

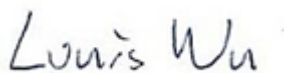


# FCC EMI TEST REPORT

FCC ID : APYHRO00322  
Equipment : Mobile Router  
Brand Name : SHARP  
Applicant : SHARP CORPORATION  
1 Takumi-cho, Sakai-ku, Sakai City, Osaka  
590-8522, Japan  
Manufacturer : SHARP CORPORATION  
1 Takumi-cho, Sakai-ku, Sakai City, Osaka  
590-8522, Japan  
Standard : FCC 47 CFR FCC Part 15 Subpart B Class B

The product was received on Sep. 08, 2022 and testing was performed from Oct. 03, 2022 to Oct. 05, 2022. We, Sporton International Inc. EMC & Wireless Communications Laboratory, 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 test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Louis Wu

**Sporton International Inc. EMC & Wireless Communications Laboratory**

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)



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## History of this test report

| Report No.  | Version | Description             | Issue Date    |
|-------------|---------|-------------------------|---------------|
| FC262909-02 | 01      | Initial issue of report | Nov. 15, 2022 |
|             |         |                         |               |
|             |         |                         |               |
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|             |         |                         |               |

## Summary of Test Result

| Report Clause | Ref Std. Clause | Test Items            | Result (PASS/FAIL) | Remark                                                        |
|---------------|-----------------|-----------------------|--------------------|---------------------------------------------------------------|
| 3.1           | 15.107          | AC Conducted Emission | Pass               | 8.12 dB<br>under the limit at<br>0.152 MHz                    |
| 3.2           | 15.109          | Radiated Emission     | Pass               | 5.89 dB<br>under the limit at<br>53.760 MHz<br>for Quasi-Peak |

### Declaration of Conformity:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.  
It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to this report "Uncertainty of Evaluation".

### Comments and Explanations:

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

**Reviewed by: Keven Cheng**

**Report Producer: Lucy Wu**

## 1. General Description

### 1.1. Product Feature of Equipment Under Test

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

| Product Feature |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| Antenna Type    | WWAN: PIFA Antenna<br>WLAN<br><Ant. 1>: FPC, PIFA Antenna<br><Ant. 2>: FPC, PIFA Antenna |

**Remark:** The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations in report summary.

### 1.2. Modification of EUT

No modifications made to the EUT during the testing.

### 1.3. Test Location

|                    |                                                                                                                           |
|--------------------|---------------------------------------------------------------------------------------------------------------------------|
| Test Site          | Sporton International Inc. EMC & Wireless Communications Laboratory                                                       |
| Test Site Location | No.52, Huaya 1st Rd., Guishan Dist.,<br>Taoyuan City 333, Taiwan (R.O.C.)<br>TEL: +886-3-327-3456<br>FAX: +886-3-328-4978 |
| Test Site No.      | <b>Sporton Site No.</b><br>CO05-HY, 03CH06-HY                                                                             |

FCC designation No.: TW1093

### 1.4. Applicable Standards

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

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

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

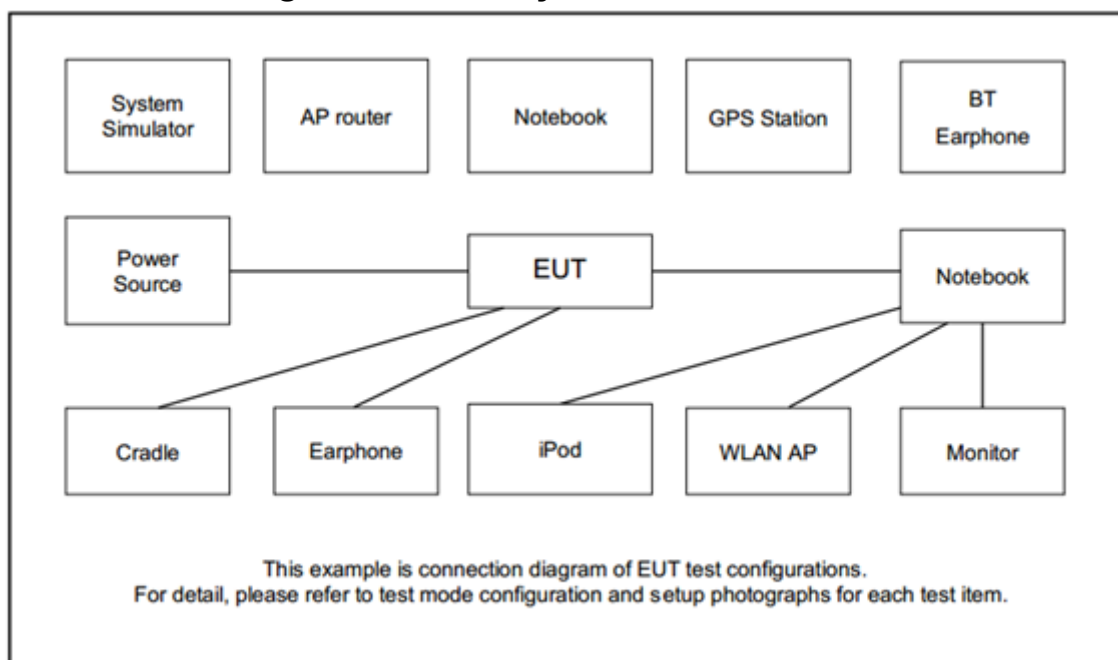
## 2. Test Configuration of Equipment Under Test

### 2.1. Test Mode

The EUT is tested along with the peripherals, operating under possible configurations in compliant with normal operation. The maximum emissions can be identified by a pre-scan carried out in different orientations of placement pursuant to ANSI C63.4-2014. Frequency range covered: Conduction Emission (150 kHz to 30 MHz), Radiation Emission (30 MHz to the 5<sup>th</sup> harmonics of the highest fundamental frequency or to 40 GHz, whichever is lower).

| Test Items                                                                                                                                                                                                                                                                                                                                                                                                                            | Functions Enabled                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>AC Conducted Emission</b>                                                                                                                                                                                                                                                                                                                                                                                                          | Mode 1: LTE Band 5 Idle + WLAN (2.4GHz) Link + Battery + USB Cable (Charging form Adapter)                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                       | Mode 2: LTE Band 12 Idle + WLAN (2.4GHz) Link + Battery + USB-Ethernet Dongle (LAN Link) + USB Cable (Charging form Adapter) |
| <b>Radiated Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                             | Mode 1: LTE Band 5 Idle + WLAN (2.4GHz) Link + Battery + USB Cable (Charging form Adapter)                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                       | Mode 2: LTE Band 12 Idle + WLAN (2.4GHz) Link + Battery + USB-Ethernet Dongle (LAN Link) + USB Cable (Charging form Adapter) |
|                                                                                                                                                                                                                                                                                                                                                                                                                                       | Mode 3: LTE Band 5 Idle + WLAN (2.4GHz) Link + Battery                                                                       |
| <b>Remark:</b> <ol style="list-style-type: none"> <li>1. The worst case of AC is mode 1; only the test data of this mode was reported.</li> <li>2. The worst case of RE is mode 2; only the test data of this mode was reported.</li> <li>3. For Radiation Emission after pre-scanned the cellular band between 30MHz ~ 960MHz (LTE Band 5/12); only the worst case for cellular band test data of this mode was reported.</li> </ol> |                                                                                                                              |

### 2.2. Connection Diagram of Test System



### 2.3. Support Unit used in test configuration and system

| Item | Equipment        | Brand Name | Model Name    | FCC ID  | Data Cable | Power Cord                                                 |
|------|------------------|------------|---------------|---------|------------|------------------------------------------------------------|
| 1.   | System Simulator | Anritsu    | MT8820C       | N/A     | N/A        | Unshielded, 1.8 m                                          |
| 2.   | Notebook         | DELL       | Latitude 3400 | FCC DoC | N/A        | AC I/P:<br>Unshielded, 1.2 m<br>DC O/P:<br>Shielded, 1.8 m |
| 3.   | Adapter          | docomo     | AC08          | N/A     | N/A        | N/A                                                        |

### 2.4. EUT Operation Test Setup

The EUT is in LTE idle mode during the test. The EUT is synchronized with the BCCH, and has been continuous receiving mode by setting paging reorganization of the system simulator.

At the same time, the EUT is attached to the Notebook via WLAN function, and the following programs installed in the EUT are programmed during the test:

1. EUT links with Notebook and executes ping via RJ-45 Cable.

### 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.

<Class B>

| Frequency of emission<br>(MHz) | Conducted limit (dBuV) |           |
|--------------------------------|------------------------|-----------|
|                                | Quasi-peak             | Average   |
| 0.15-0.5                       | 66 to 56*              | 56 to 46* |
| 0.5-5                          | 56                     | 46        |
| 5-30                           | 60                     | 50        |

\*Decreases with the logarithm of the frequency.

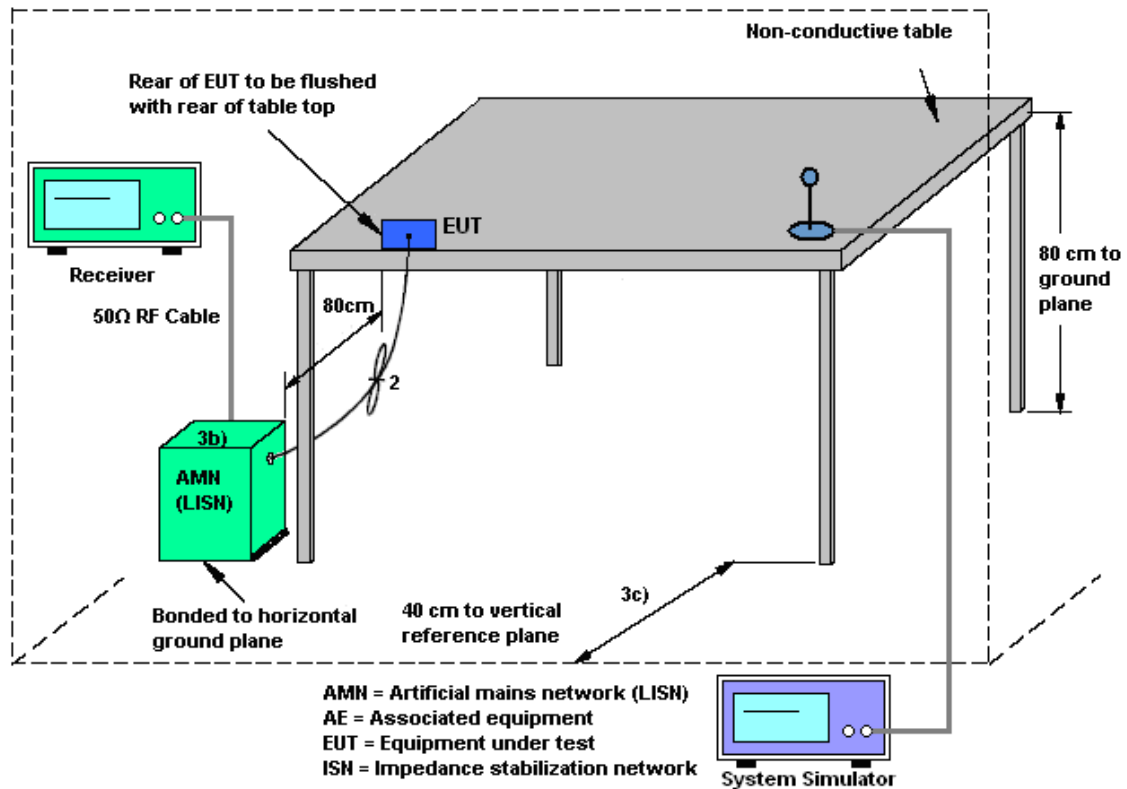
##### 3.1.2. Measuring Instruments

Please refer to the measuring equipment list in this test report.

##### 3.1.3. Test Procedure

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is 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 shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (If Bandwidth = 9 kHz) 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:

<Class B>

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 30 – 88         | 100                               | 3                             |
| 88 – 216        | 150                               | 3                             |
| 216 - 960       | 200                               | 3                             |
| Above 960       | 500                               | 3                             |

### 3.2.2. Measuring Instruments

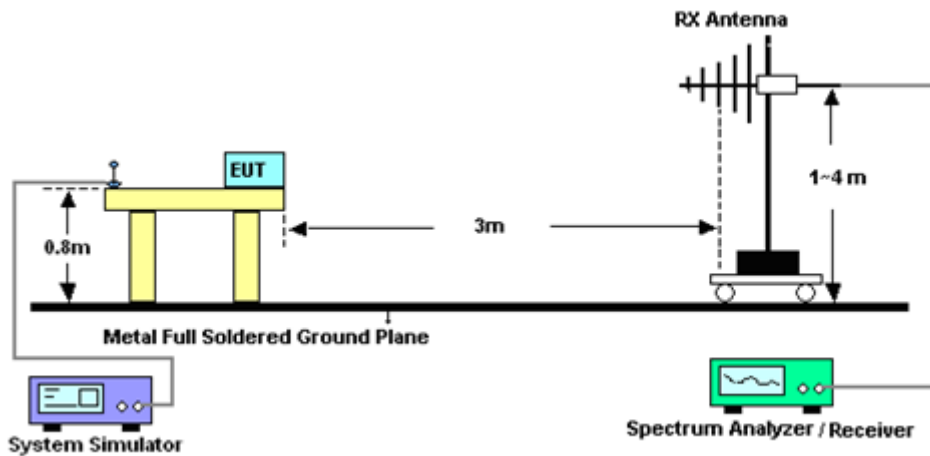
Please refer to the measuring equipment list in this test report.

### 3.2.3. Test Procedures

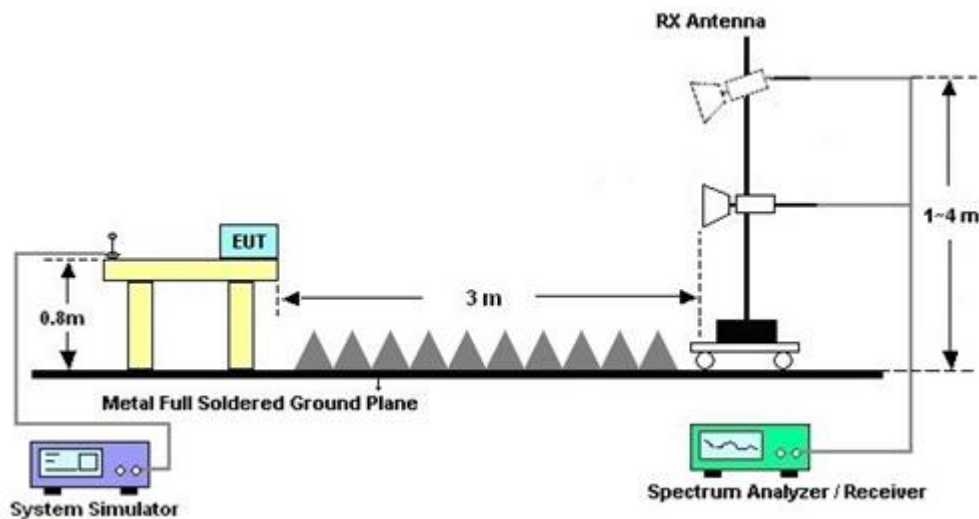
1. The EUT is placed on a turntable with 0.8 meter above ground.
2. The EUT is set 3 meters from the interference receiving antenna, which is mounted on the top of a variable height antenna tower.
3. The table is rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is 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 is 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=120 kHz/VBW=300 kHz for frequency below 1 GHz; RBW=1 MHz VBW=3 MHz (Peak), RBW=1 MHz/VBW=10 Hz (Average) for frequency above 1 GHz).
7. If the emission level of the EUT in peak mode is 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.

### 3.2.4. Test Setup of Radiated Emission

For Radiated Emissions from 30 MHz to 1 GHz



For Radiated Emissions from 1GHz to 18GHz



### 3.2.5. Test Result of Radiated Emission

Please refer to Appendix B.



## 4. List of Measuring Equipment

| Instrument        | Brand Name      | Model No.             | Serial No.      | Characteristics               | Calibration Date | Test Date     | Due Date      | Remark                |
|-------------------|-----------------|-----------------------|-----------------|-------------------------------|------------------|---------------|---------------|-----------------------|
| AC Power Source   | ChainTek        | APC-1000W             | N/A             | N/A                           | N/A              | Oct. 05, 2022 | N/A           | Conduction (CO05-HY)  |
| EMI Test Receiver | Rohde & Schwarz | ESR3                  | 102388          | 9kHz~3.6GHz                   | Dec. 01, 2021    | Oct. 05, 2022 | Nov. 30, 2022 | Conduction (CO05-HY)  |
| Hygrometer        | Testo           | 608-H1                | 34913912        | N/A                           | Nov. 17, 2021    | Oct. 05, 2022 | Nov. 16, 2022 | Conduction (CO05-HY)  |
| LISN              | Rohde & Schwarz | ENV216                | 100080          | 9kHz~30MHz                    | Dec. 03, 2021    | Oct. 05, 2022 | Dec. 02, 2022 | Conduction (CO05-HY)  |
| Software          | Rohde & Schwarz | EMC32                 | N/A             | N/A                           | N/A              | Oct. 05, 2022 | N/A           | Conduction (CO05-HY)  |
| Pulse Limiter     | SCHWARZBECK     | VTSD 9561-FN          | 00691           | N/A                           | Aug. 01, 2022    | Oct. 05, 2022 | Jul. 31, 2023 | Conduction (CO05-HY)  |
| LISN Cable        | MVE             | RG-400                | 260260          | N/A                           | Dec. 30, 2021    | Oct. 05, 2022 | Dec. 29, 2022 | Conduction (CO05-HY)  |
| Amplifier         | SONOMA          | 310N                  | 186713          | 9kHz~1GHz                     | Apr. 28, 2022    | Oct. 03, 2022 | Apr. 27, 2023 | Radiation (03CH06-HY) |
| Bilog Antenna     | Schaffner       | CBL 6111C & N-6-06    | 2725 & AT-N0601 | 30MHz~1GHz                    | Nov. 11, 2021    | Oct. 03, 2022 | Nov. 10, 2022 | Radiation (03CH06-HY) |
| EMI Test Receiver | Rohde & Schwarz | ESU26                 | 100472          | 20Hz~26.5GHz                  | Feb. 09, 2022    | Oct. 03, 2022 | Feb. 08, 2023 | Radiation (03CH06-HY) |
| Horn Antenna      | SCHWARZBECK     | BBHA 9120 D           | 9120D-02037     | 1GHz~18GHz                    | Dec. 20, 2021    | Oct. 03, 2022 | Dec. 19, 2022 | Radiation (03CH06-HY) |
| Preamplifier      | Jet-Power       | JPA00101800-30-10P    | 1601180001      | 1GHz~18GHz                    | Jul. 18, 2022    | Oct. 03, 2022 | Jul. 17, 2023 | Radiation (03CH06-HY) |
| RF Cable          | HUBER + SUHNER  | SF102_7000m           | 532299/2        | 30MHz to 40GHz                | Jul. 04, 2022    | Oct. 03, 2022 | Jul. 03, 2023 | Radiation (03CH06-HY) |
| RF Cable          | HUBER + SUHNER  | SF102_3000m           | 532422/2        | 30MHz to 40GHz                | Jul. 04, 2022    | Oct. 03, 2022 | Jul. 03, 2023 | Radiation (03CH06-HY) |
| RF Cable          | HUBER + SUHNER  | SF102_2000m           | 532421/2        | 30MHz to 40GHz                | Jul. 04, 2022    | Oct. 03, 2022 | Jul. 03, 2023 | Radiation (03CH06-HY) |
| RF Cable          | HUBER + SUHNER  | SF104                 | 802433/4        | 30Mhz to 18Ghz                | Aug. 18, 2022    | Oct. 03, 2022 | Aug. 17, 2023 | Radiation (03CH06-HY) |
| Controller        | INN-CO          | EM1000                | 060782          | Control Turn table & Ant Mast | N/A              | Oct. 03, 2022 | N/A           | Radiation (03CH06-HY) |
| Antenna Mast      | MF              | MF-7802               | MF780208212     | 1m~4m                         | N/A              | Oct. 03, 2022 | N/A           | Radiation (03CH06-HY) |
| Turn Table        | INN-CO          | DS2000                | 420/650/00      | 0-360 degree                  | N/A              | Oct. 03, 2022 | N/A           | Radiation (03CH06-HY) |
| Software          | Audix           | E3<br>6.2009-8-24(k5) | N/A             | N/A                           | N/A              | Oct. 03, 2022 | N/A           | 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% ( $U = 2Uc(y)$ ) | 3.5 dB |
|-------------------------------------------------------------------------|--------|

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

|                                                                         |        |
|-------------------------------------------------------------------------|--------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 5.2 dB |
|-------------------------------------------------------------------------|--------|

### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

|                                                                         |        |
|-------------------------------------------------------------------------|--------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 4.6 dB |
|-------------------------------------------------------------------------|--------|

### Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

|                                                                         |        |
|-------------------------------------------------------------------------|--------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 4.5 dB |
|-------------------------------------------------------------------------|--------|



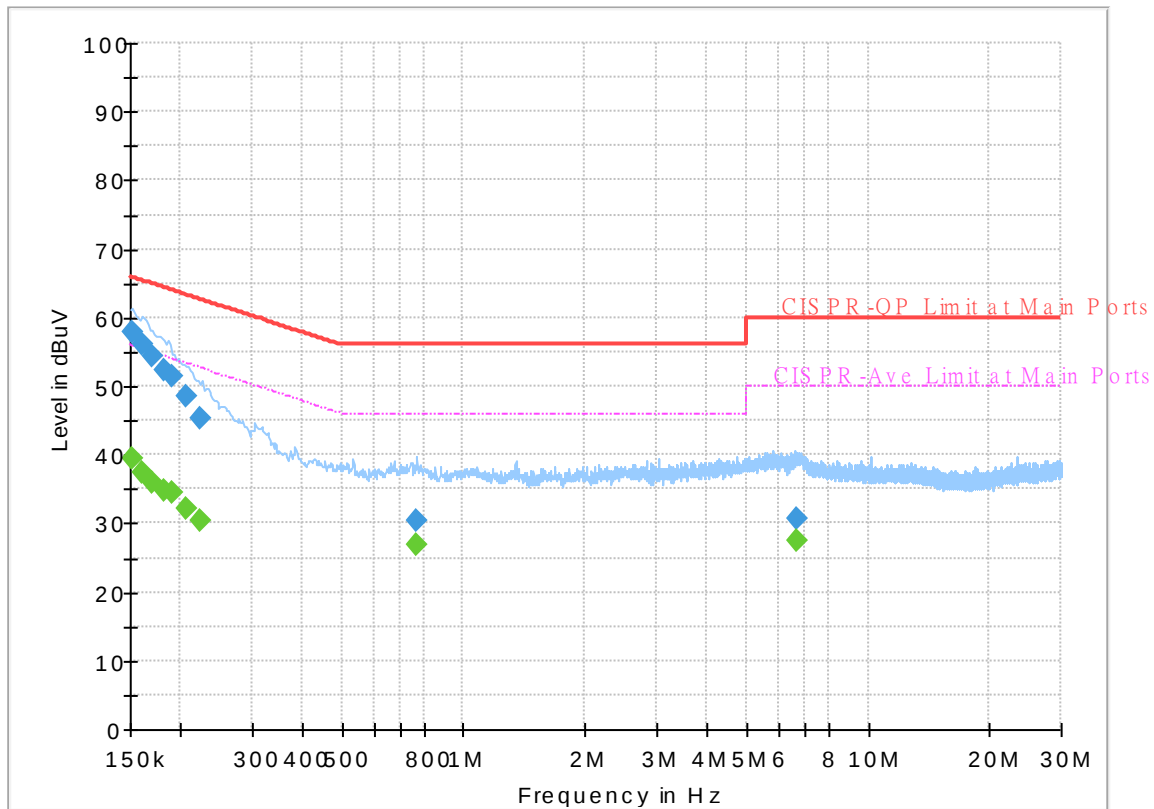
## Appendix A. AC Conducted Emission Test Results

|                 |             |                     |        |
|-----------------|-------------|---------------------|--------|
| Test Engineer : | Calvin Wang | Temperature :       | 23~26℃ |
|                 |             | Relative Humidity : | 45~55% |

## EUT Information

Report NO : 262909-02  
 Test Mode : Mode 1  
 Test Voltage : 120Vac/60Hz  
 Phase : Line

Full Spectrum



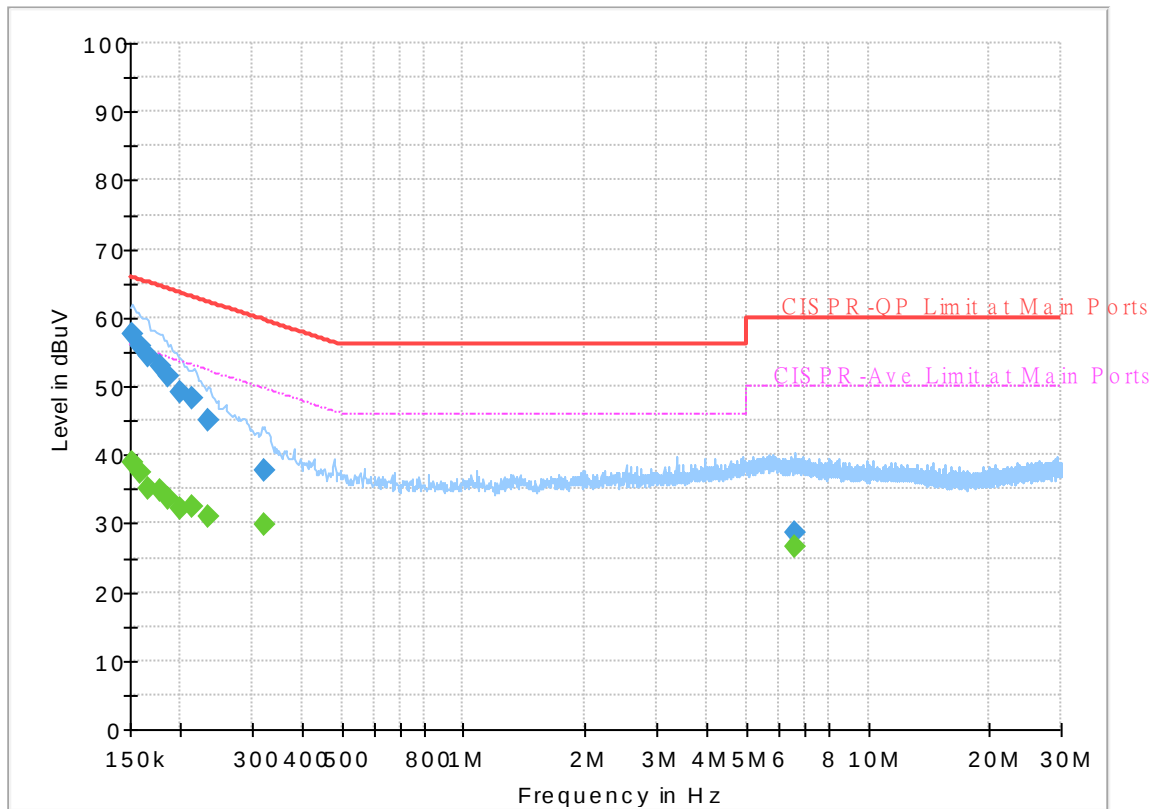
## Final\_Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------|--------|------------|
| 0.152250        | ---              | 39.50           | 55.88        | 16.38       | L1   | OFF    | 19.8       |
| 0.152250        | 57.76            | ---             | 65.88        | 8.12        | L1   | OFF    | 19.8       |
| 0.161250        | ---              | 37.49           | 55.40        | 17.91       | L1   | OFF    | 19.8       |
| 0.161250        | 56.17            | ---             | 65.40        | 9.23        | L1   | OFF    | 19.8       |
| 0.170250        | ---              | 36.10           | 54.95        | 18.85       | L1   | OFF    | 19.8       |
| 0.170250        | 54.38            | ---             | 64.95        | 10.57       | L1   | OFF    | 19.8       |
| 0.181500        | ---              | 34.74           | 54.42        | 19.68       | L1   | OFF    | 19.8       |
| 0.181500        | 52.29            | ---             | 64.42        | 12.13       | L1   | OFF    | 19.8       |
| 0.190500        | ---              | 34.46           | 54.02        | 19.56       | L1   | OFF    | 19.8       |
| 0.190500        | 51.60            | ---             | 64.02        | 12.42       | L1   | OFF    | 19.8       |
| 0.206250        | ---              | 32.23           | 53.36        | 21.13       | L1   | OFF    | 19.8       |
| 0.206250        | 48.48            | ---             | 63.36        | 14.88       | L1   | OFF    | 19.8       |
| 0.224250        | ---              | 30.38           | 52.66        | 22.28       | L1   | OFF    | 19.8       |
| 0.224250        | 45.43            | ---             | 62.66        | 17.23       | L1   | OFF    | 19.8       |
| 0.766500        | ---              | 26.81           | 46.00        | 19.19       | L1   | OFF    | 19.8       |
| 0.766500        | 30.44            | ---             | 56.00        | 25.56       | L1   | OFF    | 19.8       |
| 6.666000        | ---              | 27.43           | 50.00        | 22.57       | L1   | OFF    | 20.1       |
| 6.666000        | 30.61            | ---             | 60.00        | 29.39       | L1   | OFF    | 20.1       |

## EUT Information

Report NO : 262909-02  
 Test Mode : Mode 1  
 Test Voltage : 120Vac/60Hz  
 Phase : Neutral

Full Spectrum

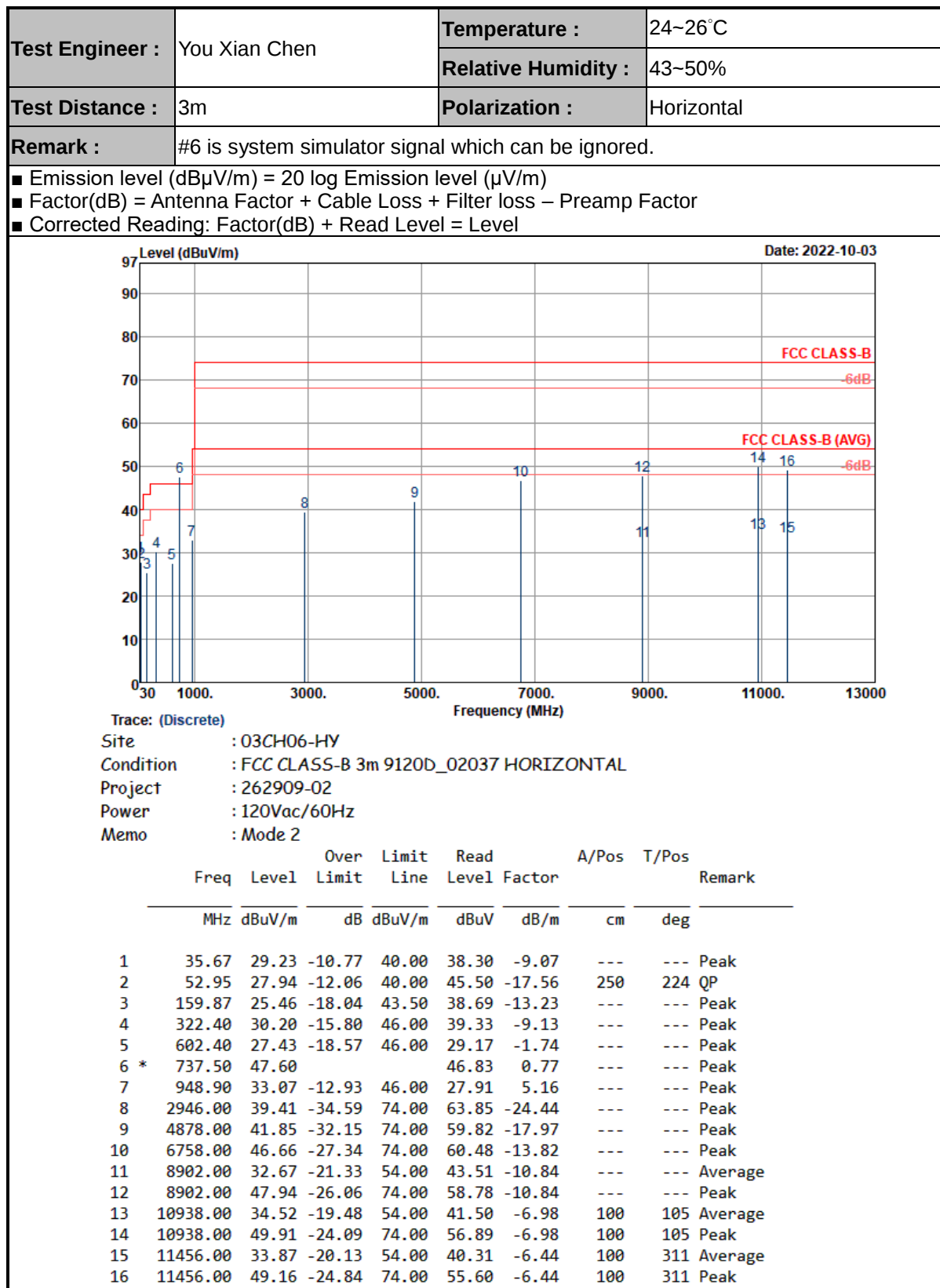


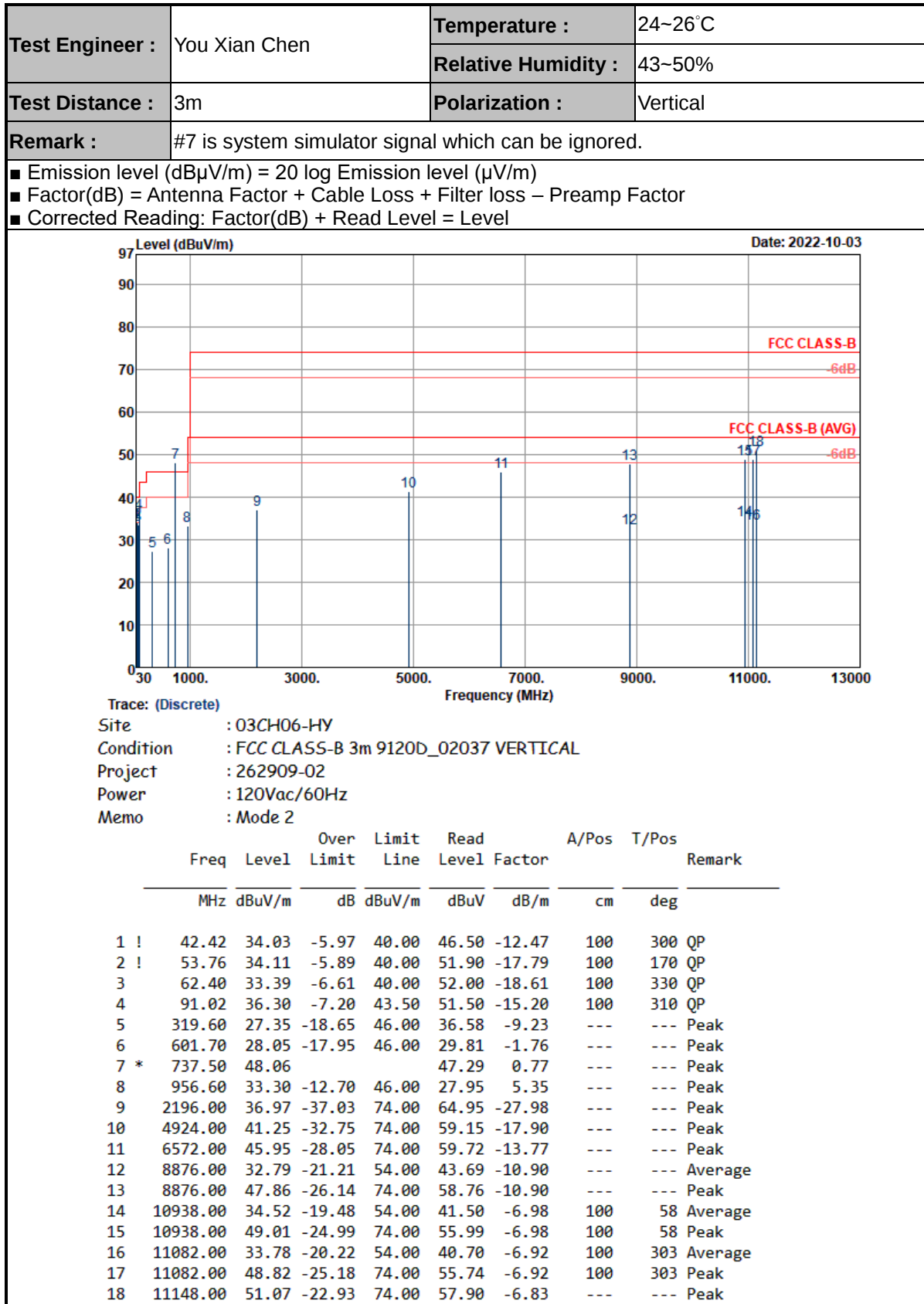
## Final\_Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------|--------|------------|
| 0.152250        | ---              | 38.84           | 55.88        | 17.04       | N    | OFF    | 19.8       |
| 0.152250        | 57.54            | ---             | 65.88        | 8.34        | N    | OFF    | 19.8       |
| 0.159000        | ---              | 37.41           | 55.52        | 18.11       | N    | OFF    | 19.8       |
| 0.159000        | 55.91            | ---             | 65.52        | 9.61        | N    | OFF    | 19.8       |
| 0.165750        | ---              | 35.04           | 55.17        | 20.13       | N    | OFF    | 19.8       |
| 0.165750        | 54.41            | ---             | 65.17        | 10.76       | N    | OFF    | 19.8       |
| 0.177000        | ---              | 34.82           | 54.63        | 19.81       | N    | OFF    | 19.8       |
| 0.177000        | 52.92            | ---             | 64.63        | 11.71       | N    | OFF    | 19.8       |
| 0.186000        | ---              | 33.61           | 54.21        | 20.60       | N    | OFF    | 19.8       |
| 0.186000        | 51.36            | ---             | 64.21        | 12.85       | N    | OFF    | 19.8       |
| 0.199500        | ---              | 32.18           | 53.63        | 21.45       | N    | OFF    | 19.8       |
| 0.199500        | 49.26            | ---             | 63.63        | 14.37       | N    | OFF    | 19.8       |
| 0.213000        | ---              | 32.50           | 53.09        | 20.59       | N    | OFF    | 19.8       |
| 0.213000        | 48.24            | ---             | 63.09        | 14.85       | N    | OFF    | 19.8       |
| 0.233250        | ---              | 30.87           | 52.33        | 21.46       | N    | OFF    | 19.8       |
| 0.233250        | 44.95            | ---             | 62.33        | 17.38       | N    | OFF    | 19.8       |
| 0.321000        | ---              | 29.83           | 49.68        | 19.85       | N    | OFF    | 19.8       |
| 0.321000        | 37.69            | ---             | 59.68        | 21.99       | N    | OFF    | 19.8       |
| 6.596250        | ---              | 26.50           | 50.00        | 23.50       | N    | OFF    | 20.1       |
| 6.596250        | 28.62            | ---             | 60.00        | 31.38       | N    | OFF    | 20.1       |



## Appendix B. Radiated Emission Test Result





THE END