

EMC TEST REPORT

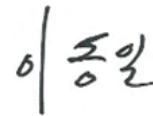
Test Report No. : KES-EM-23T0315
Date of Issue : Apr. 12, 2023
Product name : FACEPASS
Model/Type No. : FE-500
Variant Mode : FE-500L, FE-600, FE-400 , FE-500S , FE-600LE , FE-400F
Applicant : KJTECH CO.,LTD
Applicant Address : 703ho, 3rd Dongyung Venturestel, 45 Deokchon-ro Manangu
Anyang-si Gyeonggido Korea
Manufacturer : KJTECH CO.,LTD
Manufacturer Address : 703ho, 3rd Dongyung Venturestel, 45 Deokchon-ro Manangu
Anyang-si Gyeonggido Korea
Date of Receipt : Jan. 05, 2023
Test date : Mar. 13, 2023 ~ Apr. 06, 2023
Test Results : **In Compliance** **Not in Compliance**

Tested by



Dong Hyun, Won
EMC Test Engineer

Reviewed by



Dong Il, Lee
EMC Technical Manager

This test report is not related to KS Q ISO/IEC 17025 and KOLAS.



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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Apr. 12, 2023	KES-EM-23T0315	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Item		Issue
Internal highest clock frequency		24 MHz
Frequency		RFID (13.56 MHz)
I/O Port		DC Jack x 1, RJ-45 x 1, 2 Pin (Button) x 1, 2 Pin (DoorLock) x 1, 2 Pin (DC IN) x 1
Power		DC 12 V (Adapter) / DC 12 V
Function	Product Features	Face recognition Controller
	Wireless Function	RFID

1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

AC 230 V, 50 Hz DC 12 V

1.2 Variant Model Differences

Derivative models are simply customer requests for marketing purposes and do not represent any hardware or circuitry differences in the product.

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
FACEPASS	FE-500	-	KJTECH CO.,LTD	EUT
Adapter	KPL-050F-VI	-	Channel Well Technology (Guangzhou) Co.,Ltd.	MSIP-REM-CWt-KPL066F

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
DoorLock	ML200 S L D	-	VGSE®	-
Button	-	-	-	-
Notebook	P95G001	8KM8HT2	DELL INC.	-
Notebook Adapter	HA65NM130	-	Chicony Power Technology (Suzhou)Co.,Ltd.	-

1.6 External I/O Cabling

■ Adapter Mode, DC Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
FACEPASS (EUT)	DC Jack	Adapter (EUT)	Line	1.5	U
	2 Pin	DC Power	2 Pin	3.8	U
	2 Pin	DoorLock	2 Pin	4.0	U
	2 Pin	Button	2 Pin	4.0	U
	RJ-45	Notebook	RJ-45	3.5	U
Notebook	DC Jack	Notebook Adapter	Line	2.0	U

* Unshielded=U, Shielded=S

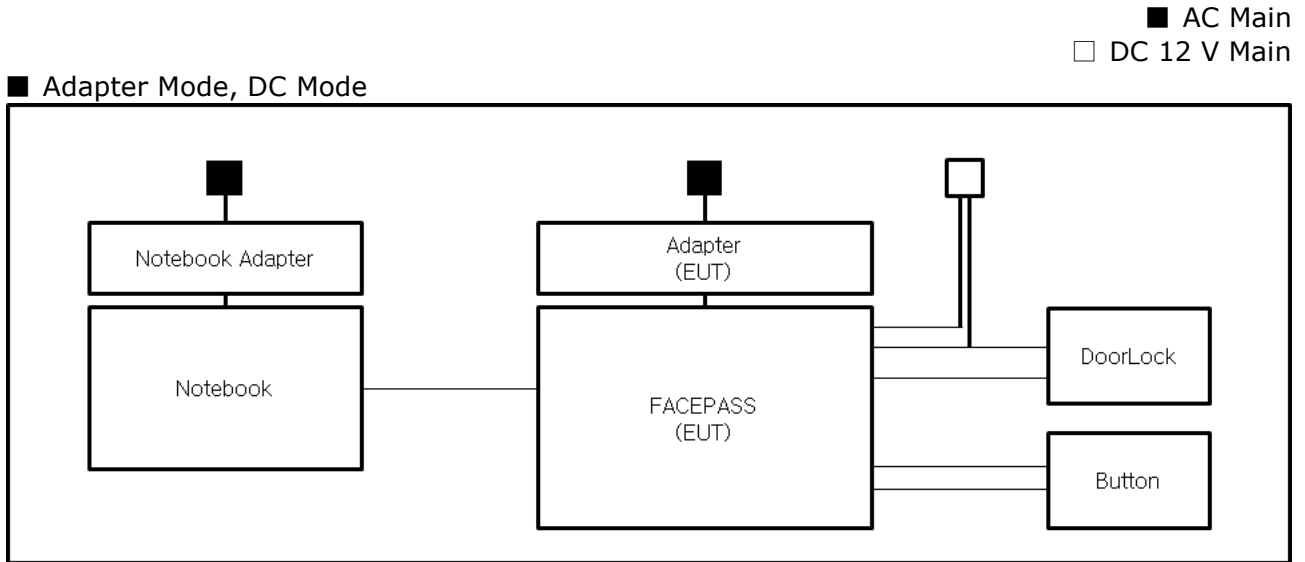
1.7 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

Test mode	operating
- Adapter Mode - DC Mode	Checked the connection status through DoorLock Open Normal operation was confirmed through the Ping Test on the Notebook.

EUT Test operating S/W		
Name	Version	Manufacture Company
-	-	-

1.8 Configuration



1.9 Remarks when standards applied

N/A







1.9 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.

1.10 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Korea, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

1.11 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Anechoic Chamber Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298
JAPAN	VCCI	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)	 C-20136, T-20137, R-20181, G-20176
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0004

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2.0 Test Regulations

The emissions tests were performed according to following regulations:

EMC – Directive 2014/30/EU

EN IEC 55014-1:2021

EN IEC 55014-2:2021

Category I

Category II

Category III

Category IV

Category V

EN IEC 61000-3-2:2019

EN 61000-3-3:2013/A1:2019

2.1 Disturbance voltage(Mains Ports)

Test Date

Mar. 13, 2023 / Apr. 06, 2023

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	11, 11, 2023
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	11, 10, 2023
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	11, 10, 2023
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023

Test Conditions

Test Date:	Mar. 13, 2023	Apr. 06, 2023
Temperature:	(23,4 ± 0,1) °C	(24,4 ± 0,1) °C
Relative Humidity:	(44,1 ± 0,1) % R.H.	(44,1 ± 0,1) % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- PASS
 NOT PASS
 NOT APPLICABLE

RemarksSee Appendix A for test data.

2.2 Disturbance voltage(Auxiliary ports)

Test Date

Apr. 06, 2023

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	11, 11, 2023
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	11, 10, 2023
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	11, 10, 2023
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023
<input checked="" type="checkbox"/>	HIGH VOLTAGE PROBE	TK9420	SCHWARZBECK	9420439	03, 03, 2024

Test Conditions

Temperature: (24,4 ± 0,1) °C

Relative Humidity: (44,1 ± 0,1) % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- PASS
 NOT PASS
 NOT APPLICABLE

Remarks

See Appendix A for test data.

2.3 Disturbance voltage(Wired network ports)

Test Date

Mar. 13, 2023 / Apr. 06, 2023

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	11, 11, 2023
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	11, 10, 2023
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	11, 10, 2023
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023
<input checked="" type="checkbox"/>	8-WIRE ISN CAT3,5	ENY81	R & S	100174	11, 22, 2023
<input type="checkbox"/>	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	11, 22, 2023

Test Conditions

Test Date:	Mar. 13, 2023	Apr. 06, 2023
Temperature:	(23,4 ± 0,1) °C	(24,4 ± 0,1) °C
Relative Humidity:	(44,1 ± 0,1) % R.H.	(44,1 ± 0,1) % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- PASS
- NOT PASS
- NOT APPLICABLE

Remarks

See Appendix A for test data.

2.4 Disturbance voltage(Clicks)

Test Date

Mar. 14, 2023

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	CLICK METER SOFTWARE CMS FOR DDA55	AFJ	4.19 (DDA55+)	-
<input checked="" type="checkbox"/>	CLICK ANALYZER	DDA55+	AFJ INSTRUMENTS	14042211198	03, 21, 2024
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101786	01, 18, 2024
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101137	01, 18, 2024

Test Conditions

Temperature: (24,0 ± 0,2) °C

Relative Humidity: (43,3 ± 0,1) % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- PASS
 NOT PASS
 NOT APPLICABLE

Remarks

See Appendix A for test data.

2.5 Disturbance power measurement(30 MHz ~ 300 MHz)

Test Date

N/A

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	11, 11, 2023
<input type="checkbox"/>	ABSORBING CLAMP	MDS21	R & S	100389	03, 03, 2024

Test Conditions

Temperature: °C

Relative Humidity: % R.H.

Frequency Range of Measurement

30 MHz to 300 MHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

- PASS
 NOT PASS
 NOT APPLICABLE

Remarks30 MHz ~ 1 000 MHz Radiated disturbance test is not applied.

2.6 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Mar. 14, 2023

Test Location

SEMI ANECHOIC CHAMBER #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	R & S	100551	03, 21, 2024
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 10, 2023
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 17, 2024
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	32173	03, 03, 2024
<input checked="" type="checkbox"/>	COMMON MODE ABSORPTION DEVICE	CMAD1614	SCHWARZBECK	00142	01, 18, 2024

Test Conditions

Temperature: (23,3 ± 0,1) °C
Relative Humidity: (43,2 ± 0,1) % R.H.

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

- PASS
 NOT PASS
 NOT APPLICABLE

Remarks

See Appendix A for test data.

2.7 Harmonic Current Emissions

Test Date

Mar. 16, 2023

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	net.control	EM TEST	2.1.4	-
<input checked="" type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	03, 27, 2024
<input checked="" type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (23,7 ± 0,1) °C

Relative Humidity: (43,2 ± 0,1) % R.H.

Classification of Equipment for Harmonic Current Emissions

- Class A
- Class B
- Class C(Below 25 W)
- Class C(Above 25 W)
- Class D

Test Results

The requirements are:

- PASS
- NOT PASS
- NOT APPLICABLE

Remarks

See Appendix A for test data.

2.8 Voltage Fluctuations and Flicker

Test Date

Mar. 16, 2023

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	net.control	EM TEST	2.1.4	-
<input checked="" type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	03, 27, 2024
<input checked="" type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (23,7 ± 0,1) °C

Relative Humidity: (43,2 ± 0,1) % R.H.

Test Results

The requirements are:

- PASS
- NOT PASS
- NOT APPLICABLE

Remarks

See Appendix A for test data.

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

General performance criteria

A functional description and a definition of performance criteria, during or as a consequence of the EMC testing, shall be provided by the manufacturer and noted in the test report, based on the following criteria.

Performance criterion A

The apparatus shall continue to operate as intended during the test.

No degradation of performance or loss of function is allowed below a performance level

(or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B

The apparatus shall continue to operate as intended after the test.

No degradation of performance or loss of function is allowed below a performance level

(or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended.

During the test, degradation of performance is allowed, however. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C

Temporary loss of function is allowed, provided the function is selfrecoverable

or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

3.1 Electrostatic discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Mar. 16, 2023

Test Location

EMS-ESD: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	ESD SIMULATOR	ESS-2000	Noise Ken	ESS01Z0454	01, 31, 2024
<input checked="" type="checkbox"/>	HCP	-	KES	-	-
<input checked="" type="checkbox"/>	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: (23,8 ± 0,1) °C
 Relative Humidity: (43,8 ± 0,1) % R.H.
 Atmospheric Pressure: (100,4 ± 0,1) kPa

Test Specifications

Discharge Factor: ≥ 1 s
 Discharge Impedance: 330 ohm / 150 pF
 Kind of Discharge: Air, Contact (direct and indirect)
 Polarity: Positive and Negative
 Number of Discharge: 10 at all locations for Air discharge
 10 at all locations for Contact discharge

Discharge Voltage:	Contact	Air	HCP	VCP
	<input checked="" type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV
	<input checked="" type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 4 kV
	<input type="checkbox"/> 6 kV	<input type="checkbox"/> 6 kV	<input type="checkbox"/> 6 kV	<input type="checkbox"/> 6 kV
	<input type="checkbox"/> 8 kV	<input checked="" type="checkbox"/> 8 kV	<input type="checkbox"/> 8 kV	<input type="checkbox"/> 8 kV
	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV

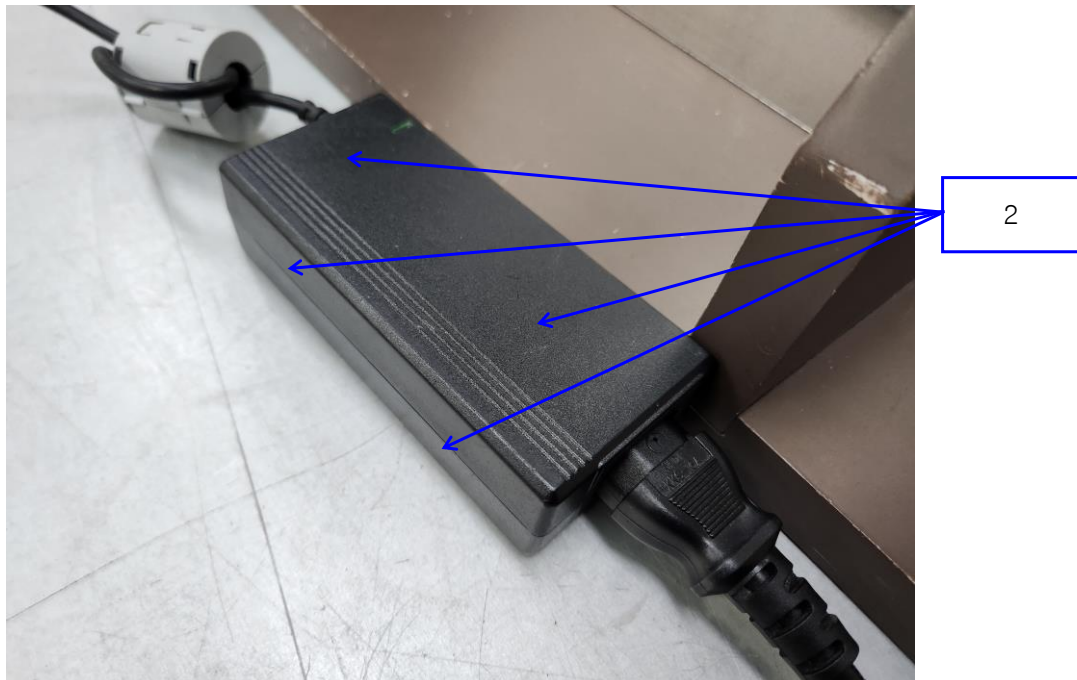
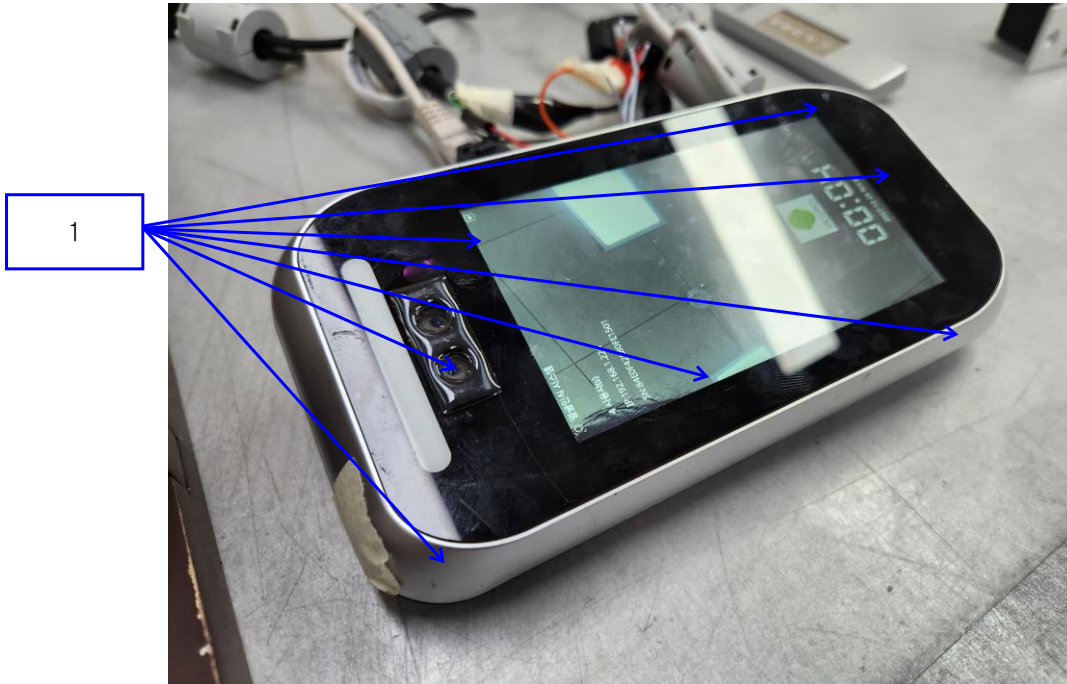
Notes: HCP: Horizontal coupling plane
 VCP: Vertical coupling plane

Required Performance Criteria: B

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Location of Discharge:

Air
Contact



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Test Data

Indirect Discharge

No.	Test Point	Discharge Method	Performance Criteria	Results	Remarks
1	HCP Contact	Contact Discharge	B	A	-
2	VCP Contact	Contact Discharge	B	A	-

Direct Discharge

No.	Test Point	Discharge Method	Performance Criteria	Results	Remarks
1	Enclosure 1	Air Discharge	B	A	-
2	Adapter	Air Discharge	B	A	-

Note: "Blank" = Not performed

Observations:

- A - No degradation of function
- B - Distortion/Error of function (self-recoverable)
- C - Loss of function

Test Results

- PASS Required Performance Criteria
- NOT PASS Required Performance Criteria
- NOT APPLICABLE

Remarks

N/A

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3.2 Radio frequency electromagnetic fields

Reference Standard

EN IEC 61000-4-3:2020

Test Date

Mar. 17, 2023

Test Location

EMS-RS: Semi Anchoic Chamber #2 Semi Anechoic Chamber #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	EMC32	R & S	10.10.02	-
<input checked="" type="checkbox"/>	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	08, 01, 2023
<input checked="" type="checkbox"/>	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
<input checked="" type="checkbox"/>	POWER METER	E4419B	Agilent	GB40203000	03, 21, 2024
<input checked="" type="checkbox"/>	AVERAGE POWER SENSOR	E9301A	Agilent	MY52170007	03, 21, 2024
<input checked="" type="checkbox"/>	AVERAGE POWER SENSOR	E9301A	Agilent	MY41498669	03, 21, 2024
<input checked="" type="checkbox"/>	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
<input type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 06, 2024

Test Conditions

Temperature: (23,7 ± 0,2) °C
 Relative Humidity: (43,5 ± 0,1) % R.H.
 Atmospheric Pressure: (100,5 ± 0,1) kPa

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Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: 3 m

Field Strength: 3 V/m

Frequency Range: 80 MHz to 1 GHz 80 MHz to 6 GHz

Modulation: AM, 80 %, 1 kHz sine wave

Frequency step: 1 % step

Dwell Time: 1 s 3 s

of Sides Radiated: 4

Required Performance Criteria: A

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Test Data

Side Exposed	Performance Criteria	Results	
		Horizontal	Vertical
Front	A	A	A
Right	A	A	A
Back	A	A	A
Left	A	A	A

Note: "Blank" = Not performed

Observations:

- A - No degradation of function
- B - Distortion/Error of function (self-recoverable)
- C - Loss of function

Test Results

- PASS Required Performance Criteria
- NOT PASS Required Performance Criteria
- NOT APPLICABLE

Remarks

N/A

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3.3 Fast transients

Reference Standard

EN 61000-4-4:2012

Test Date

Mar. 15, 2023 / Apr. 05, 2023

Test Location

EMS-EFT: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	EM TEST	5.4.8	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 28, 2023
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 29, 2023
<input checked="" type="checkbox"/>	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	11, 28, 2023

Test Conditions

Test Date:	Mar. 15, 2023	Apr. 05, 2023
Temperature:	(23,6 ± 0,1) °C	(23,7 ± 0,1) °C
Relative Humidity:	(44,0 ± 0,1) % R.H.	(43,7 ± 0,1) % R.H.
Atmospheric Pressure:	(100,9 ± 0,1) kPa	(100,7 ± 0,1) kPa

Test Specifications

Pulse Amplitude & Polarity: (Power Lines)	<input type="checkbox"/> ± 0.5 kV	<input checked="" type="checkbox"/> ± 1.0 kV
Pulse Amplitude & Polarity: (Signal Lines)	<input checked="" type="checkbox"/> ± 0.5 kV	
Burst Period:	<input checked="" type="checkbox"/> 300 ms	<input type="checkbox"/> 2 s
Repetition Rate:	<input checked="" type="checkbox"/> 5 kHz	
Duration of Test Voltage:	<input checked="" type="checkbox"/> 2 min	
Required Performance Criteria:	<input checked="" type="checkbox"/> B	

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Test Data

■ Adapter Mode

Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
L	B	A	A
N	B	A	A
PE	B	A	A
L – N	B	A	A
L – PE	B	A	A
N – PE	B	A	A
L – N – PE	B	A	A

Input d.c. power ports – Coupling/Decoupling Network used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	B	-	-

Signal ports, control ports and wired network ports – Coupling Clamp used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
RJ-45	B	A	A
2 Pin (Button)	B	A	A
2 Pin (DoorLock)	B	A	A

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DC Mode

Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	B	-	-

Input d.c. power ports – Coupling/Decoupling Network used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
L1	B	A	A
L2	B	A	A
PE	B	-	-
L1 – L2	B	A	A
L1 – PE	B	-	-
L2 – PE	B	-	-
L1 – L2 – PE	B	-	-

Signal ports, control ports and wired network ports – Coupling Clamp used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
RJ-45	B	A	A
2 Pin (Button)	B	A	A
2 Pin (DoorLock)	B	A	A

Note: “Blank” = Not performed

Observations:

- A – No degradation of function
- B – Distortion/Error of function (self-recoverable)
- C – Loss of function

Test Results

- PASS Required Performance Criteria
- NOT PASS Required Performance Criteria
- NOT APPLICABLE

Remarks

N/A

3.4 Surges

Reference Standard

EN 61000-4-5:2014+A1:2017

Test Date

Mar. 15, 2023

Test Location

EMS-Surge: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	EM TEST	5.4.8	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 28, 2023
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 29, 2023

Test Conditions

Temperature: (23,6 ± 0,1) °C
 Relative Humidity: (44,0 ± 0,1) % R.H.
 Atmospheric Pressure: (100,9 ± 0,1) kPa

Test Specifications

AC Power Lines

Source Impedance: 12 ohm for common mode and 2 ohm for differential mode

Surge Amplitude : Common Mode
 2,0 kV
Differential Mode
 1,0 kV

Number of Surges: 5 surges per angle

Angle: 90°, 270°

Polarity: Positive & Negative

Repetition Rate: 1 surge per min 1 surge per 30 sec.

Required Performance Criteria: B

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Test Data

Line to Line - Differential Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
L - N	B	A	A

Line to Earth - Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
L - PE	B	A	A
N - PE	B	A	A

Note: "Blank" = Not performed

Observations:

- A - No degradation of function
- B - Distortion/Error of function (self-recoverable)
- C - Loss of function

Test Results

- PASS Required Performance Criteria
- NOT PASS Required Performance Criteria
- NOT APPLICABLE

Remarks

N/A

3.5 Injected currents

Reference Standard

EN 61000-4-6:2014

Test Date

Mar. 13, 2023 / Mar. 19, 2023

Test Location

EMS-CS: Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	icd.control	EM TEST	5.3.12	-
<input checked="" type="checkbox"/>	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 10, 2023
<input checked="" type="checkbox"/>	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 10, 2023
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43694	11, 10, 2023
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43697	11, 10, 2023
<input checked="" type="checkbox"/>	CDN	CDN T800	TESEQ	42800	11, 10, 2023
<input checked="" type="checkbox"/>	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 14, 2023

Test Conditions

Test Date:	Mar. 13, 2023	Mar. 19, 2023
Temperature:	(23,4 ± 0,2) °C	(23,5 ± 0,2) °C
Relative Humidity:	(44,1 ± 0,1) % R.H.	(43,1 ± 0,2) % R.H.
Atmospheric Pressure:	(100,6 ± 0,1) kPa	(100,5 ± 0,1) kPa

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Test Specifications

- Frequency range: 150 kHz to 80 MHz 150 kHz to 230 MHz
- Voltage Level: 1 Vrms 3 Vrms
- Modulation: AM, 80 %, 1 kHz sine wave
- Frequency step: 1 % step
- Dwell Time: 1 s 3 s
- Required Performance Criteria: A

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Test Data

■ Adapter Mode

Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
L - N - PE	CDN	A	A

Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	-	A	-

Signal ports, control ports and wired network ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
RJ-45	CDN	A	A
2 Pin (Button)	Clamp	A	A
2 Pin (DoorLock)	Clamp	A	A

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■ DC Mode

Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	-	A	-

Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
L1 - L2	CDN	A	A

Signal ports, control ports and wired network ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
RJ-45	CDN	A	A
2 Pin (Button)	Clamp	A	A
2 Pin (DoorLock)	Clamp	A	A

Notes: CDN = Coupling Decoupling Network
"blank" = Not performed

Observations:

- A - No degradation of function
- B - Distortion/Error of function (self-recoverable)
- C - Loss of function

Test Results

- PASS Required Performance Criteria
- NOT PASS Required Performance Criteria
- NOT APPLICABLE

Remarks

N/A

3.6 Voltage dips

Reference Standard
 EN IEC 61000-4-11:2020

Test Date
 Mar. 15, 2023

Test Location
 EMS-Voltage dip: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	EM TEST	5.4.8	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 29, 2023
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 29, 2023

Test Conditions

Temperature: (23,6 ± 0,1) °C
 Relative Humidity: (44,0 ± 0,1) % R.H.
 Atmospheric Pressure: (100,9 ± 0,1) kPa

Test Specifications

Nominal Mains Voltage(V_{NOM}): AC 230 V , 50 Hz AC 230 V , 60 Hz

Level of reduction(dip): 25 periods at 30 % reduction of V_{NOM} (50 Hz)
 10 periods at 60 % reduction of V_{NOM} (50 Hz)
 30 periods at 30 % reduction of V_{NOM} (60 Hz)
 12 periods at 60 % reduction of V_{NOM} (60 Hz)

Duration of interruption(0 % of : V_{NOM}) :
 0,5 periods (50 Hz)
 0,5 periods (60 Hz)

Required Performance Criteria: C

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Voltage dips

% reduction	Period / ms	Performance Criteria	Result
100 % dip	0,5	C	A
60 % dip	10	C	A
30 % dip	25	C	A

% reduction	Period / ms	Performance Criteria	Result
100 % dip	0,5	C	A
60 % dip	12	C	A
30 % dip	30	C	A

Observations:

- A - No response observed from EUT
- B - Unit shuts down then automatically restarts when full voltage is restored.
- C - Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

- PASS Required Performance Criteria
- NOT PASS Required Performance Criteria
- NOT APPLICABLE

Remarks

N/A

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APPENDIX A – TEST DATA

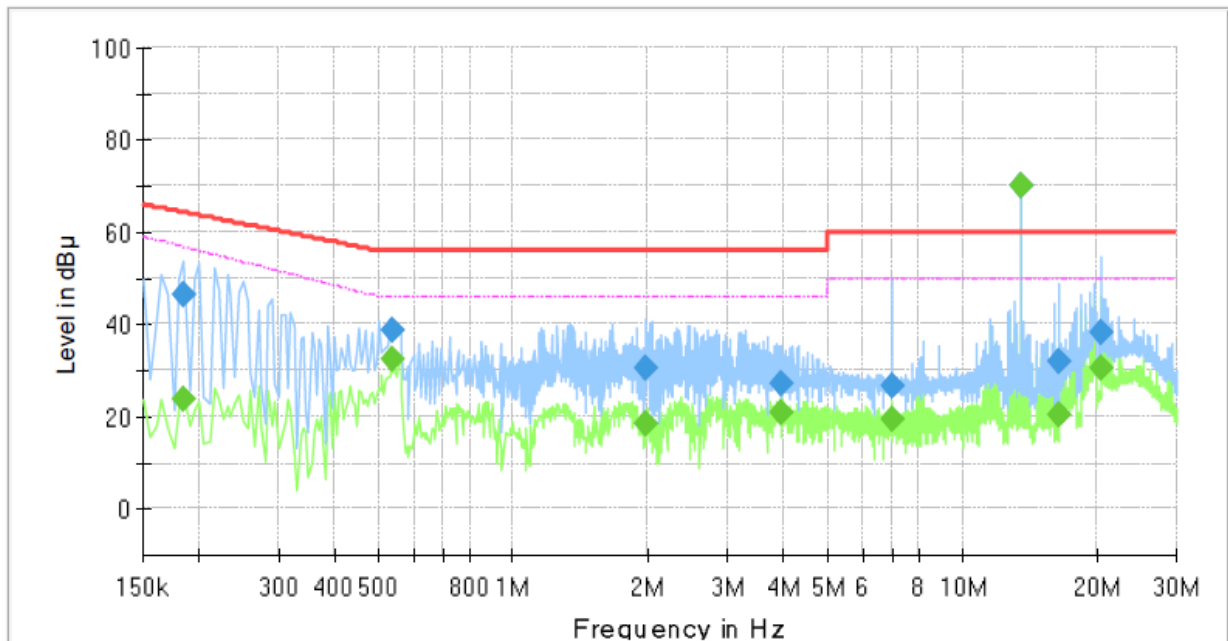
Disturbance voltage(Mains Ports)

■ Adapter Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	FE-500
Phase:	
Mode:	Adapter_H
Operator Name:	KES



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Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.185000	46.55	---	64.26	17.71	15000.0	9.000	L1	19.5
0.185000	---	23.95	56.74	32.79	15000.0	9.000	L1	19.5
0.535000	38.77	---	56.00	17.23	15000.0	9.000	L1	19.8
0.535000	---	32.51	46.00	13.49	15000.0	9.000	L1	19.8
1.970000	30.76	---	56.00	25.24	15000.0	9.000	L1	20.3
1.970000	---	18.25	46.00	27.75	15000.0	9.000	L1	20.3
3.965000	26.97	---	56.00	29.03	15000.0	9.000	L1	19.9
3.965000	---	20.87	46.00	25.13	15000.0	9.000	L1	19.9
7.005000	26.59	---	60.00	33.41	15000.0	9.000	L1	19.5
7.005000	---	19.42	50.00	30.58	15000.0	9.000	L1	19.5
13.560000	---	70.16	50.00	-20.16	15000.0	9.000	L1	20.0
13.560000	70.16	---	60.00	-10.16	15000.0	9.000	L1	20.0
16.450000	---	20.22	50.00	29.78	15000.0	9.000	L1	20.0
16.450000	31.81	---	60.00	28.19	15000.0	9.000	L1	20.0
20.280000	---	30.48	50.00	19.52	15000.0	9.000	L1	20.2
20.280000	38.20	---	60.00	21.80	15000.0	9.000	L1	20.2

* Exclusion bands

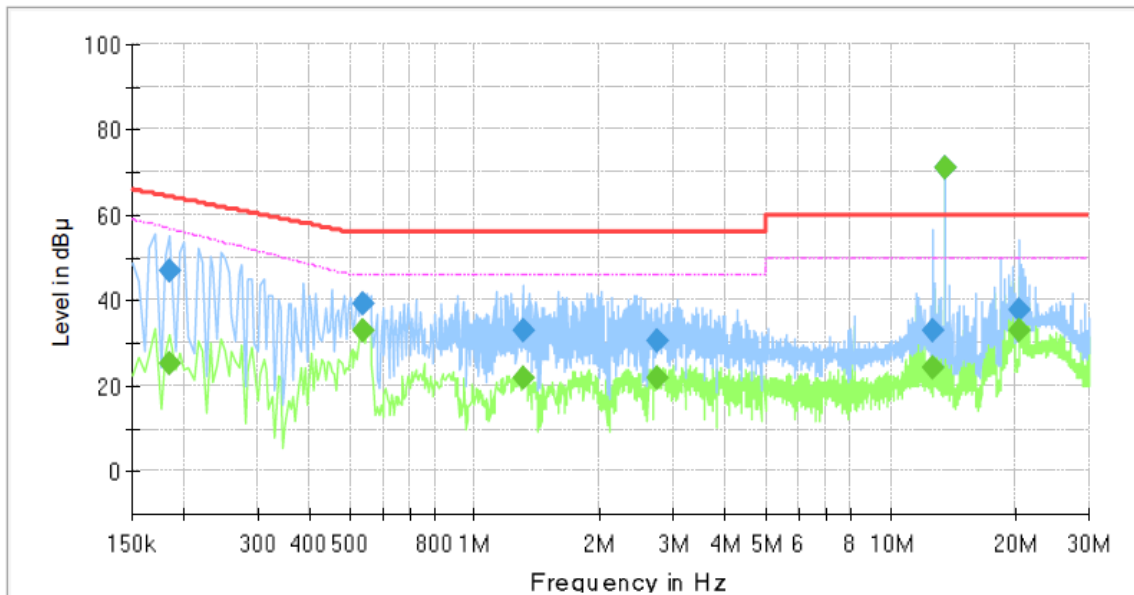
- Fundamental Frequency : 13.56 MHz

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[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	FE-500
Phase:	
Mode:	Adapter_N
Operator Name:	KES



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Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.185000	47.08	---	64.26	17.18	15000.0	9.000	N	19.5
0.185000	---	25.03	56.74	31.71	15000.0	9.000	N	19.5
0.535000	39.21	---	56.00	16.79	15000.0	9.000	N	19.8
0.535000	---	32.92	46.00	13.08	15000.0	9.000	N	19.8
1.300000	32.94	---	56.00	23.06	15000.0	9.000	N	20.2
1.300000	---	21.86	46.00	24.14	15000.0	9.000	N	20.2
2.735000	30.35	---	56.00	25.65	15000.0	9.000	N	20.2
2.735000	---	21.69	46.00	24.31	15000.0	9.000	N	20.2
12.670000	33.17	---	60.00	26.83	15000.0	9.000	N	20.0
12.670000	---	24.44	50.00	25.56	15000.0	9.000	N	20.0
13.560000	---	70.90	50.00	-20.90	15000.0	9.000	N	20.0
13.560000	70.90	---	60.00	-10.90	15000.0	9.000	N	20.0
20.300000	---	32.74	50.00	17.26	15000.0	9.000	N	20.2
20.300000	37.62	---	60.00	22.38	15000.0	9.000	N	20.2

* Exclusion bands
- Fundamental Frequency : 13.56 Mhz

◆ Calculation

QuasiPeak [dBuV] / CAverage [dBuV] = Reading Value [dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

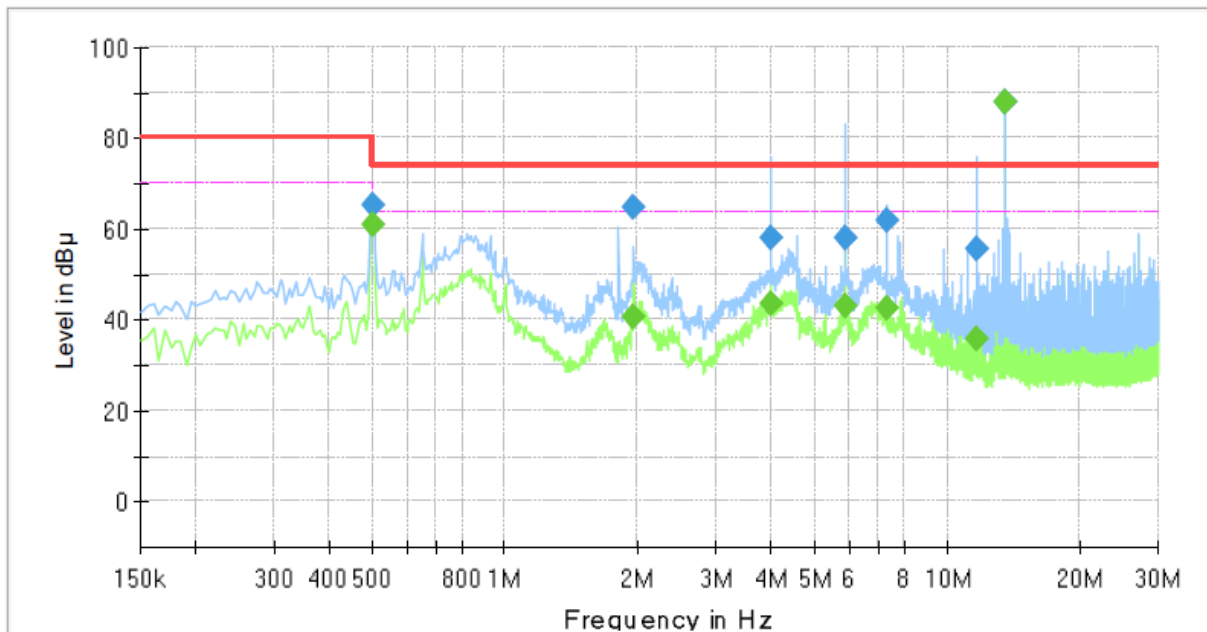
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Disturbance voltage(Auxiliary ports)

■ Adapter_Button_L1

Common Information

Test Description:	Load Port
Model No.:	FE-500
Phase :	
Mode :	Adapter_Button_L1
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.500000	65.03	---	80.00	14.97	15000.0	9.000	Single Line	39.8
0.500000	---	61.01	64.00	2.99	15000.0	9.000	Single Line	39.8
1.955000	64.96	---	74.00	9.04	15000.0	9.000	Single Line	39.8
1.955000	---	40.82	64.00	23.18	15000.0	9.000	Single Line	39.8
3.990000	57.82	---	74.00	16.18	15000.0	9.000	Single Line	39.8
3.990000	---	43.62	64.00	20.38	15000.0	9.000	Single Line	39.8
5.875000	58.00	---	74.00	16.00	15000.0	9.000	Single Line	39.9
5.875000	---	42.83	64.00	21.17	15000.0	9.000	Single Line	39.9
7.335000	61.82	---	74.00	12.18	15000.0	9.000	Single Line	39.9
7.335000	---	42.57	64.00	21.43	15000.0	9.000	Single Line	39.9
11.600000	55.80	---	74.00	18.20	15000.0	9.000	Single Line	39.9
11.600000	---	35.79	64.00	28.21	15000.0	9.000	Single Line	39.9
13.560000	---	87.78	64.00	-23.78	15000.0	9.000	Single Line	39.9
13.560000	87.77	---	74.00	-13.77	15000.0	9.000	Single Line	39.9

* Exclusion bands

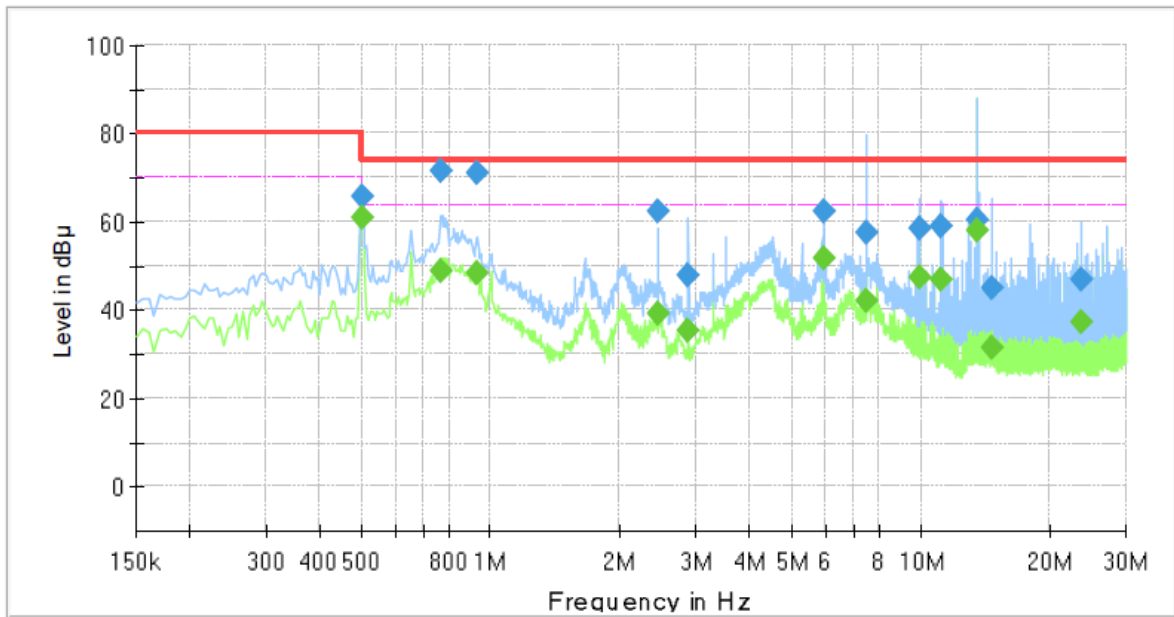
- Fundamental Frequency : 13.56 MHz

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■ Adapter_Button_L2

Common Information

Test Description:	Load Port
Model No.:	FE-500
Phase :	
Mode :	Adapter_Button_L2
Operator Name:	KES



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Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.500000	65.94	---	80.00	14.06	15000.0	9.000	Single Line	39.8
0.500000	---	61.03	64.00	2.97	15000.0	9.000	Single Line	39.8
0.765000	---	48.94	64.00	15.06	15000.0	9.000	Single Line	39.8
0.765000	71.37	---	74.00	2.63	15000.0	9.000	Single Line	39.8
0.925000	71.29	---	74.00	2.71	15000.0	9.000	Single Line	39.8
0.925000	---	48.60	64.00	15.40	15000.0	9.000	Single Line	39.8
2.445000	---	39.36	64.00	24.64	15000.0	9.000	Single Line	39.8
2.445000	62.41	---	74.00	11.59	15000.0	9.000	Single Line	39.8
2.885000	48.07	---	74.00	25.93	15000.0	9.000	Single Line	39.8
2.885000	---	35.43	64.00	28.57	15000.0	9.000	Single Line	39.8
5.925000	62.57	---	74.00	11.43	15000.0	9.000	Single Line	39.9
5.925000	---	51.58	64.00	12.42	15000.0	9.000	Single Line	39.9
7.460000	57.42	---	74.00	16.58	15000.0	9.000	Single Line	39.9
7.460000	---	42.27	64.00	21.73	15000.0	9.000	Single Line	39.9
9.885000	58.69	---	74.00	15.31	15000.0	9.000	Single Line	39.9
9.885000	---	47.21	64.00	16.79	15000.0	9.000	Single Line	39.9
11.195000	---	46.85	64.00	17.15	15000.0	9.000	Single Line	39.9
11.195000	59.07	---	74.00	14.93	15000.0	9.000	Single Line	39.9
13.550000	---	57.82	64.00	6.18	15000.0	9.000	Single Line	39.9
13.550000	60.45	---	74.00	13.55	15000.0	9.000	Single Line	39.9
14.665000	---	31.53	64.00	32.47	15000.0	9.000	Single Line	39.9
14.665000	44.90	---	74.00	29.10	15000.0	9.000	Single Line	39.9
23.745000	---	37.29	64.00	26.71	15000.0	9.000	Single Line	40.0
23.745000	46.77	---	74.00	27.23	15000.0	9.000	Single Line	40.0

* Exclusion bands

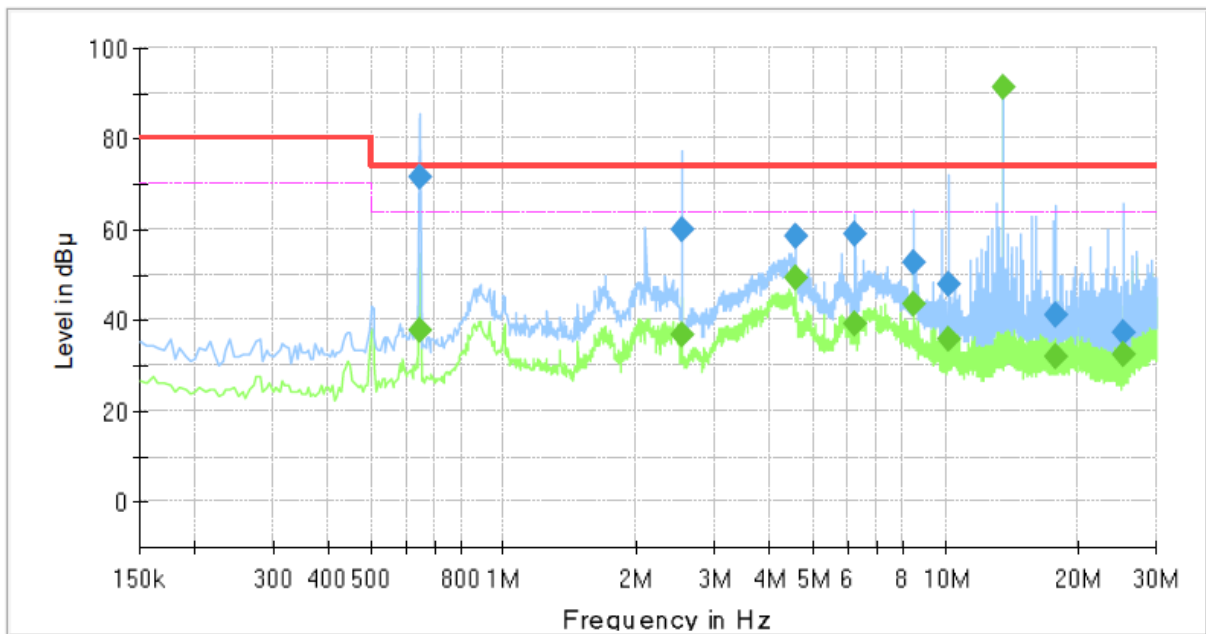
- Fundamental Frequency : 13.56 MHz

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■ Adapter_DoorLock_L1

Common Information

Test Description:	Load Port
Model No.:	FE-500
Phase :	
Mode :	Adapter_DoorLock_L1
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.645000	---	37.91	64.00	26.09	15000.0	9.000	Single Line	39.8
0.645000	71.45	---	74.00	2.55	15000.0	9.000	Single Line	39.8
2.535000	---	36.85	64.00	27.15	15000.0	9.000	Single Line	39.8
2.535000	60.13	---	74.00	13.87	15000.0	9.000	Single Line	39.8
4.565000	---	49.41	64.00	14.59	15000.0	9.000	Single Line	39.8
4.565000	58.72	---	74.00	15.28	15000.0	9.000	Single Line	39.8
6.260000	---	39.42	64.00	24.58	15000.0	9.000	Single Line	39.9
6.260000	58.83	---	74.00	15.17	15000.0	9.000	Single Line	39.9
8.500000	---	43.39	64.00	20.61	15000.0	9.000	Single Line	39.9
8.500000	52.56	---	74.00	21.44	15000.0	9.000	Single Line	39.9
10.190000	48.07	---	74.00	25.93	15000.0	9.000	Single Line	39.9
10.190000	---	35.91	64.00	28.09	15000.0	9.000	Single Line	39.9
13.560000	---	91.11	64.00	-27.11	15000.0	9.000	Single Line	39.9
17.855000	41.01	---	74.00	32.99	15000.0	9.000	Single Line	40.0
17.855000	---	31.80	64.00	32.20	15000.0	9.000	Single Line	40.0
25.295000	37.42	---	74.00	36.58	15000.0	9.000	Single Line	40.0
25.295000	---	32.63	64.00	31.37	15000.0	9.000	Single Line	40.0

* Exclusion bands

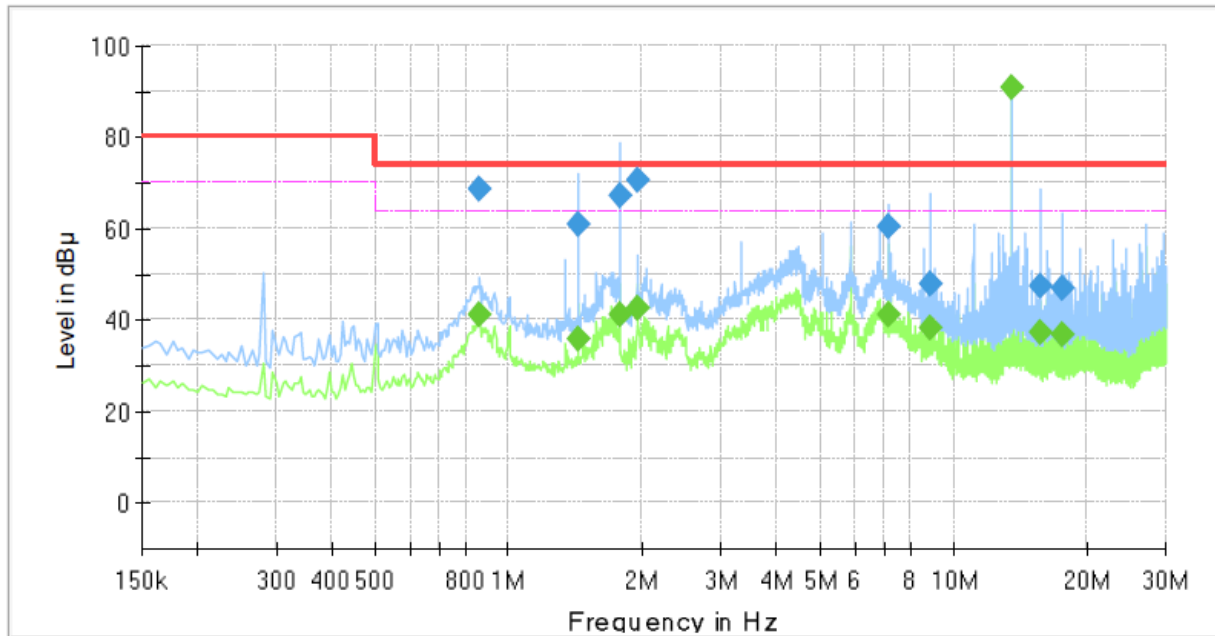
- Fundamental Frequency : 13.56 MHz

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■ Adapter_DoorLock_L2

Common Information

Test Description:	Load Port
Model No.:	FE-500
Phase :	
Mode :	Adapter_DoorLock_L2
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.860000	---	41.15	64.00	22.85	15000.0	9.000	Single Line	39.8
0.860000	68.49	---	74.00	5.51	15000.0	9.000	Single Line	39.8
1.430000	---	35.97	64.00	28.03	15000.0	9.000	Single Line	39.8
1.430000	61.09	---	74.00	12.91	15000.0	9.000	Single Line	39.8
1.775000	67.43	---	74.00	6.57	15000.0	9.000	Single Line	39.8
1.775000	---	41.31	64.00	22.69	15000.0	9.000	Single Line	39.8
1.945000	70.36	---	74.00	3.64	15000.0	9.000	Single Line	39.8
1.945000	---	42.40	64.00	21.60	15000.0	9.000	Single Line	39.8
7.155000	60.57	---	74.00	13.43	15000.0	9.000	Single Line	39.9
7.155000	---	41.21	64.00	22.79	15000.0	9.000	Single Line	39.9
8.900000	---	38.37	64.00	25.63	15000.0	9.000	Single Line	39.9
8.900000	47.80	---	74.00	26.20	15000.0	9.000	Single Line	39.9
13.560000	---	90.90	64.00	-26.90	15000.0	9.000	Single Line	39.9
15.730000	47.36	---	74.00	26.64	15000.0	9.000	Single Line	40.0
15.730000	---	37.45	64.00	26.55	15000.0	9.000	Single Line	40.0
17.515000	46.80	---	74.00	27.20	15000.0	9.000	Single Line	40.0
17.515000	---	36.62	64.00	27.38	15000.0	9.000	Single Line	40.0

* Exclusion bands
- Fundamental Frequency : 13.56 MHz

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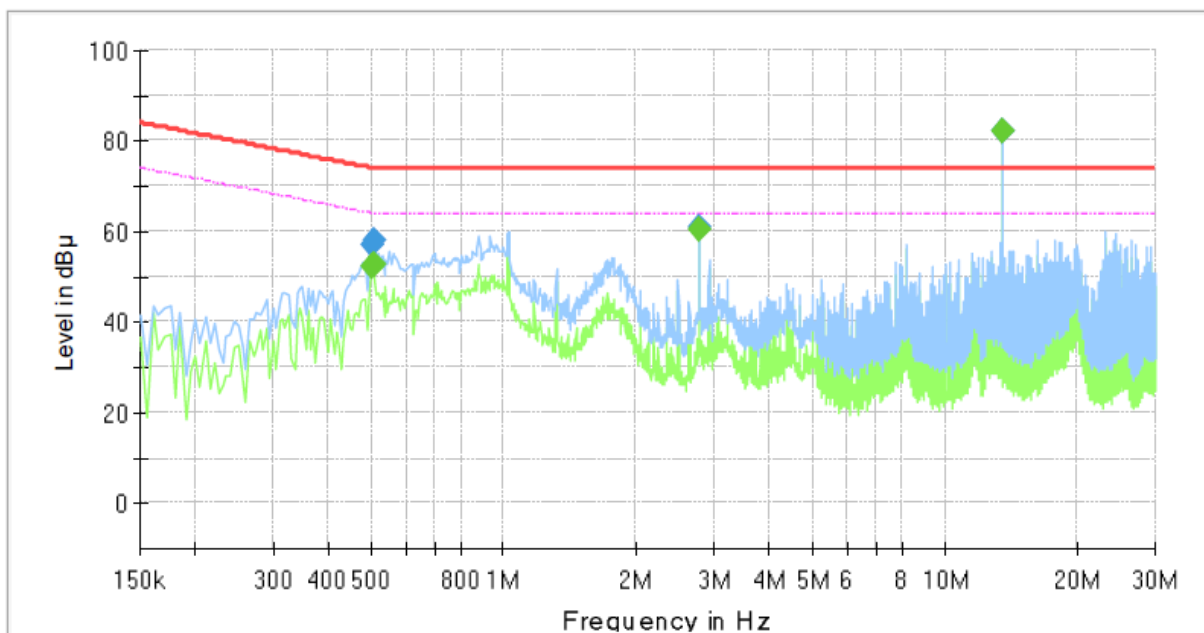
Disturbance voltage(Wired network ports)

■ Adapter Mode

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	FE-500
Mode :	Adapter_ 100 Mbps
Speed :	
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.500000	---	52.11	64.00	11.89	1000.0	9.000	Single Line	19.7
0.500000	57.22	---	74.00	16.78	1000.0	9.000	Single Line	19.7
0.505000	---	52.68	64.00	11.32	1000.0	9.000	Single Line	19.7
0.505000	57.81	---	74.00	16.19	1000.0	9.000	Single Line	19.7
2.775000	---	60.64	64.00	3.36	1000.0	9.000	Single Line	20.0
2.775000	60.74	---	74.00	13.26	1000.0	9.000	Single Line	20.0
13.560000	---	81.98	64.00	-17.98	1000.0	9.000	Single Line	19.7
13.560000	81.98	---	74.00	-7.98	1000.0	9.000	Single Line	19.7

* Exclusion bands

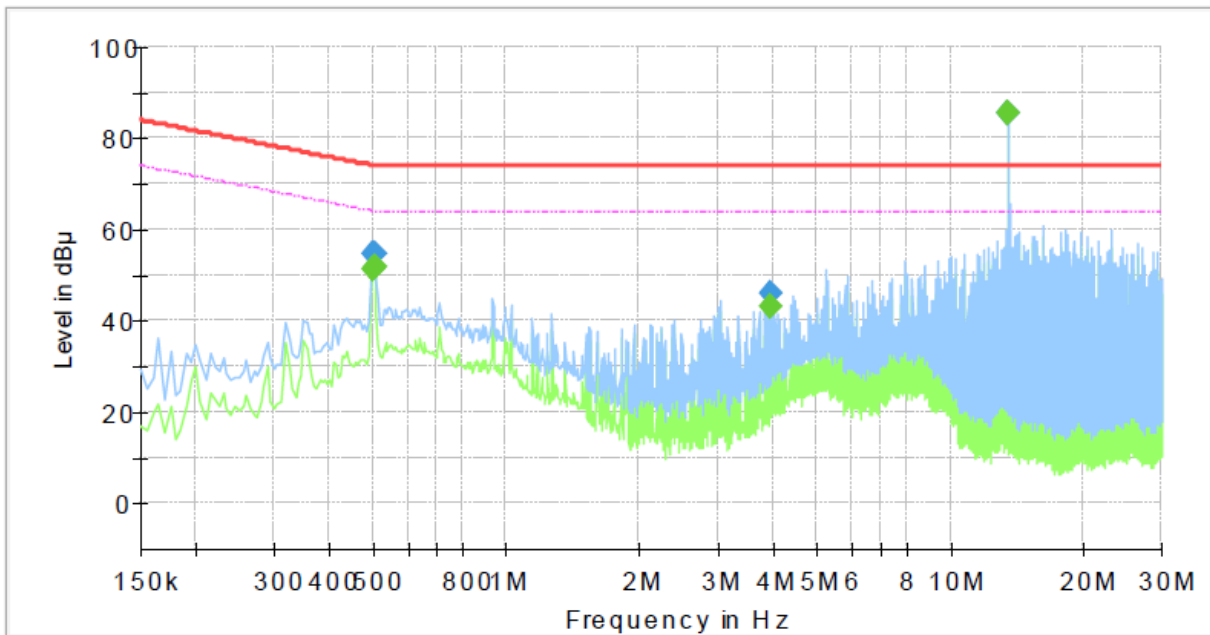
- Fundamental Frequency : 13.56 MHz

■ DC Mode

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	FE-500
Mode :	DC_ 100 Mbps
Speed :	
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.500000	---	51.07	64.00	12.93	1000.0	9.000	Single Line	19.7
0.500000	54.56	---	74.00	19.44	1000.0	9.000	Single Line	19.7
0.505000	---	51.94	64.00	12.06	1000.0	9.000	Single Line	19.7
0.505000	54.73	---	74.00	19.27	1000.0	9.000	Single Line	19.7
3.955000	---	43.19	64.00	20.81	1000.0	9.000	Single Line	19.7
3.955000	45.95	---	74.00	28.05	1000.0	9.000	Single Line	19.7
13.560000	---	85.47	64.00	-21.47	1000.0	9.000	Single Line	19.7
13.560000	85.48	---	74.00	-11.48	1000.0	9.000	Single Line	19.7

* Exclusion bands

- Fundamental Frequency : 13.56 Mhz

◆ Calculation

QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

Corr. : Correction values (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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Disturbance voltage(Clicks)



TEST REPORT

TEST PASS

14/3/2023 18:12:41

Title **Default Test** Time Test **02:00:00.00**

Required Executed by

Description

Model FE-500

Type Adapter_N SN

Report

Mode **Click Measurements**

Type of Eut **CLICK**

Rx 150 kHz Att. [dB] **10** Rx 500 kHz Att. [dB] **10**

Rx 1.4 MHz Att. [dB] **10** Rx 30 MHz Att. [dB] **10**

Rx 150 kHz Input Offset [dB] **0** Rx 500 kHz Input Offset [dB] **0**

Rx 1.4 MHz Input Offset [dB] **0** Rx 30 MHz Input Offset [dB] **0**

External Att. [dB] **NONE**

Remote **NONE**

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	150 kHz	500 kHz	1.4 MHz	30 MHz
--	---------	---------	---------	--------

First Run

Short	0	0	0	0
Long	0	0	0	0
Long (10 < t ≤ 20 ms)	0	0	0	0
Tot. Clicks Corr	0	0	0	0
Events	0	0	0	0
Time(s)	0.00	0.00	0.00	0.00
Sw.Op.	0	0	0	0
5.4.3.5 events	0	0	0	0
Limit dBuV	66	56	56	60
N	0.00	0.00	0.00	0.00
	PASS	PASS	PASS	PASS

150 kHz	No Clicks	500 kHz	No Clicks
1.4 MHz	No Clicks	30 MHz	No Clicks

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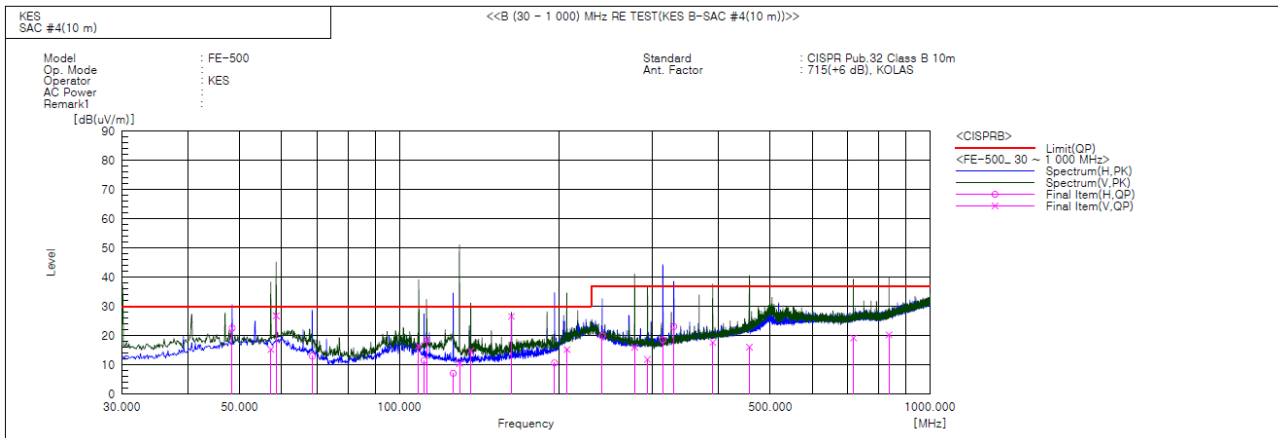
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Disturbance power measurement (30 MHz ~ 300 MHz)

N/A

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Radiated Electric Field Emissions(Below 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]	Remark
1	48.430	H	43.3	-20.7	22.6	30.0	7.4	394.0	334.0	
2	57.281	V	36.6	-21.3	15.3	30.0	14.7	116.0	346.0	
3	58.615	V	48.3	-21.5	26.8	30.0	3.2	112.0	246.0	
4	68.558	H	37.2	-24.2	13.0	30.0	17.0	298.0	349.0	
5	108.813	V	39.3	-22.8	16.5	30.0	13.5	150.0	57.0	
6	111.359	H	34.5	-23.0	11.5	30.0	18.5	400.0	266.0	
7	112.571	V	41.8	-23.2	18.6	30.0	11.4	125.0	258.0	
8	126.394	H	31.9	-24.8	7.1	30.0	22.9	284.0	356.0	
9	129.910	V	35.6	-25.1	10.5	30.0	19.5	155.0	80.0	
10	136.336	V	40.2	-25.4	14.8	30.0	15.2	146.0	274.0	
11	162.648	V	51.5	-24.9	26.6	30.0	3.4	100.0	274.0	
12	196.113	H	32.4	-21.7	10.7	30.0	19.3	365.0	119.0	
13	206.904	V	36.0	-20.7	15.3	30.0	14.7	129.0	256.0	
14	241.218	H	39.3	-19.4	19.9	37.0	17.1	400.0	48.0	
15	277.593	V	34.9	-18.8	16.1	37.0	20.9	149.0	125.0	
16	293.476	V	30.2	-18.3	11.9	37.0	25.1	155.0	307.0	
17	313.846	H	35.9	-17.3	18.6	37.0	18.4	299.0	308.0	
18	329.124	H	39.4	-16.3	23.1	37.0	13.9	400.0	331.0	
19	389.628	V	31.8	-14.1	17.7	37.0	19.3	108.0	216.0	
20	456.679	V	28.5	-12.4	16.1	37.0	20.9	146.0	318.0	
21	717.124	V	26.5	-7.3	19.2	37.0	17.8	116.0	101.0	

◆ Calculation – SEMI ANECHOIC CHAMBER #4(10 m)

Result(QP) [dB(μV/m)] = (Reading(QP)[dB(μV)] + c.f[dB(1/m)])

Margin(QP)[dB] = Limit[dB(μV/m)] - Result(QP) [dB(μV/m)]

Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.033			
2	0.004	0.353	1.080	n/a
3	0.023	1.014	2.300	PASS
4	0.004	0.972	0.430	n/a
5	0.023	1.998	1.140	PASS
6	0.005	1.664	0.300	n/a
7	0.023	2.931	0.770	PASS
8	0.004	1.574	0.230	n/a
9	0.022	5.588	0.400	PASS
10	0.003	1.702	0.184	n/a
11	0.022	6.605	0.330	PASS
12	0.003	2.179	0.153	n/a
13	0.021	10.058	0.210	PASS
14	0.004	2.742	0.131	n/a
15	0.020	13.583	0.150	PASS
16	0.004	3.052	0.115	n/a
17	0.020	14.838	0.132	PASS
18	0.003	3.254	0.102	n/a
19	0.019	15.911	0.118	PASS
20	0.003	3.318	0.092	n/a
21	0.018	11.039	0.161	PASS
22	0.003	3.455	0.084	n/a
23	0.017	11.611	0.147	PASS
24	0.003	3.682	0.077	n/a
25	0.016	11.960	0.135	PASS
26	0.003	3.643	0.071	n/a
27	0.015	12.052	0.125	PASS
28	0.002	3.775	0.066	n/a
29	0.014	12.216	0.116	PASS
30	0.002	3.678	0.061	n/a
31	0.013	12.000	0.109	PASS
32	0.002	3.579	0.058	n/a
33	0.012	11.794	0.102	PASS
34	0.002	3.698	0.054	n/a
35	0.011	11.624	0.096	PASS
36	0.002	3.408	0.051	n/a
37	0.010	10.969	0.091	PASS
38	0.002	3.327	0.048	n/a
39	0.009	10.545	0.087	PASS
40	0.001	3.193	0.046	n/a

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

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Report No.:
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Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	0.034			
2	0.005	0.330	1.620	PASS
3	0.023	0.681	3.450	PASS
4	0.006	0.893	0.645	PASS
5	0.023	1.374	1.710	PASS
6	0.007	1.518	0.450	PASS
7	0.023	1.986	1.155	PASS
8	0.005	1.474	0.345	PASS
9	0.023	3.767	0.600	PASS
10	0.004	1.577	0.276	n/a
11	0.022	4.467	0.495	PASS
12	0.005	2.048	0.230	n/a
13	0.021	6.757	0.315	PASS
14	0.005	2.535	0.197	n/a
15	0.021	9.152	0.225	PASS
16	0.005	2.816	0.173	n/a
17	0.020	10.067	0.199	PASS
18	0.005	3.027	0.153	n/a
19	0.019	10.813	0.178	PASS
20	0.004	3.079	0.138	n/a
21	0.018	11.243	0.161	PASS
22	0.004	3.226	0.125	n/a
23	0.017	11.845	0.147	PASS
24	0.004	3.396	0.115	n/a
25	0.016	12.046	0.135	PASS
26	0.004	3.413	0.106	n/a
27	0.015	12.228	0.125	PASS
28	0.003	3.501	0.099	n/a
29	0.014	12.348	0.116	PASS
30	0.003	3.427	0.092	n/a
31	0.013	12.224	0.109	PASS
32	0.003	3.316	0.086	n/a
33	0.012	12.029	0.102	PASS
34	0.003	3.443	0.081	n/a
35	0.011	11.848	0.096	PASS
36	0.002	3.160	0.077	n/a
37	0.010	11.262	0.091	PASS
38	0.002	3.006	0.073	n/a
39	0.009	10.745	0.087	PASS
40	0.002	2.874	0.069	n/a

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

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Test Data - Voltage Fluctuations

Flicker Measurements					
	P_{lt}	Max P_{st}	Max D_c	Max D_{max}	Max T_{max}
Line 1:	0.028	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

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APPENDIX B - Test Setup Photos and Configuration

Disturbance Voltage(Mains Ports)

■ Adapter Mode



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Disturbance voltage(Auxiliary ports)

■ Adapter Mode



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Disturbance voltage(Wired network ports)

■ Adapter Mode



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■ DC Mode



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Disturbance voltage(Clicks)

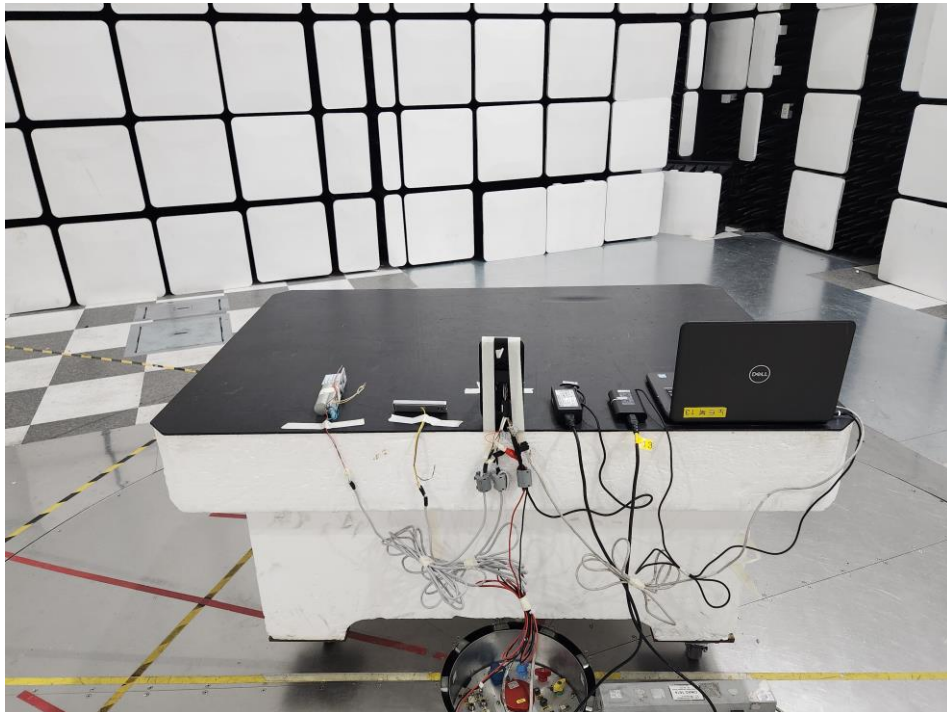
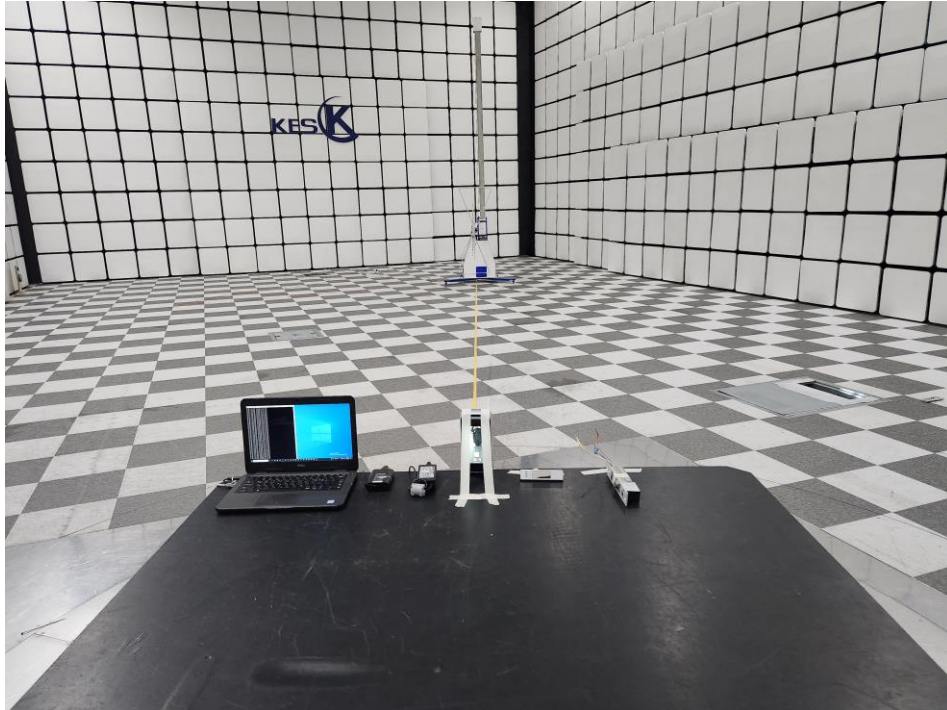
■ Adapter Mode



Disturbance power measurement (30 MHz ~ 300 MHz)

N/A

Radiated Electric Field Emissions(Below 1 GHz)



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Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ Adapter Mode

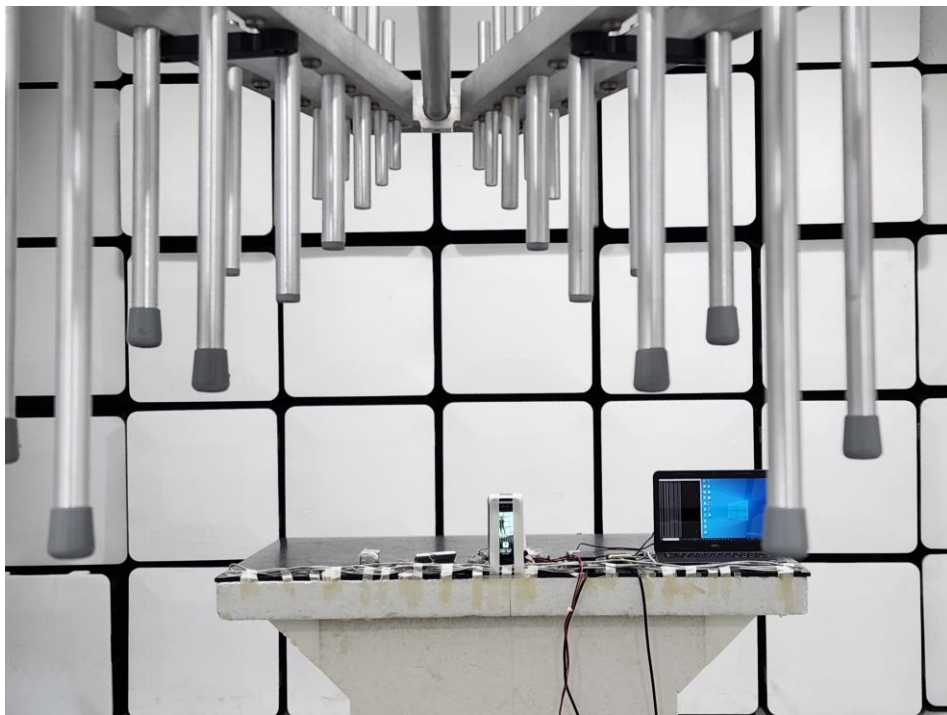


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Electrostatic discharge



Radio frequency electromagnetic fields



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Fast transients

■ Adapter Mode



■ DC Mode



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Surges

■ Adapter Mode



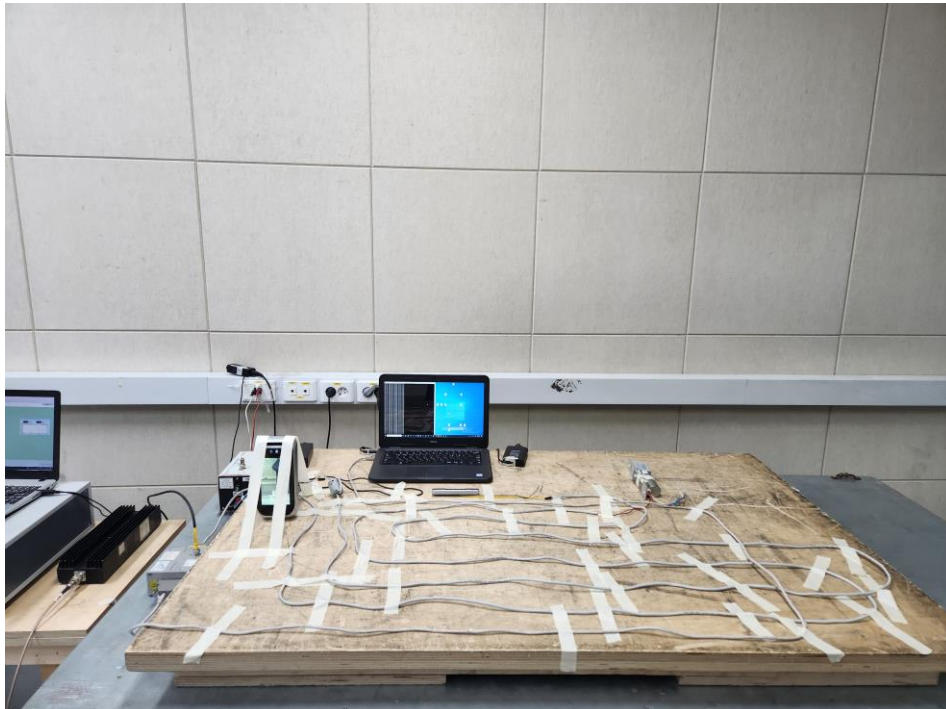
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Injected currents

■ Adapter Mode

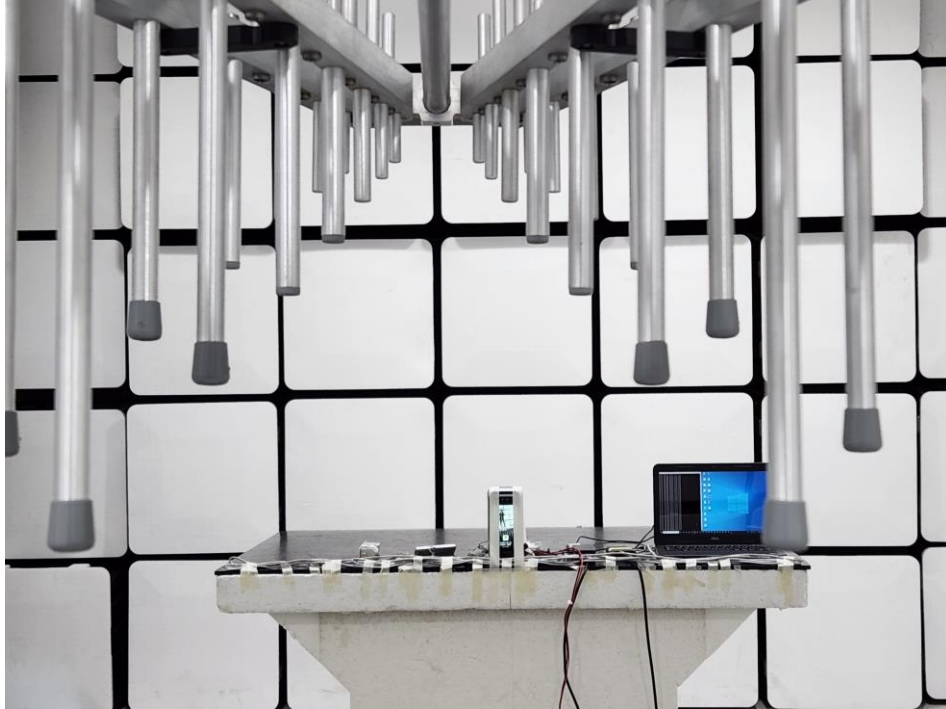


■ DC Mode



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Voltage dips



APPENDIX C - EUT Photographs

EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

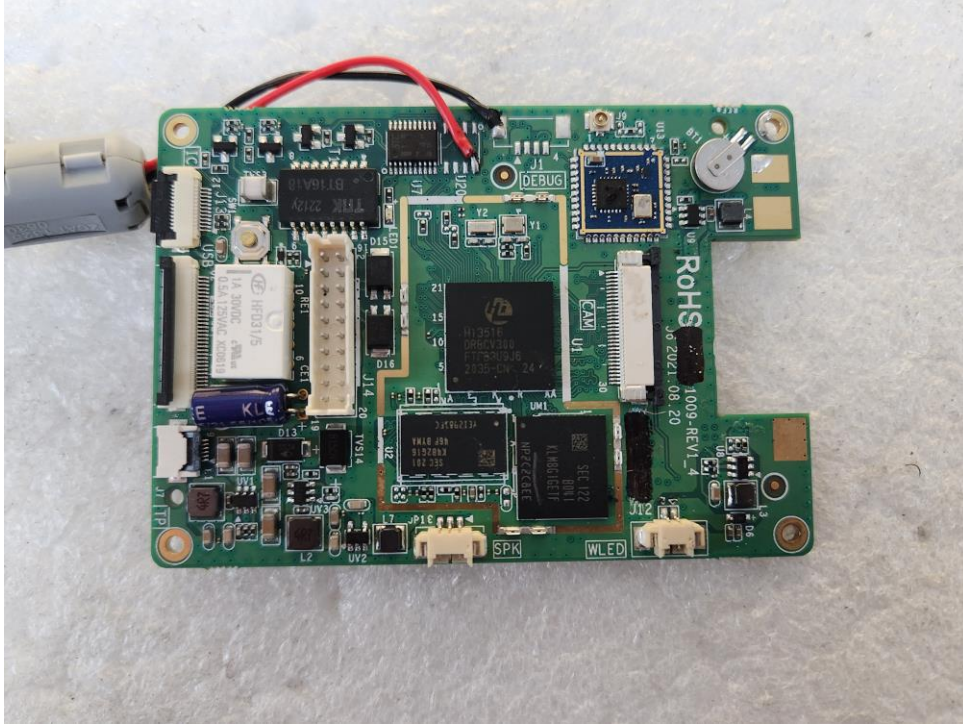
(Internal View)



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EUT Internal View – Main Board

(Top)



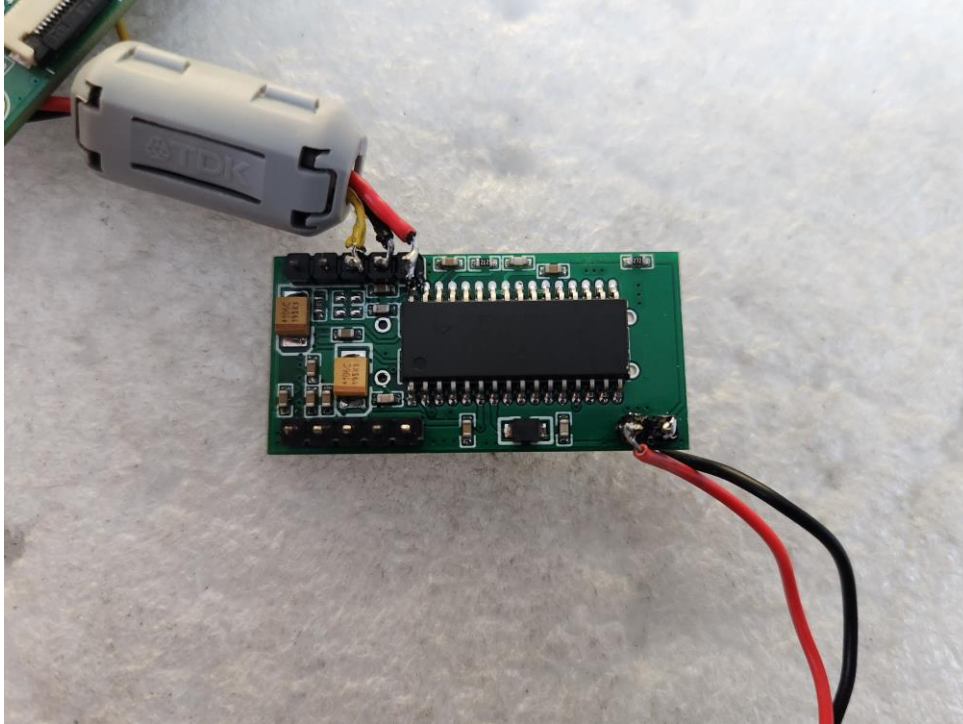
(Bottom)



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EUT Internal View – Board

(Top)



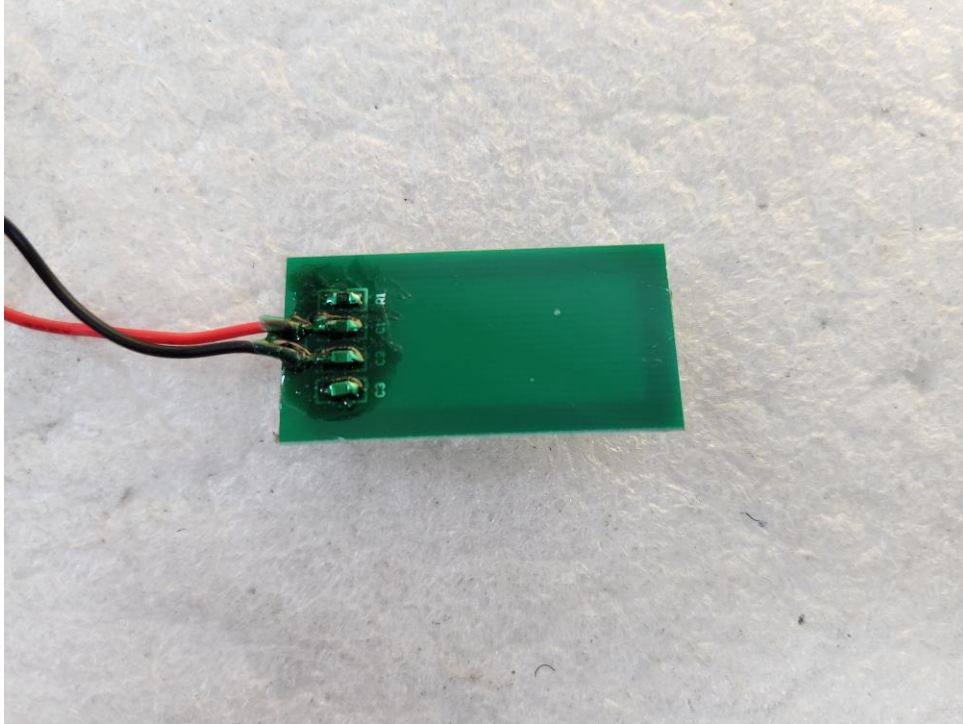
(Bottom)



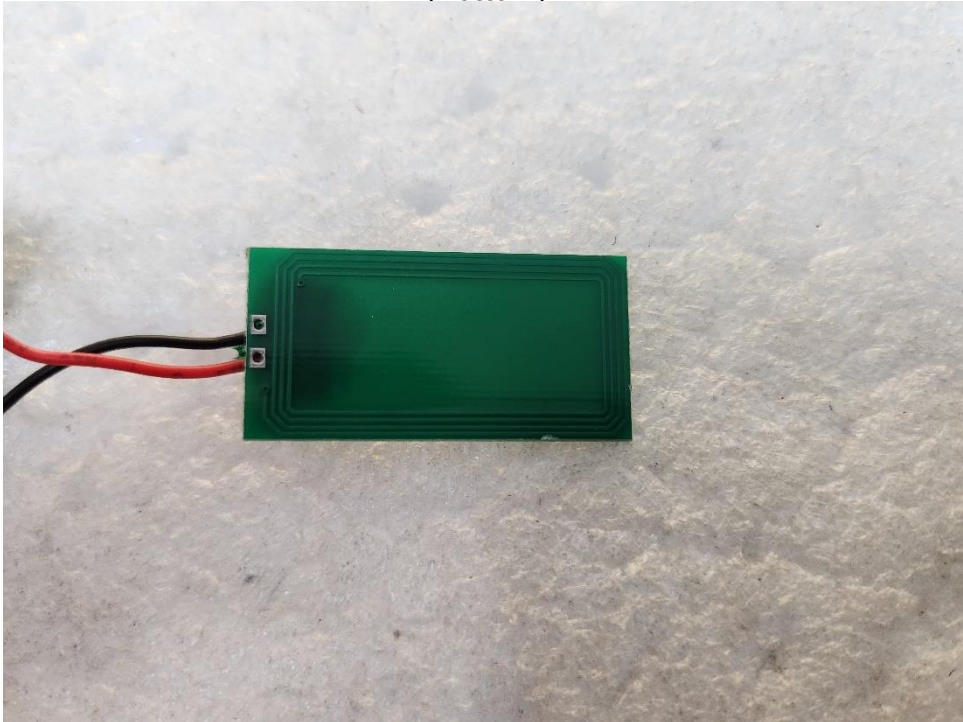
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EUT Internal View – RFID Board

(Top)



(Bottom)



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EUT Internal View – Display

(Top)



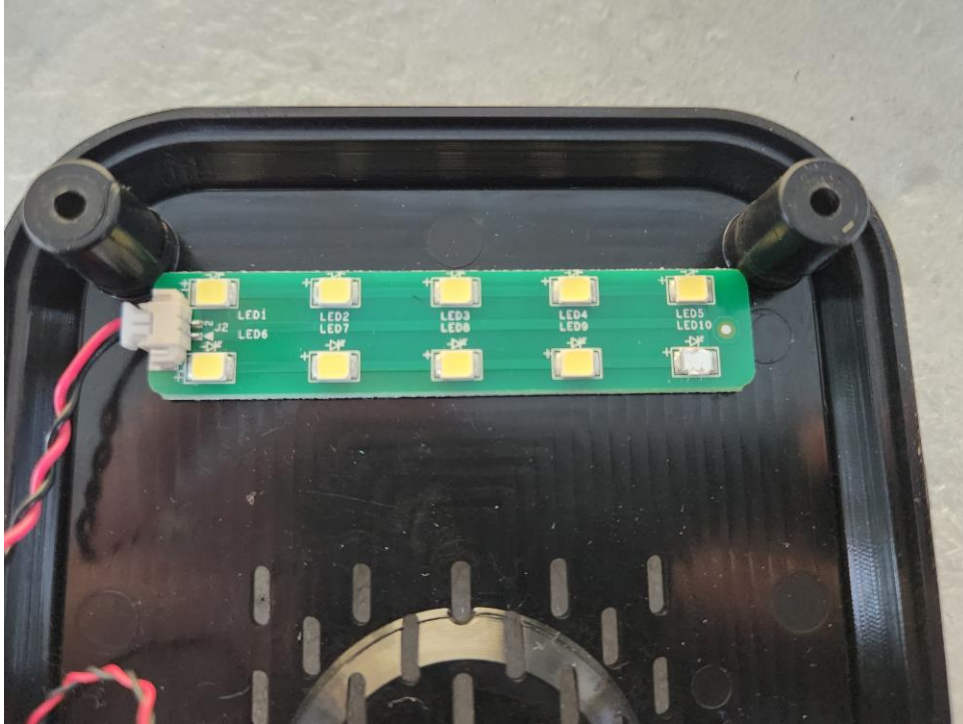
(Bottom)



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EUT Internal View – LED Board

(Top)



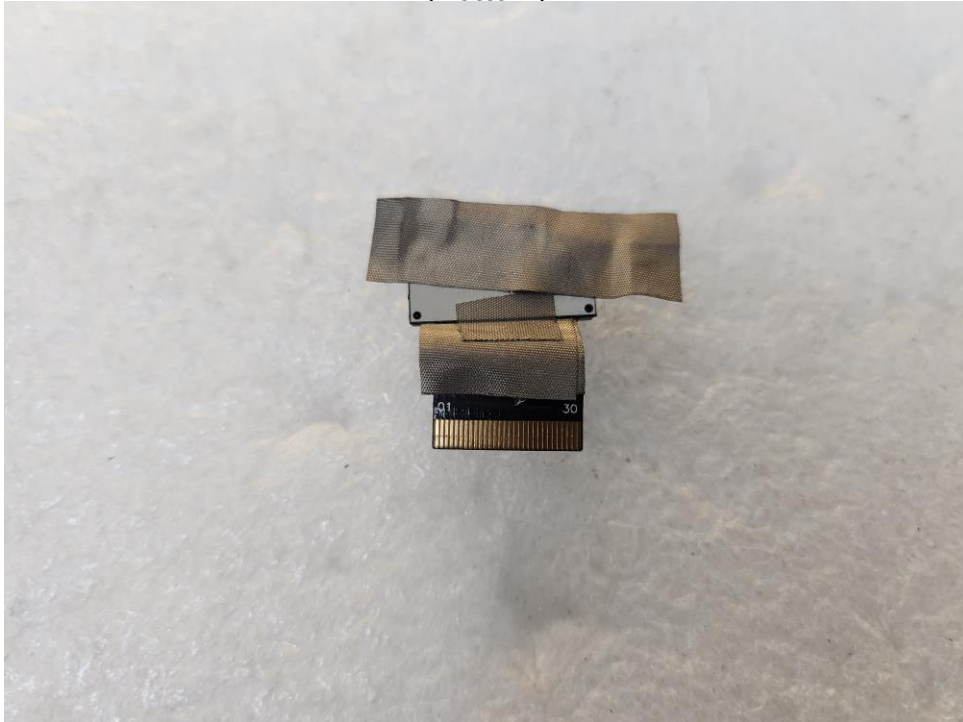
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EUT Internal View – Camera

(Top)



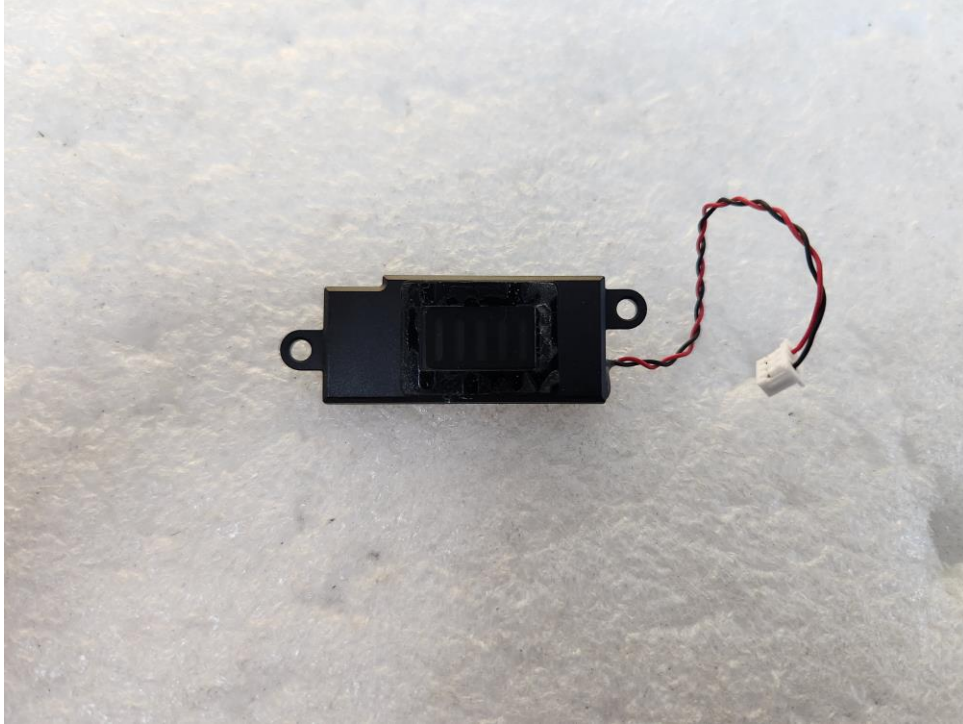
(Bottom)



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EUT Internal View – Speaker

(Top)

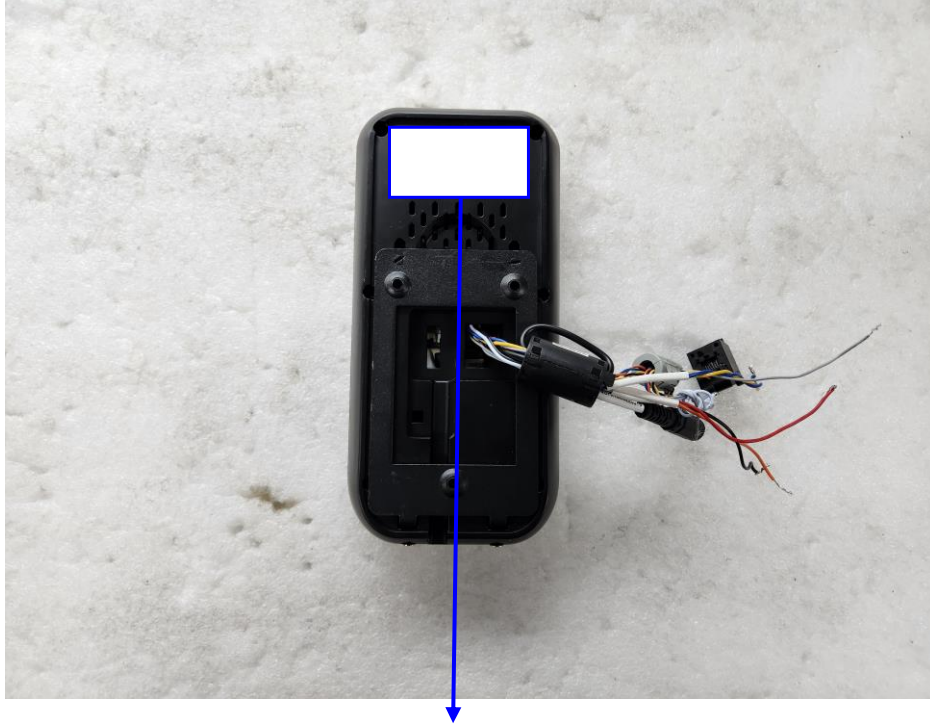


(Bottom)



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Label Photographs



FACEPASS

Model No : FE-500

Manufacturer : KJTECH CO.,LTD

Made in Korea

