ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT
FOR

58KHZ TAG AND LABEL CHECKER

MODEL NAME: WG DC58

FCC ID: P9IWGDC58-1

Prepared For

WG SECURITY PRODUCTS, INC
3031 TISCH WAY, STE 602
SAN JOSE, CA 95128
USA

Prepared By

Compliance Certification Services
561F Monterey Road
Morgan Hill CA 95037
USA

Report No : 03U1827-1
Revision A
Date : 3/3/03

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Verification Of Compliance

COMPANY NAME	:	WG SECURITY PRODUCTS, INC. 3031 TISCH WAY, STE 602 SAN JOSE, CA 95128, USA
CONTACT PERSON	:	GRAHAM HANDYSIDE / VICE PRESIDENT
TELPHONE NO	:	(408) 241-8070
MODEL NAME	:	WG DC58
DATE TESTED	:	2/20/2003 – 2/26/2003

LIMIT APPLY TO : FCC PART 15 SECTION 15.209	
TECHNICAL LIMITS	**TEST RESULT**
Radiated Emission	No non-compliance noted
LIMIT APPLY TO : FCC PART 15 SECTION 15.207	
AC Line Conducted Emission	No non-compliance noted

The above equipment was tested by Compliance Engineering Services Inc. for compliance with the requirement set forth in the requirements of CFR 47 PART 15 SUBPART C.This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

Tested By:

FRANK IBRAHIM
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Approved & Released For CCS By:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

SECTION 1: LABORATORY INFORMATION

1.1 General Condition:

This report contains an assessment of an apparatus against Electromagnetic Interference Technical Requirements based upon tests carried out on the samples submitted.

With regard to this assessment, the following points should be noted:

a) The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties. and reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section.

b) The apparatus was set up and exercised using the configurations, modes of operation and arrangements defined in this report only.

c) Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report.

d) All testing was performed under the following environmental conditions:

·	Temperature	15ºC to 35ºC (54°F to 95°F)
·	Atmospheric Pressure	860mbar to 1060mbar (25.4" to 31.3")
·	Humidity	10% to 75%

1.2 Measurement Facilities

Compliance Certification Services
561F Monterey Road
Morgan Hill CA 95037
USA
Tel: (408)463-0885, Fax: (408)463-0888

1.3 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	ELA-171
Taiwan	BSMI	CNS 13438	SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	IC2324 A,B,C, and F

1.4 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated Emission	
30MHz – 200 MHz	+/- 3.3dB
200MHz – 1000MHz	+4.5/-2.9dB
1000MHz – 2000MHz	+4.6/-2.2dB
Power Line Conducted Emission	
150kHz – 30MHz	+/-2.9

Any results falling within the above values are deemed to be marginal.

1.5 Deviation from measurement specification

Not Applicable

1.6 Measurement Instrument Calibration

The measuring equipment which were utilized in performing the tests documented herein has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment which is traceable to recognized national standards.

SECTION 2: PRODUCT INFORMATION

2.1 Product Description:

The label and tag checker is an Electronic Article Surveillance system that works with any 58kHz tags or labels. The system transmits 1.6mS wide modulated signal of 58kHz, then open a 1.6mS wide listening window to detect the rings from labels in the detection zones, two or more times validations will trigger system alarm. The whole cycle is 60mS.

2.2 Power Requirements

AC	N/A
DC	N/A
Battery Power	N/A
AC-DC Adaptor	Input: 110VAC, 60Hz / 220VAC, 50HzOutput: 2 X 10 VDC

2.3 Local Osc. Or Crystal:

Board Name	**Local Osc. / Crystal (MHz)**
Main	22.11 MHz, 3.712 MHz
Communication	N/A

2.4 Serial Number

Not Applicable

SECTION 3: TEST SUMMARY

3.1 Applicable Electromagnetic Interference Requirements:

Radiated Emission Technical Requirements 15.209		
Frequency (MHz)	**Field strength (microvolts/meter)**	**Measurement distance (meters)**
0.009-0.490	2400/F(KHz)	300
0.490-1.705	24000/F(KHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Conducted Emission Technical Requirements 15.207		
Frequency Range	**FCC limits Quasi-Peak (dBuV)**	**FCC limits Average (dBuV)**
150kHz – 0.5 MHz	66 to 56*	56 to 46*
0.5MHz – 5MHz	56	46
5MHz – 30MHz	60	50

* Decreases with logarithm of frequency

3.2 Sample received date and Test Period:

Sample received date	2/20/03
Test Period	2/26/03

3.3 MODIFICATIONS

DURING TEST SOME MODIFICATIONS WERE MADE TO ACHIEVE THE LIMIT:

1. One ferrite with two turns was added on AC Power cable.
Manufacturer: Steward
P/N: HFR100049-OB2

2. One ferrite with one turn was added on antenna.
Manufacturer: Steward.
P/N: 28A2024-OAO

SECTION 4 ELECTROMAGNETIC INTERFERENCE TEST

Ambient Conditions:

	Temperature	Humidity
Radiated Emission	25 ° C	60 %
Conducted Emission	25 ° C	60 %

Test Configuration:

Software Used During The Tests	
File Name	☐ EMCTEST ☐ Pinging ☐ Read & Write ☐ Terminal ☐ Music ☐ Joy-Stick ☒ Other:
Program Sequence	EUT transmitting a 58kHz signal and alarming with presence of a tag.

Mode of Operational Investigated:

Worse Case Emission Levels			
	Mode of Operation	Radiated Emission	Conducted Emission
1	EUT transmitting a 58kHz signal and alarming with presence of a tag	☒	☒
		☐	☐
2		☐	☐

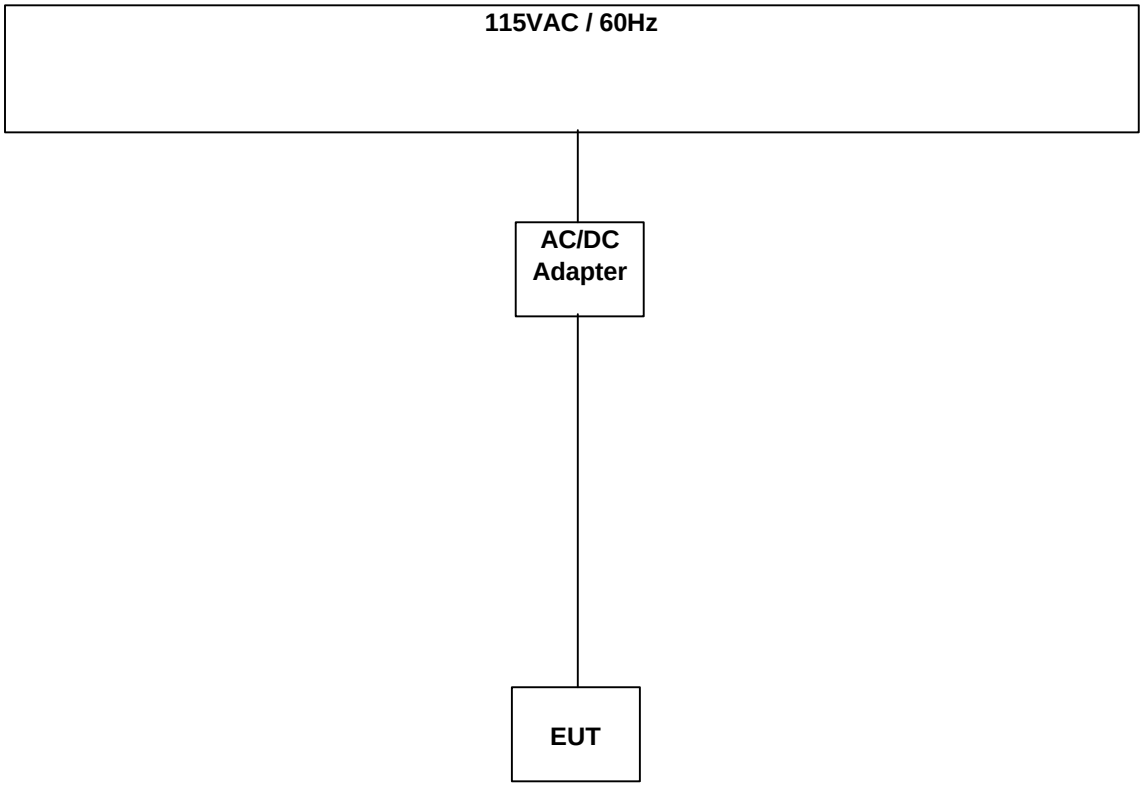
Frequency Range Investigated:

	From	To
Radiated Emissions	9kHz	1GHz
Conducted Emissions	0.15MHz	30MHz

Test Peripherals

No support equipment were used.

Test Configuration Diagram



4.1 Radiated Emission Test Procedures

The EUT was placed on a wooden table 80 cm above the ground screen. The antenna to EUT distance was 10 meters for frequencies below 30MHz, and 3 meters for frequencies above 30MHz During the test, the table was rotated 360 degrees to maximize emissions and the antenna was positioned from 1 to 4 meters above the ground screen to further maximize emissions. Measurements were made with the antenna polarized in both the vertical and the horizontal positions.

The EUT test configuration was according to Section 8 of ANSI C63.4/2001

The following procedure was used to make the measurements: The frequency range of interest was monitored at a fixed antenna height and EUT azimuth. The Frequency span was set small enough to easily differentiate between broadcast stations, intermittent ambient signals and EUT emissions. The EUT was rotated through 360 degrees to maximize emissions received. During the rotation if emission increased by more than 1 dB, or if another emission appeared that was greater by 1 dB, the EUT was returned to the azimuth where the maximum occurred, and additional cable manipulation was performed to further maximize received emissions.

The antenna was moved up and down to further maximize the suspected highest amplitude signal. If the emission increased by 1 dB or more, or if another emission appeared that was greater by 1dB or more, the antenna was returned to the height where maximum signal was observed, and, cables were manipulated to produce highest emissions, noting frequency and amplitude.

4.1.1 Instrument Setting

Frequency Range	Instrument	Detector Function	Resolution Bandwidth	Video Bandwidth
30 - 1000 MHz	EMI Receiver	Quasi-Peak	120kHz	N/A
30 – 1000 MHz	Spectrum Analyzer	Peak	100kHz	100kHz
Above 1000 MHz	Spectrum Analyzer	Peak	1 MHz	1 MHz

4.1.2 Measurement Instrument Configuration

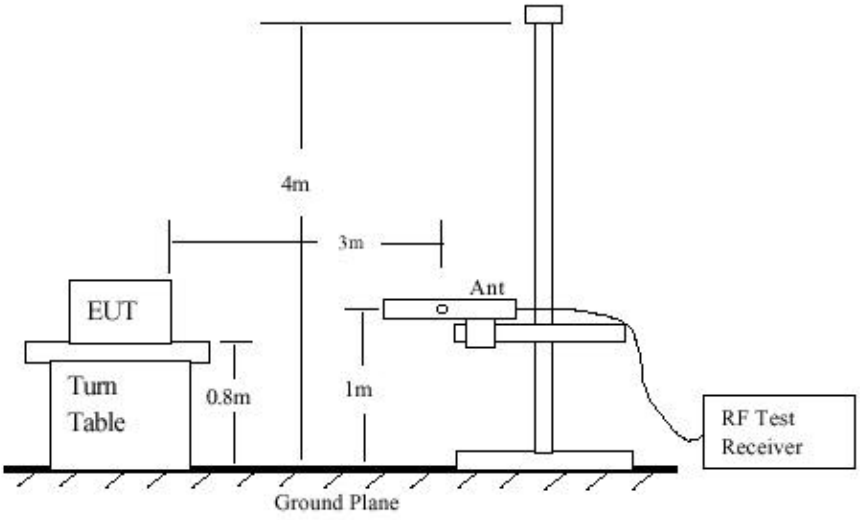


Fig 1: Radiated Emission Measurement 30 to 1000 MHz

4.1.3 Measurement Equipment Used

TEST EQUIPMENT LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
SA RF Section, 22 GHz	HP	85660B	3014A06685	6/1/03
SA Display Section 1	HP	85662A	3026A19146	5/23/03
Quasi-Peak Adaptor	HP	85650A	3145A01654	6/1/03
Preamplifier, 1300 MHz	HP	8447D	2944A06550	8/22/03
Antenna, Biconical	Eaton	94455-1	1214	3/29/03
Antenna, Log Periodic 200 ~ 1000 MHz	EMCO	3146	9107-3163	3/29/03
Antenna, Loop 9 kHz ~ 30 MHz	EMCO	6502	9202-2722	4/20/03
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	9/6/03
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	837990	9/6/03
Line Filter	Lindgren	LMF-3489	497	NCR
EMI Test Receiver	R & S	ESHS 20	827129/006	4/17/03
AC Power Source, 10KVA	ACS	AFC-10K-AFC-2	J1568	C.N.R

4.1.4 Radiated Emission Test Setup Photos

X Axis Orientation (Worst Position)

Y Axis Orientation

Z Axis Orientation

4.1.5 Radiated Emission Test Result

COMPLIANCE Certification Services
FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #:	03U1827-1
Report #:	030220B1
Date& Time:	02/20/03 2:59 PM
Test Engr:	Chin Pang

Company:	WG Security Products, Inc.
EUT Description:	58KHz TAG and Label Checker
Test Configuration :	EUT only
Type of Test:	EN55022 Class B
Mode of Operation:	EUT transmitting continuously.

<< Main Sheet

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit EN_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
176.95	43.00	9.15	3.27	28.23	27.19	30.00	-2.81	10mH	0.00	2.00	P
132.70	41.10	11.37	2.86	28.34	26.98	30.00	-3.02	10mV	0.00	1.50	QP
44.24	42.93	10.74	1.80	28.52	26.95	30.00	-3.05	10mV	0.00	2.00	QP
331.77	43.60	13.88	4.52	28.10	33.90	37.00	-3.10	10mH	0.00	2.00	P
353.92	42.80	14.52	4.68	28.24	33.76	37.00	-3.24	10mH	0.00	2.00	P
132.70	40.70	11.37	2.86	28.34	26.58	30.00	-3.42	10mH	0.00	2.50	P
6 Worst Data											

4.2 Conducted Emission Test Procedures

The EUT was setup and located so that the distance between the boundary of the EUT and the closest surface to the LISN was 0.8m or more.

EUT test configuration was according to Section 7 of ANSI C63.4/2001.

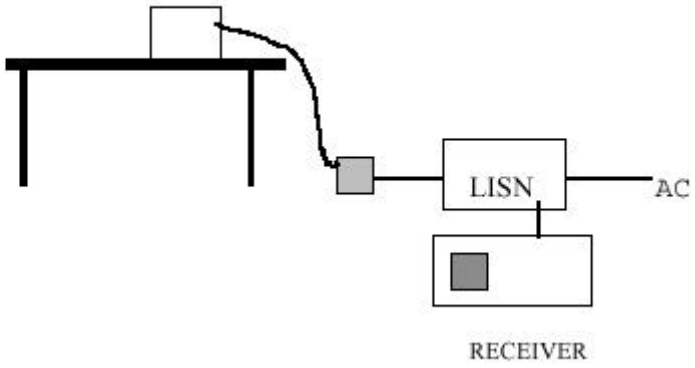
Conducted disturbance was measured between the phase lead and the ground, and between the neutral lead and the ground.The frequency range of (0.150 – 30) MHz was investigated.

The EMI receiver was set to PEAK detector setting, and swept continuously over the frequency range to be investigated. The resolution bandwidth was set to 9kHz minimum. The EMI receiver input cable was connected to LINE 1 RF measurement connection on the LISN. A 50ohm terminator was connected to the unused RF port on the LISN. For each mode of EUT operation, emissions readings were maximized by manipulating cable and wire positions. The configuration for each EUT power cord which produced emissions closest to the limit was recorded.The same procedure was repeated for LINE 2 of each EUT power cord.

4.2.1 Instrument Settings

Frequency Range	Peak	Quasi-Peak	Average
0.150 – 30 MHz	10 kHz	9 kHz	10 kHz

4.2.2 Measurement Instrument Configuration

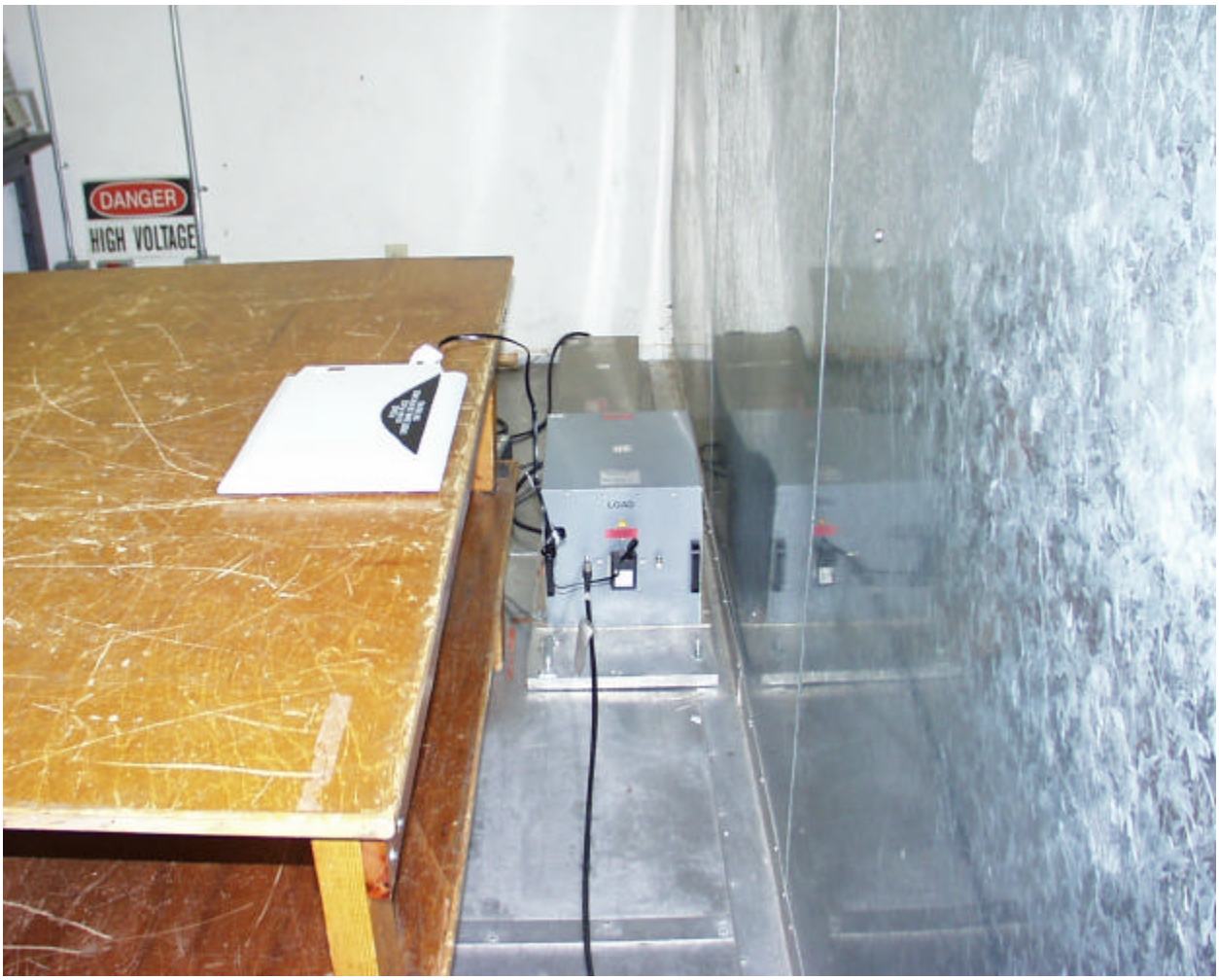


4.2.3 Measurement Equipment Used

TEST EQUIPMENT LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
SA RF Section, 22 GHz	**HP**	**85660B**	**3014A06685**	**6/1/03**
SA Display Section 1	**HP**	**85662A**	**3026A19146**	**5/23/03**
Quasi-Peak Adaptor	**HP**	**85650A**	**3145A01654**	**6/1/03**
Preamplifier, 1300 MHz	**HP**	**8447D**	**2944A06550**	**8/22/03**
Antenna, Biconical	**Eaton**	**94455-1**	**1214**	**3/29/03**
Antenna, Log Periodic 200 ~ 1000 MHz	**EMCO**	**3146**	**9107-3163**	**3/29/03**
Antenna, Loop 9 kHz ~ 30 MHz	**EMCO**	**6502**	**9202-2722**	**4/20/03**
LISN, 10 kHz ~ 30 MHz	**FCC**	**50/250-25-2**	**114**	**9/6/03**
LISN, 10 kHz ~ 30 MHz	**Solar**	**8012-50-R-24-BNC**	**837990**	**9/6/03**
Line Filter	**Lindgren**	**LMF-3489**	**497**	**NCR**
EMI Test Receiver	**R & S**	**ESHS 20**	**827129/006**	**4/17/03**
AC Power Source, 10KVA	**ACS**	**AFC-10K-AFC-2**	**J1568**	**C.N.R**

4.2.4 Conducted Emission Test Setup Photos

Front View



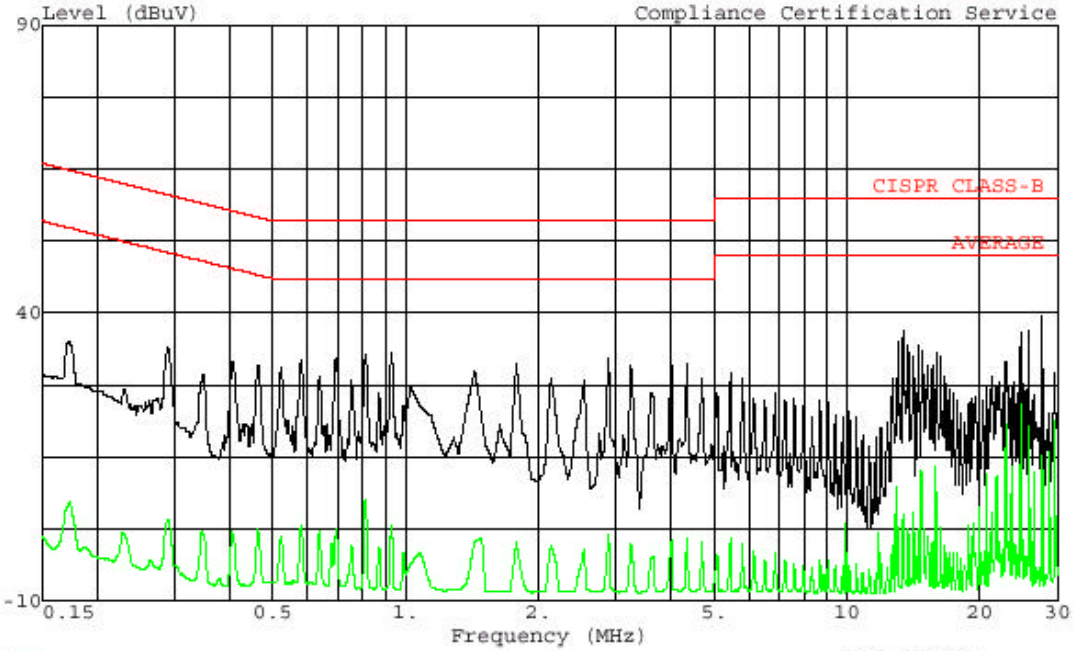
Rear View

4.2.5 Conducted Emission Test Result

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
27.71	39.54	--	37.94	0.00	60.00	50.00	-20.46	-12.06	L1
25.86	36.96	--	34.36	0.00	60.00	50.00	-23.04	-15.64	L1
13.41	36.86	--	5.20	0.00	60.00	50.00	-23.14	-44.80	L1
27.71	37.98	--	35.36	0.00	60.00	50.00	-22.02	-14.64	L2
13.41	34.90	--	3.03	0.00	60.00	50.00	-25.10	-46.97	L2
24.79	34.74	--	31.78	0.00	60.00	50.00	-25.26	-18.22	L2
6 Worst Data									

COMPLIANCE Engineering Services, Inc.
561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

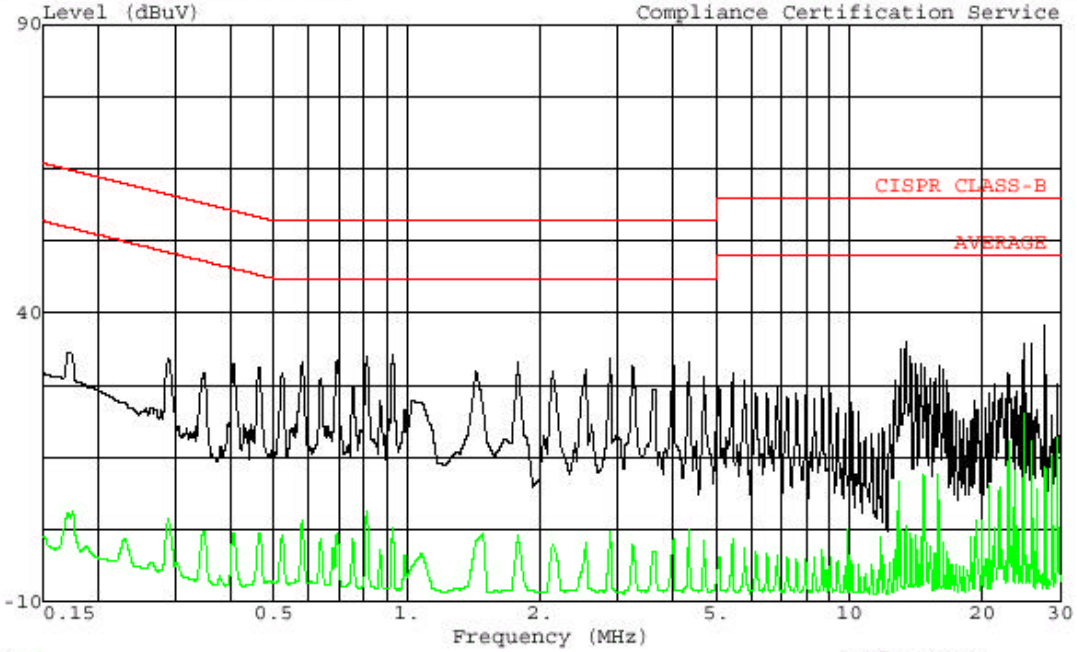
Data#: 7 File#: 03U1827A.EMI Date: 02-14-2003 Time: 11:20:12



Trace: 5 Ref Trace:
Project # : 03u1827
Test Engineer : NEELESH RAJ
Company : WG SECURITY PRODUCTS, INC.
EUT : 58KHz TAG AND LABEL CHECKER
Test Config. : EUT
Test of Target: CISPR22-B
Mode of Oper. : Tx
: L1 (peak;black avg;lgreen)
: 115VAC@60Hz

COMPLIANCE Engineering Services, Inc.
561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 7 File#: 03U1827B.EMI Date: 02-14-2003 Time: 11:29:39



Trace: 5 Ref Trace:
Project # : 03u1827
Test Engineer : NEELESH RAJ
Company : WG SECURITY PRODUCTS, INC.
EUT : 58KHz TAG AND LABEL CHECKER
Test Config. : EUT
Test of Target: CISPR22-B
Mode of Oper. : Tx
: L2 (peak;black avg;lgreen)
: 115VAC@60Hz

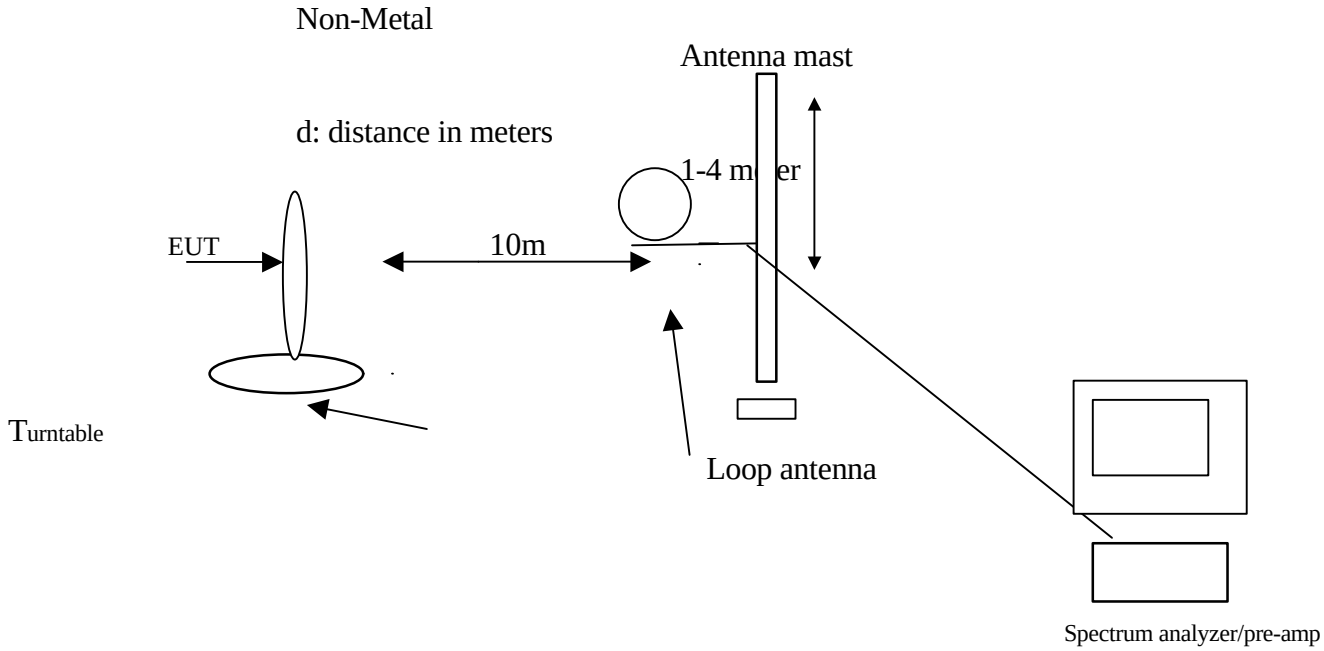
4.3FCC Testing below 30MHz.

4.3.1 Instrument Settings

Frequency Range	Instrument	Detector Function	Resolution Bandwidth	Video Bandwidth
9kHz - 150 kHz	EMI Receiver	Quasi-Peak	3kHz	3kHz
150kHz –30 MHz	EMI Receiver	Quasi-Peak	100kHz	100kHz
9kHz - 150 kHz	Spectrum Analyzer	Peak	100Hz	100Hz
150kHz– 30 MHz	Spectrum Analyzer	Peak	9kHz	9kHz

4.3.2 Measurement Instrument Configuration

Radiated BELOW 30MHz



4.3.3Measurement Equipment Used

TEST EQUIPMENT LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
SA RF Section, 22 GHz	**HP**	**85660B**	**3014A06685**	**6/1/03**
SA Display Section 1	**HP**	**85662A**	**3026A19146**	**5/23/03**
Quasi-Peak Adaptor	**HP**	**85650A**	**3145A01654**	**6/1/03**
Preamplifier, 1300 MHz	**HP**	**8447D**	**2944A06550**	**8/22/03**
Antenna, Biconical	**Eaton**	**94455-1**	**1214**	**3/29/03**
Antenna, Log Periodic 200 ~ 1000 MHz	**EMCO**	**3146**	**9107-3163**	**3/29/03**
Antenna, Loop 9 kHz ~ 30 MHz	**EMCO**	**6502**	**9202-2722**	**4/20/03**
LISN, 10 kHz ~ 30 MHz	**FCC**	**50/250-25-2**	**114**	**9/6/03**
LISN, 10 kHz ~ 30 MHz	**Solar**	**8012-50-R-24-BNC**	**837990**	**9/6/03**
Line Filter	**Lindgren**	**LMF-3489**	**497**	**NCR**
EMI Test Receiver	**R & S**	**ESHS 20**	**827129/006**	**4/17/03**
AC Power Source, 10KVA	**ACS**	**AFC-10K-AFC-2**	**J1568**	**C.N.R**

4.3.4 Below 30MHz Emission Test Setup photos

4.3.5 Below 30MHz Emission Test Results

COMPLIANCE Certification Services
FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #: 03U1827
Report #: 030221B01
Date& Time: 02/21/03 3:05 PM
Test Engr: William Zhuang

Company: WG SECURITY PRODUCTs, INC.
EUT Description: 58KHz TAG AND LABEL CHECKER, model: WG DC58 DOUBLE CHECKER
Test Configuration : Standalone EUT
Type of Test: FCC 15.209
Mode of Operation: TX ON

○ A-Site ◉ B-Site ○ C-Site ○ F-Site 6 Worst Data Descending

Freq. (MHz)	Reading (dBuV)	AF (dB/m)	Closs (dB)	DF (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
0.06	77.90	12.70	0.20	-59.00	31.80	52.34	-20.54	10mV	0.00	1.00	P
0.06	42.41	12.70	0.20	-59.00	-3.69	32.34	-36.03	10mV	0.00	1.00	Av
0.12	49.60	11.50	0.20	-59.00	2.30	46.32	-44.02	10mV	0.00	1.00	P
0.12	39.80	11.50	0.20	-59.00	-7.50	26.32	-33.82	10mV	0.00	1.00	Av
0.17	48.90	11.10	0.20	-59.00	1.20	42.79	-41.59	10mV	0.00	1.00	P
0.17	37.20	11.10	0.20	-59.00	-10.50	22.79	-33.29	10mV	0.00	1.00	Av
0.23	42.50	10.80	0.20	-59.00	-5.50	40.29	-45.79	10mV	0.00	1.00	P
0.23	34.10	10.80	0.20	-59.00	-13.90	20.29	-34.19	10mV	0.00	1.00	Av
0.29	42.80	10.80	0.20	-59.00	-5.20	38.36	-43.56	10mV	0.00	1.00	P
0.29	35.30	10.80	0.20	-59.00	-12.70	18.36	-31.06	10mV	0.00	1.00	Av
0.35	40.30	10.80	0.20	-59.00	-7.70	36.77	-44.47	10mV	0.00	1.00	P
0.35	31.30	10.80	0.20	-59.00	-16.70	16.77	-33.47	10mV	0.00	1.00	Av
0.41	39.40	10.60	0.20	-59.00	-8.80	35.43	-44.23	10mV	0.00	1.00	P
0.41	29.10	10.60	0.20	-59.00	-19.10	15.43	-34.53	10mV	0.00	1.00	Av
0.46	37.70	10.60	0.20	-59.00	-10.50	34.27	-44.77	10mV	0.00	1.00	P
0.46	27.90	10.60	0.20	-59.00	-20.30	14.27	-34.57	10mV	0.00	1.00	Av
0.52	35.00	10.60	0.20	-19.00	26.80	33.24	-6.44	10mV	0.00	1.00	QP

END OF REPORT