



FCC EMI TEST REPORT

FCC ID : U8G-P1930LITER5
Equipment : Pepwave / Peplink / Pismo Labs Wireless Product
Brand Name : Pepwave / Peplink / Pismo
Model Name : MAX Transit Mini, Max transit mini, MAX-Transit-Mini, MAX Transit Mini LTE, Max Transit Mini LTE, MAX Transit Mini LTEA, Max Transit Mini LTEA, MAX BR1 Mini, Max BR1 Mini, MAX BR1 Mini LTE, MAX BR1 Mini LTEA, MAX BR1 M2M, Pismo 930 LITE, Pismo930 LITE, Pismo930LITE, MAX-BR1-MINI-LTE-US, MAX-BR1-MINI-LTE-US-T, Pismo 930 Lite, Pismo930LITER5, Pismo 930LITER5
Applicant : Pismo Labs Technology Limited
Unit A5, 5/F, HK Spinners Ind. Bldg., Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Kowloon, Hong Kong
Manufacturer : Pismo Labs Technology Limited
Unit A5, 5/F, HK Spinners Ind. Bldg., Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Kowloon, Hong Kong
Standard : FCC 47 CFR FCC Part 15 Subpart B

The product was received on Oct. 23, 2018 and testing was started from Nov. 15, 2018 and completed on Feb. 19, 2019. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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

Approved by: Jones Tsai

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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Appendix A. AC Conducted Emission Test Result**Appendix B. Radiated Emission Test Result****Appendix C. Setup Photographs**



History of this test report



Summary of Test Result

| Report Clause | Ref Std. Clause | Test Items | Result (PASS/FAIL) | Remark |
|---------------|-----------------|-----------------------|--------------------|--|
| 3.1 | 15.107 | AC Conducted Emission | Pass | Under limit 24.29 dB at 0.519 MHz |
| 3.2 | 15.109 | Radiated Emission | Pass | Under limit 9.21 dB at 125.150 MHz |

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Louis Wu

Report Producer: Maggie Chiang



1. General Description

1.1. Product Feature of Equipment Under Test

WCDMA/LTE, and Wi-Fi 2.4GHz 802.11b/g/n.

| Product Specification subjective to this standard | |
|---|---|
| Integrated WWAN Module 1 | Brand Name: Telit Model Name: LE910-NA V2 |
| Integrated WWAN Module 2 | Brand Name: Telit Model Name: LE910C4-NF |
| Integrated WWAN Module 3 | Brand Name: Sierra Model Name: MC7455 |
| Sample 1 | EUT with WWAN module 1 (LE910-NA V2) |
| Sample 2 | EUT with WWAN module 2 (LE910C4-NF) |
| Sample 3 | EUT with WWAN module 3 (MC7455) |
| Antenna Type | WWAN: Dipole Antenna WLAN: Replacement Antenna |

Remark: The product will integrate the cellular module (LE910-NA V2, LE910C4-NF, MC7455). Among the 3 options, at a time only 1 cellular module will be installed), therefore the cellular module is incorporated into the host for Part 15B test. Equipment authorization to integrate the cellular module will follow the FCC modular approval policy and procedures.

1.2. Modification of EUT

No modifications are made to the EUT during all test items.



1.3. Test Location

| | | |
|---------------------------|---|-----------|
| Test Site | SPORTON INTERNATIONAL INC. | |
| Test Site Location | No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978 | |
| Test Site No. | Sporton Site No. | |
| | CO05-HY | 03CH06-HY |

| | | |
|---------------------------|--|--|
| Test Site | SPORTON INTERNATIONAL INC. | |
| Test Site Location | No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.. TEL: +886-2-2631-5551 FAX: +886-2-2631-9740 | |
| Test Site No. | Sporton Site No. | |
| | OS02-NH | |

FCC Designation No. TW1093 and TW1094

1.4. Applicable Standards

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

- ♦ FCC 47 CFR FCC Part 15 Subpart B
- ♦ ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

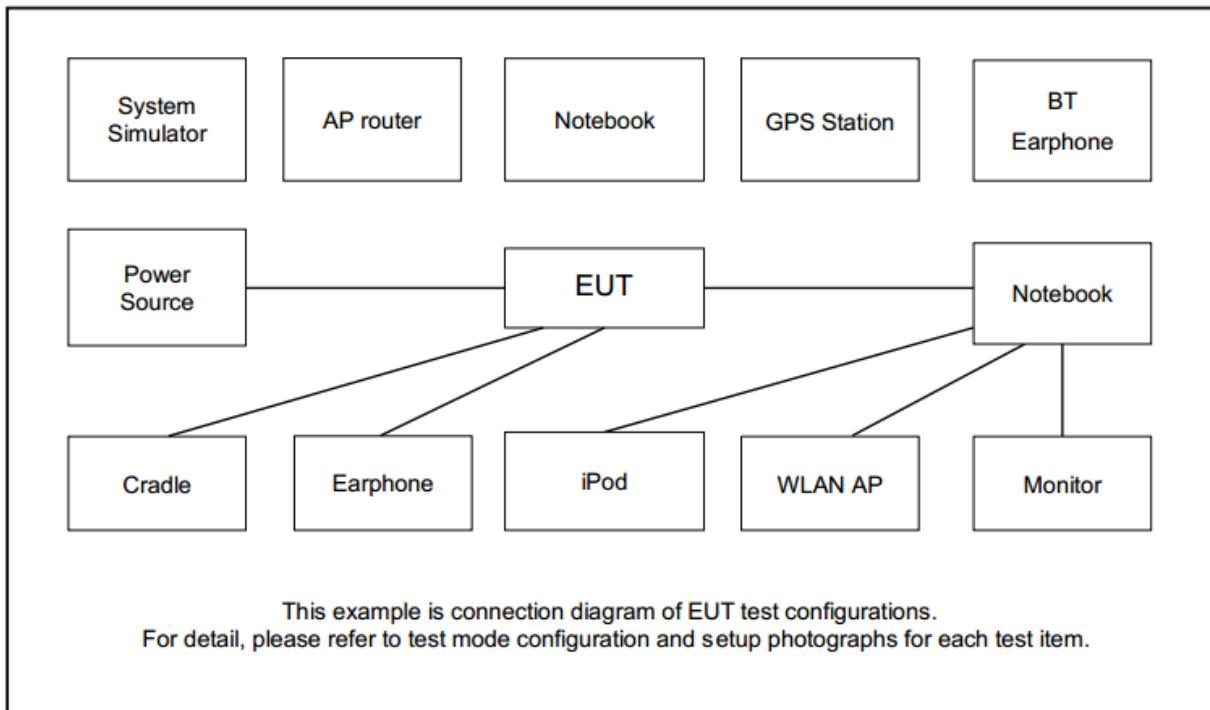
Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

| Test Items | Function Type |
|-----------------------|---|
| AC Conducted Emission | Mode 1: WCDMA Band II Idle + WLAN (2.4GHz) Idle + LAN Link + WAN Link + GPS Rx + Console Port (Load) + AC Adapter + SIM 1 for Sample 1 Mode 2: LTE Band 5 Idle + WLAN (2.4GHz) Idle + LAN Link + GPS Rx + Console Port (Load) + POE Adapter + SIM 2 for Sample 1 Mode 3: LTE Band 5 Idle + WLAN (2.4GHz) Idle + LAN Link + GPS Rx + Console Port (Load) + POE Adapter + SIM 2 for Sample 2 Mode 4: LTE Band 5 Idle + WLAN (2.4GHz) Idle + LAN Link + GPS Rx + Console Port (Load) + POE Adapter + SIM 2 for Sample 3 |
| Radiated Emissions | Mode 1: WCDMA Band II Idle + WLAN (2.4GHz) Idle + LAN Link + WAN Link + GPS Rx + Console Port (Load) + AC Adapter + SIM 1 for Sample 1 |

Remark:

1. The worst case of AC is mode 4; only the test data of this mode was reported.
2. The worst case of RE is mode 1; only the test data of this mode was reported.

2.2. Connection Diagram of Test System





2.3. Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model Name | FCC ID | Data Cable | Power Cord |
|------|------------------|------------|----------------|--|------------|--|
| 1. | System Simulator | Anritsu | MT8820C | N/A | N/A | Unshielded, 1.8 m |
| 2. | GPS Station | Pendulum | GSG-54 | N/A | N/A | Unshielded, 1.8 m |
| 3. | Notebook | Asus | P2430U | FCC DoC | N/A | AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m |
| 4. | Notebook | DELL | Latitude E6320 | FCC DoC/ Contains FCC ID: QDS-BRCM1054 | N/A | AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m |
| 5. | Notebook | DELL | Latitude E3340 | FCC DoC/ Contains FCC ID: PD97260NGU | N/A | AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m |
| 6. | Notebook | DELL | Latitude E5570 | FCC DoC | N/A | AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m |
| 7. | PEPWAVE | N/A | PoE-1012 | N/A | N/A | N/A |

2.4. EUT Operation Test Setup

The EUT was in WCDMA or LTE idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

At the same time, the following programs installed in the EUT were programmed during the test.

1. Execute "Test Console" to make the EUT receive continuous signals from GPS station.
2. EUT links with Notebook via RJ45 and execute ping.
3. For WLAN Idle, the EUT was attached to the Notebook.



3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1 Limits of AC Conducted Emission

For equipment 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.

| Frequency of emission (MHz) | Conducted limit (dBuV) | |
|--------------------------------|------------------------|---------|
| | Quasi-peak | Average |
| 0.15-0.5 | 79 | 66 |
| 0.5-30 | 73 | 60 |

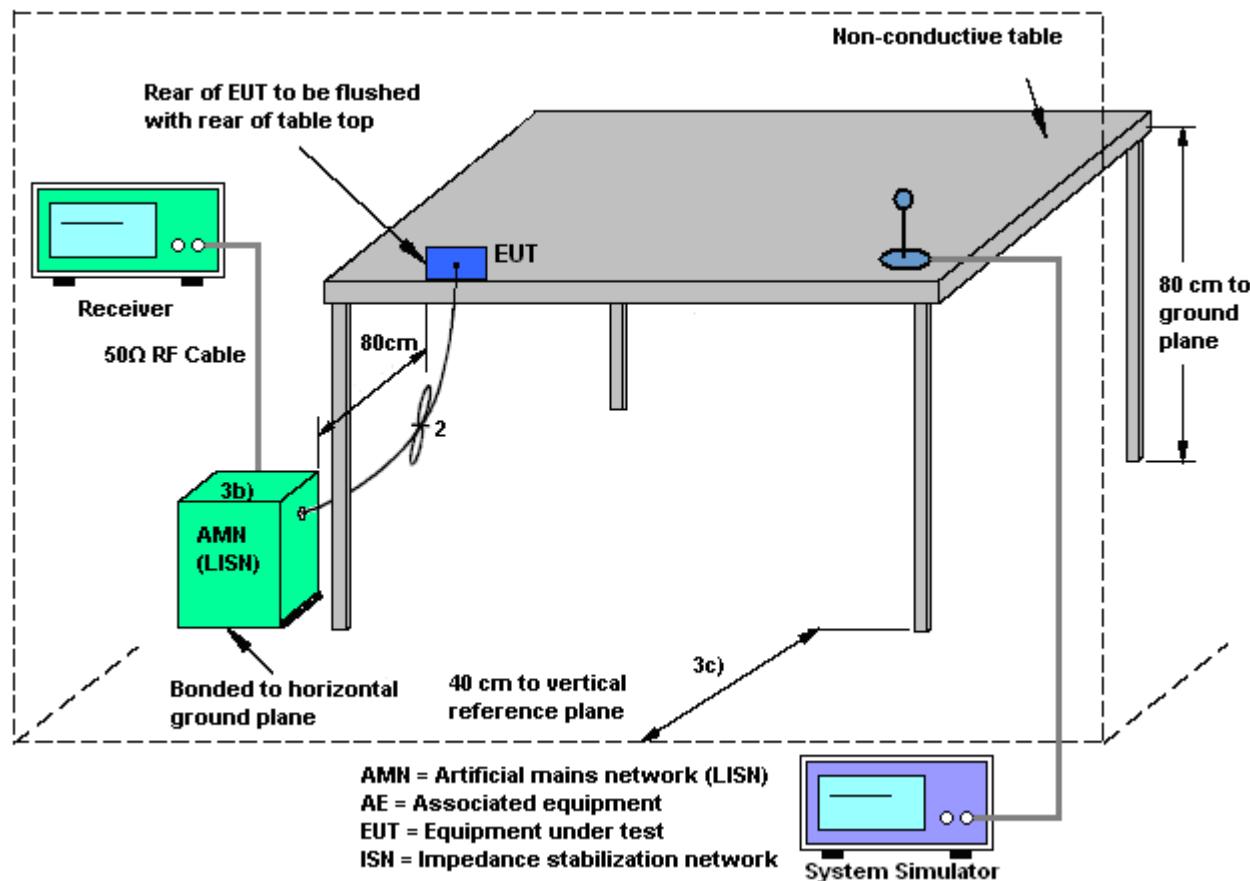
3.1.2 Measuring Instruments

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

3.1.3 Test Procedure

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.1.4 Test Setup



3.1.5 Test Result of AC Conducted Emission

Please refer to Appendix A.



3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|--------------------|--------------------------------------|----------------------------------|
| Above 960 | 300 | 10 |

| Frequency (MHz) | Field Strength (dBuV/meter) | Measurement Distance (meters) |
|--------------------|--------------------------------|----------------------------------|
| 30 – 230 | 40 | 10 |
| 230 – 1000 | 47 | 10 |

Note: Measurement follows the CISPR 22 limit line as below :

15.109 (g) As an alternative to the radiated emission limits shown in paragraphs (a) and (b) of this section, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement"

3.2.2. Measuring Instruments

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

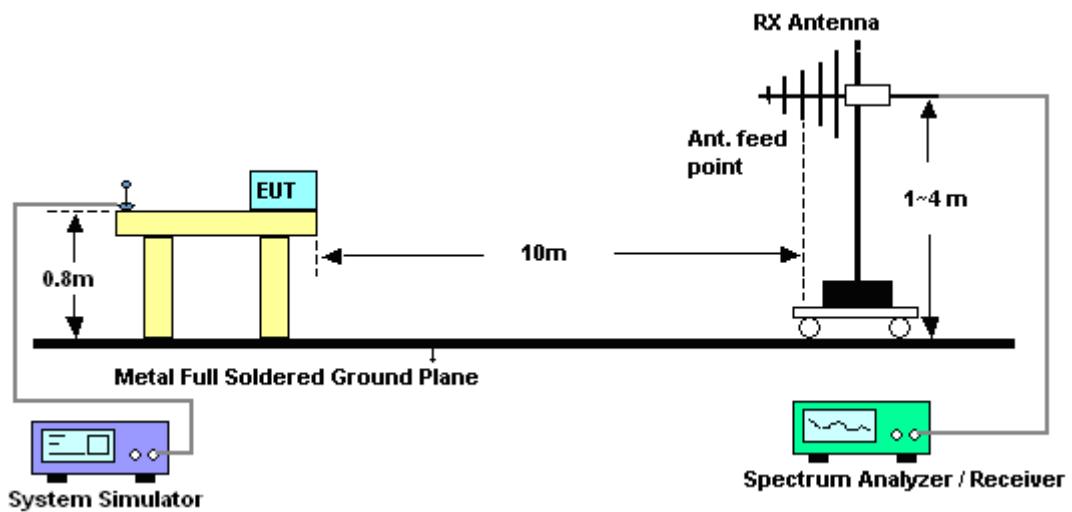


3.2.3. Test Procedures

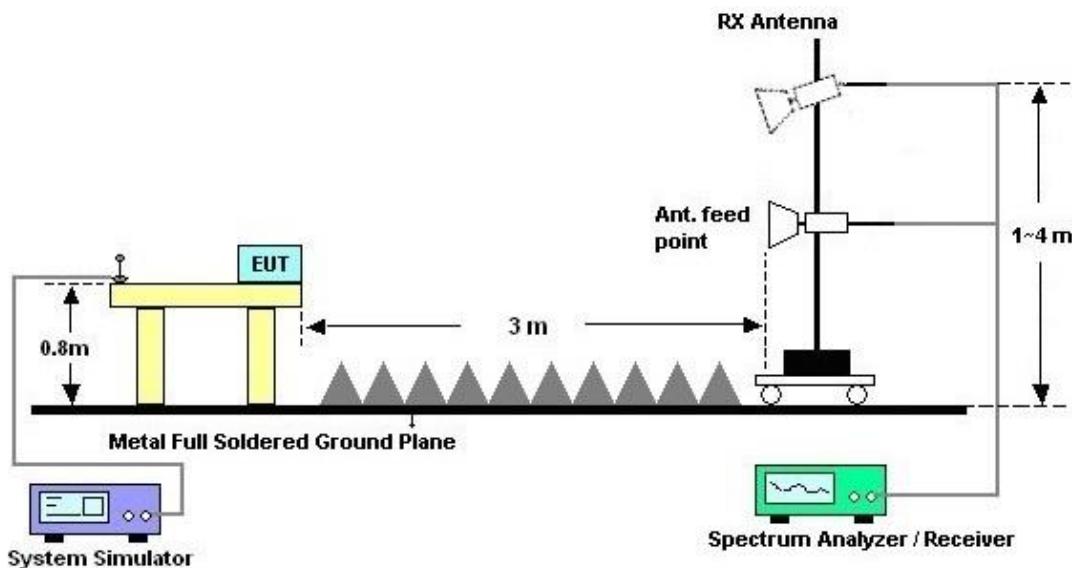
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 10 meters (30M~1G) and 3 meters (1G~ 13G) from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.2.5. Test Result of Radiated Emission

Please refer to Appendix B.



4. List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|-----------------------------------|---|-------------------------------------|---|-------------------|------------------|-----------------------------|---------------|-----------------------|
| AC Power Source | ChainTek | APC-1000W | N/A | N/A | N/A | Nov. 15, 2018~Dec. 24, 2018 | N/A | Conduction (CO05-HY) |
| EMI Test Receiver | Rohde & Schwarz | ESR3 | 102388 | 9KHz~3.6GHz | Nov. 12, 2018 | Nov. 15, 2018~Dec. 24, 2018 | Nov. 11, 2019 | Conduction (CO05-HY) |
| LISN | Rohde & Schwarz | ENV216 | 100080 | 9kHz~30MHz | Nov. 14, 2018 | Nov. 15, 2018~Dec. 24, 2018 | Nov. 13, 2019 | Conduction (CO05-HY) |
| Software | Rohde & Schwarz | EMC32 V10.30 | N/A | N/A | N/A | Nov. 15, 2018~Dec. 24, 2018 | N/A | Conduction (CO05-HY) |
| LF Cable | HUBER + SUHNER | RG-214/U | LF01 | N/A | Jan. 03, 2018 | Nov. 15, 2018~Dec. 24, 2018 | Jan. 02, 2019 | Conduction (CO05-HY) |
| Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | 100851 | N/A | Jan. 03, 2018 | Nov. 15, 2018~Dec. 24, 2018 | Jan. 02, 2019 | Conduction (CO05-HY) |
| Amplifier | HP | 8447D | 2944A06292 | 0.1 MHz - 1.3 GHz | May 14, 2018 | Feb. 15, 2019~Feb. 18, 2019 | May 13, 2019 | Radiation (OS02-NH) |
| Receiver | R&S | ESCI | 100497 | 9 kHz – 3 GHz | May 22, 2018 | Feb. 15, 2019~Feb. 18, 2019 | May 21, 2019 | Radiation (OS02-NH) |
| Bilog Antenna With 5dB Attenuator | TESEO | CBL6112D | 35376 | 30 MHz - 2 GHz | Apr. 28, 2018 | Feb. 15, 2019~Feb. 18, 2019 | Apr. 27, 2019 | Radiation (OS02-NH) |
| Turn Table | EMCO | 2080 | 9508-1805 | 0 - 360 degree | NCR | Feb. 15, 2019~Feb. 18, 2019 | NCR | Radiation (OS02-NH) |
| Antenna Mast | ETS | 2075-2 | 2385 | 1 m - 4 m | NCR | Feb. 15, 2019~Feb. 18, 2019 | NCR | Radiation (OS02-NH) |
| RF Cable-R10m | MIYAZAKI | 5DFB | CB044 | 30 MHz - 1 GHz | Aug. 24, 2018 | Feb. 15, 2019~Feb. 18, 2019 | Aug. 23, 2019 | Radiation (OS02-NH) |
| Software | Audix | E3 | Ver.4 | - | NCR | Feb. 15, 2019~Feb. 18, 2019 | NCR | Radiation (OS02-NH) |
| AVR | ACPOWER | AFC-1KV | F103030011 | - | NCR | Feb. 15, 2019~Feb. 18, 2019 | NCR | Radiation (OS02-NH) |
| EMI Test Receiver | Rohde & Schwarz | ESU26 | 100472 | 20Hz~26.5GHz | Jan. 08, 2019 | Feb. 19, 2019 | Jan. 07, 2020 | Radiation (03CH06-HY) |
| Horn Antenna | SCHWARZBECK | BBHA 9120 D | 9120D-1156 | 1GHz~18GHz | Aug. 24, 2018 | Feb. 19, 2019 | Aug. 23, 2019 | Radiation (03CH06-HY) |
| Preamplifier | MITEQ | AMF-7D-00101 800-30-10P | 1850117 | 1GHz ~ 18GHz | May 24, 2018 | Feb. 19, 2019 | May 23, 2019 | Radiation (03CH06-HY) |
| Antenna Mast | MF | MF-7802 | MF780208212 | 1m~4m | N/A | Feb. 19, 2019 | N/A | Radiation (03CH06-HY) |
| Turn Table | INN-CO | DS2000 | 420/650/00 | 0-360 degree | N/A | Feb. 19, 2019 | N/A | Radiation (03CH06-HY) |
| Test Software | AUDIX | e3 | 6.2009-8-24 (k5) | N/A | N/A | Feb. 19, 2019 | N/A | Radiation (03CH06-HY) |
| RF Cable | HUBER+SUHN WOKEN/ HARBOUR INDUSTRIES | SUCOFLEX 104 /STORM/LL14 2 | MY24966/4/ 00100A1O2A1 78T/ CA3601-3601- 1000 | 30MHz-26GHz | Nov. 22, 2018 | Feb. 19, 2019 | Nov. 21, 2019 | Radiation (03CH06-HY) |
| Filter | Microwave | H1G013G1 | SN477215 | 1.0G High Pass | Nov. 02, 2018 | Feb. 19, 2019 | Nov. 01, 2019 | Radiation (03CH06-HY) |



5. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

| | |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2U _c (y)) | 2.2 |
|---|-----|

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

| | |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2U _c (y)) | 3.0 |
|---|-----|

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

| | |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2U _c (y)) | 4.7 |
|---|-----|



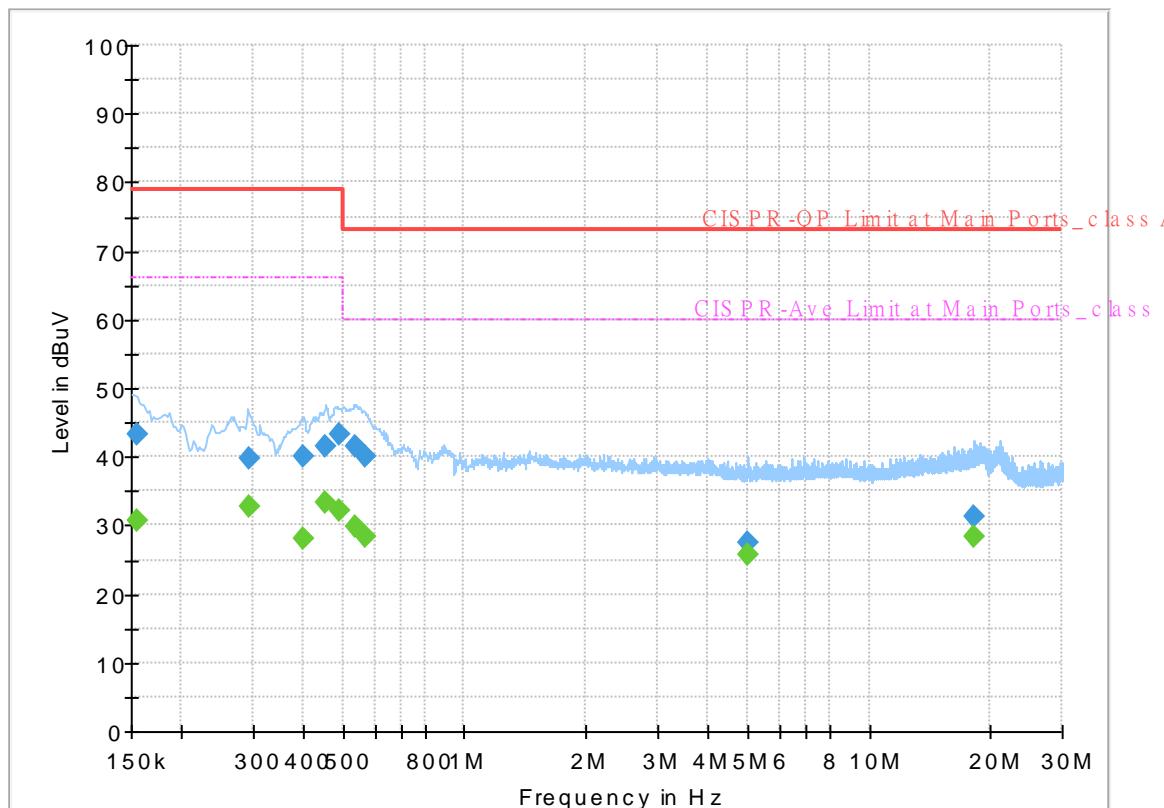
Appendix A. AC Conducted Emission Test Results

| | | | |
|------------------------|-------------|----------------------------|---------|
| Test Engineer : | Jimmy Chang | Temperature : | 24~26°C |
| | | Relative Humidity : | 50~52% |

EUT Information

Report NO : 802320
 Test Mode : Mode 4
 Test Voltage : 120Vac/60Hz
 Phase : Line

Full Spectrum



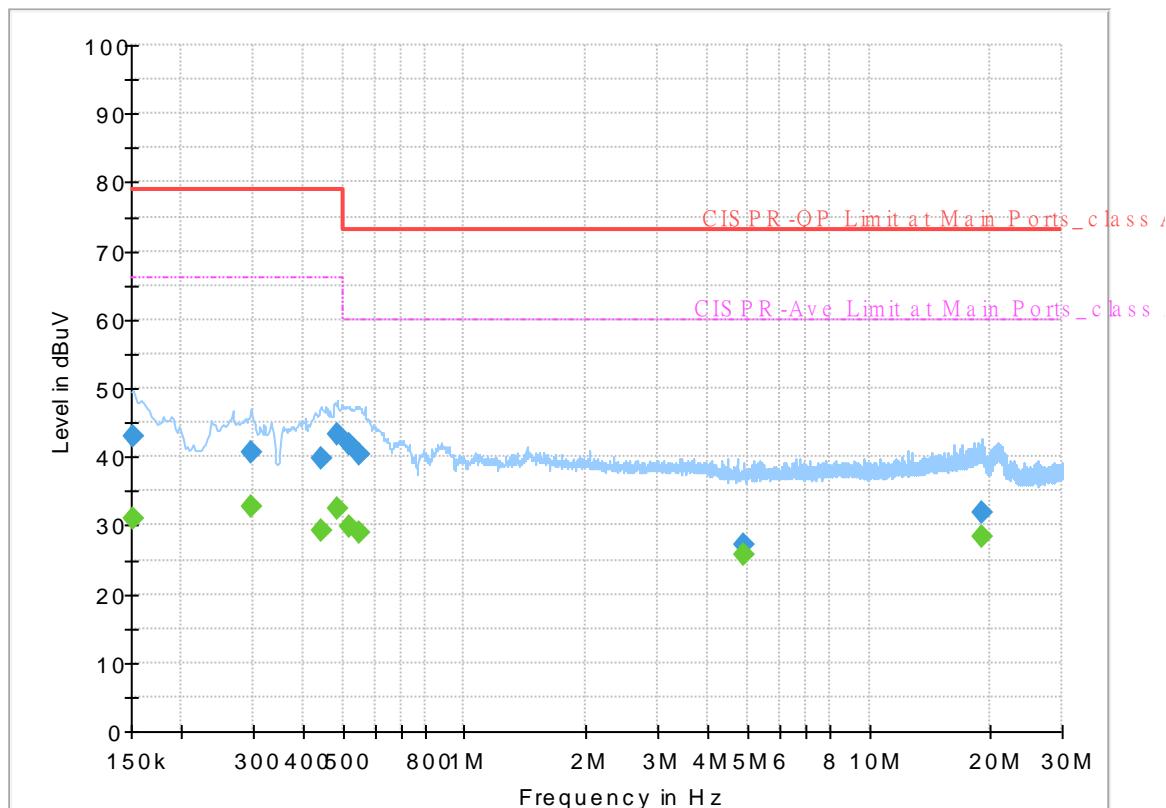
Final Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------|--------|------------|
| 0.154500 | 43.31 | --- | 79.00 | 35.69 | L1 | OFF | 19.5 |
| 0.154500 | --- | 30.66 | 73.00 | 42.34 | L1 | OFF | 19.5 |
| 0.294000 | 39.63 | --- | 79.00 | 39.37 | L1 | OFF | 19.5 |
| 0.294000 | --- | 32.68 | 73.00 | 40.32 | L1 | OFF | 19.5 |
| 0.399750 | 39.94 | --- | 79.00 | 39.06 | L1 | OFF | 19.5 |
| 0.399750 | --- | 28.02 | 73.00 | 44.98 | L1 | OFF | 19.5 |
| 0.453750 | 41.54 | --- | 79.00 | 37.46 | L1 | OFF | 19.5 |
| 0.453750 | --- | 33.34 | 73.00 | 39.66 | L1 | OFF | 19.5 |
| 0.489750 | 43.40 | --- | 79.00 | 35.60 | L1 | OFF | 19.5 |
| 0.489750 | --- | 32.28 | 73.00 | 40.72 | L1 | OFF | 19.5 |
| 0.534750 | 41.58 | --- | 66.00 | 24.42 | L1 | OFF | 19.5 |
| 0.534750 | --- | 29.76 | 60.00 | 30.24 | L1 | OFF | 19.5 |
| 0.570750 | 39.95 | --- | 66.00 | 26.05 | L1 | OFF | 19.5 |
| 0.570750 | --- | 28.37 | 60.00 | 31.63 | L1 | OFF | 19.5 |
| 5.023500 | 27.62 | --- | 66.00 | 38.38 | L1 | OFF | 19.7 |
| 5.023500 | --- | 25.82 | 60.00 | 34.18 | L1 | OFF | 19.7 |
| 18.224250 | 31.22 | --- | 66.00 | 34.78 | L1 | OFF | 20.2 |
| 18.224250 | --- | 28.30 | 60.00 | 31.70 | L1 | OFF | 20.2 |

EUT Information

Report NO : 802320
 Test Mode : Mode 4
 Test Voltage : 120Vac/60Hz
 Phase : Neutral

Full Spectrum



Final Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------|--------|------------|
| 0.152250 | 43.00 | --- | 79.00 | 36.00 | N | OFF | 19.5 |
| 0.152250 | --- | 30.86 | 73.00 | 42.14 | N | OFF | 19.5 |
| 0.296250 | 40.77 | --- | 79.00 | 38.23 | N | OFF | 19.5 |
| 0.296250 | --- | 32.82 | 73.00 | 40.18 | N | OFF | 19.5 |
| 0.442500 | 39.70 | --- | 79.00 | 39.30 | N | OFF | 19.5 |
| 0.442500 | --- | 29.23 | 73.00 | 43.77 | N | OFF | 19.5 |
| 0.485250 | 43.31 | --- | 79.00 | 35.69 | N | OFF | 19.5 |
| 0.485250 | --- | 32.56 | 73.00 | 40.44 | N | OFF | 19.5 |
| 0.519000 | 41.71 | --- | 66.00 | 24.29 | N | OFF | 19.5 |
| 0.519000 | --- | 29.80 | 60.00 | 30.20 | N | OFF | 19.5 |
| 0.552750 | 40.42 | --- | 66.00 | 25.58 | N | OFF | 19.5 |
| 0.552750 | --- | 29.09 | 60.00 | 30.91 | N | OFF | 19.5 |
| 4.899750 | 27.23 | --- | 66.00 | 38.77 | N | OFF | 19.7 |
| 4.899750 | --- | 25.67 | 60.00 | 34.33 | N | OFF | 19.7 |
| 18.996000 | 31.85 | --- | 66.00 | 34.15 | N | OFF | 20.3 |
| 18.996000 | --- | 28.37 | 60.00 | 31.63 | N | OFF | 20.3 |



Appendix B. Radiated Emission Test Result

