

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,
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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
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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

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 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 Bluetooth: 2.4~2.4835GHz WiFi: 2.4~2.4835GHz 5.15~5.25 GHz 5.725~5.85 GHz
Power Supply	Charger/Battery
Nominal Voltage	3.8V
Extreme Temperature	Lowest: -20°C Highest: +60°C
Extreme Voltage	Minimum: 3.3V Maximum: 4.2V
HW Version	MF993CHW1.0
SW Version	MF993CV1.0

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

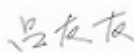
Manufacturer	Luxshare Precision Industry Company Limited
Model Number	USB-TC30-W-100-M

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

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 Director of the test department 	Checked By: Guo Yu Vice director of the test department 
Tested by: Mr. Lv Youyou Test engineer 	Issued date: 2020.12.15

2.2 Test result

2.2.1 Conducted Emissions-FCC Part15.107

Ambient condition:

Temperature	Relative humidity	Pressure
23.1°C	41.2%	100.8kPa

Test Setup with charger:

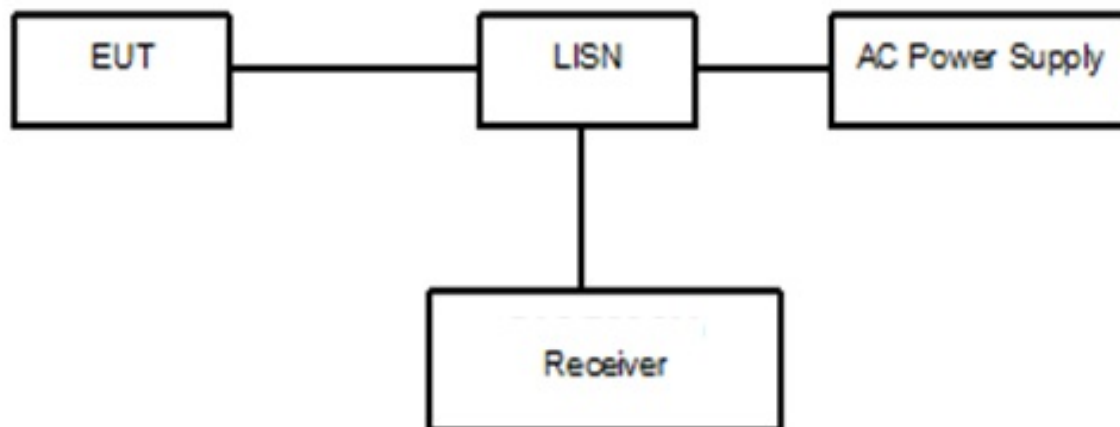


Figure 1

Test Procedure:

The EUT is placed on a non-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 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: $(17.58 \text{ dB}\mu\text{V}) = (-12.0 \text{ dB}\mu\text{V}) + (29.6 \text{ dB})$, the corresponding frequency is 0.355219MHz.

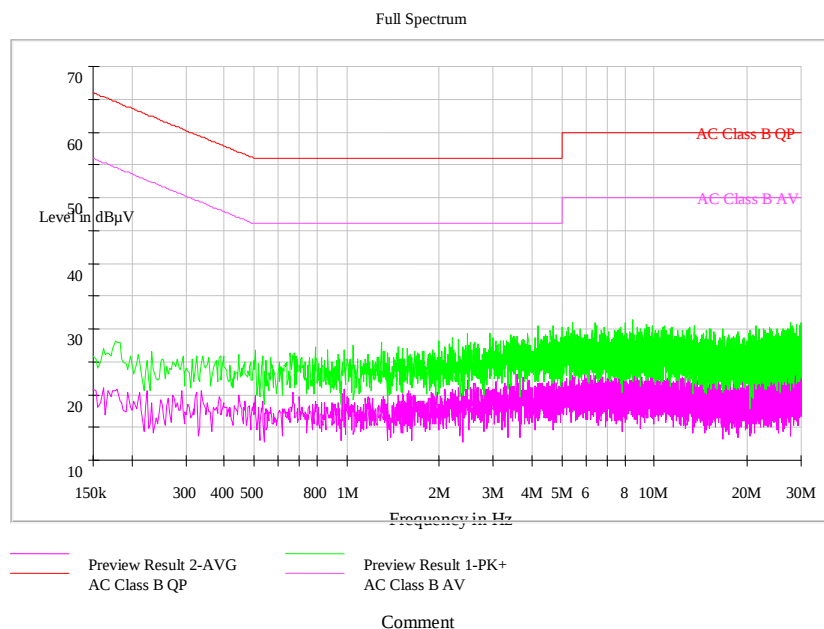
Limit:

Frequency of Emission(MHz)	Limits(dB μ V)	
	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

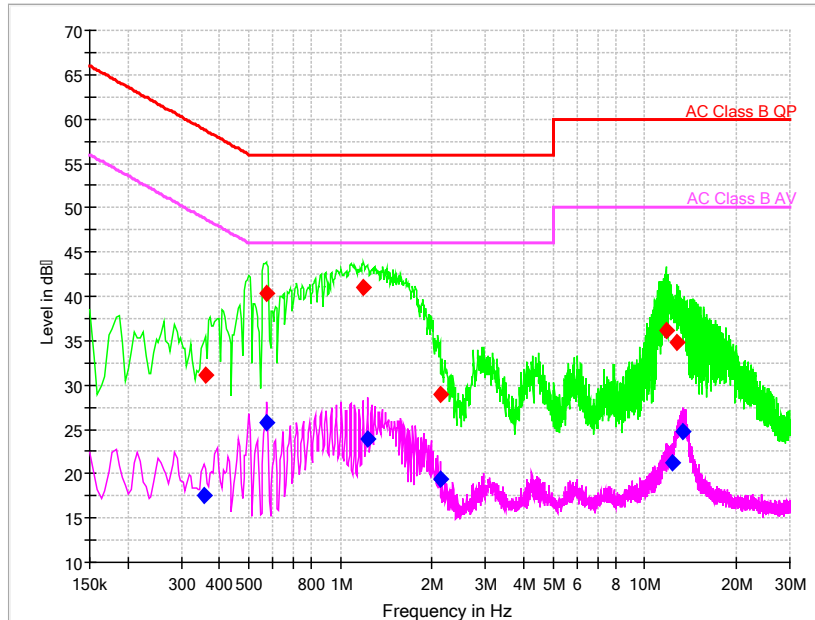
Test result:

Noise Level of the Measuring Instrument



Pic1. Conducted emission L and N Line

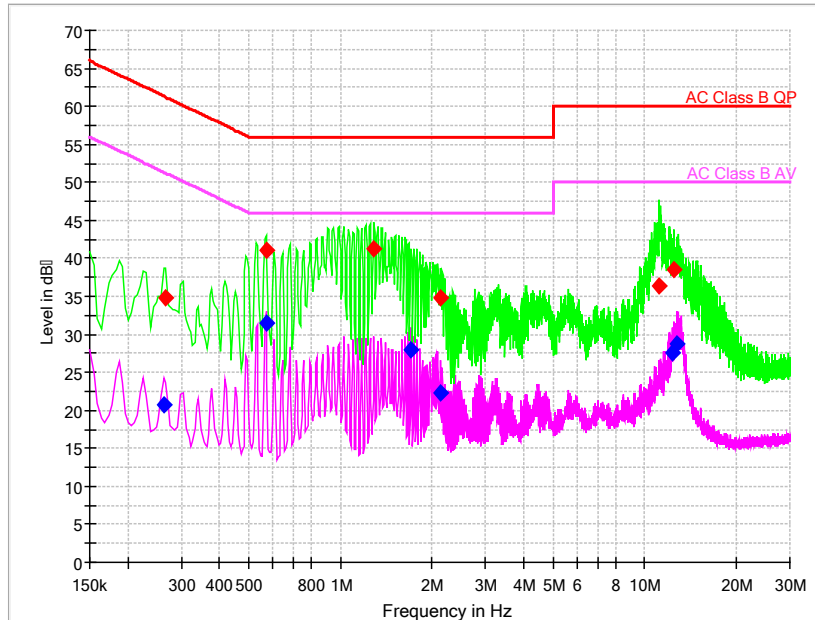
EUT1+ charger1:



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

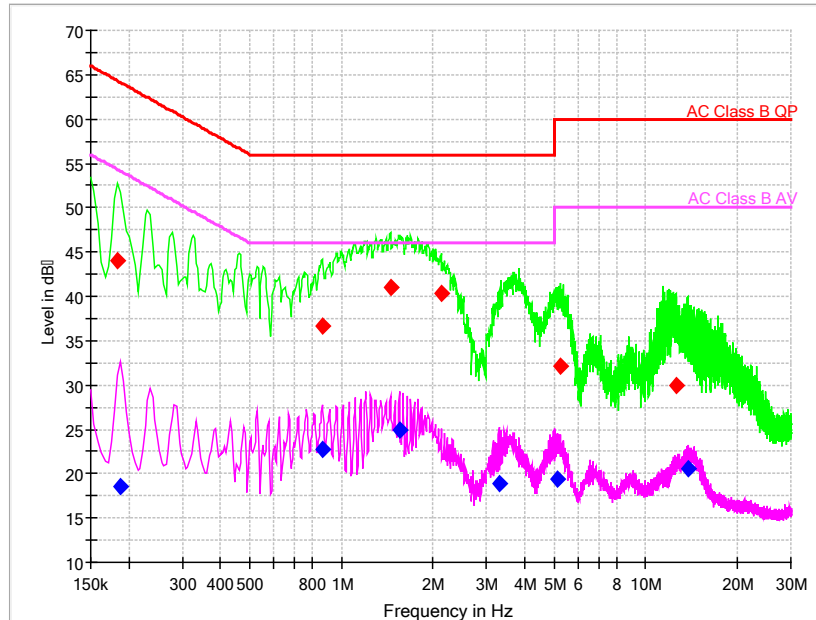
EUT1+ charger1:



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

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	P _{mea} QuasiPeak (dBμV)	P _{mea} Average (dBμV)
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

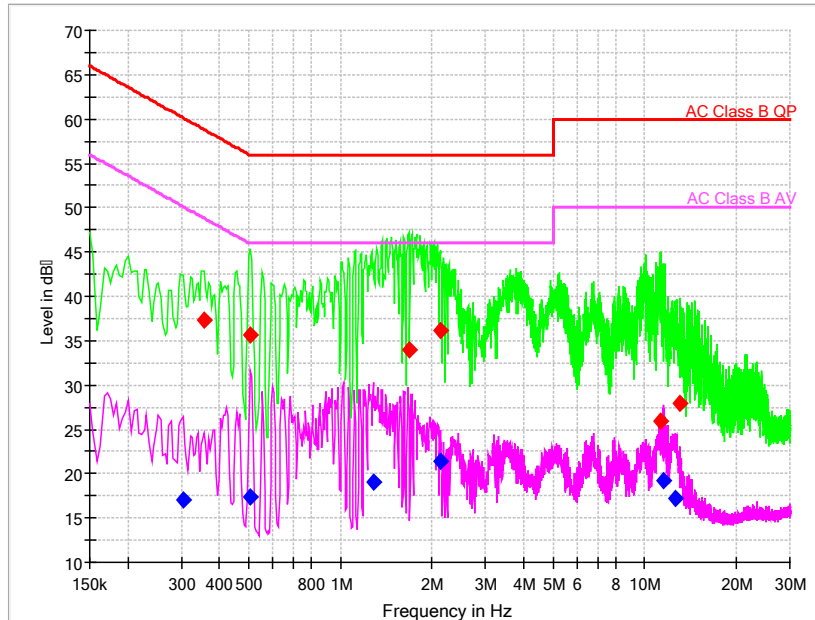
EUT1+ charger2:



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

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	---

2.2.2 Radiated Emissions-FCC Part15.109

Ambient condition:

Temperature	Relative humidity	Pressure
22.7°C	41.2%	100.8kPa

Test Setup:

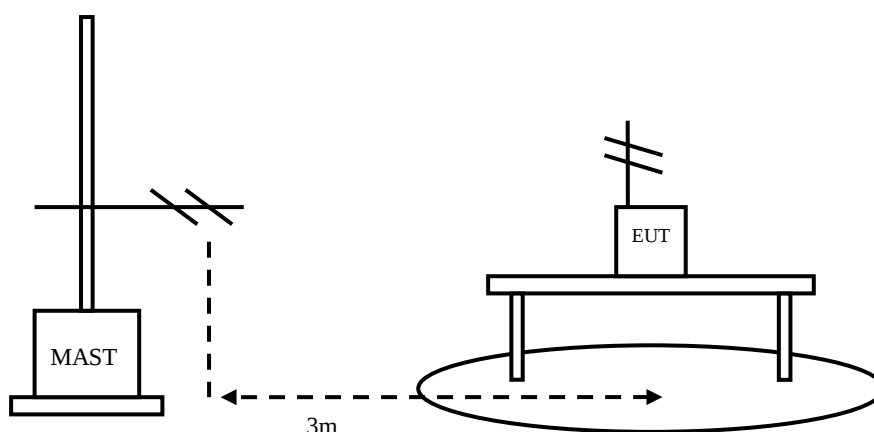


Figure 2

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 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:

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

Sample calculation: $(23.16 \text{ dB}\mu\text{V/m}) = (40.56 \text{ dB}\mu\text{V}) + (-17.4 \text{ dB/m})$, the corresponding frequency is 46.638500MHz.

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:

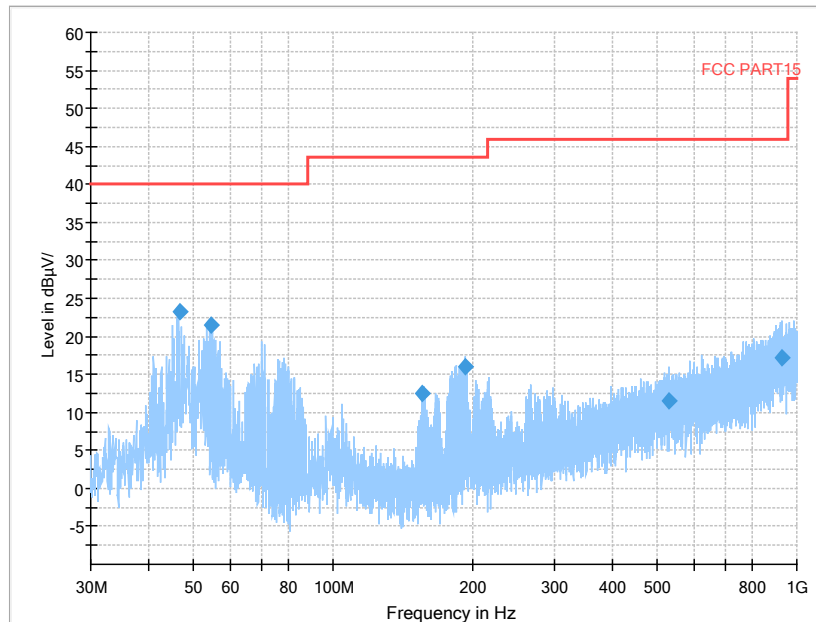
EUT1+Charger1:

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:

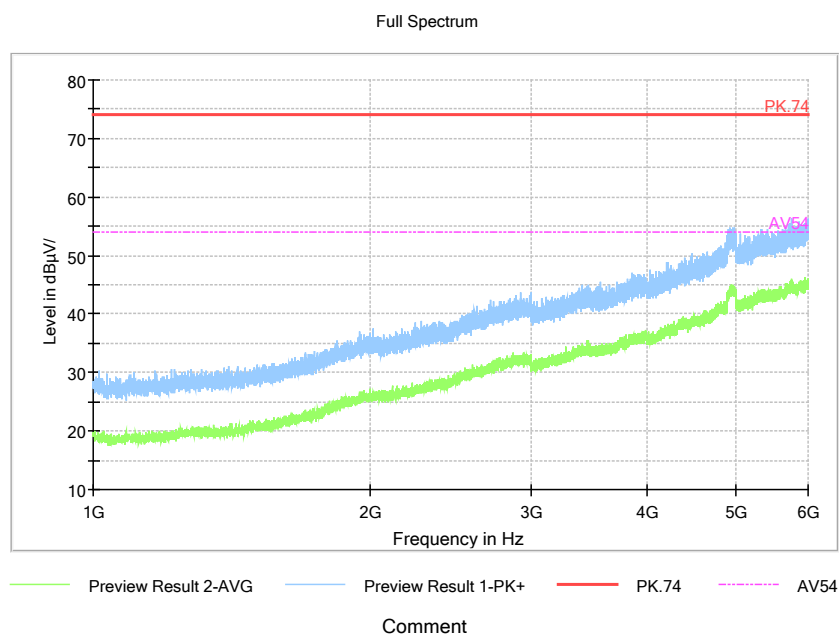
Frequency(MHz)	Result(dBuV/m)	A _{Rpl} (dB/m)	P _{mea} (dBuV)	Polarity
48.245000	20.97	-17.3	38.27	V
63.048500	18.63	-19.4	38.03	V
99.297500	16.50	-18.7	35.20	V
200.931500	11.04	-18.2	29.24	V
543.966000	11.82	-8.1	19.92	V
946.073500	17.18	-0.9	18.08	V

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



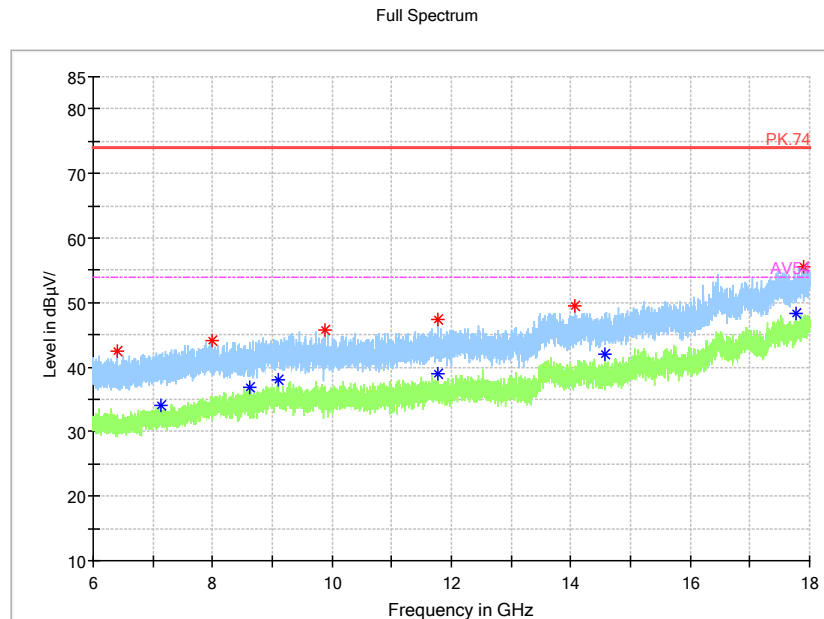
Pic6. Radiated emission (30MHz – 1GHz)

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



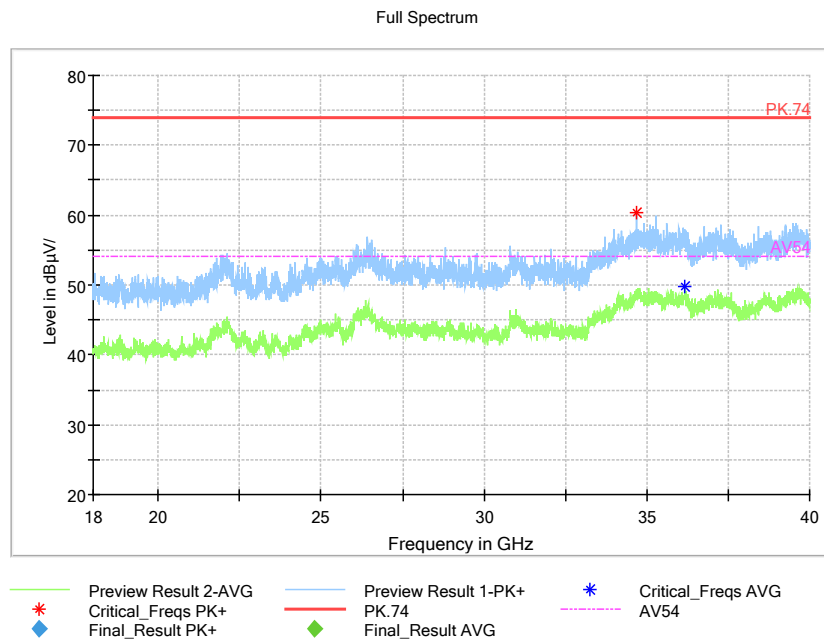
Pic7. Radiated emission (1GHz –6GHz)

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



Pic8. Radiated emission (6GHz –18GHz)

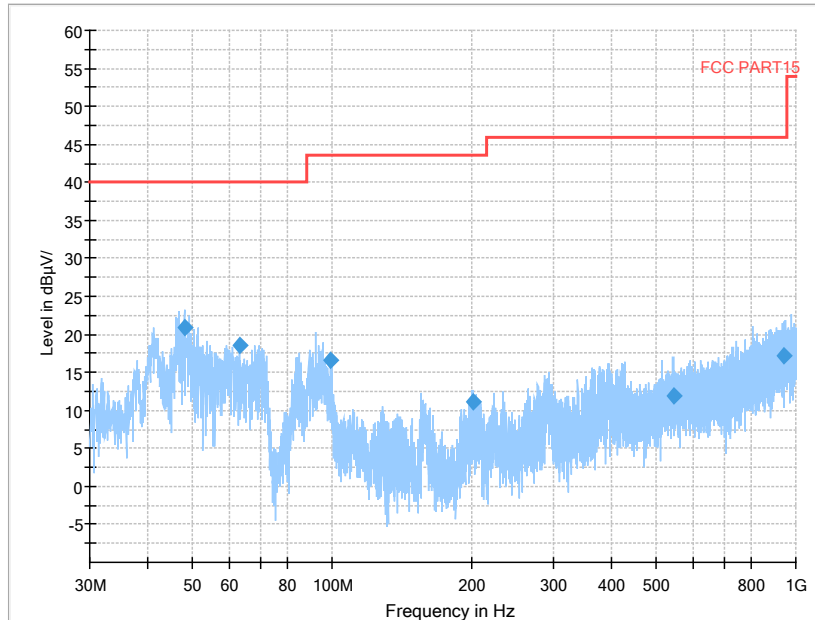
Note: The test data in the graph includes two polarizations: horizontal and vertical



Pic9. Radiated emission (18GHz –40GHz)

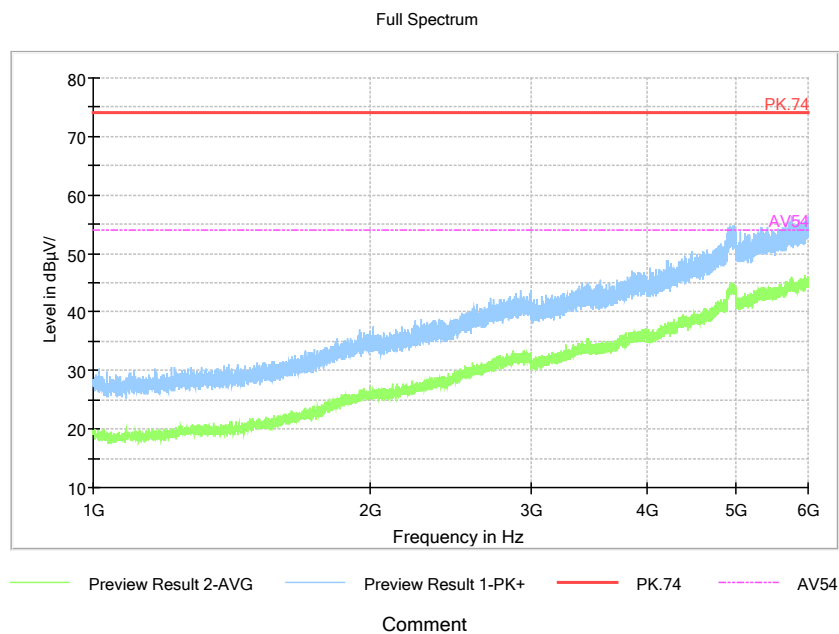
Note: The test data in the graph includes two polarizations: horizontal and vertical

EUT1+ charger2: refer to Pic10,Pic11,Pic12 and Pic13



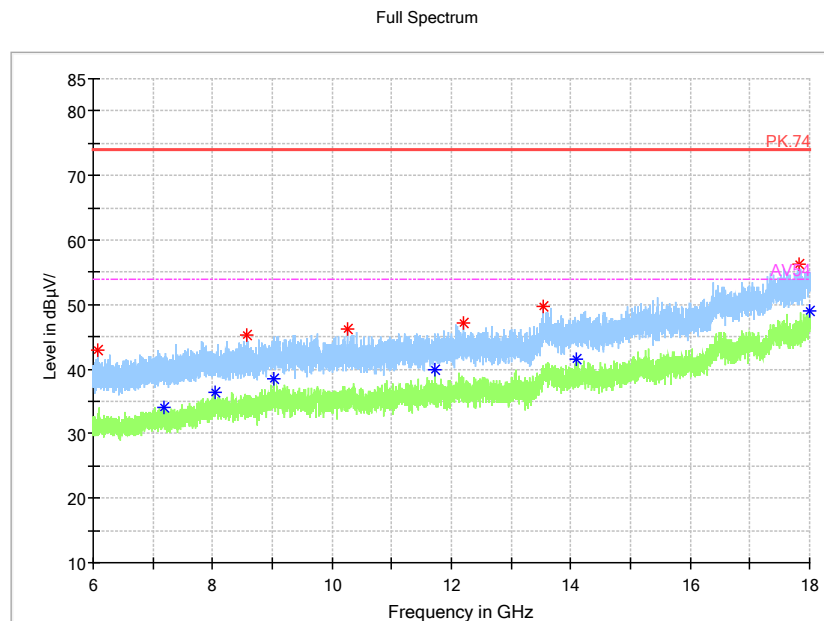
Pic10. Radiated emission (30MHz – 1GHz)

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



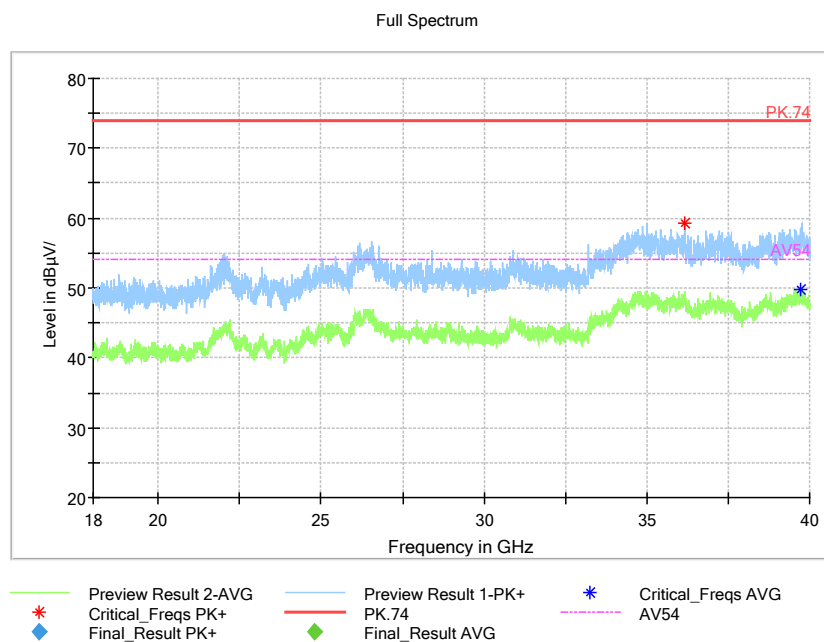
Pic11. Radiated emission (1GHz – 6GHz)

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



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

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. 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-----