



**FCC Part15, Subpart B
ICES-003**

TEST REPORT

For

Smart Plug

MODEL NUMBER: 7A-PL-W-A1

**FCC ID: 2AB2Q-7APLWA1
IC: 10256A-7APLWA1**

REPORT NUMBER: 4788899177.1-2

ISSUE DATE: March 22, 2019

Prepared for

**LEEDARSON LIGHTING CO., LTD.
Xingtai Industrial Zone, Economic Development Zone, Changtai County,
Zhangzhou City, Fujian Province, P.R.China**

Prepared by

**UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch
Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-
Tech Development Zone Dongguan, 523808, People's Republic of China
Tel: +86 769 22038881
Fax: +86 769 33244054
Website: www.ul.com**

The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.



Revision History

| Rev. | Issue Date | Revisions | Revised By |
|------|------------|---------------|------------|
| V0 | 03/22/2019 | Initial Issue | |



| Summary of Test Results | | | | |
|---|----------------------------------|---------|--------|----------|
| Standard | Test Item | Limit | Result | Remark |
| FCC Part15, Subpart B ICES-003 Issue 6 ANSI C63.4-2014 | Conducted Disturbance | Class B | PASS | |
| | Radiated Disturbance below 1 GHz | Class B | PASS | |
| | Radiated Disturbance above 1 GHz | Class B | PASS | NOTE (2) |
| <p>Note:</p> <p>(1) "N/A" denotes test is not applicable in this Test Report</p> <p>(2) If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, measurement shall only be made up to 5 GHz. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz, whichever is less.</p> | | | | |



CONTENTS

| | |
|---|-----------|
| 1. ATTESTATION OF TEST RESULTS | 5 |
| 2. TEST METHODOLOGY | 6 |
| 3. FACILITIES AND ACCREDITATION | 6 |
| 4. CALIBRATION AND UNCERTAINTY | 7 |
| 4.1. <i>Measuring Instrument Calibration</i> | <i>7</i> |
| 4.2. <i>Measurement Uncertainty</i> | <i>7</i> |
| 5. EQUIPMENT UNDER TEST | 8 |
| 5.1. <i>Description of EUT.....</i> | <i>8</i> |
| 5.2. <i>Test Mode</i> | <i>8</i> |
| 5.3. <i>EUT Accessory.....</i> | <i>8</i> |
| 5.4. <i>Support Units or Accessories for System Test.....</i> | <i>9</i> |
| 6. MEASURING EQUIPMENT AND SOFTWARE USED..... | 10 |
| 7. EMISSION TEST | 11 |
| 7.1. <i>Conducted Disturbance Measurement.....</i> | <i>11</i> |
| 7.1.1. Limits of conducted disturbance voltage | 11 |
| 7.1.2. Test Procedure..... | 11 |
| 7.1.3. Test Setup..... | 12 |
| 7.1.4. Test Environment | 12 |
| 7.1.5. Test Mode | 12 |
| 7.1.6. Test Results | 13 |
| 7.2. <i>Radiated Disturbance Measurement.....</i> | <i>21</i> |
| 7.2.1. Limits of radiated disturbance measurement | 21 |
| 7.2.2. Test Procedure..... | 22 |
| 7.2.3. Test Setup..... | 22 |
| 7.2.4. Test Environment | 23 |
| 7.2.5. Test Mode | 23 |
| 7.2.6. Test Results – below 1GHz..... | 24 |
| 7.2.7. Test Results – above 1GHz | 32 |



1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: LEEDARSON LIGHTING CO., LTD.
Address: Xingtai Industrial Zone, Economic Development Zone, Changtai County, Zhangzhou City, Fujian Province, P.R.China

Manufacturer Information

Company Name: LEEDARSON LIGHTING CO., LTD.
Address: Xingtai Industrial Zone, Economic Development Zone, Changtai County, Zhangzhou City, Fujian Province, P.R.China

EUT Information

EUT Name: Smart Plug
Model: 7A-PL-W-A1
Sample Status: Normal
Sample ID: 2138483
Brand: LEEDARSON
Sample Received Date: March 12, 2019
Date of Tested: March 12, 2019 ~ March 22, 2019

| APPLICABLE STANDARDS | |
|--|--------------|
| STANDARDS | TEST RESULTS |
| FCC Part15, Subpart B ICES-003 Issue 6 ANSI C63.4-2014 | PASS |

Prepared By:

Gary Zhang
Engineer Project Associate

Checked By:

Shawn Wen
Laboratory Leader

Approved By:

Stephen Guo
Laboratory Manager



2. TEST METHODOLOGY

All tests were performed in accordance with the standard FCC Part15 Subpart B, ANSI C63.4-2014, and ICES-003 Issue 6

3. FACILITIES AND ACCREDITATION

| | |
|---------------------------|--|
| Accreditation Certificate | <p>A2LA (Certificate No.: 4102.01) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p>FCC (FCC Designation No.: CN1187) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules</p> <p>IC(Company No.: 21320) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with Industry Canada. The Company Number is 21320.</p> <p>VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B , the VCCI registration No. is C-20012 and T-20011</p> |
|---------------------------|--|

Note: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, 523808, People's Republic of China

4. CALIBRATION AND UNCERTAINTY

4.1. Measuring Instrument Calibration

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| Test Item | Measurement Frequency Range | K | U(dB) |
|---|-----------------------------|---|-------|
| Conducted emissions from the AC mains power ports | 0.009MHz ~ 0.15MHz | 2 | 4.00 |
| Conducted emissions from the AC mains power ports | 0.15MHz ~ 30MHz | 2 | 3.62 |
| Radiated emissions | 30MHz ~ 1GHz | 2 | 4.00 |
| Radiated emissions | 1GHz ~ 18GHz | 2 | 5.78 |

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.



5. EQUIPMENT UNDER TEST

5.1. Description of EUT

| | |
|----------------|--------------|
| EUT Name | Smart Plug |
| Model | 7A-PL-W-A1 |
| Supply Voltage | AC 120V 60Hz |

5.2. Test Mode

| | |
|-----------|----------------|
| Test Mode | Description |
| Mode 1 | Normal working |

Note, there are four different samples were tested

| | |
|-------------------|--|
| Test Construction | Description |
| Construction 1 | AZ9481 Relay with power analyzer chip |
| Construction 2 | AZ9481 Relay without power analyzer chip |
| Construction 3 | HF7520 Relay with power analyzer chip |
| Construction 4 | HF7520 Relay without power analyzer chip |

5.3. EUT Accessory

| Item | Accessory | Brand Name | Model Name | Description |
|------|-----------|------------|------------|-------------|
| / | / | / | / | / |

Note: no accessory



5.4. Support Units or Accessories for System Test

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Mfr/Brand | Model/Type No. | Specification | Series No. |
|------|-----------|-----------|----------------|---------------|------------|
| 1 | Lamp | / | / | 500W | / |

The following cables were used to form a representative test configuration during the tests.

| Item | Type of cable | Shielded Type | Ferrite Core | Specification |
|------|---------------|---------------|--------------|---------------|
| 1 | AC cable | no | no | 1m |



6. MEASURING EQUIPMENT AND SOFTWARE USED

| Conducted Emissions | | | | | |
|---------------------------------------|--------------|--------------|---------------|----------------|----------------|
| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Due Date |
| EMI Test Receiver | R&S | ESR3 | 101961 | Dec. 10, 2018 | Dec. 10, 2019 |
| Two-Line V-Network | R&S | ENV216 | 101983 | Dec. 10, 2018 | Dec. 10, 2019 |
| Software | | | | | |
| Description | | Manufacturer | | Name | Version |
| Test Software for Conducted Emissions | | Farad | | EZ-EMC | Ver. UL-3A1 |
| Radiated Emissions | | | | | |
| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
| MXE EMI Receiver | KESIGHT | N9038A | MY56400036 | Dec. 10, 2018 | Dec. 10, 2019 |
| Hybrid Log Periodic Antenna | TDK | HLP-3003C | 130960 | Sept. 17, 2018 | Sept. 17, 2021 |
| Preamplifier | HP | 8447D | 2944A09099 | Dec. 10, 2018 | Dec. 10, 2019 |
| EMI Measurement Receiver | R&S | ESR26 | 101377 | Dec. 10, 2018 | Dec. 10, 2019 |
| Horn Antenna | TDK | HRN-0118 | 130939 | Sept. 17, 2018 | Sept. 17, 2021 |
| Preamplifier | TDK | PA-02-0118 | TRS-305-00067 | Apr. 8, 2018 | Apr. 8, 2019 |
| Software | | | | | |
| Description | | Manufacturer | | Name | Version |
| Test Software for Radiated Emissions | | Farad | | EZ-EMC | Ver. UL-3A1 |

7. EMISSION TEST

7.1. Conducted Disturbance Measurement

7.1.1. Limits of conducted disturbance voltage

| FREQUENCY (MHz) | Class A (dB μ V) | | Class B (dB μ V) | |
|--------------------|----------------------|---------|----------------------|----------|
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 -0.5 | 79.00 | 66.00 | 66 - 56 * | 56 - 46* |
| 0.50 -5.0 | 73.00 | 60.00 | 56.00 | 46.00 |
| 5.0 -30.0 | 73.00 | 60.00 | 60.00 | 50.00 |

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

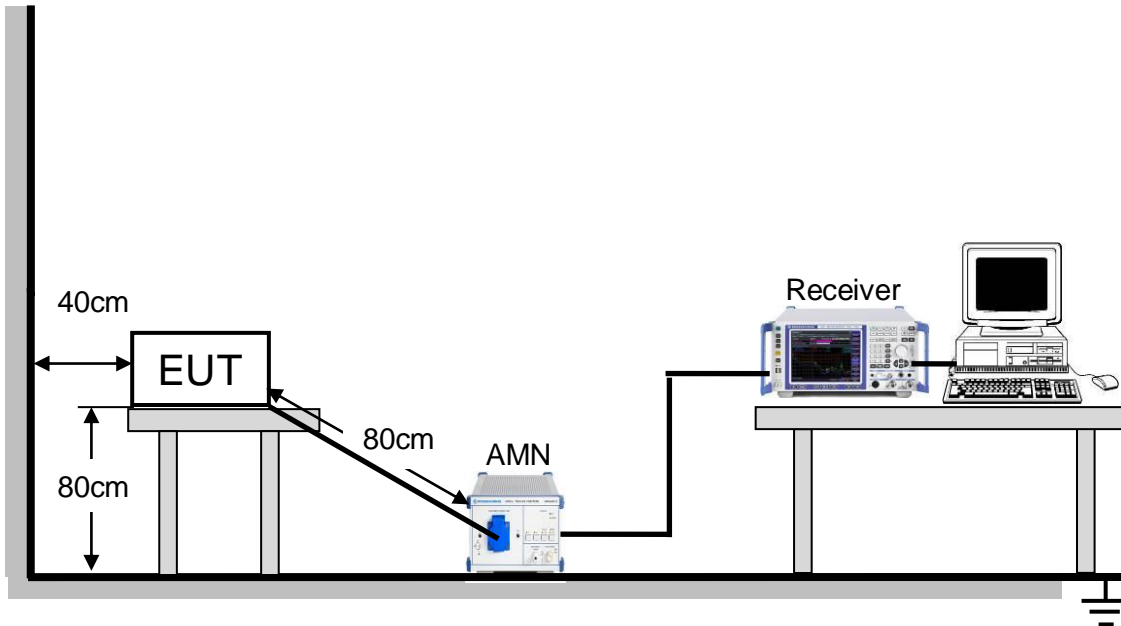
The following table is the setting of the receiver

| Receiver Parameters | Setting |
|---------------------|----------|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |

7.1.2. Test Procedure

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item: Photographs of Test Configuration.

7.1.3. Test Setup



Note : For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

7.1.4. Test Environment

| | |
|---------------|--------|
| Temperature: | 20°C |
| Humidity: | 60% |
| ATM pressure: | 101kPa |

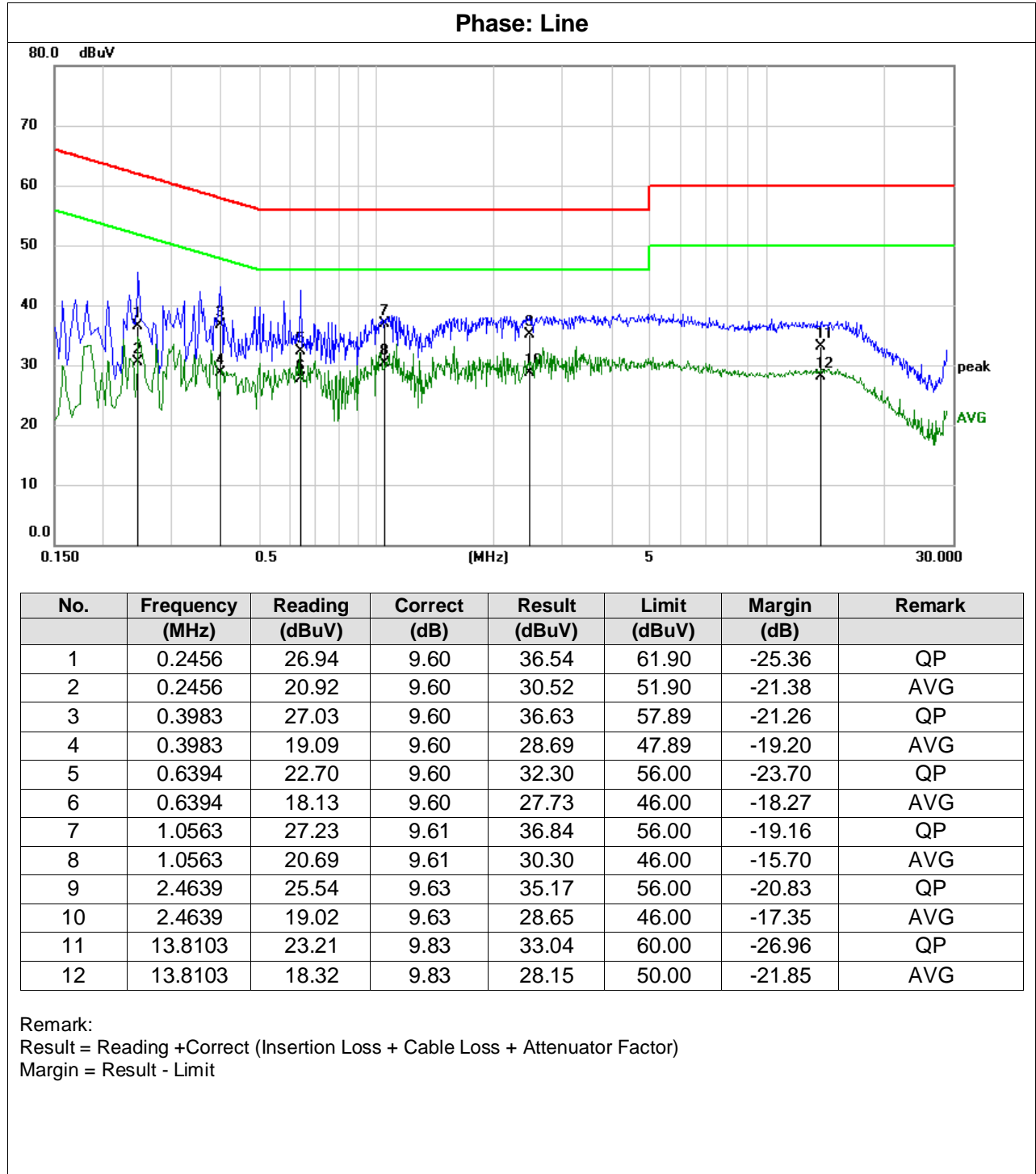
7.1.5. Test Mode

| | |
|------------------|--------|
| Pre-test Mode: | Mode 1 |
| Final Test Mode: | Mode 1 |



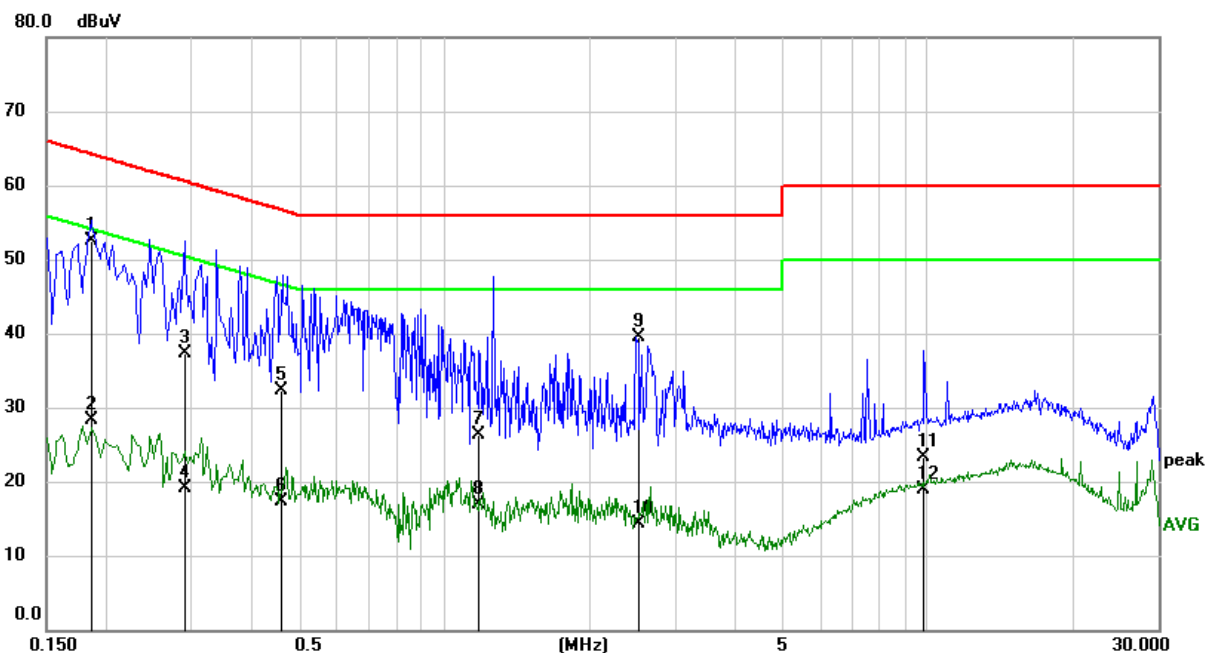
7.1.6. Test Results

| | |
|---------------|---------------------------------------|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | AZ9481 Relay with power analyzer chip |





| | |
|---------------|---------------------------------------|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | AZ9481 Relay with power analyzer chip |

Phase: Neutral

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-----------------|------------------|-----------------|----------------|--------|
| 1 | 0.1853 | 42.86 | 9.60 | 52.46 | 64.24 | -11.78 | QP |
| 2 | 0.1853 | 18.62 | 9.60 | 28.22 | 54.24 | -26.02 | AVG |
| 3 | 0.2887 | 27.76 | 9.60 | 37.36 | 60.56 | -23.20 | QP |
| 4 | 0.2887 | 9.54 | 9.60 | 19.14 | 50.56 | -31.42 | AVG |
| 5 | 0.4583 | 22.80 | 9.60 | 32.40 | 56.72 | -24.32 | QP |
| 6 | 0.4583 | 7.73 | 9.60 | 17.33 | 46.72 | -29.39 | AVG |
| 7 | 1.1780 | 16.71 | 9.61 | 26.32 | 56.00 | -29.68 | QP |
| 8 | 1.1780 | 7.21 | 9.61 | 16.82 | 46.00 | -29.18 | AVG |
| 9 | 2.5309 | 29.85 | 9.64 | 39.49 | 56.00 | -16.51 | QP |
| 10 | 2.5309 | 4.68 | 9.64 | 14.32 | 46.00 | -31.68 | AVG |
| 11 | 9.8450 | 13.60 | 9.76 | 23.36 | 60.00 | -36.64 | QP |
| 12 | 9.8450 | 9.16 | 9.76 | 18.92 | 50.00 | -31.08 | AVG |

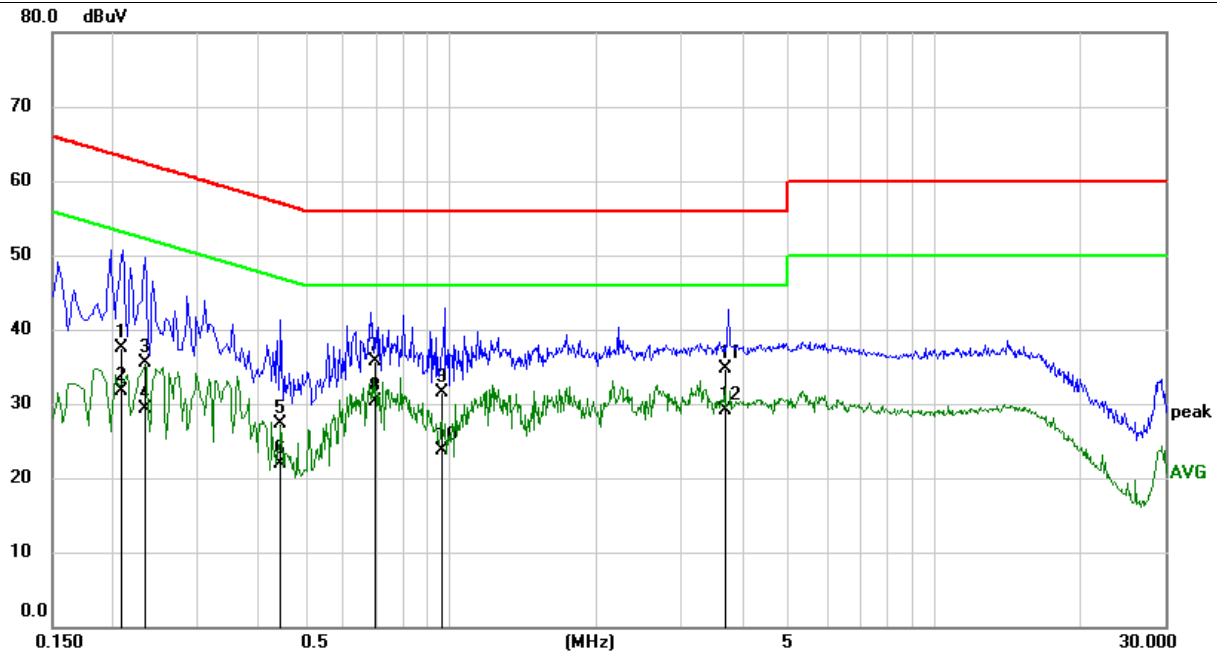
Remark:

Result = Reading +Correct (Insertion Loss + Cable Loss + Attenuator Factor)

Margin = Result - Limit



| | |
|---------------|--|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | AZ9481 Relay without power analyzer chip |

Phase: Line

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Remark |
|-----|-----------------|----------------|--------------|---------------|--------------|-------------|--------|
| 1 | 0.2075 | 27.96 | 9.60 | 37.56 | 63.30 | -25.74 | QP |
| 2 | 0.2075 | 22.06 | 9.60 | 31.66 | 53.30 | -21.64 | AVG |
| 3 | 0.2340 | 25.89 | 9.60 | 35.49 | 62.31 | -26.82 | QP |
| 4 | 0.2340 | 19.76 | 9.60 | 29.36 | 52.31 | -22.95 | AVG |
| 5 | 0.4443 | 17.70 | 9.60 | 27.30 | 56.98 | -29.68 | QP |
| 6 | 0.4443 | 12.36 | 9.60 | 21.96 | 46.98 | -25.02 | AVG |
| 7 | 0.6945 | 26.02 | 9.60 | 35.62 | 56.00 | -20.38 | QP |
| 8 | 0.6945 | 20.71 | 9.60 | 30.31 | 46.00 | -15.69 | AVG |
| 9 | 0.9588 | 21.92 | 9.61 | 31.53 | 56.00 | -24.47 | QP |
| 10 | 0.9588 | 14.04 | 9.61 | 23.65 | 46.00 | -22.35 | AVG |
| 11 | 3.7075 | 25.01 | 9.65 | 34.66 | 56.00 | -21.34 | QP |
| 12 | 3.7075 | 19.48 | 9.65 | 29.13 | 46.00 | -16.87 | AVG |

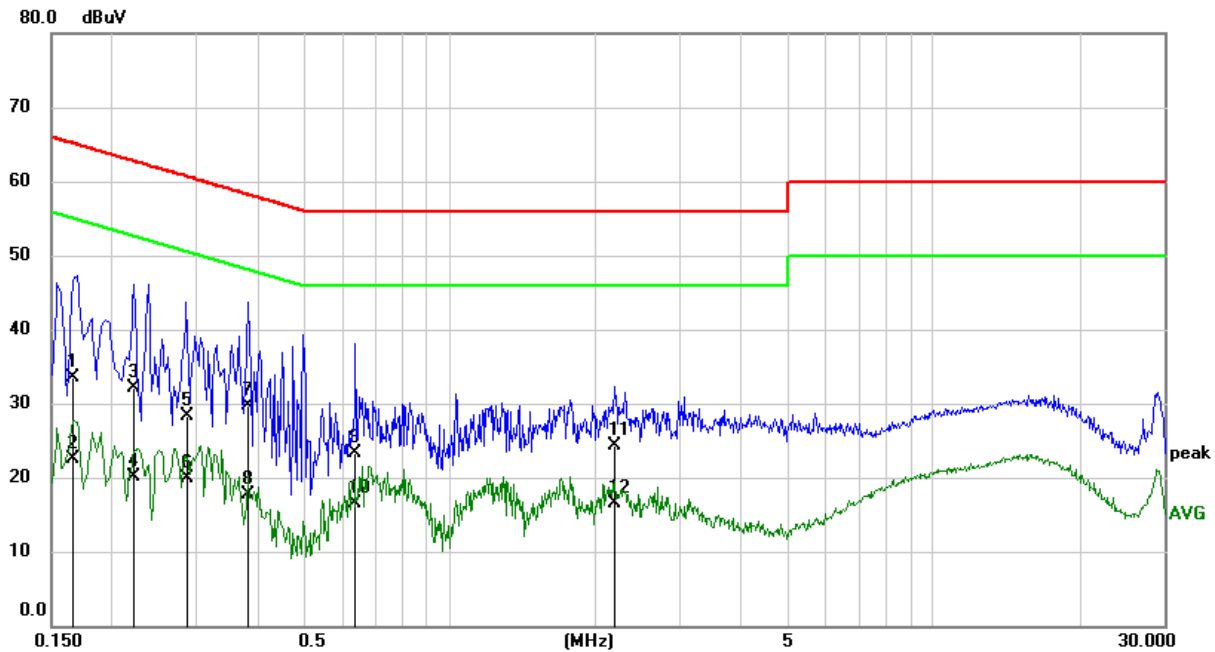
Remark:

Result = Reading +Correct (Insertion Loss + Cable Loss + Attenuator Factor)

Margin = Result - Limit



| | |
|---------------|--|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | AZ9481 Relay without power analyzer chip |

Phase: Neutral

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-----------------|------------------|-----------------|----------------|--------|
| 1 | 0.1652 | 23.82 | 9.60 | 33.42 | 65.20 | -31.78 | QP |
| 2 | 0.1652 | 12.83 | 9.60 | 22.43 | 55.20 | -32.77 | AVG |
| 3 | 0.2222 | 22.58 | 9.60 | 32.18 | 62.74 | -30.56 | QP |
| 4 | 0.2222 | 10.57 | 9.60 | 20.17 | 52.74 | -32.57 | AVG |
| 5 | 0.2869 | 18.80 | 9.60 | 28.40 | 60.61 | -32.21 | QP |
| 6 | 0.2869 | 10.34 | 9.60 | 19.94 | 50.61 | -30.67 | AVG |
| 7 | 0.3834 | 20.14 | 9.60 | 29.74 | 58.21 | -28.47 | QP |
| 8 | 0.3834 | 8.09 | 9.60 | 17.69 | 48.21 | -30.52 | AVG |
| 9 | 0.6413 | 13.71 | 9.60 | 23.31 | 56.00 | -32.69 | QP |
| 10 | 0.6413 | 6.92 | 9.60 | 16.52 | 46.00 | -29.48 | AVG |
| 11 | 2.1929 | 14.77 | 9.63 | 24.40 | 56.00 | -31.60 | QP |
| 12 | 2.1929 | 6.93 | 9.63 | 16.56 | 46.00 | -29.44 | AVG |

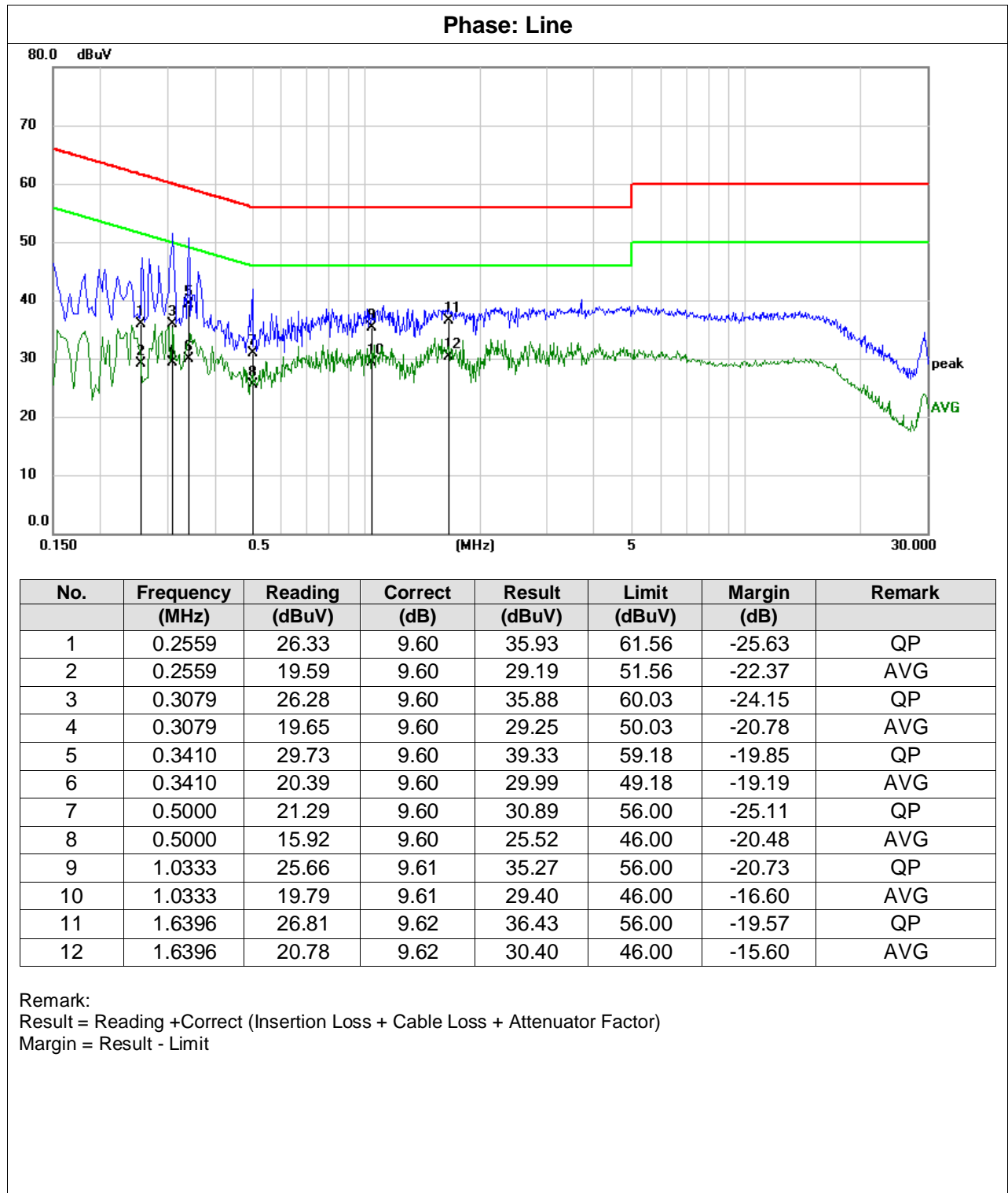
Remark:

Result = Reading + Correct (Insertion Loss + Cable Loss + Attenuator Factor)

Margin = Result - Limit

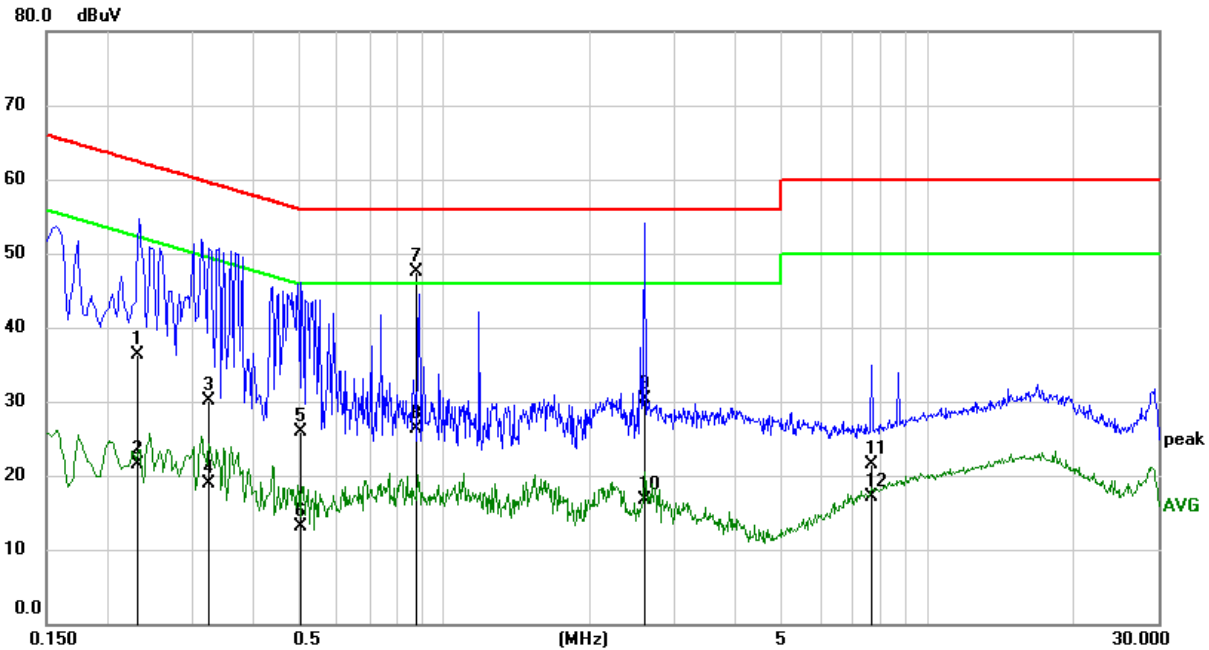


| | |
|---------------|---------------------------------------|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | HF7520 Relay with power analyzer chip |





| | |
|---------------|---------------------------------------|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | HF7520 Relay with power analyzer chip |

Phase: Neutral

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-----------------|------------------|-----------------|----------------|--------|
| 1 | 0.2307 | 26.66 | 9.60 | 36.26 | 62.42 | -26.16 | QP |
| 2 | 0.2307 | 11.87 | 9.60 | 21.47 | 52.42 | -30.95 | AVG |
| 3 | 0.3239 | 20.47 | 9.60 | 30.07 | 59.61 | -29.54 | QP |
| 4 | 0.3239 | 9.35 | 9.60 | 18.95 | 49.61 | -30.66 | AVG |
| 5 | 0.5039 | 16.39 | 9.60 | 25.99 | 56.00 | -30.01 | QP |
| 6 | 0.5039 | 3.60 | 9.60 | 13.20 | 46.00 | -32.80 | AVG |
| 7 | 0.8746 | 37.89 | 9.60 | 47.49 | 56.00 | -8.51 | QP |
| 8 | 0.8746 | 16.75 | 9.60 | 26.35 | 46.00 | -19.65 | AVG |
| 9 | 2.6108 | 20.58 | 9.64 | 30.22 | 56.00 | -25.78 | QP |
| 10 | 2.6108 | 7.06 | 9.64 | 16.70 | 46.00 | -29.30 | AVG |
| 11 | 7.6346 | 11.69 | 9.72 | 21.41 | 60.00 | -38.59 | QP |
| 12 | 7.6346 | 7.31 | 9.72 | 17.03 | 50.00 | -32.97 | AVG |

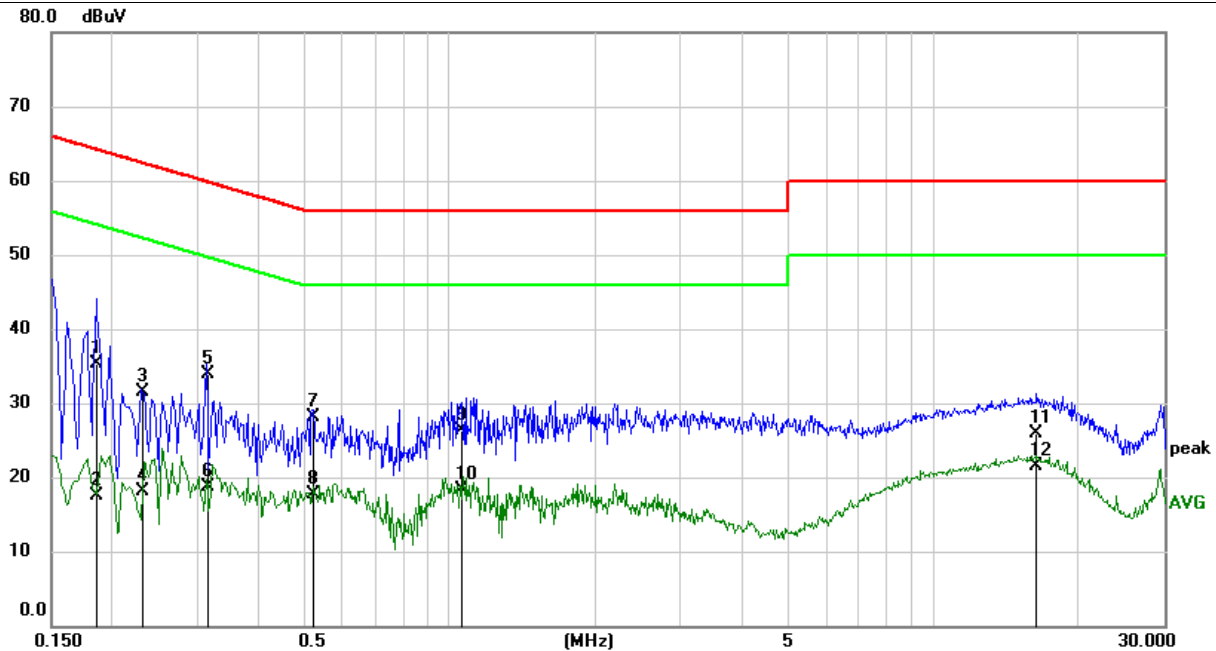
Remark:

Result = Reading +Correct (Insertion Loss + Cable Loss + Attenuator Factor)

Margin = Result - Limit



| | |
|---------------|--|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | HF7520 Relay without power analyzer chip |

Phase: Line

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-----------------|------------------|-----------------|----------------|--------|
| 1 | 0.1870 | 25.77 | 9.60 | 35.37 | 64.17 | -28.80 | QP |
| 2 | 0.1870 | 8.00 | 9.60 | 17.60 | 54.17 | -36.57 | AVG |
| 3 | 0.2322 | 21.92 | 9.60 | 31.52 | 62.37 | -30.85 | QP |
| 4 | 0.2322 | 8.57 | 9.60 | 18.17 | 52.37 | -34.20 | AVG |
| 5 | 0.3174 | 24.30 | 9.60 | 33.90 | 59.77 | -25.87 | QP |
| 6 | 0.3174 | 9.10 | 9.60 | 18.70 | 49.77 | -31.07 | AVG |
| 7 | 0.5248 | 18.49 | 9.60 | 28.09 | 56.00 | -27.91 | QP |
| 8 | 0.5248 | 8.11 | 9.60 | 17.71 | 46.00 | -28.29 | AVG |
| 9 | 1.0597 | 16.63 | 9.61 | 26.24 | 56.00 | -29.76 | QP |
| 10 | 1.0597 | 8.62 | 9.61 | 18.23 | 46.00 | -27.77 | AVG |
| 11 | 16.3758 | 16.01 | 9.92 | 25.93 | 60.00 | -34.07 | QP |
| 12 | 16.3758 | 11.63 | 9.92 | 21.55 | 50.00 | -28.45 | AVG |

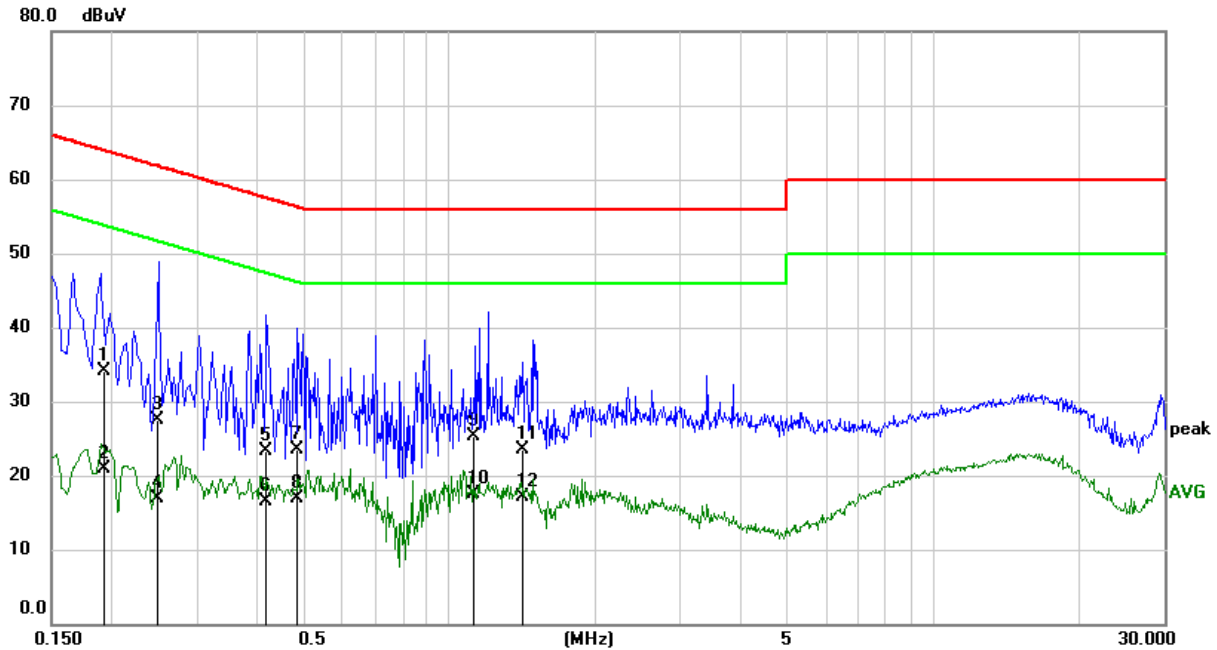
Remark:

Result = Reading + Correct (Insertion Loss + Cable Loss + Attenuator Factor)

Margin = Result - Limit



| | |
|---------------|--|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | HF7520 Relay without power analyzer chip |

Phase: Neutral

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-----------------|------------------|-----------------|----------------|--------|
| 1 | 0.1924 | 24.49 | 9.60 | 34.09 | 63.93 | -29.84 | QP |
| 2 | 0.1924 | 11.34 | 9.60 | 20.94 | 53.93 | -32.99 | AVG |
| 3 | 0.2473 | 17.93 | 9.60 | 27.53 | 61.85 | -34.32 | QP |
| 4 | 0.2473 | 7.23 | 9.60 | 16.83 | 51.85 | -35.02 | AVG |
| 5 | 0.4170 | 13.72 | 9.60 | 23.32 | 57.51 | -34.19 | QP |
| 6 | 0.4170 | 6.96 | 9.60 | 16.56 | 47.51 | -30.95 | AVG |
| 7 | 0.4857 | 13.81 | 9.60 | 23.41 | 56.24 | -32.83 | QP |
| 8 | 0.4857 | 7.21 | 9.60 | 16.81 | 46.24 | -29.43 | AVG |
| 9 | 1.1167 | 15.76 | 9.61 | 25.37 | 56.00 | -30.63 | QP |
| 10 | 1.1167 | 7.86 | 9.61 | 17.47 | 46.00 | -28.53 | AVG |
| 11 | 1.4211 | 13.91 | 9.61 | 23.52 | 56.00 | -32.48 | QP |
| 12 | 1.4211 | 7.49 | 9.61 | 17.10 | 46.00 | -28.90 | AVG |

Remark:

Result = Reading + Correct (Insertion Loss + Cable Loss + Attenuator Factor)

Margin = Result - Limit

7.2. Radiated Disturbance Measurement

7.2.1. Limits of radiated disturbance measurement

Below 1 GHz

Measurement Method and Applied Limits:

ANSI C63.4:

| Frequency (MHz) | Class A | | Class B |
|-----------------|---------------------------------|---------------------------------|---------------------------------|
| | Field strength (uV/m) (at 10m) | Field strength (dBuV/m) (at 3m) | Field strength (dBuV/m) (at 3m) |
| 30 - 88 | 90 | 49.5 | 40 |
| 88 - 216 | 150 | 53.9 | 43.5 |
| 216 - 960 | 210 | 56.9 | 46 |
| Above 960 | 300 | 60 | 54 |

Above 1 GHz

Measurement Method and Applied Limits:

ANSI C63.4:

| Frequency (MHz) | Class A | | | | Class B | |
|-----------------|------------------|---------|-------------------|---------|------------------|---------|
| | (dBuV/m) (at 3m) | | (dBuV/m) (at 10m) | | (dBuV/m) (at 3m) | |
| | Peak | Average | Peak | Average | Peak | Average |
| Above 1000 | 80 | 60 | 69.5 | 49.5 | 74 | 54 |

Frequency Range of Radiated Disturbance Measurement

| Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz) | Range (MHz) |
|---|---|
| Below 1.705 | 30 |
| 1.705 - 108 | 1000 |
| 108 - 500 | 2000 |
| 500 - 1000 | 5000 |
| Above 1000 | 5 th harmonic of the highest frequency or 40 GHz, whichever is lower |

NOTE:

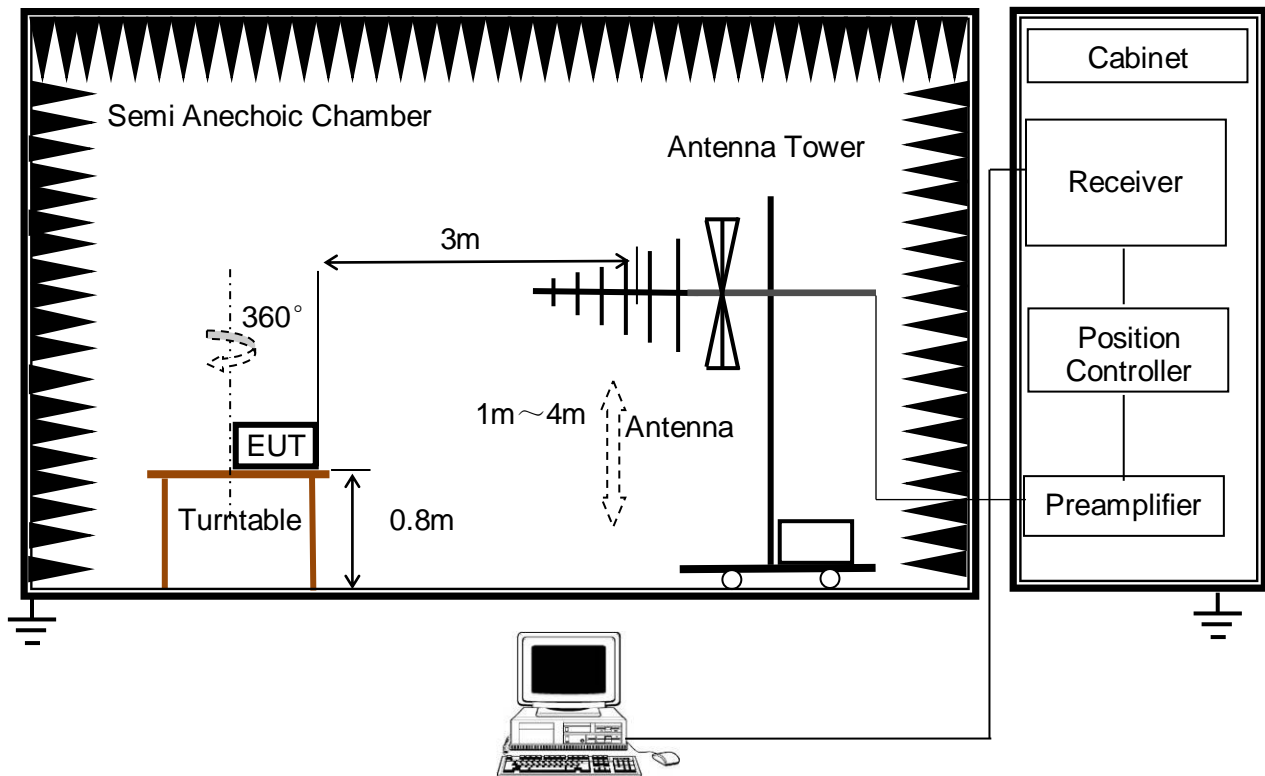
- (1) The limit for radiated test was performed according to FCC Part 15, Subpart B;
- (2) The tighter limit applies at the band edges;
- (3) Emission level (dBuV/m) = 20log Emission level (uV/m),
3m Emission level = 10m Emission level + 20log(10m/3m);

7.2.2. Test Procedure

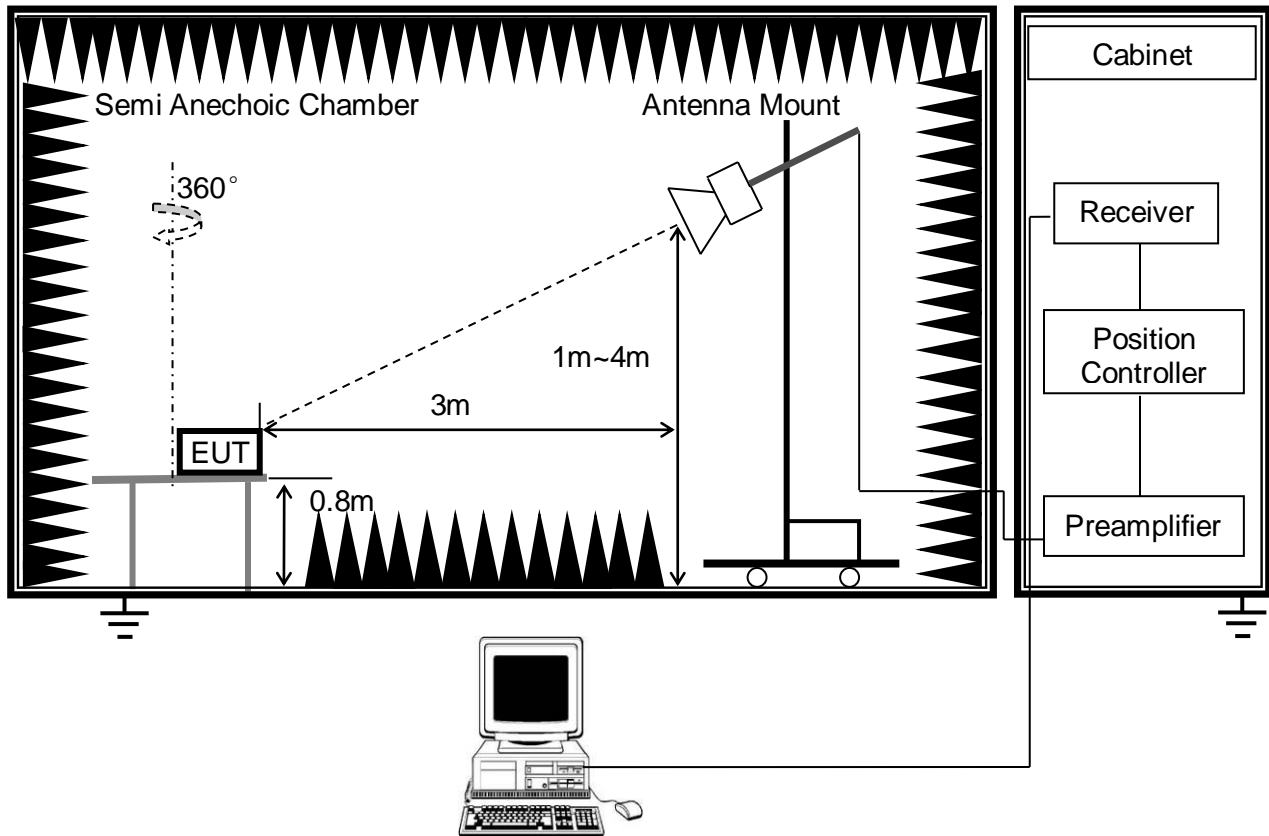
- The measuring distance of at 3m shall be used for measurements at frequency up to 1GHz.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For the actual test configuration, please refer to the related Item:EUT Photographs of Test Configuration.

7.2.3. Test Setup

(a) Radiated Disturbance Test Set-Up Frequency 30MHz - 1GHz



(b) Radiated Disturbance Test Set-Up Frequency above 1GHz



Note : For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

7.2.4. Test Environment

| Radiated Disturbance - below 1 GHz | | Radiated Disturbance - above 1 GHz | |
|------------------------------------|--------|------------------------------------|--------|
| Temperature: | 20°C | Temperature: | 24.2°C |
| Humidity: | 60% | Humidity: | 57% |
| ATM pressure: | 101kPa | ATM pressure: | 101kPa |

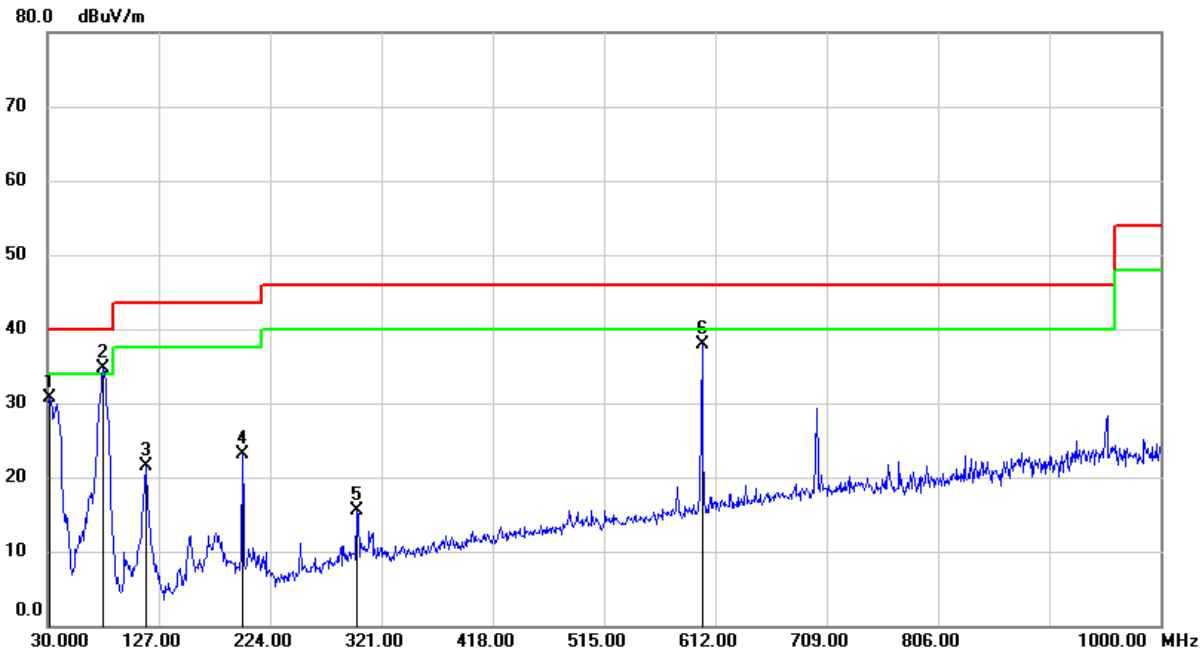
7.2.5. Test Mode

| Radiated Disturbance - below 1 GHz | | Radiated Disturbance - above 1 GHz | |
|------------------------------------|--------|------------------------------------|--------|
| Pre-test Mode: | Mode 1 | Pre-test Mode: | Mode 1 |
| Final Test Mode: | Mode 1 | Final Test Mode: | Mode 1 |

7.2.6. Test Results – below 1GHz

| | |
|---------------|---------------------------------------|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | AZ9481 Relay with power analyzer chip |

Polarization: Vertical



| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1 | 31.9400 | 47.82 | -17.09 | 30.73 | 40.00 | -9.27 | QP |
| 2 | 78.5000 | 54.94 | -20.27 | 34.67 | 40.00 | -5.33 | QP |
| 3 | 116.3300 | 42.23 | -20.81 | 21.42 | 43.50 | -22.08 | QP |
| 4 | 199.7500 | 39.07 | -15.89 | 23.18 | 43.50 | -20.32 | QP |
| 5 | 299.6600 | 29.11 | -13.51 | 15.60 | 46.00 | -30.40 | QP |
| 6 | 600.3600 | 45.97 | -8.06 | 37.91 | 46.00 | -8.09 | QP |

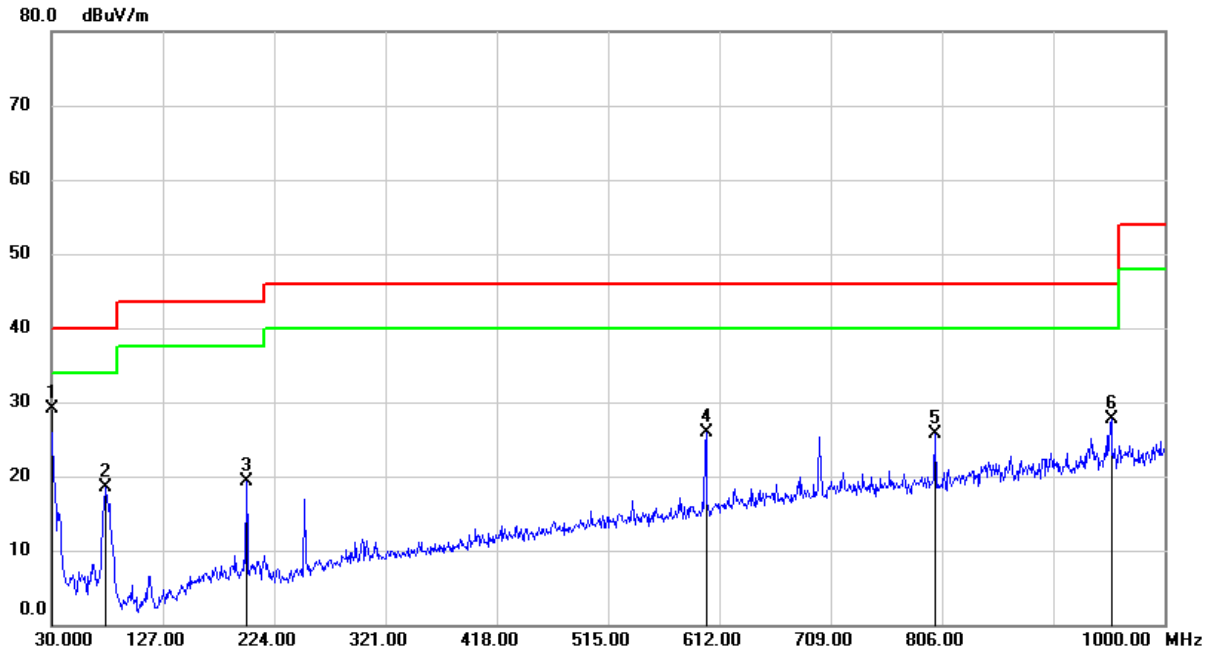
Remark:

Result = Reading +Correct (Amplifier Factor + Cable Loss + Antenna Factor)

Margin = Result - Limit



| | |
|---------------|---------------------------------------|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | AZ9481 Relay with power analyzer chip |

Polarization: Horizontal

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1 | 30.0000 | 46.00 | -16.80 | 29.20 | 40.00 | -10.80 | QP |
| 2 | 76.5600 | 38.68 | -20.23 | 18.45 | 40.00 | -21.55 | QP |
| 3 | 199.7500 | 35.13 | -15.89 | 19.24 | 43.50 | -24.26 | QP |
| 4 | 600.3600 | 34.05 | -8.06 | 25.99 | 46.00 | -20.01 | QP |
| 5 | 800.1800 | 30.56 | -4.87 | 25.69 | 46.00 | -20.31 | QP |
| 6 | 953.4400 | 30.75 | -3.01 | 27.74 | 46.00 | -18.26 | QP |

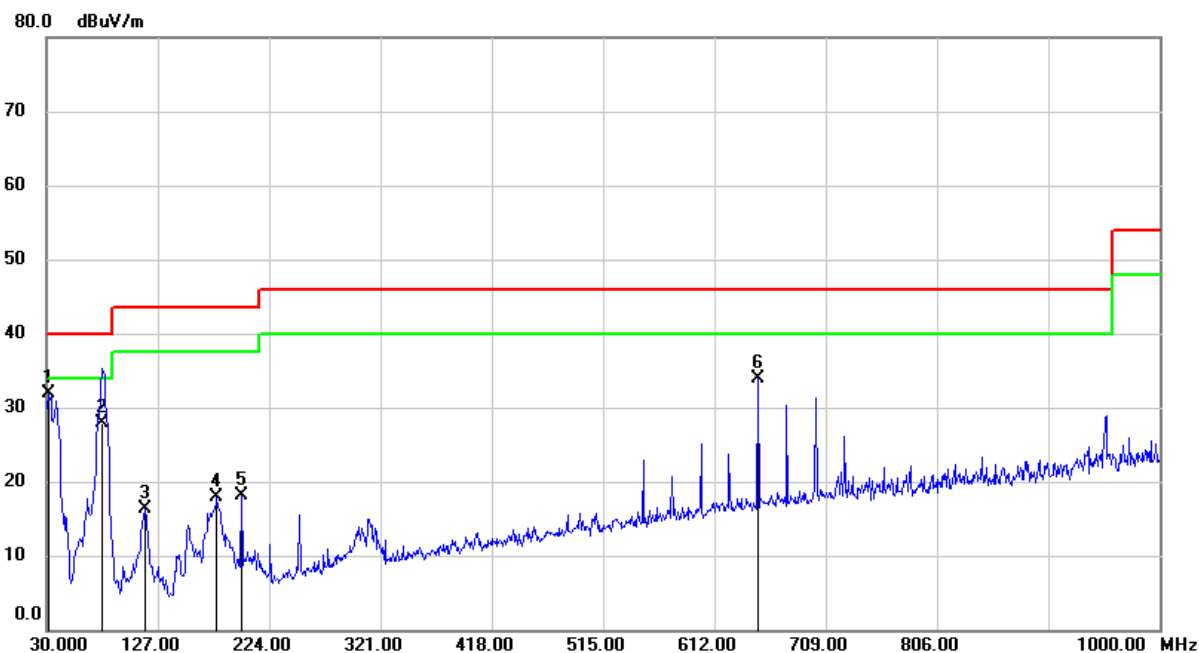
Remark:

Result = Reading + Correct (Amplifier Factor + Cable Loss + Antenna Factor)

Margin = Result - Limit



| | |
|---------------|--|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | AZ9481 Relay without power analyzer chip |

Polarization: Vertical

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1 | 31.9400 | 49.00 | -17.09 | 31.91 | 40.00 | -8.09 | QP |
| 2 | 78.5000 | 48.24 | -20.27 | 27.97 | 40.00 | -12.03 | QP |
| 3 | 115.3600 | 37.20 | -20.93 | 16.27 | 43.50 | -27.23 | QP |
| 4 | 178.4100 | 34.44 | -16.62 | 17.82 | 43.50 | -25.68 | QP |
| 5 | 199.7500 | 33.91 | -15.89 | 18.02 | 43.50 | -25.48 | QP |
| 6 | 649.8300 | 41.07 | -7.25 | 33.82 | 46.00 | -12.18 | QP |

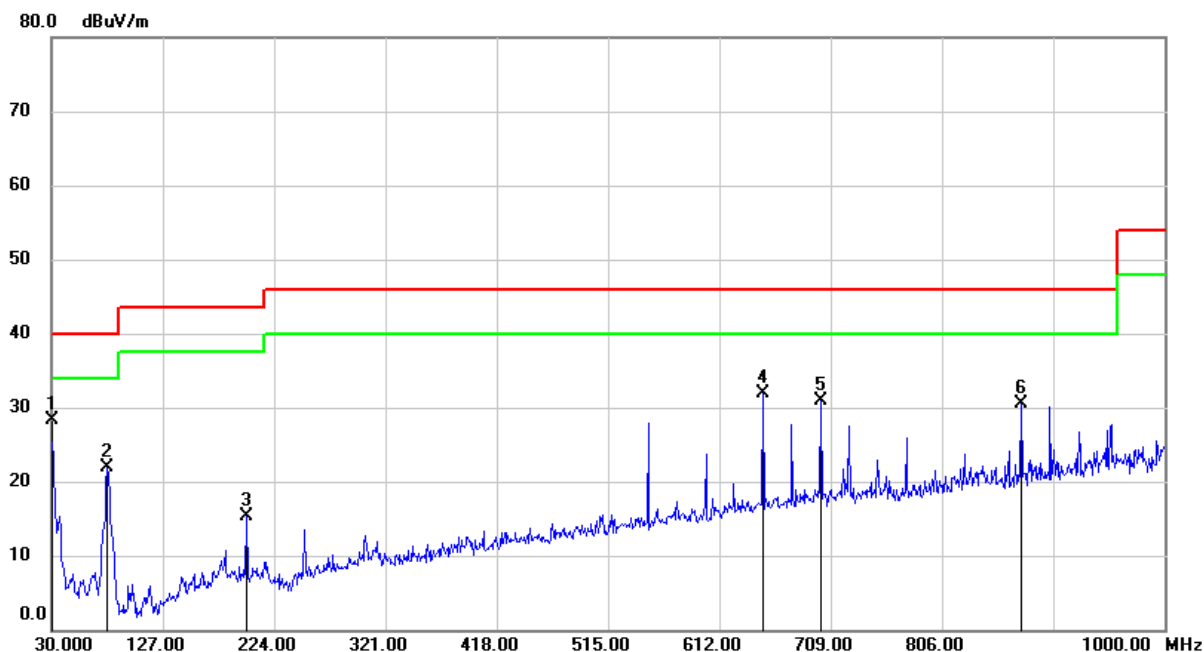
Remark:

Result = Reading + Correct (Amplifier Factor + Cable Loss + Antenna Factor)

Margin = Result - Limit



| | |
|---------------|--|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | AZ9481 Relay without power analyzer chip |

Polarization: Horizontal

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1 | 30.0000 | 45.07 | -16.80 | 28.27 | 40.00 | -11.73 | QP |
| 2 | 78.5000 | 42.14 | -20.27 | 21.87 | 40.00 | -18.13 | QP |
| 3 | 199.7500 | 31.28 | -15.89 | 15.39 | 43.50 | -28.11 | QP |
| 4 | 649.8300 | 39.20 | -7.25 | 31.95 | 46.00 | -14.05 | QP |
| 5 | 700.2700 | 37.12 | -6.16 | 30.96 | 46.00 | -15.04 | QP |
| 6 | 874.8700 | 34.50 | -3.98 | 30.52 | 46.00 | -15.48 | QP |

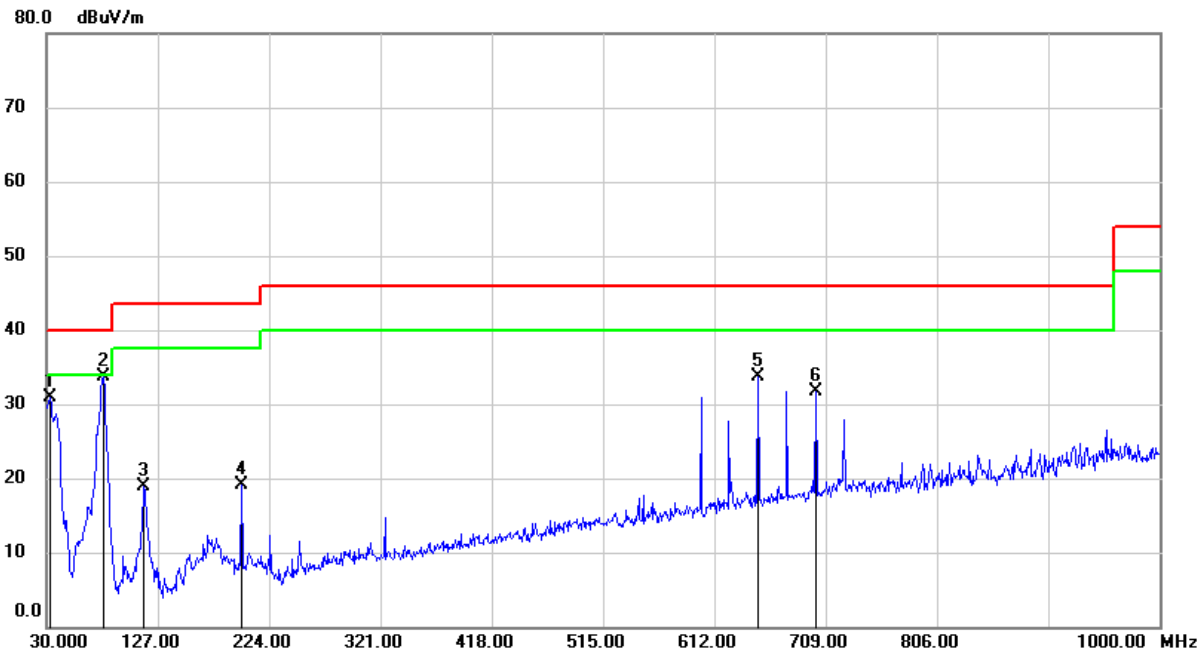
Remark:

Result = Reading + Correct (Amplifier Factor + Cable Loss + Antenna Factor)

Margin = Result - Limit



| | |
|---------------|---------------------------------------|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | HF7520 Relay with power analyzer chip |

Polarization: Vertical

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1 | 32.9100 | 48.00 | -17.19 | 30.81 | 40.00 | -9.19 | QP |
| 2 | 79.4700 | 53.96 | -20.28 | 33.68 | 40.00 | -6.32 | QP |
| 3 | 114.3900 | 39.98 | -21.01 | 18.97 | 43.50 | -24.53 | QP |
| 4 | 199.7500 | 34.93 | -15.89 | 19.04 | 43.50 | -24.46 | QP |
| 5 | 649.8300 | 40.88 | -7.25 | 33.63 | 46.00 | -12.37 | QP |
| 6 | 700.2700 | 37.95 | -6.16 | 31.79 | 46.00 | -14.21 | QP |

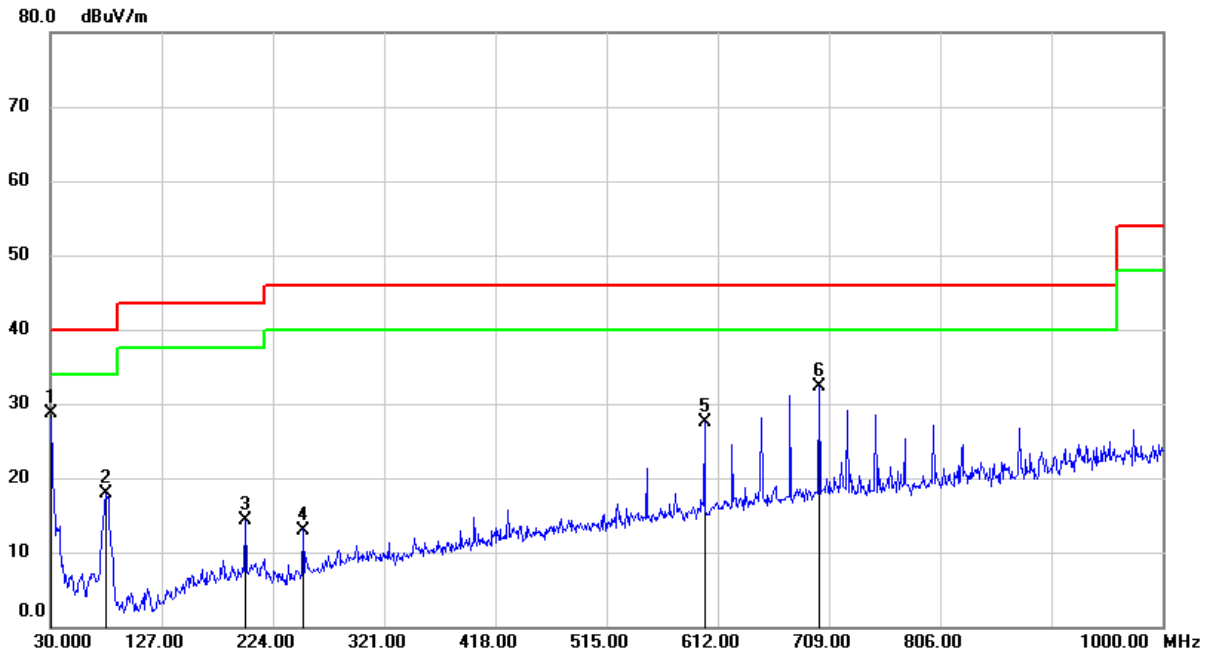
Remark:

Result = Reading + Correct (Amplifier Factor + Cable Loss + Antenna Factor)

Margin = Result - Limit



| | |
|---------------|---------------------------------------|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | HF7520 Relay with power analyzer chip |

Polarization: Horizontal

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1 | 30.0000 | 45.59 | -16.80 | 28.79 | 40.00 | -11.21 | QP |
| 2 | 78.5000 | 38.08 | -20.27 | 17.81 | 40.00 | -22.19 | QP |
| 3 | 199.7500 | 30.12 | -15.89 | 14.23 | 43.50 | -29.27 | QP |
| 4 | 250.1900 | 28.76 | -15.76 | 13.00 | 46.00 | -33.00 | QP |
| 5 | 600.3600 | 35.58 | -8.06 | 27.52 | 46.00 | -18.48 | QP |
| 6 | 700.2700 | 38.49 | -6.16 | 32.33 | 46.00 | -13.67 | QP |

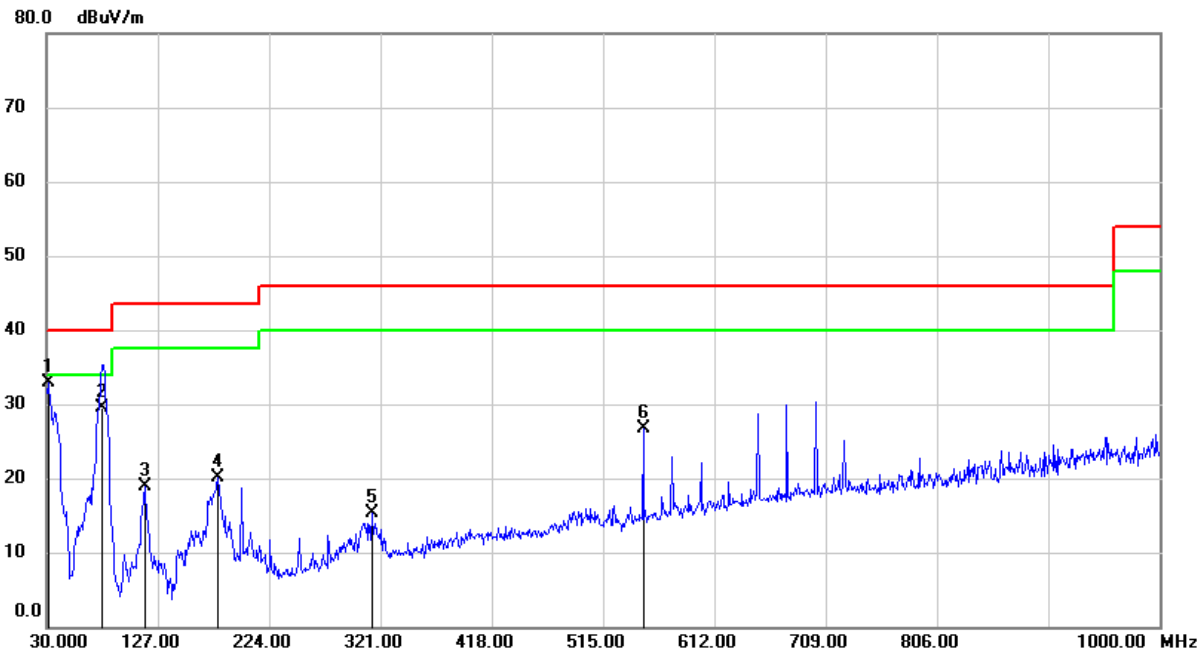
Remark:

Result = Reading + Correct (Amplifier Factor + Cable Loss + Antenna Factor)

Margin = Result - Limit



| | |
|---------------|--|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | HF7520 Relay without power analyzer chip |

Polarization: Vertical

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1 | 31.9400 | 50.01 | -17.09 | 32.92 | 40.00 | -7.08 | QP |
| 2 | 78.5000 | 49.75 | -20.27 | 29.48 | 40.00 | -10.52 | QP |
| 3 | 115.3600 | 39.75 | -20.93 | 18.82 | 43.50 | -24.68 | QP |
| 4 | 179.3800 | 36.71 | -16.55 | 20.16 | 43.50 | -23.34 | QP |
| 5 | 313.2400 | 28.71 | -13.38 | 15.33 | 46.00 | -30.67 | QP |
| 6 | 549.9200 | 35.71 | -9.09 | 26.62 | 46.00 | -19.38 | QP |

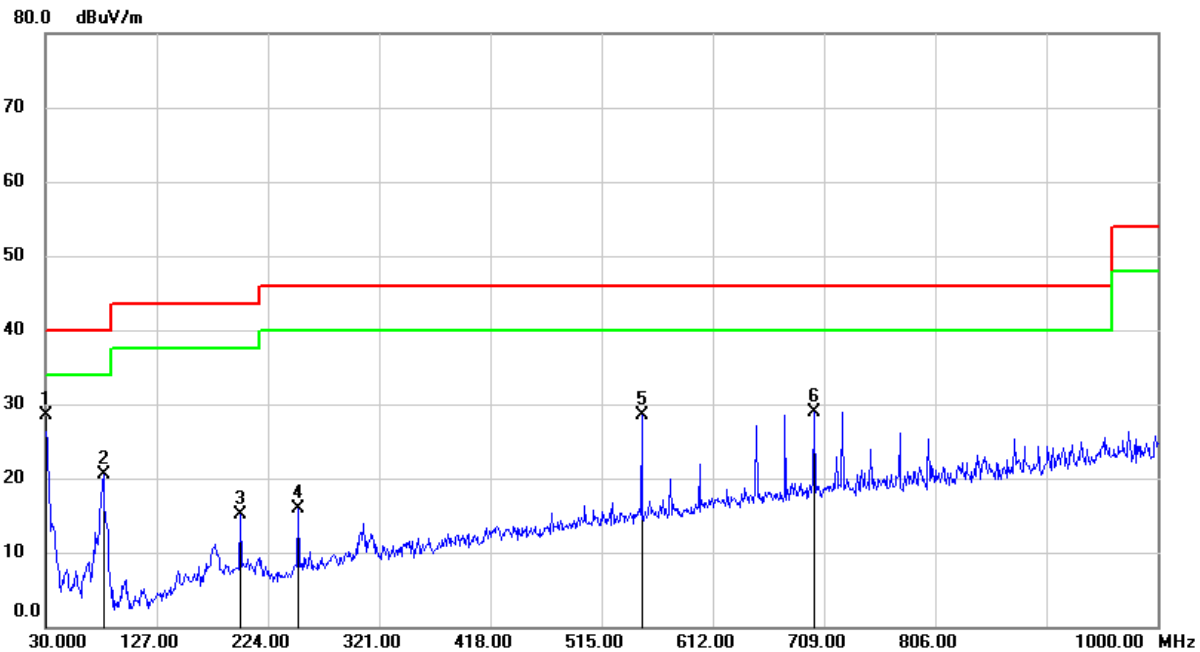
Remark:

Result = Reading + Correct (Amplifier Factor + Cable Loss + Antenna Factor)

Margin = Result - Limit



| | |
|---------------|--|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |
| Test sample: | HF7520 Relay without power analyzer chip |

Polarization: Horizontal

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1 | 30.0000 | 45.38 | -16.80 | 28.58 | 40.00 | -11.42 | QP |
| 2 | 80.4400 | 40.75 | -20.32 | 20.43 | 40.00 | -19.57 | QP |
| 3 | 199.7500 | 30.97 | -15.89 | 15.08 | 43.50 | -28.42 | QP |
| 4 | 250.1900 | 31.62 | -15.76 | 15.86 | 46.00 | -30.14 | QP |
| 5 | 549.9200 | 37.61 | -9.09 | 28.52 | 46.00 | -17.48 | QP |
| 6 | 700.2700 | 35.02 | -6.16 | 28.86 | 46.00 | -17.14 | QP |

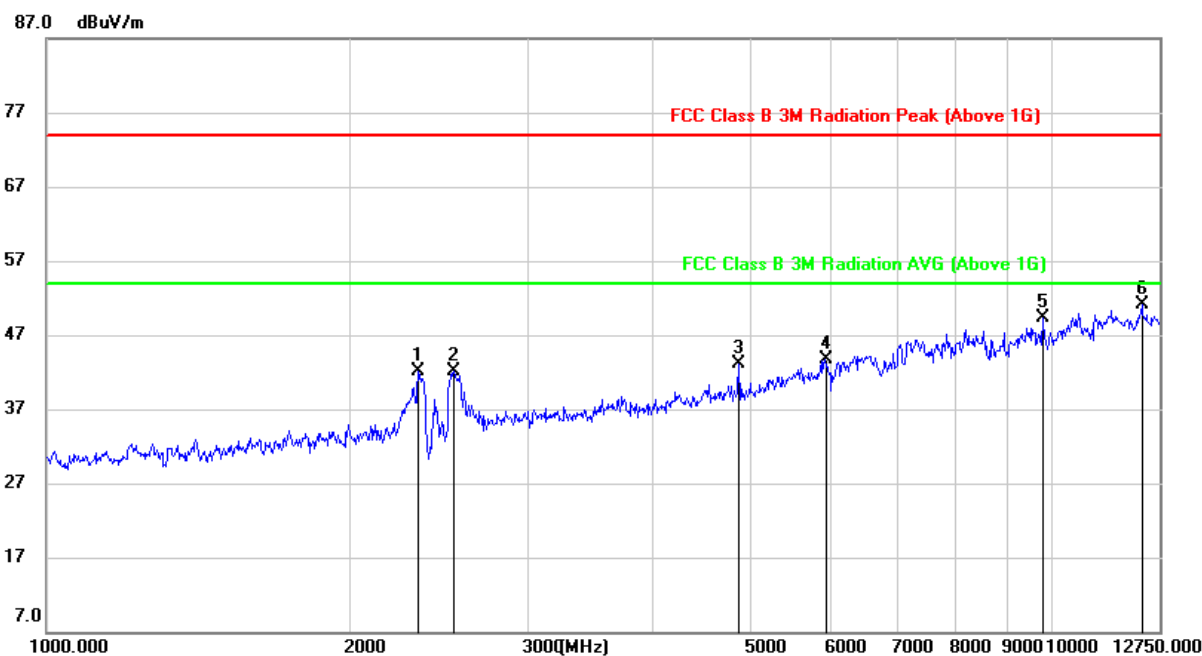
Remark:

Result = Reading + Correct (Amplifier Factor + Cable Loss + Antenna Factor)

Margin = Result - Limit

**7.2.7. Test Results – above 1GHz**

| | |
|---------------|--------------|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |

Polarization: Vertical

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|----------------|-----------------|----------------|-------------|--------|
| 1 | 2340.132 | 51.47 | -9.32 | 42.15 | 74.00 | -31.85 | peak |
| 2 | 2538.731 | 50.48 | -8.33 | 42.15 | 74.00 | -31.85 | peak |
| 3 | 4871.103 | 43.87 | -0.85 | 43.02 | 74.00 | -30.98 | peak |
| 4 | 5940.967 | 39.51 | 4.22 | 43.73 | 74.00 | -30.27 | peak |
| 5 | 9759.591 | 39.06 | 10.32 | 49.38 | 74.00 | -24.62 | peak |
| 6 | 12241.144 | 36.56 | 14.63 | 51.19 | 74.00 | -22.81 | peak |

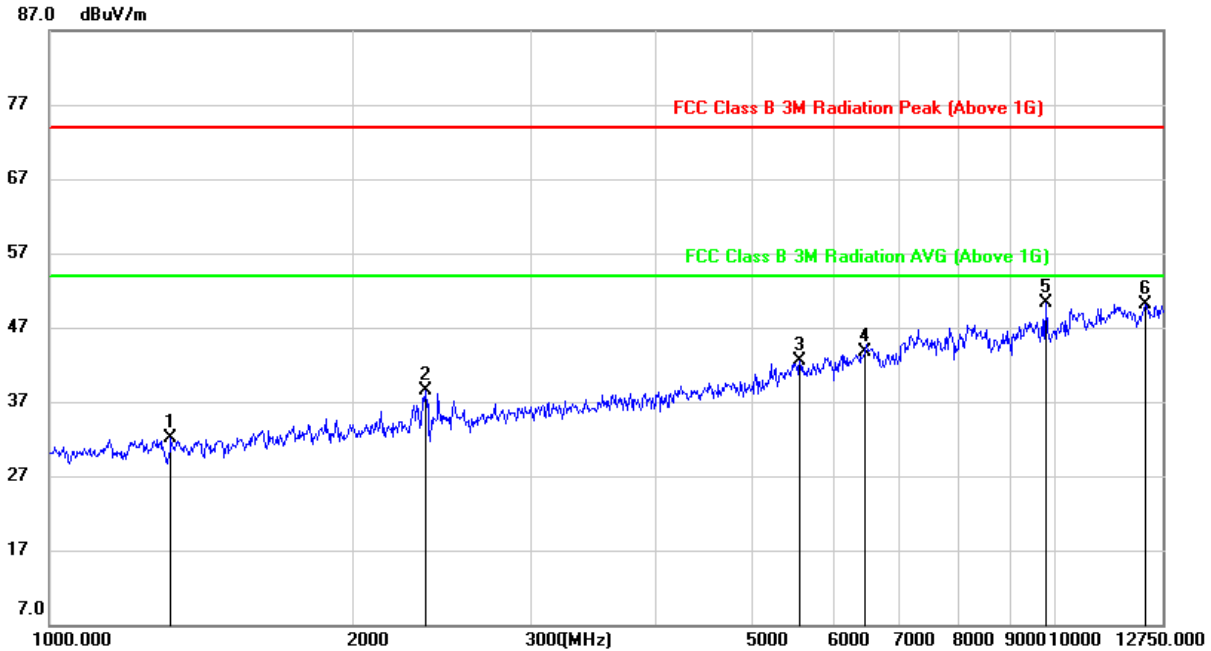
Remark:

Result = Reading +Correct (Amplifier Factor + Cable Loss + Antenna Factor)

Margin = Result - Limit



| | |
|---------------|--------------|
| Test Mode: | Mode 1 |
| Test Voltage: | AC 120V/60Hz |

Polarization: Horizontal

| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|----------------|-----------------|----------------|-------------|--------|
| 1 | 1323.141 | 45.34 | -13.17 | 32.17 | 74.00 | -41.83 | peak |
| 2 | 2370.107 | 47.60 | -9.18 | 38.42 | 74.00 | -35.58 | peak |
| 3 | 5560.500 | 40.41 | 2.19 | 42.60 | 74.00 | -31.40 | peak |
| 4 | 6445.156 | 38.58 | 5.14 | 43.72 | 74.00 | -30.28 | peak |
| 5 | 9759.591 | 39.91 | 10.32 | 50.23 | 74.00 | -23.77 | peak |
| 6 | 12241.144 | 35.54 | 14.63 | 50.17 | 74.00 | -23.83 | peak |

Remark:

Result = Reading + Correct (Amplifier Factor + Cable Loss + Antenna Factor)

Margin = Result - Limit

Note: All constructions have been tested, only the worst data of test construction 1 record in the report.

END OF REPORT