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TEST REPORT

Report No.: 14061366HKG-002R1

The Whistler Group

Application
For
Certification
(Original Grant)
(FCC ID: HSXSC10)

Class B Personal Computers and Peripherals

This report supersedes previous report with report number 14061366HKG-002 dated August 29, 2014

Prepared and Checked by:

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Signed On File
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Date: September 01, 2014

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GENERAL INFORMATION

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Contact Person:	Michael Batten
Tel:	800-457-6888 Ext. 3
Fax:	479-273-2927
e-mail:	N/A
Manufacturer:	Radix Telecom Phils., Industries Inc.
Manufacturer Address:	P-IMES Bldg. 2, Block 16, Phase IV, Peza Rosario Cavite, Philippines.
Brand Name:	radioshack, Whistler
Model:	2000668 (radioshack), WS1080 (Whistler)
Type of EUT:	Scanning Receiver and, Class B Personal Computers and Peripherals
Description of EUT:	Digital Trunking Handheld Radio Scanner
Serial Number:	N/A
FCC ID:	HSXSC10
Date of Sample Submitted:	June 27, 2014
Date of Test:	June 27, 2014 to July 30, 2014
Report No.:	14061366HKG-002R1
Report Date:	September 01, 2014
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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SUMMARY OF TEST RESULT

TEST SPECIFICATION	REFERENCE	RESULTS
AC Power Line Conducted Emissions	15.107	Pass
Receiver / Digital Device Radiated Emissions	15.109	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2012 Edition

- Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.
2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

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1.0 General Description

1.1 Product Description

This Equipment Under Test (EUT) is an audio wireless scanning receiver for its corresponding transmitter. It is powered by 4 fully charged “AA” size rechargeable batteries or 4 X1.5V AA batteries. The USB port is used to connect with PC for Library and firmware update and battery charging. The microSD card is used to record all transmissions for specific systems or talkgroups and record audio with frequency information for all transmissions found while searching.

The Model: WS1080 is the same as the Model: 2000668 in hardware aspect. The difference in model number and brand name serves as marketing strategy.

Antenna Type: External, detachable

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

This is an application for certification of computer peripherals.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009). All radiated measurements were performed in an Open Area Test Site. Preliminary scans were performed in the Open Area Test Site 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 and conducted measurement facility used to collect the radiated data is located at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong. This test facility and site measurement data have been placed on file with the FCC.

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2.0 System Test Configuration

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2009).

The device was powered by 4.8VDC (4 x 1.2V "AA" rechargeable battery) or USB 5.0VDC.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it receives the RF signal continuously.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 Measurement Uncertainty

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

2.5 Support Equipment List and Description

1. Lenovo Notebook (Model: T61; S/N: L3-CF468)
2. External 1394 HDD (Smart-drive HD3-SU2FW)
3. 1 x USB cable with length of 0.7 meter long
4. 1 x 1394 cable with length of 0.8 meter long with ferrite
5. Lenovo Notebook Adaptor with ferrite (100-240VAC to 20VDC 4.5A, Model: 42T5274)
(Provided by Intertek)

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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.

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), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

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

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
- AV = Average Factor 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 - AV 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 are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V/m}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$AV = 5.0 \text{ dB}$$

$$FS = RR + LF$$

$$FS = 18 + 9 = 27 \text{ dB}\mu\text{V/m}$$

$$RR = 18.0 \text{ dB}\mu\text{V}$$

$$LF = 9.0 \text{ dB}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(27 \text{ dB}\mu\text{V/m})/20] = 22.4 \mu\text{V/m}$$

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3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 48.000 MHz

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

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 11.9 dB

3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 0.15 MHz

For electronic filing, the worst case line-conducted configuration photographs are saved with filename: conducted photo.pdf.

3.5 Conducted Emission Data

For electronic filing, the graph and data table of conducted emission is saved with filename: conducted.pdf.

Judgment: Pass by 19.50 dB

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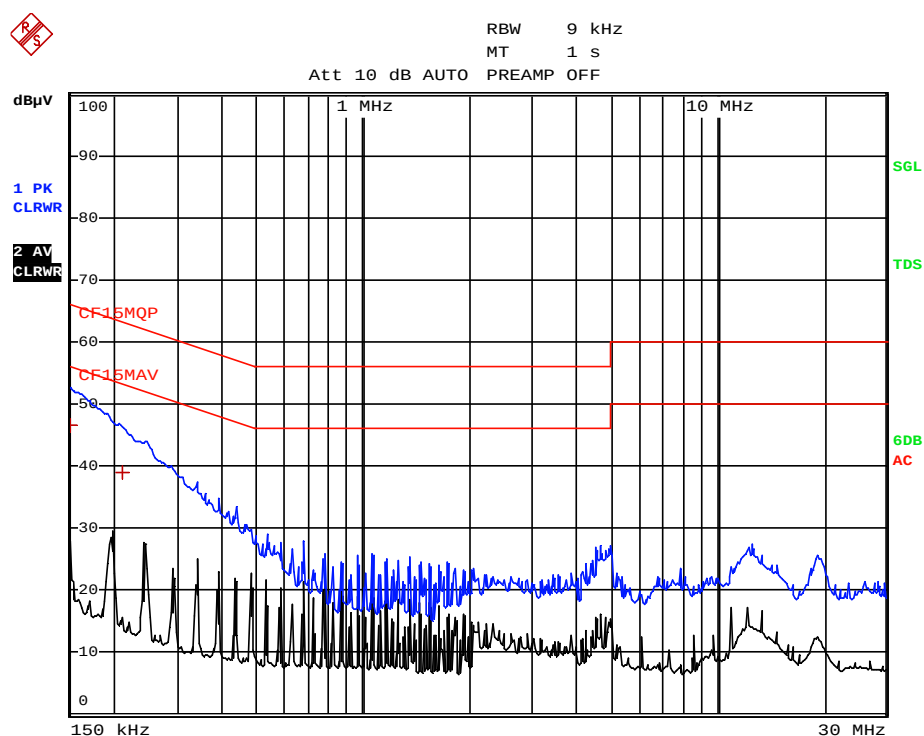
Applicant: The Whistler Group

Date of Test: July 30, 2014

Model: 2000668

Worst-Case Operating Mode: Data Transfer and Charging

Conducted Emissions Section 15.107 Requirements



EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CF15MQP			
Trace2:	CF15MAV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV		DELTA LIMIT dB
1 Quasi Peak	150 kHz	46.49	N	-19.50
1 Quasi Peak	213 kHz	39.10	N	-23.98

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Applicant: The Whistler Group

Date of Test: July 30, 2014

Model: 2000668

Worst-Case Operating Mode: Data Transfer and Charging

Table 1
Radiated Emissions
Pursuant to FCC Part 15 Section 15.109 Requirement

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)
H	36.000	33.5	16	10.0	27.5	40.0	-12.5
H	48.000	33.1	16	11.0	28.1	40.0	-11.9
H	180.000	25.5	16	20.0	29.5	43.5	-14.0
H	227.200	27.4	16	18.0	29.4	46.0	-16.6
H	377.600	23.7	16	24.0	31.7	46.0	-14.3
H	458.650	20.4	16	26.0	30.4	46.0	-15.6
H	499.200	23.5	16	26.0	33.5	46.0	-12.5
H	573.205	20.2	16	28.0	32.2	46.0	-13.8
H	718.850	19.8	16	30.0	33.8	46.0	-12.2
H	814.175	19.0	16	31.0	34.0	46.0	-12.0
H	918.650	16.9	16	33.0	33.9	46.0	-12.1

- NOTES: 1. Peak Detector Data unless otherwise stated.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances 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 sign in the column shows value below limit.
4. Horn antenna is used for the emission over 1000MHz.

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Applicant: The Whistler Group

Date of Test: July 30, 2014

Model: 2000668

Worst-Case Operating Mode: Record SD Card and Charging

Table 2
Radiated Emissions
Pursuant to FCC Part 15 Section 15.109 Requirement

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)
H	36.000	33.8	16	10.0	27.8	40.0	-12.2
H	48.000	33.0	16	11.0	28.0	40.0	-12.0
H	180.000	25.4	16	20.0	29.4	43.5	-14.1
H	227.200	27.3	16	18.0	29.3	46.0	-16.7
H	377.600	23.2	16	24.0	31.2	46.0	-14.8
H	458.650	20.5	16	26.0	30.5	46.0	-15.5
H	499.200	23.1	16	26.0	33.1	46.0	-12.9
H	573.205	19.7	16	28.0	31.7	46.0	-14.3
H	718.850	19.2	16	30.0	33.2	46.0	-12.8
H	814.175	18.8	16	31.0	33.8	46.0	-12.2
H	918.650	16.5	16	33.0	33.5	46.0	-12.5

- NOTES: 1. Peak Detector Data unless otherwise stated.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances 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 sign in the column shows value below limit.
4. Horn antenna is used for the emission over 1000MHz.

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4.0 **Equipment Photographs**

For electronic filing, the photographs are saved with filename: external photos.pdf and internal photos.pdf.

5.0 **Product Labelling**

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

6.0 **Technical Specifications**

For electronic filing, the block diagram of the tested EUT are saved with filename: block.pdf

7.0 **Instruction Manual**

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

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

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8.0 **Miscellaneous Information**

The miscellaneous information includes details of the test procedure.

8.1 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of scanning receivers operating under the Part 15, Subpart B rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 (2009). A typical or an unmodulated CW signal at the operating frequency of the EUT has been supplied to the EUT for all measurements. Such a signal is supplied by a signal generator and an antenna in close proximity to the EUT. The signal level is sufficient to stabilize the local oscillator of the EUT.

The equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the groundplane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings.

The frequency range scanned is from 30 MHz to 1000 MHz. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

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8.1 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.4 (2009).

The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 1000 MHz. Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Measurements are normally conducted at a measurement distance of three meters. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

9.0 **Confidentiality Request**

For electronic filing, a preliminary copy of the confidentiality request is saved with filename: request.pdf.

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10.0 Equipment List

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Biconical Antenna	Log Periodic Antenna
Registration No.	EW-2666	EW-0571	EW-0572
Manufacturer	R&S	EMCO	EMCO
Model No.	ESCI7	3104C	3146
Calibration Date	Jun. 20, 2013	Nov. 01, 2013	Jun. 26, 2013
Calibration Due Date	Sep. 20, 2014	May 01, 2015	Dec. 26, 2014

Equipment	Spectrum Analyzer
Registration No.	EW-2466
Manufacturer	R&S
Model No.	FSP30
Calibration Date	Aug. 04, 2013
Calibration Due Date	Aug. 04, 2014

2) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN
Registration No.	EW-2500	EW-2874
Manufacturer	R&S	R&S
Model No.	ESCI	ENV-216
Calibration Date	Mar. 22, 2013	Oct. 17, 2013
Calibration Due Date	Aug. 28, 2014	Aug. 17, 2014

END OF TEST REPORT