



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7) Date : 28 Jan 2016

Application No. : LT051920(6)

Applicant : Brilliant Rich Electronics Limited
Flat 1, 2/F Universal Industrial Centre,
19-21 Shan Mei Street, Fotan, Hong Kong.

Sample Description : One(1) item of submitted sample stated to be Cooler box radio with Bluetooth of Model No. 2313B-BT
Sample registration No. : RT056166-001, RU001497-001
Radio Frequency : 2402MHz – 2480 MHz Transceiver
Rating : 8 x 1.5V C size batteries
AC 100-240V to DC 12V
No. of submitted sample : Four (4) piece (s)

Date Received : 10 Dec 2015, 16 Jan 2016

Test Period : 29 Dec 2015 to 21 Jan 2016.

Test Requested : FCC Part 15 Certificate (15.247)

Test Method : 47 CFR Part 15 (10-1-14 Edition), ANSI C63.10 – 2013, ANSI C63.4 – 2014, FCC Public Notice DA 00-705

Test Engineer : Mr. LEUNG Shu-kan, Ken

Test Result : See attached sheet(s) from page 2 to 61.

Conclusion : The submitted sample was found to comply with requirement of FCC Part 15 Subpart B and C.

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____

Mr. WONG Lap-pong, Andrew
Manager
Electrical Division

Page 1 of 61

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

Table of Contents

1	General Information	3
1.1	General Description	3
1.2	Location of the test site	5
1.3	List of measuring equipment.....	6
1.4	Measurement Uncertainty	7
2	Description of the radiated emission test	8
2.1	Test Procedure	8
2.2	Test Result	9
2.3	Maximum peak output power	10
3	Description of the Line-conducted Test.....	14
3.1	Test Procedure	14
3.2	Test Result	14
3.3	Graph and Table of Conducted Emission Measurement Data	14
4	Photograph	15
4.1	Photographs of the Test Setup for Radiated Emission and Conducted Emission	15
4.2	Photographs of the External and Internal Configurations of the EUT	15
5	Supplementary document.....	16
5.1	Bandwidth.....	16
5.2	Hopping sequence.....	17
5.3	Average on time	18
5.4	Antenna requirement.....	18
6	Appendices	19



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

1 General Information

1.1 General Description

The equipment under test (EUT) is a cooler box with bluetooth receiver. The EUT is power by 8 x 1.5V C size batteries / AC 100-240 to DC 12V adaptor. 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 V2.1+EDR or below revision protocol for data synchronization. After paring with other standard Bluetooth device, it can play the music.

The Bluetooth module used in the speaker has been test and approved by official Bluetooth Special Interest Group (SIG) member. All technical requirements including hopping rate, Frequency channels, Pseudo randomly order list and Bandwidth has been tested and complied with Spread Spectrum System requirements. The compliance information was listed at Bluetooth SIG with ID code is D023601 for model No F-6688.

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

Page 3 of 61

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

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 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 its 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:

- U1 and its associated circuit act as bluetooth module
- U3 and its associated circuit act as FM receiver
- X1 and its associated circuit act as oscillator
- U2, U4 and its associated circuit act as audio amplifier
- IC401 and its associated circuit act as voltage regulator

Antenna type : PCB Antenna

Antenna gain : 0dBi

Modulation technique : GFSK

Number of channel : 79 channels



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

1.2 Location of the test site

FCC Registered Test Site Number: 552221

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,
Fo Tan, Shatin,
New Territories,
Hong Kong.

FCC ID: T4G2313B-BT

Page 5 of 61



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

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	02 Feb 2016	1Year
Broadband Antenna	Schaffner	CBL6112B	2692	19 Feb 2016	2Years
Loop Antenna	EMCO	6502	00056620	28 Oct 2016	1Year
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 2016	1Year
Coaxial Cable	Suhner	RG 214/U	N/A	18 May 2016	1Year
Coaxial Cable	Suhner	Sucoflex_104	N/A	13 Dec 2016	1Year
LISN	R&S	ENV216	101323	21 Oct 2016	1Year
Coaxial Cable	Tyco Electronics	RG 58C/U	N/A	01 Nov 2016	1Year



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

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)	4.66dB
30MHz ~ 200MHz (Vertical)	4.67dB
200MHz ~1000MHz (Horizontal)	4.68dB
200MHz ~1000MHz (Vertical)	4.67dB

Conducted emissions

Frequency	Uncertainty (U_{lab})
150kHz~30MHz	2.63dB



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

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.



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

2.2 Test Result

Summary

Section in FCC part 15	Description	Result
15.205(a), 15.209, 15.247(d)	Transmitter radiated spurious field strength and other emissions	Page 11
15.209	Receiver emissions	Page 12
15.209	Voltage disturbance	Page 14, 35-37
15.247 (a)(1), Part 2.1 and DA-00705	Hopping sequence	Page 38, 39
15.247 (a)(1)	20dB bandwidth and 99% bandwidth	Page 40-43
15.247 (a)(1)	Channel Spacing (Frequency separation)	Page 44, 45
15.247 (a)(1)(iii)	Number of hopping frequency	Page 46
15.247 (d)	Band Edge	Page 47-50
15.247 (a)(1)(iii)	Dwell Time (Bluetooth Average On Time)	Page 41-59
15.247 (b)(1)	Maximum Peak output power	Page 10, 60, 61

Subpart C:

Peak Detector data were measured unless otherwise stated.

“#” means emissions appear within the restricted bands shall follow the requirement of section 15.205.

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:

The emissions meet the requirement of section 15.109 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 requirement.

Page 9 of 61

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

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:	21 ° C
Relative humidity:	62 %

Operation Mode: Transmission

Channel	Frequency (MHz)	Reading (dBm)	Reading (mW)	Limit (mW)	Margin (mW)
Lower	2401.825	- 28.66	0.0014	1000.0	- 999.9986

Channel	Frequency (MHz)	Reading (dBm)	Reading (mW)	Limit (mW)	Margin (mW)
Middle	2441.184	- 28.76	0.0013	1000.0	- 999.9987

Channel	Frequency (MHz)	Reading (dBm)	Reading (mW)	Limit (mW)	Margin (mW)
Higher	2479.820	- 28.06	0.0016	1000.0	- 999.9984

The plot saved in TestRpt9.pdf shows the transmission power was less than 1 watt.

FCC ID: T4G2313B-BT

Page 10 of 61



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

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:	21 °C
Relative humidity:	62 %

Measurement: Peak RBW: 1MHz VBW: 3MHz

Testing frequency range: 9kHz to 25GHz

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dB μ V)	Transducer Factor (dB/m)	Field Strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
2402.175	H	80.8	- 4.2	76.6	114.0	- 37.4
#4803.730	H	49.5	3.7	53.2	74.0	- 20.8
#4803.779	V	48.2	3.7	51.9	74.0	- 22.1
7206.550	V	37.4	11.5	48.9	74.0	- 25.1
2441.167	H	82.2	- 4.2	78.0	114.0	- 36.0
#4881.616	H	49.8	3.7	53.5	74.0	- 20.5
#4882.281	V	49.1	3.7	52.8	74.0	- 21.2
#7322.834	V	38.2	11.5	49.7	74.0	- 24.3
2479.830	H	82.3	- 4.3	78.0	114.0	- 36.0
#4959.687	V	48.3	4.0	52.3	74.0	- 21.7
#4960.356	H	49.8	4.0	53.8	74.0	- 20.2
#7439.870	H	38.6	11.5	50.1	74.0	- 23.9

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

Page 11 of 61

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

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:	21 °C
Relative humidity:	70 %

Detector: Quasi-peak

RBW: 120kHz VBW: 300kHz

Operation Mode: Receiving mode

Testing frequency range: 9kHz to 25GHz

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dB μ V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
40.498	H	12.0	16.1	28.1	40.0	- 11.9
85.499	V	23.1	9.1	32.2	40.0	- 7.8
#121.731	H	8.8	14.2	23.0	43.5	- 20.5
#171.455	H	8.4	12.6	21.0	43.5	- 22.5
222.293	H	9.4	11.6	21.0	46.0	- 25.0
#277.960	H	9.5	15.5	25.0	46.0	- 21.0
313.043	H	9.1	16.7	25.8	46.0	- 20.2

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

FCC ID: T4G2313B-BT

Page 12 of 61



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

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:	21 °C
Relative humidity:	70 %

Detector: Quasi-peak

RBW: 120kHz VBW: 300kHz

Operation Mode: Aux-in mode

Testing frequency range: 9kHz to 25GHz

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dB μ V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
56.430	H	14.1	10.5	24.6	40.0	- 15.4
84.674	V	20.1	9.1	29.2	40.0	- 10.8
140.167	H	8.9	13.6	22.5	43.5	- 21.0
199.991	H	22.2	11.6	33.8	43.5	- 9.7
236.222	H	9.8	12.8	22.6	46.0	- 23.4
#282.955	H	9.6	15.5	25.1	46.0	- 20.9
314.264	H	9.3	16.7	26.0	46.0	- 20.0

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

FCC ID: T4G2313B-BT

Page 13 of 61



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

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 requirement.

3.3 Graph and Table of Conducted Emission Measurement Data

For electronic filling, the document is saved with filename TestRpt2.pdf.

FCC ID: T4G2313B-BT

Page 14 of 61



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

4 Photograph

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

For electronic filing, the photos are saved with filename T4G2313B-BT TSUp.pdf.

4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename T4G2313B-BT ExPho.pdf and T4G2313B-BT InPho.pdf.

FCC ID: T4G2313B-BT

Page 15 of 61



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

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
Users Manual	UserMan.pdf
Operational Description	OpDes.pdf

5.1 Bandwidth

Bluetooth:

The plot saved in TestRpt4.pdf shows the 20dB bandwidth and 99% bandwidth:

Frequency Channel (MHz)	20dB bandwidth (kHz)	99% bandwidth (kHz)
2402	1168.8	1016.9
2441	1170.8	1012.9
2480	1158.8	1012.9

The plot saved in TestRpt5.pdf 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	999	779.2	25
2441	1003	780.5	25
2480	1000	772.5	25

The plot saved in TestRpt6.pdf shows the frequency hopping channel over 75 hopping frequency.

The plot saved in TestRpt7.pdf 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.

FCC ID: T4G2313B-BT

Page 16 of 61



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

5.2 Hopping sequence

The plot saved in TestRpt3.pdf 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 = 2.4019600GHz

The 2nd example of fundamental frequency = 2.4569320GHz

The 3rd example of fundamental frequency = 2.4353270GHz

The 4th example of fundamental frequency = 2.4749500GHz

Result:

Fc 1 – Fc 2 = -54.972MHz

Fc 2 – Fc 3 = +21.605MHz

Fc 3 – Fc 4 = -39.623MHz

It was found the hopping pattern is pseudorandom random.

FCC ID: T4G2313B-BT

Page 17 of 61



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

5.3 Average on time

The plot saved in TestRpt8.pdf 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	0.161	0.4	- 0.239
2402	DH3	0.305	0.4	- 0.095
2402	DH5	0.322	0.4	- 0.078
2441	DH1	0.159	0.4	- 0.241
2441	DH3	0.301	0.4	- 0.099
2441	DH5	0.329	0.4	- 0.071
2480	DH1	0.170	0.4	- 0.230
2450	DH3	0.306	0.4	- 0.094
2480	DH5	0.341	0.4	- 0.059

5.4 Antenna requirement

Appendices A5 shows the antenna is permanently attached and cannot be changed. Therefore it fulfils the section 15.203 requirement

FCC ID: T4G2313B-BT

Page 18 of 61



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

6 Appendices

A1	Photos of the set-up of Radiated Emissions	4	pages
A2	Photos of the set-up of Conducted Emissions	2	pages
A3	Photos of External Configurations	4	pages
A4	Photos of Internal Configurations	3	pages
A5	EUT Antenna	1	page
A6	ID Label/Location	1	page
A7	Conducted Emission Measurement Data	3	pages
A8	Hopping sequence	2	pages
A9	20 dB bandwidth	2	pages
A10	99% bandwidth	2	pages
A11	Bluetooth Channel Spacing	2	pages
A12	Bluetooth Hopping Channel	1	page
A13	Band Edge	4	pages
A14	Bluetooth Average on time	9	pages
A15	Transmission Power	2	pages

FCC ID: T4G2313B-BT

Page 19 of 61



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A1. Photos of the set-up of Radiated Emissions



(Front view, 30MHz – 1GHz)



(Back view, 30MHz – 1GHz)

Tested by:

A handwritten signature in black ink, appearing to read 'Ken'.

Mr. LEUNG Shu-kan, Ken

Reviewed by:

A handwritten signature in black ink, appearing to read 'R.L.'.

Mr. WONG Lap-pong, Andrew

FCC ID: T4G2313B-BT

Page 20 of 61



CMA Testing and Certification Laboratories

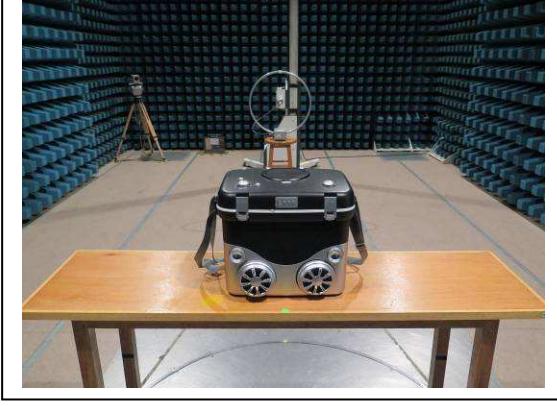
廠商會檢定中心

TEST REPORT

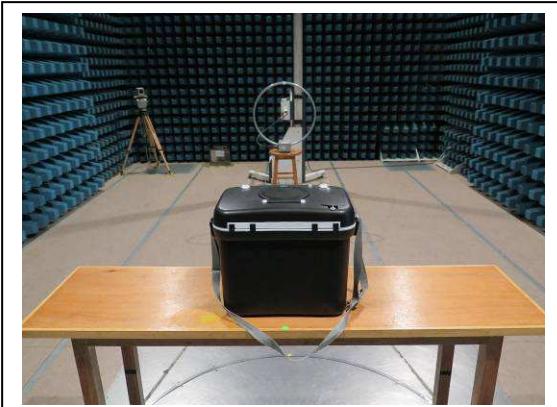
Report No. : AU0006507(7)

Date : 28 Jan 2016

A1. Photos of the set-up of Radiated Emissions



(Front view, 9KHz – 30MHz)



(Back view, 9KHz – 30MHz)

Tested by:

A handwritten signature in black ink, appearing to read 'Ken'.

Mr. LEUNG Shu-kan, Ken

Reviewed by:

A handwritten signature in black ink, appearing to read 'R. L.'.

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 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



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

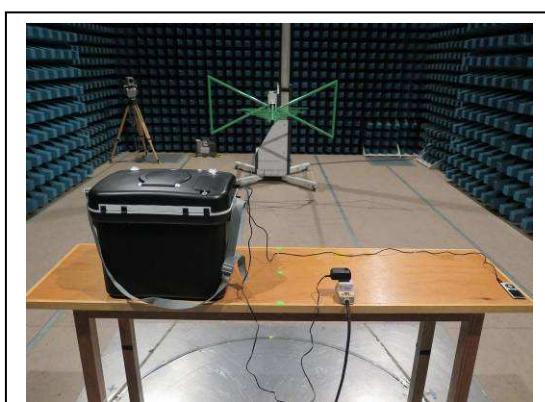
Report No. : AU0006507(7)

Date : 28 Jan 2016

A1. Photos of the set-up of Radiated Emissions



(front view, Auxi-in)



(rear view, Auxi-in)

Tested by:

A handwritten signature in black ink, appearing to read 'Ken'.

Mr. LEUNG Shu-kan, Ken

Reviewed by:

A handwritten signature in black ink, appearing to read 'R. P.'.

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A2 Photos of the set-up of Conducted Emission



(front view)



(rear view)

Tested by:

A handwritten signature in black ink, appearing to read 'Ken'.

Mr. LEUNG Shu-kan, Ken

Reviewed by:

A handwritten signature in black ink, appearing to read 'R. R.'.

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A2 Photos of the set-up of Conducted Emission



(side view)

Tested by:

A handwritten signature in black ink, appearing to read 'Ken'.

Mr. LEUNG Shu-kan, Ken

Reviewed by:

A handwritten signature in black ink, appearing to read 'R. R.'.

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A3. Photos of External Configurations



External Configuration 1



External Configuration 2

Tested by:

A handwritten signature in black ink, appearing to read 'Ken'.

Mr. LEUNG Shu-kan, Ken

Reviewed by:

A handwritten signature in black ink, appearing to read 'R. L.'.

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A3. Photos of External Configurations



External Configuration 3



External Configuration 4

Tested by:

A handwritten signature in black ink, appearing to read 'Ken'.

Mr. LEUNG Shu-kan, Ken

Reviewed by:

A handwritten signature in black ink, appearing to read 'R.L.'.

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A3. Photos of External Configurations



External Configuration 5



External Configuration 6

Tested by:

A handwritten signature in black ink, appearing to read 'Ken'.

Mr. LEUNG Shu-kan, Ken

Reviewed by:

A handwritten signature in black ink, appearing to read 'R. R.'.

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A3. Photos of External Configurations



External Configuration 7



External Configuration 8

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

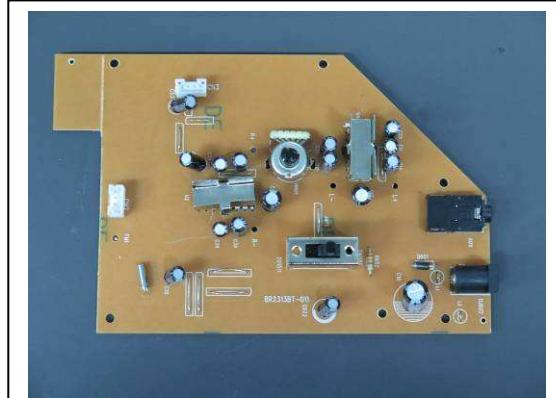
Report No. : AU0006507(7)

Date : 28 Jan 2016

A4. Photos of Internal Configurations



Internal Configuration 1



Internal Configuration 2

Tested by:

A handwritten signature in black ink, appearing to read 'Ken'.

Mr. LEUNG Shu-kan, Ken

Reviewed by:

A handwritten signature in black ink, appearing to read 'R. L.'.

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

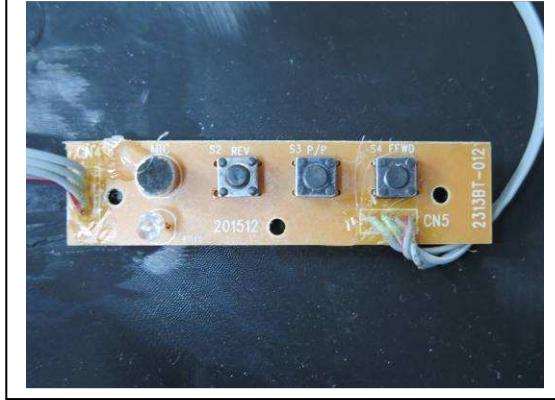
廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A4. Photos of Internal Configurations



Internal Configuration 3



Internal Configuration 4

Tested by:

A handwritten signature in black ink, appearing to read 'Ken'.

Mr. LEUNG Shu-kan, Ken

Reviewed by:

A handwritten signature in black ink, appearing to read 'R. W.'.

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A4. Photos of Internal Configurations



Internal Configuration 5

Tested by:

A handwritten signature in black ink, appearing to read 'Ken'.

Mr. LEUNG Shu-kan, Ken

Reviewed by:

A handwritten signature in black ink, appearing to read 'R.L.'.

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

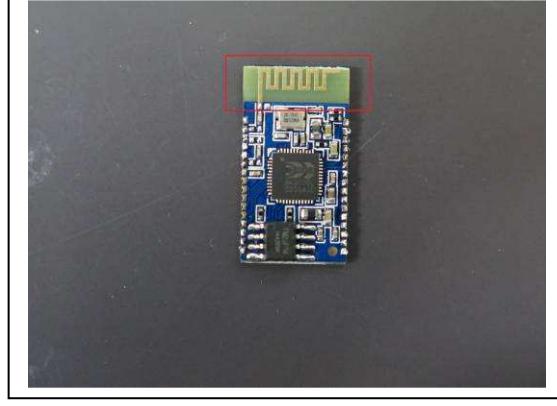
廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A5. EUT Antenna



Tested by:

A handwritten signature in black ink, appearing to read 'Ken'.

Mr. LEUNG Shu-kan, Ken

Reviewed by:

A handwritten signature in black ink, appearing to read 'R. R.'.

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A6. ID Label / Location



ID Label 1



ID Label 2

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: T4G2313B-BT

Page 34 of 61



CMA Testing and Certification Laboratories

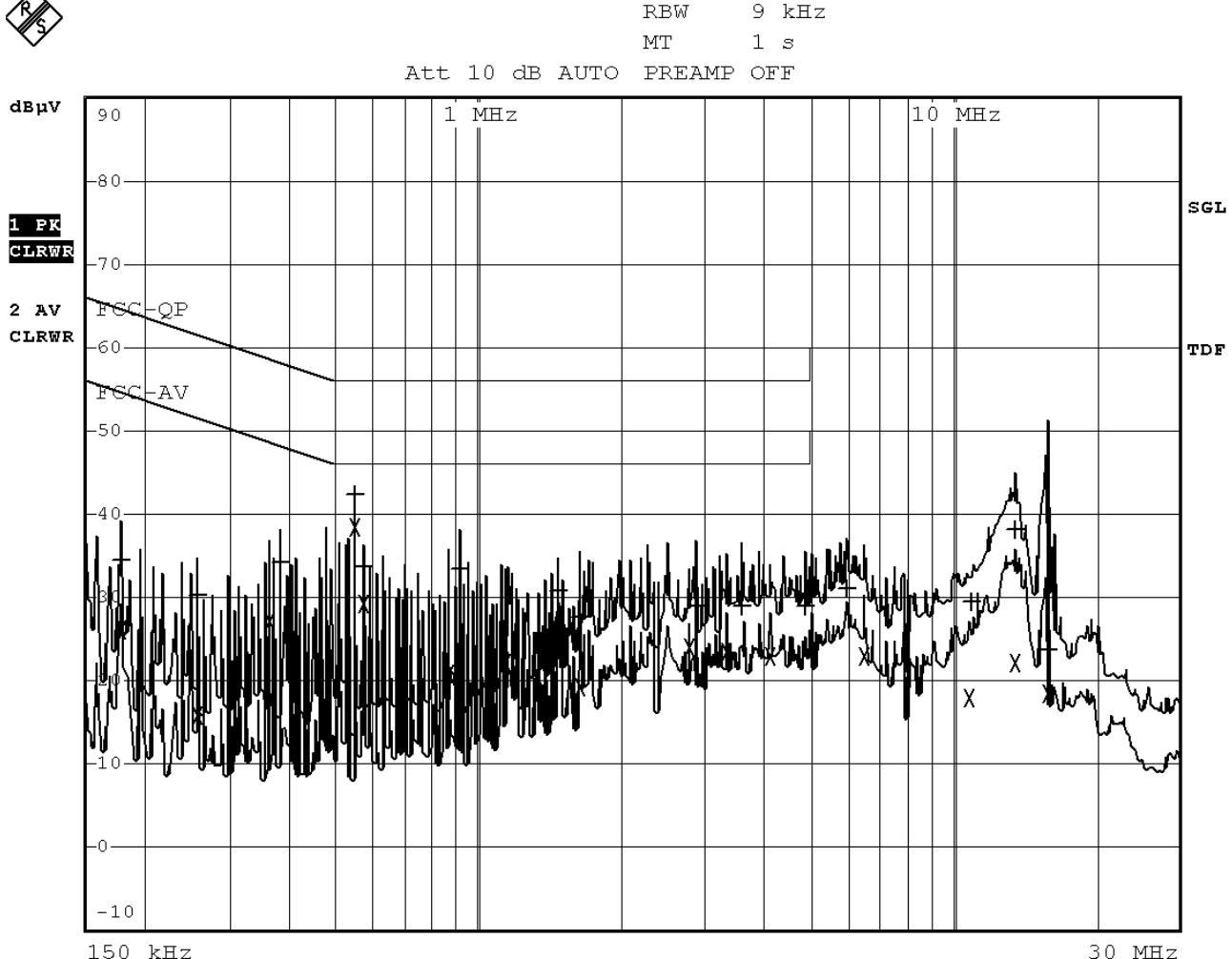
廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A7 Conducted Emission Measurement Date



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. : AU0006507(7)

Date : 28 Jan 2016

A7 Conducted Emission Measurement Data

EDIT PEAK LIST (Final Measurement Results)					
Trace1:	FCC-QP				
Trace2:	FCC-AV				
Trace3:	---				
	TRACE	FREQUENCY	LEVEL dB μ V	DELTA	LIMIT dB
1	Quasi Peak	177 kHz	34.51 L1 gnd	-30.11	
2	Average	177 kHz	26.18 N gnd	-28.43	
1	Quasi Peak	258 kHz	30.36 L1 gnd	-31.12	
2	Average	258 kHz	15.95 L1 gnd	-35.54	
2	Average	366 kHz	27.24 N gnd	-21.34	
1	Quasi Peak	384 kHz	34.21 L1 gnd	-23.97	
1	Quasi Peak	549.5 kHz	42.40 N gnd	-13.59	
2	Average	549.5 kHz	38.29 N gnd	-7.70	
1	Quasi Peak	572 kHz	33.61 N gnd	-22.38	
2	Average	572 kHz	29.15 N gnd	-16.84	
2	Average	869 kHz	20.90 N gnd	-25.09	
1	Quasi Peak	909.5 kHz	33.31 L1 gnd	-22.68	
2	Average	1.139 MHz	22.23 N gnd	-23.76	
1	Quasi Peak	1.472 MHz	30.72 N gnd	-25.27	
1	Quasi Peak	1.634 MHz	27.74 L1 gnd	-28.25	
2	Average	1.634 MHz	19.16 N gnd	-26.83	
2	Average	2.7905 MHz	23.86 N gnd	-22.13	
1	Quasi Peak	2.894 MHz	28.93 N gnd	-27.06	
2	Average	3.3395 MHz	23.52 N gnd	-22.47	
1	Quasi Peak	3.605 MHz	29.09 N gnd	-26.90	

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. : AU0006507(7)

Date : 28 Jan 2016

A7 Conducted Emission Measurement Data

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCC-QP			
Trace2:	FCC-AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dB μ V	DELTA	LIMIT dB
2 Average	4.1225 MHz	23.01 N gnd	-22.98	
1 Quasi Peak	4.8785 MHz	28.93 L1 gnd	-27.07	
1 Quasi Peak	6.0035 MHz	31.07 L1 gnd	-28.92	
2 Average	6.485 MHz	22.97 N gnd	-27.02	
2 Average	10.787 MHz	17.98 N gnd	-32.01	
1 Quasi Peak	11.03 MHz	29.50 N gnd	-30.49	
1 Quasi Peak	13.604 MHz	38.21 L1 gnd	-21.78	
2 Average	13.604 MHz	22.11 L1 gnd	-27.89	
1 Quasi Peak	15.872 MHz	23.85 L1 gnd	-36.14	
2 Average	15.872 MHz	18.50 N gnd	-31.49	

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

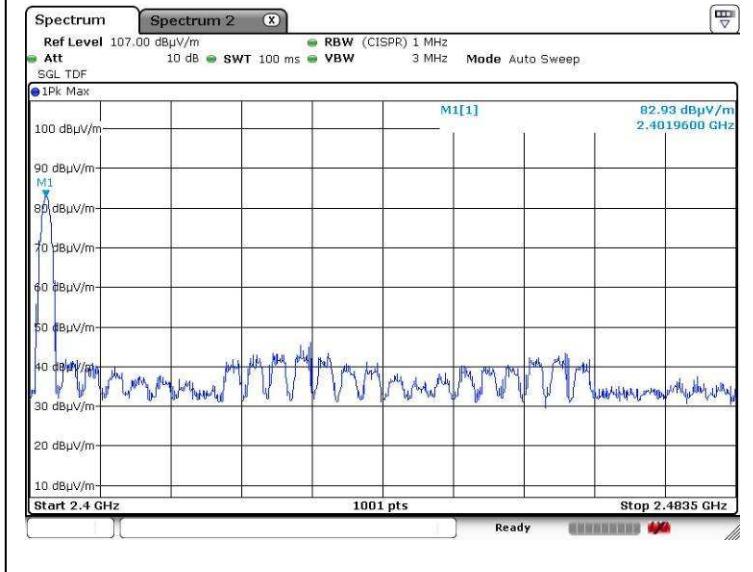
廠商會檢定中心

TEST REPORT

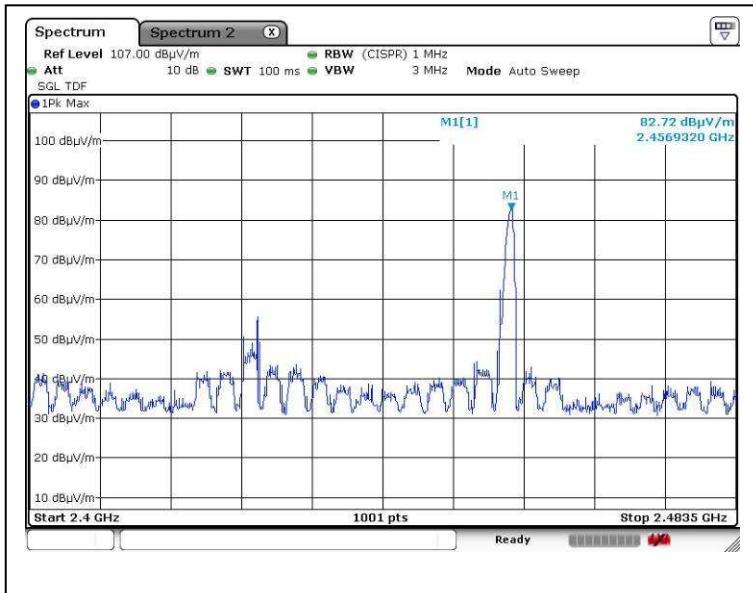
Report No. : AU0006507(7)

Date : 28 Jan 2016

A8. 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



CMA Testing and Certification Laboratories

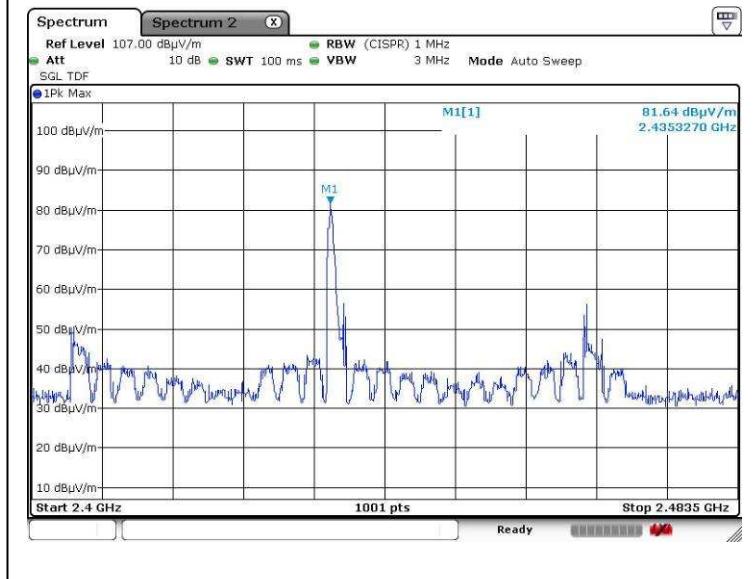
廠商會檢定中心

TEST REPORT

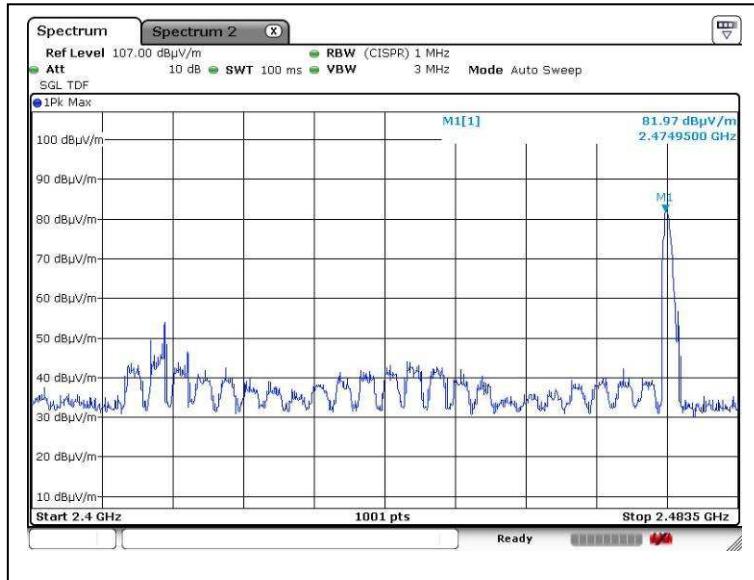
Report No. : AU0006507(7)

Date : 28 Jan 2016

A8. 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

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

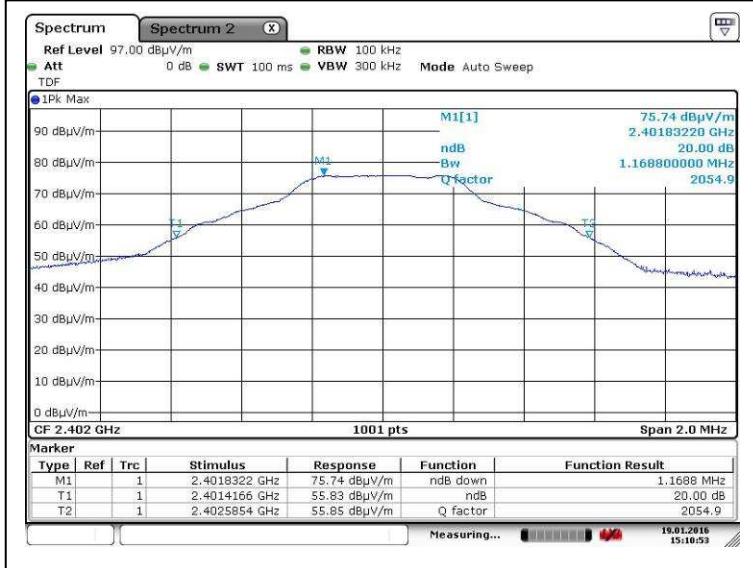
廠商會檢定中心

TEST REPORT

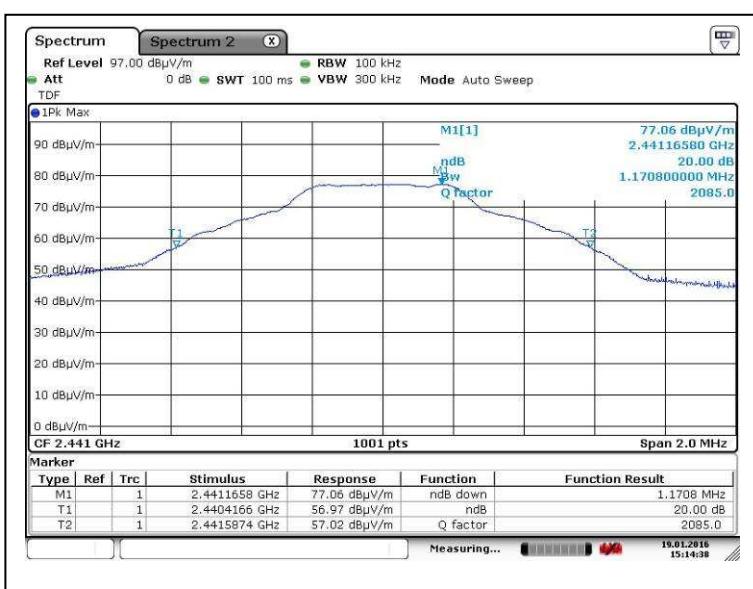
Report No. : AU0006507(7)

Date : 28 Jan 2016

A9. 20 dB bandwidth



Lower channel



Middle channel

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

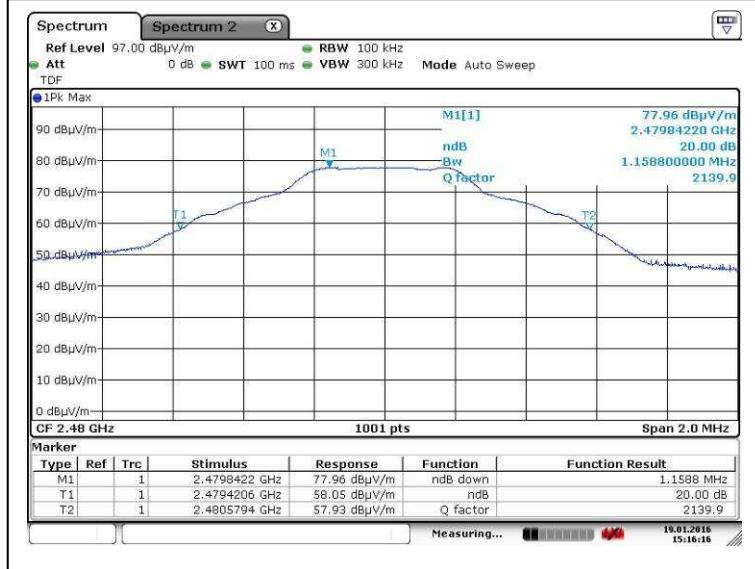
廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A9. 20 dB bandwidth



Higher channel

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

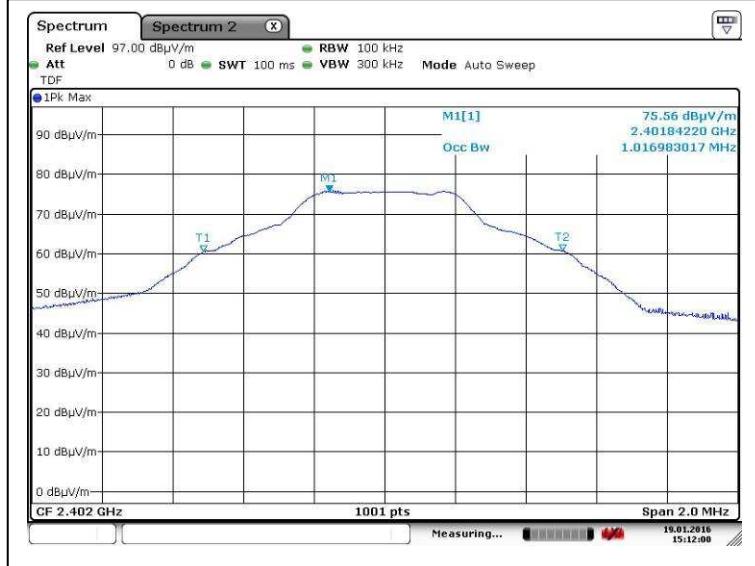
廠商會檢定中心

TEST REPORT

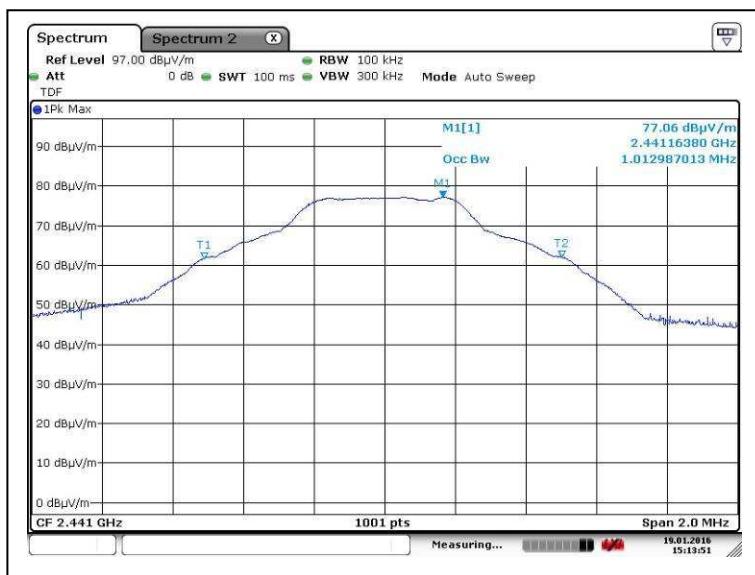
Report No. : AU0006507(7)

Date : 28 Jan 2016

A10. 99% bandwidth



Lower channel



Middle channel

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

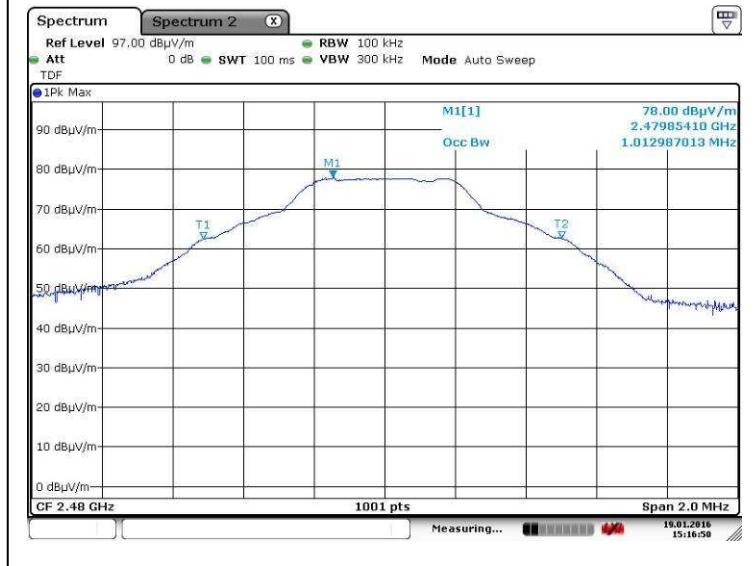
廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A10. 99% bandwidth



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

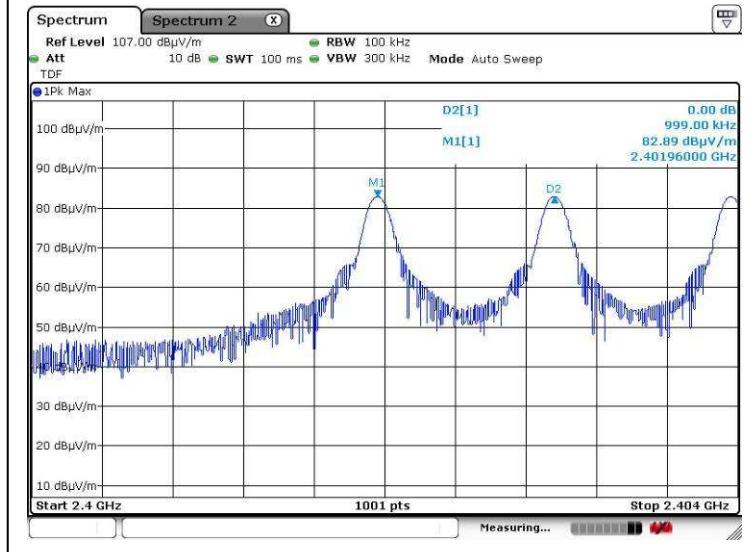
廠商會檢定中心

TEST REPORT

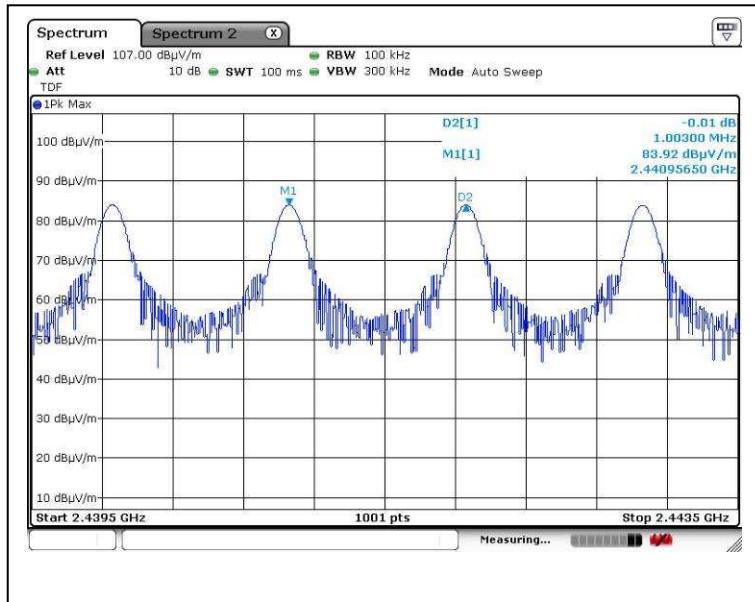
Report No. : AU0006507(7)

Date : 28 Jan 2016

A10. Bluetooth Channel Spacing



CH00-CH01



CH39-CH40

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

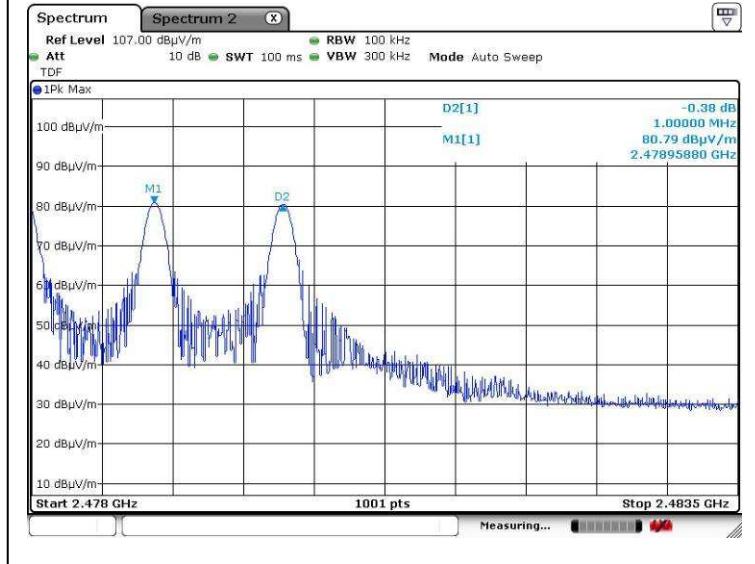
廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A11. Bluetooth Channel Spacing



CH77-CH78

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

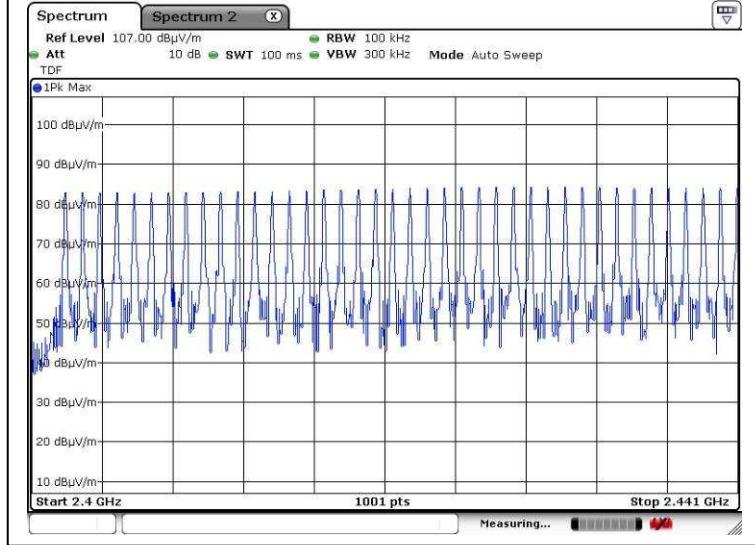
廠商會檢定中心

TEST REPORT

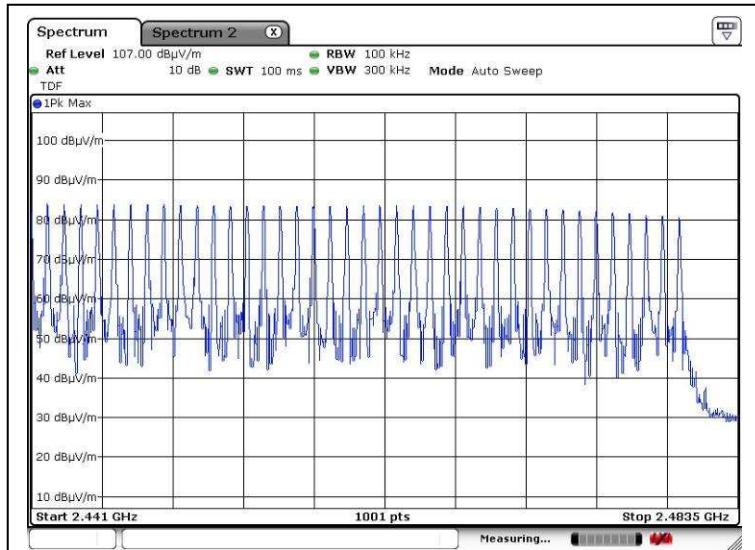
Report No. : AU0006507(7)

Date : 28 Jan 2016

A12. Bluetooth Hopping Channel



CH00-CH39



CH39-CH78

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: T4G2313B-BT

Page 46 of 61



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

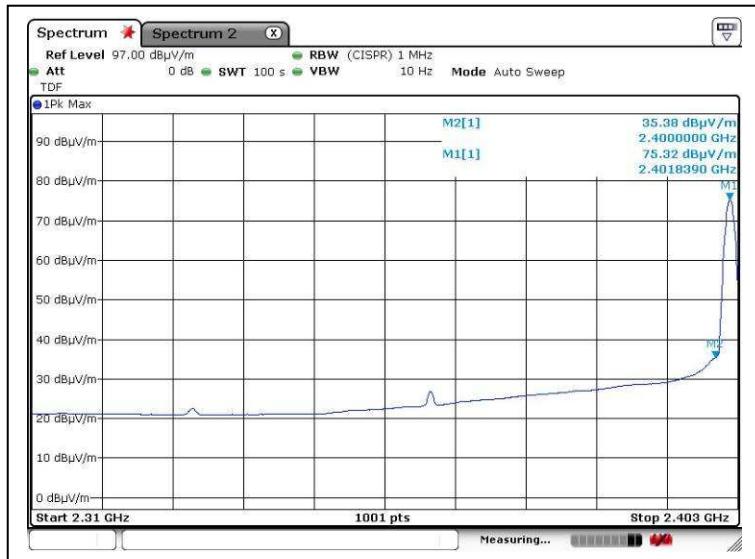
Report No. : AU0006507(7)

Date : 28 Jan 2016

A13. Band Edge



Lower edge (Peak measurement, non-hopping mode)



Lower edge (Average measurement, non-hopping mode)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

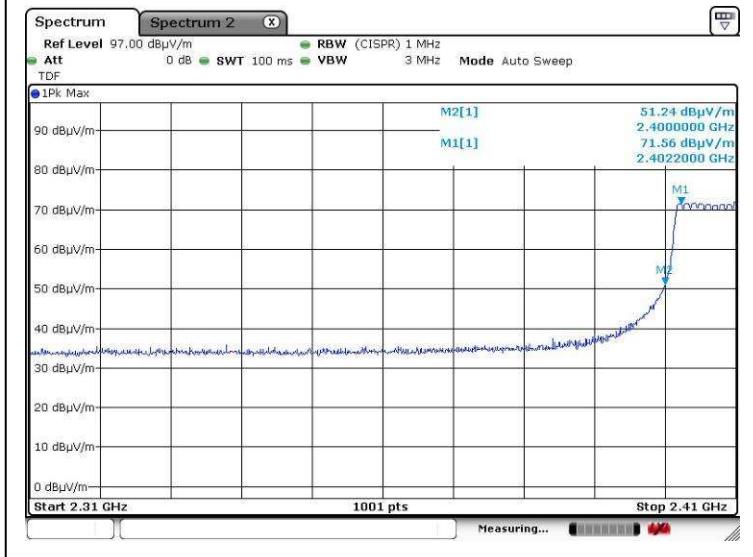
廠商會檢定中心

TEST REPORT

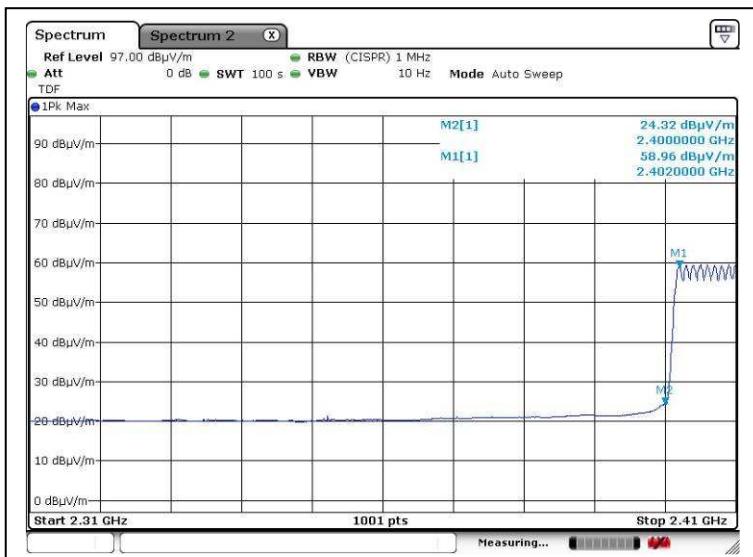
Report No. : AU0006507(7)

Date : 28 Jan 2016

A13. Band Edge



Lower edge (Peak measurement, hopping mode)



Lower edge (Average measurement, hopping mode)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



CMA Testing and Certification Laboratories

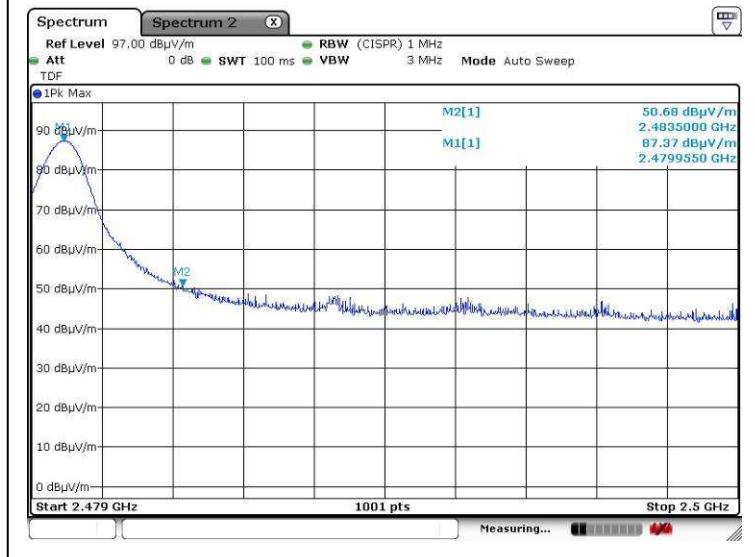
廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A13. Band Edge



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

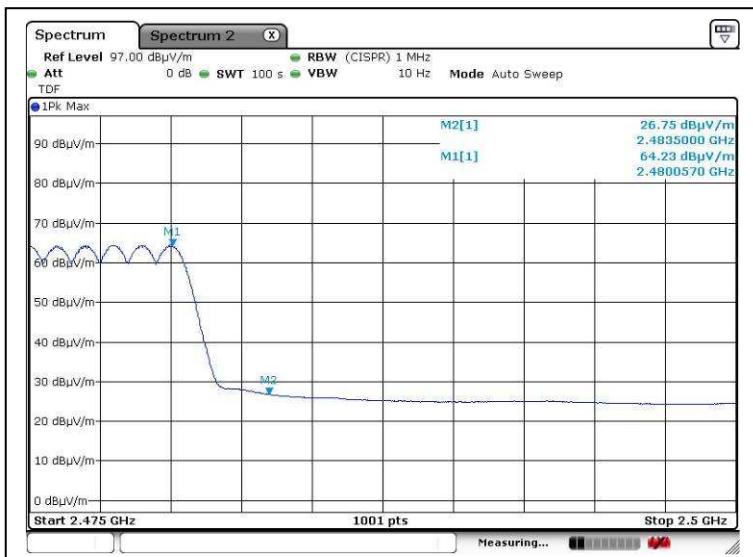
Report No. : AU0006507(7)

Date : 28 Jan 2016

A13. Band Edge



Higher edge (Peak measurement, hopping mode)



Higher edge (Average measurement, hopping mode)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

廠商會檢定中心

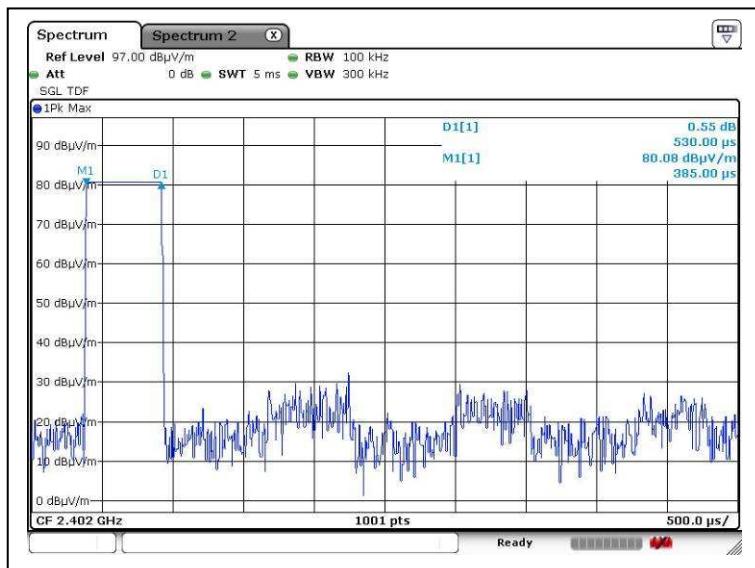
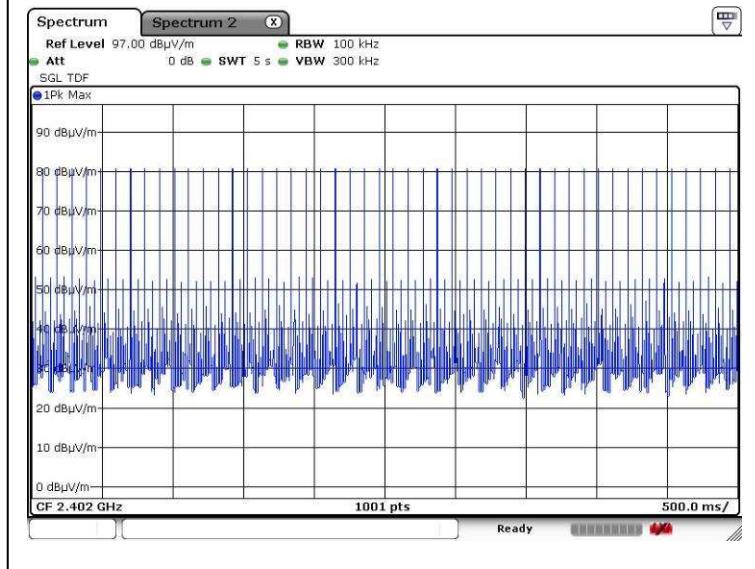
TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A14. Bluetooth Average On Time

Channel: 00
Packet: DH1



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

廠商會檢定中心

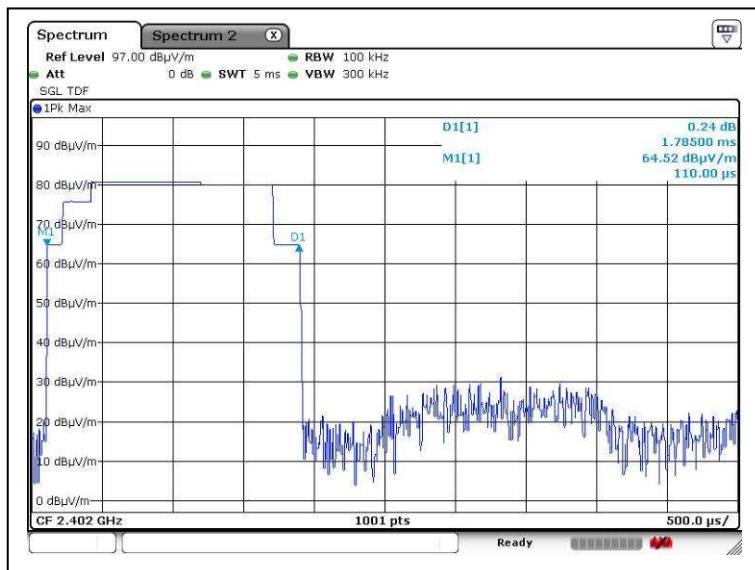
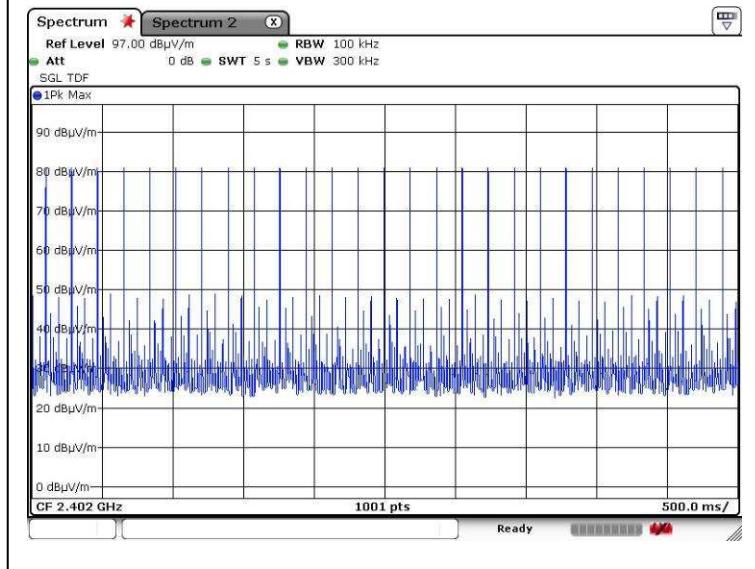
TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A14. Bluetooth Average On Time

Channel: 00
Packet: DH3



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

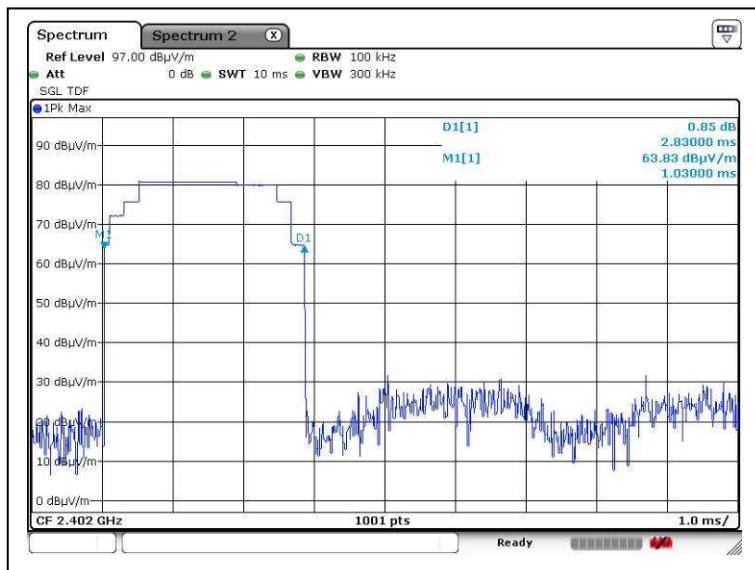
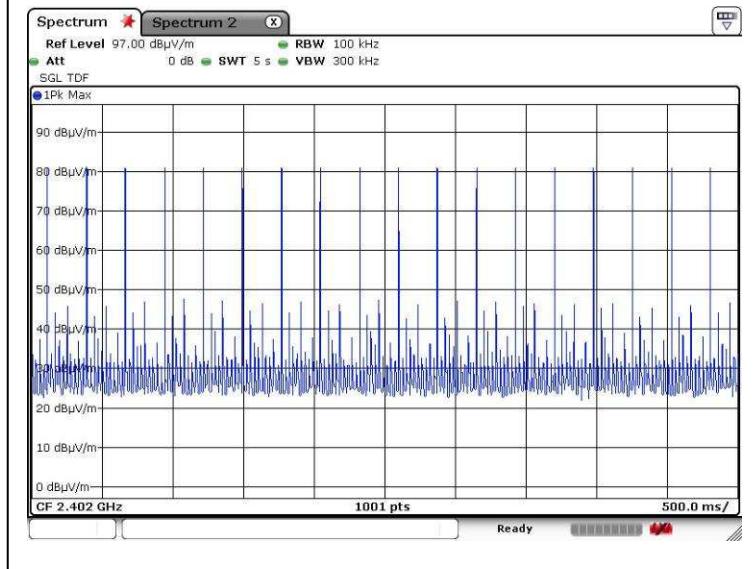
TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A14. Bluetooth Average On Time

Channel: 00
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

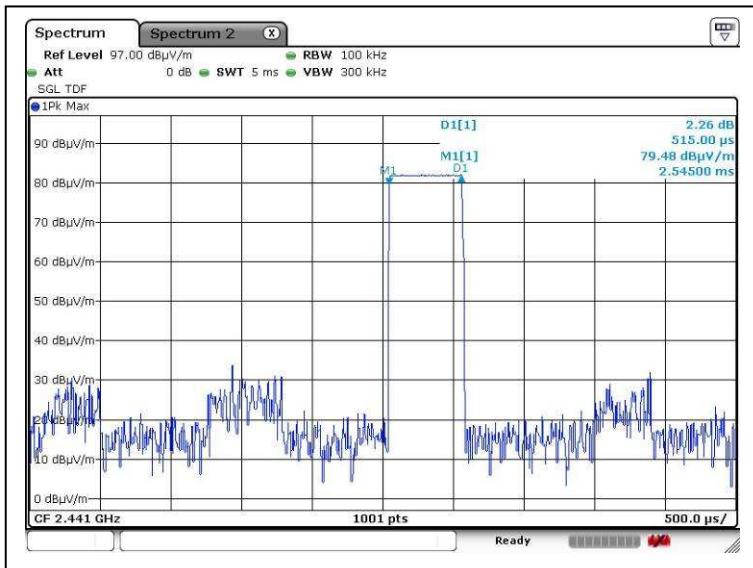
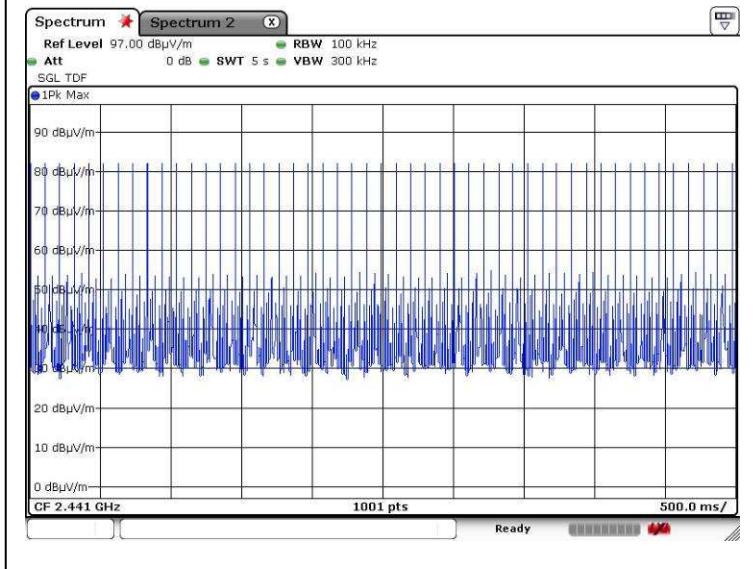
TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A12. Bluetooth Average On Time

Channel: 39
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

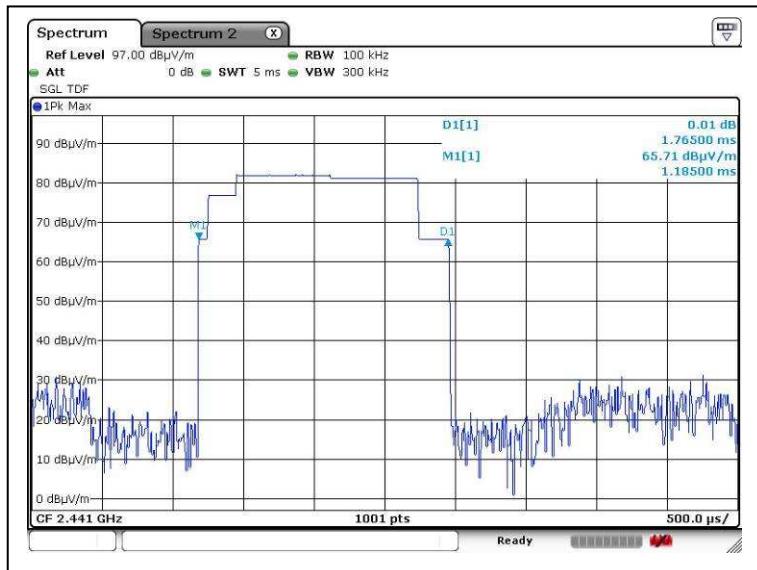
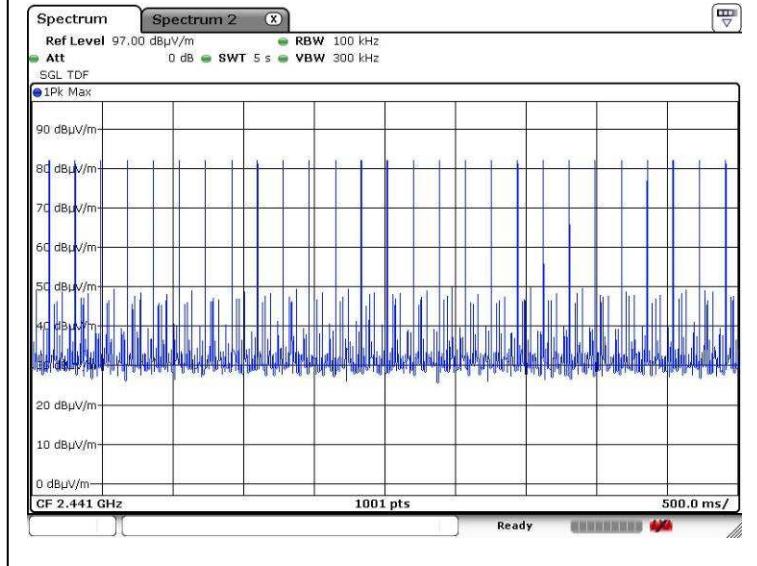
TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A14. Bluetooth Average On Time

Channel: 39
Packet: DH3



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

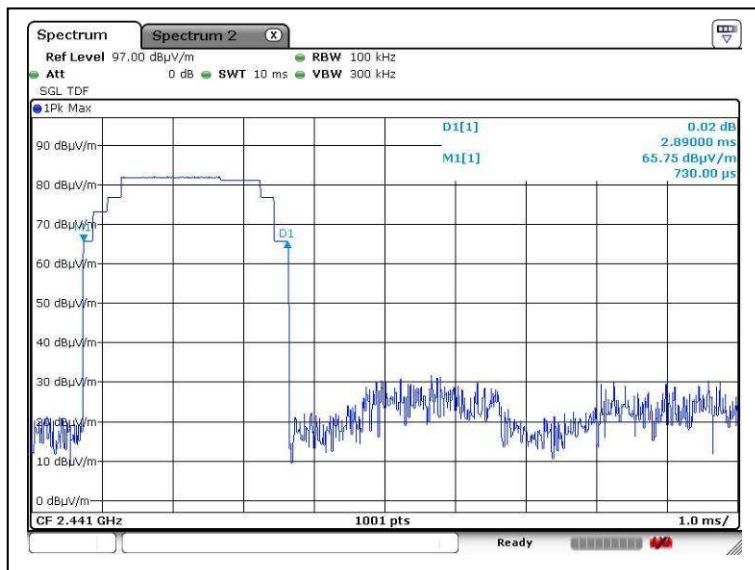
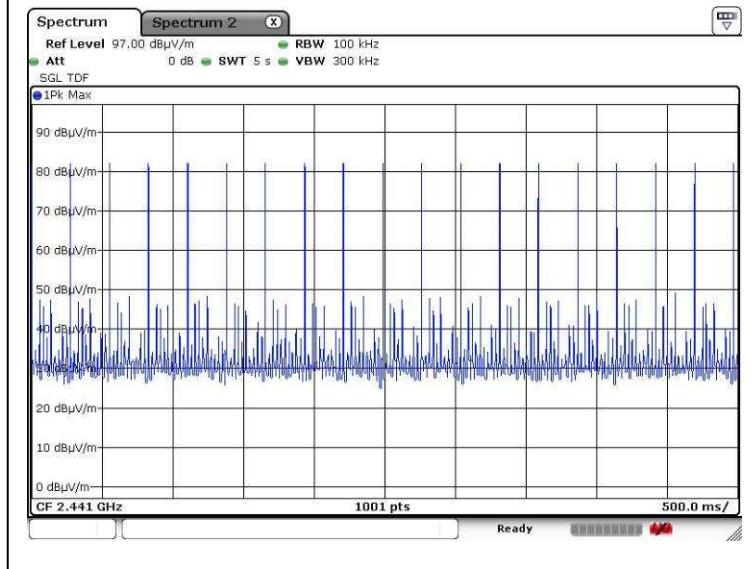
TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A14. Bluetooth Average On Time

Channel: 39
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

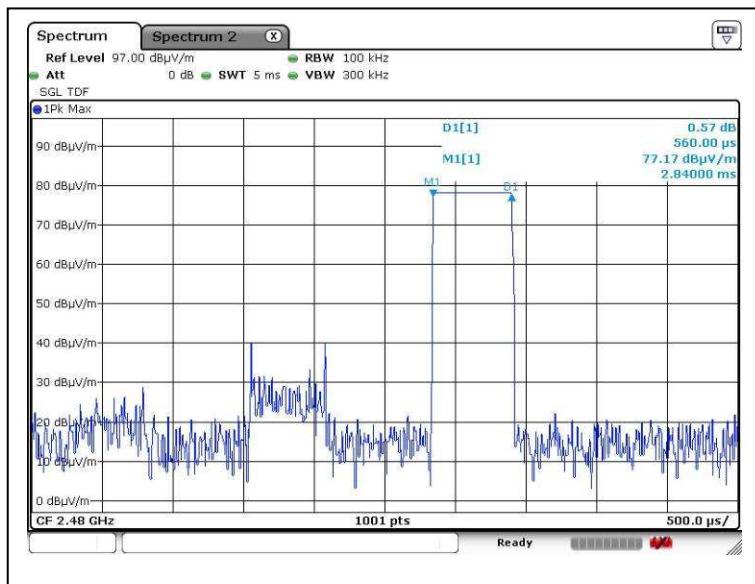
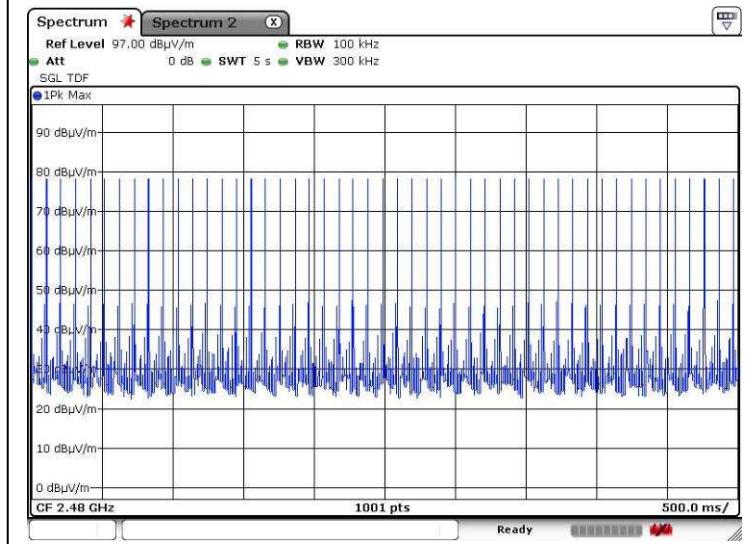
TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A14. Bluetooth Average On Time

Channel: 78
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

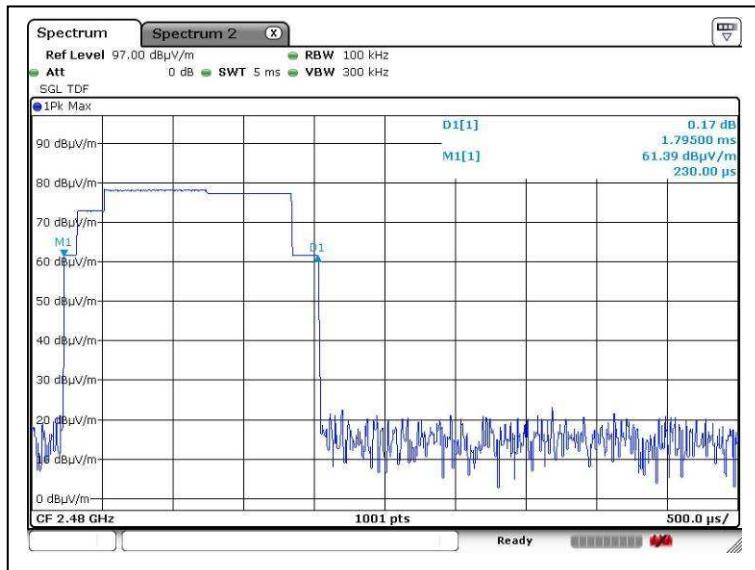
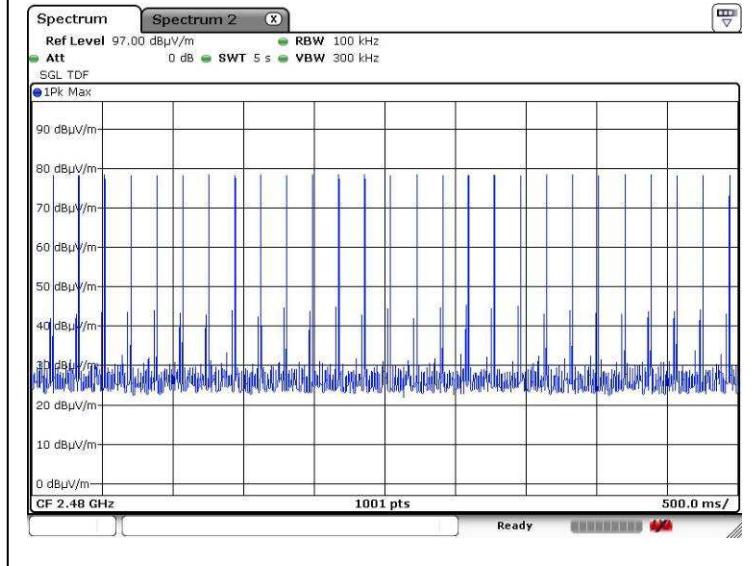
TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A14. Bluetooth Average On Time

Channel: 78
Packet: DH3



Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-ping, Andrew



CMA Testing and Certification Laboratories

廠商會檢定中心

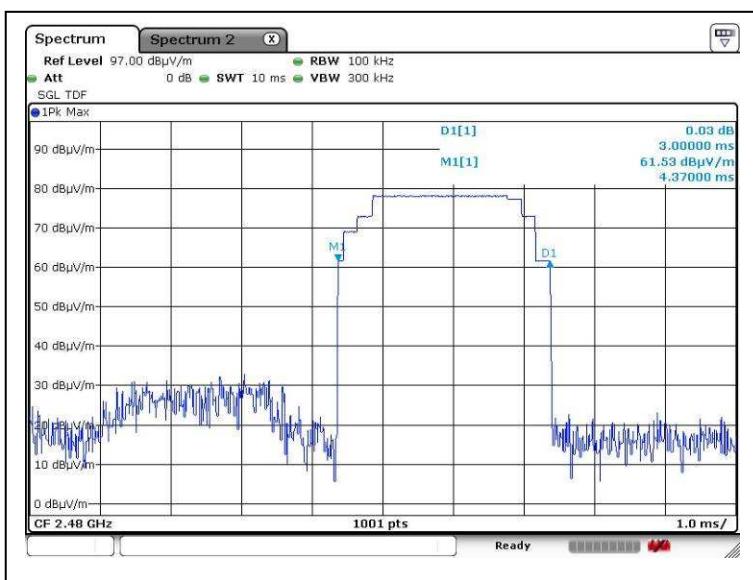
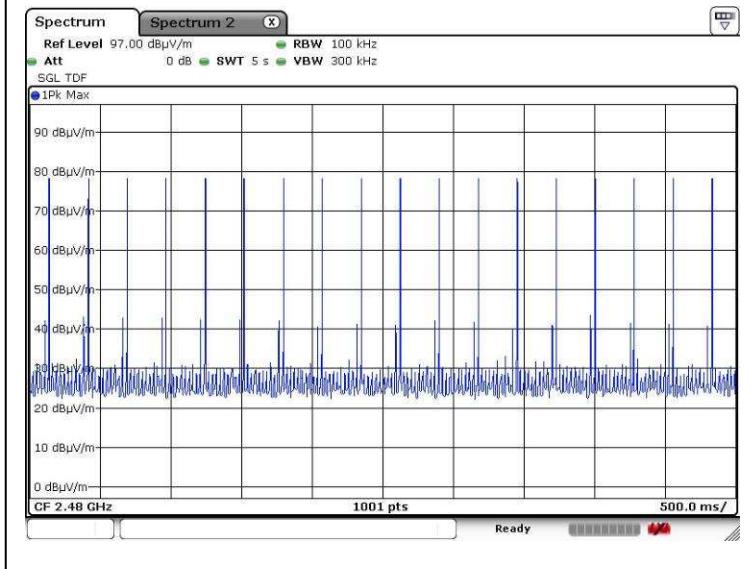
TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A14. Bluetooth Average On Time

Channel: 78
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

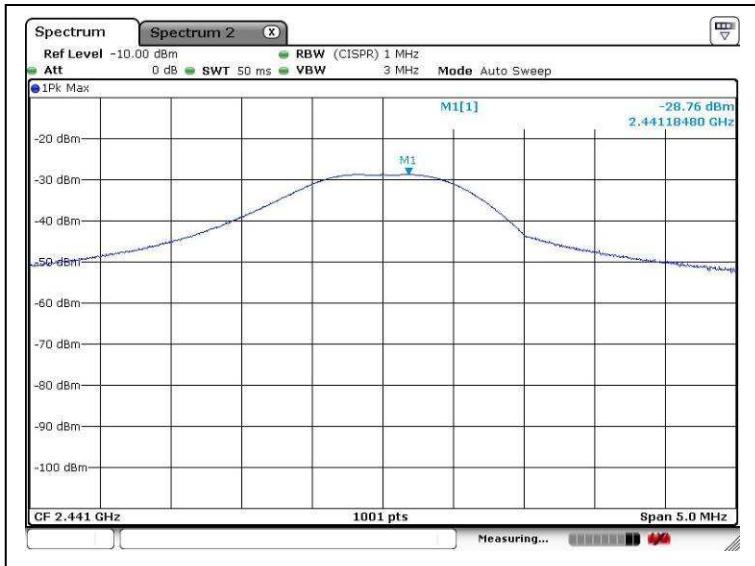
Report No. : AU0006507(7)

Date : 28 Jan 2016

A15. Transmission Power



Lower channel



Middle channel

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: T4G2313B-BT



CMA Testing and Certification Laboratories

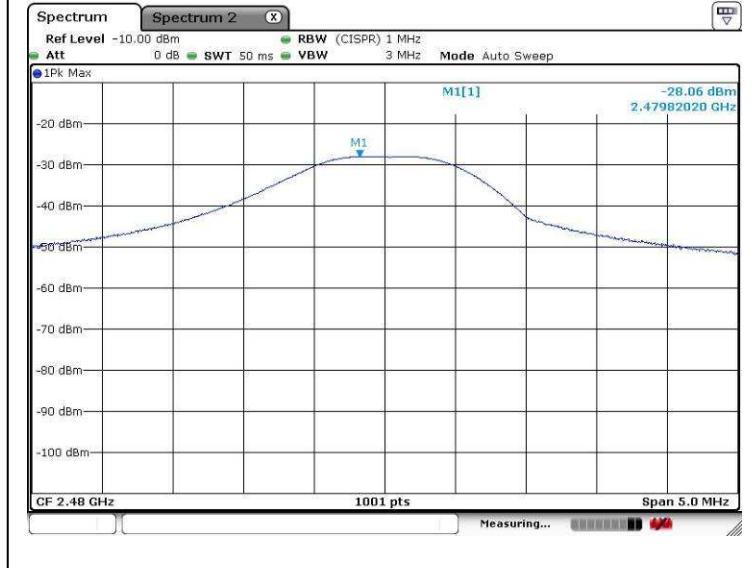
廠商會檢定中心

TEST REPORT

Report No. : AU0006507(7)

Date : 28 Jan 2016

A15. Transmission Power



Higher channel

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

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew