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# TEST REPORT

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Report No.: SRTC2019-9003(F)-0056  
Product Name: Mobile Phone  
Model Name: HLTE321E  
Applicant: Hisense International Co., Ltd.  
Manufacturer: Hisense Communications Co., Ltd.  
Specification: FCC Part15B (Certification)  
(2019 edition)  
FCC ID: 2ADOBHLTE321E

The State Radio\_monitoring\_center Testing Center (SRTC)  
15th Building, No.30 Shixing Street, Shijingshan District,  
Beijing, China

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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.  
City: Beijing  
Country or Region: China  
Contacted person: Liu Jia  
Tel: +86 10 57996183  
Fax: +86 10 57996388  
Email: liujiaf@srtc.org.cn

### 1.3 Applicant's details

Company: Hisense International Co., Ltd.  
Address: Floor 22, Hisense Tower, 17 Donghai Xi Road, Qingdao, 266071, China  
City: Qingdao  
Country or Region: China  
Contacted person: Geng Ruifeng  
Tel: +86-532-80877742  
Email: gengruifeng@hisense.com

### 1.4 Manufacturer's details

Company: Hisense Communications Co., Ltd.  
Address: No.218 Qianwangang Road, Economic & Technological Development Zone, Qingdao, China  
City: Qingdao  
Country or Region: China  
Contacted person: Deng Tingting  
Tel: +86-532-55753708  
Email: dengtingting@hisense.com

## 1.5 Application details

Date of reception of test sample: 14<sup>th</sup> December 2019

Date of test: 14<sup>th</sup> December 2019 to 6<sup>th</sup> January 2020

## 1.6 Reference specification

FCC Part 15B, 2019 (Certification)

## 1.7 Information of EUT

### 1.7.1 General information

|                            |                                 |
|----------------------------|---------------------------------|
| Name of EUT                | Mobile Phone                    |
| Model Name                 | HLTE321E                        |
| Marketing Name             | Hisense H40                     |
| FCC ID                     | 2ADOBHLTE321E                   |
| Equipment Class            | Class B                         |
| Antenna Type               | Fixed Internal Antenna          |
| Power Supply               | Battery or Charger              |
| Rated Power Supply Voltage | 3.8V                            |
| Extreme Voltage            | Minimum: 3.5V Maximum: 4.4V     |
| Extreme Temperature        | Lowest: -10°C<br>Highest: +55°C |
| HW Version                 | V1.00                           |
| SW Version                 | L1702.6.01.01.MX05              |

## 1.7.2EUT details

| Internal Control Number | Product Name | Model Name | IMEI            |
|-------------------------|--------------|------------|-----------------|
| EUT1                    | Mobile Phone | HLTE321E   | 008601601632240 |
| EUT2                    | Mobile Phone | HLTE321E   | 008601601632216 |

Note1: As the information described in section 1.7.2, EUT1 and EUT2 are different on the supplier of PFC. The relevant tests have been performed in order to verify in which combination case would have the worst features, so all the tests shown in this test report with the EUT2.

## 1.7.3 Auxiliary equipment details

AE (Auxiliary Equipment) 1#: Laptop

|               |              |
|---------------|--------------|
| Manufacturer  | Lenovo       |
| Model Number  | E470c        |
| S/N           | PF10VBX6     |
| Input Voltage | 100V-240V AC |

AE (Auxiliary Equipment) 2#: Battery

|                 |                                     |
|-----------------|-------------------------------------|
| Type            | Li-Ion                              |
| Manufacturer    | ZHONGSHAN TIANMAO BATTERY CO., LTD. |
| Model Number    | LPN385438                           |
| Capacity        | 4380mAh                             |
| Nominal Voltage | 3.85V                               |

AE (Auxiliary Equipment) 3#: Charger

|               |                                        |
|---------------|----------------------------------------|
| Manufacturer  | SHENZHEN TIANYIN ELECTRONICS CO., LTD. |
| Model Number  | TPA-10120150UU                         |
| S/N           | /                                      |
| Input Voltage | 100V-240V AC                           |
| Frequency     | 50/60Hz                                |

AE (Auxiliary Equipment) 4#: Headset

|              |                              |
|--------------|------------------------------|
| Manufacturer | NEW LEADER INDUSTRY CO.,LTD. |
| Model Number | NLD-303k-09SH                |
| S/N          | /                            |

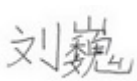
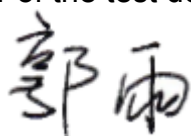
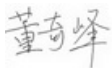
AE (Auxiliary Equipment) 5#: USB Cable

|              |                                 |
|--------------|---------------------------------|
| Manufacturer | SHENZHEN KOAR ELECTRIC CO.,LTD. |
| Model Number | GET1-2824L10WHR-AC              |
| S/N          | /                               |

## 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: Mr. Liu Wei<br>Director of the test department<br> | Checked By: Mr. Guo Yu<br>Vice director of the test department<br> |
| Tested by: Mr. Dong Qifeng<br>Test engineer<br>                 | I Issued date:<br><br>2020.01.7                                                                                                                         |

## 2.2 Test result

### 2.2.1 Conducted Emissions-FCC Part15.107

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23.2°C      | 41.4%             | 101.8kPa |

Test Setup with laptop:

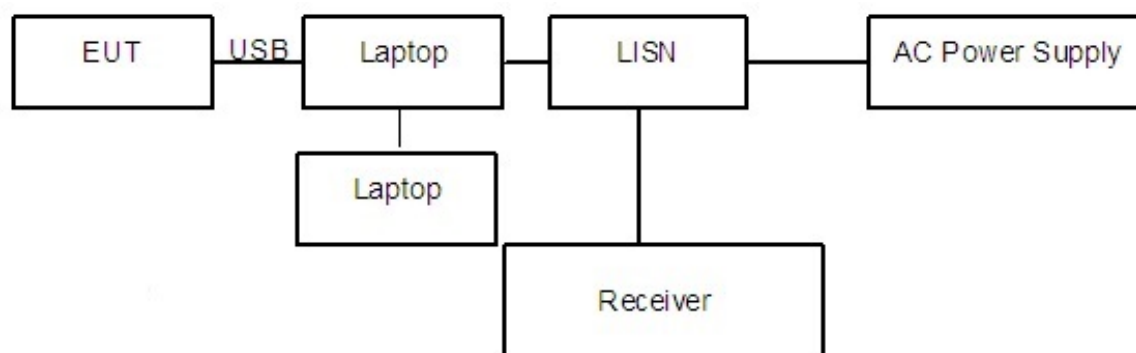


Figure 1

Test Procedure:

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The accessories of the EUT are connected with the EUT such as headset etc. The EUT was connected with a laptop via the USB cable and transferred the data by copying large files from laptop to the EUT. The laptop's LAN port is connected with another laptop via cable. And the data transferring between two laptops is maintained.

The AC main power supply of the laptop is connected to LISN and 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.

Test Setup with charger:

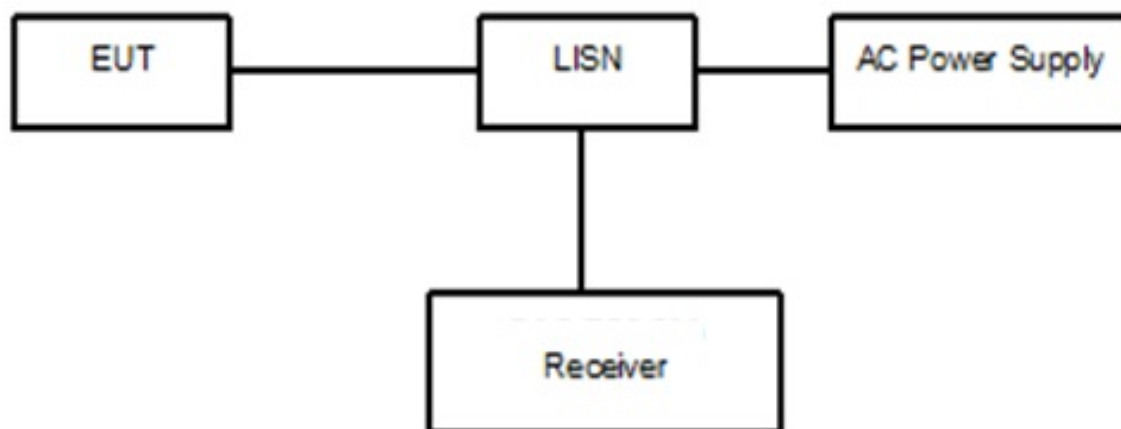


Figure 2

Test Procedure:

The EUT is placed on a non-metallic 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 accessories of the EUT are connected with the EUT such as headset etc. Open the following functions of EUT: Camera, flash lamp, positioning (such as GPS/GLONASS) and video.

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.

A "reference path loss" Corr.(dB) is established and the  $L_{\text{cable}} + \text{ATT} + \text{VDF}$  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:

$$P_{\text{result}} = P_{\text{mea}} + \text{Corr. (dB)}$$

Sample calculation:  $(54.11 \text{ dB}\mu\text{V}) = (24.41 \text{ dB}\mu\text{V}) + (29.7 \text{ dB})$ , the corresponding frequency is 0.171949MHz.



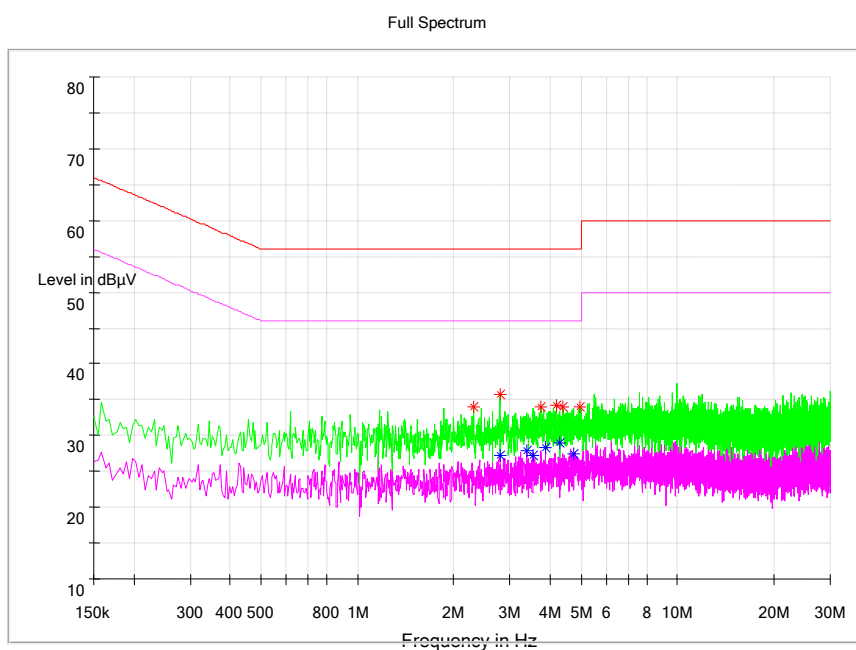
Limit:

| 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

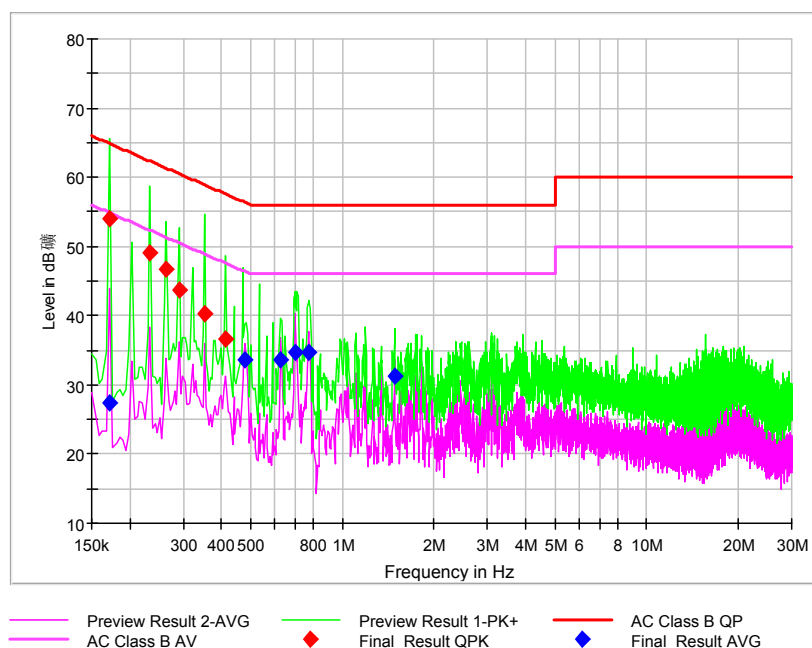
Test result:

Noise Level of the Measuring Instrument



Pic1. Conducted emission L and N Line

EUT + Charger:



Pic2. Conducted emission L&N Line

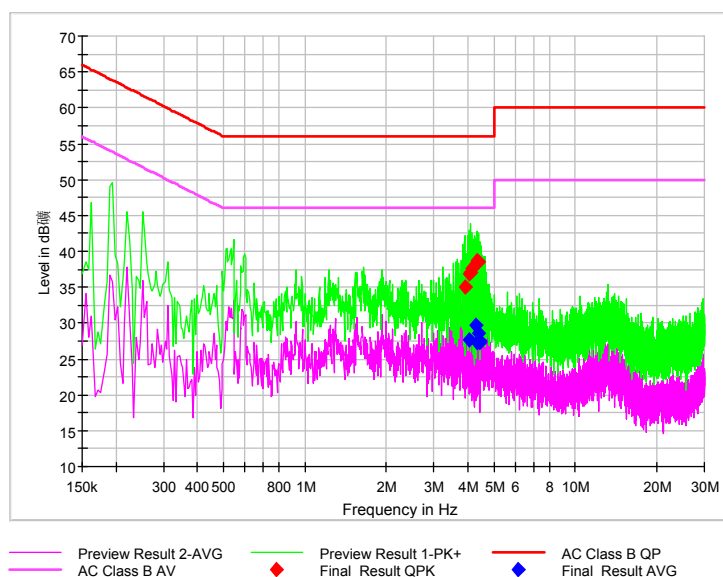
### Final\_Result\_AVG

| Frequency (MHz) | Average (dBμV) | Limit (dBμV) | Margin (dB) | Line | Corr. (dB) | Pmea Average (dBμV) |
|-----------------|----------------|--------------|-------------|------|------------|---------------------|
| 0.171949        | 27.48          | 54.87        | 27.38       | L1   | 29.7       | -2.22               |
| 0.479228        | 33.59          | 46.35        | 12.76       | L1   | 29.7       | 3.89                |
| 0.628478        | 33.70          | 46.00        | 12.30       | N    | 29.7       | 4.00                |
| 0.698713        | 34.61          | 46.00        | 11.39       | N    | 29.7       | 4.91                |
| 0.773338        | 34.74          | 46.00        | 11.26       | L1   | 29.7       | 5.04                |
| 1.484471        | 31.16          | 46.00        | 14.84       | L1   | 29.7       | 1.46                |

### Final\_Result\_QPK

| Frequency (MHz) | QuasiPeak (dBμV) | Limit (dBμV) | Margin (dB) | Line | Corr. (dB) | Pmea QuasiPeak (dBμV) |
|-----------------|------------------|--------------|-------------|------|------------|-----------------------|
| 0.171949        | 54.11            | 64.87        | 10.75       | L1   | 29.7       | 24.41                 |
| 0.233404        | 49.01            | 62.33        | 13.32       | L1   | 29.7       | 19.31                 |
| 0.264132        | 46.62            | 61.30        | 14.68       | N    | 29.7       | 16.92                 |
| 0.290471        | 43.70            | 60.51        | 16.81       | N    | 29.7       | 14.00                 |
| 0.351926        | 40.18            | 58.92        | 18.73       | L1   | 29.7       | 10.48                 |
| 0.413382        | 36.61            | 57.58        | 20.97       | L1   | 29.7       | 6.91                  |

EUT + Laptop:



Pic3. Conducted emission L&N Line

## Final\_Result\_AVG

| Frequency (MHz) | Average (dBμV) | Limit (dBμV) | Margin (dB) | Line | Corr. (dB) | Pmea Average (dBμV) |
|-----------------|----------------|--------------|-------------|------|------------|---------------------|
| 4.070007        | 27.58          | 46.00        | 18.42       | L1   | 29.9       | -2.32               |
| 4.307051        | 29.63          | 46.00        | 16.37       | L1   | 29.9       | -0.27               |
| 4.324610        | 27.35          | 46.00        | 18.66       | N    | 29.9       | -2.55               |
| 4.381676        | 28.68          | 46.00        | 17.32       | N    | 29.9       | -1.22               |
| 4.425574        | 27.40          | 46.00        | 18.60       | L1   | 29.9       | -2.5                |
| 4.438743        | 27.30          | 46.00        | 18.70       | L1   | 29.9       | -2.6                |

## Final\_Result\_QPK

| Frequency (MHz) | QuasiPeak (dBμV) | Limit (dBμV) | Margin (dB) | Line | Corr. (dB) | Pmea QuasiPeak (dBμV) |
|-----------------|------------------|--------------|-------------|------|------------|-----------------------|
| 3.894419        | 34.95            | 56.00        | 21.05       | L1   | 29.9       | 5.05                  |
| 4.070007        | 36.83            | 56.00        | 19.17       | L1   | 29.9       | 6.93                  |
| 4.078787        | 37.06            | 56.00        | 18.94       | L1   | 29.9       | 7.16                  |
| 4.131463        | 37.68            | 56.00        | 18.32       | N    | 29.9       | 7.78                  |
| 4.324610        | 38.75            | 56.00        | 17.25       | N    | 29.9       | 8.85                  |
| 4.359728        | 38.47            | 56.00        | 17.53       | L1   | 29.9       | 8.57                  |

## 2.2.2 Radiated Emissions-FCC Part15.109

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23.2°C      | 41.4%             | 101.8kPa |

Test Setup:

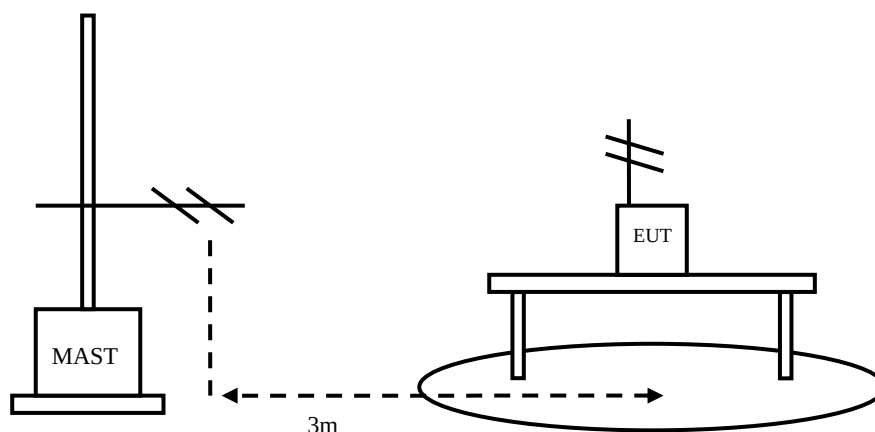


Figure 3

Test Procedure:

EUT+Laptop:

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 accessories of the EUT are connected with the EUT such as headset etc. The EUT was connected with a laptop via the USB cable and transferred the data by copying large files from laptop to the EUT.. 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 HL562.

During the test, the height of receive antenna shall be moved from 1 to 4 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.

#### 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 accessories of the EUT are connected with the EUT such as headset etc. Open the following functions of EUT: Camera, flash lamp, positioning (such as GPS/GLONASS) and video. 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 HL562.

During the test, the height of receive antenna shall be moved from 1 to 4 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

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:

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

#### 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    | 54            |
|                                                                         | Peak       | 74            |

Test result:

Sample calculation:  $(19.82 \text{ dB } \mu \text{ V/m}) = (35.42 \text{ dB } \mu \text{ V/m}) + (-15.6 \text{ dB})$ , the corresponding frequency is 63.343750MHz.

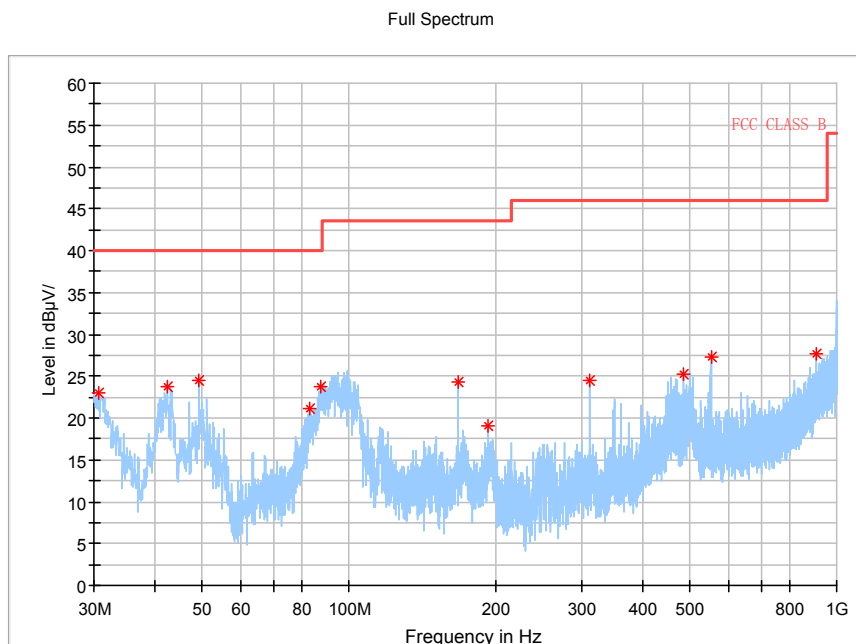
EUT+Laptop

| Frequency(MHz) | Result( dB $\mu$ V/m ) | Limit (dB $\mu$ V/m) | ARpl (dB) | Pmea ( dB $\mu$ V/m ) | Polarity |
|----------------|------------------------|----------------------|-----------|-----------------------|----------|
| 30.65          | 23.00                  | 40.00                | -13.70    | 36.70                 | H        |
| 42.45          | 23.81                  | 40.00                | -19.40    | 43.21                 | V        |
| 49.12          | 24.40                  | 40.00                | -23.60    | 48.00                 | V        |
| 83.23          | 21.13                  | 40.00                | -23.50    | 44.63                 | H        |
| 87.23          | 23.82                  | 40.00                | -23.00    | 46.82                 | V        |
| 167.98         | 24.24                  | 43.50                | -22.80    | 47.04                 | V        |
| 192.76         | 19.03                  | 43.50                | -22.40    | 41.43                 | V        |
| 311.99         | 24.56                  | 46.00                | -17.70    | 42.26                 | V        |
| 485.86         | 25.27                  | 46.00                | -12.40    | 37.67                 | H        |
| 551.98         | 27.20                  | 46.00                | -11.00    | 38.20                 | V        |
| 907.37         | 27.71                  | 46.00                | -4.70     | 32.41                 | V        |

EUT + charger

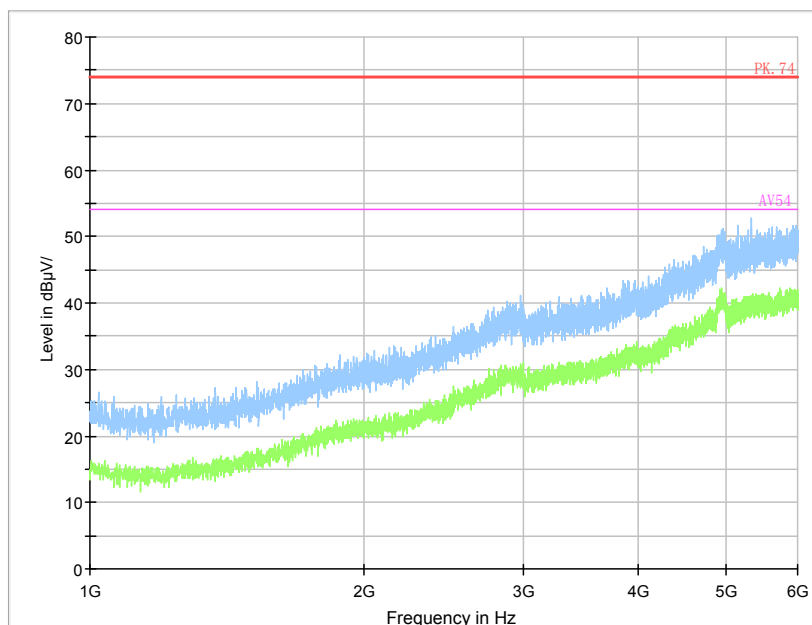
| Frequency(MHz) | Result( dB $\mu$ V/m ) | Limit (dB $\mu$ V/m) | ARpl (dB) | Pmea ( dB $\mu$ V/m ) | Polarity |
|----------------|------------------------|----------------------|-----------|-----------------------|----------|
| 31.06          | 30.12                  | 40.00                | -20.8     | 50.92                 | V        |
| 68.65          | 29.46                  | 40.00                | -21.2     | 50.66                 | V        |
| 167.27         | 21.60                  | 43.50                | -20.8     | 42.4                  | V        |
| 178.53         | 22.82                  | 43.50                | -20.2     | 43.02                 | H        |
| 460.26         | 22.30                  | 46.00                | -10.3     | 32.6                  | V        |
| 922.86         | 21.82                  | 46.00                | -1.2      | 23.02                 | V        |

EUT + Laptop: refer to Pic4, Pic5, Pic6, Pic7



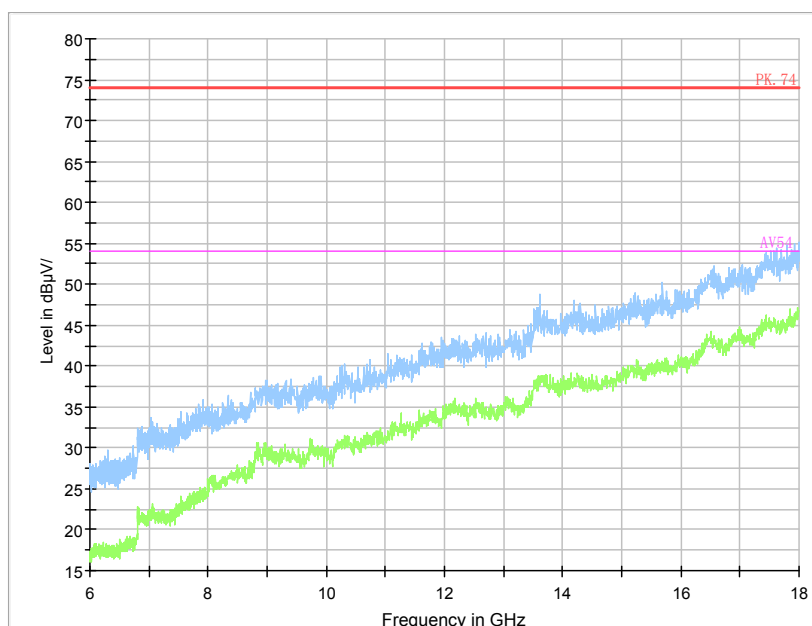
Pic4. Radiated emission(30MHz – 1GHz)

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



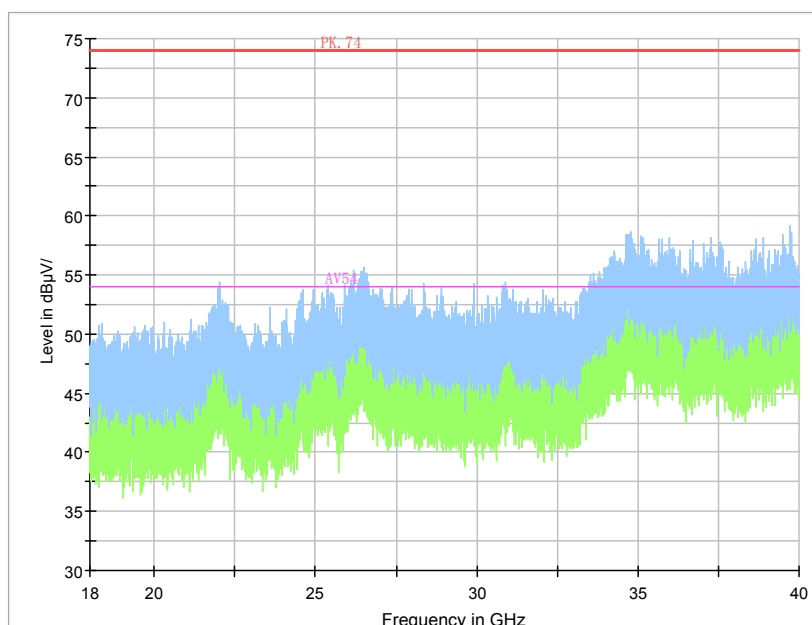
Pic5. Radiated emission (1GHz –6GHz)

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



Pic6.Radiated emission (6GHz –18GHz)

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



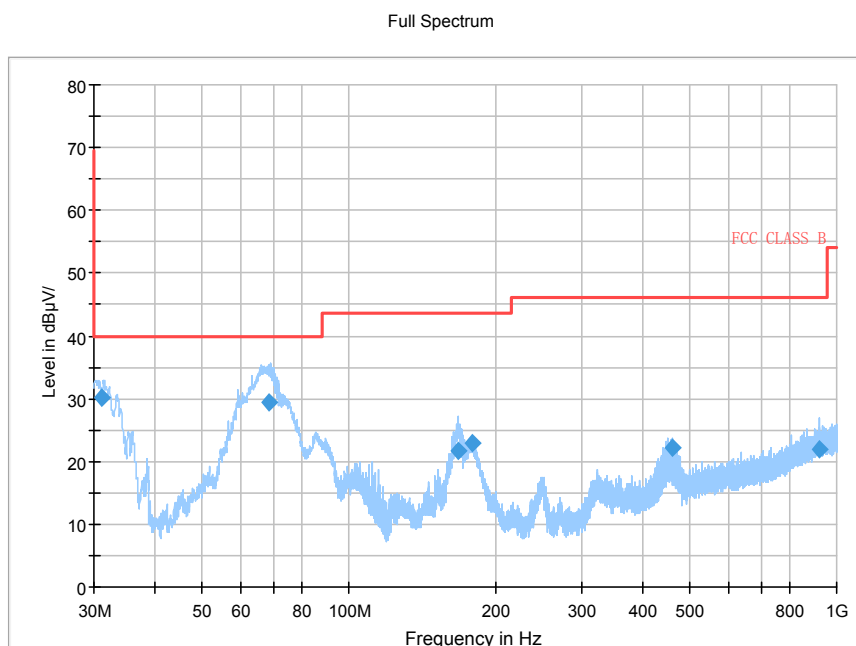
Pic7. Radiated emission (18GHz –40GHz)

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



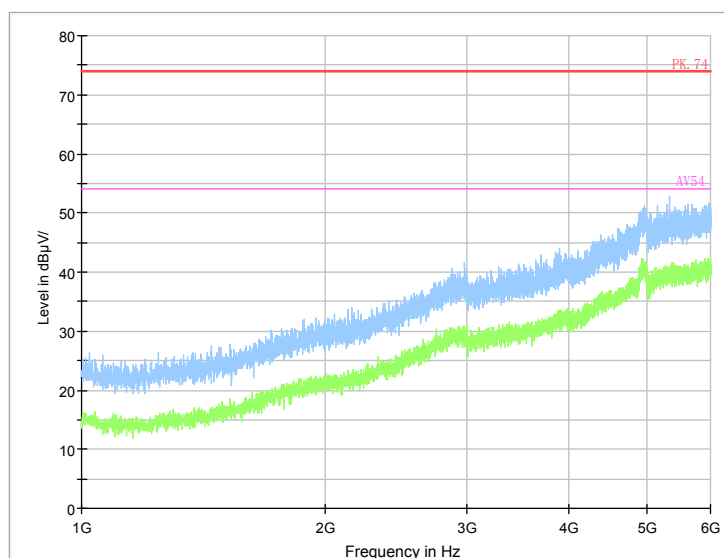


EUT + charger: refer to Pic8, Pic9, Pic10, Pic11



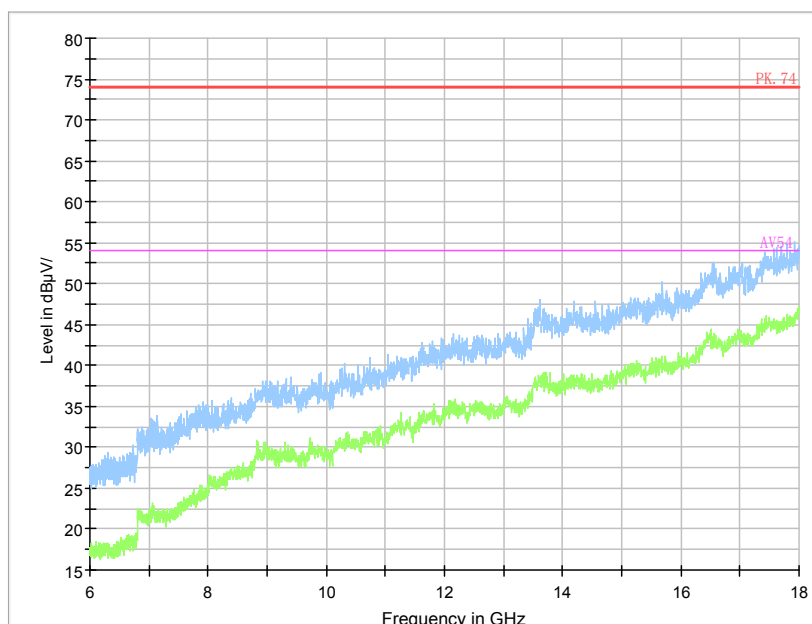
Pic8. Radiated emission(30MHz – 1GHz)

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



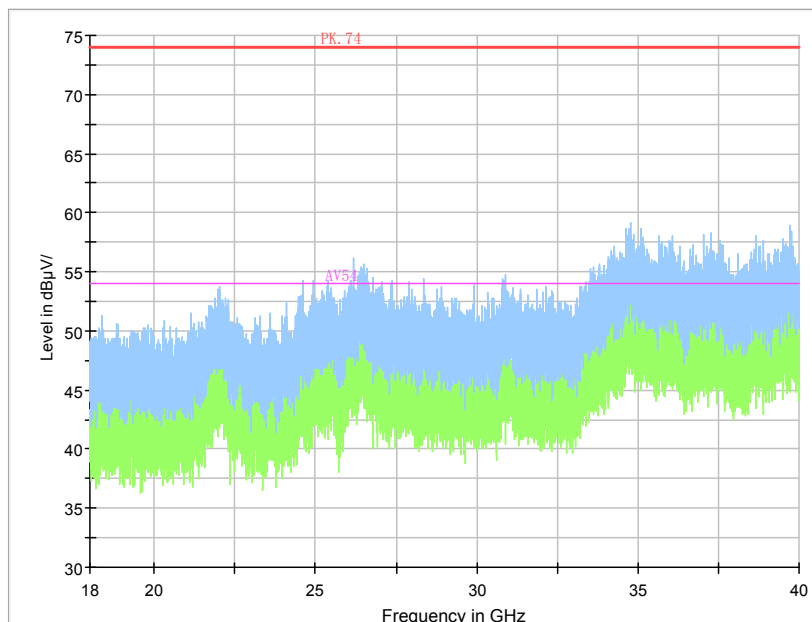
Pic9. Radiated emission (1GHz –6GHz)

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



Pic10. Radiated emission (6GHz –18GHz)

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



Pic11. Radiated emission (18GHz –40GHz)

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

## 2.3. List of test equipments

| No. | Name/Model                                     | Manufacturer | S/N              | Calibration Due Date | Calibration Date  |
|-----|------------------------------------------------|--------------|------------------|----------------------|-------------------|
| 1   | 23.18m×16.88m×9.60mS<br>emi-AnechoicChamber    | FRANKONIA    | -----            | 5th Sep.<br>2021     | 6th Sep.<br>2016  |
| 2   | ESW EMI test receiver                          | R&S          | 101574           | 20th Aug.<br>2019    | 20th Aug.<br>2018 |
| 3   | 9.080m×5.255m×3.525m<br>Shielding room         | FRANKONIA    | -----            | 5th Sep.<br>2021     | 6th Sep.<br>2016  |
| 4   | ENV216 AMN                                     | R&S          | 3560.6550.<br>12 | 20th Aug.<br>2020    | 20th Aug.<br>2019 |
| 5   | HF 907 Double-Ridged<br>Waveguide Horn Antenna | R&S          | 100513           | 20th Aug.<br>2020    | 20th Aug.<br>2019 |
| 6   | PS2000 Turn Table                              | FRANKONIA    | -----            | -----                | -----             |
| 7   | MA260 Antenna Master                           | FRANKONIA    | -----            | -----                | -----             |
| 8   | EMC32EMI test software                         | R&S          | V10.20.01        | -----                | -----             |
| 9   | VULB9163 Receive<br>antenna                    | R&S          | 886              | 20th Aug.<br>2020    | 20th Aug.<br>2019 |

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