

TEST REPORT

Report number: Z071C-10294

Issue Date: November 22, 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	: Trimble AB
Equipment under test (EUT)	: Bluetooth unit
FCC ID	: QKVNT0003
IC Certification Number	: 4399A-NT0003
Model Number	: BTunit03
Serial Number	: N/A
EUT Condition	: Production

Test procedure	: ANSI C63.4-2003
Date of test	: September 14,25,27, 2010 October 27, 2010
Test place	: 3m Semi-anechoic chamber, Shielded room
Test results	: Complied

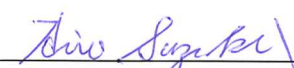
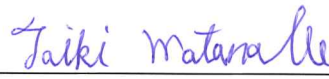
Zacta Technology Corporation certifies that no party to the application is subject to a denial of federal benefits that include FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988,21U.S.C. 853(a).

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

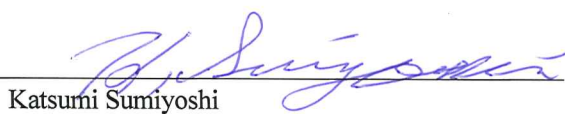
This report shall not be re-produced except in full without the written approval of ZACTA Technology Corporation.

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
Taiki Watanabe

Authorized by:


Katsumi Sumiyoshi

Manager of Quality Control Department



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) RSS-Gen 4.6.1	20dB Bandwidth / 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
15.207 RSS-Gen 7.2.2	AC power line Conducted Emissions Emissions 150kHz – 30MHz	Conducted	Pass

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

Applicant	: Trimble AB Rinkebyvägen17, Box 64, SE-182 11 Danderyd, Sweden Phone: +46-86221078 Fax: +46-86221009
Equipment under test (EUT)	: Bluetooth unit
Trade name	: Trimble
Model number	: BTunit03
Serial number	: N/A
EUT condition	: Production
Max. frequency	: BTunit03: 13MHz (Host device: 624MHz)
Power ratings	: DC 3.3V
Size	: (W) 25 x (D) 45 x (H) 3.2 mm
Environment	: Indoor and Outdoor use
Thermal limitation	: -30°C to 50°C
Operating mode	: Tx mode / Rx mode
Variation of 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 (1Mbps), $\pi/4$ -DQPSK (2Mbps), 8-DPSK (3Mbps)
Nominal Bit Rates	: 1600hops/s
Channel Separation	: 1MHz
Output power	: 0.494mW
Antenna (Rx and Tx)	: Chip antenna
Antenna gain	: 2.00dBi
RF type	: Transceiver
Intended use	: Data transmission
RF emission type designator	: 900KF1D (GFSK), 1M19G1D (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 Description of Test modes

The EUT had been tested under operating condition.
There are three channels have been tested as following:

Tested Channel	Frequency (MHz)
Low	2402
Middle	2441
High	2480

The pre-test has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates.

Following channel(s) was (were) selected for the final test as listed below.

Tested Channel	Modulation Technology	Modulation Type	Packet Type	Data Rate
Low, Middle, High	FHSS	GFSK	DH5	1Mbps
Low, Middle, High	FHSS	8-DPSK	3-DH5	3Mbps

The field strength of spurious emission was measured at each position of all three axis X,Y and Z to compare the level, and the maximum noise.

The worst emission was found in X axis and the worst case recorded.

2.5 Operating mode

【Tx mode】

i) Bluetooth test program set up

ii) Select a test mode

Operating mode: Tx mode

Operating frequency: Channel Low: 2402MHz, Channel Middle: 2441MHz, Channel High: 2480MHz
Hopping

Packet type: DH5, 3-DH5

iii) Start test mode

【Rx mode】

i) Bluetooth test program set up

ii) Select a test mode

Operating mode: Rx mode

Operating frequency: Channel Low: 2402MHz, Channel Middle: 2441MHz, Channel High: 2480MHz

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	Bluetooth unit	Trimble AB	BTunit03	N/A	FCC ID: QKVNT0003 IC: 4399A-NT0003	EUT
2	Control Unit	Trimble AB	Trimble CU 58055010	95010026	-	Host device
3	Docking Station	Trimble AB	Docking Station 58 252 001	95810014	-	-
4	AC/DC ADAPTER	Trimble AB	7362/12	N/A	-	-
5	Personal Computer	HP	Compaq nx6320	CNU7071D 2W	DoC	-
6	AC Adapter for PC	HP	PA-1650-02HC	7118525901	-	-
7	Modem	US.Robotics	Sport_Ster33.6Kbps	000839032 BK6YV4J	DoC	-
8	AC Adapter for Modem	US.Robotics	N/A	N/A	-	-
9	Printer	Canon	BJF 200	ETN02300	DoC	-
10	USB Mouse	Logitech	M-BT85	LNA43400 216	DoC	-

3.2 Cable(s) information

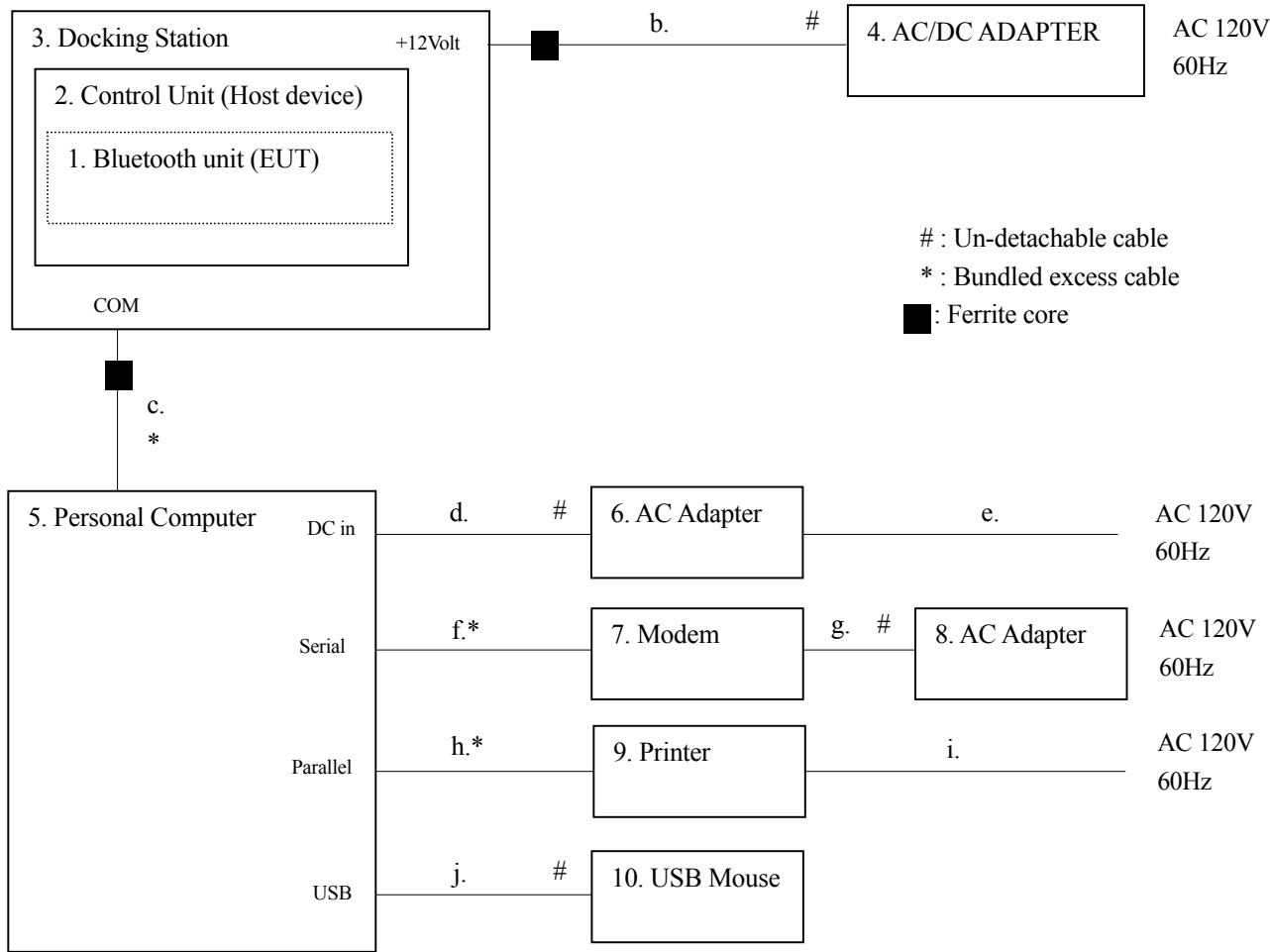
No.	Cable	Length[m]	Shield	Connector	Comment
a	DC cable	2.0	No	Plastic	-
b	DC cable for Docking Station AC Adapter	2.0	No	Metal	-
c	USB cable	2.4	Yes	Metal	-
d	DC cable	1.8	No	Plastic	-
e	AC power cord for PC AC Adapter	1.7	No	Plastic	-
f	Serial cable	1.5	Yes	Metal	-
g	DC cable	1.7	No	Plastic	-
h	Parallel cable	2.1	Yes	Metal	-
i	AC power cord for Printer	1.7	No	Plastic	-
j	Mouse cable	1.9	Yes	Metal	-

3.3 System configuration

Antenna port Conducted test, Radiated Emissions



AC power line Conducted Emissions



Note1: Numbers assigned to equipment or cables on this diagram are corresponded to the list in “3.1 EUT and Peripheral(s) used”, “3.2 Cable(s) information”.

Note2: The power supply for docking station (No.4) Trimble P/N 78600019 type FW7362/12 has a fixed DC cable (No.b) supplied with a fixed ferrite core (not removable) at the connector side.

Note3: The USB cable Trimble P/N 73840019(No.c) is supplied with a fixed ferrite core (not removable) at the connector side to the Docking Station.

Note4: As for with the Docking Station test, only the AC power line Conducted Emissions was performed by request of applicant.

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 RBW is set to 1% to 3% of the 99% bandwidth. The VBW is set to 3 times the RBW.

The spectrum analyzer internal 99% bandwidth function utilized.

The spectrum analyzer is set to:

- RBW=30kHz, VBW=100kHz, Span=3MHz, Sweep=auto

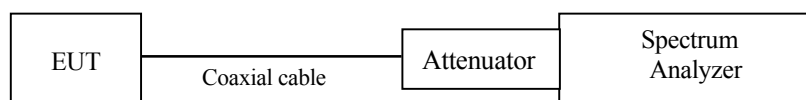
The EUT was set to operate with following conditions.

- Channel Low: 2402MHz, Channel Middle: 2441MHz, Channel High: 2480MHz

The test mode of EUT is as follows.

- Tx mode

4.1.2 Measurement Setup



4.1.3 Limit of 20dB Bandwidth / Occupied Bnadwidth

None

4.1.4 Measurement Result

Channel	Center Frequency (MHz)	Packet type	20dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
Low	2402.00	DH5	1.037	0.900
		3-DH5	1.321	1.188
Middle	2441.00	DH5	1.036	0.900
		3-DH5	1.321	1.188
High	2480.00	DH5	1.036	0.900
		3-DH5	1.323	1.194

4.1.5 Trace Data

Test Personnel:

Tested by: Taiki Watanabe

Date : Sep. 14, 2010
Temperature : 23.5 [°C]
Humidity : 62.0 [%]
Test place : Shielded room

Test Personnel:

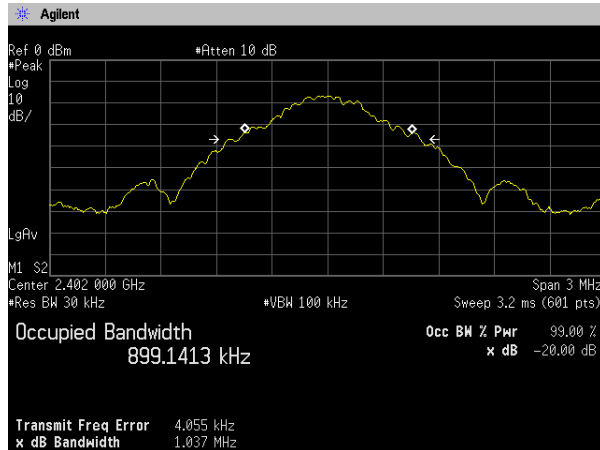
Tested by: Hiroaki Suzuki

Date : Oct. 27, 2010
Temperature : 20.0 [°C]
Humidity : 40.8 [%]
Test place : 3m Semi-anechoic chamber

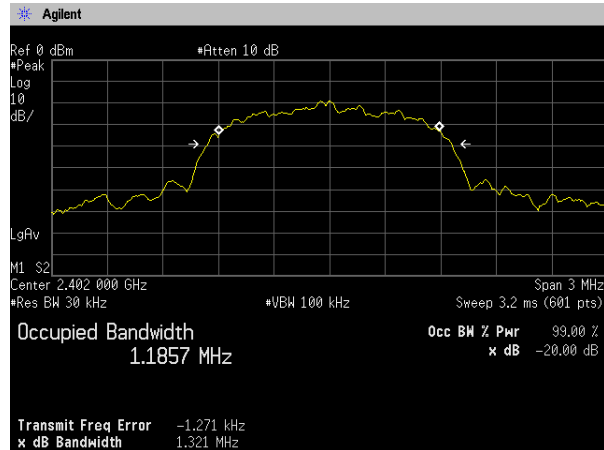
20dB Bandwidth

Channel Low: 2402.0MHz

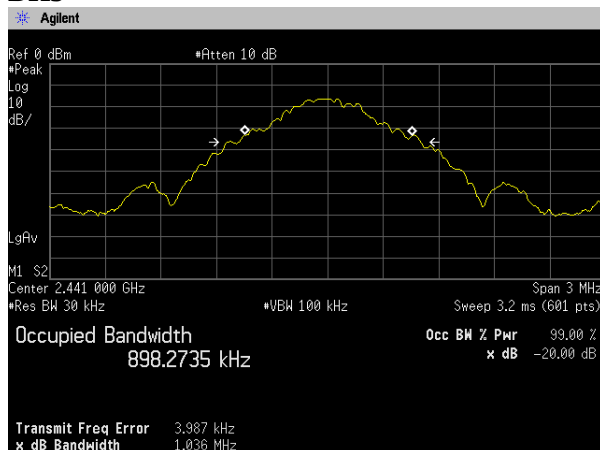
DH5



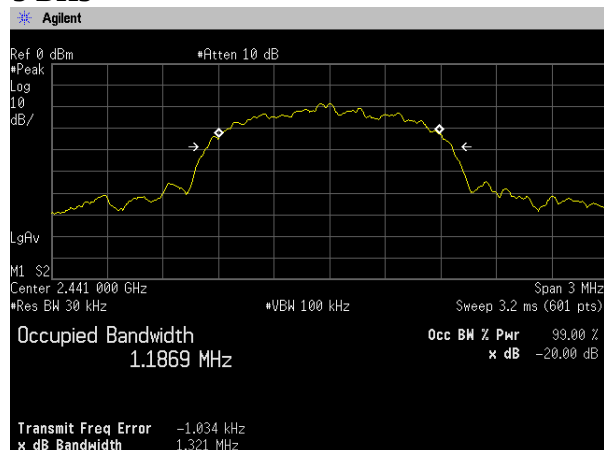
3-DH5

**Channel Middle: 2441.0MHz**

DH5

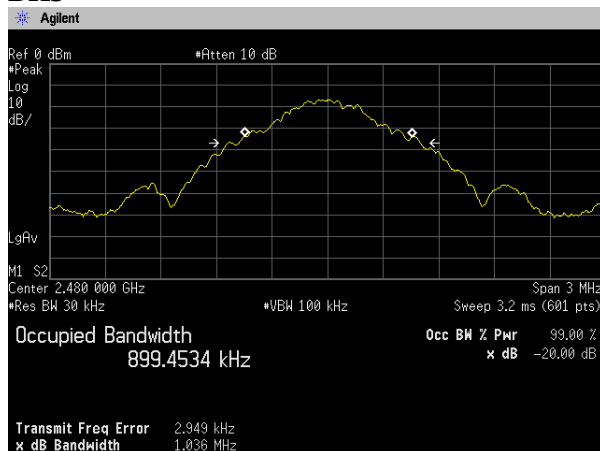


3-DH5

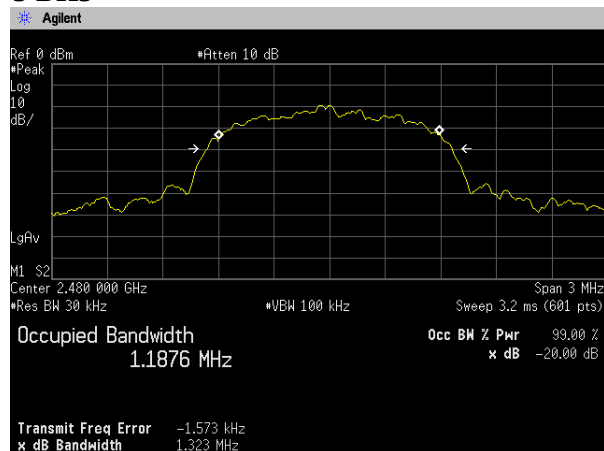


Channel High: 2480.0MHz

DH5



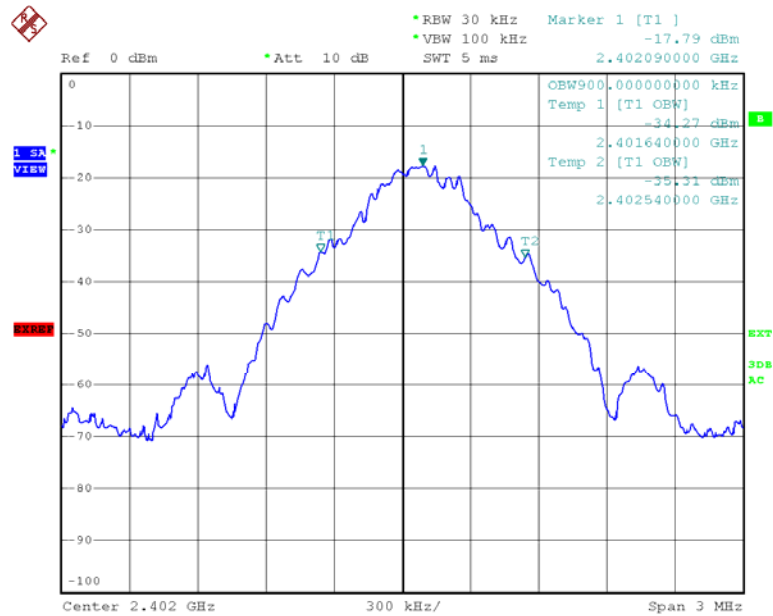
3-DH5



Occupied Bandwidth

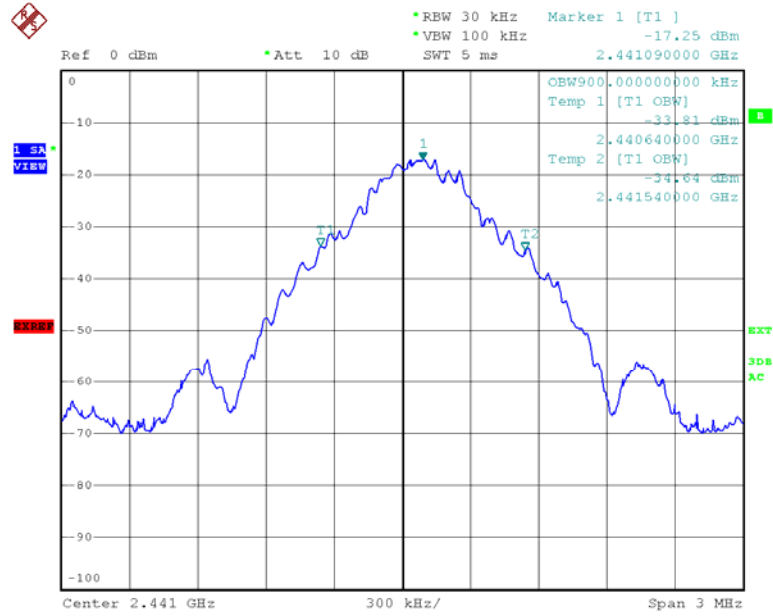
DH5

Channel Low: 2402.0MHz



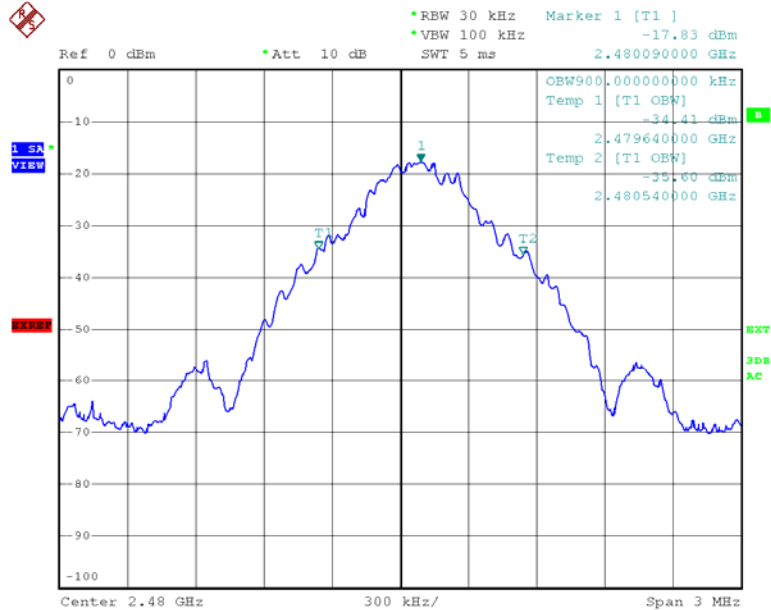
Date: 27.OCT.2010 08:53:01

Channel Middle: 2441.0MHz



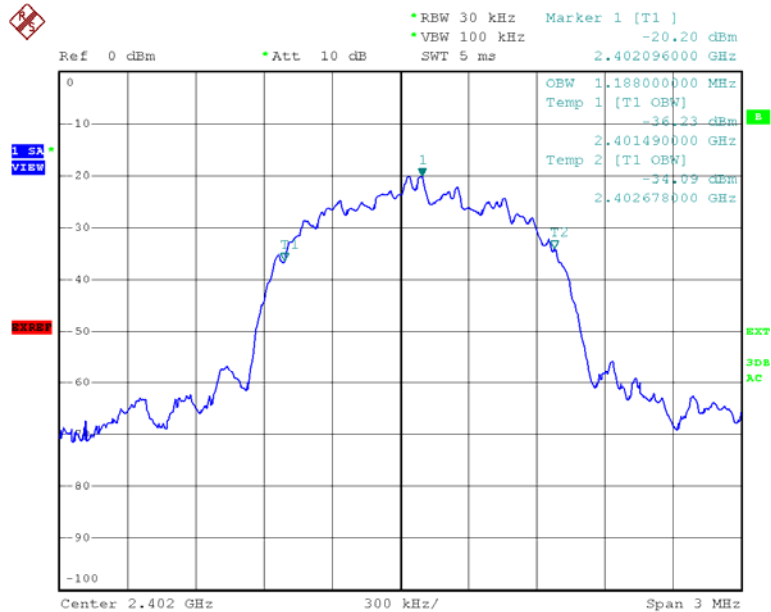
Date: 27.OCT.2010 08:54:36

Occupied Bandwidth
Channel High: 2480.0MHz



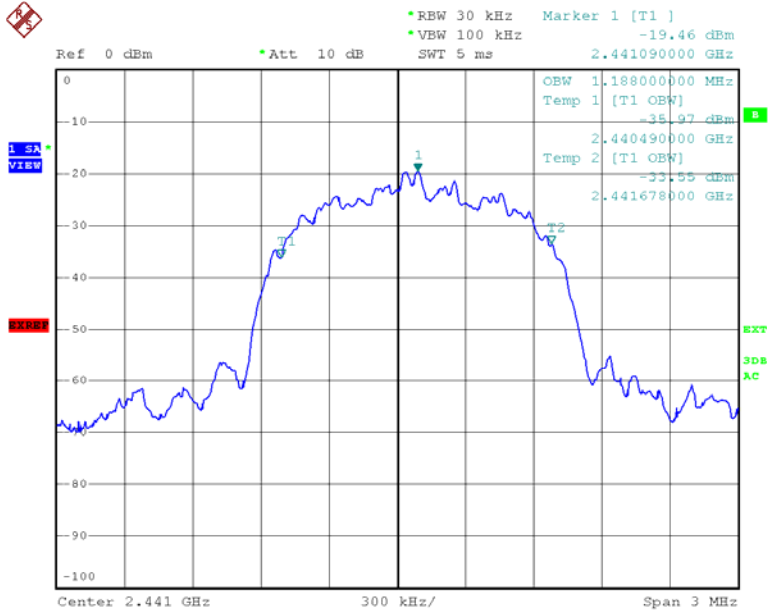
Date: 27.OCT.2010 08:56:27

3-DH5
Channel Low: 2402.0MHz



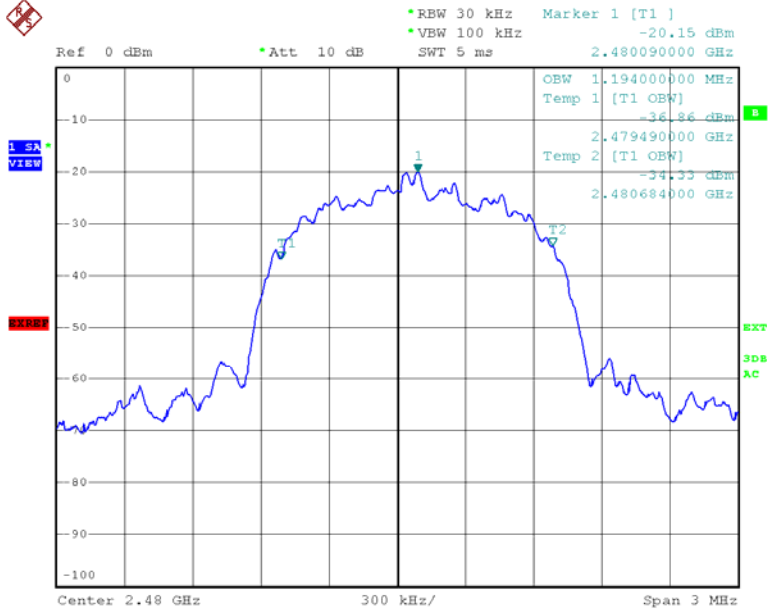
Date: 27.OCT.2010 09:01:28

Occupied Bandwidth
Channel Middle: 2441.0MHz



Date: 27.OCT.2010 09:00:04

Channel High: 2480.0MHz



Date: 27.OCT.2010 08:58:24

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

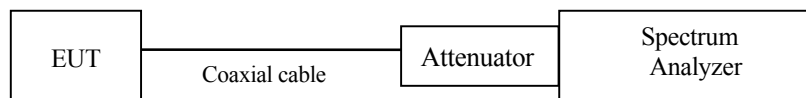
The EUT was set to operate with following conditions.

- Hopping (Channel Middle: 2441MHz)

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

Packet type	Channel separation (MHz)	Limit (MHz)	Result
DH5	1.01	>two-thirds of the 20dB Bandwidth =691.3kHz	PASS
3-DH5	1.01	>two-thirds of the 20dB Bandwidth =882kHz	PASS

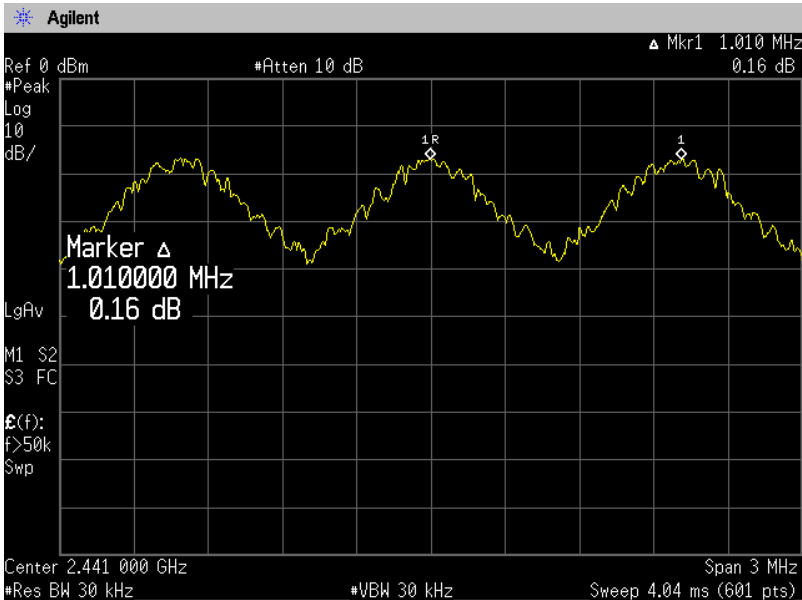
4.2.5 Trace Data

Test Personnel:

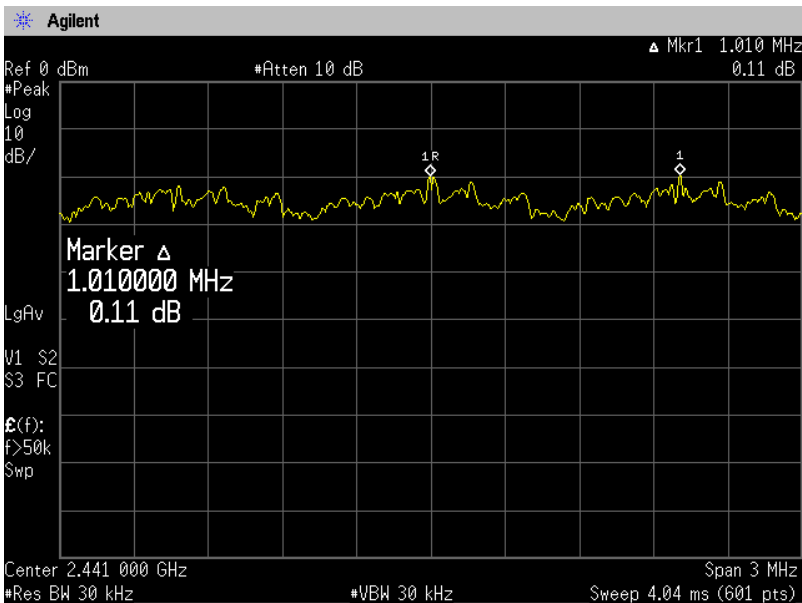
Tested by: Taiki Watanabe

Date : Sep. 14, 2010
 Temperature : 23.5 [°C]
 Humidity : 62.0 [%]
 Test place : Shielded room

Carrier Frequency Separation
Channel Middle: 2441.0MHz
DH5



3-DH5



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=510kHz, VBW=510kHz, Span=Arbitrary setting, Sweep=auto

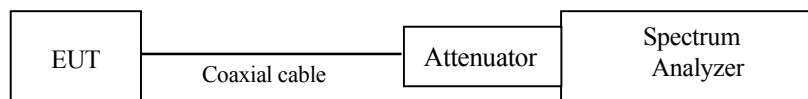
The EUT was set to operate with following conditions.

- 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

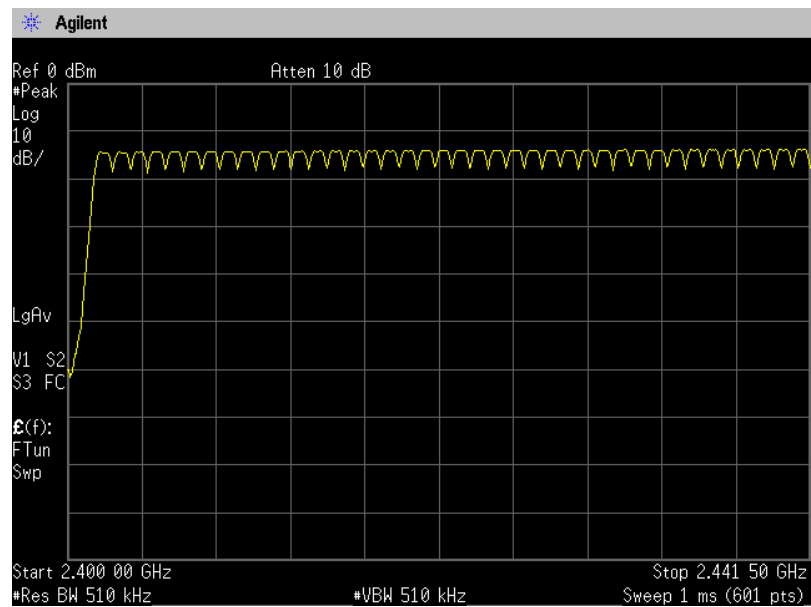
Test Personnel:

Tested by: Taiki Watanabe

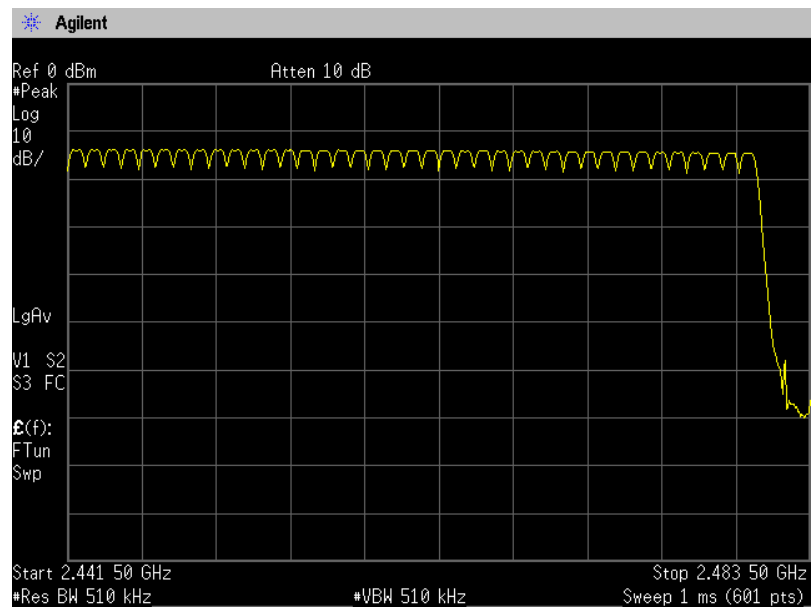
Date : Sep. 14, 2010
Temperature : 23.5 [°C]
Humidity : 62.0 [%]
Test place : Shielded room

Number of Hopping Frequencies

Lowest



Highest



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

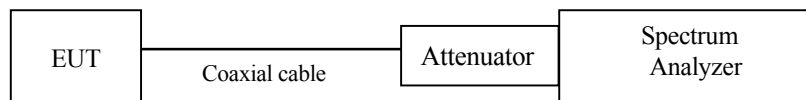
The EUT was set to operate with following conditions.

- Hopping (Channel Middle: 2441MHz)

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

GFSK

Channel	Frequency (MHz)	Packet type	Dwell time (ms)	Occupancy time of 31.6 seconds (s)	Limit	Result
Middle	2441.00	DH1	0.383	0.123	<0.4s	PASS
		DH3	1.633	0.261	<0.4s	PASS
		DH5	2.900	0.309	<0.4s	PASS

DH1 = Dwell time(ms) x 1600 / 2 / 79 x 31.6

DH3 = Dwell time(ms) x 1600 / 4 / 79 x 31.6

DH5 = Dwell time(ms) x 1600 / 6 / 79 x 31.6

8-DPSK

Channel	Frequency (MHz)	Packet type	Dwell time (ms)	Occupancy time of 31.6 seconds (s)	Limit	Result
Middle	2441.00	3-DH1	0.383	0.123	<0.4s	PASS
		3-DH3	1.650	0.264	<0.4s	PASS
		3-DH5	2.900	0.309	<0.4s	PASS

3-DH1 = Dwell time(ms) x 1600 / 2 / 79 x 31.6
 3-DH3 = Dwell time(ms) x 1600 / 4 / 79 x 31.6
 3-DH5 = Dwell time(ms) x 1600 / 6 / 79 x 31.6

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. 39, DH5 = 2.900 ms x 1600 / 6 / 79 x 31.6 = 309 ms

4.4.5 Trace Data

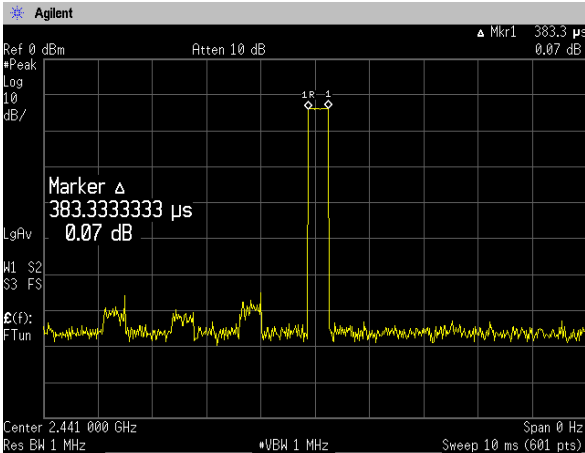
Test Personnel:

Tested by: Taiki Watanabe

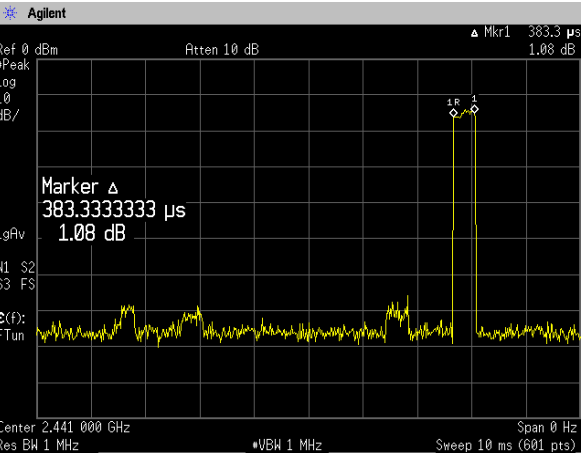
Date : Sep. 14, 2010
 Temperature : 23.5 [°C]
 Humidity : 62.0 [%]
 Test place : Shielded room

Dwell Time

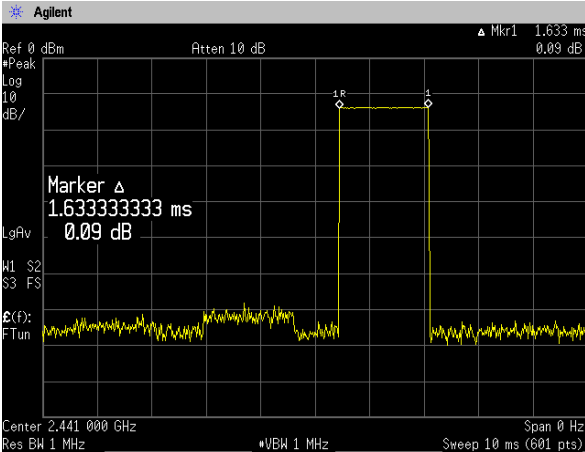
Channel Middle: 2441.0MHz
DH1



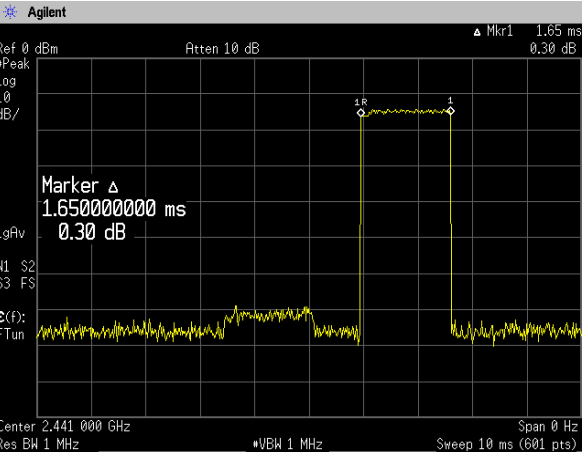
3-DH1



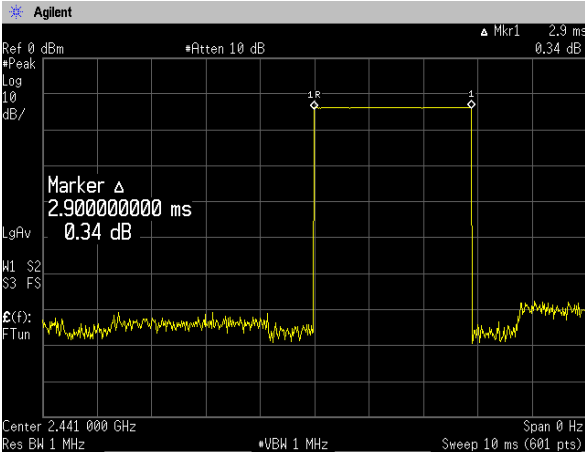
DH3



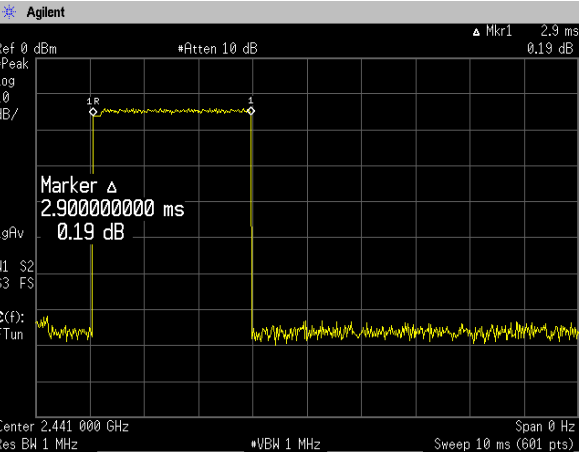
3-DH3



DH5



3-DH5



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

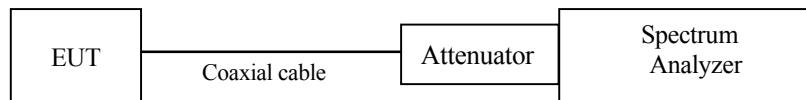
The EUT was set to operate with following conditions.

- Channel Low: 2402MHz, Channel Middle: 2441MHz, Channel High: 2480MHz

The test mode of EUT is as follows.

- Tx mode

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

Channel	Center Frequency (MHz)	Packet type	Reading (dBm)	Factor (dB)	Level (dBm)	Peak Output Power (mW)	Limit (mW)	Result
Low	2402.00	DH5	-14.19	10.20	-3.99	0.399	≤125	PASS
		3-DH5	-13.83	10.20	-3.63	0.434	≤125	PASS
Middle	2441.00	DH5	-13.63	10.20	-3.43	0.454	≤125	PASS
		3-DH5	-13.26	10.20	-3.06	0.494	≤125	PASS
High	2480.00	DH5	-14.29	10.20	-4.09	0.390	≤125	PASS
		3-DH5	-13.92	10.20	-3.72	0.425	≤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

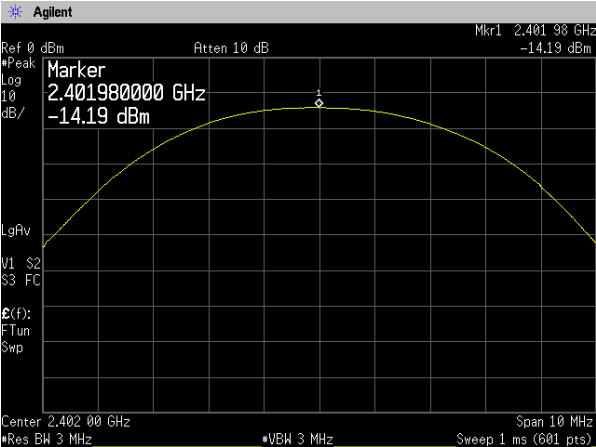
Test Personnel:

Tested by: Taiki Watanabe

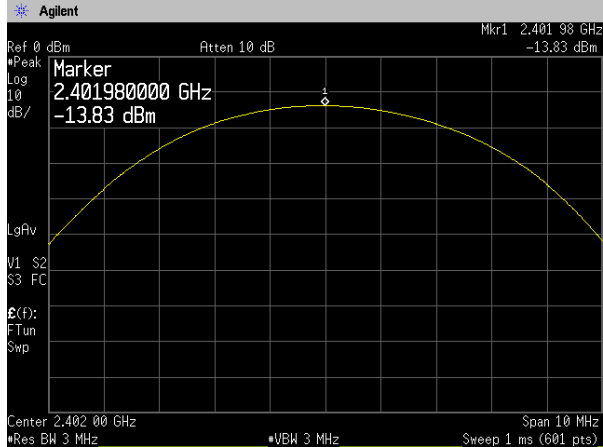
Date : Sep. 14, 2010
Temperature : 23.5 [°C]
Humidity : 62.0 [%]
Test place : Shielded room

Maximum Peak Output Power - Conducted -

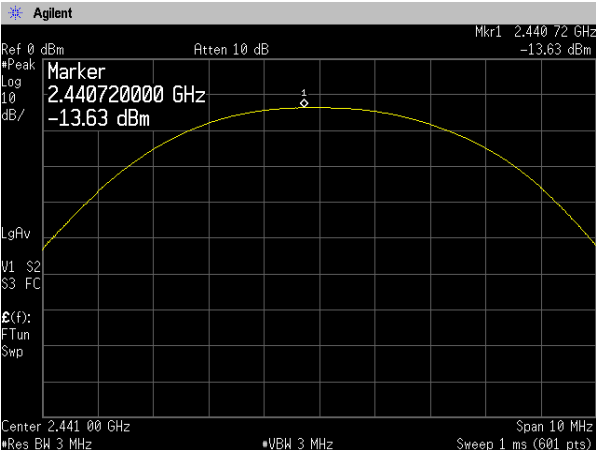
Channel Low: 2402.0MHz
DH5



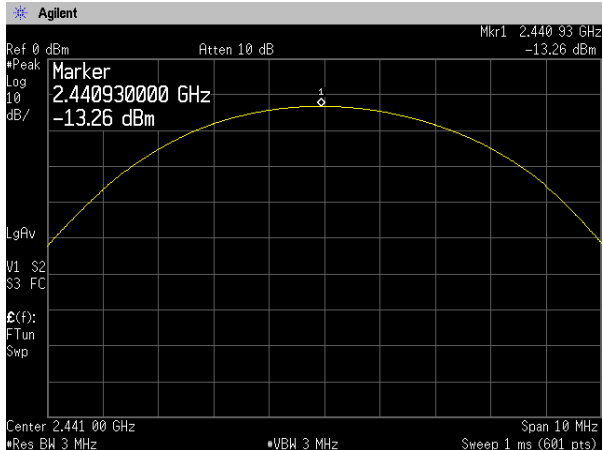
3-DH5



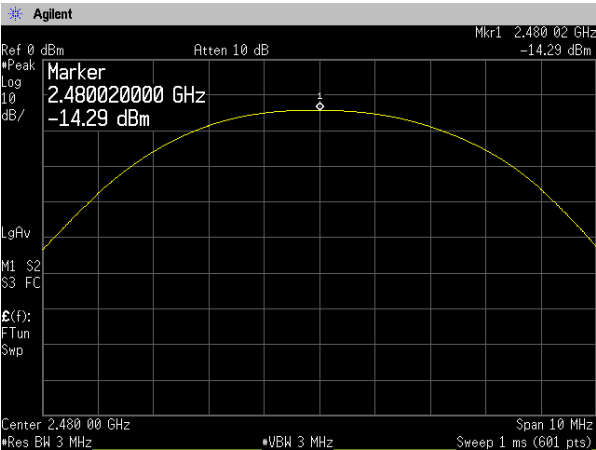
Channel Middle: 2441.0MHz
DH5



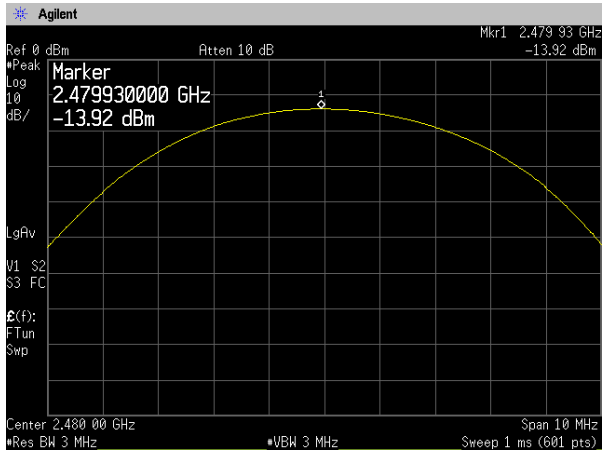
3-DH5



Channel High: 2480.0MHz
DH5



3-DH5



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

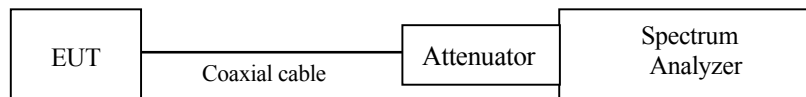
The EUT was set to operate with following conditions.

- Hopping, No hopping (Channel Low: 2402MHz, Channel High: 2480MHz)

The test mode of EUT is as follows.

- Tx mode

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)	Packet type	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2402.00	DH5	-14.86	2394.17	-73.08	58.22	At least 20dB below from peak of RF	PASS
		3-DH5	-17.07	2391.43	-68.80	51.73		PASS
High	2480.00	DH5	-14.65	2486.50	-70.14	55.49		PASS
		3-DH5	-16.81	2486.60	-70.26	53.45		PASS

[Tx mode (No hopping)]

Channel	Frequency (MHz)	Packet type	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2402.00	DH5	-14.33	2395.51	-71.66	57.33	At least 20dB below from peak of RF	PASS
		3-DH5	-16.66	2389.44	-69.14	52.48		PASS
High	2480.00	DH5	-14.48	2486.48	-68.34	53.86		PASS
		3-DH5	-16.81	2485.12	-74.43	57.62		PASS

4.6.5 Trace Data

Test Personnel:

Tested by: Taiki Watanabe

Date : Sep. 14, 2010

Temperature : 23.5 [°C]

Humidity : 62.0 [%]

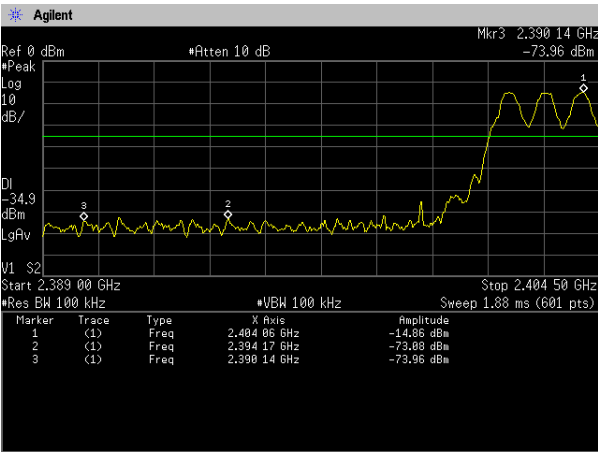
Test place : Shielded room

Band Edge Compliance of RF Conducted Emissions

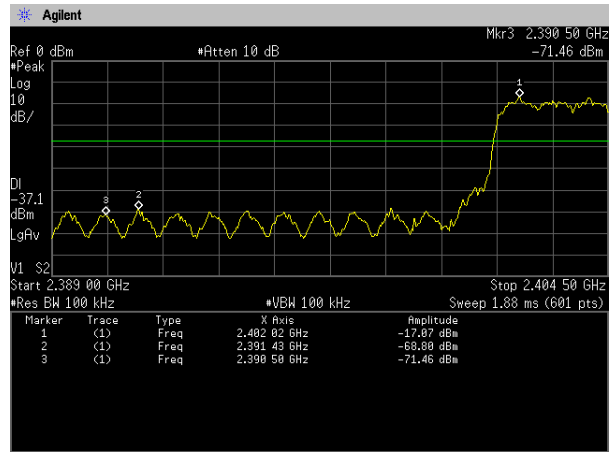
[Tx mode (Hopping)]

Channel Low: 2402.0MHz

DH5

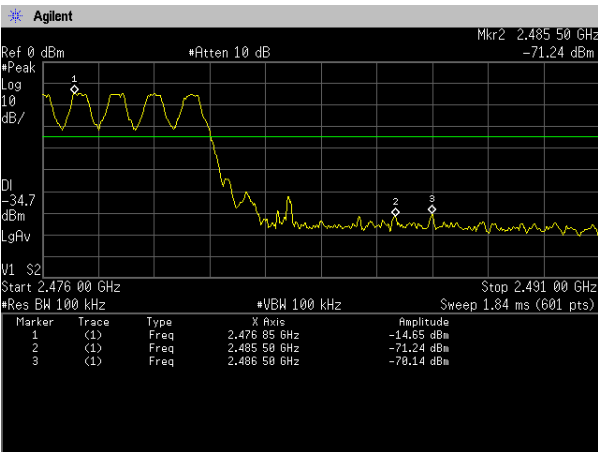


3-DH5

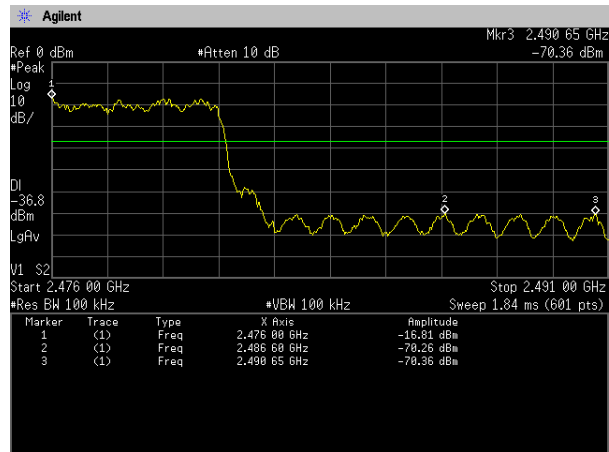


Channel High: 2480.0MHz

DH5



3-DH5

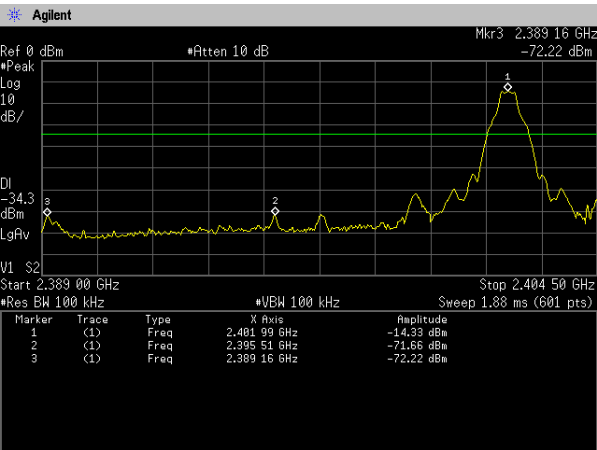


Band Edge Compliance of RF Conducted Emissions

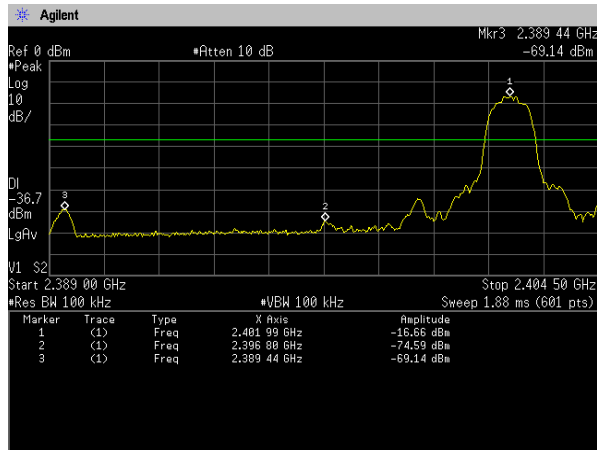
[Tx mode (No hopping)]

Channel Low: 2402.0MHz

DH5

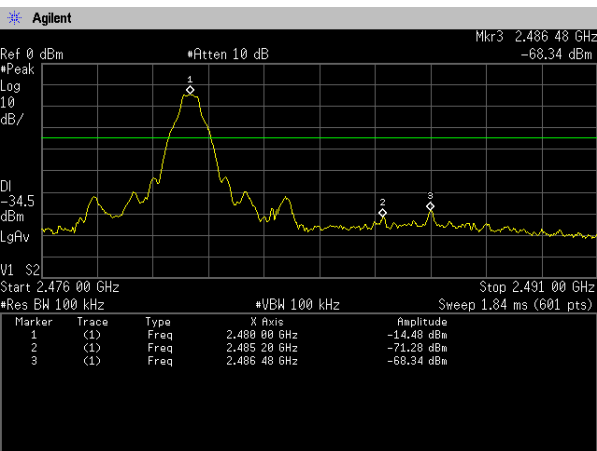


3-DH5

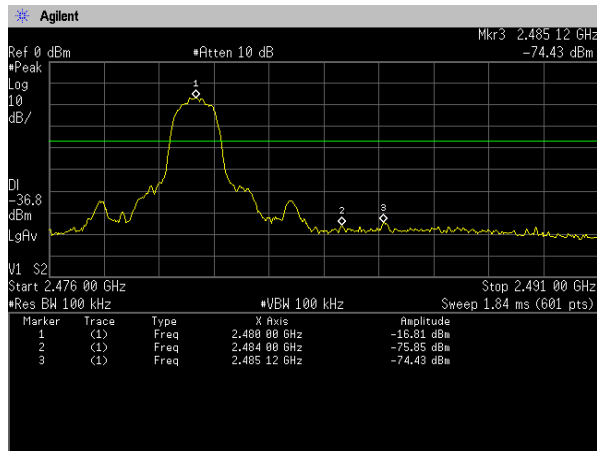


Channel High: 2480.0MHz

DH5



3-DH5



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 out-of-band emissions were measured from 30MHz to 25GHz.

The spectrum analyzer is set to:

- RBW=100kHz, VBW=300kHz, Span=Arbitrary setting, Sweep=Auto, Sweep points=1001

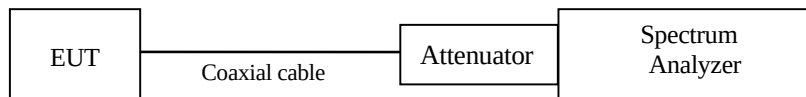
The EUT was set to operate with following conditions.

- Channel Low: 2402MHz, Channel Middle: 2441MHz, Channel High: 2480MHz

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	Result
Low	2402.0	At least 20dB below from peak of RF.	See the Trace Data	PASS
Middle	2441.0	At least 20dB below from peak of RF.	See the Trace Data	PASS
High	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 : Sep. 14, 2010
 Temperature : 23.5 [°C]
 Humidity : 62.0 [%]
 Test place : Shielded room

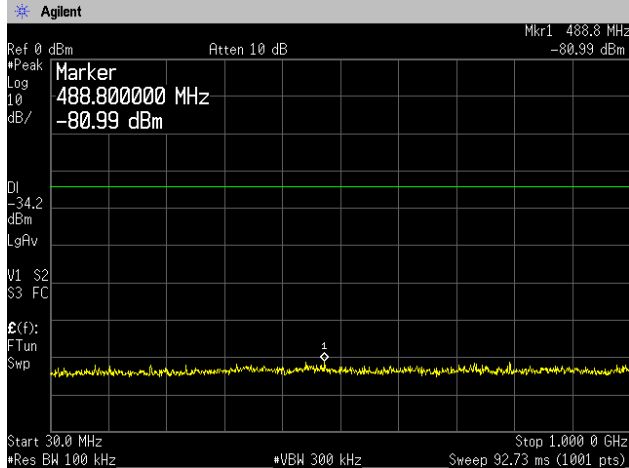
*The spectra were actually investigated properly for spurious emission and that we confirmed that no spurious exceeded the values reported in the spectra given in the test report (which show a limited number of points).

Spurious Emissions - Conducted -

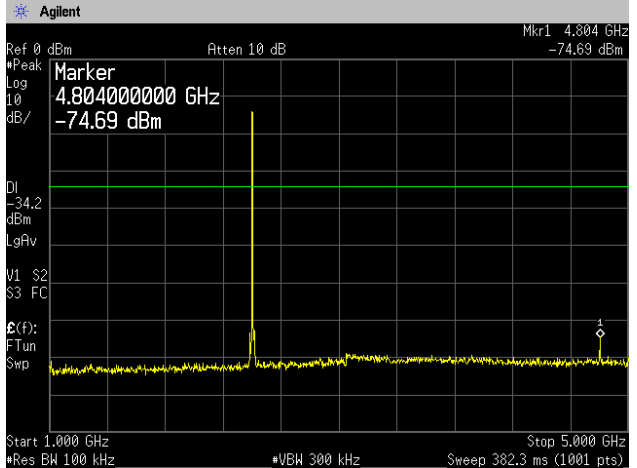
DH5

Channel Low: 2402.0MHz

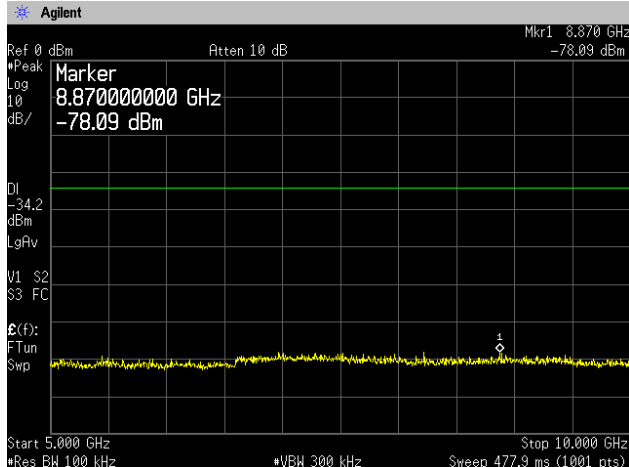
30MHz-1GHz



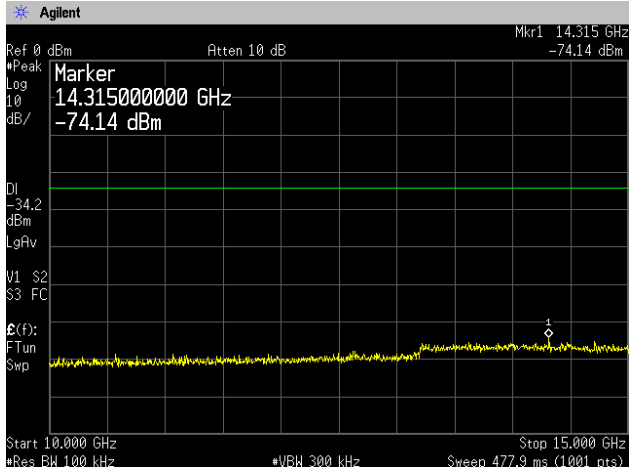
1GHz-5GHz



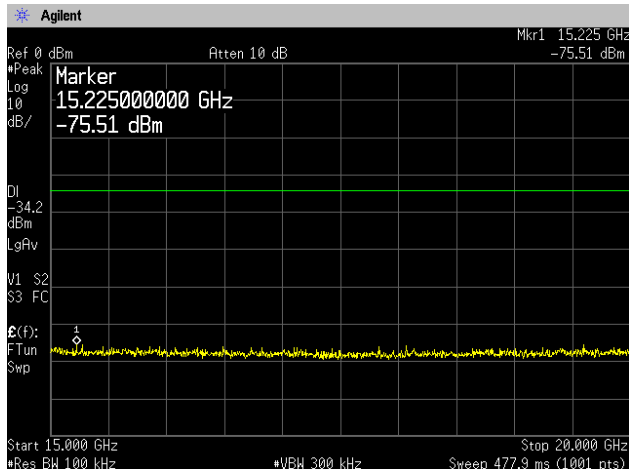
5GHz-10GHz



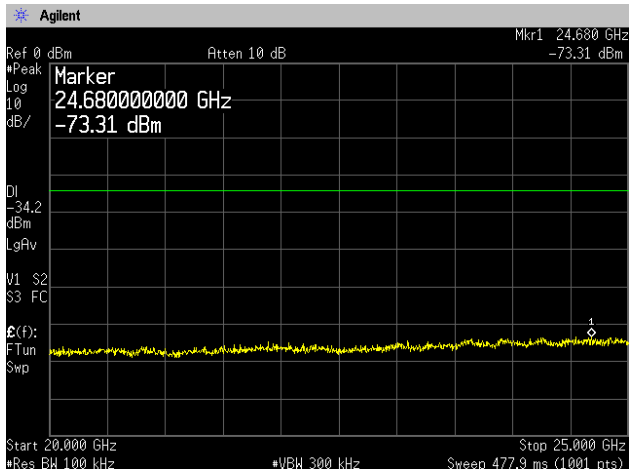
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

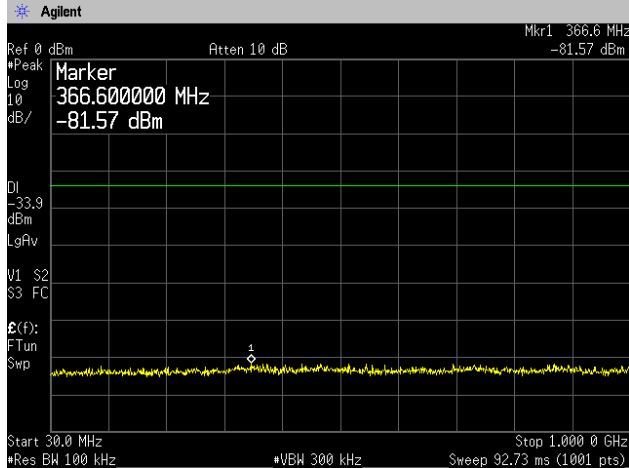


Spurious Emissions - Conducted -

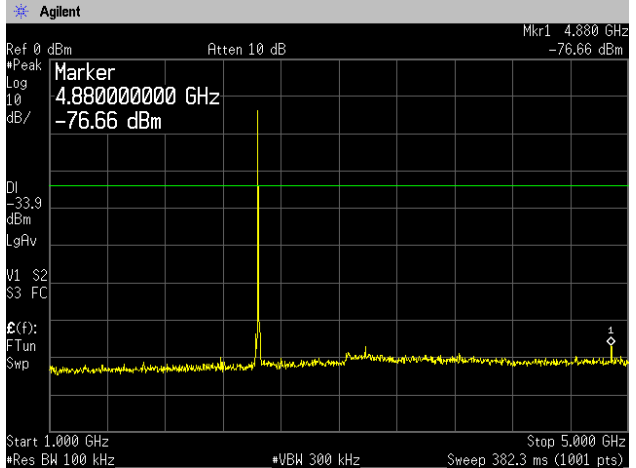
DH5

Channel Middle: 2441.0MHz

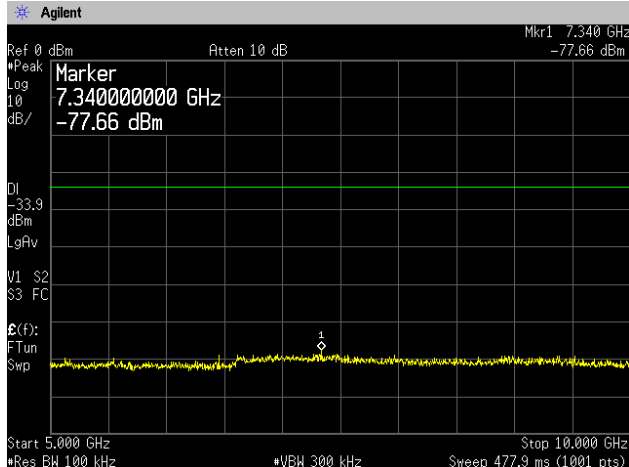
30MHz-1GHz



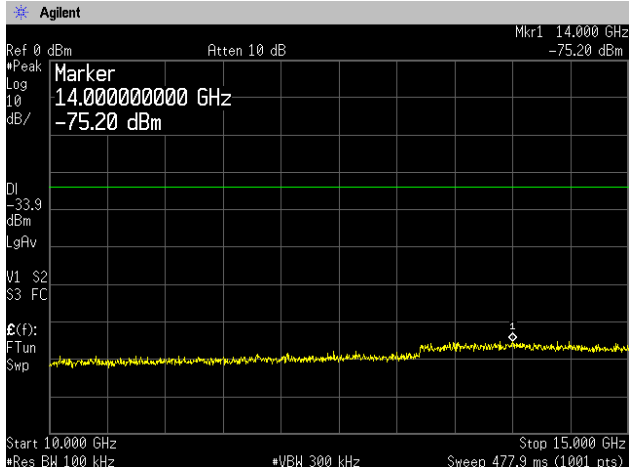
1GHz-5GHz



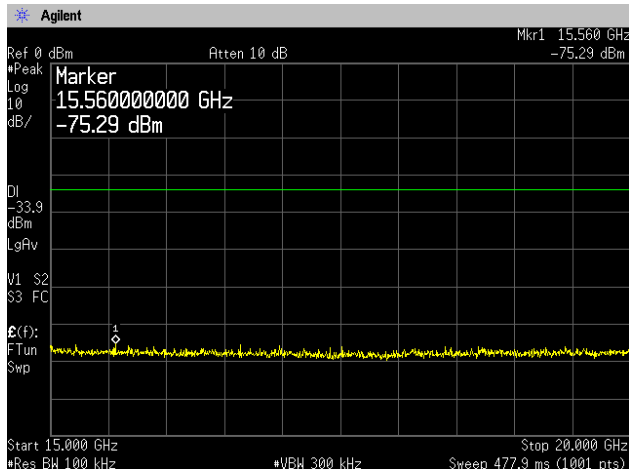
5GHz-10GHz



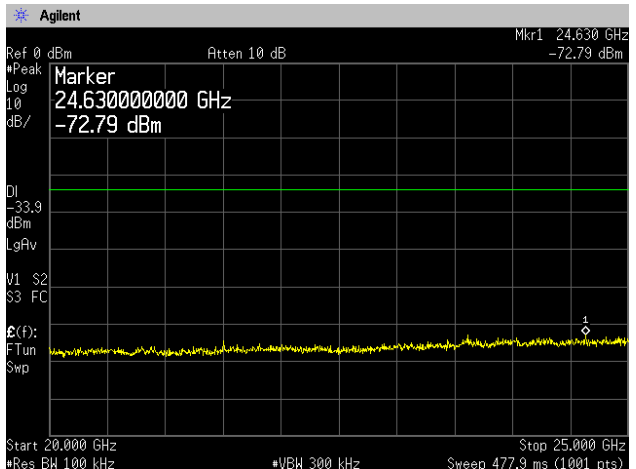
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

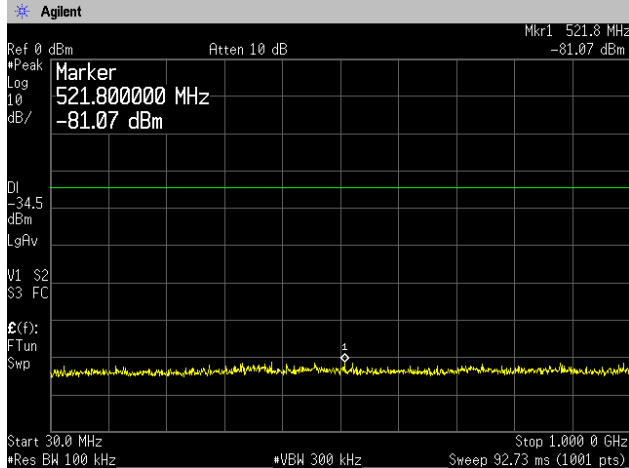


Spurious Emissions - Conducted -

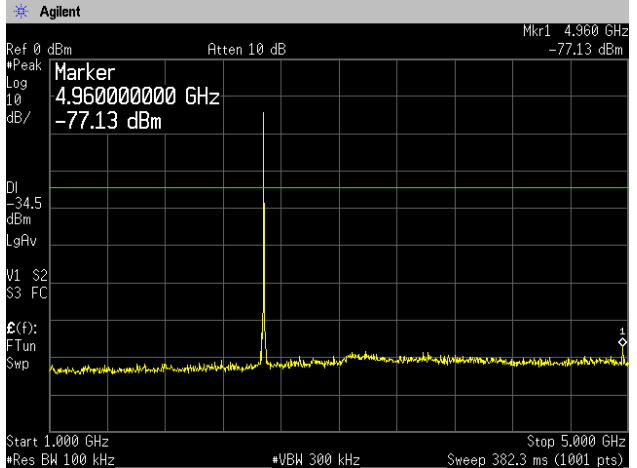
DH5

Channel High: 2480.0MHz

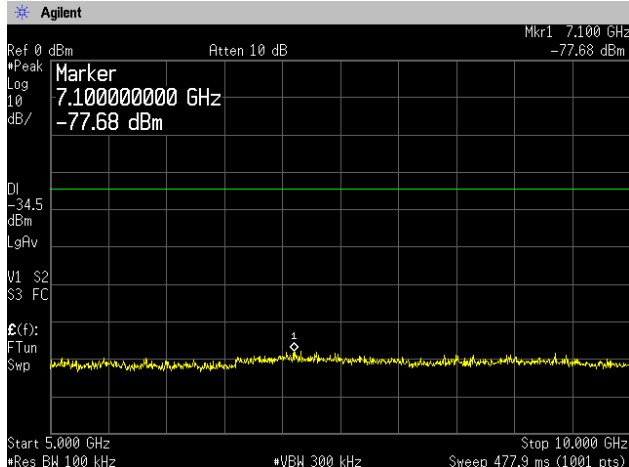
30MHz-1GHz



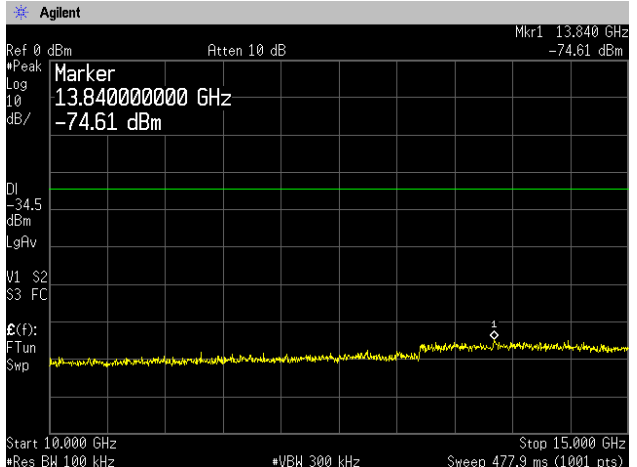
1GHz-5GHz



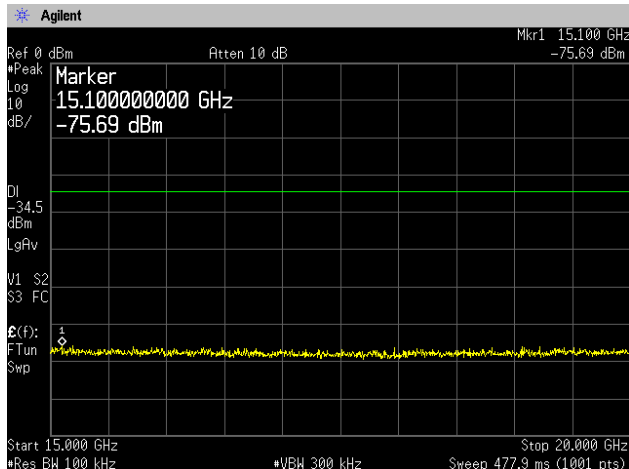
5GHz-10GHz



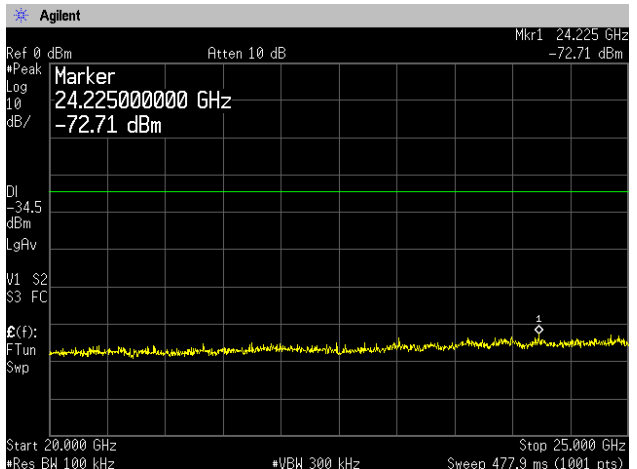
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

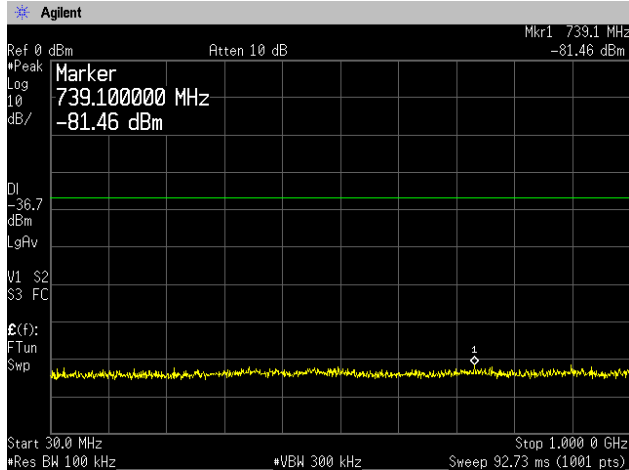


Spurious Emissions - Conducted -

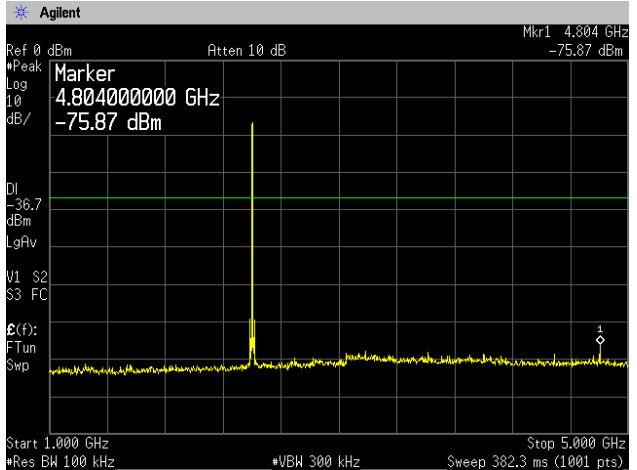
3-DH5

Channel Low: 2402.0MHz

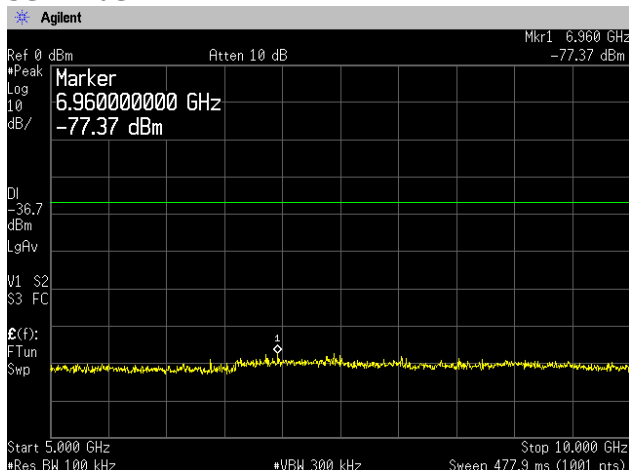
30MHz-1GHz



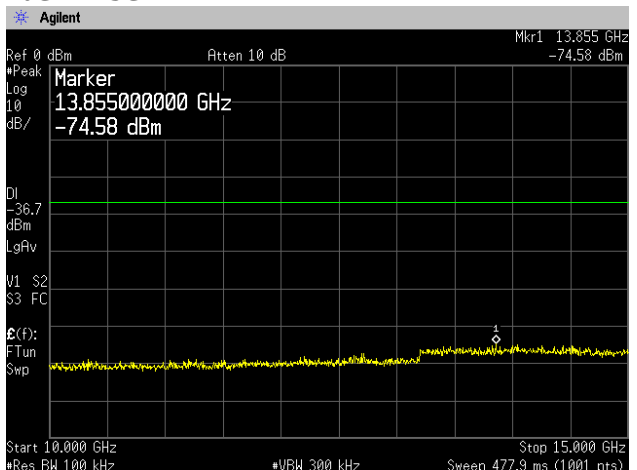
1GHz-5GHz



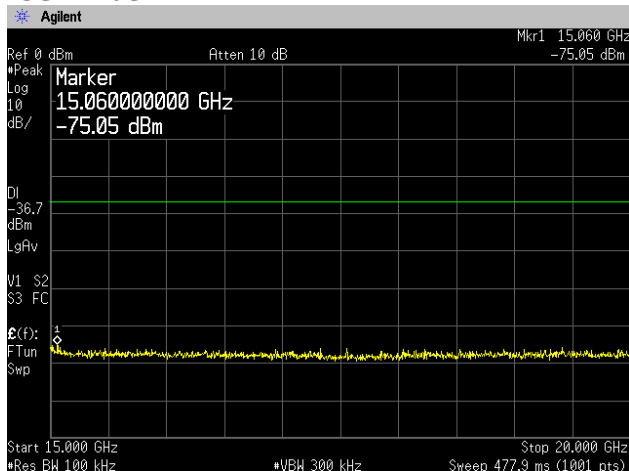
5GHz-10GHz



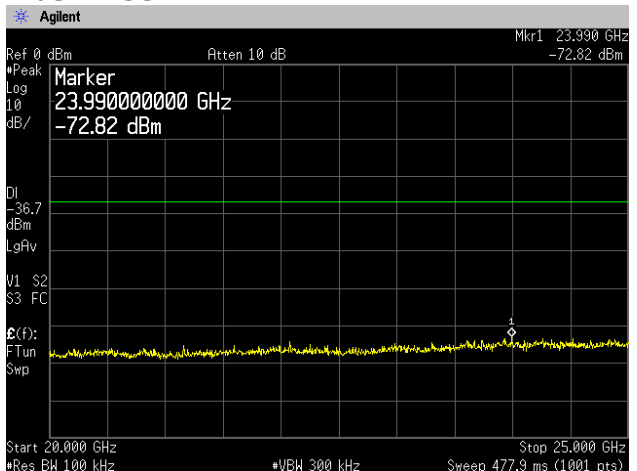
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

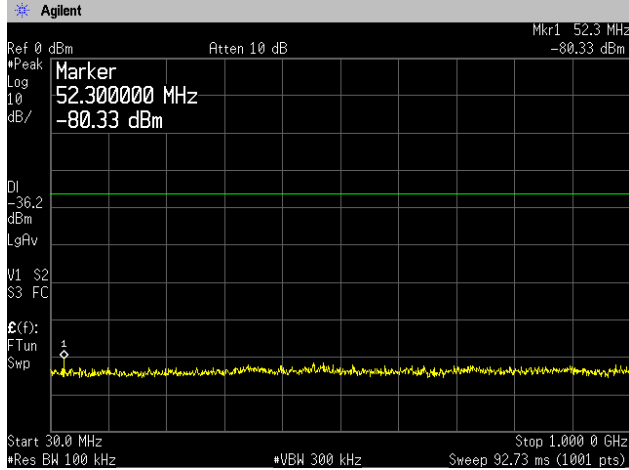


Spurious Emissions - Conducted -

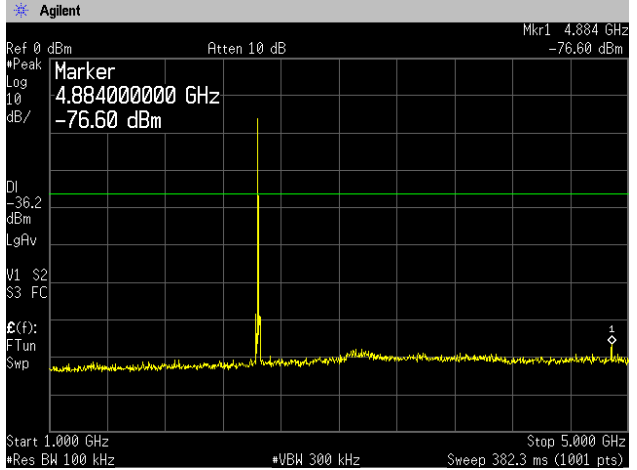
3-DH5

Channel Middle: 2441.0MHz

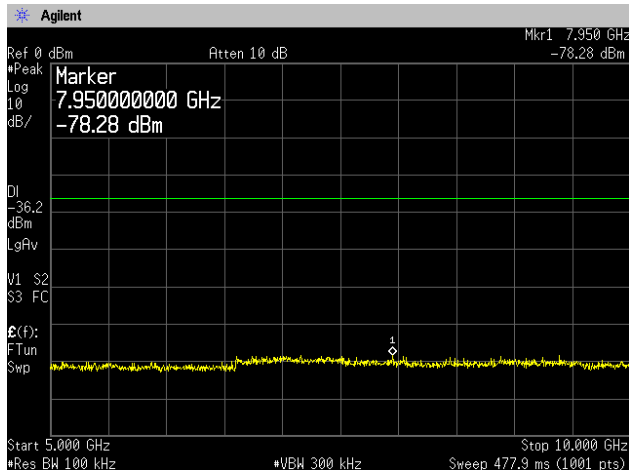
30MHz-1GHz



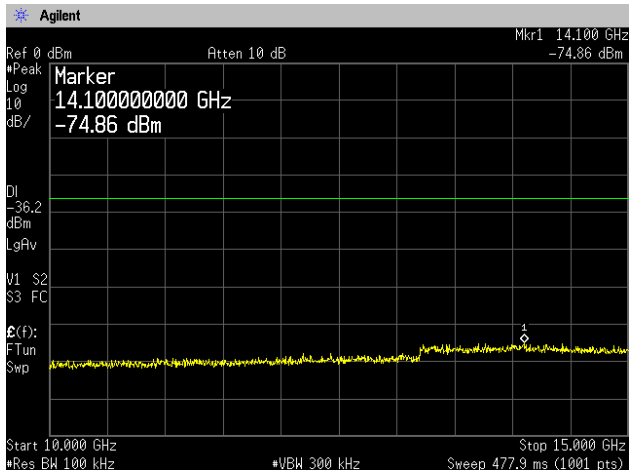
1GHz-5GHz



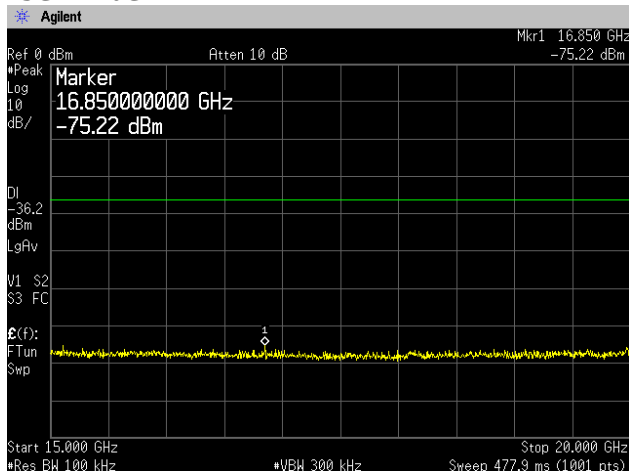
5GHz-10GHz



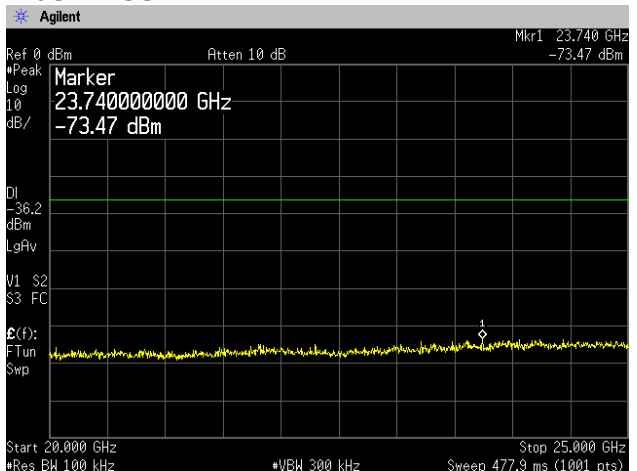
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

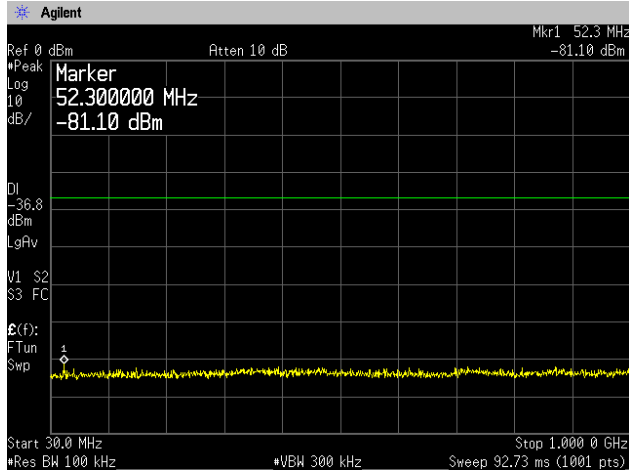


Spurious Emissions - Conducted -

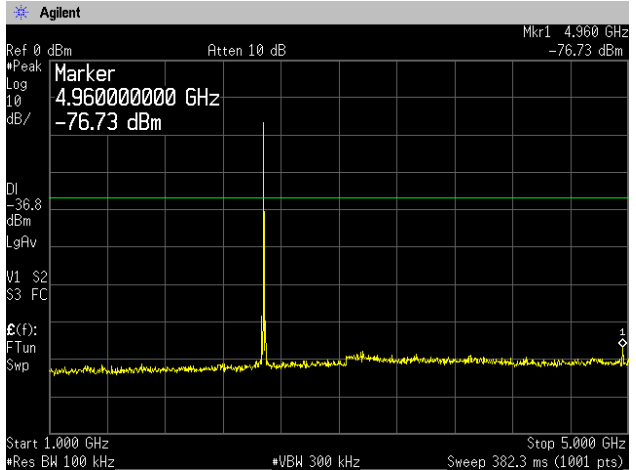
3-DH5

Channel High: 2480.0MHz

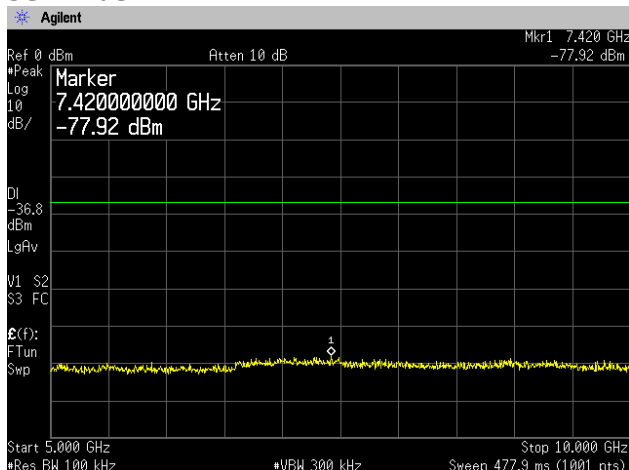
30MHz-1GHz



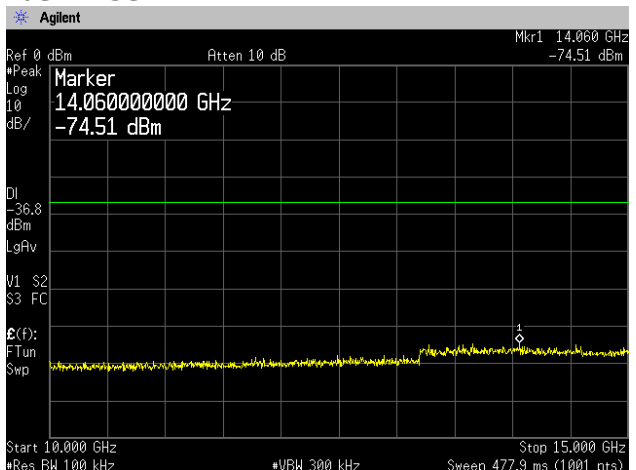
1GHz-5GHz



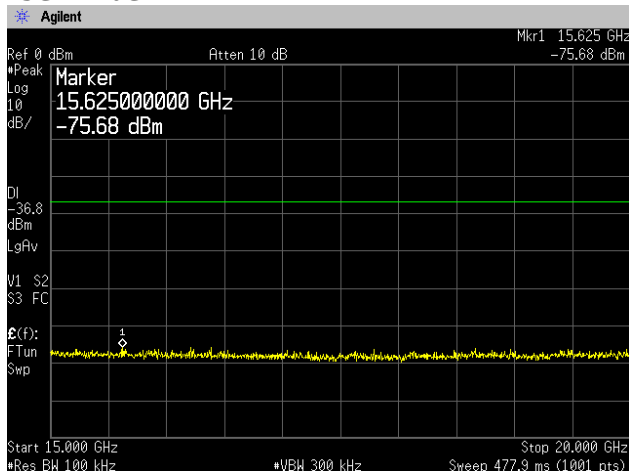
5GHz-10GHz



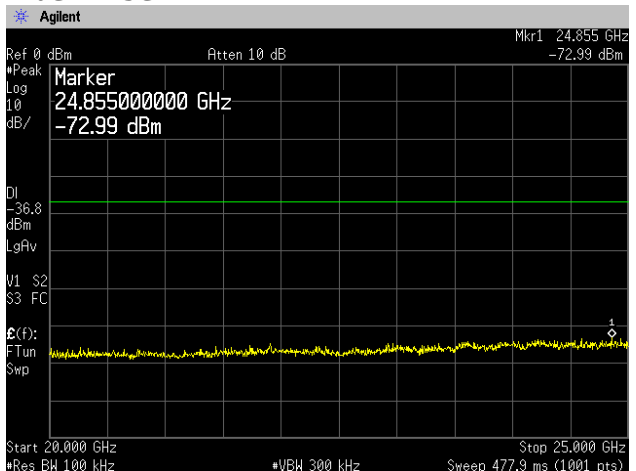
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



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.

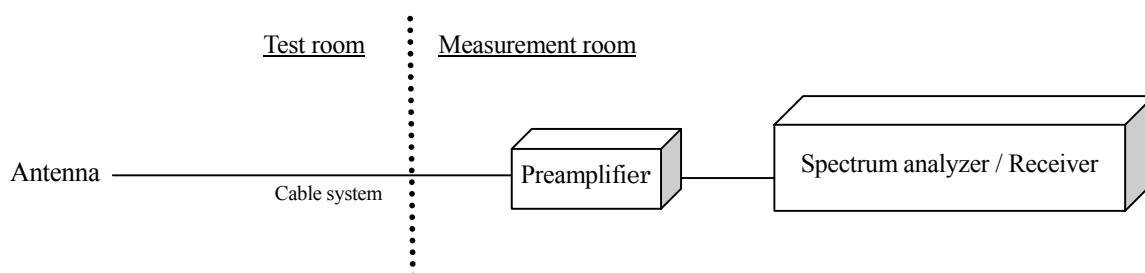
- Channel Low: 2402MHz, Channel Middle: 2441MHz, Channel High: 2480MHz

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

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

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: Hiroaki Suzuki

Date : Sep. 25, 2010
Temperature : 23.3 [°C]
Humidity : 66.1 [%]
Test place : 3m Semi-anechoic chamber

Test Personnel:

Tested by: Hiroaki Suzuki

Date : Sep. 27, 2010
Temperature : 21.3 [°C]
Humidity : 61.4 [%]
Test place : 3m Semi-anechoic chamber

Spurious Emissions - Radiated- Host device: Control Unit

DH5

Channel Low: 2402.0MHz

No.	Frequency	(P)	Reading	c. f	Result	Limit	Margin	Height	Angle
	[MHz]		QP [dB(μV)]		QP [dB(μV/m)]	[dB(μV/m)]	QP [dB]	[cm]	[°]
1	151.055	H	38.0	-8.9	29.1	43.5	14.4	194.0	255.0
2	190.668	H	43.9	-10.9	33.0	43.5	10.5	172.0	267.0
3	235.592	H	38.2	-9.6	28.6	46.0	17.4	128.0	136.0

No.	Frequency	(P)	Reading	Reading	c. f	Result	Result	Limit	Margin	Margin	Height	Angle
	[MHz]		AV [dB(μV)]	PK [dB(μV)]		AV [dB(μV/m)]	PK [dB(μV/m)]	[dB(μV/m)]	AV [dB]	PK [dB]	[cm]	[°]
1	4804.000	H		46.1	2.8		48.9	74.0		25.1	100.0	78.0
2	4804.000	H	32.8		2.8	35.6		54.0	18.4		100.0	78.0
3	4804.000	V		45.9	2.8		48.7	74.0		25.3	100.0	287.0
4	4804.000	V	32.8		2.8	35.6		54.0	18.4		100.0	287.0
5	7206.000	H		47.1	6.6		53.7	74.0		20.3	100.0	79.0
6	7206.000	H	34.2		6.6	40.8		54.0	13.2		100.0	79.0
7	7206.000	V		47.0	6.6		53.6	74.0		20.4	100.0	300.0
8	7206.000	V	34.2		6.6	40.8		54.0	13.2		100.0	300.0

Channel Middle: 2441.0MHz

No.	Frequency	(P)	Reading	c. f	Result	Limit	Margin	Height	Angle
	[MHz]		QP [dB(μV)]		QP [dB(μV/m)]	[dB(μV/m)]	QP [dB]	[cm]	[°]
1	151.046	H	38.0	-8.9	29.1	43.5	14.4	198.0	256.0
2	190.670	H	43.9	-10.9	33.0	43.5	10.5	168.0	262.0
3	235.579	H	38.2	-9.6	28.6	46.0	17.4	129.0	136.0

No.	Frequency	(P)	Reading	Reading	c. f	Result	Result	Limit	Margin	Margin	Height	Angle
	[MHz]		AV [dB(μV)]	PK [dB(μV)]		AV [dB(μV/m)]	PK [dB(μV/m)]	[dB(μV/m)]	AV [dB]	PK [dB]	[cm]	[°]
1	4882.000	H		46.1	3.0		49.1	74.0		24.9	100.0	69.0
2	4882.000	H	32.9		3.0	35.9		54.0	18.1		100.0	69.0
3	4882.000	V		45.5	3.0		48.5	74.0		25.5	100.0	298.0
4	4882.000	V	33.0		3.0	36.0		54.0	18.0		100.0	298.0
5	7323.000	H		47.4	7.3		54.7	74.0		19.3	100.0	72.0
6	7323.000	H	34.1		7.3	41.4		54.0	12.6		100.0	72.0
7	7323.000	V		46.6	7.3		53.9	74.0		20.1	100.0	306.0
8	7323.000	V	34.1		7.3	41.4		54.0	12.6		100.0	306.0

Channel High: 2480.0MHz

No.	Frequency	(P)	Reading	c. f	Result	Limit	Margin	Height	Angle
	[MHz]		QP [dB(μV)]		QP [dB(μV/m)]	[dB(μV/m)]	QP [dB]	[cm]	[°]
1	151.055	H	38.0	-8.9	29.1	43.5	14.4	200.0	259.0
2	190.660	H	43.9	-10.9	33.0	43.5	10.5	173.0	259.0
3	235.587	H	38.0	-9.6	28.4	46.0	17.6	130.0	139.0

No.	Frequency	(P)	Reading	Reading	c. f	Result	Result	Limit	Margin	Margin	Height	Angle
	[MHz]		AV [dB(μV)]	PK [dB(μV)]		AV [dB(μV/m)]	PK [dB(μV/m)]	[dB(μV/m)]	AV [dB]	PK [dB]	[cm]	[°]
1	4960.000	H		45.7	3.1		48.8	74.0		25.2	100.0	75.0
2	4960.000	H	33.1		3.1	36.2		54.0	17.8		100.0	75.0
3	4960.000	V		45.9	3.1		49.0	74.0		25.0	100.0	277.0
4	4960.000	V	33.1		3.1	36.2		54.0	17.8		100.0	277.0
5	7440.000	H		47.2	7.4		54.6	74.0		19.4	100.0	77.0
6	7440.000	H	34.0		7.4	41.4		54.0	12.6		100.0	77.0
7	7440.000	V		47.2	7.4		54.6	74.0		19.4	100.0	312.0
8	7440.000	V	34.0		7.4	41.4		54.0	12.6		100.0	312.0

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 - Host device: Control Unit

3-DH5

Channel Low: 2402.0MHz

No.	Frequency	(P)	Reading	c. f	Result	Limit	Margin	Height	Angle
	[MHz]		QP [dB(μV)]	[dB(1/m)]	QP [dB(μV/m)]	[dB(μV/m)]	QP [dB]	[cm]	[°]
1	151.050	H	38.1	-8.9	29.2	43.5	14.3	198.0	256.0
2	190.667	H	43.9	-10.9	33.0	43.5	10.5	173.0	255.0
3	235.255	H	39.1	-9.6	29.5	46.0	16.5	125.0	138.0
No.	Frequency	(P)	Reading	c. f	Result	Limit	Margin	Height	Angle
	[MHz]		AV [dB(μV)]	[dB(1/m)]	AV [dB(μV/m)]	[dB(μV/m)]	AV [dB]	[cm]	[°]
1	4804.000	H	45.6	2.8	48.4	74.0	25.6	100.0	60.0
2	4804.000	H	32.6	2.8	35.4	54.0	18.6	100.0	60.0
3	4804.000	V	45.8	2.8	48.6	74.0	25.4	100.0	299.0
4	4804.000	V	32.6	2.8	35.4	54.0	18.6	100.0	299.0
5	7206.000	H	47.6	6.6	54.2	74.0	19.8	100.0	82.0
6	7206.000	H	34.1	6.6	40.7	54.0	13.3	100.0	82.0
7	7206.000	V	47.7	6.6	54.3	74.0	19.7	100.0	310.0
8	7206.000	V	34.1	6.6	40.7	54.0	13.3	100.0	310.0

Channel Middle: 2441.0MHz

No.	Frequency	(P)	Reading	c. f	Result	Limit	Margin	Height	Angle
	[MHz]		QP [dB(μV)]	[dB(1/m)]	QP [dB(μV/m)]	[dB(μV/m)]	QP [dB]	[cm]	[°]
1	151.057	H	38.1	-8.9	29.2	43.5	14.3	198.0	255.0
2	190.670	H	43.8	-10.9	32.9	43.5	10.6	170.0	258.0
3	235.248	H	39.2	-9.6	29.6	46.0	16.4	120.0	140.0
No.	Frequency	(P)	Reading	c. f	Result	Limit	Margin	Height	Angle
	[MHz]		AV [dB(μV)]	[dB(1/m)]	AV [dB(μV/m)]	[dB(μV/m)]	AV [dB]	[cm]	[°]
1	4882.000	H	45.9	3.0	48.9	74.0	25.1	100.0	59.0
2	4882.000	H	32.9	3.0	35.9	54.0	18.1	100.0	59.0
3	4882.000	V	45.8	3.0	48.8	74.0	25.2	100.0	298.0
4	4882.000	V	32.9	3.0	35.9	54.0	18.1	100.0	298.0
5	7323.000	H	47.1	7.3	54.4	74.0	19.6	100.0	74.0
6	7323.000	H	34.0	7.3	41.3	54.0	12.7	100.0	74.0
7	7323.000	V	47.1	7.3	54.4	74.0	19.6	100.0	309.0
8	7323.000	V	34.0	7.3	41.3	54.0	12.7	100.0	309.0

Channel High: 2480.0MHz

No.	Frequency	(P)	Reading	c. f	Result	Limit	Margin	Height	Angle
	[MHz]		QP [dB(μV)]	[dB(1/m)]	QP [dB(μV/m)]	[dB(μV/m)]	QP [dB]	[cm]	[°]
1	151.037	H	38.0	-8.9	29.1	43.5	14.4	200.0	258.0
2	190.674	H	43.9	-10.9	33.0	43.5	10.5	172.0	260.0
3	235.250	H	39.2	-9.6	29.6	46.0	16.4	122.0	138.0
No.	Frequency	(P)	Reading	c. f	Result	Limit	Margin	Height	Angle
	[MHz]		AV [dB(μV)]	[dB(1/m)]	AV [dB(μV/m)]	[dB(μV/m)]	AV [dB]	[cm]	[°]
1	4960.000	H	46.4	3.1	49.5	74.0	24.5	100.0	72.0
2	4960.000	H	33.1	3.1	36.2	54.0	17.8	100.0	72.0
3	4960.000	V	46.6	3.1	49.7	74.0	24.3	100.0	309.0
4	4960.000	V	33.2	3.1	36.3	54.0	17.7	100.0	309.0
5	7440.000	H	47.1	7.4	54.5	74.0	19.5	100.0	63.0
6	7440.000	H	34.0	7.4	41.4	54.0	12.6	100.0	63.0
7	7440.000	V	46.7	7.4	54.1	74.0	19.9	100.0	322.0
8	7440.000	V	33.9	7.4	41.3	54.0	12.7	100.0	322.0

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 - Host device: Control Unit

Rx

Channel Low: 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	151.043	H	38.0	-8.9	29.1	43.5	14.4	188.0	262.0
2	190.653	H	43.9	-10.9	33.0	43.5	10.5	162.0	250.0
3	235.580	H	38.3	-9.6	28.7	46.0	17.3	120.0	138.0

Channel Middle: 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	151.044	H	38.1	-8.9	29.2	43.5	14.3	201.0	253.0
2	190.666	H	44.0	-10.9	33.1	43.5	10.4	163.0	257.0
3	235.577	H	38.2	-9.6	28.6	46.0	17.4	119.0	139.0

Channel High: 2480.0MHz

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	151.043	H	38.1	-8.9	29.2	43.5	14.3	204.0	258.0
2	190.675	H	44.0	-10.9	33.1	43.5	10.4	167.0	259.0
3	235.577	H	38.2	-9.6	28.6	46.0	17.4	115.0	136.0

Note:

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

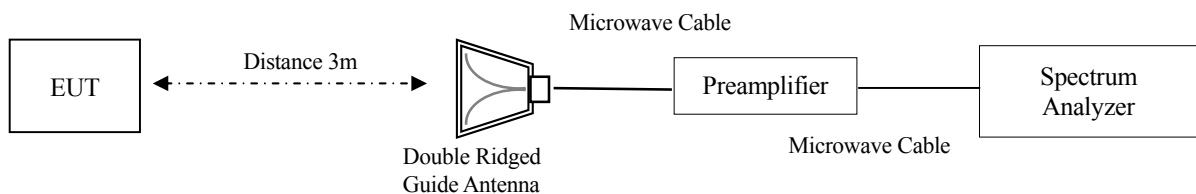
The EUT was set to operate with following conditions.

- Channel Low: 2402MHz, Channel High: 2480MHz

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

Packet type	Channel	Frequency[MHz]	Results Chart	Result
DH5	Low	2402.0	See the Trace Data	PASS
	High	2480.0	See the Trace Data	PASS
3-DH5	Low	2402.0	See the Trace Data	PASS
	High	2480.0	See the Trace Data	PASS

4.9.5 Trace Data

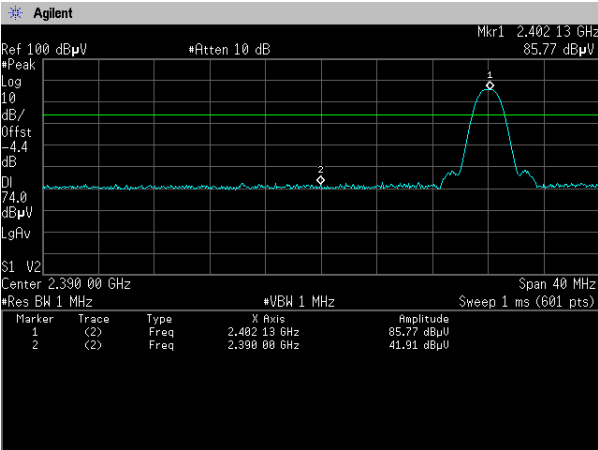
Test Personnel:

Tested by: Hiroaki Suzuki

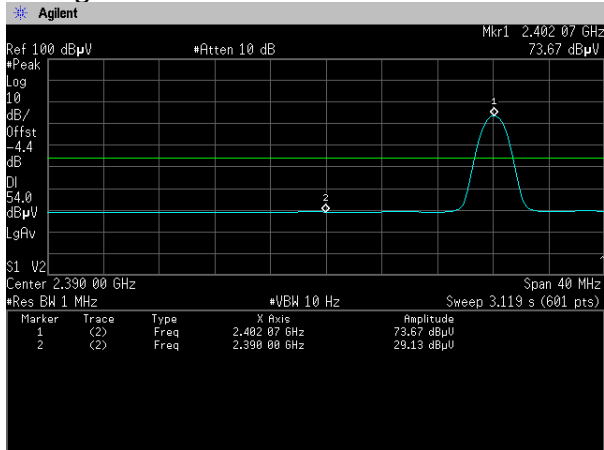
Date : Sep. 25, 2010
 Temperature : 23.3 [°C]
 Humidity : 66.1 [%]
 Test place : 3m Semi-anechoic chamber

Restricted Band of Operation

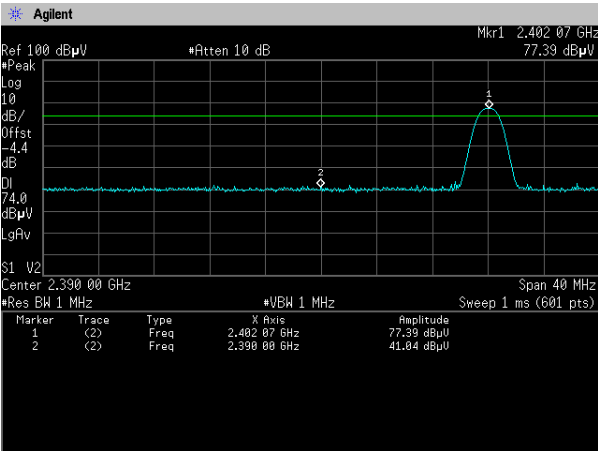
DH5
Channel Low: 2402.0MHz
-Horizontal-
Peak



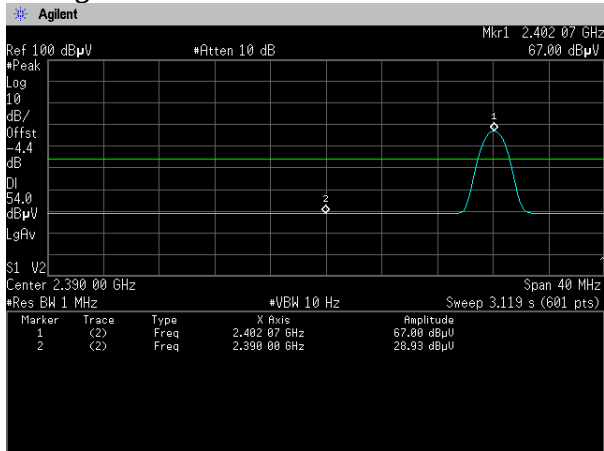
Average



-Vertical-
Peak

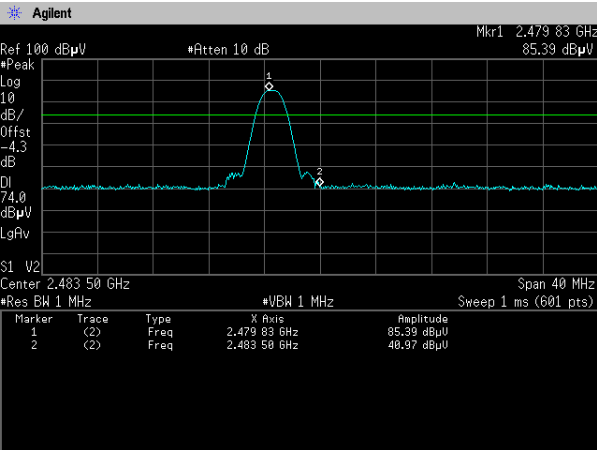


Average

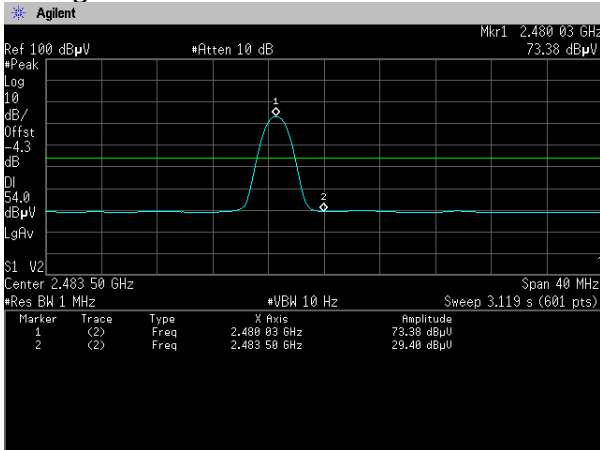


Restricted Band of Operation

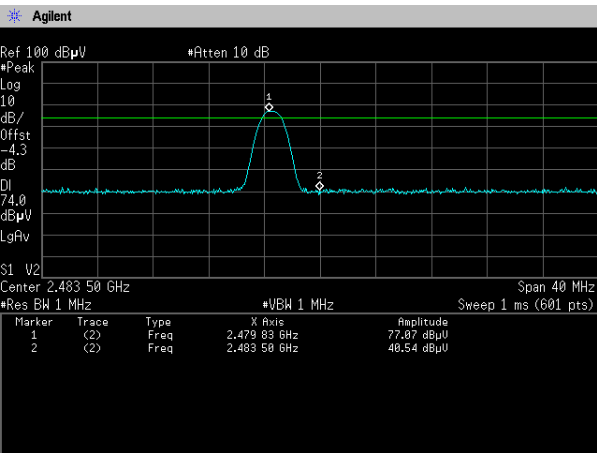
DH5
Channel High: 2480.0MHz
-Horizontal-
Peak



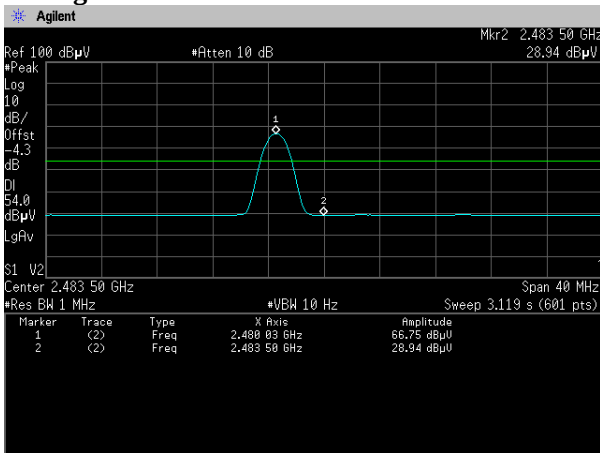
Average



-Vertical-
Peak

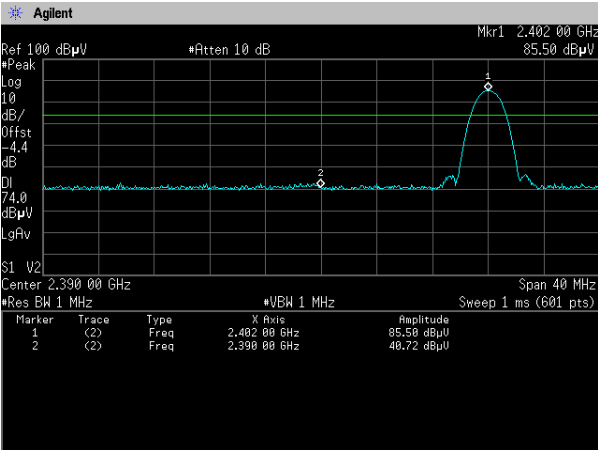


Average

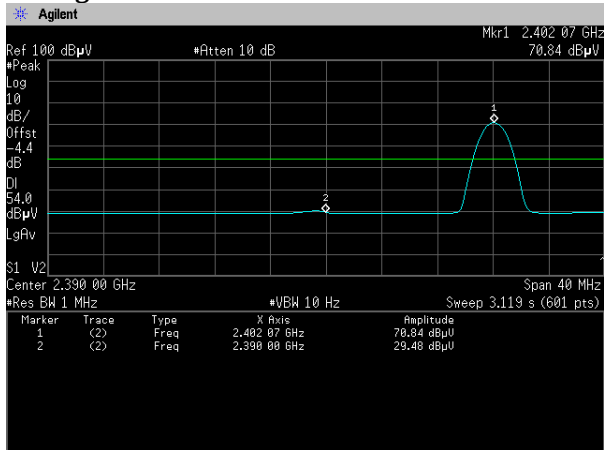


Restricted Band of Operation

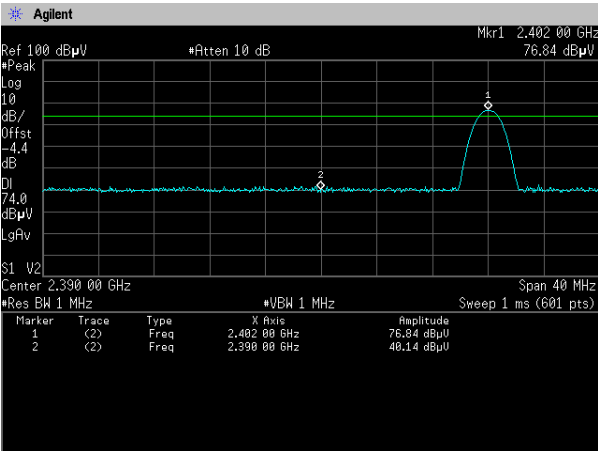
3-DH5
Channel Low: 2402.0MHz
-Horizontal-
Peak



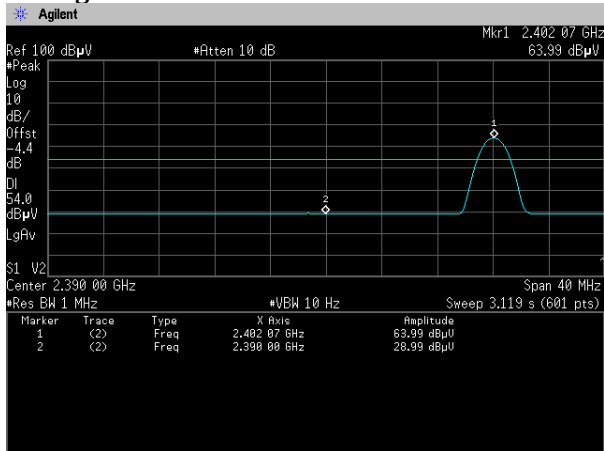
Average



-Vertical-
Peak

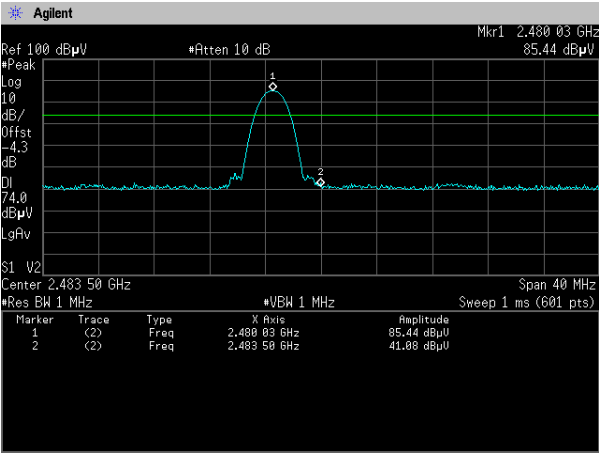


Average

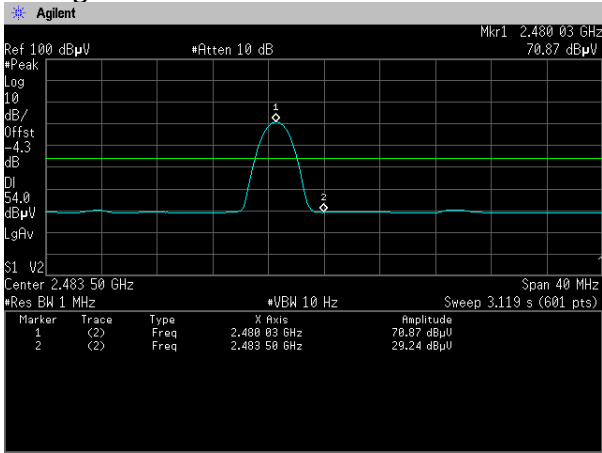


Restricted Band of Operation

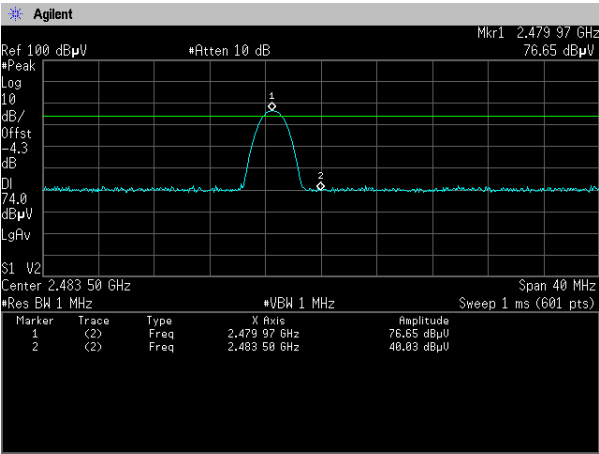
3-DH5
Channel High: 2480.0MHz
-Horizontal-
Peak



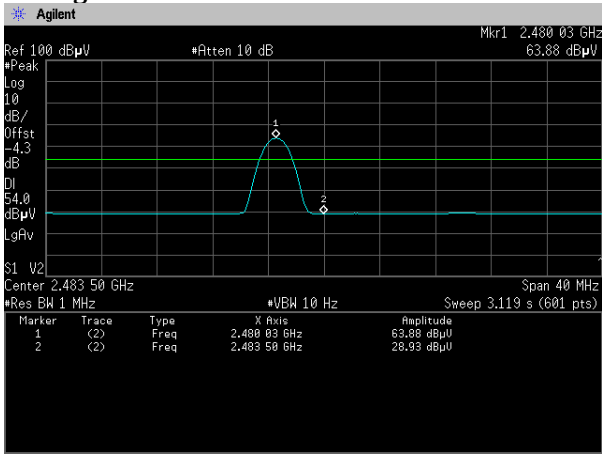
Average



-Vertical-
Peak



Average



4.10 AC power line Conducted Emissions

4.10.1 Test Procedure [FCC 15.207, IC RSS-Gen 7.2.2]

Conducted emission at AC mains port measurements are performed at 3m Semi-anechoic chamber according to ANSI C63.4 section 7.

EUT and support equipment are placed on FRP table of 2.0m(W) × 1.0m(D) × 0.8m(H) in size. EUT is connected to 50Ω/50μH Line impedance Stabilization network (LISN) which is placed on reference ground plane, and was placed 80cm away from EUT. Excess of AC power cable is bundled in center. Vertical Metal Reference Plane 2.0m (W) × 2.0m (H) in size is placed 0.4m away from EUT. LISN for peripheral is terminated in 50Ω.

EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Maximum emission configuration is determined by manipulating the EUT, support equipment, interconnecting cables. Then, emission measurements are performed with test receiver in above setting to each current-carrying conductor of the mains port. Sufficient time for EUT, support equipment and test equipment are provided in order for them to warm up to their normal operating condition.

Frequency range:

- 0.15MHz to 30MHz

The Test receiver is set to:

- Detector: Quasi-peak, Average
- Bandwidth: 9kHz

The EUT was set to operate with following conditions.

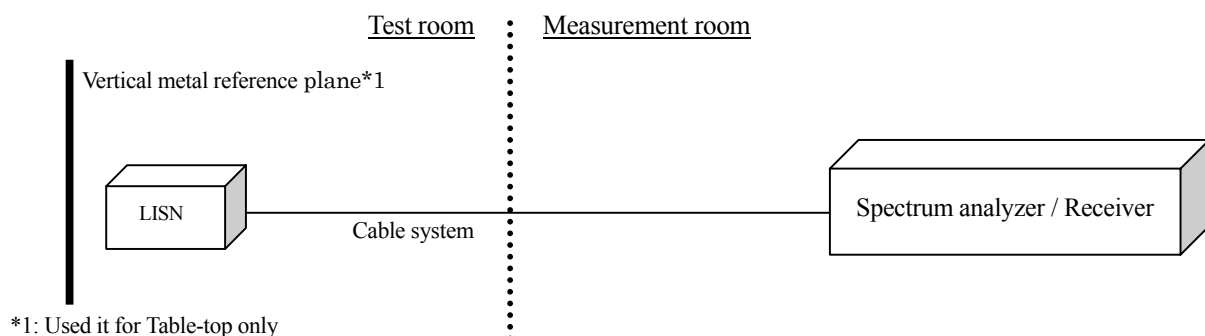
- Channel Low: 2402MHz, Channel Middle: 2441MHz, Channel High: 2480MHz

The test mode of EUT is as follows.

- Tx mode
- Rx mode

4.10.2 Measurement Setup

Test configuration for AC power line Conducted Emissions



*1: Used it for Table-top only

4.10.3 Limit of AC power line Conducted Emissions Measurement

Frequency	Limit	
	QP(dBμV)	AV(dBμV)
0.15MHz to 0.5MHz	66 to 56*	56 to 46*
0.5MHz to 5MHz	56	46
5MHz to 30MHz	60	50

*: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

4.10.4 Calculation method

Emission level = Reading + (LISN. factor + Cable system loss)

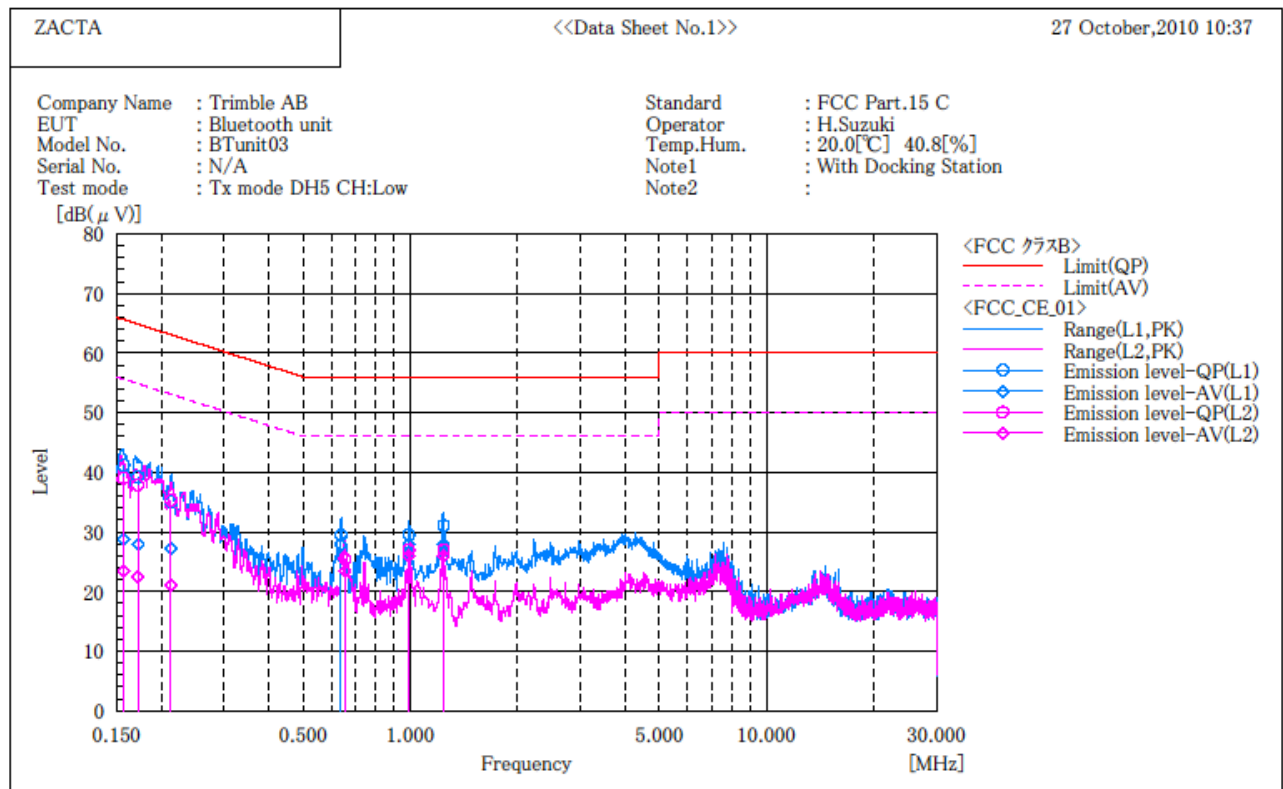
Margin = Limit – Emission level

4.10.5 Measurement Result

DH5

Channel Low: 2402.0MHz

***** CONDUCTED EMISSION at MAINS PORT *****
<< 3m Semi-anechoic chamber >>



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.157	31.0	18.5	10.2	41.2	28.7	65.6	55.6	24.4	26.9
2	0.172	29.0	17.7	10.2	39.2	27.9	64.9	54.9	25.7	27.0
3	0.213	24.9	17.0	10.1	35.0	27.1	63.1	53.1	28.1	26.0
4	0.639	19.3	17.8	10.1	29.4	27.9	56.0	46.0	26.6	18.1
5	0.992	19.4	17.8	10.1	29.5	27.9	56.0	46.0	26.5	18.1
6	1.240	21.0	17.9	10.1	31.1	28.0	56.0	46.0	24.9	18.0

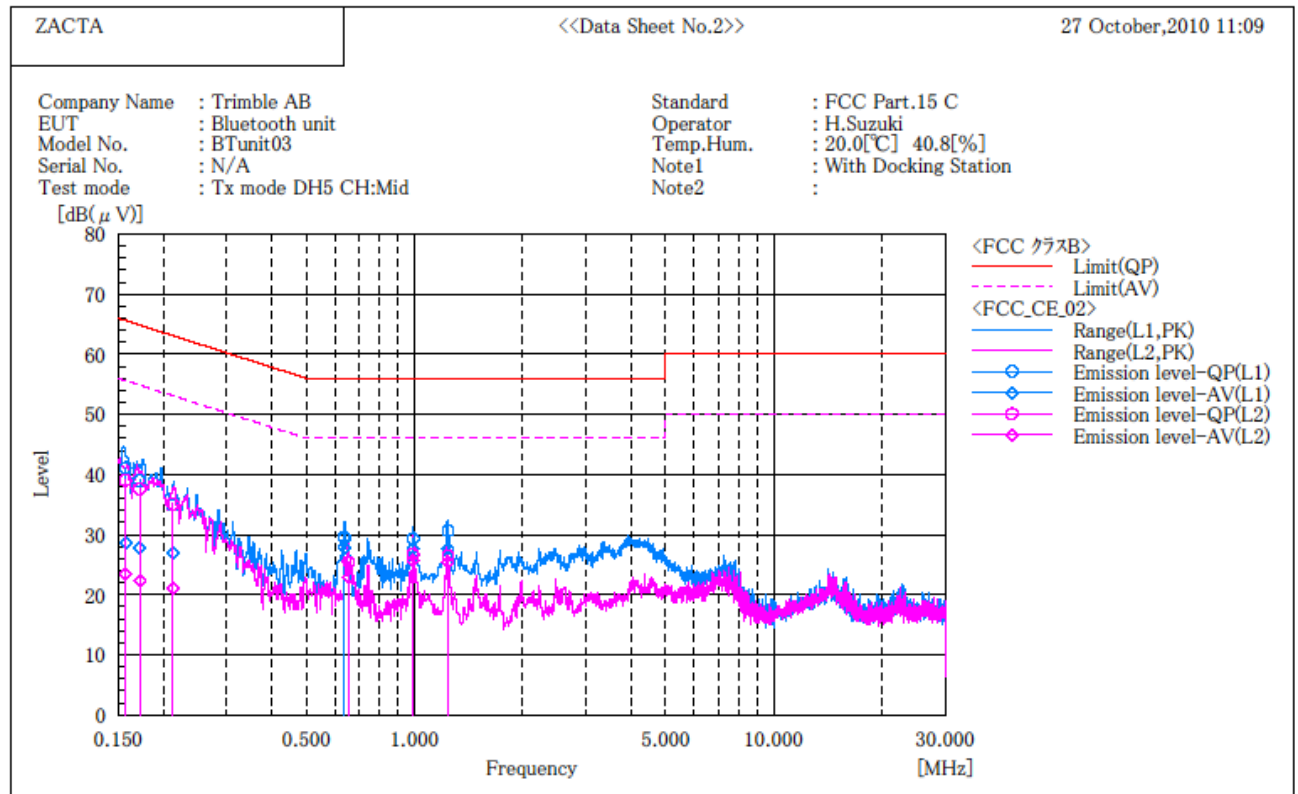
--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.157	28.8	13.2	10.2	39.0	23.4	65.6	55.6	26.6	32.2
2	0.172	27.7	12.3	10.1	37.8	22.4	64.9	54.9	27.1	32.5
3	0.213	25.2	10.9	10.1	35.3	21.0	63.1	53.1	27.8	32.1
4	0.656	15.5	13.4	10.0	25.5	23.4	56.0	46.0	30.5	22.6
5	0.992	17.0	16.0	10.0	27.0	26.0	56.0	46.0	29.0	20.0
6	1.240	17.0	16.0	10.0	27.0	26.0	56.0	46.0	29.0	20.0

DH5

Channel Middle: 2441.0MHz

***** CONDUCTED EMISSION at MAINS PORT *****
 << 3m Semi-anechoic chamber >>



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.157	30.9	18.4	10.2	41.1	28.6	65.6	55.6	24.5	27.0
2	0.172	28.8	17.6	10.2	39.0	27.8	64.9	54.9	25.9	27.1
3	0.213	24.8	16.9	10.1	34.9	27.0	63.1	53.1	28.2	26.1
4	0.639	19.4	17.8	10.1	29.5	27.9	56.0	46.0	26.5	18.1
5	0.992	19.2	17.5	10.1	29.3	27.6	56.0	46.0	26.7	18.4
6	1.240	20.5	17.5	10.1	30.6	27.6	56.0	46.0	25.4	18.4

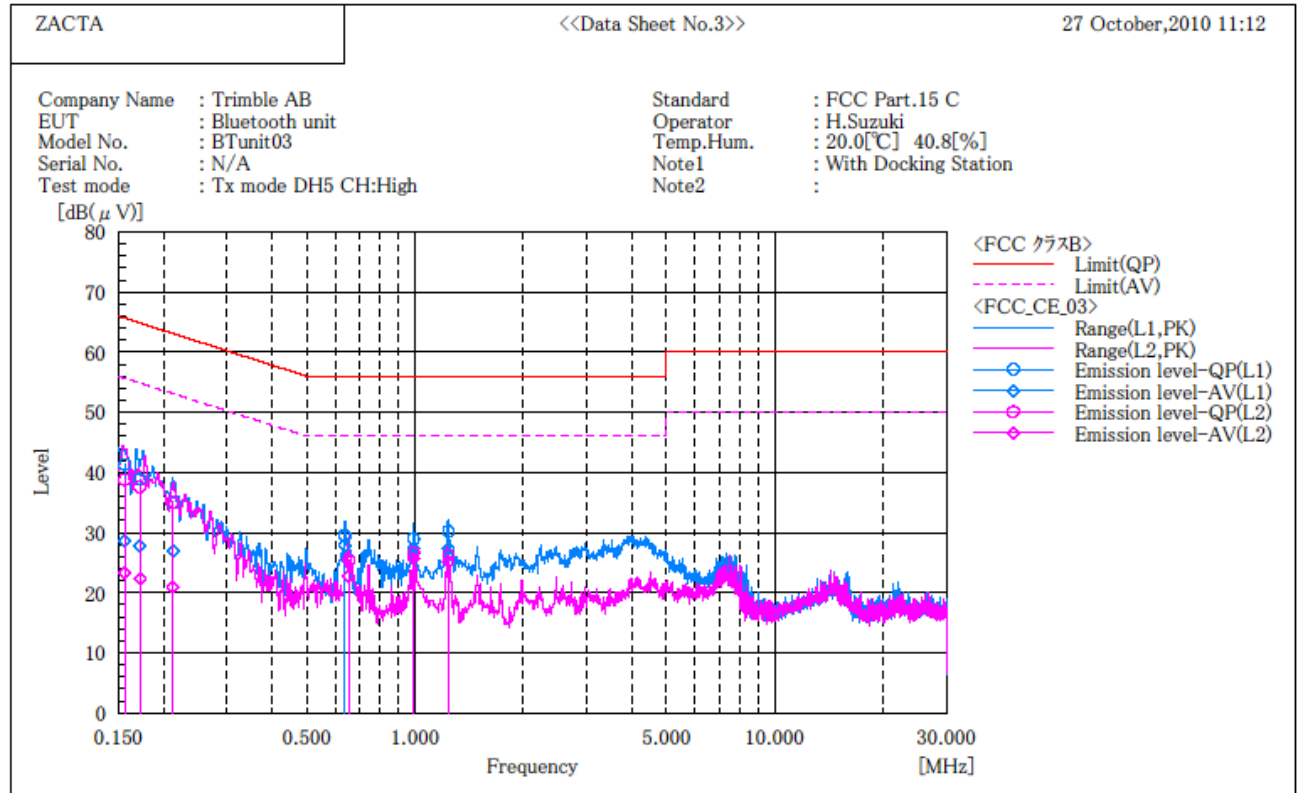
--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.157	28.8	13.2	10.2	39.0	23.4	65.6	55.6	26.6	32.2
2	0.172	27.5	12.2	10.1	37.6	22.3	64.9	54.9	27.3	32.6
3	0.213	25.0	10.9	10.1	35.1	21.0	63.1	53.1	28.0	32.1
4	0.656	15.4	12.9	10.0	25.4	22.9	56.0	46.0	30.6	23.1
5	0.992	16.7	15.7	10.0	26.7	25.7	56.0	46.0	29.3	20.3
6	1.240	16.5	15.5	10.0	26.5	25.5	56.0	46.0	29.5	20.5

DH5

Channel High: 2480.0MHz

***** CONDUCTED EMISSION at MAINS PORT *****
 << 3m Semi-anechoic chamber >>



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	31.1	18.4	10.2	41.3	28.6	65.7	55.7	24.4	27.1
2	0.172	28.7	17.6	10.2	38.9	27.8	64.9	54.9	26.0	27.1
3	0.213	24.8	16.9	10.1	34.9	27.0	63.1	53.1	28.2	26.1
4	0.639	19.4	17.8	10.1	29.5	27.9	56.0	46.0	26.5	18.1
5	0.992	18.9	17.2	10.1	29.0	27.3	56.0	46.0	27.0	18.7
6	1.240	20.1	17.2	10.1	30.2	27.3	56.0	46.0	25.8	18.7

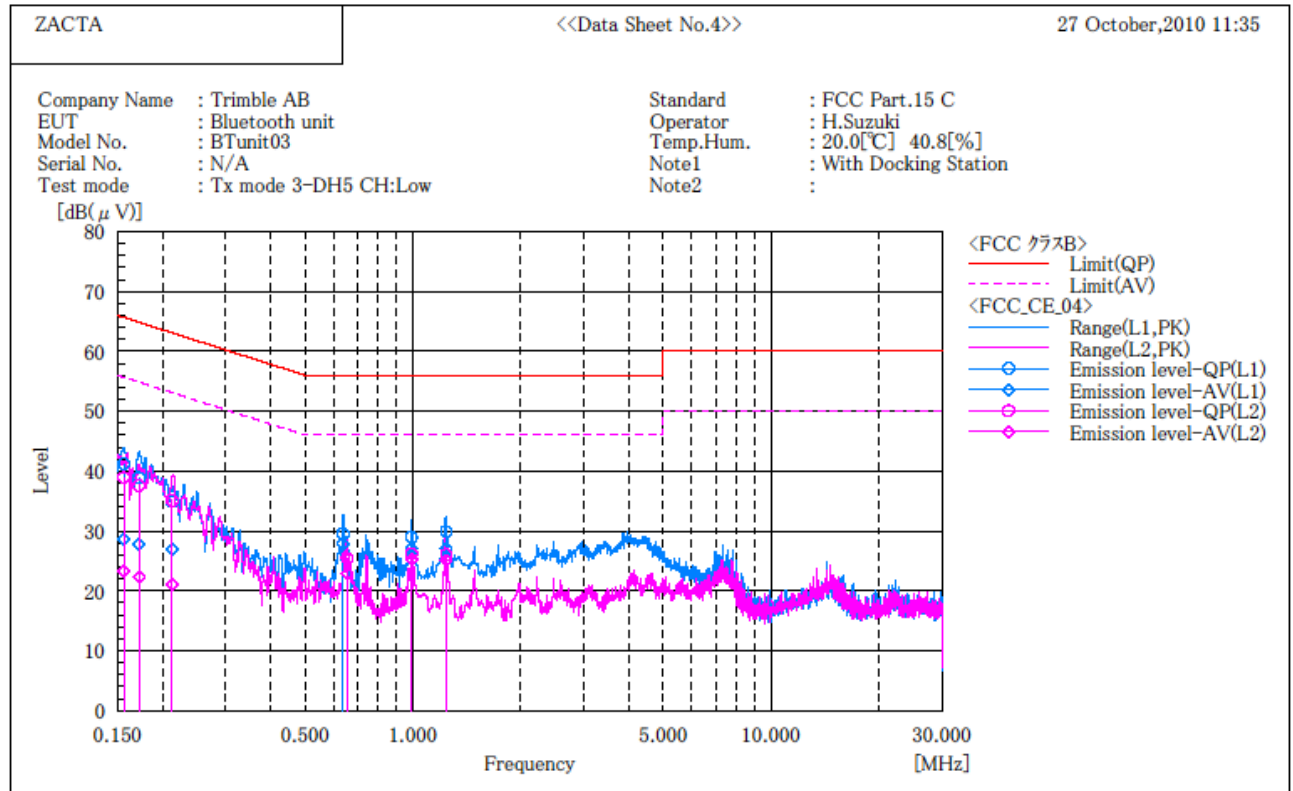
--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	28.6	13.1	10.2	38.8	23.3	65.7	55.7	26.9	32.4
2	0.172	27.5	12.2	10.1	37.6	22.3	64.9	54.9	27.3	32.6
3	0.213	25.0	10.8	10.1	35.1	20.9	63.1	53.1	28.0	32.2
4	0.656	15.4	12.7	10.0	25.4	22.7	56.0	46.0	30.6	23.3
5	0.992	16.6	15.6	10.0	26.6	25.6	56.0	46.0	29.4	20.4
6	1.240	16.2	15.2	10.0	26.2	25.2	56.0	46.0	29.8	20.8

3-DH5

Channel Low: 2402.0MHz

***** CONDUCTED EMISSION at MAINS PORT *****
<< 3m Semi-anechoic chamber >>



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	31.0	18.5	10.2	41.2	28.7	65.7	55.7	24.5	27.0
2	0.172	28.7	17.6	10.2	38.9	27.8	64.9	54.9	26.0	27.1
3	0.213	24.8	16.9	10.1	34.9	27.0	63.1	53.1	28.2	26.1
4	0.639	19.4	17.8	10.1	29.5	27.9	56.0	46.0	26.5	18.1
5	0.992	18.8	17.0	10.1	28.9	27.1	56.0	46.0	27.1	18.9
6	1.240	19.8	16.9	10.1	29.9	27.0	56.0	46.0	26.1	19.0

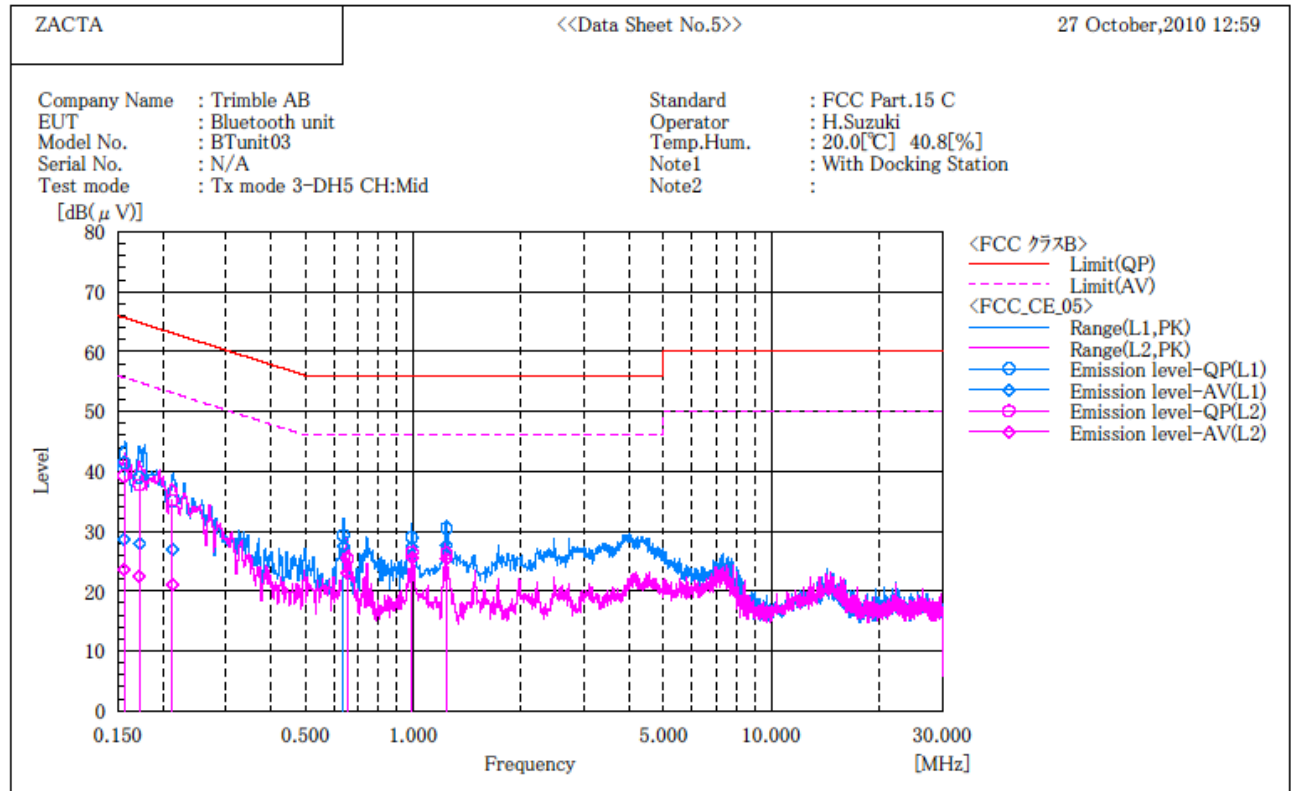
--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	28.7	13.1	10.2	38.9	23.3	65.7	55.7	26.8	32.4
2	0.172	27.5	12.2	10.1	37.6	22.3	64.9	54.9	27.3	32.6
3	0.213	25.0	10.9	10.1	35.1	21.0	63.1	53.1	28.0	32.1
4	0.656	15.4	12.8	10.0	25.4	22.8	56.0	46.0	30.6	23.2
5	0.992	16.2	15.2	10.0	26.2	25.2	56.0	46.0	29.8	20.8
6	1.240	16.0	15.0	10.0	26.0	25.0	56.0	46.0	30.0	21.0

3-DH5

Channel Middle: 2441.0MHz

***** CONDUCTED EMISSION at MAINS PORT *****
 << 3m Semi-anechoic chamber >>



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	31.2	18.4	10.2	41.4	28.6	65.7	55.7	24.3	27.1
2	0.172	28.8	17.7	10.2	39.0	27.9	64.9	54.9	25.9	27.0
3	0.213	24.9	16.9	10.1	35.0	27.0	63.1	53.1	28.1	26.1
4	0.639	19.2	17.5	10.1	29.3	27.6	56.0	46.0	26.7	18.4
5	0.992	18.9	17.2	10.1	29.0	27.3	56.0	46.0	27.0	18.7
6	1.240	20.4	17.4	10.1	30.5	27.5	56.0	46.0	25.5	18.5

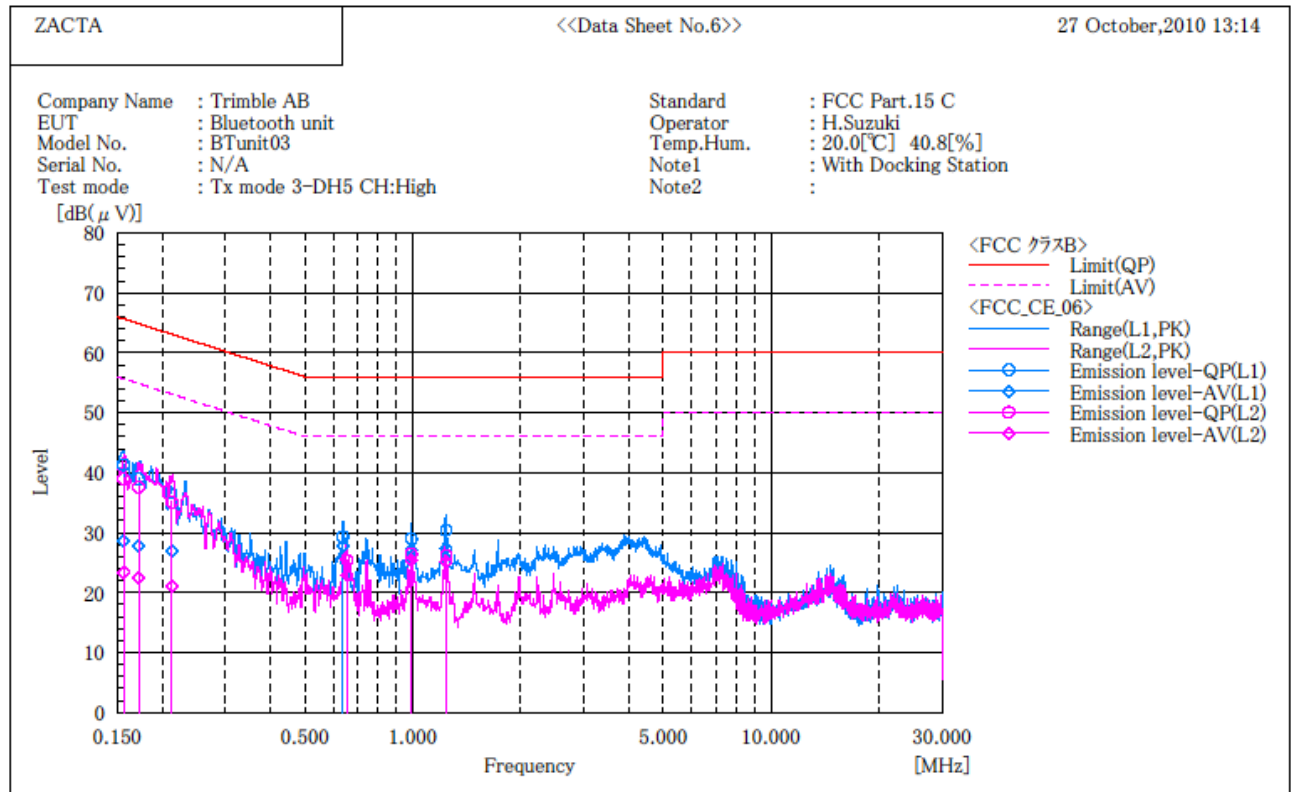
--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	29.0	13.3	10.2	39.2	23.5	65.7	55.7	26.5	32.2
2	0.172	27.6	12.3	10.1	37.7	22.4	64.9	54.9	27.2	32.5
3	0.213	25.1	10.9	10.1	35.2	21.0	63.1	53.1	27.9	32.1
4	0.656	15.4	13.0	10.0	25.4	23.0	56.0	46.0	30.6	23.0
5	0.992	16.5	15.5	10.0	26.5	25.5	56.0	46.0	29.5	20.5
6	1.240	16.3	15.3	10.0	26.3	25.3	56.0	46.0	29.7	20.7

3-DH5

Channel High: 2480.0MHz

***** CONDUCTED EMISSION at MAINS PORT *****
 << 3m Semi-anechoic chamber >>



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	31.1	18.4	10.2	41.3	28.6	65.7	55.7	24.4	27.1
2	0.172	28.8	17.6	10.2	39.0	27.8	64.9	54.9	25.9	27.1
3	0.213	24.8	16.8	10.1	34.9	26.9	63.1	53.1	28.2	26.2
4	0.639	19.2	17.6	10.1	29.3	27.7	56.0	46.0	26.7	18.3
5	0.992	18.8	17.0	10.1	28.9	27.1	56.0	46.0	27.1	18.9
6	1.240	20.3	17.2	10.1	30.4	27.3	56.0	46.0	25.6	18.7

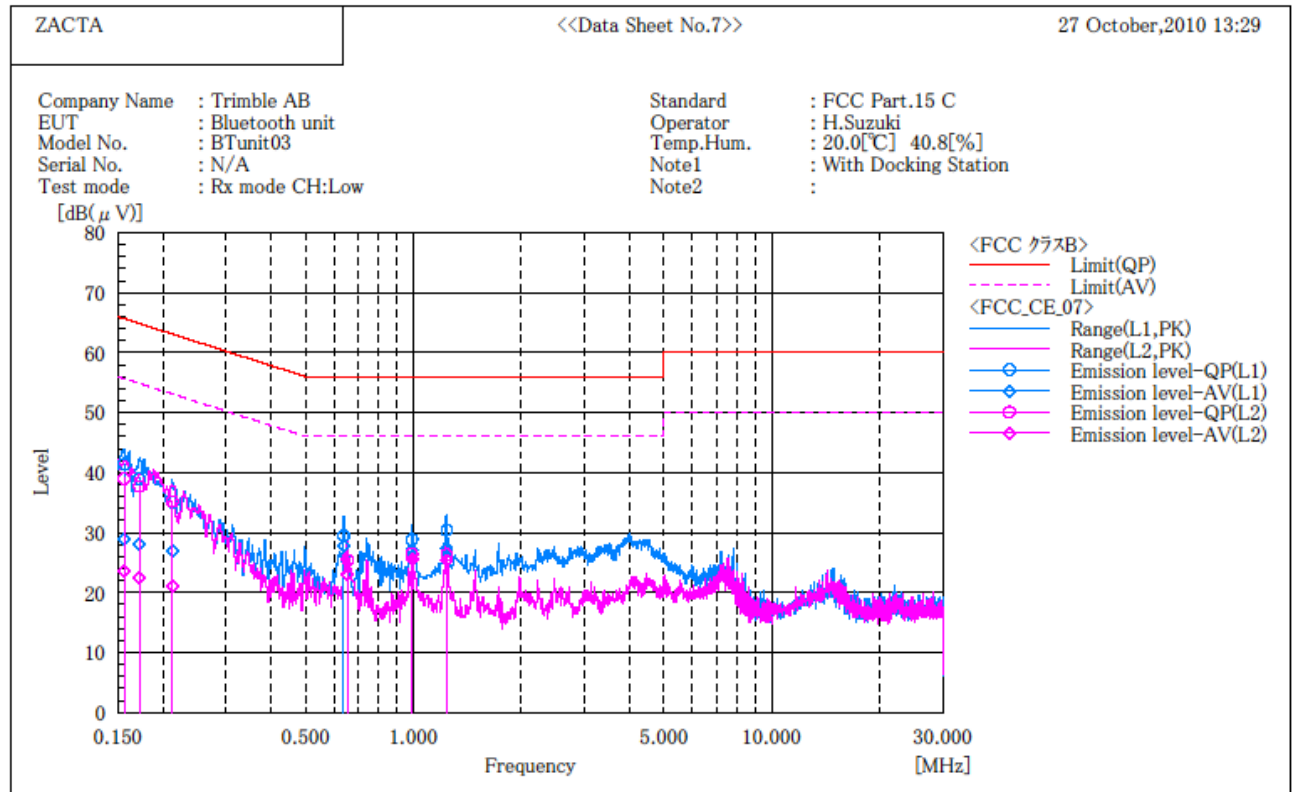
--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	28.8	13.2	10.2	39.0	23.4	65.7	55.7	26.7	32.3
2	0.172	27.5	12.3	10.1	37.6	22.4	64.9	54.9	27.3	32.5
3	0.213	25.0	10.9	10.1	35.1	21.0	63.1	53.1	28.0	32.1
4	0.656	15.4	12.9	10.0	25.4	22.9	56.0	46.0	30.6	23.1
5	0.992	16.4	15.4	10.0	26.4	25.4	56.0	46.0	29.6	20.6
6	1.240	16.2	15.2	10.0	26.2	25.2	56.0	46.0	29.8	20.8

Rx

Channel Low: 2402.0MHz

***** CONDUCTED EMISSION at MAINS PORT *****
 << 3m Semi-anechoic chamber >>



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	31.2	18.6	10.2	41.4	28.8	65.7	55.7	24.3	26.9
2	0.172	28.8	17.8	10.2	39.0	28.0	64.9	54.9	25.9	26.9
3	0.213	24.9	16.9	10.1	35.0	27.0	63.1	53.1	28.1	26.1
4	0.639	19.3	17.7	10.1	29.4	27.8	56.0	46.0	26.6	18.2
5	0.992	18.7	17.0	10.1	28.8	27.1	56.0	46.0	27.2	18.9
6	1.240	20.3	17.3	10.1	30.4	27.4	56.0	46.0	25.6	18.6

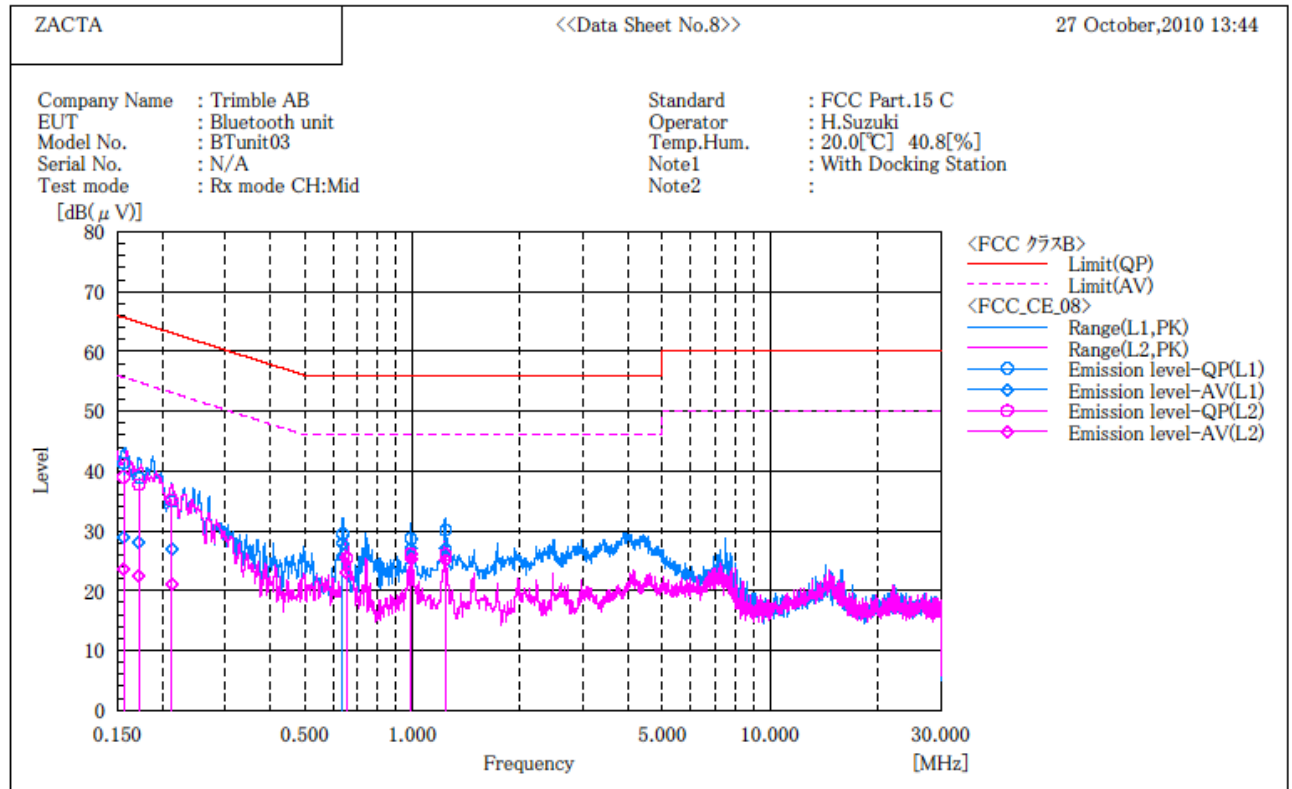
--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	28.8	13.4	10.2	39.0	23.6	65.7	55.7	26.7	32.1
2	0.172	27.6	12.4	10.1	37.7	22.5	64.9	54.9	27.2	32.4
3	0.213	25.1	11.0	10.1	35.2	21.1	63.1	53.1	27.9	32.0
4	0.656	15.4	13.0	10.0	25.4	23.0	56.0	46.0	30.6	23.0
5	0.992	16.4	15.5	10.0	26.4	25.5	56.0	46.0	29.6	20.5
6	1.240	16.3	15.3	10.0	26.3	25.3	56.0	46.0	29.7	20.7

Rx

Channel Middle: 2441.0MHz

***** CONDUCTED EMISSION at MAINS PORT *****
<< 3m Semi-anechoic chamber >>



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	31.1	18.6	10.2	41.3	28.8	65.7	55.7	24.4	26.9
2	0.172	28.7	17.8	10.2	38.9	28.0	64.9	54.9	26.0	26.9
3	0.213	24.8	16.9	10.1	34.9	27.0	63.1	53.1	28.2	26.1
4	0.639	19.3	17.8	10.1	29.4	27.9	56.0	46.0	26.6	18.1
5	0.992	18.6	17.0	10.1	28.7	27.1	56.0	46.0	27.3	18.9
6	1.240	20.0	17.0	10.1	30.1	27.1	56.0	46.0	25.9	18.9

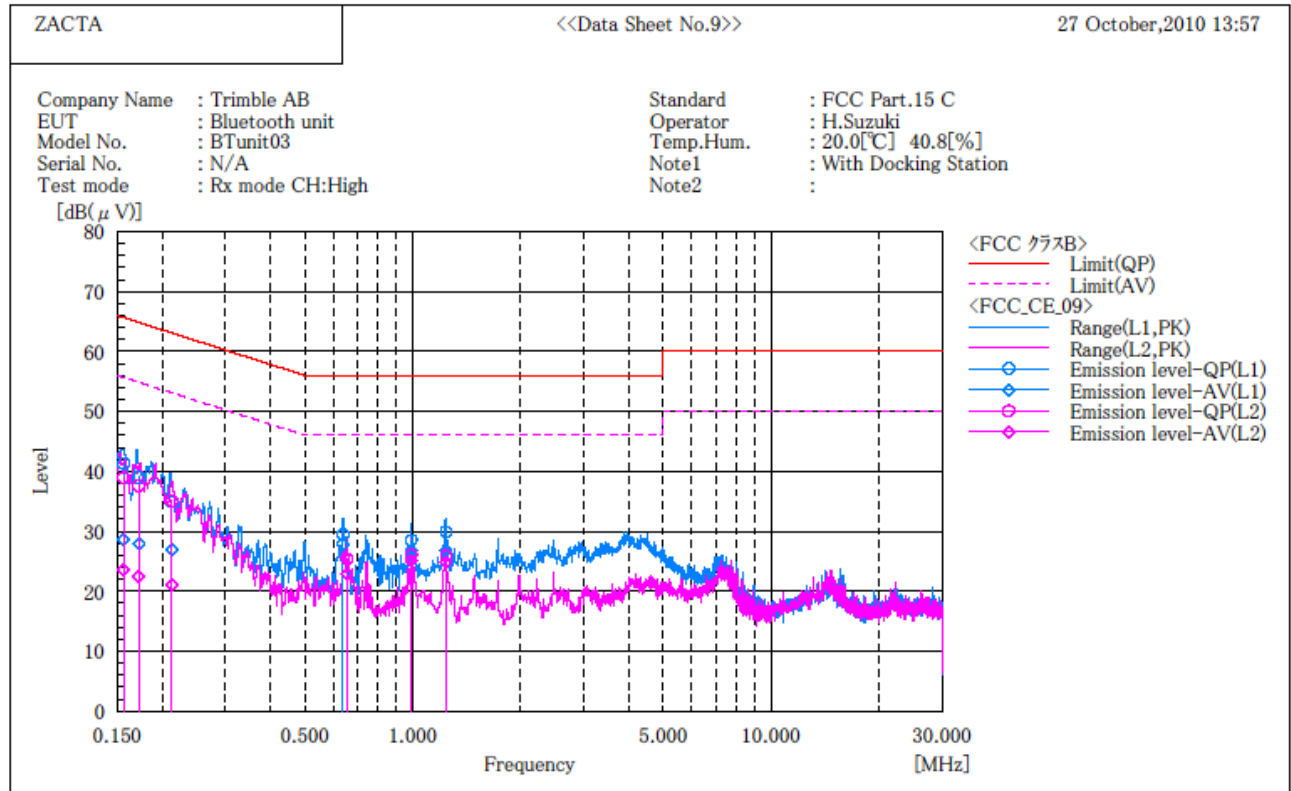
--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	28.8	13.3	10.2	39.0	23.5	65.7	55.7	26.7	32.2
2	0.172	27.6	12.4	10.1	37.7	22.5	64.9	54.9	27.2	32.4
3	0.213	25.1	11.0	10.1	35.2	21.1	63.1	53.1	27.9	32.0
4	0.656	15.4	13.0	10.0	25.4	23.0	56.0	46.0	30.6	23.0
5	0.992	16.1	15.2	10.0	26.1	25.2	56.0	46.0	29.9	20.8
6	1.240	16.0	15.0	10.0	26.0	25.0	56.0	46.0	30.0	21.0

Rx

Channel High: 2480.0MHz

***** CONDUCTED EMISSION at MAINS PORT *****
<< 3m Semi-anechoic chamber >>



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	31.1	18.5	10.2	41.3	28.7	65.7	55.7	24.4	27.0
2	0.172	28.8	17.7	10.2	39.0	27.9	64.9	54.9	25.9	27.0
3	0.213	24.8	16.9	10.1	34.9	27.0	63.1	53.1	28.2	26.1
4	0.639	19.3	17.8	10.1	29.4	27.9	56.0	46.0	26.6	18.1
5	0.992	18.4	16.7	10.1	28.5	26.8	56.0	46.0	27.5	19.2
6	1.240	19.8	16.7	10.1	29.9	26.8	56.0	46.0	26.1	19.2

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.156	28.7	13.3	10.2	38.9	23.5	65.7	55.7	26.8	32.2
2	0.172	27.5	12.4	10.1	37.6	22.5	64.9	54.9	27.3	32.4
3	0.213	25.0	10.9	10.1	35.1	21.0	63.1	53.1	28.0	32.1
4	0.656	15.4	12.9	10.0	25.4	22.9	56.0	46.0	30.6	23.1
5	0.992	16.0	15.1	10.0	26.0	25.1	56.0	46.0	30.0	20.9
6	1.240	15.9	14.7	10.0	25.9	24.7	56.0	46.0	30.1	21.3

4.11 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.

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	$\pm 3.0\text{dB}$
Radiated emission (9kHz - 30MHz)	$\pm 4.4\text{dB}$
Radiated emission (30MHz – 1000MHz)	$\pm 4.5\text{dB}$
Radiated emission (1000MHz – 26GHz)	$\pm 3.9\text{dB}$

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	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

Antenna port Conducted Test

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
Spectrum Analyzer	Agilent Technologies	E4447A	MY46180188	Mar. 2011	Mar. 4, 2010
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	Jun. 2011	Jun. 9, 2010
Microwave cable	SUHNER	SUCOFLEX104	199511/4	Nov. 2010	Nov. 12, 2009
Attenuator	Weinschel	56-10	J4180	Nov. 2010	Nov. 12, 2009
TRIPLE OUTPUT POWER SUPPLY	HP	6263B	N/A	N/A	N/A

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

Radiated Emission

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
Spectrum Analyzer	Agilent Technologies	E4447A	MY46180188	Mar. 2011	Mar. 4, 2010
Preamplifier	ANRITSU	MH648A	M08067	Jun. 2011	Jun. 12, 2010
Preamplifier	Agilent Technologies	8449B	3008A01008	Nov. 2010	Nov. 5, 2009
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	Jun. 2011	Jun. 9, 2010
Attenuator	TYC	BA-PJ-10	N/A(S347)	Apr.2011	Apr. 26, 2010
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. 2011	Jun. 12, 2010
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
TRIPLE OUTPUT POWER SUPPLY	HP	6263B	N/A	N/A	N/A
PC	DELL	DIMENSION E521	85465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V3.4	N/A	N/A
3m Semi an-echoic Chamber	TOKIN	N/A	N/A (9002-NSA)	May 2011	May 18, 2010

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

AC power line Conducted Emission

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	Jun. 2011	Jun. 9, 2010
Attenuator	TYC	BA-PJ-10	N/A(S346)	Apr.2011	Apr. 26, 2010
Line impedance stabilization network for EUT	Kyoritsu Electrical Works, Ltd.	KNW-407F	8-2003-1	May 2011	May 28, 2010
Line impedance stabilization network for peripheral	Kyoritsu Electrical Works, Ltd.	KNW-242F	8-1973-1	May 2011	May 12, 2010
Coaxial cable	FUJIKURA	5D-2W/1.5m	#AEC3R-003	Feb. 2011	Feb. 5, 2010
Coaxial cable	FUJIKURA	5D-2W/0.5m	#AEC3R-004	Feb. 2011	Feb. 5, 2010
Coaxial cable	FUJIKURA	5D-2W/4m	#AEC3C-001	Feb. 2011	Feb. 5, 2010
Coaxial cable	SUHNER	RG214/U/10m	#AEC3C-002	Feb. 2011	Feb. 5, 2010
50Ω terminator	HRS	UG-88/U	N/A (S061)	Mar. 2011	Mar. 5, 2010
PC	DELL	DIMENSION E521	85465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V3.4	N/A	N/A

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