



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0039570(2) Date : 08 Jul 2016

Application No. : LT051920(6)

Applicant : SDI Technologies Inc.
1299 Main Street, Rahway,
New Jersey 07065, United States

Factory : Arts Electronics Co., Ltd.
NO. 1, SHANGXING LU, SHANGJIAO COMMUNITY, CHANGAN TOWN,
DONGGUAN CITY, GUANGDONG PROVINCE, CHINA

Sample Description : One(1) item of submitted sample stated to be:

Brand name	Sample description	Model number
iHome	Light Therapy Bluetooth Speaker	iZBT5

Sample registration No. : RU023052-001
Radio Frequency : 2402MHz – 2480 MHz Transceiver
Rating : 3.7V rechargeable battery
No. of submitted sample : Two (2) piece (s)

Date Received : 31 May 2016

Test Period : 27 Jun 2016 to 30 Jun 2016.

Test Requested : FCC Part 15 Certificate (15.247), FCC Part 15 Verification Procedure
Industry Canada Interference Causing Equipment Standard RSS-247
Industry Canada Interference Causing Equipment Standard ICES-003

Test Method : 47 CFR Part 15 (10-1-15 Edition), ANSI C63.4 – 2014, ANSI C63.10 – 2013,
FCC Public Notice DA 00-705, KDB 558074 D01 DTS Meas Guidance v03r03

Test Engineer : Mr. LEUNG Shu-kan, Ken

Test Result : See attached sheet(s) from page 2 to 75.

Conclusion : The submitted sample was found to comply with requirement of FCC Part 15
Subpart B and C, RSS-247 Issue 1 and ICES-003 Issue 6.

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____


Mr. WONG Lap-pong, Andrew
Manager
Electrical Division

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FCC ID: EMOIZBT5
IC: 986B-IZBT5

CMA Industrial Development Foundation Limited

Room 1302, Yan Hing Centre, 9-13 Wong Chuk Yeung St., Fo Tan, Shatin, N.T., Hong Kong.

Tel: (852) 2698 8198 Fax: (852) 2695 4177 E-mail: info@cmatcl.com Web Site: <http://www.cmatcl.com>



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1 General Information

1.1 General Description

The equipment under test (EUT) is a cooler box with bluetooth receiver. The EUT is power by 3.5V rechargeable battery. The EUT has two operating modes. The first operating mode is Bluetooth mode. It receives digital audio signal from other wireless device and playback the audio signal. The second mode is Aux mode. An Aux input terminal supports audio input by 3.5 mm terminal. The third mode is FM radio receiving.

For the Bluetooth mode, it supports standard Bluetooth V4.2 or below revision protocol for data synchronization. After paring with other standard Bluetooth device, it can play the music.

A non standardized Bluetooth protocol or other Gaussian frequency-shift keying (GFSK) digital modulation signal was unable to synchronize the Bluetooth speaker.

A Bluetooth trademark was printed on the speaker enclosure to indicate it communicate with Bluetooth protocol only.

Pseudorandom frequency hopping sequence

The channel is represented by a pseudo-random hopping sequence hopping through the 79 RF Channels. The hopping sequence is unique for the piconet and is determined by the Bluetooth device address of the master; the phase in the hopping sequence is determined by the Bluetooth clock of the master. The channel is divided into time slots where each slot corresponds to an RF hop frequency. Consecutive hops correspond to different RF hop frequencies. The nominal hop rate is 1600 hops/s.

Example of a 79 hopping sequence in data mode: 40, 21, 44, 23, 42, 53, 46, 55, 48, 33, 52, 35, 50, 65, 54...

Equal Hopping Frequency Use

All Bluetooth units participating in the piconet are time and hop-synchronized to the channel.

System Receiver Input Bandwidth

The input bandwidth of the receiver is 1 MHz. In every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection (e.g. single multisport (packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings. Repeating of a packet

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has no influence on the hopping sequence.. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

Equipment Description

15.247(g): In accordance with the Bluetooth Industry Standard, the system is designed to comply With all of The regulations in Section 15.247 when the transmitter is presented with a continuous data (or information) system.

15.247(h): In accordance with the Bluetooth Industry Standard, the system does not coordinate it channels selection/ hopping sequence with other frequency hopping systems for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

The brief circuit description is listed as follows:

- U6 and its associated circuit act as bluetooth module
- X1 and its associated circuit act as oscillator
- U10 and its associated circuit act as audio amplifier
- U3 and its associated circuit act as voltage regulator
- U13 and its associated circuit act as display

Antenna type : PCB Antenna
Antenna gain : 0dBi
Modulation technique : GFSK
Number of channel : 79 channels (Bluetooth 3.0)
: 40 channels (Bluetooth 4.0)



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1.2 Location of the test site

FCC Registered Test Site Number: 552221

Industry Canada Registered Test Site Number: 4093A

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013. A Semi-Anechoic Chamber Testing Site is set up for investigation and located at:

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
Hong Kong.

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. A shielded room is located at :

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
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1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date	Calibration Period
EMI Test Receiver	R&S	ESCI	100152	27 Sep 2016	1Year
Spectrum Analyzer	R&S	FSV40	100628	09 Feb 2017	1Year
Broadband Antenna	Schaffner	CBL6112B	2718	15 Mar 2017	2Years
Loop Antenna	EMCO	6502	00056620	25 Jan 2018	2Years
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	24 Nov 2016	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	24 Nov 2016	2Years
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170442	02 Aug 2017	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9719	9719-010	02 Aug 2017	2Years
Coaxial Cable	Schaffner	RG 213/U	N/A	18 May 2017	1Years
Coaxial Cable	Suhner	RG 214/U	N/A	18 May 2017	1Years
Coaxial Cable	Suhner	Sucoflex_104	N/A	13 Dec 2016	1Years
LISN	R&S	ENV216	101323	21 Oct 2016	1Year
Coaxial Cable	Tyco Electronics	RG 58C/U	N/A	01 Nov 2016	1Year

Support equipment:

Adaptor

Model: A1299

Supply by CMA



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1.4 Measurement Uncertainty

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

Radiated emissions

Frequency	Uncertainty (U_{lab})
30MHz ~ 200MHz (Horizontal)	4.83dB
30MHz ~ 200MHz (Vertical)	4.84dB
200MHz ~ 1000MHz (Horizontal)	4.87dB
200MHz ~ 1000MHz (Vertical)	5.94dB
1GHz ~ 6GHz	4.41dB
6GHz ~ 18GHz	4.64dB

Conducted emissions

Frequency	Uncertainty (U_{lab})
150kHz~30MHz	2.64dB



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2 Description of the radiated emission test

2.1 Test Procedure

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2014, C63.10 – 2013 and DA 00-705.

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 1m and 0.8m high above the ground (below 1GHz) and 1.5 high above the ground (above 1GHz). 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was then moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

For 30MHz to 1GHz, broadband antenna with its vertical and horizontal plane is placed 3m from the EUT and rotated about its vertical and horizontal axis for maximum response at each azimuth about the EUT. And the reference point of antenna shall be 1 m above the ground.

For above 1GHz, horn antenna with its vertical and horizontal plane is placed 3m from the EUT and rotated about its vertical and horizontal axis for maximum response at each azimuth about the EUT. Preamplifier and High Pass filter was used for measurements. The reference point of antenna shall be 1 m above the ground.

The device was rotated through three orthogonal axes to determine which attitude and configuration produce the highest emission during measurement for Radiated Emission measurement.



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2.2 Test Result

Summary

Section in FCC part 15 and RSS	Description	Result
15.205(a), 15.209, 15.247(d), RSS-Gen	Transmitter radiated spurious field strength and other emissions	Page 12,13
15.209, RSS-Gen	Receiver emissions	Page 14,15
15.209, RSS-Gen	Voltage disturbance	Page 18, 40, 41
15.247 (a)(1), Part 2.1 and DA-00705, RSS-247 5.1 (1)	Hopping sequence	Page 42, 43
15.247 (a)(1), RSS-247 5.1 (2)	20dB bandwidth and 99% bandwidth	Page 44,45, 48-51
15.247 (a)(2), RSS-247 5.2 (1)	6dB bandwidth	Page 46, 47
15.247 (a)(1), RSS-247 5.1 (2)	Channel Spacing (Frequency separation)	Page 52, 53
15.247 (a)(1)(iii)), RSS-247 5.1 (4)	Number of hopping frequency	Page 54
15.247 (d), RSS-247 5.5	Band Edge	Page 55-60
15.247 (a)(1)(iii), RSS-247 5.1 (4)	Dwell Time (Bluetooth Average On Time)	Page 61-69
15.247 (e) , RSS-247 5.2 (2)	Power Spectral Density	Page 70, 71
15.247 (b)(1), RSS-247 5.4 (2)	Maximum Peak output power	Page 11, 72-75

Subpart C, RSS-247:

Peak Detector data were measured unless otherwise stated.

“#” means emissions appear within the restricted bands shall follow the requirement of section 15.205 and RSS-Gen 8.10.

The Frequencies from fundamental up to that tenth harmonics were investigated, and emissions more than 20dB below limited were not report. Thus, those higher emissions were presented in next page (section 2.3)

Subpart B, ICES-003:

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Room 1302, Yan Hing Centre, 9-13 Wong Chuk Yeung St., Fo Tan, Shatin, N.T., Hong Kong.

Tel: (852) 2698 8198 Fax: (852) 2695 4177 E-mail: info@cmatcl.com Web Site: <http://www.cmatcl.com>



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The emissions meet the requirement of section 15.109 and RSS-Gen 7.1 are based on measurements employing the CISPR quasi-peak detector below 1000MHz and average detector for frequencies above 1000MHz.

The frequencies from 30MHz to 1000MHz were investigated, and emissions more 20dB below limit were not reported. Thus, those highest emissions were presented in next page (section 2.3).

It was found that the EUT meet the FCC and RSS requirement.



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2.3 Maximum peak output power

Conductive measurements

pursuant to

the requirement of FCC Part 15 subpart C

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	29	° C
Relative humidity:	65	%

Mode: Bluetooth 3.0

Frequency (MHz)	Reading (dBm)	Reading (mW)	Limit (mW)	Margin (mW)
2401.694	- 8.16	0.153	1000.0	- 999.847
2439.704	- 6.67	0.215	1000.0	- 999.785
2479.684	- 6.19	0.240	1000.0	- 999.760

Mode: Bluetooth 4.0

2401.598	- 7.86	0.164	1000.0	- 999.836
2439.604	- 6.40	0.229	1000.0	- 999.771
2479.624	- 5.94	0.255	1000.0	- 999.745

The plots in Appendices A16 show the transmission power was less than 1 watt.



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2.4 Radiated Emission Measurement Data

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	29	° C
Relative humidity:	65	%

Measurement: Peak RBW: 1MHz VBW: 3MHz

Testing frequency range: 9kHz to 25GHz Operation Mode: Transmission (Bluetooth 3.0)

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Transducer Factor (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
2401.728	V	90.3	- 4.2	86.1	114.0	- 27.9
#4803.544	H	35.0	3.7	38.7	74.0	- 35.3
#4803.722	V	34.9	3.7	38.6	74.0	- 35.4
2439.722	H	94.1	- 4.2	89.9	114.0	- 24.1
#4879.584	H	35.9	3.7	39.6	74.0	- 34.4
#4880.213	V	35.6	3.7	39.3	74.0	- 34.7
2479.698	H	96.3	- 4.3	92.0	114.0	- 22.0
#4959.810	V	35.0	4.0	39.0	74.0	- 35.0
#4960.353	H	35.1	4.0	39.1	74.0	- 34.9

Remark: Other emissions more than 20dB below the limit are not reported.

Peak measurement values are lower than average limit, therefore average measurement is not necessary



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2.4 Radiated Emission Measurement Data

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	29	° C
Relative humidity:	65	%

Measurement: Peak

RBW: 1MHz VBW: 3MHz

Testing frequency range: 9kHz to 25GHz

Operation Mode: Transmission (Bluetooth 4.0)

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Transducer Factor (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
2401.812	V	90.6	- 4.2	86.4	114.0	- 27.6
#4803.027	H	35.2	3.7	38.9	74.0	- 35.1
#4803.484	V	35.4	3.7	39.1	74.0	- 34.9
2439.670	H	94.2	- 4.2	90.0	114.0	- 24.0
#4879.500	H	35.7	3.7	39.4	74.0	- 34.6
#4880.551	V	35.6	3.7	39.3	74.0	- 34.7
2479.585	H	96.2	- 4.3	91.9	114.0	- 22.1
#4959.166	V	34.8	4.0	38.8	74.0	- 35.2
#4960.355	H	35.4	4.0	39.4	74.0	- 34.6

Remark: Other emissions more than 20dB below the limit are not reported.

Peak measurement values are lower than average limit, therefore average measurement is not necessary



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2.4 Radiated Emission Measurement Data (Con't)

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart B

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	29	° C
Relative humidity:	65	%

Detector: Quasi-peak

RBW: 120kHz VBW: 300kHz

Operation Mode: Receiving mode (Bluetooth 3.0)

Testing frequency range: 9kHz to 25GHz

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
74.314	H	10.5	8.0	18.5	40.0	- 21.5
121.678	H	8.4	14.4	22.8	43.5	- 20.7
173.711	H	7.7	11.9	19.6	43.5	- 23.9
225.118	H	9.0	11.8	20.8	46.0	- 25.2
266.469	H	8.7	15.4	24.1	46.0	- 21.9
297.012	H	9.4	15.4	24.8	46.0	- 21.2
327.780	H	9.0	16.8	25.8	46.0	- 20.2

Remark: Other emissions more than 20dB below the limit are not reported.



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2.4 Radiated Emission Measurement Data (Con't)

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart B

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	29	° C
Relative humidity:	65	%

Detector: Quasi-peak

RBW: 120kHz VBW: 300kHz

Operation Mode: Receiving (Bluetooth 4.0)

Testing frequency range: 9kHz to 25GHz

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
51.950	H	7.1	10.6	17.7	40.0	- 22.3
83.420	H	8.8	8.5	17.3	40.0	- 22.7
113.990	H	9.9	12.2	22.1	43.5	- 21.4
157.740	H	6.3	14.1	20.4	43.5	- 23.1
195.880	H	9.2	11.2	20.4	43.5	- 23.1
235.660	H	8.6	13.2	21.8	46.0	- 24.2
254.250	H	8.5	15.4	23.9	46.0	- 22.1

Remark: Other emissions more than 20dB below the limit are not reported.



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2.4 Radiated Emission Measurement Data (Con't)

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart B

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	29	° C
Relative humidity:	65	%

Detector: Quasi-peak

RBW: 120kHz VBW: 300kHz

Operation Mode: Charging

Testing frequency range: 9kHz to 25GHz

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
129.991	H	18.3	14.4	32.7	43.5	- 10.8
181.764	V	22.1	11.2	33.3	43.5	- 10.2
285.992	H	19.6	15.4	35.0	46.0	- 11.0
311.994	H	20.8	16.8	37.6	46.0	- 8.4
337.988	H	16.4	16.8	33.2	46.0	- 12.8
364.000	H	18.6	16.8	35.4	46.0	- 10.6
389.984	H	16.1	16.8	32.9	46.0	- 13.1

Remark: Other emissions more than 20dB below the limit are not reported.



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2.4 Radiated Emission Measurement Data (Con't)

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart B

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	29	° C
Relative humidity:	65	%

Detector: Quasi-peak

RBW: 120kHz VBW: 300kHz

Operation Mode: Aux-in

Testing frequency range: 9kHz to 25GHz

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
121.831	H	8.4	14.4	22.8	43.5	- 20.7
152.060	V	12.8	14.1	26.9	43.5	- 16.6
181.428	H	27.8	11.2	39.0	43.5	- 4.5
181.621	V	28.8	11.2	40.0	43.5	- 3.5
215.963	H	8.4	12.0	20.4	43.5	- 23.1
290.479	H	15.3	15.4	30.7	46.0	- 15.3
292.692	V	14.4	15.4	29.8	46.0	- 16.2

Remark: Other emissions more than 20dB below the limit are not reported.



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3 Description of the Line-conducted Test

3.1 Test Procedure

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. The EUT was setup as described in the procedures, and both lines were measured.

3.2 Test Result

The EUT is connected to adaptor.

It was found that the EUT met the FCC and RSS requirement.

3.3 Graph and Table of Conducted Emission Measurement Data

The plots in Appendices A6 show the graph and data of conducted emission.



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4 Photograph

4.1 Photographs of the Test Setup for Radiated Emission and Conducted Emission

For electronic filing, the photos are saved with filename EMOIZBT5 TSup.pdf.

4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename EMOIZBT5 ExPho.pdf and EMOIZBT5 InPho.pdf.



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5 Supplementary document

The following document were submitted by applicant, and for electronic filing, the document are saved with the following filenames:

Document	Filename
ID Label/Location	LabelSmp.jpg
Block Diagram	BlkDia.pdf
Schematic Diagram	Schem.pdf
User Manual	UserMan.pdf
Operational Description	OpDes.pdf

5.1 Bandwidth

Bluetooth 3.0:

The plot in Appendices A8 and A10 shows the 20dB bandwidth and 99% bandwidth:

Frequency Channel (MHz)	20dB bandwidth (kHz)	99% bandwidth (kHz)
2402	1128.9	974.0
2440	1128.9	979.0
2480	1128.9	974.0

The plot in Appendices A11 shows the channel spacing has minimum 25 kHz or two-third of 20dB bandwidth of hopping channel.

Frequency (MHz)	Channel spacing (kHz)	Two-third of 20dB bandwidth (kHz)	Minimum bandwidth (kHz)
2402	994.0	752.6	25
2440	999.0	752.6	25
2480	993.0	752.6	25

The plot in Appendices A12 shows the frequency hopping channel over 75 hopping frequency.

The plot in Appendices A13 shows the fundamental emission is confined in the specified band. It shows the 20dB bandwidth and band edge meet the 15.247(d) and 15.205 requirement.



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Bluetooth 4.0:

The plot in Appendices A13 shows the band edge is fulfil 15.205 restricted band, 15.247(d) requirement.

The plot in Appendices A9 shows the 6dB bandwidth has minimum 500kHz for frequency channel 2412MHz, 2437MHz and 2462MHz. It fulfils the section 15.247(a)(2) requirement.

5.2 Hopping sequence

The plot in Appendices A7 shows the hopping sequence is pseudorandom randomly distributed. Four example of continuous fundamental frequency hopping pattern was as below:

The 1st example of fundamental frequency = 2450.092GHz

The 2nd example of fundamental frequency = 2479.705GHz

The 3rd example of fundamental frequency = 2415.974GHz

The 4th example of fundamental frequency = 2472.948GHz

Result:

Fc 1 – Fc 2 = -29.613MHz

Fc 2 – Fc 3 = +63.731MHz

Fc 3 – Fc 4 = -56.974MHz

It was found the hopping pattern is pseudorandom random.



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TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

5.3 Average on time

The plot in Appendices A14 shows the average on time for frequency hopping channel is within 0.4 seconds.

The calculation for average on time as below:

Average hopping channel = Number of transmitted carrier / Sweep time

Average on time = Packet on time x Average hopping channel

Dwell time = Average on time x Total frequency hopping channel x 0.4

Test result:

Frequency Channel (MHz)	Packet	Dwell Time (Seconds)	Limit (Seconds)	Margin (Seconds)
2402	DH1	0.118	0.4	- 0.282
2402	DH3	0.261	0.4	- 0.139
2402	DH5	0.274	0.4	- 0.126
2440	DH1	0.117	0.4	- 0.283
2440	DH3	0.250	0.4	- 0.150
2440	DH5	0.367	0.4	- 0.033
2480	DH1	0.116	0.4	- 0.284
2480	DH3	0.259	0.4	- 0.141
2480	DH5	0.256	0.4	- 0.144

5.4 Power Spectral Density

The plot in Appendices A14 shows the frequency channel 2412MHz, 2437MHz and 2462MHz were not excess 8dBm for 3kHz bandwidth. It fulfils the section 15.247(e) requirement.

5.5 Antenna requirement

Appendices A4 shows the antenna is permanently attached and cannot be changed. Therefore it fulfils the section 15.203 requirement



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Date : 08 Jul 2016

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A4	Photos of Internal Configurations	5	pages
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A7	Hopping sequence	2	pages
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A9	6dB bandwidth	2	pages
A10	99% bandwidth	4	pages
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A13	Band Edge	6	pages
A14	Bluetooth Average on time	9	pages
A15	Power Spectral Density	2	pages
A16	Transmission Power	4	pages



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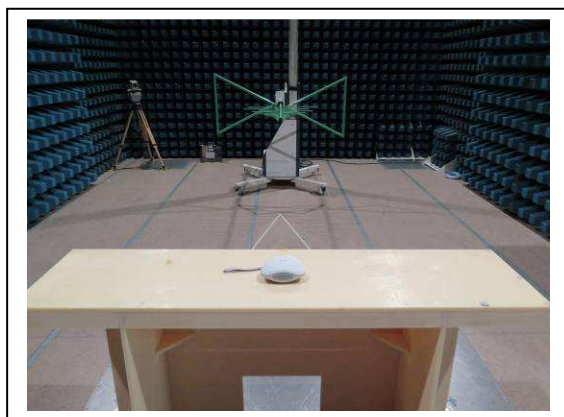
廠商會檢定中心

TEST REPORT

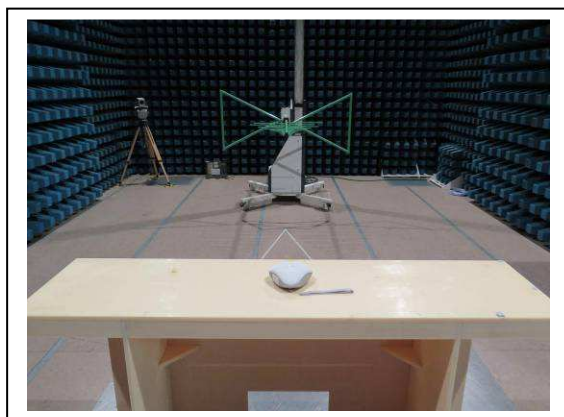
Report No. : AU0039570(2)

Date : 08 Jul 2016

A1. Photos of the set-up of Radiated Emissions



(Front view, 30MHz – 1GHz)



(Back view, 30MHz – 1GHz)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A1. Photos of the set-up of Radiated Emissions



(Front view, 9KHz – 30MHz)



(Back view, 9KHz – 30MHz)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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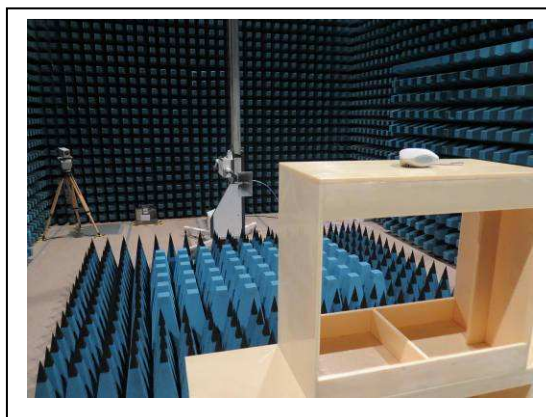
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TEST REPORT

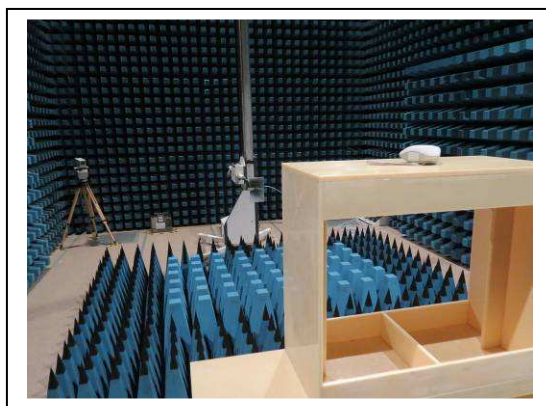
Report No. : AU0039570(2)

Date : 08 Jul 2016

A1. Photos of the set-up of Radiated Emissions



(front view, 1GHz – 25GHz)



(rear view, 1GHz – 25GHz)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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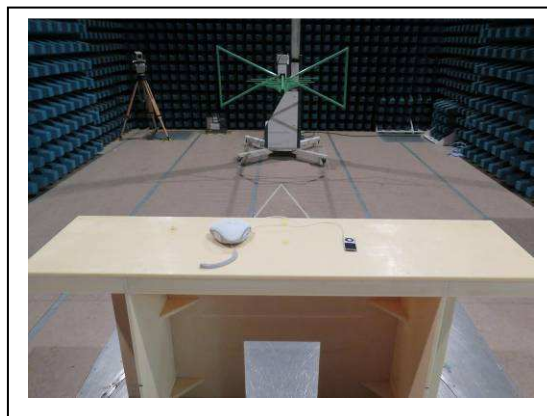
廠商會檢定中心

TEST REPORT

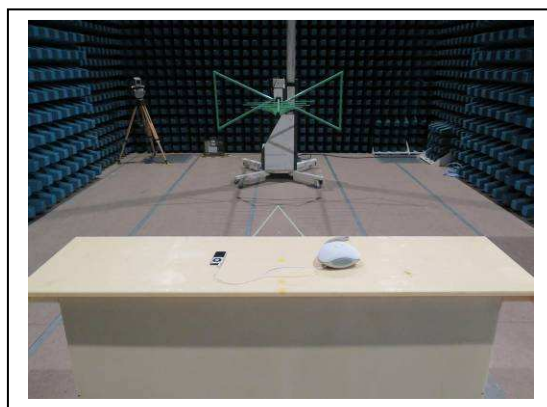
Report No. : AU0039570(2)

Date : 08 Jul 2016

A1. Photos of the set-up of Radiated Emissions



(front view, Aux-i-in)



(rear view, Aux-i-in)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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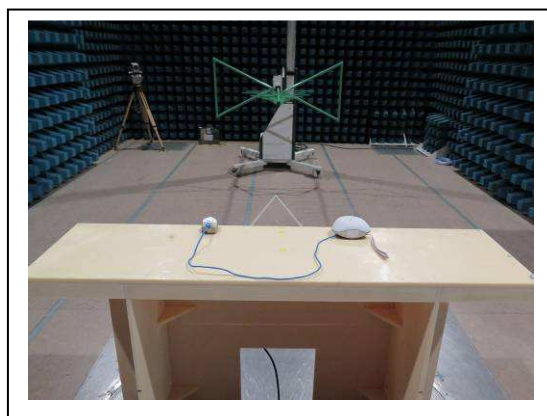
廠商會檢定中心

TEST REPORT

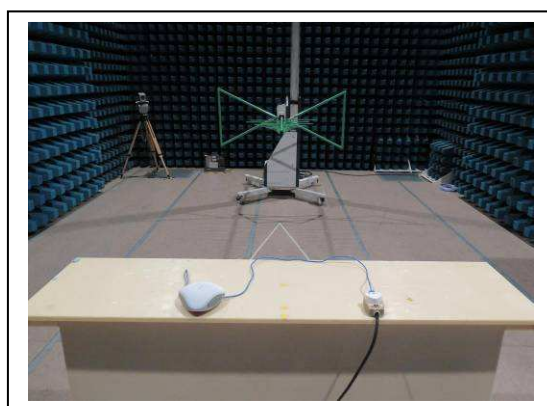
Report No. : AU0039570(2)

Date : 08 Jul 2016

A1. Photos of the set-up of Radiated Emissions



(front view, Charging)



(rear view, Charging)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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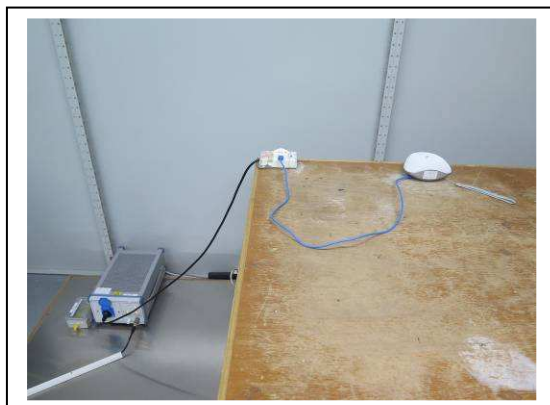
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TEST REPORT

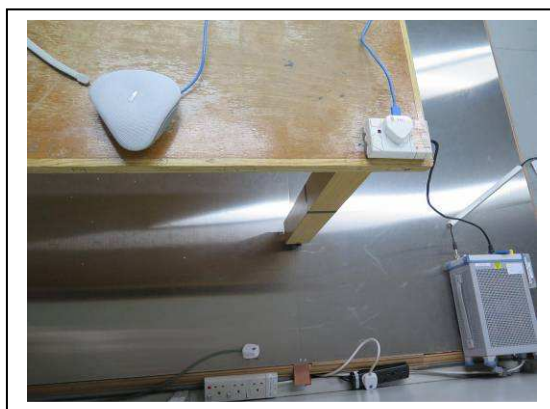
Report No. : AU0039570(2)

Date : 08 Jul 2016

A2 Photos of the set-up of Conducted Emission



(front view)



(rear view)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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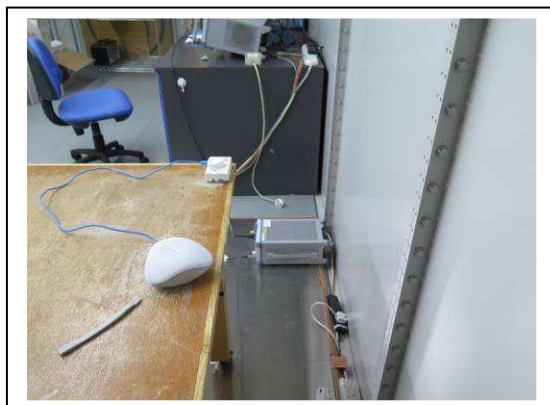
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Report No. : AU0039570(2)

Date : 08 Jul 2016

A2 Photos of the set-up of Conducted Emission



(side view)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A3. Photos of External Configurations



External Configuration 1



External Configuration 2

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: EMOIZBT5

IC: 986B-IZBT5

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Tel: (852) 2698 8198 Fax: (852) 2695 4177 E-mail: info@cmatcl.com Web Site: <http://www.cmatcl.com>



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A3. Photos of External Configurations



External Configuration 3



External Configuration 4

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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Report No. : AU0039570(2)

Date : 08 Jul 2016

A3. Photos of External Configurations



External Configuration 5

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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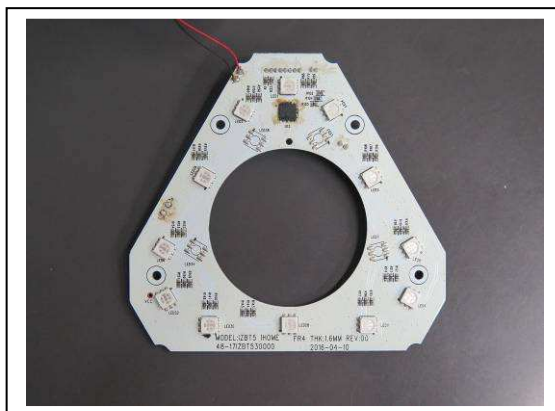
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Report No. : AU0039570(2)

Date : 08 Jul 2016

A4. Photos of Internal Configurations



Internal Configuration 1



Internal Configuration 2

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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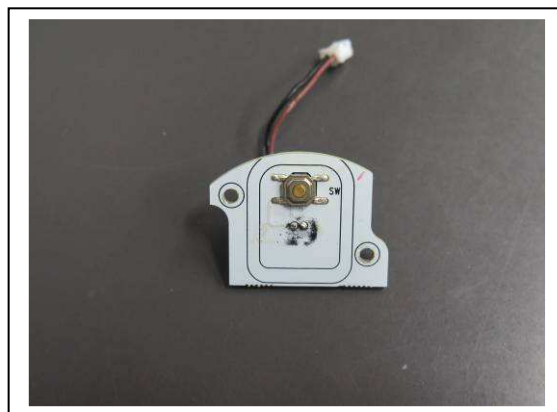
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TEST REPORT

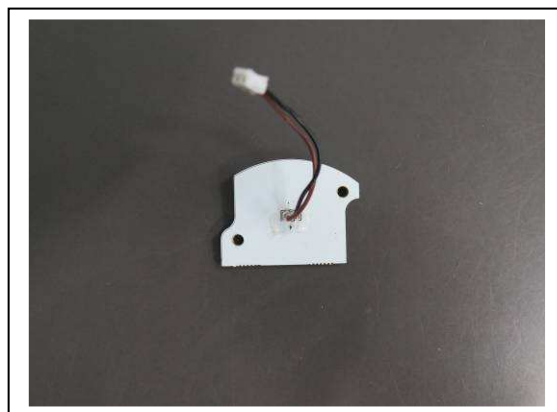
Report No. : AU0039570(2)

Date : 08 Jul 2016

A4. Photos of Internal Configurations



Internal Configuration 3



Internal Configuration 4

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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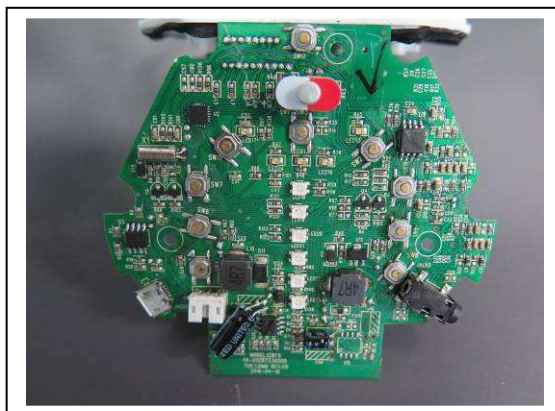
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TEST REPORT

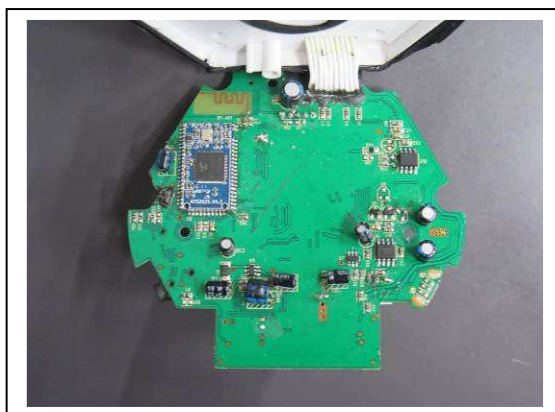
Report No. : AU0039570(2)

Date : 08 Jul 2016

A4. Photos of Internal Configurations



Internal Configuration 5



Internal Configuration 6

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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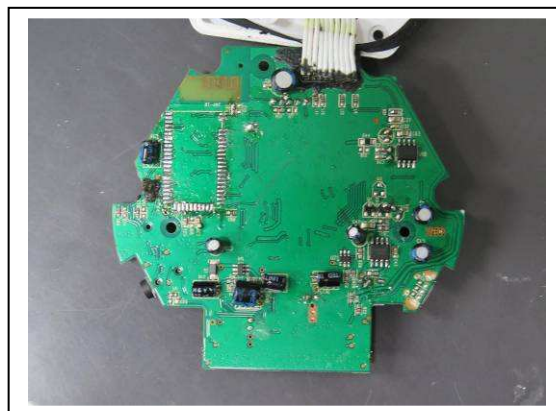
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TEST REPORT

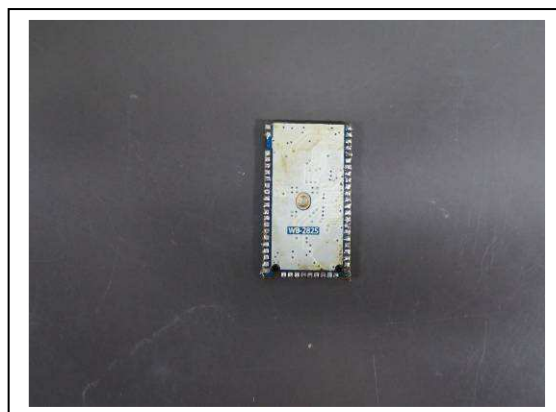
Report No. : AU0039570(2)

Date : 08 Jul 2016

A4. Photos of Internal Configurations



Internal Configuration 7



Internal Configuration 8

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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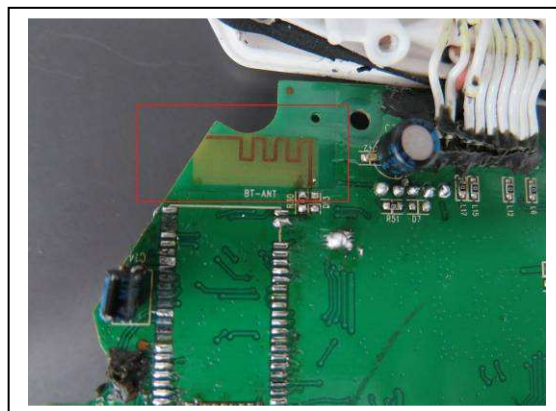
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TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A4. Photos of Internal Configurations



EUT Antenna

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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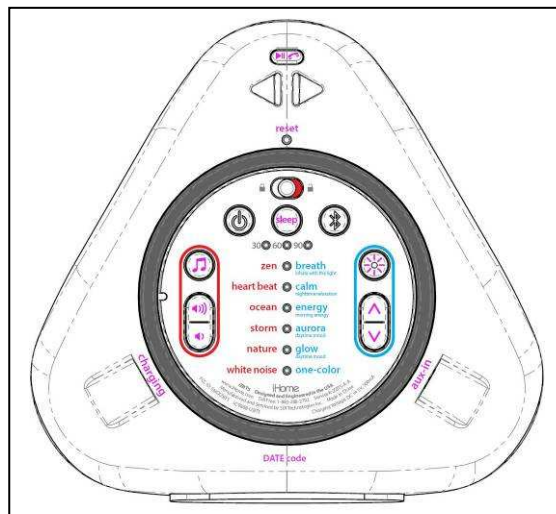
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TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A5. ID Label / Location



ID Label 1

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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Report No. : AU0039570(2)

Date : 08 Jul 2016

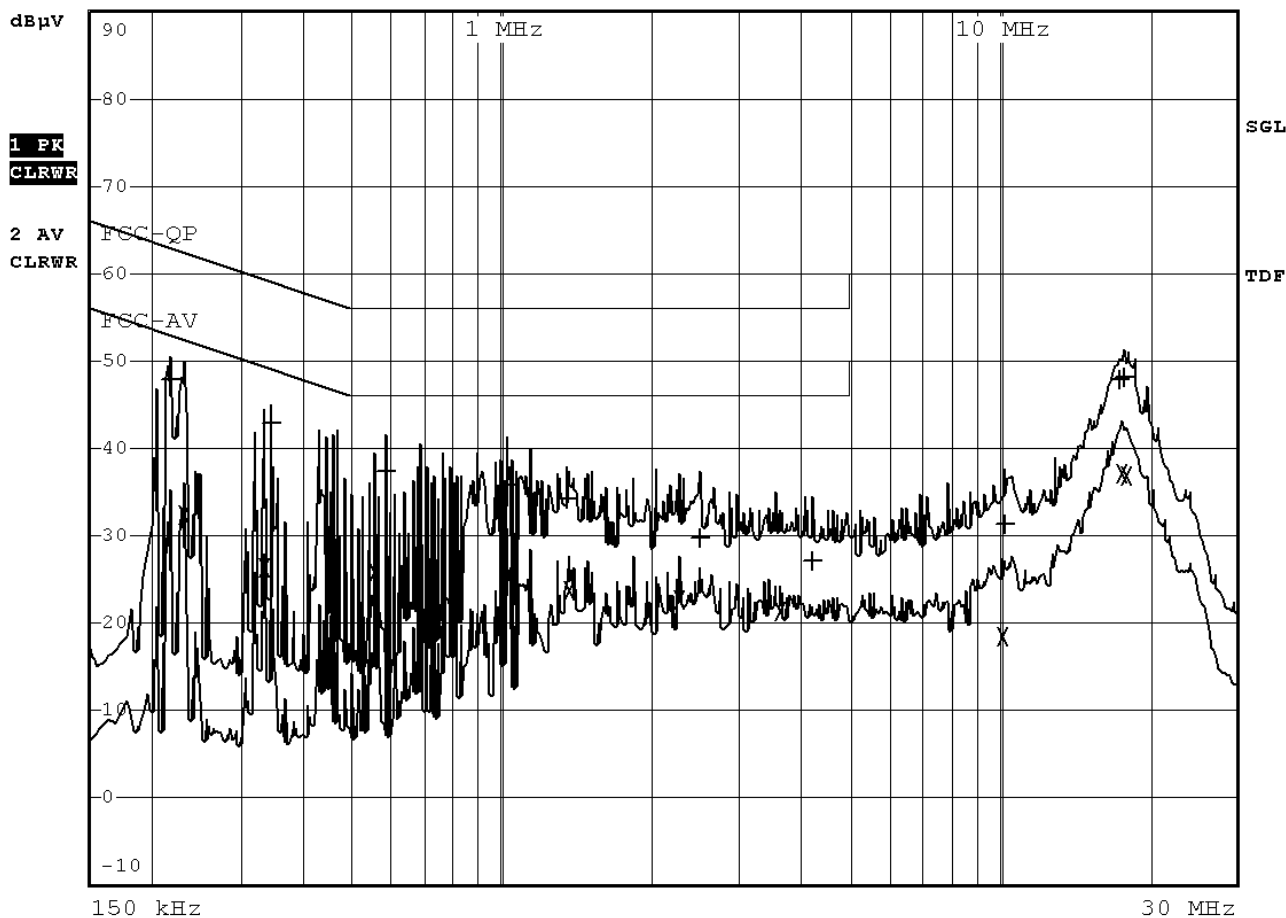
A6 Conducted Emission Measurement Date



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A6 Conducted Emission Measurement Date

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCC-QP			
Trace2:	FCC-AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV		DELTA LIMIT dB
1 Quasi Peak	217.5 kHz	47.99	N gnd	-14.91
2 Average	231 kHz	32.50	N gnd	-19.90
2 Average	334.5 kHz	26.30	N gnd	-23.03
1 Quasi Peak	348 kHz	42.82	N gnd	-16.18
2 Average	554 kHz	25.93	N gnd	-20.06
1 Quasi Peak	581 kHz	37.25	N gnd	-18.74
1 Quasi Peak	1.0265 MHz	35.90	L1 gnd	-20.09
2 Average	1.0265 MHz	25.50	N gnd	-20.49
1 Quasi Peak	1.3595 MHz	34.34	L1 gnd	-21.65
2 Average	1.373 MHz	23.60	N gnd	-22.39
2 Average	2.2775 MHz	22.59	N gnd	-23.41
1 Quasi Peak	2.516 MHz	29.82	L1 gnd	-26.17
2 Average	3.65 MHz	21.43	N gnd	-24.56
1 Quasi Peak	4.2035 MHz	27.17	N gnd	-28.82
2 Average	10.148 MHz	18.50	L1 gnd	-31.49
1 Quasi Peak	10.3055 MHz	31.35	N gnd	-28.64
1 Quasi Peak	17.4695 MHz	47.85	N gnd	-12.14
2 Average	17.6585 MHz	37.08	N gnd	-12.91
1 Quasi Peak	17.87 MHz	48.20	N gnd	-11.79
2 Average	18.0275 MHz	36.92	N gnd	-13.08

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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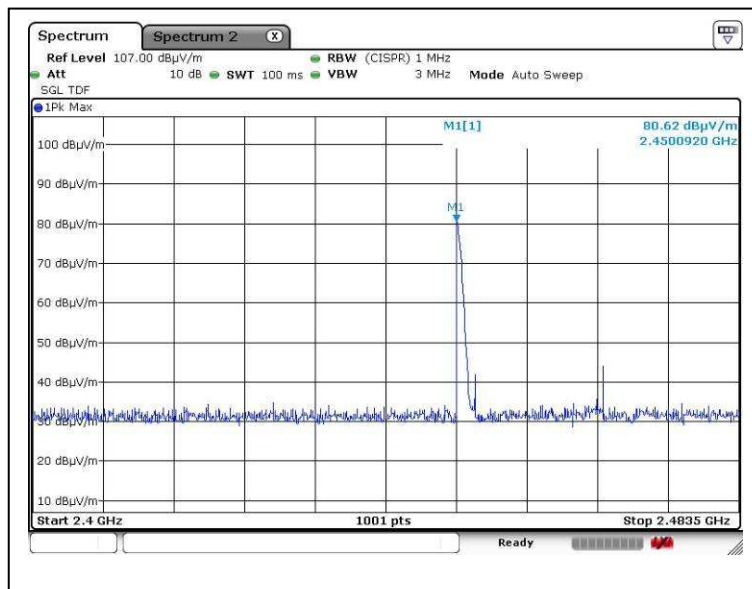
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TEST REPORT

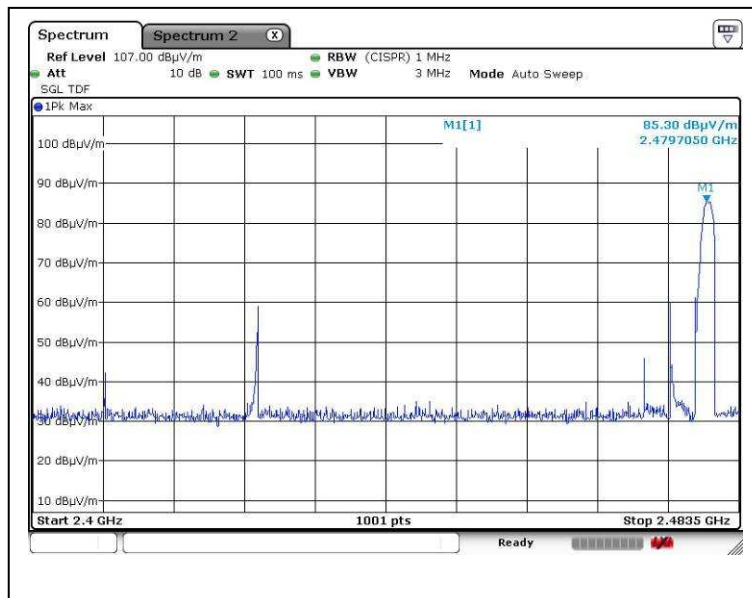
Report No. : AU0039570(2)

Date : 08 Jul 2016

A7. Hopping sequence



1st example of fundamental frequency



2nd example of fundamental frequency

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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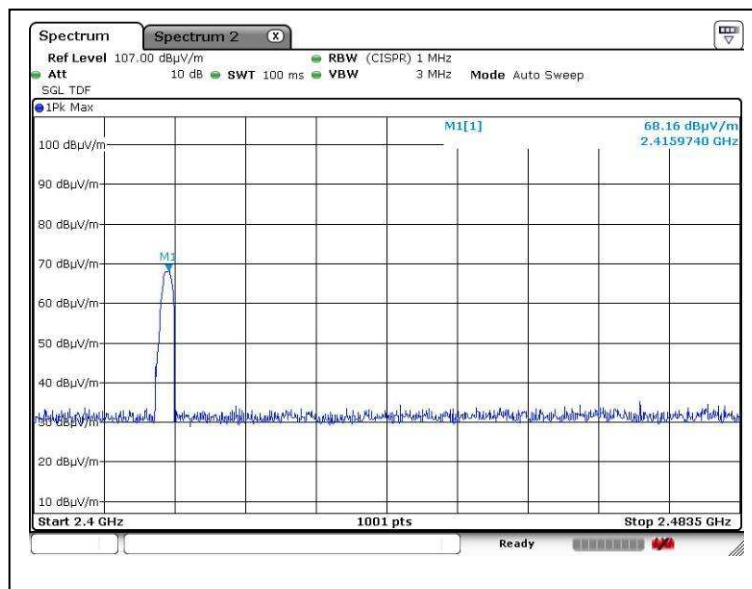
廠商會檢定中心

TEST REPORT

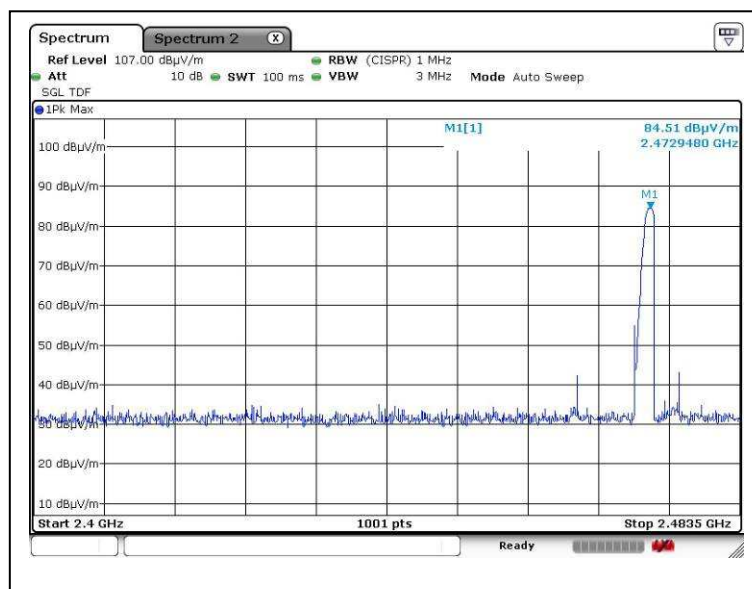
Report No. : AU0039570(2)

Date : 08 Jul 2016

A7. Hopping sequence



3rd example of fundamental frequency



4th example of fundamental frequency

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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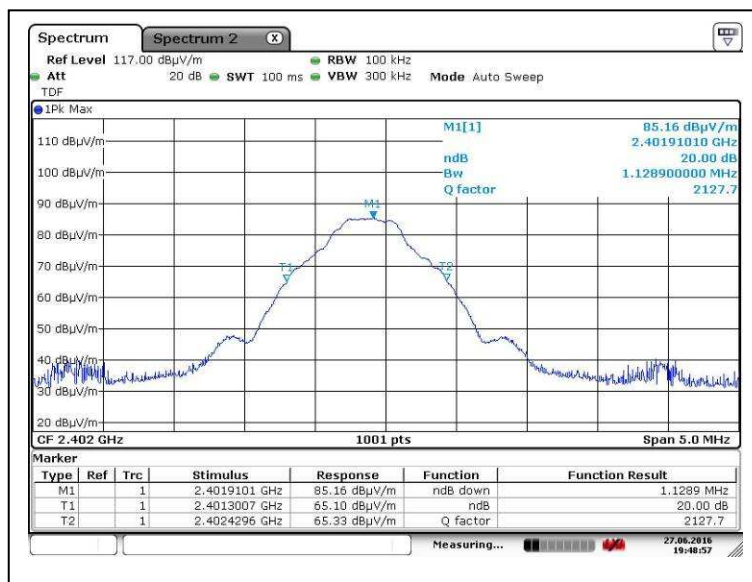
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TEST REPORT

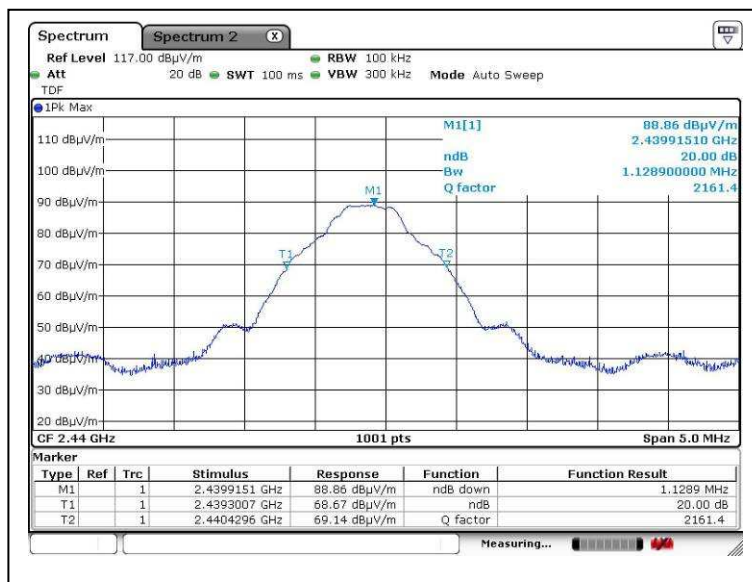
Report No. : AU0039570(2)

Date : 08 Jul 2016

A8. 20dB bandwidth



Lower channel (Bluetooth 3.0)



Middle channel (Bluetooth 3.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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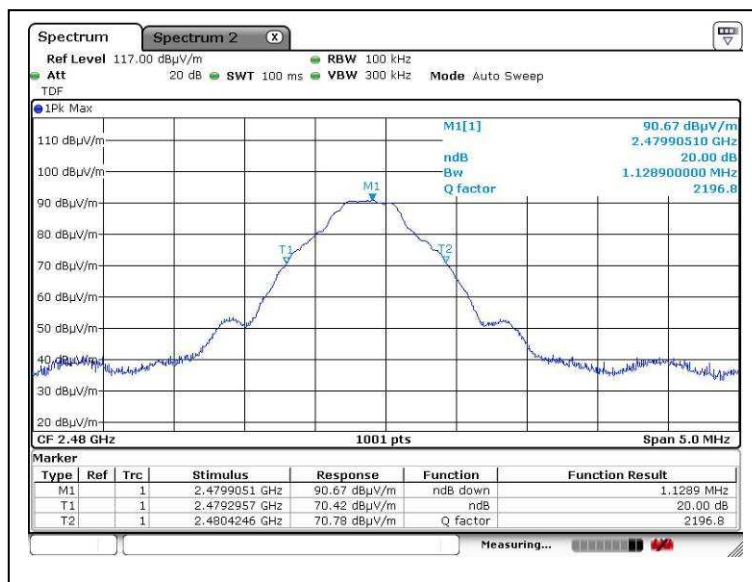
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TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A8. 20dB bandwidth



Higher channel (Bluetooth 3.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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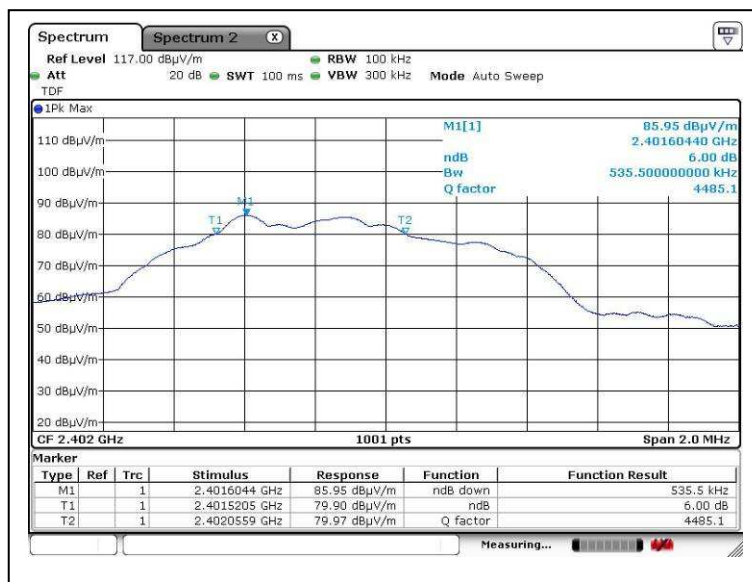
廠商會檢定中心

TEST REPORT

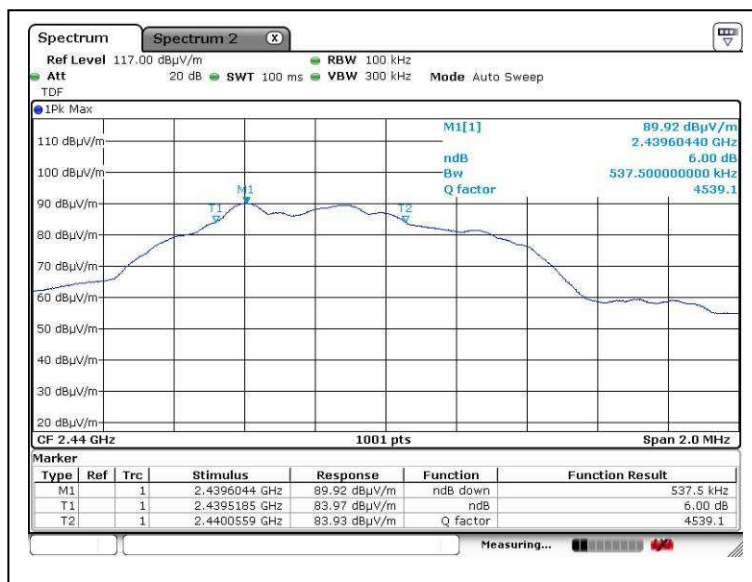
Report No. : AU0039570(2)

Date : 08 Jul 2016

A9. 6dB bandwidth



Lower channel (Bluetooth 4.0)



Middle channel (Bluetooth 4.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: EMOIZBT5

IC: 986B-IZBT5

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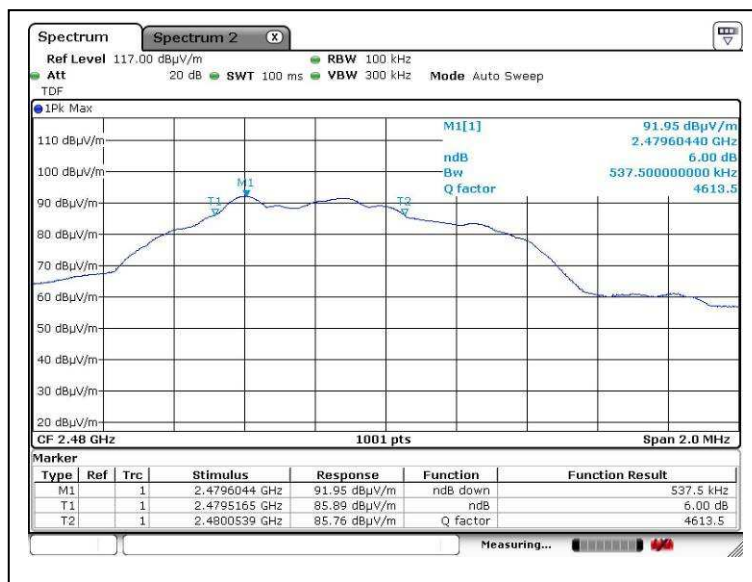
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TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A9. 6dB bandwidth



Higher channel (Bluetooth 4.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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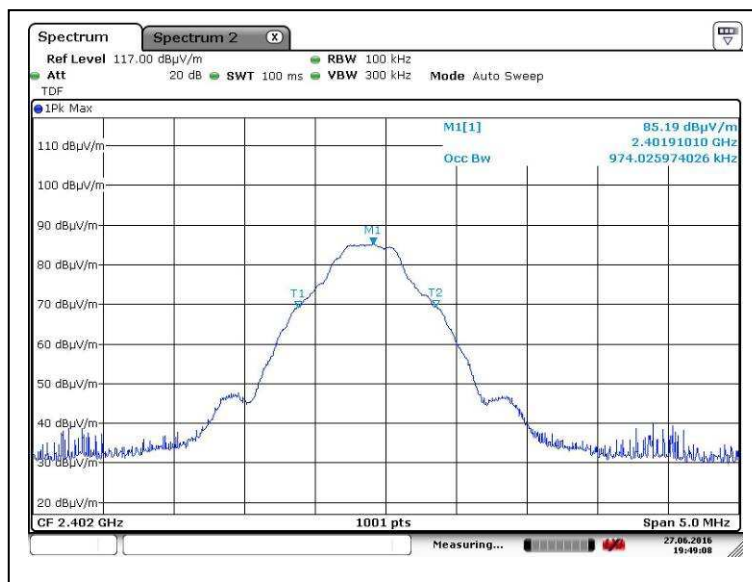
廠商會檢定中心

TEST REPORT

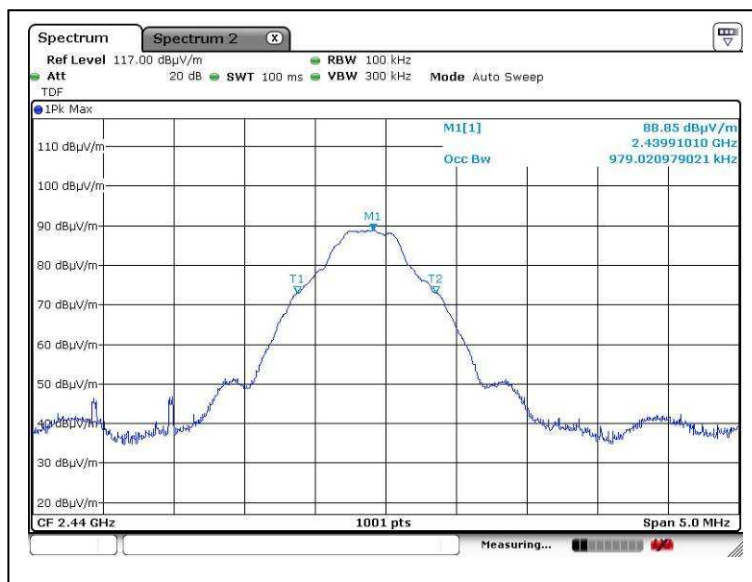
Report No. : AU0039570(2)

Date : 08 Jul 2016

A10. 99% bandwidth



Lower channel (Bluetooth 3.0)



Middle channel (Bluetooth 3.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: EMOIZBT5

IC: 986B-IZBT5

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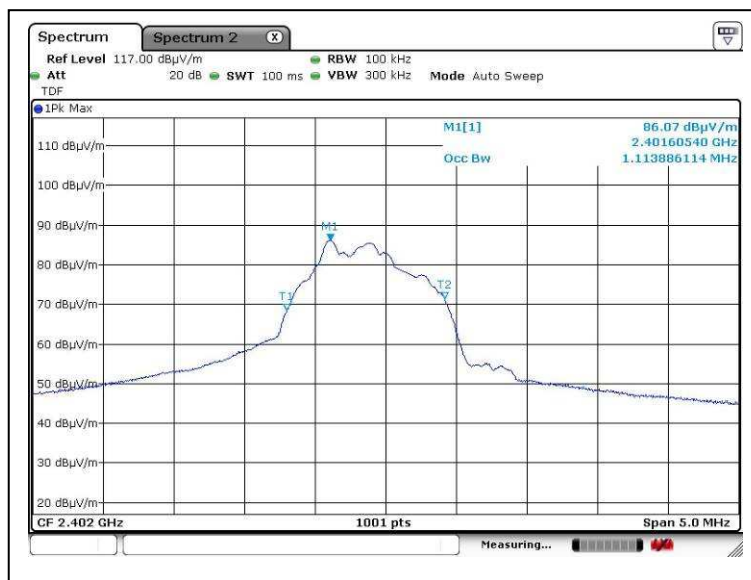
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TEST REPORT

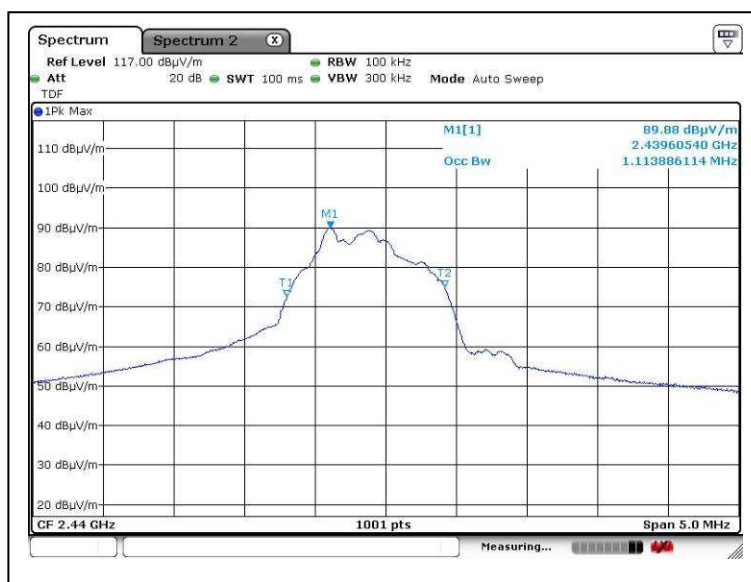
Report No. : AU0039570(2)

Date : 08 Jul 2016

A10. 99% bandwidth



Lower channel (Bluetooth 4.0)



Middle channel (Bluetooth 4.0)

Tested by:

Ken

Mr. LEUNG Shu-kan, Ken

Reviewed by:

PR

Mr. WONG Lap-pong, Andrew

FCC ID: EMOIZBT5

IC: 986B-IZBT5

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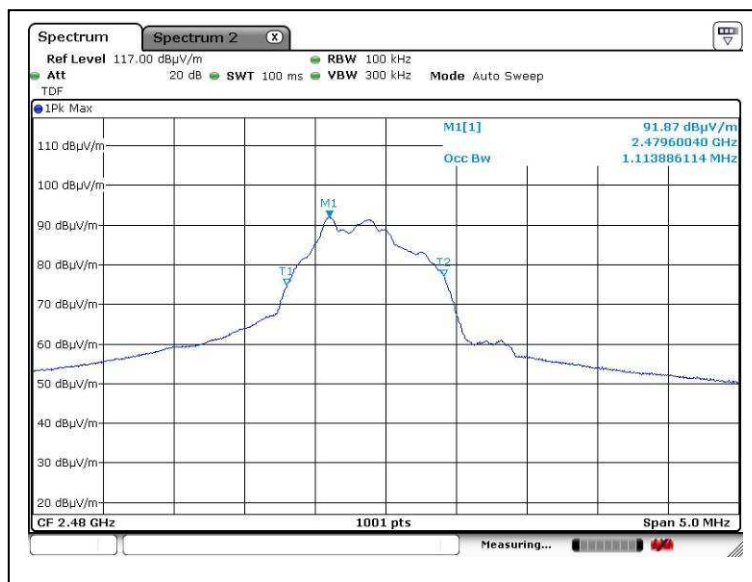
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TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A10. 99% bandwidth



Higher channel (Bluetooth 4.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

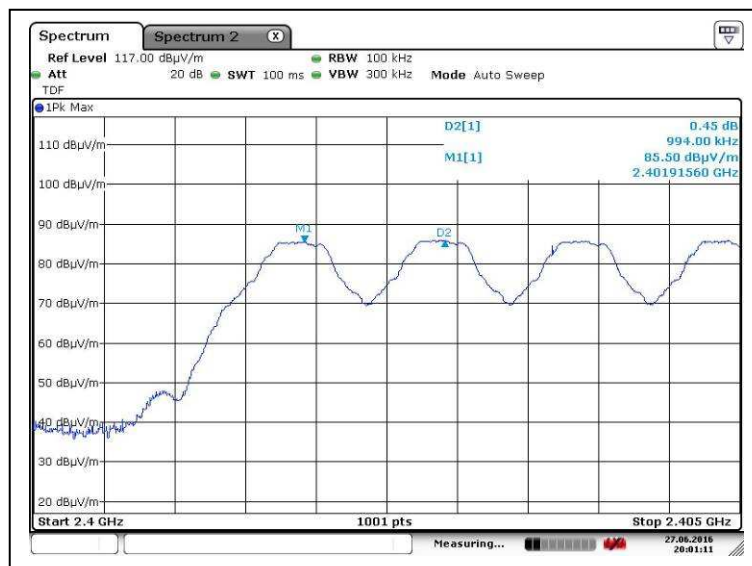
廠商會檢定中心

TEST REPORT

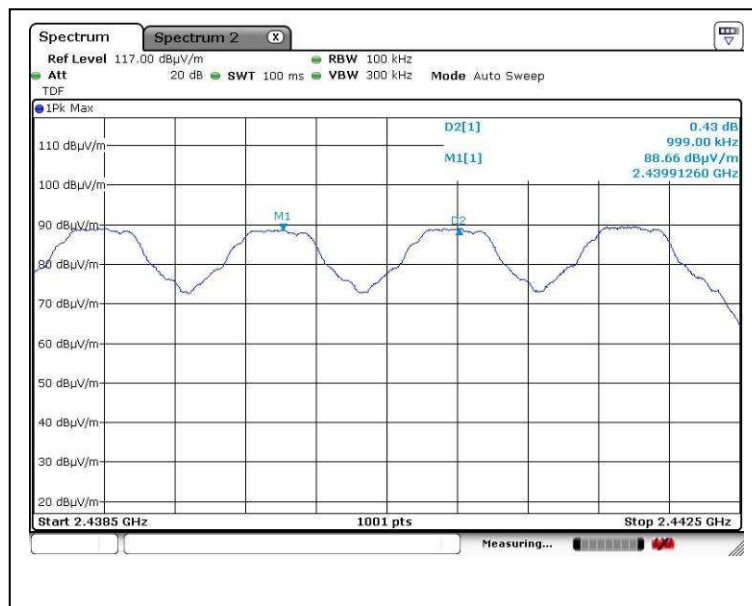
Report No. : AU0039570(2)

Date : 08 Jul 2016

A11. Bluetooth Channel Spacing



CH00-CH01 (Bluetooth 3.0)



CH39-CH40 (Bluetooth 3.0)

Tested by:

Ken

Mr. LEUNG Shu-kan, Ken

Reviewed by:

PR

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

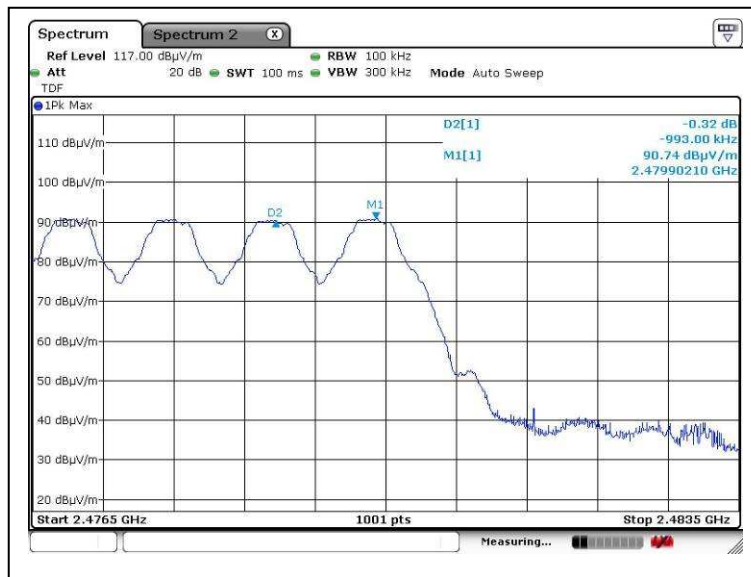
廠商會檢定中心

TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A11. Bluetooth Channel Spacing



CH77-CH78 (Bluetooth 3.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

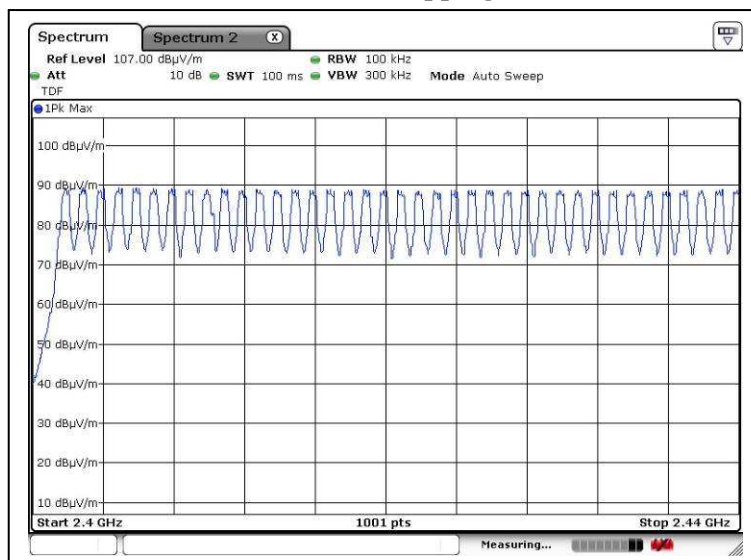
廠商會檢定中心

TEST REPORT

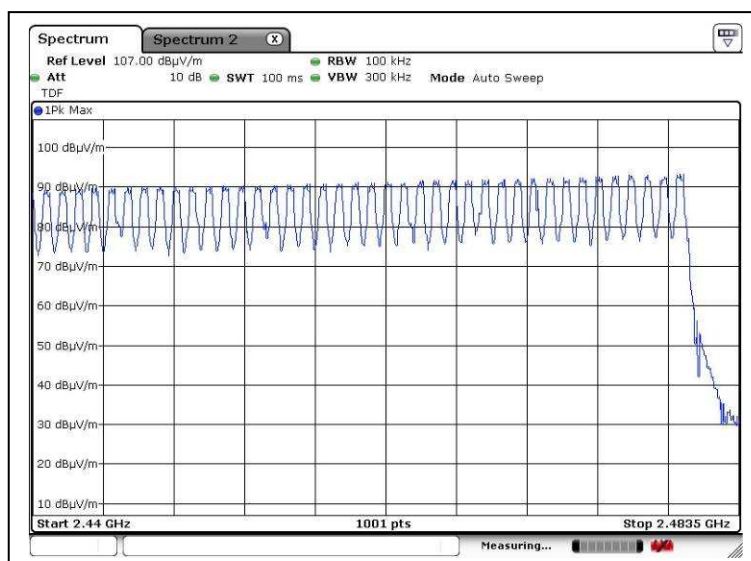
Report No. : AU0039570(2)

Date : 08 Jul 2016

A12. Bluetooth Hopping Channel



CH00-CH39 (Bluetooth 3.0)



CH39-CH78 (Bluetooth 3.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

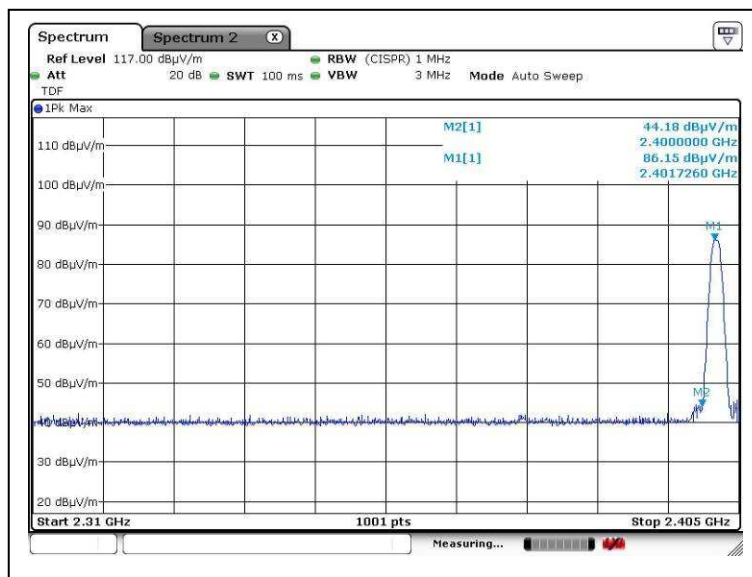
廠商會檢定中心

TEST REPORT

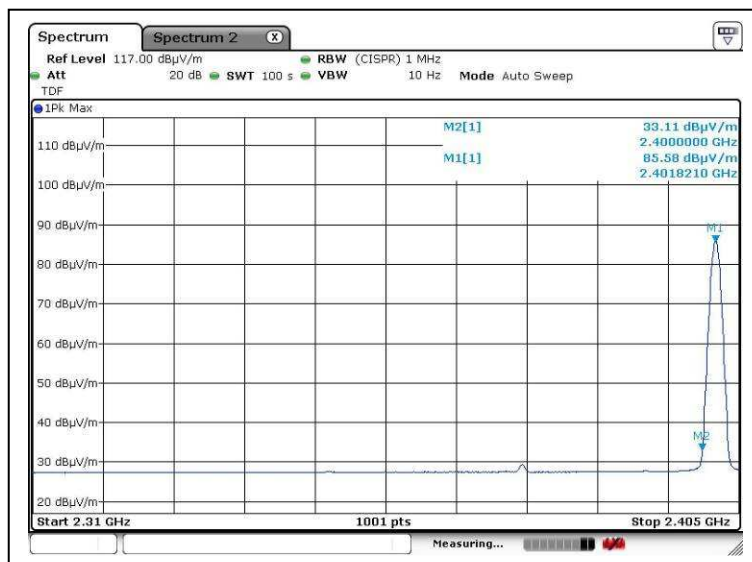
Report No. : AU0039570(2)

Date : 08 Jul 2016

A13. Band Edge



Lower edge (Bluetooth 3.0, Peak measurement, non-hopping mode)



Lower edge (Bluetooth 3.0, Average measurement, non-hopping mode)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: EMOIZBT5

IC: 986B-IZBT5

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Tel: (852) 2698 8198 Fax: (852) 2695 4177 E-mail: info@cmatcl.com Web Site: <http://www.cmatcl.com>



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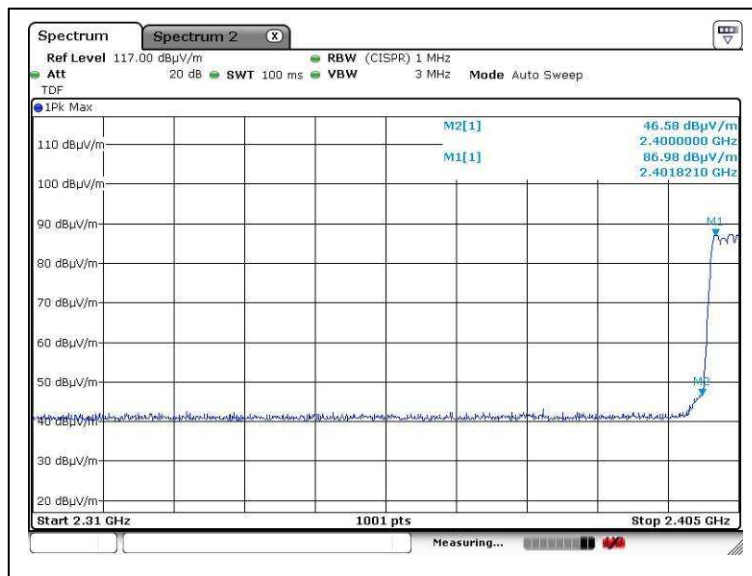
廠商會檢定中心

TEST REPORT

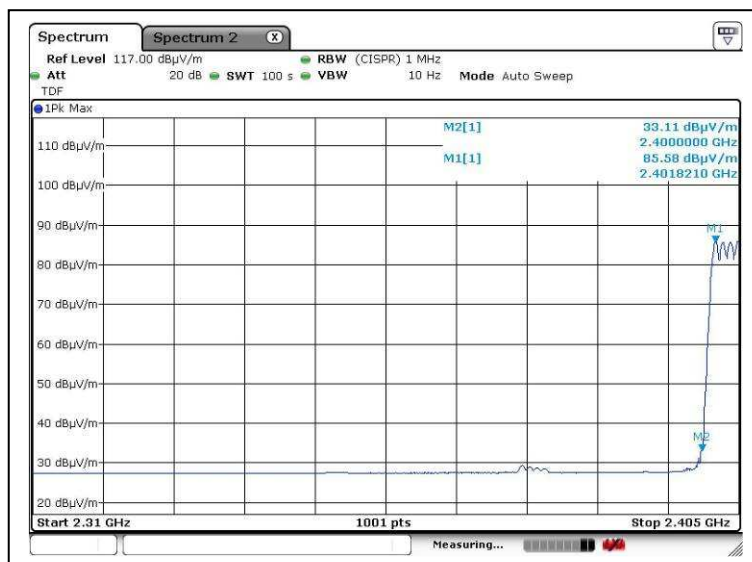
Report No. : AU0039570(2)

Date : 08 Jul 2016

A13. Band Edge



Lower edge (Bluetooth 3.0, Peak measurement, hopping mode)



Lower edge (Bluetooth 3.0, Average measurement, hopping mode)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: EMOIZBT5

IC: 986B-IZBT5

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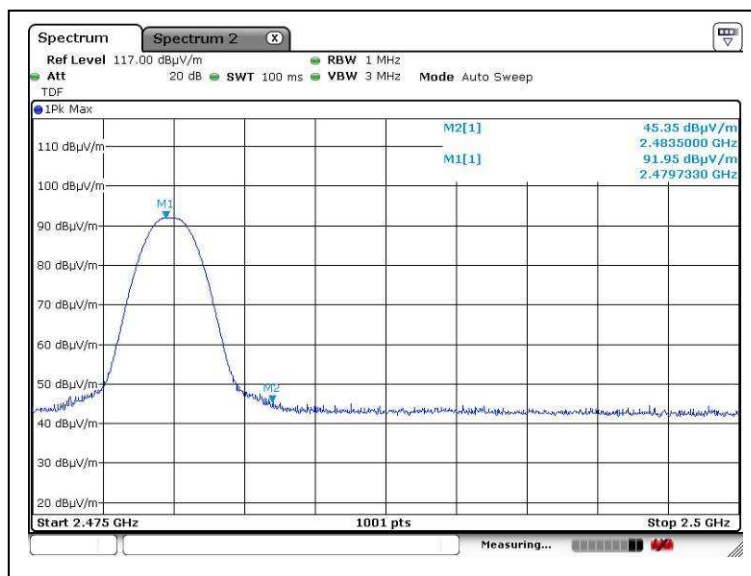
廠商會檢定中心

TEST REPORT

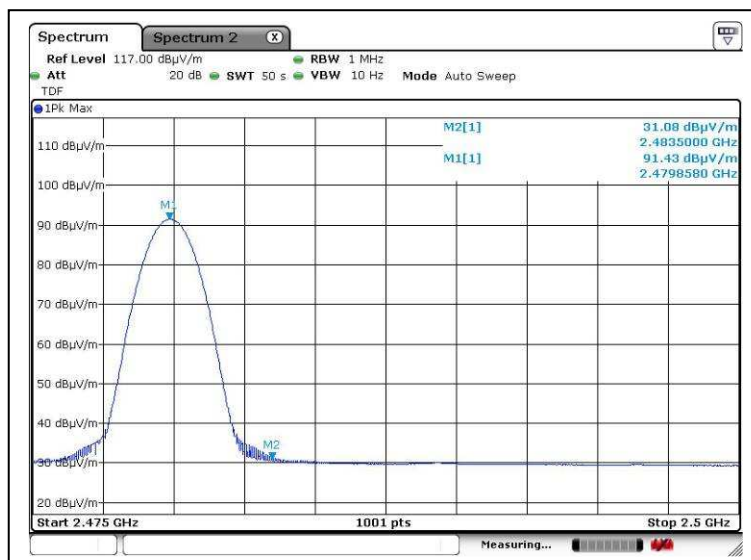
Report No. : AU0039570(2)

Date : 08 Jul 2016

A13. Band Edge



Higher edge (Bluetooth 3.0, Peak measurement, non-hopping mode)



Higher edge (Bluetooth 3.0, Average measurement, non-hopping mode)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

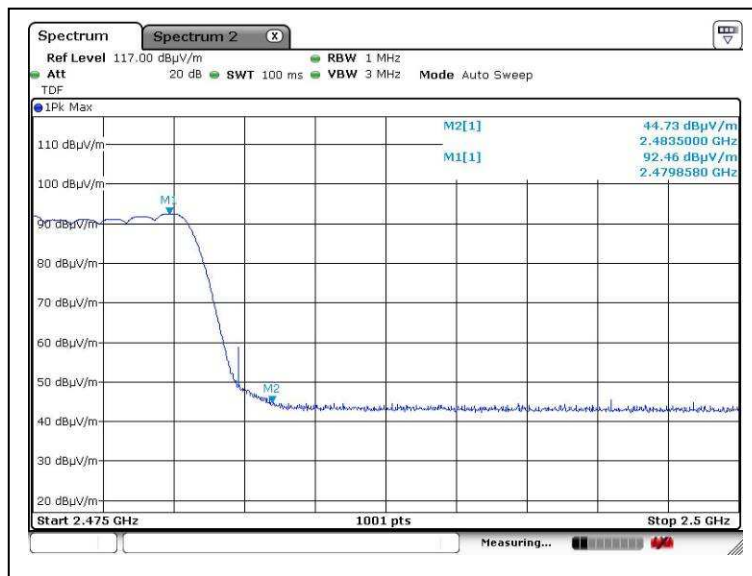
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TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A13. Band Edge



Higher edge (Bluetooth 3.0, Peak measurement, hopping mode)



Higher edge (Bluetooth 3.0, Average measurement, hopping mode)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: EMOIZBT5

IC: 986B-IZBT5

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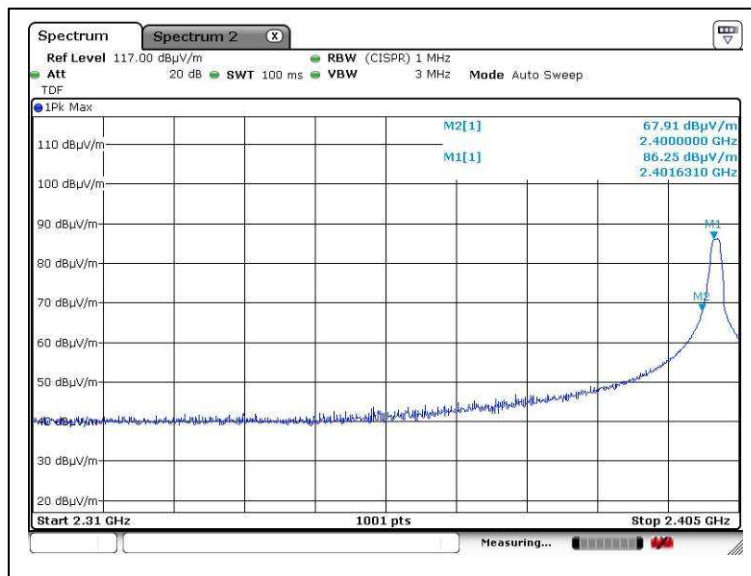
廠商會檢定中心

TEST REPORT

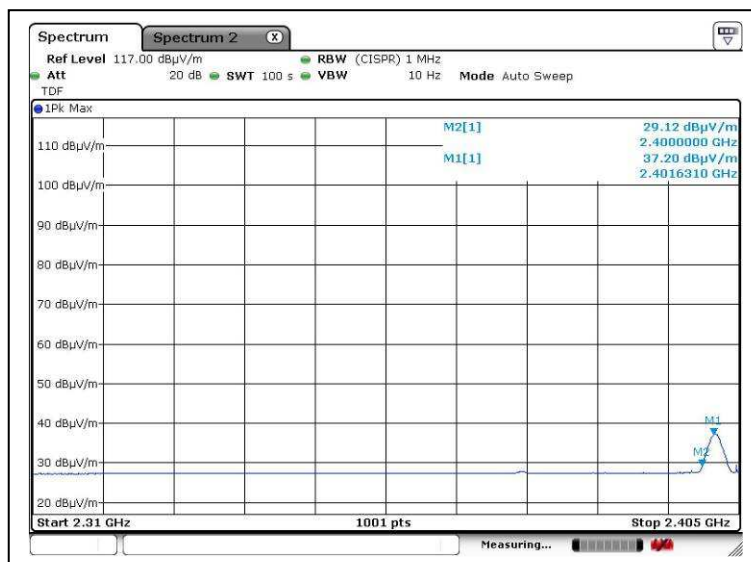
Report No. : AU0039570(2)

Date : 08 Jul 2016

A13. Band Edge



Lower edge (Bluetooth 4.0, Peak measurement)



Lower edge (Bluetooth 4.0, Average measurement)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

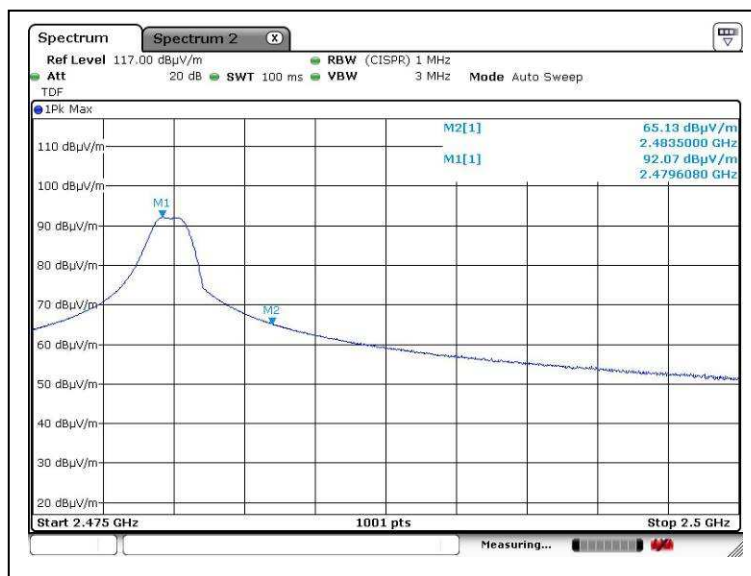
廠商會檢定中心

TEST REPORT

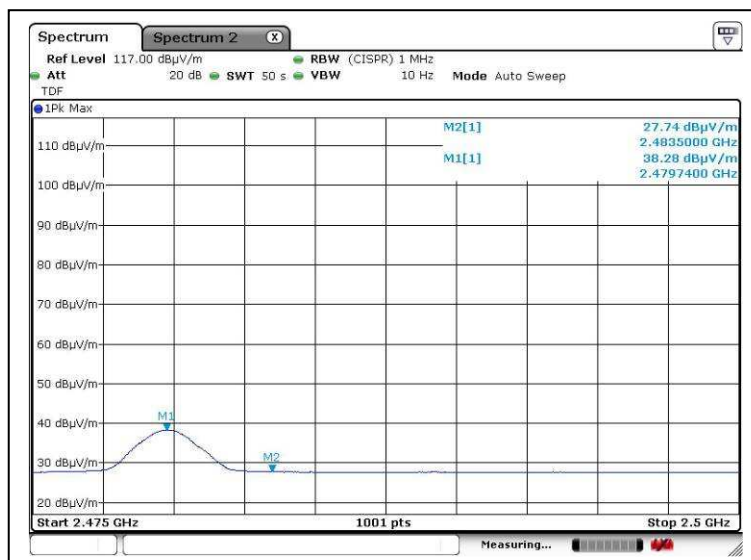
Report No. : AU0039570(2)

Date : 08 Jul 2016

A13. Band Edge



Higher edge (Bluetooth 4.0, Peak measurement)



Higher edge (Bluetooth 4.0, Average measurement)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: EMOIZBT5

IC: 986B-IZBT5

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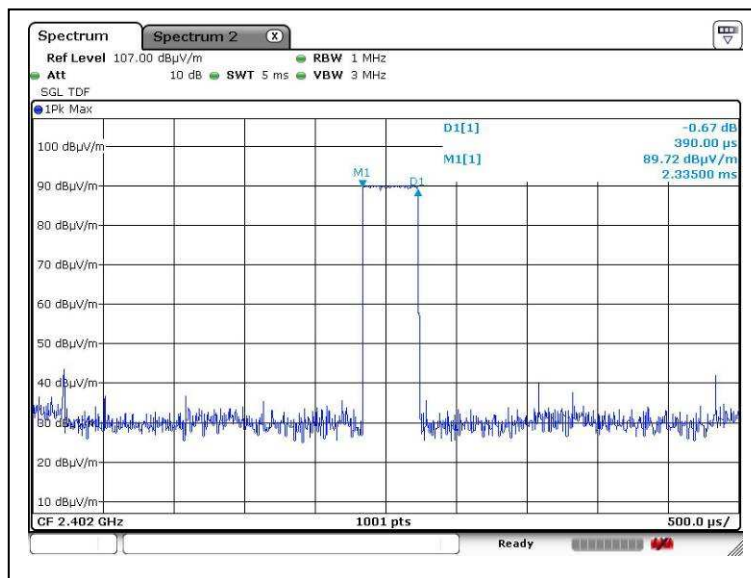
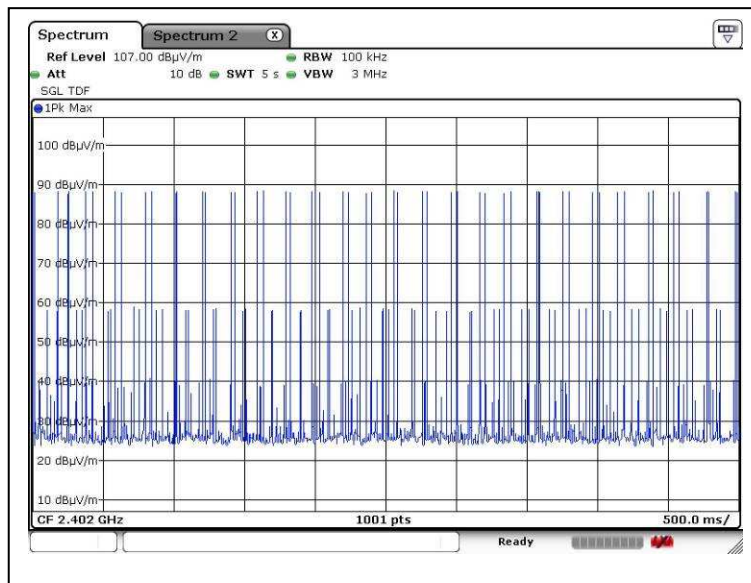
TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A14. Bluetooth Average On Time

Channel: Lower
Packet: DH1



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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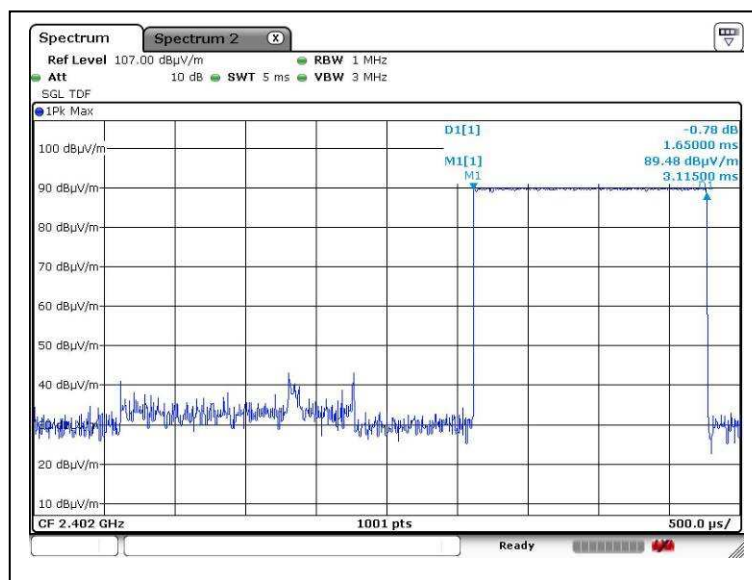
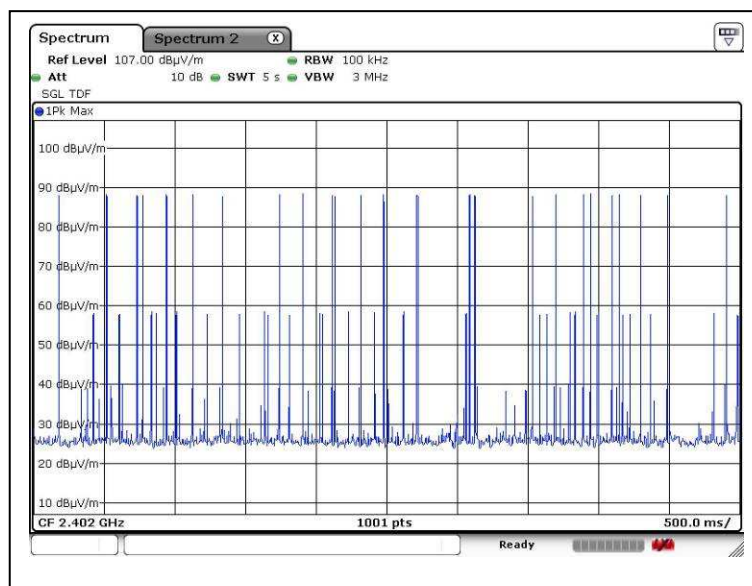
TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A14. Bluetooth Average On Time

Channel: Lower
Packet: DH3



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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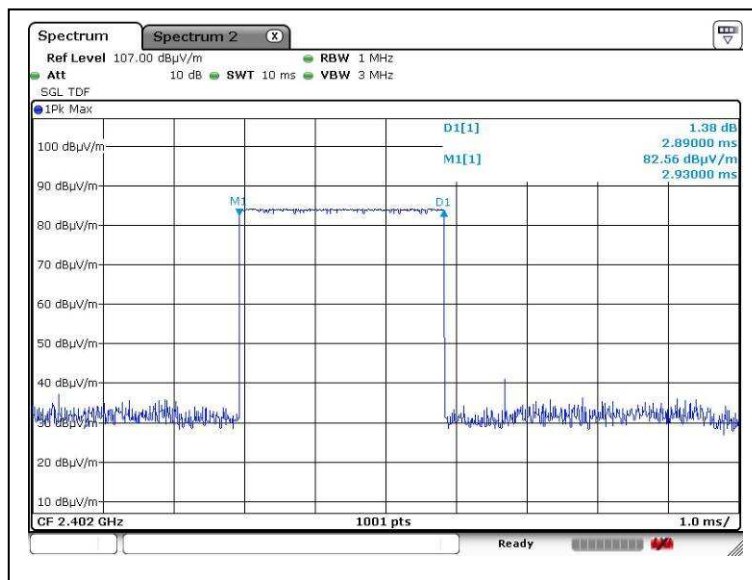
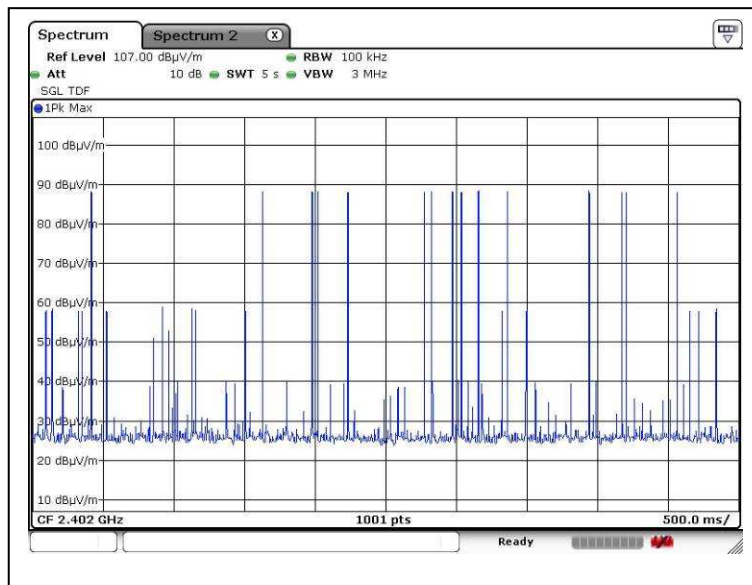
TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A14. Bluetooth Average On Time

Channel: Lower
Packet: DH5



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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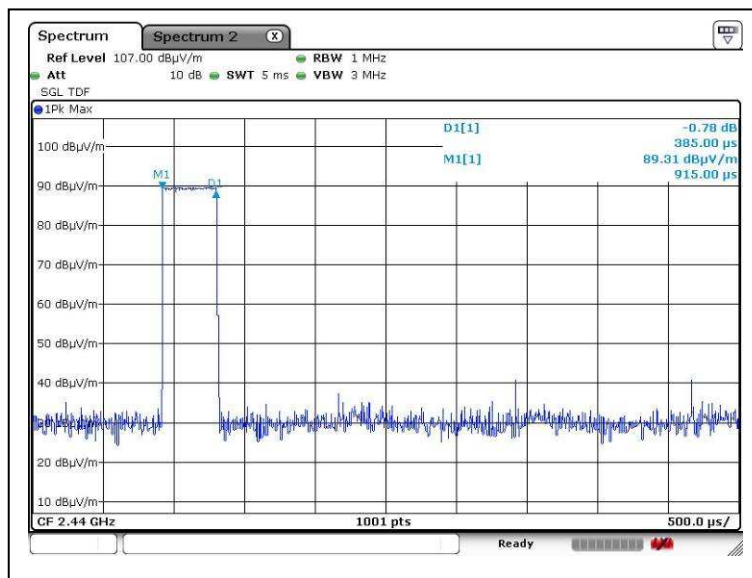
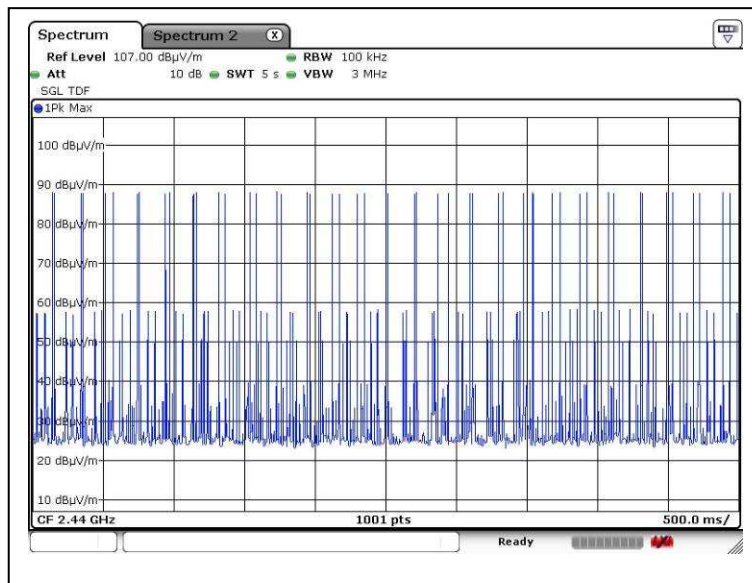
TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A14. Bluetooth Average On Time

Channel: Middle
Packet: DH1



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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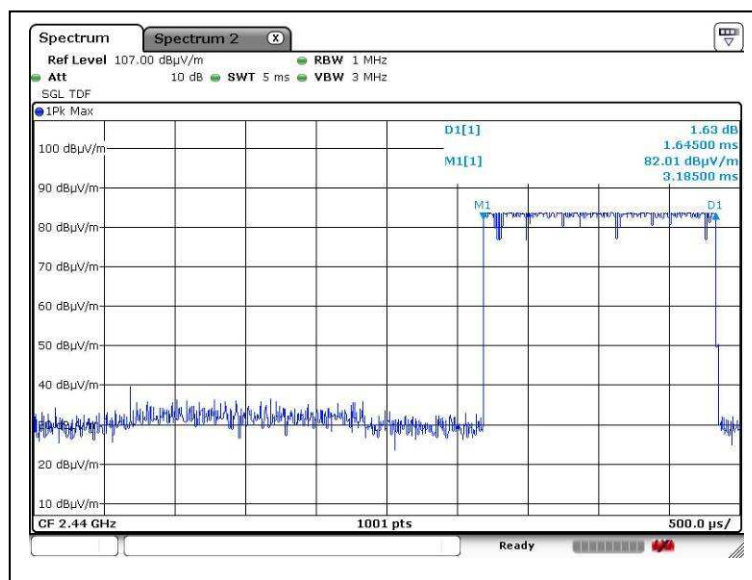
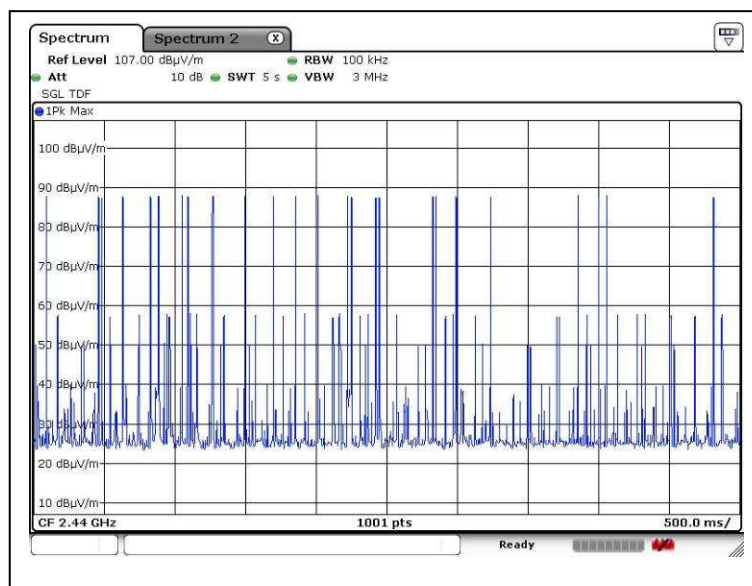
TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A14. Bluetooth Average On Time

Channel: Middle
Packet: DH3



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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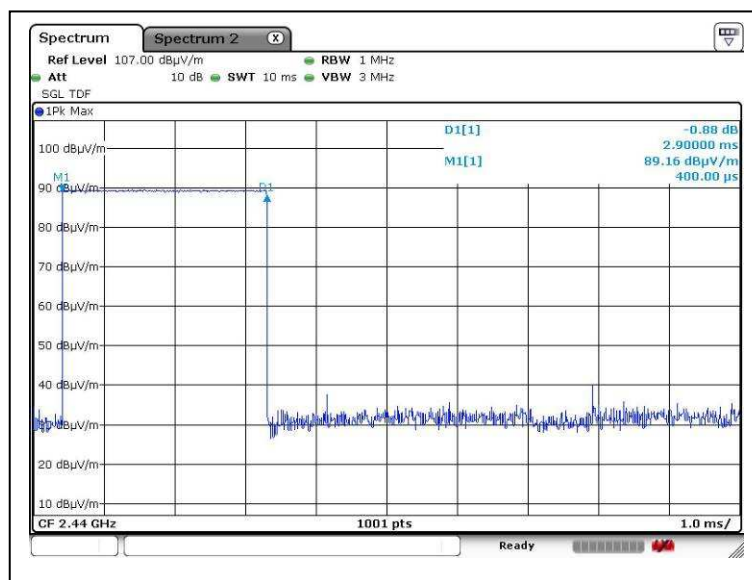
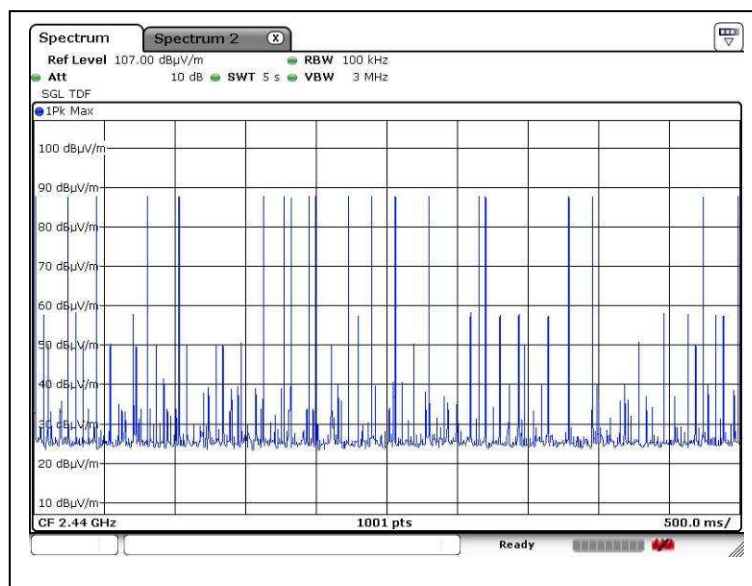
TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A14. Bluetooth Average On Time

Channel: Middle
Packet: DH5



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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廠商會檢定中心

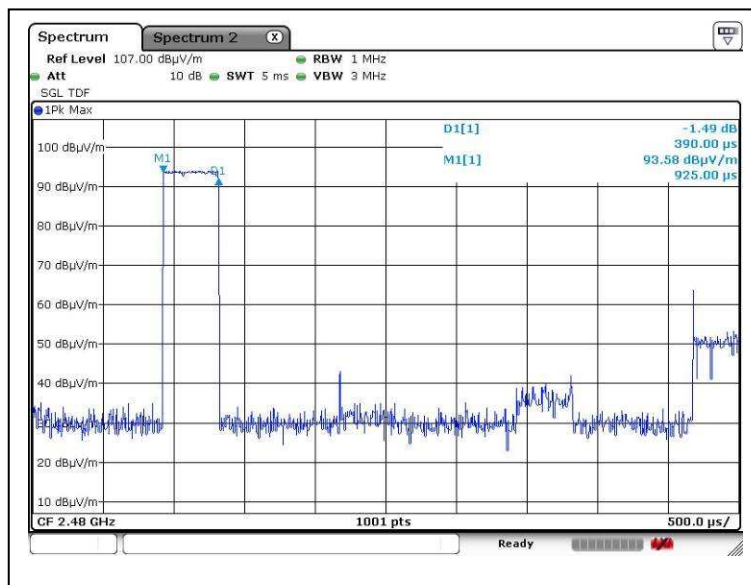
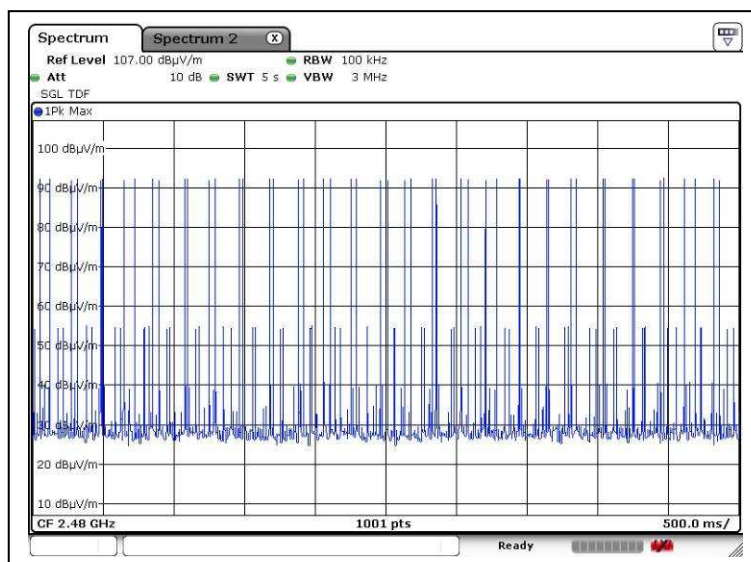
TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A14. Bluetooth Average On Time

Channel: Higher
Packet: DH1



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

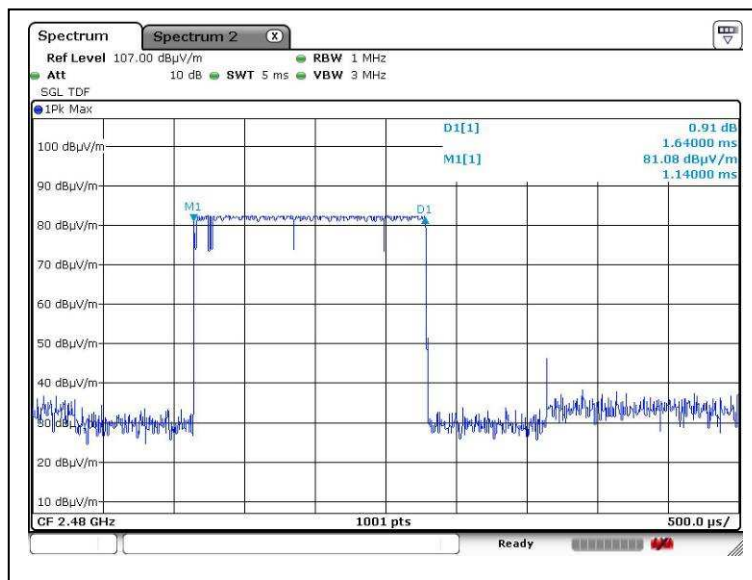
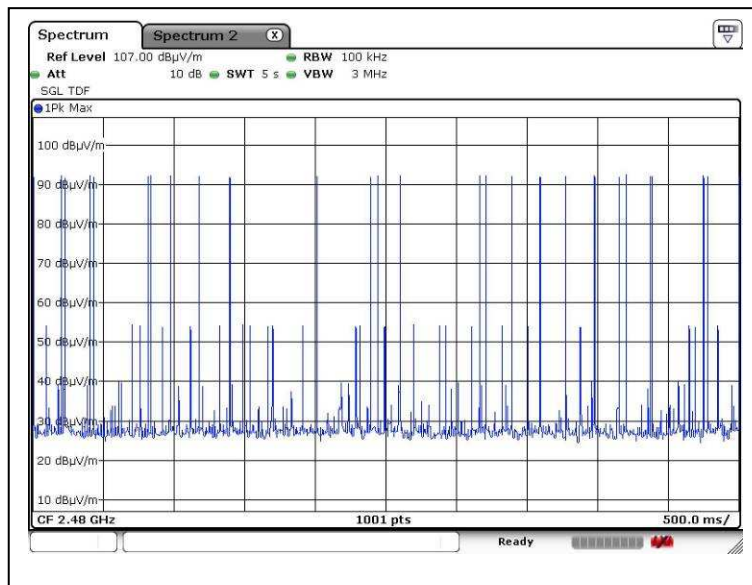
TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A14. Bluetooth Average On Time

Channel: Higher
Packet: DH3



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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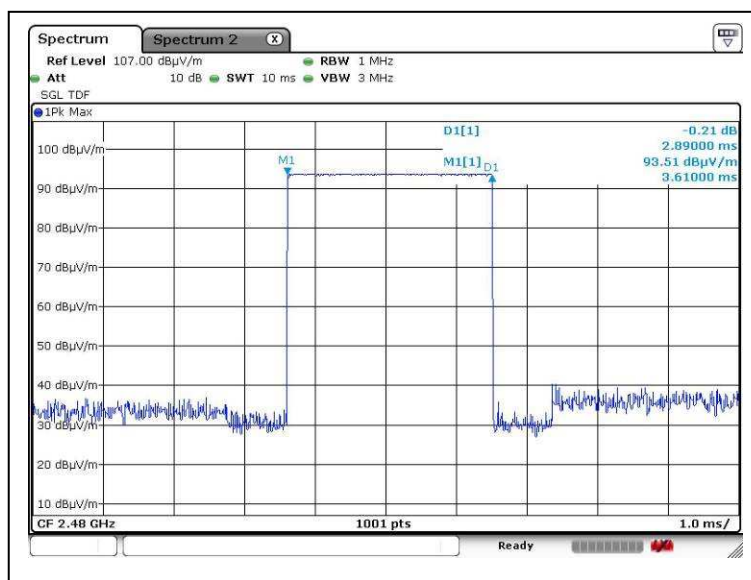
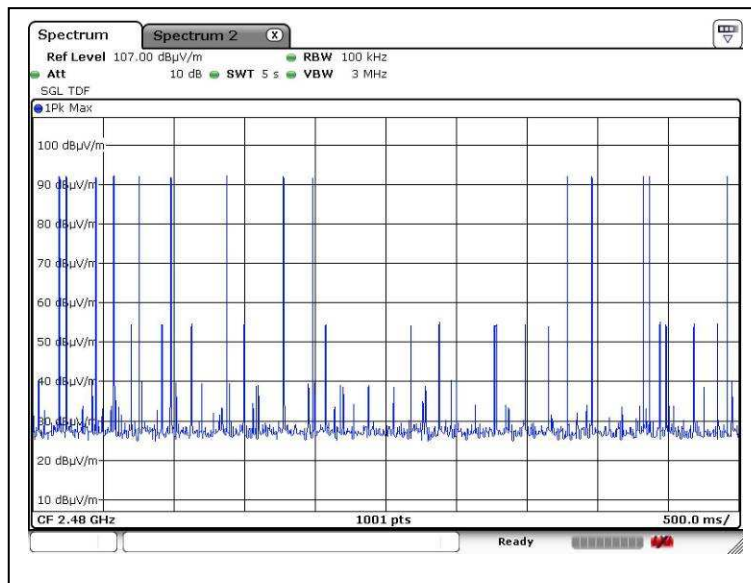
TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A14. Bluetooth Average On Time

Channel: Higher
Packet: DH5



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A15. Power Spectral Density



Lower channel (Bluetooth 4.0)



Middle channel (Bluetooth 4.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A15. Power Spectral Density



Higher channel (Bluetooth 4.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

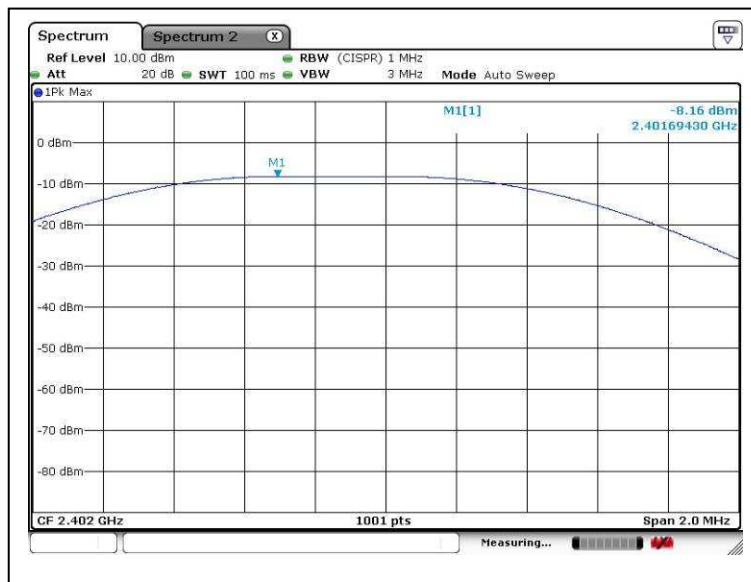
廠商會檢定中心

TEST REPORT

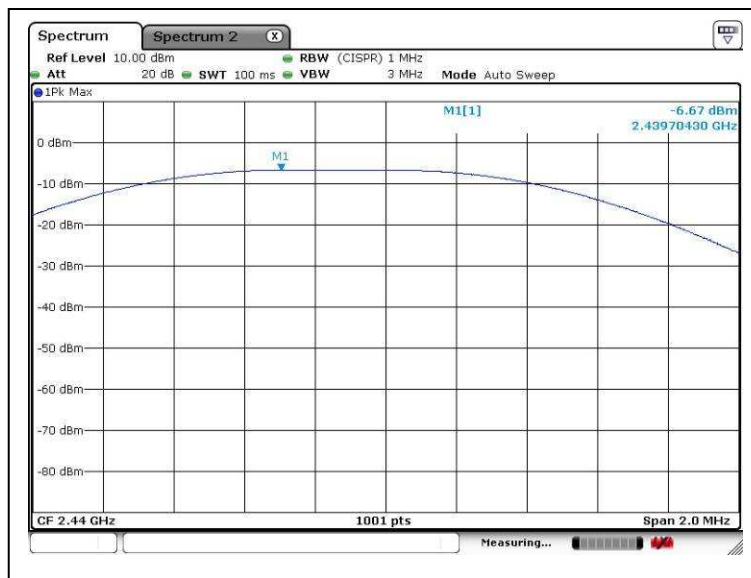
Report No. : AU0039570(2)

Date : 08 Jul 2016

A16. Transmission Power



Lower channel (Bluetooth 3.0)



Middle channel (Bluetooth 3.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

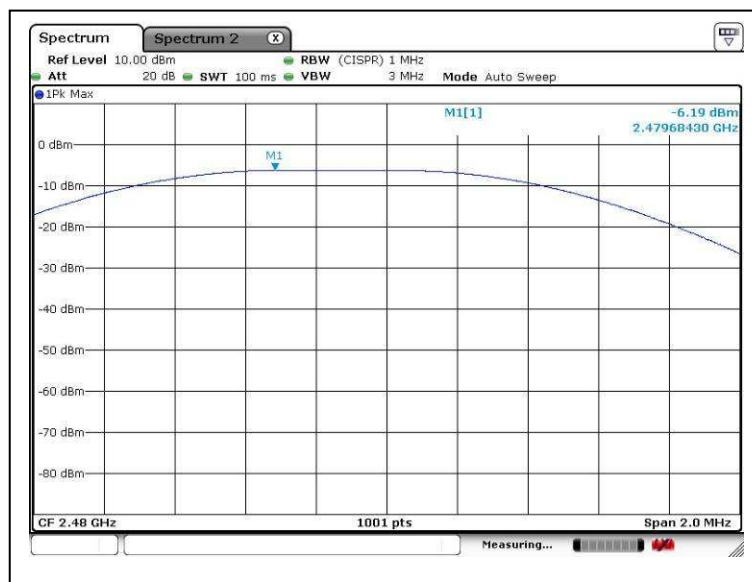
廠商會檢定中心

TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A16. Transmission Power



Higher channel (Bluetooth 3.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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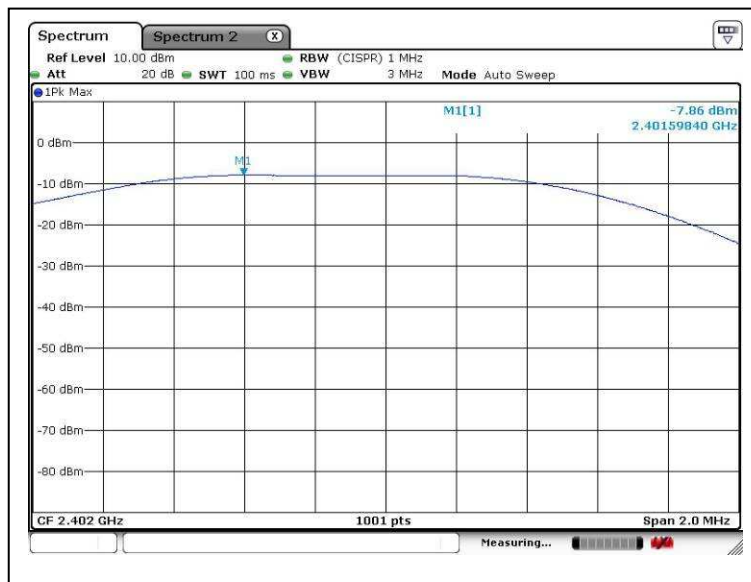
廠商會檢定中心

TEST REPORT

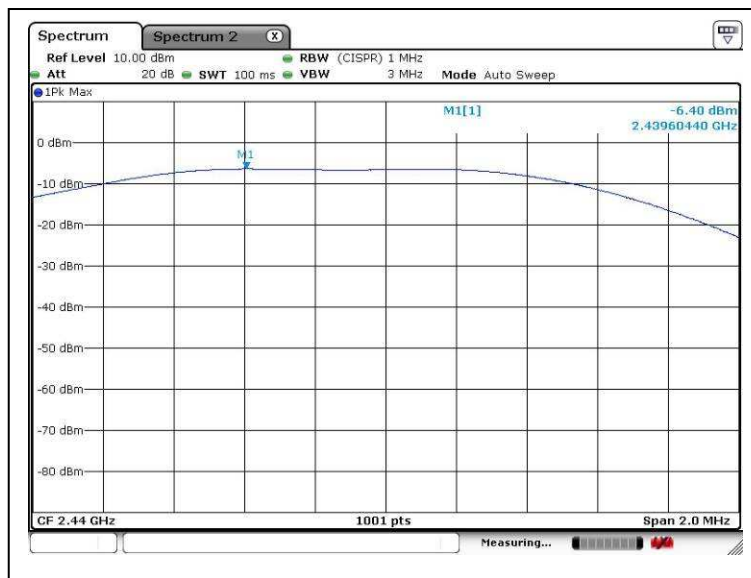
Report No. : AU0039570(2)

Date : 08 Jul 2016

A16. Transmission Power



Lower channel (Bluetooth 4.0)



Middle channel (Bluetooth 4.0)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

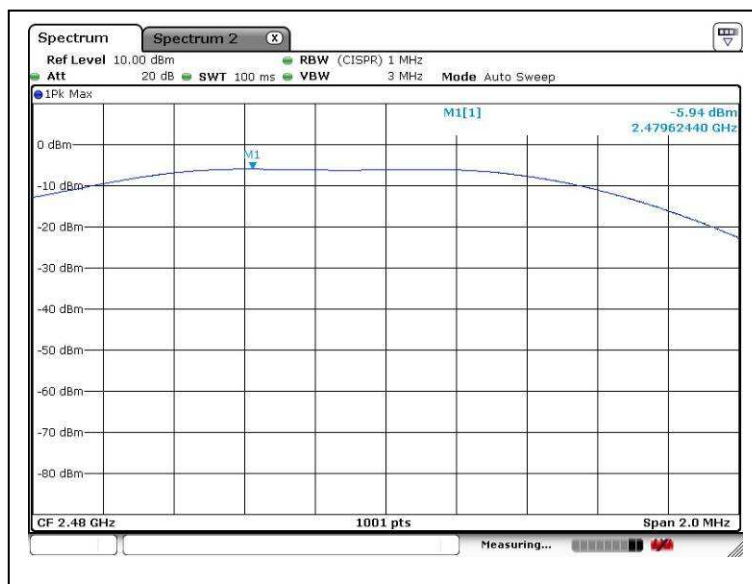
廠商會檢定中心

TEST REPORT

Report No. : AU0039570(2)

Date : 08 Jul 2016

A16. Transmission Power



Higher channel (Bluetooth 4.0)

***** End of Report *****

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew