

Reason Products LLC

Application
For
Certification

Wireless Headset

(FCC ID: RDA444-UNLEASH)

03123681
TL/Ann Choy
November 26, 2003

- The test results reported in this report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
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FCC ID: RDA444-UNLEASH

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List of attached file

Exhibit type	File Description	filename
Test Report	Test Report	report.pdf
Operation Description	Technical Description	descri.pdf
Test Setup Photo	Radiated Emission for Base	config photos.doc
Test Setup Photo	Radiated Emission for Headset	config photos.doc
External Photo	External Photo	external photos.doc
Internal Photo	Internal Photo	internal photos.doc
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
User Manual	FCC Information	fcc information.pdf

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EXHIBIT 1 GENERAL DESCRIPTION

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1.0 **General Description**

1.1 Product Description

The UNLEASH is a Wireless Headset operated at 13.560MHz with a fully integrated Time Division Duplexed (TDD) digital communications system for mobile phone. Base unit and headset are powered by 2.4VDC 40mA Ni-MH rechargeable battery, and they have an unique charging case for charging and pairing purposes. The main function of the Equipment Under Test (EUT) is to transmit and receive a Gaussian Minimum Shift Keyed (GMSK) modulated signal between the base unit and headset after the base unit connects to the mobile phone.

The base unit has volume up and volume down buttons, and the headset has a flash button which is used to control pick/release a call.

The antennas used in base unit and headset are integral, and the tested sample is a prototype.

The circuit description is saved with filename: descri.pdf

The EUT was found to comply with the Subpart C general requirement of FCC Part 15.

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1.2 Related Submittal(s) Grants

This is an Application for Certification of a wireless headset system. Two transmitters are included in this Application. This specific report details the emission characteristics of each transmitter.

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The open area test site used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

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EXHIBIT 2 SYSTEM TEST CONFIGURATION

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2.0 **System Test Configuration**

2.1 Justification

For emission testing, the equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions. The headset was powered by a fully charged battery.

For the measurements, the EUT is attached to a plastic stand if necessary and placed on the wooden turntable. If the base unit attaches to peripherals, they are connected and operational (as typical as possible). The headset is remotely located as far from the antenna and the base as possible to ensure full power transmission from the base. Else, the base is wired to transmit full power with modulation.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater. The spurious emissions more than 20 dB below the permissible value are not reported.

2.2 EUT Exercising Software

The EUT exercise program used during radiated testing was designed to exercise the various system components in a manner similar to a typical use.

For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

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2.3 Support Equipment List and Description

The FCC ID's for all equipment, plus descriptions of all cables used in the tested system (included inserted cards, which have grants) are:

HARDWARE:

The unit was operated standalone. A rechargeable battery (2.4VDC 40mA Ni-MH) was used to power the device.

CABLES:

There is no special cable necessary for compliance of this product

OTHERS:

Motorola Mobile Phone
Model: V3688+
MSN: A286ZU7E95

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2.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

2.5 Equipment Modification

Any modifications installed previous to testing by Reason Products LLC will be incorporated in each production model sold/leased in the United States.

No modifications were installed by ETL Division, Intertek Testing Services Hong Kong Ltd.

All the items listed under section 2.0 of this report are confirmed by:

Confirmed by:

*Tommy Leung
Supervisor
Intertek Testing Services
Agent for Reason Products LLC*



Signature

29 November, 2003 Date

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EXHIBIT 3 EMISSION RESULTS

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3.0 **Emission Results**

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

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3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

where FS = Field Strength in dB μ V/m
 RA = Receiver Amplitude (including preamplifier) in dB μ V
 CF = Cable Attenuation Factor in dB
 AF = Antenna Factor in dB
 AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:-

$$FS = RR + LF$$

where FS = Field Strength in dB μ V/m
 RR = RA - AG in dB μ V
 LF = CF + AF in dB

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V/m	
AF = 7.4 dB	RR = 23.0 dB μ V
CF = 1.6 dB	LF = 9.0 dB
AG = 29.0 dB	
FS = RR + LF	
FS = 23 + 9 = 32 dB μ V/m	

Level in μ V/m = Common Antilogarithm [(32 dB μ V/m)/20] = 39.8 μ V/m

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3.2 Radiated Emission Configuration Photograph - Base Unit

Worst Case Radiated Emission

at 40.680 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: config photos.doc

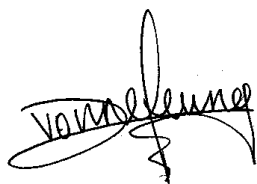
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3.3 Radiated Emission Data - Base Unit

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 3.4 dB

TEST PERSONNEL:



Tester Signature

Yvonne Leung, Engineer
Typed/Printed Name

29 November, 2003
Date

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Company: Reason Products LLC
Model: UNLEASH
Mode : TX

Date of Test: August 22-September 20, 2003

Radiated Emissions (Base Unit)

Table 1

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Calculated Net at 30m (dB μ V/m)	Limit at 30m (dB μ V/m)	Margin (dB)
V	13.56	50.7	16	9.3	44.0	4.0	29.5	-25.5
V	27.12	45.6	16	6.6	36.2	-3.8	29.5	-33.3

Table 2

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	40.680	40.9	16	11.7	36.6	40.0	-3.4
V	54.240	34.3	16	11.7	30.0	40.0	-10.0
V	67.800	36.3	16	8.5	28.8	40.0	-11.2
V	81.360	36.3	16	6.7	27.0	43.5	-16.5

- NOTES: 1. Quasi-peak detector is used for the emission below or equal to 1000MHz.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9kHz to 140MHz.

Test Engineer: Yvonne Leung

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3.4 Radiated Emission Configuration Photograph - Headset

Worst Case Radiated Emission

at 40.680 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: config photos.doc

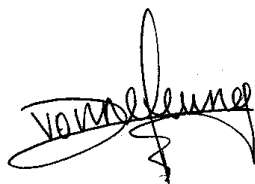
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3.5 Radiated Emission Data - Headset

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 3.7 dB

TEST PERSONNEL:



Tester Signature

Yvonne Leung, Engineer
Typed/Printed Name

29 November, 2003
Date

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Company: Reason Products LLC
Model: UNLEASH
Mode : TX

Date of Test: August 22-September 20, 2003

Radiated Emissions (Headset)

Table 3

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Calculated Net at 30m (dB μ V/m)	Limit at 30m (dB μ V/m)	Margin (dB)
V	13.56	44.4	16	9.3	37.7	-2.3	29.5	-31.8
V	27.12	37.4	16	6.6	28.0	-12.0	29.5	-41.5

Table 4

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	40.680	40.6	16	11.7	36.3	40.0	-3.7
V	54.240	32.9	16	11.7	28.6	40.0	-11.4
V	67.800	37.5	16	8.5	30.0	40.0	-10.0
V	81.360	38.3	16	6.7	29.0	43.5	-14.5

- NOTES: 1. Quasi-peak detector is used for the emission below or equal to 1000 MHz.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9kHz to 140MHz.

Test Engineer: Yvonne Leung

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EXHIBIT 4 EQUIPMENT PHOTOGRAPHS

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4.0 **Equipment Photographs**

For electronic filing, the photographs are saved with filename: external photos.doc & internal photos.doc

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EXHIBIT 5 PRODUCT LABELLING

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5.0 **Product Labelling**

For electronic filing, the FCC ID label artwork and location is saved with filename:
label.pdf

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EXHIBIT 6 TECHNICAL SPECIFICATIONS

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6.0 **Technical Specifications**

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

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EXHIBIT 7 INSTRUCTION MANUAL

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7.0 **Instruction Manual**

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf

Please note that the required FCC Information to the User is saved with filename: fcc information.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.