RF TEST REPORT



Report No.: 17020459-FCC-R1 Supersede Report No.: N/A

Applicant	CHAMPION POV	VER EQUIPMENT, II	NC	
Product Name	Remote Controlle	er		
Main Model	K185-2			
Serial Model	N/A			
Test Standard	FCC Part 15.231	: 2016, ANSI C63.10	: 2013	
Test Date	April 24, 2017			
Issue Date	April 25, 2017			
Test Result	⊠ Pass □ F	ail		
Equipment complied	d with the specific	cation		
Equipment did not o	comply with the sp	pecification		
Deon .	Qai'	Miro	Bao	
	Deon Dai Test Engineer Miro Bao Checked By			
	This test re	eport may be reproc	luced in full only	
Test resu	It presented in th	is test report is app	licable to the teste	ed sample only

Issued by:

SIEMIC (Nanjing-China) Laboratories

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Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Abordanations for Conformity Assessment		
Country/Region	Scope	
USA	EMC , RF/Wireless , Telecom	
Canada	EMC, RF/Wireless, Telecom	
Taiwan	EMC, RF, Telecom , Safety	
Hong Kong	RF/Wireless ,Telecom	
Australia	EMC, RF, Telecom , Safety	
Korea	EMI, EMS, RF , Telecom, Safety	
Japan	EMI, RF/Wireless, Telecom	
Singapore	EMC , RF , Telecom	
Europe	EMC, RF, Telecom , Safety	



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1. Report Revision History

Report No.	Report Version	Description	Issue Date
17020459-FCC-R1	NONE	Original	April 25, 2017

2. <u>Customer information</u>

Applicant Name	CHAMPION POWER EQUIPMENT, INC
Applicant Add	12039 Smith Avenue, Santa Fe Springs, CA90670, USA
Manufacturer Name	Zhongshan Kingcobra Electronics Co.,Ltd.
Manufacturer Add	20#Tongxing East Road, Dongsheng Town, Zhongshan City, Guangdong, China

3. <u>Test site information</u>

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Add	2-1 Longcang Avenue Yuhua Economic and
Lab Add	Technology Development Park, Nanjing, China
FCC Test Site No.	986914
IC Test Site No.	4842B-1
Test Software	EZ_EMC



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4. Equipment Under Test (EUT) Information

Description of EUT: Remote Controller

Main Model: K185-2

Serial Model: N/A

Date EUT received: April 21, 2017

Test Date(s): April 24, 2017

Antenna Gain: 2 dBi

Type of Modulation: ASK

RF Operating Frequency (ies): Tx:433.90MHz

Number of Channels: 1 CH

Port: N/A

Power: DC6V

Trade Name: CHAMPION

FCC ID: YA3-K185



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5. Test Summary

The product was tested in accordance with the following specifications. All testing has been performed according to below product classification:

FCC Rules Description of Test		Result
§15.203	Antenna Requirement	Compliance
§15.207	Conducted Emissions Voltage	N/A*
§15.231(b)	Fundamental & Radiated Spurious Emission	Compliance
§15.231(c)	20dB Bandwidth	Compliance
§15.231(a)(1)	Deactivation	Compliance

Note: Preliminary radiated emission testing has been performed on X, Y, Z axis, only worst case test result is presented in this test report.

Measurement Uncertainty

Emissions				
Test Item	Uncertainty			
Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	3.92dB		

N/A*: EUT is Power Supply by Battery



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6. Measurements, Examination And Derived Results

6.1 Antenna Requirement

Applicable Standard

Requirement(s): 47 CFR §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna requirement must meet at least one of the following:

- a) Antenna must be permanently attached to the device.
- b) Antenna must use a unique type of connector to attach to the device.
- c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.

The antenna is permanently attached to the device which meets the requirement.

Result: Compliance.



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6.2 AC Conducted Emissions Voltage

Temperature	-
Relative Humidity	-
Atmospheric Pressure	-
Test date :	-
Tested By:	-

Conducted Emission Limit

Frequency ranges		Limit (dBµV)
Frequency ranges (MHz)	QP	Average
0.15 ~ 0.5	66 – 56	56 – 46
0.5 ~ 5	56	46
5 ~ 30	60	50

Spec	Item	Requirement	Applicable
47CFR§15.20 7, RSS210 (A8.1)	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.	
Test Setup		Vertical Ground Reference Plane Test Receiver Horizontal Ground Reference Plane Note: 1.Support units were connected to second LISN. 2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.	
Procedure	- - -	The EUT and supporting equipment were set up in accordance with the r of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as Annex B. The power supply for the EUT was fed through a 50W/50mH EUT LISN, filtered mains. The RF OUT of the EUT LISN was connected to the EMI test receiver via coaxial cable. All other supporting equipment were powered separately from another management.	shown in connected to a a low-loss
Remark	EUT is	Power Supply by Battery	
Result	⊠N/A	□ Fail	



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6.3 20dB Occupied Bandwidth

Temperature	25°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	April 24, 2017
Tested By:	Deon Dai

Requirement(s):				
Spec	Item	Requirement	Applicable	
§15.231(c)	a)	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.		
	b)	For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.		
Test Setup		Spectrum Analyzer EUT		
Test Procedure	- - - - - N	Emission bandwidth measurement procedure Set RBW = 100 kHz. Set the video bandwidth (VBW) ≥3*RBW. Detector = Peak. Trace mode = max hold. Sweep = auto couple. Allow the trace to stabilize. Measure the maximum width of the emission that is constrained by the associated with the two outermost amplitude points (upper and lower finat are attenuated by 20 dB relative to the maximum level measured and amental emission.	requencies)	
Remark				
Result	⊠Pas	s □Fail		
Test Data ⊠Yes Test Plot ⊠Yes		□N/A □N/A		

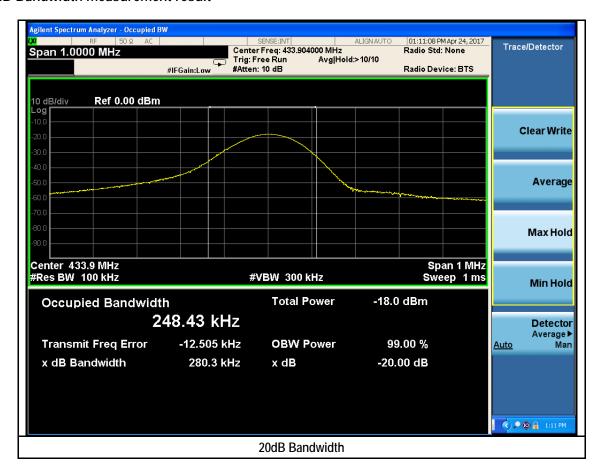


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20dB Bandwidth measurement result

Туре	Freq (MHz)	СН	Measured 20dB Bandwidth (kHz)	Limit (kHz)	Result
20dB BW	433.90	1 CH	280.3	1084.75	Pass

Test Plots 20dB Bandwidth measurement result





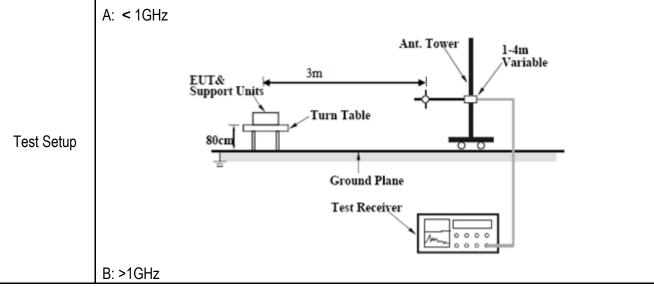
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6.4 Radiated Fundamental and Spurious Emission

Temperature	25°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	April 24, 2017
Tested By:	Deon Dai

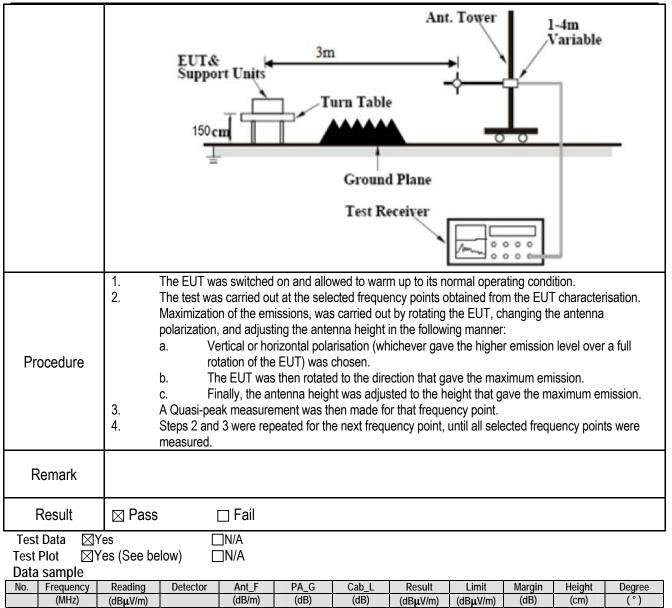
Requirement(s):

Spec	Item	Requirement			Applicable
§15.231(b)	a)	Except higher limit as s low-power radio-frequer specified in the following	ncy devices shall not exceed g table and the level of any	section, the emissions from the dethe field strength levels unwanted emissions shall not tighter limit applies at the band Field strength of spurious emissions (microvolts/meter) 225 125 125 125 to 375 375 375 to 1250 1250	Applicable
		Note: All 3 axes have			





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Frequency (MHz) = Emission frequency in MHz

Reading (dBμV/m) = Receiver Reading Value

Detector= Peak Detector or Quasi Peak Detector

Ant_F=Antenna Factor

PA_G=Pre-Amplifier Gain

Cab_L=Cable Loss

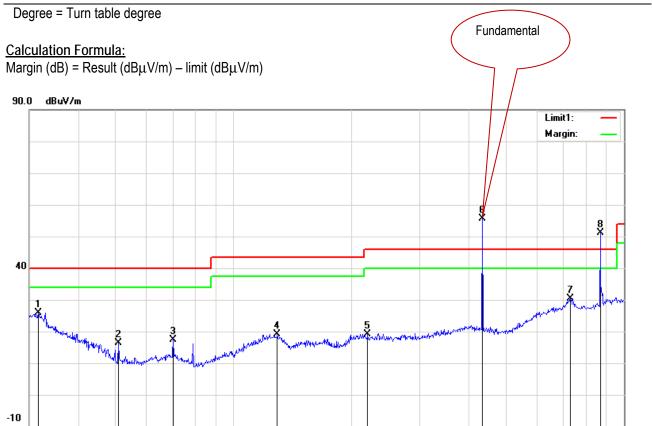
Result $(dB\mu V/m)$ = Read ing Value + Corrected Value

Limit ($dB\mu V/m$) = Limit stated in standard

Height (cm) = Height of Receiver antenna



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Vertical Polarity Plot @3m

300

400

600 700

1000.0 MHz

Field strength of fundamental Result

30.000

40

No.	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBµV/m)		(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(cm)	(°)
6	433.90	85.07	Pk	16.43	49.13	3.35	55.72	100.8	-45.08	200	222
6	433.90	-	Ave	-	-	-	44.5	80.8	-36.3	-	-

Field strength of spurious emissions Result

60

70 80

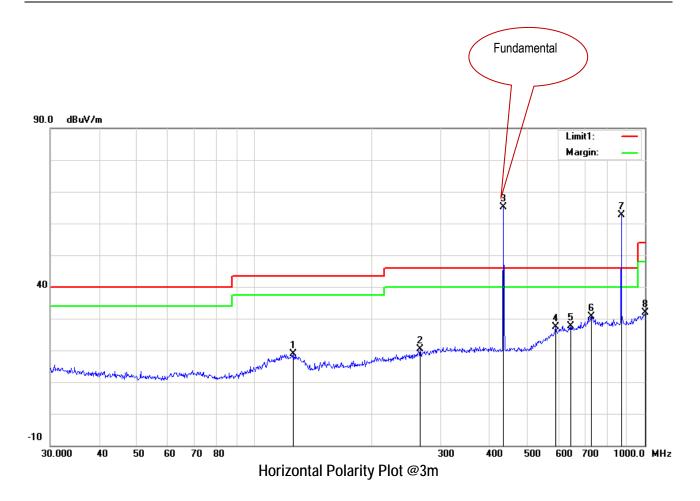
No.	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBµV/m)		(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(cm)	(°)
8	867.80	69.46	peak	23.02	46.12	4.76	51.12	80.8	-29.68	200	83
8	867.80		Ave	-	-	ı	39.9	60.8	-20.9	ı	-

Notes: Duty cycle is 27.49%, 20log (duty cycle) = -11.22dB correction was used to determine the average level from the peak reading.

Average = peak reading + 20log (duty cycle), Final Average= peak reading-11.22dB



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Field strength of fundamental Result

No.	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBµV/m)		(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(cm)	(°)
3	433.90	94.97	Pk	16.00	49.13	3.35	65.19	100.8	-35.61	200	291
3	433.90	-	Ave	-	-	-	53.97	80.8	-26.83	-	-

Field strength of spurious emissions Result

No.	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBµV/m)		(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(cm)	(°)
7	867.80	81.15	Pk	22.79	46.12	4.76	62.58	80.8	-18.22	200	360
7	867.80	-	Ave	-	-	-	51.36	60.8	-9.44	-	-

Notes: Duty cycle is 27.49%, 20log (duty cycle) = -11.22dB correction was used to determine the average level from the peak reading. Average = peak reading + 20log (duty cycle), Final Average= peak reading-11.22dB



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Spurious Emissions (<1GHz) Measurement Result

Vertical Polarity Plot @3m

						,	– 0				
No.	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBµV/m)		(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(cm)	(°)
1	31.6202	50.10	peak	20.66	45.67	0.90	25.99	40.00	-14.01	100	172
2	50.7637	52.73	peak	8.96	46.49	1.25	16.45	40.00	-23.55	100	46
3	70.0903	53.52	peak	10.42	47.88	1.44	17.50	40.00	-22.50	200	6
4	129.4678	48.19	peak	16.34	47.26	1.86	19.13	43.50	-24.37	100	72
5	220.6171	49.65	peak	14.87	47.80	2.36	19.08	46.00	-26.92	100	41
7	729.3583	49.22	peak	22.28	45.46	4.34	30.38	46.00	-15.62	119	360

Horizontal Polarity Plot @3m

	Honzontari olanti i lot com										
No.	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBµV/m)		(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(cm)	(°)
1	125.8864	48.49	peak	15.67	47.00	1.83	18.99	43.50	-24.51	300	191
2	265.6757	50.41	peak	15.70	48.22	2.59	20.48	46.00	-25.52	300	48
4	590.9737	51.32	peak	20.79	48.67	3.90	27.34	46.00	-18.66	300	242
5	645.1195	49.36	peak	21.77	47.47	4.08	27.74	46.00	-18.26	300	14
6	729.3583	49.17	peak	22.58	45.46	4.34	30.63	46.00	-15.37	300	76
8	1000.0000	47.88	peak	25.10	46.17	5.06	31.87	54.00	-22.13	200	279

Notes:

- 1. Duty cycle is 27.49%, 20log (duty cycle) = -11.22dB correction was used to determine the average level from the peak reading. Average = peak reading + 20log (duty cycle), Final Average= peak reading -11.22dB
- 2. All the data measurement of peak values.
- 3. FCC Limit for Average Measurement= 41.67^* (433.90MHz)-7083.3333=10998.1131 μ V/m=80.8dB μ V/m
- 4. Average pulsed signal over one complete pulse train or 100 ms time frame if pulse train exceeds 100 ms
- 5. Maximum average in 100 ms
- 6. Calculate duty cycle for pulse train or 100 ms
- 7. Duty cycle = (t1 + t2 + t3+...tn)/T where tn = pulse width, T = pulse train length or 100 ms



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Spurious Emissions (>1GHz) Measurement Result

Frequency GHz	Reading (dBµV/m)	Direction Degree	Height Meter	Polar H/V	Ant_F (dB/M)	PA_G (dB)	Cab_L (dB)	correct (dBµV/m)	FCC 15.231 Limit (dBµV/m)	Margin	Comments
1.302	81.24	276	2	Н	24.64	51.56	2.85	57.17	74	-16.83	Peak
1.302	-	-	-	Н	-	-	-	45.95	54	-8.05	Ave
1.736	77.26	131	1	Η	25.99	50.98	3.99	56.26	80.8	-24.54	Peak
1.736	-	-	-	Н	ı	-	ı	45.04	60.8	-15.76	Ave
2.169	73.25	56	2	Н	27.84	52.38	4.17	52.88	80.8	-27.92	Peak
2.169		-	-	Н			-	41.66	60.8	-19.14	Ave
2.603	77.25	89	1	Н	29.26	52.68	4.13	57.96	80.8	-22.84	Peak
2.603	•	•	•	Η			ı	46.74	60.8	-14.06	Ave
3.037	76.93	355	2	Н	29.33	52.82	4.5	57.94	80.8	-22.86	Peak
3.037	-	-	-	Н			-	46.72	60.8	-14.08	Ave
3.471	68.02	244	1	Н	32.02	52.88	4.91	52.07	74	-21.93	Peak
3.471	•	•	•	Η			ı	40.85	54	-13.15	Ave
1.302	64.89	65	2	V	24.64	51.56	2.85	40.82	74	-33.18	Peak
1.302	-	-	-	V	-	-	-	29.60	54	-24.4	Ave
1.736	61.26	138	1	V	25.99	50.98	3.99	40.26	80.8	-40.54	Peak
1.736	-	-	-	V	ı	-	ı	29.04	60.8	-31.76	Ave
2.169	79.79	319	2	V	27.84	52.38	4.17	59.42	80.8	-21.38	Peak
2.169	-	-	-	V			-	48.2	60.8	-12.6	Ave
2.603	78.92	286	2	V	29.26	52.68	4.13	59.63	80.8	-21.17	Peak
2.603	-	-	-	V			-	48.41	60.8	-12.39	Ave
3.037	74.48	188	2	V	29.33	52.82	4.5	55.49	80.8	-25.31	Peak
3.037	-	-	-	V			i	47.96	60.8	-12.84	Ave
3.471	79.27	2	2	V	32.02	52.88	4.91	63.32	74	-10.68	Peak
3.471	-	-	-	V			-	52.1	57	-4.9	Ave

Note: Duty cycle is 27.49%, 20log (duty cycle) = -11.22dB correction was used to determine the average level from the peak reading. Average = peak reading + 20log (duty cycle), final Average = peak reading -11.22dB

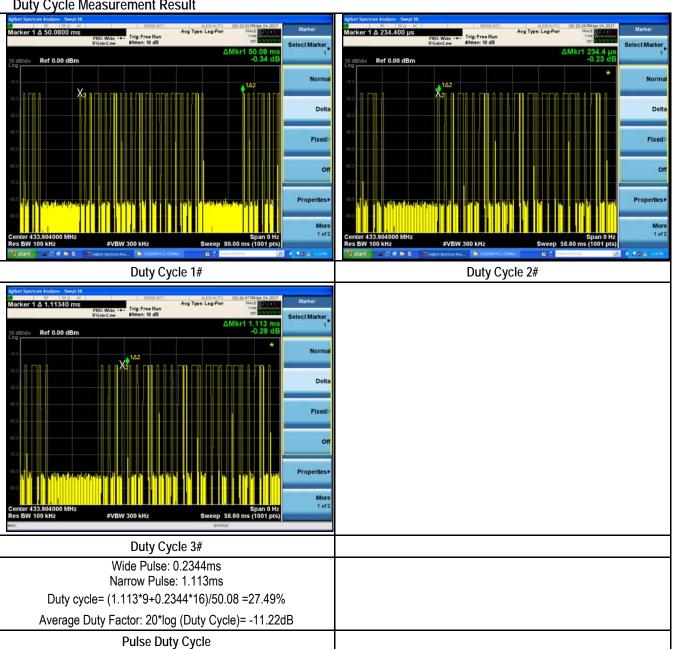
Note:

Narrow Pulse: 0.2344ms 2/NP = 2/0.2344ms =8.53kHz RBW > 2/NP (8.53kHz) Therefore PDCF is not needed.



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Duty Cycle Measurement Result





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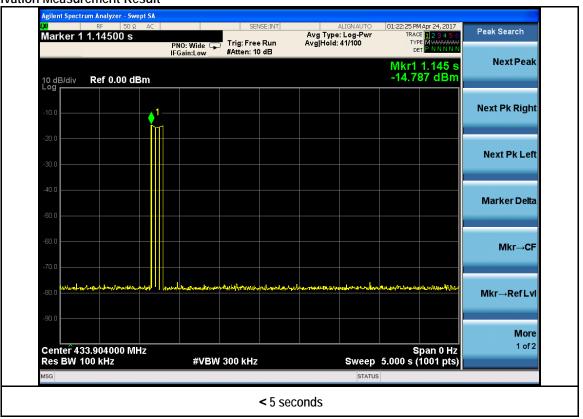
6.5 Deactivation

Temperature		25°C					
Relative Humidity		50%					
Atmospheric Pressure		1019mbar	1019mbar				
Test date :		April 24, 2017	April 24, 2017				
Tested By :		Deon Dai	Deon Dai				
Requirement(s):							
Spec	Item	Requirement	Applicable				
§15.231 (a)(1)	a)	A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.					
Test Setup		Spectrum Analyzer EUT					
Test Procedure -		ement procedure Set analyzer center frequency to channel center frequency. Set the span to 0Hz. Set the RBW = 100 kHz Set the VBW ≥ 3 ′ RBW. Detector = peak. Sweep time = auto couple. Trace mode = max hold. Allow trace to fully stabilize.					
Remark							
Result	⊠ Pass	S □Fail					
	es es (See be	⊠N/A elow) □N/A					



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Test Plots Deactivation Measurement Result





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Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions	S				
R&S EMI Test Receiver	ESPI3	101216	03/31/2017	03/31/2018	
V-LISN	ESH3-Z5	838979/005	03/31/2017	03/31/2018	
SIEMIC EZ_EMC software Conducted Emissions	Ver.ICP-03A1	N/A	N/A	N/A	
RF conducted test					
Spectrum Analyzer	N9010A	MY47191130	03/11/2017	03/10/2018	
Temperature/Humidity Chamber	1007H	N/A	01/07/2017	01/06/2018	\boxtimes
Radiated Emissions					
Agilent Technologies	N9010A	MY47191130	03/11/2017	03/10/2018	\boxtimes
R&S EMI Receiver	ESPI3	101216	03/31/2017	03/31/2018	\boxtimes
Antenna (30MHz~6GHz)	JB6	A121411	10/31/2016	10/31/2017	
EMCO Horn Antenna (1 ~18GHz)	3115	N/A	10/09/2016	10/08/2017	\boxtimes
Hp Agilent Pre-Amplifier	8447F	1937A01160	10/27/2016	10/26/2017	
Pre-Amplifier	8449B	3008A02224	10/30/2016	10/30/2017	\boxtimes
SIEMIC EZ_EMC software Radiated Emissions	Ver.ICP-03A1	N/A	N/A	N/A	\boxtimes



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Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photos



Top View of EUT



Bottom View of EUT



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Front View of EUT



Rear View of EUT



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Left View of EUT



Right View of EUT

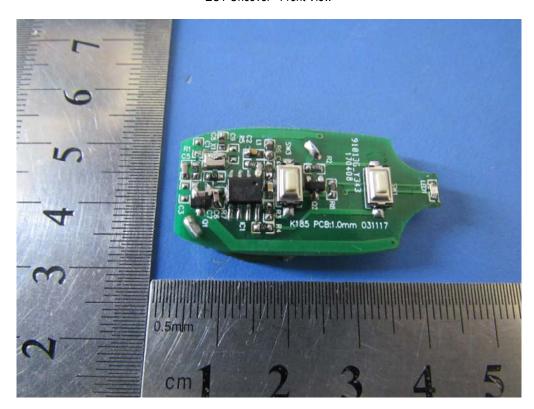


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Annex B.ii. Photograph EUT Internal Photos



EUT Uncover- Front View

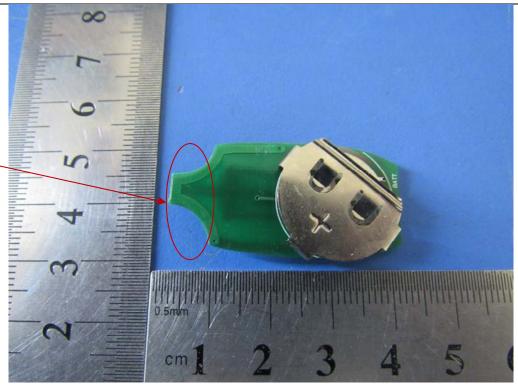


EUT PCBA - Front View



Antenna

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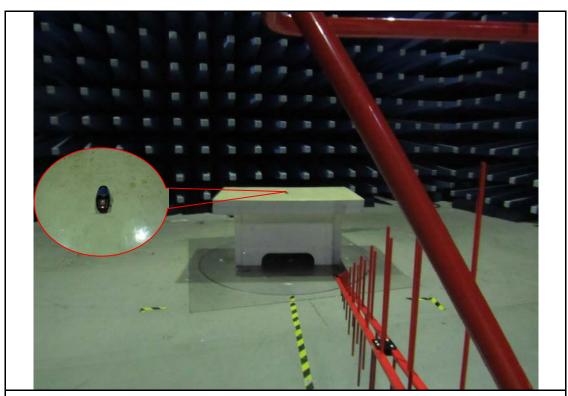


EUT PCBA 1 – Rear View



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Annex B.iii. Photograph: Test Setup Photo



Radiated Spurious Emissions Test Setup Below 1GHz



Radiated Spurious Emissions Test Setup Above 1GHz

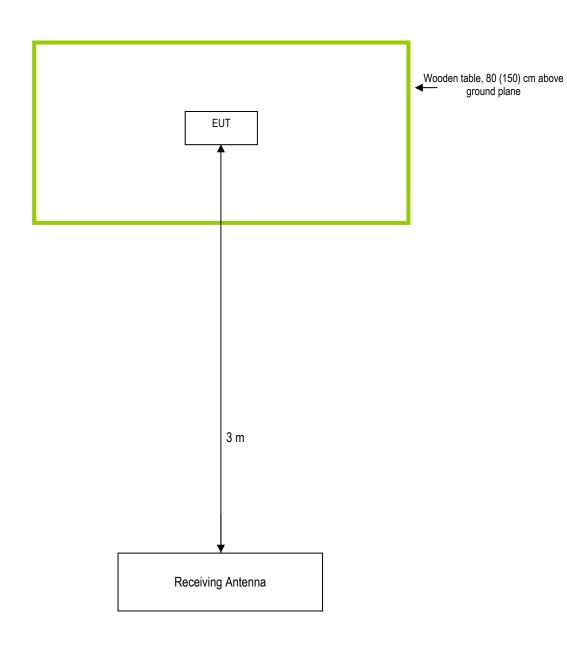


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Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.i. TEST SET UP BLOCK

Block Configuration Diagram for Radiated Emissions





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Annex C. ii. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Manufacturer	Equipment Description	Model
N/A	N/A	N/A



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Annex D. User Manua	al / block blagi	rain / Schema	ucs / Faruisi	
Please see attachment				



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Annex E. DECLARATION OF SIMILARITY

N/A

Thank you!

Printed name/title:

Purchasing Manager

FCC ID: 2AGCVT7XXX2017

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