TEST REPORT

Report No.:	PSU-NQN2412170317EM01
Product Name:	Edge Router
Model Name:	ER815-NRQ3-WLAN
Applicant:	Beijing InHand Networks Technology Co., Ltd.
Manufacturer:	Beijing InHand Networks Technology Co., Ltd.
Specification:	FCC Part 15B (Certification) (2023 edition) ANSI C63.4-2014
FCC ID：	2AANY-ER815NRQ3

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Simon Wang Date: Dec. 06, 2024	Luke Lu Date: Dec. 06, 2024

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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:	BV 7Layers Communications Technology (Shenzhen) Co., Ltd
Address:	Room B37, Warehouse A5, No.3 Chiwan 4th Road, Zhaoshang Street, Nanshan District Shenzhen, Guangdong, People’s Republic of China
City:	Shenzhen
Country or Region:	China
Tel:	+86 755 8869 6566
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Email:	customerservice.sw@bureauveritas.com
Designation Number:	CN1171
Registration number:	525120

1.3 Applicant’s details

Company:	Beijing InHand Networks Technology Co., Ltd.
Address:	Room 501, floor 5, building 3, yard 18, ziyue road, chaoyang district, Beijing China

1.4 Manufacturer’s details

Company:	Beijing InHand Networks Technology Co., Ltd.
Address:	Room 501, floor 5, building 3, yard 18, ziyue road, chaoyang district, Beijing China

1.5 Application details

Date of reception of test sample:27th November 2024
Date of test: 4th December to 16th December 2024

1.6 Reference specification

FCC Part 15B, 2023 (Certification)

ANSI C63.4-2014

1.7 Information of EUT

1.7.1 General information

Name of EUT	Edge Router
Model Name	ER815-NRQ3-WLAN
Frequency Range	**LTE：** 1850.7MHz ~ 1909.3MHz (FOR LTE Band2) 1710.7MHz ~ 1754.3MHz (FOR LTE Band4) 824.7MHz ~ 848.3MHz (FOR LTE Band5) 2502.5MHz ~ 2567.5MHz (FOR LTE Band7) 699.7MHz ~ 715.3MHz (FOR LTE Band12) 779.5MHz ~ 784.5MHz (FOR LTE Band13) 790.5MHz ~ 795.5MHz (FOR LTE Band14) 706.5MHz ~ 713.5MHz (FOR LTE Band17) 1850.7MHz ~ 1914.3MHz (FOR LTE Band25) 814.7MHz ~ 848.3MHz (FOR LTE Band26) 2307.5MHz ~ 2312.5MHz (FOR LTE Band30) 2572.5MHz ~ 2617.5MHz (FOR LTE Band38) 2498.5MHz ~2687.5MHz (FOR LTE Band41) 3452.5MHz ~3547.5MHz (FOR LTE Band42) 3602.5MHz ~3697.5MHz (FOR LTE Band43) 1710.7MHz ~ 1779.3MHz (FOR LTE Band66) 665.5MHz ~ 695.5MHz (FOR LTE Band71) **5G NR:** n2 (1852.5MHz ~1907.5MHz) n5(826.5MHz ~ 846.5MHz) n7(2502.5MHz ~ 2567.5MHz) n12(701.5MHz ~ 713.5MHz) n13(779.5MHz ~ 784.5MHz) n14(790.5MHz ~ 795.5MHz) n25(1852.5MHz ~ 1912.5MHz) n26(814.7MHz ~ 848.3MHz) n30(2307.5MHz ~ 2312.5MHz) n38(2582.52MHz ~ 2607.48MHz) n41(2506.02 ~ 2679.99MHz) n66(1712.5 ~ 1777.5MHz) n70(1695 ~ 1671MHz) n71(665.5 ~ 695.5MHz) n77(Part27Q)(3460.02 ~ 3540MHz) n77(Part27O)(3710.01 ~ 3969.99MHz) n78(Part27Q)(3460.02 ~ 3540MHz) **WiFi:** 2.412GHz~2.462GHz/ 5.15GHz-5.25GHz/

	5.725GHz-5.85GHz
Equipment Class	Class B
Power Supply	Charger
HW Version	V1.1
SW Version	V2.0

1.7.2EUT details

No.	Model Name	SN
EUT1	ER815-NRQ3-WLAN	RN815243396389A

1.7.3 Auxiliary equipment details

AE (Auxiliary Equipment) 1#: AC Adaptor

Manufacturer	SHENZHEN KUANTEN LIMITED
Model Number	KT36W120300
Input Voltage	100V-240V AC
Output Voltage	12V /3A

1.7.4 Test mode

Mode No.	Description of test mode
Mode 1	LTE/ 5G NR/WLAN receiver

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

Lab A:
BV 7Layers Communications Technology (Shenzhen) Co. Ltd
Lab Address:
Room B37, Warehouse A5, No.3 Chiwan 4th Road, Zhaoshang Street, Nanshan District
Shenzhen, Guangdong, People's Republic of China
Accredited Test Lab Cert 3939.01

The FCC Site Registration No. is 525120; The Designation No. is CN1171.

2.2 Test result

2.2.1Conducted Emissions-FCC Part15.107

Ambient condition:

Temperature	Relative humidity	Pressure
21.4°C	40.4%	100.8kPa

Test Setup with charger:

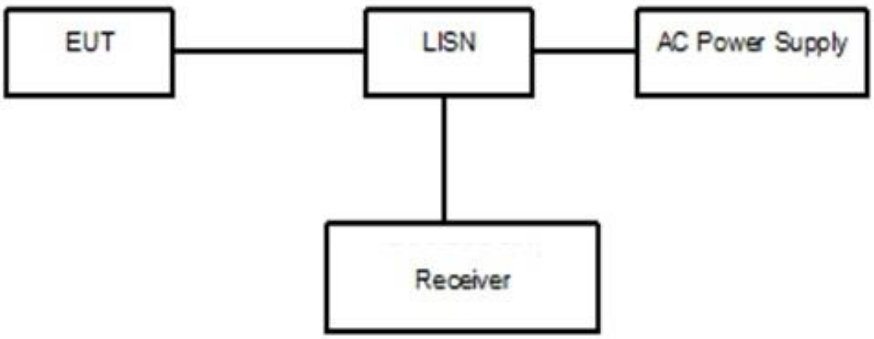


Figure 1

Test Procedure:

The EUT is placed on a non-matellic 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: GPS, Camera 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_{cable}+ATT+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:

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

Sample calculation: (39.59dBμV) = (9.99 dBμV) + (29.6 dB), the corresponding frequency is 0.15MHz

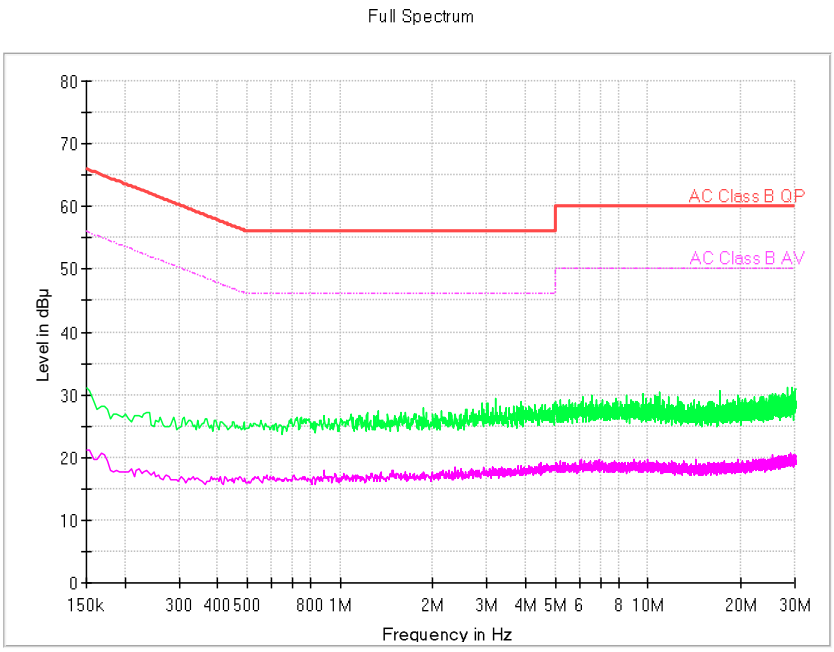
Limit:

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:

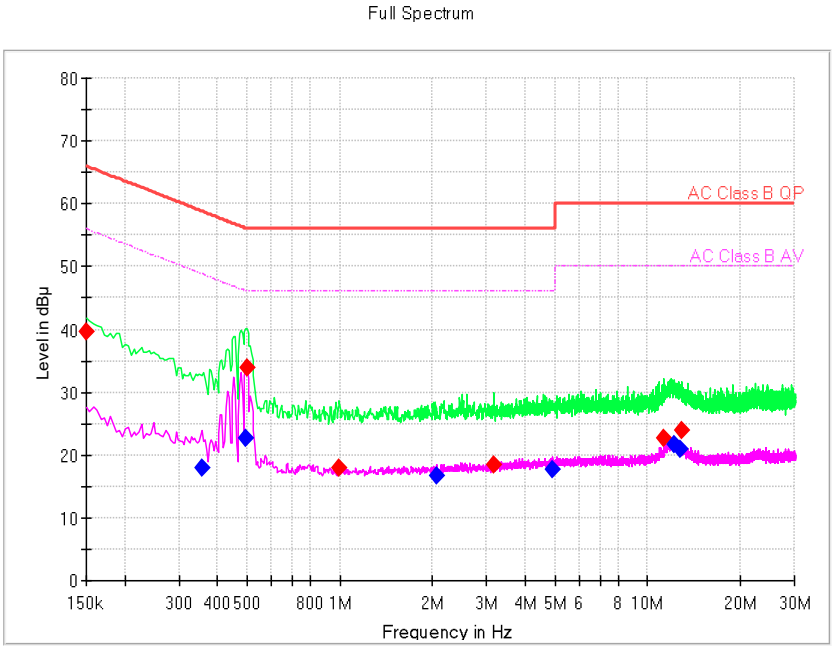
Noise Level of the Measuring Instrument



Pic1.Conducted emission L and N Line

120V AC：

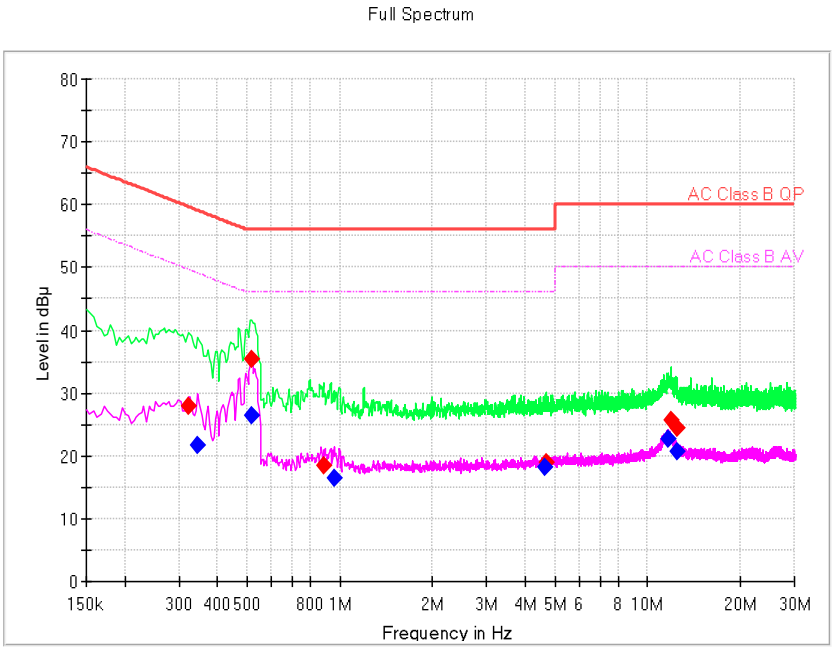
EUT +1#Charger:



Pic2. Conducted emission L&N Line

Frequency	QuasiPeak	Average	Limit	Margin	Line	Corr.	Pmea QuasiPeak	Pmea Average
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)		(dB)	(dBµV)	(dBµV)
0.15000	39.59	---	66.00	26.41	N	29.60	9.99	---
0.35469	---	17.83	48.85	31.02	N	29.60	---	-11.77
0.49541	---	22.73	46.08	23.35	L1	29.60	---	-6.87
0.49967	33.98	---	56.01	22.03	N	29.60	4.38	---
0.99433	17.91	---	56.00	38.09	N	29.60	-11.69	---
2.06466	---	16.81	46.00	29.19	L1	29.60	---	-12.79
3.16059	18.40	---	56.00	37.60	L1	29.60	-11.20	---
4.91747	---	17.66	46.00	28.34	L1	29.70	---	-12.04
11.29258	22.71	---	60.00	37.29	L1	29.90	-7.19	---
12.21366	---	21.71	50.00	28.29	N	29.90	---	-8.19
12.78508	---	21.03	50.00	28.97	L1	29.90	---	-8.87
12.95565	23.84	---	60.00	36.16	L1	29.90	-6.06	---

240V AC：
EUT +1#Charger:



Pic3. Conducted emission L&N Line

Frequency	QuasiPeak	Average	Limit	Margin	Line	Corr.	Pmea QuasiPeak	Pmea Average
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)		(dB)	(dBµV)	(dBµV)
0.32057	27.98	---	59.69	31.71	L1	29.60	-1.62	---
0.34616	---	21.70	49.05	27.35	L1	29.60	---	-7.90
0.51673	---	26.33	46.00	19.67	L1	29.60	---	-3.27
0.51673	35.41	---	56.00	20.59	N	29.60	5.81	---
0.88772	18.56	---	56.00	37.44	L1	29.60	-11.04	---
0.96021	---	16.34	46.00	29.66	L1	29.60	---	-13.26
4.64029	---	18.27	46.00	27.73	L1	29.70	---	-11.43
4.66588	18.85	---	56.00	37.15	N	29.60	-10.75	---
11.67210	---	22.56	50.00	27.44	L1	29.90	---	-7.34
11.97486	25.60	---	60.00	34.40	N	29.90	-4.30	---
12.42688	24.45	---	60.00	35.55	N	29.90	-5.45	---
12.52496	---	20.79	50.00	29.21	L1	29.90	---	-9.11

2.2.2RadiatedEmissions-FCC Part15.109

Ambient condition:

Temperature	Relative humidity	Pressure
21.4°C	40.4%	100.8kPa

Test Setup:

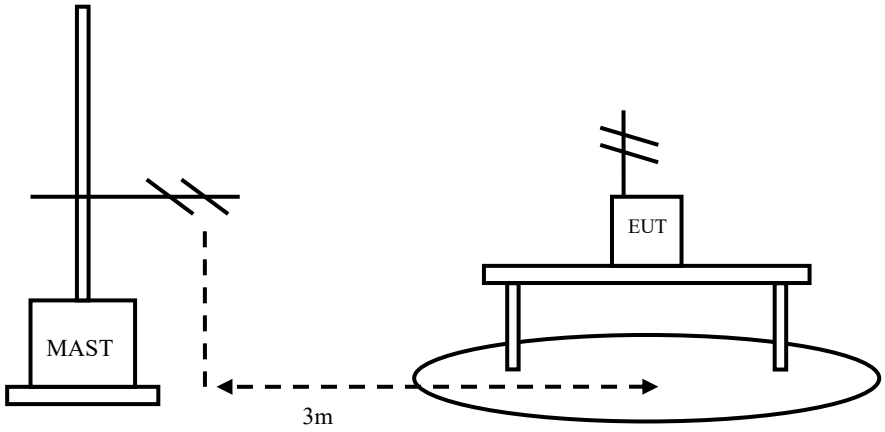


Figure 2

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 accessories of the EUT are connected with the EUT such as headset etc.Open the following functions of EUT: GPS, Camera 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 to4 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:
Result= $P_{mea} + A_{Rpl}$
Limit:

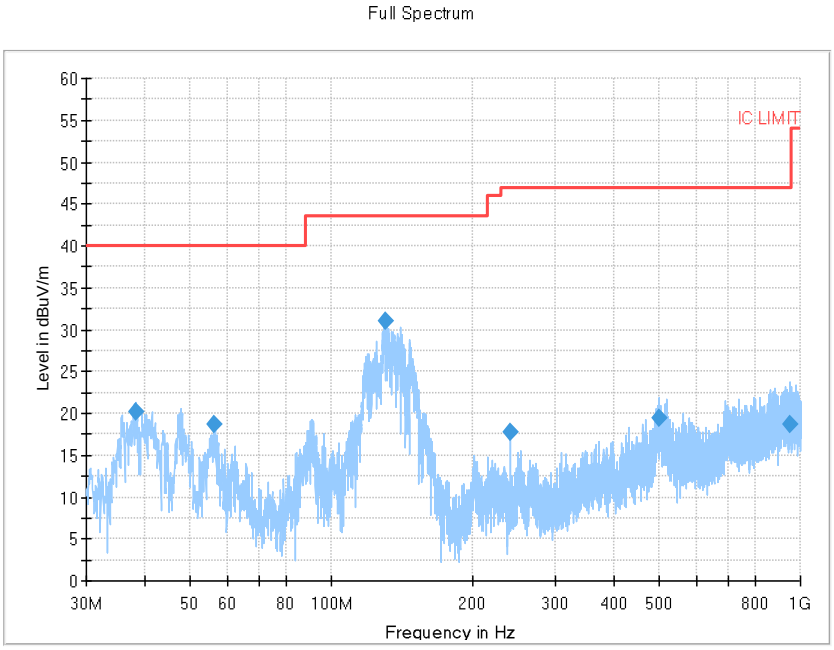
Frequency of Emission(MHz)	Limits	
	Detector	Unit (dBμV/m)
30～88	Quasi-peak	40
88～216	Quasi-peak	43.5
216～960	Quasi-peak	46
960～1000	Quasi-peak	54
1000～5th harmonic of the highest frequency or 40GHz, whichever is lower	Average Peak	54 74

Test result:
Sample calculation: (20.16dB μ V/m) = (37.66dB μ V/m) + (-17.5dB), the corresponding frequency is 38.342MHz.

EUT +1#Charger:

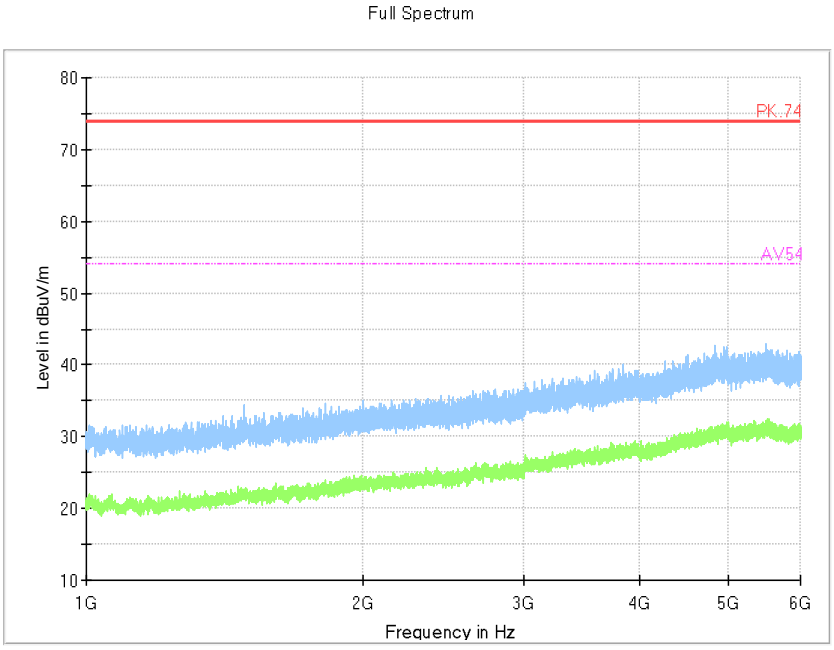
Frequency(MHz)	Result(dB μ V/m)	Limit (dB μ V/m)	ARpl (dB)	Pmea (dB μ V/m)	Polarity
38.342	20.16	40.0	-17.5	37.66	V
56.1415	18.61	40.0	-15.7	34.31	V
130.104	31.04	43.5	-20.3	51.34	V
240.005	17.71	46.0	-15.7	33.41	V
498.85	19.44	46.0	-9.3	28.74	V
949.366	18.73	46.0	-2.1	20.83	V

EUT +1#Charger: refer to Pic4,Pic5, Pic6, Pic7



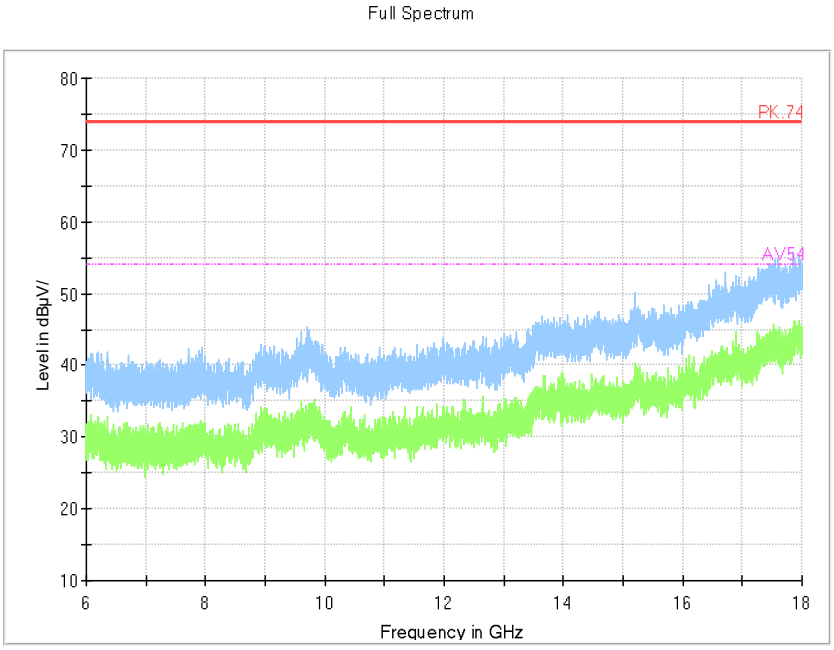
Pic4. Radiated emission(30MHz – 1GHz)

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



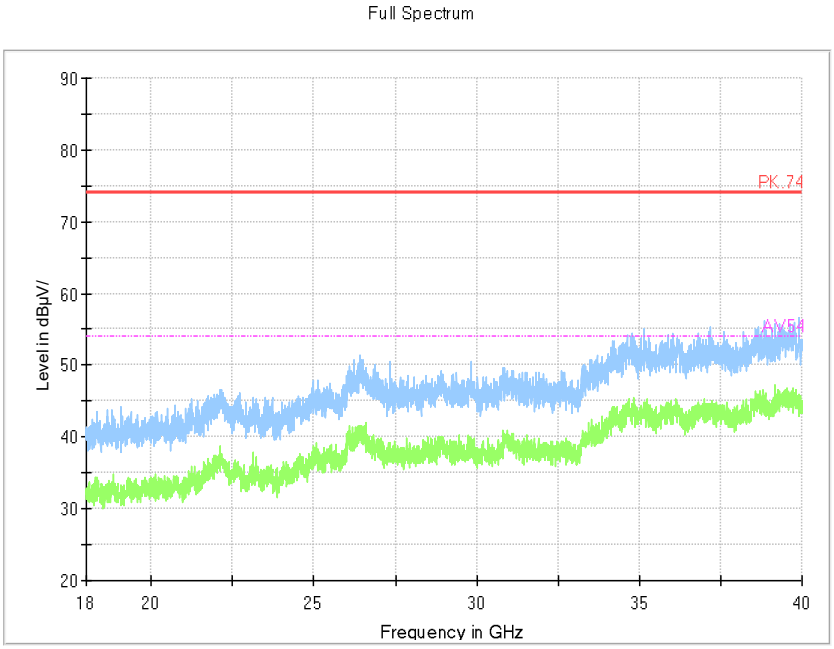
Pic5. Radiated emission (1GHz –6GHz)

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



Pic6. Radiated emission (6GHz –18GHz)

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



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×9.60mSemi-AnechoicChamber	FRANKONIA	-----	2028.09.05	2023.09.05
2	ESW EMI test receiver	R&S	101574	2025.03.06	2024.03.06
3	ESR3 EMI test receiver	R&S	102361	2025.03.06	2024.03.06
4	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	2027.03.25	2022.03.25
5	VULB 9163 Ultra log test antenna	schwarzbeck	727	2025.05.28	2023.05.28
6	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100512	2025.07.20	2023.07.20
7	SAS-574 Horn Antenna	schwarzbeck	535	2025.05.12	2023.05.12
8	ENV216 AMN	R&S	101881	2025.06.21	2024.06.21
9	EMC32EMI test software	R&S	V10	-----	-----

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