



# TEST REPORT

<b>Eurofins KCTL Co.,Ltd.</b> 52-20 Sinjeong-ro 41beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea Tel : 82-31-326-6700 Fax : 82-505-299-8311 <a href="http://www.kctl.co.kr">www.kctl.co.kr</a>	Report No.: <b>KR22-YEF0006-A</b> Page (1) of (25)	<div style="float: right; text-align: right;"> <b>KCTL</b> </div>
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**1. Client**

- Name : XPERIX Inc.
- Address : 1207, 37, Sagimakgol-ro 62beon-gil, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
- Date of Receipt : 2022-01-06

**2. Use of Report** : -

**3. Name of Product / Model** : BioMini Combo 2 / BMC-2

**4. Manufacturer / Country of Origin** : XPERIX Inc. / Korea

**5. Date of Test** : 2022-01-17

**6. Location of Test** : ☒ Permanent Testing Lab ☐ On Site Testing  
 (Address: 52-20 Sinjeong-ro 41beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea)

**7. Test method used** : FCC Part 15 Subpart B, Class A


**8. Test Result** : Refer to the test result in the test report

Affirmation	Tested by  <div style="text-align: right;">             Name : Heeyeon Baek (Signature)         </div>	Technical Manager  <div style="text-align: right;">             Name : Jaeho Park (Signature)         </div>
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2023-09-07

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## REPORT REVISION HISTORY

Date	Revision	Page No
2022-01-20	Originally issued	-
2023-09-07	Changed applicant and manufacturer	-

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## General remarks for test reports

### Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:


**Procedure number, issue date and title:**

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ Statement not required by the standard or client used for type testing

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## 1. Applicant information

**Applicant:** XPERIX Inc.

**Address:** 1207, 37, Sagimakgol-ro 62beon-gil, Jungwon-gu, Seongnam-si,  
Gyeonggi-do, Republic of Korea

**Manufacturer:** XPERIX Inc.

**Address:** 1207, 37, Sagimakgol-ro 62beon-gil, Jungwon-gu, Seongnam-si,  
Gyeonggi-do, Republic of Korea



## 2. Laboratory information

### Address

#### **Eurofins KCTL Co.,Ltd. (Yongin Lab.)**

52-20 Sinjeong-ro 41beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea

Telephone Number: 82-31-326-6700

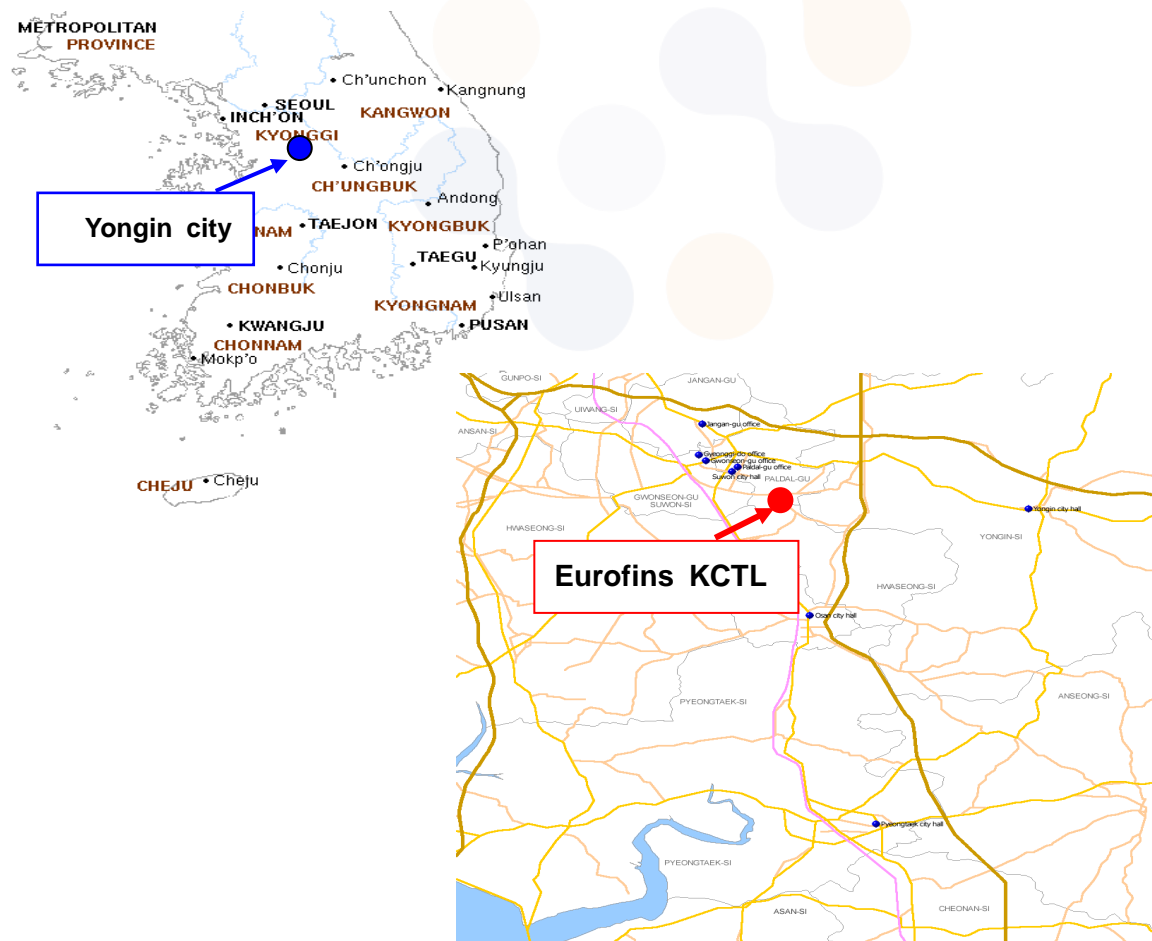
Facsimile Number: 82-505-299-8311

FCC Site Designation No: KR0040

VCCI Registration No. : C-12915, T-11320, R-14386, G-20079

KOLAS NO.: KT231

### **SITE MAP**



### 3. Test system configuration

#### 3.1 Operation environment

	Temperature	Humidity	Pressure
Chamber 10 m(RE)	18.6 °C	17.4 % R.H.	101.1 kPa
Shielded Room(CE)	25.1 °C	15.2 % R.H.	101.2 kPa

#### Test site

These testing items were performed following locations;

Test item	Test site	Used
Conducted Emission	Shielded Room	<input checked="" type="checkbox"/>
Radiated Emission	10 m Chamber	<input checked="" type="checkbox"/>

## 3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC.

The factors contributing to uncertainties are test receiver, cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna frequency interpolation, measurement distance variation, site imperfection, mismatch, and system repeatability. Based on CISPR 16-4-2, the measurement uncertainty level with a 95 % confidence level was applied.

Conducted disturbance measurements_AMN (Confidence level about 95 %, $k = 2$ )		
Shielded Room	9 kHz ~ 150 kHz : 2.0 dB	
	150 kHz ~ 30 MHz : 2.5 dB	
Conducted disturbance measurements_AAN (Confidence level about 95 %, $k = 2$ )		
Shielded Room	150 kHz ~ 30 MHz : 5.2 dB	
Disturbance Power measurements (Confidence level about 95 %, $k = 2$ )		
Shielded Room	30 MHz ~ 300 MHz : 3.7 dB	
Radiated disturbance measurement (Confidence level about 95 %, $k = 2$ )		
10 m Chamber	30 MHz ~ 1 000 MHz	3 m : 4.6 dB
		10 m : 4.6 dB
	1 GHz ~ 6 GHz	3 m : 6.4 dB

### 3.3 Measurement Program

These test items were performed by software programs


Test item	Measurement Program	Used
Conducted Emission	EP5CE_V 5.4.0 (TOYO)	<input checked="" type="checkbox"/>
Radiated Emission	EP5RE_V 6.0.120 (TOYO)	<input checked="" type="checkbox"/>
Disturbance Power	EMC32_V 10.60.10 (R&S)	<input type="checkbox"/>
Radiated Electromagnetic Disturbance	EMC32_V 10.60.10 (R&S)	<input type="checkbox"/>
Discontinuous interference	AFJ Click Meter Soft CMS_V 1.0	<input type="checkbox"/>
Radiated RF Immunity	TDK Radiated Immunity Lab_V 11.25	<input type="checkbox"/>
Conducted RF Immunity	TDK Conducted Immunity Lab_V 11.33.0.1	<input type="checkbox"/>
Conducted RF Immunity	Radimation_V 2020.0.12 (DARE)	<input type="checkbox"/>
Harmonics current emissions, Voltage fluctuations and flicker	IEC Soft_V 2.6(N4L)	<input type="checkbox"/>



## 4. Description of EUT

### 4.1 General information

Sensor Types	Optical
Resolution/Gray scale	500 dpi / 256 gray levels
Sensing Area (W x L)	15.24 x 20.32 mm
Platen Size (W x L)	16.5 x 21.0 mm
Image Size (W x L)	300 x 400 pixels
Image Certificate	FBI PIV and FBI Mobile ID FAP 20
Template Format	Suprema, ISO19794-2, ANSI 378
Image Format	RAW, BMP, WSQ, ISO 19794-4
Ingress Protection	IP65(Sensor Surface)
Operating Temperature	-10°C ~ + 55°C     // -10°C ~ + 50°C
Operating Humidity	From 10 to 90%, non-condensing
Power Supply	USB Host
Weight	260g
Interface	USB 2.0 High Speed
Operating Systems	Windows 7, 8, 8.1, 10 32/64bit Ubuntu, Debian, Fedora, OpenSUSE, CentOS 32/64bit Android 4.1(Jellybean) and above
Live Finger Detection	Supported

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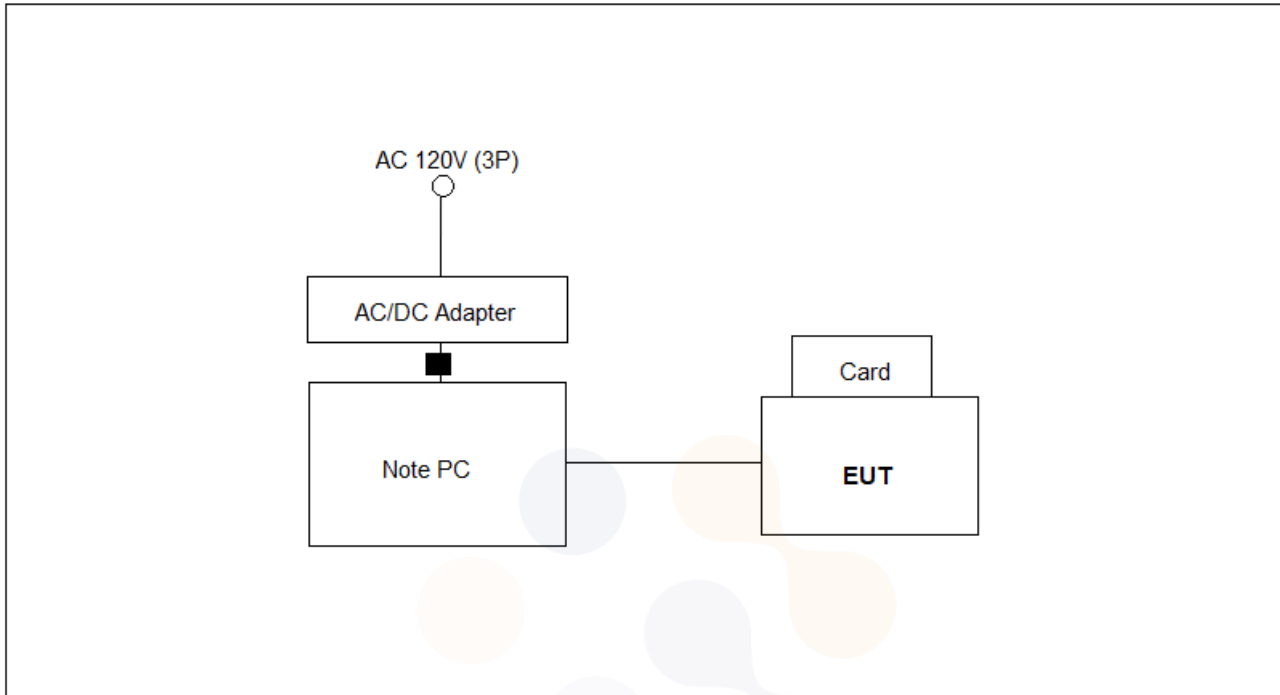
## 4.2 Product description

Type of product	BioMini Combo 2
Model name (Basic)	BMC-2
Model name (Variant)	-
Difference	-
Serial no	-
Testing voltage	120 V, 60 Hz
Input rating	DC 5 V
Internal clock frequency	Below 108 MHz
Note	-

## 4.3 Auxiliary equipments

Type	Model / Part #	S/N	Manufacturer
Note PC	NT500R5K		Samsung
AC/DC Adapter	A13-040N2A		Chicony Power Technology Co., Ltd.
Card	-	-	-

#### 4.4 Test configuration



	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	<b>EUT</b>	USB	Note PC	USB	1.4	Shield
2		Card slot	Card	DC Out	Direct	-
3	Note PC	DC In	AC/DC Adapter	DC Out	1.2	Unshield (Core 1EA)
4	AC/DC Adapter	Power	AC Main	-	1.3	Unshield

## 4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
#1	Use PC/SC Bridge v1, 01, Biomini-Demovc.exe program and Check Optertaing



## 5. Summary of test results

In the above configuration tested, The EUT complied with the requirement of the specification

### 5.1 Summary of EMI emission test results

FCC Part 15 Subpart B (Class A)

ANSI C63.4 – 2014

Applied	Test items	Test method	Result
<input checked="" type="checkbox"/>	Conducted Emission	ANSI C63.4 – 2014	Pass
<input checked="" type="checkbox"/>	Radiated Emission	ANSI C63.4 – 2014	Pass

## 6. Test results

### 6.1 Conducted Emissions

Testing voltage	120 V, 60 Hz				
Test facility	Shielded Room (CE#1)				
Date	2022. 01. 17				
Temperature (°C)	25.1 °C	Humidity (% R.H.)	15.2 % R.H.	Pressure (kPa)	101.2 kPa
Remarks	Pass				

#### 6.1.1 Limits of conducted emissions measurement

☒ AC main

Frequency [MHz]	Class A (dB( $\mu$ V))		Class B (dB( $\mu$ V))	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	79	66	66 ~ 56 *	56 ~ 46*
0.5 ~ 5	73	60	56	46
5 ~ 30	73	60	60	50

\*The limit decreases linearly with the logarithm of frequency

### 6.1.2 Measurement procedure

The measurements were performed in a shielded room. EUT was setup as shown in photograph and placed on a non-metallic table height of 0.8 m above the reference ground plane. The rear of table was located 0.4 m to the vertical conducted plane. EUT was power through the LISN, which was bonded to the ground plane. The LISN power was filtered. Each EUT power lead, except ground (safety) lead was individually connected through a LISN to input power source. EUT signal cables that hung closer than 0.4 m to the Horizontal metal ground 0.3 m ~ 0.4 m long. The power cord was bundles in the center. All peripheral equipment was powered from a sub LISN. The LISN and ISN were positioned 0.8 m from the EUT. Peak and Average detection were used in preliminary testing and Quasi-peak and Average detections were used at final measurement. Both lines of power cord, hot and neutral, were measured.

Result QP/CAV[dB( $\mu$ V)] = Reading QP/CAV[dB( $\mu$ V)] + c.f.(Insertion Loss [dB] + Cable Loss [dB])

Result QP/CAV : Result, Reading QP/CAV : Meter Reading, c.f : Correction Factor

Margin (QP/CAV) = Limit (QP/CAV) – Results (QP/CAV)

Note1) QP : Abbreviation of Quasi-Peak

Note2) CAV : Abbreviation of CISPR Average

### 6.1.3 Used equipments

Equipment	Model	Serial No.	Manufacturer	Next Cal. Date	Used
EMI Test Receiver	ESCI	100373	R&S	2022.01.21	<input checked="" type="checkbox"/>
Two Line V-Network	ENV216	102579	R&S	2022.05.21	<input checked="" type="checkbox"/>
LISN	ESH3-Z5	862770/025	R&S	2022.04.23	<input type="checkbox"/>
EMI Test Receiver	ESCI	100374	R&S	2022.07.08	<input type="checkbox"/>
Two Line V-Network	ENV216	102580	R&S	2022.05.24	<input type="checkbox"/>
Two Line V-Network	ENV216	101718	R&S	2022.07.08	<input type="checkbox"/>
EMI Test Receiver	ESCI	100154	R&S	2022.04.23	<input type="checkbox"/>
Two Line V-Network	ENV216	101719	R&S	2022.07.08	<input type="checkbox"/>
LISN	ESH3-Z5	842966/014	R&S	2022.07.08	<input type="checkbox"/>

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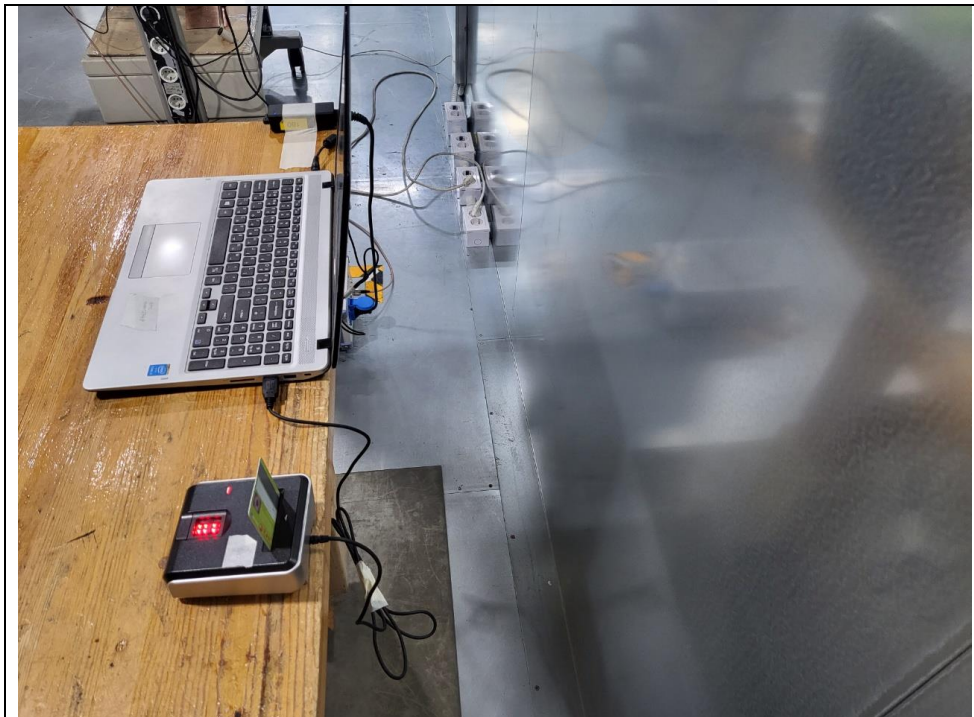
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#### 6.1.4 Photographs of test setup

\* AC Main

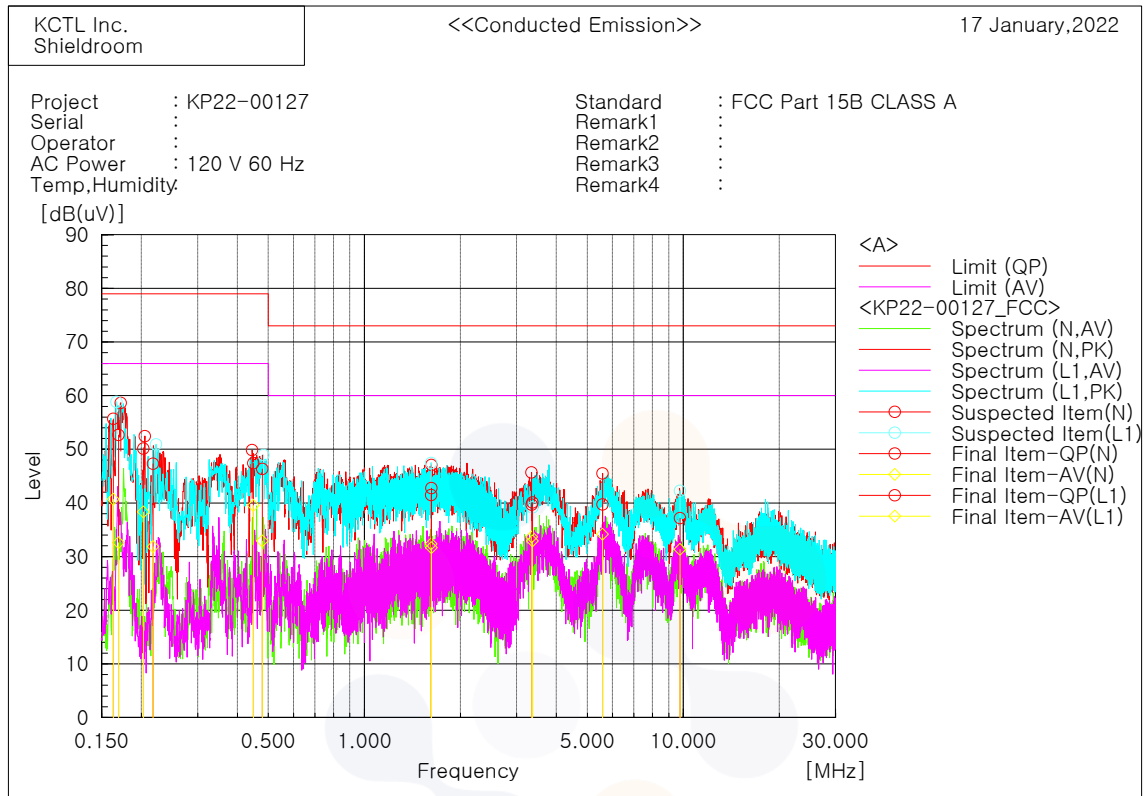




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**6.1.5 Conducted emissions measurement result****\* AC Main****Final Result****--- N Phase ---**

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.16951	42.7	22.6	10.0	52.7	32.6	79.0	66.0	26.3	33.4
2	0.2027	40.3	28.5	9.8	50.1	38.3	79.0	66.0	28.9	27.7
3	0.44858	37.5	29.6	9.9	47.4	39.5	79.0	66.0	31.6	26.5
4	1.61936	31.8	22.6	9.7	41.5	32.3	73.0	60.0	31.5	27.7
5	3.34904	30.0	23.9	9.7	39.7	33.6	73.0	60.0	33.3	26.4
6	5.57786	29.9	24.3	9.8	39.7	34.1	73.0	60.0	33.3	25.9

**--- L1 Phase ---**

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.1633	45.6	30.7	10.0	55.6	40.7	79.0	66.0	23.4	25.3
2	0.21725	37.6	22.1	9.7	47.3	31.8	79.0	66.0	31.7	34.2
3	0.47824	36.4	23.0	9.9	46.3	32.9	79.0	66.0	32.7	33.1
4	1.62281	33.0	21.9	9.7	42.7	31.6	73.0	60.0	30.3	28.4
5	3.36628	30.4	23.2	9.7	40.1	32.9	73.0	60.0	32.9	27.1
6	9.77188	27.4	21.5	9.8	37.2	31.3	73.0	60.0	35.8	28.7

## 6.2 Radiated Emission

Testing voltage	120 V, 60 Hz				
Test facility	10 m Chamber				
Test distance	3 m				
Date	2022. 01. 17				
Temperature (°C)	18.6 °C	Humidity (% R.H.)	17.4 % R.H.	Pressure (kPa)	101.1 kPa
Remarks	Pass				

### 6.2.1 Limits of radiated emission measurement

☒ Limits below 1 GHz

Frequency [MHz]	Class A (dB(μV/m)) @ 10 m	Class B (dB(μV/m)) @ 3 m
30-88	39.0	40.0
88-216	43.5	43.5
216-960	46.4	46.0
Above 960	49.5	54.0

\* Note- Alternative standard: CISPR, Pub. 22 \*

☐ Limits above 1 GHz

Frequency [GHz]	Class A @ 3 m		Class B @ 3 m	
	Peak limit (dB(μV/m))	Average limit (dB(μV/m))	Peak limit (dB(μV/m))	Average limit (dB(μV/m))
Above 1 GHz	79.5	59.5	74	54

Note - The lower limit applies at the transition frequency.

## 6.2.2 Measurement procedure

The test was done at a 10 m Chamber with a quasi-peak detector.

EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane.

Cables were folded back and forth forming a bundle 0.3 m to 0.4 m long and were hanged at a 0.4 m height to the ground plane. Cables connected to EUT were fixed to cause maximum emission.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

## 6.2.3 Used equipments

Equipment	Model no.	Serial no.	Manufacturer	Next Cal. Date	Used
EMI Test Receiver	ESCI7	100872	R&S	2022.07.08	<input checked="" type="checkbox"/>
Amplifier	310N	353132	SONOMA	2022.07.08	<input checked="" type="checkbox"/>
Attenuator	8491B 6dB	MY39270721	KEYSIGHT	2022.07.08	<input checked="" type="checkbox"/>
Bi-Log Antenna	CBL 6112D	40522	TESEQ	2022.02.26	<input checked="" type="checkbox"/>
Preamplifier	8449B	3008A00530	HP	2022.07.08	<input type="checkbox"/>
Horn Antenna	3115	9012-3602	EMCO	2022.03.17	<input type="checkbox"/>

#### 6.2.4 Sample calculation

The field strength is calculated adding the antenna Factor, cable loss and, Antenna pad adding, subtracting the amplifier gain from the measured reading.

The sample calculation is as follow:

-Below 1 GHz

$$\text{Result QP}[\text{dB}(\mu\text{V}/\text{m})] = \text{Reading QP}[\text{dB}(\mu\text{V})] + \text{c.f}(\text{Antenna Factor} [\text{dB}/\text{m}] + \text{Cable Loss} [\text{dB}] + 6 \text{ dB Att} [\text{dB}] - \text{Amp Gain} [\text{dB}])$$

Result QP : Result, Reading QP : Meter Reading, c.f : Correction Factor

Margin (QP) = Limit (QP) – Results (QP)

Note1) QP : Abbreviation of Quasi-Peak

-Above 1 GHz

$$\text{Result PK/CAV} [\text{dB}(\mu\text{V}/\text{m})] = \text{Reading PK/CAV} [\text{dB}(\mu\text{V})] + \text{c.f}(\text{Antenna Factor} [\text{dB}/\text{m}] + \text{Cable Loss} [\text{dB}] - \text{Amp Gain} [\text{dB}])$$

Result PK/CAV : Result, Reading PK/CAV : Meter Reading, c.f : Correction Factor

Margin (PK/CAV) = Limit (QP/CAV) – Results (QP/CAV)

Note1) PK : Abbreviation of Peak

Note2) CAV : Abbreviation of CISPR Average

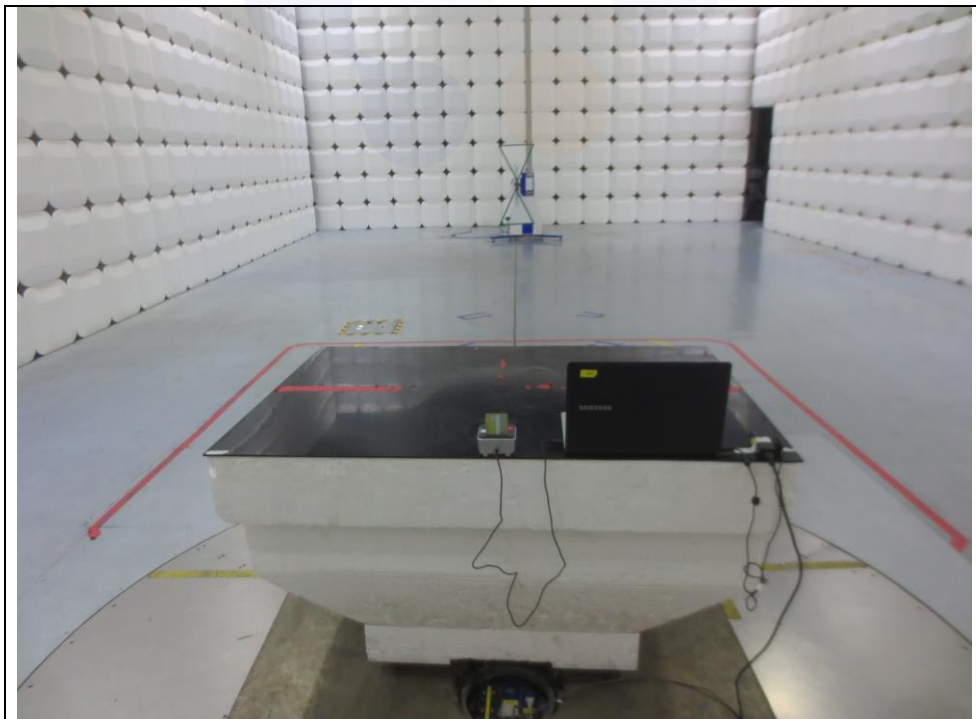
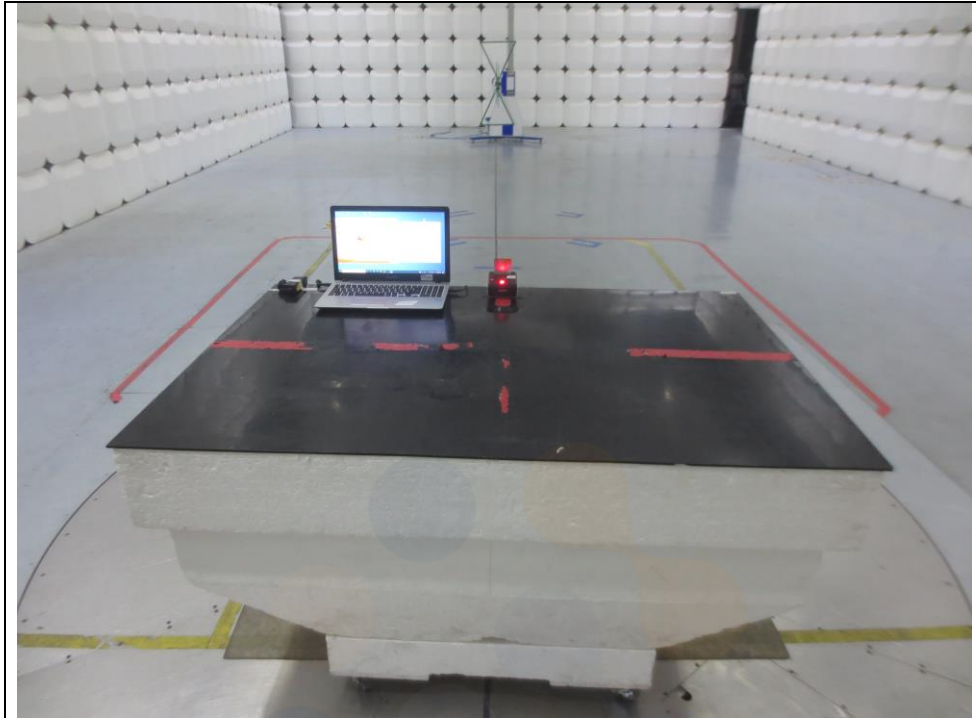
If Reading is 30 dB $\mu\text{V}$ , Antenna Factor 12 dB/m, Cable Loss 5 dB, Attenuator 6 dB, Amp Gain 35 dB

The result is

$$30 + 12 + 5 + 6 - 35 = 18 \text{ dB}(\mu\text{V}/\text{m})$$

## 6.2.5 Photographs of test setup

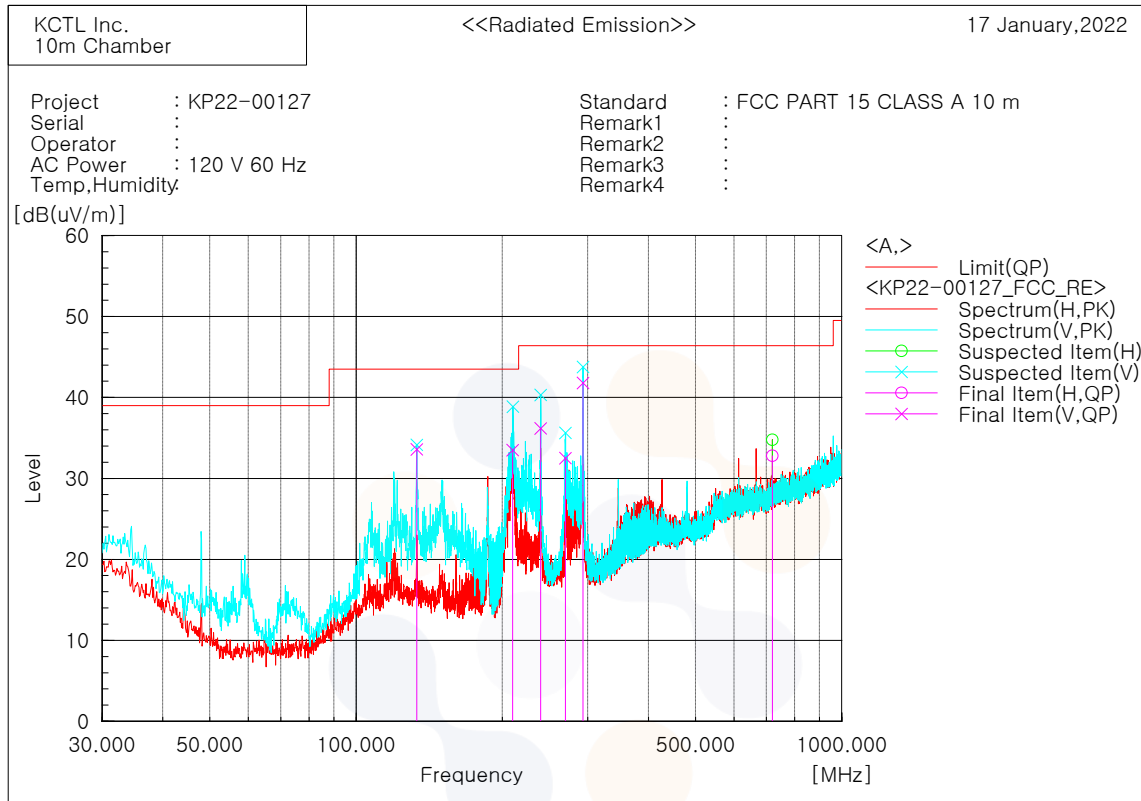
\* 30 MHz ~ 1 GHz



## 6.2.6 Radiated emission measurement result

### \* Graph and Data

\* 30 MHz ~ 1 GHz



#### Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	133.391	V	44.8	-11.2	33.6	43.5	9.9	200.0	153.0
2	210.068	V	46.5	-13.0	33.5	43.5	10.0	100.0	8.0
3	239.967	V	46.5	-10.3	36.2	46.4	10.2	100.0	309.0
4	269.955	V	41.5	-9.0	32.5	46.4	13.9	100.0	4.0
5	293.312	V	50.6	-8.8	41.8	46.4	4.6	100.0	194.0
6	720.031	H	32.2	0.6	32.8	46.4	13.6	100.0	153.0

## 7. EUT photographs

### Front View



### Rear View





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Left View



Right View





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Inside

