
TEST REPORT

Report No.: SRTC2022-9003(F)-0065
Product Name: i1421-sw
Applicant: Barrot Technology Limited
Manufacturer: Barrot Technology Limited
Specification: FCC Part15B (Certification)
(2020 edition)
ANSI C63.4-2014
FCC ID: 2AOXV-I1421-SW

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
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1.3 Applicant's details

Company: Barrot Technology Limited
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City: Beijing
Country or Region: China
Contacted person: Kerlwin Qiu
Tel: 18612671878
Email: bluetooth@barrot.com.cn

1.4 Manufacturer's details

Company: Barrot Technology Limited
Address: A1009, Block A, Jia Hua Building, No.9 Shangdisanjie St, Haidian District, Beijing
City: Beijing
Country or Region: China
Contacted person: Kerlwin Qiu
Tel: 18612671878
Email: bluetooth@barrot.com.cn

1.5 Application details

Date of reception of test sample: 5th Nov. 2022

Date of test: 5^h Nov. 2022 to 15th Nov. 2022

1.6 Reference specification

FCC Part 15B, 2020 (Certification)

1.7 Information of EUT

1.7.1 General information

Modle Name of EUT	i1421-sw
FCC ID	2AOXV-I1421-SW
Frequency Range	Bluetooth: 2.4~2.4835GHz WiFi: 2.4~2.4835GHz/ 5.15-5.25GHz/5.25-5.35GHz 5.475-5.725GHz/5.725-5.85GHz
Power Supply	3.3V
Extreme Temperature	Lowest: -40°C Highest: +85°C
Extreme Voltage	Minimum: 3.0V Maximum: 3.6V
HW Version	V2.0
SW Version	/

1.7.2 EUT details

	Product Name	Version
EUT1	i1421-sw	double antenna
EUT2	i1421-sw	single antenna

Note1:i1421-sw has two versions: i1421-sw single antenna, i1421-sw double antenna. They are all equal to each other and they are all the same of the product design with each other. i1421-sw single antenna, i1421-sw double antenna have the same external appearance Peripherals, software, features, function, etc... Only because of the market purpose, the device needs two versions. After comparison, i1421-sw double antenna is the worst.

1.7.3 Auxiliary equipment details

AE (Auxiliary Equipment) 1#: Charger

Manufacturer	Shenzhen Huoniu Technology Co., Ltd
Model Number	HNSF050300WC

AE (Auxiliary Equipment) 2#: Test board

Manufacturer	Barrot Technology Limited
Model Number	OK_MX6X_C_V2.2

Note1: As the information described in these above tables, Use AE1 and AE2 to assist EUT testing.

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. Guo Yu Vice director of the test department 郭雨	Checked By: Mr. Liu Jian 刘建
Tested by: Mr. Wen Jianlong Test engineer 温建龙	Issued date: 2022.11.16

2.2 Test result

2.2.1 Conducted Emissions-FCC Part15.107

Ambient condition:

Temperature	Relative humidity	Pressure
23.0°C	42.1%	101.0kPa

Test Setup with charger:

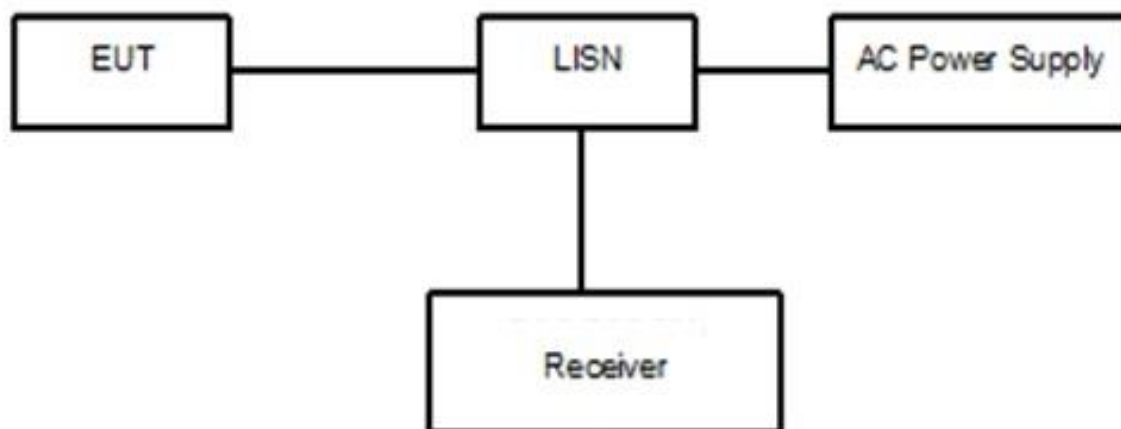


Figure 1

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:

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

Sample calculation: $(45.25\text{dB}\mu\text{V}) = (15.55\text{dB}\mu\text{V}) + (29.7\text{dB})$, the corresponding frequency is 0.15MHz.

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Corr. (dB)	Pmea QuasiPeak (dB μ V)	Pmea Average (dB μ V)
0.15	45.25	---	66	20.75	N	29.7	15.55	---

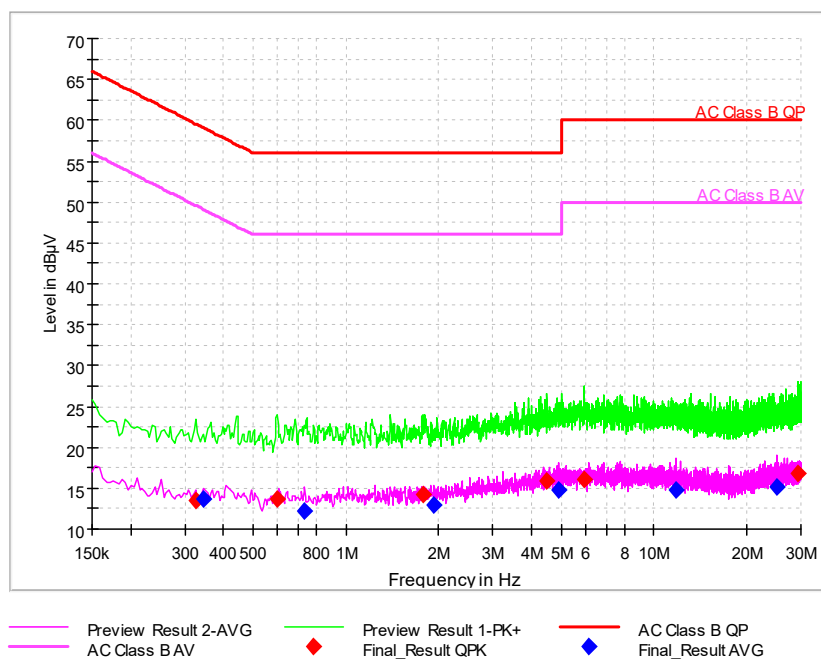
Limit:

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

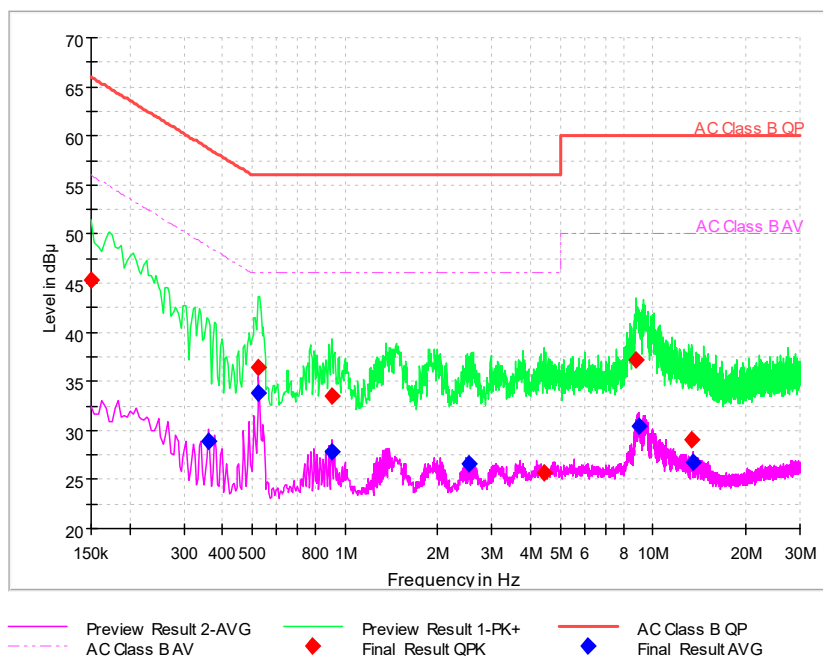
Test result:

Noise Level of the Measuring Instrument



Pic1. Conducted emission L and N Line

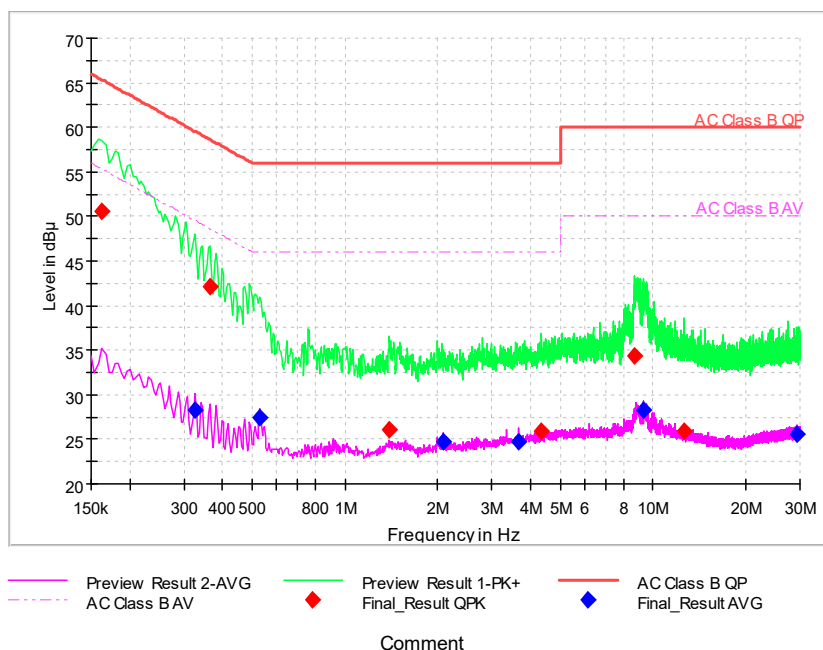
EUT1 + Charger: AC240V



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)
0.15	45.25	---	66	20.75	N	29.7	15.55	---
0.35895	---	28.87	48.75	19.88	N	29.7	---	-0.83
0.520993	36.35	---	56	19.65	N	29.7	6.65	---
0.525257	---	33.74	46	12.26	N	29.7	---	4.04
0.904779	---	27.76	46	18.24	N	29.7	---	-1.94
0.904779	33.57	---	56	22.43	N	29.7	3.87	---
2.533736	---	26.54	46	19.46	N	29.8	---	-3.26
4.427079	25.65	---	56	30.35	L1	29.8	-4.15	---
8.827821	37.2	---	60	22.8	N	29.9	7.3	---
8.968543	---	30.38	50	19.62	N	29.9	---	0.48
13.296793	29.04	---	60	30.96	N	29.9	-0.86	---
13.471629	---	26.73	50	23.27	N	29.9	---	-3.17

EUT 1+ Charger: AC120V



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)
0.162793	50.49	---	65.32	14.83	N	29.7	20.79	---
0.324836	---	28.34	49.58	21.24	L1	29.7	---	-1.36
0.363214	42.18	---	58.66	16.47	N	29.7	12.48	---
0.529521	---	27.51	46	18.49	L1	29.7	---	-2.19
1.390907	26.08	---	56	29.92	N	29.8	-3.72	---
2.077457	---	24.73	46	21.27	L1	29.8	---	-5.07
3.668036	---	24.76	46	21.24	L1	29.8	---	-5.04
4.350321	25.87	---	56	30.13	L1	29.8	-3.93	---
8.734007	34.37	---	60	25.63	N	29.9	4.47	---
9.326743	---	28.26	50	21.74	L1	29.9	---	-1.64
12.601714	25.96	---	60	34.04	N	29.9	-3.94	---
29.351829	---	25.56	50	24.44	N	30	---	-4.44

2.2.2 Radiated Emissions-FCC Part15.109

Ambient condition:

Temperature	Relative humidity	Pressure
23.0°C	42.1%	101.0kPa

Test Setup:



Figure 2

Test Procedure:

EUT1 + 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:

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

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 Peak	54 74

Test result:

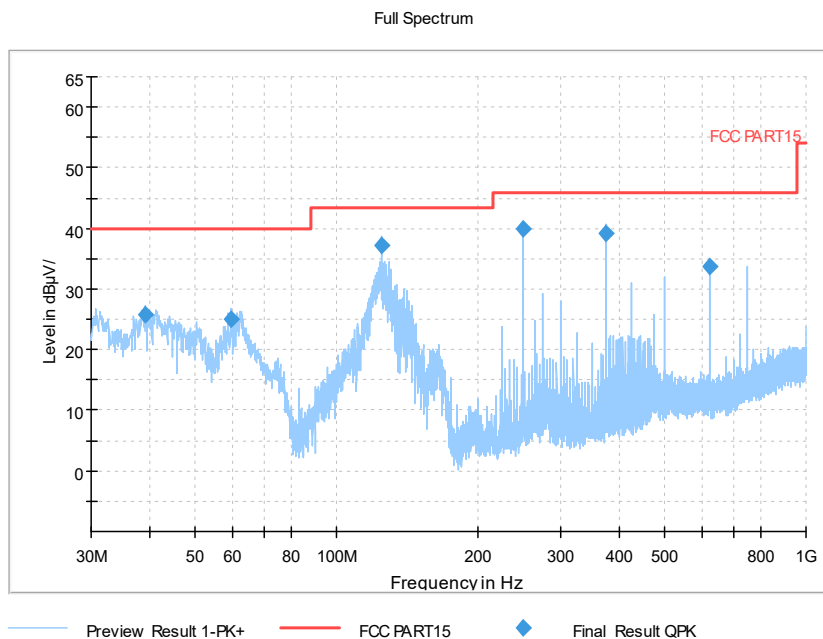
Sample calculation: (25.8dB μ V/m) = (44.6dB μ V) + (-18.8dB/m), the corresponding frequency is 39.0695MHz.

Frequency(MHz)	Result(dB μ V/m)	Limit (dB μ V/m)	ARpl (dB/m)	Pmea (dB μ V)	Polarity
39.0695	25.8	40.00	-18.8	44.6	V

EUT1 + Charger:

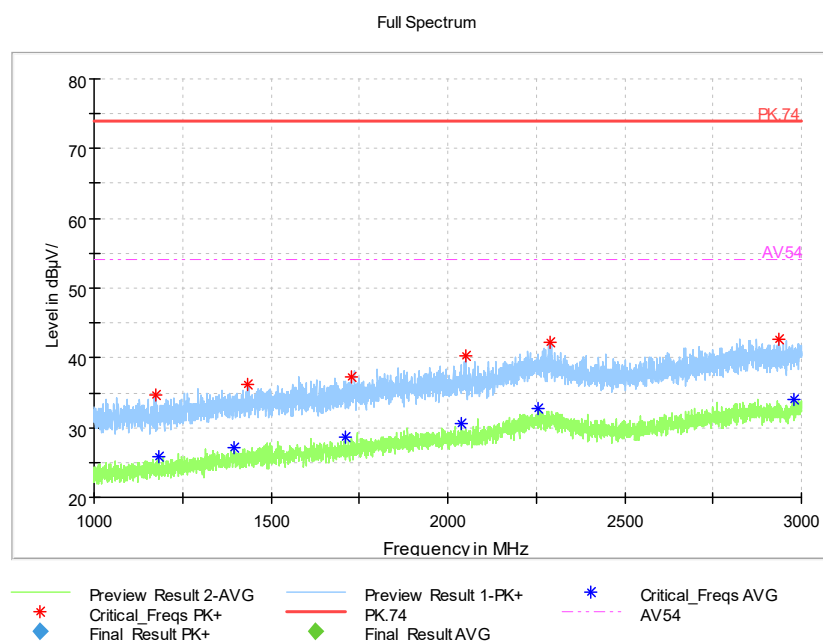
Frequency (MHz)	Result(dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	ARpl (dB/m)	Pmea (dB μ V)	Polarity
39.0695	25.8	40.00	14.20	-18.8	44.6	V
59.6335	24.99	40.00	15.01	-18.8	43.79	V
124.963	37.08	43.50	6.42	-21.8	58.88	V
249.996	39.89	46.00	6.11	-17.1	56.99	V
374.9805	39.22	46.00	6.78	-13.7	52.92	V
624.998	33.59	46.00	12.41	-8	41.59	V

EUT1 + Charger: refer to Pic4, Pic5, Pic6, Pic7, Pic8



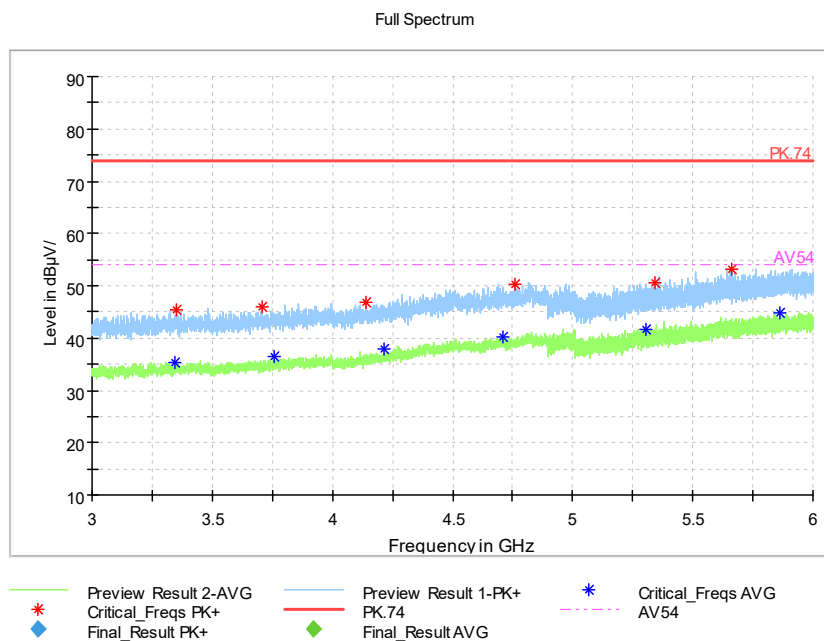
Pic4. Radiated emission(30MHz – 1GHz)

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



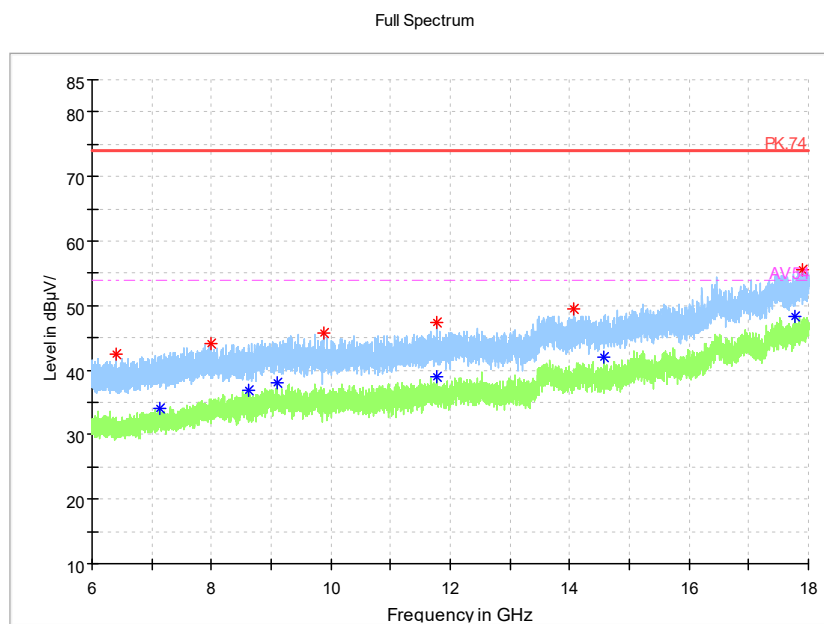
Pic5. Radiated emission (1GHz –3GHz)

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



Pic6. Radiated emission (3GHz –6GHz)

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



Pic7. Radiated emission (6GHz –18GHz)

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

Full Spectrum



Pic8. 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	-----	2023.11.15	2018.11.16
2	ESW EMI test receiver	R&S	101574	2023.06.19	2022.06.20
3	ESR3EMI test receiver	R&S	102361	2023.04.11	2022.04.12
4	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	2023.09.05	2018.09.06
5	VULB 9163 Ultra log test antenna	schwarzbeck	867	2023.05.28	2021.05.29
6	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100512	2023.05.12	2021.05.13
7	SAS-574 Horn Antenna	schwarzbeck	535	2023.06.19	2021.06.20
8	ENV216 AMN	R&S	101881	2023.06.19	2022.06.20
9	EMC32EMI test software	R&S	-----	-----	-----

-----The End-----