
TEST REPORT

Report No.: SRTC2021-9003(F)-0046
Product Name: LTE USB Modem
Model Name: Dongle400
Applicant: WuXi Beetech Data Communications Co., Ltd.
Manufacturer: WuXi Beetech Data Communications Co., Ltd.
Specification: FCC Part15B (Certification)
(2020 edition)
ANSI C63.4-2014
FCC ID: 2A23ODONGLE400

The State Radio_monitoring_center Testing Center (SRTC)
15th Building, No.30 Shixing Street, Shijingshan District,
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CONTENTS

1. General information	3
1.1 Notes of the test report	3
1.2 Information about the testing laboratory.....	3
1.3 Applicant's details	3
1.4 Manufacturer's details.....	3
1.5 Application details	4
1.6 Reference specification.....	4
1.7 Information of EUT.....	4
1.7.1 General information.....	4
1.7.2EUT details	4
1.7.3 Auxiliary equipment details.....	4
2. Test information	5
2.1 Summary of the test results	5
2.2 Test result.....	6
2.2.1Conducted Emissions-FCC Part15.107	6
2.2.2RadiatedEmissions-FCC Part15.109.....	9
2.3. List of test equipments	14

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.
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Country or Region: China
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1.3 Applicant's details

Company: WuXi Beetech Data Communications Co., Ltd.
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City: Wu Xi
Country or Region: Jiang Su, China
Contacted person: Gao Caixia
Tel: +86-18801281544
Email: gaocaixia@beetech.cn

1.4 Manufacturer's details

Company: WuXi Beetech Data Communications Co., Ltd.
Address: Office 1-101, No.58 Fei Hong Road, Liang Xi District, Wu Xi, China
City: Wu Xi
Country or Region: Jing Su ,China
Contacted person: Gao Caixia
Tel: +86-18801281544
Email: gaocaixia@beetech.cn

1.5 Application details

Date of reception of test sample: 27th Aug. 2021

Date of test: 27th Aug. 2021 to 14th Sept. 2021

1.6 Reference specification

FCC Part 15B, 2020 (Certification)

1.7 Information of EUT

1.7.1 General information

Name of EUT	LTE USB Modem
Model Name	Dongle400
FCC ID	2A23ODONGLE400
Frequency Range	WCDMA: FDD II / FDD IV / FDD V LTE:FDD 2/ FDD 4/ FDD 5/ FDD 7/ FDD 12/ FDD 17
Equipment Class	Class B
Power Supply	DC
Rated Power Supply Voltage	5V
Extreme Temperature	Lowest: -10°C Highest: +55°C
Extreme Voltage	Minimum: 4.75V Maximum: 5.25V
HW Version	SLT773_V1.01_PCB
SW Version	RW_Dongle400_V1.0.0_B01

1.7.2 EUT details

	Product Name	Model Name	IMEI
EUT	LTE USB Modem	Dongle400	865171050954893

1.7.3 Auxiliary equipment details

AE (Auxiliary Equipment) 1#: Laptop

Manufacturer	Lenovo
Model Number	Xiaoxinchao7000
S/N	MP1965WU
Input Voltage	100V-240V AC

Note1: 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 刘巍	Checked By: Mr. Guo Yu Vice director of the test department 郭雨
Tested by: Mr. Liu Jian Test engineer 刘建	Issued date: 2021.09.14

2.2 Test result

2.2.1 Conducted Emissions-FCC Part15.107

Ambient condition:

Temperature	Relative humidity	Pressure
24.2°C	42.9%	100.9kPa

Test Setup with laptop:

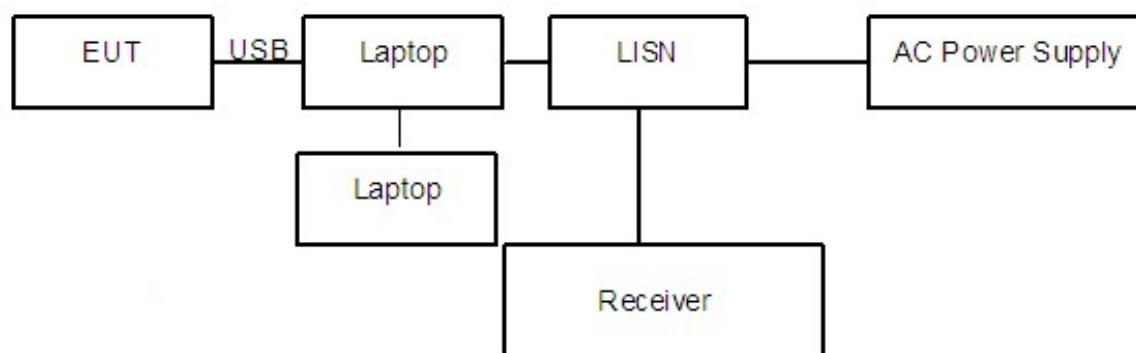


Figure 1

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 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.

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: $(28.54\text{dB}\mu\text{V}) = (-1.26\text{dB}\mu\text{V}) + (29.8\text{dB})$, the corresponding frequency is 0.202000MHz.

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)
0.202000	---	28.54	53.53	24.99	N	29.8	---	-1.26

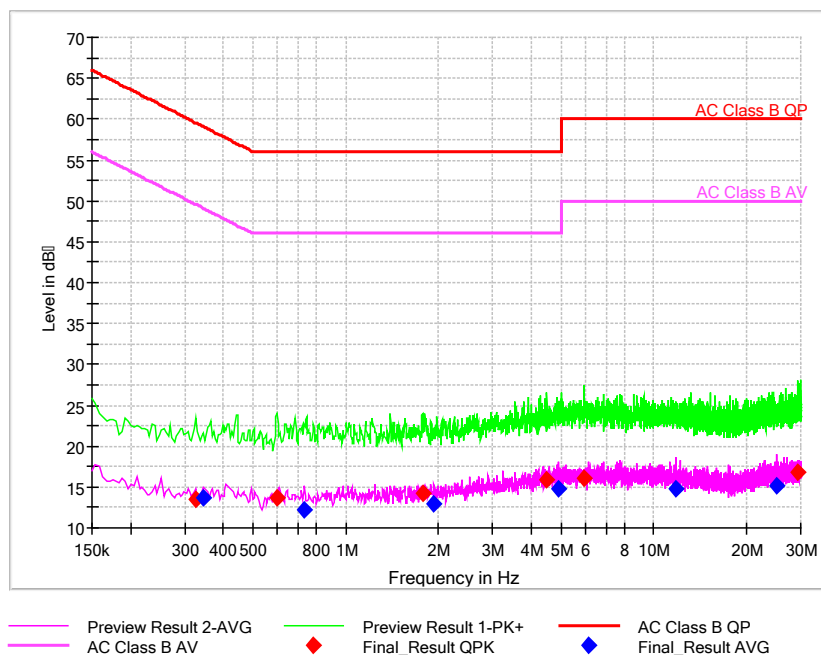
Limit:

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

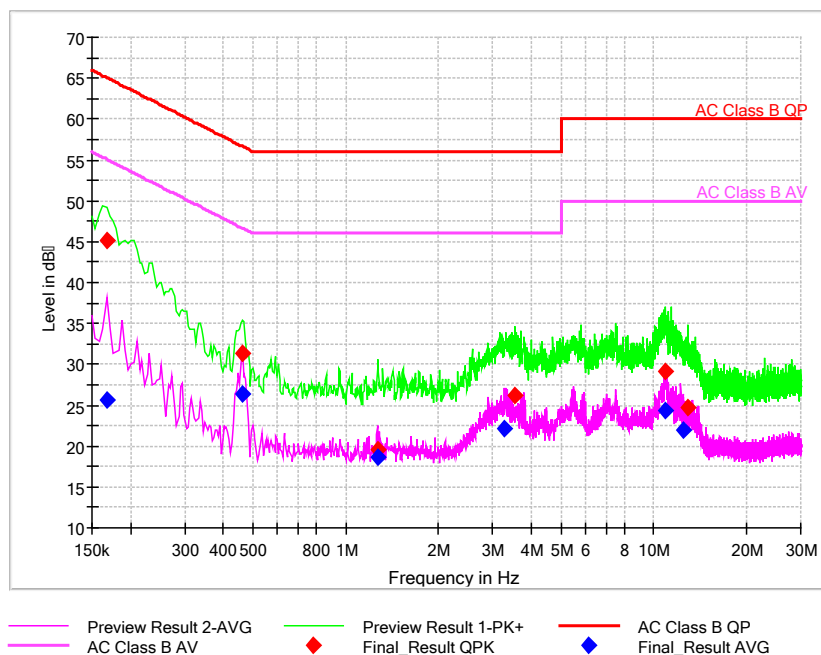
Test result:

Noise Level of the Measuring Instrument



Pic1. Conducted emission L and N Line

EUT + Laptop:



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	45.09	---	65.11	20.02	N	29.8	15.29	---
0.167057	---	25.64	55.11	29.47	N	29.8	---	-4.16
0.461293	---	26.33	46.67	20.34	L1	29.7	---	-3.37
0.461293	31.44	---	56.67	25.23	L1	29.7	1.74	---
1.267243	---	18.72	46	27.28	L1	29.8	---	-11.08
1.271507	19.6	---	56	36.4	L1	29.8	-10.2	---
3.271457	---	22.18	46	23.82	L1	29.8	---	-7.62
3.544371	26.27	---	56	29.73	L1	29.8	-3.53	---
10.84056	---	24.35	50	25.65	L1	29.9	---	-5.55
10.88321	29.1	---	60	30.9	N	30	-0.9	---
12.40556	---	21.92	50	28.08	N	30	---	-8.08
12.89595	24.76	---	60	35.24	N	30	-5.24	---

2.2.2 Radiated Emissions-FCC Part15.109

Ambient condition:

Temperature	Relative humidity	Pressure
24.6°C	42.0%	100.9kPa

Test Setup:

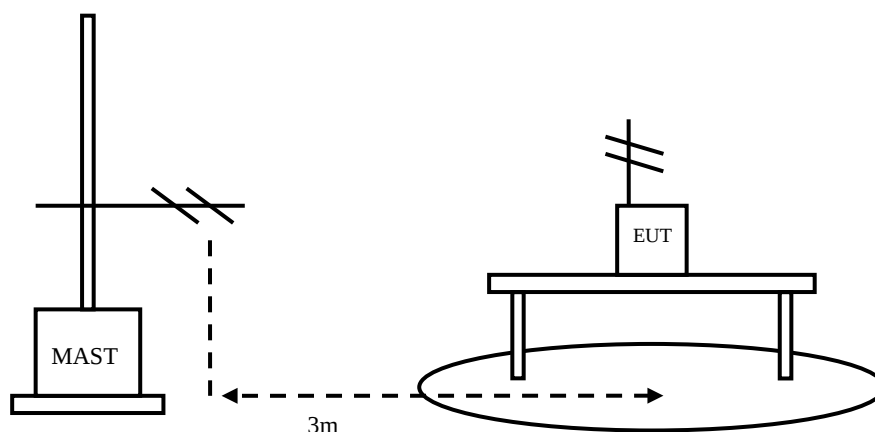


Figure 2

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 and transferred the data between the laptop and 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.

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 Peak	54 74

Test result:

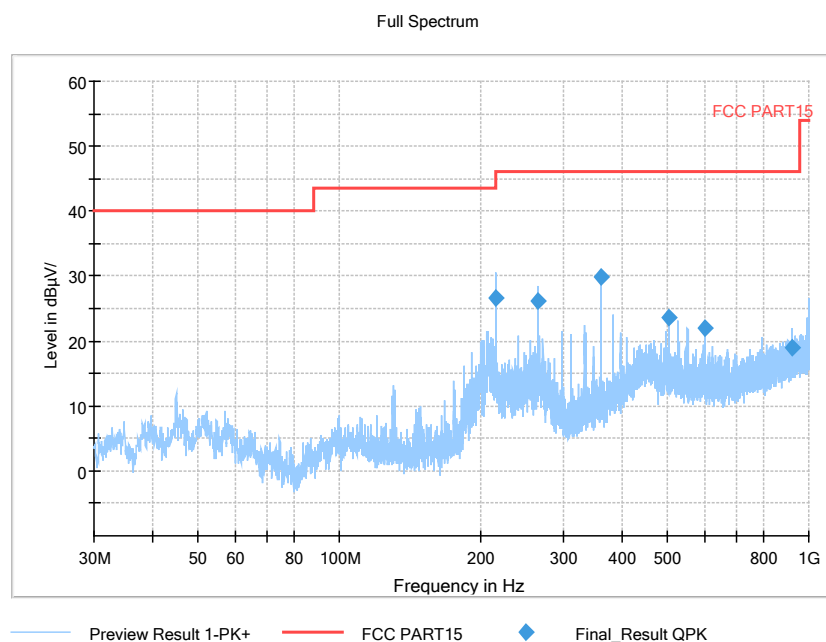
Sample calculation: (24.61dBμV/m) = (36.61dBμV) + (-12dB/m), the corresponding frequency is 30 MHz.

Frequency(MHz)	Result(dBμV/m)	Limit (dBμV/m)	ARpl (dB/m)	Pmea (dBμV)	Polarity
30	24.61	40.00	-12	36.61	V

EUT + Laptop:

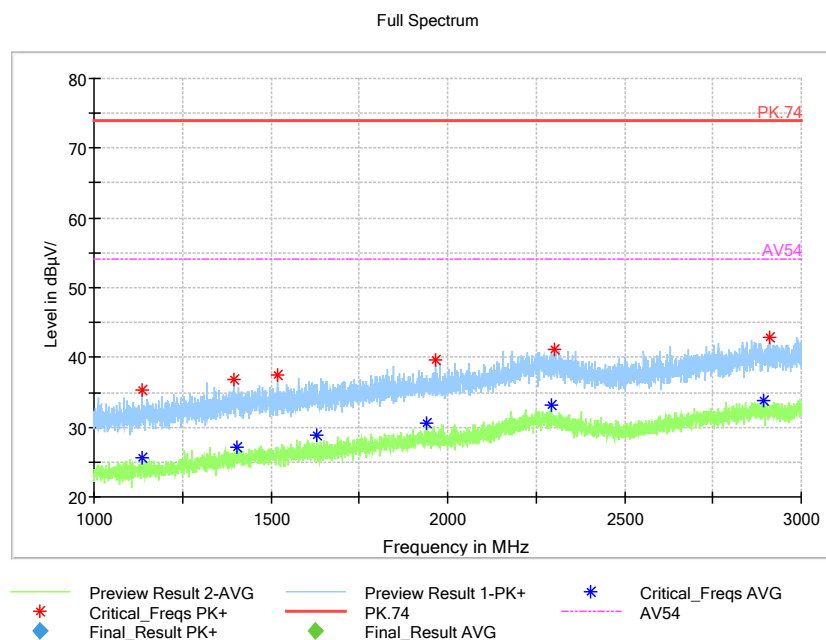
Frequency(MHz)	Result(dBμV/m)	Limit (dBμV/m)	ARpl (dB/m)	Pmea (dBμV)	Polarity
215.949	26.58	43.50	-18.5	45.08	V
263.964	26.23	46.00	-16.9	43.13	V
359.994	29.86	46.00	-14.1	43.96	V
503.9905	23.68	46.00	-10.7	34.38	V
599.972	21.9	46.00	-8.1	30	V
921.2845	18.94	46.00	-3	21.94	V

EUT + Laptop: refer to Pic3, Pic4, Pic5, Pic6, Pic7



Pic3. Radiated emission(30MHz – 1GHz)

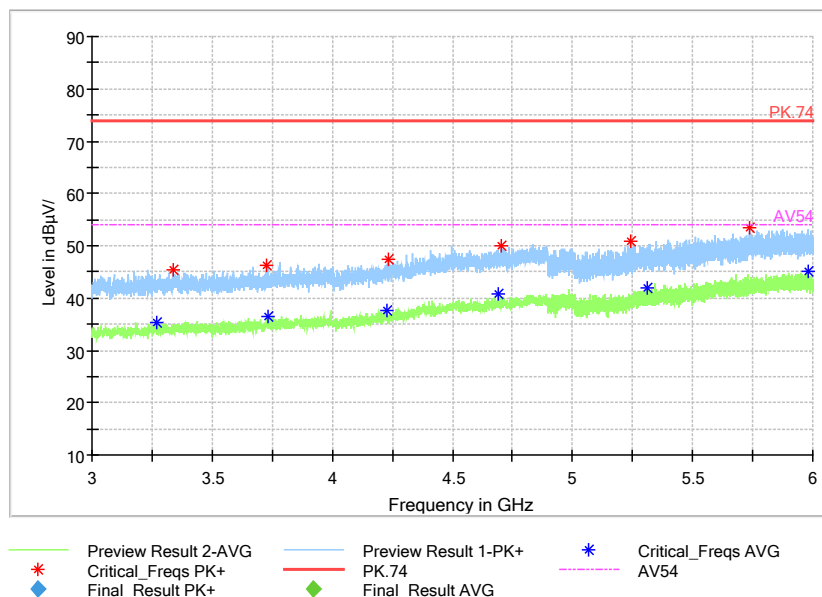
Note: The test data in the graph includes two polarizations: horizontal and vertical



Pic4. Radiated emission (1GHz –3GHz)

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

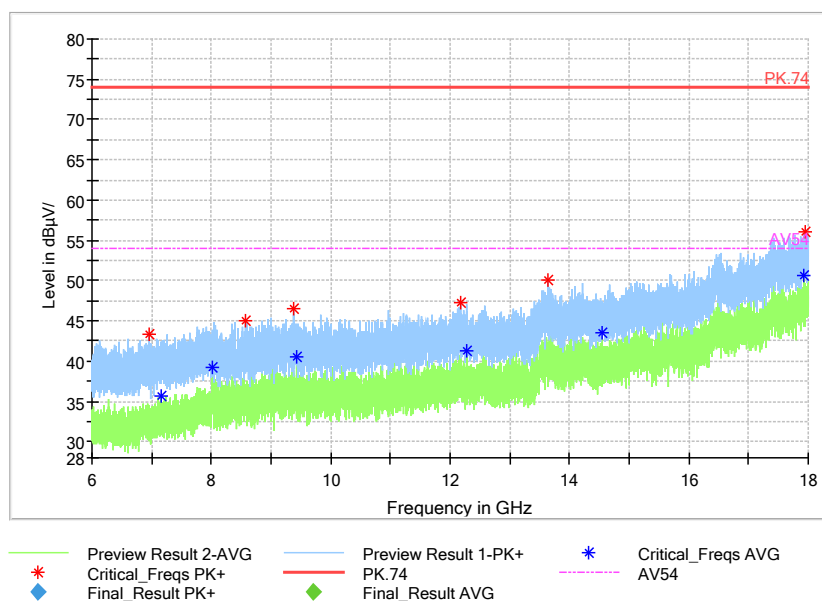
Full Spectrum



Pic5. Radiated emission (3GHz –6GHz)

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

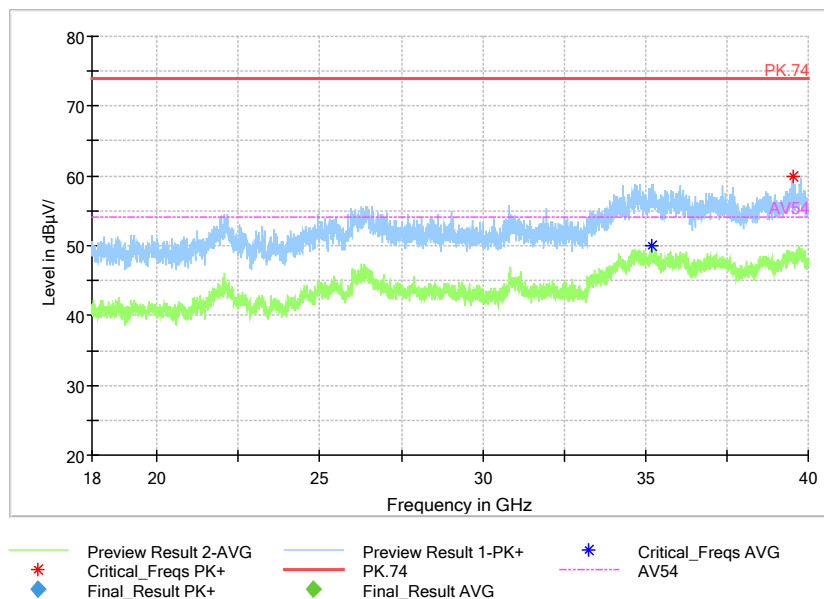
Full Spectrum



Pic6. Radiated emission (6GHz –18GHz)

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

Full Spectrum



Pic7. 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	-----	2023.09.05	2018.09.06
2	ESW EMI test receiver	R&S	101574	2022.06.19	2021.06.20
3	ESR3 EMI test receiver	R&S	102361	2022.04.11	2021.04.12
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	3560.6550. 12	2022.06.19	2021.06.20
9	EMC32EMI test software	R&S	-----	-----	-----