

TEST REPORT



DT&C Co., Ltd.

42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea 17042
Tel : 031-321-2664, Fax : 031-321-1664



1. Report No : DREKCEE1908-0492
2. Customer
 - Name : IDIS Co., Ltd.
 - Address : 8-10 TECHNO 3-RO YUSEONG-GU DAEJEON 305-509 KOREA
3. Use of Report : CE Marking
4. Product Name / Model Name : IP Camera / DC-Y6513WRX
5. Test Standard :
 - EN 55032 : 2015
 - EN 55035 : 2017
 - EN 61000-3-2 : 2014
 - EN 61000-3-3 : 2013
6. Date of Test : Jul. 10. 2019 ~ Jul. 17. 2019
7. Location of Test : Permanent Testing Lab On Site Testing
8. Testing Environment : Temperature (21 ~ 24) °C , Humidity (49 ~ 52) % R.H.
9. Test Result : Refer to the attached Test Result

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose.

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Affirmation	Tested by Name : JeongHwan You (Signature)	Reviewed by Name : HyungJun Kim (Signature)
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The above test report is the accredited test result by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.

Aug. 01. 2019

DT&C Co., Ltd.

Accredited by KOLAS, Republic of KOREA
'KS Q ISO/IEC 17025 and KOLAS accreditation'

* This laboratory is not accredited for the test results marked

If this report is required to confirmation of authenticity, please contact to report@dtnc.net

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1. General Remarks

This report contains the result of tests performed by :

DT&C Co., Ltd.

42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042

<http://www.dtnc.net>

Tel: +82-31-321-2664 Fax: +82-31-321-1664

2. Test Laboratory

DT&C Co., Ltd. has been accredited / filed / authorized by the agencies listed in the following table ;

Certificate	Nation	Agency	Code	Remark
Accreditation	Korea	KOLAS	393	ISO/IEC 17025
	South Africa	SABS	0006	ISO/IEC 17025
	Ghana	NCA	NCA agreement 23 rd , Oct, 2018	-
Site Filing	USA	FCC	KR0034 101842 678747, 596748, 804488, 165783	Accredited 2.948 Listed
	Canada	IC	5740A-3 5740A-4	Registered
	Japan	VCCI	C-1427 R-3385, R-4076, R-4180, R-4496, T-1442, G-10338, G-754, G-10815, G-20051	Registered
Certification	Korea	KC	KR0034	Designation
	Germany	TUV	CARAT 089112 0006 Rev.00	ISO/IEC 17025
	Russia	RMRS	17.10189.296	ISO/IEC 17025

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".



3. General Information of EUT

Applicant	IDIS Co., Ltd. 8-10 TECHNO 3-RO YUSEONG-GU DAEJEON 305-509 KOREA
Manufacturer	IDIS Co., Ltd. 8-10 TECHNO 3-RO YUSEONG-GU DAEJEON 305-509 KOREA
Factory	IDIS Co., Ltd. 8-10 TECHNO 3-RO YUSEONG-GU DAEJEON 305-509 KOREA
Product Name	IP Camera
Model Name	DC-Y6513WRX
Add Model Name	NC-Y6513WRX, RR-HDC360IRA, RR-HDEC360IRA
Add Model difference	The main board is identical, adding derivative models to the marketing request.
Maximum Internal Frequency	1 250 MHz
Software Version	None
Hardware Version	None
Rated Power	DC 12 V, POE
Remarks	It is a device that is registered as a radio wave suitable for business use (Class A), so please be careful about this point by the seller or the user, and it is intended for use outside the house.



4. EUT Operations and Test Configurations

4.1 Principle of Configuration Selection

Emission :

The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use. For each testing mode different configurations were used, Refer to the individual tests.

Immunity :

The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the instructions for use. For each testing mode different configurations were used. Refer to the individual tests.

4.2 EUT Operation Mode

No.	Mode	Description
1	ADAPTER	<ul style="list-style-type: none"> - The EUT is powered by an adapter and connected to the notebook to check the output image. - The EUT outputs a 1 kHz audio source sound signal input from the mobile phone through the connected speaker. - The EUT examines the image recorded on the SD card.
2	POE	<ul style="list-style-type: none"> - The EUT is powered by an POE and connected to the notebook to check the output image. - The EUT outputs a 1 kHz audio source sound signal input from the mobile phone through the connected speaker. - The EUT examines the image recorded on the SD card.

4.3 Test Configuration Mode

No.	Mode	Description
1	ADAPTER	<ul style="list-style-type: none"> - The EUT connects to the ADAPTER. - The EUT connects to the notebook via LAN. - The EUT is connected to the speaker via the AUDIO OUT cable. - The EUT is connected to the phone via the AUDIO IN cable. - The EUT is connected to the ALARM cable and terminated.
2	POE	<ul style="list-style-type: none"> - The EUT is connected to the POE via the LAN. - POE connects to the POE ADAPTER. - The EUT is connected to the speaker via the AUDIO OUT cable. - The EUT is connected to the phone via the AUDIO IN cable. - POE connects to the notebook via LAN. - The EUT is connected to the ALARM cable and terminated.



4.4 Supported Equipment

Used*	Product Type	Manufacturer	Model	Remarks
AE	Notebook	HP	HSTNN-C82C	CND5118CTG
AE	Notebook ADAPTER	CHICONY POWER	HSTNN-CA40	None
AE	ADAPTER	N/A	DSA-42PFB-12 1	None
AE	PHONE	LG	LG TH845	None
AE	Speaker	EDIFIER	BR-1000A plus	None
AE	POE	NETGEAR	FS108P	None
AE	POE ADAPTER	Dongguan Leader Electronics Inc	NU60-F480125-11NN	332-10290-01
AE	SD CARD	SanDisk	32GB	None

*Abbreviations:
 AE - Auxiliary/Associated Equipment, or
 SIM - Simulator

4.5 EUT In/Output Port

Name	Type*	Cable Max. >3m	Cable Shielded	Remarks
AUDIO IN	I/O	1.4	Non shield	None
AUDIO OUT	I/O	2.0	Non shield	None
LAN & POE	TP	3.0	Non shield	None
POWER	DC	1.6	Non shield	ADAPTER
ALARM	I/O	3.0	Non shield	None
SD CARD SLOT	I/O	N/A	N/A	None

*Abbreviations:
 AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
 I/O = Signal Input or Output Port
 TP = Telecommunication Ports

4.6 Test Voltage and Frequency

Case	Voltage (V)	Frequency (Hz)	Phases	Remarks
1	AC 230	50	Single	None



5. Test Summary

Test Items	Applied Standards	Results
I. Emission		
Conducted Disturbance	EN 55032 : 2015	C
Radiated Disturbance	EN 55032 : 2015	C
Harmonic Current Emission	EN 61000-3-2 : 2014	N/A (Note 1)
Voltage Change, Fluctuations and Flicker	EN 61000-3-3 : 2013	C
II. Immunity		
Electrostatic Discharge	EN 55035 : 2017	C
	EN 61000-4-2 : 2009	
Radio-Frequency Electromagnetic Field	EN 55035 : 2017	C
	EN 61000-4-3 : 2006 + A1 : 2008 + A2 : 2010	
Fast Transient	EN 55035 : 2017	C
	EN 61000-4-4 : 2012	
Surges	EN 55035 : 2017	C
	EN 61000-4-5 : 2014 / A1 : 2017	
Radio-Frequency Continuous Conducted	EN 55035 : 2017	C
	EN 61000-4-6 : 2014	
Power-Frequency Magnetic Fields	EN 55035 : 2017	N/A (Note 2)
	EN 61000-4-8 : 2010	
Voltage Dips and Interruptions	EN 55035 : 2017	C
	EN 61000-4-11 : 2004 / A1 : 2017	
C=Comply N/C=Not Comply N/T=Not Tested N/A=Not Applicable		
Note 1) Test not applicable With the exception of lighting equipment section 7 of the IEC61000-3-2:2014 standard declares that no Harmonic current limits are specified for equipment with a rated power of 75W or less. Note2) This test was not required because the EUT does not containing devices susceptible to magnetic fields.		

The data in this test report are traceable to the national or international standards.



6. Test Environment

Test Items	Test date (YYYY-MM-DD)	Temp. (°C)	Humidity (% R.H.)	Pressure (kPa)
I. Emission				
Conducted Disturbance	2019-07-16	22	49	99.8
Radiated Disturbance	2019-07-16	21	45	-
Harmonic Current Emission	2019-07-17	23	52	
Voltage Change, Fluctuations and Flicker	2019-07-17	23	52	
II. Immunity				
Electrostatic Discharge	2019-07-10	24	45	99.5
Radio-Frequency Electromagnetic Field	2019-07-15	23	52	99.4
Fast Transient	2019-07-11	23	49	99.4
Surges	2019-07-11	23	49	99.4
Radio-Frequency Continuous Conducted	2019-07-11	23	49	99.4
Voltage Dips and Interruptions	2019-07-11	23	49	99.4



7. Test Results : Emission

7.1 Conducted Disturbance

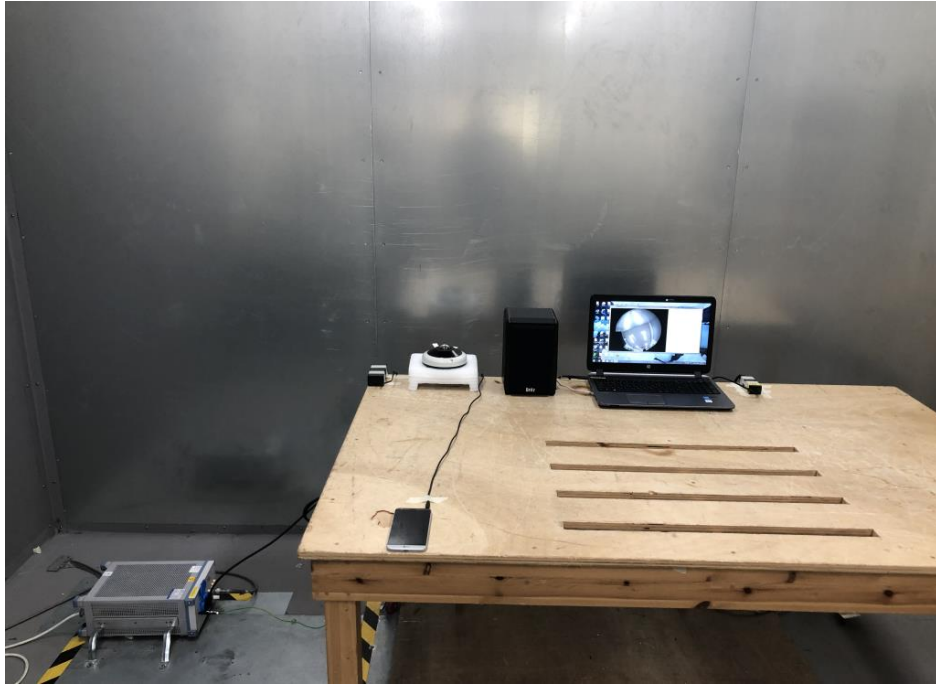
EN 55032	Mains terminal disturbance voltage	Result
Method: The AMN placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment were at least 0,8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.		Comply
Fully configured sample scanned over the following frequency range	Frequency range on each side of line	Measurement Point
	150 kHz to 30 MHz	Mains
EUT mode (Refer to clauses 4)	Test configuration mode	1
	EUT Operation mode	1
Limits – Class A		
Frequency (MHz)	Limit dB μ V	
	Quasi-Peak	Average
0.15 to 0.50	79	66
0.50 to 30	73	60
Limits – Class B		
Frequency (MHz)	Limit dB μ V	
	Quasi-Peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
MEASUREMENT SOFTWARE	EMI-C VER. 2.00.0171	TSJ	N/A	N/A	N/A
EMI TEST RECEIVER	ESU	ROHDE & SCHWARZ	100538	2019.01.23	2020.01.23
TWO-LINE V-NETWORK	ENV216	ROHDE & SCHWARZ	101979	2018.12.06	2019.12.06
LISN	LISN1600	TTI	197204	2019.06.04	2020.06.04
TRANSIENT LIMITER	TL-B0930A	EMCIS	11002	2018.09.05	2019.09.05
TERMINATION (50 OHM)	CT-01	TME	N/A	2018.12.19	2019.12.19



Mains terminal disturbance voltage _ Test setup photo

Test configuration mode	1	EUT Operation mode	1
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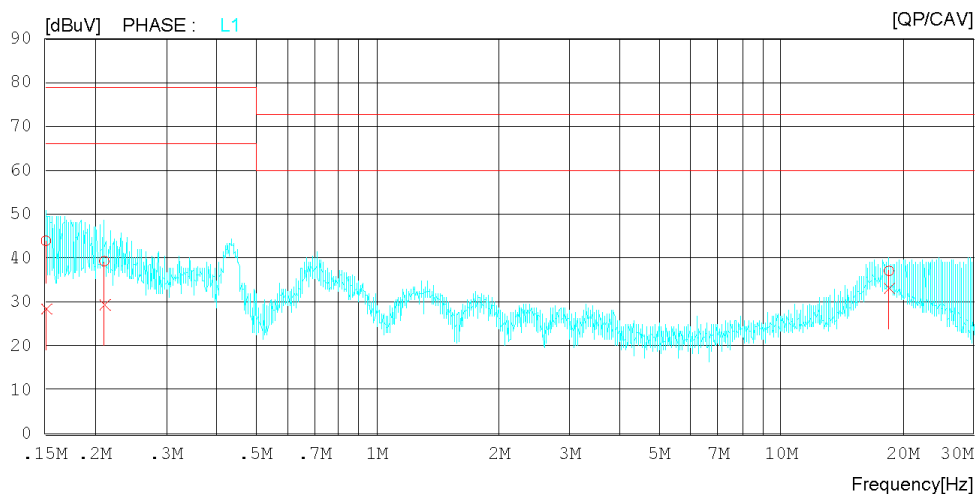
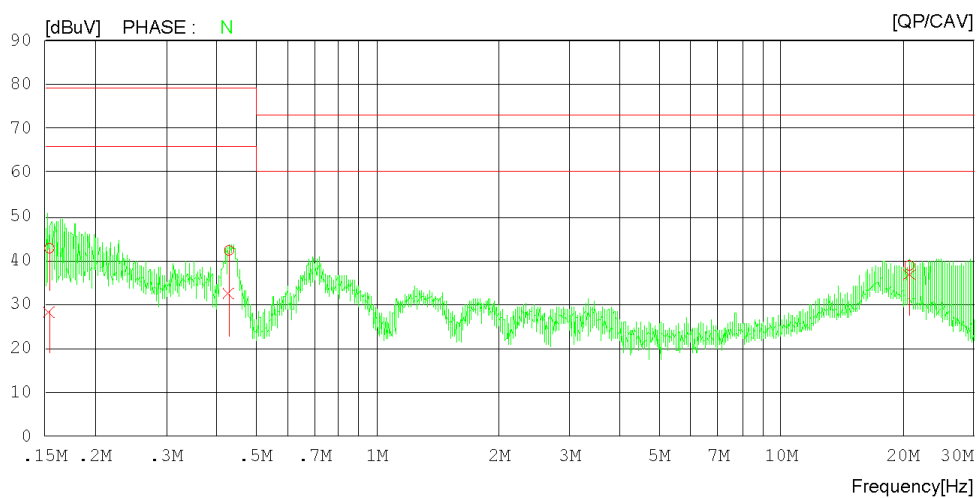
Mains terminal disturbance voltage _ Measurement data			
Test configuration mode	1	EUT Operation mode	1
Test voltage (V)	230	Test Frequency (Hz)	50

Results of Conducted Emission

DT&C
Date 2019-07-16

Order No. DTNC1906-04935
Power Supply 230 V 50 Hz
Temp/Humi/Atm 22 °C 49 % R.H. 99.8 kPa
Test Condition ADAPTER

LIMIT : 32 Class A QP
32 Class A AV



Results of Conducted Emission

DT&C
Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply 230 V 50 Hz
 Temp/Humi/Atm 22 °C 49 % R.H. 99.8 kPa
 Test Condition ADAPTER

LIMIT : 32 Class A QP
 32 Class A AV

NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	
1	0.15420	22.85	8.39	19.95	42.80	28.34	79.00	66.00	36.20	37.66	N
2	0.42980	22.24	12.42	20.03	42.27	32.45	79.00	66.00	36.73	33.55	N
3	20.82104	18.06	16.00	20.83	38.89	36.83	73.00	60.00	34.11	23.17	N
4	0.15107	23.91	8.59	20.03	43.94	28.62	79.00	66.00	35.06	37.38	L1
5	0.21071	19.35	9.44	19.98	39.33	29.42	79.00	66.00	39.67	36.58	L1
6	18.50961	16.17	12.30	20.95	37.12	33.25	73.00	60.00	35.88	26.75	L1

Calculation

N : Neutral phase, L1 : Live phase
C.FACTOR(dB) : Pulse Limiter(dB) + Cable loss(dB) + Insertion loss of LISN(dB)
Result(dBμV) : Reading Value(dBμV) + C.FACTOR(dB)
Margin(dB) : Limit(dBμV) - Result(dBμV)



EN 55032	Conducted common mode (asymmetric mode) disturbance			Result
Method: All power was connected to the system through Artificial Mains Network (AMN). All tested telecommunications lines were connected to an Asymmetric Artificial Network (AAN) and conducted voltage measurements on telecommunications lines were made at the output of the AAN. Where an AAN was not appropriate or available measurements were made using a Capacitive Voltage Probe and Current probe				Comply
Method A11.1. <input checked="" type="checkbox"/>		Method A11.2. <input type="checkbox"/>		Method A11.3. <input type="checkbox"/>
Fully configured sample scanned over the following frequency range		Frequency range on each side of line		Measurement Point
		150 kHz to 30 MHz		Telecommunication ports
EUT mode (Refer to clauses 4)		Test configuration mode		1, 2
		EUT Operation mode		1, 2
Limits - Class A				
Applicable to wired network ports, optical fiber ports with metallic shield or tension members and antenna ports				
Frequency (MHz)	Voltage Limits dBμV		Current Limits dBμA	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15 to 0.50	97 to 87	84 to 74	53 to 43	40 to 30
0.50 to 30	87	74	43	30
Limits - Class B				
Applicable to wired network ports, optical fiber ports with metallic shield or tension members, antenna ports and broadcast receiver tuner ports.				
Frequency (MHz)	Voltage Limits dBμV		Current Limits dBμA	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15 to 0.50	84 to 74	74 to 64	40 to 30	30 to 20
0.50 to 30	74	64	30	20

Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
MEASUREMENT SOFTWARE	EMI-C VER. 2.00.0171	TSJ	N/A	N/A	N/A
EMI TEST RECEIVER	ESU	ROHDE & SCHWARZ	100538	2019.01.23	2020.01.23
TWO-LINE V-NETWORK	ENV216	ROHDE & SCHWARZ	101979	2018.12.06	2019.12.06
LISN	LISN1600	TTI	197204	2019.06.04	2020.06.04
TRANSIENT LIMITER	TL-B0930A	EMCIS	11002	2018.09.05	2019.09.05
TERMINATION (50 OHM)	CT-01	TME	N/A	2018.12.19	2019.12.19
ISN	T8	TESEQ GMBH	24815	2018.12.18	2019.12.18



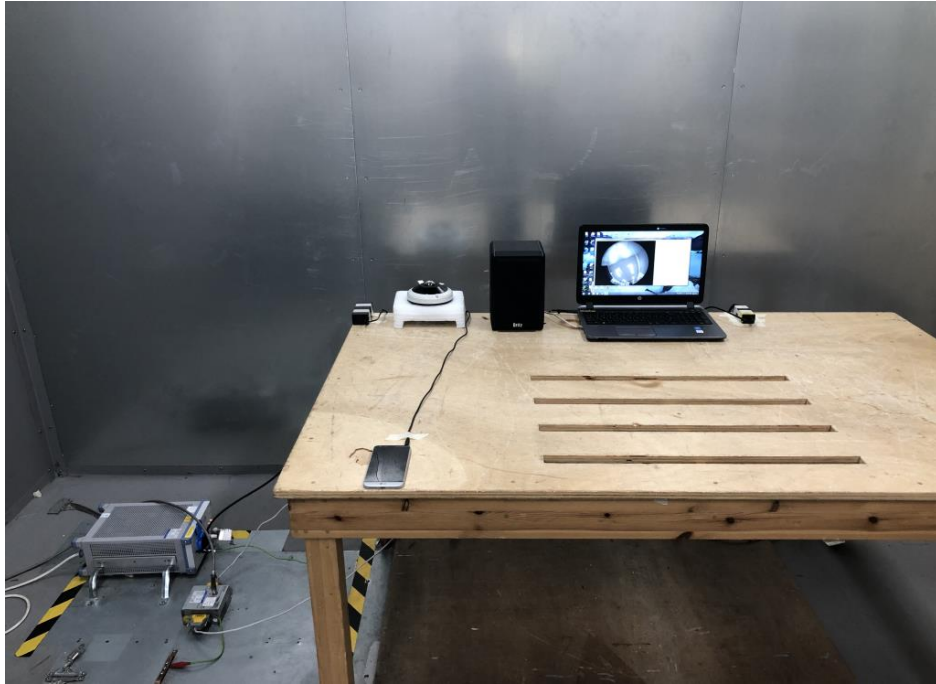
Conducted common mode (asymmetric mode) disturbance _Test setup photo

Test configuration mode

1

EUT Operation mode

1



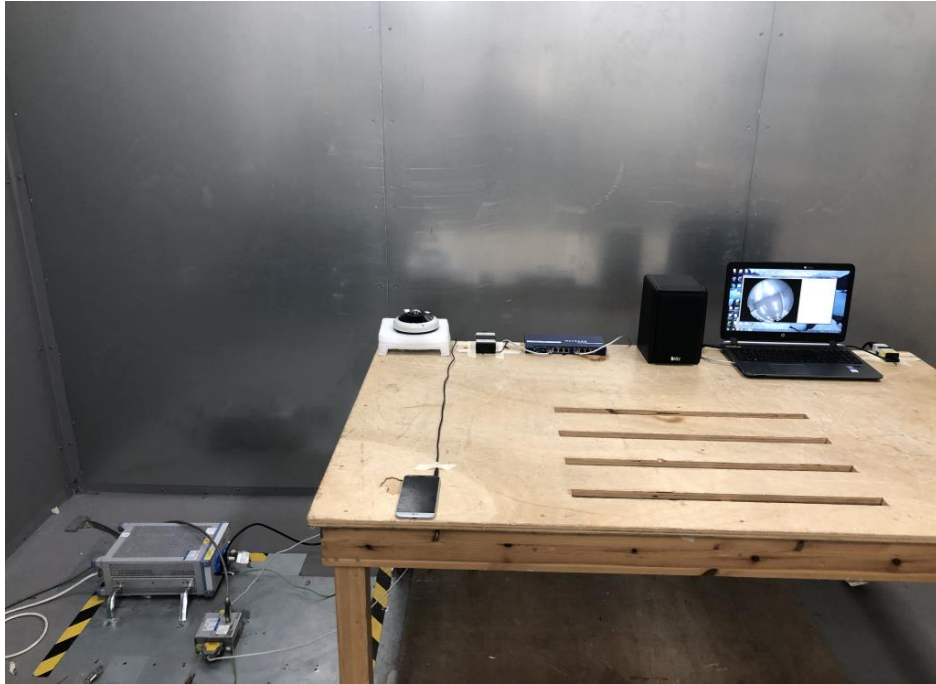
Conducted common mode (asymmetric mode) disturbance _Test setup photo

Test configuration mode

2

EUT Operation mode

2



Conducted common mode (asymmetric mode) disturbance _ Measurement data			
Test configuration mode	1	EUT Operation mode	1
Test voltage (V)	230	Test Frequency (Hz)	50
LAN Speed	100 Mbps		

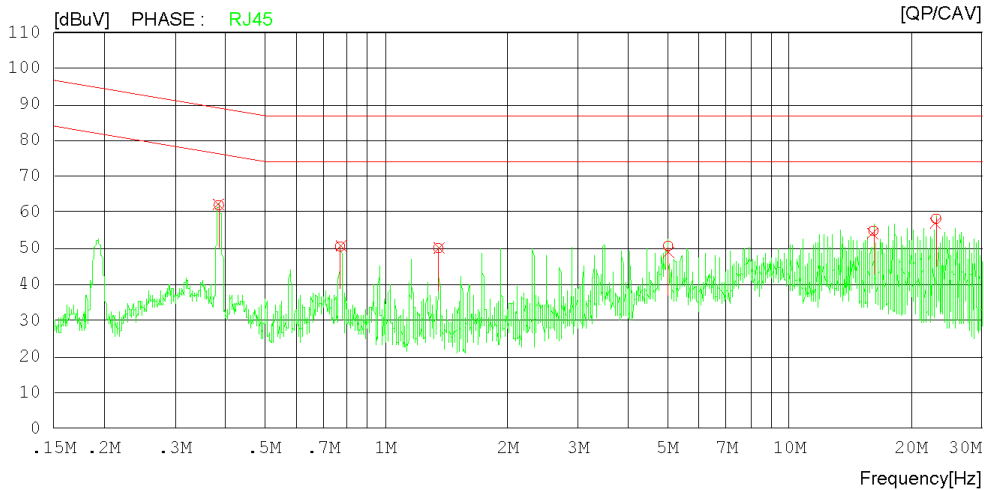
Results of Conducted Emission

DT&C

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply 230 V 50 Hz
 Temp/Humi/Atm 22 °C 49 % R.H. 99.8 kPa
 Test Condition LAN(ADAPTER)

LIMIT : ISN CLASS A QP
 ISN CLASS A AV



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	
1	0.38558	42.16	42.27	19.90	62.06	62.17	89.16	76.16	27.10	13.99	RJ45
2	0.77113	30.67	30.61	19.88	50.55	50.49	87.00	74.00	36.45	23.51	RJ45
3	1.34960	30.22	30.23	19.83	50.05	50.06	87.00	74.00	36.95	23.94	RJ45
4	5.01196	30.76	29.07	19.92	50.68	48.99	87.00	74.00	36.32	25.01	RJ45
5	16.16705	33.93	33.52	20.97	54.90	54.49	87.00	74.00	32.10	19.51	RJ45
6	23.12856	37.48	36.16	20.80	58.28	56.96	87.00	74.00	28.72	17.04	RJ45



Conducted common mode (asymmetric mode) disturbance _ Measurement data			
Test configuration mode	2	EUT Operation mode	2
Test voltage (V)	230	Test Frequency (Hz)	50
LAN Speed	100 Mbps		

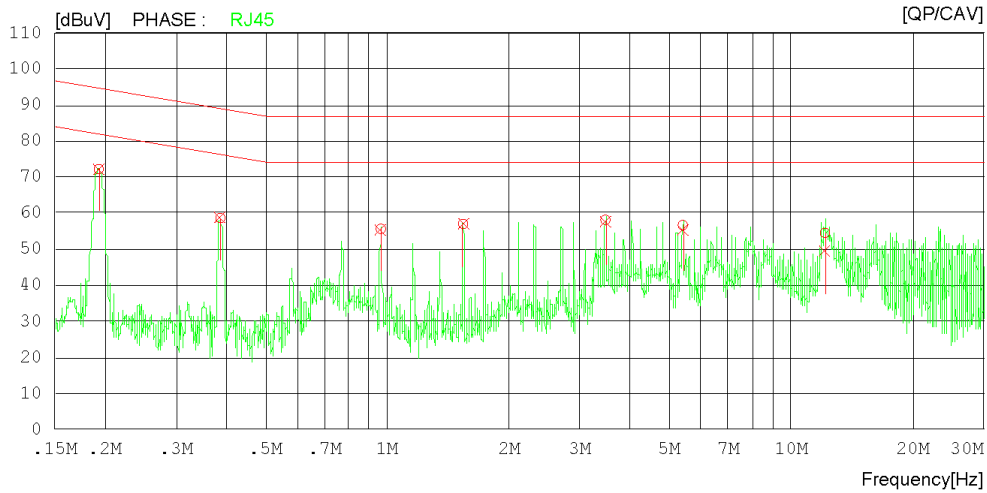
Results of Conducted Emission

DT&C

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply 230 V 50 Hz
 Temp/Humi/Atm 22 °C 49 % R.H. 99.8 kPa
 Test Condition LAN(POE)

LIMIT : ISN CLASS A QP
 ISN CLASS A AV



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	
1	0.19286	52.06	52.21	20.19	72.25	72.40	94.91	81.91	22.66	9.51	RJ45
2	0.38581	38.75	38.86	19.90	58.65	58.76	89.15	76.15	30.50	17.39	RJ45
3	0.96414	35.81	35.74	19.86	55.67	55.60	87.00	74.00	31.33	18.40	RJ45
4	1.54328	37.24	37.02	19.82	57.06	56.84	87.00	74.00	29.94	17.16	RJ45
5	3.47136	38.30	37.67	19.81	58.11	57.48	87.00	74.00	28.89	16.52	RJ45
6	5.39840	36.76	35.47	19.96	56.72	55.43	87.00	74.00	30.28	18.57	RJ45
7	12.14776	33.78	28.68	20.74	54.52	49.42	87.00	74.00	32.48	24.58	RJ45

Calculation

N : Neutral phase, L1 : Live phase
C.FACTOR(dB) : Pulse Limiter(dB) + Cable loss(dB) + Insertion loss of ISN(dB)
Result(dBμV) : Reading Value(dBμV) + C.FACTOR(dB)
Margin(dB) : Limit(dBμV) - Result(dBμV)



7.2 Radiated Disturbance

EN 55032	Radiated disturbance 30 MHz – XX GHz**			Result	
<p>Method: Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10 or 3 meter below 1GHz and 3 meter above 1GHz. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements (quasi-peak detector below 1GHz and CISPR-average detector above 1GHz) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 10 or 3 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.</p>				Comply	
Fully configured sample scanned over the following frequency range	Frequency range		Measurement distance		
	30 MHz – 1 GHz		10 or 3 m measurement distance		
	1 GHz – 6 GHz		3 m measurement distance		
EUT mode (Refer to clauses 4)	Test configuration mode		1, 2		
	EUT Operation mode		1, 2		
Radiated Disturbance below 1 000 MHz at a measuring distance of 3 m					
Frequency range (MHz)		Quasi-peak limit dBμV/m			
		Class A		Class B	
30 to 230		50		40	
230 to 1 000		57		47	
Radiated Disturbance for above 1 000 MHz at a measurement distance of 3 m					
Frequency range (GHz)		Peak limit dBμV/m		Average limit dBμV/m	
		Class A	Class B	Class A	Class B
1 to 3		76	70	56	50
3 to 6		80	74	60	54
Quasi-Peak Limit dBμV/m - FM Receiver					
Frequency (MHz)		Fundamental		Harmonics	
30 to 230		50		42	
230 to 300				42	
300 to 1000				46	
The test frequency range of Radiated Disturbance measurements are listed below.					
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)			Upper frequency of measurement range (MHz)		
Below 108			1 000		
108 – 500			2 000		
500 – 1 000			5 000		
Above 1 000			5 th harmonic of the highest frequency or 6 GHz, whichever is lower		

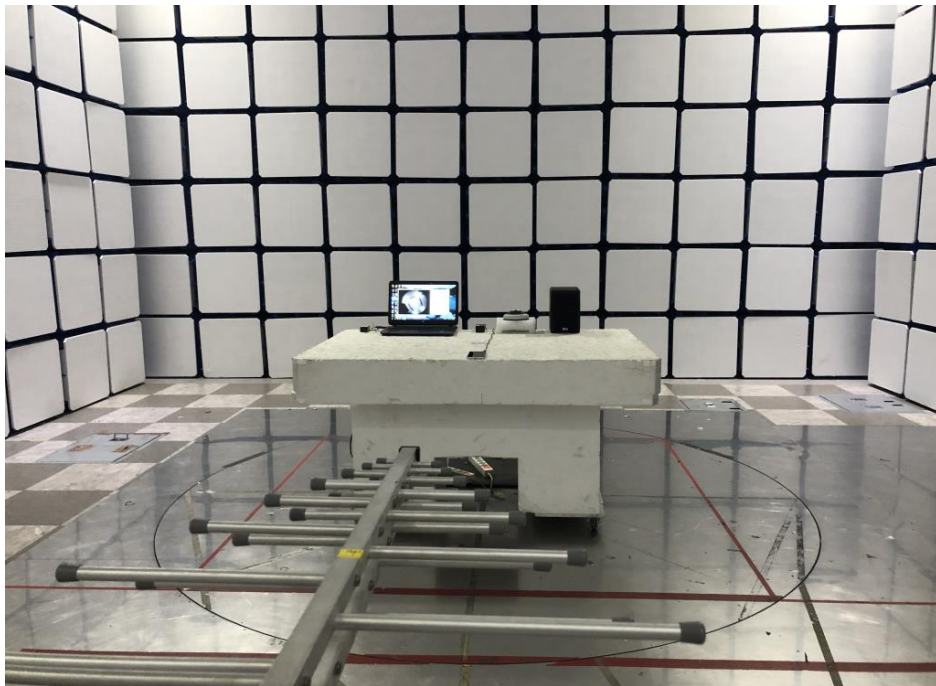
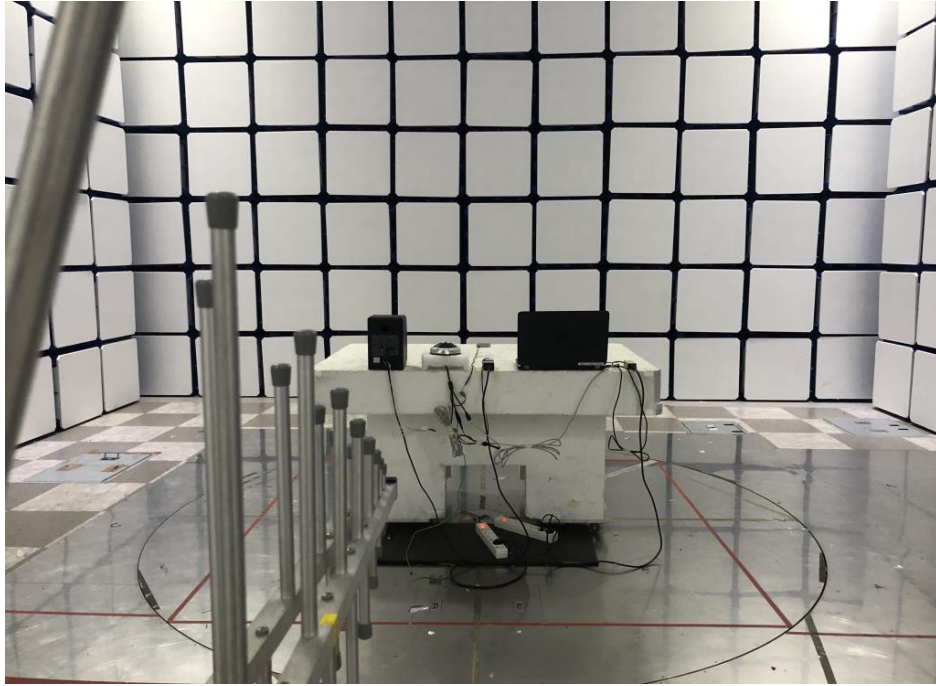


Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
MEASUREMENT SOFTWARE	EMI-R VER. 2.00.0168	TSJ	N/A	N/A	N/A
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	100525	2018.12.18	2019.12.18
TRILOG BROADBAND TEST-ANTENNA WITH 6DB ATT	VULB9160	SCHWARZBECK	9160-3339	2018.10.22	2020.10.22
	8491B	HP	18403	2018.10.22	2020.10.22
LOW NOISE PRE AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2019.02.18	2020.02.18
HORN ANTENNA	3117	ETS-LINDGREN	00152093	2018.03.26	2020.03.26
PRE AMPLIFIER	8449B	H.P	3008A00887	2018.08.31	2019.08.31



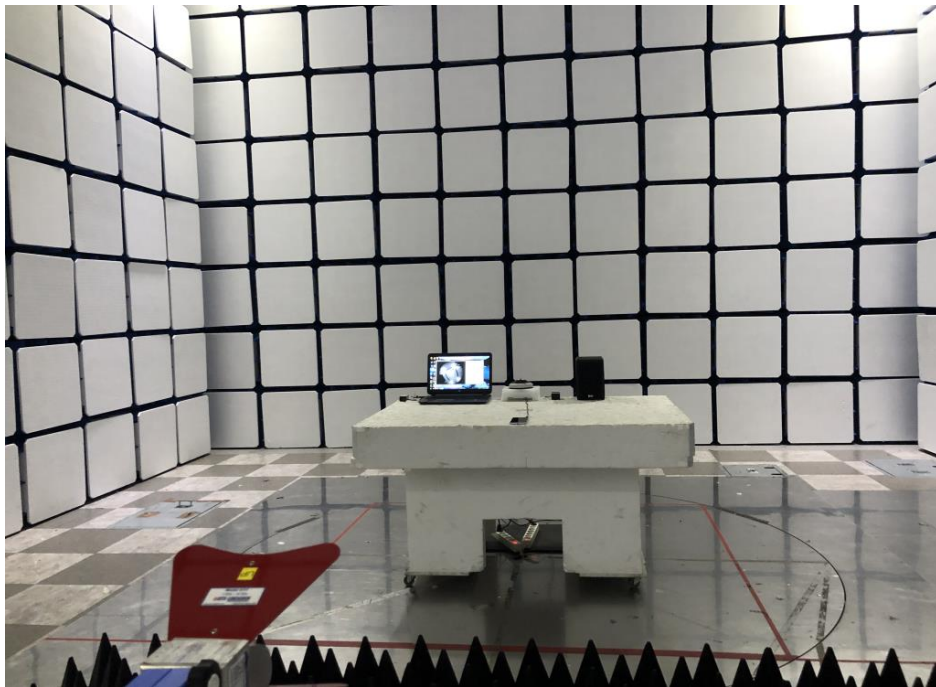
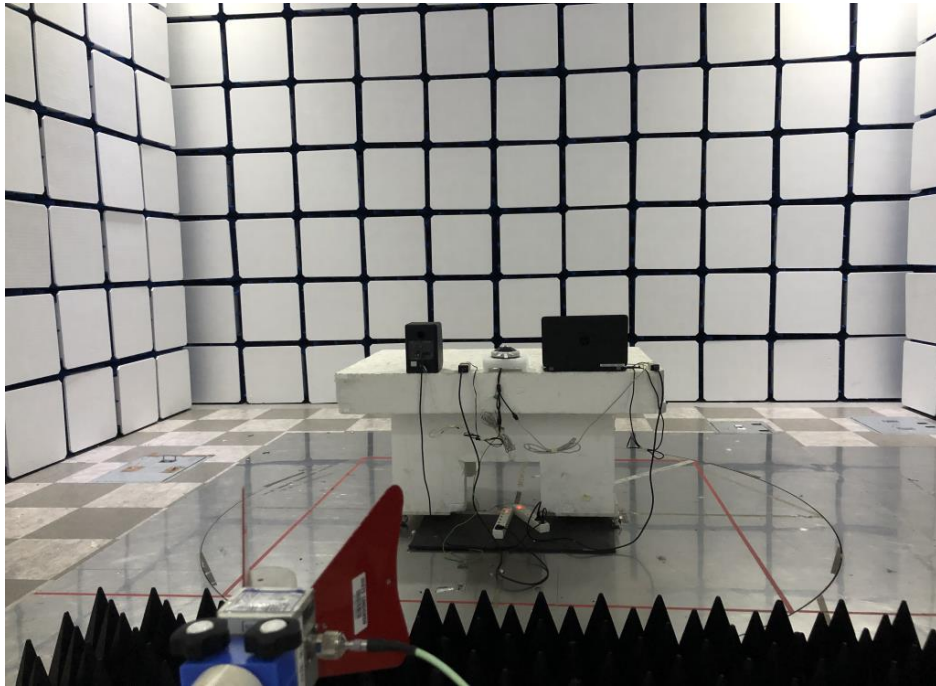
Radiated disturbance at (30 ~ 1 000) MHz _Test setup photo

Test configuration mode	1	EUT Operation mode	1
--------------------------------	----------	---------------------------	----------



Radiated disturbance at (1 ~ 6) GHz _ Test setup photo

Test configuration mode	1	EUT Operation mode	1
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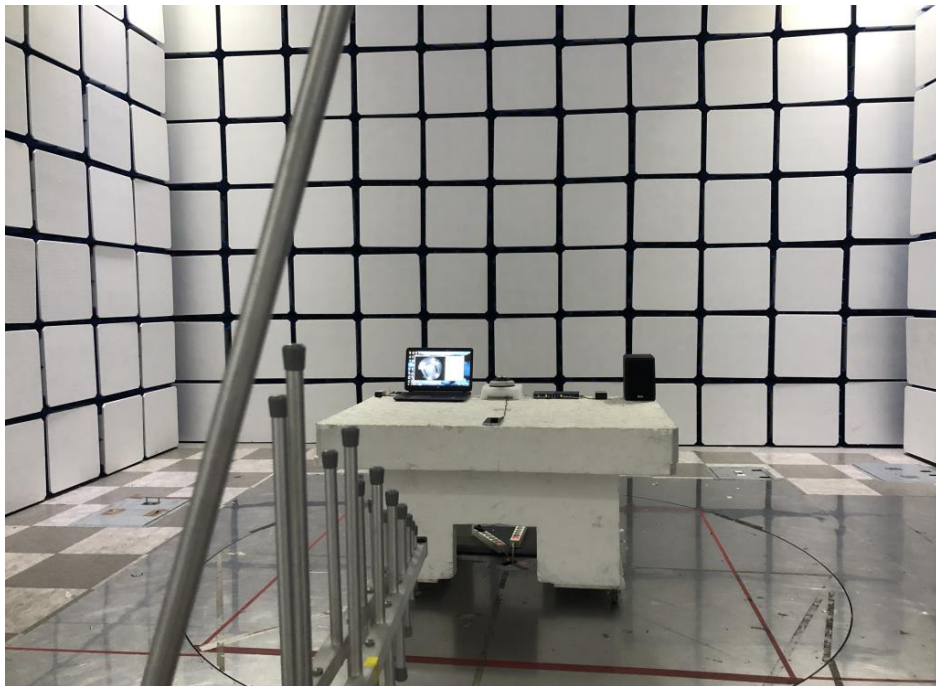
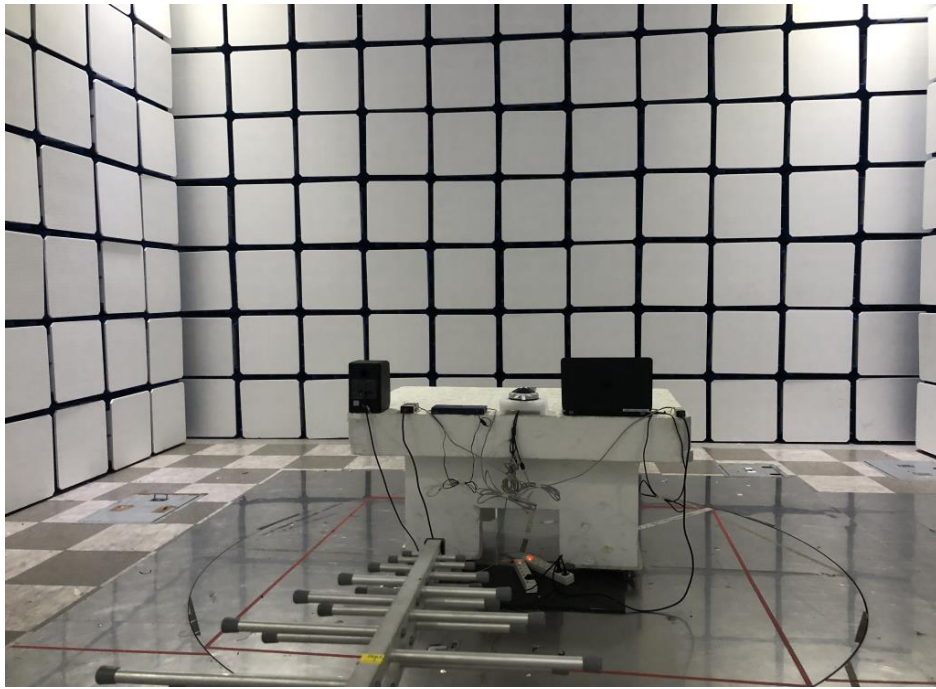
Radiated disturbance at (30 ~ 1 000) MHz _Test setup photo

Test configuration mode

2

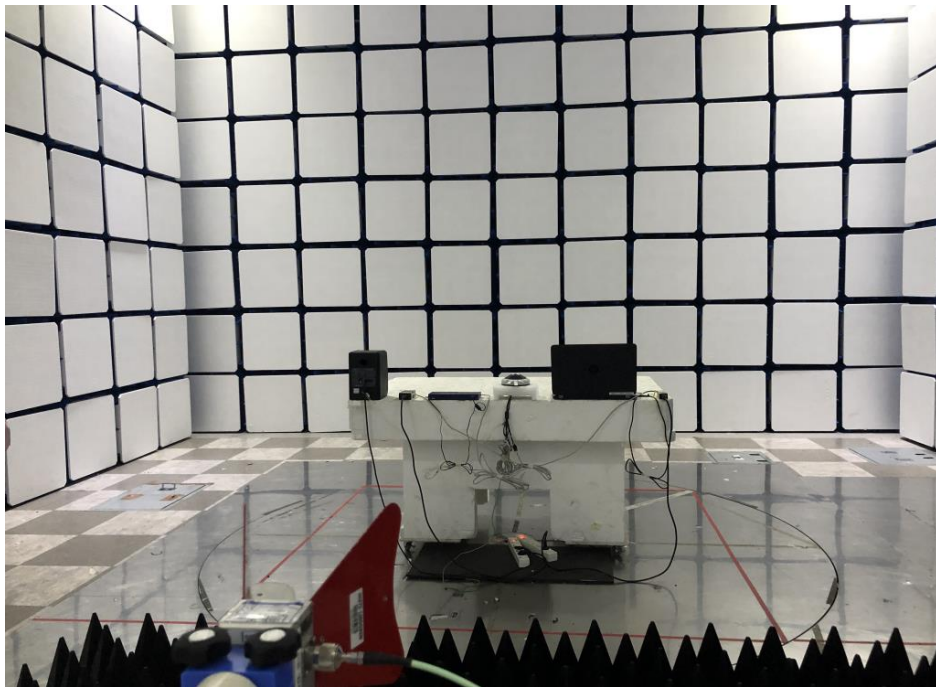
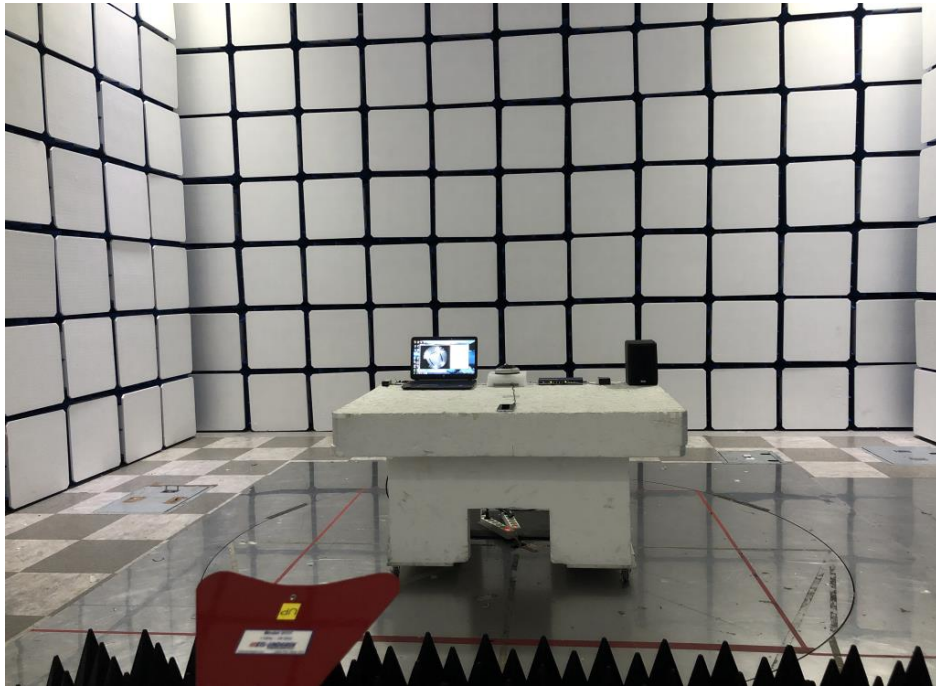
EUT Operation mode

2



Radiated disturbance at (1 ~ 6) GHz _ Test setup photo

Test configuration mode	2	EUT Operation mode	2
-------------------------	---	--------------------	---



Radiated disturbance at (30 ~ 1000) MHz _ Measurement data			
Test configuration mode	1	EUT Operation mode	1
Test voltage (V)	230	Test Frequency (Hz)	50

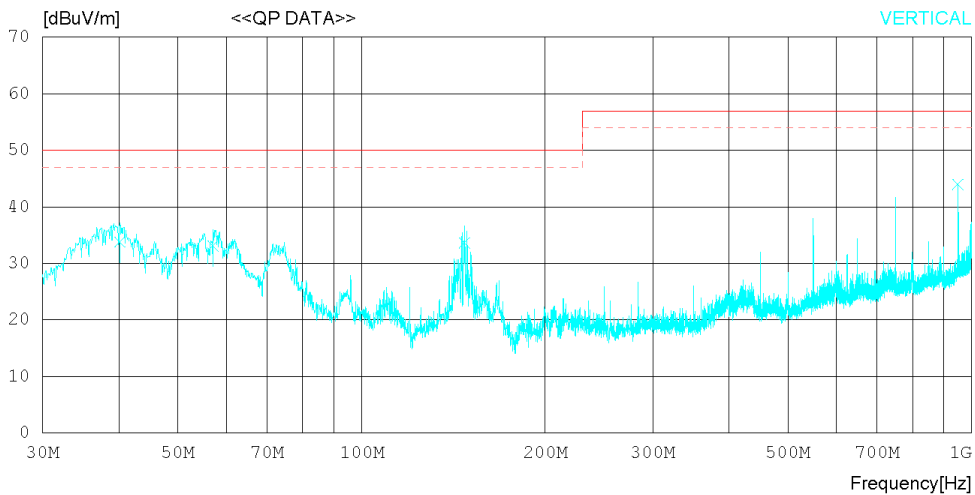
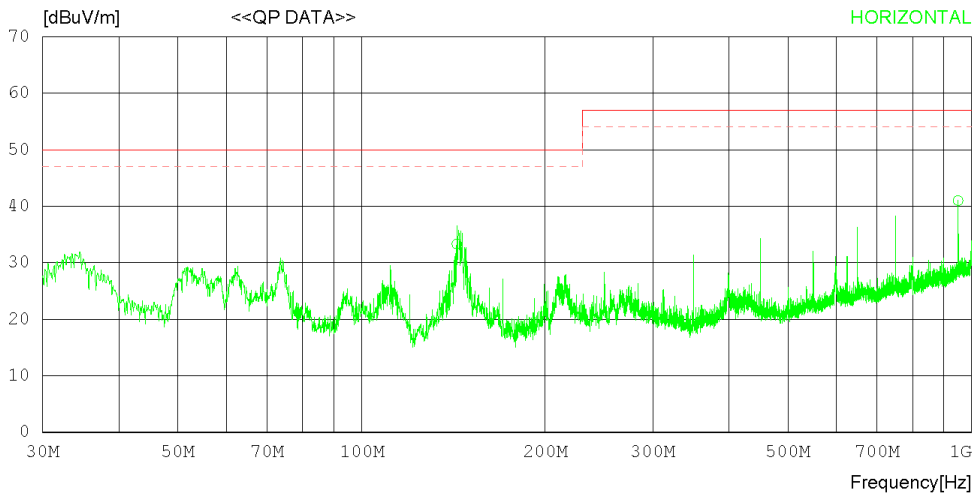
RADIATED EMISSION

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply 230 V 50 Hz
 Temp/Humi 21 °C 45 % R.H.
 Test Condition ADAPTER

Memo

LIMIT : CISPR Pub.32 Class A (3m)
 MARGIN: 3 dB



RADIATED EMISSION

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply 230 V 50 Hz
 Temp/Humi 21 °C 45 % R.H.
 Test Condition ADAPTER

Memo

LIMIT : CISPR Pub.32 Class A (3m)
 MARGIN: 3 dB

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	143.245	38.50	18.76	1.71	25.67	33.30	50.00	16.70	251	34
2	950.129	32.80	30.40	3.82	26.03	40.99	57.00	16.01	108	2
----- Vertical -----										
3	40.185	41.50	16.89	1.20	25.81	33.78	50.00	16.22	132	24
4	57.039	39.90	17.71	1.29	25.79	33.11	50.00	16.89	109	87
5	147.489	38.70	18.85	1.75	25.67	33.63	50.00	16.37	112	12
6	950.129	35.80	30.40	3.82	26.03	43.99	57.00	13.01	142	196



Radiated disturbance at (1 ~ 6) GHz _Peak measurement data			
Test configuration mode	1	EUT Operation mode	1
Test voltage (V)	230	Test Frequency (Hz)	50

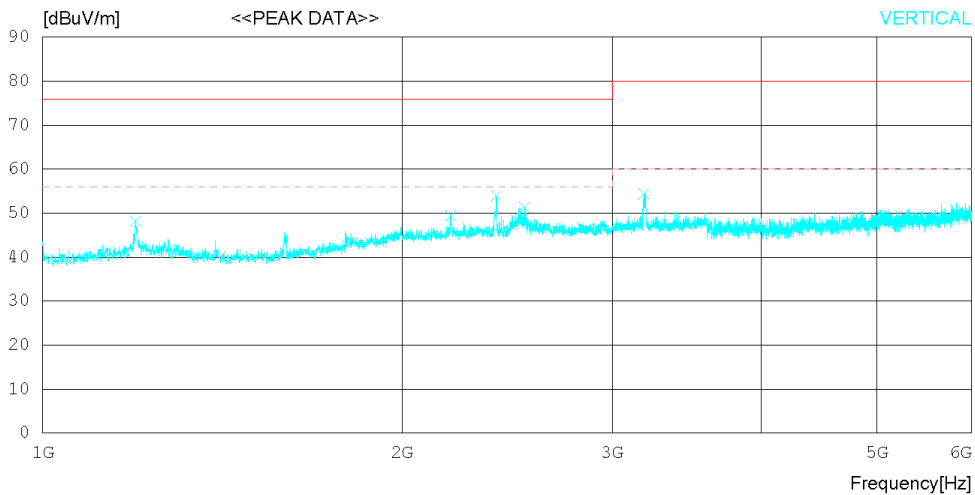
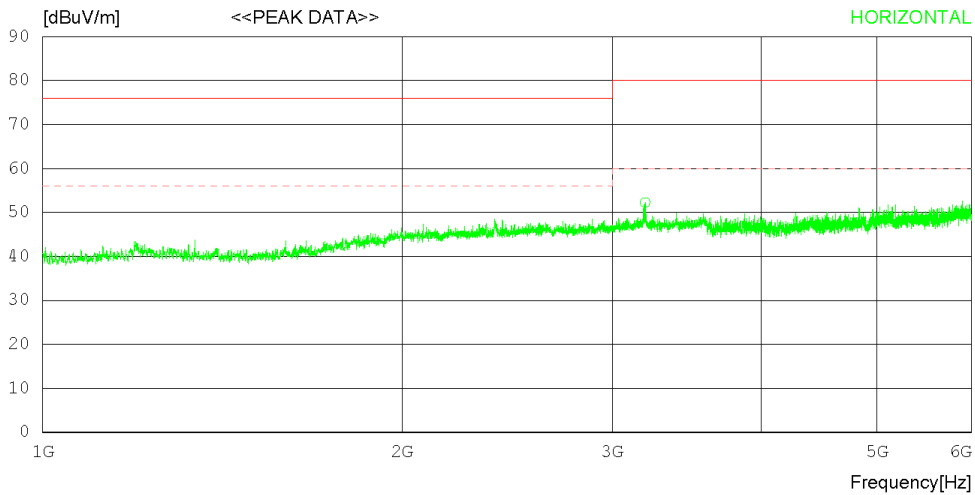
RADIATED EMISSION

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply 230 V 50 Hz
 Temp/Humi 21 °C 45 % R.H.
 Test Condition ADAPTER

Memo

LIMIT : CISPR32_1-6G_Peak_CLASS A
 CISPR32_1-6G_AVG_CLASS A



RADIATED EMISSION

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply 230 V 50 Hz
 Temp/Humi 21 °C 45 % R.H.
 Test Condition ADAPTER

Memo

LIMIT : CISPR32_1-6G_Peak_CLASS A
 CISPR32_1-6G_AVG_CLASS A

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	3196.250	46.10	33.19	7.72	34.74	52.27	80.0	27.73	100	1
----- Vertical -----										
2	1195.625	50.40	28.74	4.73	35.65	48.22	76.0	27.78	100	1
3	2198.750	46.10	31.70	6.42	34.82	49.40	76.0	26.6	100	192
4	2399.375	50.40	31.80	6.64	34.83	54.01	76.0	21.99	100	172
5	2533.750	46.90	32.44	6.79	34.83	51.30	76.0	24.7	100	338
6	3189.375	48.30	33.16	7.71	34.75	54.42	80.0	25.58	100	1



Radiated disturbance at (1 ~ 6) GHz _Average measurement data			
Test configuration mode	1	EUT Operation mode	1
Test voltage (V)	230	Test Frequency (Hz)	50

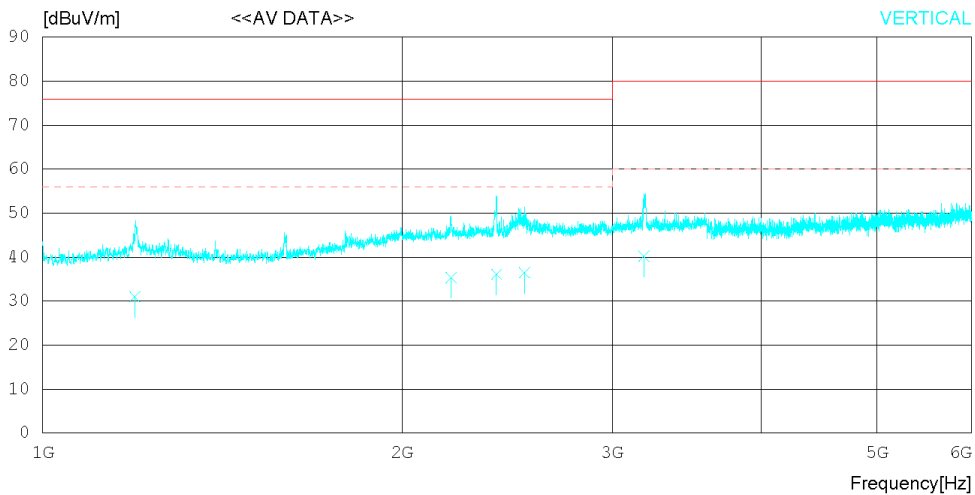
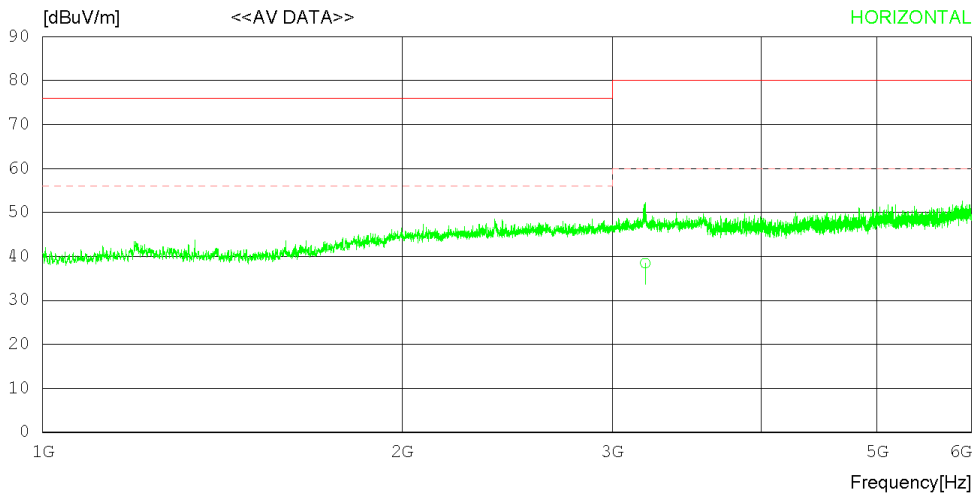
RADIATED EMISSION

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply 230 V 50 Hz
 Temp/Humi 21 °C 45 % R.H.
 Test Condition ADAPTER

Memo

LIMIT : CISPR32_1-6G_AVG_CLASS A
 CISPR32_1-6G_PeaK_CLASS A



RADIATED EMISSION

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply 230 V 50 Hz
 Temp/Humi 21 °C 45 % R.H.
 Test Condition ADAPTER

Memo

LIMIT : CISPR32_1-6G_AVG_CLASS A
 CISPR32_1-6G_Peak_CLASS A

No.	FREQ [MHz]	READING CAV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	3196.966	32.30	33.19	7.72	34.74	38.47	60.00	21.53	100	21
----- Vertical -----										
2	1195.256	33.20	28.73	4.73	35.65	31.01	56.00	24.99	100	24
3	2198.849	32.10	31.70	6.42	34.82	35.40	56.00	20.60	100	174
4	2399.448	32.50	31.80	6.64	34.83	36.11	56.00	19.89	100	6
5	2533.115	32.10	32.43	6.79	34.83	36.49	56.00	19.51	100	87
6	3189.889	34.10	33.16	7.71	34.75	40.22	60.00	19.78	100	112



Radiated disturbance at (30 ~ 1000) MHz _ Measurement data			
Test configuration mode	2	EUT Operation mode	2
Test voltage (V)	POE	Test Frequency (Hz)	-

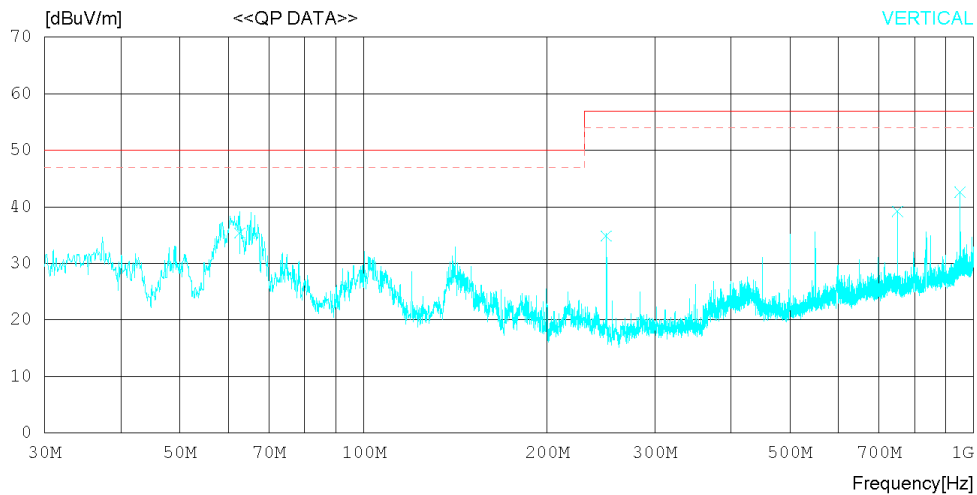
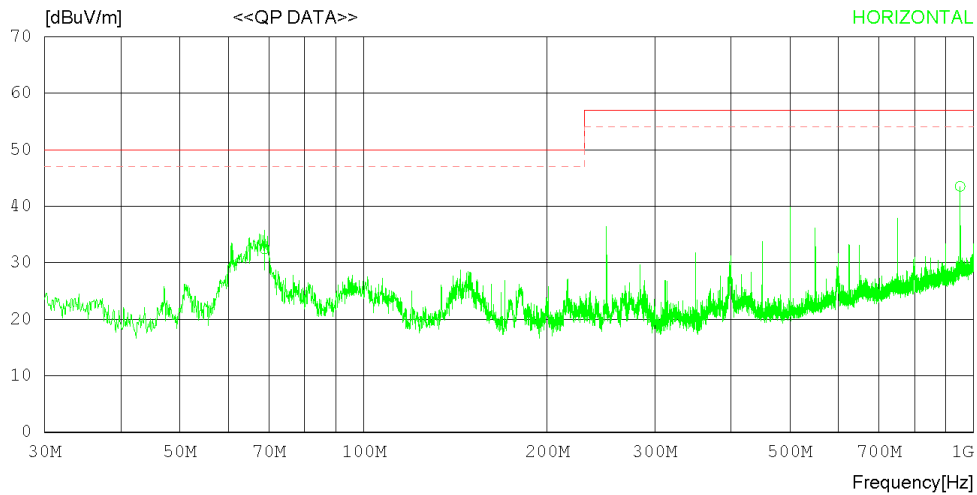
RADIATED EMISSION

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply POE
 Temp/Humi 21 °C 45 % R.H.
 Test Condition

Memo

LIMIT : CISPR Pub.32 Class A (3m)
 MARGIN: 3 dB



RADIATED EMISSION

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply POE
 Temp/Humi 21 °C 45 % R.H.
 Test Condition

Memo

LIMIT : CISPR Pub.32 Class A (3m)
 MARGIN: 3 dB

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	68.800	40.10	16.72	1.36	25.76	32.42	50.00	17.58	189	4
2	950.129	35.30	30.40	3.82	26.03	43.49	57.00	13.51	152	12
----- Vertical -----										
3	62.616	42.00	17.84	1.32	25.77	35.39	50.00	14.61	118	34
4	249.942	40.50	18.00	2.10	25.74	34.86	57.00	22.14	142	87
5	750.022	33.20	28.40	3.43	25.81	39.22	57.00	17.78	128	5
6	950.129	34.40	30.40	3.82	26.03	42.59	57.00	14.41	103	112



Radiated disturbance at (1 ~ 6) GHz _Peak measurement data			
Test configuration mode	2	EUT Operation mode	2
Test voltage (V)	POE	Test Frequency (Hz)	-

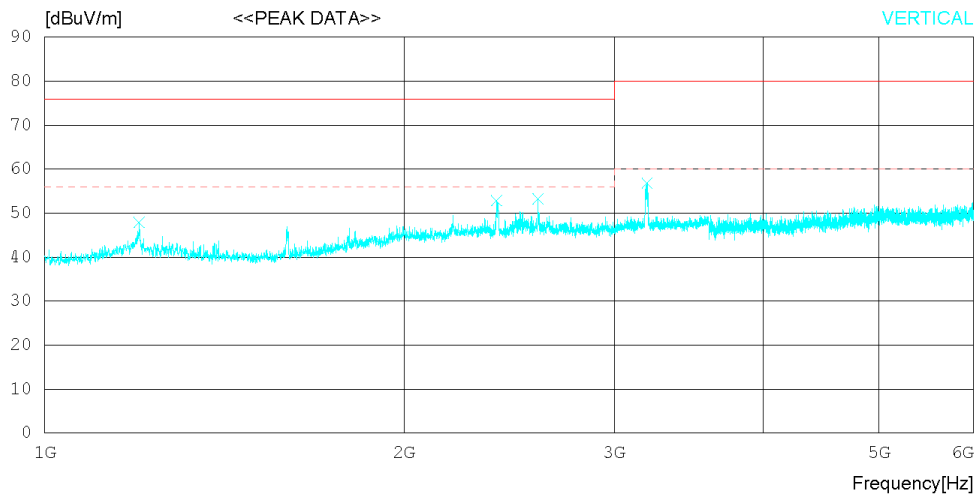
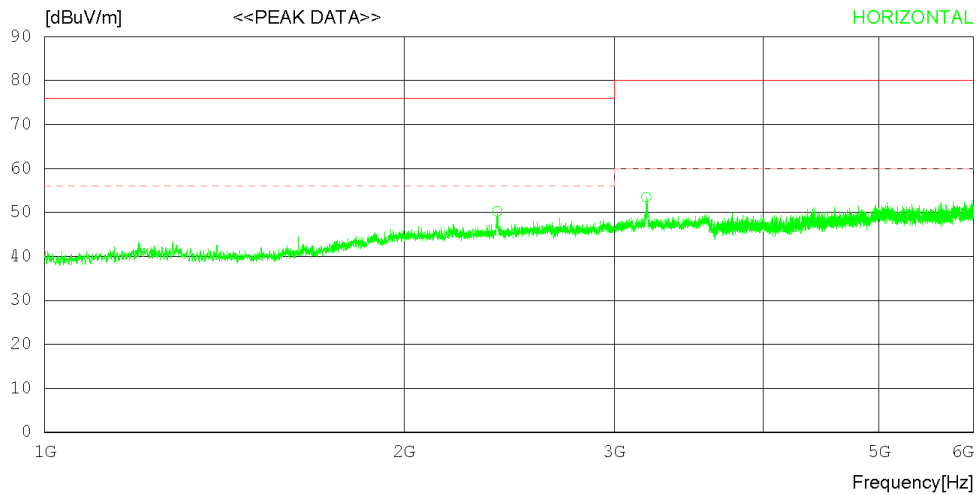
RADIATED EMISSION

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply POE
 Temp/Humi 21 'C 45 % R.H.
 Test Condition

Memo

LIMIT : CISPR32_1-6G_Peak_CLASS A
 CISPR32_1-6G_AVG_CLASS A



RADIATED EMISSION

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply POE
 Temp/Humi 21 °C 45 % R.H.
 Test Condition

Memo

LIMIT : CISPR32_1-6G_Peak_CLASS A
 CISPR32_1-6G_AVG_CLASS A

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	2393.750	46.70	31.79	6.64	34.83	50.30	76.0	25.7	100	347
2	3190.625	47.30	33.16	7.71	34.74	53.43	80.0	26.57	100	191
----- Vertical -----										
3	1200.000	50.00	28.80	4.75	35.64	47.91	76.0	28.09	100	142
4	2390.000	49.30	31.78	6.64	34.83	52.89	76.0	23.11	100	1
5	2590.000	48.60	32.58	6.86	34.83	53.21	76.0	22.79	100	328
6	3196.250	50.60	33.19	7.72	34.74	56.77	80.0	23.23	100	1



Radiated disturbance at (1 ~ 6) GHz _Average measurement data			
Test configuration mode	2	EUT Operation mode	2
Test voltage (V)	POE	Test Frequency (Hz)	-

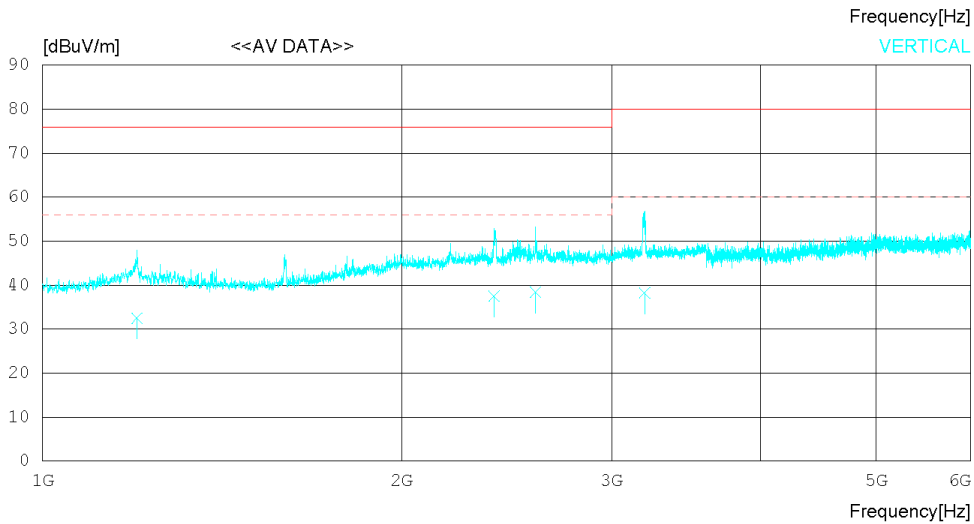
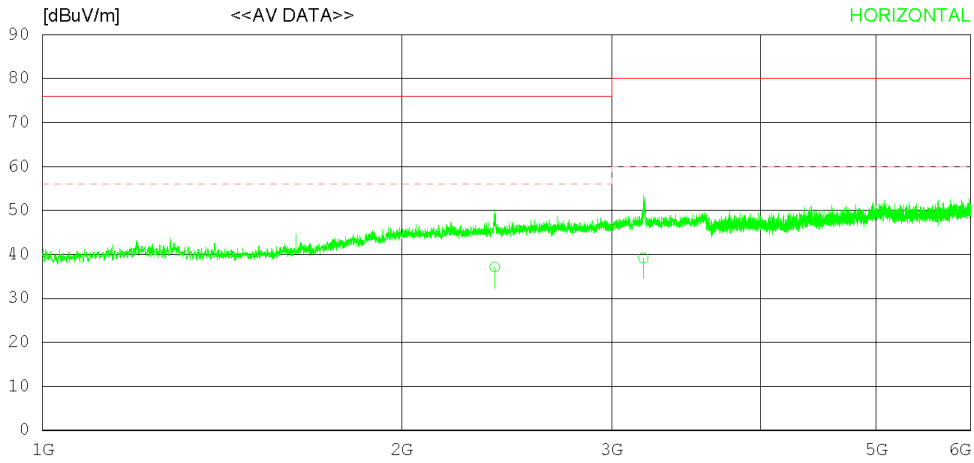
RADIATED EMISSION

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply POE
 Temp/Humi 21 °C 45 % R.H.
 Test Condition

Memo

LIMIT : CISPR32_1-6G_AVG_CLASS A
 CISPR32_1-6G_Peak_CLASS A



RADIATED EMISSION

Date 2019-07-16

Order No. DTNC1906-04935
 Power Supply POE
 Temp/Humi 21 °C 45 % R.H.
 Test Condition

Memo

LIMIT : CISPR32_1-6G_AVG_CLASS A
 CISPR32_1-6G_Peak_CLASS A

No.	FREQ [MHz]	READING CAV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	2393.215	33.53	31.79	6.64	34.83	37.13	56.00	18.87	100	94
2	3190.112	33.10	33.16	7.71	34.74	39.23	60.00	20.77	100	31
----- Vertical -----										
3	1200.415	34.60	28.80	4.75	35.64	32.51	56.00	23.49	100	84
4	2390.589	33.90	31.78	6.64	34.83	37.49	56.00	18.51	100	97
5	2590.112	33.80	32.58	6.86	34.83	38.41	56.00	17.59	100	112
6	3196.986	32.10	33.19	7.72	34.74	38.27	60.00	21.73	100	49

Calculation

Result(dBμV/m) : Reading Value(dBμV) + Cable loss(dB) - Pre amplifier gain(dB) + Ant. Factor(dB)
Margin(dB) : Limit(dBμV/m) - Result(dBμV/m)



7.3 Harmonic Current Emissions

EN 61000-3-2	Harmonic current emissions		Result
Method: This test consists on the measurement of harmonics components of the input current which may be produced by equipment having an input current up to and including 16 A per phase, and intended to be connected to public low-voltage distribution systems. The equipment is tested under specified conditions of operation.			Not Applicable
EUT mode (Refer to clauses 4)	Test configuration mode		1
	EUT Operation mode		1
Limit classification in accordance with the standard	<input checked="" type="checkbox"/>	Class A	
	<input type="checkbox"/>	Class B	
	<input type="checkbox"/>	Class C with active input power > 25 W	
	<input type="checkbox"/>	Class C with active input power ≤ 25 W (First requirement, Table 3 column 2)	
	<input type="checkbox"/>	Class C with active input power ≤ 25 W (Second requirement)	
	<input type="checkbox"/>	Class D	
Limit classification	Class A	<ul style="list-style-type: none"> - balanced three-phase equipment - household appliances, excluding equipment identified as class D - tools, excluding portable tools - dimmers for incandescent lamps - audio equipment - equipments not specified in one of the three other classes 	
	Class B	<ul style="list-style-type: none"> - portable tools - arc welding equipment which is not professional equipment 	
	Class C	<ul style="list-style-type: none"> - lighting equipment 	
	Class D	<ul style="list-style-type: none"> - Equipment specified power less than or equal to 600 W of the following types - personal computers and personal computer monitors - television receiver 	
1) According to EN61000-3-2 the manufacturer shall specify the power of the apparatus. This value shall be used for establishing limits; the specified power shall be within ±10 % of the measured power. 2) Limit are not specified for <ul style="list-style-type: none"> - Equipment with a rated power of 75 W or less (other than lighting equipment) - Professional equipment with a total rated power greater than 1 kW - Symmetrically controlled heating elements with a rated power less than or equal to 200 W - Independent dimmers for incandescent lamps with a rated power less than or equal to 1 kW 			



Harmonic Current Emission Limit			
- Limit for Class A equipment			
Harmonic order (n)	Maximum permissible Harmonic current (A)	Harmonic order (n)	Maximum permissible Harmonic current (A)
Odd harmonics		Even harmonics	
3	2.30	2	1.08
5	1.14	4	0.43
7	0.77	6	0.3
9	0.40	8 ≤ n ≤ 40	0.23 8/n
11	0.33		
13	0.21		
15 ≤ n ≤ 39	0.15 15/n		
- Limit for Class B equipment			
It shall not exceed the value give in Class A multiplied by a factor of 1.5.			
- Limit for Class C equipment			
Harmonic order (n)	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %		
2	2		
3	30·λ(λ is the circuit power factor)		
5	10		
7	7		
9	5		
11 ≤ n ≤ 39 (odd harmonics only)	3		
- Limit for Class D equipment			
Harmonic order (n)	Maximum permissible Harmonic current per watt (mA/W)	Maximum permissible Harmonic current (A)	
3	3.4	2.30	
5	1.9	1.14	
7	1.0	0.77	
9	0.5	0.40	
11	0.35	0.33	
13 ≤ n ≤ 39 (odd harmonics only)	3.85/n	See Class A	

Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
MULTIFUNCTION AC / DC POWER SOURCE	NETWAVE 60-400	EM TEST	P1311115470	2019.02.20	2020.02.20
DIGITAL POWER ANALYZER	DPA 503N	EM TEST	P1303109858	2019.02.20	2020.02.20
THREE-PHASE FLICKER IMPEDANCE	AIF 503N63	EM TEST.	P1311114936	2019.02.20	2020.02.20



Harmonic current emissions _ Test setup photo

Test configuration mode

1

EUT Operation mode

1



Harmonic current emissions _ Measurement data			
Test configuration mode	1	EUT Operation mode	1

Test Report

Report Number : DTNC1906-04935
 Test Standard : IEC 61000-3-2 (Edition 4)
 Limits for harmonic current emissions (equipment input current < 16 A per phase)
 Test Date : 7/17/2019 10:27:00 AM

Result

E.U.T. : PASS Source : PASS

Climatic Conditions

Temperature : 23 °C Pressure : 99 kPa Humidity : 52 %

Software

Name : net.control Version : 2.1.4.0

Measures & Analysis

Measure Window : 10 periods Voltage Range : 500 V
 Refresh Interval : 2 s Current Range : 10 A
 Sampling Rate : 6.4 kS/s
 Scaled Window : Rectangular
 According : IEC 61000-3-2 (Edition 4)
 Limits for harmonic current emissions (equipment input current < 16 A per phase)
 Observation Period : Quasi-stationary

Measure Results

Standard Specific Results for IEC 61000-3-2 (Edition 4)

Standard Group: Industry
 Standard Name: IEC 61000-3-2 (Edition 4)
 Limits for harmonic current emissions (equipment input current < 16 A per phase)
 Device Under Test: **PASS**
 Power Source: **PASS**
 Connection Type: L - N
 Classification: Class A
 Appli. of Limits: less than or equal to 150 %

Current limits are disabled because rated power is less than 75W.

Check Harmonics 2..40 [exception odd 21..39]

First detected harmonic order > 150 %

Line 1: **None**

<i>Harmonics orders > 150 %</i>	
Line 1:	None
<i>Harmonics orders with average > 100 %</i>	
Line 1:	None

Check Odd Harmonics 21..39			
<i>First detected time window with partial > partial limits</i>			
	<i>time window (time)</i>	<i>measured value</i>	<i>limit</i>
Line 1:	None		-
<i>Maximal time window with partial > partial limits</i>			
	<i>time window (time)</i>	<i>measured value</i>	<i>limit</i>
Line 1:	None		-
<i>First detected harmonic order > 150 %</i>			
Line 1:	None		
<i>Harmonics orders > 150 %</i>			
Line 1:	None		
<i>Harmonics orders with average > 150 %</i>			
Line 1:	None		

Measured values	
<i>Fundamental Current</i>	
Line 1:	0.026 A
<i>Active input Power</i>	
Line 1:	3.104 W *
<i>Circuit power factor</i>	
Line 1:	0.222 *

* Absolute value.

Current Test Result

Average and Maximum harmonic current results									
Hn	Average (100% / 150% *)				Maximum (150%)				Harmonic Result
	I _{eff} [A]	of Limit [%]	Limit [A]	Result	I _{eff} [A]	of Limit [%]	Limit [A]	Result	
1	0.025				0.025				
2	0.002				0.003				
3	0.015				0.015				
4	0.003				0.003				
5	0.015				0.015				
6	0.003				0.003				
7	0.015				0.015				
8	0.003				0.003				
9	0.014				0.014				
10	0.003				0.003				
11	0.014				0.014				
12	0.003				0.003				
13	0.014				0.014				



14	0.002			0.003			
15	0.014			0.014			
16	0.002			0.003			
17	0.013			0.013			
18	0.002			0.003			
19	0.013			0.013			
20	0.002			0.003			
21	0.012			0.012			
22	0.002			0.003			
23	0.012			0.012			
24	0.002			0.003			
25	0.011			0.011			
26	0.002			0.002			
27	0.011			0.011			
28	0.002			0.002			
29	0.010			0.010			
30	0.002			0.002			
31	0.010			0.010			
32	0.002			0.002			
33	0.009			0.009			
34	0.002			0.002			
35	0.009			0.009			
36	0.002			0.002			
37	0.008			0.008			
38	0.002			0.002			
39	0.007			0.008			
40	0.002			0.002			

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.
 * Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

Voltage Source Verification

Harmonic voltage results				
Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	230.718	100.312		
2	0.175	0.076	0.200	PASS
3	0.064	0.028	0.900	PASS
4	0.072	0.032	0.200	PASS
5	0.045	0.019	0.400	PASS
6	0.052	0.022	0.200	PASS
7	0.060	0.026	0.300	PASS
8	0.037	0.016	0.200	PASS
9	0.059	0.026	0.200	PASS
10	0.031	0.013	0.200	PASS
11	0.033	0.014	0.100	PASS
12	0.025	0.011	0.100	PASS
13	0.036	0.016	0.100	PASS



14	0.024	0.011	0.100	PASS
15	0.018	0.008	0.100	PASS
16	0.021	0.009	0.100	PASS
17	0.023	0.010	0.100	PASS
18	0.024	0.011	0.100	PASS
19	0.017	0.007	0.100	PASS
20	0.021	0.009	0.100	PASS
21	0.015	0.007	0.100	PASS
22	0.020	0.009	0.100	PASS
23	0.015	0.007	0.100	PASS
24	0.014	0.006	0.100	PASS
25	0.017	0.007	0.100	PASS
26	0.010	0.004	0.100	PASS
27	0.011	0.005	0.100	PASS
28	0.018	0.008	0.100	PASS
29	0.023	0.010	0.100	PASS
30	0.010	0.004	0.100	PASS
31	0.016	0.007	0.100	PASS
32	0.020	0.009	0.100	PASS
33	0.016	0.007	0.100	PASS
34	0.011	0.005	0.100	PASS
35	0.023	0.010	0.100	PASS
36	0.019	0.008	0.100	PASS
37	0.012	0.005	0.100	PASS
38	0.011	0.005	0.100	PASS
39	0.017	0.007	0.100	PASS
40	0.017	0.007	0.100	PASS



7.4 Voltage Change, Fluctuations and Flicker

EN 61000-3-3	Voltage change, fluctuations and flicker		Result
Method: EUT was connected to the Power Analyzer system. Measurements were conducted to obtain the desired flicker parameters. The measuring time depends on which parameters are to be measured. The measurement was performed with the test software			Comply
EUT mode (Refer to clauses 4)	Test configuration mode	1	
	EUT Operation mode	1	
parameters	P_{st}	the short-term flicker indicator, P_{st} , shall not be greater than 1.0	
	P_{lt}	the long-term flicker indicator, P_{lt} , shall not be greater than 0.65	
	T_{max}	T_{max} the accumulated time value of $d(t)$ with a deviation exceeding 3,3 % during a single voltage change at the EUT terminals, shall not exceed 500 ms	
	d_c	The maximum relative steady-state voltage change, d_c , shall not exceed 3.3 %	
	d_{max}	The maximum relative voltage change d_{max} , shall not exceed 4 % without additional conditions 6 % for equipment which is switched manually, if any 7 % for equipment which is attended whilst in use	

Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
MULTIFUNCTION AC / DC POWER SOURCE	NETWAVE 60-400	EM TEST	P1311115470	2019.02.20	2020.02.20
DIGITAL POWER ANALYZER	DPA 503N	EM TEST	P1303109858	2019.02.20	2020.02.20
THREE-PHASE FLICKER IMPEDANCE	AIF 503N63	EM TEST.	P1311114936	2019.02.20	2020.02.20



Voltage change, fluctuations and flicker _ Test setup photo

Test configuration mode

1

EUT Operation mode

1



Voltage change, fluctuations and flicker _ Measurement data			
Test configuration mode	1	EUT Operation mode	1

Test Report

Report Number :	DTNC1906-04935
Test Standard :	IEC 61000-3-3 (Edition 3) Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection
Test Date :	7/17/2019 10:14:49 AM

Result

E.U.T. :	Test passed
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Climatic Conditions

Temperature :	23 °C	Pressure :	99 kPa	Humidity :	52 %
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Software

Name :	net.control	Version :	2.1.4.0
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Flicker Results

Standard Specific Results for IEC 61000-3-3 (Edition 3)

Standard Group:	Industry
Standard Name:	IEC 61000-3-3 (Edition 3) Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection
Test Condition:	General Test Conditions
Analysis Status:	PASS

Flicker Measurements Settings

Main line:	230V, 50Hz
Flicker Meter:	230V / 50Hz
Flicker Impedance:	Zref
Observation Time:	3 × 10 min
Measurements performed:	3

Flicker Measurements

	P_{It}	Max P_{st}	Max D_c	Max D_{max}	Max T_{max}
Line 1:	0.017	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS





8. Test Results : Immunity

Description of Performance Criteria (EN55035)	
Criteria A	<p>The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p> <p>The measured acoustic interference ratio and/or the measured electrical interference ratio during the test shall be -20 dB or better.</p>
Criteria B	<p>After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
Criteria C	<p>Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost</p>



8.1 Electrostatic Discharge

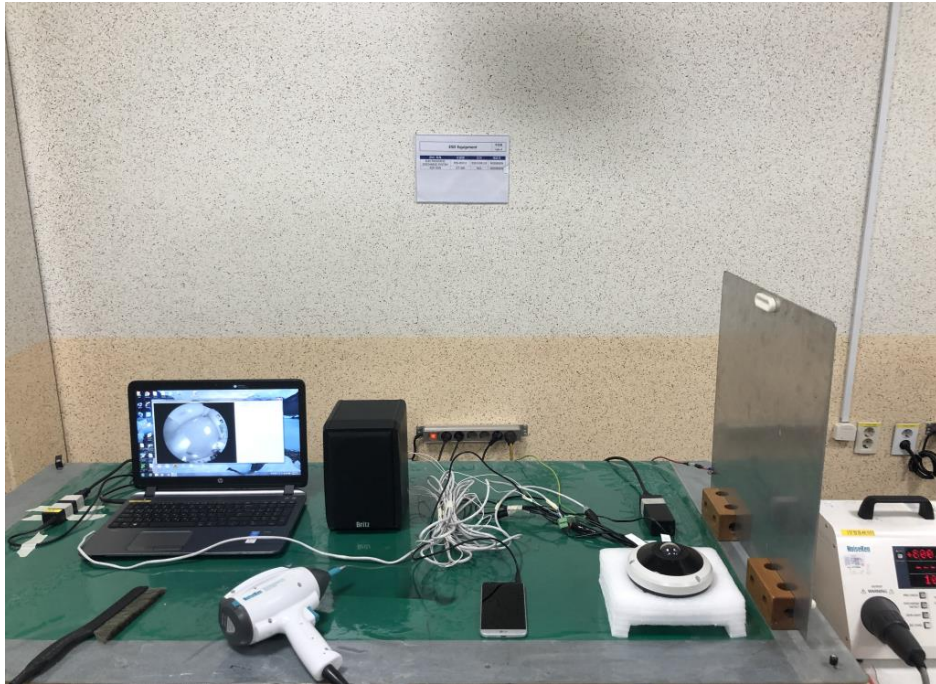
EN 55035	Electrostatic Discharge	Result
<p><u>Method:</u> The test set-up was made accordance with EN61000-4-2. A ground reference plane was located on the floor, and connected to earth via a low impedance connection. The return cable of the ESD generator was connected to the reference plane. In case of table top equipment, EUT was placed on the reference plane on 80 cm of insulating support. And a vertical coupling plane (VCP) of (0.5 x 0.5) m was located 10 cm from the EUT's sides. The VCP was connected to the reference plane via a cable with a 470 kΩ (2ea) resistor. The test was made by applying contact and air discharges to the EUT and contact discharges to the VCP/HCP. When applying the discharges to the VCP the tip of the generator was located at the middle edge of the VCP. The VCP was located 10 cm from each side of the EUT. Contact discharges were applied to various points of the EUT at conductive surfaces and to the HCP/VCP. Air discharges were applied to various points of the EUT at non-conductive surfaces.</p>		Comply
<p>EUT mode (Refer to clauses 4)</p>	<p>Test configuration mode EUT Operation mode</p>	
Test spec		
Direct : Air Discharges Contact Discharges		8 kV 4 kV
Indirect : HCP (Floor-stand product excluded) VCP		4 kV
Polarity		+ and -
Number of discharges per point for each voltage and polarity Air Discharge Contact Discharge		≥ 10 ≥ 25
Discharge impedance		330 Ω / 150 pF
Discharge Repetition		≥ 1 sec
Performance criteria		B

Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
ELECTROSTATIC DISCHARGE SYSTEM	ESS-B3011	NOISEKEN	ESS1438118	2018.12.04	2019.12.04
ESD GUN	GT-30R	NOISEKEN	N/A	2018.12.04	2019.12.04



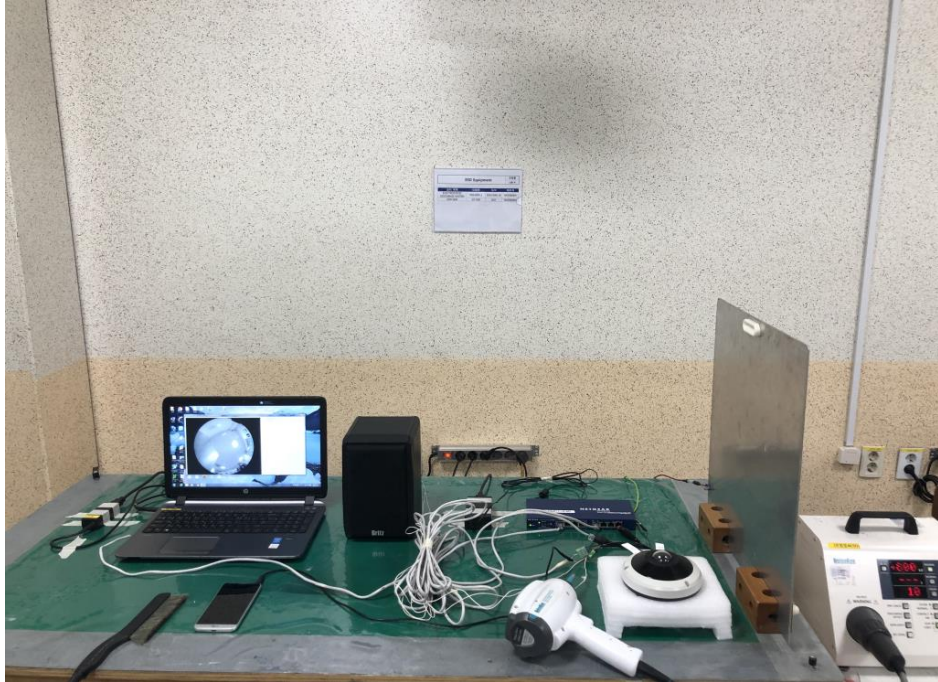
Electrostatic discharge _Test setup photo

Test configuration mode	1	EUT Operation mode	1
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Electrostatic discharge _Test setup photo

Test configuration mode	2	EUT Operation mode	2
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Electrostatic discharge position photo			
Test configuration mode	1, 2	EUT Operation mode	1, 2
3			1
2			6
Air Discharge : →		Contact Discharge : →	



Electrostatic discharge _ Test result					
Test configuration mode		1, 2	EUT Operation mode		1, 2
Indirect Discharge					
No.	Position	Kind of Discharge	Test level	Performance Criteria	Result
1	Horizontal Coupling Plane	Contact	±2 kV, ±4 kV	B	A
2	Vertical Coupling Plane				A
Direct Discharge					
No.	Position	Kind of Discharge	Test level	Performance Criteria	Result
1	SCREW	Contact	±2 kV, ±4 kV	B	A
2	Enclosure Cover				A
3	CAMERA LENS	Air	±2 kV, ±4 kV, ±8 kV		A
4	LAN PORT				A
5	AUDIO PORT				A
6	ALARM PORT				A
Note)					



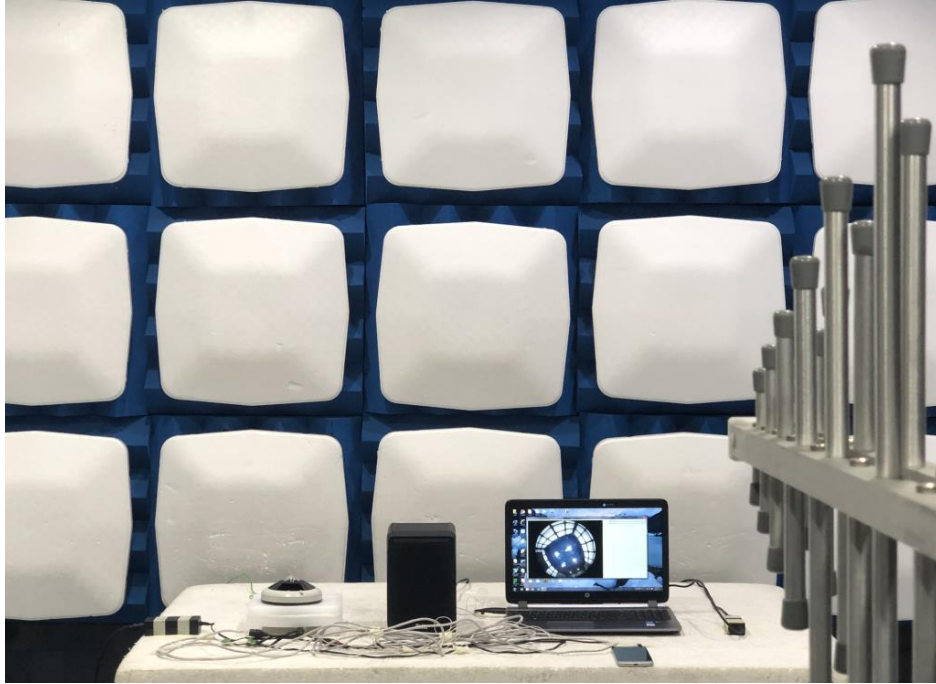
8.2 Radio-Frequency Electromagnetic Field

EN 55035	Radio-frequency electromagnetic field and Keyed carrier	Result
Method: The test set-up was made accordance with EN61000-4-3 in semi-anechoic chamber. The EUT has been placed in center of a non-metallic turntable. The height of this table was 0.8 m. The field strength was monitored by an isotropic sensor during the complete test. The isotropic sensor was located beside the equipment. The antenna has been orientated for both horizontal and vertical polarization. The distance between antennas the equipment under testing was at least 3 m. The tests have been performed with the antenna facing each of the four side of the EUT. For acoustical measurement, acoustic measurement method and / or the electrical measurement method was selected according to the port.		Comply
EUT mode (Refer to clauses 4)	Test configuration mode EUT Operation mode	
Radio-frequency electromagnetic field _ Test Spec		
EUT operation mode	1, 2	-
Field strength	3 V/m, 1 V/m (in-band frequencies)	3 V/m
Frequency range	80 MHz ~ 1 GHz	80 MHz ~ 6 GHz
Amplitude Modulation	AM, 80 %, 1 kHz sine-wave	
Step size	1 % of fundamental	
Sweep capability	$\leq 1.5 \times 10^{-3}$ decade/s	
The selected frequencies	1 800, 2 600, 3 500, 5 000 MHz	80, 104, 136, 165, 200, 260, 330, 430, 560, 715, 920 MHz \pm 1 MHz
Performance criteria	A	Continuous Phenomena

Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
SIGNAL GENERATOR	E4438C	AGILENT	US41460430	2019.01.23	2020.01.23
POWER METER	NRP2	ROHDE & SCHWARZ	107025	2018.10.15	2019.10.15
LOG-PER ANTENNA	VULP 9118	SCHWARZBECK	9118E890	N/A	N/A
HORN ANTENNA	BBHA9120A	SCHWARZBECK	556	N/A	N/A
POWER AMPLIFIER	MT100	PRANA	1317	N/A	N/A
POWER AMPLIFIER	SV20	PRANA	1100	N/A	N/A
POWER AMPLIFIER	UX30	PRANA	1708-2105	N/A	N/A



Radio-frequency electromagnetic field _ Test setup photo			
Test configuration mode	1	EUT Operation mode	1



Radio-frequency electromagnetic field _ Test setup photo			
Test configuration mode	2	EUT Operation mode	2



Radio-frequency electromagnetic field _ Test result					
Test configuration mode			1, 2	EUT Operation mode	
Test Level (V/m)	ANT. Polarization	Position	Performance Criteria	Result	Remark
3 V/m	Horizontal	Left	A	A	No degradation of performance
		Right		A	No degradation of performance
		Front		A	No degradation of performance
		Rear		A	No degradation of performance
	Vertical	Left		A	No degradation of performance
		Right		A	No degradation of performance
		Front		A	No degradation of performance
		Rear		A	No degradation of performance

Note 1) The EUT is exempt from the sound pressure test because it provides audio only when it is connected to additional equipment (such as amplifiers).



8.3 Fast Transients

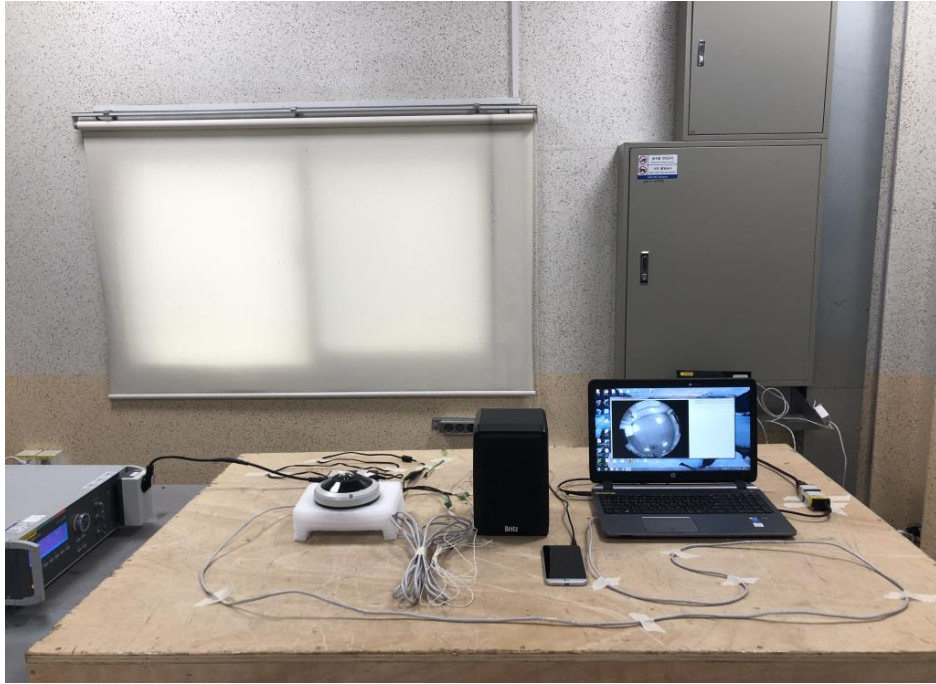
EN 55035	Fast Transients	Result
<p><u>Method:</u> The test set-up was made accordance with EN61000-4-4. The EUT has been placed on a wooden table 10 cm above the reference ground plane. The reference ground plane exceeded the projected geometry of the EUT and the capacitive clamp by more than 20 cm. The clamp has placed directly on the reference ground plane. The distance between the EUT and all other conductive structures except the ground plane beneath the EUT was more than 50 cm. The distance between noise generator and EUT was about 50 cm.</p>		Comply
<p>EUT mode (Refer to clauses 4)</p>	<p>Test configuration mode EUT Operation mode</p>	
		1, 2
		1, 2
Test Spec		
	AC power ports	DC power ports / Signal ports
Test voltage (kV)	1 kV	0.5 kV
Polarity	+ and -	
Repetition frequency	5 kHz	
Tr/Th ns	5 / 50	
Test duration	≥ 60 sec	
Performance criteria	B	

Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V1113109125	2018.09.28	2019.09.28
CAPACITIVE COUPLING CLAMP	HFK	EM TEST	0312-76	2019.06.13	2020.06.13

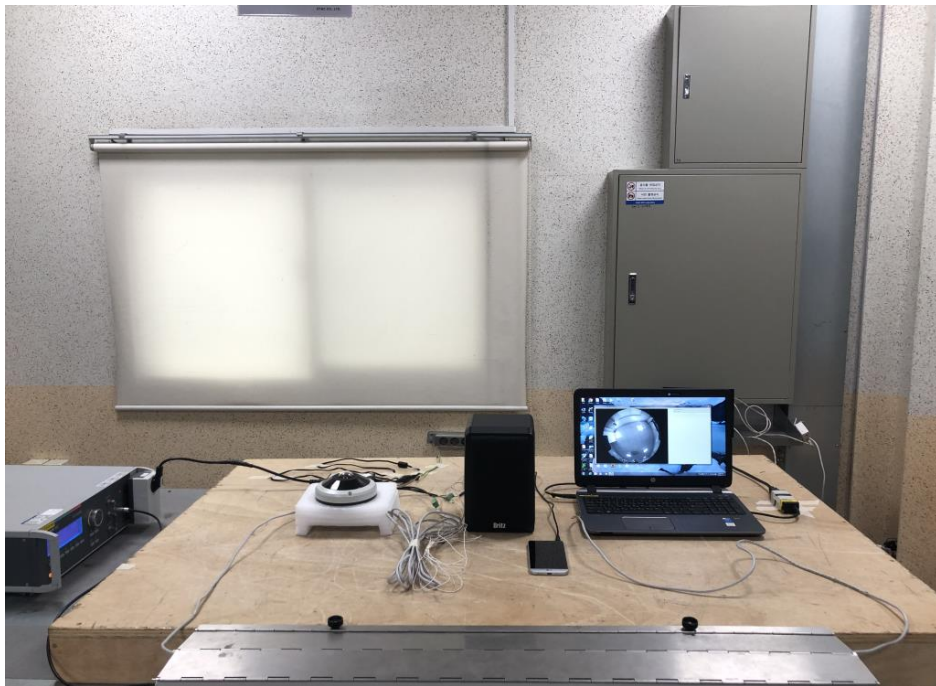


Fast Transients _Test setup photo _ power port

Test configuration mode	1	EUT Operation mode	1
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Fast Transients _Test setup photo _ signal port



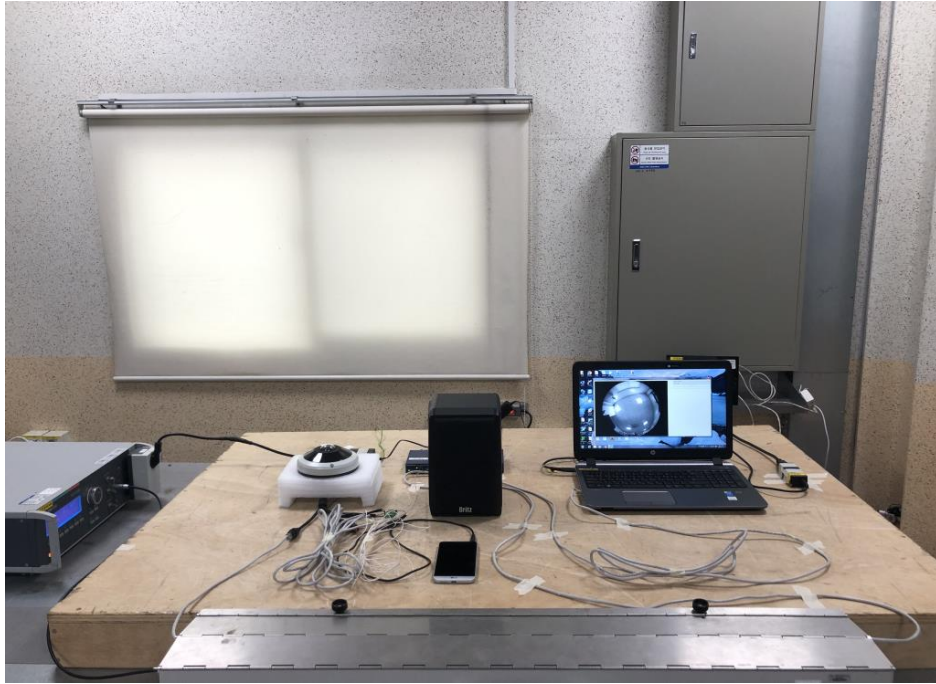
Fast Transients _Test setup photo _ signal port

Test configuration mode

2

EUT Operation mode

2



Fast Transients _ Test result of power port					
Test configuration mode		1	EUT Operation mode		1
Line	Test Level (kV)	Performance Criteria	Result	Remark	
N - L1 - PE	±1 kV	B	A	No degradation of performance	
Note) N : Neutral line, L1 : Live line, PE : Ground line					

Fast Transients _ Test result of signal port					
Test configuration mode		1	EUT Operation mode		1
Line	Test Level (kV)	Performance Criteria	Result	Remark	
LAN	±0.5 kV	B	A	No degradation of performance	
ALARM			A	No degradation of performance	
Note)					

Fast Transients _ Test result of signal port					
Test configuration mode		2	EUT Operation mode		2
Line	Test Level (kV)	Performance Criteria	Result	Remark	
POE	±0.5 kV	B	A	No degradation of performance	
ALARM			A	No degradation of performance	
Note)					



8.4 Surges

EN 55035	Surges			Result
<p><u>Method:</u> The test set-up was made accordance with EN61000-4-5. The test consists of the injection of slow high energy transients in the AC/DC mains supply lines in both line-to-line and line-to-ground coupling mode, and into the signal and extra low voltage supply lines in line-to-ground coupling mode. The impedance of the transient generator is characterized by the shape of the open-circuit voltage and the circuit current pulses. To simulate typical installation impedances, 40 are inserted when the generator when extra low voltage and signal lines are tested, and 10 are inserted when the line-to-ground test is conducted on the AC/DC mains lines. The test pulses are coupled into the leads to be tested by means of appropriate coupling networks, which maintain the test pulses within their specification. The reference ground plane exceeded the projected geometry of the EUT and the back filler by more than 20 cm. The back filler has been placed directly on a separated reference ground plane. Both ground planes were connected together. The ground terminal of the back filler has been connected directly with its reference ground plane.</p>				Comply
<p>EUT mode (Refer to clauses 4)</p>		<p>Test configuration mode EUT Operation mode</p>		
Test Spec				
	AC power ports		DC power ports	Signal ports
Test voltage (kV)	Line to Line : 1 kV Line to Ground : 2 kV		Line to Ground : 0.5 kV	Line to Ground : 1 kV Shield to Ground : 0.5 kV
Polarity	+ and -			
Waveshape, open circuit voltage	1.2 μ s / 50 μ s			10 μ s / 700 μ s 1.2 μ s / 50 μ s
Waveshape, short circuit current	8 μ s / 20 μ s			
Phase shifting	0°, 90°, 180°, 270° (AC power ports)			
Repetition rate	20 sec			
Number of surges	5			
Performance criteria	B			

Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
ULTRA COMPACT SIMULATOR	UCS 500 N5	EMTEST	V1113109125	2018.09.28	2019.09.28



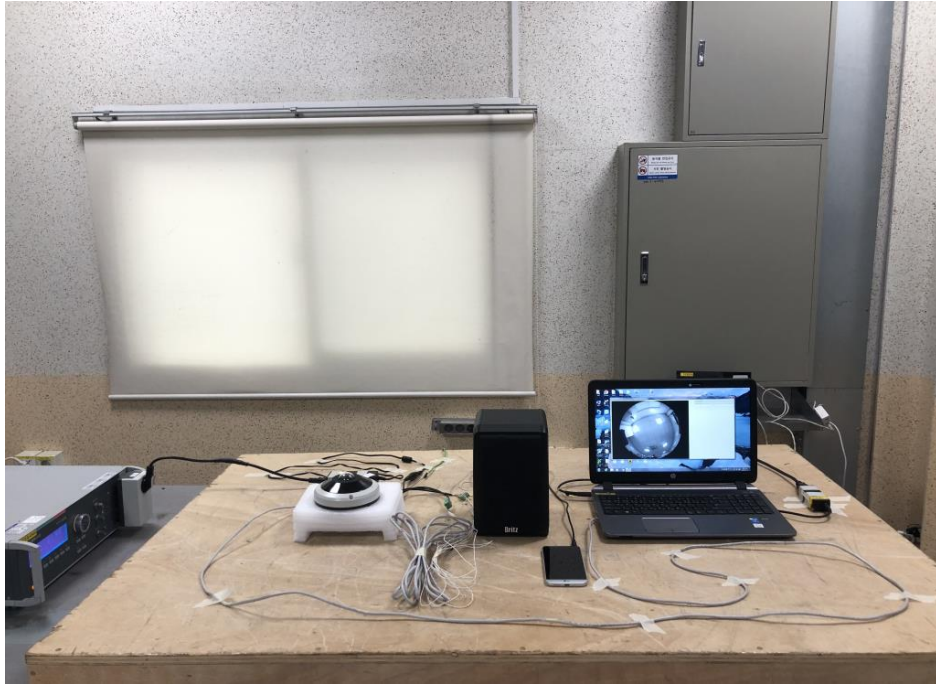
Surges _Test setup photo

Test configuration mode

1

EUT Operation mode

1



Surges _ Test result of power port					
Test configuration mode		1	EUT Operation mode		1
Line	Test Level (kV)	Performance Criteria	Result	Remark	
N - L1	±1 kV	B	A	No degradation of performance	
N – PE	±2 kV		A	No degradation of performance	
L1 - PE	±2 kV		A	No degradation of performance	

Note 1)

N : Neutral line, L1 : Live line, PE : Ground line

Surges _ Test result of signal port				
Line	Test Level (kV)	Performance Criteria	Result	Remark
-	-	B	-	-

Note)



8.5 Radio-Frequency Continuous Conducted

EN 55035	Radio-frequency continuous conducted	Result
<p><u>Method:</u> Test set-up was made according to EN61000-4-6. The EUT has been placed on a wooden table 10 cm above the reference ground plane. The reference ground plane exceeded the projected geometry of the EUT and the Coupling /Decoupling Network (CDN) by more than 30 cm. The CDN has been placed directly on the reference ground plane. The cable between CDN and EUT has a length of 30 cm. For acoustical measurement, acoustic measurement method and / or the electrical measurement method was selected according to the port.</p>		Comply
<p>EUT mode (Refer to clauses 4)</p>	<p>Test configuration mode EUT Operation mode</p>	
Test Spec		
Applied voltage and Frequency range	Frequency	voltage
	150 kHz ~ 80 MHz	3 V, 1 V (in-band frequencies)
	150 kHz ~ 10 MHz	3 V
	10 MHz ~ 30 MHz	3 V ~ 1 V
	30 MHz ~ 80 MHz	1 V
Modulation	AM, 80 %, 1 kHz sine-wave	
Step size	1 % of fundamental	
Sweep capability	1.5×10^{-3} decade/s	
The selected frequencies	0.2, 1, 7.1, 13.56, 21, 27.12, 40.68 MHz (± 1 %)	
Performance criteria	A / Continuous Phenomena.	

Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
SIGNAL GENERATOR	8657B	H/P	3630U08728	2019.06.12	2020.06.12
POWER METER	NRVD	H/P	102364	2019.02.19	2020.02.19
POWER AMPLIFIER	FLL75	FRANKONIA	0072	N/A	N/A
EM CLAMP	TSIC-23	TSJ / FCC	401	2018.10.11	2019.10.11
DECOUPLING CLAMP	TSIC-23-DCN	TSJ / FCC	150	2018.09.20	2019.09.20
CDN M3	TSCDN-M3-16A	TSJ / FCC	2008	2019.02.21	2020.02.21
CDN T4	TSCDN-T4	TSJ / FCC	2008	2019.06.04	2020.06.04
CDN M1	TSCDN-M1-16A	TSJ / FCC	2004	2019.06.04	2020.06.04
TERMINATION (50 OHM)	CT-01	TME	N/A	2018.12.19	2019.12.19



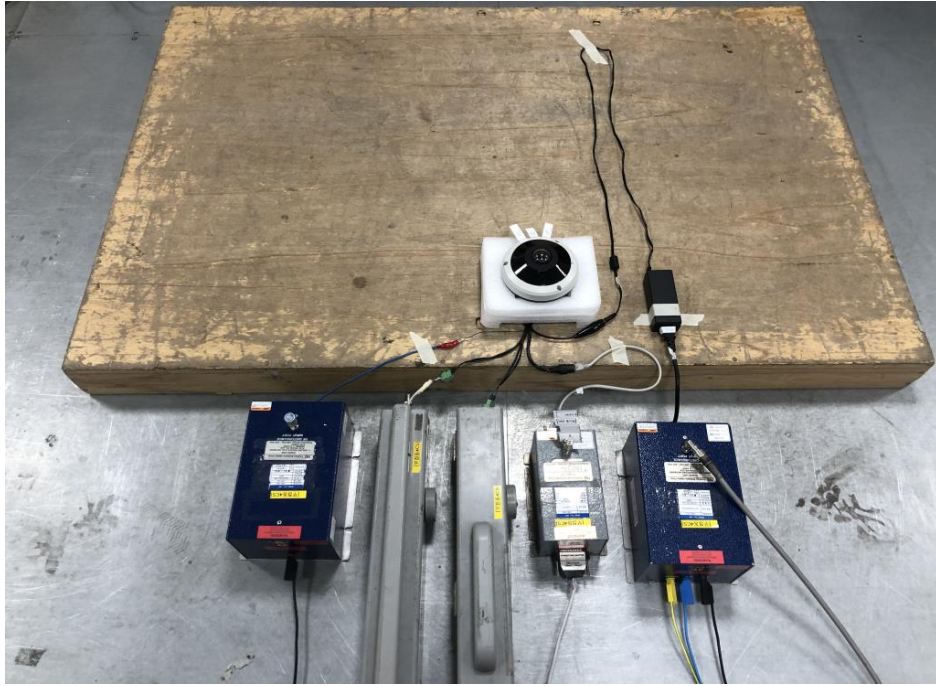
Radio-frequency continuous conducted _ Test setup photo _ power port

Test configuration mode

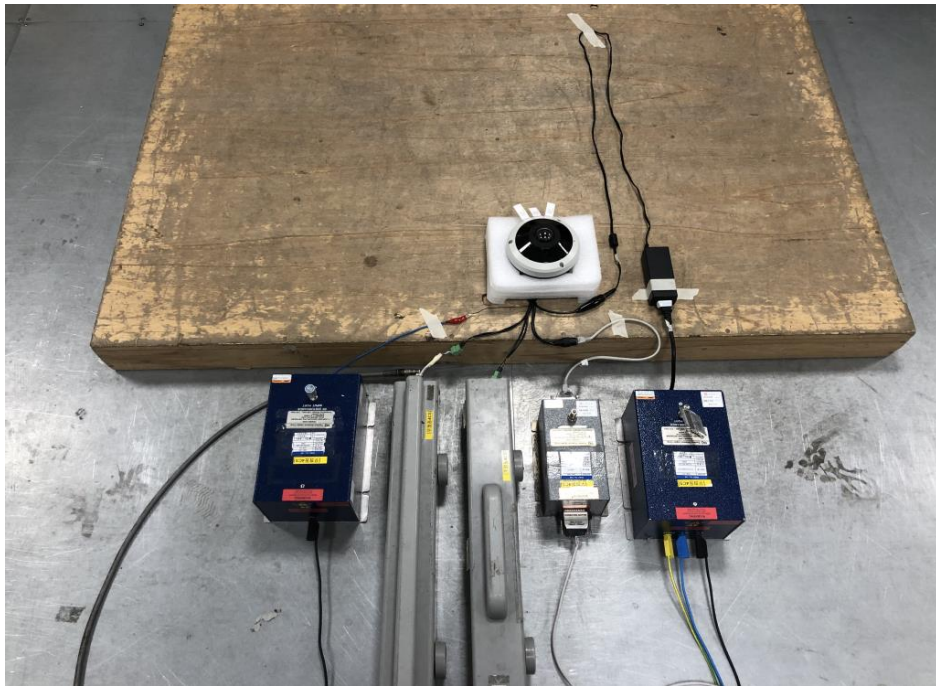
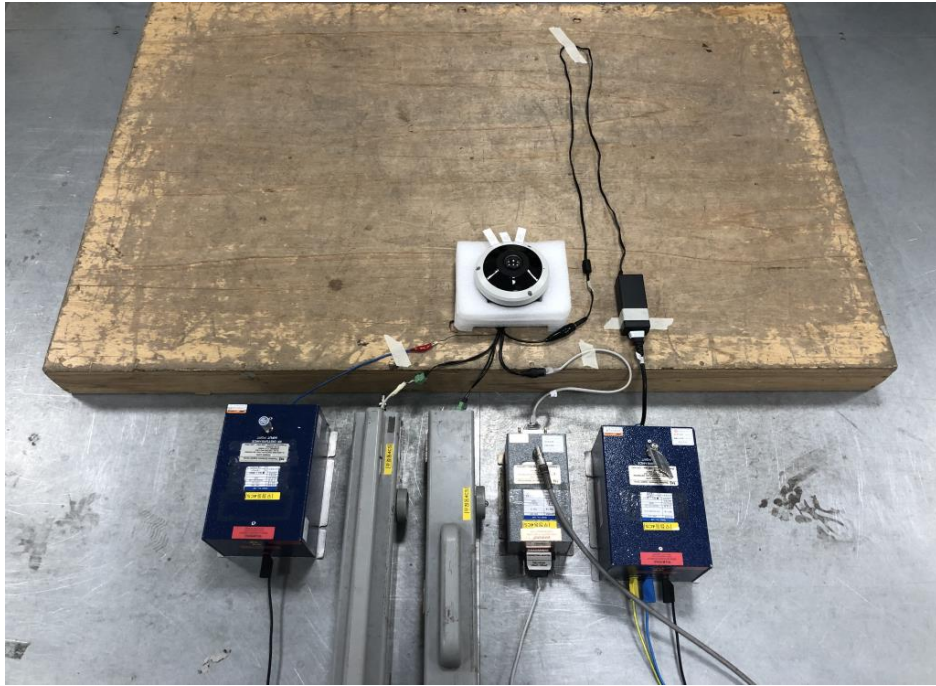
1

EUT Operation mode

1

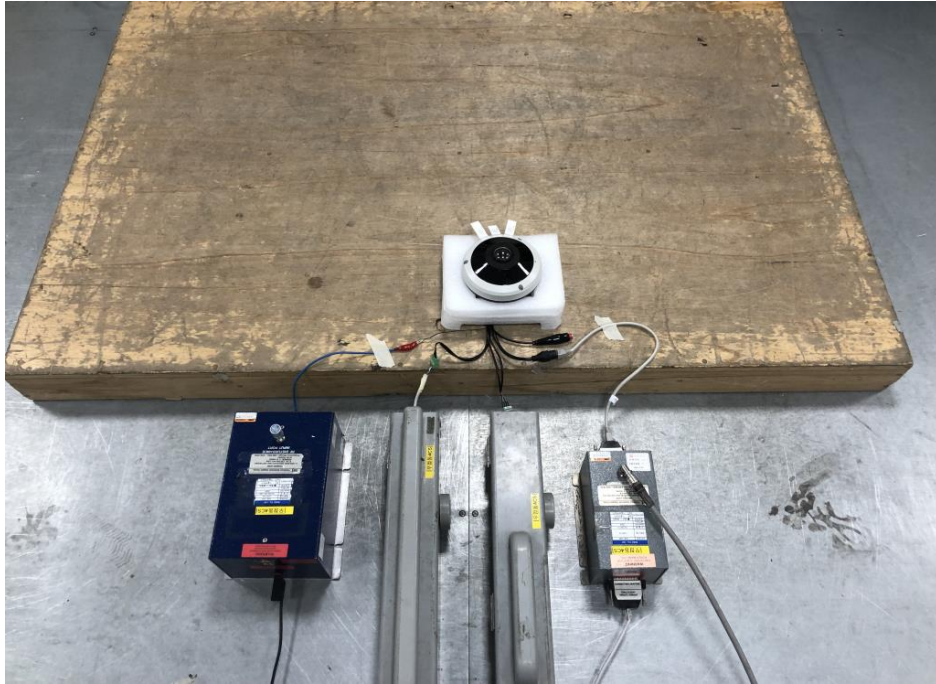


Radio-frequency continuous conducted _ Test setup photo _ signal port



Radio-frequency continuous conducted _ Test setup photo _ signal port

Test configuration mode	2	EUT Operation mode	2
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Radio-frequency continuous conducted _ Test result of power port					
Test configuration mode		1	EUT Operation mode		1
Port	Test Level (V)	Performance Criteria	Result	Remark	
Mains(M3)	3 V ~ 1 V	A	A	No degradation of performance	
Note 1) The EUT is exempt from the sound pressure test because it provides audio only when it is connected to additional equipment (such as amplifiers).					

Radio-frequency continuous conducted _ Test result of signal port					
Test configuration mode		1	EUT Operation mode		1
Port	Test Level (V)	Performance Criteria	Result	Remark	
LAN	3 V ~ 1 V	A	A	No degradation of performance	
ALARM			A	No degradation of performance	
Note 1) The EUT is exempt from the sound pressure test because it provides audio only when it is connected to additional equipment (such as amplifiers).					

Radio-frequency continuous conducted _ Test result of signal port					
Test configuration mode		2	EUT Operation mode		2
Port	Test Level (V)	Performance Criteria	Result	Remark	
POE	3 V ~ 1 V	A	A	No degradation of performance	
ALARM			A	No degradation of performance	
Note 1) The EUT is exempt from the sound pressure test because it provides audio only when it is connected to additional equipment (such as amplifiers).					



8.6 Power Frequency Magnetic Field

EN 55035	Power frequency magnetic field		Result		
<p><u>Method:</u> The test set-up was made accordance in with EN61000-4-8. The following tests are intended to demonstrate the immunity of equipment when subjected to power frequency magnetic fields related to the specific location and installation condition of the equipment (e.g. proximity of equipment to the disturbance source). The power frequency magnetic field is generated by power frequency current in conductors or, more seldom, from other devices (e.g. leakage of transformers) in the proximity of equipment. As for the influence of nearby conductors, one should differentiate between :</p> <ul style="list-style-type: none"> - the current under normal operating conditions, which produces a steady magnetic field, with a comparatively small magnitude; - the current under fault conditions which can produce comparatively high magnetic fields nut of short duration, until the protection devices operate (a few milliseconds with fuses, a few seconds for protection relays). 			Not Applicable		
Test spec					
EUT mode (Refer to clauses 4)	Test configuration mode	N/A			
	EUT Operation mode	N/A			
Frequency range	50 / 60 Hz				
Field level (EMF)	1 A/m				
Duration	60 seconds each axis				
Axis of orientation	X-axis, Y-axis and Z-axis				
Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
-	-	-	-	-	-



Power frequency magnetic field _ Test setup photo			
Test configuration mode	N/A	EUT Operation mode	N/A
N/A			

Power frequency magnetic field _ Test result at 60 Hz					
Test configuration mode		N/A	EUT Operation mode		N/A
Test Level (A/m)	Axis of orientation	Performance Criteria	Result	Remark	
1 A/m	X	A	-	-	
	Y	A	-	-	
	Z	A	-	-	



8.7 Voltage Dips and Interruptions

EN 55035	Voltage Dips and Interruptions				Result
Method: The test set-up was made accordance in with EN61000-4-11 . The dips/interruptions test is only applicable to AC mains. The dips/interruptions were applied at 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° on each phase.					Comply
EUT mode	Test configurations mode			1	
(Refer to clauses 4)	EUT Operation mode			1	
Test Spec					
Voltage Dips					
Frequency range	50 Hz		60 Hz		
Voltage reduction	30 %	100 %	30 %	100 %	
Number of periods	25	0.5, 1	30	0.5, 1	
Number of reductions (periods) at each duration	3				
Interval between reductions	≥10				
Performance criteria	C	B	C	B	
Voltage Interruptions					
Frequency range	50 Hz		60 Hz		
Voltage reduction	100 %				
Number of periods	250		300		
Number of reductions (periods) at each duration	3				
Interval between reductions	≥10				
Performance criteria	C				
Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
ULTRA COMPACT SIMULATOR	UCS 500 N5	EMTEST	V1113109125	2018.09.28	2019.09.28
MOTOR VARIAC	MV2616	EMTEST	V1113109126	2018.09.28	2019.09.28



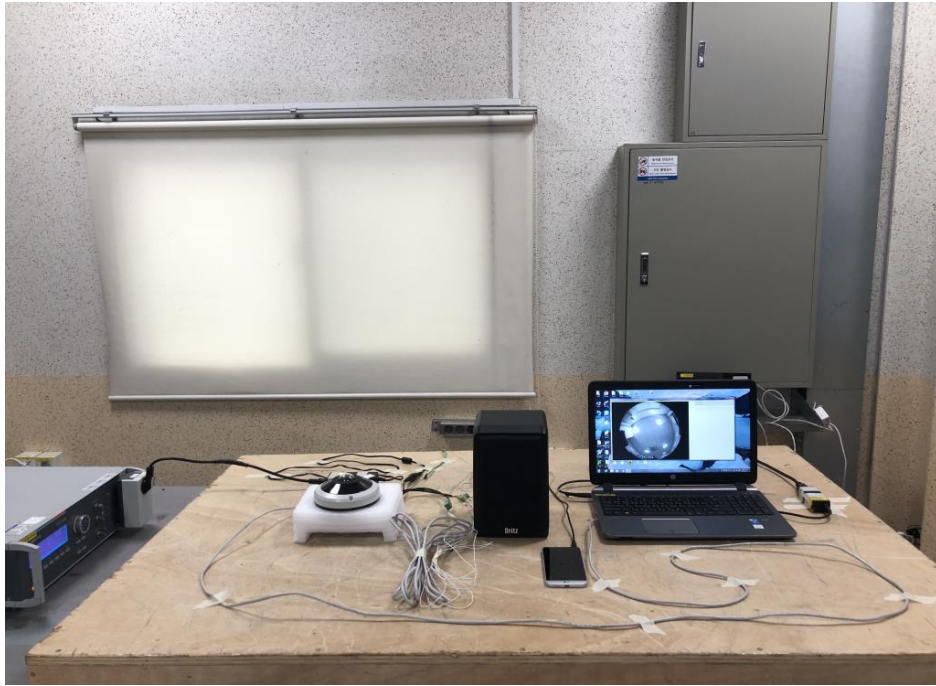
Voltage dips and interruptions _ Test setup photo

Test configuration mode

1

EUT Operation mode

1



Voltage dips and interruptions _Test result					
Test configuration mode		1	EUT Operation mode		1
Voltage Dips					
Test Level % Ut	Voltage dips % Ut	Number of periods	Performance Criteria	Result	Remark
0	100	0.5	B	A	No degradation of performance
70	30	25	C	A	No degradation of performance
Note)					
Voltage interruptions					
Test Level % Ut	Voltage dips % Ut	Number of periods	Performance Criteria	Result	Remark
0	100	250	C	C	Note 1)
Note 1) During the test EUT turned off but it operated normally again after the test with operator's intervention.					



9. Photographs of EUT

Front View of Product



Rear View of Product



Inside View of Product



10. Revision History

Date	Description	Revised By	Reviewed By
Aug. 01. 2019	Initial report	JeongHwan You	HyungJun Kim

-End of test report-

