STC Test Report

Date : 2009-03-12
No. : HM163125

Applicant (GAS003): Gatekeeper Systems (HK) Ltd.
Unit 2318-2319, Level 23, No. 223 Hing Fong Road, Kwai Fong, N.T., Hong Kong.

Manufacturer: Gatekeeper Systems (HK) Ltd.
Unit 2318-2319, Level 23, No. 223 Hing Fong Road, Kwai Fong, N.T., Hong Kong.

Description of Samples:

Product:	Purchek Door Manager
Brand Name:	Purchek Door Manager
Model Number:	D-9801
FCC ID:	W3Z-D9801

Date Samples Received: 2009-02-23

Date Tested: 2009-03-03 to 2009-03-06

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2008 and ANSI C63.4:2003 for FCC Certification.

Conclusions: The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remarks: ----

Dr. LEE Kam Chuen,
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.

The Hong Kong Standards and Testing Centre Ltd.
10 Dai Wang Street, Taipo Industrial Estate, N.T., Hong Kong
Tel: (852) 2666 1888 Fax: (852) 2664 4353 Homepage: www.hkstc.org E-mail: hkstc@hkstc.org

CONTENT:

1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate
New Territories, Hong Kong

1.2 Applicant Details

Applicant

Gatekeeper Systems (HK) Ltd.
Unit 2318-2319, Level 23, No. 223 Hing Fong Road, Kwai Fong, N.T., Hong Kong.

Manufacturer

Gatekeeper Systems (HK) Ltd.
Unit 2318-2319, Level 23, No. 223 Hing Fong Road, Kwai Fong, N.T., Hong Kong.

1.3 Equipment Under Test [EUT]

Description of Sample

Product:	Purchek Door Manager
Manufacturer:	Gatekeeper Systems (HK) Ltd
Brand Name:	Purchek Door Manager
Model Number:	Purchek Door Manager
Input Voltage:	110-220Va.c. 0.5A 50/60Hz

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Gatekeeper Systems (HK) Ltd., the transmission signal is frequency hopping with channel frequency range 2402.6-2476.1MHz during normal use. The EUT was set to fixed frequency test mode before test through RS232 cable which connected to PC, the cable was disconnected before test..

1.4 Date of Order

2009-02-23

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2009-03-03 to 2009-03-06

1.7 Country of Origin

China

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2008 Regulations and ANSI C63.4:2003 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION
Results Summary

Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Fail	N/A
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.4:2003	N/A	☒	☐	☐
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

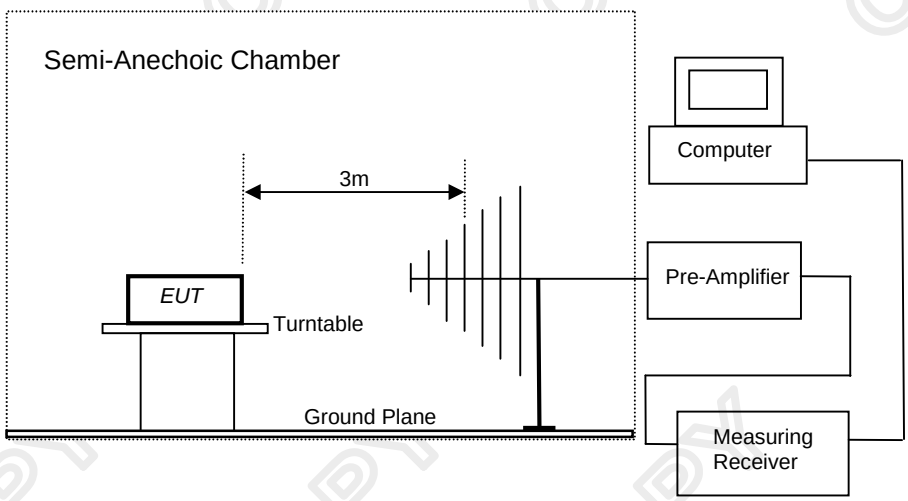
Test Requirement:	FCC 47CFR 15.249
Test Method:	ANSI C63.4:2003
Test Date:	2009-03-03
Mode of Operation:	Tx on mode

Test Method:

The sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

* Semi-anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Test Setup:



Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [microvolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928	50,000 [Average]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Results of Tx on mode (Channel 5): Pass

Field Strength of Fundamental Emissions
Peak Value

	Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
	2402.6	62.5	29.1	91.6	38,018.9	500,000	Vertical
*	4804.4	11.8	34.6	46.4	208.9	500	Vertical
	7207.8	**No Emission Detected**				500	Vertical
	9610.4					500	Vertical
*	12013.0					500	Vertical
	14415.6					500	Vertical
	16818.2					500	Vertical
*	19220.8					500	Vertical
	21623.4					500	Vertical
	24026.0					500	Vertical

Field Strength of Fundamental Emissions
Average Value

	Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
+	2402.6	45.1	29.1	74.2	5,128.6	50,000	Vertical

Remarks:
No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
*: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Secti on 15.209 were applied.

+: Adjusted by Duty Cycle = -17.4dB

Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [microvolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928	50,000 [Average]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Results of Tx on mode (Channel 128): Pass

Field Strength of Fundamental Emissions
Peak Value

	Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
	2441.2	63.0	29.3	92.3	41,209.8	500,000	Vertical
*	4881.7	12.4	34.9	47.3	231.7	500	Vertical
	7323.6	**No Emission Detected**				500	Vertical
	9764.8					500	Vertical
*	12206.0					500	Vertical
	14647.2					500	Vertical
	17088.4					500	Vertical
*	19529.6					500	Vertical
	21970.8					500	Vertical
	24412.0					500	Vertical

Field Strength of Fundamental Emissions
Average Value

	Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
+	2441.2	45.6	29.3	74.9	5,559.0	50,000	Vertical

Remarks:
No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
*: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.
+: Adjusted by Duty Cycle = -17.4dB

Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [microvolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928	50,000 [Average]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Results of Tx on mode (Channel 239): Pass

Field Strength of Fundamental Emissions
Peak Value

	Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
	2476.1	64.1	29.7	93.8	48,977.9	500,000	Vertical
*	4951.6	11.8	35.2	47.0	223.9	500	Vertical
	7428.3	**No Emission Detected**				500	Vertical
	9904.4					500	Vertical
*	12380.5					500	Vertical
	14856.6					500	Vertical
	17332.7					500	Vertical
*	19808.8					500	Vertical
	22284.9					500	Vertical
	24761.0					500	Vertical

Field Strength of Fundamental Emissions
Average Value

	Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
+	2476.1	46.7	29.7	76.4	6,606.9	50,000	Vertical

Remarks:
No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
*: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.
+: Adjusted by Duty Cycle = -17.4dB

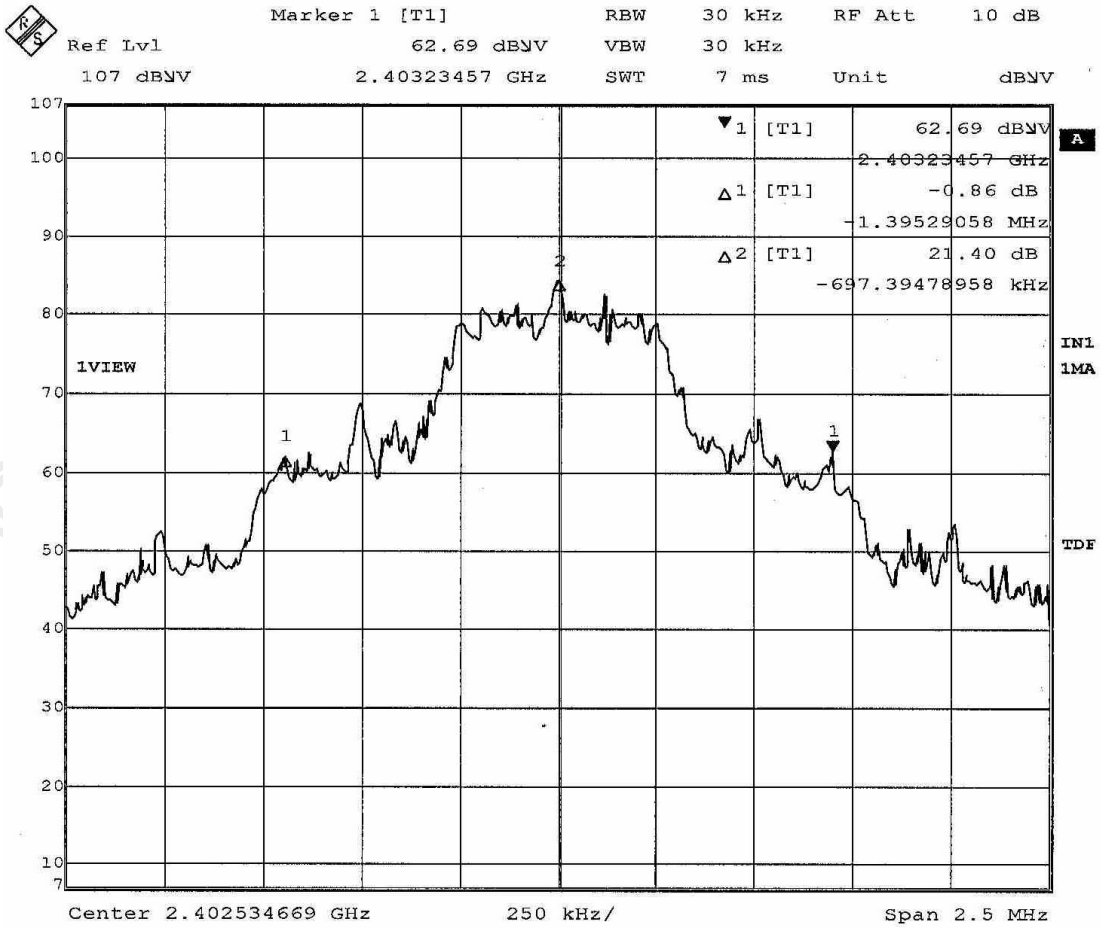
Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [MHz]
2402.5	1.395

Channel 5

20dB Bandwidth of Fundamental Emission

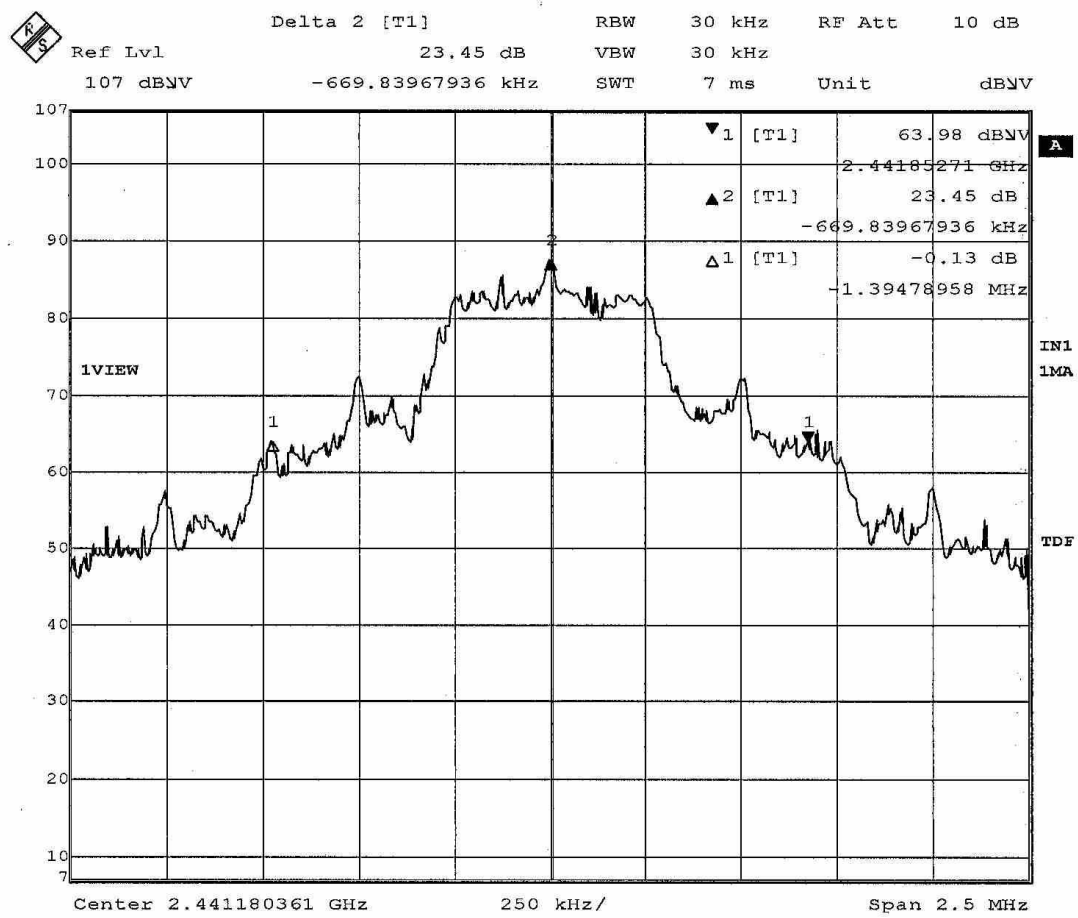


Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [MHz]
2441.2	1.395

Channel 128

20dB Bandwidth of Fundamental Emission

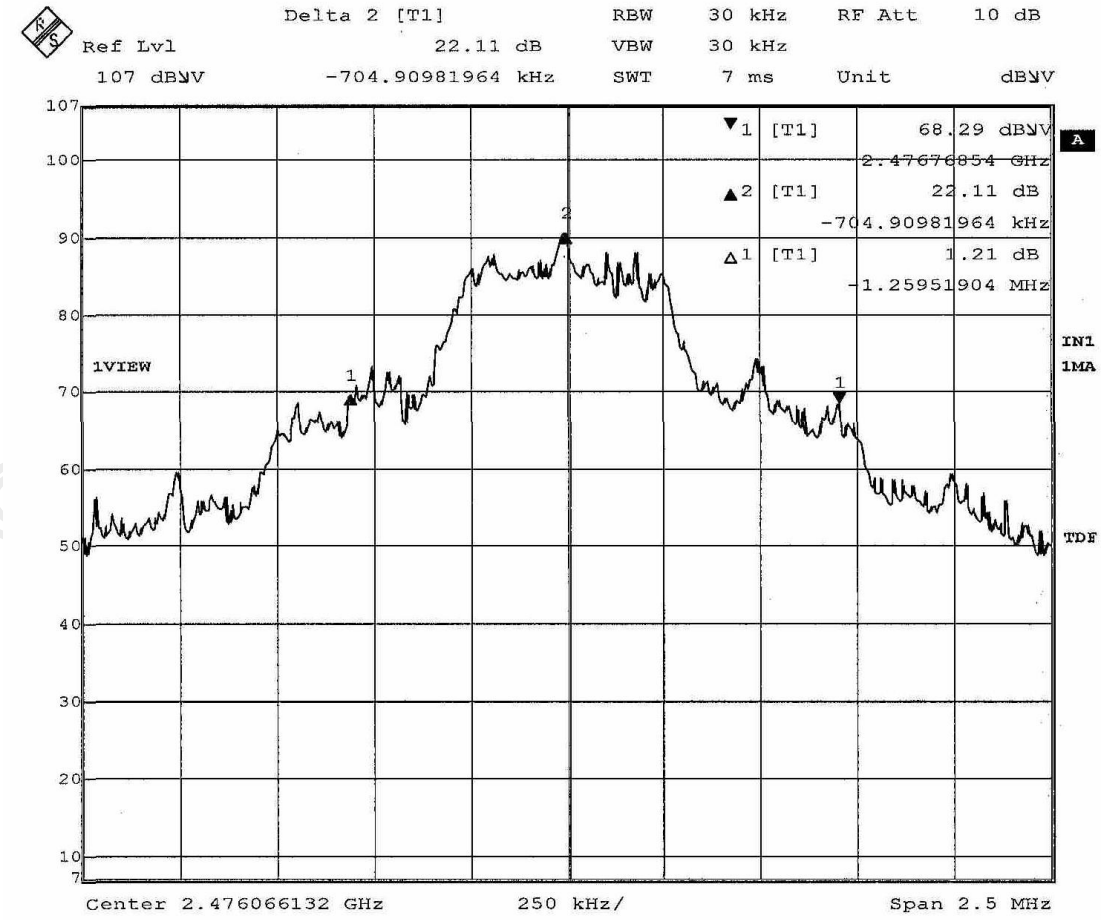


Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [MHz]
2476.1	1.26

Channel 239

20dB Bandwidth of Fundamental Emission



Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results of Tx On Mode: PASS

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dBμV/m	Limit @3m dBμV/m	Level @3m μV/m	Limit @3m μV/m
30.900	Vertical	37.4	40	74.1	100
50.100	Vertical	33.5	40	47.3	100
80.200	Vertical	34.6	40	53.7	100
203.400	Vertical	36.2	46	64.6	200

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB

1GHz to 18GHz 5.1dB

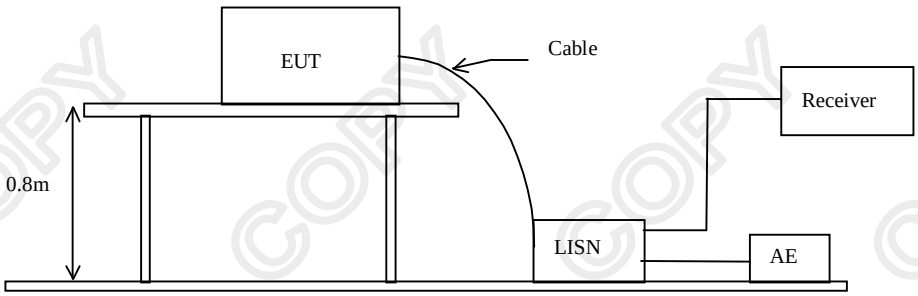
3.1.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2003
Test Date:	2009-03-03
Mode of Operation:	On mode

Test Method:

The test was performed in accordance with ANSI C63.4: 2003, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



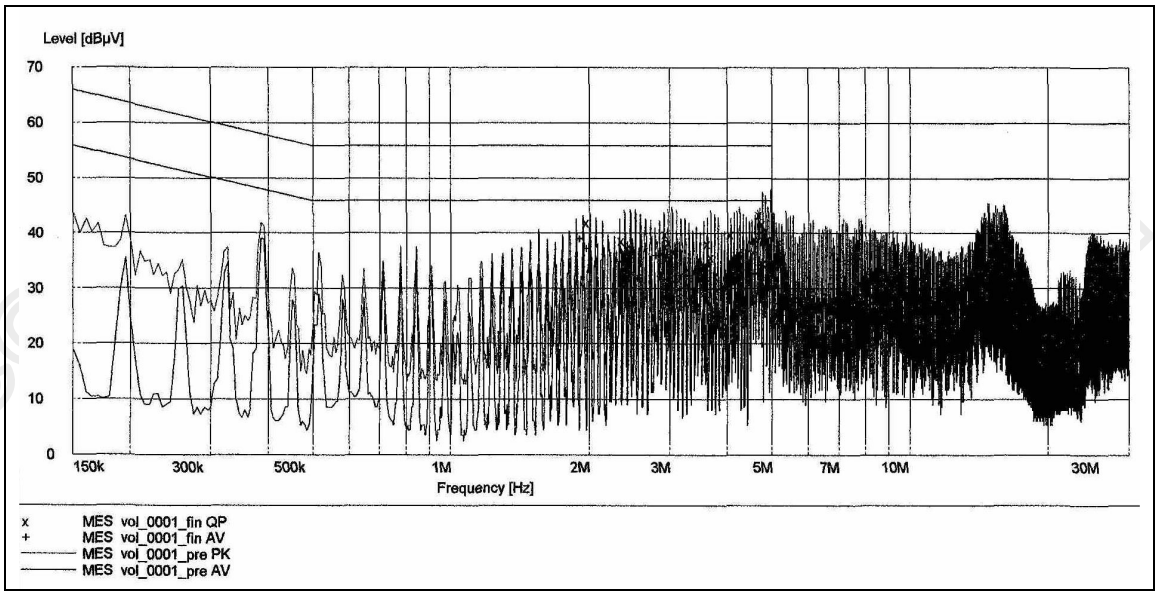
Limit for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of On mode: PASS



Results of On mode: PASS

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dBμV	Limit dBμV	Level μV	Limit μV
Live	2.455	-*-	-*-	34.0	46.0
Live	3.035	38.5	56.0	-*-	-*-
Live	3.100	36.8	56.0	-*-	-*-
Live	3.550	-*-	-*-	34.3	46.0
Live	3.680	38.2	56.0	-*-	-*-
Live	3.745	35.8	56.0	-*-	-*-
Live	4.260	-*-	-*-	32.6	46.0
Live	4.970	38.9	56.0	-*-	-*-
Neutral	1.935	-*-	-*-	39.1	46.0
Neutral	2.000	42.0	56.0	37.3	46.0
Neutral	2.390	38.7	56.0	35.0	46.0
Neutral	2.455	37.4	56.0	-*-	-*-
Neutral	2.520	37.2	56.0	-*-	-*-
Neutral	2.585	-*-	-*-	31.9	46.0
Neutral	2.840	-*-	-*-	36.0	46.0
Neutral	2.970	40.0	56.0	35.7	46.0
Neutral	3.035	-*-	-*-	35.1	46.0
Neutral	4.130	39.9	56.0	34.1	46.0
Neutral	4.260	36.1	56.0	-*-	-*-
Neutral	4.325	35.4	56.0	-*-	-*-
Neutral	4.650	-*-	-*-	32.7	46.0
Neutral	4.775	43.5	56.0	-*-	-*-
Neutral	4.780	-*-	-*-	32.9	46.0
Neutral	4.840	41.9	56.0	34.9	46.0
Neutral	4.970	-*-	-*-	33.9	46.0

Remarks:
Calculated measurement uncertainty : 3.97dB
-*- Emission(s) that is far below the corresponding limit line.

Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM020	HORN ANTENNA	EMCO	3115	4032	2006/07/11	2009/07/11
EM215	MULTIDEVICE CONTROLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-Linggren	FACT-3	--	2008/12/01	2011/12/01
EM174	BICONILOG ANTENNA	EMCO	3142B	1671	2008/01/24	2010/01/24
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2008/06/16	2009/06/16
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2006/07/26	2009/07/26

Approved Antenna List

1. Cushcraft S2401240P12NF
2. Nearson S151AM-2450S

Remarks:-

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

Appendix B

Duty Cycle Correction During 100msec

Each sample unit sends a different series of characters, but each pulse period (100msec) never exceeds a series of 35 long (0.387msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered 35x0.387msec per 100msec=13.55% duty cycle. Figure A through B show the characteristics of the pulse train for one of these functions.

Remarks:

Duty Cycle Correction = 20Log (0.135) =-17.4dB

The following figures [Figure A to Figure B] showed the characteristics of the pulse train for one of these functions.

Figure A [Pulse Train]

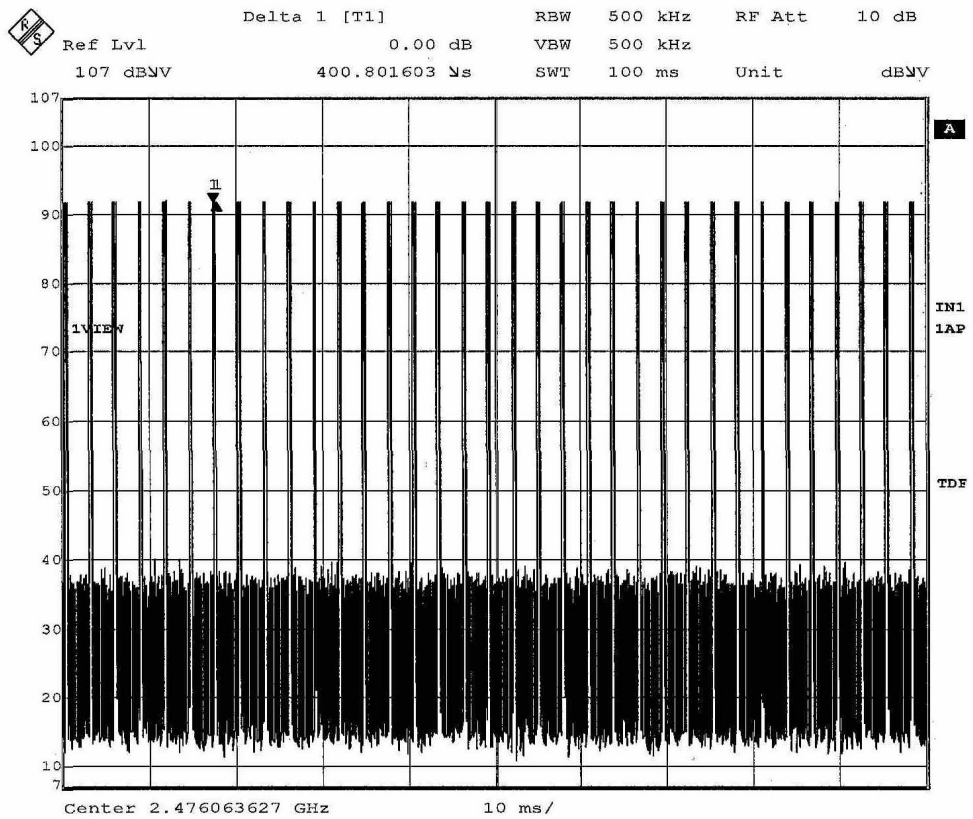
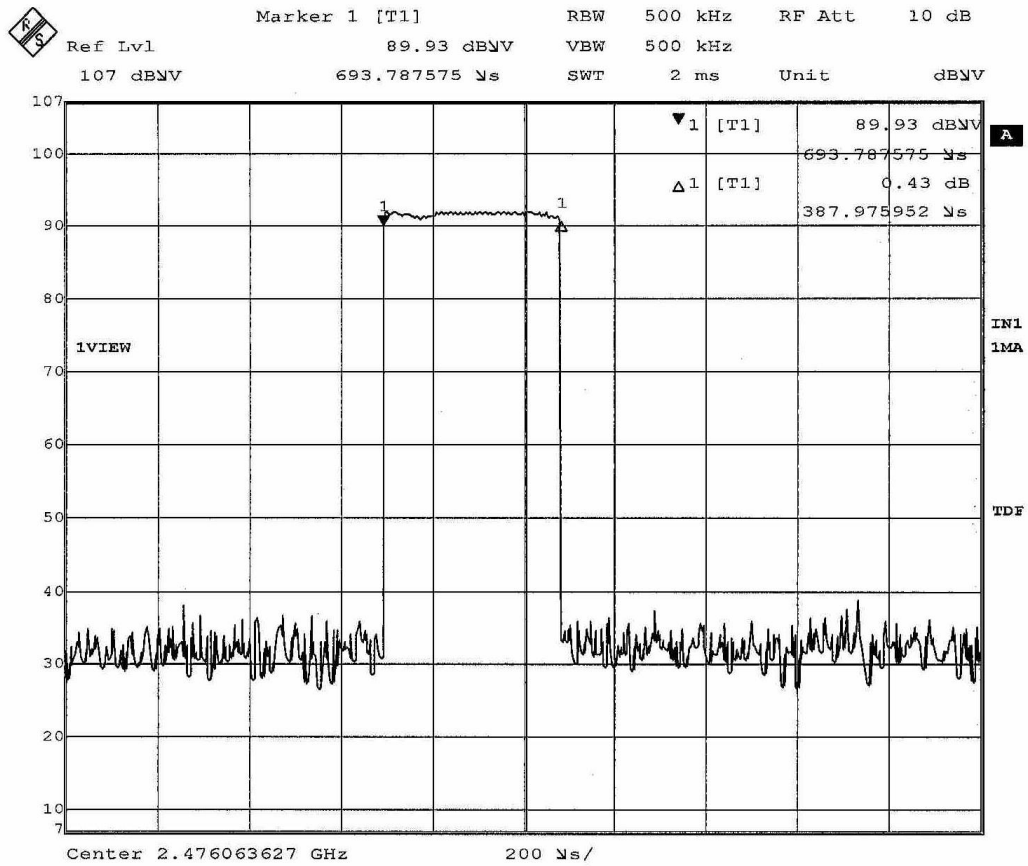


Figure B [35 Pulses within 100ms]



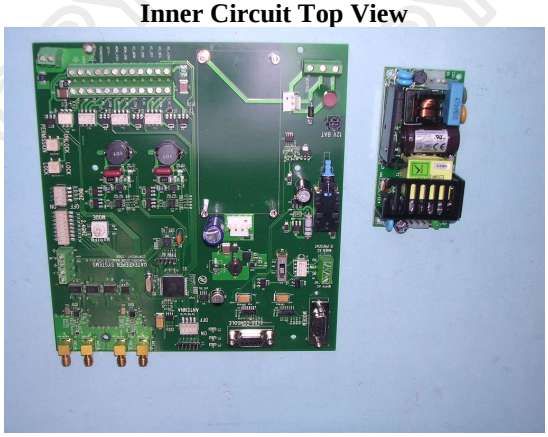
Appendix C

Photographs of EUT

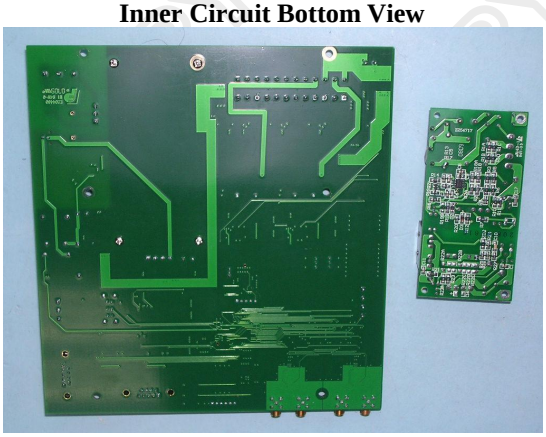
Front View of the product

Rear View of the product

Inner Circuit Top View

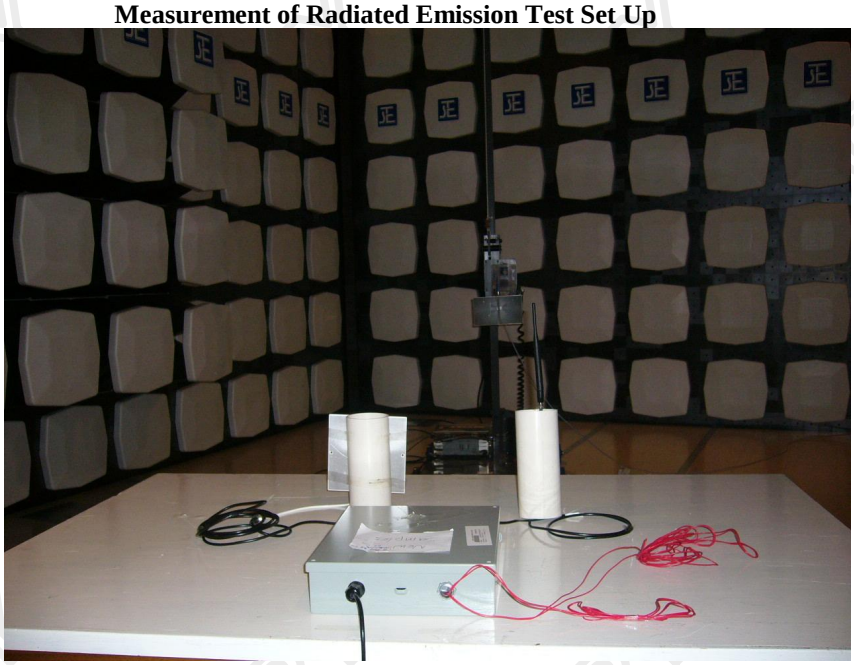


Inner Circuit Bottom View

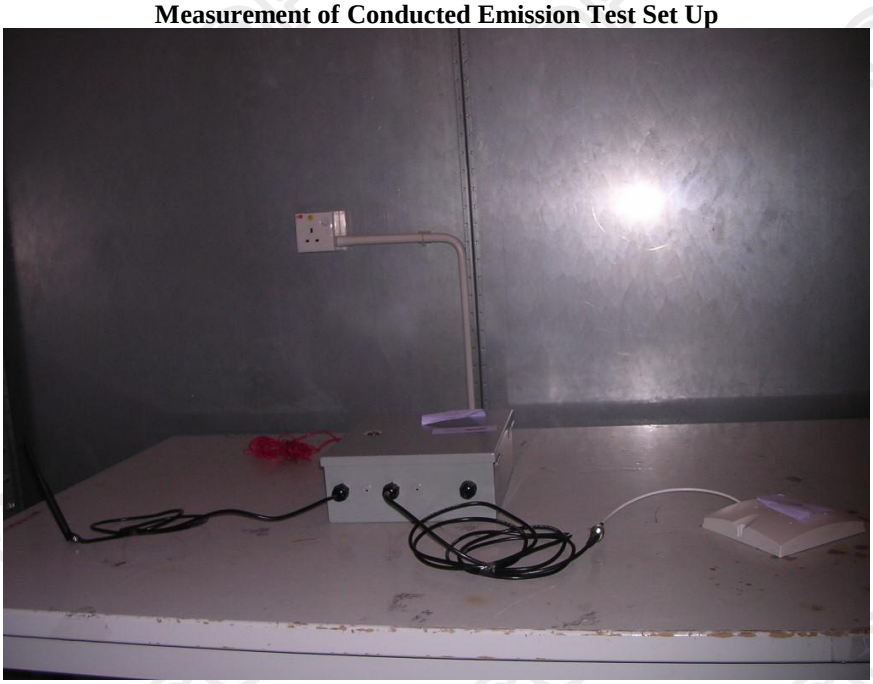


Photographs of EUT

Measurement of Radiated Emission Test Set Up

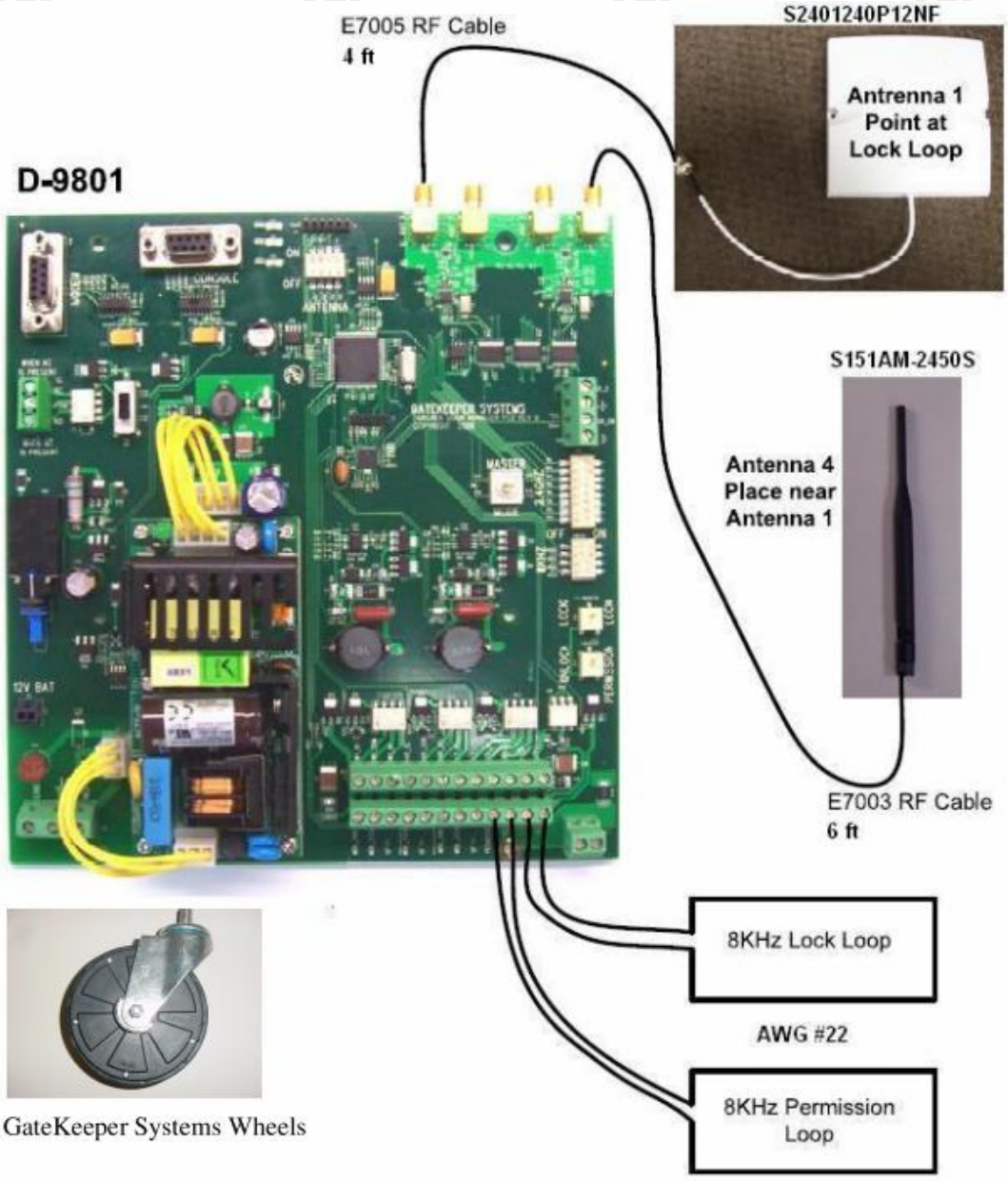


Measurement of Conducted Emission Test Set Up



Appendix D

Antenna Connection Diagram



***** End of Test Report *****