



EMI TEST REPORT

Test Report No. : 24AE0060-HO-4

Applicant : CANON INC.
Type of Equipment : Bluetooth Unit
Model No. : BU-10
Test standard : FCC Part 15 Subpart C
Section 15.207, Section 15.247
FCC ID : AZDK30218
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 : August 25, 27 and September 2, 3 and 5, 2003

Tested by : 
Hiroka Umeyama
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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MF060b(10.04.03)

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SECTION 1: Client information

Company Name	: CANON INC.
Brand Name	: CANON INC.
Address	: 16-1, Shimonoge 3-chome, Takatsu-ku, Kawasaki-shi, Kanagawa, 213- 8512 Japan
Telephone Number	: +81-44-844-3866
Facsimile Number	: +81-44-814-2856
Contact Person	: Kenji Kurita

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

2.1 Identification of E.U.T.

Type of Equipment	: Bluetooth Unit
Model No.	: BU-10
Serial No.	: 11, 12
Country of Manufacture	: Japan
Receipt Date of Sample	: August 22, 2003
Condition of EUT	: Production prototype

2.2 Product Description

CANON INC., Model: BU-10, which is referred to as the EUT in this report is a Bluetooth Unit that is based on the Bluetooth Standard V1.1.

The clock frequency used in this EUT is 16MHz (for CSR BC02).

The specification is as following;

Equipment Type	: Transceiver
Frequency band	: from 2400MHz to 2483.5 MHz
Frequency of operation	: from 2402MHz to 2480MHz
Bandwidth and channel spacing	: 79MHz, 1MHz
Type of Modulation	: FHSS
Channel access protocol	: Blue test
Intermediate frequency	: 2441MHz
Antenna Type	: Chip Antenna / LDA31(Murata Manufacturing Co., Ltd.)
Antenna Gain	: 2400MHz : from -4.0 to -3.6(dBi) 2440MHz : from -3.2 to -3.0(dBi) 2480MHz : from -3.0 to -2.8(dBi)
Antenna connector Type	: MICROWAVE COAXIAL CONNECTOR
Method of frequency Generation	: Crystal
Operating voltage	: DC5V(Operating)+/-5%, DC1.8V, 3.3V(Inner)
Operating temperature	: from 0deg.C to 40deg.C

FCC 15.31 (e)

This EUT provides stable voltage(DC5V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

Since the antenna used is a type of chip component and is permanently mounted by soldering on a printed circuit board in Bluetooth unit, it is impossible for end users to replace it without assistance of professionals. Therefore, the equipment complies with the requirement of 15.203.

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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	3.1dB 0.4485MHz, N	Complied
2	Carrier Frequency Separation	ANSI C63.4:2001	Section15.247(a)(1)	Conducted	N/A	-	Complied
3	20dB Bandwidth	ANSI C63.4:2001	Section15.247(a)(1)	Conducted	N/A	-	Complied
4	Number of Hopping Frequency	ANSI C63.4:2001	Section15.247(a)(1)(iii)	Conducted	N/A	-	Complied
5	Dwell time	ANSI C63.4:2001	Section15.247(a)(1)(iii)	Conducted	N/A	-	Complied
6	Maximum Peak Output Power	ANSI C63.4:2001	Section15.247(b)(1)	Conducted	N/A	-	Complied
7	Band Edge Compliance	ANSI C63.4:2001	Section15.247(c)	Conducted	N/A	-	Complied
8	Spurious Emission	ANSI C63.4:2001	Section15.247(c)	Conducted/ Radiated	N/A	0.3dB 4882.0MHz Horizontal	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".

*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-210	RSS-210	Conducted	N/A	N/A	N/A

3.4 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.

Remarks : The EUT was separately tested in accordance with FCC Part 15 Subpart B and the Verification was applied.

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3.5 Uncertainty

Conducted Emission

The measurement uncertainty (with a 95% confidence level) for this test is $\pm 1.3\text{dB}$.
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 EMC Head Office Lab's uncertainty.

Other test except Conducted Emission and Spurious Emission (Radiated)

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

3.6 Test Location

UL Apex Co., Ltd. Head Office EMC Lab.

No.1 semi anechoic chamber.

No.2 semi anechoic chamber.

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No.1 semi anechoic chamber has been fully described in a report submitted to FCC office, and listed on February 01, 2002. (Registration number: No.1:313583 Industry Canada: No.1: IC4247)

No.2 semi anechoic chamber has been fully described in a report submitted to FCC office, and listed on June 05, 2002. (Registration number: No.2:846015 Industry Canada: No.2: IC4247-2)

*NVLAP Lab. code: 200572-0

3.7 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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

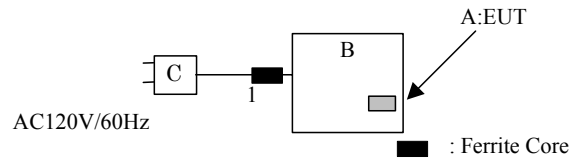
4.1 Operating Modes

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

The sequence is used : Transmitting mode(Bluetooth)
 Low Channel :2402MHz
 Mid Channel :2441MHz
 High channel :2480MHz
 Inquiry

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 and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID	Remark
A	Bluetooth Unit	BU-10	11,12	CANON INC.	AZDK30218	EUT
B	JIG	GT030731	11	FUJITSU DEVICES INC.		-
C	AC Adaptor	NP12-1S 0523	-	AKIZUKI		-

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	AC Power Cable	1.6	N	Polyvinyl chloride

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 DC 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. All unused 50ohm connectors of the LISN were resistively terminated in 50ohm when not connected to the measuring equipment.

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 and average detector (IF BW 9 kHz).

Measurement range: 0.15-30MHz

Test data	: APPENDIX 3
Test result	: Pass

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

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

Test Procedure

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

Test data	: APPENDIX 3
Test result	: Pass

SECTION 8: 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

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SECTION 9: 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

SECTION 10: 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

SECTION 11: Band Edge Compliance, Section 15.247(c)

Test Procedure

The Band Edge Compliance was measured with a spectrum analyzer connected to the antenna port.

Test data	: APPENDIX 3
Test result	: Pass

SECTION 12: Spurious Emission , Section 15.247(c)

[Conducted]

Test Procedure

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

Test data	: APPENDIX 3
Test result	: Pass

[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.1 semi anechoic chamber (19.2x11.2x7.7m) / No.2 semi anechoic chamber (7.5x5.8x5.2m) with a ground plane at a distance of 3m. 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 result was also satisfied the general limits specified in section 15.209(a).

Test data	: APPENDIX 3
Test result	: Pass

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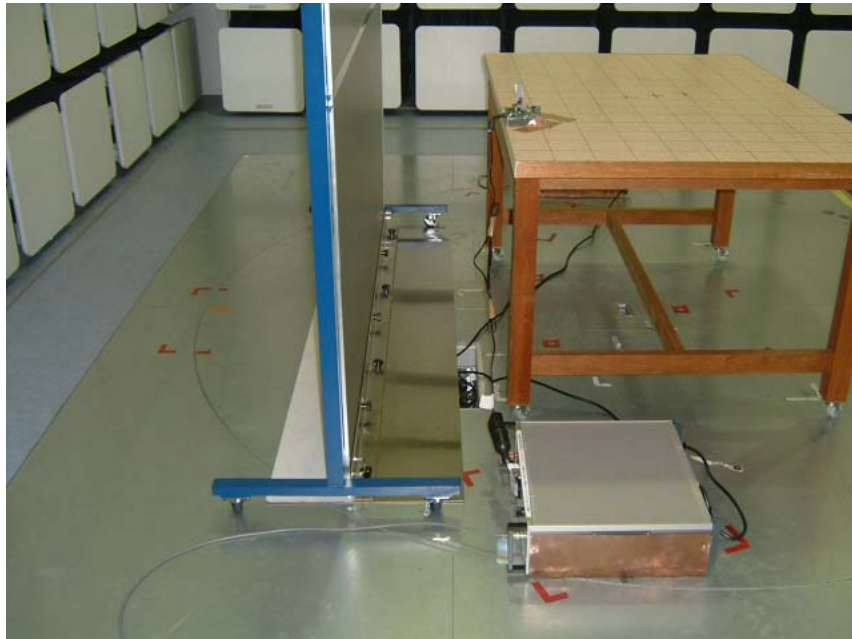
APPENDIX 1: Photographs of test setup

Conducted Emission

Front



Side



Spurious Emission (Radiated)

Front



Rear



Worst Case Position (Horizontal: X-axis: / Vertical: X-axis:)

X-axis



Y-axis



Z-axis



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	8	2002/12/28 * 12
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	1,8	2003/04/11 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ES140	8	2002/11/01 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	1,8	2003/01/31 * 12
SA-07	Spectrum Analyzer	Advantest	R3273	1,8	2002/12/10 * 12
MBTR10	Spectrum Analyzer	Rohde & Schwarz	FSP30	2 to 5, 7, 8	2002/11/13 * 12
MPA-01	Pre Amplifier	Agilent	8449B	8	2003/02/08 * 12
MPA-02	Pre Amplifier	Agilent	87405A	8	2003/04/17 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	8	2003/04/28 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	8	2003/04/28 * 12
MHA-01	Horn Antenna	EMCO	3160-09	8	2003/01/11 * 12
MHA-05	Horn Antenna	Schwarzbeck	BBHA9120D	8	2003/01/11 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	8	2003/05/08 * 12
MCC-13	Coaxial Cable	Fujikura/Agilent	-	1	2003/05/08 * 12
MCC-04	Microwave Cable	Storm	421-011	2 to 5, 7, 8	2003/01/14 * 12
MCC-05	Microwave Cable	Storm	421-011	8	2003/01/14 * 12
MCC-06	Microwave Cable	Storm	421-011	8	2003/01/14 * 12
MCC-11	Microwave coaxial cable	Suhner	SUCOFLEX 104	8	2003/03/27 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	8	2002/12/24 * 12
MBF-01	SHF Bandpass Filter	M-City	5GHz BPF	8	2003/04/24 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	1	2003/03/18 * 12
MPM-04	Power Meter	Agilent	E4416A	6	2003/03/13 * 12
MPSE-04	Power sensor	Agilent	E9327A	6	2003/03/18 * 12

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

Test Item:

- 1: Conducted emission,
- 2: Carrier Frequency Separation
- 3: 20dB Bandwidth
- 4: Number of Hopping Frequency
- 5: Dwell time
- 6: Maximum Peak Output Power
- 7: Band Edge Compliance
- 8: Spurious Emission

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APPENDIX 3: Data of EMI test

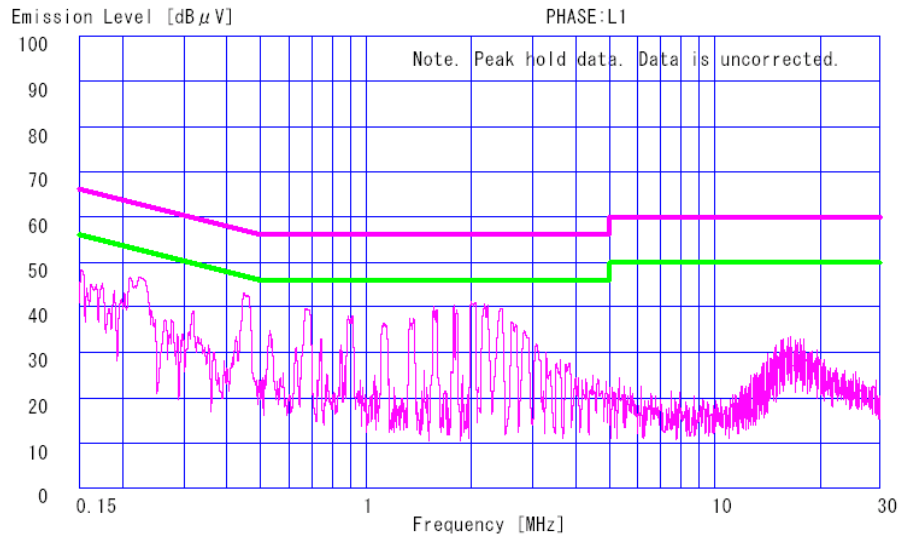
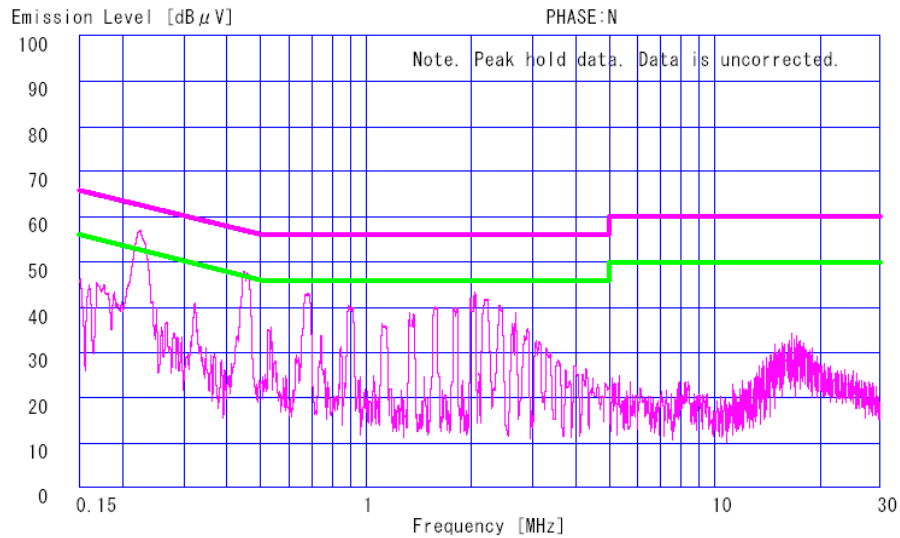
Conducted Emission (2402MHz)

DATA OF CONDUCTION TEST CHART

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 24AE0060-HO

Applicant : CANON INC.
Kind of Equipment : Bluetooth Unit
Model No. : BU-10
Serial No. : 12
Power : AC Adaptor AC120V/60Hz
Mode : Tx (2402MHz)
Remarks :
Date : 9/3/2003
Phase : Single Phase
Temperature : 26 °C
Humidity : 59 %
Regulation 1 : FCC 15.207 (0.15-30MHz)
Regulation 2 : None

Engineer : Hiroka Umeyama

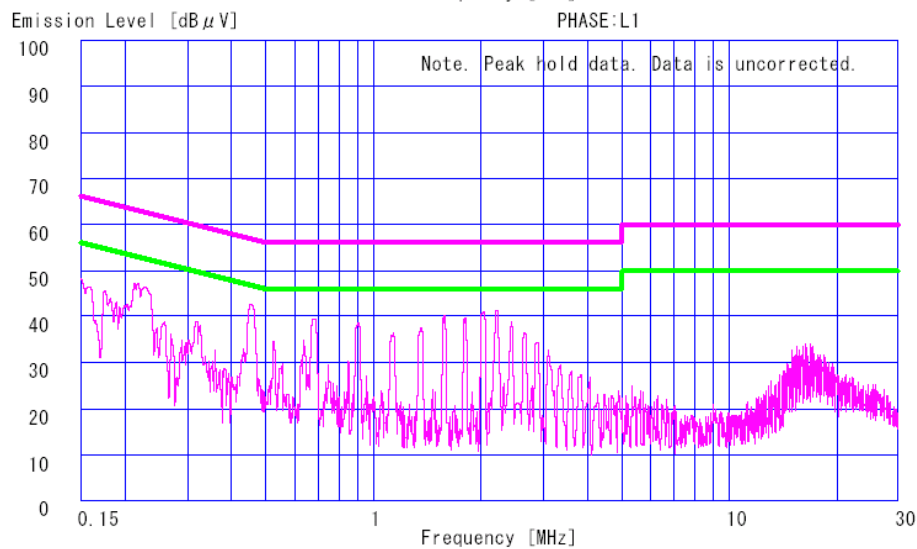
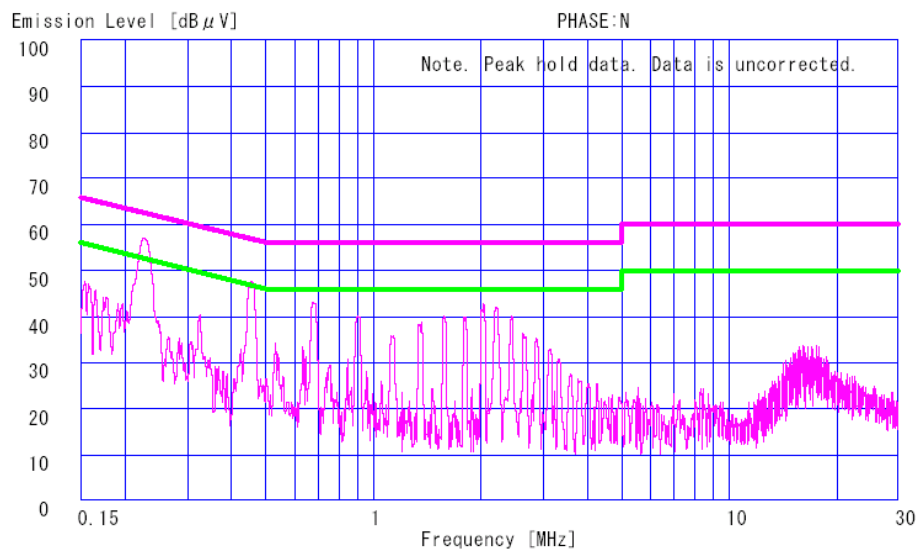


Conducted Emission(2441MHz)
DATA OF CONDUCTION TEST CHART

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 24AE0060-HO

Applicant : CANON INC.
Kind of Equipment : Bluetooth Unit
Model No. : BU-10
Serial No. : 12
Power : AC Adaptor AC120V/60Hz
Mode : Tx (2441MHz)
Remarks :
Date : 9/3/2003
Phase : Single Phase
Temperature : 26 °C
Humidity : 59 %
Regulation 1 : FCC 15.207 (0.15-30MHz)
Regulation 2 : None


Engineer : Hiroka Umeyama

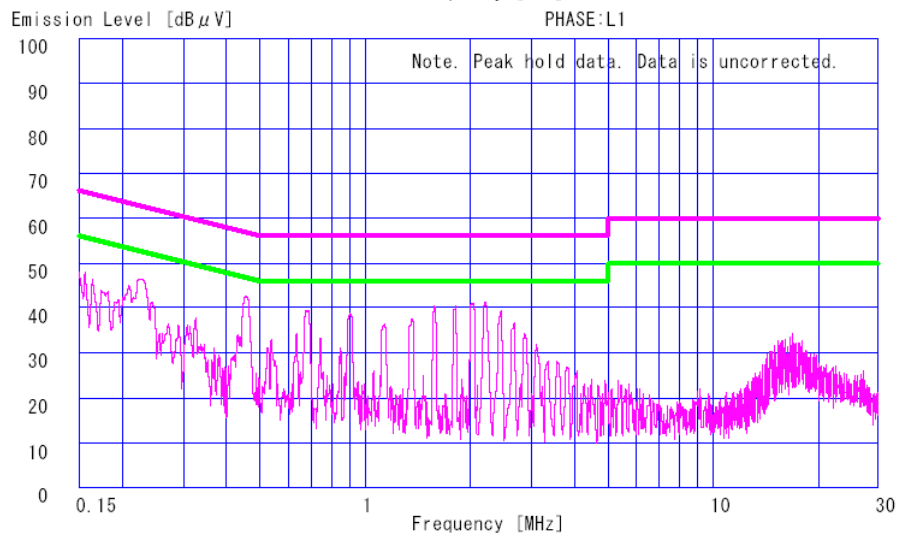
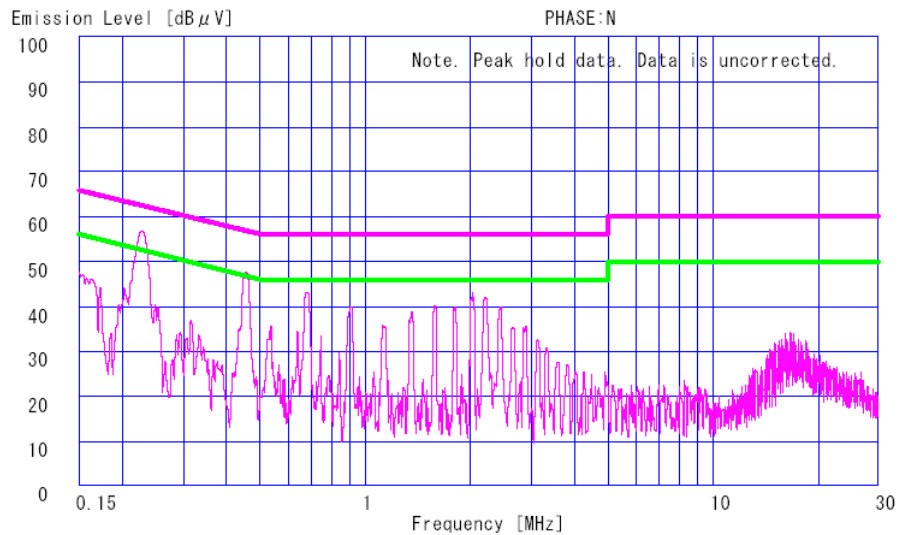


Conducted Emission(2480MHz)
DATA OF CONDUCTION TEST CHART

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 24AE0060-HO

Applicant : CANON INC.
Kind of Equipment : Bluetooth Unit
Model No. : BU-10
Serial No. : 12
Power : AC Adaptor AC120V/60Hz
Mode : Tx (2480MHz)
Remarks :
Date : 9/3/2003
Phase : Single Phase
Temperature : 26 °C
Humidity : 59 %
Regulation 1 : FCC 15.207 (0.15-30MHz)
Regulation 2 : None


Engineer : Hiroka Umeyama



Conducted Emission (2402MHz)
DATA OF CONDUCTION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 24AE0060-HO

Applicant : CANON INC.
Kind of Equipment : Bluetooth Unit
Model No. : BU-10
Serial No. : 12
Power : AC Adaptor AC120V/60Hz
Mode : Tx (2402MHz)
Remarks :
Date : 9/3/2003
Phase : Single Phase
Temperature : 26 °C
Humidity : 59 %
Regulation : FCC Part15C 15.207 (0.15-30MHz)


Engineer : Hiroka Umeyama

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.	0.1553	38.1	16.0	38.4	16.8	0.0	0.1	0.0	38.5	16.9	65.7	55.7	27.2	38.8
2.	0.2242	54.9	46.1	44.6	44.0	0.0	0.1	0.0	55.0	46.2	62.7	52.7	7.7	6.5
3.	0.4485	45.9	43.6	41.0	38.5	0.1	0.1	0.0	46.1	43.8	56.9	46.9	10.8	3.1
4.	0.6798	41.4	38.8	37.6	34.0	0.1	0.1	0.0	41.6	39.0	56.0	46.0	14.4	7.0
5.	2.0416	39.5	32.2	39.0	29.5	0.1	0.3	0.0	39.9	32.6	56.0	46.0	16.1	13.4
6.	2.2619	40.0	32.6	39.0	31.1	0.1	0.3	0.0	40.4	33.0	56.0	46.0	15.6	13.0

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

Carrier Frequency Separation

UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Measurement Room

COMPANY : CANON INC.
EQUIPMENT : Bluetooth Unit
MODEL : BU-10
S/N : 11
FCC ID : AZDK30218
IC Number : 498C-K30218
POWER : DC5V
MODE : Tx(Hopping on)/Inquiry

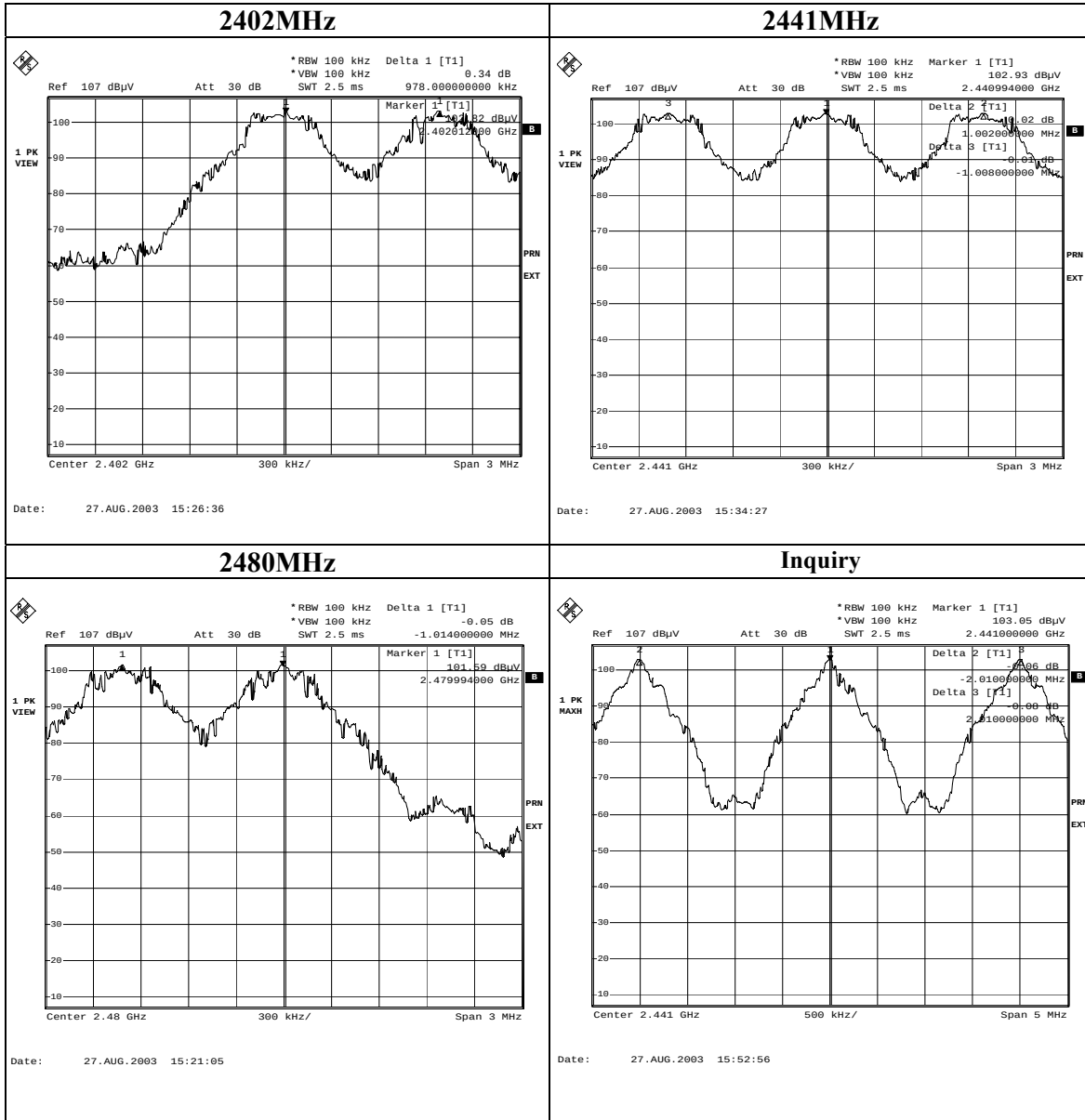
REPORT NO : 24AE0060-HO-4
REGULATION : Fcc Part15 Subpart C 15.247(a)(1)
TEST DISTANCE : -
DATE : 08/27/2003
TEMPERATURE : 24deg.C
HUMIDITY : 44%


Engineer : Hiroka Umeyama

PK DETECT(S/A :span 3MHz, RBW 100kHz ,VBW 100kHz, sweep time AUTO)

CH	FREQ	Channel separation	Limit
	[MHz]	[MHz]	
Low	2402.0	0.978	>20dB Bandwidth and 25[kHz]
Mid	2441.0	1.002	>20dB Bandwidth and 25[kHz]
High	2480.0	1.014	>20dB Bandwidth and 25[kHz]
Inquiry	2441.0	2.010	>20dB Bandwidth and 25[kHz]

Carrier Frequency Separation



20dB Bandwidth

UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Measurement Room

COMPANY : CANON INC.
EQUIPMENT : Bluetooth Unit
MODEL : BU-10
S/ N : 11
FCC ID : AZDK30218
IC Number : 498C-K30218
POWER : DC5V
MODE : Tx (Hopping off) /Inquiry

REPORT NO : 24AE0060-HO-4
REGULATION : Fcc Part15 Subpart C 15.247(a)(1)
TEST DISTANCE : -
DATE : 08/27/2003
TEMPERATURE : 24deg.C
HUMIDITY : 44%

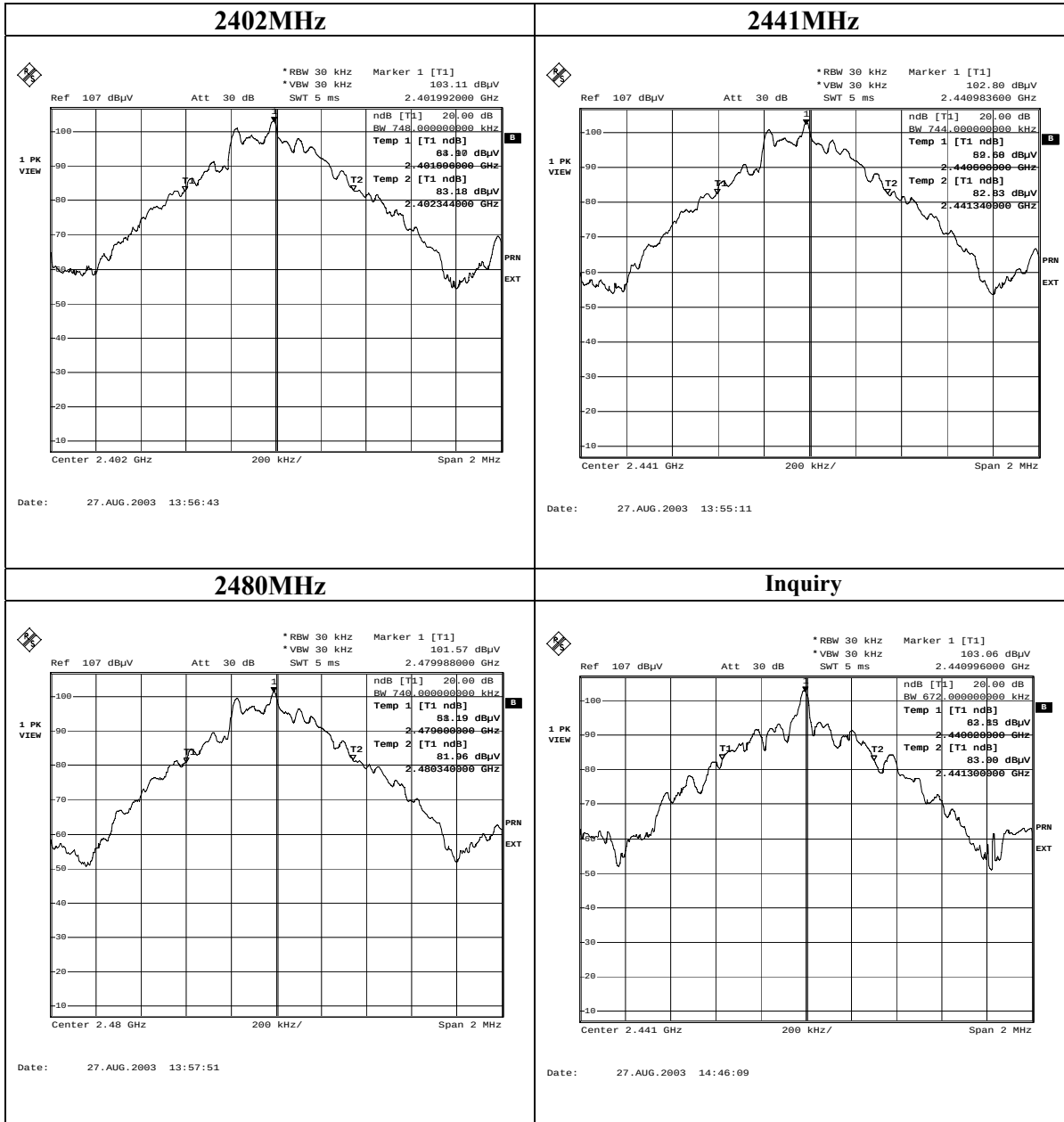

Engineer

Hiroka Umeyama

PK DETECT(S/A: span 2MHz, RBW 30kHz,VBW 30kHz, sweep time AUTO)

CH	FREQ	20dB Bandwidth	Limit
	[MHz]	[MHz]	[MHz]
Low	2402.0	0.748	1.0
Mid	2441.0	0.744	1.0
High	2480.0	0.740	1.0
Inquiry	2441.0	0.672	1.0

20dB Bandwidth



Number of Hopping Frequency

UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Measurement Room

COMPANY : CANON INC.
EQUIPMENT : Bluetooth Unit
MODEL : BU-10
S/ N : 11
FCC ID : AZDK30218
IC Number : 498C-K30218
POWER : DC5V
MODE : Tx (Hopping on) /Inquiry

REPORT NO : 24AE0060-HO-4
REGULATION : Fcc Part15 Subpart C 15.247(a)(1)(iii)
TEST DISTANCE : -
DATE : 08/27/2003
TEMPERATURE : 24deg.C
HUMIDITY : 44%

Engineer : 
Hiroka Umeyama

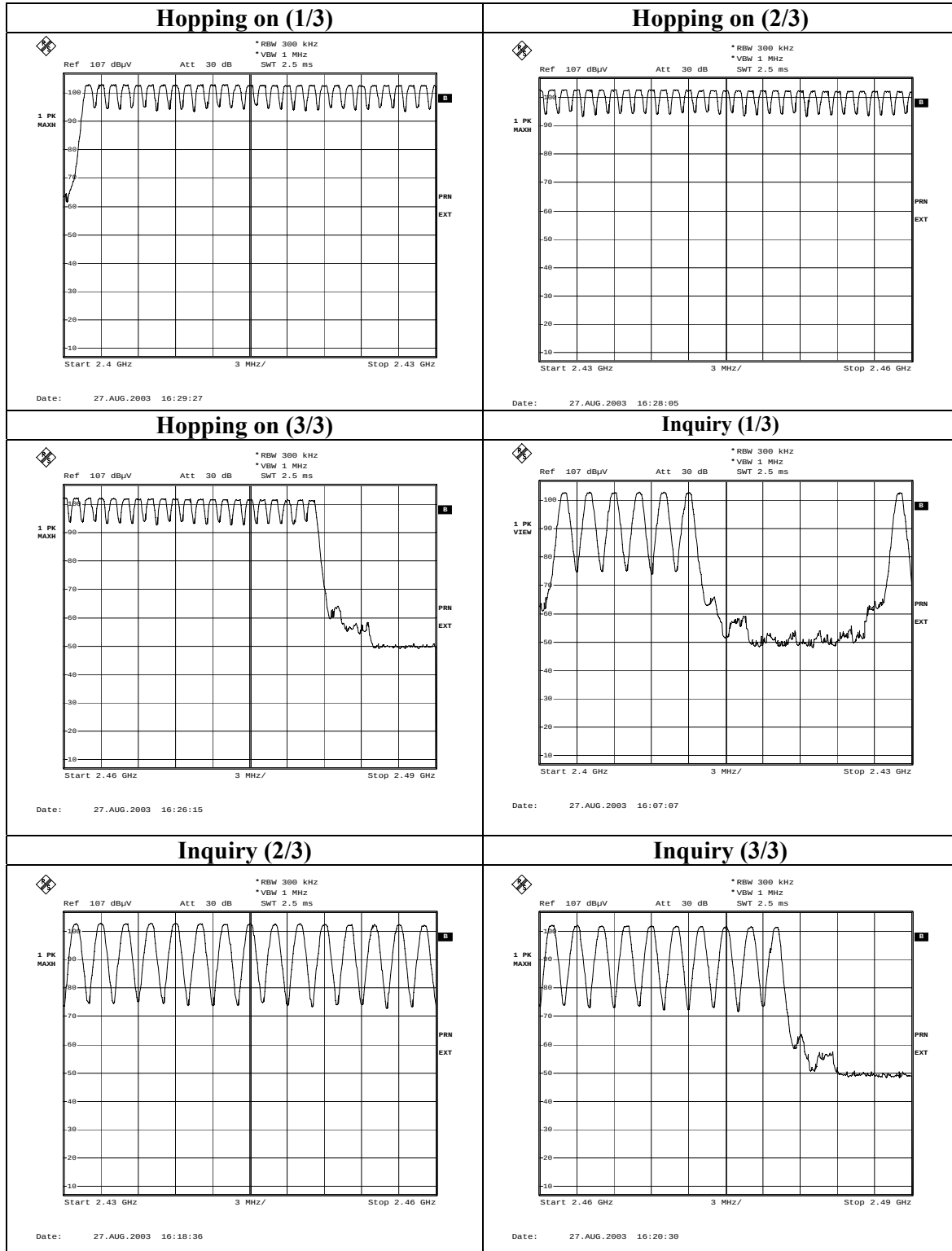
PK DETECT(S/A : RBW 300kHz ,VBW 1MHz, sweep time AUTO)

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

PK DETECT(S/A : RBW 300kHz ,VBW 1MHz, sweep time AUTO)

Mode	Number of channels	Limit
	[time]	[time]
Inquiry	32	≥ 15

Number of Hopping Frequency



Dwell time

UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Measurement Room

COMPANY : CANON INC.
EQUIPMENT : Bluetooth Unit
MODEL : BU-10
S/N : 11
FCC ID : AZDK30218
IC Number : 498C-K30218
POWER : DC5V
MODE : Tx (Hopping off) /Inquiry

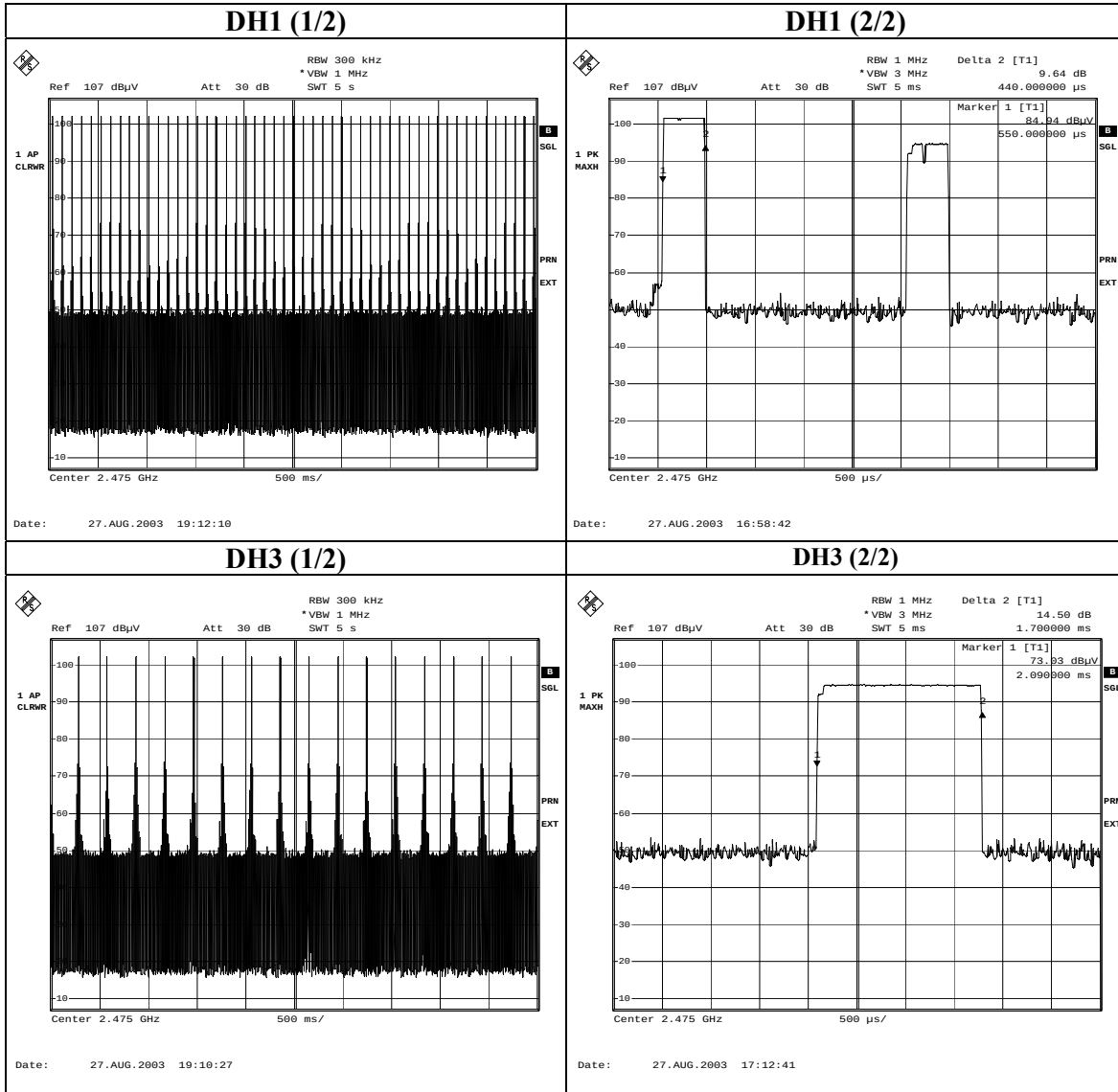
REPORT NO : 24AE0060-HO-4
REGULATION : Fcc Part15 Subpart C 15.247(a)(1)(iii)
TEST DISTANCE : -
DATE : 08/27/2003
TEMPERATURE : 24deg.C
HUMIDITY : 44%


Engineer : Hiroka Umeyama

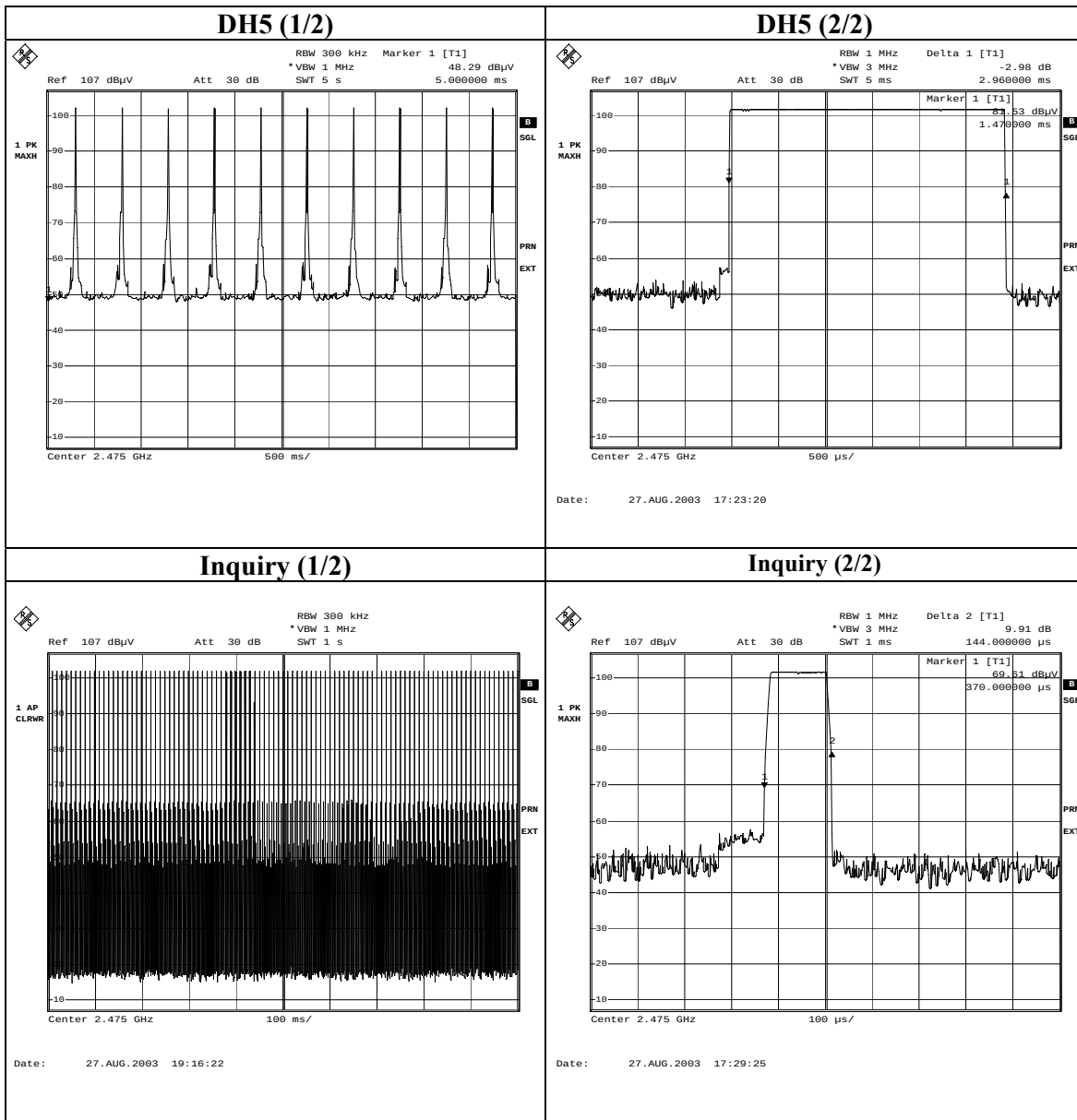
PK DETECT(S/A :span ZERO, RBW 1MHz,VBW 3MHz, sweep time 1ms-10ms)

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	51 times /5sec. x 31.6 = 322.32 times	0.440	142	400
DH3	16 times / 5sec. x 31.6 = 101.12 times	1.700	172	400
DH5	10 times / 5 sec. x 31.6 = 63.2 times	2.960	187	400
Inquiry	100 times / 1sec. x 12.8 = 1280 times	0.144	184	400

Dwell time



Dwell time



Maximum Peak Output Power

Head Office EMC Lab. No.3 Measurement Room

COMPANY	: CANON INC.	REPORT NO	: 24AE0060-HO-4
EQUIPMENT	: Bluetooth Unit	REGULATION	: Fcc Part15 Subpart C 15.247(b)(1)
MODEL	: BU-10	TEST DISTANCE	: -
S/N	: 11	DATE	: 08/27/2003
FCC ID	: AZDK30218	TEMPERATURE	: 24deg.C
IC Number	: 498C-K30218	HUMIDITY	: 44%
POWER	: DC5V		
MODE	: Tx (Hopping off) /Inquiry		

Engineer : 
Hiroka Umeyama

CH	FREQ [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Result [dBm]	Limit [dBm]
Low	2402.0	-1.3	0.5	-0.8	30.0
Mid	2441.0	-1.7	0.5	-1.2	30.0
High	2480.0	-2.6	0.5	-2.1	30.0
Inquiry	2441.0	-1.3	0.5	-0.8	21.0

Sample Calculation:

Result = P/M Reading + Cable Loss

Band Edge compliance

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY : CANON INC.
EQUIPMENT : Bluetooth Unit
MODEL : BU-10
S/N : 11
FCC ID : AZDK30218
IC Number : 498C-K30218
POWER : DC5V
MODE : Tx (Hopping on/off)

REPORT NO : 24AE0060-HO-4
REGULATION : Fcc Part15 Subpart C 15.247(c)
TEST DISTANCE : -
DATE : 08/27/2003
TEMPERATURE : 24deg.C
HUMIDITY : 44%

ENGINEER : 
Hiroka Umeyama

PK DETECT(S/A :Span 20MHz, RBW 30kHz,VBW 1MHz, 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
2389.1	47.1	2.6	49.7	1.85	-	34.3	<74[dBuV/m]
2399.9	60.5	2.6	63.0	-	42.5*	-	>20[dB]
2483.5	58.1	2.5	60.5	22.49	-	45.2	<74[dBuV/m]

* Reference : Reading (102.89[dBuV]) + Cable Loss (2.57[dB]) = E (105.46[dBuV]) at 2403.9MHz.

[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
2386.0	47.3	2.6	49.9	1.95	-	34.6	<74[dBuV/m]
2399.6	62.4	2.6	64.9	-	40.5*	-	>20[dB]
2484.5	58.1	2.5	60.6	22.80	-	45.2	<74[dBuV/m]

* Reference : Reading (102.86[dBuV]) + Cable Loss (2.57[dB]) = E (105.43[dBuV]) at 2402.0MHz.

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(m)

G : Numeric Antenna Gain 0.44

UL Apex Co., Ltd.

Head Office EMC Lab.

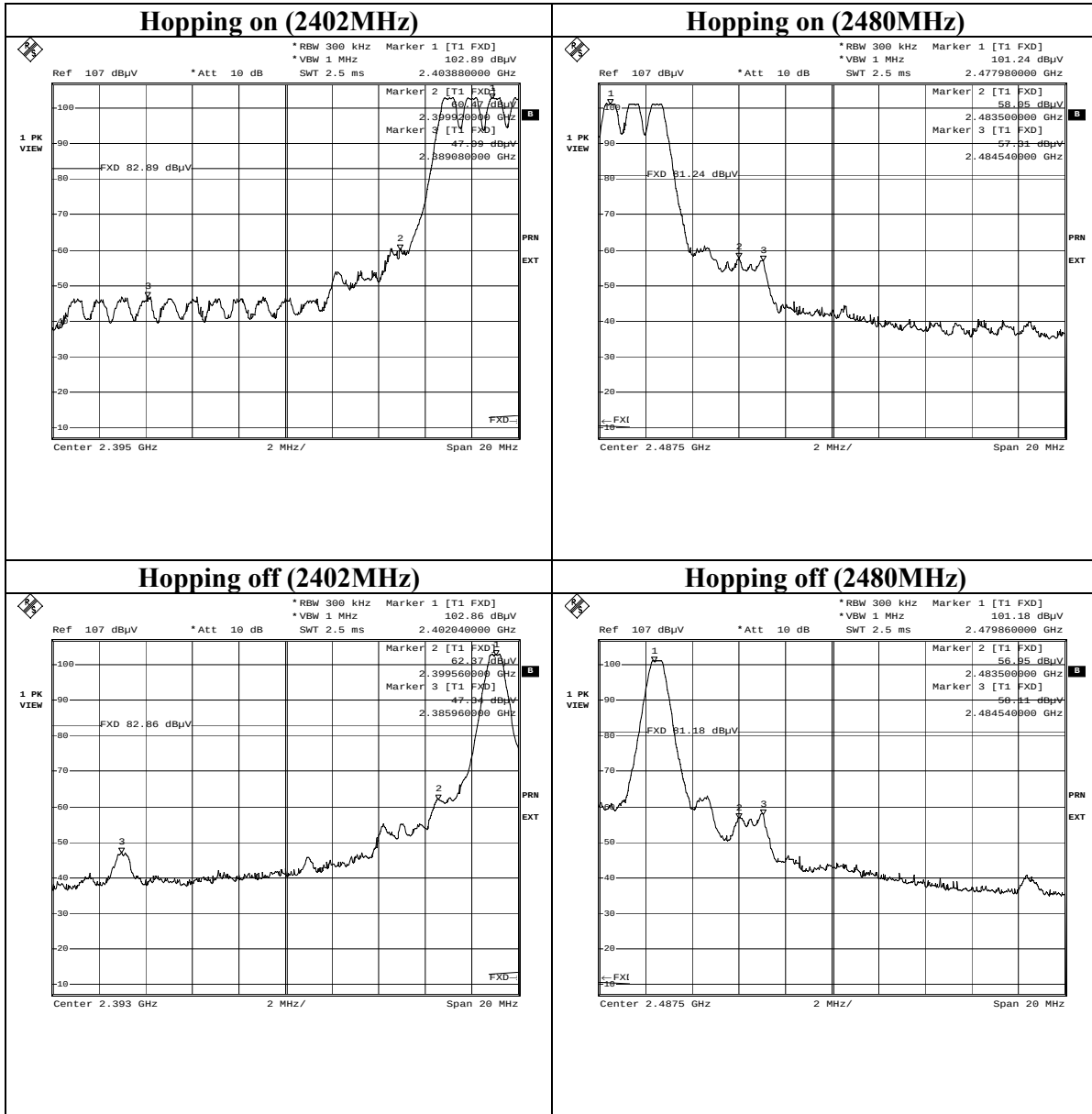
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

MF060b(10.04.03)

Band Edge compliance



Spurious Emission(Radiated) 2402MHz

DATA OF RADIATION TEST

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

Applicant : CANON INC.
Kind of Equipment : Bluetooth Unit
Model No. : BU-10
Serial No. : 12
Power : AC Adaptor AC120V/60Hz
Mode : Tx (2402MHz)
Remarks : MAX-axis
Date : 8/25/2003
Test Distance : 3 m
Temperature : 26 °C
Humidity : 60 %
Regulation : FCC Part15C § 15.209(a)


Engineer : Hiroka Umeyama

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.	48.00	BB	24.9	34.7	11.8	23.7	0.8	6.0	19.8	29.6	40.0	20.2	10.4
2.	64.00	BB	26.4	27.0	6.9	23.7	1.0	6.0	16.6	17.2	40.0	23.4	22.8
3.	112.00	BB	30.2	26.2	11.3	23.3	1.3	6.0	25.5	21.5	43.5	18.0	22.0
4.	416.03	BB	32.7	29.5	17.4	22.9	2.8	6.2	36.2	33.0	46.0	9.8	13.0
5.	432.03	BB	29.6	29.1	17.6	22.9	2.8	6.2	33.3	32.8	46.0	12.7	13.2
6.	672.05	BB	24.3	23.5	20.4	23.2	3.8	6.1	31.4	30.6	46.0	14.6	15.4
7.	704.05	BB	31.3	25.2	20.7	23.2	3.9	6.1	38.8	32.7	46.0	7.2	13.3

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

Except for the above table:adequate margin data below the limits.
ANT. TYPE:30-300MHz Biconical Antenna, 300-1000MHz Logperiodic Antenna

Spurious Emission(Radiated) 2441MHz

DATA OF RADIATION TEST

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

Applicant : CANON INC.
Kind of Equipment : Bluetooth Unit
Model No. : BU-10
Serial No. : 12
Power : AC Adaptor AC120V/60Hz
Mode : Tx (2441MHz)
Remarks : MAX-axis
Date : 8/25/2003
Test Distance : 3 m
Temperature : 26 °C
Humidity : 60 %
Regulation : FCC Part15C § 15.209(a)


Engineer : Hiroka Umeyama

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.	48.00	BB	25.0	34.3	11.8	23.7	0.8	6.0	19.9	29.2	40.0	20.1	10.8
2.	64.00	BB	26.9	26.4	6.9	23.7	1.0	6.0	17.1	16.6	40.0	22.9	23.4
3.	112.00	BB	30.2	24.8	11.3	23.3	1.3	6.0	25.5	20.1	43.5	18.0	23.4
4.	416.03	BB	33.5	27.5	17.4	22.9	2.8	6.2	37.0	31.0	46.0	9.0	15.0
5.	432.03	BB	29.2	23.4	17.6	22.9	2.8	6.2	32.9	27.1	46.0	13.1	18.9
6.	672.05	BB	23.5	21.6	20.4	23.2	3.8	6.1	30.6	28.7	46.0	15.4	17.3
7.	704.05	BB	30.0	25.0	20.7	23.2	3.9	6.1	37.5	32.5	46.0	8.5	13.5

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

Except for the above table:adequate margin data below the limits.
ANT. TYPE:30-300MHz Biconical Antenna, 300-1000MHz Logperiodic Antenna

Spurious Emission(Radiated) 2480MHz
DATA OF RADIATION TEST

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

Applicant : CANON INC.
Kind of Equipment : Bluetooth Unit
Model No. : BU-10
Serial No. : 12
Power : AC Adaptor AC120V/60Hz
Mode : Tx(2480MHz)
Remarks : MAX-axis
Date : 8/25/2003
Test Distance : 3 m
Temperature : 26 °C
Humidity : 60 %
Regulation : FCC Part15C § 15.209(a)


Engineer : Hiroka Umeyama

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.	48.00	BB	24.8	34.6	11.8	23.7	0.8	6.0	19.7	29.5	40.0	20.3	10.5
2.	64.00	BB	27.3	28.7	6.9	23.7	1.0	6.0	17.5	18.9	40.0	22.5	21.1
3.	112.00	BB	30.1	26.3	11.3	23.3	1.3	6.0	25.4	21.6	43.5	18.1	21.9
4.	416.03	BB	31.9	29.3	17.4	22.9	2.8	6.2	35.4	32.8	46.0	10.6	13.2
5.	432.03	BB	31.7	28.4	17.6	22.9	2.8	6.2	35.4	32.1	46.0	10.6	13.9
6.	672.05	BB	29.2	23.6	20.4	23.2	3.8	6.1	36.3	30.7	46.0	9.7	15.3
7.	704.05	BB	31.6	24.9	20.7	23.2	3.9	6.1	39.1	32.4	46.0	6.9	13.6

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

Except for the above table:adequate margin data below the limits.
ANT.TYPE:30-300MHz Biconical Antenna, 300-1000MHz Logperiodic Antenna

Test report No. : 24AE0060-HO-4
Page : 32 of 38
Issued date : September 12, 2003
Revised date : February 6, 2004
FCC ID : AZDK30218

Spurious Emission(Radiated) 2402MHz

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY : CANON INC.
EQUIPMENT : Bluetooth Unit
MODEL : BU-10
S/N : 12
FCC ID : AZDK30218
IC Number : 498C-K30218
POWER : DC5V
MODE : Tx (2402MHz)
AXIS : MAX-axis

REPORT NO : 24AE0060-HO
REGULATION : FCC Part 15 Subpart C 15.247(c)
TEST DISTANCE : 3 and 1m
DATE : 09/02/2003 and 09/05/2003
TEMPERATURE : 26deg.C and 25 deg.C.
HUMIDITY : 61% and 60%

ENGINEER : Hiroka Umeyama

PK DETECT

No.	FREQ	T/R READING		ANT FACTOR	AMP GAIN	CABLE LOSS	ATTEN. OR FILTER	RESULT		LIMIT PK	MARGIN	
	[MHz]	HOR	VER					[dBm]	[dB]		[dB]	HOR
Test distance 3meters RESULT=READING + ANT FACTOR -AMP GAIN + CABLE LOSS + ATTEN. OR FILTER.												
1	1201.5	50.7	50.1	23.3	37.6	4.7	0.0	41.1	40.5	74.0	33.0	33.5
2	2386.0	48.1	44.4	30.7	36.9	6.3	0.0	48.2	44.5	74.0	25.8	29.5
3	4804.0	56.8	52.2	35.1	36.8	8.8	0.3	64.2	59.6	74.0	9.8	14.4
4	7206.0	44.1	44.4	37.5	36.5	10.7	0.0	55.8	56.1	74.0	18.2	17.9
5	9608.0	43.7	45.6	37.4	37.2	12.7	0.0	56.6	58.5	74.0	17.4	15.5
Test distance 1meters RESULT=READING - AMP GAIN + CABLE LOSS + ATTEN OR FILTER - Dfac												
6	12010.0	43.7	45.0	40.5	36.8	14.2	0.0	52.1	53.4	74.0	21.9	20.6
7	14412.0	43.6	43.4	42.8	35.3	15.8	0.0	57.4	57.2	74.0	16.6	16.9
8	16814.0	43.7	43.4	45.2	36.5	17.6	0.0	60.5	60.2	74.0	13.5	13.9
9	19216.0	43.4	43.2	41.0	35.8	18.9	0.0	58.0	57.8	74.0	16.1	16.2
10	21618.0	44.1	44.3	40.9	36.8	19.5	0.0	58.2	58.4	74.0	15.8	15.6
11	24020.0	44.8	44.0	40.3	36.4	20.8	0.0	60.0	59.2	74.0	14.0	14.8

AV DETECT

No.	FREQ	T/R READING		ANT FACTOR	AMP GAIN	CABLE LOSS	ATTEN. OR FILTER	RESULT		LIMIT AV	MARGIN	
	[MHz]	HOR	VER					HOR	VER		HOR	VER
[dBuV/m] [dB] [dB] [dB] [dBuV/m] [dB] [dB]												
Test distance 3meters RESULT=READING + ANT FACTOR -AMP GAIN + CABLE LOSS + ATTEN. OR FILTER.												
1	1201.5	43.5	42.7	23.3	37.6	4.7	0.0	33.9	33.1	54.0	20.1	20.9
2	2386.0	35.3	31.7	30.7	36.9	6.3	0.0	35.4	31.8	54.0	18.6	22.2
3	4804.0	45.6	40.2	35.1	36.8	8.8	0.3	53.0	47.6	54.0	1.0	6.4
4	7206.0	30.5	30.6	37.5	36.5	10.7	0.0	42.2	42.3	54.0	11.8	11.7
5	9608.0	30.9	31.8	37.4	37.2	12.7	0.0	43.8	44.7	54.0	10.2	9.3
Test distance 1meters RESULT=READING - AMP GAIN + CABLE LOSS + ATTEN OR FILTER - Dfac												
6	12010.0	31.0	31.0	40.5	36.8	14.2	0.0	39.4	39.4	54.0	14.6	14.6
7	14412.0	30.2	30.2	42.8	35.3	15.8	0.0	44.0	44.0	54.0	10.0	10.0
8	16814.0	30.2	30.2	45.2	36.5	17.6	0.0	47.0	47.0	54.0	7.0	7.1
9	19216.0	30.0	30.0	41.0	35.8	18.9	0.0	44.6	44.6	54.0	9.5	9.4
10	21618.0	30.9	30.9	40.9	36.8	19.5	0.0	45.0	45.0	54.0	9.0	9.0
11	24020.0	31.0	31.0	40.3	36.4	20.8	0.0	46.2	46.2	54.0	7.8	7.8

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

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

Spurious Emission(Radiated)2441MHz

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY : CANON INC.
EQUIPMENT : Bluetooth Unit
MODEL : BU-10
S/ N : 12
FCC ID : AZDK30218
IC Number : 498C-K30218
POWER : DC5V
MODE : Tx (2441MHz)
AXIS : MAX-axis

REPORT NO : 24AE0060-HO
REGULATION : FCC Part 15 Subpart C 15.247(c)
TEST DISTANCE : 3 and 1m
DATE : 09/02/2003 and 09/05/2003
TEMPERATURE : 26deg.C and 35deg.C.
HUMIDITY : 61% and 60%


ENGINEER : Hiroka Umeyama

PK DETECT

No.	FREQ	T/R READING		ANT FACTOR	AMP GAIN	CABLE LOSS	ATTEN. OR FILTER	RESULT		LIMIT PK	MARGIN	
	[MHz]	HOR	VER					[dBm]	[dB]		[dB]	HOR
		[dBuV/m]		[dB]					[dBuV/m]		[dB]	
Test distance 3meters RESULT=READING + ANT FACTOR -AMP GAIN + CABLE LOSS + ATTEN. OR FILTER.												
1	1220.5	48.3	49.1	23.3	37.6	4.7	0.0	38.7	39.5	74.0	35.3	34.5
2	4882.0	55.7	50.5	35.5	36.8	8.9	0.0	63.3	58.1	74.0	10.7	15.9
3	7323.0	44.3	44.3	37.8	36.6	10.8	0.0	56.3	56.3	74.0	17.7	17.7
4	9764.0	43.7	44.9	37.0	37.2	12.8	0.0	56.3	57.5	74.0	17.7	16.5
Test distance 1meters RESULT=READING - AMP GAIN + CABLE LOSS + ATTEN OR FILTER - Dfac												
5	12205.0	43.9	43.7	41.2	36.7	14.4	0.0	53.3	53.1	74.0	20.7	20.9
6	14646.0	43.7	44.0	43.1	35.5	16.0	0.0	57.8	58.1	74.0	16.2	15.9
7	17087.0	42.4	43.4	45.5	36.2	17.8	0.0	60.0	61.0	74.0	14.0	13.1
8	19528.0	43.7	43.2	40.6	36.0	19.0	0.0	57.8	57.3	74.0	16.2	16.7
9	21969.0	45.4	45.4	40.9	36.0	19.6	0.0	60.4	60.4	74.0	13.6	13.6
10	24410.0	43.9	44.6	40.5	36.9	21.0	0.0	59.0	59.7	74.0	15.0	14.3

AV DETECT

No.	FREQ	T/R READING		ANT FACTOR	AMP GAIN	CABLE LOSS	ATTEN. OR FILTER	RESULT		LIMIT AV	MARGIN	
	[MHz]	HOR	VER					HOR	VER		HOR	VER
Test distance 3meters RESULT=READING + ANT FACTOR -AMP GAIN + CABLE LOSS + ATTEN. OR FILTER.												
1	1220.5	39.7	41.0	23.3	37.6	4.7	0.0	30.1	31.4	54.0	23.9	22.6
2	4882.0	46.1	40.3	35.5	36.8	8.9	0.0	53.7	47.9	54.0	0.3	6.2
3	7323.0	30.7	30.7	37.8	36.6	10.8	0.0	42.7	42.7	54.0	11.4	11.3
4	9764.0	30.6	31.4	37.0	37.2	12.8	0.0	43.2	44.0	54.0	10.8	10.0
Test distance 1meters RESULT=READING - AMP GAIN + CABLE LOSS + ATTEN OR FILTER - Dfac												
5	12205.0	30.7	30.7	41.2	36.7	14.4	0.0	40.1	40.1	54.0	13.9	13.9
6	14646.0	30.4	30.9	43.1	35.5	16.0	0.0	44.5	45.0	54.0	9.5	9.0
7	17087.0	29.6	29.6	45.5	36.2	17.8	0.0	47.2	47.2	54.0	6.8	6.8
8	19528.0	29.8	29.8	40.6	36.0	19.0	0.0	43.9	43.9	54.0	10.1	10.1
9	21969.0	32.3	32.3	40.9	36.0	19.6	0.0	47.3	47.3	54.0	6.7	6.7
10	24410.0	31.0	31.0	40.5	36.9	21.0	0.0	46.1	46.1	54.0	7.9	7.9

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

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

Spurious Emission(Radiated) 2480MHz

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY : CANON INC.
EQUIPMENT : Bluetooth Unit
MODEL : BU-10
S/ N : 12
FCC ID : AZDK30218
IC Number : 498C-K30218
POWER : DC5V
MODE : Tx (2480MHz)
AXIS : MAX-axis

REPORT NO : 24AE0060-HO
REGULATION : FCC Part 15 Subpart C 15.247(c)
TEST DISTANCE : 3 and 1m
DATE : 09/02/2003
TEMPERATURE : 26deg.C
HUMIDITY : 61%


ENGINEER : Hiroka Umeyama

PK DETECT

No.	FREQ	T/R READING		ANT FACTOR	AMP GAIN	CABLE LOSS	ATTEN. OR FILTER	RESULT		LMIT PK	MARGIN	
	[MHz]	HOR	VER					HOR	VER		HOR	VER
[dBuV/m] [dB/m] [dB] [dB] [dBuV/m] [dB] [dB]												
Test distance 3meters RESULT=READING + ANT FACTOR -AMP GAIN + CABLE LOSS + ATTEN. OR FILTER.												
1	1240.5	48.7	49.5	23.4	37.6	4.8	0.0	39.3	40.1	74.0	34.7	33.9
2	2484.5	53.8	49.5	30.7	36.9	6.4	0.0	54.0	49.7	74.0	20.0	24.3
3	4960.0	52.0	48.7	36.0	36.8	8.9	0.0	60.1	56.8	74.0	14.0	17.2
4	7440.0	44.4	45.1	38.1	36.7	10.9	0.0	56.7	57.4	74.0	17.3	16.6
5	9920.0	43.7	45.4	36.5	37.3	13.0	0.0	55.9	57.6	74.0	18.1	16.4
Test distance 1meters RESULT=READING - AMP GAIN + CABLE LOSS + ATTEN OR FILTER - Dfac												
6	12400.0	44.7	44.3	41.8	36.6	14.5	0.0	54.9	54.5	74.0	19.1	19.5
7	14880.0	43.8	43.4	43.3	35.7	16.1	0.0	58.0	57.6	74.0	16.1	16.5
8	17360.0	42.8	43.5	45.4	36.2	18.0	0.0	60.5	61.2	74.0	13.5	12.8
9	19840.0	43.2	43.4	41.0	36.1	19.1	0.0	57.7	57.9	74.0	16.3	16.2
10	22320.0	46.0	45.6	40.8	35.5	19.8	0.0	61.6	61.2	74.0	12.4	12.8
11	24800.0	44.4	44.4	40.6	36.7	21.1	0.0	59.9	59.9	74.0	14.1	14.1

AV DETECT

No.	FREQ	T/R READING		ANT FACTOR	AMP GAIN	CABLE LOSS	ATTEN. OR FILTER	RESULT		LMIT AV	MARGIN	
	[MHz]	HOR	VER					HOR	VER		HOR	VER
		[dBuV/m]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]
Test distance 3meters RESULT=READING + ANT FACTOR -AMP GAIN + CABLE LOSS + ATTEN. OR FILTER.												
1	1240.5	37.9	39.8	23.4	37.6	4.8	0.0	28.5	30.4	54.0	25.5	23.6
2	2484.5	39.5	35.7	30.7	36.9	6.4	0.0	39.7	35.9	54.0	14.3	18.1
3	4960.0	42.1	37.1	36.0	36.8	8.9	0.0	50.2	45.2	54.0	3.8	8.8
4	7440.0	30.9	30.9	38.1	36.7	10.9	0.0	43.2	43.2	54.0	10.8	10.8
5	9920.0	30.8	31.2	36.5	37.3	13.0	0.0	43.0	43.4	54.0	11.0	10.6
Test distance 1meters RESULT=READING - AMP GAIN + CABLE LOSS + ATTEN OR FILTER - Dfac												
6	12400.0	31.2	31.2	41.8	36.6	14.5	0.0	41.4	41.4	54.0	12.7	12.6
7	14880.0	30.6	30.5	43.3	35.7	16.1	0.0	44.8	44.7	54.0	9.3	9.3
8	17360.0	29.8	29.8	45.4	36.2	18.0	0.0	47.5	47.5	54.0	6.5	6.5
9	19840.0	29.9	29.9	41.0	36.1	19.1	0.0	44.4	44.4	54.0	9.6	9.6
10	22320.0	32.4	32.4	40.8	35.5	19.8	0.0	48.0	48.0	54.0	6.0	6.0
11	24800.0	31.4	31.4	40.6	36.7	21.1	0.0	46.9	46.9	54.0	7.1	7.1

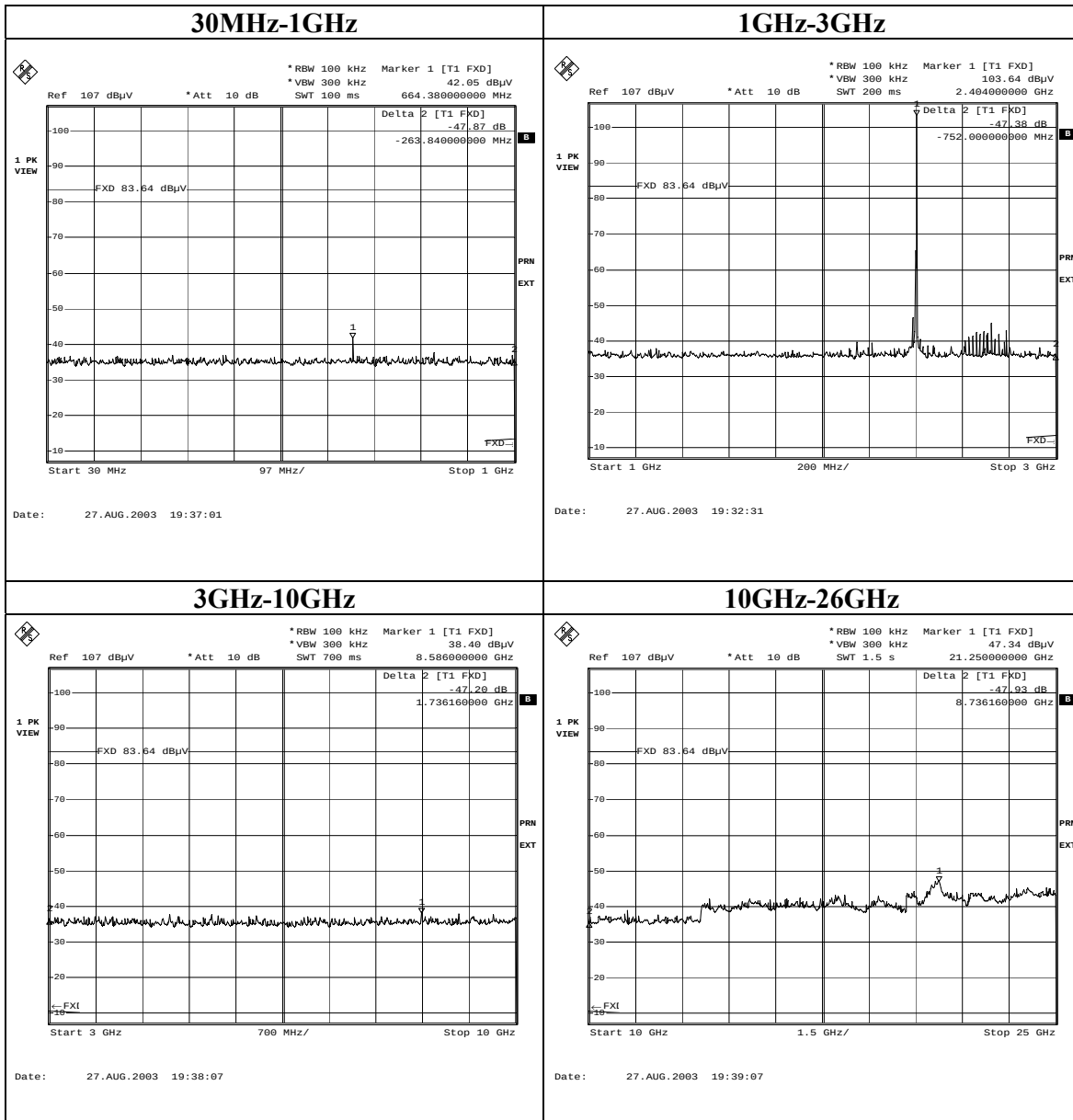
Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) =

9.5 dB

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

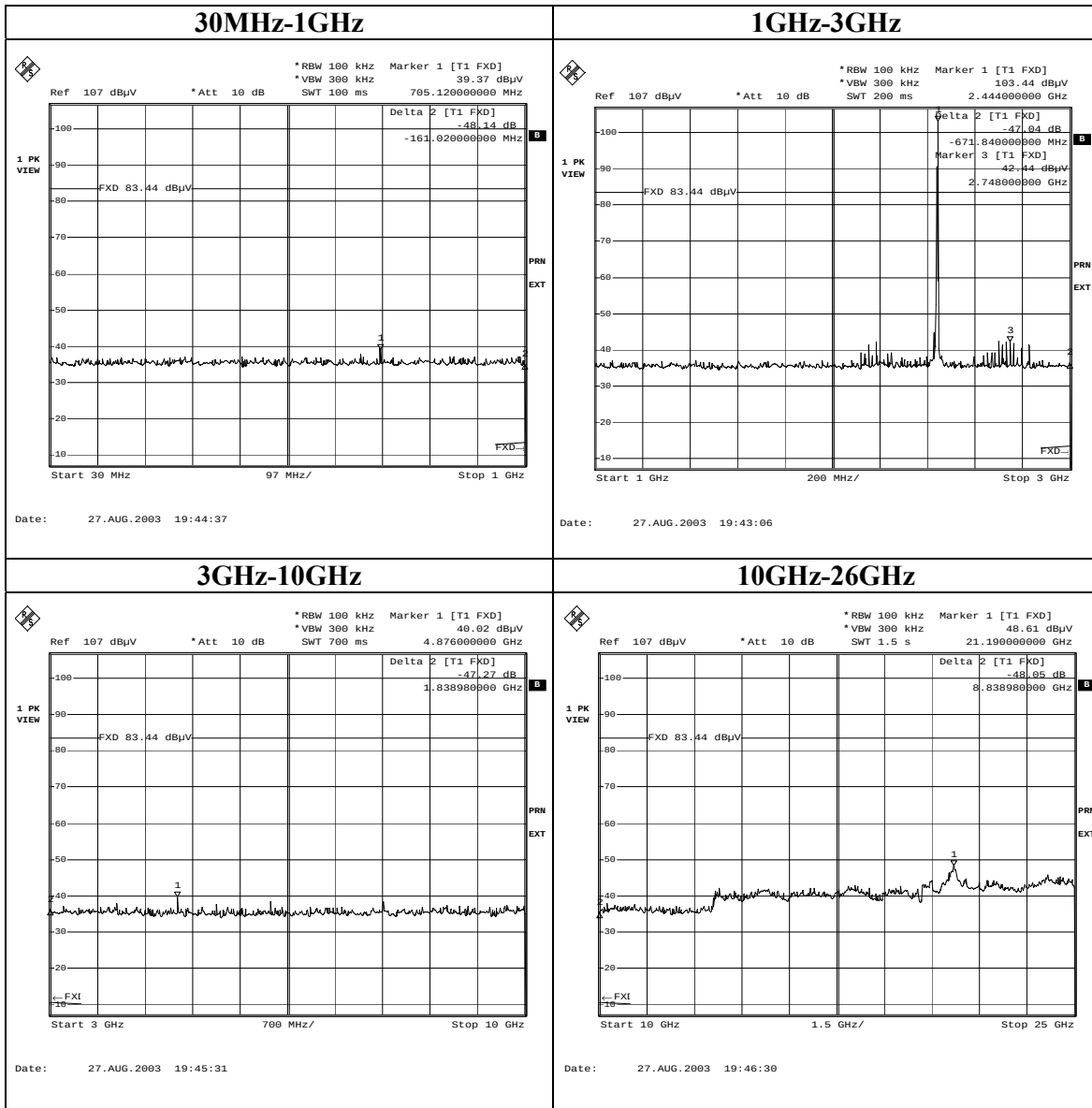
Spurious Emission(Conducted)

2402MHz



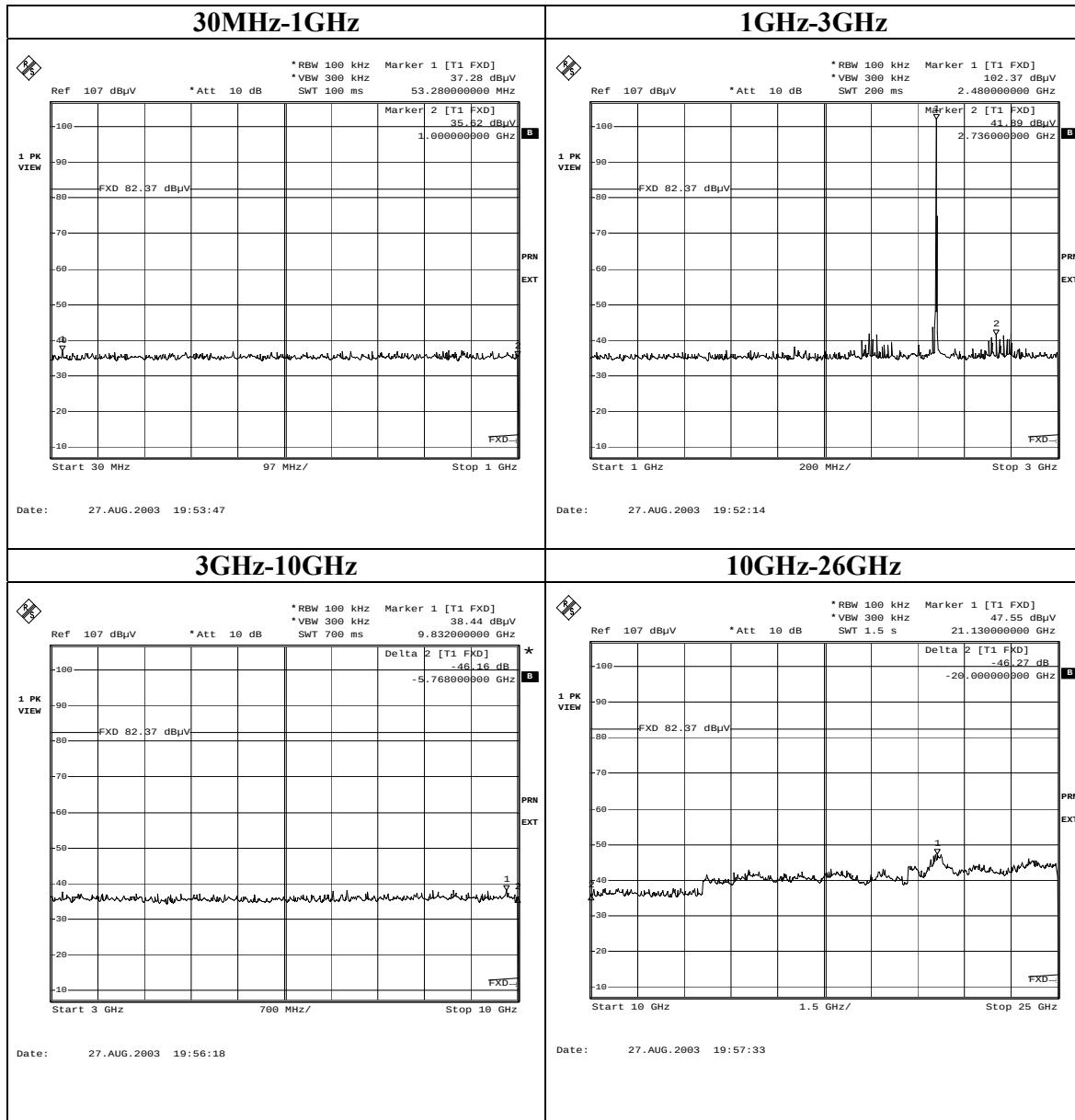
Spurious Emission(Conducted)

2441MHz



Spurious Emission(Conducted)

2480MHz



99% Occupied Bandwidth

