

廠商會檢定中心

**TEST REPORT** 

Report No.	:	AT0039591(5)		Date :	12 Aug 2015
Application No.	:	LT018800(6)			
Applicant	:	Zego Electronic Company Room 703, Kowloon Bui 555 Nathan Road, Kowlo	lding,	n Yangri Ele	ctronic Ltd)
Sample Description	:	One(1) item of submitted of Model No. <u>6001359</u> Sample registration No. Radio Frequency Rating No. of submitted sample	: RT026006-003, : 2402MHz – 247 : 4 x 1.5V AAA si	RT0035651- 5MHz Transo	001
Date Received	:	29 Apr 2015, 24 Jul 2015			
Test Period	:	07 May 2015 to 11 Aug 2	2015.		
Test Requested	:	FCC Part 15 Certificate			
Test Method	:	47 CFR Part 15 (10-1-12 ANSI C63.4 – 2009	Edition)		
Test Engineer	:	Mr. LEUNG Shu-kan, Ke	en		
Test Result	:	See attached sheet(s) from page 2 to 28.			
Conclusion	:	The submitted sample was Subpart B and C.	s found to comply	with requiren	nent of FCC Part 15

For and on behalf of CMA Industrial Development Foundation Limited

Authorized Signature : Page 1 of 28 Mr. WONG Lap-pong Andrew Manager Electrical Division FCC ID: 2ACS65TX

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### 1 General Information

#### 1.1 General Description

The equipment under test (EUT) is a controller for Dominator Drone. The EUT is power by  $4 \times 1.5V$  AAA size batteries. It operates at 2402MHz – 2475MHz. There are buttons and joysticks on the EUT. When the buttons are pressed or the joysticks are moved, the EUT will transmit radio control signal to receiver.

The brief circuit description is listed as follows:

- U3	and its associated circuit act as MCU
- U1 (module)	and its associated circuit act as RF circuit
- U1	and its associated circuit act as power supply circuit
- Y1	and its associated circuit act as oscillator
- S2, S4, S5, S6, S7, S9, VR1,	and its associated circuit act as copter control
VR2	-

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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

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 section 15.205.

The harmonic emissions meet the requirement of section 15.209 are based on measurements employing the CISPR quasi-peak detector below 1000MHz and average detector for frequencies above 1000MHz.

#### Subpart B:

Quasi-Peak Detector data were measured unless otherwise stated.

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

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.

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### **TEST REPORT**

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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:28

Relative humidity:

Measurement: Peak RBW: 1MHz VBW: 3MHz Operation mode: Transmission Testing frequency range: 9kHz to 25GHz

61

° C

%

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)
2401.732	Н	87.2	- 4.1	83.1	114.0	- 30.9
#4803.837	Н	56.4	3.8	60.2	74.0	- 13.8
7206.578	Н	50.1	11.7	61.8	74.0	- 12.2
7206.610	V	50.1	11.7	61.8	74.0	- 12.2
2432.735	Н	86.3	- 4.1	82.2	114.0	- 31.8
#4865.916	Н	56.5	3.8	60.3	74.0	- 13.7
#7299.604	V	49.6	11.7	61.3	74.0	- 12.7
#7299.680	Н	49.9	11.7	61.6	74.0	- 12.4
	•					
2475.214	V	91.3	- 4.3	87.0	114.0	- 27.0
#4949.942	Н	56.8	4.1	60.9	74.0	- 13.1
#7425.560	V	48.3	11.7	60.0	74.0	- 14.0
#7425.788	Н	46.6	11.7	58.3	74.0	- 15.7

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 C

Environmental conditions:	_	
Parameter	Recorded value	
Ambient temperature:	28	° C
Relative humidity:	61	%

Measurement: Average RBW: 1MHz VBW: 10Hz Operation mode: Transmission 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)
2402.180	Н	59.7	- 4.1	55.6	94.0	- 38.4
#4804.115	Н	30.9	3.8	34.7	54.0	- 19.3
7206.657	V	25.4	11.7	37.1	54.0	- 16.9
7206.665	Н	25.4	11.7	37.1	54.0	- 16.9
2433.094	Н	56.0	- 4.1	51.9	94.0	- 42.1
#4866.119	Н	30.9	3.8	34.7	54.0	- 19.3
#7299.636	Н	25.9	11.7	37.6	54.0	- 16.4
#7299.674	V	25.6	11.7	37.3	54.0	- 16.7
2475.193	V	62.4	- 4.3	58.1	94.0	- 35.9
#4950.222	Н	31.1	4.1	35.2	54.0	- 18.8
#7425.696	V	25.3	11.7	37.0	54.0	- 17.0
#7425.788	Н	24.8	11.7	36.5	54.0	- 17.5

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:	_	
Parameter	Recorded value	
Ambient temperature:	28	° C
Relative humidity:	61	%

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)
		(dBµV)	(dB/m)	(dBµV/m)		
65.894	Н	9.4	8.1	17.5	40.0	- 22.5
108.510	Н	10.2	12.9	23.1	43.5	- 20.4
146.888	Н	9.2	13.6	22.8	43.5	- 20.7
192.736	Н	10.0	11.6	21.6	43.5	- 21.9
237.287	Н	10.5	12.8	23.3	46.0	- 22.7
283.074	Н	10.0	15.5	25.5	46.0	- 20.5
326.582	Н	10.3	16.7	27.0	46.0	- 19.0

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:	_	
Parameter	Recorded value	
Ambient temperature:	28	° C
Relative humidity:	61	%

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

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

Frequency (MHz)	Polarity (H/V)	Reading at 3m	Antenna Factor and Cable Loss	Field Strength at 3m	Limit at 3m (dBµV/m)	Margin (dB)
		(dBµV)	(dB/m)	(dBµV/m)	•	
55.234	Н	7.4	10.5	17.9	40.0	- 22.1
100.611	Н	9.4	12.9	22.3	43.5	- 21.2
139.490	Н	8.9	14.2	23.1	43.5	- 20.4
181.253	Н	9.6	11.6	21.2	43.5	- 22.3
225.662	Н	10.2	11.6	21.8	46.0	- 24.2
279.341	Н	9.9	15.5	25.4	46.0	- 20.6
339.102	Н	11.0	16.7	27.7	46.0	- 18.3

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 2ACS65TX TSup.pdf.

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

For electronic filing, the photos are saved with filename 2ACS65TX ExPho.pdf and 2ACS65TX 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	Арре	endices			
	A1	Photos of the set-up of Radiated Emissions	3	pages	
	A2	Photos of External Configurations	2	pages	
	A3	Photos of Internal Configurations	2	pages	
	A4	ID Label/Location	1	page	
	A5	Band Edge	2	pages	
	A6	20dB Bandwidth Plot	2	pages	

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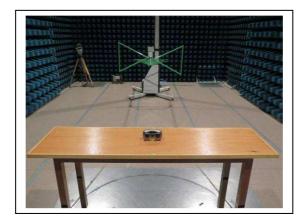


# **TEST REPORT**

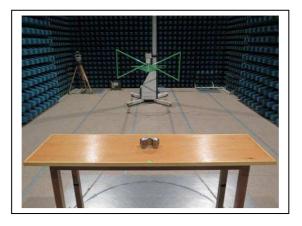
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A1. Photos of the set-up of Radiated Emissions



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



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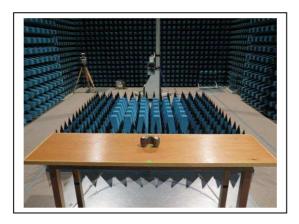
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A1. Photos of the set-up of Radiated Emissions



(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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**Photos of External Configuration** A2.



External Configuration 1



**External Configuration 2** 

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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### A2. Photos of External Configuration



**External Configuration 3** 



**External Configuration 4** 

Tested by:

Jen

Mr. LEUNG Shu-kan, Ken

Reviewed by: P.C.



Mr. WONG Lap-pong, Andrew

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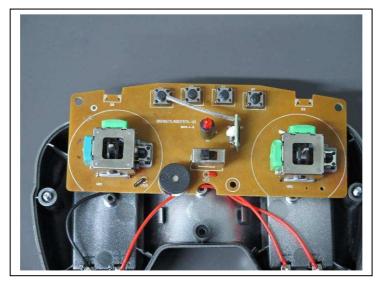
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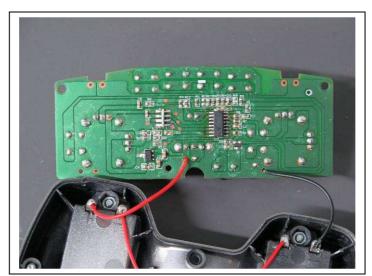
Date :

12 Aug 2015

**Photos of Internal Configuration** A3.



Internal Configuration 1



Internal Configuration 2

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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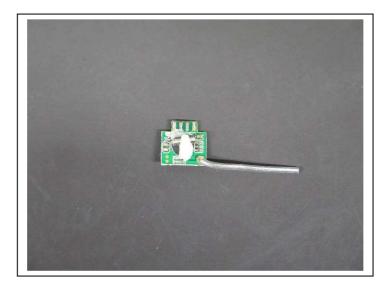


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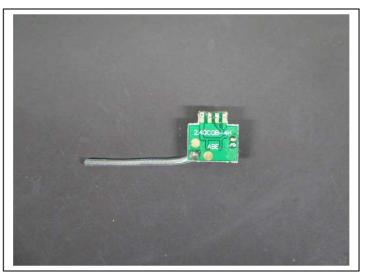
Report No. AT0039591(5) :

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#### **Photos of Internal Configuration** A3.



Internal Configuration 3



Internal Configuration 4

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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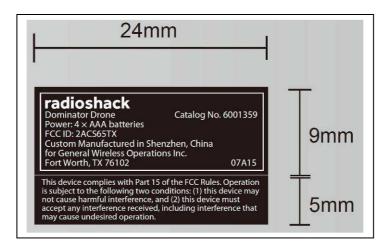
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#### A4. **ID** Label/Location



ID Label 1



ID Label 2

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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### A5. Band Edge

Lower edge (Peak measurement)

1CA Max					
100 dBµV/m		12[1]	25.79 dBµV/n 2.400000 GH: 55.52 dBµV/n 2.402180 GH:		
90 dBµV/m	M	11[1]			
90 0BpV/m					
80 dBµV/m	 		_		
70 dBµV/m					
60 dBµV/m-	 		M	11	
50 dBµV/m	 		+	Ą	
40 dBµV/m-	 			+	
30 dBµV/m	 2 12		- Int	-	
20 dBµV/m				_	
10 dBuV/m					

Lower edge (Average measurement)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by: P.C.

Mr. WONG Lap-pong, Andrew

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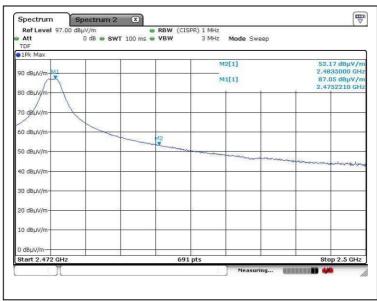
Report No.

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:

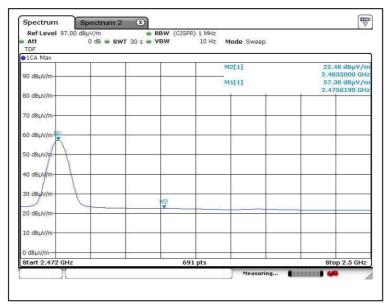
Date :

12 Aug 2015



### A5. Band Edge

Upper edge (Peak measurement)



Upper edge (Average measurement)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: 2ACS65TX

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Spectrum	Spectrum 2 🛛 🗴					
Ref Level 97.0	10 dBµV/m	RBW 100 kH:	z			
Att TDF	0 dB 👄 SWT 100 m	is 🖷 <b>VBW</b> 300 kH.	z Mode Sweep			
1 DF		-			-	
			M1[1]		83.54 dBµV/n	
90 dBµV/m-		MI	Constant and		2.40195660 GH	
23 23		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ndB		20.00 di	
80 dBµV/m			BW		1.280800000 MH	
TO IN LUC		-	Q factor	1 1	1875.	
70 dBµV/m-		Y	12			
60 dBµV/m-		P	1			
oo abb viii				-may		
50 dBuV/m				m		
minint	200 - 1 DV -					
40 dBµV/m-						
V V						
30 dBµV/m-						
20 dBµV/m-						
10 dBuV/m-	2 0					
10 dbp v/m						
0 dBµV/m			1			
CF 2.402 GHz		691 pt	s		Span 5.0 MHz	
Marker						
Type   Ref   Tr	c Stimulus	Response	Function	Function Result		
M1	1 2.4019566 GHz	83.54 dBµV/m	ndB down	1.2808 MHz		
T1	1 2.4013198 GHz	63.53 dBµV/m	ndB	20.00 dB 1875.4		
T2	1 2.4026006 GHz	64.11 dBµV/m	Q factor	Q factor		

### A6. 20dB Bandwidth Plot

#### Bandwidth 1 (2402MHz)

Spect			pectrum 2	×					1
	evel	97.00 dBj			RBW 100 kH;				
Att TDF			0 dB 👄 SWT 1	00 ms	🖶 VBW 300 kHz	Mode Sweep	p		
PIPK M	2011								
O TEK IN			1 1		1	M1[1]		70.67 di	31152.70
90 dBu	v/m-		-			wift]		79.67 dBµV/r 2.43272280 GH	
	26575		1 1		M3.	ndB			.00 d
80 dBµ	v/m-		-			Bw		1.295200000 MH	
	10000					Q factor			1878.
70 dBµ'	v/m				1	1			
					TI	3	15		
60 dBµ	v/m-			10701-002	1		1		
50 dBµ	ilm.			Sm	-		June		
10 00µ	v/m	the second	- martin					1 miles	
40 dBu	V/m-	J							~~
120499206550	0.990.00		1 1						
30 dBµ	V/m-		-					9	
			1 1						
20 dBµ	V/m-							1 1	
10 40 -									
10 dBµ'	v/m								
0 dBµV	(m		a			1		a	
CF 2.4		GHz			691 pt	s		Span 5.	MHZ
Marker	1. The 1. Court of Co							(September 20)	
Туре		Trc	Stimulus Response Function Fur			Fun	ction Result		
M1		1	2.4327228 GHz		79.67 dBµV/m			1.2952 MHz	
T1		1	2.4323103 GHz		59.68 dBµV/m				00 dB
T2		1	2.4336055	GHz	59.97 dBµV/m	Q factor		10	378.2
	1.1	11				) Mo	asuring	a na	_

#### Bandwidth 2 (2433MHz)

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## **TEST REPORT**

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#### Spectrum Ref Level 97.0 Att µV/m **© RBW** 100 kHz 0 dB **© SWT** 100 ms **© VBW** 300 kHz Mode Sweep TDF 1Pk M M1[1] 86.10 dBµV/r 2.47495970 GH 90 dBµV 20.00 d 80 dBuV 1.30250 000 M 1900 70 dBuly sn de 50 dBj 40 dBµ 30 dBµ' 20 dBµ\ 10 dBuV/ dF CF 2.474938 GHz 691 pts Span 5.0 MHz lark Type | Ref | Trc Stimulus Response Function Function Result 3025 MHz 20.00 dB 1900.2 2.4743085 2.4756109 66.38

### A6. 20dB Bandwidth Plot

Bandwidth 3 (2475MHz)

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

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by: P-C

Mr. WONG Lap-pong, Andrew

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