EMI TEST REPORT

Test Report No. : 23FE0027-YK-1

Applicant	:	**Fujitsu Media Devices Limited**
Type of Equipment	:	**Bluetooth CF Card**
Model No.	:	**MBH2BT01**
FCC ID	:	**QZIMBH2BT01**
Test standard	:	**FCC Part15 Subpart C, Section 15.247**
Test Result	:	**Complied**

1. This test report shall not be reproduced except 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.

Date of test:
EMI: January 31 and February 4, 2003

Tested by:
EMI: T. Imamura
Toyokazu Imamura

Approved by: O. Watatani
Osamu Watatani
Site Assistant Manager of Yamakita Lab.

A-Pex International Co., Ltd.
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1 GENERAL INFORMATION

Company Name	: Fujitsu Media Devices Limited
Brand Name	: Fujitsu
Address	: Shin-Yokohama Square Bldg. 12F, 2-3-12, Shin-Yokohama, Kohoku-ku Yokohama-shi, Kanagawa 222-0033 JAPAN
Telephone Number	: +81 45 476 4273
Facsimile Number	: +81 45 476 4265
Contact Person/ E-mail	: Tohru Muramatsu/ muramatsu@fmd.ed.fujitsu.co.jp
Type of Equipment	: Bluetooth CF Card
Model No.	: MBH2BT01
Serial No.	: No.1
Rating	: 5V, 3.3V (Output:3.3V)
Country of Manufacture	: Japan
Receipt Date of Sample	: January 31, 2003
Condition of EUT	: Production prototype
Regulation(s)	: FCC Part15 Subpart C, Section 15.247
Test Site	: A-Pex Yamakita No.2 Open Test Site

1.1 Tested Methodology
The measurements were performed according to the procedures in ANSI C63.4 (2001).
These tests were also referred to FCC Public Notice DA 00-705 “Guidance on Measurement for Frequency Hopping Spread Spectrum Systems”.

1.2 Test Facility
This site has been fully described in a report submitted to FCC office, and accepted on December 8, 2000 (Registration No.: 99354).
NVLAP Lab. code : 200441-0

2 PRODUCT DESCRIPTION

Fujitsu Media Devices Limited, Model: MBH2BT01 (referred to as the EUT in this report) is a Bluetooth CF Card.
Clock frequencies used in EUT : 14.745MHz, 16MHz

Frequency Characteristics	: 2402 - 2480MHz
Channel Characteristics	: 79 channel selectable by 1MHz spacing
Bandwidth	: 1MHz
Spread Method	: 2FSK
Antenna Type	: Monopole antenna (Internal)
Antenna Gain	: -5.73dBi
ITU Emission Code(s)	: 79M0F1D

*FCC Part15.31 (e)

The host device provides the Bluetooth CF Card with stable power supply (DC5V, 3.3V), and the power is not changed when voltage of the host device is varied. Therefore, the Bluetooth CF Card complies power supply regulation.

*FCC Part 15.203 Antenna requirement

The Bluetooth CF Card and its antenna comply with this requirement since this antenna is built in Bluetooth CF Card when they are put up for sale and they are used with a particular antenna connector.

3 SYSTEM TEST CONFIGURATION

3.1 Justification

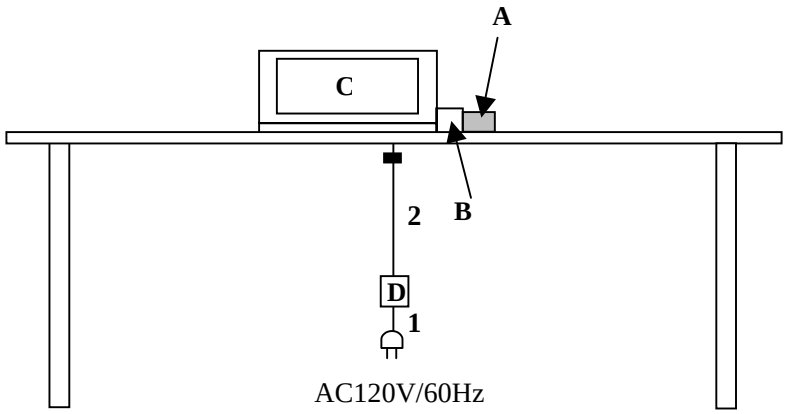
The system was configured in typical fashion (as a customer would normally use it) for testing.

Test mode:

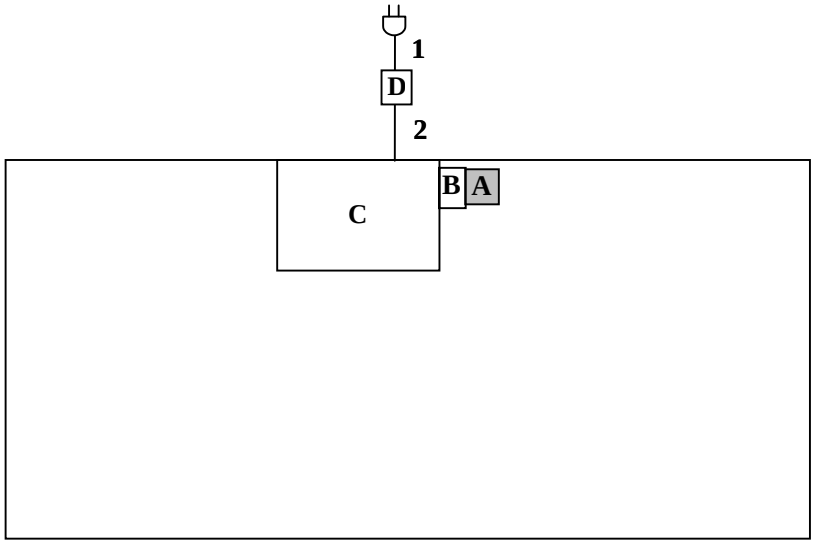
1. Transmitting mode (DH5) : Radiated and Antenna Port Conducted tests
   Performed the test about channels 2402MHz (Low) and 2480MHz (High) channels of all Carrier frequencies.
2. Hopping mode : Antenna Port Conducted tests
3. Inquiry mode : Antenna Port Conducted tests

3.2 Configuration of Tested System

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	Remarks	FCC ID
A	Bluetooth CF Card	MBH2BT01	No.1	Fujitsu Media Devices Limited	EUT	QZIMBH2BT01
B	Adapter Card	-	-	FUJITSU LIMITED	-	-
C	Personal Computer	FMVMF460R	R0800945	FUJITSU LIMITED	-	-
D	AC Adapter	FMV-AC304	99X14476B	SANKEN ERECTRIC CO., LTD	-	-

List of cables used

No.	Name	Length (m)	Shield	Backshell material
1	AC Power Cable	2.0	Unshielded	Polyvinyl chloride
2	DC Power Cable	1.8	Unshielded	Polyvinyl chloride

4 MEASUREMENT UNCERTAINTY

Conducted emission test
The measurement uncertainty (with a 95% confidence level) for this test was ±1.3dB.

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

Radiated emission test
The measurement uncertainty (with 95% confidence level) for this test using Biconical antenna is ±4.8dB.
The measurement uncertainty (with 95% confidence level) for this test using Logperiodic antenna is ±5.2dB.
The measurement uncertainty (with 95% confidence level) for this test using Horn antenna is ±6.6dB.

The data listed in this test report may exceed the test limit because it does not have enough margin.

5 SUMMARY OF TESTS

5.1 §15.207 Conducted Emissions (Limits by CISPR Pub.22 Class B)

Test Procedure
EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop.
All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN and excess AC cable was bundled in center.
Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source.
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT on a shielded room.
The EUT was connected to a Line Impedance Stabilization Network (LISN).
An overview sweep with peak detection has been performed.
The measurements have been performed with a CISPR quasi-peak detector (IF BW 10kHz).
(Measurement range : 150kHz to 30MHz)

Test data : APPENDIX Page 15 to 18
Photographs of test setup: Page 12
Test result : Pass
Test instruments : KCC-24/25/26/28/KPL-02, KLS-06, KSA-02, KTR-03

5.2 §15.247 (a)(1) Frequency Hopping Systems

Bluetooth CF Card uses 79channels, each 1MHz wide.
On Average, each channel is used equally.

Test data : APPENDIX Page 19
Test result : Pass
Test instruments : KTR-01, KCC-D4

5.3 §15.247 (a)(1)(ii) Channel Utilization

The total number of channel is 79.

Test data : APPENDIX Page 20 to 22
Test result : Pass
Test instruments : KTR-01, KCC-D4

20dB Band Width
1. 2402MHz (Low): 0.9319MHz < 1MHz
2. 2480MHz (High): 0.9499MHz < 1MHz

Test data : APPENDIX Page 23
Test result : Pass
Test instruments : KTR-01, KCC-D4

Dwell Time
Spectrum analyzer was set as center frequency 2402MHz, dwell time 30sec. (Hopping mode)
Spectrum analyzer was set as center frequency 2402MHz, dwell time 1sec. (Inquiry and page mode)

1. Hopping mode
As a result of observation with Bluetooth CF Card was on hopping condition,
101 Average times Hopping were appeared per 1channel.
Maximum transmit ON time per appeared hopping is 2.88ms (DH5)
101*2.88ms = 290.88ms < 400ms

2. Inquiry mode
As a result of observation with Bluetooth CF Card was on hopping condition,
100 Average times Inquiry were appeared per 1channel.
Maximum transmit ON time per appeared hopping is 90μs (Inquiry mode: 32ch)
100*(0.4*32)*90μs = 115.2ms < 400ms

Test data : APPENDIX Page 24 to 27
Test result : Pass
Test instruments : KTR-01, KCC-D4, KST-01

5.4 § 15.247(b)(3) Maximum Peak Out Put Power (Antenna Port Conducted)

Test Procedure
The Maximum Peak Output power was measured with a power meter connected to the antenna port.
* Antenna Gain dose not exceed 6dBi.

Test data : APPENDIX Page 28
Test result : Pass
Test instruments : KPM-05, KPSS-01

5.5 § 15.247(c) Out of Band Emissions (Radiated)

Test Procedure

EUT was placed on a platform 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.
The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m.
The measuring antenna height was varied between 1 and 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.
EUT emission levels were compared when the EUT antenna position was vertical polarization and horizontal polarization.
The equipment was also previously checked at each position of three axes X, Y and Z.
In 30-1000MHz, X axis was worst under horizontal polarization and Y axis was worst under vertical polarization.
In above 1GHz, Z axis was worst both vertical and horizontal antenna polarization.
The positions in which the maximum noise occurred were chosen to put into measurement.
See the photographs in page 14.

Radiated spurious emissions

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.
The result was also satisfied the general limits specified in Sec.15.209 (a).
Measurement range : 30MHz to 1000MHz CISPR QP Detector, IF BW 120kHz
: 1GHz to 26GHz PK and AV Detector

Test data : APPENDIX Page 29 to 30 (30 - 1000MHz)
: APPENDIX Page 31 to 34 (1 - 26GHz)
: APPENDIX Page 35 to 38
(Band Edges: 2390MHz/ 2483.5MHz, Restricted band Charts)
Photographs of test setup : Page 13
Test result : Pass
Test instruments : KAF-03, KAF-04, KAT6-03, KBA-02, KTR-01, KTR-04, KFL-01
KCC-20/21/22/23/29, KCC-D3, KHA-02, KHA-04, KLA-02, KOTS-02, KSA-02

5.6 § 15.247(c) Out of Band Emissions (Antenna Port Conducted)

Test Procedure

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX Page 39 to 44
Test result : Pass
Test instruments : KTR-01, KCC-D4

APPENDIX 1: Photographs of test setup

1.Page 12 : Conducted emission
2.Page 13 : Radiated emission
3.Page 14 : Pre check of worse-case position

APPENDIX 2: Test Data

1.Page 15 - 18 : Conducted emission
2.Page 19 : Channel Separation (Antenna Port Conducted)
3.Page 20 - 22 : Channel Utilization (Antenna Port Conducted)
4.Page 23 : 20dB Bandwidth (Antenna Port Conducted)
5.Page 24 - 27 : Dwell Time (Antenna Port Conducted)
6.Page 28 : Maximum Peak Power (Antenna Port Conducted)
7.Page 29 - 38 : Out of Band Emissions (Radiated)
8.Page 39 - 44 : Out of Band Emissions (Antenna Port Conducted)

APPENDIX 3: Test instruments

Page 45 : Test instruments

Conducted emission

Radiated emission

Pre check of worse-case position

DATA OF CONDUCTION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.3 Shielded Room
Report No. : 23FE0027-YK-1

Applicant	: Fujitsu Media Devices Limited
Kind of Equipment	: Bluetooth CF Card
Model No.	: MBH2BT01
Serial No.	: 1
Power	: AC120V/60Hz
Mode	: Transmitting (2402MHz)
Remarks	: -
Date	: 1/31/2003
Phase	: Single Phase
Temperature	: 22 ℃
Humidity	: 35 %
Regulation	: FCC Part15C §15.207. (CISPR Pub.22)

Engineer : Toyokazu Imamura

No.	FREQ.	READING(N) QP	READING(N) AV	READING(L1) QP	READING(L1) AV	LISN FACTOR	CABLE LOSS	ATTEN.	RESULT QP	RESULT AV	LIMITS QP	LIMITS AV	MARGIN QP	MARGIN AV
	[MHz]	[dBuV]		[dBuV]		[dB]	[dB]	[dB]	[dBuV]		[dBuV]		[dB]	
1.	0.1891	42.0	-	41.5	-	0.1	0.1	0.0	42.2	-	64.1	54.1	21.9	-
2.	0.2685	37.9	-	41.2	-	0.1	0.1	0.0	41.4	-	61.2	51.2	19.8	-
3.	0.3170	35.6	-	34.7	-	0.1	0.1	0.0	35.8	-	59.8	49.8	24.0	-
4.	0.3774	28.0	-	35.8	-	0.1	0.2	0.0	36.1	-	58.3	48.3	22.2	-
5.	1.7214	26.7	17.1	21.1	13.7	0.1	0.3	0.0	27.1	17.5	56.0	46.0	28.9	28.5
6.	2.1534	26.9	-	22.4	-	0.1	0.4	0.0	27.4	-	56.0	46.0	28.6	-

CALCULATION: READING[dBμV] + LISN FACTOR[dB] + CABLE LOSS[dB] + ATTEN[dB].

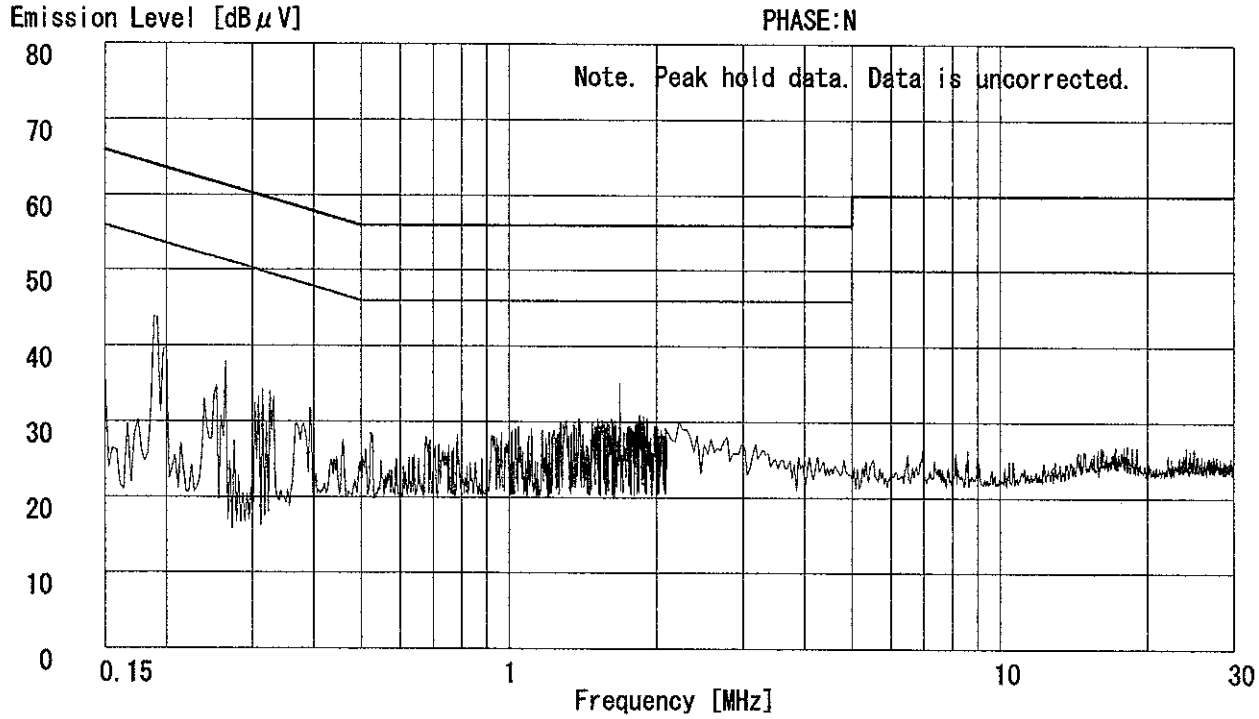
■LISN:KLS-06(NSLK8127) ■COAXIAL CABLE:KCC-24/25/26/28
■PULSE LIMITTER:KPL-02■EMI RECEIVER:KTR-03(ESHS10)

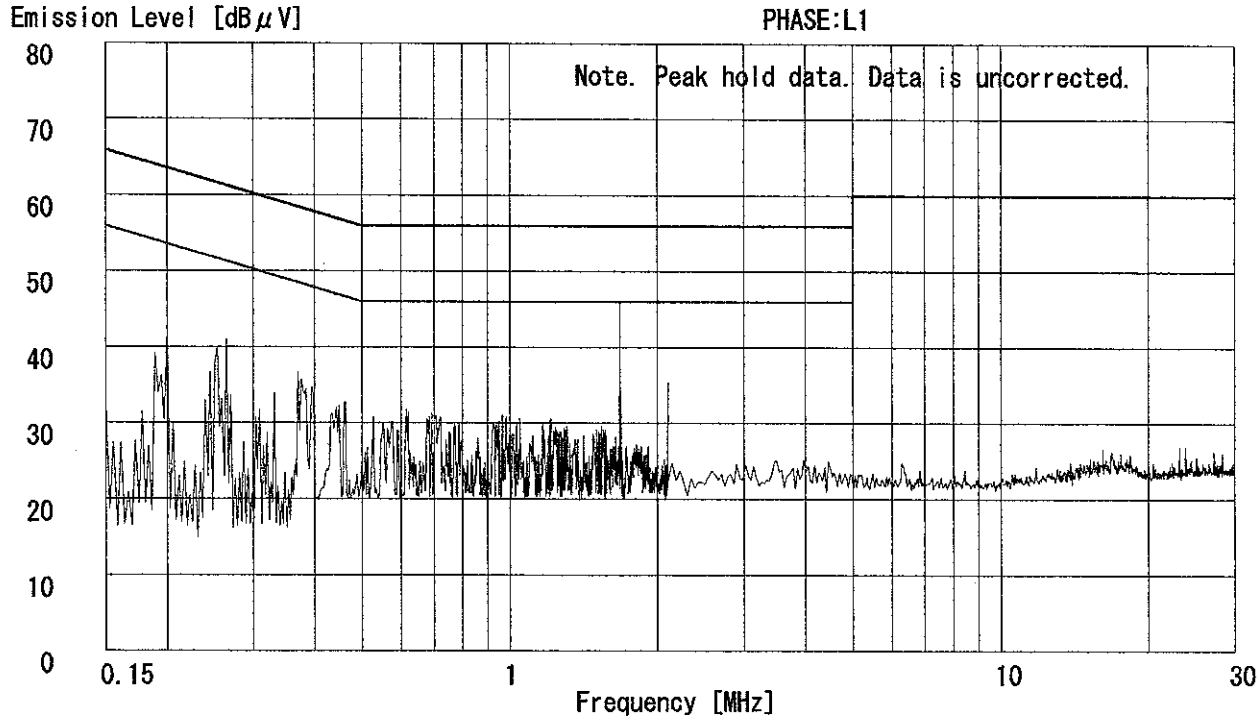
DATA OF CONDUCTION TEST CHART

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.3 Shielded Room
Report No.: 23FE0027-YK-1

Applicant	:	Fujitsu Media Devices Limited
Kind of Equipment	:	Bluetooth CF Card
Model No.	:	MBH2BT01
Serial No.	:	1
Power	:	AC120V/60Hz
Mode	:	Transmitting (2402MHz)
Remarks	:	-
Date	:	1/31/2003
Phase	:	Single Phase
Temperature	:	22 ℃
Humidity	:	35 %
Regulation 1	:	FCC Part15C §15.207.(CISPR Pub.22)
Regulation 2	:	None

Engineer : Toyokazu Imamura





DATA OF CONDUCTION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.3 Shielded Room
Report No.: 23FE0027-YK-1

Applicant	: Fujitsu Media Devices Limited
Kind of Equipment	: Bluetooth CF Card
Model No.	: MBH2BT01
Serial No.	: 1
Power	: AC120V/60Hz
Mode	: Transmitting (2480MHz)
Remarks	: -
Date	: 1/31/2003
Phase	: Single Phase
Temperature	: 22 ℃
Humidity	: 35 %
Regulation	: FCC Part15C §15.207. (CISPR Pub.22)

Engineer : Toyokazu Imamura

No.	FREQ.	READING(N) QP	READING(N) AV	READING(L1) QP	READING(L1) AV	LISN FACTOR	CABLE LOSS	ATTEN.	RESULT QP	RESULT AV	LIMITS QP	LIMITS AV	MARGIN QP	MARGIN AV
	[MHz]	[dBuV]		[dBuV]		[dB]	[dB]	[dB]	[dBuV]		[dBuV]		[dB]	
1.	0.1890	41.7	-	41.2	-	0.1	0.1	0.0	41.9	-	64.1	54.1	22.2	-
2.	0.2685	37.7	-	41.6	-	0.1	0.1	0.0	41.8	-	61.2	51.2	19.4	-
3.	0.3157	36.5	-	35.3	-	0.1	0.1	0.0	36.7	-	59.8	49.8	23.1	-
4.	0.3791	29.0	-	35.6	-	0.1	0.2	0.0	35.9	-	58.3	48.3	22.4	-
5.	1.7059	26.3	17.2	24.3	14.1	0.1	0.3	0.0	26.7	17.6	56.0	46.0	29.3	28.4
6.	2.1534	26.6	-	22.8	-	0.1	0.4	0.0	27.1	-	56.0	46.0	28.9	-

CALCULATION: READING[dBμV] + LISN FACTOR[dB] + CABLE LOSS[dB] + ATTEN[dB].

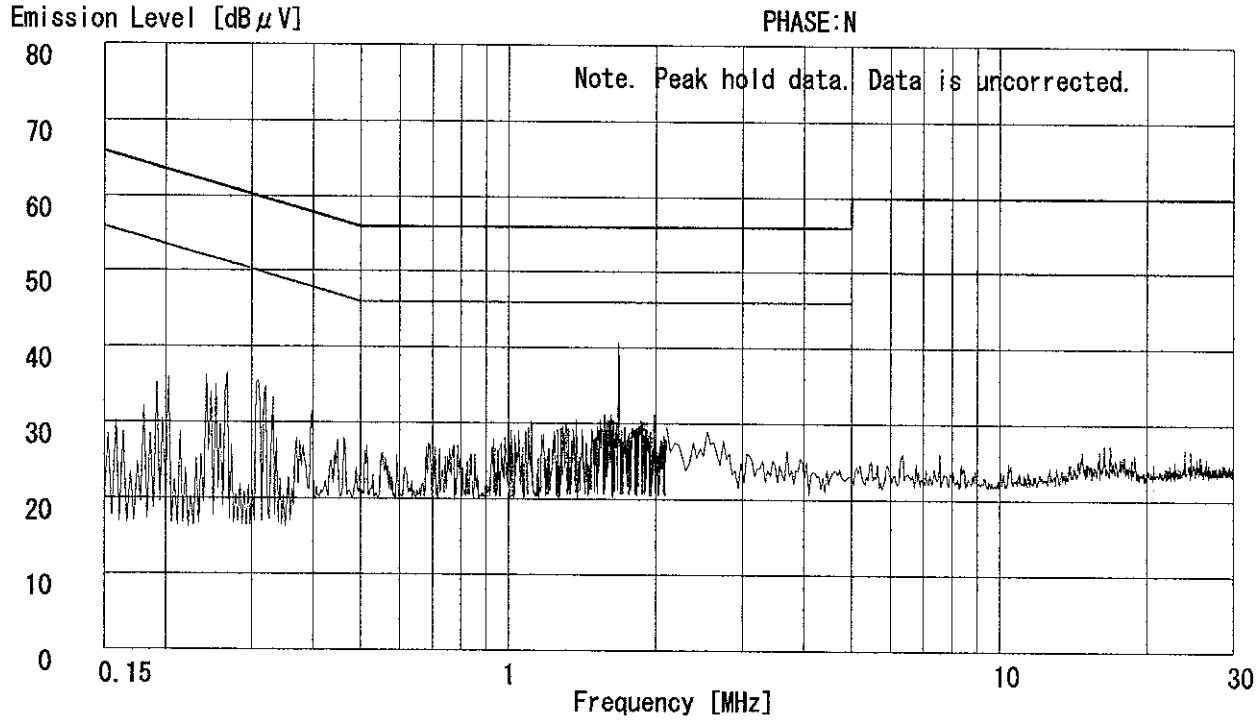
■LISN:KLS-06(NSLK8127) ■COAXIAL CABLE:KCC-24/25/26/28
■PULSE LIMITTER:KPL-02■EMI RECEIVER:KTR-03(ESHS10)

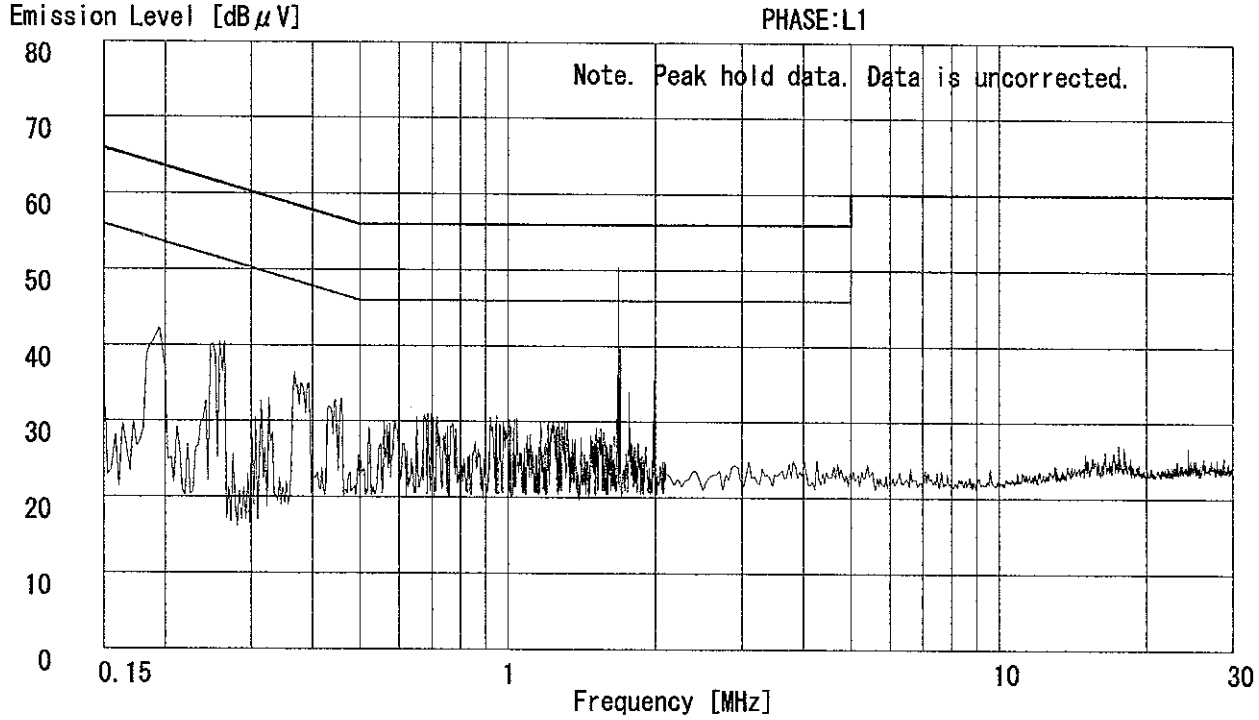
DATA OF CONDUCTION TEST CHART

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.3 Shielded Room
Report No.: 23FE0027-YK-1

Applicant	: Fujitsu Media Devices Limited
Kind of Equipment	: Bluetooth CF Card
Model No.	: MBH2BT01
Serial No.	: 1
Power	: AC120V/60Hz
Mode	: Transmitting (2480MHz)
Remarks	: -
Date	: 1/31/2003
Phase	: Single Phase
Temperature	: 22 ℃
Humidity	: 35 %
Regulation 1	: FCC Part15C §15.207. (CISPR Pub.22)
Regulation 2	: None

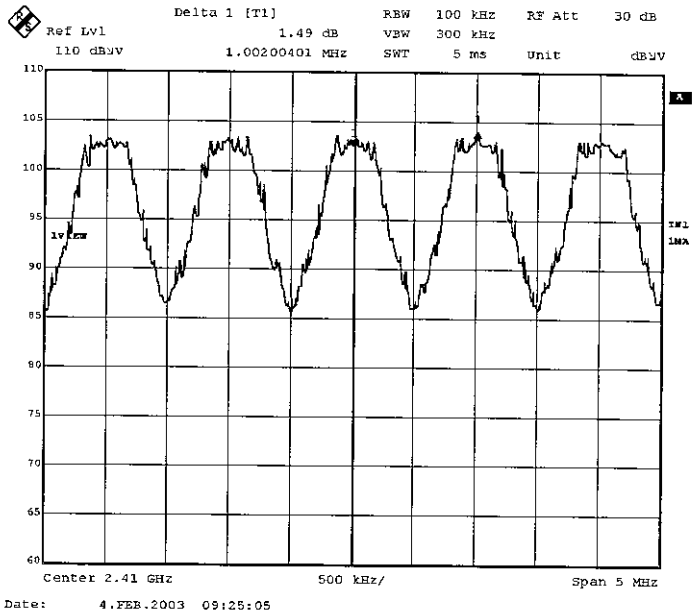
Engineer : Toyokazu Imamura





T. Iramina

Hopping



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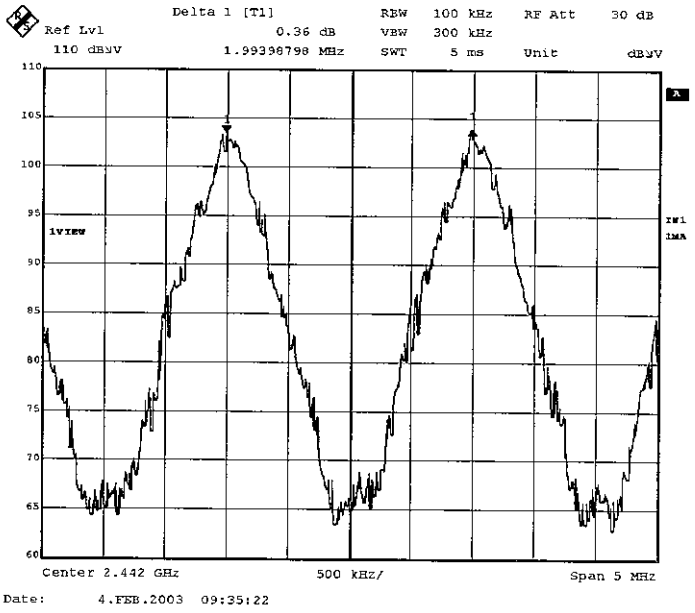

T. Amamura

Hopping

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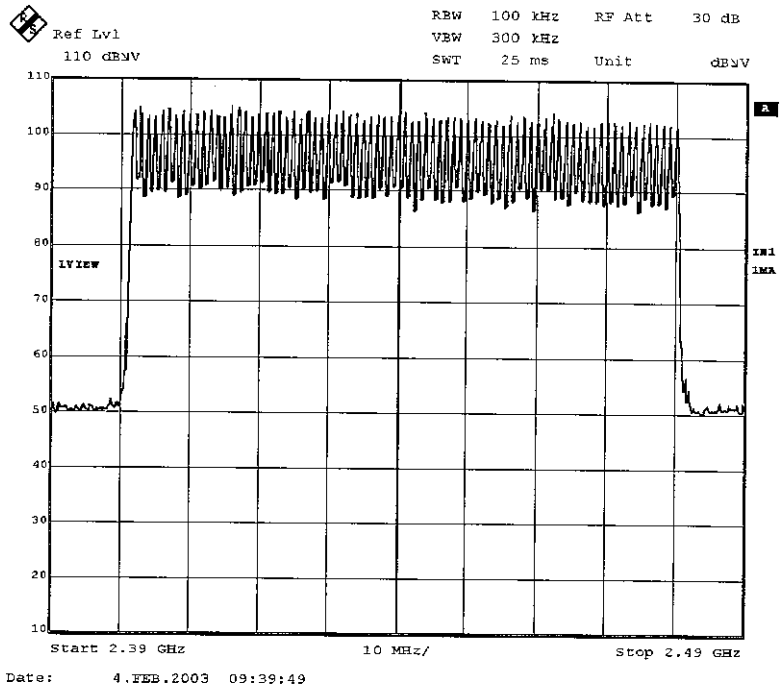

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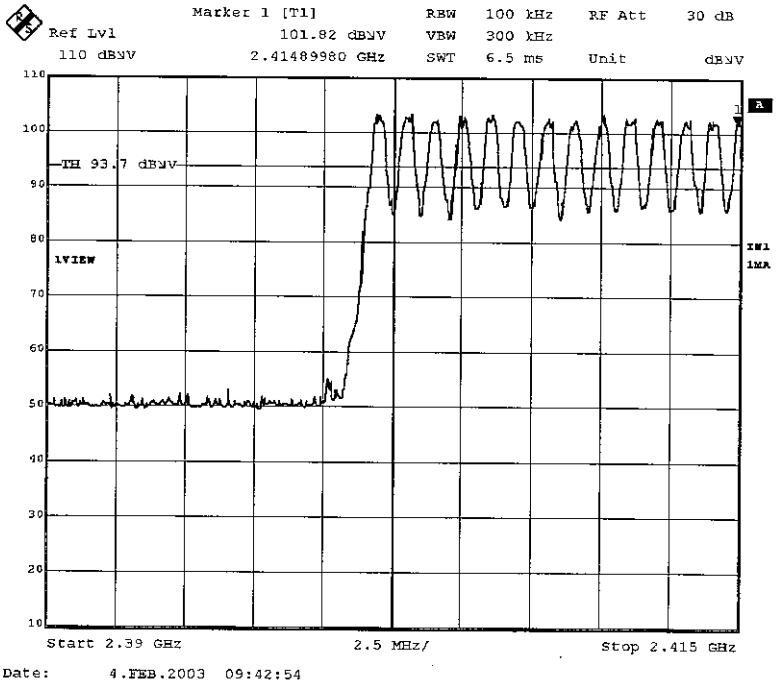

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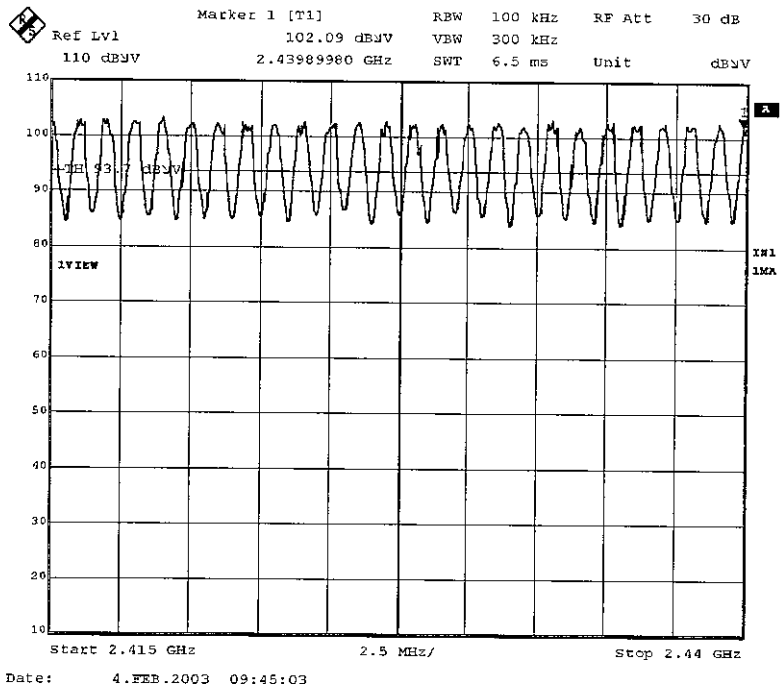
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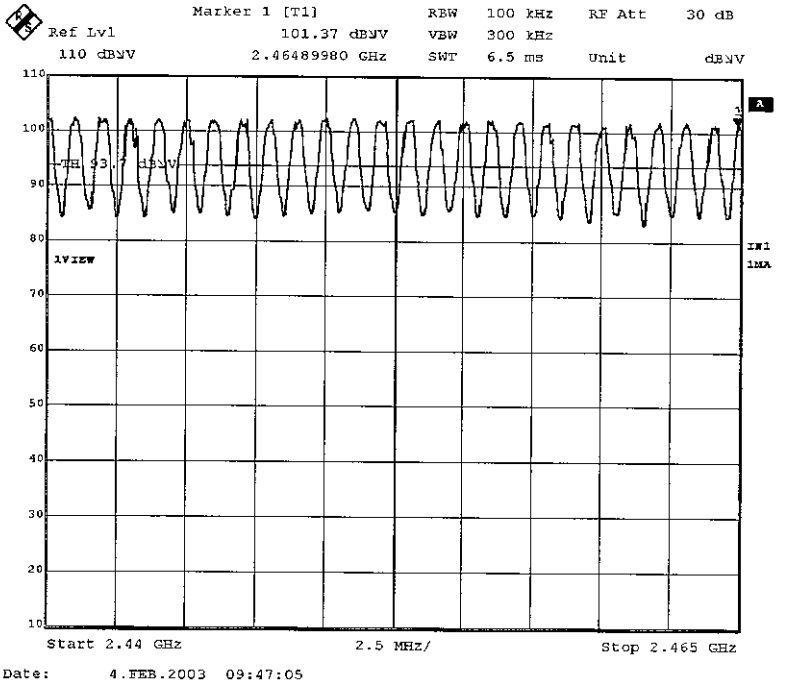
Ref Lvl
110 dBµV
102.09 dBµV
2.43989980 GHz
RBW 100 kHz
VBW 300 kHz
SWT 6.5 ms
RF Att 30 dB
Unit dBµV
TH 93.7 dBµV
1VIEW
1MA
Start 2.415 GHz
2.5 MHz/
Stop 2.44 GHz
Date: 4.FEB.2003 09:45:03

4.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Ref Lvl
110 dBµV
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RBW 100 kHz
VBW 300 kHz
SWT 6.5 ms
RF Att 30 dB
Unit dBµV
TH 93.7 dBµV
1VIEW
1MA
Start 2.44 GHz
2.5 MHz/
Stop 2.465 GHz
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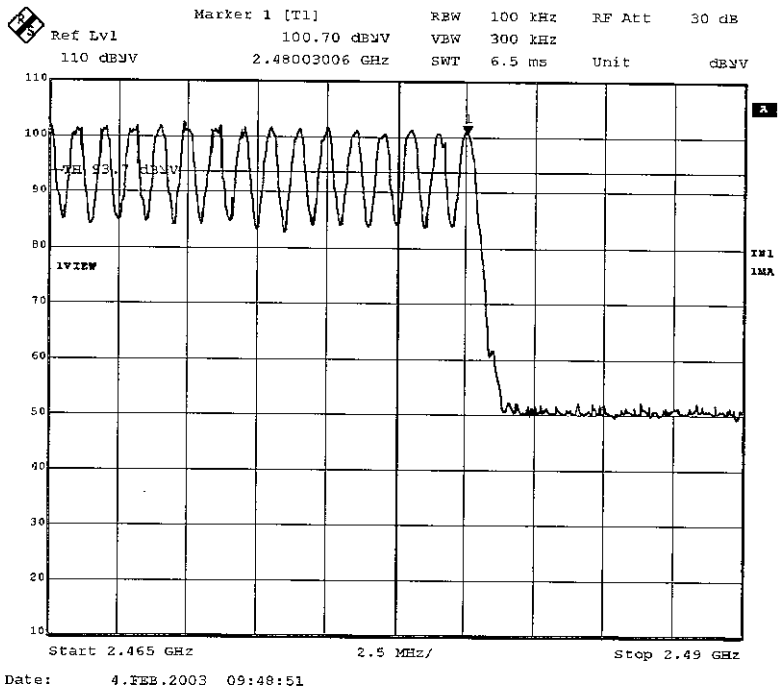
5.

T. Imamura



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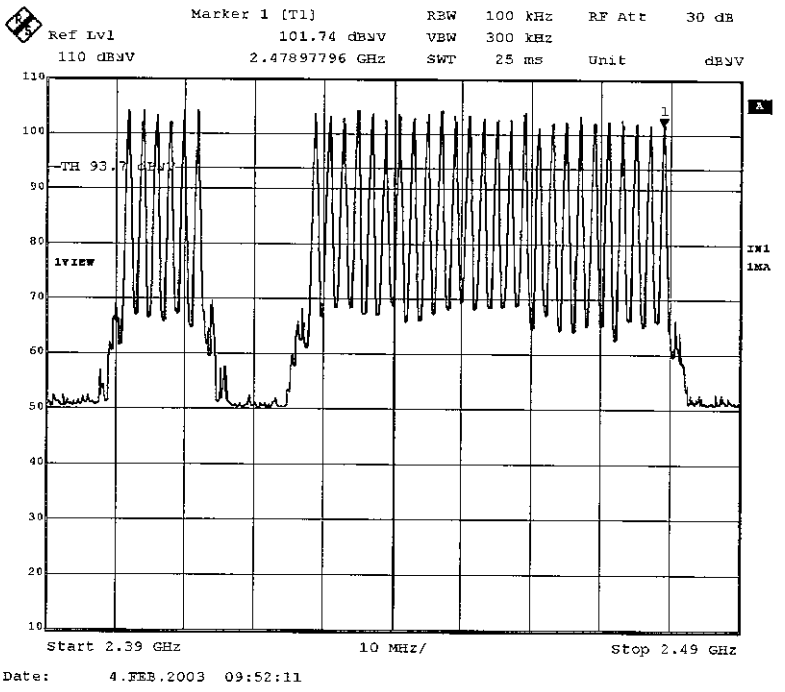
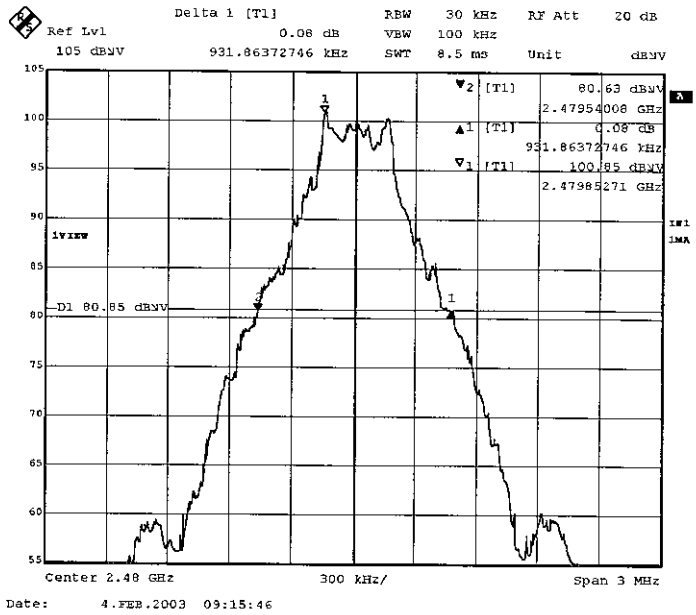
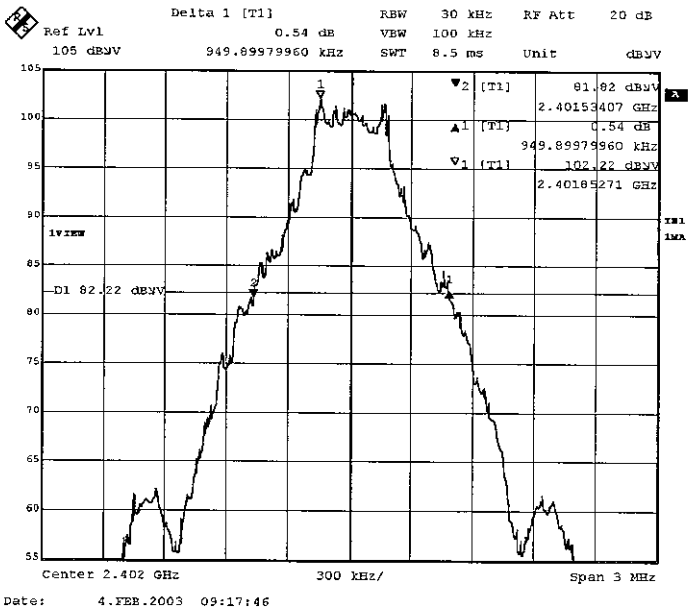


T. Imamura

1. ch Low: 2402MHz



2. ch High: 2480MHz

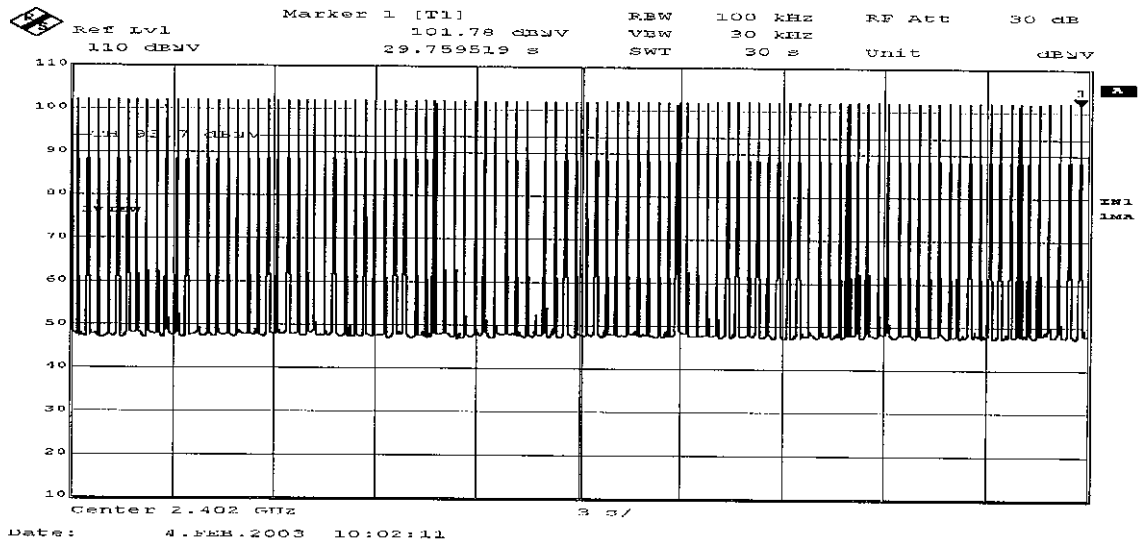


T. Amamura

Dwell Time and Duty Cycle: FCC 15.247(a)

Dwell Time(Hopping)

Count 1



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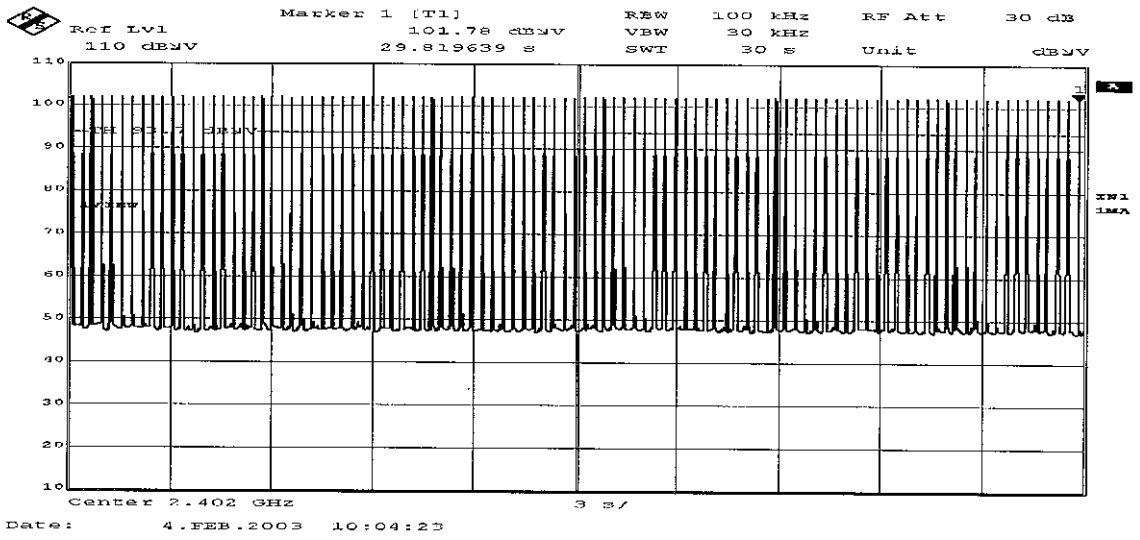
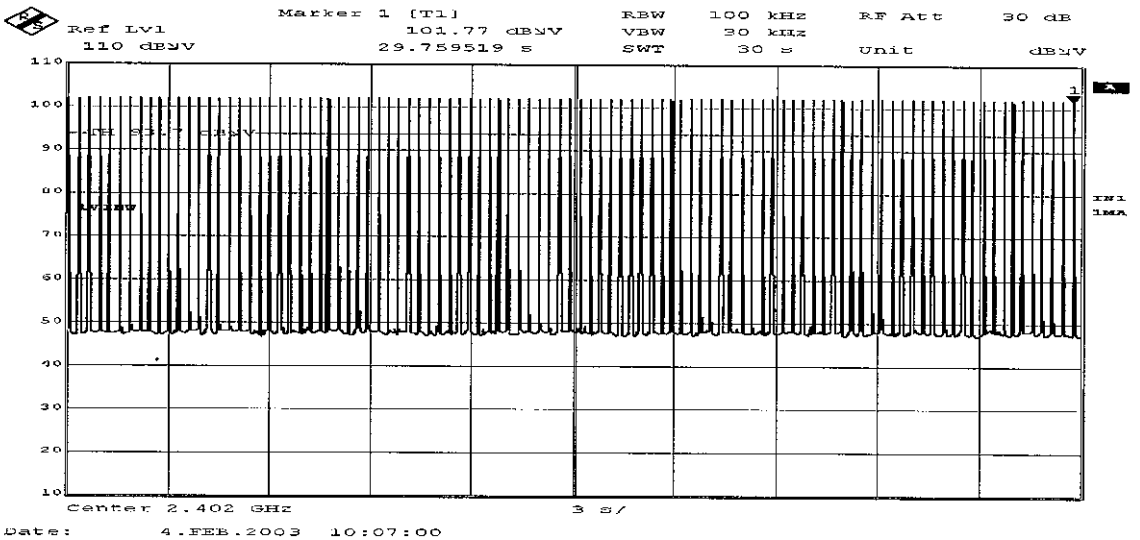


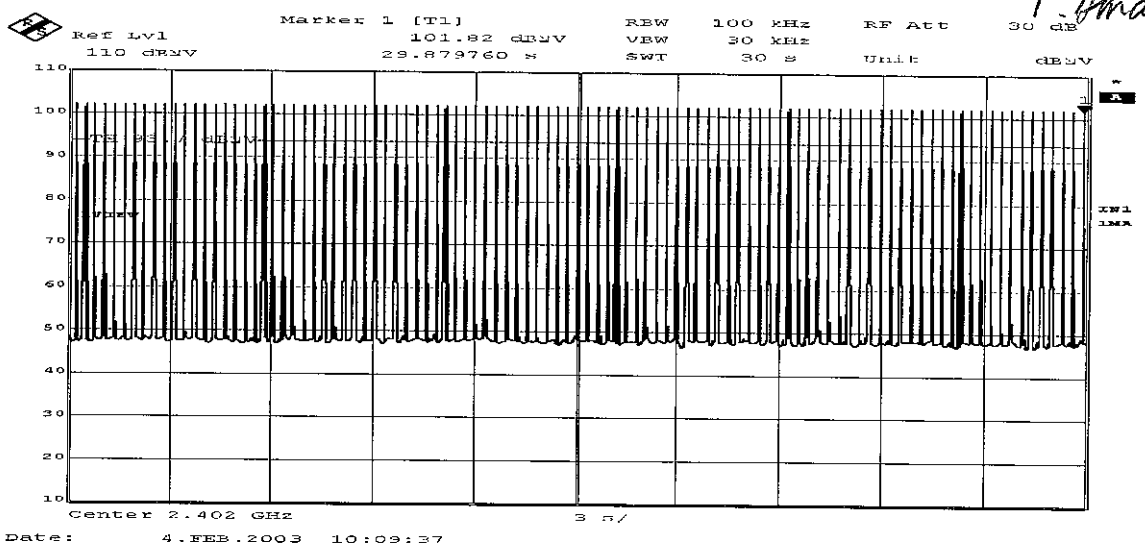
Count 3



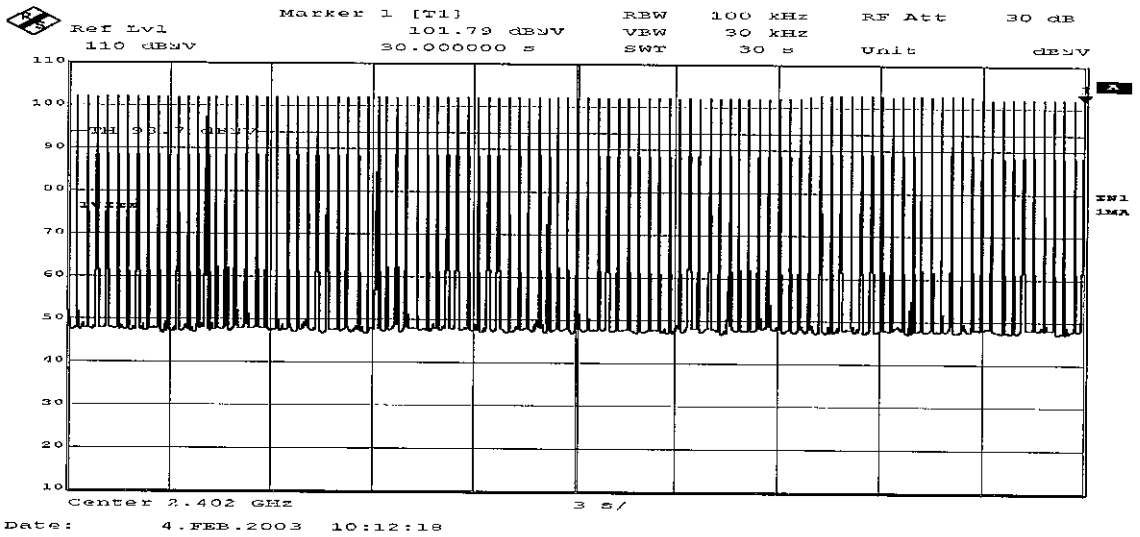
Dwell Time and Duty Cycle: FCC 15.247(a)

T. Imamura

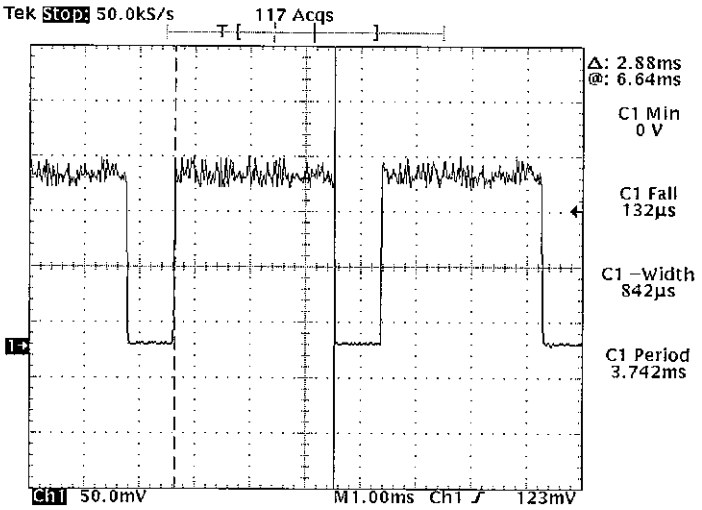
Count 4



Count 5



Duty cycle(Hopping)

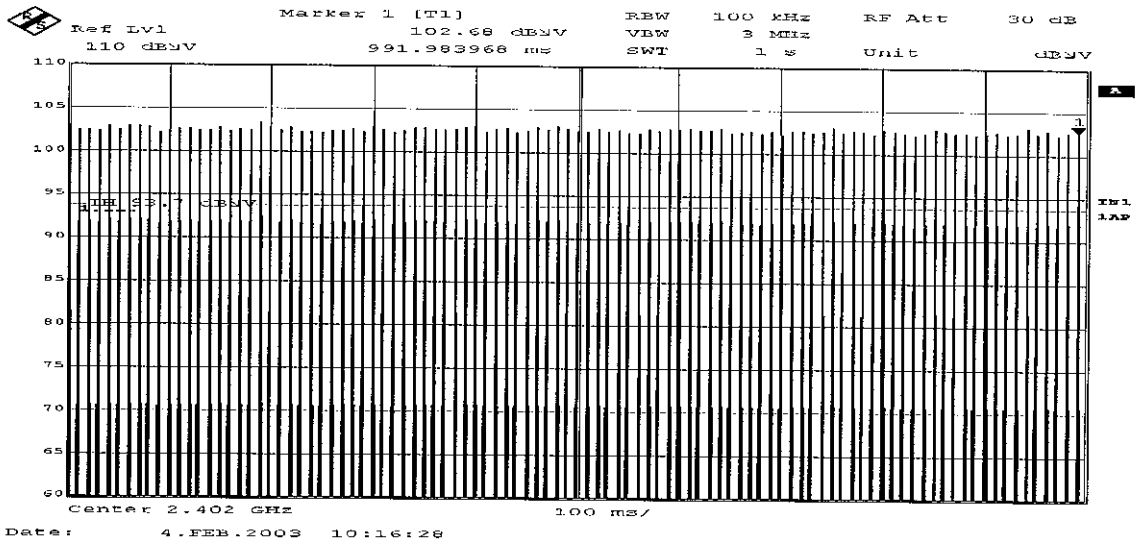


Dwell time = (Count 1 + Count1 2 + Count 3 + Count 4 + Count5) / 5 * Ton
= (101 + 101 + 101 + 101 + 101) / 5 * 2.88[ms]
= 290.88 [ms]

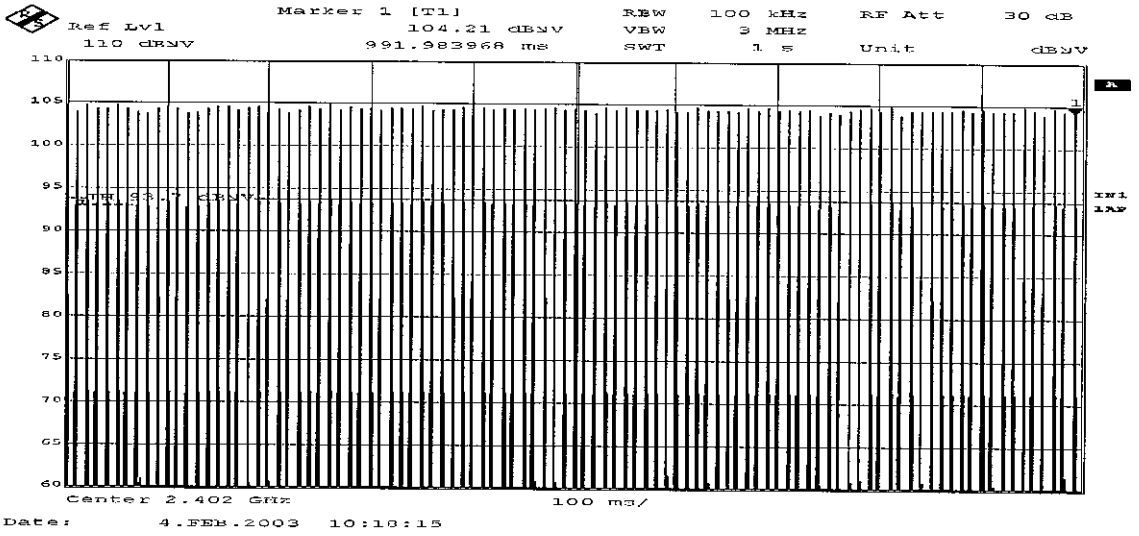
T. Onamura

Dwell Time(Inquiry)

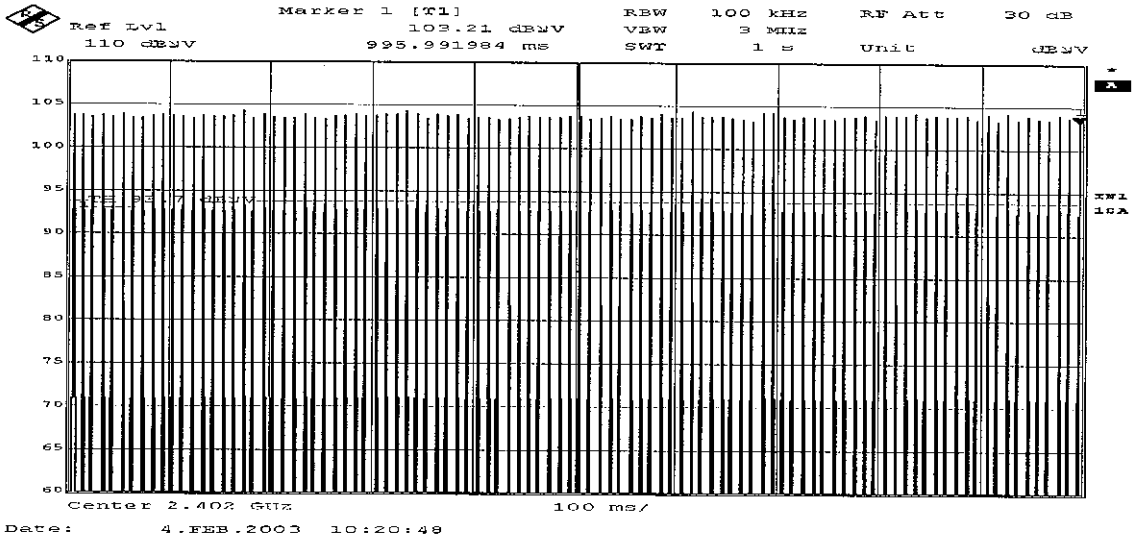
Count 1



Count 2

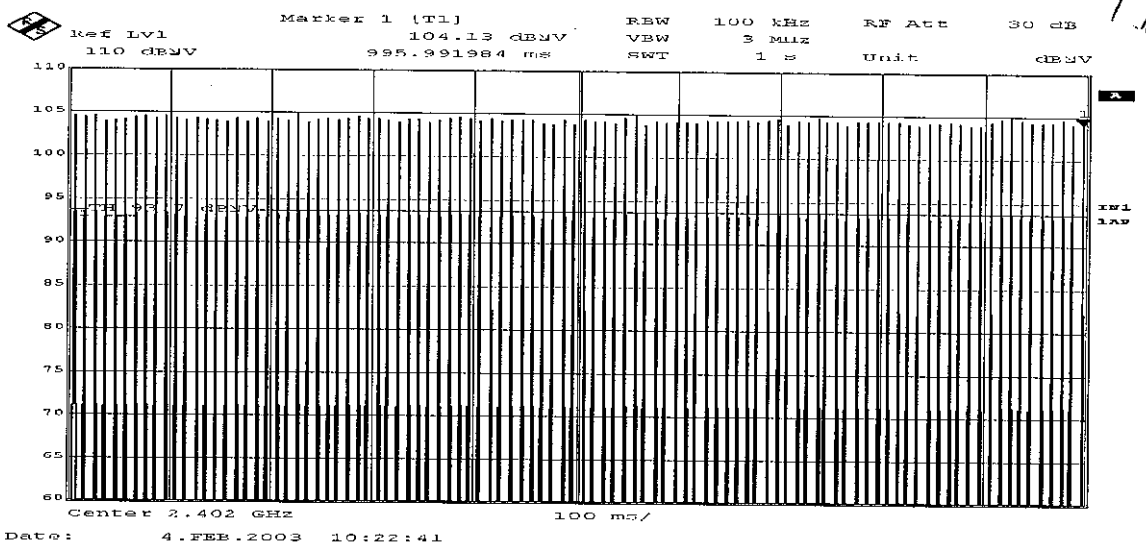


Count 3

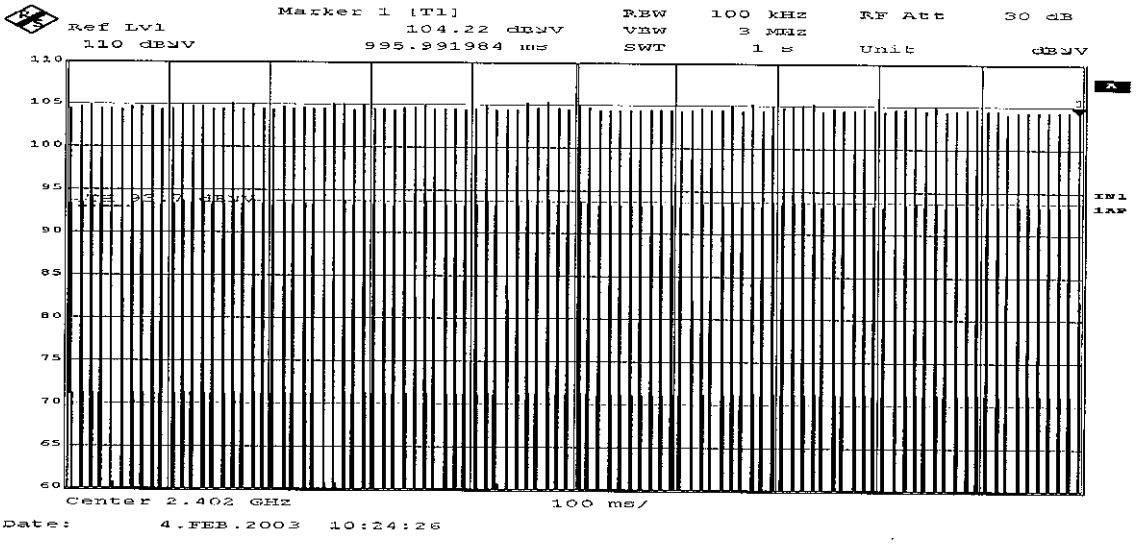


Dwell Time and Duty Cycle: FCC 15.247(a)

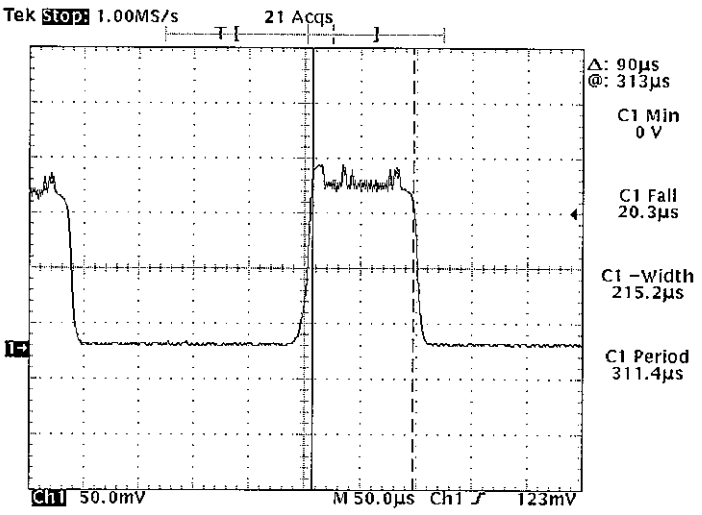
Count 4



Count 5



Duty cycle(Inquiry)



Dwell time = (Count 1 + Count1 2 + Count 3 + Count 4 + Count5) / 5 * 0.4x * Ton
= (100 + 100 + 100 + 100 + 100) / 5 * 12.8[s] * 90 [µs]
= 115.2 [ms]
Note.0.4x = 0.4 * 32ch = 12.8[s]

Peak Out Put Power (Conducted)

A-PEX INTERNATIONAL CO., LTD.
YAMAKITA NO.4 Shield Room

COMPANY : FUJITSU MEDIA DEVICE LIMITED
EQUIPMENT : Bluetooth CF Card
MODEL : MBH2BT01
FCC ID : QZIMBH2BT01
POWER : DC3.3V (PC:AC120V/60Hz)
Mode : Transmitting

REPORT NO : 23FE0027-YK-1
REGULATION : Fcc Part15SubpartC 247 (b) (1)
DATE : 2003/ 2/4
Temp. /Humi. : 20℃/35%

T. Imamura

ENGINEER : Toyokazu Imamura

CH or Mode	FREQ [GHz]	PM Reading [dBm]	Cable Loss [dB]	Results [dBm]	Limit [dBm]	MARGIN [dB]
Low	2402.00	0.25	0.50	0.75	30.0	29.25
High	2480.00	-1.20	0.50	-0.70	30.0	30.70
Inquiry	-	2.83	0.50	3.33	30.0	26.67
Hopping	-	2.00	0.50	2.50	20.96	18.46

Limit:1W=30dBm
Limit (Hopping) :125mW=20.96dBm

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.2 Open Test Site
Report No. : 23FE0027-YK-1

Applicant	:	Fujitsu Media Devices Limited
Kind of Equipment	:	Bluetooth CF Card
Model No.	:	MBH2BT01
Serial No.	:	1
Power	:	AC120V/60Hz
Mode	:	Transmitting (2402MHz)
Remarks	:	-
Date	:	1/31/2003
Test Distance	:	3 m
Temperature	:	24 ℃
Humidity	:	36 %
Regulation	:	FCC Part15C §15.209

Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	120.27	BB	26.3	20.7	13.0	27.6	2.3	5.8	19.8	14.2	43.5	23.7	29.3
2.	265.42	BB	28.3	25.0	17.5	27.1	3.6	5.8	28.1	24.8	46.0	17.9	21.2
3.	294.91	BB	28.6	24.8	19.3	27.1	3.9	5.8	30.5	26.7	46.0	15.5	19.3
4.	324.39	BB	31.3	27.5	15.2	27.3	4.1	5.8	29.1	25.3	46.0	16.9	20.7
5.	420.94	BB	19.7	19.7	17.4	28.0	4.7	5.8	19.6	19.6	46.0	26.4	26.4
6.	460.99	BB	19.8	19.9	17.7	28.4	5.0	5.8	19.9	20.0	46.0	26.1	26.0

CALCULATION: READING[dBμV] + ANT.FACTOR[dB/m] + CABLE LOSS[dB] - AMP.GAIN[dB] + ATTEN[dB].

■ANTENNA:KBA-02(BBA9106)30-299MHz/KLA-02(USLP9143)300-1000MHz
■AMP:KAF-03(8447D) ■RECEIVER:KTR-04(ESVS10) ■CABLE:KCC-20/21/22/23/29

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.2 Open Test Site
Report No. : 23FE0027-YK-1

Applicant	: Fujitsu Media Devices Limited
Kind of Equipment	: Bluetooth CF Card
Model No.	: MBH2BT01
Serial No.	: 1
Power	: AC120V/60Hz
Mode	: Transmitting (2480MHz)
Remarks	: -
Date	: 1/31/2003
Test Distance	: 3 m
Temperature	: 24 ℃
Humidity	: 36 %
Regulation	: FCC Part15C §15.209

Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	120.27	BB	26.2	21.0	13.0	27.6	2.3	5.8	19.7	14.5	43.5	23.8	29.0
2.	265.43	BB	28.0	24.3	17.5	27.1	3.6	5.8	27.8	24.1	46.0	18.2	21.9
3.	294.93	BB	28.0	24.7	19.3	27.1	3.9	5.8	29.9	26.6	46.0	16.1	19.4
4.	324.39	BB	31.3	27.7	15.2	27.3	4.1	5.8	29.1	25.5	46.0	16.9	20.5
5.	420.94	BB	19.7	19.8	17.4	28.0	4.7	5.8	19.6	19.7	46.0	26.4	26.3
6.	460.99	BB	20.0	20.0	17.7	28.4	5.0	5.8	20.1	20.1	46.0	25.9	25.9

CALCULATION: READING[dBμV] + ANT.FACTOR[dB/m] + CABLE LOSS[dB] - AMP.GAIN[dB] + ATTEN[dB].

■ANTENNA:KBA-02(BBA9106)30-299MHz/KLA-02(USLP9143)300-1000MHz
■AMP:KAF-03(8447D) ■RECEIVER:KTR-04(ESVS10) ■CABLE:KCC-20/21/22/23/29

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.2 Open Test Site
Report No. : 23FE0027-YK-1

Applicant	: Fujitsu Media Devices Limited
Kind of Equipment	: Bluetooth CF Card
Model No.	: MBH2BT01
Serial No.	: 1
Power	: AC120V/60Hz
Mode	: Transmitting (2402MHz)
Remarks	: AV Detector
Date	: 1/31/2003
Test Distance	: 3 m
Temperature	: 24 ℃
Humidity	: 36 %
Regulation	: FCC Part15C §15.209(AV Detection)

Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	1200.95	BB	52.3	54.4	26.5	38.0	1.7	0.0	42.5	44.6	54.0	11.5	9.4
2.	2390.00	BB	31.0	30.8	29.7	36.7	2.4	0.0	26.4	26.2	54.0	27.6	27.8
3.	3602.90	BB	43.8	43.6	30.3	36.7	2.9	1.0	41.3	41.1	54.0	12.7	12.9
4.	4804.00	BB	42.5	44.4	33.5	37.1	3.5	0.9	43.3	45.2	54.0	10.7	8.8
5.	6005.00	BB	37.4	39.5	36.7	36.5	3.8	0.8	42.2	44.3	54.0	11.8	9.7
6.	7206.00	BB	43.4	48.0	38.0	37.0	4.2	0.6	49.2	53.8	54.0	4.8	0.2
7.	9608.00	BB	35.4	32.7	39.9	37.0	5.2	0.9	44.4	41.7	54.0	9.6	12.3
8.	12010.00	BB	30.3	30.2	42.8	36.1	5.6	0.5	43.1	43.0	54.0	10.9	11.0
9.	14412.00	BB	29.3	29.2	41.0	35.1	6.3	0.9	42.4	42.3	54.0	11.6	11.7
10.	16814.00	BB	29.8	29.8	41.1	34.9	6.5	1.2	43.7	43.7	54.0	10.3	10.3
11.	19216.00	BB	30.5	30.4	41.3	34.8	7.2	0.0	44.2	44.1	54.0	9.8	9.9
12.	21618.00	BB	31.1	31.0	41.5	34.9	7.5	0.0	45.2	45.1	54.0	8.8	8.9
13.	24020.00	BB	31.4	31.3	40.7	34.6	8.1	0.0	45.6	45.5	54.0	8.4	8.5

CALCULATION: READING[dBμV] + ANT.FACTOR[dB/m] + CABLE LOSS[dB] - AMP.GAIN[dB] + ATTEN[dB].

■ANTENNA:KHA-02(1-18GHz) ■ANTENNA:KHA-04(18-26GHz)
■AMP:KAF-04(8449B) ■RECEIVER:KTR-01 ■CABLE:KCC-D3

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.2 Open Test Site
Report No. : 23FE0027-YK-1

Applicant	: Fujitsu Media Devices Limited
Kind of Equipment	: Bluetooth CF Card
Model No.	: MBH2BT01
Serial No.	: 1
Power	: AC120V/60Hz
Mode	: Transmitting (2480MHz)
Remarks	: AV Detector
Date	: 1/31/2003
Test Distance	: 3 m
Temperature	: 24 ℃
Humidity	: 36 %
Regulation	: FCC Part15C §15.209(AV Detection)

Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	1240.00	BB	52.1	50.2	26.5	37.9	1.8	0.0	42.5	40.6	54.0	11.5	13.4
2.	2483.50	BB	40.8	42.5	30.0	36.7	2.4	0.0	36.5	38.2	54.0	17.5	15.8
3.	3720.00	BB	34.6	38.0	30.9	37.0	3.0	0.9	32.4	35.8	54.0	21.6	18.2
4.	4960.00	BB	38.3	38.7	34.0	36.8	3.5	1.0	40.0	40.4	54.0	14.0	13.6
5.	6200.00	BB	36.4	35.4	36.4	36.4	3.8	0.5	40.7	39.7	54.0	13.3	14.3
6.	7440.00	BB	45.6	46.7	39.2	36.9	4.3	0.5	52.7	53.8	54.0	1.3	0.2
7.	9920.00	BB	34.5	33.0	39.6	36.8	5.4	1.1	43.8	42.3	54.0	10.2	11.7
8.	12400.00	BB	30.1	30.1	42.2	35.6	5.7	0.6	43.0	43.0	54.0	11.0	11.0
9.	14880.00	BB	30.3	30.3	41.7	35.5	6.5	0.9	43.9	43.9	54.0	10.1	10.1
10.	17360.00	BB	31.0	31.0	42.9	34.9	6.7	0.9	46.6	46.6	54.0	7.4	7.4
11.	19840.00	BB	30.6	30.9	40.9	35.3	7.5	0.0	43.7	44.0	54.0	10.3	10.0
12.	22320.00	BB	32.3	32.3	41.6	35.3	7.2	0.0	45.8	45.8	54.0	8.2	8.2
13.	24800.00	BB	31.5	31.5	41.0	34.2	8.3	0.0	46.6	46.6	54.0	7.4	7.4

CALCULATION: READING[dBμV] + ANT.FACTOR[dB/m] + CABLE LOSS[dB] - AMP.GAIN[dB] + ATTEN[dB].

■ANTENNA:KHA-02(1-18GHz) ■ANTENNA:KHA-04(18-26GHz)
■AMP:KAF-04(8449B) ■RECEIVER:KTR-01 ■CABLE:KCC-D3

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.2 Open Test Site
Report No.: 23FE0027-YK-1

Applicant	: Fujitsu Media Devices Limited
Kind of Equipment	: Bluetooth CF Card
Model No.	: MBH2BT01
Serial No.	: 1
Power	: AC120V/60Hz
Mode	: Transmitting (2402MHz)
Remarks	: PK Detector
Date	: 1/31/2003
Test Distance	: 3 m
Temperature	: 24 ℃
Humidity	: 36 %
Regulation	: FCC Part15C §15.209(PK Detection)

Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	1200.95	BB	62.7	63.6	26.5	38.0	1.7	0.0	52.9	53.8	74.0	21.1	20.2
2.	2390.00	BB	42.5	42.1	29.7	36.7	2.4	0.0	37.9	37.5	74.0	36.1	36.5
3.	3602.90	BB	51.3	51.2	30.3	36.7	2.9	1.0	48.8	48.7	74.0	25.2	25.3
4.	4804.00	BB	42.5	44.4	33.5	37.1	3.5	0.9	43.3	45.2	74.0	30.7	28.8
5.	6005.00	BB	47.7	50.1	36.7	36.5	3.8	0.8	52.5	54.9	74.0	21.5	19.1
6.	7206.00	BB	52.9	56.7	38.0	37.0	4.2	0.6	58.7	62.5	74.0	15.3	11.5
7.	9608.00	BB	47.3	45.4	39.9	37.0	5.2	0.9	56.3	54.4	74.0	17.7	19.6
8.	12010.00	BB	43.7	42.6	42.8	36.1	5.6	0.5	56.5	55.4	74.0	17.5	18.6
9.	14412.00	BB	42.0	41.6	41.0	35.1	6.3	0.9	55.1	54.7	74.0	18.9	19.3
10.	16814.00	BB	42.2	43.1	41.1	34.9	6.5	1.2	56.1	57.0	74.0	17.9	17.0
11.	19216.00	BB	43.7	43.3	41.3	34.8	7.2	0.0	57.4	57.0	74.0	16.6	17.0
12.	21618.00	BB	43.4	44.0	41.5	34.9	7.5	0.0	57.5	58.1	74.0	16.5	15.9
13.	24020.00	BB	44.4	44.0	40.7	34.6	8.1	0.0	58.6	58.2	74.0	15.4	15.8

CALCULATION: READING[dBμV] + ANT.FACTOR[dB/m] + CABLE LOSS[dB] - AMP.GAIN[dB] + ATTEN[dB].

■ANTENNA:KHA-02(1-18GHz) ■ANTENNA:KHA-04(18-26GHz)
■AMP:KAF-04(8449B) ■RECEIVER:KTR-01 ■CABLE:KCC-D3

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.2 Open Test Site
Report No. : 23FE0027-YK-1

Applicant	: Fujitsu Media Devices Limited
Kind of Equipment	: Bluetooth CF Card
Model No.	: MBH2BT01
Serial No.	: 1
Power	: AC120V/60Hz
Mode	: Transmitting (2480MHz)
Remarks	: PK Detector
Date	: 1/31/2003
Test Distance	: 3 m
Temperature	: 24 ℃
Humidity	: 36 %
Regulation	: FCC Part15C §15.209(PK Detection)

Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	1240.00	BB	58.7	56.9	26.5	37.9	1.8	0.0	49.1	47.3	74.0	24.9	26.7
2.	2483.50	BB	49.7	51.0	30.0	36.7	2.4	0.0	45.4	46.7	74.0	28.6	27.3
3.	3720.00	BB	45.8	47.8	30.9	37.0	3.0	0.9	43.6	45.6	74.0	30.4	28.4
4.	4960.00	BB	38.3	38.7	34.0	36.8	3.5	1.0	40.0	40.4	74.0	34.0	33.6
5.	6200.00	BB	48.1	47.4	36.4	36.4	3.8	0.5	52.4	51.7	74.0	21.6	22.3
6.	7440.00	BB	55.0	55.4	39.2	36.9	4.3	0.5	62.1	62.5	74.0	11.9	11.5
7.	9920.00	BB	46.9	45.5	39.6	36.8	5.4	1.1	56.2	54.8	74.0	17.8	19.2
8.	12400.00	BB	42.8	42.9	42.2	35.6	5.7	0.6	55.7	55.8	74.0	18.3	18.2
9.	14880.00	BB	43.3	43.0	41.7	35.5	6.5	0.9	56.9	56.6	74.0	17.1	17.4
10.	17360.00	BB	44.0	43.6	42.9	34.9	6.7	0.9	59.6	59.2	74.0	14.4	14.8
11.	19840.00	BB	42.9	43.7	40.9	35.3	7.5	0.0	56.0	56.8	74.0	18.0	17.2
12.	22320.00	BB	44.7	45.2	41.6	35.3	7.2	0.0	58.2	58.7	74.0	15.8	15.3
13.	24800.00	BB	43.9	44.4	41.0	34.2	8.3	0.0	59.0	59.5	74.0	15.0	14.5

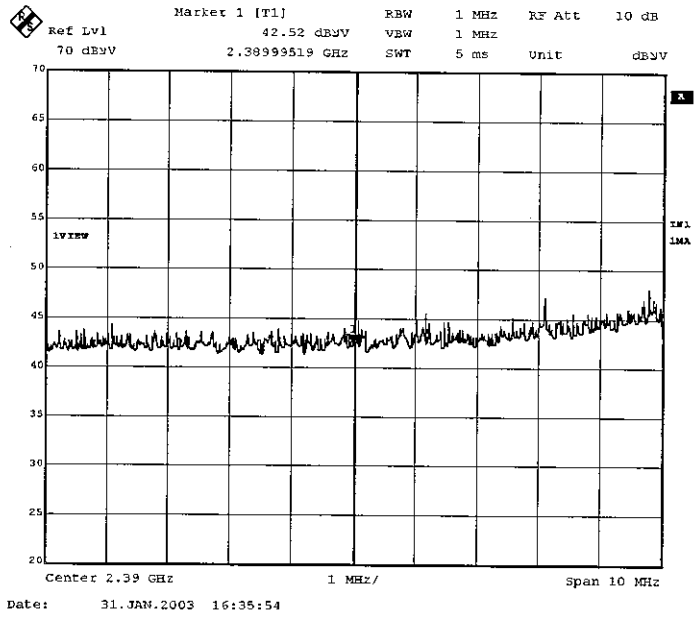
CALCULATION: READING[dBμV] + ANT.FACTOR[dB/m] + CABLE LOSS[dB] - AMP.GAIN[dB] + ATTEN[dB].

■ANTENNA:KHA-02(1-18GHz) ■ANTENNA:KHA-04(18-26GHz)
■AMP:KAF-04(8449B) ■RECEIVER:KTR-01 ■CABLE:KCC-D3

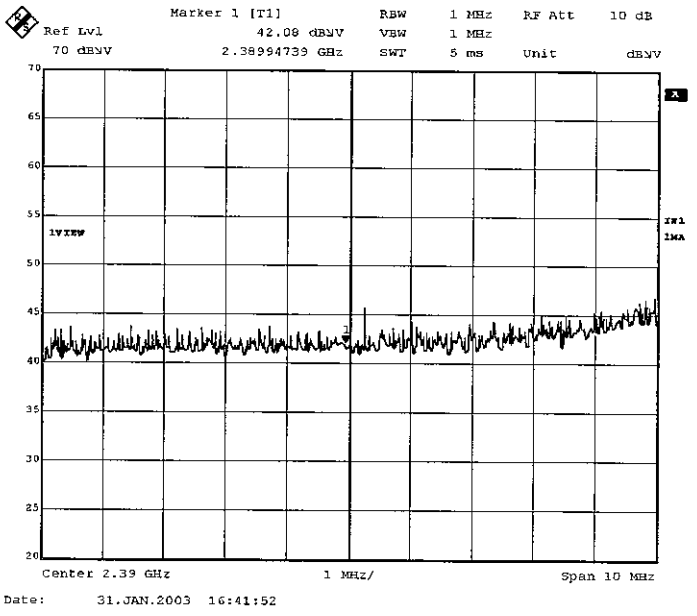
T. Imamura

2.39GHz (Ch :2402MHz)

1. **Horizontal/ PK**

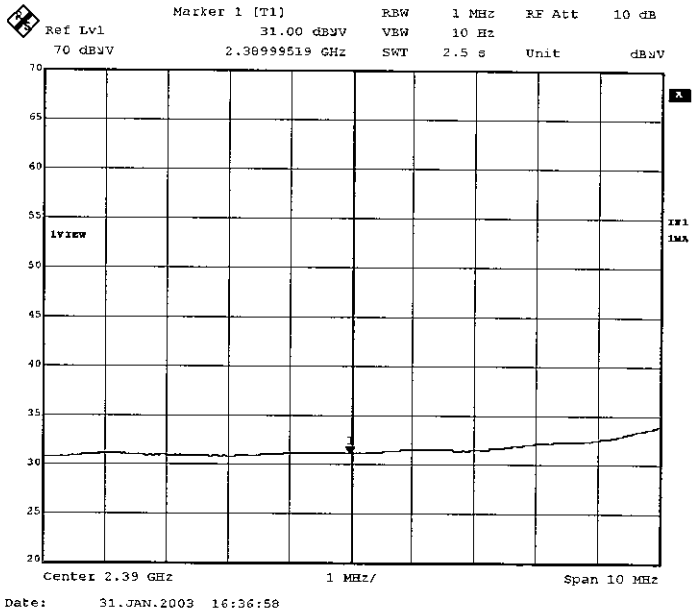


2. **Vertical/ PK**

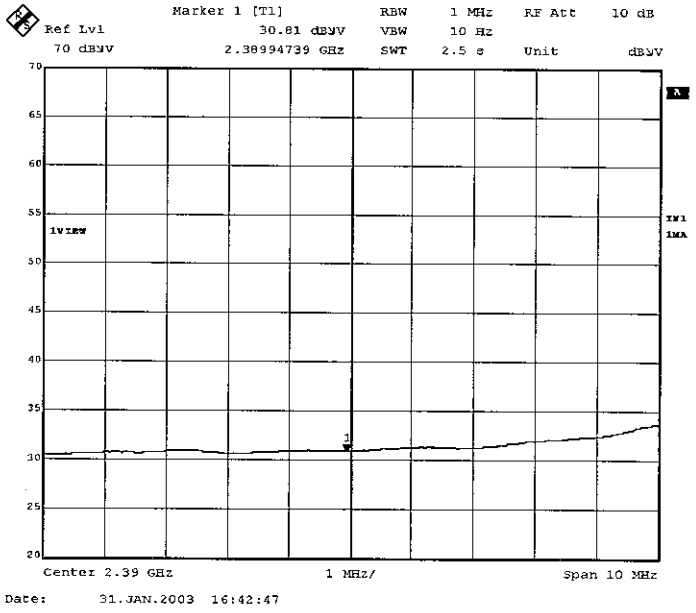


T. Imamura

3. Horizontal/ AV



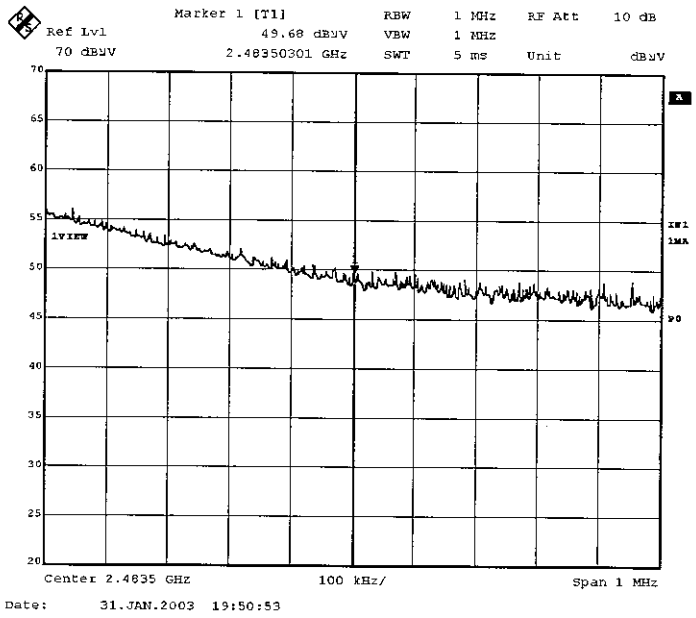
4. Vertical/ AV



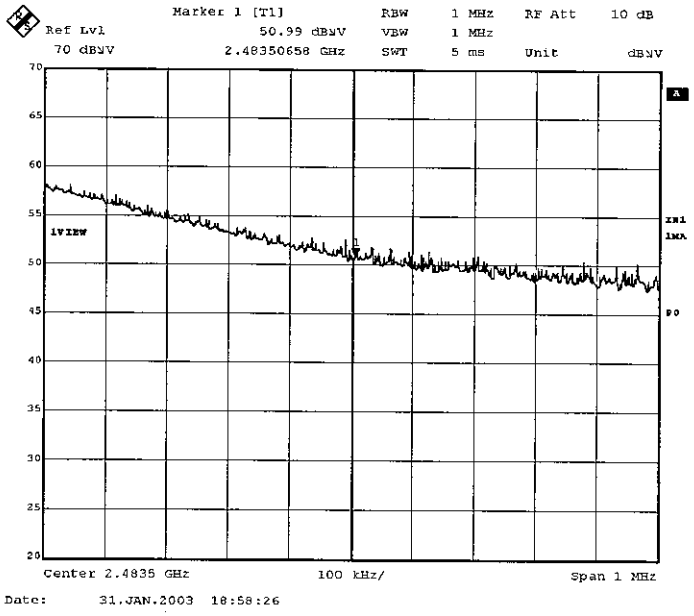
T. Imamura

2.4835GHz (Ch :2480MHz)

1. **Horizontal/ PK**

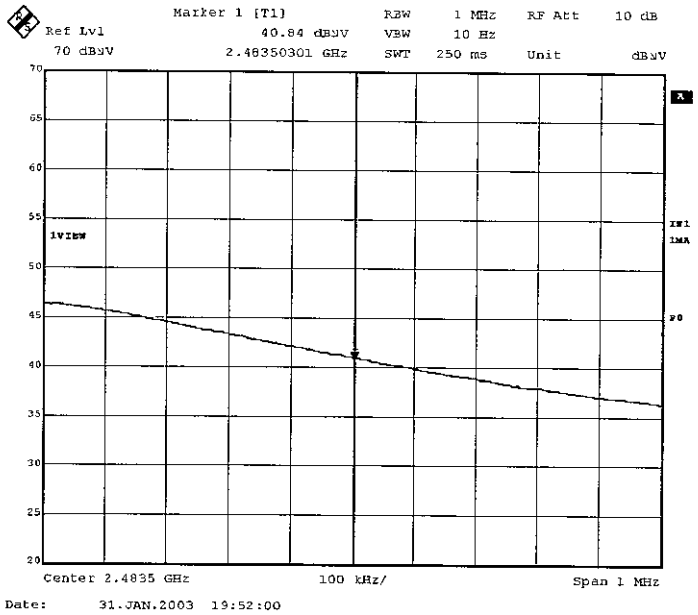


2. **Vertical/ PK**

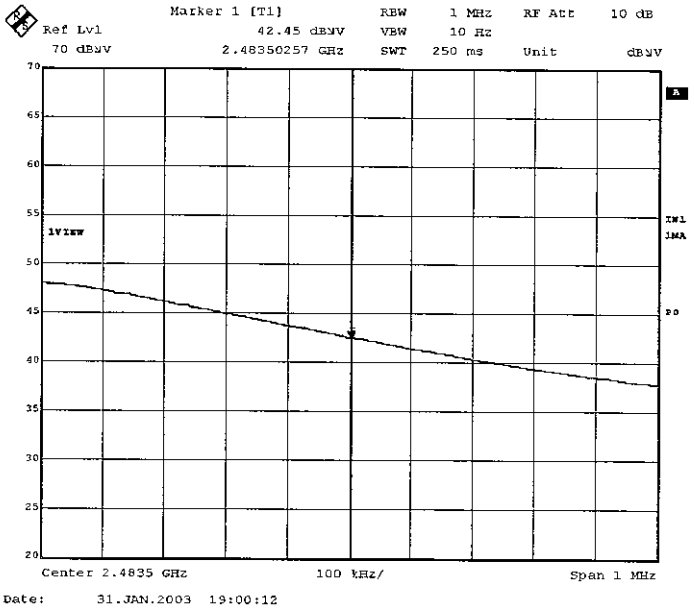


T. Imamura

3. Horizontal/ AV

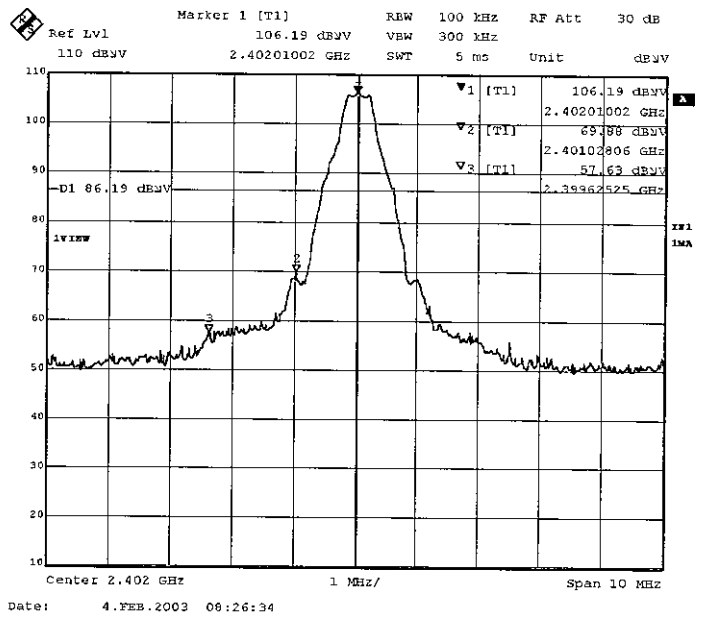


4. Vertical/ AV

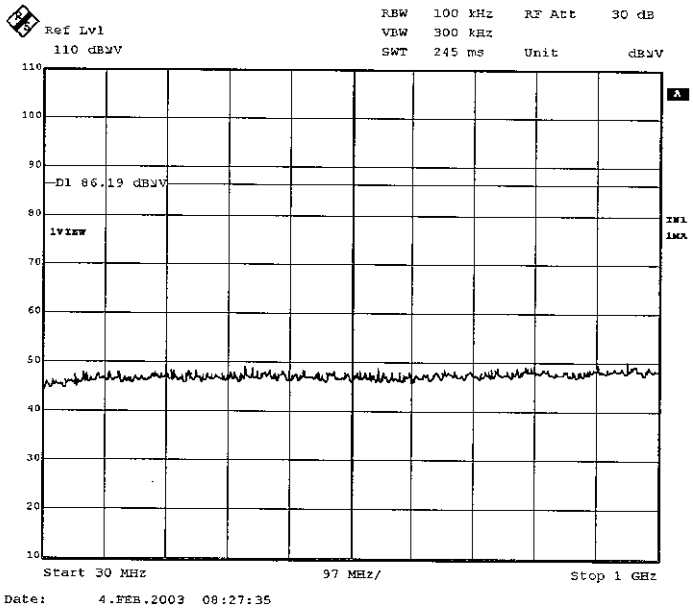


Ch Low: 2402MHz

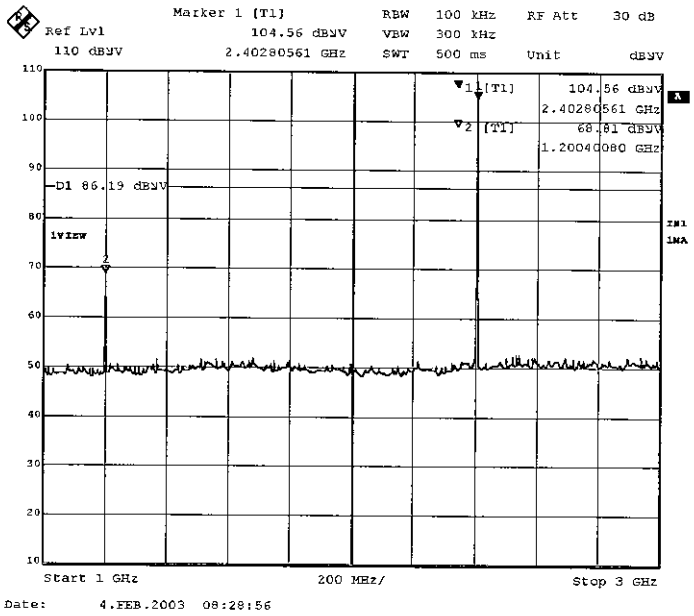
1.



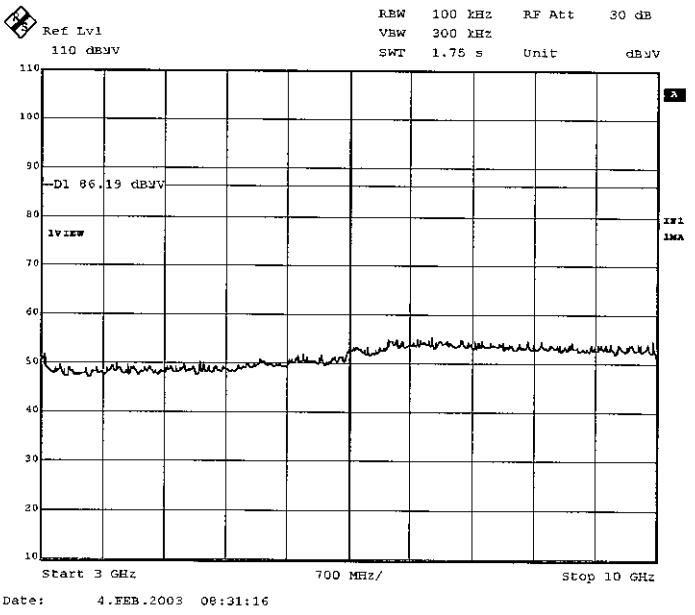
2.



3.

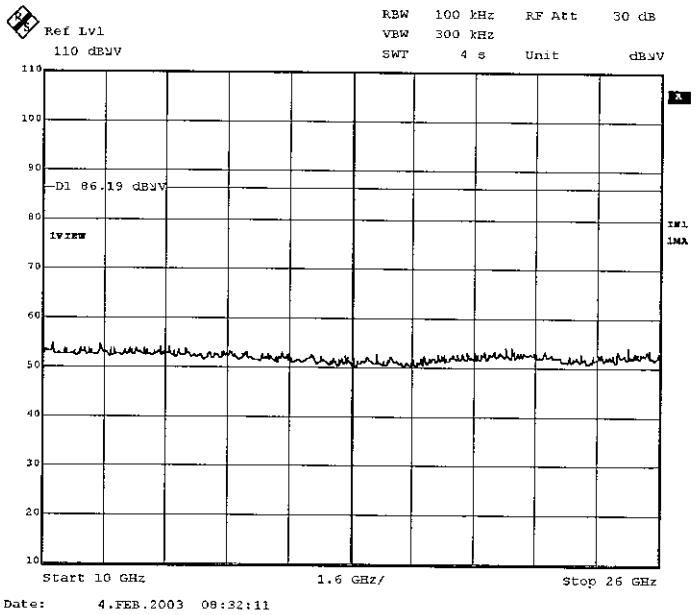

Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
104.56 dBµV
VBW 300 kHz
110 dBµV
2.40280561 GHz
SWT 500 ms
Unit dBµV
1[T1] 104.56 dBµV
2.40280561 GHz
2 [T1] 68.81 dBµV
1.20040080 GHz
D1 86.19 dBµV
1VIEW
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 4.FEB.2003 08:28:56

4.


Ref Lvl
110 dBµV
RBW 100 kHz
RF Att 30 dB
VBW 300 kHz
SWT 1.75 s
Unit dBµV
D1 86.19 dBµV
1VIEW
Start 3 GHz
700 MHz/
Stop 10 GHz
Date: 4.FEB.2003 08:31:16

5.

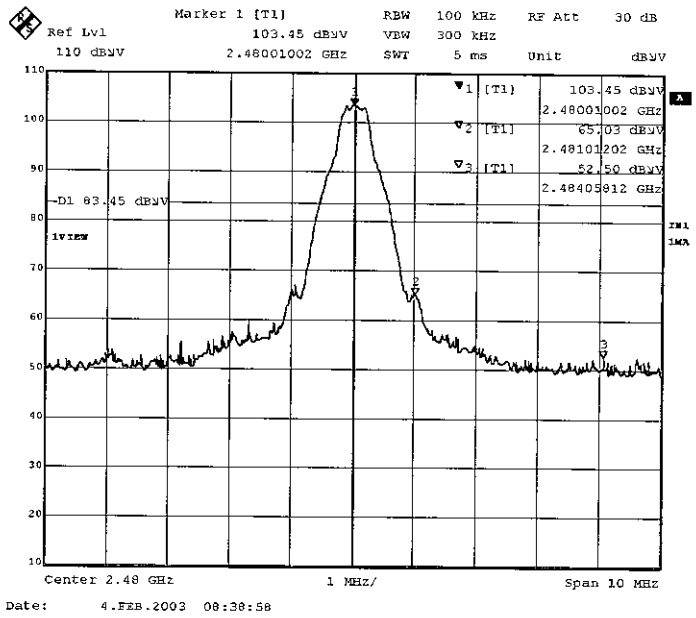
T. Imamura


RBW 100 kHz
VBW 300 kHz
SWT 4 s
RF Att 30 dB
Unit dBµV
Ref Lvl
110 dBµV
D1 86.19 dBµV
1VIEW
1MA
Start 10 GHz
1.6 GHz/
Stop 26 GHz
Date: 4.FEB.2003 08:32:11

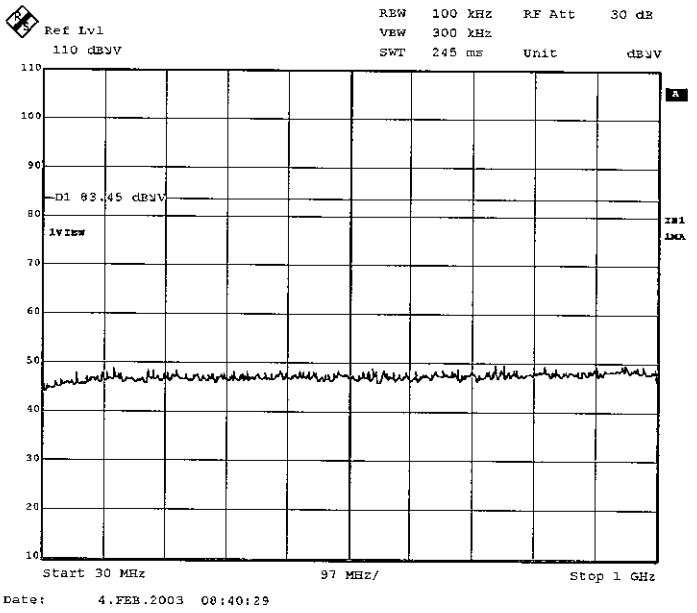
T. Amamura

Ch High: 2480MHz

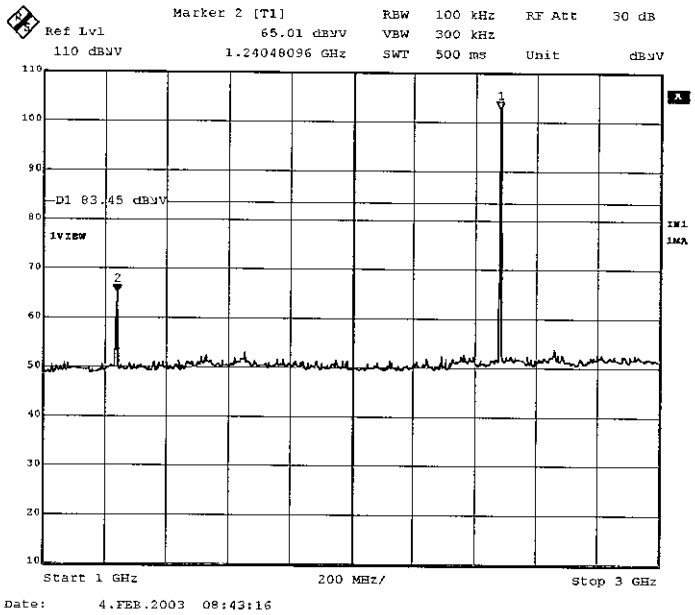
1.



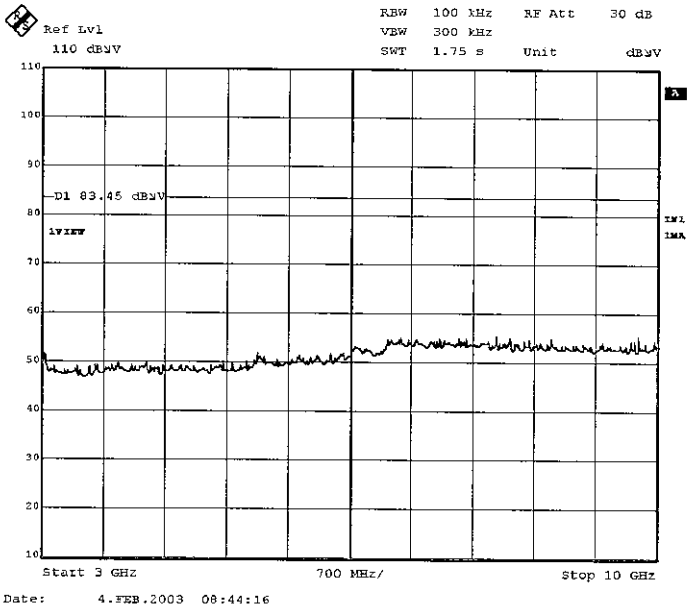
2.



3.

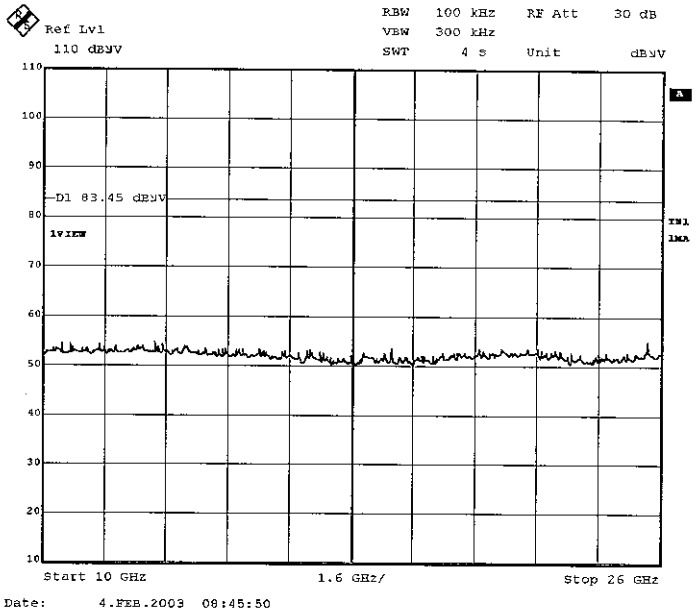

Marker 2 [T1]
65.01 dBµV
1.24048096 GHz
RBW 100 kHz
VBW 300 kHz
SWT 500 ms
RF Att 30 dB
Unit dBµV
Ref Lvl
110 dBµV
D1 83.45 dBµV
1VIEW
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 4.FEB.2003 08:43:16

4.


RBW 100 kHz
VBW 300 kHz
SWT 1.75 s
RF Att 30 dB
Unit dBµV
Ref Lvl
110 dBµV
D1 83.45 dBµV
1VIEW
Start 3 GHz
700 MHz/
Stop 10 GHz
Date: 4.FEB.2003 08:44:16

5.

T. Imamura


RBW 100 kHz
VBW 300 kHz
SWT 4 s
RF Att 30 dB
Unit dBµV
Ref Lvl
110 dBµV
D1 83.45 dBµV
110
100
90
80
70
60
50
40
30
20
10
Start 10 GHz
1.6 GHz/
Stop 26 GHz
Date: 4.FEB.2003 08:45:50

Test Report No : 23FE0027-YK-1

APPENDIX 3
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
KAF-03	Pre Amplifier	Hewlett Packard	8447D	RE	2002/09/19 * 12
KAF-04	Pre Amplifier	Agilent	8449B	RE	2002/05/07 * 12
KAT6-03	Attenuator	INMET	18N-6dB	RE	2002/06/20 * 12
KBA-02	Biconical Antenna	Schwarzbeck	BBA9106	RE	2002/08/25 * 12
KCC-20/21/22/23/29	Coaxial Cable	Fujikura/Suhner	8D-2W/12D-SFA/S04272B/S04272B	RE	2002/09/17 * 12
KCC-24/25/26/28/KPL-02	Coaxial Cable/Pulse Limitter	Fujikura/Suhner/PMM	5D-2W/5D-2W/S04272B/S04272B/PL01	CE	2002/09/17 * 12
KCC-D3	Coaxial Cable	Rosenberger	2201	RE	2002/06/28 * 12
KFL-01	Highpass Filter	Hewlett Packard	84300 80038	RE	2002/05/02 * 12
KHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2002/08/17 * 12
KHA-04	Horn Antenna	EMCO	3160-09	RE	2002/04/27 * 12
KLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2002/08/17 * 12
KOTS-02	Open Test Site	JSE	10m	RE	2002/08/20 * 12
KLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	CE	2002/09/17 * 12
KPM-05	Power meter	Agilent	E4417A	AT	2002/02/15 * 12
KPSS-01	Power sensor	Agilent	E9327A	AT	2002/03/12 * 12
KSA-02	Spectrum Analyzer	Advantest	R3265A	CE/RE	2002/11/29 * 12
KTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE/AT	2002/07/22 * 12
KTR-03	Test Receiver	Rohde & Schwarz	ESHS10	CE	2002/05/14 * 12
KTR-04	Test Receiver	Rohde & Schwarz	ESVS10	RE	2002/10/09 * 12
KST-01	Digitizing Oscilloscope	Tektronix	TDS420A	AT	2002/08/21 * 12
KCC-D4	Coaxial Cable	Storm	421-011(4m)	AT	2002/04/16 * 12

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

Test Item:

CE: Conducted emission test
RE: Radiated emission test
AT: Antenna terminal test