

TEST REPORT

Report No.: Z01C-06240

Issue Date: July 14, 2006

The device, as described herewith, was tested pursuant to applicable test procedure indicated below and complies with the requirements of;

FCC Part15 Subpart C / IC RSS-210

The test results are traceable to the international or national standards.

Applicant	:	MITSUMI ELECTRIC CO., LTD. 2-11-2, TSURUMAKI, TAMA-SHI, TOKYO 206-8567, Japan Phone: +81-42-310-5333 Fax.: +81-42-310-5168
Equipment under test (EUT)	:	Wii Remote Controller
FCC ID	:	POO-WC45
IC Certification Number	:	4250A-WC45
Model Number	:	RVL-003
Serial Number	:	N/A
EUT Condition	:	Pre-production

Test procedure : ANSI C63.4-2003
Date of test : June 28-30, 2006
Test place : Site 3, Shielded room
Test results : Complied

Zacta Technology Corporation certifies that no party to the application is subject to a denial of federal benefits that include FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21U.S.C. 853(a).

The results in this report are applicable only to the samples tested.

This report shall not be re-produced except in full without the written approval of ZACTA Technology Corporation.

This test report must not be used by client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Authorized by: Jun Shimanuki
General Manager of EMC Technical Division



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1. Summary of Test Results

Table-A presents the list of the measurement items for Spread Spectrum, Frequency hopping devices under FCC Part 15 Subpart C and Industry Canada RSS-210 Issue 6.

Table-A: List of the measurements

Test Items Section	Test Items			Condition	Result	
	Transmit mode [Tx]:	Limit				
15.247(a)(1) RSS-210 A8.1(1)	Occupied Bandwidth (20dB Bandwidth)	None			Conducted	Pass
RSS-Gen 4.4.1	99% Occupied bandwidth	No limit			Conducted	Pass
15.247(a)(1) A8.1(2)	Carrier Frequency Separation	Systems shall have hopping channel carrier frequencies separated by a minimum of; 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.			Conducted	Pass
15.247(a)(1)(iii) A8.1(4)	Number of Hopping Frequencies	Shall have more than 15 channels.			Conducted	Pass
15.247(a)(1)(iii) A8.1(4)	Time of Occupancy (Dwell Time)	The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.			Conducted	Pass
15.247(b)(1) 15.31(e) A8.4(2)	Maximum Peak Output Power - Conducted -	Shall not exceed 0.125 W.			Conducted	Pass
15.247(c) A8.5	Band Edge Compliance of RF Conducted Emissions	In any 100KHz bandwidth outside the frequency band the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power.			Conducted	Pass
15.247(c) RSS-210 A8.5 RSS-Gen 4.7, 4.8	Spurious Emissions	In any 100KHz bandwidth outside the frequency band the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power.			Conducted Radiated	Pass
15.247(c) 15.205 15.209 RSS-210 A8.5	Restricted Bands of Operation	Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).			Radiated	Pass
15.247(d) A8.2(2)	Transmitter power spectral Density	Shall not be greater than 8 dBm in any 3KHz band.			Conducted	Pass
15.207 RSS-Gen 7.2.2	AC Power Line Conducted Emissions 150kHz – 30MHz	MHz	QP[dBuV]	AV[dBuV]	Conducted	N/A
		0.15 - 0.50	66 - 56	56 - 46		
		0.50 - 5	56	46		
		5 - 30	60	50		

Note: Conducted Emissions measurement is not applicable because the EUT is powered by dry batteries.

2. Equipment description

2.1 EUT information

No.	EUT	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	Wii Remote Controller	NINTENDO	RVL-003	N/A	POO-WC45	EUT

Oscillator(s)/Crystal(s) : 24MHz
 Operating frequency
 Power ratings : DC 3.0V(dry battery)
 Port(s) : I/O
 Size : (W) 36 x (D) 148 x (H) 34 mm
 Operating mode : Test mode
 Variation of model(s) : Not applicable

[RF Specification]

Protocol : Bluetooth
 Spread method : Frequency hopping spread spectrum (FHSS)
 Communication method : TDD
 Frequency Range : 2402MHz – 2480MHz
 Number of FR Channels : 79 Channels
 Modulation Method : Gauss Ian Frequency Shift Keying (GFSK)
 Nominal Bit Rates : 1600hops/s
 Symbol rate on channel : 1Mbps
 Channel Separation : 1MHz
 Output power : 1.251mW
 Antenna (Rx and Tx) : Integral antenna
 Antenna gain : 1.2dBi
 RF type : Tranceiver
 Intended use : Data transmission
 RF emission type designator : 901KF1D

2.2 Operating channels and frequencies.

Channel	Frequency [MHz]	Channel	Frequency [MHz]	Channel	Frequency [MHz]
1	2402	28	2429	55	2456
2	2403	29	2430	56	2457
3	2404	30	2431	57	2458
4	2405	31	2432	58	2459
5	2406	32	2433	59	2460
6	2407	33	2434	60	2461
7	2408	34	2435	61	2462
8	2409	35	2436	62	2463
9	2410	36	2437	63	2464
10	2411	37	2438	64	2465
11	2412	38	2439	65	2466
12	2413	39	2440	66	2467
13	2414	40	2441	67	2468
14	2415	41	2442	68	2469
15	2416	42	2443	69	2470
16	2417	43	2444	70	2471
17	2418	44	2445	71	2472
18	2419	45	2446	72	2473
19	2420	46	2447	73	2474
20	2421	47	2448	74	2475
21	2422	48	2449	75	2476
22	2423	49	2450	76	2477
23	2424	50	2451	77	2478
24	2425	51	2452	78	2479
25	2426	52	2453	79	2480
26	2427	53	2454		
27	2428	54	2455		

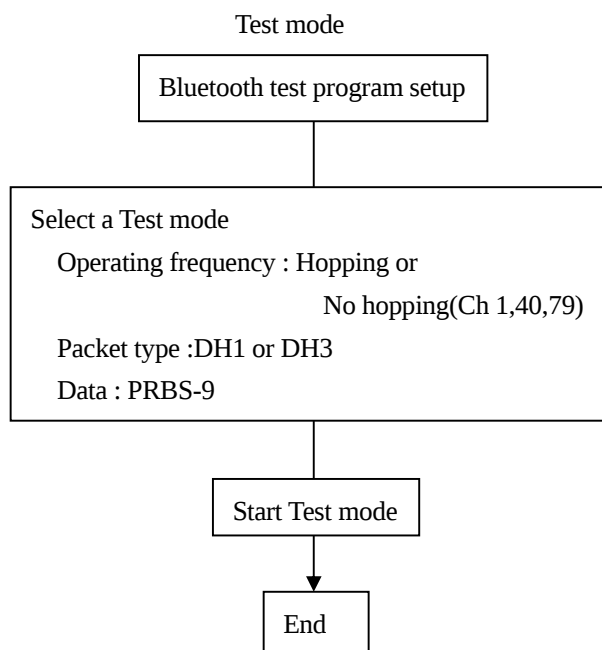
2.3 Operating flow

2.3.1 Operating condition

The test was carried out under the following conditions during the test.

2.3.2 Test mode

Following programs were performed continuously.



3. Configuration information

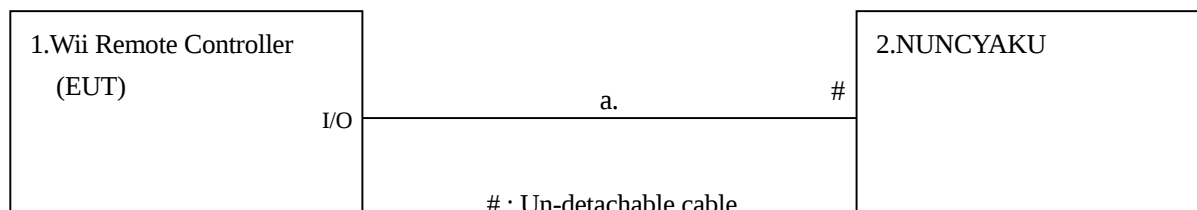
3.1 Peripheral(s) used

No.	Equipment	Company	Model No.	Serial No.	DoC / FCC ID	Comment
2	NUNCYAKU	NINTENDO	RVL-004	N/A	N/A	-

3.2 Cable(s) information

No.	Cable	Length [m]	Shield	Connector	From	To	Comment
a	Controller cable	0.7	Shielded	Metal	EUT	Nunchaku	-

3.3 System configuration



Note 1: Numbers assigned to equipment or cables on this diagram are corresponded to the list in “2.1 EUT information”, “3.1 Peripheral(s) used and “3.2 Cable(s) information”.

4. Test Instruments

List of Measuring Instruments

Equipment	Company	Model No.	Serial No.	Cal. due
Spectrum Analyzer (100Hz-1.5GHz)	Agilent Technologies	8568B	2732A03847	Nov. 2006
Spectrum Analyzer (100kHz-26GHz)	ADVANTEST	R3271A	65050042	Nov. 2006
Spectrum Analyzer (9kHz – 13.2GHz)	Agilent Technologies	E 4405 B	US40240628	May. 2007
Spectrum Analyzer (9kHz – 26.5GHz)	Agilent Technologies	E7405A	US41160344	Jul. 2006
Preamplifier (100kHz-1.2GHz)	NOGAWA	5331	060110	Jan. 2007
Preamplifier (1GHz-26.5GHz)	Agilent Technologies	8449B	3008A01008	Jan. 2007
Test Receiver (9kHz-30MHz)	ROHDE&SCHWARZ	ESHS10	835499/012	Apr.2007
Test Receiver (25MHz-1.5GHz)	Kyoritsu Electrical Works, Ltd.	KNM-5002	4N-200-5	Dec. 2006
	Kyoritsu Electrical Works, Ltd.	KCV-6002	4-288-2	Dec. 2006
Loop Antenna	ROHDE&SCHWARZ	HFH2-Z2	892246/010	Dec. 2007
Biconical Antenna	Schwarzbeck	VHA9103/BBA9106	1488	Jun. 2007
Log Periodic Antenna	Schwarzbeck	UHALP9108A	0398	Jun. 2007
Double Ridged Guide Antenna	EMCO	3115	9408-4327	Aug. 2007
HORN Antenna	Schwarzbeck	BBHA9170	BBHA9170189	Oct.2007
Microwave cable	Suhner	SUCOFLEX 104/15m SUCOFLEX 104/1m	108014/4 108015/4	Jan. 2007
Coaxial cable	Fujikura	8D-SFA/15m	YTCRFC#3R-001	Jul. 2007
		8D-SFA/15m	YTCRFC#3R-002	Jul. 2007
		8D-2W/8m	YTCRFC#3R-003	Jul. 2007
		5D-2W/1m	YTCRFC#3R,3C-001	Jul.2007
Coax cable	N/A	N/A	N/A	Apr. 2007
Coaxial Switch	ANRITSU	MP59B	6200331883	Jun. 2007
Site attenuation	ZACTA Technology Corp.	Site 3	N/A	Nov. 2006

*The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.

5. Test Type and Results

5.1. 20dB Bandwidth / Occupied Bandwidth

5.1.1 Test Procedure [FCC 15.247(a)(1), IC RSS-210 A8.1(1)]

The bandwidth at 20 dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to:

- RBW=30kHz, VBW=300kHz, Span=3MHz, Sweep=auto

The EUT was set to operate with following conditions.

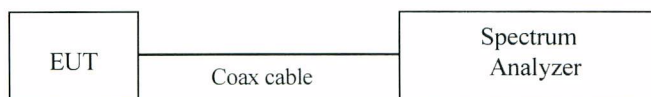
- No hopping [ch 1 (low), ch 40 (mid) and ch 79 (high)]

The test mode of EUT is as follows.

- Test mode

5.1.2 Test Instruments and Measurement Setup

Equipment	Company	Model Number	Serial Number
Spectrum Analyzer	Agilent Technologies	E7405A	US41160344
Coax cable: - Spectrum Analyzer <=> EUT	N/A	Length: 5cm Loss: 0.1dB	N/A



5.1.3 Limit of Bandwidth at 20 dB below

None

5.1.4 Measurement Result

[Test mode]

Channel	Center Frequency [MHz]	20dB Bandwidth [MHz]	Occupied Bandwidth [MHz]
1	2402.0	0.971	0.901
40	2441.0	0.990	0.883
79	2480.0	0.982	0.851

5.1.5 Trace Data

As for the chart of the observed RF profiles, refer to **Appendix A**.

Test Personnel:

Tester Signature:

Tester Name:

Hiroaki Suzuki
Hiroaki Suzuki

Date : Jun. 29, 2006

Temperature : 24.0 [°C]

Humidity : 51.0 [%]

Test place : Shielded room

5.2. Carrier Frequency Separation

5.2.1 Test Procedure [FCC 15.247(a)(1), IC RSS-210 A8.1(2)]

The adjacent channel interval is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to:

- RBW=100KHz, VBW=100KHz, Span=3MHz, Sweep=auto

The EUT was set to operate with following conditions.

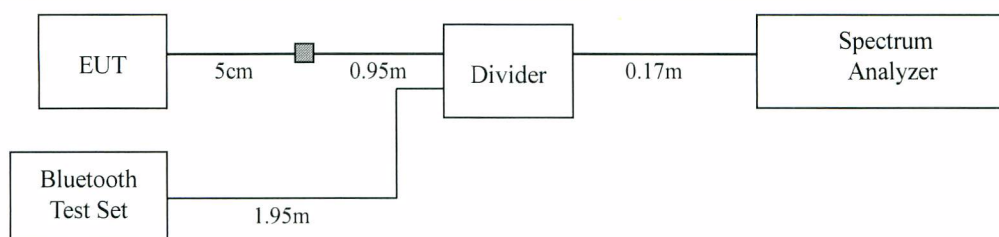
- Hopping

The test mode of EUT is as follows.

- Test mode

5.2.2 Test Instruments and Measurement Setup

Equipment	Company	Model Number	Serial Number
Spectrum Analyzer	Agilent Technologies	E7405A	US41160344
Coax cable: - EUT <=> Connector	N/A	Length: 5cm	N/A
Coax cable: - Connector <=> Divider	N/A	Length: 0.95m	N/A
Coax cable: - Bluetooth Test Set <=> Divider	N/A	Length: 1.95m	N/A
Coax cable: - Divider <=> Spectrum Analyzer	N/A	Length: 0.17m	N/A



5.2.3 Limit of Carrier Frequency Separation

Systems shall have hopping channel carrier frequencies separated by a minimum of;
25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

5.2.4 Measurement Result

[Test mode]		
Channel Separation [MHz]	Limit [MHz]	PASS / FAIL
0.990	>two-thirds of the 20dB Bandwidth =660kHz	PASS

5.2.5 Trace Data

As for the chart of the observed RF profiles, refer to **Appendix B**.

Test Personnel:

Tester Signature:

Tester Name:

Hiroaki Suzuki
Hiroaki Suzuki

Date : Jun. 29, 2006

Temperature : 24.0 [°C]

Humidity : 51.0 [%]

Test place : Shielded room

5.3. Number of Hopping Frequencies

5.3.1 Test Procedure [FCC 15.247(a)(1)(iii), IC RSS-210 A8.1(4)]

The number of hopping channels is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to:

- RBW=100kHz, VBW=100kHz, Span=Arbitrary setting, Sweep=auto

The EUT was set to operate with following conditions.

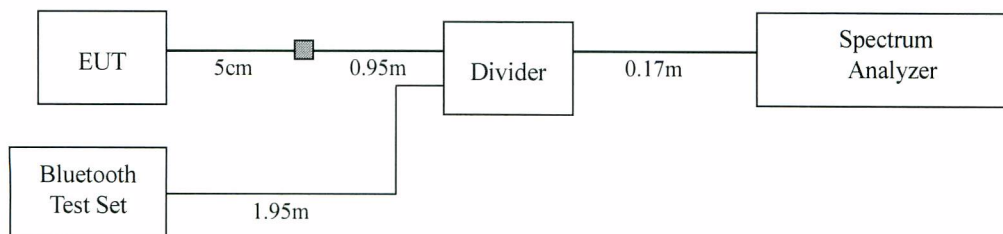
- Hopping

The test mode of EUT is as follows.

- Test mode

5.3.2 Test Instruments and Measurement Setup

Equipment	Company	Model Number	Serial Number
Spectrum Analyzer	Agilent Technologies	E7405A	US41160344
Coax cable: - EUT <=> Connector	N/A	Length: 5cm	N/A
Coax cable: - Connector <=> Divider	N/A	Length: 0.95m	N/A
Coax cable: - Bluetooth Test Set <=> Divider	N/A	Length: 1.95m	N/A
Coax cable: - Divider <=> Spectrum Analyzer	N/A	Length: 0.17m	N/A



5.3.3 Limit of Number of Hopping Frequencies

Shall have more than 15 channels.

5.3.4 Measurement Result

[Test mode]

Number of channels	Limit	PASS / FAIL
79	≥ 15 channel	PASS

5.3.5 Trace Data

As for the chart of the observed RF profiles, refer to **Appendix C**.

Test Personnel:

Tester Signature: Hiroaki Suzuki
Tester Name: Hiroaki Suzuki

Date : Jun. 29, 2006
Temperature : 24.0 [°C]
Humidity : 51.0 [%]
Test place : Shielded room

5.4. Time of Occupancy (Dwell Time)

5.4.1 Test Procedure [FCC 15.247(a)(1)(iii), IC RSS-210 A8.1(4)]

The time occupancy of hopping channel is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to:

- RBW=1MHz, VBW=1MHz, Span=0MHz, Sweep=5ms

The EUT was set to operate with following conditions.

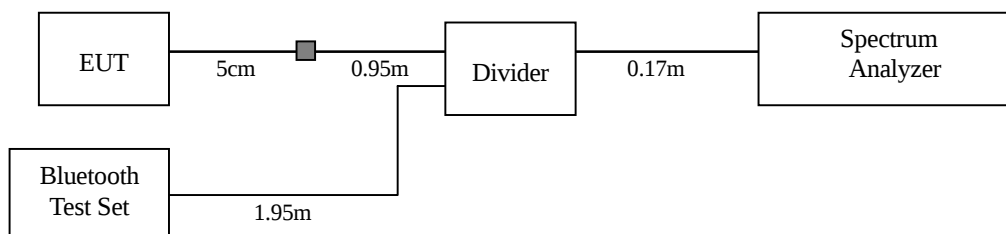
- Hopping [ch 1 (low), ch 40 (mid) and ch 79 (high)]

The test mode of EUT is as follows.

- Test mode

5.4.2 Test Instruments and Measurement Setup

Equipment	Company	Model Number	Serial Number
Spectrum Analyzer	Agilent Technologies	E 4405 B	US40240628
Coax cable: - EUT <=> Connector	N/A	Length: 5cm	N/A
Coax cable: - Connector <=> Divider	N/A	Length: 0.95m	N/A
Coax cable: - Bluetooth Test Set <=> Divider	N/A	Length: 1.95m	N/A
Coax cable: - Divider <=> Spectrum Analyzer	N/A	Length: 0.17m	N/A



5.4.3 Limit of Time of Occupancy (Dwell Time)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

5.4.4 Measurement Result

[Test mode]

Channel	Frequency [MHz]	Packet type	Dwell Time [ms]	Occupancy time of 31.6 seconds [s]	Limit	PASS / FAIL
1	2402.0	DH1	0.375	0.120	< 0.4 s	PASS
		DH3	1.626	0.260	< 0.4 s	PASS
40	2441.0	DH1	0.375	0.120	< 0.4 s	PASS
		DH3	1.613	0.258	< 0.4 s	PASS
79	2480.0	DH1	0.363	0.116	< 0.4 s	PASS
		DH3	1.612	0.258	< 0.4 s	PASS

The hopping rates of Bluetooth devices change with different types of payload. The longer the payload is, the slower the hopping rate. The hopping rate scenario is defined in Bluetooth core specification.

Calculation :

Occupancy time of 31.6 seconds * = time domain slot length x hop rate / number of hop per channel x 31.6

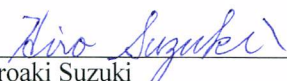
5.4.5 Trace Data

As for the chart of the observed RF profiles, refer to **Appendix D**.

Test Personnel:

Tester Signature:

Tester Name:


Hiroaki Suzuki

Date : Jun. 30, 2006

Temperature : 24.3 [°C]

Humidity : 52.0 [%]

Test place : Shielded room