FCC DOC TEST REPORT

Test item	: NFC SECURE SSD
Model No.	: SZ2530
Order No.	: DTNC1511-05726
Date of receipt	: 2015-11-16
Test duration	: 2015-11-25 ~ 2015-12-07
Date of Issue	: 2016-01-06

Applicant : SAFERZONE Co., Ltd.
8F., 67 Gasan Digital 2-ro, Geumcheon-gu, Seoul South Korea

Test laboratory : DT&C Co., Ltd.
42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

Test specification : ANSI C 63.4:2014
FCC Part 15 Subpart B
(Class B personal computers and peripherals)

Test environment : Temperature : (19 ~ 22)°C,
Humidity : (38 ~ 49) % R.H.

Test result : ☒ Comply ☐ Not Comply

Tested by:

Engineer
MinChul Kim

Reviewed by:

Technical Manager
MyungJin Song

PRESIDENT OF DT&C Co., Ltd.

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, 449-935

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-338, G754, G-815	Registered
Certification	Korea	KC	KR0034	Designation
	Germany	TUV	CARAT 13 11 86721 001	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	NFC SECURE SSD
Model Name	SZ2530
Add Model Name	None
Serial No.	None
Type of Sample Tested	Pre-Production
Supplied Power for Test	120 V, 60 Hz
Rating Power	DC 3.3 V, 2 A
Clock Frequency	27.12 MHz
Applicant	SAFERZONE Co., Ltd. 8F., 67 Gasan Digital 2-ro, Geumcheon-gu, Seoul South Korea
Manufacturer	SAFERZONE Co., Ltd. 8F., 67 Gasan Digital 2-ro, Geumcheon-gu, Seoul South 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	**C**
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 (℃)	Humidity (% R.H.)
Conducted Disturbance	2015-12-07	19	38
Radiated Disturbance	2015-11-25 2015-12-03	22 22	49 49

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

- The EUT connected to PC repeated reading and writing the data.

5.3 Support Equipment Used

Unit	Model No.	Serial No.	Manufacturer	CABLE			Backshell	FCC ID
				Connect type	Length (m)	shield		
PC	VOSTRO470	37818613441	DELL INC.	SATA USB USB USB HDMI LAN POWER	0.3 1.7 1.4 1.6 1.5 3.0 1.5	Shield Non-Shield Non-Shield Shield Shield Non-Shield Non-Shield	Plastic Plastic Plastic Plastic Plastic Plastic Plastic Plastic	DOC
MONITOR	23MT55D	409KKKG3Q053	LG Electronics	HDMI POWER	1.5 1.3	Shield Non-Shield	Plastic	DOC
PRINTER	EPSON AcuLaser M1200	LWTZ181308	EPSON	USB POWER	1.6 1.2	Shield Non-Shield	Plastic	DOC
KEYBOARD	KB-065	CN11163237	HP	USB	1.7	Shield	Plastic	DOC
MOUSE	1113	X821908-002	Microsoft	USB	1.4	Non-Shield	Plastic Plastic	DOC

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 C63.4 .**

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

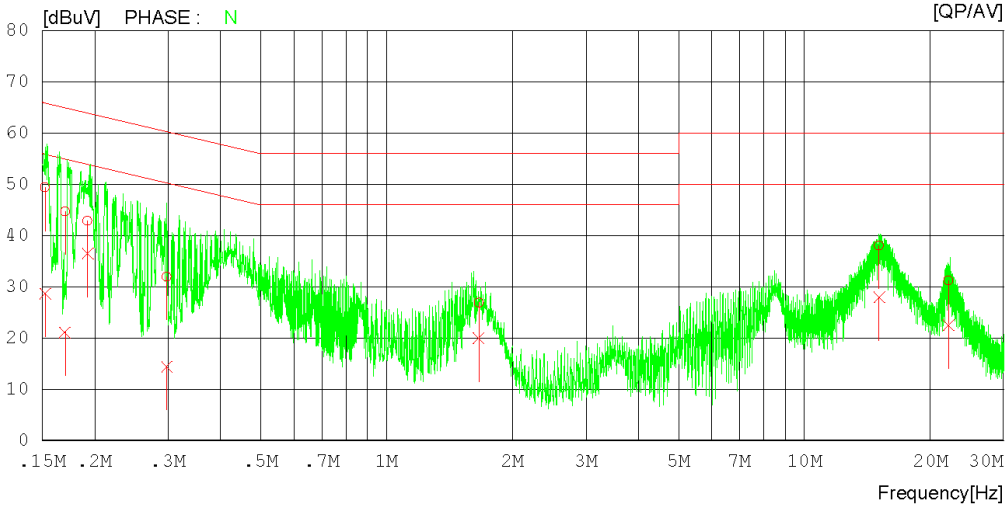
DT&C

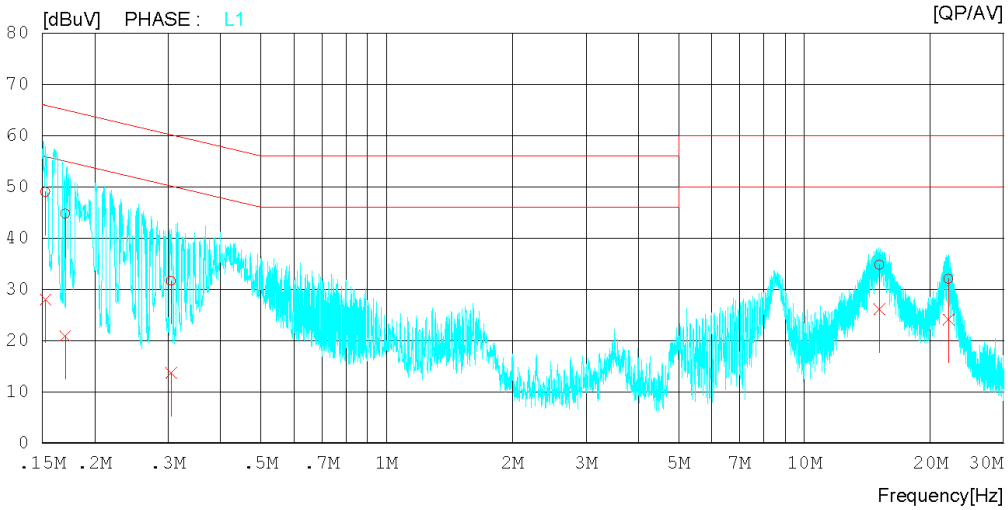
Date : 2015-12-09

Order No.	:	DTNC1511-05726	Referrence No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi.	:	19 'C 38 % R.H.
Test Condition	:		Operator	:	

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV





Results of Conducted Emission

DT&C

Date : 2015-12-09

Order No.	:	DTNC1511-05726	Referrence No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi.	:	19 'C 38 % R.H.
Test Condition	:		Operator	:	

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15230	47.6	26.8	1.8	49.4	28.6	65.9	55.9	16.5	27.3	N
2	0.16985	43.1	19.5	1.6	44.7	21.1	65.0	55.0	20.3	33.9	N
3	0.19250	41.5	35.0	1.4	42.9	36.4	63.9	53.9	21.0	17.5	N
4	0.29770	30.9	13.4	1.0	31.9	14.4	60.3	50.3	28.4	35.9	N
5	1.66060	26.5	19.7	0.3	26.8	20.0	56.0	46.0	29.2	26.0	N
6	15.07980	37.7	27.6	0.3	38.0	27.9	60.0	50.0	22.0	22.1	N
7	22.11040	30.8	22.1	0.4	31.2	22.5	60.0	50.0	28.8	27.5	N
8	0.15260	47.2	26.1	1.8	49.0	27.9	65.9	55.9	16.9	28.0	L1
9	0.17003	43.2	19.3	1.6	44.8	20.9	65.0	55.0	20.2	34.1	L1
10	0.30477	30.7	12.7	0.9	31.6	13.6	60.1	50.1	28.5	36.5	L1
11	15.09380	34.6	25.8	0.2	34.8	26.0	60.0	50.0	25.2	24.0	L1
12	22.12480	31.6	23.8	0.3	31.9	24.1	60.0	50.0	28.1	25.9	L1

6.2 Radiated Disturbance

6.2.1 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 **10m 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 >

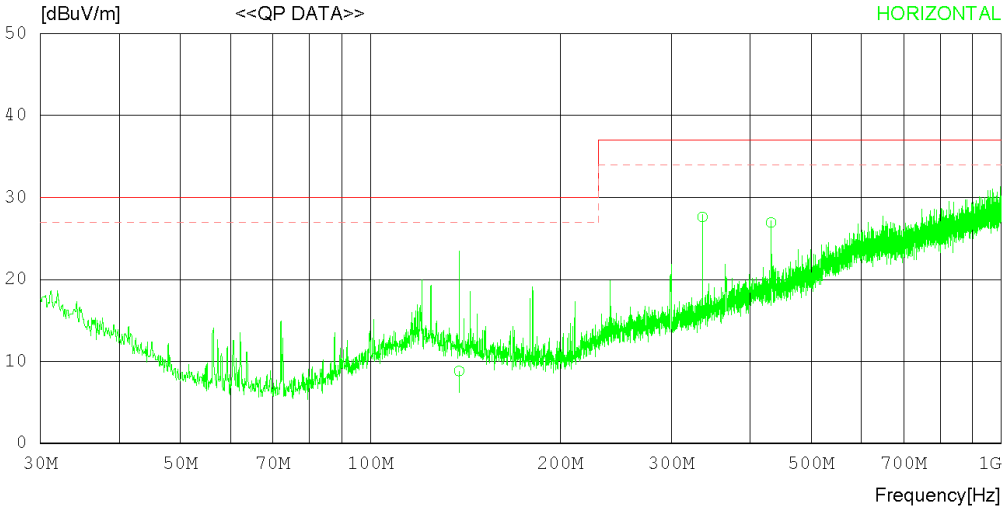
RADIATED EMISSION

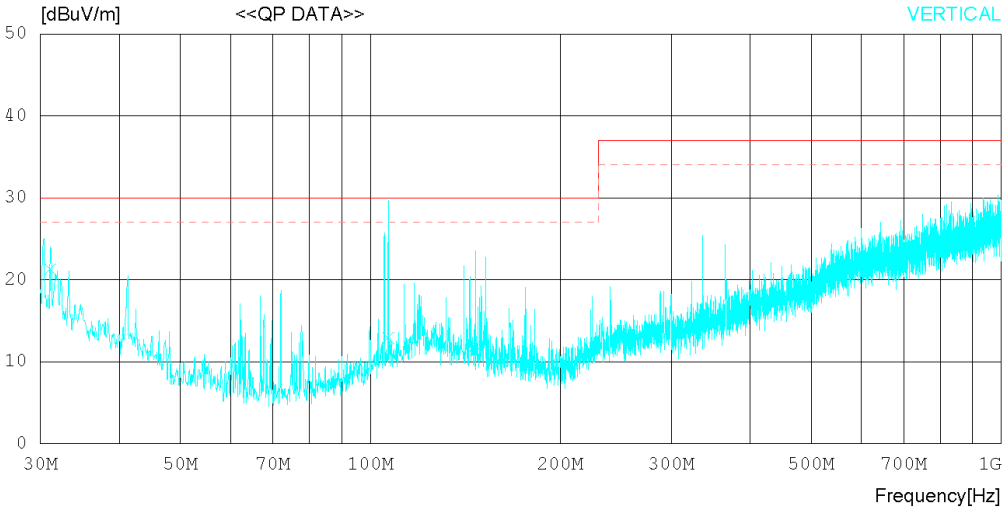
Date : 2015-11-25

Order No.	:	DTNC1511-05726	Reference No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi	:	22 'C 49 % R.H.
Test Condition	:		Operator	:	

Memo :

LIMIT : CISPR Pub.22 Class B (10m)
MARGIN: 3 dB





RADIATED EMISSION

Date : 2015-11-25

Order No.	:	DTNC1511-05726	Reference No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi	:	22 'C 49 % R.H.
Test Condition	:		Operator	:	

Memo :

LIMIT : CISPR Pub.22 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	138.274	17.8	11.1	2.8	22.9	8.8	30.0	21.2	400	190
2	336.027	32.8	14.2	4.5	23.9	27.6	37.0	9.4	400	180
3	432.054	29.6	16.4	5.2	24.3	26.9	37.0	10.1	400	160
----- Vertical ------										
4	31.099	24.6	18.0	1.3	22.6	21.3	30.0	8.7	100	50
5	106.750	22.1	11.2	2.4	22.8	12.9	30.0	17.1	100	50
6	146.761	21.4	10.7	2.8	22.9	12.0	30.0	18.0	100	120

< (1 ~ 18) GHz _ Peak >

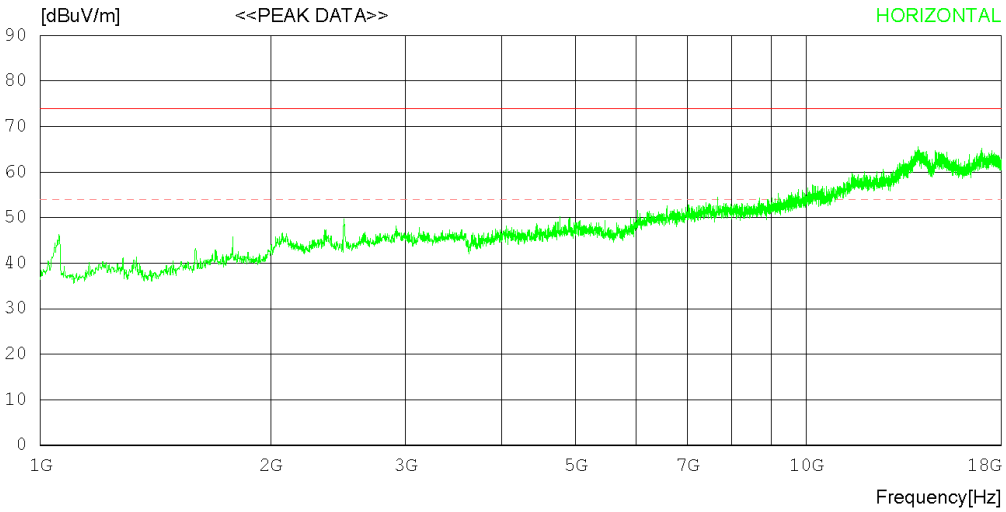
RADIATED EMISSION

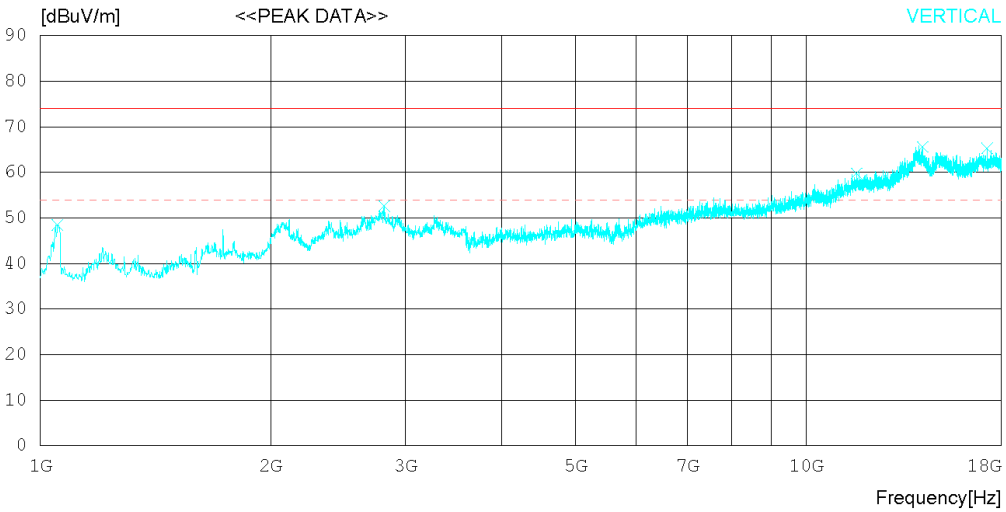
Date : 2015-12-03

Order No.	:	DTNC1511-05726	Reference No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi	:	22 'C 49 % R.H.
Test Condition	:		Operator	:	

Memo :

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





RADIATED EMISSION

Date : 2015-12-03

Order No.	:	DTNC1511-05726	Reference No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi	:	22 'C 49 % R.H.
Test Condition	:		Operator	:	

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]
----- Vertical ------										
1	1053.125	64.6	28.2	3.3	47.7	48.4	74.0	25.6	100	1
2	2812.625	61.9	32.9	5.4	47.6	52.6	74.0	21.4	100	1
3	11650.500	53.2	39.2	13.1	45.7	59.8	74.0	14.2	100	1
4	14204.750	54.9	39.2	18.2	46.7	65.6	74.0	8.4	100	165
5	17247.750	52.0	41.9	16.9	45.5	65.3	74.0	8.7	100	165

< (1 ~ 18) GHz _ Average >

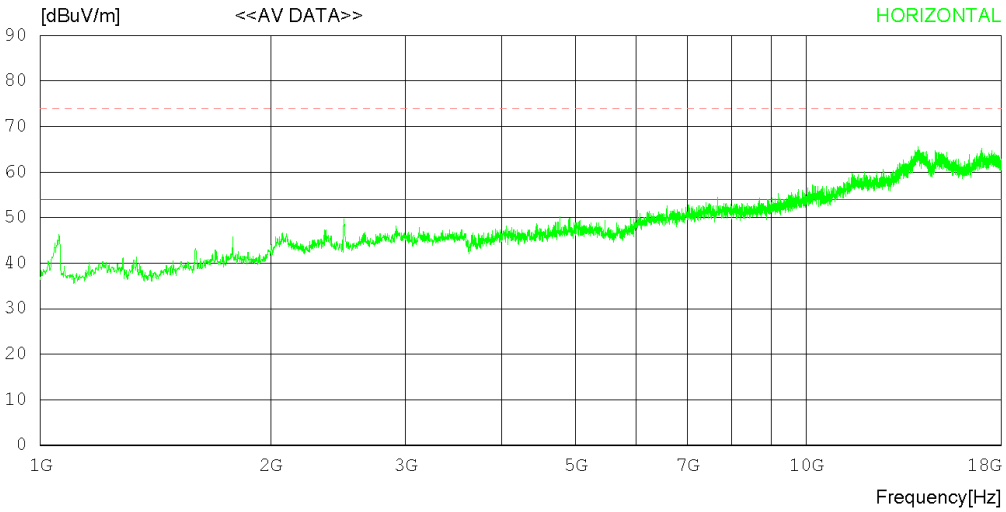
RADIATED EMISSION

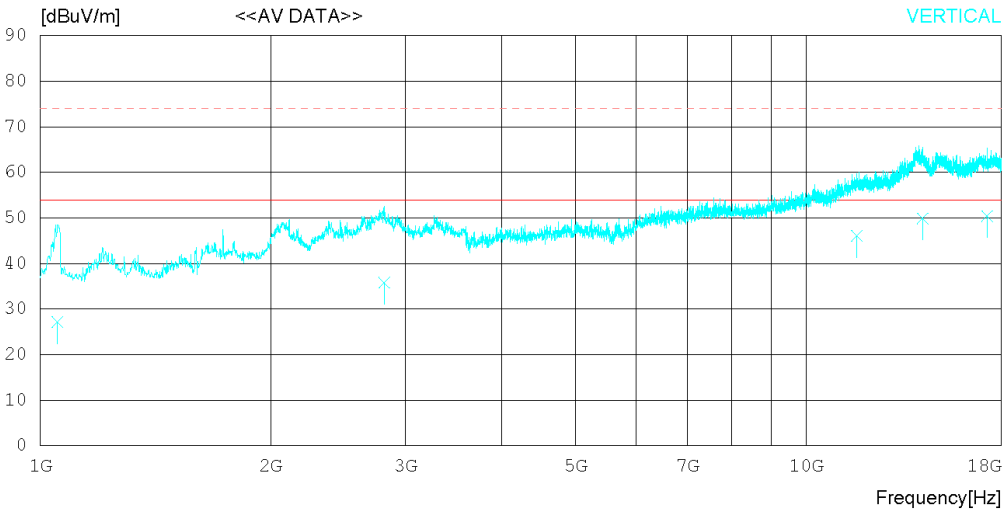
Date : 2015-12-03

Order No.	:	DTNC1511-05726	Reference No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi	:	22 'C 49 % R.H.
Test Condition	:		Operator	:	

Memo :

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





RADIATED EMISSION

Date : 2015-12-03

Order No.	:	DTNC1511-05726	Reference No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi	:	22 'C 49 % R.H.
Test Condition	:		Operator	:	

Memo :

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]
----- Vertical ------										
1	1053.125	43.3	28.2	3.3	47.7	27.1	54.0	26.9	100	140
2	2812.625	45.1	32.9	5.4	47.6	35.8	54.0	18.2	100	1
3	11650.500	39.5	39.2	13.1	45.7	46.1	54.0	7.9	100	1
4	14204.750	39.2	39.2	18.2	46.7	49.9	54.0	4.1	100	165
5	17247.750	37.1	41.9	16.9	45.5	50.4	54.0	3.6	100	165

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
☐	SPECTRUM ANALYZER	8591E	H/P	3649A05889	N/A	N/A
☐	LISN	KNW-407	KYORITSU	8-317-8	2015.01.07	2016.01.07
☐	LISN	ESH2-Z5	ROHDE & SCHWARZ	828739/006	2015.09.10	2016.09.10
☒	EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2015.02.25	2016.02.25
☒	ARTIFICIAL MAINS NETWORK	PMM L2-16B	NARDA S.T.S. / PMM	000WX20305	2015.06.26	2016.06.26
☒	LISN	LISN1600	TTI	197204	2015.06.26	2016.06.26
☒	50 OHM TERMINATOR	CT-01	TME	N/A	2015.01.06	2016.01.06
☒	HIGH PASS FILTER	KFL-007D	KYORITSU	8-2259-4	N/A	N/A
☐	ISN	T8	TESEQ GMBH	24815	2015.01.07	2016.01.07
☐	LISN (DC)	NNBM8125	SCHWARZBECK	8125-821	2015.09.10	2016.09.10
☐	LISN (DC)	NNBM8125	SCHWARZBECK	8125-1390	2015.09.10	2016.09.10

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	2015.01.06	2016.01.06
☒	BILOG ANTENNA	CBL6112B	SCHAFFNER	2737	2014.12.10	2016.12.10
☐	HORN ANTENNA	BBHA9120A	SCHWARZBECK	322	2014.05.12	2016.05.12
☒	AMPLIFIER	8447E	H/P	2945A02865	2015.01.06	2016.01.06
☐	PRE AMPLIFIER	8449B	AGILENT	3008A01590	2015.02.25	2016.02.25
☐	SPECTRUM ANALYZER	E4411B	AGILENT	US41062735	2015.06.25	2016.06.25
☐	AMPLIFIER	8447D	AGILENT	2443A03690	2015.06.25	2016.06.25
☒	EMI TEST RECEIVER	ESU	ROHDE & SCHWARZ	100538	2015.02.06	2016.02.06
☒	LOW NOISE PRE AMLIFIER	MLA-100M18-B01-42	TSJ	1872271	2015.05.26	2016.05.26
☒	HORN ANTENNA	3117	ETS-LINDGREN	00152093	2014.01.30	2016.01.30