TEST REPORT

Dt&C

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 : DREFCC1708-0221
2. Customer
   - Name : Nolangroup S.p.A.
   - Address : Nolangroup S.p.A., via Terzi di S.Agata 2 24030 - Brembate di sopra (BG) - Italia
3. Product Name / Model Name : Nolan Communication System (B6V03) / B901 S
4. Test Method Used : ANSI C 63.4:2014
   FCC Part 15 Subpart B (All other devices)
   ICES-003:2016
   CAN/CSA-CISPR 22-10
5. Date of Test : 2017-08-02 ~ 2017-08-07
6. Testing Environment : Temperature (21 ~ 22) °C , Humidity (43 ~ 47) % R.H.
7. Test Result : Refer to the attached Test Result

Affirmation	Tested by Name : JunSeo Park (Signature)	Technical Manager 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.
This test report shall not be reproduced except in full, without the written approval of DT&C Co., Ltd.

2017. 08. 28.

DT&C Co., Ltd.

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

CONTENTS

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

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	Mark
Accreditation	Korea	KOLAS	393	ISO/IEC 17025
Site Filing	USA	FCC	KR0034 101842 678747, 596748, 804488, 165783	Accredited 2.948 Listed
	Canada	IC	5740A-1 5740A-2	Registered
	Japan	VCCI	C-1427 R-1364, R-3385, R-4076, R-4180, T-1442, G-10338, G-754, G-815	Registered
Certification	Korea	KC	KR0034	Designation
	Germany	TUV	CARAT 17 01 89112 004	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

Kind of Equipment	Nolan Communication System (B6V03)
Model Name	B901 S
Add Model Name	None
Serial No.	None
Type of Sample Tested	Pre-Production
Supplied Power for Test	AC 120 V, 60 Hz
Clock Frequency	240 MHz
Applicant	Nolangroup S.p.A. Nolangroup S.p.A., via Terzi di S.Agata 2 24030 - Brembate di sopra (BG) – Italia
Manufacturer	Nolangroup S.p.A. Nolangroup S.p.A., via Terzi di S.Agata 2 24030 - Brembate di sopra (BG) – Italia

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 C 63.4:2014 CAN/CSA-CISPR 22-10	C
Radiated Disturbance	ANSI C 63.4:2014 CAN/CSA-CISPR 22-10	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 (℃)	Humidity (% R.H.)
Conducted Disturbance	2017-08-02	22	47
Radiated Disturbance	2017-08-07	21	43

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 was connected BT to mobile phone play 1 kHz source.

5.3 Support Equipment Used

Unit	Model No.	Serial No.	Manufacturer	CABLE			Backshell	FCC ID
				Connect type	Length (m)	Shield		
Mobile Phone	-	-	-	-	-	-	-	-

NOTE

- See “APPENDIX 2 Photographs” for actual system test setup

6. Test Results : Emission

6.1 Conducted Disturbance

6.1.1 Measurement Procedure

In the range of 0.15 MHz to 30 MHz, the conducted disturbance was measured and set-up was made accordance with **ANSI C 63.4 and CAN/CSA-CISPR 22.**

If the EUT is table top equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 0.4 m from the conducting wall of the shielded room.

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.

Connect the EUT's power source lines to the appropriate power mains / peripherals through the LISN. All the other peripherals are connected to the 2nd LISN, if any.

Unused measuring port of the LISN was resistively terminated by 50 ohm terminator.

The measuring port of the LISN for EUT was connected to spectrum analyzer.

Using conducted emission test software, the emissions were scanned with peak detector mode.

After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has Quasi-Peak detector and Average detector.

By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission.

For further description of the configuration refer to the picture of the test set-up.

6.1.2 Limit for Conducted Disturbance

(1) Conducted disturbance at mains ports.

Frequency range (MHz)	Limits dB(μV)			
	Quasi-peak		Average	
	Class A	Class B	Class A	Class B
0.15 to 0.50	79	66 to 56	66	56 to 46
0.50 to 5	73	56	60	46
5 to 30		60		50
Note 1 The lower limit shall apply at the transition frequencies. Note 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Note) 1. Emission Level = Reading Value + Correction Factor.
2. Correction Factor = Cable Loss + Insertion Loss of LISN
3. Margin = Limit - Emission level

Test Result

Results of Conducted Emission

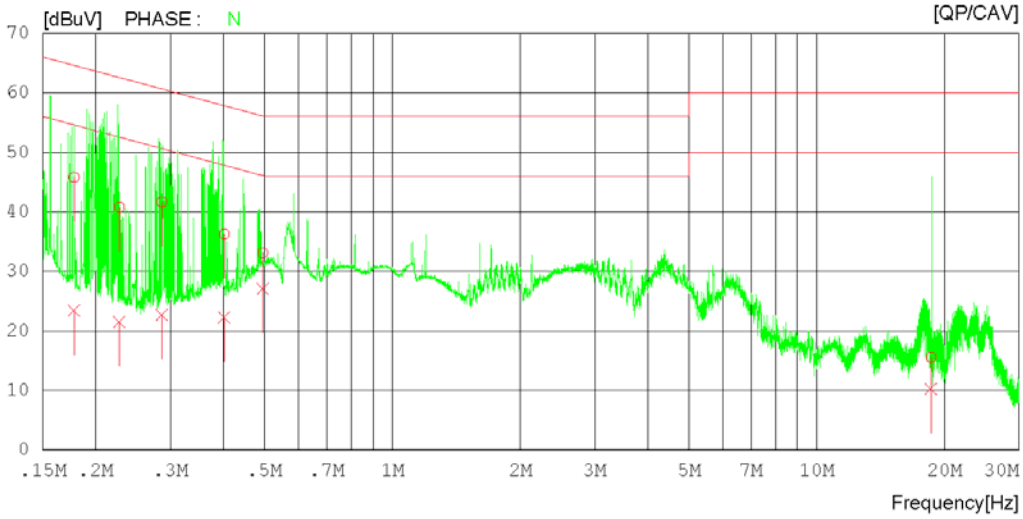
DT&C

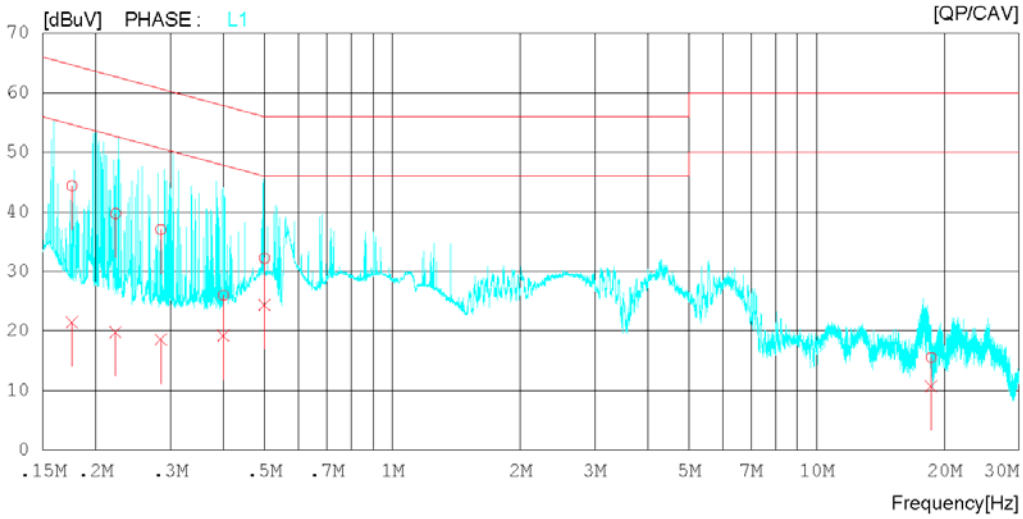
Date : 2017-08-02

Order No.	:	DTNC1707-05429,05430	:	
Power Supply	:	120 V 60 Hz	:	
Temp/Humi.	:	22 'C 47 % R.H	:	
Test Condition	:		:	

Memo :

LIMIT : CISPR32_B QP
CISPR32_B AV





Results of Conducted Emission

DT&C

Date : 2017-08-02

Order No. : DTNC1707-05429,05430 :
Power Supply : 120 V 60 Hz :
Temp/Humi. : 22 'C 47 % R.H :
Test Condition : :

Memo :

LIMIT : CISPR32_B QP
CISPR32_B AV

NO	FREQ	READING QP	READING CAV	C.FACTOR	RESULT QP	RESULT CAV	LIMIT QP	LIMIT CAV	MARGIN QP	MARGIN CAV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.17748	35.81	13.43	9.98	45.79	23.41	64.60	54.60	18.81	31.19	N
2	0.22717	30.81	11.54	9.98	40.79	21.52	62.55	52.55	21.76	31.03	N
3	0.28621	31.68	12.74	9.98	41.66	22.72	60.63	50.63	18.97	27.91	N
4	0.40150	26.27	12.27	10.00	36.27	22.27	57.82	47.82	21.55	25.55	N
5	0.49450	23.10	17.08	10.00	33.10	27.08	56.09	46.09	22.99	19.01	N
6	18.61759	5.06	-0.23	10.51	15.57	10.28	60.00	50.00	44.43	39.72	N
7	0.17550	34.39	11.52	9.98	44.37	21.50	64.70	54.70	20.33	33.20	L1
8	0.22250	29.74	9.84	9.98	39.72	19.82	62.72	52.72	23.00	32.90	L1
9	0.28432	27.04	8.61	9.98	37.02	18.59	60.69	50.69	23.67	32.10	L1
10	0.39999	16.02	9.23	9.99	26.01	19.22	57.85	47.85	31.84	28.63	L1
11	0.49950	22.22	14.37	10.00	32.22	24.37	56.01	46.01	23.79	21.64	L1
12	18.62309	5.07	0.24	10.49	15.56	10.73	60.00	50.00	44.44	39.27	L1

6.2 Radiated Disturbance

6.2.1 Measurement Procedure

The radiated disturbance was measured and set-up was made accordance with **ANSI C 63.4 and CAN/CSA-CISPR 22.**

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 **3 m 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 below 1 GHz frequency range, Quasi-Peak detector with 120 kHz RBW was used.

Also Peak and Average detector with 1 MHz RBW were used for above 1 GHz frequency range.

For further description of the configuration refer to the picture of the test set-up.

6.2.2 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	5th harmonic of the highest frequency or 40 GHz, whichever is lower

(1) Limit for Radiated Emission below 1 000MHz

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 000MHz 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. loss = Cable loss, gain = Amp gain, Ant Factor = Antenna Factor

Test Result

< 30 MHz ~ 1 GHz >

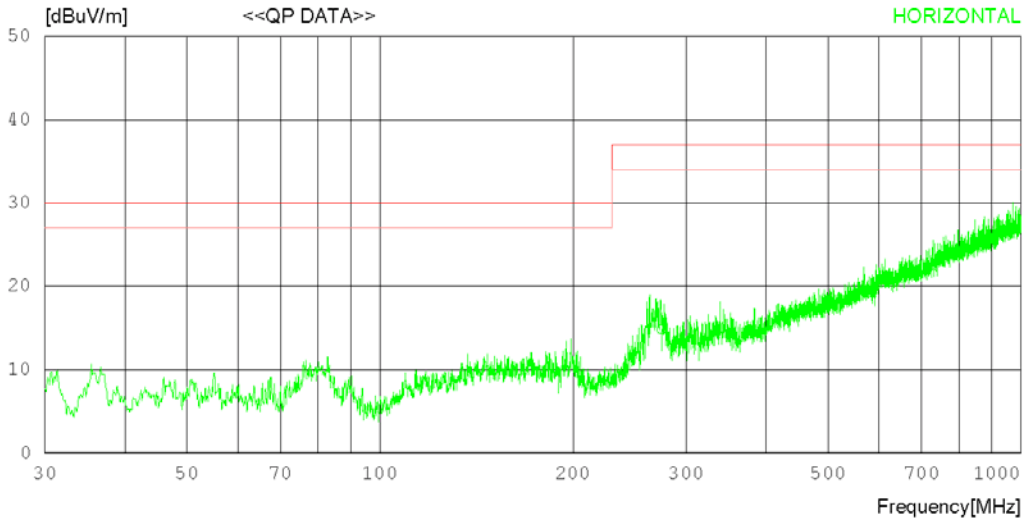
RADIATED EMISSION

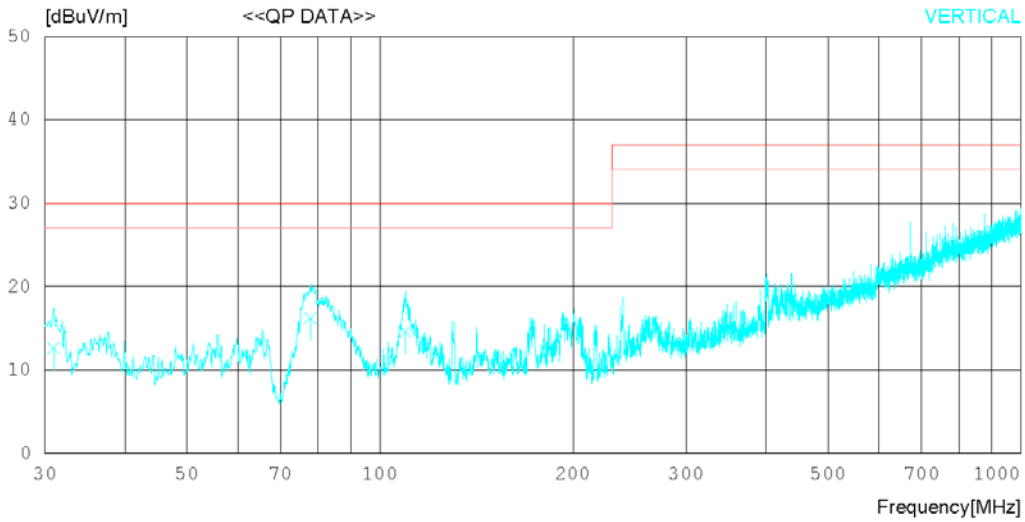
Date : 2017-08-07

Order No.	:	DTNC1707-05429,05430	:	
Power Supply	:	120 V 60 Hz	:	
Temp/Humi	:	21 'C 43 % R.H.	:	
Test Condition	:		:	

Memo :

LIMIT : Class B (10m)
MARGIN: 3 dB





RADIATED EMISSION

Date : 2017-08-07

Order No.	:	DTNC1707-05429,05430	:	
Power Supply	:	120 V 60 Hz	:	
Temp/Humi	:	21 'C 43 % R.H.	:	
Test Condition	:		:	

Memo :

LIMIT : Class B (10m)
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	275.123	27.4	12.7	4.7	29.9	14.9	37.0	22.1	400	2
----- Vertical ------										
2	30.970	30.2	11.3	1.7	30.6	12.6	30.0	17.4	100	358
3	77.893	35.2	8.8	2.6	30.4	16.2	30.0	13.8	200	208
4	109.539	31.2	10.7	3.0	30.3	14.6	30.0	15.4	200	112

< (1 ~ 18) GHz _ Peak >

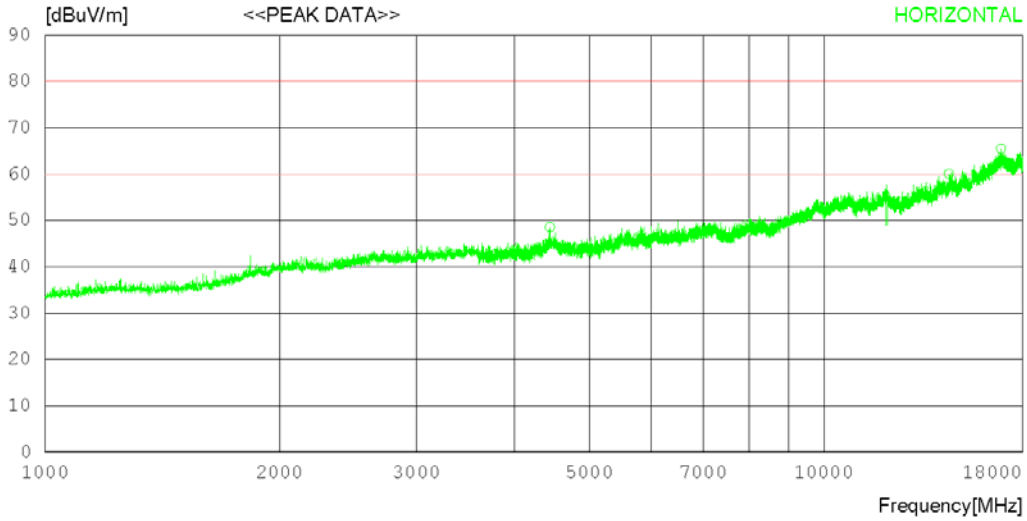
RADIATED EMISSION

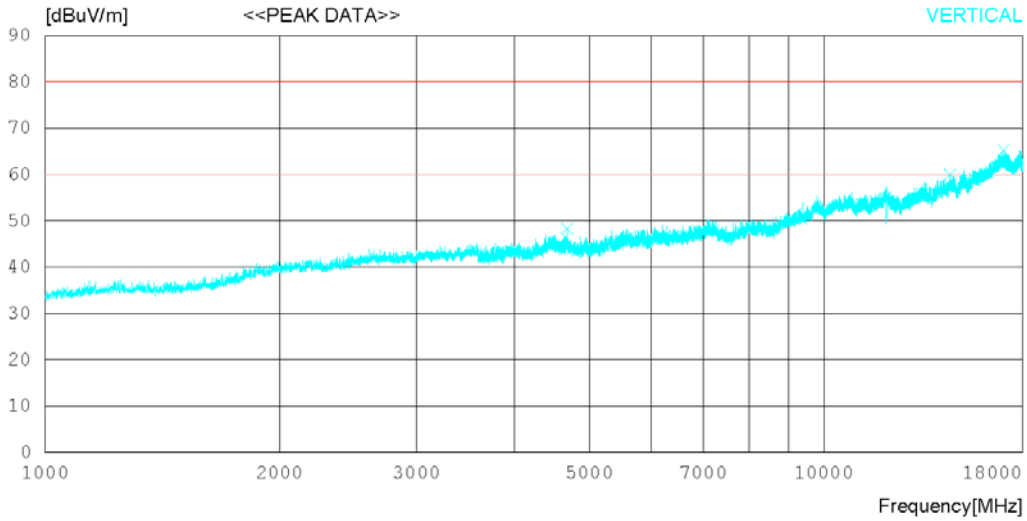
Date : 2017-08-07

Order No.	:	DTNC1707-05429,05430	:	
Power Supply	:	120 V 60 Hz	:	
Temp/Humi	:	21 'C 43 % R.H.	:	
Test Condition	:		:	

:

LIMIT : FCC_CLASS A__PK_1-18G
FCC_CLASS A_AV_1-18G





RADIATED EMISSION

Date : 2017-08-07

Order No.	:	DTNC1707-05429,05430	:	
Power Supply	:	120 V 60 Hz	:	
Temp/Humi	:	21 'C 43 % R.H.	:	
Test Condition	:		:	
	:			

LIMIT : FCC_CLASS A__PK_1-18G
FCC_CLASS A_AV_1-18G

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	4445.000	47.4	33.7	5.1	37.7	48.6	80.0	31.5	100	358
2	14469.750	45.4	39.2	11.0	35.6	60.0	80.0	20	100	346
3	16897.500	47.9	41.8	11.1	35.4	65.4	80.0	14.6	100	77
----- Vertical ------										
4	4680.000	46.5	33.8	5.6	37.6	48.3	80.0	31.7	100	299
5	14511.750	45.2	39.3	11.1	35.7	59.9	80.0	20.1	100	1
6	17017.500	47.7	41.7	11.0	35.2	65.1	80.0	14.9	100	1

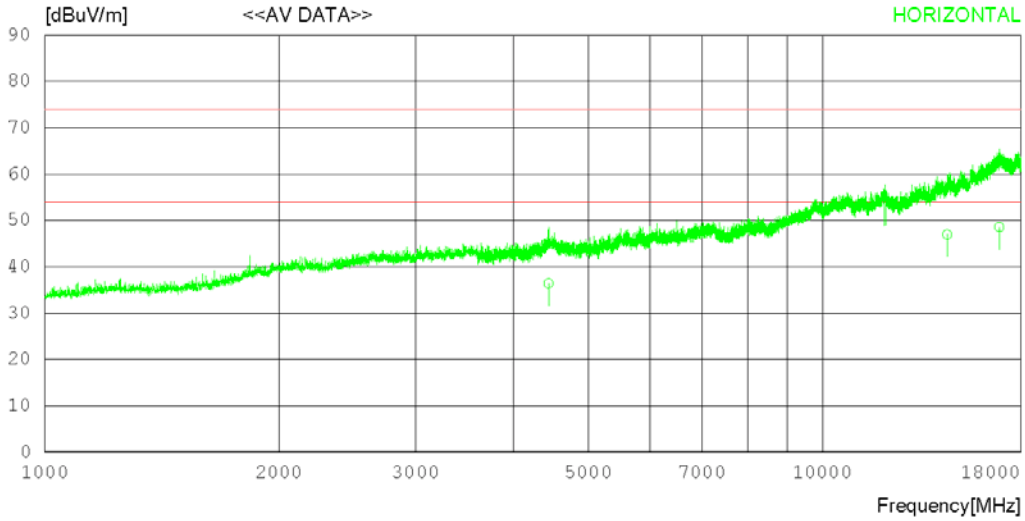
< (1 ~ 18) GHz _ Average >

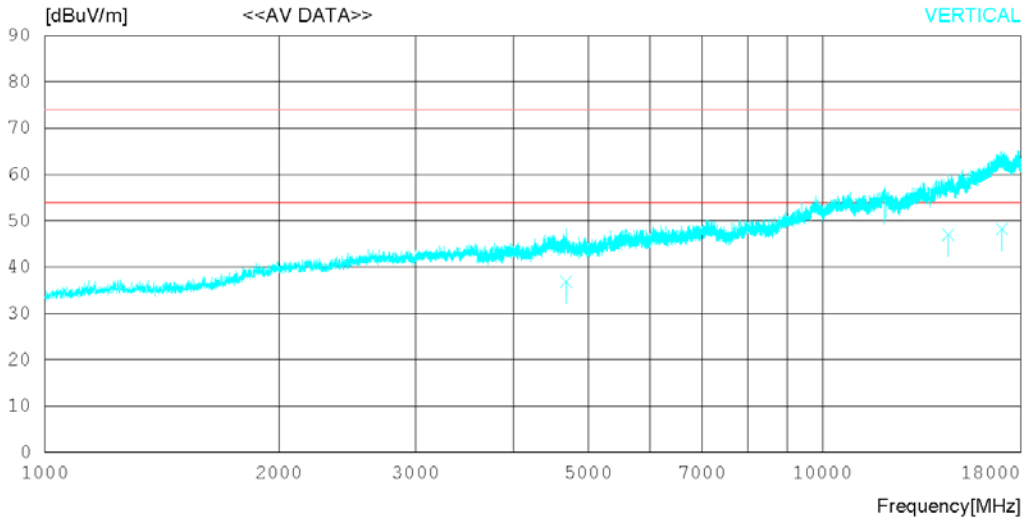
RADIATED EMISSION

Date : 2017-08-07

Order No.	:	DTNC1707-05429,05430	:
Power Supply	:	120 V 60 Hz	:
Temp/Humi	:	21 'C 43 % R.H.	:
Test Condition	:		:
	:		

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





RADIATED EMISSION

Date : 2017-08-07

Order No.	:	DTNC1707-05429,05430	:
Power Supply	:	120 V 60 Hz	:
Temp/Humi	:	21 'C 43 % R.H.	:
Test Condition	:		:
	:		

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

No.	FREQ [MHz]	READING AV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	4442.131	35.2	33.7	5.1	37.7	36.3	54.0	17.7	100	324
2	14469.780	32.3	39.2	11.0	35.6	46.9	54.0	7.1	100	128
3	16896.570	31.0	41.8	11.1	35.4	48.5	54.0	5.5	100	96
----- Vertical ------										
4	4682.253	35.1	33.8	5.6	37.6	36.9	54.0	17.1	100	113
5	14511.220	32.2	39.3	11.1	35.7	46.9	54.0	7.1	100	0
6	17016.130	30.8	41.7	11.0	35.2	48.2	54.0	5.8	100	0

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. Conducted Disturbance

Name of Instrument		Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
☒	MEASUREMENT SOFTWARE	EMI-C VER. 2.00.0143	TSJ	N/A	N/A	N/A
☒	EMI TEST RECEIVER	ESR	ROHDE&SCHWARZ	101767	2017.01.03	2018.01.03
☒	LISN	NNLK8121	SCHWARZBECK	NNLK8121-580	2017.07.27	2018.07.27
☒	PULSE LIMITER	ESH3-Z2	ROHDE&SCHWARZ	101334	2017.01.03	2018.01.03
☒	50 OHM TERMINATOR	CT-01	TME	N/A	2017.01.03	2018.01.03

2. Radiated Disturbance

Name of Instrument		Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
☒	MEASUREMENT SOFTWARE	EMI-R VER. 2.00.0121	TSJ	N/A	N/A	N/A
☒	EMI TEST RECEIVER	ESU	ROHDE & SCHWARZ	100014	2016.12.23	2017.12.23
☒	HORN ANTENNA	BBHA9120A	SCHWARZBECK	322	2016.05.13	2018.05.13
☒	PREAMPLIFIER	8449B	AGILENT TECHNOLOGIES	3008A01590	2017.02.20	2018.02.20
☒	EMI TEST RECEIVER	ESR7	ROHDE&SCHWARZ	101061	2017.02.16	2018.02.16
☒	TRILOG BROADBAND TEST-ANTENNA	VULB9160	SCHWARZBECK	9160-3362	2016.08.05	2018.08.05
☒	LOW NOISE PRE AMPLIFIER	MLA-010K01-B01-27	TSJ	1844538	2017.03.06	2018.03.06

Appendix 2

Photographs of the Test Configurations

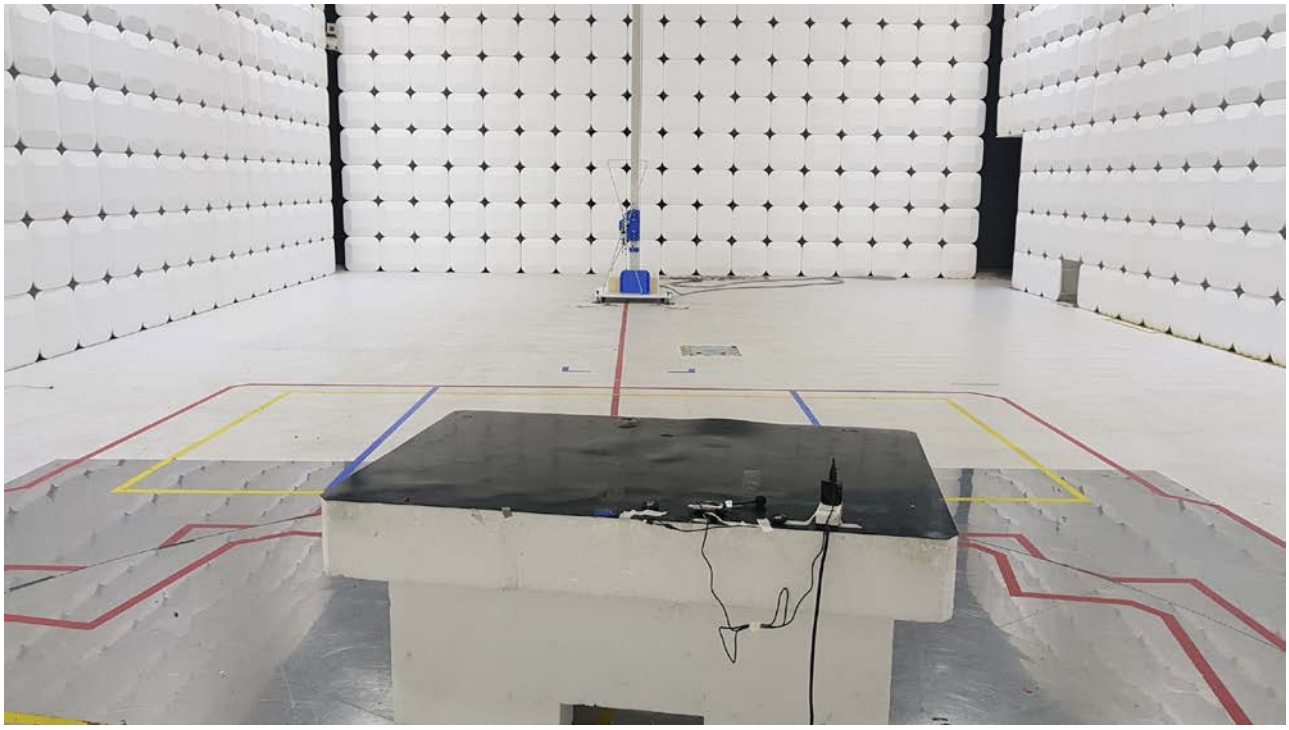
1. Conducted Disturbance

2. Radiated Disturbance

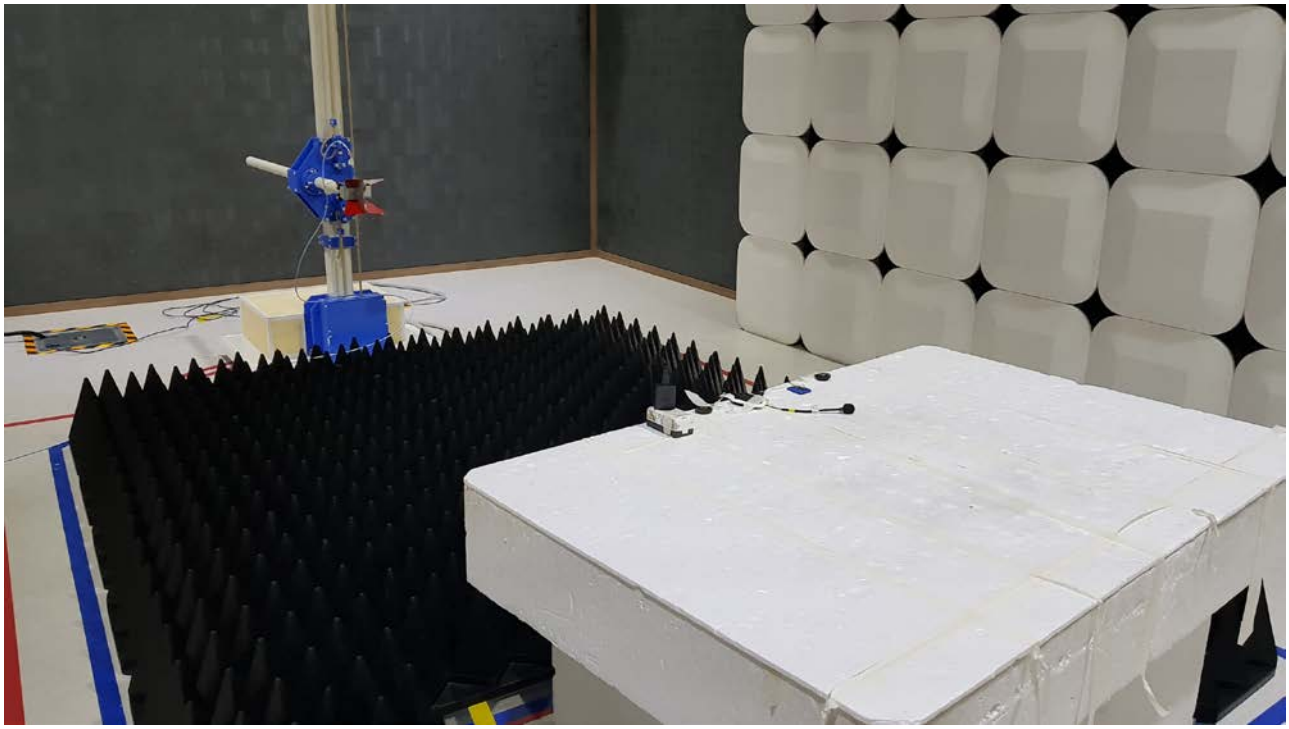
A2-1. Conducted Disturbance

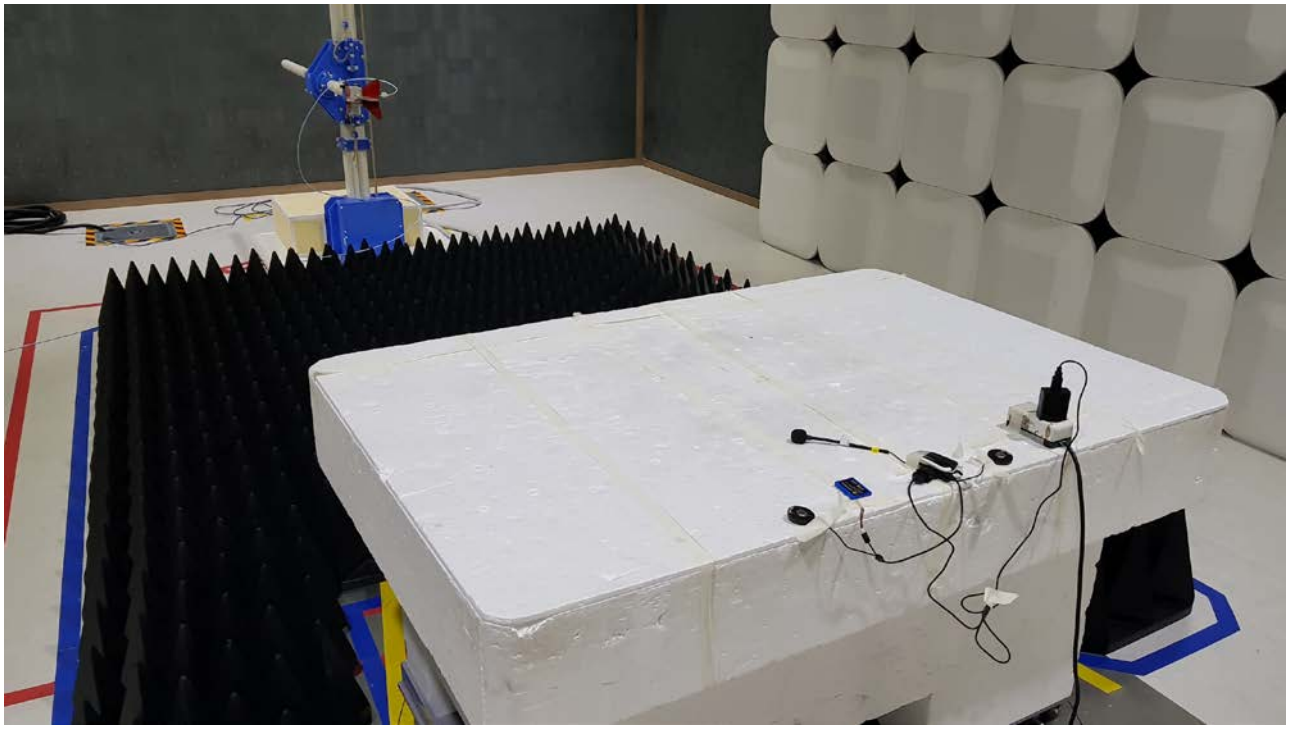
A2-2. Radiated Disturbance

< 30 MHz ~ 1 GHz >



< (1 ~ 18) GHz >





Appendix 3

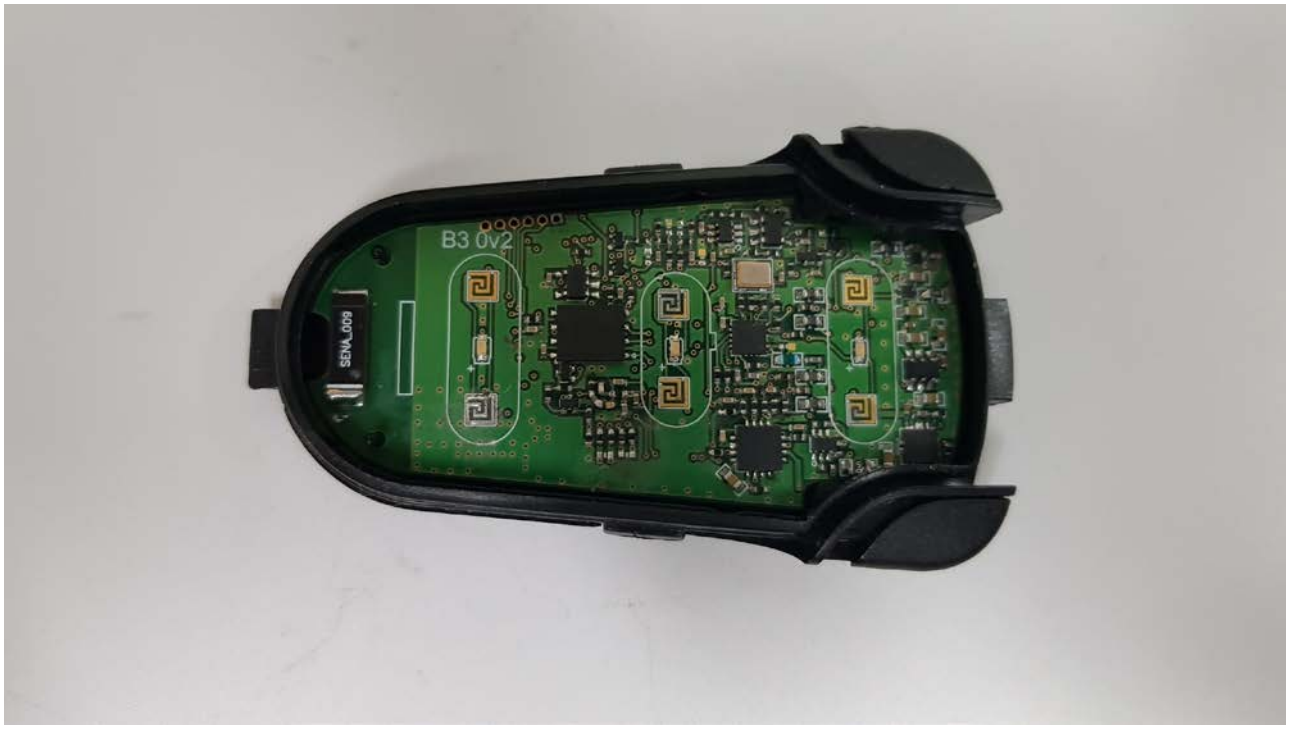
Photographs of EUT

A3-1. EUT

1. Front View of Product

2. Rear View of Product

3. Inside View of Product



Appendix 4

Report Revision History

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