
TEST REPORT

Report No.: SRTC2021-9003(F)-0019
Product Name: LTE/WCDMA/GSM Multi-Mode Digital Mobile Phone
Model Name: Z5158
Applicant: ZTE CORPORATION
Manufacturer: ZTE CORPORATION
Specification: FCC Part15B (Certification)
(2020 edition)
FCC ID: SRQ-Z5158

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
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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, P.R.China
City: Shenzhen
Country or Region: P.R.China
Contacted person: Gong Yu
Tel: +86-21-68895397
Email: gongyu@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, P.R.China
City: Shenzhen
Country or Region: P.R.China
Contacted person: Gong Yu
Tel: +86-21-68895397
Email: gongyu@zte.com.cn

1.5 Application details

Date of reception of test sample: 5th July 2021

Date of test: 5th July 2021 to 16th July 2021

1.6 Reference specification

FCC Part 15B, 2020 (Certification)

1.7 Information of EUT

1.7.1 General information

Name of EUT	LTE/WCDMA/GSM Multi-Mode Digital Mobile Phone
Model Name	Z5158
FCC ID	SRQ-Z5158
Frequency Range	GSM: GSM850 / PCS1900 WCDMA: FDD II / FDD IV / FDD V LTE: FDD 2/ FDD 4/ FDD 5/ FDD 12/ TDD 41/FDD 66/FDD 71 Bluetooth: 2.4~2.4835GHz WiFi: 2.4~2.4835GHz
Equipment Class	Class B
Power Supply	Battery or Charger
Rated Power Supply Voltage	4V
Extreme Temperature	Lowest: 0°C Highest: +55°C
Extreme Voltage	Minimum: 3.8V Maximum: 4.3V
HW Version	Z5158HW1.0
SW Version	Z5158_CCv1.0.0B06

1.7.2 EUT details

Product Name	Model Name	IMEI
LTE/WCDMA Multi-Mode Digital Mobile Phone	Z5158	865748050003589

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#: USB Cable1

Manufacturer	Dongwan Kingpower Electronics Co.,LTD
Model Number	USB-TC20-W-100-M-L

AE (Auxiliary Equipment) 3#: USB Cable2

Manufacturer	Luxshare
Model Number	USB-TC20-W-100-M-L

AE (Auxiliary Equipment) 4#: Charger1

Manufacturer	SHENZHEN RUIJING INDUSTRIAL CO.,LTD
Model Number	STC-A51D-Z
S/N	/
Input Voltage	100V-240V AC 250mA
Output Voltage	5.0VDC 1000mA

AE (Auxiliary Equipment) 5#: Charger2

Manufacturer	Jiangxi Jian Aohai Technology Co., Ltd.
Model Number	STC-A51D-Z
S/N	/
Input Voltage	100V-240V AC 250mA
Output Voltage	5.0VDC 1000mA

AE (Auxiliary Equipment) 6#: Charger3

Manufacturer	HUIZHOU PUAN ELECTRONICS CO.,LTD
Model Number	STC-A51D-Z
S/N	/
Input Voltage	100V-240V AC 250mA
Output Voltage	5.0VDC 1000mA

AE (Auxiliary Equipment) 7#: Battery

Manufacturer	Jiade Energy Technology(zhuhai) CO., LTD
Model Number	Li3830T43P8h486375

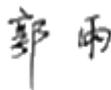
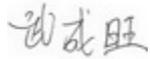
Note1: As the information described in these above tables, the relevant tests have been performed in order to verify in which supply would have the worst features. When the EUT exercised with 4# Charger, 7# Battery, 2# USB Cable1 is the worst feature, and record the results in the test report.

Note2: AE1# Laptop was selected by testing laboratory and was only cooperated with this test, not for sale.

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 	Checked By: Mr. Guo Yu Vice director of the test department 
Tested By: Mr. Wu Chengwang 	Issued date: 2021.07.15

2.2 Test result

2.2.1 Conducted Emissions-FCC Part15.107

Ambient condition:

Temperature	Relative humidity	Pressure
27.3°C	40.1%	100.8kPa

Test Setup with laptop:

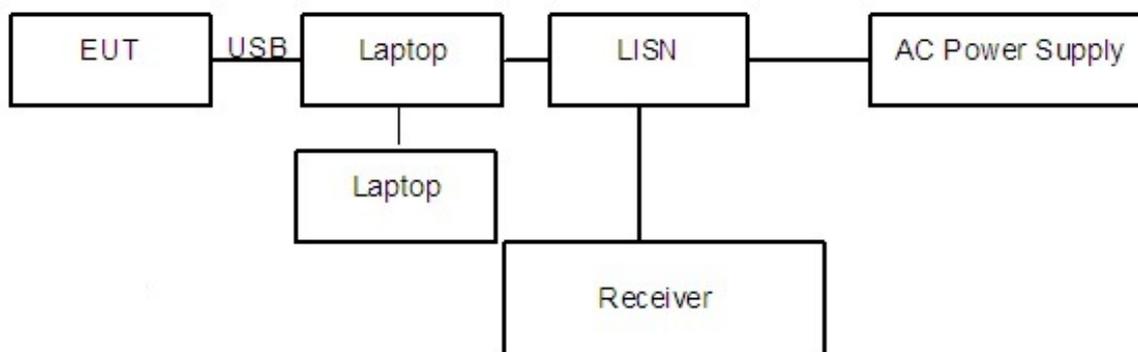


Figure 1

Test Procedure:

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The 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:

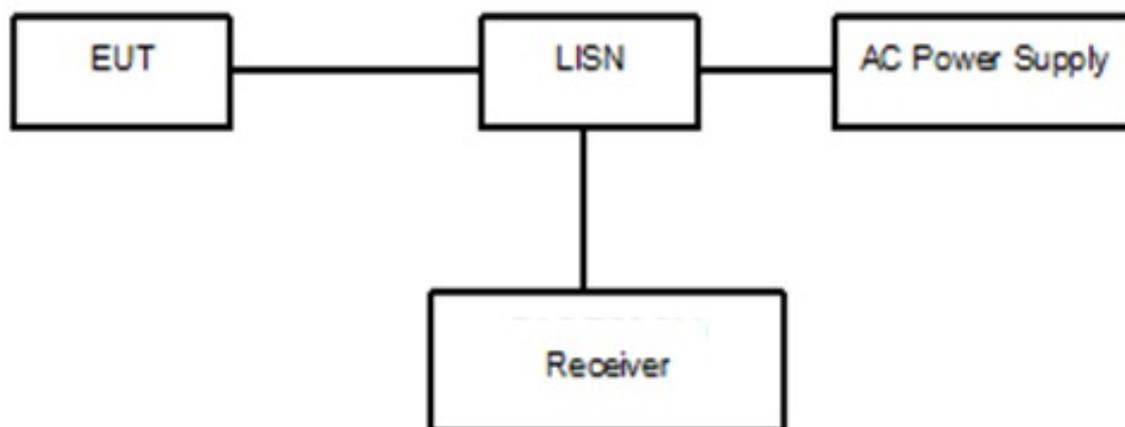


Figure 2

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 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: $(39.95 \text{ dB}\mu\text{V}) = (10.25 \text{ dB}\mu\text{V}) + (29.7 \text{ dB})$, the corresponding frequency is 0.167057MHz.

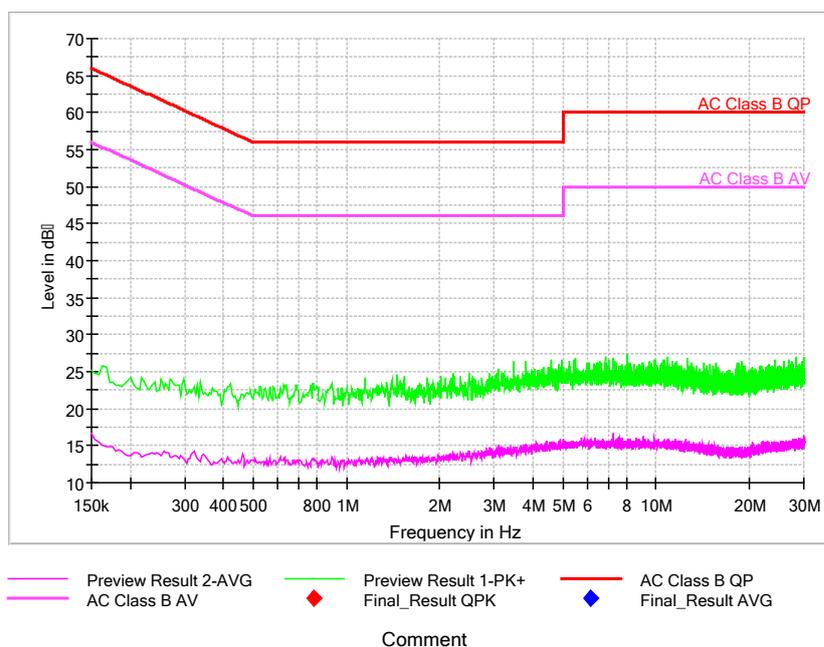
Limit:

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:

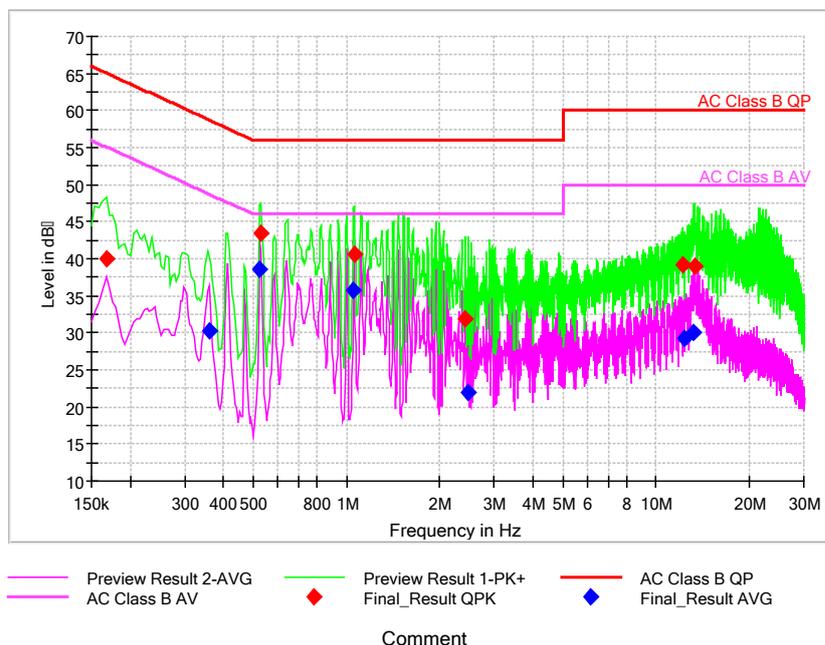
Noise Level of the Measuring Instrument



Pic1. Conducted emission L and N Line

240VAC:

EUT + 2#AE: USB Cable1+4# AE: Charger1+7# AE: Battery1:

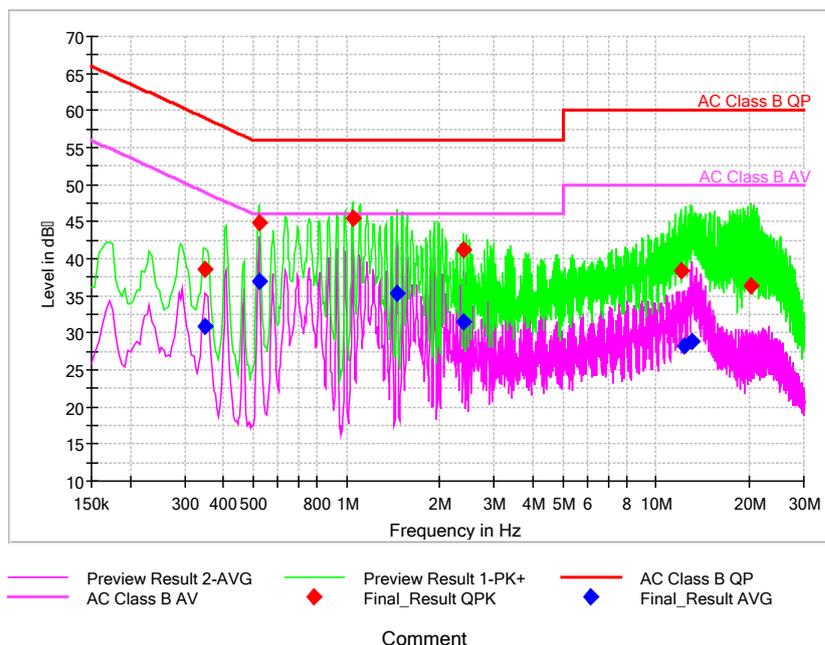


Pic2. Conducted emission L&N Line

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	Pmea QuasiPeak (dBμV)	Pmea Average (dBμV)
0.167057	39.95	---	65.11	25.16	L1	29.7	10.25	---
0.358950	---	30.37	48.75	18.38	L1	29.7	---	0.67
0.525257	---	38.60	46.00	7.40	L1	29.7	---	8.9
0.529521	43.40	---	56.00	12.60	L1	29.7	13.7	---
1.054029	---	35.72	46.00	10.28	L1	29.8	---	5.92
1.058293	40.68	---	56.00	15.32	L1	29.8	10.88	---
2.418600	31.92	---	56.00	24.08	L1	29.8	2.12	---
2.474036	---	22.00	46.00	24.00	L1	29.8	---	-7.8
12.145436	39.11	---	60.00	20.89	L1	30.0	9.11	---
12.388500	---	29.22	50.00	20.78	N	30.0	---	-0.78
13.156071	---	30.02	50.00	19.98	N	30.0	---	0.02
13.275471	38.91	---	60.00	21.09	L1	30.0	8.91	---

120VAC:

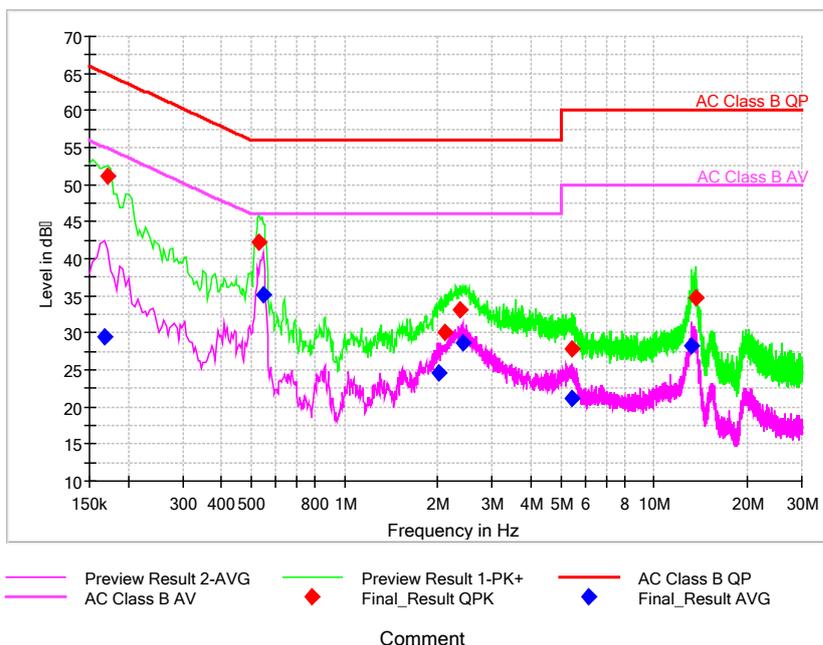
EUT + 2#AE: USB Cable1+4# AE: Charger1+7# AE: Battery1:



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)
0.350421	---	30.82	48.95	18.13	L1	29.7	---	1.12
0.350421	38.60	---	58.95	20.35	L1	29.7	8.9	---
0.520993	---	36.96	46.00	9.04	L1	29.7	---	7.26
0.520993	44.79	---	56.00	11.21	L1	29.7	15.09	---
1.045500	45.49	---	56.00	10.51	L1	29.8	15.69	---
1.454871	---	35.27	46.00	10.73	L1	29.8	---	5.47
2.388750	41.16	---	56.00	14.84	L1	29.8	11.36	---
2.388750	---	31.40	46.00	14.60	L1	29.8	---	1.6
11.996186	38.39	---	60.00	21.61	L1	30.0	8.39	---
12.392764	---	28.18	50.00	N	L1	30.0	---	-1.82
13.002557	---	28.83	50.00	N	L1	30.0	---	-1.17
20.213464	36.27	---	60.00	23.73	L1	30.2	6.07	---

EUT +2#AE: USB Cable1+7# AE: Battery1+1# AE: Laptop:



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)
0.167057	---	29.53	55.11	25.58	L1	29.7	---	-0.17
0.171321	51.22	---	64.90	13.68	L1	29.7	21.52	---
0.529521	42.20	---	56.00	13.80	L1	29.7	12.5	---
0.546579	---	35.06	46.00	10.94	L1	29.7	---	5.36
2.009229	---	24.63	46.00	21.37	L1	29.8	---	-5.17
2.120100	30.00	---	56.00	26.00	L1	29.8	0.2	---
2.363164	33.16	---	56.00	22.84	L1	29.8	3.36	---
2.401543	---	28.73	46.00	17.27	L1	29.8	---	-1.07
5.399336	---	21.09	50.00	28.91	L1	29.8	---	-8.71
5.416393	27.75	---	60.00	32.25	L1	29.8	-2.05	---
13.237093	---	28.29	50.00	21.71	L1	30.0	---	-1.71
13.629407	34.64	---	60.00	25.36	L1	30.0	4.64	---

2.2.2 Radiated Emissions-FCC Part15.109

Ambient condition:

Temperature	Relative humidity	Pressure
27.3°C	41.2%	100.8kPa

Test Setup:

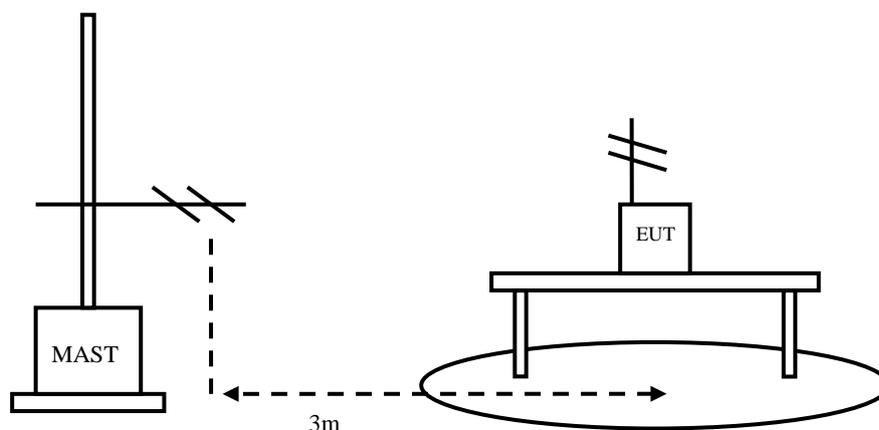


Figure 3

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 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 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.

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 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 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:

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

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: $(36.17 \text{ dB } \mu \text{ V/m}) = (53.75 \text{ dB } \mu \text{ V/m}) + (-17.6 \text{ dB})$, the corresponding frequency is 82.682000MHz.

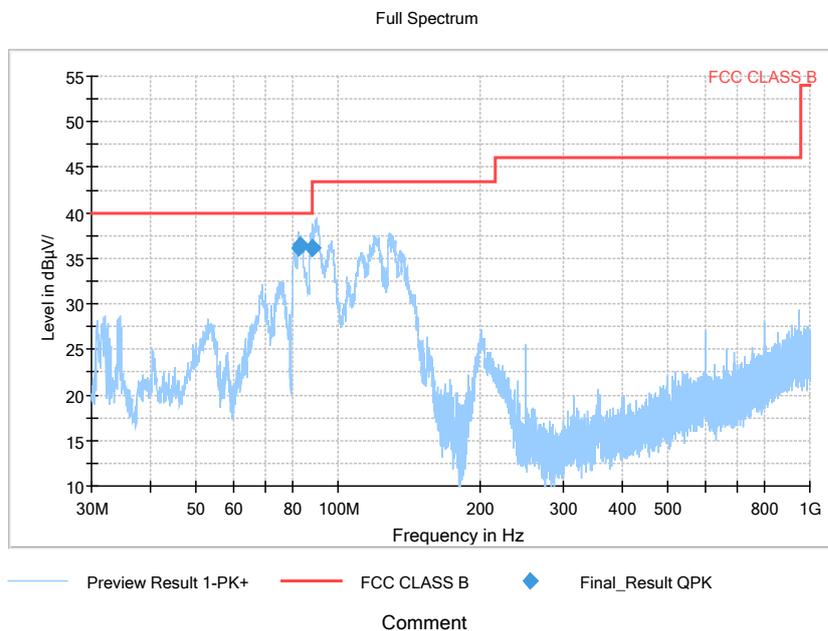
EUT + 2#AE: USB Cable1+4# AE: Charger1+7# AE: Battery1:

Frequency(MHz)	Result(dB μ V/m)	Limit (dB μ V/m)	ARpl (dB)	Pmea (dB μ V/m)	Polarity
82.682000	36.17	40.00	-17.6	53.77	V
82.890000	36.45	40.00	-17.5	53.95	V
87.918000	36.11	40.00	-15.9	52.01	V
88.063000	36.14	43.50	-15.9	52.04	V
88.160000	36.14	43.50	-15.9	52.04	V
88.217000	36.12	43.50	-15.9	52.02	V

EUT + 2#AE: USB Cable1+7# AE: Battery1+1# AE: Laptop:

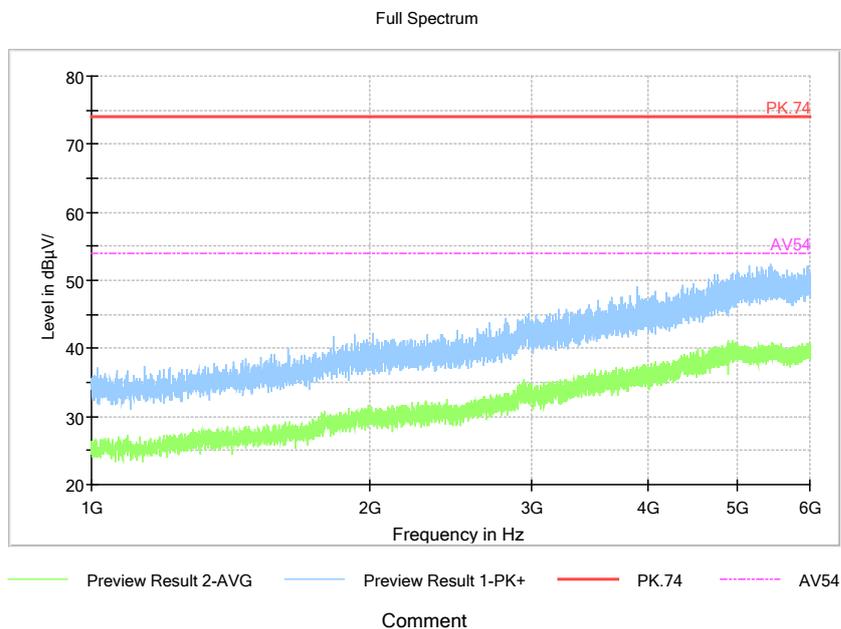
Frequency(MHz)	Result(dB μ V/m)	Limit (dB μ V/m)	ARpl (dB)	Pmea (dB μ V/m)	Polarity
119.987500	22.93	43.50	-21.3	44.23	V
168.002500	31.22	43.50	-21.5	52.72	V
504.010500	25.39	46.00	-10.5	35.89	V
551.985500	26.02	46.00	-9.2	35.22	V
600.000500	28.64	46.00	-8.0	36.64	V
792.012000	24.17	46.00	-5.1	29.27	V

EUT + 2#AE: USB Cable1+4# AE: Charger1+7# AE: Battery: refer to Pic5, Pic6, Pic7



Pic5. Radiated emission(30MHz – 1GHz)

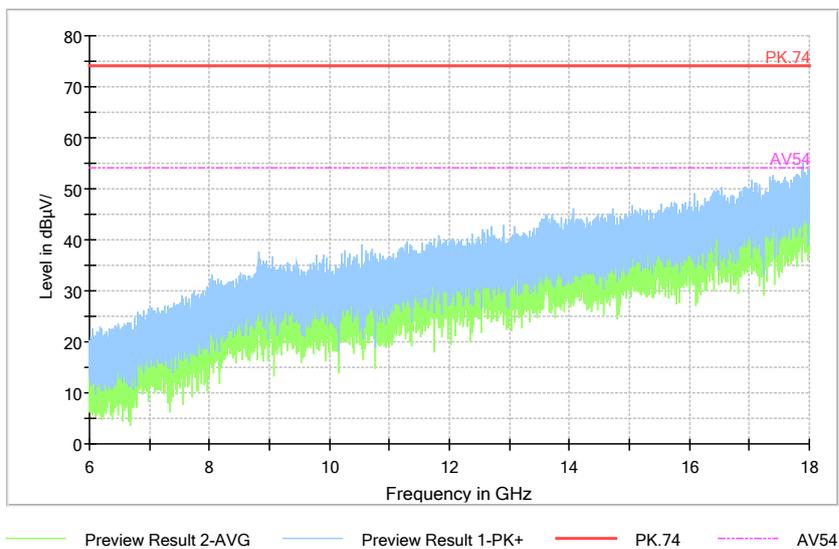
Note: The test data in the graph includes two polarizations: horizontal and vertical



Pic6. Radiated emission (1GHz –6GHz)

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

Full Spectrum



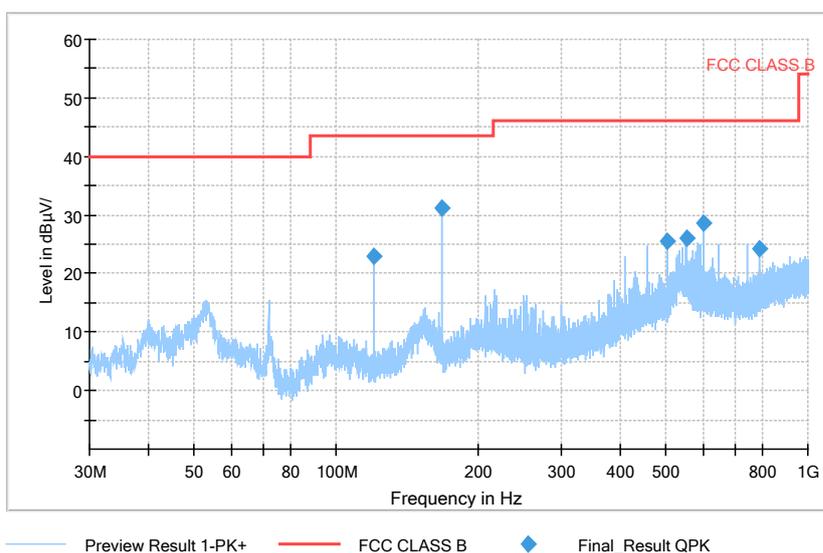
Comment

Pic7. Radiated emission (6GHz –18GHz)

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

EUT + 2#AE: USB Cable1 +7# AE: Battery1+1# AE: Laptop: refer to Pic8, Pic9, Pic10

Full Spectrum

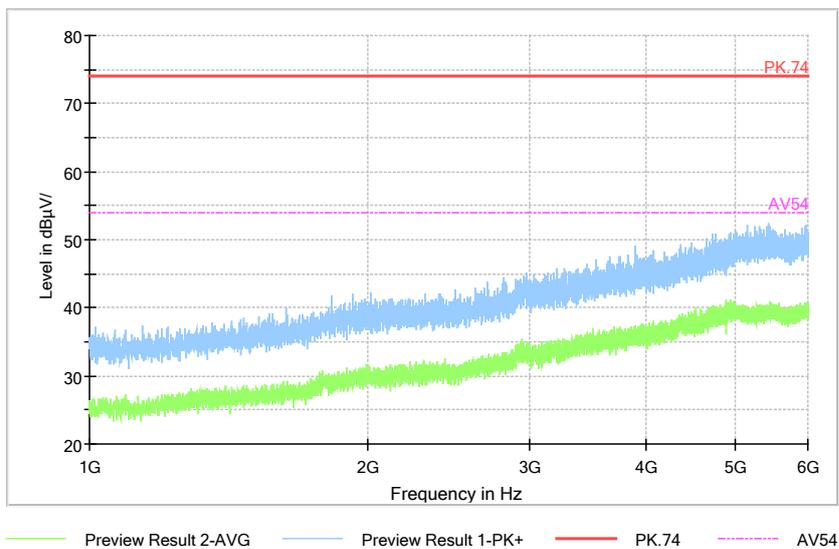


Comment

Pic8. Radiated emission(30MHz – 1GHz)

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

Full Spectrum

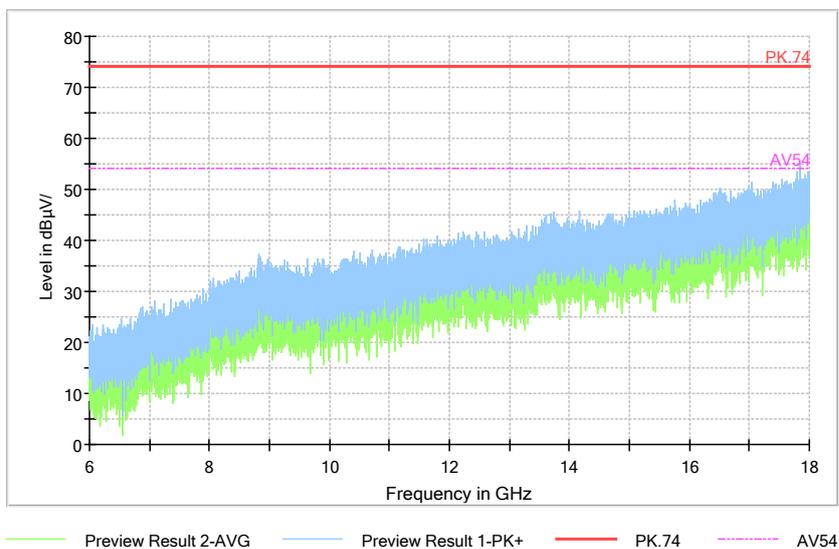


Comment

Pic9. Radiated emission (1GHz –6GHz)

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

Full Spectrum



Comment

Pic10. Radiated emission (6GHz –18GHz)

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	-----	5 th Sep. 2021	6 th Sep. 2016
2	ESW EMI test receiver	R&S	101574	19 th Aug. 2021	20 th Aug. 2020
3	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	5 th Sep. 2021	6 th Sep. 2016
4	ESR3 EMI test receiver	R&S	102361	19 th Mar. 2022	20 th Mar. 2021
5	VULB 9163 Ultra log test antenna	schwarzbeck	867	19 th Mar. 2023	20 th Mar. 2021
6	ENV216 AMN	R&S	3560.6550. 12	19 th Aug. 2021	20 th Aug. 2020
7	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100512	19 th Mar. 2023	20 th Mar. 2021
8	PS2000 Turn Table	FRANKONIA	-----	-----	-----
9	MA260 Antenna Master	FRANKONIA	-----	-----	-----
10	EMC32EMI test software Version 10.20.01	R&S	-----	-----	-----

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