



STC Test Report

Date : 2008-09-05

Page 1 of 1

No. : HM162429

Applicant (MUE001):

Musical Electronics Limited.
8/F., Wider Industrial Building, 58 Tsun Yip Street, Kwun Tong, Kowloon, Hong Kong.

Manufacturer:

Musical Electronics (Qing Yuan) Ltd.
Tai He Industrial Park, Qing Xin County, Qing Yuan, Quang Dong, China

Description of Samples:

Product: Outdoor Wireless Speaker – Outback
Brand Name: Rocketfish
Model Number: RF-WS02/03
FCC ID: AUISP707LTX

Date Samples Received: 2008-08-26

Date Tested: 2008-08-28

Investigation Requested:

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2007 and ANSI C63.4:2003 for FCC Certification.

Conclusions:

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.

Remarks:

Dr. LEE Kam Chuen,
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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STC Test Report

Date : 2008-09-05

Page 2 of 2

No. : HM162429

CONTENT:

Cover
Content

Page 1 of 18
Page 2 of 18

1.0 General Details

1.1	Test Laboratory	Page 3 of 18
1.2	Applicant Details Applicant Manufacturer	Page 3 of 18
1.3	Equipment Under Test [EUT] Description of EUT operation	Page 4 of 18
1.4	Date of Order	Page 4 of 18
1.5	Submitted Sample	Page 4 of 18
1.6	Test Duration	Page 4 of 18
1.7	Country of Origin	Page 4 of 18

2.0 Technical Details

2.1	Investigations Requested	Page 5 of 18
2.2	Test Standards and Results Summary	Page 5 of 18

3.0 Test Results

3.1	Radiated Emission	Page 6-10 of 18
3.2	Conducted Emission Bandwidth of Fundamental Emission	Page 11-14 of 18 Page 13-15 of 18

Appendix A

List of Measurement Equipment	Page 16 of 18
-------------------------------	---------------

Appendix B

Photographs	Page 17-18 of 18
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STC Test Report

Date : 2008-09-05

Page 3 of 3

No. : HM162429

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

Musical Electronics Limited.
8/F., Wider Industrial Building, 58 Tsun Yip Street, Kwun Tong, Kowloon, Hong Kong.

Manufacturer

Musical Electronics (Qing Yuan) Ltd.
Tai He Industrial Park, Qing Xin County, Qing Yuan, Quang Dong, China

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STC Test Report

Date : 2008-09-05

Page 4 of 4

No. : HM162429

1.3 Equipment Under Test [EUT]

Description of Sample

Product: Outdoor Wireless Speaker – Outback
Manufacturer: Musical Electronics (Qing Yuan) Ltd.
Brand Name: Rocketfish
Model Number: RF-WS02/03
Input Voltage: 5Vd.c. 200mA

The AC/DC Adaptor used for the tests was provided by the applicant with the following details:
Two pins (Live / Neutral) only adaptor, Model Number: KU1B-050-0200D, Input: 120Va.c.
60Hz 6VA, Output: 5Vd.c. 200mA

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Musical Electronics Limited., OUTDOOR WIRELESS SPEAKER – OUTBACK, the transmission signal is within the 2.405-2.477GHz frequency range.

1.4 Date of Order

2008-08-26

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2008-08-28

1.7 Country of Origin

N/A

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STC Test Report

Date : 2008-09-05

Page 5 of 5

No. : HM162429

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2007 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	
			Pass	Fail
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.4:2003	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>

Note: N/A – Not Applicable

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STC Test Report

Date : 2008-09-05

Page 6 of 6

No. : HM162429

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

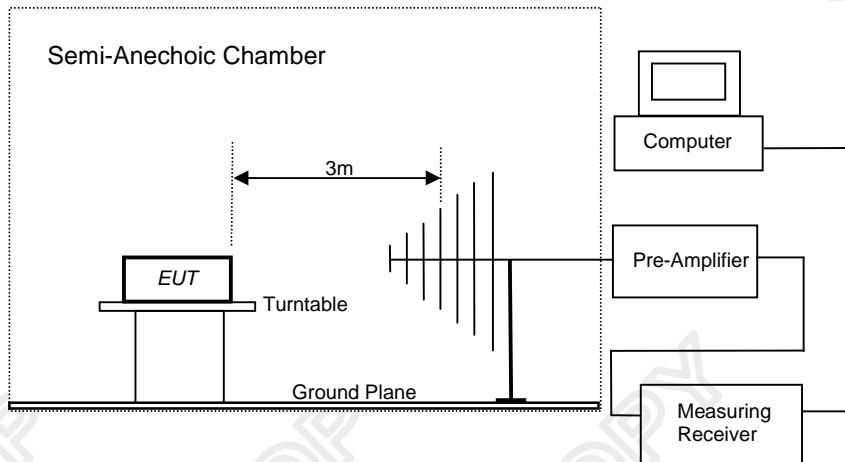
Test Requirement: FCC 47CFR 15.249
Test Method: ANSI C63.4:2003
Test Date: 2008-08-28
Mode of Operation: Communication mode and Communication mode (spurious except harmonics)

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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STC Test Report

Date : 2008-09-05

Page 7 of 7

No. : HM162429

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 Communication mode (Tx mode – Lowest Channel Frequency): 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
2405.0	55.4	29.1	84.5	16,788.0	500,000	Horizontal
*	4810.0				500	Vertical
	7215.0				500	Vertical
	9620.0				500	Vertical
*	12025.0				500	Vertical
	14430.0				500	Vertical
	16835.0				500	Vertical
*	19240.0				500	Vertical
	21645.0				500	Vertical
	24050.0				500	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
2405.0	41.1	29.1	70.2	3,235.9	50,000	Horizontal

Remarks:

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

*: 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.

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

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STC Test Report

Date : 2008-09-05

Page 8 of 8

No. : HM162429

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 Communication mode (Tx mode – Mid Channel Frequency): 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
2441.0	58.4	29.3	87.7	24,266.1	500,000	Horizontal
*	4882.0				500	Vertical
	7323.0				500	Vertical
	9764.0				500	Vertical
*	12205.0				500	Vertical
	14646.0				500	Vertical
	17087.0				500	Vertical
*	19528.0				500	Vertical
	21969.0				500	Vertical
	24410.0				500	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
2441.0	43.2	29.3	72.5	4,217.0	50,000	Horizontal

Remarks:

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

*: 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.

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

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STC Test Report

Date : 2008-09-05

Page 9 of 9

No. : HM162429

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 Communication mode (Tx mode – Highest Channel Frequency): 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
2477.0	57.6	29.7	87.3	23,173.9	500,000	Horizontal
*	4954.0				500	Vertical
	7431.0				500	Vertical
	9908.0				500	Vertical
*	12385.0				500	Vertical
	14862.0				500	Vertical
	17339.0				500	Vertical
*	19816.0				500	Vertical
	22293.0				500	Vertical
	24770.0				500	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
2477.0	42.4	29.7	72.1	4,027.2	50,000	Horizontal

Remarks:

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

*: 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.

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

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STC Test Report

Date : 2008-09-05

Page 10 of 10

No. : HM162429

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

Frequency Range [MHz]	Quasi-Peak Limits [μ V/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 Communication mode (Tx Spurious except harmonics): Pass

Radiated Emissions Quasi - Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
64.0	Vertical	30.9	40.0	35.1	100
128.0	Horizontal	34.3	43.5	51.9	150
224.0	Horizontal	31.6	46.0	38.0	200
712.8	Horizontal	36.1	46.0	63.8	200

Results of Communication mode (Rx Spurious except harmonics): Pass

Radiated Emissions Quasi - Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
64.0	Vertical	30.9	40.0	35.1	100
128.0	Horizontal	34.3	43.5	51.9	150
224.0	Horizontal	31.6	46.0	38.0	200
712.8	Horizontal	36.1	46.0	63.8	200

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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STC Test Report

Date : 2008-09-05

Page 11 of 11

No. : HM162429

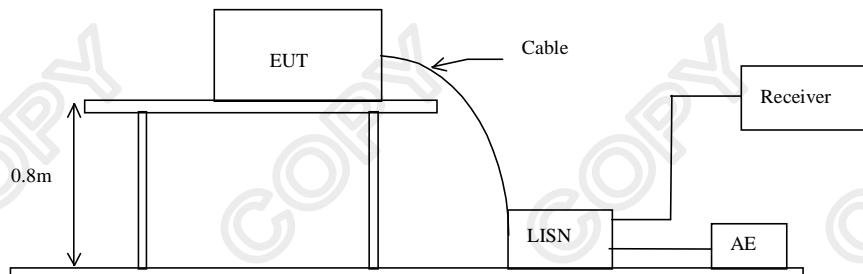
3.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC 47CFR 15.107
Test Method: ANSI C63.4:2003
Test Date: 2008-08-28
Mode of Operation: Communication mode

Test Method:

The test was performed in accordance with ANSI C63.4: 2003, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



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STC Test Report

Date : 2008-09-05

Page 12 of 12

No. : HM162429

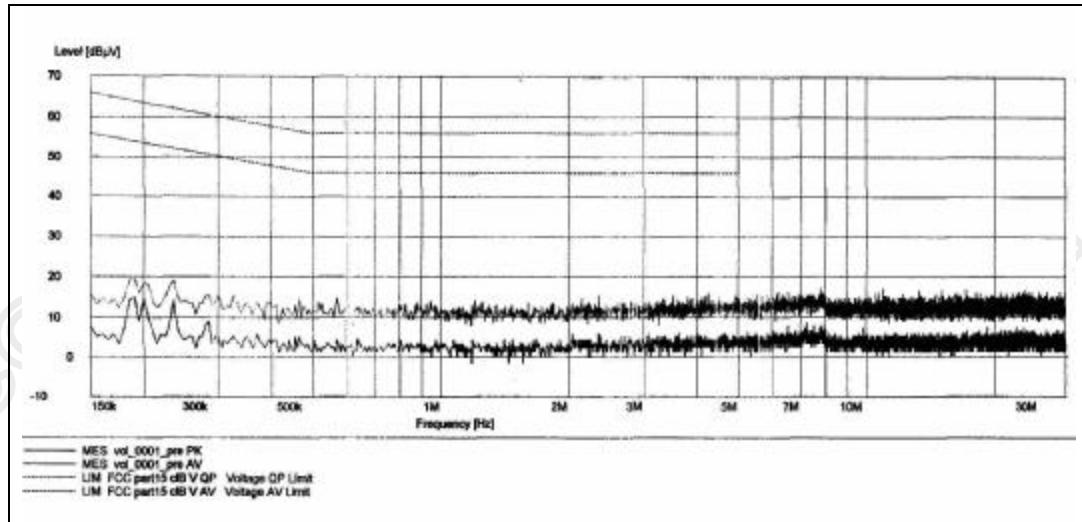
Limit for Conducted Emissions (FCC 47 CFR 15.107):

Frequency Range [MHz]	Quasi-Peak Limits [dB μ V]	Average [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of communication mode: PASS



Remarks:

Calculated measurement uncertainty : 3.97dB

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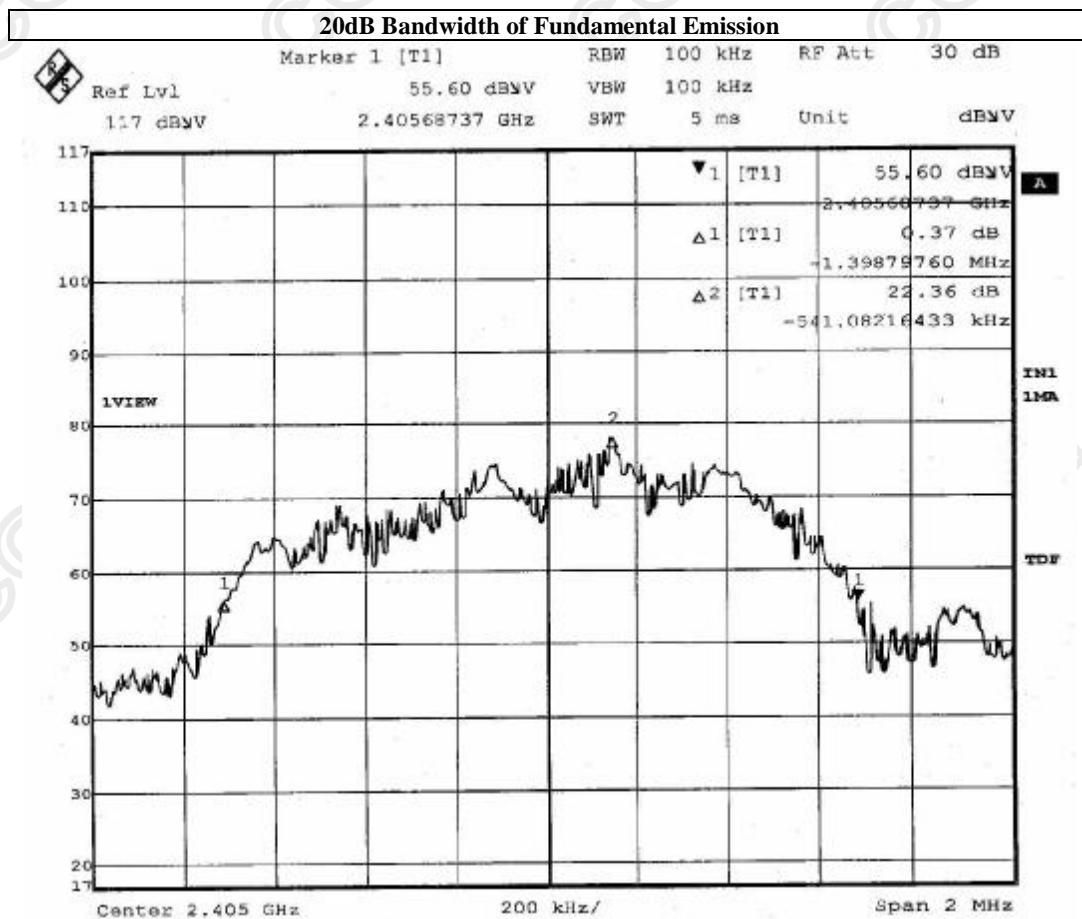
Date : 2008-09-05

Page 13 of 13

No. : HM162429

Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [GHz]	20dB Bandwidth [MHz]
2.405	1.399



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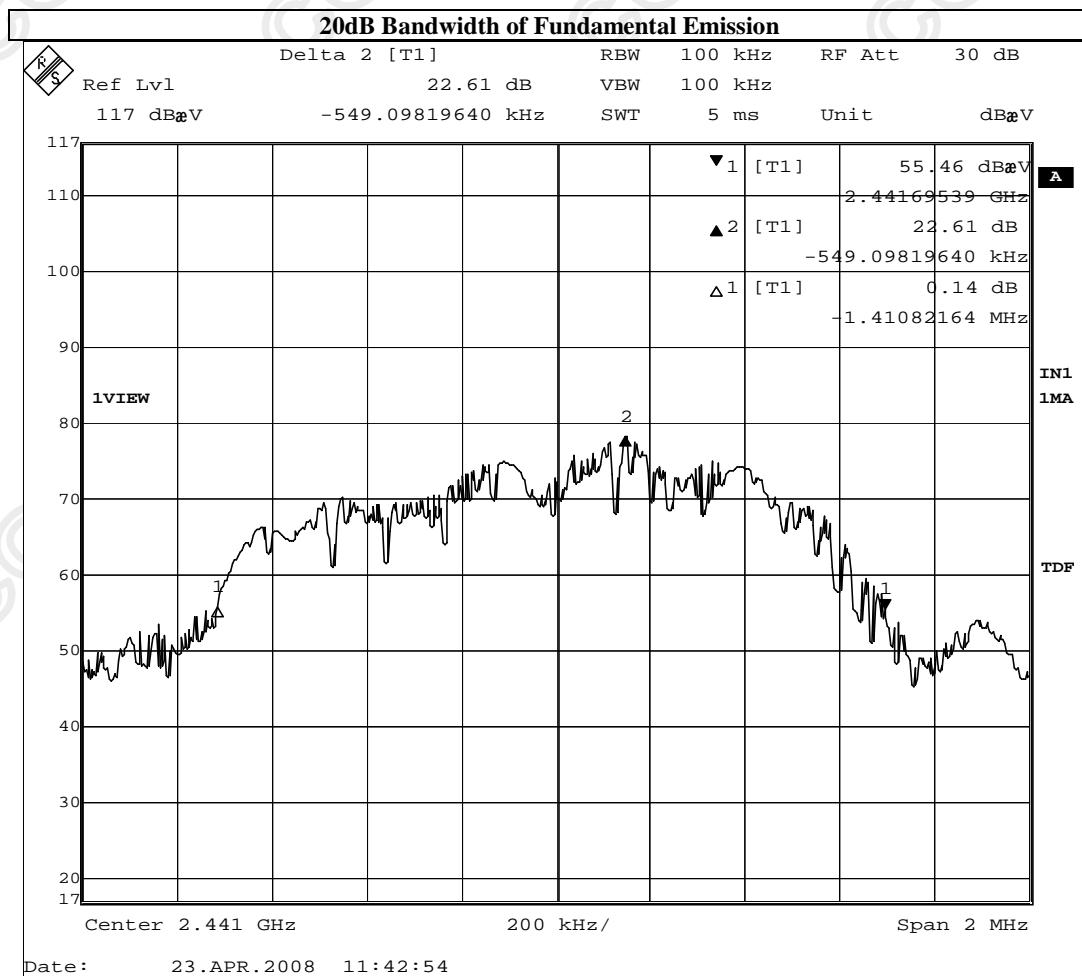
Date : 2008-09-05

Page 14 of 14

No. : HM162429

Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [GHz]	20dB Bandwidth [MHz]
2.441	1.410



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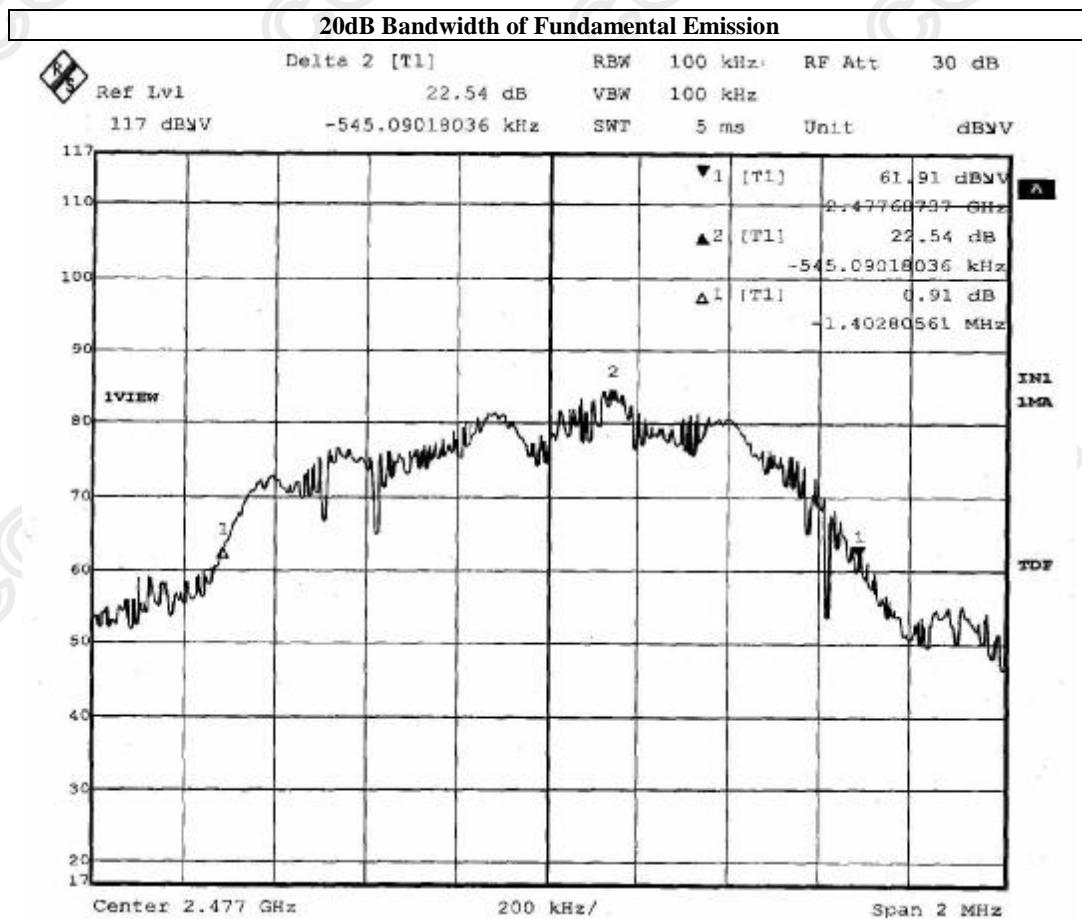
Date : 2008-09-05

Page 15 of 15

No. : HM162429

Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [GHz]	20dB Bandwidth [MHz]
2.477	1.403



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STC Test Report

Date : 2008-09-05

Page 16 of 16

No. : HM162429

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-Linggren	FACT-3	--	2006/05/02	2009/05/02
EM174	BICONILOG ANTENNA	EMCO	3142C	00029071	2008/01/24	2009/01/24
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

Ancillary Equipment

ITEM NO.	DESCRIPTION	MODEL NO.	FCC ID	REMARK
1	IPOD NANO	A1137	N/A	Serial No.: SU603KHUSZB, Part No.: MA004HK/A
2	12V LEAD-ACID BATTERY	N/A	N/A	N/A
3	PHILIP SPEAKER L	N/A	N/A	N/A
4	PHILIP SPEAKER R	N/A	N/A	N/A
5	RCA SPEAKER L	N/A	N/A	N/A
6	RCA SPEAKER R	N/A	N/A	N/A

Remarks:-

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

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STC Test Report

Date : 2008-09-05

Page 17 of 17

No. : HM162429

Appendix B

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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STC Test Report

Date : 2008-09-05

Page 18 of 18

No. : HM162429

Photographs of EUT

Measurement of Radiated Emission Test Set Up



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