| | | | | |
|---|---|---|---|---|
| **Prüfbericht-Nr.:** *Test report No.:* | **60361866 001** | **Auftrags-Nr.:** *Order No.:* | 168125922 | Seite 1 von 23 *Page 1 of 23* |
| **Kunden-Referenz-Nr.:** *Client reference No.:* | N/A | **Auftragsdatum:** *Order date:* | 01.08.2019 | |
| **Auftraggeber:** *Client:* | **MESHBOX FOUNDATION PTE.LTD**<br>152 BEACH ROAD #14-02 GATEWAYEAST SINGAPORE(189721) | | | |
| **Prüfgegenstand:** *Test item:* | MeshBox Tesla | | | |
| **Bezeichnung / Typ-Nr.:** *Identification / Type No.:* | MTes-J1900-W5<br>(Trademark: MeshBox) | | | |
| **Auftrags-Inhalt:** *Order content:* | FCC approval | | | |
| **Prüfgrundlage:** *Test specification:* | CFR47 FCC Part 15: Subpart C Section 15.247<br>CFR47 FCC Part 15: Subpart C Section 15.207<br>CFR47 FCC Part 15: Subpart C Section 15.209<br>CFR47 FCC Part 15: Subpart B Section 15.107<br>CFR47 FCC Part 15: Subpart B Section 15.109<br>CFR47 FCC Part 2: Section 2.1091 | | | |
| **Wareneingangsdatum:** *Date of receipt:* | 19.02.2020 | Please refer to photo documents | | |
| **Prüfmuster-Nr.:** *Test sample No.:* | A001064741-001 to 006 | | | |
| **Prüfzeitraum:** *Testing period:* | 16.03.2020 - 16.04.2020 | | | |
| **Ort der Prüfung:** *Place of testing:* | TÜV Rheinland (Shenzhen) Co., Ltd. | | | |
| **Prüflaboratorium:** *Testing laboratory:* | TÜV Rheinland (Shenzhen) Co., Ltd. | | | |
| **Prüfergebnis*:** *Test result*:* | Pass | | | |

| **geprüft von** / *tested by:* | | | **kontrolliert von** / *reviewed by:* | | |
|---|---|---|---|---|---|
| | Bell Hu | | | Winnie Hou | |
| 06.08.2020 | Bell Hu / Project Engineer | | 06.08.2020 | Winnie Hou / Technical Certifier | |
| **Datum** *Date* | **Name/Stellung** *Name/Position* | **Unterschrift** *Signature* | **Datum** *Date* | **Name/Stellung** *Name/Position* | **Unterschrift** *Signature* |

**Sonstiges** / *Other:*

FCC ID: 2AV8M-MBTES01202001

**Zustand des Prüfgegenstandes bei Anlieferung:** *Condition of the test item at delivery:* — Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged:*

| | | | | | |
|---|---|---|---|---|---|
| * Legende: | 1 = sehr gut | 2 = gut | 3 = befriedigend | 4 = ausreichend | 5 = mangelhalt |
| | P(ass) = entspricht o.g. Prüfgrundlage(n) | | F(ail) = entspricht nicht o.g. Prüfgrundlage(n) | N/A = nicht anwendbar | N/T = nicht getestet |
| Legend: | 1 = very good | 2 = good | 3 = satisfactory | 4 = sufficient | 5 = poor |
| | P(ass) = passed a.m. test specifications(s) | | F(ail) = failed a.m. test specifications(s) | N/A = not applicable | N/T = not tested |

**Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.**

*This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.*

# *Test Summary*

**5.1.1 ANTENNA REQUIREMENT**
*RESULT: Pass*

**5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER**
*RESULT: Pass*

**5.1.3 CONDUCTED POWER SPECTRAL DENSITY**
*RESULT: Pass*

**5.1.4 6DB BANDWIDTH**
*RESULT: Pass*

**5.1.5 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH**
*RESULT: Pass*

**5.1.6 RADIATED SPURIOUS EMISSION**
*RESULT: Pass*

**5.1.7 CONDUCTED EMISSION ON AC MAINS**
*RESULT: Pass*

**5.1.8 RADIATED EMISSION**
*RESULT: Pass*

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# 1 General Remarks

## 1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

Appendix B: Test Results of Wi-Fi 802.11 b/g/n

# 2 Test Sites

## 2.1 Test Facilities

**TÜV Rheinland (Shenzhen) Co., Ltd.**
362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China
FCC Accreditation Designation No.: CN1260
ISED wireless device testing laboratory: 25069

## 2.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

**TÜV Rheinland (Shenzhen) Co., Ltd.**

| **Radio Spectrum Testing (TS8997)** | | | | |
|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **Serial No.** | **Cal. until** |
| Signal Analyzer | R&S | FSV 40 | 101441 | 20.08.2020 |
| OSP | R&S | OSP 150 | 101017 | 17.12.2020 |
| Control PC | DELL | OptiPlex 7050 | FTJZ9P2 | N/A |
| Test Software | R&S | WMS32 (V10.50.10) | N/A | N/A |
| Power Meter | R&S | NRP2 | 107105 | 17.12.2020 |
| Wideband Power Sensor | R&S | NRP-Z81 | 105350 | 17.12.2020 |
| Shielding Room 8# | Albatross | SR8 | APC17151-SR8 | 23.07.2020 |
| **Unwanted Emission Testing (TS9975)** | | | | |
| **Equipment** | **Manufacturer** | **Model** | **Serial No.** | **Cal. until** |
| EMI Test Receiver | R&S | ESR 7 | 102021 | 19.08.2020 |
| Signal Analyzer | R&S | FSV 40 | 101439 | 21.08.2020 |
| System Controller Interface | R&S | SCI-100 | S10010038 | N/A |
| Filterbank | R&S | Wlan | 100759 | 21.08.2020 |
| OSP | R&S | OSP 120 | 102040 | N/A |
| Pre-amplifier | R&S | SCU08F1 | 08320031 | 20.08.2020 |
| Amplifier | R&S | SCU-18F | 180070 | 20.08.2020 |
| Amplifier | R&S | SCU40A | 100475 | 20.09.2020 |
| Trilog Broadband Antenna (30 MHz - 7 GHz) | Schwarzbeck | VULB 9162 | 193 | 02.09.2020 |
| Double-Ridged Antenna (1 -18 GHz) | ETS-LINDGREN | 3117 | 00218717 | 02.09.2020 |
| Wideband Ridged Horn Antenna (18-40 GHz) | Steatite | QMS-00880 | 19067 | 02.09.2020 |
| Active Loop Antenna | Schwarzbeck | FMZB 1513 | 302 | 01.09.2020 |
| Wideband Ridged Horn Antenna (12-18 GHz) | Steatite | QMS-00208 | 18313 | 02.09.2020 |
| Test software | R&S | EMC32 (V10.50.40) | N/A | N/A |
| Control PC | Dell | OptiPlex 7050 | 36NV9P2 | N/A |
| 3m Semi-Anechoic Chamber | Albatross | SAC-3m | APC17151-SAC | 06.07.2020 |

| Conducted Emission on AC Mains | | | | |
|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Cali. until** |
| EMI Test Receiver | R&S | ESR3 | 102428 | 03.09.2020 |
| Artificial Mains Network | R&S | ENV216 | 102333 | 19.08.2020 |
| EMC32 test software | R&S | EMC32(Ver.10.50.01) | N/A | N/A |

| Radiated Emission (3m chamber) | | | | |
|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Cali. until** |
| 3m SAC | ETS | SAC3 | CT001632-Q1362 | 23.08.2021 |
| EMI Test Receiver | R&S | ESR7 | 102111 | 04.01.2021 |
| Horn Antenna | R&S | HF907 | 102706 | 01.09.2020 |
| Preamplifier | FIT | SCU-18F | 180077 | 19.08.2020 |
| Active magnetic loop antenna | SCHWARZBECK | FMZB1519B | 00080 | 19.08.2020 |
| Trilog-Broadband antenna | SCHWARZBECK | VULB9168 | 0945 | 12.09.2020 |
| Switching Controller Interface | R&S | OSP 120 | 102039 | N/A |
| EMC32 test software | R&S | EMC32(Ver.10.50.01) | N/A | N/A |

## 2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

## 2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

## 2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

| Parameter | Uncertainty |
|---|---|
| Radio Frequency | ±1 x 10-7 |
| RF Power (conducted) | ±2.5 dB |
| Radiated Emission of Transmitter, valid up to 26.5 GHz | ±6 dB |
| Radiated Emission of Receiver, valid up to 26.5 GHz | ±6 dB |
| Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz) | ±3.70 dB / ±3.30 dB |
| Radiated Emission (3m SAC), 30MHz to 1000MHz | ±4.52 dB |
| Radiated Emission (3m SAC), above 1000MHz | ±4.37 dB |
| Temperature | ±1 °C |
| Humidity | ±5 % |
| Voltage (DC) | ±1 % |
| Voltage (AC, <10kHz) | ±2 % |

## 2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd.. file for certification follow-up purposes.

## 2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at 362 Huanguan Road Middle Longhua District, Shenzhen 518110 People’s Republic of China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

# 3 General Product Information

## 3.1 Product Function and Intended Use

The EUT is a MeshBox Tesla, which supports Wi-Fi 802.11 a/b/g/n/ac wireless technologies. The EUT supports the following functions: Wireless access in the 2.4GHz band or 5GHz band.

There are four antennas (Chain 0, 1, 2, 3) for Wi-Fi, and the worst antenna is SISO antenna Chain 2. For details refer to the User Manual, Technical Description and Circuit Diagram.

## 3.2 Ratings and System Details

**Table 2: Technical Specification of EUT**

| General Information of EUT | Value |
|---|---|
| Kind of Equipment | MeshBox Tesla |
| Type Designation | MTes-J1900-W5 |
| Trade Mark | MeshBox |
| FCC ID | 2AV8M-MBTES01202001 |
| Operating Voltage | DC 12V@6A input via AC/DC adapter |
| Testing Voltage | AC 120V@60Hz |
| **Technical Specification of Wi-Fi 802.11 b/g/n** | |
| Operating Frequency | 2412 - 2462 MHz for 802.11b/g/n(HT20)<br>2422 - 2452 MHz for 802.11n(HT40) |
| Type of Modulation | DSSS(DBPSK/DQPSK/CCK)<br>OFDM(BPSK/QPSK/16QAM/64QAM) |
| Data Rate | 1/2/5.5/11 Mbps for 802.11b<br>6/9/12/18/24/36/48/54 Mbps for 802.11g<br>MCS0 ~ MCS7 for 802.11n |
| Channel Number | 11 channels for 802.11b/g/n(HT20)<br>7 channels for 802.11n(HT40) |
| Channel Separation | 5 MHz |
| **Smart Antenna System** | |
| Antenna Type | External Antenna |
| Number of Antenna | 4 |
| Max Antenna Gain | 7 dBi for both 2.4GHz and 5GHz bands |
| Beamforming | Not supported |
| Operating modes | 1. SISO and MIMO mode supported.<br>2. All the four RF ports have identical RF characteristics. In case of SISO mode, only results for the worst case (Ant 2) listed.<br>3. MIMO mode, array Gain considered as per KDB662911D01 section F). |

**Table 3: RF Channel and Frequency of Wi-Fi 802.11 b/g/n**

| RF Channel | 802.11 b/g/n(HT20) | 802.11 n(HT40) |
|---|---|---|
| | Frequency (MHz) | Frequency (MHz) |
| **01** | **2412** | / |
| 02 | 2417 | / |
| **03** | 2422 | **2422** |
| 04 | 2427 | 2427 |
| 05 | 2432 | 2432 |
| **06** | **2437** | **2437** |
| 07 | 2442 | 2442 |
| 08 | 2447 | 2447 |
| **09** | 2452 | **2452** |
| 10 | 2457 | / |
| **11** | **2462** | / |

Test frequencies are lowest channel: 2412 MHz, middle channel: 2437 MHz and highest channel: 2462 MHz for 802.11b/g/n(HT20)

Test frequencies are lowest channel: 2422 MHz, middle channel: 2437 MHz and highest channel: 2452 MHz for 802.11n(HT40)

## 3.3 Independent Operation Modes

The basic operation modes are:

A. On, Wi-Fi 802.11 b/g/n wireless transmitting mode
   1. Low channel
   2. Middle channel
   3. High channel

B. On, 2.4G Wi-Fi connecting mode

C. On, Normal operation mode

D. Off

## 3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

## 3.5 Submitted Documents

- FCC/IC Label and Location Info
- User Manual

# 4 Test Set-up and Operation Modes

## 4.1 Principle of Configuration Selection

**Radio Spectrum:** The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

## 4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All tests were performed according to the procedures in ANSI C63.10: 2013 and ANSI C63.4: 2014.

**Parameters of Test Software Setting**

| Mode | Channel No. | Frequency (MHz) | Data rate | Software Power setting | |
|---|---|---|---|---|---|
| | | | | MIMO | SISO |
| 802.11b | 01 | 2412 | 1M | 18.0 | 20.0 |
| 802.11b | 06 | 2437 | 1M | 18.0 | 25.0 |
| 802.11b | 11 | 2462 | 1M | 18.0 | 20.0 |
| 802.11g | 01 | 2412 | 6M | 14.0 | 15.0 |
| 802.11g | 06 | 2437 | 6M | 14.0 | 23.0 |
| 802.11g | 11 | 2462 | 6M | 14.0 | 15.0 |
| 802.11n HT20 | 01 | 2412 | MCS 0 | 14.0 | 14.0 |
| 802.11n HT20 | 06 | 2437 | MCS 0 | 14.0 | 23.0 |
| 802.11n HT20 | 11 | 2462 | MCS 0 | 12.0 | 14.0 |
| 802.11n HT40 | 03 | 2422 | MCS 0 | 10.0 | 13.0 |
| 802.11n HT40 | 06 | 2437 | MCS 0 | 15.0 | 23.0 |
| 802.11n HT40 | 09 | 2452 | MCS 0 | 9.0 | 13.0 |

## 4.3 Special Accessories and Auxiliary Equipment

**Table 4: List of Accessories and Auxiliary Equipment**

| Description | Manufacturer | Model | S/N | Rating |
|---|---|---|---|---|
| Laptop | Lenovo | T480 | PF-16A6N8 | N/A |

## 4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

# 4.5 Test Setup Diagram

**Diagram of Measurement Configuration for Radiation Test (Below 1GHz)**

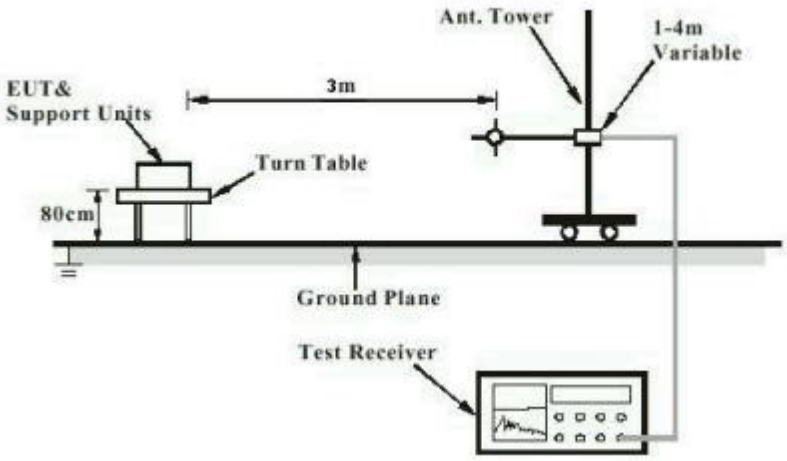



**Diagram of Measurement Configuration for Radiation Test (Above 1GHz)**

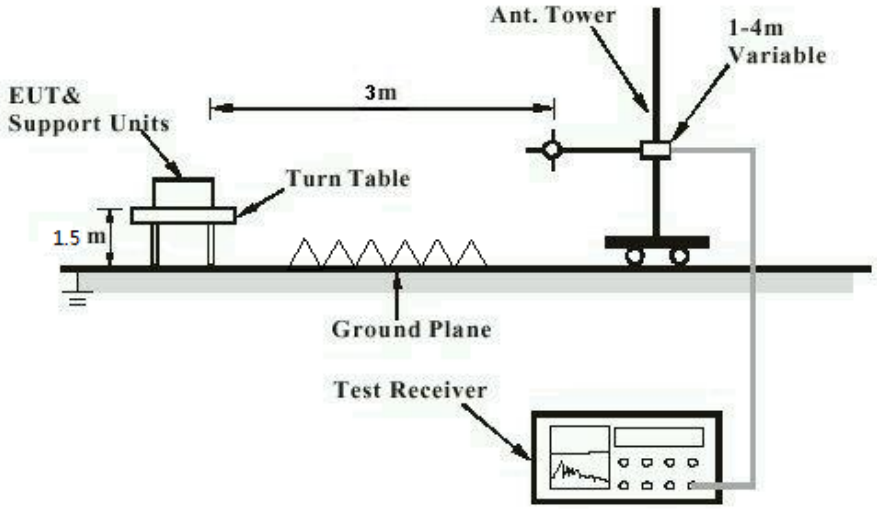


**Diagram of Measurement Configuration for Mains Conduction Measurement**

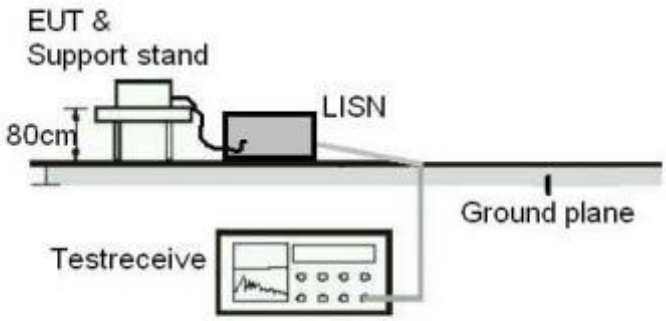
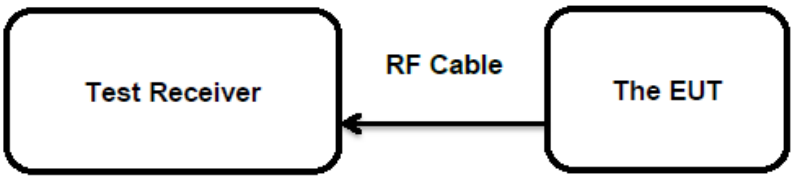



**Diagram of Measurement Configuration for Conducted Transmitter Measurement**



# 5 Test Results

## 5.1 Transmitter Requirement & Test Suites

### 5.1.1 Antenna Requirement

**RESULT:** **Pass**

**Test Specification**

Test standard : FCC Part 15.247(b)(4) and Part 15.203

According to the manufacturer declared, the EUT has four external antennas with special non-standard connectors and the maximum gain 7 dBi.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

## 5.1.2 Maximum Peak Conducted Output Power

**RESULT:** **Pass**

**Test Specification**

| | | |
|---|---|---|
| Test standard | : | FCC Part 15.247(b)(3) |
| Basic standard | : | ANSI C63.10: 2013 |
| Limits | : | 1.0 Watts |
| Kind of test site | : | Shielded Room |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | 08.04.2020, 16.04.2020 |
| Input voltage | : | AC 120V@60Hz |
| Operation mode | : | A |
| Test channel | : | Low / Middle / High |
| Ambient temperature | : | 25 ℃ |
| Relative humidity | : | 56 % |
| Atmospheric pressure | : | 101 kPa |

For details refer to following test result.

**Table 5: Test Result of Maximum Peak Conducted Output Power, Wi-Fi 802.11 b/g/n**

| Test Mode | Data Rate | Test Channel (MHz) | Measured Peak Power (SISO) | | Measured Peak Power (MIMO) | | Limit (dBm) |
|---|---|---|---|---|---|---|---|
| | | | (dBm) | (W) | (dBm) | (W) | |
| 802.11b | 1 Mbps | 2412 | 20.40 | 0.1096 | 23.64 | 0.2312 | 29 |
| | | 2437 | 26.27 | 0.4236 | 23.88 | 0.2443 | |
| | | 2462 | 20.71 | 0.1178 | 24.57 | 0.2864 | |
| 802.11g | 6 Mbps | 2412 | 18.20 | 0.0661 | 22.81 | 0.1910 | |
| | | 2437 | 26.78 | 0.4764 | 23.33 | 0.2153 | |
| | | 2462 | 19.80 | 0.0955 | 23.86 | 0.2432 | |
| 802.11n (HT20) | MCS0 | 2412 | 17.50 | 0.0562 | 23.22 | 0.2099 | |
| | | 2437 | 27.74 | 0.5943 | 23.47 | 0.2223 | |
| | | 2462 | 19.00 | 0.0794 | 22.49 | 0.1774 | |
| 802.11n (HT40) | MCS0 | 2422 | 16.60 | 0.0457 | 18.14 | 0.0652 | |
| | | 2437 | 27.32 | 0.5395 | 22.37 | 0.1726 | |
| | | 2452 | 16.60 | 0.0457 | 17.44 | 0.0555 | |
| **Maximum Measured Value** | | | 27.74 | 0.5943 | 24.57 | 0.2864 | |

Note:
1) The cable loss is taken into account in results.
2) Antenna gain(G) **7** dBi.

## 5.1.3 Conducted Power Spectral Density

**RESULT:** **Pass**

**Test Specification**

| | | |
|---|---|---|
| Test standard | : | FCC Part 15.247(e) |
| Basic standard | : | ANSI C63.10: 2013 |
| Limits | : | < 8 dBm / 3kHz |
| Kind of test site | : | Shielded Room |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | Refer to test result |
| Input voltage | : | AC 120V@60Hz |
| Operation mode | : | A |
| Test channel | : | Low / Middle / High |
| Ambient temperature | : | 25 ℃ |
| Relative humidity | : | 56 % |
| Atmospheric pressure | : | 101 kPa |

For the measurement records, refer to the appendix B.

## 5.1.4 6dB Bandwidth

**RESULT:** **Pass**

**Test Specification**

| | | |
|---|---|---|
| Test standard | : | FCC Part 15.247(a)(2) |
| Basic standard | : | ANSI C63.10: 2013 |
| Limits | : | > 500 KHz |
| Kind of test site | : | Shielded Room |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | 24.03.2020 |
| Input voltage | : | AC 120V@60Hz |
| Operation mode | : | A |
| Test channel | : | Low / Middle / High |
| Ambient temperature | : | 25 ℃ |
| Relative humidity | : | 56 % |
| Atmospheric pressure | : | 101 kPa |

For the measurement records, refer to the appendix B.

## 5.1.5 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

**RESULT:** **Pass**

**Test Specification**

| | | |
|---|---|---|
| Test standard | : | FCC Part 15.247(d) |
| Basic standard | : | ANSI C63.10: 2013 |
| Limits | : | 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power);<br>In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a) |
| Kind of test site | : | Shielded Room |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | Refer to test result |
| Input voltage | : | AC 120V@60Hz |
| Operation mode | : | A |
| Test channel | : | Low / Middle / High |
| Ambient temperature | : | 25 ℃ |
| Relative humidity | : | 56 % |
| Atmospheric pressure | : | 101 kPa |

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix B.

## 5.1.6 Radiated Spurious Emission

**RESULT:** **Pass**

**Test Specification**

| | | |
|---|---|---|
| Test standard | : | FCC Part 15.247(d) & FCC Part 15.205 |
| Basic standard | : | ANSI C63.10: 2013 |
| Limits | : | FCC Part 15.209(a) |
| Kind of test site | : | 3m Semi-anechoic Chamber |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | Refer to test result |
| Input voltage | : | AC 120V@60Hz |
| Operation mode | : | A |
| Test channel | : | Low / Middle / High |
| Ambient temperature | : | 23 ℃ |
| Relative humidity | : | 56 % |
| Atmospheric pressure | : | 101 kPa |

Remark:
Testing was carried out within frequency range 9kHz to the tenth harmonics. All configurations tested for both MIMO and SISO, only worst-case mode data reported.

For the measurement records, refer to the appendix B.

## 5.1.7 Conducted Emission on AC Mains

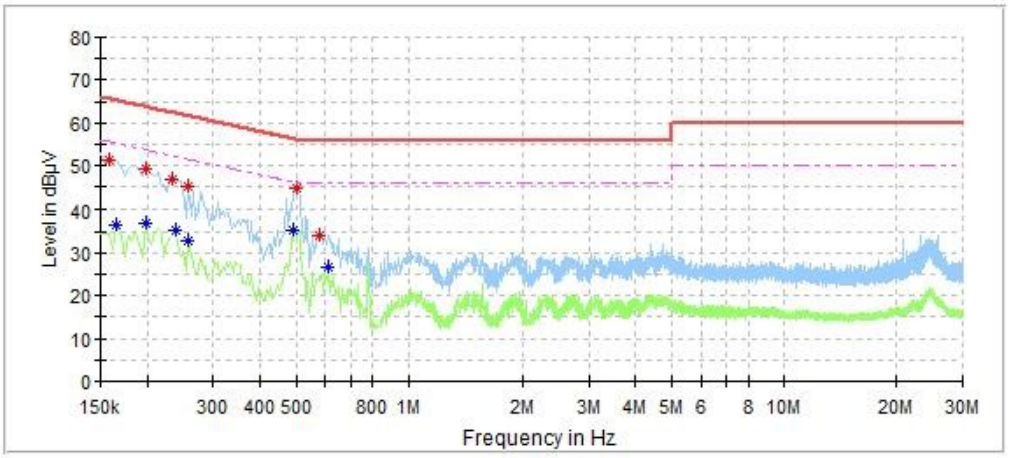
**RESULT:** **Pass**

**Test Specification**

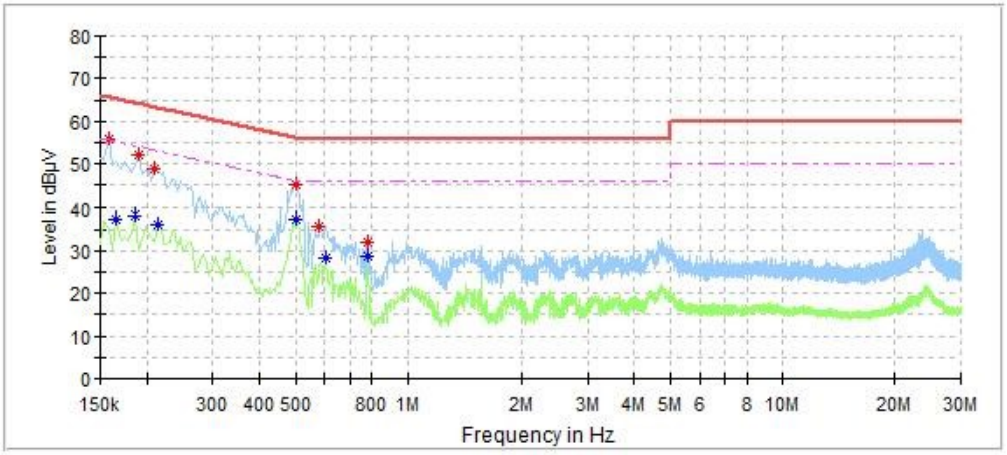
| | | |
|---|---|---|
| Test standard | : | FCC Part 15.207(a) & FCC Part 15.107(a) |
| Basic standard | : | ANSI C63.10: 2013 & ANSI C63.4: 2014 |
| Frequency range | : | 0.15 – 30MHz |
| Limits | : | FCC Part 15.207(a) & FCC Part 15.107(a) |
| Kind of test site | : | Shielded Room |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | Refer to test result |
| Input voltage | : | AC 120V@60Hz |
| Operation mode | : | B, C |
| Earthing | : | Not connected |
| Ambient temperature | : | 24 ℃ |
| Relative humidity | : | 53 % |
| Atmospheric pressure | : | 101 kPa |




| Frequency (MHz) | MaxPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|
| 0.158000 | 51.08 | --- | 65.57 | 14.49 | L1 | 9.6 |
| 0.166000 | --- | 36.40 | 55.16 | 18.76 | L1 | 9.6 |
| 0.198000 | --- | 37.06 | 53.69 | 16.64 | L1 | 9.6 |
| 0.198000 | 49.36 | --- | 63.69 | 14.33 | L1 | 9.6 |
| 0.234000 | 46.83 | --- | 62.31 | 15.48 | L1 | 9.6 |
| 0.238000 | --- | 35.23 | 52.17 | 16.94 | L1 | 9.6 |
| 0.258000 | --- | 32.77 | 51.50 | 18.73 | L1 | 9.6 |
| 0.258000 | 45.21 | --- | 61.50 | 16.28 | L1 | 9.6 |
| 0.494000 | --- | 35.33 | 46.10 | 10.77 | L1 | 9.7 |
| 0.500000 | 44.81 | --- | 56.00 | 11.19 | L1 | 9.7 |
| 0.580000 | 34.16 | --- | 56.00 | 21.84 | L1 | 9.7 |
| 0.612000 | --- | 26.59 | 46.00 | 19.41 | L1 | 9.7 |




| Frequency (MHz) | MaxPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|
| 0.158000 | 55.76 | --- | 65.57 | 9.80 | N | 9.6 |
| 0.166000 | --- | 37.27 | 55.16 | 17.89 | N | 9.6 |
| 0.186000 | --- | 38.11 | 54.21 | 16.11 | N | 9.6 |
| 0.190000 | 52.11 | --- | 64.04 | 11.93 | N | 9.6 |
| 0.210000 | 48.80 | --- | 63.21 | 14.40 | N | 9.6 |
| 0.214000 | --- | 36.04 | 53.05 | 17.01 | N | 9.6 |
| 0.500000 | --- | 37.22 | 46.00 | 8.78 | N | 9.7 |
| 0.500000 | 45.28 | --- | 56.00 | 10.72 | N | 9.7 |
| 0.580000 | 35.76 | --- | 56.00 | 20.24 | N | 9.7 |
| 0.604000 | --- | 28.12 | 46.00 | 17.88 | N | 9.7 |
| 0.780000 | --- | 28.73 | 46.00 | 17.27 | N | 9.7 |
| 0.780000 | 31.99 | --- | 56.00 | 24.01 | N | 9.7 |

## 5.1.8 Radiated Emission

**RESULT:** **Pass**

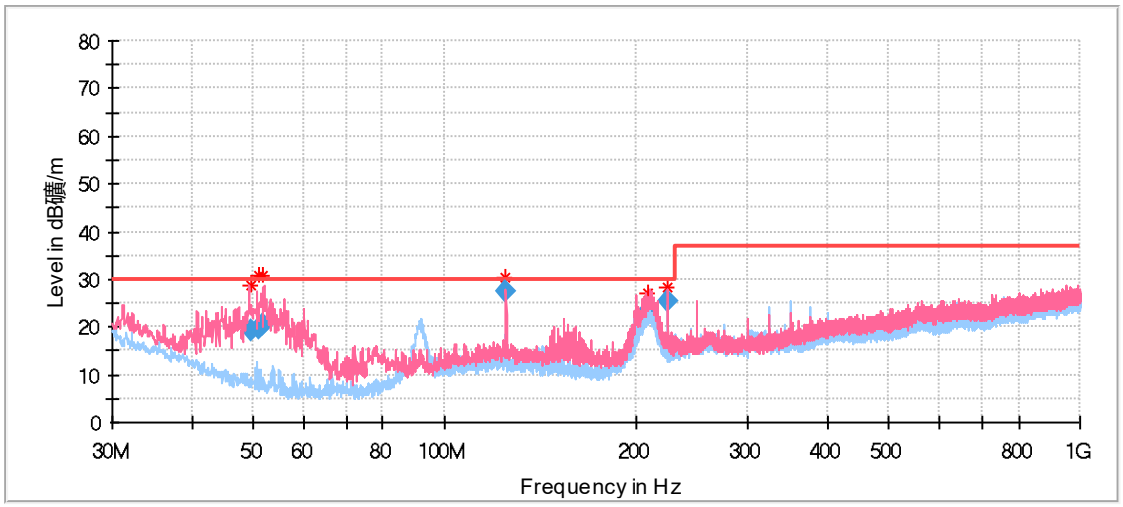
**Test Specification**

| | | |
|---|---|---|
| Test standard | : | FCC Part 15.109(a) |
| Basic standard | : | ANSI C63.4: 2014 |
| Frequency range | : | 30 - 6000MHz |
| Classification | : | Class B |
| Limits | : | FCC Part 15.109(a) |
| Kind of test site | : | 10m Semi-anechoic Chamber & 3m Full-anechoic Chamber |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | Refer to test result |
| Input voltage | : | AC 120V@60Hz |
| Operation mode | : | C |
| Earthing | : | Not connected |
| Ambient temperature | : | 24 ℃ |
| Relative humidity | : | 53 % |
| Atmospheric pressure | : | 101 kPa |

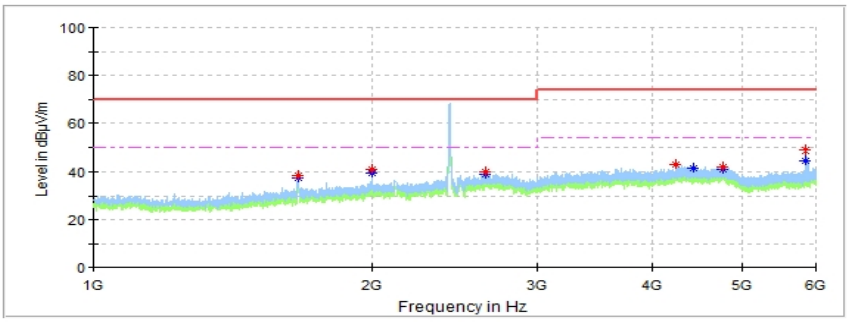
30M-1000MHz



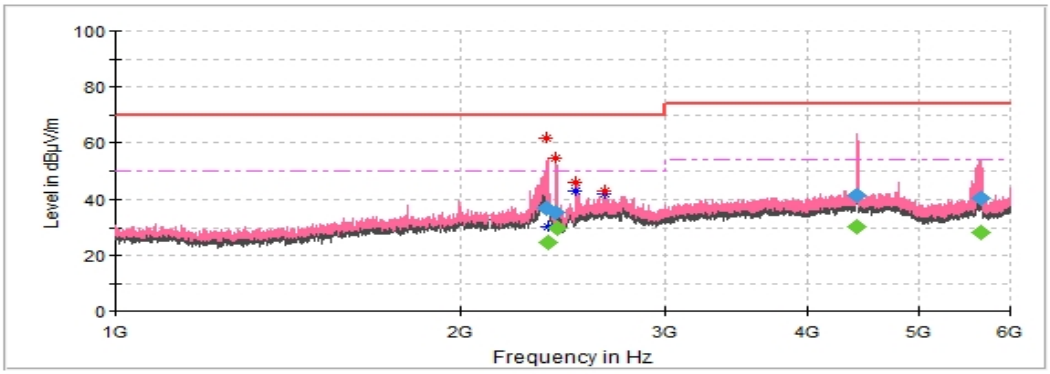

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol |
|---|---|---|---|---|---|---|---|
| 49.438333 | 19.20 | 30.00 | 10.80 | 1000.0 | 120.000 | 155.0 | V |
| 50.906667 | 19.64 | 30.00 | 10.36 | 1000.0 | 120.000 | 400.0 | V |
| 51.853333 | 20.70 | 30.00 | 9.30 | 1000.0 | 120.000 | 102.0 | V |
| 124.992222 | 27.33 | 30.00 | 2.67 | 1000.0 | 120.000 | 202.0 | V |
| 209.583333 | 23.28 | 30.00 | 6.72 | 1000.0 | 120.000 | 116.0 | V |
| 225.010000 | 25.31 | 30.00 | 4.69 | 1000.0 | 120.000 | 131.0 | V |

Test performed for both horizontal and vertical polarizations, worst-case reported as above.

**Above 1000MHz**




| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Pol |
|---|---|---|---|---|---|
| 1663.500000 | 38.32 | --- | 70.00 | 31.68 | H |
| 1664.000000 | --- | 37.61 | 50.00 | 12.39 | H |
| 2000.000000 | 41.24 | --- | 70.00 | 28.76 | H |
| 2000.000000 | --- | 39.66 | 50.00 | 10.34 | H |
| 2643.000000 | --- | 39.06 | 50.00 | 10.94 | H |
| 2643.000000 | 39.97 | --- | 70.00 | 30.03 | H |
| 4231.500000 | 42.85 | --- | 74.00 | 31.15 | H |
| 4428.500000 | --- | 41.65 | 54.00 | 12.35 | H |
| 4754.500000 | --- | 40.93 | 54.00 | 13.07 | H |
| 4762.000000 | 41.87 | --- | 74.00 | 32.13 | H |
| 5855.500000 | --- | 44.48 | 54.00 | 9.52 | H |
| 5855.500000 | 48.64 | --- | 74.00 | 25.36 | H |




| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Pol |
|---|---|---|---|---|---|
| 2366.700000 | 36.67 | --- | 70.00 | 33.33 | V |
| 2375.000000 | --- | 24.36 | 50.00 | 25.64 | V |
| 2413.000000 | 35.27 | --- | 70.00 | 34.73 | V |
| 2414.200000 | --- | 29.89 | 50.00 | 20.11 | V |
| 4412.800000 | --- | 30.02 | 54.00 | 23.98 | V |
| 4414.700000 | 41.40 | --- | 74.00 | 32.60 | V |
| 5650.800000 | 40.30 | --- | 74.00 | 33.70 | V |
| 5656.200000 | --- | 28.29 | 54.00 | 25.71 | V |

# 6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

# 7 List of Tables

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