



CTK Co., Ltd.  
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# CTK Co., Ltd.

386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea  
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## EMC TEST REPORT For FCC



Test Report No. : CTK-2013-01342

Date of Issue : 2013-09-02

Kind of Product : Wireless Headphones with Active Noise Cancelling

Basic Model/Type No. : CHORD MS 530

Variant Model/Type No. : -

Applicant : Cresyn Co., Ltd.

Applicant Address : 8-22, Jamwon-dong, Seocho-gu, Seoul, Korea

Manufacturer : Cresyn Co., Ltd.

Manufacturer Address : 8-22, Jamwon-dong, Seocho-gu, Seoul, Korea

Contact Person : Cho Yong-min

Telephone : +82-2-2041-2857

Received Date : 2013-08-20

Test period : Start : 2013-08-28 End : 2013-08-29

Test Results :  **In Compliance**  **Not in Compliance**

The test results presented in this report relate only to the object tested.

Tested by

Lee Eun-Won  
EMC Test Engineer  
Date: 2013-09-02

Reviewed by

Park Young-Joon  
EMC Technical Manager  
Date: 2013-09-02



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## REPORT REVISION HISTORY

Date	Revision	Page No
2013-09-02	Issued (CTK-2013-01342)	All

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## TABLE OF CONTENTS

REPORT REVISION HISTORY .....	2
1.0 General Product Description .....	4
1.1 Model Differences .....	4
1.2 Device Modifications.....	4
1.3 EUT Configuration(s).....	5
1.4 Test Software .....	5
1.5 EUT Operating Mode(s) .....	5
1.6 Configuration .....	6
1.7 Calibration Details of Equipment Used for Measurement .....	7
1.8 Test Facility.....	7
1.9 Measurement Procedure .....	7
1.10 Laboratory Accreditations and Listings.....	8
1.11 Measurement Uncertainty .....	8
2.0 EMC Test Regulations/Standards.....	9
3.0 Results of Individual Test.....	10
3.1 Conducted Voltage Emissions of Mains ports .....	10
3.2 Radiated Electric Field Emissions (Below 1 GHz).....	15
3.3 Radiated Electric Field Emissions (Above 1 GHz) .....	17
APPENDIX A - Test Setup Photos and Configuration.....	18
Conducted Voltage Emissions of Mains Ports.....	19
Radiated Electric Field Emissions (Below 1 GHz) .....	20
Radiated Electric Field Emissions (Above 1 GHz).....	21
APPENDIX B – EUT Photographs .....	22
EUT External Photographs.....	23
EUT Internal Photographs .....	25
PCB.....	26



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## 1.0 General Product Description

No.	ITEM	APPLICATION	
1	Kind of Product	Wireless Headphones with Active Noise Cancelling	
2	Basic Model/Type No.	CHORD MS 530	
3	Variant Model/Type No.	-	
4	Mobility	<input checked="" type="checkbox"/> Table-top <input type="checkbox"/> Floor-standing <input type="checkbox"/> Built-in <input checked="" type="checkbox"/> Portable	
5	Maximum Clock Frequency	26 MHz	
6	Electrical Ratings	Input:	5 Vdc, 300 mA
		Output:	-
7	Test Voltage / Frequency	Voltage:	120 Vac (Mains of Notebook)
		Frequency:	60 Hz

### 1.1 Model Differences

Not applicable

### 1.2 Device Modifications

The following modifications were necessary for compliance:

Not applicable



### 1.3 EUT Configuration(s)

See Appendix A for individual test set-up configuration(s). The following peripheral devices and/or interface cables were connected during the measurement:

Peripheral Devices

Device	Model No.	Serial No.	Manufacturer
Notebook	NT-R40	825K93ALC00051V	SAMSUNG
Adaptor	CPA09-002A	-	Hipro Electronics (Suzhou) Co., Ltd.

Cable Description

No.	From		To		Type of Cable		
	Device	I/O Port	Device	I/O Port	Length (m)	Shielded or Unshielded	Ferrite Core [Y/N]
1	EUT	Mini USB	Notebook	USB	0.8	S	N
2		Audio Jack	Notebook	Earphone	0.8	U	N
3	Notebook	DC IN	Adaptor	DC OUT	1.5	U	Y
4	Adaptor	AC Power	AC Mains	-	1.5	U	N

\* Shielded or Unshielded : Unshielded=U, Shielded=S

### 1.4 Test Software

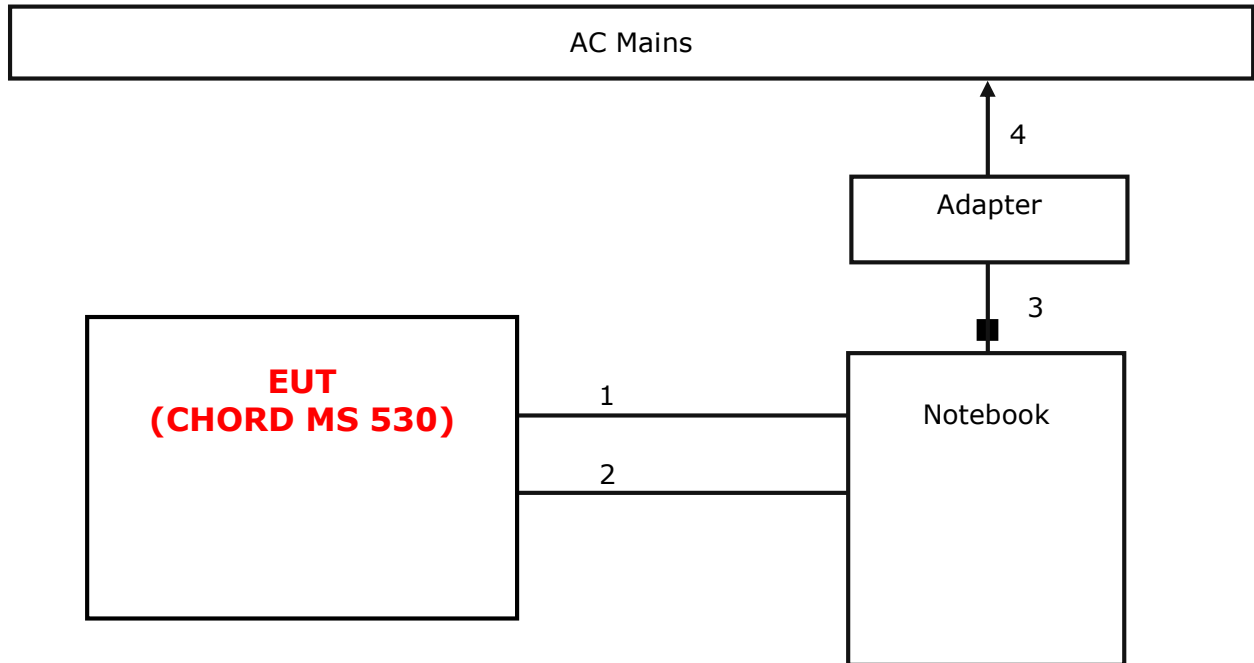
- EMC Test V 1.0
- Display Test Patterns - V1.5
- Ping.exe
- Not applicable

### 1.5 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

- USB Charging mode
- Music Playing mode

## 1.6 Configuration





## 1.7 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

## 1.8 Test Facility

The measurement facility is located at 386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## 1.9 Measurement Procedure

Preliminary AC power line conducted emissions tests were performed shielded room. To find worst mode, several typical mode and typical cable position were tested. Final AC power line conducted emissions test was performed shielded room. (location is same as Preliminary test)

Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

Preliminary radiated emissions test were performed Semi-Anechoic Chamber or anechoic chamber (Distance of antenna and EUT was 3 m). To find worst mode, several typical mode and typical cable position were tested and peak level and frequency were recorded.

Final radiated emissions test was performed Semi-Anechoic Chamber. Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

\* Measurement procedures was In accordance with ANSI C63.4-2009 7.3.3, 7.3.4, 8.3.1.1, 8.3.1.2, 8.3.2.1, 8.3.2.2

Note : These results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations.



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## 1.10 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 m & 10 m SAC and Conducted Test Site to perform FCC Part 15/18 measurements	 805871
JAPAN	VCCI	3 m & 10 m SAC and Conducted Test Site	 C-986, T-1843, R-3627, G-387
KOREA	KCC	EMI (3 m & 10 m SAC and Conducted Test Site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and Interruptions)	 No. 51, KR0025

## 1.11 Measurement Uncertainty

Compliance of the product is based on the measured value.

However, the measurement uncertainty is included for information purposes.

The measurement uncertainties given below are based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

Measurement Type	Frequency Range	Expanded Uncertainty
Conducted Emission	150 kHz to 30 MHz	$\pm 2.66$ dB (C.L.: Approx. 95 %, $k=2$ )
Radiated Emission	30 MHz to 1000 MHz	$\pm 3.66$ dB (C.L.: Approx. 95 %, $k=2$ )
Radiated Emission	1 GHz Above	$\pm 4.16$ dB (C.L.: Approx. 95 %, $k=2$ )





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## 2.0 EMC Test Regulations/Standards

The tests were performed according to following regulations:

Applied standard	Title	Applied	Test Result
FCC Part 15 Subpart B <input type="checkbox"/> Class A <input checked="" type="checkbox"/> Class B	Conducted Voltage Emissions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> MET <input type="checkbox"/> NOT MET
	Radiated Electric Field Emissions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> MET <input type="checkbox"/> NOT MET



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## 3.0 Results of Individual Test

### 3.1 Conducted Voltage Emissions of Mains ports

**Test Date**

2013-08-29

**Test Location**

Shielded Room

**Test Equipment**

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESCI7	Rohde & Schwarz	100816	2013-12-14	<input checked="" type="checkbox"/>
LISN	ENV216	Rohde & Schwarz	101235	2014-08-02	<input checked="" type="checkbox"/>
LISN	ENV216	Rohde & Schwarz	101236	2014-08-02	<input type="checkbox"/>
EMI Test Receiver	ESR7	Rohde & Schwarz	101088	2014-08-02	<input type="checkbox"/>
LISN	ENV216	Rohde & Schwarz	101151	2013-11-09	<input type="checkbox"/>
LISN	ESH3-Z5	Rohde & Schwarz	100207	2013-11-09	<input type="checkbox"/>
EMI Test Receiver	ESCI3	Rohde & Schwarz	100032	2014-02-04	<input type="checkbox"/>
LISN	ENV216	Rohde & Schwarz	101150	2014-02-04	<input type="checkbox"/>
LISN	3825/2	EMCO	9607-2575	2014-07-12	<input type="checkbox"/>

**Test Software**

ESCI7, ESCI3 : EMC32 Ver. 8.50.0

ESHS30 : ESxS-K1 ver. 2.12

**Frequency Range of Measurement**

150 kHz to 30 MHz

**Instrument Setting**

IF Band Width: 9 kHz

**Climate Condition**

Temperature: (22 ± 1) °C

Relative Humidity: (48 ± 1) %

Atmospheric Pressure: 98 kPa

**Test Result**

The requirements are:  MET  NOT MET

Frequency (MHz)	Measured Data (dBµV)	Margin (dB)	Remark
0.190 500	41.6	12.4	Average

The Result is calculated by using the following formula;

\* Result = Limit - Margin (Result included the correction factor)

\* Correction factor = Cable Loss + Insertion loss of LISN



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## Test Data

[Line: L1]

Test

1 / 2

# Test Report

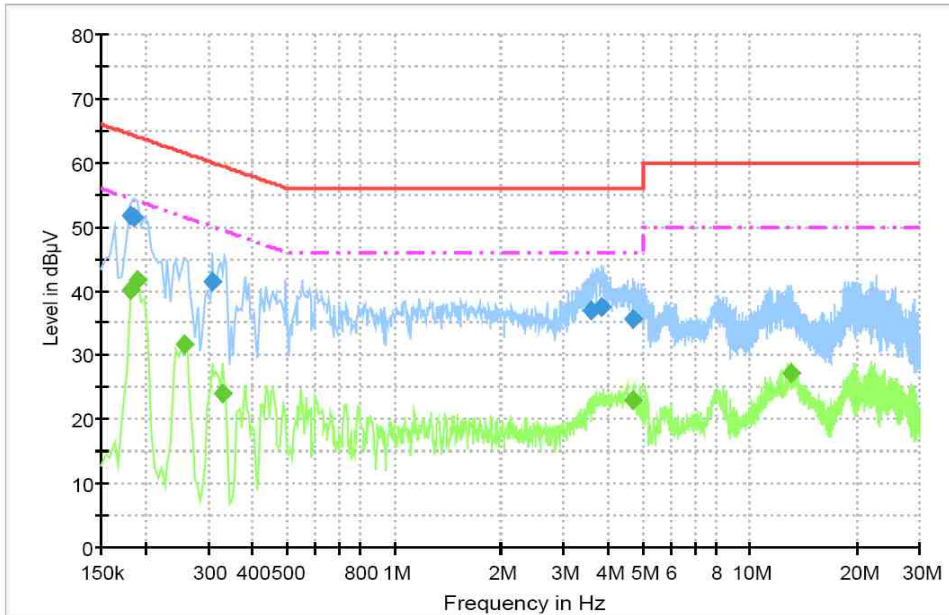
## Common Information

Test Model Name:	CHORD MS530
Test Mode:	Charging mode
Manufacturer:	CRESYN
Tester:	LEE EUN-WON

## Hardware Setup: EMI conducted\Voltage with ENV216\_FO(101235) - [EMI conducted]

Subrange 1	
Frequency Range:	150 kHz - 30 MHz
Receiver:	ESCI 7 [ESCI 7] @ GPIB0 (ADR 20), SN 100816/007, FW 4.42
Signal Path:	ESCI 7-ENV216 FO(101235) FW 1.0 Correction Table: 3CE Cable Loss
LISN:	ENV216 FO(101235) Correction Table (Line 0): ENV216_FO_N(101235) Correction Table (Line 1): ENV216_FO_L1(101235)

3CE\_CISPR 22 Class B\_L1



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Test

2 / 2

## Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.181500	51.8	1000.0	9.000	On	L1	10.0	12.7	64.4
0.186000	51.4	1000.0	9.000	On	L1	10.0	12.8	64.2
0.307500	41.6	1000.0	9.000	On	L1	10.0	18.5	60.0
3.561000	37.0	1000.0	9.000	On	L1	9.7	19.0	56.0
3.826500	37.4	1000.0	9.000	On	L1	9.7	18.6	56.0
4.699500	35.8	1000.0	9.000	On	L1	9.7	20.2	56.0

## Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.181500	40.2	1000.0	9.000	On	L1	10.0	14.2	54.4
0.190500	41.6	1000.0	9.000	On	L1	10.0	12.4	54.0
0.258000	31.7	1000.0	9.000	On	L1	9.9	19.8	51.5
0.330000	24.1	1000.0	9.000	On	L1	10.1	25.4	49.5
4.699500	23.1	1000.0	9.000	On	L1	9.7	22.9	46.0
13.029000	27.2	1000.0	9.000	On	L1	9.8	22.8	50.0

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[Line : Neutral]

Test

1 / 2

## Test Report

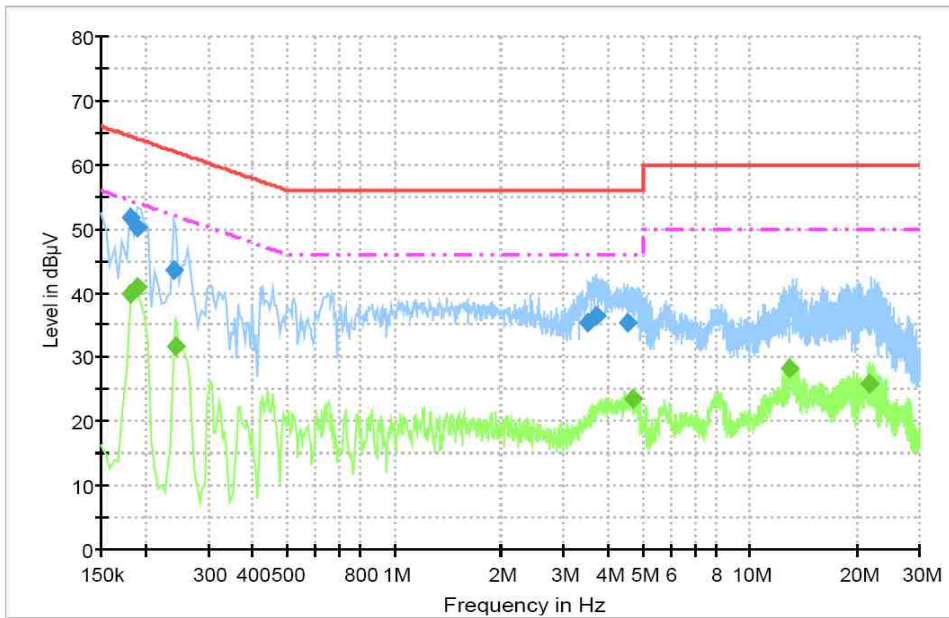
### Common Information

Test Model Name:	CHORD MS530
Test Mode:	Charging mode
Manufacturer:	CRESYN
Tester:	LEE EUN-WON

### Hardware Setup: EMI conducted Voltage with ENV216\_FO(101235) - [EMI conducted]

Subrange 1	
Frequency Range:	150 kHz - 30 MHz
Receiver:	ESCI 7 [ESCI 7] @ GPIB0 (ADR 20), SN 100816/007, FW 4.42
Signal Path:	ESCI 7-ENV216 FO(101235) FW 1.0 Correction Table: 3CE Cable Loss
LISN:	ENV216 FO(101235) Correction Table (Line 0): ENV216_FO_N(101235) Correction Table (Line 1): ENV216_FO_L1(101235)

3CE\_CISPR 22 Class B\_N



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Test

2 / 2

## Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.181500	51.9	1000.0	9.000	On	N	10.0	12.6	64.4
0.190500	50.1	1000.0	9.000	On	N	10.0	13.9	64.0
0.240000	43.7	1000.0	9.000	On	N	9.9	18.4	62.1
3.511500	35.5	1000.0	9.000	On	N	9.7	20.5	56.0
3.691500	36.6	1000.0	9.000	On	N	9.7	19.4	56.0
4.515000	35.5	1000.0	9.000	On	N	9.7	20.5	56.0

## Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.181500	39.9	1000.0	9.000	On	N	10.0	14.5	54.4
0.190500	41.0	1000.0	9.000	On	N	10.0	13.0	54.0
0.244500	31.6	1000.0	9.000	On	N	9.9	20.3	51.9
4.681500	23.4	1000.0	9.000	On	N	9.7	22.6	46.0
12.948000	28.3	1000.0	9.000	On	N	9.8	21.7	50.0
21.534000	25.8	1000.0	9.000	On	N	9.9	24.2	50.0

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## 3.2 Radiated Electric Field Emissions (Below 1 GHz)

### Test Date

2013-08-28

### Test Location

10 m SAC (test distance :  10 m,  3 m)

### Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESCI7	Rohde & Schwarz	100814	2013-12-14	<input checked="" type="checkbox"/>
Trilog Broadband Antenna	VULB 9161 SE	SCHWARZBECK	9161-4133	2014-06-11	<input checked="" type="checkbox"/>
6dB Attenuator	DNF	Rohde & Schwarz	272.4110.50	2013-11-09	<input checked="" type="checkbox"/>
Amplifier	310	Sonoma Instrument Co.	291721	2014-03-21	<input checked="" type="checkbox"/>

### Test Software

TOYO EMI software Ver. 5.1.0

### Frequency Range of Measurement

30 MHz to 1 GHz

### Instrument Setting

IF Band Width: 120 kHz

### Climate Condition

Temperature: (21 ± 1) °C

Relative Humidity: (52 ± 1) %

Atmospheric Pressure: 98 kPa

### Test Result

The requirements are:  MET  NOT MET

Frequency (MHz)	Measured Data (dBµV/m)	Margin (dB)	Remark
70.255	34.3	5.7	Quasi-peak

The Result is calculated by using the following formula;

\* Result = Reading + Correction factor

\* Correction factor = Antenna Factor + Cable Loss + 6 dB attenuator – Amp Gain



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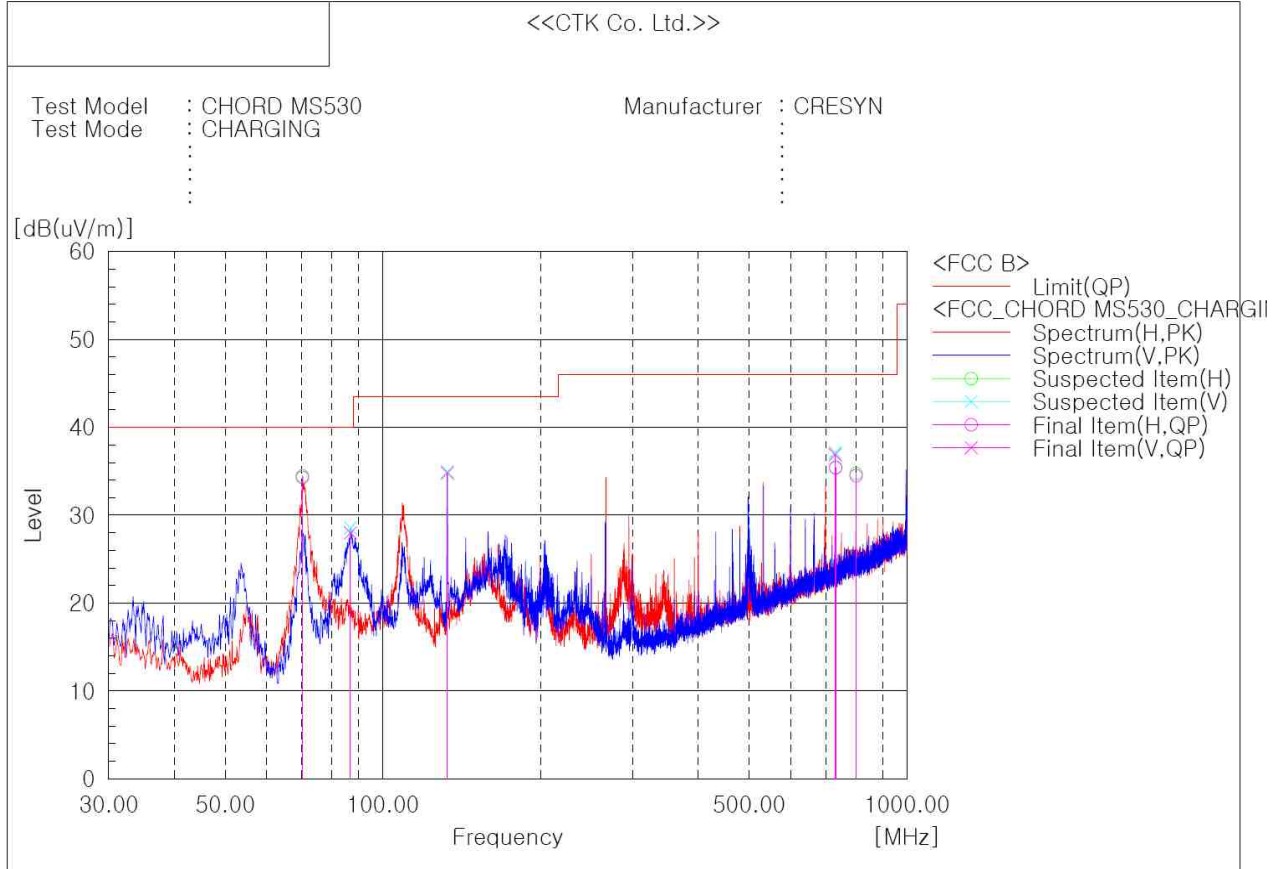
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## Test Data



### Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	70.255	H	49.9	-15.6	34.3	40.0	5.7	400.0	70.0
2	86.745	V	42.6	-14.6	28.0	40.0	12.0	100.0	0.0
3	132.820	V	44.6	-9.8	34.8	43.5	8.7	100.0	107.0
4	729.976	V	37.1	-0.2	36.9	46.0	9.1	100.0	219.0
5	731.553	H	35.6	-0.2	35.4	46.0	10.6	210.0	71.0
6	800.059	H	33.6	0.9	34.5	46.0	11.5	100.0	8.0





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## 3.3 Radiated Electric Field Emissions (Above 1 GHz)

### Test Date

Not Applicable

### Test Location

3 m SAC

### Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESU40	Rohde & Schwarz	100336	2014-06-27	<input type="checkbox"/>
Double Ridged Guide Antenna	3115	ETS-Lindgren	78895	2015-02-28	<input type="checkbox"/>
Preamplifier	8449B	Agilent Technologies	3008A02307	2013-11-09	<input type="checkbox"/>

### Test Software

TOYO EMI software Ver. 5.1.0

### Frequency Range of Measurement

1 GHz to 6 GHz

### Instrument Setting

IF Band Width: 1 MHz

### Climate Condition

Temperature:

Relative Humidity:

Atmospheric Pressure:

### Test Result

The requirements are:  MET  NOT MET

Frequency (MHz)	Measured Data (dB $\mu$ V/m)	Margin (dB)	Remark

The Result is calculated by using the following formula;

\* Result = Reading + Correction factor

\* Correction factor = Antenna Factor + Cable Loss- Amp Gain

### Test Data



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## APPENDIX A - Test Setup Photos and Configuration



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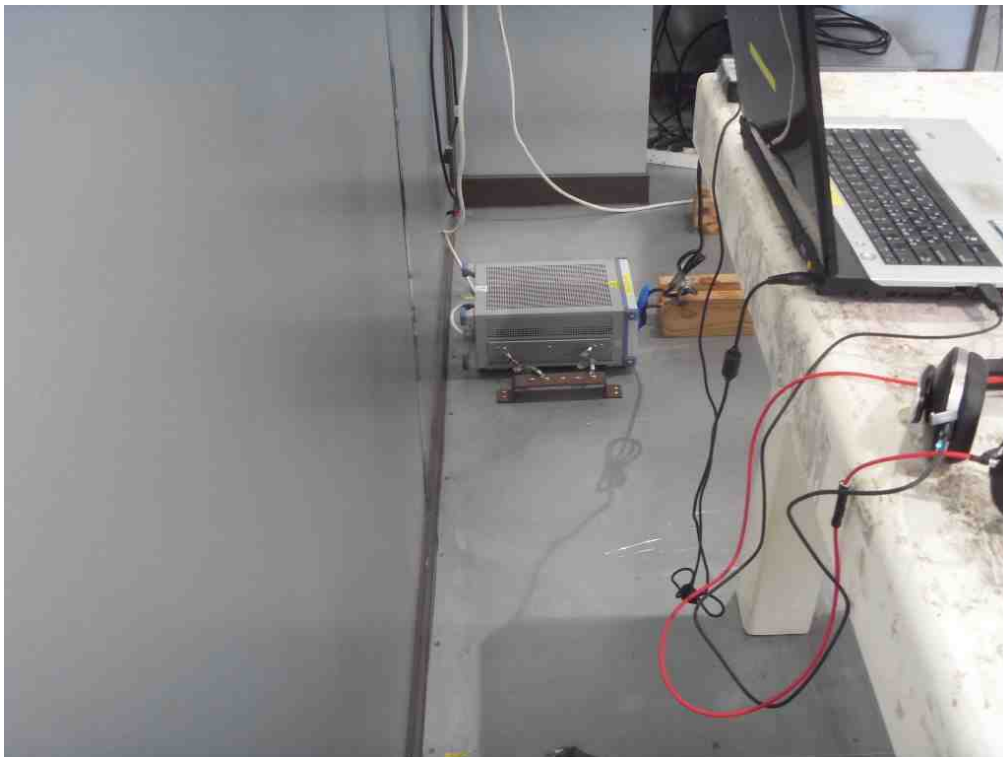
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## Conducted Voltage Emissions of Mains Ports





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## Radiated Electric Field Emissions (Below 1 GHz)





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### Radiated Electric Field Emissions (Above 1 GHz)

*Not Applicable*



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## **APPENDIX B – EUT Photographs**



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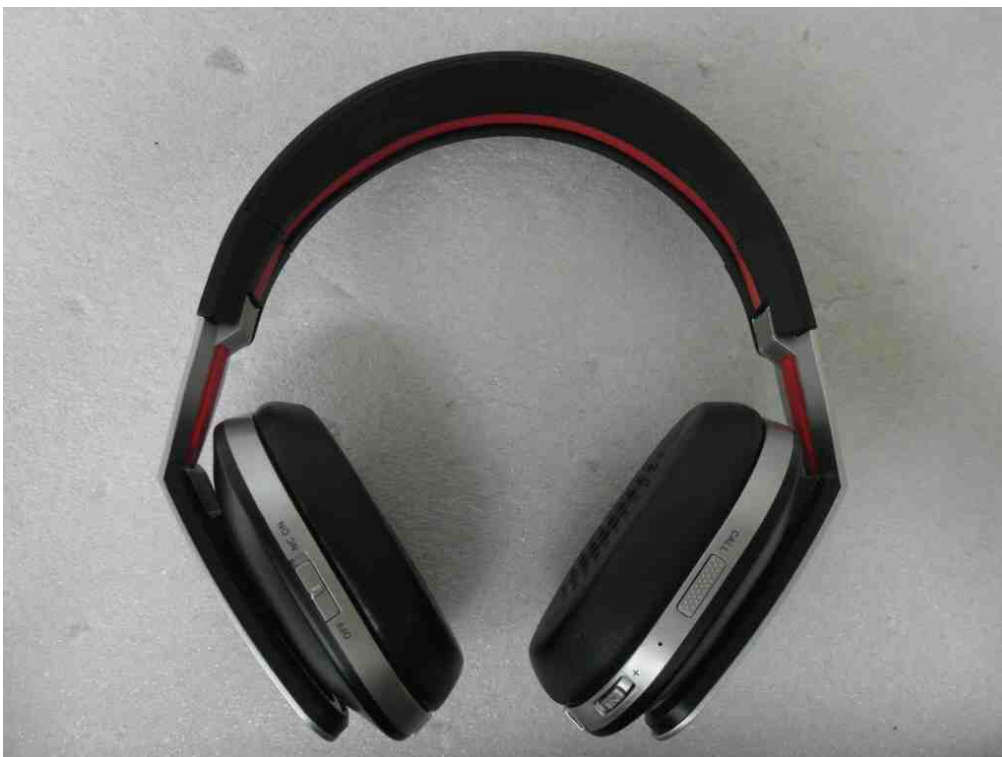
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### EUT External Photographs





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## PCB





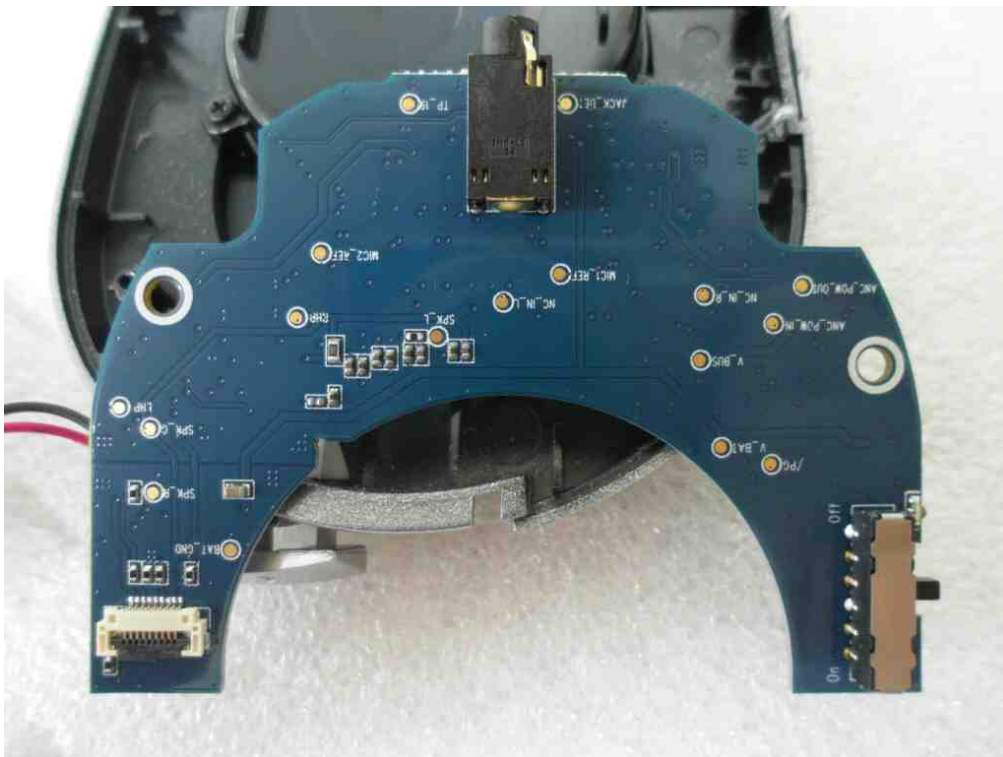
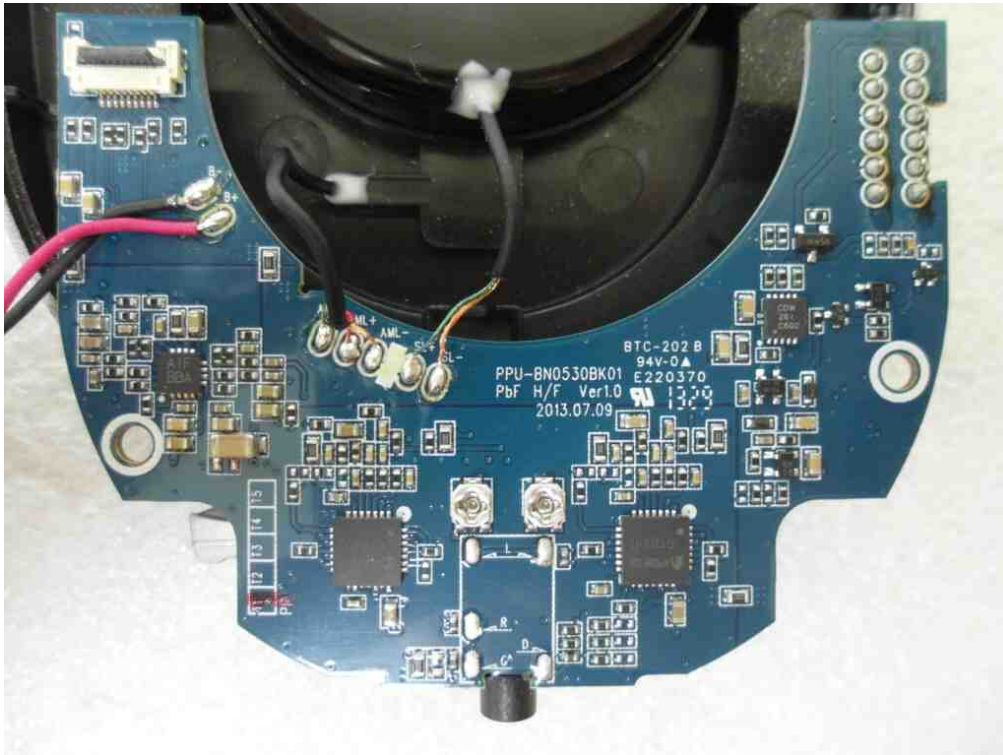
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