ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
CERTIFICATION TO FCC PART 15 REQUIREMENTS

for

INTENTIONAL RADIATOR

TOY WITH RADIO FREQUENCY ID CIRCUIT

MODEL NAME: B2663

FCC ID: CCT-B2663-03T

Prepared For

FISHER-PRICE INC.
636 GIRARD AVE
EAST AURORA, NY 14052
USA

Prepared By

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

Report No :03U2002-1
Revision No: A
Date:6/3/03

[Total number of pages: 27]

REPORT REVISION HISTORY

Date	Revision	Page No

TABLE OF CONTENTS

Verification Of Compliance

GENERAL INFORMATION	
Applicant	FISHER-PRICE INC. 636 GIRARD AVE EAST AURORA, NY14052
Manufacturer	FISHER-PRICE INC.

PRODUCT DESCRIPTION	
EUT Description	TOY WITH RADIO FREQUENCY ID CIRCUIT
Model Name	B2663
Product Family	N/A
Serial No	N/A

Technical Standard	*Result*
FCC Part 15 Subpart C	Passed

MEASUREMENT FACILITIES	
Laboratory Name	Accreditation
Compliance Certification Services 561F Monterey Road, Morgan Hill CA 95037 USA TEL: (408)463-0885 FAX: (408)463-0888	NVLAP, NEMKO, VCCI, BSMI and Industry Canada

*This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards & Specifications listed above and as indicated in the measurement report number :**03U2002-2***
This Verification of Compliance is hereby issued to the above named company and is only valid for the type of equipment which is identical mechanically and electronically with the unit tested under Compliance Certification Services' supervision.

Tested By: _____
Thanh Nguyen – EMC Technician

Reviewed By: _____
Thu Chan –EMC Supervisor

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. ent 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	NVLAP*	FCC Part 15, CISPR 22, AS/NZS 3548,IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CNS 13438	NVLAP 200065-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	FC 1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	VCCI 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	N 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	N ELA-171
Taiwan	BSMI	CNS 13438	SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	Canada IC2324 A,B,C, and F

*No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government

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 was 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:

Toy with Radio Frequency ID Circuit

2.2 Power Requirements

AC	**N/A**
DC	**N/A**
Battery Power	**4.5VDC (1.5 x 3 "C" Cell)**
AC-DC Adaptor	**N/A**

2.3 Local Osc. Or Crystal:

Board Name	**Local Osc. / Crystal (MHz)**
Main	**13.56**
Communication	**N/A**

2.4 Serial Number

Not Applicable

SECTION 3: TEST SUMMARY

3.1 Applicable Electromagnetic Interference Requirements:

Radiated Emission Technical Requirements FCC 15.209	
Frequency (MHz)	**FCC limits @ 3 meter Quasi-Peak/dBuV/m**
1.705 – 30.0	30.0
30 –88	40.0
88-216	43.5
216-230	46.0
230-960	46.0
960-1000	54.0
Above 1000	54.0

3.2 Sample received date and Test Period:

Sample received date	**5/20/03**
Test Period	**From 5/23/03 To 5/27/03**

3.3 Engineering Justification:

NO MODIFICATIONS WERE MADE

SECTION 4 ELECTROMAGNETIC INTERFERENCE TEST

Ambient Conditions:

	Temperature	Humidity
Radiated Emission	21 ° C	68 %
Conducted Emission	N/A	N/A

Test Configuration:

Software Used During The Tests			
File Name	☐ EMCTEST	☐ Pinging	☐ Read & Write
	☐ Terminal	☐ Music	☐ Joy-Stick
	☒ Other:		
Program Sequence	Continuously TX		

Mode of Operational Investigated:

Worse Case Emission Levels			
	Mode of Operation	Radiated Emission	Conducted Emission
1	Tx	☒	☐
2		☐	☐
3		☐	☐

Frequency Range Investigated:

	From	To
Radiated Emissions	10MHz	1GHz
Conducted Emissions	N/A	N/A

Test Personnel

	Name	Signature
Radiated Emissions	Thanh Nguyen	
Conducted Emissions	N/A	

Test Peripherals

EUT tested alone, no any support equipment was used.

Test Configuration Diagram

EUT tested alone, no any support equipment was used.

I/O Cable Configuration

EUT tested alone, no any support equipment was used.

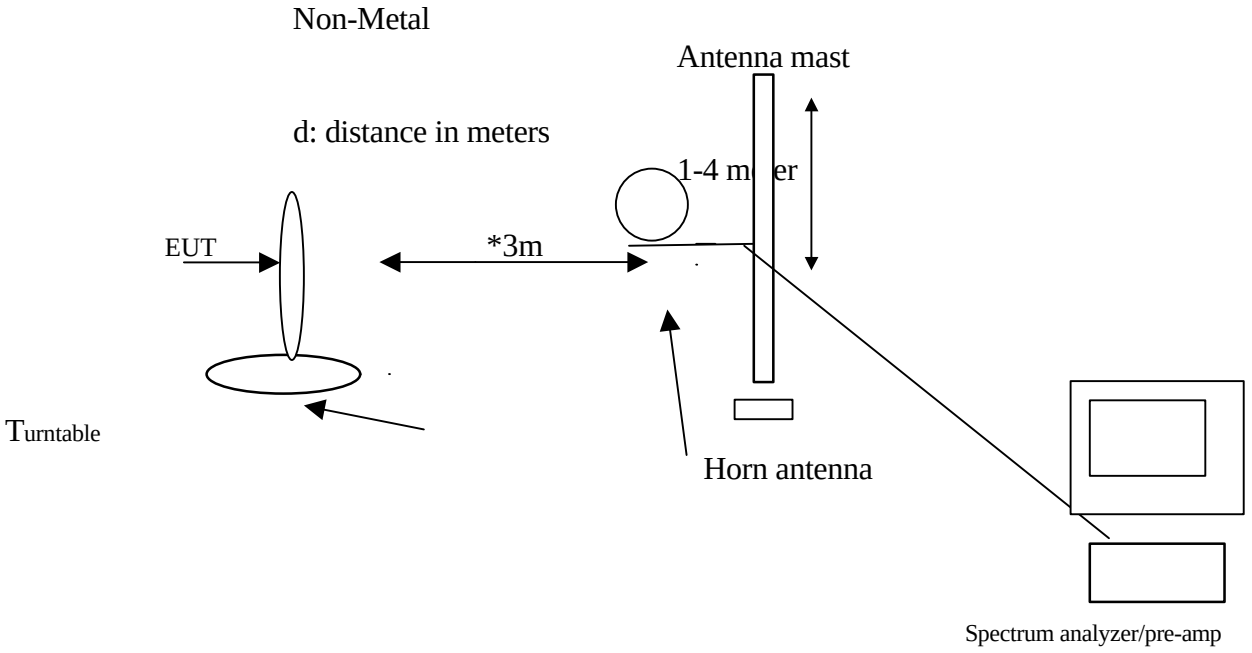
4.1 FCC Testing below 30MHz.

4.1.1 Instrument Settings

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

4.1.2 Measurement Instrument Configuration

Radiated BELOW 30GHz



*With a distant extrapolation of 40log(3m/30m) on the offset level of receiver during the test.

4.1.3 Measurement Equipment Used

TEST EQUIPMENT LIST				
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
Antenna, Loop 9 kHz ~ 30 MHz	EMCO	6502	9202-2722	4/23/04
RF Filter Section	HP	85420E	3705A00256	11/20/03
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	11/20/03

4.1.3 Below 30MHz Emission Test Setup photos

4.1.5 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 #: 03U2002-1
Report #: 030523B1
Date& Time: 05/23/03 8:18 PM
Test Engr: Thanh Nguyen

Company: FISHER-PRICE
EUT Description: TOY WITH RADIO FREQUENCY ID CIRCUIT
Test Configuration : EUT With 3 /1.5V Size C Batteries
Type of Test: FCC Part 15.225, and RSS-210 IC
Mode of Operation: Normal Tx

(○) A-Site (●) B-Site (○) C-Site (○) F-Site [6 Worst Data] [Descending]

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC B	Margin (dB)	Dist. (m)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
Measure the Fundemental, Lopp Antenna at 0 Degree.											
13.56	7.50	10.20	1.51	0.00	19.21	80.00	-60.79	3m	0.00	1.00	P
Measure the Fundemental, Loop Antenna at 45 Degree											
13.56	18.10	10.20	1.51	0.00	29.81	80.00	-50.19	3m	0.00	1.00	P
Measure the Fundemental , Loop Antenna at 90 Degree											
13.56	14.80	10.20	1.51	0.00	26.51	80.00	-53.49	3m	0.00	1.00	P
Loop Antenna at 45 degree is the Worst Position											
13.56	18.50	10.20	1.51	0.00	30.21	80.00	-49.79	3m	0.00	1.00	P
13.56	18.20	10.20	1.51	0.00	29.91	80.00	-50.09	3m	0.00	1.00	QP
Lower BandEdge 13.5529MHz											
13.56	8.40	10.20	1.51	0.00	20.11	29.50	-9.39	3m	0.00	1.00	P
Higher BandEdge at 13.5529MHz											
13.55	14.20	10.20	1.51	0.00	25.91	29.50	-3.59	3m	0.00	1.00	P
2nd Harmonic 27.1216MHz											
27.12	-6.80	9.80	1.51	0.00	4.51	29.50	-24.99	3m	0.00	1.00	P
All signal readings above were testing with distant extralpolation of 40*log(3/30) .											
Total data #: 8											
V.2b											

4.2 Radiated Emission Test Procedures

The EUT and all other support equipment were placed on a wooden table 80 cm above the ground screen. The antenna to EUT distance was 3 meters 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.

4.2.1 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

4.2.2 Measurement Instrument Configuration

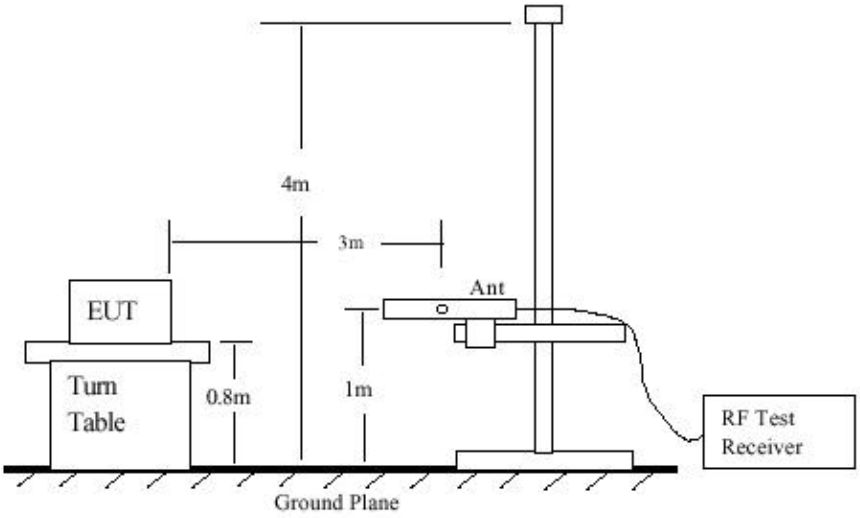


Fig 1: Radiated Emission Measurement 30 to 1000 MHz

4.2.3 Measurement Equipment Used

TEST EQUIPMENT LIST

Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
RF Filter Section	HP	85420E	3705A00256	11/20/03
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	11/20/03
Antenna, Bicon/Log, 25 ~ 2000 MHz	ARA	LPB-2520/A	1185	3/6/04
Antenna, Loop 9 kHz ~ 30 MHz	EMCO	6502	9202-2722	4/23/04

4.2.4 Radiated Emission Test Setup Photos

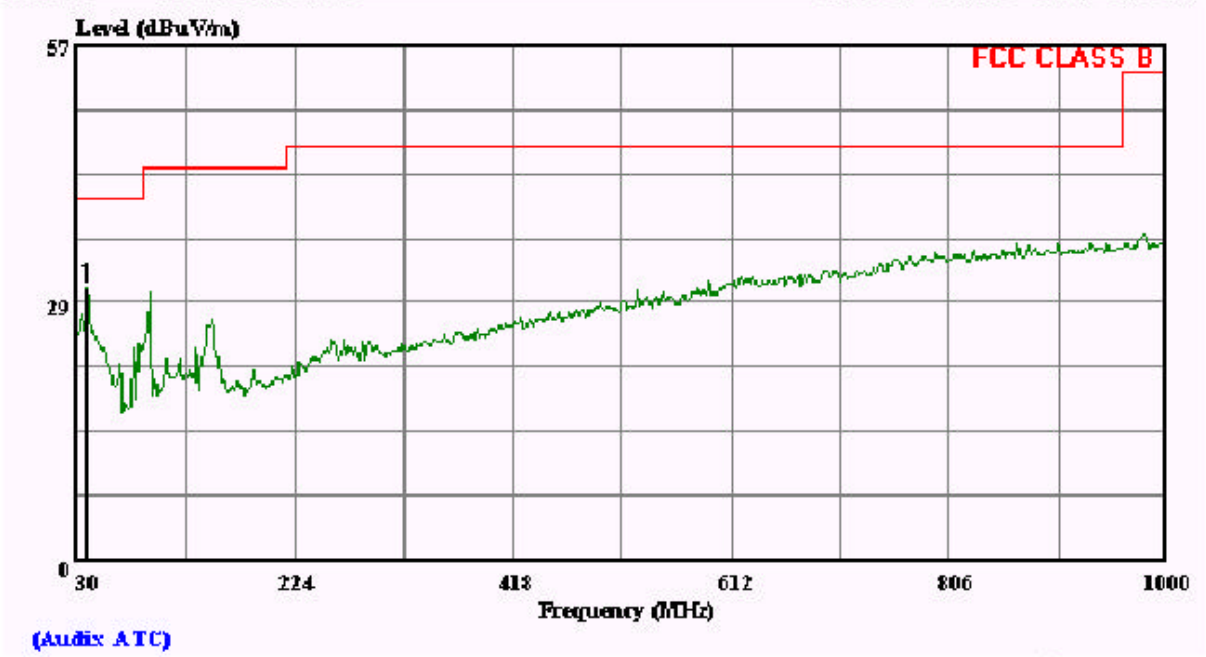
Radiated Emission Test Setup

4.2.5 Radiated Emission Test Result

COMPLIANCE Engineering Services, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

561F Monterey Road
Morgan Hill, CA 95037, U.S.A.
Tel: (408) 463-0885
Fax:(408) 463-0888

Data#: 5 File#: 052303.emi Date: 05-27-2003 Time: 09:03:22



Trace: 4 Ref Trace:

Condition: FCC CLASS B 3m CHAMBER 030306 1185 HORIZONTAL
Company : FISHER-PRICE
EUT Description : TOY WITH RADIO FREQUENCY ID CIRCUIT
Model Number : B2663
Test Configurtion: EUT
Test Target : FCC Part 15.225, RSS-210 IC
Mode of Operation: Normal Tx
Project No : 03U2002

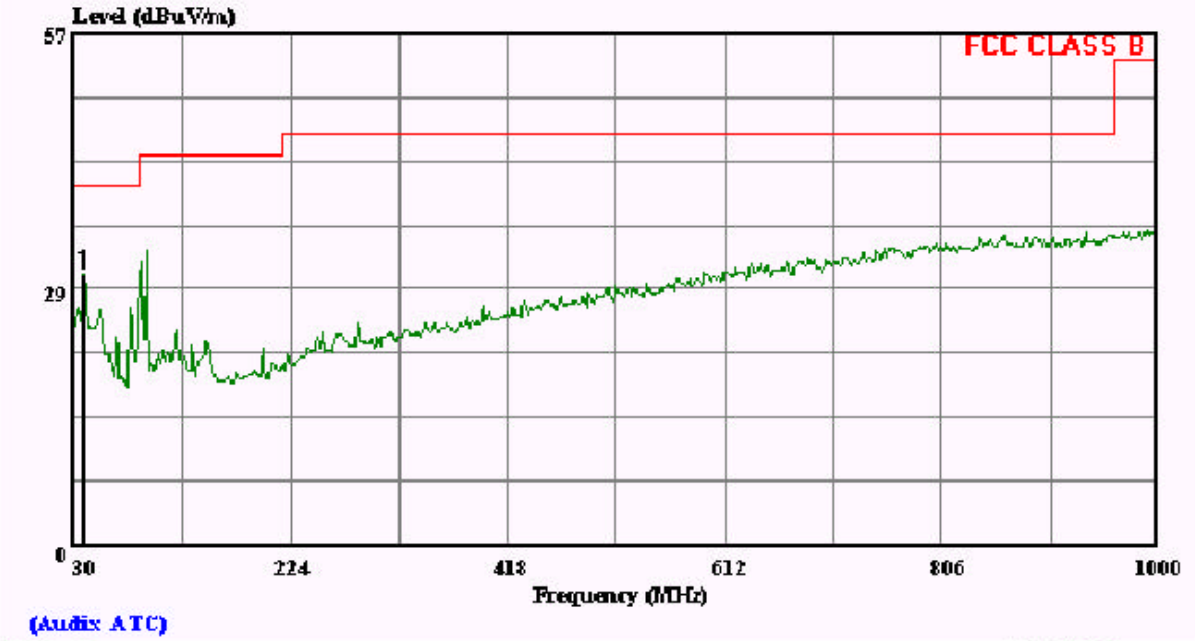
Page: 1

	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	38.730	12.97	16.64	0.59	0.00	30.20	40.00	-9.80	Peak

COMPLIANCE Engineering Services, Inc.
FCC,VCCI,CISPR,CC
UL,CSA,TUV

561F Monterey Road
Morgan Hill, CA 95037, U.S.A.
Tel: (408) 463-0885
Fax:(408) 463-0888

Data#: 7 File#: 052303.emi Date: 05-27-2003 Time: 09:11:05



Trace: 6 Ref Trace:

Condition: FCC CLASS B 3m CHAMBER 030306 1185 VERTICAL
Company : FISHER-PRICE
EUT Description : TOY WITH RADIO FREQUENCY ID CIRCUIT
Model Number : B2663
Test Configurtion: EUT
Test Target : FCC Part 15.225, RSS-210 IC
Mode of Operation: Normal Tx
Project No : 03U2002

Page: 1

	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	38.730	12.85	16.64	0.59	0.00	30.08	40.00	-9.92	Peak

4.3 Conducted Emission Test Procedures

Not applicable, EUT is running on DC batteries.

4.4 FREQUENCY STABILITY

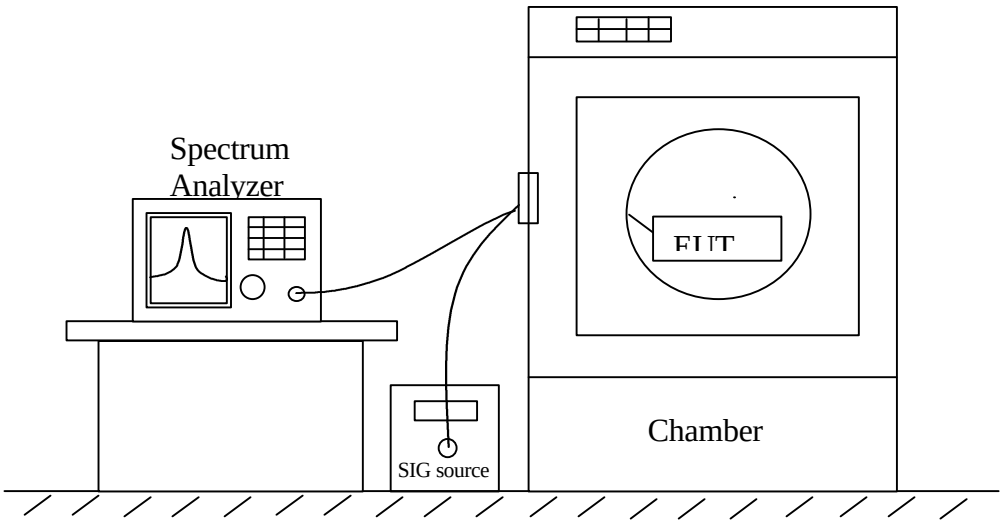
4.4.1 Instrument Settings

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
EMI Receiver	HP	8593EM	6/11/03
Spectrum Analyzer 20 Hz ~ 44 GHz	Agilent	E4446A	1/13/04
Environmental Chamber	Thermotron	SE 600-10-10	4/26/04

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	Peak	300 Hz	300 Hz

4.4.2 Measurement Instrument Configuration



Frequency Stability Setup

4.4.4 Test Procedures

- **Frequency stability versus environmental temperature**

1). Setup the configuration per figure shown for frequencies measurement inside the environmental chamber. Set the temperature of the chamber to 20°C. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 20°C operating frequency as reference frequency.
2). Turn EUT off and set Chamber temperature to -20°C.
3). Allow sufficient time (approximately 20 to 30 minus after chamber reach the assigned temperature) for EUT to stabilize. Turn on EUT and measure the EUT operating frequency. Turn off EUT after the measurement.
4). Repeat step 3 with a 10°C increased per stage until the highest temperature of +50°C reached, record all measured frequencies on each temperature step.

- **Frequency stability versus AC input voltage**

1). Setup the configuration per figure 6 and set chamber temperature to 20°C. Use a variable AC power supply to power the EUT and set AC output voltage to EUT nominal input AC voltage. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 20°C operating frequency as reference frequency.
2). Slowly reduce the EUT input voltage to specified extreme voltage variation (±15%) and record the maximum frequency change.

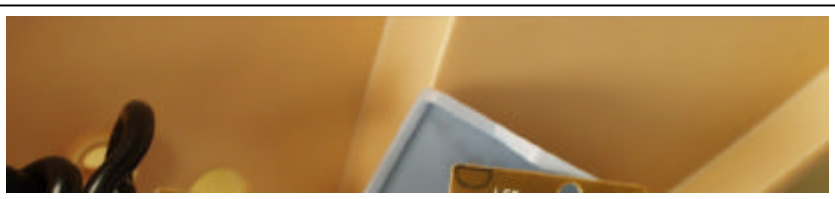
4.4.5 Results

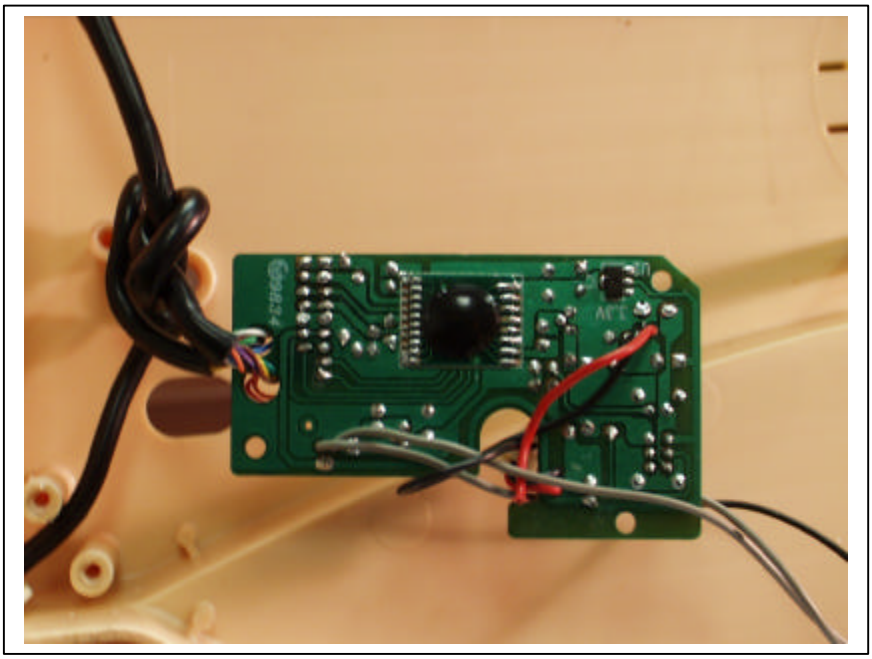
No non-compliance noted.

Reference Frequency: 13.56000000MHz @ 20°C Limit: to stay ± 0.01 % = 1356.180 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (%)	Limit (%)
4.50	50	**13.56170**	0.00074	± 0.01
4.50	40	**13.56166**	0.00100	± 0.01
4.50	30	**13.56150**	0.00221	± 0.01
4.50	*25*	**13.56180**	0.00000	± 0.01
4.50	**20**	**13.56180**	**0.00000**	**± 0.01**
4.50	10	*13.56170*	0.00074	± 0.01
4.50	0	**13.56180**	0.00000	± 0.01
4.50	-10	*13.56230*	-0.00369	± 0.01
4.50	-20	*13.56280*	-0.00737	± 0.01
1.61 (end point)	20	**13.56180**	0.00000	± 0.01
3.825	20	**13.56180**	0.00000	± 0.01
5.2	20	**13.56180**	0.00000	± 0.01

5. APPENDIX

5.1 EUT Photographs





5.2 Schematics

Pease refer to attached sheets.

5.3 Block Diagram

Please refer to attached sheets.

5.4 User's Manual

Please refer to attached sheets.

END OF REPORT