

Application for FCC Certificate
On Behalf of
Philips Medical Systems North America Co.

Advanced Interface Module

Model No.: ST80i AIM

Serial No.: AWD1100021

FCC ID : PQC-ST80IAIM

Prepared For : Philips Medical Systems North America Co.
3000 Minuteman Road, Andover, Massachusetts,
United States, 01810

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Report No. : ACI-F12022
Date of Test : Jan 20 – 21, 2012
Date of Report : Feb 22, 2012

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TEST REPORT FOR FCC CERTIFICATE

Applicant : Philips Medical Systems North America Co.
 Manufacturer : Philips Medical Systems North America Co.
 EUT Description : Advanced Interface Module
 (A) Model No. : ST80i AIM
 (B) Serial No. : AWD1100021
 (C) Test Voltage : DC 5V (USB Power) for Host unit,
 DC 1.5V (AA Battery) for Patient unit

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART B CLASS B OCTOBER 2010
AND ANSI C63.4-2003*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B (Class B) limits both radiated and conducted emissions.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report shows that the EUT (M/N: ST80i AIM; S/N: AWD1100021) which was tested in 3m anechoic chamber Jan 20 – 21, 2012 is technically compliance with the FCC official limits also.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

This report contains data that are not covered by the NVLAP accreditation.


This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

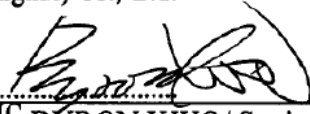
The test result for RF function of the EUT is contained in No.F12023, Certificate reports.

Date of Test : Jan 20 – 21, 2012 Date of Report : Feb 22, 2012

Producer : 
 ALAN HE / Assistant

Review : 
 SAMMY CHEN / Deputy Manager

 For and on behalf of
 Audix Technology (Shanghai) Co., Ltd.

Signatory : 
 Authorized Signature EMC BYRON KWO/ Senior Manager

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description of Test Item	Standard	Limits	Results
EMISSION			
Conducted Disturbance at the Mains Terminal	FCC RULES AND REGULATIONS PART 15 SUBPART B OCTOBER 2010 AND ANSI C63.4-2003	15.107(a) Class B	Pass
Radiated Disturbance	FCC RULES AND REGULATIONS PART 15 SUBPART B OCTOBER 2010 AND ANSI C63.4-2003	15.109(a) Class B	Pass

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description	:	Advanced Interface Module
Type of EUT	:	<input checked="" type="checkbox"/> Production <input type="checkbox"/> Pre-product <input type="checkbox"/> Pro-type
Model Number	:	ST80i AIM
Serial Number	:	AWD1100021
Note	:	The EUT contain a Host unit and a Patient unit
Applicant	:	Philips Medical Systems North America Co. 3000 Minuteman Road, Andover, Massachusetts, United States, 01810
Manufacturer	:	Philips Medical Systems North America Co. 3000 Minuteman Road, Andover, Massachusetts, United States, 01810

Remark:

The EUT is a Advanced Interface Module which input/output ports as follows:

For Host unit:

- (1) One USB Port : Connected with PC
- (2) Four Signal Ports : Connected with Signal line and Load

For Patient unit:

- (1) One Signal Port : Connected with Load

2.2 Peripherals

2.2.1 Notebook PC

Manufacturer	:	DELL
Model Number	:	PP38L
Serial Number	:	N/A
Certificate	:	CE/EMC, FCC DoC, CCC, VCCI, BSMI

2.3 Description of Test Facility

Site Description (No.3 3m Chamber)	:	Sept. 17, 1998 file on Apr 29, 2009 Renewed Federal Communications Commission FCC Engineering Laboratory 7435 Oakland Mills Road Columbia, MD 21046, USA
Name of Firm	:	Audix Technology (Shanghai) Co., Ltd.
Site Location	:	3F 34Bldg 680 Guiping Rd, Caohejing Hi-Tech Park, Shanghai 200233, China
NVLAP Lab Code	:	200371-0

2.4 Measurement Uncertainty

Conducted Emission Expanded Uncertainty:	U = 3.38dB
Radiated Emission Expanded Uncertainty (30-200MHz):	U = 4.58 dB (horizontal) U = 4.70 dB (vertical)
Radiated Emission Expanded Uncertainty (200M-1GHz):	U = 4.84 dB (horizontal) U = 4.70 dB (vertical)
Radiated Emission Expanded Uncertainty (Above 1GHz):	U= 4.60 dB (horizontal) U= 4.18 dB (vertical)

3 CONDUCTED EMISSION TEST

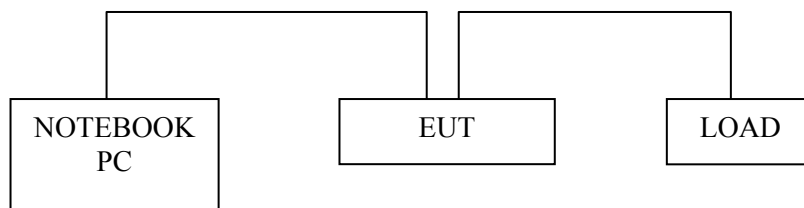
3.1 Test Equipment

The following test equipments are used during the conducted emission test in a shielded room:

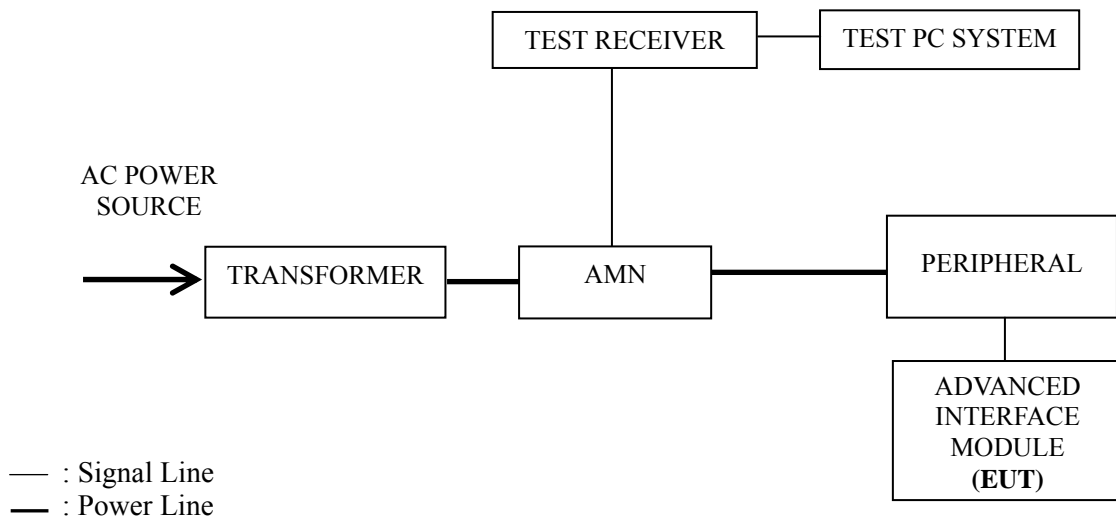
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	100841	Mar 22, 2011	Mar 22, 2012
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	Mar 22, 2011	Mar 22, 2012
3.	50Ω Coaxial Switch	Anritsu	MP59B	6200426389	Sep 18, 2011	Mar 18, 2012
4.	Software	Audix	E3	SET00200 9804M592	--	--

3.2 Block Diagram of Test Setup

3.2.1 EUT & Peripherals



3.2.2 Conducted Disturbance Test Setup



3.3 Conducted Emission Limit [FCC Part 15 Subpart B 15.107(a)]

Frequency Range (MHz)	Limits dB (μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66~56	56~46
0.5 ~ 5	56	46
5 ~ 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~0.50 MHz

3.4 Test Configuration

The EUT (listed in Sec.2.1) and the peripherals (listed in Sec 2.2) were installed as shown on Sec.3.2 to meet FCC requirement and operating in a manner that tends to maximize its emission level in a normal application.

3.5 Operating Condition of EUT

3.5.1 Setup the EUT and peripherals as shown in Sec. 3.2.

3.5.2 Turn on the power of all equipments and the EUT.

3.5.3 Connect the EUT and Notebook PC through USB cable.

3.5.4 Notebook PC controls the EUT to communicating between Host unit and Patient unit.

3.5.5 Set the EUT on the test mode (Operating), and then test.

3.6 Test Procedures

The EUT was connected to Notebook PC, and the Notebook PC was connected to the power mains through an Artificial Mains Network (AMN). This provided a 50 ohm coupling impedance for the measuring equipment.

Both sides of AC line (Line & Neutral) were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed or manipulated according to ANSI C63.4:2003 during conducted emission test.

The bandwidth of R&S Test Receiver ESCI was set at 9 kHz.

The frequency range from 150 kHz to 30 MHz was checked.

The test modes were done on conducted disturbance test and all the test results are listed in Sec. 3.7.

3.7 Test Results

< **PASS** >

The frequency and amplitude of the highest conducted emission relative to the limit is reported. All emissions not reported below are too low against the prescribed limits.

NOTE 1 – Factor = Cable Loss + AMN Factor.

NOTE 2 – Emission Level = Meter Reading + Factor.

NOTE 3 – “QP” means “Quasi-Peak” values, “AV” means “Average” values.

NOTE 4 – The worst emission is detected at 0.296 MHz (AV Value) with corrected signal level of 37.99 dB (μ V) (limit is 50.37 dB (μ V)), when the Neutral of the Notebook PC is connected to AMN.

EUT : Advanced interface Module Temperature : 25°C

Model No. : ST80i AIM Humidity : 44%RH

Serial No. : AWD1100021 Date of Test : Jan. 20, 2012

Test Mode : Operating

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.150	52.69	0.22	52.91	66.00	13.09	QP
	0.294	39.22	0.24	39.46	60.42	20.96	
	0.352	45.25	0.28	45.53	58.93	13.40	
	0.528	40.50	0.32	40.82	56.00	15.18	
	0.680	39.35	0.39	39.74	56.00	16.26	
	0.872	37.48	0.38	37.86	56.00	18.14	
	AV	0.150	35.30	0.22	35.52	56.00	20.48
		0.294	37.50	0.24	37.74	50.42	12.68
		0.352	27.50	0.28	27.78	48.93	21.15
		0.528	22.40	0.32	22.72	46.00	23.28
		0.680	25.70	0.39	26.09	46.00	19.91
		0.872	22.60	0.38	22.98	46.00	23.02
Neutral	0.151	51.62	0.18	51.80	65.96	14.16	QP
	0.296	40.50	0.19	40.69	60.37	19.68	
	0.346	43.67	0.21	43.88	59.05	15.17	
	0.516	42.31	0.24	42.55	56.00	13.45	
	0.686	41.93	0.28	42.21	56.00	13.79	
	0.822	42.46	0.34	42.80	56.00	13.20	
	AV	0.151	35.60	0.18	35.78	55.96	20.18
		0.296	37.80	0.19	37.99	50.37	12.38
		0.346	27.70	0.21	27.91	49.05	21.14
		0.516	22.80	0.24	23.04	46.00	22.96
		0.686	27.50	0.28	27.78	46.00	18.22
		0.822	23.60	0.34	23.94	46.00	22.06

TEST ENGINEER: LVY LV

4 RADIATED EMISSION TEST

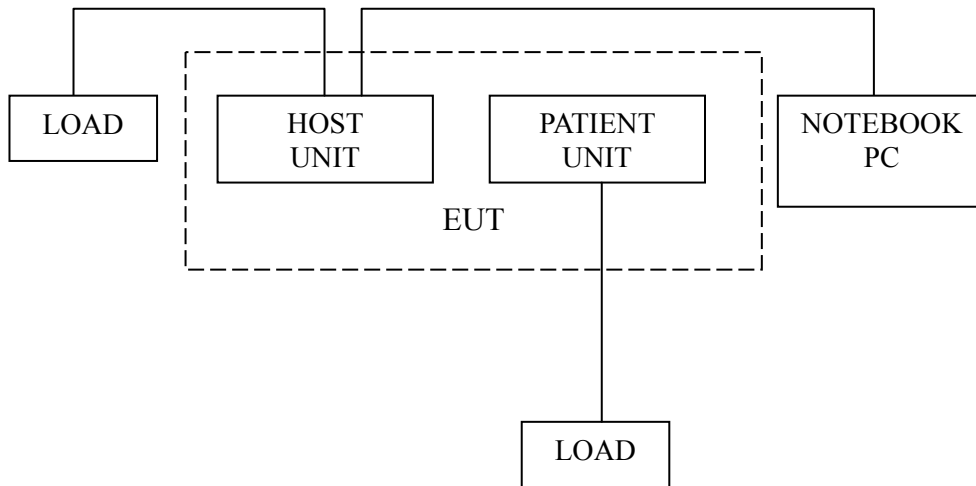
4.1 Test Equipment

The following test equipments are used during the radiated emission test in a semi-anechoic chamber:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Preamplifier	Agilent	8447D	2944A10548	Mar 22, 2011	Mar 22, 2012
2.	Preamplifier	HP	8449B	3008A00864	Mar 22, 2011	Mar 22, 2012
3.	Spectrum Analyzer	Agilent	E7405A	MY45106600	Mar 22, 2011	Mar 22, 2012
4.	Test Receiver	R&S	ESVS10	844594/001	Mar 22, 2011	Mar 22, 2012
5.	Bi-log Antenna	TESEQ	CBL6112D	23192	Dec 01, 2011	Dec 01, 2012
6.	Horn Antenna	EMCO	3115	9607-4878	May 06, 2011	May 06, 2012
7.	50Ω Coaxial Switch	Anritsu	MP59B	6200426390	Sep 18, 2011	Mar 18, 2012
8.	Software	Audix	E3	SET00200 9912M295-2	-	-

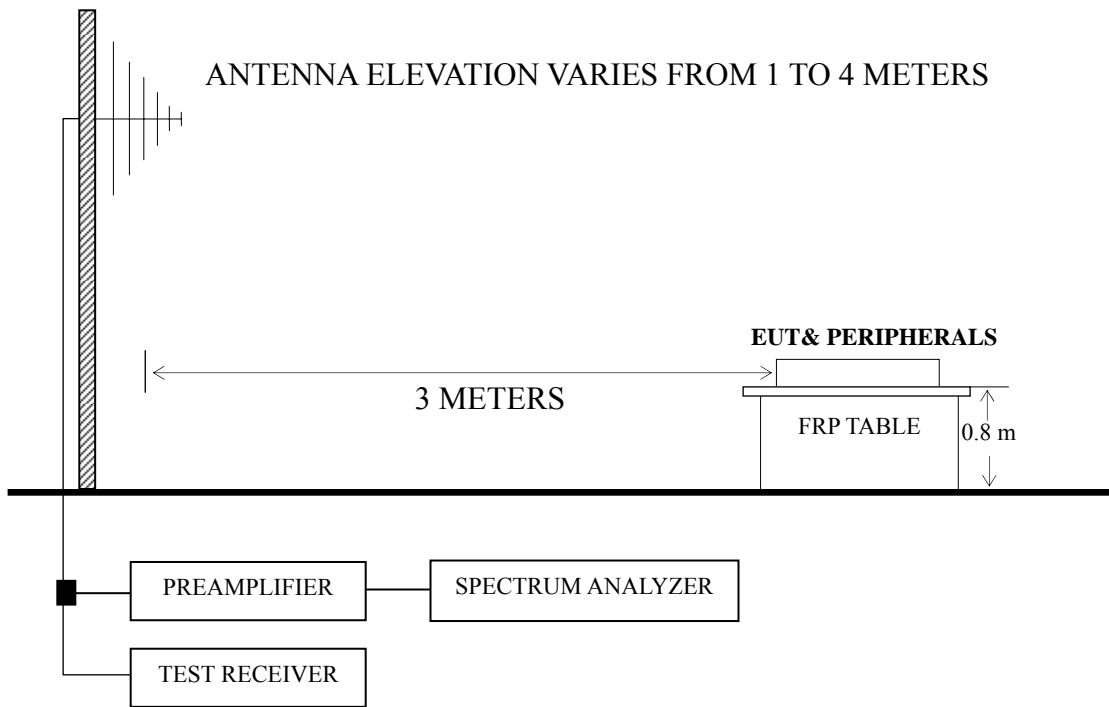
4.2 Block Diagram of Test Setup

4.2.1 EUT and Peripherals



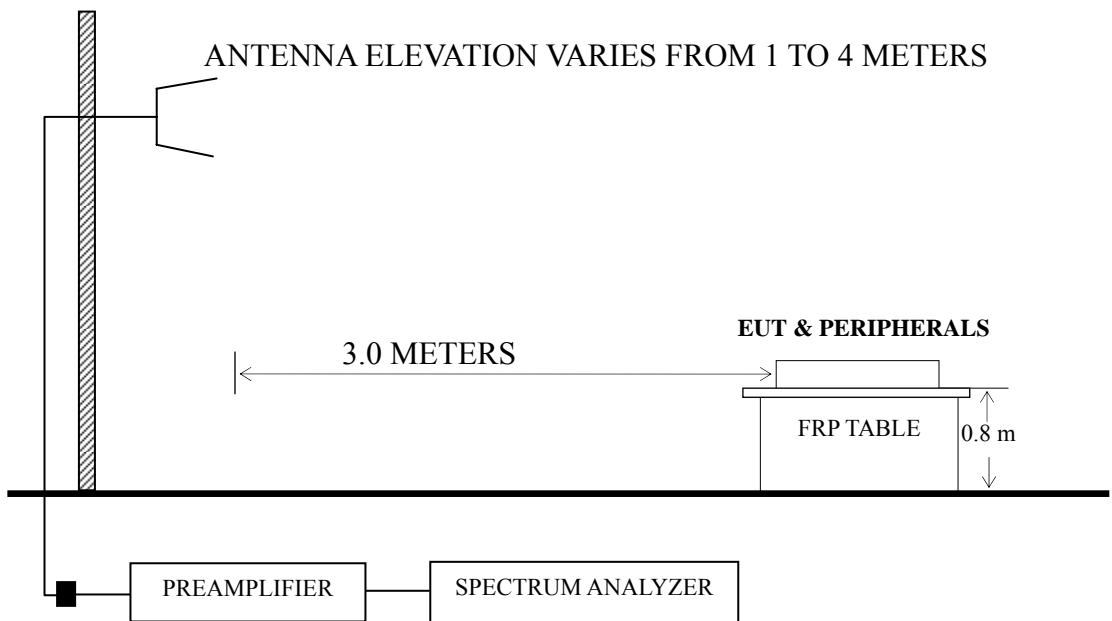
4.2.2 Radiated emission test setup

4.2.2.1 Below 1GHz



■ : 50 ohm Coaxial Switch

4.2.2.2 Above 1GHz



■ : 50 ohm Coaxial Switch

4.3 Radiated Emission Limit [FCC Part 15 Subpart B 15.109(a)]

Frequency (MHz)	Distance (m)	Field strength limits	
		($\mu\text{V/m}$)	dB ($\mu\text{V/m}$)
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0

NOTE 1 - Emission Level dB ($\mu\text{V/m}$) = 20 log Emission Level ($\mu\text{V/m}$)
 NOTE 2 - The tighter limit applies at the band edges.
 NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 NOTE 4 - The limits shown are based on Quasi-peak value detector.

4.4 Test Configuration

The configuration of the EUT and peripherals are same as those used in conducted emission test.

Please refer to Sec.3.4.

4.5 Operating Condition of EUT

Same as conducted emission test which is listed in Sec.3.5, except for the test setup replaced by Sec.4.2.

4.6 Test Procedures

The EUT and peripherals were placed on a FRP turntable that is 0.8 meter above ground. The FRP turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. Broadband antenna (Calibrated Bilog Antenna) or Horn Antenna was used as receiving antenna. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.4:2003 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESVS10 was set at 120 kHz below 1GHz and the Spectrum Agilent E7405A was set at 1MHz above 1GHz.

The frequency range from 30 MHz to 12.5 GHz (Up to 5th harmonics from fundamental frequency) was checked.

The test mode was done on radiated disturbance test and all the test results are listed in Sec.4.7.

4.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

- NOTE 1 – Emission Level = Antenna Factor + Cable Loss + Meter Reading. (< 1GHz)
- NOTE 2 – Emission Level = Antenna Factor + Cable Loss – Preamp Factor + Meter Reading. (> 1GHz)
- NOTE 3 – All reading are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.
- NOTE 4 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.
- NOTE 5 – The worst emission at horizontal polarization was detected at 443.22MHz with corrected signal level of 39.15 dB ($\mu\text{V}/\text{m}$) (limit is 46.00 dB ($\mu\text{V}/\text{m}$)), when the antenna was 1.40 m height and the turntable was at 70°. The worst emission at vertical polarization was detected at 165.80 MHz with corrected signal level of 34.24 dB ($\mu\text{V}/\text{m}$) (limit is 43.50 dB ($\mu\text{V}/\text{m}$)), when the antenna was 1.20 m height and the turntable was at 250°.

EUT : Advanced interface Module Temperature : 25°C

Model No. : ST80i AIM Humidity : 45%RH

Serial No. : AWD1100021 Date of Test : Jan 21, 2012

Test Mode : Operating

Polarization	Frequency (MHz)	Meter Reading dB (µV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (µV/m)	Limits dB (µV/m)	Margin (dB)	Remark
Horizontal	79.47	10.21	10.51	1.58	--	22.30	40.00	17.70	QP
	94.99	10.05	11.18	1.80	--	23.03	43.50	20.47	
	162.89	13.54	10.21	2.29	--	26.04	43.50	17.46	
	242.43	18.04	11.65	2.58	--	32.27	46.00	13.73	
	443.22	19.17	16.87	3.11	--	39.15	46.00	6.85	
	640.13	6.95	18.74	3.55	--	29.24	46.00	16.76	PK
	1252.00	48.51	26.10	5.42	37.64	42.39	74.00	29.27	
	1684.00	47.89	27.15	6.06	36.61	44.49	74.00	26.37	
	4960.00	51.15	36.49	9.20	35.21	61.63	74.00	20.51	
	AV	7444.00	44.87	38.56	10.02	34.72	58.73	74.00	16.29
		1252.00	32.51	26.10	5.42	37.64	26.39	54.00	24.98
		1684.00	31.81	27.15	6.06	36.61	28.41	54.00	22.20
		4960.00	37.40	36.49	9.20	35.21	47.88	54.00	16.58
Vertical	7444.00	28.91	38.56	10.02	34.72	42.77	54.00	11.80	QP
	48.43	19.01	9.02	0.90	--	28.93	40.00	11.07	
	94.99	17.71	11.18	1.80	--	30.69	43.50	12.81	
	165.80	21.77	10.17	2.30	--	34.24	43.50	9.26	
	239.52	20.00	11.51	2.57	--	34.08	46.00	11.92	
	PK	432.55	9.65	16.72	3.08	--	29.45	46.00	16.55
		640.13	9.12	18.74	3.55	--	31.41	46.00	14.59
		1336.00	53.28	26.47	5.53	37.42	47.86	74.00	26.14
		2332.00	51.20	28.97	6.82	36.11	50.88	74.00	23.12
		4960.00	53.41	36.49	9.20	35.21	63.89	74.00	10.11
		7456.00	42.95	38.56	10.02	34.72	56.81	74.00	17.19
		1336.00	35.70	26.47	5.53	37.42	30.28	54.00	23.72
		2332.00	33.43	28.97	6.82	36.11	33.11	54.00	20.89
AV	4960.00	33.77	36.49	9.20	35.21	44.25	54.00	9.75	
	7456.00	27.87	38.56	10.02	34.72	41.73	54.00	12.27	

TEST ENGINEER: RAVEN JIN

5 DEVIATION TO TEST SPECIFICATIONS

None.