
EMI TEST REPORT

Test Report No. : 23FE0015-HO-1

Applicant : FUJITSU TEN LIMITED
Type of Equipment : Security Transmitter
Model No. : 237131-056
Test standard : FCC Part 15 Subpart C Section 15.231
FCC ID : BAB237131-056
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of A-Pex International Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this report are traceable to the national or international standards.
5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

Date of test : February 14, 2003

Issued date : February 21, 2003

Tested by : Sumio Nishii
Sumio Nishii
EMC Head Office Division

Approved by : Hironobu Shimoi
Hironobu Shimoi
Group Leader of EMC Head Office Division

A-Pex International Co., Ltd. EMC Head Office Division.

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SECTION 1: Client information

Company name : FUJITSU TEN LIMITED
Brand name : -
Address : 2-28, GOSYO-DORI 1-CHOME, HYOUGO-KU, KOBE, 652-8510 Japan
Telephone Number : +81-78-682-2031
Facsimile Number : +81-78-671-7160
Contact Person : Naoto Nishimura

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : Security Transmitter
Model No. : 237131-056
Serial No. : 0209
Rating : DC 3.0V
Country of Manufacture : JAPAN and UNITED STATES OF AMERICA
Receipt Date of Sample : February 13, 2003
Condition of EUT : Production prototype

2.2 Product Description

FUJITSU TEN LIMITED. Model: 237131-056 (refer to as the EUT in this report) is the security Transmitter.

The specification is as following

Frequency Operation : 303.885 MHz
Type of Modulation : AM
Antenna Type : Integral antenna
Mode of Operation : Simplex Duplex
Transmit power or power range : < 74.9 dBu V/m
Duty Cycle : 50% \pm 10%
Method of frequency Generation : Crystal Synthesizer Other (Resonator)
Power Supply : DC 3V
Operating voltage : 2.5-3.2V
Operating temperature : -20 deg. C. to 60 deg. C.

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SECTION 3: Test specification, procedures and results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.231 Periodic operation in the band 40.66 – 40.70MHz and above 70MHz

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Deviation	Worst margin	Results
1	Automatically Deactivate	ANSI C63.4:2001	Section 15.231(a)(1)	N/A	-	Complied
2	Electric Field Strength of Fundamental Emission	ANSI C63.4:2001	Section 15.231(b)	N/A	10.1dB 303.861MHz Horizontal	Complied
3	Electric Field Strength of Spurious Emission	ANSI C63.4:2001	Section 15.205 Section 15.209 Section 15.231(b)	N/A	8.5dB 1823.281MHz Horizontal	Complied
4	-20dB Bandwidth	ANSI C63.4:2001	Section 15.231(c)	N/A	-	Complied

3.3 Additions to standards

No addition, deviation or exclusion has been made from standards.

3.4 Confirmation

A-Pex International Co., Ltd. hereby confirms that E.U.T. , in the configuration tested, complies with the specifications FCC Part15 Subpart C Section 15.231.

3.5 Uncertainty

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ± 4.5 dB.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ± 5.2 dB.
The measurement uncertainty (with a 95% confidence level) for this test using Horn Antenna is ± 6.6 dB.
 The data listed in this test report may exceed the test limit because it does not have enough margin.
 The data listed in this test report has enough margin.

3.6 Test Location

A-Pex International Co., Ltd. EMC Head Office Division. No.2 semi anechoic chamber, 7.5 x 5.8 x 5.2m.
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Telephone: +81 596 24 8116 Facsimile: +81 596 24 8124
This site has been fully described in a report submitted to FCC office, and listed on June 05, 2002 (Registration number: 846015).
*NVLAP Lab. code: 200572-0

3.7 Test setup, Data of EMI and Test instruments

Refer to Appendix 1 to 3.

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SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

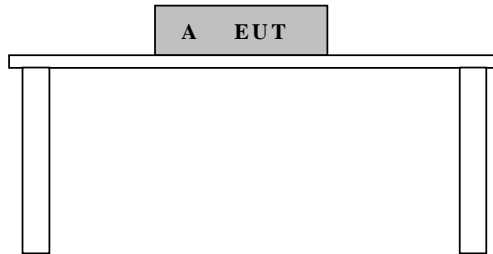
The EUT exercise program used during radiated testing was designed to exercise the various system components in a manner similar to typical use.

The operating mode/system was as follows:

Operation mode : Transmitting

Justification : The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	Security Transmitter	237131-056	0209	FUJITSU TEN LIMITED	BAB237131-056

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SECTION 5: Radiated emission (Fundamental and Spurious Emission)

5.1 Operating environment

The test was carried out in a No.2 semi anechoic chamber, 7.5 x 5.8 x 5.2m.

Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.

The EUT was set on the center of the tabletop.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

A drawing of the set up is shown in the photos of Appendix 1.

5.3 Test conditions

Frequency range : 30MHz-3200MHz
Test distance : 3m
EUT position : Tabletop
EUT operation mode : Transmitting

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on No.2 semi anechoic chamber with a ground plane and at a distance of 3m.

Measurements were performed with a Peak detector.

The measuring antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

The radiated emission measurements were made with the following detector function of the test receiver.

	Below 1GHz	Above 1GHz
Detector Type	Peak	Peak
IF Bandwidth	120kHz	1MHz

-The noise was measured at each position of all three axes X, Y and Z to compare the level, and the maximum noise level was recorded.

-The reading level was reduced by 6.3dB for comparison to the limits as this EUT had 50%±10% duty cycle. See the data in Appendix 3.

5.5 Results

Summary of the test results: Pass

Date: February 14, 2003

Tested by: Sumio Nishii

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APPENDIX 1: Photographs of test setup

Page 8 : Radiated emission

APPENDIX 2: Test instruments

Page 9 : Test instruments

APPENDIX 3: Data of EMI test

Page 10 : Automatically Deactivate

Page 11 : Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission)

Page 12 : Duty Cycle Under Normal Operation

Page 13 : -20dB Bandwidth

APPENDIX 1: Photographs of test setup
Radiated emission



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Test Report No : 23FE0015-HO-1

APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2002/12/24 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2002/05/02 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2002/05/02 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE	2002/05/09 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2002/03/13 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ES140	RE	2002/11/01 * 12
MHA-05	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2003/01/11 * 12
MPA-01	Pre Amplifier	Agilent	8449B	RE	2003/02/08 * 12
MCC-05	Microwave Cable	Storm	421-011	RE	2003/01/14 * 12
MCC-06	Microwave Cable	Storm	421-011	RE	2003/01/14 * 12
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2002/04/12 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Test Item: ,

RE: Radiated emission,

DATA OF AUTOMATICALLY DEACTIVATE

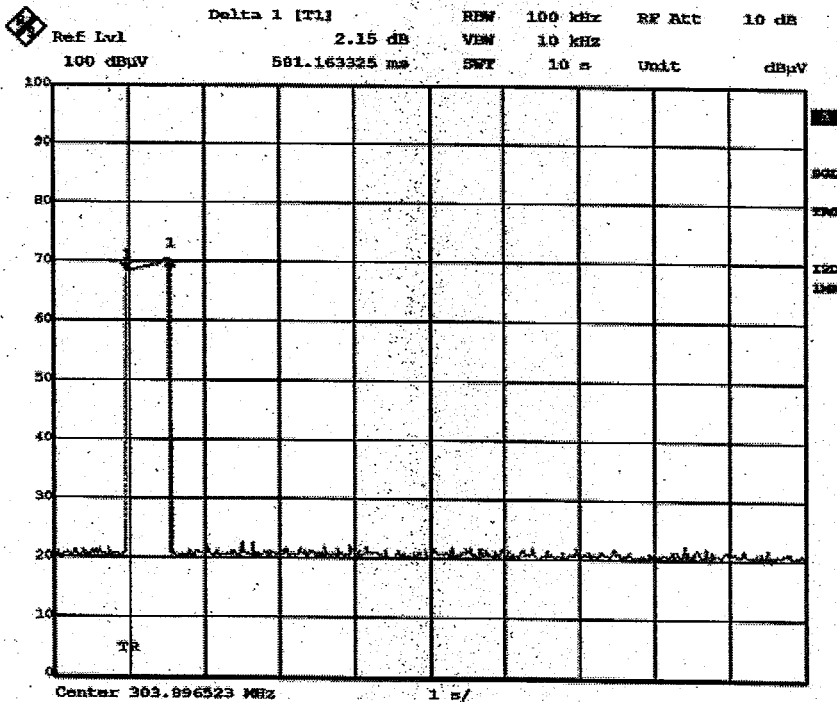
A-Pex International Co., Ltd.
EMC HEAD OFFICE DIVISION No.2 SEMI ANECHOIC CHAMBER

COMPANY : FUJITSU TEN LIMITED
EQUIPMENT : Security Transmitter
MODEL : 237131-056
S/N : 0209
FCC ID : BAB237131-056
IC Number : 2024 102 1519
POWER : DC3.0V
Mode : Transmitting

REPORT NO : 23FE0015-HO- **1**
REGULATION : Fcc Part15 Subpart C 231(a)
DATE : 2003/2/14
TEMPERATURE : 22°C
HUMIDITY : 33%

Sumio Nishii
ENGINEER : Sumio Nishii

Time of Transmitting	Limit	Result
[sec]	[sec]	
0.58	5.00	Pass



DATA OF RADIATED EMISSIONS

A-Pex International Co., Ltd.
EMC HEAD OFFICE DIVISION No.2 SEMI ANECHOIC CHAMBER

COMPANY : FUJITSU TEN LIMITED
EQUIPMENT : Security Transmitter
MODEL : 237131-056
S/N : 0209
FCC ID : BAB237131-056
IC Number : 2024 102 1519
POWER : DC3.0V
Mode : Transmitting

REPORT NO : 23FE0015-HO- 1
REGULATION : Fcc Part15 Subpart C 231(b) / 205
TEST DISTANCE : 3m
DATE : 2003/02/14
TEMPERATURE : 22°C
HUMIDITY : 33%

Sumio Nishii
ENGINEER : Sumio Nishii

No.	FREQ [MHz]	T/R READING : PK		ANT Factor [dB]	AMP GAIN [dB]	LOSS [dB]	Duty Factor [dB]	RESULT		Limit [dBuV/m]	MARGIN	
		HOR [dBuV/m]	VER [dBuV/m]					HOR [dB]	VER [dB]			
1	303.861	75.1	71.0	14.5	26.2	7.7	-6.3	64.8	60.7	74.9	10.1	14.2
2	607.749	35.9	36.3	19.1	27.7	9.0	-6.3	30.0	30.4	54.9	24.9	24.5
3	911.637	31.0	29.4	22.7	27.0	9.7	-6.3	30.1	28.5	54.9	24.8	26.4
4	1215.516	49.6	49.1	23.3	37.3	4.7	-6.3	34.0	33.5	54.0	20.0	20.5
5	1519.389	49.3	48.0	24.5	37.1	5.2	-6.3	35.7	34.4	54.0	18.4	19.7
6	1823.281	55.6	54.7	28.4	36.9	5.6	-6.3	46.4	45.5	54.9	8.5	9.4
7	2127.168	49.6	49.9	30.7	36.8	6.1	-6.3	43.3	43.6	54.9	11.6	11.3
8	2431.054	47.9	47.4	30.7	36.7	6.4	-6.3	42.0	41.5	54.9	12.9	13.4
9	2734.749	44.7	44.4	31.6	36.8	6.7	-6.3	39.9	39.6	54.0	14.1	14.4
10	3038.610	44.1	44.7	32.5	36.8	7.0	-6.3	40.5	41.1	54.9	14.4	13.8

REMARKS

ANTENNA TYPE:30-300MHz Biconical / 300-1000MHz Logperiodic / 1-3.2GHz Horn
CALCULATION RESULT=Reading + ANT Factor - Amp Gain + LOSS (Cable+ ATTEN.)+Duty factor
Duty Factor [dB] = 20 log (Duty Cycle)

Duty Cycle

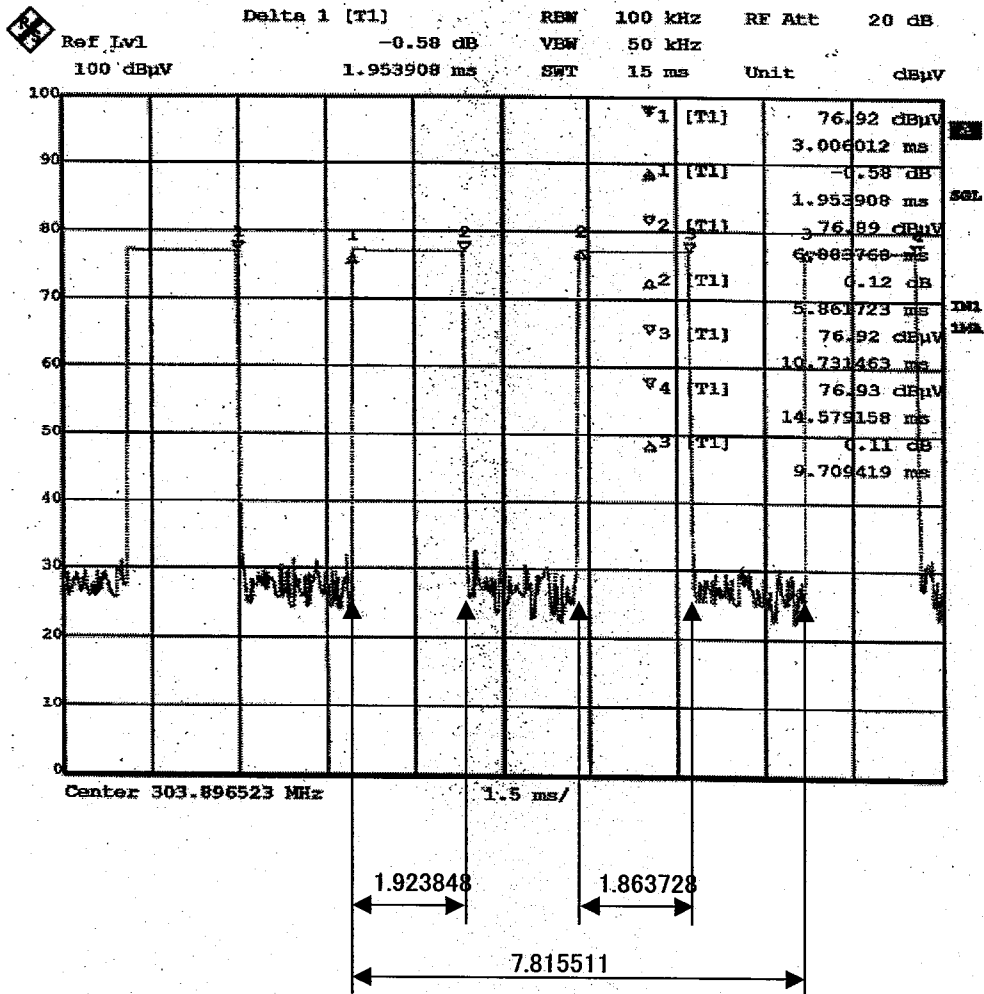
A-PEX INTERNATIONAL CO., LTD.
EMC HEAD OFFICE DIVISION No.2 SEMI ANECHOIC CHAMBER

Company : FUJITSU TEN LIMITED
Equipment : Security Transmitter
Model : 237131-056
Sample No. : 0209
Power : DC 3.0V
Mode : Transmitting Mode

Report No. : 23FE0015-HO- 1
Regulation : Fcc Part15 Subpart C 231(b)
Date : 2003/02/14
Temperature : 22deg.C
Humidity : 33%

FCC ID : BAB237131-056
IC No. : 2024 102 1519

Sumio Nishii
ENGINEER : Sumio Nishii



Duty Cycle : 48.4 % (= (1.923848 + 1.863728) / 7.815511)

DATA OF -20dB-Bandwidth

A-Pex International Co., Ltd.
EMC HEAD OFFICE DIVISION No.2 SEMI ANECHOIC CHAMBER

COMPANY : FUJITSU TEN LIMITED
EQUIPMENT : Security Transmitter
MODEL : 237131-056
S/N : 0209
FCC ID : BAB237131-056
IC Number : 2024 102 1519
POWER : DC3.0V
Mode : Transmitting

REPORT NO : 23FE0015-HO-1
REGULATION : Fcc Part15 Subpart C 231(c)
DATE : 2003/02/14
TEMPERATURE : 22°C
HUMIDITY : 33%

Sumio Nishii
ENGINEER : Sumio Nishii

Bandwidth Limit : Fundamental Frequency 303.86MHz X 0.25% = 759.65kHz

-20dB Bandwidth	Bandwidth Limit	Result
[kHz]	[kHz]	
341.18	759.65	Pass

