

廠商會檢定中心

TEST REPORT

Report No.	:	AU0050511(1)		Date :	25 Aug 2016
Application No.	:	LU027789(0)			
Applicant	:	Zego Electronic Compan Room 703, Kowloon Bui 555 Nathan Road, Kowlo	lding,		
Sample Description	:	One(1) item of submitted of Model No. <u>2770422</u> Sample registration No. Radio Frequency Rating No. of submitted sample	: RU036405-001 : 2402MHz – 247 : 3.7V rechargeab : USB 5V chargin	5MHz Trans le battery	
Date Received	:	08 Aug 2016			
Test Period	:	15 Aug 2016 to 19 Aug 2	2016		
Test Requested	:	FCC Part 15 Certification	n, FCC Part 15 Veri	fication Proc	edure
Test Method	:	47 CFR Part 15 (10-1-15 ANSI C63.4 – 2014, ANS	,		
Test Engineer	:	Mr. LEUNG Shu-kan, Ke	en		
Test Result	:	See attached sheet(s) from	n page 2 to 34.		
Conclusion	:	The submitted sample was Subpart B and C.	as found to comply	with requirer	nent of FCC Part 15

For and on behalf of CMA Industrial Development Foundation Limited

Authorized Signature : Page 1 of 34 Mr. WONG Lap-pong Andrew Manager Electrical Division FCC ID: 2ACS617RX

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1 General Information

1.1 General Description

The equipment under test (EUT) is a copter for Ninja Drone. The EUT is power by 3.7V rechargeable battery. It operates at 2402MHz - 2475MHz. When the receiver receives radio signal from transmitter, it will take the corresponding actions.

The brief circuit description is listed as follows:

- U1,U3	and its associated circuit act as MCU
- U2	and its associated circuit act as RF circuit
- Y1	and its associated circuit act as oscillator
- Q1, Q2	and its associated circuit act as LED
- M1, M2, M3, M4	and its associated circuit act as motor
- Q4	and its associated circuit act as power supply

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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 C63.10 - 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.

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1.3 List of measuring equipment

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

Support equipment:

Adaptor Model: A1299

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1.4 Measurement Uncertainty

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

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

Conducted emissions

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

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2 Description of the radiated emission test

2.1 Test Procedure

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 - 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. 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 Frequencies from fundamental up to tenth harmonics were investigated, and emissions more 20dB below limited were not reported. Thus, those higher emissions were presented in next page (section 2.3).

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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2.3 Radiated Emission Measurement Data

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	26	° C
Relative humidity:	75	%

Measurement: Peak RBW: 1MHz VBW: 3MHz 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)
2402.151	V	80	- 4.2	75.8	114.0	-38.2
#4801.790	V	36.8	3.7	40.5	74.0	-33.5
#4801.990	Н	36.3	3.7	40.0	74.0	-34
				•		
2433.135	V	80.6	- 4.2	76.4	114.0	-37.6
#4863.750	Н	38.8	3.7	42.5	74.0	-31.5
#4863.872	V	24.7	3.7	28.4	74.0	-45.6
				•		
2475.154	V	80.5	- 4.3	76.2	114.0	-37.8
#4947.746	V	37.1	4.0	41.1	74.0	-32.9
#4947.812	Н	36.6	4.0	40.6	74.0	-33.4

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

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

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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:	26	° C
Relative humidity:] 75	%

Detector: Quasi-peak Mode; Transmission RBW: 120kHz VBW: 300kHz

Testing frequency range: 9kHz to 25GHz

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)		
89.121	Н	8.4	9.7	18.1	43.5	- 25.4
122.930	Н	8.1	14.4	22.5	43.5	- 21.0
160.340	Н	8.2	11.9	20.1	43.5	- 23.4
185.590	Н	8.9	11.2	20.1	43.5	- 23.4
221.174	Н	8.5	11.8	20.3	46.0	- 25.7
278.220	Н	9.3	15.4	24.7	46.0	- 21.3
313.910	Н	8.2	16.8	25.0	46.0	- 21.0

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:	26	° C
Relative humidity:	75	%

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

Testing frequency range: 9kHz to 25GHz

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)		
112.560	Н	9.5	12.2	21.7	43.5	- 21.8
135.660	Н	7.5	14.4	21.9	43.5	- 21.6
161.843	Н	8.2	11.9	20.1	43.5	- 23.4
201.720	Н	9.4	12.0	21.4	43.5	- 22.1
236.555	Н	8.9	13.2	22.1	46.0	- 23.9
295.729	Н	9.2	15.4	24.6	46.0	- 21.4
335.163	Н	9.3	16.8	26.1	46.0	- 19.9

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:	26	° C
Relative humidity:	75	%

Detector: Quasi-peak Mode; Charging RBW: 120kHz VBW: 300kHz

Testing frequency range: 9kHz to 25GHz

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)		
60.029	Н	7.9	7.6	15.5	40.0	- 24.5
99.315	Н	9.9	10.1	20.0	43.5	- 23.5
148.860	Н	8.0	14.1	22.1	43.5	- 21.4
205.580	Н	8.9	12.0	20.9	43.5	- 22.6
243.667	Н	10.0	13.2	23.2	46.0	- 22.8
285.120	Н	9.4	15.4	24.8	46.0	- 21.2
343.560	Н	9.2	16.8	26.0	46.0	- 20.0

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

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3 Description of the Line-conducted Test

3.1 Test Procedure

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

3.2 Test Result

The EUT connected to an adaptor for charging.

It was found that the EUT met the FCC requirement.

3.3 Graph and Table of Conducted Emission Measurement Data

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

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4 Photograph

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

For electronic filing, the photos are saved with filename 2ACS617RX TSup.pdf.

4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename 2ACS617RX ExPho.pdf and 2ACS617RX 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 in Appendices A8 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 in Appendices A7 shows the band edge is fulfil 15.209 requirement.

5.2 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	6 Appendices				
	A1	Photos of the set-up of Radiated Emissions	3	pages	
	A2	Photos of the set-up of Conducted Emissions	1	pages	
	A3	Photos of External Configurations	4	pages	
	A4	Photos of Internal Configurations	3	pages	
	A5	ID Label/Location	1	page	
	A6	Conducted Emission Measurement Data	2	pages	
	A7	Band Edge	2	pages	
	A8	20dB Bandwidth Plot	2	pages	

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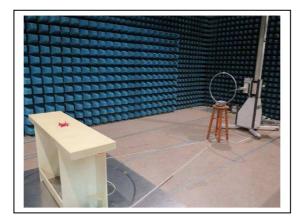
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A1. Photos of the set-up of Radiated Emissions



30MHz - 1GHz



9kHz – 30MHz

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Mr. LEUNG Shu-kan, Ken

Reviewed by:

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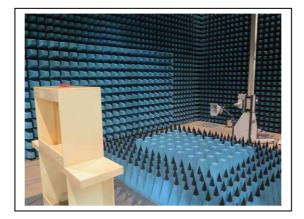
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A1. Photos of the set-up of Radiated Emissions



1GHz-25GHz

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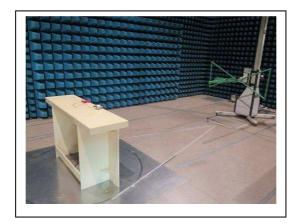


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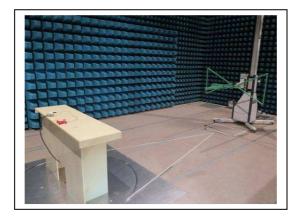
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A1. Photos of the set-up of Radiated Emissions



(front view, charging)



(rear view, charging)

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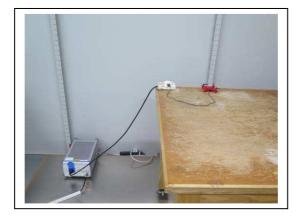


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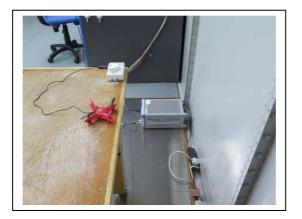
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A2 Photos of the set-up of Conducted Emission



(front view)



(side view)

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A3. Photos of External Configuration



External Configuration 1



External Configuration 2

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A3. Photos of External Configuration



External Configuration 3



External Configuration 4

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A3. Photos of External Configuration



External Configuration 5



External Configuration 6

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A3. Photos of External Configuration



External Configuration 7

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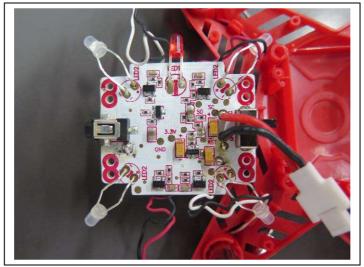
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A4. Photos of Internal Configuration



Internal Configuration 1



Internal Configuration 2

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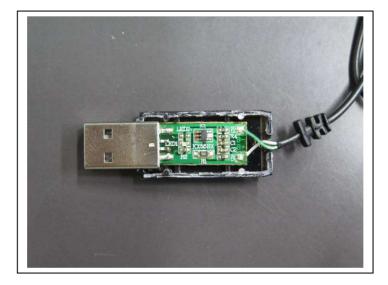
Report No. : AU

AU0050511(1)

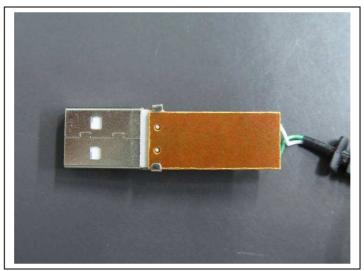
Date :

25 Aug 2016

A4. Photos of Internal Configuration



Internal Configuration 3



Internal Configuration 4

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Reviewed by:

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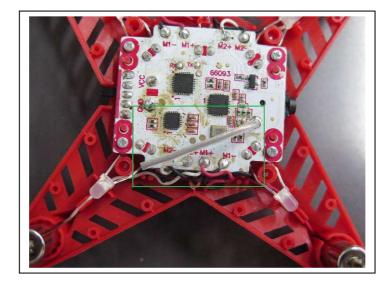


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Date : 25 Aug 2016

A4. Photos of Internal Configuration



EUT antenna

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TEST REPORT

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Date :

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A5. ID Label/Location



Label 1



Label 2

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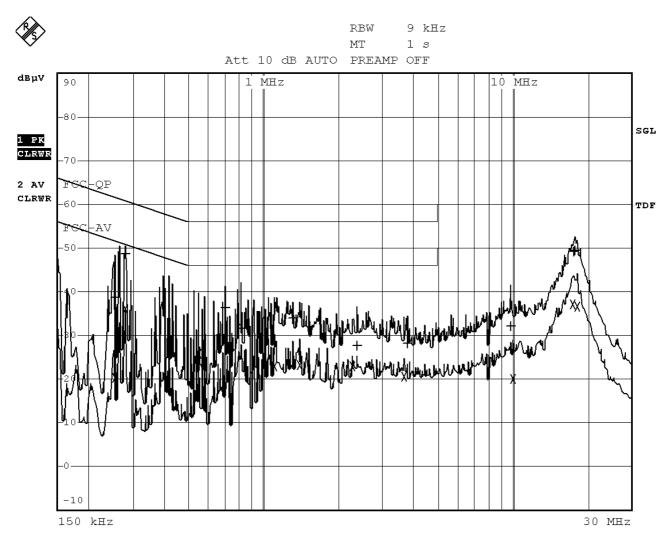
TEST REPORT

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Date :

25 Aug 2016

A6 Conducted Emission Measurement Date



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TEST REPORT

Report No. : AU0050511(1)

Date : 25

25 Aug 2016

A6 Conducted Emission Measurement Date

	EDIT PEAK LIST (Final Measurement Results)				
Tra	Tracel: FCC-QP				
Tra	ce2 :	FCC-AV			
Tra	ce3:				
	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB	
1	Quasi Peak	253.5 kHz	38.62 N gnd	-23.01	
2	Average	253.5 kHz	20.32 N gnd	-31.31	
1	Quasi Peak	280.5 kHz	48.65 N gnd	-12.14	
2	Average	280.5 kHz	36.08 N gnd	-14.71	
2	Average	549.5 kHz	25.88 N gnd	-20.11	
1	Quasi Peak	702.5 kHz	36.27 N gnd	-19.73	
1	Quasi Peak	810.5 kHz	31.55 N gnd	-24.44	
2	Average	1.103 MHz	22.89 N gnd	-23.10	
1	Quasi Peak	1.3145 MHz	33.90 L1 gnd	-22.09	
2	Average	1.3955 MHz	23.23 N gnd	-22.76	
2	Average	2.273 MHz	22.89 N gnd	-23.10	
1	Quasi Peak	2.3675 MHz	27.61 N gnd	-28.38	
2	Average	3.6815 MHz	20.64 N gnd	-25.35	
1	Quasi Peak	3.7985 MHz	28.07 N gnd	-27.92	
1	Quasi Peak	9.824 MHz	32.12 N gnd	-27.87	
2	Average	10.0625 MHz	20.06 L1 gnd	-29.93	
2	Average	17.501 MHz	37.01 N gnd	-12.98	
1	Quasi Peak	17.6225 MHz	49.22 N gnd	-10.78	
1	Quasi Peak	17.9285 MHz	49.51 N gnd	-10.48	
2	Average	18.23 MHz	36.59 N gnd	-13.40	

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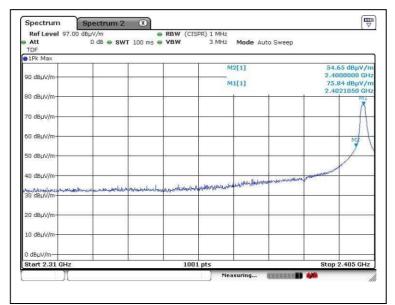
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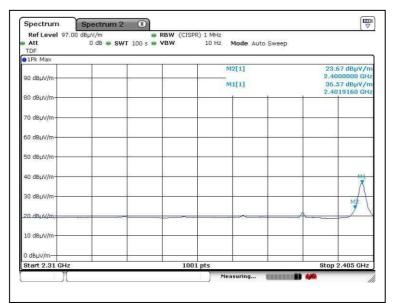
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A7. Band Edge

Lower edge (Peak measurement)



Lower edge (Average measurement)

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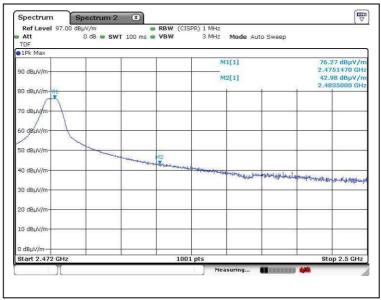
Report No.

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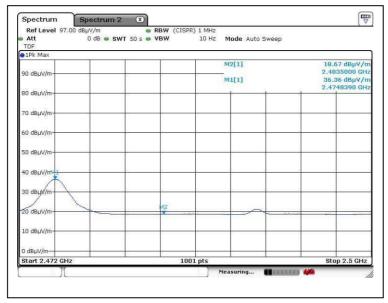
Date :

25 Aug 2016



A7. Band Edge

Upper edge (Peak measurement)



Upper edge (Average measurement))

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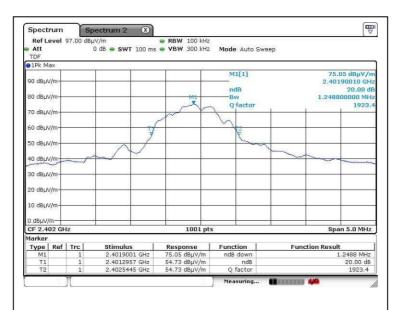
<u>TEST REPORT</u>

Report No.

AU0050511(1)

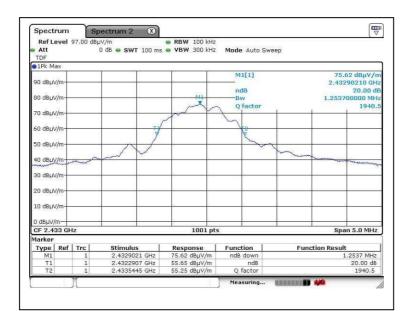
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Date : 25 Aug 2016



A8. 20dB Bandwidth Plot

Bandwidth 1 (2402MHz)



Bandwidth 2 (2433MHz)

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TEST REPORT

Report No.

AU0050511(1)

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25 Aug 2016 Date :

Spectrum Ref Level 97.1 Att uV/m **B RBW** 100 kHz 0 dB **B SWT** 100 ms **B VBW** 300 kHz Mode Auto Sweer TDF 1Pk Ma M1[1] 75.37 dBµV 90 dBuV 2.47489510 GH ndP 20.00 0 80 dBµ\ 1 2987 nno M 0 f 1905 70 dBuly 60 dBus 40.) 30 dBµ 20 dBµV, 10 dBµV/i dBi CF 2.475 GH 1001 pt 5.0 MH larke Type | Ref | Tro Function Stimulu Response 2.474250 20.00 dB 1905.7 Q facto

Bandwidth 3 (2475MHz)

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

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A8. 20dB Bandwidth Plot