# FCC Test Report

| | | |
|---|---|---|
| **Equipment** | : | **SKYBUDS** |
| **Brand Name** | : | **Alpha** |
| **Model No.** | : | **SB100** |
| **FCC ID** | : | **2AJGJ-SB100-B** |
| **Standard** | : | **47 CFR FCC Part 15.209** |
| **Operating Band** | : | **10.375MHz** |
| **FCC Classification** | : | **DXX** |
| **Applicant** | : | **Alpha Audiotronics, Inc.**<br>73 Spring Street, Suite 502, NY, NY 10012, New York, U.S.A. |
| **Manufacturer** | : | **Fugang Electronic (Dongguan) Co., Ltd**<br>Industry Street, Dong-Keng, Dong-Guan, Guang-Dong, China |

**The product sample received on Aug. 18, 2016 and completely tested on Sep. 08, 2016. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.**

**The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.**

**Reviewed by:**

Kevin Liang / Assistant Manager

Testing Laboratory 1190

# Table of Contents

# Summary of Test Result

| Conformance Test Specifications | | | | | |
|---|---|---|---|---|---|
| **Report Clause** | **Ref. Std. Clause** | **Description** | **Measured** | **Limit** | **Result** |
| 1.1.2 | 15.203 | Antenna Requirement | Antenna connector mechanism complied | FCC 15.203 | Complied |
| 3.1 | 15.207 | AC Power-line Conducted Emissions | [dBuV]:0.41MHz<br>31.19 (Margin 26.45dB) - QP<br>30.90 (Margin 16.74dB) - AV | FCC 15.207 | Complied |
| 3.2 | 15.209 | Transmitter Radiated Emissions | [dBuV/m at 3m]:31.940MHz<br>28.45(Margin 11.55dB) - PK | FCC 15.209 | Complied |
| 3.3 | 15.215(c) | Emission Bandwidth | 99% Bandwidth: 484.000 [kHz]<br>20dB Bandwidth: 494.000 [kHz] | N/A | Complied |

# Revision History

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| FR671803-01 | Rev. 01 | Initial issue of report | Sep. 14, 2016 |
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# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

| RF General Information | | | |
|---|---|---|---|
| Frequency | | 10.375MHz | |
| Modulation | Ch. Frequency (kHz) | Channel Number | Field Strength (dBuV/@1m) |
| 8-DPSK | 10.375 | 1 | 52.11 |
| Note 1: Field strength performed peak level at 1m. | | | |

### 1.1.2 Antenna Information

| Antenna Category | |
|---|---|
| ☐ | Equipment placed on the market without antennas |
| ☒ | Integral antenna (antenna permanently attached) |
| ☐ | External antenna (dedicated antennas) |

### 1.1.3 Type of EUT

| Identify EUT | |
|---|---|
| EUT Serial Number | N/A |
| Presentation of Equipment | ☒ Production ; ☐ Pre-Production ; ☐ Prototype |
| **Type of EUT** | |
| ☒ | Stand-alone |
| ☐ | Combined (EUT where the radio part is fully integrated within another device)<br>Combined Equipment - Brand Name / Model No.: … |
| ☐ | Plug-in radio (EUT intended for a variety of host systems)<br>Host System - Brand Name / Model No.: … |
| ☐ | Other: |

### 1.1.4 Test Signal Duty Cycle

| Operated Mode for Worst Duty Cycle |
|---|
| ☒ Operated normal mode for worst duty cycle |
| ☐ Operated test mode for worst duty cycle |
| **Test Signal Duty Cycle (x)** |
| ☒ 100.00% |

### 1.1.5 EUT Operational Condition

| | | | |
|---|---|---|---|
| **Supply Voltage** | ☒ AC mains | ☒ DC | |
| **Type of DC Source** | ☒ External AC adapter | ☒ From Battery | ☒ From System |

## 1.2 Accessory and Support Equipment

| **Accessories Information** | | | | |
|---|---|---|---|---|
| **Dock** | **Brand Name** | Alpha | **Model Name** | SB100-D |

Note: Regarding to more detail and other information, please refer to user manual.

| **Support Equipment – RF Conducted** | | | |
|---|---|---|---|
| **No.** | **Equipment** | **Brand Name** | **Model Name** |
| 1 | iPad | APPLE | A1599 |
| 2 | Adapter for iPad | APPLE | W010A051 |

| **Support Equipment – AC Conduction** | | | |
|---|---|---|---|
| **No.** | **Equipment** | **Brand Name** | **Model Name** |
| 1 | Notebook | DELL | E5540 |
| 2 | Adapter for NB | DELL | HA65NM130 |

| **Support Equipment – RF Radiated Emission** | | | |
|---|---|---|---|
| **No.** | **Equipment** | **Brand Name** | **Model Name** |
| 1 | Notebook | DELL | E5540 |
| 2 | Adapter for NB | DELL | HA65NM130 |
| 3 | iPad | APPLE | A1599 |
| 4 | Adapter for iPad | APPLE | W010A051 |

## 1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR FCC Part 15
- ANSI C63.10-2013

## 1.4 Testing Location Information

| **Testing Location** | | | | | |
|---|---|---|---|---|---|
| ☒ | HWA YA | ADD : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. | | | |
| | | TEL : 886-3-327-3456 | FAX : 886-3-327-0973 | | |
| **Test Site Registration Number: 553509** | | | | | |
| **Test Condition** | **Test Site No.** | **Test Engineer** | **Test Environment** | **Test Date** | |
| AC Conduction | CO04-HY | Jeff | 22.4°C / 55% | 08/09/2016 | |
| RF Conducted | TH01-HY | Lisa | 25°C / 66% | 19/08/2016 | |
| Radiated Emission | 03CH02-HY | Daniel | 21.6°C / 51% | 19/08/2016 | |

Test site registered number [ 553509 ] with FCC.

## 1.5 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

| Measurement Uncertainty | | |
|---|---|---|
| **Test Item** | | **Uncertainty** |
| AC power-line conducted emissions | | ±2.3 dB |
| Emission bandwidth, 6dB bandwidth | | ±0.6 % |
| RF output power, conducted | | ±0.1 dB |
| Power density, conducted | | ±0.6 dB |
| Unwanted emissions, conducted | 9 – 150 kHz | ±0.4 dB |
| | 0.15 – 30 MHz | ±0.4 dB |
| | 30 – 1000 MHz | ±0.6 dB |
| | 1 – 18 GHz | ±0.5 dB |
| | 18 – 40 GHz | ±0.5 dB |
| | 40 – 200 GHz | N/A |
| All emissions, radiated | 9 – 150 kHz | ±2.5 dB |
| | 0.15 – 30 MHz | ±2.3 dB |
| | 30 – 1000 MHz | ±2.6 dB |
| | 1 – 18 GHz | ±3.6 dB |
| | 18 – 40 GHz | ±3.8 dB |
| | 40 – 200 GHz | N/A |
| Temperature | | ±0.8 °C |
| Humidity | | ±5 % |
| DC and low frequency voltages | | ±0.9 % |
| Time | | ±1.4 % |
| Duty Cycle | | ±0.6 % |

# 2 Test Configuration of EUT

## 2.1 The Worst Case Modulation Configuration

| Transmitter Mode | Field Strength (dBuV/m@1m) | Field Strength (dBuV/m@3m) |
|---|---|---|
| NFMI | 52.11 | 33.03 |

## 2.2 Test Channel Frequencies Configuration

| Modulation | Test Channel Frequencies (MHz) |
|---|---|
| 8-DPSK | 10.375 |

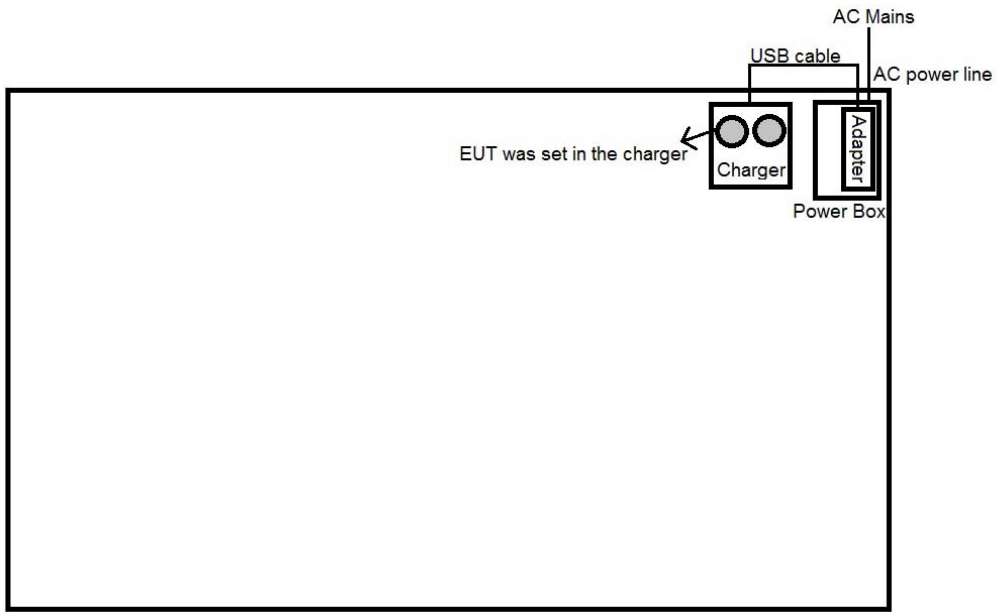
## 2.3 The Worst Case Measurement Configuration

| The Worst Case Mode for Following Conformance Tests | |
|---|---|
| **Tests Item** | AC power-line conducted emissions |
| **Condition** | AC power-line conducted measurement for line and neutral<br>Test Voltage: 120Vac / 60Hz |
| **Operating Mode** | Operating Mode Description |
| **1** | EUT with DOCK (Adapter Mode) |
| **2** | EUT with DOCK (USB Mode) |
| Mode 2 configuration was pretested and found to be the worst case and measured during the test. | |

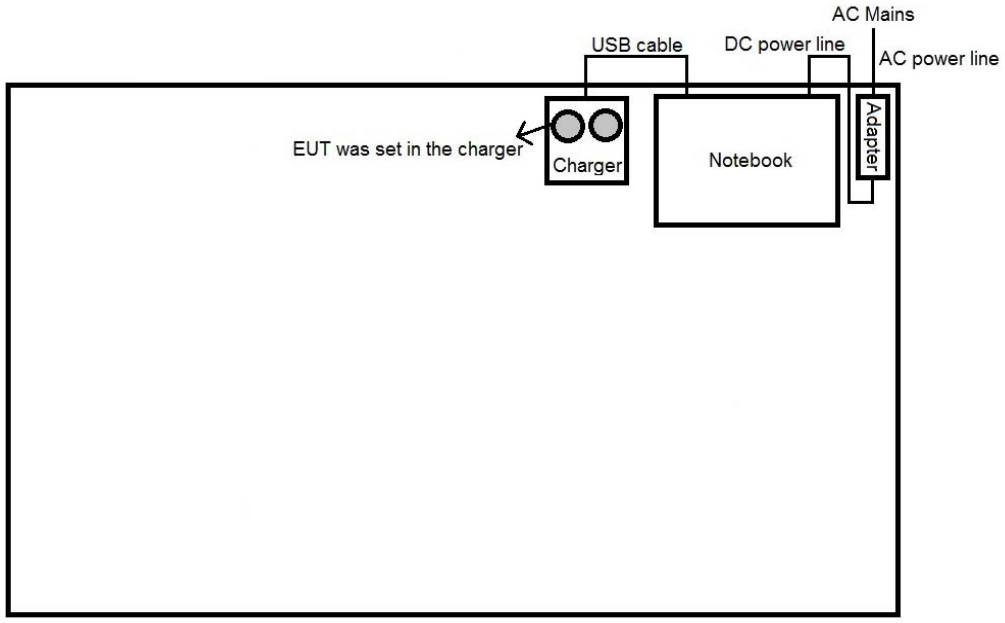
| The Worst Case Mode for Following Conformance Tests | | | |
|---|---|---|---|
| **Tests Item** | Emission Bandwidth, Field Strength of Fundamental Emissions<br>Transmitter Radiated Unwanted Emissions | | |
| **Test Condition** | Radiated measurement | | |
| **User Position** | ☐ EUT will be placed in fixed position. | | |
| | ☐ EUT will be placed in mobile position and operating multiple positions. EUT shall be performed three orthogonal planes. | | |
| | ☒ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. | | |
| **Operating Mode** | Operating Mode Description | | |
| **1** | EUT with DOCK (Adapter Mode) | | |
| **2** | EUT with DOCK (USB Mode) | | |
| **3** | EUT Only | | |
| Mode 3 is Transmitter mode, the other modes are charge mode only. | | | |
| **Transmitter Mode** | NFMI | | |
| **Orthogonal Planes of EUT** | **X Plane** | **Y Plane** | **Z Plane** |
| |  |  |  |
| **Worst Planes of EUT** | | | V |

## 2.4 Test Setup Diagram

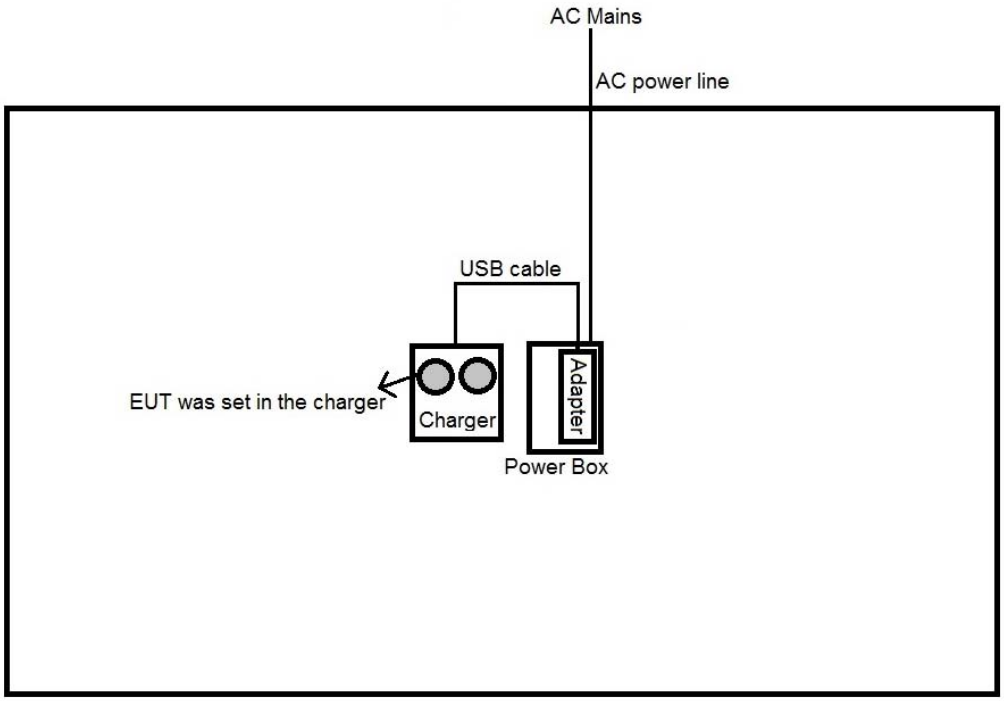
**Test Setup Diagram – AC Line Conducted Emission Test (Mode 1)**



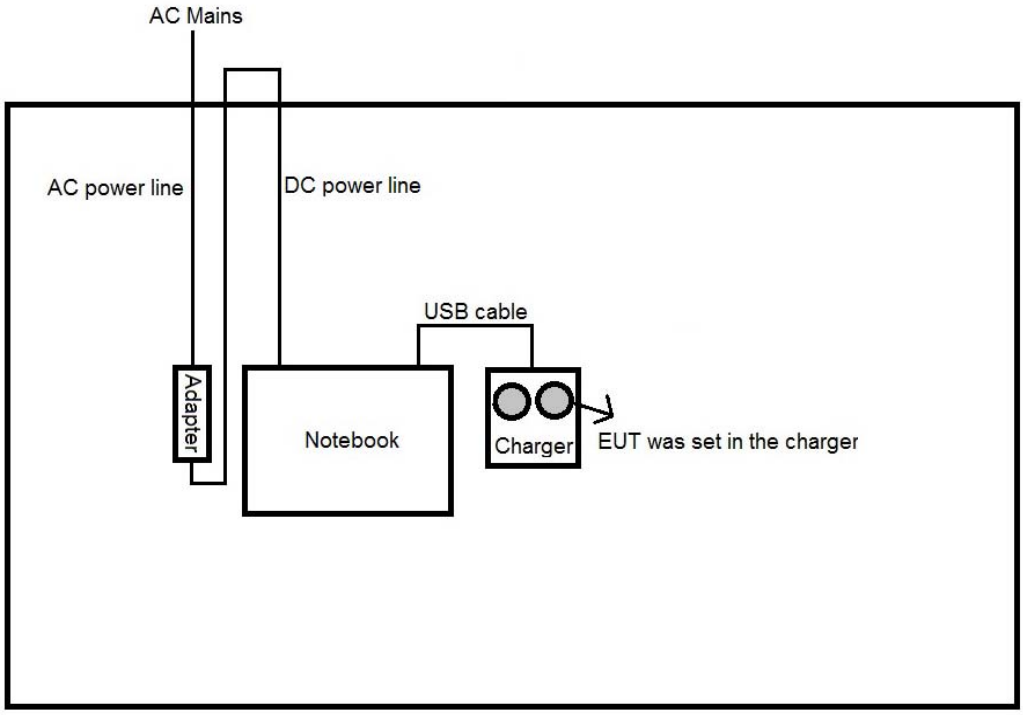

**Test Setup Diagram – AC Line Conducted Emission Test (Mode 2)**



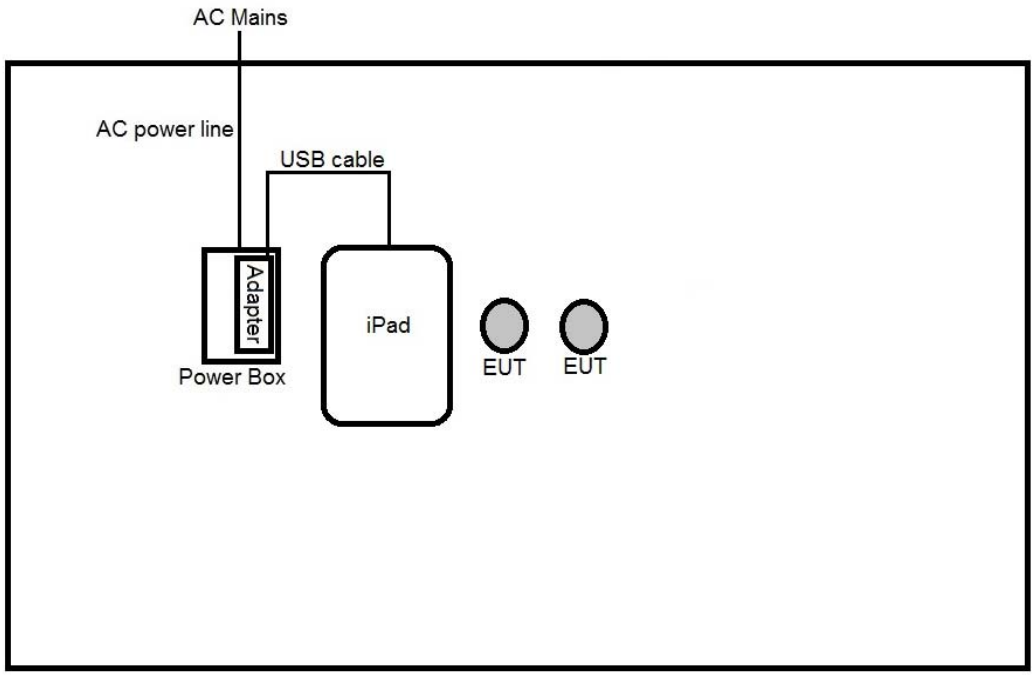
**Test Setup Diagram - Radiated Test (Mode 1)**




**Test Setup Diagram - Radiated Test (Mode 2)**



**Test Setup Diagram - Radiated Test (Mode 3)**



# 3 Transmitter Test Result

## 3.1 AC Power-line Conducted Emissions

### 3.1.1 AC Power-line Conducted Emissions Limit

| AC Power-line Conducted Emissions Limit | | |
|---|---|---|
| **Frequency Emission (MHz)** | **Quasi-Peak** | **Average** |
| 0.15-0.5 | 66 - 56 * | 56 - 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |
| Note 1: * Decreases with the logarithm of the frequency. | | |

### 3.1.2 Measuring Instruments

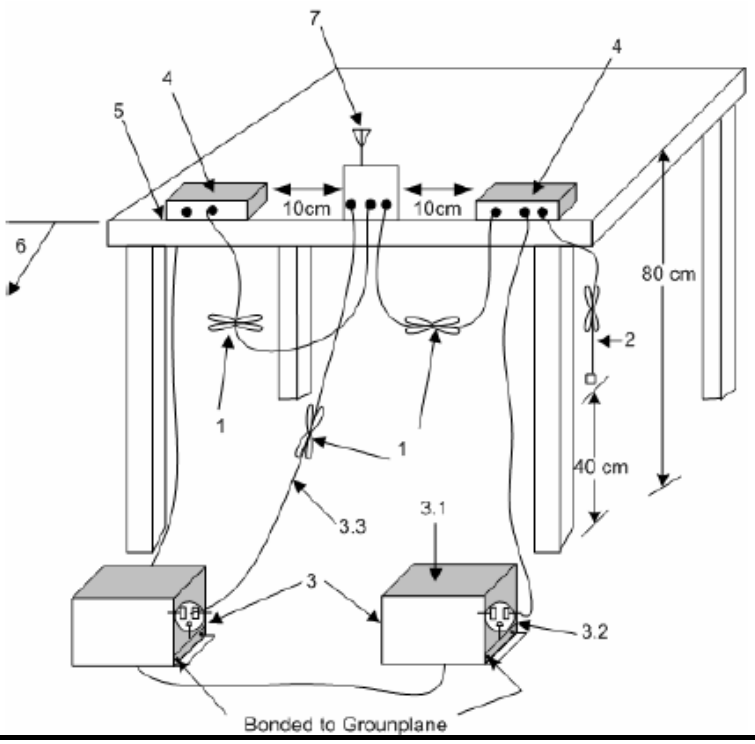
Refer a test equipment and calibration data table in this test report.

### 3.1.3 Test Procedures

| Test Method | |
|---|---|
| ☒ | Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions. |
| ☒ | If AC conducted emissions fall in operating band, then following below test method confirm final result. |
| ☐ | Accept measurements done with a suitable dummy load replacing the antenna under the following conditions:<br>(1) Perform the AC line conducted tests with the antenna connected to determine compliance with FCC 15.207 limits outside the transmitter's fundamental emission band;<br>(2) Retest with a dummy load to determine compliance with FCC 15.207 limits within the transmitter's fundamental emission band. |
| ☒ | For a device with a permanent antenna operating at or below 30 MHz, accept measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions:<br>(1) Perform the AC line conducted tests with the permanent antenna to determine compliance with the FCC 15.207 limits outside the transmitter's fundamental emission band;<br>(2) Retest with a dummy load in lieu of the permanent antenna to determine compliance with the FCC 15.207 limits within the transmitter's fundamental emission band. |

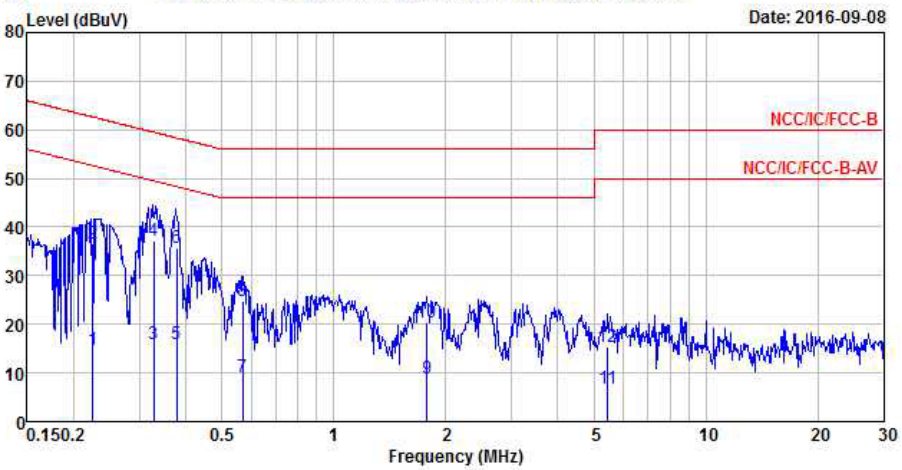
### 3.1.4 Test Setup

**AC Power-line Conducted Emissions**



### 3.1.5 Test Result of AC Power-line Conducted Emissions

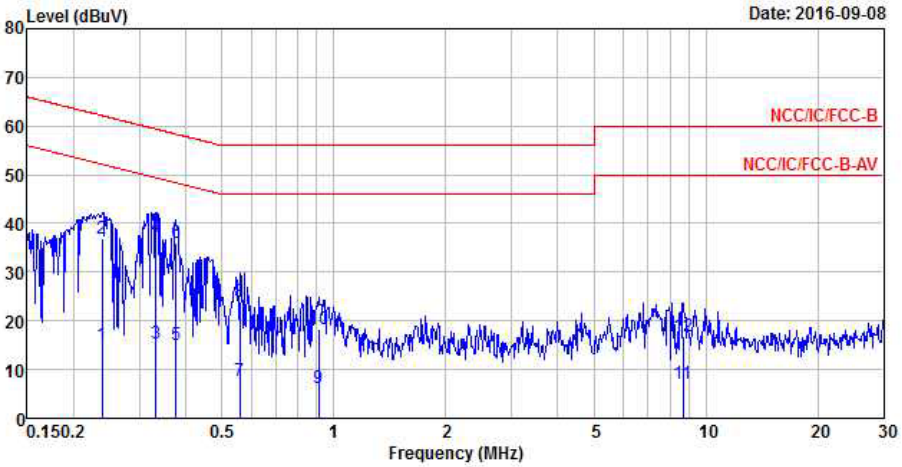
| AC Power-line Conducted Emissions Result | | | |
|---|---|---|---|
| **Operating Mode** | 1 | **Power Phase** | Neutral |
| **Ch. Frequency (MHz)** | 10.375 | | |




| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Aux Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | dB | |
| 1 | 0.22 | 14.85 | -37.79 | 52.64 | 4.60 | 0.11 | 0.27 | 9.87 | Average |
| 2 | 0.22 | 36.46 | -26.18 | 62.64 | 26.21 | 0.11 | 0.27 | 9.87 | QP |
| 3 | 0.33 | 16.04 | -33.45 | 49.49 | 5.88 | 0.12 | 0.16 | 9.88 | Average |
| 4 | 0.33 | 37.20 | -22.29 | 59.49 | 27.04 | 0.12 | 0.16 | 9.88 | QP |
| 5 | 0.38 | 15.81 | -32.50 | 48.31 | 5.69 | 0.12 | 0.12 | 9.88 | Average |
| 6 | 0.38 | 35.78 | -22.53 | 58.31 | 25.66 | 0.12 | 0.12 | 9.88 | QP |
| 7 | 0.57 | 9.08 | -36.92 | 46.00 | -1.02 | 0.12 | 0.10 | 9.88 | Average |
| 8 | 0.57 | 24.67 | -31.33 | 56.00 | 14.57 | 0.12 | 0.10 | 9.88 | QP |
| 9 | 1.78 | 8.82 | -37.18 | 46.00 | -1.49 | 0.15 | 0.27 | 9.89 | Average |
| 10 | 1.78 | 20.29 | -35.71 | 56.00 | 9.98 | 0.15 | 0.27 | 9.89 | QP |
| 11 | 5.45 | 6.75 | -43.25 | 50.00 | -3.49 | 0.21 | 0.13 | 9.90 | Average |
| 12 | 5.45 | 15.22 | -44.78 | 60.00 | 4.98 | 0.21 | 0.13 | 9.90 | QP |

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)
Note 3: When emissions are in operating band over limits, retest with a dummy load for final in-band results.

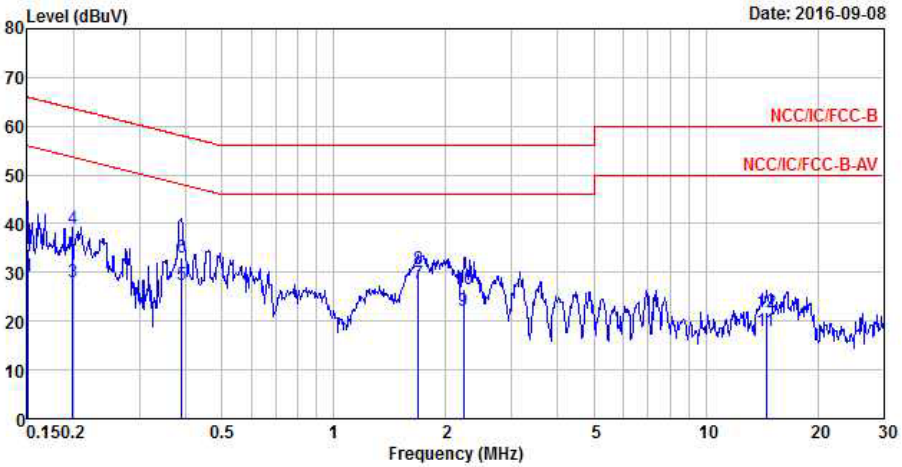
| AC Power-line Conducted Emissions Result | | | |
|---|---|---|---|
| **Operating Mode** | 1 | **Power Phase** | Line |
| **Ch. Frequency (MHz)** | 10.375 | | |




| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Aux Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | dB | |
| 1 | 0.24 | 14.97 | -37.17 | 52.14 | 4.74 | 0.11 | 0.25 | 9.87 | Average |
| 2 | 0.24 | 36.79 | -25.35 | 62.14 | 26.56 | 0.11 | 0.25 | 9.87 | QP |
| 3 | 0.33 | 15.34 | -34.06 | 49.40 | 5.19 | 0.12 | 0.15 | 9.88 | Average |
| 4 | 0.33 | 37.24 | -22.16 | 59.40 | 27.09 | 0.12 | 0.15 | 9.88 | QP |
| 5 | 0.38 | 15.01 | -33.33 | 48.34 | 4.89 | 0.12 | 0.12 | 9.88 | Average |
| 6 | 0.38 | 36.13 | -22.21 | 58.34 | 26.01 | 0.12 | 0.12 | 9.88 | QP |
| 7 | 0.56 | 7.80 | -38.20 | 46.00 | -2.30 | 0.12 | 0.10 | 9.88 | Average |
| 8 | 0.56 | 23.95 | -32.05 | 56.00 | 13.85 | 0.12 | 0.10 | 9.88 | QP |
| 9 | 0.91 | 6.21 | -39.79 | 46.00 | -3.90 | 0.13 | 0.10 | 9.88 | Average |
| 10 | 0.91 | 18.21 | -37.79 | 56.00 | 8.10 | 0.13 | 0.10 | 9.88 | QP |
| 11 | 8.68 | 7.12 | -42.88 | 50.00 | -3.21 | 0.25 | 0.18 | 9.90 | Average |
| 12 | 8.68 | 16.88 | -43.12 | 60.00 | 6.55 | 0.25 | 0.18 | 9.90 | QP |

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)
Note 3: When emissions are in operating band over limits, retest with a dummy load for final in-band results.

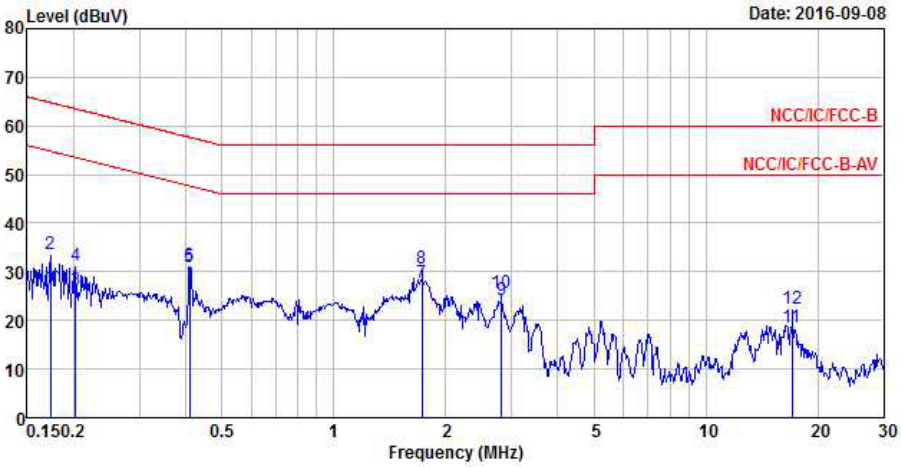
| AC Power-line Conducted Emissions Result | | | |
|---|---|---|---|
| **Operating Mode** | 2 | **Power Phase** | Neutral |
| **Ch. Frequency (MHz)** | 10.375 | | |




| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Aux Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | dB | |
| 1 | 0.15 | 29.13 | -26.83 | 55.96 | 18.94 | 0.10 | 0.22 | 9.87 | Average |
| 2 | 0.15 | 34.72 | -31.24 | 65.96 | 24.53 | 0.10 | 0.22 | 9.87 | QP |
| 3 | 0.20 | 27.94 | -25.73 | 53.67 | 17.66 | 0.11 | 0.30 | 9.87 | Average |
| 4 | 0.20 | 39.04 | -24.63 | 63.67 | 28.76 | 0.11 | 0.30 | 9.87 | QP |
| 5 | 0.39 | 27.35 | -20.73 | 48.08 | 17.24 | 0.12 | 0.11 | 9.88 | Average |
| 6 | 0.39 | 32.94 | -25.14 | 58.08 | 22.83 | 0.12 | 0.11 | 9.88 | QP |
| 7 | 1.69 | 27.81 | -18.19 | 46.00 | 17.52 | 0.15 | 0.25 | 9.89 | Average |
| 8 | 1.69 | 30.83 | -25.17 | 56.00 | 20.54 | 0.15 | 0.25 | 9.89 | QP |
| 9 | 2.24 | 22.23 | -23.77 | 46.00 | 11.92 | 0.15 | 0.27 | 9.89 | Average |
| 10 | 2.24 | 26.69 | -29.31 | 56.00 | 16.38 | 0.15 | 0.27 | 9.89 | QP |
| 11 | 14.52 | 17.94 | -32.06 | 50.00 | 7.47 | 0.33 | 0.20 | 9.94 | Average |
| 12 | 14.52 | 21.89 | -38.11 | 60.00 | 11.42 | 0.33 | 0.20 | 9.94 | QP |

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)
Note 3: When emissions are in operating band over limits, retest with a dummy load for final in-band results.

| AC Power-line Conducted Emissions Result | | | |
|---|---|---|---|
| **Operating Mode** | 2 | **Power Phase** | Line |
| **Ch. Frequency (MHz)** | 10.375 | | |




| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Aux Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | dB | |
| 1 | 0.17 | 26.92 | -27.89 | 54.81 | 16.68 | 0.11 | 0.26 | 9.87 | Average |
| 2 | 0.17 | 33.70 | -31.11 | 64.81 | 23.46 | 0.11 | 0.26 | 9.87 | QP |
| 3 | 0.20 | 26.20 | -27.34 | 53.54 | 15.92 | 0.11 | 0.30 | 9.87 | Average |
| 4 | 0.20 | 31.40 | -32.14 | 63.54 | 21.12 | 0.11 | 0.30 | 9.87 | QP |
| 5 | 0.41 | 30.90 | -16.74 | 47.64 | 20.80 | 0.12 | 0.10 | 9.88 | Average |
| 6 | 0.41 | 31.19 | -26.45 | 57.64 | 21.09 | 0.12 | 0.10 | 9.88 | QP |
| 7 | 1.73 | 27.63 | -18.37 | 46.00 | 17.33 | 0.15 | 0.26 | 9.89 | Average |
| 8 | 1.73 | 30.84 | -25.16 | 56.00 | 20.54 | 0.15 | 0.26 | 9.89 | QP |
| 9 | 2.82 | 24.12 | -21.88 | 46.00 | 13.86 | 0.16 | 0.20 | 9.90 | Average |
| 10 | 2.82 | 25.80 | -30.20 | 56.00 | 15.54 | 0.16 | 0.20 | 9.90 | QP |
| 11 | 17.02 | 18.59 | -31.41 | 50.00 | 8.13 | 0.33 | 0.20 | 9.93 | Average |
| 12 | 17.02 | 22.37 | -37.63 | 60.00 | 11.91 | 0.33 | 0.20 | 9.93 | QP |

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)
Note 3: When emissions are in operating band over limits, retest with a dummy load for final in-band results.

# 3.2 Transmitter Radiated Emissions

## 3.2.1 Transmitter Radiated Emissions Limit

| Transmitter Radiated Emissions Limit | | | |
|---|---|---|---|
| **Frequency Range (MHz)** | **Field Strength (uV/m)** | **Field Strength (dBuV/m)** | **Measure Distance (m)** |
| 0.009~0.490 | 2400/F(kHz) | 48.5 - 13.8 | 300 |
| 0.490~1.705 | 24000/F(kHz) | 33.8 - 23 | 30 |
| 1.705~30.0 | 30 | 29 | 30 |
| 30~88 | 100 | 40 | 3 |
| 88~216 | 150 | 43.5 | 3 |
| 216~960 | 200 | 46 | 3 |
| Above 960 | 500 | 54 | 3 |

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: the frequency bands 9-90 kHz, 110-490 kHz measurements employing an average detector and other below 1GHz measurements employing a CISPR quasi-peak detector.

## 3.2.2 Measuring Instruments

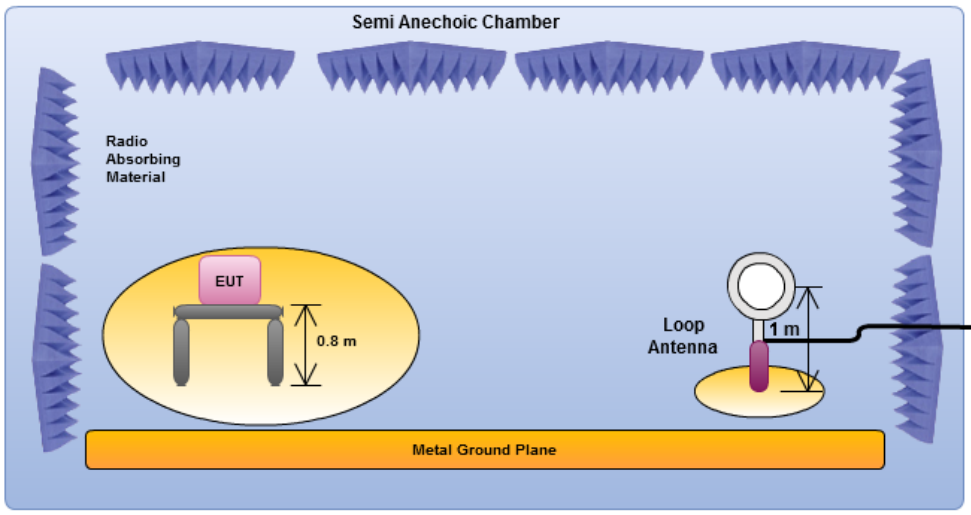
Refer a test equipment and calibration data table in this test report.

### 3.2.3 Test Procedures

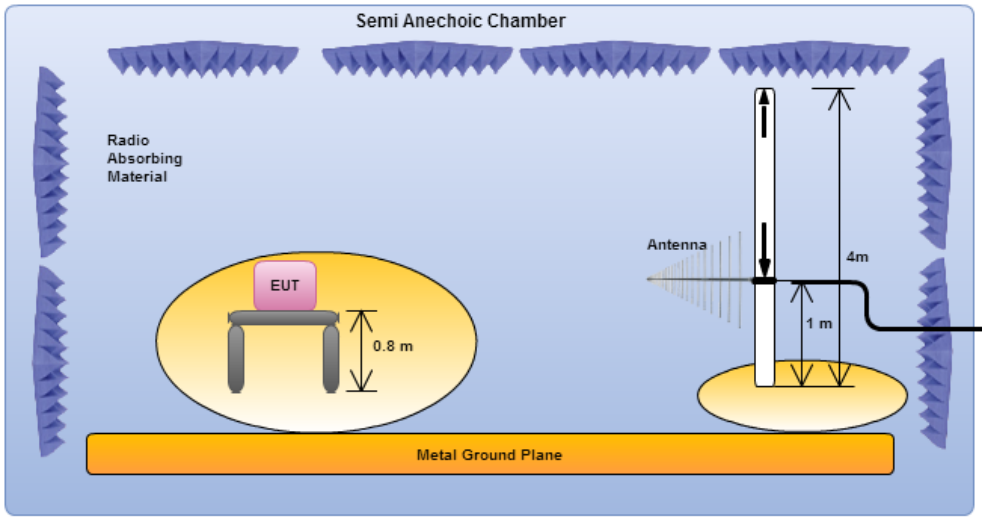
| Test Method | |
|---|---|
| ☒ | Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m. |
| ☒ | Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz. The frequency bands 9-90 kHz, 110-490 kHz measurements employing an average detector and other below 30MHz measurements employing a CISPR quasi-peak detector. Test distance is 3m. |
| ☒ | At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be following below methods. |
| ☐ | The results shall be extrapolated to the specified distance by making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor. |
| ☒ | The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade). |
| ☒ | For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level. |
| ☒ | The any unwanted emissions level shall not exceed the fundamental emission level. |
| ☒ | All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported. |

### 3.2.4 Test Setup

**Transmitter Radiated Emissions**



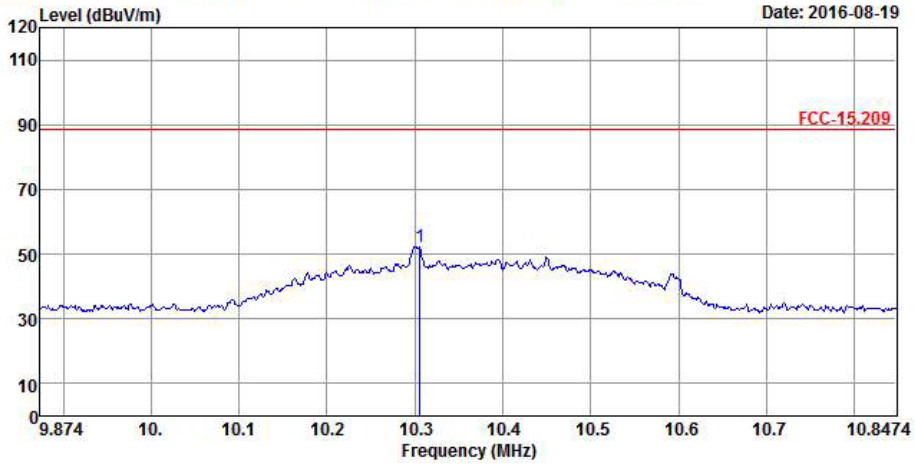

Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna. The center of the loop shall be 1 m above the ground.




Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna. the antenna height shall be varied from 1 m to 4 m.

### 3.2.5 Transmitter Radiated Emissions (Below 30MHz)

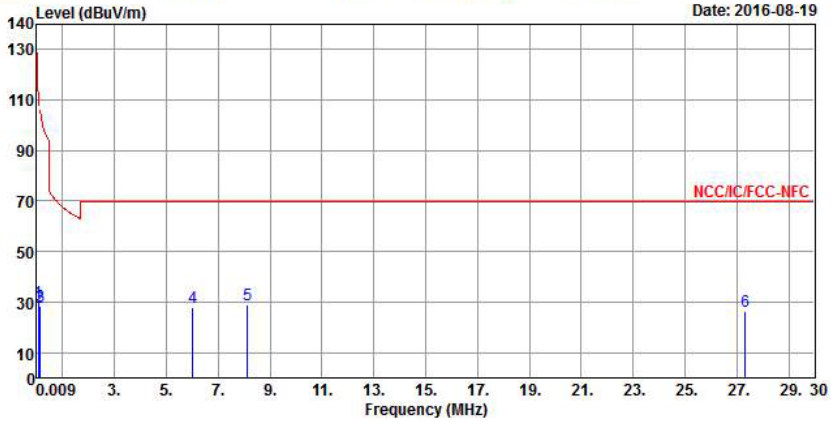
| Transmitter Radiated Emissions (10.375 MHz) | | | |
|---|---|---|---|
| **Mode** | NFMI | **Test Freq.(MHz)** | 10.375 |
| **Operating Mode** | 3 | **Polarization** | H |




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 10.3054 | 52.11 | -36.51 | 88.62 | 30.31 | 21.31 | 0.49 | 0.00 | Peak |

Note 1: “>20dB” means spurious emission levels that exceed the level of 6 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.
Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.
Note 6 : Below 30MHz of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

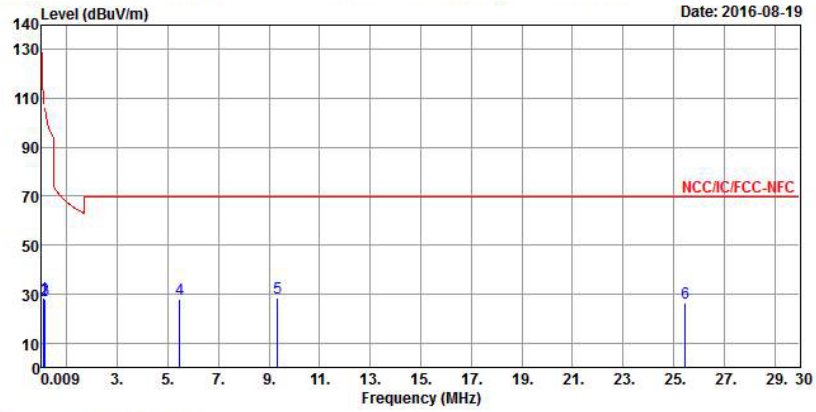
| Transmitter Radiated Emissions (9kHz~30MHz) | | | |
|---|---|---|---|
| **Mode** | NFMI | **Test Freq.(MHz)** | 10.375 |
| **Operating Mode** | 1 | **Polarization** | H |




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 0.0643 | 29.79 | -81.66 | 111.45 | 8.74 | 21.00 | 0.05 | 0.00 | Peak |
| 2 | 0.0973 | 28.10 | -79.75 | 107.85 | 6.93 | 21.10 | 0.07 | 0.00 | Peak |
| 3 | 0.1331 | 28.54 | -76.59 | 105.13 | 7.40 | 21.06 | 0.08 | 0.00 | Peak |
| 4 | 6.0200 | 27.81 | -41.73 | 69.54 | 6.47 | 20.98 | 0.36 | 0.00 | Peak |
| 5 | 8.1360 | 28.91 | -40.63 | 69.54 | 7.33 | 21.15 | 0.43 | 0.00 | Peak |
| 6 | 27.3300 | 26.42 | -43.12 | 69.54 | 4.07 | 21.65 | 0.70 | 0.00 | Peak |

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.
Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.
Note 6 : Below 30MHz of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

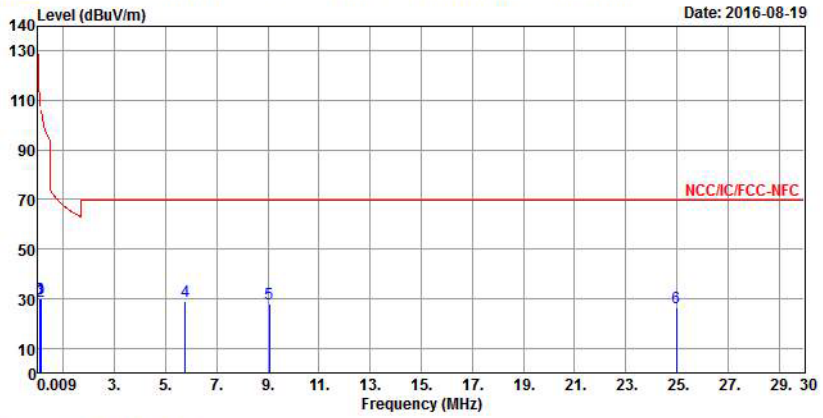
| Transmitter Radiated Emissions (9kHz~30MHz) | | | |
|---|---|---|---|
| **Mode** | NFMI | **Test Freq.(MHz)** | 10.375 |
| **Operating Mode** | 2 | **Polarization** | H |




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 0.0846 | 28.34 | -80.72 | 109.06 | 7.18 | 21.10 | 0.06 | 0.00 | Peak |
| 2 | 0.1289 | 27.15 | -78.26 | 105.41 | 6.01 | 21.06 | 0.08 | 0.00 | Peak |
| 3 | 0.1410 | 28.11 | -76.52 | 104.63 | 6.97 | 21.06 | 0.08 | 0.00 | Peak |
| 4 | 5.4700 | 28.08 | -41.46 | 69.54 | 6.79 | 20.94 | 0.35 | 0.00 | Peak |
| 5 | 9.3420 | 28.58 | -40.96 | 69.54 | 6.86 | 21.25 | 0.47 | 0.00 | Peak |
| 6 | 25.4700 | 26.47 | -43.07 | 69.54 | 4.15 | 21.61 | 0.71 | 0.00 | Peak |

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.
Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.
Note 6 : Below 30MHz of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

| Transmitter Radiated Emissions (9kHz~30MHz) | | | |
|---|---|---|---|
| **Mode** | NFMI | **Test Freq.(MHz)** | 10.375 |
| **Operating Mode** | 3 | **Polarization** | H |

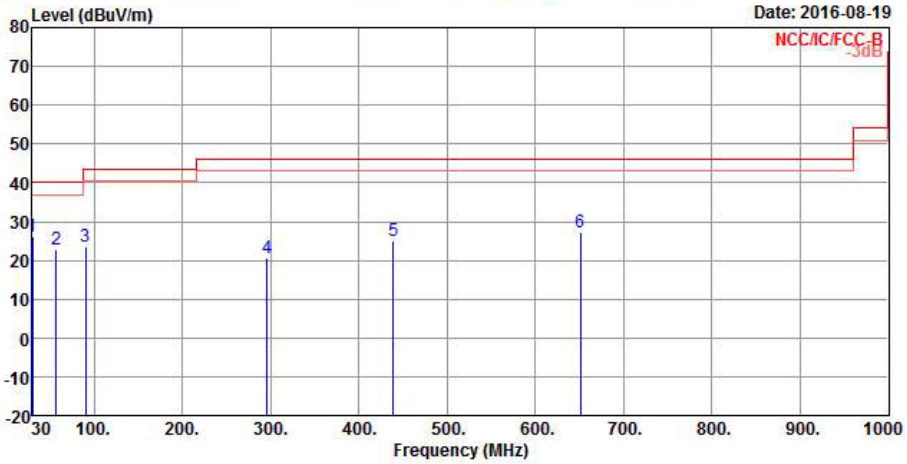



| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 0.0834 | 29.94 | -79.24 | 109.18 | 8.88 | 21.00 | 0.06 | 0.00 | Peak |
| 2 | 0.1029 | 28.72 | -78.64 | 107.36 | 7.55 | 21.10 | 0.07 | 0.00 | Peak |
| 3 | 0.1260 | 29.79 | -75.81 | 105.60 | 8.65 | 21.06 | 0.08 | 0.00 | Peak |
| 4 | 5.7680 | 28.78 | -40.76 | 69.54 | 7.47 | 20.96 | 0.35 | 0.00 | Peak |
| 5 | 9.0540 | 27.88 | -41.66 | 69.54 | 6.19 | 21.23 | 0.46 | 0.00 | Peak |
| 6 | 25.0000 | 26.55 | -42.99 | 69.54 | 4.24 | 21.60 | 0.71 | 0.00 | Peak |

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.
Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.
Note 6 : Below 30MHz of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

### 3.2.6 Transmitter Radiated Emissions (Above 30MHz)

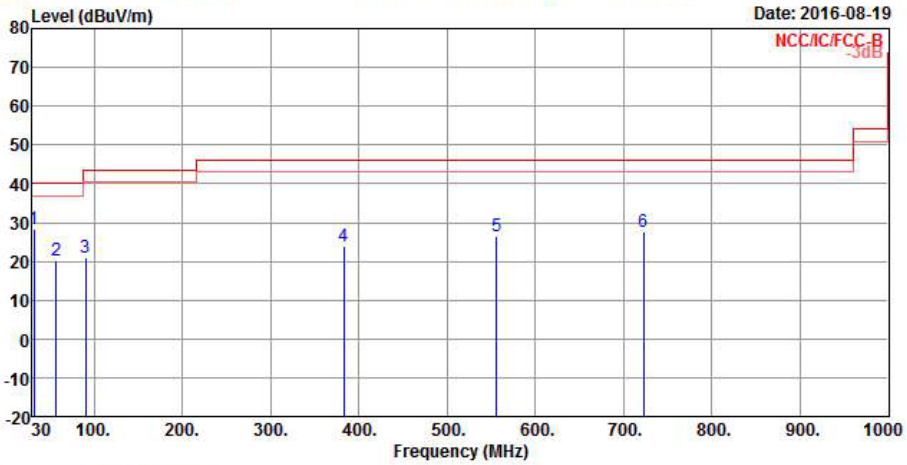
| Transmitter Radiated Emissions (Above 30MHz) | | | |
|---|---|---|---|
| **Mode** | NFMI | **Test Freq.(MHz)** | 10.375 |
| **Operating Mode** | 1 | **Polarization** | V |




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 30.0000 | 26.05 | -13.95 | 40.00 | 27.37 | 24.95 | 0.68 | 26.95 | Peak |
| 2 | 57.1600 | 22.93 | -17.07 | 40.00 | 37.24 | 12.46 | 1.14 | 27.91 | Peak |
| 3 | 90.1400 | 23.42 | -20.08 | 43.50 | 35.61 | 14.26 | 1.35 | 27.80 | Peak |
| 4 | 295.7800 | 20.48 | -25.52 | 46.00 | 26.24 | 18.91 | 2.50 | 27.17 | Peak |
| 5 | 439.3400 | 25.00 | -21.00 | 46.00 | 27.72 | 22.15 | 3.20 | 28.07 | Peak |
| 6 | 650.8000 | 27.15 | -18.85 | 46.00 | 27.15 | 24.65 | 3.76 | 28.41 | Peak |

Note 1: “>20dB” means spurious emission levels that exceed the level of 6 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.
Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

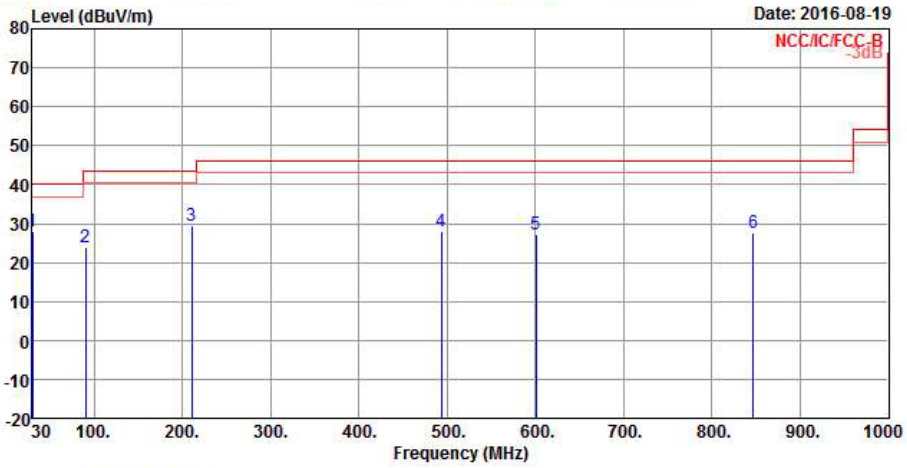
| Transmitter Radiated Emissions (Above 30MHz) | | | |
|---|---|---|---|
| **Mode** | NFMI | **Test Freq.(MHz)** | 10.375 |
| **Operating Mode** | 1 | **Polarization** | H |




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 31.9400 | 28.45 | -11.55 | 40.00 | 31.17 | 23.67 | 0.71 | 27.10 | Peak |
| 2 | 57.1600 | 20.05 | -19.95 | 40.00 | 34.36 | 12.46 | 1.14 | 27.91 | Peak |
| 3 | 90.1400 | 20.83 | -22.67 | 43.50 | 33.02 | 14.26 | 1.35 | 27.80 | Peak |
| 4 | 383.0800 | 23.73 | -22.27 | 46.00 | 27.30 | 21.30 | 2.86 | 27.73 | Peak |
| 5 | 555.7400 | 26.64 | -19.36 | 46.00 | 27.49 | 23.90 | 3.61 | 28.36 | Peak |
| 6 | 722.5800 | 27.66 | -18.34 | 46.00 | 26.73 | 25.08 | 4.13 | 28.28 | Peak |

Note 1: “>20dB” means spurious emission levels that exceed the level of 6 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.
Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

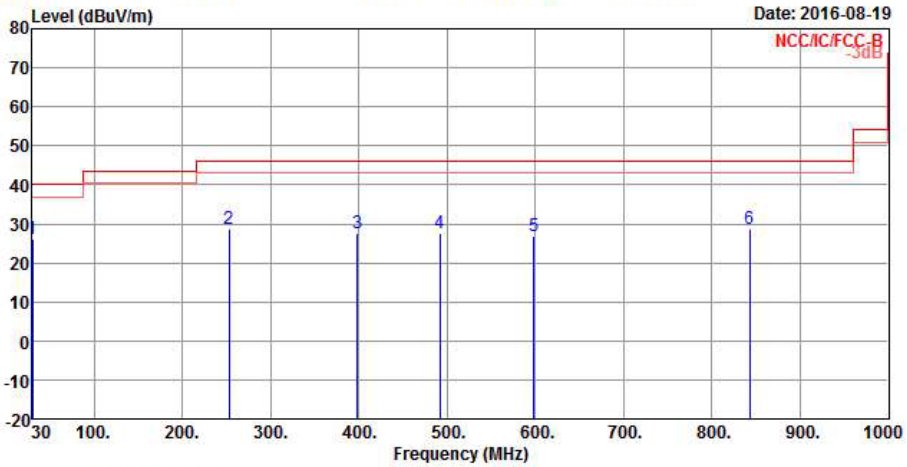
| Transmitter Radiated Emissions (Above 30MHz) | | | |
|---|---|---|---|
| **Mode** | NFMI | **Test Freq.(MHz)** | 10.375 |
| **Operating Mode** | 2 | **Polarization** | V |




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 30.0000 | 27.82 | -12.18 | 40.00 | 29.14 | 24.95 | 0.68 | 26.95 | Peak |
| 2 | 90.1400 | 23.91 | -19.59 | 43.50 | 36.10 | 14.26 | 1.35 | 27.80 | Peak |
| 3 | 210.4200 | 29.53 | -13.97 | 43.50 | 38.91 | 15.77 | 2.23 | 27.38 | Peak |
| 4 | 493.6600 | 28.10 | -17.90 | 46.00 | 30.18 | 22.95 | 3.37 | 28.40 | QP |
| 5 | 600.3600 | 27.06 | -18.94 | 46.00 | 27.67 | 24.26 | 3.66 | 28.53 | QP |
| 6 | 846.7401 | 27.44 | -18.56 | 46.00 | 24.11 | 26.44 | 4.70 | 27.81 | QP |

Note 1: “>20dB” means spurious emission levels that exceed the level of 6 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.
Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

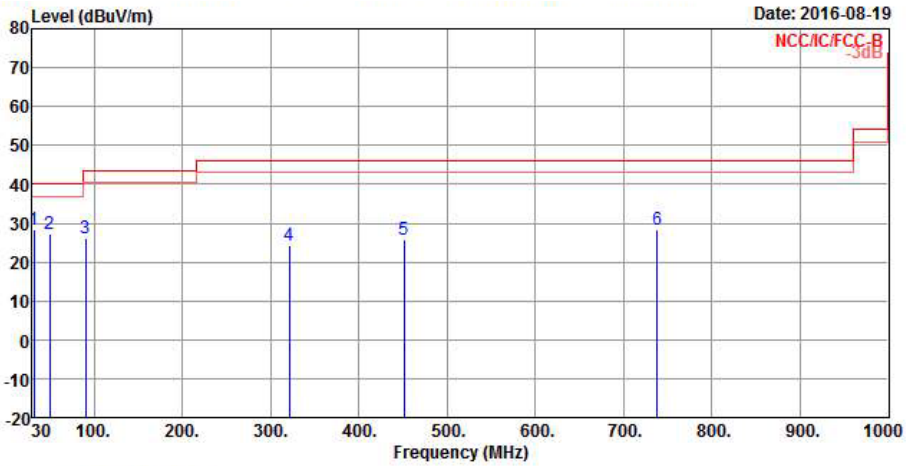
| Transmitter Radiated Emissions (Above 30MHz) | | | |
|---|---|---|---|
| **Mode** | NFMI | **Test Freq.(MHz)** | 10.375 |
| **Operating Mode** | 2 | **Polarization** | H |




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 30.0000 | 25.96 | -14.04 | 40.00 | 27.28 | 24.95 | 0.68 | 26.95 | Peak |
| 2 | 253.1000 | 28.67 | -17.33 | 46.00 | 35.45 | 18.09 | 2.22 | 27.09 | QP |
| 3 | 398.6000 | 27.58 | -18.42 | 46.00 | 30.75 | 21.71 | 2.99 | 27.87 | QP |
| 4 | 491.7200 | 27.45 | -18.55 | 46.00 | 29.55 | 22.92 | 3.37 | 28.39 | QP |
| 5 | 598.4200 | 27.04 | -18.96 | 46.00 | 27.66 | 24.24 | 3.66 | 28.52 | QP |
| 6 | 842.8600 | 28.84 | -17.16 | 46.00 | 25.60 | 26.40 | 4.67 | 27.83 | QP |

Note 1: “>20dB” means spurious emission levels that exceed the level of 6 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.
Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

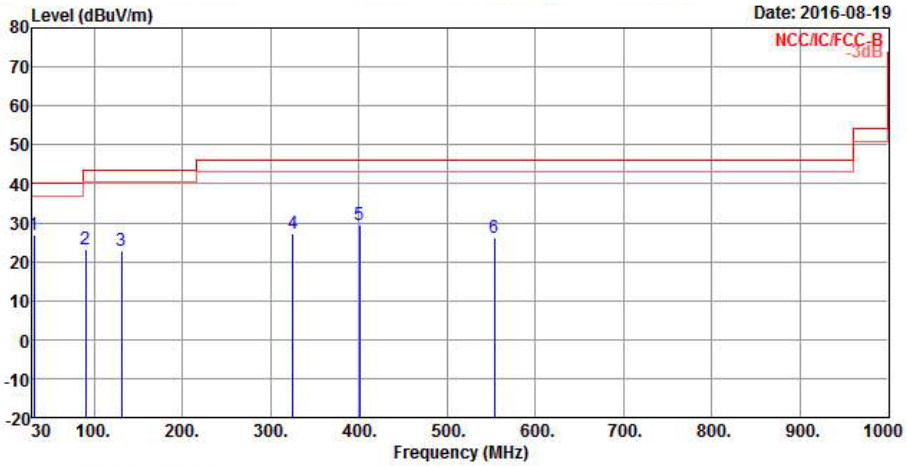
| Transmitter Radiated Emissions (Above 30MHz) | | | |
|---|---|---|---|
| **Mode** | NFMI | **Test Freq.(MHz)** | 10.375 |
| **Operating Mode** | 3 | **Polarization** | V |




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 31.9400 | 28.35 | -11.65 | 40.00 | 31.07 | 23.67 | 0.71 | 27.10 | QP |
| 2 | 49.4000 | 27.18 | -12.82 | 40.00 | 39.59 | 14.34 | 0.94 | 27.69 | Peak |
| 3 | 90.1400 | 26.21 | -17.29 | 43.50 | 38.40 | 14.26 | 1.35 | 27.80 | Peak |
| 4 | 321.0000 | 24.31 | -21.69 | 46.00 | 29.44 | 19.60 | 2.56 | 27.29 | Peak |
| 5 | 450.9800 | 25.88 | -20.12 | 46.00 | 28.48 | 22.28 | 3.25 | 28.13 | Peak |
| 6 | 738.1000 | 28.42 | -17.58 | 46.00 | 27.25 | 25.22 | 4.15 | 28.20 | Peak |

Note 1: “>20dB” means spurious emission levels that exceed the level of 6 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.
Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

| Transmitter Radiated Emissions (Above 30MHz) | | | |
|---|---|---|---|
| **Mode** | NFMI | **Test Freq.(MHz)** | 10.375 |
| **Operating Mode** | 3 | **Polarization** | H |




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 31.9400 | 26.98 | -13.02 | 40.00 | 29.70 | 23.67 | 0.71 | 27.10 | Peak |
| 2 | 90.1400 | 23.03 | -20.47 | 43.50 | 35.22 | 14.26 | 1.35 | 27.80 | Peak |
| 3 | 130.8800 | 22.97 | -20.53 | 43.50 | 31.45 | 17.53 | 1.72 | 27.73 | Peak |
| 4 | 324.8800 | 27.30 | -18.70 | 46.00 | 32.34 | 19.71 | 2.56 | 27.31 | Peak |
| 5 | 400.5400 | 29.58 | -16.42 | 46.00 | 32.71 | 21.75 | 3.00 | 27.88 | Peak |
| 6 | 553.8000 | 25.97 | -20.03 | 46.00 | 26.84 | 23.88 | 3.60 | 28.35 | Peak |

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.
Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

# 3.3 Emission Bandwidth

## 3.3.1 Emission Bandwidth Limit

| Emission Bandwidth Limit |
|---|
| N/A |

## 3.3.2 Measuring Instruments

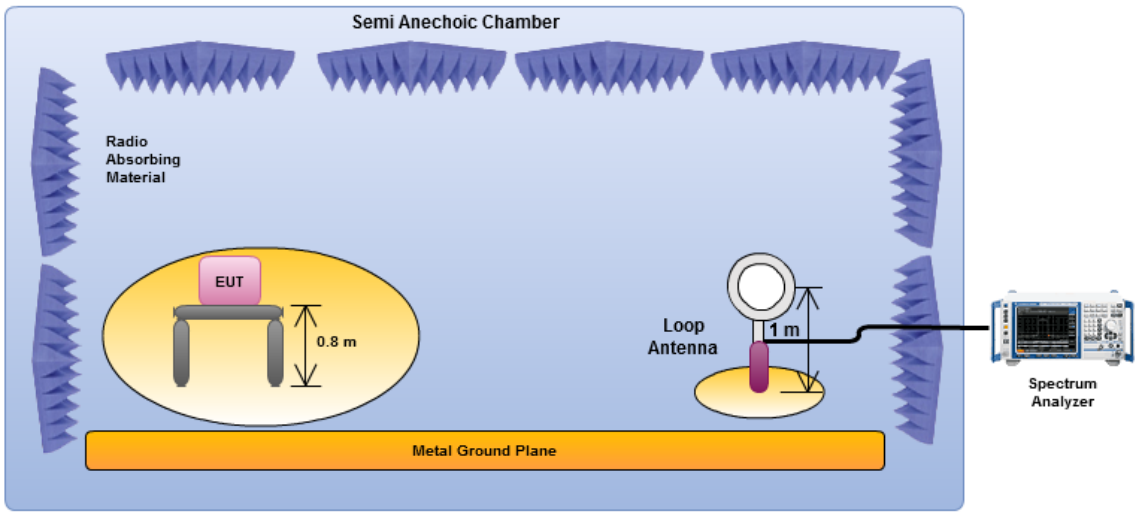
Refer a test equipment and calibration data table in this test report.

## 3.3.3 Test Procedures

| Test Method | |
|---|---|
| ☒ | For the emission bandwidth refer ANSI C63.10, clause 6.9.1 for occupied bandwidth testing. |
| ☒ | For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level. |

## 3.3.4 Test Setup

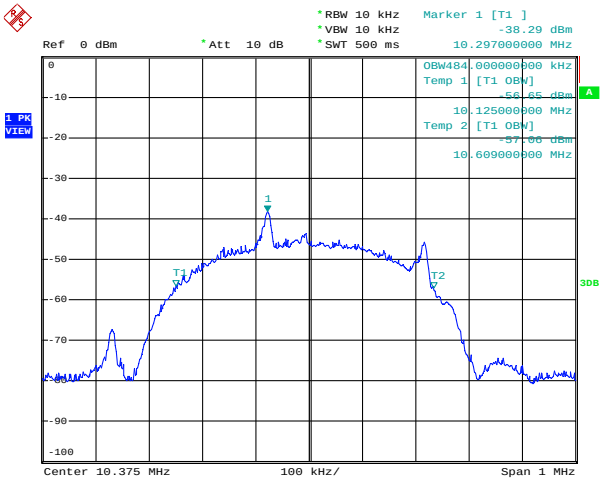
**Emission Bandwidth**



## 3.3.5 Test Result of Emission Bandwidth

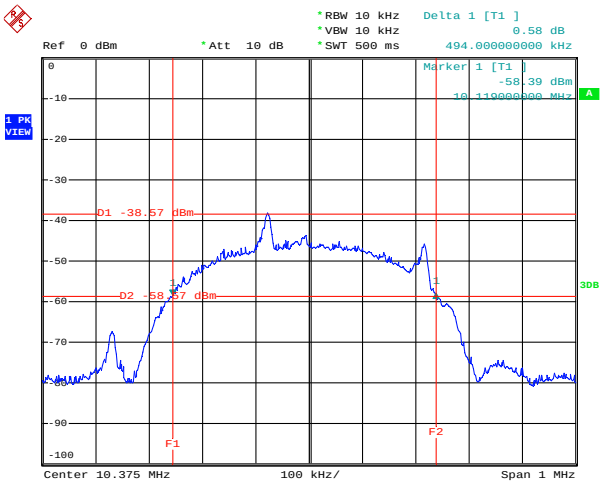
| Occupied Channel Bandwidth Result | | | |
|---|---|---|---|
| **Transmitter Mode** | **Frequency (MHz)** | **99% Bandwidth (kHz)** | **20dB Bandwidth (kHz)** |
| NFMI | 10.375 | 484.000 | 494.000 |
| **Limit** | | **N/A** | |
| **Result** | | **Complied** | |

**Emission Bandwidth Plot - 99% Bandwidth**




Date: 19.AUG.2016 16:17:30

**Emission Bandwidth Plot - 20dB Bandwidth**




Date: 19.AUG.2016 16:15:41

# 4 Test Equipment and Calibration Data

**<AC Power-line Conducted Emissions>**

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|---|
| EMC Receiver | R&S | ESR-3 | 102051 | 9 kHz ~ 3.6 GHz | 19/04/2016 | 18/04/2017 |
| LISN | SCHWARZBECK MESS-ELEKTRONIK | NSLK 8127 | 8127-477 | 9 kHz ~ 30 MHz | 26/01/2016 | 25/01/2017 |
| LISN (Support Unit) | R&S | ENV216 | 101295 | 9 kHz ~ 30 MHz | 04/11/2015 | 03/11/2016 |
| RF Cable-CON | HUBER+SUHNER | RG213/U | 07611832020001 | 9 kHz ~ 30 MHz | 30/10/2015 | 29/10/2016 |
| EMI Filter | LINDGREN | LRE-2030 | 2651 | < 450 Hz | NCR | NCR |

**NCR : Non-Calibration Require**

**<RF Conducted>**

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSP 40 | 100305 | 9 kHz ~ 40 GHz | 16/02/2016 | 15/02/2017 |

**<Radiated Emission>**

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSP 40 | 100593 | 9 kHz ~ 40 GHz | 19/10/2015 | 18/10/2016 |
| 3m Semi Anechoic Chamber | SIDT FRANKONIA | SAC-3M | 03CH02-HY | 30 MHz ~ 1 GHz 3m | 03/06/2016 | 02/06/2017 |
| Amplifier | Agilent | 8447D | 2944A11149 | 100 kHz ~ 1.3 GHz | 01/07/2016 | 30/06/2017 |
| Bilog Antenna | SCHAFFNER | CBL 6112B | 2723 | 30 MHz ~ 1 GHz | 05/10/2015 | 04/10/2016 |
| Loop Antenna | TESEQ | HLA 6120 | 31244 | 9 kHz~30 MHz | 02/02/2015 | 01/02/2017 |