



STC Test Report

Date : 2011-03-23

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No. : MH184983

Applicant (C01729):

MASTER GOLD MANUFACTURING LTD
Flat A, 11/F., Hung Fuk Fty Bldg., 60 Hung To Rd., Kwun
Tong, Kln

Manufacturer:

CITYSPEED MFG.LTD
Flat C08 Feng Huang District. Fuyong Baoan Shenzhen

Description of Sample(s):

Product: WIRELESS SPEAKER SYSTEM FOR
IPOD + IPHONE
Brand Name: ILIVE
Model Number: ISP801B
FCC ID: ZBH801DOCK

Date Sample(s) Received:

2011-02-14

Date Tested:

2011-02-15 to 2011-03-08

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

Product:	WIRELESS SPEAKER SYSTEM FOR IPOD + IPHONE
Manufacturer:	CITYSPEED MFG.LTD
	Flat C08 Feng Huang District. Fuyong Baoan Shenzhen
Brand Name:	ILIVE
Model Number:	ISP801B
Input Voltage:	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: HNK075120U, Input: 100-240Va.c. 50/60Hz 0.5A, Output: 7.5Vd.c. 1A.

1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is a MASTER GOLD MANUFACTURING LTD, WIRELESS SPEAKER SYSTEM FOR IPOD + IPHONE, it is Audio System, modulation by IC; and type is frequency hopping speed spectrum Modulation.

1.3 Date of Order

2011-02-14

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2011-03-04

1.6 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 C63.4:2003 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
Output Power of Fundamental Emissions	FCC 47CFR 15.247(b)(1)	ANSI C63.4:2003	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RF Conduct Spurious Emission	FCC 47CFR 15.247(c)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Spurious Emissions	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AC Mains Conducted Emissions	FCC 47CFR 15.207	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of Operating Channel	FCC 47CFR 15.247(a)(2)(b)(1)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Band-edge compliance of Conducted Emission	FCC 47CFR 15.247©	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Channel Separation	FCC 47CFR 15.247(a)(1)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pseudorandom Hopping Algorithm	FCC 47CFR 15.247(a)(1)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RF Exposure compliance	FCC 47CFR 1.1307, 2.1091, 2.1093	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time of Occupancy	FCC 47CFR 15.247(a)(1)(iii)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20dB Bandwidth	FCC 47CFR 15.247(a)(2)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Antenna requirement	FCC 47CFR 15.203	N/A	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 Maximum Peak Output Power

Test Requirement:	FCC 47CFR 15.247(b)(1)
Test Method:	N/A
Test Date:	2011-03-01
Mode of Operation:	Tx mode

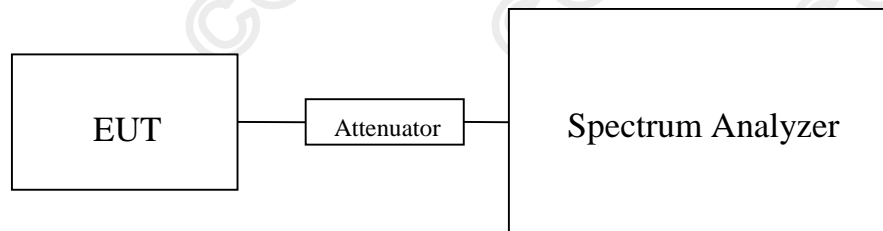
Test Method:

The RF output of the EUT was connected to the spectrum analyzer. All the attenuation or cable loss will be added to the measured maximum output power. The results are recorded in dBm.

Spectrum Analyzer Setting:

RBW = 3 MHz, VBW = 3MHz, Sweep = Auto, Span = 10MHz
Detector = Peak, Trace = Max. hold

Test Setup:



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Limits for Peak Output Power of Fundamental & Harmonics Emissions [FCC 47CFR 15.247]:

The maximum peak output power shall not exceed the following limits:
For frequency hopping systems employing at least 75 hopping channels: 1 Watt
For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 Watts
For Digital Transmission systems in 2400-2483.5 MHz Band: 1 Watt

Results of Tx Mode (2404.0 MHz to 2476.0MHz) : Pass (TX Unit)

Maximum conducted output power

Transmitter Frequency (MHz)	Maximum conducted output power (mW)
2404	43.4

Transmitter Frequency (MHz)	Maximum conducted output power (mW)
2440	13.2

Transmitter Frequency (MHz)	Maximum conducted output power (mW)
2476	28.5

Limit: 0.125W (125.0mW)

Calculated measurement uncertainty : 30MHz to 1GHz 1.7dB
1GHz to 18GHz 1.7dB

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3.1.2 Radiated Emissions

Test Requirement: FCC 47CFR 15.209
Test Method: ANSI C63.4:2003
Test Date: 2011-03-03
Mode of Operation: Tx mode

Test Method:

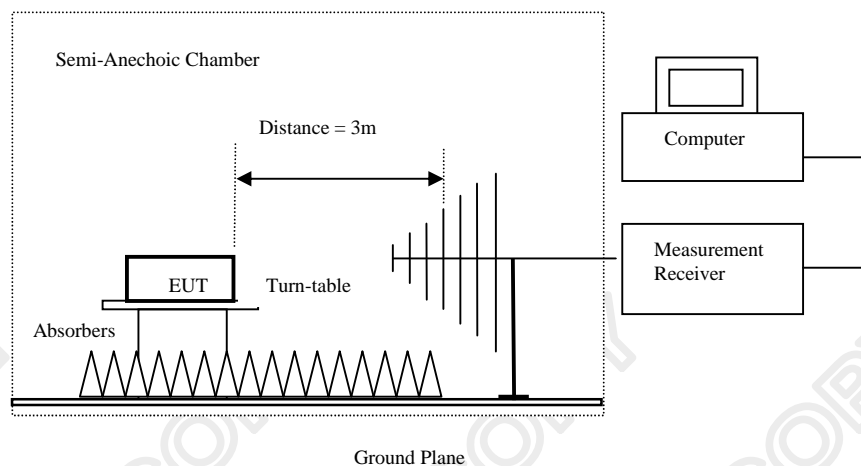
The sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, considered typical configuration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

Above 1GHz – RBW = 3 MHz, VBW = 3MHz,
Below 1GHz to 30MHz – RBW = 120kHz, VBW = 120kHz
Below 30MHz to 9kHz – RBW = 10kHz, VBW = 30kHz
Sweep = Auto, Span = Fully capture the emissions being measured, Detector = Peak,
Trace = Max. hold

Test Setup:



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

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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
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.

Result of Tx Mode (CH1) (9kHz – 30MHz): Pass

Emissions detected are more than 20 dB below the limit line(s)

Result of Tx Mode(CH1): Pass

Field Strength of Harmonic Emissions						
Peak Value						
Frequency	Measured	Correction	Field	Limit	Margin	E-Field
MHz	Level @ 3m dBμV	Factor dB/m	Strength dBμV/m	@ 3m dBμV/m	dBμV/m	Polarity
4808.0	7.9	41.9	49.8	74.0	-24.2	Horizontal
4808.0	12.8	41.9	54.7	74.0	-19.3	Vertical
7212.0	1.8	47.8	49.6	74.0	-24.4	Horizontal
7212.0	2.6	47.8	50.4	74.0	-23.6	Vertical

Field Strength of Harmonic Emissions						
Average Value						
Frequency	Measured	Correction	Field	Limit	Margin	E-Field
MHz	Level @ 3m dBμV	Factor dB/m	Strength dBμV/m	@ 3m dBμV/m	dBμV/m	Polarity
4808.0	0.4	41.9	42.3	54.0	-11.7	Horizontal
4808.0	5.3	41.9	47.2	54.0	-6.8	Vertical
7212.0	-5.7	47.8	42.1	54.0	-11.9	Horizontal
7212.0	-4.9	47.8	42.9	54.0	-11.1	Vertical

Remarks:

- * Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz 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.

Correction Factor included Antenna Factor and Cable Attenuation.

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

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

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Frequency Range	Quasi-Peak Limits
[MHz]	[$\mu\text{V/m}$]
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.

Result of Tx Mode (CH13) (9kHz – 30MHz): Pass

Emissions detected are more than 20 dB below the limit line(s)

Result of Tx Mode (CH13): Pass

Field Strength of Harmonic Emissions						
Peak Value						
Frequency	Measured	Correction	Field	Limit	Margin	E-Field
MHz	Level @ 3m	Factor	Strength	@ 3m		Polarity
	$\text{dB}\mu\text{V}$	dB/m	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
4880.0	8.1	42.0	50.1	74.0	-23.9	Horizontal
4880.0	12.6	42.0	54.6	74.0	-19.4	Vertical
7320.0	2.6	48.0	50.6	74.0	-23.4	Horizontal
7320.0	3.1	48.0	51.1	74.0	-22.9	Vertical

Field Strength of Harmonic Emissions						
Average Value						
Frequency	Measured	Correction	Field	Limit	Margin	E-Field
MHz	Level @ 3m	Factor	Strength	@ 3m		Polarity
	$\text{dB}\mu\text{V}$	dB/m	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
4880.0	0.6	42.0	42.6	54.0	-11.4	Horizontal
4880.0	5.1	42.0	47.1	54.0	-6.9	Vertical
7320.0	-4.9	48.0	43.1	54.0	-10.9	Horizontal
7320.0	-4.4	48.0	43.6	54.0	-10.4	Vertical

Remarks:

- * Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz 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.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
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 [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
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.

Result of Tx Mode (CH25) (9kHz – 30MHz): Pass

Emissions detected are more than 20 dB below the limit line(s)

Result of Tx Mode (CH25): Pass

Field Strength of Harmonic Emissions						
Peak Value						
Frequency MHz	Measured Level @ 3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @ 3m dBμV/m	Margin dBμV/m	E-Field Polarity
4952.0	9.2	42.0	51.2	74.0	-22.8	Horizontal
4952.0	11.6	42.0	53.6	74.0	-20.4	Vertical
7428.0	1.4	48.2	49.6	74.0	-24.4	Horizontal
7428.0	2.3	48.2	50.5	74.0	-23.5	Vertical

Field Strength of Harmonic Emissions						
Average Value						
Frequency MHz	Measured Level @ 3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @ 3m dBμV/m	Margin dBμV/m	E-Field Polarity
4952.0	1.7	42.0	43.7	54.0	-10.3	Horizontal
4952.0	4.1	42.0	46.1	54.0	-7.9	Vertical
7320.0	-6.1	48.2	42.1	54.0	-11.9	Horizontal
7320.0	-5.2	48.2	43.0	54.0	-11.0	Vertical

Remarks:

* Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000MHz 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.

Correction Factor included Antenna Factor and Cable Attenuation.

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

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

Frequency Range	Quasi-Peak Limits
[MHz]	[$\mu\text{V/m}$]
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.

Result of Rx Mode (9kHz – 30MHz): Pass

Emissions detected are more than 20 dB below the limit line(s)

Result of Rx Mode (Above 30MHz): Pass

Emissions detected are more than 20 dB below the limit line(s)

Result of Communication Mode With Speaker (Aux In Connection iPod): Pass

Field Strength of Fundamental Emissions						
Quasi-Peak Value						
Frequency	Measured	Correction	Field	Limit	Margin	E-Field
MHz	Level @ 3m	Factor	Strength	@ 3m		Polarity
	$\text{dB}\mu\text{V}$	dB/m	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
150.0	30.3	8.6	38.9	43.5	-4.6	Vertical
172.1	28.4	10.2	38.6	43.5	-4.9	Vertical
417.7	22.6	18.8	41.4	46.0	-4.6	Horizontal
516.0	23.1	20.1	43.2	46.0	-2.8	Horizontal
906.0	14.2	27.1	41.3	46.0	-4.7	Vertical
935.4	14.3	27.4	41.7	46.0	-4.3	Horizontal

Remarks:

- * Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz 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.

Correction Factor included Antenna Factor and Cable Attenuation.

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

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

Frequency Range	Quasi-Peak Limits
[MHz]	[$\mu\text{V/m}$]
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.

Result of Communication Mode With Speaker (iPod Play): Pass

Field Strength of Fundamental Emissions						
Quasi-Peak Value						
Frequency	Measured	Correction	Field	Limit	Margin	E-Field
MHz	Level @ 3m	Factor	Strength	@ 3m		Polarity
	$\text{dB}\mu\text{V}$	dB/m	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
72.7	29.1	5.4	34.5	40.0	-5.5	Vertical
150.0	30.1	8.6	38.7	43.5	-4.8	Vertical
172.1	28.0	10.2	38.2	46.0	-7.8	Vertical
417.7	23.5	18.8	42.3	46.0	-3.7	Horizontal
466.9	23.7	18.9	42.6	46.0	-3.4	Horizontal
516.1	20.3	20.1	40.4	46.0	-5.6	Horizontal

Remarks:

- * Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz 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.

Correction Factor included Antenna Factor and Cable Attenuation.

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

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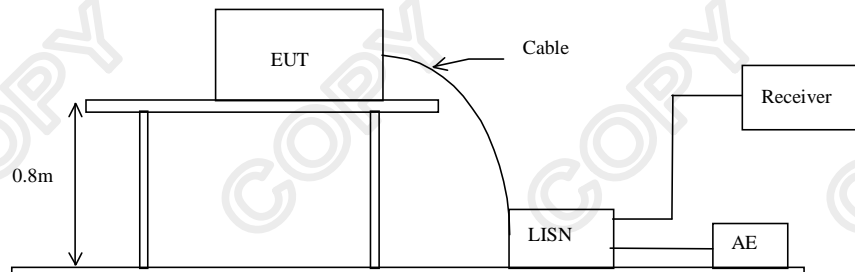
3.1.3 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC 47CFR 15.207
Test Method: ANSI C63.4:2003
Test Date: 2011-03-03
Mode of Operation: Communication Mode With Speaker (Aux In Connection iPod Mode / iPod Play 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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Limit for Conducted Emissions (FCC 47 CFR 15.207):

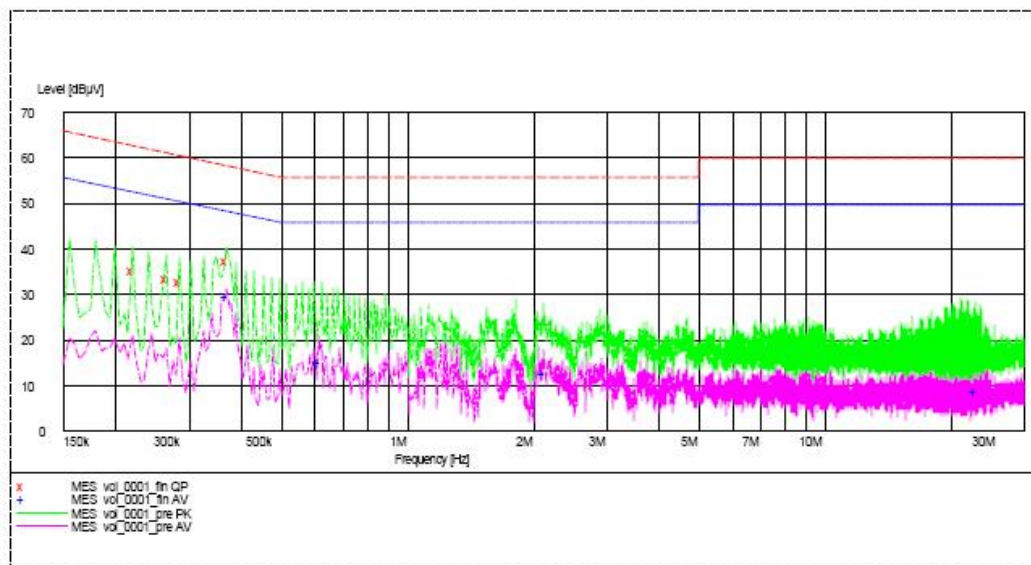
Frequency Range [MHz]	Quasi-Peak Limits [dBμV]	Average [dBμV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* 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 With Speaker (Aux In Connection iPod) (L): Pass

Please refer to the following diagram for individual results.



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Results of Communication Mode With Speaker (Aux In Connection iPod) (L): Pass

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Live	0.220	35.3	63.0	-*-	-*-
Live	0.265	33.5	61.0	-*-	-*-
Live	0.285	32.9	61.0	-*-	-*-
Live	0.370	37.4	59.0	29.5	49.0
Live	0.615	-*-	-*-	15.4	46.0
Live	2.130	-*-	-*-	12.7	46.0
Live	22.940	-*-	-*-	8.9	50.0

Remarks:

Calculated measurement uncertainty : 3.97dB

-*- Emission(s) that is far below the corresponding limit line.

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Limit for Conducted Emissions (FCC 47 CFR 15.207):

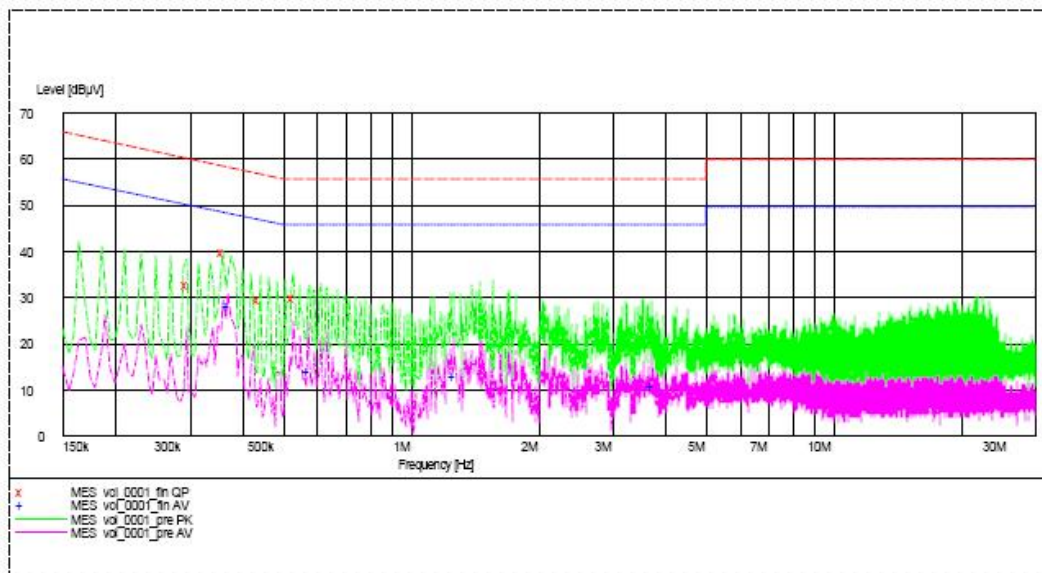
Frequency Range [MHz]	Quasi-Peak Limits [dBμV]	Average [dBμV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* 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 With Speaker (Aux In Connection iPod) (N): Pass

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Results of Communication Mode With Speaker (Aux In Connection iPod) (N): Pass

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Neutral	0.295	32.8	60.0	-*-	-*-
Neutral	0.360	39.8	59.0	-*-	-*-
Neutral	0.370	-*-	-*-	28.1	49.0
Neutral	0.440	39.5	57.0	-*-	-*-
Neutral	0.530	30.0	56.0	-*-	-*-
Neutral	0.570	-*-	-*-	14.3	46.0
Neutral	1.260	-*-	-*-	20.9	46.0
Neutral	3.715	-*-	-*-	11.1	46.0

Remarks:

Calculated measurement uncertainty : 3.97dB

-*- Emission(s) that is far below the corresponding limit line.

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Limit for Conducted Emissions (FCC 47 CFR 15.207):

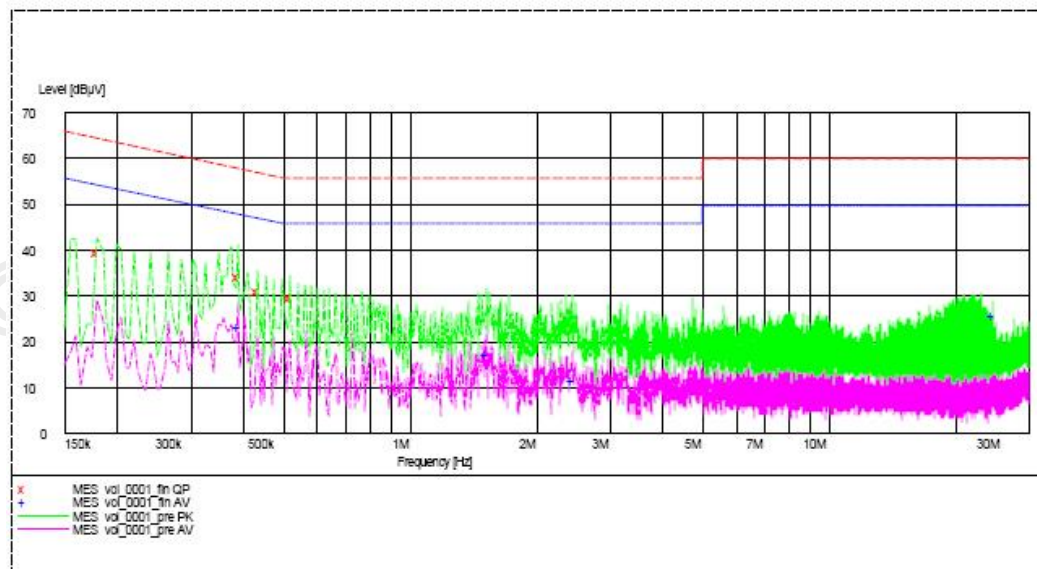
Frequency Range [MHz]	Quasi-Peak Limits [dBμV]	Average [dBμV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* 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 With Speaker (iPod Play) (L): Pass

Please refer to the following diagram for individual results.



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Results of Communication Mode With Speaker (iPod Play) (L): Pass

Conductor	Frequency MHz	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Live	0.180	39.5	65.0	-*-	-*-
Live	0.390	34.2	58.0	23.2	48.0
Live	0.435	31.1	57.0	-*-	-*-
Live	0.520	29.8	56.0	-*-	-*-
Live	1.530	-*-	-*-	17.2	46.0
Live	2.440	-*-	-*-	11.7	46.0
Live	24.575	-*-	-*-	25.7	50.0

Remarks:

Calculated measurement uncertainty : 3.97dB

-*- Emission(s) that is far below the corresponding limit line.

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Limit for Conducted Emissions (FCC 47 CFR 15.207):

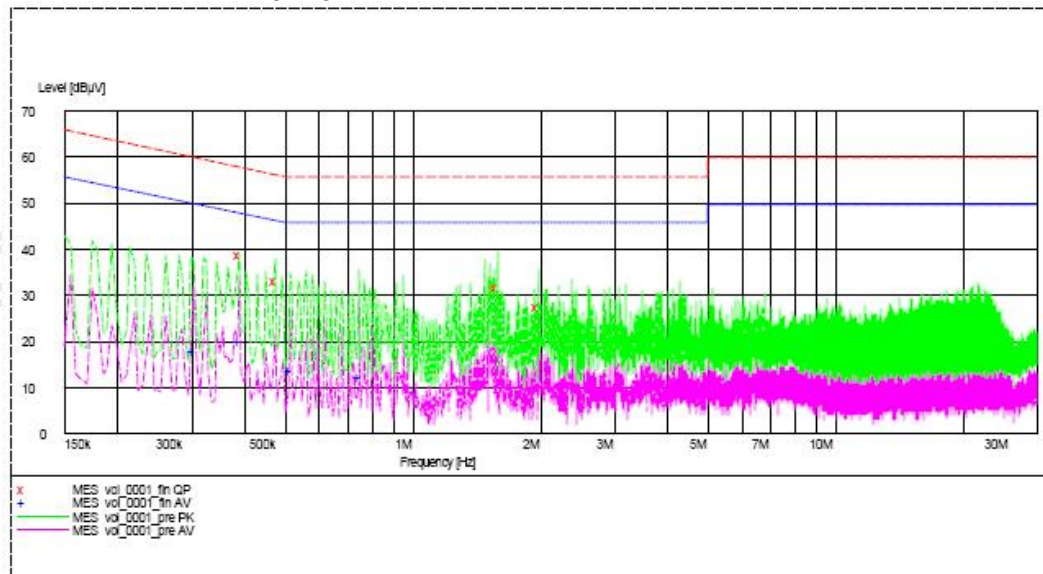
Frequency Range [MHz]	Quasi-Peak Limits [dBμV]	Average [dBμV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* 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 With Speaker (iPod Play) (N): Pass

Please refer to the following diagram for individual results.



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Results of Communication Mode With Speaker (iPod Play) (N): Pass

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Neutral	0.305	-*-	-*-	18.0	50.0
Neutral	0.390	38.7	58.0	20.3	48.0
Neutral	0.475	33.1	56.0	-*-	-*-
Neutral	0.515	-*-	-*-	13.8	46.0
Neutral	0.750	-*-	-*-	12.3	46.0
Neutral	1.590	31.6	56.0	-*-	-*-
Neutral	1.985	27.4	56.0	-*-	-*-

Remarks:

Calculated measurement uncertainty : 3.97dB

-*- Emission(s) that is far below the corresponding limit line.

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3.1.4 20dB Bandwidth Measurement

Test Requirement: FCC 47CFR 15.247(a)(1)
Test Method: ANSI C63.4:2003
Test Date: 2011-03-08
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.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.

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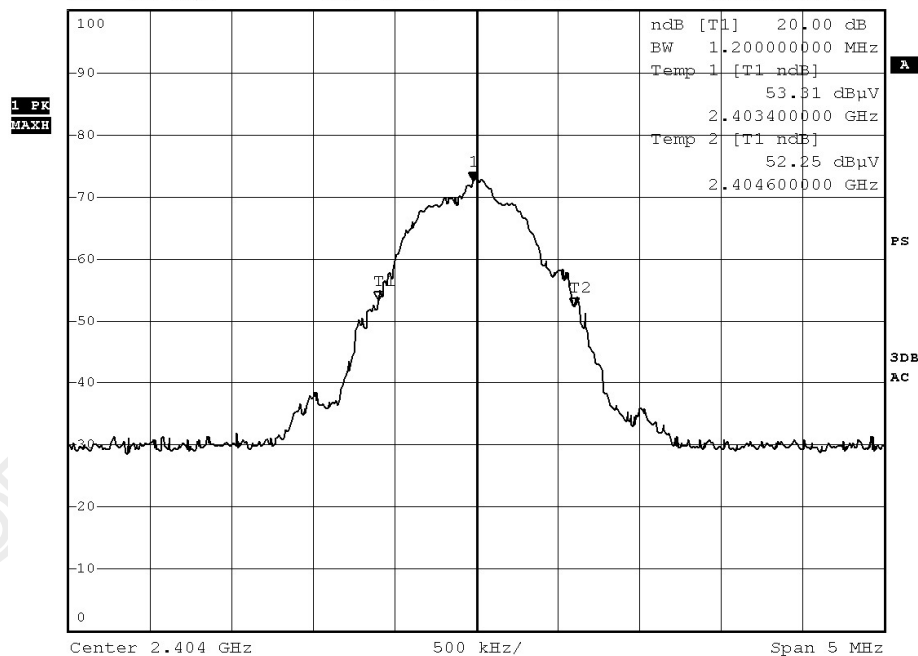
No. : MH184983

Fundamental Frequency [MHz]	20dB Bandwidth [kHz]	FCC Limits [MHz]
2403.98	1200	Within 2400-2483.5

(Lowest Operating Frequency)



*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz 72.67 dBuV
Ref 100 dBuV *Att 10 dB SWT 2.5 ms 2.403980000 GHz



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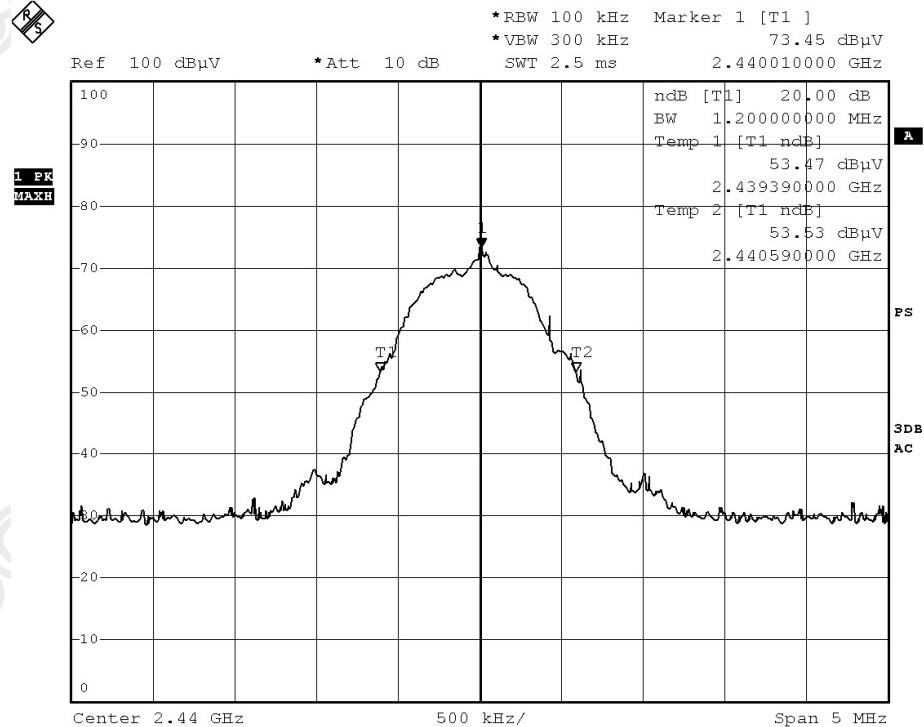
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Fundamental Frequency [MHz]	20dB Bandwidth [kHz]	FCC Limits [MHz]
2440.01	1200	Within 2400-2483.5

(Mid. Operating Frequency)



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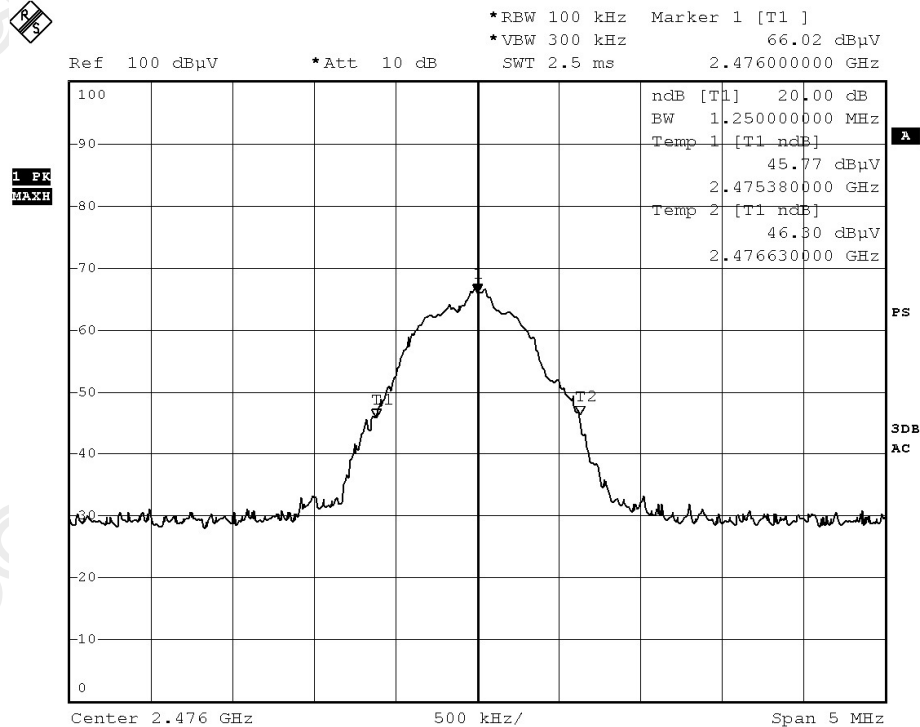
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Fundamental Frequency [MHz]	20dB Bandwidth [kHz]	FCC Limits [MHz]
2476.00	1250	Within 2400-2483.5

(Highest Operating Frequency)



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Channel Centre Frequency

Requirements:

Frequency hopping system in the 2400-2483.5MHz band shall use at least 15 non-overlapping channels.

Item	Frequency (MHz)	Item	Frequency (MHz)
1	2404	14	2443
2	2407	15	2446
3	2410	16	2449
4	2413	17	2452
5	2416	18	2455
6	2419	19	2458
7	2422	20	2461
8	2425	21	2464
9	2428	22	2467
10	2431	23	2470
11	2434	24	2473
12	2437	25	2476
13	2440	-	-

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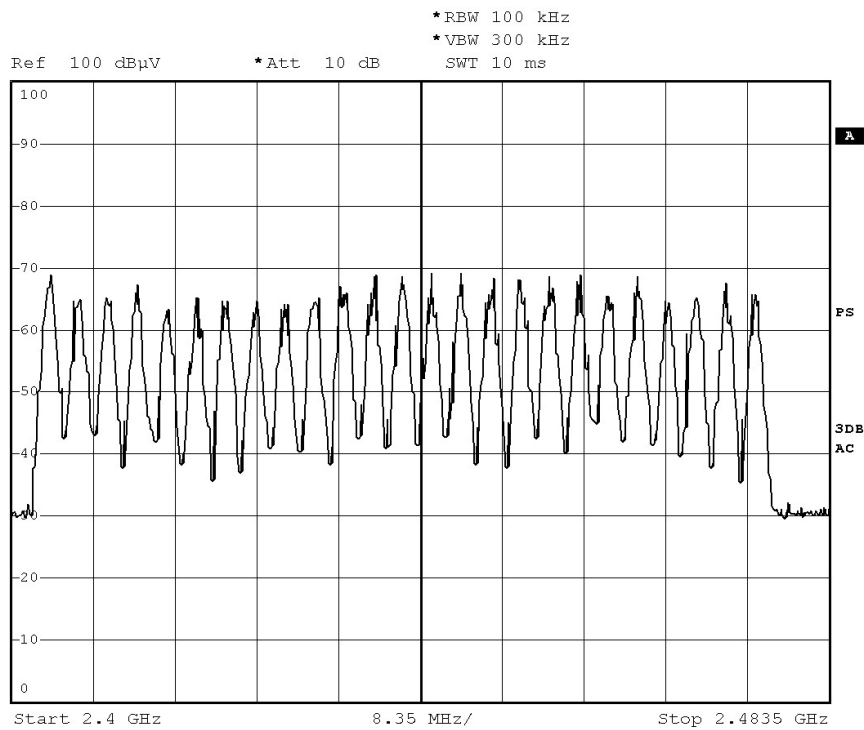
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Number of Hopping frequencies = 25 Channels



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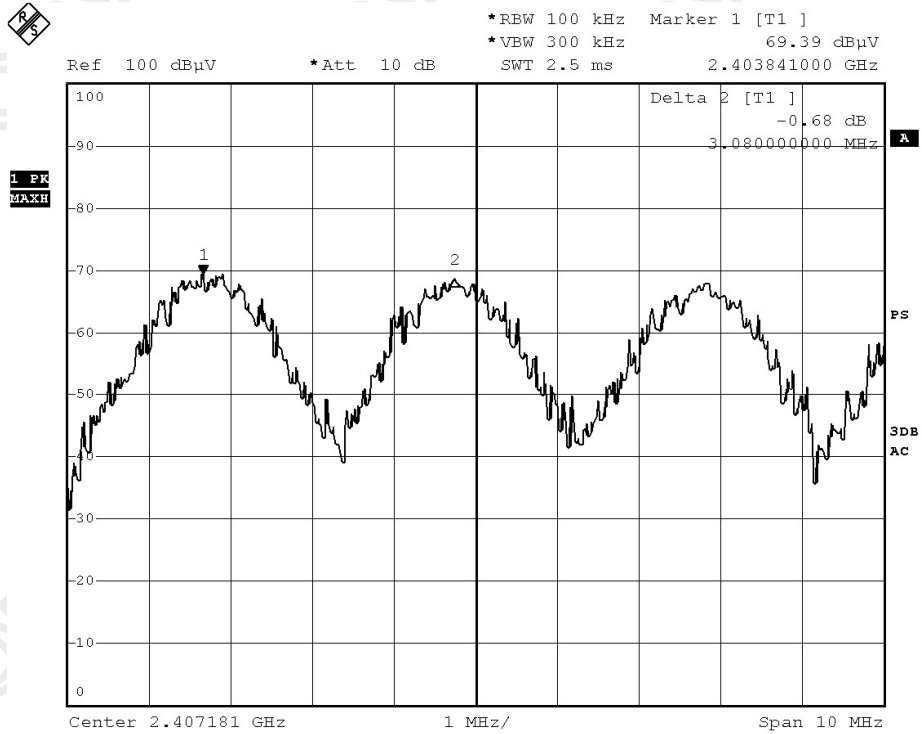
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Channel Separation (3080.0KHz)



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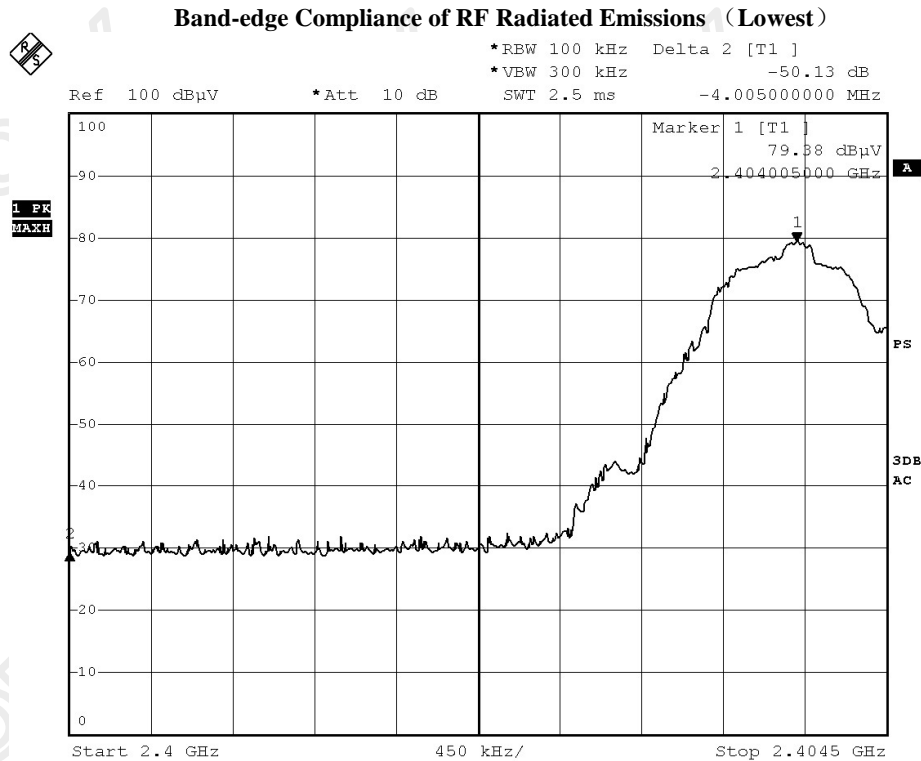


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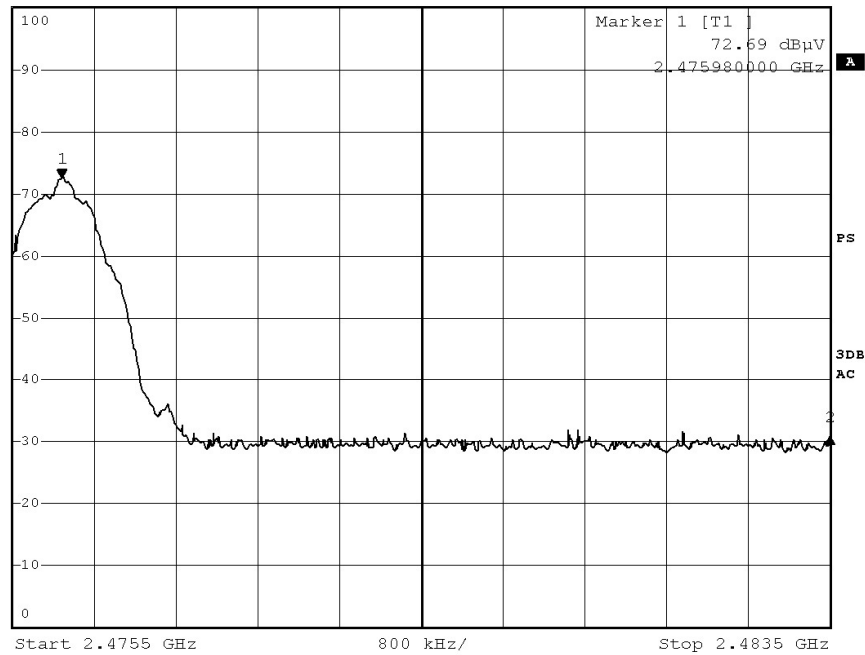
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Band-edge Compliance of RF Radiated Emissions (Highest)



Ref 100 dBμV *Att 10 dB *RBW 100 kHz Delta 2 [T1]
*VBW 300 kHz -41.73 dB
SWT 2.5 ms 7.520000000 MHz



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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 1 Antenna which is permanently attached to the main unit and attached on PCB board, the antenna gain = 2dBi. All component install on inside of EUT. User unable to remove or changed the Antenna.

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Pseudorandom Hopping Algorithm

Requirements:

The channel frequencies shall be selected from a pseudorandom ordered list of hopping frequencies. Each frequency must be used equally by the transmitter.

Pseudorandom Frequency Hopping

The embedded FHSS engine uses 25 hopping frequencies. Each channel frequency is selected from a pseudorandom ordered list of hopping frequencies, from 2404.0MHz to 2476.0MHz with separating in 1250.0 kHz apart from each of the channels. A single data frame is transmitted on each frequency location before skipping to the next hopping frequency in the list.

Typically, the initiation of an FHSS communication is as follows

1. The initiating party sends a request via a predefined frequency or control channel.
2. The receiving party sends a number, known as a seed back to the initiating party.
3. The initiating party sends a synchronization signal acknowledging to the receiving party as it has successfully established a transmission link.
4. The communication begins, and both the receiving and the sending party change their frequencies along an unpredictable hopping sequence with pseudorandom properties.

System Receiver Input Bandwidth

The receiver bandwidth is equal to the receiver bandwidth in the 25 hopping channel mode, which is 2000.0 kHz. The receiver bandwidth was verified during RF hopping to the relative channel.

Receiver Hopping Capability

The associated receiver has the ability to shift frequencies in synchronization with the transmitted signals, with they start connect with a same channel and then hop to next channel with a same formula among each other.

Occupancy Time

Requirements:

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channel employed.
No requirements for Digital Transmission System.

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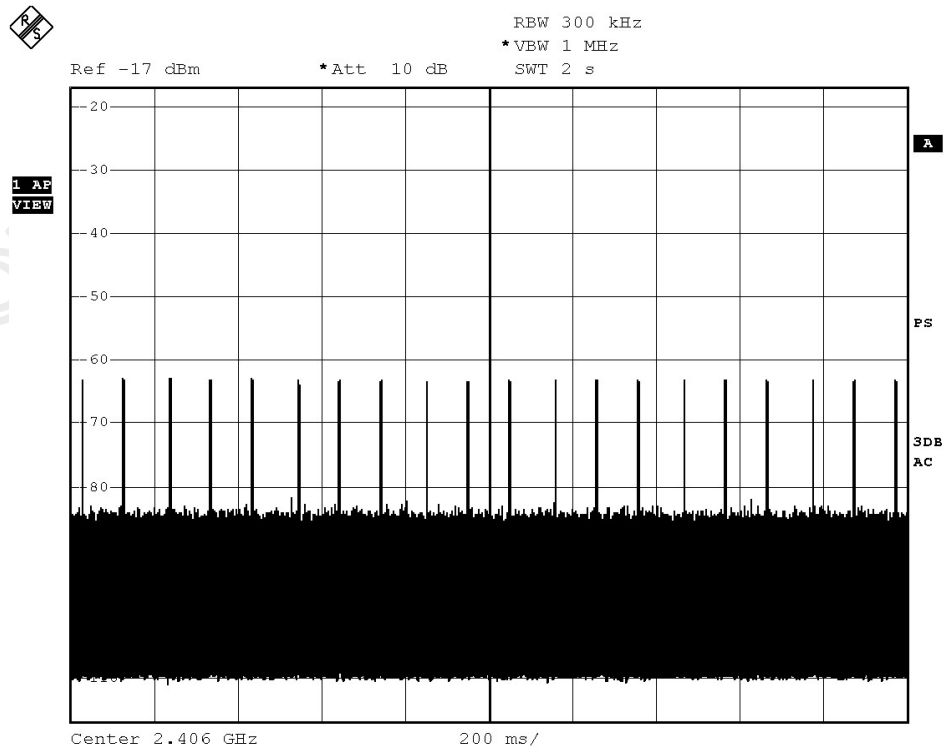
No. : MH184983

Measurement Data: Number of RF channel: 25
Observed duration of occupancy: $0.4 \times 25 = 10\text{s}$
Period observed: 2s
Duration of long burst: 1.88ms
Duration of short burst: $140\mu\text{s}$

Time of occupancy: $(20 \times 0.00188 + 20 \times 0.00014) / 2\text{s} \times 10 = 0.2$
See fig. A and B.

Remark: The Occupancy Time of the Lowest, Middle and Highest operating frequency has been examined and the worst case test result is recorded in this test report.

Fig. A Time between RF Burst



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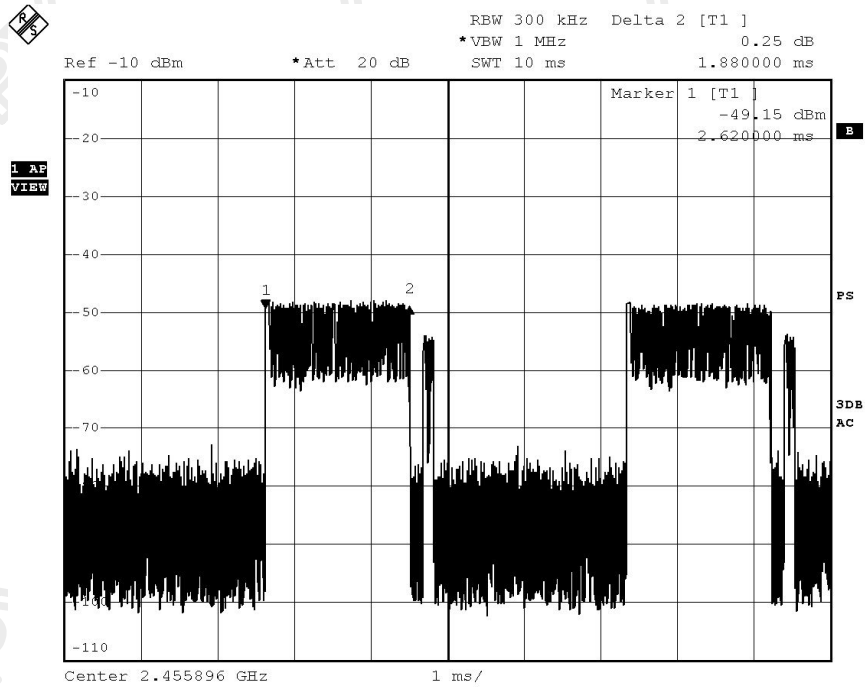
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Fig B . RF Burst



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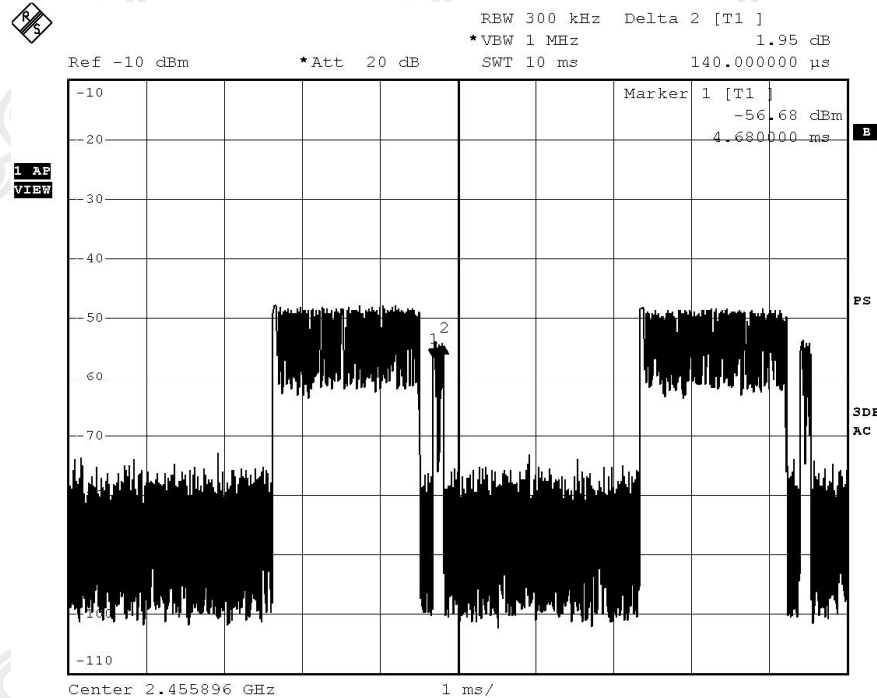
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Fig C . RF Burst



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RF Exposure

Test Requirement: FCC 47CFR 15.247(b)(5)
Test Date: 2011-3-03
Mode of Operation: Tx mode

Test Method:

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

Test Results:

The EUT complied with the requirement(s) of this section.
EUT meets the requirements of these sections as proven through MPE calculation
The MPE calculation for EUT @ 20cm
Based on the highest P = 43.4 mW

$$\begin{aligned} P_d &= PG / 4\pi R^2 = (43.4 \times 1.584) / 12.566 \times (20)^2 \\ &= (68.746) / 12.566 \times 400 = 68.746 / 5026.4 \\ &= 0.014 \text{ mW/cm}^2 \end{aligned}$$

where:

- * P_d = power density in mW/cm²
- * G = Antenna numeric gain (1.584); $\text{Log } G = g/10$ ($g = 2\text{dBi}$).
- * P = Conducted RF power to antenna (43.4 mW).
- * R = Minimum allowable distance.(20 cm)

- * The power density $P_d = 0.014 \text{ mW/cm}^2$ is less than 1 mW/cm^2 (listed MPE limit)
- * The SAR evaluation is not needed (this is a desk top device, $R > 20 \text{ cm}$)
- * The EUT(antenna) must be 0.2 meters away from the General Population.

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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	2009/09/11	2011/09/11
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNABLE	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
EM194	BICONILOG ANTENNA	EMCO	3142B	1795	2010/10/06	2012/10/06
EM219	BICONILOG ANTENNA	EMCO	3142C	00029071	2011/01/06	2013/01/06
EM229	EMI Test Receiver	R&S	ESIB40	100248	2010/11/02	2011/11/02
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2010/07/01	2011/07/01
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	Adapter	HNK075120U	N/A	Two pins (Live / Neutral) only adapter, Input: 100-240V a.c. 50/60Hz 0.5A, Output: 7.5V d.c. 1A.
2	iPod Player	A1236	N/A	N/A

The Hong Kong Standards and Testing Centre Ltd.

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Appendix B

Photographs of EUT

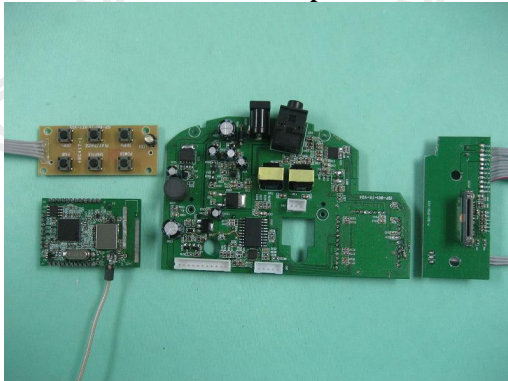
Front View of the product



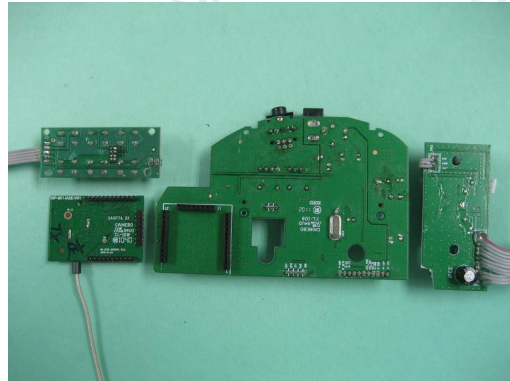
Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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Photographs of EUT

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Photographs of EUT

Measurement of Conducted Emission Test Set Up



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

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