



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AU0006085(8) Date : 26 Jan 2016

Application No. : LT047591(4)

Applicant : Marathon Watch Company Limited
30 Mural Street #10, Richmond Hill,
Ontario, Canada, L4B 1B5

Sample Description : One(1) item of submitted sample stated to be Tabletop Bluetooth Clock System of
Model No. CL800002
Sample registration No. : RT054682-001, RT055795-001
Radio Frequency : 2402MHz – 2480 MHz Transceiver
Rating : 2 x 1.5V AA size batteries
No. of submitted sample : Three (3) piece (s)

Date Received : 23 Nov 2015, 11 Dec 2015

Test Period : 16 Dec 2015 to 24 Dec 2015.

Test Requested : FCC Part 15 Certificate (15.247)
Industry Canada Interference Causing Equipment Standard RSS-247

Test Method : 47 CFR Part 15 (10-1-14 Edition), ANSI C63.10 – 2013
Industry Canada RSS-Gen Issue 4
KDB 558074 D01 DTS Meas Guidance v03r03

Test Engineer : Mr. LEUNG Shu-kan, Ken

Test Result : See attached sheet(s) from page 2 to 31.

Conclusion : The submitted sample was found to comply with requirement of FCC Part 15
Subpart C and Industry Canada RSS-247 Issue 1.

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: 2AGNSCL800002
IC: 20921-CL800002



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1 General Information

1.1 General Description

The equipment under test (EUT) is a Bluetooth Temperature sensor. The EUT is power by 2 x 1.5V AA sizes batteries. It operates at 2402MHz – 2480MHz. The MCU will measure the temperature and humidity. It will transmit the measured data to other wireless device when connected with EUT by Bluetooth.

The brief circuit description is listed as follows:

- U1 and its associated circuit act as MCU
- X1 and its associated circuit act as oscillator
- LCD and its associated circuit act as display
- TH1 and its associated circuit act as thermistor
- HD and its associated circuit act as humidity sensor
- BT and its associated circuit act as Bluetooth module



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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	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
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170442	18 Jun 2017	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	24 Nov 2016	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9719	9719-010	17 Jun 2017	2Years
Coaxial Cable	Suhner	Sucoflex_104	N/A	24 Nov 2016	1Year



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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)	4.66dB
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



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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 C63.10 – 2013.

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 for below 1GHz measurement and 1.5m high above the ground for above 1GHz measurement. 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 to determine which attitude and configuration produce the highest emission during measurement for Radiated Emission measurement.



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2.2 Test Result

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 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 Radiated Emission Measurement Data

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C and RSS

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	23	° C
Relative humidity:	48	%

Measurement: Peak RBW: 1MHz VBW: 3MHz

Testing frequency range: 9kHz to 25GHz

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)
2401.676	V	87.0	- 4.1	82.9	114.0	- 31.1
#4804.574	V	43.4	3.8	47.2	74.0	- 26.8
7205.009	V	39.8	11.7	51.5	74.0	- 22.5
7206.224	H	41.1	11.7	52.8	74.0	- 21.2

2439.670	V	88.4	- 4.1	84.3	114.0	- 29.7
#4879.905	H	39.3	3.8	43.1	74.0	- 30.9
#4879.956	V	44.0	3.8	47.8	74.0	- 26.2
#7320.664	H	39.9	11.7	51.6	74.0	- 22.4

2479.668	V	86.0	- 4.3	81.7	114.0	- 32.3
#4960.549	V	43.3	4.1	47.4	74.0	- 26.6
#7438.836	H	40.0	11.7	51.7	74.0	- 22.3
#7441.073	V	38.8	11.7	50.5	74.0	- 23.5

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

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

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2.4 Data of Conducted Emission

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	23	° C
Relative humidity:	48	%

Measurement: Peak RBW: 1MHz VBW: 3MHz

Frequency (MHz)	Reading (dBm)	Reading (mW)	Limit (mW)	Margin (mW)
2402.312	- 6.48	0.225	1000.0	- 999.775
2439.641	- 6.20	0.240	1000.0	- 999.760
2479.984	- 6.89	0.205	1000.0	- 999.795



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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

No measurement is required as the EUT is a battery-operated product.

3.3 Graph and Table of Conducted Emission Measurement Data

Not Applicable



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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 2AGNSCL800002 TSup.pdf.

4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename 2AGNSCL800002 ExPho.pdf and 2AGNSCL800002 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
Users Manual	UserMan.pdf
Operational Description	OpDes.pdf

5.1 Bandwidth

The plot saved in TestRpt2.pdf shows the band edge is fulfil 15.205 restricted band, 15.247(d) and RSS-247 clause 5.5 requirement.

The plot saved in TestRpt3.pdf shows the 6dB bandwidth has minimum 500kHz for frequency channel 2402MHz, 2440MHz and 2480MHz. It fulfils the section 15.247(a)(2) and RSS-247 clause 5.2 (1) requirement.

5.2 Power Spectral Density

The plot saved in TestRpt4.pdf shows the frequency channel 2402MHz, 2440MHz and 2480MHz were not excess 8dBm for 3kHz bandwidth. It fulfils the section 15.247(e) and RSS-247 clause 5.2 (2) requirement.

5.3 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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6 Appendices

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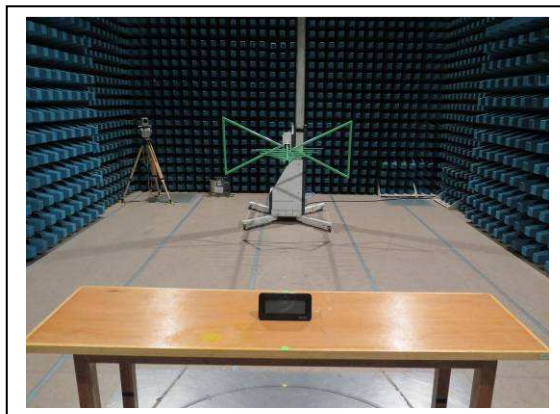
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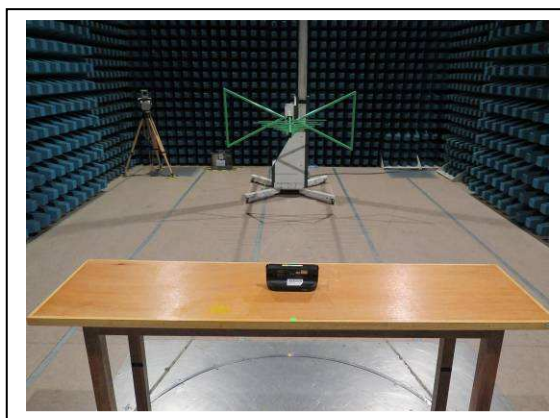
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A1. Photos of the set-up of Radiated Emissions



(Front view, 30Hz – 1GHz)



(Back view, 30MHz – 1GHz)

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Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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A1. Photos of the set-up of Radiated Emissions



(Front view, 9kHz – 30MHz)



(Back view, 9kHz – 30MHz)

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A1. Photos of the set-up of Radiated Emissions



(Front view, above 1GHz)



(Back view, above 1GHz)

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A2 Photos of External Configurations



External Configuration 1



External Configuration 2

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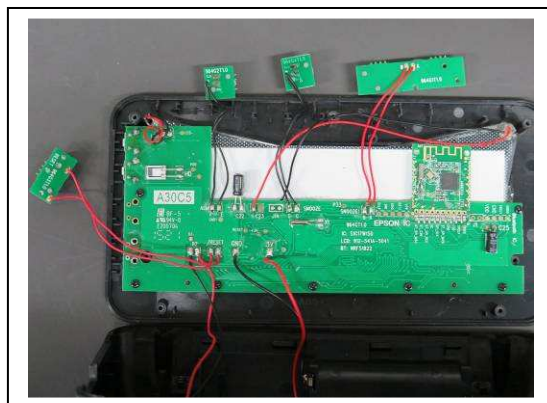
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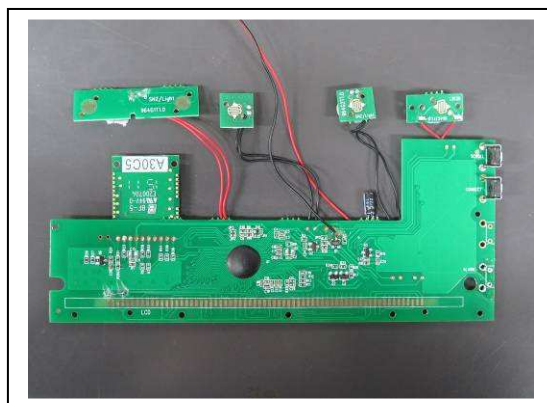
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A3 Photos of Internal Configurations



Internal Configuration 1



Internal Configuration 2

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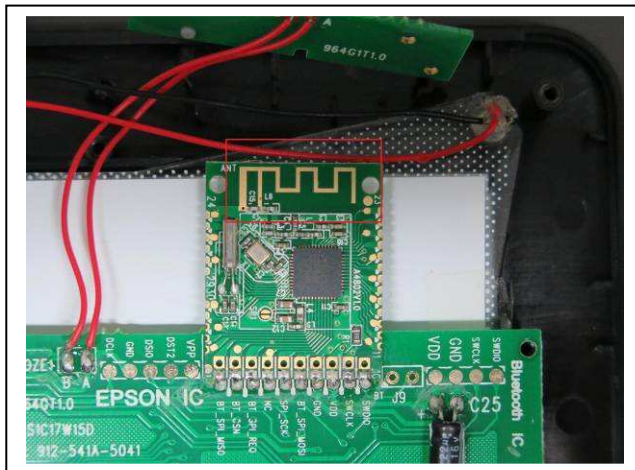
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A4. EUT Antenna



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Reviewed by:

Mr. WONG Lap-pong, Andrew



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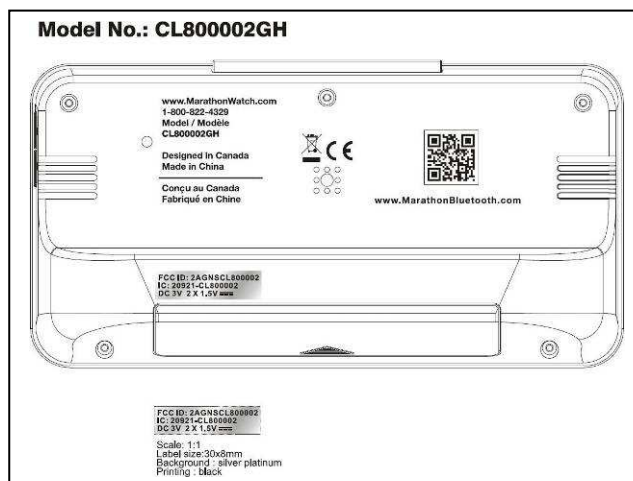
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A5. ID Label / Location



ID Label

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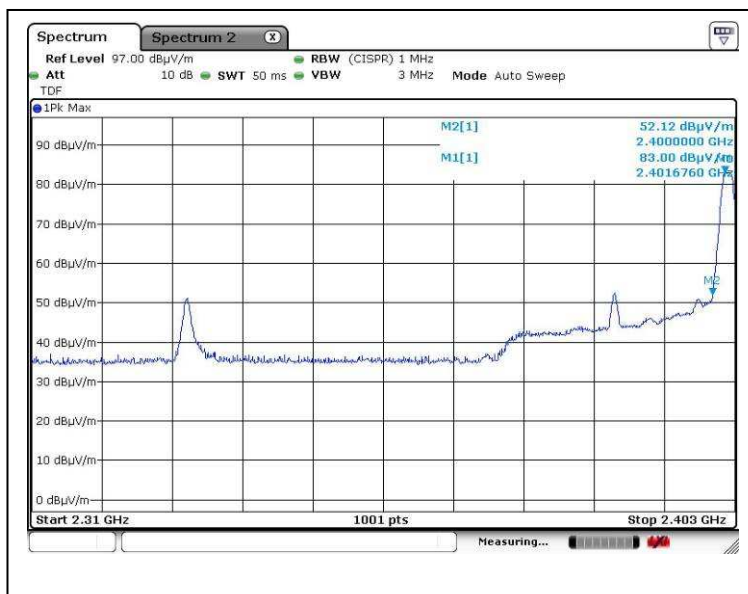
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A6. Band Edge



Lower edge (Peak measurement)



Lower edge (Average measurement)

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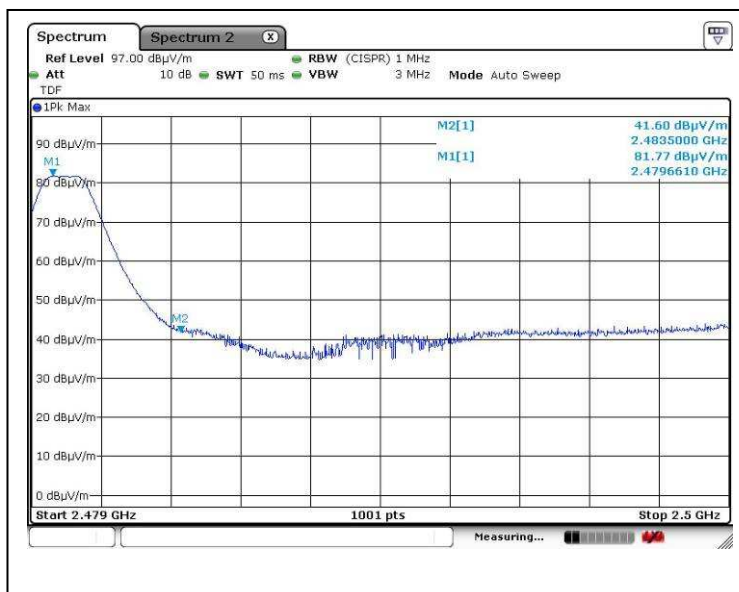
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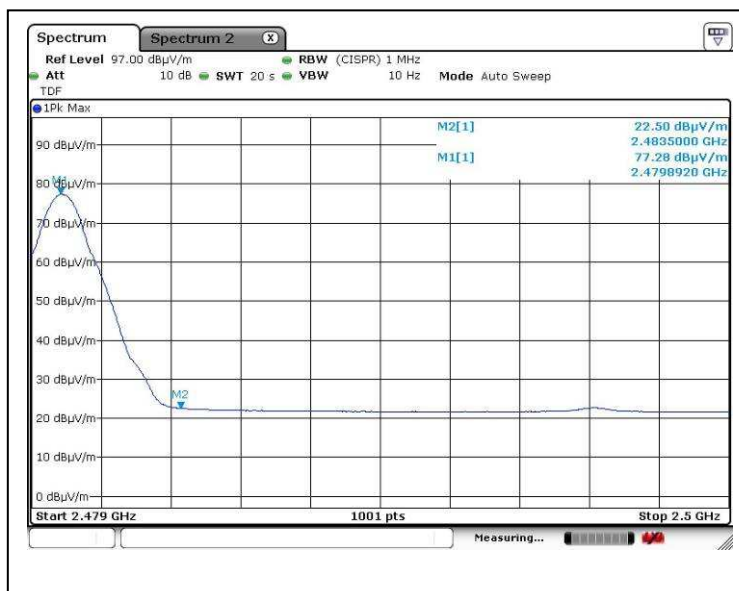
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A6. Band Edge



Higher edge (Peak measurement)



Higher edge (Average measurement)

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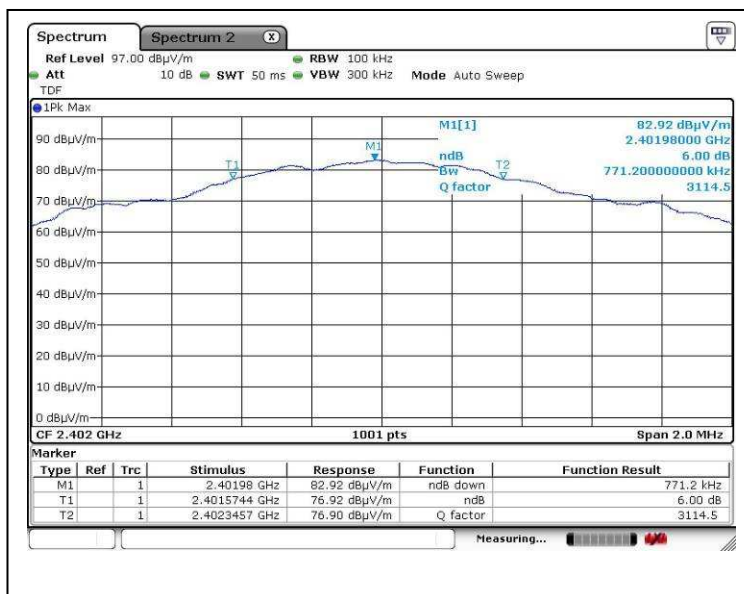
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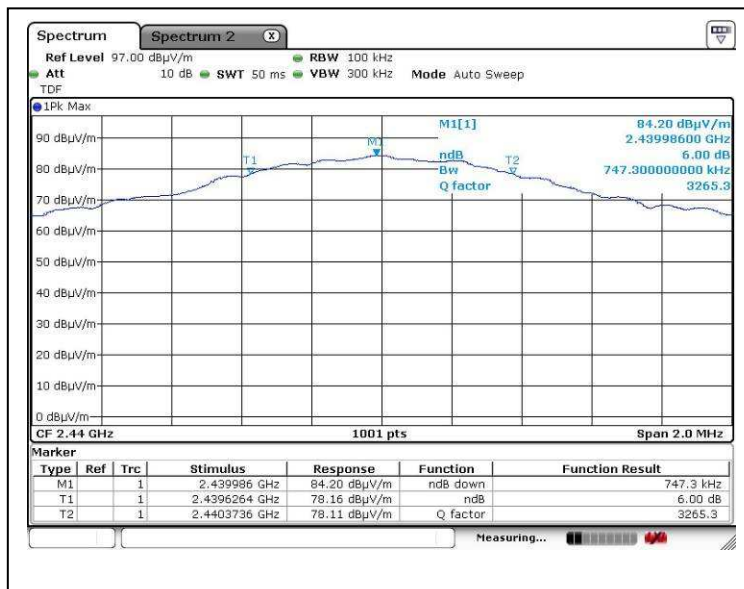
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A7. 6dB Bandwidth Plot



Lower channel



Middle channel

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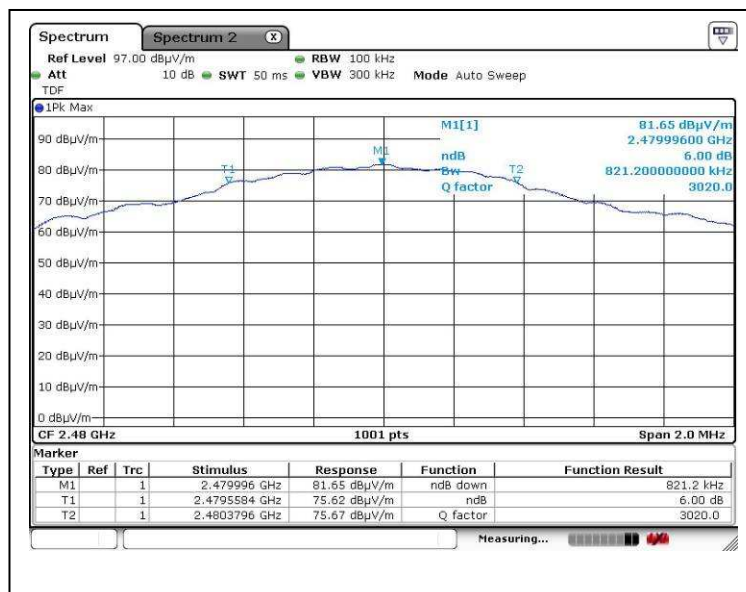
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A7. 6dB Bandwidth Plot



Higher channel

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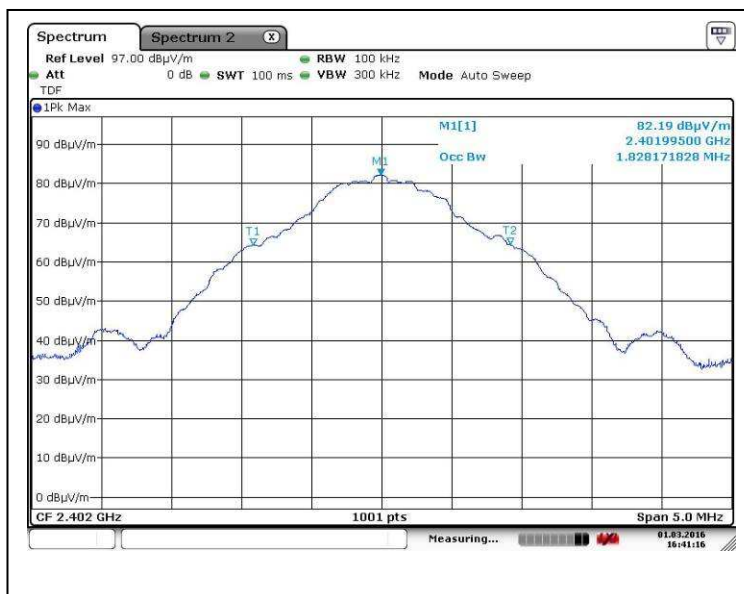
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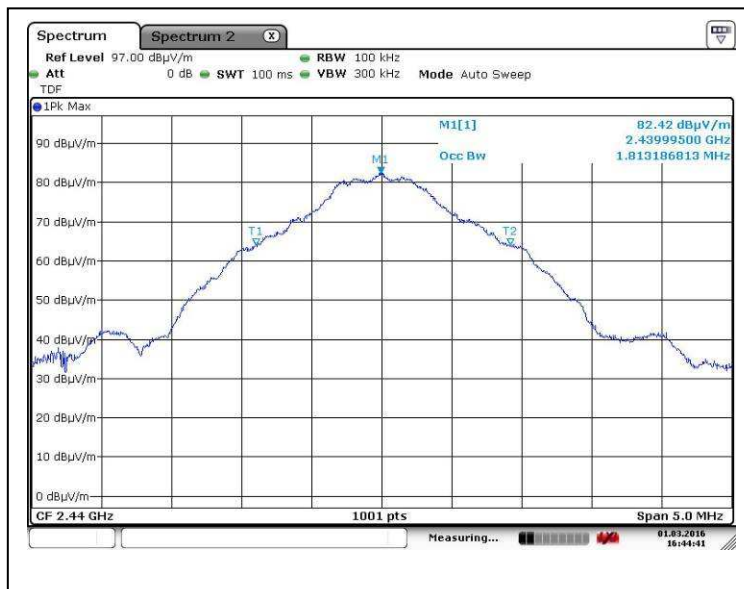
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A8. 99% Bandwidth Plot



Lower channel



Middle channel

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Reviewed by:

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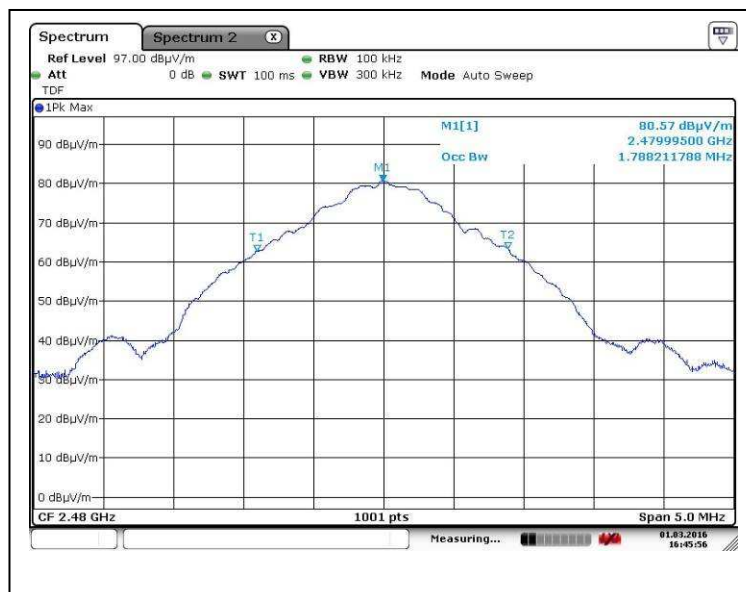
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A8. 99% Bandwidth Plot



Higher channel

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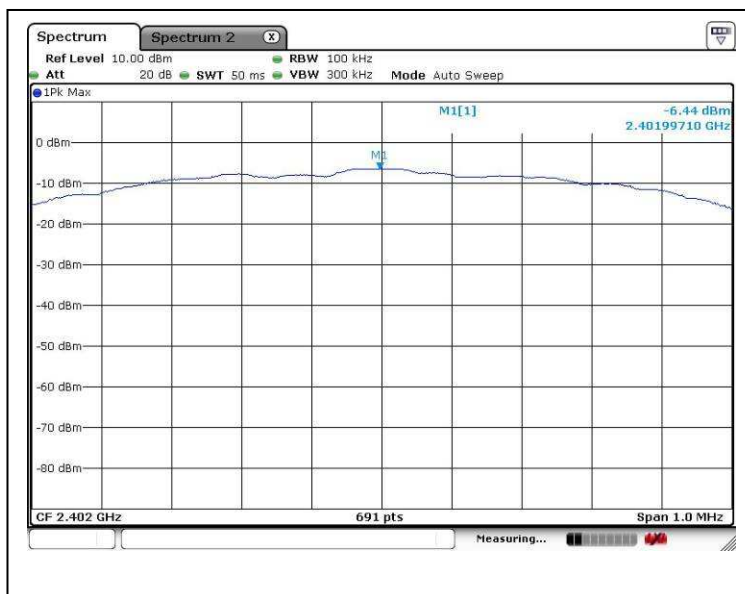
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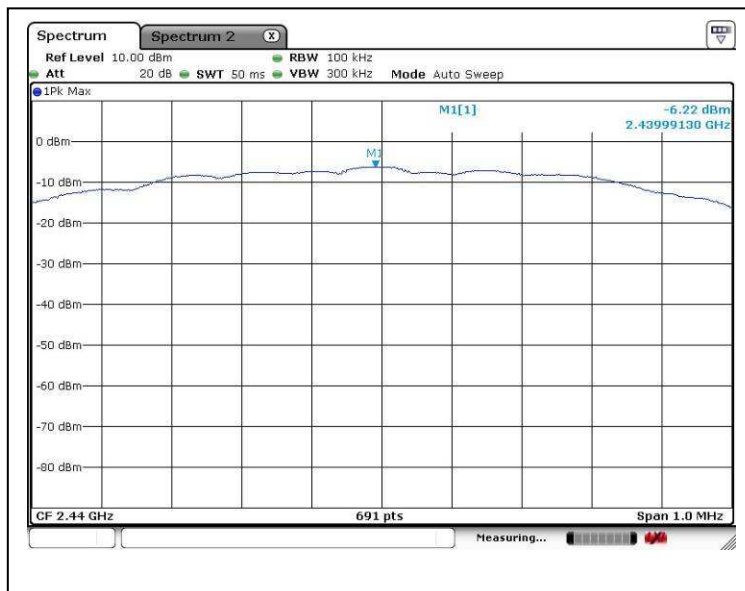
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A9. Power Spectral Density



Lower channel



Middle channel

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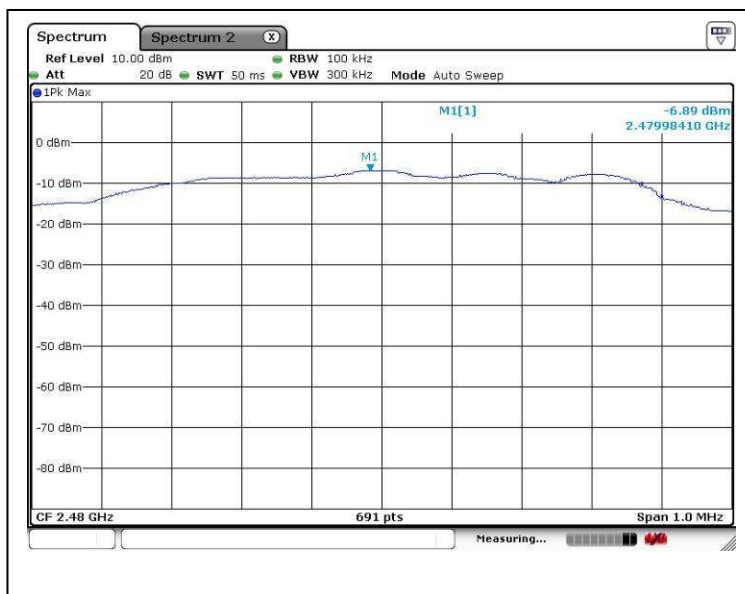
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A9. Power Spectral Density



Higher channel

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Mr. WONG Lap-pong, Andrew



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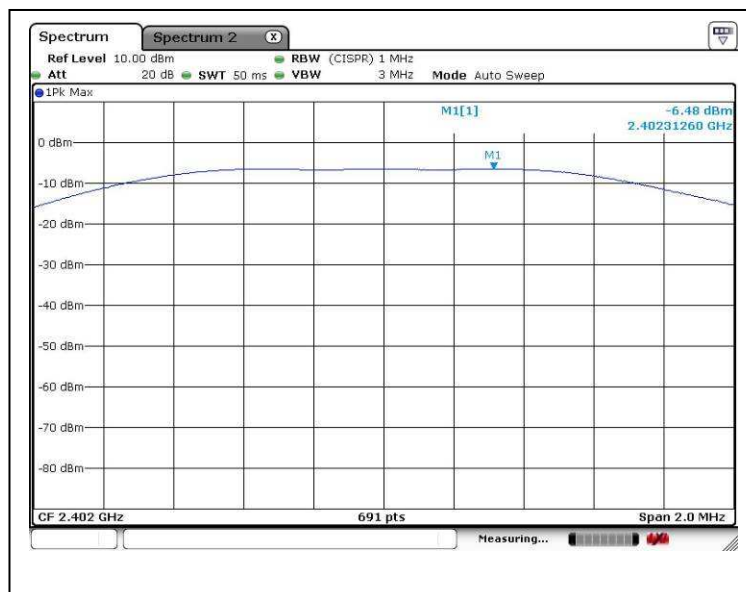
廠商會檢定中心

TEST REPORT

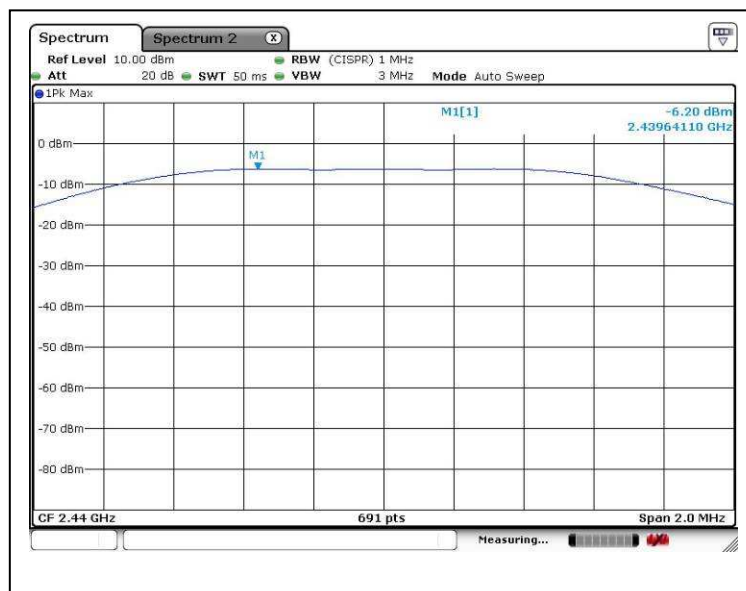
Report No. : AU0006085(8)

Date : 26 Jan 2016

A10. Transmission Power



Lower channel



Middle channel

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: 2AGNSCL800002

IC: 20921-CL800002



CMA Testing and Certification Laboratories

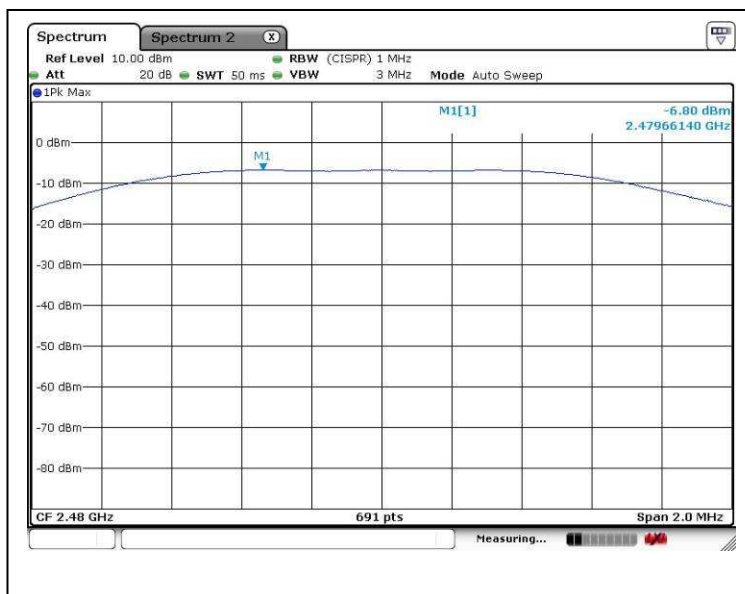
廠商會檢定中心

TEST REPORT

Report No. : AU0006085(8)

Date : 26 Jan 2016

A10. Transmission Power



Higher channel

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

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew