
TEST REPORT

Report No.: SRTC2019-9003(F)-0024
Product Name: LTE Ufi
Model Name: MF971V
Applicant: ZTE Corporation
Manufacturer: ZTE Corporation
Specification: FCC Part15B (Certification)
(2019 edition)
FCC ID: SRQ-ZTE-MF971V

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

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1. General information

1.1 Notes of the test report

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written permission of The State Radio_monitoring_center Testing Center (SRTC).

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: ZTE Corporation
Address: ZTE Plaza, #55 Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Guangdong, China
City: Shenzhen
Country or Region: P.R.China
Contacted person: Yang Zhao
Tel: 029-83600770
Email: zhao.yangxa@zte.com.cn

1.4 Manufacturer's details

Company: ZTE Corporation
Address: ZTE Plaza, #55 Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Guangdong, China
City: Shenzhen
Country or Region: P.R.China
Contacted person: Yang Zhao
Tel: 029-83600770
Email: zhao.yangxa@zte.com.cn

1.5 Application details

Date of reception of test sample: 30th April. 2019

Date of test: 30th April. 2019 to 16th May. 2019

1.6 Reference specification

FCC Part 15B, 2019 (Certification)

1.7 Information of EUT

1.7.1 General information

Name of EUT	LTE Ufi
Model Name	MF971V
Marketing Name	MF971V
FCC ID	SRQ-ZTE-MF971V
Frequency Range	GSM: GSM850 / PCS1900 WCDMA: FDD II / FDD V LTE: FDD 2/ FDD 4/ FDD 5/FDD 7/ TDD 38 WiFi: 2.4~2.4835GHz/5.15-5.25GHz
Carrier Aggregation	DownLink: B38+B38; B7+B7
Equipment Class	Class B
Antenna Type	PIFA Antenna
Power Supply	Battery or Charger
Rated Power Supply Voltage	3.8V
Extreme Temperature	Lowest: -10°C Highest: +55°C
Extreme Voltage	Minimum: 3.6V Maximum: 4.35V
HW Version	dqaA
SW Version	BD_MF971VV1.0.0B01

1.7.2EUT details

Product Name	Model Name	IMEI
LTE Ufi	MF971V	869626021439007

1.7.3 Auxiliary equipment details

The EUT's charger have three different models or suppliers. For more information, see tables below.

AE (Auxiliary Equipment) 1#: Laptop

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

AE (Auxiliary Equipment) 2#: USB Cable

Manufacturer	Shen Zhen Shi Yi HUA XING Electron Co.,Ltd
Model Number	USB-MU5-W-100-L

AE (Auxiliary Equipment) 3#: Battery

Type	Li-Lon
Manufacturer	Zhongshan Tianmao Battery Co., Ltd.
Model Number	Li3823T43P3h715345
Capacity	2300mAh
Nominal Voltage	3.8V

AE (Auxiliary Equipment) 4#: Charger 1

Manufacturer	AOHAI
Model Number	STC-A51A-B
S/N	/
Input Voltage	100V-240V AC
Frequency	50/60Hz

AE (Auxiliary Equipment) 5#: Charger 2

Manufacturer	AOHAI
Model Number	STC-A51A-Z
S/N	/
Input Voltage	100V-240V AC

Frequency	50/60Hz
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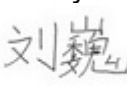
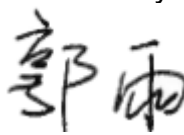
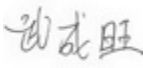
AE (Auxiliary Equipment) 6#: Charger 3

Manufacturer	SHENZHEN RUIJING INDUSTRIAL CO LTD
Model Number	STC-A51A-Z
S/N	/
Input Voltage	100V-240V AC
Frequency	50/60Hz

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

Issued By: 	Checked By: 
Tested By: Mr. Wu Chengwang 	Issued date: 2019.5.16

2.2 Test result

2.2.1 Conducted Emissions-FCC Part15.107

Ambient condition:

Temperature	Relative humidity	Pressure
23.6°C	41.2%	100.8kPa

Test Setup with laptop:

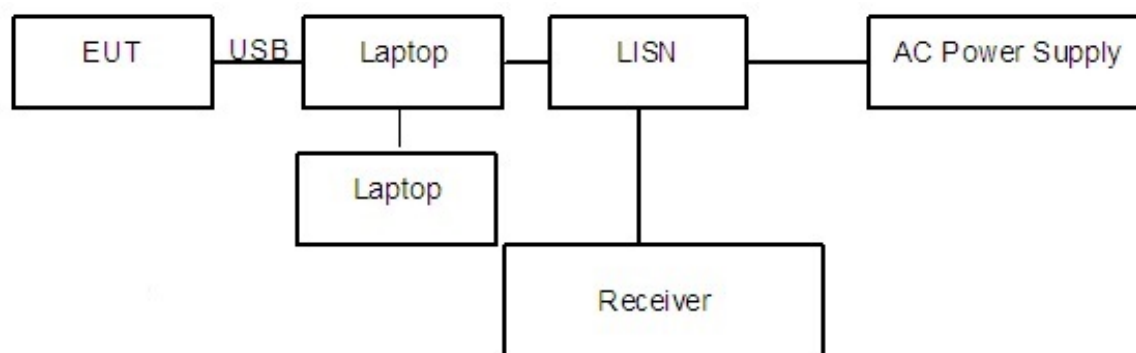


Figure 1

Test Procedure:

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The EUT was connected with a laptop via the USB cable. The EUT was configured by Laptop and transferred the data by sharing the network via USB cable. 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:

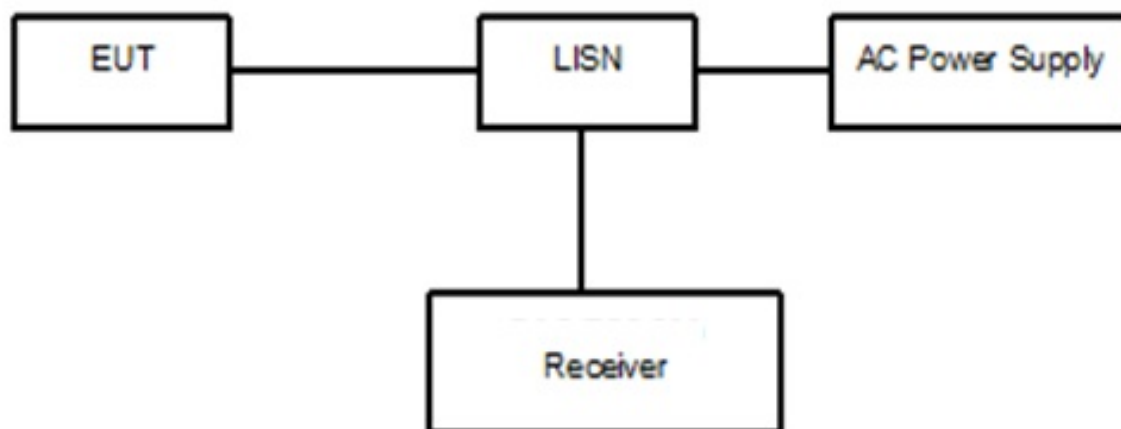


Figure 2

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 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 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: $(46.54 \text{ dB}\mu\text{V}) = (16.84 \text{ dB}\mu\text{V}) + (29.7 \text{ dB})$, the corresponding frequency is 0.198000MHz.

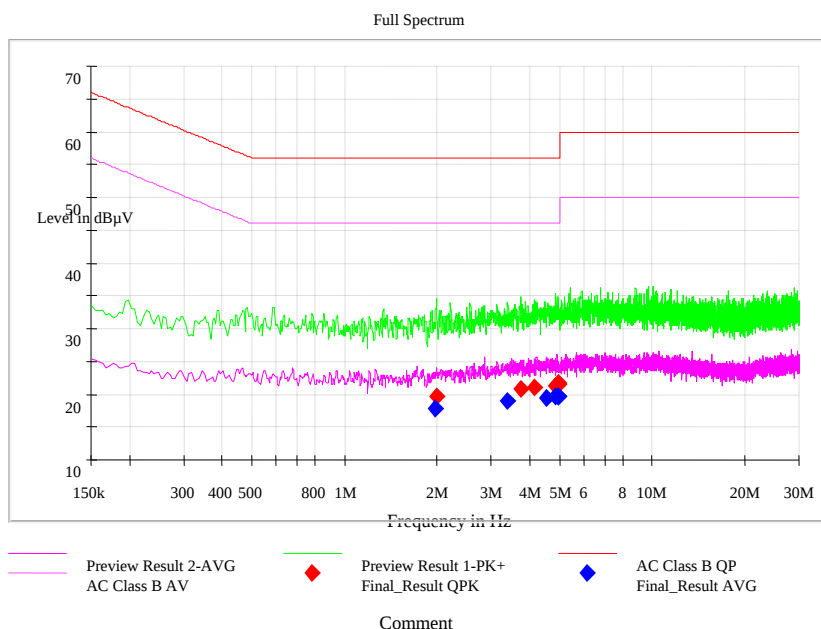
Limit:

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

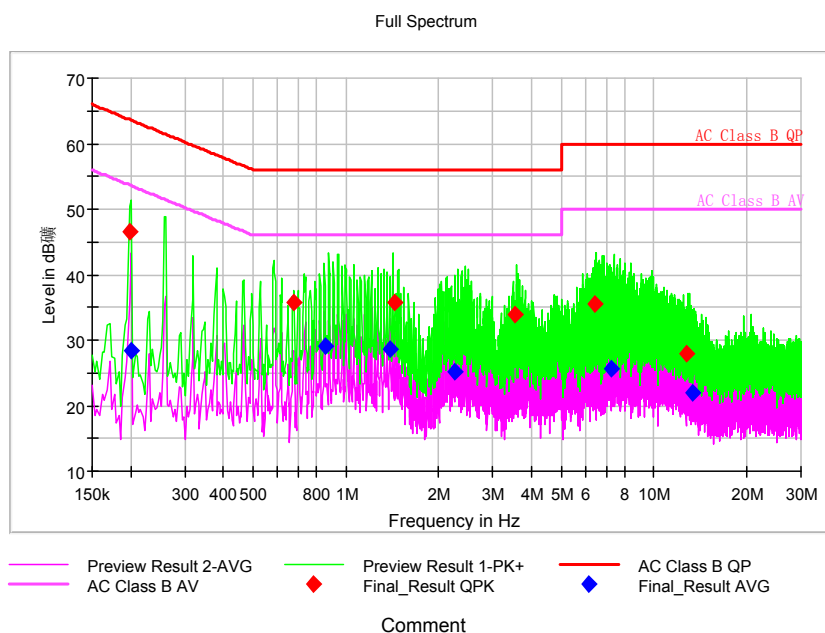
Test result:

Noise Level of the Measuring Instrument



Pic1. Conducted emission L and N Line

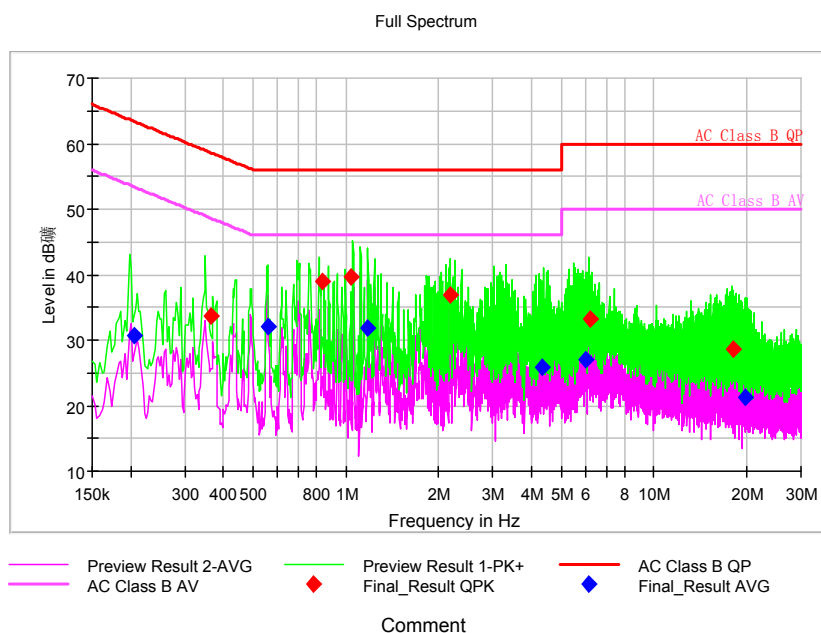
EUT + Charger1 (#4):



Pic2. Conducted emission L&N Line

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	Pmea QuasiPeak (dBμV)	Pmea Average (dBμV)
0.198000	46.54	---	63.69	17.15	L1	29.7	16.8	---
0.202000	---	28.34	53.53	25.19	L1	29.7	---	-1.36
0.674825	35.68	---	56.00	20.32	L1	29.7	5.98	---
0.855475	---	29.11	46.00	16.89	L1	29.7	---	-0.59
1.396360	---	28.53	46.00	17.47	L1	29.7	---	-1.17
1.439640	35.69	---	56.00	20.31	L1	29.7	5.99	---
2.251025	---	25.20	46.00	20.80	N	29.8	---	-4.6
3.552840	33.93	---	56.00	22.07	L1	29.8	4.13	---
6.407095	35.48	---	60.00	24.52	L1	29.8	5.68	---
7.310595	---	25.57	50.00	24.43	L1	29.9	---	-4.33
12.760130	27.94	---	60.00	32.06	L1	29.9	-1.96	---
13.382745	---	21.89	50.00	28.11	L1	29.9	---	-8.01

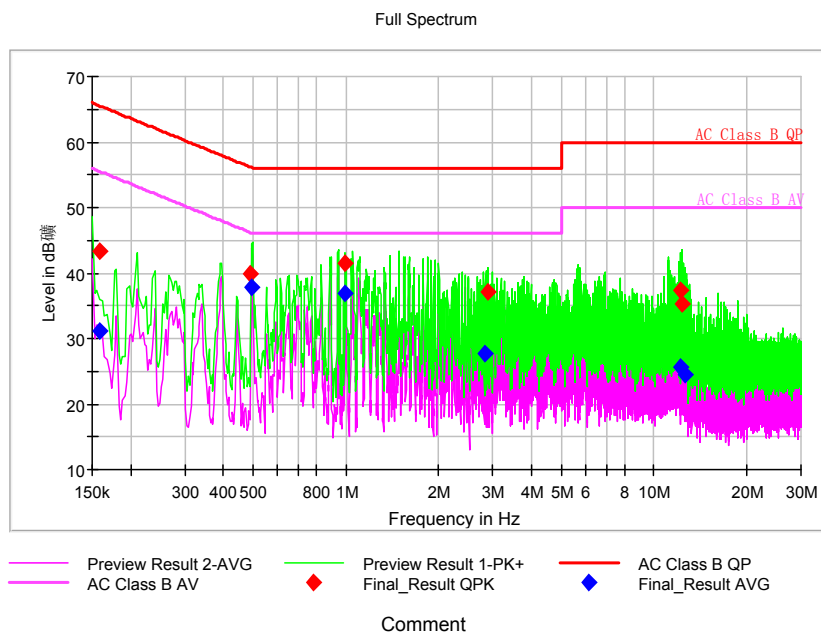
EUT + Charger2 (#5):



Pic3. Conducted emission L&N Line

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	Pmea QuasiPeak (dBμV)	Pmea Average (dBμV)
0.205995	---	30.58	53.37	22.79	L1	29.7	---	0.88
0.365995	33.58	---	58.59	25.01	L1	29.7	3.88	---
0.558945	---	32.14	46.00	13.86	L1	29.7	---	2.44
0.842640	38.99	---	56.00	17.01	L1	29.7	9.29	---
1.038455	39.62	---	56.00	16.38	L1	29.7	9.92	---
1.173140	---	31.90	46.00	14.10	L1	29.7	---	2.2
2.180755	36.84	---	56.00	19.16	L1	29.8	7.04	---
4.324640	---	25.76	46.00	20.24	L1	29.8	---	-4.04
6.003940	---	27.11	50.00	22.89	L1	29.8	---	-2.69
6.202925	33.17	---	60.00	26.83	L1	29.8	3.37	---
18.047405	28.71	---	60.00	31.29	L1	29.9	-1.19	---
19.746465	---	21.28	50.00	28.72	L1	29.9	---	-8.62

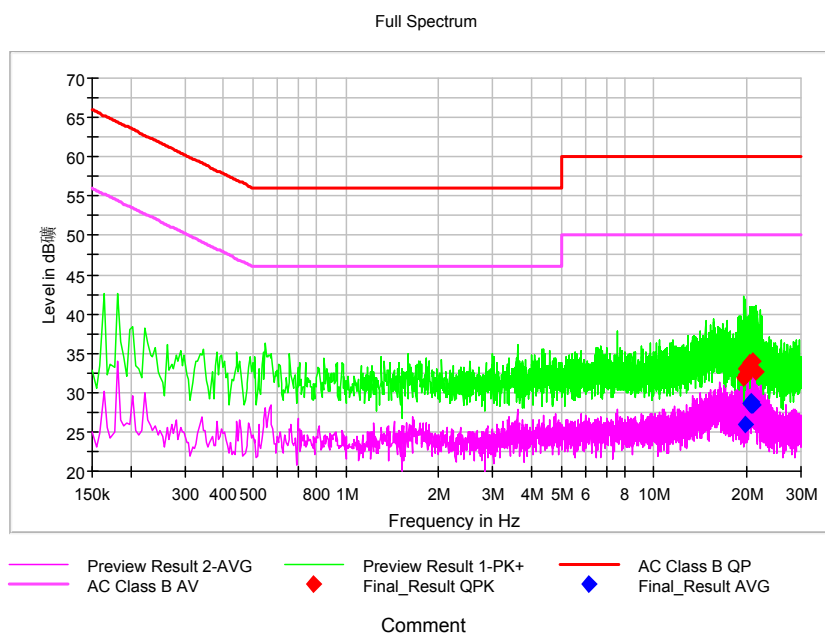
EUT + Charger3 (#6):



Pic4. Conducted emission L&N Line

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	Pmea QuasiPeak (dBμV)	Pmea Average (dBμV)
0.158000	---	31.17	55.57	24.39	L1	29.7	---	1.47
0.158000	43.24	---	65.57	22.33	L1	29.7	13.5	---
0.491245	39.84	---	56.15	16.31	L1	29.7	10.1	---
0.492260	---	37.77	46.13	8.36	L1	29.7	---	8.07
0.988010	41.52	---	56.00	14.48	L1	29.7	11.8	---
0.988010	---	36.91	46.00	9.09	L1	29.7	---	7.21
2.830470	---	27.64	46.00	18.36	L1	29.8	---	-2.16
2.887185	37.10	---	56.00	18.90	L1	29.8	7.3	---
12.141040	---	25.68	50.00	24.32	L1	29.9	---	-4.22
12.161040	37.25	---	60.00	22.75	L1	29.9	7.35	---
12.369395	35.24	---	60.00	24.76	L1	29.9	5.34	---
12.575835	---	24.51	50.00	25.49	L1	29.9	---	-5.39

EUT + Laptop (#1):



Pic5. Conducted emission L&N Line

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	Pmea QuasiPeak (dBμV)	Pmea Average (dBμV)
19.579636	31.96	---	60.00	28.04	L1	30.0	1.96	---
19.697227	---	26.00	50.00	24.00	L1	30.0	---	-4
19.697227	32.26	---	60.00	27.74	L1	30.0	2.26	---
19.896227	33.03	---	60.00	26.97	L1	30.0	3.03	---
20.452523	33.82	---	60.00	26.18	L1	30.0	3.82	---
20.533932	---	28.64	50.00	21.36	L1	30.0	---	-1.36
20.692227	---	28.41	50.00	21.59	L1	30.0	---	-1.59
20.732932	---	28.82	50.00	21.18	L1	30.0	---	-1.18
20.809818	---	28.60	50.00	21.40	L1	30.0	---	-1.4
20.891227	34.06	---	60.00	25.94	L1	30.0	4.06	---
20.891227	---	28.48	50.00	21.52	L1	30.0	---	-1.52
21.447523	32.59	---	60.00	27.41	L1	30.0	2.59	---

2.2.2 Radiated Emissions-FCC Part15.109

Ambient condition:

Temperature	Relative humidity	Pressure
22.8°C	41.6%	100.8kPa

Test Setup:

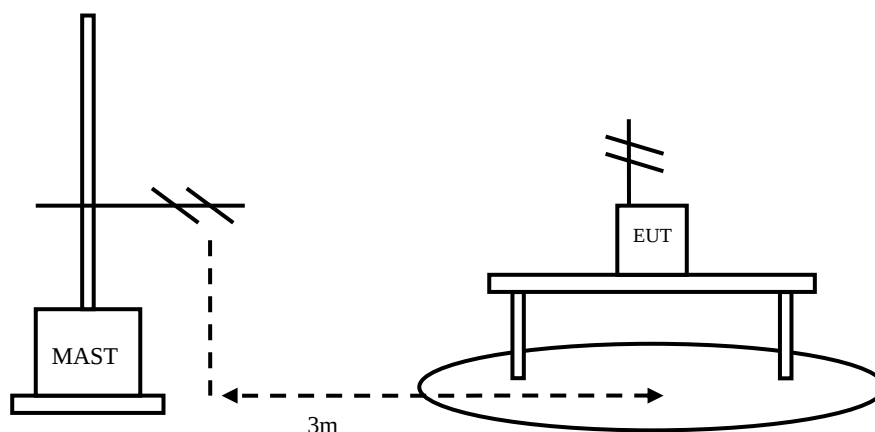


Figure 3

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 EUT was connected with a laptop via the USB cable. The EUT was configured by Laptop and transferred the data by sharing the network via USB cable. shared the network via USB cable. 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 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: $(18.67 \text{ dB } \mu \text{ V/m}) = (37.57 \text{ dB } \mu \text{ V/m}) + (-18.9 \text{ dB})$, the corresponding frequency is 41.555000MHz.

EUT + charger1 (#4)

Frequency(MHz)	Result(dB μ V/m)	Limit (dB μ V/m)	ARpl (dB)	Pmea (dB μ V/m)	Polarity
41.555000	18.67	40.00	-18.9	37.57	V
51.516667	22.07	40.00	-24.6	46.67	V
71.230417	13.45	40.00	-24.3	37.75	V
82.202917	15.29	40.00	-23.6	38.89	V
84.385000	16.28	40.00	-23.3	39.58	V
112.813333	19.97	43.50	-21.4	41.37	V

EUT + charger2 (#5)

Frequency(MHz)	Result(dB μ V/m)	Limit (dB μ V/m)	ARpl (dB)	Pmea (dB μ V/m)	Polarity
66.333333	17.34	40.00	-25.2	42.54	V
67.581667	18.69	40.00	-25.0	43.69	V
76.641667	21.50	40.00	-24.0	45.5	V
78.095000	20.84	40.00	-24.0	44.84	V
79.432083	20.71	40.00	-23.9	44.61	V
85.917500	14.18	40.00	-23.2	37.38	V

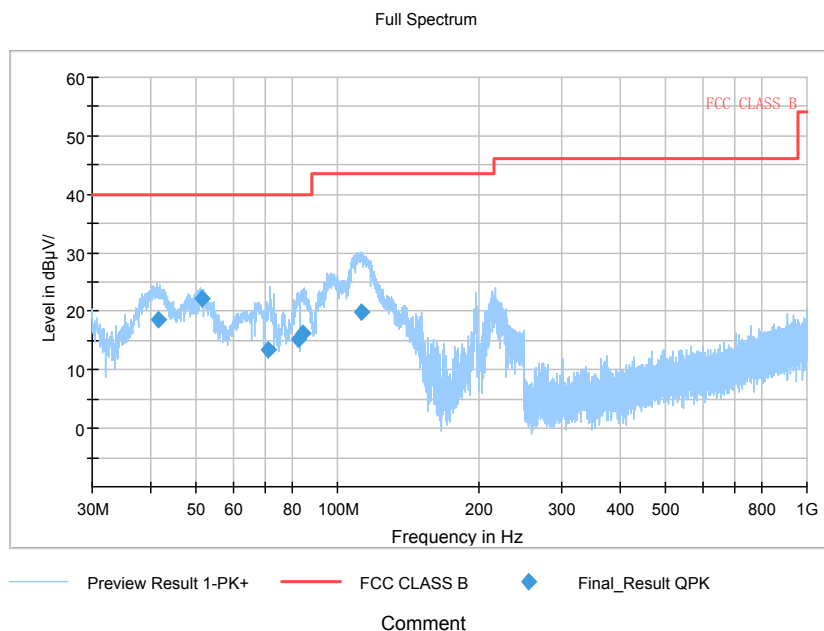
EUT + charger3 (#6)

Frequency(MHz)	Result(dB μ V/m)	Limit (dB μ V/m)	ARpl (dB)	Pmea (dB μ V/m)	Polarity
76.700833	24.56	40.00	-24.0	48.56	V
85.329167	31.02	40.00	-23.2	54.22	V
87.133333	30.63	40.00	-23.0	53.63	V
95.980417	29.96	43.50	-22.1	52.06	V
112.817917	28.10	43.50	-21.4	49.5	V
124.368333	26.52	43.50	-21.5	48.02	V

EUT+ Laptop (#1)

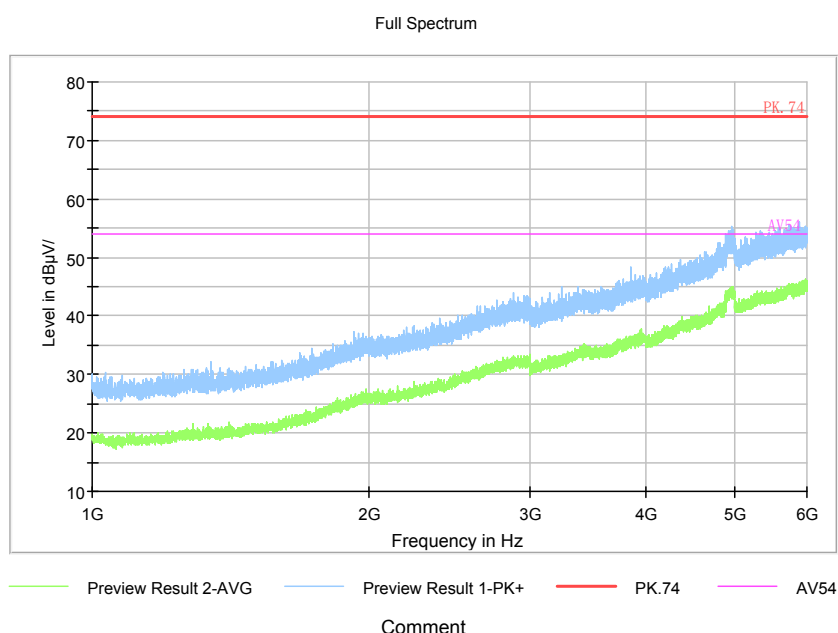
Frequency(MHz)	Result(dB μ V/m)	Limit (dB μ V/m)	ARpl (dB)	Pmea (dB μ V/m)	Polarity
72.352917	8.32	40.00	-24.3	32.62	V
168.562500	11.91	43.50	-22.8	34.71	V
168.573333	11.79	43.50	-22.8	34.59	V
360.002083	31.05	46.00	-16.3	47.35	V
455.991667	29.15	46.00	-13.4	42.55	V
503.986667	28.39	46.00	-11.9	40.29	V

EUT + charger1 (#4): refer to Pic6, Pic7, Pic8, Pic9



Pic6. Radiated emission(30MHz – 1GHz)

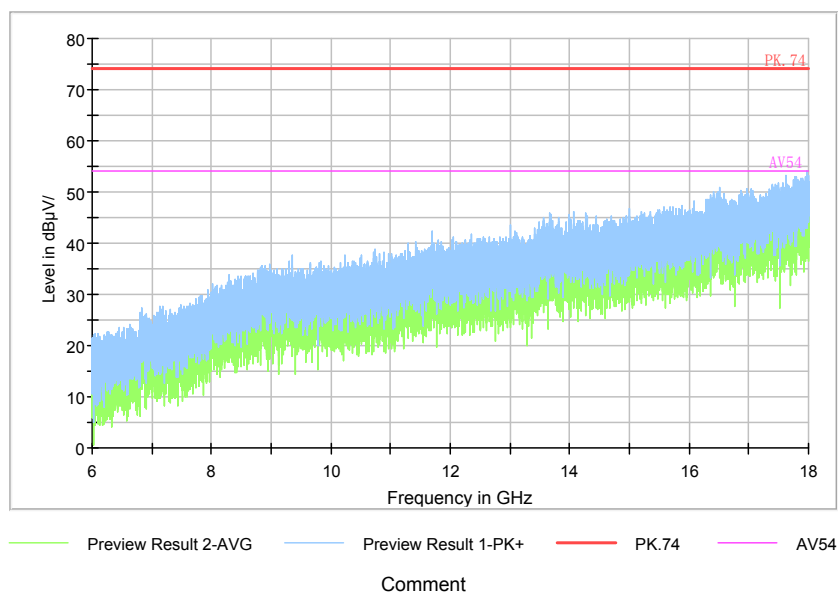
Note : The test data in the graph includes two polarizations: horizontal and vertical



Pic7. Radiated emission (1GHz –6GHz)

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

Full Spectrum

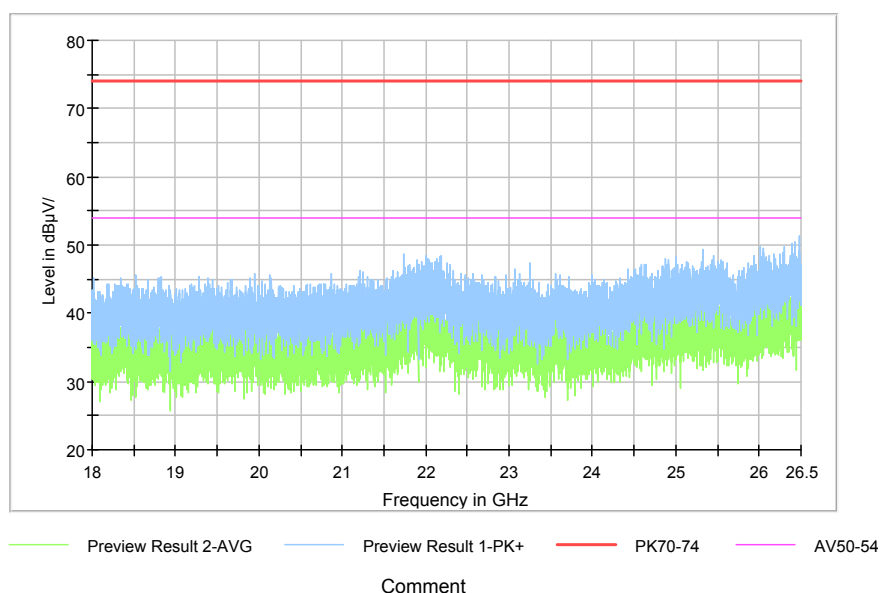


Comment

Pic8. Radiated emission (6GHz –18GHz)

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

Full Spectrum

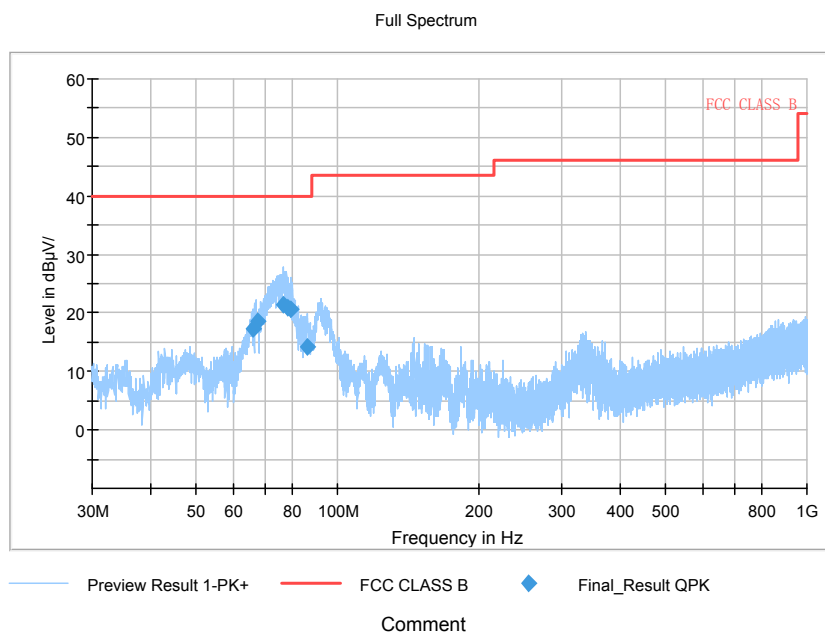


Comment

Pic9. Radiated emission (18GHz –26.5GHz)

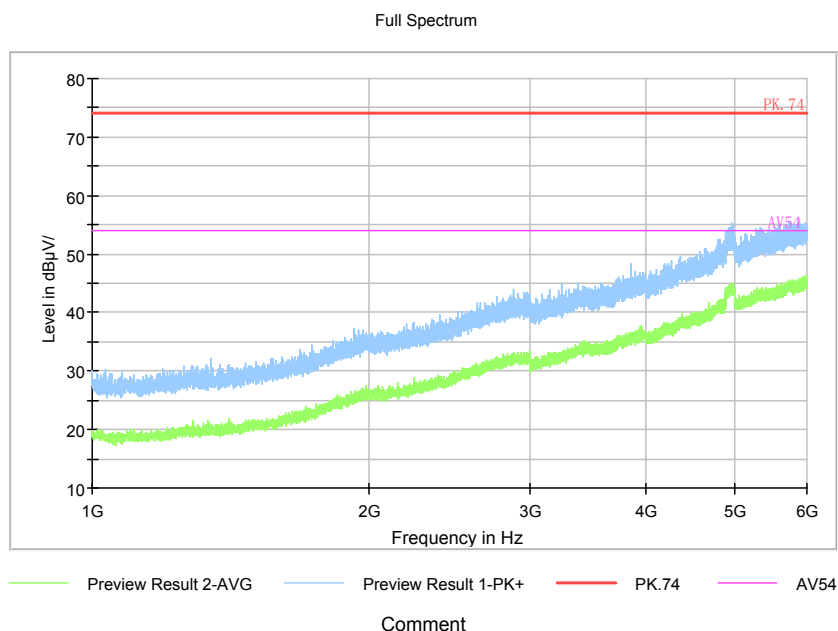
Note : The test data in the graph includes two polarizations: horizontal and vertical.

EUT + charger2 (#5): refer to Pic10, Pic11, Pic12, Pic13



Pic10. Radiated emission(30MHz – 1GHz)

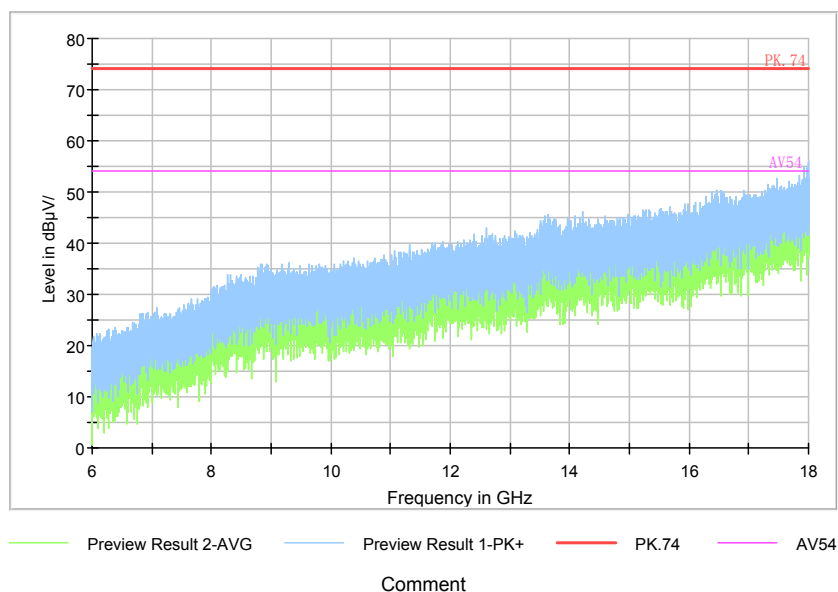
Note : The test data in the graph includes two polarizations: horizontal and vertical



Pic11. Radiated emission (1GHz –6GHz)

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

Full Spectrum

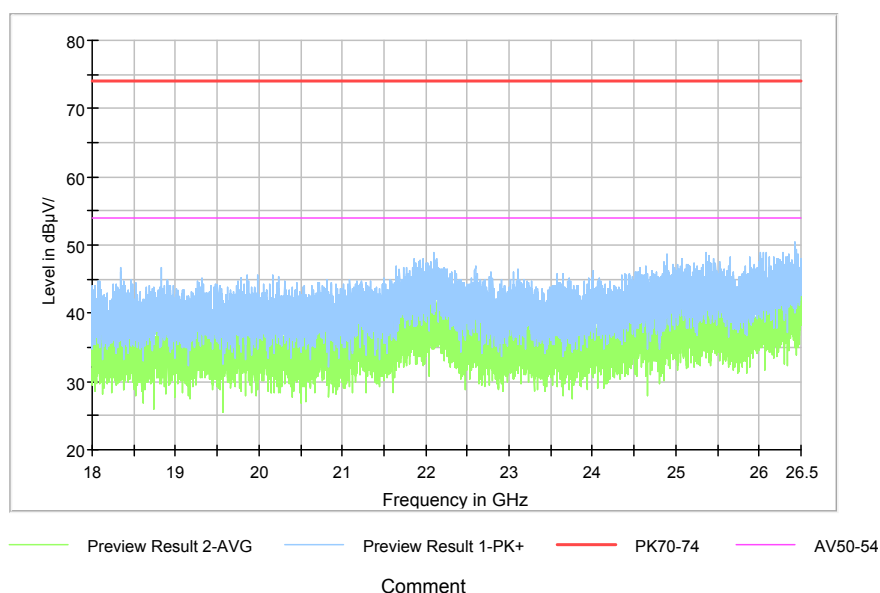


Comment

Pic12. Radiated emission (6GHz –18GHz)

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

Full Spectrum

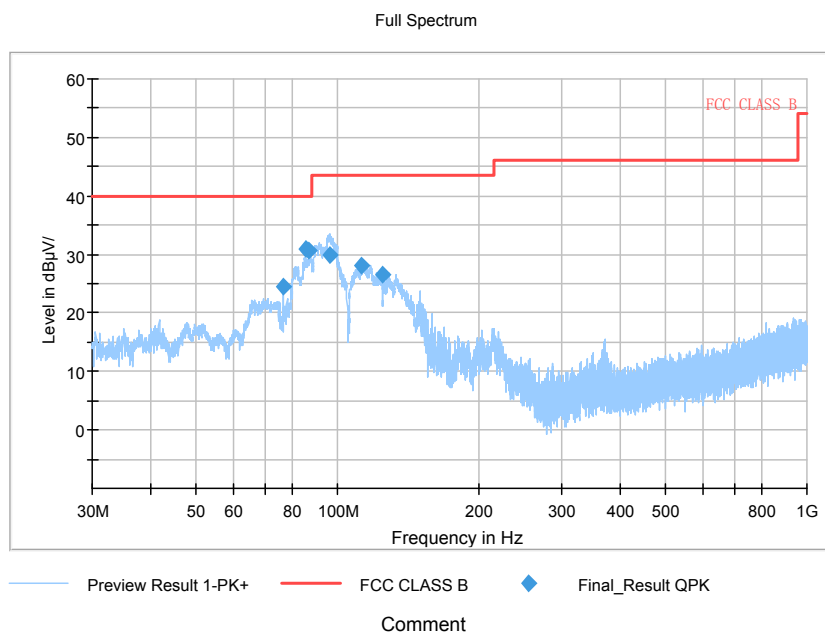


Comment

Pic13. Radiated emission (18GHz –26.5GHz)

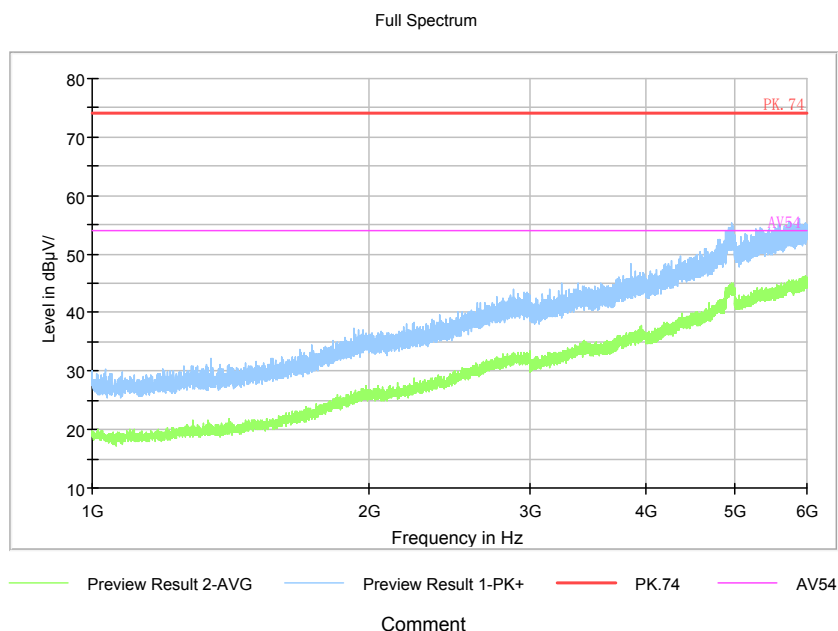
Note : The test data in the graph includes two polarizations: horizontal and vertical.

EUT + charger3 (#6): refer to Pic14, Pic15, Pic16, Pic17



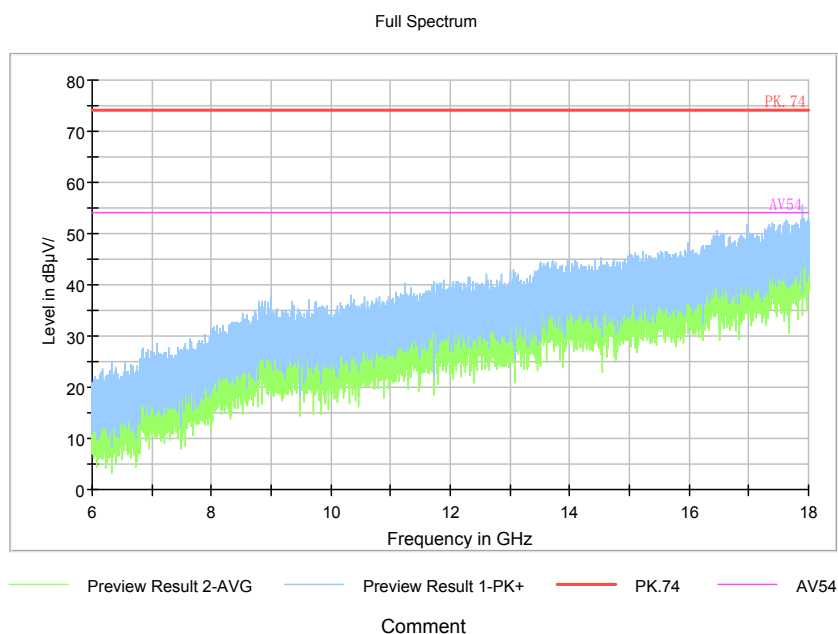
Pic14. Radiated emission(30MHz – 1GHz)

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



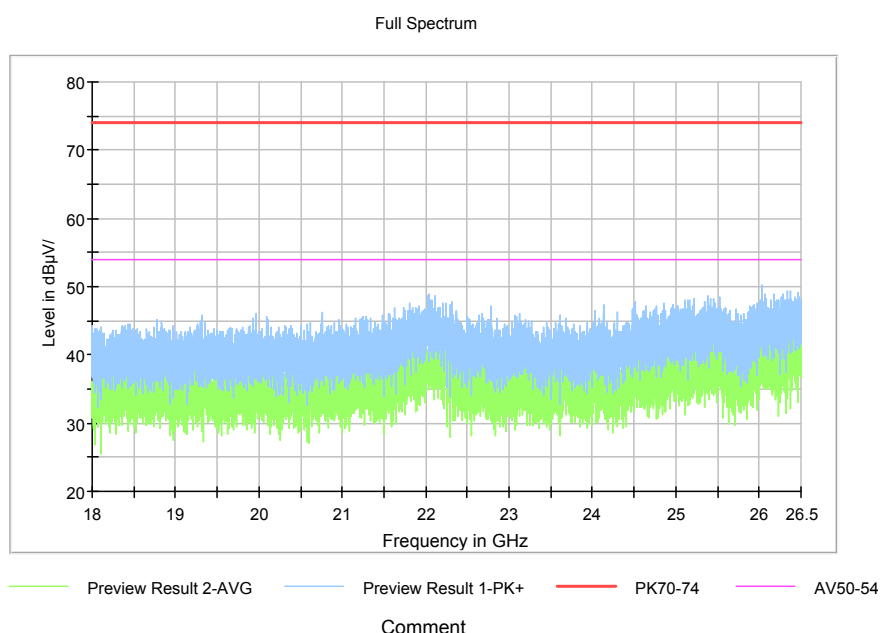
Pic15. Radiated emission (1GHz –6GHz)

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



Pic16. Radiated emission (6GHz –18GHz)

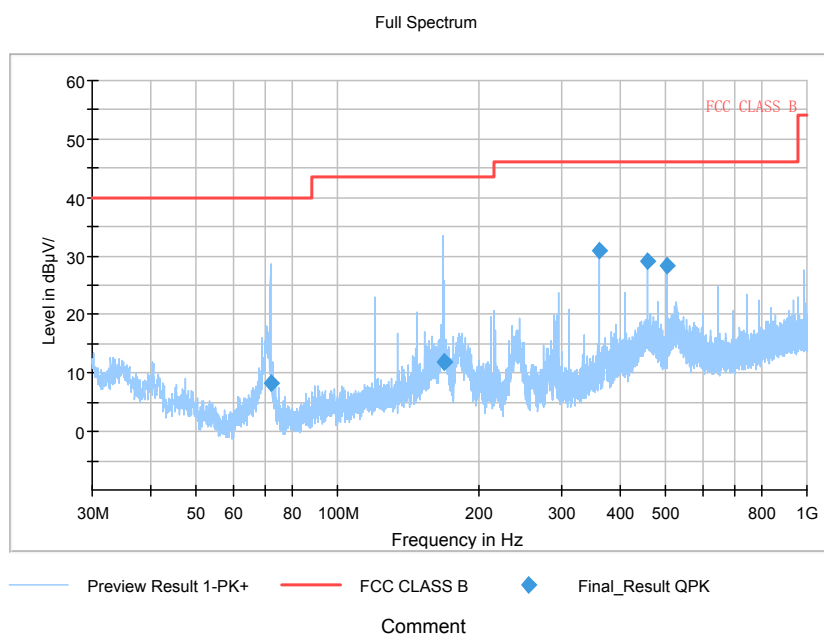
Note : The test data in the graph includes two polarizations: horizontal and vertical.



Pic17. Radiated emission (18GHz –26.5GHz)

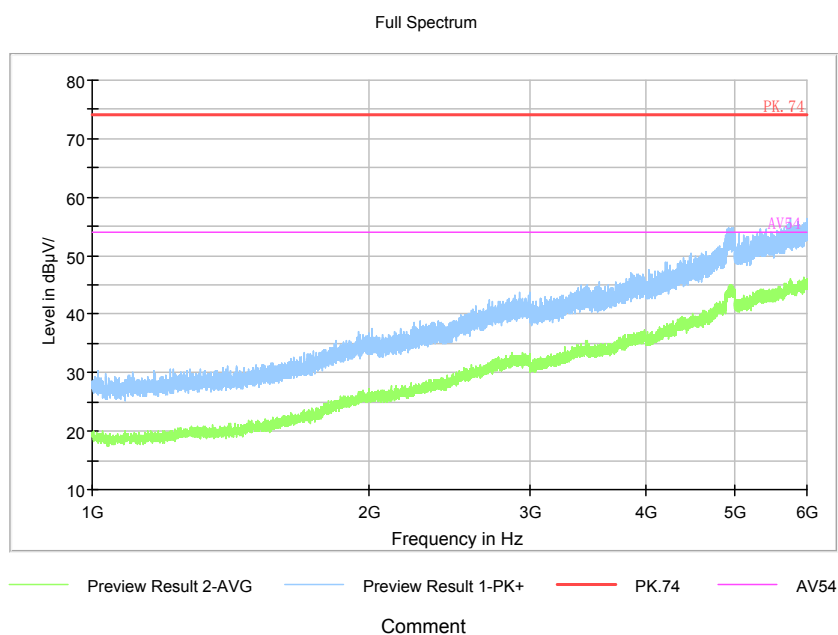
Note : The test data in the graph includes two polarizations: horizontal and vertical.

EUT + Laptop: refer to Pic18, Pic19, Pic20, Pic21



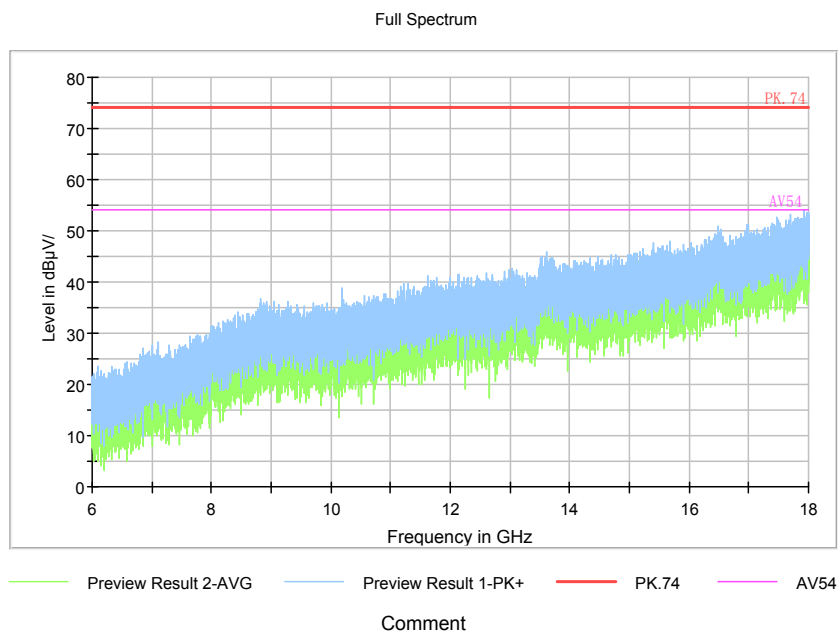
Pic18. Radiated emission(30MHz – 1GHz)

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



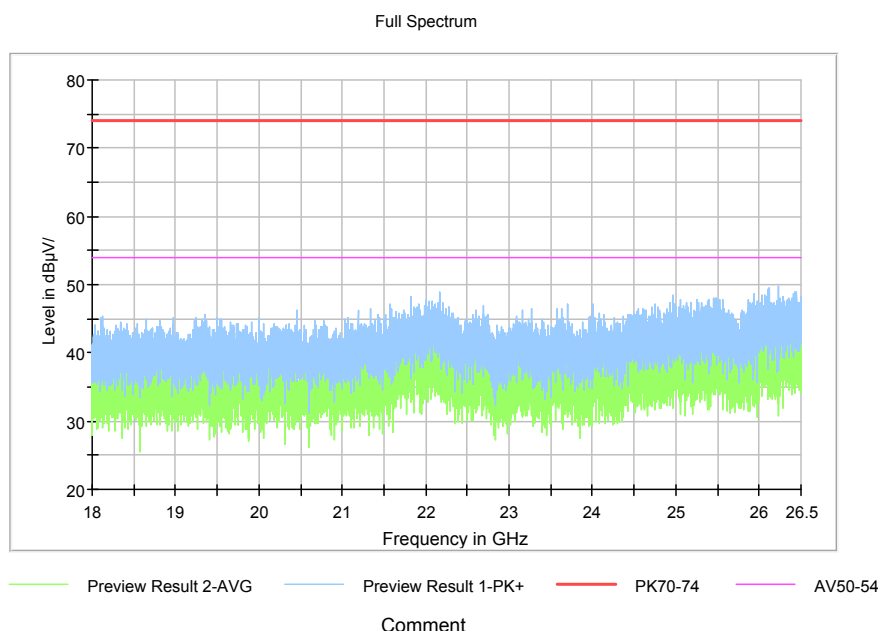
Pic19. Radiated emission (1GHz –6GHz)

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



Pic20. Radiated emission (6GHz –18GHz)

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



Pic21. Radiated emission (18GHz –26.5GHz)

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	ESIB7 EMI test receiver	R&S	100280	20th Aug. 2019	20th Aug. 2018
5	HL562Ultra log test antenna	R&S	100167	20th Aug. 2019	20th Aug. 2018
6	ENV216 AMN	R&S	3560.6550. 12	20th Aug. 2019	20th Aug. 2018
7	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100512	20th Aug. 2019	20th Aug. 2018
8	PS2000 Turn Table	FRANKONIA	-----	-----	-----
9	MA260 Antenna Master	FRANKONIA	-----	-----	-----
10	EMC32EMI test software	R&S	-----	-----	-----