

Prüfbericht - Nr.:	14012038 002		Seite 1 von 11		
Test Report No.	Page 1 of 11				
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Gegenstand der Prüfung: Test item	<b>Transmitter of Magnetic Field Wireless Neckband Headphone</b>				
Bezeichnung: Identification	MF401	Serien-Nr.: Serial No.	Engineering sample		
Wareneingangs-Nr.: Receipt No.	060126054	Eingangsdatum: Date of receipt	26.01.2006		
Prüfort: Testing location	<b>TÜV Rheinland Hong Kong Ltd.</b> Unit 8, 25 <sup>th</sup> Floor, Skyline Tower, 39 Wang Kwong Road, Kowloon Bay Kowloon, Hong Kong				
	<b>Hong Kong Productivity Council</b> HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong				
Prüfgrundlage: Test specification	<b>FCC Part 15, Subpart C</b>				
Prüfergebnis: Test Result	<b>Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage.</b> The above mentioned product was tested and <b>passed</b> .				
geprüft / tested by:	kontrolliert / reviewed by:				
06.04.2006	Derek Leung Project Manager		06.04.2006	Thomas Berns Senior Project Manager	
Datum Date	Name Name	Unterschrift Signature	Datum Date	Name Name	Unterschrift Signature
Sonstiges: Other Aspects	<b>FCC ID:REDMF400-001T</b>				
Abkürzungen: OK, Pass, P Fail, F N/A N/T	= entspricht Prüfgrundlage = entspricht nicht Prüfgrundlage = nicht anwendbar = nicht getestet		Abbreviations: OK, Pass, P = passed Fail, F = failed N/A = not applicable N/T = not tested		
<p><b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b></p> <p>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicate in extracts. This test report does not entitle to carry any safety mark on this or similar products.</p>					

## Test Summary

### Radiated Emissions of Carrier Frequencies

*Result: Pass*

### Spurious Radiated Emissions

*Result: Pass*

### Conducted Emission Test

*Result: Not Applicable*

## Contents

<b>List of Test and Measurement Instruments.....</b>	<b>4</b>
<b>General Product Information.....</b>	<b>5</b>
Product Function and Intended Use.....	5
Ratings and System Details .....	5
Independent Operation Modes.....	6
Submitted Documents .....	6
Related Submittal(s) Grants .....	6
<b>Test Set-up and Operation Mode.....</b>	<b>7</b>
Principle of Configuration Selection .....	7
Test Operation and Test Software.....	7
Special Accessories and Auxiliary Equipment .....	7
Countermeasures to achieve EMC Compliance.....	7
<b>Test Methodology .....</b>	<b>8</b>
Radiated Emission .....	8
Conducted Emission.....	8
<b>Test Results .....</b>	<b>9</b>
Radiated Emission of Carrier Frequency	Section 15.205 & 15.209 .....
Spurious Radiated Emissions Section 15.209 .....	10
Conducted Emission Test Section 15.207 .....	11
<b>Appendix 1: Test Results</b>	
<b>Appendix 2: Test Setup</b>	
<b>Appendix 3: EUT External Photo</b>	
<b>Appendix 4: EUT Internal Photo</b>	
<b>Appendix 5: FCCID Label, Block Diagram, Schematics , User manual and Bill of Material</b>	

## List of Test and Measurement Instruments

Kind of Equipment	Manufacturer	Type	S/N
Test Receiver	Rohde & Schwarz	ESVS30	842807/009
Biconical Antenna	Rohde & Schwarz	HK116	841489/015
Log.-Periodic Antenna	Rohde & Schwarz	HL223	841516/017
Active Loop Antenna	EMCO	6502	9107-2651
Spectrum Analyzer	Rohde & Schwarz	FSP30	1093.4495K30

## General Product Information

### Product Function and Intended Use

The transmitter (Model: MF401) is a magnetic field wireless neckband headphone system operating at 2 channels (13.56 MHz & 14.65 MHz) with auto-switching. A stereo analog audio signal is input to the transmitter and converted by an on-board ADC, to a signal digital audio stream. The transmitter then encodes the audio stream and transmitting the audio signal to the associated wireless neckband headphone receiver (MF102).

Frequency switching mechanism: The default operating frequency of a paired devices is 14.65MHz, when another paired devices close the them ( i.e. within 1-2 m range), the original pair of transmitter and receiver will be shifted to 13.56MHz by the transmitter change its frequency and it also commands the receiver to change the frequency. When the interferer move away or powered off, the original pair will switch the frequency back to 14.65MHz. The detection of the co-channel interference (14.65MHz) is done by the transmitter of which periodically scan the environment.

**FCC ID: REDMF400-001T**

### Ratings and System Details

Operated Frequencies :	13.56 MHz and 14.65 MHz
Number of channel :	1 for each frequency
Type of antenna :	Integral antenna x1: TDK Ferrite core Q5F (E2D5x6x50mm), part No.:33-05E2D5x6x50
Power supply :	Battery operated 3.7 Volt (Internal rechargeable battery-Lithium Ion)
Port :	A.C. mains charging port by AC/DC adapter
Charger adapter :	Brand: Technics. Model: TEAD-28-050150U. Input: AC120V, 60Hz, 3.0W Output: DC5V, 150mA.

## Independent Operation Modes

The basic operation mode :

- transmits audio signal (i.e. music) to the associated wireless headset.

For further information refer to User Manual

## Submitted Documents

The submitted documents are listed as follow:

- Circuit diagram
- Block diagram
- User manual
- FCC ID label

## Related Submittal(s) Grants

This is a single application for certification of the transmitter.

## Test Set-up and Operation Mode

### Principle of Configuration Selection

**Emission:** The test was performed under normal operating mode to obtain the maximum emission

### Test Operation and Test Software

Test operation should refer to test methodology.

- There was no special software to exercise the device.

### Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

- none

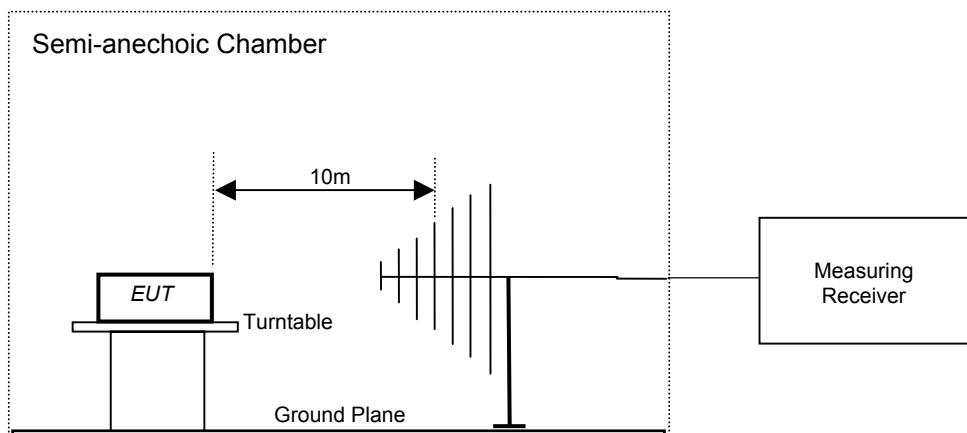
### Countermeasures to achieve EMC Compliance

- none

## Test Methodology

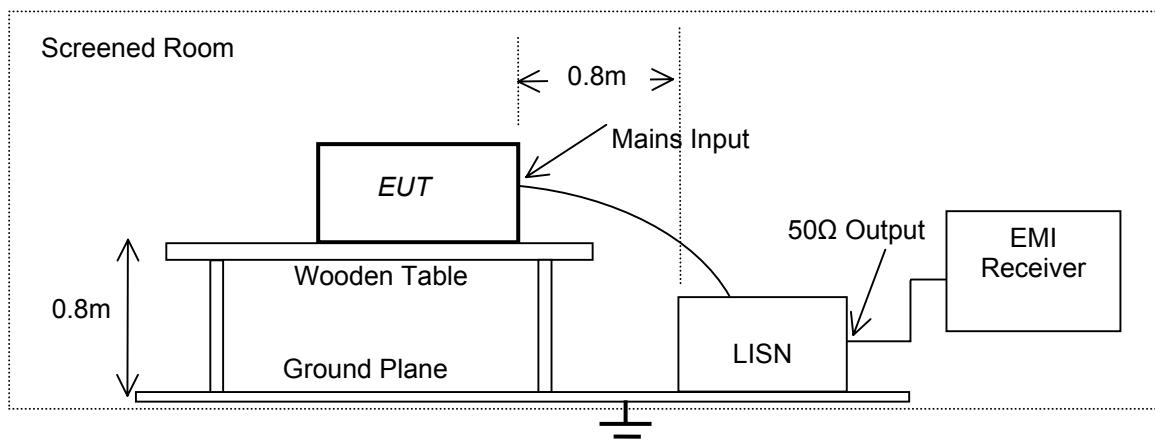
### Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.4-2003. The equipment under test (EUT) was placed at the middle of the 80 cm height turntable, and the turntable is 10 meters far from the measuring antenna. The EUT was tested in three orthogonal planes and the turntable was rotated 360° for obtaining the maximum emission. The antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement below 30MHz was performed by a loop antenna, maximum emission was obtained by varying the two antenna polarizations of the loop antenna faced and sided to the EUT.



### Conducted Emission

The equipment under test (EUT) was placed on a wooden table 80cm above the ground plane, the LISN was place 80cm away from the EUT. 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 20dB 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 Results

### Radiated Emission of Carrier Frequency

### Section 15.205 & 15.209

#### RESULT:

Pass

Test Specification : FCC Part 15 Section 15.205 & 15.209  
 Test Method : ANSI C63.4-2003  
 Measurement Location : Semi Anechoic Chamber  
 Measurement BW : 10 kHz  
 Detector : Peak  
 Supply Voltage : Battery operated 3.7Volt  
 Fundamental Frequencies : 13.56MHz and 14.65MHz

Fundamental Signal (MHz)	Antenna Polarization	Limit at 30m (dB $\mu$ V/m)	Limit at 10m (dB $\mu$ V/m)	Field Strength at 10m (dB $\mu$ V/m)	Margin (dB)
13.56	Loop face to EUT	29.5	48.6	39	9.6
14.65	Loop face to EUT	29.5	48.6	36.2	12.4

#### Remarks:

Peak detection was used instead of QP detection for the measurements. Peak values should be higher or equal to QP values.

Conversion of limit at 30m to limit at 10m:  $20 \log\left(\frac{30}{10}\right)^2 = 19.1dB$

## Spurious Radiated Emissions

## Section 15.209

### RESULT:

Pass

Test Specification	:	FCC Part 15 Section 15.209
Test Method	:	ANSI C63.4-2003
Measurement Location	:	Semi Anechoic Chamber
Detector Function	:	QP
Supply Voltage	:	Battery operated 3.7Volt
Measuring Frequency Range	:	9kHz – 330MHz(Up to 10 <sup>th</sup> harmonic of the internal crystal oscillator frequency-32.768MHz)
Measuring Distance	:	10m

Fundamental Carrier Signal (MHz)	Spurious Emission (MHz)	Antenna Polarization	Field Strength at 10m (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
13.56	67.328	Vertical	26.1	29.55	3.45
14.65	73.758	Vertical	28.2	29.55	1.35
	103.272	Vertical	28.7	33.07	4.4
	44.252	Horizontal	15.2	29.55	14.35
	73.75	Horizontal	15.9	29.55	13.65
	103.28	Horizontal	21.2	33.07	11.87

### Section 15.209

Radiated emissions, which fall in the restricted bands, as defined in Section 15.205(a), was also comply with the radiated emission limits specified in Section 15.209.

### Limit for Radiated Emission under Section 15.209:

Frequency (MHz)	Field strength ( $\mu$ V/m) at 3m	Field strength (dB $\mu$ V/m) at 3m	Field strength (dB $\mu$ V/m) at 10m
30-88	100	40.00	29.55
88-216	150	43.52	33.07
216-960	200	46.00	35.50

## Conducted Emission Test

## Section 15.207

### RESULT:

Not Applicable

Since the AC power line only for charging purpose and the EUT does not operate during charging process, according to 15.207(c) the conducted emission is exempted.