

KLA-Tencor

ADDENDUM TO TEST REPORT 92849-9

Wafer Maintenance System Model: Storage Case 300

Tested To The Following Standards:

FCC Part 15 Subpart C Sections 15.209
and
RSS-210 Issue 8

Report No.: 92849-9A

Date of issue: October 17, 2013



This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.



TABLE OF CONTENTS

Administrative Information	3
Test Report Information	3
Report Authorization	3
Test Facility Information	4
Site Registration & Accreditation Information	4
Summary of Results	5
Conditions During Testing	5
Equipment Under Test	6
Peripheral Devices	6
FCC Part 15 Subpart C	7
15.31(e) Voltage Variations	7
15.209 Radiated Emissions	9
2.1046 RF Power Output	25
-20dBc Bandwidth	32
RSS-210 99% Bandwidth	34
Supplemental Information	36
Measurement Uncertainty	36
Emissions Test Details	36



ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

KLA-Tencor
SensArray Division
One Technology Drive
Milpitas, CA 95035

Representative: Jim Bella
Customer Reference Number: 20474736

DATE OF EQUIPMENT RECEIPT:**DATE(S) OF TESTING:****REPORT PREPARED BY:**

Morgan Tramontin
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 92849

September 9, 2013

May 9, 2012 – October 11, 2013

Original: Testing of the Wafer Maintenance System, Storage Case 300 to FCC Part 15 Subpart C Section 15.209 and RSS 210 Issue 8.

Addendum A: In the original report portions of the transmitter were not tested. All data has been replaced with new testing.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

A handwritten signature in black ink that reads 'Steve Behm'. The signature is written in a cursive style and is positioned above a horizontal line.

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
 CKC Laboratories, Inc.
 1120 Fulton Place
 Fremont, CA 94539

Site Registration & Accreditation Information

Location	CB #	Taiwan	Canada	FCC	Japan
Fremont	US0082	SL2-IN-E-1148R	3082B-1	958979	R-2160 C-2332 T-228 G-522



SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C 15.109 / RSS-210 Issue 8

Description	Test Procedure/Method	Results
Voltage Variation	FCC Part 15 Subpart C Section 15.31(e)	Pass
Radiated Emissions	FCC Part 15 Subpart C Section 15.209 / ANSI C63.4 (2003)	Pass
RF Power Output	FCC Part 15 Subpart C Section	Pass
-20dB Bandwidth	FCC Part 15 Subpart C	Pass
99% Bandwidth	FCC Part 15 Subpart C / RSS-210 /RSS-GEN	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions



EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

Wafer Maintenance System

Manuf: KLA-Tencor

Model: Storage Case 300

Serial: SA07051

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Wafer

Manuf: KLA-Tencor

Model: type: 3440D-12-8004

Serial: D42742

FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 15C requirements for Unlicensed Radio Frequency Devices, Subpart C - Intentional Radiators.

15.31(e) Voltage Variations

Test Conditions / Setup

Test Location: CKC Laboratories • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: **KLA-Tencor**

Specification: **15.31e**

Work Order #: **92849**

Date: 9/9/2013

Test Type: **Radiated Scan**

Time: 16:25:36

Equipment: **Wafer Maintenance System**

Sequence#: 1

Manufacturer: KLA-Tencor

Tested By: Hieu Song Nguyenpham

Model: Storage Case 300

S/N: SA07051

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00432	Loop Antenna	6502	4/2/2013	4/2/2015
T2	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T3	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Wafer Maintenance System*	KLA-Tencor	Storage Case 300	SA07051

Support Devices:

Function	Manufacturer	Model #	S/N
Wafer	KLA-Tencor	type: 3440D-12-8004	D42742

Test Conditions / Notes:

Highest Clock: 25MHz

Firmware: RF_StorageCase_v2.1.118+_EmissionsTest

Temperature: 23.6°C, Humidity: 45%, Atmospheric Pressure: 100.4kPa

The EUT is in the Wafer Maintenance System. It is placed on 80cm Styrofoam table. The EUT is a battery device and operated at 4VDC

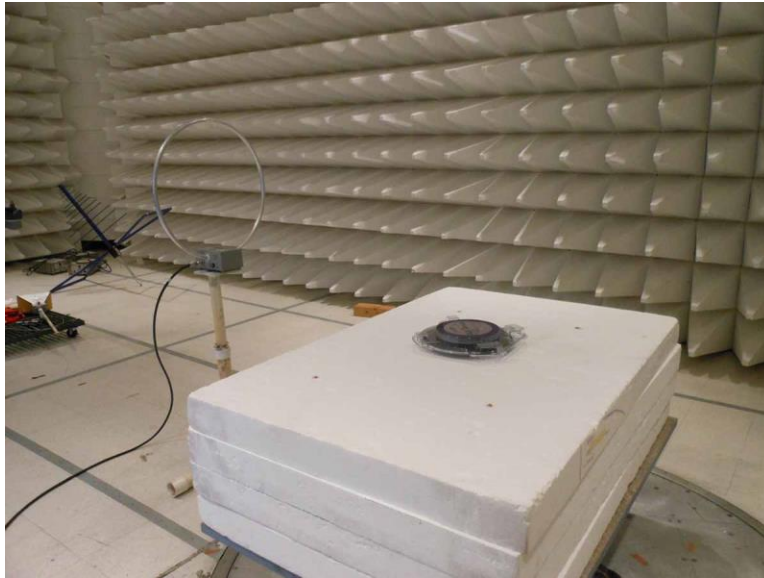
Transmitting operation frequency: 1.54MHz

Notes: Communications Mode

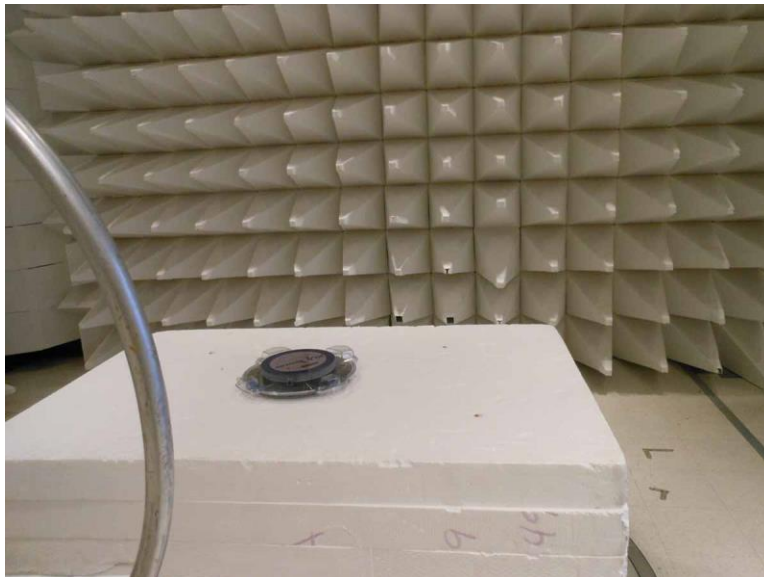
Self-Test Loop embedded in the EUT Firmware where it does a forced communication around once a second.

15.31e: Using a new battery.

Test Setup Photos



Front Side



Back Side

15.209 Radiated Emissions

Test Data Sheets

Test Location: CKC Laboratories • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: **KLA-Tencor**

Specification: **15.209 Radiated Emissions**

Work Order #: **92849**

Date: 9/12/2013

Test Type: **Radiated Scan**

Time: 15:32:23

Equipment: **Wafer Maintenance System**

Sequence#: 19

Manufacturer: KLA-Tencor

Tested By: Hieu Song Nguyenpham

Model: Storage Case 300

S/N: SA07051

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00432	Loop Antenna	6502	4/2/2013	4/2/2015
T2	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T3	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Wafer Maintenance System*	KLA-Tencor	Storage Case 300	SA07051

Support Devices:

Function	Manufacturer	Model #	S/N
Wafer	KLA-Tencor	type: 3440D-12-8004	D42742

Test Conditions / Notes:

Radiated Spurious Emission

Frequency Range: 9kHz to 30MHz

Highest Clock: 25MHz

Firmware: RF_StorageCase_v2.1.118+_EmissionsTest

Temperature: 23.6°C, Humidity: 45%, Atmospheric Pressure: 100.4kPa

The EUT is in the Wafer Maintenance System. It is placed on 80cm Styrofoam table. The EUT is a battery device and operated at 4VDC

Transmitting operation frequency: 1.54MHz

Notes: Communications Mode

Self-Test Loop embedded in the EUT Firmware where it does a forced communication around once a second.

X-axis



Ext Attn: 0 dB

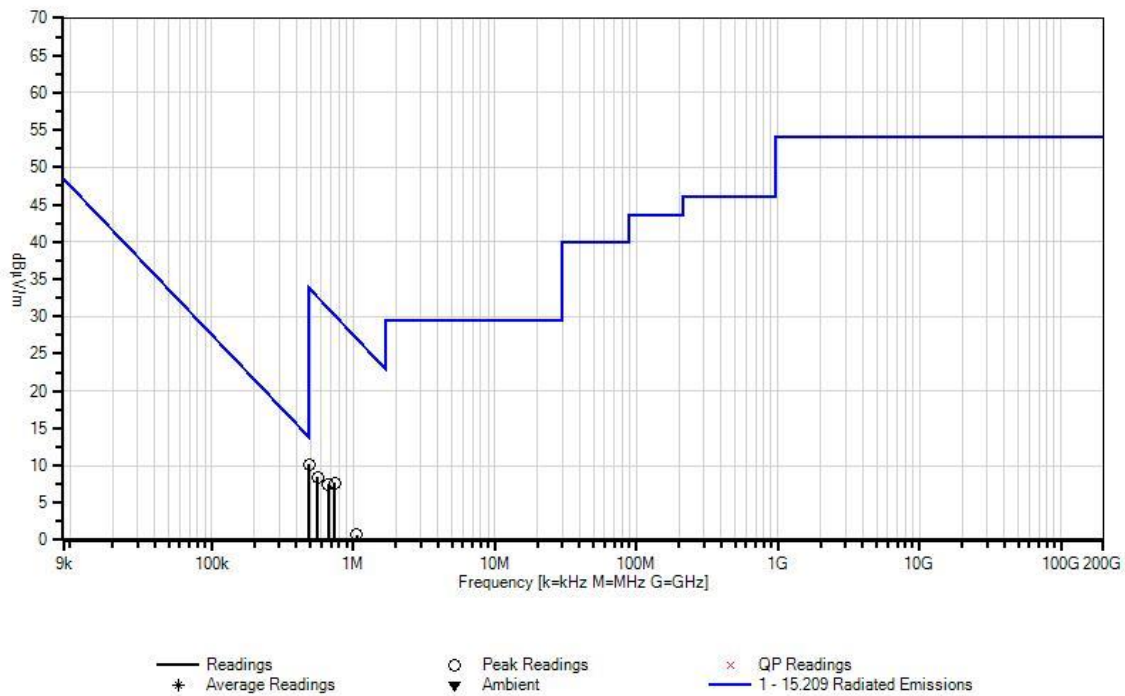
Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB		Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	745.832k	37.9	+9.7	+0.1	+0.0		-40.0	7.7	30.1	-22.4	Perpe
2	671.600k	37.5	+9.9	+0.1	+0.0		-40.0	7.5	31.0	-23.5	Paral
3	491.465k	40.3	+9.8	+0.1	+0.0		-40.0	10.2	33.8	-23.6	Paral
4	562.727k	38.5	+9.8	+0.1	+0.0		-40.0	8.4	32.6	-24.2	Perpe
5	1.068M	30.9	+9.7	+0.1	+0.0		-40.0	0.7	27.0	-26.3	Perpe
6	1.561M	27.0	+9.8	+0.1	+0.0		-40.0	-3.1	23.7	-26.8	Paral

CKC Laboratories Date: 9/12/2013 Time: 15:32:23 KLA-Tencor WO#: 92849
 15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 19 Perpendicular
 Communications Mode





Test Location: CKC Laboratories • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: **KLA-Tencor**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **92849**
 Test Type: **Radiated Scan**
 Equipment: **Wafer Maintenance System**
 Manufacturer: KLA-Tencor
 Model: Storage Case 300
 S/N: SA07051

Date: 9/12/2013
 Time: 13:48:30
 Sequence#: 4
 Tested By: Hieu Song Nguyenpham

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00730	Preamp	8447D	1/17/2013	1/17/2015
T2	AN00852	Biconilog Antenna	CBL 6111C	11/28/2012	11/28/2014
T3	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T4	ANP01183	Cable	CNT-195	10/24/2011	10/24/2013
T5	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Wafer Maintenance System*	KLA-Tencor	Storage Case 300	SA07051

Support Devices:

Function	Manufacturer	Model #	S/N
Wafer	KLA-Tencor	type: 3440D-12-8004	D42742

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 30MHz to 1000MHz

Highest Clock: 25MHz
 Firmware: RF_StorageCase_v2.1.118+_EmissionsTest
 Temperature: 23.6°C
 Humidity: 45%
 Atmospheric Pressure: 100.4kPa

The EUT is in the Wafer Maintenance System. It is placed on 80cm Styrofoam table. The EUT is a battery device and operated at 4VDC

Transmitting operation frequency: 1.54MHz

Notes: Communications Mode
 Self-Test Loop embedded in the EUT Firmware where it does a forced communication around once a second.
 X-axis

Ext Attn: 0 dB

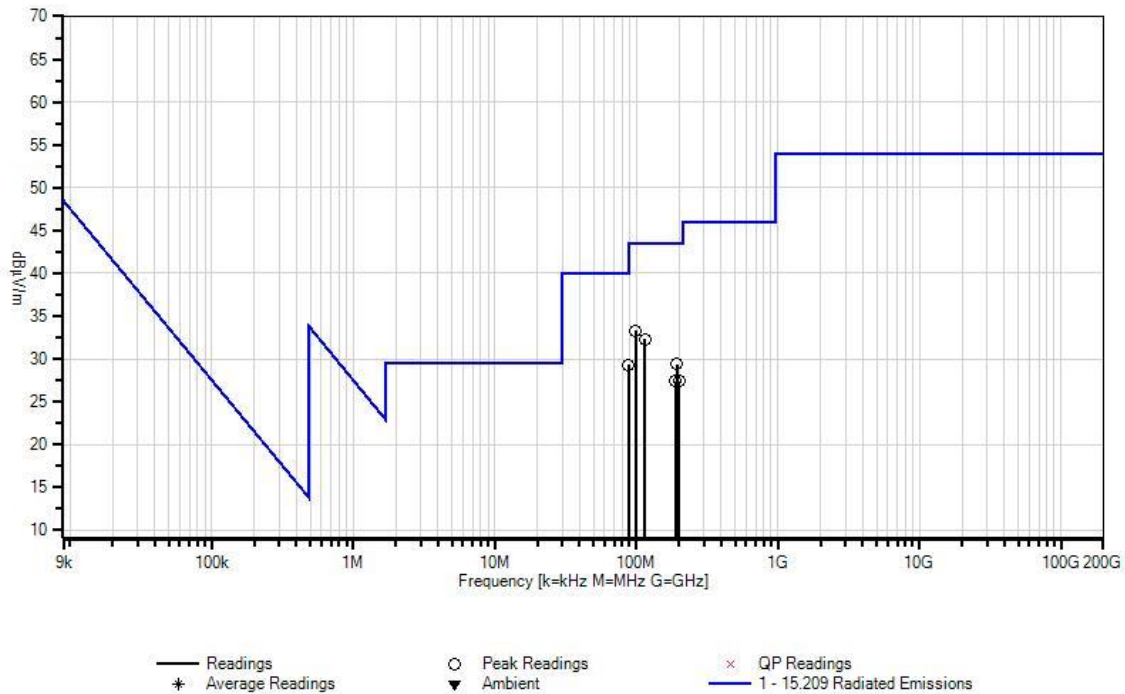
Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	99.192M	49.0	-27.1 +0.3	+9.9	+1.0	+0.2	+0.0	33.3	43.5	-10.2	Vert
2	87.964M	46.3	-27.0 +0.3	+8.7	+0.9	+0.1	+0.0	29.3	40.0	-10.7	Vert
3	115.168M	46.4	-26.9 +0.3	+11.3	+1.0	+0.2	+0.0	32.3	43.5	-11.2	Vert
4	195.167M	45.4	-27.0 +0.4	+8.9	+1.4	+0.3	+0.0	29.4	43.5	-14.1	Horiz
5	201.654M	43.4	-27.0 +0.4	+9.0	+1.4	+0.2	+0.0	27.4	43.5	-16.1	Horiz
6	190.363M	43.4	-27.0 +0.4	+8.8	+1.4	+0.4	+0.0	27.4	43.5	-16.1	Horiz

CKC Laboratories Date: 9/12/2013 Time: 13:48:30 KLA-Tencor WO#: 92849
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 4 Vert
Communications Mode





Test Location: CKC Laboratories • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: **KLA-Tencor**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **92849**
 Test Type: **Radiated Scan**
 Equipment: **Wafer Maintenance System**
 Manufacturer: KLA-Tencor
 Model: Storage Case 300
 S/N: SA07051

Date: 9/12/2013
 Time: 15:18:11
 Sequence#: 16
 Tested By: Hieu Song Nguyenpham

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00432	Loop Antenna	6502	4/2/2013	4/2/2015
T2	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T3	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Wafer Maintenance System*	KLA-Tencor	Storage Case 300	SA07051

Support Devices:

Function	Manufacturer	Model #	S/N
Wafer	KLA-Tencor	type: 3440D-12-8004	D42742

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 9kHz to 30MHz

Highest Clock: 25MHz
 Firmware: RF_StorageCase_v2.1.118+_EmissionsTest
 Temperature: 23.6°C
 Humidity: 45%
 Atmospheric Pressure: 100.4kPa

The EUT is in the Wafer Maintenance System. It is placed on 80cm Styrofoam table. The EUT is a battery device and operated at 4VDC

Transmitting operation frequency: 1.54MHz

Notes:
 Communications Mode
 Self-Test Loop embedded in the EUT Firmware where it does a forced communication around once a second.
 Y-axis



Ext Attn: 0 dB

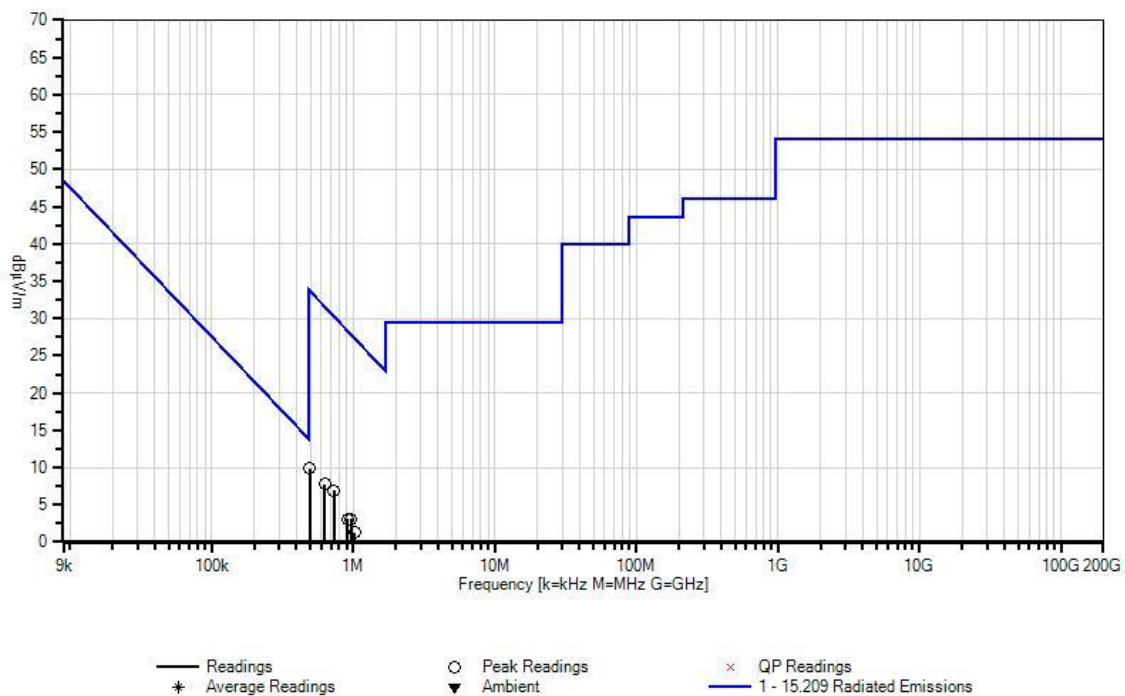
Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB		Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	735.934k	37.1	+9.7	+0.1	+0.0		-40.0	6.9	30.2	-23.3	Perpe
2	633.990k	37.9	+9.8	+0.1	+0.0		-40.0	7.8	31.5	-23.7	Paral
3	496.414k	40.0	+9.8	+0.1	+0.0		-40.0	9.9	33.7	-23.8	Perpe
4	970.506k	33.4	+9.6	+0.1	+0.0		-40.0	3.1	27.8	-24.7	Perpe
5	919.039k	33.5	+9.5	+0.1	+0.0		-40.0	3.1	28.3	-25.2	Paral
6	1.030M	31.5	+9.7	+0.1	+0.0		-40.0	1.3	27.3	-26.0	Paral

CKC Laboratories Date: 9/12/2013 Time: 15:18:11 KLA-Tencor WO#: 92849
 15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 16 Parallel
 Communications Mode





Test Location: CKC Laboratories • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: **KLA-Tencor**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **92849**
 Test Type: **Radiated Scan**
 Equipment: **Wafer Maintenance System**
 Manufacturer: KLA-Tencor
 Model: Storage Case 300
 S/N: SA07051

Date: 9/12/2013
 Time: 14:10:45
 Sequence#: 7
 Tested By: Hieu Song Nguyenpham

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00730	Preamp	8447D	1/17/2013	1/17/2015
T2	AN00852	Biconilog Antenna	CBL 6111C	11/28/2012	11/28/2014
T3	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T4	ANP01183	Cable	CNT-195	10/24/2011	10/24/2013
T5	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Wafer Maintenance System*	KLA-Tencor	Storage Case 300	SA07051

Support Devices:

Function	Manufacturer	Model #	S/N
Wafer	KLA-Tencor	type: 3440D-12-8004	D42742

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 30MHz to 1000MHz

Highest Clock: 25MHz
 Firmware: RF_StorageCase_v2.1.118+_EmissionsTest
 Temperature: 23.6°C
 Humidity: 45%
 Atmospheric Pressure: 100.4kPa

The EUT is in the Wafer Maintenance System. It is placed on 80cm Styrofoam table. The EUT is a battery device and operated at 4VDC

Transmitting operation frequency: 1.54MHz

Notes: Communications Mode
 Self-Test Loop embedded in the EUT Firmware where it does a forced communication around once a second.
 Y-axis

Ext Attn: 0 dB

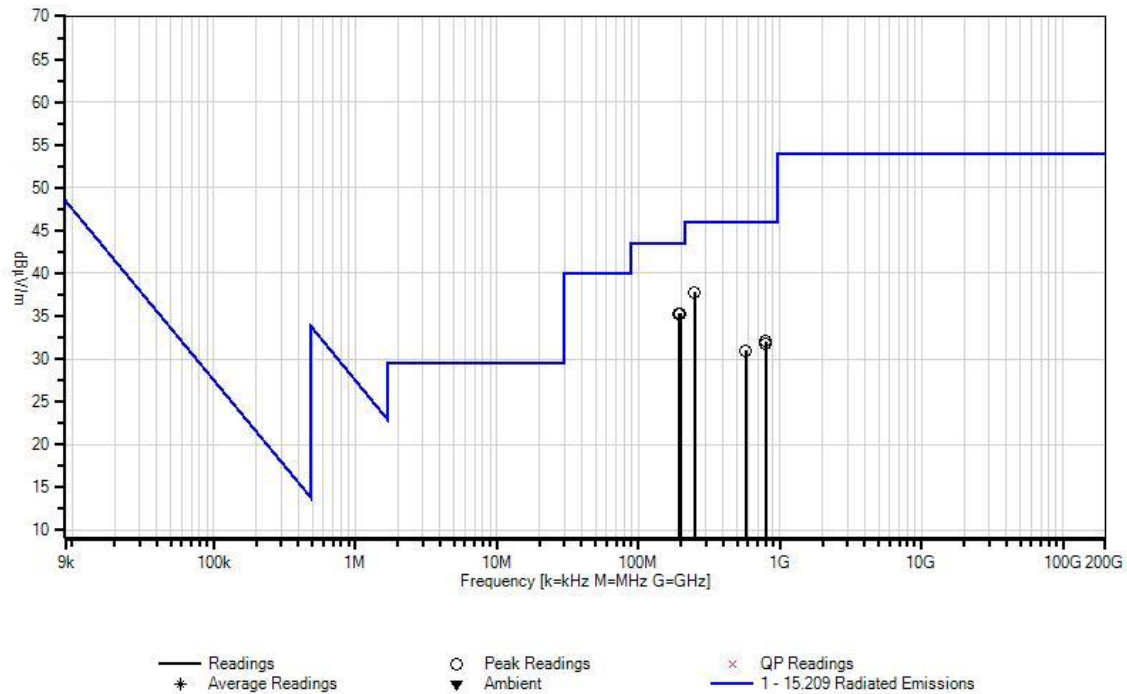
Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	250.663M	49.9	-27.0 +0.4	+12.6	+1.6	+0.3	+0.0	37.8	46.0	-8.2	Horiz
2	198.411M	51.3	-27.0 +0.4	+9.0	+1.4	+0.2	+0.0	35.3	43.5	-8.2	Horiz
3	195.167M	51.3	-27.0 +0.4	+8.9	+1.4	+0.3	+0.0	35.3	43.5	-8.2	Horiz
4	793.485M	32.2	-26.7 +0.9	+21.6	+3.2	+0.9	+0.0	32.1	46.0	-13.9	Vert
5	801.173M	31.8	-26.7 +0.9	+21.7	+3.2	+0.8	+0.0	31.7	46.0	-14.3	Vert
6	579.672M	34.3	-27.0 +0.7	+19.8	+2.6	+0.6	+0.0	31.0	46.0	-15.0	Vert

CKC Laboratories Date: 9/12/2013 Time: 14:10:45 KLA-Tencor WO#: 92849
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 7 Horiz
Communications Mode





Test Location: CKC Laboratories • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: **KLA-Tencor**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **92849**
 Test Type: **Radiated Scan**
 Equipment: **Wafer Maintenance System**
 Manufacturer: KLA-Tencor
 Model: Storage Case 300
 S/N: SA07051

Date: 9/12/2013
 Time: 15:02:56
 Sequence#: 13
 Tested By: Hieu Song Nguyenpham

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00432	Loop Antenna	6502	4/2/2013	4/2/2015
T2	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T3	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Wafer Maintenance System*	KLA-Tencor	Storage Case 300	SA07051

Support Devices:

Function	Manufacturer	Model #	S/N
Wafer	KLA-Tencor	type: 3440D-12-8004	D42742

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 9kHz to 30MHz

Highest Clock: 25MHz
 Firmware: RF_StorageCase_v2.1.118+_EmissionsTest
 Temperature: 23.6°C
 Humidity: 45%
 Atmospheric Pressure: 100.4kPa

The EUT is in the Wafer Maintenance System. It is placed on 80cm Styrofoam table. The EUT is a battery device and operated at 4VDC

Transmitting operation frequency: 1.54MHz

Notes: Communications Mode
 Self-Test Loop embedded in the EUT Firmware where it does a forced communication around once a second.
 Z-axis



Ext Attn: 0 dB

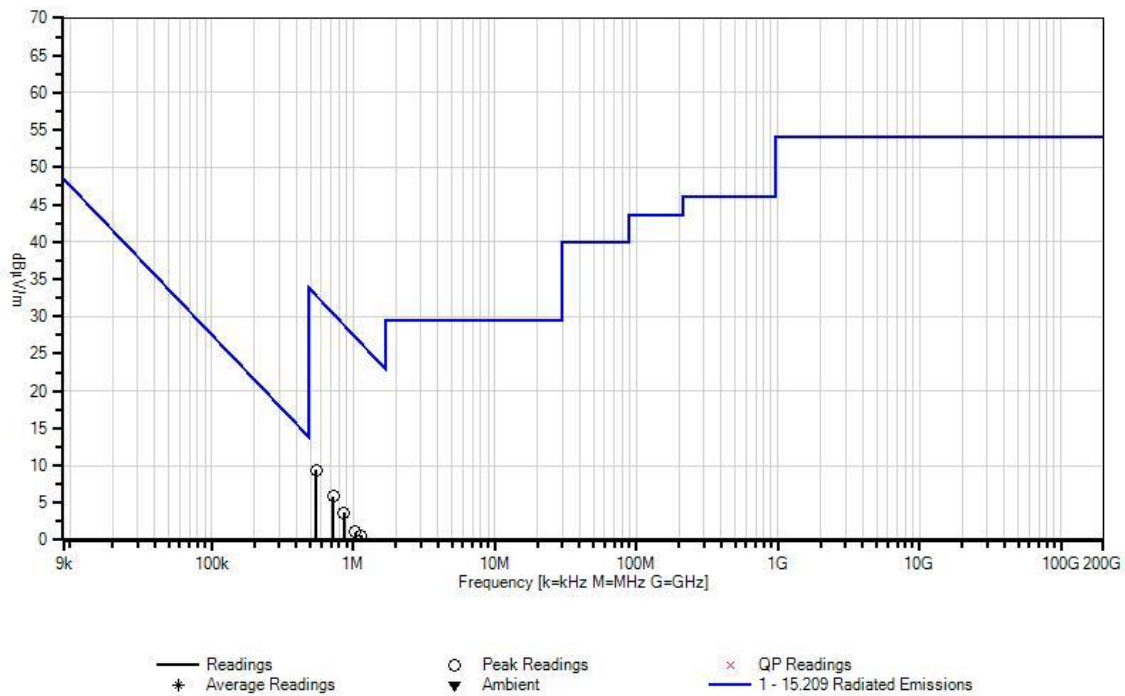
Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB		Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	547.881k	39.5	+9.8	+0.1	+0.0		-40.0	9.4	32.8	-23.4	Perpe
2	724.943k	36.0	+9.8	+0.1	+0.0		-40.0	5.9	30.4	-24.5	Paral
3	861.633k	34.1	+9.5	+0.1	+0.0		-40.0	3.7	28.9	-25.2	Perpe
4	1.138M	30.8	+9.7	+0.1	+0.0		-40.0	0.6	26.4	-25.8	Perpe
5	1.041M	31.3	+9.7	+0.1	+0.0		-40.0	1.1	27.2	-26.1	Paral
6	1.511M	27.2	+9.8	+0.1	+0.0		-40.0	-2.9	24.0	-26.9	Paral

CKC Laboratories Date: 9/12/2013 Time: 15:02:56 KLA-Tencor WO#: 92849
 15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 13 Perpendicular
 Communications Mode





Test Location: CKC Laboratories • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: **KLA-Tencor**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **92849**
 Test Type: **Radiated Scan**
 Equipment: **Wafer Maintenance System**
 Manufacturer: KLA-Tencor
 Model: Storage Case 300
 S/N: SA07051

Date: 9/12/2013
 Time: 14:35:12
 Sequence#: 10
 Tested By: Hieu Song Nguyenpham

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00730	Preamplifier	8447D	1/17/2013	1/17/2015
T2	AN00852	Biconilog Antenna	CBL 6111C	11/28/2012	11/28/2014
T3	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T4	ANP01183	Cable	CNT-195	10/24/2011	10/24/2013
T5	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Wafer Maintenance System*	KLA-Tencor	Storage Case 300	SA07051

Support Devices:

Function	Manufacturer	Model #	S/N
Wafer	KLA-Tencor	type: 3440D-12-8004	D42742

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 30MHz to 1000MHz

Highest Clock: 25MHz
 Firmware: RF_StorageCase_v2.1.118+_EmissionsTest
 Temperature: 23.6°C
 Humidity: 45%
 Atmospheric Pressure: 100.4kPa

The EUT is in the Wafer Maintenance System. It is placed on 80cm Styrofoam table. The EUT is a battery device and operated at 4VDC

Transmitting operation frequency: 1.54MHz

Notes: Communications Mode
 Self-Test Loop embedded in the EUT Firmware where it does a forced communication around once a second.
 Z-axis

Ext Attn: 0 dB

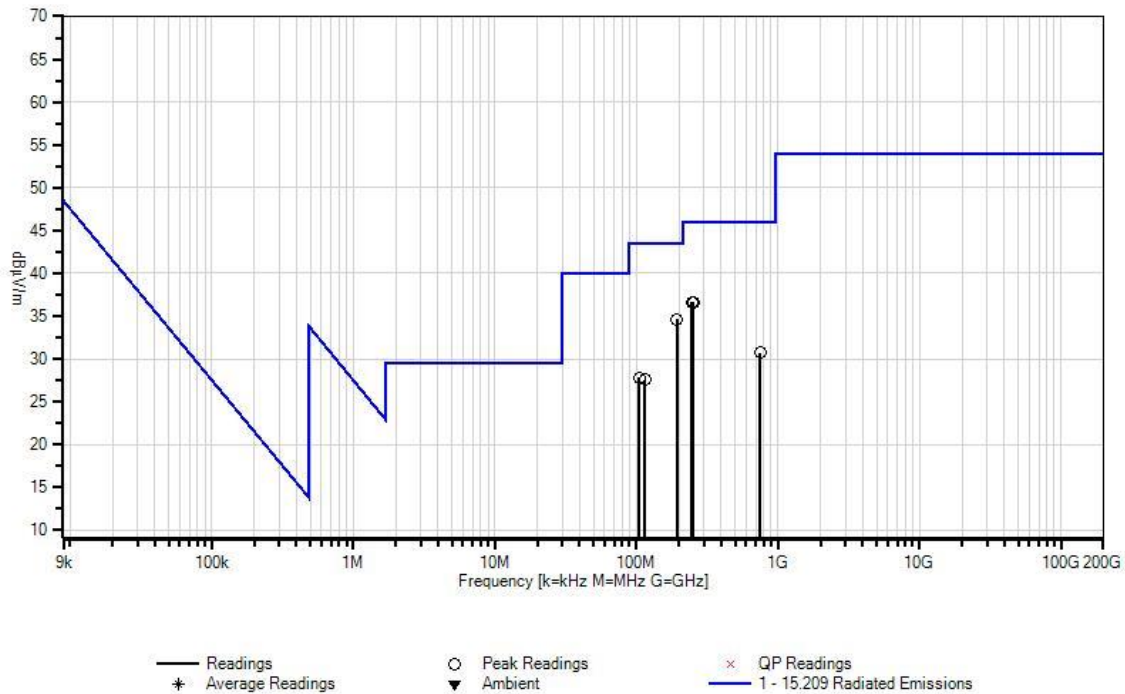
Measurement Data:

Reading listed by margin.

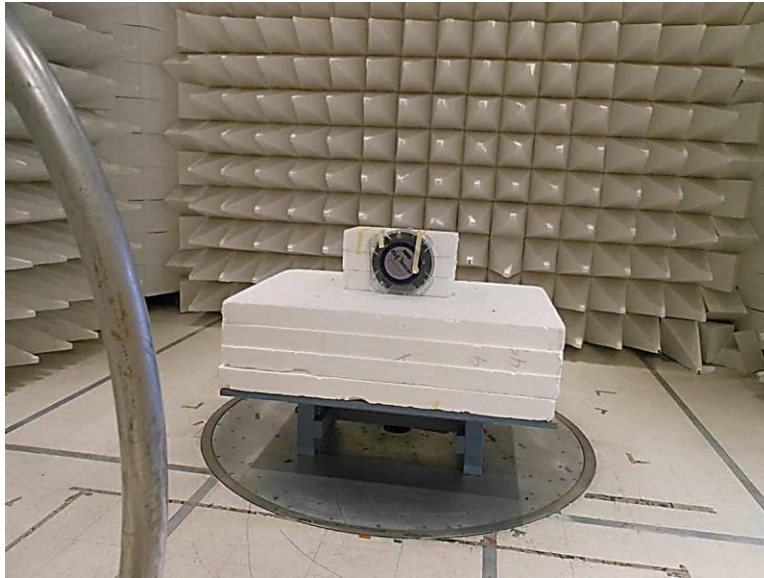
Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	195.167M	50.6	-27.0 +0.4	+8.9	+1.4	+0.3	+0.0	34.6	43.5	-8.9	Horiz
2	253.786M	48.3	-27.0 +0.4	+13.0	+1.6	+0.3	+0.0	36.6	46.0	-9.4	Horiz
3	247.420M	49.1	-27.0 +0.4	+12.2	+1.6	+0.3	+0.0	36.6	46.0	-9.4	Horiz
4	751.083M	30.9	-26.9 +0.8	+22.0	+3.0	+0.9	+0.0	30.7	46.0	-15.3	Vert
5	105.558M	42.9	-27.1 +0.3	+10.5	+1.0	+0.2	+0.0	27.8	43.5	-15.7	Vert
6	115.168M	41.7	-26.9 +0.3	+11.3	+1.0	+0.2	+0.0	27.6	43.5	-15.9	Vert

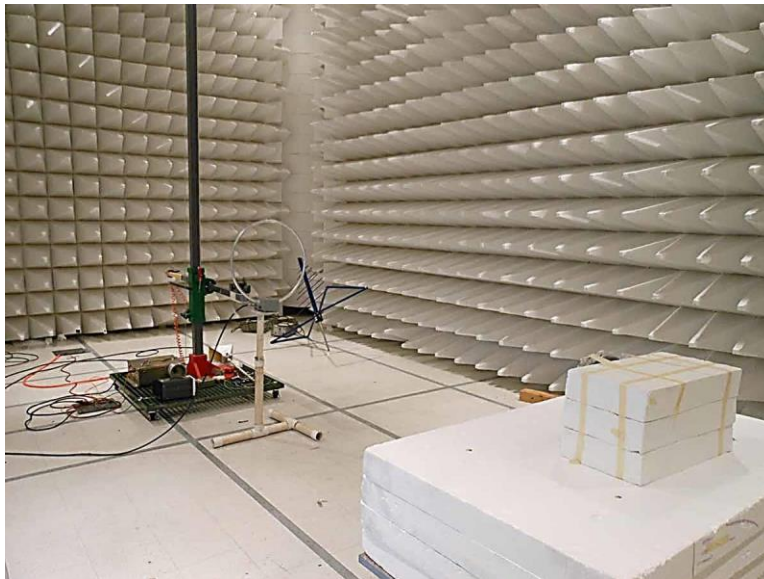
CKC Laboratories Date: 9/12/2013 Time: 14:35:12 KLA-Tencor WO#: 92849
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 10 Vert
Communications Mode



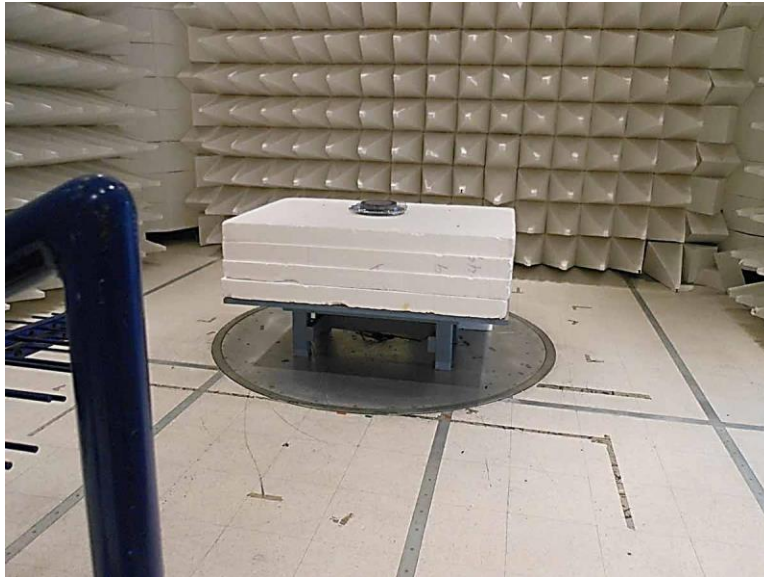
Test Setup Photos



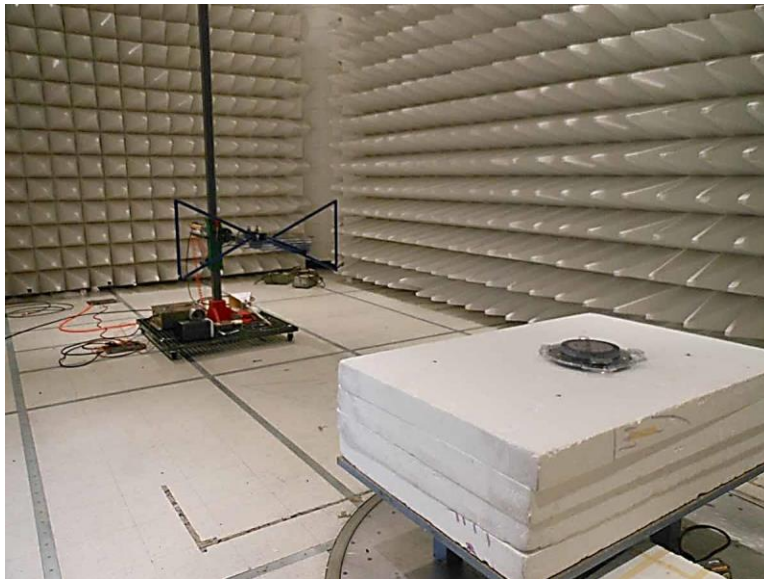
Front Side, 9kHz - 30MHz



Back Side, 9kHz - 30MHz



Front Side, 30MHz - 1GHz



Back Side, 30MHz – 1GHz



X - Axis



Y - Axis



Z - Axis

2.1046 RF Power Output

Test Conditions / Setup

Test Location: CKC Laboratories • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: **KLA-Tencor**

Specification: **15.209 Radiated Emissions**

Work Order #: **92849**

Date: 9/9/2013

Test Type: **Radiated Scan**

Time: 16:25:36

Equipment: **Wafer Maintenance System**

Sequence#: 1

Manufacturer: KLA-Tencor

Tested By: Hieu Song Nguyenpham

Model: Storage Case 300

S/N: SA07051

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00432	Loop Antenna	6502	4/2/2013	4/2/2015
T2	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T3	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Wafer Maintenance System*	KLA-Tencor	Storage Case 300	SA07051

Support Devices:

Function	Manufacturer	Model #	S/N
Wafer	KLA-Tencor	type: 3440D-12-8004	D42742

Test Conditions / Notes:

Fundamental of the EUT

Highest Clock: 25MHz

Firmware: RF_StorageCase_v2.1.118+_EmissionsTest

Temperature: 23.6°C

Humidity: 45%

Atmospheric Pressure: 100.4kPa

The EUT is in the Wafer Maintenance System. It is placed on 80cm Styrofoam table. The EUT is a battery device and operated at 4VDC.

Transmitting operation frequency: 1.54MHz

Notes: Communications Mode

Self-Test Loop embedded in the EUT Firmware where it does a forced communication around once a second.



Ext Attn: 0 dB

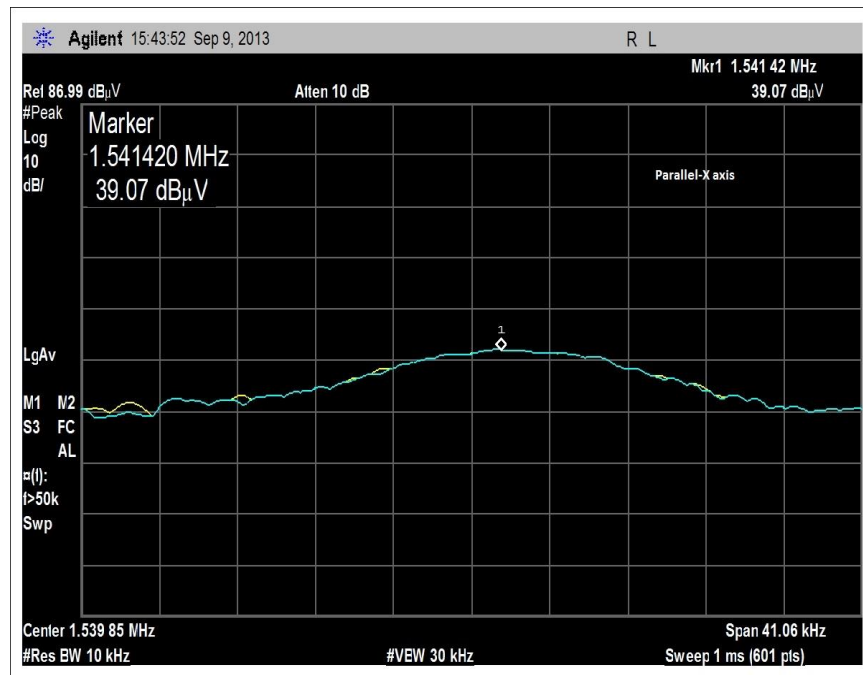
Measurement Data:

Reading listed by margin.

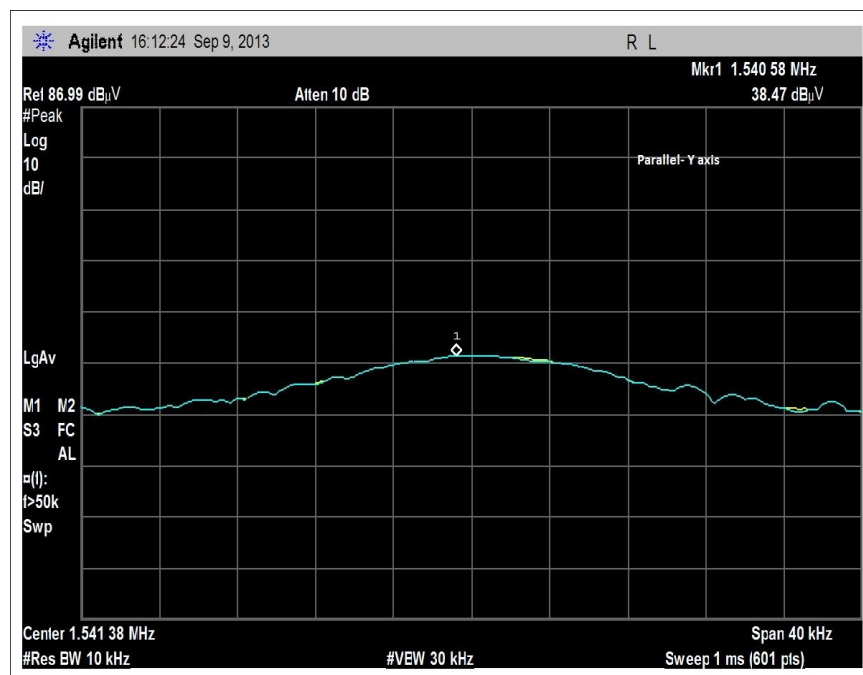
Test Distance: 1 Meter

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB		Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	1.539M	39.2	+9.8	+0.1	+0.0		-59.1	-10.0	23.8 X-axis	-33.8	Paral
2	1.541M	38.6	+9.8	+0.1	+0.0		-59.1	-10.6	23.8 Z-axis	-34.4	Paral
3	1.541M	38.5	+9.8	+0.1	+0.0		-59.1	-10.7	23.8 Y-axis	-34.5	Paral
4	1.541M	35.2	+9.8	+0.1	+0.0		-59.1	-14.0	23.8 Z-axis	-37.8	Perpe
5	1.541M	34.7	+9.8	+0.1	+0.0		-59.1	-14.5	23.8 Y-axis	-38.3	Perpe
6	1.539M	34.4	+9.8	+0.1	+0.0		-59.1	-14.8	23.8 X-axis	-38.6	Perpe

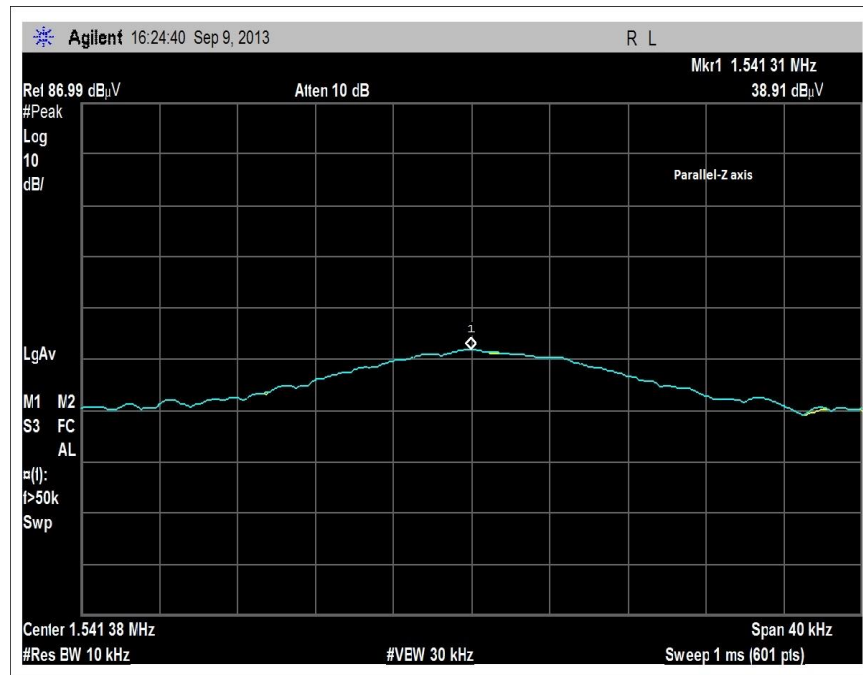
Test Data



X - Axis

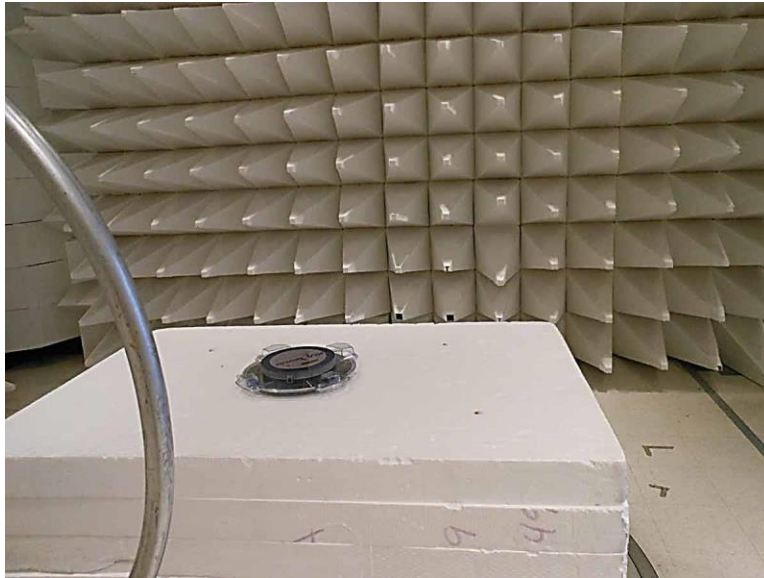


Y - Axis



Z - Axis

Test Setup Photos



Front Side



Back Side



X - Axis



Y - Axis



Z - Axis

-20dBc Bandwidth

Test Conditions / Setup

Test Location: CKC Laboratories • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: **KLA-Tencor**

Specification: **OBW**

Work Order #: **92849**

Date: 10/11/2013

Test Type: **Radiated Scan**

Time: 08:07:28

Equipment: **Wafer Maintenance System**

Sequence#: 2

Manufacturer: KLA-Tencor

Tested By: Hieu Song Nguyenpham

Model: Storage Case 300

S/N: SA07051

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015
	AN00730	Preamplifier	8447D	1/17/2013	1/17/2015
	ANP01183	Cable	CNT-195	9/3/2013	9/3/2015
	ANP06024	Near-Field Probe	N/A	NCR	NCR

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Wafer Maintenance System*	KLA-Tencor	Storage Case 300	SA07051

Support Devices:

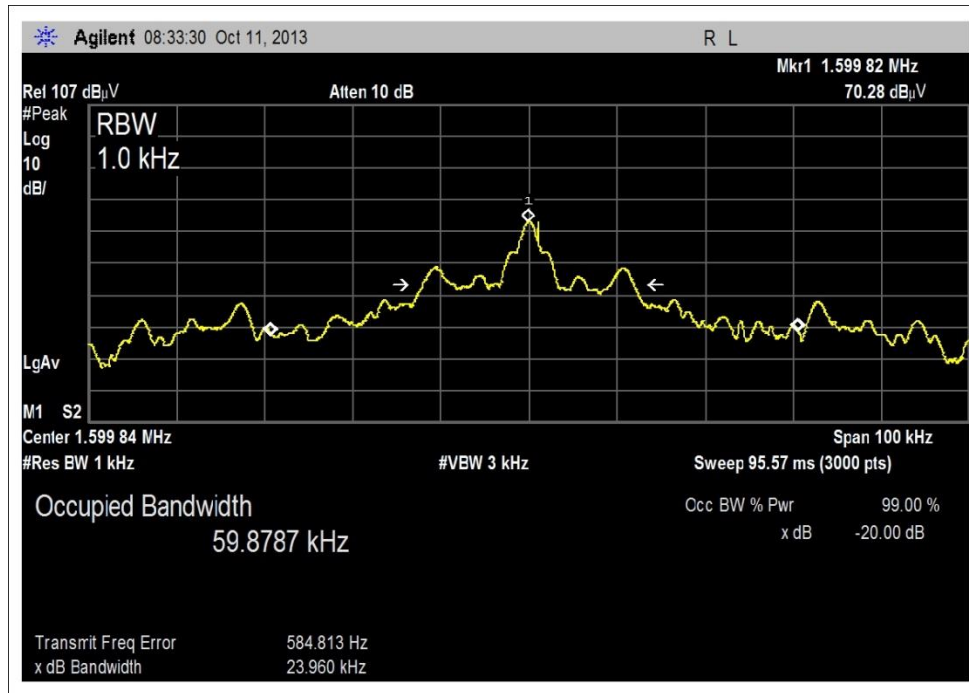
Function	Manufacturer	Model #	S/N
Wafer	KLA-Tencor	type: 3440D-12-8004	D42742

Test Conditions / Notes:

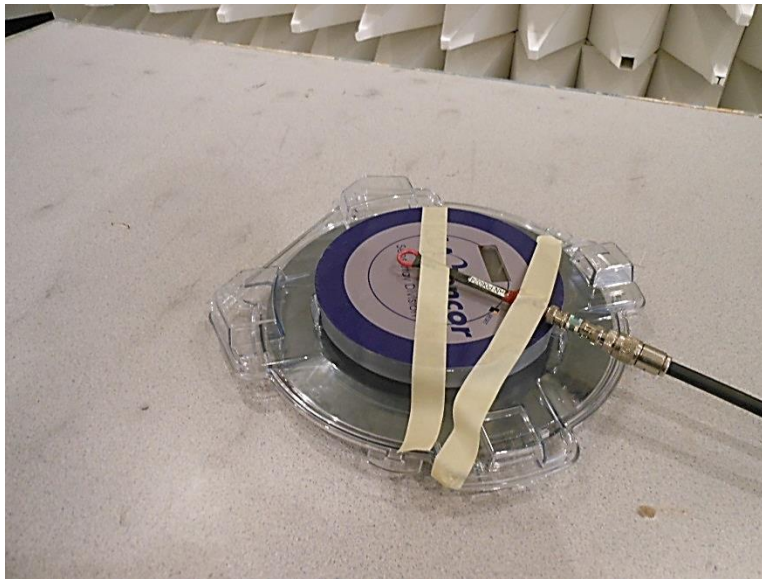
Highest Clock: 25MHz
 Firmware: RF_StorageCase_v2.1.118+_EmissionsTest
 Temperature: 19.5°C, Humidity: 43%, Atmospheric Pressure: 101.4kPa
 The EUT is in a Wafer Maintenance System. It is placed on 80cm Styrofoam table. The EUT is a battery device and operated at 4VDC.
 Transmitting operation frequency: 1.54MHz

Notes: Communications Mode
 Self-Test Loop embedded in the EUT Firmware where it does a forced communication around once a second.
 Using a near field probe to measure the OBW. The absolute amplitude scale of the measurements is not calibrated.

Test Data



Test Setup Photo



RSS-210 99% Bandwidth

Test Conditions / Setup

Test Location: CKC Laboratories • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: **KLA-Tencor**

Specification: **OBW**

Work Order #: **92849**

Date: 10/11/2013

Test Type: **Radiated Scan**

Time: 08:07:28

Equipment: **Wafer Maintenance System**

Sequence#: 2

Manufacturer: KLA-Tencor

Tested By: Hieu Song Nguyenpham

Model: Storage Case 300

S/N: SA07051

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015
	AN00730	Preamplifier	8447D	1/17/2013	1/17/2015
	ANP01183	Cable	CNT-195	9/3/2013	9/3/2015
	ANP06024	Near-Field Probe	N/A	NCR	NCR

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Wafer Maintenance System*	KLA-Tencor	Storage Case 300	SA07051

Support Devices:

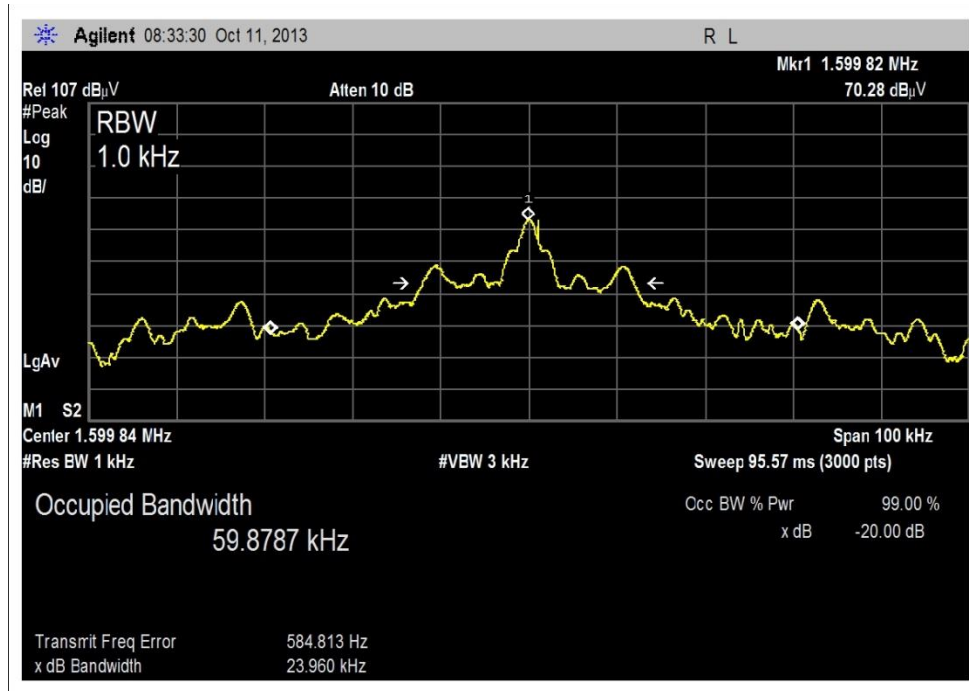
Function	Manufacturer	Model #	S/N
Wafer	KLA-Tencor	type: 3440D-12-8004	D42742

Test Conditions / Notes:

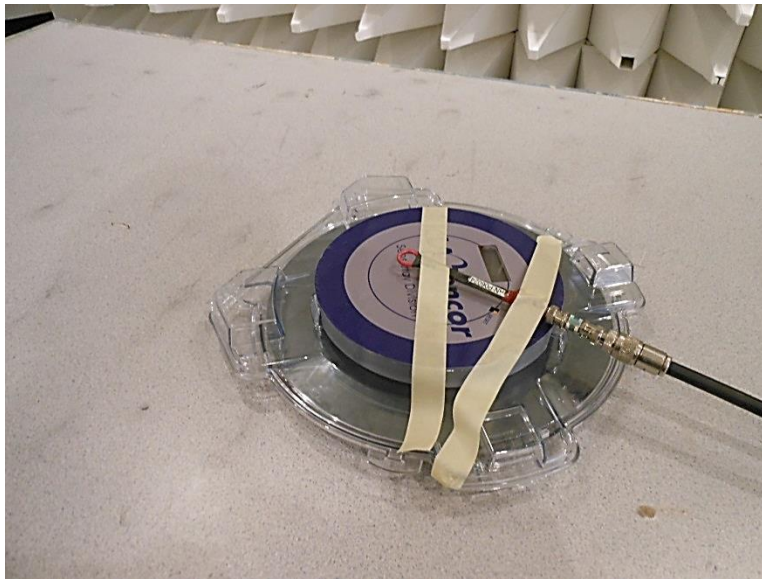
Highest Clock: 25MHz
 Firmware: RF_StorageCase_v2.1.118+_EmissionsTest
 Temperature: 19.5°C, Humidity: 43%, Atmospheric Pressure: 101.4kPa
 The EUT is in a Wafer Maintenance System. It is placed on 80cm Styrofoam table. The EUT is a battery device and operated at 4VDC.
 Transmitting operation frequency: 1.54MHz

Notes: Communications Mode
 Self-Test Loop embedded in the EUT Firmware where it does a forced communication around once a second.
 Using a near field probe to measure the OBW. The absolute amplitude scale of the measurements is not calibrated

Test Data



Test Setup Photos



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k=2$. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula. This reading was then compared to the applicable specification limit.



SAMPLE CALCULATIONS		
	Meter reading	(dBμV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBμV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.