

# TEST REPORT



**CTK Co., Ltd.**

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,  
Gyeonggi-do, 17142, Korea  
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Report No.:  
CTK-2025-02191  
Page (1) / (20) Pages

## 1. Applicant

- Name : UNION biometrics Co., Ltd.
- Address : 12F, Munjeong Daemyeong Valeon bldg, 127 Beobwon-ro Songpa-gu, Seoul, Republic of Korea
- Date of Receipt : 2025-07-16

## 2. Manufacturer

- Name : UNION biometrics Co., Ltd.
- Address : 12F, Munjeong Daemyeong Valeon bldg, 127 Beobwon-ro Songpa-gu, Seoul, Republic of Korea

## 3. Use of Report : For FCC Certification

## 4. Test Sample / Model : UBio-X Tag / UBio-X Tag (KP)

## 5. Date of Test : 2025-08-18 to 2025-08-20

## 6. Test Standard(method) used : FCC 47 CFR part 15 subpart C 15.209

## 7. Testing Environment : refer to 7 page

## 8. Test Results : Compliance

## 9. Location of Test : Permanent Testing Lab On Site Testing

(Address : (Unhak-Dong) 5, Dongbu-ro 221beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea)

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

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Approval	Tested by Su-Jun Hwang: (Signature) 	Technical Manager Ji-Hye, Kim: (Signature) 
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2025-08-20

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Report No.:  
CTK-2025-02191  
Page (2) / (20) Pages

## REPORT REVISION HISTORY

Date	Revision	Page No
2025-08-20	Issued (CTK-2025-02191)	All

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Report No.:  
CTK-2025-02191  
Page (3) / (20) Pages

## **CONTENTS**

1. General Product Description .....	4
1.1 Applicant Information .....	4
1.2 Product Information.....	4
1.3 Antenna Information.....	4
1.4 Model Differences .....	5
2. Accreditations .....	6
2.1 Laboratory Accreditations and Listings .....	6
2.2 Calibration Details of Equipment Used for Measurement .....	6
3. Test Specifications .....	7
3.1 Standards.....	7
3.2 Testing Environment .....	7
3.3 Mode of operation during the test.....	8
3.4 Peripheral Devices .....	8
3.5 Measurement Uncertainty.....	8
3.6 Test Software.....	8
4. Technical Characteristic Test.....	9
4.1 Emission Bandwidth.....	9
4.2 Radiated emissions .....	11
4.3 AC Conducted Emissions .....	17
APPENDIX A – Test Equipment Used For Tests .....	20

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Page (4) / (20) Pages

## 1. General Product Description

### 1.1 Applicant Information

<b>Company</b>	UNION biometrics Co., Ltd.
<b>Contact Point</b>	12F, Munjeong Daemyeong Valeon bldg, 127 Beobwon-ro Songpa-gu Seoul, Republic of Korea
<b>Contact Person</b>	Name : CHO, MIN-GU E-mail : mgcho@unioncomm.co.kr Tel : +82-02-6488-3261

### 1.2 Product Information

<b>FCC ID</b>	XX2-UBIOXTAG
<b>Product Description</b>	UBio-X Tag
<b>Model name</b>	UBio-X Tag (KP)
<b>Variant Model name</b>	UBio-X Tag (K) - Same internal RF as the base model UBio-X Tag, UBio-X Tag (P) - Removed external keypad, Same internal RF as the base model
<b>FVIN</b>	N/A
<b>Operating Frequency</b>	125 kHz
<b>RF Output Power</b>	74.2 dBuV/m @ 3m
<b>That may have multiple primary coils</b>	No
<b>Antenna Type</b>	Integral
<b>Power Source</b>	DC 12 V(Adapter), DC 48 V(PoE Adapter)

### 1.3 Antenna Information

<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input type="checkbox"/>	Temporary RF connector provided
<input checked="" type="checkbox"/>	No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.
<input type="checkbox"/>	External antenna (dedicated antennas)



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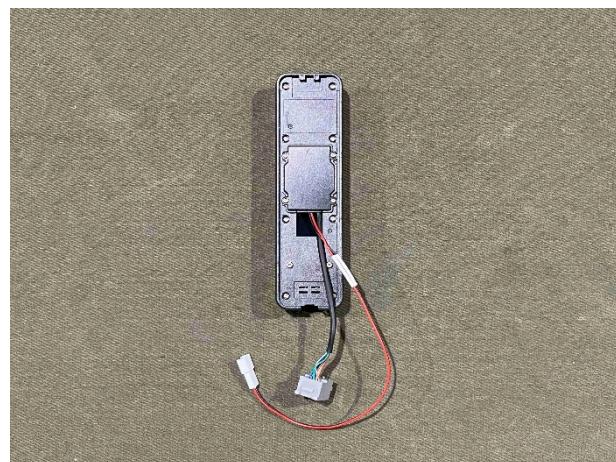
Report No.:

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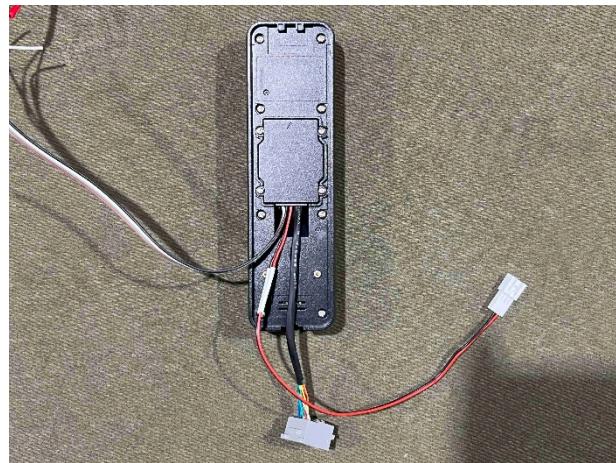
Page (5) / (20) Pages

## 1.4 Model Differences

### UBio-X Tag, UBio-X Tag (P)



### UBio-X Tag (K)





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Report No.:  
CTK-2025-02191  
Page (6) / (20) Pages

## 2. Accreditations

### 2.1 Laboratory Accreditations and Listings

Country	Agency	Registration Number
USA	FCC	805871
CANADA	ISED	CN : 8737A CAB ID : KR0025
KOREA	NRRA	KR0025

### 2.2 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

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Report No.:  
CTK-2025-02191  
Page (7) / (20) Pages

### 3. Test Specifications

#### 3.1 Standards

FCC Part Section(s)	Requirement(s)	Status (Note 1)	Report Clause
15.203	Antenna Requirement	C	1.3
15.215(c)	Emission Bandwidth	C	4.1
15.209	Radiated Emissions	C	4.2
15.207	AC Power line Conducted Emissions	C	4.3

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

Note 3: The sample was tested according to the following specification: ANSI C63.10-2013.

#### 3.2 Testing Environment

Test Item	Test Date	Temperature (± 1 °C)	Relative Humidity (± 3 % R.H.)
Bandwidth	2025-08-19	23	59
Transmitter emission (Radiated) 1) 9 kHz to 30 MHz	2025-08-18	24	58
	2025-08-20	25	62
AC Conducted Emission	2025-08-20	23	53

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Report No.:  
CTK-2025-02191  
Page (8) / (20) Pages

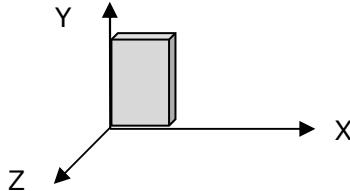
### 3.3 Mode of operation during the test

It is configured so that the maximum level is transmitted continuously.

#### Test Frequency

Operating Frequency	
125 kHz	

#### The Worst Case Measurement Configuration

Tests Item	Transmitter Radiated Emissions, Emission Bandwidth
Condition	Radiated measurement
User Position	<input checked="" type="checkbox"/> EUT will be placed in fixed position. <input type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. <input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions.
Operating Mode	DC 12 V(Adapter), PoE
EUT faces identified relative to view from receiving antenna	

### 3.4 Peripheral Devices

No.	Device	Manufacturer	Model No.	Serial No.
1	Ethernet Switch(PoE)	Hangzhou Hikvision Digital Technology Co.,Ltd.	DS-3E0505HP-E	K54105863
2	Adapter	SHENZHEN RUI YU TECHNOLOGY CO.,LTD.	RY48B120350M3	-

### 3.5 Measurement Uncertainty

The value of the measurement uncertainty for the measurement of each parameter.  
Coverage factor  $k = 2$ , Confidence levels of 95 %

Test Item	Uncertainty
Occupied Bandwidth	0.1 MHz (C.L. : Approx. 95%, $k = 2$ )
Radiated emissions	4.11 dB(C.L. : Approx. 95%, $k = 2$ )
Line Conducted emissions	2.06 dB(C.L. : Approx. 95%, $k = 2$ )

### 3.6 Test Software

#### Automation program

Conducted Test	-
Radiated Test	EP5RE Ver. 6.0.10, ES10 Ver. 2022.04.000
Line Conducted Test	EMC32 Ver. 10.50.00

#### Test program

-
---



## 4. Technical Characteristic Test

### 4.1 Emission Bandwidth

#### Requirement

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

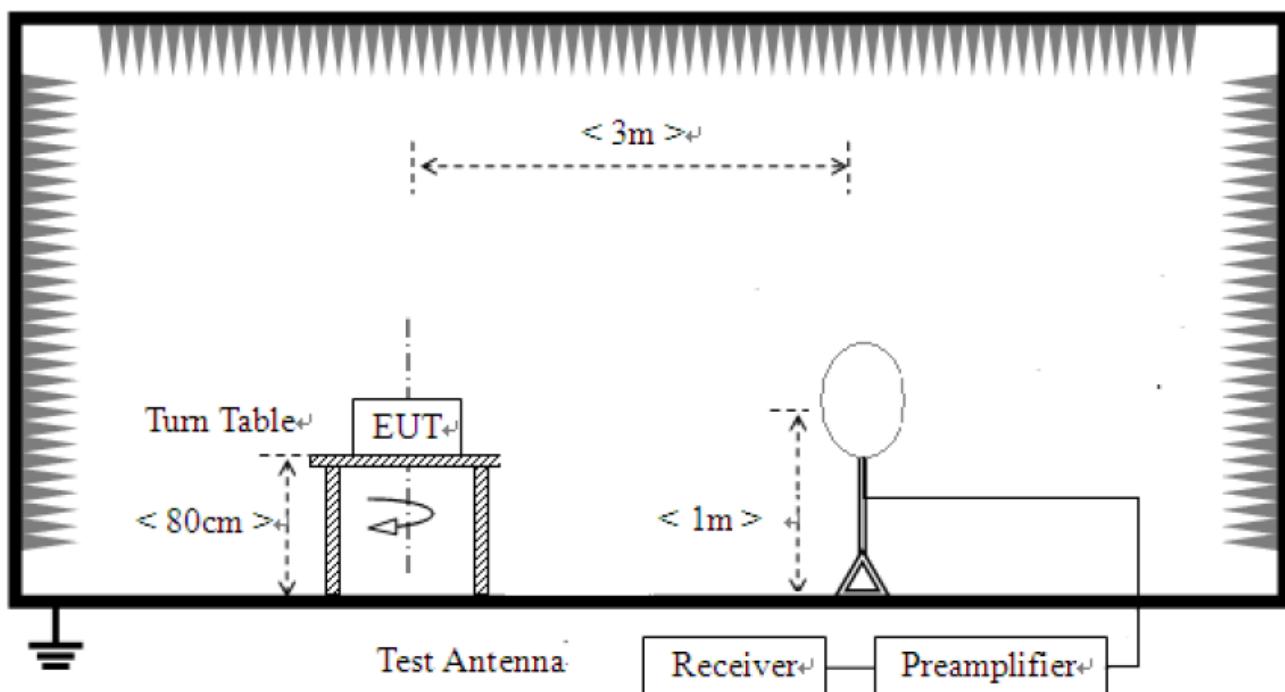
The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the "x dB bandwidth" is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

#### Test Procedures

For the emission bandwidth refer ANSI C63.10-2013, clause 6.9(Occupied bandwidth).

#### Test Setup



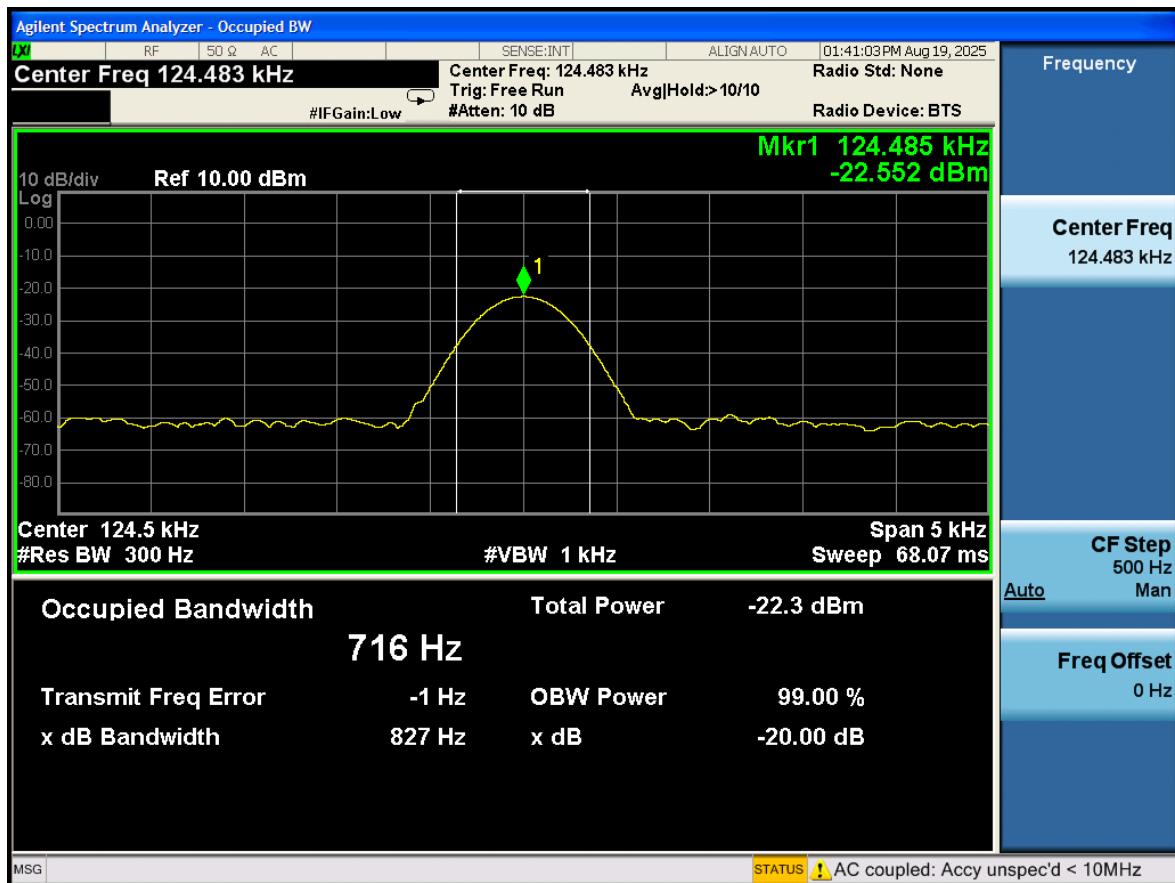
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Report No.:  
CTK-2025-02191  
Page (10) / (20) Pages

## Test results

Emission Bandwidth	Result	Limit
20dB Bandwidth	827 Hz	N/A
99 % Bandwidth	716 Hz	N/A



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Report No.:  
CTK-2025-02191  
Page (11) / (20) Pages

## 4.2 Radiated emissions

### FCC Requirement

FCC Part 15 § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency(MHz)	Field Strength uV/m	Field Strength dBuV/m	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	48.5 – 13.8	300
0.490-1.705	24000/F(kHz)	33.8 – 23	30
1.705-30	30	29.5	30
30-88	100**	40	3
88-216	150**	43.5	3
216-960	200**	46	3
Above 960	500	54	3

\*\* Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

Note : The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

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CTK-2025-02191  
Page (12) / (20) Pages

## Test Location

10 m SAC (test distance :  10 m,  3 m)

## Test Procedures

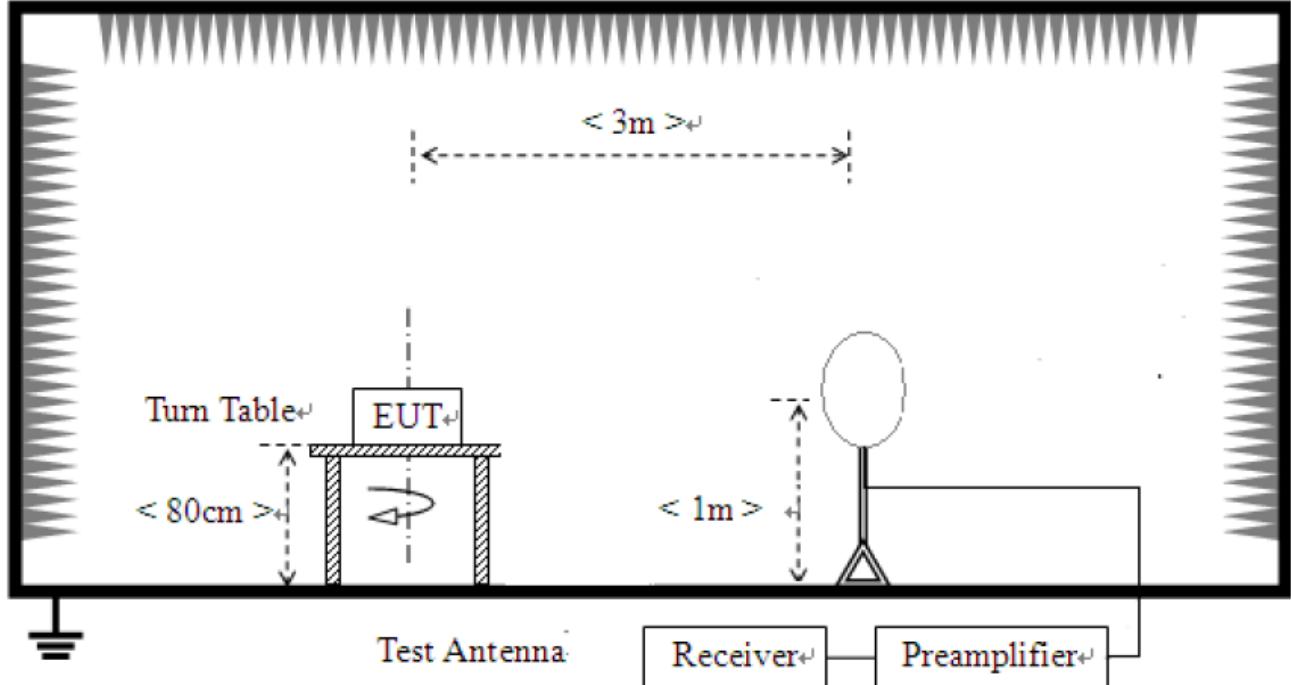
<b>Test Method</b>	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2013, clause 6.4(Radiated emissions from unlicensed wireless devices below 30 MHz).
<input checked="" type="checkbox"/>	Radiated emission tests shall be performed in the frequency range of 9 kHz to 30 MHz, using a calibrated loop antenna.
<input checked="" type="checkbox"/>	When perpendicular to the ground plane, the lowest height of the magnetic antenna shall be 1 m above the ground and shall be positioned at the specified distance from the EUT. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> The results shall be by using the square of an inverse linear distance extrapolation factor(40 dB/decade).
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2013, clause 6.5(Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz).
<input checked="" type="checkbox"/>	In the frequency range above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) is used. Test Antenna height is carried from 1m to 4m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.
<input checked="" type="checkbox"/>	Emissions more than 20 dB below the limit do not need to be reported.

## Measuring instrument Settings

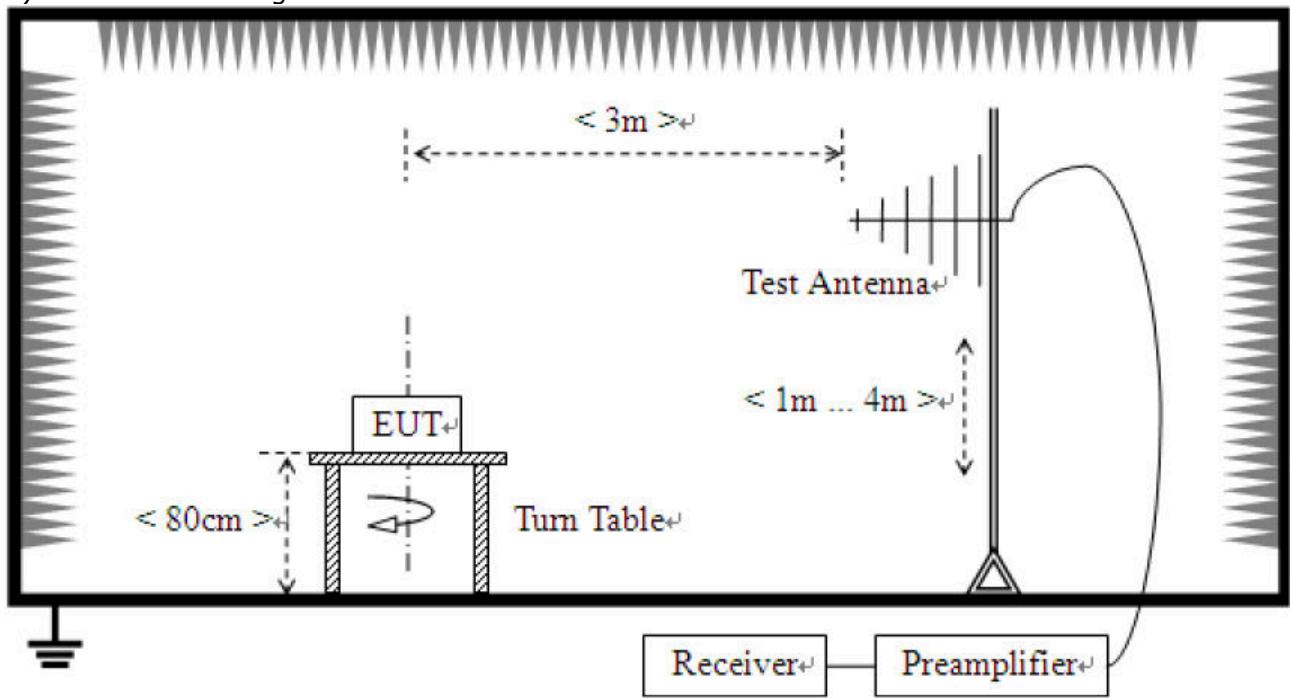
Frequency Range	9 kHz – 1 000 MHz
RBW	200 Hz (9 kHz – 150 kHz) 9 kHz (150 kHz – 30 MHz) 120 kHz (30 MHz – 1 000 MHz)
VBW	$\geq$ RBW
Sweep time	auto couple
Detector function	CISPR quasi-peak(below 1 000 MHz)

## Test Setup

- 1) For field strength of emissions from 9 kHz to 30 MHz



- 2) For field strength of emissions from 30 MHz to 1 GHz



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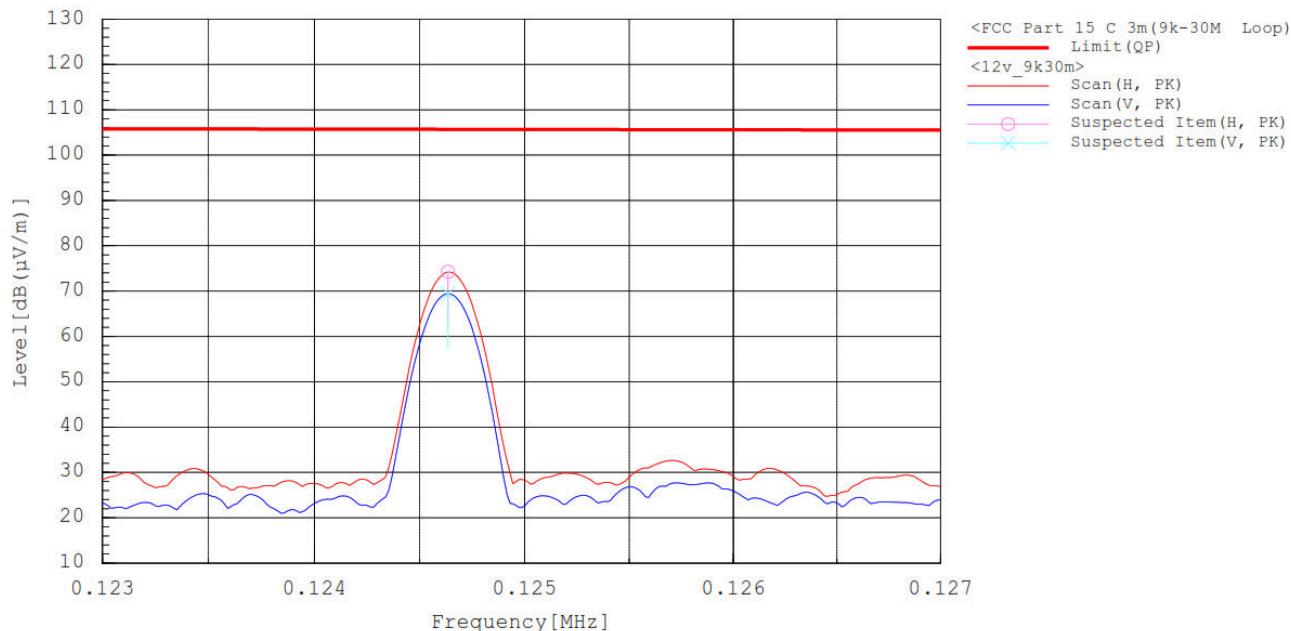
Report No.:  
CTK-2025-02191  
Page (14) / (20) Pages

## Test results

### 1) Radiated emissions of fundamental frequency

The requirements are:

Complies



Frequency [MHz]	Pol	Reading [dBuV]	c.f [dB/m]	Result [dBuV/m]	Limit [dBuV/m]	Margin[dB]	Remark
0.125	H	49.4	24.8	74.2	105.7	31.5	
0.125	V	44.7	24.8	69.5	105.7	36.2	

#### Remark :

1. Result = Reading + c.f(correction factor)
2. Correction factor = Antenna factor + Cable loss + 6 dB attenuator
3. The test result in peak detector is less than quasi-peak limit.
4. Radiated emission testing was conducted using the higher value, the 12V adapter, instead of PoE.

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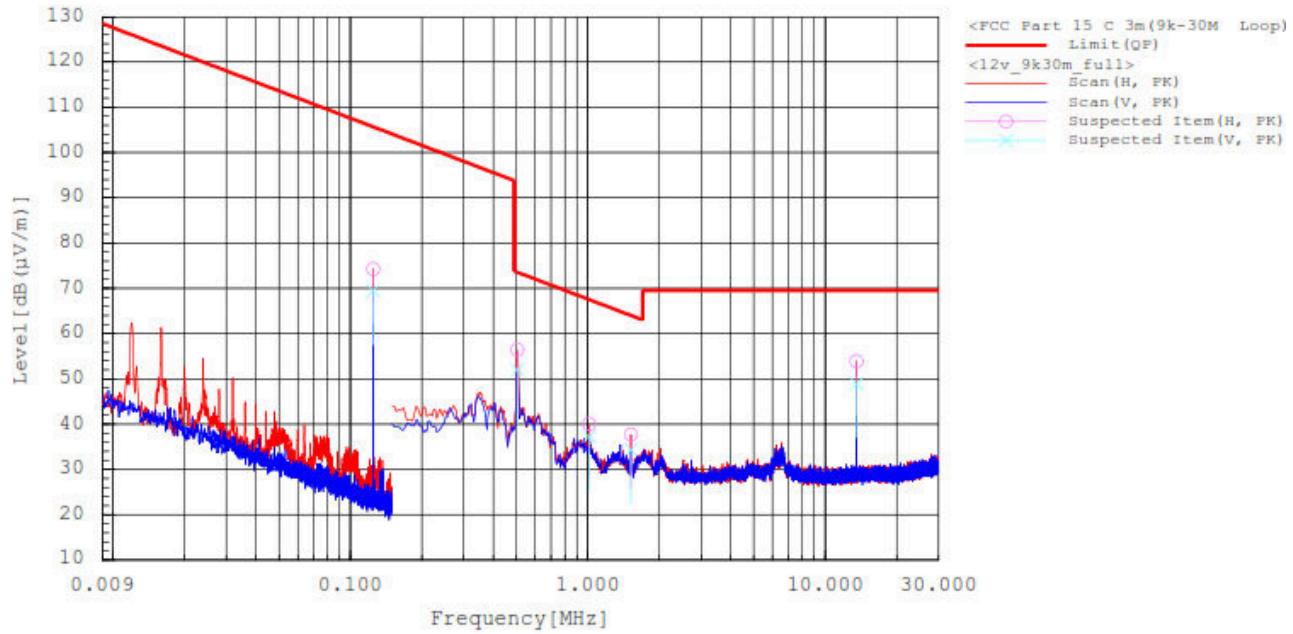
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Page (15) / (20) Pages

## 2) Radiated emissions in the frequency range of 9 kHz to 30 MHz

The requirements are:

Complies



### Spectrum Selection

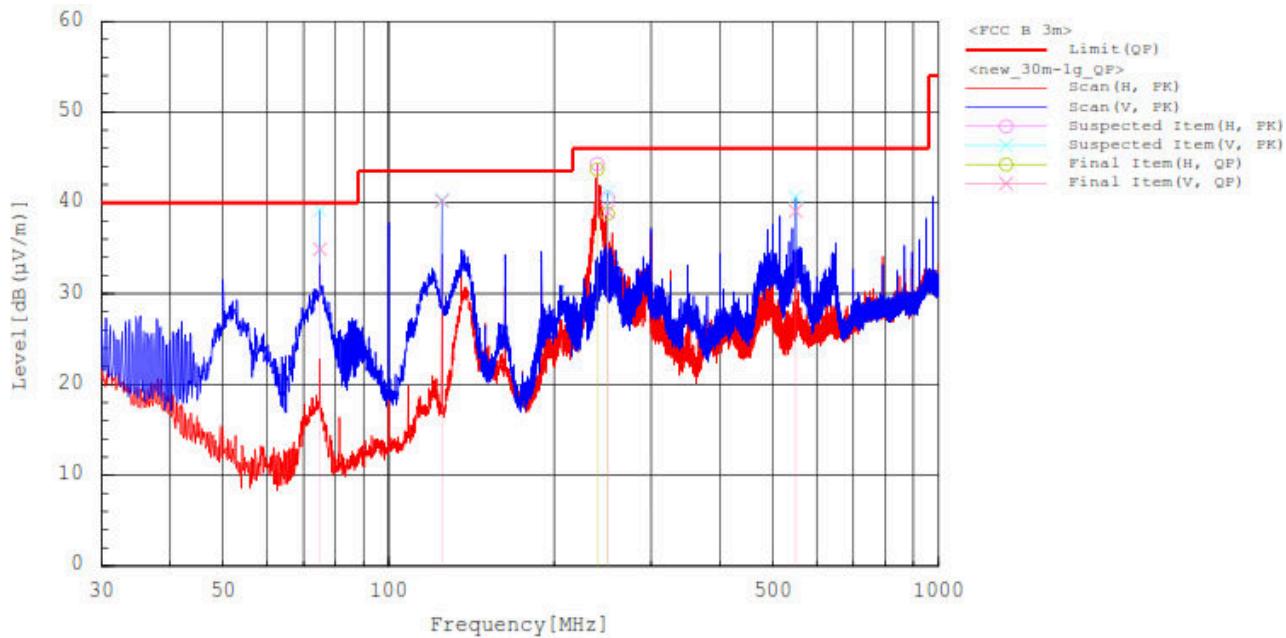
No.	Frequency	Pol	Reading	c.f	Result	Limit	Margin	Height	Angle
	[MHz]		[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[cm]	[deg]
1	0.125	H	49.4	24.8	74.2	105.7	31.5	99.9	181.1
2	0.125	V	44.7	24.8	69.5	105.7	36.2	99.9	266.3
3	0.505	H	31.6	24.9	56.5	73.5	17.0	99.9	166.1
4	0.505	V	27.1	24.9	52.0	73.5	21.5	99.9	256.8
5	1.013	V	12.4	24.9	37.3	67.5	30.2	99.9	256.8
6	1.013	H	15.2	24.9	40.1	67.5	27.4	99.9	156.3
7	1.520	H	12.7	25.0	37.7	64.0	26.3	99.9	152.5
8	1.520	V	9.3	25.0	34.3	64.0	29.7	99.9	83.5
9	13.559	H	27.6	26.3	53.9	69.5	15.6	99.9	176.8
10	13.559	V	22.6	26.3	48.9	69.5	20.6	99.9	104.0

### Remark :

1. Result = Reading + c.f (correction factor)
2. Correction factor = Antenna factor + Cable loss + 6 dB attenuator
3. The test result in peak detector is less than quasi-peak limit.
4. For the transmitter, frequencies of 13.56 MHz and 125 kHz were used.  
Tested while two signals were being transmitted.
5. Radiated emission testing was conducted using the higher value, the 12V adapter, instead of PoE.

**3) Radiated emissions in the frequency range of 30 MHz to 1 000 MHz**

The requirements are:

 Complies**Final Result**

No.	Frequency	Pol	Reading	c.f	Result	Limit	Margin	Height	Angle
	[MHz]		[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[cm]	[deg]
1	75.008	V	52.0	-17.1	34.9	40.0	5.1	99.9	223.7
2	124.963	V	52.7	-12.5	40.2	43.5	3.3	99.9	312.1
3	239.326	H	55.4	-11.7	43.7	46.0	2.3	99.9	0.0
4	249.996	V	49.7	-10.7	39.0	46.0	7.0	99.9	312.1
5	249.996	H	49.5	-10.7	38.8	46.0	7.2	99.9	0.3
6	550.017	V	41.0	-1.9	39.1	46.0	6.9	99.9	328.5

**Remark :**

1. Result = Reading + c.f(Correction factor)
2. Correction factor = Antenna factor + Cable loss + 6 dB attenuator – Amp. Gain
3. For the transmitter, frequencies of 13.56 MHz and 125 kHz were used.
4. Radiated emission testing was conducted using the higher value, the PoE, instead of 12V adapter.

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CTK-2025-02191  
Page (17) / (20) Pages

## 4.3 AC Conducted Emissions

A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz-30 MHz, shall not exceed the limits.

### Frequency Range of Measurement

150 kHz to 30 MHz

### Instrument Settings

IF Band Width: 9 kHz

### Test Procedures

ANSI C63.10-2013 - Section 6.2.2

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

### Limit

#### - 15.207(a)

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average**
0.15 ~ 0.5	66 to 56*	56 to 46*
0.5 ~ 5	56	46
5 ~ 30	60	50

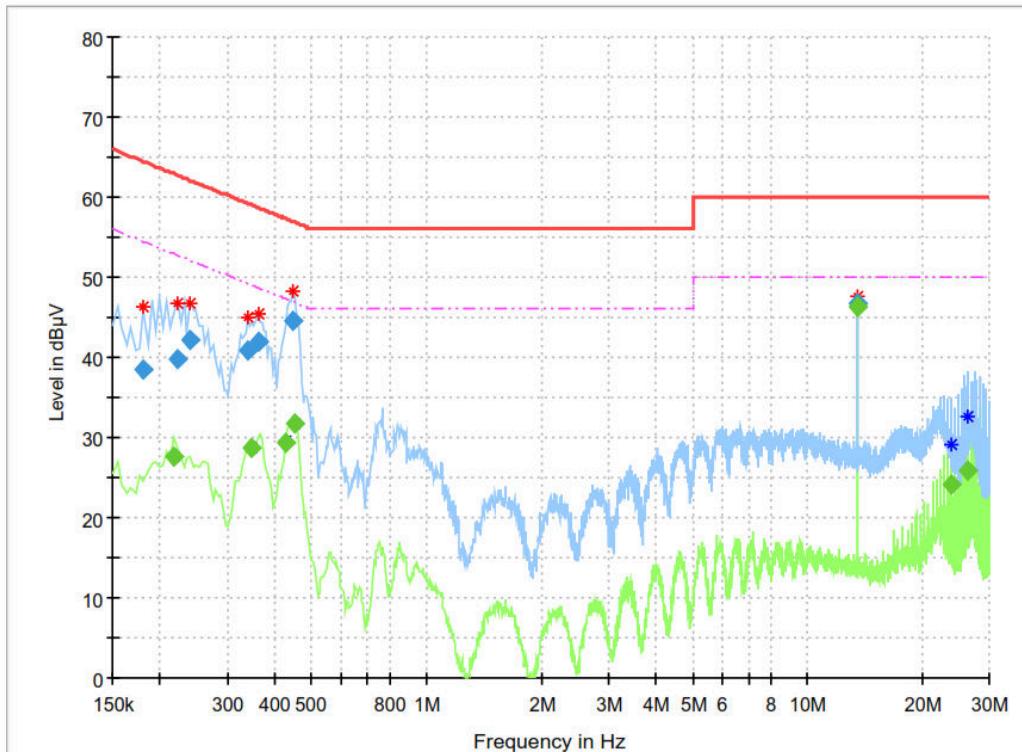
\* The level decreases linearly with the logarithm of the frequency.

\*\* A linear average detector is required.

### Test Results

The requirements are:

Complies

**Test Data****[DC 12 V Adapter, LINE & NEUTRAL]****Final Result**

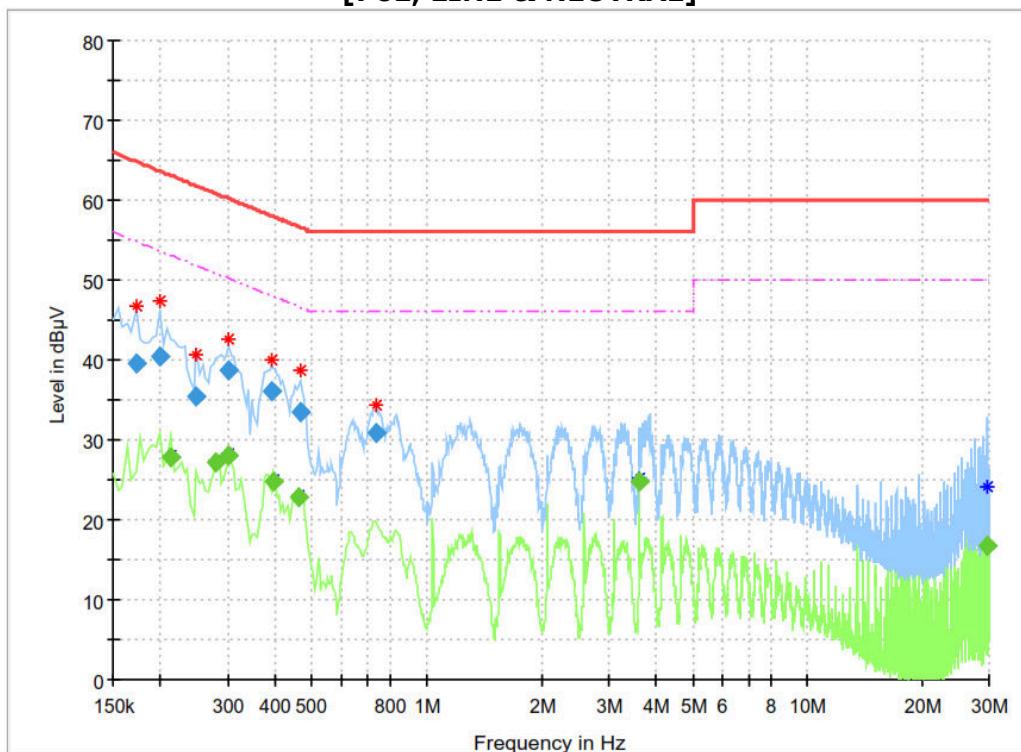
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.181500	38.44	---	64.42	25.98	15000.0	9.000	L1	ON	9.9
0.217500	---	27.53	52.91	25.38	15000.0	9.000	N	ON	9.8
0.222000	39.80	---	62.74	22.95	15000.0	9.000	L1	ON	9.8
0.240000	42.18	---	62.10	19.92	15000.0	9.000	N	ON	9.7
0.339000	40.85	---	59.23	18.38	15000.0	9.000	N	ON	9.9
0.348000	---	28.80	49.01	20.21	15000.0	9.000	N	ON	9.9
0.361500	41.91	---	58.69	16.79	15000.0	9.000	N	ON	9.9
0.429000	---	29.39	47.27	17.88	15000.0	9.000	N	ON	9.9
0.447000	44.53	---	56.93	12.40	15000.0	9.000	N	ON	9.9
0.451500	---	31.69	46.85	15.16	15000.0	9.000	N	ON	9.9
13.560000	46.68	---	60.00	13.32	15000.0	9.000	L1	ON	10.1
13.560000	---	46.33	50.00	3.67	15000.0	9.000	L1	ON	10.1
23.860500	---	24.13	50.00	25.87	15000.0	9.000	N	ON	10.2
26.398500	---	25.92	50.00	24.08	15000.0	9.000	N	ON	10.2

\* The frequency 13.56 MHz is the Fundamental signal.

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Report No.:  
CTK-2025-02191  
Page (19) / (20) Pages

**[PoE, LINE & NEUTRAL]****Final Result**

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	CAverage (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.172500	39.53	---	64.84	25.31	15000.0	9.000	N	ON	9.8
0.199500	40.51	---	63.63	23.12	15000.0	9.000	N	ON	9.8
0.213000	---	27.72	53.09	25.37	15000.0	9.000	N	ON	9.8
0.249000	35.33	---	61.79	26.46	15000.0	9.000	N	ON	9.6
0.280500	---	27.19	50.80	23.61	15000.0	9.000	N	ON	9.8
0.303000	---	28.00	50.16	22.16	15000.0	9.000	N	ON	9.8
0.303000	38.66	---	60.16	21.50	15000.0	9.000	N	ON	9.8
0.393000	36.11	---	58.00	21.89	15000.0	9.000	N	ON	9.9
0.397500	---	24.80	47.91	23.10	15000.0	9.000	N	ON	9.9
0.460500	---	22.92	46.68	23.77	15000.0	9.000	N	ON	9.9
0.465000	33.50	---	56.60	23.10	15000.0	9.000	L1	ON	10.0
0.735000	30.81	---	56.00	25.19	15000.0	9.000	N	ON	9.9
3.628500	---	24.76	46.00	21.24	15000.0	9.000	N	ON	9.7
29.553000	---	16.71	50.00	33.29	15000.0	9.000	L1	ON	10.0

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Report No.:  
CTK-2025-02191  
Page (20) / (20) Pages

## APPENDIX A – Test Equipment Used For Tests

	<b>Name of Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Cal Date</b>	<b>Due Date</b>
1	Signal Analyzer	Agilent	N9020A	MY50510240	2025-07-02	2026-07-02
2	Signal Generator	Rohde & Schwarz	SMB100A	175528	2025-03-21	2026-03-21
3	EMI TEST RECEIVER	Rohde & Schwarz	ESW44	102039	2025-04-28	2026-04-28
4	BILOG ANTENNA	TESEQ	CBL6111D	63162	2024-09-13	2026-09-13
5	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-125	2024-04-15	2026-04-15
6	6dB Attenuator	PASTERNACK	PE7AP006-06	L20210504000023	2025-07-28	2026-07-28
7	6dB Attenuator	NONE	6dB	190557	2024-09-19	2025-09-19
8	AMPLIFIER	SONOMA INSTRUMENT	310N	411011	2025-07-28	2026-07-28
9	Dual-Tracking DC Power Supply	Topward Electric Instruments Co.,Ltd.	6303D	802204	2025-03-13	2026-03-13
10	DC POWER SUPPLY	HP	E3632A	MY40009327	2025-03-12	2026-03-12
11	EMI Test Receiver	R&S	ESR3	102826	2025-04-28	2026-04-28
12	LISN	R&S	ENV216	101236	2024-10-30	2025-10-30

<b>No.</b>	<b>Cable</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Check Date</b>
1	RF Cable (Conducted)	Junkosha Inc.	MWX221	1512S151	2025-08-18
2	RF Cable (9 kHz - 1 GHz Radiated)	HUBER+SUHNER	SUCOFLEX 104	MY27558/4	2025-03-05
3	RF Cable (9 kHz - 30 MHz Radiated)	Canare Corporation	L-5D2W	N/A	2025-03-05
4	RF Cable (30 MHz - 1 GHz Radiated)	Canare Corporation	L-5D2W	N/A	2025-03-05
5	RF Cable (Line Conducted)	Canare Corporation	L-5D2W	N/A	2025-03-05

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