Certificate Number: 5055.02

# TEST REPORT

| | |
|---|---|
| Report No.: | SRTC2020-9003(F)-0067 |
| Product Name: | LTE uFi |
| Model Name: | MF993C |
| Applicant: | ZTE Corporation |
| Manufacturer: | ZTE Corporation |
| Specification: | FCC Part15B (Certification) (2020 edition) ANSI C63.4-2014 |
| FCC ID: | SRQ-MF993C |

The State Radio_monitoring_center Testing Center (SRTC)

15th Building, No.30 Shixing Street, Shijingshan District,

Beijing, China

Tel: 86-10-57996183 Fax: 86-10-57996388

# CONTENTS




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# 1. General information

## 1.1 Notes of the test report

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The test results relate only to individual items of the samples which have been tested.

## 1.2 Information about the testing laboratory

| | |
|---|---|
| Company: | The State Radio_monitoring_center Testing Center (SRTC) |
| Address: | 15th Building, No.30 Shixing Street, Shijingshan District |
| Testing location： | No.80, Zhaojiachang, BeizangCun, Daxing District, Beijing, China. |
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| Country or Region: | China |
| Contacted person: | Liu Jia |
| Tel: | +86 10 57996183 |
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| Email: | liujiaf@srtc.org.cn |

## 1.3 Applicant’s details

| | |
|---|---|
| Company: | ZTE Corporation |
| Address: | ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District,Shenzhen, Guangdong, 518057, P.R.China |
| City: | Shenzhen |
| Country or Region: | P.R.China |
| Contacted person: | Zhao Yang |
| Tel: | 86-029-83637990 |
| Email: | zhao.yangxa@zte.com.cn |

## 1.4 Manufacturer’s details

| | |
|---|---|
| Company: | ZTE Corporation |
| Address: | ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District,Shenzhen, Guangdong, 518057, P.R.China |
| City: | Shenzhen |
| Country or Region: | P.R.China |
| Contacted person: | Zhao Yang |
| Tel: | 86-029-83637990 |
| Email: | zhao.yangxa@zte.com.cn |


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## 1.5 Application details

Date of reception of test sample: 4th Dec. 2020
Date of test: 4th Dec. 2020 to 15th Dec. 2020

## 1.6 Reference specification

FCC Part 15B, 2020 (Certification)

## 1.7 Information of EUT

### 1.7.1 General information

| | |
|---|---|
| Product Name of EUT | LTE uFi |
| Model of EUT | MF993C |
| FCC ID | SRQ-MF993C |
| Frequency Range | WCDMA Band 2 / WCDMA Band 4 / WCDMA Band 5<br>LTE band 2/ LTE band 4 / LTE band 5 / LTE band 7/ LTE band 12/ LTE band 13/ LTE band 29/ LTE band 66/ LTE band 71<br>Bluetooth: 2.4~2.4835GHz<br>WiFi: 2.4~2.4835GHz<br>5.15~5.25 GHz<br>5.725~5.85 GHz |
| Power Supply | Charger/Battery |
| Nominal Voltage | 3.8V |
| Extreme Temperature | Lowest: -20°C<br>Highest: +60°C |
| Extreme Voltage | Minimum: 3.3V Maximum: 4.2V |
| HW Version | MF993CHW1.0 |
| SW Version | MF993CV1.0 |


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### 1.7.2EUT details

| No. | Product Name | Model Name | IMEI |
|---|---|---|---|
| EUT1 | LTE uFi | MF993C | 865486050001390 |

### 1.7.3 Auxiliary equipment details

AE (Auxiliary Equipment) 1#: Charger

| | |
|---|---|
| Manufacturer | RUIJING INDUSTRIAL |
| Model Number | STC-A520A-Z |
| Input Voltage | 100V-240V AC |
| Output Voltage | 5V DC |

AE (Auxiliary Equipment) 2#: Charger

| | |
|---|---|
| Manufacturer | CHENYANG ELECTRONICS |
| Model Number | STC-A520A-Z |
| Input Voltage | 100V-240V AC |
| Output Voltage | 5V DC |

AE (Auxiliary Equipment) 3#: Battery

| | |
|---|---|
| Manufacturer | Jiade Energy Technology(Zhuhai) Co., Ltd |
| Model Number | Li3730T43P4h794667 |

AE (Auxiliary Equipment) 4#: USB cable

| | |
|---|---|
| Manufacturer | King Power Electronics Co.,Ltd. |
| Model Number | USB-TC30-W-100-M |

AE (Auxiliary Equipment) 5#: USB cable

| | |
|---|---|
| Manufacturer | Luxshare Precision Industry Company Limited |
| Model Number | USB-TC30-W-100-M |

Note: This application has two Kinds of adapter. In this report, two kinds of adapters are tested.


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# 2. Test information

## 2.1 Summary of the test results

| No. | Test case | FCC reference | Verdict |
|---|---|---|---|
| 1 | Conducted emissions | 15.107 | Pass |
| 2 | Radiated emissions | 15.109 | Pass |

| | |
|---|---|
| Approved By: Liu Wei<br>Director of the test department | Checked By: Guo Yu<br>Vice director of the test department |
| Tested by: Mr. Lv Youyou<br>Test engineer | Issued date:<br>2020.12.15 |


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## 2.2 Test result

### 2.2.1Conducted Emissions-FCC Part15.107

Ambient condition:

| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23.1°C | 41.2% | 100.8kPa |

Test Setup with charger:

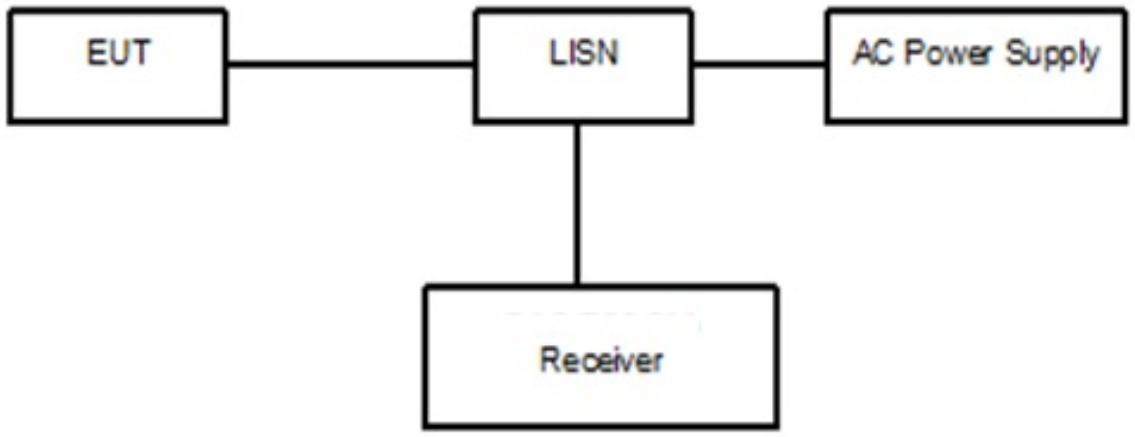


Figure 1

Test Procedure:

The EUT is placed on a non-matellic table 0.8m above the horizontal metal reference ground plane. The EUT is connected with LISN via the charger. The LISN is connected to the reference ground.
The test set-up and the test methods are performed according to ANSI C63.4:2014.
Then start the test software EMC32. Sweep the whole frequency band through the range from 150 KHz to 30 MHz with RBW 9kHz, VBW 30kHz.The measurement should be done for both L line and N line. During pre-test, the receiver uses both peak detector and average detector. And the final test, the receiver uses both average detector and Quasi-peak detector.
The data of cable loss has been calibrated in full testing frequency range before the testing.


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A “reference path loss” Corr.(dB) is established and the $L_{cable}$+ATT+VDF is the attenuation of ”reference path loss”, and including the cable loss, the attenuation of the attenuator, the voltage division factor of AMN.
The measurement results are obtained as described below:
$P_{result}=P_{mea}$+Corr.(dB)
Sample calculation: (17.58dBμV) = (-12.0 dBμV) + (29.6 dB), the corresponding frequency is 0.355219MHz.

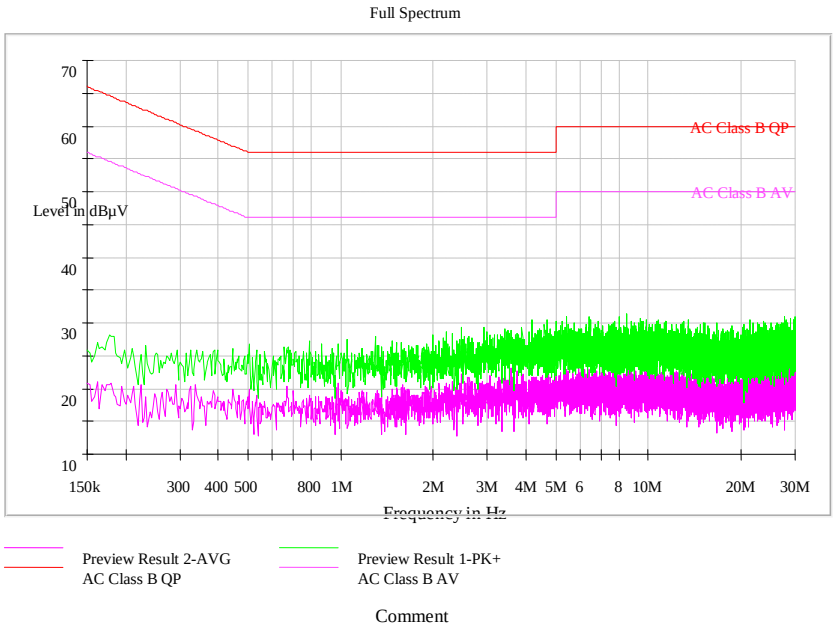
Limit:

| Frequency of Emission(MHz) | Limits(dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15～0.5 | 66 to 56* | 56 to 46* |
| 0.5～5 | 56 | 46 |
| 5～30 | 60 | 50 |

Note: * Decreases with the logarithm of the frequency

Test result:

Noise Level of the Measuring Instrument




Pic1.Conducted emission L and N Line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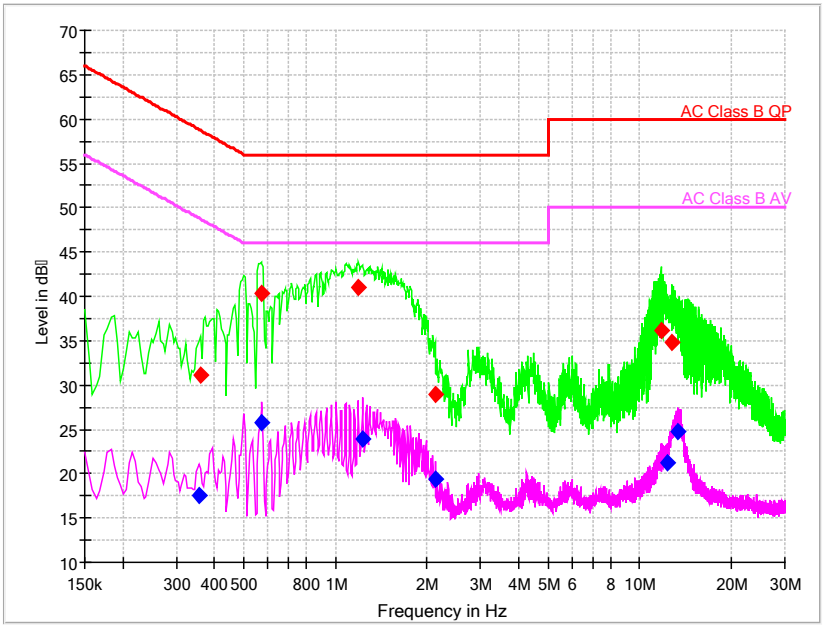
EUT1+ charger1:




Pic2. Conducted emission L&N Line Voltage：120VAC

| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) | $P_{mea}$ QuasiPeak | $P_{mea}$ Average |
|---|---|---|---|---|---|---|---|---|
| 0.355219 | --- | 17.58 | 48.84 | 31.26 | L1 | 29.6 | --- | -12.0 |
| 0.359883 | 31.18 | --- | 58.73 | 27.55 | L1 | 29.6 | 1.58 | --- |
| 0.569766 | 40.39 | --- | 56.00 | 15.61 | L1 | 29.6 | 10.7 | --- |
| 0.574430 | --- | 25.71 | 46.00 | 20.29 | L1 | 29.6 | --- | -3.89 |
| 1.190086 | 41.00 | --- | 56.00 | 15.00 | L1 | 29.7 | 11.3 | --- |
| 1.227398 | --- | 23.97 | 46.00 | 22.03 | L1 | 29.7 | --- | -5.73 |
| 2.122898 | 28.93 | --- | 56.00 | 27.07 | L1 | 29.7 | -0.77 | --- |
| 2.127562 | --- | 19.36 | 46.00 | 26.64 | L1 | 29.7 | --- | -10.3 |
| 11.730867 | 36.14 | --- | 60.00 | 23.86 | L1 | 29.8 | 6.34 | --- |
| 12.397828 | --- | 21.22 | 50.00 | 28.78 | L1 | 29.8 | --- | -8.58 |
| 12.784945 | 34.79 | --- | 60.00 | 25.21 | L1 | 29.8 | 4.99 | --- |
| 13.400602 | --- | 24.79 | 50.00 | 25.21 | N | 29.8 | --- | -5.01 |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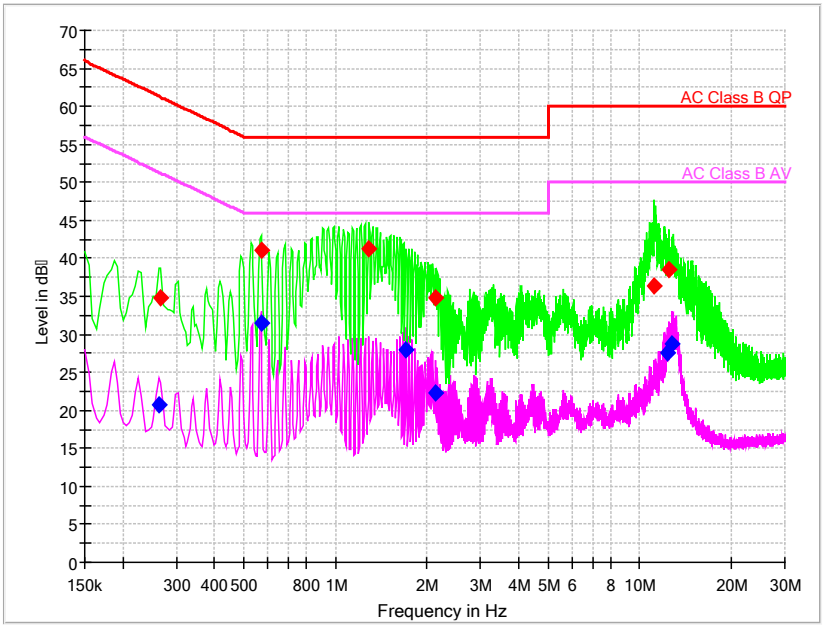
EUT1+ charger1:




Pic3. Conducted emission L&N Line Voltage：240VAC

| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) | $P_{mea}$ QuasiPeak | $P_{mea}$ Average |
|---|---|---|---|---|---|---|---|---|
| 0.261938 | --- | 20.81 | 51.37 | 30.56 | L1 | 29.6 | --- | -8.79 |
| 0.266602 | 34.75 | --- | 61.22 | 26.47 | L1 | 29.6 | 5.15 | --- |
| 0.569766 | --- | 31.46 | 46.00 | 14.54 | L1 | 29.6 | --- | 1.86 |
| 0.569766 | 41.06 | --- | 56.00 | 14.94 | L1 | 29.6 | 11.4 | --- |
| 1.292695 | 41.27 | --- | 56.00 | 14.73 | L1 | 29.7 | 11.5 | --- |
| 1.707797 | --- | 27.92 | 46.00 | 18.08 | L1 | 29.7 | --- | -1.78 |
| 2.127562 | --- | 22.26 | 46.00 | 23.74 | L1 | 29.7 | --- | -7.44 |
| 2.127562 | 34.74 | --- | 56.00 | 21.26 | N | 29.7 | 5.04 | --- |
| 11.185172 | 36.36 | --- | 60.00 | 23.64 | L1 | 29.8 | 6.56 | --- |
| 12.379172 | --- | 27.50 | 50.00 | 22.50 | L1 | 29.8 | --- | -2.3 |
| 12.453797 | 38.59 | --- | 60.00 | 21.41 | L1 | 29.8 | 8.79 | --- |
| 12.752297 | --- | 28.70 | 50.00 | 21.30 | N | 29.8 | --- | -1.1 |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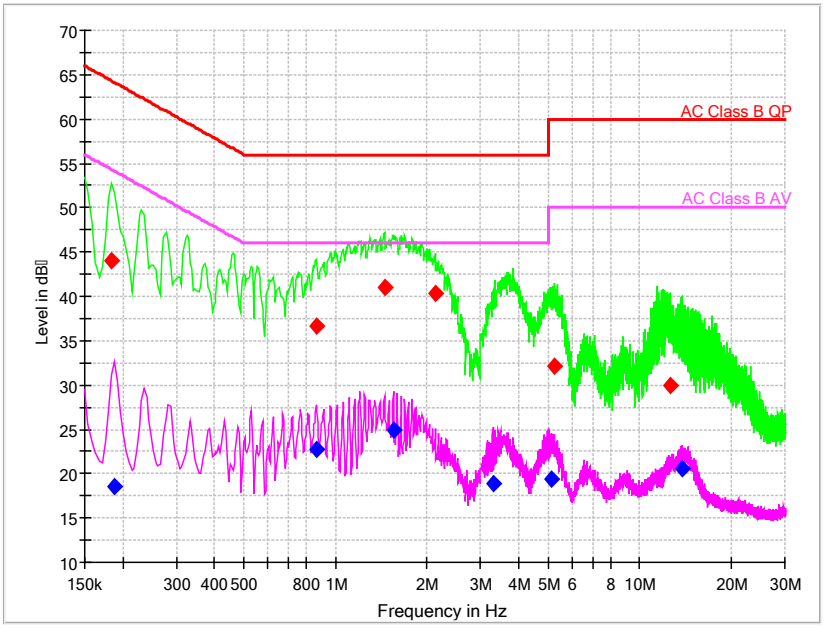
EUT1+ charger2:




Pic4. Conducted emission L&N Line Voltage：120VAC

| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) | $P_{mea}$ QuasiPeak | $P_{mea}$ Average |
|---|---|---|---|---|---|---|---|---|
| 0.184114 | 44.07 | --- | 64.30 | 20.23 | L1 | 29.6 | 14.4 | --- |
| 0.188379 | --- | 18.61 | 54.11 | 35.50 | L1 | 29.6 | --- | -10.9 |
| 0.866400 | --- | 22.80 | 46.00 | 23.20 | L1 | 29.6 | --- | -6.8 |
| 0.866400 | 36.58 | --- | 56.00 | 19.42 | L1 | 29.6 | 6.98 | --- |
| 1.450607 | 41.02 | --- | 56.00 | 14.98 | L1 | 29.7 | 11.3 | --- |
| 1.548686 | --- | 24.93 | 46.00 | 21.07 | N | 29.7 | --- | -4.77 |
| 2.128629 | 40.28 | --- | 56.00 | 15.72 | L1 | 29.7 | 10.5 | --- |
| 3.292779 | --- | 18.84 | 46.00 | 27.16 | L1 | 29.7 | --- | -10.8 |
| 5.139214 | --- | 19.35 | 50.00 | 30.65 | L1 | 29.7 | --- | -10.3 |
| 5.237293 | 32.13 | --- | 60.00 | 27.87 | L1 | 29.7 | 2.43 | --- |
| 12.546279 | 29.98 | --- | 60.00 | 30.02 | L1 | 29.8 | 0.18 | --- |
| 13.821300 | --- | 20.55 | 50.00 | 29.45 | L1 | 29.8 | --- | -9.25 |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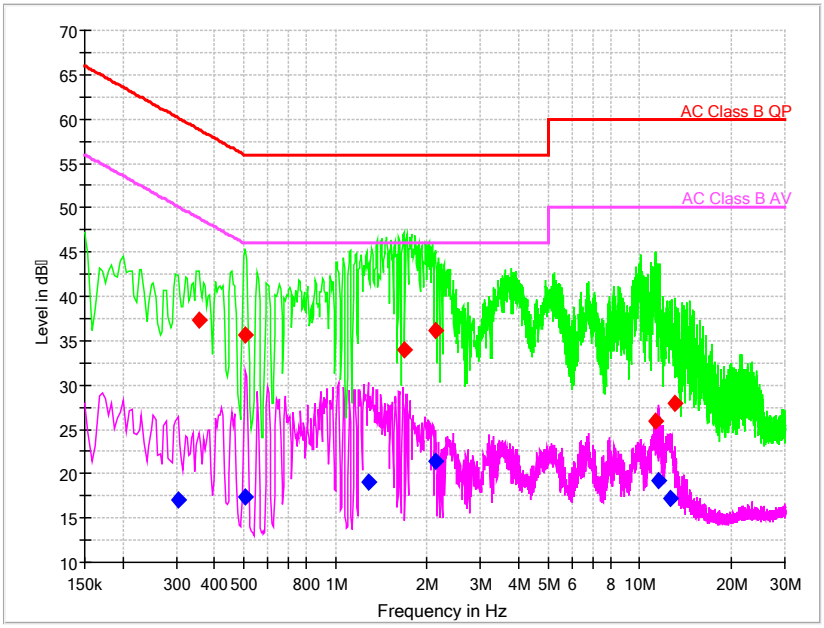
EUT1+ charger2:




Pic5. Conducted emission L&N Line Voltage：240VAC

| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) | $P_{mea}$ QuasiPeak | $P_{mea}$ Average |
|---|---|---|---|---|---|---|---|---|
| 0.303514 | --- | 17.06 | 50.15 | 33.08 | L1 | 29.6 | --- | -12.5 |
| 0.354686 | 37.26 | --- | 58.85 | 21.59 | L1 | 29.6 | 7.66 | --- |
| 0.503936 | 35.67 | --- | 56.00 | 30.33 | L1 | 29.6 | 6.07 | --- |
| 0.508200 | --- | 17.35 | 46.00 | 28.65 | L1 | 29.6 | --- | -12.2 |
| 1.280036 | --- | 19.04 | 46.00 | 26.96 | L1 | 29.7 | --- | -10.6 |
| 1.676614 | 33.91 | --- | 56.00 | 32.09 | L1 | 29.7 | 4.21 | --- |
| 2.137157 | 36.19 | --- | 56.00 | 19.81 | L1 | 29.7 | 6.49 | --- |
| 2.137157 | --- | 21.42 | 46.00 | 24.58 | N | 29.7 | --- | -8.28 |
| 11.262729 | 25.84 | --- | 60.00 | 34.16 | L1 | 29.8 | -3.96 | --- |
| 11.518586 | --- | 19.26 | 50.00 | 30.74 | L1 | 29.8 | --- | -10.5 |
| 12.665679 | --- | 17.27 | 50.00 | 32.73 | L1 | 29.8 | --- | -12.5 |
| 13.087843 | 27.87 | --- | 60.00 | 32.13 | N | 29.8 | -1.93 | --- |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### 2.2.2Radiated Emissions-FCC Part15.109

Ambient condition:

| Temperature | Relative humidity | Pressure |
|---|---|---|
| 22.7°C | 41.2% | 100.8kPa |

Test Setup:

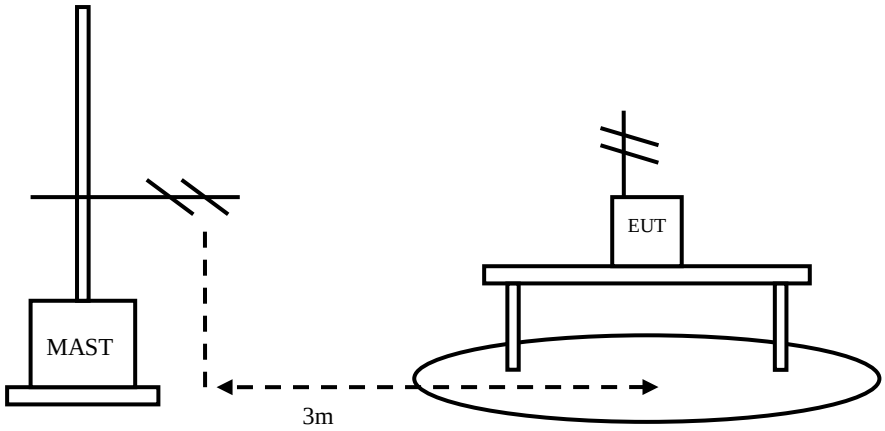


Figure 2

Test Procedure:

EUT+Charger:

The EUT should be placed on a non-metallic table 80cm above the ground plane. The receive antennas shall be moved from 1 to 4 meters. The distance between EUT and receive antenna should be 3 meters.

The EUT should work in idle mode. The test set-up and the test methods are performed according to ANSI C63.4:2014.

Then start the test software EMC32. Sweep the whole frequency band through the range from 30MHz to 1GHz, using receive log period antenna VULB 9163.

During the test, the height of receive antenna shall be moved from 1 to4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The EUT is laid in two modes as follow: 1. put the EUT in horizontal direction; 2. put the EUT in vertical direction.

The data of cable loss and antenna factor have been calibrated in full testing frequency range before the testing. All test results are performed with max hold at the horizontal and vertical polarity.

RBW=120kHz, VBW=300kHz, when the test frequency: 30MHz<f<1GHz

RBW=1MHz, VBW=3MHz, when the test frequency: f>1GHz


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A “reference path loss” is established and the $A_{Rpl}$ is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

Result= $P_{mea} + A_{Rpl}$

Sample calculation: (23.16 dBμV/m) = (40.56dBμV) + (-17.4dB/m), the corresponding frequency is 46.638500MHz.

Limit:

| Frequency of Emission(MHz) | Limits | |
|---|---|---|
| | Detector | Unit (dBμV/m) |
| 30～88 | Quasi-peak | 40 |
| 88～216 | Quasi-peak | 43.5 |
| 216～960 | Quasi-peak | 46 |
| 960～1000 | Quasi-peak | 54 |
| 1000～5th harmonic of the highest frequency or 40GHz, whichever is lower | Average<br>Peak | 54<br>74 |


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Test result:

EUT1+Charger1:

| Frequency(MHz) | Result(dBuV/m) | $A_{Rpl}$ (dB/m) | $P_{mea}$ (dBuV) | Polarity |
|---|---|---|---|---|
| 46.638500 | 23.16 | -17.4 | 40.56 | V |
| 54.618000 | 21.44 | -17.7 | 39.14 | V |
| 156.139500 | 12.47 | -21.4 | 33.87 | V |
| 192.223500 | 16.02 | -19.0 | 35.02 | V |
| 528.577000 | 11.51 | -8.6 | 20.11 | V |
| 925.946000 | 17.22 | -1.1 | 18.32 | V |

EUT1+Charger2:

| Frequency(MHz) | Result(dBuV/m) | $A_{Rpl}$ (dB/m) | $P_{mea}$ (dBuV) | Polarity |
|---|---|---|---|---|
| 48.245000 | 20.97 | -17.3 | 38.27 | V |
| 63.048500 | 18.63 | -19.4 | 38.03 | V |
| 99.297500 | 16.50 | -18.7 | 35.20 | V |
| 200.931500 | 11.04 | -18.2 | 29.24 | V |
| 543.966000 | 11.82 | -8.1 | 19.92 | V |
| 946.073500 | 17.18 | -0.9 | 18.08 | V |


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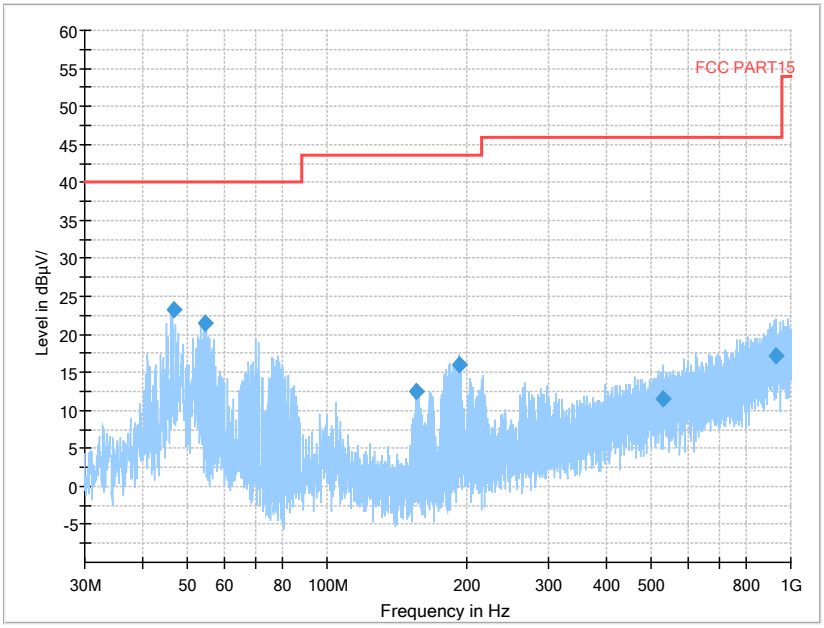
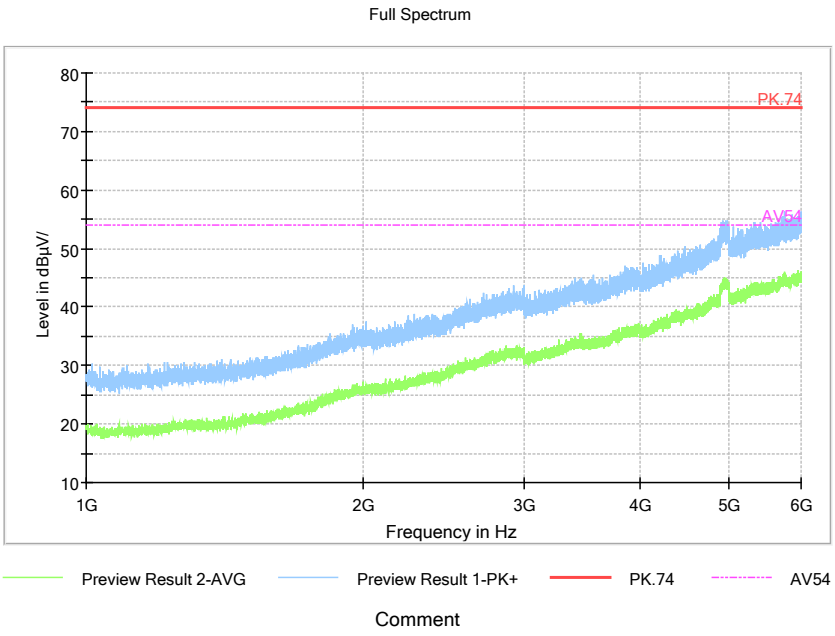
EUT1+ charger1: refer to Pic6,Pic7,Pic8 and Pic9




Pic6. Radiated emission (30MHz – 1GHz)

Note: The test data in the graph includes two polarizations: horizontal and vertical




Pic7. Radiated emission (1GHz –6GHz)

Note: The test data in the graph includes two polarizations: horizontal and vertical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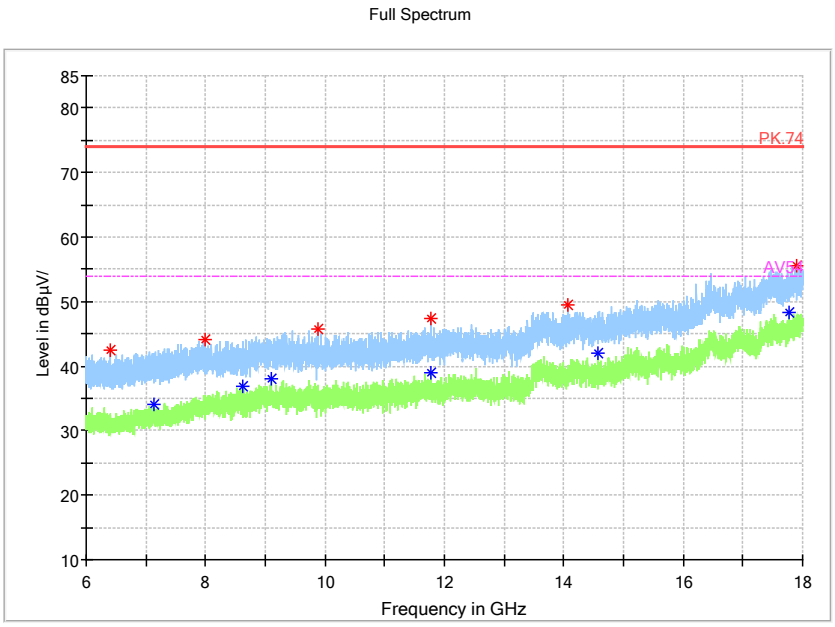
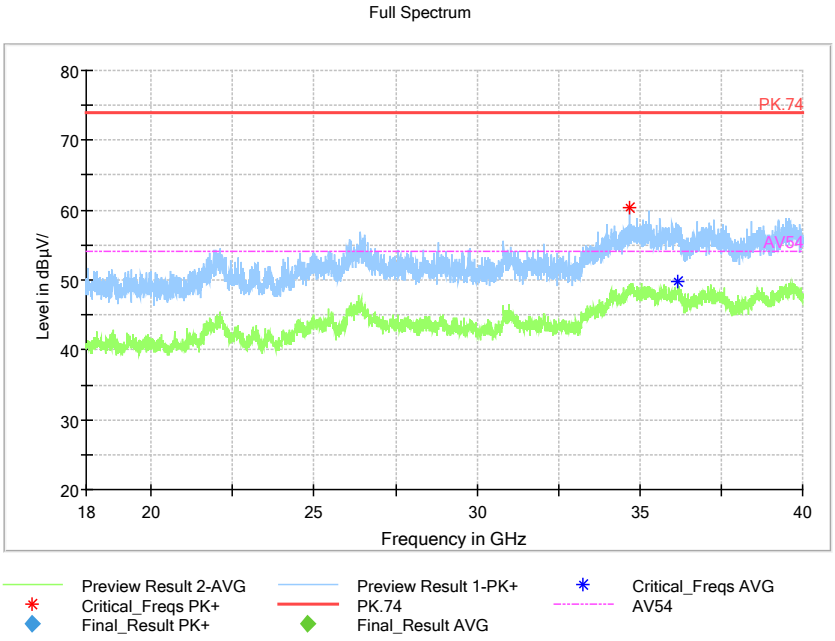



Pic8. Radiated emission (6GHz –18GHz)

Note: The test data in the graph includes two polarizations: horizontal and vertical




Pic9. Radiated emission (18GHz –40GHz)

Note: The test data in the graph includes two polarizations: horizontal and vertical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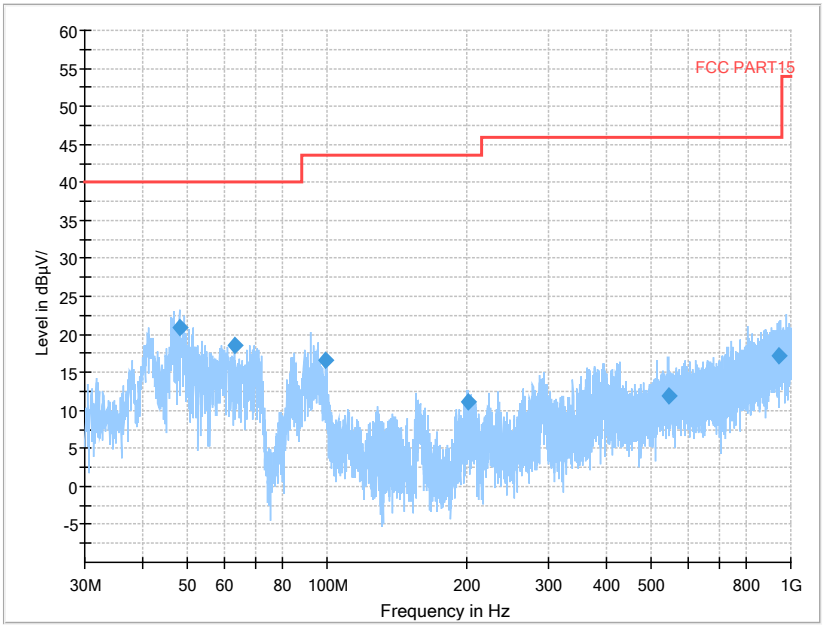
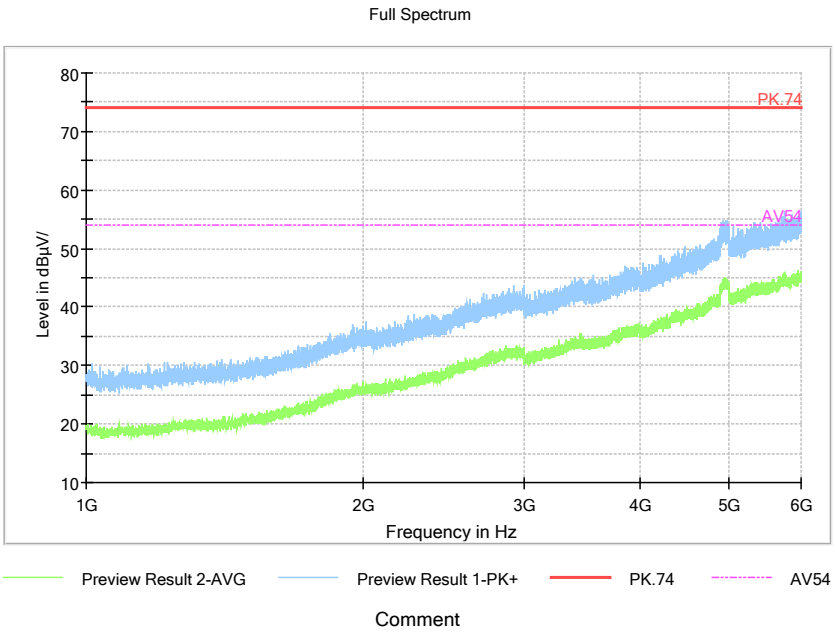
EUT1+ charger2: refer to Pic10,Pic11,Pic12 and Pic13




Pic10. Radiated emission (30MHz – 1GHz)

Note: The test data in the graph includes two polarizations: horizontal and vertical




Pic11. Radiated emission (1GHz –6GHz)

Note: The test data in the graph includes two polarizations: horizontal and vertical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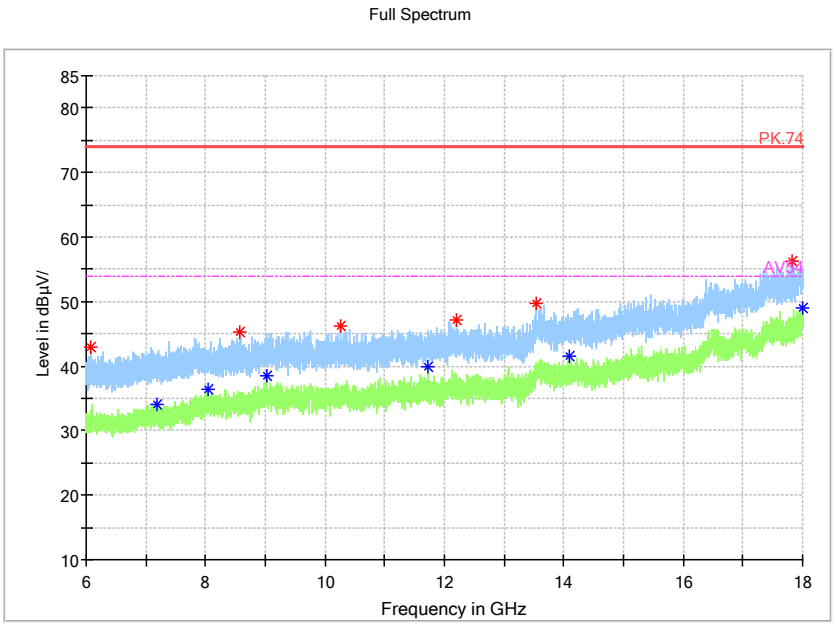
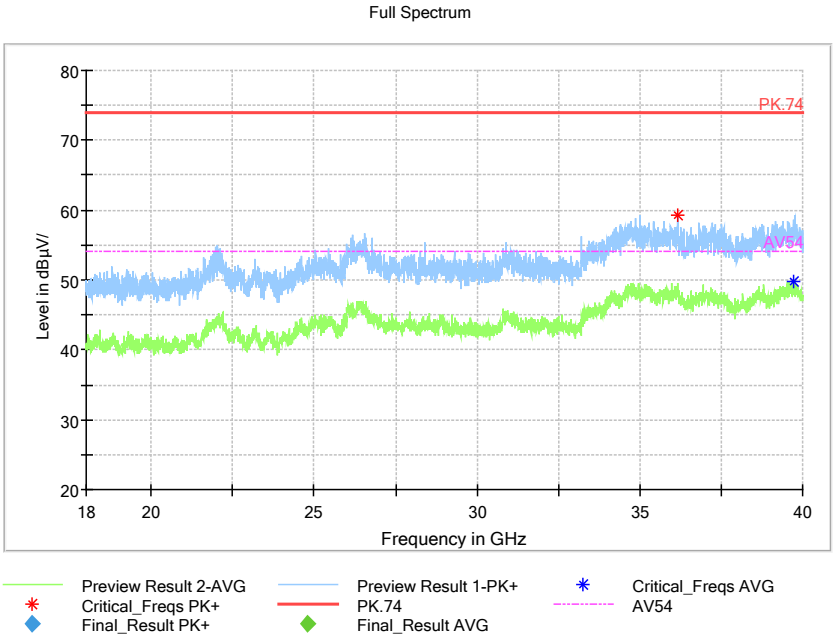



Pic12. Radiated emission (6GHz –18GHz)

Note: The test data in the graph includes two polarizations: horizontal and vertical




Pic13. Radiated emission (18GHz –40GHz)

Note: The test data in the graph includes two polarizations: horizontal and vertical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## 2.3. List of test equipments

| No. | Name/Model | Manufacturer | S/N | Calibration Due Date | Calibration Date |
|---|---|---|---|---|---|
| 1 | 23.18m×16.88m×9.60mSemi-AnechoicChamber | FRANKONIA | ----- | 5th Sep. 2021 | 6th Sep. 2016 |
| 2 | ESW EMI test receiver | R&S | 101574 | 20th Aug. 2021 | 20th Aug. 2020 |
| 3 | ESR3EMI test receiver | R&S | 102361 | 21th Apr. 2021 | 21th Apr. 2020 |
| 4 | 9.080m×5.255m×3.525m Shielding room | FRANKONIA | ----- | 5th Sep. 2021 | 6th Sep. 2016 |
| 5 | VULB 9163 Ultra log test antenna | schwarzbeck | 867 | 25th Mar. 2021 | 25th Mar. 2020 |
| 6 | HF 907 Double-Ridged Waveguide Horn Antenna | R&S | 100512 | 25th Mar. 2021 | 25th Mar. 2020 |
| 7 | SAS-574 Horn Antenna | schwarzbeck | 535 | 20th Aug. 2021 | 20th Aug. 2020 |
| 8 | ENV216 AMN | R&S | 3560.6550.12 | 20th Aug. 2021 | 20th Aug. 2020 |
| 9 | EMC32EMI test software | R&S | ----- | ----- | ----- |

----------The end----------


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