



TEST REPORT

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,
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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: 14th December 2019

Date of test: 14th December 2019 to 6th 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 Highest: +55°C
HW Version	V1.00
SW Version	L1702.6.01.01.MX05

1.7.2 EUT 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 Director of the test department 刘巍	Checked By: Mr. Guo Yu Vice director of the test department 郭雨
Tested by: Mr. Dong Qifeng Test engineer 董奇峰	Issued date: 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:

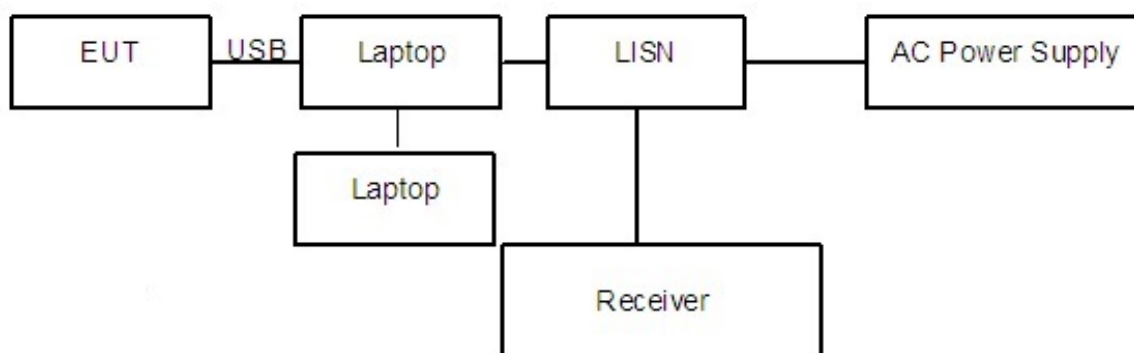


Figure 1

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:

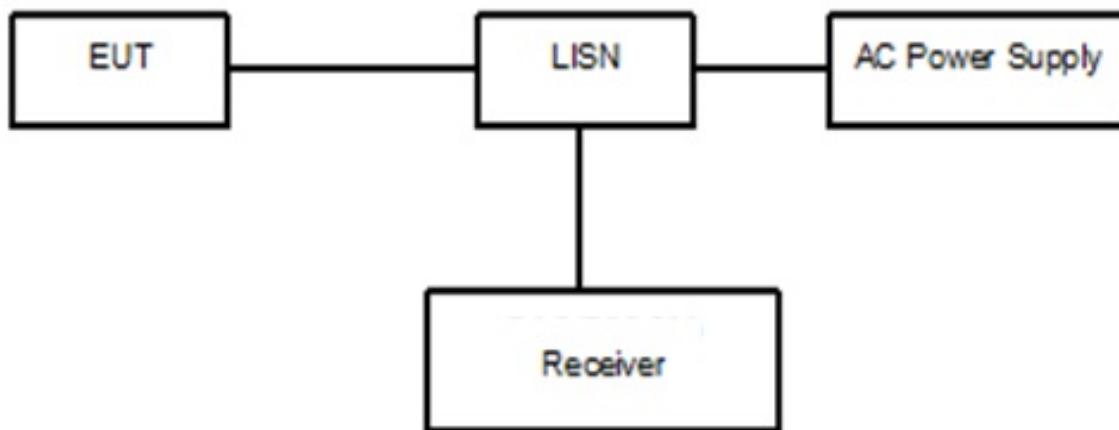


Figure 2

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

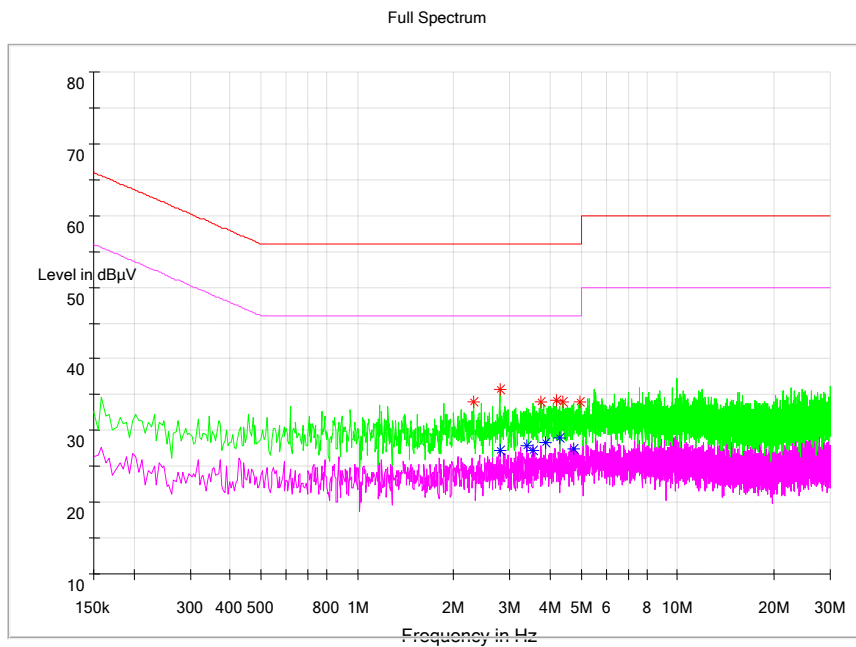
Limit:

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

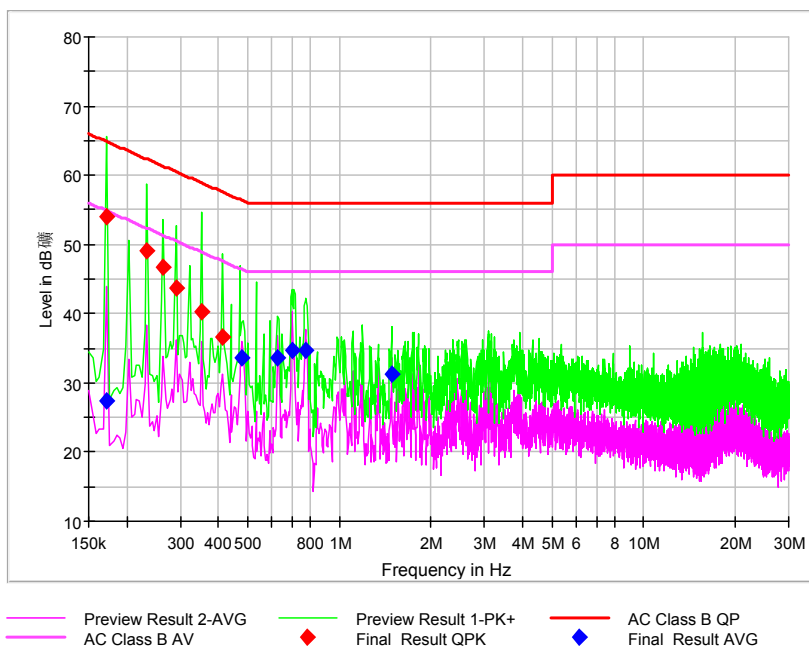
Test result:

Noise Level of the Measuring Instrument



Pic1. Conducted emission L and N Line

EUT + Charger:



Pic2. Conducted emission L&N Line

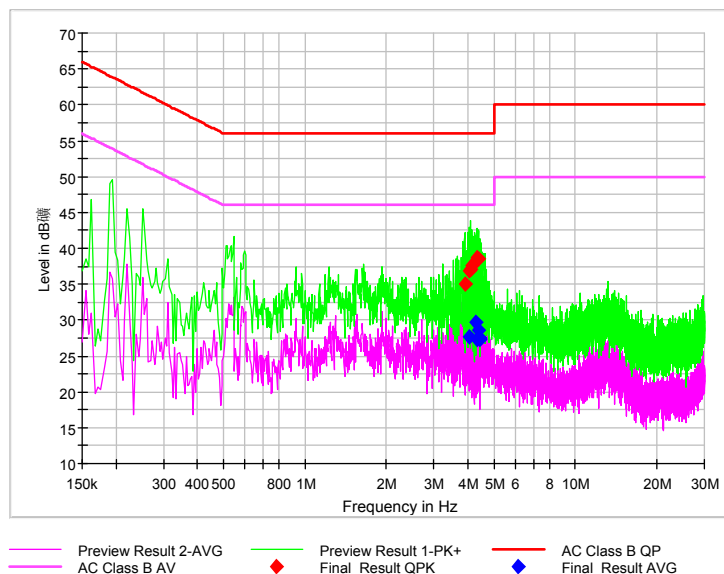
Final_Result_AVG

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:

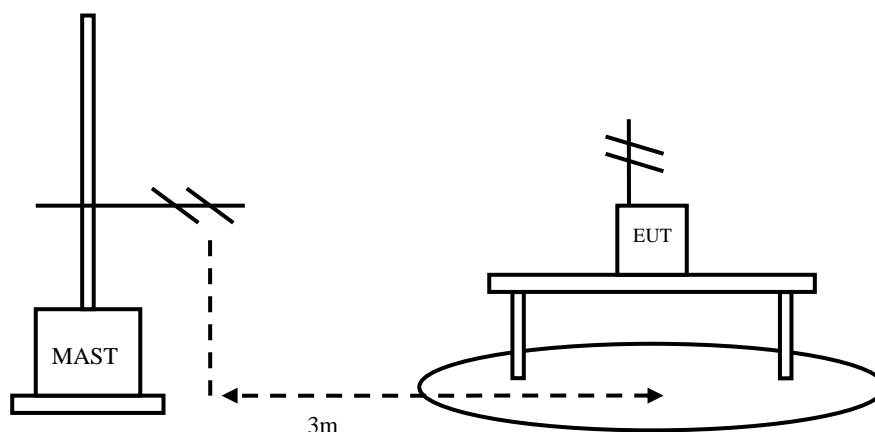


Figure 3

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 (dB μ V/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

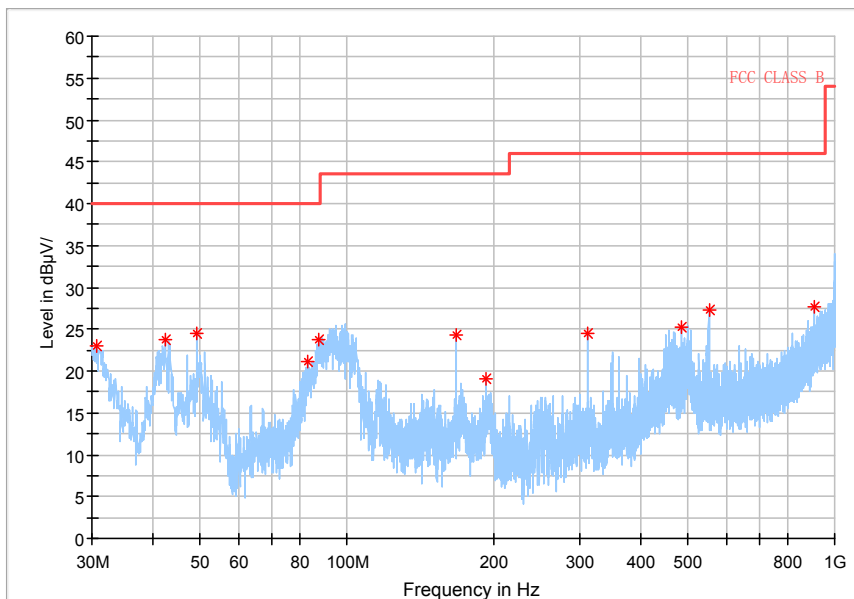
Frequency(MHz)	Result(dB μ V/m)	Limit (dB μ V/m)	ARpl (dB)	Pmea (dB μ V/m)	Polarity
30.65	23.00	40.00	-13.70	36.70	H
42.45	23.81	40.00	-19.40	43.21	V
49.12	24.40	40.00	-23.60	48.00	V
83.23	21.13	40.00	-23.50	44.63	H
87.23	23.82	40.00	-23.00	46.82	V
167.98	24.24	43.50	-22.80	47.04	V
192.76	19.03	43.50	-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 μ V/m)	Limit (dB μ V/m)	ARpl (dB)	Pmea (dB μ 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

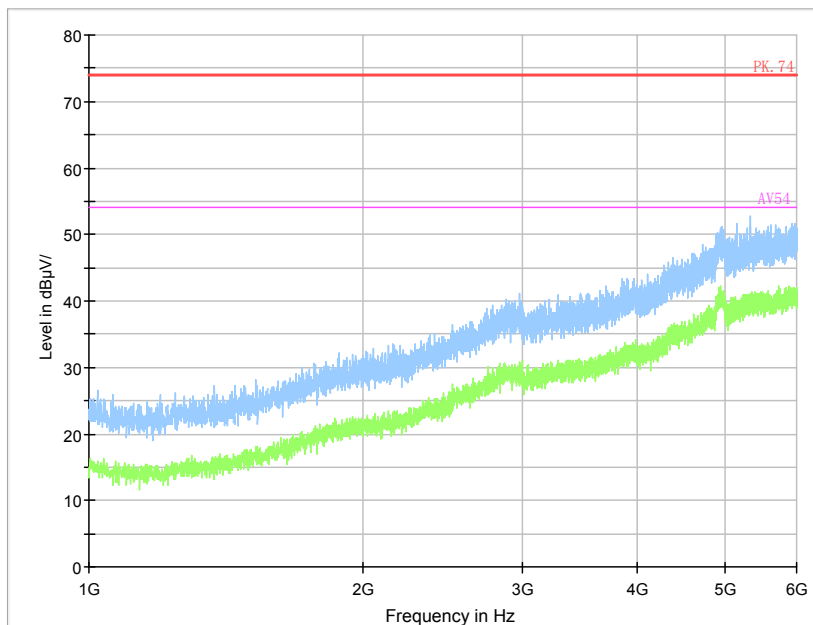
EUT + Laptop: refer to Pic4, Pic5, Pic6, Pic7

Full Spectrum



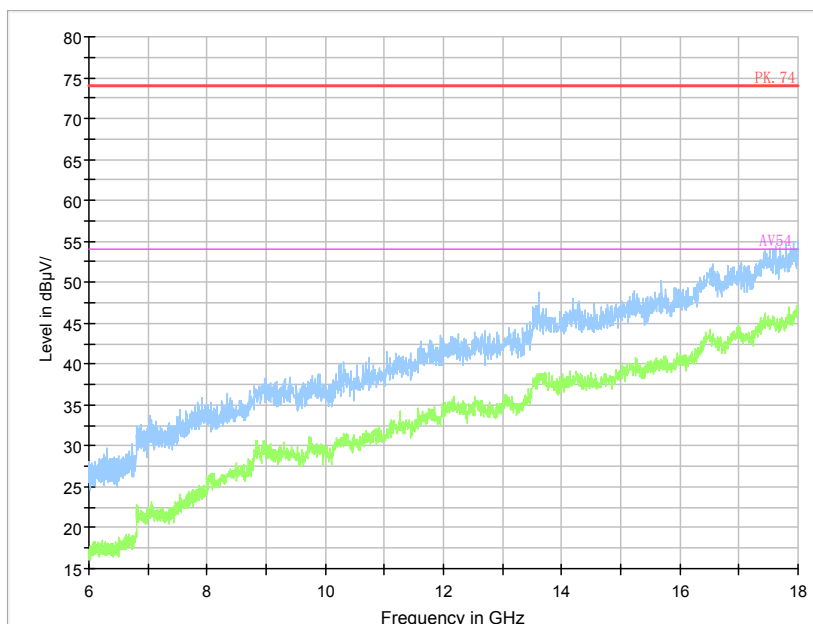
Pic4. Radiated emission(30MHz – 1GHz)

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



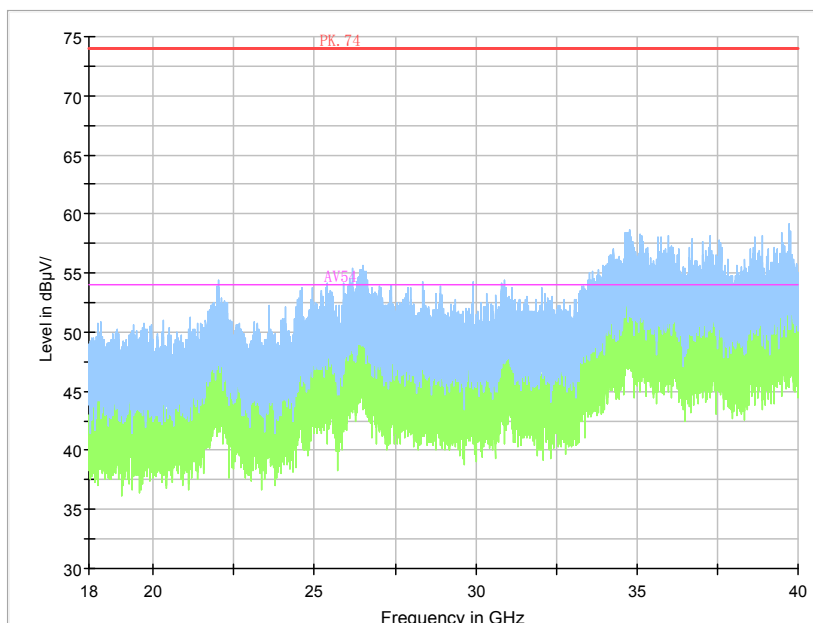
Pic5. Radiated emission (1GHz –6GHz)

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



Pic6.Radiated emission (6GHz –18GHz)

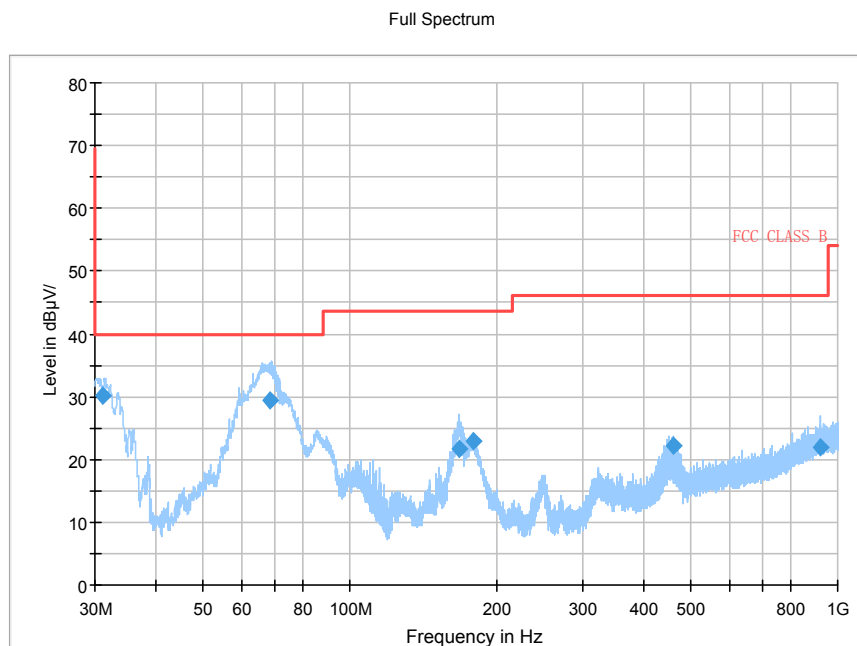
Note : The test data in the graph includes two polarizations: horizontal and vertical.



Pic7. Radiated emission (18GHz –40GHz)

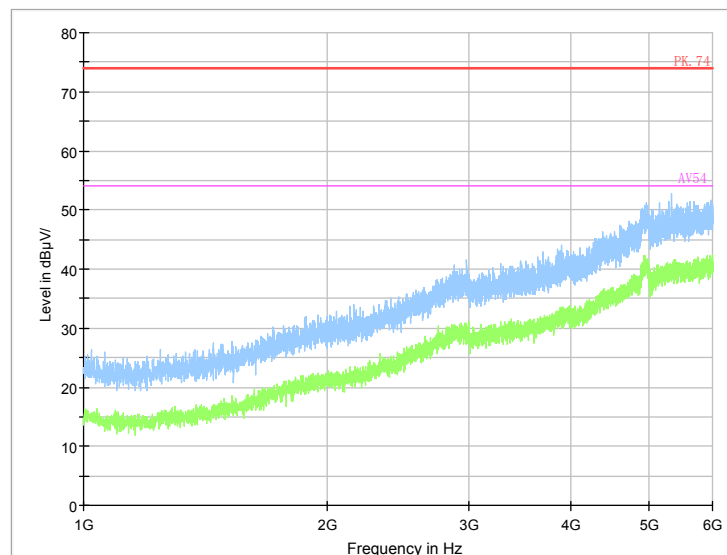
Note : The test data in the graph includes two polarizations: horizontal and vertical.

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



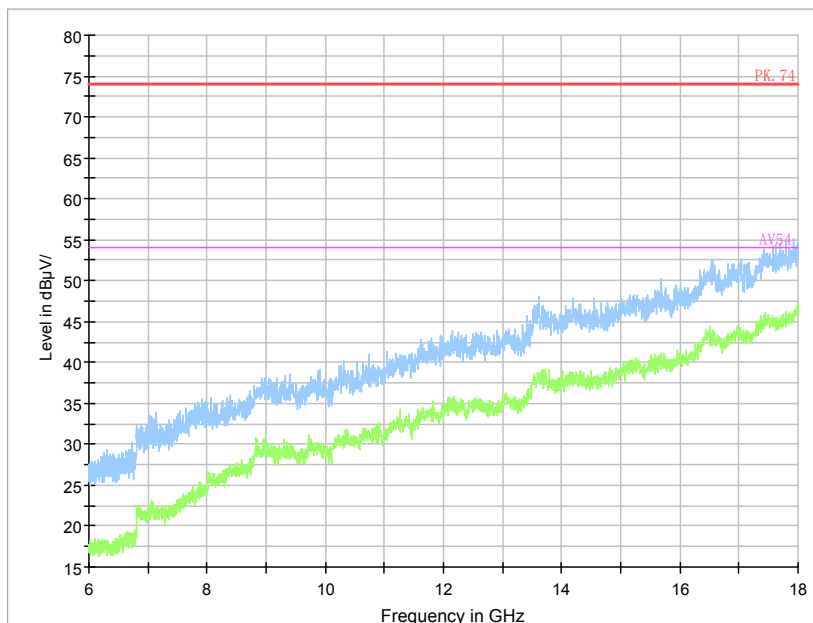
Pic8. Radiated emission(30MHz – 1GHz)

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



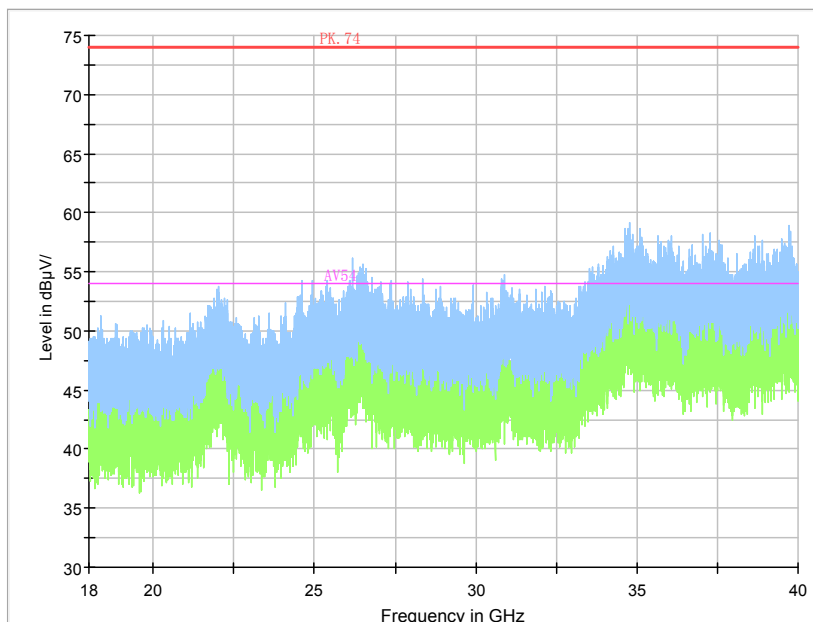
Pic9. Radiated emission (1GHz –6GHz)

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 emi-AnechoicChamber	FRANKONIA	-----	5th Sep. 2021	6th Sep. 2016
2	ESW EMI test receiver	R&S	101574	20th Aug. 2019	20th Aug. 2018
3	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	5th Sep. 2021	6th Sep. 2016
4	ENV216 AMN	R&S	3560.6550. 12	20th Aug. 2020	20th Aug. 2019
5	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100513	20th Aug. 2020	20th Aug. 2019
6	PS2000 Turn Table	FRANKONIA	-----	-----	-----
7	MA260 Antenna Master	FRANKONIA	-----	-----	-----
8	EMC32EMI test software	R&S	V10.20.01	-----	-----
9	VULB9163 Receive antenna	R&S	886	20th Aug. 2020	20th Aug. 2019

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