

FCC CERTIFICATION RADIO MEASUREMENT TECHNICAL REPORT

On Model Name: Bluetooth Module

Model Number: BC04-191

Trademark : ZBA

FCC ID : VMTZBA-BT44

Prepared for ZBA, Inc.

According to FCC Part 15 (2007), Subpart C

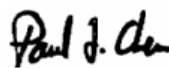
Test Report #: ZBA-0708-0717SH-FCC

Prepared by: Chris Huang

Reviewed by: Harry Zhao

QC Manager: Paul Chen

Test Report Released by:



Paul Chen

2007, October 23

Date

Test Location

Tests performed in a Certified ANSI Semi-Anechoic Chamber and Shielded Room performed testing.

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Accreditation Bodies

The report is prepared by EMC Compliance Management Group, which is a fully accredited Test Laboratory for ITE, ISM and Telecommunications Products.

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Opinions and Interpretations

This test report relates to the abovementioned equipment under test (EUT). Without the permission of EMC Compliance Management Group Test Lab this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products. The manufacturer has sole responsibility of continued compliance of the device.

Statement of Measurement Uncertainty

The data and results referenced in the document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error. Furthermore, component and process variability of devices similar to that tested may result in additional deviation.

Administrative Data

Test Sample : Bluetooth Module

Model Number : BC04-191

Trade Mark : ZBA

Date Tested : 2007, August 31 / 2007, September 18 / 2007, October 18

*Applicant : ZBA, Inc.
94 old camplain Rd Hillsborough NJ 08844*

Telephone : 908-359-2070

*Manufacturer : Chongqing Jinou Science and Technology Development Co., Ltd.
Guigu City Villa 12-2-101, huanxuan branch 108# Yuzhou Road, Hi-tech Development zone, Chongqing 400041, P.R.China*

Telephone : 86-23-68798999

Fax : 86-23-68889515

EUT Description

ZBA, Inc. Model number BC04-191(referred to as the EUT in this test report) is a Bluetooth Module.

*We tested the EUT with two kinds of test jigs:
One of the test jig named: JO-0205-1-1, uses USB port to power and communicate.*

The other test jig named: JO-0208-1-5, uses USB port to power and RS232 port to communicate.

And, for the test jigs, the data and power connector is a little different.

Both of the two kinds of test jigs are tested. For RF test items, only one was recorded.

Antenna Statement

The Bluetooth module has no antenna connector. It has it's integrate PCB antenna.

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Prepared for ZBA, Inc.

Prepared by EMC Compliance Management Group

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Test Summary

The Electromagnetic Compatibility requirements on BC04-191 for this test are stated below. All results listed in this report relate exclusively to this above-mentioned model as the Equipment Under Test. This report confers no approval or endorsement upon any other component, host or subsystem used in the test set-up.

EMC Test Items			
<i>Reference FCC Part 15 (2007), Subpart C</i>			
Specification	Description	Test Results	Remark
<i>FCC Part 15.203</i>	<i>Antenna Requirement</i>	<i>Compliance</i>	<i>See the antenna statement.</i>
<i>FCC Part 15.205</i>	<i>Restricted Band of Operation</i>	<i>Compliance</i>	<i>Refer to Attachment 1</i>
<i>FCC Part 15.209</i>	<i>Radiated Emission Limits</i>	<i>Compliance</i>	<i>Attachment 1</i>
<i>FCC Part 1.1307(b)(1) & 2.1093</i>	<i>RF Exposure</i>	<i>Compliance</i>	<i>Attachment 2</i>
<i>FCC Part 15.207</i>	<i>Conducted Limits</i>	<i>Compliance</i>	<i>Attachment 3</i>
<i>FCC Part 15.247(a)</i>	<i>Bandwidth</i>	<i>Compliance</i>	<i>Attachment 4</i>
<i>FCC Part 15.247 (b) (2)</i>	<i>Maximum Peak Power</i>	<i>Compliance</i>	<i>Attachment 5</i>
<i>FCC Part 15.247(d)</i>	<i>Band Edge</i>	<i>Compliance</i>	<i>Attachment 6</i>
<i>FCC Part 15.247(a) (1) (iii)</i>	<i>Number of Hopping Channels</i>	<i>Compliance</i>	<i>Attachment 7</i>
<i>FCC Part 15.247(a) (1)</i>	<i>Hopping Channel Separation</i>	<i>Compliance</i>	<i>Attachment 8</i>
<i>FCC Part 15.247(a) (1) (iii)</i>	<i>Time of Occupying</i>	<i>Compliance</i>	<i>Attachment 9</i>

Test Mode Justification

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

EUT Exercise Software

Software “CSR Bluesuite” was used in during the test.

Equipment Modification

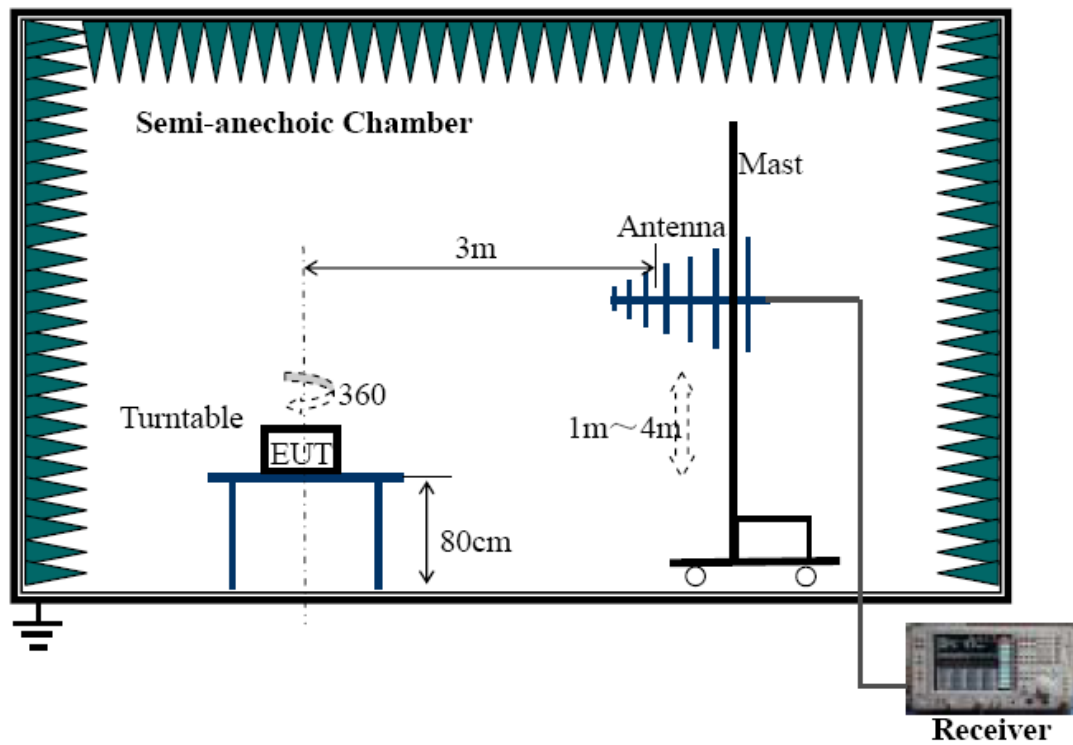
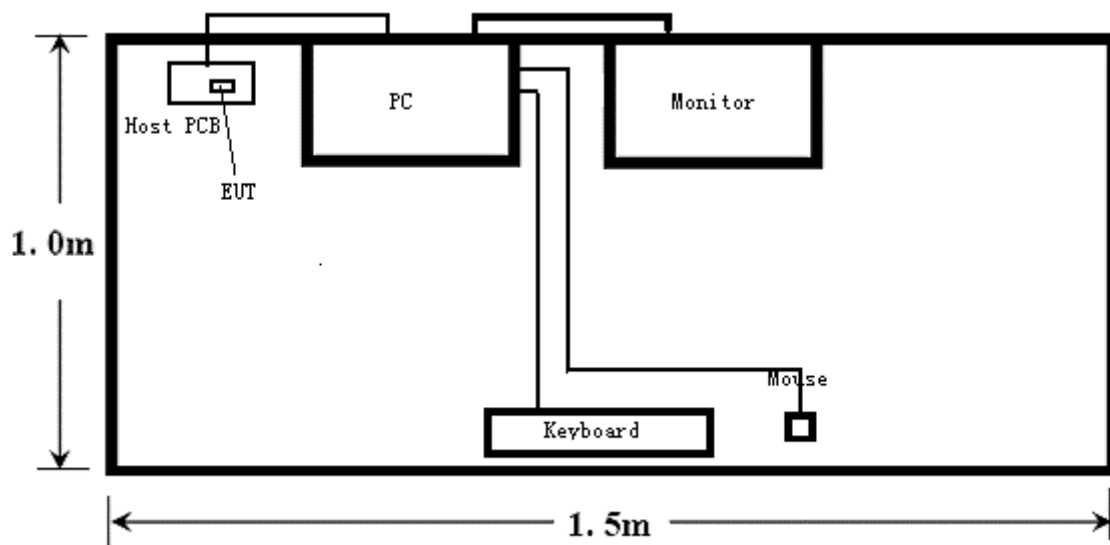
Any modifications installed previous to testing by ZBA, Inc. will be incorporated in each production model sold or leased in United States.

There were no modifications installed by EMC Compliance Management Group (China) test personnel.

Test System Details

EUT					
Model Number:	BC04-191				
Trademark::	ZBA				
Serial Number:	Engineering Sample				
Input Voltage:	120V~ 60Hz at AC port				
Description:	Bluetooth Module				
Manufacturer:	Chongqing Jinou Science and Technology Development Co., Ltd.				
Support Equipment					
Description	Model Number	Serial Number	Manufacturer	Power Cable Description (Meters)	
Host PC	8138	3399	Lenovo (IBM)	2.0m Unshielded	
Monitor	L170P	L434402	Lenovo (IBM)	1.8m Unshielded	
Mouse	M028UO	23-042928	Lenovo (IBM)	N/A	
Keyboard	SK-8815	11531572	Lenovo (IBM)	N/A	
Cable Description					
Description	From	To	Length	Ferrite	Shielded
VGA Cable	PC	Monitor	2.0m	Y*2	Y
Mouse Cable	PC	Mouse	1.9m	N	N
Keyboard Cable	PC	Mouse	1.8m	N	N
RS232 Cable	PC	EUT	0.5m	N	N
USB Cable	PC	EUT	0.15m	N	N

Configuration of Tested System



ATTACHMENT 1 – Radiated Spurious Emissions

CLIENT:	ZBA, Inc.	TEST STANDARD:	FCC Part 15.209 FCC Part 15.205
MODEL NUMBER:	BC04-191	PRODUCT:	Bluetooth Module
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	Grounding through USB
TESTED BY:	Allen Xia	DATE OF TEST:	2007, September18 & October 18
SETUP METHOD:	ANSI C63.4 : 2003		
TEST PROCEDURE:	<p>a. The EUT was placed on a rotatable table with 0.8 meters above ground.</p> <p>b. The EUT was set 3 meters from the interference-receiving antenna, which was mounted on the top of a variable height antenna tower.</p> <p>c. The antenna was varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna were set to make measurement.</p> <p>d. For each suspected emission the EUT was arranged to its worst case and then change the antenna tower height (from 1m to 4m) and turn table (from 0 degree to 360 degree) to find the maximum reading.</p> <p>e. If the emission level of the EUT in peak mode was 20 dB lower than the specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be tested using the quasi-peak method in about six maximal points and the results will be reported.</p> <p>f. Broadband antenna (Calibrated antenna) was used as receiving antenna below 1000MHz. Horn antenna were used as receiving antenna above 1000MHz.</p> <p>g. The bandwidth is 120 kHz below 1000 MHz, and 1 MHz above 1000 MHz</p> <p>Explanation of the Correction Factor are given as follows:</p> $FS = RA + AF + CF - AG - DC$ <p>Where: FS = Field Strength</p> <p>RA = Receiver Amplitude</p> <p>AF = Antenna Factor</p> <p>CF = Cable Attenuation Factor</p> <p>AG = Amplifier Gain</p> <p>DC = Duty Cycle Correction Factor</p>		

CONTINUE ON THE NEXT PAGE...

TESTED RANGE:	30MHz to 24,000MHz
TEST VOLTAGE:	120V / 60Hz
TEST STATUS:	Keep Tx in continuous transmission mode, modulated
RESULTS:	<p>The EUT meets the requirements of field strength test.</p> <p>The test results relate only to the equipment under test provided by client.</p>
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB

*For Test Jig JO-0205-1-1
For Channel 0
Test Results (30MHz~1GHz)*

<i>Horizontal</i>								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	40.56	12.7	0.4	24.8	40.0	-15.2	125	100
2	204.00	8.6	1.5	30.8	43.5	-12.7	207	100
3	685.97	18.8	3.0	36.5	46.0	-9.5	219	288
<i>Vertical</i>								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	38.79	13.5	0.4	31.4	40.0	-8.6	32	100
2	246.98	11.6	1.5	32.4	46.0	-13.6	200	200
3	448.71	16.5	2.0	35.8	46.0	-10.2	276	100
Note: All readings are quasi-peak unless stated otherwise, using a QP bandwidth of 120kHz, with a 30 ms sweep time. A video filter was not used.								

For Channel 0
Test Results (1GHz~24GHz)

<i>Horizontal</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	2886.8	27.8	7.6	34.5	54.0	-19.5	42.1	74.0	-31.9
2	4804.6	33.7	9.3	43.7	54.0	-10.3	50.6	74.0	-23.4
3	5320.4	34.0	9.8	37.6	54.0	-16.4	45.0	74.0	-29.0
4	7206.7	36.3	10.1	43.9	54.0	-10.1	51.8	74.0	-22.2
5	8964.6	37.7	10.9	41.1	54.0	-12.9	52.2	74.0	-21.8
6	9609.2	37.9	11.5	41.9	54.0	-12.1	51.1	74.0	-22.9
<i>Vertical</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	2886.8	27.8	7.6	35.2	54.0	-18.8	43.0	74.0	-31.0
2	4804.6	33.7	9.3	44.1	54.0	-9.9	52.4	74.0	-21.6
3	5320.4	34.0	9.8	39.7	54.0	-14.3	47.1	74.0	-26.9
4	7206.7	36.3	10.1	42.8	54.0	-11.2	51.3	74.0	-22.7
5	8964.6	37.7	10.9	42.2	54.0	-11.8	49.6	74.0	-24.4
6	9609.2	37.9	11.5	42.8	54.0	-11.2	50.8	74.0	-23.2
Note: All readings are average and peak unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.									

For Channel 39
Test Results (30MHz~1GHz)

<i>Horizontal</i>								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	85.48	8.0	0.7	28.6	40.0	-11.4	118	200
2	580.09	18.5	2.5	30.7	46.0	-15.3	234	187
3	887.65	20.3	3.7	33.8	46.0	-12.2	319	200
<i>Vertical</i>								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	38.77	13.4	0.4	31.8	40.0	-8.2	209	108
2	376.54	14.8	1.7	32.1	46.0	-13.9	187	119
3	776.59	19.6	3.5	32.7	46.0	-13.3	201	118
Note: All readings are quasi-peak unless stated otherwise, using a QP bandwidth of 120kHz, with a 30 ms sweep time. A video filter was not used.								

For Channel 39
Test Results (1GHz~24GHz)

<i>Horizontal</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	1370.7	25.2	6.2	33.2	54.0	-20.8	40.6	74.0	-33.4
2	4520.3	32.4	9.3	35.6	54.0	-18.4	45.0	74.0	-29
3	4882.1	33.9	9.5	44.3	54.0	-10.1	55.3	74.0	-20.8
4	7323.6	36.6	10.3	44.7	54.0	-9.2	55.9	74.0	-20.0
5	8964.6	37.7	10.9	41.4	54.0	-12.6	52.6	74.0	-21.4
6	9764.9	38.6	11.8	43.1	54.0	-10.9	54.8	74.0	-19.2
<i>Vertical</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	1370.7	25.2	6.2	34.5	54.0	-19.5	42.6	74.0	-31.4
2	4520.3	32.4	9.3	36.6	54.0	-17.4	45.8	74.0	-28.2
3	4882.1	33.9	9.5	45.1	54.0	-8.9	56.1	74.0	-17.9
4	7323.6	36.6	10.3	45.7	54.0	-8.3	57.0	74.0	-17.0
5	8964.6	37.7	10.9	41.7	54.0	-12.3	50.4	74.0	-23.6
6	9764.9	38.6	11.8	44.8	54.0	-9.2	55.2	74.0	-18.8
Note: All readings are average and peak unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.									

For Channel 78
Test Results (30MHz~1GHz)

<i>Horizontal</i>								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	82.87	7.3	0.8	29.6	40.0	-10.4	211	200
2	204.77	8.6	1.5	31.6	43.5	-11.9	305	100
3	814.65	19.9	3.6	33.7	46.0	-12.3	123	178
<i>Vertical</i>								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	41.67	12.5	0.4	31.1	40.0	-8.9	127	122
2	287.66	12.6	1.5	30.9	46.0	-15.1	198	100
3	476.98	16.9	2.0	33.5	46.0	-12.5	201	100
Note: All readings are quasi-peak unless stated otherwise, using a QP bandwidth of 120kHz, with a 30 ms sweep time. A video filter was not used.								

For Channel 78
Test Results (1GHz~24GHz)

<i>Horizontal</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	1778.3	25.4	6.4	32.5	54.0	-21.5	39.8	74.0	-34.2
2	3498.6	31.4	8.0	36.6	54.0	-17.4	45.1	74.0	-28.9
3	4960.4	34.2	9.7	45.8	54.0	-8.2	55.9	74.0	-18.1
4	7441.0	36.9	10.5	45.3	54.0	-8.7	55.6	74.0	-18.4
5	9921.3	38.4	11.8	46.9	54.0	-7.1	57.0	74.0	-17.0
6	10113.7	37.8	12.0	40.7	54.0	-13.3	50.0	74.0	-24.0
<i>Vertical</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	1778.3	25.4	6.4	33.7	54.0	-20.3	41.5	74.0	-32.5
2	3498.6	31.4	8.0	37.4	54.0	-16.6	46.9	74.0	-27.1
3	4960.4	34.2	9.7	46.5	54.0	-7.5	56.7	74.0	-17.3
4	7441.0	36.9	10.5	46.4	54.0	-7.6	56.5	74.0	-17.5
5	9921.3	38.4	11.8	46.8	54.0	-7.2	57.1	74.0	-16.9
6	10113.7	37.8	12.0	42.2	54.0	-11.8	51.5	74.0	-22.5
Note: All readings are average and peak unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.									

*For Test Jig JO-0208-1-5
For Channel 0
Test Results (30MHz~1GHz)*

<i>Horizontal</i>								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	200.00	8.6	1.5	32.0	43.5	-11.5	100	108
2	457.09	16.5	2.0	34.5	46.0	-11.5	288	204
3	687.09	18.9	2.9	35.9	46.0	-10.1	37	200
<i>Vertical</i>								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	33.87	16.8	0.3	32.7	40.0	-7.3	309	120
2	600.98	18.5	2.5	30.7	46.0	-15.3	28	100
3	804.39	19.8	3.6	31.8	46.0	-14.2	209	104
Note: All readings are quasi-peak unless stated otherwise, using a QP bandwidth of 120kHz, with a 30 ms sweep time. A video filter was not used.								

For Channel 0
Test Results (1GHz~24GHz)

<i>Horizontal</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	2886.8	27.8	7.6	31.7	54.0	-22.3	38.7	74.0	-35.3
2	4804.6	33.7	9.3	44.5	54.0	-9.5	51.5	74.0	-22.5
3	5320.4	34.0	9.8	34.8	54.0	-19.2	43.2	74.0	-30.8
4	7206.7	36.3	10.1	44.6	54.0	-9.4	52.3	74.0	-21.7
5	8964.6	37.7	10.9	39.2	54.0	-14.8	48.9	74.0	-25.1
6	9609.2	37.9	11.5	43.1	54.0	-10.9	53.5	74.0	-20.5
<i>Vertical</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	2886.8	27.8	7.6	32.5	54.0	-21.5	40.3	74.0	-33.7
2	4804.6	33.7	9.3	45.5	54.0	-8.5	52.4	74.0	-21.6
3	5320.4	34.0	9.8	36.4	54.0	-17.6	44.8	74.0	-29.2
4	7206.7	36.3	10.1	46.0	54.0	-8.0	53.8	74.0	-20.2
5	8964.6	37.7	10.9	41.8	54.0	-12.2	50.8	74.0	-23.2
6	9609.2	37.9	11.5	43.0	54.0	-11.0	53.4	74.0	-20.6
Note: All readings are average and peak unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.									

For Channel 39
Test Results (30MHz~1GHz)

<i>Horizontal</i>								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	140.87	11.0	1.0	26.8	43.5	-16.7	290	177
2	398.76	15.4	1.8	27.5	46.0	-18.5	209	189
3	512.84	17.8	2.3	31.1	46.0	-14.9	19	129
<i>Vertical</i>								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	56.87	6.2	0.5	29.2	40.0	-10.8	209	108
2	609.98	18.7	2.5	31.1	46.0	-14.9	187	119
3	772.33	19.7	3.5	33.2	46.0	-12.8	201	118
Note: All readings are quasi-peak unless stated otherwise, using a QP bandwidth of 120kHz, with a 30 ms sweep time. A video filter was not used.								

For Channel 39
Test Results (1GHz~24GHz)

<i>Horizontal</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	1370.7	25.2	6.2	33.6	54.0	-20.4	41.2	74.0	-32.8
2	4520.3	32.4	9.3	36.4	54.0	-17.6	44.8	74.0	-29.2
3	4882.1	33.9	9.5	44.5	54.0	-10.1	55.8	74.0	-20.8
4	7323.6	36.6	10.3	44.6	54.0	-9.2	55.8	74.0	-20.0
5	8964.6	37.7	10.9	41.7	54.0	-12.3	48.7	74.0	-25.3
6	9764.9	38.6	11.8	42.9	54.0	-11.1	53.7	74.0	-20.3
<i>Vertical</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	1370.7	25.2	6.2	34.2	54.0	-19.8	42.3	74.0	-31.7
2	4520.3	32.4	9.3	36.8	54.0	-17.2	45.0	74.0	-29.0
3	4882.1	33.9	9.5	46.1	54.0	-7.9	56.9	74.0	-17.1
4	7323.6	36.6	10.3	45.9	54.0	-8.1	56.7	74.0	-17.3
5	8964.6	37.7	10.9	41.8	54.0	-12.2	49.8	74.0	-24.2
6	9764.9	38.6	11.8	43.1	54.0	-10.9	55.6	74.0	-18.4
Note: All readings are average and peak unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.									

For Channel 78
Test Results (30MHz~1GHz)

<i>Horizontal</i>								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	78.88	7.0	0.8	29.8	40.0	-10.2	143	212
2	287.65	12.6	1.5	27.8	46.0	-18.2	355	187
3	703.45	18.8	3.0	31.1	46.0	-14.9	24	132
<i>Vertical</i>								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	40.21	12.7	0.4	30.0	40.0	-10.0	176	158
2	199.67	8.6	1.5	28.7	43.5	-14.8	123	198
3	409.22	15.6	1.8	27.9	46.0	-18.1	223	100
Note: All readings are quasi-peak unless stated otherwise, using a QP bandwidth of 120kHz, with a 30 ms sweep time. A video filter was not used.								

For Channel 78
Test Results (1GHz~24GHz)

<i>Horizontal</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	1778.3	25.4	6.4	31.1	54.0	-22.9	38.7	74.0	-35.3
2	3498.6	31.4	8.0	35.7	54.0	-18.3	44.3	74.0	-29.7
3	4960.4	34.2	9.7	45.8	54.0	-8.2	56.5	74.0	-17.3
4	7440.7	36.9	10.5	46.0	54.0	-8.0	56.7	74.0	-17.5
5	9920.8	38.4	11.8	44.4	54.0	-9.6	53.2	74.0	-20.8
6	10113.7	37.8	12.0	41.0	54.0	-13.0	49.7	74.0	-24.3
<i>Vertical</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	1778.3	25.4	6.4	32.6	54.0	-21.4	40.5	74.0	-33.5
2	3498.6	31.4	8.0	39.7	54.0	-14.3	47.8	74.0	-26.2
3	4960.4	34.2	9.7	45.7	54.0	-8.3	55.9	74.0	-18.1
4	7440.7	36.9	10.5	45.4	54.0	-8.6	55.6	74.0	-18.4
5	9920.8	38.4	11.8	42.9	54.0	-11.1	53.8	74.0	-20.2
6	10113.7	37.8	12.0	41.6	54.0	-12.4	50.6	74.0	-23.4
Note: All readings are average and peak unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.									

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4440A	US45303119	03/20/07	03/19/08
Test Receiver	R&S	ESIB26	1088.7490.26	06/20/07	06/19/08
Preamplifier	HP	CC4494	3520	06/20/07	06/19/08
Bilog Antenna	Chase	HL562	4041.3000.02	06/20/07	06/19/08
Horn Antenna	R&S	HF906	4044.4507.02	06/20/07	06/19/08
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY: Allen dia
ENGINEER

REVIEWED BY: Hayden
SENIOR ENGINEER

ATTACHMENT 2 – RF EXPOSURE CALCULATION

CLIENT:	ZBA, Inc.	TEST STANDARD:	FCC 1.1307(b)(1) FCC 2.1093																																																																	
MODEL NUMBERS:	BC04-191	PRODUCT:	Bluetooth Module																																																																	
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment																																																																	
TEMPERATURE:	21°C	HUMIDITY:	53%RH																																																																	
ATM PRESSURE:	101.6 kPa	GROUNDING:	No Grounding																																																																	
TESTED BY:	Allen Xia	DATE OF TEST:	2007, October 18																																																																	
SETUP METHOD:	N/A																																																																			
TEST PROCEDURE:	<p>According to § 15.247(i), 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. See § 1.1307(b)(1) of this chapter.</p> <p>According to § 1.1310 and § 2.1093 RF exposure is calculated.</p> <p>Limits for General Population/Uncontrolled Exposure</p> <p style="text-align: center;">TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)</p> <table><tr><th>Frequency range (MHz)</th><th>Electric field strength (V/m)</th><th>Magnetic field strength (A/m)</th><th>Power density (mW/cm²)</th><th>Averaging time (minutes)</th></tr><tr><td colspan="5">(A) Limits for Occupational/Controlled Exposures</td></tr><tr><td>0.3–3.0</td><td>614</td><td>1.63</td><td>*(100)</td><td>6</td></tr><tr><td>3.0–30</td><td>1842/f</td><td>4.89/f</td><td>*(900/F²)</td><td>6</td></tr><tr><td>30–300</td><td>61.4</td><td>0.163</td><td>1.0</td><td>6</td></tr><tr><td>300–1500</td><td></td><td></td><td>f/300</td><td>6</td></tr><tr><td>1500–100,000</td><td></td><td></td><td>5</td><td>6</td></tr><tr><td colspan="5">(B) Limits for General Population/Uncontrolled Exposure</td></tr><tr><td>0.3–1.34</td><td>614</td><td>1.63</td><td>*(100)</td><td>30</td></tr><tr><td>1.34–30</td><td>824/f</td><td>2.19/f</td><td>*(180/F²)</td><td>30</td></tr><tr><td>30–300</td><td>27.5</td><td>0.073</td><td>0.2</td><td>30</td></tr><tr><td>300–1500</td><td></td><td></td><td>f/1500</td><td>30</td></tr><tr><td>1500–100,000</td><td></td><td></td><td>1.0</td><td>30</td></tr></table> <p>f = frequency in MHz * = Plane-wave equivalent power density</p> <p>NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.</p> <p>NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.</p>			Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)	(A) Limits for Occupational/Controlled Exposures					0.3–3.0	614	1.63	*(100)	6	3.0–30	1842/f	4.89/f	*(900/F ²)	6	30–300	61.4	0.163	1.0	6	300–1500			f/300	6	1500–100,000			5	6	(B) Limits for General Population/Uncontrolled Exposure					0.3–1.34	614	1.63	*(100)	30	1.34–30	824/f	2.19/f	*(180/F ²)	30	30–300	27.5	0.073	0.2	30	300–1500			f/1500	30	1500–100,000			1.0	30
Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)																																																																
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300–1500			f/1500	30																																																																
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MPE PREDICTION:

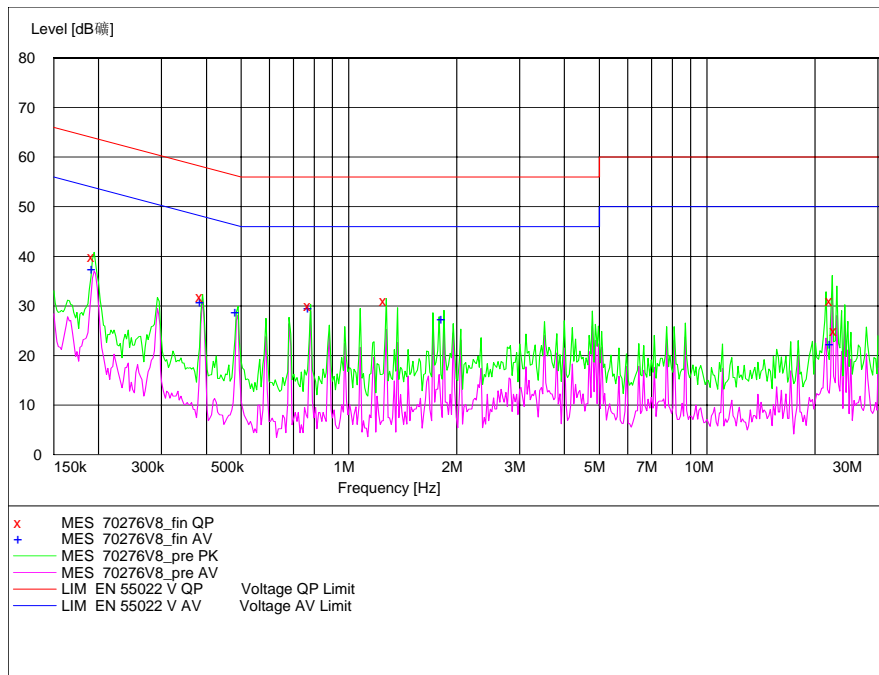
The maximum power of the EUT is 4.11 dBm= 2.58mW is less than low threshold power of TCB exclusion list.

So no RF exposure evaluation is required.

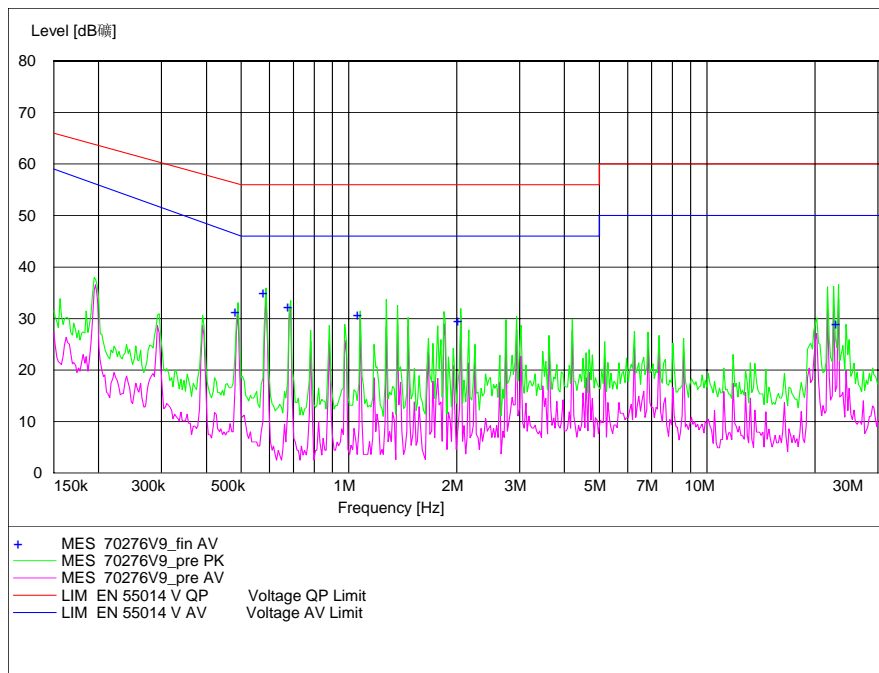
ATTACHMENT 3 – CONDUCTED EMISSION TEST RESULTS

CLIENT:	ZBA, Inc.	TEST STANDARD:	FCC 15.107/207
MODEL NUMBER:	BC04-191	PRODUCT:	Bluetooth Module
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	23°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	Grounding through USB
TESTED BY:	Allen Xia	DATE OF TEST:	2007, September 18
SETUP METHOD:	ANSI C63.4 : 2003, FCC 15.107/207		
TEST PROCEDURE:	<p>a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.</p> <p>b. Connect EUT to the power mains through a line impedance stabilization network (LISN)</p> <p>c. The LISN provides 50ohm coupling impedance for the measuring instrument</p> <p>d. Both sides of AC line were checked for maximum conducted interference.</p> <p>e. The frequency range from 150KHz to 30MHz was searched.</p> <p>f. Set the test-receiver system to Peak Detect Function and Specified bandwidth.</p> <p>g. If the emission level of the EUT in peak mode was 20 dB lower than the specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be tested using the quasi-peak method in about six maximal points and the results will be reported.</p>		
TESTED RANGE:	0.15MHz-30MHz		
TEST VOLTAGE:	120V / 60Hz		
TEST STATUS:	Keep Tx in continuous transmission mode, modulated		
RESULTS:	<p>The EUT meets the requirements of test reference for Conducted Emissions on line N by 18.6 dB of Quasi-Peak detector and 11.0 dB of Average Detector.</p> <p>The test results relate only to the equipment under test provided by client.</p>		
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

For Model BC04-191



Line L Conducted Emission Graph



Line N Conducted Emission Graph

Line L (Hot Lead)								
Signal	Frequency (MHz)	Corrected QP Level (d)	Limits QP (dBuV)	Margin QP (dB)	Frequency (MHz)	Corrected AVE Level (dBuV)	Limits AVE (dBuV)	Margin AVE (dB)
1	0.194288	40.0	64.0	-23.9	0.194288	37.4	54.0	-16.6
2	0.389891	31.9	58.0	-26.1	0.389891	30.9	48.0	-17.1
3	0.782419	30.1	56.0	-25.9	0.782419	28.8	46.0	-17.2
4	1.274050	31.1	56.0	-24.9	1.274050	29.6	46.0	-16.4
5	22.373930	31.1	60.0	-28.9	22.373930	25.4	50.0	-24.6
6	23.051882	25.1	60.0	-34.9	23.051882	22.4	50.0	-27.6
Line N (Neutral Lead)								
Signal	Frequency (MHz)	Corrected QP Level (dBuV)	Limits QP (dBuV)	Margin QP (dB)	Frequency (MHz)	Corrected AVE Level (dBuV)	Limits AVE (dBuV)	Margin AVE (dB)
1	0.490156	34.9	56.0	-21.1	0.490156	31.4	46.0	-14.6
2	0.586299	37.4	56.0	-18.6	0.586299	35.0	46.0	-11.0
3	0.687482	35.7	56.0	-20.3	0.687482	32.3	46.0	-13.7
4	1.075780	33.9	56.0	-22.1	1.075780	30.7	46.0	-15.3
5	2.054057	32.6	56.0	-23.4	2.054057	29.6	46.0	-16.4
6	23.282401	33.0	60.0	-27.0	23.282401	29.0	50.0	-21.0
Note: All readings are using a bandwidth of 9 kHz, with a 30 ms sweep time. A video filter was not used.								

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
EMI Receiver	R&S	ESIB26	1088.7490.26	06/20/07	06/19/08
AMN	R&S	ENV4200	1107.2387.02	06/20/07	06/19/08
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

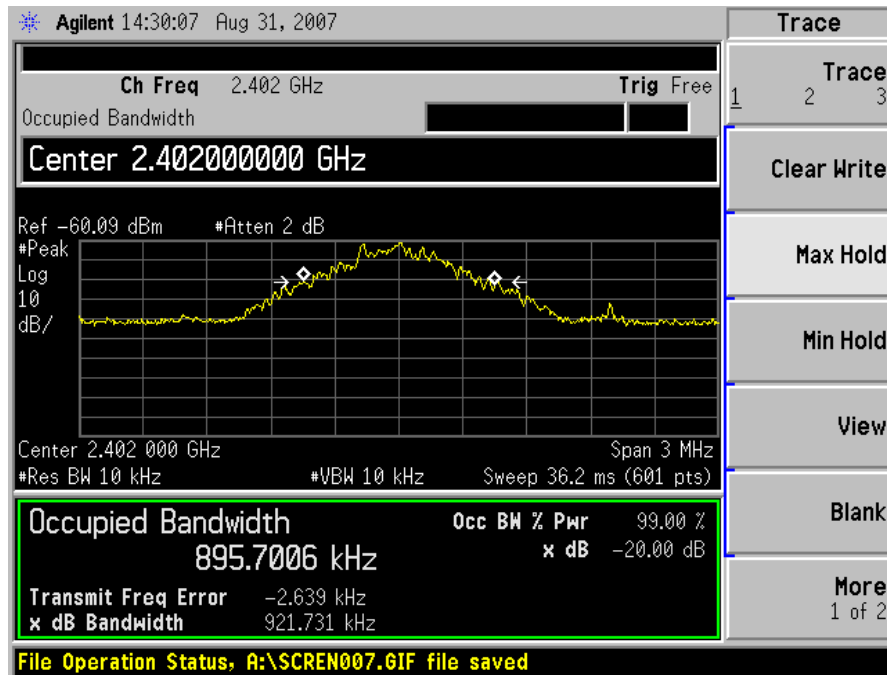
SIGNED BY: Allen dia
ENGINEER

REVIEWED BY: Hang zhuo
SENIOR ENGINEER

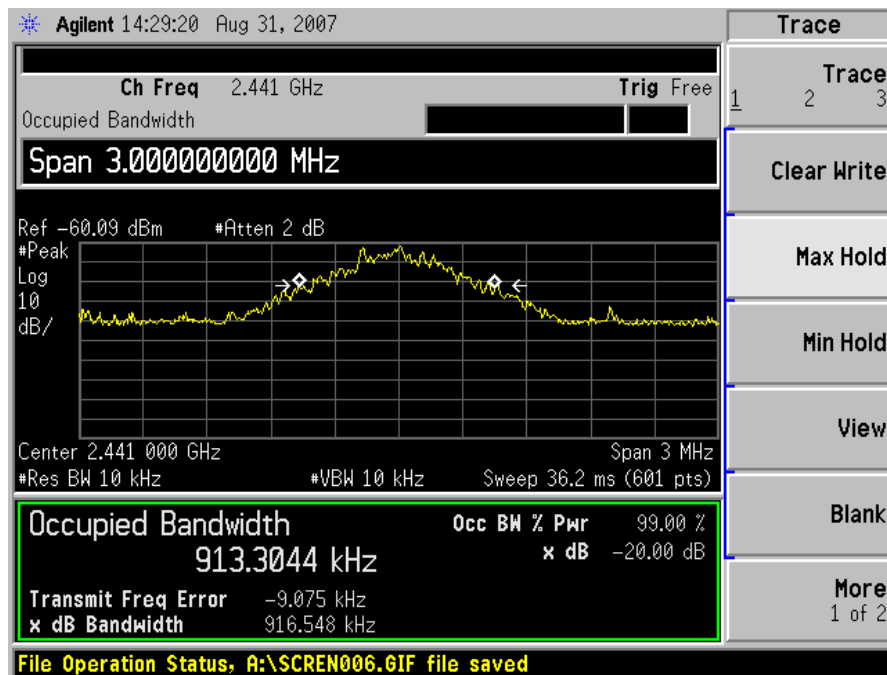
ATTACHMENT 4 – BANDWIDTH

CLIENT:	ZBA, Inc.	TEST STANDARD:	FCC Part 15.247 (a)
MODEL NUMBER:	BC04-191	PRODUCT:	Bluetooth Module
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	Grounding through USB
TESTED BY:	Allen Xia	DATE OF TEST:	2007, August 31 & October 18
SETUP METHOD:	ANSI C63.4 - 2003		
BANDWIDTH REQUIREMENT:	FCC 15.247 (a) (1) For frequency hopping system operating in the 2400-2483.5MHz, if the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.		
TEST PROCEDURE:	<p>Set the spectrum as follow:</p> <p>Span=approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channel;</p> <p>RBW=1% of the 20dB bandwidth; VBW\geq RBW; Sweep=Auto; Detector=Peak; Trace=Maxhold;</p> <p>Use the search peak function to set the marker to the peak of the emission;</p> <p>Use the delta-mark function to measure 20dB down to both sides of the emission;</p> <p>The 20dB BW is the delta reading between two 20dB down marker.</p>		
TEST VOLTAGE:	120V / 60Hz		
TEST STATUS:	Hopping at channel 0, channel 39, channel 78		
RESULTS:	The EUT meets the bandwidth requirement. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

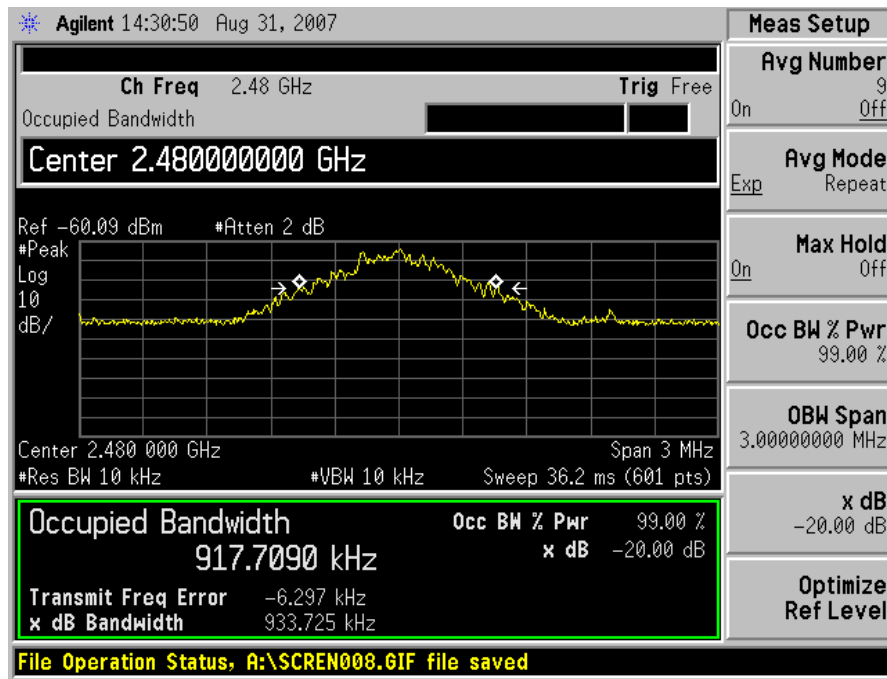
For standard mode of Model BC04-191



Channel 0



Channel 39



Channel 78

Test Result

Channel	Frequency	20dB Bandwidth
0	2402MHz	921.731kHz
39	2441MHz	916.548kHz
78	2480MHz	933.725kHz

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4440A	US45303119	03/20/07	03/19/08
Horn Antenna	R&S	HF906	4044.4507.02	06/20/07	06/19/08
Preamplifier	R&S	SCA-0118	SCA/AVL/1389	06/20/07	06/19/08
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

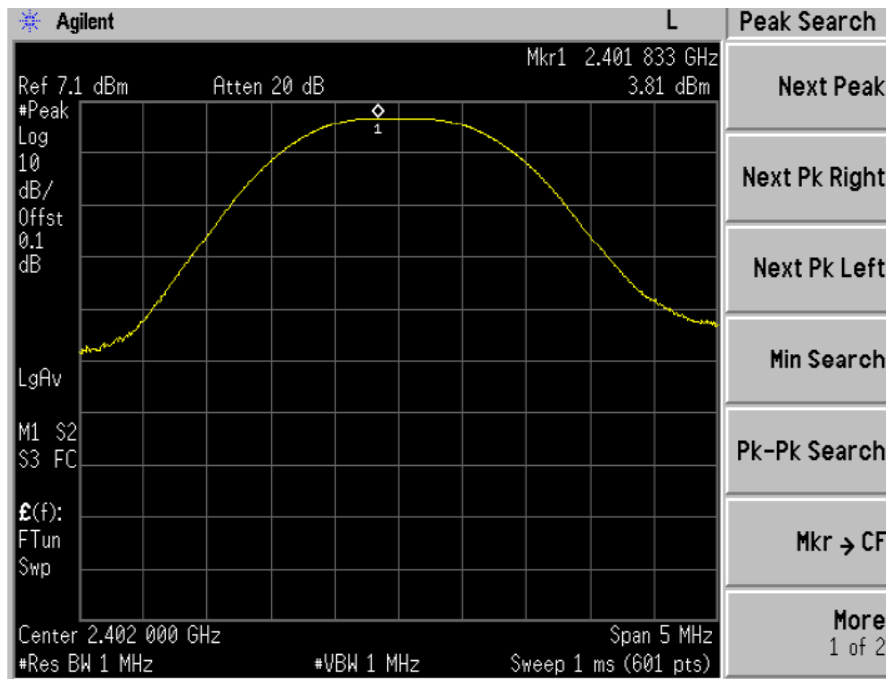
SIGNED BY: Allen dia
ENGINEER

REVIEWED BY: Hayden
SENIOR ENGINEER

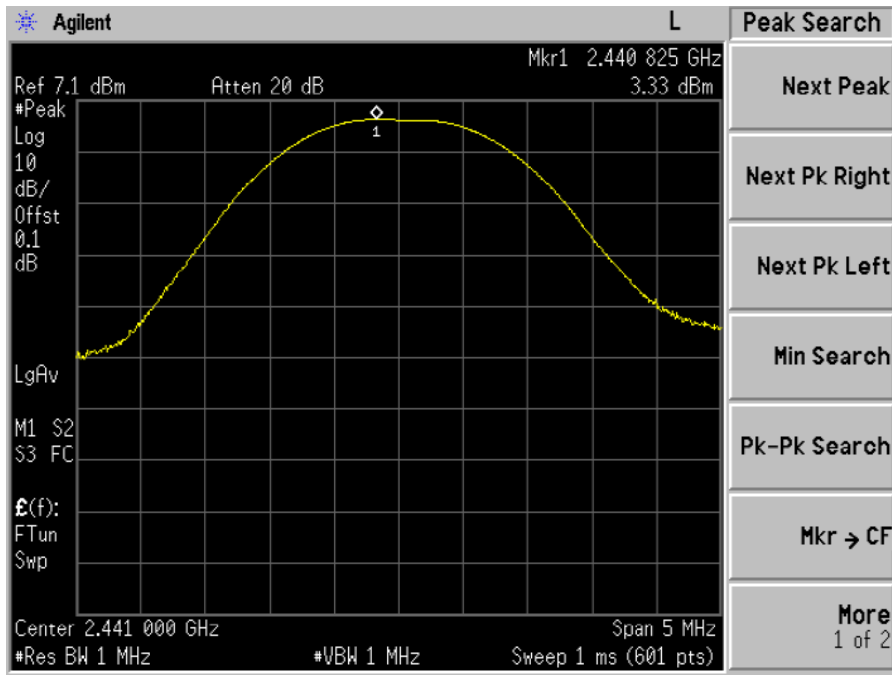
ATTACHMENT 5 – Maximum Peak Output Power Test

CLIENT:	ZBA, Inc.	TEST STANDARD:	FCC Part 15.247 (b) (2)
MODEL NUMBER:	BC04-191	PRODUCT:	Bluetooth Module
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	Grounding through USB
TESTED BY:	Allen Xia	DATE OF TEST:	2007, August 31 & October 18
SETUP METHOD:	ANSI C63.4 - 2003		
TEST REQUIREMENT:	FCC 15.247 (b) (2) For frequency hopping systems operating in the 2400-2483.5MHz band employing at least 75 non-overlapping hopping channels: 1 watt. For all other frequency hopping systems in the 2400-2483.5MHz band: 0.125 watts.		
TEST PROCEDURE:	<p>Connect the antenna port to the spectrum with a short cable and set the spectrum as follow:</p> <p>Span=5MHz, centered on a hopping channel; RBW=1MHz; VBW\geqRBW; Sweep=Auto; Detector=Peak; Trace=Maxhold;</p> <p>Allow the trace to stabilize and use the search peak function to set the marker to the peak of the emission.</p>		
TEST VOLTAGE:	120V / 60Hz		
TEST STATUS:	Hopping at channel 0, channel 39, channel 68		
RESULTS:	The EUT meets the maximum peak conducted output power requirement. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

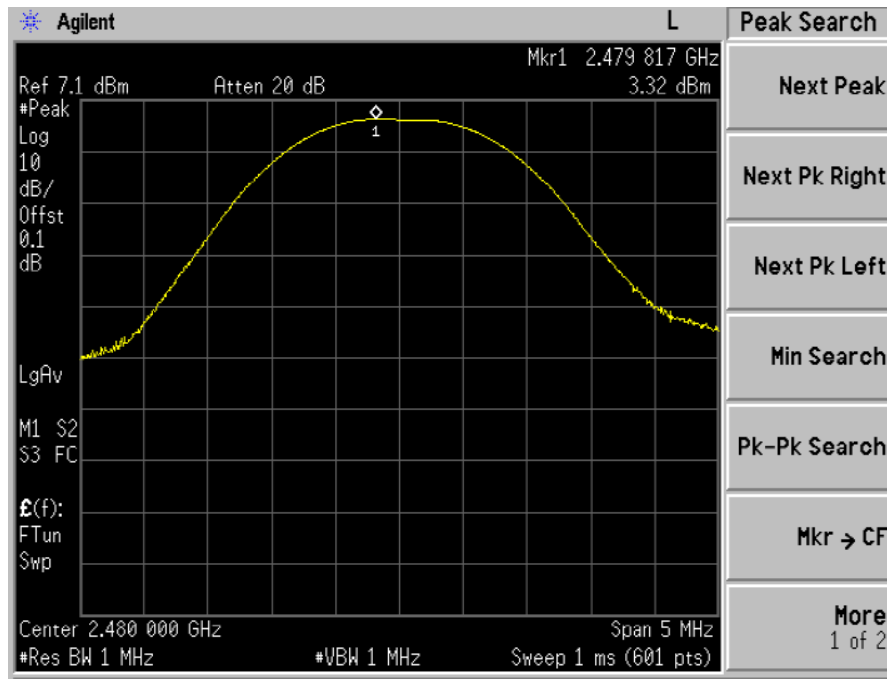
For standard mode of Model BC04-191



Channel 0



Channel 39



Channel 78

Test Result

Channel	Frequency (MHz)	Reading Level (dBm)	Cable loss(dB)	Level (dBm)	Limit(mw)	Result
1	2401	3.81	0.3	4.11	125 mW	Pass
39	2441	3.33	0.3	3.61		Pass
78	2480	3.32	0.3	3.62		Pass

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4440A	US45303119	03/20/07	03/19/08
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

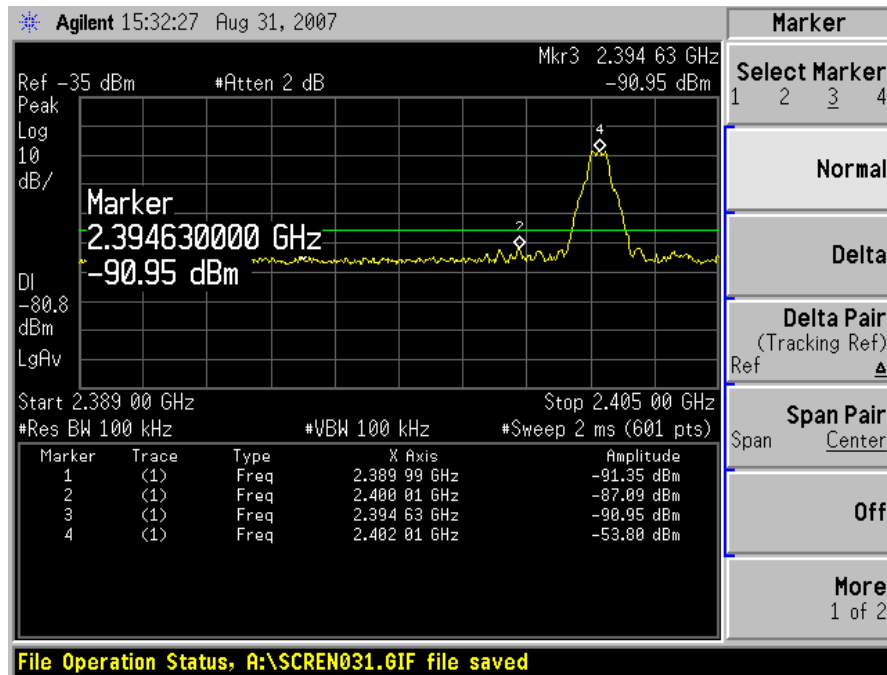
SIGNED BY: Allen dia
ENGINEER

REVIEWED BY: Hayden
SENIOR ENGINEER

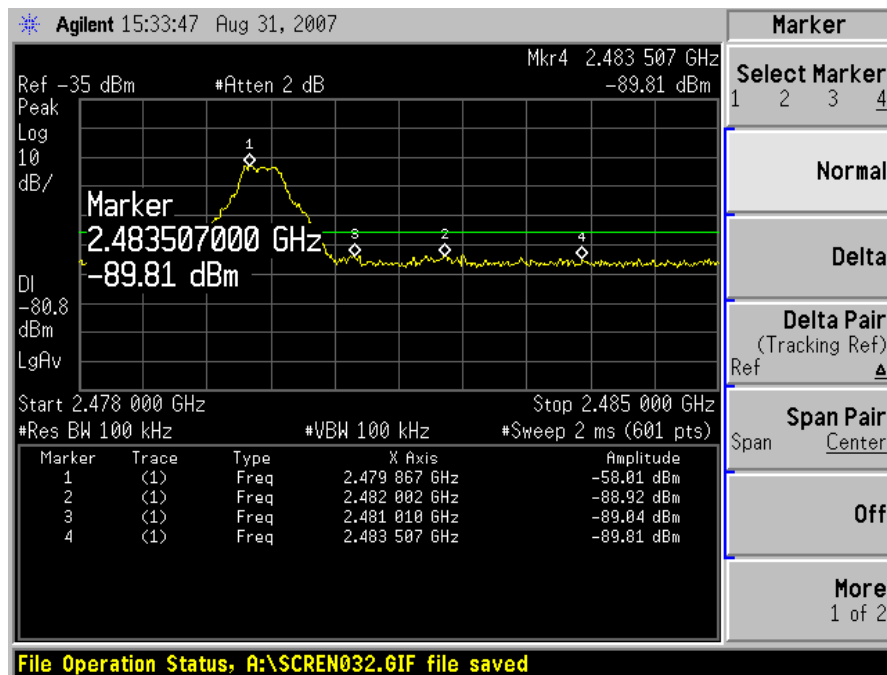
ATTACHMENT 6 – Band Edge Test

CLIENT:	ZBA, Inc.	TEST STANDARD:	FCC Part 15.247 (d)
MODEL NUMBERS:	BC04-191	PRODUCT:	Bluetooth Module
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	Grounding through USB
TESTED BY:	Allen Xia	DATE OF TEST:	2007, August 31 & October 18
SETUP METHOD:	ANSI C63.4 - 2003		
BANDEDGE REQUIREMENT:	FCC 15.247 (d) In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiators shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.		
TEST PROCEDURE:	<p>Set the spectrum as follow:</p> <p>Span=wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation.</p> <p>RBW=100kHz; VBW\geqRBW; Sweep=Auto; Detector=Peak; Trace=Maxhold;</p> <p>Allow the trace to stabilize and use the search peak function to set the marker to the peak of the useful emission, then use delta-mark function to mark the maximum emission outside of the band, record the delta level to see if it's more than 20dB.</p>		
TEST VOLTAGE:	120V / 60Hz		
TEST STATUS:	Hopping at channel 0, channel 78		
RESULTS:	The EUT meets band edge requirement. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

Model BC04-191



Channel 0



Channel 78

For test data in chamber
For Channel 0
Test Results

<i>Horizontal</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	2394.5	25.3	6.8	38.8	54.0	-15.2	58.5	74.0	-15.5
2	2400.0	25.4	6.8	40.7	54.0	-13.3	61.7	74.0	-12.3
3	2402.0	25.4	6.8	69.5	---	--	95.8	--	--
<i>Vertical</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	2394.5	25.3	6.8	38.4	54.0	-15.6	57.3	74.0	-16.7
2	2400.0	25.4	6.8	40.4	54.0	-13.6	60.9	74.0	-13.1
3	2402.0	25.4	6.8	70.2	---	--	96.2	--	--
Note: All readings are average and peak unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.									

For Channel 78
Test Results

<i>Horizontal</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	2480.0	26.1	7.0	69.2	---	--	94.9	--	--
2	2482.0	26.1	7.0	42.8	54.0	-11.2	63.0	74.0	-11.0
3	2483.5	26.1	7.0	42.5	54.0	-11.5	62.6	74.0	-11.4
<i>Vertical</i>									
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	2480.0	26.1	7.0	68.5	---	--	93.8	--	--
2	2482.0	26.1	7.0	42.6	54.0	-11.4	62.7	74.0	-11.3
3	2483.5	26.1	7.0	42.3	54.0	-11.7	62.5	74.0	-11.5
Note: All readings are average and peak unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.									

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4440A	US45303119	03/20/07	03/19/08
Horn Antenna	R&S	HF906	4044.4507.02	06/20/07	06/19/08
Preamplifier	R&S	SCA-0118	SCA/AVL/1389	06/20/07	06/19/08
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

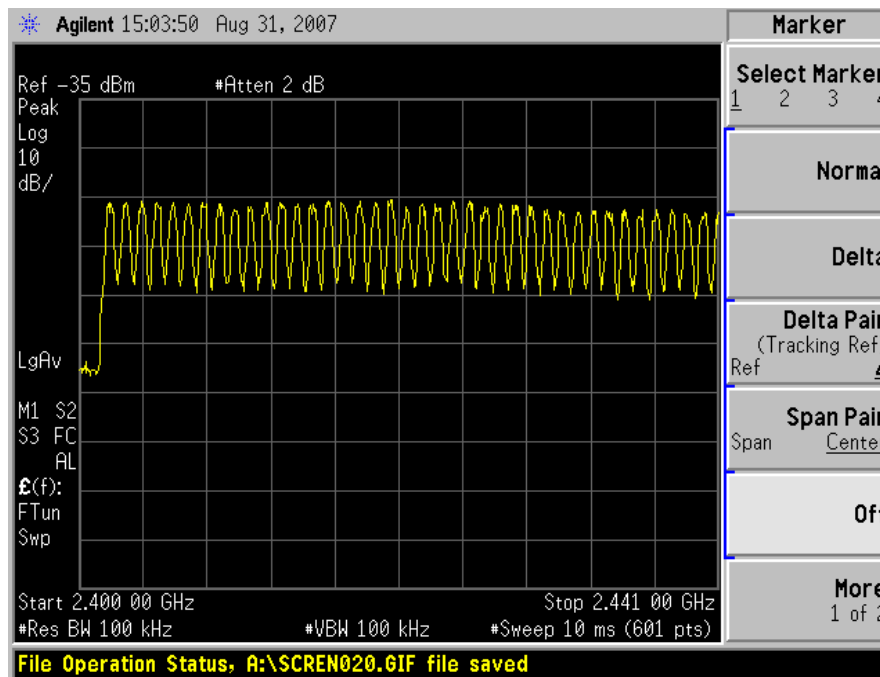
SIGNED BY: Allen dia
ENGINEER

REVIEWED BY: Hayden
SENIOR ENGINEER

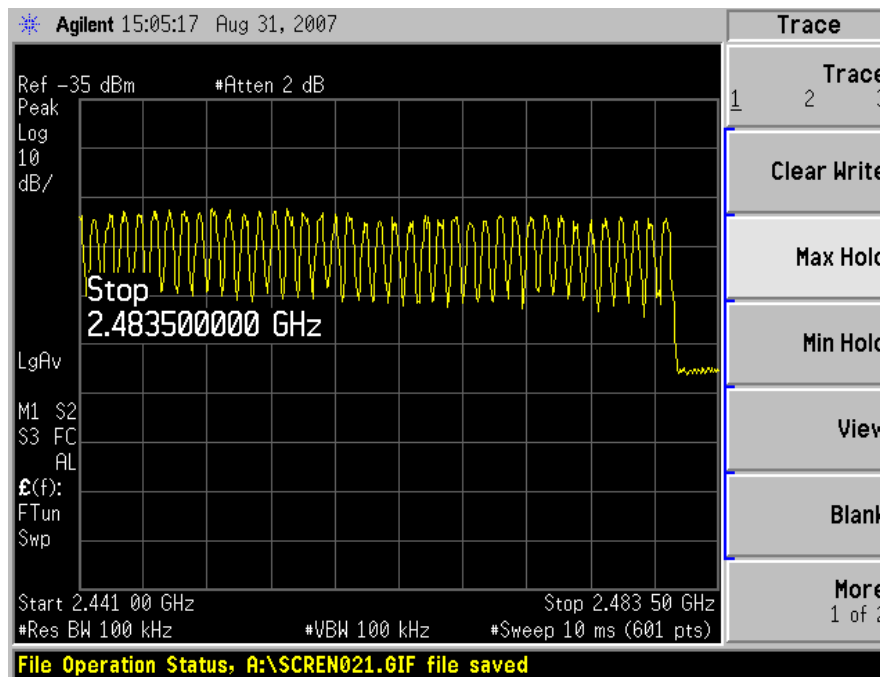
ATTACHMENT 7 – Number of Hopping Channels

CLIENT:	ZBA, Inc.	TEST STANDARD:	FCC Part 15.247 (a) (1) (iii)
MODEL NUMBER:	BC04-191	PRODUCT:	Bluetooth Module
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	Grounding
TESTED BY:	Allen Xia	DATE OF TEST:	2007, August 31
SETUP METHOD:	ANSI C63.4 - 2003		
TEST REQUIREMENT:	FCC 15.247 (a) (1) (iii) Frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.		
TEST PROCEDURE:	Set the spectrum as follow: Span=the frequency band of operation RBW=1% of the span; VBW \geq RBW; Sweep=Auto; Detector=Peak; Trace=Maxhold; Allow the trace to stabilize and count the number of hopping channels.		
TEST VOLTAGE:	120V / 60Hz		
TEST STATUS:	Hopping enable		
RESULTS:	The EUT has 79 hopping numbers, it meets number of hopping channels requirement. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

Model BC04-191



2400MHz-2441MHz



2441MHz-2483.5MHz

Result: Total 79 Channels

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4440A	US45303119	03/20/07	03/19/08
Horn Antenna	R&S	HF906	4044.4507.02	06/20/07	06/19/08
Preamplifier	R&S	SCA-0118	SCA/AVL/1389	06/20/07	06/19/08
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

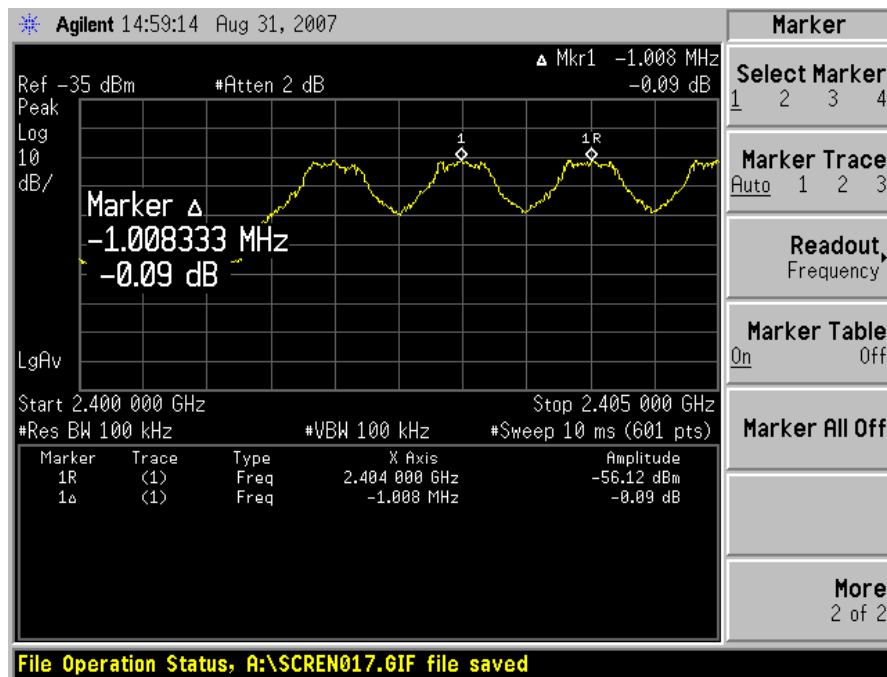
SIGNED BY: Allen dia
ENGINEER

REVIEWED BY: Hayden
SENIOR ENGINEER

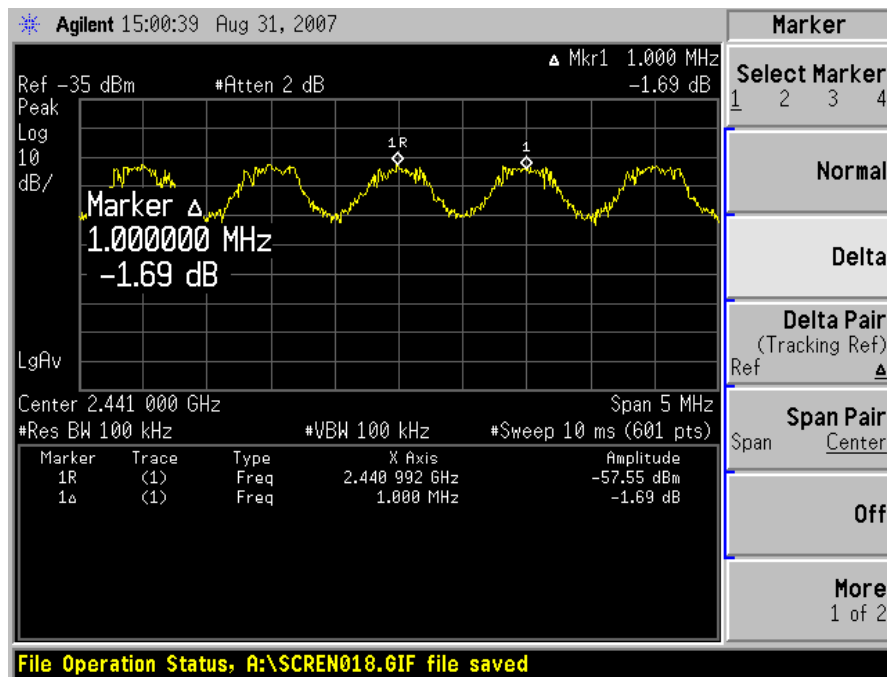
ATTACHMENT 8 – Hopping Channels Separation

CLIENT:	ZBA, Inc.	TEST STANDARD:	FCC Part 15.247 (a) (1)
MODEL NUMBER:	BC04-191	PRODUCT:	Bluetooth Module
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	Grounding through USB
TESTED BY:	Allen Xia	DATE OF TEST:	2007, August 31
SETUP METHOD:	ANSI C63.4 - 2003		
TEST REQUIREMENT:	FCC 15.247 (a) (1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the system operate with an output power no greater than 125mw.		
TEST PROCEDURE:	<p>Set the spectrum as follow:</p> <p>Span=wide enough to capture the peaks of two adjacent channels; RBW=1% of the span; VBW\geq RBW; Sweep=Auto; Detector=Peak; Trace=Maxhold;</p> <p>Allow the trace to stabilize and delta mark two channels peak emission, then record the frequency separation.</p>		
TEST VOLTAGE:	120V / 60Hz		
TEST STATUS:	Hopping enable		
RESULTS:	The EUT meets the hopping channels separation requirement. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

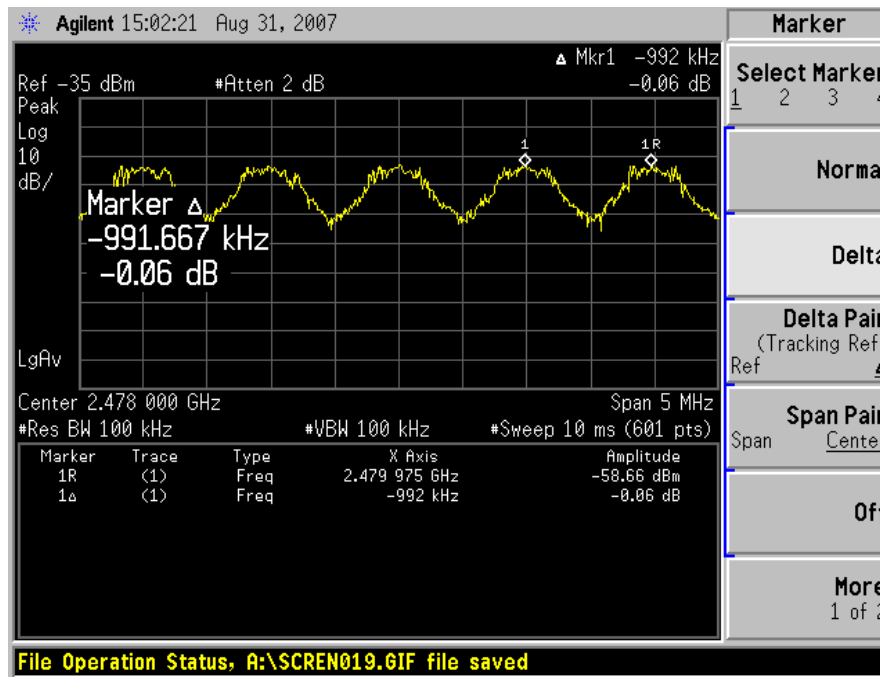
For standard mode of Model BC04-191



Near Channel 0



Near Channel 39



Near Channel 79

Test Result:

Channel	Channel Separation	Limit	Result
Near 0	1008kHz	25kHz or $2/3 \times 20\text{dB}$ Bandwidth= $2/3 \times 917.7\text{kHz}$ =611.8kHz	Pass
Near 39	1000kHz		Pass
Near 79	991.667kHz		Pass

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4440A	US45303119	03/20/07	03/19/08
Horn Antenna	R&S	HF906	4044.4507.02	06/20/07	06/19/08
Preamplifier	R&S	SCA-0118	SCA/AVL/1389	06/20/07	06/19/08
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

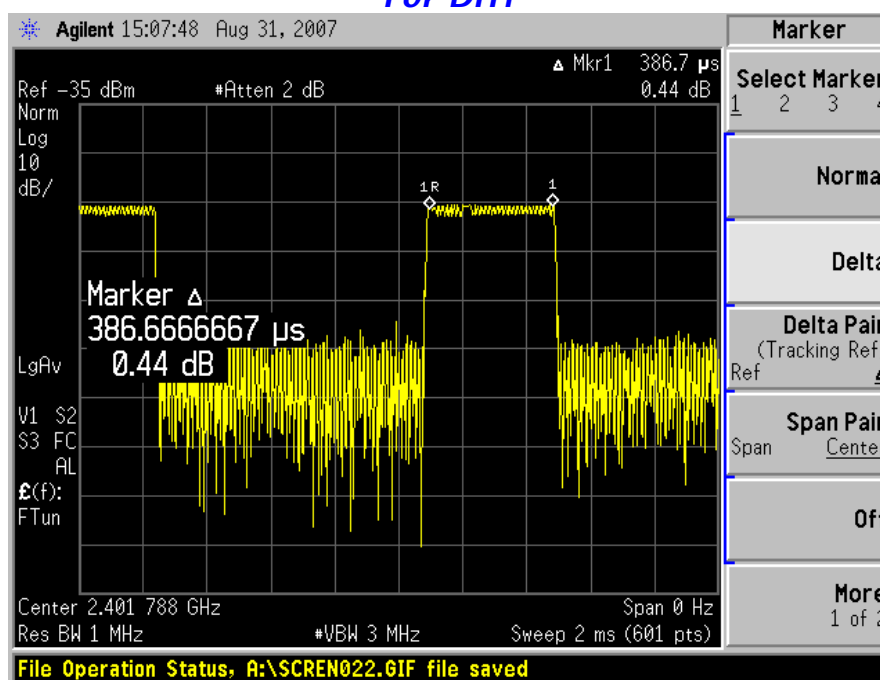
SIGNED BY: Allen dia
ENGINEER

REVIEWED BY: Hayden
SENIOR ENGINEER

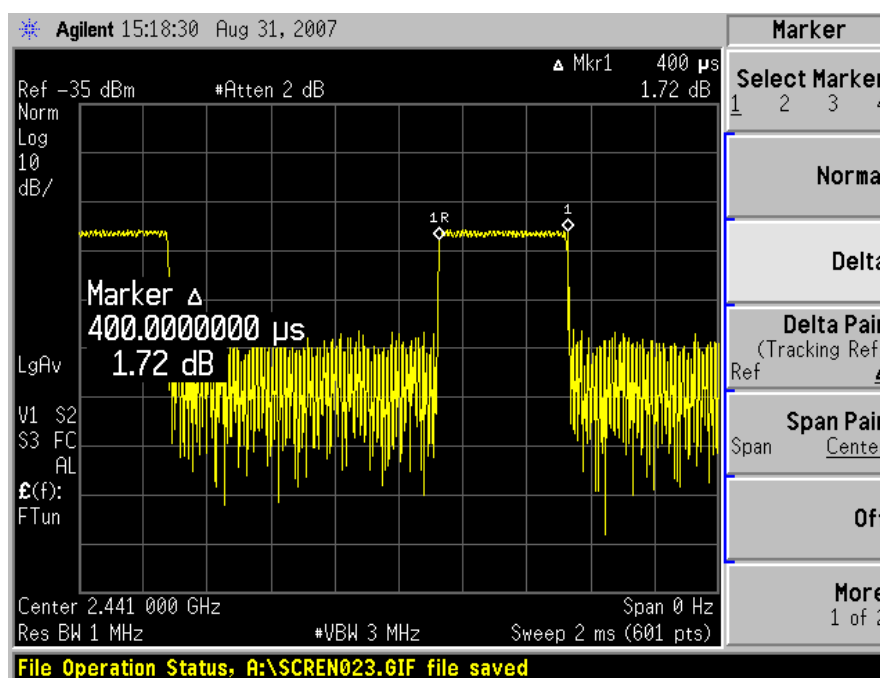
ATTACHMENT 9 – Time of Occupying Test

CLIENT:	ZBA, Inc.	TEST STANDARD:	FCC Part 15.247 (a) (1) (iii)
MODEL NUMBER:	BC04-191	PRODUCT:	Bluetooth Module
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	Grounding
TESTED BY:	Allen Xia	DATE OF TEST:	2007, August 31
SETUP METHOD:	ANSI C63.4 - 2003		
TEST REQUIREMENT:	FCC 15.247 (a) (1) (iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.		
TEST PROCEDURE:	<p>Set the spectrum as follow:</p> <p>Span=0Hz center on the hopping channel; RBW=100kHz; VBW\geq RBW; Sweep=as necessary to capture the entire dwell time per hopping channel; Detector=Peak; Trace=Maxhold;</p> <p>Let the EUT transmit at its maximum data rate and allow the trace to stabilize ; record the total dwell time within the specified tiem.</p>		
TEST VOLTAGE:	120V / 60Hz		
TEST STATUS:	Hopping enable		
RESULTS:	The EUT meets the time of occupying requirement. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

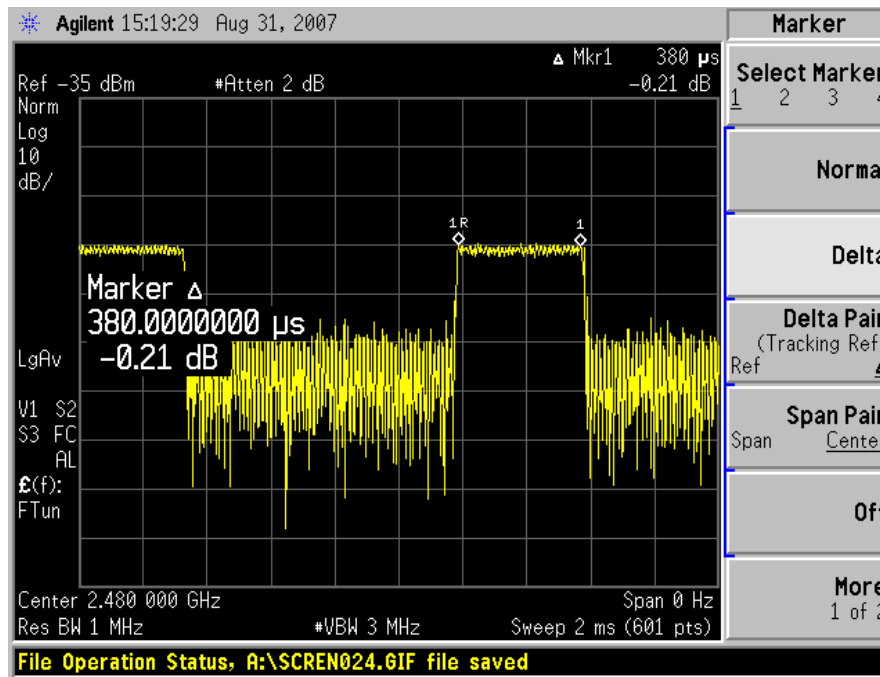
Model JO-173 For DH1



Channel 0 Single Occupying Time



Channel 38 Single Occupying Time

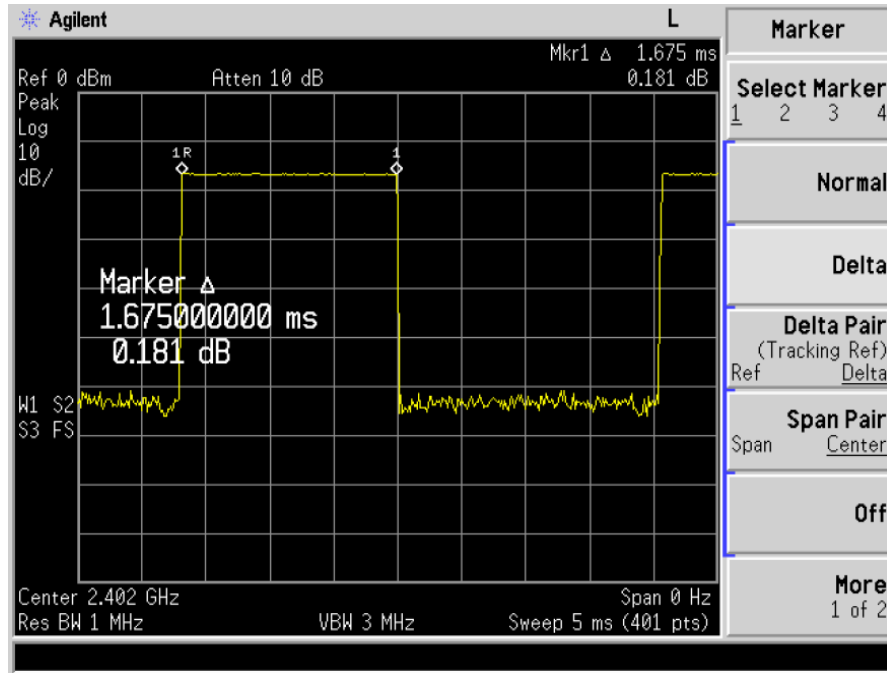


Channel 79 Single Occupying Time

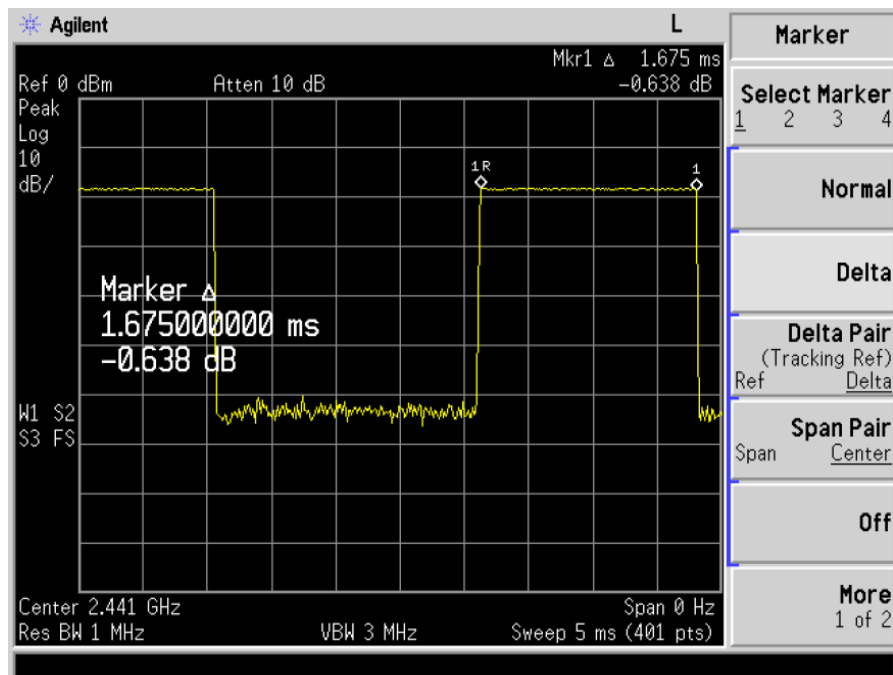
Test Result:

Channel	Time	Limit	Result
1	$0.3867ms * (1600 / (79 * 2)) * 31.6$ $= 123.74ms$	0.4s within 31.6s	Pass
38	$0.4000ms * (1600 / (79 * 2)) * 31.6$ $= 128ms$	0.4s within 31.6s	Pass
79	$0.3800ms * (1600 / (79 * 2)) * 31.6$ $= 121.6ms$	0.4s within 31.6s	Pass

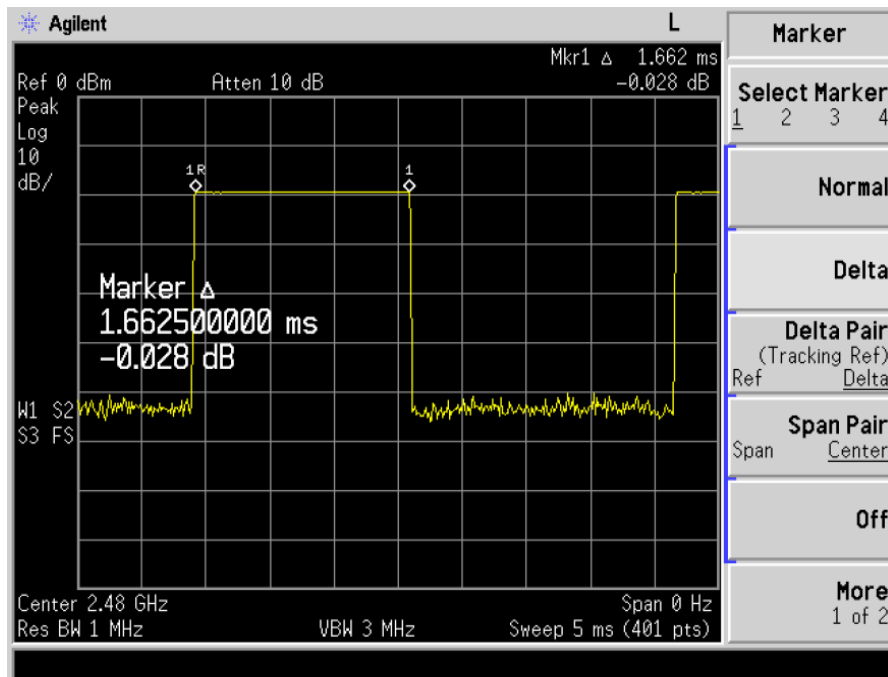
For DH3



Channel 0 Single Occupying Time



Channel 38 Single Occupying Time

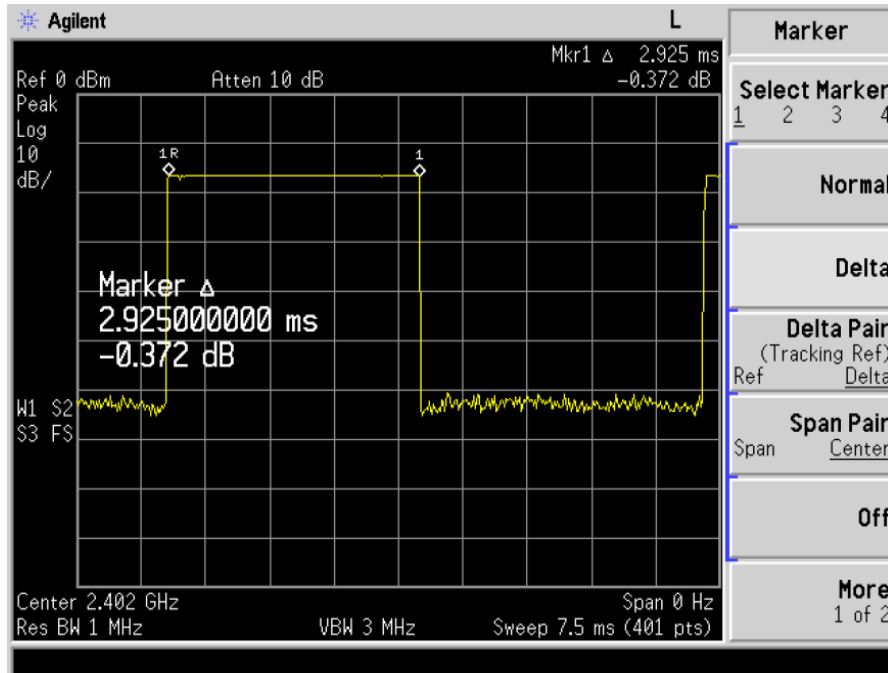


Channel 79 Single Occupying Time

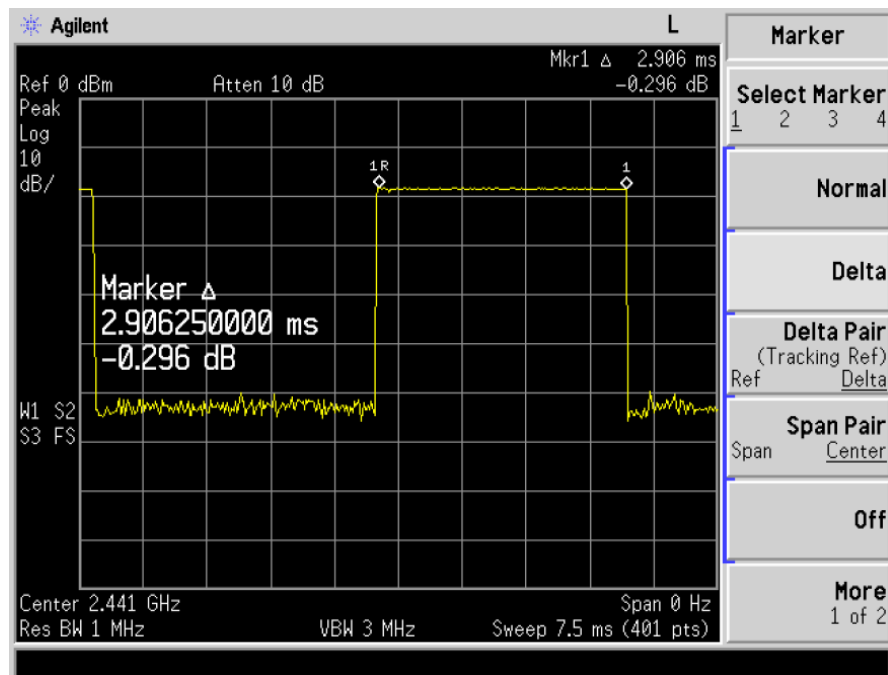
Test Result:

Channel	Time	Limit	Result
1	$1.675\text{ms} \times (1600 / (79 \times 4)) \times 31.6$ =268.00ms	0.4s within 31.6s	Pass
38	$1.675\text{ms} \times (1600 / (79 \times 4)) \times 31.6$ =268.00ms	0.4s within 31.6s	Pass
79	$1.6625\text{ms} \times (1600 / (79 \times 4)) \times 31.6$ =265.92ms	0.4s within 31.6s	Pass

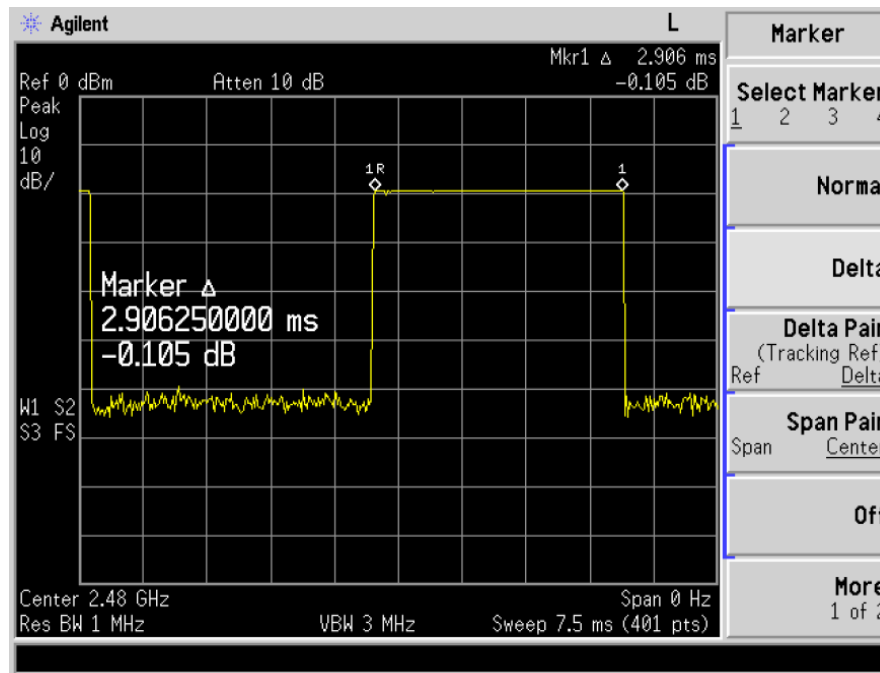
For DH5



Channel 0 Single Occupying Time



Channel 38 Single Occupying Time



Channel 79 Single Occupying Time

Test Result:

Channel	Time	Limit	Result
1	$2.925\text{ms} \times (1600 / (79 \times 6)) \times 31.6$ $= 312.00\text{ms}$	0.4s within 31.6s	Pass
38	$2.906\text{ms} \times (1600 / (79 \times 6)) \times 31.6$ $= 309.79\text{ms}$	0.4s within 31.6s	Pass
79	$2.906\text{ms} \times (1600 / (79 \times 6)) \times 31.6$ $= 309.79\text{ms}$	0.4s within 31.6s	Pass

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4440A	US45303119	03/20/07	03/19/08
Horn Antenna	R&S	HF906	4044.4507.02	06/20/07	06/19/08
Preamplifier	R&S	SCA-0118	SCA/AVL/1389	06/20/07	06/19/08
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY: Allen dia
ENGINEER

REVIEWED BY: Hayden
SENIOR ENGINEER