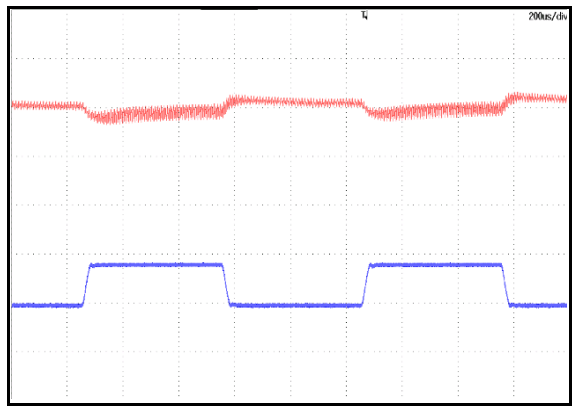
500mV/DIV	2ms/DIV
2ms/DIV	
+0.55%	-0.64%

← Vout →

← Iout →

← Iout:0% →

f = 1kHz



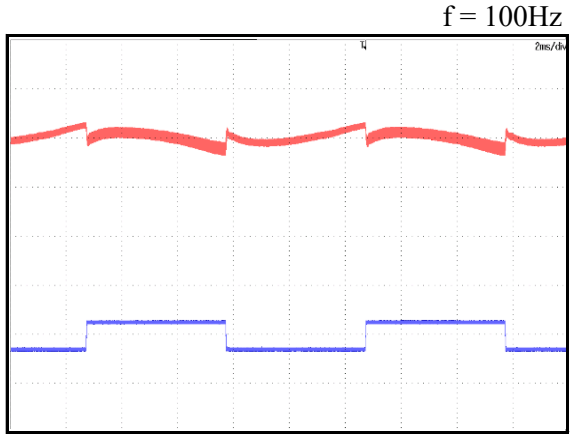
500mV/DIV	200µs/DIV
200µs/DIV	
+0.64%	-0.61%

2-9. Dynamic load response characteristics

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

36V

f = 100Hz



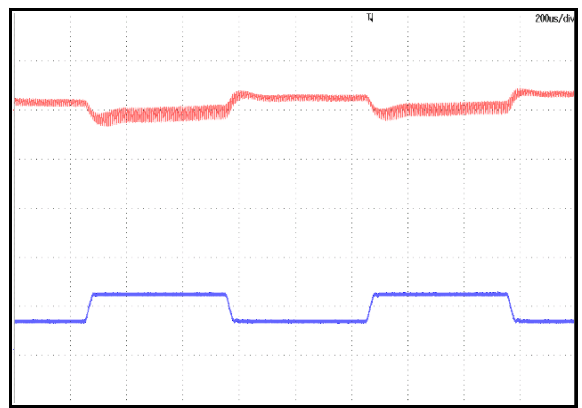
500mV/DIV	2ms/DIV
2ms/DIV	
+0.38%	-0.51%

←Vout→

← Iout →

← Iout:0% →

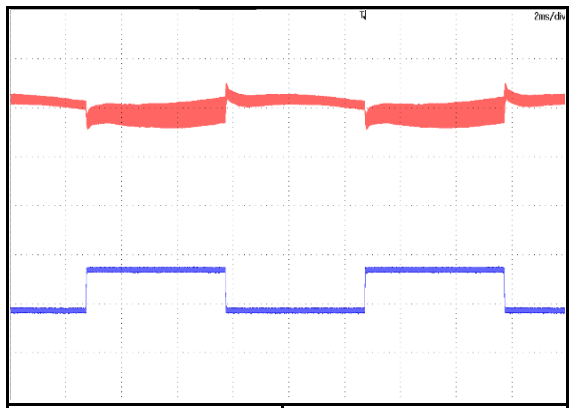
f = 1kHz



500mV/DIV	200µs/DIV
200us/DIV	
+0.53%	-0.48%

48V

f = 100Hz



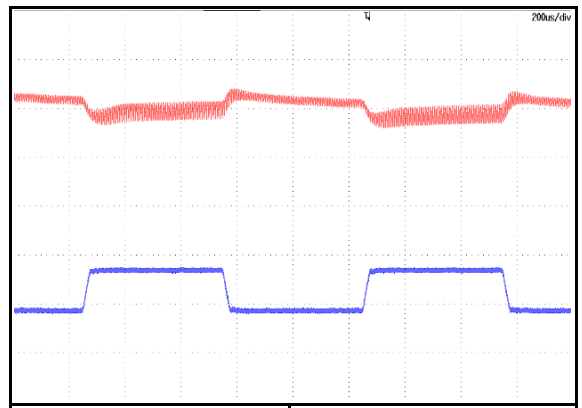
500mV/DIV	2ms/DIV
2ms/DIV	
+0.44%	-0.46%

←Vout→

←Iout→

←Iout:0%→

f = 1kHz



500mV/DIV	200µs/DIV
200us/DIV	
+0.53%	-0.38%

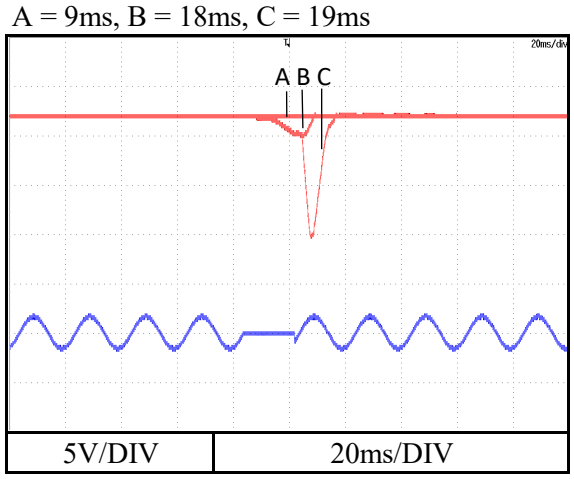
2-10. Response to brown out characteristics

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.

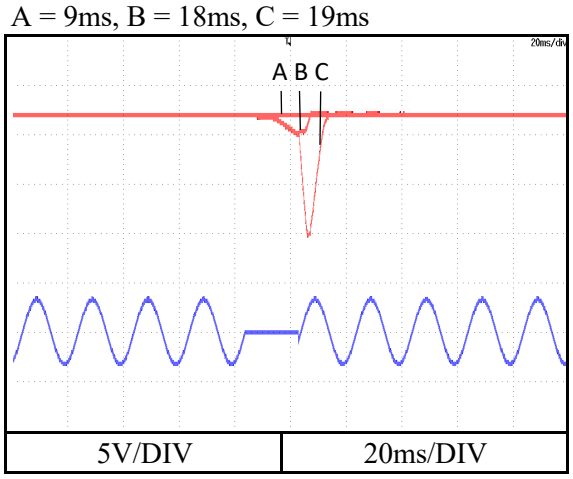
12V

Vin : 115VAC
A = 9ms, B = 18ms, C = 19ms



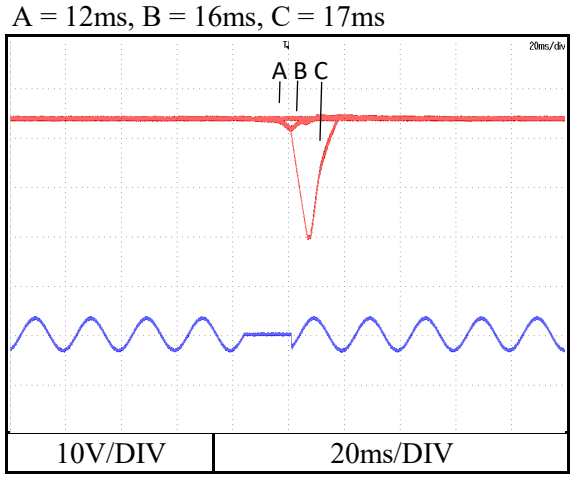
←Vout→
←0V→
←Vin→

Vin : 230VAC
A = 9ms, B = 18ms, C = 19ms



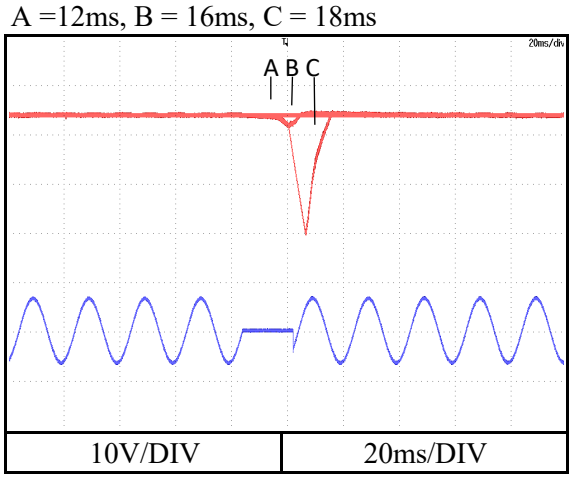
24V

Vin : 115VAC
A = 12ms, B = 16ms, C = 17ms



←Vout→
←0V→
←Vin→

Vin : 230VAC
A =12ms, B = 16ms, C = 18ms



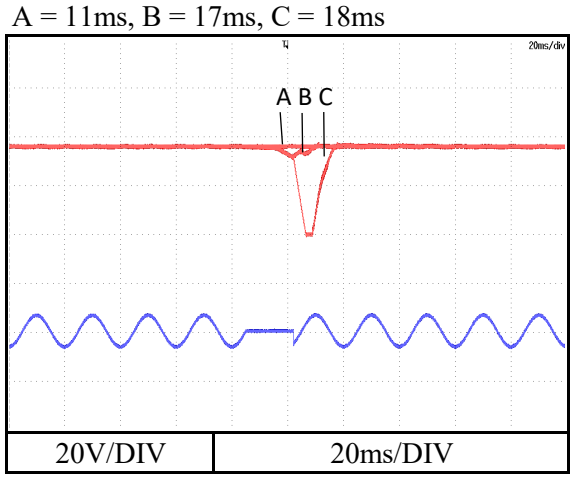
2-10. Response to brown out characteristics

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.

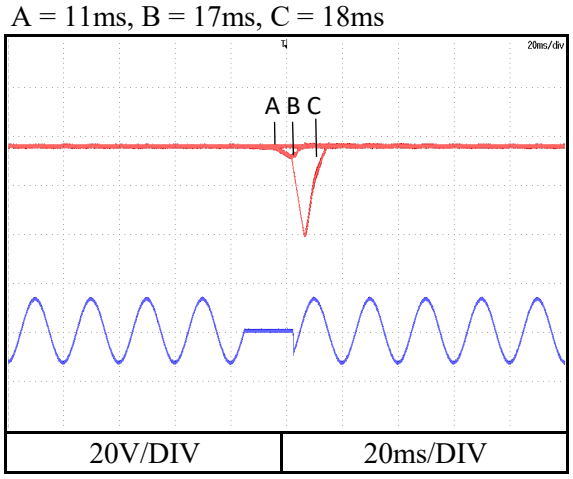
36V

Vin : 115VAC
A = 11ms, B = 17ms, C = 18ms



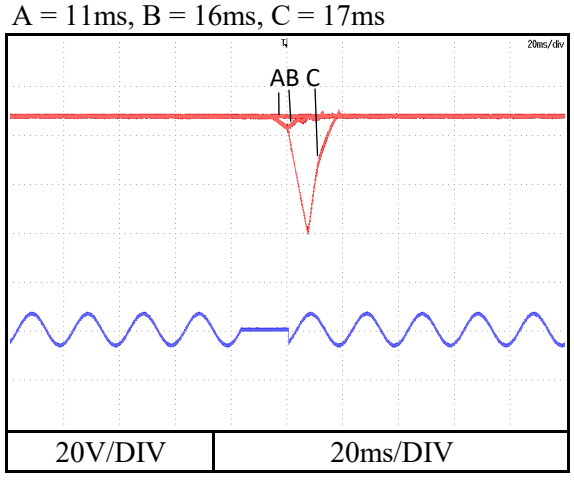
←Vout→
←0V→
←Vin→

Vin : 230VAC
A = 11ms, B = 17ms, C = 18ms



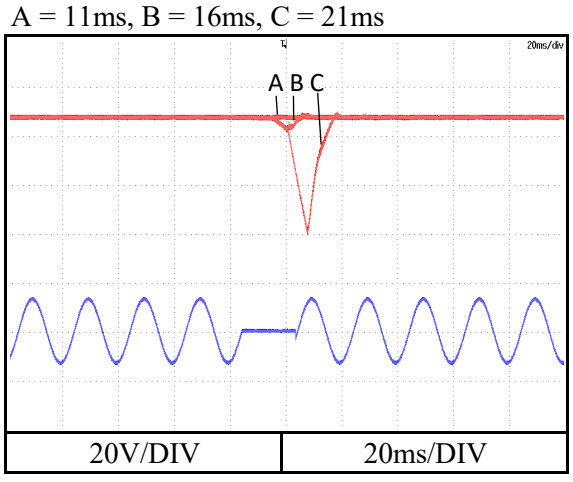
48V

Vin : 115VAC
A = 11ms, B = 16ms, C = 17ms



←Vout→
←0V→
←Vin→

Vin : 230VAC
A = 11ms, B = 16ms, C = 21ms

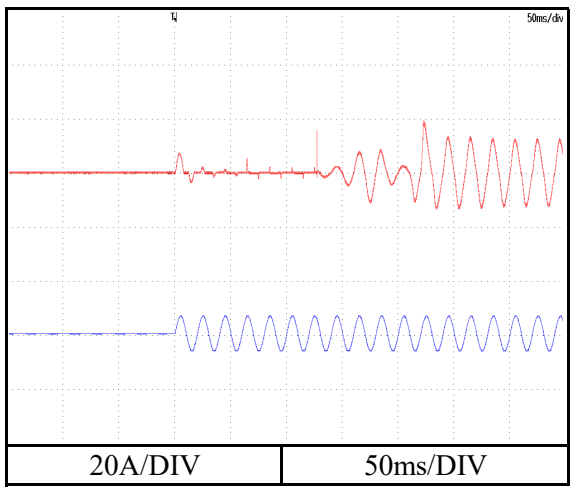


2-11. Inrush current waveform

Conditions Vin : 115 VAC
Iout : 100 % (16.7A)
Istb : 100 %
Ta : 25 °C

48V

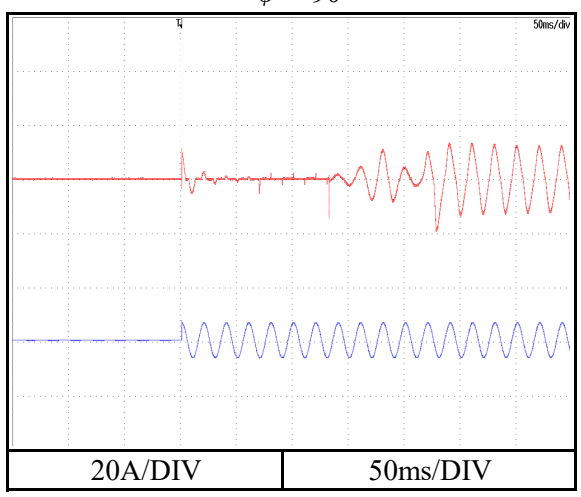
Switch on phase angle of input AC voltage
ϕ = 0°



← Iin →

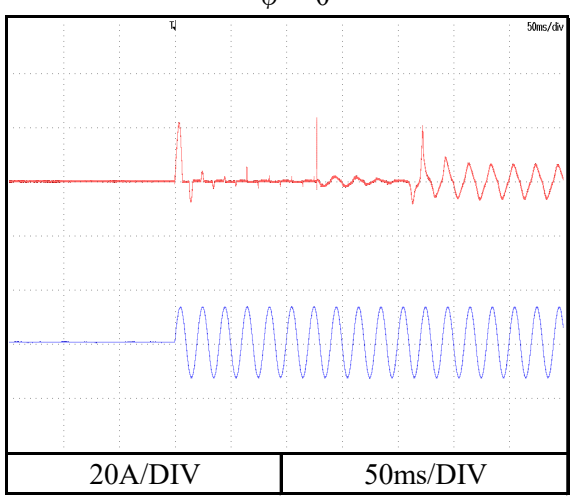
← Vin →

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



Conditions Vin : 230 VAC
Iout : 100 % (16.7A)
Istb : 100 %
Ta : 25 °C

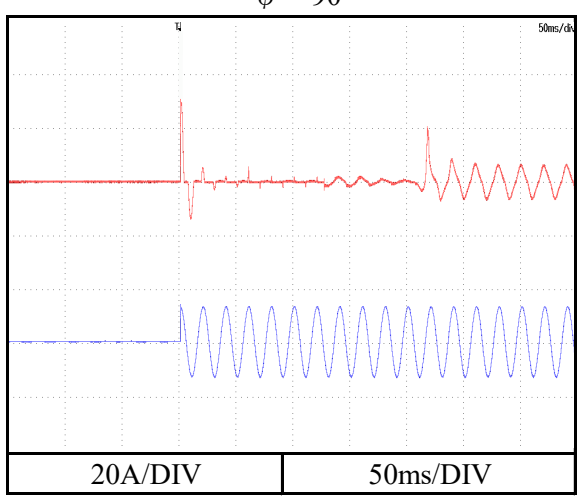
Switch on phase angle of input AC voltage
ϕ = 0°



← Iin →

← Vin →

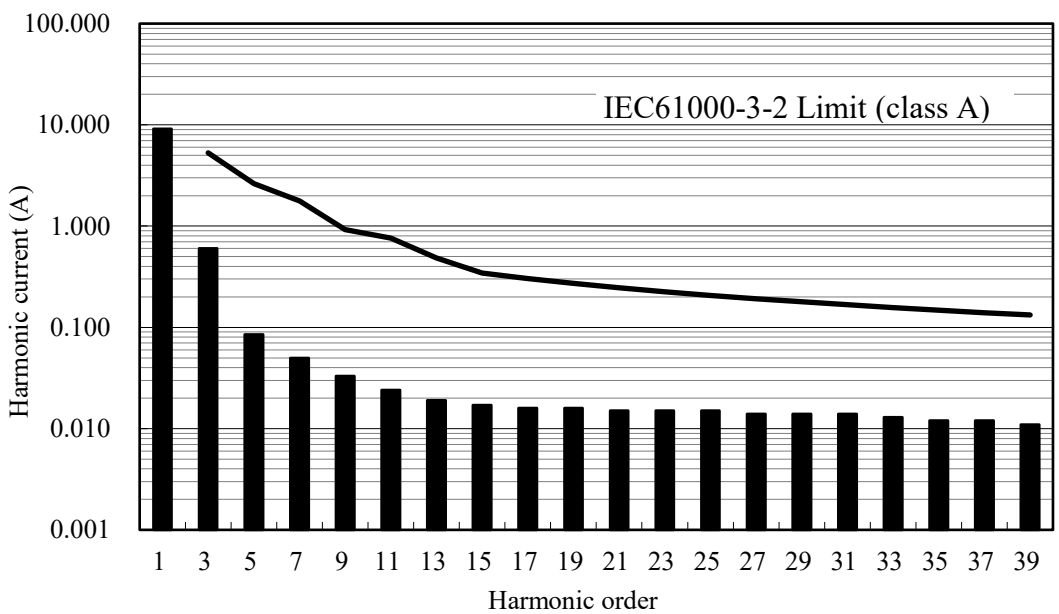
Switch on phase angle of input AC voltage
ϕ = 90°



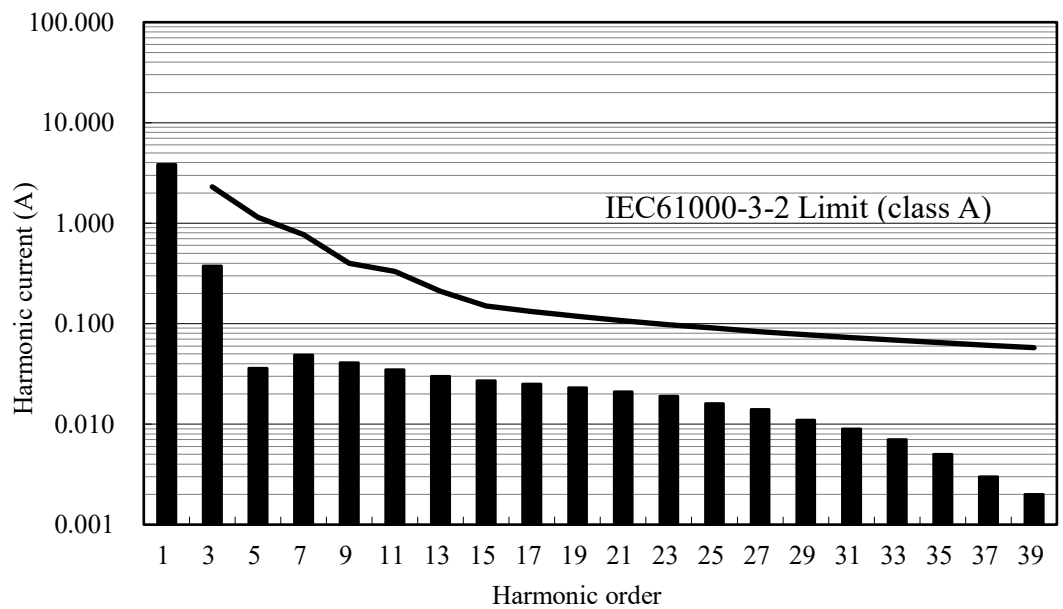
2-12. Input current harmonics

Conditions
Vin : 100 VAC
Iout : 16.7 A (100%)
Istb : 100 %
Ta : 25 °C

48V



Conditions
Vin : 230 VAC
Iout : 16.7 A (100%)
Istb : 100 %
Ta : 25 °C

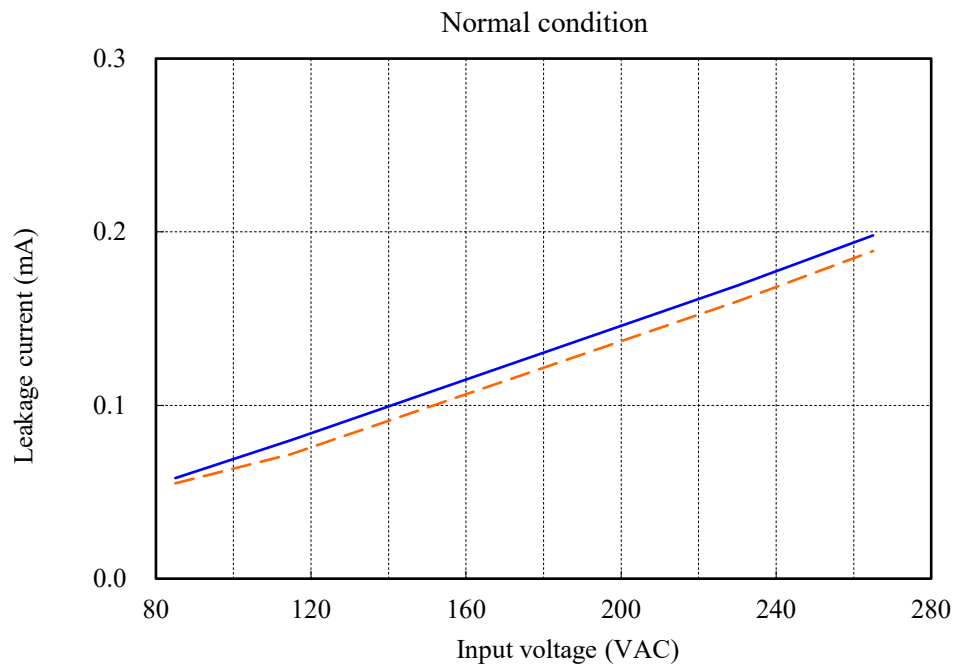


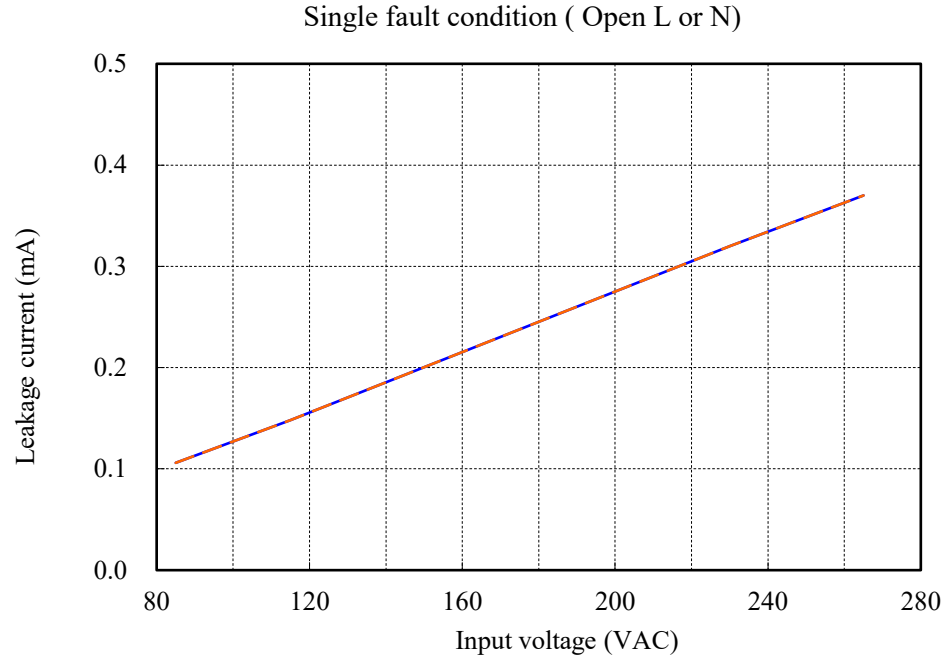
2-13. Leakage current characteristics

Earth leakage current of CLASS I equipment

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

48V



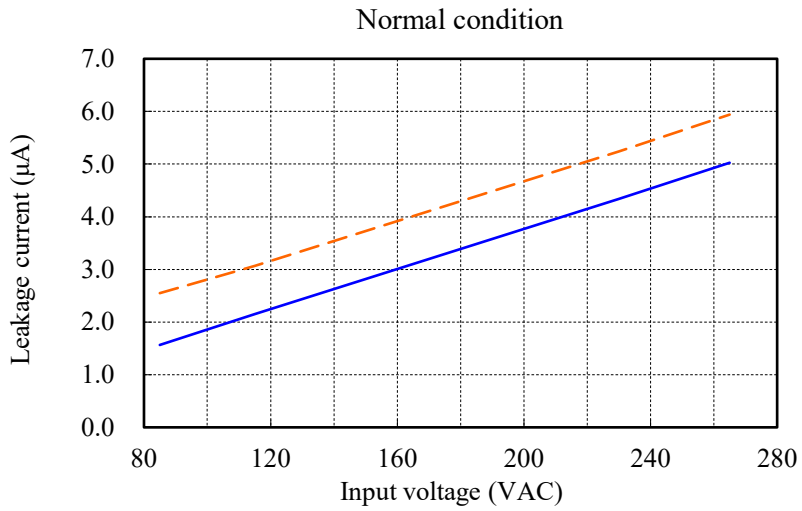


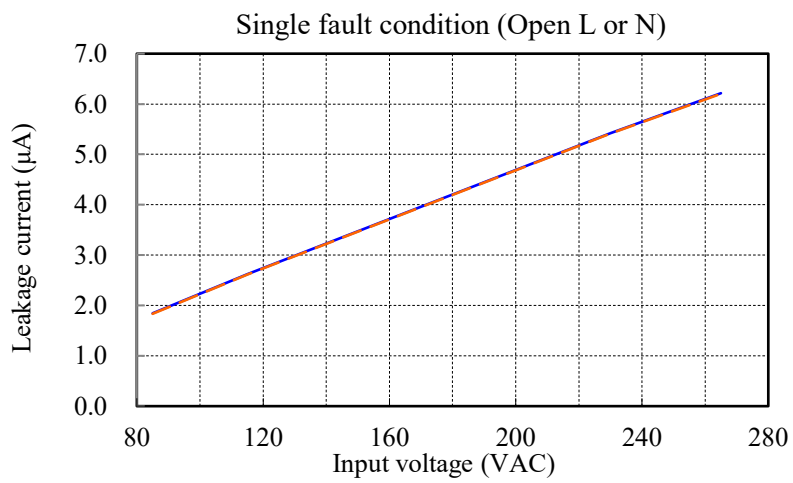
2-13. Leakage current characteristics

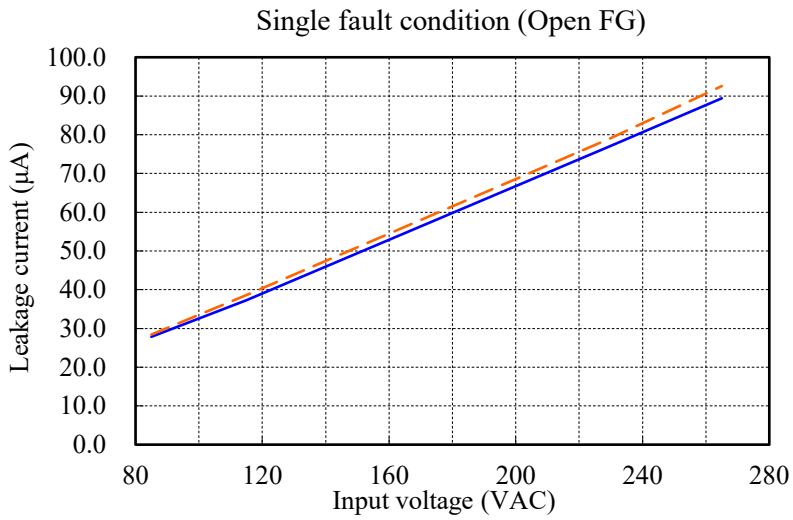
Patient leakage current of CLASS I equipment

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

48V



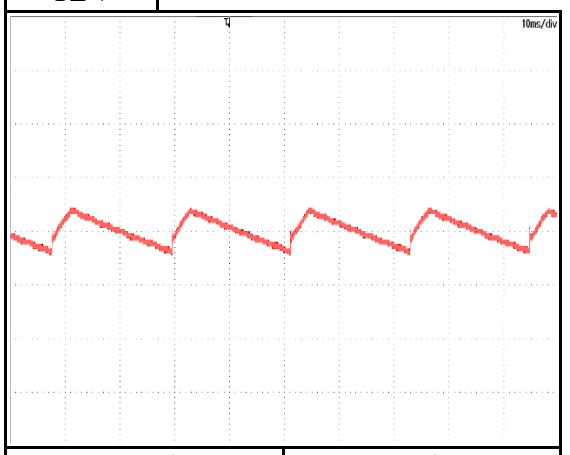




2-14. Output ripple and noise waveform

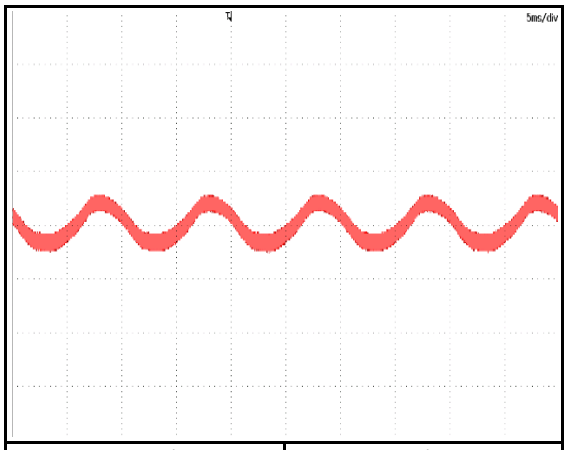
Conditions Vin : 115 VAC
Istb : 100 %
Ta : 25 °C

12V Iout : 0 %



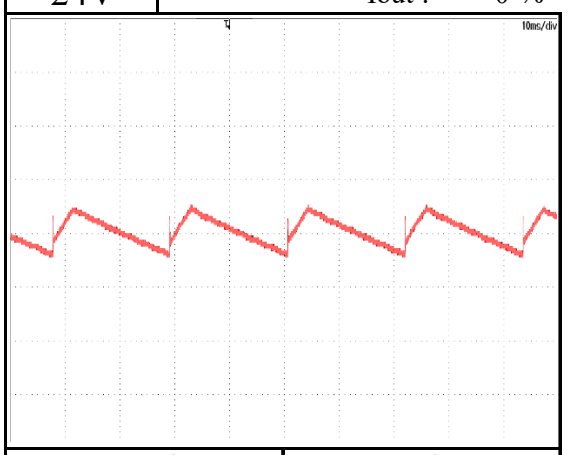
100mV/DIV | 10ms/DIV

Iout : 100 %



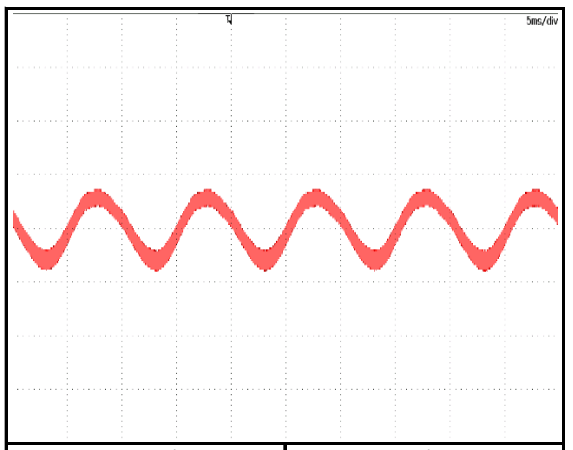
100mV/DIV | 5ms/DIV

24V Iout : 0 %



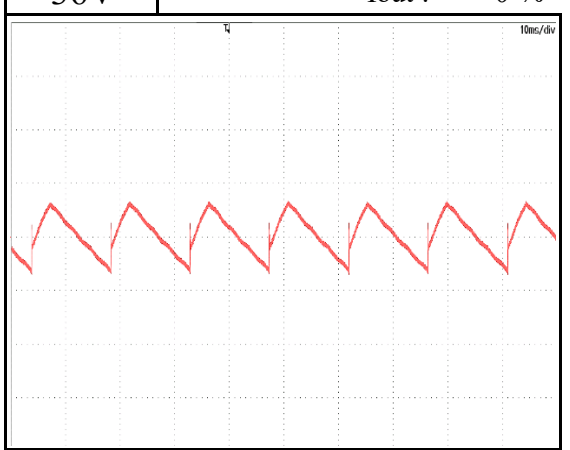
100mV/DIV | 10ms/DIV

Iout : 100 %



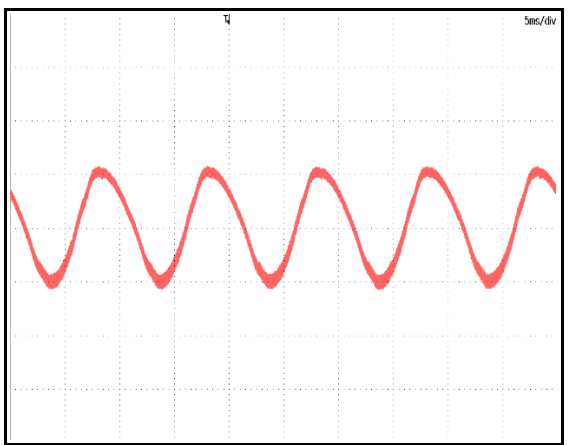
100mV/DIV | 5ms/DIV

36V Iout : 0 %



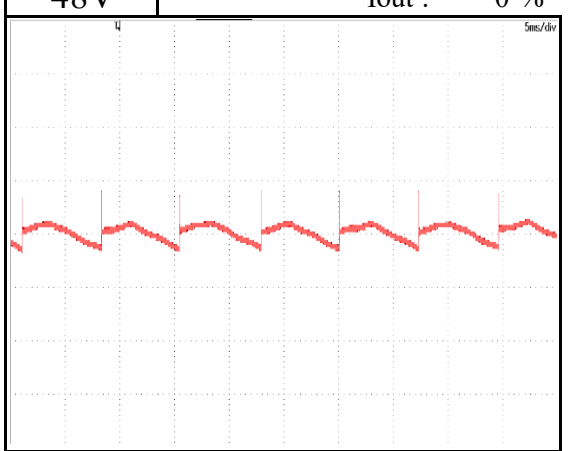
100mV/DIV | 10ms/DIV

Iout : 100 %



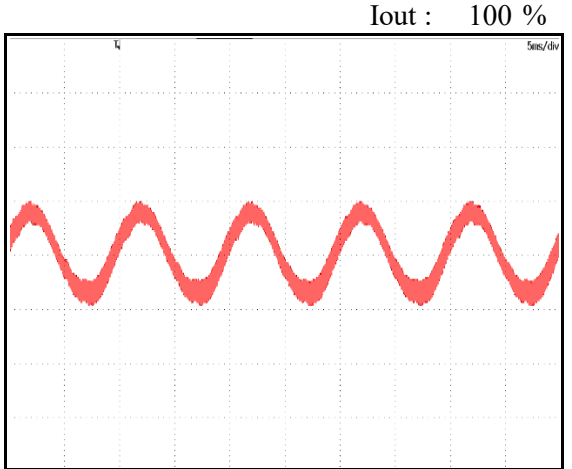
100mV/DIV | 5ms/DIV

48V Iout : 0 %



100mV/DIV | 5ms/DIV

Iout : 100 %



100mV/DIV | 5ms/DIV

2-15. Electro-Magnetic Interference characteristics

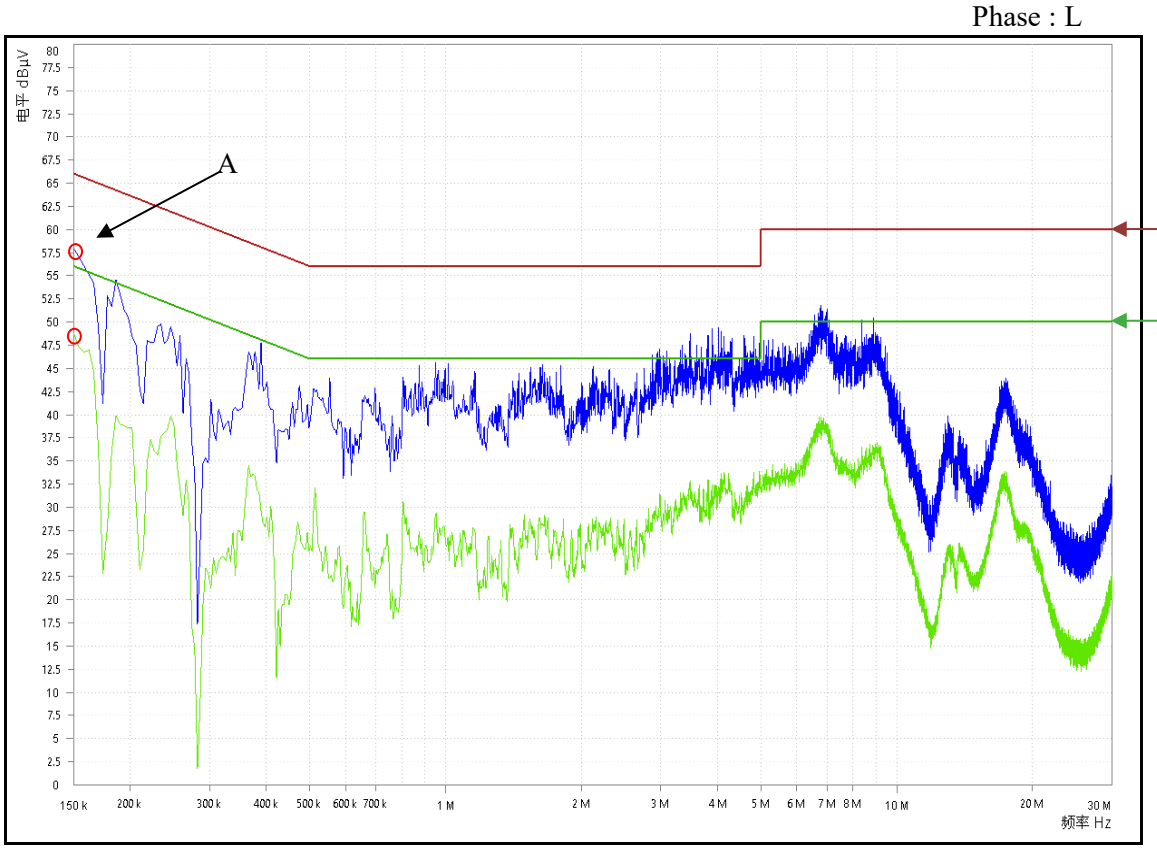
Conditions Vin : 115 VAC
Iout : 56.7 A (100%)
Istb : 100 %
Ta : 25 °C

Conducted Emission

12V

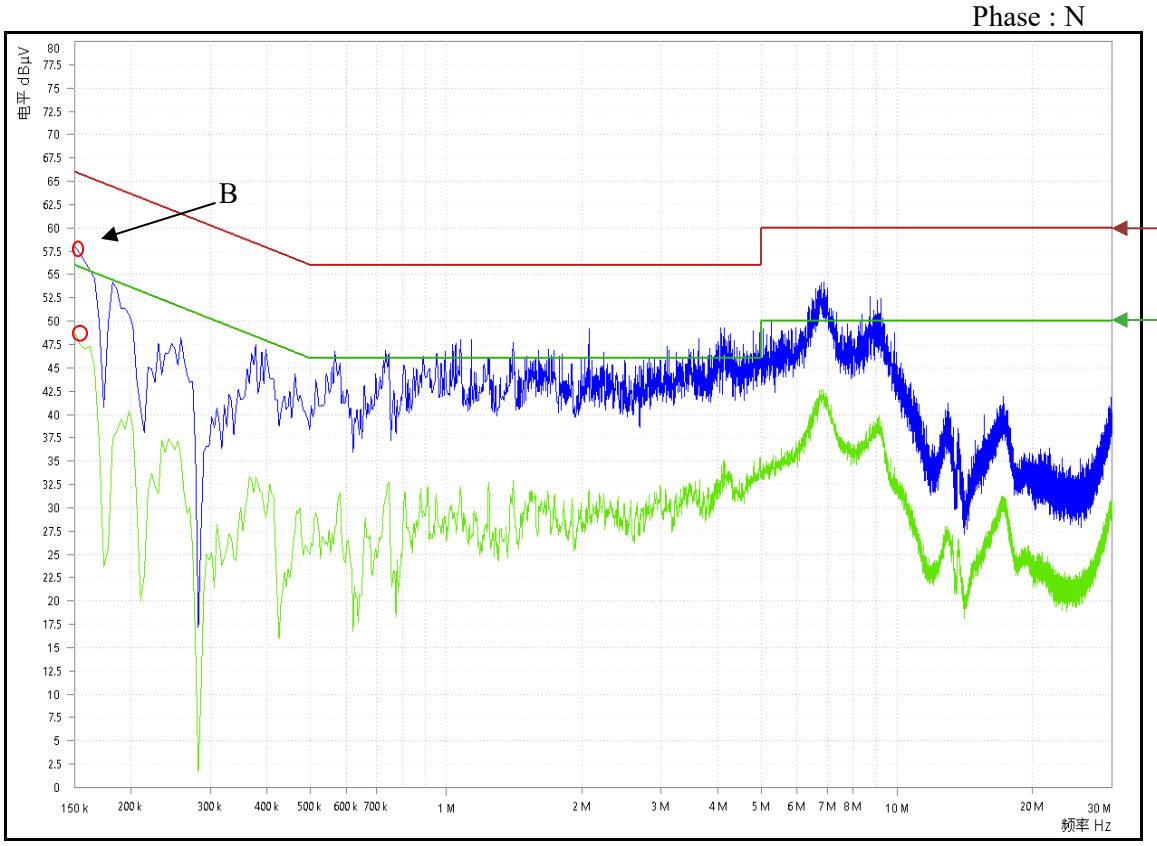
Phase : L

Ref. Data	Point A (150kHz) Limit (dB)	Measure (dB)
QP	66.0	57.9
AV	56.0	48.7



Phase : N

Ref. Data	Point B (150kHz) Limit (dB)	Measure (dB)
QP	66.0	58.0
AV	56.0	48.4



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

2-15. Electro-Magnetic Interference characteristics

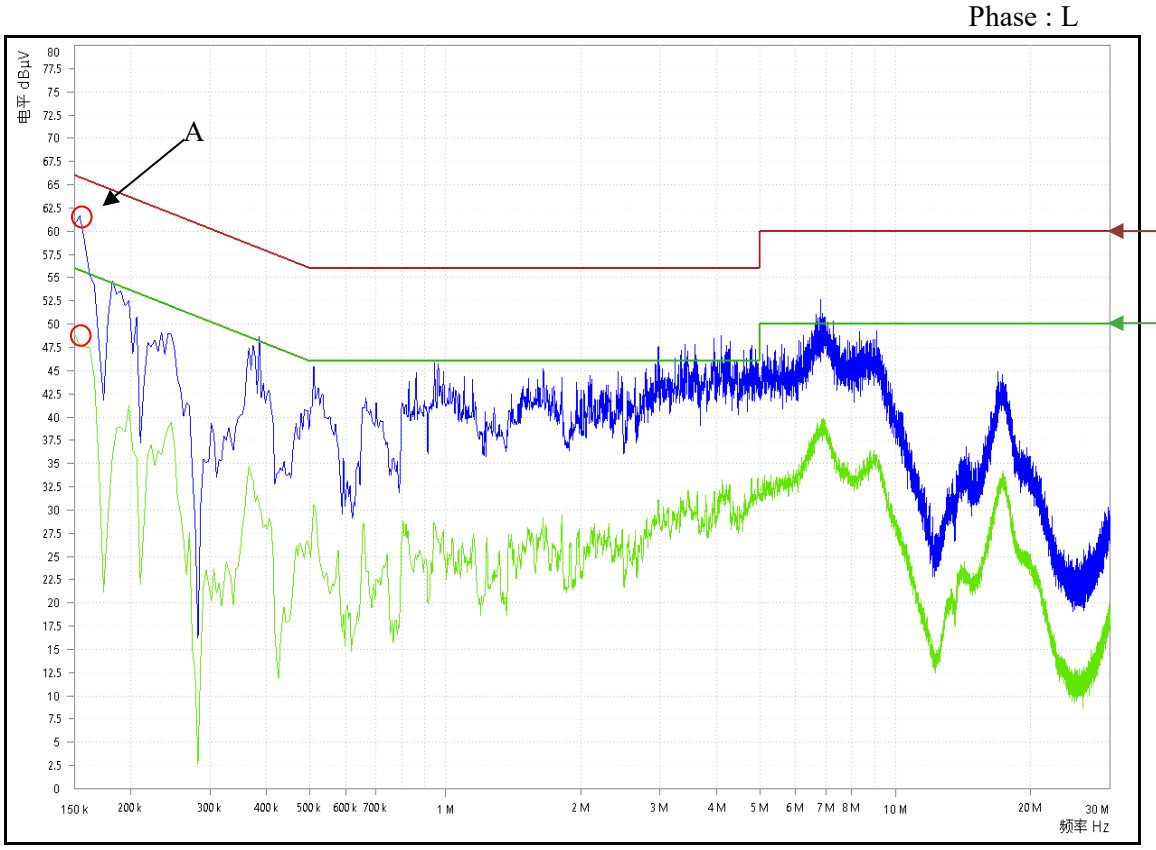
Conditions Vin : 230 VAC
Iout : 56.7 A (100%)
Istb : 100 %
Ta : 25 °C

Conducted Emission

12V

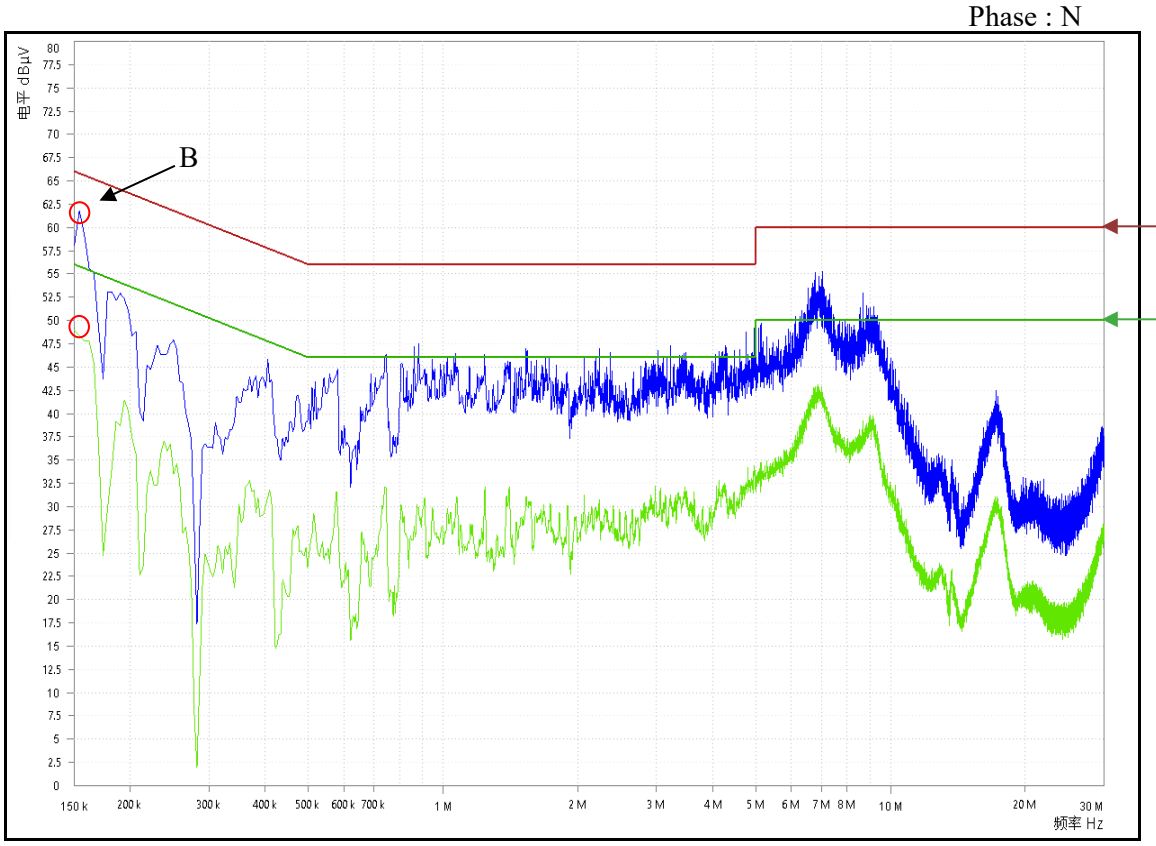
Phase : L

Ref. Data	Point A (154kHz) Limit (dB)	Measure (dB)
QP	65.8	60.2
AV	56.0	48.3



Phase : N

Ref. Data	Point B (154kHz) Limit (dB)	Measure (dB)
QP	65.8	60.4
AV	56.0	48.5



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

2-15. Electro-Magnetic Interference characteristics

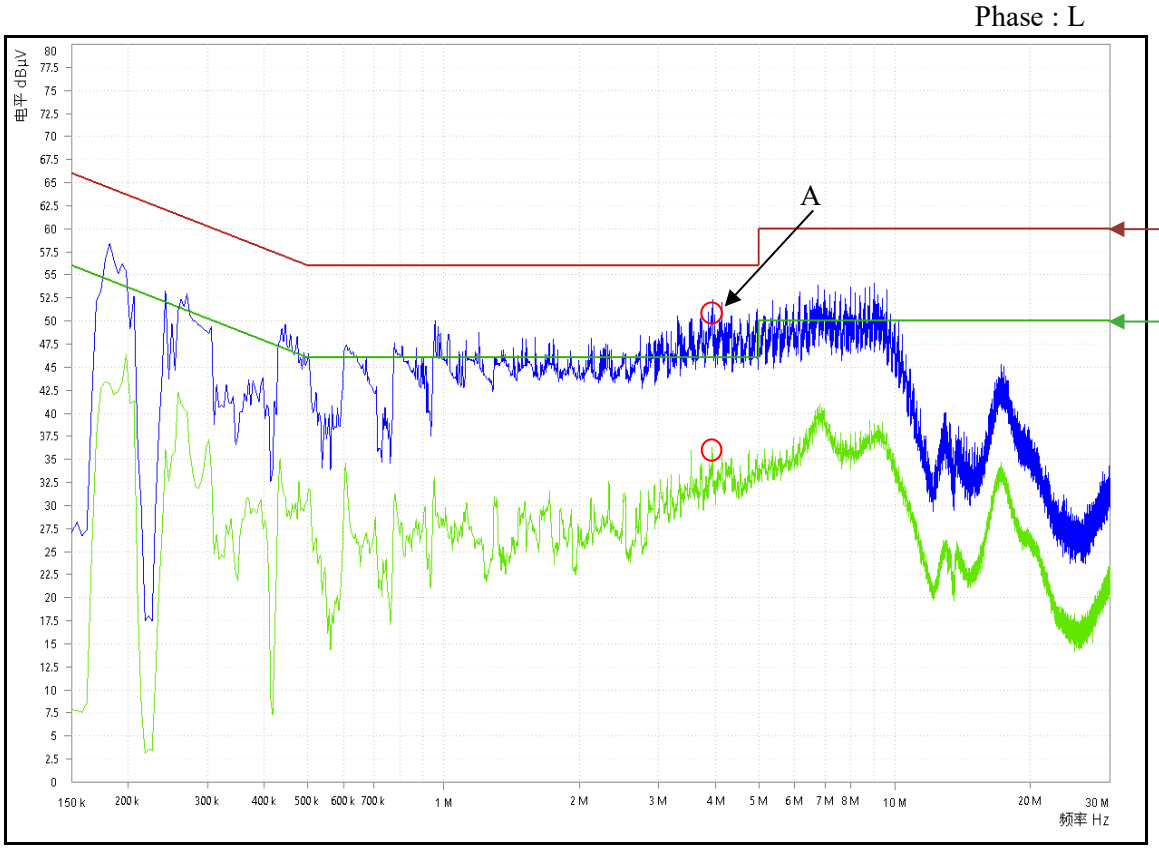
Conditions Vin : 115 VAC
Iout : 33.4 A (100%)
Istb : 100 %
Ta : 25 °C

Conducted Emission

24V

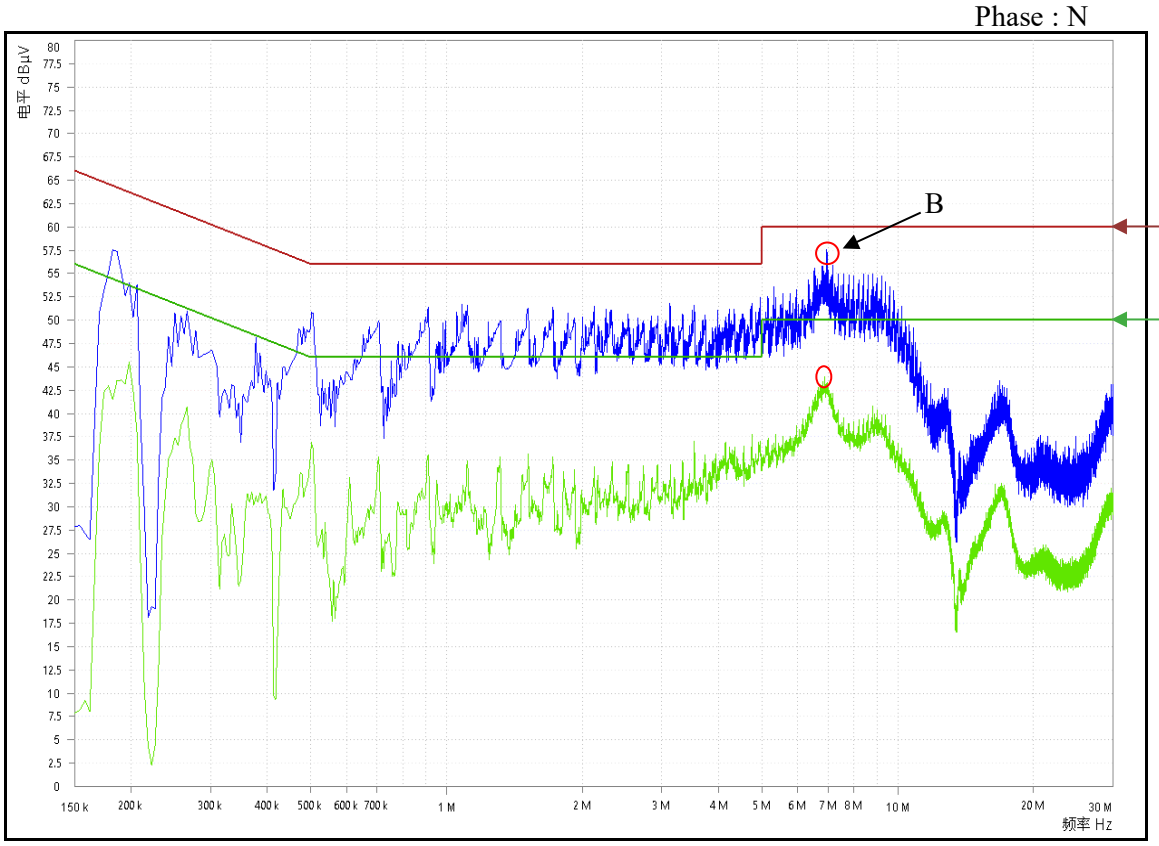
Phase : L

Ref. Data	Point A (3.934MHz) Limit (dB)	Measure (dB)
QP	56.0	48.1
AV	46.0	36.3



Phase : N

Ref. Data	Point B (6.966MHz) Limit (dB)	Measure (dB)
QP	60.0	51.8
AV	50.0	42.4



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

2-15. Electro-Magnetic Interference characteristics

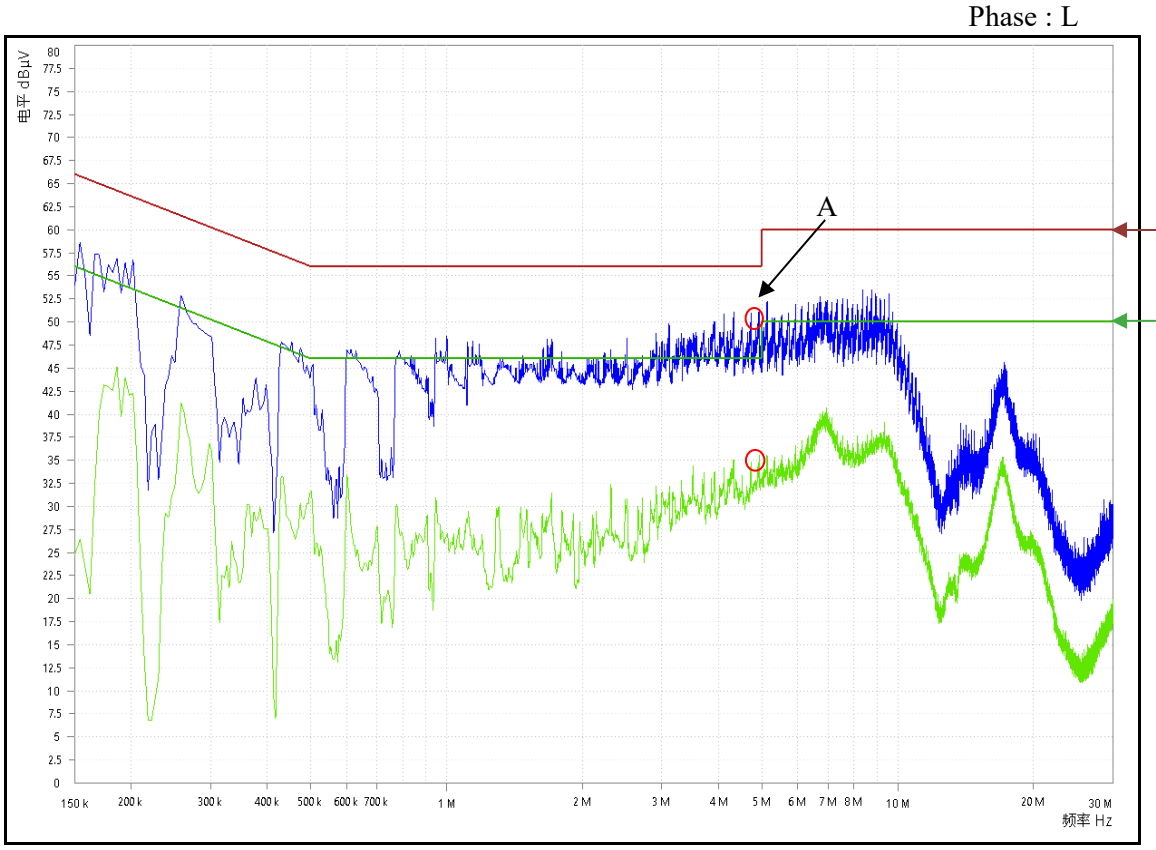
Conditions Vin : 230 VAC
Iout : 33.4 A (100%)
Istb : 100 %
Ta : 25 °C

Conducted Emission

24V

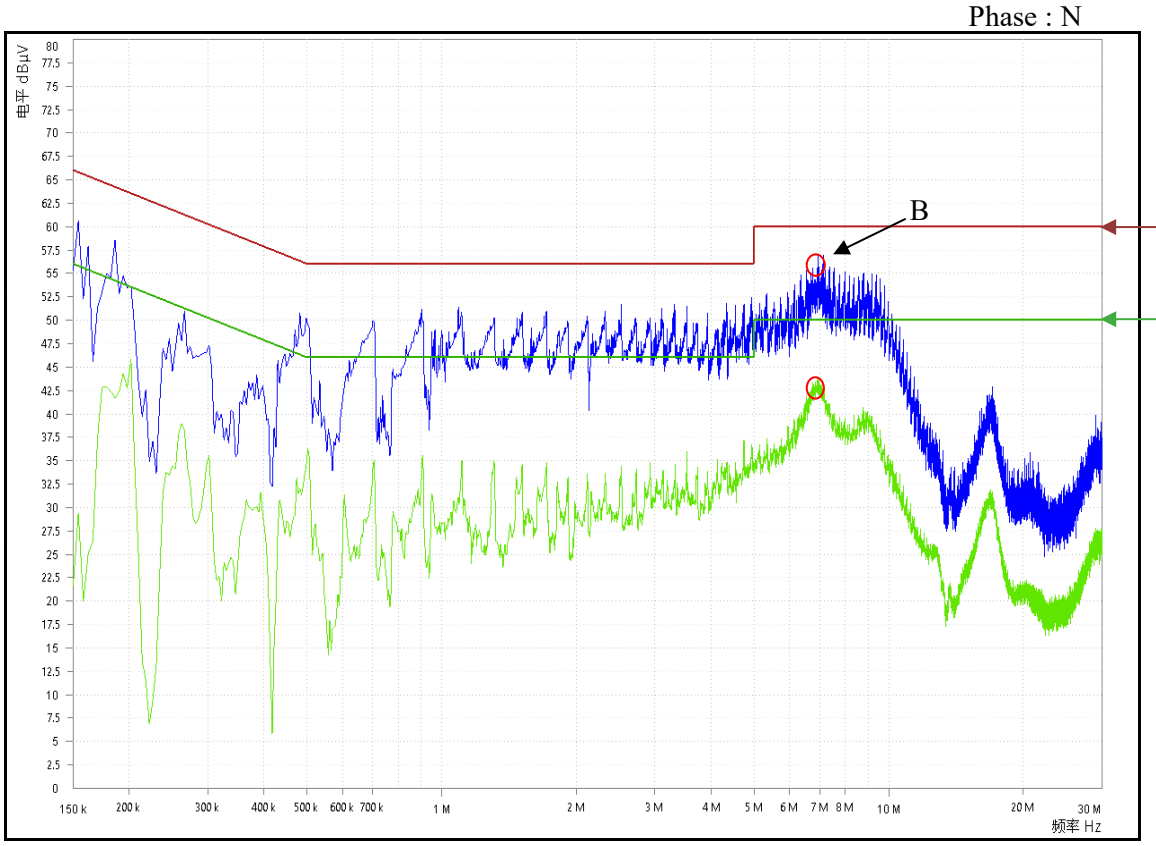
Phase : L

Ref. Data	Point A (4.93MHz) Limit (dB)	Measure (dB)
QP	56.0	48.2
AV	46.0	35.5



Phase : N

Ref. Data	Point B (6.962MHz) Limit (dB)	Measure (dB)
QP	60.0	52.5
AV	50.0	42.5



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

2-15. Electro-Magnetic Interference characteristics

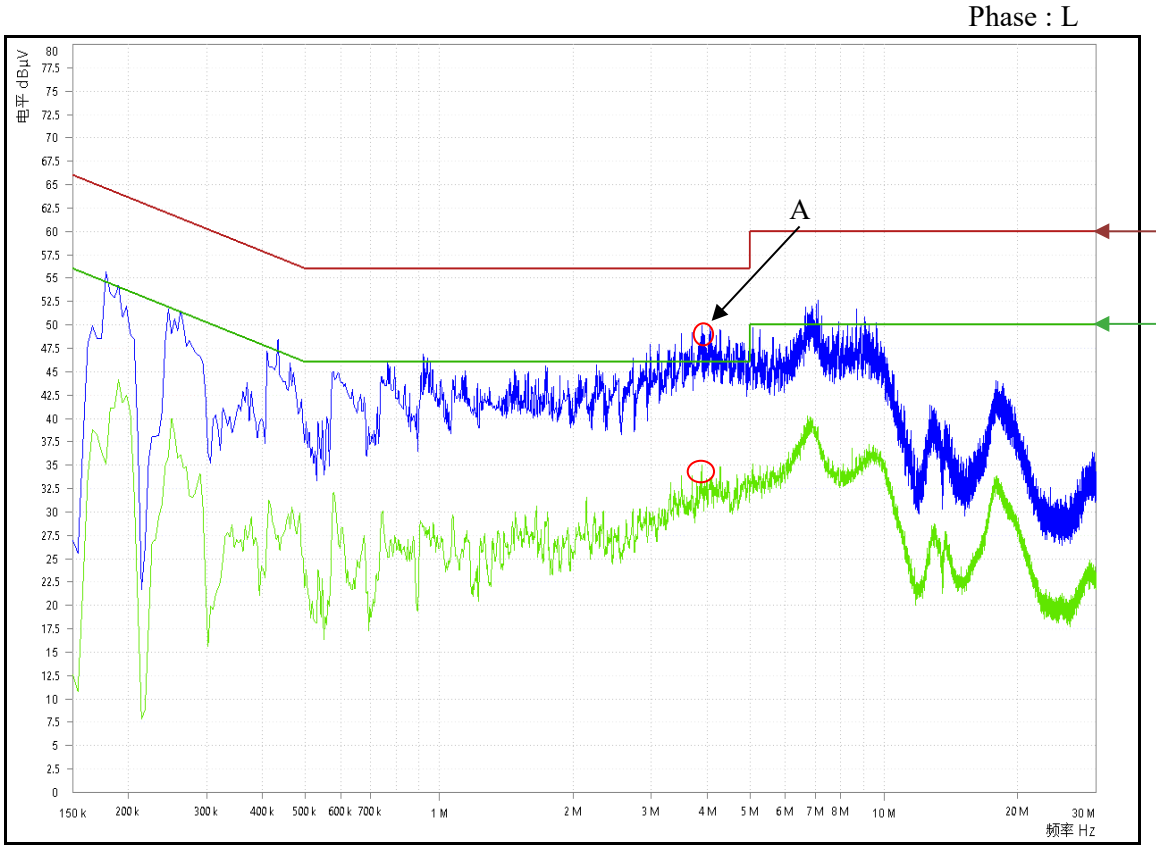
Conditions Vin : 115 VAC
Iout : 22.2 A (100%)
Istb : 100 %
Ta : 25 °C

Conducted Emission

36V

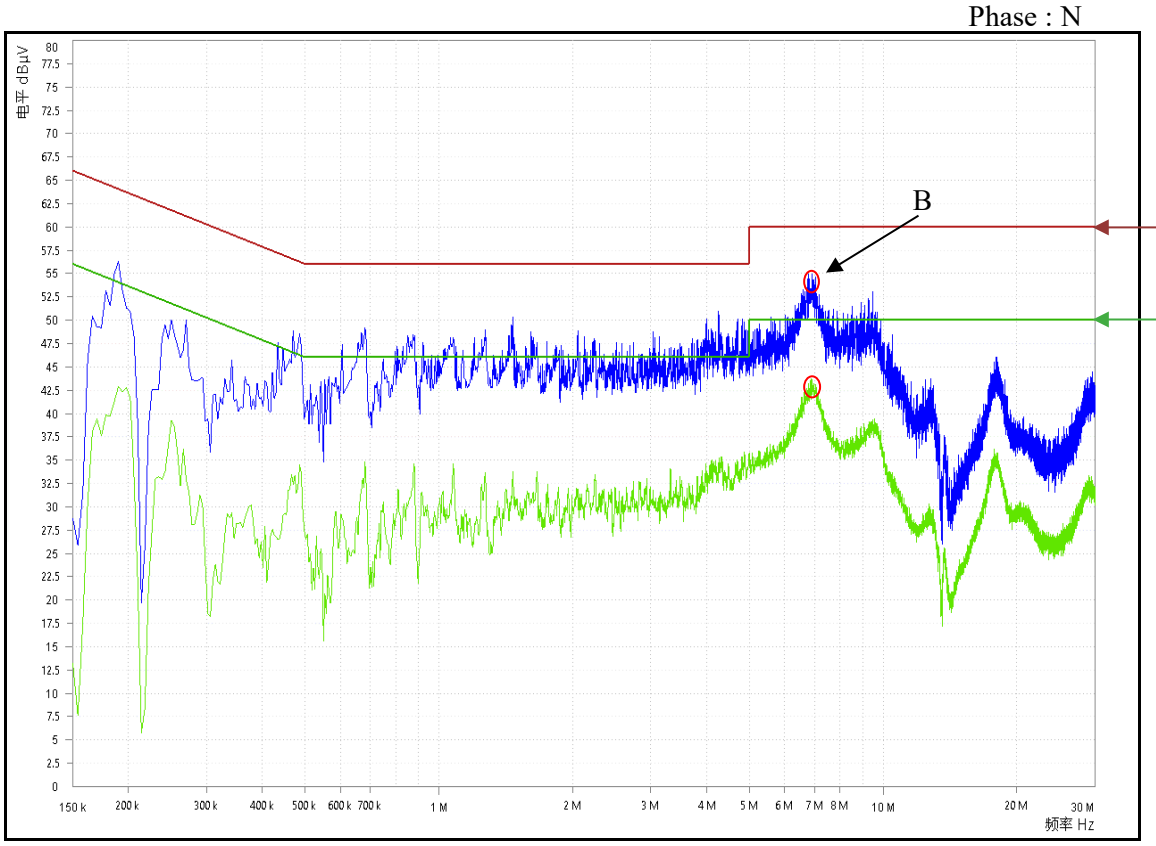
Phase : L

Ref. Data	Point A (3.902MHz) Limit (dB)	Measure (dB)
QP	56.0	47.1
AV	46.0	35.1



Phase : N

Ref. Data	Point B (6.922MHz) Limit (dB)	Measure (dB)
QP	60.0	50.1
AV	50.0	42.7



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

2-15. Electro-Magnetic Interference characteristics

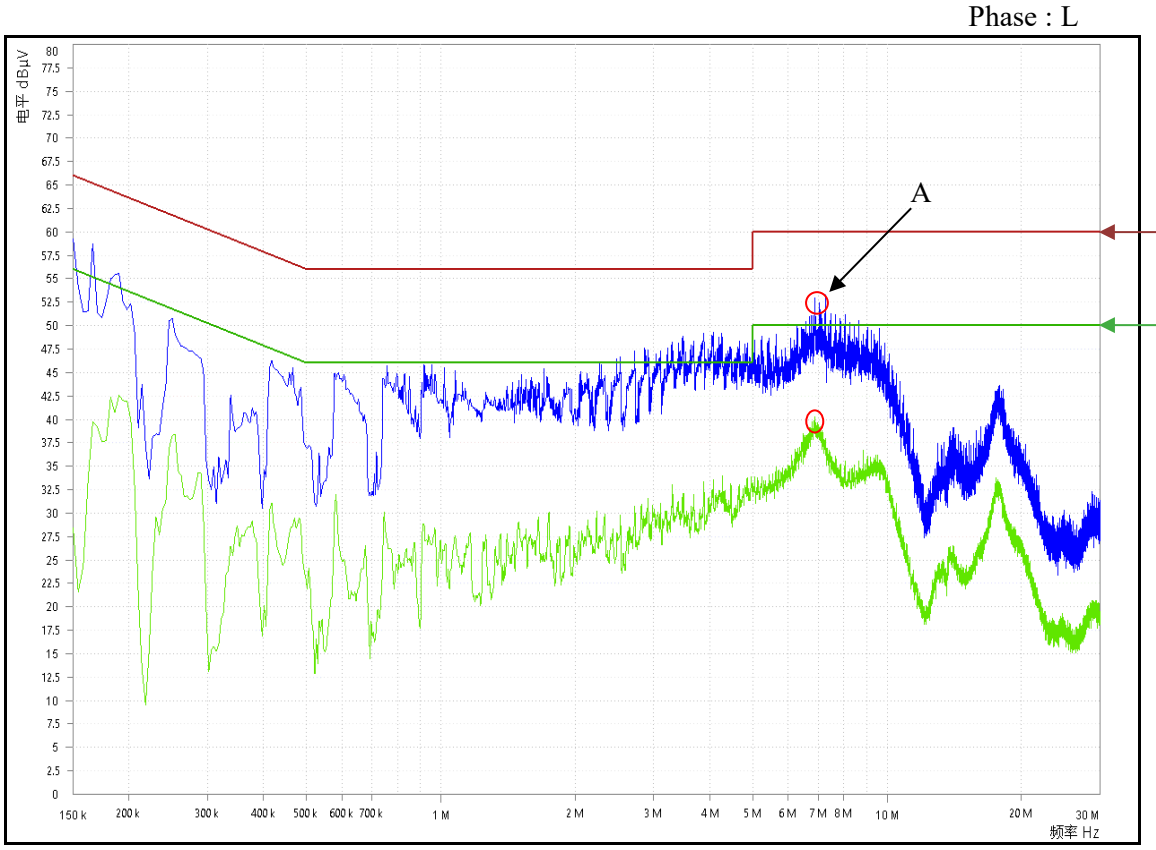
Conditions Vin : 230 VAC
Iout : 22.2 A (100%)
Istb : 100 %
Ta : 25 °C

Conducted Emission

36V

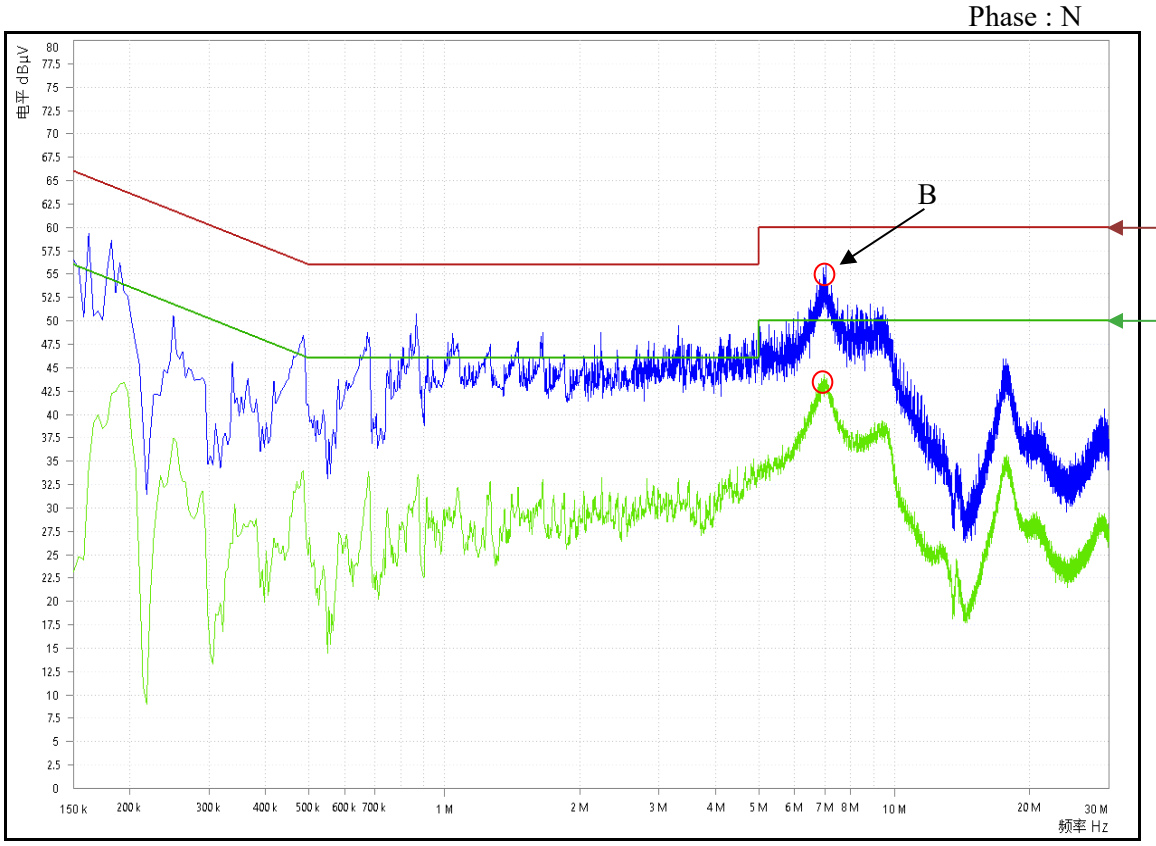
Phase : L

Ref. Data	Point A (6.894MHz) Limit (dB)	Measure (dB)
QP	60.0	51.0
AV	50.0	40.2



Phase : N

Ref. Data	Point B (6.982MHz) Limit (dB)	Measure (dB)
QP	60.0	51.6
AV	50.0	42.7



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

2-15. Electro-Magnetic Interference characteristics

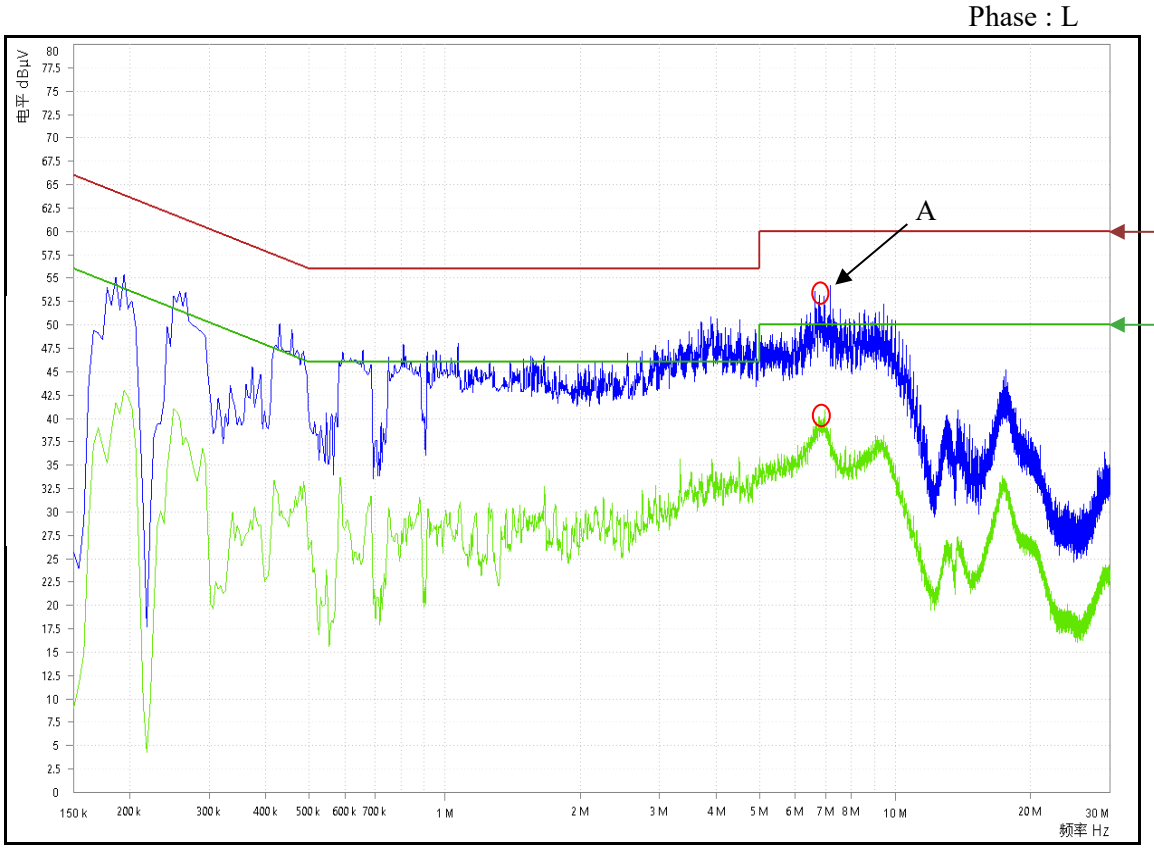
Conditions Vin : 115 VAC
Iout : 16.7 A (100%)
Istb : 100 %
Ta : 25 ℃

Conducted Emission

48V

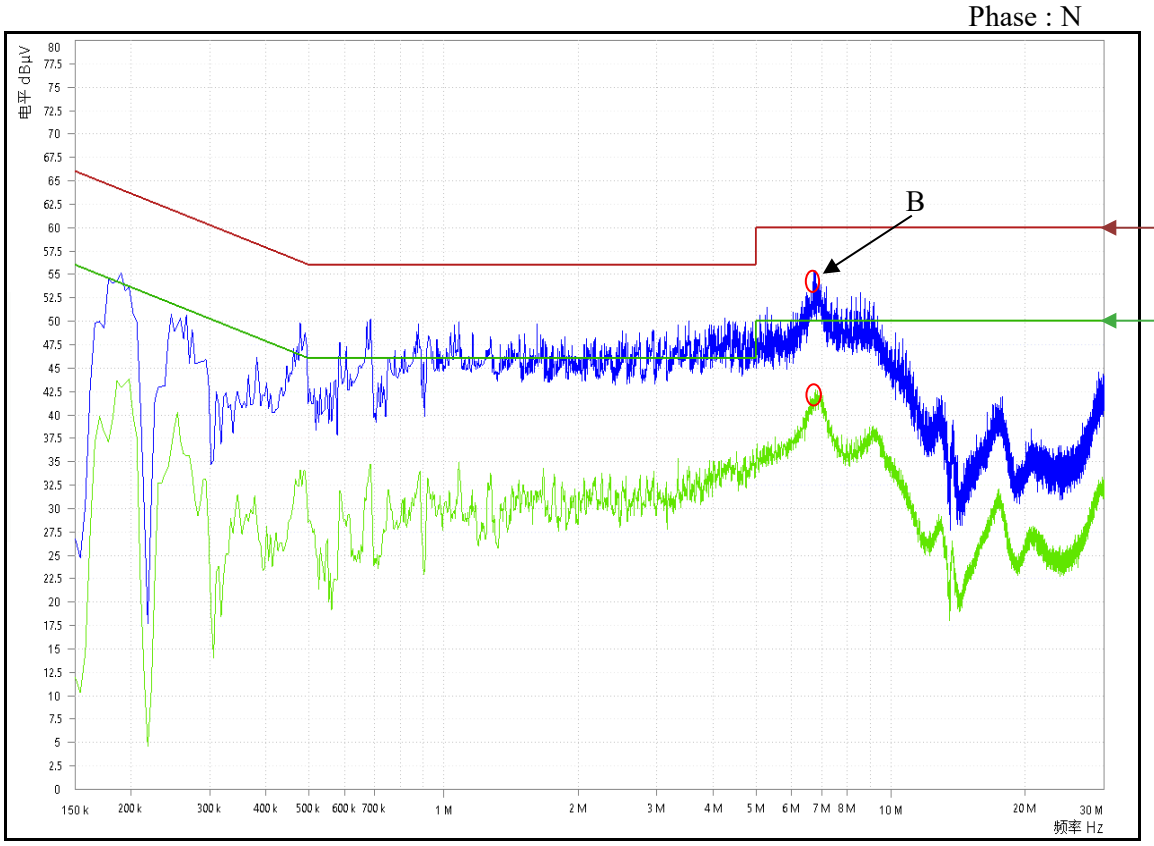
Phase : L

Ref. Data	Point A (6.974MHz) Limit (dB)	Measure (dB)
QP	60.0	52.2
AV	50.0	39.3



Phase : N

Ref. Data	Point B (6.79MHz) Limit (dB)	Measure (dB)
QP	60.0	52.3
AV	50.0	41.8



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

2-15. Electro-Magnetic Interference characteristics

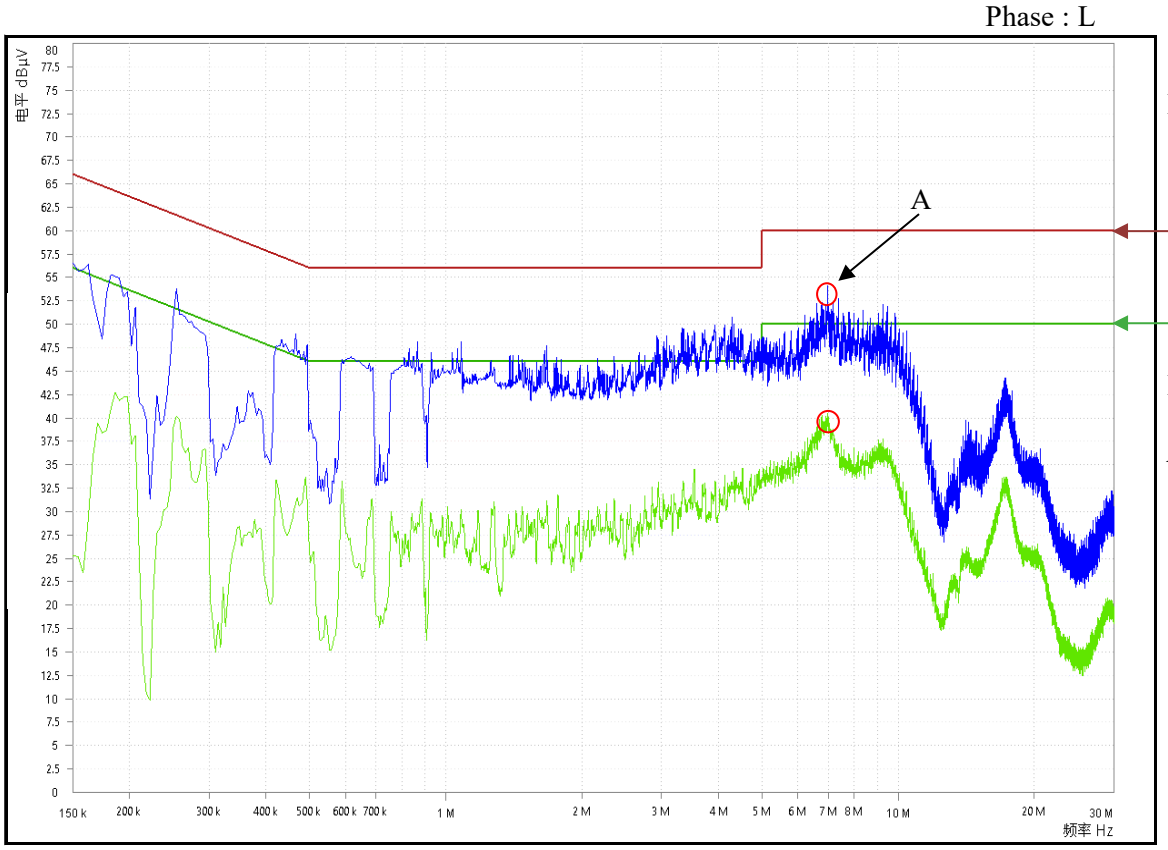
Conditions Vin : 230 VAC
Iout : 16.7 A (100%)
Istb : 100 %
Ta : 25 °C

Conducted Emission

48V

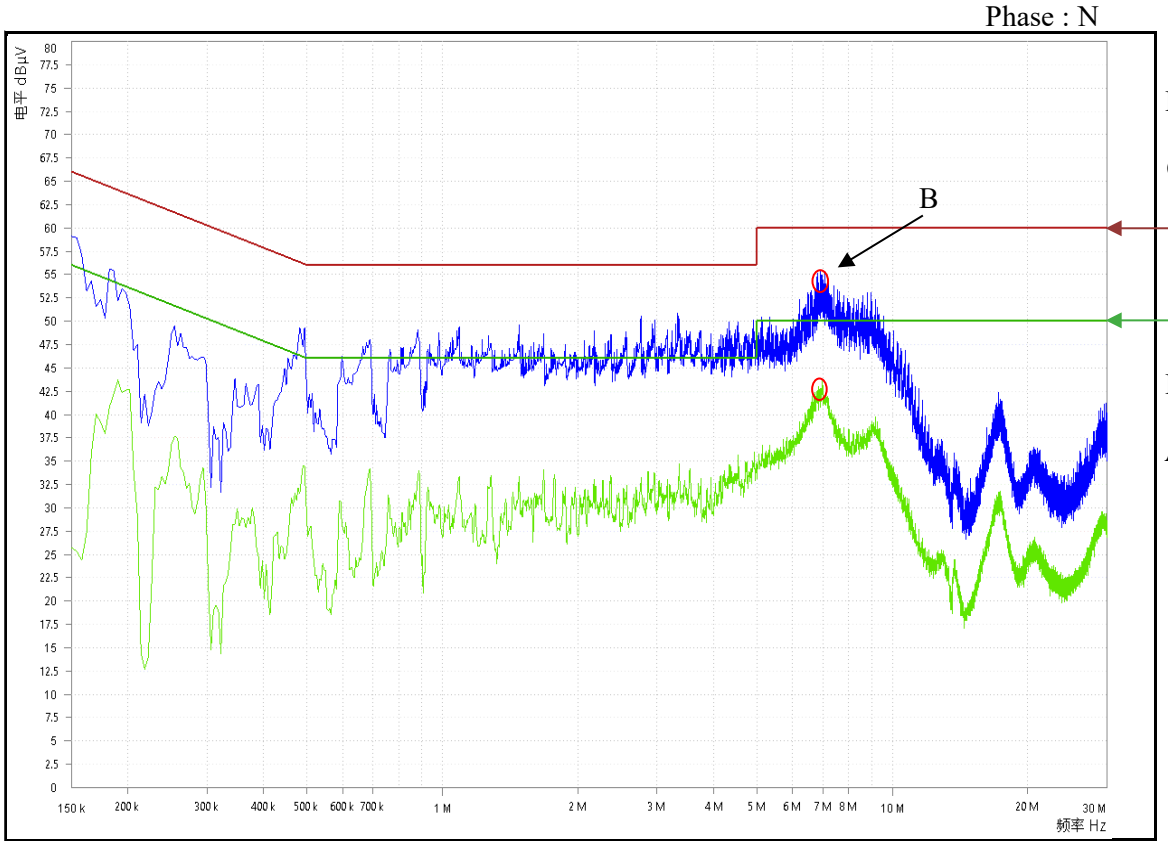
Phase : L

Ref. Data	Point A (6.998MHz) Limit (dB)	Measure (dB)
QP	60.0	51.6
AV	50.0	39.5



Phase : N

Ref. Data	Point B (6.814MHz) Limit (dB)	Measure (dB)
QP	60.0	50.0
AV	50.0	42.3



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

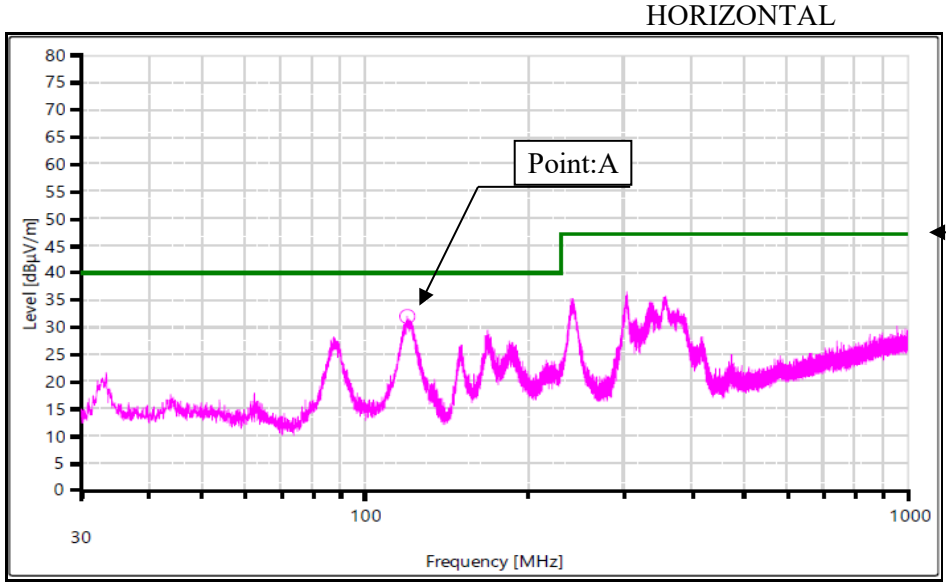
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 115 VAC
Iout : 56.7 A (100%)
Istb : 100 %
Ta : 25 °C

Radiated Emission

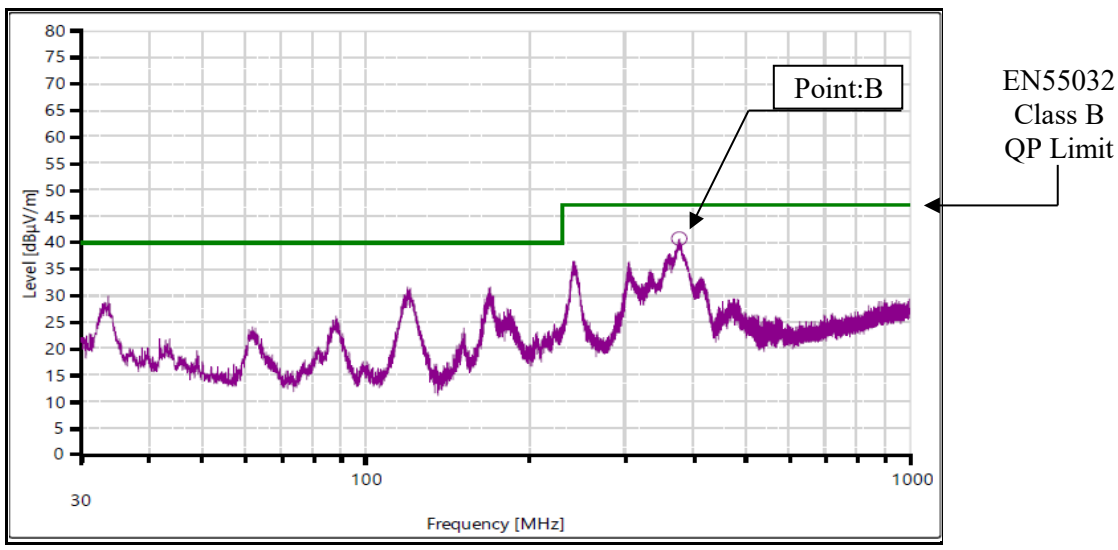
12V

HORIZONTAL



Ref. Data	Point A (120MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	32.0

VERTICAL



Ref. Data	Point B (378MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	40.7

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

Indication is peak values.

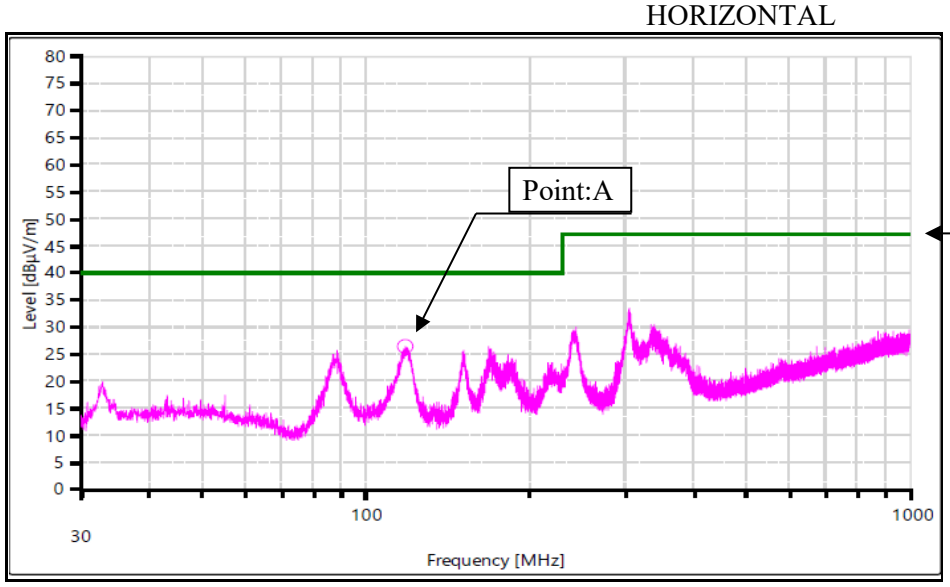
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 56.7 A (100%)
Istb : 100 %
Ta : 25 °C

Radiated Emission

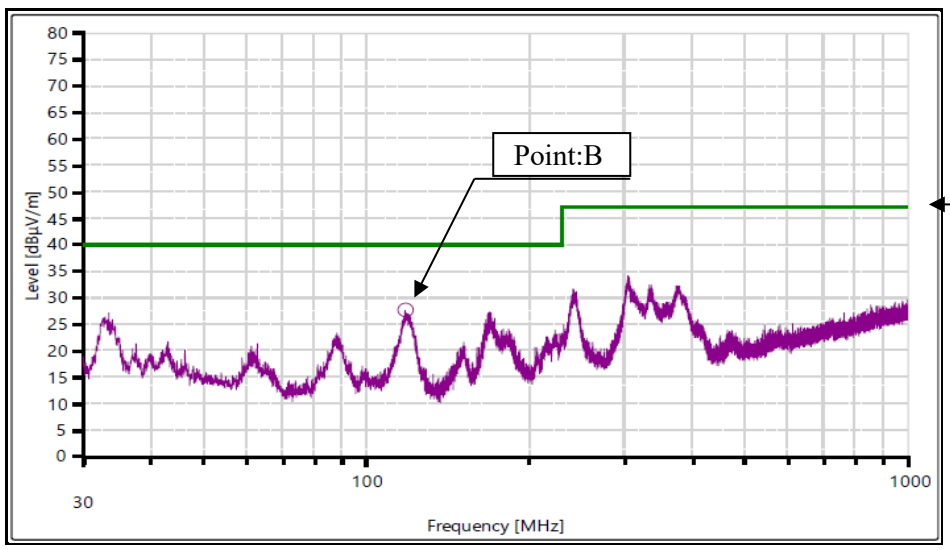
12V

HORIZONTAL



Ref. Data	Point A (118MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	26.5

VERTICAL



Ref. Data	Point B (118MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	27.7

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

Indication is peak values.

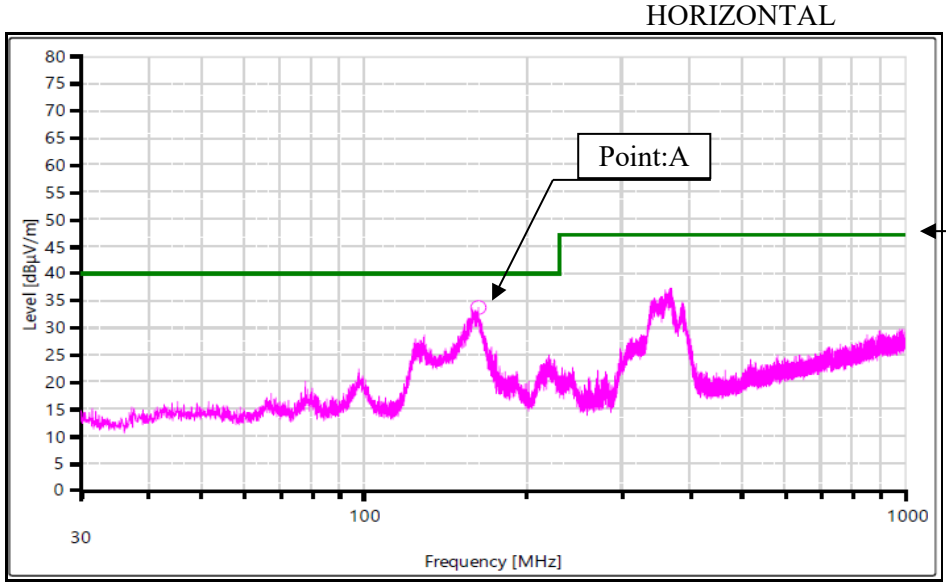
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 115 VAC
Iout : 33.4 A (100%)
Istb : 100 %
Ta : 25 °C

Radiated Emission

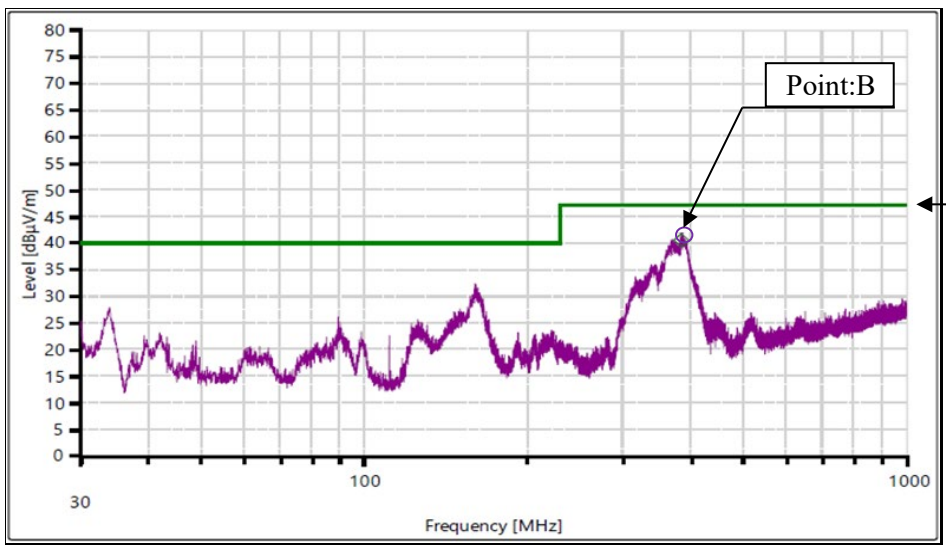
24V

HORIZONTAL



Ref. Data	Point A (163MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	33.7

VERTICAL



Ref. Data	Point B (386MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	40.4

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

Indication is peak values.

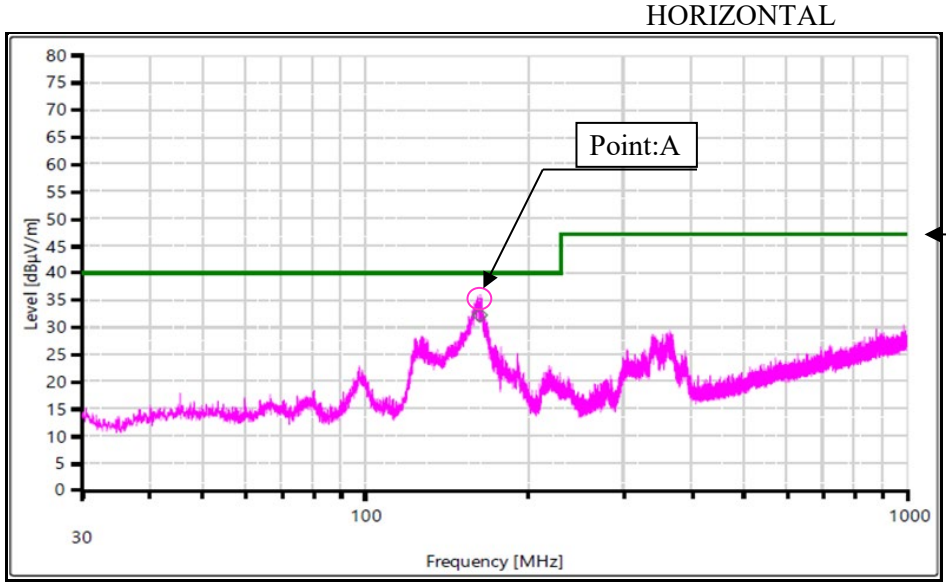
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 33.4 A (100%)
Istb : 100 %
Ta : 25 °C

Radiated Emission

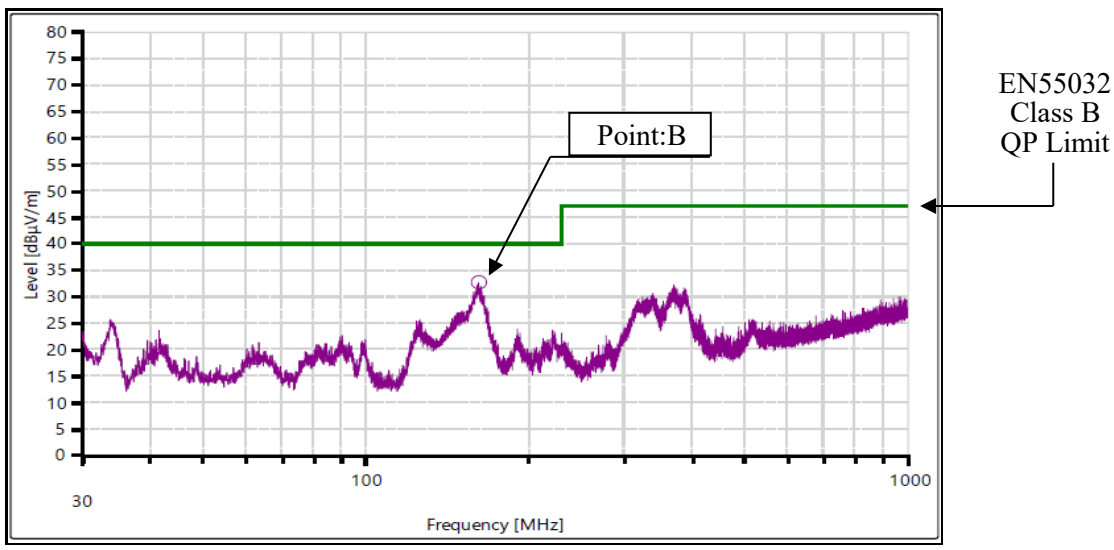
24V

HORIZONTAL



Ref. Data	Point A (163MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	32.3

VERTICAL



Ref. Data	Point B (162MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	32.8

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

Indication is peak values.

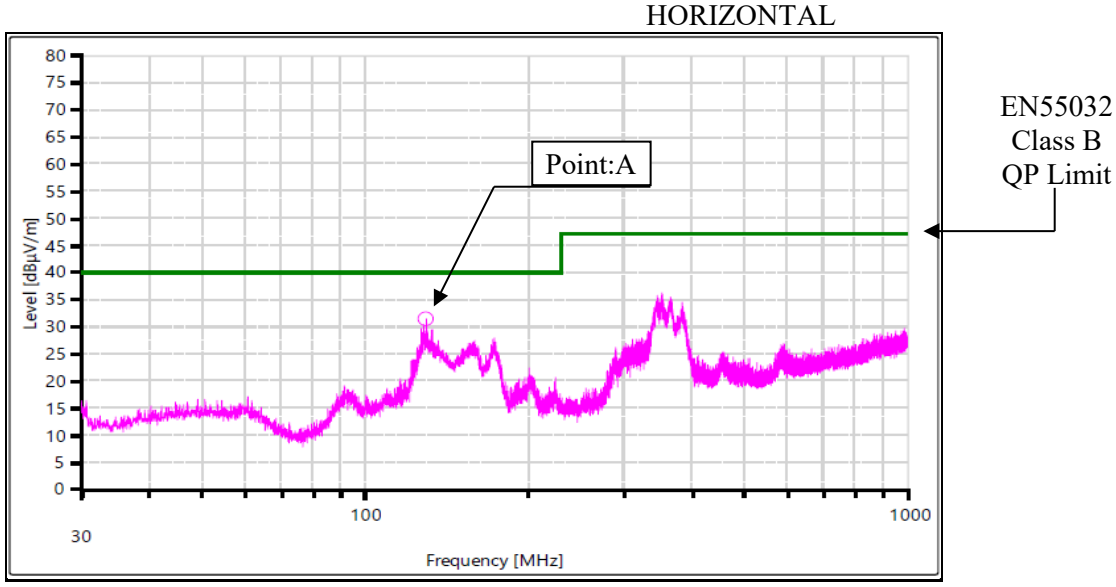
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 115 VAC
Iout : 22.2 A (100%)
Istb : 100 %
Ta : 25 °C

Radiated Emission

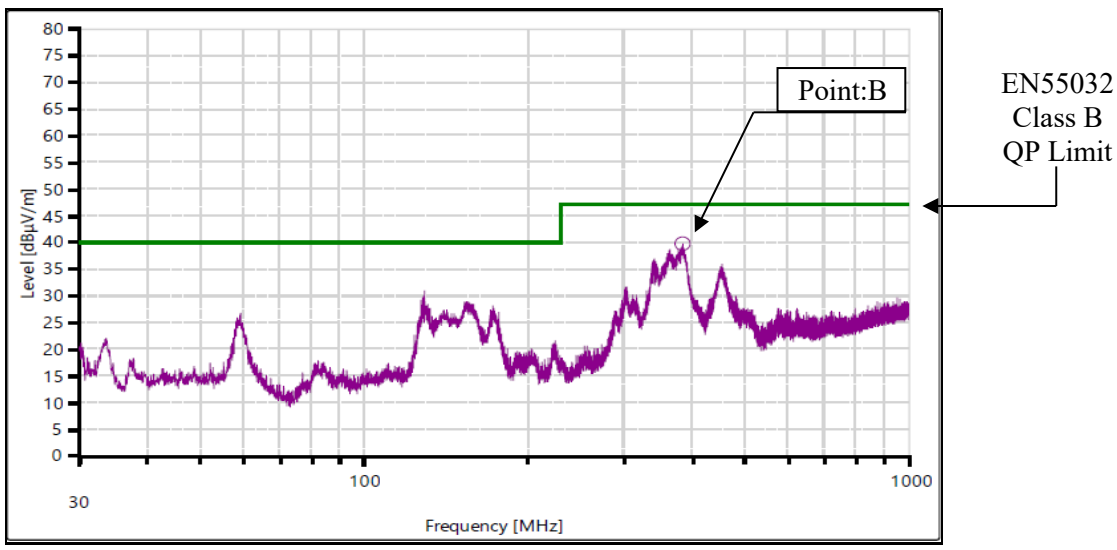
36V

HORIZONTAL



Ref. Data	Point A (130MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	31.4

VERTICAL



Ref. Data	Point B (386MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	39.7

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

Indication is peak values.

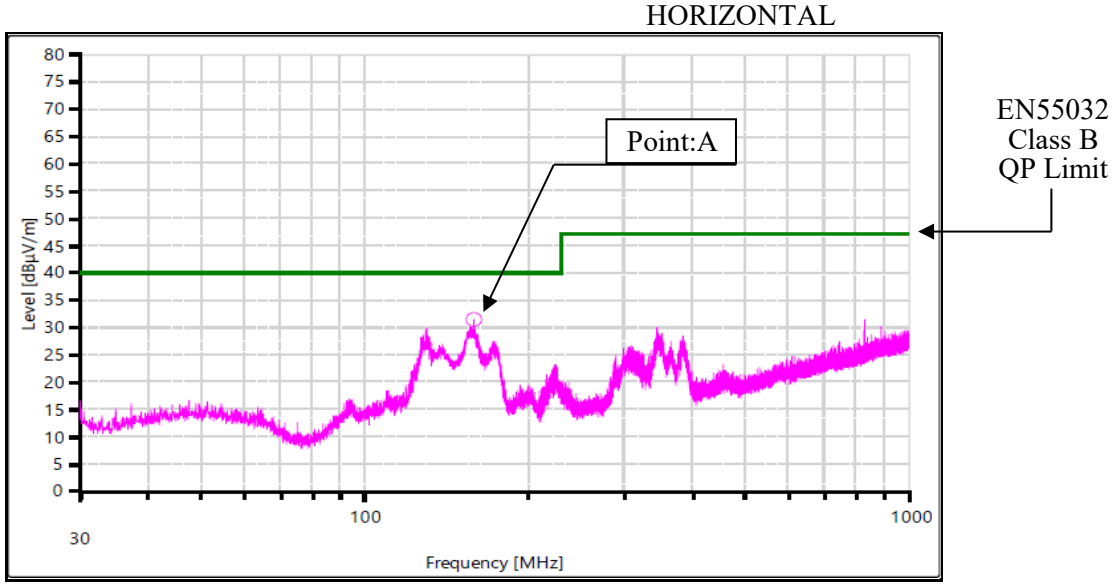
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 22.2 A (100%)
Istb : 100 %
Ta : 25 °C

Radiated Emission

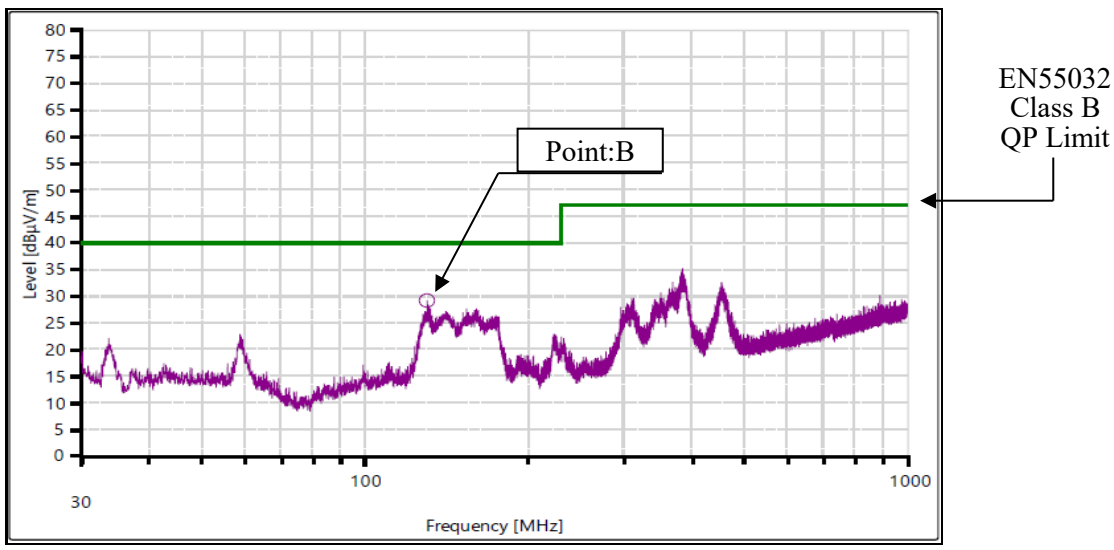
36V

HORIZONTAL



Ref. Data	Point A (159MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	31.6

VERTICAL



Ref. Data	Point B (130MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	29.2

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

Indication is peak values.

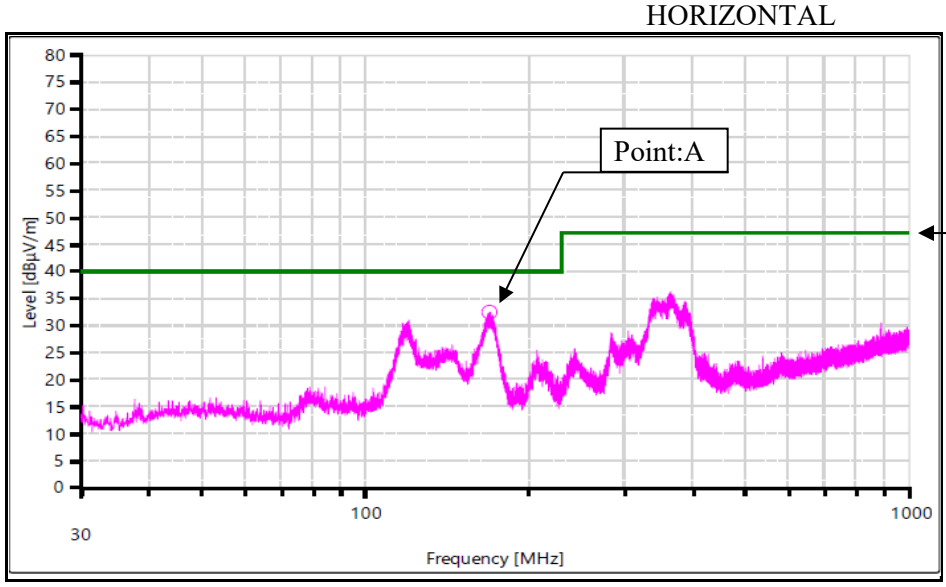
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 115 VAC
Iout : 16.7 A (100%)
Istb : 100 %
Ta : 25 °C

Radiated Emission

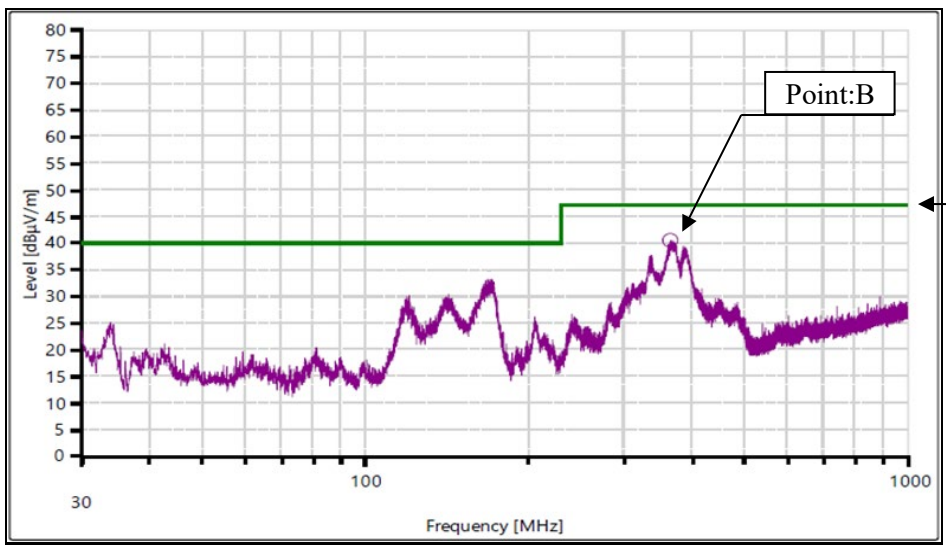
48V

HORIZONTAL



Ref. Data	Point A (169MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	32.5

VERTICAL



Ref. Data	Point B (367MHz) Limit (dBuV)	Measure (dBuV)
QP	47.0	40.4

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

Indication is peak values.

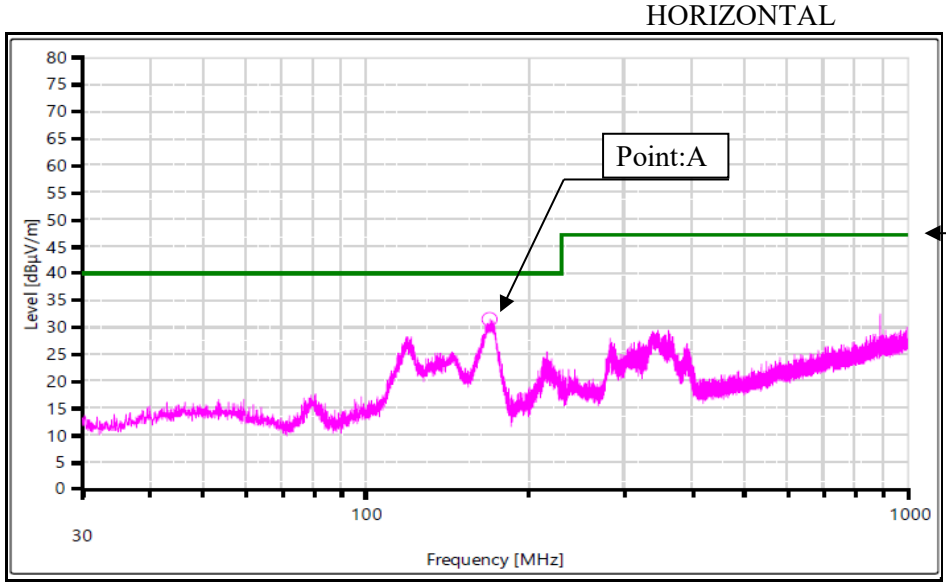
2-15. Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 16.7 A (100%)
Istb : 100 %
Ta : 25 °C

Radiated Emission

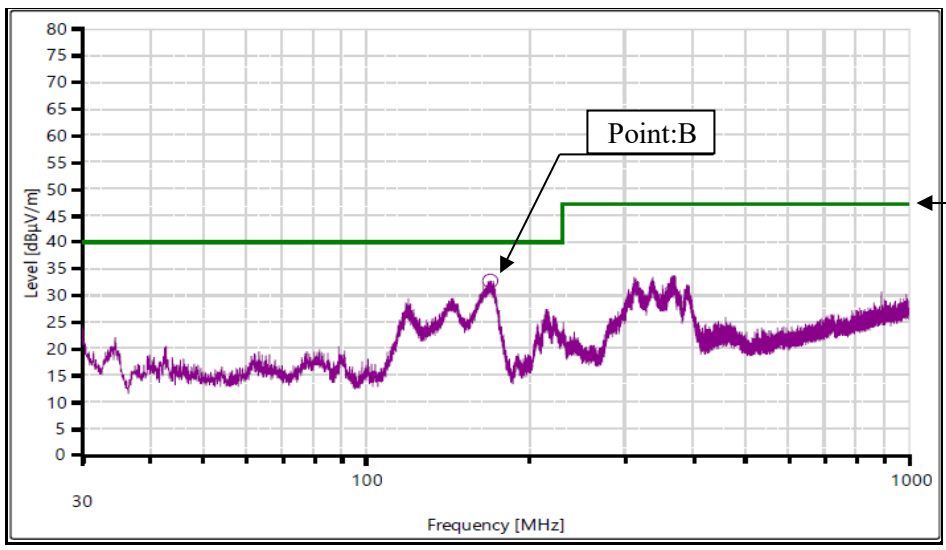
48V

HORIZONTAL



Ref. Data	Point A (170MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	31.5

VERTICAL



Ref. Data	Point B (169MHz) Limit (dBuV)	Measure (dBuV)
QP	40.0	32.8

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

Indication is peak values.