

TEST REPORT

Report number: Z071C-10017

Issue Date: May 28, 2010

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.
Equipment under test (EUT)	: Wii Remote Controller
FCC ID	: POO-WC62
IC Certification Number	: 4250A-WC62
Model Number	: RVL-036
Serial Number	: Nx
EUT Condition	: Pre-production

Test procedure	: ANSI C63.4-2003
Date of test	: April 20,26,27,2010 May 28,2010
Test place	: 3m Semi-anechoic chamber, 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, 21 U.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.

Tested by:



Taiki Watanabe

Authorized by:



Jun Shimanuki

General Manager of Technical Division



NVLAP LAB CODE 200306-0

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1. Summary of Test

1.1 Purpose of test

It is the original test in order to verify conformance to standards listed in section 1.2.

1.2 Standards

CFR47 FCC Part 15 Subpart C, RSS-210

1.3 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 7.

Table-A: List of the measurements

Test Items Section	Test Items	Condition	Result
	Transmit mode [Tx]:		
15.247(a)(1) RSS-210 A8.1(a)	Occupied Bandwidth (20dB Bandwidth)	Conducted	Pass
RSS-Gen 4.6.1	99% Occupied bandwidth	Conducted	Pass
15.247(a)(1) RSS-210 A8.1(b)	Carrier Frequency Separation	Conducted	Pass
15.247(a)(1)(iii) RSS-210 A8.1(d)	Number of Hopping Frequencies	Conducted	Pass
15.247(a)(1)(iii) RSS-210 A8.1(d)	Time of Occupancy (Dwell Time)	Conducted	Pass
15.247(b)(1) 15.31(e) RSS-210 A8.4(2)	Maximum Peak Output Power - Conducted -	Conducted	Pass
15.247(d) RSS-210 A8.5	Band Edge Compliance of RF Conducted Emissions	Conducted	Pass
15.247(d) RSS-210 A8.5 RSS-Gen 4.9, 4.10	Spurious Emissions	Conducted Radiated	Pass
15.247(d) 15.205 15.209 RSS-210 2.2	Restricted Bands of Operation	Radiated	Pass

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

1.4 Deviation from the standard

None

1.5 Modification to the EUT by laboratory

None

2. Equipment description

2.1 General Description of equipment

EUT is Remote controller for Wii console.

2.2 EUT information

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
Trade name : NINTENDO
Model number : RVL-036
Serial number : Nx
EUT condition : Pre-production
Max. frequency : 24MHz
Power ratings : DC 3.0V (Dry battery)
Size : (W) 36.2 x (D) 148 x (H) 33.54 mm
Environment : Indoor use
Thermal limitation : 0°C to 40°C
Operating mode : Tx mode / Rx mode
Variation of the family model(s) : N/A

[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/Data rate : GFSK
Nominal Bit Rates : 1600hops/s
Channel Separation : 1MHz
Output power : 1.183mW
Antenna (Rx and Tx) : Integral antenna
Antenna gain : 1.2dBi
RF type : Transceiver
Intended use : Data transmission
RF emission type designator : 927KF1D (GFSK)

2.3 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		

2.4 Operating mode

【Tx mode】

- i) Bluetooth test program set up
- ii) Select a test mode
 - Operating mode: Tx mode
 - Operating frequency: No hopping (CH.1, 40, 79), Hopping
 - Packet type: DH1 only
 - Data: PRBS-9 or Un modulated
- iii) Start test mode

【Rx mode】

- i) Bluetooth test program set up
- ii) Select a test mode
 - Operating mode: Rx mode (Write Receive only)
 - Operating frequency: No hopping (CH.1, 40, 79)
- iii) Start test mode

3. Configuration information

3.1 EUT and Peripheral(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	Wii Remote Controller	NINTENDO	RVL-036	Nx	FCC ID: POO-WC62 IC ID: 4250A-WC62	EUT
2	NUNCYAKU	NINTENDO	RVL-004	N/A	N/A	

3.2 Cable(s) information

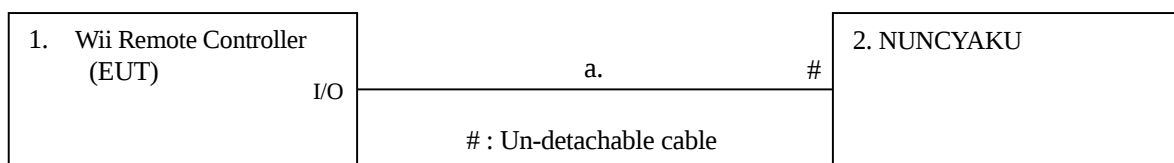
No.	Cable	Length [m]	Shield	Connector	Comment
a	Controller cable	0.9	Yes	Metal	-

3.3 System configuration

[RF Conducted test]



[RF Radiated test]



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

4. Test Type and Results

4.1 20dB Bandwidth / Occupied Bandwidth

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

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

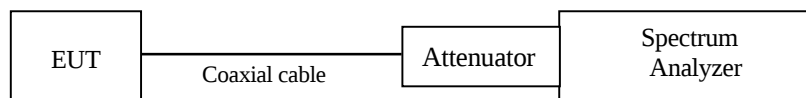
The EUT was set to operate with following conditions.

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

The test mode of EUT is as follows.

- Tx mode

4.1.2 Measurement Setup



4.1.3 Limit of Bandwidth at 20 dB below

None

4.1.4 Measurement Result

Channel	Center Frequency (MHz)	20dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
1	2402.00	1.009	0.927
40	2441.00	0.981	0.920
79	2480.00	0.978	0.916

4.1.5 Trace Data

Test Personnel:

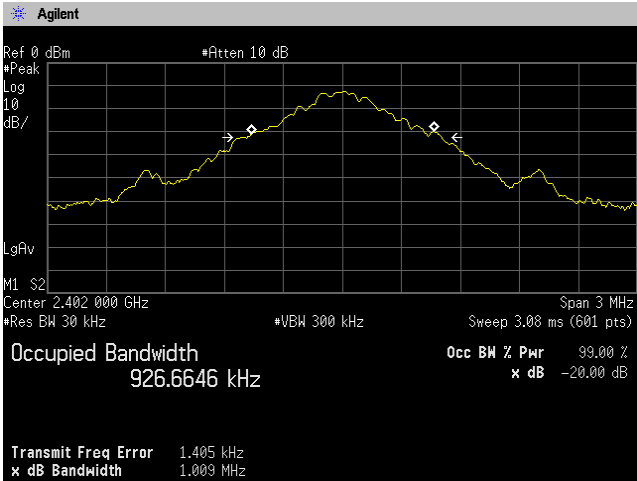
Tested by:

Taiki Watanabe

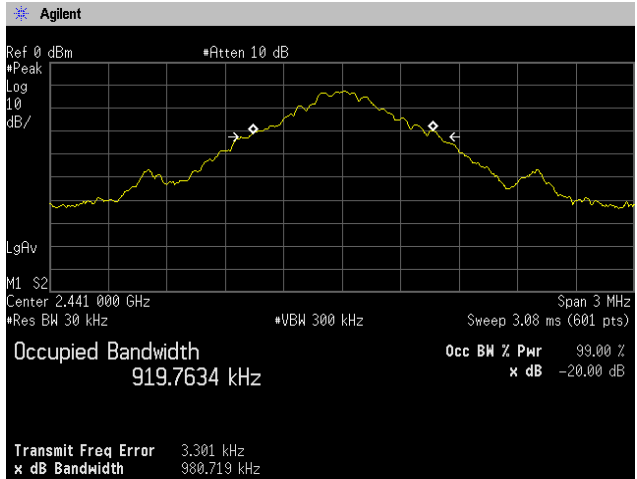
Date : Apr. 20, 2010
 Temperature : 21.0 [°C]
 Humidity : 46.0 [%]
 Test place : Shielded room

20dB Bandwidth/Occupied Bandwidth

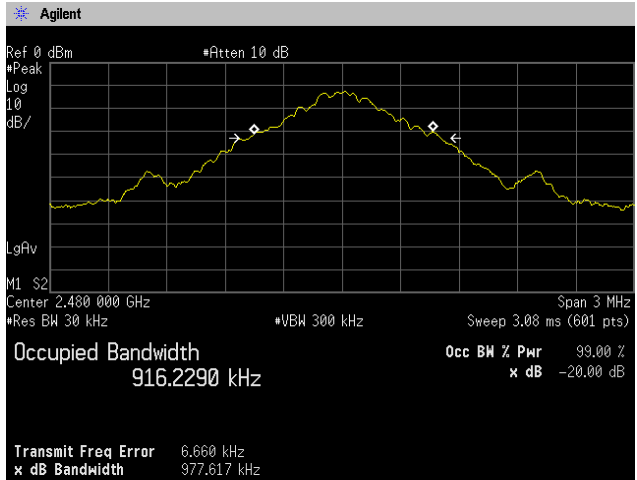
Channel 1: 2402.0MHz



Channel 40: 2441.0MHz



Channel 79: 2480.0MHz



4.2 Carrier Frequency Separation

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

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=30kHz, VBW=30kHz, Span=3MHz, Sweep=auto

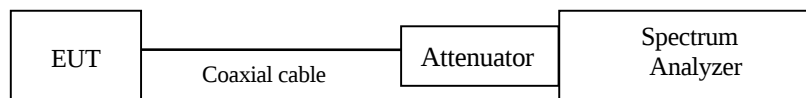
The EUT was set to operate with following conditions.

- Hopping [ch 40 (mid)]

The test mode of EUT is as follows.

- Tx mode

4.2.2 Measurement Setup



4.2.3 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.

4.2.4 Measurement Result

Channel separation (MHz)	Limit (MHz)	Result
1.03	>two-thirds of the 20dB Bandwidth =673kHz	PASS

4.2.5 Trace Data

Test Personnel:

Tested by:

Taiki Watanabe

Date : Apr. 20, 2010

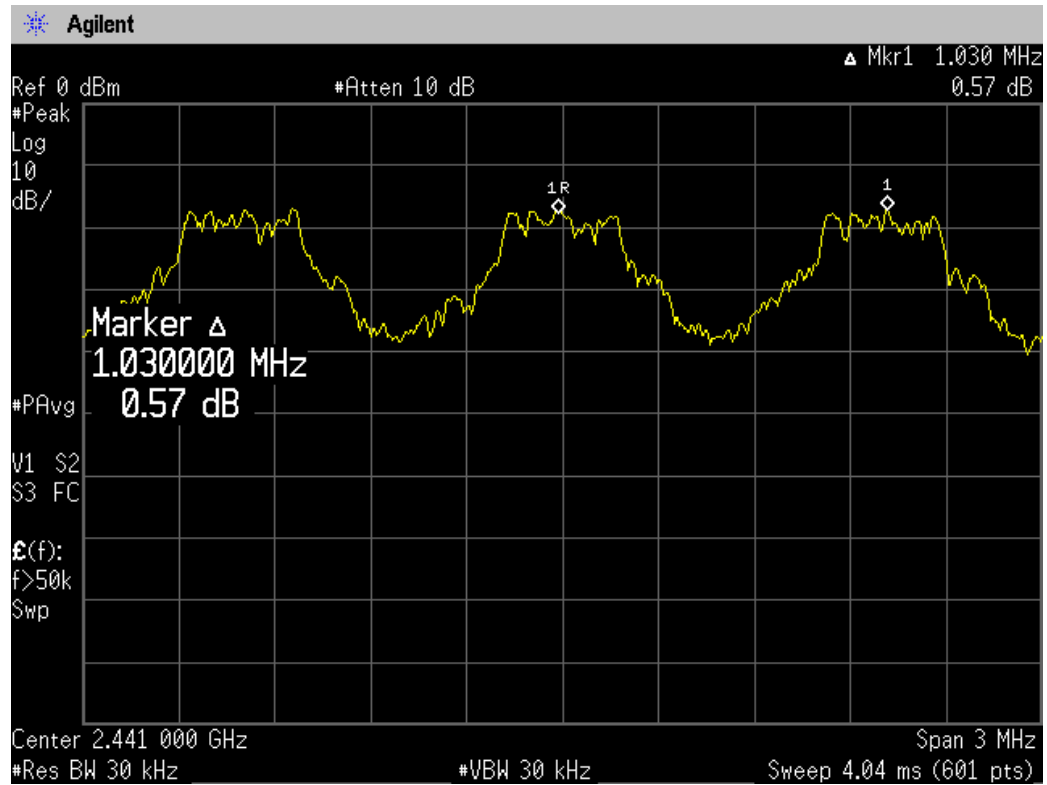
Temperature : 21.0 [°C]

Humidity : 46.0 [%]

Test place : Shielded room

Carrier Frequency Separation

Channel 40: 2441.0MHz



4.3 Number of Hopping Frequencies

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

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=300kHz, Span=Arbitrary setting, Sweep=auto

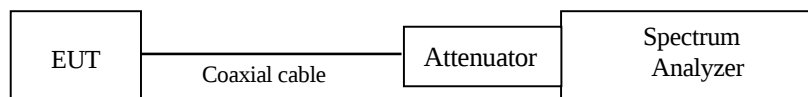
The EUT was set to operate with following conditions.

- Hopping

The test mode of EUT is as follows.

- Tx mode

4.3.2 Measurement Setup



4.3.3 Limit of Number of Hopping Frequencies

Shall have more than 15 channels.

4.3.4 Measurement Result

Number of channels	Limit	Result
79	≥15 channel	PASS

4.3.5 Trace Data

Test Personnel:

Tested by: Taiki Watanabe

Date : Apr. 20, 2010

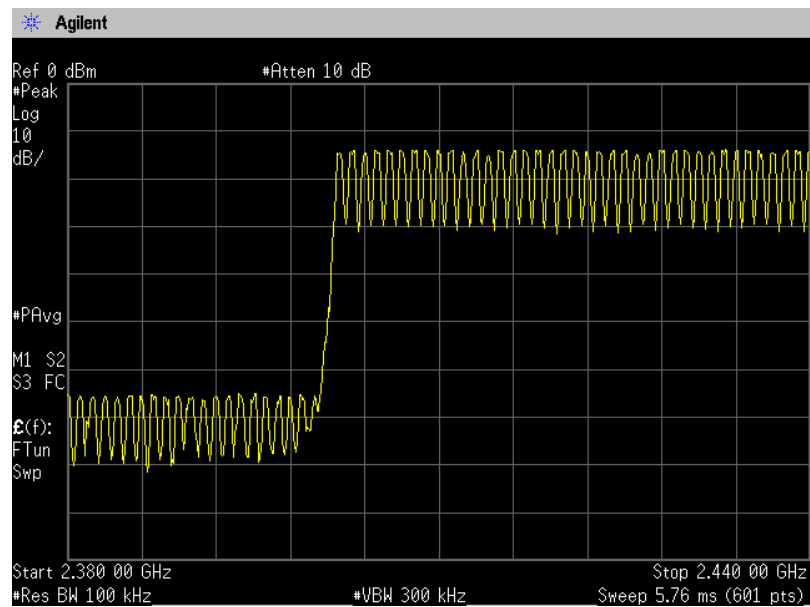
Temperature : 21.0 [°C]

Humidity : 46.0 [%]

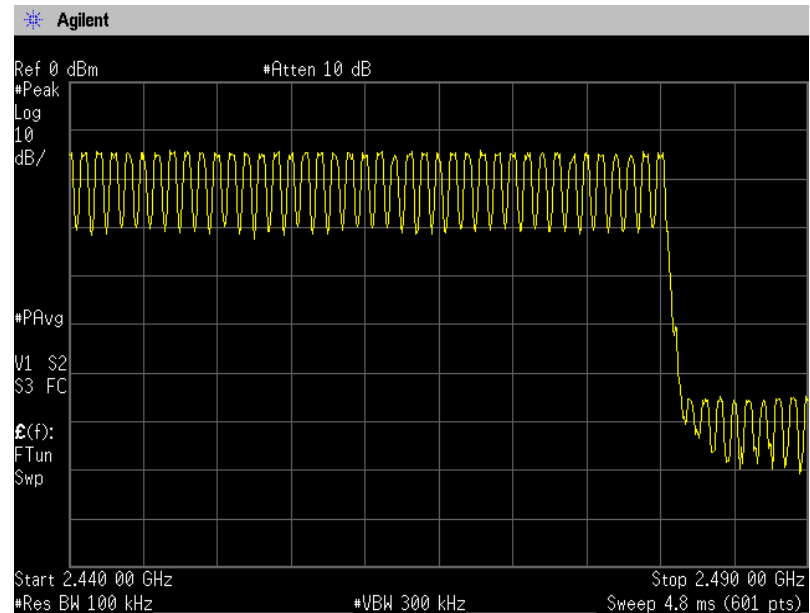
Test place : Shielded room

Number of Hopping Frequencies

Low



High



4.4 Time of Occupancy (Dwell Time)

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

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=10ms

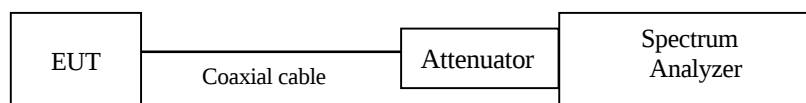
The EUT was set to operate with following conditions.

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

The test mode of EUT is as follows.

- Tx mode

4.4.2 Measurement Setup



4.4.3 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.

4.4.4 Measurement Result

Channel	Frequency (MHz)	Packet type	Dwell time (ms)	Occupancy time of 31.6 seconds (s)	Limit	Result
1	2402.00	DH1	0.367	0.117	<0.4s	PASS
40	2441.00	DH1	0.367	0.117	<0.4s	PASS
79	2480.00	DH1	0.367	0.117	<0.4s	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 hopper channel / 79 x 31.6

EX.) For Ch. 1, DH1 = 0.367 ms x 1600 / 2 / 79 x 31.6 = 117ms

4.4.5 Trace Data

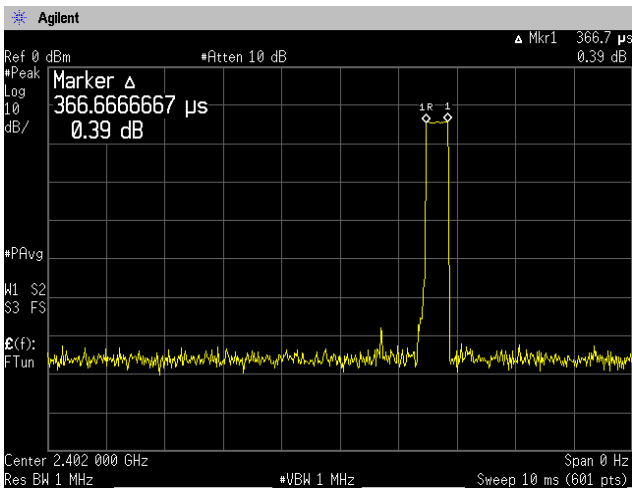
Test Personnel:

Tested by: Taiki Watanabe

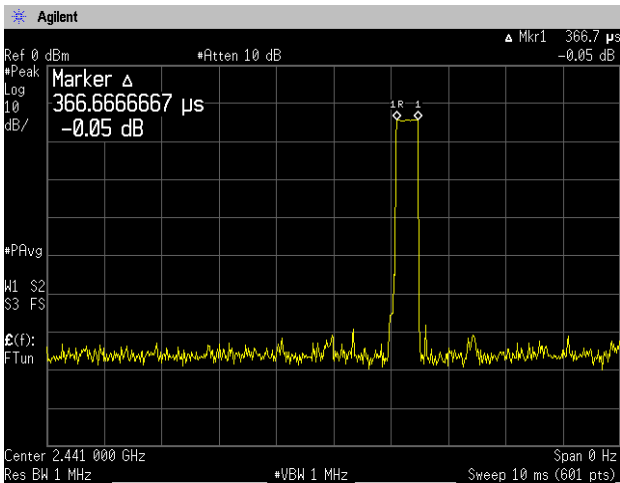
Date : Apr. 20, 2010
Temperature : 21.0 [°C]
Humidity : 46.0 [%]
Test place : Shielded room

Dwell Time

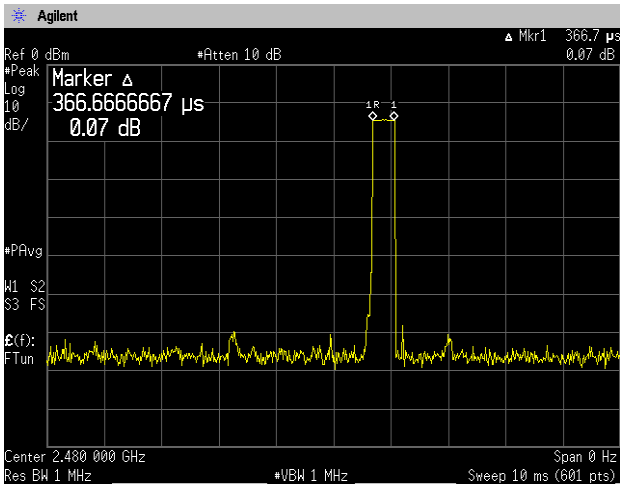
Channel 1: 2402.0MHz



Channel 40: 2441.0MHz



Channel 79: 2480.0MHz



4.5 Maximum Peak Output Power - Conducted -

4.5.1 Test Procedure [FCC 15.247(b)(1), 15.31(e), IC RSS-210 A8.4(2)]

The peak power 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=3MHz, VBW=3MHz, Span=10MHz, Sweep=auto

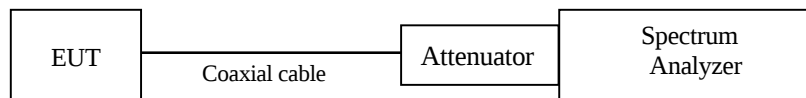
The EUT was set to operate with following conditions.

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

The test mode of EUT is as follows.

- Tx mode in Battery operation. (Full charge)

4.5.2 Test Instruments and Measurement Setup



4.5.3 Limit of Maximum Peak Output Power

0.125 watt or less.

4.5.4 Measurement Result

[Tx mode in Battery operation. (Full charge)]

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Peak Output Power (mW)	Limit (mW)	Result
1	2402.00	-10.07	10.80	0.73	1.183	125	PASS
40	2441.00	-10.08	10.80	0.72	1.180	125	PASS
79	2480.00	-10.23	10.80	0.57	1.140	125	PASS

Calculation:

Reading (dBm) + Factor (dB) = Level (dBm)

$10\log P = \text{Level (dBm)}$

$P = 10^{(\text{Maximum Peak Output Power (dBm)} / 10)} (\text{mW})$

4.5.5 Trace Data

Test Personnel:

Tested by: Taiki Watanabe

Date : Apr. 20, 2010

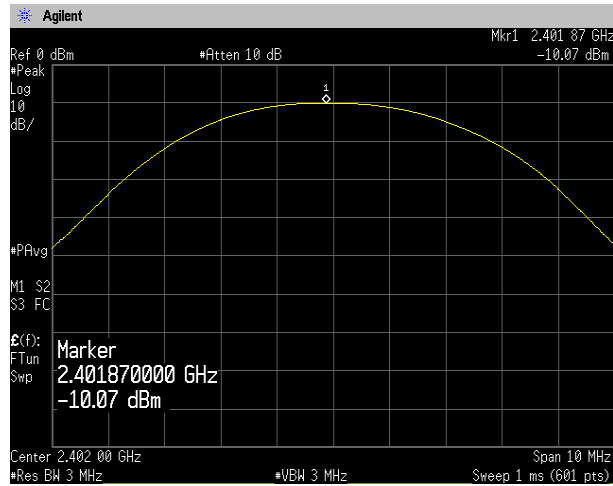
Temperature : 21.0 [°C]

Humidity : 46.0 [%]

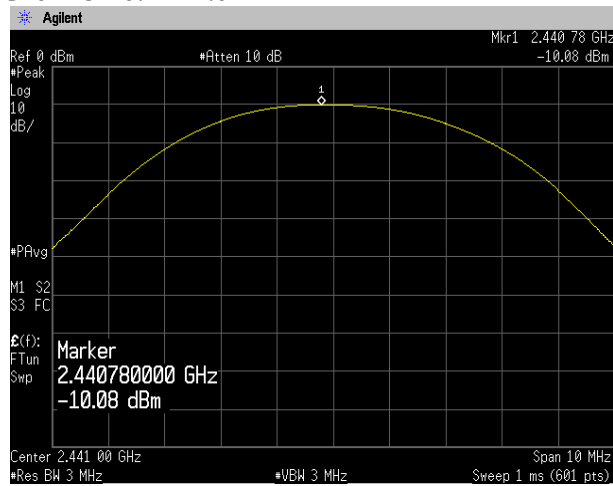
Test place : Shielded room

Maximum Peak Output Power - Conducted - [Battery operation Full charge]

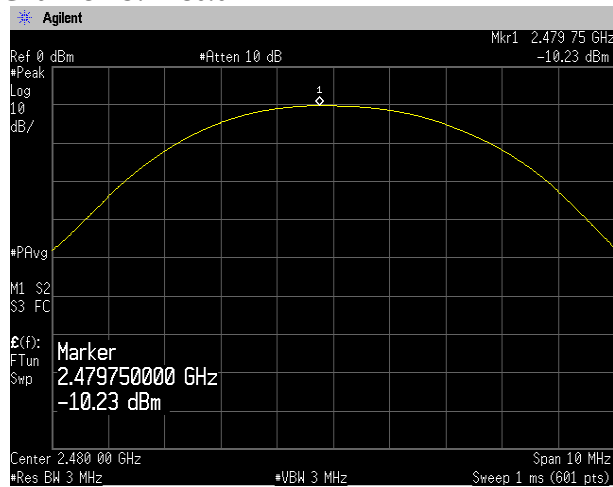
Channel 1: 2402.0MHz



Channel 40: 2441.0MHz



Channel 79: 2480.0MHz



4.6 Band Edge Compliance of RF Conducted Emissions

4.6.1 Test Procedure [FCC 15.247 (d), IC RSS-210 A8.5]

The Band Edge 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=15MHz, Sweep=Auto

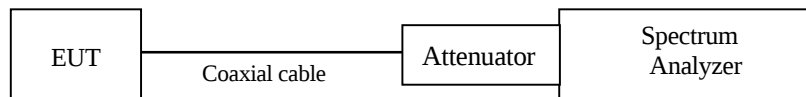
The EUT was set to operate with following conditions.

- Hopping [ch 1 (low) and ch 79 (high)]
- No hopping [ch 1 (low) and ch 79 (high)]

The test mode of EUT is as follows.

- Tx mode (Hopping)
- Tx mode (No hopping)

4.6.2 Test Instruments and Measurement Setup



4.6.3 Limit of 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.

4.6.4 Measurement Results of Band-edge

[Tx mode (Hopping)]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
1	2402.00	-13.75	2395.15	-64.72	50.97	At least 20dB below from peak of RF	PASS
1	2402.00	-13.75	2393.98	-64.61	50.86		PASS
1	2402.00	-13.75	2390.00	-65.77	52.02		PASS
79	2480.00	-14.70	2482.90	-65.06	50.36		PASS
79	2480.00	-14.70	2488.85	-65.08	50.38		PASS

[Tx mode (No hopping)]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
1	2402.00	-10.68	2400.00	-61.65	50.97	At least 20dB below from peak of RF	PASS
1	2402.00	-10.68	2399.50	-65.41	54.73		PASS
1	2402.00	-10.68	2390.00	-77.91	67.23		PASS
79	2480.00	-10.95	2482.00	-62.38	51.43		PASS
79	2480.00	-10.95	2483.00	-66.07	55.12		PASS

4.6.5 Trace Data

Test Personnel:

Tested by: Taiki Watanabe

Date : Apr. 20, 2010
Temperature : 21.0 [°C]
Humidity : 46.0 [%]
Test place : Shielded room

Test Personnel:

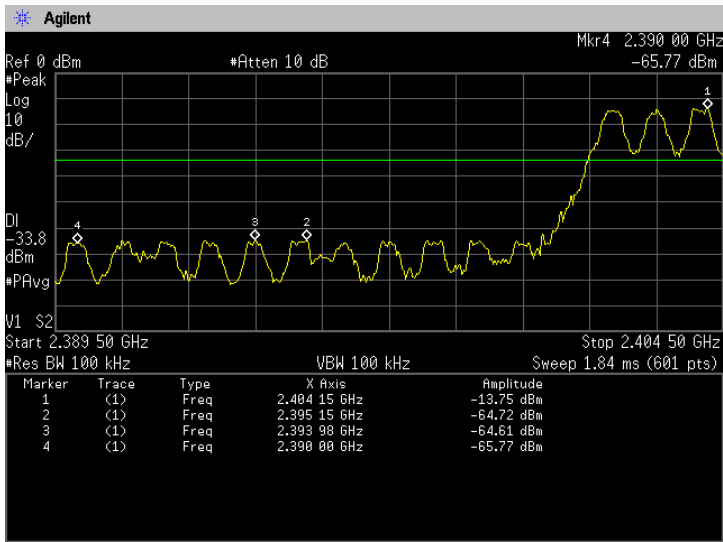
Tested by: Taiki Watanabe

Date : May. 28, 2010
Temperature : 19.0 [°C]
Humidity : 60.0 [%]
Test place : Shielded room

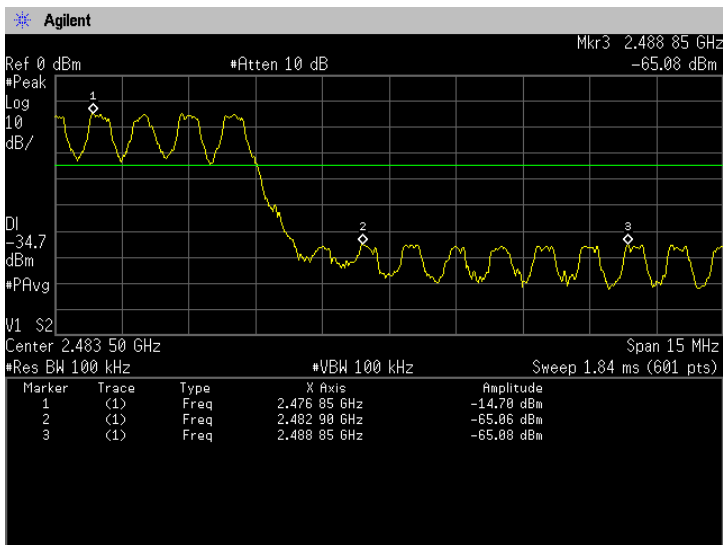
Band Edge Compliance of RF Conducted Emissions

[Tx mode (Hopping)]

Channel 1: 2402.0MHz



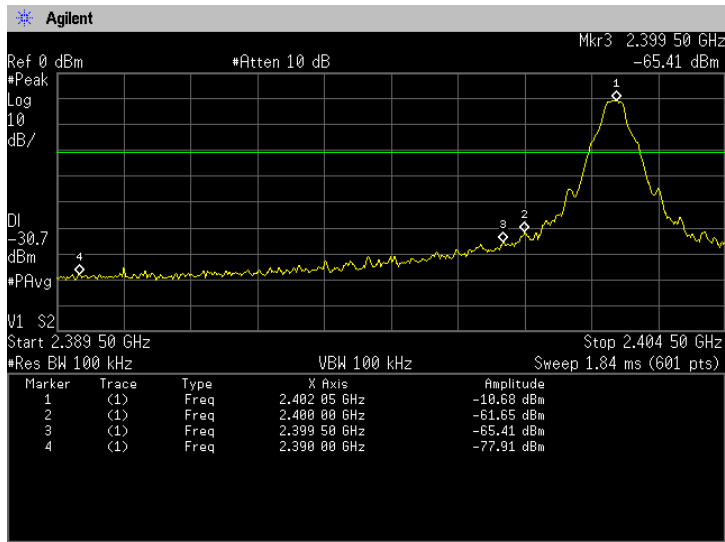
Channel 79: 2480.0MHz



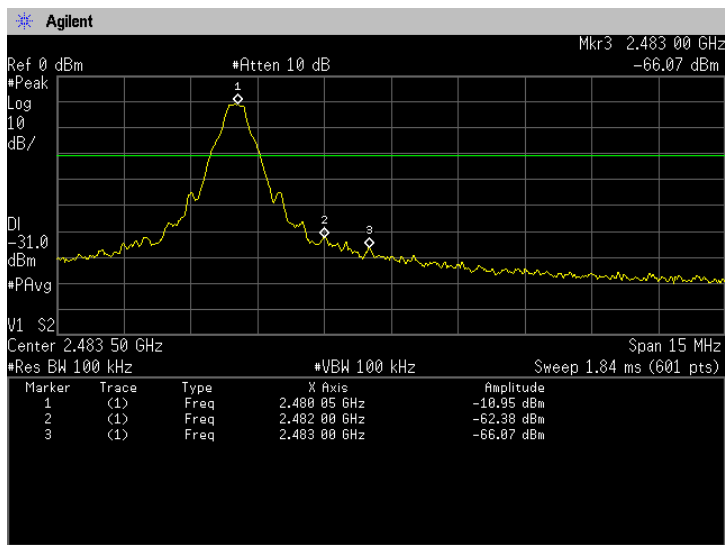
Band Edge Compliance of RF Conducted Emissions

[Tx mode (No hopping)]

Channel 1: 2402.0MHz



Channel 79: 2480.0MHz



4.7 Spurious Emissions - Conducted -

4.7.1 Test Procedure [FCC 15.247(d), IC RSS-210 A8.5, RSS-Gen 4.9&4.10]

The spurious emissions (Conducted) are 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=300kHz, Span=Arbitrary setting, Sweep=Auto

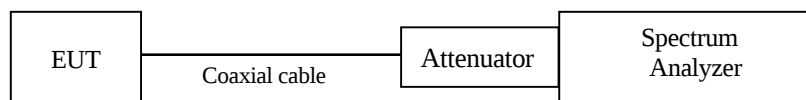
The EUT was set to operate with following conditions.

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

The test mode of EUT is as follows.

- Tx mode

4.7.2 Measurement Setup



4.7.3 Limit of Spurious Emissions - Conducted -

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.

4.7.4 Measurement Results of Spurious Emissions - Conducted -

Channel	Frequency [MHz]	Limit [dBm]	Results Chart	PASS / FAIL
1	2402.0	At least 20dB below from peak of RF.	See the Trace Data	PASS
40	2441.0	At least 20dB below from peak of RF.	See the Trace Data	PASS
79	2480.0	At least 20dB below from peak of RF.	See the Trace Data	PASS

4.7.5 Trace Data

Test Personnel:

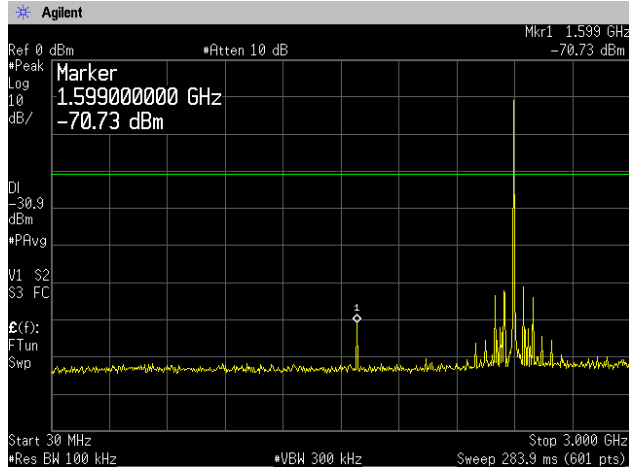
Tested by: Taiki Watanabe

Date : Apr. 20, 2010
 Temperature : 21.0 [°C]
 Humidity : 46.0 [%]
 Test place : Shielded room

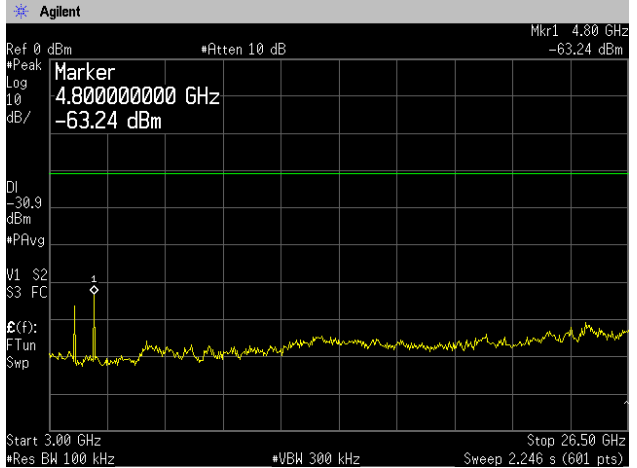
Spurious Emissions - Conducted -

Channel 1: 2402.0MHz

30MHz-3GHz

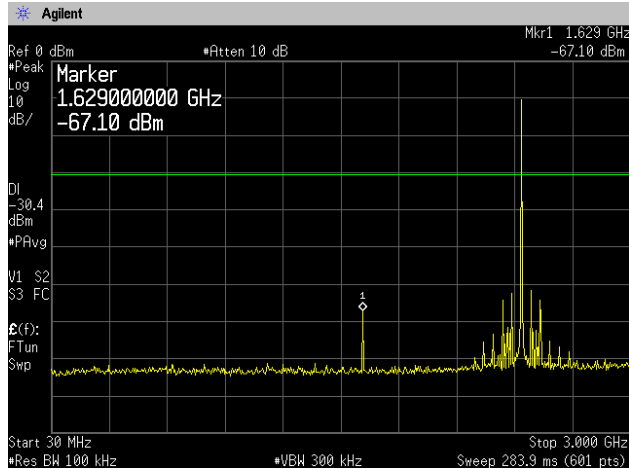


3GHz-26.5GHz

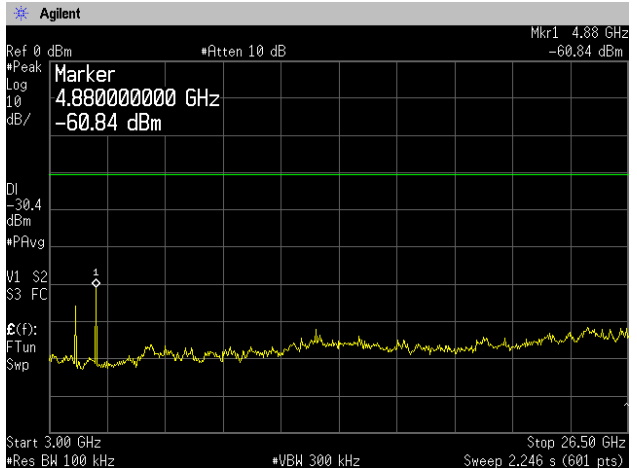


Channel 40: 2441.0MHz

30MHz-3GHz

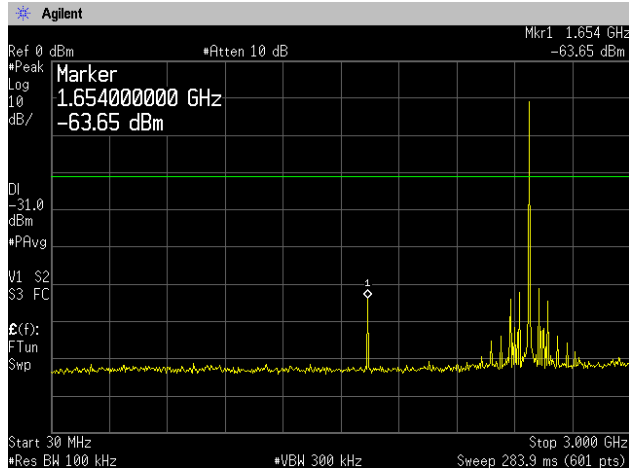


3GHz-26.5GHz

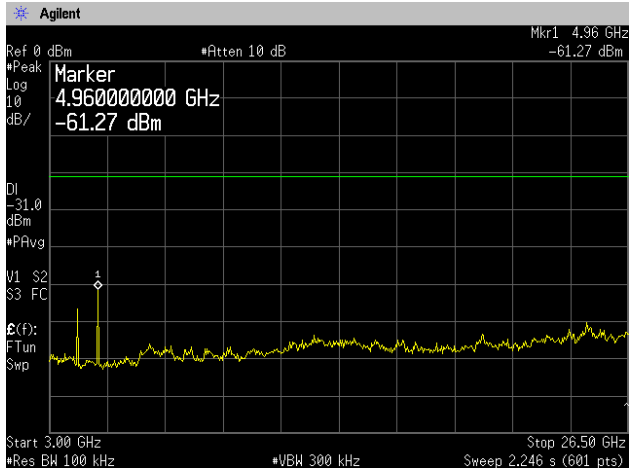


Channel 79: 2480.0MHz

30MHz-3GHz



3GHz-26.5GHz



4.8 Spurious Emissions - Radiated - (9kHz - 25GHz)

4.8.1 Test Procedure [FCC 15.205/209/247(d), IC RSS-210 A8.5, RSS-Gen 4.9&4.10]

Radiated emission measurements are performed at 3m distance with the broadband antenna (Loop antenna, TRILOG antenna, and double-ridged guide antenna). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1 to 4 meters and stopped at height producing the maximum emission. As for the Loop antenna, it is positioned with its plane vertical, and the center of the Loop is 1.0meter above the ground plane. Frequency Range: 9kHz –1GHz is scanned and investigated with the test receiver, and above 1GHz, with the spectrum analyzer. The detector function of the test receiver is set to CISPR Quasi-peak mode and the bandwidth is set to 120kHz. Peak and average detectors are used for measurements above 1GHz. The bandwidth of the spectrum analyzer is set to 1MHz.

The EUT and support equipment are placed on a 1meter x 2meter surface, 0.8meter height FRP table. The turntable is rotated by 360 degrees and stopped at azimuth of producing the maximum emission.

Interconnecting cables, which hanging closer than 40cm to the horizontal metal ground plane are bundled its excess in center. The highest fundamental frequency generated in the EUT is 2402-2480MHz, therefore the frequency was investigated up to 25GHz, as specified in CFR section 15.33, and at least six highest emissions are reported. The test results represent the worst-case emission for each emission with manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation.

Sufficient time for the EUT, support equipment, and test equipment are allowed in order for them to warm up to their normal operating condition.

The spectrum analyzer is set to:

- Peak: RBW=1MHz, VBW=1MHz, Span=0Hz, Sweep=auto
- Average: RBW=1MHz, VBW=10Hz, Span=0Hz, Sweep=auto

The EUT was set to operate with following conditions.

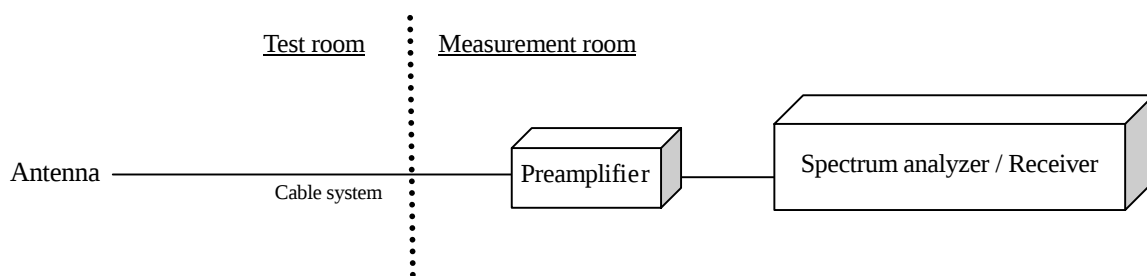
- No hopping [ch 1 (low), ch 40 (mid), ch 79(high)]

The test mode of EUT is as follows.

- Tx mode, Rx mode

4.8.2 Measurement Setup

Test configuration for Spurious emissions



4.8.3 Limit of Spurious Emission Measurement

Frequency [MHz]	Field Strength	
	[uV/m]	[dBuV/m]
0.009 – 0.490	2400 / F [kHz]	20logE [uV/m]
0.490 – 1.705	24000 / F [kHz]	20logE [uV/m]
1.705-30	30	29.5
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level [dBuV/m] = 20 log Emission [uV/m]
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.8.4 Sample of field strength calculation

Spurious Emission $\text{dB}\mu\text{V/m} = 20\log_{10}(\mu\text{V/m})$

Limit @147.6MHz = 150μV/m = 43.5dBμV/m
Reading = 42.8dBμV
Ant. Factor + Cable Loss - Amp. Gain = 14.2 + 3.0 - 30.0 = -12.8dB
Total = 42.8 - 12.8 = 30.0dBμV/m
Margin = 43.5 - 30.0 = <u>13.5dB</u>

4.8.5 Measurement Results

Test Personnel:

Tested by: Taiki Watanabe

Date : Apr. 26, 2010
Temperature : 19.8 [°C]
Humidity : 28.6 [%]
Test place : 3m Semi-anechoic chamber

Test Personnel:

Tested by: Taiki Watanabe

Date : Apr. 27, 2010
Temperature : 26.3 [°C]
Humidity : 23.3 [%]
Test place : 3m Semi-anechoic chamber

Spurious Emissions - Radiated-

Tx Channel 1: 2402.0MHz

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	100.367	H	36.5	-12.8	23.7	43.5	19.8	193.0	174.0
2	312.015	H	44.2	-7.4	36.8	46.0	9.2	100.0	119.0
3	612.021	V	35.6	-0.6	35.0	46.0	11.0	100.0	124.0

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c. f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1	2450.000	H	---	53.1	-4.4	---	48.7	74.0	---	25.3	100.0	210.0
2	2450.000	H	50.0	---	-4.4	45.6	---	54.0	8.4	---	100.0	210.0
3	2498.140	V	---	51.1	-4.2	---	46.9	74.0	---	27.1	100.0	195.0
4	2498.140	V	46.7	---	-4.2	42.5	---	54.0	11.5	---	100.0	195.0
5	2498.140	H	---	53.3	-4.2	---	49.1	74.0	---	24.9	100.0	118.0
6	2498.140	H	49.6	---	-4.2	45.4	---	54.0	8.6	---	100.0	118.0
7	4804.000	H	---	46.3	2.8	---	49.1	74.0	---	24.9	182.0	292.0
8	4804.000	H	42.2	---	2.8	45.0	---	54.0	9.0	---	182.0	292.0
9	4804.000	V	---	46.3	2.8	---	49.1	74.0	---	24.9	100.0	87.0
10	4804.000	V	42.4	---	2.8	45.2	---	54.0	8.8	---	100.0	87.0

Tx Channel 40: 2441.0MHz

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	100.565	H	36.7	-12.8	23.9	43.5	19.6	185.0	179.0
2	300.005	H	45.5	-7.7	37.8	46.0	8.2	100.0	290.0
3	624.030	V	36.2	-0.5	35.7	46.0	10.3	100.0	121.0

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c. f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1	2489.085	H	---	54.0	-4.3	---	49.7	74.0	---	24.3	100.0	116.0
2	2489.085	H	50.7	---	-4.3	46.4	---	54.0	7.6	---	100.0	116.0
3	2537.142	V	---	51.8	-4.1	---	47.7	74.0	---	26.3	100.0	183.0
4	2537.142	V	48.1	---	-4.1	44.0	---	54.0	10.0	---	100.0	183.0
5	2537.142	H	---	53.9	-4.1	---	49.8	74.0	---	24.2	100.0	270.0
6	2537.142	H	49.8	---	-4.1	45.7	---	54.0	8.3	---	100.0	270.0
7	4882.000	H	---	47.4	3.0	---	50.4	74.0	---	23.6	182.0	300.0
8	4882.000	H	42.8	---	3.0	45.8	---	54.0	8.2	---	182.0	300.0
9	4882.000	V	---	47.0	3.0	---	50.0	74.0	---	24.0	100.0	82.0
10	4882.000	V	43.3	---	3.0	46.3	---	54.0	7.7	---	100.0	82.0

Note:

1. Emission Level (Margin) = Limit – [Reading + Factor (Antenna + Cable - Amp)]
2. No emissions were detected in frequency range 9kHz to 30MHz at the 3 meters distance.

Tx Channel 79: 2480.0MHz

No.	Frequency	(P)	Reading	c. f	Result	Limit	Margin	Height	Angle
	[MHz]		QP		QP		QP		
			[dB(μ V)]	[dB(1/m)]	[dB(μ V/m)]	[dB(μ V/m)]	[dB]	[cm]	[°]
1	100.021	H	37.0	-12.9	24.1	43.5	19.4	324.0	175.0
2	312.003	H	45.9	-7.4	38.5	46.0	7.5	100.0	119.0
3	612.026	V	35.4	-0.6	34.8	46.0	11.2	100.0	103.0

No.	Frequency	(P)	Reading	Reading	c. f	Result	Result	Limit	Margin	Margin	Height	Angle
			AV	PK		AV	PK		AV	PK		
	[MHz]		[dB(μ V)]	[dB(μ V)]	[dB(1/m)]	[dB(μ V/m)]	[dB(μ V/m)]	[dB(μ V/m)]	[dB]	[dB]	[cm]	[°]
1	2384.087	H		52.4	-4.4		48.0	74.0		26.0	100.0	261.0
2	2384.087	H	48.9		-4.4	44.5		54.0	9.5		100.0	261.0
3	2527.800	V		53.5	-4.1		49.4	74.0		24.6	100.0	180.0
4	2527.800	V	49.5		-4.1	45.4		54.0	8.6		100.0	180.0
5	2528.570	H		53.5	-4.1		49.4	74.0		24.6	100.0	271.0
6	2528.570	H	48.9		-4.1	44.8		54.0	9.2		100.0	271.0
7	4960.000	H		47.4	3.1		50.5	74.0		23.5	100.0	182.0
8	4960.000	H	43.2		3.1	46.3		54.0	7.7		100.0	182.0
9	4960.000	V		46.5	3.1		49.6	74.0		24.4	100.0	159.0
10	4960.000	V	41.9		3.1	45.0		54.0	9.0		100.0	159.0

Note:

1. Emission Level (Margin) = Limit – [Reading + Factor (Antenna + Cable - Amp)]
2. No emissions were detected in frequency range 9kHz to 30MHz at the 3 meters distance.

Spurious Emissions - Radiated-

Rx Channel 1: 2402.0MHz

No.	Frequency	(P)	Reading	c. f	Result	Limit	Margin	Height	Angle
	[MHz]		QP [dB(μ V)]		QP [dB(μ V/m)]		QP [dB]		
1	100.761	H	36.8	-12.8	24.0	43.5	19.5	195.0	167.0
2	300.019	H	45.2	-7.7	37.5	46.0	8.5	100.0	281.0
3	624.023	V	37.8	-0.5	37.3	46.0	8.7	119.0	176.0

No.	Frequency	(P)	Reading	Reading	c. f	Result	Result	Limit	Margin	Margin	Height	Angle
	[MHz]		AV [dB(μ V)]	PK [dB(μ V)]		AV [dB(μ V/m)]	PK [dB(μ V/m)]		AV [dB]	PK [dB]		
1	2403.970	H	46.3	50.7	-4.4	41.9	46.3	74.0	12.1	27.7	100.0	260.0
2	2403.970	H	46.3	50.7	-4.4	41.9	46.3	54.0	12.1	27.7	100.0	260.0

Rx Channel 40: 2441.0MHz

No.	Frequency	(P)	Reading		c. f	Result	Limit	Margin	Height	Angle		
	[MHz]		QP			QP		QP				
			[dB (μ V)]		[dB (1/m)]	[dB (μ V/m)]	[dB (μ V/m)]	[dB]	[cm]	[°]		
1	100.007	H	36.7		-12.9	23.8	43.5	19.7	298.0	194.0		
2	300.019	H	44.3		-7.7	36.6	46.0	9.4	100.0	111.0		
3	624.018	V	37.0		-0.5	36.5	46.0	9.5	108.0	184.0		
No.	Frequency	(P)	Reading	Reading	c. f	Result	Result	Limit	Margin	Margin	Height	Angle
	[MHz]		AV	PK		AV	PK		AV	PK		
			[dB (μ V)]	[dB (μ V)]	[dB (1/m)]	[dB (μ V/m)]	[dB (μ V/m)]	[dB (μ V/m)]	[dB]	[dB]	[cm]	[°]
1	2426.170	H	45.7	50.8	-4.4	41.3	46.4	74.0	12.7	27.7	100.0	258.0
2	2426.170	H	45.7	50.8	-4.4	41.3	46.4	54.0	12.7	27.7	100.0	258.0

Rx Channel 79: 2480.0MHz

No.	Frequency	(P)	Reading	c. f	Result	Limit	Margin	Height	Angle
	[MHz]		QP		QP		QP		
			[dB (μ V)]	[dB (1/m)]	[dB (μ V/m)]	[dB (μ V/m)]	[dB]	[cm]	[°]
1	100.003	H	36.7	-12.9	23.8	43.5	19.7	349.0	159.0
2	312.013	H	46.1	-7.4	38.7	46.0	7.3	100.0	114.0
3	624.022	V	36.3	-0.5	35.8	46.0	10.2	100.0	109.0

No.	Frequency	(P)	Reading	Reading	c. f	Result	Result	Limit	Margin	Margin	Height	Angle
			AV	PK		AV	PK		AV	PK		
	[MHz]		[dB (μ V)]	[dB (μ V)]	[dB (1/m)]	[dB (μ V/m)]	[dB (μ V/m)]	[dB (μ V/m)]	[dB]	[dB]	[cm]	[°]
1	2425.800	H	46.2	50.4	-4.4	41.8	46.0	74.0	12.2	28.0	100.0	259.0
2	2425.800	H	46.2	50.4	-4.4	41.8	46.0	54.0	12.2	28.0	100.0	259.0

Note:

1. Emission Level (Margin) = Limit – [Reading + Factor (Antenna + Cable - Amp)]
2. No emissions were detected in frequency range 9kHz to 30MHz at the 3 meters distance.

4.9 Restricted Band of Operation

4.9.1 Test Procedure [FCC 15.205, 15.209, 15.247(d), IC RSS-210 2.2]

The peak power 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:

- Peak: RBW=1MHz, VBW=1MHz, Span=40MHz, Sweep=auto
- Average: RBW=1MHz, VBW=10Hz, Span=40MHz, Sweep=auto

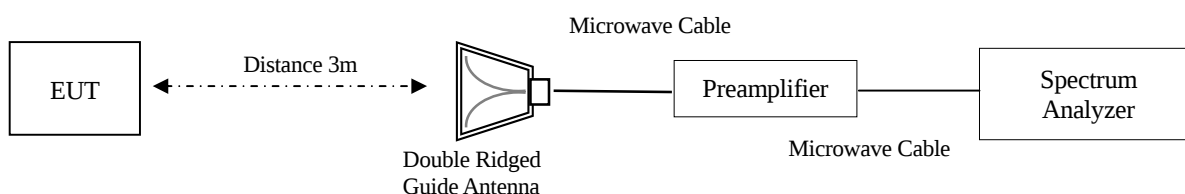
The EUT was set to operate with following conditions.

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

The test mode of EUT is as follows.

- Tx mode

4.9.2 Measurement Setup



4.9.3 Limit of Restricted Band of Operation

Emission at the boundary of the restricted band provided by 15.205 shall be lower than 15.209 limit.

4.9.4 Measurement Result

[Tx mode]

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c. f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]
1	2390.000	H	—	47.7	-4.4	—	43.3	74.0	—	30.7
2	2390.000	H	35.5	—	-4.4	31.1	—	54.0	22.9	—
3	2390.000	V	—	45.6	-4.4	—	41.2	74.0	—	32.8
4	2390.000	V	33.1	—	-4.4	28.7	—	54.0	25.3	—
5	2483.500	H	—	53.4	-4.3	—	49.1	74.0	—	24.9
6	2483.500	H	45.8	—	-4.3	41.5	—	54.0	12.5	—
7	2483.500	V	—	52.9	-4.3	—	48.6	74.0	—	25.4
8	2483.500	V	44.9	—	-4.3	40.6	—	54.0	13.4	—

4.9.5 Trace Data

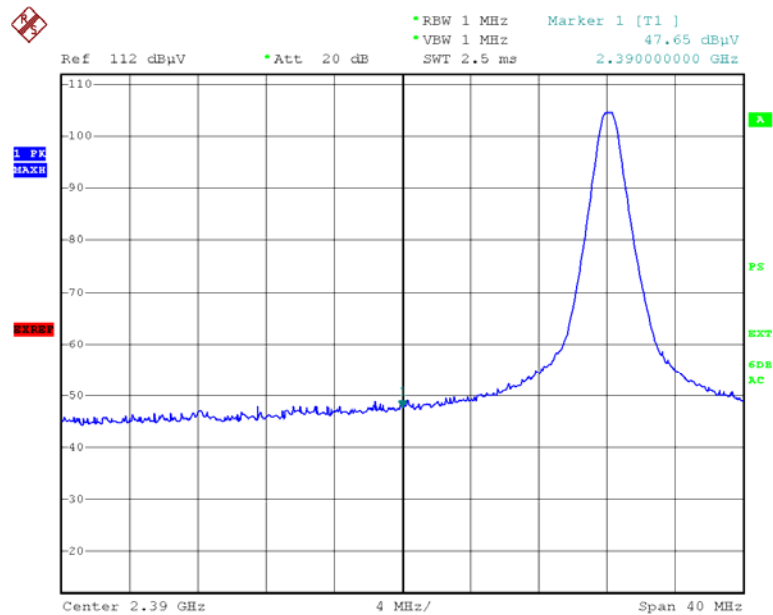
Test Personnel:

Tested by: Taiki Watanabe

Date : Apr. 27, 2010
Temperature : 26.3 [°C]
Humidity : 23.3 [%]
Test place : 3m Semi-anechoic chamber

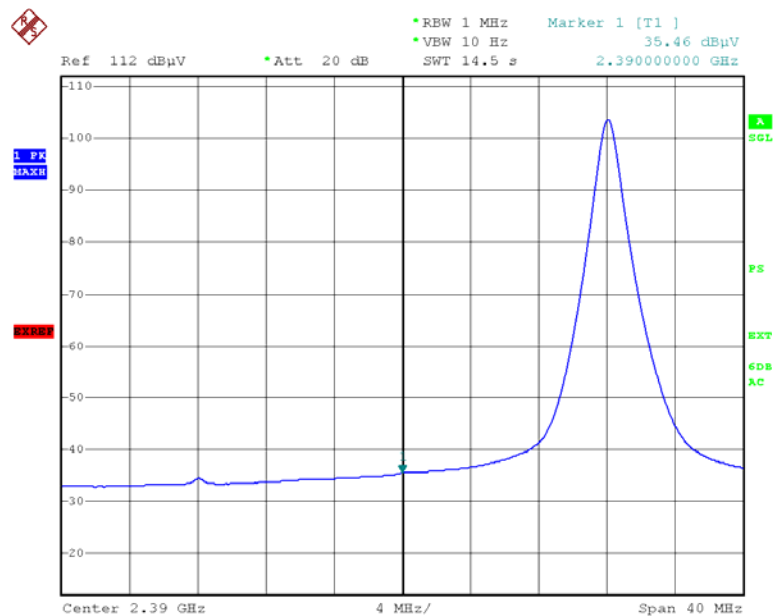
Restricted Band of Operation

**Frequency: 2390.0MHz -Horizontal-
Peak**



Date: 26.APR.2010 17:05:27

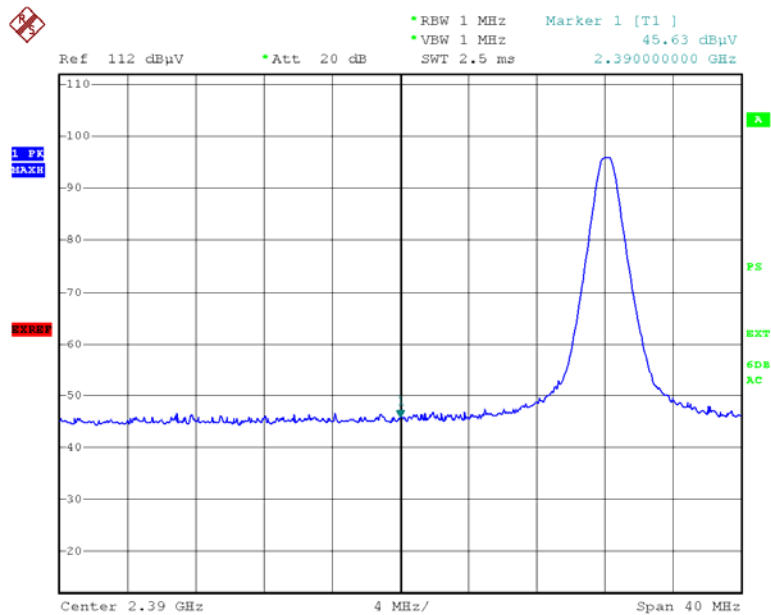
Average



Date: 26.APR.2010 17:07:17

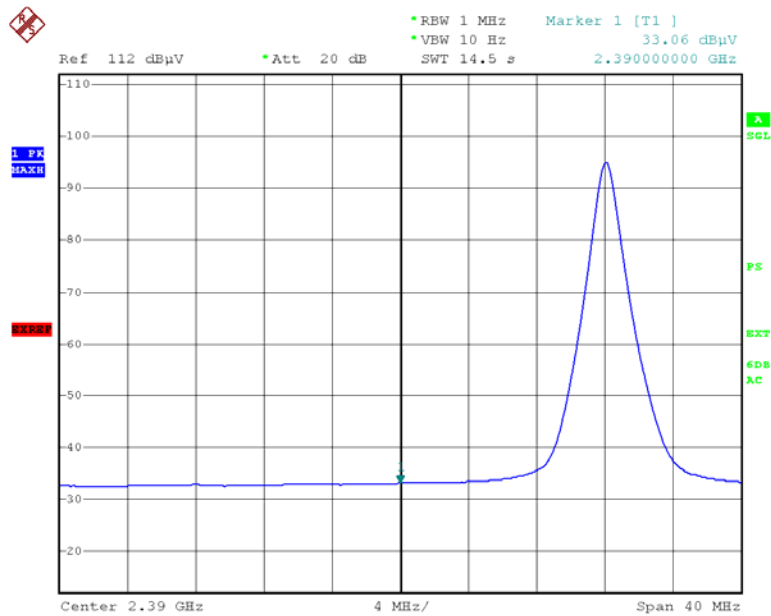
Restricted Band of Operation

**Frequency: 2390.0MHz -Vertical-
Peak**



Date: 26.APR.2010 17:11:57

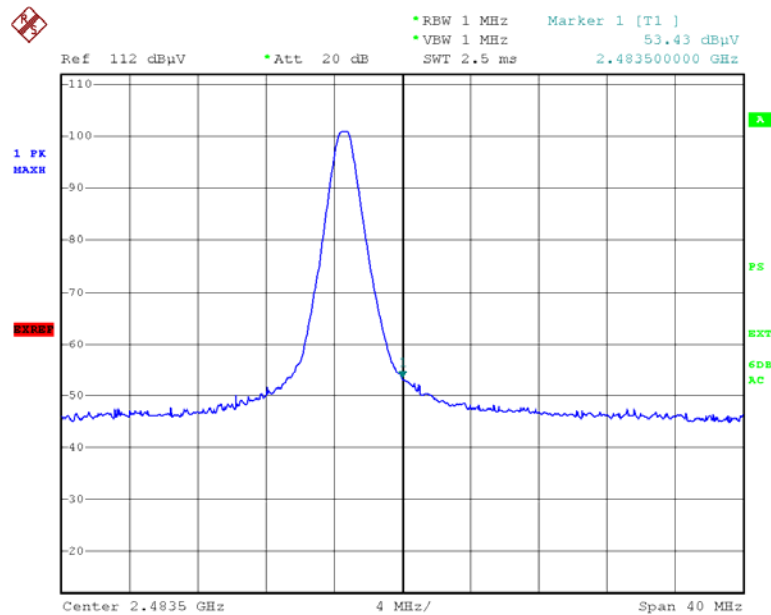
Average



Date: 26.APR.2010 17:14:18

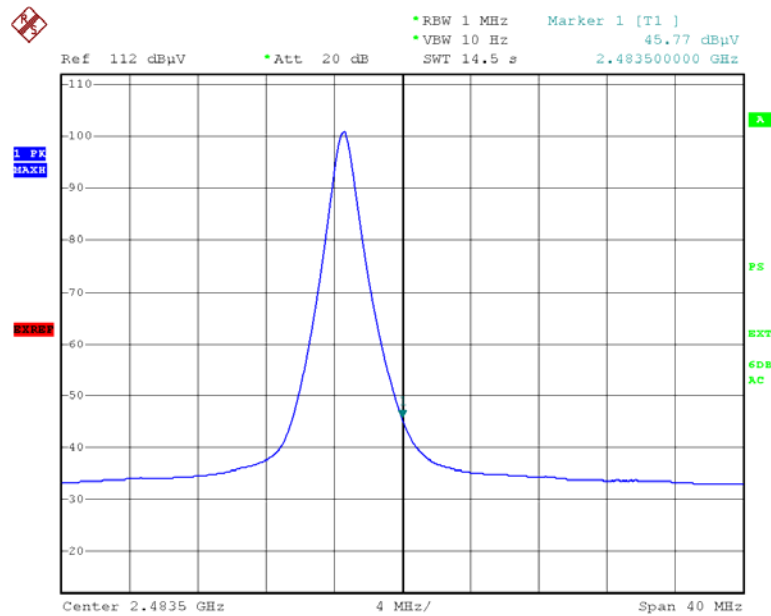
Restricted Band of Operation

**Frequency: 2483.5MHz -Horizontal-
Peak**



Date: 26.APR.2010 17:22:08

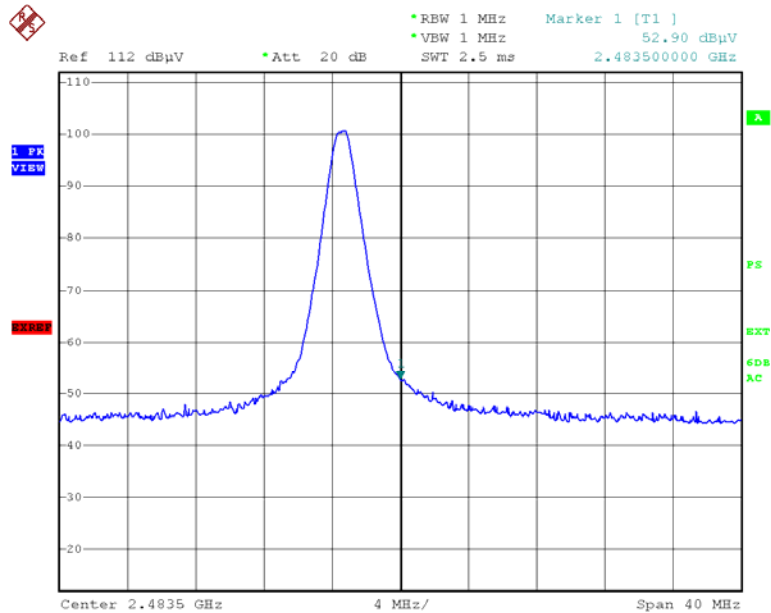
Average



Date: 26.APR.2010 17:33:06

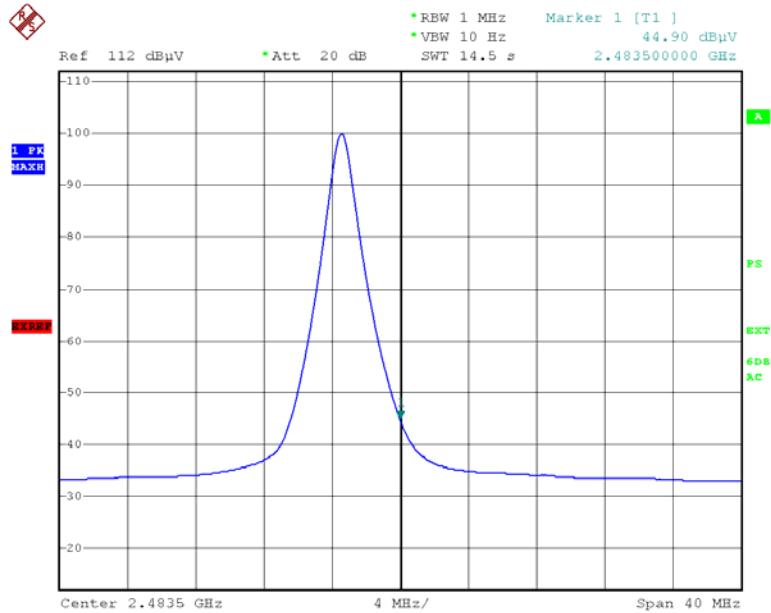
Restricted Band of Operation

**Frequency: 2483.5MHz -Vertical-
Peak**



Date: 26.APR.2010 17:36:07

Average



Date: 26.APR.2010 17:26:58

5. Uncertainty of measurement

Expanded uncertainties stated were calculated with a coverage Factor $k=2$.

Please note that these results are not taken into account when determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission at mains port (150kHz - 30MHz)	$\pm 2.9\text{dB}$
Radiated emission (9kHz - 30MHz)	$\pm 4.4\text{dB}$
Radiated emission (30MHz – 1000MHz)	$\pm 5.2\text{dB}$
Radiated emission (1000MHz – 26GHz)	$\pm 3.6\text{dB}$

6. Laboratory description

6.1 Location: ZACTA Technology Corporation Yonezawa Testing Center
4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan
Phone: +81-238-28-2880 Fax: +81-238-28-2888

6.2 Facility filing information:

1) NVLAP accreditation: NVLAP Lab. code: 200306-0

2) FCC filing:

Site name	Registration Number	Expiry Date
Site 2, Site3	91065	November 19, 2011
3m Semi-anechoic chamber 10m Semi-anechoic chamber Shielded room No.1	540072	February 16, 2013

3) Industry Canada Oats site filing:

Site name	Sites on file: Oats 3m/10m	Expiry Date
Site 2	4224A-2	February 16, 2012
Site 3	4224A-3	February 16, 2012
3m Semi-anechoic chamber	4224A-4	February 16, 2012
10m Semi-anechoic chamber	4224A-5	February 16, 2012

4) VCCI site filing:

Site name	Radiated emission	Conducted Emission for mains port	Expiry Date	Conducted emission for telecom port	Expiry Date
Site 2	R-137	C-133	Nov. 16, 2011	T-1477	Oct. 8, 2011
Site 3	R-138	C-134	Nov. 16, 2011	T-1478	Oct. 8, 2011
10m Semi-anechoic chamber	R-2480	C-2722	Jul. 3, 2011	T-1474	Oct. 8, 2011
3m Semi-anechoic chamber	R-2481	C-2723	Jul. 3, 2011	T-1475	Oct. 8, 2011
Shielded room No.1	-	C-2724	Jul. 3, 2011	T-1476	Oct. 8, 2011

5) Intertek authorization:

Authorized as an EMC test laboratory.

6) TUV Rheinland authorization:

Authorized as an EMC test laboratory.

7) BUREAU VERITAS certification:

Certified as an EMC test laboratory.

Appendix A: Test equipment

List of Measuring Instruments

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
Spectrum Analyzer (3Hz – 42.98GHz)	Agilent Technologies	E4447A	MY46180188	Mar. 2011	Mar. 04, 2010
Spectrum Analyzer (9kHz – 26.5GHz)	ADVANTEST	R3271	35050045	Jul. 2011	Jul. 1, 2009
Preamplifier (100kHz-1.2GHz)	ANRITSU	MH648A	M08067	Jun. 2010	Jun. 13, 2009
Preamplifier (1GHz-26.5GHz)	Agilent Technologies	8449B	3008A00589	Nov. 2010	Nov. 5, 2009
EMI Receiver	ROHDE&SCHWARZ	ESCI	100764	Jun. 2010	Jun. 4, 2009
Loop antenna	ROHDE&SCHWARZ	HFH2-Z2	892246/010	Feb. 2011	Feb. 25, 2010
TRILOG Antenna	Schwarzbeck	VULB9160	9160-3218	Apr. 2011	Apr. 14, 2010
Attenuator (6dB)	TDC	TAT-43B-06	N/A	Jun. 2010	Jun. 13, 2009
Double Ridged Guide Antenna	EMCO	3115	4328	Dec. 2010	Dec. 10, 2008
Broad-Band Horn antenna	Schwarzbeck	BBHA9170	BBHA9170189	Apr. 2013	Apr. 20, 2010
Preamplifier	TSJ	MLA-1840-B03-35	1240332	Apr. 2013	Apr. 20, 2010
Microwave cable	SUHNER	SUCOFLEX 106	60929/6 (15m)	Nov. 2010	Nov. 5, 2009
	SUHNER	SUCOFLEX 106	60959/6 (1m)	Nov. 2010	Nov. 5, 2009
Coaxial cable	Fujikura	5D-2W/10m	#AEC3R-001	Feb. 2011	Feb. 5, 2010
		5D-2W/1.5m	#AEC3R-003	Feb. 2011	Feb. 5, 2010
		5D-2W/0.5m	#AEC3R-004	Feb. 2011	Feb. 5, 2010
	SUHNER	SUCOFLEX_106/7m	#AEC3R-002	Feb. 2011	Feb. 5, 2010
Microwave cable	SUHNER	SUCOFLEX104	199511/4	Nov. 2010	Nov. 12, 2009
Attenuator	Weinschel	56-10	J4180	Nov. 2010	Nov. 12, 2009
PC	DELL	DIMENSION E521	85465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V3.4	N/A	N/A
Site attenuation	ZACTA Technology	3m Semi-anechoic chamber	5192Z	May. 2010	May. 18, 2009

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