STC Test Report

Date : 2011-03-01

No. : MH184855

Applicant (C00144): Ablelink Electronics Limited
Room 506, Remington Centre, 23 Hung To Road, Kwun Tong, Kowloon, Hong Kong

Manufacturer: ANFAIR ELECTRONICS PLASTIC FACTORY
CHANGSANTOU VILLAGE, DONGGUAN CITY, GUANGDONG PROVINCE, CHINA.

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

Product:	iTrip
Brand Name:	Griffin
Model Number:	P3783
FCC ID:	YHEP3783

Date Sample(s) Received: 2010-12-20

Date Tested: 2011-02-15, 2011-02-22

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2010 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
Tel: (852) 2666 1888 Fax: (852) 2664 4353 Homepage: www.hkstc.org E-mail: hkstc@hkstc.org

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1.0 General Details

1.1 Equipment Under Test [EUT]

Description of Sample

Product:	iTrip
Manufacturer:	ANFAIR ELECTRONICS PLASTIC FACTORY
Brand Name:	Griffin
Model Number:	P3783
Input Voltage:	12Vd.c. (connected to the battery of the vehicle)

1.1.1 Description of EUT Operation

The Equipment Under Test (EUT) is an Ablelink Electronics Limited, iTrip.
It is FM transmitter, Modulation by IC; and type is frequency modulation.

1.2 Date of Order

2010-12-20

1.3 Submitted Sample(s):

1 Sample

1.4 Test Duration

2011-02-15, 2011-02-22

1.5 Country of Origin

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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: 2010 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
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.239	ANSI C63.4:2003	N/A	☒	☐
Radiated Emissions	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)

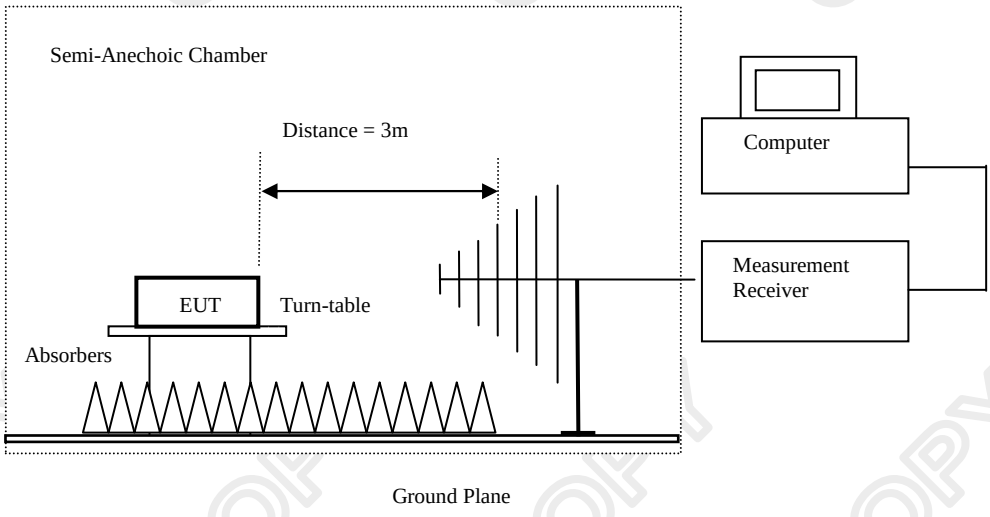
Test Requirement:	FCC 47CFR 15.239
Test Method:	ANSI C63.4:2003
Test Date:	2011-02-15
Mode of Operation:	Tx mode

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 and the frequency spectrum should be measured from the lowest operating frequency of the EUT.
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:



Absorbers placed on top of the ground plane are for measurements above 1000MHz only.

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Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.239]:

Frequency Range of Fundamental [MHz]	Peak Limits [μV/m]	Average Limits [μV/m]
88-108	2,500	250

Results of Tx Mode(88.1MHz): PASS

Field Strength of Fundamental Emissions Peak Value						
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
88.10	39.30	7.9	47.2	229.1	2,500	Horizontal

Field Strength of Fundamental Emissions Average Limits						
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
88.10	38.90	7.9	46.8	218.8	250	Horizontal

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty: 30MHz to 1GHz 5.1dB

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

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

Frequency Range [MHz]	Quasi-Peak Limits [μV/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
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.

Result of Tx Mode (9kHz – 30MHz): Pass
Emissions detected are more than 20 dB below the limit line(s)

Results of Tx Mode(88.1 MHz): 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
31.40	12.4	17.0	29.4	29.5	100	Vertical
176.20	16.0	11.0	27.0	22.4	150	Horizontal
264.30	19.6	13.7	33.3	46.2	200	Horizontal
352.40	20.1	15.9	36.0	63.1	200	Horizontal
440.50	18.8	18.8	37.6	75.9	200	Horizontal
528.60	15.6	20.7	36.3	65.3	200	Horizontal

Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty: 30MHz to 1GHz 5.1dB
No spurious emissions found between the EUT lowest operating frequency and 30MHz.

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Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.239]:

Frequency Range of Fundamental [MHz]	Peak Limits [μV/m]	Average Limits [μV/m]
88-108	2,500	250

Results of Tx Mode(98.1MHz): PASS

Field Strength of Fundamental Emissions Peak Value						
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
98.10	38.60	8.7	47.3	231.7	2,500	Horizontal

Field Strength of Fundamental Emissions Average Limits						
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
98.10	37.00	8.7	45.7	192.8	250	Horizontal

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty: 30MHz to 1GHz 5.1dB

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

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Frequency Range [MHz]	Quasi-Peak Limits [μV/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
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.

Result of Tx Mode (9kHz – 30MHz): Pass
Emissions detected are more than 20 dB below the limit line(s)

Results of Tx Mode(98.1 MHz): 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
30.20	11.7	17.4	29.1	28.5	100	Vertical
196.20	22.1	9.7	31.8	38.9	150	Horizontal
294.30	22.2	14.4	36.6	67.6	200	Horizontal
392.40	16.8	18.4	35.2	57.5	200	Horizontal
668.30	14.1	24.5	38.6	85.1	200	Horizontal
909.60	12.2	27.0	39.2	91.2	200	Horizontal

Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty: 30MHz to 1GHz 5.1dB
No spurious emissions found between the EUT lowest operating frequency and 30MHz.

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Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.239]:

Frequency Range of Fundamental [MHz]	Peak Limits [μV/m]	Average Limits [μV/m]
88-108	2,500	250

Results of Tx Mode(107.9MHz): PASS

Field Strength of Fundamental Emissions Peak Value						
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
107.90	39.30	8.2	47.5	237.1	2,500	Horizontal

Field Strength of Fundamental Emissions Average Limits						
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
107.90	37.10	8.2	45.3	184.1	250	Horizontal

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty: 30MHz to 1GHz 5.1dB

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

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Frequency Range [MHz]	Quasi-Peak Limits [μV/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
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.

Result of Tx Mode (9kHz – 30MHz): Pass
Emissions detected are more than 20 dB below the limit line(s)

Results of Tx Mode(107.9MHz): 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
30.00	12.6	17.1	29.7	30.5	100	Horizontal
215.80	20.6	10.5	31.1	35.9	150	Horizontal
323.70	17.8	15.2	33.0	44.7	200	Horizontal
590.90	15.9	22.3	38.2	81.3	200	Vertical
730.60	15.0	25.5	40.5	105.9	200	Horizontal
780.50	15.5	24.7	40.2	102.3	200	Vertical

Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty: 30MHz to 1GHz 5.1dB
No spurious emissions found between the EUT lowest operating frequency and 30MHz.

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3.2 20dB Bandwidth of Fundamental Emission

Test Requirement:	FCC 47 CFR 15.239
Test Method:	ANSI C63.4:2003 (Section 13.1.7)
Test Date:	2011-02-22
Mode of Operation:	Tx 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. Verify the lowest and highest tunable frequency, insure the tunable frequency range is within the frequency band specified in this part. After the measurements, ensure the transmitter is still functional.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.

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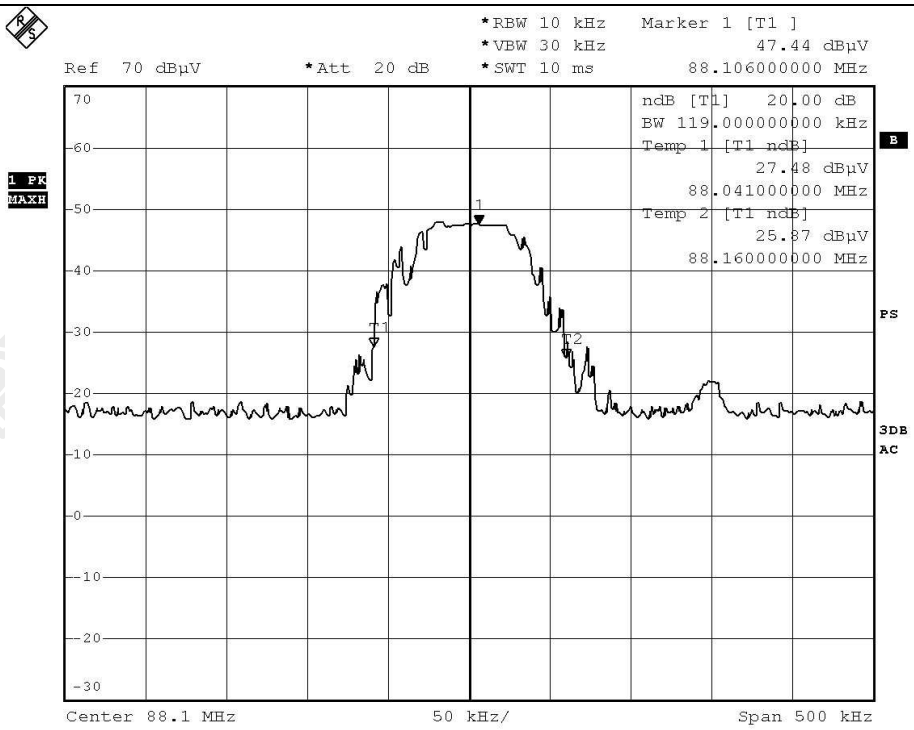
Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]	FCC Limits [kHz]
88.1	119	200

Result: Pass

The following figure is the measured bandwidth of Fundamental Emission.

20 dB Bandwidth Plot on 88.1MHz



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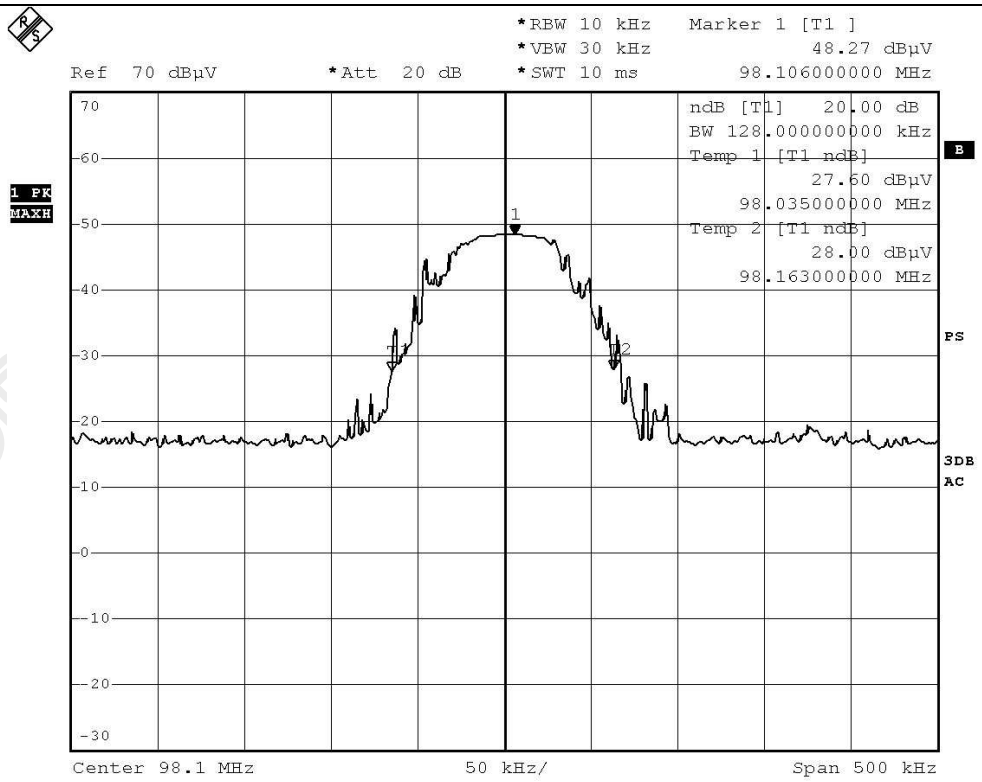
Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]	FCC Limits [kHz]
98.1	128	200

Result: PASS

The following figure is the measured bandwidth of Fundamental Emission.

20 dB Bandwidth Plot on 98.1MHz



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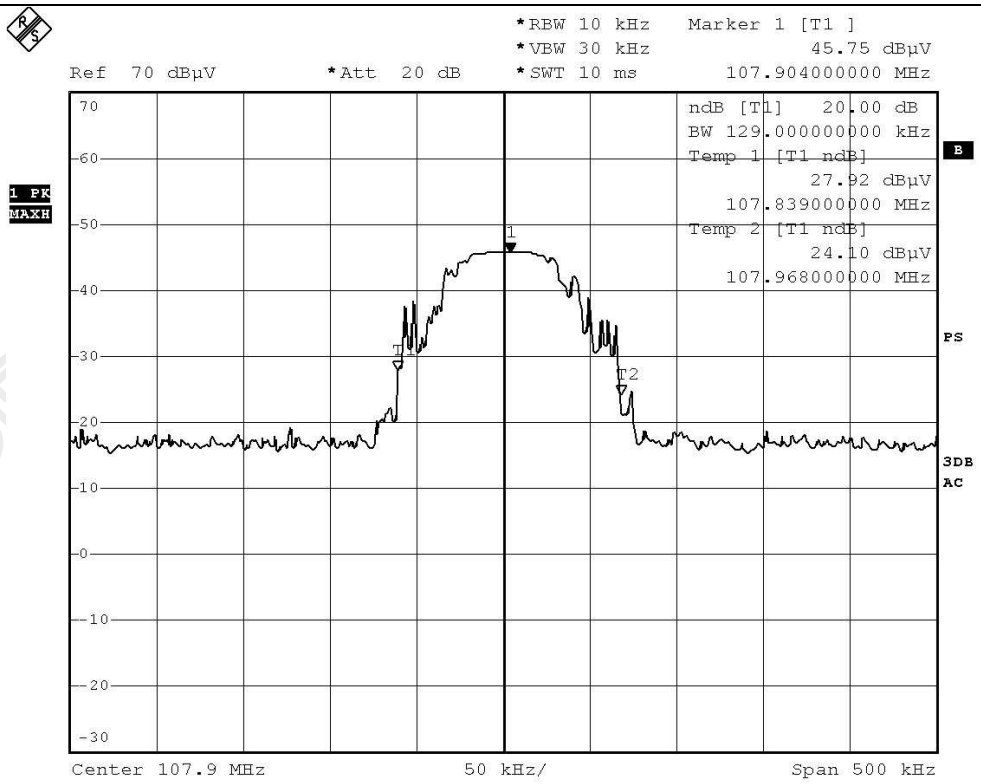
Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]	FCC Limits [kHz]
107.9	129	200

Result: Pass

The following figure is the measured bandwidth of Fundamental Emission.

20 dB Bandwidth Plot on 107.9MHz



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Operation Description

3.3.1 Operating Frequency and Rating

The transmitter is a FM transmitter operating at 88.1-107.9MHz band. The transmitter is powered by 12Vd.c. and the transmitting frequency is IC controlled.

3.3.2 EUT Antenna

No external antenna, Is PCB layout internal antenna. There is no external ground connection. The ground is only that of the printed circuit board.

3.3.3 Installation Method

(Please refer to user manual)

3.3.4 Test Procedure Used

ANSI C36.4 test method is adopted and the fully charged batteries have been used for the measurements.

3.3.5 Tuning range of the EUT

The EUT is able to tune with the 88.1 to 107.9MHz band. and the frequency is controlled by IC. cannot be tuned outside 88.1 to 107.9MHz.

3.3.6 Test signal

The audio input of the EUT, the audio signal will consist of different sound (MP3) for testing (is not a single tone), the volume will be also turn to maximum in order to obtain the worst case scenario.

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Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
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	--	2008/12/01	2011/12/01
EM174	BICONILOG ANTENNA	EMCO	3142B	1671	2010/01/24	2012/01/24
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2010/06/29	2011/06/29
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2009/07/26	2011/07/26

Remarks:-

CM Corrective Maintenance

N/A Not Applicable or Not Available

TBD To Be Determined

Appendix B

Ancillary Equipment

ITEM NO.	DESCRIPTION	MODEL NO.	FCC ID	REMARK
1	iPod Player	A1236	N/A	N/A

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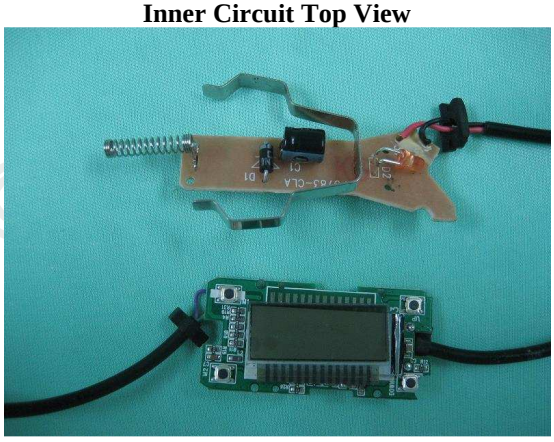
Appendix C

Photographs of EUT

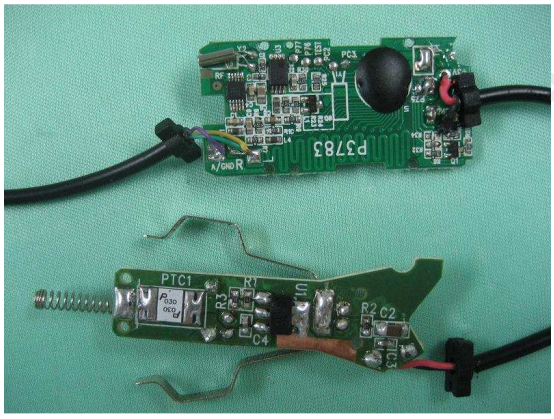
Front View of the product

Rear View of the product

Inner Circuit Top View



Inner Circuit Bottom View



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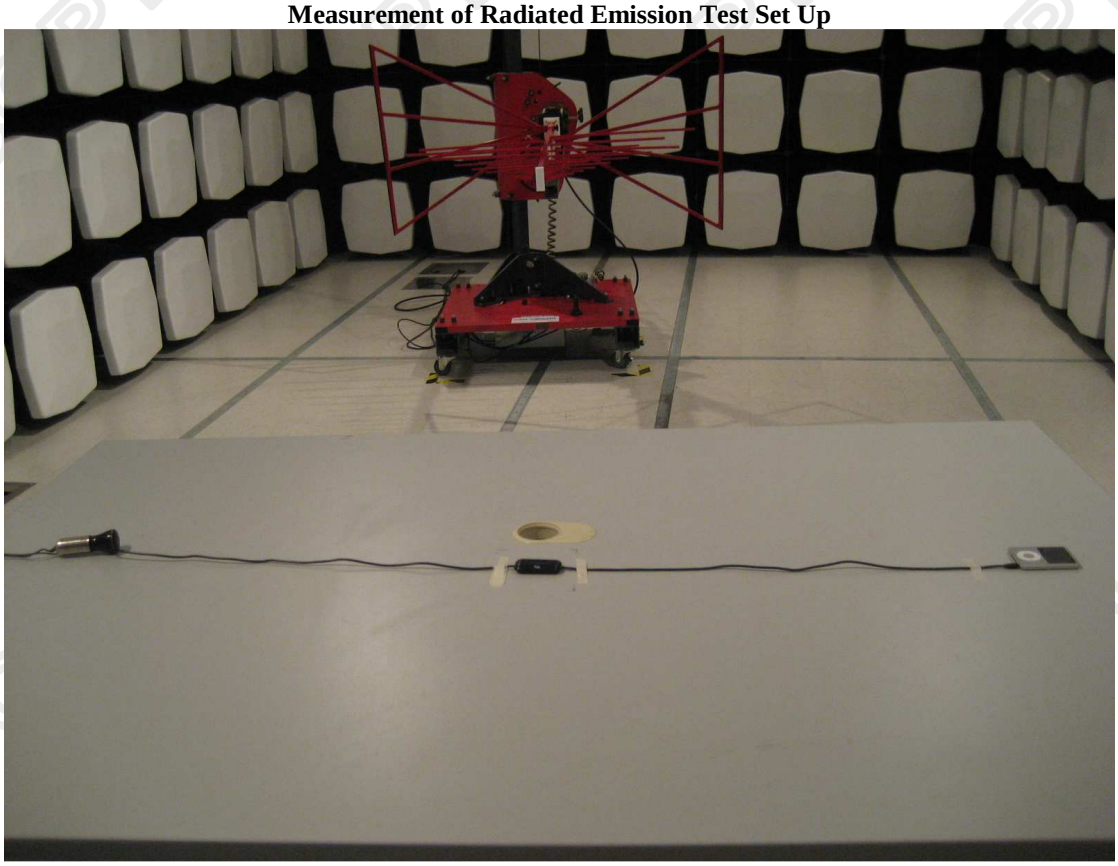
Photographs of EUT

Measurement of Radiated Emission Test Set Up



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