

廠商會檢定中心

## **TEST REPORT**

Report No. : AT0046034(6) Date : 20 Jul 2015

Application No. : LT021849(2)

Applicant : Asian Express Holdings Limited

4F,-4, No.669 Jingping Rd., Zhonghe City, TaiPei county 235

Taiwan R.O.C, Taiwan

Client : Asian Express Holdings Limited

Room 1702, Sino Centre, 582-592 Nathan Road,

Mongkok, Kowloon, Hong Kong.

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

 Sample Description
 Model No.

 Sonic HD Drone /
 PL-1280 / PL-1281 / PL-1282 / PL-1283 / PL-1284 / PL-1285 /

 HD Video Drone
 PL-1286 / PL-1287 / PL-1288 / PL-1289

Sample registration No. : RT024355-006, RT028844-001 Radio Frequency : 2405MHz – 2475 MHz Transceiver

Rating : 6 x 1.5V AA size batteries

No. of submitted sample : Four (4) set(s)

Date Received : 20 May 2015, 19 Jun 2015

Test Period : 04 Jun 2015 to 07 Jul 2015.

Test Requested : FCC Part 15 Certificate

Test Method : 47 CFR Part 15 (10-1-14 Edition), ANSI C63.4 – 2009

Test Engineer : Mr. LEUNG Shu-kan, Ken

Test Result : See attached sheet(s) from page 2 to 32.

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-pon Andrew

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Manager

Electrical Division

FCC ID: VLEPL1281-T



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Remark : All ten models are the same in circuitry and components; and therefore model PL-

1280 was chosen to be the representative of the test sample. The difference

between the tested model and the declared model(s) is/are the Model no. and Color

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### 1 General Information

#### 1.1 General Description

The equipment under test (EUT) is a controller for Sonic HD Drone. The EUT is power by 6 x 1.5V AA size batteries. It operates at 2405MHz – 2475MHz. There are buttons and two joysticks. When the buttons are pressed or joysticks are moved, there are radio signals transmitting to receiver.

The brief circuit description is listed as follows:

IC2 and its associated circuit act as RF module
IC3, IC4 and its associated circuit act as Power regulator
U1, U2 and its associated circuit act as RF module
RW2, POT2 and its associated circuit act as copter control
X1 and its associated circuit act as oscillator

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### 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 C63.4 – 2009. 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 C63.4 – 2009. A shielded room is located at :

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

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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	28 Aug 2015	1Year
Spectrum Analyzer	R&S	FSV40	100628	02 Feb 2016	1Year
Broadband Antenna	Schaffner	CBL6112B	2698	19 Feb 2016	2Years
Loop Antenna	EMCO	6502	00056620	28 Oct 2015	2Years
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	Schaffner	RG 213/U	N/A	19 Feb 2016	1Years
Coaxial Cable	Suhner	RG 214/U	N/A	19 Feb 2016	1Years
Coaxial Cable	Suhner	Sucoflex_104	N/A	24 Nov 2016	2Years

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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 <sub>lab</sub> )
30MHz ~ 200MHz (Horizontal)	4.63dB
30MHz ~ 200MHz (Vertical)	4.65dB
200MHz ~1000MHz (Horizontal)	4.45dB
200MHz ~1000MHz (Vertical)	4.41dB

#### Conducted emissions

Conducted Chinggions		
Frequency	Uncertainty (U <sub>lab</sub> )	
150kHz~30MHz	2.47dB	

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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 – 2009.

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. 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

## Subpart C

Peak Detector data were measured unless otherwise stated.

"#" means emissions appear within the restricted bands shall follow the requirement of 15.205.

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 requirement.

### Subpart B:

Ouasi-Peak Detector data were measured unless otherwise stated.

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.

"#" means emissions appear within the restricted bands shall follow the requirement of 15.205.

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.

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### 2.3 Radiated Emission Measurement Data

#### **Radiated emission**

#### pursuant to

### the requirement of FCC Part 15 subpart C

Environmental conditions:

ParameterRecorded valueAmbient temperature:30° CRelative humidity:62%

Measurement: Peak RBW: 1MHz VBW: 3MHz Operation Mode: Transmission

Testing frequency range: 9kHz to 25GHz

Channel	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)
	2404.499	Н	103.4	- 4.1	99.3	114.0	- 14.7
Low	#4808.953	V	45.0	3.8	48.8	74.0	- 25.2
	#4809.937	Н	45.4	3.8	49.2	74.0	- 24.8
	2445.341	Н	105.1	- 4.1	101.0	114.0	- 13.0
Middle	#4888.853	V	43.4	3.8	47.2	74.0	- 26.8
	#4889.031	Н	44.1	3.8	47.9	74.0	- 26.1
	2474.898	Н	105.6	- 4.3	101.3	114.0	- 12.7
High	#4948.842	V	42.7	4.1	46.8	74.0	- 27.2
	#4948.914	Н	43.4	4.1	47.5	74.0	- 26.5

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

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### 2.3 Radiated Emission Measurement Data (Con't)

#### **Radiated emission**

#### pursuant to

### the requirement of FCC Part 15 subpart C

Environmental conditions:

ParameterRecorded valueAmbient temperature:30 ° CRelative humidity:62 %

Measurement: Average RBW: 1MHz VBW: 10Hz Operation Mode: Transmission

Testing frequency range: 9kHz to 25GHz

Channel	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)
	2404.854	Н	77.0	- 4.1	72.9	114.0	- 21.1
Low	#4809.253	Н	25.9	3.8	29.7	74.0	- 24.3
	#4809.266	V	25.7	3.8	29.5	74.0	- 24.5
	2444.835	Н	78.6	- 4.1	74.5	114.0	- 19.5
Middle	#4889.151	V	25.4	3.8	29.2	74.0	- 24.8
	#488.9172	Н	25.4	3.8	29.2	74.0	- 24.8
	2474.819	Н	78.9	- 4.3	74.6	114.0	- 19.4
High	#4949.154	V	25.1	4.1	29.2	74.0	- 24.8
	#4949.146	Н	25.5	4.1	29.6	74.0	- 24.4

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

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## 2.3 Radiated Emission Measurement Data (Con't)

#### **Radiated emission**

#### pursuant to

### the requirement of FCC Part 15 subpart C

**Environmental conditions:** 

ParameterRecorded valueAmbient temperature:28° CRelative humidity:63%

Detector: Quasi-peak RBW: 120kHz VBW: 300kHz

Testing frequency range: 9kHz to 25GHz Operation mode: Transmission

Frequency (MHz)	Polarity (H/V)	Reading at 3m	Antenna Factor and Cable Loss	Field Strength at 3m	Limit at 3m (dBµV/m)	Margin (dB)
(141112)	(11/ 1/)	(dBµV)	(dB/m)	(dBµV/m)	(αΒμ ۷/ΠΙ)	(uD)
49.297	Н	6.8	13.3	20.1	40.0	- 19.9
77.155	Н	9.6	8.6	18.2	40.0	- 21.8
#120.498	Н	9.4	14.2	23.6	43.5	- 19.9
175.337	Н	8.8	12.6	21.4	43.5	- 22.1
201.698	Н	9.6	11.9	21.5	43.5	- 22.0
239.777	Н	10.9	12.8	23.7	46.0	- 22.3
311.496	Н	9.6	16.7	26.3	46.0	- 19.7

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

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## 2.3 Radiated Emission Measurement Data (Con't)

#### **Radiated emission**

#### pursuant to

### the requirement of FCC Part 15 subpart B

**Environmental conditions:** 

ParameterRecorded valueAmbient temperature:28° CRelative humidity:63%

Detector: Quasi-peak RBW: 120kHz VBW: 300kHz

Testing frequency range: 9kHz to 25GHz Operation mode: Receiving

Frequency	Polarity	Reading	Antenna Factor	Field Strength	Limit at 3m	Margin
(MHz)	(H/V)	at 3m (dBµV)	and Cable Loss (dB/m)	at 3m (dBµV/m)	(dBµV/m)	(dB)
50.229	Н	9.9	10.5	20.4	40.0	- 19.6
77.133	Н	10.0	8.6	18.6	40.0	- 21.4
#113.608	Н	10.5	12.9	23.4	43.5	- 20.1
175.089	Н	9.3	12.6	21.9	43.5	- 21.6
210.443	Н	9.4	11.9	21.3	46.0	- 22.2
239.946	Н	8.2	15.5	23.7	46.0	- 22.3
301.989	Н	9.2	16.7	25.9	46.0	- 20.1

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 C63.4 - 2009. 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 VLEPL1281-T TSup.pdf and VLEPL1281-T TSup.pdf.

### 4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename VLEPL1281-T ExPho.pdf and VLEPL1281-T 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 fundamental emission is confined in the specified band. It shows the 20dB bandwidth met the 15.215 requirement for frequency band 2400 to 2483.5 MHz.

The plot saved in TestRpt3.pdf shows the band edge is fulfil 15.209 requirement.

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## 6 Appendices

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A2	Photos of External Configurations	2	pages
A3	Photos of Internal Configurations	5	pages
A4	ID Label/Location	1	pages
A5	Band Edge	2	pages
A6	20dB Bandwidth Plot	2	pages

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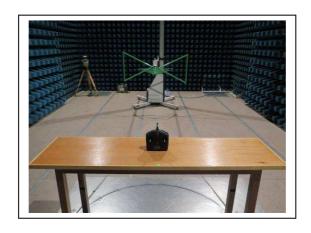


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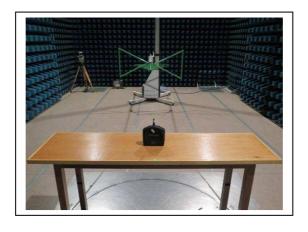
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## A1. Photos of the set-up of Radiated Emissions



(Front view, 30MHz – 1GHz)



(Back view, 30HMz – 1GHz)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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# **TEST REPORT**

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## 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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### A1. Photos of the set-up of Radiated Emissions



(Front view, 1GHz – 25GHz)



(Back view, above 1GHz – 25GHz)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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### **A2** Photos of External Configurations



(External Configuration 1)



(External Configuration 2)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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## **TEST REPORT**

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### **A2** Photos of External Configurations



(External Configuration 3)



(External Configuration 4)

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Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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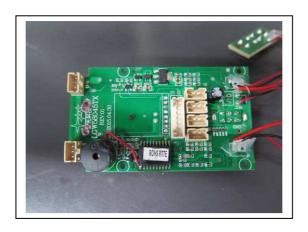


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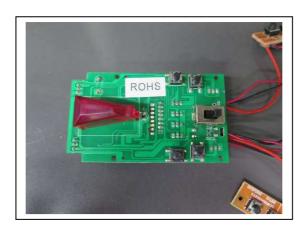
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### A3. Photos of Internal Configurations



Internal Configuration 1



**Internal Configuration 2** 

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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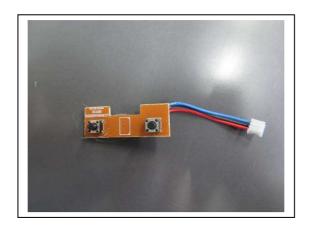


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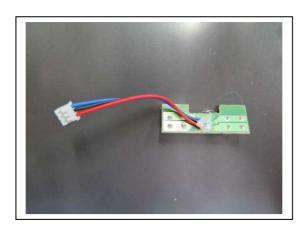
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### A3. Photos of Internal Configurations



**Internal Configuration 3** 



**Internal Configuration 4** 

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Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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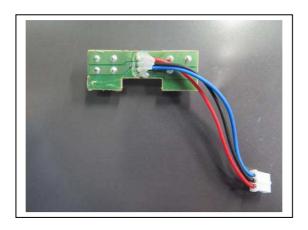


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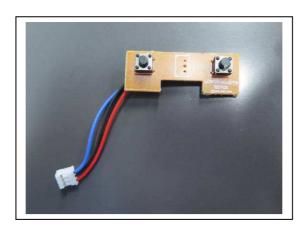
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### A3. Photos of Internal Configurations



Internal Configuration 5



Internal Configuration 6

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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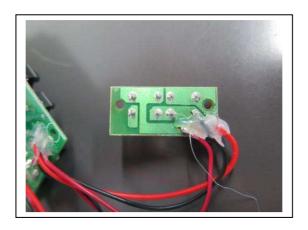


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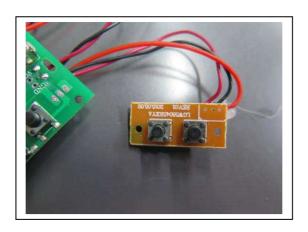
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### A3. Photos of Internal Configurations



Internal Configuration 7



**Internal Configuration 8** 

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Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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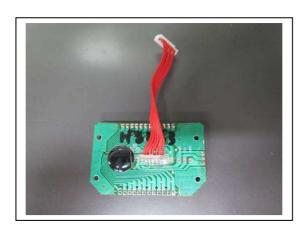
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### A3. Photos of Internal Configurations



**Internal Configuration 9** 



Internal Configuration 10

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Reviewed by:

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## A4. ID Label / Location



ID Label 1

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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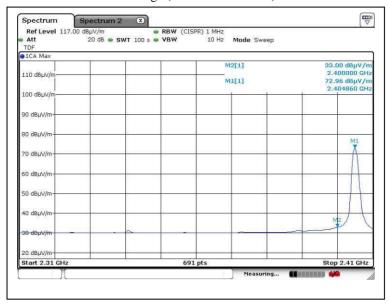
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## A5. Band Edge



Lower edge (Peak measurement)



Lower edge (Average measurement)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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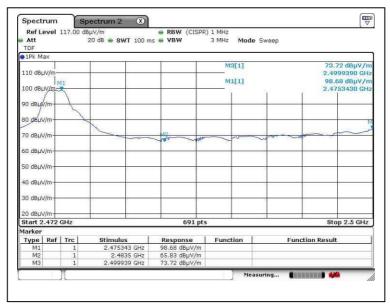


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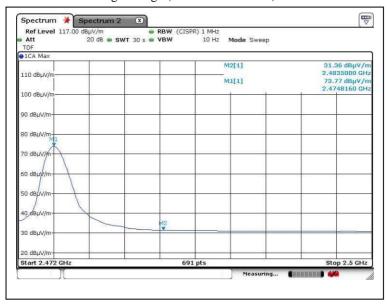
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### A5. Band Edge



Higher edge (Peak measurement)



Higher edge (Average measurement)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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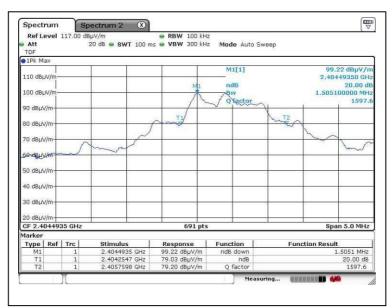


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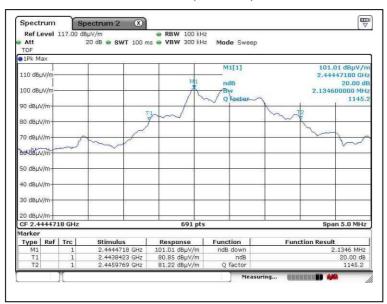
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### A6. 20dB Bandwidth Plot



Bandwidth 1 (2405MHz)



Bandwidth 2 (2445MHz)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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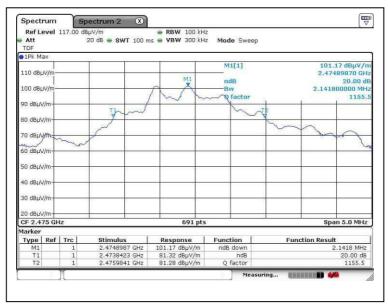


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### A6. 20dB Bandwidth Plot



Bandwidth 3 (2475MHz)

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

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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