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TEST REPORT

Report number: Z071C-08414

Issue Date: March 25, 2009

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	:	NIKON-TRIMBLE CO., LTD. 20, Shin-oyoke, Miya, Zao-machi, Katta-gun, Miyagi 989-0701 Japan Phone: +81-224-32-2240 Fax: +81-224-32-2242
Equipment under test (EUT)	:	Bluetooth Module
FCC ID	:	W4LNT0001
IC Certification Number	:	8170A-NT0001
Model Number	:	BTunit01
Serial Number	:	N/A
EUT Condition	:	Production

Test procedure	:	ANSI C63.4-2003
Date of test	:	January 29, 30, 2009 February 2, 3, 2009
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 1988,21U.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.

Tested by: Hiroaki Suzuki

Authorized by: Katsumi Sumiyoshi
Manager of Quality Control Division

NVLAP LAB CODE 200306-0

Table of contents

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 Transmit mode [Tx]:	Condition	Result
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**
15.247(e) RSS-210 A8.2(b)	Transmitter power spectral density	Conducted	**Pass**
15.207 RSS-Gen 7.2.2	AC Power Line Conducted Emissions 150kHz – 30MHz	Conducted	**N/A**

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 the Bluetooth module.

2.2 EUT information

No.	EUT	Company	Model No.	Serial No.	FCC/IC ID	Comment
1	Bluetooth Module	NIKON-TRIMBLE	BTunit01	N/A	FCC ID: W4LNT0001 IC ID: 8170A-NT0001	EUT
2	Total Station	NIKON-TRIMBLE	Nivo$^{5.M}$	600001	-	Host device
3	Battery Pack	Tripod Data Systems	2908	N/A	-	Accessory
4	Battery Pack	Tripod Data Systems	2908	N/A	-	Accessory

Oscillator(s)/Crystal(s) : 16MHz
Operating frequency
Power ratings : DC 3.3V
Size : (W) 25 x (D) 27 x (H) 5 mm
Type of equipment : Bluetooth Module
Operating temperature : -20ºC to 50ºC
Operating mode : Tx mode, Rx mode
Host device
Variation of model(s) : There are four electrically identical host devices as follows;

Model No.	Brand name	Modification(s) From Nivo$^{5.M}$	Note
Nivo$^{5.M}$	Nikon	-	with/without BT
Nivo$^{3.M}$	Nikon	angle precision	with/without BT
TS635	Trimble	angle precision, yellow body	with BT
FOCUS4	Spectra Precision	angle precision, blue body	with/without BT

[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 (1Mbps), π/4-DQPSK (2Mbps), 8-DPSK (3Mbps)
Nominal Bit Rates : 1600hops/s
Channel Separation : 1MHz
Output power : 5.105mW
Antenna (Rx and Tx) : Chip antenna
Antenna gain : 2dBi
RF type : Transceiver
Intended use : Data transmission
RF emission type designator : 880KF1D (GFSK)
: 1M17G1D (8-DPSK)

2.3 Operating channels and frequencies

Channel	Frequency [MHz]	Channel	Frequency [MHz]	Channel	Frequency [MHz]
0	2402	27	2429	54	2456
1	2403	28	2430	55	2457
2	2404	29	2431	56	2458
3	2405	30	2432	57	2459
4	2406	31	2433	58	2460
5	2407	32	2434	59	2461
6	2408	33	2435	60	2462
7	2409	34	2436	61	2463
8	2410	35	2437	62	2464
9	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

2.4 Operating mode

【Tx mode】
i) Bluetooth test program set up
ii) Select a test mode
Operating frequency: No hopping (CH 0, 39, 78), Hopping
Packet type: DH1, DH5, 3-DH5
iii) Start test mode

Note: Tests were performed in DH5 and 3-DH5 which have the maximum bandwidth.

【Standby / Rx mode】
i) Bluetooth test program set up
ii) Select a test mode
Write Receive only
Operating frequency: No hopping (CH 0, 39, 78)
iii) Start test mode

3. Configuration information

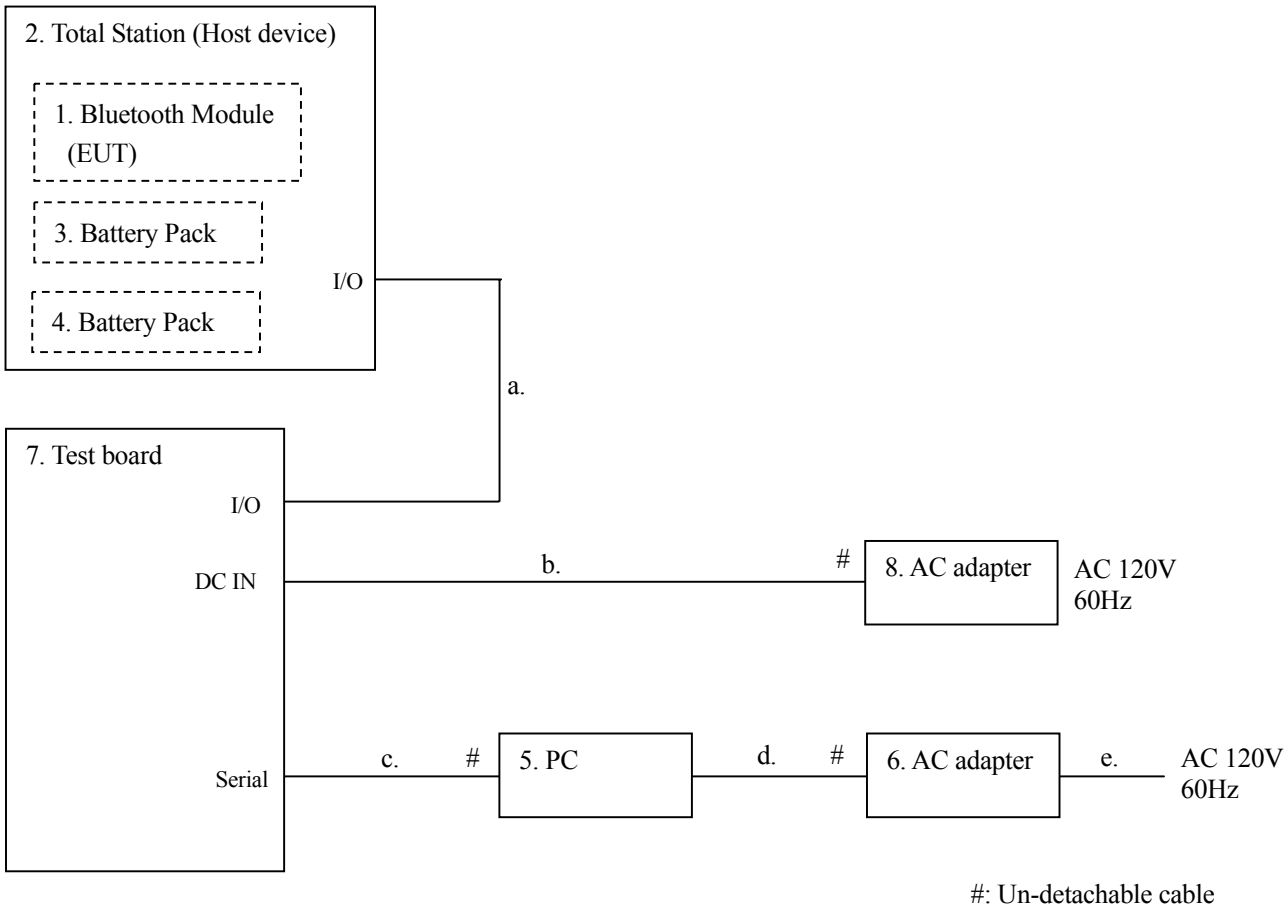
3.1 Peripheral(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID/DoC	Comment
5	Personal Computer	hp	Compaq nx6320	CNU7071H4D	DoC	-
6	AC adapter for PC	hp	PA-1650-02HC	7108054501	-	-
7	Test board	SMK	BE005	N/A	-	-
8	AC adapter	UNIFIVE	US300520	707-0288125	-	-

3.2 Cable(s) information

No.	Cable	Length [m]	Shield	Connector	Comment
a	I/O cable	1.8	No	Plastic	-
b	DC cable	1.8	No	Plastic	-
c	Serial cable	3.0	Yes	Metal	-
d	DC cable for PC AC adapter	1.8	No	Plastic	-
e	AC Power cord for PC AC adapter	1.7	No	Plastic	-

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	Cal. date
Spectrum Analyzer (3Hz – 42.98GHz)	Agilent Technologies	E4447A	MY46180188	Feb. 2009	Feb. 12, 2008
Preamplifier (100kHz-1.2GHz)	ANRITSU	MH648A	M96057	Jun. 2009	Jun. 14, 2008
Preamplifier (1GHz-26.5GHz)	Agilent Technologies	8449B	3008A01008	Dec. 2009	Dec. 11, 2007
EMI Receiver	ROHDE&SCHWARZ	ESCI	100764	May. 2009	May. 30, 2008
Loop antenna	ROHDE&SCHWARZ	HFH2-Z2	892246/010	Feb.2009	Feb. 12, 2008
Coaxial cable	N/A	RG213	N/A	Feb. 2009	Feb. 14, 2008
TRILOG Antenna	Schwarzbeck	VULB9160	9160-3218	Apr. 2009	Apr. 23, 2008
Attenuator(6dB)	TDC	TAT-43B-06	N/A	Aug. 2009	Aug. 8, 2008
Double Ridged Guide Antenna	EMCO	3115	5205	Sep. 2009	Sep. 26, 2007
Microwave cable	STORM	MFR-57500 15m	90-660-591	Dec. 2009	Dec. 11, 2007
	SUHNER	SUCOFLEX 104 1m	199119/4	Dec. 2009	Dec. 11, 2007
Coaxial cable	Fujikura	5D-2W/10m	#AEC3R-001	Feb. 2010	Feb. 5, 2009
		5D-2W/1.5m	#AEC3RC-001	Feb. 2010	Feb. 5, 2009
		5D-2W/1m	#AEC3RC-002	Feb. 2010	Feb. 5, 2009
		SUCOFLEX_106/7m	#AEC3R-003	Feb. 2010	Feb. 5, 2009
Microwave cable	SUHNER	SUCOFLEX104	199511/4	Nov. 2009	Nov. 12, 2008
Attenuator	Weinschel	56-10	J4180	Nov. 2009	Nov. 12, 2008
PC	DELL	DIMENSION E521	85465BX	N/A	N/A
PC	IBM	6892-44J	97-42089	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	Apr. 2009	Apr. 26, 2008

*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(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

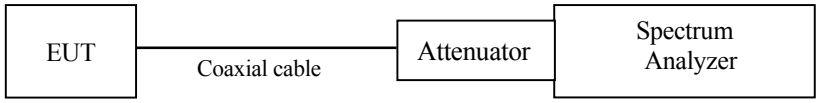
The EUT was set to operate with following conditions.

- No hopping [ch 0 (low), ch 39 (mid) and ch 78 (high)]

The test mode of EUT is as follows.

- Tx mode

5.1.2 Measurement Setup



5.1.3 Limit of Bandwidth at 20 dB below

None

5.1.4 Measurement Result

Channel	Packet type	Center Frequency [MHz]	20dB Bandwidth [MHz]	Occupied Bandwidth [MHz]
0	DH5	2402.0	0.945	0.879
	3-DH5	2402.0	1.265	1.173
39	DH5	2441.0	0.947	0.880
	3-DH5	2441.0	1.266	1.170
78	DH5	2480.0	0.949	0.880
	3-DH5	2480.0	1.250	1.173

5.1.5 Trace Data

Test Personnel:

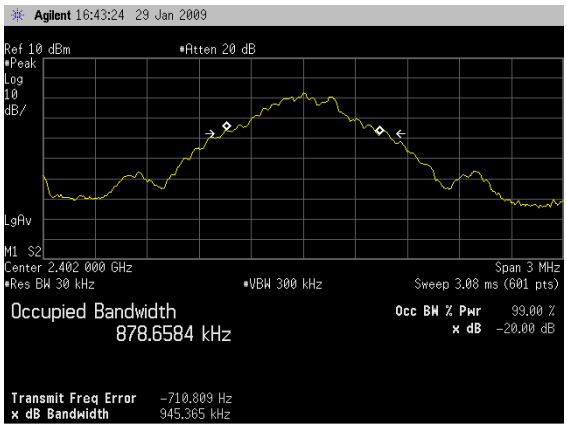
Tested by: Hiroaki Suzuki

Date : Jan. 29, 2009
Temperature : 21.0 [ºC]
Humidity : 52.5 [%]
Test place : Shielded room

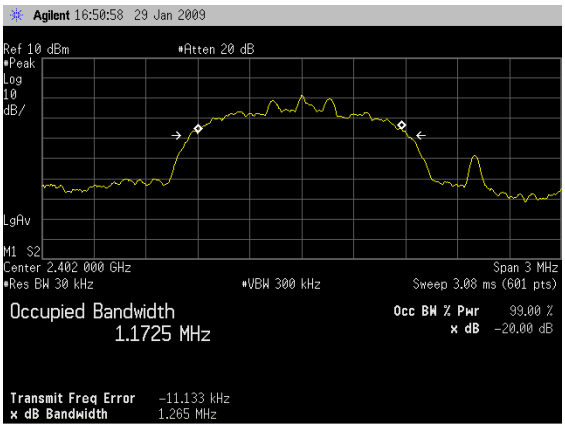
20dB Bandwidth/Occupied Bandwidth

Channel Low: 2402.0MHz [Channel 0]

DH5



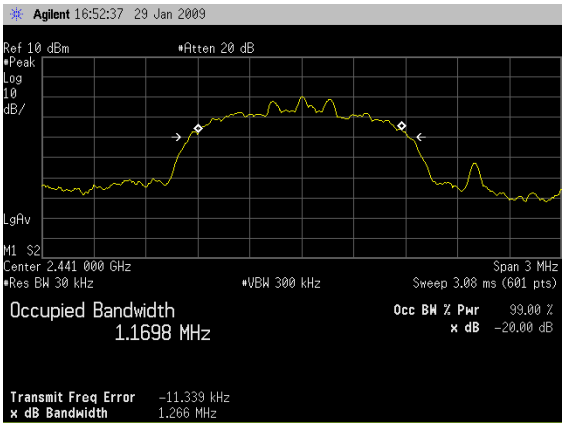
3-DH5



Channel Middle: 2441.0MHz [Channel 39]

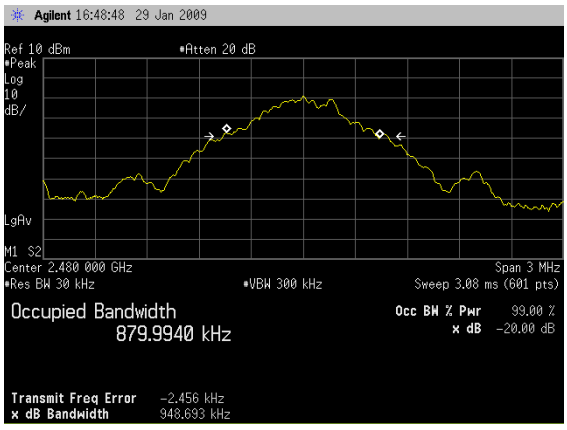
DH5

3-DH5

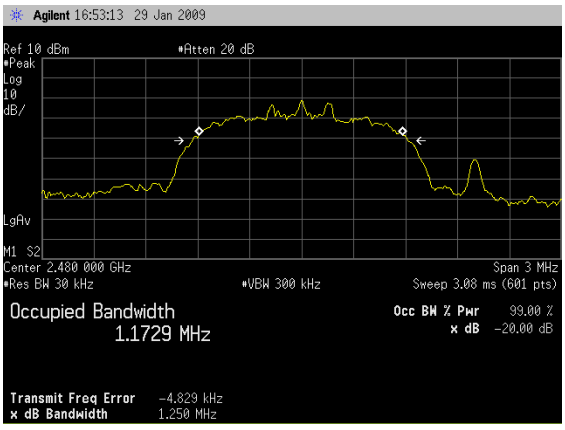


Channel High: 2480.0MHz [Channel 78]

DH5



3-DH5



5.2 Carrier Frequency Separation

5.2.1 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

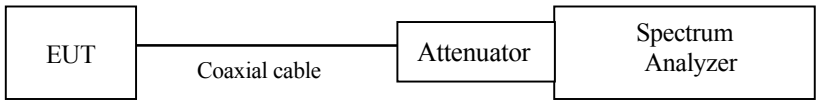
The EUT was set to operate with following conditions.

- Hopping [ch 39 (mid)]

The test mode of EUT is as follows.

- Tx mode

5.2.2 Measurement Setup



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

Packet type	Channel Separation [MHz]	Limit [MHz]	PASS / FAIL
DH5	1.000	>two-thirds of the 20dB Bandwidth =631kHz	PASS
3-DH5	1.005	>two-thirds of the 20dB Bandwidth =844kHz	PASS

5.2.5 Trace Data

Test Personnel:

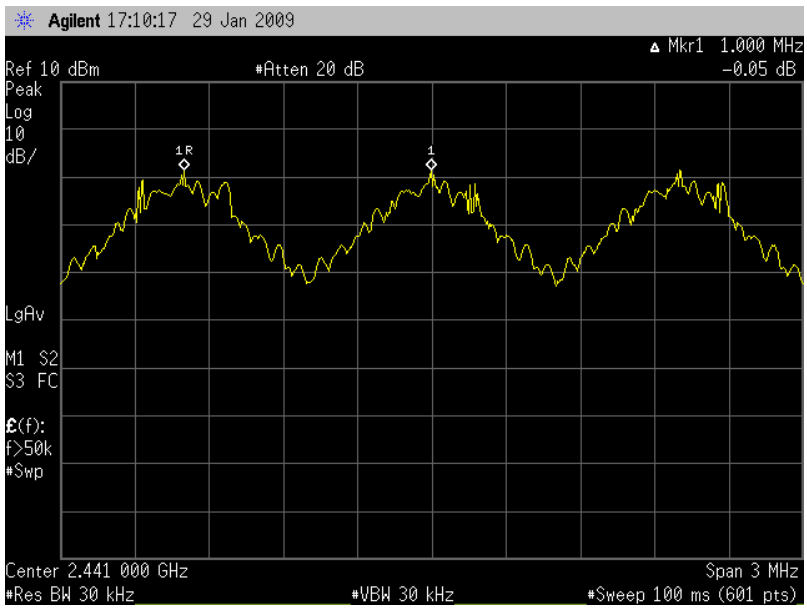
Tested by: Hiroaki Suzuki

Date : Jan. 29, 2009
Temperature : 21.0 [ºC]
Humidity : 52.5 [%]
Test place : Shielded room

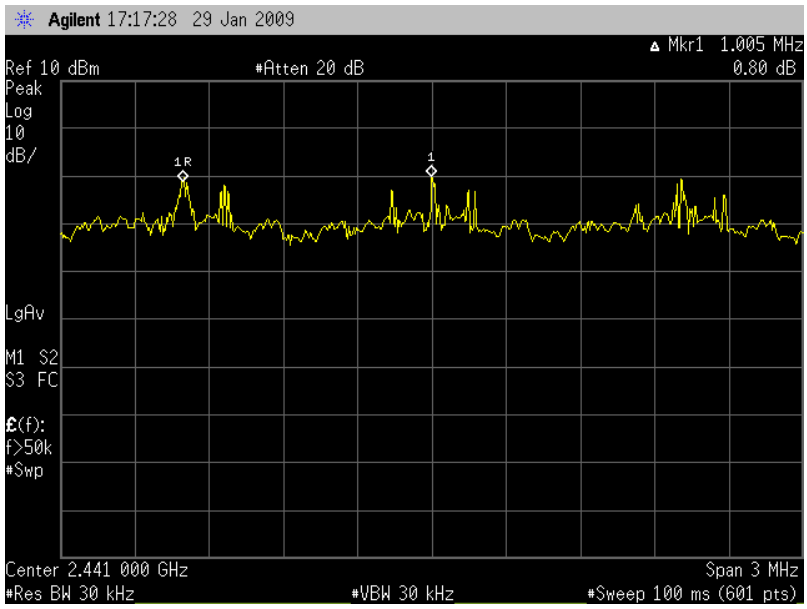
Carrier Frequency Separation

Channel Middle: 2441.0MHz [Channel 39]

DH5



3-DH5



5.3 Number of Hopping Frequencies

5.3.1 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

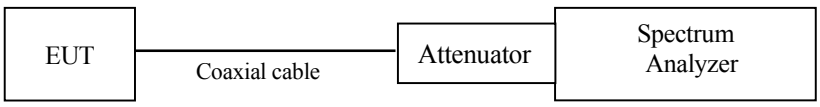
The EUT was set to operate with following conditions.

- Hopping

The test mode of EUT is as follows.

- Tx mode

5.3.2 Measurement Setup



5.3.3 Limit of Number of Hopping Frequencies

Shall have more than 15 channels.

5.3.4 Measurement Result

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

5.3.5 Trace Data

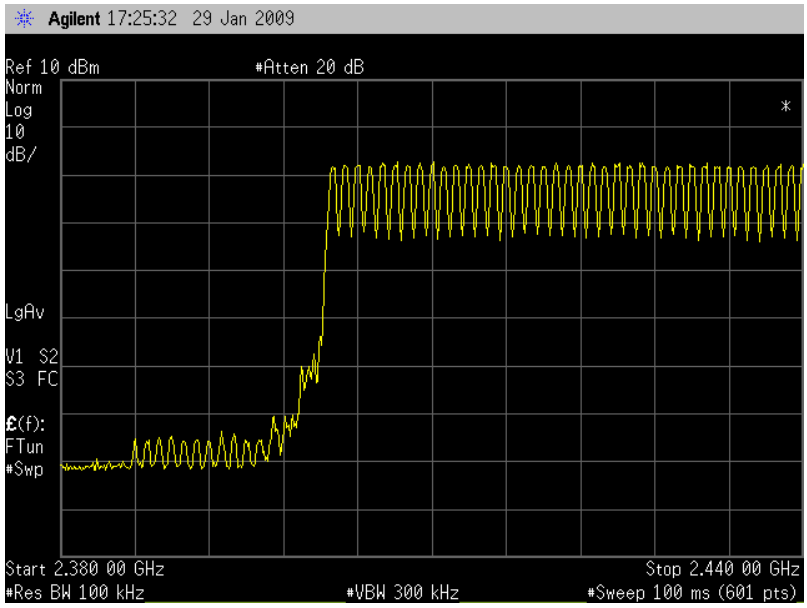
Test Personnel:

Tested by: Hiroaki Suzuki

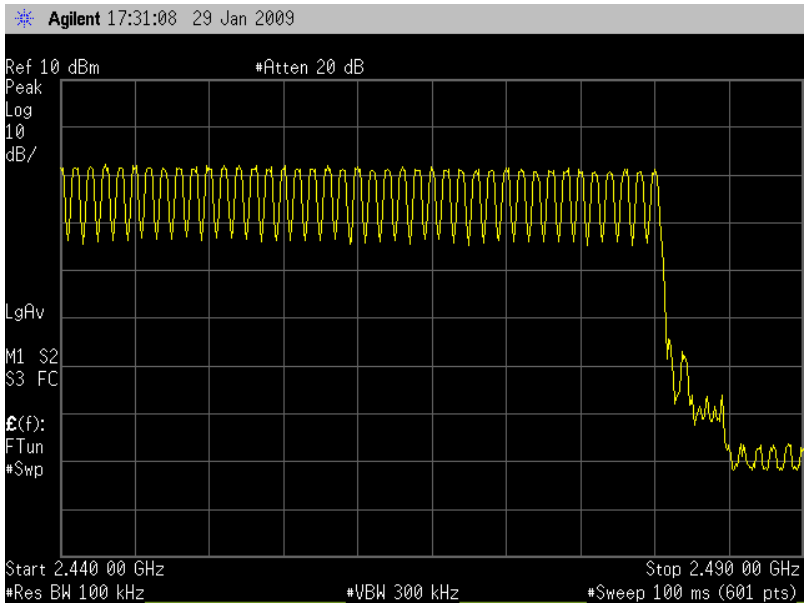
Date : Jan. 29, 2009
Temperature : 21.0 [ºC]
Humidity : 52.5 [%]
Test place : Shielded room

Number of Hopping Frequencies

Low



High



5.4 Time of Occupancy (Dwell Time)

5.4.1 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=5ms, 10ms

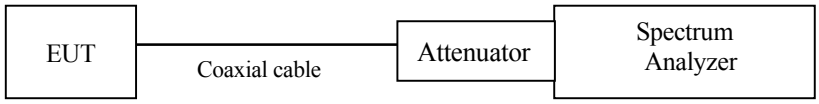
The EUT was set to operate with following conditions.

- Hopping [ch 0 (low), ch 39 (mid) and ch 78 (high)]

The test mode of EUT is as follows.

- Tx mode

5.4.2 Measurement Setup



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

Channel	Frequency [MHz]	Packet type	Dwell Time [ms]	Occupancy time of 31.6 seconds [s]	Limit	PASS / FAIL
0	2402.0	DH1	0.383	0.123	< 0.4 s	PASS
		DH5	2.883	0.308		PASS
		3-DH5	2.933	0.313		PASS
39	2441.0	DH1	0.383	0.123		PASS
		DH5	2.900	0.309		PASS
		3-DH5	2.900	0.309		PASS
78	2480.0	DH1	0.383	0.123		PASS
		DH5	2.900	0.309		PASS
		3-DH5	2.900	0.309		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. 0, DH1 = 0.383 ms x 1600 / 2 / 79 x 31.6 = 123.0 ms

5.4.5 Trace Data

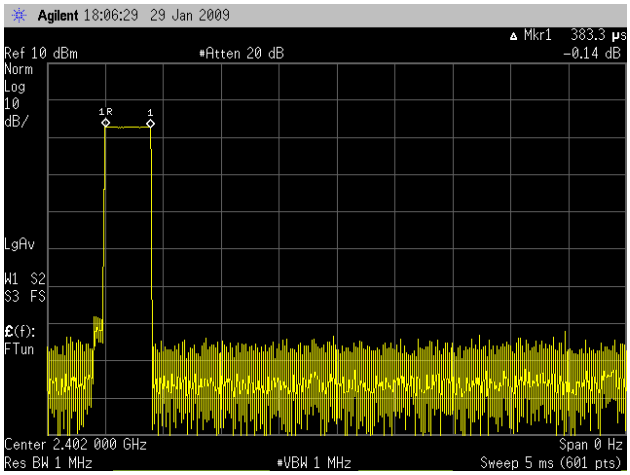
Test Personnel:

Tested by: Hiroaki Suzuki

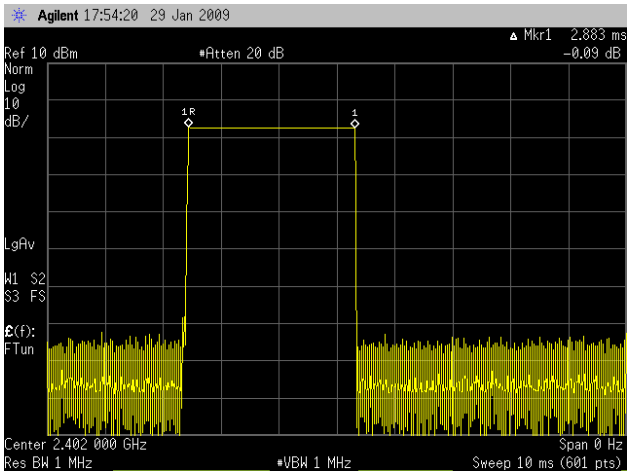
Date : Jan. 29, 2009
Temperature : 21.0 [ºC]
Humidity : 52.5 [%]
Test place : Shielded room

Dwell Time

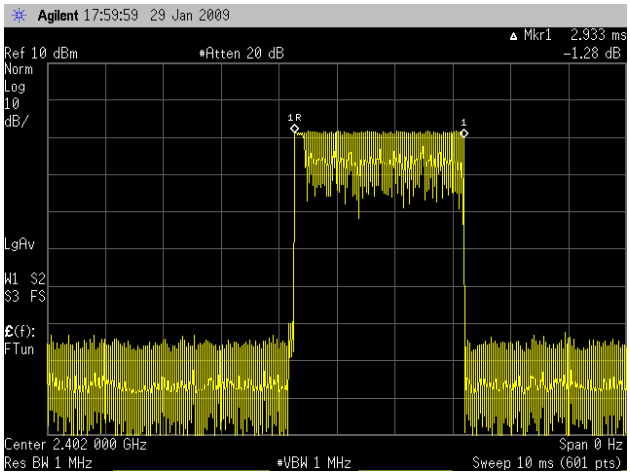
Channel Low: 2402.0MHz [Channel 0] DH1



Channel Low: 2402.0MHz [Channel 0] DH5

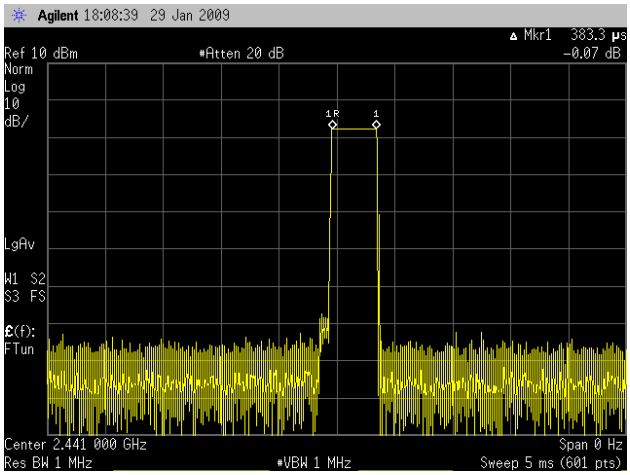


Channel Low: 2402.0MHz [Channel 0] 3-DH5

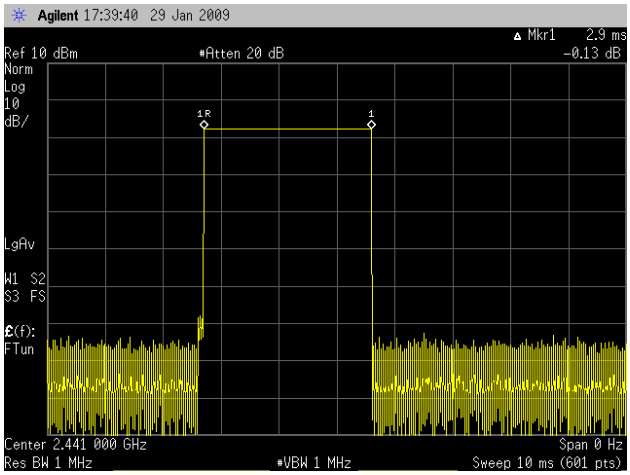


Dwell Time

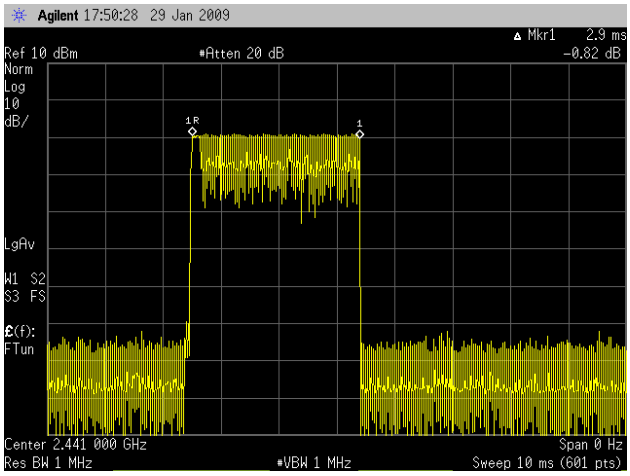
Channel Middle: 2441.0MHz [Channel 39] DH1



Channel Middle: 2441.0MHz [Channel 39] DH5

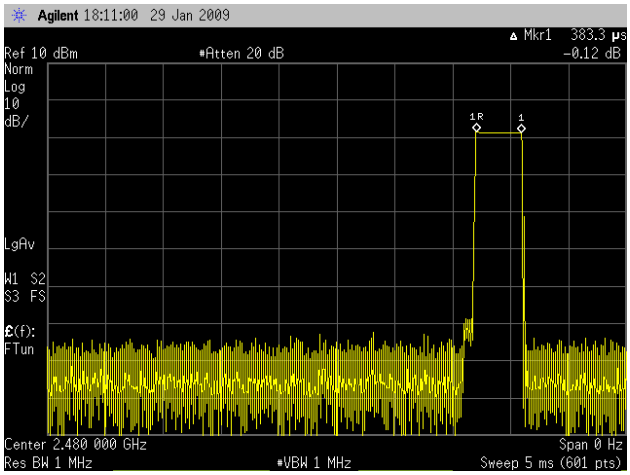


Channel Middle: 2441.0MHz [Channel 39] 3-DH5

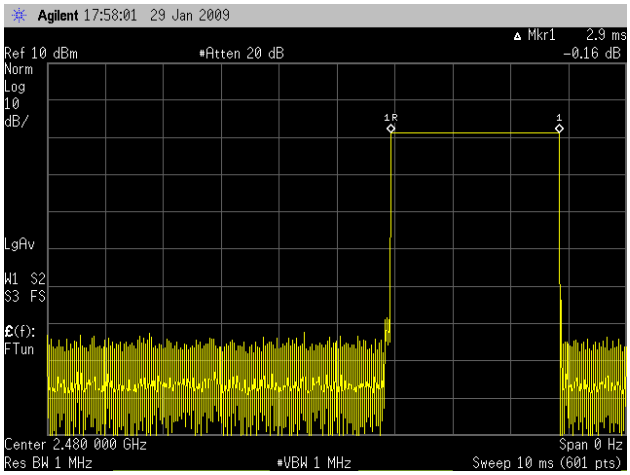


Dwell Time

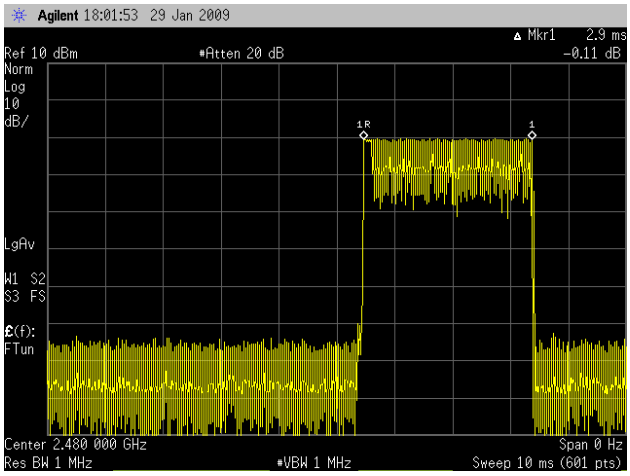
Channel High: 2480.0MHz [Channel 78] DH1



Channel High: 2480.0MHz [Channel 78] DH5



Channel High: 2480.0MHz [Channel 78] 3-DH5



5.5 Maximum Peak Output Power - Conducted -

5.5.1 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=1MHz, VBW=3MHz, Span=100MHz, Sweep=auto

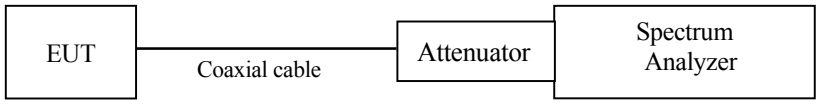
The EUT was set to operate with following conditions.

- No hopping [ch 0 (low), ch 39 (mid) and ch 78 (high)]

The test mode of EUT is as follows.

- Tx mode in Battery operation. (Full charge)

5.5.2 Test Instruments and Measurement Setup



5.5.3 Limit of Maximum Peak Output Power

0.125 watt or less.

5.5.4 Measurement Result

[Test mode in Battery operation (Full charge) DC 3.8V]

Channel	Center Frequency [MHz]	Packet type	Factor [dB]	Reading [dBm]	Antenna Gain of EUT [dBi]	Level [dBm]	Peak Output Power [mW]	Limit [mW]	PASS /FAIL
0	2402.0	DH5	10.36	-6.75	2.0	5.61	3.639	≦125	PASS
		3-DH5	10.36	-5.28	2.0	7.08	5.105	≦125	PASS
39	2441.0	DH5	10.36	-7.19	2.0	5.17	3.289	≦125	PASS
		3-DH5	10.36	-5.89	2.0	6.47	4.436	≦125	PASS
78	2480.0	DH5	10.36	-8.20	2.0	4.16	2.606	≦125	PASS
		3-DH5	10.36	-7.08	2.0	5.28	3.373	≦125	PASS

Calculation:

Reading (dBm) + Factor (dB) + Antenna Gain of EUT (dBi) = Level (dBm)

10logP = Level (dBm)

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

5.5.5 Trace Data

Test Personnel:

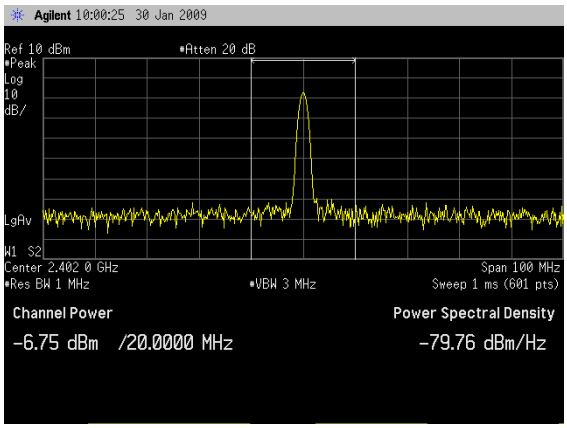
Tested by: Hiroaki Suzuki

Date : Jan. 30, 2009
Temperature : 18.0 [ºC]
Humidity : 46.0 [%]
Test place : Shielded room

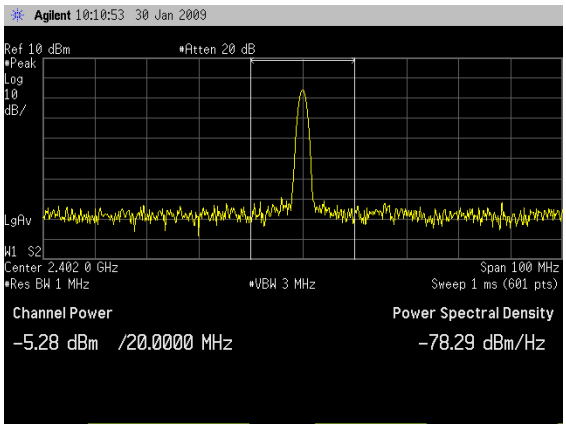
Maximum Peak Output Power - Conducted - [Full charge]

Channel Low: 2402.0MHz [Channel 0]

DH5

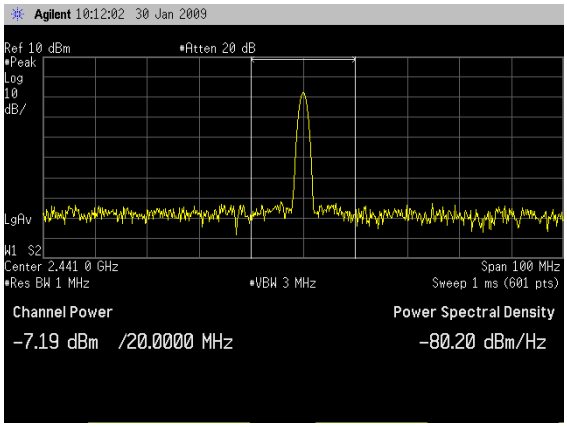


3-DH5

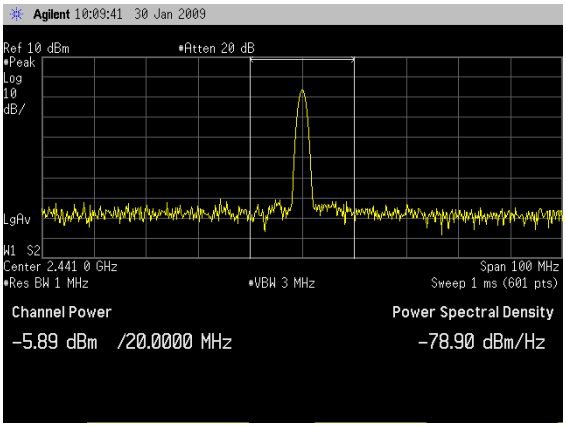


Channel Middle: 2441.0MHz [Channel 39]

DH5

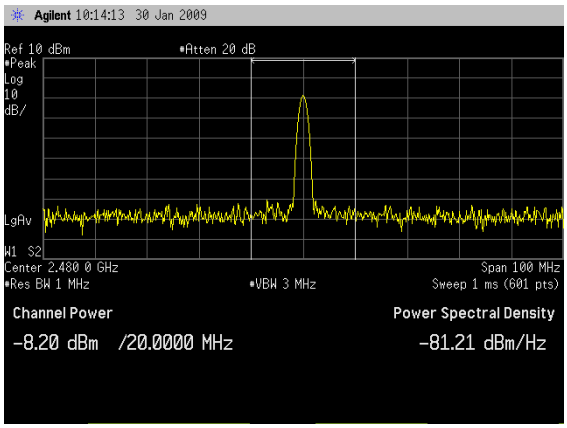


3-DH5

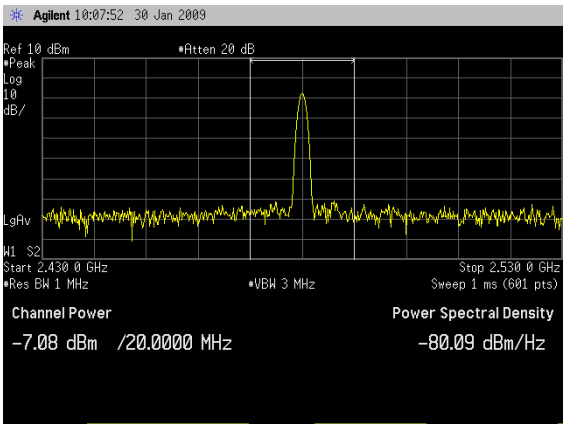


Channel High: 2480.0MHz [Channel 78]

DH5



3-DH5



5.6 Band Edge Compliance of RF Conducted Emissions

5.6.1 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

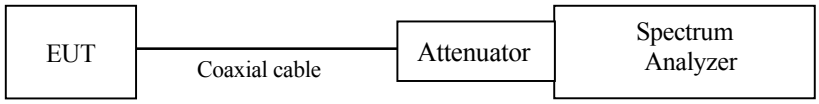
The EUT was set to operate with following conditions.

- No hopping [ch 0 (low) and ch 78 (high)]

The test mode of EUT is as follows.

- Tx mode

5.6.2 Test Instruments and Measurement Setup



5.6.3 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.

5.6.4 Measurement Results of Band-edge

Channel	Frequency [MHz]	Packet type	RF power Level [dBm]	Band-edge Frequency [MHz]	Band-edge Level [dBm]	Difference Level [dBm]	Limit [dBm]	PASS / FAIL
0	2402.0	DH5	-7.06	2400.50	-45.20	38.14	At least 20dB below from peak of RF.	PASS
		3-DH5	-8.20	2400.52	-44.38	36.18		PASS
78	2480.0	DH5	-8.41	2481.85	-49.98	41.57		PASS
		3-DH5	-10.41	2482.38	-50.78	40.37		PASS

5.6.5 Trace Data

Test Personnel:

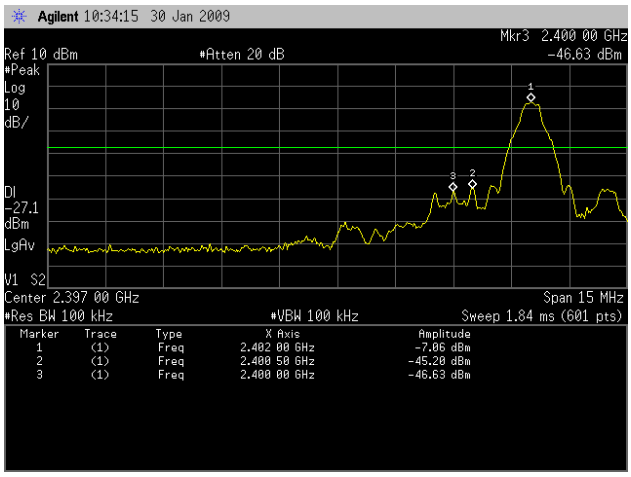
Tested by: Hiroaki Suzuki

Date : Jan. 30, 2009
Temperature : 18.0 [ºC]
Humidity : 46.0 [%]
Test place : Shielded room

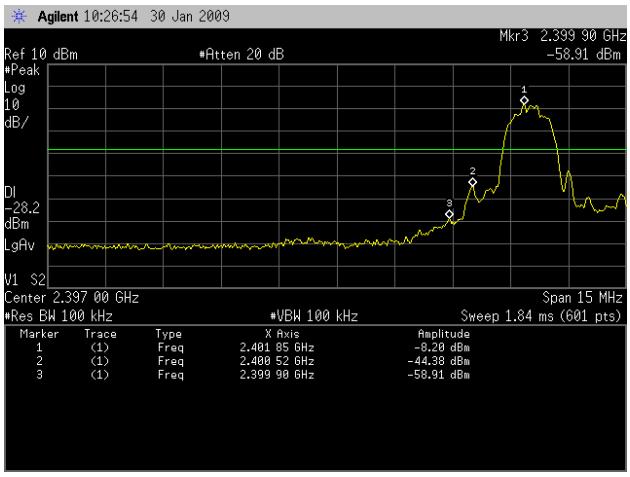
Band Edge Compliance of RF Conducted Emissions

Channel Low: 2402.0MHz [Channel 0]

DH5

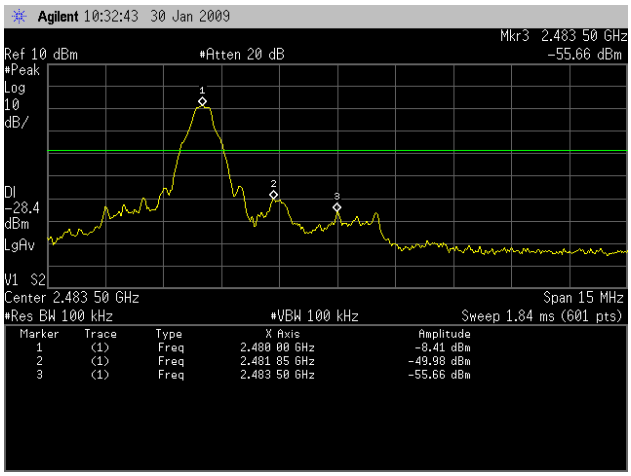


3-DH5

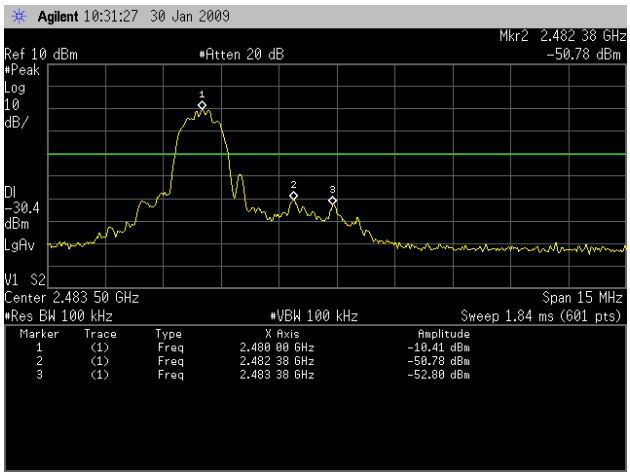


Channel High: 2480.0MHz [Channel 78]

DH5



3-DH5



5.7 Spurious Emissions - Conducted -

5.7.1 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

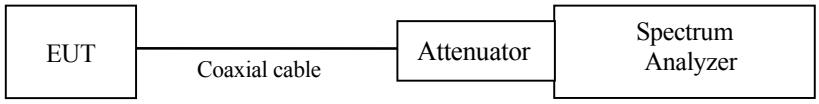
The EUT was set to operate with following conditions.

- No hopping [ch 0 (low), ch 39 (mid) and ch 78 (high)]

The test mode of EUT is as follows.

- Tx mode

5.7.2 Measurement Setup



5.7.3 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.

5.7.4 Measurement Results of Spurious Emissions - Conducted -

Channel	Frequency [MHz]	Limit [dBm]	Results Chart	PASS / FAIL
0	2402.0	At least 20dB below from peak of RF.	See the Trace Data	PASS
39	2441.0	At least 20dB below from peak of RF.	See the Trace Data	PASS
78	2480.0	At least 20dB below from peak of RF.	See the Trace Data	PASS

5.7.5 Trace Data

Test Personnel:

Tested by: Hiroaki Suzuki

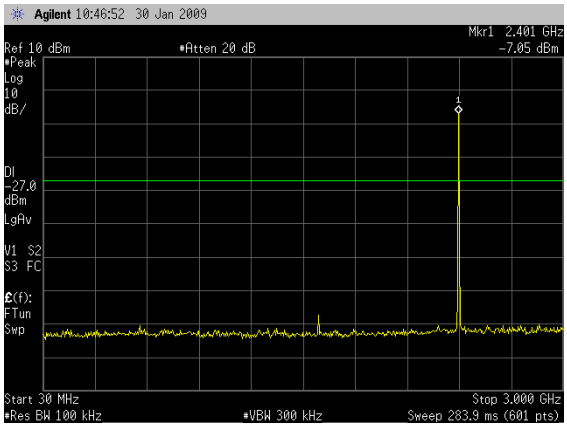
Date : Jan. 30, 2009
Temperature : 18.0 [ºC]
Humidity : 46.0 [%]
Test place : Shielded room

Spurious Emissions - Conducted –

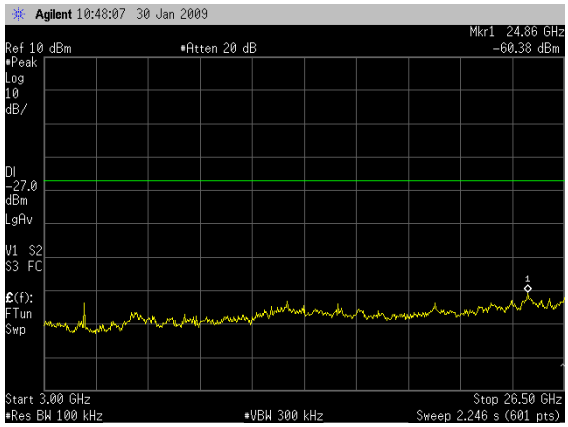
DH5

Channel Low: 2402.0MHz [Channel 0]

30MHz-3GHz

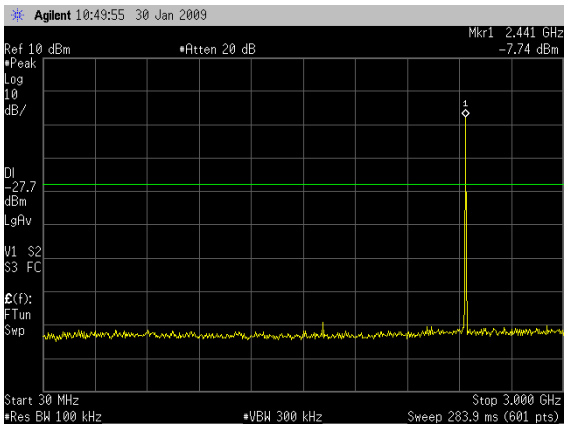


3GHz-26.5GHz

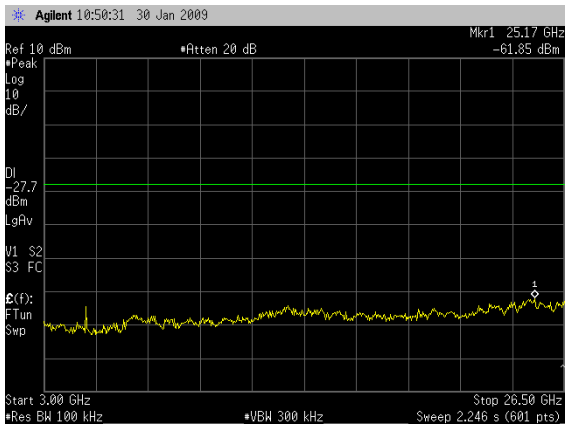


Channel Middle: 2441.0MHz [Channel 39]

30MHz-3GHz

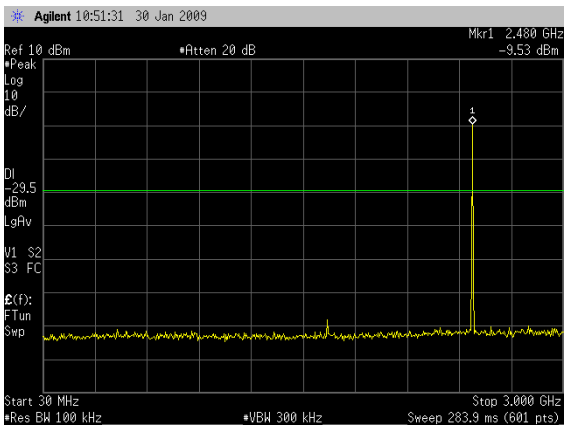


3GHz-26.5GHz

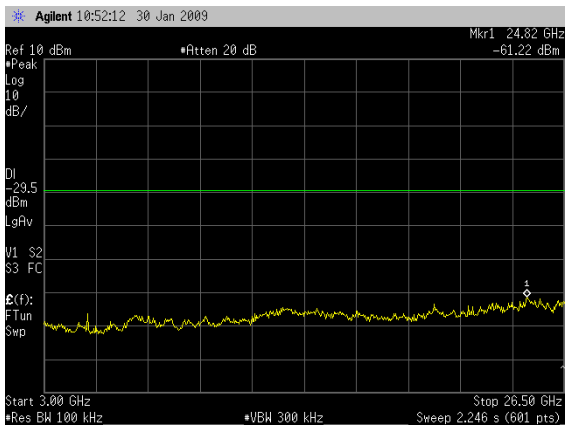


Channel High: 2480.0MHz [Channel 78]

30MHz-3GHz



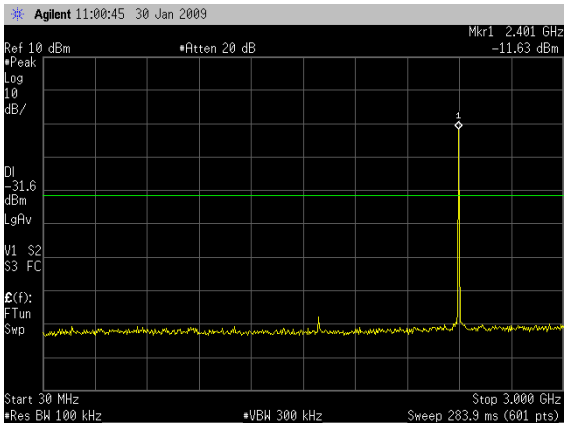
3GHz-26.5GHz



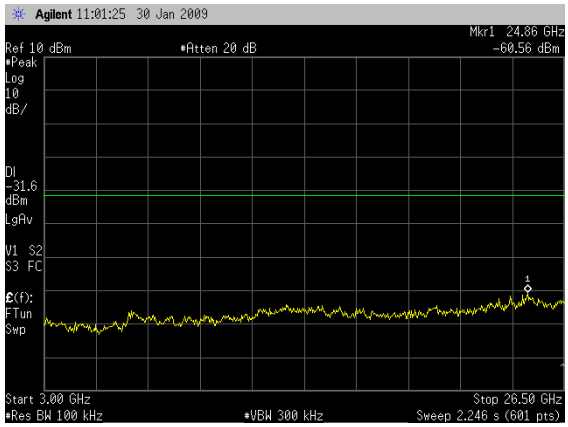
3-DH5

Channel Low: 2402.0MHz [Channel 0]

30MHz-3GHz

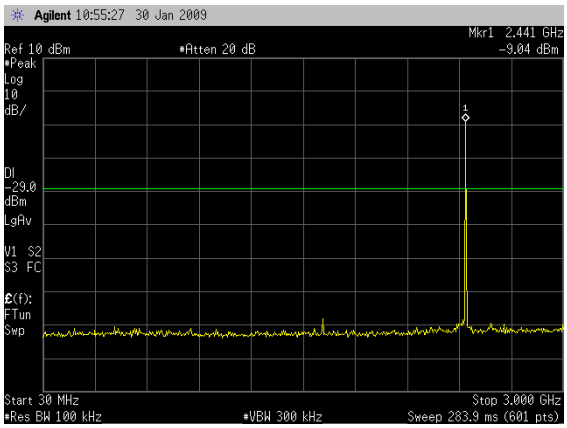


3GHz-26.5GHz

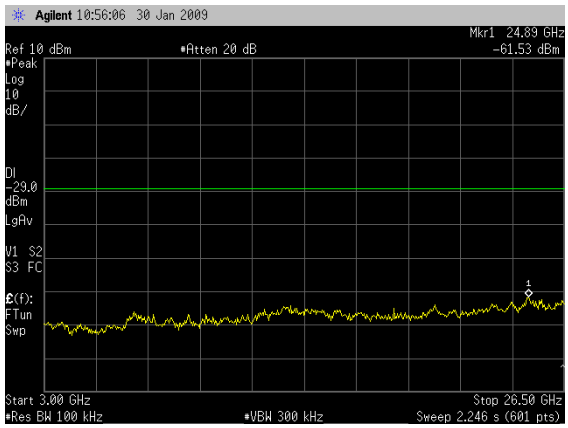


Channel Middle: 2441.0MHz [Channel 39]

30MHz-3GHz

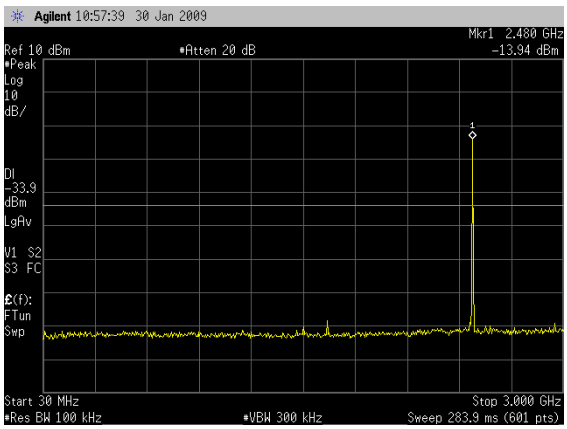


3GHz-26.5GHz

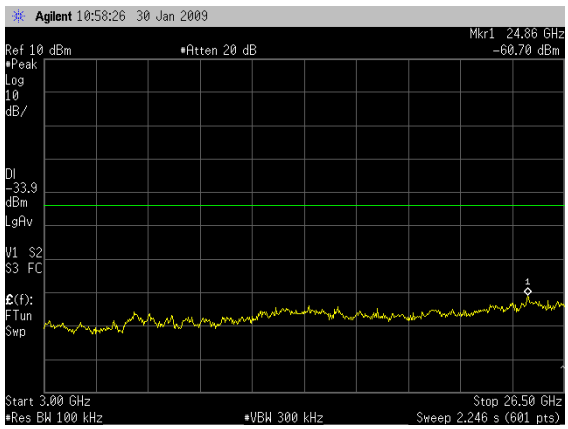


Channel High: 2480.0MHz [Channel 78]

30MHz-3GHz



3GHz-26.5GHz



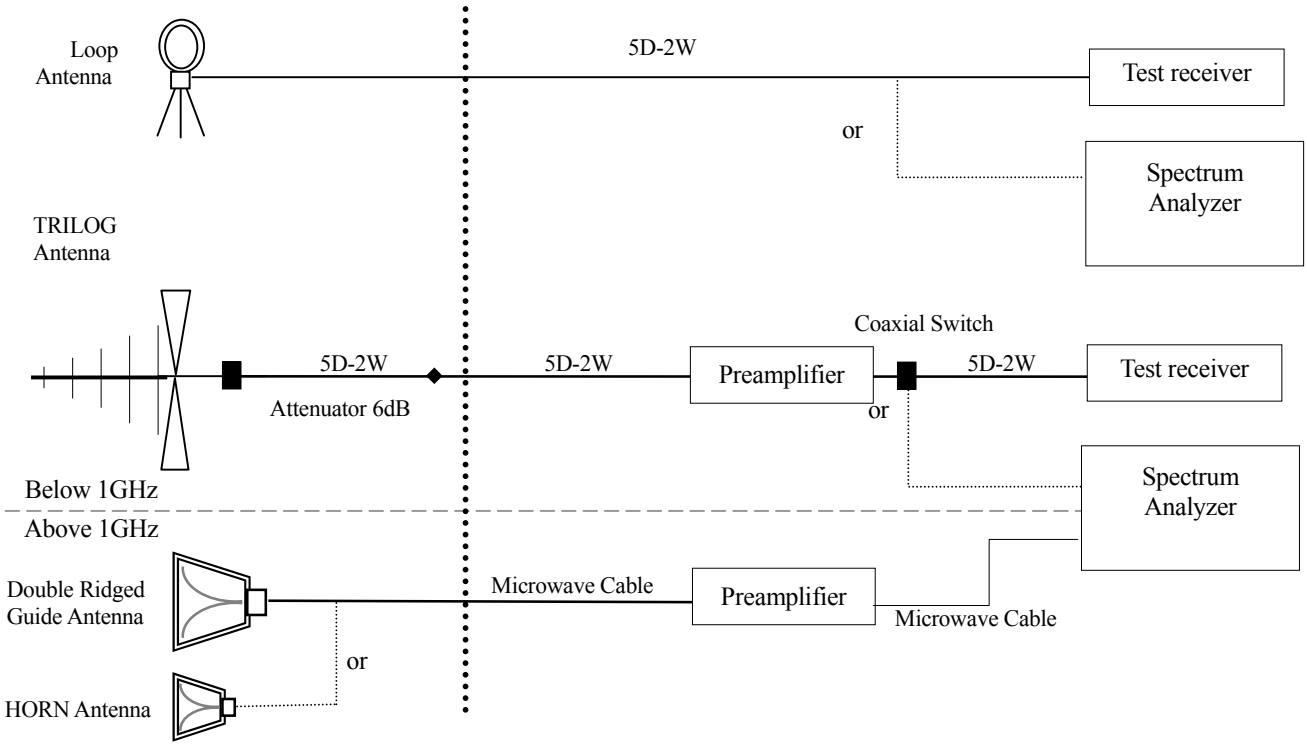
5.8 Spurious Emissions - Radiated - (9kHz - 25GHz)

5.8.1 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.

5.8.2 Measurement Setup

Test configuration for Spurious emissions



5.8.3 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.

5.8.4 Sample of field strength calculation

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

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 = 13.5dB

5.8.5 Measurement Results

Test Personnel:

Tested by: Hiroaki Suzuki

Date : Feb. 2, 2009
Temperature : 20.1 [ºC]
Humidity : 23.9 [%]
Test place : 3m Semi-anechoic chamber

Test Personnel:

Tested by: Hiroaki Suzuki

Date : Feb. 3, 2009
Temperature : 21.5 [ºC]
Humidity : 26.9 [%]
Test place : 3m Semi-anechoic chamber

Spurious Emissions - Radiated –

DH5

Tx Channel Low: 2402.0MHz [Channel 0]

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit	Margin QP	Height	Angle
	[MHz]		[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[cm]	[°]
1	87.120	V	43.5	-14.4	29.1	40.0	10.9	100.0	242.0
2	114.710	V	42.4	-10.6	31.8	43.5	11.7	100.0	143.0
3	353.890	V	44.6	-5.5	39.1	46.0	6.9	144.0	113.0
4	472.480	V	40.3	-2.6	37.7	46.0	8.3	100.0	44.0
5	796.060	V	34.1	3.6	37.7	46.0	8.3	100.0	204.0

No.	Frequency	(P)	Reading AV	Reading PK	c.f	Result AV	Result PK	Limit	Margin AV	Margin PK	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4804.000	H	--------	58.3	5.8	--------	64.1	74.0	--------	9.9	100.0	268.0
2	4803.980	H	37.8	--------	5.8	43.6	--------	54.0	10.4	--------	100.0	256.0
3	4804.020	V	--------	58.3	5.8	--------	64.1	74.0	--------	9.9	100.0	262.0
4	4804.020	V	38.1	--------	5.8	43.9	--------	54.0	10.1	--------	100.0	262.0
5	7206.000	V	--------	45.9	11.2	--------	57.1	74.0	--------	16.9	100.0	265.0
6	7206.000	V	31.6	--------	11.2	42.8	--------	54.0	11.2	--------	100.0	265.0

Tx Channel Middle: 2441.0MHz [Channel 39]

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit	Margin QP	Height	Angle
	[MHz]		[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[cm]	[°]
1	87.110	V	43.2	-14.4	28.8	40.0	11.2	100.0	243.0
2	113.440	V	41.7	-10.7	31.0	43.5	12.5	100.0	309.0
3	353.890	V	44.1	-5.5	38.6	46.0	7.4	150.0	95.0
4	472.500	V	40.6	-2.6	38.0	46.0	8.0	100.0	46.0
5	796.140	V	35.4	3.7	39.1	46.0	6.9	100.0	212.0

No.	Frequency	(P)	Reading AV	Reading PK	c.f	Result AV	Result PK	Limit	Margin AV	Margin PK	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4882.020	H	--------	60.4	5.8	--------	66.2	74.0	--------	7.8	160.0	255.0
2	4882.020	H	39.2	--------	5.8	45.0	--------	54.0	9.0	--------	160.0	255.0
3	4881.980	V	--------	59.9	5.8	--------	65.7	74.0	--------	8.3	100.0	280.0
4	4881.930	V	39.0	--------	5.8	44.8	--------	54.0	9.2	--------	100.0	280.0
5	7323.000	V	--------	46.3	11.6	--------	57.9	74.0	--------	16.1	100.0	269.0
6	7323.000	V	31.8	--------	11.6	43.4	--------	54.0	10.6	--------	100.0	269.0

Tx Channel High: 2480.0MHz [Channel 78]

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit	Margin QP	Height	Angle
	[MHz]		[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[cm]	[°]
1	85.860	V	42.4	-14.3	28.1	40.0	11.9	100.0	221.0
2	110.930	V	42.3	-10.9	31.4	43.5	12.1	100.0	143.0
3	353.890	V	43.1	-5.5	37.6	46.0	8.4	141.0	92.0
4	472.500	V	40.5	-2.6	37.9	46.0	8.1	100.0	46.0
5	796.100	V	35.3	3.7	39.0	46.0	7.0	100.0	209.0

No.	Frequency	(P)	Reading AV	Reading PK	c.f	Result AV	Result PK	Limit	Margin AV	Margin PK	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4960.000	H	--------	60.9	6.1	--------	67.0	74.0	--------	7.0	153.0	261.0
2	4960.000	H	39.5	--------	6.1	45.6	--------	54.0	8.4	--------	153.0	261.0
3	4960.000	V	--------	61.1	6.1	--------	67.2	74.0	--------	6.8	100.0	280.0
4	4960.000	V	39.6	--------	6.1	45.7	--------	54.0	8.3	--------	100.0	280.0
5	7440.000	V	--------	46.0	11.8	--------	57.8	74.0	--------	16.2	100.0	279.0
6	7440.000	V	34.5	--------	11.8	46.3	--------	54.0	7.7	--------	100.0	279.0

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.

3-DH5

Tx Channel Low: 2402.0MHz [Channel 0]

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit	Margin QP	Height	Angle
	[MHz]		[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[cm]	[°]
1	85.860	V	42.9	-14.3	28.6	40.0	11.4	100.0	260.0
2	114.700	V	42.0	-10.6	31.4	43.5	12.1	100.0	298.0
3	353.890	V	44.2	-5.5	38.7	46.0	7.3	156.0	132.0
4	472.500	V	40.3	-2.6	37.7	46.0	8.3	100.0	47.0
5	796.120	V	36.0	3.7	39.7	46.0	6.3	100.0	210.0

No.	Frequency	(P)	Reading AV	Reading PK	c.f	Result AV	Result PK	Limit	Margin AV	Margin PK	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4803.990	H	--------	52.7	5.8	--------	58.5	74.0	--------	15.5	100.0	268.0
2	4803.990	H	32.5	--------	5.8	38.3	--------	54.0	15.7	--------	100.0	268.0
3	4803.990	V	--------	53.6	5.8	--------	59.4	74.0	--------	14.6	100.0	304.0
4	4803.990	V	32.7	--------	5.8	38.5	--------	54.0	15.5	--------	100.0	304.0
5	7206.000	V	--------	46.1	11.2	--------	57.3	74.0	--------	16.7	100.0	279.0
6	7206.000	V	31.7	--------	11.2	42.9	--------	54.0	11.1	--------	100.0	279.0

Tx Channel Middle: 2441.0MHz [Channel 39]

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit	Margin QP	Height	Angle
	[MHz]		[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[cm]	[°]
1	85.860	V	43.4	-14.3	29.1	40.0	10.9	100.0	232.0
2	114.700	V	42.5	-10.6	31.9	43.5	11.6	100.0	128.0
3	353.890	V	44.4	-5.5	38.9	46.0	7.1	150.0	90.0
4	472.500	V	40.0	-2.6	37.4	46.0	8.6	100.0	45.0
5	796.120	V	34.0	3.7	37.7	46.0	8.3	100.0	215.0

No.	Frequency	(P)	Reading AV	Reading PK	c.f	Result AV	Result PK	Limit	Margin AV	Margin PK	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4881.970	H	--------	55.0	5.8	--------	60.8	74.0	--------	13.2	160.0	253.0
2	4881.970	H	33.7	--------	5.8	39.5	--------	54.0	14.5	--------	160.0	253.0
3	4881.980	V	--------	55.5	5.8	--------	61.3	74.0	--------	12.7	100.0	312.0
4	4881.980	V	33.5	--------	5.8	39.3	--------	54.0	14.7	--------	100.0	312.0
5	7323.000	V	--------	46.6	11.6	--------	58.2	74.0	--------	15.8	100.0	280.0
6	7323.000	V	31.8	--------	11.6	43.4	--------	54.0	10.6	--------	100.0	280.0

Tx Channel High: 2480.0MHz [Channel 78]

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit	Margin QP	Height	Angle
	[MHz]		[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[cm]	[°]
1	87.120	V	43.1	-14.4	28.7	40.0	11.3	100.0	240.0
2	114.700	V	42.4	-10.6	31.8	43.5	11.7	100.0	144.0
3	353.890	V	43.4	-5.5	37.9	46.0	8.1	149.0	110.0
4	472.500	V	40.2	-2.6	37.6	46.0	8.4	100.0	52.0
5	796.120	V	35.5	3.7	39.2	46.0	6.8	100.0	205.0

No.	Frequency	(P)	Reading AV	Reading PK	c.f	Result AV	Result PK	Limit	Margin AV	Margin PK	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4959.990	H	--------	54.8	6.1	--------	60.9	74.0	--------	13.1	151.0	262.0
2	4959.990	H	33.6	--------	6.1	39.7	--------	54.0	14.3	--------	151.0	262.0
3	4960.000	V	--------	56.6	6.1	--------	62.7	74.0	--------	11.3	100.0	294.0
4	4960.000	V	33.9	--------	6.1	40.0	--------	54.0	14.0	--------	100.0	294.0
5	7440.000	V	--------	46.8	11.8	--------	58.6	74.0	--------	15.4	100.0	278.0
6	7440.000	V	31.9	--------	11.8	43.7	--------	54.0	10.3	--------	100.0	278.0

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 –

DH5

Rx Channel Low: 2402.0MHz [Channel 0]

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	68.320	V	37.2	-11.1	26.1	40.0	13.9	100.0	358.0
2	114.700	V	44.3	-10.6	33.7	43.5	9.8	100.0	150.0
3	353.880	V	46.7	-5.5	41.2	46.0	4.8	154.0	123.0
4	472.490	V	41.0	-2.6	38.4	46.0	7.6	100.0	247.0
5	796.120	V	34.2	3.7	37.9	46.0	8.1	100.0	221.0

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	1600.320	V	---	54.9	-7.0	---	47.9	74.0	---	26.1	185.0	221.0
2	1600.320	V	45.3	---	-7.0	38.3	---	54.0	15.7	---	185.0	221.0
3	1600.330	H	---	62.9	-7.0	---	55.9	74.0	---	18.1	148.0	316.0
4	1600.330	H	57.3	---	-7.0	50.3	---	54.0	3.7	---	148.0	316.0
5	2400.480	H	---	49.9	-2.4	---	47.5	74.0	---	26.5	143.0	217.0
6	2400.480	H	40.5	---	-2.4	38.1	---	54.0	15.9	---	143.0	217.0

Rx Channel Middle: 2441.0MHz [Channel 39]

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	84.620	V	43.2	-14.2	29.0	40.0	11.0	142.0	63.0
2	114.690	V	44.3	-10.6	33.7	43.5	9.8	100.0	139.0
3	353.890	V	46.6	-5.5	41.1	46.0	4.9	151.0	116.0
4	431.260	V	40.7	-3.6	37.1	46.0	8.9	100.0	38.0
5	796.080	V	34.0	3.7	37.7	46.0	8.3	100.0	189.0

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	1626.330	V	---	52.1	-6.8	---	45.3	74.0	---	28.7	176.0	3.0
2	1626.330	V	44.1	---	-6.8	37.3	---	54.0	16.7	---	176.0	3.0
3	1626.330	H	---	60.0	-6.8	---	53.2	74.0	---	20.8	144.0	271.0
4	1626.330	H	57.8	---	-6.8	51.0	---	54.0	3.0	---	144.0	309.0
5	2439.490	H	---	50.4	-2.4	---	48.0	74.0	---	26.0	151.0	289.0
6	2439.490	H	42.4	---	-2.4	40.0	---	54.0	14.0	---	151.0	289.0

Rx Channel High: 2480.0MHz [Channel 78]

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	85.860	V	43.5	-14.3	29.2	40.0	10.8	145.0	55.0
2	114.700	V	44.2	-10.6	33.6	43.5	9.9	100.0	148.0
3	353.900	V	45.9	-5.5	40.4	46.0	5.6	152.0	101.0
4	431.260	V	38.9	-3.6	35.3	46.0	10.7	117.0	53.0
5	796.090	V	34.6	3.7	38.3	46.0	7.7	100.0	223.0

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	1652.330	V	--------	53.0	-6.6	--------	46.4	74.0	--------	27.6	100.0	346.0
2	1652.330	V	46.6	--------	-6.6	40.0	--------	54.0	14.0	--------	100.0	346.0
3	1652.330	H	--------	59.3	-6.6	--------	52.7	74.0	--------	21.3	139.0	315.0
4	1652.330	H	56.7	--------	-6.6	50.1	--------	54.0	3.9	--------	139.0	315.0
5	2478.490	H	--------	51.7	-2.0	--------	49.7	74.0	--------	24.3	139.0	280.0
6	2478.490	H	44.3	--------	-2.0	42.3	--------	54.0	11.7	--------	139.0	280.0

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.

3-DH5

Rx Channel Low: 2402.0MHz [Channel 0]

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	87.100	V	43.7	-14.4	29.3	40.0	10.7	136.0	23.0
2	114.700	V	44.2	-10.6	33.6	43.5	9.9	100.0	142.0
3	353.880	V	46.6	-5.5	41.1	46.0	4.9	143.0	94.0
4	431.270	V	40.0	-3.6	36.4	46.0	9.6	100.0	12.0
5	796.100	V	34.8	3.7	38.5	46.0	7.5	100.0	224.0

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	1600.290	H	--------	61.5	-7.0	--------	54.5	74.0	--------	19.5	144.0	303.0
2	1600.290	H	58.0	--------	-7.0	51.0	--------	54.0	3.0	--------	144.0	303.0
3	1600.330	V	--------	53.8	-7.0	--------	46.8	74.0	--------	27.2	185.0	223.0
4	1600.330	V	44.7	--------	-7.0	37.7	--------	54.0	16.3	--------	185.0	223.0
5	2400.490	H	--------	50.7	-2.4	--------	48.3	74.0	--------	25.7	137.0	271.0
6	2400.490	H	42.7	--------	-2.4	40.3	--------	54.0	13.7	--------	137.0	271.0

Rx Channel Middle: 2441.0MHz [Channel 39]

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit	Margin QP	Height	Angle
	[MHz]		[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[cm]	[°]
1	84.610	V	43.6	-14.2	29.4	40.0	10.6	138.0	37.0
2	114.700	H	44.4	-10.6	33.8	43.5	9.7	100.0	138.0
3	353.900	V	46.2	-5.5	40.7	46.0	5.3	151.0	70.0
4	431.260	V	39.3	-3.6	35.7	46.0	10.3	100.0	38.0
5	799.910	V	35.6	3.8	39.4	46.0	6.6	100.0	226.0

No.	Frequency	(P)	Reading AV	Reading PK	c.f	Result AV	Result PK	Limit	Margin AV	Margin PK	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	1626.330	H	--------	59.4	-6.8	--------	52.6	74.0	--------	21.4	141.0	314.0
2	1626.330	H	57.0	--------	-6.8	50.2	--------	54.0	3.8	--------	141.0	314.0
3	1626.330	V	--------	53.0	-6.8	--------	46.2	74.0	--------	27.8	180.0	216.0
4	1626.330	V	45.8	--------	-6.8	39.0	--------	54.0	15.0	--------	180.0	216.0
5	2439.490	H	--------	50.5	-2.4	--------	48.1	74.0	--------	25.9	150.0	282.0
6	2439.490	H	42.4	--------	-2.4	40.0	--------	54.0	14.0	--------	150.0	282.0

Rx Channel High: 2480.0MHz [Channel 78]

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit	Margin QP	Height	Angle
	[MHz]		[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[cm]	[°]
1	84.620	V	43.1	-14.2	28.9	40.0	11.1	140.0	48.0
2	114.700	V	44.2	-10.6	33.6	43.5	9.9	100.0	129.0
3	353.900	V	46.0	-5.5	40.5	46.0	5.5	157.0	93.0
4	431.250	V	39.9	-3.6	36.3	46.0	9.7	100.0	29.0
5	796.080	V	35.1	3.7	38.8	46.0	7.2	100.0	226.0

No.	Frequency	(P)	Reading AV	Reading PK	c.f	Result AV	Result PK	Limit	Margin AV	Margin PK	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	1652.320	V	--------	56.2	-6.6	--------	49.6	74.0	--------	24.4	121.0	274.0
2	1652.320	V	52.1	--------	-6.6	45.5	--------	54.0	8.5	--------	121.0	274.0
3	1652.330	H	--------	59.9	-6.6	--------	53.3	74.0	--------	20.7	141.0	308.0
4	1652.330	H	57.6	--------	-6.6	51.0	--------	54.0	3.0	--------	141.0	308.0
5	2478.490	H	--------	51.1	-2.0	--------	49.1	74.0	--------	24.9	139.0	280.0
6	2478.490	H	43.8	--------	-2.0	41.8	--------	54.0	12.2	--------	139.0	280.0

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.

5.9 Restricted Band of Operation

5.9.1 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:

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

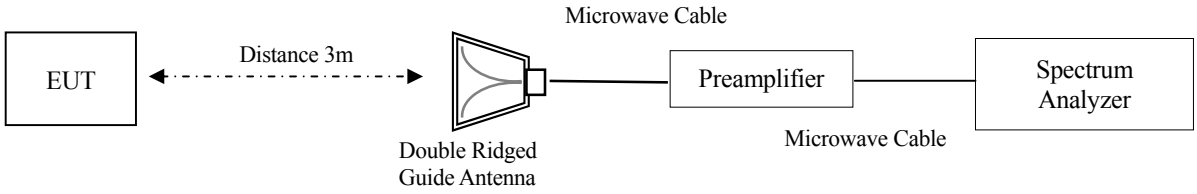
The EUT was set to operate with following conditions.

- No hopping [ch 0 (low), ch 78 (high)]

The test mode of EUT is as follows.

- Tx mode

5.9.2 Measurement Setup



5.9.3 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.

5.9.4 Measurement Result

DH5

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	--------	44.0	-2.5	--------	41.5	74.0	--------	32.5
2	2390.000	H	30.9	--------	-2.5	28.4	--------	54.0	25.6	--------
3	2390.000	V	--------	46.6	-2.5	--------	44.1	74.0	--------	29.9
4	2390.000	V	30.8	--------	-2.5	28.3	--------	54.0	25.7	--------
5	2483.500	H	--------	53.6	-1.9	--------	51.7	74.0	--------	22.3
6	2483.500	H	34.8	--------	-1.9	32.9	--------	54.0	21.1	--------
7	2483.500	V	--------	54.5	-1.9	--------	52.6	74.0	--------	21.4
8	2483.500	V	34.5	--------	-1.9	32.6	--------	54.0	21.4	--------

3-DH5

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	--------	44.8	-2.5	--------	42.3	74.0	--------	31.7
2	2390.000	H	30.8	--------	-2.5	28.3	--------	54.0	25.7	--------
3	2390.000	V	--------	48.3	-2.5	--------	45.8	74.0	--------	28.2
4	2390.000	V	30.7	--------	-2.5	28.2	--------	54.0	25.8	--------
5	2483.500	H	--------	56.5	-1.9	--------	54.6	74.0	--------	19.4
6	2483.500	H	34.8	--------	-1.9	32.9	--------	54.0	21.1	--------
7	2483.500	V	--------	58.3	-1.9	--------	56.4	74.0	--------	17.6
8	2483.500	V	35.3	--------	-1.9	33.4	--------	54.0	20.6	--------

5.9.5 Trace Data

Test Personnel:

Tested by: Hiroaki Suzuki

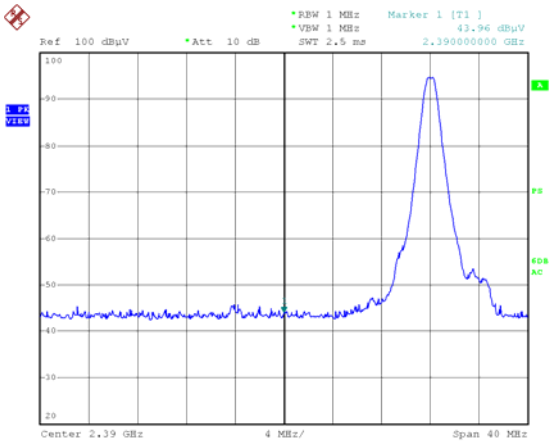
Date : Feb. 2, 2009
Temperature : 20.1 [℃]
Humidity : 23.9 [%]
Test place : 3m Semi-anechoic chamber

Restricted Band of Operation

DH5

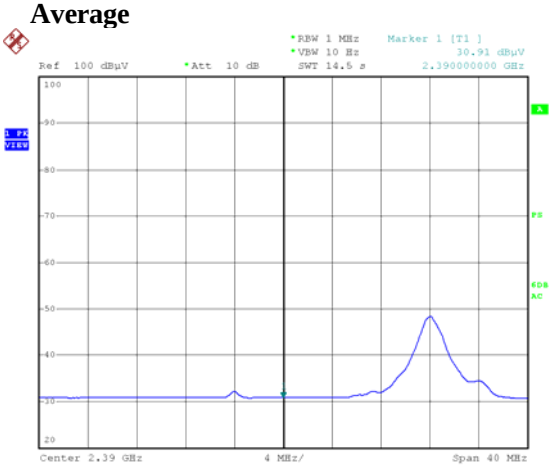
Frequency: 2390.0MHz -Horizontal-

Peak



Date: 3.FEB.2009 12:50:19

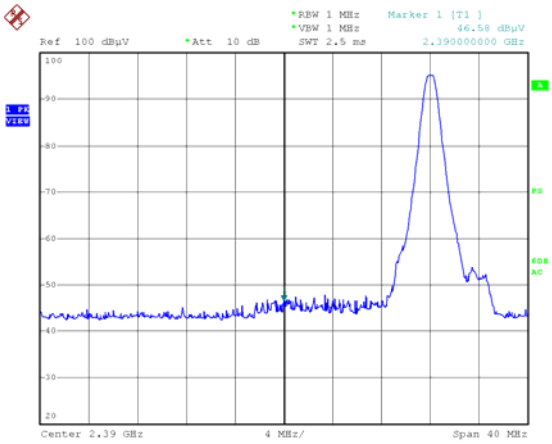
Average



Date: 3.FEB.2009 12:52:49

Frequency: 2390.0MHz -Vertical-

Peak



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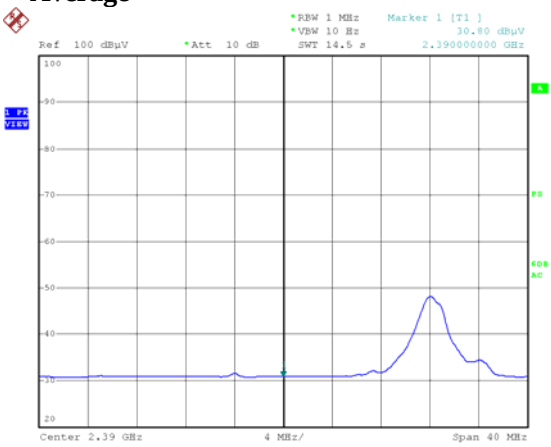


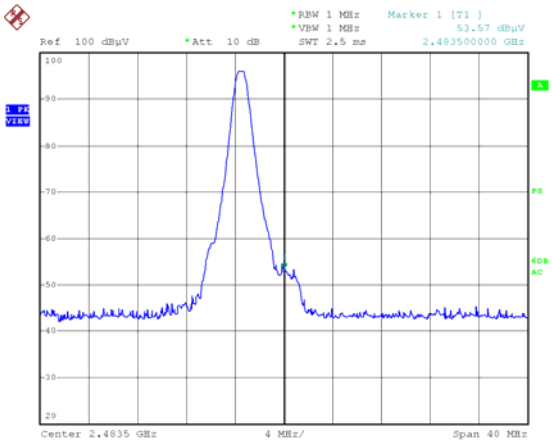
Date: 3.FEB.2009 12:56:32

Restricted Band of Operation

DH5

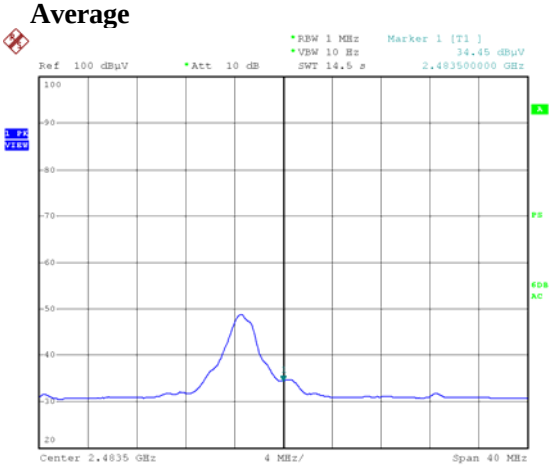
Frequency: 2483.5MHz -Horizontal-

Peak



Date: 3.FEB.2009 12:59:38

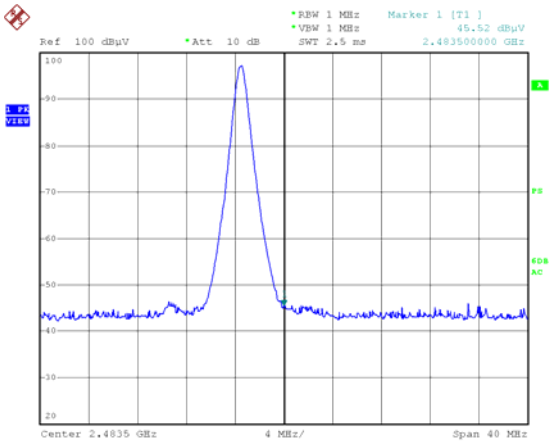
Average



Date: 3.FEB.2009 13:05:55

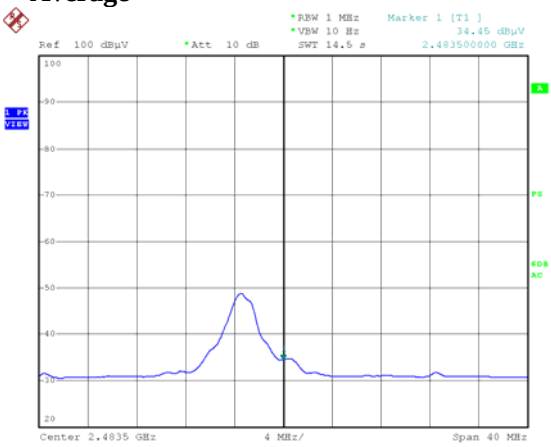
Frequency: 2483.5MHz -Vertical-

Peak



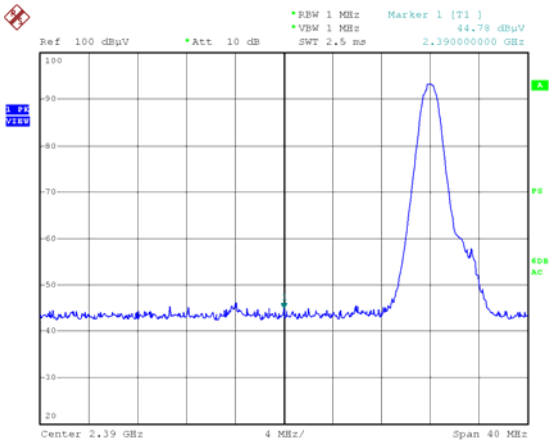
Date: 2.FEB.2009 17:57:32

Average



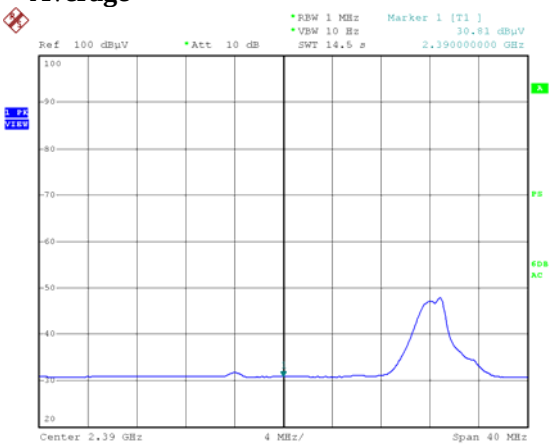
Date: 3.FEB.2009 13:05:55

3-DH5
Frequency: 2390.0MHz -Horizontal-
Peak



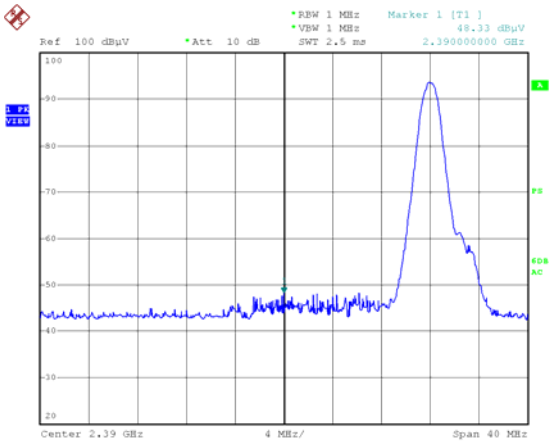
Date: 3.FEB.2009 13:16:05

Average



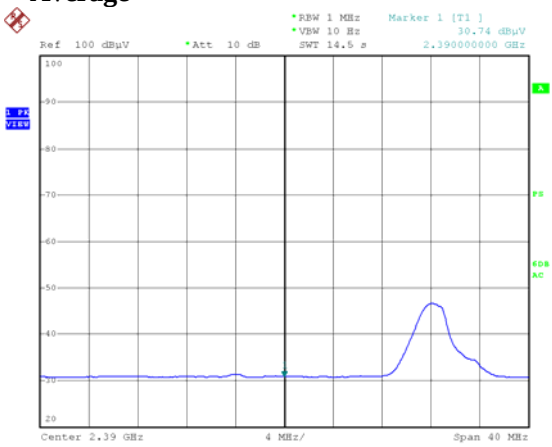
Date: 3.FEB.2009 13:14:41

Frequency: 2390.0MHz -Vertical-
Peak



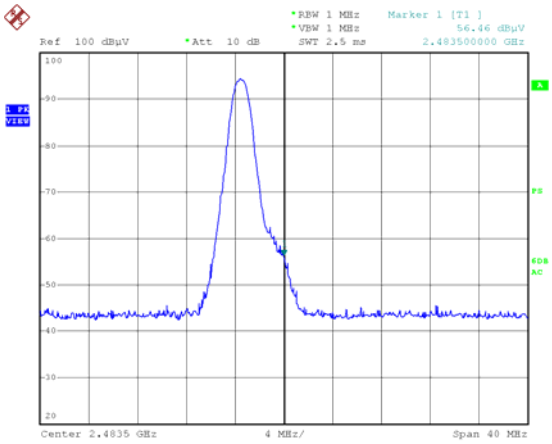
Date: 3.FEB.2009 13:17:32

Average



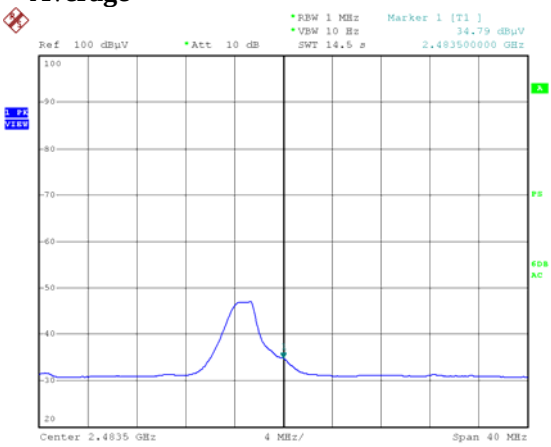
Date: 3.FEB.2009 13:20:05

3-DH5
Frequency: 2483.5MHz -Horizontal-
Peak



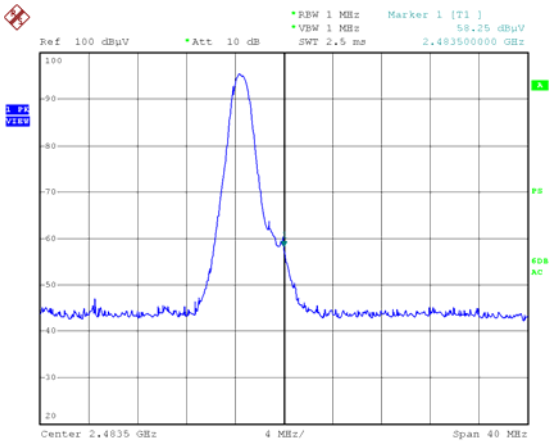
Date: 3.FEB.2009 13:23:11

Average



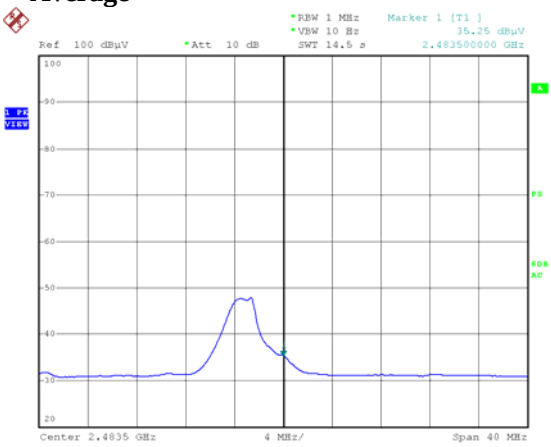
Date: 3.FEB.2009 13:25:25

Frequency: 2483.5MHz -Vertical-
Peak



Date: 3.FEB.2009 13:27:46

Average



Date: 3.FEB.2009 13:30:42

5.10 Transmitter Power Spectral Density

5.10.1 Test Procedure [FCC 15.247(d), IC RSS-210 A8.2(b)]

The peak power 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= 3kHz, VBW=3kHz, Span=3MHz, Sweep = 1000sec.

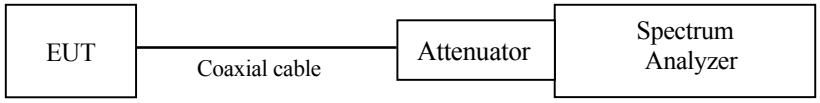
The EUT was set to operate with following conditions.

- No hopping [ch 0 (low), ch39 (mid), ch 78 (high)]

The test mode of EUT is as follows.

- Tx mode

5.10.2 Measurement Setup



5.10.3 Limit of Transmitter Power Spectral Density

The peak power spectral density shall not be greater then 8dBm in any 3kHz band.

5.10.4 Measurement Results

Ch No.	Frequency [MHz]	Packet type	Reading [dBm]	Factor (Cable loss) [dB]	Level [dBm]	Limit [dBm]	Margin [dB]
0	2402.0	DH5	-19.62	10.36	-9.26	8.0	17.26
		3-DH5	-22.61	10.36	-12.25	8.0	20.25
39	2441.0	DH5	-19.81	10.36	-9.45	8.0	17.45
		3-DH5	-23.26	10.36	-12.90	8.0	20.90
78	2480.0	DH5	-20.82	10.36	-10.46	8.0	18.46
		3-DH5	-24.79	10.36	-14.43	8.0	22.43

Note:

1. Transmitter Power Spectral Density Level (Margin) = Limit – [Reading + Factor (Cable)]

5.10.5 Trace Data

Test Personnel:

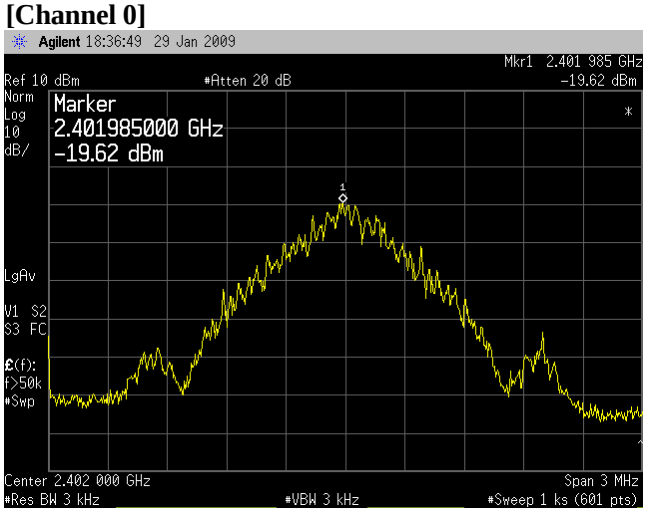
Tested by: Hiroaki Suzuki

Date : Jan. 29, 2009
Temperature : 21.0 [ºC]
Humidity : 52.5 [%]
Test place : Shielded room

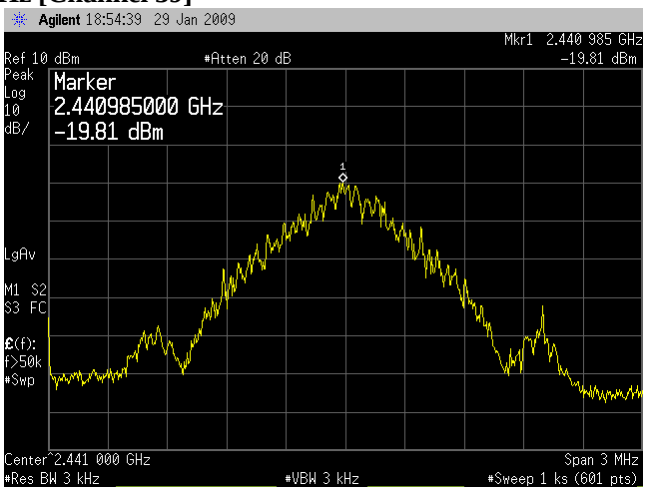
Transmitter Power Spectral Density

DH5

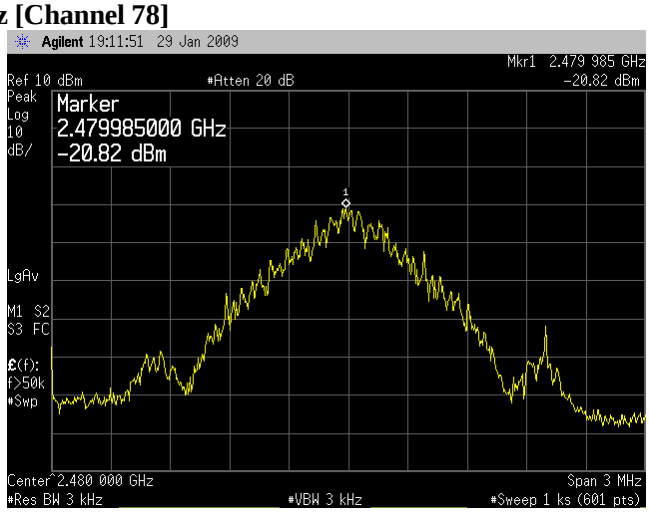
Channel Low: 2402.0MHz [Channel 0]



Channel Middle: 2441.0MHz [Channel 39]

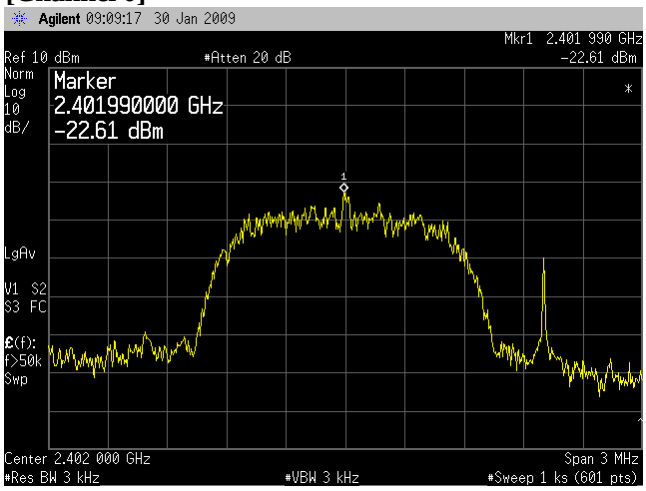


Channel High: 2480.0MHz [Channel 78]

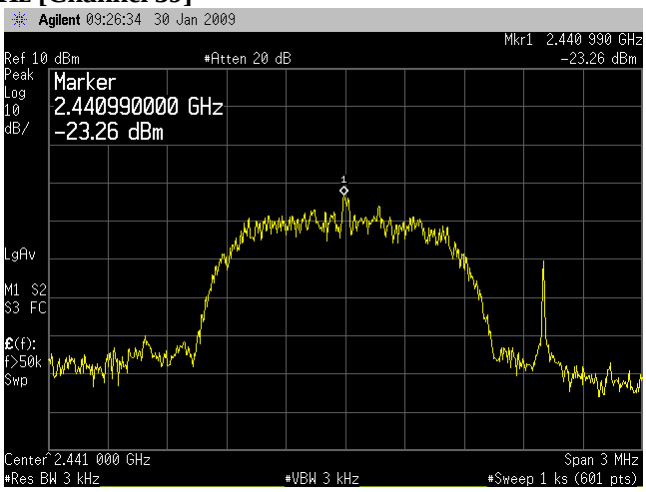


3-DH5

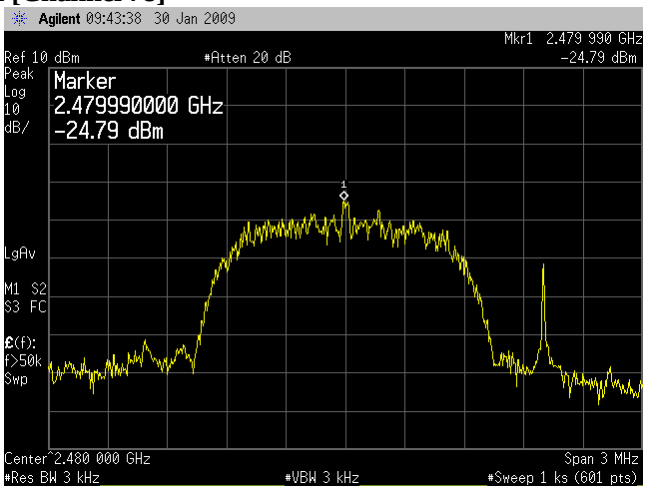
Channel Low: 2402.0MHz [Channel 0]



Channel Middle: 2441.0MHz [Channel 39]



Channel High: 2480.0MHz [Channel 78]



5.11 Antenna requirement

According to FCC section 15.203., an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
The antenna is a chip antenna mounted inside of the EUT. Therefore, the EUT complies with the antenna requirement of FCC section 15.203.

6. 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)	±2.9dB
Radiated emission (9kHz - 30MHz)	±4.4dB
Radiated emission (30MHz – 1000MHz)	±5.2dB
Radiated emission (1000MHz – 26GHz)	±3.6dB

7. Laboratory description

7.1 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

7.2 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 16, 2011
3m Semi-anechoic chamber 10m Semi-anechoic chamber	540072	March 12, 2010

3) Industry Canada Oats site filing:

Site name	Sites on file: Oats 3m/10m	Expiry Date
Site 2	4224A-2	January 24, 2010
Site 3	4224A-3	January 24, 2010
3m Semi-anechoic chamber	4224A-4	January 24, 2010
10m Semi-anechoic chamber	4224A-5	January 24, 2010

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	Dec. 19, 2009	T-1474	Oct. 8, 2011
3m Semi-anechoic chamber	R-2481	C-2723	Dec. 19, 2009	T-1475	Oct. 8, 2011
Shielded room No.1	R-137	C-2724	Dec. 19, 2009	T-1476	Oct. 8, 2011

5) ETL SEMKO authorization:

Authorized as an EMC test laboratory.

6) TUV Rheinland authorization:

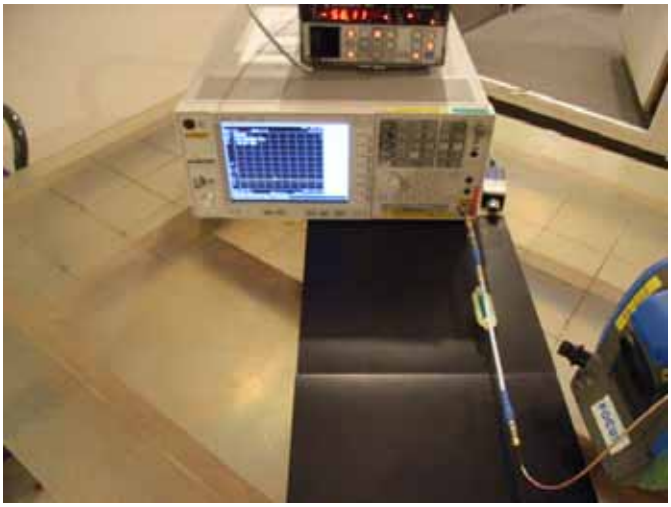
Authorized as an EMC test laboratory.

7) BUREAU VERITAS certification:

Certified as an EMC test laboratory.

8. Test photographs

System configuration (RF Conducted test)



Transmitter Radiated Spurious Emissions (RF Radiated test)