



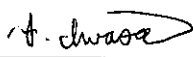
EMI TEST REPORT

Test Report No. : 23KE0035-HO-3

Applicant : SEIKO EPSON Corporation
Type of Equipment : Bluetooth Unit
Model No. : EU-84
Test standard : FCC Part 15 Subpart C
Section 15.207, Section 15.247
FCC ID : BKMFBEU-84
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Apex 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 : July 17, 18 and 19, 2003

Tested by : 
Yoshiaki Iwasa
EMC Service

Approved by : 
Hironobu Shimoji
Group Leader of EMC Service

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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SECTION 1: Client information

Company Name : SEIKO EPSON Corporation
Brand Name : EPSON
Address : 80 Harashinden, Hirooka, Shiojiri-shi Nagano-ken 399-0785 Japan
Telephone Number : +81-263-53-8909
Facsimile Number : +81-263-53-3702
Contact Person : Takeshi Ono

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

2.1 Identification of E.U.T.

Type of Equipment : Bluetooth Unit
Model No. : EU-84
Serial No. : 000190
Rating : DC 5V/0.16A
Country of Manufacture : Japan
Receipt Date of Sample : July 15, 2003
Condition of E.U.T. : Production prototype

2.2 Product Description

SEIKO EPSON Corporation , Model: EU-84 which was referred to as the EUT in this report is a Bluetooth Unit. The EUT is a wireless communication module used to print from digital cameras and other devices with Bluetooth wireless technology without cables when connected to the printer. 2.4GHz Bluetooth communication to use for EPSON printers.

The specification is as following;

Equipment Type : Transceiver
Clock frequency used in EUT : 16MHz
Frequency characteristics : from 2402MHz to 2480MHz
Bandwidth & Channel spacing : 1MHz Interval 79wave
Emission Designation (ITU Code) : 79M0F1D
Antenna Type : InternalCeramic Antenna (A104F2450S1)
Antenna Gain : 2.044dBi (2442MHz)
Method of Frequency Generation : Synthesizer
Operating temperature : +10deg.C. to +35deg.C.

FCC 15.31 (e)

The host device EU-84 provide the stable power supply (DC5V), and the Bluetooth Unit complies power supply regulation.

FCC Part 15.203 Antenna requirement

Since Bluetooth Unit uses a transmitting antenna that is an integral part of the equipment, it is impossible for end users to replace the antenna without use of a special tool. Therefore, the equipment complies with the requirement of 15.203.

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MF060b(10.04.03)

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part15 Subpart C

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928MHz,
2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted emission	ANSI C63.4:2001	Section 15.207	-	N/A	22.0dB 1.3370MHz L1	Complied
2	Carrier Frequency Separation	ANSI C63.4:2001	Section 15.247(a)(1)	Conducted	N/A	-	Complied
3	-20dB Bandwidth	ANSI C63.4:2001	Section 15.247(a)(2)	Conducted	N/A	-	Complied
4	Maximum Peak Output Power	ANSI C63.4:2001	Section 15.247(b)(3)	Conducted	N/A	-	Complied
5	Number of Hopping Frequency	ANSI C63.4:2001	Section 15.247(a)(1)	Conducted	N/A	-	Complied
6	Dwell time	ANSI C63.4:2001	Section 15.247(a)(1)	Conducted	N/A	-	Complied
7	Out of Band Emission	ANSI C63.4:2001	Section 15.247 (c)	Conducted/ Radiated	N/A	2.8dB 2483.5MHz Vertical	Complied
8	Restricted Band Edges	ANSI C63.4:2001	Section 15.247 (c)	Conducted	N/A	-	Complied

Note: UL Apex's EMI Work Procedures No.QPM05.

*These tests were also referred to FCC Public Notice DA 00-705 "Guidance on Measurement for Frequency Hopping Spread Spectrum Systems".

3.3 Confirmation

UL Apex Co., Ltd. hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part 15 Subpart C Section 15.207 and 15.247.

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3.4 Uncertainty

Conducted Emission

The measurement uncertainty (with a 95% confidence level) for this test was $\pm 1.3\text{dB}$.
The data listed in this test report has enough margin.

Spurious Emission (Radiated)

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is $\pm 4.5\text{dB}(3\text{m})$.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is $\pm 5.2\text{dB}(3\text{m})$.
The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is $\pm 6.6\text{dB}$.
The result is within Head Office EMC lab's uncertainty.

Other test except Conducted Emission and Spurious Emission (Radiated)

The measurement uncertainty (with a 95% confidence level) for this test was $\pm 3.0\text{dB}$.
The data listed in this test report has enough margin.

3.5 Test Location

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 semi anechoic chamber.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124

This semi anechoic chamber has been fully described in a report submitted to FCC office, and listed on June 05, 2002. (Registration number: 846015 Industry Canada: IC4247-2)

*NVLAP Lab. code: 200572-0

3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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

4.1 Operating Modes

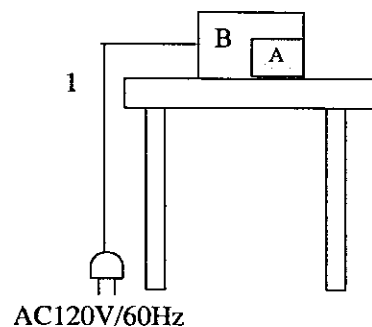
The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

The sequence is used : Transmitting

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

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

4.2 Configuration and peripherals



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

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	Bluetooth Unit	EU-84	000190	SEIKO EPSON Corporation	BKMFBUEU-84
B	Inkjet Printer	B281A	100092	SEIKO EPSON Corporation	DoC

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	AC Power Cable	1.9	N	Polyvinyl chloride

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SECTION 5: Conducted Emission, Section 15.207

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. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. 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 reference ground plane 4.0 x 4.0m in a No.2 semi Anechoic Chamber.

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 9 kHz).

Measurement range: 0.15-30MHz

Test data	:	APPENDIX 3
Test result	:	Pass
Test instruments	:	MCC-13, MLS-06, SA-07, MTR-02

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SECTION 6: Carrier Frequency Separation, Section 15.247(a)(1)

Test Procedure

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass
Test instruments : SA-07

SECTION 7: 20dB Bandwidth, Section 15.247(a)(1)

Test Procedure

The minimum 20dB bandwidth was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass
Test instruments : SA-07

SECTION 8: Maximum Peak Output Power, Section 15.247(b)(1)

Test Procedure

The Maximum Peak Output Power was measured with a Power Meter connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass
Test instruments : MPM-01, MCC-06, PS-03

SECTION 9: Number of Hopping Frequency, Section 15.247(a)(1)(iii)

Test Procedure

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass
Test instruments : SA-07

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SECTION 10: Dwell time, Section 15.247(a)(1)(iii)

Test Procedure

The Dwell time was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass
Test instruments : SA-07

SECTION 11: Out of Band Emission and Restricted Band Edge, Section 15.247 (c)

[Conducted]

Test Procedure

The Out of Band Emission (Conducted) was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass
Test instruments : SA-07

[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 Radiated Electric Field Strength intensity has been measured in No.2 semi anechoic chamber (7.5x5.8x5.2m) with a ground plane and at a distance of 3m and 1m.

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.

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.

Test data : APPENDIX 3
Test result : Pass
Test instruments : MCC-13, MHA-06, MPA-01/02, MBA-03, MLA-03,
MAT-07, MHA-01, SA-07,

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MF060b(10.04.03)

CONTENTS OF APPENDIXES

APPENDIX 1: Photographs of test setup

Page 12	: Conducted Emission
Page 13-14	: Spurious Emission (Radiated)

APPENDIX 2: Test instruments

Page 15	: Test instruments
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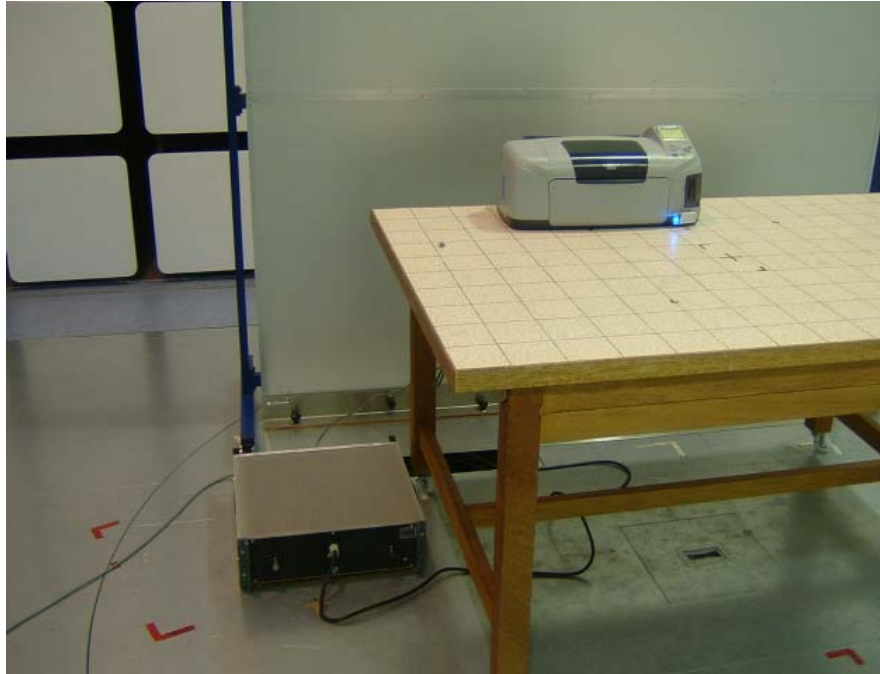
APPENDIX 3: Data of EMI test

Page 16-21	: Conducted Emission
Page 22	: Carrier Frequency Separation
Page 23	: -20dB Bandwidth
Page 24	: Peak Output Power
Page 25	: Number of hopping frequency
Page 26	: Dwell time
Page 27-38	: Out of Band Emission
Page 39-40	: Restricted Band Edge
Page 41	: 99% Occupied Bandwidth

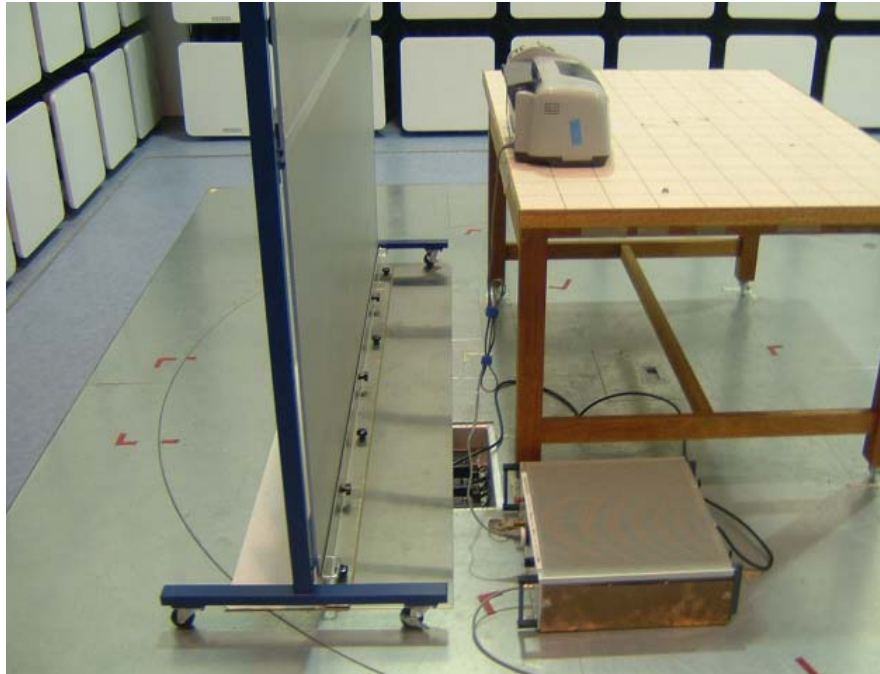
APPENDIX 1: Photographs of test setup

Conducted Emission

Front



Side

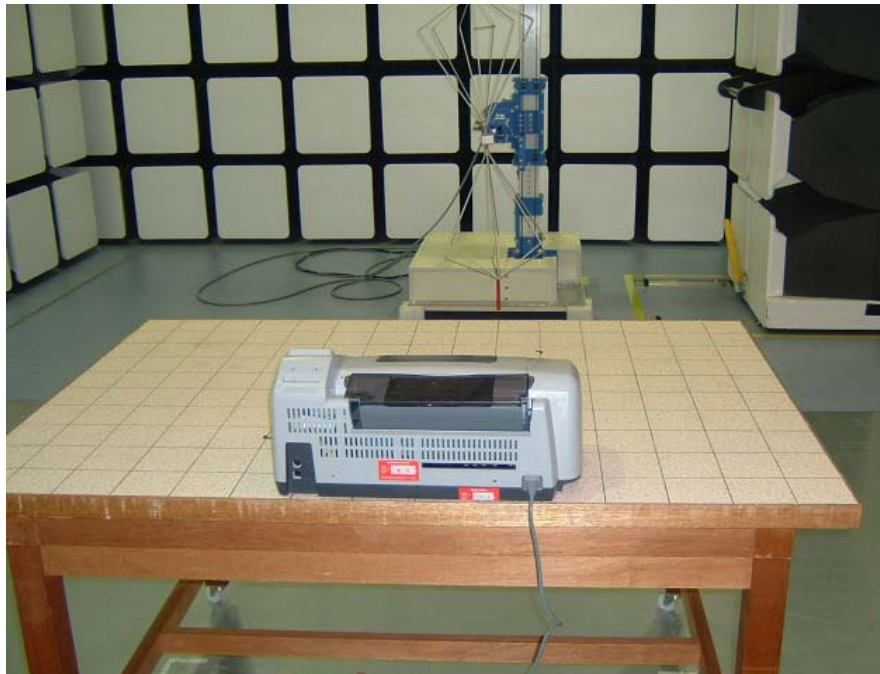


Spurious Emission (Radiated)

Front



Rear



Worst Case Position
(Y-axis:Horizontal Y-axis:Vertical)

X-axis



Y-axis



Z-axis



APPENDIX 2: Test instruments

Test Report No : 23KE0035-HO-3

APPENDIX2 Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE /CE	2003/04/11 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2002/12/24 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/04/28 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE	2003/05/08 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/04/28 * 12
MOS-02	Digital Humidity Indicator	N.T	NT-1800	RE/CE	2002/12/10 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE/CE	2003/01/31 * 12
MPA-02	Pre Amplifier	Agilent	87405A	RE	2003/04/17 * 12
SA-07	Spectrum Analyzer	Advantest	R3273	RE/CE	2002/12/10 * 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
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	CE	2003/03/18 * 12
MHA-01	Horn Antenna	EMCO	3160-09	RE	2003/01/11 * 12
MCC-13	Coaxial Cable	Fujikura/Agilent	-	CE	2003/05/08 * 12

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

Test Item:

CE: Conducted emission,
RE: Radiated emission,

APPENDIX 3: Data of EMI test

Conducted Emission (TX 2402MHz) DATA OF CONDUCTION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23KE0035-HO-3

Applicant : SEIKO EPSON Corporation
Kind of Equipment : Bluetooth Unit
Model No. : EU-84
Serial No. : 000190
Power : AC120V/60Hz
Mode : TX 2402MHz
Remarks : FCC ID:BKMFBUEU-84, IC Number:1052-EU84
Date : 7/19/2003
Phase : Single Phase
Temperature : 25 °C
Humidity : 66 %
Regulation : FCC 15.207 (0.15-30MHz)

Engineer : Yoshiaki Iwasa

No.	FREQ. [MHz]	READING(N)		READING(L1)		LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
		QP	AV	QP	AV				QP	AV	QP	AV	QP	AV
		[dBuV]		[dBuV]					[dBuV]		[dBuV]		[dB]	
1.	0.1500	38.9	17.7	38.3	17.6	0.0	0.1	0.0	39.0	17.8	66.0	56.0	27.0	38.2
2.	0.2720	36.6	-	36.7	-	0.0	0.1	0.0	36.8	-	61.1	51.1	24.3	-
3.	0.5450	25.7	-	22.5	-	0.1	0.1	0.0	25.9	-	56.0	46.0	30.1	-
4.	0.6150	19.4	-	19.8	-	0.1	0.1	0.0	20.0	-	56.0	46.0	36.0	-
5.	1.3370	25.3	-	33.3	-	0.1	0.2	0.0	33.6	-	56.0	46.0	22.4	-
6.	5.1200	6.4	-	23.6	-	0.2	0.6	0.0	24.4	-	60.0	50.0	35.6	-
7.	10.1800	14.2	-	23.4	-	0.4	0.8	0.0	24.6	-	60.0	50.0	35.4	-
8.	23.9800	17.1	-	17.8	-	0.8	1.3	0.0	19.9	-	60.0	50.0	40.1	-

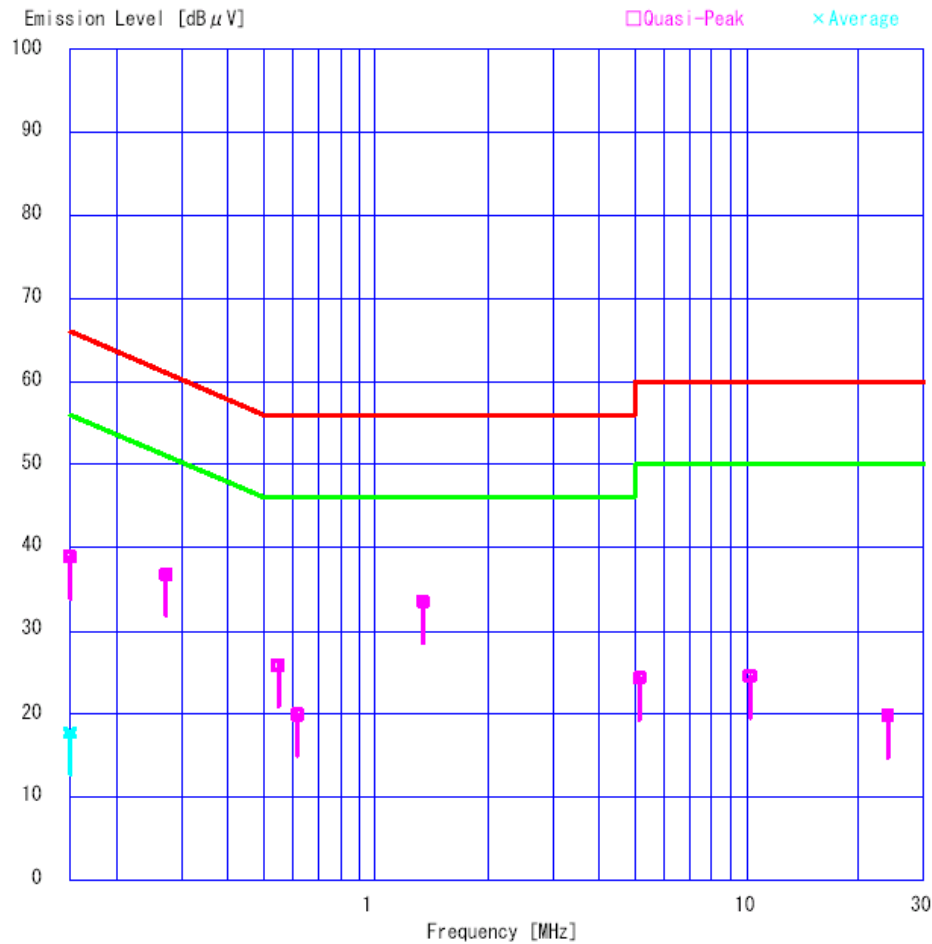
CALCULATION: READING[dBμV] + LISN FACTOR[dB] + CABLE LOSS[dB] + ATTEN[dB].

DATA OF CONDUCTION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23KE0035-HO-3

Applicant : SEIKO EPSON Corporation
Kind of Equipment : Bluetooth Unit
Model No. : EU-84
Serial No. : 000190
Power : AC120V/60Hz
Mode : TX 2402MHz
Remarks : FCC ID: BKMFB EU-84, IC Number: 1052-EU84
Date : 7/19/2003
Phase : Single Phase
Temperature : 25 °C
Humidity : 66 %
Regulation : FCC 15.207 (0.15-30MHz)

Engineer : Yoshiaki Iwasa



Conducted Emission (TX 2441MHz)
DATA OF CONDUCTION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23KE0035-HO-3

Applicant : SEIKO EPSON Corporation
Kind of Equipment : Bluetooth Unit
Model No. : EU-84
Serial No. : 000190
Power : AC120V/60Hz
Mode : TX 2441MHz
Remarks : FCC ID:BKMFBUEU-84, IC. Number:1052-EU84
Date : 7/19/2003
Phase : Single Phase
Temperature : 25 °C
Humidity : 66 %
Regulation : FCC 15.207 (0.15-30MHz)

Engineer : Yoshiaki Iwasa

No.	FREQ. [MHz]	READING (N)		READING (L1)		LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
		QP	AV	QP	AV				QP	AV	QP	AV	QP	AV
		[dBuV]		[dBuV]					[dBuV]		[dBuV]		[dB]	
1.	0.1500	38.4	16.8	38.5	17.0	0.0	0.1	0.0	38.6	17.1	66.0	56.0	27.4	38.9
2.	0.2680	34.6	-	35.7	-	0.0	0.1	0.0	35.8	-	61.2	51.2	25.4	-
3.	0.5450	24.2	-	20.9	-	0.1	0.1	0.0	24.4	-	56.0	46.0	31.6	-
4.	0.6710	19.8	-	19.7	-	0.1	0.1	0.0	20.0	-	56.0	46.0	36.0	-
5.	1.3370	25.3	-	33.5	-	0.1	0.2	0.0	33.8	-	56.0	46.0	22.2	-
6.	5.1200	6.4	-	23.7	-	0.2	0.6	0.0	24.5	-	60.0	50.0	35.5	-
7.	10.1800	14.4	-	23.5	-	0.4	0.8	0.0	24.7	-	60.0	50.0	35.3	-
8.	23.9700	17.3	-	18.0	-	0.8	1.3	0.0	20.1	-	60.0	50.0	39.9	-

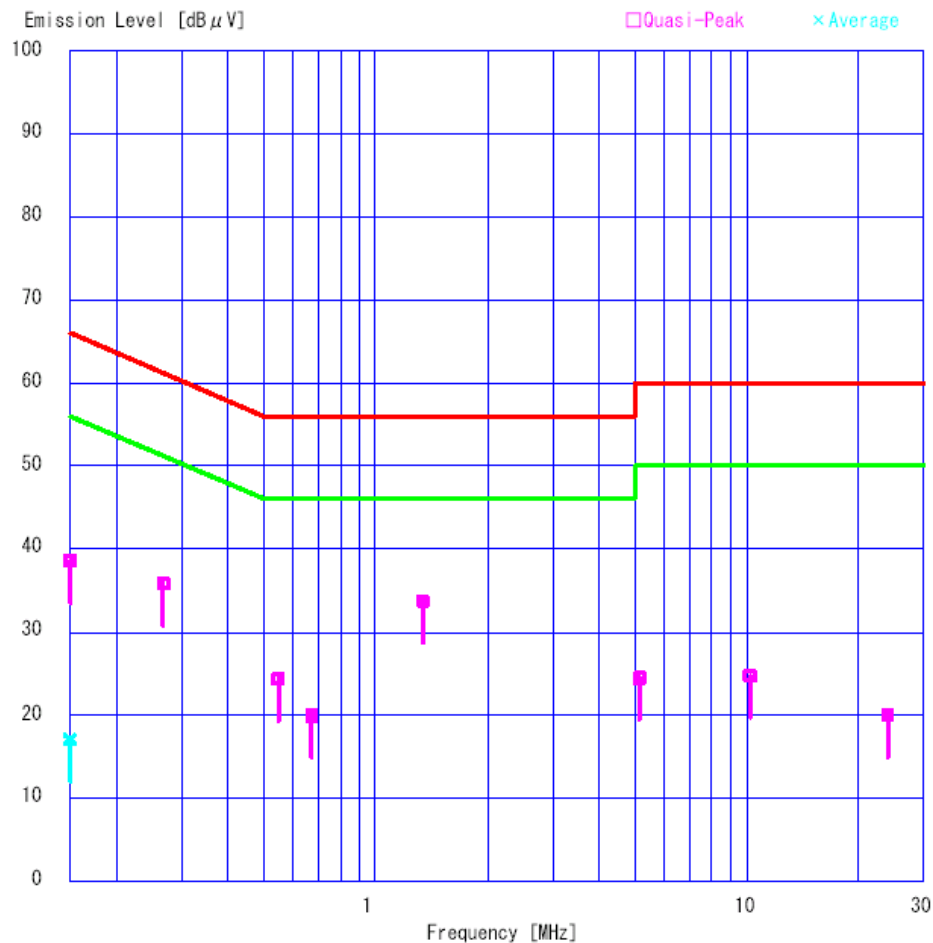
CALCULATION: READING[dBμV] + LISN FACTOR[dB] + CABLE LOSS[dB] + ATTEN[dB].

DATA OF CONDUCTION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23KE0035-HO-3

Applicant : SEIKO EPSON Corporation
Kind of Equipment : Bluetooth Unit
Model No. : EU-84
Serial No. : 000190
Power : AC120V/60Hz
Mode : TX 2441MHz
Remarks : FCC ID:BKMFBUEU-84, IC Number:1052-EU84
Date : 7/19/2003
Phase : Single Phase
Temperature : 25 °C
Humidity : 66 %
Regulation : FCC 15.207 (0.15-30MHz)

Engineer : Yoshiaki Iwasa



Conducted Emission (TX 2480MHz)
DATA OF CONDUCTION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23KE0035-HO-3

Applicant : SEIKO EPSON Corporation
Kind of Equipment : Bluetooth Unit
Model No. : EU-84
Serial No. : 000190
Power : AC120V/60Hz
Mode : TX 2480MHz
Remarks : FCC ID: BKMFBUEU-84, IC Number: 1052-EU84
Date : 7/19/2003
Phase : Single Phase
Temperature : 25 °C
Humidity : 66 %
Regulation : FCC 15.207 (0.15-30MHz)

Engineer : Yoshiaki Iwasa

No.	FREQ. [MHz]	READING (N)		READING (L1)		LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]				QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]
1.	0.1500	39.1	17.7	38.8	16.6	0.0	0.1	0.0	39.2	17.8	66.0	56.0	26.8	38.2
2.	0.2730	36.6	-	35.4	-	0.0	0.1	0.0	36.7	-	61.0	51.0	24.3	-
3.	0.5450	26.0	-	20.3	-	0.1	0.1	0.0	26.2	-	56.0	46.0	29.8	-
4.	0.6150	19.5	-	19.6	-	0.1	0.1	0.0	19.8	-	56.0	46.0	36.2	-
5.	1.3370	25.3	-	33.7	-	0.1	0.2	0.0	34.0	-	56.0	46.0	22.0	-
6.	5.1200	6.4	-	23.9	-	0.2	0.6	0.0	24.7	-	60.0	50.0	35.3	-
7.	10.1800	14.1	-	23.7	-	0.4	0.8	0.0	24.9	-	60.0	50.0	35.1	-
8.	23.9800	17.1	-	18.0	-	0.8	1.3	0.0	20.1	-	60.0	50.0	39.9	-

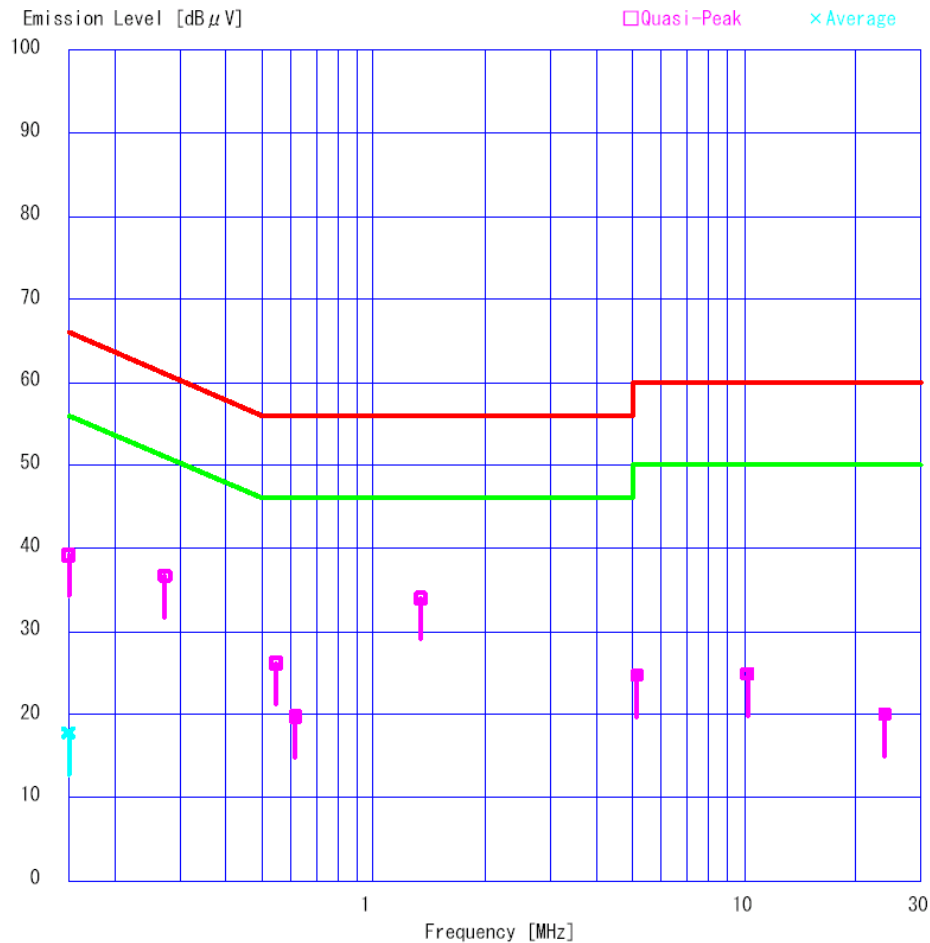
CALCULATION: READING[dBμV] + LISN FACTOR[dB] + CABLE LOSS[dB] + ATTEN[dB].

DATA OF CONDUCTION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23KE0035-HO-3

Applicant : SEIKO EPSON Corporation
Kind of Equipment : Bluetooth Unit
Model No. : EU-84
Serial No. : 000190
Power : AC120V/60Hz
Mode : TX 2480MHz
Remarks : FCC ID: BKMFBEU-84, IC Number: 1052-EU84
Date : 7/19/2003
Phase : Single Phase
Temperature : 25 °C
Humidity : 66 %
Regulation : FCC 15.207 (0.15-30MHz)

Engineer : Yoshiaki Iwasa



DATA OF CARRIER FREQUENCY SEPARATION (CONDUCTED)

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : SEIKO EPSON Corporation
EQUIPMENT : Bluetooth Unit
MODEL : EU-84
S/N : 000190
FCC ID : BKMFBEU-84
IC Number : 1052C-EU84
POWER : DC 5V
MODE : Tx (Hopping off)

REPORT NO. : 23KE0035-HO-3
REGULATION : Fcc Part15 Subpart C 15.247(a)(1)
TEST DISTANCE : -
DATE : 07/19/2003
TEMPERATURE : 26°C
HUMIDITY : 51%

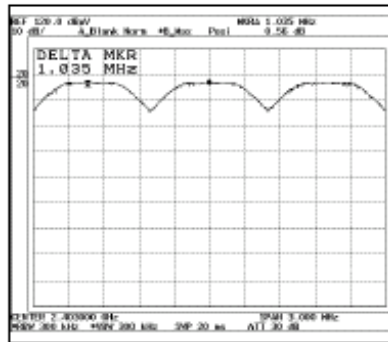
Y. Iwasa

Engineer : Yoshiaki Iwasa

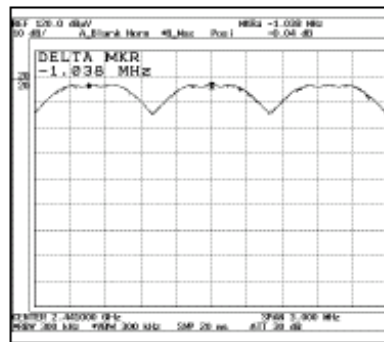
PK DETECT(S/A :span 3MHz, RBW 300kHz, VBW 300kHz, sweep time AUTO)

CH	FREQ	Channel separation	Limit
	[MHz]	[kHz]	
Low	2402.0	1035.000	>20dB Bandwidth and 25[kHz]
Mid	2441.0	1038.000	>20dB Bandwidth and 25[kHz]
High	2480.0	1035.000	>20dB Bandwidth and 25[kHz]

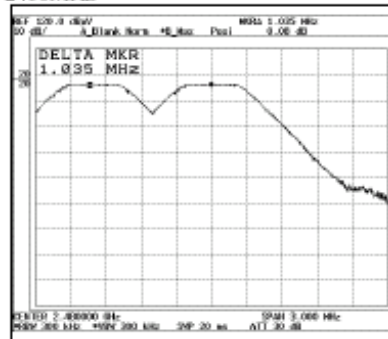
2402MHz



2441MHz



2480MHz



DATA OF -20dB BANDWIDTH (CONDUCTED)

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : SEIKO EPSON Corporation
EQUIPMENT : Bluetooth Unit
MODEL : EU-84
S/N : 000190
FCC ID : BKMFBUEU-84
IC Number : 1052C-EU84
POWER : DC 5V
MODE : Tx (Hopping off)

REPORT NO. : 23KE0035-HO-3
REGULATION : Fcc Part15 Subpart C 15.247(a)(1)
TEST DISTANCE : -
DATE : 07/19/2003
TEMPERATURE : 26°C
HUMIDITY : 51%

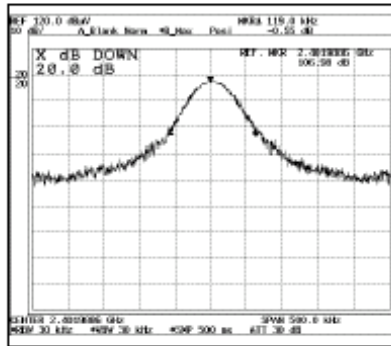
Y. Iwasa

Engineer : Yoshiaki Iwasa

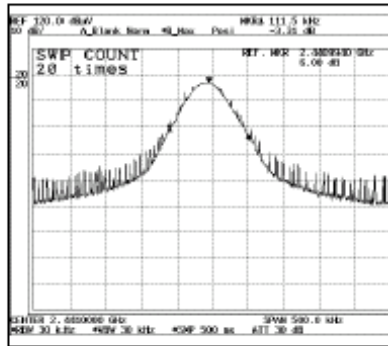
PK DETECT(S/A: span 500kHz, RBW 30kHz, VBW 30kHz, sweep time AUTO)

CH	FREQ	-20dB Bandwidth	Limit
	[MHz]	[MHz]	[MHz]
Low	2402.0	0.119	1.0
Mid	2441.0	0.112	1.0
High	2480.0	0.112	1.0

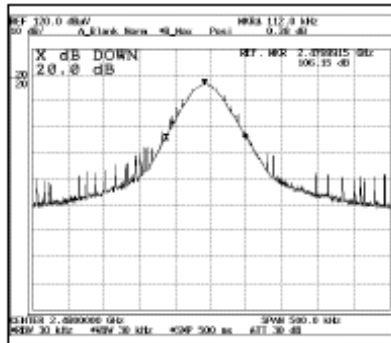
2402MHz



2441MHz



2480MHz



DATA OF PEAK OUTPUT POWER(CONDUCTED)

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : SEIKO EPSON Corporation
EQUIPMENT : Bluetooth Unit
MODEL : EU-84
S/N : 000190
FCC ID : BKMFBUEU-84
IC Number : 1052C-EU84
POWER : DC 5V
MODE : Tx (Hopping off)

REPORT NO : 23KE0035-HO-3
REGULATION : Fcc Part15 Subpart C 15.247(b)(1)
TEST DISTANCE : -
DATE : 07/19/2003
TEMPERATURE : 25°C
HUMIDITY : 51%



Engineer : Yoshiaki Iwasa

CH	FREQ [MHz]	P/M Reading [dBm]	Cable loss [dB]	Attenuator [dB]	Result [dBm]	Limit (1W) [dBm]	Margin [dB]
Low	2402.0	-10.7	0.4	10.0	-0.3	30.0	30.3
Mid	2441.0	-11.6	0.4	10.0	-1.2	30.0	31.2
High	2480.0	-11.8	0.4	10.0	-1.4	30.0	31.4

Sample Calculation:

Result=PM Reading + Cable Loss + Attenuator

Test instruments used: MPM-03 + MCC-15 + MPSE-03 + MAT-20

DATA OF NUMBER OF HOPPING FREQUENCY (CONDUCTED)

UL Apex Co., Ltd.

Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : SEIKO EPSON Corporation
EQUIPMENT : Bluetooth Unit
MODEL : EU-84
S/N : 000190
FCC ID : BKMFBUEU-84
IC Number : 1052C-EU84
POWER : DC 5V
MODE : Tx (Hopping on)

REPORT NO : 23KE0035-HO-3
REGULATION : Fcc Part15 Subpart C 15.247(a)(1)
TEST DISTANCE : -
DATE : 07/19/2003
TEMPERATURE : 26°C
HUMIDITY : 51%

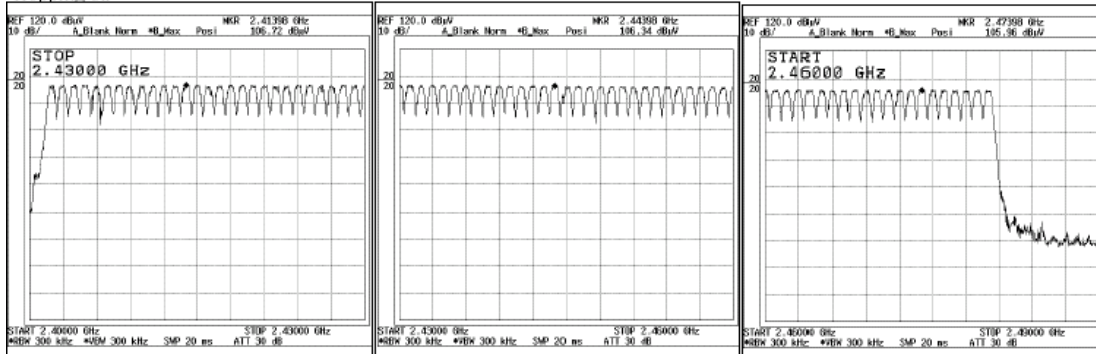
Y. Iwasa

Engineer : Yoshiaki Iwasa

PK DETECT(S/A : RBW 300kHz, VBW 300kHz, sweep time AUTO)

Mode	Number of channel [time]	Limit [time]
Tx(Hopping on)	79	≥ 15

Hopping on



DATA OF DWELL TIME (CONDUCTED)

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : SEIKO EPSON Corporation
EQUIPMENT : Bluetooth Unit
MODEL : EU-84
S/N : 000190
FCC ID : BKMFBUEU-84
IC Number : 1052C-EU84
POWER : DC 5V
MODE : Tx (Hopping off)

REPORT NO : 23KE0035-HO-3
REGULATION : Fcc Part15 Subpart C 15.247(a)(1)(iii)
TEST DISTANCE : -
DATE : 07/19/2003
TEMPERATURE : 26°C
HUMIDITY : 51%

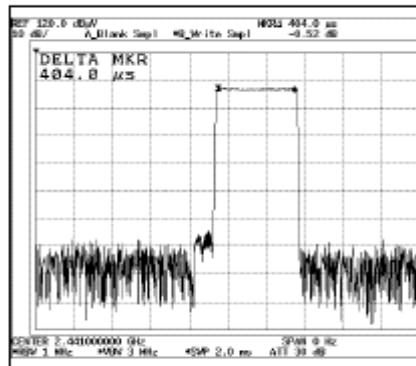
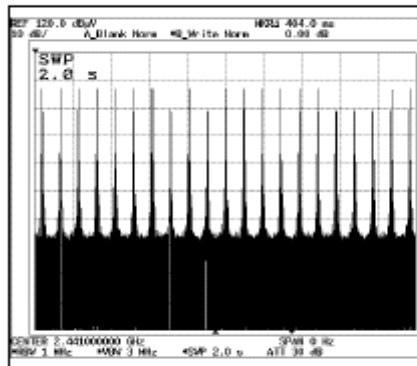
Y. Iwasa

Engineer : Yoshiaki Iwasa

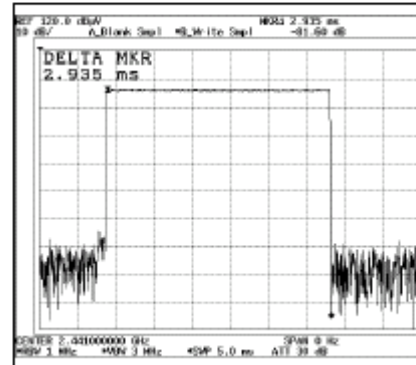
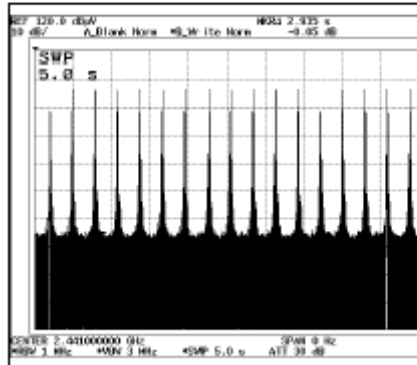
PK DETECT (S/A :span ZERO, RBW 1MHz,VBW 3MHz, sweep time 0.5ms-100ms)

Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8(32 Hopping x 0.4)second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	21 times / 2 sec. x 31.6 = 332 times	0.404	134.05	400
DH5	17 times / 5 sec. x 31.6 = 107 times	2.935	315.34	400

DH1



DH5



Radiated Emission(TX 2402MHz)
DATA OF RADIATION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23KE0035-HO-3

Applicant : SEIKO EPSON Corporation
Kind of Equipment : Bluetooth Unit
Model No. : EU-84
Serial No. : 000190
Power : AC120V/60Hz
Mode : TX 2402MHz
Remarks : DETECTOR:QP, FCC. ID:BKMFBUEU-84, IC. Number:1052-EU84
Date : 7/17/2003
Test Distance : 3 m
Temperature : 25 °C
Humidity : 62 %
Regulation : FCC § 15. 247 (C)

Engineer : Yoshiaki Iwasa

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
1.	60.00	BB	24.0	34.0	8.4	23.5	0.9	6.0	15.8	25.8	40.0	24.2	14.2
2.	96.00	BB	33.4	30.2	7.7	23.6	1.2	6.1	24.8	21.6	43.5	18.7	21.9
3.	192.00	BB	34.8	28.6	16.2	23.3	1.9	6.0	35.6	29.4	43.5	7.9	14.1
4.	432.00	BB	19.3	21.3	17.6	22.9	2.8	6.2	23.0	25.0	46.0	23.0	21.0
5.	480.01	BB	19.9	26.2	18.0	23.0	3.0	6.2	24.1	30.4	46.0	21.9	15.6
6.	528.00	BB	23.3	29.2	18.6	23.2	3.1	6.1	27.9	33.8	46.0	18.1	12.2

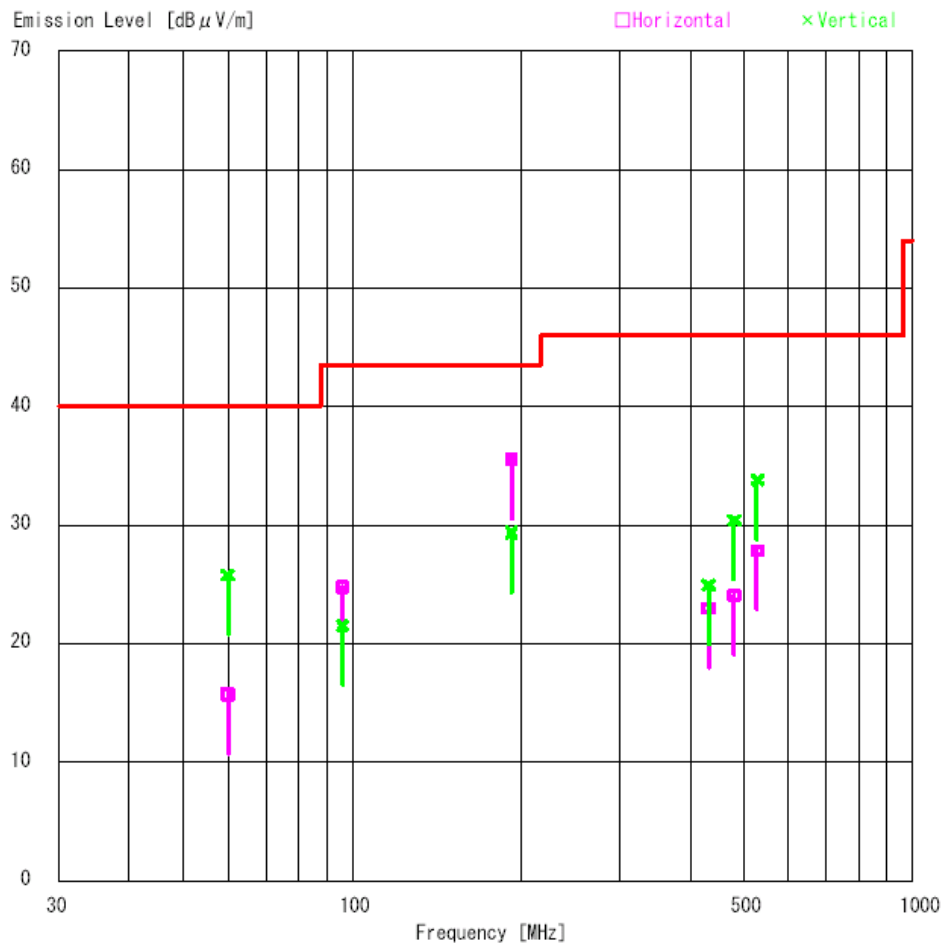
CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

DATA OF RADIATION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23KE0035-HO-3

Applicant : SEIKO EPSON Corporation
Kind of Equipment : Bluetooth Unit
Model No. : EU-84
Serial No. : 000190
Power : AC120V/60Hz
Mode : TX 2402MHz
Remarks : DETECTOR:QP, FCC. ID:BKMFBUEU-84, IC. Number:1052-EU84
Date : 7/17/2003
Test Distance : 3 m
Temperature : 25 °C
Humidity : 62 %
Regulation : FCC § 15. 247 (C)

Engineer : Yoshiaki Iwasa



Radiated Emission(TX 2441MHz)
DATA OF RADIATION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23KE0035-HO-3

Applicant : SEIKO EPSON Corporation
Kind of Equipment : Bluetooth Unit
Model No. : EU-84
Serial No. : 000190
Power : AC120V/60Hz
Mode : TX 2441MHz
Remarks : DETECTOR:QP, FCC. ID:BKMFBEU-84, IC. Number:1052-EU84
Date : 7/17/2003
Test Distance : 3 m
Temperature : 25 °C
Humidity : 62 %
Regulation : FCC § 15.247 (C)

Engineer : Yoshiaki Iwasa

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	60.00	BB	24.2	34.1	8.4	23.5	0.9	6.0	16.0	25.9	40.0	24.0	14.1
2.	96.00	BB	33.6	29.6	7.7	23.6	1.2	6.1	25.0	21.0	43.5	18.5	22.5
3.	192.00	BB	35.2	28.5	16.2	23.3	1.9	6.0	36.0	29.3	43.5	7.5	14.2
4.	432.00	BB	20.0	21.5	17.6	22.9	2.8	6.2	23.7	25.2	46.0	22.3	20.8
5.	480.00	BB	19.9	21.2	18.0	23.0	3.0	6.2	24.1	25.4	46.0	21.9	20.6
6.	528.00	BB	20.0	29.3	18.6	23.2	3.1	6.1	24.6	33.9	46.0	21.4	12.1

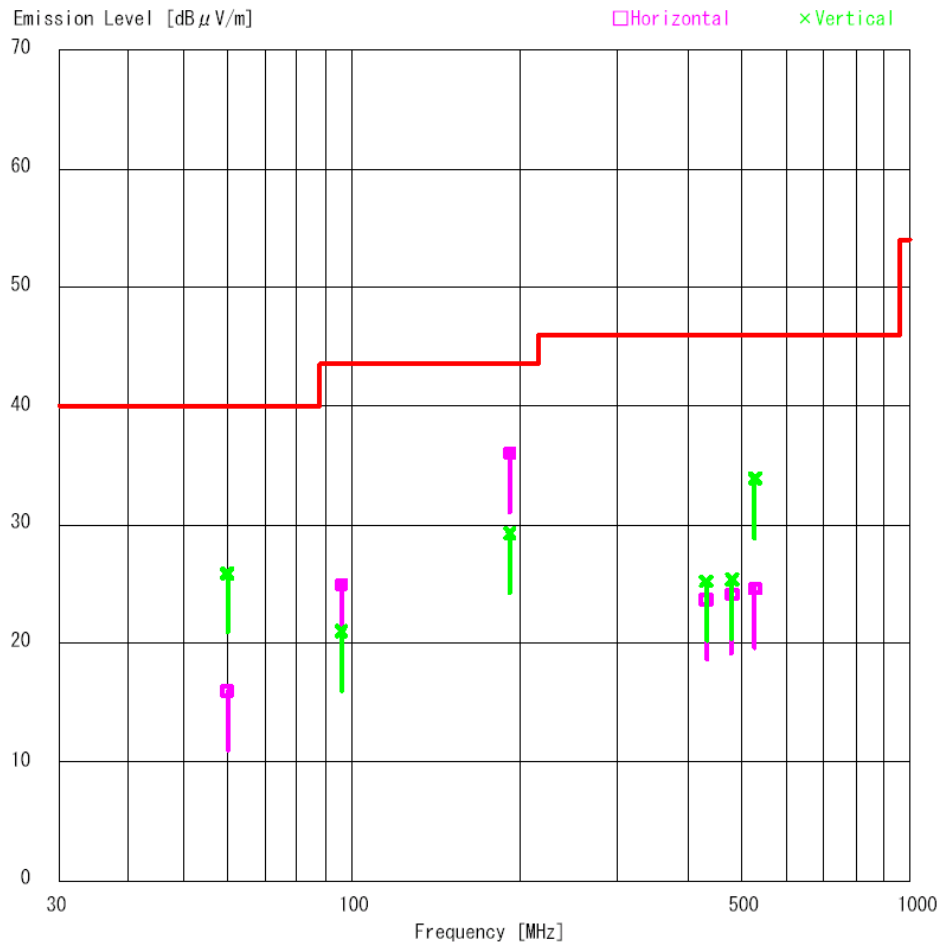
CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

DATA OF RADIATION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23KE0035-HO-3

Applicant : SEIKO EPSON Corporation
Kind of Equipment : Bluetooth Unit
Model No. : EU-84
Serial No. : 000190
Power : AC120V/60Hz
Mode : TX 2441MHz
Remarks : DETECTOR:QP, FCC ID:BKMFBUEU-84, IC Number:1052-EU84
Date : 7/17/2003
Test Distance : 3 m
Temperature : 25 °C
Humidity : 62 %
Regulation : FCC § 15.247(C)

Engineer : Yoshiaki Iwasa



Radiated Emission(TX 2480MHz)
DATA OF RADIATION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23KE0035-HO-4

Applicant : SEIKO EPSON Corporation
Kind of Equipment : Bluetooth Photo Print Adapter
Model No. : EU-84
Serial No. : 000190
Power : AC120V/60Hz
Mode : TX 2480MHz
Remarks : DETECTOR:QP, FCC. ID:BKMFBUEU-84, IC. Number:1052-EU84
Date : 7/17/2003
Test Distance : 3 m
Temperature : 25 °C
Humidity : 62 %
Regulation : FCC § 15. 247 (C)

Engineer : Yoshiaki Iwasa

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
1.	60.00	BB	24.1	34.3	8.4	23.5	0.9	6.0	15.9	26.1	40.0	24.1	13.9
2.	96.00	BB	33.6	29.4	7.7	23.6	1.2	6.1	25.0	20.8	43.5	18.5	22.7
3.	192.00	BB	35.2	28.5	16.2	23.3	1.9	6.0	36.0	29.3	43.5	7.5	14.2
4.	432.00	BB	19.9	21.5	17.6	22.9	2.8	6.2	23.6	25.2	46.0	22.4	20.8
5.	480.00	BB	19.7	21.0	18.0	23.0	3.0	6.2	23.9	25.2	46.0	22.1	20.8
6.	528.00	BB	20.1	29.3	18.6	23.2	3.1	6.1	24.7	33.9	46.0	21.3	12.1

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

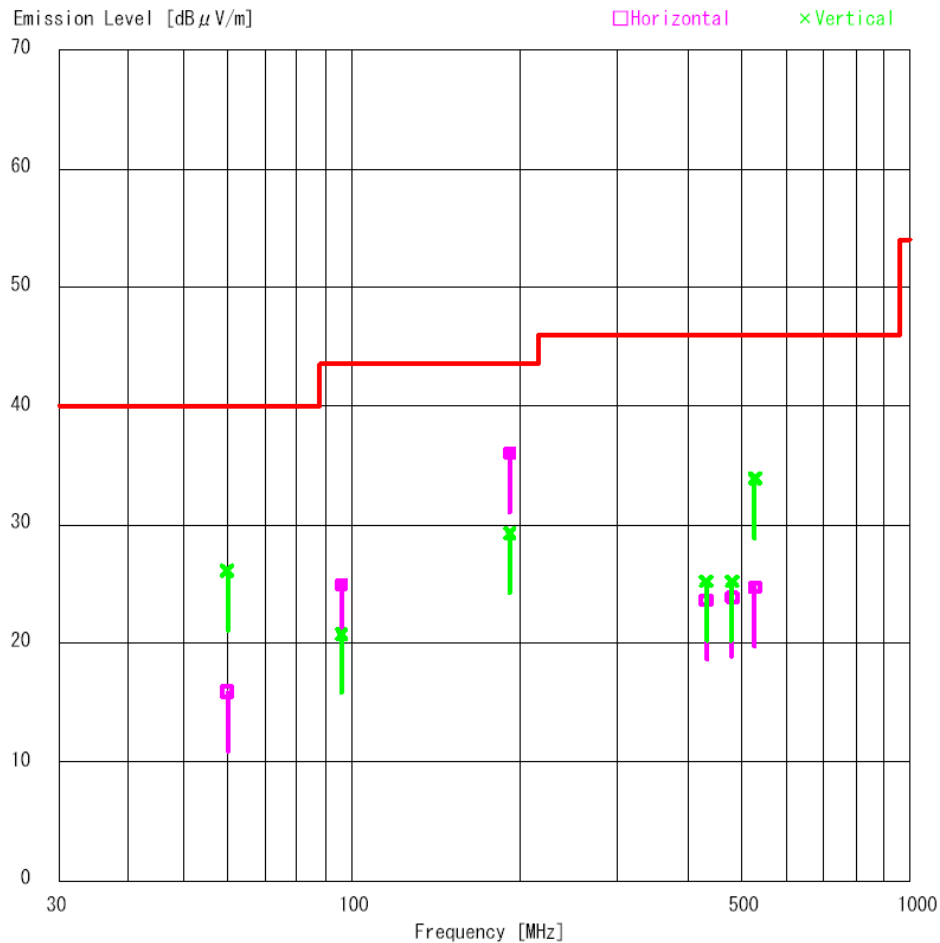
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DATA OF RADIATION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23KE0035-HO-3

Applicant : SEIKO EPSON Corporation
Kind of Equipment : Bluetooth Unit
Model No. : EU-84
Serial No. : 000190
Power : AC120V/60Hz
Mode : TX 2480MHz
Remarks : DETECTOR:QP, FCC. ID:BKMFBUEU-84, IC. Number:1052-LPS4
Date : 7/17/2003
Test Distance : 3 m
Temperature : 25 °C
Humidity : 62 %
Regulation : FCC § 15.247(C)

Engineer : Yoshiaki Iwasa



DATA OF SPURIOUS EMISSIONS(1GHz to 25GHz)

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : SEIKO EPSON Corporation
EQUIPMENT : Bluetooth Unit
MODEL : EU-84
S/N : 000190
FCC ID : BKMFBUEU-84
IC Number : 1052C-EU84
POWER : DCSV
MODE : Tx 2402MHz (Hopping off)

REPORT NO : 23KE0035-HO-3
REGULATION : EN300328
TEST DISTANCE : 3m
DATE : 07/16/2003
TEMPERATURE : 25°C
HUMIDITY : 60%

Y. Iwasa

Engineer : Yoshiaki Iwasa

PK DETECT

No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Band-Pass Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV/m]	[dBuV/m]					[dBuV/m]	[dBuV/m]		[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass.												
0	1201.0	52.9	54.5	23.3	37.6	4.7	0.0	43.3	44.9	74.0	30.7	29.1
1	2390.0	44.8	46.4	30.7	36.9	6.3	0.0	44.9	46.5	74.0	29.1	27.5
2	4804.0	44.0	41.6	35.1	36.8	8.8	0.7	51.8	49.4	74.0	22.2	24.6
3	7206.0	43.0	42.8	37.5	36.5	10.7	0.0	54.7	54.5	74.0	19.3	19.5
4	9608.0	43.8	43.7	37.4	37.2	12.7	0.0	56.7	56.6	74.0	17.4	17.4
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass - Dfac												
5	12010.0	43.0	42.6	40.5	36.8	14.2	0.0	51.4	51.0	74.0	22.6	23.0
6	14412.0	42.5	42.2	42.8	35.3	15.8	0.0	56.3	56.0	74.0	17.7	18.0
7	16814.0	45.2	45.5	45.2	36.5	17.6	0.0	62.0	62.3	74.0	12.0	11.7
8	19216.0	44.8	44.4	41.0	35.8	18.9	0.0	59.4	59.0	74.0	14.6	15.0
9	21618.0	44.1	44.5	40.9	36.8	19.5	0.0	58.2	58.6	74.0	15.8	15.4
10	24020.0	45.1	44.5	40.3	36.4	20.8	0.0	60.3	59.7	74.0	13.7	14.3

AV DETECT

No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Band-Pass Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV/m]	[dBuV/m]					[dBuV/m]	[dBuV/m]		[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass.												
0	1201.0	46.8	50.2	23.3	37.6	4.7	0.0	37.2	40.6	54.0	16.8	13.4
1	2390.0	32.5	30.7	30.7	36.9	6.3	0.0	32.6	30.8	54.0	21.4	23.2
2	4804.0	31.2	31.1	35.1	36.8	8.8	0.7	38.9	38.9	54.0	15.1	15.1
3	7206.0	29.9	29.9	37.5	36.5	10.7	0.0	41.6	41.6	54.0	12.4	12.4
4	9608.0	30.7	30.7	37.4	37.2	12.7	0.0	43.6	43.6	54.0	10.4	10.4
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass - Dfac												
5	12010.0	29.9	29.9	40.5	36.8	14.2	0.0	38.3	38.3	54.0	15.7	15.7
6	14412.0	29.5	29.5	42.8	35.3	15.8	0.0	43.3	43.3	54.0	10.7	10.7
7	16814.0	31.5	31.6	45.2	36.5	17.6	0.0	48.3	48.4	54.0	5.7	5.6
8	19216.0	31.5	32.2	41.0	35.8	18.9	0.0	46.1	46.8	54.0	7.9	7.2
9	21618.0	32.0	32.0	40.9	36.8	19.5	0.0	46.1	46.1	54.0	7.9	7.9
10	24020.0	32.0	32.2	40.3	36.4	20.8	0.0	47.2	47.4	54.0	6.8	6.6

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) 9.5 dB

*Except for the above table : All other spurious emissions were less than 20dB for the limit.

*In the frequency over the fifth harmonic, the noise from the EUT was not seen. The data above is its base noise.

*The limit of 15.209 was applied also to frequency other than the restricted band which was shown in 15.205.

DATA OF SPURIOUS EMISSIONS(1GHz to 25GHz)

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : SEIKO EPSON Corporation
EQUIPMENT : Bluetooth Unit
MODEL : EU-84
S/N : 000190
FCC ID : BKMFBUEU-84
IC Number : 1052C-EU84
POWER : DC5V
MODE : Tx 2441MHz (Hopping off)

REPORT NO : 23KE0035-HO-3
REGULATION : EN300328
TEST DISTANCE : 3m
DATE : 07/16/2003
TEMPERATURE : 25°C
HUMIDITY : 60%

Engineer :  Yoshiaki Iwasa

PK DETECT

No.	FREQ	S/A READING		ANT	AMP	CABLE	Band-Pass	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS	Filter	HOR	VER	PK	HOR	VER
	[MHz]	[dBuV/m]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass.												
0	1220.5	52.3	52.0	23.3	37.6	4.7	0.0	42.7	42.4	74.0	31.3	31.7
1	4882.0	44.3	44.2	35.5	36.8	8.9	0.7	52.6	52.5	74.0	21.4	21.5
2	7329.0	42.1	40.9	37.8	36.6	10.8	0.0	54.1	52.9	74.0	19.9	21.1
3	9764.0	42.5	42.9	37.0	37.2	12.8	0.0	55.1	55.5	74.0	18.9	18.5
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass - Dfac												
4	12182.2	43.1	43.0	41.2	36.7	14.4	0.0	52.5	52.4	74.0	21.5	21.6
5	14646.0	42.3	42.7	43.1	35.5	16.0	0.0	56.4	56.8	74.0	17.6	17.2
6	17087.0	44.7	44.7	45.5	36.2	17.8	0.0	62.3	62.3	74.0	11.7	11.7
7	19528.0	44.3	44.3	40.6	36.0	19.0	0.0	58.4	58.4	74.0	15.6	15.6
8	21969.0	44.4	44.3	40.9	36.0	19.6	0.0	59.4	59.3	74.0	14.6	14.7
9	24410.0	44.5	44.4	40.5	36.9	21.0	0.0	59.6	59.5	74.0	14.4	14.5

AV DETECT

No.	FREQ	S/A READING		ANT	AMP	CABLE	Band-Pass	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS	Filter	HOR	VER	AV	HOR	VER
	[MHz]	[dBuV/m]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass.												
0	1220.5	35.2	37.8	23.3	37.6	4.7	0.0	25.6	28.2	54.0	28.4	25.8
1	4882.0	31.3	31.3	35.5	36.8	8.9	0.7	39.6	39.6	54.0	14.4	14.4
2	7329.0	30.7	30.6	37.8	36.6	10.8	0.0	42.7	42.6	54.0	11.3	11.4
3	9764.0	31.5	31.5	37.0	37.2	12.8	0.0	44.1	44.1	54.0	9.9	10.0
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass - Dfac												
4	12182.2	30.2	30.6	41.2	36.7	14.4	0.0	39.6	40.0	54.0	14.4	14.0
5	14646.0	29.3	29.1	43.1	35.5	16.0	0.0	43.4	43.2	54.0	10.6	10.8
6	17087.0	31.9	31.7	45.5	36.2	17.8	0.0	49.5	49.3	54.0	4.5	4.7
7	19528.0	31.7	31.7	40.6	36.0	19.0	0.0	45.8	45.8	54.0	8.2	8.2
8	21969.0	31.7	31.7	40.9	36.0	19.6	0.0	46.7	46.7	54.0	7.3	7.3
9	24410.0	31.9	31.9	40.5	36.9	21.0	0.0	47.0	47.0	54.0	7.0	7.0

Test Distance 1.0m : Distance Factor(Dfac) = $20\log(3/1.0) = 9.5$ dB

*Except for the above table : All other spurious emissions were less than 20dB for the limit.

*In the frequency over the fifth harmonic, the noise from the EUT was not seen. The data above is its base noise.

*The limit of 15.209 was applied also to frequency other than the restricted band which was shown in 15.205.

DATA OF SPURIOUS EMISSIONS(1GHz to 25GHz)

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : SEIKO EPSON Corporation
EQUIPMENT : Bluetooth Unit
MODEL : EU-84
S/N : 000190
FCC ID : BKMFBUEU-84
IC Number : 1052C-EU84
POWER : DC5V
MODE : Tx 2480MHz (Hopping off)

REPORT NO : 23KE0035-HO-3
REGULATION : EN300328
TEST DISTANCE : 3m
DATE : 07/16/2003
TEMPERATURE : 25°C
HUMIDITY : 60%

Engineer :  Yoshiaki Iwasa

PK DETECT

No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Band-Pass Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV/m]	[dBuV/m]					[dBuV/m]	[dBuV/m]		[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass.												
0	1240.0	53.6	53.8	23.4	37.6	4.8	0.0	44.2	44.4	74.0	29.8	29.6
1	2483.5	50.0	51.5	30.7	36.9	6.3	0.0	50.1	51.6	74.0	23.9	22.4
2	4960.0	40.8	44.5	36.0	36.8	8.9	0.8	49.7	53.4	74.0	24.3	20.6
3	7440.0	43.1	43.4	38.1	36.7	10.9	0.0	55.4	55.7	74.0	18.6	18.3
4	9920.0	44.2	43.7	36.5	37.3	13.0	0.0	56.4	55.9	74.0	17.6	18.1
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass - Dfac												
5	12400.0	44.0	43.0	41.8	36.6	14.5	0.0	54.2	53.2	74.0	19.8	20.8
6	14880.0	43.7	42.7	43.3	35.7	16.1	0.0	57.9	56.9	74.0	16.1	17.1
7	17360.0	44.9	45.7	45.4	36.2	18.0	0.0	62.6	63.4	74.0	11.4	10.6
8	19840.0	43.7	44.5	41.0	36.1	19.1	0.0	58.2	59.0	74.0	15.8	15.0
9	22320.0	44.0	44.0	40.8	35.5	19.8	0.0	59.6	59.6	74.0	14.4	14.4
10	24800.0	44.4	43.6	40.6	36.7	21.1	0.0	59.9	59.1	74.0	14.1	14.9

AV DETECT

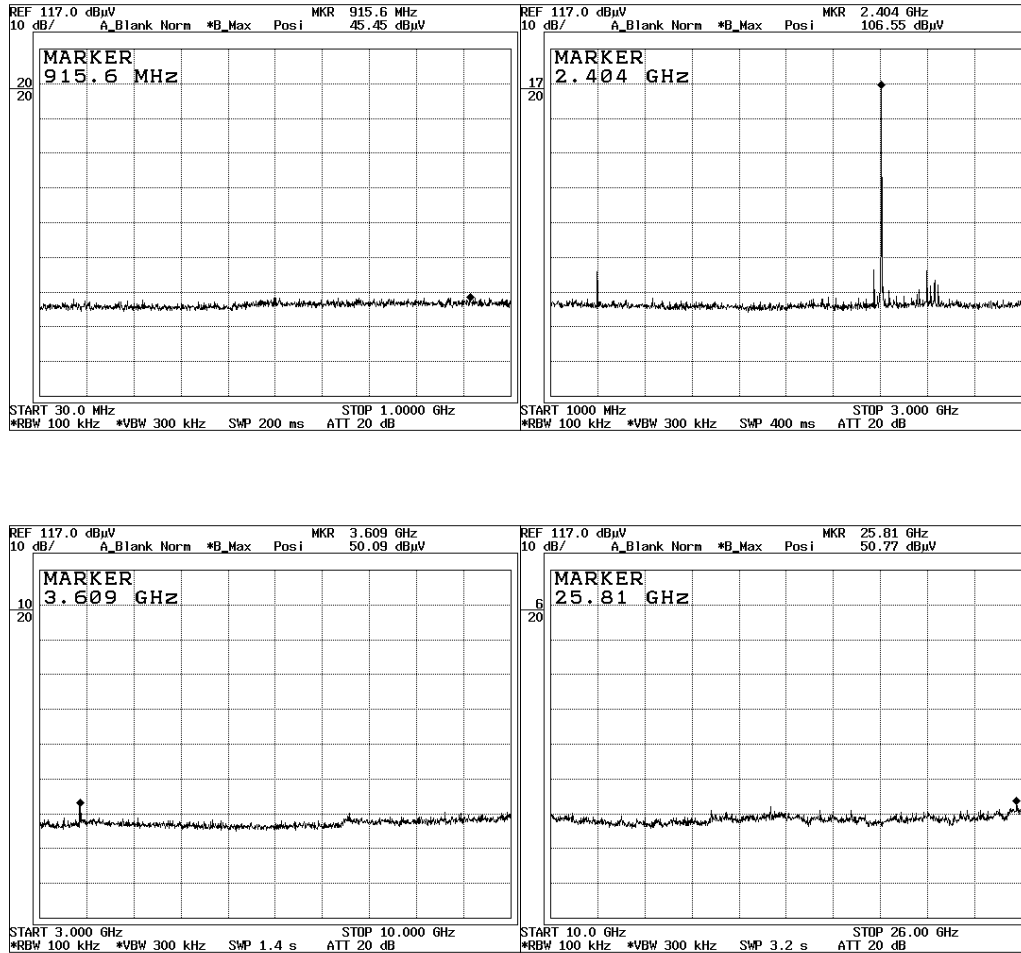
No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Band-Pass Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV/m]	[dBuV/m]					[dBuV/m]	[dBuV/m]		[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass.												
0	1240.0	44.6	51.2	23.4	37.6	4.8	0.0	35.2	41.8	54.0	18.8	12.2
1	2483.5	50.0	51.1	30.7	36.9	6.3	0.0	50.1	51.2	54.0	3.9	2.8
2	4960.0	30.9	30.9	36.0	36.8	8.9	0.8	39.8	39.8	54.0	14.2	14.2
3	7440.0	30.1	30.2	38.1	36.7	10.9	0.0	42.4	42.5	54.0	11.6	11.5
4	9920.0	31.2	31.1	36.5	37.3	13.0	0.0	43.4	43.3	54.0	10.6	10.7
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass - Dfac												
5	12400.0	29.9	29.9	41.8	36.6	14.5	0.0	40.1	40.1	54.0	13.9	13.9
6	14880.0	29.5	29.6	43.3	35.7	16.1	0.0	43.7	43.8	54.0	10.3	10.2
7	17360.0	31.7	31.7	45.4	36.2	18.0	0.0	49.4	49.4	54.0	4.6	4.6
8	19840.0	31.5	31.7	41.0	36.1	19.1	0.0	46.0	46.2	54.0	8.0	7.8
9	22320.0	31.7	31.7	40.8	35.5	19.8	0.0	47.3	47.3	54.0	6.7	6.7
10	24800.0	31.9	31.9	40.6	36.7	21.1	0.0	47.4	47.4	54.0	6.6	6.6

Test Distance 1.0m : Distance Factor(Dfac) = $20\log(3/1.0) = 9.5$ dB

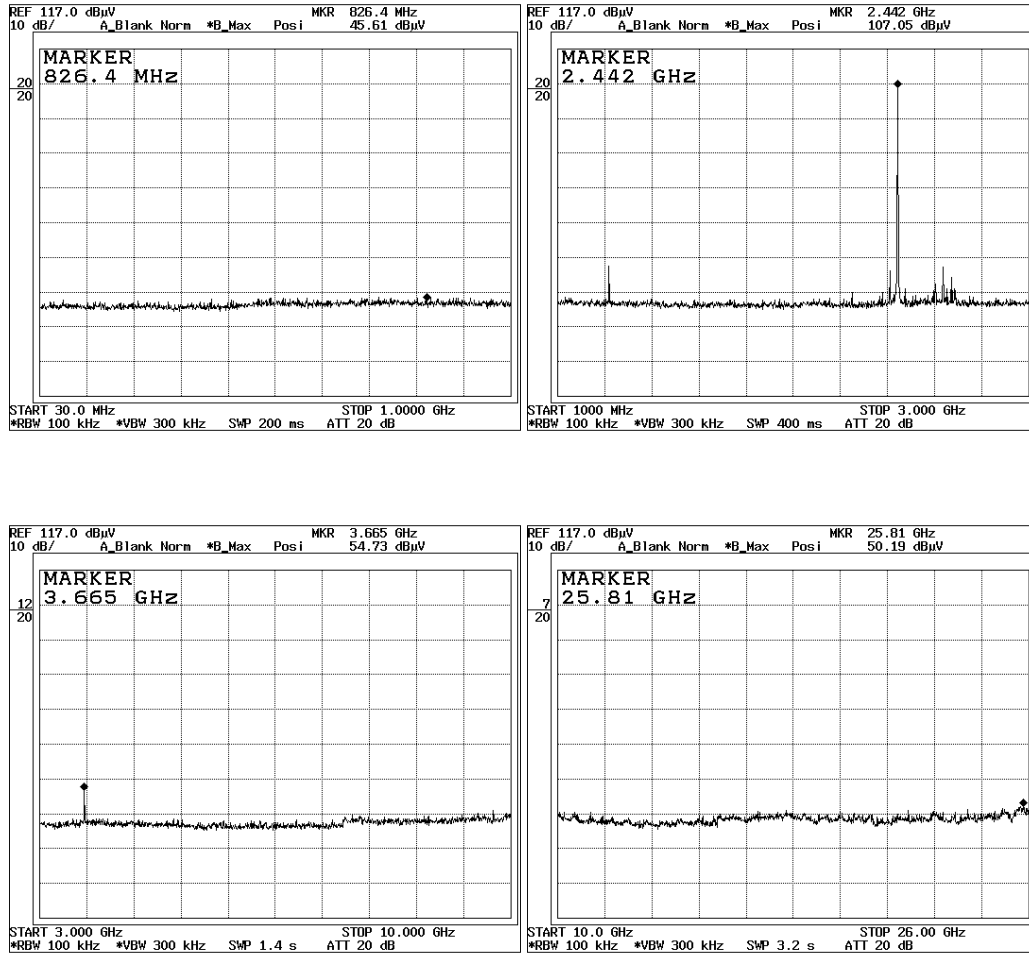
*Except for the above table : All other spurious emissions were less than 20dB for the limit.

*In the frequency over the fifth harmonic, the noise from the EUT was not seen. The data above is its base noise.

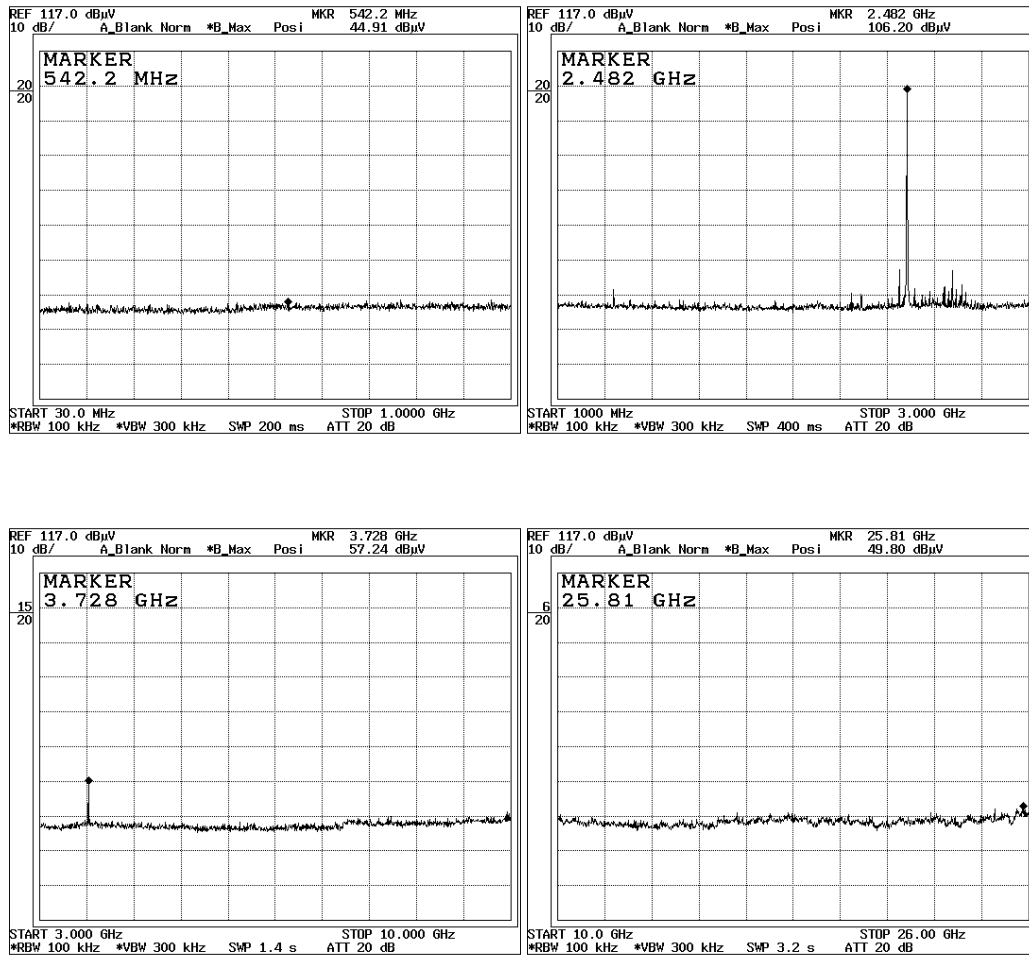
DATA OF OUT BAND EMISSIONS (Tx:2402MHz) (Conducted)



DATA OF OUT BAND EMISSIONS (Tx:2441MHz) (Conducted)



DATA OF OUT BAND EMISSIONS (Tx:2480MHz) (Conducted)



DATA OF BAND EDGE (CONDUCTED)

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anchoic Chamber

COMPANY : SEIKO EPSON Corporation	REPORT NO. : 23KE0035-HO-3
EQUIPMEN : Bluetooth Unit	REGULATION : Fee Part15 Subpart C 15.247(c)
MODEL : EU-84	TEST DISTANCE : -
S/N : 000190	DATE : 07/19/2003
FCC ID : BKMFBEU-84	TEMPERATURE : 25℃
IC Number : 1052C-EU84	HUMIDITY : 60%
POWER : DC 5V	
MODE : Tx	

y. iwasa
Engineer : Yoshiaki Iwasa

PK DETECT (S/A :SPAN 10MHz, RBW 100kHz, VBW 100kHz, sweep time AUTO)

[Hopping on] Conducted

Frequency [MHz]	Reading [dBuV]	Cable Loss [dB]	E [dBuV]	P [nW]	Difference of level [dB]	Field Strength [dBuV/m]	Limit
2387.0	53.2	0.5	53.7	4.63	-	43.9	<74[dBuV/m]
2400.0	53.0	0.5	53.5	-	46.8	-	>20[dB]
2483.3	44.2	0.5	44.7	0.59	-	35.0	<74[dBuV/m]

* Reference : Reading (99.8[dBuV]) + Cable Loss (0.5[dB]) = 100.3 [dBuV])(at 2402MHz)

AV DETECT (S/A :SPAN 10MHz, RBW 10Hz, VBW 10Hz, sweep time AUTO)

[Hopping on] Conducted

Frequency [MHz]	Reading [dBuV]	Cable Loss [dB]	E [dBuV]	P [nW]	Difference of level [dB]	Field Strength [dBuV/m]	Limit
2387.0	20.1	0.5	20.6	0.00	-	10.9	<54[dBuV/m]
2483.3	20.5	0.5	21.0	0.00	-	11.3	<54[dBuV/m]

PK DETECT (S/A :SPAN 10MHz, RBW 100kHz, VBW 100kHz, sweep time AUTO)

[Hopping off] Tx (2402/2480MHz)] Conducted

Frequency [MHz]	Reading [dBuV]	Cable Loss [dB]	E [dBuV]	P [nW]	Difference of level [dB]	Field Strength [dBuV/m]	Limit
2387.0	40.5	0.5	41.0	0.25	-	31.3	<74[dBuV/m]
2400.0	40.8	0.5	41.3	-	59.0	-	>20[dB]
2483.3	43.6	0.5	44.1	0.51	-	34.4	<74[dBuV/m]

* Reference : Reading (99.8[dBuV]) + Cable Loss (0.5[dB]) = 100.3 [dBuV])(at 2402MHz)

AV DETECT (S/A :SPAN 10MHz, RBW 10Hz, VBW 10Hz, sweep time AUTO)

[Hopping off] Tx (2402/2480MHz)] Conducted

Frequency [MHz]	Reading [dBuV]	Cable Loss [dB]	E [dBuV]	P [nW]	Difference of level [dB]	Field Strength [dBuV/m]	Limit
2387.0	20.2	0.5	20.7	0.00	-	11.0	<54[dBuV/m]
2483.3	20.6	0.5	21.1	0.00	-	11.4	<54[dBuV/m]

Sample Calculation:

Field Strength = $20 \log(\sqrt{30 \cdot P \cdot 10^{-9} \cdot G}) / d \cdot 10^6$

E : Reading + Cable Loss

P : Converted to nW

d : Test distance(3.0m)

G : Numeric Antenna (

1.60 (antenna gain

2.044 dB)

UL Apex Co., Ltd.

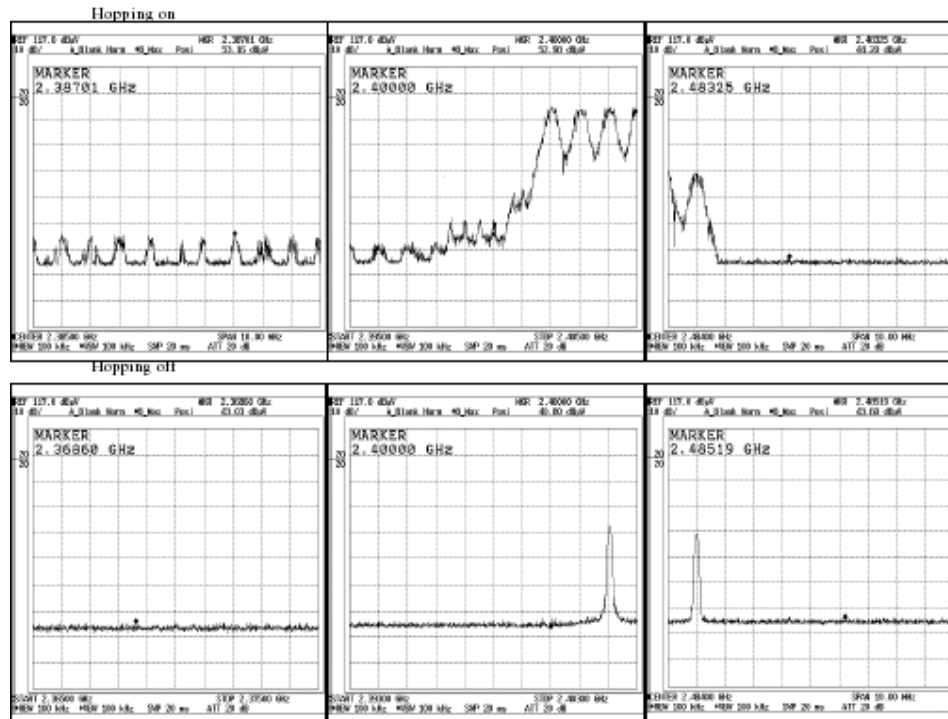
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MF060b(10.04.03)



DATA OF 99% OCCUPIED BANDWIDTH

