

# FCC DOC TEST REPORT

Applicant	: TPV Electronics (Fujian) Co., Ltd.
Address	<ul><li>Rongqiao Economic and Technological</li><li>Development Zone, Fuqing City, Fujian Province, P.R. China</li></ul>
Equipment	: LCD Monitor
Model No.	: 315LM00026; **322****

#### I HEREBY CERTIFY THAT :

The sample was received on Mar. 10, 2017 and the testing was carried out on Mar. 14, 2017 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Kero Kuo / EMC & RF Manager

Laboratory Accreditation:



Cerpass Technology Corporation Test Laboratory





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## History of this test report

Report No.	Issue Date	Description
TEFD1702092	Mar. 15, 2017	Original



## 1. Summary of Test Procedure and Test Result

#### **1.1. Applicable Standards**

#### FCC

The measurements shown in this test report were made in accordance with the procedures given in ANSI C63.4 – 2014 and the energy emitted by this equipment was passed Part 2, Part 15, CISPR PUB. 22.

#### Canada

The measurements shown in this test report were made in accordance with the procedures given in Canada ICES-003 issue 6 section 3.a and 3.b.

The energy emitted by this equipment was passed both Radiated and Conducted Emissions Class **B** limits.

Test Item	Normative References	Test Result	Remarks
Conducted Emission			Meets Class B Limit Minimum passing margin(AVG) is -16.88 dB at 18.0100MHz
Radiated Emission	ANSI C63.4-2014, FCC Part 15 Subpart B, KDB17416 Canada ICES-003 issue 6		Meets Class B Limit Minimum passing margin(QP) is -4.52 dB at 206.54MHz



## 2. Test Configuration of Equipment under Test

## 2.1. Feature of Equipment under Test

		315LM00026; **322****		
LCD Monitor	Model No.	The "*" could be any alphanumeric character		
		including blank for marketing differentiation.		
	Brand	TPV		
Adamtar	Model No.	ADPC2090		
Adapter	INPUT	100-240V ~ 1.3A 50-60Hz		
	OUTPUT	20V / 4.5A		
Please refer to the user's manual.				



#### 2.2. Test Manner

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- b. The complete test system included PC, Keyboard, Mouse, Printer, iPod, Earphone, USB3.0 HDD and EUT for EMI test.
- c. The test modes of EMI test as follow:

AC 120V					
Test Mode	Operating Description				
1	HDMI 1: 2560 x 1440@75Hz				
2	HDMI 1: 1280 x 1024@75Hz				
3	HDMI 1: 640 x 480@60Hz				
4	HDMI 2: 2560 x 1440@75Hz				
5	HDMI 2: 1280 x 1024@75Hz				
6	HDMI 2: 640 x 480@60Hz				
7	VGA: 1920 x 1080@60Hz				
8	VGA: 1280 x 1024@75Hz				
9	VGA: 640 x 480@60Hz				
10	DP 1: 2560 x 1440@144Hz				
11	DP 1: 1280 x1024@75Hz				
12	DP 1: 640 x480@60Hz				
13	DP 2: 2560 x 1440@144Hz				
14	DP 2: 1280 x1024@75Hz				
15	DP 2: 640 x480@60Hz				
16	1080P from DVD Mode				
AC 240V	AC 240V				
Test Mode	Operating Description				
17	DP 2: 2560 x 1440@144Hz				
The "Test Mo	ode 13" generated the worst case, it was reported as the final data.				

d. An executive program, "BURNIN.EXE" under WIN 8, which generates a complete line of continuously repeating "H" pattern was used as the test software.

The program was executed as follows:

- 1. Turn on the power of all equipment.
- 2. The PC reads the test program from the hard disk drive and runs it.
- 3. The PC sends "H" messages to the EUT, and the EUT displays "H" patterns on the screen.
- 4. The PC sends "H" messages to the internal Hard Disk, and the Hard Disk reads and writes the message.
- 5. The PC sends "H" messages to the printer, then the printer prints them on the paper.
- 6. Repeat the steps from 2 to 5.
- e. An executed program. "BURNIN.EXE" was executed to play 1kHz signals.
- f. An executed program. "BURNIN.EXE" was executed to read and write data from USB3.0 HDD.
- g. The maximum operating frequency is above 108MHz, the test frequency range is from 30MHz to 18GHz.



## 2.3. Description of Test System

Device	Manufacturer	Model No.	Description
PC	DELL	XPS8700	Power Cable, Non-Shielded, 1.8m
PC	DELL	XPS8500	Power Cable, Non-Shielded, 1.8m
Keyboard	DELL	SK-8175	Data Cable, USB Shielding 1.85m
Mouse	DELL	MS111-P	Data Cable, USB Shielding 1.85m
Printer	HP	P1102w	Power Cable, Non-Shielded 1.8m Data Cable, USB Shielding 1.6m
iPod	APPLE	A1320	Data Cable, USB Shielding 1.0m
Earphone*2	INTOPIC	JAZZ-269	Data Cable, Audio Non-Shielded 1.35m
USB3.0 HDD*2	WD	WD1600BEVT/P	Data Cable, USB3.0 Shielding 1.0m

#### Use Cable:

Cable	Quantity	Description
VGA	1	Shielding, 1.8m
VGA	1	Shielding, 1.5m
DP	2	Shielding, 1.8m
DP	2	Shielding, 1.5m
HDMI	2	Shielding, 1.8m
HDMI	2	Shielding, 1.5m
USB A to B	1	Shielding, 1.0m
Mini USB (floating)	1	Shielding, 1.8m





#### 2.4. General Information of Test

	Cerpass Technology Corporation Test Laboratory				
	Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848,				
	Taiwan (R.O.C.)				
	Tel:+886-3-3226-888				
	Fax:+886-3-3226-881				
	Address: I	No.68-1, Shihbachongsi, Shihding Township,			
	New Taipe	ei City 223, Taiwan, R.O.C.			
Test Site	Tel: +886-	2-2663-8582			
	FCC	TW1079, TW1061, 390316, 228391, 641184			
	IC	4934E-1, 4934E-2			
	VCCI	T-2205 for Telecommunication Test			
		C-4663 for Conducted emission test			
		R-4399, R-4218 for Radiated emission test			
		G-812, G-813 for radiated disturbance above 1GHz			
Frequency Range	Conducted	d: from 150kHz to 30 MHz			
Investigated:	Radiation: from 30 MHz to 18,000MHz				
	The test distance of radiated emission below 1GHz from antenna to				
Test Distance :	EUT is 10 M.				
	The test distance of radiated emission above 1GHz from antenna to				
	EUT is 3 M.				

#### 2.5. Measurement Uncertainty

Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	LINE / NEUTRAL	±3.25 dB
	30 MHz ~ 1,000 MHz	Vertical / Horizontal	±3.93 dB
Radiated Emission	1,000 MHz ~ 6,000 MHz	Vertical / Horizontal	±4.01 dB
	6,000 MHz ~ 18,000 MHz	Vertical / Horizontal	±4.72 dB

The measurement uncertainty will be considered, when test result margin to the limit.

## 3. Test of Conducted Emission

#### 3.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz, according to the methods defined in ANSI C63.4-2014. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

#### **Conducted Emission Limits:**

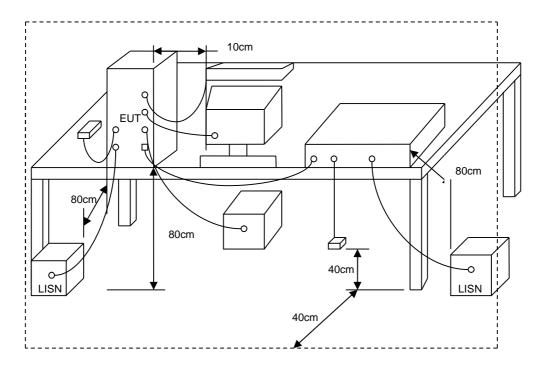
Frequency (MHz)	Quasi Peak (dB µ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 - 30.0	60	50

#### 3.2. Test Procedures

- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connecting to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



## 3.3. Typical test Setup



## 3.4. Measurement Equipment

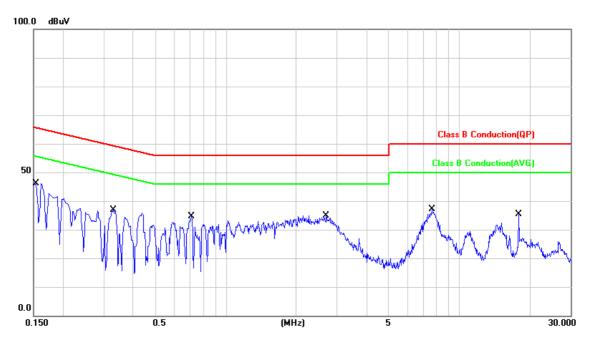
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI3	101423	2016/04/08	2017/04/07
LISN	Schwarzbeck	NSLK 8127	8127-516	2016/09/06	2017/09/05
LISN	Schwarzbeck	NSLK 8127	8127-740	2016/08/30	2017/08/29
Pulse Limiter	R&S	ESH3-Z2	101933	2016/08/29	2017/08/28
Software	Farad	Ez-EMC	ver.ct3a1	N/A	N/A





#### 3.5. Test Result and Data

Power	:	AC 120V	Pol/Phase :	LINE
Test Mode	:	Mode 13	Temperature :	20 °C
Test Date	:	Mar. 10, 2017	Humidity :	66 %
Model No.	:	315LM00026		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1539	9.98	29.16	39.14	65.78	-26.64	QP	Р
2	0.1539	9.98	11.20	21.18	55.78	-34.60	AVG	Ρ
3	0.3300	9.96	25.42	35.38	59.45	-24.07	QP	Р
4	0.3300	9.96	20.12	30.08	49.45	-19.37	AVG	Р
5	0.7140	10.00	22.21	32.21	56.00	-23.79	QP	Ρ
6	0.7140	10.00	14.94	24.94	46.00	-21.06	AVG	Ρ
7	2.7060	10.09	21.30	31.39	56.00	-24.61	QP	Ρ
8	2.7060	10.09	7.19	17.28	46.00	-28.72	AVG	Ρ
9	7.6860	10.21	21.79	32.00	60.00	-28.00	QP	Р
10	7.6860	10.21	14.09	24.30	50.00	-25.70	AVG	Ρ
11	18.0100	10.45	23.75	34.20	60.00	-25.80	QP	Ρ
12	18.0100	10.45	22.58	33.03	50.00	-16.97	AVG	Ρ

Note: Level = Reading + Factor

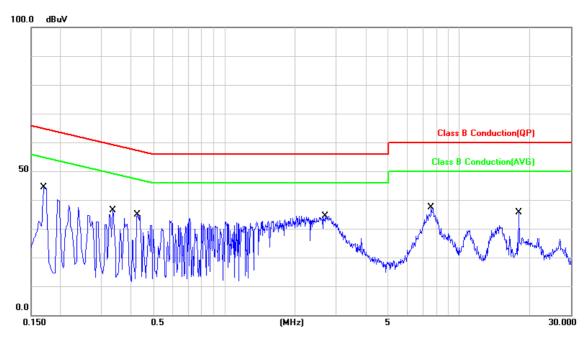
Margin = Level – Limit

Factor = (LISN, ISN, PLC or Current Probe) Factor + Cable Loss + Attenuator





Power	:	AC 120V	Pol/Phase :	NEUTRAL
Test Mode		Mode 13	Temperature :	20 °C
Test Date	:	Mar. 10, 2017	Humidity :	66 %
Model No.	:	315LM00026		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1700	9.98	27.19	37.17	64.96	-27.79	QP	Ρ
2	0.1700	9.98	10.44	20.42	54.96	-34.54	AVG	Р
3	0.3339	9.95	24.01	33.96	59.35	-25.39	QP	Ρ
4	0.3339	9.95	13.67	23.62	49.35	-25.73	AVG	Ρ
5	0.4260	9.94	23.51	33.45	57.33	-23.88	QP	Р
6	0.4260	9.94	15.24	25.18	47.33	-22.15	AVG	Р
7	2.7020	10.07	21.35	31.42	56.00	-24.58	QP	Р
8	2.7020	10.07	9.62	19.69	46.00	-26.31	AVG	Р
9	7.6300	10.25	21.51	31.76	60.00	-28.24	QP	Ρ
10	7.6300	10.25	13.37	23.62	50.00	-26.38	AVG	Р
11	18.0 <mark>1</mark> 00	10.54	23.75	34.29	60.00	-25.71	QP	Ρ
12	18.0 <mark>1</mark> 00	10.54	22.58	33.12	50.00	-16.88	AVG	Ρ

Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or Current Probe) Factor + Cable Loss + Attenuator

Test engineer:





## 3.6. Test Photographs



Front View

**Rear View** 

## 4. Test of Radiated Emission

#### 4.1. Test Limit

Radiated emissions from 30 MHz to 18,000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in ANSI C63.4-2014. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance Meters	Radiated (µ V / M)	Radiated (dB µ V/ M)
30-88	3	100	40.0
88-216	3	150	43.5
216-960	3	200	46.0
Above 960	3	500	54.0

For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the below table.

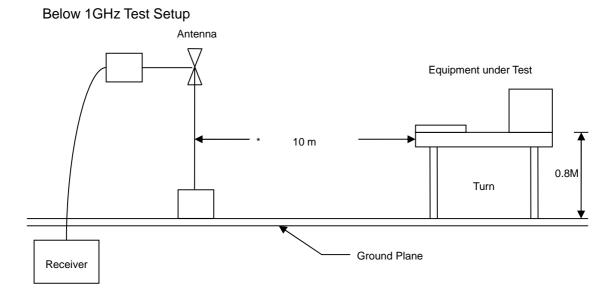
Frequency (MHz)	Distance Meters	Radiated (dB µ V/ M)
30-230	10	30
230-1000	10	37

#### 4.2. Test Procedures

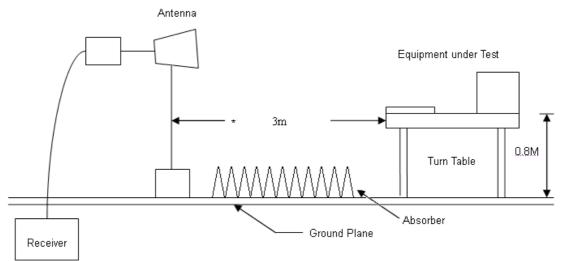
- a. The EUT was placed on a Rota table top 0.8 meter above ground.
- b. The EUT was set 3/10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 6 dB margin will be repeated one by one using the quasi-peak method and reported.



#### 4.3. Typical test Setup



Above 1GHz Test Setup





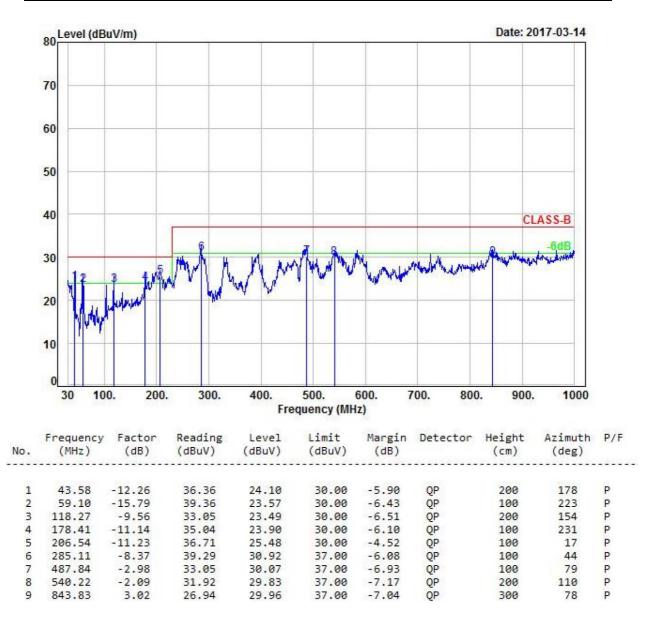
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Bilog Antenna	Sunol	JB1	A020514-1	2017/02/13	2018/02/12
Bilog Antenna	Sunol	JB1	A020514-2	2016/03/17	2017/03/16
EMI Receiver	R&S	ESCI3	101402	2017/02/13	2018/02/12
EMI Receiver	R&S	ESCI7	100963	2017/03/06	2018/03/05
Preamplifier	EM Electronics corp.	EM330	60610	2017/02/25	2018/02/24
Preamplifier	EM Electronics corp.	EM330	60611	2017/02/10	2018/02/09
Horn Antenna	EMCO	3115	31601	2016/09/05	2017/09/04
Spectrum Analyzer	R&S	FSP40	100219	2016/09/01	2017/08/31
Preamplifier	EMC INSTRUMENTS	EMC051845SE	980333	2016/09/13	2017/09/12
Software	E3	AUDIX	Version: 8.14.806b	N/A	N/A

## 4.4. Measurement Equipment



#### 4.5. Test Result and Data (30MHz ~ 1GHz)

Power	:	AC 120V	Pol/Phase :	VERTICAL
Test Mode	:	Mode 13	Temperature :	25 °C
Test Date	:	Mar. 14, 2017	Humidity :	48 %
Model No.	:	315LM00026		



Note: Level = Reading + Factor

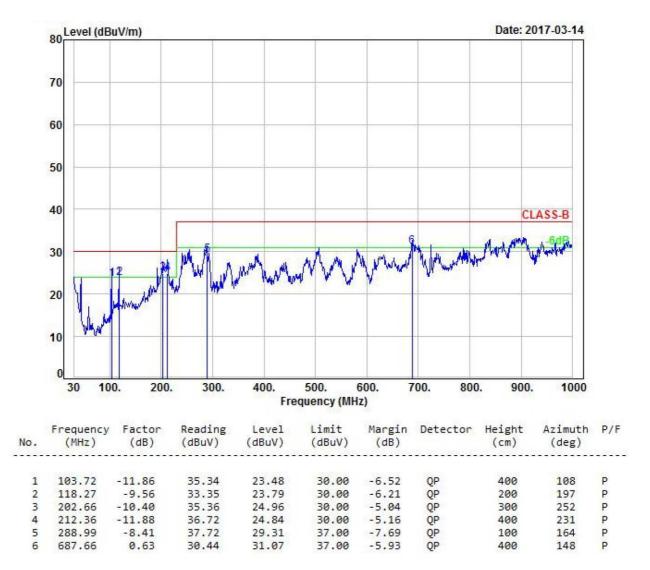
Margin = Level - Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor





Power	:	AC 120V	Pol/Phase :	HORIZONTAL
Test Mode	:	Mode 13	Temperature :	25 °C
Test Date	:	Mar. 14, 2017	Humidity :	48 %
Model No.	:	315LM00026		



Note: Level = Reading + Factor

Margin = Level - Limit

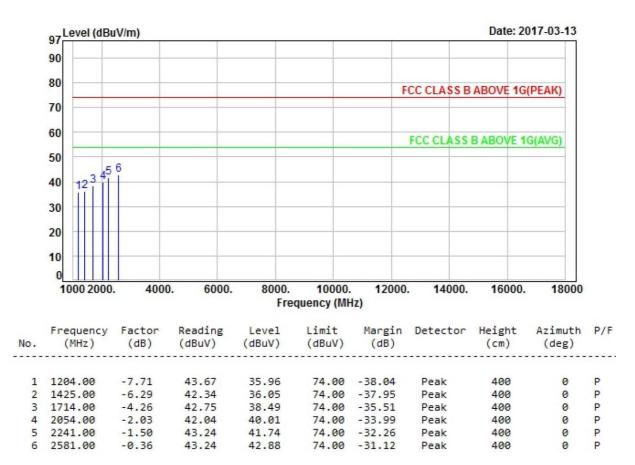
Factor = Antenna Factor + Cable Loss - Amplifier Factor

Test engineer:



#### 4.6. Test Result and Data (1GHz ~ 18GHz)

Power	:	AC 120V	Pol/Phase :	VERTICAL
Test Mode	•••	Mode 13	Temperature :	24 °C
Test Date	:	Mar. 13, 2017	Humidity :	48 %
Model No.	:	315LM00026		



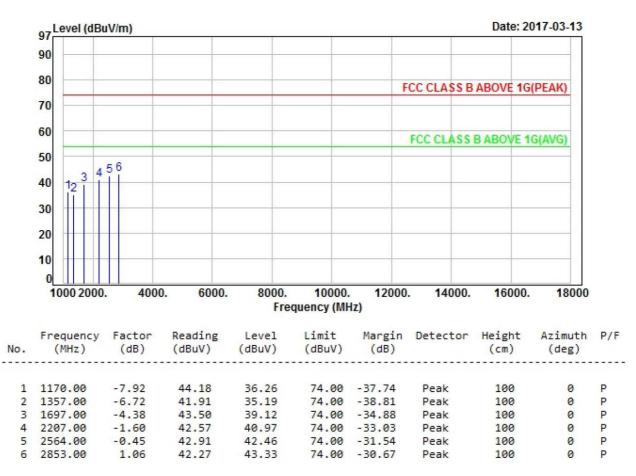
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	:	AC 120V	Pol/Phase :	HORIZONTAL
Test Mode	:	Mode 13	Temperature :	24 °C
Test Date	:	Mar. 13, 2017	Humidity :	48 %
Model No.	:	315LM00026		



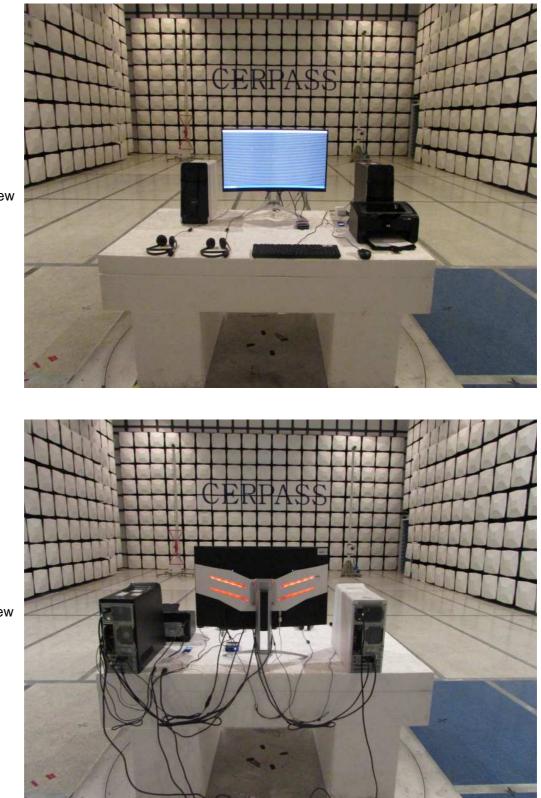
#### Note: Level = Reading + Factor

Margin = Level – Limit Factor = Antenna Factor + Cable Loss - Amplifier Factor

Wal Test engineer:



## 4.7. Test Photographs (30MHz ~ 1GHz)



Front View

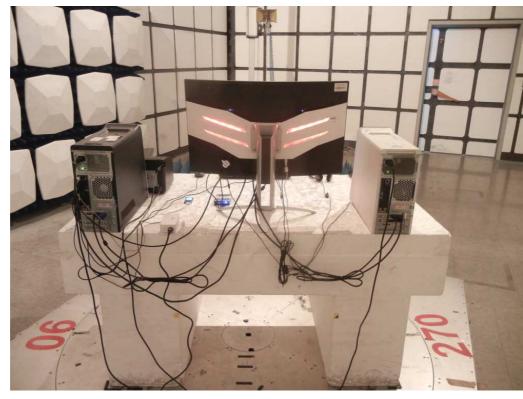
**Rear View** 



## 4.8. Test Photographs (1GHz ~ 18GHz)



Front View



Rear View



## 5. Photographs of EUT

















