STC Test Report

Applicant (KMA001):   K-MARK INDUSTRIAL LIMITED.
FLAT A, 7/F., MAI ON IND. BLDG., 17-21 KUNG YIP
STREET, KWAI CHUNG, HONG KONG

Manufacturer: K-Mark Industrial (Shen Zhen) Ltd.
Niuhu Village, Guan Lan Town, Bao An County, Shenzhen
City, GuangDong Province, China.

Description of Samples: Model Name: The Kernel game caller with remote
Brand Name: The Kernel
Model Number: DUC172
FCC ID: VEP-SZE-KHKGC

Date Samples Received: 2008-11-10, 2008-11-20

Date Tested: 2008-11-12 to 2008-12-04

Investigation Requested: Perform ElectroMagnetic Interference measurement in
accordance with FCC 47CFR [Codes of Federal Regulations]
Part 15: 2008 and ANSI C63.4:2003 for FCC Certification.

Conclusions: The submitted product <u>COMPLIED</u> with the requirements of
Federal Communications Commission [FCC] Rules and
Regulations Part 15. The tests were performed in accordance
with the standards described above and on Section 2.2 in this
Test Report.

Remarks: For additional models details, see page 5.

Dr. LEE Kam Chuen,
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.

STC Test Report

CONTENT:

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1.0   General Details

1.1   Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate
New Territories, Hong Kong

Telephone: 852 2666 1888
Fax: 852 2664 4353

1.2   Applicant Details
Applicant

K-MARK INDUSTRIAL LIMITED.
FLAT A, 7/F., MAI ON IND. BLDG.,
17-21 KUNG YIP STREET, KWAI CHUNG, HONG KONG

Manufacturer

K-Mark Industrial (Shen Zhen) Ltd.
Niuhu Village, Guan Lan Town, Bao An County,
Shenzhen City, GuangDong Province, China.

The Hong Kong Standards and Testing Centre Ltd.
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1.3   Equipment Under Test [EUT]
Description of Sample

Product: The Kernel game caller with remote
Manufacturer: K-Mark Industrial (Shen Zhen) Ltd.
Brand Name: The Kernel
Model Number: DUC172
Additional Model Number(s):   SZE-KHKGC
Rating: 12Vd.c. ("L1028" size battery x 1)

1.3.1   Description of EUT Operation

The Equipment Under Test (EUT) is a K-MARK INDUSTRIAL LIMITED., The Kernel game caller with remote. There are 4 buttons in the transmitter keypad, When any one button is pressed, the corresponding signal is transmitted. When one of the buttons of the transmitter is pressed, the oscillator is turned on and off by the encoded signal from encoder SC2262.   The modulated signal is then transmitted through the antenna.

1.4   Date of Order

2008-11-10, 2008-11-20

1.5   Submitted Sample(s):

3 Samples

1.6   Test Duration

2008-11-12 to 2008-12-04

1.7   Country of Origin

China

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2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 2008 and ANSI C63.4:2003 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary						
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Failed	N/A
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.231a	ANSI C63.4:2003	N/A	☒	☐	☐
Radiated Emissions, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	☒	☐	☐

Note: N/A - Not Applicable

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3.0 Test Results

### 3.1 Emission

3.1.1 Radiated Emissions (30 – 1000MHz)

Test Requirement: FCC 47CFR 15.231a
Test Method: ANSI C63.4:2003
Test Date: 2008-12-04
Mode of Operation: Tx on mode

Test Method:

The sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

*: Semi-anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Test Setup:
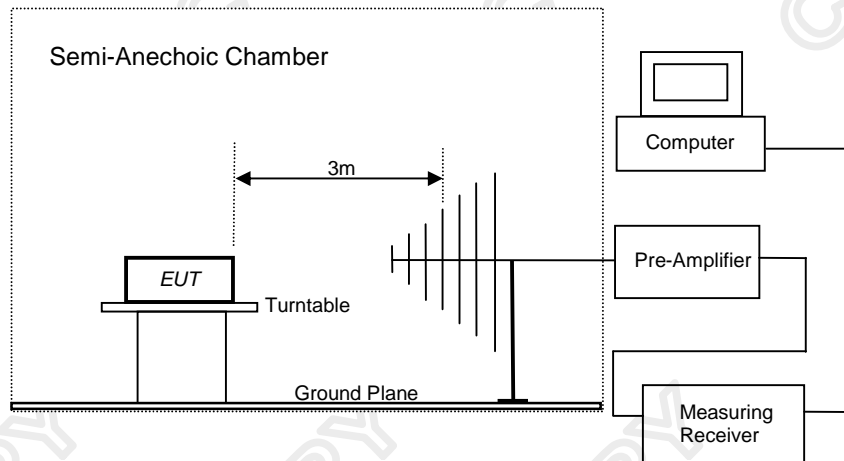
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Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.231a]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Average] [μV/m]	Field Strength of Spurious Emission [Average] [μV/m]
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750 *	125 to 375 *
174-260	3,750	375
260-470	3,750 to 12,500 *	375 to 1,250 *
Above 470	12,500	1,250

* Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, μV/m at 3 meters=56.81818(F)-6136.3636; for the band 260-470 MHz, μV/m at 3 meters =41.6667(F)-7083.3333. The maximum permissible unwanted emission level is 20dB below the maximum permitted fundamental level.

Results of Tx on mode: PASS

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
315.1	56.5	15.9	72.4	4168.7	60,450.1	Vertical

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
315.1	46.2	15.9	62.1	1273.5	6,045.0	Vertical

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Results of Tx on mode: PASS

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
630.1	21.6	22.0	43.6	151.4	1,250.0	Vertical
945.2	34.8	26.1	60.9	1109.2	1,250.0	Vertical
1260.0	35.0	25.5	60.5	1059.3	1,250.0	Vertical
+ 1575.0	27.0	25.5	52.5	421.7	500.0	Vertical
1890.5	< 1.0	17.4	< 18.4	< 8.3	1,250.0	Vertical
+ 2205.6	< 1.0	17.2	< 18.2	< 8.1	500.0	Vertical
2520.6	< 1.0	18.8	< 19.8	< 9.8	1,250.0	Vertical
+ 2835.7	< 1.0	19.7	< 20.7	< 10.8	500.0	Vertical
3150.8	< 1.0	20.6	< 21.6	< 12.0	1,250.0	Vertical

Remarks:

Adjusted by Duty Cycle = -10.26dB

FCC Limit for Average Measurement = 41.6667(315.08MHz)-7083.3333=6045.10506μV/m

+: Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 were not adjusted for averaging and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty	:	30MHz to 1GHz	5.2dB
		1GHz to 18GHz	5.1dB

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Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency [MHz]	Field Strength [microvolts/meter]	Measurement Distance [meter]
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation   within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Results of Tx on mode: PASS

Radiated Emission Quasi-Peak						
Frequency MHz	Measured Level @3m dBµV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
Emissions detected are more than 20dB below the FCC Limits						

Remarks:

No further spurious emissions found between lowest internal frequency and 30MHz.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty	:	30MHz to 1GHz	5.2dB
		1GHz to 18GHz	5.1dB

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3.2　20dB Bandwidth of Fundamental Emission

Test Requirement:　　FCC 47 CFR 15.231a
Test Method:　　　　ANSI C63.4:2003 (Section 13.1.7)
Test Date:　　　　　2008-12-04
Mode of Operation:　On mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.

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Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [KHz]	FCC Limits * [KHz]
315.08	136.27	787.7

*:   FCC Limit for Bandwidth measurement   = (0.25%)(Center Frequency)

=(0.0025)(315.08)

= 787.7KHz

20dB Bandwidth of Fundamental Emission

Center 315.0639279 MHz   200 kHz/   Span 2 MHz
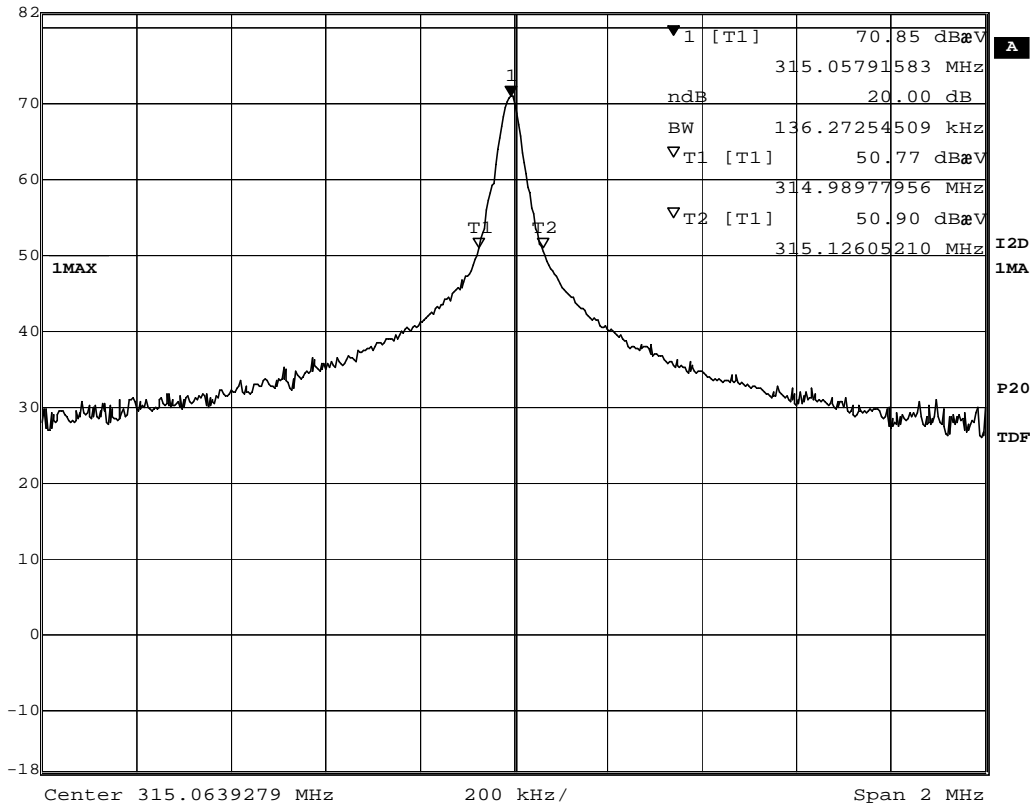
Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM020	HORN ANTENNA	EMCO	3115	4032	2006/07/11	2009/07/11
EM215	MULTIDEVICE CONTROLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-Lindgren	FACT-3	--	2006/05/02	2009/05/02
EM174	BICONILOG ANTENNA	EMCO	3142C	00029071	2008/01/24	2010/01/24
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2008/06/16	2009/06/16
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2006/07/26	2009/07/26

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM197	LISN	EMCO	4825/2	1193	2007/10/30	2009/10/30
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2008/06/16	2009/06/16
EM154	SHIELDING ROOM	SIEMENS MATSUSHITA COMPONENTS	N/A	803-740-057-99A	2008/01/23	2009/01/23

Remarks:-
CM　　Corrective Maintenance
N/A　　Not Applicable or Not Available
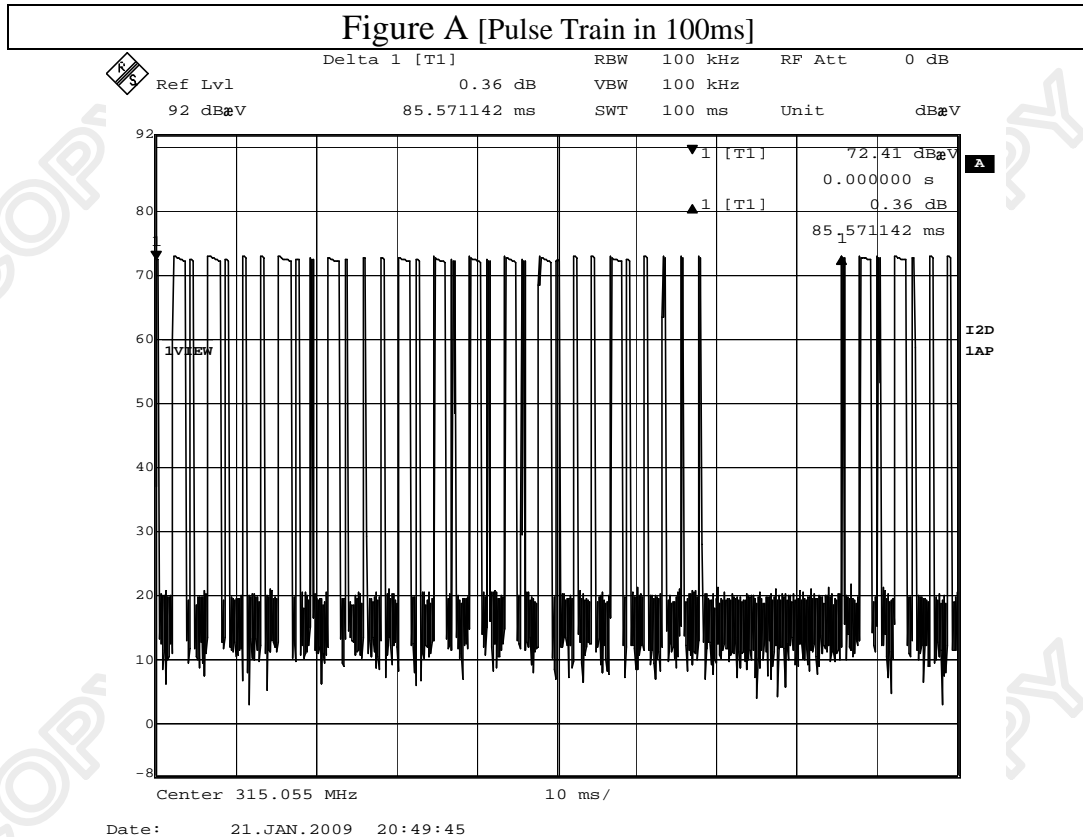TBD　　To Be Determined

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Appendix B

Duty Cycle Correction During 100msec

Each function key sends a different series of characters, but each packet period (100msec) never exceeds a series of 11 long (1.66msec) and 23 short (0.541msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered (11x1.66)+(23x0.541)msec per 100msec=30.7% duty cycle. Figure A through D show the characteristics of the pulses train for one of these functions.

Remarks:

Duty Cycle Correction = 20Log(0.307) =-10.26dB

The following figures [Figure A to Figure D] showed the characteristics of the pulse train for one of these functions.

Figure A [Pulse Train in 100ms]

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Figure B [Long Pulse 1.66ms]
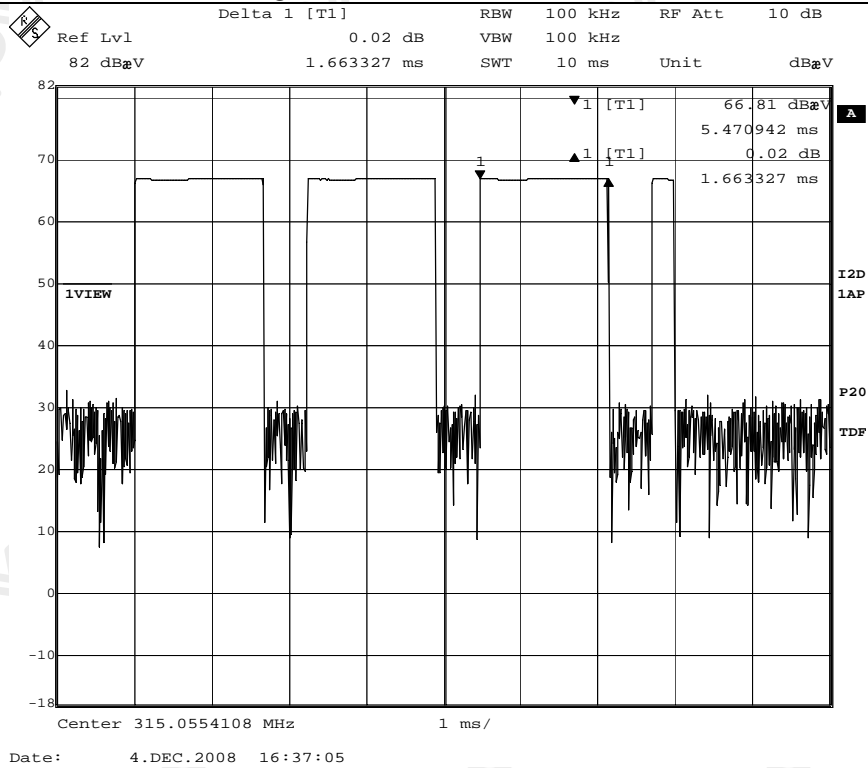
Figure C [Short Pulse 541.08μs]

Delta 1 [T1]		RBW	100 kHz	RF Att	10 dB
Ref Lvl	-0.04 dB	VBW	100 kHz		
82 dBæV	541.082164 æs	SWT	10 ms	Unit	dBæV

Center 315.0554108 MHz   1 ms/

Date: 4.DEC.2008 16:35:24

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Figure D [Transmission deactivated within 5s]
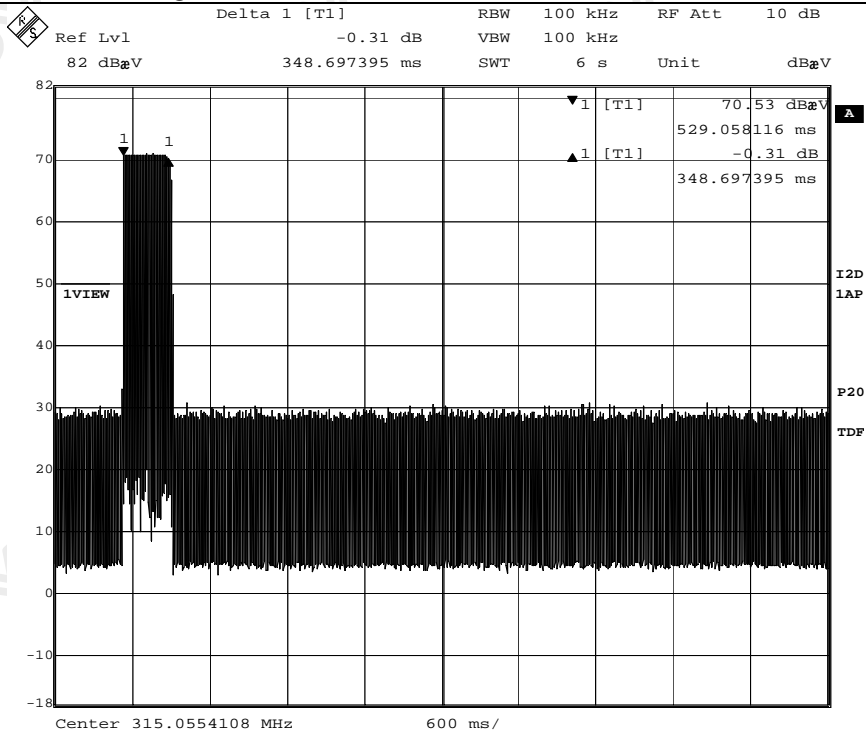
Center 315.0554108 MHz   600 ms/

Date: 4.DEC.2008 16:39:09

Appendix C

Periodic Operation [FCC 47CFR 15.231(a2)]

According to FCC 47CFR15.231 (a2). A transmitter automatically activated must automatically deactivate within not more than 5 seconds of being released. The EUT ceases transmission almost immediately upon being released and appears to finish the current packet being transmitted. Therefore the longest period of time the transmitter should take to deactivate is a packet length.

Appendix D

Photographs of EUT

Front View of the product	Rear View of the product

Inner Circuit Top View	Inner Circuit Bottom View

Photographs of EUT

Measurement of Radiated Emission Test Set Up

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

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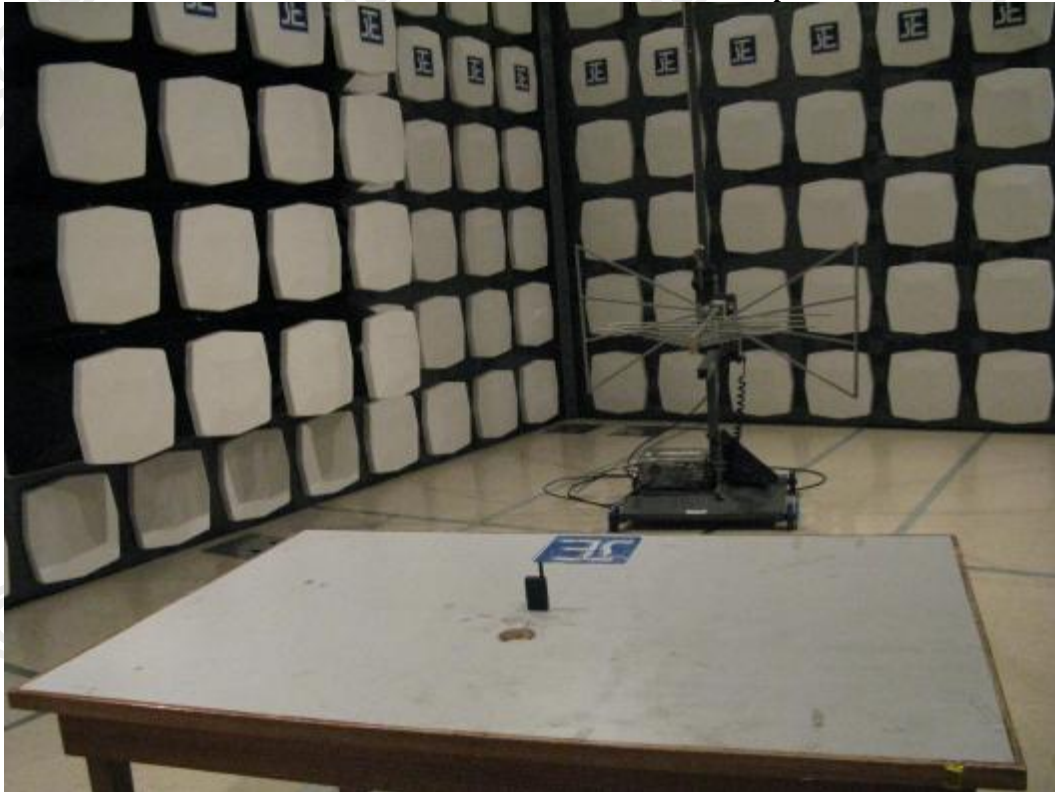For Conditions of Issuance of this test report, please refer to the overleaf or Homepage