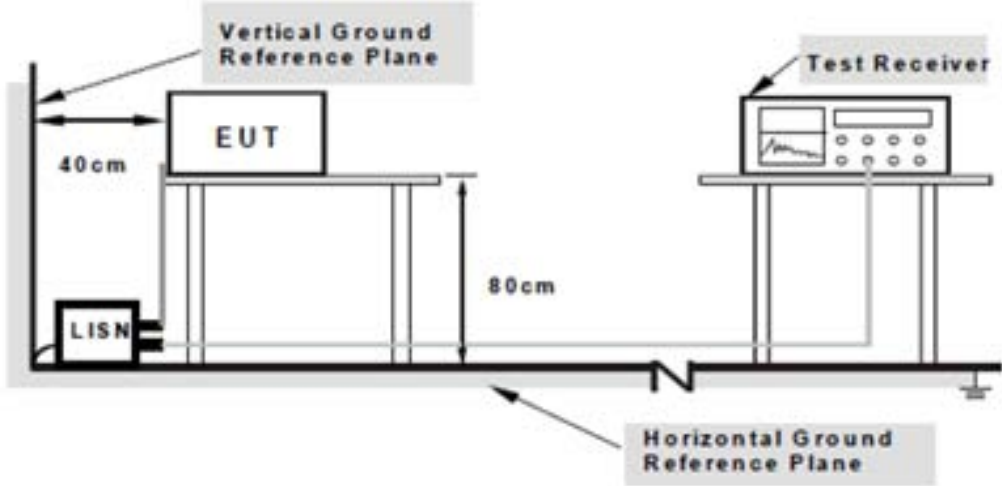


## 6.6 AC Power Line Conducted Emissions

|                      |                |
|----------------------|----------------|
| Temperature          | 28°C           |
| Relative Humidity    | 54%            |
| Atmospheric Pressure | 1021mbar       |
| Test date :          | March 29, 2018 |
| Tested By :          | Peter Wei      |

| Spec                                                                                                                                                                                                                                                                                           | Item                   | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Applicable                                     |                        |              |         |            |         |         |            |    |    |          |    |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------------------------|--------------|---------|------------|---------|---------|------------|----|----|----------|----|----|
| 47CFR§15.207                                                                                                                                                                                                                                                                                   | a)                     | For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <div><input checked="" type="checkbox"/></div> |                        |              |         |            |         |         |            |    |    |          |    |    |
|                                                                                                                                                                                                                                                                                                |                        | Class A Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                |                        |              |         |            |         |         |            |    |    |          |    |    |
|                                                                                                                                                                                                                                                                                                |                        | <table><tr><th>Frequency ranges (MHz)</th><th colspan="2">Limit (dBµV)</th></tr><tr><th></th><th>QP</th><th>Average</th></tr><tr><td>0.15 ~ 0.5</td><td>79</td><td>66</td></tr><tr><td>0.5 ~ 30</td><td>73</td><td>60</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                | Frequency ranges (MHz) | Limit (dBµV) |         |            | QP      | Average | 0.15 ~ 0.5 | 79 | 66 | 0.5 ~ 30 | 73 | 60 |
|                                                                                                                                                                                                                                                                                                |                        | Frequency ranges (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                | Limit (dBµV)           |              |         |            |         |         |            |    |    |          |    |    |
|                                                                                                                                                                                                                                                                                                |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                | QP                     | Average      |         |            |         |         |            |    |    |          |    |    |
| 0.15 ~ 0.5                                                                                                                                                                                                                                                                                     | 79                     | 66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                |                        |              |         |            |         |         |            |    |    |          |    |    |
| 0.5 ~ 30                                                                                                                                                                                                                                                                                       | 73                     | 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                |                        |              |         |            |         |         |            |    |    |          |    |    |
| Class B Limit                                                                                                                                                                                                                                                                                  |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                |                        |              |         |            |         |         |            |    |    |          |    |    |
| <table><tr><th>Frequency ranges (MHz)</th><th colspan="2">Limit (dBµV)</th></tr><tr><th></th><th>QP</th><th>Average</th></tr><tr><td>0.15 ~ 0.5</td><td>66 – 56</td><td>56 – 46</td></tr><tr><td>0.5 ~ 5</td><td>56</td><td>46</td></tr><tr><td>5 ~ 30</td><td>60</td><td>50</td></tr></table> | Frequency ranges (MHz) | Limit (dBµV)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                |                        | QP           | Average | 0.15 ~ 0.5 | 66 – 56 | 56 – 46 | 0.5 ~ 5    | 56 | 46 | 5 ~ 30   | 60 | 50 |
| Frequency ranges (MHz)                                                                                                                                                                                                                                                                         | Limit (dBµV)           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                |                        |              |         |            |         |         |            |    |    |          |    |    |
|                                                                                                                                                                                                                                                                                                | QP                     | Average                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                |                        |              |         |            |         |         |            |    |    |          |    |    |
| 0.15 ~ 0.5                                                                                                                                                                                                                                                                                     | 66 – 56                | 56 – 46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                |                        |              |         |            |         |         |            |    |    |          |    |    |
| 0.5 ~ 5                                                                                                                                                                                                                                                                                        | 56                     | 46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                |                        |              |         |            |         |         |            |    |    |          |    |    |
| 5 ~ 30                                                                                                                                                                                                                                                                                         | 60                     | 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                |                        |              |         |            |         |         |            |    |    |          |    |    |
| Test Setup                                                                                                                                                                                                                                                                                     |                        | <div><p><b>Note: 1. Support units were connected to second LISN.</b><br/><b>2. Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</b></p></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                |                        |              |         |            |         |         |            |    |    |          |    |    |
| Procedure                                                                                                                                                                                                                                                                                      |                        | <div><ul style="list-style-type: none"><li>- The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.</li><li>- The power supply for the EUT was fed through a 50 [mu]H/50 EUT LISN, connected to filtered mains.</li><li>- The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li><li>- All other supporting equipment were powered separately from another main supply.</li><li>- The EUT was switched on and allowed to warm up to its normal operating condition.</li><li>- A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.</li><li>- High peaks, relative to the limit line, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz.</li></ul></div> |                                                |                        |              |         |            |         |         |            |    |    |          |    |    |

|        |                                                                                        |
|--------|----------------------------------------------------------------------------------------|
|        | - Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power). |
| Remark |                                                                                        |
| Result | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                 |

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

#### Data sample

| No. | Frequency<br>(MHz) | Reading<br>(dBμV) | Detector | Lisn/lisn<br>(dB) | Ps_Lmt<br>(dB) | Cab_L<br>(dB) | Result<br>(dBμV) | Limit<br>(dBμV) | Margin<br>(dB) |
|-----|--------------------|-------------------|----------|-------------------|----------------|---------------|------------------|-----------------|----------------|
|-----|--------------------|-------------------|----------|-------------------|----------------|---------------|------------------|-----------------|----------------|

Frequency (MHz) = Emission frequency in MHz

Reading (dBμV) = Receiver Reading Value

Detector=Quasi Peak Detector or Average Detector

Lisn/lisn= Insertion loss of LISN

Ps\_Lmt= Insertion loss of transient limiter (The transient limiter included 10dB attenuation)

Cab\_L= cable loss

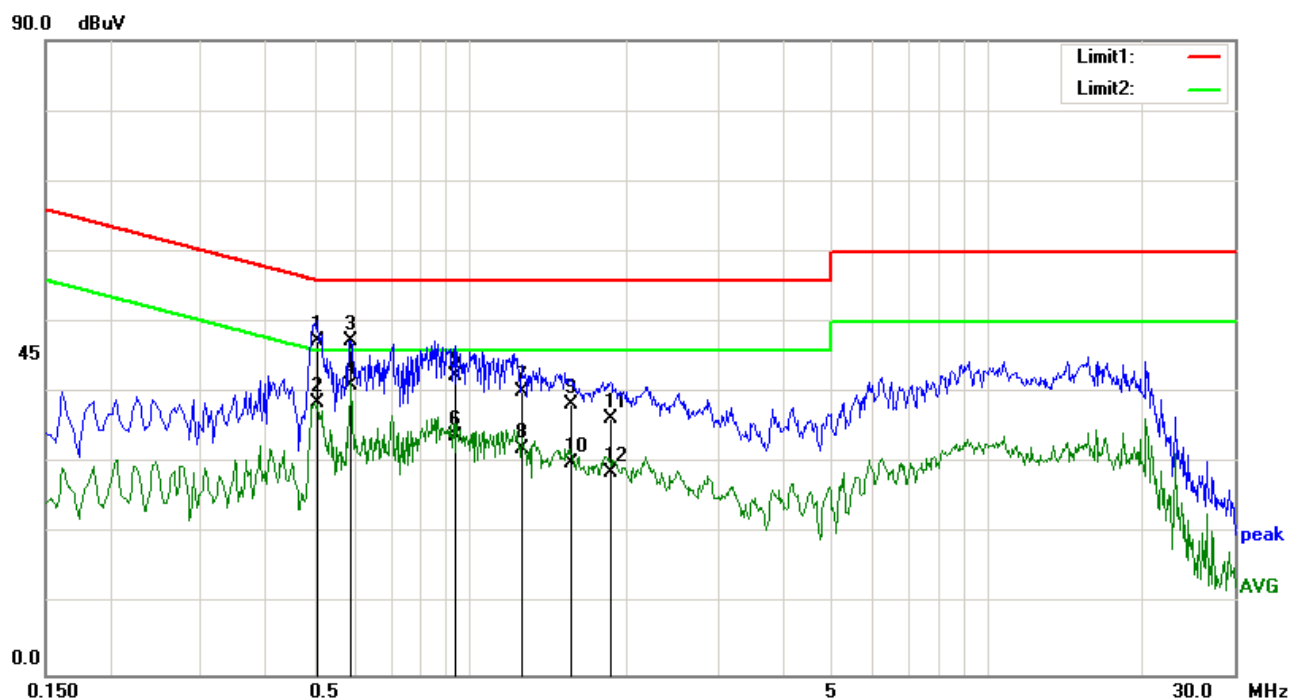
Result (dBμV) = Reading Value + Corrected Value

Limit (dBμV) = Limit stated in standard

#### Calculation Formula:

Margin (dB) = Result (dBμV) – limit (dBμV)

Test Mode(Adapter) : Normal Working Mode



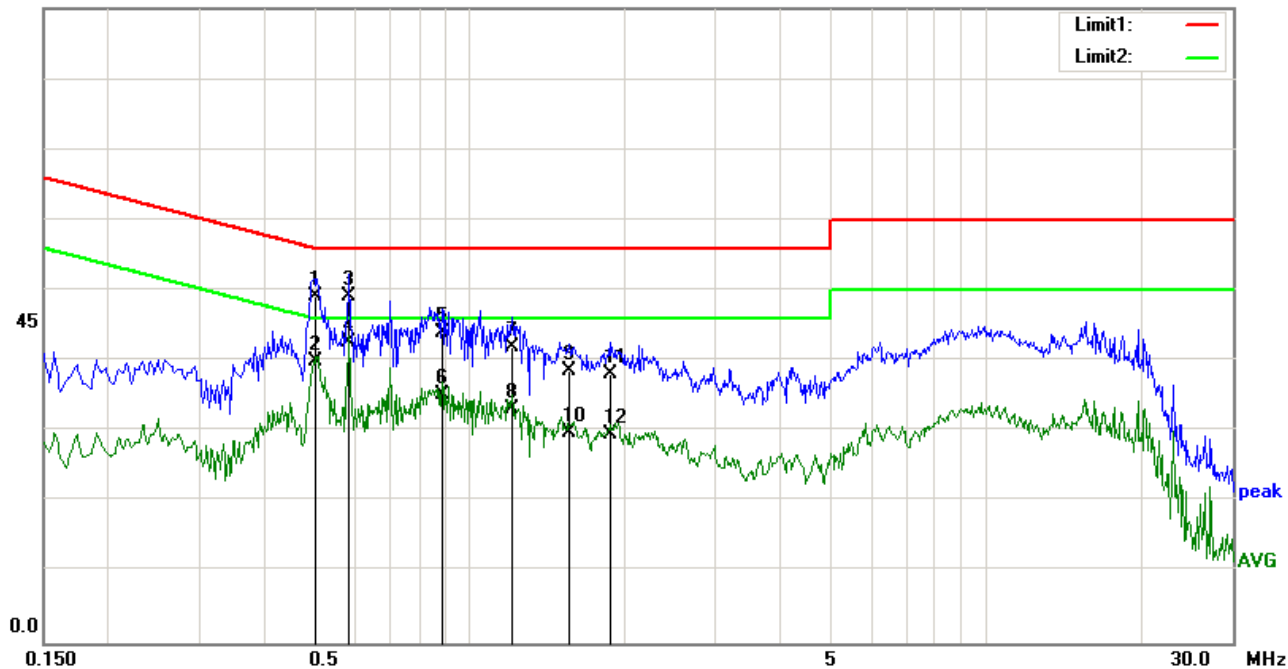
Test Data

Phase Line Plot at 120Vac, 60Hz

| No. | Frequency<br>(MHz) | Reading<br>(dB $\mu$ V) | Detector | Lisn/Isn<br>(dB) | Ps_Lmt<br>(dB) | Cab_L<br>(dB) | Result<br>(dB $\mu$ V) | Limit<br>(dB $\mu$ V) | Margin<br>(dB) |
|-----|--------------------|-------------------------|----------|------------------|----------------|---------------|------------------------|-----------------------|----------------|
| 1   | 0.5060             | 37.07                   | QP       | 0.12             | -10.00         | 0.21          | 47.40                  | 56.00                 | -8.60          |
| 2   | 0.5060             | 28.19                   | AVG      | 0.12             | -10.00         | 0.21          | 38.52                  | 46.00                 | -7.48          |
| 3   | 0.5860             | 37.03                   | QP       | 0.12             | -10.00         | 0.21          | 47.36                  | 56.00                 | -8.64          |
| 4   | 0.5860             | 30.83                   | AVG      | 0.12             | -10.00         | 0.21          | 41.16                  | 46.00                 | -4.84          |
| 5   | 0.9340             | 32.13                   | QP       | 0.14             | -10.00         | 0.19          | 42.46                  | 56.00                 | -13.54         |
| 6   | 0.9340             | 23.47                   | AVG      | 0.14             | -10.00         | 0.19          | 33.80                  | 46.00                 | -12.20         |
| 7   | 1.2500             | 29.91                   | QP       | 0.15             | -10.00         | 0.21          | 40.27                  | 56.00                 | -15.73         |
| 8   | 1.2500             | 21.72                   | AVG      | 0.15             | -10.00         | 0.21          | 32.08                  | 46.00                 | -13.92         |
| 9   | 1.5620             | 27.95                   | QP       | 0.15             | -10.00         | 0.20          | 38.30                  | 56.00                 | -17.70         |
| 10  | 1.5620             | 19.63                   | AVG      | 0.15             | -10.00         | 0.20          | 29.98                  | 46.00                 | -16.02         |
| 11  | 1.8620             | 26.00                   | QP       | 0.16             | -10.00         | 0.20          | 36.36                  | 56.00                 | -19.64         |
| 12  | 1.8620             | 18.24                   | AVG      | 0.16             | -10.00         | 0.20          | 28.60                  | 46.00                 | -17.40         |

Test Mode(Adapter) : Normal Working Mode

90.0 dB $\mu$ V

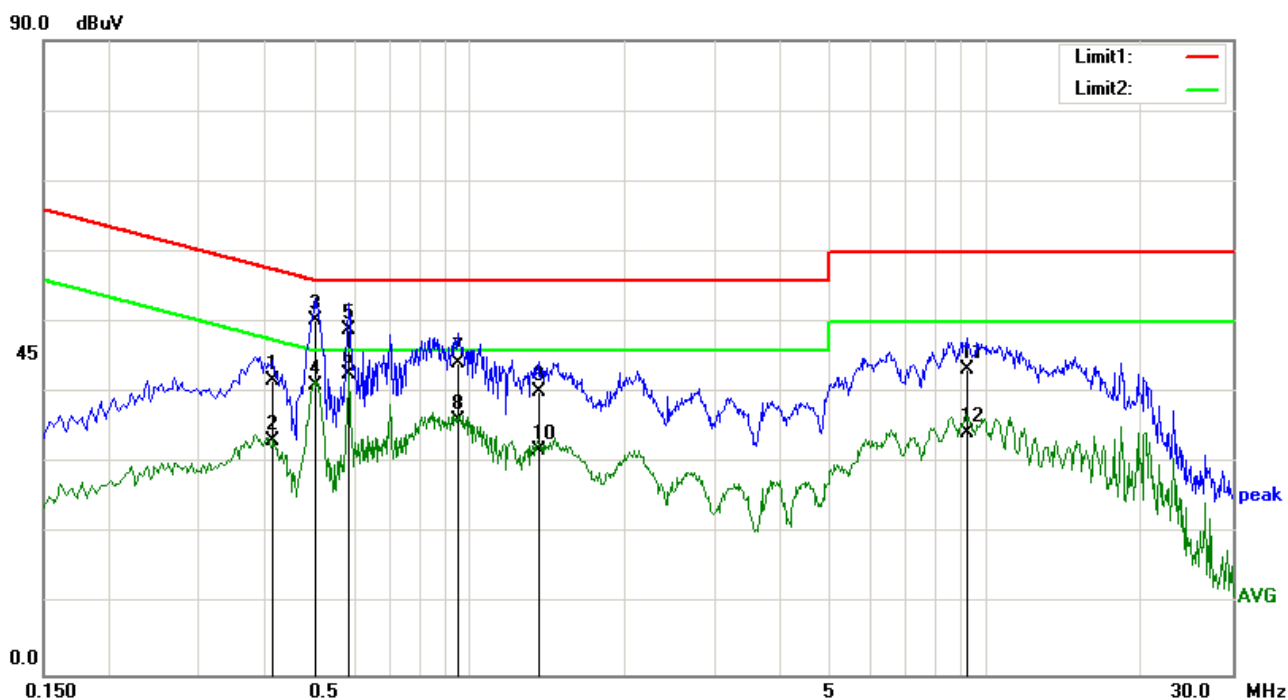


Test Data

Phase Neutral Plot at 120Vac, 60Hz

| No. | Frequency<br>(MHz) | Reading<br>(dB $\mu$ V) | Detector | Lisn/Isn<br>(dB) | Ps_Lmt<br>(dB) | Cab_L<br>(dB) | Result<br>(dB $\mu$ V) | Limit<br>(dB $\mu$ V) | Margin<br>(dB) |
|-----|--------------------|-------------------------|----------|------------------|----------------|---------------|------------------------|-----------------------|----------------|
| 1   | 0.5020             | 38.80                   | QP       | 0.11             | -10.00         | 0.21          | 49.12                  | 56.00                 | -6.88          |
| 2   | 0.5020             | 29.60                   | AVG      | 0.11             | -10.00         | 0.21          | 39.92                  | 46.00                 | -6.08          |
| 3   | 0.5860             | 38.78                   | QP       | 0.11             | -10.00         | 0.21          | 49.10                  | 56.00                 | -6.90          |
| 4   | 0.5860             | 32.34                   | AVG      | 0.11             | -10.00         | 0.21          | 42.66                  | 46.00                 | -3.34          |
| 5   | 0.8860             | 33.60                   | QP       | 0.13             | -10.00         | 0.19          | 43.92                  | 56.00                 | -12.08         |
| 6   | 0.8860             | 24.82                   | AVG      | 0.13             | -10.00         | 0.19          | 35.14                  | 46.00                 | -10.86         |
| 7   | 1.2100             | 31.59                   | QP       | 0.14             | -10.00         | 0.21          | 41.94                  | 56.00                 | -14.06         |
| 8   | 1.2100             | 22.95                   | AVG      | 0.14             | -10.00         | 0.21          | 33.30                  | 46.00                 | -12.70         |
| 9   | 1.5660             | 28.21                   | QP       | 0.15             | -10.00         | 0.20          | 38.56                  | 56.00                 | -17.44         |
| 10  | 1.5660             | 19.45                   | AVG      | 0.15             | -10.00         | 0.20          | 29.80                  | 46.00                 | -16.20         |
| 11  | 1.8740             | 27.78                   | QP       | 0.16             | -10.00         | 0.20          | 38.14                  | 56.00                 | -17.86         |
| 12  | 1.8740             | 19.24                   | AVG      | 0.16             | -10.00         | 0.20          | 29.60                  | 46.00                 | -16.40         |

Test Mode(Adapter) : Normal Working Mode

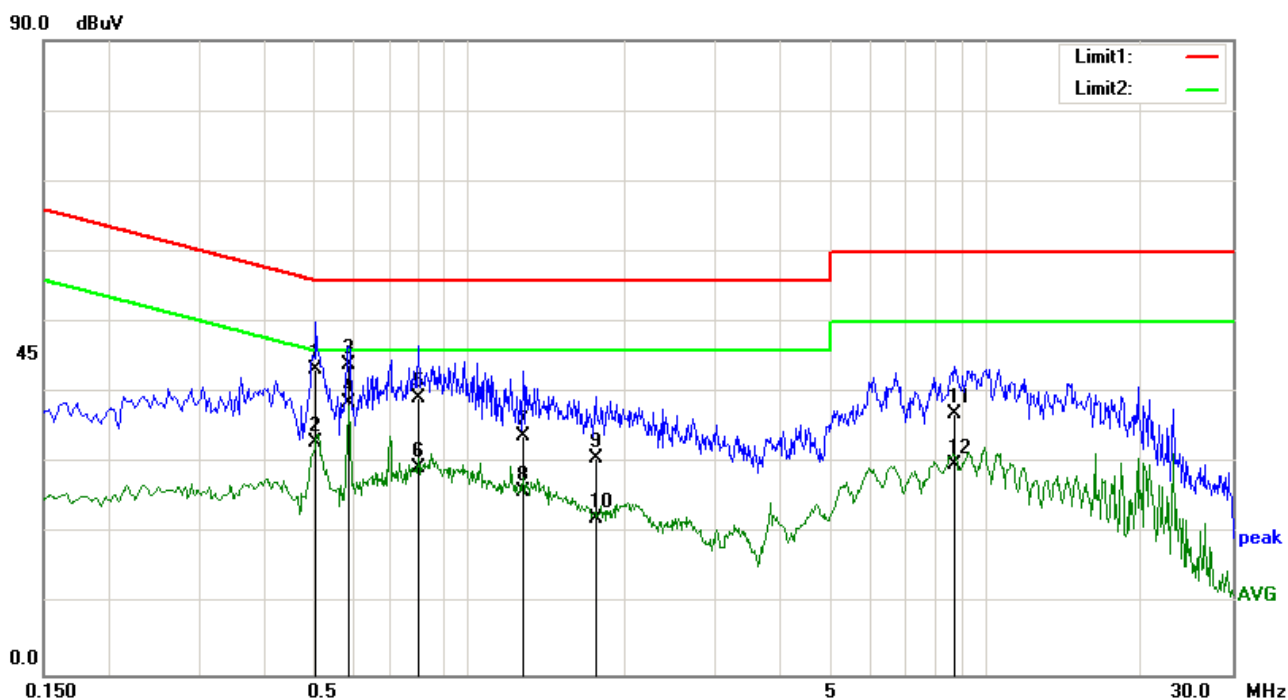


Test Data

Phase Line Plot at 230Vac, 50Hz

| No. | Frequency (MHz) | Reading (dBμV) | Detector | Lisn/Isn (dB) | Ps_Lmt (dB) | Cab_L (dB) | Result (dBμV) | Limit (dBμV) | Margin (dB) |
|-----|-----------------|----------------|----------|---------------|-------------|------------|---------------|--------------|-------------|
| 1   | 0.4180          | 31.48          | QP       | 0.11          | -10.00      | 0.21       | 41.80         | 57.49        | -15.69      |
| 2   | 0.4180          | 22.96          | AVG      | 0.11          | -10.00      | 0.21       | 33.28         | 47.49        | -14.21      |
| 3   | 0.5020          | 40.05          | QP       | 0.12          | -10.00      | 0.21       | 50.38         | 56.00        | -5.62       |
| 4   | 0.5020          | 30.69          | AVG      | 0.12          | -10.00      | 0.21       | 41.02         | 46.00        | -4.98       |
| 5   | 0.5860          | 38.54          | QP       | 0.12          | -10.00      | 0.21       | 48.87         | 56.00        | -7.13       |
| 6   | 0.5860          | 32.34          | AVG      | 0.12          | -10.00      | 0.21       | 42.67         | 46.00        | -3.33       |
| 7   | 0.9500          | 33.81          | QP       | 0.14          | -10.00      | 0.19       | 44.14         | 56.00        | -11.86      |
| 8   | 0.9500          | 25.83          | AVG      | 0.14          | -10.00      | 0.19       | 36.16         | 46.00        | -9.84       |
| 9   | 1.3620          | 29.80          | QP       | 0.15          | -10.00      | 0.21       | 40.16         | 56.00        | -15.84      |
| 10  | 1.3620          | 21.51          | AVG      | 0.15          | -10.00      | 0.21       | 31.87         | 46.00        | -14.13      |
| 11  | 9.1900          | 32.37          | QP       | 0.46          | -10.00      | 0.38       | 43.21         | 60.00        | -16.79      |
| 12  | 9.1900          | 23.37          | AVG      | 0.46          | -10.00      | 0.38       | 34.21         | 50.00        | -15.79      |

**Test Mode(Adapter) :** Normal Working Mode



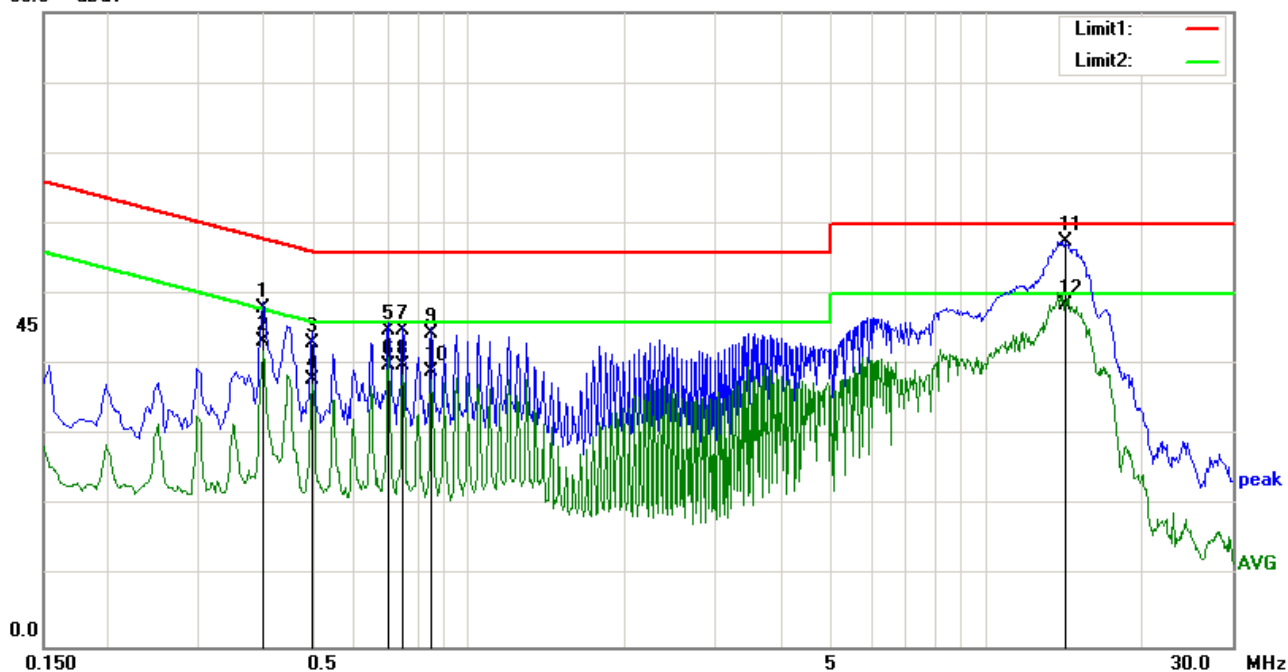
**Test Data**

**Phase Neutral Plot at 230Vac, 50Hz**

| No. | Frequency<br>(MHz) | Reading<br>(dBμV) | Detector | Lisn/Isn<br>(dB) | Ps_Lmt<br>(dB) | Cab_L<br>(dB) | Result<br>(dBμV) | Limit<br>(dBμV) | Margin<br>(dB) |
|-----|--------------------|-------------------|----------|------------------|----------------|---------------|------------------|-----------------|----------------|
| 1   | 0.5060             | 33.09             | QP       | 0.11             | -10.00         | 0.21          | 43.41            | 56.00           | -12.59         |
| 2   | 0.5060             | 22.55             | AVG      | 0.11             | -10.00         | 0.21          | 32.87            | 46.00           | -13.13         |
| 3   | 0.5860             | 33.75             | QP       | 0.11             | -10.00         | 0.21          | 44.07            | 56.00           | -11.93         |
| 4   | 0.5860             | 28.26             | AVG      | 0.11             | -10.00         | 0.21          | 38.58            | 46.00           | -7.42          |
| 5   | 0.7980             | 29.00             | QP       | 0.12             | -10.00         | 0.20          | 39.32            | 56.00           | -16.68         |
| 6   | 0.7980             | 19.09             | AVG      | 0.12             | -10.00         | 0.20          | 29.41            | 46.00           | -16.59         |
| 7   | 1.2740             | 23.49             | QP       | 0.14             | -10.00         | 0.21          | 33.84            | 56.00           | -22.16         |
| 8   | 1.2740             | 15.57             | AVG      | 0.14             | -10.00         | 0.21          | 25.92            | 46.00           | -20.08         |
| 9   | 1.7620             | 20.26             | QP       | 0.16             | -10.00         | 0.21          | 30.63            | 56.00           | -25.37         |
| 10  | 1.7620             | 11.75             | AVG      | 0.16             | -10.00         | 0.21          | 22.12            | 46.00           | -23.88         |
| 11  | 8.6900             | 26.06             | QP       | 0.48             | -10.00         | 0.37          | 36.91            | 60.00           | -23.09         |
| 12  | 8.6900             | 18.92             | AVG      | 0.48             | -10.00         | 0.37          | 29.77            | 50.00           | -20.23         |

Test Mode(POE) : Normal Working Mode

90.0 dBuV

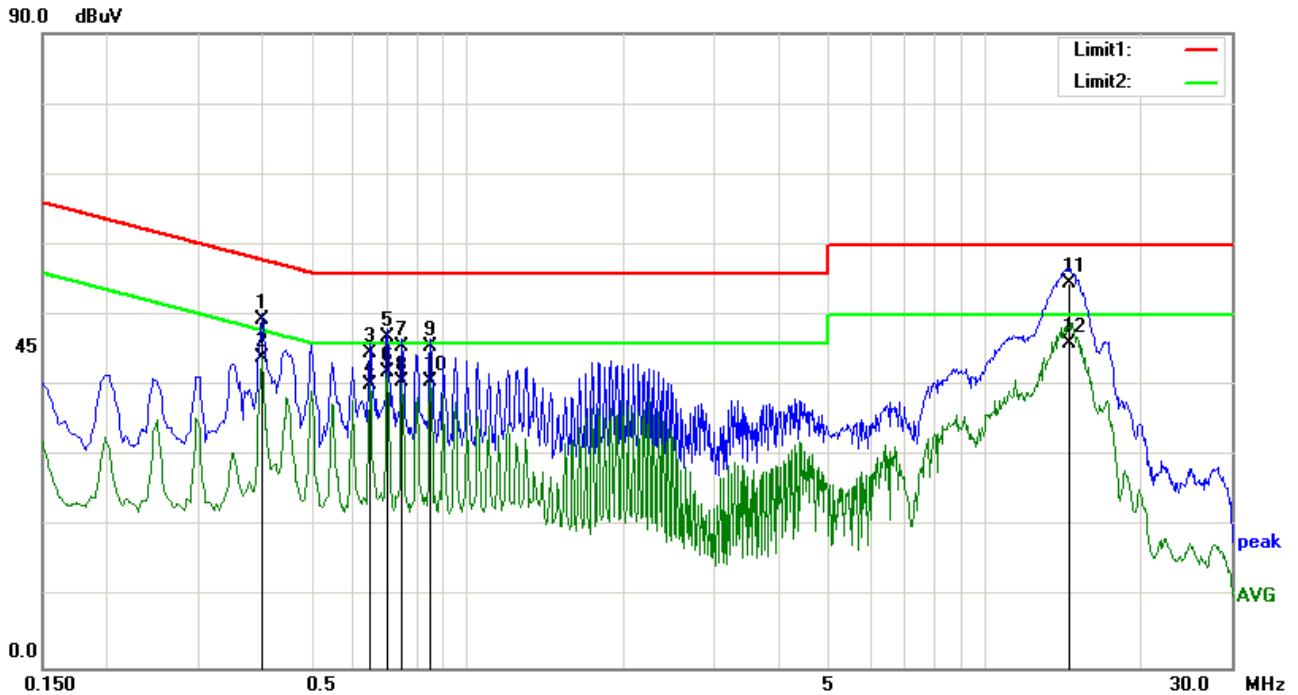


Test Data

Phase Line

| No. | Frequency<br>(MHz) | Reading<br>(dBμV) | Detector | Lisn/Isn<br>(dB) | Ps_Lmt<br>(dB) | Cab_L<br>(dB) | Result<br>(dBμV) | Limit<br>(dBμV) | Margin<br>(dB) |
|-----|--------------------|-------------------|----------|------------------|----------------|---------------|------------------|-----------------|----------------|
| 1   | 0.3980             | 37.77             | QP       | 0.11             | -10.00         | 0.21          | 48.09            | 57.90           | -9.81          |
| 2   | 0.3980             | 33.00             | AVG      | 0.11             | -10.00         | 0.21          | 43.32            | 47.90           | -4.58          |
| 3   | 0.4980             | 32.76             | QP       | 0.12             | -10.00         | 0.21          | 43.09            | 56.03           | -12.94         |
| 4   | 0.4980             | 27.59             | AVG      | 0.12             | -10.00         | 0.21          | 37.92            | 46.03           | -8.11          |
| 5   | 0.6980             | 34.62             | QP       | 0.13             | -10.00         | 0.20          | 44.95            | 56.00           | -11.05         |
| 6   | 0.6980             | 29.56             | AVG      | 0.13             | -10.00         | 0.20          | 39.89            | 46.00           | -6.11          |
| 7   | 0.7460             | 34.47             | QP       | 0.13             | -10.00         | 0.20          | 44.80            | 56.00           | -11.20         |
| 8   | 0.7460             | 29.58             | AVG      | 0.13             | -10.00         | 0.20          | 39.91            | 46.00           | -6.09          |
| 9   | 0.8460             | 34.08             | QP       | 0.13             | -10.00         | 0.20          | 44.41            | 56.00           | -11.59         |
| 10  | 0.8460             | 28.71             | AVG      | 0.13             | -10.00         | 0.20          | 39.04            | 46.00           | -6.96          |
| 11  | 14.2740            | 46.22             | QP       | 0.81             | -10.00         | 0.47          | 57.50            | 60.00           | -2.50          |
| 12  | 14.2740            | 37.27             | AVG      | 0.81             | -10.00         | 0.47          | 48.55            | 50.00           | -1.45          |

Test Mode(POE) : Normal Working Mode



Test Data

Phase Neutral

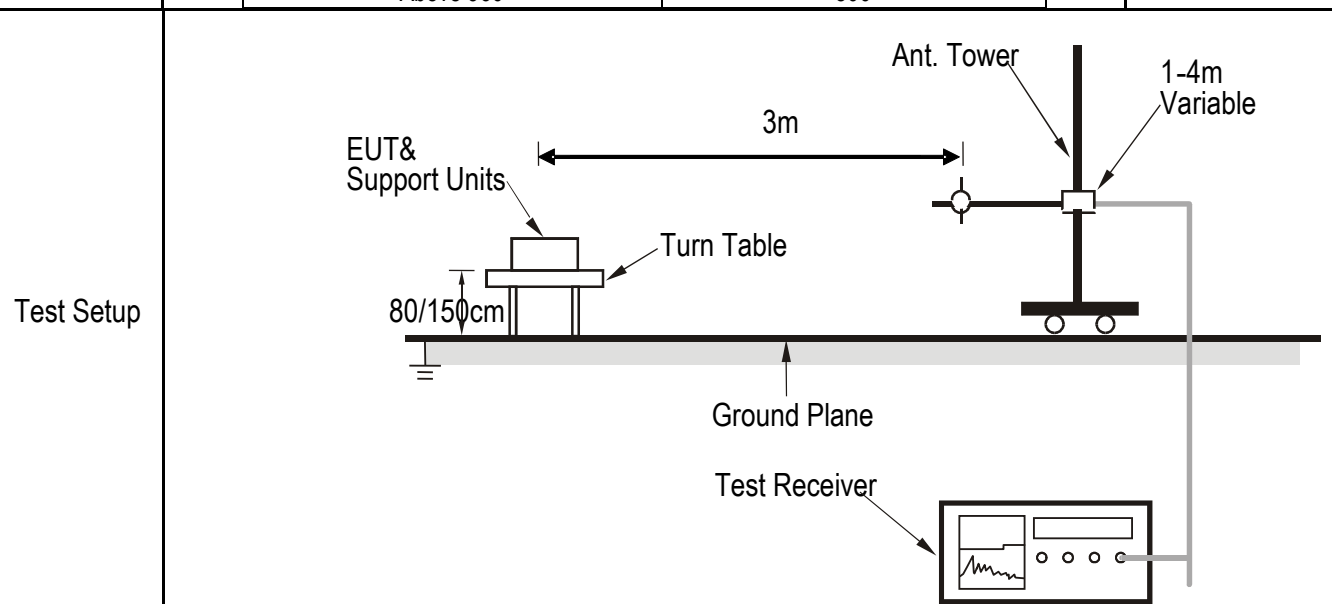
| No. | Frequency<br>(MHz) | Reading<br>(dBμV) | Detector | Lisn/Isn<br>(dB) | Ps_Lmt<br>(dB) | Cab_L<br>(dB) | Result<br>(dBμV) | Limit<br>(dBμV) | Margin<br>(dB) |
|-----|--------------------|-------------------|----------|------------------|----------------|---------------|------------------|-----------------|----------------|
| 1   | 0.3980             | 39.08             | QP       | 0.11             | -10.00         | 0.21          | 49.40            | 57.90           | -8.50          |
| 2   | 0.3980             | 33.76             | AVG      | 0.11             | -10.00         | 0.21          | 44.08            | 47.90           | -3.82          |
| 3   | 0.6460             | 34.36             | QP       | 0.12             | -10.00         | 0.20          | 44.68            | 56.00           | -11.32         |
| 4   | 0.6460             | 29.88             | AVG      | 0.12             | -10.00         | 0.20          | 40.20            | 46.00           | -5.80          |
| 5   | 0.6980             | 36.50             | QP       | 0.12             | -10.00         | 0.20          | 46.82            | 56.00           | -9.18          |
| 6   | 0.6980             | 31.68             | AVG      | 0.12             | -10.00         | 0.20          | 42.00            | 46.00           | -4.00          |
| 7   | 0.7460             | 35.22             | QP       | 0.12             | -10.00         | 0.20          | 45.54            | 56.00           | -10.46         |
| 8   | 0.7460             | 30.35             | AVG      | 0.12             | -10.00         | 0.20          | 40.67            | 46.00           | -5.33          |
| 9   | 0.8460             | 35.24             | QP       | 0.12             | -10.00         | 0.20          | 45.56            | 56.00           | -10.44         |
| 10  | 0.8460             | 30.33             | AVG      | 0.12             | -10.00         | 0.20          | 40.65            | 46.00           | -5.35          |
| 11  | 14.5260            | 43.10             | QP       | 0.91             | -10.00         | 0.47          | 54.48            | 60.00           | -5.52          |
| 12  | 14.5260            | 34.63             | AVG      | 0.91             | -10.00         | 0.47          | 46.01            | 50.00           | -3.99          |

## 6.7 Radiated Emissions

|                      |                |
|----------------------|----------------|
| Temperature          | 28°C           |
| Relative Humidity    | 54%            |
| Atmospheric Pressure | 1021mbar       |
| Test date :          | March 29, 2018 |
| Tested By :          | Peter Wei      |

### Requirement(s):

| Spec                  | Requirement                                                                                                                                                                                                                                                                                                                                   | Applicable   |                       |                       |         |     |          |     |           |     |           |     |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------|-----------------------|---------|-----|----------|-----|-----------|-----|-----------|-----|
| 47CFR<br>§15.209      | Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges | <div>☒</div> |                       |                       |         |     |          |     |           |     |           |     |
|                       | <b>Class A Limit</b>                                                                                                                                                                                                                                                                                                                          |              |                       |                       |         |     |          |     |           |     |           |     |
|                       | <table><tr><th>Frequency range (MHz)</th><th>Field Strength (µV/m)</th></tr><tr><td>30 – 88</td><td>90</td></tr><tr><td>88 – 216</td><td>150</td></tr><tr><td>216 – 960</td><td>210</td></tr><tr><td>Above 960</td><td>300</td></tr></table>                                                                                                  |              | Frequency range (MHz) | Field Strength (µV/m) | 30 – 88 | 90  | 88 – 216 | 150 | 216 – 960 | 210 | Above 960 | 300 |
|                       | Frequency range (MHz)                                                                                                                                                                                                                                                                                                                         |              | Field Strength (µV/m) |                       |         |     |          |     |           |     |           |     |
|                       | 30 – 88                                                                                                                                                                                                                                                                                                                                       |              | 90                    |                       |         |     |          |     |           |     |           |     |
|                       | 88 – 216                                                                                                                                                                                                                                                                                                                                      |              | 150                   |                       |         |     |          |     |           |     |           |     |
|                       | 216 – 960                                                                                                                                                                                                                                                                                                                                     |              | 210                   |                       |         |     |          |     |           |     |           |     |
|                       | Above 960                                                                                                                                                                                                                                                                                                                                     |              | 300                   |                       |         |     |          |     |           |     |           |     |
|                       | <b>Class B Limit</b>                                                                                                                                                                                                                                                                                                                          |              |                       |                       |         |     |          |     |           |     |           |     |
|                       | <table><tr><th>Frequency range (MHz)</th><th>Field Strength (µV/m)</th></tr><tr><td>30 – 88</td><td>100</td></tr><tr><td>88 – 216</td><td>150</td></tr><tr><td>216 – 960</td><td>200</td></tr><tr><td>Above 960</td><td>500</td></tr></table>                                                                                                 |              | Frequency range (MHz) | Field Strength (µV/m) | 30 – 88 | 100 | 88 – 216 | 150 | 216 – 960 | 200 | Above 960 | 500 |
| Frequency range (MHz) | Field Strength (µV/m)                                                                                                                                                                                                                                                                                                                         |              |                       |                       |         |     |          |     |           |     |           |     |
| 30 – 88               | 100                                                                                                                                                                                                                                                                                                                                           |              |                       |                       |         |     |          |     |           |     |           |     |
| 88 – 216              | 150                                                                                                                                                                                                                                                                                                                                           |              |                       |                       |         |     |          |     |           |     |           |     |
| 216 – 960             | 200                                                                                                                                                                                                                                                                                                                                           |              |                       |                       |         |     |          |     |           |     |           |     |
| Above 960             | 500                                                                                                                                                                                                                                                                                                                                           |              |                       |                       |         |     |          |     |           |     |           |     |
|                       |                                                                                                                                                                                                                                                                                                                                               |              |                       |                       |         |     |          |     |           |     |           |     |
|                       |                                                                                                                                                                                                                                                                                                                                               |              |                       |                       |         |     |          |     |           |     |           |     |
|                       |                                                                                                                                                                                                                                                                                                                                               |              |                       |                       |         |     |          |     |           |     |           |     |
|                       |                                                                                                                                                                                                                                                                                                                                               |              |                       |                       |         |     |          |     |           |     |           |     |
|                       |                                                                                                                                                                                                                                                                                                                                               |              |                       |                       |         |     |          |     |           |     |           |     |



|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Procedure | <ol style="list-style-type: none"> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> <li>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li> <li>The EUT was then rotated to the direction that gave the maximum emission.</li> <li>Finally, the antenna height was adjusted to the height that gave the maximum emission.</li> </ol> </li> <li>For emission frequencies measured below and above 1GHz, set the spectrum analyzer on a 100kHz and</li> </ol> |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|           |                                                                                                                                                                                        |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           | 4. 1MHz resolution bandwidth respectively for each frequency measured.<br>Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured. |
| Remark    | Note: We had tested 802.11b、 802.11g、 802.11n20、 802.11n40,and only show worse case (802.11b ) in the report.                                                                          |
| Result    | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                 |
| Test Data | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A                                                                                                                   |
| Test Plot | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A                                                                                                                   |

### Data sample

| No. | Frequency | Reading  | Detector | Ant_F  | PA_G | Cab_L | Result   | Limit    | Margin | Height | Degree |
|-----|-----------|----------|----------|--------|------|-------|----------|----------|--------|--------|--------|
|     | (MHz)     | (dBμV/m) |          | (dB/m) | (dB) | (dB)  | (dBμV/m) | (dBμV/m) | (dB)   | (cm)   | (°)    |

Frequency (MHz) = Emission frequency in MHz

Reading (dBμV/m) = Receiver Reading Value

Detector= Peak Detector or Quasi Peak Detector

Ant\_F=Antenna Factor

PA\_G=Pre-Amplifier Gain

Cab\_L=Cable Loss

Result (dBμV/m) = Read ing Value + Corrected Value

Limit (dBμV/m) = Limit stated in standard

Height (cm) = Height of Receiver antenna

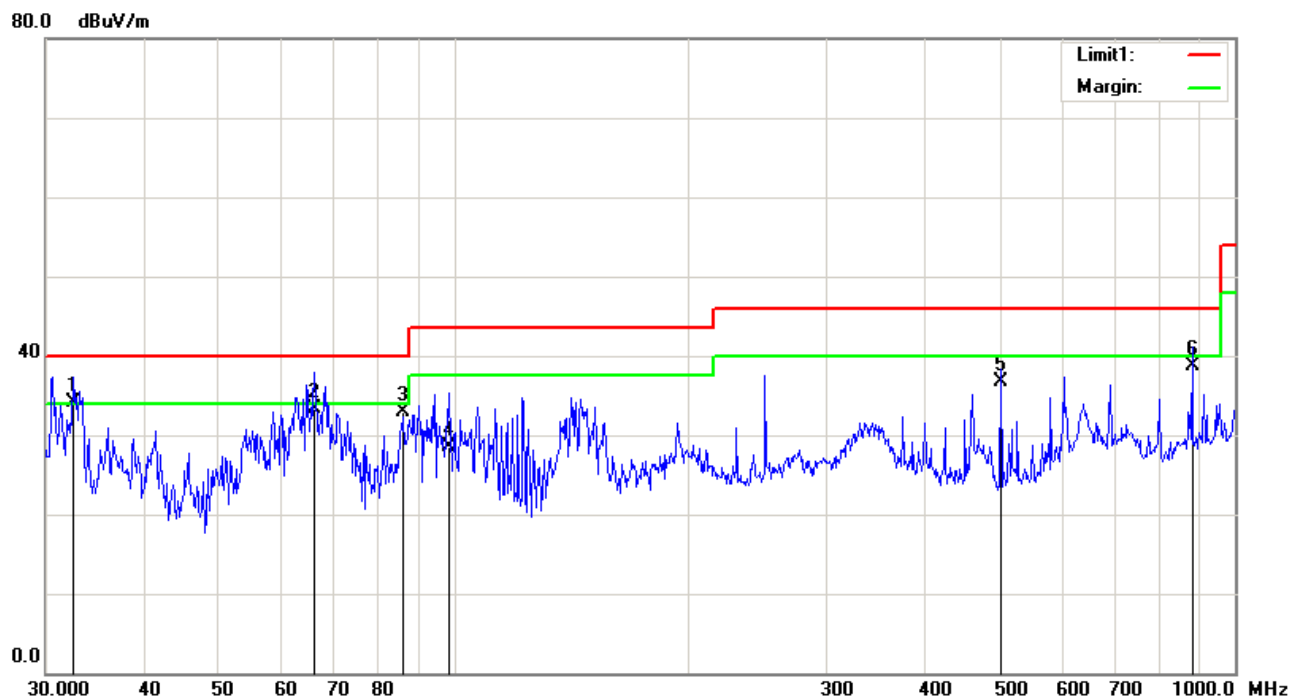
Degree = Turn table degree

### Calculation Formula:

Margin (dB) = Result (dBμV/m) – limit (dBμV/m)

**Test Mode(Adapter) :** Normal Working Mode

### Below 1GHz

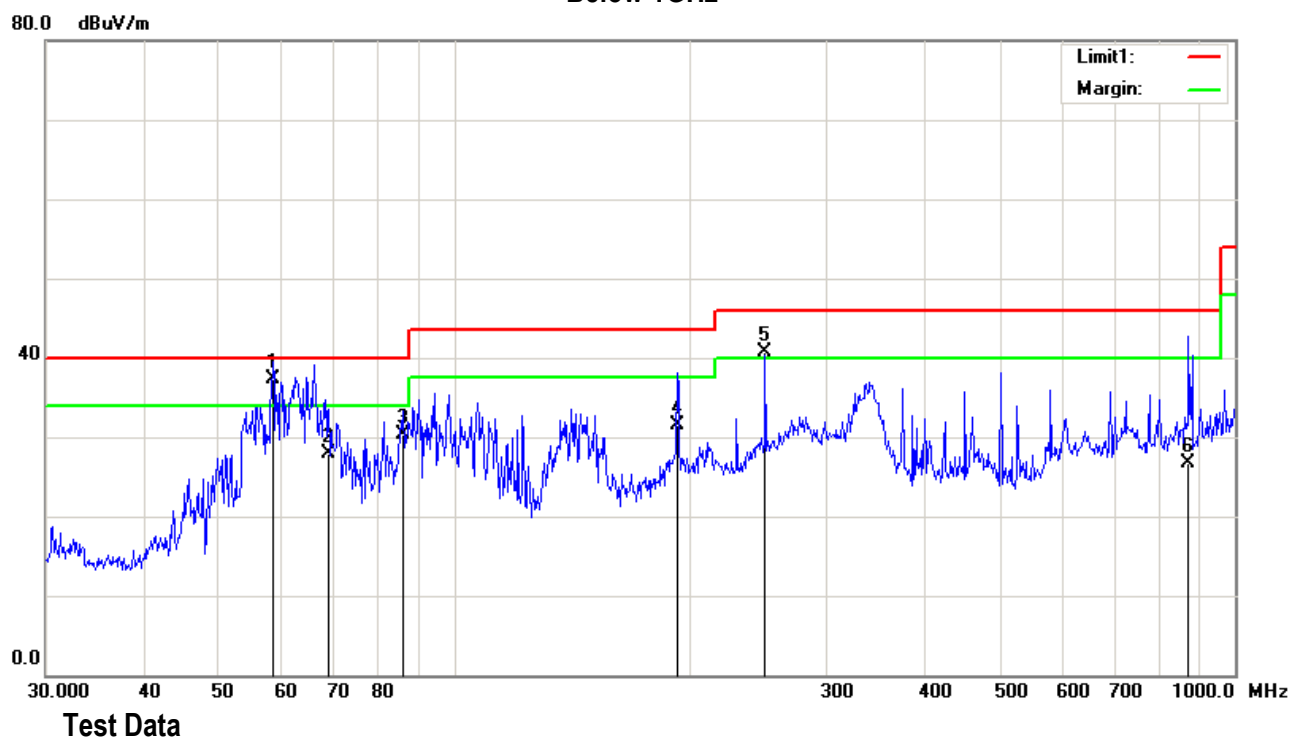


### Vertical Polarity Plot @3m

| No. | Frequency<br>(MHz) | Reading<br>(dB $\mu$ V/m) | Detector | Ant_F<br>(dB/m) | PA_G<br>(dB) | Cab_L<br>(dB) | Result<br>(dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Margin<br>(dB) | Height<br>(cm) | Degree<br>(°) |
|-----|--------------------|---------------------------|----------|-----------------|--------------|---------------|--------------------------|-------------------------|----------------|----------------|---------------|
| 1   | 32.5198            | 58.71                     | QP       | 20.13           | 45.66        | 0.92          | 34.10                    | 40.00                   | -5.90          | 100            | 259           |
| 2   | 66.2662            | 70.13                     | QP       | 9.48            | 47.70        | 1.39          | 33.30                    | 40.00                   | -6.70          | 100            | 35            |
| 3   | 85.8984            | 70.53                     | QP       | 8.32            | 47.43        | 1.48          | 32.90                    | 40.00                   | -7.10          | 100            | 76            |
| 4   | 98.4866            | 62.67                     | QP       | 10.79           | 46.56        | 1.60          | 28.50                    | 43.50                   | -15.00         | 121            | 360           |
| 5   | 501.1790           | 67.13                     | QP       | 15.38           | 49.27        | 3.56          | 36.80                    | 46.00                   | -9.20          | 100            | 162           |
| 6   | 881.4067           | 56.67                     | QP       | 23.28           | 45.95        | 4.80          | 38.80                    | 46.00                   | -7.20          | 200            | 322           |

Test Mode(Adapter) : Normal Working Mode

### Below 1GHz



### Horizontal Polarity Plot @3m

| No. | Frequency<br>(MHz) | Reading<br>(dBμV/m) | Detector | Ant F<br>(dB/m) | PA G<br>(dB) | Cab L<br>(dB) | Result<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) | Height<br>(cm) | Degree<br>(°) |
|-----|--------------------|---------------------|----------|-----------------|--------------|---------------|--------------------|-------------------|----------------|----------------|---------------|
| 1   | 58.6126            | 73.59               | QP       | 9.54            | 47.12        | 1.29          | 37.30              | 40.00             | -2.70          | 300            | 148           |
| 2   | 69.1141            | 63.80               | QP       | 10.61           | 47.84        | 1.43          | 28.00              | 40.00             | -12.00         | 200            | 154           |
| 3   | 85.8984            | 66.72               | QP       | 9.63            | 47.43        | 1.48          | 30.40              | 40.00             | -9.60          | 200            | 154           |
| 4   | 193.0945           | 63.29               | QP       | 12.98           | 46.90        | 2.23          | 31.60              | 43.50             | -11.90         | 200            | 201           |
| 5   | 250.3012           | 70.87               | QP       | 15.16           | 47.74        | 2.51          | 40.80              | 46.00             | -5.20          | 100            | 181           |
| 6   | 872.1832           | 45.31               | QP       | 22.78           | 46.06        | 4.77          | 26.80              | 46.00             | -19.20         | 100            | 213           |

### Above 1GHz

|                   |                                                  |
|-------------------|--------------------------------------------------|
| <b>Test Mode:</b> | <b>Transmitting Mode ( 802.11b Low Channel )</b> |
|-------------------|--------------------------------------------------|

#### Vertical

| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Detector | Ant F<br>(dB/m) | PA G<br>(dB) | Cab L<br>(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Degree<br>( ° ) |
|-----|--------------------|---------------------|----------|-----------------|--------------|---------------|--------------------|-------------------|----------------|----------------|-----------------|
| 1   | 4826               | 56.28               | peak     | 33.22           | 53.43        | 6.08          | 42.15              | 74                | -31.85         | 100            | 78              |
| 2   | 6354               | 55.41               | peak     | 33.97           | 52.38        | 5.84          | 42.84              | 74                | -31.16         | 100            | 158             |
| 3   | 8637               | 54.39               | peak     | 34.55           | 54.02        | 8.29          | 43.21              | 74                | -30.79         | 100            | 126             |
| 4   | 11057              | 51.24               | peak     | 38.42           | 53.22        | 9.56          | 46.00              | 74                | -28.00         | 100            | 267             |
| 5   | 13909              | 53.21               | peak     | 42              | 52.11        | 9.11          | 52.21              | 74                | -21.79         | 100            | 144             |
| 6   | 15562              | 56.38               | peak     | 39.33           | 50.28        | 10.21         | 55.64              | 74                | -18.36         | 100            | 256             |
| 7   | 15562              | 41.30               | AVG      | 39.33           | 50.28        | 10.21         | 40.56              | 54                | -13.44         | 100            | 256             |

#### Horizontal

| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Detector | Ant F<br>(dB/m) | PA G<br>(dB) | Cab L<br>(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Degree<br>( ° ) |
|-----|--------------------|---------------------|----------|-----------------|--------------|---------------|--------------------|-------------------|----------------|----------------|-----------------|
| 1   | 4915               | 65.19               | peak     | 33.4            | 53.81        | 5.96          | 50.74              | 74                | -23.26         | 100            | 338             |
| 2   | 7392               | 58.14               | peak     | 34.93           | 54.94        | 7.25          | 45.38              | 74                | -28.62         | 100            | 243             |
| 3   | 10520              | 54.28               | peak     | 38.59           | 53.04        | 9.36          | 49.19              | 74                | -24.81         | 100            | 353             |
| 4   | 12951              | 53.47               | peak     | 40.43           | 51.91        | 9.64          | 51.63              | 74                | -22.37         | 100            | 142             |
| 5   | 13937              | 54.33               | peak     | 42.04           | 52.12        | 9.09          | 53.34              | 74                | -20.66         | 100            | 190             |
| 6   | 15518              | 51.26               | peak     | 39.46           | 50.08        | 10.18         | 50.82              | 74                | -23.18         | 100            | 36              |

|                   |                                                     |
|-------------------|-----------------------------------------------------|
| <b>Test Mode:</b> | <b>Transmitting Mode ( 802.11b Middle Channel )</b> |
|-------------------|-----------------------------------------------------|

#### Vertical

| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Detector | Ant_F<br>(dB/m) | PA_G<br>(dB) | Cab_L<br>(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Degree<br>(°) |
|-----|--------------------|---------------------|----------|-----------------|--------------|---------------|--------------------|-------------------|----------------|----------------|---------------|
| 1   | 4847               | 57.26               | peak     | 33.25           | 53.51        | 6.05          | 43.05              | 74                | -30.95         | 100            | 30            |
| 2   | 7975               | 56.39               | peak     | 36.51           | 54.74        | 7.82          | 45.98              | 74                | -28.02         | 100            | 256           |
| 3   | 10383              | 53.24               | peak     | 38.63           | 53.39        | 9.31          | 47.79              | 74                | -26.21         | 100            | 142           |
| 4   | 13114              | 52.49               | peak     | 40.73           | 51.84        | 9.6           | 50.98              | 74                | -23.02         | 100            | 14            |
| 5   | 14338              | 55.67               | peak     | 41.58           | 52.44        | 9.27          | 54.08              | 74                | -19.92         | 100            | 308           |
| 6   | 14338              | 40.01               | AVG      | 41.58           | 52.44        | 9.27          | 38.42              | 54                | -15.58         | 100            | 308           |
| 7   | 15532              | 54.17               | peak     | 39.42           | 50.15        | 10.19         | 53.63              | 74                | -20.37         | 100            | 232           |

#### Horizontal

| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Detector | Ant_F<br>(dB/m) | PA_G<br>(dB) | Cab_L<br>(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Degree<br>(°) |
|-----|--------------------|---------------------|----------|-----------------|--------------|---------------|--------------------|-------------------|----------------|----------------|---------------|
| 1   | 4874               | 56.86               | peak     | 33.33           | 53.66        | 6             | 42.53              | 74                | -31.47         | 100            | 231           |
| 2   | 7475               | 54.17               | peak     | 35.06           | 54.82        | 7.38          | 41.79              | 74                | -32.21         | 100            | 345           |
| 3   | 10694              | 53.69               | peak     | 38.52           | 53.11        | 9.41          | 48.51              | 74                | -25.49         | 100            | 135           |
| 4   | 13102              | 53.32               | peak     | 40.73           | 51.84        | 9.6           | 51.81              | 74                | -22.19         | 100            | 213           |
| 5   | 15708              | 53.47               | peak     | 39.01           | 50.82        | 10.28         | 51.94              | 74                | -22.06         | 100            | 168           |
| 6   | 17036              | 53.18               | peak     | 40.19           | 57.17        | 11.21         | 47.41              | 74                | -26.59         | 100            | 336           |

|                   |                                                   |
|-------------------|---------------------------------------------------|
| <b>Test Mode:</b> | <b>Transmitting Mode ( 802.11b High Channel )</b> |
|-------------------|---------------------------------------------------|

#### Vertical

| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Detector | Ant_F<br>(dB/m) | PA_G<br>(dB) | Cab_L<br>(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Degree<br>(°) |
|-----|--------------------|---------------------|----------|-----------------|--------------|---------------|--------------------|-------------------|----------------|----------------|---------------|
| 1   | 3005               | 59.48               | peak     | 31.55           | 52.81        | 4.45          | 42.67              | 74                | -31.33         | 100            | 115           |
| 2   | 4703               | 57.27               | peak     | 32.95           | 52.9         | 6.13          | 43.45              | 74                | -30.55         | 100            | 321           |
| 3   | 5927               | 55.15               | peak     | 33.41           | 51.52        | 5.91          | 42.95              | 74                | -31.05         | 200            | 85            |
| 4   | 7947               | 55.36               | peak     | 36.56           | 54.74        | 7.84          | 45.02              | 74                | -28.98         | 100            | 231           |
| 5   | 11050              | 55.98               | peak     | 38.41           | 53.22        | 9.54          | 50.71              | 74                | -23.29         | 100            | 135           |
| 6   | 13846              | 55.47               | peak     | 41.99           | 52.11        | 9.12          | 54.47              | 74                | -19.53         | 100            | 311           |
| 7   | 13846              | 39.45               | AVG      | 41.99           | 52.11        | 9.12          | 38.45              | 54                | -15.55         | 100            | 311           |

#### Horizontal

| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Detector | Ant_F<br>(dB/m) | PA_G<br>(dB) | Cab_L<br>(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Degree<br>(°) |
|-----|--------------------|---------------------|----------|-----------------|--------------|---------------|--------------------|-------------------|----------------|----------------|---------------|
| 1   | 5994               | 56.12               | peak     | 33.4            | 51.29        | 5.85          | 44.08              | 74                | -29.92         | 100            | 359           |
| 2   | 8083               | 54.39               | peak     | 36.16           | 54.56        | 7.95          | 43.94              | 74                | -30.06         | 100            | 63            |
| 3   | 10141              | 53.28               | peak     | 38.67           | 53.79        | 9.27          | 47.43              | 74                | -26.57         | 100            | 269           |
| 4   | 11577              | 54.26               | peak     | 38.59           | 53.24        | 10.08         | 49.69              | 74                | -24.31         | 100            | 157           |
| 5   | 13780              | 53.87               | peak     | 41.88           | 52.08        | 9.2           | 52.87              | 74                | -21.13         | 100            | 93            |
| 6   | 15635              | 52.49               | peak     | 39.17           | 50.55        | 10.25         | 51.36              | 74                | -22.64         | 100            | 257           |

## Annex A. TEST INSTRUMENT

| Instrument                                       | Model        | Serial #       | Cal Date   | Cal Due    | In use                              |
|--------------------------------------------------|--------------|----------------|------------|------------|-------------------------------------|
| <b>AC Line Conducted Emissions</b>               |              |                |            |            |                                     |
| R&S EMI Test Receiver                            | ESPI3        | 101216         | 04/26/2018 | 04/25/2019 | <input checked="" type="checkbox"/> |
| V-LISN                                           | ESH3-Z5      | 838979/005     | 04/26/2018 | 04/25/2019 | <input checked="" type="checkbox"/> |
| INFOMW Antenna<br>(1 ~18GHz)                     | JXTXLB-10180 | J2031081120092 | 05/19/2018 | 05/18/2019 | <input checked="" type="checkbox"/> |
| SIEMIC EZ_EMC<br>Conducted Emissions<br>software | Ver.ICP-03A1 | N/A            | N/A        | N/A        | <input checked="" type="checkbox"/> |
| <b>RF Conducted Test</b>                         |              |                |            |            |                                     |
| R&S EMI Receiver                                 | ESPI3        | 101216         | 04/26/2018 | 04/25/2019 | <input checked="" type="checkbox"/> |
| Power Splitter                                   | 1#           | 1#             | 04/26/2018 | 04/25/2019 | <input checked="" type="checkbox"/> |
| Spectrum Analyzer                                | N9010A       | MY47191130     | 04/26/2018 | 04/25/2019 | <input checked="" type="checkbox"/> |
| <b>Radiated Emissions</b>                        |              |                |            |            |                                     |
| Spectrum Analyzer                                | N9010A       | MY47191130     | 04/26/2018 | 04/25/2019 | <input checked="" type="checkbox"/> |
| R&S EMI Receiver                                 | ESPI3        | 101216         | 04/26/2018 | 04/25/2019 | <input checked="" type="checkbox"/> |
| Antenna (30MHz~6GHz)                             | JB6          | A121411        | 05/19/2018 | 05/18/2019 | <input checked="" type="checkbox"/> |
| EMCO Horn Antenna<br>(1 ~18GHz)                  | 3115         | N/A            | 04/26/2018 | 04/25/2019 | <input checked="" type="checkbox"/> |
| INFOMW Antenna<br>(1 ~18GHz)                     | JXTXLB-10180 | J2031081120092 | 04/26/2018 | 04/25/2019 | <input checked="" type="checkbox"/> |
| Hp Pre-Amplifier                                 | 8447F        | 1937A01160     | 04/26/2018 | 04/25/2019 | <input checked="" type="checkbox"/> |
| Agilent Pre-Amplifier                            | 8449B        | N/A            | 04/26/2018 | 04/25/2019 | <input checked="" type="checkbox"/> |
| SIEMIC EZ_EMC<br>Conducted Emissions             | Ver.ICP-03A1 | N/A            | N/A        | N/A        | <input checked="" type="checkbox"/> |

## Annex B. EUT and Test Setup Photographs

### Annex B.i. Photograph: EUT External Photo



The Whole Package – Front View



EUT - Top View



EUT - Bottom View



EUT - Front View



EUT - Rear View

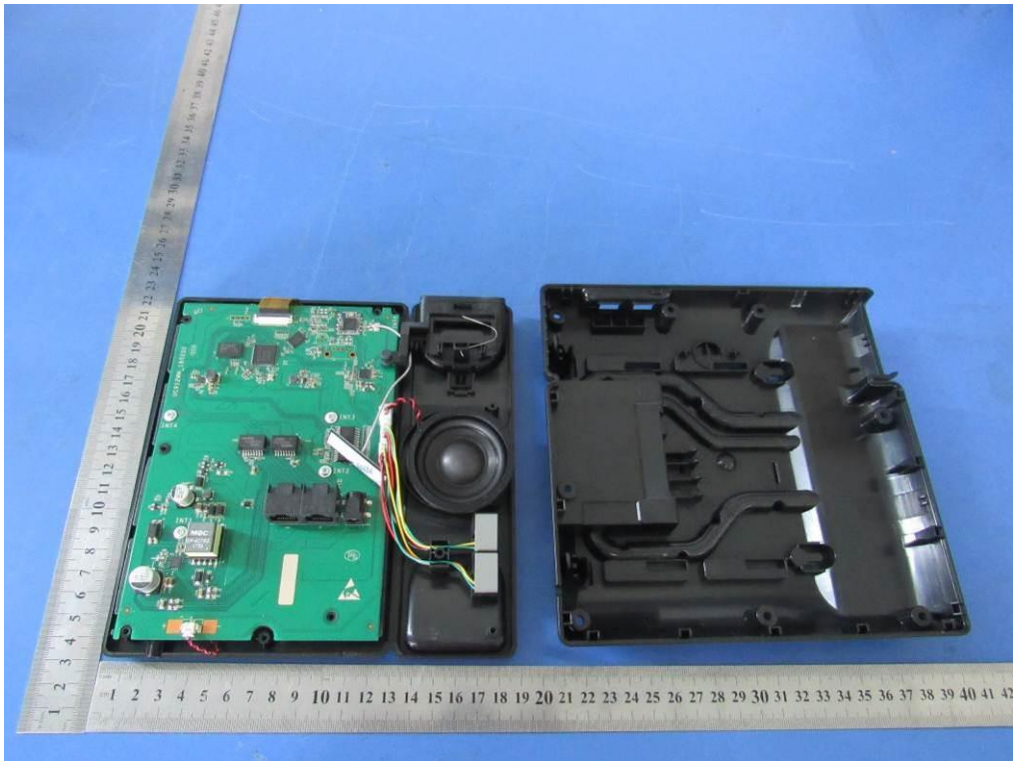


EUT - Left View



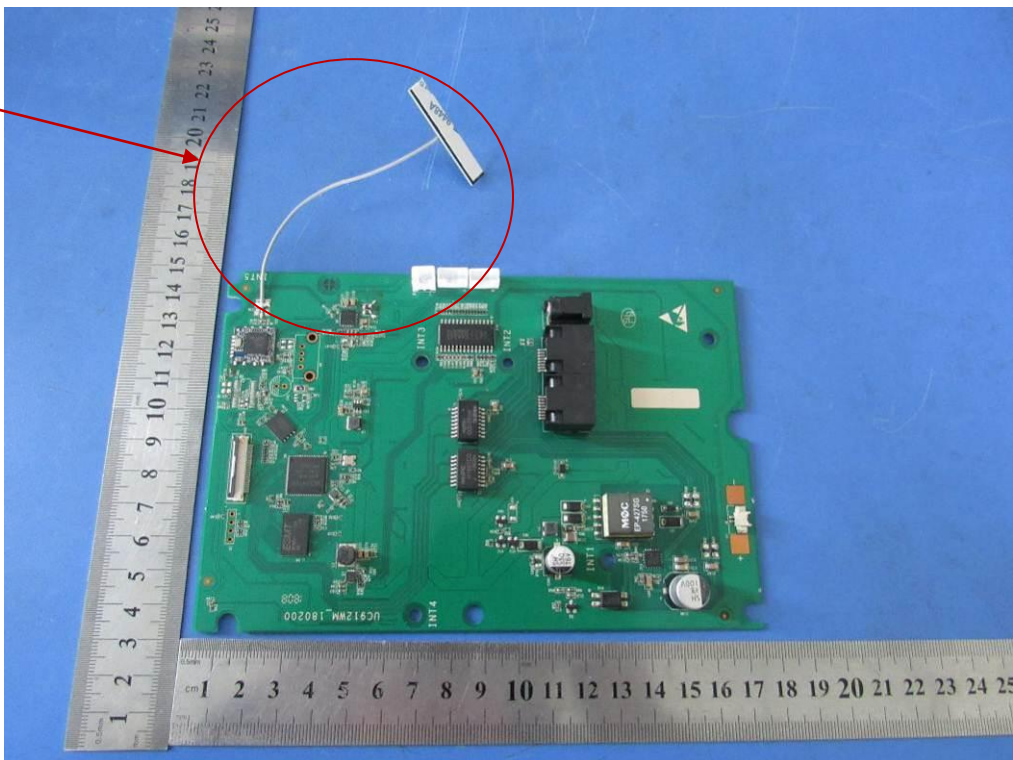
EUT - Right View

**Annex B.ii. Photograph: EUT Internal Photo**

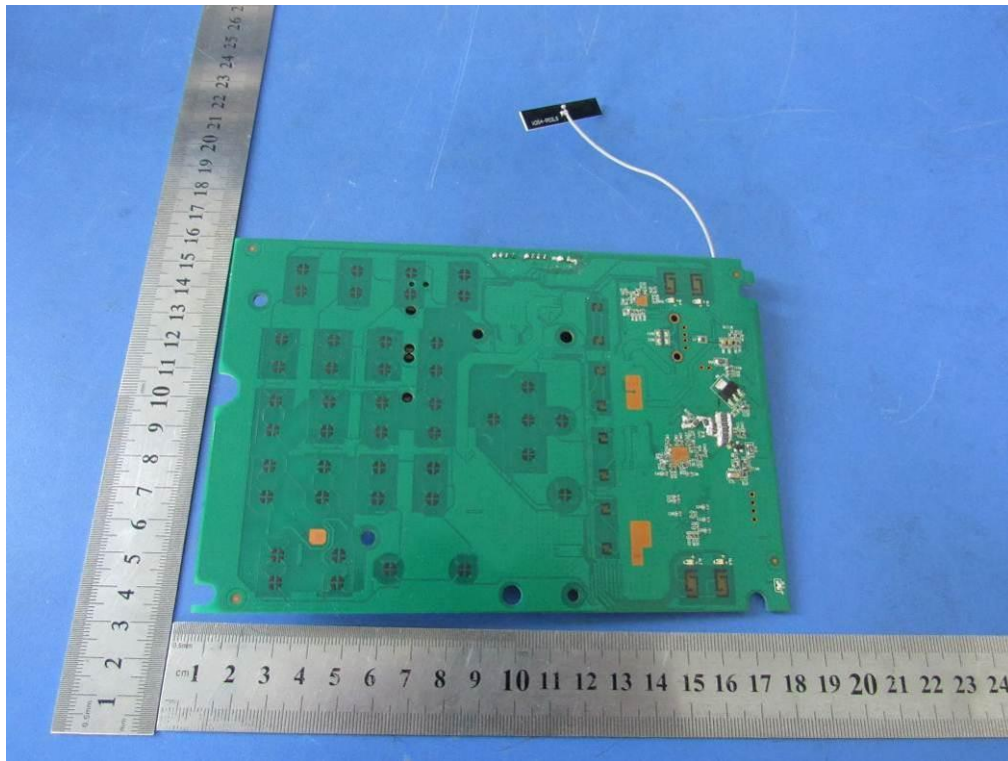


EUT Uncover – Front View

Antenna



EUT PCBA – Front View



EUT PCBA- Rear View

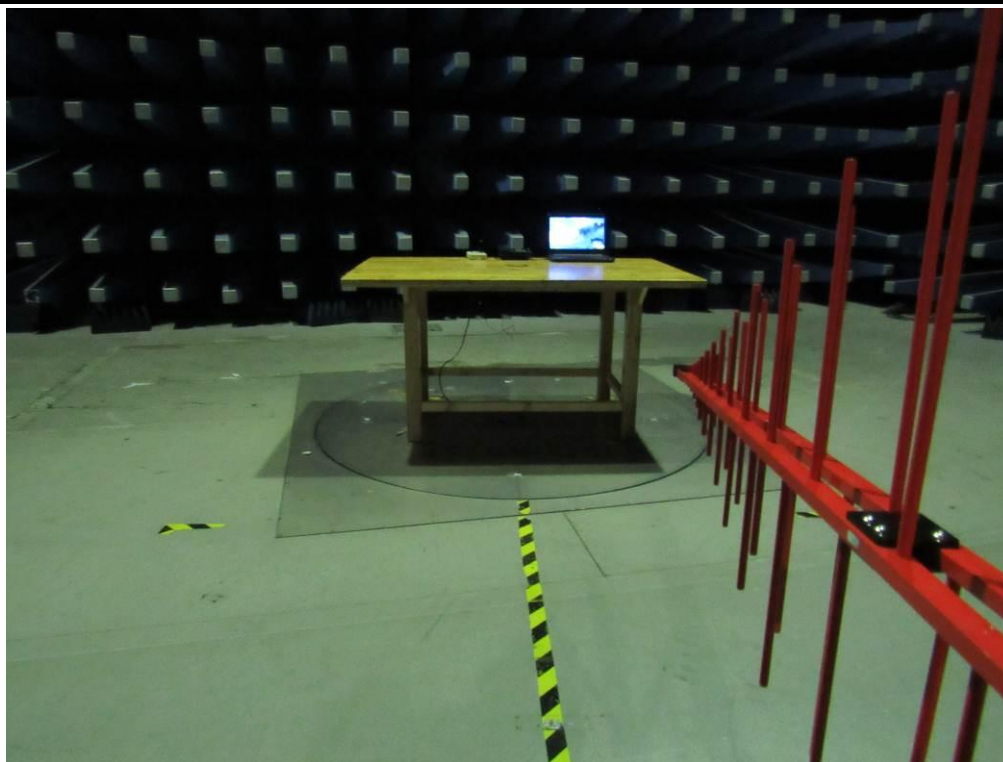
**Annex B.iii. Photograph: Test Setup Photo**



Conducted Emissions Test Setup Front View



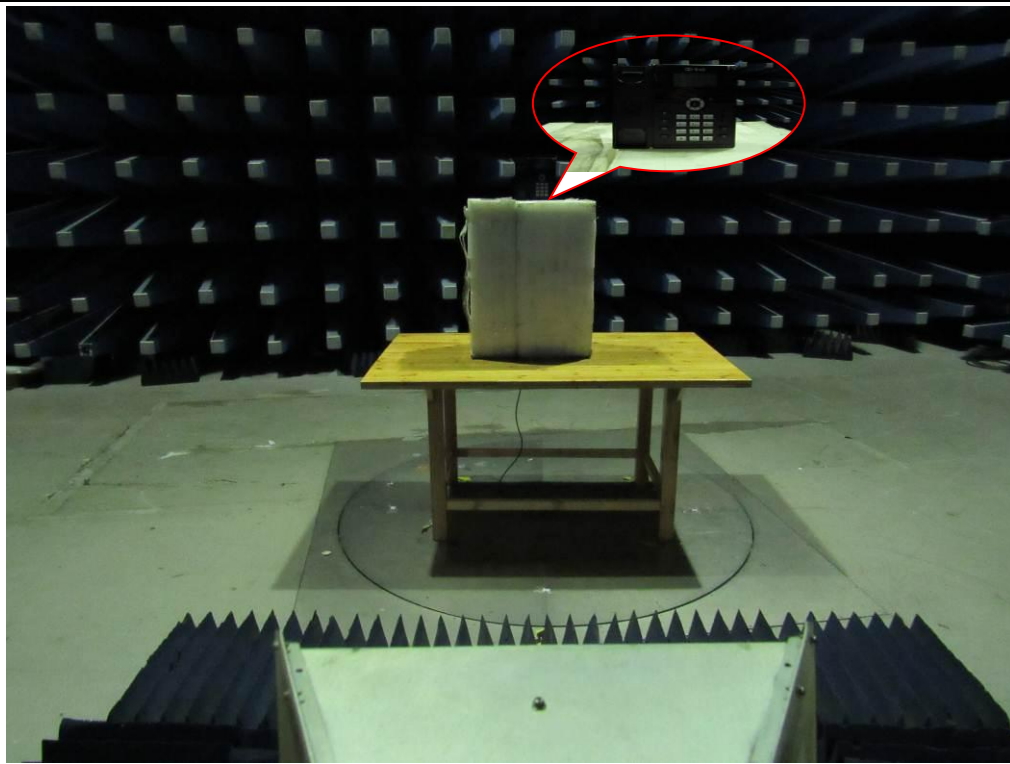
Conducted Emissions Test Setup Side View



Radiated Spurious Emissions Test Setup Front View Below 1GHz



Radiated Spurious Emissions Test Setup Rear View Below 1GHz

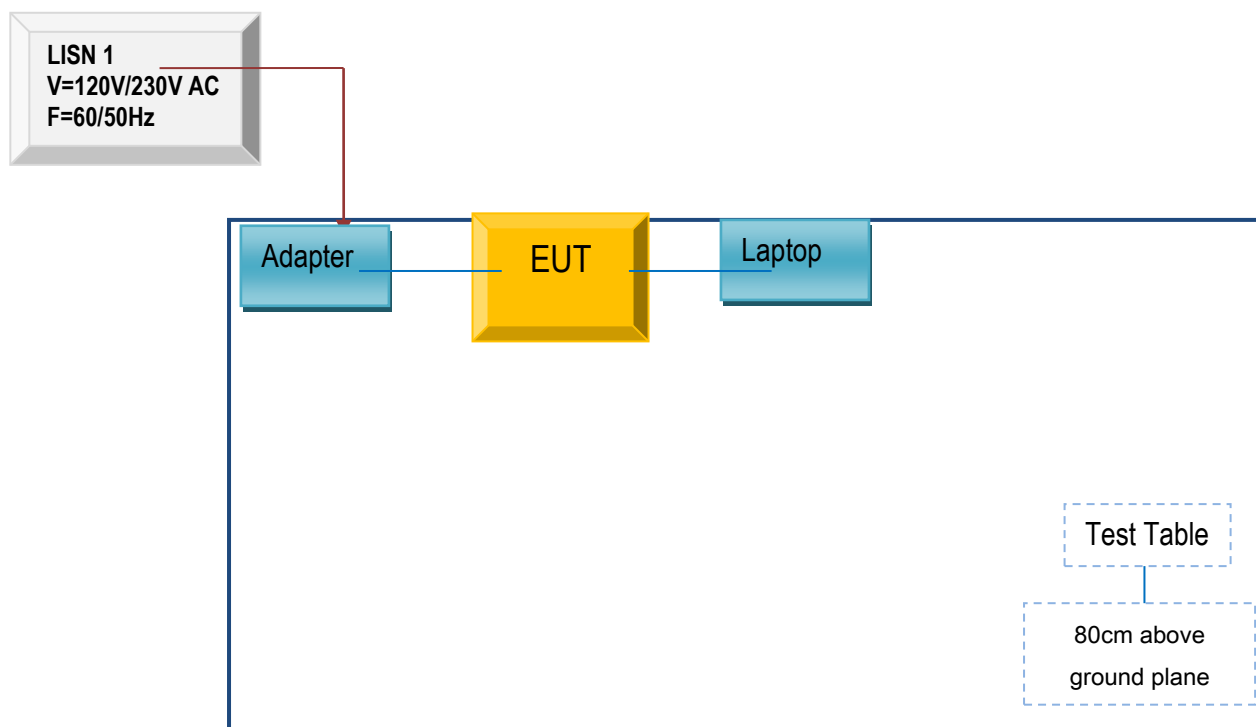


Radiated Spurious Emissions Test Setup Above 1GHz

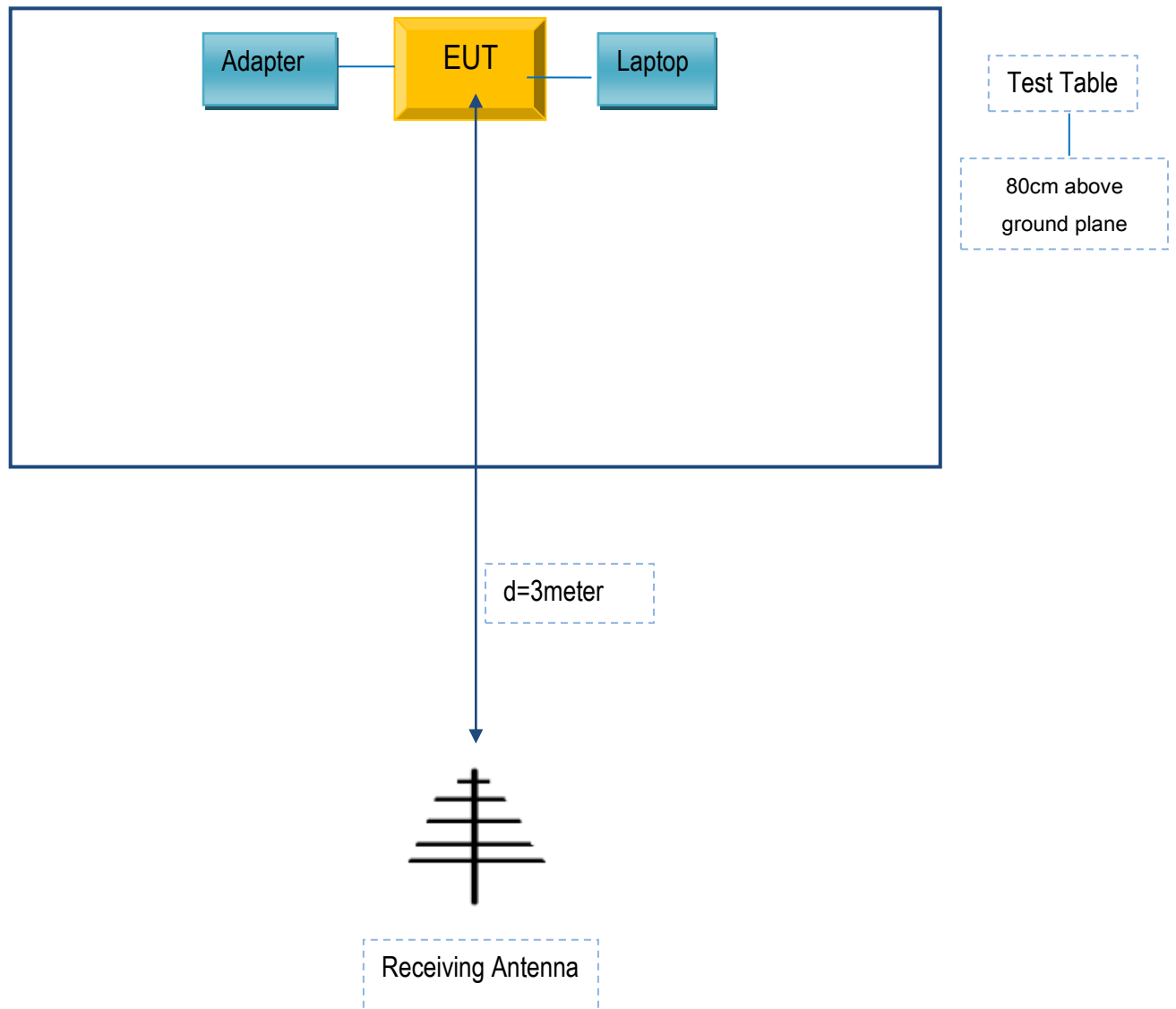
## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

### Annex C.i. TEST SET UP BLOCK

#### Block Configuration Diagram for Conducted Emissions



## Block Configuration Diagram for Radiated Emissions



## **Annex C. il. SUPPORTING EQUIPMENT DESCRIPTION**

The following is a description of supporting equipment and details of cables used with the EUT.

### **Supporting Equipment:**

| Manufacturer | Equipment Description | Model     | Serial No    |
|--------------|-----------------------|-----------|--------------|
| HP           | Laptop                | 4321S     | N/A          |
| N/A          | Earphone              | N/A       | N/A          |
| PROCET       | POE                   | PT-PSE101 | PT1050000242 |

### **Supporting Cable:**

| Cable type  | Shield Type  | Ferrite Core | Length | Serial No |
|-------------|--------------|--------------|--------|-----------|
| Power Cable | Un-shielding | No           | 0.8m   | N/A       |

|                 |                 |
|-----------------|-----------------|
| Test Report No. | 18020543-FCC-R2 |
| Page            | 61 of 62        |

## Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see attachment

|                 |                 |
|-----------------|-----------------|
| Test Report No. | 18020543-FCC-R2 |
| Page            | 62 of 62        |

## Annex E. DECLARATION OF SIMILARITY

N/A