VCCI TEST REPORT

According to

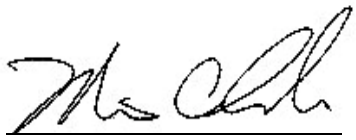
VCCI: 2014-04 Class B

Applicant	:	ASUSTEK COMPUTER INC.
Address	:	4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN
Equipment	:	Motherboard
Model No.	:	Z170-K,H170-PRO,Z170-P
Brand name	:	ASUS

I HEREBY CERTIFY THAT :

The sample was received on Jun. 08, 2015 and the testing was carried out on Jun. 16, 2015 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:



Miro Chueh
EMC/RF B.U. Manager

VCCI TEST REPORT

Issued by:

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The test record, data evaluation & Equipment. Under Test configurations represented herein are true and accurate accounts of the measurements of the samples EMC characteristics under the conditions specified in this report.

Laboratory Accreditation:

☐ Cerpass Technology Corporation Test Laboratory

NVLAP LAB Code:	**200954-0**
TAF LAB Code:	**1439**

☒ Cerpass Technology(SuZhou) Co., Ltd.

NVLAP LAB Code:	**200814-0**
CNAS LAB Code:	**L5515**

Contents

History of this test report

■ ORIGINAL.

☐ Additional attachment as following record:

Report No	Version	Date	Description
SEJV1506034	Rev 01	Jun 17,2015	Initial Issue

1. Summary of Test Procedure and Test Results

1.1. Applicable Standards

The measurements shown in this test report were made in accordance with the procedures given in **Implementation Regulation for the VOLUNTARY CONTROL of RADIO INTERFERENCE by DATA PROCESSING EQUIPMENT and ELECTRONIC OFFICE MACHINES.**

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 (Mains Ports)	VCCI-Technical Requirement （V-3/2014.04）, CISPR22：2008	PASS	Meets Class B Limit Minimum passing margin(AV) is -10.38 dB at 3.6740 MHz
Conducted Emission (Telecommunication Ports)	VCCI-Technical Requirement （V-3/2014.04）, CISPR22：2008	PASS	Meets Class B Limit Minimum passing margin(QP) is -15.62 dB at 1.3619 MHz
Radiated Emission	VCCI-Technical Requirement （V-3/2014.04）, CISPR22：2008	PASS	Meets Class B Limit Minimum passing margin(QP) is-6.54 dB at 213.3300 MHz

2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

Motherboard	Model No.:	Z170-K,H170-PRO,Z170-P
Remark	The model name Z170-P less VGA port and SATA Express than Z170-K& H170-PRO.	
Switching Power Supply	Model No.:	FSP350-60HHN(85)
	Input	AC 200V~240V~3A 50Hz
	Output:	DC(+3.3V/21A; +5V/20A; +12V1/15A; +12V2/15A; -12V/0.5A; +5Vsb/2.5A)

Key component List			
Item	Manufactory	Model	Specification
CPU	Intel	QJE9	3.40GHz
RAM	SAMSUNG	M378A5143DB0-CPB	4GB
HDD	WD	WD3200AAKX-001CA0	320GB

Model Number	Z170-K		
CPU	Intel CPU Support Type	LGA 1151	
Chipset	PCH Vendor	Intel	
	PCH Type	Z170	
Memory	Memory Type	DDR4	
	Memory size	Min: 1042MB	
		Max: 16GB	
resolutin	D-sub Max.resolutin:	1920*1200 60Hz	
	DVI Max.resolutin:	1920*1200 60Hz	
	HDMI Max.resolutin:	1920*1080 60Hz	
Network:	10M/bps,100M/bps,1000M/bps		
I/O Ports:	1	PS-2 port:	2
	2	USB1.1&2.0 port	2
	3	USB3.0 port	2
	4	DVI port	1
	5	D-sub port	1
	6	HDMI port	1
	7	RJ-45 port(10M/bps,100M/bps,1000M/bps)	1
	8	Audio port	3

Model Number	H170-PRO		
CPU	Intel CPU Support Type	LGA 1151	
Chipset	PCH Vendor	Intel	
	PCH Type	H170	
Memory	Memory Type	DDR4	
	Memory size	Min: 1042MB	
		Max: 16GB	
resolutin	D-sub Max.resolutin:	1920*1200 60Hz	
	DVI Max.resolutin:	1920*1200 60Hz	
	HDMI Max.resolutin:	1920*1080 60Hz	
Network:	10M/bps,100M/bps,1000M/bps		
I/O Ports:	1	PS-2 port:	2
	2	USB1.1&2.0 port	2
	3	USB3.0 port	2
	4	DVI port	1
	5	D-sub port	1
	6	HDMI port	1
	7	RJ-45 port(10M/bps,100M/bps,1000M/bps)	1
	8	Audio port	3

Model Number	Z170-P		
CPU	Intel CPU Support Type	LGA 1151	
Chipset	PCH Vendor	Intel	
	PCH Type	Z170	
Memory	Memory Type	DDR4	
	Memory size	Min: 1042MB	
		Max: 16GB	
resolutin	DVI Max.resolutin:	1920*1200 60Hz	
	HDMI Max.resolutin:	1920*1080 60Hz	
Network:	10M/bps,100M/bps,1000M/bps		
I/O Ports:	1	PS-2 port:	2
	2	USB1.1&2.0 port	2
	3	USB3.0 port	2
	4	DVI port	1
	5	D-sub port	0
	6	HDMI port	1
	7	RJ-45 port(10M/bps,100M/bps,1000M/bps)	1
	8	Audio port	3

2.2. Test Manner

a. During testing, the interface cables and equipment positions were varied according to VCCI-Technical Requirement.
b. The complete test system included the Notebook PC, PS/2 Keyboard, PS/2 Mouse, LCD Monitor, iPod, HDD, Earphone and EUT for EMI test.
c. During the test, setup up the EUT and all system, turn on the power of all Equipments.
d. An executive program, “BurnIn Test professional V6”, run the EMC test software “H”, “H” font size No. is 11, CPU+RAM+2D+3D 100%..
e. An executive program, “WINTHRAX.EXE” was executed to read and write data from IPOD, HDD.
f. During the disturbances at telecommunication port test, the condition of LAN utilization in excess of 10%.
g. Make the EUT at the test mode and it is normal operation, and then test.
h. The test mode as follow:

The pre-test modes:

Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1
Mode 2: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 2
Mode 3: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 3
Mode 4: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 4
Mode 5: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 5
Mode 6: Full System with VGA (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1
Mode 7: Full System with VGA (1920*1200@60Hz) and DVI (1920*1200@60Hz) for Z170-K with Status 1
Mode 8:Full System with DVI (1920*1200@60Hz) and HDMI(1920*1200@60Hz) for H170-PRO with Status 1
Mode 9: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-P with Status 1
Mode 10:Full System with DVI (1280*1024@75Hz) and HDMI(1280*1024@75Hz) for Z170-K with Status 1
Mode 11:Full System with DVI (640*480@60Hz) and HDMI (640*480@60Hz) for Z170-K with Status 1

The final test mode :

Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1

i. The maximum operating frequency is above 108MHz, the test frequency range is from 30MHz t 6GHz.

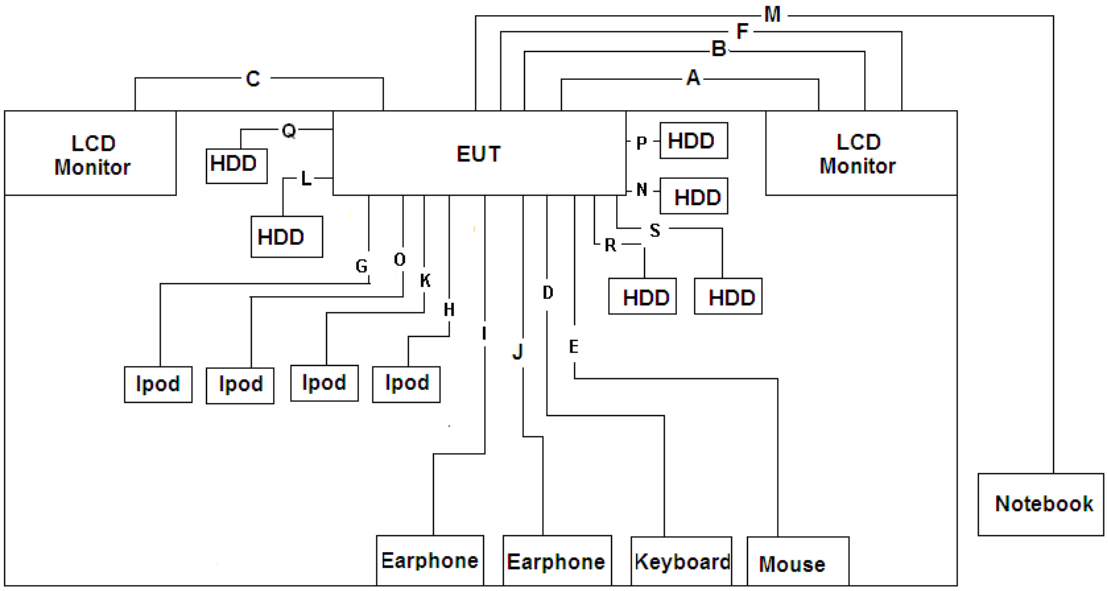
Note1:

Status1: USB 2.0 Port Ipod, USB3.0 port connect to HDD
Status1: USB 2.0 Port Connect to mouse and keyboard, USB3.0 port connect to HDD
Status1: USB 2.0 Port Connect to mouse , USB3.0 port connect to keyboard
Status1: USB 2.0 Port Connect to keyboard , USB3.0 port connect to mouse
Status1: USB 3.0 Port Connect to mouse and keyboard, USB2.0 port connect to Ipod

2.3. Description of Support Unit

No.	Device	Manufacturer	Model No.	Description
1	Notebook PC	SONY	PCG-71811P	Non-Shielded, 1.5m R33021
2	PS/2 Keyboard	DELL	SK-8115	T3A002
3	PS/2 Mouse	DELL	G0K02XYK	N/A
4	LCD Monitor	DELL	3008WFPt	Non-Shielded, 1.8m R3A002
5	LCD Monitor	Lenovo	L2364wA	Non-Shielded, 1.8m R33B65
6	iPod	APPLE	A1373	N/A
7	iPod	APPLE	A1373	N/A
8	iPod	APPLE	3409A	N/A
9	iPod	APPLE	3409A	N/A
10	HDD	WD	WDBPCK5000ABK-01	N/A
11	HDD	WD	WDBPCK5000ABK-02	N/A
12	HDD	WD	WD4711.A	N/A
13	HDD	WD	WD4711.A	N/A
14	HDD	WD	WD4711.A	N/A
15	HDD	WD	WD4711.A	N/A
16	Earphone	SALAR	V18	N/A
17	Earphone	SALAR	V18	N/A

2.4. Connection Diagram of Test System



Item	Cable	Quantity	Description
A	VGA Cable	1	Shielded, 1.8m,with two ferrites core bonded
B	DVI Cable	1	Shielded, 1.8m,with two ferrites core bonded
C	HDMI Cable	1	Non-Shielded, 1.5m
D	PS/2 Cable	1	Shielded, 1.8m,with a ferrite core bonded
E	PS/2 Cable	1	Shielded, 1.2m
F	Audio Cable	1	Shielded, 1.8m
I	Audio Cable	1	Non-Shielded, 1.8m
J	Audio Cable	1	Non-Shielded, 1.8m
K	USB Cable	1	Shielded, 1.0m
H	USB Cable	1	Shielded,1.0m
O	USB Cable	1	Shielded, 1.0m
G	USB Cable	1	Shielded,1.0m
L	USB Cable	1	Shielded,0.6m
P	USB Cable	1	Shielded,0.6m
Q	USB Cable	1	Shielded,0.6m
N	USB Cable	1	Shielded, 0.6m
S	USB Cable	1	Shielded, 0.6m
R	USB Cable	1	Shielded, 0.6m
M	LAN Cable	1	Non-Shielded, >3.0m

2.5. General Information of Test

☐	Test Site	**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: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582
	FCC	TW1079, TW1061,390316, 228391, 641184
	IC	4934B-1, 4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4463 for Conducted emission test R-3428, R-4128 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz
☒	Test Site	**Cerpass Technology (Suzhou) Co.,Ltd** Address: No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China Tel: +86-512-6917-5888 Fax: +86-512-6917-5666
	FCC	331395
	IC	7290A-1, 7290A-2
	VCCI	T-1945 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test G-227 for radiated disturbance above 1GHz
Frequency Range Investigated:		Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 6000MHz
Test Distance :		The test distance of radiated emission below 1GHz from antenna to EUT is 10 M. The test distance of radiated emission above 1GHz from antenna to EUT is 3 M.

2.6. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Test results and Measurement uncertainty without any relationship in the test report.

Measurement	Frequency	Uncertainty
Conducted emissions(LINE)	0.09MHz-30MHz	+/- 0.6888 dB
Conducted emissions(NEUTRAL)	0.09MHz-30MHz	+/- 0.7002 dB

Measurement	Polarity	Frequency	Uncertainty
Radiated emissions (below 1GHz)	H	30MHz ~ 200MHz	+/- 4.0677dB
		200MHz ~1000MHz	+/- 3.9131dB
	V	30MHz ~ 200MHz	+/- 4.0678dB
		200MHz ~1000MHz	+/- 3.9142dB
Radiated emissions (above 1GHz)	H	1000MHz ~18000MHz	+/- 3.8904 dB
		18000MHz ~40000MHz	+/-3.9356dB
	V	1000MHz ~18000MHz	+/- 3.8896dB
		18000MHz ~40000MHz	+/- 3.8766dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22: 2008, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

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 on the 100V AC power and return leads of the EUT according to the methods defined in Implementation Regulation for the Voluntary Control of Radio Interference by Data Processing Equipment and Electronic Office Machines, Section 4.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 4.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position producing maximum conducted emissions.

Table 1 Conducted Emission Limits (dBμV):

Frequency range (MHz)	Class A Equipment		Class B Equipment	
	Quasi Peak	Average	Quasi Peak	Average
0.15 to 0.50	79	66	66 to 56	56 to 46
0.50 to 5	73	60	56	46
5. to 30.	73	60	60	50
Note 1: The lower limits 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 0.5MHz.				

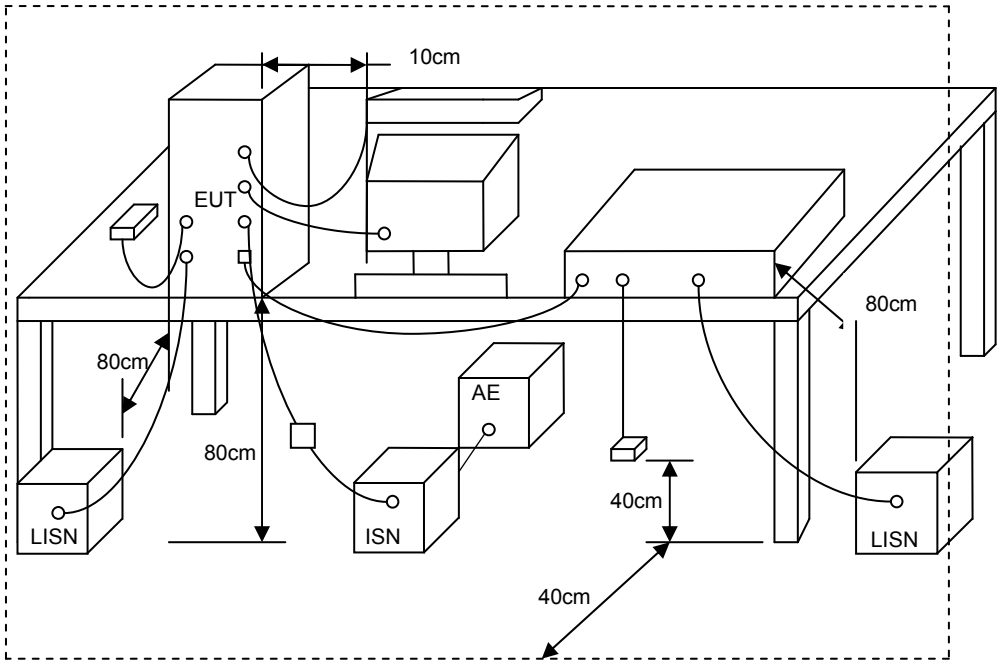
Table 2 - Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0.15 MHz to 30 MHz(dB(μV)).

Frequency range (MHz)	Class A Equipment				Class B Equipment			
	Voltage		Current		Voltage		Current	
	Quasi Peak	Avg.	Quasi Peak	Avg.	Quasi Peak	Avg.	Quasi Peak	Avg.
0.15 to 0.5	97~ 87	84~74	53~43	40~30	84~74	74~64	40~30	30~20
0.5 to 5	87	74	43	30	30	20	30	20
5 to 30	87	74	43	30	30	20	30	20
Note 1: The limits decrease linearly with the logarithm of the frequency in the range 0.15 to 0.5 MHz. Note 2 : The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150Ω to the telecommunication under test (conversion factor is 20 $\log_{10}$ 150/1 = 44dB).								

3.2. Test Procedures

a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters 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 CISPR 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



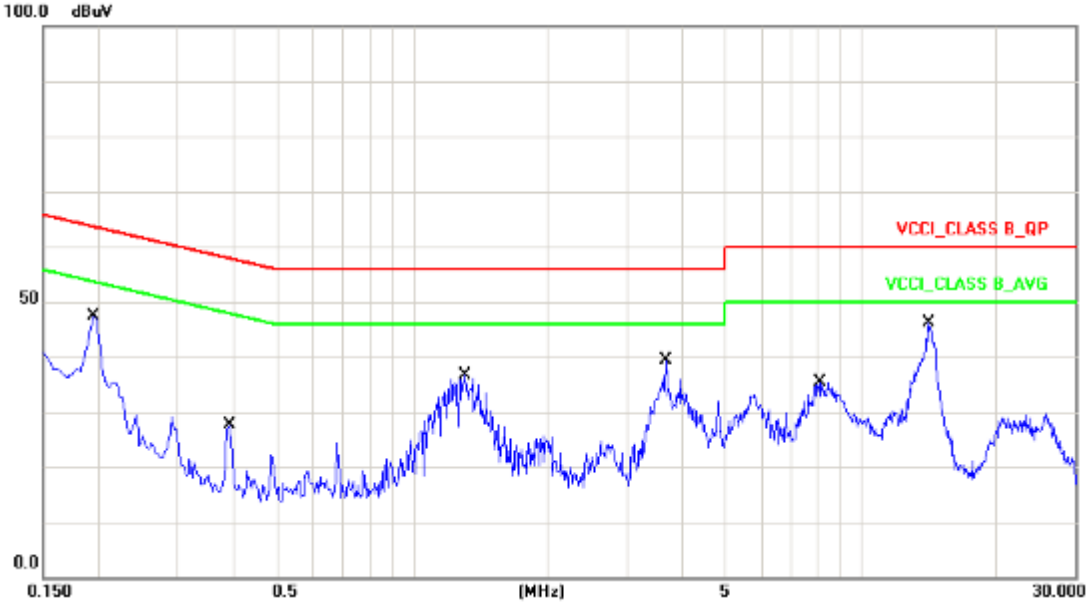
3.4. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2015.03.29	2016.03.28
AMN	R&S	ESH2-Z5	100182	2014.09.04	2015.09.03
Two-Line V-Network	R&S	ENV216	100325	/	/
ISN	FCC	FCC-TLISN-T2-02	20379	2015.03.29	2016.03.28
ISN	FCC	FCC-TLISN-T4-02	20380	2015.03.29	2016.03.28
ISN	FCC	FCC-TLISN-T8-02	20381	2015.03.29	2016.03.28
ISN	TESEQ	ISN ST08	30175	2015.03.29	2016.03.28
Current Probe	R&S	EZ-17	100303	2015.03.29	2016.03.28
Passive Voltage Probe	R&S	ESH2-Z3	100026	2015.03.29	2016.03.28
Pulse Limiter	R&S	ESH3-Z2	100529	2015.03.29	2016.03.28
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2015.04.02	2016.04.01
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A

3.5. Test Result and Data

3.5.1 Conducted Emission for Power Port Test Data

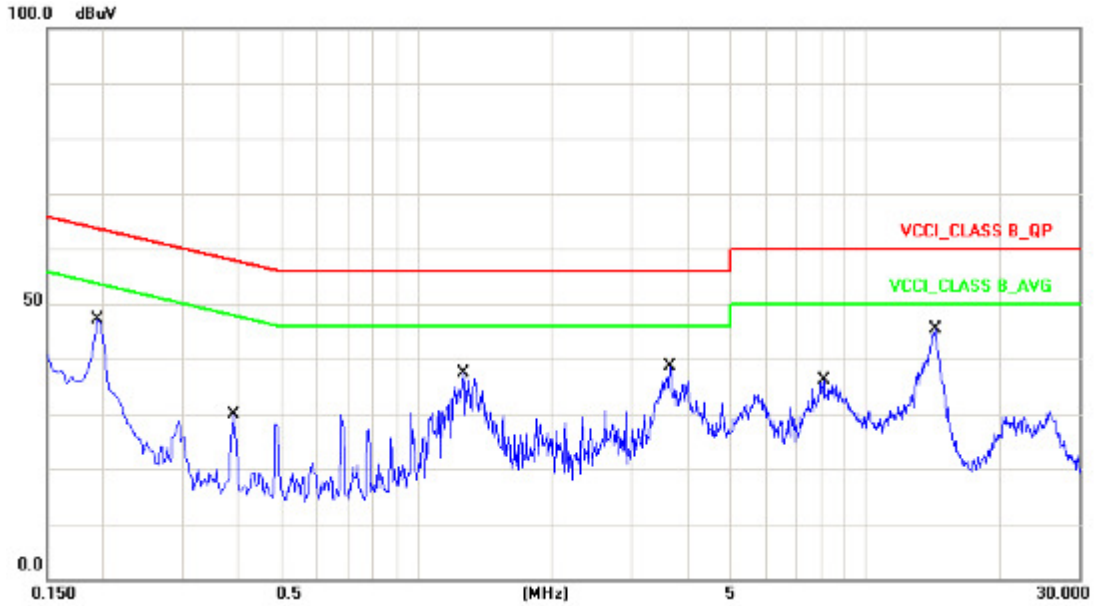
Test Mode :	Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1		
AC Power :	AC 100V/50Hz	Phase :	LINE
Temperature :	24℃	Humidity :	48%
Pressure(mbar) :	1002	Date :	2015/06/16



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1940	10.12	35.20	45.32	63.86	-18.54	QP
2	0.1940	10.12	28.37	38.49	53.86	-15.37	AVG
3	0.3899	10.15	15.72	25.87	58.06	-32.19	QP
4	0.3899	10.15	15.15	25.30	48.06	-22.76	AVG
5	1.3140	10.16	21.69	31.85	56.00	-24.15	QP
6	1.3140	10.16	7.37	17.53	46.00	-28.47	AVG
7	3.6780	10.20	26.29	36.49	56.00	-19.51	QP
8	3.6780	10.20	22.98	33.18	46.00	-12.82	AVG
9	8.0900	10.25	23.58	33.83	60.00	-26.17	QP
10	8.0900	10.25	21.39	31.64	50.00	-18.36	AVG
11	14.1380	10.48	26.84	37.32	60.00	-22.68	QP
12	14.1380	10.48	17.68	28.16	50.00	-21.84	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1		
AC Power :	AC 100V/50Hz	Phase :	NEUTRAL
Temperature :	24℃	Humidity :	48%
Pressure(mbar) :	1002	Date :	2015/06/16



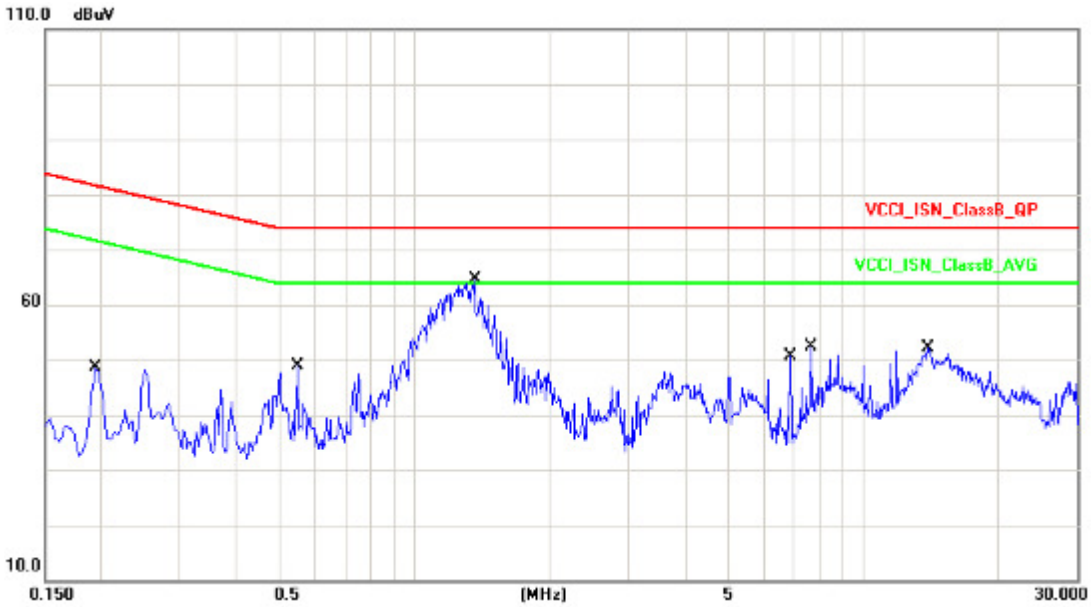
No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1940	10.13	34.88	45.01	63.86	-18.85	QP
2	0.1940	10.13	26.90	37.03	53.86	-16.83	AVG
3	0.3899	10.15	17.75	27.90	58.06	-30.16	QP
4	0.3899	10.15	17.53	27.68	48.06	-20.38	AVG
5	1.2700	10.18	20.47	30.65	56.00	-25.35	QP
6	1.2700	10.18	15.65	25.83	46.00	-20.17	AVG
7	3.6740	10.21	27.99	38.20	56.00	-17.80	QP
8	3.6740	10.21	25.41	35.62	46.00	-10.38	AVG
9	8.0900	10.26	24.16	34.42	60.00	-25.58	QP
10	8.0900	10.26	21.88	32.14	50.00	-17.86	AVG
11	14.3260	10.49	27.33	37.82	60.00	-22.18	QP
12	14.3260	10.49	17.42	27.91	50.00	-22.09	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Steven

3.5.2 Conducted Emission for Telecommunication Port Test Data

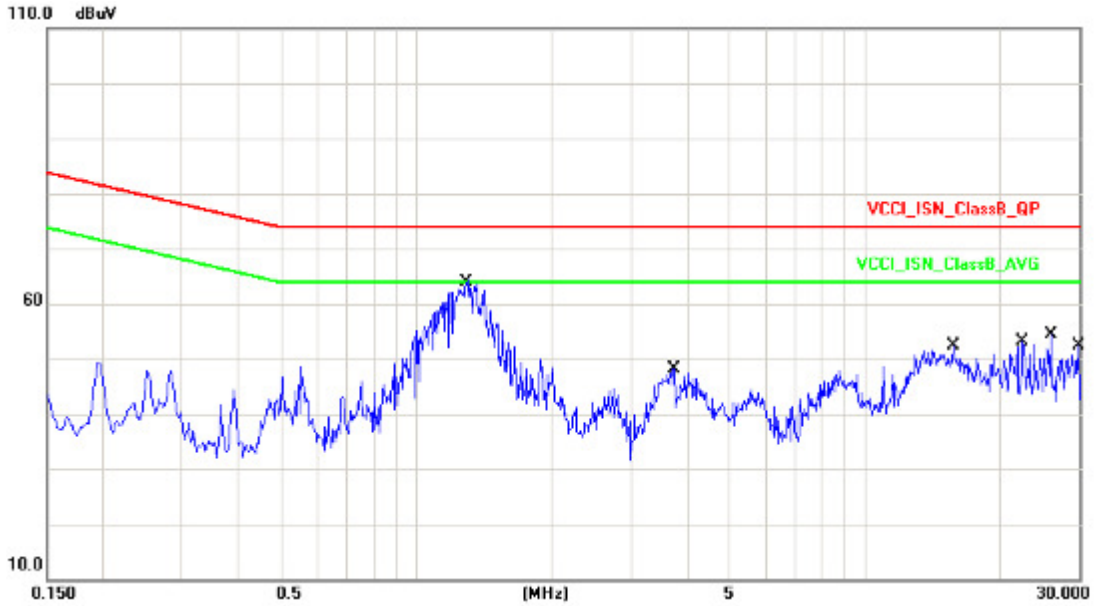
Test Mode :	Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1		
AC Power :	AC 100V/50Hz	Phase :	10M(No-Shielded)
Temperature :	24℃	Humidity :	48%
Pressure(mbar) :	1002	Date :	2015/06/16



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1940	19.61	28.06	47.67	82.74	-35.07	QP
2	0.1940	19.61	27.92	47.53	72.74	-25.21	AVG
3	0.5500	19.59	28.64	48.23	74.00	-25.77	QP
4	0.5500	19.59	18.30	37.89	64.00	-26.11	AVG
5	1.3619	19.26	39.12	58.38	74.00	-15.62	QP
6	1.3619	19.26	24.31	43.57	64.00	-20.43	AVG
7	6.9020	19.40	22.78	42.18	74.00	-31.82	QP
8	6.9020	19.40	17.88	37.28	64.00	-26.72	AVG
9	7.6620	19.44	24.72	44.16	74.00	-29.84	QP
10	7.6620	19.44	19.63	39.07	64.00	-24.93	AVG
11	13.9620	19.34	25.51	44.85	74.00	-29.15	QP
12	13.9620	19.34	18.25	37.59	64.00	-26.41	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1		
AC Power :	AC 100V/50Hz	Phase :	100M(No-Shielded)
Temperature :	24℃	Humidity :	48%
Pressure(mbar) :	1002	Date :	2015/06/16



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.2940	19.27	37.79	57.06	74.00	-16.94	QP
2	1.2940	19.27	24.76	44.03	64.00	-19.97	AVG
3	3.7420	19.48	25.95	45.43	74.00	-28.57	QP
4	3.7420	19.48	23.53	43.01	64.00	-20.99	AVG
5	15.7300	19.30	25.50	44.80	74.00	-29.20	QP
6	15.7300	19.30	18.43	37.73	64.00	-26.27	AVG
7	22.5300	19.71	27.26	46.97	74.00	-27.03	QP
8	22.5300	19.71	14.21	33.92	64.00	-30.08	AVG
9	25.9500	19.80	27.60	47.40	74.00	-26.60	QP
10	25.9500	19.80	9.61	29.41	64.00	-34.59	AVG
11	29.9820	19.73	26.72	46.45	74.00	-27.55	QP
12	29.9820	19.73	14.76	34.49	64.00	-29.51	AVG

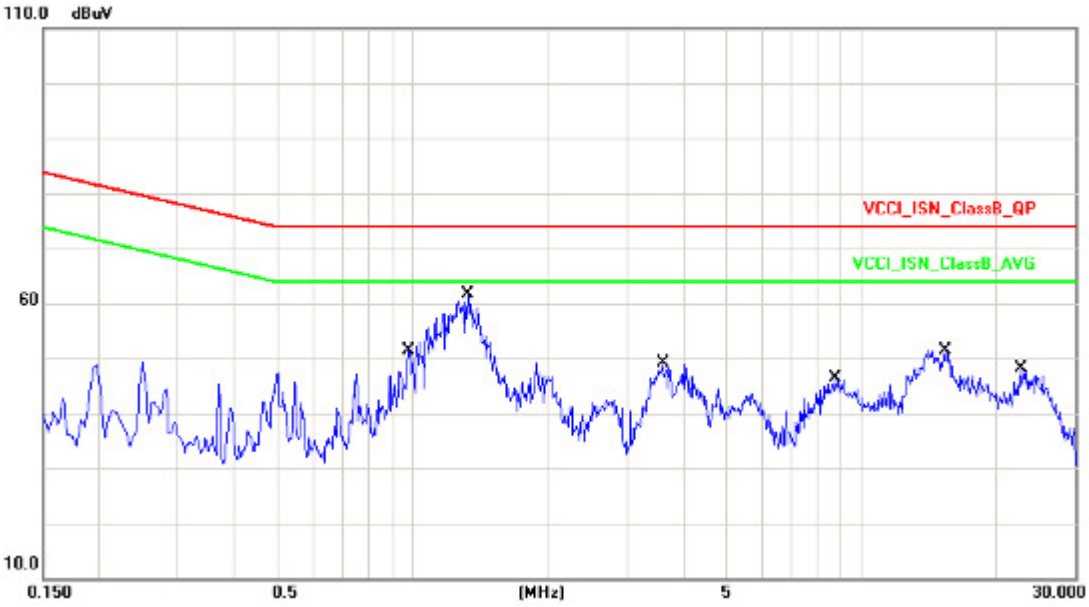
Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1		
AC Power :	AC 100V/50Hz	Phase :	1000M (No-Shielded)
Temperature :	24℃	Humidity :	48%
Pressure(mbar) :	1002	Date :	2015/06/16

No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.5500	19.59	28.25	47.84	74.00	-26.16	QP
2	0.5500	19.59	16.81	36.40	64.00	-27.60	AVG
3	1.3060	19.27	35.24	54.51	74.00	-19.49	QP
4	1.3060	19.27	23.45	42.72	64.00	-21.28	AVG
5	3.3740	19.42	35.26	54.68	74.00	-19.32	QP
6	3.3740	19.42	20.57	39.99	64.00	-24.01	AVG
7	8.6340	19.54	25.38	44.92	74.00	-29.08	QP
8	8.6340	19.54	18.67	38.21	64.00	-25.79	AVG
9	14.1300	19.32	24.78	44.10	74.00	-29.90	QP
10	14.1300	19.32	18.21	37.53	64.00	-26.47	AVG
11	22.9020	19.72	18.45	38.17	74.00	-35.83	QP
12	22.9020	19.72	13.93	33.65	64.00	-30.35	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1		
AC Power :	AC 100V/50Hz	Phase :	10M (Shielded)
Temperature :	24℃	Humidity :	48%
Pressure(mbar) :	1002	Date :	2015/06/16



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.9820	19.31	25.23	44.54	74.00	-29.46	QP
2	0.9820	19.31	14.66	33.97	64.00	-30.03	AVG
3	1.3300	19.26	36.23	55.49	74.00	-18.51	QP
4	1.3300	19.26	22.83	42.09	64.00	-21.91	AVG
5	3.6060	19.46	25.67	45.13	74.00	-28.87	QP
6	3.6060	19.46	18.65	38.11	64.00	-25.89	AVG
7	8.7700	19.55	23.34	42.89	74.00	-31.11	QP
8	8.7700	19.55	19.18	38.73	64.00	-25.27	AVG
9	15.3940	19.27	24.25	43.52	74.00	-30.48	QP
10	15.3940	19.27	17.42	36.69	64.00	-27.31	AVG
11	22.6620	19.72	23.91	43.63	74.00	-30.37	QP
12	22.6620	19.72	19.98	39.70	64.00	-24.30	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1		
AC Power :	AC 100V/50Hz	Phase :	100M(Shielded)
Temperature :	24℃	Humidity :	48%
Pressure(mbar) :	1002	Date :	2015/06/16

No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2500	19.62	27.84	47.46	81.14	-33.68	QP
2	0.2500	19.62	27.54	47.16	71.14	-23.98	AVG
3	0.4980	19.60	26.28	45.88	74.06	-28.18	QP
4	0.4980	19.60	25.59	45.19	64.06	-18.87	AVG
5	0.7500	19.51	25.84	45.35	74.00	-28.65	QP
6	0.7500	19.51	25.16	44.67	64.00	-19.33	AVG
7	1.3460	19.26	38.26	57.52	74.00	-16.48	QP
8	1.3460	19.26	25.09	44.35	64.00	-19.65	AVG
9	3.6060	19.46	25.47	44.93	74.00	-29.07	QP
10	3.6060	19.46	18.06	37.52	64.00	-26.48	AVG
11	13.9820	19.34	24.12	43.46	74.00	-30.54	QP
12	13.9820	19.34	15.00	34.34	64.00	-29.66	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1		
AC Power :	AC 100V/50Hz	Phase :	1000M(Shielded)
Temperature :	24℃	Humidity :	48%
Pressure(mbar) :	1002	Date :	2015/06/16

No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.5500	19.59	26.66	46.25	74.00	-27.75	QP
2	0.5500	19.59	12.82	32.41	64.00	-31.59	AVG
3	1.2820	19.27	35.13	54.40	74.00	-19.60	QP
4	1.2820	19.27	23.34	42.61	64.00	-21.39	AVG
5	3.5700	19.46	24.66	44.12	74.00	-29.88	QP
6	3.5700	19.46	15.55	35.01	64.00	-28.99	AVG
7	5.8020	19.58	17.80	37.38	74.00	-36.62	QP
8	5.8020	19.58	12.80	32.38	64.00	-31.62	AVG
9	14.5060	19.29	24.91	44.20	74.00	-29.80	QP
10	14.5060	19.29	16.05	35.34	64.00	-28.66	AVG
11	23.4740	19.75	25.16	44.91	74.00	-29.09	QP
12	23.4740	19.75	23.57	43.32	64.00	-20.68	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Steven

3.6. Test Photographs of Power Port

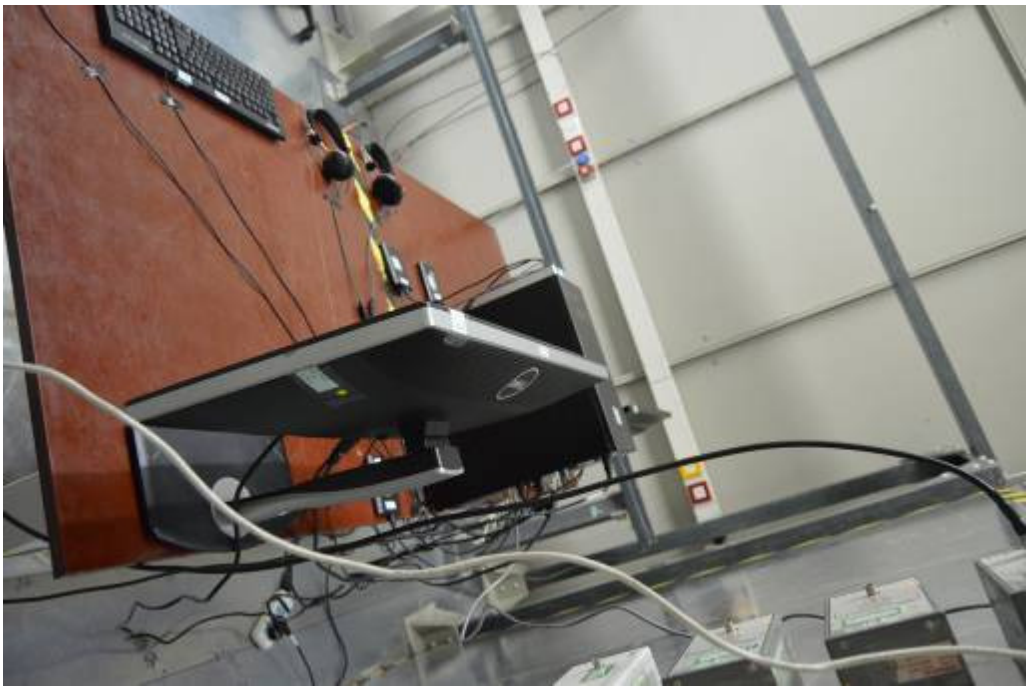
Front View

Rear View

3.7. Test Photographs of Telecommunication Port

Front View

Rear View



4. Test of Radiated Emission

4.1. Test Limit

Radiated emissions from 30 MHz to 6000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in implementation Regulation for the Voluntary Control of Radio Interference by Data Processing Equipment and Electronic Office Machines. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in section 5.2. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

Table 1 – Limits for radiated disturbance at a measuring distance of 10 m (dB(μV/m))

Frequency range(MHz)	Class A Equipment	Class B Equipment
	Quasi-peak	Quasi-peak
30 to 230	40	30
230 to 1000	47	37
NOTE 1 The lower limit shall apply at the transition frequency. NOTE 2 Additional provisions may be required for cases where interference occurs.		

The EUT shall meet the limits of below Table when measured in accordance with the method described in European Standard EN 55022 Clause 10 and the conditional testing procedure described below.

Table 2 – Limits for radiated disturbance at a measuring distance of 3 m (dB (μV/m))

Frequency range (MHz)	Class A Equipment		Class B Equipment	
	Avg.	Peak	Avg.	Peak
1 to 3	56	76	50	70
3 to 6	60	80	54	74
NOTE The lower limit applies at the transition frequency.				

- **Conditional testing procedure:**

The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes.

If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.

If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.

If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.

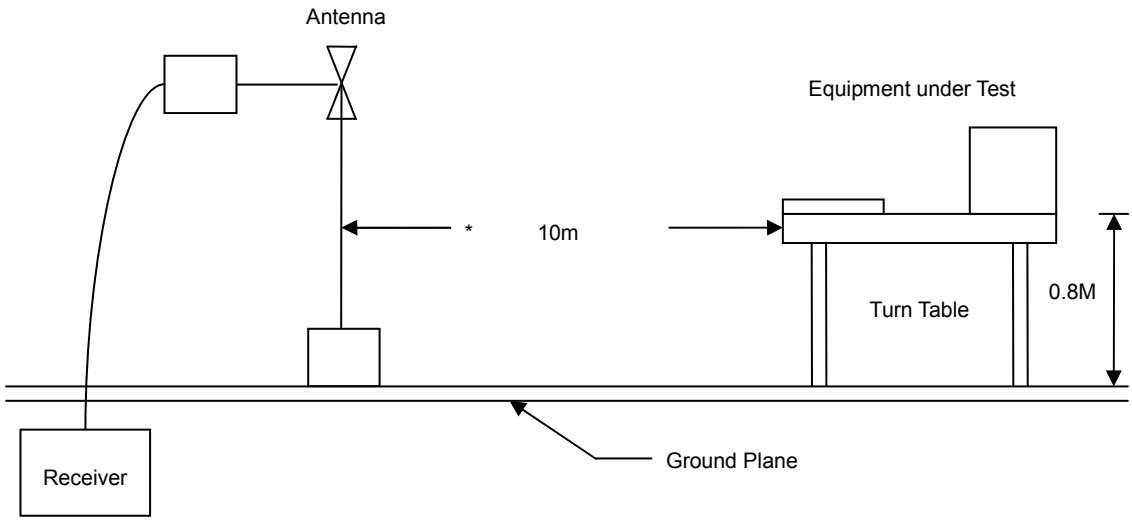
If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

4.2. Test Procedures

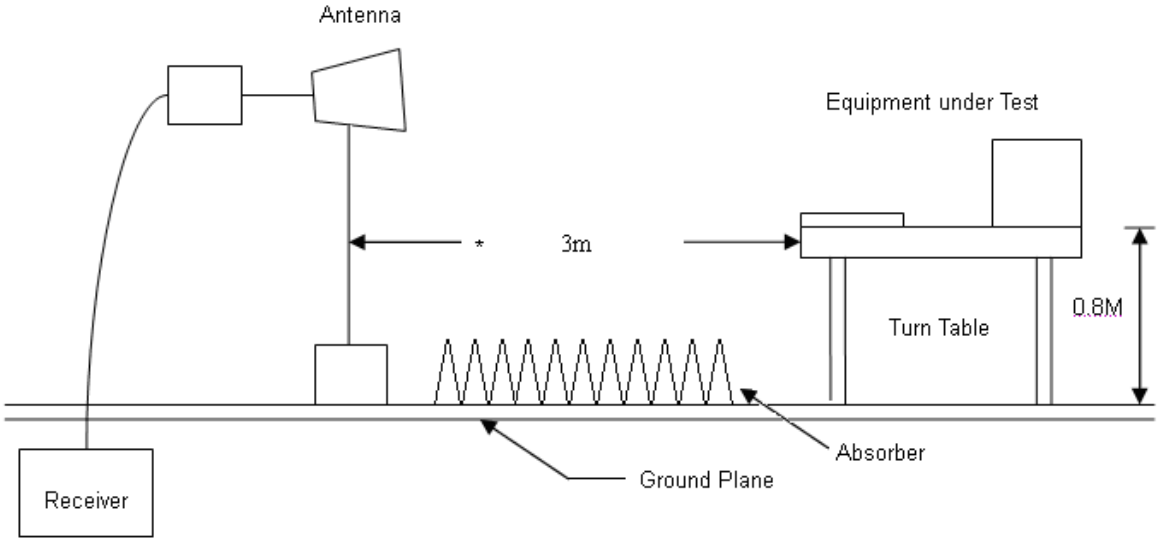
a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 3/10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The 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 3 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 3 dB margin will be repeated one by one using the quasi-peak method and reported.

4.3. Typical Test Setup

Below 1GHz Test Setup



Above 1GHz Test Setup

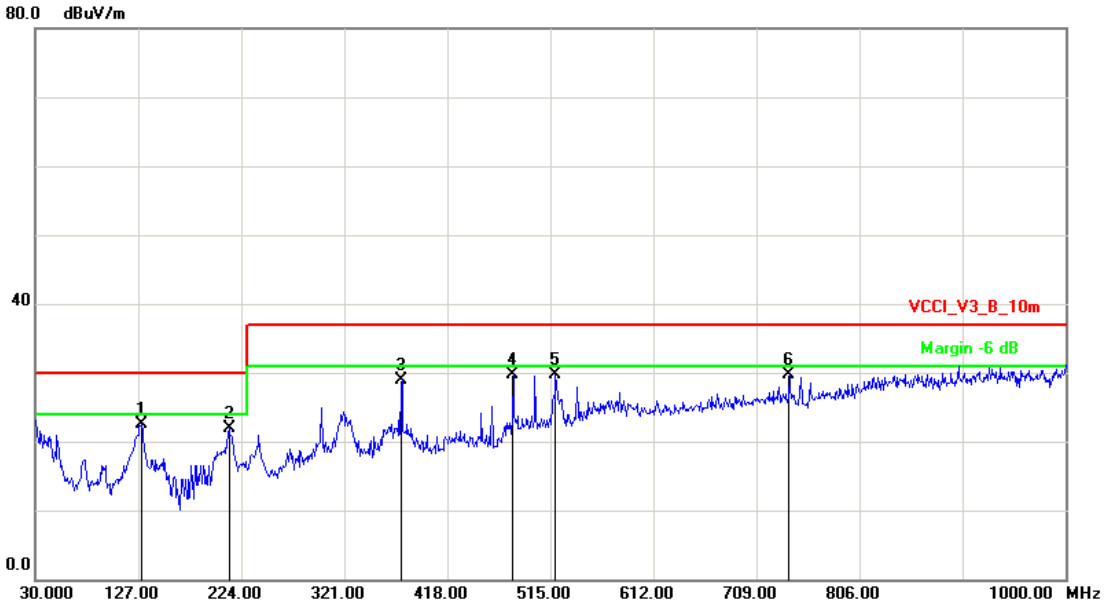


4.4. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Test Receiver	R&S	ESCI7	100968	2015.03.29	2016.03.28
Preamplifier	Agilent	87405B	My39500554	2015.03.29	2016.03.28
Preamplifier	Agilent	8449B	3008A02342	2015.03.29	2016.03.28
Bilog Antenna	Sunol Science	JB1	A072414-3	2014.08.05	2015.08.04
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-618	2015.04.20	2016.04.19
Spectrum Analyzer	R&S	FSP40	100324	2015.03.29	2016.03.28
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-001	2015.04.02	2016.04.01
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A

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

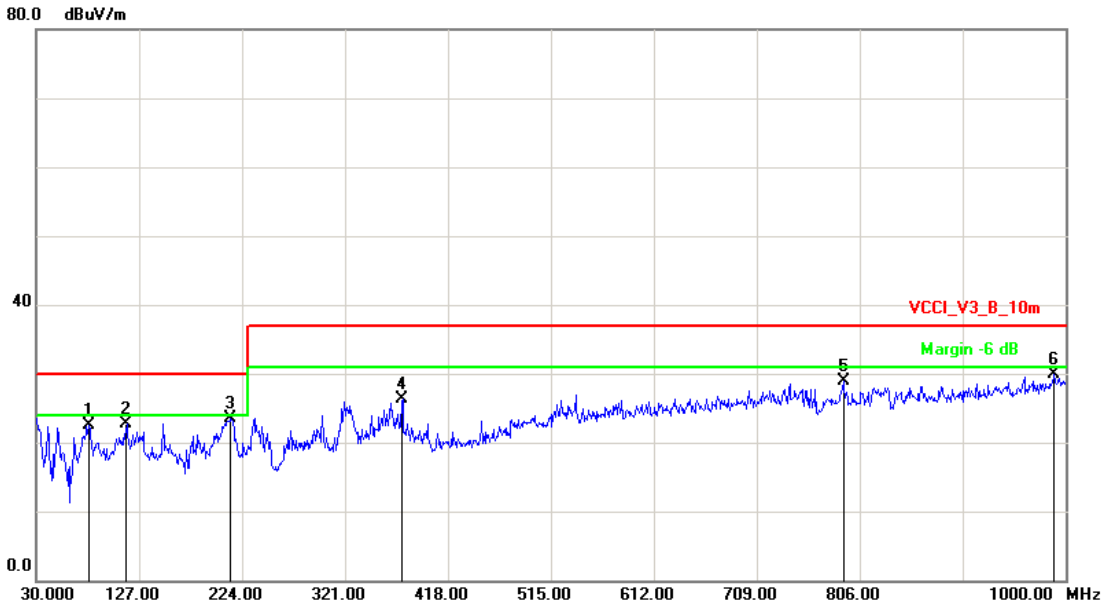
Test Mode :	Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1		
AC Power :	AC 100V/50Hz	Ant. Polarization:	Horizontal
Temp :	24℃	Humidity :	42%
Pressure(mbar) :	1002	Date :	2015.06.16



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	129.9099	-10.84	33.28	22.44	30.00	-7.56	QP	200	123
2	212.3600	-10.90	32.83	21.93	30.00	-8.07	QP	200	314
3	375.3199	-5.56	34.49	28.93	37.00	-8.07	QP	200	68
4	480.0799	-3.04	32.81	29.77	37.00	-7.23	QP	100	263
5	519.8500	-2.13	31.82	29.69	37.00	-7.31	QP	100	252
6	740.0399	2.16	27.47	29.63	37.00	-7.37	QP	200	93

Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1		
AC Power :	AC 100V/50Hz	Ant. Polarization:	Vertical
Temp :	24℃	Humidity :	42%
Pressure(mbar) :	1002	Date :	2015.06.16

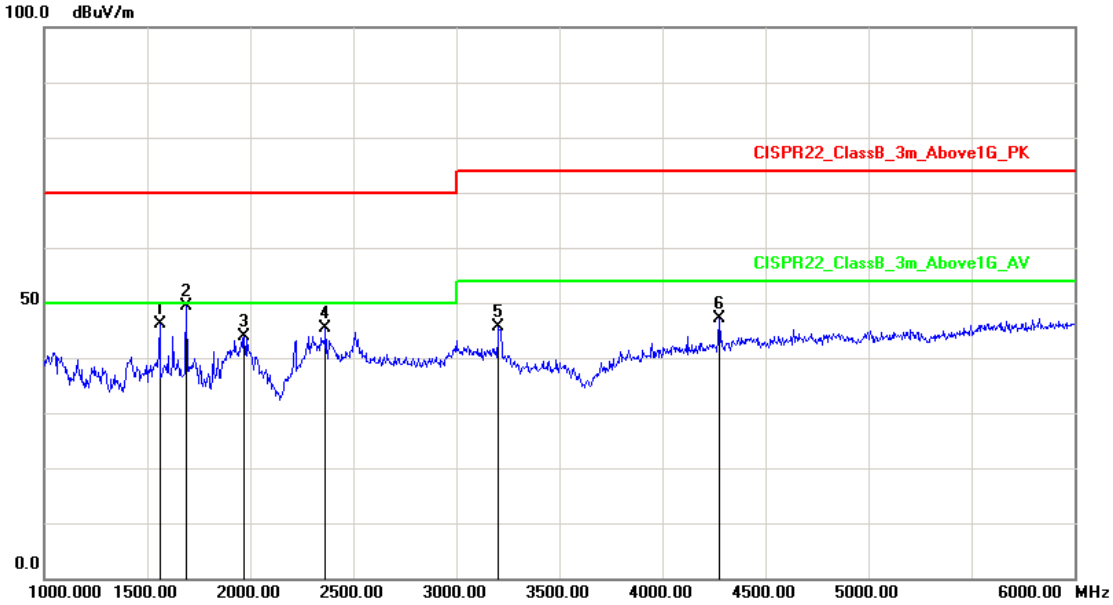


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	79.4699	-15.77	38.32	22.55	30.00	-7.45	QP	100	360
2	115.3599	-11.80	34.44	22.64	30.00	-7.36	QP	100	226
3	213.3300	-10.89	34.35	23.46	30.00	-6.54	QP	200	92
4	375.3199	-5.56	31.83	26.27	37.00	-10.73	QP	200	115
5	790.4800	3.23	25.67	28.90	37.00	-8.10	QP	100	87
6	989.3300	5.69	24.14	29.83	37.00	-7.17	QP	200	154

Note: Measurement Level = Reading Level + Correct Factor

4.6. Test Result and Data (1GHz ~ 6GHz)

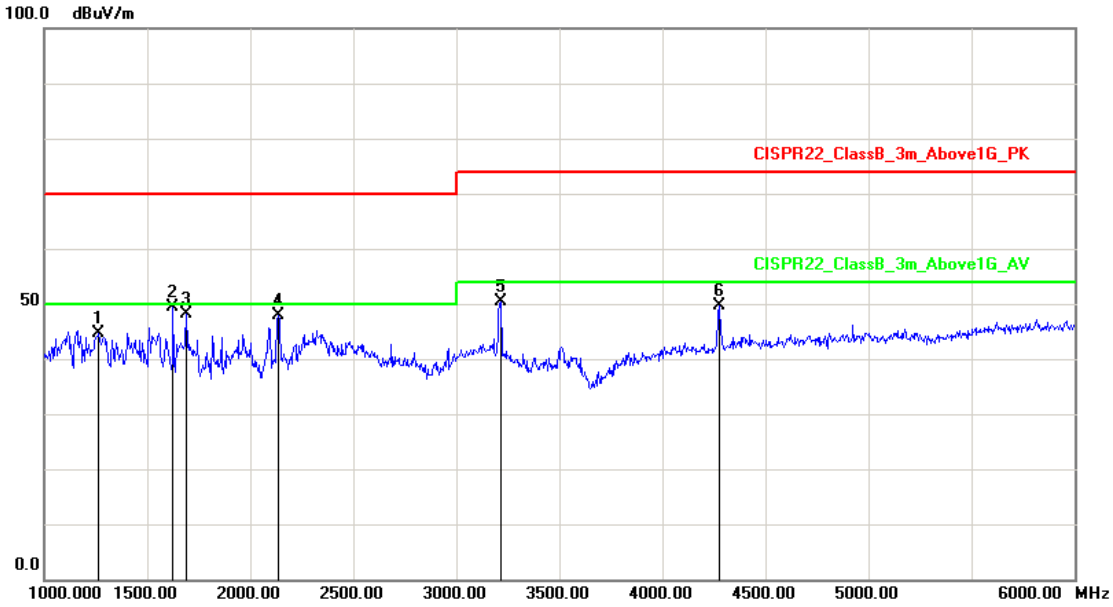
Test Mode :	Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1		
AC Power :	AC 100V/50Hz	Ant. Polarization:	Horizontal
Temp :	24℃	Humidity :	42%
Pressure(mbar) :	1002	Date :	2015.06.16



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1560.000	-12.15	58.33	46.18	70.00	-23.82	peak	100	301
2	1690.000	-11.56	60.85	49.29	70.00	-20.71	peak	100	302
3	1970.000	-9.26	53.22	43.96	70.00	-26.04	peak	100	324
4	2365.000	-3.14	48.64	45.50	70.00	-24.50	peak	100	309
5	3205.000	-2.52	48.23	45.71	74.00	-28.29	peak	100	0
6	4275.000	0.28	46.82	47.10	74.00	-26.90	peak	100	13

Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Mode 1: Full System with DVI (1920*1200@60Hz) and HDMI (1920*1200@60Hz) for Z170-K with Status 1		
AC Power :	AC 100V/50Hz	Ant. Polarization:	Vertical
Temp :	24℃	Humidity :	42%
Pressure(mbar) :	1002	Date :	2015.06.16



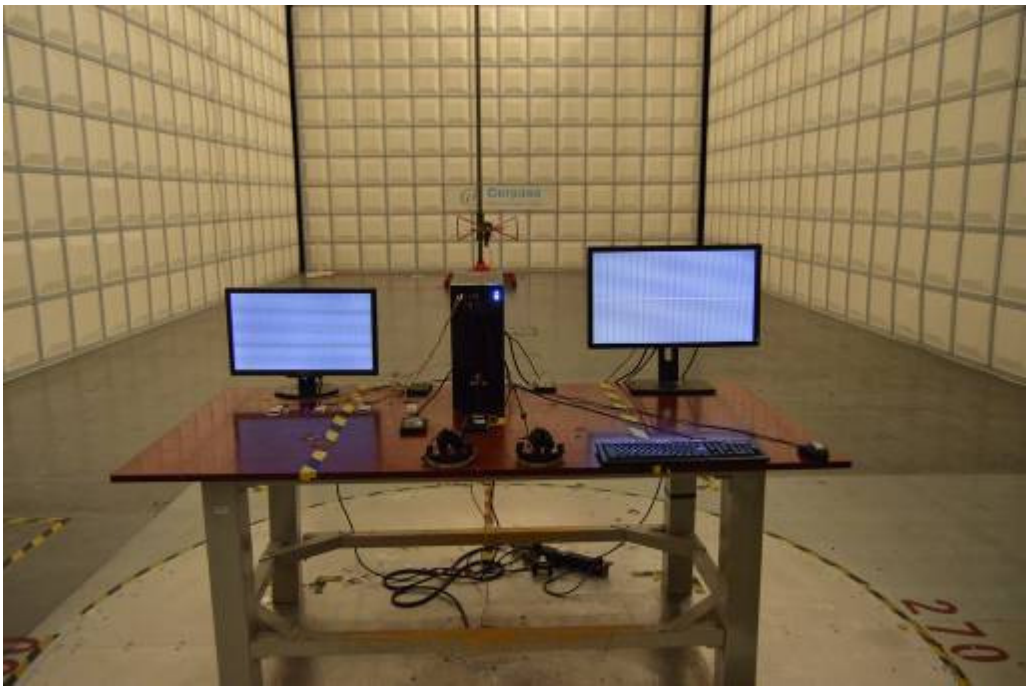
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1265.000	-13.76	58.44	44.68	70.00	-25.32	peak	100	16
2	1625.000	-11.88	61.36	49.48	70.00	-20.52	peak	100	60
3	1690.000	-11.56	59.66	48.10	70.00	-21.90	peak	100	68
4	2135.000	-6.43	54.26	47.83	70.00	-22.17	peak	100	29
5	3215.000	-2.71	52.99	50.28	74.00	-23.72	peak	100	170
6	4275.000	0.28	49.31	49.59	74.00	-24.41	peak	100	325

Note: Measurement Level = Reading Level + Correct Factor

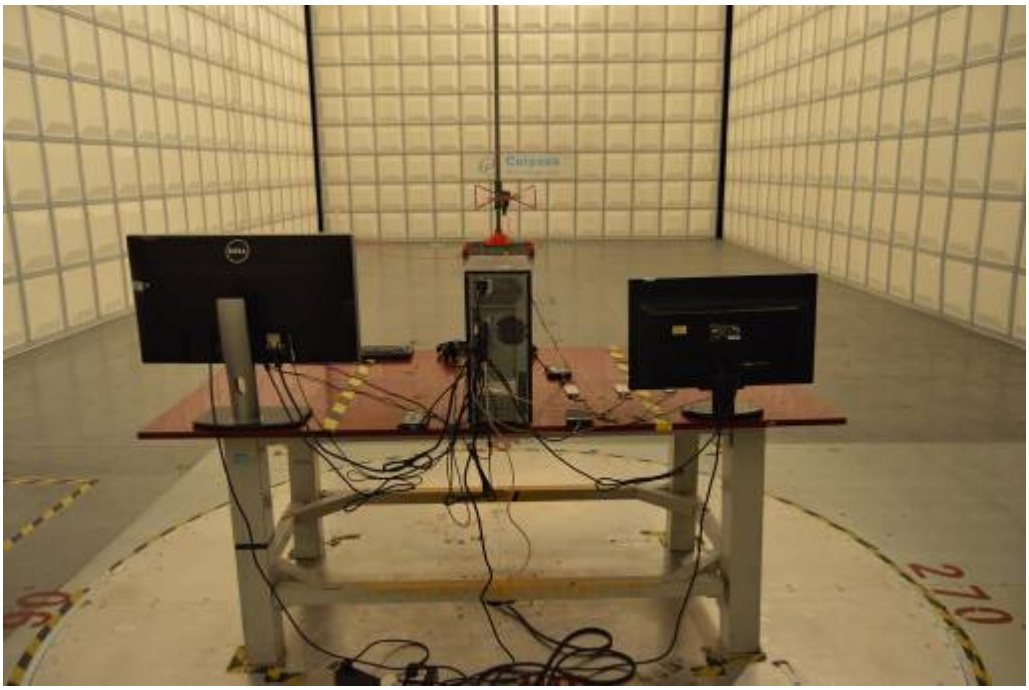
Test engineer: Steven

4.7. Test Photographs (30MHz~1GHz)

Front View

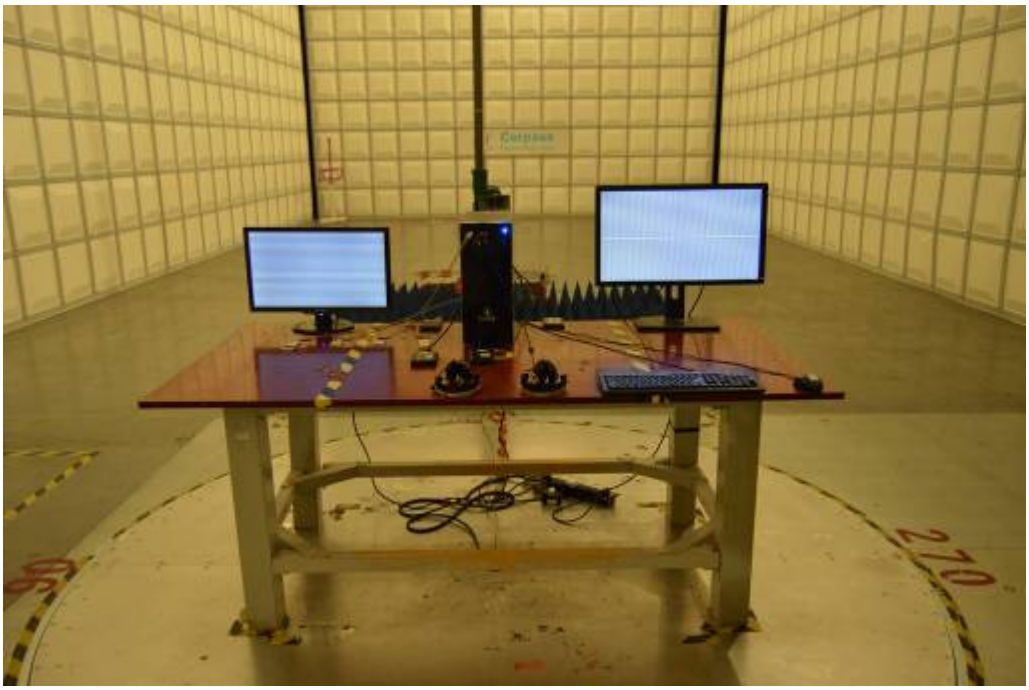


Rear View

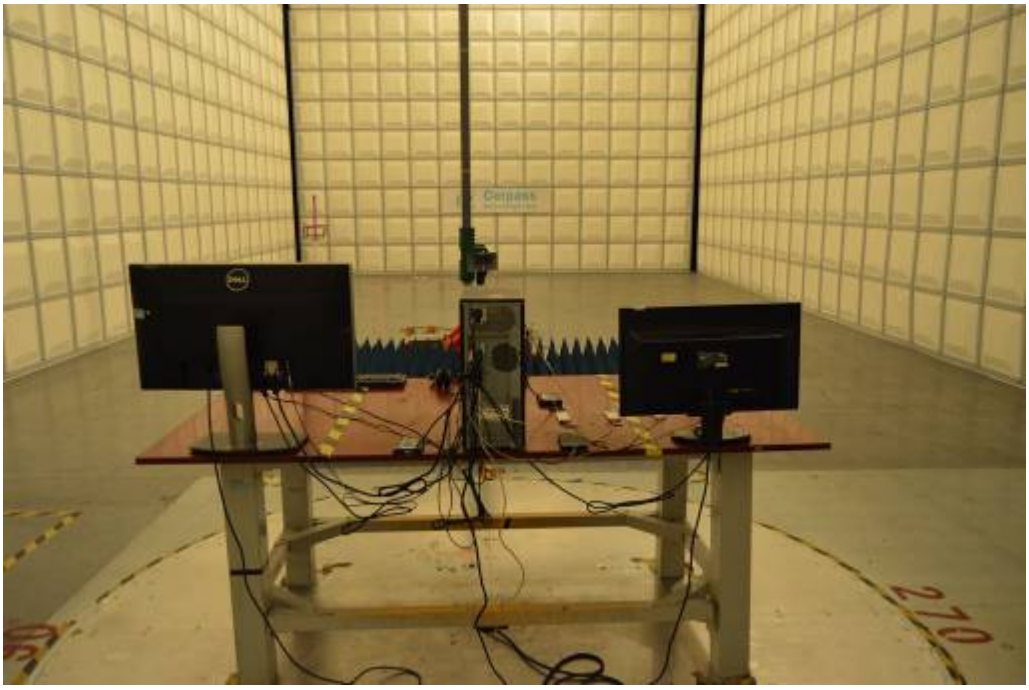


4.8. Test Photographs (1GHz~6GHz)

Front View



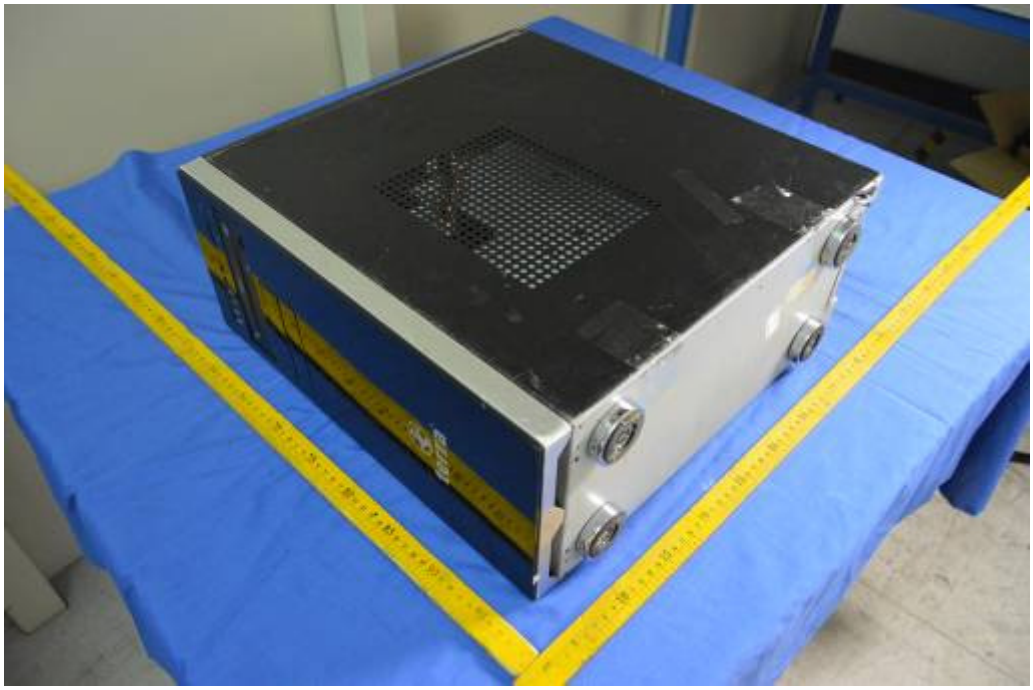
Rear View



5. Photographs of EUT

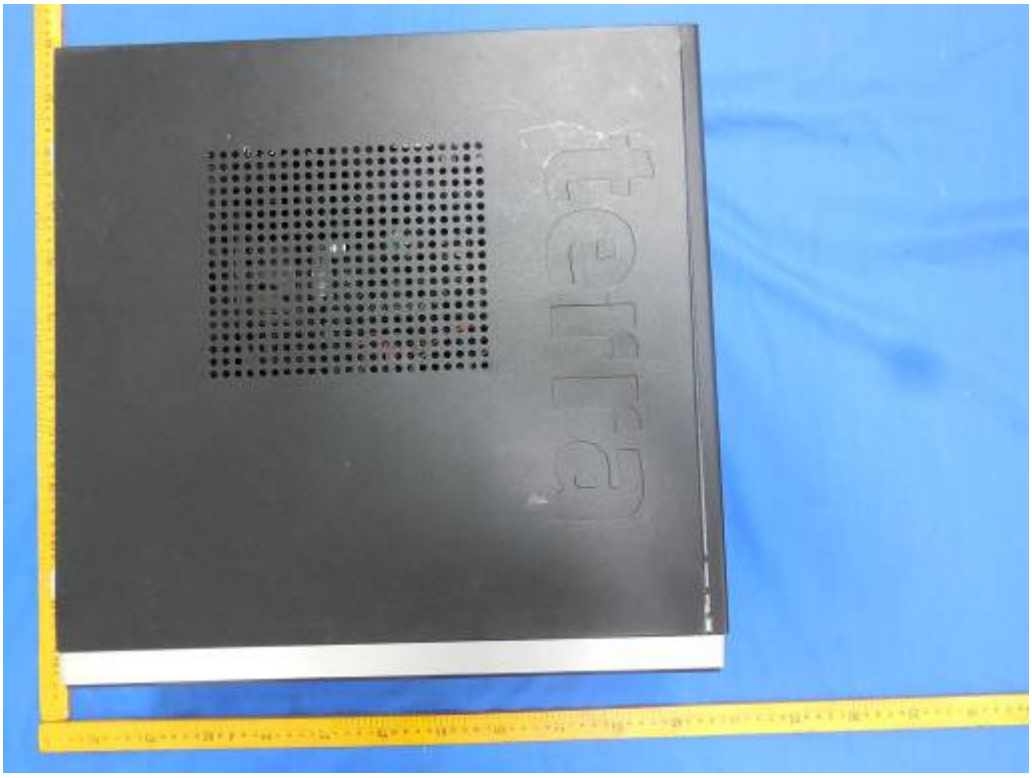
1) EUT Photo

2) EUT Photo

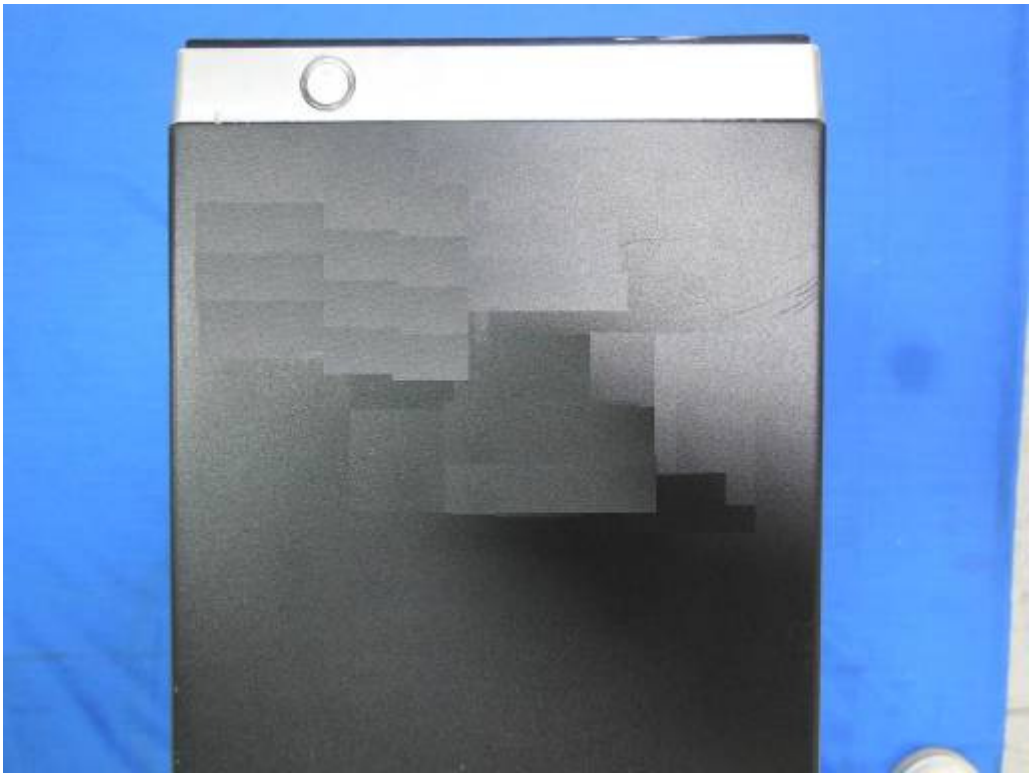


3) EUT Photo

4) EUT Photo



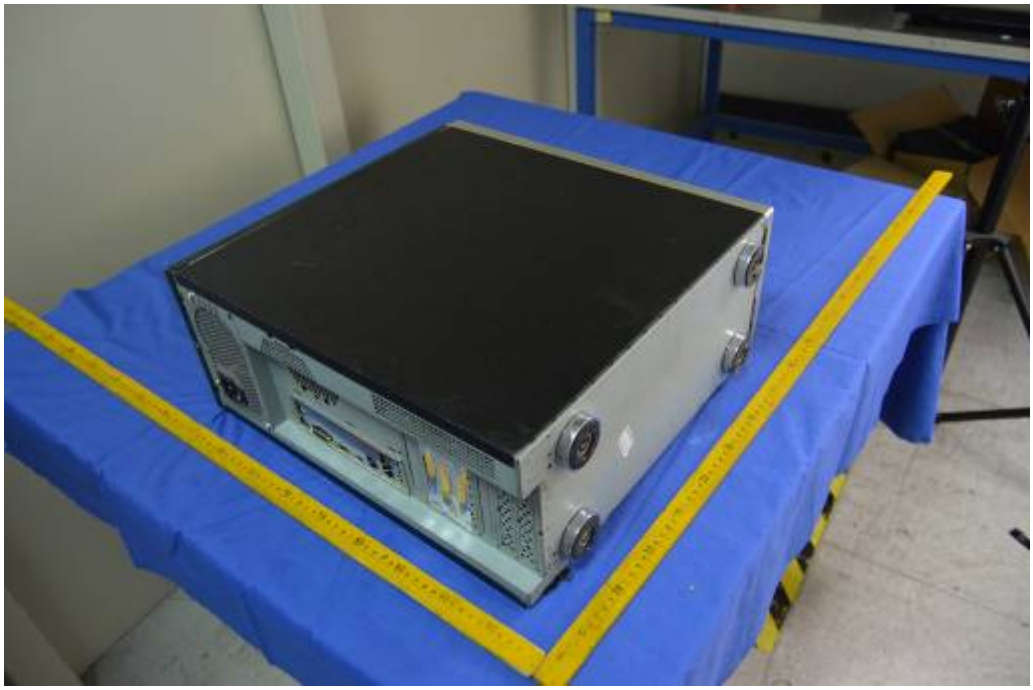
5) EUT Photo



6) EUT Photo(Z170-K,H170-PRO)

7) EUT Photo(Z170-K,H170-PRO)

8) EUT Photo(Z170-P)



9) EUT Photo(Z170-P)

10) EUT Photo(Z170-P)

11) EUT Photo

12) EUT Photo

13) EUT Photo

14) EUT Photo

15) EUT Photo

16) EUT Photo(Z170-K)

17) EUT Photo(Z170-K)

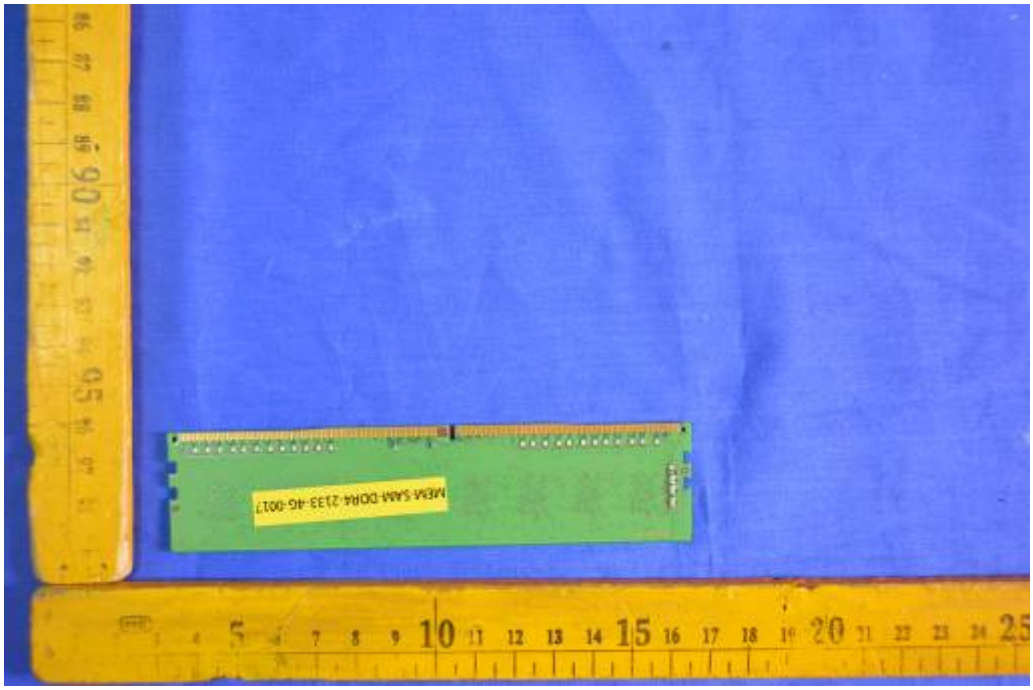
18) EUT Photo(H170-PRO)

19) EUT Photo(H170-PRO)

20) EUT Photo(Z170-P)

21) EUT Photo (Z170-P)

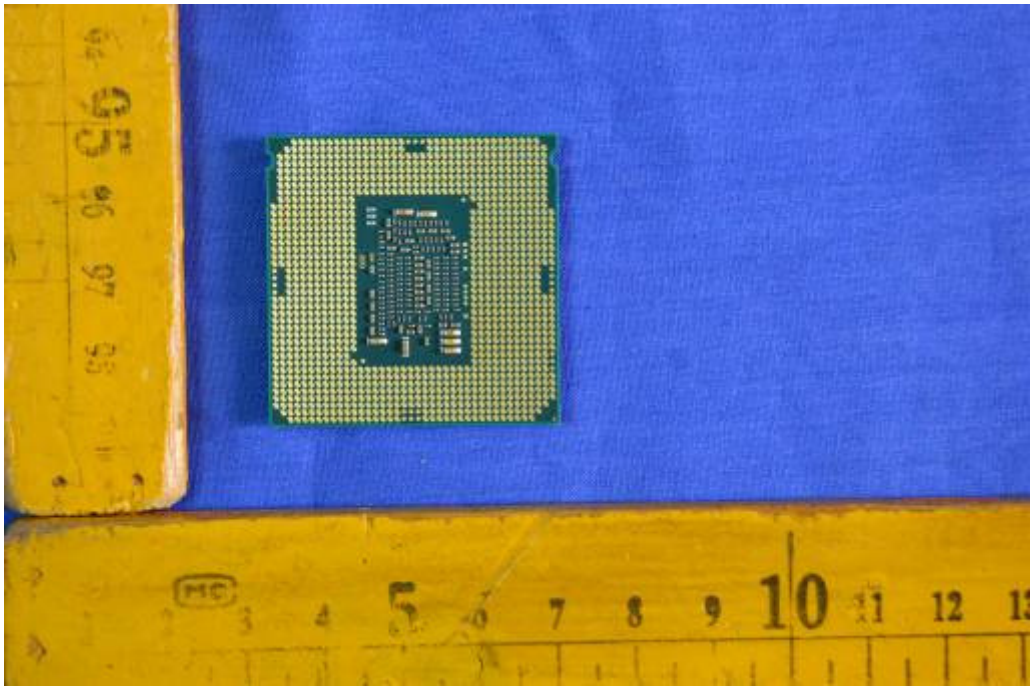
22) EUT Photo



23) EUT Photo

24) EUT Photo

25) EUT Photo



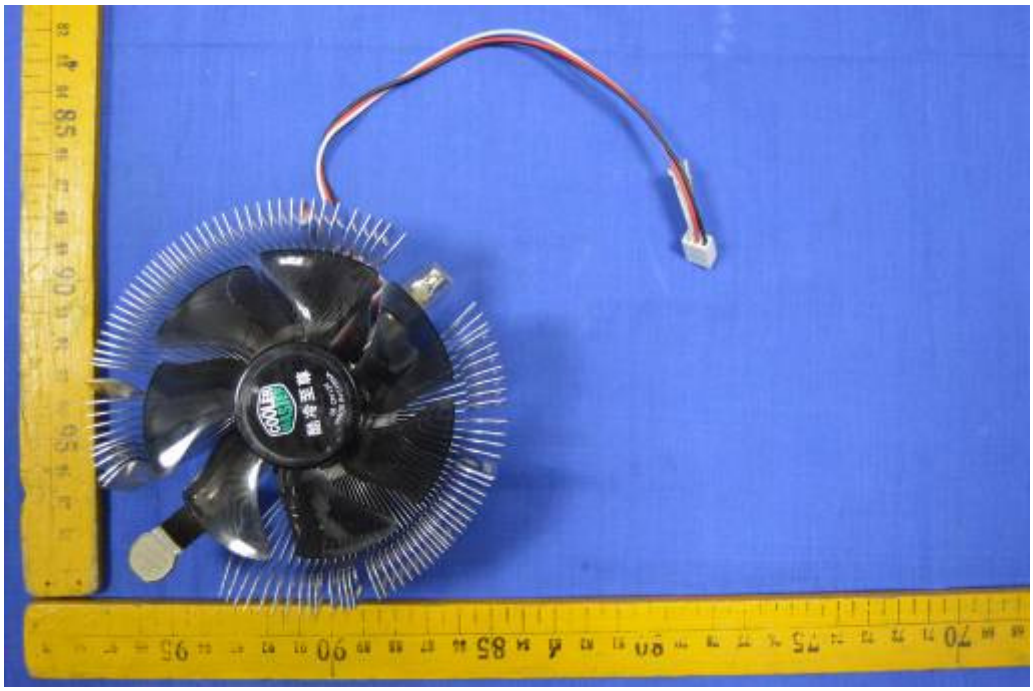
26) EUT Photo

27) EUT Photo

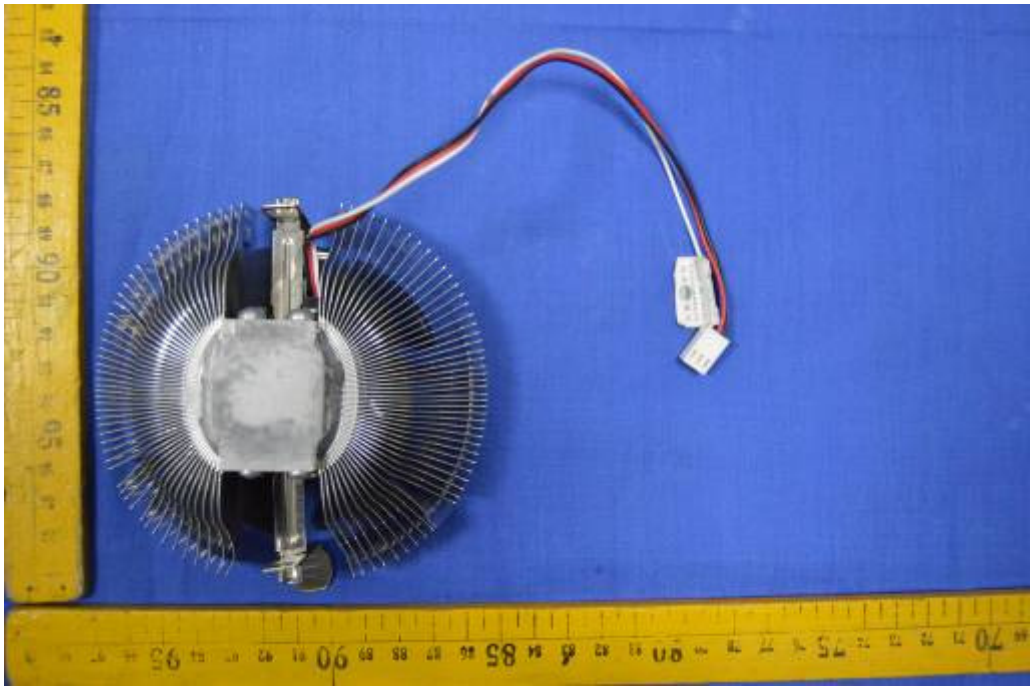
28) EUT Photo

29) EUT Photo

30) EUT Photo



31) EUT Photo



32) EUT Photo

33) EUT Photo

34) EUT Photo