

APPLICATION FOR CERTIFICATION

On Behalf of

Sonos, Inc

Controller

Model No. : CR100

Contains TX module : FCC ID: SBVRM000

Prepared for : Sonos, Inc

223 E. De La Guerra St. Santa Barbara,
CA 93101, USA

Prepared by : Audix Corporation

Technical Division EMC Department
No. 53-11, Tin-Fu Tsun, Lin-Kou,
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File Number : EM950685R1

Report Number : EM-F950247

Date of Test : Jun. 28, 2006

Date of Report : Jul. 05, 2006

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TEST REPORT CERTIFICATION

Applicant	:	Sonos, Inc
Manufacturer	:	Inventec Electronics (M) Sdn. Bhd.
EUT Description	:	Controller
Contains TX module	:	FCC ID: SBVRM000
	(A) MODEL NO.	: CR100
	(B) SERIAL NO.	: N/A
	(C) BRAND	: SONOS
	(D) POWER SUPPLY	: DC IN 6V or Battery
	(E) TEST VOLTAGE	: AC 120V/60Hz (via Power Supply)

Measurement Procedure Used:

FCC RULES AND REGULATIONS PART 15 SUBPART C, FEBRUARY 2006
AND ANSI C63.4/2003

(FCC CFR 47 Part 15C, §15.205, §15.209 and §15.247)

The device described above was tested by AUDIX CORPORATION to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart C limits.

The measurement results are contained in this test report and AUDIX CORPORATION is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC official limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX CORPORATION.

Date of Test: Jun. 28, 2006

Prepared by: Julie Hsu Jul. 07. 2006
(Julie Hsu/Assistant Administrator)

Test Engineer: Henning Chang Jul. 07, 2006
(Henning Chang/Supervisor)

Approved & Authorized Signer: Leon Liu, Jul. 7 2006
(Leon Liu/Senior Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Controller This devices is a controller for digital music system (Zone Player, ZP100).
Model Number	:	CR100
Contains TX module	:	FCC ID: SBVRM000
Brand Name	:	SONOS
Applicant	:	Sonos, Inc 506 Chapala Street, Santa Barbara, CA93101, USA
Manufacturer	:	Inventec Electronics (M) Sdn. Bhd. Plot 102, Bayan Lepas Industrial Estate, 11900 Bayan Lepas, Penang, Malaysia.
High Frequency of Used	:	5.0MHz、 10.0MHz、 20.0MHz、 33.0MHz、 32.768kHz
Li-Polymer Battery (Rechargeable)	:	PL-0548135 >3000mAh
Wireless LAN Card (RF Module)	:	Cameo Communications, Inc. M/N WLG1304 802.11g WLAN mini-PCI Adapter
I.T.E. Power Supply	:	UNIFIUE, M/N UIA324-06 S/N 410-0215062 BSMI ID. D53003 I/O: AC 100-240V, 50/60Hz, 0.6A O/P: DC 6V, 3.8A Cable: Shielded, Undetachable, 1.85m Bonded a ferrite core
AC Power Cord (2Pin)	:	Non-Shielded, Detachable, 1.85m
Date of Receipt of Sample	:	Jun. 28, 2006
Date of Test	:	Jun. 28, 2006

Remark :

The FCC reports to refer to the WiFi card as Sonos WiFi card FCC ID SBVRM000.

1.2. Description of Test Facility

Name of Firm : **Audix Corporation**
Technical Division EMC Department
 No. 53-11, Tin-Fu Tsun, Lin-Kou Hsiang,
 Taipei County 24443, Taiwan, R.O.C.

Test Location & Facility (AC) : **Semi-Anechoic Chamber**
 No. 53-11, Tin-Fu Tsun, Lin-Kou Hsiang,
 Taipei County 24443, Taiwan, R.O.C.
 May. 16, 2003 File on
 Federal Communication Commission
 Registration Number: 90993

NVLAP Lab. Code : 200077-0
 (NVLAP is a NATA accredited body under Mutual Recognition Agreement)

1.3. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Radiation Test (Distance: 3m)	30MHz~300MHz	±2.91dB
	300MHz~1000MHz	±2.94dB
	Above 1GHz	± 5.02dB

Remark : Uncertainty = $k_{uc}(y)$

2. RADIATED EMISSION MEASUREMENT

2.1. Test Equipment

The following test equipment was used during the radiated emission measurement:

2.1.1. For Frequency 30MHz~1000MHz (at Semi-Anechoic Chamber)

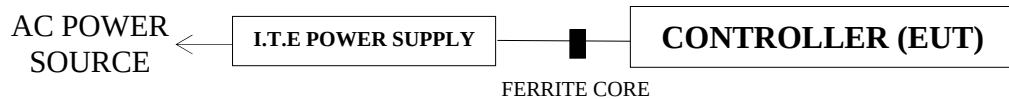
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	HP	8593EM	3826A00248	Sep.26, 05'	Sep.25, 06'
2.	Test Receiver	Rohde & Schwarz	ESCS 30	100265	Sep.27, 05'	Sep.26, 06'
3.	Pre-Amplifier	HP	8447D	2944A06305	Mar.09, 06'	Mar.08, 07'
4.	Broadband Antenna	CHASE	VBA6106A	1264	Nov.11, 05'	Nov.10, 06'
5.	Broadband Antenna	Schwarzbeck	UHALP 9108-A	0139	Apr.19, 06'	Apr.18, 07'

2.1.2. For Frequency Above 1GHz (at Semi-Anechoic Chamber)

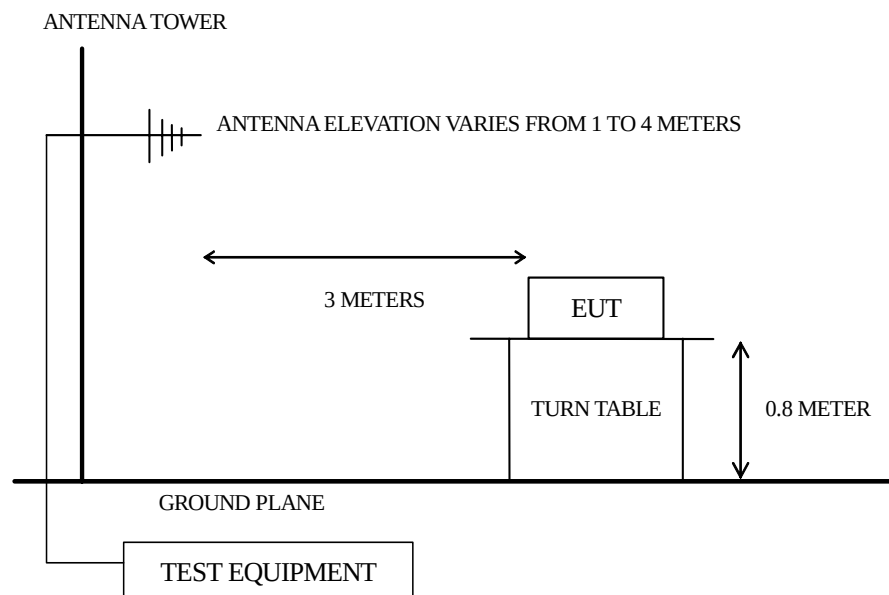
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	HP	8593EM	3826A00248	Sep.26, 05'	Sep.25, 06'
2.	Pre-Amplifier	HP	8449B	3008A00529	Jul.05, 05'	Jul.04, 06'
3.	Horn Antenna	EMCO	3115	9609-4927	Jul.08, 05'	Jul.07, 06'

2.2. Test Setup

2.2.1. Block Diagram of connection between EUT and simulators



2.2.2. Semi-Anechoic Chamber (3m) Setup Diagram



2.3. Radiated Emission Limits (§15.209)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMITS	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 $\text{dB}\mu\text{V/m}$ (Peak) 54.0 $\text{dB}\mu\text{V/m}$ (Average)	

Remark : (1) Emission level ($\text{dB}\mu\text{V/m}$) = 20 log Emission level ($\mu\text{V/m}$)
 (2) The tighter limit applies at the edge between two frequency bands.
 (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.

2.4. Operating Condition of EUT

2.4.1. Setup the EUT and simulator as shown on 2.2.

2.4.2. Turn on the power of all equipment.

2.4.3. Run telnet on Notebook to run test software scripts on controller to execute the Wi-Fi Card, Normal application software was running simultaneously.

2.5. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna which was mounted on a antenna tower. The antenna moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna such as calibrated biconical and log- periodical antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to FCC ANSI C63.4-2003 regulation.

The bandwidth of the R&S Test Receiver ESCS30 was set at 120kHz. (For 30MHz to 1000MHz)

The resolution bandwidth and video bandwidth of test spectrum analyzer is 1MHz for peak detection (PK) at frequency above 1GHz.

The resolution bandwidth of test spectrum analyzer is 1MHz and the video bandwidth is 10Hz for average detection (AV) at frequency above 1GHz.

The frequency range from 30MHz to 25GHz (Up to 10th harmonics from fundamental frequency) was checked.

2.6. Radiated Emission Measurement Results

PASSED. All the emissions not reported below are too low against the official limits.

Test Date : Jun. 28, 2006 Temperature : 25°C Humidity : 62%

The EUT was tested with the following test modes in frequency range of 30MHz ~ 1000MHz and all the test results are listed in section 2.6.1.

No.	Test Mode	Test Frequency	Reference Test Data No.	
			Horizontal	Vertical
1.	Transmitting	2412MHz (CH1)	# 9	# 10
2.		2437MHz (CH6)	# 10	# 9
3.		2462MHz (CH11)	# 9	# 10
4.	Receiving	---	# 10	# 9

The EUT was tested with the following test modes in frequency range above 1GHz and all the test results are listed in section 2.6.2.

No.	Test Mode	Test Frequency
1.	Transmitting	2412MHz (CH1)
2.		2437MHz (CH6)
3.		2462MHz (CH11)
4.	Receiving	---

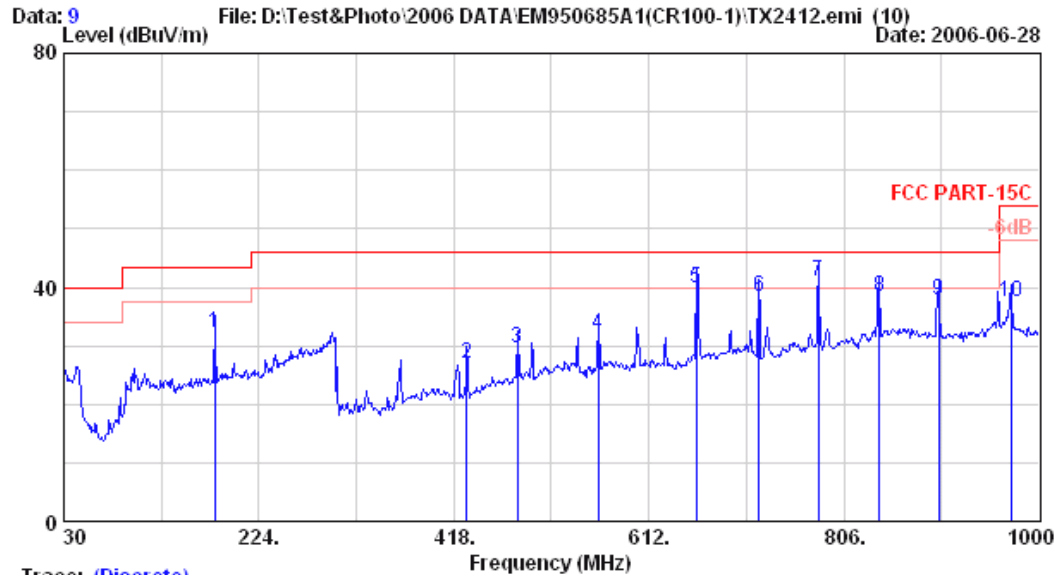
The EUT was tested in restricted bands and all the test results are listed in section 2.6.3. [The restricted bands defined in part 15.205(a)]

No.	Test Mode	Test Frequency	Reference Test Data No.			
			Horizontal		Vertical	
1.	Out of Band	2412MHz	Peak	# 2	Peak	# 1
			Average	# 3	Average	# 4
		2462MHz	Peak	# 8	Peak	# 7
			Average	# 5	Average	# 6

2.6.1. Frequency Range: 30MHz~1000MHz



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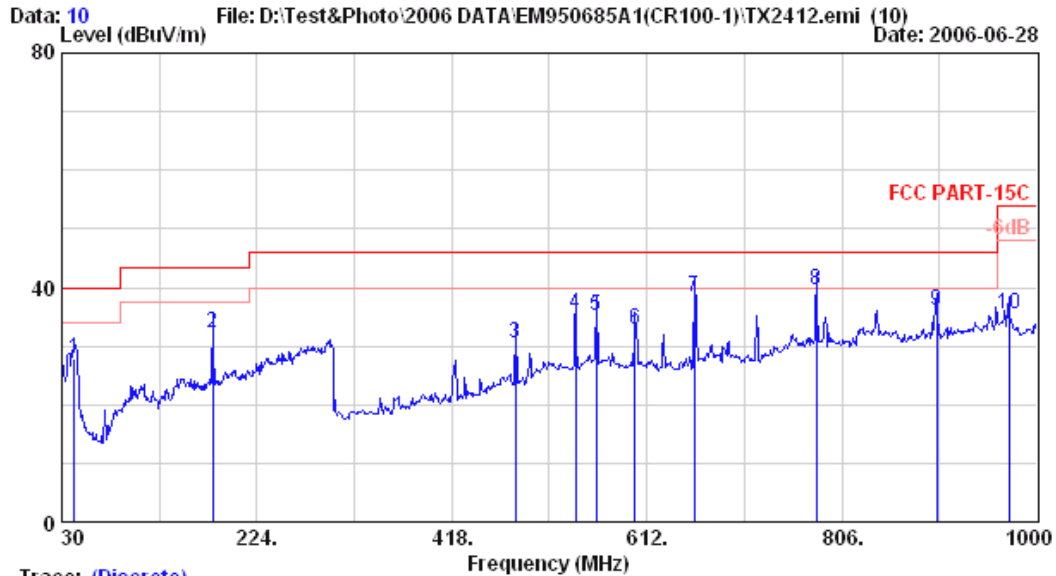
Site no. : A/C Chamber Data no. : 9
Dis. / Ant. : 3m VBA6106A/UHALP9108-A Ant. pol. : HORIZONTAL
Limit : FCC PART-15C
Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang
EUT : Controller M/N:CR100
Power Rating : 120Vac/60Hz
Test Mode : TX 2412MHz

		Ant.	Cable		Emission			
Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1	180.350	21.31	2.90	8.00	32.21	43.50	11.29	
2	430.610	17.26	5.20	4.49	26.95	46.00	19.05	
3	481.050	18.74	6.10	4.70	29.53	46.00	16.47	
4	561.560	20.16	6.70	5.09	31.95	46.00	14.05	
5	659.530	22.30	6.40	11.29	39.98	46.00	6.02	
6	721.610	22.21	6.50	9.66	38.37	46.00	7.63	
7	780.780	24.11	6.80	10.05	40.96	46.00	5.04	
8	840.920	25.08	7.10	6.31	38.49	46.00	7.51	
9	900.090	24.96	7.37	5.58	37.91	46.00	8.09	
10	971.870	26.79	7.70	2.93	37.42	54.00	16.58	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



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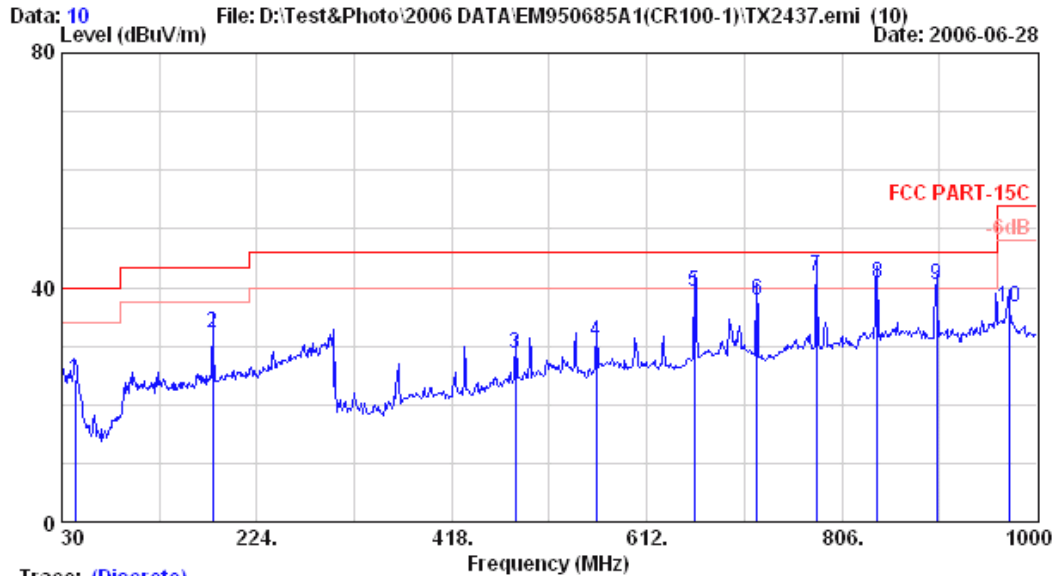
Site no. : A/C Chamber Data no. : 10
Dis. / Ant. : 3m VBA6106A/UHALP9108-A Ant. pol. : VERTICAL
Limit : FCC PART-15C
Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang
EUT : Controller M/N:CR100
Power Rating : 120Vac/60Hz
Test Mode : TX 2412MHz

	Freq.	Ant.	Cable		Emission			
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	42.610	19.33	1.30	7.07	27.70	40.00	12.30	
2	180.350	21.28	2.90	8.14	32.32	43.50	11.18	
3	481.050	18.93	6.10	5.58	30.60	46.00	15.40	
4	541.190	20.48	7.01	7.99	35.48	46.00	10.52	
5	561.560	22.08	6.70	6.48	35.26	46.00	10.74	
6	600.360	21.65	6.30	4.88	32.83	46.00	13.17	
7	659.530	21.96	6.40	10.00	38.36	46.00	7.64	
8	780.780	25.36	6.80	7.31	39.48	46.00	6.52	
9	900.090	25.83	7.37	2.79	35.99	46.00	10.01	
10	971.870	26.81	7.70	0.96	35.47	54.00	18.53	

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Trace: (Discrete)

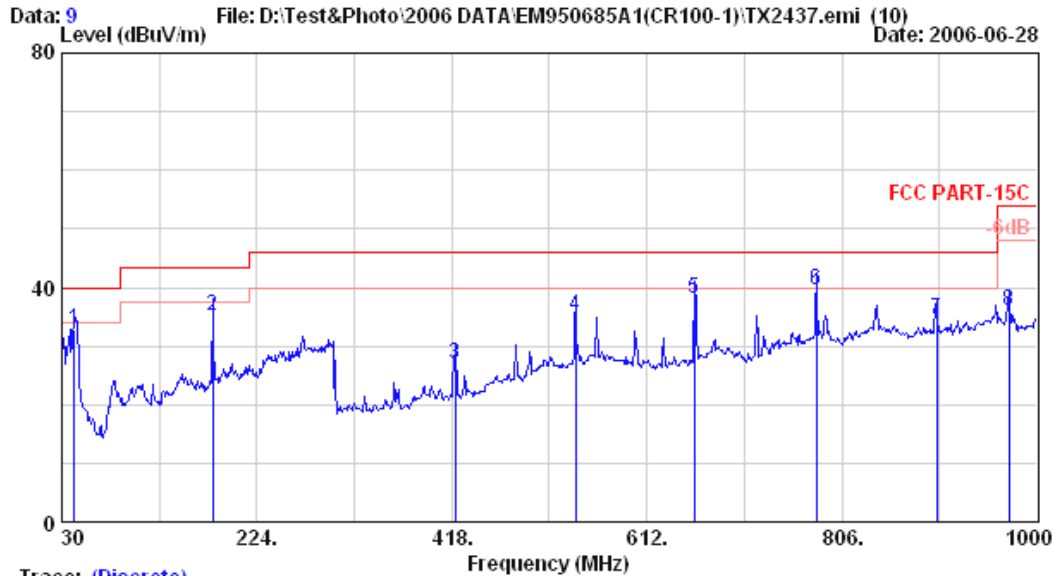
Site no. : A/C Chamber Data no. : 10
 Dis. / Ant. : 3m VBA6106A/UHALP9108-A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang
 EUT : Controller M/N:CR100
 Power Rating : 120Vac/60Hz
 Test Mode : TX2437MHz

	Freq.	Ant.	Cable		Emission			
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	43.580	19.42	1.30	3.70	24.43	40.00	15.57	
2	180.350	21.31	2.90	8.12	32.33	43.50	11.17	
3	481.050	18.74	6.10	3.78	28.61	46.00	17.39	
4	561.560	20.16	6.70	3.95	30.81	46.00	15.19	
5	659.530	22.30	6.40	10.57	39.26	46.00	6.74	
6	721.610	22.21	6.50	8.98	37.69	46.00	8.31	
7	780.780	24.11	6.80	10.93	41.84	46.00	4.16	
8	840.920	25.08	7.10	8.46	40.64	46.00	5.36	
9	900.090	24.96	7.37	7.97	40.30	46.00	5.70	
10	971.870	26.79	7.70	2.21	36.70	54.00	17.30	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



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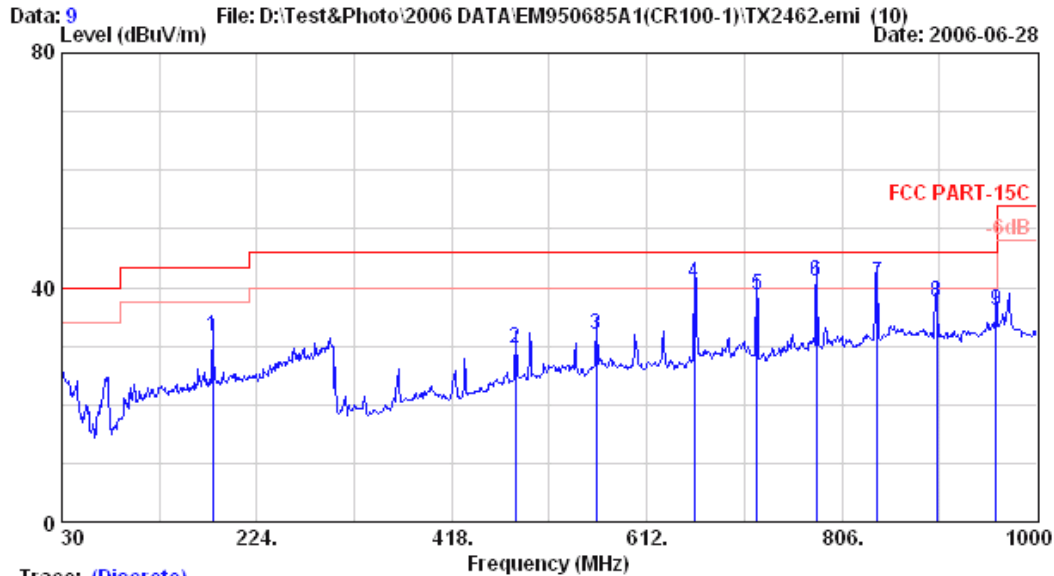
Site no. : A/C Chamber Data no. : 9
 Dis. / Ant. : 3m VBA6106A/UHALP9108-A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang
 EUT : Controller M/N:CR100
 Power Rating : 120Vac/60Hz
 Test Mode : TX2437MHz

	Freq.	Ant.	Cable		Emission			
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	42.610	19.33	1.30	12.33	32.96	40.00	7.04	
2	180.350	21.28	2.90	10.91	35.09	43.50	8.41	
3	420.910	17.11	5.01	4.94	27.06	46.00	18.94	
4	541.190	20.48	7.01	7.76	35.25	46.00	10.75	
5	659.530	21.96	6.40	9.75	38.11	46.00	7.89	
6	780.780	25.36	6.80	7.34	39.51	46.00	6.49	
7	900.090	25.83	7.37	1.31	34.51	46.00	11.49	
8	971.870	26.81	7.70	1.68	36.19	54.00	17.81	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



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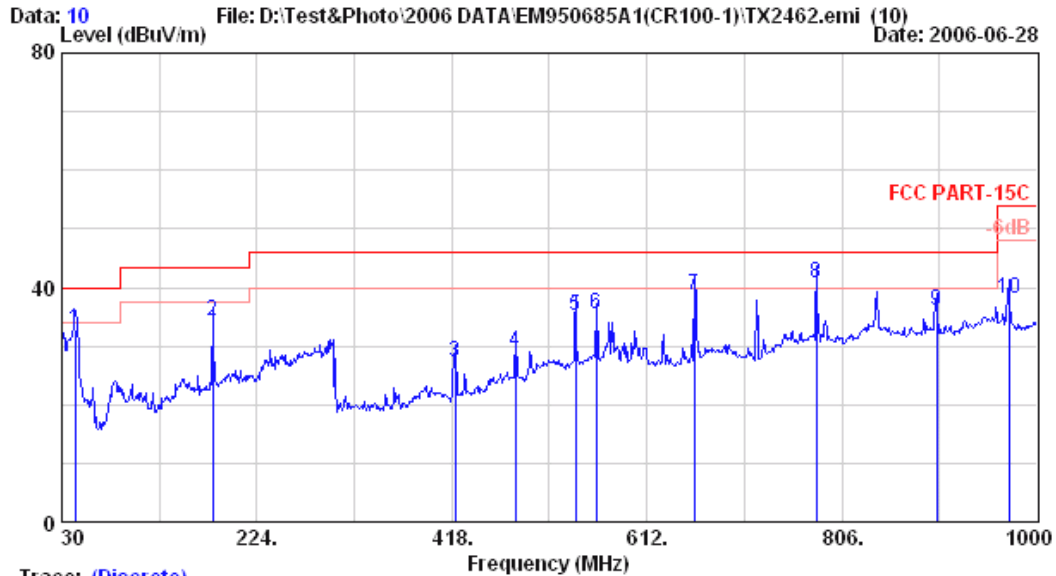
Site no. : A/C Chamber Data no. : 9
Dis. / Ant. : 3m VBA6106A/UHALP9108-A Ant. pol. : HORIZONTAL
Limit : FCC PART-15C
Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang
EUT : Controller M/N:CR100
Power Rating : 120Vac/60Hz
Test Mode : TX2462MHz

	Freq.	Ant.	Cable		Emission			
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	180.350	21.31	2.90	7.42	31.63	43.50	11.87	
2	481.050	18.74	6.10	4.79	29.62	46.00	16.38	
3	561.560	20.16	6.70	5.00	31.86	46.00	14.14	
4	659.530	22.30	6.40	11.91	40.60	46.00	5.40	
5	721.610	22.21	6.50	10.02	38.73	46.00	7.27	
6	780.780	24.11	6.80	10.24	41.15	46.00	4.85	
7	840.920	25.08	7.10	8.48	40.66	46.00	5.34	
8	900.090	24.96	7.37	5.30	37.63	46.00	8.37	
9	959.260	26.38	7.60	2.14	36.13	46.00	9.87	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



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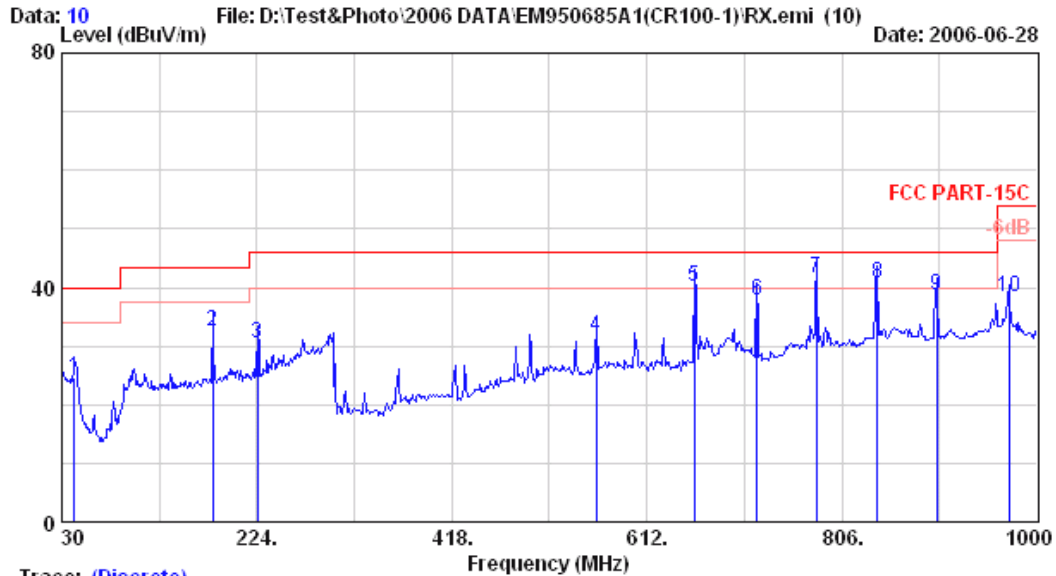
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Dis. / Ant. : 3m VBA6106A/UHALP9108-A Ant. pol. : VERTICAL
Limit : FCC PART-15C
Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang
EUT : Controller M/N:CR100
Power Rating : 120Vac/60Hz
Test Mode : TX2462MHZ

	Freq.	Ant.	Cable		Emission			
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	43.580	18.62	1.30	13.04	32.96	40.00	7.04	
2	180.350	21.28	2.90	10.23	34.41	43.50	9.09	
3	420.910	17.11	5.01	5.20	27.32	46.00	18.68	
4	481.050	18.93	6.10	3.93	28.95	46.00	17.05	
5	541.190	20.48	7.01	7.76	35.25	46.00	10.75	
6	561.560	22.08	6.70	6.57	35.35	46.00	10.65	
7	659.530	21.96	6.40	10.45	38.81	46.00	7.19	
8	780.780	25.36	6.80	8.49	40.66	46.00	5.34	
9	900.090	25.83	7.37	2.72	35.92	46.00	10.08	
10	971.870	26.81	7.70	3.73	38.24	54.00	15.76	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



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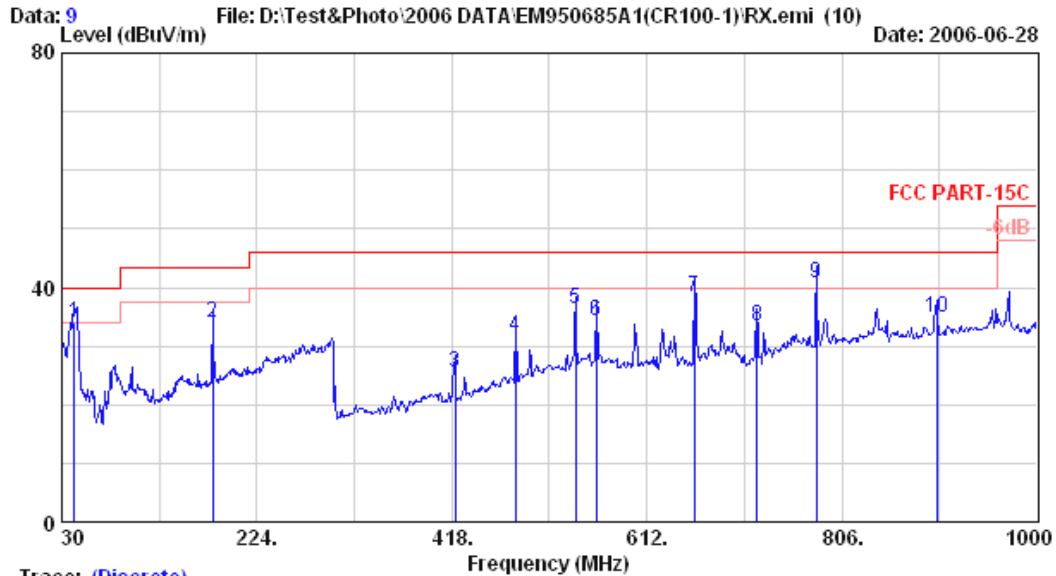
Site no. : A/C Chamber Data no. : 10
Dis. / Ant. : 3m VBA6106A/UHALP9108-A Ant. pol. : HORIZONTAL
Limit : FCC PART-15C
Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang
EUT : Controller M/N:ZP100
Power Rating : 120Vac/60Hz
Test Mode : RX

	Freq.	Ant.	Cable		Emission			
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	42.610	19.86	1.30	3.32	24.48	40.00	15.52	
2	180.350	21.31	2.90	8.42	32.63	43.50	10.87	
3	224.970	21.95	3.30	5.11	30.36	46.00	15.64	
4	561.560	20.16	6.70	4.72	31.58	46.00	14.42	
5	659.530	22.30	6.40	11.43	40.12	46.00	5.88	
6	721.610	22.21	6.50	9.05	37.76	46.00	8.24	
7	780.780	24.11	6.80	10.70	41.61	46.00	4.39	
8	840.920	25.08	7.10	8.41	40.59	46.00	5.41	
9	900.090	24.96	7.37	6.28	38.61	46.00	7.39	
10	971.870	26.79	7.70	3.95	38.44	54.00	15.56	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



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Trace: (Discrete)

Site no. : A/C Chamber Data no. : 9
Dis. / Ant. : 3m VBA6106A/UHALP9108-A Ant. pol. : VERTICAL
Limit : FCC PART-15C
Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang
EUT : Controller M/N: ZP100
Power Rating : 120Vac/60Hz
Test Mode : RX

	Freq.	Ant.	Cable		Emission			
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	42.610	19.33	1.30	13.47	34.10	40.00	5.90	
2	180.350	21.28	2.90	9.79	33.97	43.50	9.53	
3	420.910	17.11	5.01	3.26	25.38	46.00	20.62	
4	481.050	18.93	6.10	6.57	31.59	46.00	14.41	
5	541.190	20.48	7.01	8.86	36.35	46.00	9.65	
6	561.560	22.08	6.70	5.59	34.37	46.00	11.63	
7	659.530	21.96	6.40	10.07	38.43	46.00	7.57	
8	721.610	22.11	6.50	4.67	33.28	46.00	12.72	
9	780.780	25.36	6.80	8.54	40.71	46.00	5.29	
10	900.090	25.83	7.37	1.73	34.93	46.00	11.07	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

2.6.2. Frequency Range Above 1GHz

Date of Test : Jun. 28, 2006 Temperature : 25°C

EUT : Controller Humidity : 62%

Test Mode : Transmitting Mode, Frequency: 2412MHz

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB
Peak	1157.920	25.27	4.50	10.92	40.69	74.00	33.31
	1771.120	26.79	7.07	8.36	42.22	74.00	31.78
Average	1157.920	25.27	4.50	2.92	32.69	54.00	21.31
	1771.120	26.79	7.07	0.36	34.22	54.00	19.78

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Peak	1351.120	25.35	4.98	8.51	38.84	74.00	35.16
	1692.160	26.41	6.80	8.93	42.14	74.00	31.86
Average	1351.120	25.35	4.98	-0.49	29.84	54.00	24.16
	1692.160	26.41	6.80	0.93	34.14	54.00	19.86

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Measurement was up to 25GHz, but the emission levels were too low against the official limit and not reported.

Date of Test : Jun. 28, 2006 Temperature : 25°C

EUT : Controller Humidity : 62%

Test Mode : Transmitting Mode, Frequency: 2437MHz

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB
Peak	1608.160	25.98	6.21	8.56	40.75	74.00	33.25
	1767.760	26.77	7.09	8.57	42.43	74.00	31.57
Average	1608.160	25.98	6.21	0.56	32.75	54.00	21.25
	1767.760	26.77	7.09	0.57	34.43	54.00	19.57

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Peak	1431.760	25.38	5.24	9.78	40.40	74.00	33.60
	1717.360	26.53	6.96	10.86	44.35	74.00	29.65
Average	1431.760	25.38	5.24	1.78	32.40	54.00	21.60
	1717.360	26.53	6.96	2.86	36.35	54.00	17.65

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Measurement was up to 25GHz, but the emission levels were too low against the official limit and not reported.

Date of Test : Jun. 28, 2006 Temperature : 25°C

EUT : Controller Humidity : 62%

Test Mode : Transmitting Mode, Frequency: 2462MHz

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB
Peak	1594.720	25.90	6.12	8.60	40.62	74.00	33.38
	1737.520	26.62	7.07	15.64	49.33	74.00	24.67
Average	1594.720	25.90	6.12	0.60	32.62	54.00	21.38
	1737.520	26.62	7.07	7.64	41.33	54.00	12.67

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Peak	1225.120	25.30	4.63	9.70	39.63	74.00	34.37
	1838.320	27.10	6.72	8.71	42.53	74.00	31.47
Average	1225.120	25.30	4.63	1.70	31.63	54.00	22.37
	1838.320	27.10	6.72	0.71	34.53	54.00	19.47

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Measurement was up to 25GHz, but the emission levels were too low against the official limit and not reported.

Date of Test : Jun. 28, 2006 Temperature : 25°C

EUT : Controller Humidity : 62%

Test Mode : Receiving Mode

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB
Peak	1754.320	26.70	7.15	5.62	39.47	74.00	34.53
	2254.960	28.33	6.17	7.16	41.66	74.00	32.34
Average	1754.320	26.70	7.15	-2.38	31.47	54.00	22.53
	2254.960	28.33	6.17	-0.84	33.66	54.00	20.34

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Peak	1179.760	25.28	4.55	7.37	37.20	74.00	36.80
	2145.760	28.11	6.04	6.02	40.17	74.00	33.83
Average	1179.760	25.28	4.55	-0.63	29.20	54.00	24.80
	2145.760	28.11	6.04	-1.98	32.17	54.00	21.83

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Measurement was up to 25GHz, but the emission levels were too low against the official limit and not reported.

2.6.3. Restricted Bands Measurement Results

Date of Test : Jun. 28, 2006 Temperature : 25°C

EUT : Controller Humidity : 62%

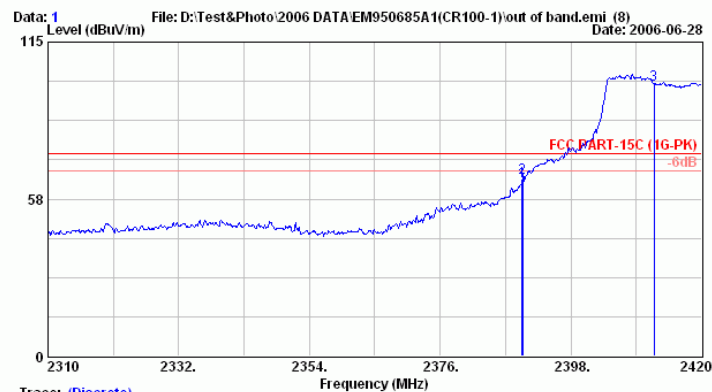
Test Mode : Transmitting Mode, Frequency: 2412MHz

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB
Peak *	2389.750	28.59	6.34	29.26	64.19	74.00	9.81
Average *	2389.420	28.59	6.34	8.72	43.65	54.00	10.35

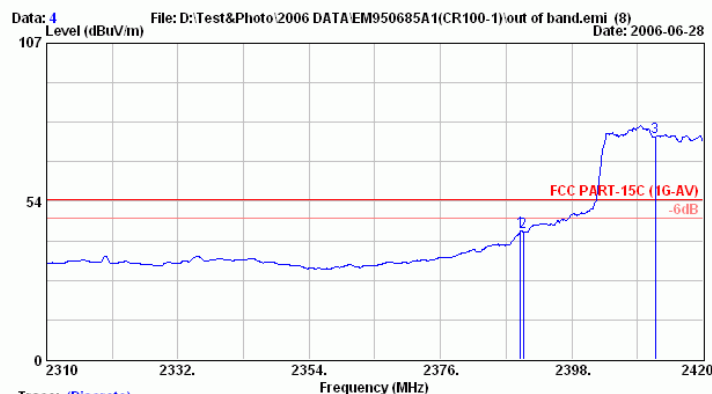
- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Low frequency section (spurious in the restricted band 2310-2390MHz).
 3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



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Site no. : A/C Chamber Data no. : 1
 Dis. / Ant. : 3m 3115 Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C (1G-PK)
 Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang
 EUT : Controller M/N:CR100
 Power Rating : 120Vac/60Hz
 Test Mode : TX2412MHz



Site no. : A/C Chamber Data no. : 4
 Dis. / Ant. : 3m 3115 Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C (1G-AV)
 Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang
 EUT : Controller M/N:CR100
 Power Rating : 120Vac/60Hz
 Test Mode : TX2412MHz

Date of Test : Jun. 28, 2006 Temperature : 25°C

EUT : Controller Humidity : 62%

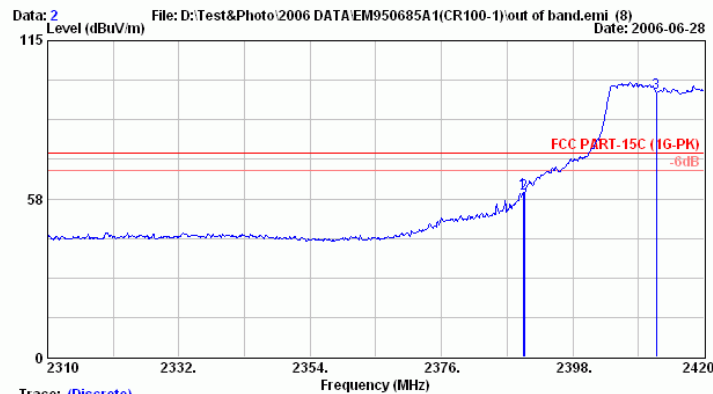
Test Mode : Transmitting Mode, Frequency: 2412MHz

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Peak *	2389.640	28.59	6.34	24.72	59.65	74.00	14.35
Average *	2389.200	28.59	6.34	5.03	39.96	54.00	14.04

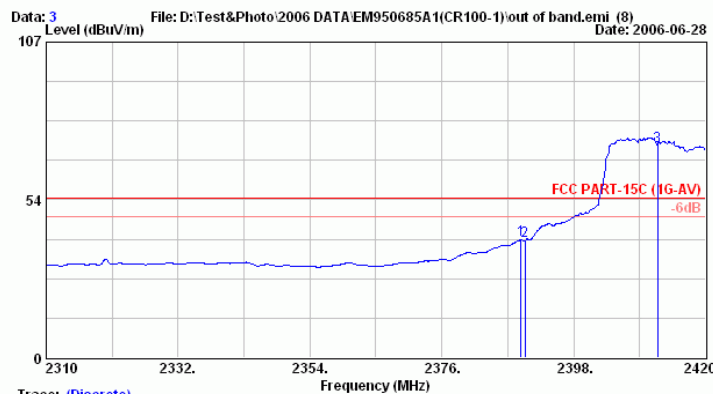
- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Low frequency section (spurious in the restricted band 2310-2390MHz).
 3. “*” The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



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Site no. : A/C Chamber Data no. : 2
 Dis. / Ant. : 3m 3115 Ant. pol. : VERTICAL
 Limit : FCC PART-15C (1G-PK)
 Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang
 EUT : Controller M/N:CR100
 Power Rating : 120Vac/60Hz
 Test Mode : TX2412MHz



Site no. : A/C Chamber Data no. : 3
 Dis. / Ant. : 3m 3115 Ant. pol. : VERTICAL
 Limit : FCC PART-15C (1G-AV)
 Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang
 EUT : Controller M/N:CR100
 Power Rating : 120Vac/60Hz
 Test Mode : TX2412MHz

Date of Test : Jun. 28, 2006 Temperature : 25°C

EUT : Controller Humidity : 62%

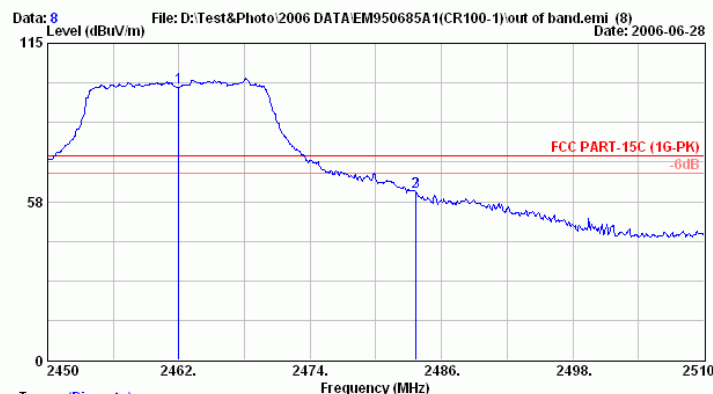
Test Mode : Transmitting Mode, Frequency: 2462MHz

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB
Peak *	2483.600	28.77	6.45	26.00	61.22	74.00	12.78
Average *	2483.600	28.77	6.45	4.22	39.44	54.00	14.56

- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. High frequency section (spurious in the restricted band 2483.5-2500MHz).
 3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



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Trace: (Discrete)

Site no. : A/C Chamber Data no. : 8

Dis. / Ant. : 3m 3115 Ant. pol. : HORIZONTAL

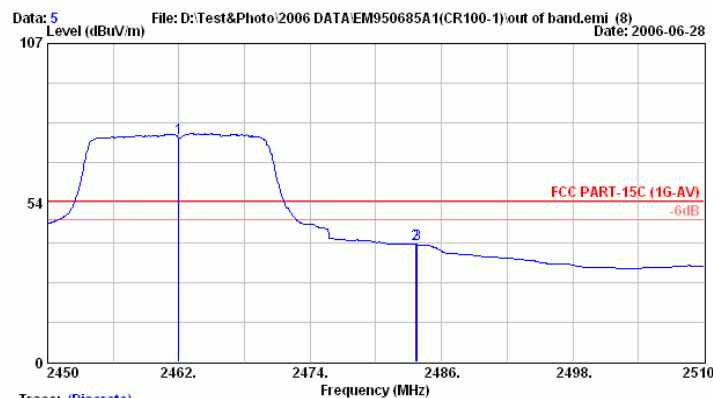
Limit : FCC PART-15C (1G-PK)

Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang

EUT : Controller M/N:CR100

Power Rating : 120Vac/60Hz

Test Mode : TX2462MHz



Trace: (Discrete)

Site no. : A/C Chamber Data no. : 5

Dis. / Ant. : 3m 3115 Ant. pol. : HORIZONTAL

Limit : FCC PART-15C (1G-AV)

Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang

EUT : Controller M/N:CR100

Power Rating : 120Vac/60Hz

Test Mode : TX2462MHz

Date of Test : Jun. 28, 2006 Temperature : 25°C

EUT : Controller Humidity : 62%

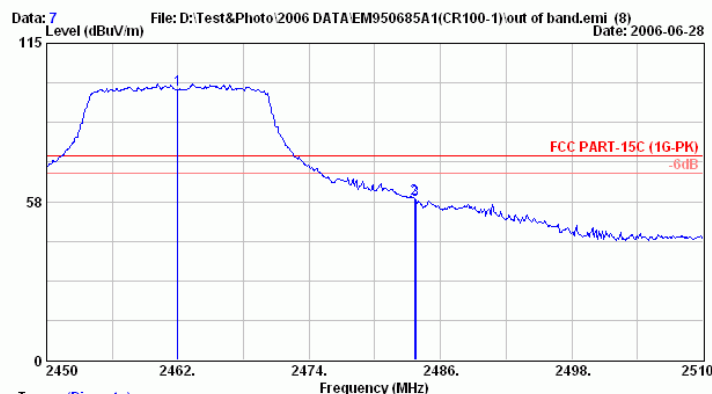
Test Mode : Transmitting Mode, Frequency: 2462MHz

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Peak *	2483.600	28.77	6.45	23.47	58.69	74.00	15.31
Average *	2483.600	28.77	6.45	2.42	37.64	54.00	16.36

- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. High frequency section (spurious in the restricted band 2483.5-2500MHz).
 3. “*” The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



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Trace: (Discrete)

Site no. : A/C Chamber Data no. : 7

Dis. / Ant. : 3m 3115 Ant. pol. : VERTICAL

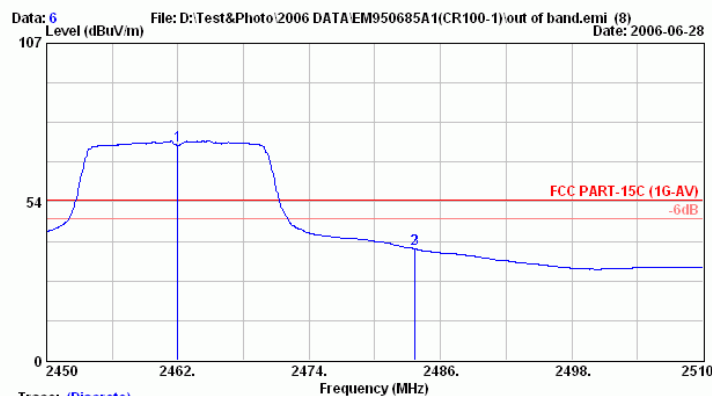
Limit : FCC PART-15C (1G-PK)

Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang

EUT : Controller M/N:CR100

Power Rating : 120Vac/60Hz

Test Mode : TX2462MHz



Trace: (Discrete)

Site no. : A/C Chamber Data no. : 6

Dis. / Ant. : 3m 3115 Ant. pol. : VERTICAL

Limit : FCC PART-15C (1G-AV)

Env. / Ins. : 8593EM 25°C/62% Engineer : Alvin_Yang

EUT : Controller M/N:CR100

Power Rating : 120Vac/60Hz

Test Mode : TX2462MHz

3. DEVIATION TO TEST SPECIFICATIONS

【NONE】

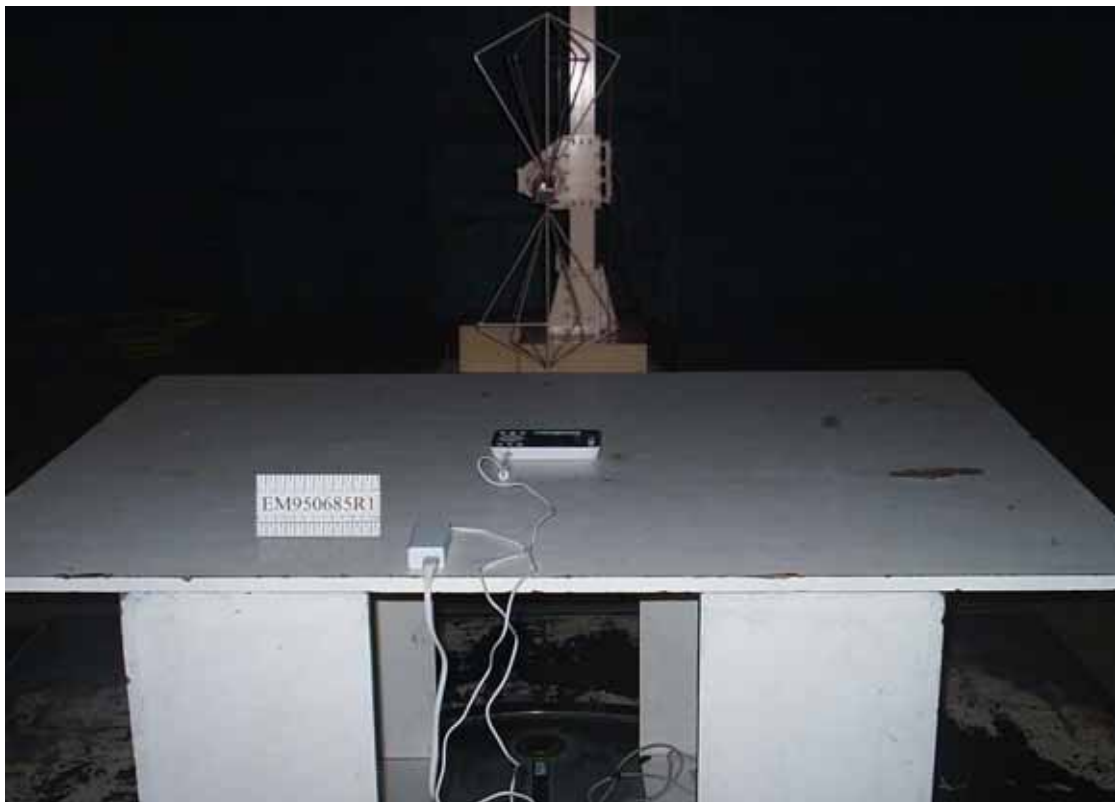
4. PHOTOGRAPHS

4.1. Photos of Radiated Measurement at Semi-Anechoic Chamber

4.1.1. Frequency Range: 30MHz to 1GHz



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

4.1.2. Frequency Range: Above 1GHz



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT