RADIO TEST REPORT

Test Report No. : 27IE0241-HO-A-R1

Applicant	:	**BROTHER INDUSTRIES, LTD.**
Type of Equipment	:	**Multi-Function Center**
Model No.	:	**MFC-885CW**
FCC ID	:	**B3Q8CAE19**
Test standard	:	**FCC Part 15 Subpart C Section 15.207, Section 15.247: 2007**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. Original test report number of this report is 27IE0241-HO-A

Date of test:

April 24 to June 18, 2007

Tested by:

Kenichi Adachi
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Approved by :

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NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address, http://ulapex.jp/emc/nvlap.htm

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SECTION 1: Client information

Company Name	:	BROTHER INDUSTRIES, LTD.
Address	:	1-1-1, Kawagishi, Mizuho-ku, Nagoya, 467-8562, Japan
Telephone Number	:	+81-52-824-2348
Facsimile Number	:	+81-52-824-2734
Contact Person	:	Katsuhiro Sato

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

2.1 Identification of E.U.T.

Type of Equipment	:	Multi-Function Center
Model No.	:	MFC-885CW
Serial No.	:	U61823C7F001768, U61823C7F001821, U61823C7F001822
Rating	:	AC100-120V, 50/60Hz
Country of Manufacture	:	China
Receipt Date of Sample	:	April 17, 2007
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No modification by the test lab.

2.2 Product Description

Model No: MFC-885CW (referred to as the EUT in this report) is the Multi-Function Center.

Clock frequency(ies) in the system	:	13.824MHz
Equipment Type	:	Transceiver
Frequency of Operation	:	5725.809328MHz to 5848.889420MHz
Bandwidth & Channel spacing	:	1MHz & 0.891871MHz
Modulation	:	FHSS
Power Supply (inner)	:	DC 3.3V
Antenna Type	:	1/4 lambda dipole antenna (External), Wire antenna (Internal)
Antenna Connector Type	:	N/A
Antenna Gain	:	0.2dBi (MAX): 1/4 lambda dipole antenna 3.7dBi (MAX): Wire antenna

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part15 Subpart C : 2007
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits : 2007 Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz : 2007

FCC 15.31 (e)
This EUT provides stable voltage(DC 3.3V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antennas are mounted inside and outside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.2 Procedures and results

[FHSS]

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
1	Conducted emission	**FCC:** ANSI C63.4:2003 7. AC powerline conducted emission measurements	**FCC:** Section 15.207	-	N/A	7.3dB 0.51569MHz AV, N	Complied
		IC: RSS-Gen 7.2.2	**IC:** RSS-Gen 7.2.2				
2	Carrier Frequency Separation	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section15.247(a)(1)	Conducted	N/A	See data.	Complied
		IC: -	**IC:** RSS-210 A8.1 (2)				
3	20dB Bandwidth	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section15.247(a)(1)(ii)	Conducted	N/A		Complied
		IC: -	**IC:** RSS-210 A8.1 (1) (5)				
4	Number of Hopping Frequency	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section15.247(a)(1)(ii)	Conducted	N/A		Complied
		IC: -	**IC:** RSS-210 A8.1 (5)				
5	Dwell time	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section15.247(a)(1)(ii)	Conducted	N/A		Complied
		IC: -	**IC:** RSS-210 A8.1 (5)				
6	Maximum Peak Output Power	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section15.247(b)(1)	Conducted	N/A		Complied
		IC: RSS-Gen 4.6	**IC:** RSS-210 A8.1 (3)				
7	Band Edge Compliance	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section15.247(d)	Conducted	N/A		Complied
		IC: -	**IC:** RSS-210 A8.5				
8	Spurious Emission	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section15.247(d)	Conducted/ Radiated	N/A	[Tx] 8.3dB, 875.157MHz Vertical External antenna [Rx] 6.7dB, 17364.72MHz Horizontal/Vertical, AV Internal antenna	Complied
		IC: RSS-Gen 4.7 RSS-Gen 4.8	**IC:** RSS-210 A8.5 RSS-Gen 7.2.1 and 7.2.3				
Note: UL Japan, Inc.'s EMI Work Procedures No.QPM05 and QPM15.							

*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-Gen 4.4.1	-	Conducted	N/A	N/A	N/A

3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.
Conducted Emission
The measurement uncertainty for this test is ±2.66dB.
The data listed in this test report has enough margin, more than the site margin.

Spurious Emission (Radiated)
The measurement uncertainty for this test using Biconical antenna is ±4.59dB(3m).
The measurement uncertainty for this test using Logperiodic antenna is ±4.62dB(3m).
The measurement uncertainty for this test using Horn antenna is ±5.27dB.
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Other test except Conducted Emission and Spurious Emission (Radiated)
The measurement uncertainty for this test is ±3.0dB.

3.5 Test Location

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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	655103	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247A-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	IC4247A-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	-
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	N/A	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

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 mode used for test : **[Conducted emission test]**

・Transmitting mode Hopping off
Low Channel (ch 1) : 5725.809328MHz
Mid Channel (ch 71) : 5788.240269MHz
High Channel (ch 139) : 5848.889420MHz

・Receiving mode Hopping off
Mid Channel (ch 71) : 5788.240269MHz

[Radiated emission test]

・Transmitting mode Hopping off
Low Channel (ch 1) : 5725.809328MHz
Mid Channel (ch 71) : 5788.240269MHz
High Channel (ch 139) : 5848.889420MHz

・Receiving mode Hopping off
Mid Channel (ch 71) : 5788.240269MHz

[20dB Bandwidth, Maximum Peak Output Power and Band Edge Compliance, 99% Occupied bandwidth tests]

・Transmitting mode Hopping off
Low Channel (ch 1) : 5725.809328MHz
Mid Channel (ch 71) : 5788.240269MHz
High Channel (ch 139) : 5848.889420MHz

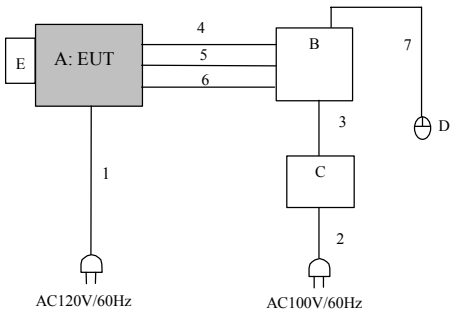
[Carrier Frequency Separation, Number of Hopping Frequency, Dwell time and Band Edge Compliance, 99% Occupied bandwidth tests]

・Transmitting mode Hopping on* : 5725.809328MHz to 5848.889420MHz

*EUT communicates with Digital Cordless Handset.

4.2 Configuration and peripherals

Conducted emission tests



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

Description of EUT and Support equipment

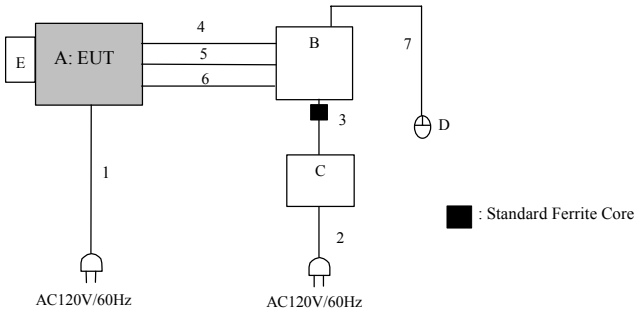
No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Multi-Function Center	MFC-885CW	U61823C7F001768 *1) U61823C7F001822 *2)	BROTHER INDUSTRIES, LTD.	**EUT**
B	Note PC	Compaq nx 9030	CNF5190ZWJ	HP	-
C	AC Adapter	PPP 009H	F3-00208124D	HP	-
D	Mouse	M-UB48	LZE02650788	Logitech	-
E	Digital Cordless Handset	BCL-D10	07118155	BROTHER INDUSTRIES, LTD.	FCC ID: B3QBCLD10

*1) For External antenna tests
*2) For Internal antenna tests

List of cables used

No.	Name	Length (m)	Shield	
			Cable	Connector
1	AC Cable	2.0	Unshielded	Unshielded
2	AC Cable	1.7	Unshielded	Unshielded
3	DC Cable	1.7	Unshielded	Unshielded
4	LAN Cable	2.0	Unshielded	Unshielded
5	Tel Cable	2.0	Unshielded	Unshielded
6	USB Cable	1.8	Shielded	Shielded
7	Mouse Cable	0.8	Unshielded	Unshielded

Radiated emission tests



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

Description of EUT and Support equipment

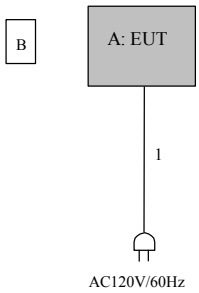
No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Multi-Function Center	MFC-885CW	U61823C7F001768 *1) U61823C7F001822 *2)	BROTHER INDUSTRIES, LTD.	**EUT**
B	Note PC	2647-LJ3	97-ALT8N	IBM	-
C	AC Adapter	02K6750	Z2UP29909J	IBM	-
D	Mouse	M-UB48	LZE02650788	Logitech	-
E	Digital Cordless Handset	BCL-D10	07118155	BROTHER INDUSTRIES, LTD.	FCC ID: B3QBCLD10

*1) For External antenna tests
*2) For Internal antenna tests

List of cables used

No.	Name	Length (m)	Shield	
			Cable	Connector
1	AC Cable	2.0	Unshielded	Unshielded
2	AC Cable	1.7	Unshielded	Unshielded
3	DC Cable	1.7	Unshielded	Unshielded
4	LAN Cable	2.0	Unshielded	Unshielded
5	Tel Cable	2.0	Unshielded	Unshielded
6	USB Cable	1.8	Shielded	Shielded
7	Mouse Cable	0.8	Unshielded	Unshielded

Antenna Terminal tests



Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Multi-Function Center	MFC-885CW	U61823C7F001821	BROTHER INDUSTRIES, LTD.	**EUT**
B	Digital Cordless Handset	BCL-D10	07118155	BROTHER INDUSTRIES, LTD.	FCC ID: B3QBCLD10

List of cables used

No.	Name	Length (m)	Shield	
			Cable	Connector
1	AC Cable	2.0	Unshielded	Unshielded

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0m 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 a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

1) For the tests on EUT with other peripherals (as a whole system)
I/O cable and AC cables that were connected to the peripherals were 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. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber or a Measurement Room.
The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

Detector : quasi-peak and average detector (IF BW 9 kHz)
Measurement range : 0.15-30MHz
Test data : APPENDIX 2
Test result : Pass

SECTION 6: Spurious Emission

[Conducted]
Test Procedure
The Out of Band Emission was measured with a spectrum analyzer connected to the antenna port.
Test data : APPENDIX 2
Test result : Pass

[Radiated]
Test Procedure
EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 80cm above the conducting ground plane.
The Radiated Electric Field Strength intensity has been measured in a Semi Anechoic Chamber with a ground plane and at a distance of 3m(Below 10GHz) and 1m(Upper 10GHz) and 0.5m (Upper 26.5GHz).
The height of the measuring 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 with the Test Receiver, or the Spectrum Analyzer (in linear mode).
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

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.

20dBc was applied to the frequency over the limit of FCC 15.209 / Table 2 of RSS-210 2.7 (IC) and outside the restricted band of FCC15.205 / Table 1 of RSS-210 2.7 (IC).

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver / Spectrum Analyzer	Spectrum Analyzer
Detector IF Bandwidth	QP: BW 120kHz(T/R) 20dBc : RBW: 100kHz VBW: 300kHz (S/A)	PK: RBW:1MHz/VBW: 1MHz AV: RBW:1MHz/VBW:10Hz 20dBc : RBW:100kHz/VBW:300kHz

For External antenna
- The carrier level and noise levels were confirmed at each position of 0 deg., 90 deg. and 180 deg. of EUT's external antenna to see the position of maximum noise, and the test was made at the position that has the maximum noise.

For Internal antenna
The test was made on EUT at the normal use position since its internal antenna is fixed inside.

Test data : APPENDIX 2
Test result : Pass

SECTION 7: Bandwidth

Test Procedure

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

Test data : APPENDIX 2
Test result : Pass

SECTION 8: Maximum Peak Output Power

Test Procedure

The Maximum Peak Output Power was measured with a power meter (tested bandwidth: 50MHz) connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass

SECTION 9: Carrier Frequency Separation

Test Procedure

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

Test data : APPENDIX 2
Test result : Pass

SECTION 10: Number of Hopping Frequency

Test Procedure

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

Test data : APPENDIX 2
Test result : Pass

SECTION 11: Dwell time

Test Procedure

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

Test data : APPENDIX 2
Test result : Pass