



STC Test Report

Date: 2011-08-19

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No.: MH185441

Applicant (C00676): Shenzhen Shenchuang Electronics Co., Ltd.
7th Floor, West Tower, Hengfang Laobing Industrial Park,
Xingye Road, Xixiang Town, Baoan District, shenzhen,
China

Manufacturer: Shenzhen Shenchuang Electronics Co., Ltd.
7th Floor, West Tower, Hengfang Laobing Industrial Park,
Xingye Road, Xixiang Town, Baoan District, shenzhen,
China

Description of Sample(s): Product: Remote control
Brand Name: N/A
Model Number: G9001
FCC ID: ZIEG9001

Date Sample(s) Received: 2011-07-05

Date Tested: 2011-07-30

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2010 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.

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1.0 General Details

1.1 Equipment Under Test [EUT]

Description of Sample(s)

Product:	Remote control
Manufacturer:	Shenzhen Shenchuang Electronics Co., Ltd.
Brand Name:	N/A
Model Number:	G9001
Input Voltage:	4.5Vd.c. ("AAA" size battery × 3)

1.1.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Shenzhen Shenchuang Electronics Co., Ltd., Remote control. The transmission signal is frequency hopping with channel frequency range 2402.0.-2480.0MHz during normal use. The EUT was set to fixed frequency test mode by application.

1.2 Date of Order

2011-07-05

1.3 Submitted Sample(s):

1 Sample

1.4 Test Duration

2011-07-30

1.5 Country of Origin

China

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2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2010 Regulations 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	Fail	N/A
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: N/A - Not Applicable

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3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

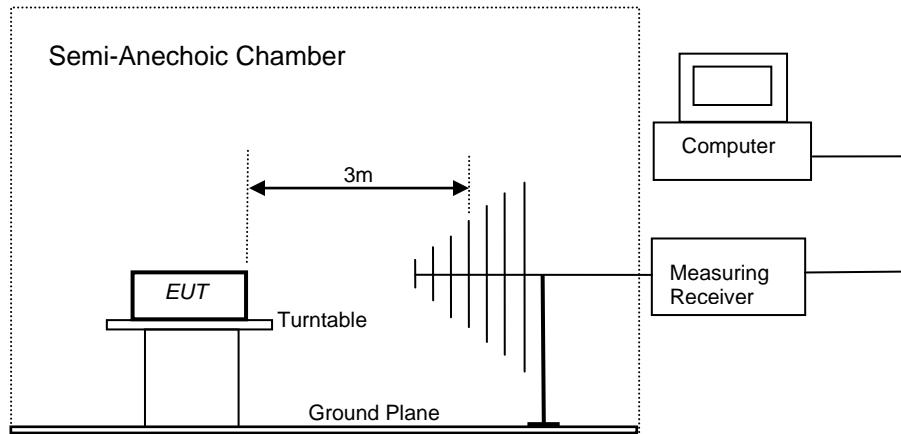
Test Requirement: FCC 47CFR 15.249
Test Method: ANSI C63.4:2009
Test Date: 2011-07-30
Mode of Operation: Communication mode with TV BOX (Tx mode & Rx mode)

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 & 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 (low frequency channel): Pass

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
2402.0	55.2	35.4	90.6	33,884.4	500,000	Vertical
4804.0	14.9	41.5	56.4	660.7	5,000	Vertical
7206.0	5.4	48.8	54.2	512.9	5,000	Vertical
*	12010.0				5,000	Vertical
*	14412.0				5,000	Vertical
*	16814.0				5,000	Vertical
*	19216.0				5,000	Vertical
*	21618.0				5,000	Vertical
*	24020.0			No Emission Detected	5,000	Vertical

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
+	2402.0	35.2	35.4	70.6	3,388.4	50,000
+	4804.0	-5.1	41.5	36.4	66.1	500
+	7206.0	-14.6	48.8	34.2	51.3	500

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 = -25.7dB

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

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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 (Middle frequency channel): Pass

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
2440.0	54.0	35.5	89.5	29,853.8	500,000	Vertical
4880.0	17.0	41.4	58.4	831.8	5,000	Vertical
7320.0	7.9	48.7	56.6	676.1	5,000	Vertical
9760.0					5,000	Vertical
*	12200.0				5,000	Vertical
	14640.0				5,000	Vertical
	17080.0				5,000	Vertical
*	19520.0				5,000	Vertical
	21960.0			No Emission Detected	5,000	Vertical

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
+	2440.0	34.0	35.5	69.5	2,985.4	50,000
+	4880.0	-3.0	41.4	38.4	83.2	500
+	7320.0	-12.1	48.7	36.6	67.6	500

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 = -25.7dB

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

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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 (High frequency channel): Pass

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
2480.0	55.9	35.8	91.7	38,459.2	500,000	Vertical
4960.0	9.6	41.4	51.0	354.8	5,000	Vertical
7440.0	6.1	48.6	54.7	543.3	5,000	Vertical
9920.0					5,000	Vertical
* 12400.0					5,000	Vertical
14880.0					5,000	Vertical
17360.0					5,000	Vertical
* 19840.0					5,000	Vertical
22320.0					5,000	Vertical
24800.0				No Emission Detected	5,000	Vertical

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
+	2480.0	35.9	35.8	71.7	3,845.9	50,000
+	4960.0	-10.4	41.4	31.0	35.5	500
+	7440.0	-13.9	48.6	34.7	54.3	500

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 = -25.7dB

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

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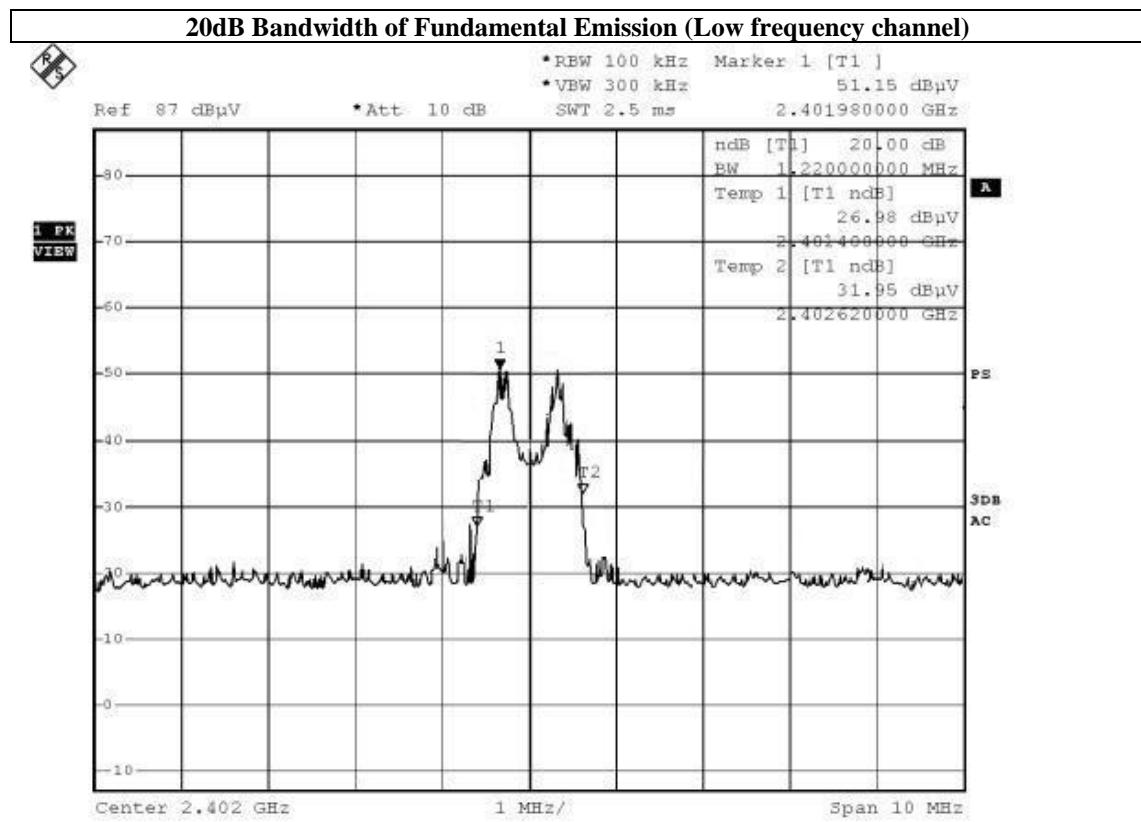
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Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [MHz]
2402	1.22



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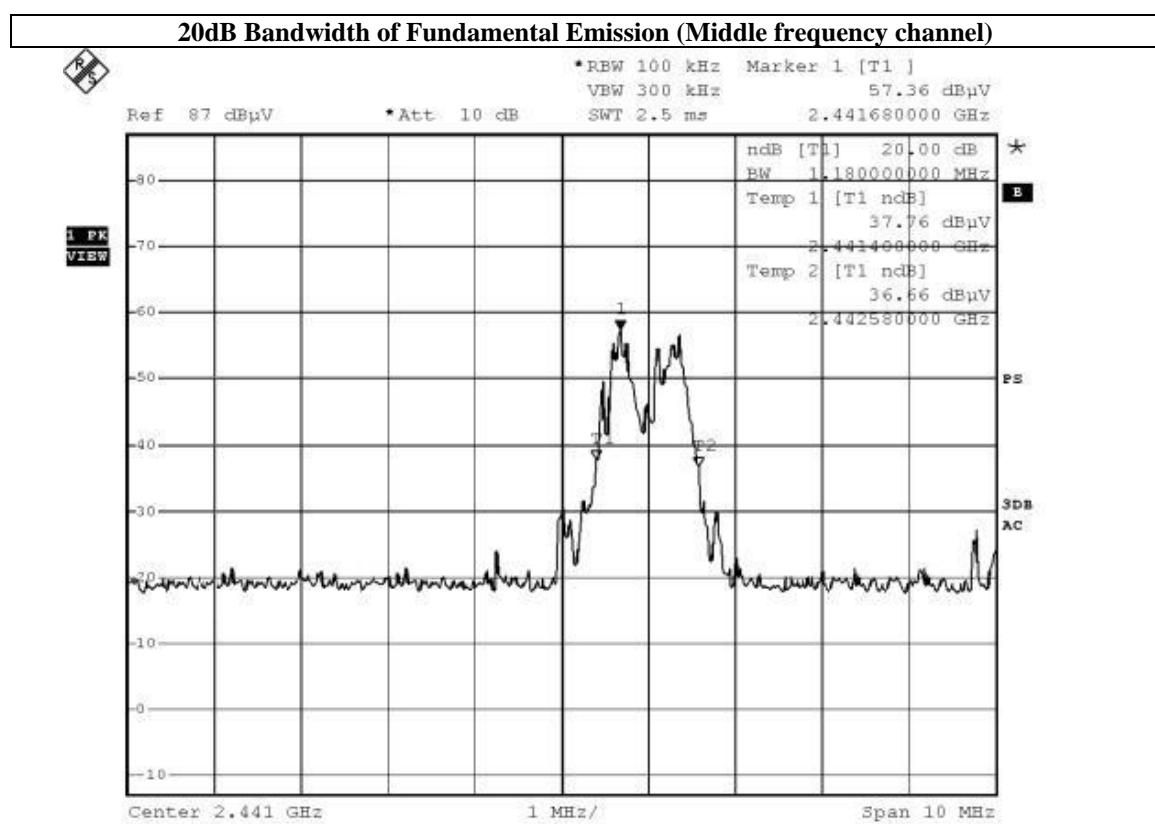
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Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [MHz]
2441	1.18



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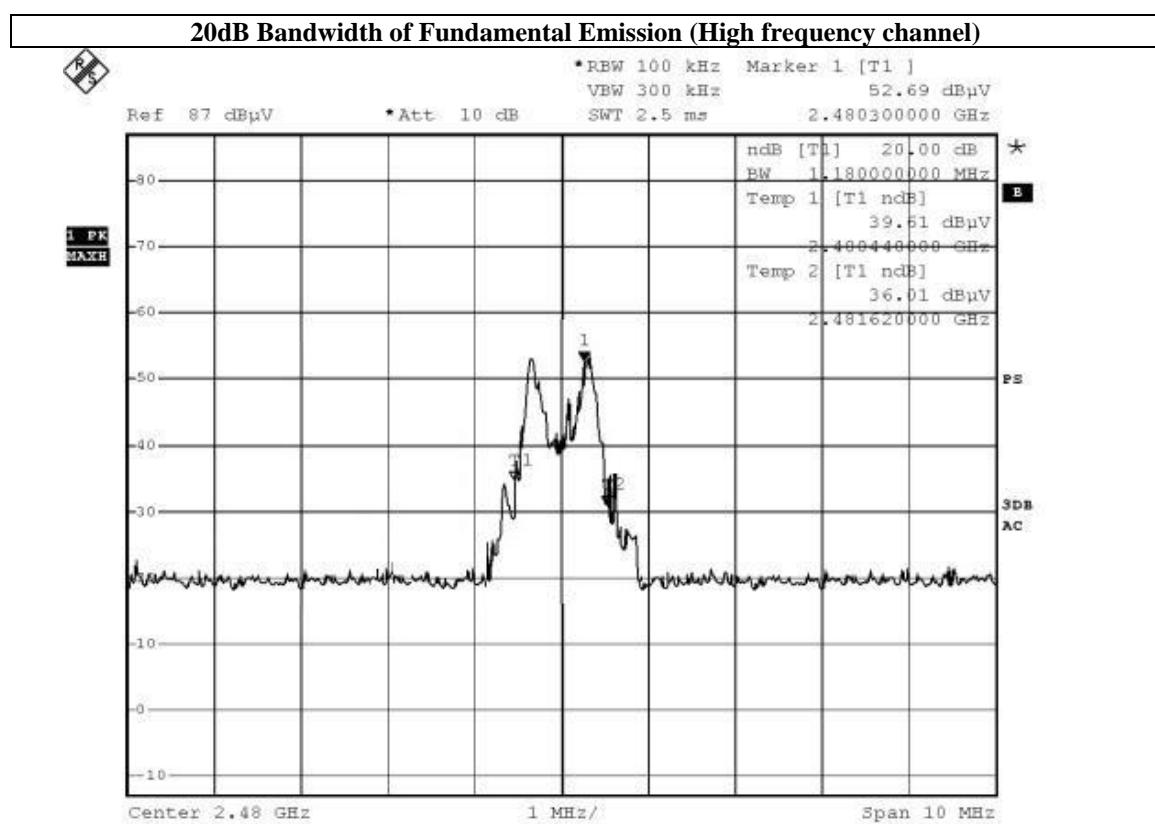
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Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [MHz]
2480	1.18



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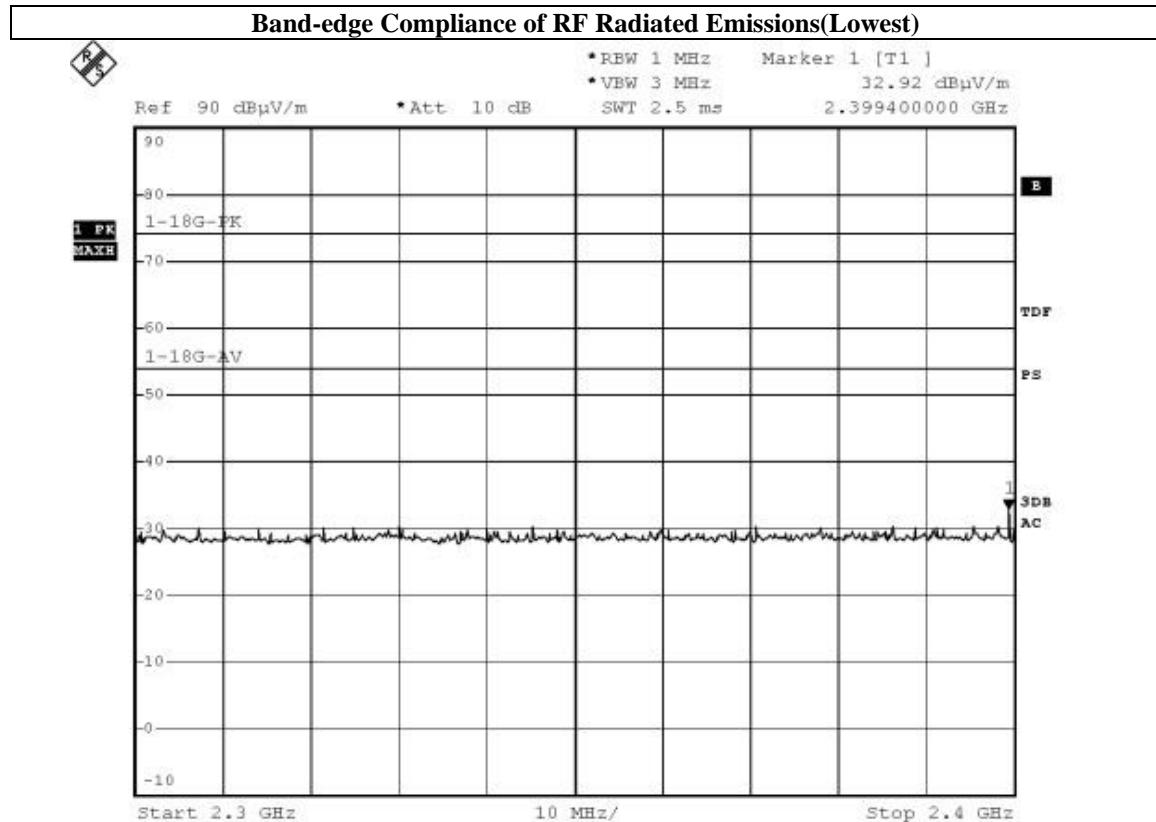
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Band Edge Measurement:



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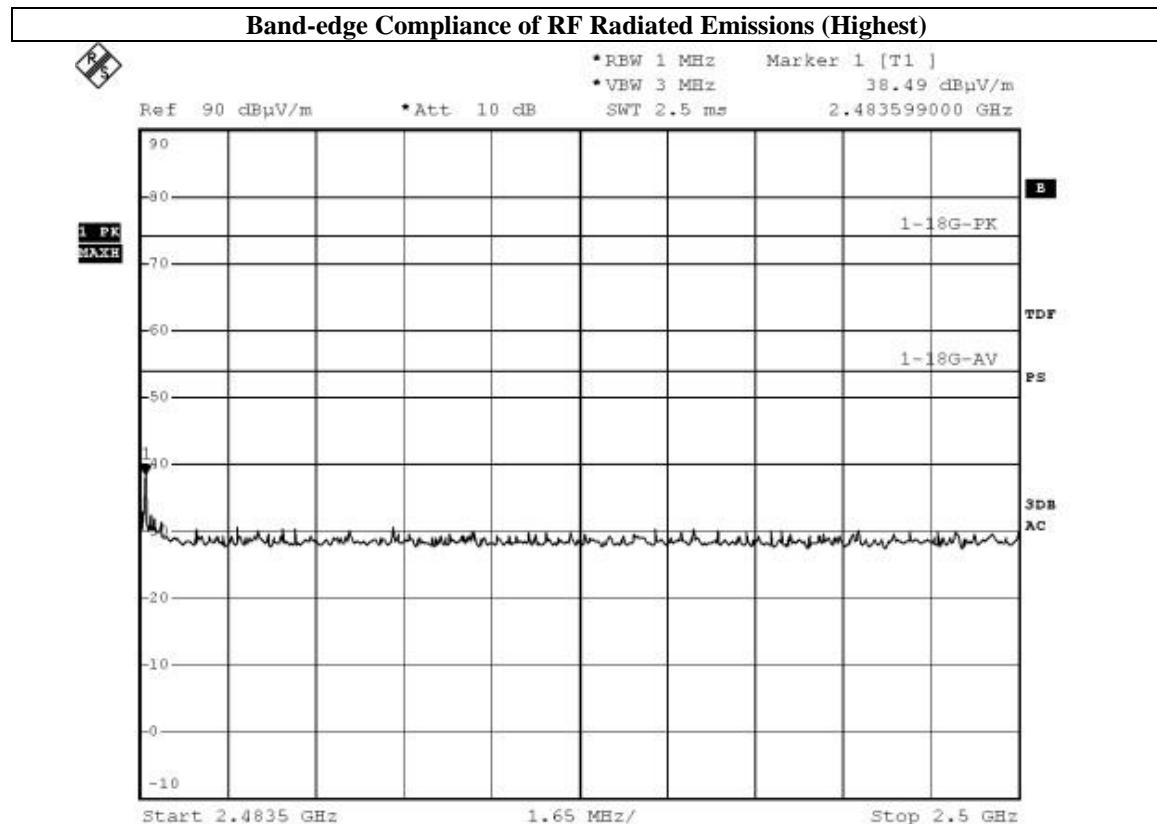
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Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above 960	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 Communication mode with TV Box(9kHz-30MHz): PASS

Emissions detected are more than 20 dB below the FCC Limits

Results of Communication mode with TV Box: PASS

Please refer to the following table for result details

Emission Frequency MHz	E-Field Polarity	Radiated Emissions Quasi-Peak			
		Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
222.8	Horizontal	27.9	46.0	24.8	200
500.0	Horizontal	36.4	46.0	66.1	200
718.6	Horizontal	41.6	46.0	120.2	200
850.0	Horizontal	40.9	46.0	110.9	200
44.1	Vertical	34.4	40.0	52.5	100
112.3	Vertical	33.0	43.5	44.7	150
192.1	Vertical	28.9	43.5	27.9	150
515.5	Vertical	36.3	46.0	65.3	200
908.3	Vertical	41.5	46.0	118.9	200

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

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

Frequency Range [MHz]	Quasi-Peak Limits [μ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above 960	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 Rx mode: PASS

Emissions detected are more than 20 dB below the FCC Limits.

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

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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	2009/09/02	2011/09/02
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-Linggren	FACT-3	--	2010/10/25	2011/11/25
EM174	BICONILOG ANTENNA	EMCO	3142B	1671	2010/02/09	2012/02/09
EM229	EMI Test Receiver	R&S	ESIB40	100248	2011/04/26	2012/04/26

Remarks:-

CM Corrective Maintenance

N/A Not Applicable

TBD To Be Determined

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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 11 sole (0.47msec) pulses. Assuming any combination of sole pulses may be obtained due to encoding the worst case transmit duty cycle would be considered $11 \times 0.47\text{msec} / 100\text{msec} = 5.17\%$ duty cycle. Figure A through B show the characteristics of the pulse train for one of these functions.

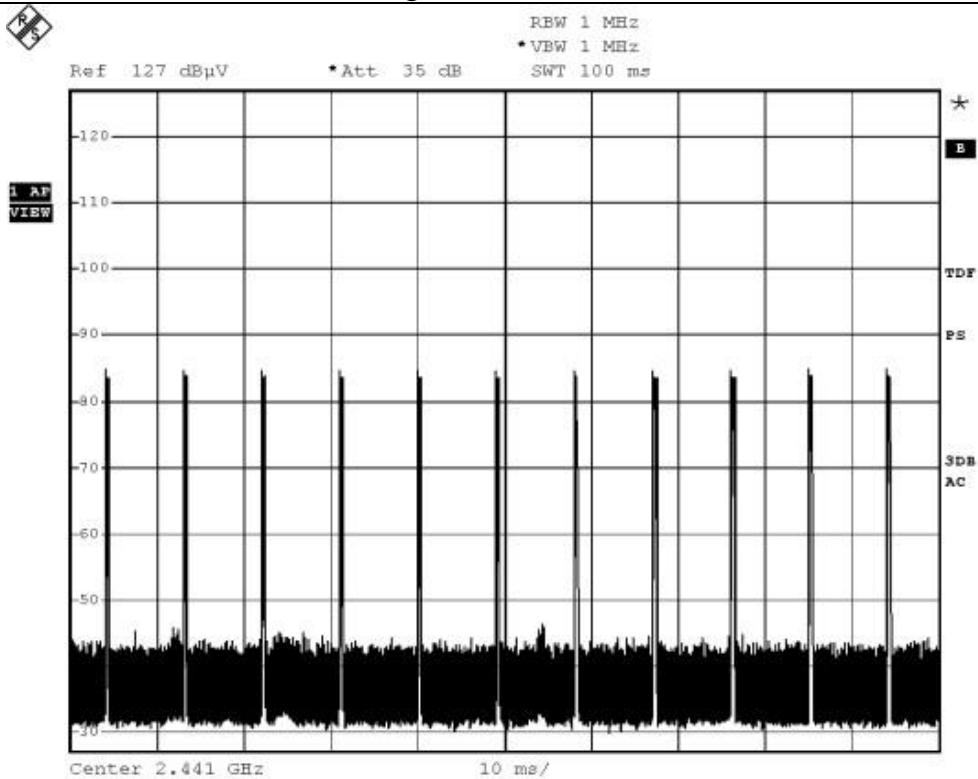
Remarks:

Duty Cycle Correction = $20\log(0.0517) = -25.7\text{ dB}$

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

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

Figure A [Pulse Train]



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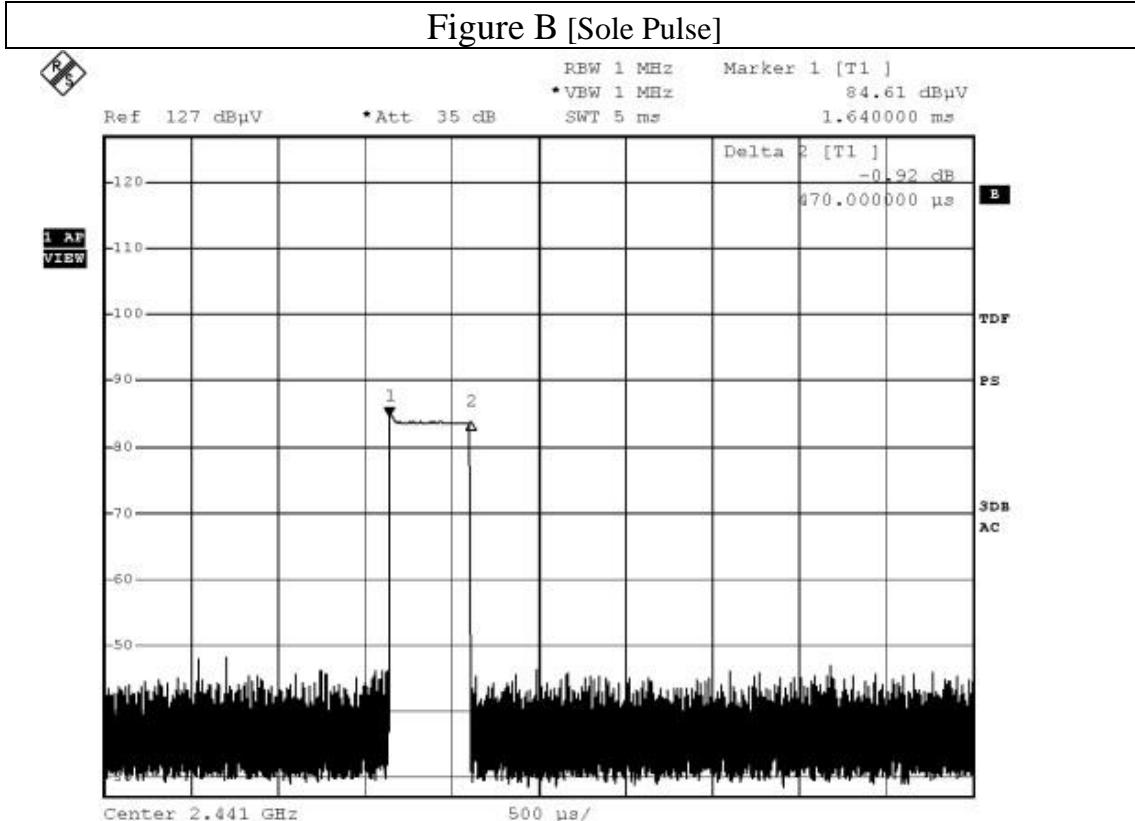
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Figure B [Sole Pulse]



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Antenna Requirement

Test Requirements: § 15.203

Test Specification:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Test Results:

The EUT has 2 Dipole Antenna which is connected to the reverse-polarity SMA connector on the PCB of the main unit, the antenna gain = 0.5dBi. All component install on inside of EUT. User unable to remove or changed the Antenna.

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Appendix C

Photographs of EUT

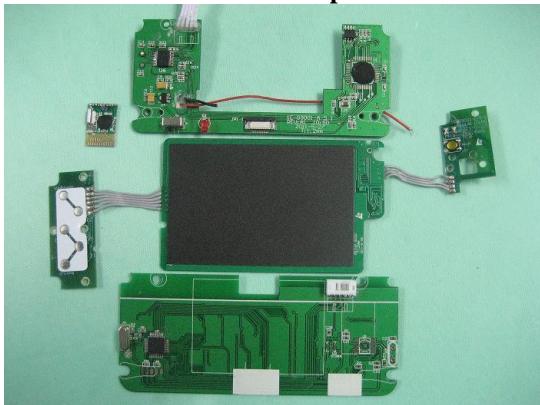
Front View of the product



Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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

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