STC Test Report

Date : 2012-09-21

No. : HM167830

Applicant (CKT001): CKICOM TECHNOLOGY LTD.
Flat F 4/F Universal Ind. Ctr. 19-21 Shan Mei St, Fotan, Hong Kong.

Manufacturer: CKICOM TECHNOLOGY LTD.
Flat F 4/F Universal Ind. Ctr. 19-21 Shan Mei St, Fotan, Hong Kong.

Description of Sample(s): Submitted sample(s) said to be

Product:	Wetness Sensor
Brand Name:	Carease
Model Number:	T-230
FCC ID:	YQKCEIIPT-230

Date Sample(s) Received: 2012-08-15

Date Tested: 2012-08-29 to 2012-09-10

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2011 and ANSI C63.4:2009 for FCC Certification.

Conclusion(s): The submitted product COMPLIED 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.

Remark(s): ---

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

The Hong Kong Standards and Testing Centre Ltd.
10 Dai Wang Street, Taipo Industrial Estate, N.T., Hong Kong
Tel: (852) 2666 1888 Fax: (852) 2664 4353 Homepage: www.hkstc.org E-mail: hkstc@hkstc.org

STC Test Report

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Tel: (852) 2666 1888 Fax: (852) 2664 4353 Homepage: www.hkstc.org E-mail: hkstc@hkstc.org

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10 Dai Wang Street, Taipo Industrial Estate, N.T., Hong Kong
Tel: (852) 2666 1888 Fax: (852) 2664 4353 Homepage: www.hkstc.org E-mail: hkstc@hkstc.org

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

CKICOM TECHNOLOGY LTD.
Flat F 4/F Universal Ind. Ctr. 19-21 Shan Mei St, Fotan, Hong Kong.

Manufacturer

CKICOM TECHNOLOGY LTD.
Flat F 4/F Universal Ind. Ctr. 19-21 Shan Mei St, Fotan, Hong Kong.

1.3 Equipment Under Test [EUT]
Description of Sample

Submitted sample(s) said to be

Product:	Wetness Sensor
Manufacturer:	CKICOM TECHNOLOGY LTD. Flat F 4/F Universal Ind. Ctr. 19-21 Shan Mei St, Fotan, Hong Kong.
Brand Name:	Carease
Model Number:	T-230
Rating:	3Vd.c. (“LR43” size battery x 2)

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a CKICOM TECHNOLOGY LTD., Wetness Sensor. The EUT is a 433MHz transceiver, a RF signal will be transmitted when the wetness sensor of EUT is triggered, the RF transmission will stop when the sensor resumed to un-triggered status or is disable by another transmitter.

1.4 Date of Order

2012-08-15

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2012-08-29 to 2012-09-10

1.7 Country of Origin

Hong Kong

2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 2011 and ANSI C63.4:2009 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 15.231e	ANSI C63.4:2009	N/A	☒	☐	☐
Radiated Emissions, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2009	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions (30 – 1000MHz)

Test Requirement:	FCC 47CFR 15.231e
Test Method:	ANSI C63.4:2009
Test Date:	2012-08-29
Mode of Operation:	Tx on mode / Rx on mode

Test Method:

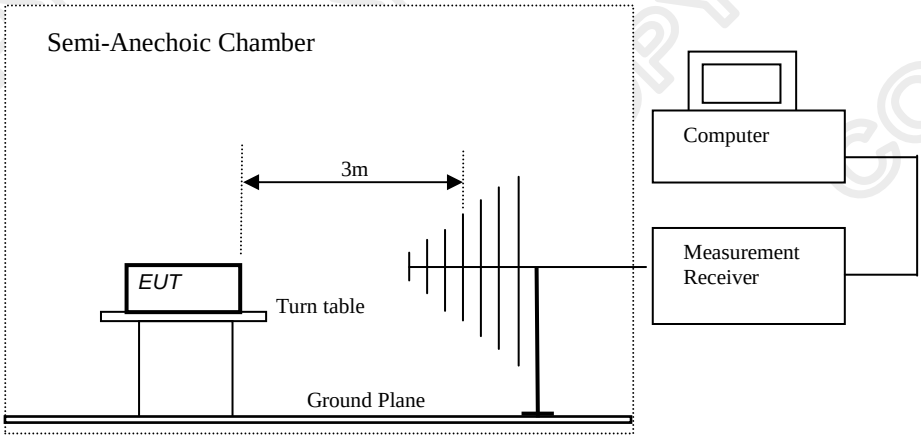
The sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, considered typical configuration 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.

Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)	RBW:	10kHz
	VBW:	30kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
30MHz – 1GHz (QP)	RBW:	120kHz
	VBW:	120kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
Above 1GHz (Pk & Av)	RBW:	3MHz
	VBW:	3MHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold

Test Setup:



Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.231e]:

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	1,000	100
70-130	500	50
130-174	500 to 1,500 **	50 to 150 **
174-260	1,500	150
260-470	1,500 to 5,000 **	150 to 500 **
Above 470	5,000	500

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 = 22.72727(F) - 2454.545; for the band 260-470 MHz, µV/m at 3 meters = 16.6667(F) - 2833.3333. The maximum permitted unwanted emission level is 20 dB 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/m	Correction Factor dB/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
	434.0	63.3	19.0	82.3	13,031.7	43,996.8	Horizontal
	868.1	12.8	26.3	39.1	90.2	4,399.7	Horizontal
+	1301.9	< 1.0	28.2	< 29.2	< 28.8	5,000.0	Horizontal
	1735.9	< 1.0	31.4	< 32.4	< 41.7	4,399.7	Horizontal
	2169.9	< 1.0	32.9	< 33.9	< 49.5	4,399.7	Horizontal
	2603.9	< 1.0	32.9	< 33.9	< 49.5	4,399.7	Horizontal
	3037.9	< 1.0	5.8	< 6.8	< 2.2	4,399.7	Horizontal
	3471.8	< 1.0	34.9	< 35.9	< 62.4	4,399.7	Horizontal
+	3905.8	< 1.0	26.5	< 27.5	< 23.7	5,000.0	Horizontal
+	4339.8	< 1.0	26.5	< 27.5	< 23.7	5,000.0	Horizontal

Remarks:

FCC Limit for Fundamental Average Measurement = 16.6667(433.98)-2833.3333=4,399.7µV/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.

*: Adjusted by Duty Cycle = -19.3dB
Duty Cycle Correction =-20dB, if the calculation duty cycle correction >-20dB

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB

Results of Tx on mode: PASS

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dB/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
434.0	44.1	19.0	63.1	1,428.9	4,399.7	Horizontal
868.1	0.0	26.3	26.3	20.7	440.0	Horizontal
+ 1301.9	< 17.2	28.2	< 45.4	< 186.2	500.0	Horizontal
1735.9	< 11.7	31.4	< 43.1	< 142.9	440.0	Horizontal
2169.9	< 10.4	32.9	< 43.3	< 146.2	440.0	Horizontal
2603.9	< 13.8	32.9	< 46.7	< 216.3	440.0	Horizontal
3037.9	< 1.0	5.8	< 6.8	< 2.2	440.0	Horizontal
3471.8	< 1.0	34.9	< 35.9	< 62.4	440.0	Horizontal
+ 3905.8	< 1.0	26.5	< 27.5	< 23.7	500.0	Horizontal
+ 4339.80	< 1.0	26.5	< 27.5	< 23.7	500.0	Horizontal

Remarks:

FCC Limit for Fundamental Average Measurement = 16.6667(433.98)-2833.3333=4,399.7µV/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.

*: Adjusted by Duty Cycle = -19.3dB

Duty Cycle Correction =-20dB, if the calculation duty cycle correction >-20dB

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Field strength [microvolts/meter]	Measurement distance [meters]
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above960	500	3

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results of Tx on mode (9k – 30MHz): PASS

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level dBµV/m	Correction Factor dB/m	Field Strength dBµV/m	Field Strength µV/m	Limit µV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Results of Tx on mode (30MHz – 1000MHz): PASS

Field Strength of Spurious Emissions Quasi-Peak Value						
Frequency MHz	Measured Level dBµV/m	Correction Factor dB/m	Field Strength dBµV/m	Field Strength µV/m	Limit µV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Results of Tx on mode (1000MHz): PASS

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level dBµV/m	Correction Factor dB/m	Field Strength dBµV/m	Field Strength µV/m	Limit µV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Results of Tx on mode (Above 1000MHz): PASS

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level dBµV/m	Correction Factor dB/m	Field Strength dBµV/m	Field Strength µV/m	Limit µV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Field strength [microvolts/meter]	Measurement distance [meters]
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above960	500	3

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results of Rx on mode (9k – 30MHz): PASS

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level dBµV/m	Correction Factor dB/m	Field Strength dBµV/m	Field Strength µV/m	Limit µV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Results of Rx on mode (30MHz – 1000MHz): PASS

Field Strength of Spurious Emissions Quasi-Peak Value						
Frequency MHz	Measured Level dBµV/m	Correction Factor dB/m	Field Strength dBµV/m	Field Strength µV/m	Limit µV/m	E-Field Polarity
434.30	1.3	19	20.3	10.4	200.0	Horizontal

Results of Rx on mode (1000MHz): PASS

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level dBµV/m	Correction Factor dB/m	Field Strength dBµV/m	Field Strength µV/m	Limit µV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Results of Rx on mode (Above 1000MHz): PASS

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level dBµV/m	Correction Factor dB/m	Field Strength dBµV/m	Field Strength µV/m	Limit µV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB

3.2 20dB Bandwidth of Fundamental Emission

Test Requirement:	FCC 47 CFR 15.231e
Test Method:	ANSI C63.4:2003 (Section 13.1.7)
Test Date:	2012-09-10
Mode of Operation:	Tx 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:

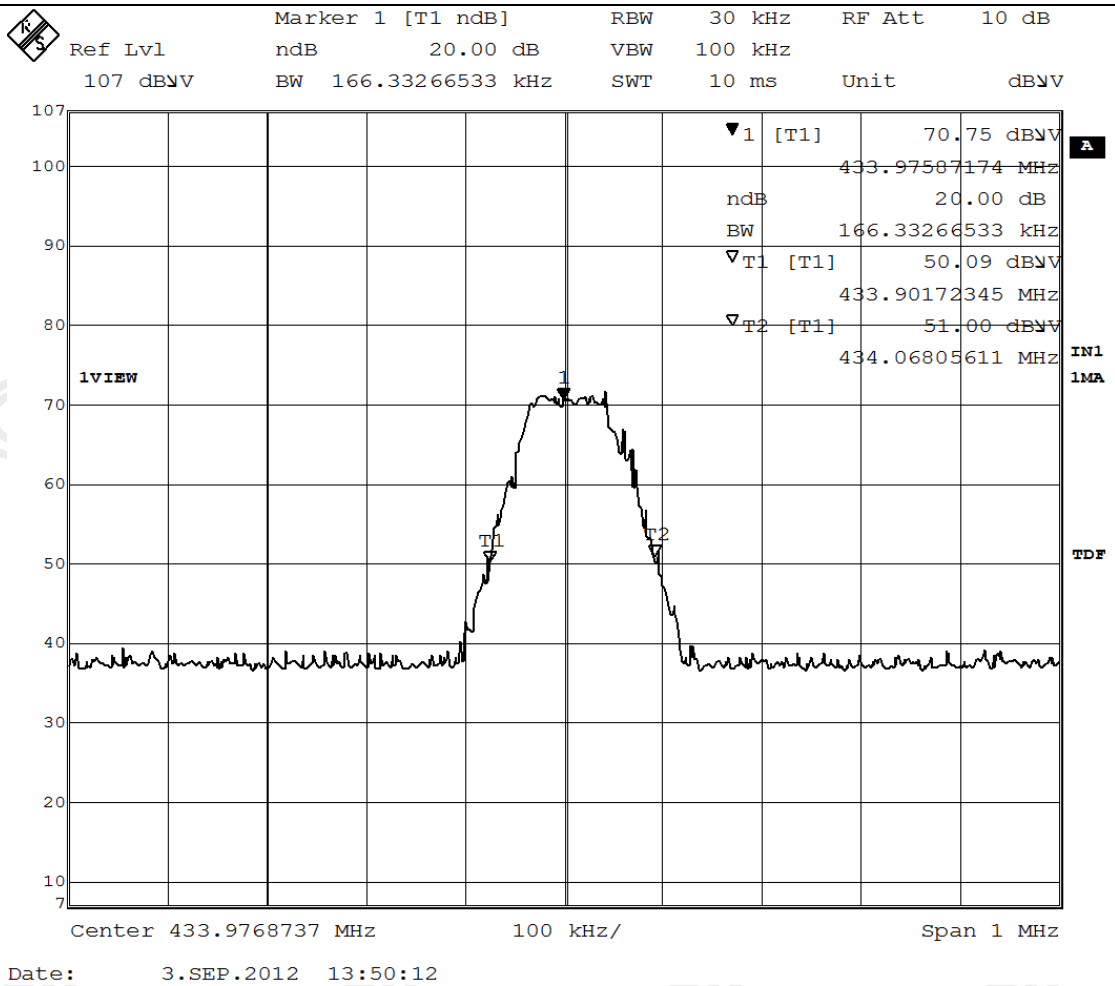
As Test Setup of clause 3.1.1 in this test report.

Limits for 20 dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]	FCC Limits * [kHz]
433.98	166.3	1084.95

*: FCC Limit for Bandwidth measurement = (0.25%)(Center Frequency)
=(0.0025)(433.98)
= 1084.95kHz

20dB Bandwidth of Fundamental Emission



Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM299	DOUBLE-RIDGED WAVEGUIDE HORN ANTENNA	ETS-LINDGREN	3115	00114120	2012/01/25	2014/01/25
EM215	MULTIDEVICE CONTROLLER	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	--	2011/10/25	2012/10/25
EM194	BICONILOG ANTENNA	EMCO	3142B	1795	2010/10/06	2012/10/06
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2012/05/03	2013/05/03
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2011/09/14	2013/09/14

Remarks:-

CM Corrective Maintenance
N/A Not Applicable
TBD To Be Determined

Appendix B

Duty Cycle Correction During 100msec [FCC 47CFR 15.231(e)]

The transmitter periodically sends a different series of characters, There are 3 pulses (pulse duration = 3.61ms) within 100ms. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered (3x3.61msec)/100x100% = 10.83% duty cycle. Figure A through F show the characteristics of the pulses train for one of these functions.

Remarks:

Duty Cycle Correction = 20log (0.1083)=-19.3dB

Duty Cycle Correction =-20dB, if the calculation duty cycle correction >-20dB

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

Figure A [3 pulses within 100ms, pulse period = 3.61ms]

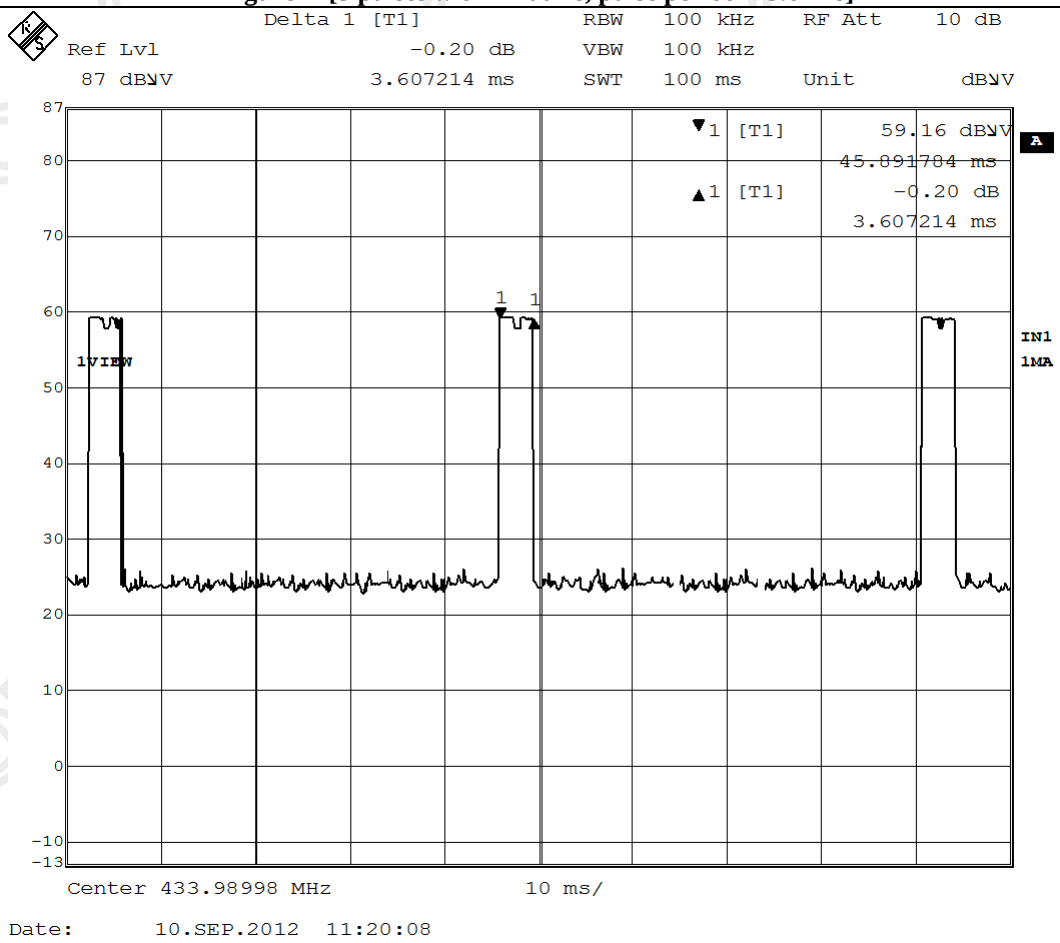


Figure B [Transmission Period = 0.421s]

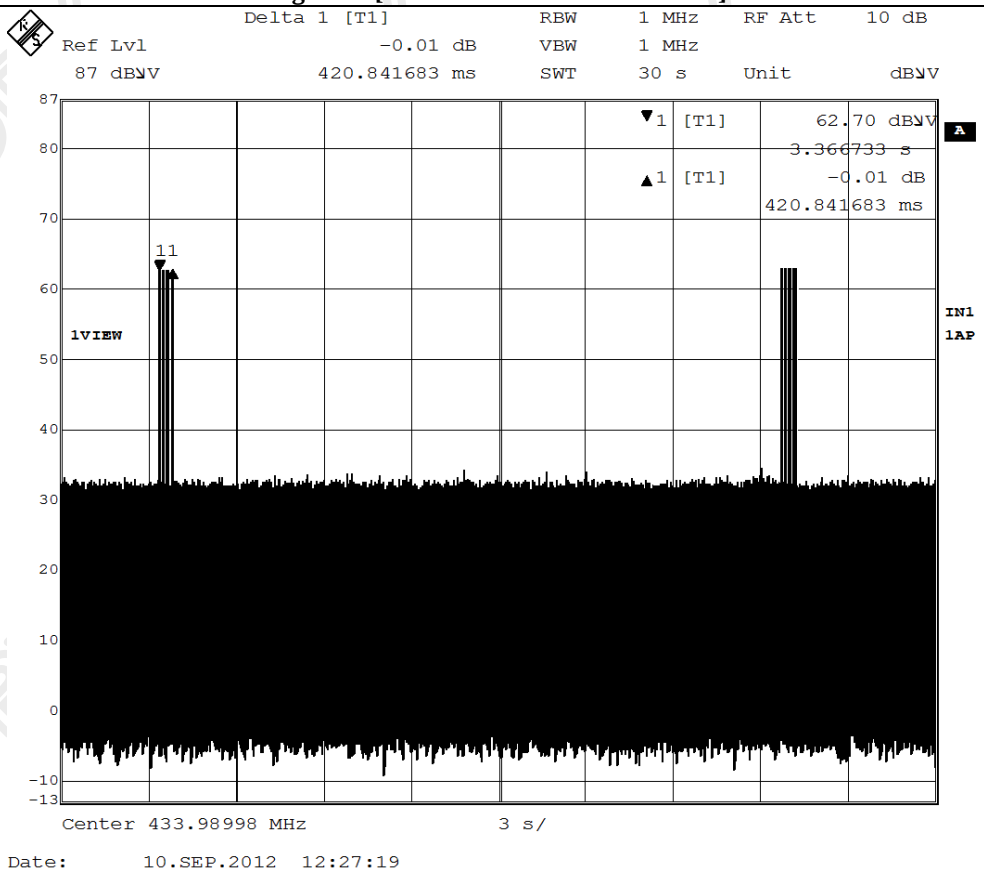
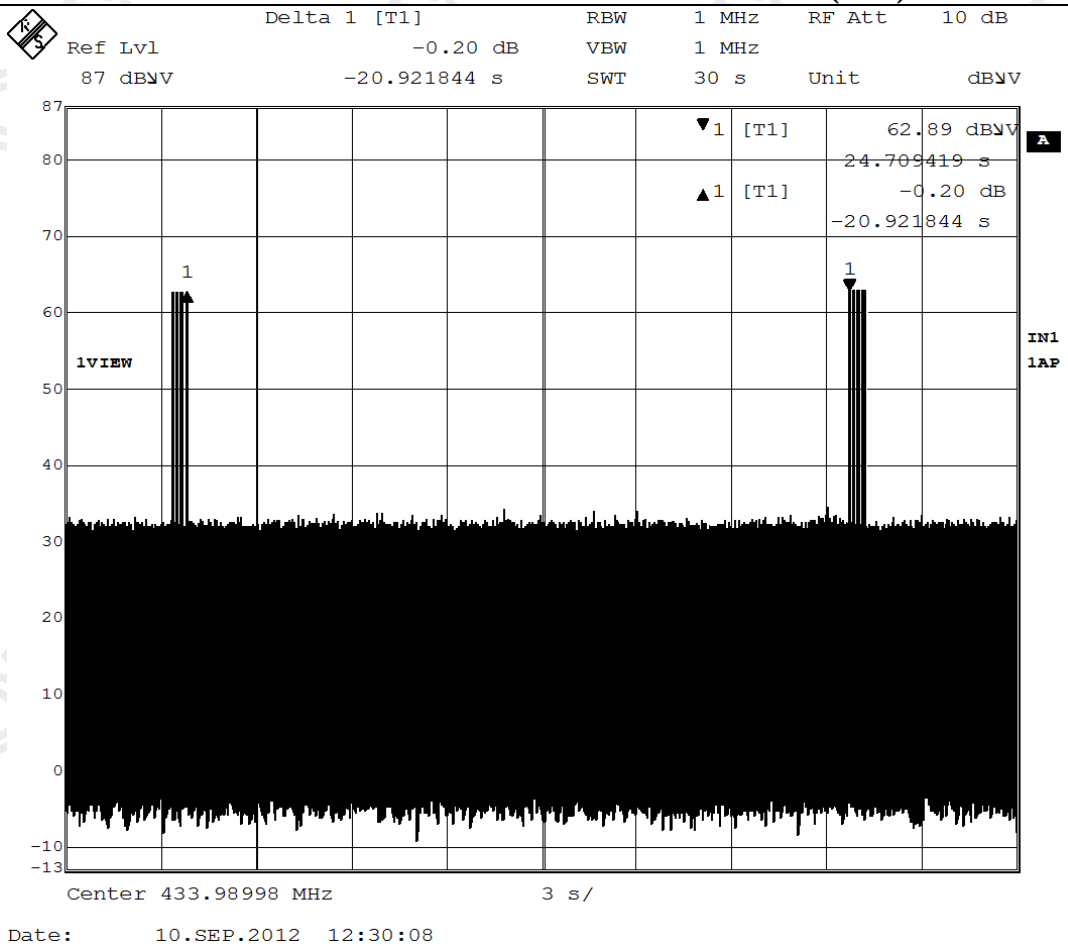


Figure C [Silent Period = 20.922s]
Silent Period should be >30 times of Transmission Period (12.3s)



Appendix C

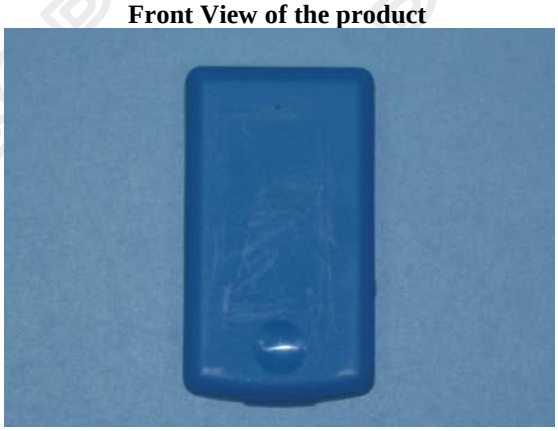
Periodic Operation [FCC 47CFR 15.231(e)]

According to FCC 47CFR15.231 (e). A periodic transmitter shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

Appendix D

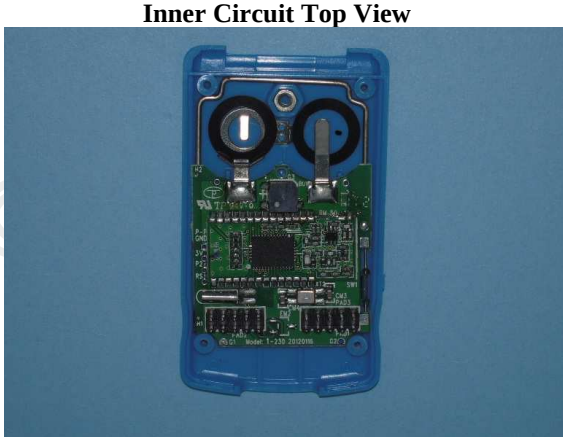
Photographs of EUT

Front View of the product

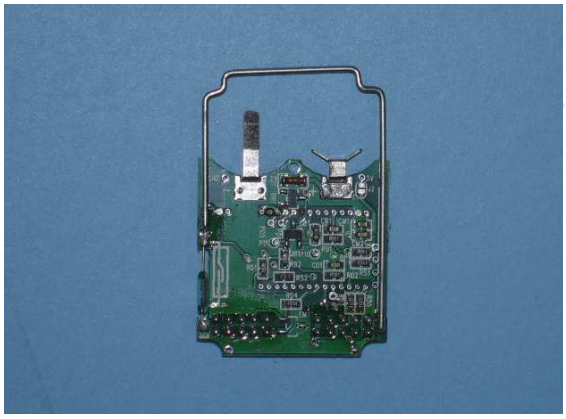


Rear View of the product

Inner Circuit Top View

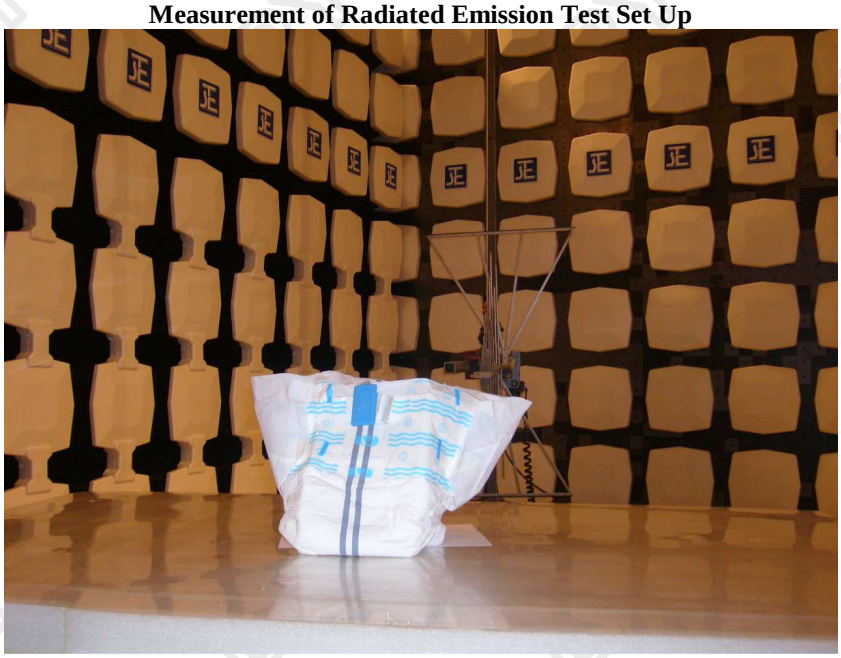


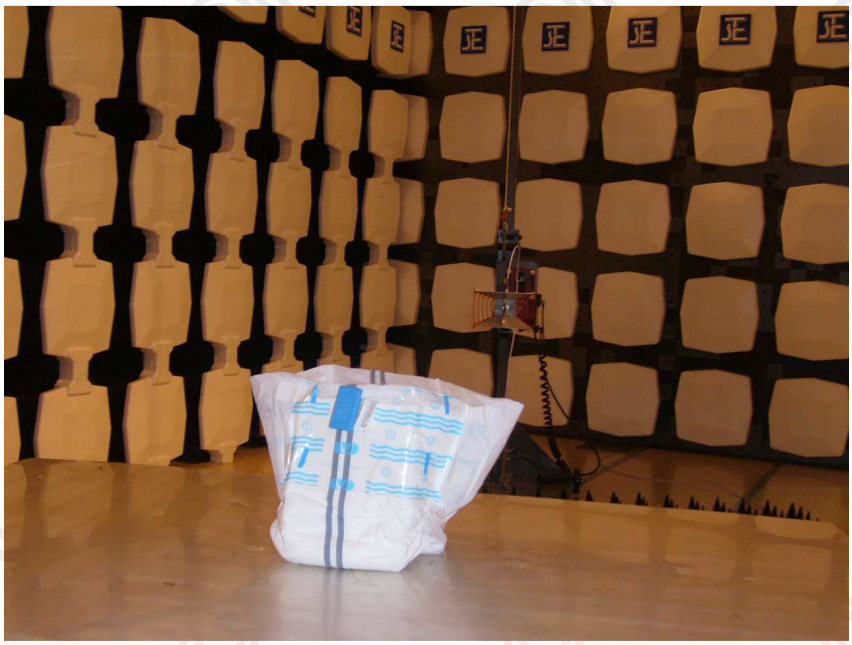
Inner Circuit Bottom View



Photographs of EUT

Measurement of Radiated Emission Test Set Up





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