






TEST REPORT

KCTL Inc. 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 www.kctl.co.kr	Report No.: KR22-YEF0031 Page (1) of (25)	 KCTL
<p>1. Client</p> <ul style="list-style-type: none"> ◦ Name : Suprema ID Inc. ◦ Address : 1207, 37, Sagimakgol-ro 62beon-gil, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea ◦ Date of Receipt : 2022-04-20 <p>2. Use of Report : -</p> <p>3. Name of Product / Model : RealScan-D / RS-D</p> <p>4. Manufacturer / Country of Origin : Suprema ID Inc. / Korea</p> <p>5. Date of Test : 2022-04-21 to 2022-04-22</p> <p>6. Location of Test : <input checked="" type="checkbox"/> Permanent Testing Lab <input type="checkbox"/> On Site Testing (Address: 52-20 Sinjeong-ro 41beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea)</p> <p>7. Test method used : FCC Part 15 Subpart B, Class A</p> <p>8. FCC ID : 2AVDARS-D</p> <p>9. Test Result : Refer to the test result in the test report</p>		
Affirmation	Tested by  Name : Yeongbae Seo (Signature)	Technical Manager  Name : Jaeho Park (Signature)
<p style="text-align: right;">2022-04-29</p> <p style="text-align: center;">KCTL Inc.</p> <p>As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.</p>		

REPORT REVISION HISTORY

Date	Revision	Page No
2022-04-29	Originally issued	-

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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: Suprema ID Inc.
Address: 1207, 37, Sagimakgol-ro 62beon-gil, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
Telephone: +82-10-3161-3686
Fax: -
E-mail: sypark2@suprema.co.kr
Contact name: Suyeol Park

Manufacturer: Suprema ID Inc.
Address: 1207, 37, Sagimakgol-ro 62beon-gil, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
Telephone: +82-10-3161-3686
Fax: -
E-mail: sypark2@suprema.co.kr
Contact name: Suyeol Park

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2. Laboratory information

Address

KCTL Inc. (Yongin Lab.)

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Telephone Number: 82-31-326-6700

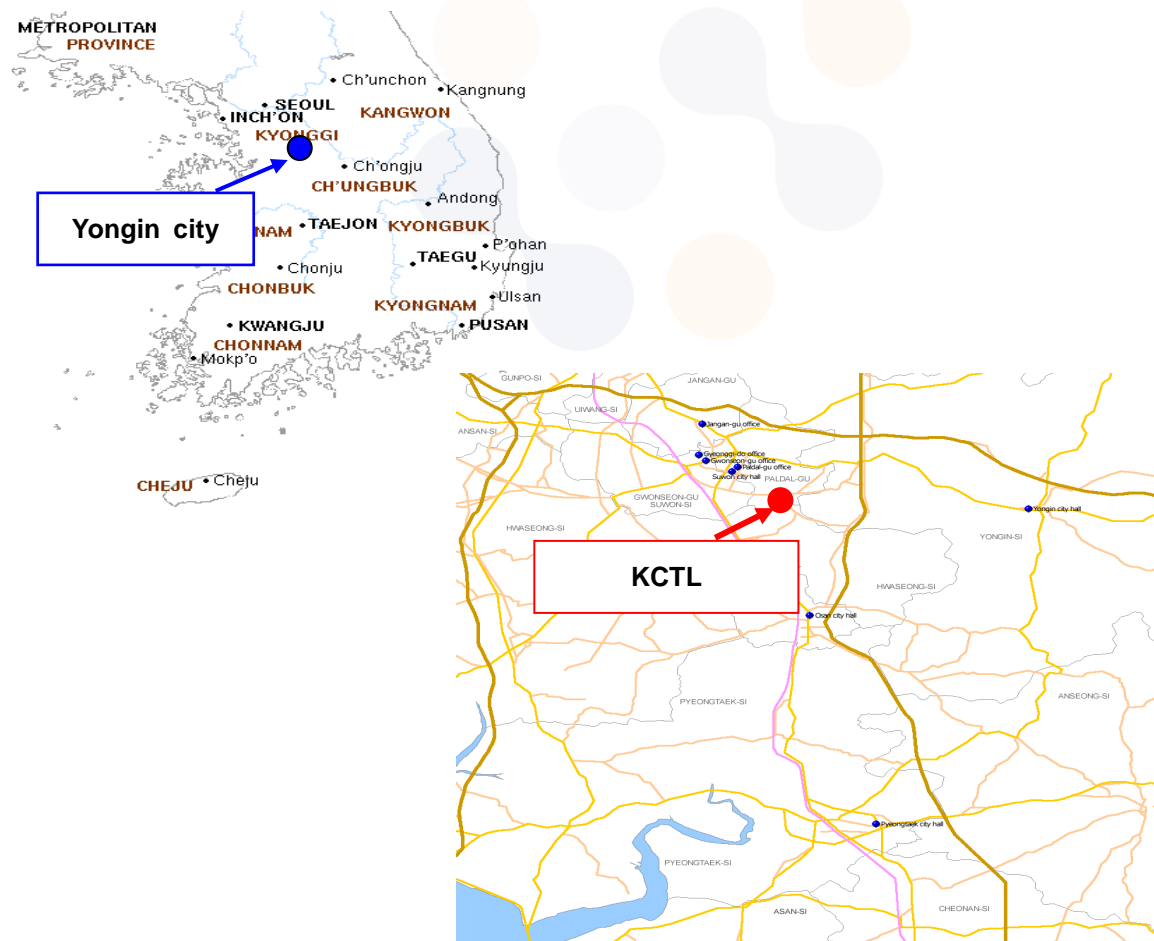
Facsimile Number: 82-505-299-8311

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)	19.3 °C	36.8 % R.H.	100.8 kPa
Shielded room(CE)	24.0 °C	28.4 % R.H.	100.9 kPa

Test site

These testing items were performed following locations;

Test item	Test site
Conducted Emission	Shielded Room
Radiated Emission	10 m Chamber

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 : 2.3 dB	
	150 kHz ~ 30 MHz : 2.6 dB	
Conducted disturbance measurements_AAN (Confidence level about 95 %, $k = 2$)		
Shielded Room	150 kHz ~ 30 MHz : 3.9 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 : 4.7 dB
		10 m : 4.8 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 4.16	<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"/>

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4. Description of EUT

4.1 General information

Main	Fingerprint Type Frame Rate Resolution Platen Size (W x L) Sensing Area (W x L) Image Size (W x L) Image Quality Standards	Single Rolls Single Flats Dual Finger Flats 20 frames per second 500 dpi, 256 gray 48 x 48 mm (1.9" x 1.9") 45.72 x 45.72 mm 900 x 900 pixels FBI IAFIS Appendix F
Interface	USB	2.0 High-speed (Data & Power)
Hardware	IP Rating Operating Temperature Operating Humidity Dimension (W x L x H) Weight Certification	Splash proof -10°C ~ 50°C 10 ~ 90%, non-condensing 84 x 171 x 63 mm (3.3" x 6.7" x 2.5") 0.54kgs (1.19lbs) WHQL, CE, FCC, UL, KC

4.2 Product description

Type of product	RealScan-D
Model name (Basic)	RS-D
Model name (Variant)	RealScan-DM, RS-DM
Difference	Variant model is identical to the basic model except for model name.
Serial no	-
Testing voltage	120 V, 60 Hz
Input rating	USB 5 Vdc, 500 mA
Internal clock frequency	24 MHz
Note	-

4.3 Auxiliary equipments

Type	Model / Part #	S/N	Manufacturer
Note PC	15U50P	102QCNL575263	LG Electronics Co.,Ltd.
Adapter	A18-065N3A	CNYAAG19034C 291011S28738	Chicony Power Technology (Chongqing) Co.,Ltd.

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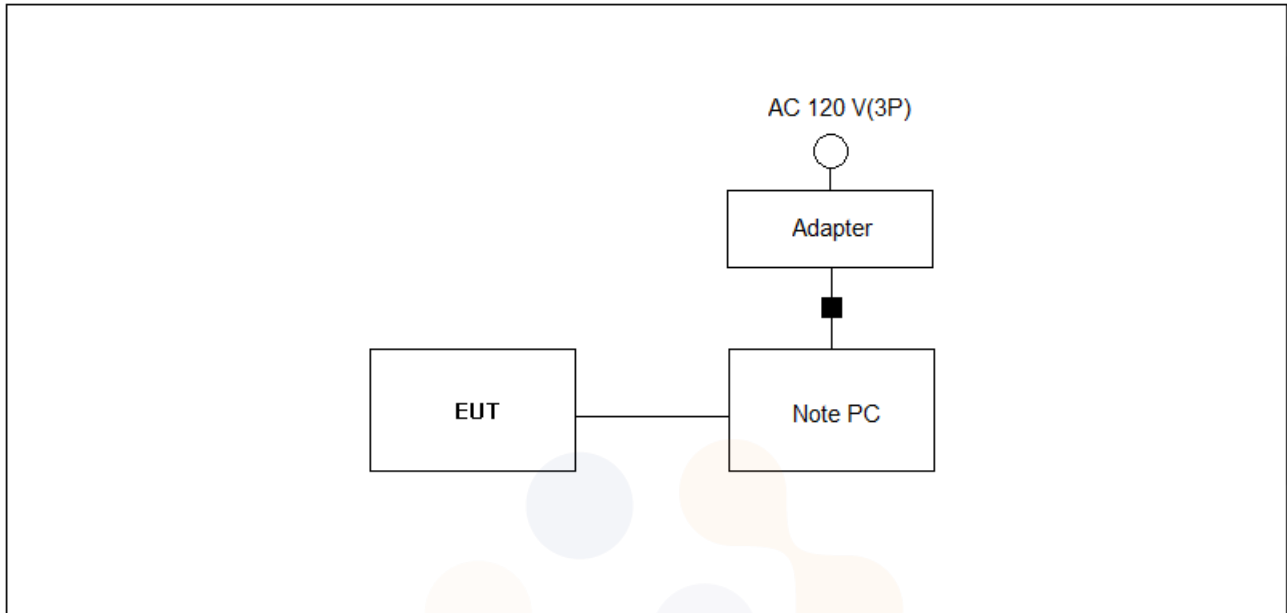
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4.4 Test configuration



	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT	-	Note PC	USB	1.8	Unshield
2	Note PC	DC In	Adapter	DC Out	1.8	Unshield (Core 1 EA)
3	Adapter	Power	AC Main	-	0.8	Unshield

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4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
#1	Fingerprint scanning mode.



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. 04. 22				
Temperature (°C)	24.0 °C	Humidity (% R.H.)	28.4 % R.H.	Pressure (kPa)	100.9 kPa
Remarks	Pass				

6.1.1 Limits of conducted emissions measurement

AC main

Frequency [MHz]	Class A (dB(μ V))		Class B (dB(μ 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(μV)] = Reading QP/CAV[dB(μV)] + 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	2023.01.20	<input type="checkbox"/>
Two Line V-Network	ENV216	102579	R&S	2022.05.21	<input type="checkbox"/>
LISN	ESH3-Z5	862770/025	R&S	2023.04.22	<input type="checkbox"/>
EMI Test Receiver	ESCI	100374	R&S	2022.07.08	<input checked="" type="checkbox"/>
Two Line V-Network	ENV216	102580	R&S	2022.05.24	<input checked="" type="checkbox"/>
Two Line V-Network	ENV216	101718	R&S	2022.07.08	<input type="checkbox"/>
EMI Test Receiver	ESCI	100154	R&S	2023.04.22	<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"/>
LISN	NNLK8121	NNLK8121-609	SCHWARZBECK	2022.07.08	<input type="checkbox"/>
PULSE LIMITER	ESH3-Z2	357.8810.52	R&S	2022.07.09	<input type="checkbox"/>
Artificial Hand	FCC-AH-1	44	FCC	-	<input type="checkbox"/>
Artificial Hand	FCC-AH-1	45	FCC	-	<input type="checkbox"/>

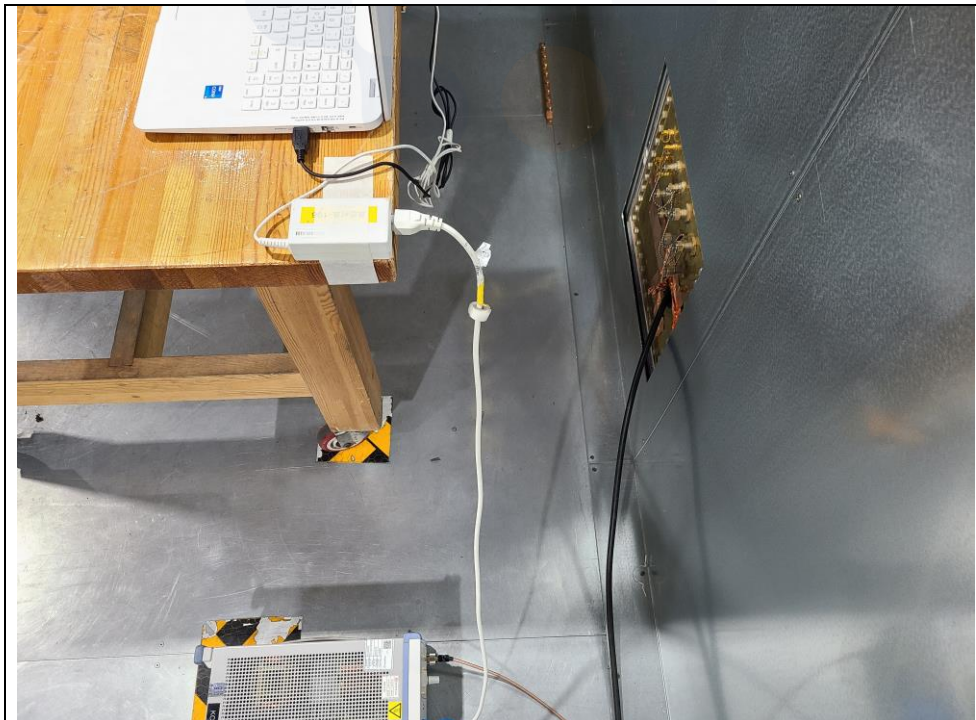
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6.1.4 Photographs of test setup



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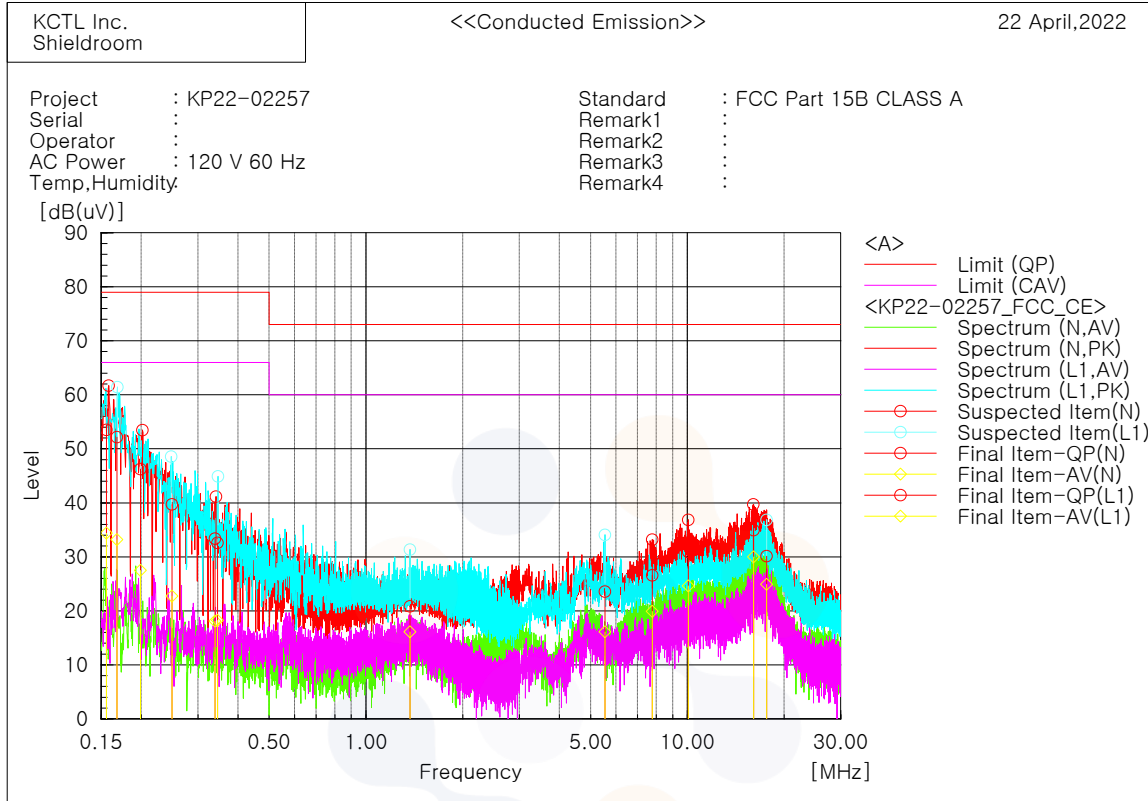
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6.1.5 Conducted emissions measurement result

* 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	0.15563	43.7	24.6	9.8	53.5	34.4	79.0	66.0	25.5	31.6
2	0.19873	36.4	17.7	9.8	46.2	27.5	79.0	66.0	32.8	38.5
3	0.3392	23.6	8.3	9.8	33.4	18.1	79.0	66.0	45.6	47.9
4	7.77473	16.8	10.1	9.8	26.6	19.9	73.0	60.0	46.4	40.1
5	10.06606	21.1	14.8	9.8	30.9	24.6	73.0	60.0	42.1	35.4
6	16.06206	25.0	20.1	9.9	34.9	30.0	73.0	60.0	38.1	30.0

--- 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	0.16789	42.2	23.2	10.0	52.2	33.2	79.0	66.0	26.8	32.8
2	0.24904	30.0	13.0	9.7	39.7	22.7	79.0	66.0	39.3	43.3
3	0.34519	22.8	8.4	9.8	32.6	18.2	79.0	66.0	46.4	47.8
4	1.37076	11.0	6.3	9.8	20.8	16.1	73.0	60.0	52.2	43.9
5	5.53938	13.8	6.4	9.7	23.5	16.1	73.0	60.0	49.5	43.9
6	17.64253	20.2	15.0	9.9	30.1	24.9	73.0	60.0	42.9	35.1

6.2 Radiated Emission

Testing voltage	120 V, 60 Hz				
Test facility	10 m Chamber				
Test distance	10 m				
Date	2022. 04. 21				
Temperature (°C)	19.3 °C	Humidity (% R.H.)	36.8 % R.H.	Pressure (kPa)	100.8 kPa
Remarks	Pass				

6.2.1 Limits of radiated emission measurement

Limits below 1 GHz

Frequency [MHz]	Class A (dB(μ V/m)) @ 10 m	Class B (dB(μ V/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(μ V/m))	Average limit (dB(μ V/m))	Peak limit (dB(μ V/m))	Average limit (dB(μ V/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	ESCI 7	R&S	100872	2023.03.11	<input checked="" type="checkbox"/>
Amplifier	310N	SONOMA	353132	2022.07.08	<input checked="" type="checkbox"/>
ATTENUATOR	8491B 6dB	KEYSIGHT	MY39270721	2022.07.08	<input checked="" type="checkbox"/>
Bi-Log Antenna	CBL 6112D	TESEQ	40522	2024.03.03	<input checked="" type="checkbox"/>
Preamplifier	8449B	3008A00530	HP	2022.07.08	<input type="checkbox"/>
Horn Antenna	3115	9012-3602	EMCO	2023.03.24	<input type="checkbox"/>

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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

$$\text{Margin (QP)} = \text{Limit (QP)} - \text{Results (QP)}$$

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

$$\text{Margin (PK/CAV)} = \text{Limit (QP/CAV)} - \text{Results (QP/CAV)}$$

Note1) PK : Abbreviation of Peak

Note2) CAV : Abbreviation of CISPR Average

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

The result is

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

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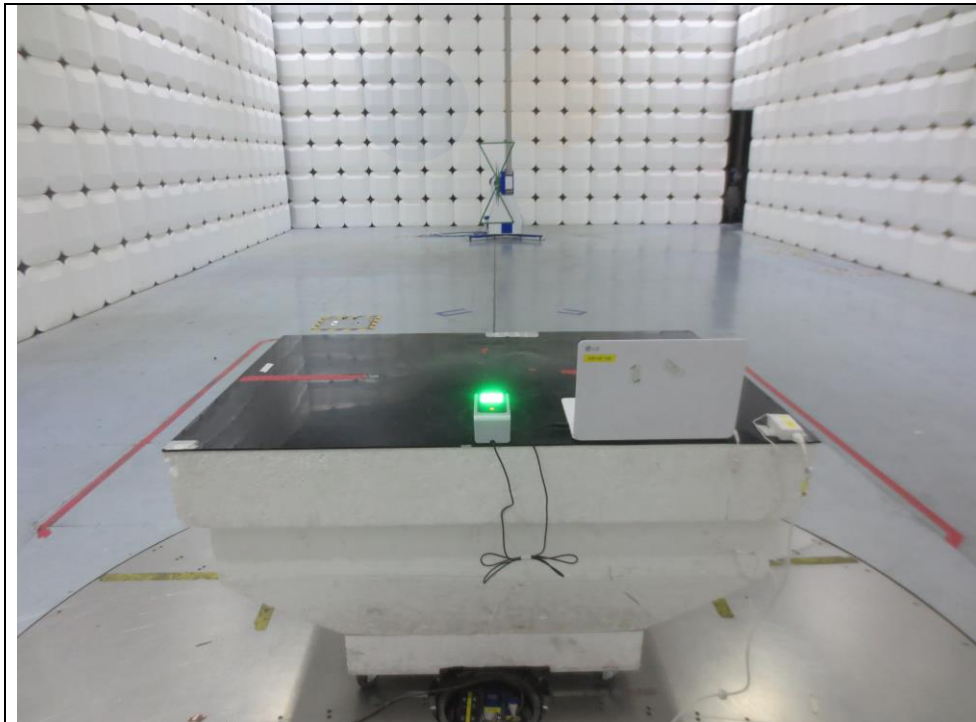
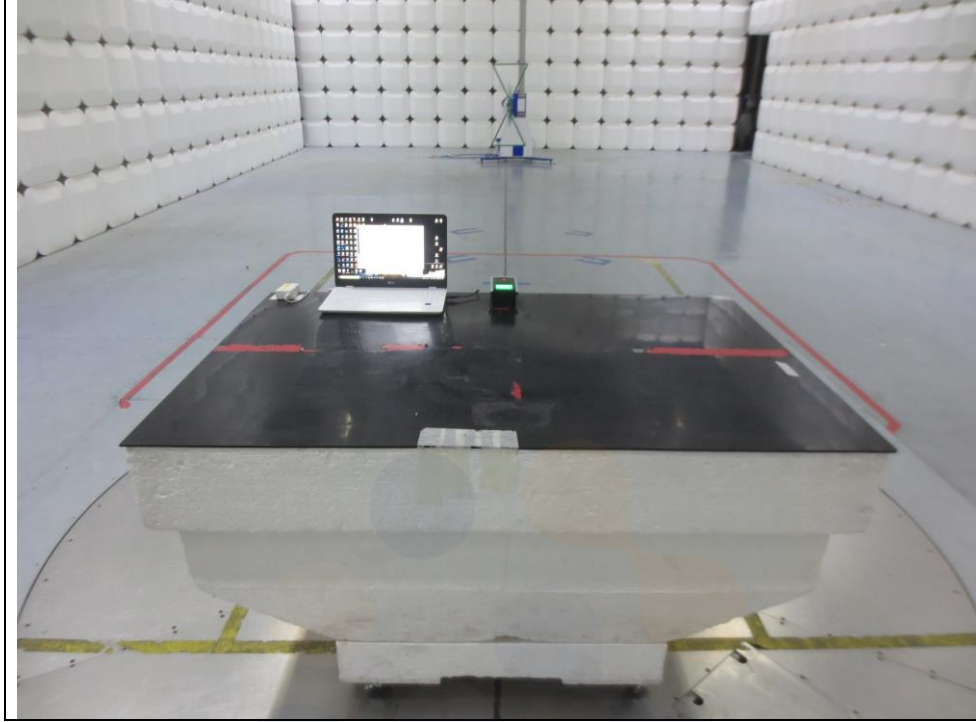
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6.2.5 Photographs of test setup

* 30 MHz ~ 1 GHz



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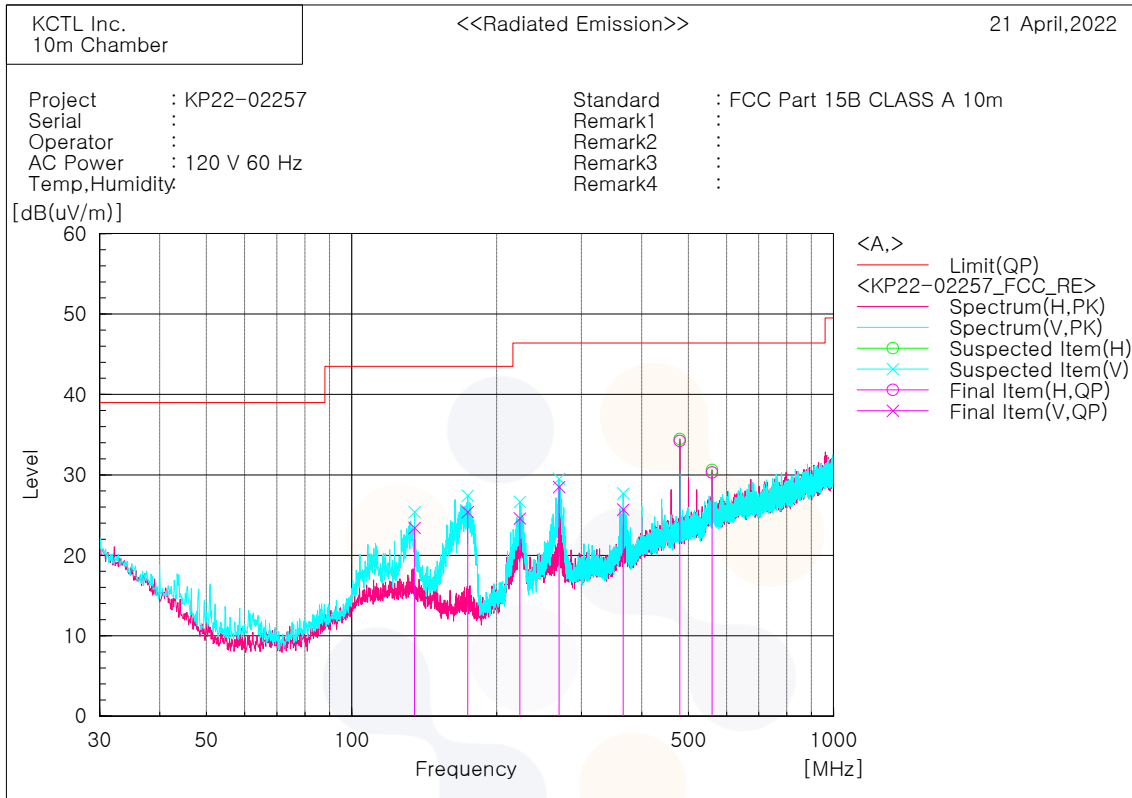


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6.2.6 Radiated emission measurement result

* 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	135.004	V	34.9	-11.5	23.4	43.5	20.1	117.0	24.0
2	174.165	V	39.1	-13.7	25.4	43.5	18.1	105.0	54.0
3	223.393	V	37.6	-13.0	24.6	46.4	21.8	100.0	348.0
4	269.591	V	37.7	-9.2	28.5	46.4	17.9	100.0	170.0
5	366.224	V	32.3	-6.6	25.7	46.4	20.7	103.0	170.0
6	479.958	H	37.8	-3.6	34.2	46.4	12.2	115.0	121.0
7	559.983	H	31.8	-1.5	30.3	46.4	16.1	136.0	96.0

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7. EUT photographs

Front View



Rear View



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Left View



Right View



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Inside

