

FCC Test Report

Report No.: RF180531D06

FCC ID: 2ARPT0001

Test Model: Inductive Interface

Received Date: May 31, 2018

Test Date: Jun. 4 to 22, 2018

Issued Date: Jul. 12, 2018

Applicant: Carl Zeiss 3D Automation GmbH

Address: Carl-Zeiss-Strasse 27, 73431 Aalen, Germany

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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FCC Registration /
Designation Number: 198487 / TW2021



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Release Control Record

| Issue No. | Description | Date Issued |
|-------------|------------------|---------------|
| RF180531D06 | Original release | Jul. 12, 2018 |

1 Certificate of Conformity

Product: Pallet interface

Brand: ZEISS

Model No.: Inductive Interface

Sample Status: Engineering sample

Applicant: Carl Zeiss 3D Automation GmbH

Test Date: Jun. 4 to 22, 2018

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.209)

ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :



, **Date:**

Jul. 12, 2018

Annie Chang / Senior Specialist

Approved by :



, **Date:**

Jul. 12, 2018

Rex Lai / Associate Technical Manager

2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart C (Section 15.209) | | | |
|------------------------------------------------|-------------------------------|--------|-----------------------------------------------------------------------------------|
| FCC Clause | Test Item | Result | Remarks |
| 15.207 | AC Power Conducted Emission | Pass | Meet the requirement of limit. Minimum passing margin is -4.78dB at 0.44506MHz |
| 15.215 | Channel Bandwidth Measurement | | |
| 15.209 | Radiated Emission Test | Pass | Meet the requirement of limit. Minimum passing margin is -3.08dB at 154.79MHz |

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement | Frequency | Expanded Uncertainty (k=2) (±) |
|------------------------------------|-----------------|--------------------------------|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 2.79 dB |
| Radiated Emissions up to 1 GHz | 9kHz ~ 30MHz | 2.38 dB |
| | 30MHz ~ 1000MHz | 5.54 dB |

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

| | |
|---------------------|------------------------------|
| Product | Pallet interface |
| Brand | ZEISS |
| Test Model | Inductive Interface |
| Sample Status | Engineering sample |
| Power Supply Rating | DC Power from host equipment |
| Modulation Type | OOK (On-Off-Keying) |
| Operating Frequency | 1.6MHz, 4MHz, 10MHz |
| Number of Channel | 3 |
| Antenna Type | Coil antenna |
| Field Strength | 36.39dBuV/m |
| Accessory Device | N/A |
| Data Cable Supplied | N/A |

Note:

1. The EUT is a temperature sensor with two RF chips as follows:

❖ 33FJ16GS402
 ❖ 33FJ32GP302

The above two RF chips were pre-tested and **33FJ16GS402** was the worst case for final test.

2. The emission of the simultaneous operation has been evaluated and no non-compliance was found.

3.2 Description of Test Modes

3 channels are provided to this EUT:

| Channel | Frequency |
|---------|-----------|
| 1 | 1.6MHz |
| 2 | 4MHz |
| 3 | 10MHz |

3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT Configure Mode | Applicable To | | Description |
|--------------------|---------------|-----|-------------|
| | RE<1G | PLC | |
| - | √ | √ | - |

Where RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

Radiated Emission Test (Below 1GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Available Channel | Tested Channel | Modulation Type |
|--------------------|-------------------|----------------|-----------------|
| - | 1 to 3 | 1, 2, 3 | FSK |

Power Line Conducted Emission Test:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Available Channel | Tested Channel | Modulation Type |
|--------------------|-------------------|----------------|-----------------|
| - | 1 to 3 | 1 | FSK |

Antenna Port Conducted Measurement:

Test Condition:

| Applicable To | Environmental Conditions | Input Power | Tested by |
|---------------|--------------------------|-----------------------|-------------|
| RE<1G | 24 deg. C, 74% RH | 120Vac, 60Hz (System) | James Wei |
| PLC | 25 deg. C, 75% RH | 120Vac, 60Hz (System) | Chiawei Lin |

3.3 Description of Support Units

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.

Radiated Emission Test

| ID | Product | Brand | Model No. | Serial No. | FCC ID | Remarks |
|----|----------------------|-------|-----------|------------|------------------|--------------------|
| A. | PC | N/A | C99 | N/A | N/A | Supplied by client |
| B. | Signal converter | N/A | MCA | N/A | N/A | Supplied by client |
| C. | LCD MONITOR | HP | LA2405wg | CN41210F8Z | FCC DoC Approved | Provided by Lab |
| D. | Terminating resister | N/A | N/A | N/A | N/A | Supplied by client |

Note: All power cords of the above support units are non-shielded (1.8m).

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks |
|----|--------------------|------|------------|--------------------|--------------|--------------------|
| 1. | I/O cable (M801) | 1 | 0.6 | N | 0 | Supplied by client |
| 2. | CAN cable (X193) | 1 | 2.5 | N | 0 | Supplied by client |
| 3. | D-Sub cable | 1 | 1.8 | Y | 2 | Supplied by client |
| 4. | temperature sensor | 1 | 0.15 | N | 0 | Supplied by client |

Note: The core(s) is(are) originally attached to the cable(s).

Power Line Conducted Emission Test:

| ID | Product | Brand | Model No. | Serial No. | FCC ID | Remarks |
|----|----------------------|-----------|------------------------|--------------------------|------------------|--------------------|
| A. | LCD MONITOR | HP | LA2405wg | CN41210F8Z | FCC DoC Approved | Provided by Lab |
| B. | PC | N/A | C99 | N/A | N/A | Supplied by client |
| C. | USB Keyboard | Dell | KB216t | CN-0W33XP-LO300-7CL-1904 | FCC DoC Approved | Provided by Lab |
| D. | USB Mouse | Microsoft | 1113 | 9170515896637 | FCC DoC Approved | Provided by Lab |
| E. | Printer | HP | HP Officejet Pro 251dw | CN55FCV012 | FCC DoC Approved | Provided by Lab |
| F. | MODEM | ACEEX | 1414 | 980020538 | IFAXDM1414 | Provided by Lab |
| G. | Signal converter | N/A | MCA | N/A | N/A | Supplied by client |
| H. | Terminating resister | N/A | N/A | N/A | N/A | Supplied by client |

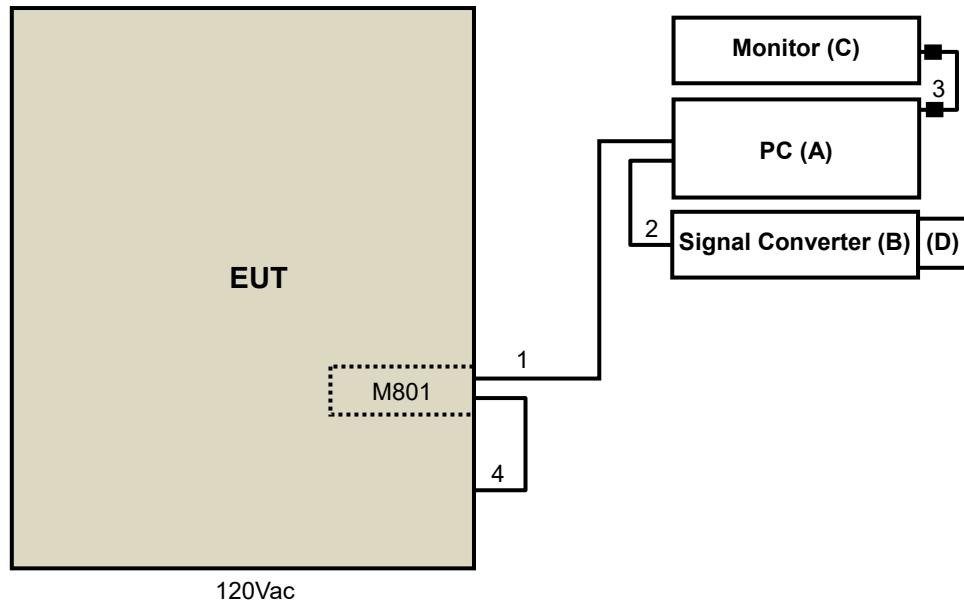
Note: All power cords of the above support units are non-shielded (1.8m).

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks |
|-----|--------------------|------|------------|--------------------|--------------|--------------------|
| 1. | D-Sub cable | 1 | 1.8 | Y | 2 | Supplied by client |
| 2. | USB cable | 1 | 1.8 | Y | 0 | Provided by Lab |
| 3. | USB cable | 1 | 1.8 | Y | 1 | Provided by Lab |
| 4. | USB cable | 1 | 1.5 | Y | 0 | Provided by Lab |
| 5. | RS232 cable | 1 | 0.5 | Y | 0 | Provided by Lab |
| 6. | CAN cable (X111) | 1 | 0.3 | N | 0 | Supplied by client |
| 7. | CAN cable (X160) | 1 | 0.1 | N | 0 | Supplied by client |
| 8. | CAN cable (X193) | 1 | 2.5 | N | 0 | Supplied by client |
| 9. | I/O cable (M801) | 1 | 1.5 | N | 0 | Supplied by client |
| 10. | I/O cable (M801) | 1 | 0.6 | N | 0 | Supplied by client |
| 11. | temperature sensor | 1 | 0.8 | N | 0 | Supplied by client |
| 12. | temperature sensor | 1 | 0.15 | N | 0 | Supplied by client |

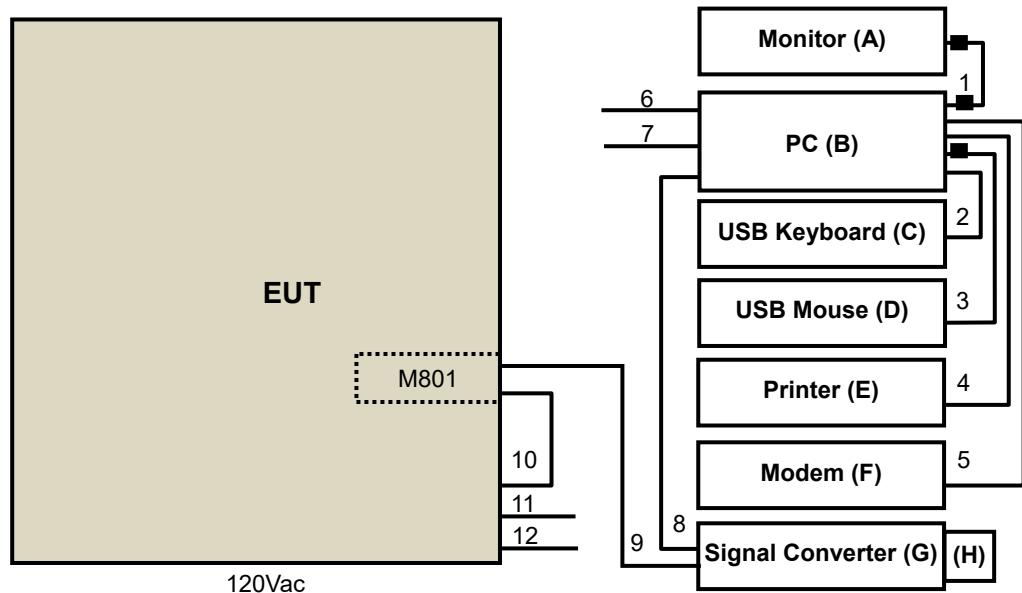
Note: The core(s) is(are) originally attached to the cable(s).

3.3.1 Configuration of System under Test

Radiated Emission Test



Power Line Conducted Emission Test:



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.209)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

| Frequencies (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009 ~ 0.490 | 2400/F(kHz) | 300 |
| 0.490 ~ 1.705 | 24000/F(kHz) | 30 |
| 1.705 ~ 30.0 | 30 | 30 |
| 30 ~ 88 | 100 | 3 |
| 88 ~ 216 | 150 | 3 |
| 216 ~ 960 | 200 | 3 |
| Above 960 | 500 | 3 |

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 Test Instruments

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|----------------------------------------|----------------------|----------------|-----------------|------------------|
| HP Preamplifier | 8447D | 2432A03504 | Feb. 21, 2018 | Feb. 20, 2019 |
| HP Preamplifier | 8449B | 3008A01201 | Feb. 22, 2018 | Feb. 21, 2019 |
| MITEQ Preamplifier | AMF-6F-260400-33-8P | 892164 | Feb. 21, 2018 | Feb. 20, 2019 |
| Agilent TEST RECEIVER | N9038A | MY51210129 | Feb. 6, 2018 | Feb. 5, 2019 |
| Schwarzbeck Antenna | VULB 9168 | 139 | Nov. 29, 2017 | Nov. 28, 2018 |
| Schwarzbeck Antenna | VHBA 9123 | 480 | May 19, 2017 | May 18, 2019 |
| Schwarzbeck Horn Antenna | BBHA-9170 | 212 | Dec. 1, 2017 | Nov. 30, 2018 |
| Schwarzbeck Horn Antenna | BBHA 9120-D1 | D130 | Dec. 1, 2017 | Nov. 30, 2018 |
| ADT. Turn Table | TT100 | 0306 | NA | NA |
| ADT. Tower | AT100 | 0306 | NA | NA |
| Software | Radiated_V7.6.15.9.5 | NA | NA | NA |
| SUHNER RF cable With 4dB PAD | SF104 | CABLE-CH6 | Aug. 14, 2017 | Aug. 13, 2018 |
| SUHNER RF cable With 3dB PAD | SF102 | Cable-CH8-3.6m | Aug. 14, 2017 | Aug. 13, 2018 |
| KEYSIGHT Spectrum Analyzer | N9030A | MY54490260 | Jul. 26, 2017 | Jul. 25, 2018 |
| Loop Antenna EMCI | LPA600 | 270 | Aug. 11, 2017 | Aug. 10, 2019 |
| EMCO Horn Antenna | 3115 | 00028257 | Nov. 30, 2017 | Nov. 29, 2018 |
| Highpass filter Wainwright Instruments | WHK 3.1/18G-10SS | SN 8 | NA | NA |
| ROHDE & SCHWARZ Spectrum Analyzer | FSV40 | 101042 | Sep. 29, 2017 | Sep. 28, 2018 |
| Anritsu Power Sensor | MA2411B | 0738404 | Apr. 26, 2018 | Apr. 25, 2019 |
| Anritsu Power Meter | ML2495A | 0842014 | Apr. 26, 2018 | Apr. 25, 2019 |

NOTE:

1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

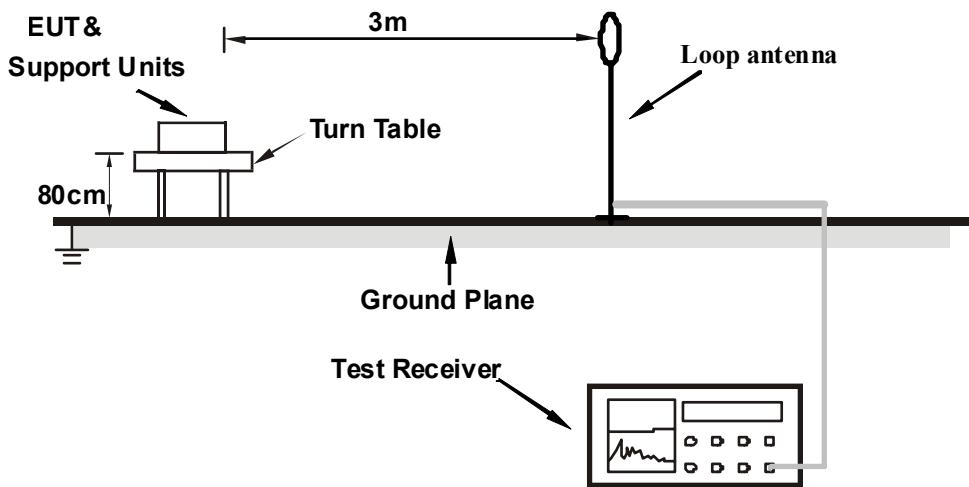
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

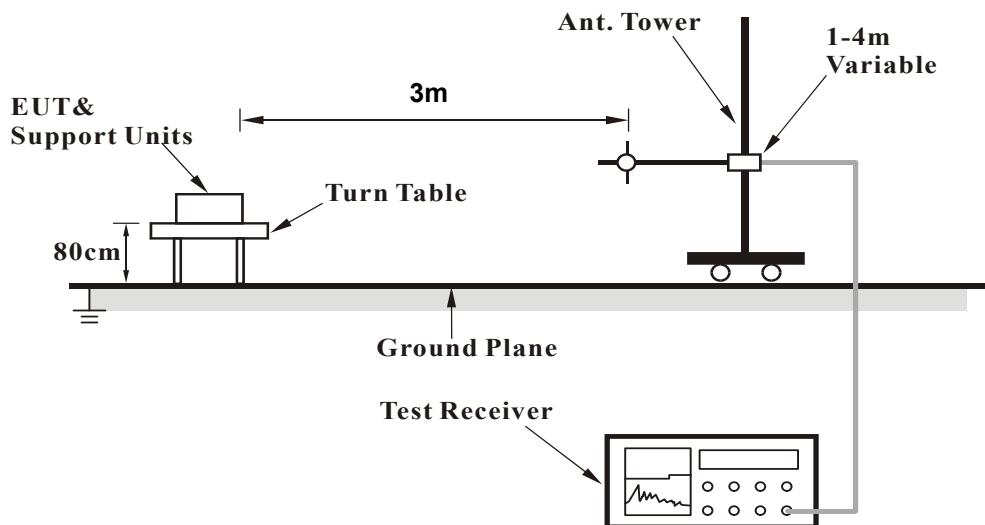
No deviation.

4.1.5 Test Set Up

For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- Turned on the power of all equipment.
- PC ran a test program to enable all functions.
- PC read and wrote messages to/ from HDD.
- EUT received messages from temperature sensors and sent messages to PC via signal converter.
- PC sent messages to ext. LCD Monitor. Then it displayed them on its screen.
- Steps c-e were repeated.

4.1.7 Test Results

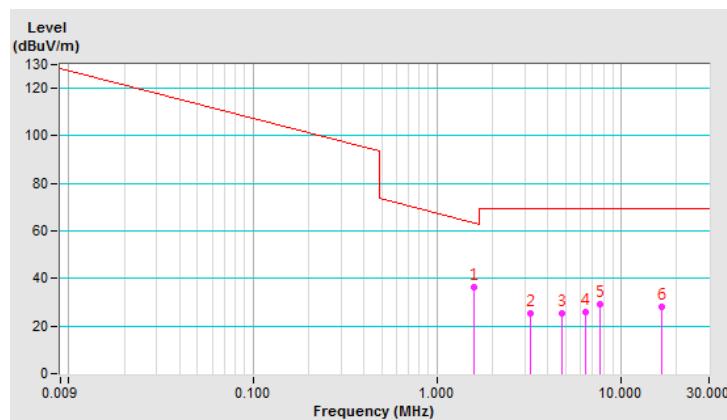
Below 30MHz Data:

| | | | |
|-----------------|----------------|-------------------|------------|
| Test Frequency | 1.6MHz | Detector Function | Quasi-Peak |
| Frequency Range | 9 kHz ~ 30 MHz | | |

| Antenna Polarity & Test Distance: Loop Antenna Open At 3m | | | | | | | | |
|-----------------------------------------------------------|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *1.600 | 36.39 QP | 63.52 | -27.13 | 1.00 | 161 | 37.86 | -1.47 |
| 2 | 3.200 | 25.23 QP | 69.54 | -44.31 | 1.00 | 241 | 28.62 | -3.39 |
| 3 | 4.800 | 25.33 QP | 69.54 | -44.21 | 1.00 | 302 | 29.12 | -3.79 |
| 4 | 6.400 | 26.00 QP | 69.54 | -43.54 | 1.00 | 359 | 29.85 | -3.85 |
| 5 | 7.687 | 29.24 QP | 69.54 | -40.30 | 1.00 | 152 | 33.16 | -3.92 |
| 6 | 16.684 | 28.30 QP | 69.54 | -41.24 | 1.00 | 271 | 33.24 | -4.94 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “*”: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

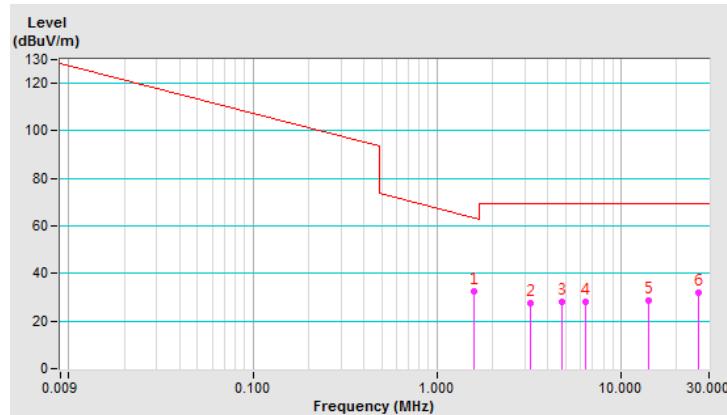


| | | | |
|-----------------|----------------|-------------------|------------|
| Test Frequency | 1.6MHz | Detector Function | Quasi-Peak |
| Frequency Range | 9 kHz ~ 30 MHz | | |

| Antenna Polarity & Test Distance: Loop Antenna Close At 3m | | | | | | | | |
|------------------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *1.600 | 32.52 QP | 63.52 | -31.00 | 1.00 | 312 | 33.99 | -1.47 |
| 2 | 3.200 | 27.53 QP | 69.54 | -42.01 | 1.00 | 237 | 30.92 | -3.39 |
| 3 | 4.800 | 28.16 QP | 69.54 | -41.38 | 1.00 | 186 | 31.95 | -3.79 |
| 4 | 6.400 | 28.19 QP | 69.54 | -41.35 | 1.00 | 102 | 32.04 | -3.85 |
| 5 | 14.105 | 28.40 QP | 69.54 | -41.14 | 1.00 | 144 | 32.67 | -4.27 |
| 6 | 26.131 | 31.78 QP | 69.54 | -37.76 | 1.00 | 285 | 40.35 | -8.57 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “*”: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

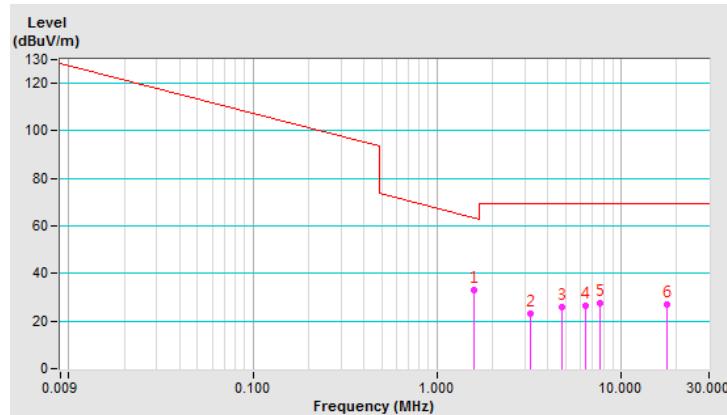


| | | | |
|-----------------|----------------|-------------------|------------|
| Test Frequency | 1.6MHz | Detector Function | Quasi-Peak |
| Frequency Range | 9 kHz ~ 30 MHz | | |

| Antenna Polarity & Test Distance: Loop Antenna Ground-parallel At 3m | | | | | | | | |
|----------------------------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *1.600 | 33.26 QP | 63.52 | -30.26 | 1.00 | 339 | 34.73 | -1.47 |
| 2 | 3.200 | 23.05 QP | 69.54 | -46.49 | 1.00 | 318 | 26.44 | -3.39 |
| 3 | 4.800 | 25.89 QP | 69.54 | -43.65 | 1.00 | 259 | 29.68 | -3.79 |
| 4 | 6.400 | 26.17 QP | 69.54 | -43.37 | 1.00 | 195 | 30.02 | -3.85 |
| 5 | 7.657 | 27.71 QP | 69.54 | -41.83 | 1.00 | 182 | 31.63 | -3.92 |
| 6 | 17.884 | 27.21 QP | 69.54 | -42.33 | 1.00 | 102 | 32.63 | -5.42 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “*”: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

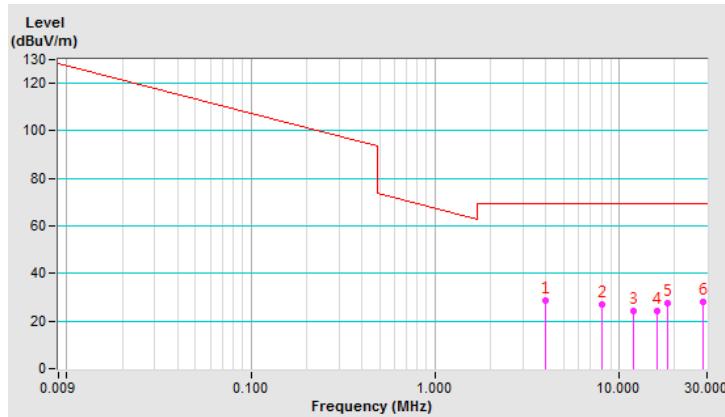


| | | | |
|-----------------|----------------|-------------------|------------|
| Test Frequency | 4MHz | Detector Function | Quasi-Peak |
| Frequency Range | 9 kHz ~ 30 MHz | | |

| Antenna Polarity & Test Distance: Loop Antenna Open At 3m | | | | | | | | |
|-----------------------------------------------------------|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *4.000 | 28.66 QP | 69.54 | -40.88 | 1.00 | 343 | 32.29 | -3.63 |
| 2 | 8.000 | 27.05 QP | 69.54 | -42.49 | 1.00 | 217 | 31.01 | -3.96 |
| 3 | 12.000 | 24.19 QP | 69.54 | -45.35 | 1.00 | 145 | 28.55 | -4.36 |
| 4 | 16.000 | 23.99 QP | 69.54 | -45.55 | 1.00 | 97 | 28.66 | -4.67 |
| 5 | 18.363 | 27.64 QP | 69.54 | -41.90 | 1.00 | 175 | 33.18 | -5.54 |
| 6 | 28.500 | 27.93 QP | 69.54 | -41.61 | 1.00 | 276 | 32.38 | -4.45 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “*”: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

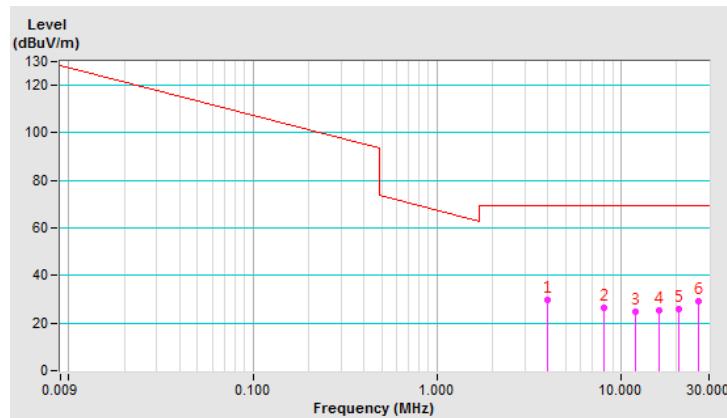


| | | | |
|-----------------|----------------|-------------------|------------|
| Test Frequency | 4MHz | Detector Function | Quasi-Peak |
| Frequency Range | 9 kHz ~ 30 MHz | | |

| Antenna Polarity & Test Distance: Loop Antenna Close At 3m | | | | | | | | |
|------------------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *4.000 | 29.82 QP | 69.54 | -39.72 | 1.00 | 108 | 33.45 | -3.63 |
| 2 | 8.000 | 26.50 QP | 69.54 | -43.04 | 1.00 | 154 | 30.46 | -3.96 |
| 3 | 12.000 | 24.89 QP | 69.54 | -44.65 | 1.00 | 202 | 29.25 | -4.36 |
| 4 | 16.000 | 25.56 QP | 69.54 | -43.98 | 1.00 | 271 | 30.23 | -4.67 |
| 5 | 20.553 | 26.01 QP | 69.54 | -43.53 | 1.00 | 185 | 31.69 | -5.68 |
| 6 | 26.131 | 28.96 QP | 69.54 | -40.58 | 1.00 | 177 | 37.53 | -8.57 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “*”: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

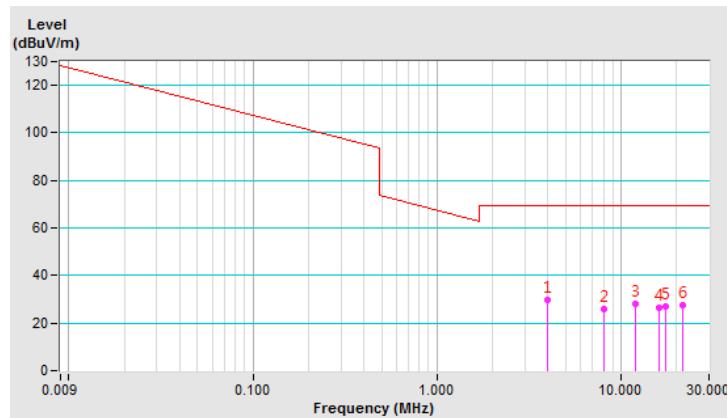


| | | | |
|-----------------|----------------|-------------------|------------|
| Test Frequency | 4MHz | Detector Function | Quasi-Peak |
| Frequency Range | 9 kHz ~ 30 MHz | | |

| Antenna Polarity & Test Distance: Loop Antenna Ground-parallel At 3m | | | | | | | | |
|----------------------------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *4.000 | 29.48 QP | 69.54 | -40.06 | 1.00 | 168 | 33.11 | -3.63 |
| 2 | 8.000 | 26.06 QP | 69.54 | -43.48 | 1.00 | 239 | 30.02 | -3.96 |
| 3 | 12.000 | 27.99 QP | 69.54 | -41.55 | 1.00 | 177 | 32.35 | -4.36 |
| 4 | 16.000 | 26.63 QP | 69.54 | -42.91 | 1.00 | 152 | 31.30 | -4.67 |
| 5 | 17.584 | 26.87 QP | 69.54 | -42.67 | 1.00 | 185 | 32.17 | -5.30 |
| 6 | 21.692 | 27.37 QP | 69.54 | -42.17 | 1.00 | 56 | 33.26 | -5.89 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “*”: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40



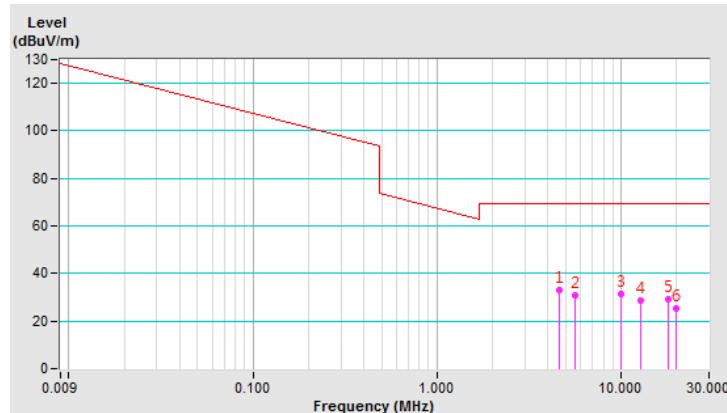
| | | | |
|-----------------|----------------|-------------------|------------|
| Test Frequency | 10MHz | Detector Function | Quasi-Peak |
| Frequency Range | 9 kHz ~ 30 MHz | | |

Antenna Polarity & Test Distance: Loop Antenna Open At 3m

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| 1 | 4.598 | 32.78 QP | 69.54 | -36.76 | 1.00 | 125 | 36.53 | -3.75 |
| 2 | 5.617 | 30.60 QP | 69.54 | -38.94 | 1.00 | 188 | 34.46 | -3.86 |
| 3 | *10.000 | 31.56 QP | 69.54 | -37.98 | 1.00 | 105 | 35.81 | -4.25 |
| 4 | 12.695 | 28.41 QP | 69.54 | -41.13 | 1.00 | 185 | 32.70 | -4.29 |
| 5 | 18.094 | 28.93 QP | 69.54 | -40.61 | 1.00 | 185 | 34.42 | -5.49 |
| 6 | 20.000 | 25.38 QP | 69.54 | -44.16 | 1.00 | 24 | 31.06 | -5.68 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “*”: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

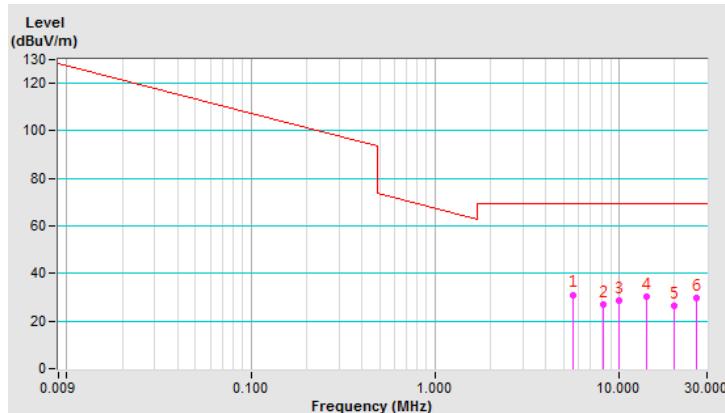


| | | | |
|-----------------|----------------|-------------------|------------|
| Test Frequency | 10MHz | Detector Function | Quasi-Peak |
| Frequency Range | 9 kHz ~ 30 MHz | | |

| Antenna Polarity & Test Distance: Loop Antenna Close At 3m | | | | | | | | |
|------------------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 5.617 | 31.10 QP | 69.54 | -38.44 | 1.00 | 58 | 34.96 | -3.86 |
| 2 | 8.217 | 27.12 QP | 69.54 | -42.42 | 1.00 | 188 | 31.13 | -4.01 |
| 3 | *10.000 | 28.51 QP | 69.54 | -41.03 | 1.00 | 124 | 32.76 | -4.25 |
| 4 | 14.105 | 30.23 QP | 69.54 | -39.31 | 1.00 | 55 | 34.50 | -4.27 |
| 5 | 20.000 | 26.40 QP | 69.54 | -43.14 | 1.00 | 71 | 32.08 | -5.68 |
| 6 | 26.131 | 29.57 QP | 69.54 | -39.97 | 1.00 | 167 | 38.14 | -8.57 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “*”: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

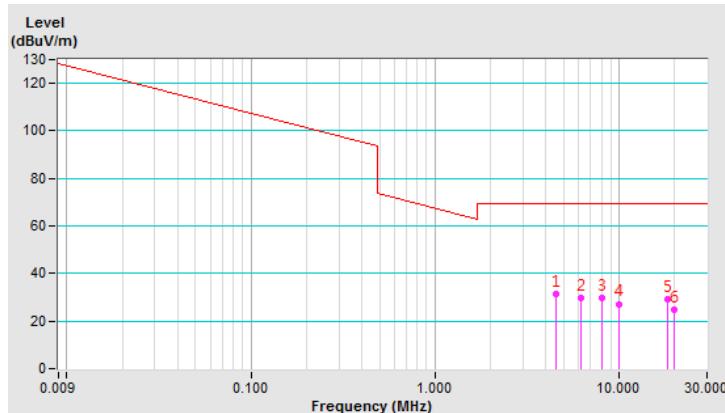


| | | | |
|-----------------|----------------|-------------------|------------|
| Test Frequency | 10MHz | Detector Function | Quasi-Peak |
| Frequency Range | 9 kHz ~ 30 MHz | | |

| Antenna Polarity & Test Distance: Loop Antenna Ground-parallel At 3m | | | | | | | | |
|----------------------------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 4.568 | 31.34 QP | 69.54 | -38.20 | 1.00 | 55 | 35.09 | -3.75 |
| 2 | 6.157 | 29.84 QP | 69.54 | -39.70 | 1.00 | 172 | 33.70 | -3.86 |
| 3 | 8.017 | 29.52 QP | 69.54 | -40.02 | 1.00 | 186 | 33.48 | -3.96 |
| 4 | *10.010 | 27.23 QP | 69.54 | -42.31 | 1.00 | 291 | 31.48 | -4.25 |
| 5 | 18.304 | 29.41 QP | 69.54 | -40.13 | 1.00 | 226 | 34.94 | -5.53 |
| 6 | 20.000 | 24.77 QP | 69.54 | -44.77 | 1.00 | 305 | 30.45 | -5.68 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “*”: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40



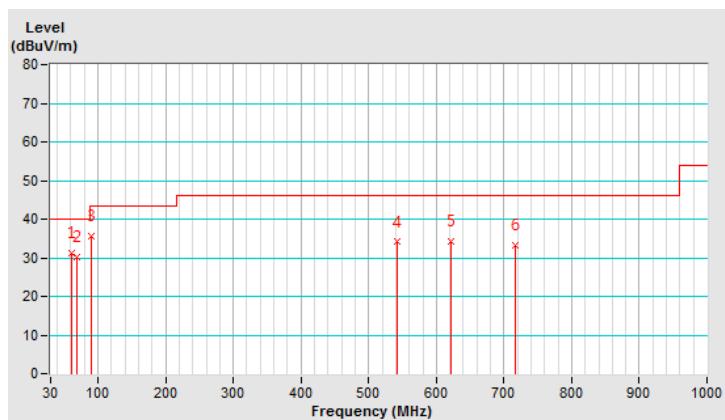
Below 1GHz Data:

| | | | |
|-----------------|---------------|-------------------|------------|
| Test Frequency | 1.6MHz | Detector Function | Quasi-Peak |
| Frequency Range | 30 MHz ~ 1GHz | | |

| Antenna Polarity & Test Distance: Horizontal At 3m | | | | | | | | |
|----------------------------------------------------|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 61.38 | 31.31 QP | 40.00 | -8.69 | 2.71 H | 175 | 39.07 | -7.76 |
| 2 | 68.61 | 30.23 QP | 40.00 | -9.77 | 2.22 H | 170 | 38.69 | -8.46 |
| 3 | 89.46 | 35.54 QP | 43.50 | -7.96 | 2.03 H | 196 | 48.19 | -12.65 |
| 4 | 542.45 | 34.14 QP | 46.00 | -11.86 | 2.73 H | 111 | 34.39 | -0.25 |
| 5 | 621.85 | 34.38 QP | 46.00 | -11.62 | 2.71 H | 189 | 32.55 | 1.83 |
| 6 | 717.00 | 33.23 QP | 46.00 | -12.77 | 1.84 H | 50 | 30.17 | 3.06 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

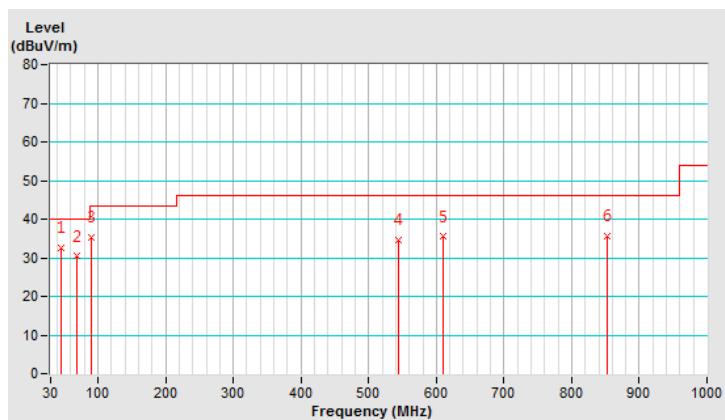


| | | | |
|-----------------|---------------|-------------------|------------|
| Test Frequency | 1.6MHz | Detector Function | Quasi-Peak |
| Frequency Range | 30 MHz ~ 1GHz | | |

| Antenna Polarity & Test Distance: Vertical At 3m | | | | | | | | |
|--------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 45.67 | 32.53 QP | 40.00 | -7.47 | 1.55 V | 296 | 39.87 | -7.34 |
| 2 | 69.24 | 30.40 QP | 40.00 | -9.60 | 1.43 V | 103 | 39.04 | -8.64 |
| 3 | 89.46 | 35.31 QP | 43.50 | -8.19 | 1.36 V | 193 | 47.96 | -12.65 |
| 4 | 543.23 | 34.67 QP | 46.00 | -11.33 | 1.52 V | 122 | 34.89 | -0.22 |
| 5 | 610.40 | 35.43 QP | 46.00 | -10.57 | 2.28 V | 205 | 33.98 | 1.45 |
| 6 | 853.43 | 35.51 QP | 46.00 | -10.49 | 1.75 V | 198 | 30.05 | 5.46 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

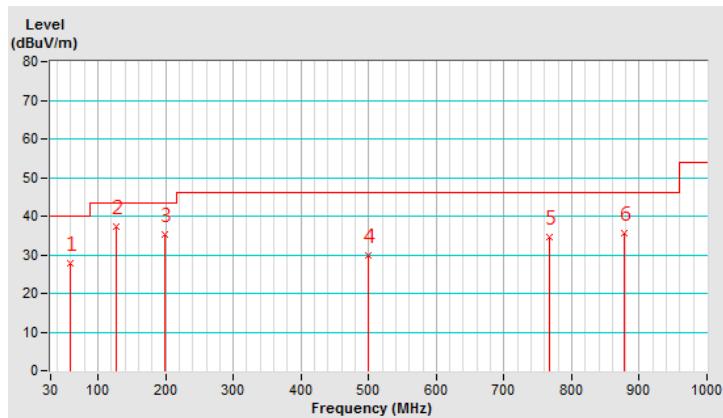


| | | | |
|-----------------|---------------|-------------------|------------|
| Test Frequency | 4MHz | Detector Function | Quasi-Peak |
| Frequency Range | 30 MHz ~ 1GHz | | |

| Antenna Polarity & Test Distance: Horizontal At 3m | | | | | | | | |
|----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 58.13 | 27.81 QP | 40.00 | -12.19 | 2.16 H | 180 | 35.17 | -7.36 |
| 2 | 126.08 | 37.43 QP | 43.50 | -6.07 | 1.96 H | 155 | 46.31 | -8.88 |
| 3 | 199.17 | 35.36 QP | 43.50 | -8.14 | 1.37 H | 207 | 44.99 | -9.63 |
| 4 | 500.45 | 29.77 QP | 46.00 | -16.23 | 1.82 H | 12 | 30.76 | -0.99 |
| 5 | 767.88 | 34.70 QP | 46.00 | -11.30 | 1.06 H | 50 | 30.32 | 4.38 |
| 6 | 877.05 | 35.57 QP | 46.00 | -10.43 | 2.04 H | 8 | 30.08 | 5.49 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

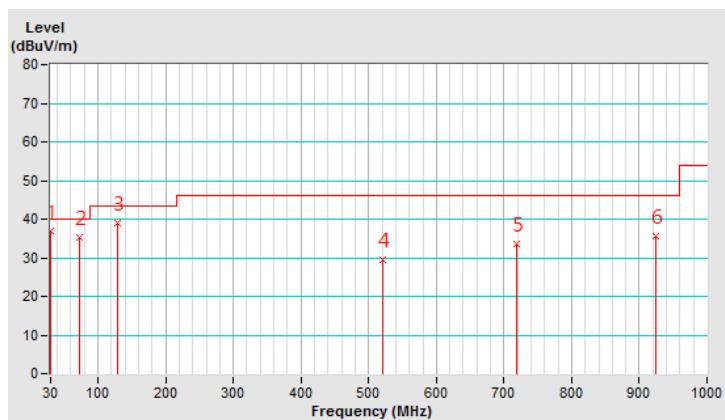


| | | | |
|-----------------|---------------|-------------------|------------|
| Test Frequency | 4MHz | Detector Function | Quasi-Peak |
| Frequency Range | 30 MHz ~ 1GHz | | |

| Antenna Polarity & Test Distance: Vertical At 3m | | | | | | | | |
|--------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 30.10 | 36.79 QP | 40.00 | -3.21 | 1.88 V | 179 | 45.82 | -9.03 |
| 2 | 71.81 | 35.23 QP | 40.00 | -4.77 | 1.93 V | 140 | 44.68 | -9.45 |
| 3 | 128.65 | 39.03 QP | 43.50 | -4.47 | 1.54 V | 266 | 47.64 | -8.61 |
| 4 | 520.87 | 29.44 QP | 46.00 | -16.56 | 2.11 V | 4 | 29.98 | -0.54 |
| 5 | 718.70 | 33.54 QP | 46.00 | -12.46 | 1.39 V | 351 | 30.48 | 3.06 |
| 6 | 924.83 | 35.65 QP | 46.00 | -10.35 | 1.25 V | 188 | 29.06 | 6.59 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

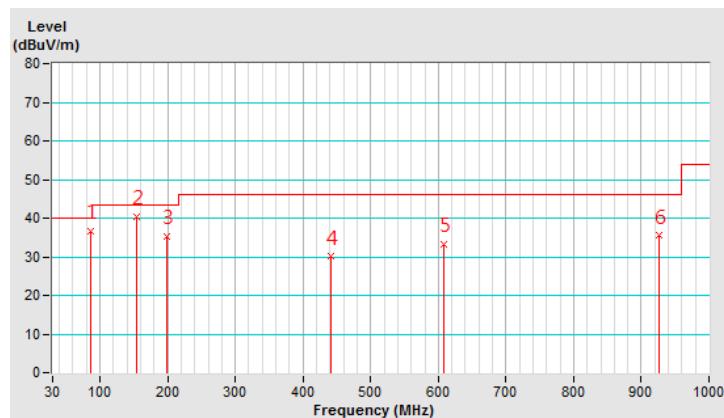


| | | | |
|-----------------|---------------|-------------------|------------|
| Test Frequency | 10MHz | Detector Function | Quasi-Peak |
| Frequency Range | 30 MHz ~ 1GHz | | |

| Antenna Polarity & Test Distance: Horizontal At 3m | | | | | | | | |
|----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 86.21 | 36.64 QP | 40.00 | -3.36 | 2.08 H | 202 | 49.25 | -12.61 |
| 2 | 154.79 | 40.42 QP | 43.50 | -3.08 | 2.27 H | 312 | 47.19 | -6.77 |
| 3 | 199.17 | 35.36 QP | 43.50 | -8.14 | 1.00 H | 207 | 44.99 | -9.63 |
| 4 | 440.46 | 30.04 QP | 46.00 | -15.96 | 1.36 H | 19 | 32.10 | -2.06 |
| 5 | 607.39 | 33.26 QP | 46.00 | -12.74 | 2.13 H | 193 | 31.88 | 1.38 |
| 6 | 926.62 | 35.45 QP | 46.00 | -10.55 | 1.84 H | 1 | 28.82 | 6.63 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

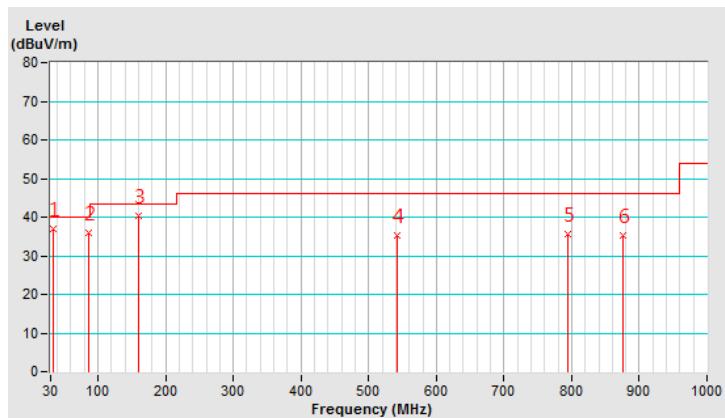


| | | | |
|-----------------|---------------|-------------------|------------|
| Test Frequency | 10MHz | Detector Function | Quasi-Peak |
| Frequency Range | 30 MHz ~ 1GHz | | |

| Antenna Polarity & Test Distance: Vertical At 3m | | | | | | | | |
|--------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 33.93 | 36.95 QP | 40.00 | -3.05 | 1.91 V | 152 | 45.61 | -8.66 |
| 2 | 86.21 | 36.09 QP | 40.00 | -3.91 | 2.34 V | 175 | 48.70 | -12.61 |
| 3 | 160.71 | 40.50 QP | 43.50 | -3.00 | 1.63 V | 0 | 47.25 | -6.75 |
| 4 | 542.06 | 35.42 QP | 46.00 | -10.58 | 2.05 V | 140 | 35.69 | -0.27 |
| 5 | 794.02 | 35.62 QP | 46.00 | -10.38 | 1.14 V | 218 | 31.26 | 4.36 |
| 6 | 875.26 | 35.41 QP | 46.00 | -10.59 | 1.22 V | 218 | 29.89 | 5.52 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

| Frequency (MHz) | Conducted Limit (dBuV) | |
|-----------------|------------------------|---------|
| | Quasi-peak | Average |
| 0.15 - 0.5 | 66 - 56 | 56 - 46 |
| 0.50 - 5.0 | 56 | 46 |
| 5.0 - 30.0 | 60 | 50 |

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due |
|------------------------------------------------------------|---------------|--------------|---------------|---------------|
| ROHDE & SCHWARZ TEST RECEIVER | ESR3 | 102413 | Feb. 8, 2018 | Feb. 7, 2019 |
| ROHDE & SCHWARZ Artificial Mains Network (for EUT) | ESH2-Z5 | 100104 | Dec. 6, 2017 | Dec. 5, 2018 |
| LISN With Adapter (for EUT) | AD10 | C09Ada-001 | Dec. 6, 2017 | Dec. 5, 2018 |
| ROHDE & SCHWARZ Artificial Mains Network (for peripherals) | ESH3-Z5 | 847265/023 | Nov. 3, 2017 | Nov. 2, 2018 |
| SCHWARZBECK Artificial Mains Network (For EUT) | NNLK8129 | 8129229 | May 3, 2018 | May 2, 2019 |
| Software | Cond_V7.3.7.4 | NA | NA | NA |
| RF cable (JYEBAO) With 10dB PAD | 5D-FB | Cable-C09.01 | Feb. 21, 2018 | Feb. 20, 2019 |
| SUHNER Terminator (For ROHDE & SCHWARZ LISN) | 65BNC-5001 | E1-010789 | May 8, 2018 | May 7, 2019 |

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in Shielded Room No. 9.
 3. The VCCI Site Registration No. C-1312.

4.2.3 Test Procedures

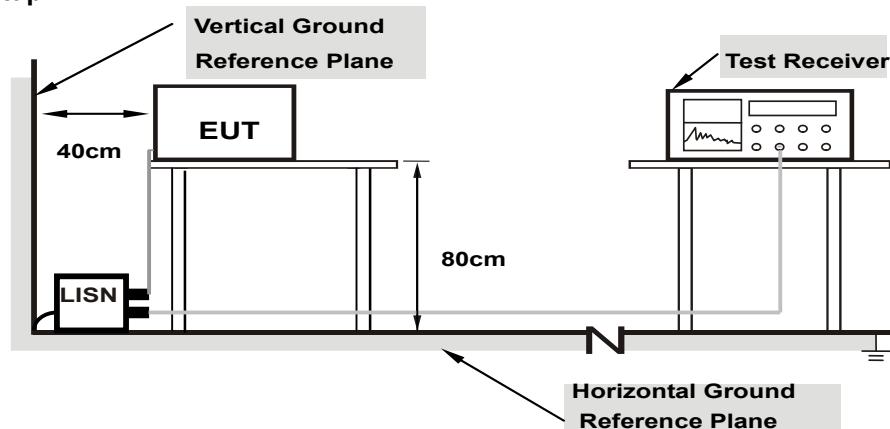
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1. Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

- Turned on the power of all equipment.
- PC ran a test program to enable all functions.
- PC read and wrote messages to/ from HDD.
- EUT received messages from temperature sensors and sent messages to PC via signal converter.
- PC sent messages to ext. LCD Monitor. Then it displayed them on its screen.
- PC sent messages to printer, and the printer printed them out.
- PC sent messages to modem.
- Steps c-g were repeated.

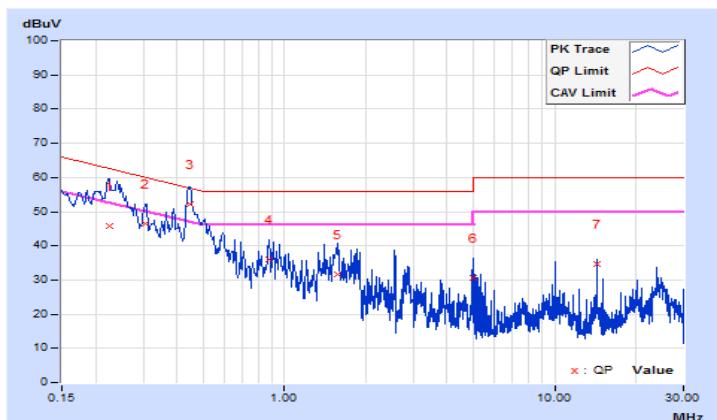
4.2.7 Test Results

| Phase | | Line (L) | | Detector Function | | Quasi-Peak (QP) / Average (AV) | |
|-------|--|----------|--|-------------------|--|--------------------------------|--|
|-------|--|----------|--|-------------------|--|--------------------------------|--|

| No | Freq. | Corr. | Reading Value | | Emission Level | | Limit | | Margin | |
|----------|----------------|--------------|---------------|--------------|----------------|--------------|--------------|--------------|--------------|---------------|
| | | Factor | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. |
| 1 | 0.22429 | 10.20 | 35.59 | 25.65 | 45.79 | 35.85 | 62.66 | 52.66 | -16.87 | -16.81 |
| 2 | 0.30615 | 10.22 | 36.24 | 32.82 | 46.46 | 43.04 | 60.07 | 50.07 | -13.61 | -7.03 |
| 3 | 0.44506 | 10.24 | 41.95 | 23.46 | 52.19 | 33.70 | 56.97 | 46.97 | -4.78 | -13.27 |
| 4 | 0.87203 | 10.28 | 25.67 | 16.06 | 35.95 | 26.34 | 56.00 | 46.00 | -20.05 | -19.66 |
| 5 | 1.57134 | 10.38 | 21.19 | 13.15 | 31.57 | 23.53 | 56.00 | 46.00 | -24.43 | -22.47 |
| 6 | 4.97695 | 10.65 | 20.04 | 14.03 | 30.69 | 24.68 | 56.00 | 46.00 | -25.31 | -21.32 |
| 7 | 14.36445 | 11.08 | 23.54 | 22.88 | 34.62 | 33.96 | 60.00 | 50.00 | -25.38 | -16.04 |

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

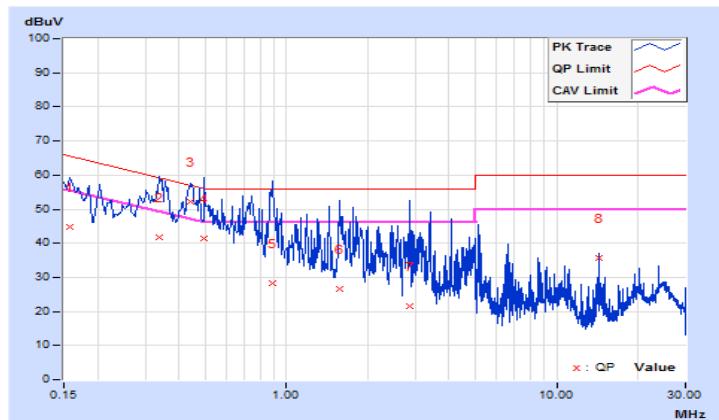


| Phase | Neutral (N) | | Detector Function | | Quasi-Peak (QP) / Average (AV) | |
|-------|-------------|--|-------------------|--|--------------------------------|--|
|-------|-------------|--|-------------------|--|--------------------------------|--|

| No | Freq. [MHz] | Corr. Factor | Reading Value | | Emission Level | | Limit | | Margin | |
|----|----------------|-----------------|---------------|-----------|----------------|-----------|-------|-------|--------|--------|
| | | (dB) | [dB (uV)] | [dB (uV)] | [dB (uV)] | [dB (uV)] | (dB) | (dB) | (dB) | (dB) |
| | | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15782 | 10.21 | 34.63 | 21.70 | 44.84 | 31.91 | 65.58 | 55.58 | -20.74 | -23.67 |
| 2 | 0.33768 | 10.26 | 31.36 | 13.61 | 41.62 | 23.87 | 59.26 | 49.26 | -17.64 | -25.39 |
| 3 | 0.44272 | 10.28 | 41.87 | 24.40 | 52.15 | 34.68 | 57.01 | 47.01 | -4.86 | -12.33 |
| 4 | 0.49799 | 10.29 | 31.13 | 19.72 | 41.42 | 30.01 | 56.03 | 46.03 | -14.61 | -16.02 |
| 5 | 0.88318 | 10.33 | 18.07 | 6.63 | 28.40 | 16.96 | 56.00 | 46.00 | -27.60 | -29.04 |
| 6 | 1.57525 | 10.43 | 16.05 | 5.13 | 26.48 | 15.56 | 56.00 | 46.00 | -29.52 | -30.44 |
| 7 | 2.86164 | 10.57 | 10.95 | 3.94 | 21.52 | 14.51 | 56.00 | 46.00 | -34.48 | -31.49 |
| 8 | 14.36836 | 10.99 | 24.83 | 24.68 | 35.82 | 35.67 | 60.00 | 50.00 | -24.18 | -14.33 |

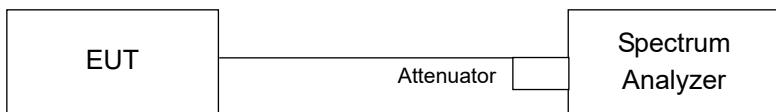
REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



4.3 Channel Bandwidth

4.3.1 Test Setup



4.3.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.3 Test Procedure

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.

4.3.4 Deviation from Test Standard

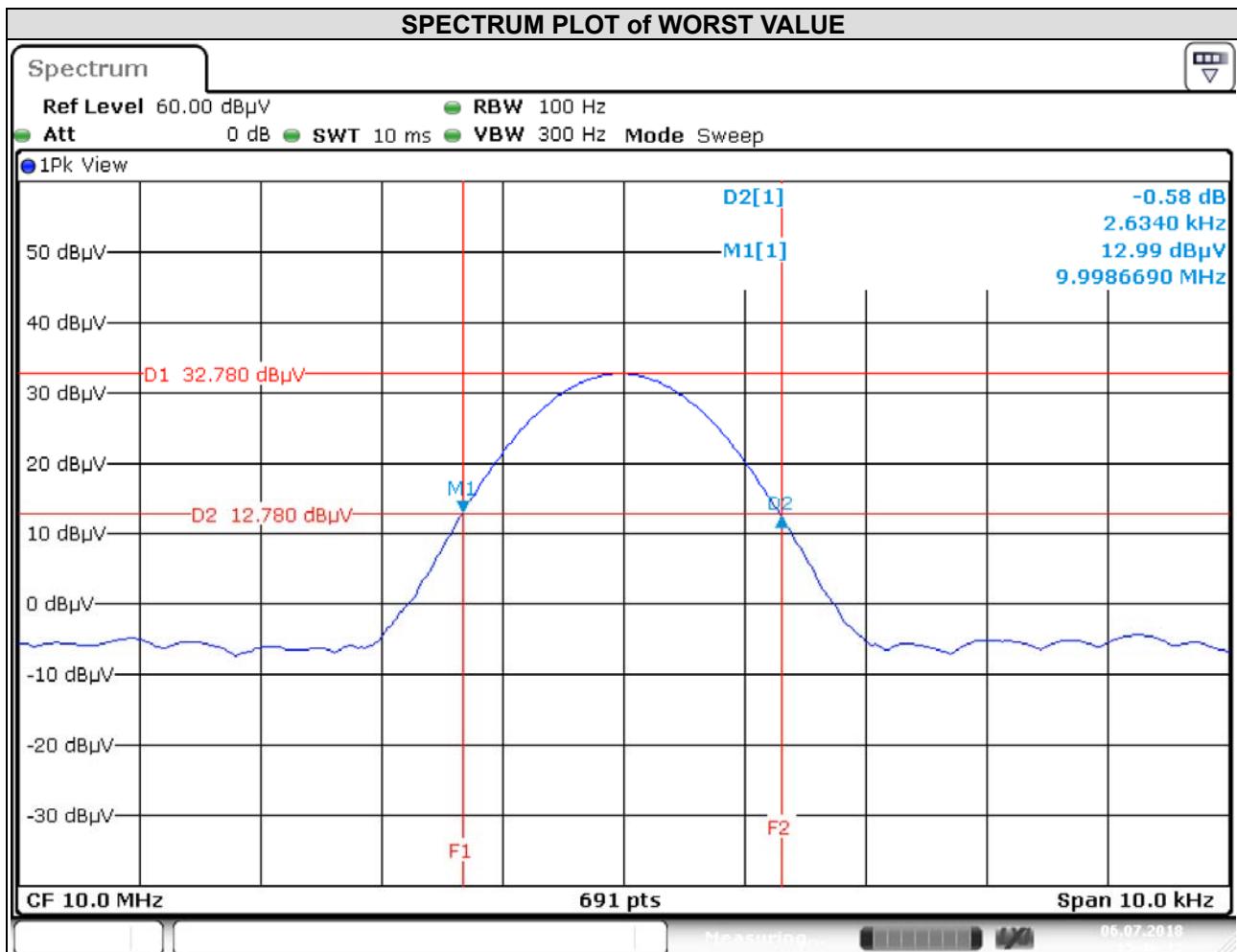
No deviation.

4.3.5 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.3.6 Test Results

| CHANNEL | FREQUENCY (MHz) | 20dB BANDWIDTH (kHz) |
|---------|-----------------|----------------------|
| 1 | 1.6 | 2.619 |
| 2 | 4 | 2.619 |
| 3 | 10 | 2.634 |



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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