STC Test Report

Date : 2010-07-07
No. : MH184214

Applicant (SHQ003): Shenzhen zhongherong electric technology Co., Ltd
1st to 3rd Floor, 28 Building North Yongfa Industrial Park, Jinxiu Rd, Heyi Village, Shajing Town, Baoan District

Manufacturer: Shenzhen zhongherong electric technology Co., Ltd
1st to 3rd Floor, 28 Building North Yongfa Industrial Park, Jinxiu Rd, Heyi Village, Shajing Town, Baoan District

Description of Sample(s):

Product:	Transmitter
Brand Name:	ESKY
Model Number:	NANO
FCC ID:	WICESKYSZ0100

Date Sample(s) Received: 2010-06-18

Date Tested: 2010-06-25

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2009 and ANSI C63.4:2003 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
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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

1.2 Applicant Details

Applicant

Shenzhen zhongherong electric technology Co., Ltd
1st to 3rd Floor, 28 Building North Yongfa Industrial Park, Jinxiu Rd, Heyi Village, Shajing Town, Baoan District

Manufacturer

Shenzhen zhongherong electric technology Co., Ltd
1st to 3rd Floor, 28 Building North Yongfa Industrial Park, Jinxiu Rd, Heyi Village, Shajing Town, Baoan District

1.3 Equipment Under Test [EUT]
Description of Sample(s)

Product:	Transmitter
Manufacturer:	Shenzhen zhongherong electric technology Co., Ltd
Brand Name:	ESKY
Model Number:	NANO
Input Voltage:	6Vd.c. (“AA” size battery×4)

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Shenzhen zhongherong electric technology Co., Ltd, Transmitter. The transmission signal is frequency hopping with channel frequency range 2410.0.-2475.0MHz during normal use. The EUT was set to fixed frequency test mode by application

1.4 Date of Order

2010-06-18

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2010-06-25

1.7 Country of Origin

China

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2009 Regulations 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	Fail	N/A
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.4:2003	N/A	☒	☐	☐
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

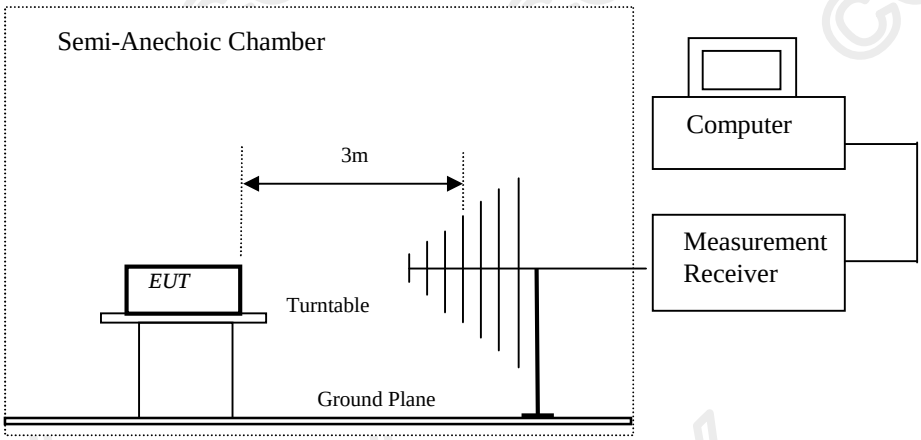
Test Requirement:	FCC 47CFR 15.249
Test Method:	ANSI C63.4:2003
Test Date:	2010-06-25
Mode of Operation:	Tx mode

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:



Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [microvolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928	50,000 [Average]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Results of Tx mode: Pass

Field Strength of Fundamental Emissions
Peak Value

	Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
	2410.0	63.1	36.8	99.9	98,855.3	500,000	Vertical
*	4820.0	14.7	41.9	56.6	676.1	5,000	Vertical
	7230.0					500	Vertical
	7230.0					500	Vertical
	9640.0					500	Vertical
*	12050.0					500	Vertical
	14460.0					500	Vertical
	16870.0					500	Vertical
*	19280.0					500	Vertical
	21690.0	**No Emission Detected**				500	Vertical

Field Strength of Fundamental Emissions
Average Value

	Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
+	2410.0	43.9	36.8	80.7	10,839.3	50,000	Vertical
*	4820.0	-4.5	41.9	37.4	74.1	500	Vertical

Remarks:
No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
*: 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 and the limits of FCC Rules Part 15 Section 15.209 were applied.

+: Adjusted by Duty Cycle = -19.2dB

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

Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [microvolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928	50,000 [Average]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Results of Tx mode: Pass

Field Strength of Fundamental Emissions
Peak Value

	Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
	2443.0	62.1	36.9	99.0	89,125.1	500,000	Vertical
*	4886.0	12.8	42.0	54.8	549.5	5,000	Vertical
	7329.0					500	Vertical
	9772.0					500	Vertical
*	12215.0					500	Vertical
	14658.0					500	Vertical
	17101.0					500	Vertical
*	19544.0					500	Vertical
	21987.0					500	Vertical
	24430.0	**No Emission Detected**				500	Vertical

Field Strength of Fundamental Emissions
Average Value

	Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
+	2443.0	42.9	36.9	79.8	9,772.4	50,000	Vertical
*	4886.0	-6.4	42.0	35.6	60.3	500	Vertical

Remarks:
No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
*: 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 and the limits of FCC Rules Part 15 Section 15.209 were applied.
+: Adjusted by Duty Cycle = -19.2dB

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

Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [microvolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928	50,000 [Average]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Results of Tx mode: Pass

Field Strength of Fundamental Emissions
Peak Value

	Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
	2475.0	63.2	37.1	100.3	103,514.2	500,000	Vertical
*	4856.0	16.5	42.1	58.6	851.1	5,000	Vertical
	7425.0					500	Vertical
	9900.0					500	Vertical
*	12375.0					500	Vertical
	14850.0					500	Vertical
	17325.0					500	Vertical
*	19800.0					500	Vertical
	22275.0					500	Vertical
	24750.0	**No Emission Detected**				500	Vertical

Field Strength of Fundamental Emissions
Average Value

	Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
+	2475.0	44.0	37.1	81.1	11,350.1	50,000	Vertical
*	4950.0	-2.7	42.1	39.4	93.3	500	Vertical

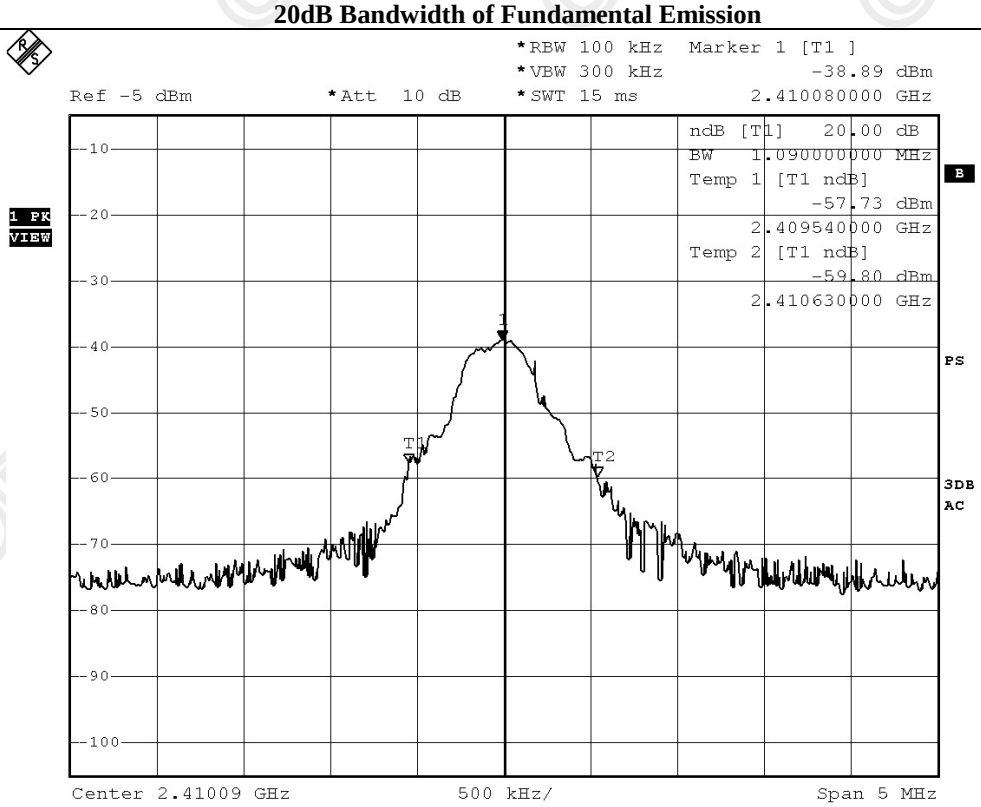
Remarks:
No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
*: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.
+: Adjusted by Duty Cycle = -19.2dB

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

Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [MHz]
2410	1.09

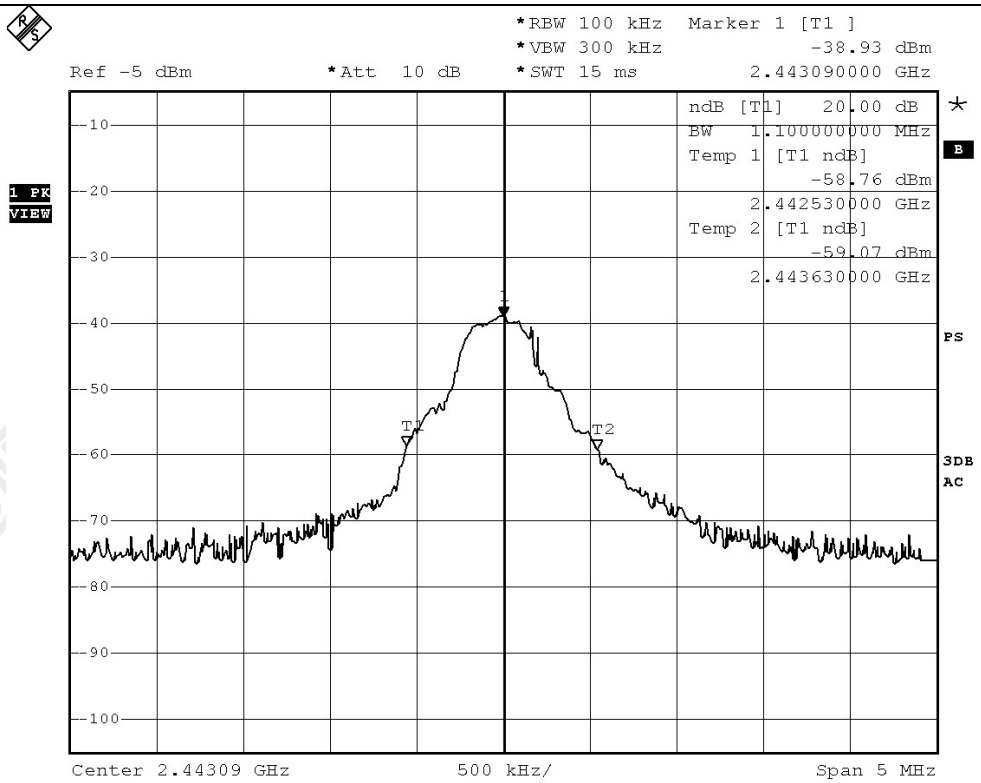
20dB Bandwidth of Fundamental Emission



Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [MHz]
2443	1.10

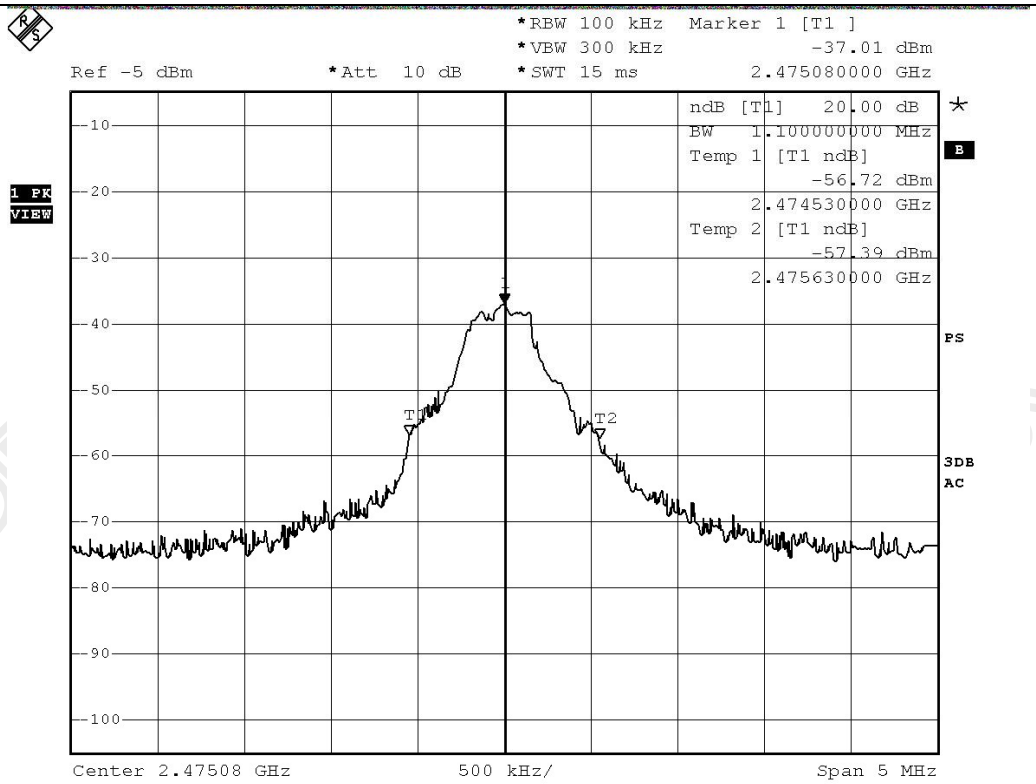
20dB Bandwidth of Fundamental Emission



Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [MHz]
2475	1.10

20dB Bandwidth of Fundamental Emission



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

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
30-88	100
88-216	150
216-960	200
Above960	500

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 mode: PASS

Radiated Emissions Quasi-Peak						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
49.60	8.1	12.6	20.7	10.8	150	Horizontal
85.20	7.6	7.4	15.0	5.6	150	Horizontal
140.10	8.2	8.5	16.7	6.8	150	Vertical
190.20	5.9	9.9	15.8	6.2	200	Vertical
225.70	6.7	10.9	17.6	7.6	200	Vertical
324.90	6.9	15.2	22.1	12.7	200	Vertical

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

Correction Factor included Antenna Factor and Cable Attenuation.

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

Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM062	HORN ANTENNA	EMCO	3117	0075933	2008/11/06	2010/11/06
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-Linggren	FACT-3	--	2009/05/02	2012/05/02
EM174	BICONILOG ANTENNA	EMCO	3142B	00029071	2010/01/24	2012/01/24
EM229	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB40	100248	2009/09/27	2010/09/27
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2009/07/26	2011/07/26

Remarks:-

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

Appendix B

Duty Cycle Correction During 100msec

Each sample unit sends a different series of characters, but each pulse period (100msec) never exceeds a series of 51 short (0.214msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered 51x0.0.214msec per 100msec=10.9% duty cycle. Figure A through B show the characteristics of the pulse train for one of these functions.

Remarks:

Duty Cycle Correction = 20Log (0.109) = -19.2dB

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

Figure A [Pulse Train]

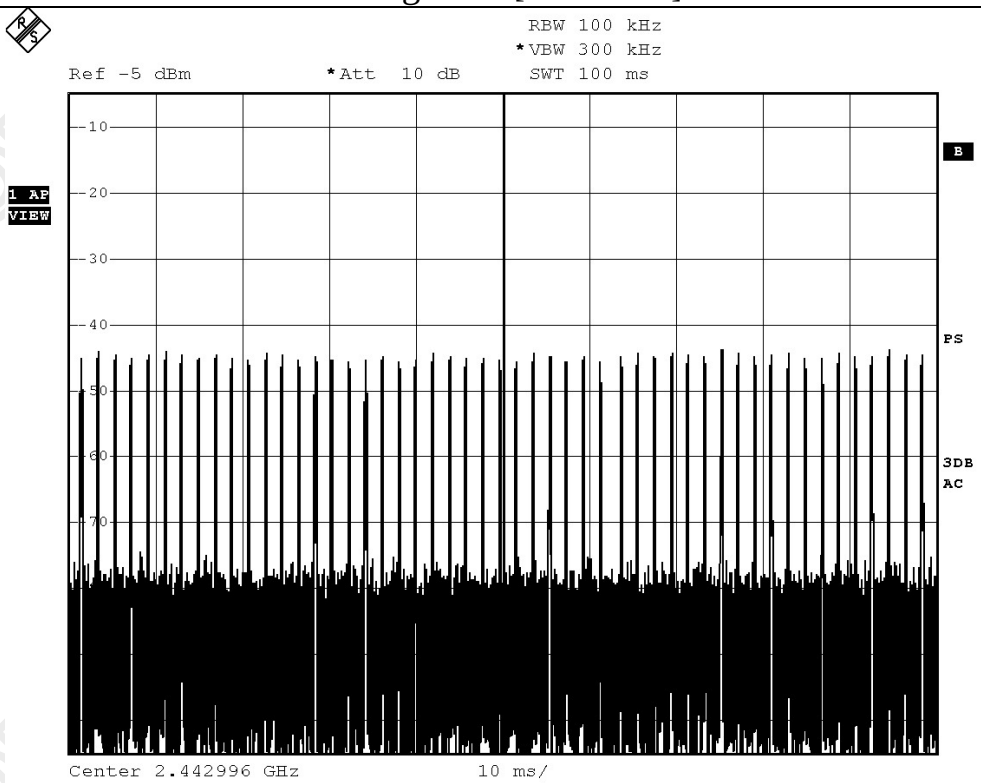
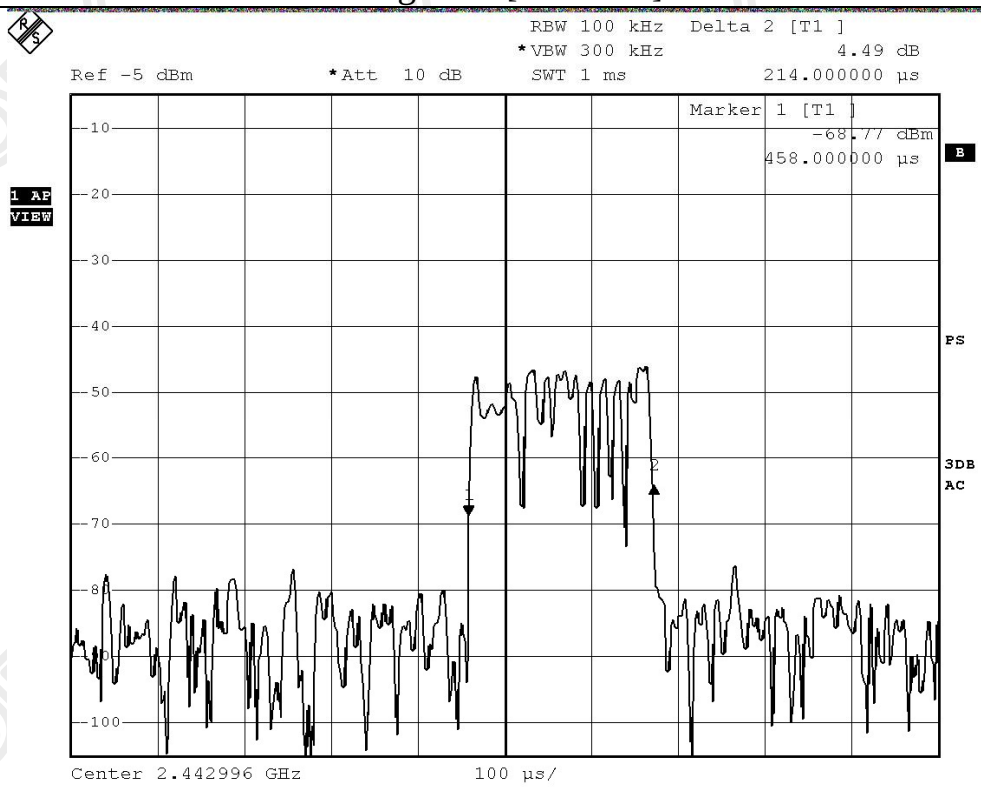


Figure B [Sole Pulse]



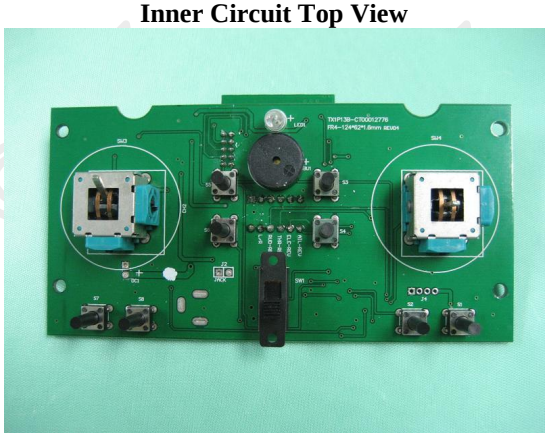
Appendix C

Photographs of EUT

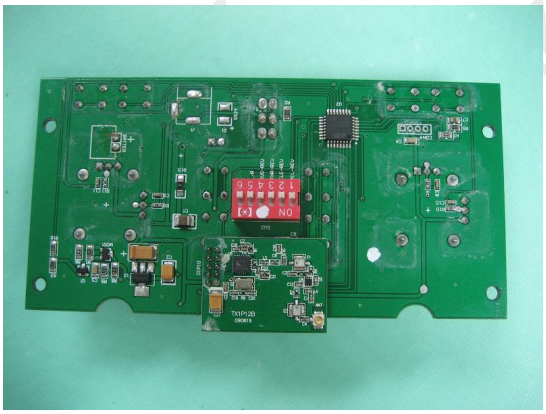
Front View of the product

Rear View of the product

Inner Circuit Top View

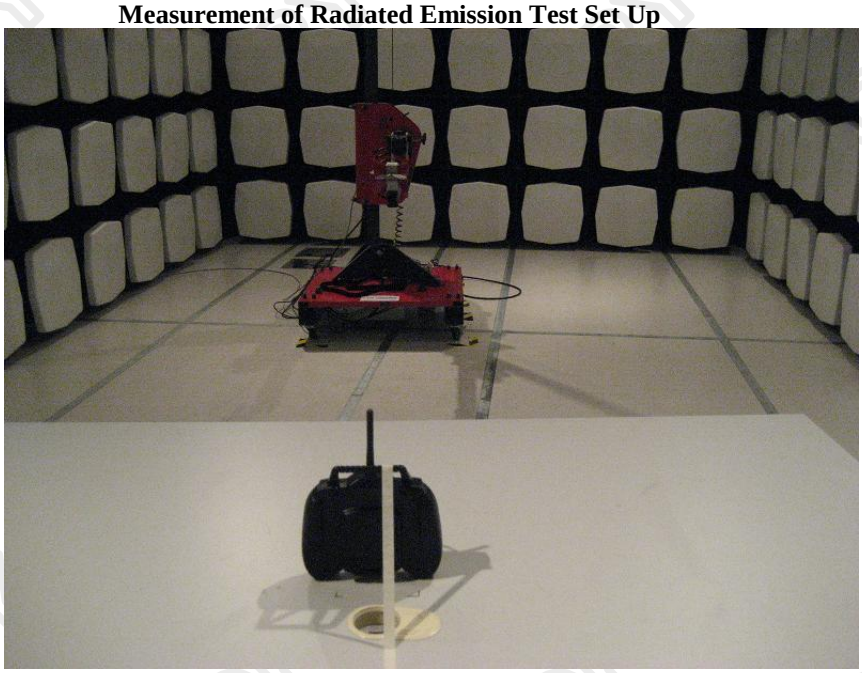


Inner Circuit Bottom View



Photographs of EUT

Measurement of Radiated Emission Test Set Up



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