TEST REPORT

Report No.:	6119F
Date:	20th July 2006
Applicant:	Kenwood Corporation
	2967-3, Ishikawa-machi, Hachioji-shi, Tokyo, 192-8525, Japan.
EUT:	Car Audio System
FCC ID:	IOM33256
Model No.:	KCA-BT100
Serial No.:	PPE00005 (Radiated Emission)
	PPE00004 (Conducted Emission)
Receipt date of tested sample:	10th July 2006
Date of measurement:	10th 11th July 2006 (Radiated Emission)
	12th July 2006 (Conducted Emission)
Test location:	TAIYO YUDEN CO., LTD. EMC Center
	5607-2, Nakamuroda, Haruna-machi,
	Gunma-Gun, Gunma, 370-3347, Japan.
Applied standard:	FCC 47 CFR Part 15 Subpart C Section 15.247, (10-1-05 Edition)
Procedure:	ANSI C63.4-2003 PUBLIC NOTICE DA 00-705
Test results:	PASS

Approved by: 24/7/06
Manager / Kenzo Furuta

Reviewed by: 2006/7/20
Chief Engineer / Takeshi Matsumura

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Tested by: 2006/7/20
Engineer / Shin Itakura

: 2006 7/20
Assistant / Yasuko Hirata

Table of Contents

Revised Record

Revised Record				
Number of Revised time	Date	Person in Charge	Detail of Revision	Approved by
Initial	20th July 2006	Y.Hirata	-	-

1 Test report

(1) This report summarizes the result of a single investigation and test result relate only to tested sample.
(2) The report shall not be reproduced except in full without the written approval of the Taiyo Yuden Co., Ltd.
(3) This test report must not be used by the client to claim product endorsement by any government agency.
(4) We hereby certify that no party to the applications authorized hereunder is subject to a denial of benefits, including FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 853(a).

2 General Information

2.1 Product Description

EUT:	Car Audio System
Model No.:	KCA-BT100
Serial No.:	PPE00004, PPE00005
FCC ID:	IOM33256
Production stage:	Production
Summary of EUT:	Hands Free Equipment of 2.4GHz Bluetooth unit for Car Audio
Modulation:	GFSK
Power supply:	Nominal DC12.0V vehicle battery
Weight:	350g
Dimensions of EUT:	W95.0mm×D105.0mm×H30.0mm
Max antenna gain:	2.02dBi
The clock frequencies used in this EUT:	16MHz
	20MHz
	26MHz
	2.4GHz

EUT is hands free equipment of 2.4 GHz Bluetooth unit for car audio.
This is operated within the bands 2400 – 2483.5MHz frequency hopping intentional radiators that comply with FCC15.247. It provides 79 channels. And it adopts an AFH function to prevent interference with other wireless applications. Refer to APPENDIX 1.

EUT operates in the unlicensed 2.4 GHz ISM (Industrial Scientific Medical) band. A frequency hop transceiver is applied to combat interference and fading.

2.2 Summary of Test and Inspection Result

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
1	AC Powerline Conducted Emission	ANSI C63.4: 2003	FCC 15.207	-	N/A	-	N/A
2	Carrier Frequency Separation	ANSI C63.4: 2003 Public Notice DA00-705	FCC 15.247(a)(1)	Conducted	N/A	-	Pass
3	Number of Hoping Frequency		FCC 15.247(a)(1)(iii)		N/A	-	Pass
4	Dwell time		FCC 15.247(a)(1)(iii)		N/A	-	Pass
5	Maximum peak Output Power		FCC 15.247(b)(1)		N/A	-	Pass
6	Band Edge Compliance		FCC 15.247(d)		N/A	-	Pass
7	Spurious RF Conducted Emission		FCC 15.247(d)		N/A	-	Pass
8	Radiated Emission		FCC 15.247(d)	Radiated	N/A	14.5dB Transmitting mode: 2402MHz Frequency: 4804.400MHz Axial Direction: YZ-Plane Antenna Polarization: Horizontal	Pass
9	E.I.R.P.		FCC 15.247(b) (5)	Conducted Calculated	N/A	-	Pass

2.3 Test Methodology

Interference measurements were made in accordance with ANSI C63.4-2003 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

2.4 Test Facility

1. FCC 47CFR, Part 15, Section 15.247 regulation test were performed on the shielded room, and radiated interference field strength test was performed on the 10 meter semi-anechoic chamber located at Taiyo Yuden Co., Ltd. EMC Center, 5607-2 Nakamuroda Haruna-Machi Gunma-Gun Gunma, 370-3347 Japan.
2. This Laboratory is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP) by United States Department of Commerce, National Institute of Standard and Technology (NIST) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations.
3. These criteria encompass the requirements of ISO/IEC 17025:1999 and the relevant requirements of ISO 9002:1994 as suppliers of calibration or test results. Accreditation awarded for specific services, listed on the Scope of Accreditation for: ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS FCC. (NVLAP LAB CODE: 200607-0). Refer the certificate of the accreditation to Appendix 2.

3 System Test Configuration

3.1 Justification

1. Emission tests were performed with no deviation from the ANSI C63.4-2003 and FCC 47CFR, Part 15, Section 15.247 regulation tests were performed with no deviation from the FCC Public Notice DA00-705 released March 30, 2000.
2. The system was configured for testing a typical fashion. (as a customer would normally use it.)
3. Radiate testing in the range of 1 GHz to 25 GHz was investigated with the spectrum (peak detector function) under the FCC regulation section 15.209 (e) and 15.35 (b). The test performed at an antenna to EUT distance of 1 meter. The level of any unwanted emissions from EUT did not exceed the level of the fundamental emission (Compliance with 15.209 (c)). And test result found to be compliance with FCC regulation section 15.209 (a) Radiated emission limits (500 micro-volts/meter). Data is presented for the “worst case” measurements, that E.U.T was normal operated.
4. Radiate testing in the range of 30 MHz to 1000 MHz was performed at an antenna to EUT distance of 3 meters under the 15.209 (e) and 15.31(f)(1).
5. All tests were performed with the representative channel operation as follows.

   a. Lowest frequency channel: CH0 2402MHz
   b. Middle frequency channel: CH39 2441MHz
   c. Highest frequency channel: CH78 2480MHz

6. All tests were performed with DC12.0V power supply. EUT was tested in advance with DC10.8V, 13.2V, and 15.6V. There was no major RF Characteristic change by changing supply voltage.

3.2 Operating modes

Transmitting mode

Modulation:	GFSK
Signal pattern:	PRBS9
Signal packet type:	DH1, DH3, DH5 for Dwell time test
	DH5 for other test
Representative channel:	CH0 2402MHz (Lowest frequency channel)
	CH39 2441MHz (Middle frequency channel)
	CH78 2480MHz (Highest frequency channel)

Remarks:

Signal pattern PRBS9:	Periodic Pseudo Random Bit Sequence. $2^9 - 1$
Signal packet type:	Data High rate, ACL type packet
	Data payload with CRC, without FEC
	Fully transmission within one consecutive 625 microsecond transmission slots.
	Number of slot = 1(DH1), 3(DH3), 5(DH5)
	Data size of payload = 27bytes(DH1), 183bytes(DH3), 339bytes(DH5)
Software (controller):	AIO Easy Tester Lite! Ver1.21 software supplied by ALPS ELECTRIC CO., LTD.
	was used to set up to the Bluetooth operating mode except for AFH operating mode.
	In order to establish the AFH operating mode, Ceva Host Controller Data
	Transfer Tester Version BT1.2 software supplied by Ceva, Inc. was used.

3.3 List of accessories

	Product name	M/N	S/N	Manufacturer	Notes	FCC ID / DoC
a	CD Receiver (Head unit for Conducted Test)	KDC-MP532U	60602299	KENWOOD	-	N/A
b	CD Receiver (Head unit for Radiated Test)	KDC-W5534U	KE1259U060024	KENWOOD	-	N/A
c	Note PC	PP11L	CN-0D4571-48643-598-4197	DELL	-	DoC
d	AC Adapter for Note PC	PA-1650-05D2	CN-0F7970-71615-580-2048	DELL	-	N/A
e	Jig	N/A	N/A	KENWOOD	-	N/A
f	Regulated DC power supply	PA18-1.2	2110071	KENWOOD	-	N/A
g	Regulated DC power supply	PAB32-2A	49311834	KIKUSUI	-	N/A
h	Bluetooth Module	UGZZ5X506A	05FA540	ALPS	-	N/A
i	Jig 2	N/A	No.083	ALPS	-	N/A
j	Note PC 2	F2125W	TW03801924	Hewlett Packard	-	DoC
k	AC Adapter for Note PC 2	HP F1454F	JAD0031080551	Hewlett Packard	-	N/A

3.4 Interface cables

	Cable Type	M/N	Connection	Shielded	Ferrite core	Material of connector	Length	Treatment for the extra length
1	Signal cable	-0RX	EUT⇔2 (Radiated)	Yes	No	Metal	1.46m	-
2	Signal cable	-0RX	1⇔b (Radiated)	Yes	No	Metal	2.00m	
3	DC cable	-	b⇔4 (Radiated)	No	No	Metal	0.20m	-
4	DC cable	-	3⇔f (Radiated)	No	No	Metal	0.70m	-
5	AC cable	-	f⇔AC (Radiated)	No	No	Metal	2.04m	-
6	Signal cable	-0RX	a⇔EUT (Conducted)	Yes	No	Metal	1.50m	-
7	DC cable	-	a⇔8 (Conducted)	No	No	Metal	0.30m	-
8	DC cable	-	g⇔7 (Conducted)	No	No	Metal	0.55m	-
9	AC Cable	-	g⇔AC (Conducted)	No	No	Metal	2.29m	-
10	RS232C Cable	-	e⇔EUT (Conducted)	No	No	Metal	0.93m	-
11	RS232C Cable	-	c⇔e (Conducted)	Yes	No	Metal	0.68m	
12	DC cable	-	c⇔d (Conducted)	No	Yes	Metal	1.81m	-
13	AC cable	-	d⇔AC (Conducted)	No	No	Metal	0.91m	-
14	USB cable	-	i⇔j (Conducted)	Yes	Yes	Metal	1.45m	-
15	RS232C Cable	-	i⇔j (Conducted)	Yes	No	Metal	1.77m	-
16	DC Cable	-	j⇔k (Conducted)	No	Yes	Metal	1.80m	-
17	AC Cable	-	k⇔AC (Conducted)	No	No	Metal	1.78m	-

3.5 Special Test Condition

Nothing

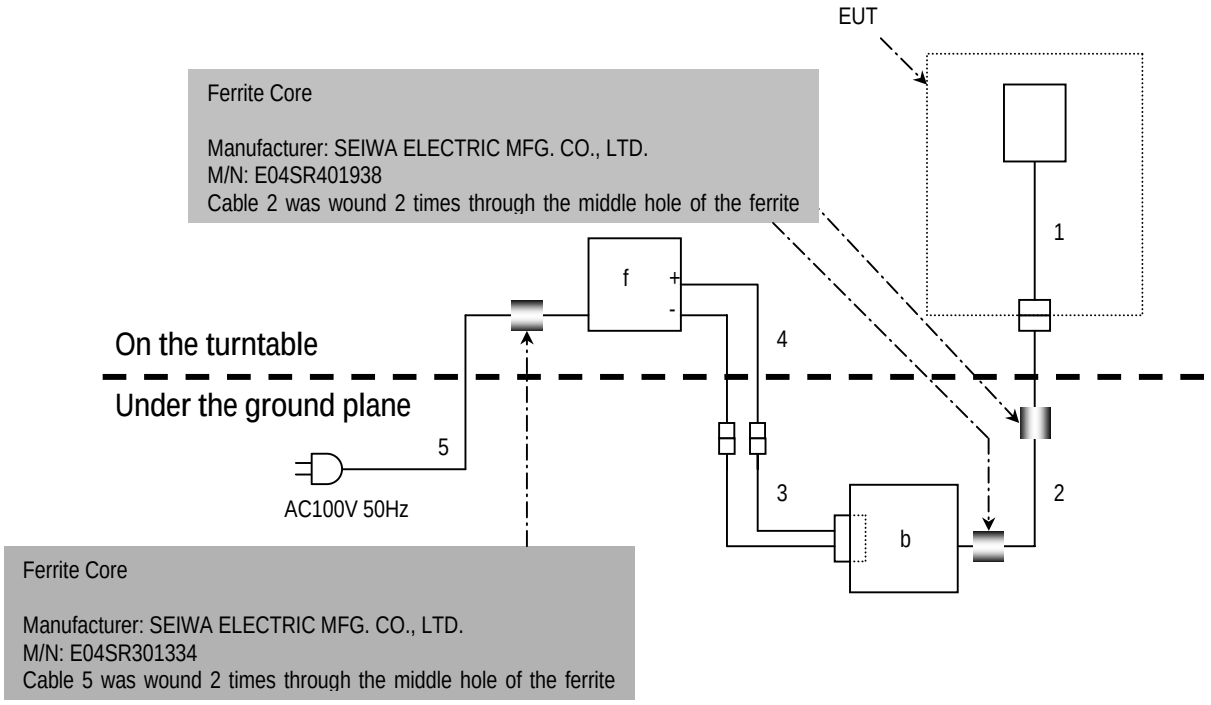
3.6 Equipment Modifications

No modification has been carried out by the test laboratory.

3.7 Configuration of Tested System

(1) Radiated Emission Test

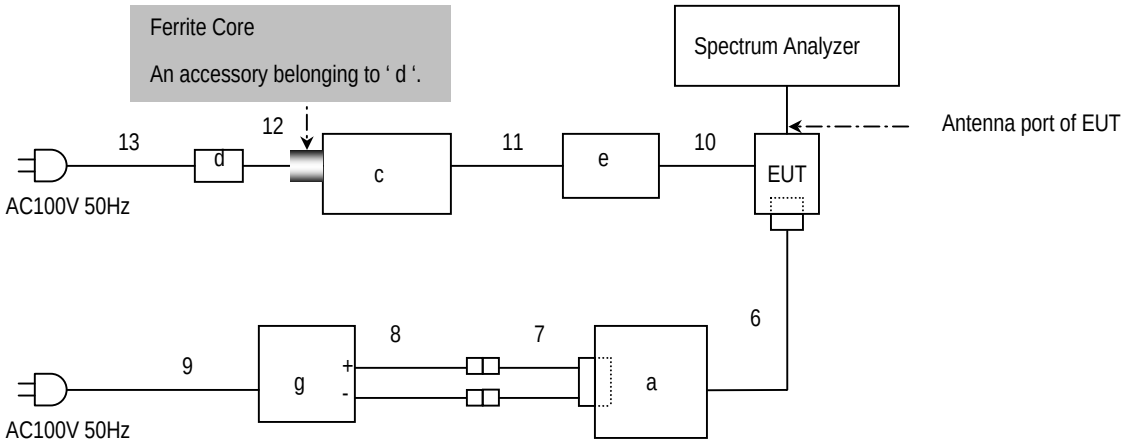
These numbers and the marks in the picture are corresponding to the numbers and the marks in Tables shown at the Section 3.3 and 3.4.
Power supply of EUT: DC12.0V from CD Receiver "b"
(DC12V is supplied to CD Receiver "b" from Regulated DC Power Supply "f".)



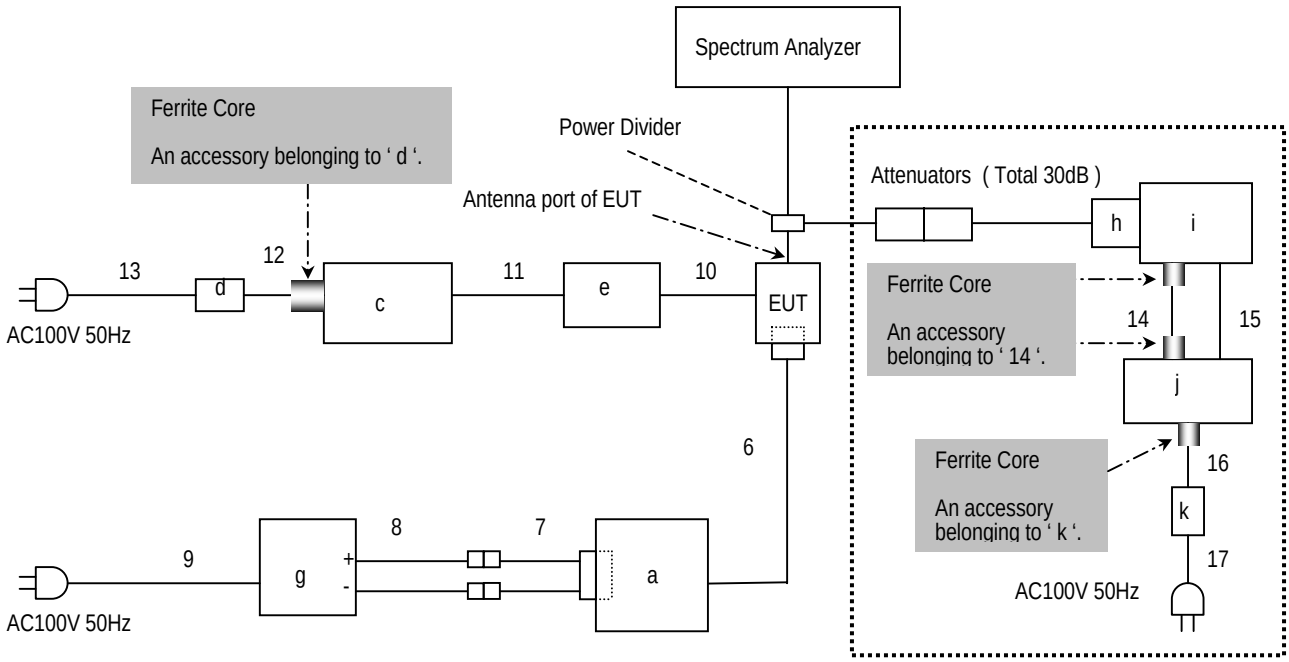
(2) Conducted Emission Test

These numbers and the marks in the picture are corresponding to the numbers and the marks in Tables shown at the Section 3.3 and 3.4.
Power supply of EUT: DC12.0V from CD Receiver "a"
(DC12V is supplied to CD Receiver "a" from Regulated DC Power Supply "g".)

Test Setting for Normal Frequency Hopping and Non Frequency Hopping mode



Test Setting for Adaptive Frequency Hopping mode



Setting for the opposite Bluetooth equipment

It is needed to make communication between EUT and the other bluetooth equipment in an appointed way in order to make AFH (Adaptive Frequency Hopping) function of EUT working. Therefore, we have to prepare the RF signal path to communicate with the opposite equipment against EUT in addition to the RF signal path for measurement. The setting shown above satisfies this requirement by connecting two paths with the power divider.

4 Antenna Requirement

The EUT provides a permanently attached antenna and it was found to be compliant with FCC regulation section 15.203.

Antenna type: Inverted F Type
Antenna gain: 2.02dBi

5 AC Powerline Conducted Emission Test

N/A

This EUT is intended for use in vehicles. So this measurement is not applied to this EUT.

6 Radiated Emission Test

6.1 Test Setup

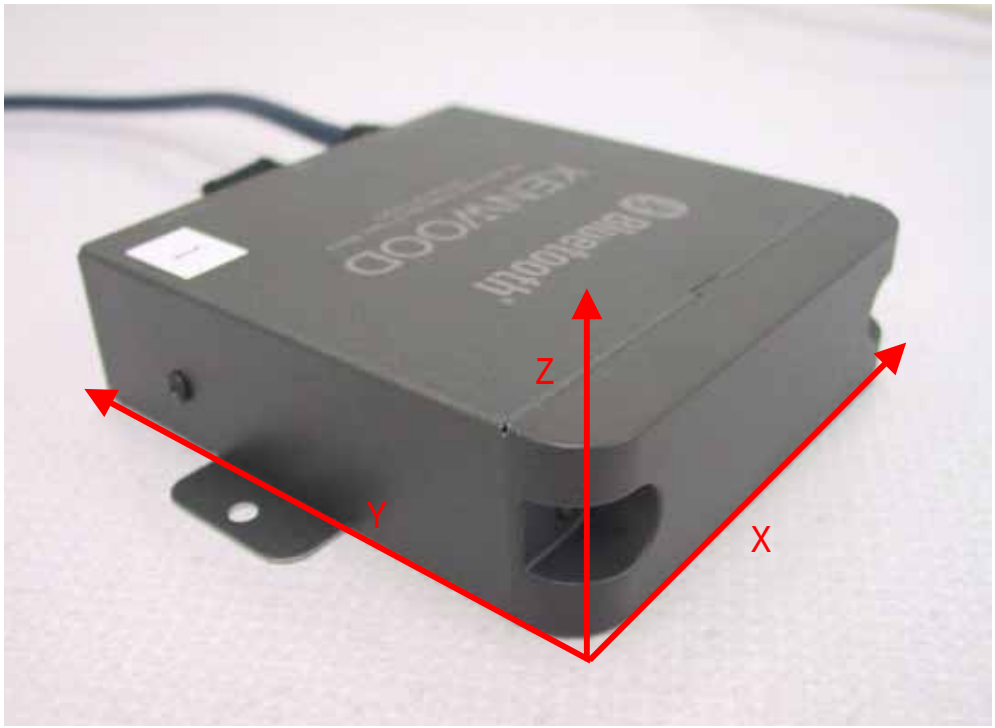
The test setup was made according to ANSI STD C63.4-2003 clause 8 on the 10 meter semi-anechoic chamber, which allows a 3 or 1 m distance measurement.
EUT was placed on non-conductive table (foam polystyrene). The height of this table was 0.8 m.
The measurement has been conducted with both horizontal and vertical antenna polarization.
The turntable has been fully rotated. The highest radiation of the equipment has been recorded.
For further description of the configuration refer to the pictures of this report.

Distance between equipment and antenna: 3m (30MHz to 18GHz)
: 1m (18GHz to 25GHz)

Spectrum Analyzer Setting

30〜1000MHz	Detector: Quasi-Peak Bandwidth: 120kHz
1〜25GHz	Detector: Peak and Average Bandwidth: 1MHz

Axial Direction



6.2 Test Instrumentation

Facility/ Equipment	Manufacturer	Model No.	Serial No.	Frequency Range	Calibration Date	Next Calibration Due
10m Anechoic Chamber	TDK Co., Ltd.	DA-06912	-	-	13th-17th.3.2006.	12th.3.2007.
EMI Test Receiver	R&S	ESCS 30	100148	30-1000MHz	11th.8.2005.	10th.8.2006.
Spectrum Analyzer	Agilent Technologies	8563E	3416A02230	30-1000MHz	12th.4.2006.	11th.4.2007.
		E4446A	US42070181	1-40GHz	14th.11.2005.	13th.11.2006.
Amplifier		83017A	3950M00169	1-26.5GHz	25th.4.2006.	24th.4.2007.
		8447D	2944A06812	30-1000MHz	13th.2.2006.	12th.2.2007.
RF Selector	TDK Co., Ltd	NS4900	0302-010	-	13th.2.2006.	12th.2.2007.
RF Cable	SUHNER	RG214	RG 1	30-1000MHz	13th.2.2006.	12th.2.2007.
		RG214	RG 3	30-1000MHz	13th.2.2006.	12th.2.2007.
		RG214	RG 8	30-1000MHz	13th.2.2006.	12th.2.2007.
		RG214	RG 5	30-1000MHz	25th.4.2006.	24th.4.2007.
		RG214	RG 6	30-1000MHz	25th.4.2006.	24th.4.2007.
		SUCOFLEX 106	SU1	1-18GHz	25th.4.2006.	24th.4.2007.
		SUCOFLEX 104	SU4	1-18GHz	25th.4.2006.	24th.4.2007.
	HP	85381C	No.3	18-25GHz	25th.4.2006.	24th.4.2007.
		85381C	No.5	18-25GHz	25th.4.2006.	24th.4.2007.
Attenuator	KYORITSU	KPD-602	220142	30-1000MHz	13th.2.2006.	12th.2.2007.
Antenna	Schwarzbeck	BBA9106	No.4	30-300MHz	25nd.2.2006.	24th.2.2007.
		UHALP9108-A	160	300-1000MHz	25nd.2.2006	24th.2.2007.
	EMCO	3115	9403-4232	1-18GHz	1st.4.2005.	31st.3.2007.
		3116	9311-2227	18-40GHz	1st.4.2005.	31st.3.2007.
Software	TOYO Corporation	EP5/RE Ver.2.0	0208086	-	-	-

6.3 Radiated Emission Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading.
The basic equation with a sample calculation is as follows:

c.f. = AF + CF + AL - AG - DF
RE = RA + c.f.

Where c.f. = Correction Factor [dB/m]
RE = Radiated Emission (Emission Level - Result) [dB(uV/m)]
RA = Receiver Amplitude (Reading Level) [dBuV]
AF = Antenna Factor [dB/m]
CF = Cable Attenuation Loss [dB]
AG = Amplifier Gain [dB]
AL = Attenuator Loss [dB]
DF = Distance Factor
Distance between equipment and antenna: 3m = 0 [dB]
Distance between equipment and antenna: 1m = 9.5 [dB]

Assume a receiver reading of 41.3 dBuV is obtained. The Correction Factor of -1.1 dB/m is added, giving a Radiated Emission of 40.2 dBuV/m. The 40.2 dBuV/m value was mathematically converted to its corresponding level in uV/m.

RE = 41.3 + (-1.1) = 40.2 dBuV/m
Level in uV/m = Common Antilogarithm: 10^(40.2/20)= 102.3uV/m

6.4 Test Results

Spurious Emission (Radiated) 2402MHz

Serial No.: PPE00005
Power: DC12V
Mode: Transmitting mode
Temperature: 23℃
Humidity: 76 %

Axial Direction: XY-Plane

Frequency [MHz]	Antenna Polarization	Meter Reading [dB(uV)]		Factor [dB/m]	Emission Level [dB(uV/m)]		Limits [dB(uV/m)]		Margin [dB]	
		Average	Peak		Average	Peak	Average	Peak	Average	Peak
1087.708	Horizontal	37.7	48.0	-11.8	25.9	36.2	54.0	74.0	28.1	37.8
1088.075	Vertical	47.8	52.5	-11.8	36.0	40.7	54.0	74.0	18.0	33.3
4803.758	Vertical	36.5	49.4	1.0	37.5	50.4	54.0	74.0	16.5	23.6
4804.600	Horizontal	37.5	49.5	1.0	38.5	50.5	54.0	74.0	15.5	23.5
4885.825	Horizontal	34.0	48.3	1.3	35.3	49.6	54.0	74.0	18.7	24.4
4885.933	Vertical	34.7	49.2	1.3	36.0	50.5	54.0	74.0	18.0	23.5
7206.088	Horizontal	<32.0	<44.5	3.7	<35.7	<48.2	54.0	74.0	>18.3	>25.8
9608.392	Horizontal	<32.0	<46.3	6.5	<38.5	<52.8	54.0	74.0	>15.5	>21.2
12010.135	Horizontal	<29.4	<41.6	7.7	<37.1	<49.3	54.0	74.0	>16.9	>24.7

Axial Direction: YZ-Plane

Frequency [MHz]	Antenna Polarization	Meter Reading [dB(uV)]		Factor [dB/m]	Emission Level [dB(uV/m)]		Limits [dB(uV/m)]		Margin [dB]	
		Average	Peak		Average	Peak	Average	Peak	Average	Peak
1087.930	Horizontal	36.2	46.7	-11.8	24.4	34.9	54.0	74.0	29.6	39.1
1088.125	Vertical	46.8	52.6	-11.8	35.0	40.8	54.0	74.0	19.0	33.2
4803.425	Vertical	32.5	45.4	1.0	33.5	46.4	54.0	74.0	20.5	27.6
4804.400	Horizontal	38.5	51.3	1.0	39.5	52.3	54.0	74.0	14.5	21.7
4885.917	Horizontal	35.7	49.5	1.3	37.0	50.8	54.0	74.0	17.0	23.2
4886.017	Vertical	33.2	45.6	1.3	34.5	46.9	54.0	74.0	19.5	27.1
7206.088	Horizontal	<32.0	<44.5	3.7	<35.7	<48.2	54.0	74.0	>18.3	>25.8
9608.392	Horizontal	<32.0	<46.3	6.5	<38.5	<52.8	54.0	74.0	>15.5	>21.2
12010.135	Horizontal	<29.4	<41.6	7.7	<37.1	<49.3	54.0	74.0	>16.9	>24.7

Axial Direction: ZX-Plane

Frequency [MHz]	Antenna Polarization	Meter Reading [dB(uV)]		Factor [dB/m]	Emission Level [dB(uV/m)]		Limits [dB(uV/m)]		Margin [dB]	
		Average	Peak		Average	Peak	Average	Peak	Average	Peak
1087.742	Vertical	47.3	52.4	-11.8	35.5	40.6	54.0	74.0	18.5	33.4
1088.700	Horizontal	38.4	48.8	-11.8	26.6	37.0	54.0	74.0	27.4	37.0
4803.358	Vertical	37.1	48.9	1.0	38.1	49.9	54.0	74.0	15.9	24.1
4803.900	Horizontal	35.9	47.7	1.0	36.9	48.7	54.0	74.0	17.1	25.3
4885.883	Horizontal	34.0	46.8	1.3	35.3	48.1	54.0	74.0	18.7	25.9
4886.008	Vertical	35.1	49.9	1.3	36.4	51.2	54.0	74.0	17.6	22.8
7206.088	Horizontal	<32.0	<44.5	3.7	<35.7	<48.2	54.0	74.0	>18.3	>25.8
9608.392	Horizontal	<32.0	<46.3	6.5	<38.5	<52.8	54.0	74.0	>15.5	>21.2
12010.135	Horizontal	<29.4	<41.6	7.7	<37.1	<49.3	54.0	74.0	>16.9	>24.7

The Mark "<", ">" in the table each means floor noise data and the data is below or over the shown value.

Spurious Emission (Radiated) 2441MHz

Serial No.: PPE00005
Power: DC12V
Mode: Transmitting mode
Temperature: 24℃
Humidity: 81 %

Axial Direction: XY-Plane

Frequency [MHz]	Antenna Polarization	Meter Reading [dB(uV)]		Factor [dB/m]	Emission Level [dB(uV/m)]		Limits [dB(uV/m)]		Margin [dB]	
		Average	Peak		Average	Peak	Average	Peak	Average	Peak
1088.100	Vertical	47.7	54.7	-11.8	35.9	42.9	54.0	74.0	18.1	31.1
1088.030	Horizontal	39.5	49.4	-11.8	27.7	37.6	54.0	74.0	26.3	36.4
4881.942	Horizontal	36.0	48.2	1.3	37.3	49.5	54.0	74.0	16.7	24.5
4882.075	Vertical	36.5	48.3	1.3	37.8	49.6	54.0	74.0	16.2	24.4
4885.983	Horizontal	35.2	49.7	1.3	36.5	51.0	54.0	74.0	17.5	23.0
4886.100	Vertical	34.5	49.3	1.3	35.8	50.6	54.0	74.0	18.2	23.4
7323.250	Horizontal	<32.2	<45.4	4.1	<36.3	<49.5	54.0	74.0	>17.7	>24.5
9764.058	Horizontal	<31.6	<43.1	6.6	<38.2	<49.7	54.0	74.0	>15.8	>24.3
12205.425	Horizontal	<27.7	<40.1	7.4	<35.1	<47.5	54.0	74.0	>18.9	>26.5

Axial Direction: YZ-Plane

Frequency [MHz]	Antenna Polarization	Meter Reading [dB(uV)]		Factor [dB/m]	Emission Level [dB(uV/m)]		Limits [dB(uV/m)]		Margin [dB]	
		Average	Peak		Average	Peak	Average	Peak	Average	Peak
1087.842	Vertical	47.9	52.5	-11.8	36.1	40.7	54.0	74.0	17.9	33.3
1088.258	Horizontal	38.5	48.1	-11.8	26.7	36.3	54.0	74.0	27.3	37.7
4881.767	Horizontal	36.8	49.1	1.3	38.1	50.4	54.0	74.0	15.9	23.6
4881.933	Vertical	32.6	44.8	1.3	33.9	46.1	54.0	74.0	20.1	27.9
4885.792	Vertical	32.3	46.6	1.3	33.6	47.9	54.0	74.0	20.4	26.0
4886.033	Horizontal	35.2	48.7	1.3	36.5	50.0	54.0	74.0	17.5	24.0
7323.250	Horizontal	<32.2	<45.4	4.1	<36.3	<49.5	54.0	74.0	>17.7	>24.5
9764.058	Horizontal	<31.6	<43.1	6.6	<38.2	<49.7	54.0	74.0	>15.8	>24.3
12205.425	Horizontal	<27.7	<40.1	7.4	<35.1	<47.5	54.0	74.0	>18.9	>26.5

Axial Direction: ZX-Plane

Frequency [MHz]	Antenna Polarization	Meter Reading [dB(uV)]		Factor [dB/m]	Emission Level [dB(uV/m)]		Limits [dB(uV/m)]		Margin [dB]	
		Average	Peak		Average	Peak	Average	Peak	Average	Peak
1087.683	Vertical	48.6	52.7	-11.8	36.8	40.9	54.0	74.0	17.2	33.1
1088.050	Horizontal	38.2	48.4	-11.8	26.4	36.6	54.0	74.0	27.6	37.4
4881.825	Vertical	36.2	48.9	1.3	37.5	50.2	54.0	74.0	16.5	23.8
4882.583	Horizontal	32.8	44.0	1.3	34.1	45.3	54.0	74.0	19.9	28.7
4885.792	Horizontal	32.8	44.8	1.3	34.1	46.1	54.0	74.0	19.9	27.9
4885.867	Vertical	35.1	49.2	1.3	36.4	50.5	54.0	74.0	17.6	23.5
7323.250	Horizontal	<32.2	<45.4	4.1	<36.3	<49.5	54.0	74.0	>17.7	>24.5
9764.058	Horizontal	<31.6	<43.1	6.6	<38.2	<49.7	54.0	74.0	>15.8	>24.3
12205.425	Horizontal	<27.7	<40.1	7.4	<35.1	<47.5	54.0	74.0	>18.9	>26.5

The Mark “<”, “>” in the table each means floor noise data and the data is below or over the shown value.

Spurious Emission (Radiated) 2480MHz

Serial No.: PPE00005
Power: DC12V
Mode: Transmitting mode
Temperature: 24℃
Humidity: 81 %

Axial Direction: XY-Plane

Frequency [MHz]	Antenna Polarization	Meter Reading [dB(uV)]		Factor [dB/m]	Emission Level [dB(uV/m)]		Limits [dB(uV/m)]		Margin [dB]	
		Average	Peak		Average	Peak	Average	Peak	Average	Peak
1088.080	Horizontal	37.2	47.5	-11.8	25.4	35.7	54.0	74.0	28.6	38.3
1088.033	Vertical	47.4	52.6	-11.8	35.6	40.8	54.0	74.0	18.4	33.2
4885.783	Vertical	34.5	49.0	1.3	35.8	50.3	54.0	74.0	18.2	23.7
4886.242	Horizontal	34.0	46.7	1.3	35.3	48.0	54.0	74.0	18.7	26.0
4959.467	Horizontal	37.1	49.2	1.5	38.6	50.7	54.0	74.0	15.4	23.3
4959.650	Vertical	36.6	48.3	1.5	38.1	49.8	54.0	74.0	15.9	24.2
7440.278	Horizontal	<32.5	<45.8	4.2	<36.7	<50.0	54.0	74.0	>17.3	>24.0
9920.075	Horizontal	<31.8	<44.4	6.9	<38.7	<51.3	54.0	74.0	>15.3	>22.7
12399.865	Horizontal	<26.7	<40.5	7.4	<34.1	<47.9	54.0	74.0	>19.9	>26.1

Axial Direction: YZ-Plane

Frequency [MHz]	Antenna Polarization	Meter Reading [dB(uV)]		Factor [dB/m]	Emission Level [dB(uV/m)]		Limits [dB(uV/m)]		Margin [dB]	
		Average	Peak		Average	Peak	Average	Peak	Average	Peak
1087.867	Vertical	46.7	52.7	-11.8	34.9	40.9	54.0	74.0	19.1	33.1
1087.892	Horizontal	37.9	48.2	-11.8	26.1	36.4	54.0	74.0	27.9	37.6
4885.933	Horizontal	35.0	48.7	1.3	36.3	50.0	54.0	74.0	17.7	24.0
4886.100	Vertical	33.4	46.0	1.3	34.7	47.3	54.0	74.0	19.3	26.7
4959.792	Horizontal	35.9	48.1	1.5	37.4	49.6	54.0	74.0	16.6	24.5
4960.175	Vertical	34.1	46.3	1.5	35.6	47.8	54.0	74.0	18.4	26.2
7440.278	Horizontal	<32.5	<45.8	4.2	<36.7	<50.0	54.0	74.0	>17.3	>24.0
9920.075	Horizontal	<31.8	<44.4	6.9	<38.7	<51.3	54.0	74.0	>15.3	>22.7
12399.865	Horizontal	<26.7	<40.5	7.4	<34.1	<47.9	54.0	74.0	>19.9	>26.1

Axial Direction: ZX-Plane

Frequency [MHz]	Antenna Polarization	Meter Reading [dB(uV)]		Factor [dB/m]	Emission Level [dB(uV/m)]		Limits [dB(uV/m)]		Margin [dB]	
		Average	Peak		Average	Peak	Average	Peak	Average	Peak
1088.075	Vertical	48.0	53.1	-11.8	36.2	41.3	54.0	74.0	17.8	32.7
1088.117	Horizontal	37.5	48.3	-11.8	25.7	36.5	54.0	74.0	28.3	37.5
4959.642	Vertical	37.1	49.3	1.5	38.6	50.8	54.0	74.0	15.4	23.2
4960.008	Horizontal	32.8	45.0	1.5	34.3	46.5	54.0	74.0	19.7	27.5
7440.278	Horizontal	<32.5	<45.8	4.2	<36.7	<50.0	54.0	74.0	>17.3	>24.0
9920.075	Horizontal	<31.8	<44.4	6.9	<38.7	<51.3	54.0	74.0	>15.3	>22.7
12399.865	Horizontal	<26.7	<40.5	7.4	<34.1	<47.9	54.0	74.0	>19.9	>26.1

The Mark "<", ">" in the table each means floor noise data and the data is below or over the shown value.

7 20dB Bandwidth

7.1 Test Setup

The spectrum analyzer was connected to the transmitter output port through the RF cable.

Spectrum analyzer setting:

DETECTOR MODE: PEAK
RBW: 30kHz
VBW: 30kHz
SPAN: 2MHz
SWEEP TIME: AUTO

7.2 Test Instrument

Equipment	Manufacture	Model No.	Serial No.	Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSIQ26	840061/0004	10th.2.2006	9th.2.2007
RF Cable	SUHNER	SUCOFLEX 104E	RF2	4th.7.2006	3rd.7.2007
Multi Meter	R6451A	67840312	Advantest	15th.6.2006	14th.6.2007

7.3 Test Results

Serial No.: PPE00004
Power: DC12.00V
Mode: Transmitting mode, Non Frequency Hopping
Temperature: 22.0 ℃
Humidity: 63.0 %

CH	Frequency [MHz]	20dB Bandwidth [MHz]
0ch(Lowest)	2402.0	0.970
39ch(Middle)	2441.0	0.930
78ch(Highest)	2480.0	0.858

8 Carrier Frequency Separation

8.1 Test Setup

The spectrum analyzer was connected to the transmitter output port through the RF cable.

Spectrum analyzer setting:

DETECTOR MODE:	PEAK
RBW:	100kHz
VBW:	300kHz
SPAN:	3MHz
SWEEP TIME:	AUTO

8.2 Test Instrument

Equipment	Manufacture	Model No.	Serial No.	Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSIQ26	840061/0004	10th.2.2006	9th.2.2007
RF Cable	SUHNER	SUCOFLEX 104E	RF2	4th.7.2006	3rd.7.2007
RF Cable	SUHNER	SUCOFLEX 104	RF3-2	17th.5.2006	16th.5.2007
Power Divider	Aeroflex / Inmet	6005-03	RF-8	4th.7.2006	3rd.7.2007
Multi Meter	R6451A	67840312	Advantest	15th.6.2006	14th.6.2007

8.3 Test Results

Serial No.:	PPE00004
Power:	DC12.00V
Mode:	Transmitting mode, Frequency Hopping
	Transmitting mode, Adoptive Frequency Hopping
Temperature:	22.0 ℃
Humidity:	63.0 %
Regulation:	FCC Part15 C §15.247 (a)(1)

Transmitting mode, Frequency Hopping (79ch)

Channel	Channel Separation [MHz]	Limit *1 [MHz]
Low frequency (0ch-1ch)	0.998	> 0.647
Middle frequency (38ch-39ch)	0.974	> 0.620
High frequency (77ch-78ch)	1.010	> 0.572

Transmitting mode, Adoptive Frequency Hopping (20ch)

Channel	Channel Separation [MHz]	Limit *1 [MHz]
Low frequency (0ch-1ch)	0.992	> 0.647
Middle frequency (38ch-39ch)	0.986	> 0.620
High frequency (77ch-78ch)	0.992	> 0.572

*1: Limit value of Carrier Frequency Separation is 2/3 of 20dB Bandwidth.
Refer the result of 20dB Bandwidth to Section 7.

9 Number of Hopping Frequency

9.1 Test Setup

The spectrum analyzer was connected to the transmitter output port through the RF cable.

Spectrum analyzer setting:

DETECTOR MODE: PEAK
RBW: 300kHz
VBW: 300kHz
SWEEP TIME: AUTO

9.2 Test Instrument

Equipment	Manufacture	Model No.	Serial No.	Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSIQ26	840061/0004	10th.2.2006	9th.2.2007
RF Cable	SUHNER	SUCOFLEX 104E	RF2	4th.7.2006	3rd.7.2007
RF Cable	SUHNER	SUCOFLEX 104	RF3-2	17th.5.2006	16th.5.2007
Power Divider	Aeroflex / Inmet	6005-03	RF-8	4th.7.2006	3rd.7.2007
Multi Meter	R6451A	67840312	Advantest	15th.6.2006	14th.6.2007

9.3 Test Results

Serial No.: PPE00004
Power: DC 12.00V
Mode: Transmitting mode, Frequency Hopping
Transmitting mode, Adoptive Frequency Hopping
Temperature: 22.0 ℃
Humidity: 63.0 %
Regulation: FCC Part15 C §15.247 (a)(1)(iii)

Mode	Number of channel [time]	Limit [time]
Transmitting mode Frequency Hopping (79ch)	79	≥ 15
Transmitting mode Adoptive Frequency Hopping (20ch)	20 *A	≥ 15

AFH: Intelligent hopping techniques to avoid interference to other transmission.

*A: None of them is overlapped each other.

10 Dwell Time

10.1 Test Setup

The spectrum analyzer was connected to the transmitter output port through the RF cable.

Spectrum analyzer setting:

DETECTOR MODE: PEAK
RBW: 1MHz
VBW: 1MHz
SPAN: 0Hz
SWEEP TIME: AUTO

10.2 Test Instrument

Equipment	Manufacture	Model No.	Serial No.	Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSIQ26	840061/0004	10th.2.2006	9th.2.2007
RF Cable	SUHNER	SUCOFLEX 104E	RF2	4th.7.2006	3rd.7.2007
RF Cable	SUHNER	SUCOFLEX 104	RF3-2	17th.5.2006	16th.5.2007
Power Divider	Aeroflex / Inmet	6005-03	RF-8	4th.7.2006	3rd.7.2007
Multi Meter	R6451A	67840312	Advantest	15th.6.2006	14th.6.2007

10.3 Test Results

Serial No.: PPE00004
Power: DC12.00V
Mode: Transmitting mode (DH1, DH3, DH5), Frequency Hopping
Transmitting mode, (DH1, DH3, DH5),Adoptive Frequency Hopping
Temperature: 22.0 ℃
Humidity: 63.0 %
Regulation: FCC Part15 C §15.247 (a)(1)(iii)

(1) 79ch

Packet	Dwell time [ms]	Limit [ms]
DH1	151.39	400
DH3	281.63	400
DH5	320.54	400

(2) 20ch

Packet	Dwell time [ms]	Limit [ms]
DH1	150.11	400
DH3	282.60	400
DH5	321.18	400

Data of Dwell Time (Frequency Hopping (79ch))

Time of occupancy (Dwell Time) for packet type DH1.

FH hop rate of Bluetooth system is 1600hops per 1 second.
A DH1 packet needs 1 time slot for transmitting and 1 time slot for receiving.

In a DH1 packet, it hops 800 times for transmitting per 1 second.
The number of hopping channel is 79.
The number of times that appears in 1 channel per 1 second is as follows.
800/79=10.13 [times]

The average time of occupancy on any channel shall not be greater than 0.4 seconds (400ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed 0.4 x 79 = 31.6 seconds
The number of times that appears in 1 channel per 31.6 seconds is as follows.
10.13 x 31.6 = 320.11 [times]

Transmitting time is 0.473ms.
Then, dwell time is 320.11 x 0.473ms = 151.39ms per 31.6 seconds.

Time of occupancy (Dwell Time) for packet type DH3.

FH hop rate of Bluetooth system is 1600hops per 1 second.
A DH3 packet needs 3 times slot for transmitting and 1 time slot for receiving.

In a DH3 packet, it hops 400 times for transmitting per 1 second.
The number of hopping channel is 79.
The number of times that appears in 1 channel per 1 second is as follows.
400/79=5.1 [times]

The average time of occupancy on any channel shall not be greater than 0.4 seconds (400ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed 0.4 x 79 = 31.6 seconds
The number of times that appears in 1 channel per 31.6 seconds is as follows.
5.1 x 31.6 = 161.16 [times]

Transmitting time is 1.747ms.
Then, dwell time is 161.16 x 1.747ms = 281.63ms per 31.6 seconds.

Time of occupancy (Dwell Time) for packet type DH5.

FH hop rate of Bluetooth system is 1600hops per 1 second.
A DH5 packet needs 5 times slot for transmitting and 1 time slot for receiving.

In a DH5 packet, it hops 266.67 times for transmitting per 1 second.
The number of hopping channel is 79.
The number of times that appears in 1 channel per 1 second is as follows.
266.67/79=3.37 [times]

The average time of occupancy on any channel shall not be greater than 0.4 seconds (400ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed 0.4 x 79 = 31.6 seconds
The number of times that appears in 1 channel per 31.6 seconds is as follows.
3.37 x 31.6 = 106.49 [times]

Transmitting time is 3.010ms.
Then, dwell time is 106.49 x 3.010ms = 320.54ms per 31.6 seconds.

Data of Dwell Time (Frequency Hopping (20ch))

Time of occupancy (Dwell Time) for packet type DH1.

FH hop rate of Bluetooth system is 1600hops per 1 second.
A DH1 packet needs 1 time slot for transmitting and 1 time slot for receiving.

In a DH1 packet, it hops 800 times for transmitting per 1 second.
The number of hopping channel is 20.
The number of times that appears in 1 channel per 1 second is as follows.
800/20=40 (times)

The average time of occupancy on any channel shall not be greater than 0.4 seconds (400ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed 0.4 x 20 = 8.0 seconds
The number of times that appears in 1 channel per 8.0 seconds is as follows.
40 x 8.0 = 320.00 (times)

Transmitting time is 0.469ms.
Then, dwell time is 320.00 x 0.469ms = 150.11ms per 8.0 seconds.

Time of occupancy (Dwell Time) for packet type DH3.

FH hop rate of Bluetooth system is 1600hops per 1 second.
A DH3 packet needs 3 times slot for transmitting and 1 time slot for receiving.

In a DH3 packet, it hops 400 times for transmitting per 1 second.
The number of hopping channel is 20.
The number of times that appears in 1 channel per 1 second is as follows.
400/20=20 (times)

The average time of occupancy on any channel shall not be greater than 0.4 seconds (400ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed 0.4 x 20 = 8.0 seconds
The number of times that appears in 1 channel per 8.0 seconds is as follows.
20 x 8.0 = 160.00 (times)

Transmitting time is 1.754ms.
Then, dwell time is 160.00 x 1.754ms = 282.60ms per 8.0 seconds.

Time of occupancy (Dwell Time) for packet type DH5.

FH hop rate of Bluetooth system is 1600hops per 1 second.
A DH5 packet needs 5 times slot for transmitting and 1 time slot for receiving.

In a DH5 packet, it hops 266.67 times for transmitting per 1 second.
The number of hopping channel is 20.
The number of times that appears in 1 channel per 1 second is as follows.
266.67/20=13.34 (times)

The average time of occupancy on any channel shall not be greater than 0.4 seconds (400ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed 0.4 x 20 = 8.0 seconds
The number of times that appears in 1 channel per 8.0 seconds is as follows.
13.34 x 8.0 = 106.72 (times)

Transmitting time is 3.016ms.
Then, dwell time is 106.72 x 3.016ms = 321.18ms per 8.0 seconds.

11 Maximum Peak Output Power

11.1 Test Setup

The spectrum analyzer was connected to the transmitter output port through the RF cable.

Spectrum analyzer setting:

DETECTOR MODE: PEAK
RBW: 1MHz
VBW: 1MHz
SPAN: 5MHz
SWEEP TIME: AUTO

11.2 Test Instrument

Equipment	Manufacture	Model No.	Serial No.	Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSIQ26	840061/0004	10th.2.2006	9th.2.2007
RF Cable	SUHNER	SUCOFLEX 104E	RF2	4th.7.2006	3rd.7.2007
Multi Meter	R6451A	67840312	Advantest	15th.6.2006	14th.6.2007

11.3 Test Results

Serial No.: PPE00004
Power: DC12.00V
Mode: Transmitting mode, Non Frequency Hopping
Transmitting mode, Adoptive Frequency Hopping
Temperature: 22.0 ℃
Humidity: 63.0 %
Regulation: FCC Part15 C §15.247 (b)(1)

CH	Frequency [MHz]	Reading [dBm]	Cable Loss1 [dB]	Cable Loss2 [dB]	Result [dBm]	Limit [dBm]
0ch(Lowest)	2402	-2.15	0.69	0.20	-1.26	30.0
39ch(Middle)	2441	-2.94	0.64	0.20	-2.10	30.0
78ch(Highest)	2480	-3.92	0.71	0.20	-3.01	30.0

Result = Reading + Cable Loss1 + Cable Loss2

Note: Cable Loss1: RF2
Cable Loss2: Conversion cable used for connecting to SMA type

12 Band Edge Compliance

12.1 Test Setup

The spectrum analyzer was connected to the transmitter output port through the RF cable.

Spectrum analyzer setting:

DETECTOR MODE: PEAK
RBW: 100kHz
VBW: 100kHz
SPAN: 10MHz
SWEEP TIME: AUTO

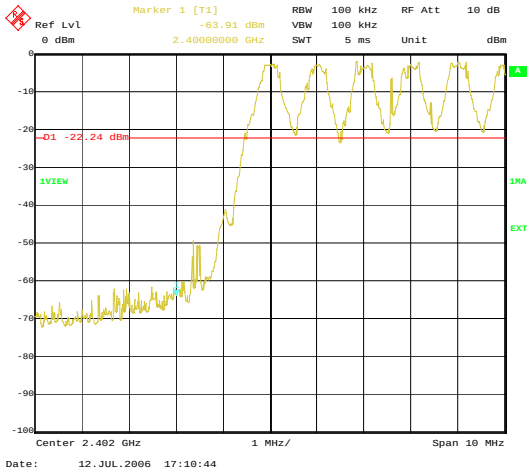
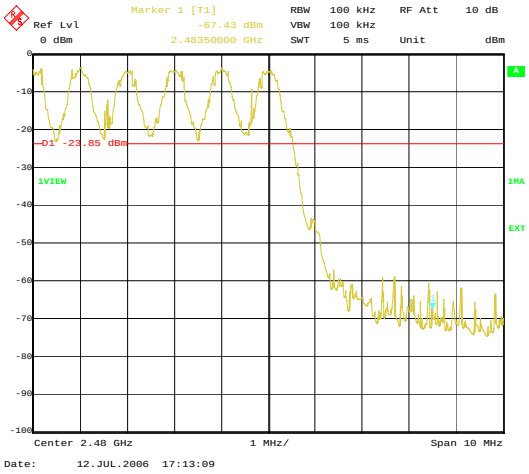
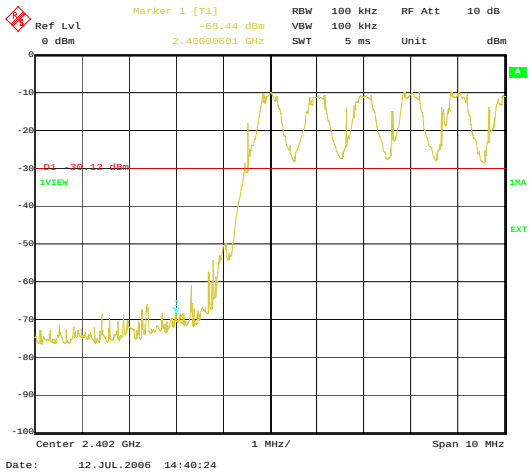
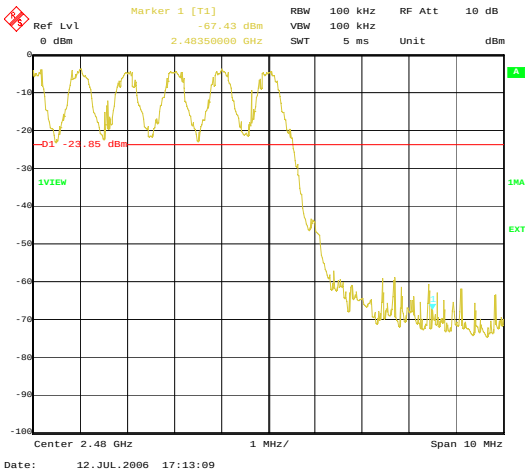
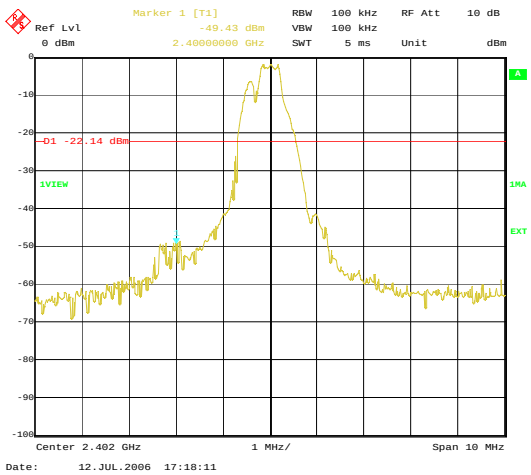
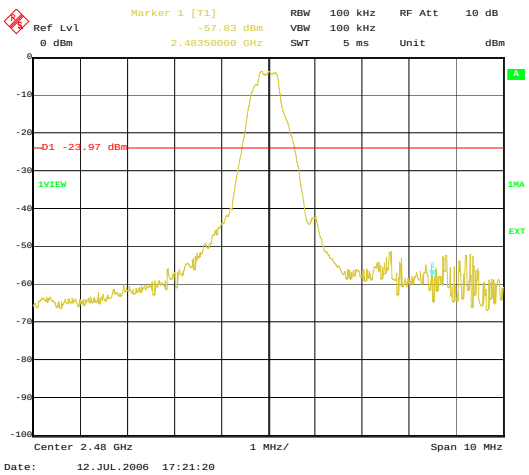
12.2 Test Instrument

Equipment	Manufacture	Model No.	Serial No.	Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSIQ26	840061/0004	10th.2.2006	9th.2.2007
RF Cable	SUHNER	SUCOFLEX 104E	RF2	4th.7.2006	3rd.7.2007
RF Cable	SUHNER	SUCOFLEX 104	RF3-2	17th.5.2006	16th.5.2007
Power Divider	Aeroflex / Inmet	6005-03	RF-8	4th.7.2006	3rd.7.2007
Multi Meter	R6451A	67840312	Advantest	15th.6.2006	14th.6.2007

12.3 Test Results

Serial No.: PPE00004
Power: DC12.00V
Mode: Transmitting mode, Frequency Hopping (79ch)
Transmitting mode, Adoptive Frequency Hopping (20ch)
Transmitting mode, Non Frequency Hopping
Temperature: 22.0 ℃
Humidity: 63.0 %
Regulation: FCC Part15 C §15.247 (d)

The spectrum data are attached next page. Display line indicates the 20dB offset below highest level.
It shows compliance with the requirement in part 15.247(d)

Frequency Hopping 79ch (2402MHz)	Frequency Hopping 79ch (2480MHz)
	
Adoptive Frequency Hopping 20ch (2402MHz)	Adoptive Frequency Hopping 20ch (2480MHz)
	
Non Frequency Hopping (0ch(Lowest) 2402MHz)	Non Frequency Hopping (78ch(Highest) 2480MHz)
	

13 Spurious RF Conducted Emission

13.1 Test Setup

The spectrum analyzer was connected to the transmitter output port through the RF cable.

Spectrum analyzer setting:

DETECTOR MODE: PEAK
RBW: 100kHz
VBW: 100kHz
SWEEP TIME: AUTO

13.2 Test Instrument

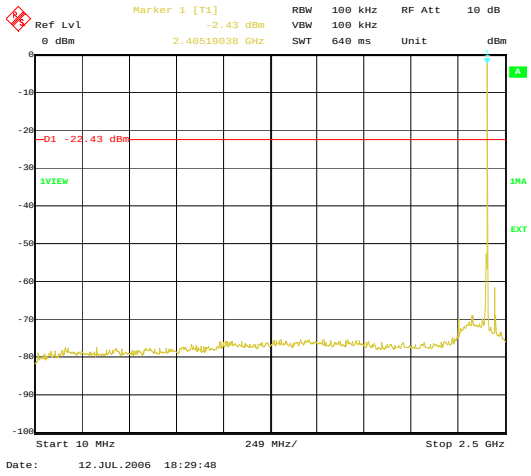
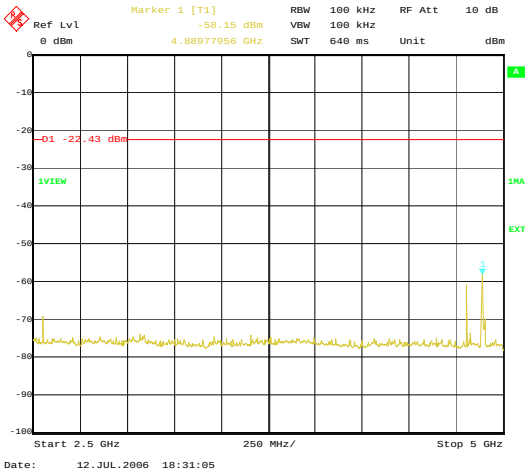
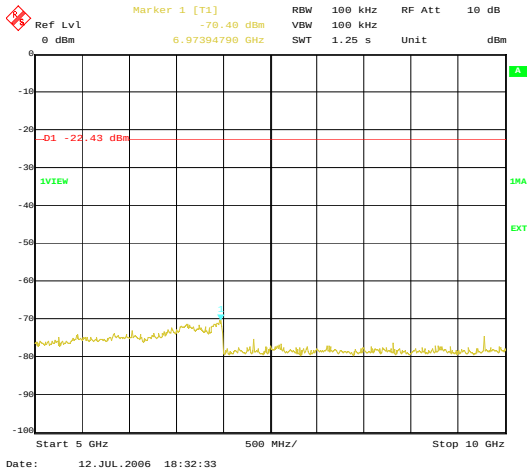
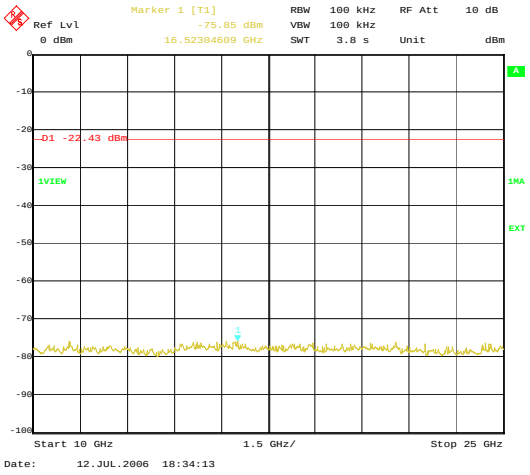
Equipment	Manufacture	Model No.	Serial No.	Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSIQ26	840061/0004	10th.2.2006	9th.2.2007
RF Cable	SUHNER	SUCOFLEX 104E	RF2	4th.7.2006	3rd.7.2007
Multi Meter	R6451A	67840312	Advantest	15th.6.2006	14th.6.2007

13.3 Test Results

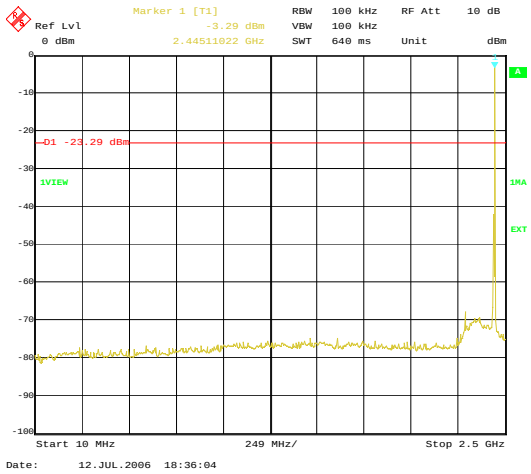
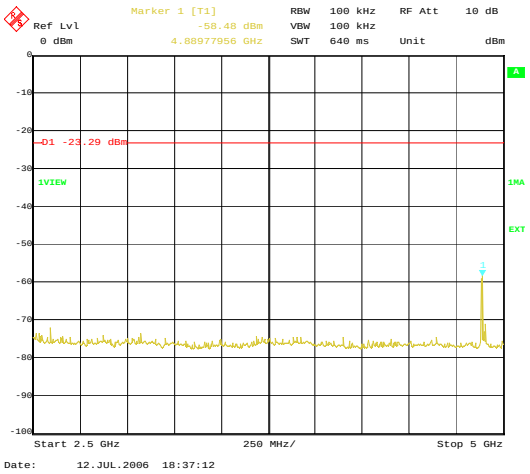
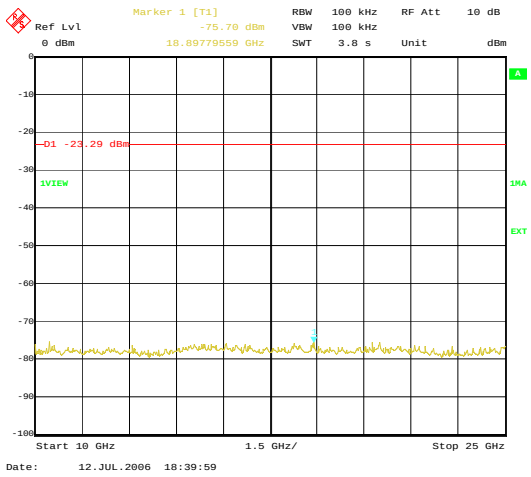
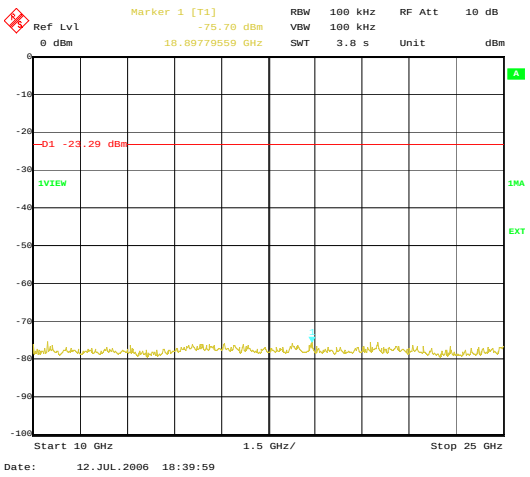
Serial No.: PPE00004
Power: DC12.00V
Mode: Transmitting mode, Frequency Hopping (79ch)
Transmitting mode, Non Frequency Hopping
Temperature: 22.0 ℃
Humidity: 63.0 %
Regulation: FCC Part15 C §15.247 (d)

The spectrum data are attached next page. Display line indicates the 20dB offset below highest level.
It shows compliance with the requirement in part 15.247(d)

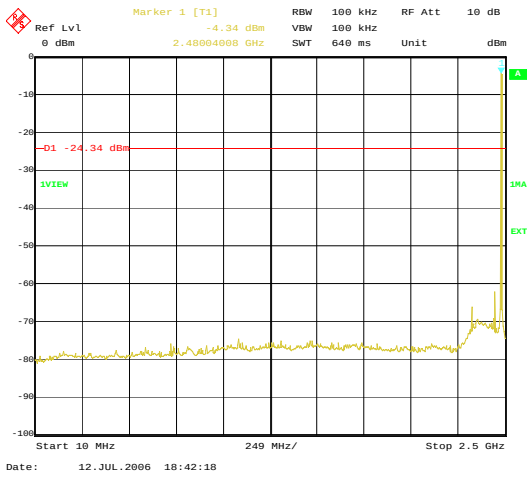
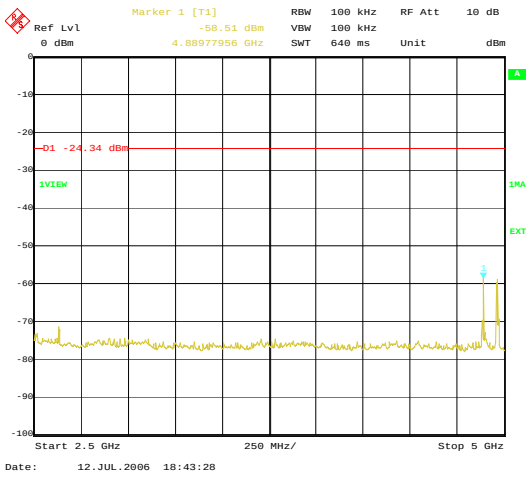
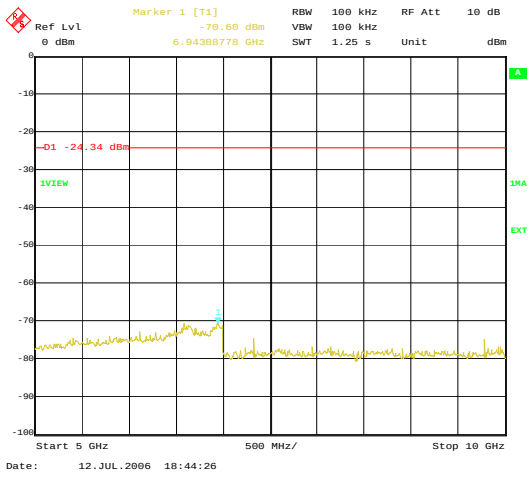
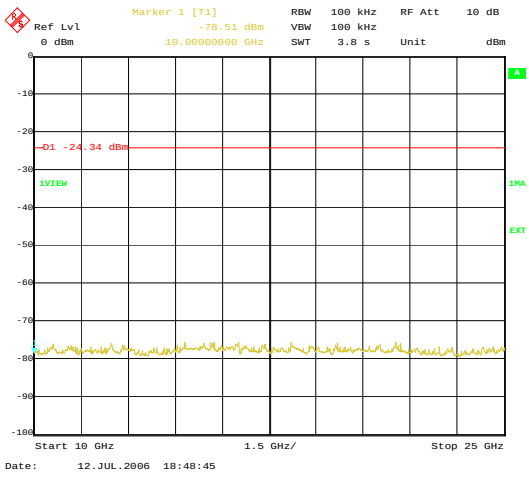
(1) 0ch(Lowest) 2402MHz

10MHz～2.5GHz	2.5GHz～5GHz
	
5GHz～10GHz	**10GHz～25GHz**
	

(2) 39ch(Middle) 2441MHz

10MHz～2.5GHz	2.5GHz～5GHz
	
5GHz～10GHz	**10GHz～25GHz**
	

(3) 78ch(Highest) 2480MHz

10MHz～2.5GHz	2.5GHz～5GHz
	
5GHz～10GHz	**10GHz～25GHz**
	

14 EIRP Calculation from Peak Power

15.247 (b)(5): Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.
(Limit [W] =60 / f [MHz] , 24mW at 2.5GHz)

EIRP Calculation:

A	B	C		
Specified Antenna Gain [dBi]	Max. RF Output Power at Antenna Terminal [dBm]	Total EIRP		Limit [W] 60 / f [MHz]
		[dBm]	[mW]	
2.02	-1.26	0.76	1.19	25mW

Calculation: C [dBm] = A [dBi] + B [dBm]
EIRP = 0.76dBm = 1.19mW

15 Photos of Tested EUT

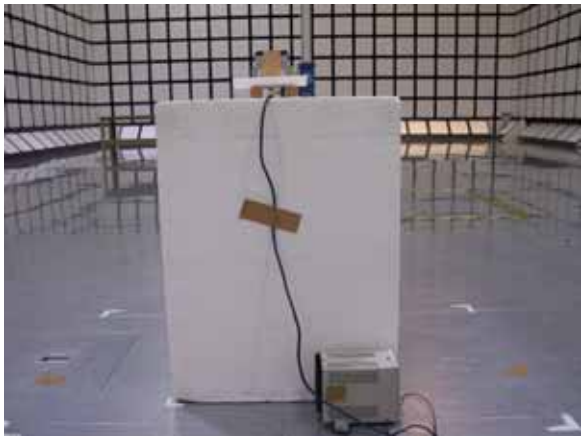
16 Photos of Test Setup

Photos of Radiated Measurement

Axial Direction: XY-Plane

Axial Direction: YZ-Plane

Axial Direction: ZX-Plane

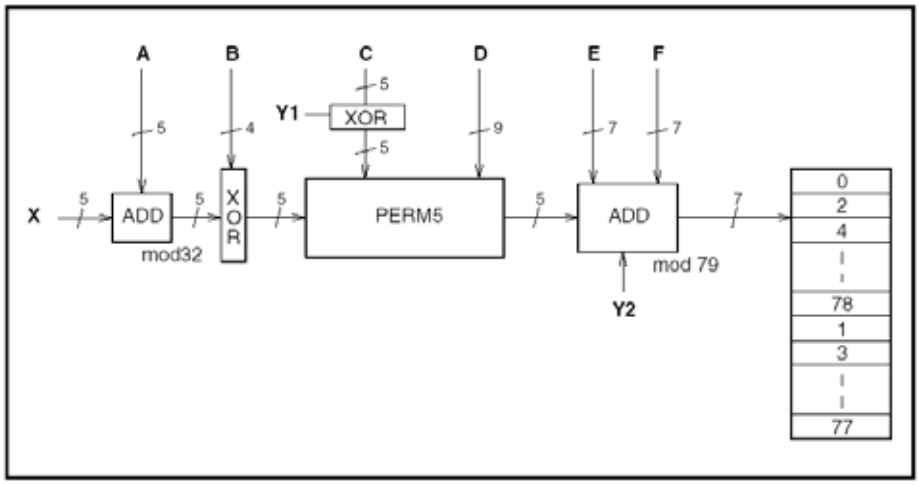


17 APPENDIX 1

About AFH-Hopping Sequence

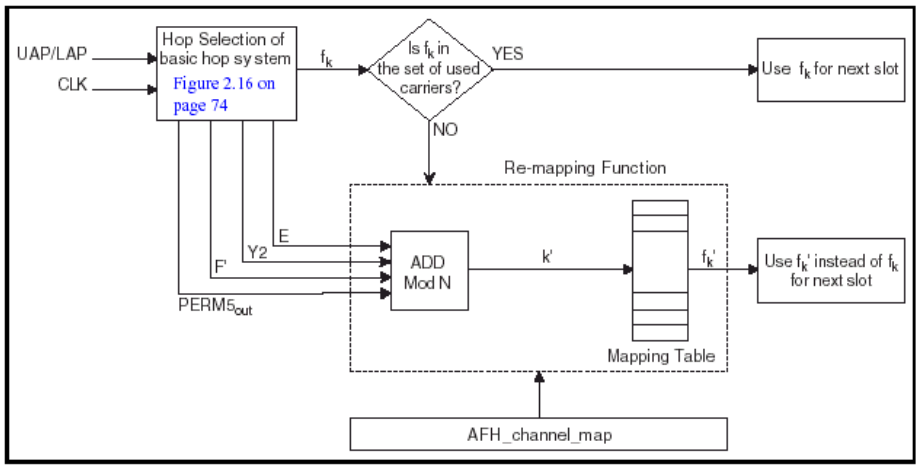
AFH-Hopping Sequence is provided for in the Bluetooth Spec 1.2. Here is an outline below.

1.In the case of 79Hopping



Due to the above flow, 32 hops are made into 5 ways. Then, the sign of the sign head 160 is formed. The remainder that is worked out by dividing with 79 is assigned to Hopping Channel. Each parameter of the above figure uses the value calculated from the Bluetooth clock and the Bluetooth address which are shown in the next page.

2.In the case of AFH-Hopping



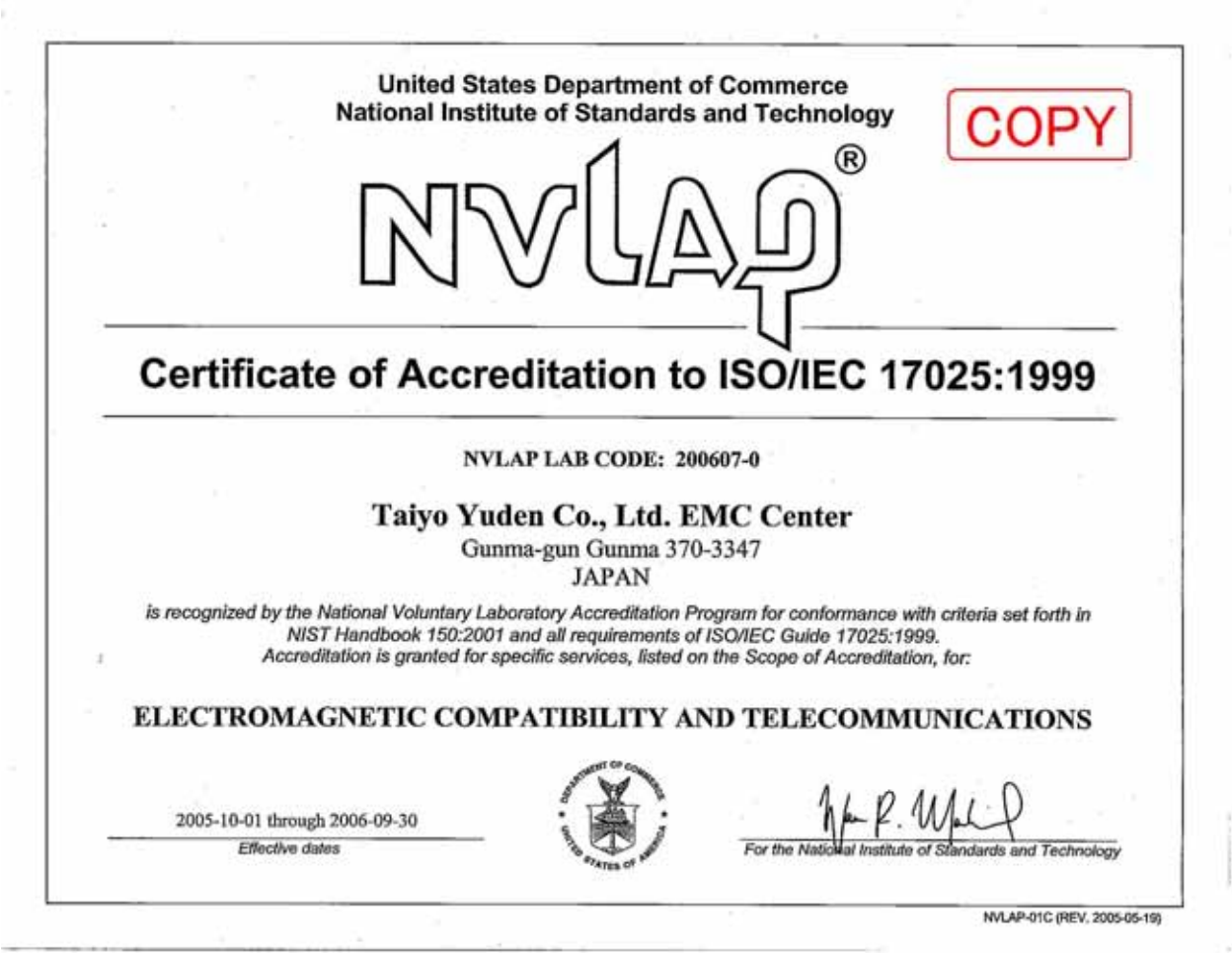
Also in the case of AFH, the fundamental sign adopt the sign head 160 that is the same as the case of 79Hopping. Hopping Pattern uses the value that is worked out by dividing with the number of AFH-Channel's. Then, available Hopping becomes even as well as 79Hopping.
The selection of the communication Channel is done by the communication error rate and the receiving signal strength. Frequency is determined by pairing the channel and the value which is divided by the number of AFH-Channel one-to-one.

It is decided in the specifications that Communication Channel has to have “20Channels” at least. However, if the number of communication Channel is controlled to be under 20 back to 79Channel-Hopping, and select the communication Channel again.

3.The parameter list which decides Hopping-Pattern

	Page scan / Interlaced Page Scan / Inquiry scan / Interlaced Inquiry Scan	Page/Inquiry	Master/Slave page response and Inquiry response	Connection state
X	$CLKN_{16-12}$ / $(CLKN_{16-12}+16) mod 32$ / Xir_{4-0} / $Xir_{4-0}+16) mod 32$	Xp_{4-0} / Xi_{4-0}	$Xprm_{4-0}$ / $Xprs_{4-0}$ / Xir_{4-0}	CLK_{6-2}
Y1	0	$CLKE_1$ / $CLKN_1$	$CLKE_1$ / $CLKN_1$ / 1	CLK_1
Y2	0	$32 \times CLKE_1$ / $32 \times CLKN_1$	$32 \times CLKE_1$ / $32 \times CLKN_1$ / 32×1	$32 \times CLK_1$
A	A_{27-23}	A_{27-23}	A_{27-23}	$A_{27-23} \oplus CLK_{25-21}$
B	A_{22-19}	A_{22-19}	A_{22-19}	A_{22-19}
C	$A_{8,6,4,2,0}$	$A_{8,6,4,2,0}$	$A_{8,6,4,2,0}$	$A_{8,6,4,2,0} \oplus CLK_{20-16}$
D	A_{18-10}	A_{18-10}	A_{18-10}	$A_{18-10} \oplus CLK_{15-7}$
E	$A_{13,11,9,7,5,3,1}$	$A_{13,11,9,7,5,3,1}$	$A_{13,11,9,7,5,3,1}$	$A_{13,11,9,7,5,3,1}$
F	0	0	0	$16 \times CLK_{27-7} \bmod 79$
F'	n/a	n/a	n/a	$16 \times CLK_{27-7} \bmod N$

18 APPENDIX 2



United States Department of Commerce
National Institute of Standards and Technology

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