



EMC TEST REPORT

Test Report No. : KES-EM-23T0006-R2
Date of Issue : Feb. 24, 2023
Product name : PENDANT SPEAKER
Model/Type No. : SPA-P100B
Variant Model : SPA-P100W
Applicant : Hanwha Vision Co., Ltd
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : Inter-M Corporation
Manufacturer Address : 7-18, Gwonyul-ro 1253beon-gil, Baekseok-eup, Yangju-si,
Gyeonggi-do
Equipment authorization : **Supplier's Declaration of Conformity**
Date of Receipt : Dec. 26, 2022
Test date : Jan. 01, 2023 ~ Jan. 03, 2023
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Eun Gu, Jeon
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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



REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jan. 04, 2023	KES-EM-23T0006	Issued
Jan. 27, 2023	KES-EM-23T0006-R1	Change Manufacturer Address
Feb. 24, 2023	KES-EM-23T0006-R2	Change the Applicant at the request of the customer

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1.0 General Product Description

Main Specifications of EUT are:

Model	SPA-P100
Product	
Type	IP Pendant Speaker
Line Output	
Output Level	None
Frequency Response	None
THD + N Ratio (AES17 LPF)	None
S/N Ratio (20kHz LPF, A-WTD)	None
Amplifier	
Description	Built in 10W Class D
Network	
Ethernet	10/100 Base-T
Memory	
Internal Memory	1 GBytes
External Memory (Micro SD)	SDHC upto 32GB (SANDISK)
Contact	
Contact Input. Dry contact	One channel
Contact Output. Dry contact (NO)	One channel
General	
Operating Temperature	-20 ~ +50°C (-4°F ~ +122°F)
Operating Humidity	10~85% RH (Non-Condensing)
IP code	None
Weight	2.1Kg
Size	Φ269*256(H)
Color	Black/White
Certificate	EMC : FCC Part 15 Subpart B, ICES-003 Safety : UL 62368-1, CAN/CSA C22.2 No.2 62368-1
Power	
PoE	PoE (IEEE 802.3 af type 1 Class 3)
PoE+	PoE+(IEEE 802.3 at type 2 Class 4)
Embedded MIC	
Input Sensitivity	Sound Level Meter
Frequency Response	Sound Level Meter
Audio	
Built-in microphone	50Hz ~16kHz
Audio Compression	WAV, MP3 in mono/stereo from 64 kbps to 320 kbps. Sampling rate from 16 kHz up to 48 kHz
Speaker	
Speaker Component	2Way 8" LF Drive & 2" HF Drive. Coaxial Cone type
Max. Sound Pressure Level (PoE : 4.5 Watt)	97dB
Max. Sound Pressure Level (PoE+ : 10 Watt)	101dB
Frequency Range (-10dB)	130Hz~20kHz
Sensitivity (1Watt)	91dB
Coverage Pattern	(HxV) : 130°(1kHz) / 60°(4kHz)
Network Protocol	
Security	Password protection : admin,setup,user,guest (sha-2, Digest authentication, User access log) Digest authentication, User access log
Supported Protocols	IPv4, HTTP, SIP, mDNS, DNS, NTP, TCP, UDP, DHCP, ARP, ICMP
System Integration	
API (Application Programming Interface)	SUNAPI
Multi-source Dynamic PA control	Multi-source up to 48 (Multicast) (Audio 24CH + Mic 24CH) Up to 256 Zone Control (Multicast) Up to 20 Zone Control (Unicast) Up to 255 Groups
VoIP	Tested with PBX suppliers such as Cisco and Asterisk. Supported SIP features: DTMF (RFC2833) Supported codecs: PCMU, PCMA, speex/8000, speex/16000
TTS	Domestic Version : Korean Export Version : English(US, UK), German, French, Spanish, Russian
Audio Monitoring	Speaker test by graphic level meter (Built in test tool)
Event & Preset	Virtual Contact, Dry contact
Functional Monitoring	Connection verification, Built-in system logging

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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

Color Differences

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
PENDANT SPEAKER	SPA-P100B	-	Inter-M Corporation	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
NOTEBOOK	Latitude 5300	8C47BE45C060	DELL INC.	-
NOTEBOOK ADAPTER	HA65NM130	-	Chicony Power Technology(Suzhou)Co.,Ltd.	-
PoE INJECTOR	PT-PSE109GBRO-AH-S	-	Dongguan PROCET Network Technology Co.,Ltd	-
BUTTON ALARM	-	-	-	-
MULTIMETER	DM-10-10	-	DONG HWA	-
Micro SD Card	-	-	-	8 GB

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
PENDANT SPEAKER (EUT)	RJ -45	PoE INJECTOR	RJ-45	3.0	U
	Micro SD Slot	Micro SD Card	Micro SD Slot	-	-
	ALARM IN	BUTTON ALARM	Line	3.0	U
	ALARM OUT	MULTIMETER	Line	3.0	U
	Groud	Groud	Groud	1.8	U

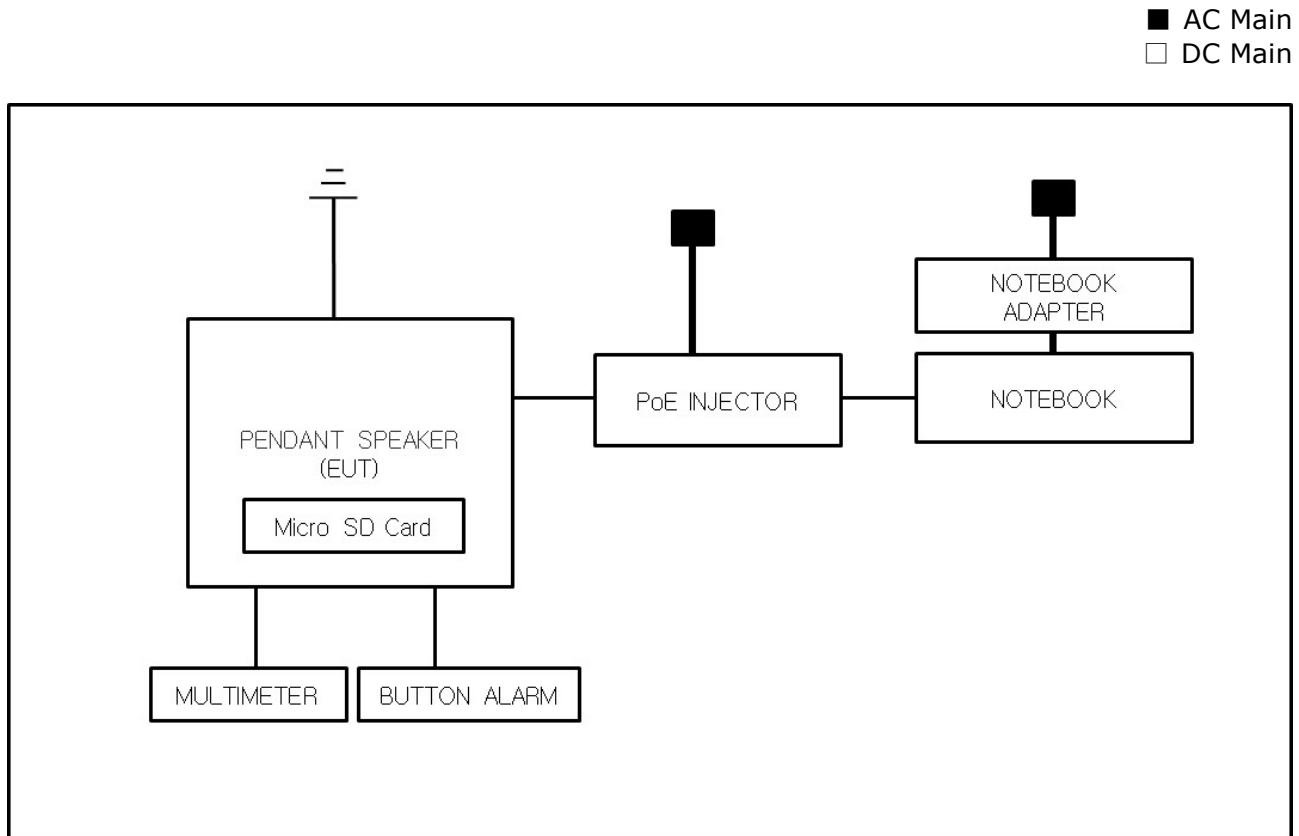
* Unshielded = U, Shielded = S

1.7 EUT Operating Mode(s)

Test Mode	operating
Operation	1. Ping Test Mode. 2. After accessing the web browser, the operation status was checked by playing the 1KHz Tone. 3. Test by uploading the sound source stored on the Micro SD Card through the web viewer 4. Tested while connecting to a web viewer and checking the operation status at the ALARM IN/OUT port.

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

1.8 Configuration



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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, 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

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic 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-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, 10 m Open Area and 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	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-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0004

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 checked="" type="checkbox"/> Class A | <input 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 checked="" type="checkbox"/> Class A | <input type="checkbox"/> Class B |

2.1 Conducted Emissions at Mains Power Ports

Test Date

Jan. 03, 2023

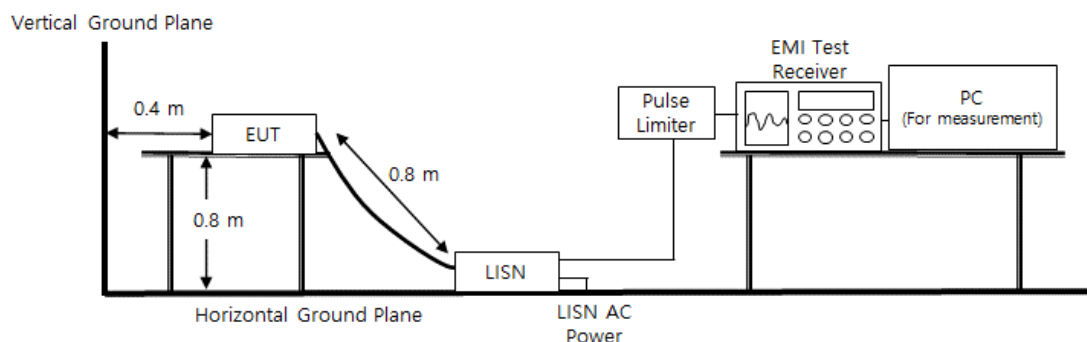
Test Location

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

Diagram of test setup





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Test Conditions

Temperature: (22,6 ± 0,1) °C

Relative Humidity: (46,1 ± 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.

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2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jan. 02, 2023

Test Location

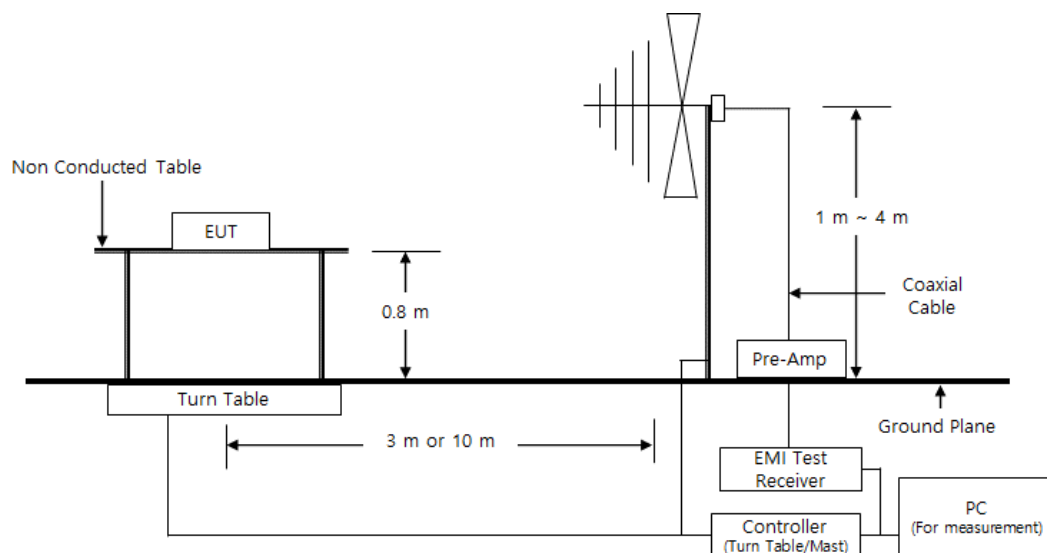
☐ OPEN AREA TEST SITE #2

☒ 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, 31, 2023
<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, 08, 2023

Diagram of test setup



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Test Conditions

Temperature: (22,3 ± 0,1) °C

Relative Humidity: (44,6 ± 0,2) % 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

Jan. 01, 2023

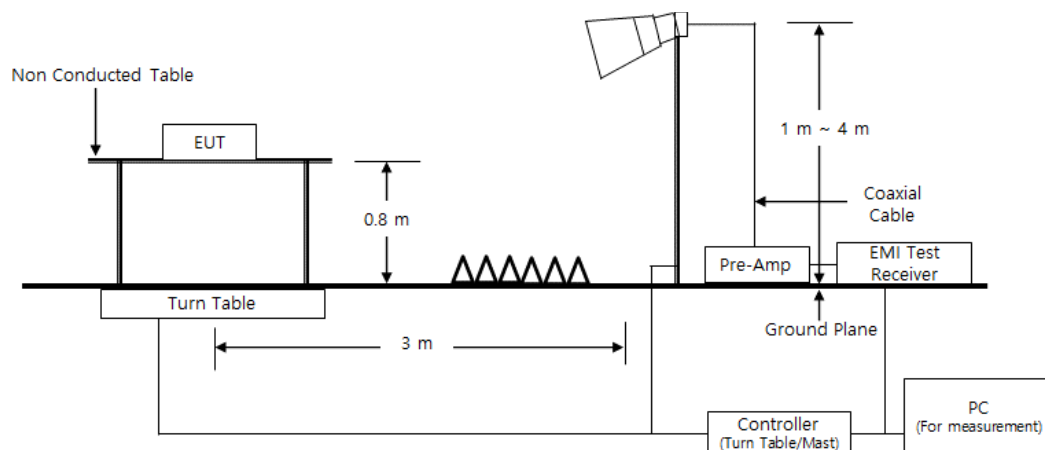
Test Location

SEMI ANECHOIC CHAMBER #5

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<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
<input checked="" type="checkbox"/>	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	11, 28, 2023
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	HP	3008A00538	06, 02, 2023
<input checked="" type="checkbox"/>	ATTENUATOR	8491B	HP	23094	04, 21, 2023

Diagram of test setup





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Test Conditions

Temperature: (23,2 ± 0,1) °C

Relative Humidity: (44,8 ± 0,1) % R.H.

Frequency Range of Measurement

1 GHz to 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.
- The Average of the test data is the cispr average result.

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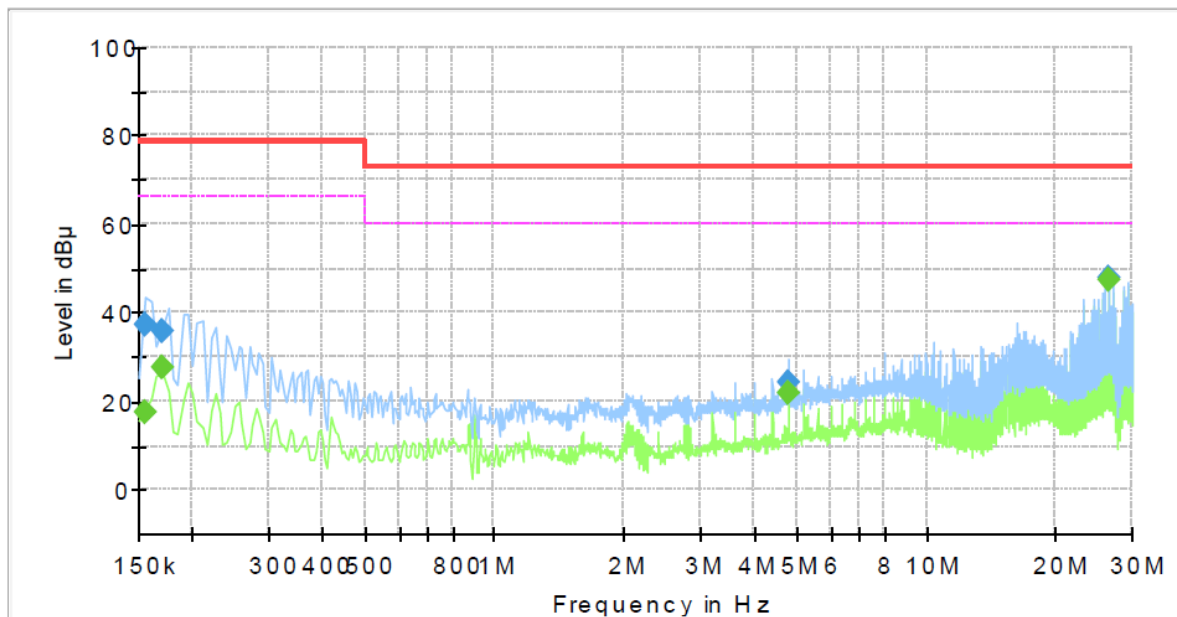
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description: Conducted Emission
 Model No.: SPA-P100B
 Phase: L1
 Mode:
 Operator Name: KES



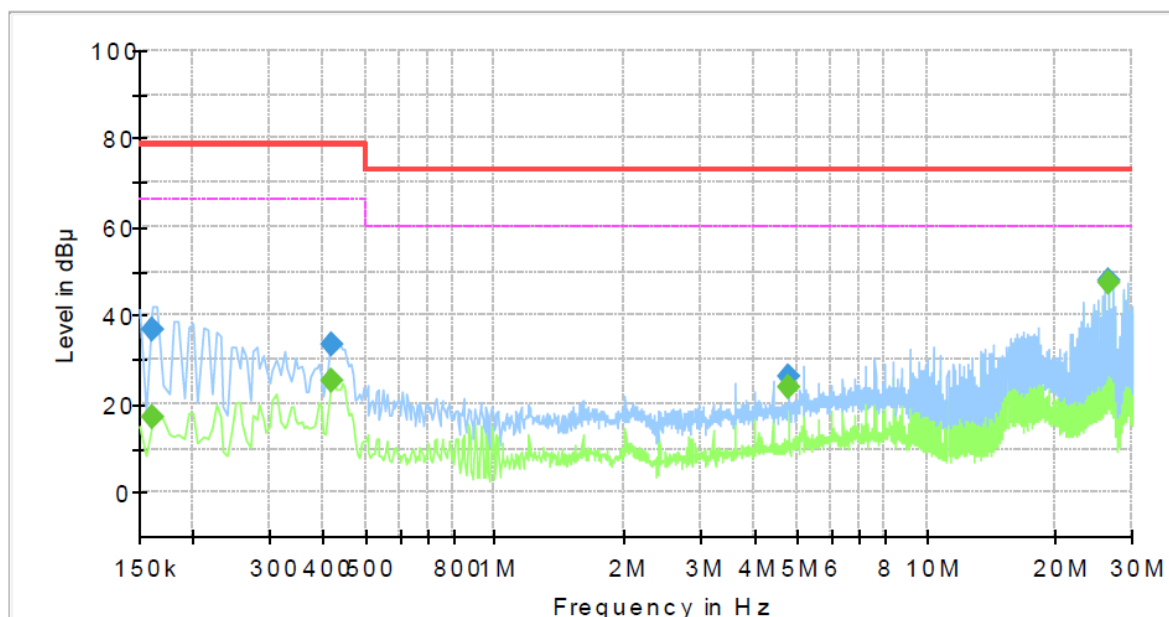
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	17.70	66.00	48.30	1000.0	9.000	L1	19.5
0.155000	37.27	---	79.00	41.73	1000.0	9.000	L1	19.5
0.170000	---	27.45	66.00	38.55	1000.0	9.000	L1	19.5
0.170000	35.81	---	79.00	43.19	1000.0	9.000	L1	19.5
4.795000	---	21.92	60.00	38.08	1000.0	9.000	L1	19.7
4.795000	24.36	---	73.00	48.64	1000.0	9.000	L1	19.7
26.610000	---	47.34	60.00	12.66	1000.0	9.000	L1	20.3
26.610000	47.87	---	73.00	25.13	1000.0	9.000	L1	20.3

NEUTRAL LINE

Common Information

Test Description: Conducted Emission
 Model No.: SPA-P100B
 Phase: N
 Mode:
 Operator Name: KES



Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	16.78	66.00	49.22	1000.0	9.000	N	19.4
0.160000	36.57	---	79.00	42.43	1000.0	9.000	N	19.4
0.420000	---	25.45	66.00	40.55	1000.0	9.000	N	19.7
0.420000	33.42	---	79.00	45.58	1000.0	9.000	N	19.7
4.800000	---	24.01	60.00	35.99	1000.0	9.000	N	19.7
4.800000	26.04	---	73.00	46.96	1000.0	9.000	N	19.7
26.610000	---	47.36	60.00	12.64	1000.0	9.000	N	20.3
26.610000	47.88	---	73.00	25.12	1000.0	9.000	N	20.3

◆ Calculation

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

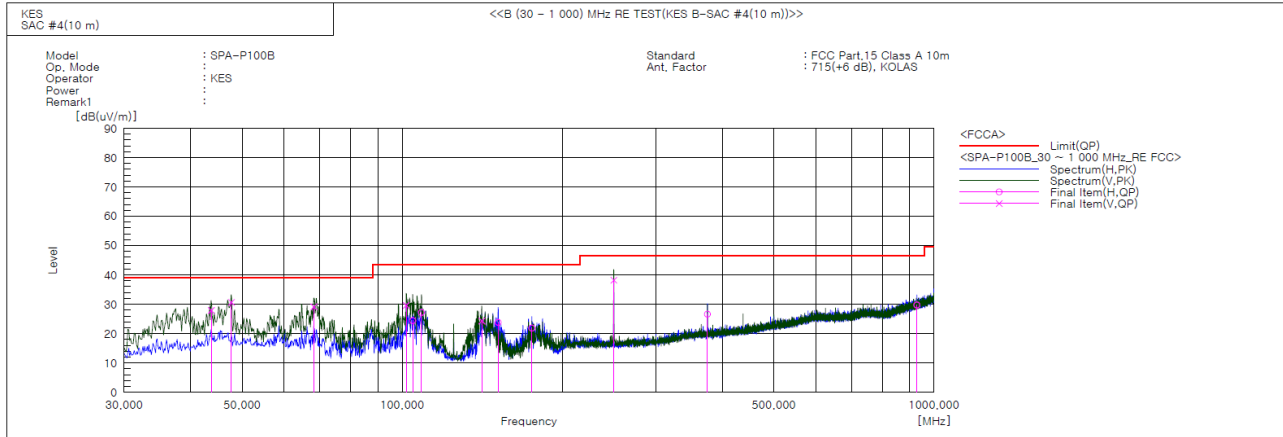
QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

Radiated Electric Field Emissions(Below 1 GHz)

- 47 CFR Part 15, Subpart B

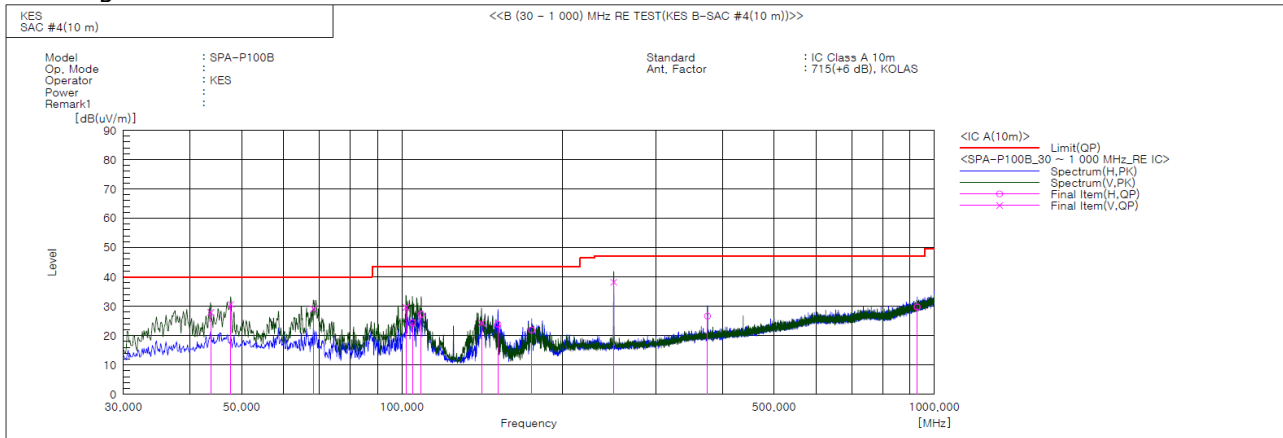


Final Result

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	43.738	V	49.0	-21.1	27.9	39.0	11.1	144.0	149.0	
2	47.734	V	51.2	-20.6	30.6	39.0	8.4	133.0	82.0	
3	68.194	V	52.9	-23.8	29.1	39.0	9.9	109.0	301.0	
4	101.767	V	51.6	-22.0	29.6	43.5	13.9	139.0	249.0	
5	104.694	H	46.5	-22.1	24.4	43.5	19.1	358.0	9.0	
6	108.691	H	49.6	-22.4	27.2	43.5	16.3	381.0	1.0	
7	141.186	V	49.3	-25.0	24.3	43.5	19.2	155.0	249.0	
8	151.493	H	48.7	-24.9	23.8	43.5	19.7	396.0	303.0	
9	175.379	H	45.4	-23.6	21.8	43.5	21.7	394.0	348.0	
10	249.948	V	57.0	-18.8	38.2	46.5	8.3	161.0	179.0	
11	374.956	H	40.6	-14.0	26.6	46.5	19.9	344.0	333.0	
12	928.826	H	33.1	-3.4	29.7	46.5	16.8	336.0	348.0	

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- IC Regulation ICES-003 Issue 7



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	43.738	V	49.0	-21.1	27.9	40.0	12.1	144.0	149.0	
2	47.734	V	51.2	-20.6	30.6	40.0	9.4	133.0	82.0	
3	68.194	V	52.9	-23.8	29.1	40.0	10.9	109.0	301.0	
4	101.767	V	51.6	-22.0	29.6	43.5	13.9	139.0	249.0	
5	104.694	H	46.5	-22.1	24.4	43.5	19.1	358.0	9.0	
6	108.691	H	49.6	-22.4	27.2	43.5	16.3	381.0	1.0	
7	141.186	V	49.3	-25.0	24.3	43.5	19.2	155.0	249.0	
8	151.493	H	48.7	-24.9	23.8	43.5	19.7	396.0	303.0	
9	175.379	H	45.4	-23.6	21.8	43.5	21.7	394.0	348.0	
10	249.948	V	57.0	-18.8	38.2	47.0	8.8	161.0	179.0	
11	374.956	H	40.6	-14.0	26.6	47.0	20.4	344.0	333.0	
12	928.826	H	33.1	-3.4	29.7	47.0	17.3	336.0	348.0	

◆ Calculation - SAC #4(10 m)

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

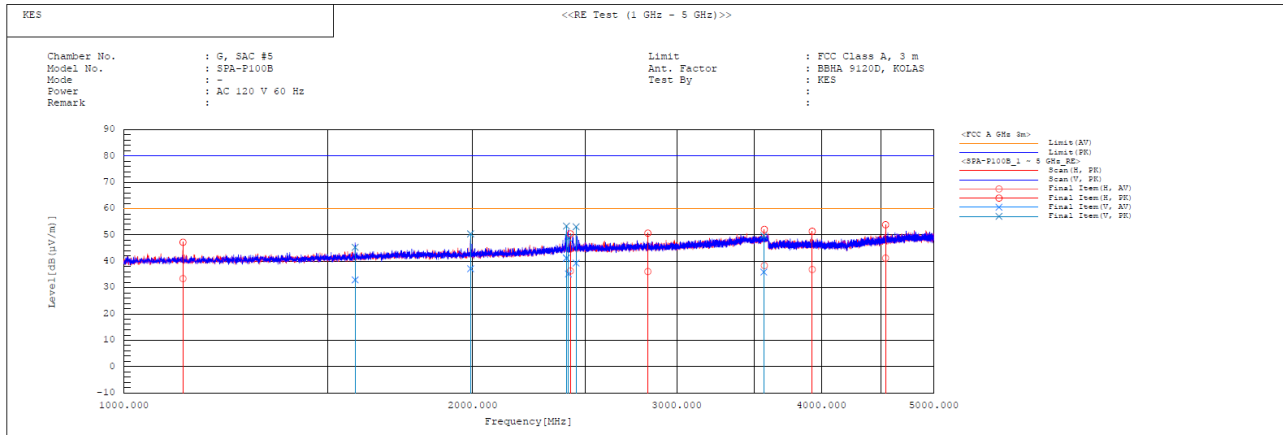
Margin(QP)[dB] = Limit[dB(μV/m)] - Result(QP) [dB(μV/m)]

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



Radiated Electric Field Emissions(Above 1 GHz)



Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1124.814	H	35.3	49.1	-1.9	33.4	47.2	60.0	80.0	26.6	32.8	341.0	253.7	
2	1583.633	V	32.7	45.1	0.2	32.9	45.3	60.0	80.0	27.1	34.7	114.0	247.5	
3	1991.631	V	35.3	48.5	1.9	37.2	50.4	60.0	80.0	22.8	29.6	146.0	244.9	
4	2410.084	V	37.9	50.1	3.3	41.2	53.4	60.0	80.0	18.8	26.6	156.0	42.5	
5	2418.839	V	31.9	45.5	3.3	35.2	48.8	60.0	80.0	24.8	31.2	107.0	359.2	
6	2428.388	H	33.0	47.1	3.3	36.3	50.4	60.0	80.0	23.7	29.6	344.0	255.5	
7	2457.149	V	35.9	49.7	3.4	39.3	53.1	60.0	80.0	20.7	26.9	158.0	5.0	
8	2832.788	H	31.5	46.1	4.6	36.1	50.7	60.0	80.0	23.9	29.3	392.0	74.9	
9	3566.923	V	30.0	43.8	5.9	35.9	49.7	60.0	80.0	24.1	30.3	121.0	108.7	
10	3570.682	H	32.5	46.2	5.9	38.4	52.1	60.0	80.0	21.6	27.9	355.0	354.0	
11	3927.486	H	30.3	44.8	6.6	36.9	51.4	60.0	80.0	23.1	28.6	365.0	85.7	
12	4543.236	H	32.2	44.9	9.0	41.2	53.9	60.0	80.0	18.8	26.1	339.0	88.2	

◆ Calculation

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

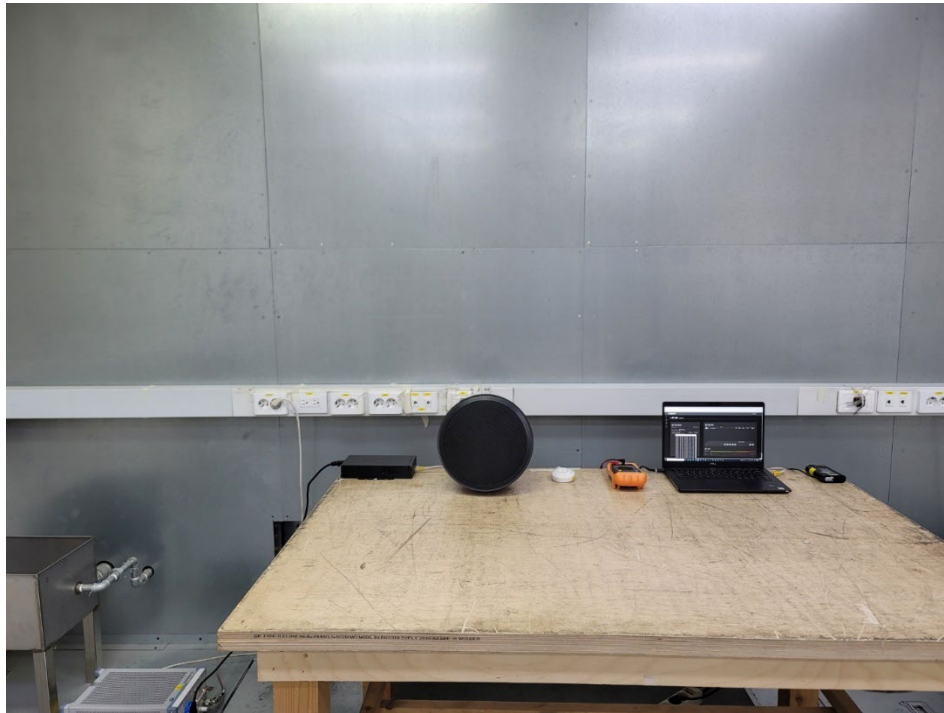
Margin(PK/CAV)[dB] = Limit[dB(μV/m)] - Result(PK/CAV) [dB(μV/m)]

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: Margin value

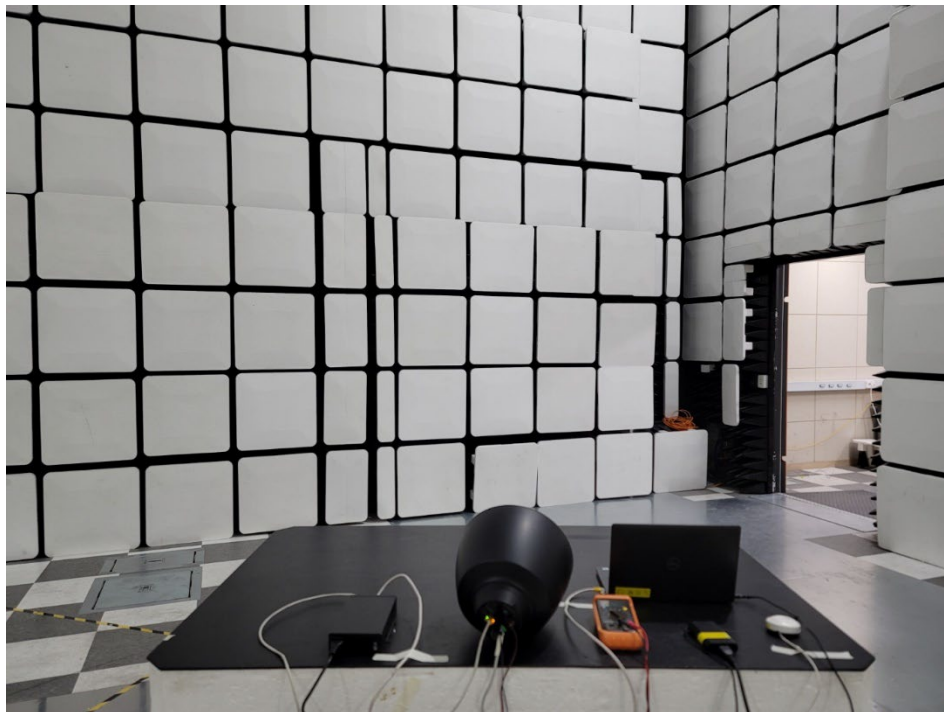
Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports



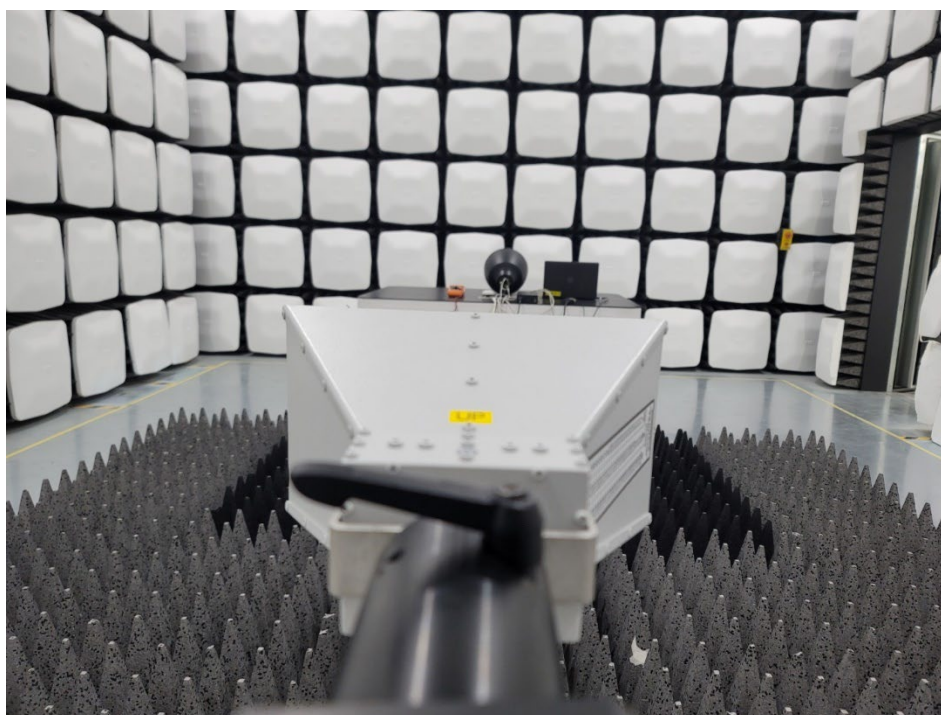
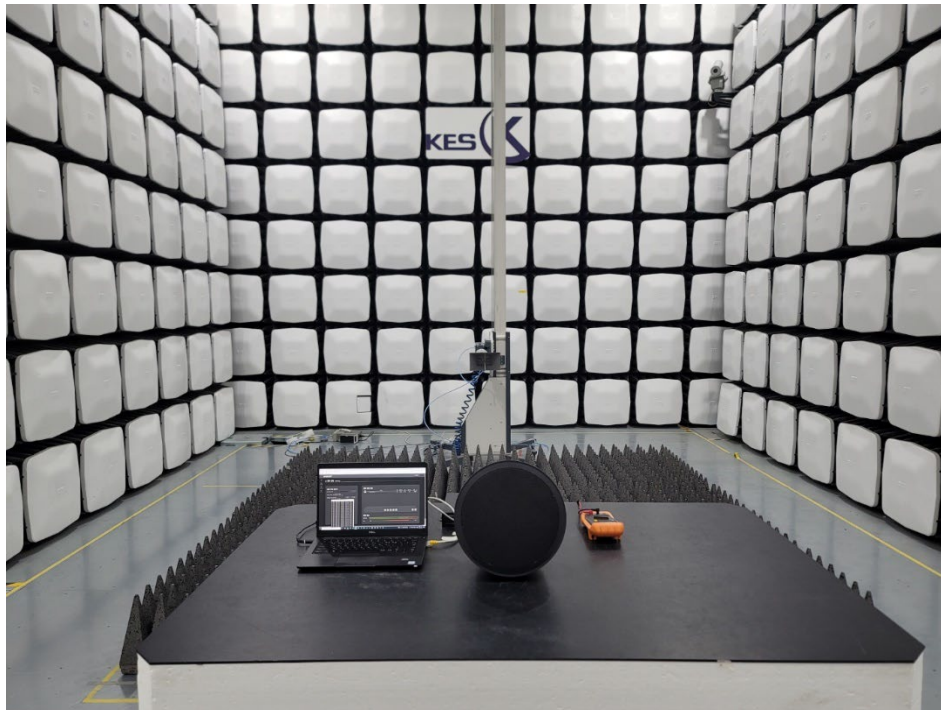
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

(Internal View)



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EUT Internal View – Board 1

(Top)



(Bottom)



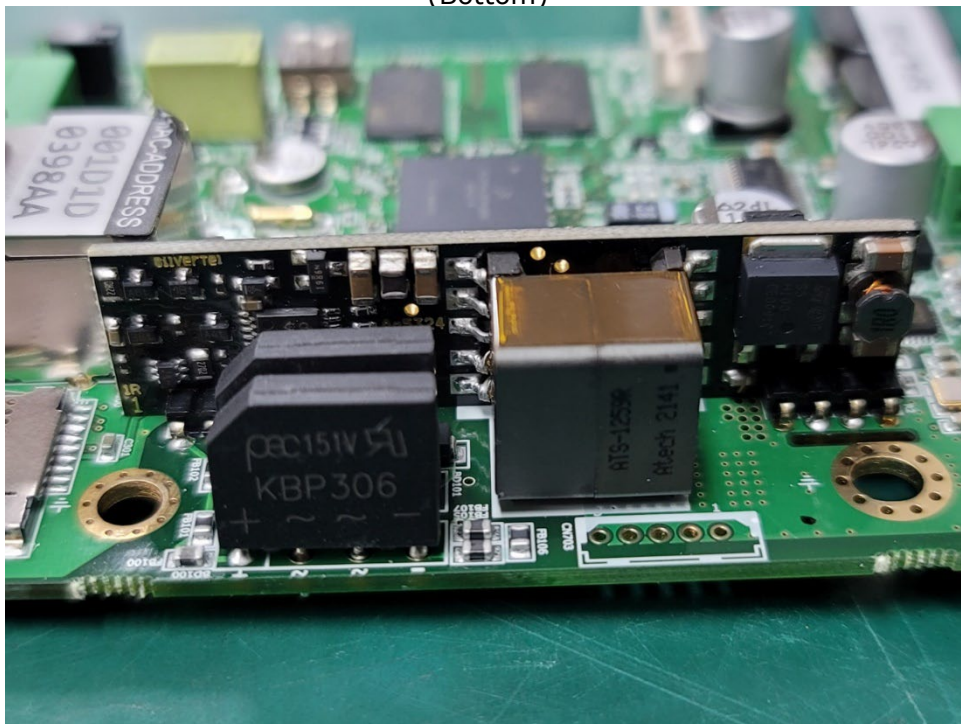
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EUT Internal View – Board 2

(Top)



(Bottom)



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EUT Internal View – Speaker

(Top)



(Bottom)



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Label Photographs

FCC Label



Hanwha Vision Co., Ltd

SPA-P100B

IC Label

CAN ICES-003(A) / NMB-003(A)

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.