EU Declaration of Conformity

EU Declaration of Conformity

According to

EMC Directive 2014/30/EU

For the following

Product	**:**	**NETWORK VIDEO RECORDER**
Model Name	**:**	**DR-8432D**
Applicant	**:**	**IDIS CO., LTD.**
Address	**:**	**8-10, TECHNO 3-RO, YUSEONG-GU, DAEJEON, KOREA**
Manufactured at	**:**	**IDIS CO., LTD.**
Address	**:**	**8-10, TECHNO 3-RO, YUSEONG-GU, DAEJEON, KOREA**

The submitted sample of the above equipment has been tested for CE marking according to following European Directive and standards:
- Electromagnetic Compatibility Directive 2014/30/EU

The referred test report(s) show that the product complies with standard(s) recognized as giving presumption of compliance with the essential requirements in the specified European Directive.
This verification does not imply assessment of the production of the product.
The CE marking may be affixed if all relevant and effective European Directives with CE are applicable.

The standards relevant for the evaluation of EMC requirements are as follows:

Test Standards	**:**	**EN 55032:2015, Class A** **EN 50130-4:2011 /A1:2014** **EN 61000-3-2:2014** **EN 61000-3-3:2013**

Date of issue: 2018-03-15

IDIS CO., LTD.

8-10, TECHNO 3-RO, YUSEONG-GU,
DAEJEON, KOREA

(Name and signature of authorized person)

TEST REPORT

KCTL Inc.
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

1. Client

- Name : IDIS CO., LTD.
- Address : 8-10, TECHNO 3-RO, YUSEONG-GU, DAEJEON, KOREA
- Date of Receipt : 2018-02-05

2. Use of Report : -

3. Name of Product and Model : NETWORK VIDEO RECORDER / DR-8432D

4. Manufacturer and Country of Origin : IDIS CO., LTD. / Korea

5. Date of Test : 2018-02-21 to 2018-03-10

6. Test method used : EN 55032:2015, Class A
EN 50130-4:2011 /A1:2014
EN 61000-3-2:2014
EN 61000-3-3:2013

7. Test Results : Refer to the test result in the test report

Affirmation	Tested by Name : Jinwon Kim (Signature)	Technical Manager Name : Gunsu Park (Signature)

2018-03-15

KCTL Inc.

REPORT REVISION HISTORY

Date	Revision	Page No
2018-03-15	Originally issued	-

Contents

1. Applicant information

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Manufacturer:	IDIS CO., LTD.
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Contact name:	Jungdoo Jang

2. Laboratory information

Address

KCTL Inc. (Suwon Lab.)

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea

Telephone Number: 82 31 285 0894

Facsimile Number: 82 505 299 8311

FCC Site Designation No: KR0040, FCC Site Registration No: 687132

VCCI Registration No. : R-3327, G-198, C-3706, T-1849

Industry Canada Registration No. : 8035A

KOLAS NO.: KT231

SITE MAP

3. Test system configuration

3.1 Operation environment

	Temperature	Humidity	Pressure
Chamber 10 m(RE)	23.0 °C / 23.2 °C	20.5 % R.H. / 20.2 % R.H.	-
Shielded room(CE)	21.7 °C	23.3 % R.H.	-
Shielded room(ESD)	20.6 °C	48.8 % R.H.	101.7 kPa

Test site

These testing items were performed following locations;

Test item	Test site
Conducted Emission	Shielded Room
Radiated Emission	10 m Chamber
Harmonics current	EMI Test area
Voltage fluctuations and flickers	EMI Test area
Electrostatic discharge	Shielded Room
Radiated RF immunity	6F Fully anechoic chamber (3 m)
Electric Fast Transient/BURST	Shielded Room
Surge	Shielded Room
Conducted RF immunity	Shielded Room
Voltage dip/interruption	Shielded Room
Mains supply voltage variations	Shielded Room

3.2 Measurement Uncertainty

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

Conducted Emission measurement (Confidence level about 95 %, *k* = 2)		
Shielded Room (CE#1)	9 kHz ~ 150 kHz: 3.66 dB	
	150 kHz ~ 30 MHz: 3.24 dB	
Shielded Room (CE#2)	9 kHz ~ 150 kHz: 3.48 dB	
	150 kHz ~ 30 MHz: 3.06 dB	
Radiated Emission measurement (Confidence level about 95 %, *k* = 2)		
10 m Chamber (4F)	30 MHz ~ 300 MHz	3 m: 5.02 dB
		10 m: 5.00 dB
	300 MHz ~ 1 000 MHz	3 m: 5.16 dB
		10 m: 5.04 dB
	1 GHz ~ 6 GHz	3 m: 6.30 dB
10 m Chamber (2F)	30 MHz ~ 300 MHz	3 m: 5.54 dB
		10 m: 5.52 dB
	300 MHz ~ 1 000 MHz	3 m: 5.60 dB
		10 m: 5.48 dB
	1 GHz ~ 6 GHz	3 m: 6.32 dB
Radio Frequency Electromagnetic Fields (Confidence level about 95 %, *k* = 2)		
0.86 dB		
Disturbance Power Electromagnetic Fields (Confidence level about 95 %, *k* = 2)		
2.82 dB		

3.3 Measurement Program

These test items were performed by software programs;

Test item	Measurement Program		Used
Conducted Emission	EP5CE_V 5.4.0(TOYO)		☒
Radiated Emission	2F	EP5RE_V 4.6.0(TOYO)	☒
	4F	EP5RE_V 5.11.10(TOYO)	
Harmonics current, Voltage fluctuations and flickers	CTS 4_V 4.6.2 (AMETEK)		☒
Radiated RF immunity	3F	EMC32_V 9.01.0 (ROHDE & SCHWARZ)	☒
	6F	EMC32_V 8.53.0 (ROHDE & SCHWARZ)	
Electrical Fast Transient/BURST, Surge, Voltage dip/interruption	6F(#1)	ISMIEC_V 4.08(EM TEST)	☒
	6F(#2)	ISMIEC_V 4.07(EM TEST)	
	3F(#3)	IEC_V 5.2.9(EM TEST)	
Conducted RF immunity	6F(#1)	EMC32_V 9.25.00 (ROHDE & SCHWARZ)	☒
	3F(#2)	ICD_V 5.3.4(EM TEST)	

4. Description of EUT

4.1 General information

VIDEO	
Video Inputs	16/32 IP channels
Video Outputs	1 HDMI, 1 VGA
Display Resolution	3840x2160, 1920 x 1200 , 1920 x 1080, 1680 x 1050, 1600 x 1200
Display Speed	Up to 960ips (DR-8432/8432D) Up to 480ips (DR-8416)

* If more than 16 cameras from video encoders are registered on the NVR, video may not be displayed smoothly in a remote program.

RECORDING	
Max. Throughput	230Mbps, 480ips@Full HD, 120ips @ 4K (UHD) (DR-8416) 230Mbps, 960ips @ Full HD,120ips @ 4K (UHD) (DR-8432/8432D)
Compression	H.265, H.264
Recording Mode	Time-Lapse, Event, Pre-Event, Panic

PLAYBACK	
Performance	16ch Full HD synchronous playback 4ch 4K playback
Search Mode	Time-lapse, Event log,Thumbnail, Motion, Text-in

STORAGE	
HDD	SATA x 8, eSATA x4,(Up to 6TB capacity for each disk), RAID 1, 5, 6, 10 supported
Total Capacity	144TB(6TB x (8(internal)+4x4(internal)))
Data Export Device	USB HDD, USB Stick

NETWORK	
Client Connection	Gigabit Ethernet(Client) x1
Video in Connection	Gigabit Ethernet(Video In) x3, SFP(Video In) x 2
Transmission Speed	50Mbps / 100Mbps(BRP Mode)
Event Notification	Email (attach clip (.cbf) .MP4), Callback to Remote S/W, Push notification (IDIS Mobile)

INTERFACE	
Audio In / Out	NVR : 1 RCA / 1 RCA + 1 HDMI
NVR Alarm Spec- In	16 TTL, NC/NO programmable, 2.4V (NC) or 0.3V (NO) threshold, 5V DC
NVR Alarm Spec- Out	4 relay output, NC/NO, 2A@125V AC, 1A@30V DC
NVR Alarm Spec - Reset IN	1 TTL, terminal block
Internal Buzzer	Yes
Serial Interface	RS232 (Terminal Block), RS485 (Terminal Block)
USB	USB 2.0 x 2. USB 3.0 x 1

GENERAL	
Operating System	Embedded Linux
Unit Dimensions (W x H x D)	482.6mm x 88mm x 523.3mm (19"x3.5"x20.6")
Unit Weight	10.5kg (23.1lb) (DR-8416/DR-8432) 10.8kg (23.8lb) (DR-8432D)
Working Temperature	0°C to 40°C
Operating Humidity	0% ~ 90%
Power	AC 100-240 V, 50/60Hz, 6.0 - 3.0A (DR-8416/DR-8432) AC 100-240 V, 50/60Hz, 8.0 - 4.0A (DR-8432D)
Power input	AC 100-240 V, 50/60Hz, 6.0 - 3.0A (DR-8416/DR-8432) AC 100-240 V, 50/60Hz, 8.0 - 4.0A (DR-8432D)
Power Consumption	Max. 105W (DR-8416/DR-8432) Max. 115W (DR-8432D)

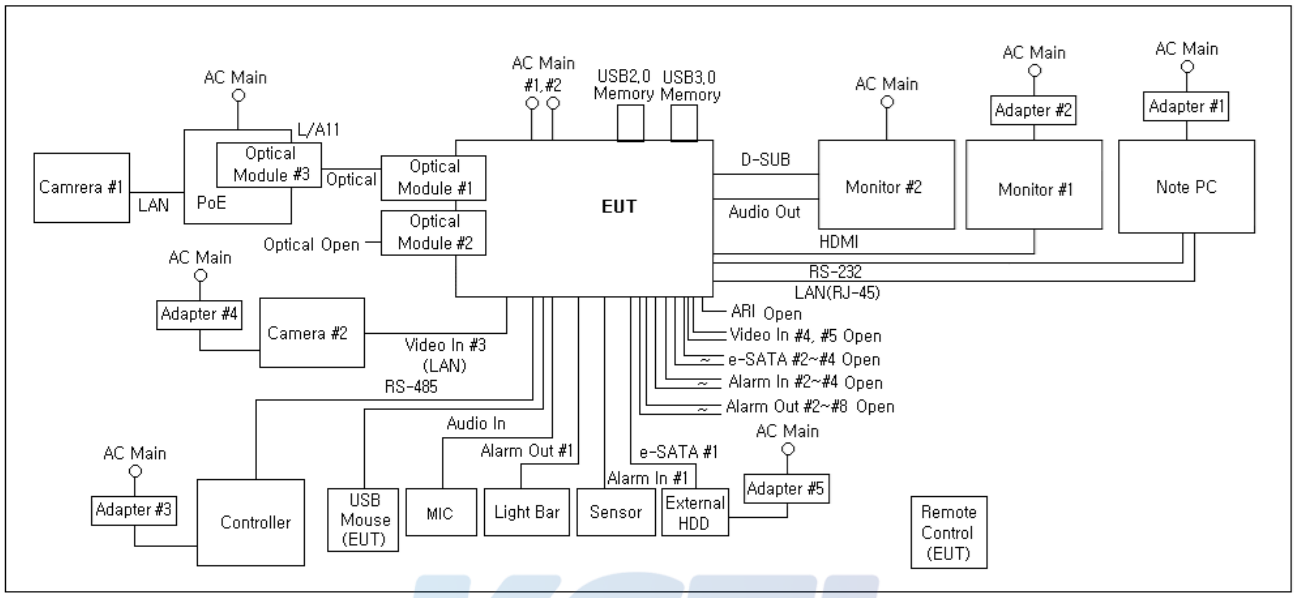
4.2 Product description

Type of product	NETWORK VIDEO RECORDER
Model name (Basic)	DR-8432D
Model name (Variant)	-
Difference	-
Serial no	-
Testing voltage	230 V, 50 Hz
Input rating	AC 100 V ~ 240 V, 50/60 Hz
Internal clock frequency	6 GHz
Note	-

4.3 Auxiliary equipments

Type	Model / Part #	S/N	Manufacturer
MIC	-	-	-
Note PC	HP ProBook 470 G2	CND50740W0	HP
Adapter #1	PPP009C	F220881440034774	HP
Monitor #1	27UD88	705NTSU4H358	LG
Adapter #2	LCAP31	EH37N629490051248	LG
Controller	SCC-1000	C60E67WC801263M	SAMSUNG
Adapter #3	ADS-65LSI-12-1	-	HOIOTO
Camera #1	B310-DP	-	IDIS
Camera #2	EB310-P	-	IDIS
Adapter #4	PW1205B	-	DOO HYUN ELEC
Sensor	-	-	DAE MYUNG ELECTRONICS CO., LTD
Light Bar	DS-360	-	DAE MYUNG ELECTRONICS CO., LTD
PoE	DDR3F-DIE	-	-
USB 2.0 Memory (16 GB)	SDCZ50-016G	-	SanDisk
USB 3.0 Memory (16 GB)	SDCZ48-016G-U46	-	SanDisk
Optical Module #1	APS31123CDL20	S1T31251200045	ATOP
Optical Module #2	APS31123CDL20	S1T31251200067	ATOP
Optical Module #3	APS31123CDL20	S1T31251200051	ATOP
External HDD	IT-735	6127677	IT-CEO
Adapter #5	PW1205B	-	DOO HYUN ELEC

4.4 Test configuration



	Start		End		Cable		
	Name	I/O port	Name	I/O port	Length (m)	Spec.	Cable
1	EUT	Power #1	AC Main	-	1.5	Unshield	-
2		Power #2	AC Main	-	1.5	Unshield	-
3		USB2.0	USB2.0 Memory	-	Direct	-	-
4		USB3.0	USB3.0 Memory	-	Direct	-	-
5		Video In #1	Optical Module #1	-	Direct	-	-
6		Video In #2	Optical Module #2	-	Direct	-	-
7		Alarm Out #1	Light Bar	-	3.0	Unshield	Out-door
8		Alarm In #1	Sensor	-	3.0	Unshield	Out-door
9		Video In #3 (LAN)	Camera #2	LAN	3.0	Unshield	Out-door
10		RS-485	Controller	RS-485	3.0	Unshield	Out-door
11		D-SUB	Monitor #2	D-SUB	1.5	Shield	-
12		Audio Out	Monitor #2	Audio In	3.0	Shield	Out-door
13		HDMI	Monitor #1	HDMI	1.7	Shield	-
14		RS-232	Note PC	USB	3.0	Unshield	Out-door
15		e-SATA #1	External HDD	-	0.5	Shield	-
16		USB	USB Mouse(EUT)	-	1.0	Shield	-
17		e-SATA #2~#4	Open	-	0.5	Shield	-
18		Video In #4, #5	Open	-	3.0	Unshield	-
19		LAN(RJ-45)	Note PC	LAN (RJ-45)	3.0	Unshield	Out-door

20		ARI	Open	-	3.0	Unshield	-
21		Alarm In #2~#4	Open	-	3.0	Unshield	-
22		Alarm Out #2~#8	Open	-	3.0	Unshield	-
23		Audio In	MIC	-	3.0	Shield	Out-door
24	Optical Module #2	Optical	Open	-	3.0	Unshield	-
25	Optical Module #1	Optical	Optical Module #3	Optical	3.0	Unshield	-
26	PoE	Power	AC Main	-	1.5	Unshield	-
27		LAN	Camrera #1	LAN	2.5	Unshield	-
28		L/A11	Optical Module #3	-	Direct	-	-
29	Camera #2	Power	Adapter #4	-	1.2	Unshield	-
30	Controller	Power	Adapter #3	-	1.5	Unshield	-
31	Monitor #1	Power	Adapter #2	-	1.0	Unshield	-
32	Note PC	Power	Adapter #1	-	1.2	Unshield	-
33	External HDD	Power	Adapter #5	-	1.2	Unshield	-

4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
Test #1 [Power #1, Power #2]	Check the EUT operating test by the monitor #1, monitor #2.
	Alarm test.(Used the Light bar, Sensor)
	RS-485 test.(Used the controller)
	Audio In test.(Used the MIC)
	Audio Out test.(Used the Monitor #2)
	Webview test.(Used the program: IRAS)
	Ping test.(Used the Note PC)
	RS-232 test.(Used the program: Teraterm)
Resolution: 1 920 x 1 080, HDMI: 3 840 x 2 160	

5. Summary of test results

5.1 Summary of EMI emission test results

Applied	Test items	Test method	Result
☒	Conducted Emission	EN 55032:2015	Pass
☒	Radiated Emission	EN 55032:2015	Pass
☒	Harmonics current	EN 61000-3-2:2014	Pass
☒	Voltage fluctuations and flickers	EN 61000-3-3:2013	Pass

5.2 Summary of immunity test results

Applied	Test items	Test method	Result
EN 50130-4:2011 /A1:2014			
☒	Electrostatic discharge	EN 61000-4-2:2009	Pass
☒	Radiated RF immunity	EN 61000-4-3:2006 /A2:2010	Pass
☒	Electrical Fast Transient/BURST	EN 61000-4-4:2012	Pass
☒	Surge	EN 61000-4-5:2014	Pass
☒	Conducted RF immunity	EN 61000-4-6:2014	Pass
☒	Voltage dip/interruption	EN 61000-4-11:2004	Pass
☒	Mains supply voltage variations	EN 50130-4:2011 /A1:2014	Pass

This product complies with the requirements of the EMC Directive 2014/30/EU.

5.3 Performance criteria

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.
If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.
A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test (see Clause 6), after the conditioning.

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators occurs at a field strength of 3 V/m.
For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at 10 V/m, providing.

(a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable setting etc.)
(b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and
(c) there is no observable deterioration of the picture at 1 V/m.

The EUT shall meet the acceptance criteria for the functional test(see Clause 6), after the conditioning.

Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of the bursts is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test

(see Clause 6), after the conditioning.

Slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of the surges is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test (see Clause 6), after the conditioning.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators occurs at U_0 = 130 dBμV.
For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at U_0 = 140 dBμV, providing

(a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable settings, etc.)
(b) at U_0 = 130 dBμV, any deterioration of the picture is so minor that the system could still be used, and
(c) there is no observable deterioration of the picture at U_0 = 120 dBμV.

The EUT shall meet the acceptance criteria for the functional test(see Clause 6), after the conditioning.

Voltage dip/interruption / Voltage variation

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test(see Clause 6), after the conditioning.

Mains supply voltage variations

There shall be no damage, malfunction or change of status due to the different supply voltage conditions. The EUT shall meet the acceptance criteria for the functional test(see Clause 6), during the conditioning.

6. Test results

6.1 Conducted Emission

Test specification	EN 55032:2015, Class A		
Testing voltage	230 V, 50 Hz		
Test facility	Shielded room (CE#1)		
Date	2018-02-22		
Temperature (°C)	21.7 °C	Humidity (% R.H.)	23.3 % R.H.
Remarks	Pass		

Both conducted lines are measured in Quasi-Peak and C/Average mode, including the worst-case data points for each tested configuration. The EUT measured in accordance with the methods described in standards.

6.1.1 Limits of conducted emission measurement

☒ AC main

Frequency [MHz]	Resolution Bandwidth [kHz]	Class A (dB(μV))		Class B (dB(μV))	
		Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	9	79	66	66 ~ 56	56 ~ 46
0.5 ~ 5	9	73	60	56	46
5 ~ 30	9	73	60	60	50

☒ Telecommunication

Frequency [MHz]	Resolution Bandwidth [kHz]	Class A Limits (dB(μV))		Current Limits (dB(μV))	
		Quasi-Peak	Average	Quasi-Peak	Average
0.15 ~ 0.5	9	97 to 87	84 to 74	53 to 43	40 to 30
0.5 ~ 30	9	87	74	43	30
Frequency [MHz]	Resolution Bandwidth [kHz]	Class B Limits (dB(μV))		Current Limits (dB(μV))	
		Quasi-Peak	Average	Quasi-Peak	Average
0.15 ~ 0.5	9	84 to 74	74 to 64	40 to 30	30 to 20
0.5 ~ 30	9	74	64	30	20

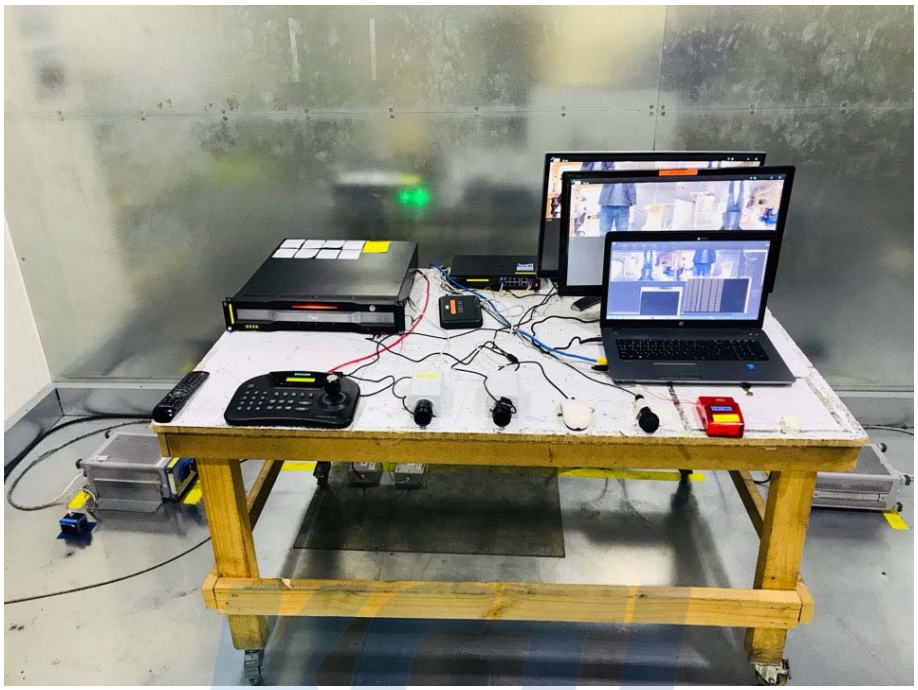
If the reading on the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 seconds at each measurement frequency, the highest reading shall be recorded, with the exception of any brief isolated high reading (which shall be ignored).

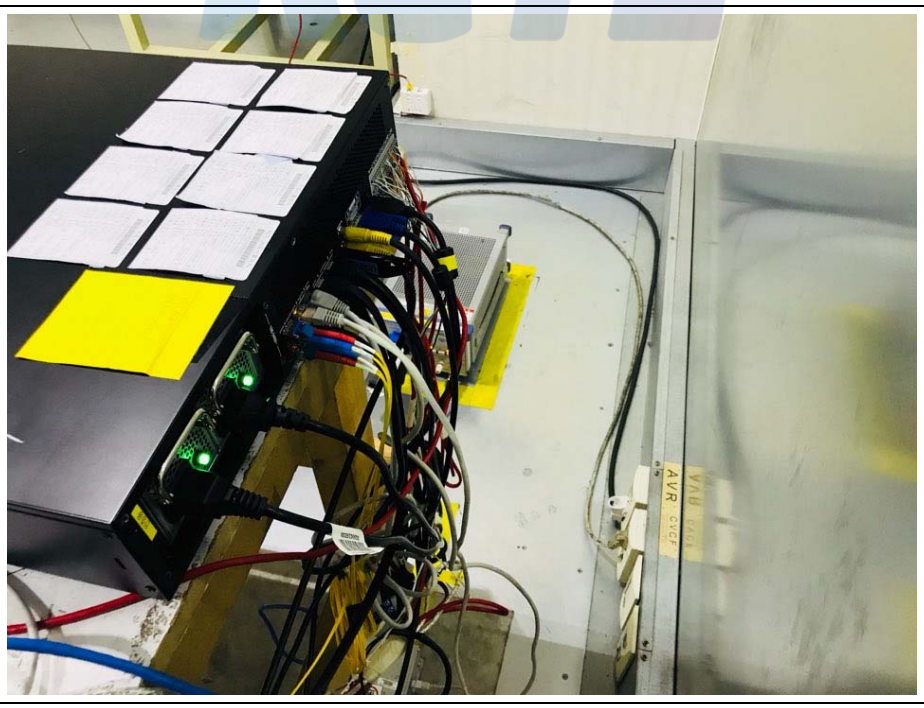
6.1.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
EMI TEST RECEIVER	ESCI	100001	R&S	2018.08.24	☒
TWO-LINE V-NETWORK	ENV216	101358	R&S	2018.08.01	☒
TWO-LINE V-NETWORK	ENV216	101584	R&S	2018.07.03	☒
8-WIRE ISN CAT5	8158 CAT5	CAT5-8158-0071	SCHWARZBECK	2018.08.30	☒
8-WIRE ISN CAT5	NTFM 8158 ISN CAT5	CAT5 8158 #138	SCHWARZBECK	2018.05.18	☒

6.1.3 Photographs of test setup

AC Main

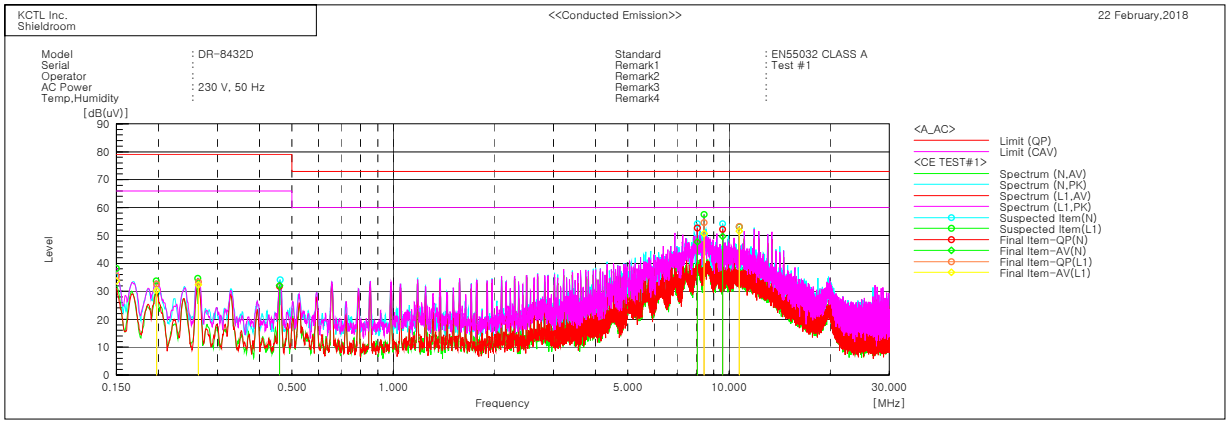




Telecommunication

6.1.4 Conducted emission measurement result

AC Main



Final Result

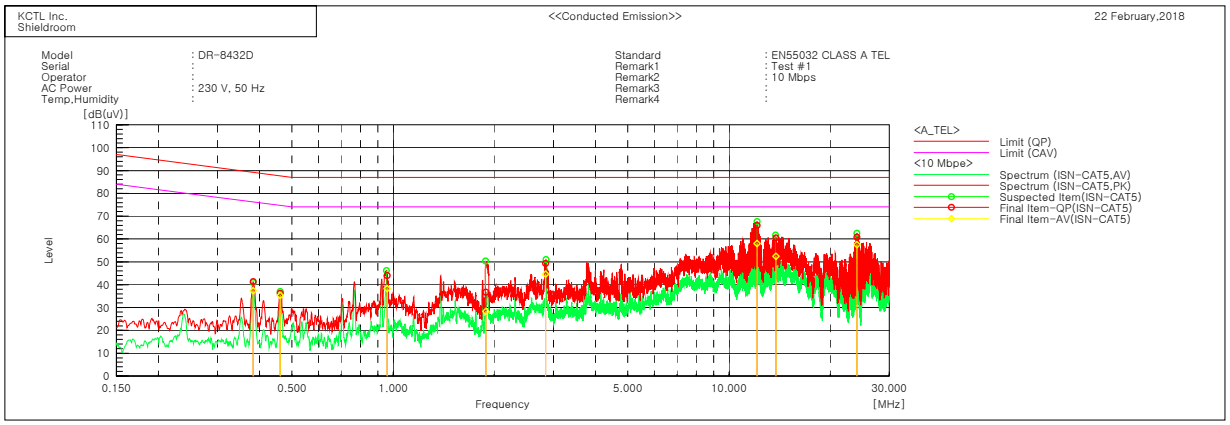
--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.459	22.0	22.2	9.8	31.8	32.0	79.0	66.0	47.2	34.0
2	8.04781	43.0	38.0	9.8	52.8	47.8	73.0	60.0	20.2	12.2
3	9.58072	42.3	39.7	9.9	52.2	49.6	73.0	60.0	20.8	10.4

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.15014	26.0	24.1	9.6	35.6	33.7	79.0	66.0	43.4	32.3
2	0.19762	22.7	20.5	9.8	32.5	30.3	79.0	66.0	46.5	35.7
3	0.26335	23.9	22.8	9.5	33.4	32.3	79.0	66.0	45.6	33.7
4	8.43133	44.8	40.9	9.8	54.6	50.7	73.0	60.0	18.4	9.3
5	10.73091	43.3	41.7	9.9	53.2	51.6	73.0	60.0	19.8	8.4

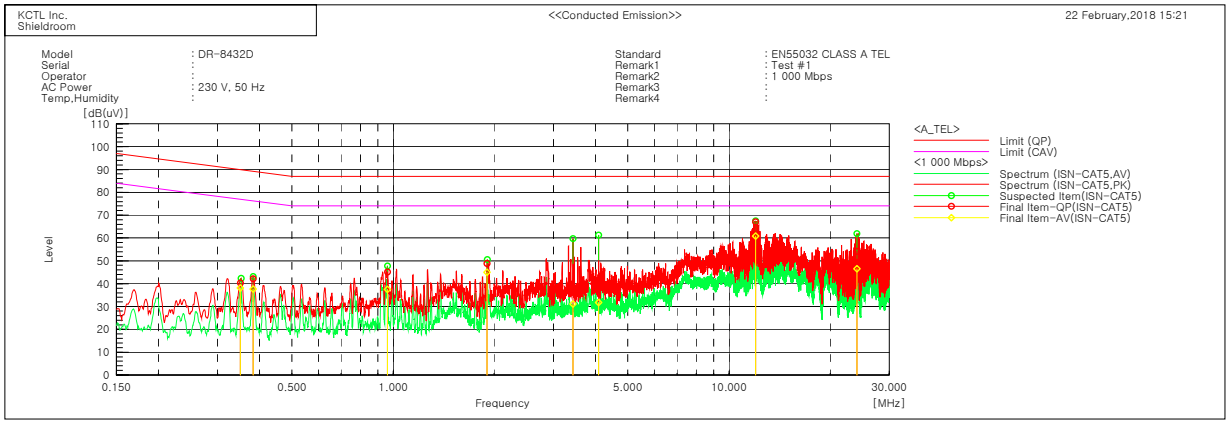
Telecommunication



Final Result

--- ISN-CAT5 Phase ---

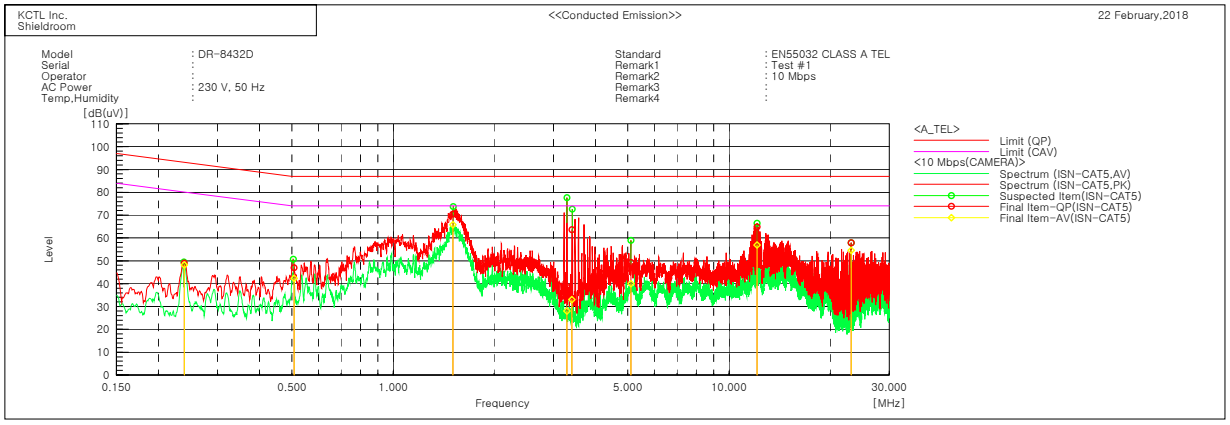
No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.38295	32.0	28.0	9.4	41.4	37.4	89.2	76.2	47.8	38.8
2	0.46145	26.9	25.9	9.4	36.3	35.3	87.7	74.7	51.4	39.4
3	0.95912	34.8	29.0	9.3	44.1	38.3	87.0	74.0	42.9	35.7
4	1.88994	27.5	19.1	9.2	36.7	28.3	87.0	74.0	50.3	45.7
5	2.84755	40.2	35.5	9.2	49.4	44.7	87.0	74.0	37.6	29.3
6	12.13282	56.3	48.3	9.7	66.0	58.0	87.0	74.0	21.0	16.0
7	13.77603	50.9	42.8	9.7	60.6	52.5	87.0	74.0	26.4	21.5
8	24.02924	51.0	47.8	9.8	60.8	57.6	87.0	74.0	26.2	16.4



Final Result

--- ISN-CAT5 Phase ---

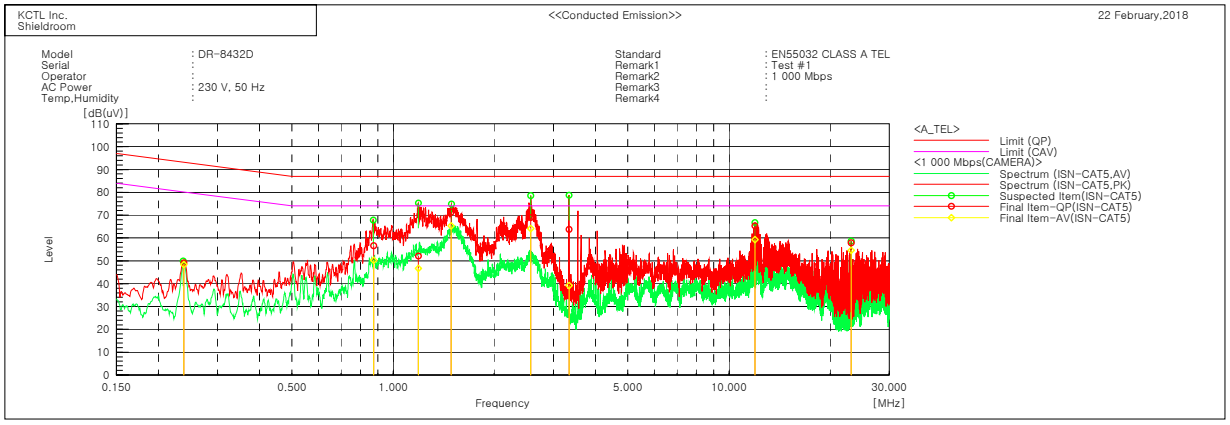
No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.35082	31.0	28.7	9.4	40.4	38.1	89.9	76.9	49.5	38.8
2	0.38314	32.8	28.3	9.4	42.2	37.7	89.2	76.2	47.0	38.5
3	0.96284	35.8	28.1	9.3	45.1	37.4	87.0	74.0	41.9	36.6
4	1.90543	39.7	35.7	9.2	48.9	44.9	87.0	74.0	38.1	29.1
5	3.43248	28.5	22.0	9.2	37.7	31.2	87.0	74.0	49.3	42.8
6	4.09264	32.2	22.5	9.3	41.5	31.8	87.0	74.0	45.5	42.2
7	12.01449	57.4	51.1	9.7	67.1	60.8	87.0	74.0	19.9	13.2
8	24.03898	44.3	36.7	9.8	54.1	46.5	87.0	74.0	32.9	27.5



Final Result

--- ISN-CAT5 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.2386	39.5	38.8	9.5	49.0	48.3	93.1	80.1	44.1	31.8
2	0.50696	37.6	33.0	9.4	47.0	42.4	87.0	74.0	40.0	31.6
3	1.50738	61.2	56.5	9.3	70.5	65.8	87.0	74.0	16.5	8.2
4	3.29459	27.7	18.8	9.2	36.9	28.0	87.0	74.0	50.1	46.0
5	3.41042	54.4	23.8	9.2	63.6	33.0	87.0	74.0	23.4	41.0
6	5.10301	40.1	30.8	9.3	49.4	40.1	87.0	74.0	37.6	33.9
7	12.13267	55.1	47.3	9.7	64.8	57.0	87.0	74.0	22.2	17.0
8	23.12823	48.1	44.8	9.8	57.9	54.6	87.0	74.0	29.1	19.4



Final Result

--- ISN-CAT5 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.23813	39.7	38.9	9.5	49.2	48.4	93.2	80.2	44.0	31.8
2	0.8741	47.2	40.8	9.4	56.6	50.2	87.0	74.0	30.4	23.8
3	1.19012	42.8	37.3	9.3	52.1	46.6	87.0	74.0	34.9	27.4
4	1.48911	62.0	56.0	9.3	71.3	65.3	87.0	74.0	15.7	8.7
5	2.56931	59.7	54.9	9.2	68.9	64.1	87.0	74.0	18.1	9.9
6	3.34177	54.6	30.0	9.2	63.8	39.2	87.0	74.0	23.2	34.8
7	11.95245	55.7	49.6	9.7	65.4	59.3	87.0	74.0	21.6	14.7
8	23.12854	48.1	44.8	9.8	57.9	54.6	87.0	74.0	29.1	19.4

6.2 Radiated Emission

Test specification		EN 55032:2015, Class A		
Testing voltage		230 V, 50 Hz		
Test facility		10 m Chamber (4F)		
Test distance		10 m, 3 m		
Date		2018-02-21		
10 m 3 m	Temperature(°C)	23.0 °C 23.2 °C	Humidity (% R.H.)	20.5 % R.H. 20.2 % R.H.
Remarks		Pass		

Of those emissions above (*L* – 20 dB), where *L* is the limit level in logarithmic units, record at least the emission levels and the frequencies of the six highest emissions.
The following data lists the significant emission frequencies, measured levels, correction factors (for antenna and cables), orientation of table, polarization and height of antenna, the corrected reading, the limit, and the amount of margin. All measurements were taken utilizing quasi-peak detection unless stated otherwise.
Measurements were performed at an antenna to EUT distance of 10 or 3 meters and elevated between 1 and 4 meters. Both vertical and horizontal antenna polarizations were measured.

Below 1 GHz, peak detector function mode for prescan was used with resolution bandwidth of 120 kHz and a video bandwidth of 300 kHz and sweep method.
The sweep time for prescan set below 200 ms up and final measurement with quasi-peak detector evaluated for suspected frequencies points, which are detected from prescan measurement.

Final measurements consisted of 3 steps.
First step, frequency fine tuning to find exact emission frequency.
Second step, rechecking to search for maximum height and azimuth for interference from EUT
In final step, there are conducted measuring with quasi-peak detector for points which are detected from 1st step & 2nd step.

6.2.1 Limits of radiated emission measurement

☒ Limits below 1 GHz

Frequency [MHz]	Resolution Bandwidth [kHz]	Class A (dB(μV/m)) @ 10 m	Class B (dB(μV/m)) @ 10 m
30 ~ 230	120	40	30
230 ~ 1 000	120	47	37

☒ Limits above 1 GHz

Frequency [GHz]	Resolution Bandwidth [MHz]	Class A @ 3 m		Class B @ 3 m	
		Average limit (dB(μV/m))	Peak limit (dB(μV/m))	Average limit (dB(μV/m))	Peak limit (dB(μV/m))
1 ~ 3	1	56	76	50	70
3 ~ 6	1	60	80	54	74
Note - The lower limit applies at the transition frequency.					

Measurements within 20 dB of the limit were then maximized by adjusting turntable position.

Final measurements were made using an C/Average detector.

Results checked manually and points close to the limit line were re-measured.

6.2.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
EMI TEST RECEIVER	ESR7	101078	R&S	2018.08.24	☒
Bilog Antenna	CBL 6112D	37876	TESEQ	2018.08.05	☒
AMPLIFIER	310N	293004	SONOMA	2018.08.24	☒
ATTENUATOR	8491B	MY39270292	AGILENT	-	☒
Antenna Mast	MA4640-XP-ET	-	Innco Systems	-	☒
Turn Table	TT 3.0-3t	-	MATURO	-	☒
PREAMPLIFIER	8449B	3008A01802	AGILENT	2018.04.06	☒
DOUBLE RIDGED HORN ANTENNA	3115	00086706	ETS-LINDGREN	2018.08.31	☒
Spectrum Analyzer	FSV40	100988	R&S	2019.01.05	☐

6.2.3 Sample calculation

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

The sample calculation is as follow:

Result = M.R + C.F(A.F + C.L + 6 dB Att – A.G)

M.R = Meter Reading

C.F = Correction Factor

A.F = Antenna Factor

C.L = Cable Loss

A.G = Amplifier Gain

6 dB Att = 6 dB Attenuator

If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 6 dB, A.G 35 dB

The result is 30 + 12 + 5 + 6 – 35 = 18 dB(μN/m)

Bilog Antenna and ATTENUATOR (6 dB) were calibrated together.

AV = CAV : Abbreviation of CISPR Average

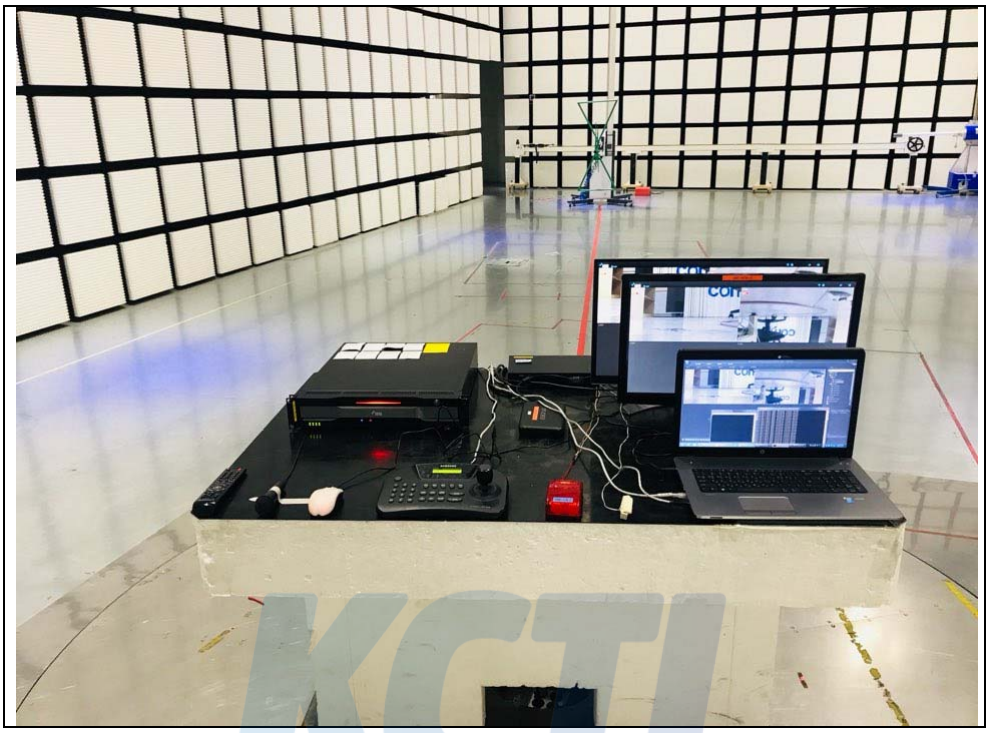
Correction

$E_m = E_{dm} + 20\log(d/3)$

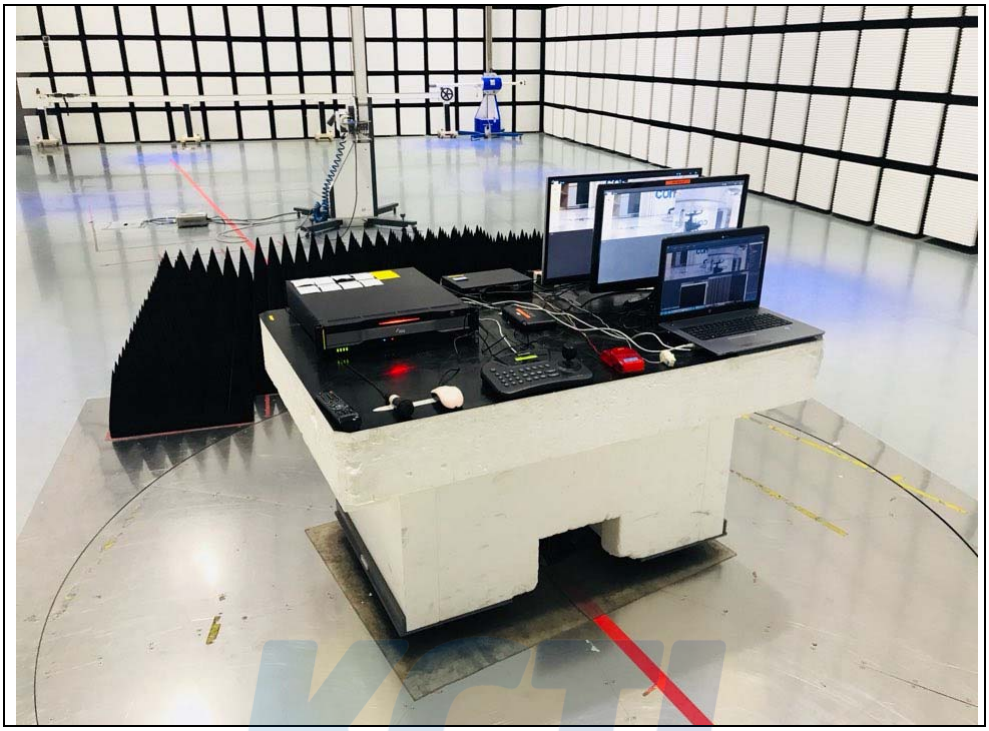
E_m: Result, E_{dm}: Measured value of the measured distance

6.2.4 Photographs of test setup

30 MHz ~ 1 GHz

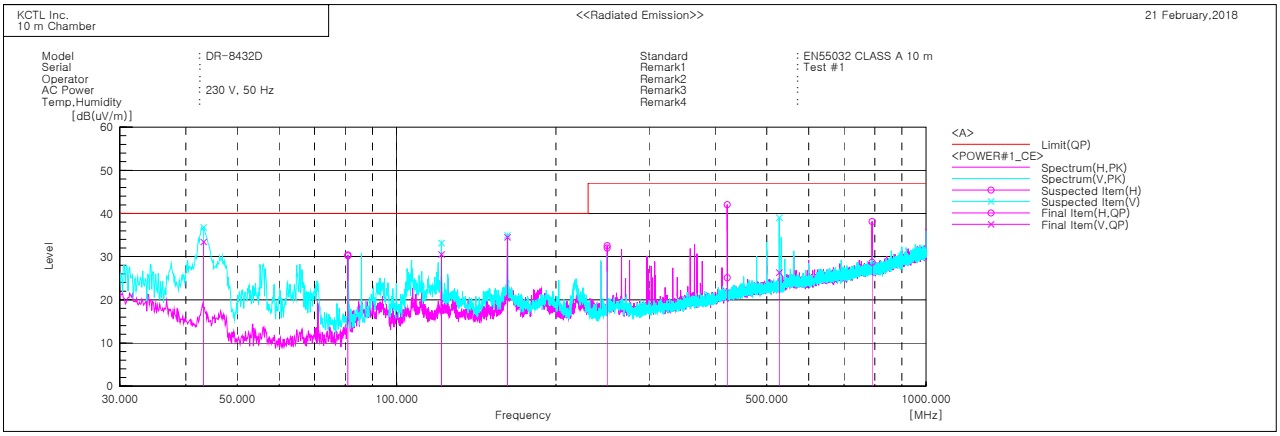


1 GHz ~ 6 GHz



6.2.5 Radiated emission measurement result

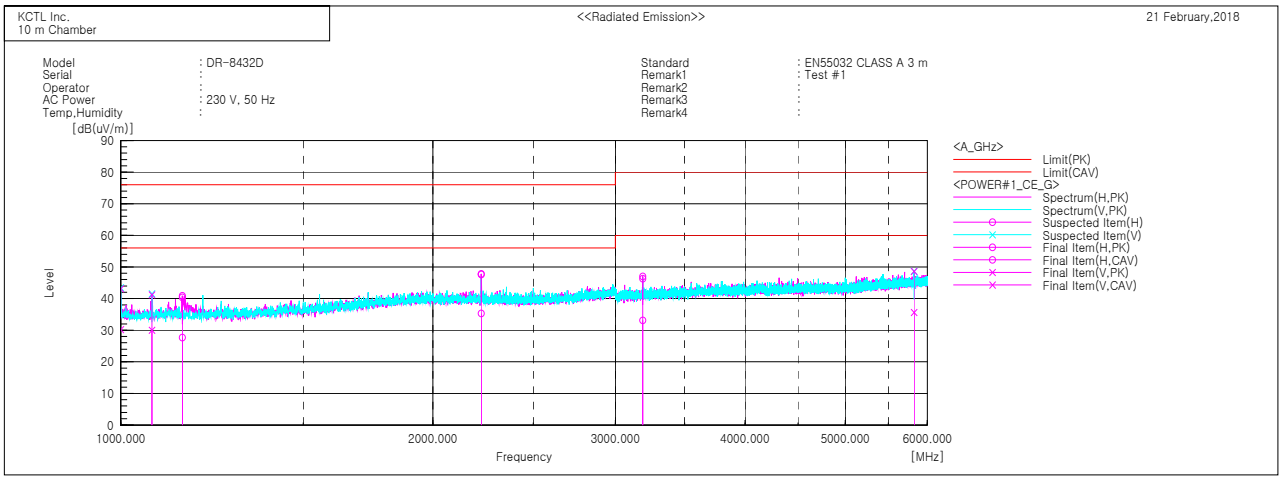
30 MHz ~ 1 GHz



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	43.216	V	46.2	-12.8	33.4	40.0	6.6	199.0	9.4
2	80.925	H	46.5	-16.3	30.2	40.0	9.8	400.0	97.1
3	121.544	V	41.1	-10.6	30.5	40.0	9.5	109.0	267.5
4	161.920	V	46.9	-12.4	34.5	40.0	5.5	100.0	22.0
5	249.948	H	41.3	-9.3	32.0	47.0	15.0	400.0	50.4
6	421.274	H	28.6	-3.5	25.1	47.0	21.9	295.0	294.9
7	528.338	V	27.7	-1.4	26.3	47.0	20.7	398.0	295.6
8	790.965	H	26.0	2.7	28.7	47.0	18.3	314.0	294.9

1 GHz ~ 6 GHz



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]
1	1000.000	V	54.7	41.8	-11.6	43.1	30.2	76.0	56.0	32.9	25.8	100.0	218.1
2	1072.030	V	52.5	41.3	-11.3	41.2	30.0	76.0	56.0	34.8	26.0	100.0	41.6
3	1146.502	H	51.3	38.6	-10.9	40.4	27.7	76.0	56.0	35.6	28.3	100.0	99.9
4	2227.567	H	51.6	39.3	-4.0	47.6	35.3	76.0	56.0	28.4	20.7	100.0	56.9
5	3187.767	H	47.8	34.6	-1.5	46.3	33.1	80.0	60.0	33.7	26.9	100.0	345.4
6	5824.197	V	43.4	30.4	5.2	48.6	35.6	80.0	60.0	31.4	24.4	100.0	110.2

◈ Correction(Distance: 3.3 m)

Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading CAV [dB (μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result CAV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit CAV [dB(μV/m)]	Margin PK [dB]	Margin CAV [dB]
1000.000	V	54.7	41.8	-10.8	43.9	31.0	76.0	56.0	32.1	25.0
1072.030	V	52.5	41.3	-10.5	42.0	30.8	76.0	56.0	34.0	25.2
1146.502	H	51.3	38.6	-10.1	41.2	28.5	76.0	56.0	34.8	27.5
2227.567	H	51.6	39.3	-3.2	48.4	36.1	76.0	56.0	27.6	19.9
3187.767	H	47.8	34.6	-0.7	47.1	33.9	80.0	60.0	32.9	26.1
5824.197	V	43.4	30.4	6.0	49.4	36.4	80.0	60.0	30.6	23.6

6.3 Harmonics

Test specification	EN 61000-3-2:2014				
Testing voltage	230 V, 50 Hz				
Test facility	EMI Test area(6F)				
Date	2018-02-23				
Temperature(°C)	20.7 °C	Humidity (% R.H.)	26.5 % R.H.	Pressure (kPa)	101.9 kPa
Remarks	Pass				

6.3.1 Measurement procedure

The equipment is supplied in series with shunt(s) Rm or current transformer(s) from a source having the same nominal voltage and frequency as the rated supply voltage and frequency of the equipment. Measurements shall be made under normal load, or conditions for adequate heat discharge, and under normal operating conditions. User's operation controls or automatic programmers shall be set to produce the maximum harmonic component, for each successive harmonic component in turn. For the purpose of harmonic current limitation, equipment is classified as follows :

Class A : Equipment not specified in one of the three other Classes shall be considered as Class A equipment.

- Balanced three-phase equipment;
- Household appliances, excluding equipment identified as Class D;
- Tools, excluding portable tools;
- Dimmers for incandescent lamps;
- Audio equipment.

Class B : Portable tools; Arc welding equipment which is not professional equipment.

Class C : Lighting equipment.

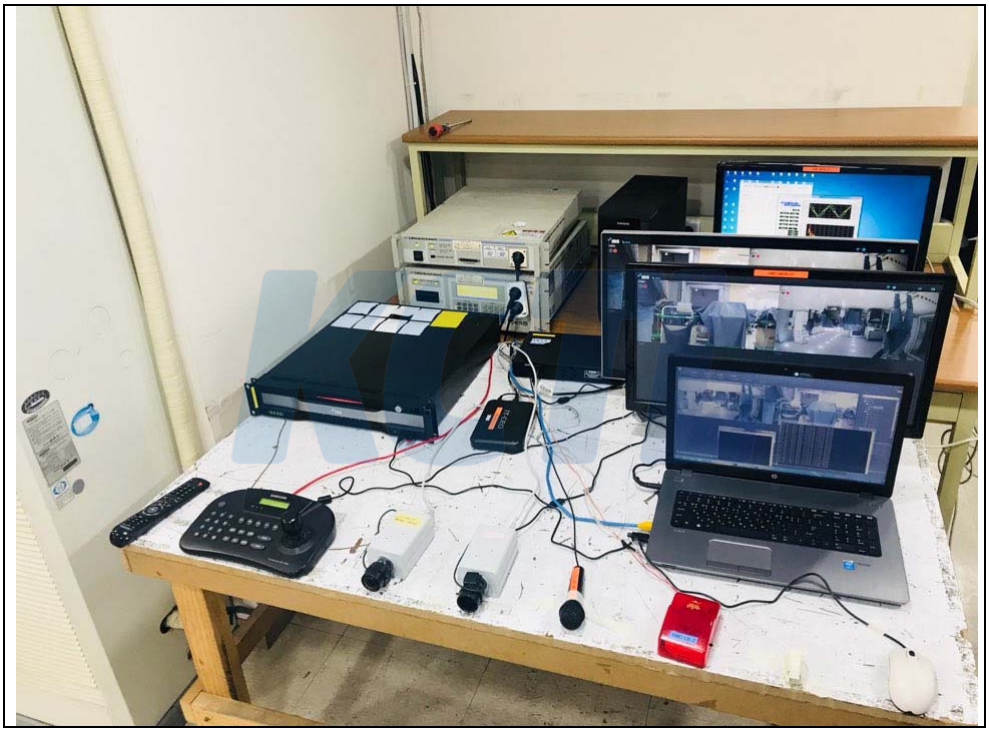
Class D : Equipment having a specified power according to 6.2.2 less than or equal to 600 w, of the following types:

- Personal computers and personal computer monitors;
- Television receivers.
- Refrigerators and freezers having one or more variable-speed drives to control compressor motor(s).

6.3.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
Hamonic / Flicker Meter (AC POWER SOURCE)	5001IX	54894	C.I.	2018.03.21	☒
Hamonic / Flicker Meter (Analyzer)	PACS-1	72072	C.I.	2018.04.07	☒

6.3.3 Photographs of test setup



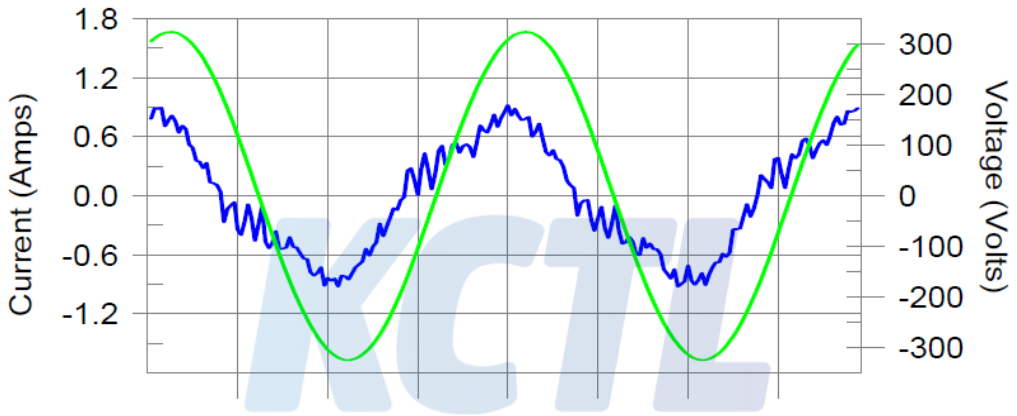
6.3.4 Measurement result

Harmonics – Class-A per Ed. 4.0 (2014)(Run time)

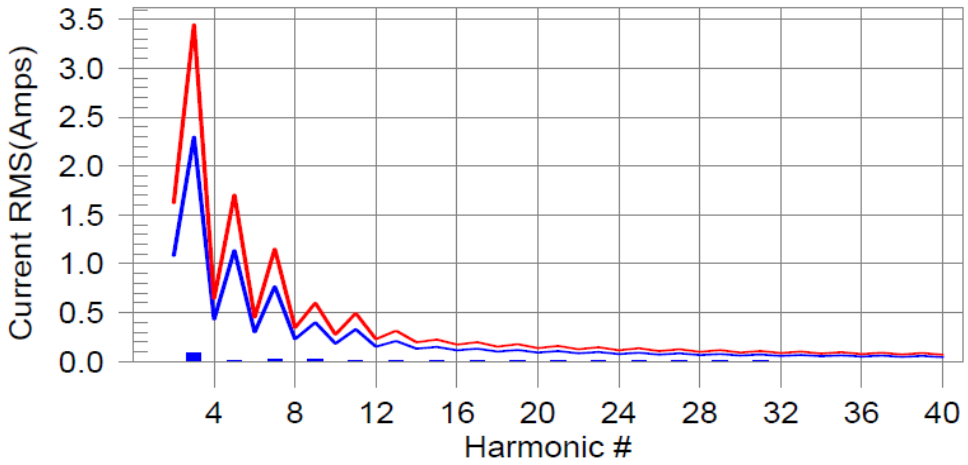
EUT: DR-8432D **Tested by: KCTL**
Test category: Class-A per Ed. 4.0 (2014) (European limits) **Test Margin: 100**
Test date: 23/02/2018 **Start time: 13:24:44** **End time: 13:27:36**
Test duration (min): 2.5 **Data file name: H-000769.cts_data**
Comment: Comments
Customer: IDIS CO., LTD.

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class A limit line **European Limits**



Test result: Pass **Worst harmonic was #19 with 6.4% of the limit.**

Current Test Result Summary (Run time)

EUT: DR-8432D **Tested by: KCTL**
Test category: Class-A per Ed. 4.0 (2014) (European limits) **Test Margin: 100**
Test date: 23/02/2018 **Start time: 13:24:44** **End time: 13:27:36**
Test duration (min): 2.5 **Data file name: H-000769.cts_data**
Comment: Comments
Customer: IDIS CO., LTD.

Test Result: Pass **Source qualification: Normal**
THC(A): 0.095 **I-THD(%): 17.9** **POHC(A): 0.006** **POHC Limit(A): 0.251**
Highest parameter values during test:

V_RMS (Volts):	229.46	Frequency(Hz):	50.00
I_Peak (Amps):	1.120	I_RMS (Amps):	0.559
I_Fund (Amps):	0.536	Crest Factor:	2.006
Power (Watts):	108.4	Power Factor:	0.863

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	1.080	N/A	0.003	1.620	N/A	Pass
3	0.089	2.300	3.9	0.090	3.450	2.6	Pass
4	0.000	0.430	N/A	0.001	0.645	N/A	Pass
5	0.004	1.140	N/A	0.004	1.710	N/A	Pass
6	0.000	0.300	N/A	0.000	0.450	N/A	Pass
7	0.021	0.770	2.7	0.021	1.155	1.8	Pass
8	0.000	0.230	N/A	0.000	0.345	N/A	Pass
9	0.019	0.400	4.6	0.019	0.600	3.1	Pass
10	0.000	0.184	N/A	0.001	0.276	N/A	Pass
11	0.009	0.330	2.9	0.010	0.495	2.0	Pass
12	0.000	0.153	N/A	0.001	0.230	N/A	Pass
13	0.004	0.210	N/A	0.004	0.315	N/A	Pass
14	0.000	0.131	N/A	0.001	0.197	N/A	Pass
15	0.003	0.150	N/A	0.004	0.225	N/A	Pass
16	0.000	0.115	N/A	0.001	0.173	N/A	Pass
17	0.005	0.132	N/A	0.005	0.198	N/A	Pass
18	0.000	0.102	N/A	0.001	0.153	N/A	Pass
19	0.008	0.118	6.4	0.008	0.178	4.3	Pass
20	0.000	0.092	N/A	0.000	0.138	N/A	Pass
21	0.006	0.107	5.2	0.006	0.161	3.6	Pass
22	0.000	0.084	N/A	0.001	0.125	N/A	Pass
23	0.004	0.098	N/A	0.005	0.147	N/A	Pass
24	0.000	0.077	N/A	0.000	0.115	N/A	Pass
25	0.004	0.090	N/A	0.005	0.135	N/A	Pass
26	0.000	0.071	N/A	0.001	0.107	N/A	Pass
27	0.004	0.083	N/A	0.004	0.125	N/A	Pass
28	0.001	0.066	N/A	0.001	0.099	N/A	Pass
29	0.003	0.078	N/A	0.004	0.116	N/A	Pass
30	0.001	0.061	N/A	0.001	0.092	N/A	Pass
31	0.004	0.073	N/A	0.004	0.109	N/A	Pass
32	0.001	0.058	N/A	0.001	0.086	N/A	Pass
33	0.002	0.068	N/A	0.002	0.102	N/A	Pass
34	0.001	0.054	N/A	0.001	0.081	N/A	Pass
35	0.002	0.064	N/A	0.002	0.096	N/A	Pass
36	0.001	0.051	N/A	0.001	0.077	N/A	Pass
37	0.003	0.061	N/A	0.003	0.091	N/A	Pass
38	0.001	0.048	N/A	0.001	0.073	N/A	Pass
39	0.002	0.058	N/A	0.002	0.087	N/A	Pass
40	0.001	0.046	N/A	0.001	0.069	N/A	Pass

Voltage Source Verification Data (Run time)

EUT: DR-8432D **Tested by: KCTL**
Test category: Class-A per Ed. 4.0 (2014) (European limits) **Test Margin: 100**
Test date: 23/02/2018 **Start time: 13:24:44** **End time: 13:27:36**
Test duration (min): 2.5 **Data file name: H-000769.cts_data**
Comment: Comments
Customer: IDIS CO., LTD.

Test Result: Pass **Source qualification: Normal**

Highest parameter values during test:

Voltage (Vrms):	229.46	Frequency(Hz):	50.00
I_Peak (Amps):	1.120	I_RMS (Amps):	0.559
I_Fund (Amps):	0.536	Crest Factor:	2.006
Power (Watts):	108.4	Power Factor:	0.863

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.113	0.459	24.70	OK
3	0.532	2.065	25.74	OK
4	0.024	0.459	5.28	OK
5	0.016	0.918	1.73	OK
6	0.024	0.459	5.23	OK
7	0.028	0.688	4.11	OK
8	0.016	0.459	3.52	OK
9	0.020	0.459	4.36	OK
10	0.014	0.459	3.08	OK
11	0.030	0.229	13.27	OK
12	0.018	0.229	7.82	OK
13	0.019	0.229	8.12	OK
14	0.012	0.229	5.20	OK
15	0.010	0.229	4.54	OK
16	0.012	0.229	5.41	OK
17	0.013	0.229	5.47	OK
18	0.014	0.229	6.22	OK
19	0.011	0.229	4.83	OK
20	0.003	0.229	1.48	OK
21	0.015	0.229	6.41	OK
22	0.009	0.229	3.95	OK
23	0.009	0.229	3.88	OK
24	0.008	0.229	3.64	OK
25	0.010	0.229	4.46	OK
26	0.011	0.229	4.61	OK
27	0.008	0.229	3.65	OK
28	0.009	0.229	3.85	OK
29	0.008	0.229	3.50	OK
30	0.012	0.229	5.10	OK
31	0.011	0.229	4.90	OK
32	0.005	0.229	2.20	OK
33	0.003	0.229	1.36	OK
34	0.007	0.229	3.03	OK
35	0.007	0.229	3.00	OK
36	0.005	0.229	2.02	OK
37	0.009	0.229	3.72	OK
38	0.009	0.229	3.78	OK
39	0.015	0.229	6.58	OK
40	0.012	0.229	5.04	OK

6.4 Flicker

Test specification	EN 61000-3-3:2013				
Testing voltage	230 V, 50 Hz				
Test facility	EMI Test area(6F)				
Date	2018-02-23				
Temperature(°C)	20.7 °C	Humidity (% R.H.)	26.5 % R.H.	Pressure (kPa)	101.9 kPa
Remarks	Pass				

6.4.1 Measurement procedure

EUT was connected to the power analyzer system.

Measurement was performed to obtain the desired flicker parameters.

The measuring time depends on which parameters are to be measured.

P_{lt} = 2 h

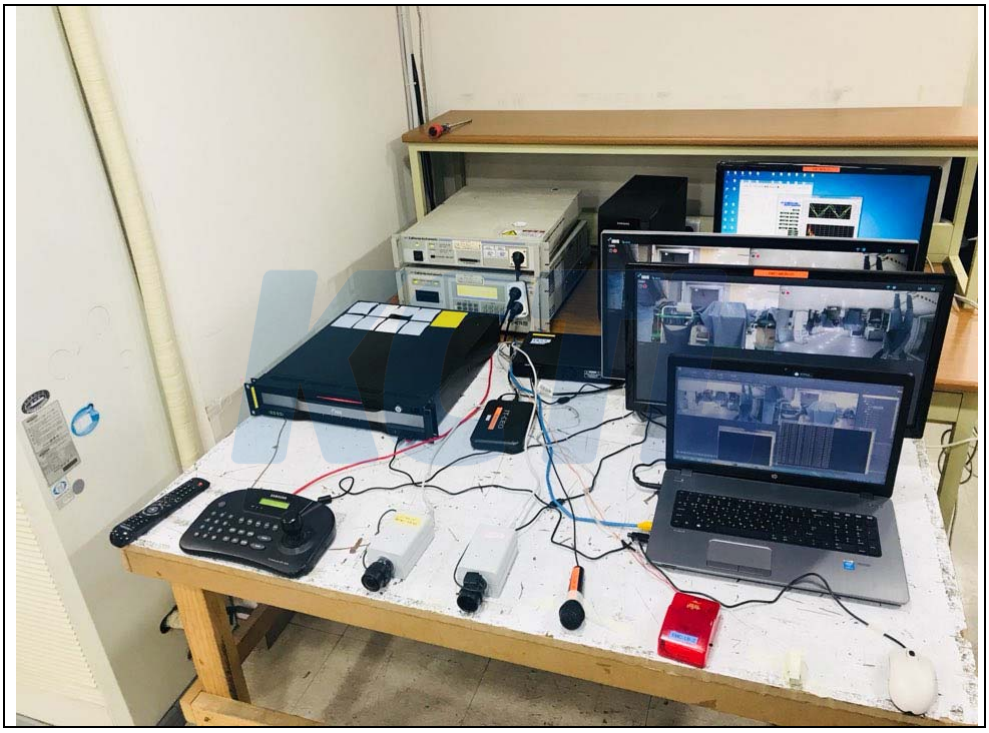
P_{st} = 10 min

Controls and automatic programs shall be set to produce the most unfavorable sequence of voltage changes, using only those combinations of controls and programs are mentioned by the manufacturer in the instruction manual.

6.4.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
Hamonic / Flicker Meter (AC POWER SOURCE)	5001IX	54894	C.I.	2018.03.21	☒
Hamonic / Flicker Meter (Analyzer)	PACS-1	72072	C.I.	2018.04.07	☒

6.4.3 Photographs of test setup



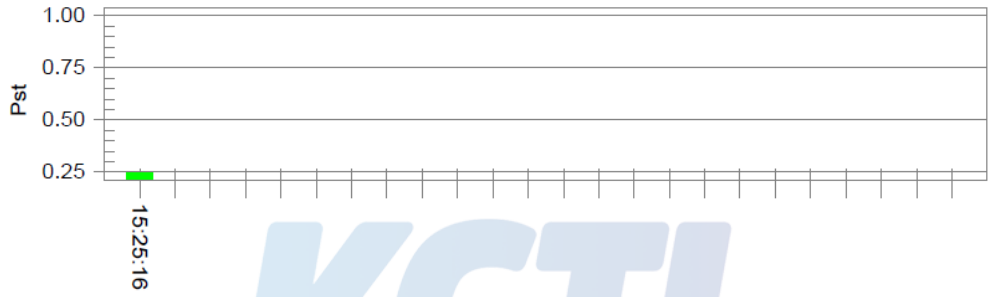
6.4.4 Measurement result

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

EUT: DR-8432D **Tested by: KCTL Inc.**
Test category: All parameters (European limits) **Test Margin: 100**
Test date: 23/02/2018 **Start time: 15:14:46** **End time: 15:25:17**
Test duration (min): 10 **Data file name: F-000770.cts_data**
Comment: Comments
Customer: IDIS CO., LTD.

Test Result: Pass **Status: Test Completed**

Pst_i and limit line **European Limits**



Plt and limit line

Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.41			
Highest dt (%):	0.00	Test limit (%):	N/A	N/A
T-max (mS):	0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	-0.02	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.248	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.108	Test limit:	0.650	Pass

6.5 Electrostatic Discharge

Test specification	EN 61000-4-2:2009				
Test level	☒ Contact: ± 6 kV ☒ Air: ± 2 kV, ± 4 kV, ± 8 kV ☒ HCP: ± 6 kV ☒ VCP: ± 6 kV				
Discharge impedance	330 Ω / 150 pF				
Number of discharge (Each polarity)	☒ Contact: 10 ☒ Air: 10 ☒ HCP / VCP: 10				
Interval between discharges	1 s				
Testing voltage	230 V, 50 Hz				
Test facility	Shielded room (6F)				
Date	2018-03-06				
Temperature(°C)	20.6 °C	Humidity (% R.H.)	48.8 % R.H.	Pressure (kPa)	101.7 kPa
Remarks	Pass -There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs.				

6.5.1 Measurement procedure

A ground reference plane was located on the floor, and connected to earth via a low Impedance connection. The return cable of the ESD generator was connected to the reference plane. In case of floor standing equipment, EUT was placed on the reference plane on 0.1 ㎝ of insulating Support. In case of table top equipment, EUT was placed on a wooden table 0.8 ㎝ above the reference grounded floor. A horizontal coupling plane (HCP) was placed on the table, and Connected to the reference plane via a 470 ㏀ resistor located in each end (0.5 ㎜ insulating support between EUT and HCP). In both cases a vertical coupling plane(VCP) OF 0.5 X 0.5 ㎝ was located 0.1 ㎝ from the EUT's sides. The VCP was connected to the reference plane in the same matter as the HCP.

6.5.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
ESD SIMULATOR	ONYX30	183121	HAEFELY	2018.09.04	☒
ESD TESTER	PESD1600	H011309	HAEFELY	2018.05.04	☐
HCP	-	-	-	-	☒
VCP	-	-	-	-	☒

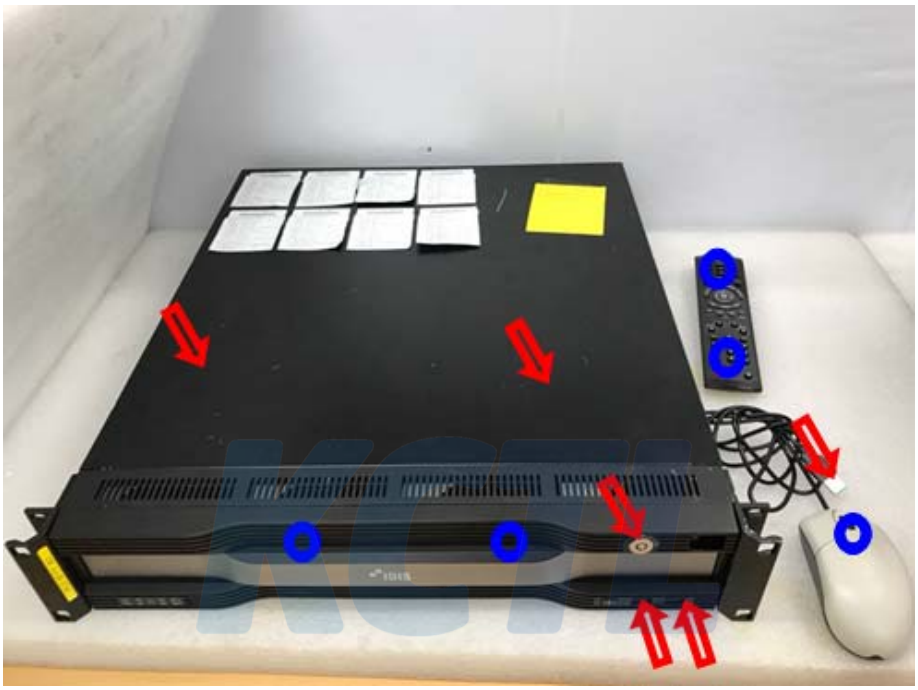
6.5.3 Photographs of test setup

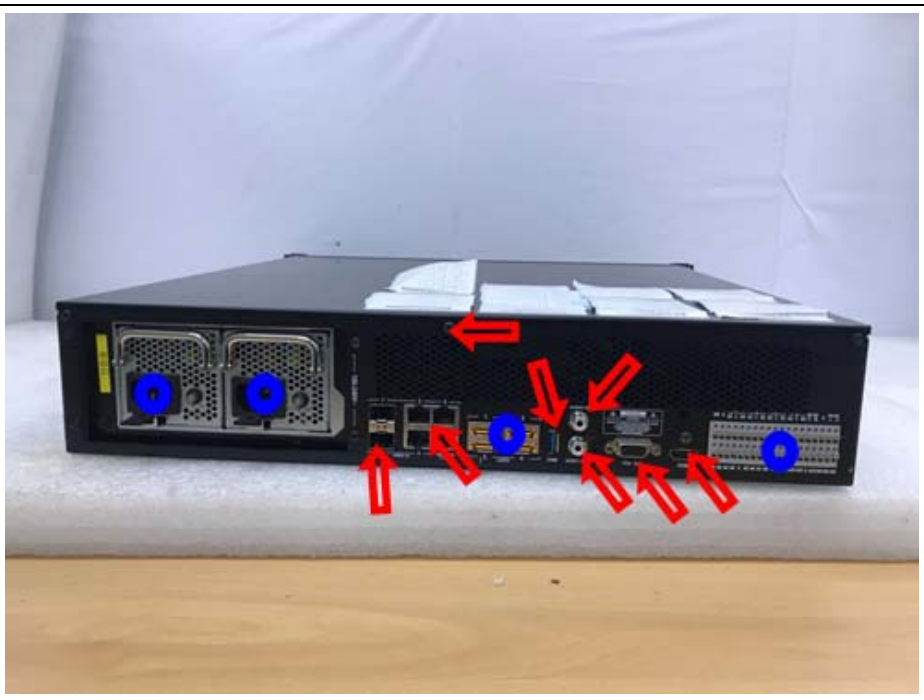
6.5.4 Measurement result

Electrostatic Discharge (Test Point)

Air discharge ○

Contact discharge ⇨





HCP/VCP discharge

Location(EUT)	Applied level (±)	Result
HCP (All 4 sides)	± 6 kV	Pass
VCP (All 4 sides)	± 6 kV	Pass

Contact discharge

Location(EUT)	Applied level (±)	Result
Front	± 6 kV	Pass
Rear	± 6 kV	Pass
Left	± 6 kV	Pass
Right	± 6 kV	Pass

Air discharge

Location(EUT)	Applied level (±)	Result
Front	± 2 kV, ± 4 kV, ± 8 kV	Pass
Rear	± 2 kV, ± 4 kV, ± 8 kV	Pass
Left	± 2 kV, ± 4 kV, ± 8 kV	-
Right	± 2 kV, ± 4 kV, ± 8 kV	-

6.6 Radio Frequency Electromagnetic Fields

Test specification	EN 61000-4-3:2006 /A2:2010				
Tested frequency	80 MHz ~ 1 GHz, 1 GHz ~ 2.7 GHz				
Test level & Modulation	1 V/m, 3 V/m, 10 V/m, 80 % Amplitude Modulation (1 kHz) 1 V/m, 3 V/m, 10 V/m, Pulse Modulation (1 Hz (0.5 s ON: 0.5s OFF))				
Frequency Step	1 % step				
Dwell time	3 s				
Distance	3 m from EUT to tip of antenna				
Testing voltage	230 V, 50 Hz				
Test facility	6F Fully anechoic chamber (3 m)				
Date	2018-03-10				
Temperature (°C)	19.5 °C	Humidity (% R.H.)	25.9 % R.H.	Pressure (kPa)	101.9 kPa
Remarks	Pass -There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs.				

6.6.1 Measurement procedure

The test was performed at 3 m full anechoic chamber.

For floor standing equipment, the EUT was standing on the floor.

For tabletop equipment, the EUT was located on a wooden table 0.8 m above the floor.

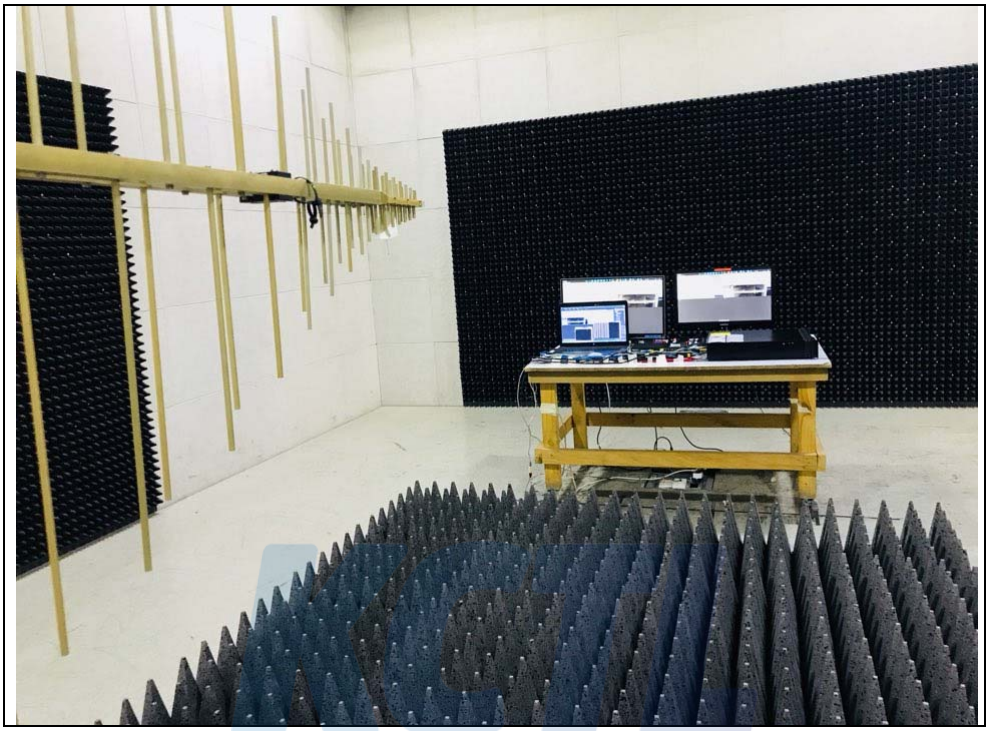
The EUT was tested all sides, horizontal and vertical polarization.

6.6.2 Used equipments

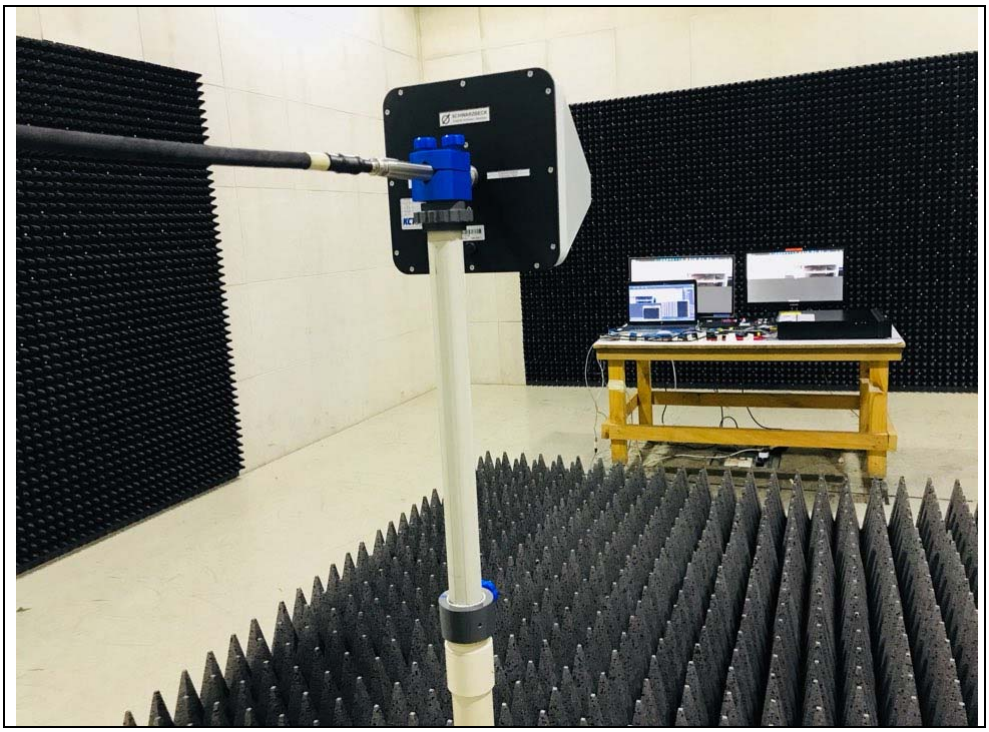
Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
POWER METER	PM2002	302852	AR	2018.08.25	☒
POWER SENSOR	PH2000	303224	AR	2018.08.25	☒
POWER SENSOR	PH2000	311217	AR	2018.08.25	☒
DUAL DIRECTIOAL COUPLER	DC6180	303976	AR	2018.08.25	☒
Dual Directional Coupler	DC7200A	0349434	AR	2018.08.16	☒
Signal Generator	SMB100A	101737	R&S	2018.05.04	☒
BROADBAND AMPLFIER	BBA 100	100996-1	R&S	-	☒
RF Power Amplifier	100S1G6AB	0349688	AR	-	☒
Broadband Ant.	LPDA-0803	130269	ETS-LINDGREN	-	☒
Antenna master	-	-	-	-	☒
Stacked Log.-Per. Antenna 0.1 GHz - 9 GHz	STLP9149	9149-511	SCHWARZBECK	-	☒

6.6.3 Photographs of test setup

[80 MHz ~ 1 GHz]



[1 GHz ~ 2.7 GHz]



6.6.4 Measurement result

Location(EUT)	Antenna polarization	Result
Front side	Horizontal	Pass
	Vertical	Pass
Rear side	Horizontal	Pass
	Vertical	Pass
Left side	Horizontal	Pass
	Vertical	Pass
Right side	Horizontal	Pass
	Vertical	Pass

6.7 Electric Fast Transient/BURST

Test specification	EN 61000-4-4:2012				
Coupling	☒ AC Main ☒ Signal/Control: Clamp ☒ Telecommunication: Clamp				
Test level	☒ AC Main: ± 2 kV Peak ☒ Signal/Control: ± 1 kV Peak ☒ Telecommunication: ± 1 kV Peak				
Repetition frequency	100 kHz, Tr/Th = 5 / 50 ㎱				
Coupling time (Minimum)	60 s				
Testing voltage	230 V, 50 Hz				
Test facility	Shielded room (6F)				
Date	2018-03-04				
Temperature(°C)	20.8 °C	Humidity (% R.H.)	24.5 % R.H.	Pressure (kPa)	101.7 kPa
Remarks	Pass -There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs.				

6.7.1 Measurement procedure

A ground reference plane was located on the floor.
EFT generator was connected to reference ground plane via low impedance connection.
For floor standing equipment, EUT was placed on a 0.1 ㎜ wooden table.
For tabletop equipment, EUT was placed on a 0.1 ㎜ above the ground reference plane.
Test generator and coupling/decoupling network was placed on, and bounded to, the ground reference plane. When using the coupling clamp, the minimum distance between the coupling plates and all other conductive surfaces, except the ground reference plane beneath the coupling clamp, Shall be 0.5 ㎜.

6.7.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
ULTRA COMPACT SIMULATOR	UCS 500-M6BS1	V0545100858	EM TEST	2018.04.07	☒
ULTRA COMPACT SIMULATOR	UCS 500M	0701-03	EM TEST	2018.08.24	☐
Capacitive Coupling clamp	CA HFK	0001	EM TEST	2018.08.24	☒

6.7.3 Photographs of test setup

6.7.4 Measurement result

AC Main [Power #1, Power #2]

Coupling point	(+)	(-)	Result
L-N-PE	+ 2 kV	- 2 kV	Pass

Signal/Control

Coupling point	(+)	(-)	Result
Alarm In/Out	+ 1 kV	- 1 kV	Pass
RS-485	+ 1 kV	- 1 kV	Pass
Audio In/Out	+ 1 kV	- 1 kV	Pass
RS-232	+ 1 kV	- 1 kV	Pass

Telecommunication

Coupling point	(+)	(-)	Result
LAN(RJ-45)	+ 1 kV	- 1 kV	Pass
Vidoe In #3(LAN)	+ 1 kV	- 1 kV	Pass

6.8 Surge

Test specification	EN 61000-4-5:2014				
Coupling	☒ AC Main: Direct ☒ Signal: Direct ☒ Telecommunication: CDN				
Test level	☒ AC Main: ☒Differential mode: ± 0.5 kV, ± 1 kV ☒Common mode: ± 0.5 kV, ± 1 kV, ± 2 kV ☒ Signal/Control: ± 0.5 kV, ± 1 kV ☒ Telecommunication: ± 0.5 kV, ± 1 kV				
Coupling Impedance	☒ Differential mode: 18 μF ☒ Common mode: 10 Ω + 9 μF ☒ 40 Ω + 0.5 μF ☒ Direct				
Surge pulse shape	Tr/Th = 1.2 / 50 μs				
Angles	0 °, 90 °, 180 °, 270 °				
Number of surge	5				
Coupling time	60 s				
Testing voltage	230 V, 50 Hz				
Test facility	Shielded room (6F)				
Date	2018-03-04				
Temperature(°C)	20.5 °C	Humidity (% R.H.)	30.1 % R.H.	Pressure (kPa)	101.7 kPa
Remarks	Pass -There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs.				

6.8.1 Measurement procedure

A ground reference plane was located on the floor. SURGE generator was connected to reference ground plane via low impedance connection. For floor standing equipment & table top equipment, EUT was placed on a wooden table.

6.8.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
ULTRA COMPACT SIMULATOR	UCS 500-M6BS1	V0545100858	EM TEST	2018.04.07	☒
ULTRA COMPACT SIMULATOR	UCS500M	0701-03	EM TEST	2018.08.24	☐
ULTRA COMPACT SIMULATOR	UCS500N5V	P1429136861	EM TEST	2018.08.24	☐
COUPLING & DECOUPLING NETWORK	CNV 508 N1	V1108108861	EM TEST	2018.08.25	☒

6.8.3 Photographs of test setup


EFT/Burst
SURGE
Dip/Interruption
Magnetic Field

6.8.4 Measurement result

AC Main [Power #1, Power #2]

Coupling point	(+)	(-)	Result
L-N	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Pass
L-PE	+ 0.5 kV, + 1 kV, + 2 kV	- 0.5 kV, - 1 kV, - 2 kV	Pass
N-PE	+ 0.5 kV, + 1 kV, + 2 kV	- 0.5 kV, - 1 kV, - 2 kV	Pass

Signal/Control

Coupling point	(+)	(-)	Result
Alarm In/Out	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Pass
RS-485	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Pass
Audio In/Out	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Pass
RS-232	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Pass

Telecommunication

Coupling point	(+)	(-)	Result
LAN(RJ-45)	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Pass
Vidoe In #3(LAN)	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Pass

6.9 Conducted Immunity

Test specification		EN 61000-4-6:2014				
Tested frequency		0.15 MHz ~ 100 MHz				
Test level & Modulation		1 V/m, 3 V/m, 10 V/m, 80 % Amplitude Modulation (1 kHz) 1 V/m, 3 V/m, 10 V/m, Pulse Modulation (1 Hz (0.5 s ON: 0.5s OFF))				
Frequency Step		1 % step				
Dwell time		3 s				
Coupling method		☒ AC Main: CDN(M3) ☒ Signal/Control: Clamp ☒ Telecommunication: CDN(T8-RJ45), CDN(T8 RJ45)				
Testing voltage		230 V, 50 Hz				
Test facility		Shielded room (6F)				
Date		2018-03-06 / 2018-03-07				
2018-03-06	Temperature(°C)	20.6 °C	Humidity (% R.H.)	30.4 % R.H.	Pressure(kPa)	101.7 kPa
2018-03-07		19.6 °C		35.2 % R.H.		101.7 kPa
Remarks		Pass -There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs.				

6.9.1 Measurement procedure

A ground reference plane was located on the floor.

The test was performed on a ground reference plane on a 0.1 m wooden table.

This test were performed using CDN for mains, clamp for signal and injection probe.

The frequency range was swept from 0.15 MHz to 80 MHz. This frequency range was

Modulated with 1 kHz sine wave at 80 %.

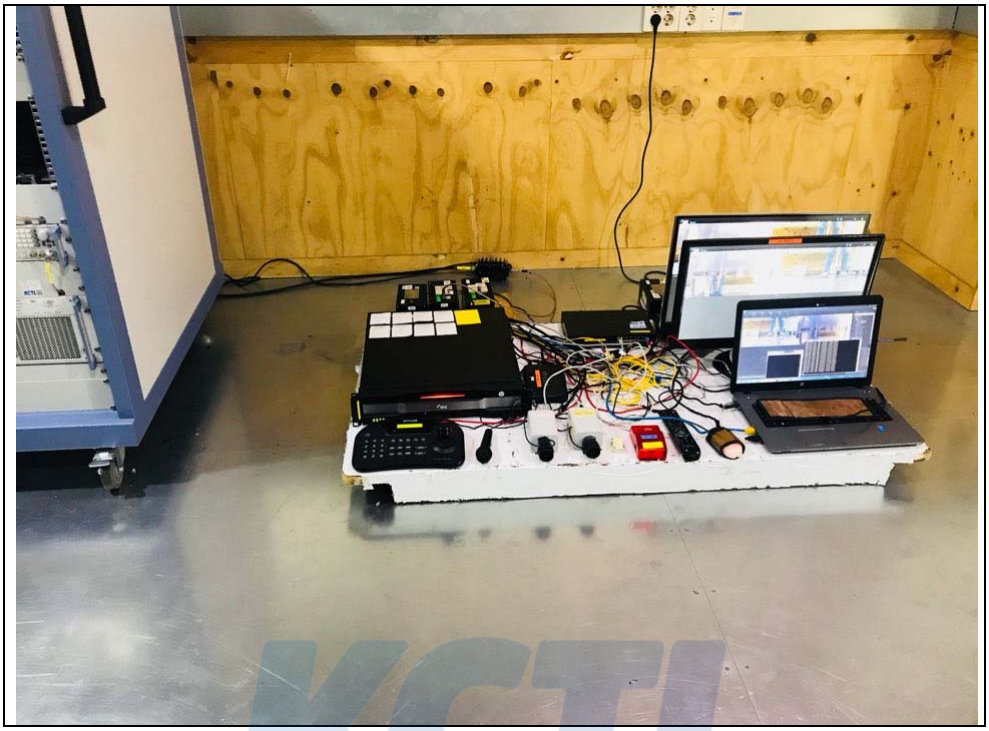
The signal generators provided the modulated frequency at a 1 % step size.

The power and all network cable, I/O cables longer than 3 m length were tested.

6.9.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
POWER SENSOR	NRP-Z91	103183	R&S	2018.08.25	☒
POWER SENSOR	NRP-Z91	103184	R&S	2018.08.25	☒
C.D.N	CDN L-801 M2 / M3	2936	EM TEST	2018.08.24	☒
C.D.N	CDN M2/M3N	0111-04	EM TEST	2018.08.24	☒
SIGNAL GENERATOR	SMC100A	105221	R&S	2018.08.01	☒
COAXIAL FIXED ATTENUATOR	73-6-34	MU918	MCE/ WEINSCHEL	2018.08.01	☒
BROADBAND AMPLFIER	BBA150	101937	R&S	2018.08.25	☒
EM Clamp	KEMZ 801	17643	SCHAFFNER	2018.04.07	☒
C.D.N	CDN T8 RJ45	P1404129872	EM TEST	2018.04.07	☒
C.D.N	CDN-T8-RJ45	0113-22	EM TEST	2018.08.24	☒

6.9.3 Photographs of test setup



6.9.4 Measurement result

AC Main [Power #1, Power #2]

Coupling point	Coupling method	Result
Power	CDN(M3)	Pass

Signal/Control

Coupling point	Coupling method	Result
Alarm In/Out	Clamp	Pass
RS-485	Clamp	Pass
Audio In/Out	Clamp	Pass
RS-232	Clamp	Pass

Telecommunication

Coupling point	Coupling method	Result
LAN(RJ-45)	CDN(T8-RJ45)	Pass
Vidoe In #3(LAN)	CDN(T8 RJ45)	Pass

6.10 Dips and Interruption

Test specification	EN 61000-4-11:2004				
Number of dips	3 T				
Duration	10 s				
Phase	Zero crossing (0 °)				
Dwell time	1 s				
Testing voltage	100 V, 50/60 Hz / 240 V, 50/60 Hz				
Test facility	Shielded room (6F)				
Date	2018-03-04				
Temperature(°C)	19.6 °C	Humidity (% R.H.)	29.1 % R.H.	Pressure(kPa)	101.7 kPa
Remarks	Pass -There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs.				

6.10.1 Measurement procedure

The dips/interruption test is only applicable to AC mains.

The dips/interruptions were applied at zero crossing.

6.10.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
ULTRA COMPACT SIMULATOR	UCS 500-M6BS1	V0545100858	EM TEST	2018.04.07	☒
ULTRA COMPACT SIMULATOR	UCS 500M	0701-03	EM TEST	2018.08.24	☐

6.10.3 Photographs of test setup

6.10.4 Measurement result

100 V, 50/60 Hz / 240 V, 50/60 Hz

Test Level (%UT)	Dip/Int. (%UT)	Duration /Period	Angle (°)	Count number	Result
80 %	20 %	250 Period[1)]	0	3T	Pass
70 %	30 %	25 Period	0	3T	Pass
40 %	60 %	10 Period	0	3T	Pass
0 %	100 %	250 Period[2)]	0	3T	Note

Comment:

- There was no change of operation status during above testing.

(250 Period[1)], 25 Period, 10 Period)

- Note (250 Period[2)])

The power of EUT is off during the test. After the test, EUT is getting back to normal operation.
It fully recorded using ancillary Power source equipment to content with Manufacturer`s set up manual.
During the 250 period power loss, in accordance with the standard, a UPS was used to maintain full operation of the unit.

6.11 Mains supply voltage variations

Test specification	EN 50130-4:2011 /A1:2014				
Supply voltage	*U nom* + 10 %, *U nom* - 15 %				
Testing voltage	100 V, 50/60 Hz / 240 V, 50/60 Hz				
Test facility	Shielded room (6F)				
Date	2018-03-04				
Temperature(°C)	19.9 °C	Humidity (% R.H.)	29.8 % R.H.	Pressure(kPa)	101.7 kPa
Remarks	Pass				

6.11.1 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
ULTRA COMPACT SIMULATOR	UCS 500-M6BS1	V0545100858	EM TEST	2018.04.07	☒
ULTRA COMPACT SIMULATOR	UCS 500M	0701-03	EM TEST	2018.08.24	☐

6.11.2 Measurement result

100 V, 50/60 Hz

Supply voltage		Result
+ 10 %	110 V	Pass
- 15 %	85 V	Pass

240 V, 50/60 Hz

Supply voltage		Result
+ 10 %	264 V	Pass
- 15 %	204 V	Pass

Comment:

- There was no change of operation status during above testing.

7. EUT photographs

Whole

Front View

Rear View

Left View

Right View

Top View

Bottom View

Inside

USB Mouse

Remote Control