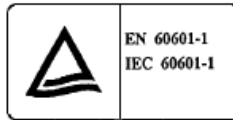




**BF direct patient contact rated**



**FEATURES**

- 300W convection cooled and 360W forced air cooling single output medical power supply
- Active PFC meets Class D
- Conducted EMI meets CISPR/FCC Class B
- High Efficiency up to 91%
- Adjustable output range
- Design to meet medical standard IEC 60601-1, EN 60601-1, UL 60601-1 type BF rated
- Two units parallel possible with worst case leakage current less than 300µA (see section 9 option)

**1. Description**

TEK360M series is a fan-less 300W, U-frame, switching power supply with active PFC function for medical application.

| Model Number | Output Voltage Range <sup>(Note 1)</sup> | Min. Output Current | Rated Output Power | Max. Output Power <sup>(Note 7)</sup> | Total Regulation <sup>(Note 2)</sup> | Ripple & Noise p-p <sup>(Note 3)</sup> | Initial Setting Accuracy <sup>(Note 4)</sup> |
|--------------|--|---------------------|--------------------|---------------------------------------|--------------------------------------|--|--|
| TEK360M-12   | +12-14V / 12V                            | 0A                  | 300W               | 360W                                  | ±2%                                  | ±1%                                    | 1%   |
| TEK360M-24   | +19-28V / 24V                            | 0A                  | 300W               | 360W                                  | ±2%                                  | ±1%                                    | 1%   |
| TEK360M-36   | +36V                                     | 0A                  | 8.05A              | 9.72A                                 | ±2%                                  | ±1%                                    | 1%   |
|              | +5V <sup>(floating)</sup>                | 0A                  | 1.5A               | 2A                                    | ±5%                                  | 120mV                                  | 5%   |

**Total Output Power:** total maximum power is rated 300W, peak 360W max. 5 seconds with convection cooled; max. 360W continuously with minimum 23.3CFM <sup>(Note 5)</sup> forced air cooling at 50°C environment temperature <sup>(Note 6)</sup>.

- Note:
- 1) Output voltage can be adjusted by variable resistor with nominal 12/24V which would be adjusted at factory.
  - 2) Total regulation is measured a setting output voltage. Input voltage is from 90-264VAC and output from 0W to 360W.
  - 3) Measured by a 20MHz bandwidth limited oscilloscope and the each output is connected with a 10µF Electrolytic Capacitor and a 0.1µF Ceramic Capacitor.
  - 4) Voltage setting is at nominal AC input voltage 60% rated load and 25°C.
  - 5) Higher forced air cooling up to 40.6CFM is recommended for TEK360M.
  - 6) While environment temperature over 25°C, an accessory L-type heat sink (min. 30 \* 12.3 + 30 \* 4 cm with 2.5mm-- -thickness) is recommended to be added at the bottom of the power supply itself for TEK360M.
  - 7) Max. output power at 19V output is 350W.

**2. Input Specification**

| Parameter       | Conditions/Description | Min. | Nom.    | Max. | Units |
|-----------------|------------------------|------|---------|------|-------|
| Input Voltage   | Continuous input range | 90   | 115/230 | 264  | VAC   |
| Input Frequency | AC input.              | 47   | 50/60   | 63   | Hz    |
| Hold Up Time    |                        | 16   |         |      | ms    |
| Inrush Current  |                        |      |         | 60   | A     |

**3. Output Specification**

| Parameter        | Conditions/Description   | Min. | Nom. | Max. | Units                    |
|------------------|--|------|------|------|--------------------------|
| Efficiency       | AC 230V input, rated load  |      |      | 91   | %                        |
| Minimum load     |  |      |      |      | See Chart of Description |
| Ripple & Noise   | Rated load, 20MHz bandwidth  |      |      |      | See Chart of Description |
| Total Regulation | On condition of a setting output voltage, input voltage from 90-264VAC and output from 0W to 360W. |      |      |      | See Chart of Description |

**4. Interface Signals and Internal Protection**

| Parameter                   | Conditions/Description   |
|-----------------------------|--|
| Remote Voltage sense        | Compensates for wire voltage drop.   |
| Short Circuit Protection    | Fully protected against output overload and short circuit. Automatic recovery upon of overload condition.  |
| Over Voltage Protection     | For some reason the power supply fails to control itself, the build-in over voltage protection circuit will shut down the outputs to prevent damaging external circuits. |
| Over Temperature Protection | When the power supply operating over the temperature or over load limit, the power supply will be shut down automatically to protect itself.                             |

5. Part number coding

TEK360M- X - W

[Confirm availability of P/N with LHV Power.](#)

**Output voltage**

- X = 12: +12Vdc
- X = 12-1: +13.8Vdc
- X = 24-19: +19Vdc
- X = 24-20: +20Vdc
- X = 24: +24Vdc
- X = 24-28: +28Vdc
- X = 36: +36Vdc, +5Vdc

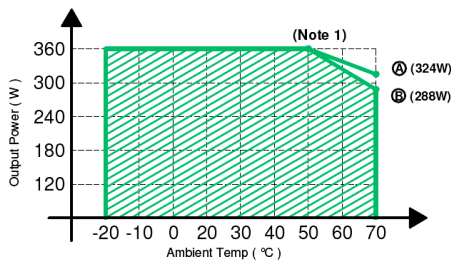
**Option**

- W = C: with cover assembled.
- W = D: voltage dips criteria A complies.
- W = E: with cover assembled & voltage dips criteria A complies.
- W = ET: with European terminal blocks both input CN1 and output CN2.
- W = S: with direction reverse protection available in two pieces serial connection application. (for TEK360M-24 and TEK360M-36 only.)

6. Environment Specification

| Parameter             | Conditions/Description  | Min. | Nom. | Max.       | Units |
|-----------------------|---|------|------|------------|-------|
| Storage Temperature   |   | -20  |      | +85        | °C    |
| Relative Humidity     | Non-condensing.   | 5    |      | 95         | %RH   |
| Altitude              | Operating   |      |      | 2K         | Meter |
|                       | Non-operating   |      |      | 4K         |       |
| Operating Temperature | Could be start up at -20°C.   |      |      |            |       |
|                       | Derate above 50°C to a maximum temperature of 70°C as curves below: | -20  |      | +50<br>+70 | °C    |

Derating curves

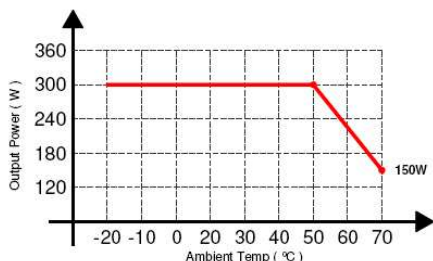


- Ⓐ 14V output (Maximum adjustable output voltage of TEK360M-12-C).  
36V output (TEK360M-36-C)
- Ⓑ 12V output (Minimum adjustable output voltage of TEK360M-12-C).  
TEK360M-24-C

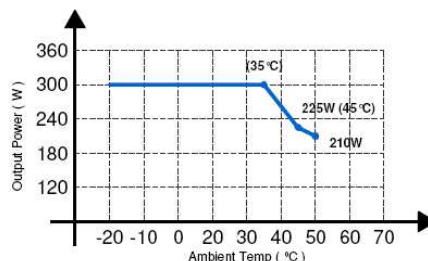
: With 23.3 CFM forced air cooling

Note: 1) The max output power at 19V output is 350W.

1. TEK360M-12:

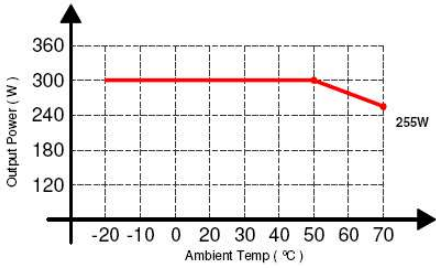


**Convection cooled**  
(TEK360M-12; 12V & 14V output)

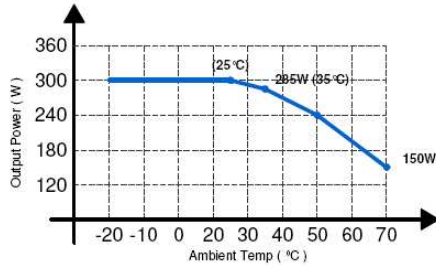


**Convection cooled with optional cover**  
(TEK360M-12-C; 12V & 14V output)

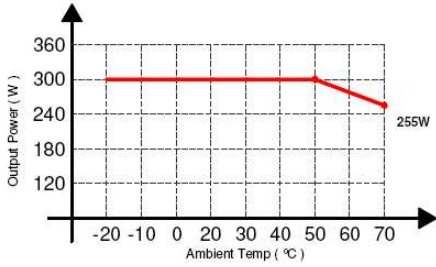
2. TEK360M-24:



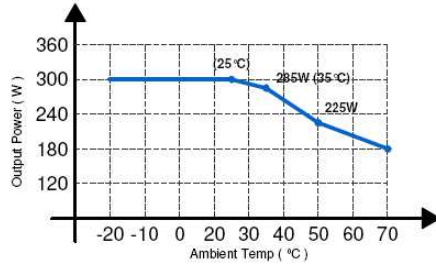
Convection cooled  
(TEK360M-24; 28V output)



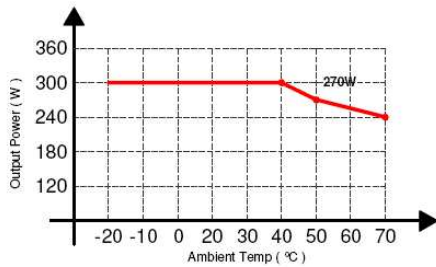
Convection cooled with optional cover  
(TEK360M-24-C; 28V output)



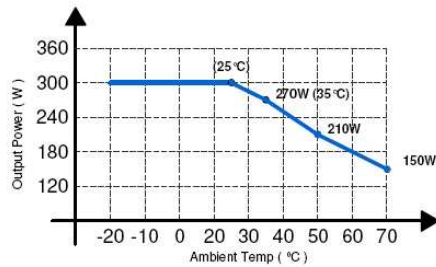
Convection cooled  
(TEK360M-24; 24V output)



Convection cooled with optional cover  
(TEK360M-24-C; 24V output)

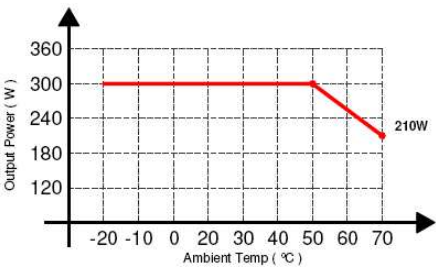


Convection cooled  
(TEK360M-24; 19V output)

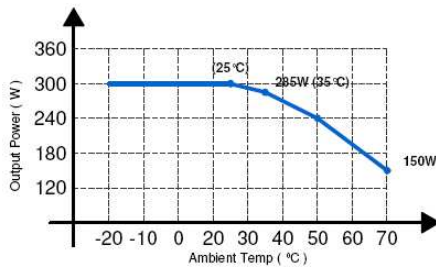


Convection cooled with optional cover  
(TEK360M-24-C; 19V output)

3. TEK360M-36:



Convection cooled  
(TEK360M-36)



Convection cooled with optional cover  
(TEK360M-36-C)

## 7. Safety Approvals, EMI and EMS Specification

| Parameter                              | Conditions/Description   | Min. | Nom. | Max. | Units          |
|--|--|------|------|------|----------------|
| Approvals                              | IEC 60601-1: 1988+A1+A2  |      |      |      | TUV approved   |
|  | IEC 60601-1: 2005  |      |      |      | TUV approved   |
|  | EN 60601-1: 2006   |      |      |      | TUV approved   |
|  | UL 60601-1, 1st Edition, 2006-04-26  |      |      |      | UL approved    |
|  | CAN/CSA-C22.2 No. 601.1-M90, 2005  |      |      |      | cUL approved   |
| Leakage Current                        | Patient Leakage Current at 264Vac, 63Hz normal condition<br>(Primary to Earth GND) | BF   |      |      | Type<br>150 uA |
|  | (Secondary to Earth GND)   |      |      |      | 100 uA         |
| EMI <sup>(Note 1)</sup>                | EN 60601-1-2: 2001   | B    |      |      | Class          |
|  | EN 55011 / EN 55022  | B    |      |      |                |
| PFC                                    | EN 61000-3-2: 2000 & EN 610003-3: 2001   | D    |      |      |                |
| EMS                                    | IEC 61000-4-2: 2001, 8KV air discharge, 6KV contact discharge                      | A    |      |      | Criteria       |
|  | IEC 61000-4-3: 2002, 10V/m   | A    |      |      |                |
|  | IEC 61000-4-4: 2004, 2KV line & PE   | A    |      |      |                |
|  | IEC 61000-4-5: 2001, 1KV line to line, 2KV line to PE                              | A    |      |      |                |
|  | IEC 61000-4-6: 2004, 10V/m   | A    |      |      |                |
|  | IEC 61000-4-8: 2001, 3A/m  | A    |      |      |                |
|  | IEC 61000-4-11: 2004, Voltage dips >95%, 0.5 cycle                                 | A    |      |      |                |
|  | Voltage dips 30%, 25 cycles  | A    |      |      |                |
|  | Voltage dips 60%, 5 cycles   | A-B* |      |      |                |
| Voltage interruptions >95%, 250 cycles | B  |      |      |      |                |

\* Criteria A option by request separately, find section 9 for detail.

Note: 1) As a build-in type power supply, the power supply needs to be installed in a suitable enclosure to pass the EMI/EMC tests. The final assembly has to comply with the valid EMI/EMC and safety.

## 8. Mechanical

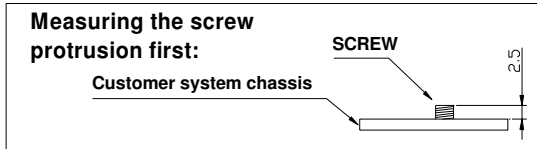
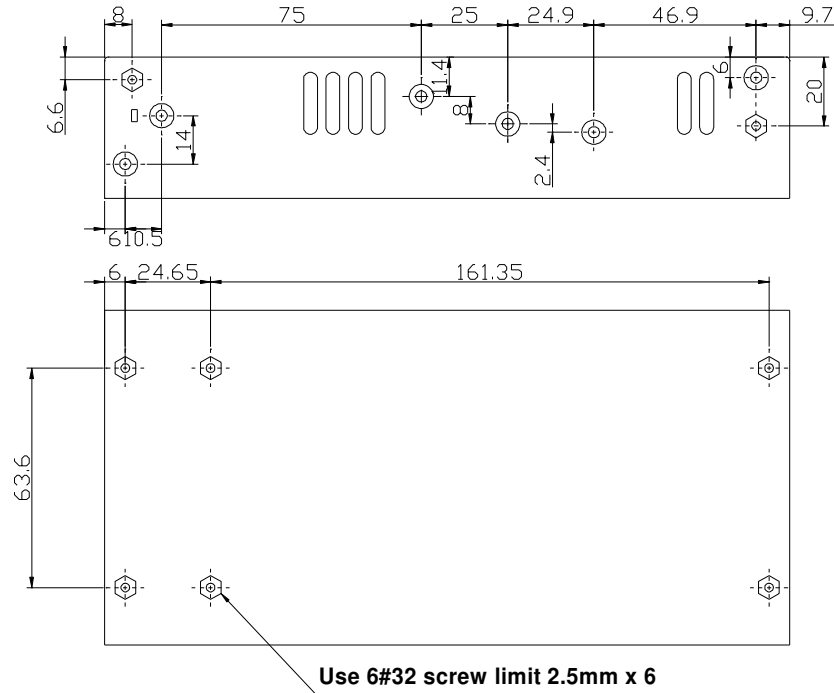
| Parameter      | Conditions/Description  |
|----------------|---|
| Dimension      | 198 (L) x 97 (W) mm, tolerance +/- 0.4mm, with (H) 41 mm, tolerance +0/-0.5 mm. |
| Connector      | CN1 --- AC input: 3 Positions Terminal Blocks, European type by request.        |
|                | CN2 --- DC output: 4 Positions Terminal Blocks, European type by request.       |
|                | CN3 --- Output remote sense: 2 Positions  |
| Pin Assignment | CN1 Pin 1. L 2. N 3.GND   |
|                | CN2 Pin 1. V+ 2. V+ 3. V- 4. V-   |
|                | CN3 Pin 1. Remote Sense + 2. Remote Sense -                                     |
|                | FAN <sup>(Note 1)</sup> Pin 1. + 2. -   |

Note: 1) The voltage of fan is the same with the output voltage of power supply.

✘The mechanical drawing is on next page.



**The mechanical drawing of bottom enclosure ( and spec of fixed screws ):**



**9. Option**

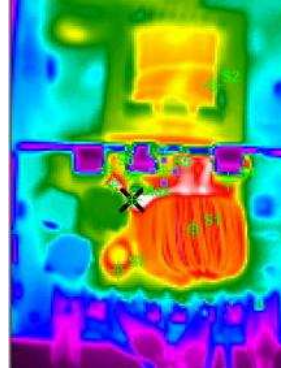
| Parameter  | Conditions/Description  | <i>* Please contact us for the availability and pricing</i> |
|--|---|---|
| Cover (P/N 831-U30U)   | Order part number with suffix code “-C” with cover assembled.   |   |
| DIP criteria A (for TEK360M-24 only)   | Additional storage electronic capacitors provided to comply with criteria A of voltage dips at 100Vac input. Order part number TEK360M-24-D.  |   |
| DIP criteria A (for TEK360M-12 only)   | Criteria A is only at output loading under 240W condition; When output loading above 240W, it will be criteria B. Order part number TEK360M-12-D.   |   |
| DIP criteria A (for TEK360M-36 only)   | Criteria A is only at output loading under (TBD)W condition; When output loading above (TBD)W, it will be criteria B. Order part number TEK360M-36D.  |   |
| Cover & DIP criteria A   | Both with cover provided and DIP criteria A complies, is with suffix code “-E”  |   |
| European terminal block appliance  | Order part number with suffix code “-ET” with European terminal blocks both input CN1 and output CN2.   |   |
| Available for two pieces in serial connection (for TEK360M-24 and TEK360M-36 only) | Order part number with suffix code “-S”, with direction reverse protection available in two pieces serial connection application.   |   |
| Redundant module (for TEK360M-24 only, P/N 900-RD30)                               | Additional module available by request separately for redundant function. Earth leakage current with two units parallel mode up to 500/600W is less than 300µA at 264Vac, 63Hz normal condition and 500µA single fault condition. |   |
| UPS charger module (not apply to TEK360M-36)                                       | Additional module available by request separately for UPS charger function.   |   |
| Multi outputs module (not apply to TEK360M-36)                                     | Additional module available by request separately for multi outputs.  |   |

### 10. Performance

Thermal (input 115V/50Hz, output 24Vdc / full load, ambient temperature 25°C)



| #            | Temp.  |
|--------------|--------|
| S1           | 84.0°C |
| S2           | 87.4°C |
| S3           | 99.7°C |
| S4           | 93.3°C |
| S5           | 92.6°C |
| S6           | 87.6°C |
| S7           | 89.2°C |
| Primary part |        |



| #              | Temp.   |
|----------------|---------|
| S1             | 96.4°C  |
| S2             | 90.6°C  |
| S3             | 104.1°C |
| S4             | 89.0°C  |
| S5             | 88.2°C  |
| S6             | 82.3°C  |
| S7             | 94.3°C  |
| Secondary part |         |

Thermal (input 230V/50Hz, output 24Vdc / full load, ambient temperature 25°C)

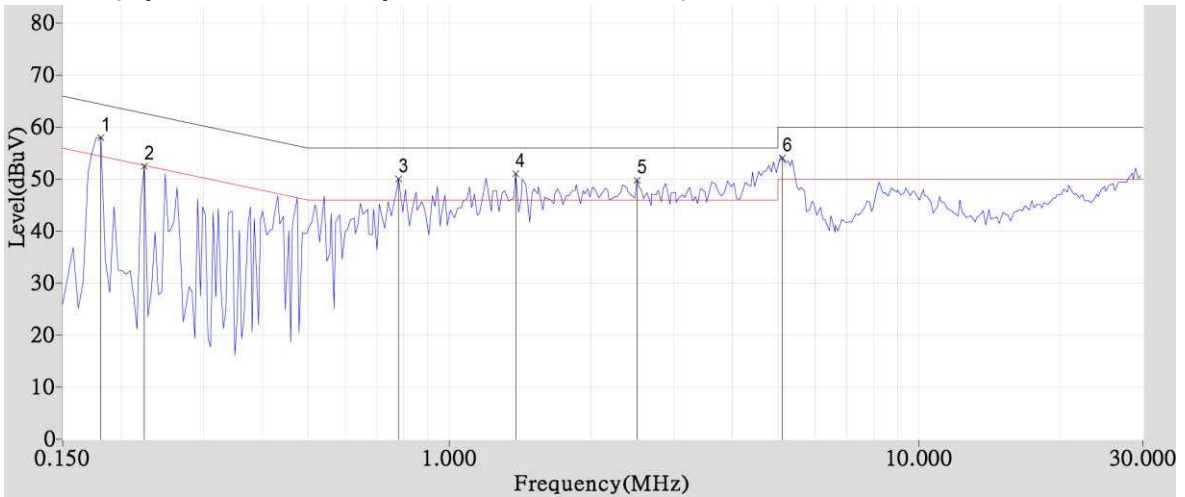


| #            | Temp.  |
|--------------|--------|
| S1           | 65.5°C |
| S2           | 63.8°C |
| S3           | 62.8°C |
| S4           | 83.7°C |
| S5           | 73.7°C |
| S6           | 88.9°C |
| S7           | 62.5°C |
| Primary part |        |



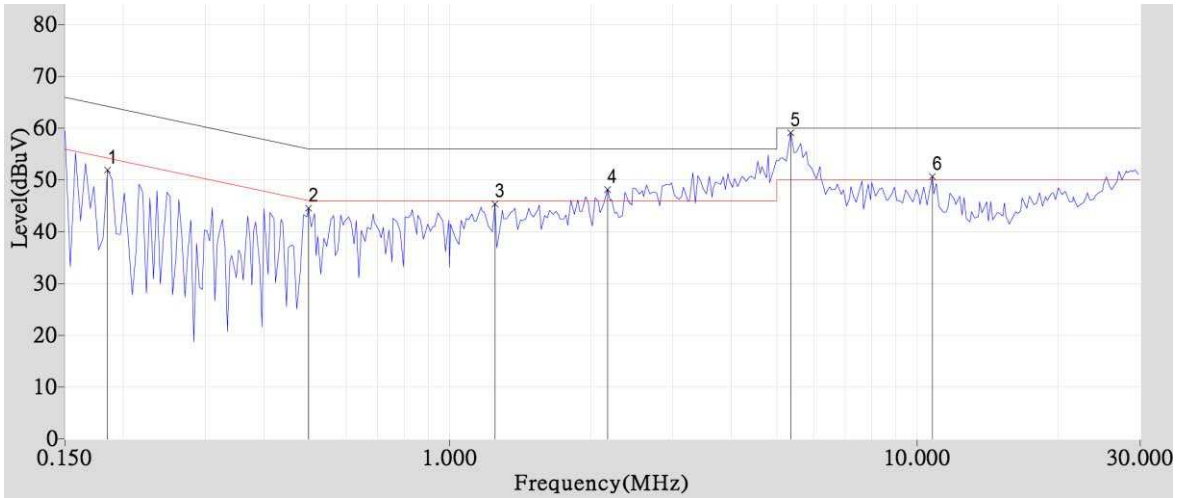
| #              | Temp.   |
|----------------|---------|
| S1             | 96.6°C  |
| S2             | 91.9°C  |
| S3             | 103.1°C |
| S4             | 89.5°C  |
| S5             | 87.5°C  |
| S6             | 88.8°C  |
| S7             | 95.0°C  |
| Secondary part |         |

Conduction Line (input 230V/50Hz, output 24Vdc, and full load)



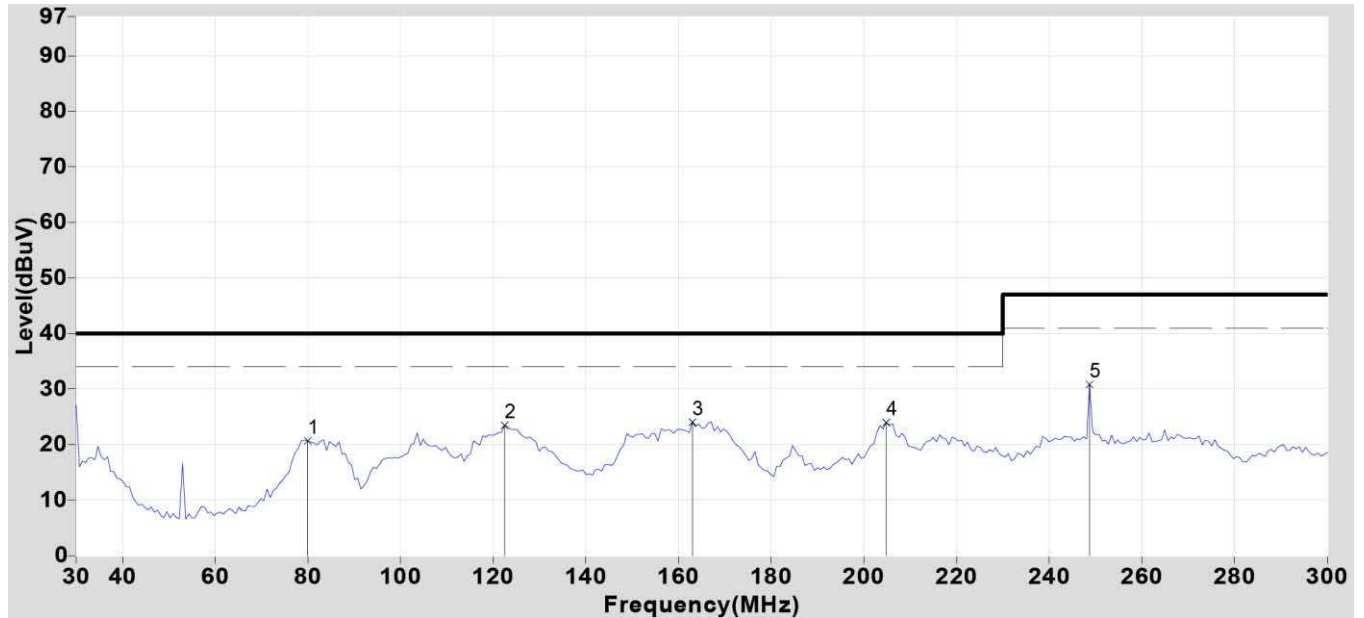
|   | QP/AV Freq. | QP/AV Level | Margin | Limit Level | Read Level | Total Factor | Ant. Factor | Cable Factor | Other Factor | Det. Mode |
|---|-------------|-------------|--------|-------------|------------|--------------|-------------|--------------|--------------|-----------|
|   | MHz         | dBuV        | dB     | dB          | dBuV       | dB           | dB          | dB           | dB           |           |
| 1 | 0.181       | 52.17       | -12.27 | 64.44       | 52.00      | 0.17         | 0.07        | 0.10         | 0.00         | QP        |
| 1 | 0.181       | 35.37       | -19.07 | 54.44       | 35.20      | 0.17         | 0.07        | 0.10         | 0.00         | AV        |
| 2 | 0.224       | 47.86       | -14.81 | 62.67       | 47.71      | 0.15         | 0.06        | 0.09         | 0.00         | QP        |
| 2 | 0.224       | 27.89       | -24.78 | 52.67       | 27.74      | 0.15         | 0.06        | 0.09         | 0.00         | AV        |
| 3 | 0.779       | 44.52       | -11.48 | 56.00       | 44.43      | 0.09         | 0.06        | 0.03         | 0.00         | QP        |
| 3 | 0.779       | 32.92       | -13.08 | 46.00       | 32.83      | 0.09         | 0.06        | 0.03         | 0.00         | AV        |
| 4 | 1.384       | 43.08       | -12.92 | 56.00       | 43.01      | 0.07         | 0.07        | 0.00         | 0.00         | QP        |
| 4 | 1.384       | 32.84       | -13.16 | 46.00       | 32.77      | 0.07         | 0.07        | 0.00         | 0.00         | AV        |
| 5 | 2.509       | 44.35       | -11.65 | 56.00       | 44.26      | 0.09         | 0.09        | 0.00         | 0.00         | QP        |
| 5 | 2.509       | 36.88       | -9.12  | 46.00       | 36.79      | 0.09         | 0.09        | 0.00         | 0.00         | AV        |
| 6 | 5.115       | 49.31       | -10.69 | 60.00       | 49.13      | 0.18         | 0.18        | 0.00         | 0.00         | QP        |
| 6 | 5.115       | 42.11       | -7.89  | 50.00       | 41.93      | 0.18         | 0.18        | 0.00         | 0.00         | AV        |

**Conduction Line (input 110V/60Hz, output 24Vdc, and full load)**



|   | QP/AV Freq. | QP/AV Level | Margin | Limit Level | Read Level | Total Factor | Ant. Factor | Cable Factor | Other Factor | Det. Mode |
|---|-------------|-------------|--------|-------------|------------|--------------|-------------|--------------|--------------|-----------|
|   | MHz         | dBuV        | dB     | dB          | dBuV       | dB           | dB          | dB           | dB           |           |
| 1 | 0.185       | 41.37       | -12.89 | 54.26       | 41.20      | 0.17         | 0.07        | 0.10         | 0.00         | AV        |
| 2 | 0.498       | 33.01       | -13.02 | 46.03       | 32.90      | 0.11         | 0.05        | 0.06         | 0.00         | AV        |
| 3 | 1.248       | 41.26       | -14.74 | 56.00       | 41.20      | 0.06         | 0.06        | 0.00         | 0.00         | QP        |
| 3 | 1.248       | 31.76       | -14.24 | 46.00       | 31.70      | 0.06         | 0.06        | 0.00         | 0.00         | AV        |
| 4 | 2.173       | 34.25       | -11.75 | 46.00       | 34.17      | 0.08         | 0.08        | 0.00         | 0.00         | AV        |
| 4 | 2.173       | 42.78       | -13.22 | 56.00       | 42.70      | 0.08         | 0.08        | 0.00         | 0.00         | QP        |
| 5 | 5.357       | 44.29       | -5.71  | 50.00       | 44.10      | 0.19         | 0.19        | 0.00         | 0.00         | AV        |
| 5 | 5.357       | 51.99       | -8.01  | 60.00       | 51.80      | 0.19         | 0.19        | 0.00         | 0.00         | QP        |
| 6 | 10.767      | 36.40       | -13.60 | 50.00       | 35.88      | 0.52         | 0.42        | 0.10         | 0.00         | AV        |
| 6 | 10.767      | 41.62       | -18.38 | 60.00       | 41.10      | 0.52         | 0.42        | 0.10         | 0.00         | QP        |

**Radiation Vertical (input 230V/50Hz, output 24Vdc, and full load)**



Radiation Vertical (input 110V/60Hz, output 24Vdc, and full load)

