

FCC CFR47 PART 15 SUBPART C INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

Bluetooth Module

MODEL NUMBER: BT401

FCC ID: GT3FC018 IC: 3683A-FC018

REPORT NUMBER: 33HE0044-SH-A

ISSUE DATE: April 16, 2013 REVISED DATE: April 17, 2013

Prepared for SMK Corporation 5-5, Togoshi 6-chome, Shinagawa-ku, Tokyo, 142-8511, JAPAN

Prepared by UL Japan, Inc. Shonan EMC Lab. 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN Telephone number : +81 463 50 6400 Facsimile number : +81 463 50 6401 JAB Accreditation No. : RTL02610



Revision History

Rev.	lssue Date	Revisions	Revised By
	04/16/13	Initial Issue	T. Arai
1	04/17/13	p.10, change (STR-03)"Test Receiver" to "EMI Test Receiver". p.20, p.55 added "Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification." in TEST PROCEDURE. p.25, added "This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence ($20 \le N \le 79$), is always less than 0.4s regardless of packet size (DH1, DH3 or DH5). This is confirmed in the test report for N=79." in TEST PROCEDURE. p.60, added "This device complies with the Bluetooth protocol	T. Arai
		for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence ($20 \le N \le 79$), is always less than 0.4s regardless of packet size (3-DH1, 3-DH3 or 3-DH5). This is confirmed in the test report for N=79." in TEST PROCEDURE.	

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REPORT NO: 33HE0044-SH-A FCC ID: GT3FC018

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1. ATTESTATION OF TEST RESULTS

APPLICABLE STANDARDS				
DATE TESTED:	March 30 to April 12, 2013			
SERIAL NUMBER:	000190F07F85, 000190F08231			
MODEL:	BT401			
EUT DESCRIPTION:	Bluetooth Module			
COMPANY NAME:	SMK Corporation 5-5,Togoshi 6-chome, Shinagawa-ku, Tokyo, 142-8511, JAPAN			

AFFEICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

UL Japan Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Japan, Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Japan, Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Japan, Inc. will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by any government agency.

Approved & Released For UL Japan, Inc. By:

Tested By:

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I arai

Tatsuya Arai Engineer of WiSE Japan, UL Verification Service

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN.

UL Japan is accredited by JAB, Laboratory Code RTL02610. The full scope of accreditation can be viewed at http://www.jab.or.jp/cgi-bin/jab_exam_proof_j.cgi?page=2&authorization_number=RTL02610

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY	
Power Line Conducted Emission	150kHz-30MHz	+/- 3.5 dB
	30MHz-300MHz	+/- 4.9 dB
	300MHz-1000MHz	+/- 4.9 dB
Radiated Emission	1000MHz-15GHz	+/- 4.9 dB
	15GHz-18GHz	+/- 5.6 dB
	18GHz-26.5GHz	+/- 4.4 dB

Uncertainty figures are valid to a confidence level of 95% using a coverage factor k=2..

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Bluetooth Module (Power Class 2), powered by DC power supply. The radio module is manufactured by CSR.

GENERAL INFORMATION

Power Requirements	DC 2.7-3.6V
List of frequencies generated or used by the EUT	26MHz

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	3.80	2.40
2402 - 2480	Enhanced 8PSK	2.89	1.95

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes PCB antenna, with a maximum gain of 2.0 dBi.

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was RF test tool Ver.1.2.4.

5.5. WORST-CASE CONFIGURATION AND MODE

The fundamental and spurious was measured in three different orientations X, Y and Z to find worst-case orientation, and final testing for radiated emissions was performed with EUT in following orientation.

	Horizontal		Vertical	
	Tx	Rx	Тx	Rx
Spurious (below 1GHz)	Х	Х	Х	Х
Spurious (1 - 15GHz)	Х	Z	Z	Х
Spurious (above 15GHz)	Х	Х	Х	Х

The worst-case channel is determined as the channel with the highest output power, radiated emissions below 1 GHz and power line conducted emissions were performed with the EUT set to the channel with highest output power.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

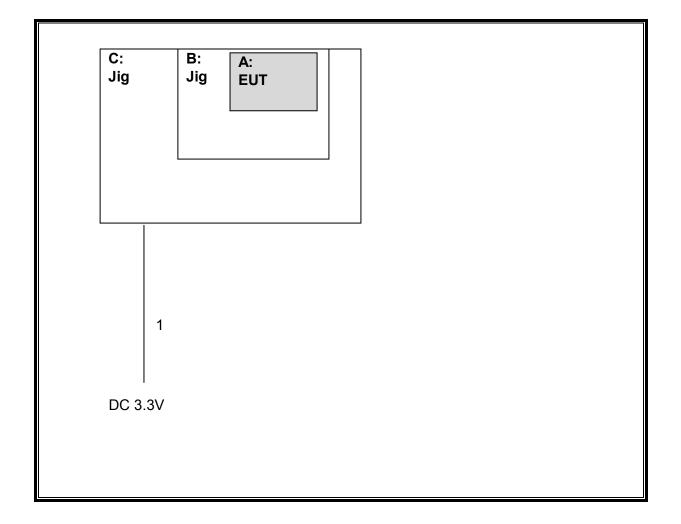
PERIPHERAL SUPPORT EQUIPMENT LIST						
Description Manufacturer Model Serial Number						
B: Jig	SMK	BT401-CB 001	-			
C: Jig	SMK	BE005	-			

I/O CABLES

	I/O CABLE LIST									
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks				
1	DC cable	1	DC	Un-Shielded	1.4m	N/A				

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SETUP DIAGRAM FOR RADIATED TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-	Semi-Anechoic	TDK	SAEC-03(NSA)	3	RE	2012/09/21 * 12
03(NSA)	Chamber					
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2012/08/17 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2012/04/10 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2012/12/18 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	51	RE	2012/12/18 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2012/07/18 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2012/05/22 * 12
STR-03	EMI Test Receiver	Rohde & Schwarz	ESI40	100054/040	RE, CE	2012/06/14 * 12
SOS-05		A&D		4062518	RE	2013/02/27 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE, CE	-
COTS-SEMI- 1	EMI Software	TSJ	TEPTO- DV(RE,CE,RFI, MF)	-	RE, CE	-
SHA-05	Horn Antenna	ETS LINDGREN	Sep-60	LM4210	RE	2013/03/14 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	18	RE	2013/03/19 * 12
SCC-G18	Coaxial Cable	Suhner	SUCOFLEX 104A	46292/4A	RE	2013/03/16 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2012/10/08 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108- A 0901	RE	2012/10/08 * 12
SAT6-03	Attenuator	JFW	50HF-006N	_	RE	2013/02/12 * 12
SCC- C1/C2/C3/C4/ C5/C10/SRSE -03			8D2W/12DSFA/ 141PE/141PE/1 41PE/141PE/NS 4906	271(RF	RE	2012/04/10 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2013/02/12 * 12
SCC- C9/C10/SRSE -03	Coaxial Cable&RF Selector	Suhner/Suhner/TOY O		-/0901- 271(RF Selector)	CE	2012/04/10 * 12
SAT3-05	Attenuator	JFW	50HF-003N	-	CE	2013/02/12 * 12
SLS-05	LISN		ENV216	100516	CE	2013/02/25 * 12
SOS-06	Humidity Indicator	A&D		4062118	CE	2013/03/07 * 12
		Agilent	E4448A	MY48250106	AT	2013/03/28 * 12
				37588	AT	2012/04/06 * 12
SCC-G11	Coaxial Cable	Suhner	SUCOFLEX 102		AT	2013/03/16 * 12
SPM-06				850009	AT	2012/04/19 * 12
SPSS-03				917063	AT	2012/04/19 * 12
SOS-09				4061484	AT	2013/03/07 * 12

The expiration date of the calibration is the end of the expired month.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

Test Item:

CE: Conducted emission, RE: Radiated emission, AT: Antenna terminal conducted tests

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7. ANTENNA PORT TEST RESULTS

7.1. BASIC DATA RATE GFSK MODULATION

7.1.1. 20 dB AND 99% BANDWIDTH

<u>LIMIT</u>

None; for reporting purposes only.

TEST PROCEDURE

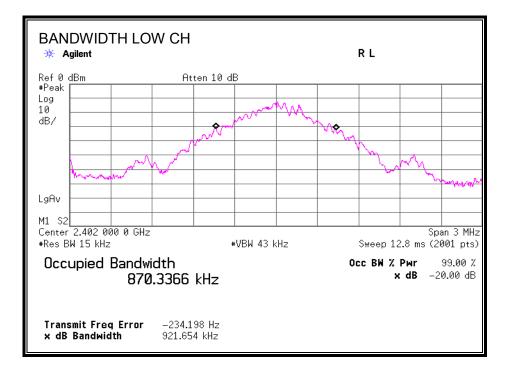
The transmitter output is connected to a spectrum analyzer. The RBW is set to \geq 1% of the 20 dB bandwidth. The VBW is set to \geq RBW. The sweep time is coupled.

RESULTS

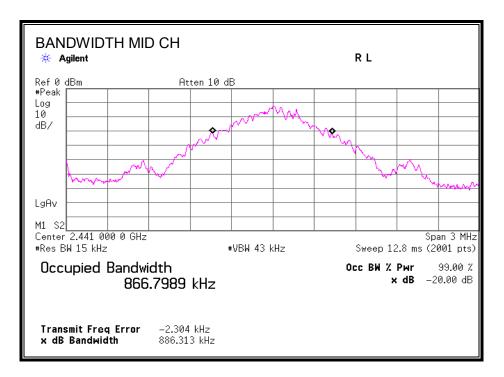
Channel	Frequency	20 dB Bandwidth	99% Bandwidth	
	(MHz)	(kHz)	(kHz)	
Low	2402	921.654	899.5593	
Middle	2441	886.313	897.7218	
High	2480	934.756	902.7653	

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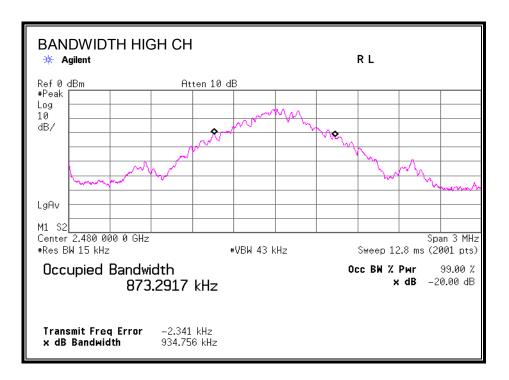
20 dB BANDWIDTH



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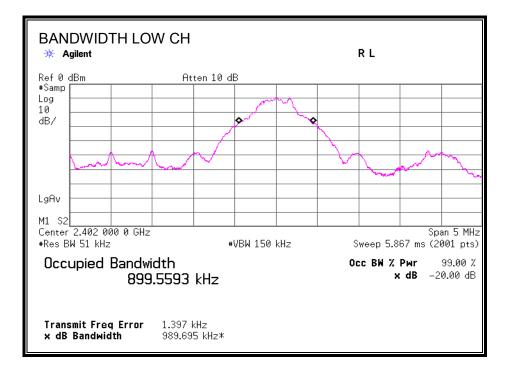


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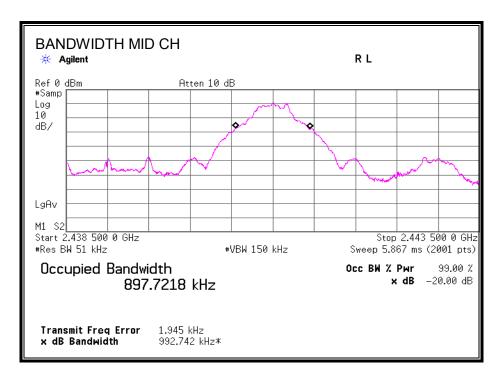


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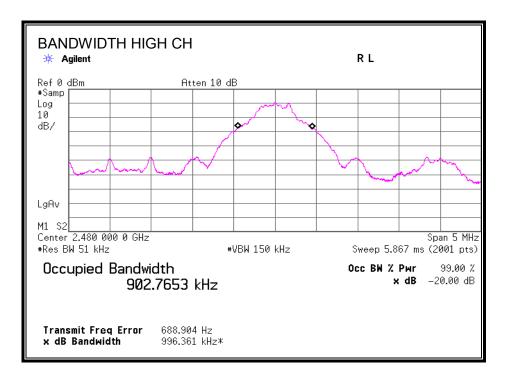
99% BANDWIDTH



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7.1.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

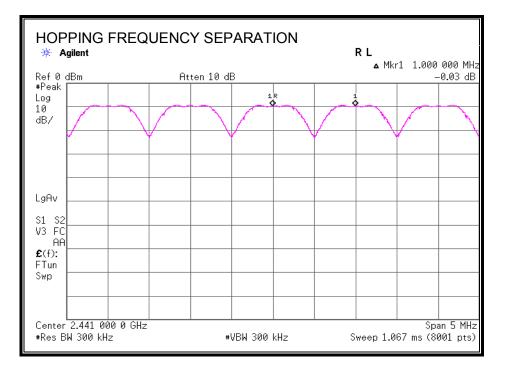
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

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RESULTS

HOPPING FREQUENCY SEPARATION



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7.1.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 nonoverlapping channels.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

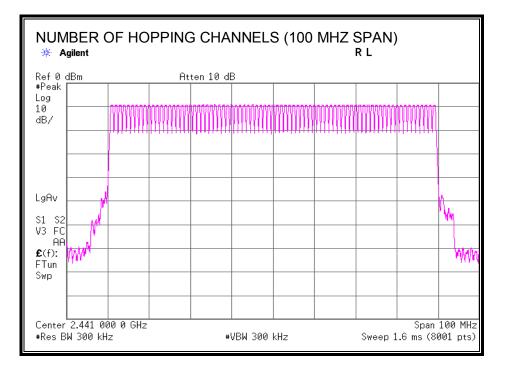
Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth 3.0 Specification.

RESULTS

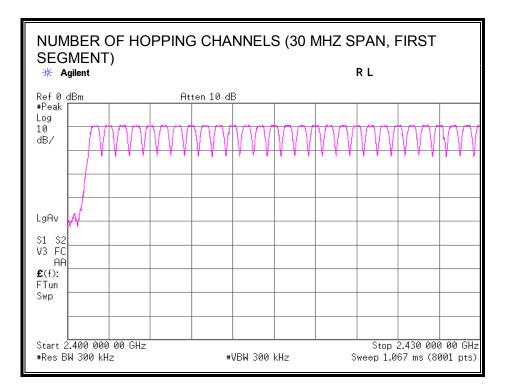
79 Channels observed.

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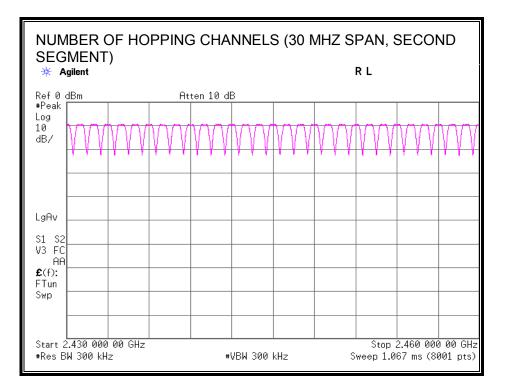
NUMBER OF HOPPING CHANNELS



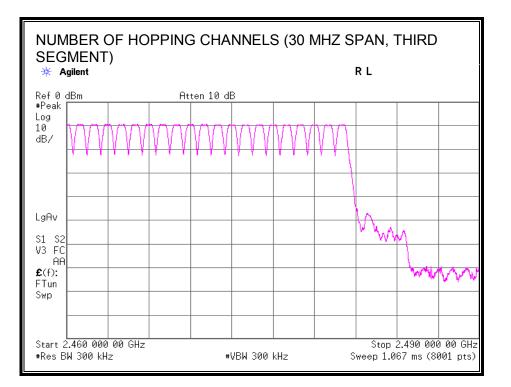
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7.1.4. AVERAGE TIME OF OCCUPANCY

<u>LIMIT</u>

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

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.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence ($20 \le N \le 79$), is always less than 0.4s regardless of packet size (DH1, DH3 or DH5). This is confirmed in the test report for N=79.

RESULTS

Time Of Occupancy = 10 * xx pulses * yy msec = zz msec

GFSK Mode

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.4010	32	0.1283	0.4	0.2717
DH3	1.6620	16	0.2659	0.4	0.1341
DH5	2.9110	11	0.3202	0.4	0.0798

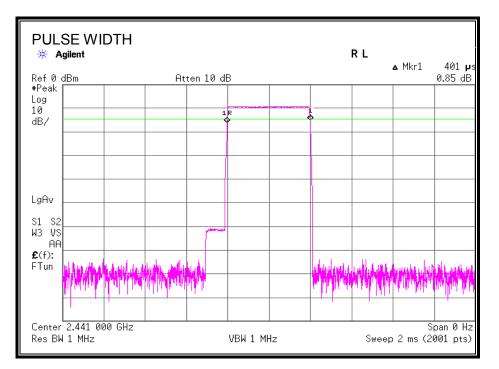
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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN TEL: +81 463 50 6400 FAX: +81 463 50 6401

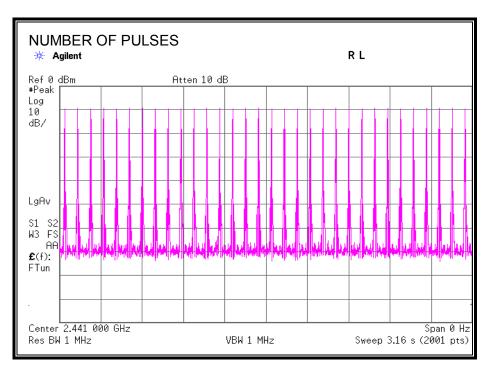
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DH1 PULSE WIDTH



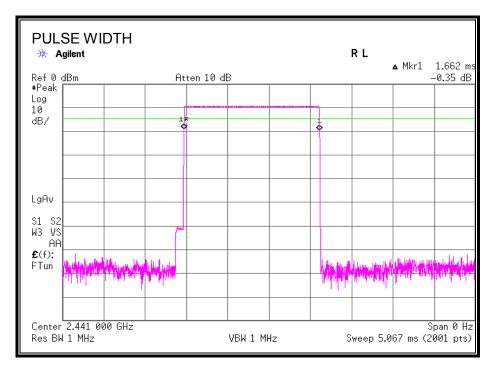
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DH1 NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD



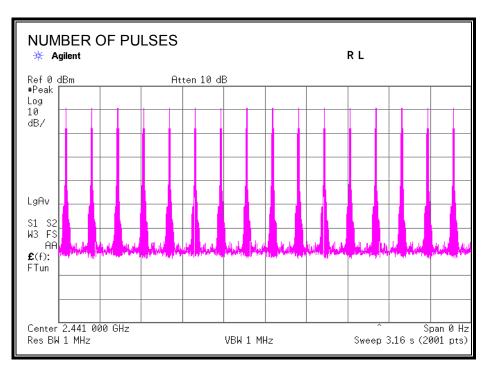
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DH3 PULSE WIDTH



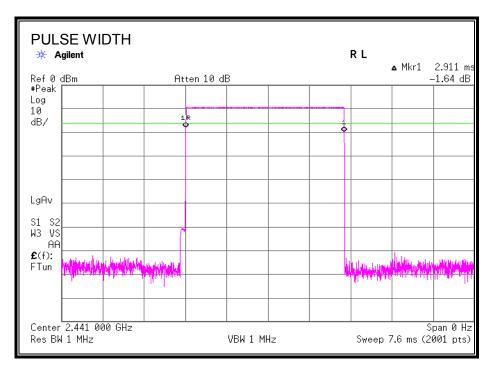
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DH3 NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD



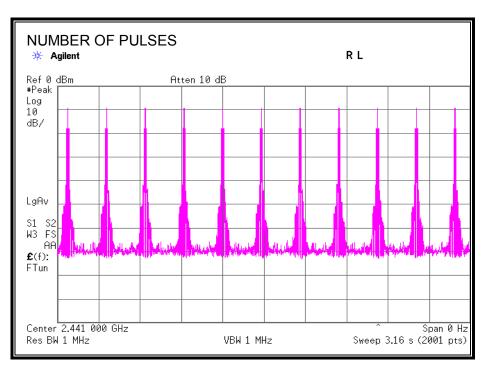
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DH5 PULSE WIDTH



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DH5 NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD



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7.1.5. OUTPUT POWER

<u>LIMIT</u>

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

The maximum antenna gain is less than 6 dBi, therefore the limit is 20.96 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

<u>RESULTS</u>

Channel	Frequency	Output Power	factor (cable	Output Power	Limit	Margin
	(MHz)	Reading (dBm)	,ATT) (dB)	Result (dBm)	(dBm)	(dB)
Low	2402	-7.05	10.67	3.62	20.96	17.34
Middle	2441	-6.88	10.68	3.80	20.96	17.16
High	2480	-7.04	10.68	3.64	20.96	17.32

Sample calculation: Output Power Reading [dBm] + factor [dB]

Test was not performed at AFH mode because this Bluetooth radio is in compliance of Bluetooth Specification 3.0 and the output power at non-AFH mode is less than 20.96dBm.

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7.1.6. AVERAGE POWER

<u>LIMIT</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.67 – 10.68 dB (including 10.00 dB pad and 0.67 - 0.68 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Average Power	
	(MHz)	(dBm)	
Low	2402	2.46	
Middle	2441	2.62	
High	2480	2.49	

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7.1.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

In the frequency range below 30MHz, RBW was narrowed to separate the noise contents. Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

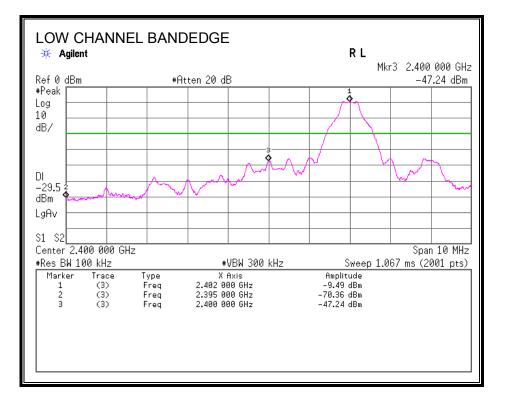
The spectrum from 9 kHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

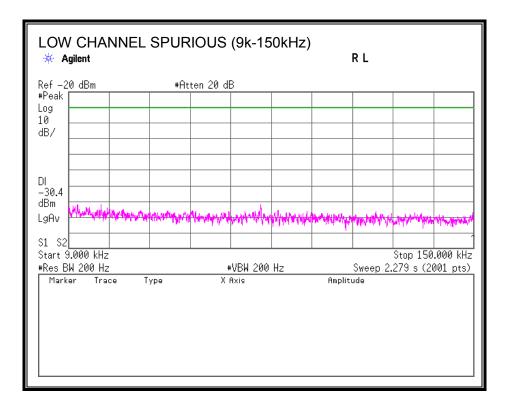
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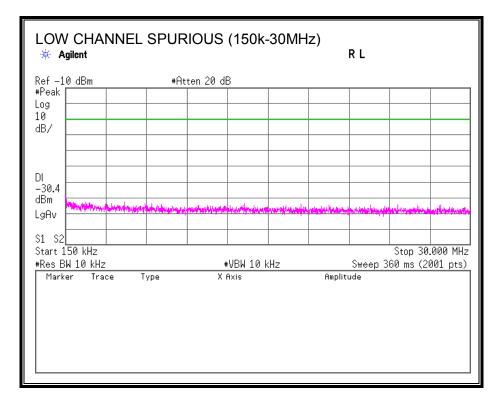
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

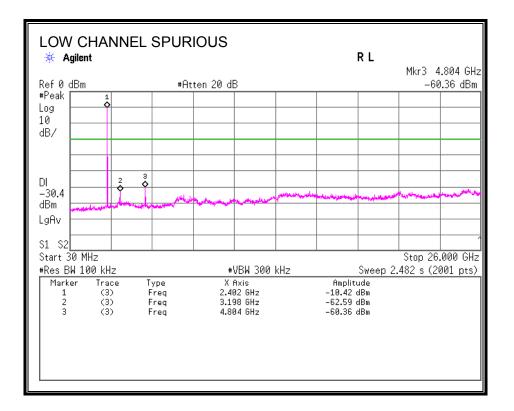


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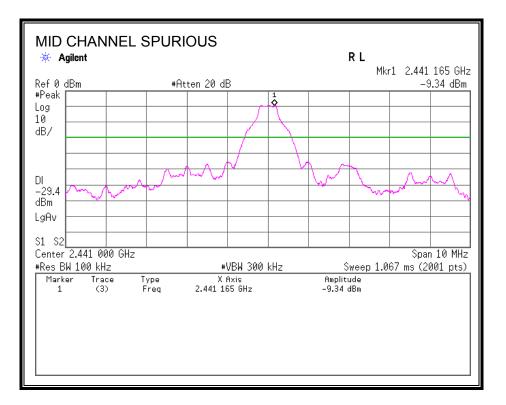


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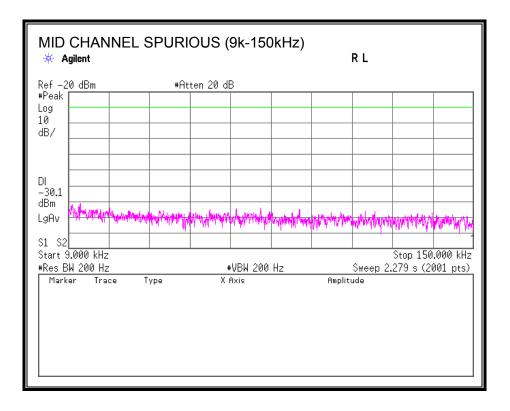


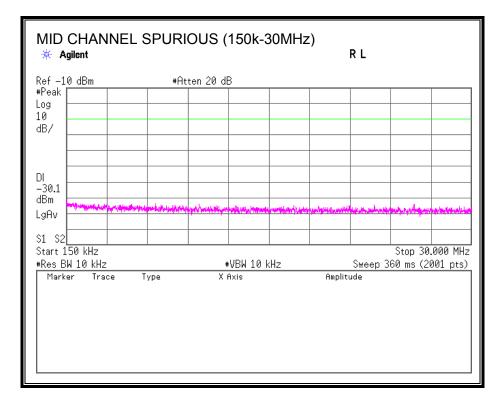
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SPURIOUS EMISSIONS, MID CHANNEL

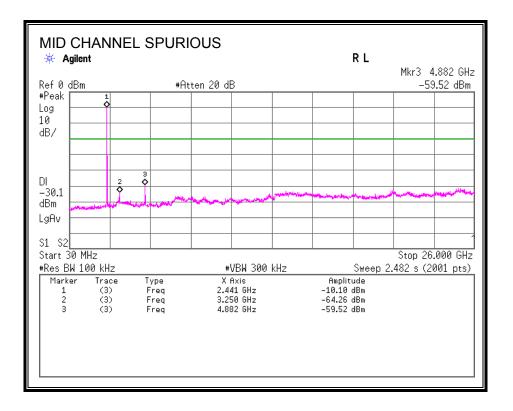


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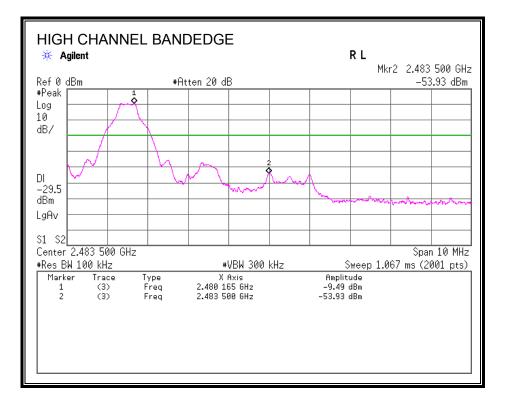


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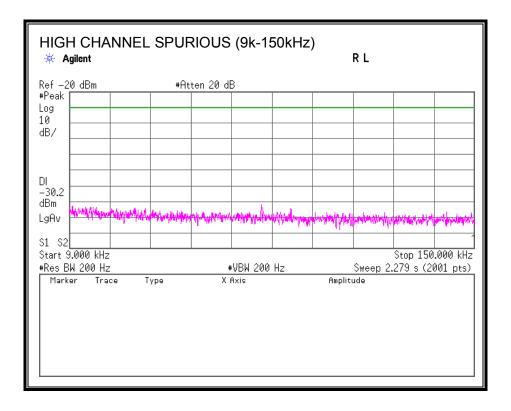


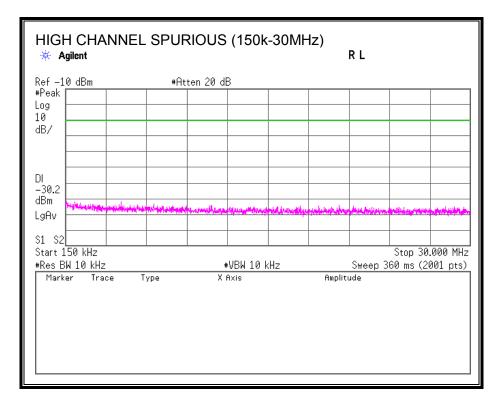
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SPURIOUS EMISSIONS, HIGH CHANNEL

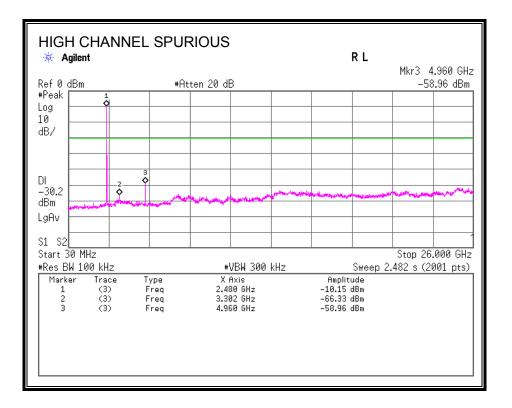


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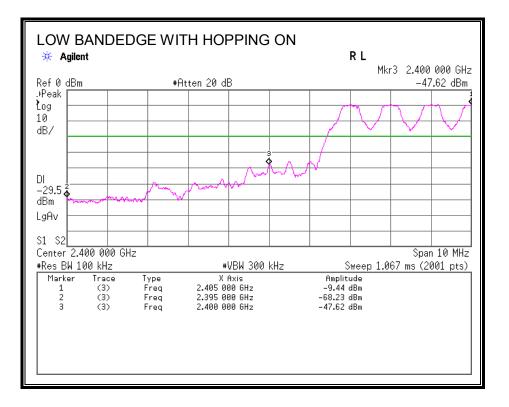


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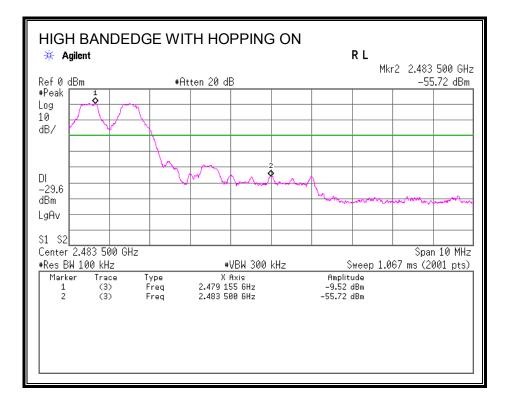


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SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



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7.2. ENHANCED DATA RATE 8PSK MODULATION

7.2.1. 20 dB AND 99% BANDWIDTH

<u>LIMIT</u>

None; for reporting purposes only.

TEST PROCEDURE

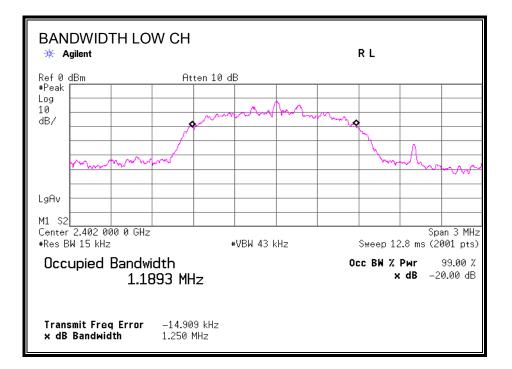
The transmitter output is connected to a spectrum analyzer. The RBW is set to \geq 1% of the 20 dB bandwidth. The VBW is set to \geq RBW. The sweep time is coupled.

RESULTS

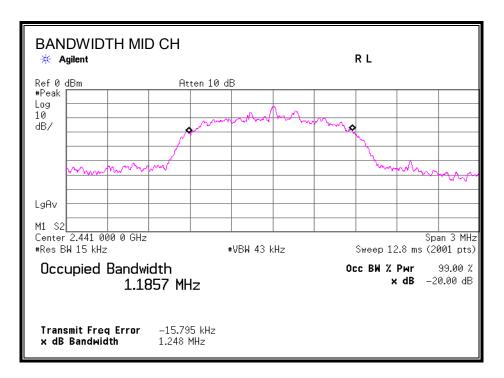
Channel	Frequency	20 dB Bandwidth	99% Bandwidth	
	(MHz)	(kHz)	(kHz)	
Low	2402	1250	1174.3	
Middle	2441	1248	1174.9	
High	2480	1246	1174.0	

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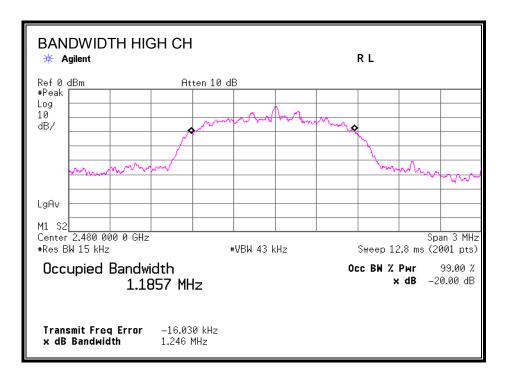
20 dB BANDWIDTH



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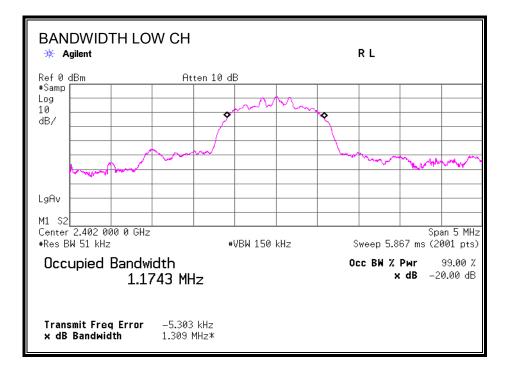


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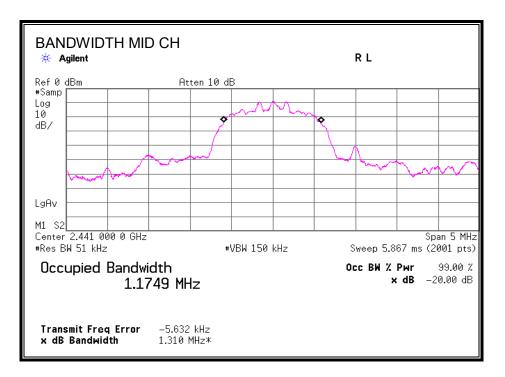


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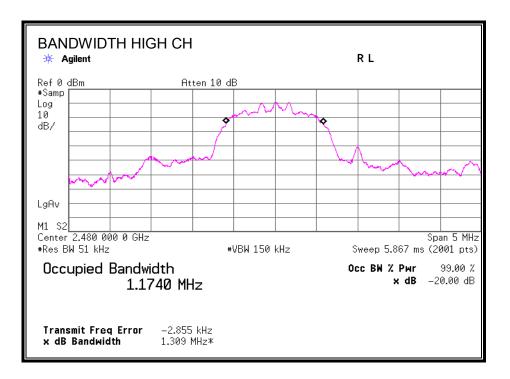
99% BANDWIDTH



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7.2.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

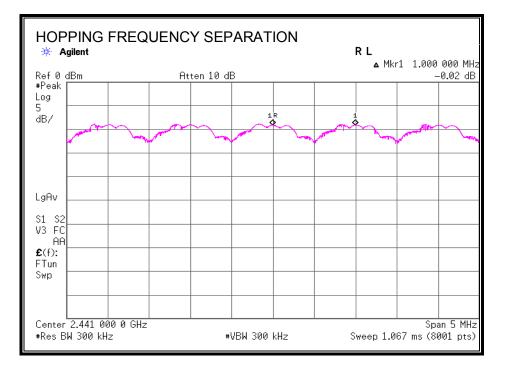
<u>RESULTS</u>

The channel separation was 1MHz and the test result was greater than the requirement that was 2/3 of 20 dB channel bandwidth.

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RESULTS

HOPPING FREQUENCY SEPARATION



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7.2.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 nonoverlapping channels.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

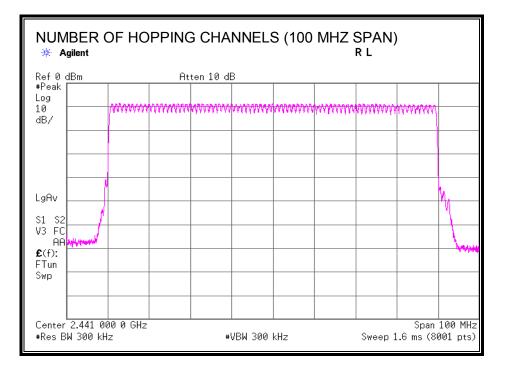
Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth 3.0 Specification.

RESULTS

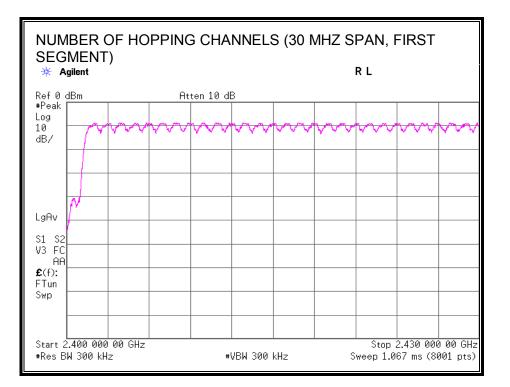
79 Channels observed.

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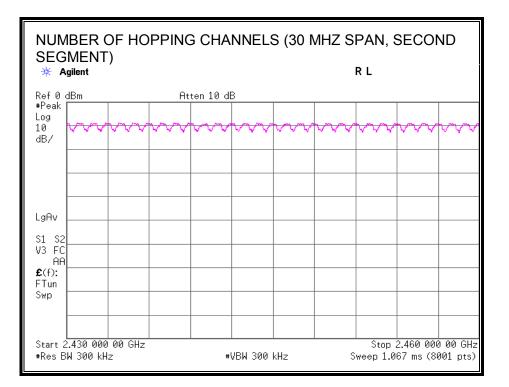
NUMBER OF HOPPING CHANNELS



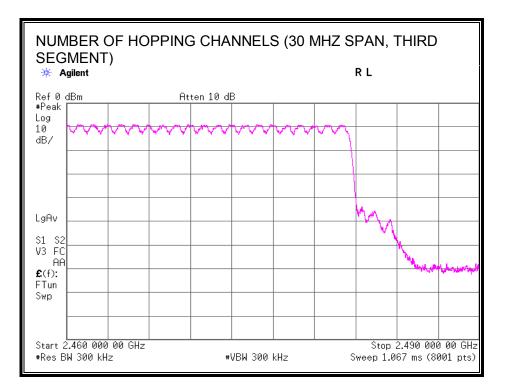
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7.2.4. AVERAGE TIME OF OCCUPANCY

<u>LIMIT</u>

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

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.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence ($20 \le N \le 79$), is always less than 0.4s regardless of packet size (3-DH1, 3-DH3 or 3-DH5). This is confirmed in the test report for N=79.

RESULTS

Time of Occupancy = 10 * xx pulses * yy msec = zz msec

8PSK Mode

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16	Average Time of (sec)	Limit (sec)	Margin (sec)
		seconds			
3DH1	0.419	32	0.134	0.4	0.266
3DH3	1.669	16	0.267	0.4	0.133
3DH5	2.922	11	0.321	0.4	0.079

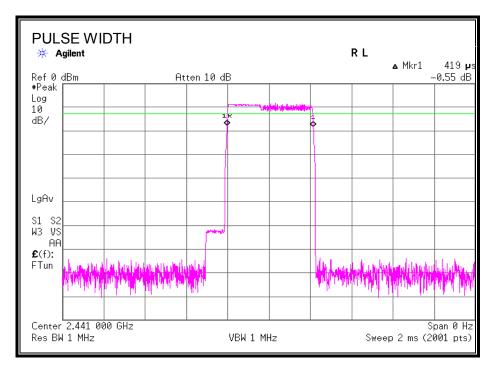
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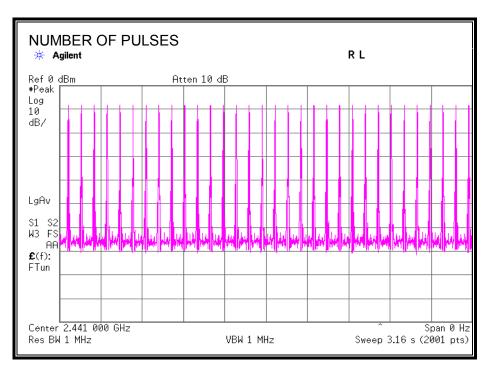
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3DH1 PULSE WIDTH



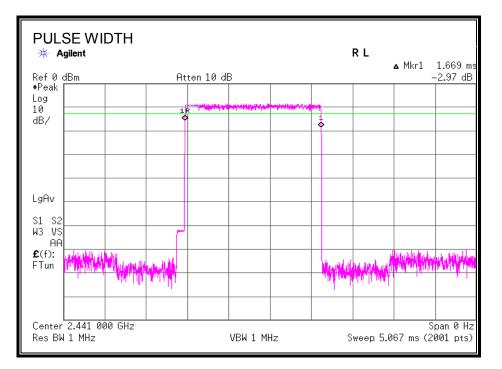
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3DH1 NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD



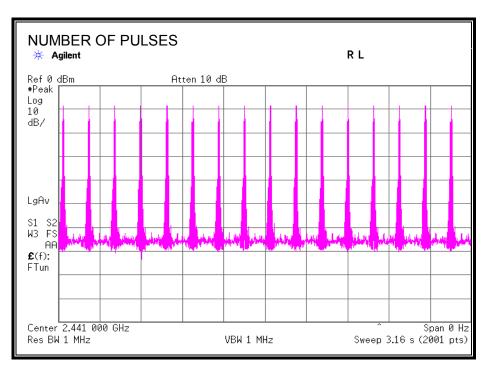
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3DH3 PULSE WIDTH



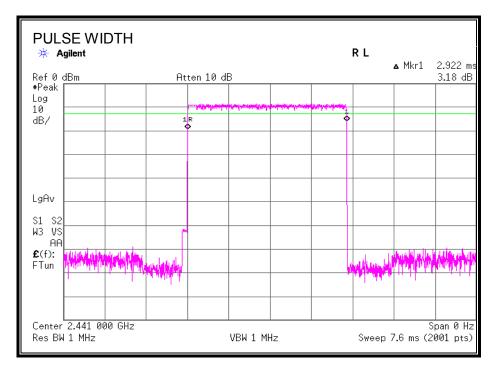
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3DH3 NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD



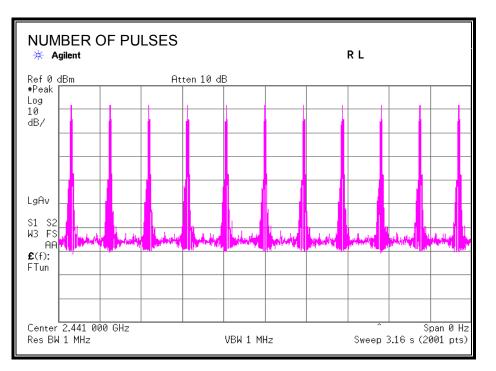
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3DH5 PULSE WIDTH



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3DH5 NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD



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7.2.5. OUTPUT POWER

<u>LIMIT</u>

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

The maximum antenna gain is less than 6 dBi, therefore the limit is 20.96 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

<u>RESULTS</u>

Channel	Frequency	Output Power	factor (cable	Output Power	Limit	Margin
	(MHz)	Reading (dBm)	,ATT) (dB)	Result (dBm)	(dBm)	(dB)
Low	2402	-7.81	10.67	2.86	20.96	18.10
Middle	2441	-7.79	10.68	2.89	20.96	18.07
High	2480	-8.21	10.68	2.47	20.96	18.49

Sample calculation: Output Power Reading [dBm] + factor [dB]

Test was not performed at AFH mode because this Bluetooth radio is in compliance of Bluetooth Specification 3.0 and the output power at non-AFH mode is less than 20.96dBm.

7.2.6. AVERAGE POWER

<u>LIMIT</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.67 – 10.68 dB (including 10.00 dB pad and 0.67 - 0.68 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Average Power	
	(MHz)	(dBm)	
Low	2402	-0.62	
Middle	2441	-0.72	
High	2480	-1.12	

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7.2.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

In the frequency range below 30MHz, RBW was narrowed to separate the noise contents. Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

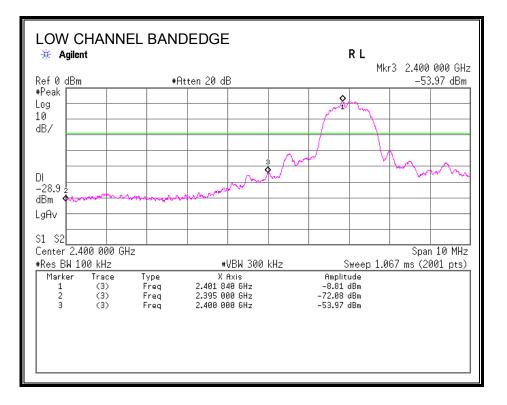
The spectrum from 9 kHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

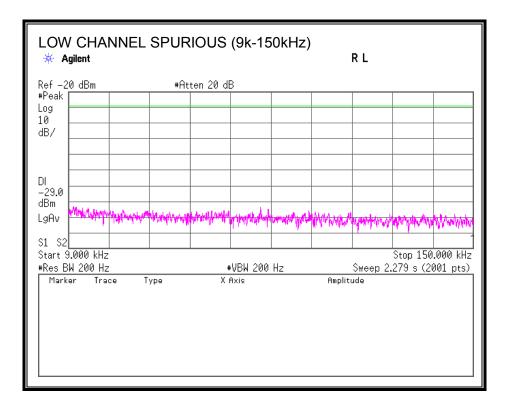
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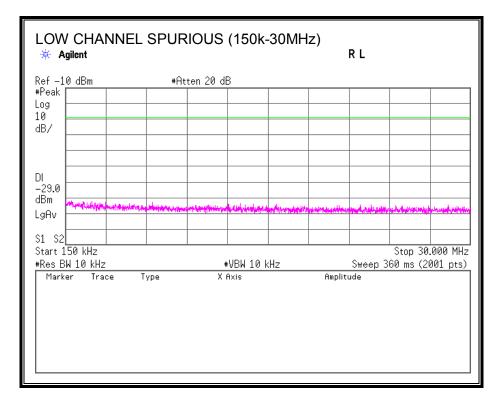
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

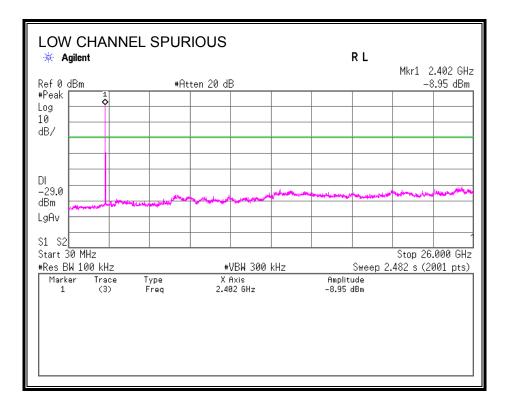


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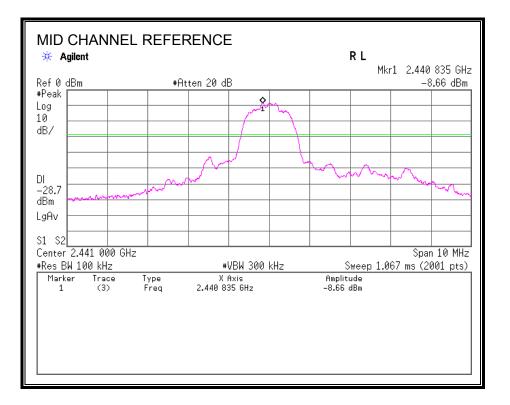


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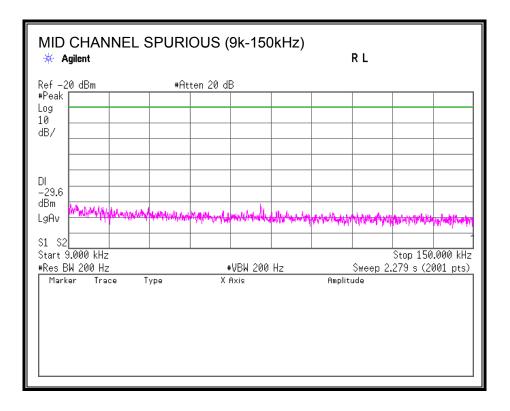


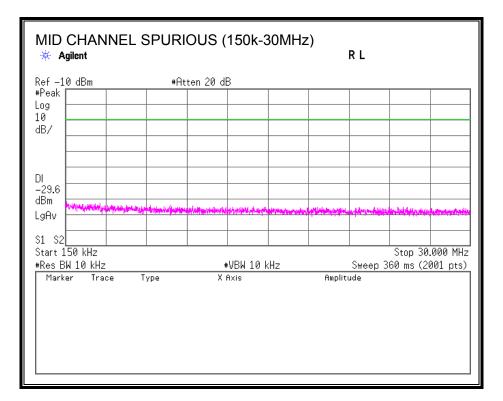
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SPURIOUS EMISSIONS, MID CHANNEL

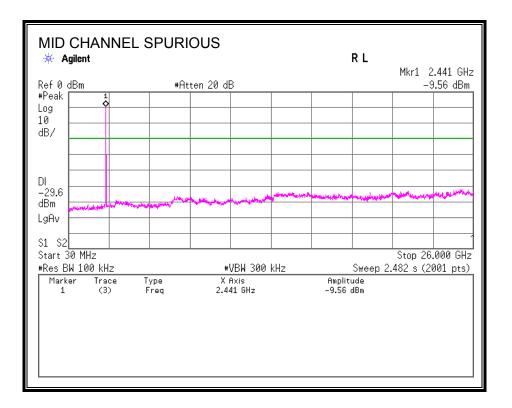


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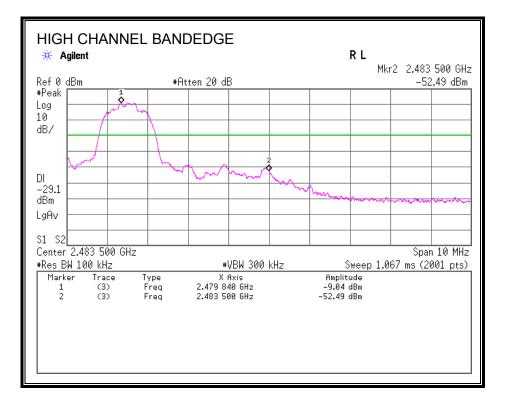


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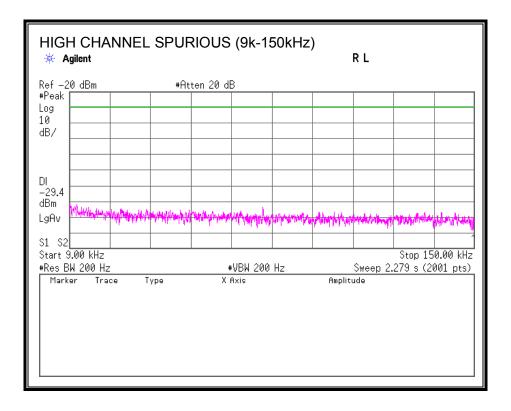


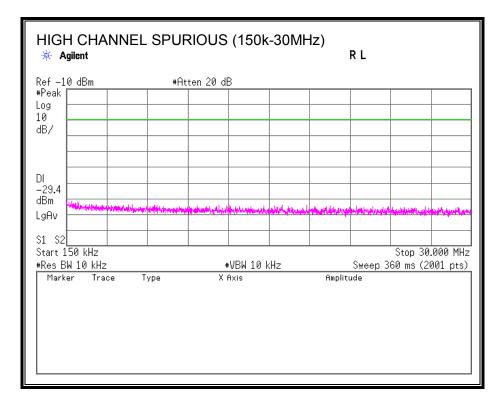
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SPURIOUS EMISSIONS, HIGH CHANNEL

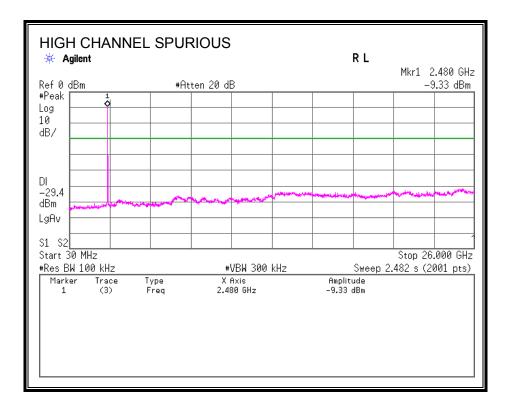


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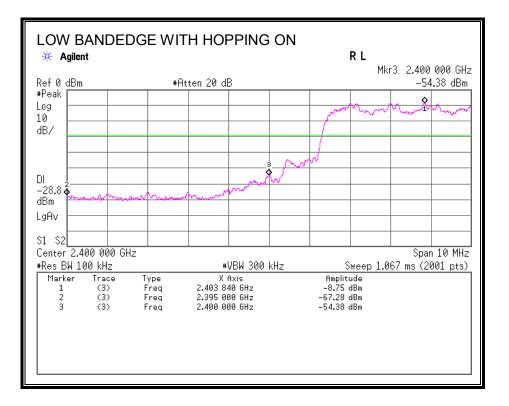


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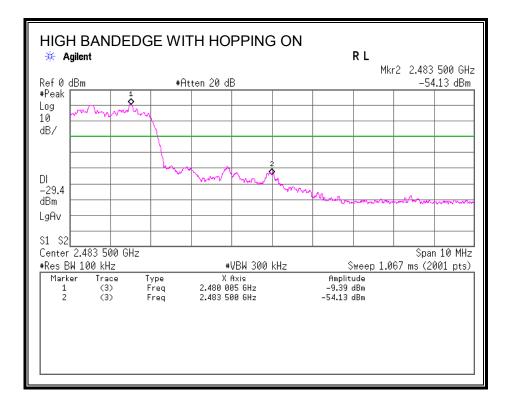


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SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



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8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

<u>LIMITS</u>

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	53.9

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

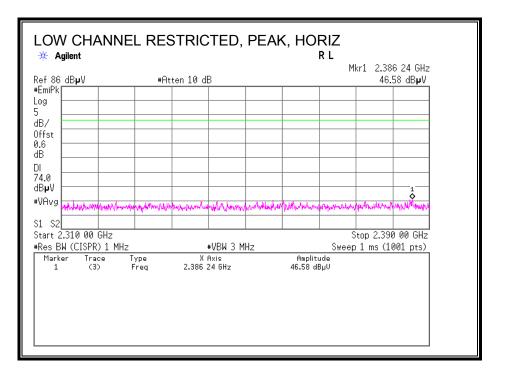
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

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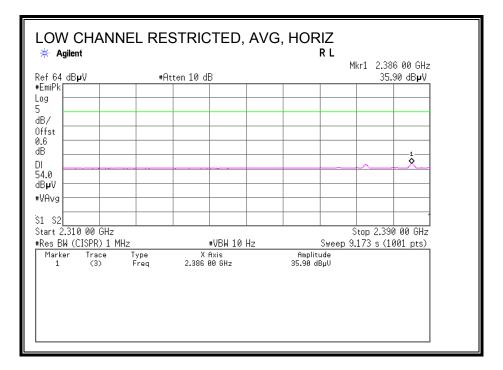
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. BASIC DATA RATE GFSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

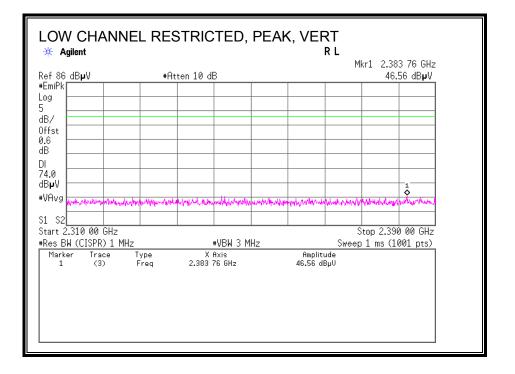


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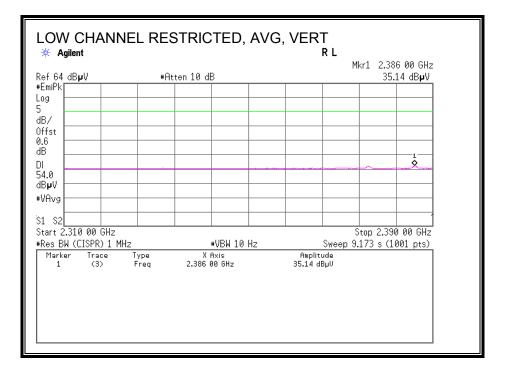


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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

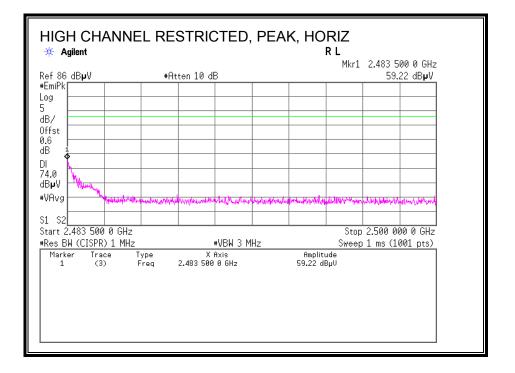


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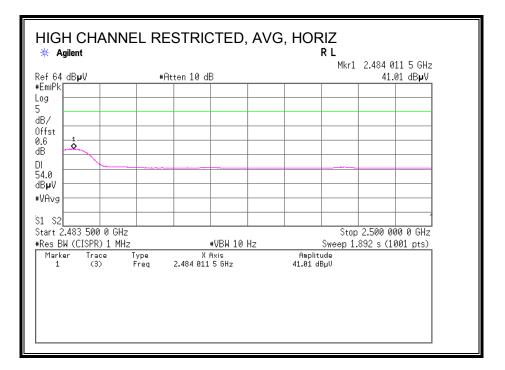


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RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

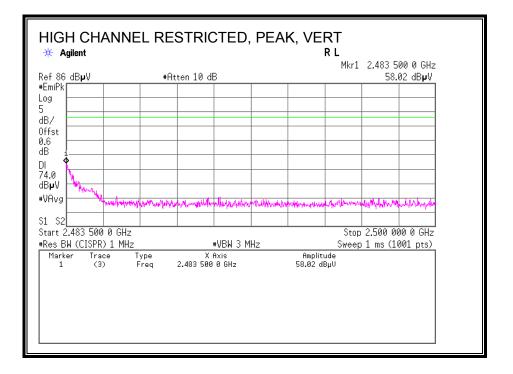


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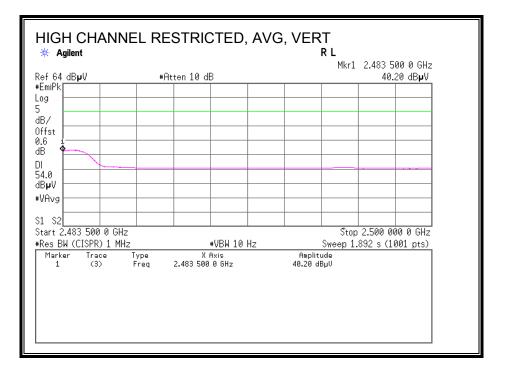


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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

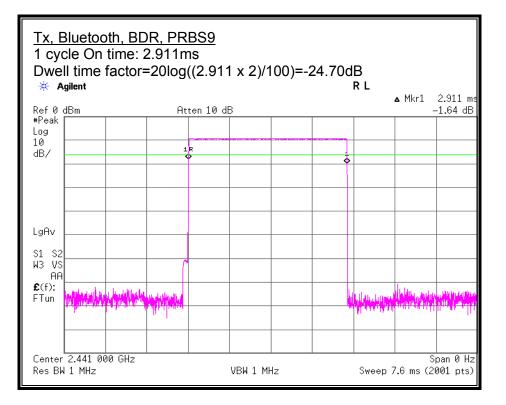


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Dwell time factor Calculation chart



On time of some channel during 100ms: Twice This is the worst case in hopping sequence of Bluetooth.

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DH5, 2402MHz (LOW)

st place ate mperatu gineer ode	ure / Humidit		March 30 24 deg.0 Kenichi A Tx,	2, 39 %R⊦ Adachi 2402	H MHz	March 3 ⁴ 23 deg.0 Kenichi A	, 34 %RI		ni Anech	oic Chan	nber		
				tooth, BD		9							
Polarity	Frequency	(* PK: Peak, Detector	AV: Average, Reading	QP: Quasi-Pea Ant.Fac.	ik) Loss	Gain	Result	Limit	Margin	Height	Angle	Remark	
Folanty	[MHz]	Detector	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[deg]	I CIIIdi K	
Hori.	1602.021	PK	51.7	25.1	13.3	40.8	49.3	73.9	24.6	111	237		
Hori.		PK	48.1	28.8	5.7	41.6	41.0	73.9	32.9	109	327		
Hori.		PK	66.0	31.1	6.8	41.2	62.7	73.9	11.2	100	11		
Hori.		PK	47.7	36.6	8.3	41.4	51.2	73.9	22.7	100	332		
Hori.		PK	45.0	39.8	-1.9	46.5	36.4	73.9	37.5	100	0		
Hori.		AV	46.8	25.1	13.3	40.8	44.4	53.9	9.5	111	237		
Hori.		AV	38.7	28.8	5.7	41.6	31.6	53.9	22.3	109	327		
Hori.		AV	32.3	39.8	-1.9	46.5	23.7	53.9	30.2	100	0		
Vert.		PK	50.3	25.1	13.3	40.8	47.9	73.9	26.0	131	262		
Vert.		PK	47.9	28.8	5.7	41.6	40.8	73.9	33.1	100	7		
Vert.		PK	68.9	31.1	6.8	41.2	65.6	73.9	8.3	100	22		
Vert.		PK	47.8	36.6	8.3	41.4	51.3	73.9	22.6	101	182		
Vert.		PK	45.1	39.8	-1.9	46.5	36.5	73.9	37.4	100	0		
Vert.		AV	44.4	25.1	13.3	40.8	42.0	53.9	11.9	131	262		
Vert.		ÂŇ	38.1	28.8	5.7	41.6	31.0	53.9	22.9	100			
Vert.	24020.000		32.4	39.8	-1.9	46.5	23.8	53.9	30.1	100	ó		
	Reading + Ant.F									100			
				n/1.0m)= 9. were not se		enough m	argin (more						7
Distance *Other fre Dwell tim	e factor relaxa										Remark		1
Distance *Other fre		ation Detector	Reading	Ant.Fac.	Loss	Gain	Dwell	Result	Limit	Margin			1
Distance *Other fre Dwell tim Polarity	e factor relaxa Frequency [MHz]	Detector	[dBuV]	[dB/m]	[dB]	[dB]	Factor [dB]	[dBuV/m]	[dBu∀/m]	[dB]			4
Distance *Other fre Dwell tim Polarity Hori.	e factor relaxa Frequency [MHz] 4804.000	Detector	[dBuV] 58.6	[dB/m] 31.1	[dB] 6.8	[dB] 41.2	Factor [dB] -24.7	[dBuV/m] 30.5	[dBuV/m] 53.9	[dB] 23.4			
Distance *Other fre Dwell tim Polarity Hori. Hori.	e factor relaxa Frequency [MHz] 4804.000 7206.000	Detector AV AV	[dBuV] 58.6 34.9	[dB/m] 31.1 36.6	[dB] 6.8 8.3	[dB] 41.2 41.4	Factor [dB] -24.7 -24.7	[dBuV/m] 30.5 13.6	[dBuV/m] 53.9 53.9	[dB] 23.4 40.3			
Distance *Other fre Dwell tim Polarity Hori. Hori. Vert.	e factor relaxa Frequency [MHz] 4804.000 7206.000 4804.000	AV AV AV	[dBuV] 58.6 34.9 62.8	[dB/m] 31.1 36.6 31.1	[dB] 6.8 8.3 6.8	[dB] 41.2 41.4 41.2	Factor [dB] -24.7 -24.7 -24.7	[dBuV/m] 30.5 13.6 34.7	[dBuV/m] 53.9 53.9 53.9	[dB] 23.4 40.3 19.2			
Distance *Other fre Polarity Hori. Hori. Vert. Vert.	e factor relaxa Frequency [MHz] 4804.000 7206.000	AV AV AV AV AV	[dBuV] 58.6 34.9 62.8 35.0	[dB/m] 31.1 36.6 31.1 36.6	[dB] 6.8 8.3 6.8 8.3	[dB] 41.2 41.4 41.2 41.4	Factor [dB] -24.7 -24.7 -24.7 -24.7	[dBuV/m] 30.5 13.6 34.7 13.7	[dBuV/m] 53.9 53.9 53.9 53.9 53.9	[dB] 23.4 40.3 19.2 40.2			

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DH5, 2441MHz (MIDDLE)

est place ate		ke se	March 30			March 31	,						
	ure / Humidit	У	•	C, 39 %R⊦		•), 34 %RI	-					
ngineer			Kenichi A			Kenichi A	Adachi						
ode			Tx,	2441	MHz								
			Tx, Bluet	tooth, BDI	R, PRBS	9							
Polarity	Frequency	(* PK: Peak, Detector	AV: Average, Reading	QP: Quasi-Pea Ant.Fac.	ak) Loss	Gain	Result	Limit	Margin	Height	Angle	Remark	
Polarity	[MHz]	Detector	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[deg]	Kemark	
Hori.	1627.989	PK	49.7	25.3	13.4	40.8	47.6	73.9	26.3	113	233		
Hori.		PK	48.5	28.9	5.7	41.6	41.5	73.9	32.4	110	323		
Hori.		PK	65.7	31.3	6.9	41.1	62.8	73.9	11.1	100	9		
Hori.		PK	47.6	36.6	8.4	41.4	51.2	73.9	22.7	100	358		
Hori.	24410.000	PK	44.8	39.7	-1.8	46.7	36.0	73.9	37.9	100	0		
Hori.	1627.989	AV	44.9	25.3	13.4	40.8	42.8	53.9	11.1	113	233		
Hori.	3255.979	AV	38.8	28.9	5.7	41.6	31.8	53.9	22.1	110	323		
Hori.	24410.000	AV	32.5	39.7	-1.8	46.7	23.7	53.9	30.2	100	0		
Vert.		PK	48.5	25.3	13.4	40.8	46.4	73.9	27.5	128	265		
Vert.		PK	48.3	28.9	5.7	41.6	41.3	73.9	32.6	100	11		
Vert.		PK	67.9	31.3	6.9	41.1	65.0	73.9	8.9	100	25		
Vert. Vert.	7323.000 24410.000	PK PK	47.5 44.9	36.6 39.7	8.4 -1.8	41.4 46.7	51.1 36.1	73.9 73.9	22.8 37.8	100 100	181 0		
	24410.000		44.9 42.7	39.7 25.3	-1.8 13.4	46.7	36.1 40.6	73.9	37.8	100	265		
	1607 080		44.1										
Vert.													
Vert. Vert. Vert. Result = F Distance f	3255.979 24410.000 Reading + Ant.f factor : 15GHz	AV AV Fac. + Loss 2 -40GHz :	38.3 32.6 s (Cable+At 20log(3.0m	28.9 39.7 ttenuator+Fi n/1.0m)= 9.	5.7 -1.8 ilter-Distan .5dB	41.6 46.7 ce factor(ab	31.3 23.8 bove 15GH	53.9 53.9 z)) - Gain(A	22.6 30.1 Amprifier)	100 100	11 0		
Vert. Vert. Vert. Result = F Distance f *Other free Dwell tim	3255.979 24410.000 Reading + Ant.f factor : 15GHz quency noises te factor relaxa	AV AV Fac. + Loss -40GHz : omitted in ation	38.3 32.6 s (Cable+At 20log(3.0m this report	28.9 39.7 ttenuator+Fi n/1.0m)= 9. were not se	5.7 -1.8 ilter-Distan 5dB een or have	41.6 46.7 ce factor(at enough ma	31.3 23.8 bove 15GH argin (more	53.9 53.9 z)) - Gain(A than 20dB	22.6 30.1 Amprifier)).	100 100	11 0		
Vert. Vert. Vert. Result = F Distance f *Other free	3255.979 24410.000 Reading + Ant.f factor : 15GHz quency noises	AV AV Fac. + Loss -40GHz : omitted in	38.3 32.6 s (Cable+At 20log(3.0m	28.9 39.7 ttenuator+Fi n/1.0m)= 9.	5.7 -1.8 ilter-Distan .5dB	41.6 46.7 ce factor(ab	31.3 23.8 bove 15GH argin (more Dwell	53.9 53.9 z)) - Gain(A	22.6 30.1 Amprifier)	100	11		[
Vert. Vert. Vert. Result = F Distance f *Other free Dwell tim	3255.979 24410.000 Reading + Ant.f factor : 15GHz quency noises te factor relaxa	AV AV Fac. + Loss -40GHz : omitted in ation	38.3 32.6 s (Cable+At 20log(3.0m this report	28.9 39.7 ttenuator+Fi n/1.0m)= 9. were not se	5.7 -1.8 ilter-Distan 5dB een or have	41.6 46.7 ce factor(at enough ma	31.3 23.8 bove 15GH argin (more	53.9 53.9 z)) - Gain(A than 20dB	22.6 30.1 Amprifier)).	100 100	11 0		[
Vert. Vert. Vert. Result = F Distance f *Other free Dwell tim	3255.979 24410.000 Reading + Ant.f factor : 15GHz quency noises he factor relax: Frequency [MHz]	AV AV Fac. + Loss 2 -40GHz : omitted in ation Detector	38.3 32.6 s (Cable+At 20log(3.0n this report Reading	28.9 39.7 ttenuator+Fi n/1.0m)= 9. were not se Ant.Fac.	5.7 -1.8 ilter-Distan 5dB een or have Loss	41.6 46.7 ce factor(at enough ma	31.3 23.8 bove 15GH argin (more Dwell Factor	53.9 53.9 z)) - Gain(/ than 20dB Result	22.6 30.1 Amprifier)). Limit	100 100 Margin	11 0		
Vert. Vert. Vert. Result = F Distance f *Other free Polarity Hori. Hori.	3255.979 24410.000 Reading + Ant.f factor : 15GHz quency noises refactor relaxa Frequency [MHz] 4882.000 7323.000	AV AV Fac. + Loss 2 -40GHz : omitted in ation Detector	38.3 32.6 s (Cable+At 20log(3.0m this report Reading [dBuV]	28.9 39.7 ttenuator+Fi n/1.0m)= 9. were not se Ant.Fac. [dB/m] 31.3 36.6	5.7 -1.8 ilter-Distant 5dB een or have Loss [dB] 6.9 8.4	41.6 46.7 ce factor(at enough ma Gain [dB] 41.1 41.4	31.3 23.8 bove 15GH argin (more Dwell Factor [dB] -24.7 -24.7	53.9 53.9 z)) - Gain(A than 20dB Result [dBu∨/m] 30.7 13.6	22.6 30.1 (mprifier)). Limit [dBuV/m] 53.9 53.9	100 100 Margin [dB] 23.2 40.3	11 0		[
Vert. Vert. Vert. Result = F Distance f *Other free Dwell tim Polarity Hori. Hori. Vert.	3255.979 24410.000 Reading + Ant.f. factor : 15GHz quency noises Frequency [MHz] 4882.000 7323.000 4882.000	AV AV Fac. + Loss - 40GHz : omitted in ation Detector AV AV AV	38.3 32.6 s (Cable+A 20log(3.0n this report [dBuV] 58.4 34.8 62.4	28.9 39.7 ttenuator+F n/1.0m)= 9. were not se Ant.Fac. [dB/m] 31.3 36.6 31.3	5.7 -1.8 ilter-Distant 5dB teen or have Loss [dB] 6.9 8.4 6.9	41.6 46.7 ce factor(al enough ma Gain [dB] 41.1 41.4 41.1	31.3 23.8 bove 15GH argin (more Dwell Factor [dB] -24.7 -24.7 -24.7	53.9 53.9 z)) - Gain(A than 20dB Result [dBuV/m] 30.7 13.6 34.7	22.6 30.1 Amprifier)). Limit [dBuV/m] 53.9 53.9 53.9	100 100 Margin [dB] 23.2 40.3 19.2	11 0		[
Vert. Vert. Result = F Distance f *Other free Polarity Hori. Hori. Vert. Vert. Result = F	3255.979 24410.000 Reading + Ant.f factor : 15GHz quency noises refactor relaxa Frequency [MHz] 4882.000 7323.000	AV AV Fac. + Loss 2-40GHz : omitted in ation Detector AV AV AV AV AV AV Fac. + Loss	38.3 32.6 s (Cable+At 20log(3.0n this report Reading [dBuV] 58.4 34.8 62.4 34.7 s(Cable+At	28.9 39.7 ttenuator+Fin/1.0m)= 9. were not se AnL.Fac. [dB/m] 31.3 36.6 31.3 36.6 ttenuator+Fil	5.7 -1.8 ilter-Distand 5dB een or have Loss [dB] 6.9 8.4 6.9 8.4 Iter-Distand	41.6 46.7 ce factor(al enough ma (dB) 41.1 41.4 41.1 41.4	31.3 23.8 bove 15GH argin (more Dwell Factor [dB] -24.7 -24.7 -24.7 -24.7	53.9 53.9 z)) - Gain(A than 20dB Result [dBuV/m] 30.7 13.6 34.7 13.5	22.6 30.1 Amprifier)). [dBuV/m] 53.9 53.9 53.9 53.9 53.9	100 100 Margin [dB] 23.2 40.3 19.2 40.4	11 0 Remark		

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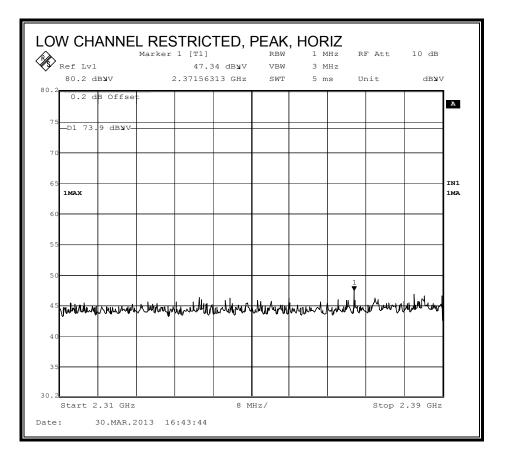
DH5, 2480MHz (HIGH)

st place				n, Inc. She	onan EM	Clab		No 2 Ser	mi Anech	oic Chan	aber	
ate			March 30		UTIATT EIVI	March 3	1 2012	NU.3 SEI	III Allechi	oic chan	liber	
	una (I lumaialit											
	ure / Humidit	y	-	, 39 %RH	1	-	0, 34 %RI					
ngineer			Kenichi A		1000	Kenichi /	Adachi					
ode			Tx,	2480								
				tooth, BDF		9						
Polarity	Frequency	(* PK: Peak, Detector	AV: Average, Reading	QP: Quasi-Pea Ant Fac	k) Loss	Gain	Result	Limit	Margin	Height	Angle	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[deg]	
Hori.	1653.979	PK	51.0	25.4	13.4	40.9	48.9	73.9	25.0	108	235	
Hori.		PK	47.9	29.0	5.7	41.7	40.9	73.9	33.0	107	330	
Hori.	4960.000		66.2	31.6	6.9	41.0	63.7	73.9	10.2	100	14	
Hori.	7440.000		47.5	36.7	8.5	41.5	51.2	73.9	22.7	100	359	
Hori.	24800.000		44.7	39.6	-1.6	46.7	36.0	73.9	37.9	100	0	
Hori.	1653.979	AV	46.4	25.4	13.4	40.9	44.3	53.9	9.6	108	235	
Hori.	3307.997	AV	37.9	29.0	5.7	41.7	30.9	53.9	23.0	107	330	
Hori.	24800.000	AV	32.3	39.6	-1.6	46.7	23.6	53.9	30.3	100	0	
Vert. Vert.	1653.979 3307.997	PK	49.9 47.8	25.4 29.0	13.4 5.7	40.9 41.7	47.8	73.9 73.9	26.1 33.1	133 100	261 6	
Vert. Vert.	4960.000		47.8	29.0	5.7	41.7	40.8	73.9	33.1 8.3	100	20	
Vert. Vert.	7440.000		47.6	36.7	8.5	41.0	51.3	73.9	22.6	100	184	
Vert.	24800.000		44.6	39.6	-1.6	46.7	35.9	73.9	38.0	100	0	
				25.4	13.4	40.9	42.1	53.9	11.8	133	261	
	1653 979		. 44 2					00.0	11.0	100		
Vert.	1653.979 3307.997	AV AV	44.2 37.8					53.9	23.1	100	6	
Vert. Vert. Vert. Result = I Distance	1653.979 3307.997 24800.000 Reading + Ant. factor : 15GHz equency noises	AV AV Fac. + Loss z -40GHz :	37.8 32.3 s (Cable+At 20log(3.0m	29.0 39.6 ttenuator+Fi n/1.0m)= 9.	5.7 -1.6 ilter-Distan 5dB	41.7 46.7 ce factor(al	30.8 23.6 pove 15GH			100 100	6 0	
Vert. Vert. Vert. Result = I Distance *Other fre Dwell tim	3307.997 24800.000 Reading + Ant. factor : 15GHz equency noises ne factor relax	AV AV Fac. + Loss z -40GHz : s omitted in ation	37.8 32.3 s (Cable+At 20log(3.0m this report	29.0 39.6 ttenuator+Fi n/1.0m)= 9. were not se	5.7 -1.6 ilter-Distan 5dB en or have	41.7 46.7 ce factor(al enough ma	30.8 23.6 bove 15GH argin (more	53.9 z)) - Gain(A than 20dB	30.3 Amprifier)).	100	0	
Vert. Vert. Vert. Result = I Distance *Other fre	3307.997 24800.000 Reading + Ant. factor : 15GHz equency noises ne factor relax Frequency	AV AV Fac. + Loss z -40GHz : s omitted in	37.8 32.3 s (Cable+At 20log(3.0m this report Reading	29.0 39.6 ttenuator+Fi n/1.0m)= 9. were not se	5.7 -1.6 ilter-Distan 5dB en or have	41.7 46.7 ce factor(al enough ma Gain	30.8 23.6 bove 15GH argin (more Dwell Factor	53.9 z)) - Gain(A than 20dB Result	30.3 Amprifier)). Limit	100 Margin		
Vert. Vert. Result = Distance *Other fre Dwell tim Polarity	3307.997 24800.000 Reading + Ant. factor : 15GHz equency noises ne factor relax Frequency [MHz]	AV AV Fac. + Los: z -40GHz : omitted in ation Detector	37.8 32.3 s (Cable+At 20log(3.0m this report Reading [dBuV]	29.0 39.6 ttenuator+Fi n/1.0m)= 9. were not se Ant.Fac. [dB/m]	5.7 -1.6 ilter-Distan 5dB en or have Loss [dB]	41.7 46.7 ce factor(al enough m Gain [dB]	30.8 23.6 bove 15GH argin (more Dwell Factor [dB]	53.9 z)) - Gain(A than 20dB Result [dBuV/m]	30.3 Amprifier)). Limit [dBuV/m]	100 Margin [dB]	0	
Vert. Vert. Result = Distance *Other fre Dwell tim Polarity Hori.	3307.997 24800.000 Reading + Ant. factor : 15GHz equency noises ne factor relax Frequency [MHz] 4960.000	AV AV Fac. + Los: z -40GHz : omitted in ation Detector	37.8 32.3 s (Cable+At 20log(3.0m this report v Reading [dBuV] 58.1	29.0 39.6 ttenuator+Fi n/1.0m)= 9. were not se Ant Fac. [dB/m] 31.6	5.7 -1.6 ilter-Distan 5dB en or have Loss [dB] 6.9	41.7 46.7 ce factor(al enough m Gain [dB] 41.0	30.8 23.6 pove 15GH argin (more Dwell Factor [dB] -24.7	53.9 z)) - Gain(A than 20dB Result [dBuV/m] 30.8	30.3 Amprifier)). Limit [dBuV/m] 53.9	100 Margin [dB] 23.1	0	
Vert. Vert. Vert. Result = 1 Distance *Other fre Polarity Hori. Hori.	3307.997 24800.000 Reading + Ant. factor : 15GHz equency noises ne factor relax Frequency [MHz] 4960.000 7440.000	AV AV Fac. + Loss z -40GHz : c omitted in ation Detector AV AV	37.8 32.3 s (Cable+At 20log(3.0m this report v Reading [dBuV] 58.1 34.8	29.0 39.6 ttenuator+Fi n/1.0m)= 9. were not ser Ant.Fac. [dB/m] 31.6 36.7	5.7 -1.6 ilter-Distan 5dB en or have Loss [dB] 6.9 8.5	41.7 46.7 ce factor(al enough ma Gain [dB] 41.0 41.5	30.8 23.6 bove 15GH argin (more Factor [dB] -24.7 -24.7	53.9 z)) - Gain(A than 20dB Result [dBuV/m] 30.8 13.7	30.3 xmprifier)). Limit [dBuV/m] 53.9 53.9	100 Margin [dB] 23.1 40.2	0	
Vert. Vert. Vert. Result = 1 Distance *Other fre Dwell tim Polarity Hori. Vert. Vert.	3307.997 24800.000 Reading + Ant. factor : 15GHz equency noises ne factor relax Frequency [MHz] 4960.000 7440.000 7440.000	AV AV Fac. + Los: z -40GHz : o omitted in ation Detector AV AV AV AV	37.8 32.3 s (Cable+At 20log(3.0m this report v Reading [dBuV] 58.1 34.8 62.2 34.9	29.0 39.6 ttenuator+Fin n/1.0m)= 9. were not sev Ant.Fac. [dB/m] 31.6 36.7 31.6 36.7	5.7 -1.6 ilter-Distan 5dB en or have Loss [dB] 6.9 8.5 6.9 8.5	41.7 46.7 ce factor(al enough ma Gain [dB] 41.0 41.5 41.0 41.5	30.8 23.6 bove 15GH argin (more Factor [dB] -24.7 -24.7 -24.7 -24.7	53.9 z)) - Gain(<i>F</i> than 20dB Result [dBuV/m] 30.8 13.7 34.9 13.8	30.3 Amprifier)). [dBu√/m] 53.9 53.9 53.9 53.9 53.9	Margin [dB] 23.1 40.2 19.0 40.1	0 Remark	
Vert. Vert. Result = Distance *Other fre Dwell tim Polarity Hori. Hori. Vert. Vert. Vert. Result = I Distance	3307.997 24800.000 Reading + Ant. factor : 15GH2 equency noises refactor relax Frequency [MHz] 4960.000 7440.000 4960.000	AV AV Fac. + Los: z -40GHz : omitted in ation Detector AV AV AV AV AV Z -40GHz : z -40GHz :	37.8 32.3 s (Cable+At 20log(3.0m this report) [dBuV] 58.1 34.8 62.2 34.9 s(Cable+Att 20log(3.0m	29.0 39.6 ittenuator+Fi /1.0m)= 9. were not se [dB/m] 31.6 36.7 31.6 36.7 31.6 36.7 tenuator+Fil n/1.0m)= 9.	5.7 -1.6 ilter-Distan 5dB en or have (dB) 6.9 8.5 6.9 8.5 (e.9 8.5 (c.9) 8.5	41.7 46.7 ce factor(al enough m. Gain (dB) 41.0 41.5 41.0 41.5 5 ef actor(ab	30.8 23.6 bove 15GH argin (more [dB] -24.7 -24.7 -24.7 -24.7 -24.7 yove 15GH;	53.9 z)) - Gain(A than 20dB Result [dBuV/m] 30.8 13.7 34.9 13.8 z)) - Gain(A	30.3 Amprifier)). [dBu√/m] 53.9 53.9 53.9 53.9 53.9 53.9	Margin [dB] 23.1 40.2 19.0 40.1	0 Remark	
Vert. Vert. Result = Distance *Other fre Dwell tim Polarity Hori. Hori. Vert. Vert. Vert. Result = I Distance	3307.997 <u>24800.000</u> Reading + Ant. factor : 15GH2 equency noises requency [MHz] 4960.000 7440.000 4960.000 7440.000 Reading + Ant. factor : 15GH2	AV AV Fac. + Los: z -40GHz : omitted in ation Detector AV AV AV AV AV Z -40GHz : z -40GHz :	37.8 32.3 s (Cable+At 20log(3.0m this report) [dBuV] 58.1 34.8 62.2 34.9 s(Cable+Att 20log(3.0m	29.0 39.6 ittenuator+Fi /1.0m)= 9. were not se [dB/m] 31.6 36.7 31.6 36.7 31.6 36.7 tenuator+Fil n/1.0m)= 9.	5.7 -1.6 ilter-Distan 5dB en or have (dB) 6.9 8.5 6.9 8.5 (e.9 8.5 (c.9) 8.5	41.7 46.7 ce factor(al enough m. Gain (dB) 41.0 41.5 41.0 41.5 5 ef actor(ab	30.8 23.6 bove 15GH argin (more [dB] -24.7 -24.7 -24.7 -24.7 -24.7 yove 15GH;	53.9 z)) - Gain(A than 20dB Result [dBuV/m] 30.8 13.7 34.9 13.8 z)) - Gain(A	30.3 Amprifier)). [dBu√/m] 53.9 53.9 53.9 53.9 53.9 53.9	Margin [dB] 23.1 40.2 19.0 40.1	0 Remark	
Vert. Vert. Result = Distance *Other fre Dwell tim Polarity Hori. Hori. Vert. Vert. Vert. Result = I Distance	3307.997 <u>24800.000</u> Reading + Ant. factor : 15GH2 equency noises requency [MHz] 4960.000 7440.000 4960.000 7440.000 Reading + Ant. factor : 15GH2	AV AV Fac. + Los: z -40GHz : omitted in ation Detector AV AV AV AV AV Z -40GHz : z -40GHz :	37.8 32.3 s (Cable+At 20log(3.0m this report) [dBuV] 58.1 34.8 62.2 34.9 s(Cable+Att 20log(3.0m	29.0 39.6 ittenuator+Fi /1.0m)= 9. were not se [dB/m] 31.6 36.7 31.6 36.7 31.6 36.7 tenuator+Fil n/1.0m)= 9.	5.7 -1.6 ilter-Distan 5dB en or have (dB) 6.9 8.5 6.9 8.5 (e.9 8.5 (c.9) 8.5	41.7 46.7 ce factor(al enough m. Gain (dB) 41.0 41.5 41.0 41.5 5 ef actor(ab	30.8 23.6 bove 15GH argin (more [dB] -24.7 -24.7 -24.7 -24.7 -24.7 yove 15GH;	53.9 z)) - Gain(A than 20dB Result [dBuV/m] 30.8 13.7 34.9 13.8 z)) - Gain(A	30.3 Amprifier)). [dBu√/m] 53.9 53.9 53.9 53.9 53.9 53.9	Margin [dB] 23.1 40.2 19.0 40.1	0 Remark	
Vert. Vert. Result = Distance *Other fre Dwell tim Polarity Hori. Hori. Vert. Vert. Vert. Result = I Distance	3307.997 <u>24800.000</u> Reading + Ant. factor : 15GH2 equency noises traguency <u>(MHz)</u> <u>4960.000</u> 7440.000 <u>7440.000</u> <u>7440.000</u> Reading + Ant. factor : 15GH2	AV AV Fac. + Los: z -40GHz : omitted in ation Detector AV AV AV AV AV Z -40GHz : z -40GHz :	37.8 32.3 s (Cable+At 20log(3.0m this report) [dBuV] 58.1 34.8 62.2 34.9 s(Cable+Att 20log(3.0m	29.0 39.6 ittenuator+Fi /1.0m)= 9. were not se [dB/m] 31.6 36.7 31.6 36.7 31.6 36.7 tenuator+Fil n/1.0m)= 9.	5.7 -1.6 ilter-Distan 5dB en or have (dB) 6.9 8.5 6.9 8.5 (e.9 8.5 (c.9) 8.5	41.7 46.7 ce factor(al enough m. Gain (dB) 41.0 41.5 41.0 41.5 5 ef actor(ab	30.8 23.6 bove 15GH argin (more [dB] -24.7 -24.7 -24.7 -24.7 -24.7 yove 15GH;	53.9 z)) - Gain(A than 20dB Result [dBuV/m] 30.8 13.7 34.9 13.8 z)) - Gain(A	30.3 Amprifier)). [dBu√/m] 53.9 53.9 53.9 53.9 53.9 53.9	Margin [dB] 23.1 40.2 19.0 40.1	0 Remark	

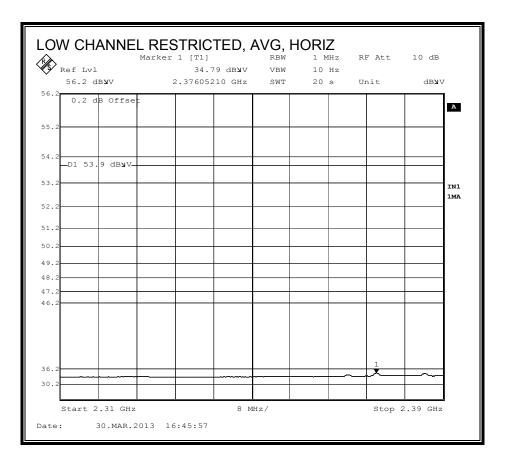
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ENHANCED DATA RATE 8PSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

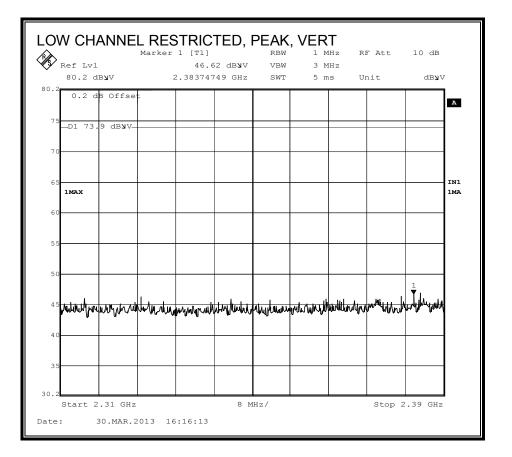


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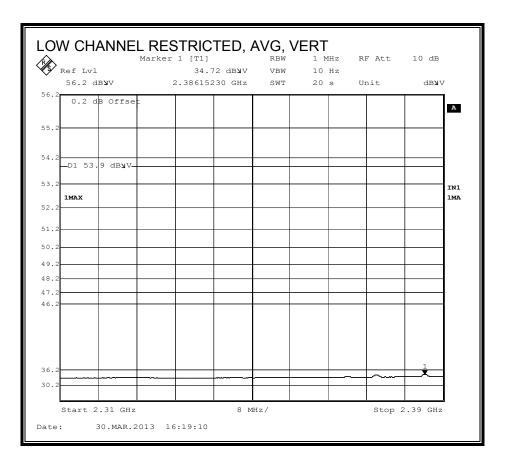


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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

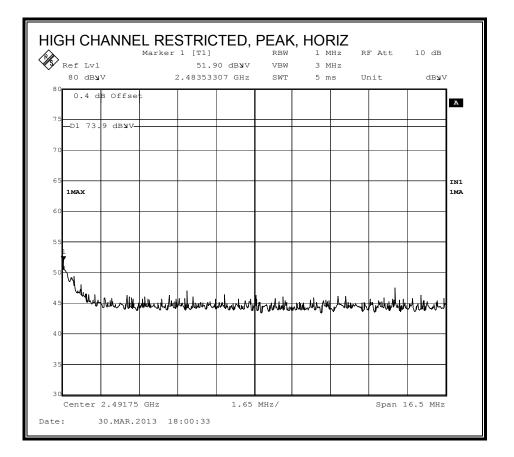


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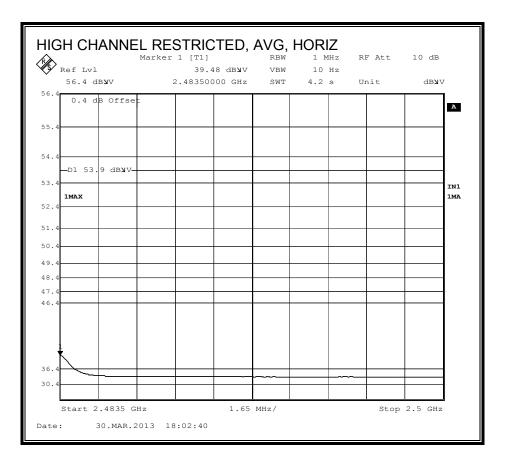


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RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

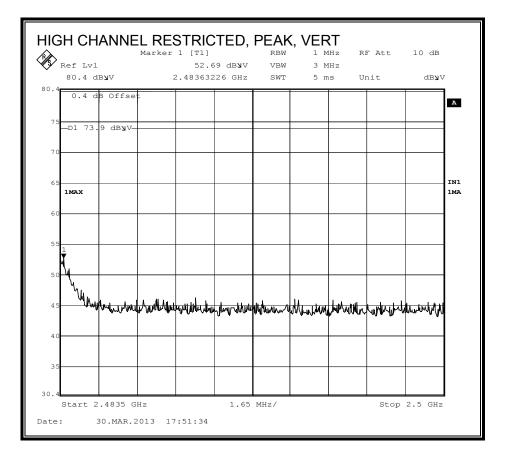


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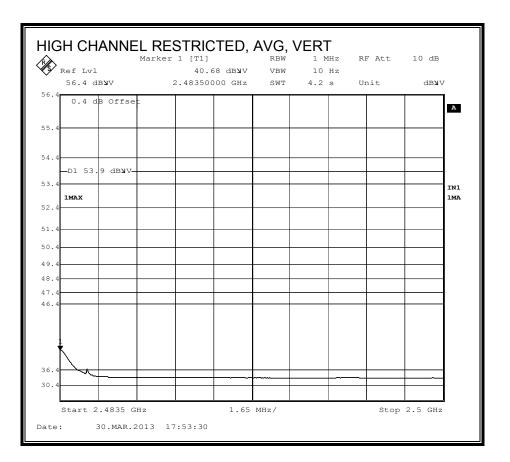


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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

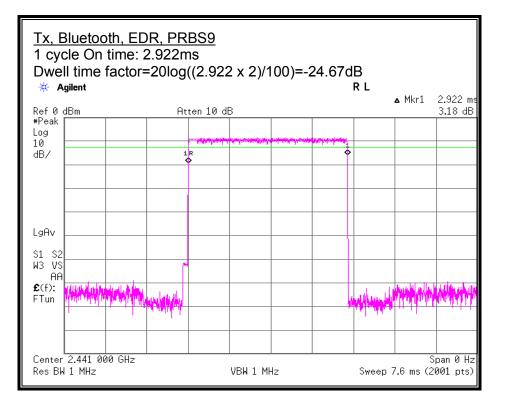


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Dwell time factor Calculation chart



On time of some channel during 100ms: Twice This is the worst case in hopping sequence of Bluetooth.

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3-DH5, 2402MHz (LOW)

steptace UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber march 30, 2013 March 31, 2013 amperature / Humidity 24 deg.C, 39 %RH 23 deg.C, 34 %RH. igineer Tx, 2402 Tx, 2511 Tx, 252	Ate March 30, 2013 March 31, 2013 Imperature / Humidity 24 deg.C, 39 %RH 23 deg.C, 34 %RH Igineer Kenichi Adachi Kenichi Adachi Jode Tx, 2402 Tx, Bluetooth, EDR, PRBS9 Polanty Frequency Delector Polanty Frequency Aurge Delay Aurge Aurge Hori. 1602.017 PK 51.3 25.1 Hori. 463.9 73.9 24.0 100 32.0 Hori. 1602.017 AV 46.5 28.8 5.7 41.6 39.4 13.9 24.0 104 32.3 Hori. 2020.000 PK 45.1 33	st place			LIL Jana	n Inc Sh	onan EM	CLab		No 3 Se	mi Anech	oic Chan	nher		
Properature / Humidity 24 deg.C, 39 %RH 23 deg.C, 34 %RH rgineer Kenichi Adachi Kenichi Adachi rx, 2402 Tx, 2402 Tx, 2402 Tx, 2402 Tx, 2402 Tx, Encichi Adachi reverse, 200 Tx, Budototh, EDR, PRBS9 Encichi Adachi Control of the colspan=Peak Polarity Frequency Detector Reading Anti-Fac. 1601 1602.017 PK 51.3 25.1 13.3 40.8 48.9 73.9 25.0 107 230 Hori. 1602.017 PK 51.3 25.1 13.3 40.8 48.9 73.9 25.0 107 230 Hori. 2203.078 PK 46.5 28.5 7.4 100 0 107 230 Hori. 2402.000 PK 45.3 35.7 3.9 30.2 100 0 Hori. 2402.0000 AV 32.3 39.8<	Imperature / Humidity 24 deg.C, 39 %RH 23 deg.C, 34 %RH Igineer Kenichi Adachi Kenichi Adachi Ode Tx, 2402 Polanty Frequency Detector Reading Antification Polanty Frequency Detector Reading Antification Limit Murgin Height Angle Hori. 1602.017 PK 51.3 25.1 13.3 40.8 48.9 73.9 25.0 107 230 Hori. 2020.000 PK 45.1 36.5 73.9 10.0 00 9 Hori. 2020.000 PK 45.3 35.7 41.6 39.4 100.0 107 230 Hori.					·			1 2012	10.0 00		ole oridi			
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Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB "Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB). Dwell time factor relaxation Polarity Frequency Detector Reading Ant.Fac. Loss Gain Dwell Result Limit Margin Remark IMHz) [dBuV] [dB/m] [dB] [dB] [dBUV/m] [dB]	Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB "Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB). Dwell time factor relaxation Polarity Frequency Detector Reading Ant.Fac. Loss Gain Dwell Result Limit Margin Remark IMHz) [dBuV] [dB/m] [dB] [dB] [dBUV/m] [dB]									53.0	20.2	100	<u>ہ</u>		
[MHz] [dBuV] [dB/m] [dB] Factor [dBuV/m] [dB] [dB] Hori. 4804.000 AV 36.8 31.1 6.8 41.2 -24.7 8.7 53.9 45.2 Hori. 7206.000 AV 34.9 36.6 8.3 41.4 -24.7 13.6 53.9 40.3 Vert. 4804.000 AV 38.7 31.1 6.8 41.2 -24.7 10.6 53.9 40.3 Vert. 7206.000 AV 38.7 31.1 6.8 41.2 -24.7 13.6 53.9 40.3 Vert. 7206.000 AV 34.8 36.6 8.3 41.4 -24.7 13.5 53.9 40.4 Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB	[MHz] [dBuV] [dB/m] [dB] Factor [dBuV/m] [dB] [dB] Hori. 4804.000 AV 36.8 31.1 6.8 41.2 -24.7 8.7 53.9 45.2 Hori. 7206.000 AV 34.9 36.6 8.3 41.4 -24.7 13.6 53.9 40.3 Vert. 4804.000 AV 38.7 31.1 6.8 41.2 -24.7 10.6 53.9 40.3 Vert. 7206.000 AV 38.7 31.1 6.8 41.2 -24.7 13.6 53.9 40.3 Vert. 7206.000 AV 34.8 36.6 8.3 41.4 -24.7 13.5 53.9 40.4 Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB	Vert. Result = I Distance *Other fre	Reading + Ant.f factor : 15GHz quency noises	AV Fac. + Los -40GHz : omitted in	s (Cable+At 20log(3.0n	ttenuator+F n/1.0m)= 9.	ilter-Distan .5dB	ce factor(a	bove 15GH	z)) - Gain(/	Amprifier)	100	0	<u></u>	
Hori. 4804.000 AV 36.8 31.1 6.8 41.2 -24.7 8.7 53.9 45.2 Hori. 7206.000 AV 34.9 36.6 8.3 41.4 -24.7 13.6 53.9 40.3 Vert. 4804.000 AV 38.7 31.1 6.8 41.2 -24.7 13.6 53.9 40.3 Vert. 7206.000 AV 38.7 31.1 6.8 41.2 -24.7 13.6 53.9 40.3 Vert. 7206.000 AV 34.8 36.6 8.3 41.4 -24.7 13.5 53.9 40.4 Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB 9.5dB	Hori. 4804.000 AV 36.8 31.1 6.8 41.2 -24.7 8.7 53.9 45.2 Hori. 7206.000 AV 34.9 36.6 8.3 41.4 -24.7 13.6 53.9 40.3 Vert. 4804.000 AV 38.7 31.1 6.8 41.2 -24.7 13.6 53.9 40.3 Vert. 7206.000 AV 38.7 31.1 6.8 41.2 -24.7 13.6 53.9 40.3 Vert. 7206.000 AV 34.8 36.6 8.3 41.4 -24.7 13.5 53.9 40.4 Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB 9.5dB	Vert. Result = I Distance *Other fre Dwell tim	Reading + Ant.f factor : 15GHz quency noises ne factor relaxa	A∨ Fac. + Los -40GHz : omitted in ation	s (Cable+A 20log(3.0n this report	ttenuator+F n/1.0m)= 9. were not se	ilter-Distan .5dB een or have	ce factor(al	bove 15GH argin (more	z)) - Gain(/ than 20dB	Amprifier)			<u> </u>	
Hori. 7206.000 AV 34.9 36.6 8.3 41.4 -24.7 13.6 53.9 40.3 Vert. 4804.000 AV 38.7 31.1 6.8 41.2 -24.7 10.6 53.9 40.3 Vert. 7206.000 AV 34.8 36.6 8.3 41.4 -24.7 10.6 53.9 40.4 Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor Distance factor : 15GHz - 40GHz : 20log(3.0m/1.0m)= 9.5dB 9.5dB	Hori. 7206.000 AV 34.9 36.6 8.3 41.4 -24.7 13.6 53.9 40.3 Vert. 4804.000 AV 38.7 31.1 6.8 41.2 -24.7 10.6 53.9 40.3 Vert. 7206.000 AV 34.8 36.6 8.3 41.4 -24.7 10.6 53.9 40.4 Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor Distance factor : 15GHz - 40GHz : 20log(3.0m/1.0m)= 9.5dB 9.5dB	Vert. Result = I Distance *Other fre Dwell tim	Reading + Ant.f factor : 15GHz quency noises le factor relaxa Frequency	A∨ Fac. + Los -40GHz : omitted in ation	s (Cable+A 20log(3.0n this report	ttenuator+F n/1.0m)= 9. were not se Ant.Fac.	ilter-Distan 5dB en or have Loss	ce factor(al enough m Gain	bove 15GH argin (more Dwell Factor	z)) - Gain(/ e than 20dB Result	Amprifier) I). Limit	Margin		I	
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Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB	Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB	Vert. Result = I Distance *Other fre Dwell tim Polarity Hori.	Reading + Ant.f. factor : 15GHz quency noises he factor relaxa Frequency [MHz] 4804.000	AV Fac. + Los: -40GHz : omitted in ation Detector	s (Cable+Ai 20log(3.0n this report Reading [dBuV] 36.8	ttenuator+F n/1.0m)= 9. were not se Ant.Fac. [dB/m] 31.1	ilter-Distan 5dB en or have Loss [dB] 6.8	ce factor(al enough m Gain [dB] 41.2	bove 15GH argin (more Dwell Factor [dB] -24.7	z)) - Gain(<i>i</i> than 20dB Result [dBuV/m] 8.7	Amprifier) ;). Limit [dBuV/m] 53.9	Margin [dB] 45.2			
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB	Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB	Vert. Result = 1 Distance *Other fre Dwell tim Polarity Hori. Hori.	Reading + Ant.f factor : 15GHz quency noises he factor relaxa Frequency [MHz] 4804.000 7206.000	AV Fac. + Los: -40GHz : omitted in Detector AV AV	s (Cable+A 20log(3.0n this report Reading [dBuV] 36.8 34.9	ttenuator+F n/1.0m)= 9. were not se Ant.Fac. [dB/m] 31.1 36.6	ilter-Distan 5dB en or have Loss [dB] 6.8 8.3	ce factor(al enough m Gain [dB] 41.2 41.4	Dove 15GH argin (more Dwell Factor [dB] -24.7 -24.7	z)) - Gain(<i>i</i> e than 20dB Result [dBuV/m] 8.7 13.6	Amprifier)). Limit [dBuV/m] 53.9 53.9	Margin [dB] 45.2 40.3			
		Vert. Result = 1 Distance *Other fre Dwell tim Polarity Hori. Hori. Vert.	Reading + Ant.f factor : 15GHz quency noises te factor relax: Frequency [MHz] 4804.000 7206.000 4804.000	AV Fac. + Los: -40GHz : omitted in Ation Detector AV AV AV	s (Cable+A 20log(3.0n this report Reading [dBuV] 36.8 34.9 38.7	ttenuator+F n/1.0m)= 9. were not se Ant.Fac. [dB/m] 31.1 36.6 31.1	ilter-Distan 5dB en or have Loss [dB] 6.8 8.3 6.8	ce factor(al enough m Gain [dB] 41.2 41.4 41.2	Dove 15GH argin (more Factor [dB] -24.7 -24.7 -24.7	z)) - Gain(<i>i</i> e than 20dB Result [dBuV/m] 8.7 13.6 10.6	Amprifier) Limit [dBuV/m] 53.9 53.9 53.9	Margin [dB] 45.2 40.3 43.3			
		Vert. Result = 1 Distance *Other free Polarity Hori. Hori. Vert. Vert. Vert. Result = 1	Reading + Ant.f factor : 15GHz quency noises ie factor relaxa Frequency [MHz] 4804.000 7206.000 8804.000 7206.000 Reading + Ant.f	AV =ac. + Los: -40GHz : omitted in ation Detector AV AV AV AV AV AV =ac. + Los:	s (Cable+Ai 20log(3.0n this report [dBuV] 36.8 34.9 38.7 34.8 s(Cable+Att	ttenuator+F n/1.0m)= 9. were not se <u>[dB/m]</u> 31.1 36.6 31.1 36.6 tenuator+Fi	Ilter-Distan 5dB en or have [dB] 6.8 8.3 6.8 8.3 Iter-Distanc	ce factor(al enough m Gain [dB] 41.2 41.4 41.2 41.4	Dove 15GH argin (more Factor [dB] -24.7 -24.7 -24.7 -24.7 -24.7	z)) - Gain(/ e than 20dB Result [dBuV/m] 8.7 13.6 10.6 13.5	Amprifier) Limit [dBu√/m] 53.9 53.9 53.9 53.9 53.9	Margin [dB] 45.2 40.3 43.3 40.4	Remark		
		Vert. Result = 1 Distance *Other fre Polarity Hori. Hori. Vert. Vert. Vert. Result = 1 Distance	Reading + Ant.f. factor : 15GHz quency noises ie factor relaxa Frequency [MHz] 4804.000 7206.000 7206.000 Reading + Ant.f factor : 15GHz	AV =ac. + Los: -40GHz : omitted in ation Detector AV AV AV AV AV AV AV 	s (Cable+Ai 20log(3.0n this report [dBuV] 36.8 34.9 38.7 34.8 s(Cable+Att 20log(3.0n	ttenuator+F n/1.0m)= 9. were not se Ant.Fac. [dB/m] 31.1 36.6 31.1 36.6 tenuator+Fi n/1.0m)= 9.	Ilter-Distan 5dB en or have [dB] 6.8 8.3 6.8 8.3 8.3 Iter-Distanc 5dB	ce factor(al enough m [dB] 41.2 41.4 41.2 41.4 5e factor(ab	Dove 15GH argin (more Factor [dB] -24.7 -24.7 -24.7 -24.7 -24.7 ove 15GHz	z)) - Gain(/ e than 20dB Result [dBuV/m] 8.7 13.6 10.6 13.5 z)) - Gain(A	Amprifier))). Limit [dBuV/m] 53.9 53.	Margin [dB] 45.2 40.3 43.3 40.4	Remark		

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3-DH5, 2441MHz (MIDDLE)

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est place	•			n, Inc. Sh	onan EM			No.3 Sei	mi Aneche	oic Chan	nber	
ate			March 3	0, 2013		March 3	1, 2013					
emperati	ure / Humidit	У	24 deg.0	C, 39 %RF	4	23 deg.C), 34 %RI	Н				
naineer			Kenichi /	Adachi		Kenichi /	Adachi					
ode			Tx.	2441	MHz							
040				tooth, ED		0						
						9						
Polarity	Frequency	(* PK: Peak, Detector	AV: Average, Reading	QP: Quasi-Pea Ant.Fac.	ak) Loss	Gain	Result	Limit	Margin	Height	Angle	Remark
Polarity	[MHz]	Detector	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[deg]	T CEITIGER
Hori.		PK	49.3	25.3	13.4	40.8	47.2	73.9	26.7	108		
Hori.		PK	46.6	28.9	5.7	41.6	39.6	73.9	34.3	112		
Hori.		PK	58.8	31.3	6.9	41.1	55.9	73.9	18.0	100		
Hori.		PK	47.5	36.6	8.4	41.4	51.1	73.9	22.8	100		
Hori.		PK	45.0	39.7	-1.8	46.7	36.2	73.9	37.7	100		
Hori.		AV	44.7	25.3	13.4	40.8	42.6	53.9	11.3	108		
Hori.		AV	36.8	28.9	5.7	41.6	29.8	53.9	24.1	112		
Hori.	24410.000	AV	32.5	39.7	-1.8	46.7	23.7	53.9	30.2	100		
Vert.		PK	48.4	25.3	13.4	40.8	46.3	73.9	27.6	130	269	
Vert.	3255.982	PK	46.8	28.9	5.7	41.6	39.8	73.9	34.1	100		
Vert.	4882.000	PK	61.3	31.3	6.9	41.1	58.4	73.9	15.5	100	27	
Vert.		PK	47.5	36.6	8.4	41.4	51.1	73.9	22.8	100		
Vert.		PK	44.9	39.7	-1.8	46.7	36.1	73.9	37.8	100		1
Vert.		AV	42.4	25.3	13.4	40.8	40.3	53.9	13.6	130		
Vert.	3255.982		36.8	28.9	5.7	41.6	29.8	53.9	24.1	100		
Vert.	24410.000 Reading + Ant.		32.5	39.7	-1.8	46.7	23.7	53.9	30.2	100	0	
Dwell tim Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Dwell Factor	Result	Limit	Margin	Remark	
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]		
Hori.	4882.000	AV	36.6	31.3	6.9	41.1	-24.7	8.9	53.9	45.0		
Hori.		AV	34.9	36.6	8.4	41.4	-24.7	13.7	53.9	40.2		
Vert.		ÂV	38.4	31.3	6.9	41.1	-24.7	10.7	53.9	43.2		
Vert.	7323.000		34.8	36.6	8.4	41.4	-24.7	13.6	53.9	40.3		
	Reading + Ant.)factor	
	factor : 15GHz equency noises					e enough m	argin (more	than 20dB).			

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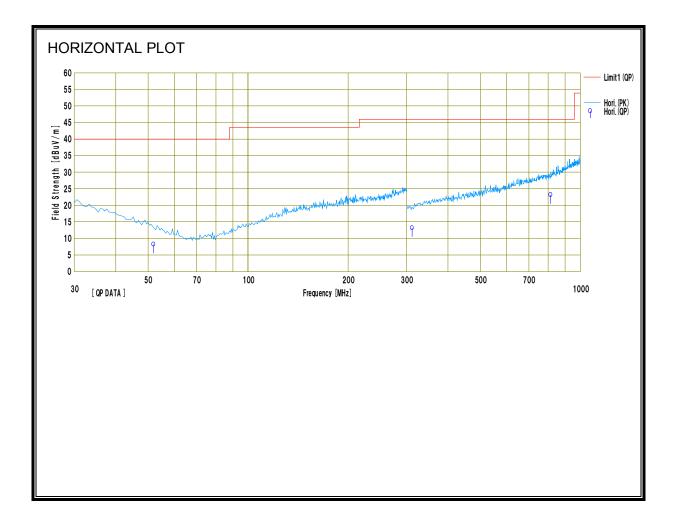
3-DH5, 2480MHz (HIGH)

I Hori. 1 Hori. 3 Hori. 4 Hori. 7 Hori. 24 Hori. 1 Hori. 24 Hori. 3 Hori. 24 Vert. 1 Vert. 3 Vert. 4 Vert. 4 Vert. 4 Vert. 4 Vert. 24 Vert. 4 Vert. 3 Vert. 24 Vert. 1 Vert. 3	requency [MHz] 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996 4800.000 1653.984 3307.996 4960.000 7440.000 1653.984	(* PK: Peak, Detector PK PK PK	March 30 24 deg.0 Kenichi A Tx, Tx, Bluet	, 39 %RH	H MHz R, PRBS	March 3 ⁻ 23 deg.0 Kenichi /	Result [dBuV/m] 48.0 40.0 57.2 51.5 36.1 43.1 30.2 23.7 47.8		Margin [dB] 25.9 33.9 16.7 22.4 37.8 10.8 23.7 30.2	Height [cm] 112 110 100 100 112 110	Angle [deg] 233 317 14 355 0 233 317	
Polarity Free ode Polarity Free Hori. 1 Hori. 3 Hori. 4 Hori. 24 Hori. 1 Hori. 24 Hori. 24 Hori. 24 Vert. 1 Vert. 3 Vert. 24 Vert. 1 Vert. 24 Vert. 1 Vert. 24 Result = Readi	requency [MHz] 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996 4800.000 7440.000 7440.000 7440.000 7440.000 74800.000 74800.000	(* PK: Peak, Detector PK PK PK PK PK PK PK PK PK PK PK PK PK	24 deg.C Kenichi A Tx, Tx, Bluel AV: Average, [dBuV] 50.1 47.0 59.7 47.8 44.8 45.2 37.2 32.4 49.9 47.3 60.4 47.7	2, 39 %RH Adachi 2480 tooth, ED Ant.Fac. [dB/m] 25.4 29.0 31.6 36.7 39.6 25.4 29.0 31.6 36.7 39.6 25.4 29.0 31.6 31.6	MHz R, PRBS [dB] 13.4 5.7 6.9 8.5 -1.6 13.4 5.7 -1.6 13.4 5.7 -1.6 13.4 5.7	23 deg.C Kenichi / 9 ^{Gain} [dB] 40.9 41.7 41.0 41.5 46.7 40.9 41.7 40.9 41.7 40.9	Result [dBuV/m] 48.0 40.0 57.2 51.5 36.1 43.1 30.2 23.7 47.8	Limit [dBuV/m] 73.9 73.9 73.9 73.9 53.9 53.9	[dB] 25.9 33.9 16.7 22.4 37.8 10.8 23.7	[cm] 112 110 100 100 100 112 110	[deg] 233 317 14 355 0 233	
Polarity Free Ode I Hori. 1 Hori. 1 Hori. 3 Hori. 4 Hori. 24 Hori. 1 Hori. 24 Hori. 3 Hori. 24 Vert. 1 Vert. 3 Vert. 4 Vert. 4 Vert. 24 Vert. 24 Vert. 24 Vert. 24 Vert. 24 Vert. 24 Result = Readi	requency [MHz] 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996 4800.000 7440.000 7440.000 7440.000 7440.000 74800.000	(* PK: Peak, Detector PK PK PK PK PK PK PK PK PK PK PK PK PK	Kenichi A Tx, Tx, Bluel Reading [dBuV] 50.1 47.0 59.7 47.8 44.8 45.2 37.2 32.4 49.9 47.3 60.4 47.7	Adachi 2480 tooth, ED Ant.Fac. [dB/m] 25.4 29.0 31.6 36.7 39.6 25.4 29.0 39.6 25.4 29.0 39.6 25.4 29.0 39.6 25.4 29.0 31.6	MHz R, PRBS [dB] 13.4 5.7 6.9 8.5 -1.6 13.4 5.7 -1.6 13.4 5.7 -1.6 13.4 5.7	Gain [dB] 40.9 41.7 41.0 41.5 46.7 40.9 41.7 40.9 41.7 40.9 40.9	Result [dBuV/m] 48.0 40.0 51.5 36.1 43.1 30.2 23.7 47.8	Limit [dBuV/m] 73.9 73.9 73.9 73.9 53.9 53.9	[dB] 25.9 33.9 16.7 22.4 37.8 10.8 23.7	[cm] 112 110 100 100 100 112 110	[deg] 233 317 14 355 0 233	
Polarity Free Hori. 1 Hori. 1 Hori. 3 Hori. 4 Hori. 24 Hori. 1 Hori. 24 Hori. 24 Vert. 1 Vert. 1 Vert. 24 Vert. 1 Vert. 24 Result = Readi	requency [MHz] 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996 4800.000 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996	(* PK: Peak, Detector PK PK PK PK PK PK PK PK PK PK PK PK PK	Tx, Tx, Bluet Reading [dBW7] 50.1 47.0 59.7 47.8 44.8 45.2 37.2 32.4 49.9 47.3 60.4 47.7	2480 tooth, ED Ant.Fac. [dB/m] 25.4 29.0 31.6 36.7 39.6 25.4 29.0 39.6 25.4 29.0 39.6 25.4 29.0 39.6 25.4 29.0 31.6	R, PRBS [dB] 13.4 5.7 6.9 8.5 -1.6 13.4 5.7 -1.6 13.4 5.7 -1.6 13.4 5.7	9 Gain [dB] 40.9 41.7 41.0 41.5 46.7 40.9 41.7 46.7 40.9	Result [dBuV/m] 48.0 57.2 51.5 36.1 43.1 30.2 23.7 47.8	[dBuV/m] 73.9 73.9 73.9 73.9 73.9 53.9 53.9 53.9	[dB] 25.9 33.9 16.7 22.4 37.8 10.8 23.7	[cm] 112 110 100 100 100 112 110	[deg] 233 317 14 355 0 233	
Polarity Free I I Hori. 1 Hori. 3 Hori. 4 Hori. 24 Hori. 1 Hori. 24 Hori. 24 Hori. 3 Hori. 3 Vert. 1 Vert. 3 Vert. 4 Vert. 7 Vert. 24 Vert. 24	requency [MHz] 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996 4800.000 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996	(* PK: Peak, Detector PK PK PK PK PK PK PK PK PK PK PK PK PK	Tx, Bluet AV: Average, Reading [dBuV] 50.1 47.0 59.7 47.8 44.8 45.2 37.2 32.4 49.9 47.3 60.4 47.7	tooth, ED Ant.Fac. [dB/m] 25.4 29.0 31.6 36.7 39.6 25.4 29.0 39.6 25.4 29.0 39.6 25.4 29.0 31.6 39.6 25.4 29.0 31.6 39.6 25.4 29.0 31.6 39.6 25.4 29.0 31.6 39.6 25.4 29.0 31.6 31.6 31.6 30.6 31.6 30.6 31.6	R, PRBS [dB] 13.4 5.7 6.9 8.5 -1.6 13.4 5.7 -1.6 13.4 5.7 -1.6 13.4 5.7	Gain [dB] 40.9 41.7 41.0 41.5 46.7 40.9 41.7 46.7 40.9	[dBuV/m] 48.0 40.0 57.2 51.5 36.1 43.1 30.2 23.7 47.8	[dBuV/m] 73.9 73.9 73.9 73.9 73.9 53.9 53.9 53.9	[dB] 25.9 33.9 16.7 22.4 37.8 10.8 23.7	[cm] 112 110 100 100 100 112 110	[deg] 233 317 14 355 0 233	
I Hori. 1 Hori. 3 Hori. 7 Hori. 24 Hori. 1 Hori. 3 Hori. 3 Hori. 3 Hori. 3 Hori. 3 Vert. 1 Vert. 3 Vert. 3 Vert. 3 Vert. 4 Vert. 4 Vert. 24 Vert. 3 Vert. 24 Vert. 24 Result = Readi	requency [MHz] 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996 4800.000 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996	(* PK: Peak, Detector PK PK PK PK PK PK PK PK PK PK PK PK PK	AV: Average, Reading [dBuV] 50.1 47.0 59.7 47.8 44.5 37.2 32.4 49.9 47.3 60.4 47.7	Ant.Fac. [dB/m] 25.4 29.0 31.6 36.7 39.6 25.4 29.0 39.6 25.4 29.0 39.6 25.4 29.0 31.6	Loss [dB] 13.4 5.7 6.9 8.5 -1.6 13.4 5.7 -1.6 13.4 5.7	Gain [dB] 40.9 41.7 41.0 41.5 46.7 40.9 41.7 46.7 40.9	[dBuV/m] 48.0 40.0 57.2 51.5 36.1 43.1 30.2 23.7 47.8	[dBuV/m] 73.9 73.9 73.9 73.9 73.9 53.9 53.9 53.9	[dB] 25.9 33.9 16.7 22.4 37.8 10.8 23.7	[cm] 112 110 100 100 100 112 110	[deg] 233 317 14 355 0 233	
I Hori. 1 Hori. 3 Hori. 7 Hori. 24 Hori. 1 Hori. 3 Hori. 3 Hori. 3 Hori. 3 Hori. 3 Vert. 1 Vert. 3 Vert. 3 Vert. 3 Vert. 4 Vert. 4 Vert. 24 Vert. 3 Vert. 24 Vert. 24 Result = Readi	requency [MHz] 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996 4800.000 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996	Detector PK PK PK PK PK AV AV AV AV AV PK PK PK PK	Reading [dBuV] 50.1 47.0 59.7 47.8 44.8 45.2 37.2 37.2 32.4 49.9 47.3 60.4 47.7	Ant.Fac. [dB/m] 25.4 29.0 31.6 36.7 39.6 25.4 29.0 39.6 25.4 29.0 31.6	Loss [dB] 13.4 5.7 6.9 8.5 -1.6 13.4 5.7 -1.6 13.4 5.7	[dB] 40.9 41.7 41.0 41.5 46.7 40.9 41.7 46.7 40.9	[dBuV/m] 48.0 40.0 57.2 51.5 36.1 43.1 30.2 23.7 47.8	[dBuV/m] 73.9 73.9 73.9 73.9 73.9 53.9 53.9 53.9	[dB] 25.9 33.9 16.7 22.4 37.8 10.8 23.7	[cm] 112 110 100 100 100 112 110	[deg] 233 317 14 355 0 233	
I Hori. 1 Hori. 3 Hori. 7 Hori. 24 Hori. 1 Hori. 3 Hori. 3 Hori. 3 Hori. 3 Hori. 3 Vert. 1 Vert. 3 Vert. 3 Vert. 3 Vert. 4 Vert. 4 Vert. 24 Vert. 3 Vert. 24 Vert. 24 Result = Readi	[MHz] 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996 4800.000 1653.984 3307.996 4960.000 7440.000 7440.000 4800.000 1653.984 3307.996	ъъъъъ>>>ккккк ккккк>>>кккккккк кккккк	[dBuV] 50.1 47.0 59.7 47.8 44.8 45.2 37.2 32.4 49.9 47.3 60.4 47.7	[dB/m] 25.4 29.0 31.6 36.7 39.6 25.4 29.0 39.6 25.4 29.0 31.6	[dB] 13.4 5.7 6.9 8.5 -1.6 13.4 5.7 -1.6 13.4 5.7	[dB] 40.9 41.7 41.0 41.5 46.7 40.9 41.7 46.7 40.9	[dBuV/m] 48.0 40.0 57.2 51.5 36.1 43.1 30.2 23.7 47.8	[dBuV/m] 73.9 73.9 73.9 73.9 73.9 53.9 53.9 53.9	[dB] 25.9 33.9 16.7 22.4 37.8 10.8 23.7	[cm] 112 110 100 100 100 112 110	[deg] 233 317 14 355 0 233	
Hori. 3 Hori. 4 Hori. 7 Hori. 24 Hori. 1 Hori. 24 Hori. 24 Vert. 1 Vert. 3 Vert. 4 Vert. 4 Vert. 24 Vert. 3 Vert. 24 Result = Readit	3307.996 4960.000 7440.000 1653.984 3307.996 4800.000 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996	ъъъъххх 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	47.0 59.7 47.8 44.8 45.2 37.2 32.4 49.9 47.3 60.4 47.7	29.0 31.6 36.7 39.6 25.4 29.0 39.6 25.4 29.0 31.6	5.7 6.9 8.5 -1.6 13.4 5.7 -1.6 13.4 5.7	41.7 41.0 41.5 46.7 40.9 41.7 46.7 40.9	40.0 57.2 51.5 36.1 43.1 30.2 23.7 47.8	73.9 73.9 73.9 73.9 53.9 53.9	33.9 16.7 22.4 37.8 10.8 23.7	110 100 100 100 112 110	233 317 14 355 0 233	
Hori. 4 Hori. 7 Hori. 24 Hori. 1 Hori. 3 Hori. 24 Vert. 3 Vert. 1 Vert. 4 Vert. 24 Vert. 1 Vert. 24 Vert. 24 Vert. 1 Vert. 24 Result = Readit	4960.000 7440.000 1653.984 3307.996 4800.000 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996	Р К К Х Х Х Х Х Х Х Х Х Х Х Х Х Х Х Х Х	59.7 47.8 44.8 45.2 37.2 32.4 49.9 47.3 60.4 47.7	31.6 36.7 39.6 25.4 29.0 39.6 25.4 29.0 31.6	6.9 8.5 -1.6 13.4 5.7 -1.6 13.4 5.7	41.0 41.5 46.7 40.9 41.7 46.7 40.9	57.2 51.5 36.1 43.1 30.2 23.7 47.8	73.9 73.9 73.9 53.9 53.9	16.7 22.4 37.8 10.8 23.7	100 100 100 112 110	14 355 0 233	
Hori. 7 Hori. 24 Hori. 1 Hori. 3 Hori. 24 Vert. 1 Vert. 3 Vert. 3 Vert. 3 Vert. 3 Vert. 4 Vert. 24 Vert. 24 Vert. 3 Vert. 24 Result = Readit	7440.000 4800.000 1653.984 3307.996 4800.000 1653.984 3307.996 4960.000 7440.000 4800.000 1653.984 3307.996	₽₩₩ ₽₩ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽	47.8 44.8 45.2 37.2 32.4 49.9 47.3 60.4 47.7	36.7 39.6 25.4 29.0 39.6 25.4 29.0 31.6	8.5 -1.6 13.4 5.7 -1.6 13.4 5.7	41.5 46.7 40.9 41.7 46.7 40.9	51.5 36.1 43.1 30.2 23.7 47.8	73.9 73.9 53.9 53.9	22.4 37.8 10.8 23.7	100 100 112 110	355 0 233	
Hori. 24 Hori. 1 Hori. 3 Hort. 24 Vert. 1 Vert. 3 Vert. 4 Vert. 24 Vert. 4 Vert. 7 Vert. 24 Vert. 3 Vert. 24 Vert. 3 Vert. 24 Result = Readit	4800.000 1653.984 3307.996 4800.000 1653.984 3307.996 4960.000 7440.000 1653.984 3307.996	PK A V V V V V V V V V V	44.8 45.2 37.2 32.4 49.9 47.3 60.4 47.7	39.6 25.4 29.0 39.6 25.4 29.0 31.6	-1.6 13.4 5.7 -1.6 13.4 5.7	46.7 40.9 41.7 46.7 40.9	36.1 43.1 30.2 23.7 47.8	73.9 53.9 53.9	37.8 10.8 23.7	100 112 110	0 233	
Hori. 1 Hori. 3 Hori. 24 Vert. 1 Vert. 3 Vert. 4 Vert. 24 Vert. 24 Vert. 1 Vert. 24 Vert. 3 Vert. 24 Result = Readit	1653.984 3307.996 4800.000 1653.984 3307.996 4960.000 7440.000 4800.000 1653.984 3307.996	AV AV PK PK PK PK	45.2 37.2 32.4 49.9 47.3 60.4 47.7	25.4 29.0 39.6 25.4 29.0 31.6	13.4 5.7 -1.6 13.4 5.7	40.9 41.7 46.7 40.9	43.1 30.2 23.7 47.8	53.9 53.9	10.8 23.7	112 110	233	
Hori. 3 Hori. 24 Vert. 1 Vert. 4 Vert. 4 Vert. 24 Vert. 24 Vert. 24 Vert. 24 Vert. 3 Vert. 24 Result = Readit	3307.996 4800.000 1653.984 3307.996 4960.000 7440.000 4800.000 1653.984 3307.996	AV AV PK PK PK PK	37.2 32.4 49.9 47.3 60.4 47.7	29.0 39.6 25.4 29.0 31.6	5.7 -1.6 13.4 5.7	41.7 46.7 40.9	30.2 23.7 47.8	53.9	23.7	110		
Hori. 24 Vert. 1 Vert. 3 Vert. 4 Vert. 7 Vert. 24 Vert. 3 Vert. 24 Vert. 3 Vert. 24 Result = Readit	4800.000 1653.984 3307.996 4960.000 7440.000 4800.000 1653.984 3307.996	AV PK PK PK PK	32.4 49.9 47.3 60.4 47.7	39.6 25.4 29.0 31.6	-1.6 13.4 5.7	46.7 40.9	23.7 47.8					1
Vert. 1 Vert. 3 Vert. 4 Vert. 7 Vert. 24 Vert. 1 Vert. 3 Vert. 24 Result = Readit	1653.984 3307.996 4960.000 7440.000 4800.000 1653.984 3307.996	PK PK PK PK PK	49.9 47.3 60.4 47.7	25.4 29.0 31.6	13.4 5.7	40.9	47.8			100	0	
Vert. 3 Vert. 4 Vert. 7 Vert. 24 Vert. 1 Vert. 3 Vert. 24 Result = Readi	3307.996 4960.000 7440.000 4800.000 1653.984 3307.996	PK PK PK PK	47.3 60.4 47.7	29.0 31.6	5.7			73.9	26.1	132	263	
Vert. 4 Vert. 7 Vert. 24 Vert. 1 Vert. 3 Vert. 24 Result = Readit	4960.000 7440.000 4800.000 1653.984 3307.996	PK PK	47.7		6.0		40.3	73.9	33.6	100	11	
Vert. 24 Vert. 1 Vert. 3 Vert. 24 Result = Readi	4800.000 1653.984 3307.996	PK		267	0.5	41.0	57.9	73.9	16.0	100	22	
Vert. 1 Vert. 3 Vert. 24 Result = Readi	1653.984 3307.996		44.7		8.5	41.5	51.4	73.9	22.5	100	180	1
Vert. 3 Vert. 24 Result = Readi	3307.996	AV		39.6	-1.6	46.7	36.0	73.9	37.9	100	0	
Vert. 24 Result = Readi		A1/	44.4	25.4	13.4	40.9	42.3	53.9 53.9	11.6	132	263	1
Result = Readi		AV	37.4 32.3	29.0 39.6	5.7 -1.6	41.7 46.7	30.4 23.6	53.9	23.5 30.3	100 100	11 0	
Dwell time fac Polarity Fre	ctor relaxa	tion Detector	Reading	Ant.Fac.	Loss	Gain	Dwell	Result	Limit	Margin	Remark	
							Factor			-		
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]		
	4960.000		36.9	31.6	6.9	41.0	-24.7	9.6	53.9	44.3		
		AV AV	34.9 38.1	36.7 31.6	8.5 6.9	41.5 41.0	-24.7 -24.7	13.8 10.8	53.9 53.9	40.1 43.1		
	7440.000		34.8	36.7	8.5	41.5	-24.7	13.7	53.9	40.2		
Result = Readi											factor	
*Other frequen	ncy noises (omitted in	this report	were not se	en or have	enough m	argin (more	than 20dB).			

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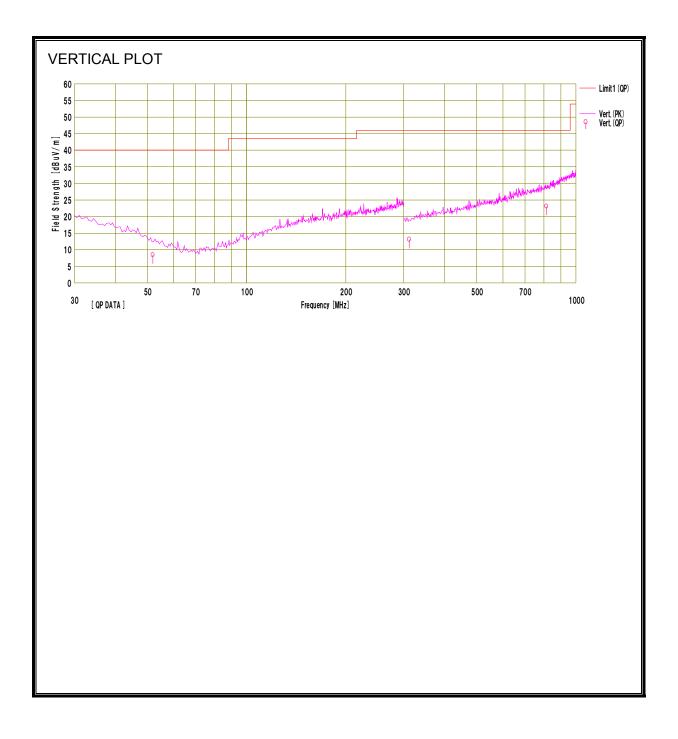
8.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



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SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



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HORIZONTAL AND VERTICAL DATA DATA OF RADIATED EMISSION TEST
UL Japan, Inc. Shonan EMC Lab. No.3 Semi-Anechoic Chamber Date : 2013/03/31
Company : SMK Corporation Mode : Transmitting. 3-DH5, 2441MHz Kind of EUT : Bluetooth Module Order No. : 33HE0044-SH Model No. : BT401 Power : DC 3.3V Serial No. : 000190F08231 Temp./Humi. : 23deg.C / 34%RH
Remarks : EUT-worst-axis: H: X, V: X
Limit1 : FCC15.209 3m. below 1GHz:QP. above 1GHz:AV Engineer : Kenichi Adachi << QP DATA >>
No. Freq. COP> Ant.Fac Loss Gain Result Limit Margin Pola. Height Angle Ant. Type Ant. Type Comment (MHz) (dBuV) (dB) (dB) (dBuV/m) (dB) (dB) (H/V) [cm] [deg] Ant. Type Comment
1 522000 23.4 10.3 6.7 32.2 8.2 4000 31.8 Hort 100 0 BC 2 312.000 22.3 114.2 8.6 32.0 13.1 46.0 32.9 Hort 100 0 BC 3 814.000 23.1 24.1 10.5 31.6 46.0 22.9 Hort 100 0 LP
4 52.000 23.6 10.3 6.7 32.2 8.4 40.0 31.6 Vert 100 0 BC 5 312.000 22.3 14.2 8.6 32.0 13.1 46.0 32.9 Vert 100 0 LP 6 814.000 23.1 24.1 10.5 31.6 22.9 Vert 100 LP
Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable+ATT+⊿AF) [dB] –Gain (AMP) [dB] Ant.Type=BC:Biconical Antenna, LP:Logperiodic Antenna, SHA**:Horn Antenna

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9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

Frequency of Emission (MHz)	Conducted I	Limit (dBuV)
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46 *
0.5-5	56	46
5-30	60	50

Decreases with the logarithm of the frequency.

TEST PROCEDURE

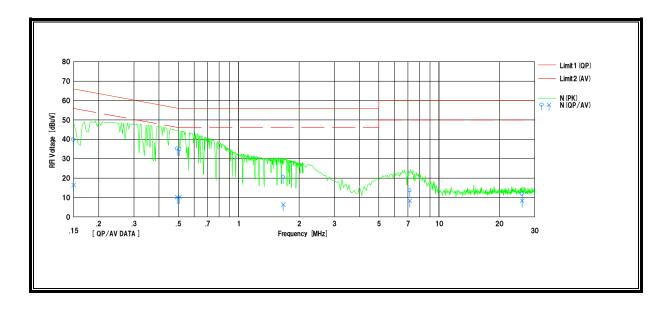
ANSI C63.4

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			DA	TA	OF (CON	IDU(CTE	d Ei	MISS	SIO	N TEST
										UL Jap	an,Inc.	Shonan EMC Lab. No.3 Shielded Room Date : 2013/03/31
Compan Kind of N Model N Serial No Remarks	ĚUT lo. o.	: Bl : B1	MK Corp uetooth T401 00190F	Module	•			Pow	le er No. er ip./Hun	ni.	: 331 : DC	nsmitting, DH5, 2402MHz HEOO44-SH 3.3V (DC supply:AC120V/60Hz) deg.C / 33%RH
Limit1 : Limit2 : << QP/	FCC 1	5C (15.	207) Q 207) A	P V				Eng	ineer		: Ker	nichi Adachi
No. [1	Freq	Read <qp> [dBuV]</qp>	<av> [d Bu V]</av>	C.Fac [dB]	Res <qp> [dBuV]</qp>	<av> [dBuV]</av>	Lin <qp> [dBuV]</qp>	<av> [d Bu V]</av>	<qp> [dB]</qp>	gin <av> [dB]</av>	Ph ase	Comment
2 3 4 5 6 2 7 8 9 10 11	0.15000 0.49299 0.50782 1.66803 7.15179 6.00000 0.15000 0.49299 0.50782 1.69558 6.11729 6.00000	27.0 22.4 22.1 7.7 0.5 -2.0 27.0 22.3 22.1 11.3 -0.9 -2.0	3.7 -2.6 -2.5 -6.4 -4.7 -5.5 -2.6 -2.6 -2.6 -5.5 -5.5 -5.5 -5.5	12.7 12.7 12.8 13.0 13.8 12.7 12.7 12.7 12.8 13.0 13.8	39,7 35,1 34,8 20,5 511,8 39,7 35,0 34,8 24,1 12,1 11,8	16.4 10.1 10.2 6.4 8.3 16.4 10.1 7.3 7.5 8.3	66.0 56.1 55.0 60.0 66.0 56.1 56.0 56.0 60.0 60.0	560 46.1 46.0 50.0 50.0 56.0 46.1 46.0 50.0 50.0 50.0	26.3 21.0 21.2 35.5 48.2 26.3 21.1 21.2 31.9 47.9 48.2	39.6 36.0 35.8 39.6 41.7 39.6 36.0 36.9 38.7 42.5 41.7	N N N L1 L1 L1 L1 L1	
	lation: SLS-0		[dBuV]=Rea	ding[d	lBuV]⊦	-C.Fac	(LISN	+Cabl	e+AT	Г)[dВ	9]

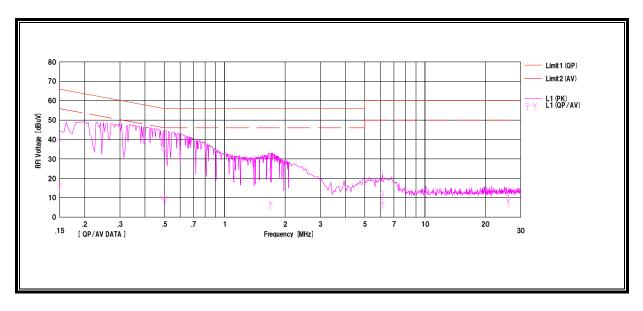
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LINE 1 RESULTS



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LINE 2 RESULTS



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