

EMI TEST REPORT

Test Report No. : 21JE0059-YW-1

Applicant: Fujitsu Ten Limited

Type of Equipment: Motion Sensor

Model No.: FTL186

FCC ID: BAB271000-186


Test standard: FCC Part 15 Subpart C. 245

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: June 10 and 16, 2001 **Issued date:** July 8, 2001

Tested by:

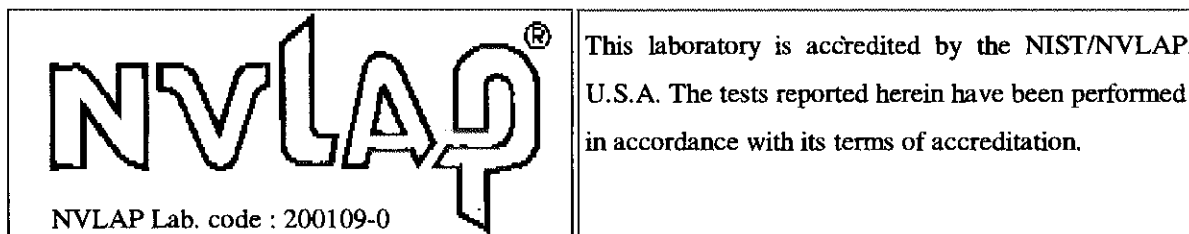


Naoki Sakamoto
EMC section

Approved by:



Kazutoyo Nakanishi
Section Manager of EMC section



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MF060b(22.05.01)

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SECTION 1: Client information

Company name : Fujitsu Ten Limited
Address : 2-28 Goshō-dori 1-chome, Hyogo-ku, Kobe 652-8510 Japan
Telephone Number : +81-78-628-2031
Facsimile Number : +81-78-671-7160
Contact Person : Isamu Kadowaki, General Manager Technical Administration Dept.

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

2.1 Identification of E.U.T.

Type of Equipment : Motion Sensor
Model No. : FTL186
Serial No. : 11149
Condition of EUT : Production prototype
Rating : DC 12V
Country of Manufacture : Italy / Japan
Receipt Date of Sample : June 2, 2001

2.2 Product Description

Model: FTL186, which is referred to as the EUT in this report, is a motion sensor.

Specifications is as follows;

Frequency : One fixed frequency 2450MHz \pm 5MHz
Modulation : Non
ITU Code : 10M0N0N
Output power : 1mW eirp
Antenna type : Integral

FTL186 Series Version No

89732-02010, 89732-02020, 271000-2280, 271000-2220, 271000-2050

The EUT has series models whose difference is only the shape of plastic case as the structure of setting place varies depending on the car manufacturer and type of car.

One of the series models is tested for compliance as a representative since there is no difference between them concerning about radio wave specifications.

2.3 Manufacturer

1) Fujitsu Ten Limited

2) DELTA ELETTRONIC SPA

Address : Via Astico, 41 I-21100 Varese Italy

TEL : +39-332-825111 FAX : +39-332-222005

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SECTION 3: Test specification, methods & procedures

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
Title : FCC 47CFR Part15 Radio Frequency Device
Subpart C Intentional Radiators
§ 15.245 Operation within the Band 2435 – 2465MHz

3.2 Methods & Procedures

No.	Item	Test Procedure	Specification	Remarks
1	Electric Field Strength of Fundamental Emission	ANSI C63.4:1992	§ 15.245(a)	-
2	Electric Field Strength of Spurious Emission	ANSI C63.4:1992	§ 15.245(b) / § 15.209	-

3.3 Additions or deviations to standards

No addition, deviation nor exclusion have been made from standards.

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

4.1 Operating Modes

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

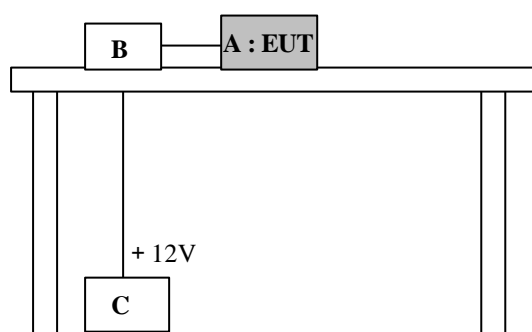
The operating mode/system were as follows:

Operation : Transmitting mode

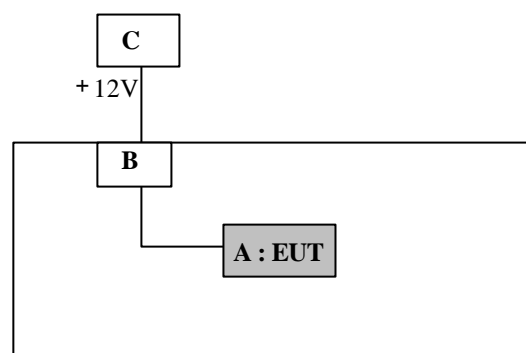
Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals

Front View



Top View



*Cabling was taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID	Remark
A	Motion Sensor	FTL186	11149	Fujitsu Ten Limited *DELTA ELETTRONICA SPA	BAB271000-186	EUT
B	Checker	-	-	Fujitsu Ten Limited	N/A	-
C	Battery	-	-	YUASA	N/A	-

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
	Sensor Cable	1.0	N	Polyvinyl chloride
	DC Cable	1.2	N	Polyvinyl chloride

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SECTION 5: Summary of test results

5.1 Test results

No.	Item	Test Procedure	Specification	Worst margin	Result	
1	Electric Field Strength of Fundamental Emission	ANSI C63.4:1992	§ 15.245(a)	2449.50MHz (24.9dB, Vertical)	Complied	
2	Electric Field Strength of Spurious Emission	ANSI C63.4:1992	§ 15.245(b) / § 15.209	30MHz-1GHz	31.99MHz (19.6dB, Vertical)	Complied
				1GHz-25GHz (PK)	4.8999GHz (15.4dB, Vertical)	
				1GHz-25GHz (AV)	4.8999GHz (1.3dB, Vertical)	

A-PEX INTERNATIONAL hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part15 Subpart C.245

5.2 Uncertainty

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test was ± 3.3 dB.

The data listed in this test report may exceed the test limit because it does not have enough margin (more than 3.3dB).

The data listed in this test report has enough margin, more than 3.3dB.

5.3 Test equipment used

See SECTION 6: Test instruments

5.4 Test Location

A-PEX International Co.,Ltd. Yokowa No.3 test site

108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 Japan

Telephone number : +81-596-39-1485

Facsimile number : +81-596-39-0232

This site has been fully described in a report submitted to FCC office, and listed on September 12, 2000 (Registration number: 90412).

*NVLAP Lab. Code : 200109-0

5.5 Test Configuration Photographs

See Appendix 1.

5.6 Data of EMI Test

See Appendix 2.

SECTION 6: Test instruments

Instrument	Mfr.	Model No.	Control No.	Test Item	Calibration Date / Interval
Pre Amplifier	Hewlett Packard	8447D	AF-01	RE	March 31, 2001 / 1 year
Pre Amplifier	Hewlett Packard	8449B	AF-04	RE	November 5, 2000 / 1 year
Biconical Antenna	Schwarzbeck	BBA9106	BA-03	RE	May 1, 2001 / 1 year
Horn Antenna	A.H.Systems	SAS-200/571	HA-01	RE	May 20, 2001 / 1 years
Horn Antenna	Schwarzbeck	BBHA9170	HA-03	RE	November 23, 2000 / 3 years
Logperiodic Antenna	Schwarzbeck	UHALP9108-A	LA-05	RE	November 4, 2000 / 1 year
Spectrum Analyzer	Hewlett Packard	8567A	SA-04	RE	March 31, 2001 / 1 year
Spectrum Analyzer	Hewlett Packard	8567A	SA-05	RE	March 31, 2001 / 1 year
Test Receiver	Rohde & Schwarz	ESVS10	TR-06	RE	August 10, 2000 / 1 year

* Test Item ; RE: Radiated emission

*All measurement equipment are traceable to national or international standard.

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SECTION 7: Radiated emission

7.1 Operating environment

The test was carried out in an open site.

Temperature : See data
Humidity : See data

7.2 Test configuration

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

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.

7.3 Test conditions

Frequency range : 30MHz-25GHz
Test distance : 3m
EUT position : Table top

7.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m.

Pre check measurements were performed within a screened room for ambient noise at high-level, especially from 272MHz to 288MHz.

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 EUT was put into operation at Transmitting mode.

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

	30MHz-1GHz	1GHz-25GHz	1GHz-25GHz
Detector Type	: T/R QP Detect	:S/A PK Detect	:S/A AV Detect
IF Bandwidth	: 120kHz	: RBW and VBW 1MHz	: RBW 1MHz, VBW10Hz

7.6 Results

Summary of the test results: Pass

Date: June 10 and 16, 2001

Tested by: N. Sakamoto

A-pex International Co., Ltd.

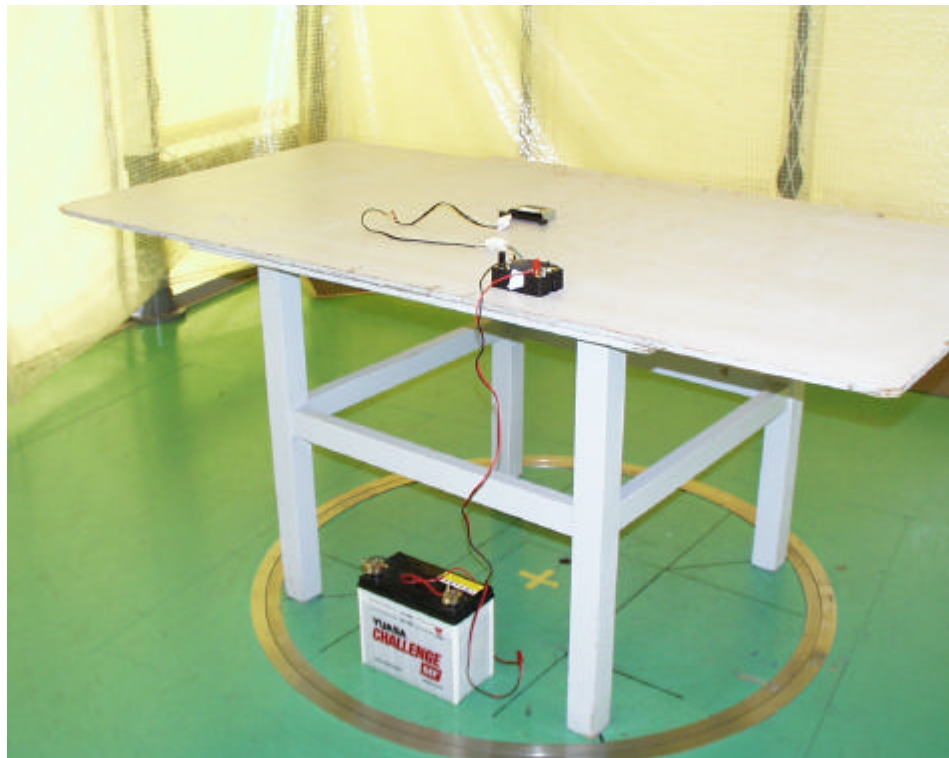
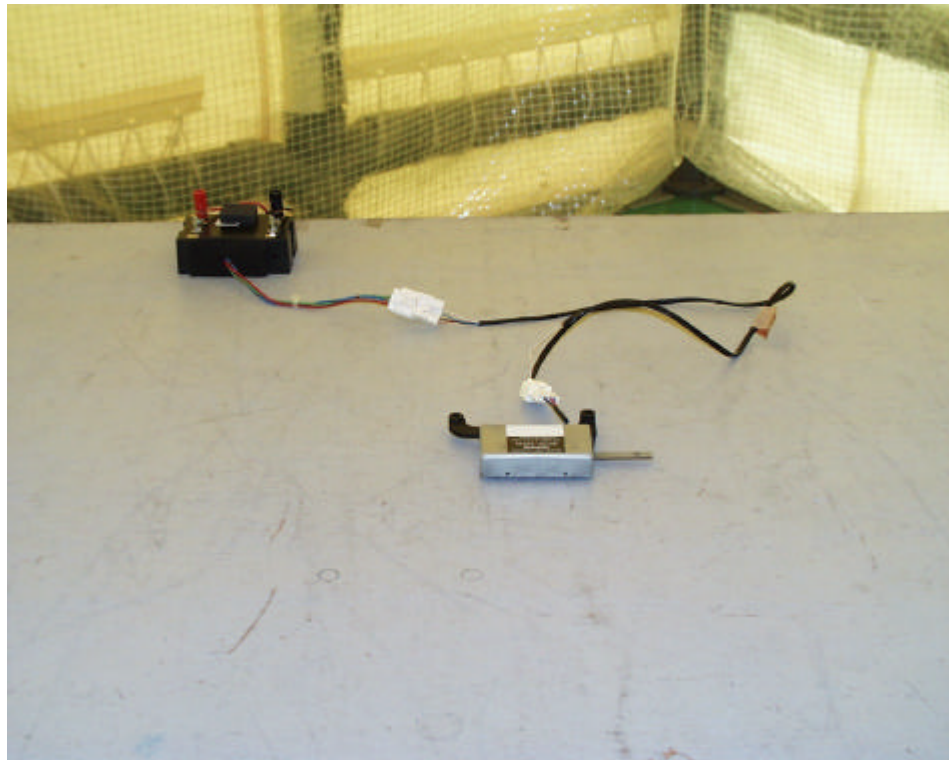
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APPENDIX 1: Photographs of test setup(Radiated Emission)



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APPENDIX 2: Data of EMI test

This section contains the following data

Page 10-12 : Radiated Fundamental emission test

Page 13-14 : Radiated Spurious emission test

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DATA OF FUNDAMENTAL EMISSIONS(2450MHz)

A-PEX INTERNATIONAL CO., LTD.
YOKOWA NO. 3 OPEN SITE

COMPANY : FUJITSU TEN LIMITED REPORT NO : 21JE0059-YW-1
 EQUIPMENT : Motion Sensor REGULATION : Fcc Part15SubpartC 245 / 209
 MODEL : FTL186(No11149) TEST DISTANCE : 3m
 SERIAL : 11149 DATE : 2001/06/10
 FCC ID : BAB271000-186 Temp./Humi. : 27°C/58%
 POWER : DC12.0V
 DESCRIPTION : Transmitting

ENGINEER : Naoki. Sakamoto

PK Detect (S/A : RBW 1MHz and VBW 1MHz)

No.	FREQ [MHz]	T/R READING		ANT Factor	AMP GAIN	CABLE LOSS	ATTEN [dB]	RESULT		Limit AV	MARGIN	
		HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
1	2449.50	83.9	84.9	31.5	34.5	7.1	0.0	88.0	89.0	113.9	25.9	24.9

Sample Calculation :

RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + ATTEN.

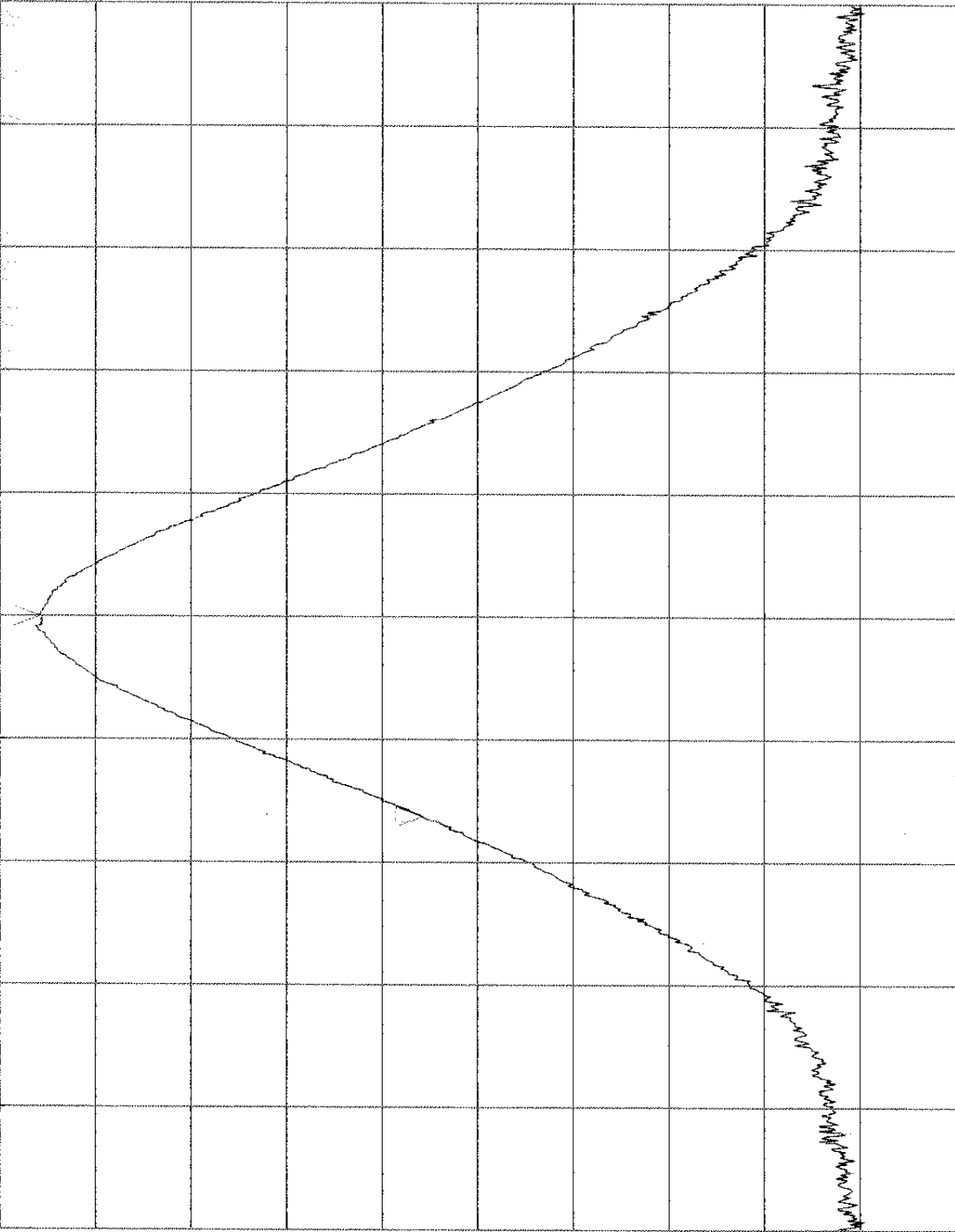
Handwritten mark

20dB Band Width
M/N : FTL186
REF 87 dBuV

Report No : 21JE0059-YW-1
FCC ID : BAB271000-18
ATT 10 dB

MAKER
2.4495 GHz
84.88 dBuV

Δ MAKER
-1.6286 MHz
-20.00 dBuV



5dB/

START 2.444450GHZ
RBW 1MHZ

STOP 2.454450GHZ
SWP 10s

VBW 1MHZ

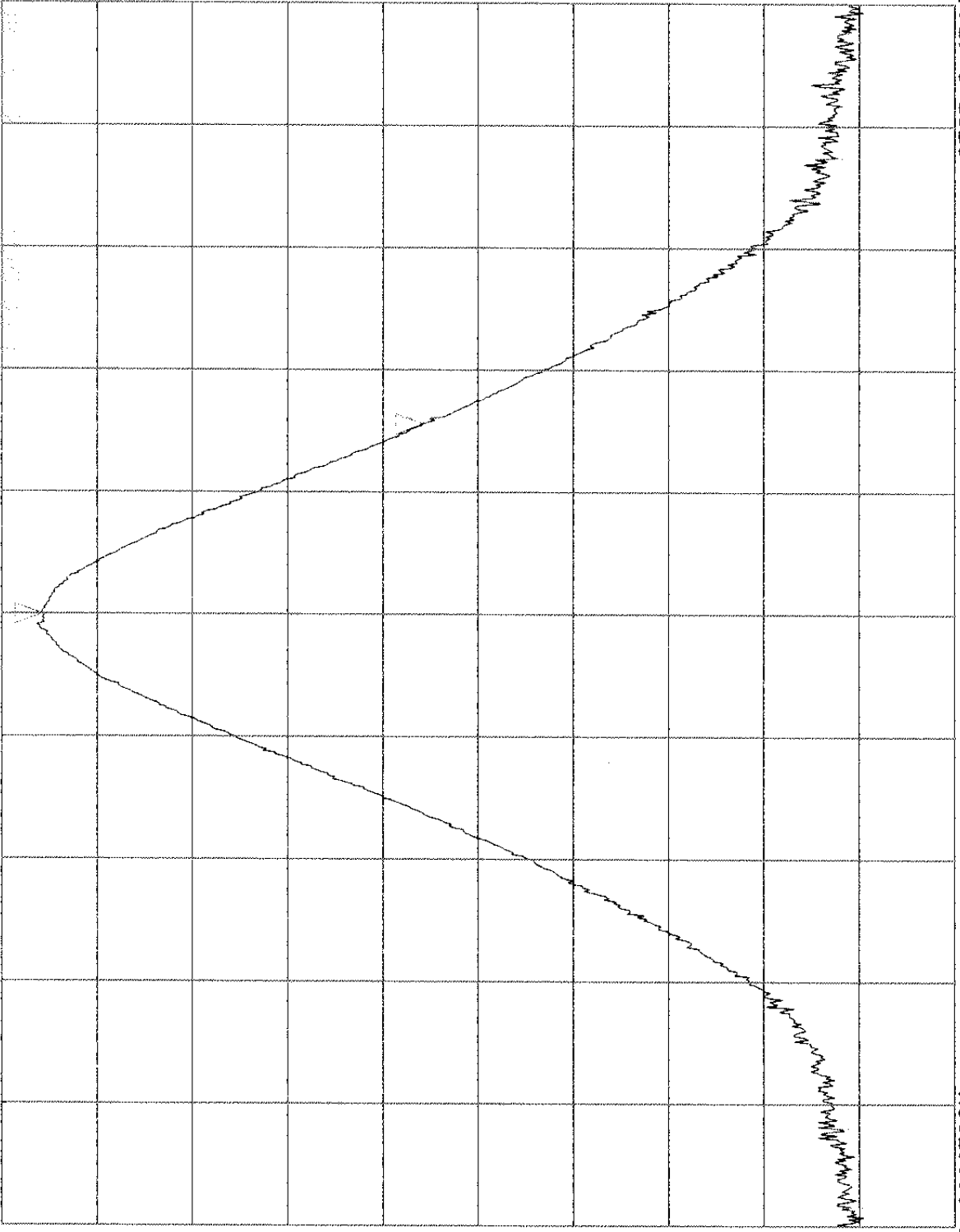
20dB Band Width
M/N : FTL186
REF 87 dBuV

Report No : 21JE0059-YW-1
FCC ID : BAB271000-18
ATT 10 dB

MAKER
2.4495 GHz
84.88 dBuV

Δ MAKER
1.5571 MHz
-20.00 dBuV

5dB/



START 2.44450GHZ
RBW 1MHz

VBW 1MHz

STOP 2.454450GHZ
SWP 10s

DATA OF SPURIOUS EMISSIONS (Below 1GHz)

A-PEX INTERNATIONAL CO., LTD.
YOKOWA NO.3 OPEN SITE

COMPANY	: FUJITSU TEN LIMITED	REPORT NO	: 21JE0059-YW-1
EQUIPMENT	: Motion Sensor	REGULATION	: Fcc Part15SubpartC 245 / 209
MODEL	: FTL186 (No11149)	TEST DISTANCE	: 3m
SERIAL	: 11149	DATE	: 2001/06/16
FCC ID	: BAB271000-186	Temp. /Humi.	: 26°C/62%
POWER	: DC12.0V		
DESCRIPTION	: Transmitting		

ENGINEER : Naoki. Sakamoto

QP Detect (T/R : BW 120kHz)

No.	FREQ [MHz]	T/R READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN [dB]	RESULT		Limit QP [dB μV/m]	MARGIN	
		HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1	31.99	23.0	24.3	17.2	28.1	1.0	6.0	19.1	20.4	40.0	20.9	19.6
2	40.00	23.3	24.4	14.5	28.1	1.2	6.0	16.9	18.0	40.0	23.1	22.0
3	60.00	23.5	23.7	7.4	27.9	1.4	5.9	10.3	10.5	40.0	29.7	29.5
4	80.00	24.2	25.0	6.3	27.9	1.7	5.9	10.2	11.0	40.0	29.8	29.0
5	120.00	23.6	24.2	13.3	27.9	2.1	5.9	17.0	17.6	43.5	26.5	25.9
6	320.00	22.5	22.6	14.4	27.6	3.6	5.8	18.7	18.8	46.0	27.3	27.2

Sample Calculation :

RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + ATTEN.

Except for the above table : All other spurious emissions are more than 20dB below the limit.

DATA OF SPURIOUS EMISSIONS(1GHz to 25GHz)

A-PEX INTERNATIONAL CO., LTD.
YOKOWA NO.3 OPEN SITE

COMPANY : FUJITSU TEN LIMITED REPORT NO : 21JE0059-YW-1
EQUIPMENT : Motion Sensor REGULATION : Fcc Part15SubpartC 245 / 209
MODEL : FTL186(No11149) TEST DISTANCE : 3m
SERIAL : 11149 DATE : 2001/06/10
FCC ID : BAB271000-186 Temp./Humi. : 27°C/58%
POWER : DC12.0V
DESCRIPTION : Transmitting

ENGINEER : Naoki. Sakamoto

PK DETECT(S/A : RBW 1MHz and VBW 1MHz)

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN [dB]	RESULT		Limit PK [dB μV/m]	MARGIN	
		HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1	4.8999	46.0	47.4	35.7	34.5	10.0	0.0	57.2	58.6	74.0	16.8	15.4
2	7.3494	42.0	42.1	39.2	34.9	11.7	0.0	58.0	58.1	74.0	16.0	15.9
3	9.7993	44.3	43.2	39.2	34.9	13.7	0.0	62.3	61.2	84.0	21.7	22.8
4	12.2475	*	*	43.4	34.3	14.9	0.0	-	-	74.0	-	-
5	14.6970	*	*	42.7	33.1	15.7	0.0	-	-	84.0	-	-
6	17.1465	*	*	43.0	33.3	16.1	0.0	-	-	84.0	-	-
7	19.5960	*	*	40.2	33.4	17.0	0.0	-	-	74.0	-	-
8	22.0455	*	*	40.3	33.0	17.5	0.0	-	-	74.0	-	-
9	24.4950	*	*	40.3	33.2	19.8	0.0	-	-	84.0	-	-

AV DETECT(S/A : RBW 1MHz and VBW 10Hz)

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN [dB]	RESULT		Limit AV [dB μV/m]	MARGIN	
		HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1	4.8999	39.2	41.5	35.7	34.5	10.0	0.0	50.4	52.7	54.0	3.6	1.3
2	7.3494	30.0	30.1	39.2	34.9	11.7	0.0	46.0	46.1	54.0	8.0	7.9
3	9.7993	33.2	33.1	39.2	34.9	13.7	0.0	51.2	51.1	64.0	12.8	12.9
4	12.2475	*	*	43.4	34.3	14.9	0.0	-	-	54.0	-	-
5	14.6970	*	*	42.7	33.1	15.7	0.0	-	-	64.0	-	-
6	17.1465	*	*	43.0	33.3	16.1	0.0	-	-	64.0	-	-
7	19.5960	*	*	40.2	33.4	17.0	0.0	-	-	54.0	-	-
8	22.0455	*	*	40.3	33.0	17.5	0.0	-	-	54.0	-	-
9	24.4950	*	*	40.3	33.2	19.8	0.0	-	-	64.0	-	-

Sample Calculation :

RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + ATTEN.

Except for the above table : All other spurious emissions are more than 20dB below the limit.

*Emissions did not detect.