

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 : DREFCC1712-0307

2. Customer

• Name : COMMAX CO., Ltd.

• Address : 494 Dunchon-Daero, Jungwon-Gu, Sungnam-Si, Gyeonggi-Do, 13229,
REPUBLIC OF KOREA

3. Use of Report : FCC Certification of Conformity Marking

4. Product Name / Model Name : Wall PAD / CIP-700MW

5. Test Method Used : ANSI C 63.4:2014
FCC Part 15 Subpart B
(Class B personal computers and peripherals)

6. Date of Test : 2017-11-25

7. Testing Environment : Temperature 21 °C , Humidity 32 % R.H.

8. Test Result : Refer to the attached Test Result

Affirmation	Tested by	Technical Manager
	Name : MinChul Kim (Signature)	Name : HyunSuk Ko (Signature)

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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2017. 12. 11.

DT&C Co., Ltd.

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.

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

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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
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-1364, R-3385, R-4076, R-4180, T-1442, G-10338, G-754, G-10815	Registered
Certification	Korea	KC	KR0034	Designation
	Germany	TUV	CARAT 17 11 89112 005	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

Product Name	Wall PAD
Model Name	CIP-700MW
Add Model Name	None
Serial No	None
Type of Sample Tested	Pre-Production
Supplied Power for Test	PoE DC 48 V
Rating Power	PoE DC 36~54 V
FCC ID	CCECIP-700MW
IC	22254-CIP700MW
Applicant	COMMAX CO., Ltd. 494 Dunchon-Daero, Jungwon-Gu, Sungham-Si, Gyeonggi-Do, 13229, REPUBLIC OF KOREA
Manufacturer	COMMAX CO., Ltd. 494 Dunchon-Daero, Jungwon-Gu, Sungham-Si, Gyeonggi-Do, 13229, REPUBLIC OF KOREA

Related Submittal(s) / Grant(s)
Original submittal only.

4. Test Summary

4.1 Applied standards and test results

Test Items	Applied Standards	Results
Conducted Disturbance	ANSI C63.4:2014	N/A
Radiated Disturbance	ANSI C63.4:2014	C
C=Comply N/C=Not Comply N/T=Not Tested N/A=Not Applicable		

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

4.2 Test environment and conditions

Test Items	Test date (YYYY-MM-DD)	Temp (°C)	Humidity (% R.H.)
Radiated Disturbance	2017-11-25	21	32

4.3 Test result Summary

(1) Radiated Emission

Frequency [MHz]	Pol.	Result [dB(μV/m)]	Detector	Limit [dB(μV/m)]	Margin [dB]
198.027	H	41.69	QP	43.50	1.81

5. Test Set-up and operation mode

5.1 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.

5.2 Test Operation Mode

- EUT uses POE power and RS 485 is connected to notebook PC to check the communication status. The operation status of the sensor was checked through the monitor of the EUT and connected to the lobby phone and tested continuously.

5.3 Support Equipment Used

Unit	Model No.	Serial No.	Manufacturer	CABLE				Back shell	FCC ID
				Connect type	Length (m)	shield	With Ferrite		
Door jig	CDL-447TI	N/A	COMMAX INC	EUT Connect	0.5	Non-shield	X	Plastic	DoC
Lobby phone	N/A	N/A	COMMAX INC	EUT Connect	1.4	Non-shield	X	Plastic	DoC
NOTE BOOK	HSTNN-Q95C	N/A	HP INC	USB	1.4	Non-shield	X	Plastic	CoC
NOTE BOOK ADAPTER	HSTNN-CA40	N/A	CHICONY POWER TECHNOLOGY(CHO NGQING) CO.,LTD	DC IN	1.6	Non-shield	X	Plastic	DoC
Communication JIG	N/A	N/A	COMMAX INC	EUT Connect	0.3	Non-shield	X	Plastic	DoC
POE	N/A	N/A	COMMAX INC	LAN	3.2	Non-shield	X	Plastic	DoC
Sensor	N/A	N/A	COMMAX INC	LAN	3.0	Non-shield	X	Plastic	DoC

6. Test Results : Emission

6.1 Radiated Disturbance

6.1.1 Measurement Procedure

The radiated disturbance was measured and set-up was made accordance with **ANSI C63.4**.

If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 3 m or 10 m away from the interference receiving antenna in the **3m semi-anechoic chamber**. Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane. Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m above the reference ground plane continuously to determine associated with higher emission levels and record them. The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report. For final measurement below 1 GHz frequency range, Quasi-Peak detector with (RBW = 120 kHz Bandwidth) was used. For final measurement above 1 GHz frequency range, Peak detector with (RBW = 1 MHz Bandwidth) and CISPR Average detector with (RBW = 1 MHz Bandwidth) were used. For further description of the configuration refer to the picture of the test set-up.

6.1.2 Limit for Radiated Disturbance

- 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 40 GHz, whichever is lower

(1) Limit for Radiated Emission below 1 000 MHz

Frequency range (MHz)	Class A Equipment (10 m distance)	Class B Equipment (3 m distance)
	Quasi-peak (dBμV/m)	Quasi-peak (dBμV/m)
30 to 88	39.1	40
88 to 216	43.5	43.5
216 to 960	46.4	46
960 to 1 000	49.5	54
Note 1 The lower limit shall apply at the transition frequency. Note 2 Additional provisions may be required for cases where interference occurs. Note 3 According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards(CISPR), Pub. 22 shown as below.		
Frequency range (MHz)	Class A Equipment (10 m distance)	Class B Equipment (10 m distance)
	Quasi-peak (dBμV/m)	Quasi-peak (dBμV/m)
30 to 230	40	30
230 to 1 000	47	37

(2) Limits for Radiated Emission above 1 000 MHz at a measuring distance of 3 m

Frequency (GHz)	Class A Equipment		Class B Equipment	
	Peak (dBμV/m)	Average (dBμV/m)	Peak (dBμV/m)	Average (dBμV/m)
1 to 40	80	60	74	54

Note)1. Emission Level = Reading Value + loss - gain + Ant Factor

2. Margin = Limit - Emission level

3. (0.03 ~ 6) GHz : Loss = Cable Loss, Gain = Amp Gain, Ant Factor = Antenna Factor

4. (6 ~ 18) GHz : Loss = Cable Loss, Ant Factor = Antenna Factor - Amp Gain

Test Result

< 30 MHz ~ 1 GHz >

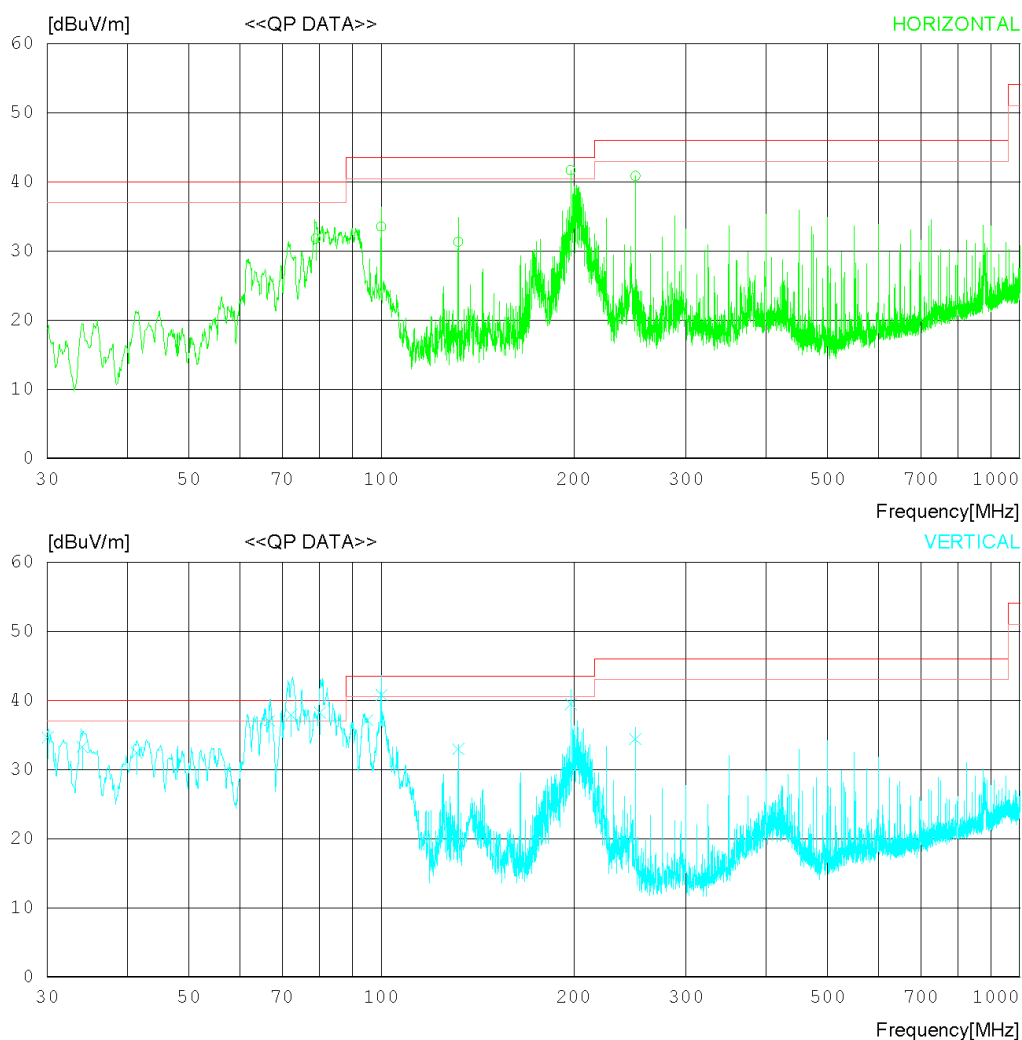
RADIATED EMISSION

Date 2017-11-25

Order No. DTNC1711-08427
Power Supply POE DC 48 V
Temp/Humi 21 'C 32 % R.H
Test Condition

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB



RADIATED EMISSION

Date 2017-11-25

Order No. DTNC1711-08427
Power Supply POE DC 48 V
Temp/Humi 21 °C 32 % R.H
Test Condition

Memo

LIMIT : FCC Part15 Subpart.B Class B (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	78.912	49.16	8.08	1.33	26.81	31.76	40.00	8.24	293	334
2	100.035	49.67	9.11	1.47	26.79	33.46	43.50	10.04	345	157
3	132.056	44.03	12.26	1.75	26.72	31.32	43.50	12.18	241	146
4	198.027	56.32	9.88	2.14	26.65	41.69	43.50	1.81	175	295
5	249.994	53.13	11.80	2.46	26.54	40.85	46.00	5.15	123	276
----- Vertical -----										
6	30.037	51.39	9.36	0.74	26.85	34.64	40.00	5.36	104	262
7	34.025	50.14	9.14	0.81	26.85	33.24	40.00	6.76	110	290
8	41.379	47.64	10.68	0.92	26.84	32.40	40.00	7.60	117	257
9	66.720	51.76	10.86	1.22	26.82	37.02	40.00	2.98	113	302
10	72.248	53.77	9.71	1.27	26.82	37.93	40.00	2.07	125	270
11	80.217	55.88	7.77	1.34	26.81	38.18	40.00	1.82	113	305
12	95.237	54.26	8.24	1.44	26.79	37.15	43.50	6.35	111	80
13	100.053	56.97	9.11	1.47	26.79	40.76	43.50	2.74	121	345
14	132.001	45.64	12.26	1.75	26.72	32.93	43.50	10.57	198	109
15	197.993	54.03	9.88	2.14	26.65	39.40	43.50	4.10	122	28
16	250.013	46.65	11.80	2.46	26.54	34.37	46.00	11.63	112	13

< (1 ~ 6) GHz _ Peak >

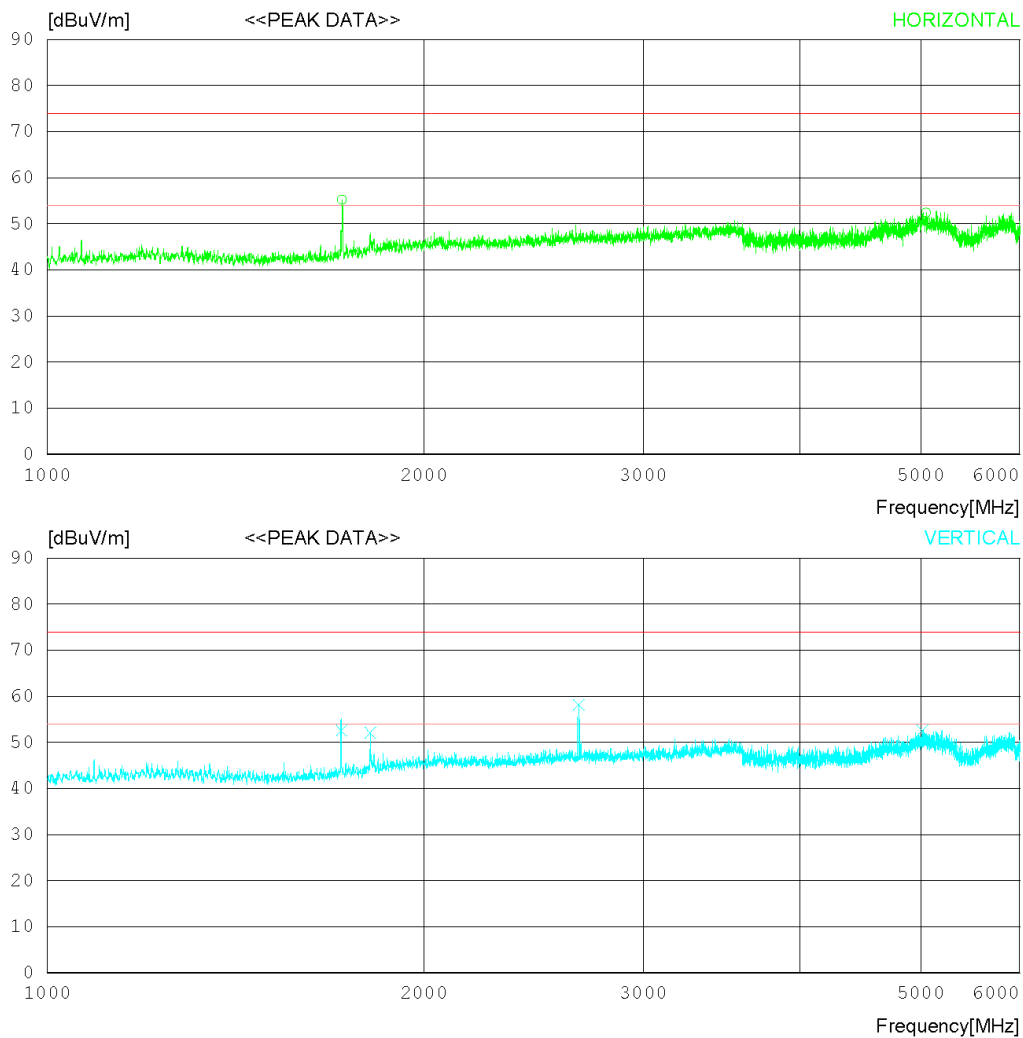
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Date 2017-11-25

Order No. DTNC1711-08427
Power Supply POE DC 48 V
Temp/Humi 21 'C 32 % R.H
Test Condition

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak)
FCC Part15 Subpart.B Class B (3m) - 18G(Avg)



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Date 2017-11-25

Order No. DTNC1711-08427
Power Supply POE DC 48 V
Temp/Humi 21 °C 32 % R.H
Test Condition

Memo

LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Peak)
FCC Part15 Subpart B Class B (3m) - 18G(Avg)

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	1720.625	54.00	29.25	4.42	32.40	55.27	74.0	18.73	100	358
2	5049.375	41.30	34.05	9.33	32.26	52.42	74.0	21.58	100	53
----- Vertical -----										
3	1719.375	51.30	29.23	4.42	32.40	52.55	74.0	21.45	100	1
4	1813.125	49.60	30.32	4.58	32.44	52.06	74.0	21.94	200	1
5	2661.250	52.80	32.36	5.55	32.56	58.15	74.0	15.85	100	1
6	5016.250	41.30	34.02	9.44	32.24	52.52	74.0	21.48	100	356

< (1 ~ 6) GHz _ Average >

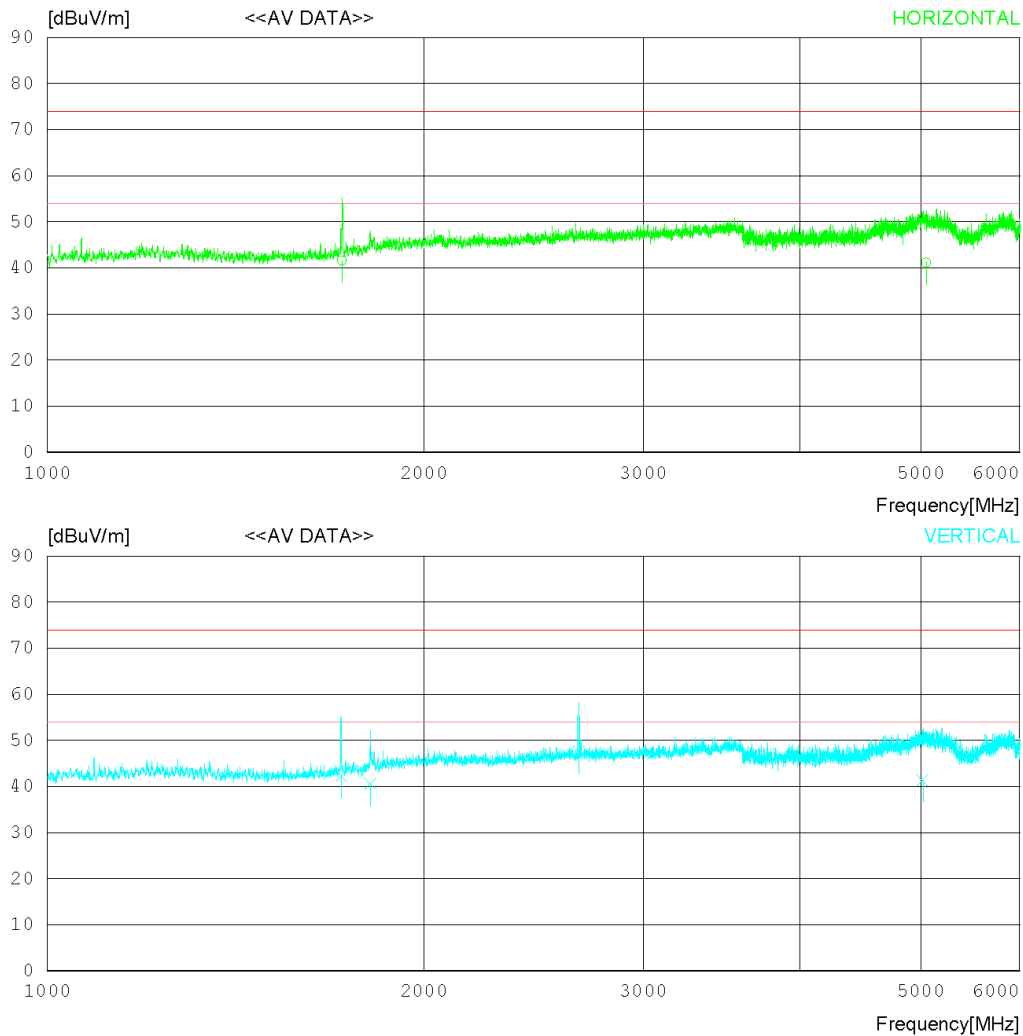
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Test Condition

Memo

LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Avg)
FCC Part15 Subpart B Class B (3m) - 18G(Peak)

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	1720.621	40.37	29.25	4.42	32.40	41.64	54.00	12.36	104	358
2	5049.361	30.02	34.05	9.33	32.26	41.14	54.00	12.86	102	60
----- Vertical -----										
3	1719.379	41.08	29.23	4.42	32.40	42.33	54.00	11.67	117	5
4	1813.122	38.09	30.32	4.58	32.44	40.55	54.00	13.45	234	10
5	2661.252	42.25	32.36	5.55	32.56	47.60	54.00	6.40	100	15
6	5016.259	30.02	34.02	9.44	32.24	41.24	54.00	12.76	100	355

< (6 ~ 18) GHz _ Peak >

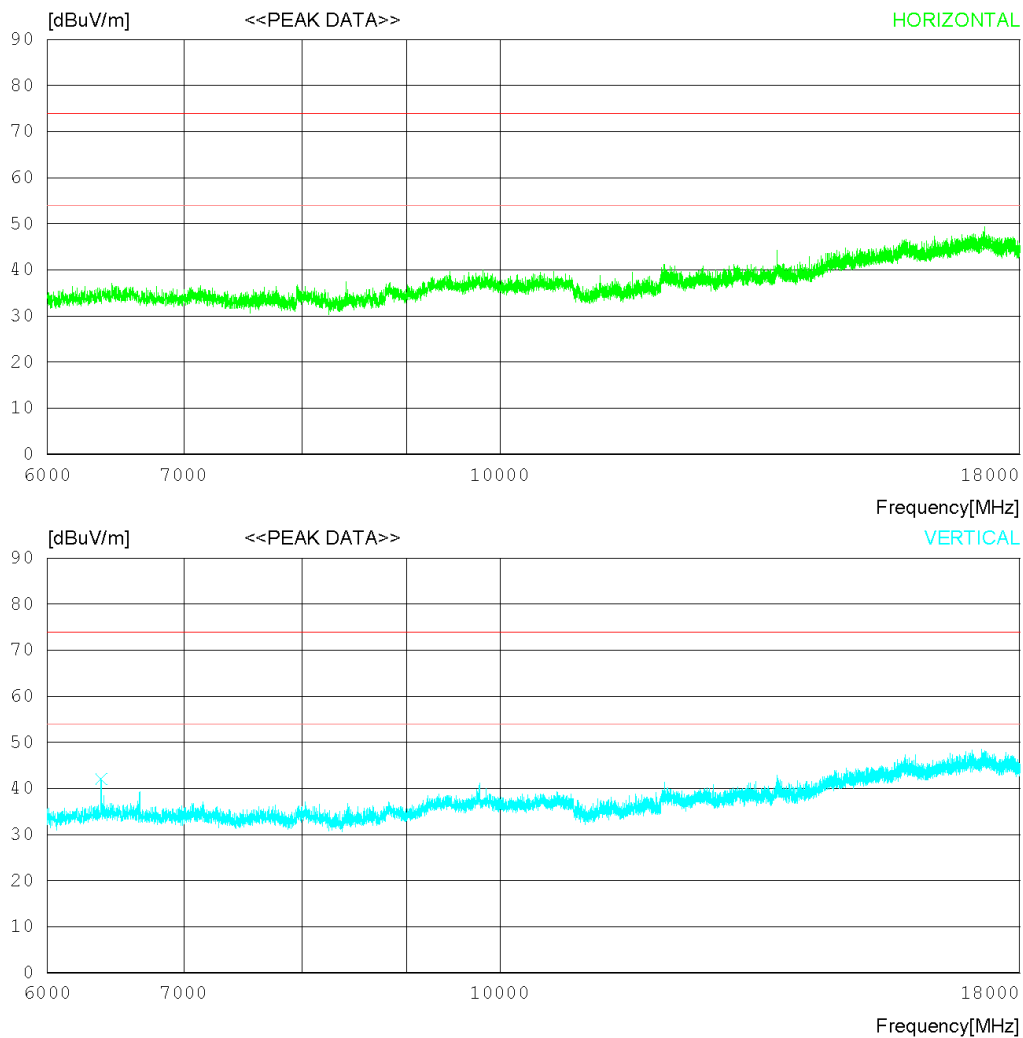
RADIATED EMISSION

Date 2017-11-25

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Power Supply POE DC 48 V
Temp/Humi 21 'C 32 % R.H.
Test Condition

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak)
FCC Part15 Subpart.B Class B (3m) - 18G(Avg)



* The measurement is performed above 18 GHz up to 30 GHz and not found emissions above 18 GHz.

RADIATED EMISSION

Date 2017-11-25

Order No. DTNC1711-08427
Power Supply POE DC 48 V
Temp/Humi 21 'C 32 % R.H
Test Condition

Memo

LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Peak)
FCC Part15 Subpart B Class B (3m) - 18G(Avg)

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	17255.250	29.60	-0.14	15.97	0.00	45.43	74.0	28.57	100	1
2	17355.750	29.30	-0.14	16.54	0.00	45.70	74.0	28.3	100	1
----- Vertical -----										
3	6374.250	41.80	-8.54	8.86	0.00	42.12	74.0	31.88	100	123
4	17333.250	29.20	-0.14	16.42	0.00	45.48	74.0	28.52	300	231

< (6 ~ 18) GHz _ Average >

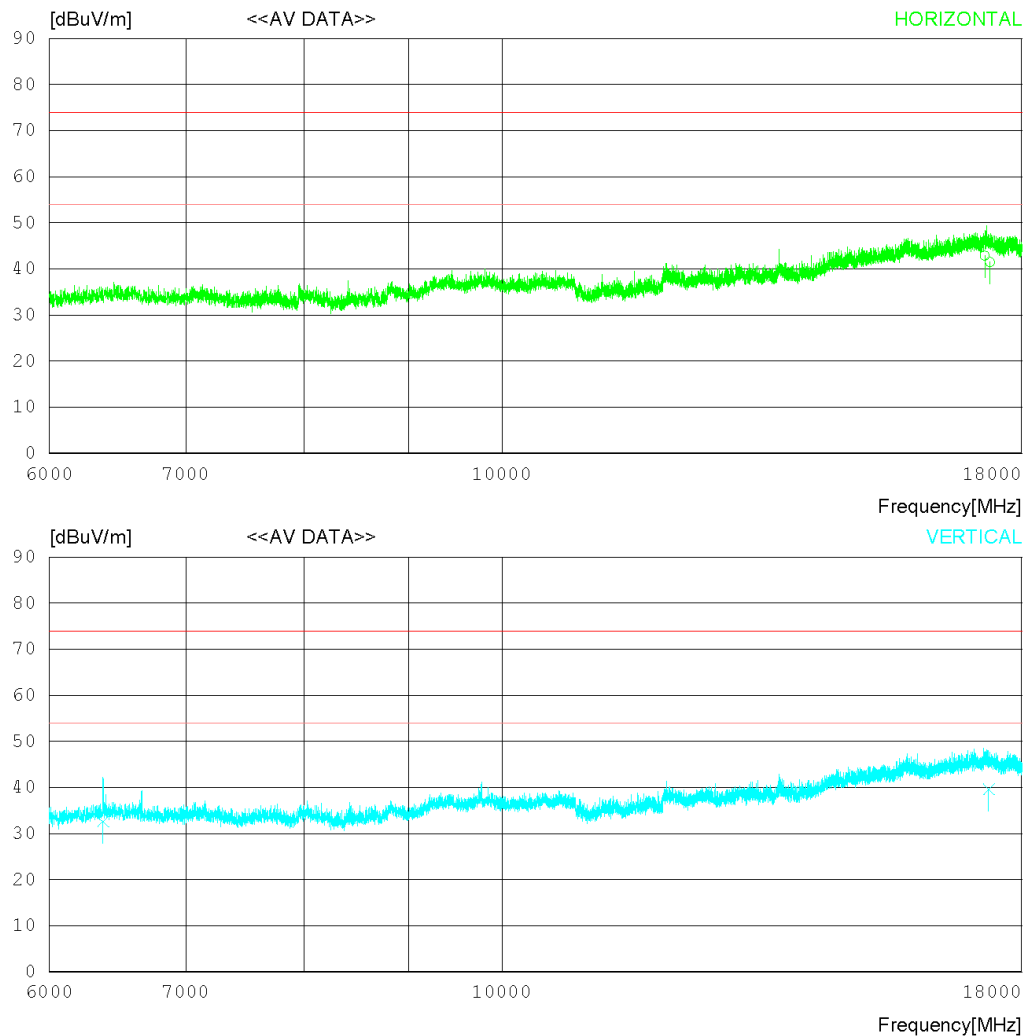
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* The measurement is performed above 18 GHz up to 30 GHz and not found emissions above 18 GHz.

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LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Avg)
FCC Part15 Subpart B Class B (3m) - 18G(Peak)

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	17255.250	27.06	-0.14	15.97	0.00	42.89	54.00	11.11	100	5
2	17355.750	25.06	-0.14	16.54	0.00	41.46	54.00	12.54	145	10
----- Vertical -----										
3	6374.251	32.24	-8.54	8.86	0.00	32.56	54.00	21.44	100	115
4	17333.260	23.24	-0.14	16.42	0.00	39.52	54.00	14.48	311	230

Appendix 1

List of Test and Measurement Instruments

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment is identified by the Test Laboratory.

1. Radiated Disturbance

Name of Instrument	Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
☒ MEASUREMENT SOFTWARE	EMI-R VER. 2.00.0177	TSJ	N/A	N/A	N/A
☒ EMI TEST RECEIVER	ESU	ROHDE & SCHWARZ	100538	2017.02.03	2018.02.03
☒ TRILOG BROADBAND TEST-ANTENNA	VULB9160	SCHWARZBECK	9160-3339	2017.04.21	2019.04.21
☒ PREAMPLIFIER	8449B	AGILENT TECHNOLOGIES	3008A01590	2017.02.20	2018.02.20
☒ LOW NOISE PRE AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2017.02.20	2018.02.20
☒ HORN ANTENNA	3117	ETS-LINDGREN	00152093	2016.02.26	2018.02.26
☒ HORN ANTENNA	EM-6969	ELECTRO-METRICS	156	2017.02.10	2019.02.10
☒ PREAMPLIFIER	MLA-0618-B03-34	TSJ	1785642	2017.01.19	2018.01.19
☐ EMI TEST RECEIVER	ESU	ROHDE & SCHWARZ	100469	2017.07.06	2018.07.06
☐ LOW NOISE PRE AMPLIFIER	MLA-1840-J02-40	TSJ	13184	2017.10.10	2018.10.10
☐ HORN ANTENNA	SAS-574	A.H.SYSTEMS,INC	155	2017.07.31	2019.07.31

* NOTE1) The measurement antennas were calibrated in accordance to the requirements of C63.5-2017.

Appendix 2

Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None	Original	N/A	N/A