



KES Co., Ltd.

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Report No.:
KES-EM-22T0785
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EMC TEST REPORT

Test Report No. : KES-EM-22T0785
Date of Issue : Sep. 15, 2022
Product name : Digital Phoropter
Model/Type No. : VISUPHOR500
Variant Mode : -
Applicant : HUVITZ Co., Ltd.
Applicant Address : 38, Burim-ro 170beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14055, Republic of Korea
Manufacturer : Carl Zeiss Meditec AG
Manufacturer Address : Goeschwitzer Strasse 51-52 07745 Jena, Germany
FCC ID : 2A8FTVISUPHOR500
IC ID : 28962-VISUPHOR500
Date of Receipt : Jul. 04, 2022
Test date : Jul. 06, 2022 ~ Jul. 07, 2022
Test Results : **In Compliance** **Not in Compliance**

Tested by

Min Seong, Kim
EMC Test Engineer

Reviewed by

Dong Hun, Jang
EMC Technical Manager

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REPORT REVISION HISTORY

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1.0 General Product Description

Main Specifications of EUT are:

Technical data

Dimensions (W x D x H)	
Digital Phoropter	361 mm x 108 mm x 280 mm
Junction box	71 mm x 240 mm x 251 mm
Weight	
Digital Phoropter	4.74 kg
Junction box	1.88 kg
Mains voltage	100 V to 240 V AC
Line frequency	50/60 Hz
Power consumption	1.0 A to 0.5 A AC

Classification of the device

Fuse	T2.50AH, 250 V
Protection class	1
Ingress protection rating	IPX0
Device type	B (DIN EN 60601-1)
Operating mode	continuous operation
Bluetooth	Class I: 100 mW (20 dBm), 100 m

Ambient conditions for intended use

Temperature	+10 °C to +35°C
Relative humidity	30 % to 90 %
Ambient air pressure	690 mbar to 1060 mbar
The device may not be operated using air, oxygen or nitrous oxide in the proximity of a flammable mix of anesthetics.	

Ambient conditions for storage and transport

Ambient temperature	-10 °C to +55 °C
Relative humidity	30 % to 95 %
Ambient air pressure	700 hPa to 1060 hPa



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Setting range	
Spherical lenses	-29.00 D to +26.75 D. -19.00 D to +16.75 D (when using a cross cylinder or a prism) (steps of 0.125 D)
Toric lenses	
Cylinder power	0.00 D to 8.75 D (steps of 0.25 D)
Cylinder axis	0° to 180° (steps of 1°)
Cross cylinder	± 0.25 D ± 0.50 D ±0.25 D (dual cross cylinder)
Prismatic lenses	0 Δ to 20 Δ (steps of 0.1 Δ)
PD	48 mm to 80 mm (steps of 0.25 mm)
Near-point examination	
PD	50 mm to 74 mm
Working distance,	35 cm to 70 cm
Retinoscope lenses	+1.5 D, +2.0 D (distance, 67 cm, 50 cm)

Special lenses

Aperture diaphragm	Ø 2 mm
Maddox filter	right eye: red/horizontal, left eye: red/vertical
Red/green filter	right eye: red, left eye: green
Polarization filter	Right eye: (135°, 45°), left eye: (45°, 135°)
Dissociating prism	Right eye: 6 Δ BU Left eye: 10 Δ BI (up to 5 Δ complement)
Cross cylinder, fix	(±0.50 D, axis 90°)
Visual field	40° (CVD: 12 mm)

HF transmitter specifications

Frequency range	2400 MHz to 2483.5 MHz
Transmission power	max. 4.7 dBm
Modulation type	FHSS
Channel	79 channel
Antenna amplification	max. 2.0 dBi
Working temperature	-10 °C to +35 °C
Supply voltage	100 V to 240 V AC
Line frequency	50/60 Hz
Power consumption	1.0 A to 0.5 A

● EUT Internal Operating Frequencies:

Frequency (MHz)	Description
36.864Mhz	CPU in Main Body (phoropter body)
36.864Mhz	CPU in Junction Box

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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 120 V 60 Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
Digital Phoropter (Phoropter Body)	VISUPHOR500	9706183245	Carl Zeiss Meditec AG	EUT
Digital Phoropter (Junction Box)	VISUPHOR500	9711123642	Carl Zeiss Meditec AG	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
USB Dongle	UBT18-0	-	spezial electronic	-
Notebook	NT700Z5A	-	Samsung Electronic Co., Ltd.	-
Notebook Adapter	A10-090P1A	-	Chicony Power Technology (Suzhou) Co., Ltd.	-
Auto Lensmeter 1	VISULENS 550	-	Carl Zeiss Meditec AG	-
Auto Lensmeter 2	VISULENS 550	-	Carl Zeiss Meditec AG	-
Extension cable SUB-D	SUB-D cable (Part No. 000000-0577-459 / spec. 1:1, 9plug/9sock, black, 3m double shielded with 2 ferrite cores)	-	Baaske Medical Germany	-



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1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Digital Phoropter (Phoropter Body) (EUT)	Phoropter Body (DVI)	Digital Phoropter (Junction Box) (EUT)	DVI	3.0	S
	Wireless (Bluetooth)	USB Dongle	Wireless (Bluetooth)	-	-
	COM 1 (RS-232)	Auto Lensmeter 1	RS-232	3.0	S
	COM 2 (RS-232)	Auto Lensmeter 2	RS-232	3.0	S
Notebook	USB	USB Dongle	USB	-	-
	DC Jack	Notebook Adapter	Line-Out (DC Jack)	1.0	U

* Unshielded = U, Shielded = S

1.7 EUT Operating Mode(s)

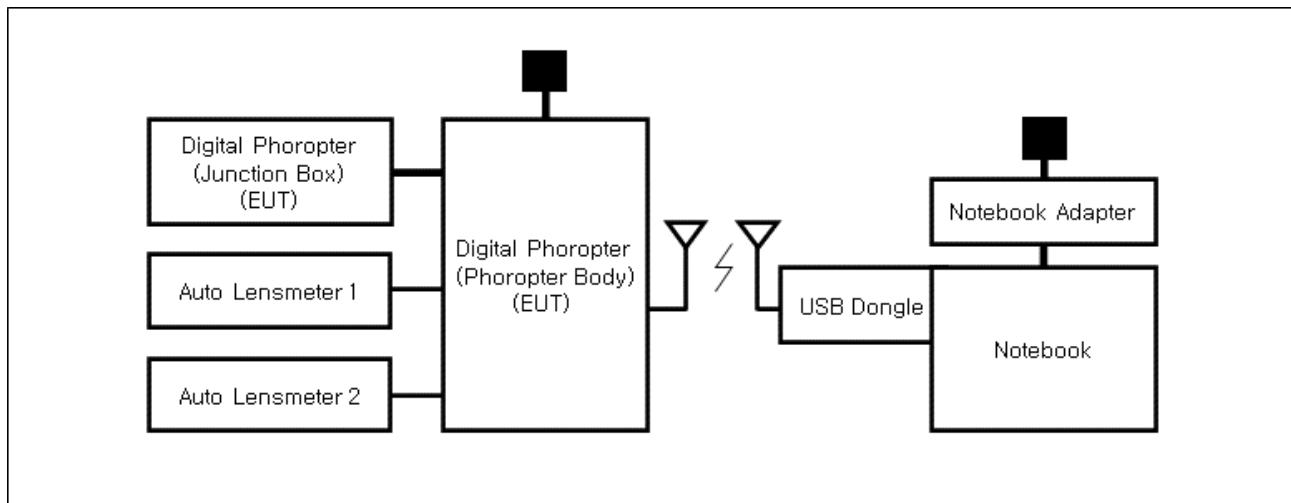
Test mode	operating	operating
Operating	Continuous operation of EUT using program SerialPortMon	AC 120 V, 60 Hz

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

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1.8 Configuration

- AC Main
- DC Main



Digital Phoropter(EUT) – USB Dongle : Bluetooth 2.4 GHz

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1.9 Remarks when standards applied

N/A

1.10 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.

1.11 Test Facility

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

1.12 Measurement Procedure

- Conducted Emissions

The conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emission exceed the average limit with the instrument set to the quasi-peak mode, the measurements are made in the average mode. The emission spectrum was scanned from 150 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limits were measured and have been recorded. Quasi-peak readings are distinguished with a "QP".

- Radiated Electric Field Emissions

The test was done at a SEMI ANECHOIC CHAMBER with quasi-peak detector. The final test data was measured using a Quasi-Peak detector below 1 GHz at 10 m or 3 m distance and a Peak and Average detector above 1 GHz at 3 m distance. Test was proceeded worst case test mode and cable configuration.

Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency.

Measurement procedures was In accordance with ANSI C63.4-2014 7.3.3, 7.3.4, 8.3.1.1, 8.3.1.2, 8.3.2.1, 8.3.2.2



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1.13 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Aechoic Chamber ,10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Aechoic Chamber , and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Aechoic Chamber, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Aechoic Chamber and Conducted test site	 23298
JAPAN	VCCI	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	 R-20056, C-20036 T-20040, G-20057
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Aechoic Chamber , 10 m Open Area 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:

47 CFR Part 15, Subpart B

<input type="checkbox"/> CISPR 22:2009 +A1:2010	<input type="checkbox"/> Class A	<input type="checkbox"/> Class B
<input checked="" type="checkbox"/> ANSI C63.4a-2017	<input type="checkbox"/> Class A	<input checked="" type="checkbox"/> Class B

IC Regulation ICES-003 Issue 7

<input type="checkbox"/> CAN/CSA-CISPR 32:17	<input type="checkbox"/> Class A	<input type="checkbox"/> Class B
<input checked="" type="checkbox"/> ANSI C63.4a-2017	<input type="checkbox"/> Class A	<input checked="" type="checkbox"/> Class B

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2.1 Conducted Emissions at Mains Power Ports

Test Date

Jul. 06, 2022

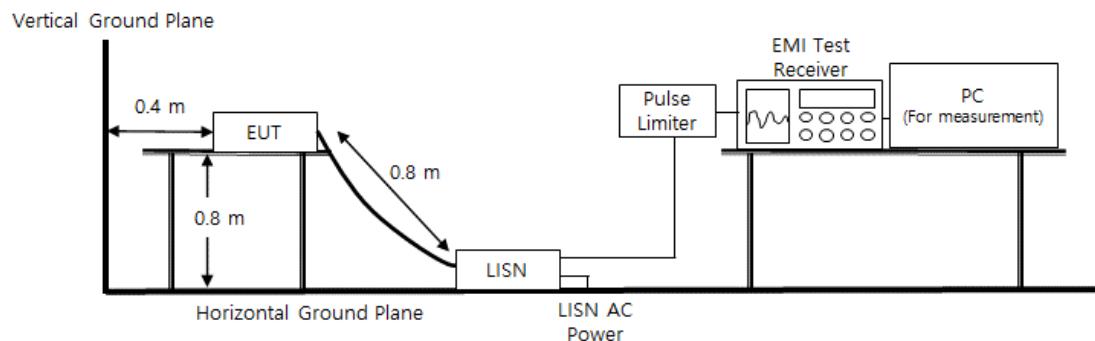
Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
<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	12, 28, 2022	1 Year
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	12, 27, 2022	1 Year
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	12, 27, 2022	1 Year
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 27, 2022	1 Year

Diagram of test setup





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Test Conditions

Temperature: (25,0 \pm 0,1) °C
Relative Humidity: (44,9 \pm 0,3) % 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.

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2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jul. 06, 2022

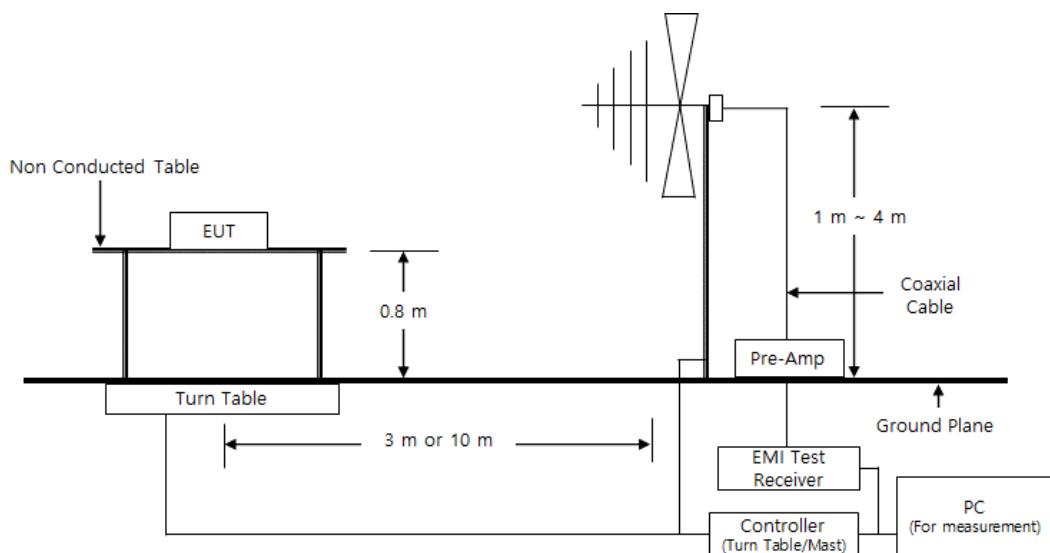
Test Location

OPEN AREA TEST SITE #2 SEMI ANECHOIC CHAMBER #4(10m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
<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, 31, 2023	1 Year
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 24, 2022	1 Year
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022	2 Year
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	32173	03, 08, 2023	1 Year

Diagram of test setup





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Test Conditions

Temperature: (24,5 \pm 0,2) °C
Relative Humidity: (44,6 \pm 0,4) % 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.

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2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Jul. 07, 2022

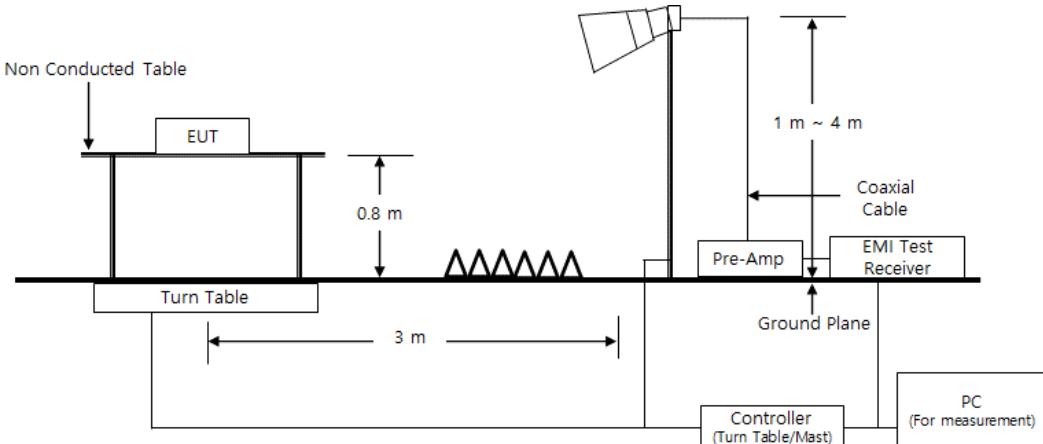
Test Location

SEMI ANECHOIC CHAMBER #5

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
<input checked="" type="checkbox"/>	EMI Test S/W	ES10/RE	TOYO Corporation	2022.01.000	-	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	03, 31, 2023	1 Year
<input checked="" type="checkbox"/>	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	12, 16, 2022	1 Year
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	HP	3008A00538	06, 02, 2023	1 Year

Diagram of test setup





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Test Conditions

Temperature: (24,2 \pm 0,2) °C
Relative Humidity: (45,8 \pm 0,3) % R.H.

Frequency Range of Measurement

1 GHz to 2,5 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- PASS
- NOT PASS
- NOT APPLICABLE

Remarks

See Appendix A for test data.

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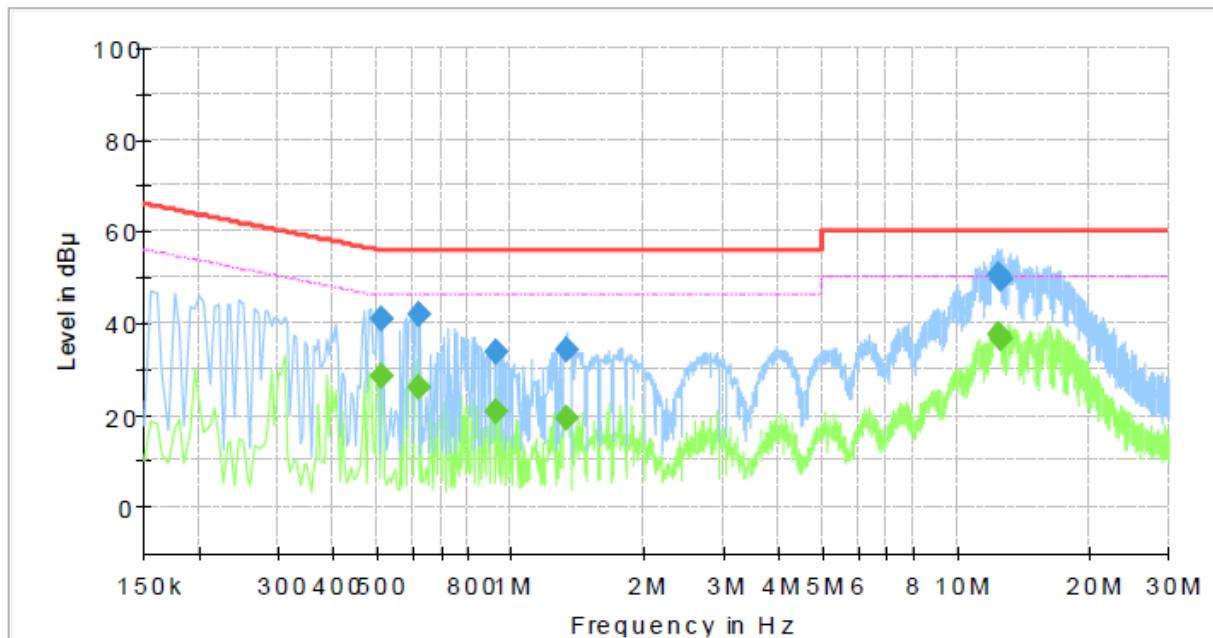
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description: Conducted Emission
 Model No.: VISUPHOR500
 Phase: L1
 Mode: AC 120 V, 60 Hz
 Operator Name: KES



Final Result

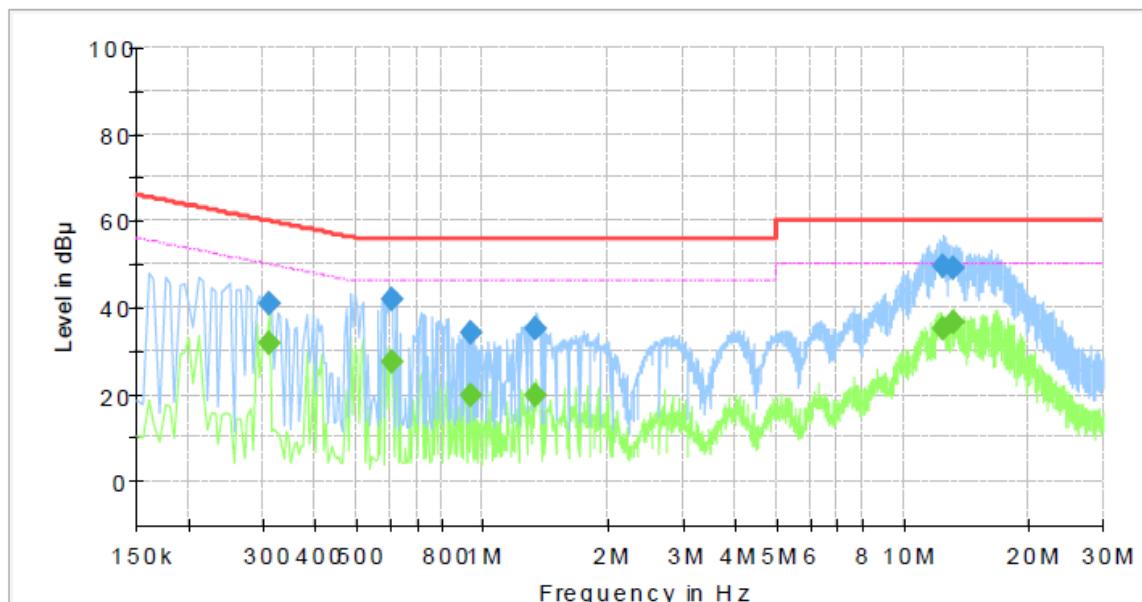
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.515000	---	28.61	46.00	17.39	1000.0	9.000	L1	19.7
0.515000	40.73	---	56.00	15.27	1000.0	9.000	L1	19.7
0.625000	---	25.83	46.00	20.17	1000.0	9.000	L1	19.9
0.625000	42.10	---	56.00	13.90	1000.0	9.000	L1	19.9
0.930000	---	20.81	46.00	25.19	1000.0	9.000	L1	20.1
0.930000	33.80	---	56.00	22.20	1000.0	9.000	L1	20.1
1.330000	---	19.24	46.00	26.76	1000.0	9.000	L1	20.2
1.330000	34.33	---	56.00	21.67	1000.0	9.000	L1	20.2
12.445000	---	37.52	50.00	12.48	1000.0	9.000	L1	20.0
12.445000	50.39	---	60.00	9.61	1000.0	9.000	L1	20.0
12.550000	---	36.78	50.00	13.22	1000.0	9.000	L1	20.0
12.550000	49.76	---	60.00	10.24	1000.0	9.000	L1	20.0

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NEUTRAL LINE

Common Information

Test Description: Conducted Emission
 Model No.: VISUPHOR500
 Phase: N
 Mode: AC 120 V, 60 Hz
 Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.310000	---	31.58	49.97	18.39	1000.0	9.000	N	19.5
0.310000	40.88	---	59.97	19.09	1000.0	9.000	N	19.5
0.610000	---	27.34	46.00	18.66	1000.0	9.000	N	19.8
0.610000	42.04	---	56.00	13.96	1000.0	9.000	N	19.8
0.935000	---	19.97	46.00	26.03	1000.0	9.000	N	20.1
0.935000	34.30	---	56.00	21.70	1000.0	9.000	N	20.1
1.340000	---	20.00	46.00	26.00	1000.0	9.000	N	20.2
1.340000	35.03	---	56.00	20.97	1000.0	9.000	N	20.2
12.540000	---	35.27	50.00	14.73	1000.0	9.000	N	20.0
12.540000	49.74	---	60.00	10.26	1000.0	9.000	N	20.0
13.225000	---	36.75	50.00	13.25	1000.0	9.000	N	19.9
13.225000	49.17	---	60.00	10.83	1000.0	9.000	N	19.9

◆ Calculation

$$\text{QuasiPeak[dB μ V] / CAverage [dB μ V] = Reading Value[dB μ V] + Corr. [dB]}$$

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



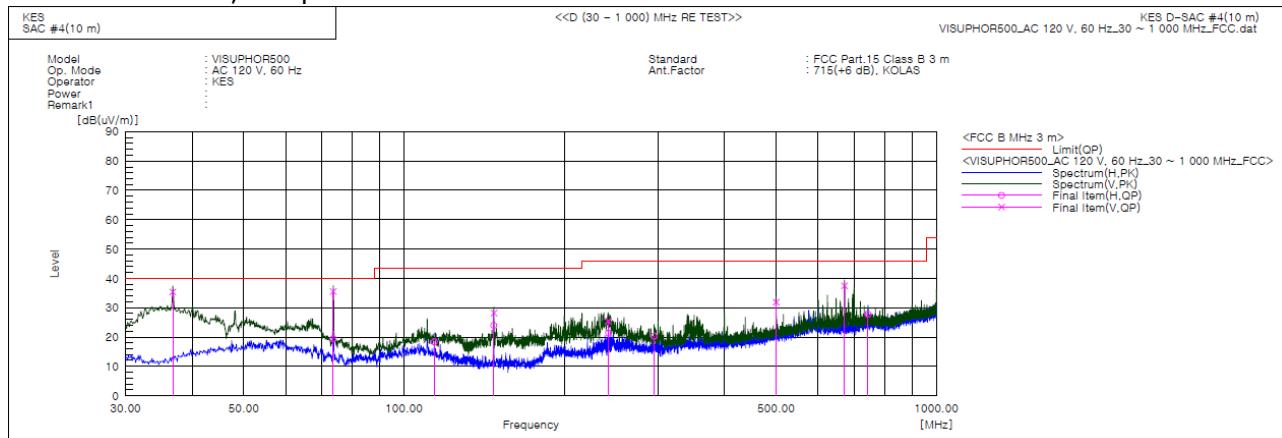
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Radiated Electric Field Emissions(Below 1 GHz)

- 47 CFR Part 15, Subpart B

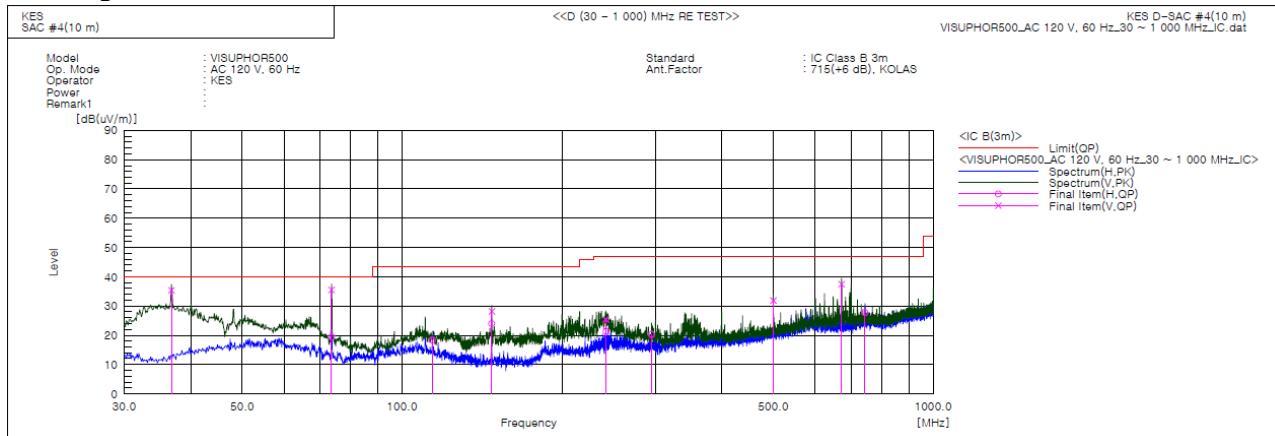


Final Result

No.	Frequency [MHz]	(P) [dB(uV)]	Reading QP [dB(1/m)]	c.f [dB(uV/m)]	Result QP [dB(uV/m)]	Limit QP [dB]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	36.790	V 60.0	-24.6	35.4	40.0	4.6	132.0	196.0		
2	73.650	V 62.3	-26.8	35.5	40.0	4.5	134.0	158.9		
3	73.650	H 46.3	-26.8	19.5	40.0	20.5	362.0	297.2		
4	114.026	H 41.8	-23.4	18.4	43.5	25.1	400.0	297.2		
5	147.370	H 50.0	-26.0	24.0	43.5	19.5	372.0	206.1		
6	147.491	V 54.2	-26.0	28.2	43.5	15.3	100.0	104.3		
7	241.824	V 45.8	-20.4	25.4	46.0	20.6	143.0	22.8		
8	242.309	H 41.7	-20.4	21.3	46.0	24.7	400.0	96.5		
9	294.931	H 39.4	-19.1	20.3	46.0	25.7	325.0	79.0		
10	499.965	V 44.6	-12.7	31.9	46.0	14.1	100.0	1.6		
11	672.019	V 46.9	-9.4	37.5	46.0	8.5	109.0	177.5		
12	744.163	H 35.7	-7.9	27.8	46.0	18.2	373.0	169.3		

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- IC Regulation ICES-003 Issue 7



Final Result

No.	Frequency	(P)	Reading	c.f	Result	Limit	Margin	Height	Angle	Remark
	[MHz]		[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]	
1	36.790	V	60.0	-24.6	35.4	40.0	4.6	132.0	196.0	
2	73.650	V	62.3	-26.8	35.5	40.0	4.5	134.0	158.9	
3	73.650	H	46.3	-26.8	19.5	40.0	20.5	362.0	297.2	
4	114.026	H	41.8	-23.4	18.4	43.5	25.1	400.0	297.2	
5	147.370	H	50.0	-26.0	24.0	43.5	19.5	372.0	206.1	
6	147.491	V	54.2	-26.0	28.2	43.5	15.3	100.0	104.3	
7	241.824	V	45.8	-20.4	25.4	47.0	21.6	143.0	22.8	
8	242.309	H	41.7	-20.4	21.3	47.0	25.7	400.0	96.5	
9	294.931	H	39.4	-19.1	20.3	47.0	26.7	325.0	79.0	
10	499.965	V	44.6	-12.7	31.9	47.0	15.1	100.0	1.6	
11	672.019	V	46.9	-9.4	37.5	47.0	9.5	109.0	177.5	
12	744.163	H	35.7	-7.9	27.8	47.0	19.2	373.0	169.3	

◆ Calculation – SAC #4(10 m)

$$\text{Result(QP)} [\text{dB}(\mu\text{V}/\text{m})] = (\text{Reading(QP)} [\text{dB}(\mu\text{V})] + \text{c.f} [\text{dB}(1/\text{m})])$$

$$\text{Margin(QP)[dB]} = \text{Limit[dB}(\mu\text{V/m})] - \text{Result(QP) [dB}(\mu\text{V/m})]$$

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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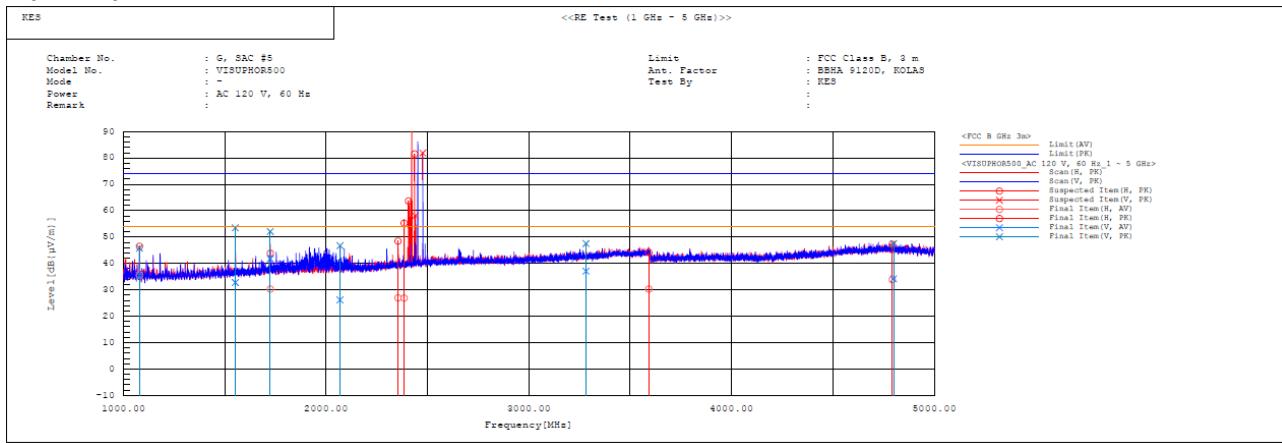
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Radiated Electric Field Emissions(Above 1 GHz)

- (1 ~ 5) GHz

**Final Result**

No.	Frequency	Pol	Reading	Reading	c.f.	Result	Result	Limit	Limit	Margin	Margin	Height	Angle
	[MHz]		AV	PK		AV	PK	AV	PK	AV	PK	[cm]	[deg]
1	1079.317	V	42.7	53.1	-7.3	35.4	45.8	54.0	74.0	18.6	28.2	106.0	1.3
2	1079.435	H	42.9	53.8	-7.3	35.6	46.5	54.0	74.0	18.4	27.5	375.0	29.9
3	1552.138	V	37.6	58.3	-4.8	32.8	53.5	54.0	74.0	21.2	20.5	100.0	359.6
4	1724.637	V	45.8	56.1	-4.0	41.8	52.1	54.0	74.0	12.2	21.9	131.0	97.4
5	1724.695	H	34.3	47.9	-4.0	30.3	43.9	54.0	74.0	23.7	30.1	400.0	49.6
6	2069.244	V	28.7	49.3	-2.5	26.2	46.8	54.0	74.0	27.8	27.2	112.0	222.7
7	2355.301	H	28.6	50.1	-1.6	27.0	48.5	54.0	74.0	27.0	25.5	400.0	138.8
8	2365.645	H	28.4	56.8	-1.5	26.9	55.3	54.0	74.0	27.1	18.7	303.0	27.2
9	3292.830	V	35.5	46.0	1.6	37.1	47.6	54.0	74.0	16.9	26.4	100.0	359.4
10	3592.408	H	28.3	42.2	2.0	30.3	44.2	54.0	74.0	23.7	29.8	344.0	26.0
11	4793.609	H	27.5	40.9	6.4	33.9	47.3	54.0	74.0	20.1	26.7	398.0	95.9
12	4800.090	V	27.7	41.1	6.5	34.2	47.6	54.0	74.0	19.8	26.4	103.0	233.0
13	2406.800	H	-----	-----	-1.4	-----	-----	-----	-----	-----	-----	400.0	68.0
14	2436.800	H	-----	-----	-1.3	-----	-----	-----	-----	-----	-----	400.0	206.4
15	2440.800	V	-----	-----	-1.3	-----	-----	-----	-----	-----	-----	100.0	356.4
16	2477.200	V	-----	-----	-1.1	-----	-----	-----	-----	-----	-----	100.0	146.2

*** Exclusion Bands**

- Fundamental Frequency: 2.4 GHz Band (Bluetooth)

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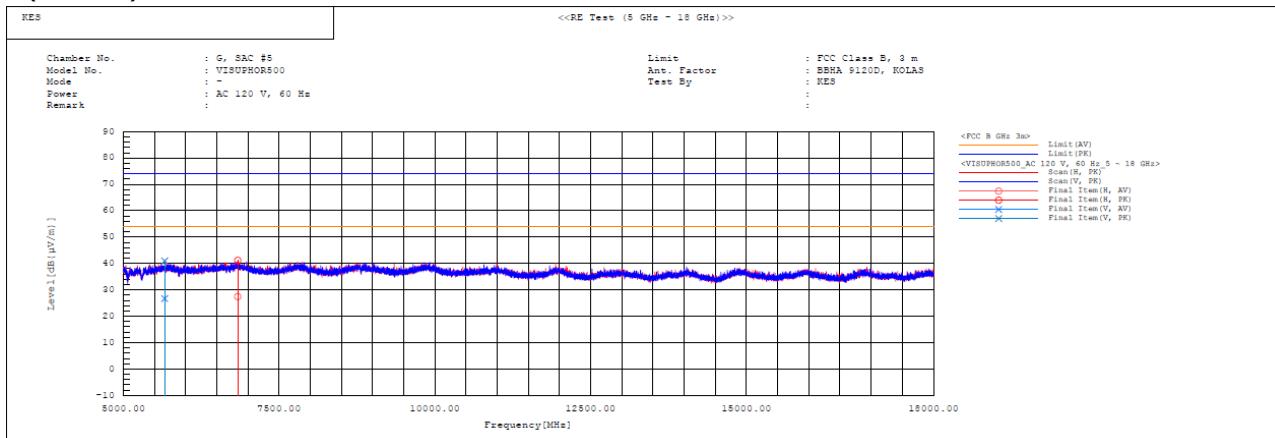
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- (5 ~ 18) GHz



- PK

Frequency (MHz)	Reading PK (dBuV)	Polarization	Height (m)	ANT Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5 665.600	41.000	V	1.000	32.360	9.520	33.630	49.250	74.000	24.750
6 836.316	41.200	H	4.000	35.050	11.170	34.820	52.600	74.000	21.400

- CAV

Frequency (MHz)	Reading CISPR AV (dBuV)	Polarization	Height (m)	ANT Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5 665.600	26.700	V	1.000	32.360	9.520	33.630	34.950	54.000	19.050
6 836.316	27.500	H	4.000	35.050	11.170	34.820	38.900	54.000	15.100

* No spurious emission were detected above 5 GHz.

◆ Calculation

$$\text{Result(PK/CAV)} [\text{dB}(\mu\text{V}/\text{m})] = (\text{Reading(PK/CAV)} [\text{dB}(\mu\text{V})] + \text{c.f} [\text{dB}(1/\text{m})])$$

$$\text{Margin(PK/CAV)} [\text{dB}] = \text{Limit} [\text{dB}(\mu\text{V}/\text{m})] - \text{Result(PK/CAV)} [\text{dB}(\mu\text{V}/\text{m})]$$

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

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

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