

**Nemko Korea Co., Ltd.**

67-1 &amp; 300-2, Osan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, Korea

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**FCC PART 15 Class II Permissive Change****Applicant :****D&T Inc.****Daedeok Valley, 59-9, Jang Dong, Yuseong Gu,****Daejeon, 305-343 Korea****Attn : Mr. Kyutae Park****Dates of Issue : January 13, 2012****Test Report No. : NK-11-E-952****Test Site : Nemko Korea Co., Ltd.****EMC site, Korea****FCC ID****Brand Name****Contact Person****THCFS-S5502F****CISCO****D&T Inc.****Daedeok Valley, 59-9, Jang Dong, Yuseong Gu,****Daejeon, 305-343 Korea****Mr. Kyutae Park****Telephone No. : + 82 42 360 8000****Applied Standard:****Part 15 & 2****Classification :****FCC Class B Device****EUT Type:****55" Dual Color TFT LCD Monitor for building-in**

**Remark : This Class II Permissive change test report was based on test report no. NK-11-E-382 which was issued on June 24 2011.**

The device bearing the brand name and FCC ID specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003.

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

 Jan. 13, 2012

**Tested By : Hyunoh Noh**  
**Engineer**

 Jan. 13, 2012

**Reviewed By : Hyunho Kim**  
**Manager & Chief Engineer**

**D&T Inc.****Page 1 of 47****FCC ID : THCFS-S5502F**

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## SCOPE

*Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 15.*

Responsible Party :	D&T Inc.
Contact Person :	Mr. Kyutae Park
	Tel No.: + 82 42 360 8000
Manufacturer :	D&T Inc.
	Daedeok Valley, 59-9, Jang Dong, Yuseong Gu, Daejeon, 305-343 Korea
Factory :	D&T Inc.
	Daedeok Valley, 59-9, Jang Dong, Yuseong Gu, Daejeon, 305-343 Korea

- FCC ID: THCFS-S5502F
- Model: FS-S5502F
- EUT Type: 55" Dual Color TFT LCD Monitor for building-in
- Electric Rating: a.c. 100-240 V, 50-60 Hz, 5 A MAX.
- Test Voltage: a.c. 120 V, 60 Hz
- Port/Connector: Left : HDMI 1, HDMI 2, RS-232 Input, Speaker Input  
Right : HDMI 1, HDMI 2, RS-232 Input, Speaker Input
- Classification: FCC Class B
- Applied Standard: FCC Part 15 & Part 2
- Test Procedure(s): ANSI C63.4 (2003)
- Dates of Test: December 15, 2011 to January 10, 2012
- Place of Tests: Nemko Korea Co., Ltd. EMC Site
- Test Report No.: NK-11-E-952

## INTRODUCTION

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-2003) was used in determining radiated and conducted emissions emanating from **D&T Inc.**

FCC ID : **THCFS-S5502F, 55" Dual Color TFT LCD Monitor for building-in.**

These measurement tests were conducted at **Nemko Korea Co., Ltd. EMC Laboratory.**

The site address is 67-1 & 300-2, Osan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, Korea

The area of Nemko Korea Corporation Ltd. EMC Test Site is located in a mountain area at 80 kilometers (48 miles) southeast and Incheon International Airport (Incheon Airport), 30 kilometers (18 miles) south-southeast from central Seoul.

It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures.

The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on 2003.



Nemko Korea Co., Ltd.  
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Fig. 1. The map above shows the Seoul in Korea vicinity area.  
The map also shows Nemko Korea Corporation Ltd. EMC Lab and Incheon Airport.

## TEST CONDITIONS & EUT INFORMATION

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### Operating During Test

The EUT was connected to the PC and it displayed continuously an "H" pattern on the screen. The EUT was set to 1920 x 1080 video resolution, with 60 Hz vertical refresh rate.

### Support Equipment

55" Dual Color TFT LCD Monitor for building-in (EUT)	D&T Inc. FCC ID : THCFS-S5502F 0.9 m shielded HDMI cable 1.5 m shielded RS-232 cable 1.2 m shielded speaker cable 1.8 m unshielded AC power cable	S/N: Left (DNT1529P002), Right (DNT1529Q002)
PC 1	Dell ASIA PACIFIC SDN. Model : DMC 1.8 m unshielded AC power cable	FCC DOC S/N: 2D94D1S
PC 2	HP Model : HP Pavilion t000_oxford 1.8 m unshielded AC power cable	FCC DOC S/N: KRJ4150QN
Keyboard 1	Samsung Electro-Mechanics Co.,Ltd. Model : SDM4600UH 1.5 m unshielded USB cable	S/N : 4S006484
Keyboard 2	MONTEREY INTERNATIONAL CORP. Model : SKG-3300VB 1.5 m unshielded USB2 cable	S/N : TAKZ903492H
Mouse 1	MICROSOFT CORPORATION Model : Wheel Mouse Optical 1.1A USB and PS/2 Compatible 1.8 m shielded USB cable	S/N : N/A
Mouse 2	MONTEREY INTERNATIONAL CORP Model : SML-21QPB 1.8 m shielded USB cable	S/N : TAKB338554 L

## EUT Information

Clock	27.00 MHz (Y1, Y2), 7.3728 MHz(Y3)
Chipset(s)	U29(ATmega88V-10AU), U10(IT6603), U14(K4H561638H-UCCC), U15(K4H561638H-UCCC), U7(THC63LVD1027), U4(CAT6353X)
LCD Panel Type	A-si TFT Active matrix
Screen size	138.8 cm (Left / Right individual)
Maximum Resolution	1920 x 1080 @ 60 Hz
Pixel pitch	0.63 (H) mm x 0.63 (V) mm
Display colors	16.7 M (RGB 8-bit data)
Contrast Ratio(Typ.)	4000:1
Viewing Angle(Typ.)	89/89/89/89
Response Time(Typ.)	10 ms
Luminance(Typ.)	350 cd/m2
Synchronization	Horizontal Frequency : 76.5 kHz Vertical Frequency : 60 Hz
Power Consumption	Maximum : 500 W Standby mode : Under 1 W
Port(s)	Left : HDMI 1, HDMI 2, RS-232 Input, Speaker Input Right : HDMI 1, HDMI 2, RS-232 Input, Speaker Input
Size and weight	2520.5 x 950 x 170 / 107 kg

## EUT System

Equipment	Model	Manufacturer	Serial Number
Panel	LTI550HJ05	Samsung Electronics or S-LCD	N/A
Main Board	LB506B Main board	D&T Inc.	N/A
I/O Board	LB506B I/O board	D&T Inc.	N/A
Crossover filter	2345613	MAEDEN International	N/A
Power Supply	DT-PB260W	D&T Inc.	N/A

※ The EUT is a dual-monitor-type and configuration is the same both the left and right.

## Description of the Changes according to FCC part 2.1043

- Crossover filter position was changed. Refer to Appendix D.  
The others are not changed at all.

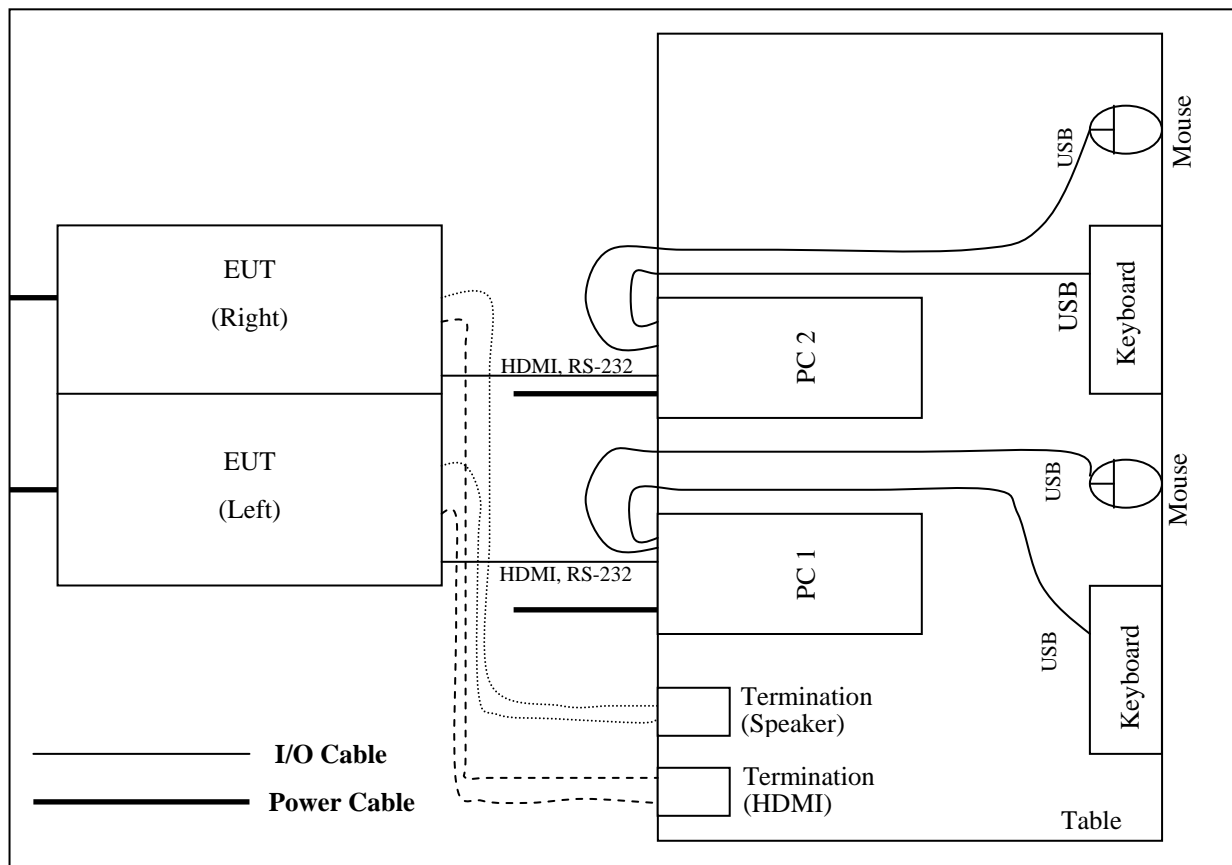
## Description of Test Modes

The EUT was pre-tested under the following resolutions mode:

1. 640 X 480 (60 Hz / 29.5 kHz) : Clock 23.625 MHz
2. 800 X 600 (60 Hz / 37 kHz) : Clock 35.5 MHz
3. 1280 X 1024 (60 Hz / 64 kHz) : Clock 108 MHz
4. 1600 X 1200 (60 Hz / 74 kHz) : Clock 130.375 MHz
5. 1920 X 1080 (60 Hz / 76.5 kHz) : Clock 148.5 MHz

The worst emission level was found when the EUT was tested under 1920 x 1080 resolution, therefore, the test data of this mode was recorded in the report.

## Setup Drawing



## SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specification:

Name of Test	Paragraph No.	Result	Remark
Conducted Emission	15.107(a)	Complies	
Radiated Emission	15.109(g)	Complies	Below 1 GHz
Radiated Emission	15.109(a)	Complies	Above 1 GHz

## RECOMMENDATION/CONCLUSION

The data collected shows that the **D&T Inc.**

FCC ID : **THCFS-S5502F, 55" Dual Color TFT LCD Monitor for building-in.**

The highest emission observed was at **1.50 MHz** for conducted emissions with a A.V margin of **5.2 dB**, at **30.19 MHz** for radiated emissions with a margin of **5.4 dB**.

## SAMPLE CALCULATION

$$\text{dB } \mu V = 20 \log_{10} (\mu V/m)$$

$$\mu V = 10^{(\text{dB } \mu V/20)}$$

### EX. 1.

@165.0 MHz

Class B limit = 30.0 dB  $\mu V/m$

Reading = 38.2 dB  $\mu V$  (calibrated level)

Antenna factor + Cable Loss + Amplifier Gain = -12.9 dB

Total = 25.30 dB  $\mu V/m$

Margin = 30.0 – 25.30 = 4.70

4.70 dB below the limit



## DESCRIPTION OF TESTS

### Conducted Emissions

The Line conducted emission test facility is located inside a 1.8 m x 2.0 m shielded enclosure.

It is manufactured by EM engineering. The shielding effectiveness of the shielded room is in accordance with MIL-STD-285 or NSA 65-6.

A 1 m x 1.5 m wooden table 0.8 m height is placed 0.4 m away from the vertical wall and 0.5 m away from the side of wall of the shielded room Rohde & Schwarz (ENV216) and Rohde & Schwarz (ESH2-Z5) of the 50 ohm / 50 uH Line Impedance Stabilization Network(LISN) are bonded to the shielded room.

The EUT is powered from the Rohde & Schwarz (ENV216) LISN and the support equipment is powered from the Rohde & Schwarz (ESH2-Z5) LISN.

Power to the LISN s are filtered by high-current high insertion loss power line filters.

The purpose of filter is to attenuate ambient signal interference and this filter is also bonded to shielded enclosure. All electrical cables are shielded by tinned copper zipper tubing with inner diameter of 1 / 2 ".

If d.c. power device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the LISNs,

All interconnecting cables more than 1 m were shortened by non inductive bundling (serpentine fashion) to a 1 m length.

Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The spectrum was scanned from 150 kHz to 30 MHz with 20 ms sweep time.

The frequency producing the maximum level was re-examined using the EMI test receiver. (Rohde & Schwarz ENV216).

The detector functions were set to CISPR quasi-peak mode & average mode.

The bandwidth of receiver was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.

Each emission was maximized by; switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux a.c. outlet, if applicable; which ever determined the worst case emission.

Each EME reported was calibrated using the R&S signal generator.

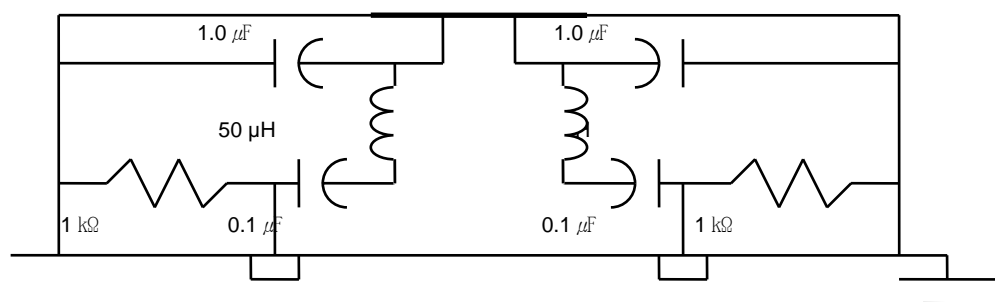


Fig. 2. LISN Schematic Diagram

## DESCRIPTION OF TESTS

### Radiated Emissions

Measurement were made indoors at 10 & 3 meter using antennas, amplifier, and EMI test receiver to determine the frequency producing the maximum EME.

Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The Technology configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna was note for each frequency found.

Measurements were made indoors at 10 m test range using Trilog Broadband Test Antenna (Shwarzbeck, VULB9163) and Above 1 GHz, at 3 m test range using a Doppelsteg Horn Antenna (SCHWARTZBECK, HF907) in fully anechoic chamber.

The test equipment was placed on a wooden table.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

Each frequency found during measurements was reexamined and investigated using EMI test receiver. (ESU 40)

The detector function were set to CISPR quasi-peak and peak mode and the bandwidth of the receiver were set to 120 kHz and 1MHz depending on the frequency or type of signal.

The half wave dipole antenna was tuned to the frequency found during preliminary radiated measurements.

The EUT support equipment and interconnecting cables were re configured to the setup producing the maximum emission for the frequency and were placed on top of a 0.8 m high non- metallic 1.0 x 1.5 meter table.

The EUT, support equipment and interconnecting cables were re-arranged and manipulated to maximize each EME emission.

The turn table containing the Technology was rotated; the antenna height was varied 1 to 4 meter and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by : switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux a.c. outlet, if applicable; which ever determined the worst case emission.

Each EME reported was calibrated using the R/S signal generator.

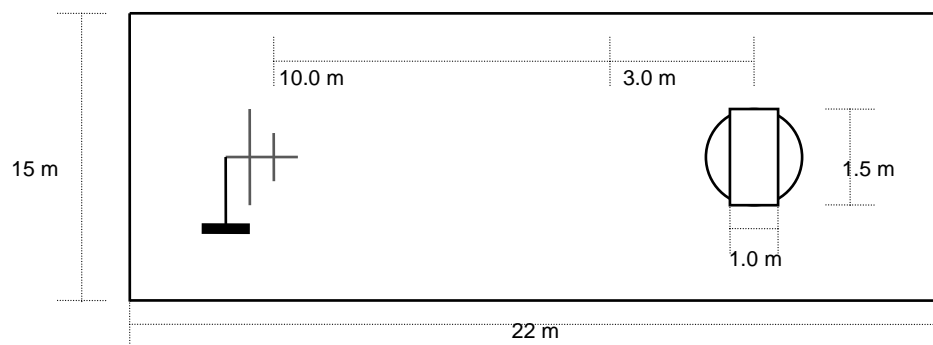


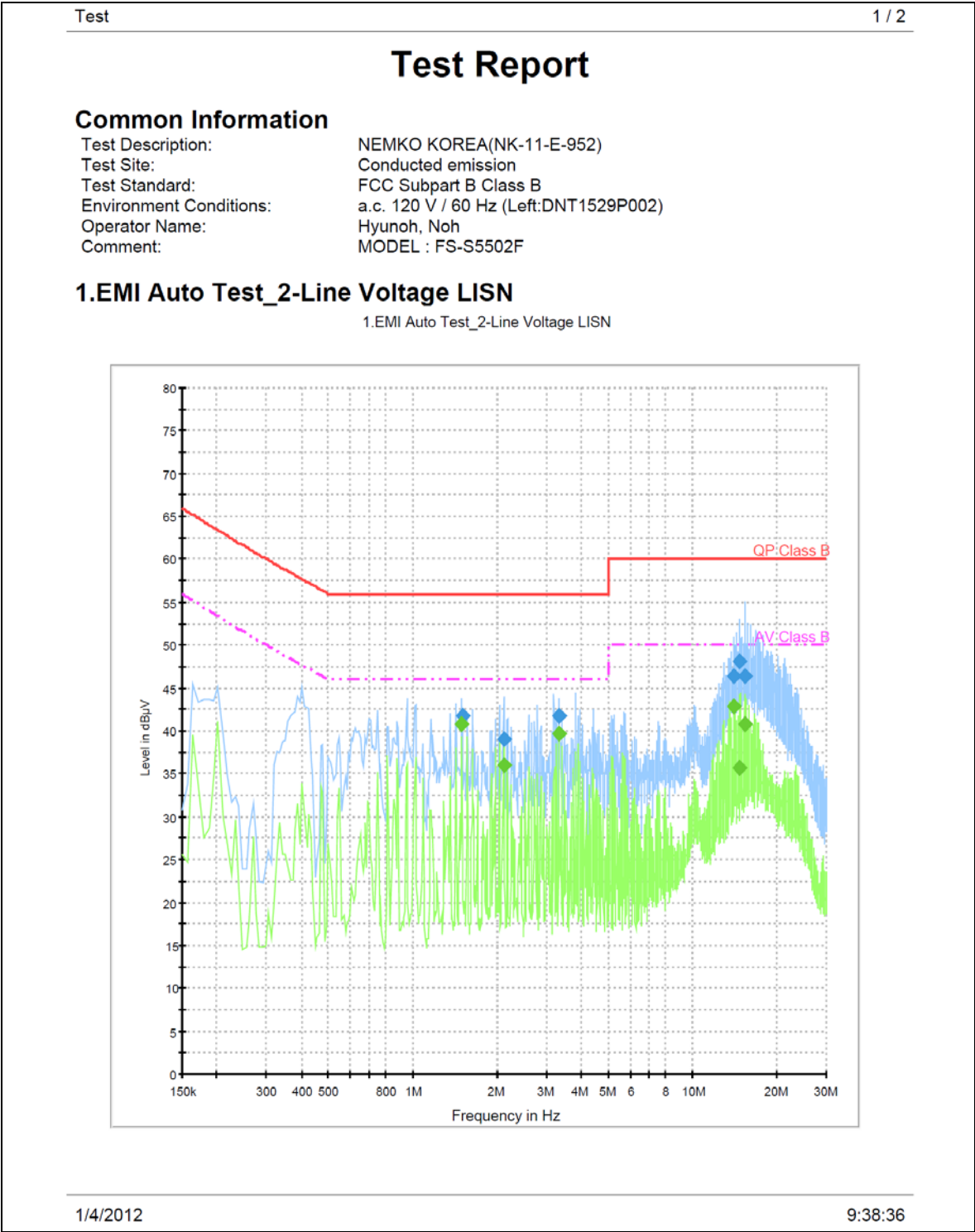
Fig. 3. Dimensions of semi anechoic chamber

**TEST DATA**

**Conducted Emissions**

FCC ID : THCFS-S5502F

① Left



Test

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### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
1.502000	41.8	15000.0	On	N	9.9	14.2	56.0	
2.112638	39.0	15000.0	On	L1	9.9	17.0	56.0	
3.343950	41.8	15000.0	On	L1	9.9	14.2	56.0	
14.075025	46.3	15000.0	On	L1	10.0	13.7	60.0	
14.746650	48.1	15000.0	On	L1	10.0	11.9	60.0	
15.298875	46.4	15000.0	On	L1	10.1	13.6	60.0	

### Final Result 2

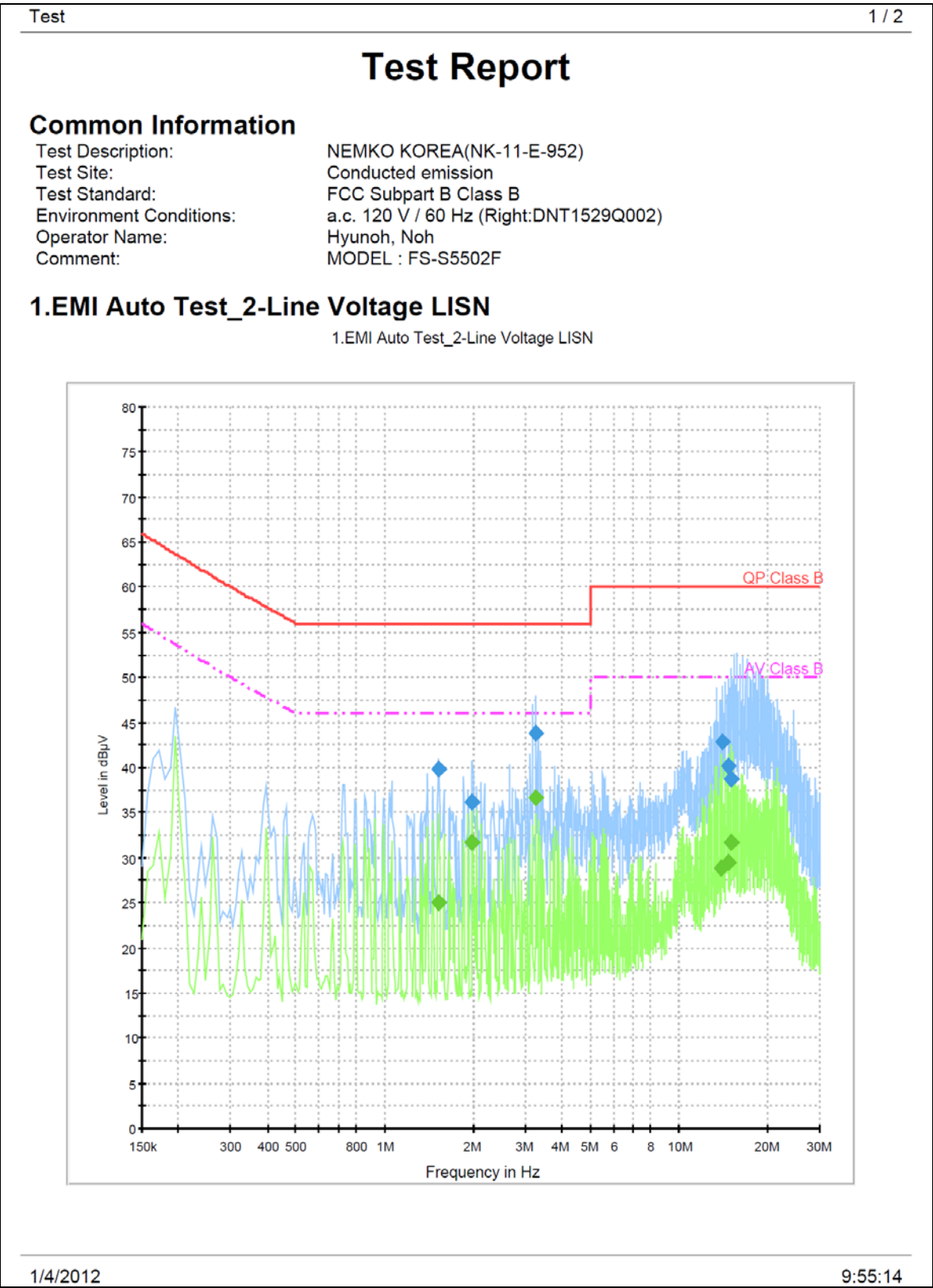
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
1.500712	40.8	15000.0	On	L1	9.9	5.2	46.0	
2.112638	35.9	15000.0	On	L1	9.9	10.1	46.0	
3.343950	39.7	15000.0	On	L1	9.9	6.3	46.0	
14.067562	42.8	15000.0	On	L1	10.0	7.2	50.0	
14.754112	35.8	15000.0	On	N	10.1	14.2	50.0	
15.298875	40.8	15000.0	On	L1	10.1	9.2	50.0	

1/4/2012

9:38:36

**Table 1. Line Conducted Emissions Tabulated Data**

② Right



Test

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### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
1.530562	39.8	15000.0	On	N	9.9	16.2	56.0	
1.993238	36.2	15000.0	On	L1	9.9	19.8	56.0	
3.261000	43.8	15000.0	On	N	9.9	12.2	56.0	
13.978012	42.9	15000.0	On	N	10.1	17.1	60.0	
14.634712	40.2	15000.0	On	L1	10.0	19.8	60.0	
15.097388	38.7	15000.0	On	N	10.1	21.3	60.0	

### Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
1.523100	25.0	15000.0	On	L1	9.9	21.0	46.0	
1.993238	31.7	15000.0	On	N	9.9	14.3	46.0	
3.261000	36.7	15000.0	On	N	9.9	9.3	46.0	
13.970550	28.8	15000.0	On	L1	10.0	21.2	50.0	
14.634712	29.5	15000.0	On	N	10.1	20.5	50.0	
15.104850	31.6	15000.0	On	L1	10.1	18.4	50.0	

1/4/2012

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**Table 2. Line Conducted Emissions Tabulated Data**

**NOTES:**

1. *Measurements using CISPR quasi-peak mode & average mode.*
2. *All modes of operation were investigated and the worst -case emission are reported. See attached Plots.*
3. *LINE : L =Line , N = Neutral*
4. *The limit for Class B device is on the FCC Part section 15.107(a).*

A handwritten signature in blue ink, appearing to read 'Hyunoh Noh', is positioned above a horizontal line.

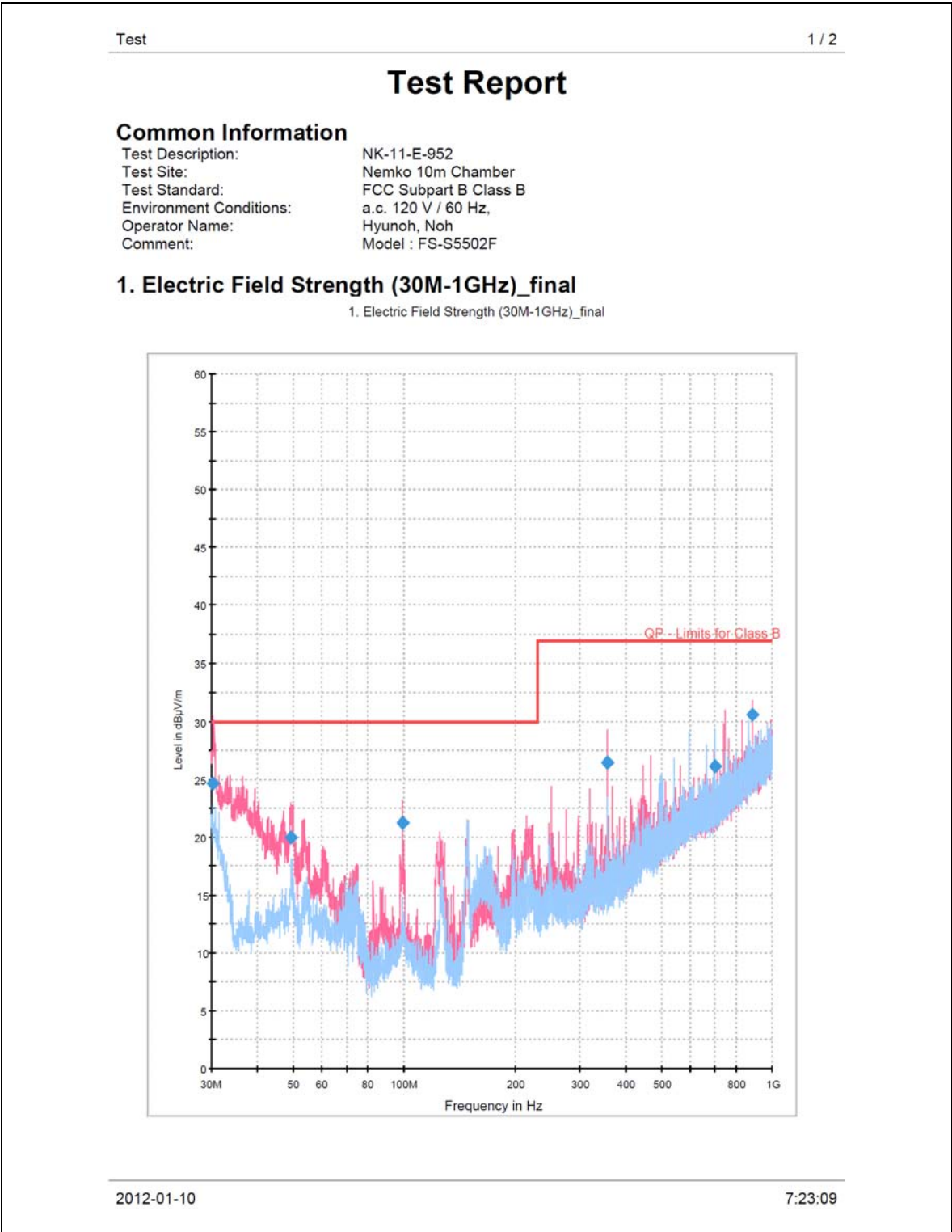
Tested by : **Hyunoh Noh**



**TEST DATA**

**Radiated Emissions (Below 1 GHz)**

FCC ID : THCFS-S5502F





Test

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### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)
30.194000	24.6	15000.0	120.000	200.0	V	26.0	-23.9	5.4
49.157500	20.0	15000.0	120.000	100.0	V	193.0	-22.1	10.0
99.064000	21.2	15000.0	120.000	200.0	V	157.0	-23.2	8.8
355.920000	26.4	15000.0	120.000	100.0	V	123.0	-17.0	10.6
698.669500	26.1	15000.0	120.000	100.0	H	186.0	-9.4	10.9
883.648500	30.6	15000.0	120.000	200.0	V	281.0	-6.6	6.4

(continuation of the "Final Result 1" table from column 9 ...)

Frequency (MHz)	Limit (dBμV/m)	Comment
30.194000	30.0	
49.157500	30.0	
99.064000	30.0	
355.920000	37.0	
698.669500	37.0	
883.648500	37.0	

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**Table 3. Radiated Measurements at 10 meters (1920 x 1080, 60 Hz)**

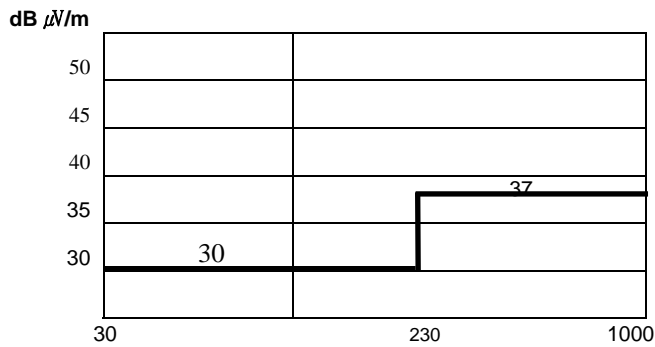


Fig. 4. Limits at 10 meters

**NOTES:**

1. All modes were measured and the worst-case emission was reported.
2. Below 1 GHz, the radiated limits are shown on Figure 4.
3. CISPR 22 limit will be applied for radiated emission test

**NOTES:**

1. All modes of operation were investigated and reported.
2. \*Pol. H=Horizontal V=Vertical
3. \*\*AF+CL+Amp. = Antenna Factor + Cable Loss + Amplifier.
4. The limit for Class B device is on the FCC Part section 15.109(g).

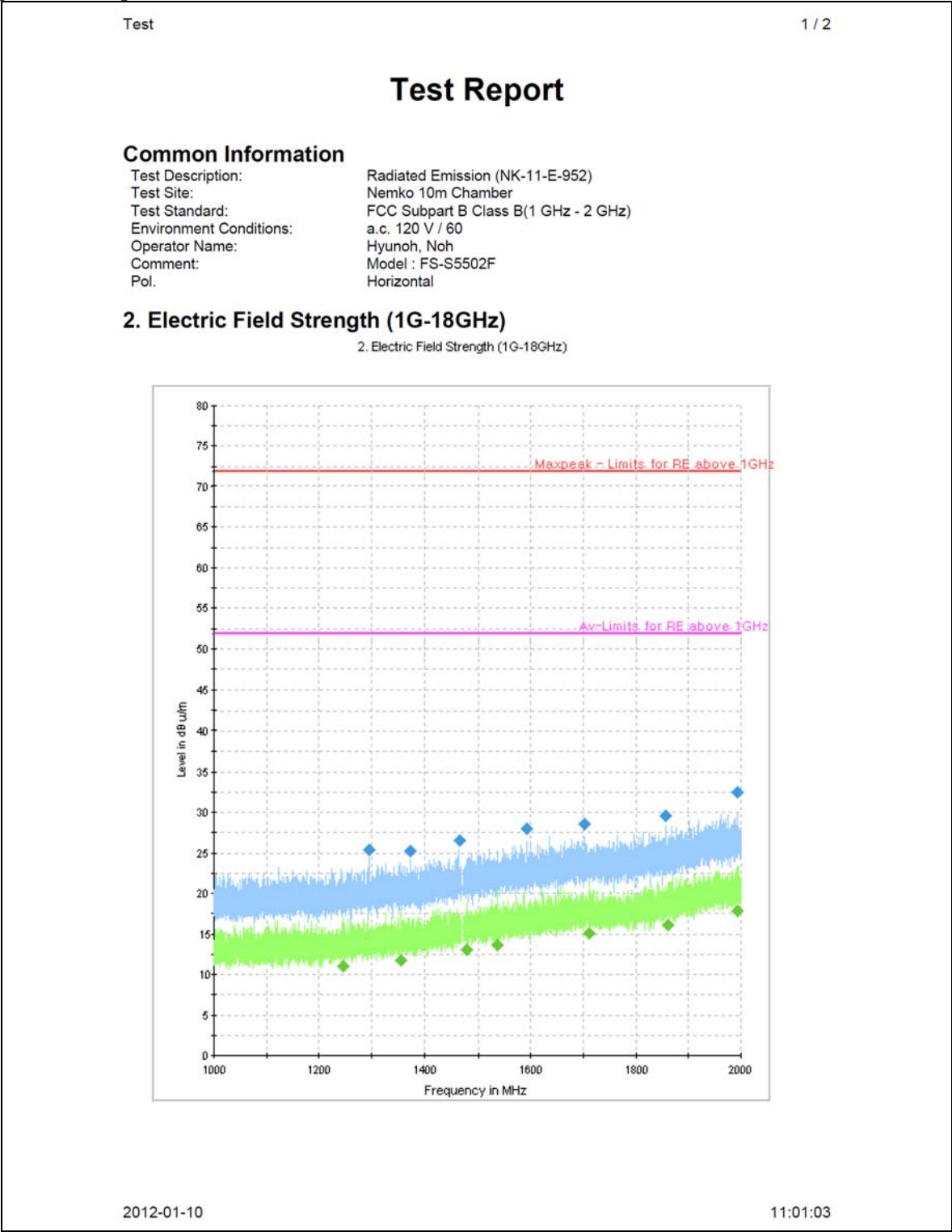
Tested by : **Hyunoh Noh**

**TEST DATA**

**Radiated Emissions (Above 1 GHz)**

FCC ID : THCFS-S5502F

[Horizontal]



Test

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### Final Result 1

Frequency (MHz)	MaxPeak (dBu/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)
1296.250000	25.4	15000.0	1000.000	110.0	H	0.0	-11.1	48.6
1374.350000	25.3	15000.0	1000.000	110.0	H	0.0	-10.7	48.7
1464.850000	26.5	15000.0	1000.000	110.0	H	15.0	-9.9	47.5
1592.400000	28.0	15000.0	1000.000	110.0	H	0.0	-8.7	46.0
1701.650000	28.6	15000.0	1000.000	110.0	H	180.0	-8.3	45.4
1856.300000	29.6	15000.0	1000.000	110.0	H	60.0	-7.3	44.4
1992.700000	32.4	15000.0	1000.000	110.0	H	0.0	-5.8	41.6

(continuation of the "Final Result 1" table from column 9 ...)

Frequency (MHz)	Limit (dBu/m)	Comment
1296.250000	74.0	
1374.350000	74.0	
1464.850000	74.0	
1592.400000	74.0	
1701.650000	74.0	
1856.300000	74.0	
1992.700000	74.0	

### Final Result 2

Frequency (MHz)	Average (dBu/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)
1245.600000	11.1	15000.0	1000.000	110.0	H	30.0	-11.5	42.9
1354.800000	11.8	15000.0	1000.000	110.0	H	180.0	-10.9	42.2
1478.750000	13.1	15000.0	1000.000	110.0	H	30.0	-9.7	40.9
1537.200000	13.7	15000.0	1000.000	110.0	H	60.0	-9.1	40.3
1712.400000	15.0	15000.0	1000.000	110.0	H	270.0	-8.3	39.0
1861.250000	16.0	15000.0	1000.000	110.0	H	180.0	-7.3	38.0
1992.350000	17.8	15000.0	1000.000	110.0	H	0.0	-5.8	36.2

(continuation of the "Final Result 2" table from column 9 ...)

Frequency (MHz)	Limit (dBu/m)	Comment
1245.600000	54.0	
1354.800000	54.0	
1478.750000	54.0	
1537.200000	54.0	
1712.400000	54.0	
1861.250000	54.0	
1992.350000	54.0	

2012-01-10

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**Table 4. Radiated Measurements at 3 meters (1920 x 1080, 60 Hz)**

[Vertical]

Test

1 / 2

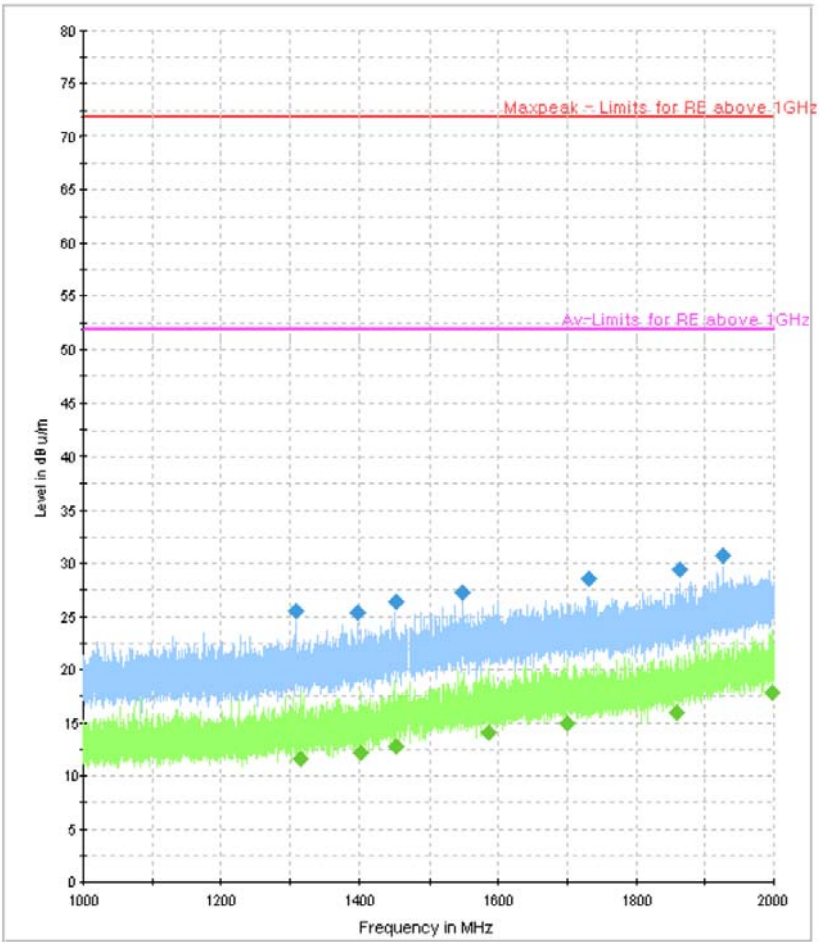
# Test Report

## Common Information

Test Description:	Radiated Emission (NK-11-E-952)
Test Site:	Nemko 10m Chamber
Test Standard:	FCC Subpart B Class B(1 GHz - 2 GHz)
Environment Conditions:	a.c. 120 V / 60
Operator Name:	Hyunoh, Noh
Comment:	Model : FS-S5502F
Pol.	Vertical

## 2. Electric Field Strength (1G-18GHz)

2. Electric Field Strength (1G-18GHz)



2012-01-10

10:50:52

Test

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### Final Result 1

Frequency (MHz)	MaxPeak (dBu/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)
1309.550000	25.5	15000.0	1000.000	110.0	V	0.0	-11.1	48.5
1398.650000	25.4	15000.0	1000.000	110.0	V	180.0	-10.6	48.6
1452.850000	26.4	15000.0	1000.000	110.0	V	180.0	-10.0	47.6
1547.150000	27.3	15000.0	1000.000	110.0	V	30.0	-9.0	46.7
1731.700000	28.5	15000.0	1000.000	110.0	V	270.0	-8.2	45.5
1864.000000	29.4	15000.0	1000.000	110.0	V	360.0	-7.3	44.6
1925.600000	30.7	15000.0	1000.000	110.0	V	180.0	-6.7	43.3

(continuation of the "Final Result 1" table from column 9 ...)

Frequency (MHz)	Limit (dBu/m)	Comment
1309.550000	74.0	
1398.650000	74.0	
1452.850000	74.0	
1547.150000	74.0	
1731.700000	74.0	
1864.000000	74.0	
1925.600000	74.0	

### Final Result 2

Frequency (MHz)	Average (dBu/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)
1314.500000	11.6	15000.0	1000.000	110.0	V	15.0	-11.0	42.4
1403.200000	12.1	15000.0	1000.000	110.0	V	270.0	-10.6	41.9
1451.250000	12.7	15000.0	1000.000	110.0	V	180.0	-10.1	41.3
1585.850000	14.0	15000.0	1000.000	110.0	V	45.0	-8.8	40.0
1700.650000	15.0	15000.0	1000.000	110.0	V	180.0	-8.3	39.0
1858.950000	16.0	15000.0	1000.000	110.0	V	270.0	-7.3	38.0
1997.850000	17.9	15000.0	1000.000	110.0	V	180.0	-5.8	36.1

(continuation of the "Final Result 2" table from column 9 ...)

Frequency (MHz)	Limit (dBu/m)	Comment
1314.500000	54.0	
1403.200000	54.0	
1451.250000	54.0	
1585.850000	54.0	
1700.650000	54.0	
1858.950000	54.0	
1997.850000	54.0	

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10:50:52

Table 5. Radiated Measurements at 3 meters (1920 x 1080, 60 Hz)

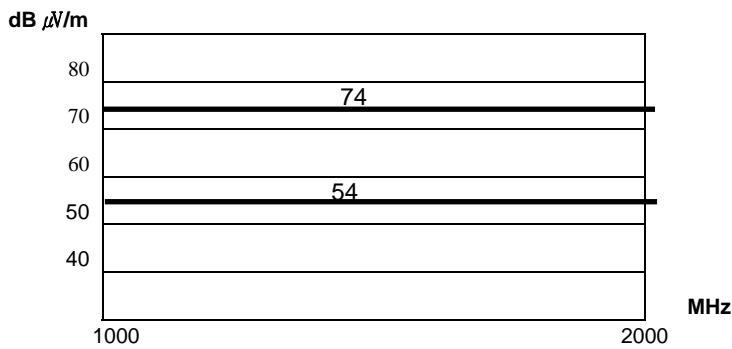


Fig. 5. Limits at 3 meters

**NOTES:**

1. All modes were measured and the worst-case emission was reported.
2. Above 1 GHz, the radiated limits are shown on Figure 5.

**NOTES:**

1. \*Pol. H=Horizontal V=Vertical
2. \*\*AF+CL+Amp. = Antenna Factor + Cable Loss + Amplifier.
3. The limit for Class B device is on the FCC Part section 15.109(a).
4. Above 1 GHz, peak detector function mode is used using a resolution bandwidth of 1 MHz and a video bandwidth of 1 MHz, average detector function mode is used using a resolution bandwidth of 1 MHz and a video bandwidth of 1 MHz.  
Peak mode is used with linearly polarized horn antenna and low-loss microwave cable.



Tested by : Hyunoh Noh



## ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95 %

### 1. Conducted Uncertainty Calculation

Source of Uncertainty	$X_i$	Uncertainty of $X_i$		Coverage factor $k$	$u(X_i)$ (dB)	$C_i$	$C_i u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Receiver reading	$R_i$	$\pm 0.10$	normal 2	2.00	0.05	1	0.05
Attenuation AMN-Receiver	$L_c$	$\pm 0.08$	normal 2	2.00	0.04	1	0.04
AMN Voltage division factor	$L_{AMN}$	$\pm 0.09$	rectangular	$\sqrt{3}$	0.05	1	0.05
Sine wave voltage	$dV_{SW}$	$\pm 0.11$	rectangular	$\sqrt{3}$	0.06	1	0.06
Pulse amplitude response	$dV_{PA}$	$\pm 0.16$	rectangular	$\sqrt{3}$	0.09	1	0.09
Pulse repetition rate response	$dV_{PR}$	$\pm 0.16$	rectangular	$\sqrt{3}$	0.09	1	0.09
Noise floor proximity	$dV_{NF}$	$\pm 0.00$			0.00	1	0.00
AMN Impedance	$dZ$	$\pm 0.60$	triangular	$\sqrt{6}$	0.24	1	0.24
Mismatch	$M$	-0.89	U-Shaped	$\sqrt{2}$	-0.62	1	-0.62
Measurement System Repeatability	$R_s$	$\pm 0.05$	normal 1	1.00	0.05	1	0.05
Remark	Receiver VRC 0.15 AMN + Cable 0.65						
Combined Standard Uncertainty	Normal			0.69			
Expanded Uncertainty U	Normal ( $k = 2$ )			$\pm 1.38$			



## 2. Radiation Uncertainty Calculation

Source of Uncertainty	$X_i$	Uncertainty of $X_i$		Coverage factor $k$	$u(X_i)$ (dB)	$C_i$	$C_i u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Receiver reading	$RI$	$\pm 0.10$	normal 2	2.00	0.05	1	0.05
Sine wave voltage	$dV_{sw}$	$\pm 0.17$	normal 2	2.00	0.09	1	0.09
Pulse amplitude response	$dV_{pa}$	$\pm 0.92$	rectangular	$\sqrt{3}$	0.53	1	0.53
Pulse repetition rate response	$dV_{pr}$	$\pm 0.35$	rectangular	$\sqrt{3}$	0.20	1	0.20
Noise floor proximity	$dV_{nf}$	$\pm 0.50$	normal 2	2.00	0.25	1	0.25
Antenna Factor Calibration	$AF$	$\pm 2.00$	normal 2	2.00	1.00	1	1.00
Cable Loss	$CL$	$\pm 1.00$	normal 2	2.00	0.50	1	0.50
Antenna Directivity	$AD$	$\pm 0.00$	rectangular	$\sqrt{3}$	0.00	1	0.00
Antenna Factor Height Dependence	$AH$	$\pm 2.00$	rectangular	$\sqrt{3}$	1.15	1	1.15
Antenna Phase Centre Variation	$AP$	$\pm 0.20$	rectangular	$\sqrt{3}$	0.12	1	0.12
Antenna Factor Frequency Interpolation	$AI$	$\pm 0.25$	rectangular	$\sqrt{3}$	0.14	1	0.14
Site Imperfections	$SI$	$\pm 4.00$	triangular	$\sqrt{6}$	1.63	1	1.63
Measurement Distance Variation	$DV$	$\pm 0.60$	rectangular	$\sqrt{3}$	0.35	1	0.35
Antenna Balance	$Dbal$	$\pm 0.90$	rectangular	$\sqrt{3}$	0.52	1	0.52
Cross Polarisation	$DCross$	$\pm 0.00$	rectangular	$\sqrt{3}$	0.00	1	0.00
Mismatch	$M$	$- 0.18$	U-Shaped	$\sqrt{2}$	$- 0.13$	1	$- 0.13$
Measurement System Repeatability	$RS$	$\pm 0.26$	normal 1	1.00	0.26	1	0.26
Remark	Mismatch Receiver VRC : 1.1 Antenna + Cable VRC : 1.8						

Combined Standard Uncertainty	Normal	2.48 dB
Expanded Uncertainty U	Normal ( $k = 2$ )	$\pm 5.0$ dB

## LIST OF TEST EQUIPMENT

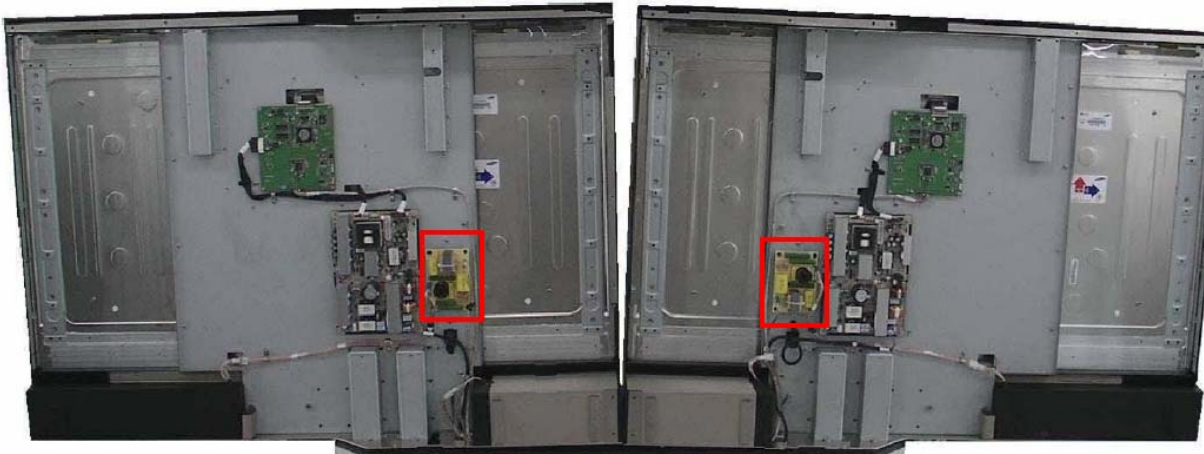
No.	Instrument	Manufacturer	Model	Serial No.	Calibration Date	Calibration Interval
1	*Test Receiver	R & S	ESU 40	100202	Apr. 04 2011	1 year
2	*EMI Test Receiver	R & S	ESCI	101041	Apr. 04 2011	1 year
3	Amplifier	HP	8447F	2805A03427	July 19 2011	1 year
4	Amplifier	Sonoma	310 N	291916	July 07 2011	1 year
5	*Signal Conditioning Unit	R & S	SCU 01	10030	Apr. 05 2011	1 year
6	*Signal Conditioning Unit	R & S	SCU 18	10065	Apr. 05 2011	1 year
7	Spectrum Analyzer	R & S	FSL3	101732	Apr. 04 2011	1 year
8	Spectrum Analyzer	R & S	FSP40	100361	Jul. 19 2011	1 year
9	*Trilog Broadband Test Antenna	SCHWARZBECK	VULB 9163	9163-454	Oct. 07 2010	2 years
10	*Doppelsteg Horn Antenna	SCHWARZBECK	HF907	100197	Mar. 22 2011	2 years
11	*TWO-LINE V-NETWORK	R & S	ENV216	101156	Apr. 04 2011	1 year
12	*Artificial Mains Network	R & S	ESH2-Z5	100273	Apr. 04 2011	1 year
13	LISN	R & S	ESH3-Z5	833874/006	Oct. 12 2011	1 year
14	LISN	R & S	ESH2-Z5	100227	Apr. 06 2011	1 year
15	*Controller	innco systems GmbH	CO2000-G	CO2000/562 /23890210/L	N/A	N/A
16	*Open Switch and Control Unit	R & S	OSP-120	100015	N/A	N/A
17	*Antenna Mast (Left)	innco systems GmbH	MA4000-EP	N/A	N/A	N/A
18	*Turn Table	innco systems GmbH	DT3000-3T	N/A	N/A	N/A
19	Open Switch And Control Unit	Rohde & Schwarz	OSP-120	100081	N/A	N/A
20	Turn Table	Innco systems GmbH	DS 1200 S	N/A	N/A	N/A
21	Antenna Mast	Rohde & Schwarz	MA 4000	N/A	N/A	N/A

\*) Test equipment used during the test

## APPENDIX D – MODIFIACATION

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*Before*



*After*



## ***APPENDIX E – BLOCK DIAGRAM***

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## ***APPENDIX F – USER’S MANUAL***

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## ***APPENDIX G – SCHEMATIC DIAGRAM***

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