Issuing Laboratory:
Intertek Testing Services Hong Kong Limited

Hong Kong Accreditation Service (HKAS) has accredited this laboratory under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this report were determined by this laboratory in accordance with its terms of accreditation.

HOKLAS 005
TEST

TEST REPORT

Report No.: HK13020672-1

PH Marketing Limited

Application
For
Certification
(Original Grant)
(FCC ID: SE3PH2022-23-28)
(IC: 7744A-PH2022)

Transceiver

Prepared and Checked by:

Lee Shui Tim, Tim
Assistant Engineer

Approved by:

Chan Chi Hung, Terry
Assistant Supervisor
Date: April 15, 2013

GENERAL INFORMATION

PH Marketing Limited

FCC ID: SE3PH2022-23-28
BRAND NAME: N/A, MODEL: PH2022, PH2023, PH2028

IC: 7744A-PH2022
BRAND NAME: Digital Lab, MODEL: DLHP-220

Grantee:	PH Marketing Limited
Grantee Address:	Rm 2A02, Cheung Wah Industrial Bldg., 10-12 Shipyard Lane, Quarry Bay, Hong Kong.
Contact Person:	Joyce Ng
Tel:	852-2155 3813
Fax:	852-2155 3815
e-mail:	joyce@phml.hk
Manufacturer:	PH Marketing Limited
Manufacturer Address:	Room 2A02, Cheung Wah Industrial Bldg., 10-12 Shipyard Lane, Quarry Bay, Hong Kong.
Brand Name / FCC Model:	N/A / PH2022, PH2023, PH2028
Brand Name / IC Model:	Digital Lab / DLHP-220
Type of EUT:	Transceiver
Description of EUT:	Bluetooth Headphone
Serial Number:	N/A
FCC ID / IC:	SE3PH2022-23-28 / 7744A-PH2022
Date of Sample Submitted:	February 26, 2013
Date of Test:	March 05, 2013 to March 25, 2013
Report No.:	HK13020672-1
Report Date:	April 15, 2013
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

Hong Kong Accreditation Service (HKAS) has accredited this laboratory under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this report were determined by this laboratory in accordance with its terms of accreditation.

SUMMARY OF TEST RESULT

PH Marketing Limited

FCC ID: SE3PH2022-23-28
BRAND NAME: N/A, MODEL: PH2022, PH2023, PH2028

IC: 7744A-PH2022
BRAND NAME: Digital Lab, MODEL: DLHP-220

TEST SPECIFICATION	REFERENCE	RESULTS
Transmitter Power Line Conducted Emissions	15.207 / RSS-Gen 7.2.4	Pass
Transmitter Field Strength and Bandwidth Requirement	15.249 / RSS-210 A2.9	Pass
Digital Device Radiated Emissions	15.109 / RSS-210 2.5	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2011 Edition
RSS-210 Issue 8, December 2010
RSS-Gen Issue 3, December 2010

Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the pervisions 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.

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

Table of Contents

1.0 **General Description** 1
1.1 Product Description 1
1.2 Related Submittal(s) Grants 1
1.3 Test Methodology 1
1.4 Test Facility 1

2.0 **System Test Configuration** 2
2.1 Justification 2
2.2 EUT Exercising Software 2
2.3 Special Accessories 2
2.4 Equipment Modification 2
2.5 Measurement Uncertainty 3
2.6 Support Equipment List and Description 3

3.0 **Emission Results** 4
3.1 Field Strength Calculation 4
3.2 Radiated Emission Configuration Photograph 5
3.3 Radiated Emission Data 5
3.4 Conducted Emission Configuration Photograph 5
3.5 Conducted Emission Data 5

4.0 **Equipment Photographs** 10

5.0 **Product Labelling** 10

6.0 **Technical Specifications** 10

7.0 **Instruction Manual** 10

8.0 **Miscellaneous Information** 11
8.1 Measured Bandwidth 11
8.2 Discussion of Pulse Desensitization 14
8.3 Calculation of Average Factor 14
8.4 Emissions Test Procedures 15

9.0 **Confidentiality Request** 16

10.0 **Equipment List** 17

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a Bluetooth Headphone. It can pair with a Bluetooth device as the audio source. The Bluetooth module in the EUT is operating in the frequency range from 2402MHz to 2480MHz (79 channels with 1MHz channel spacing). The EUT is powered by internal 3.7VDC Ni-MH rechargeable battery which can be charged by 5VDC from USB port. The 3.5 mm phone plug input can accept external analog source. Moreover, the EUT can receive phone call when it is pairing with the mobile device by Bluetooth function. The Adaptive-Frequency Hopping function is not used as declared by the applicant.

The Model(s) DLHP-220, PH2023 and PH2028 are the same as the Model: PH2022 in hardware aspect as declared by applicant. The difference in model number serves as marketing strategy. Only Model: PH2022 is tested.

Antenna Type : Internal, Integral

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

1.2 Related Submittal(s) Grants

This is a single application for certification of a transceiver.

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 Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been placed on file with the FCC and IC.

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

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 USB port and rechargeable battery (3.7VDC Ni-MH).

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 transmits the RF signal continuously.

2.3 Special Accessories

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

2.4 Equipment Modification

Any modifications installed previous to testing by PH Marketing Limited will be incorporated in each production model sold/leased in the United States and Canada.

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

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

2.5 Measurement Uncertainty

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

2.6 Support Equipment List and Description

1. HP Notebook (Compaq nx6320 s/n:CNU6370FWM) (Supplied by Intertek)
2. 1 X 60cm USB cable (Supplied by Client)
   (USB port is for charging only)
3. 1 X 1.0m audio cable terminated by 47Kohm resistance
   (Supplied by Client)

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

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 dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
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 dBµV/m
RR = RA - AG - AV in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV 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 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
AV = 5.0 dB
FS = RR + LF
FS = 18 + 9 = 27 dBµV/m

RR = 18.0 dBµV
LF = 9.0 dB

Level in µV/m = Common Antilogarithm [(27 dBµV/m)/20] = 22.4 µV/m

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 2480.000 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 16.0 dB

3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 0.474 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 4.7 dB

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

Applicant: PH Marketing Limited
Model: PH2022
Worst-Case Operating Mode: Transmitting

Date of Test: March 25, 2013

Table 1

Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Lowest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2402.000	100.6	33	29.4	97.0	30.1	66.9	94.0	-27.1
H	4804.000	43.3	33	34.9	45.2	30.1	15.1	54.0	-38.9
H	7206.000	43.9	33	37.9	48.8	30.1	18.7	54.0	-35.3
H	9608.000	43.0	33	40.4	50.4	30.1	20.3	54.0	-33.7
H	12010.000	43.8	33	40.5	51.3	30.1	21.2	54.0	-32.8
H	14412.000	45.7	33	40.0	52.7	30.1	22.6	54.0	-31.4

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	2402.000	100.6	33	29.4	97.0	114.0	-17.0
H	4804.000	43.3	33	34.9	45.2	74.0	-28.8
H	7206.000	43.9	33	37.9	48.8	74.0	-25.2
H	9608.000	43.0	33	40.4	50.4	74.0	-23.6
H	12010.000	43.8	33	40.5	51.3	74.0	-22.7
H	14412.000	45.7	33	40.0	52.7	74.0	-21.3

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.

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

Applicant: PH Marketing Limited
Model: PH2022
Worst-Case Operating Mode: Transmitting

Date of Test: March 25, 2013

Table 2

Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Middle Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2442.000	100.8	33	29.4	97.2	30.1	67.1	94.0	-26.9
H	4884.000	41.9	33	34.9	43.8	30.1	13.7	54.0	-40.3
H	7326.000	43.5	33	37.9	48.4	30.1	18.3	54.0	-35.7
H	9768.000	43.3	33	40.4	50.7	30.1	20.6	54.0	-33.4
H	12210.000	43.7	33	40.5	51.2	30.1	21.1	54.0	-32.9
H	14652.000	47.0	33	38.4	52.4	30.1	22.3	54.0	-31.7

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	2442.000	100.8	33	29.4	97.2	114.0	-16.8
H	4884.000	41.9	33	34.9	43.8	74.0	-30.2
H	7326.000	43.5	33	37.9	48.4	74.0	-25.6
H	9768.000	43.3	33	40.4	50.7	74.0	-23.3
H	12210.000	43.7	33	40.5	51.2	74.0	-22.8
H	14652.000	47.0	33	38.4	52.4	74.0	-21.6

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.

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

Applicant: PH Marketing Limited
Model: PH2022
Worst-Case Operating Mode: Transmitting

Date of Test: March 25, 2013

Table 3

Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Highest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2480.000	101.6	33	29.4	98.0	30.1	67.9	94.0	-26.1
H	4960.000	42.1	33	34.9	44.0	30.1	13.9	54.0	-40.1
H	7440.000	43.7	33	37.9	48.6	30.1	18.5	54.0	-35.5
H	9920.000	43.2	33	40.4	50.6	30.1	20.5	54.0	-33.5
H	12400.000	44.0	33	40.5	51.5	30.1	21.4	54.0	-32.6
H	14880.000	47.4	33	38.4	52.8	30.1	22.7	54.0	-31.3

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	2480.000	101.6	33	29.4	98.0	114.0	-16.0
H	4960.000	42.1	33	34.9	44.0	74.0	-30.0
H	7440.000	43.7	33	37.9	48.6	74.0	-25.4
H	9920.000	43.2	33	40.4	50.6	74.0	-23.4
H	12400.000	44.0	33	40.5	51.5	74.0	-22.5
H	14880.000	47.4	33	38.4	52.8	74.0	-21.2

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.

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

Applicant: PH Marketing Limited
Model: PH2022
Worst-Case Operating Mode: Bluetooth On Mode

Date of Test: March 25, 2013

Table 4

Radiated Emissions
Pursuant to FCC Part 15 Section 15.109 Requirement

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	33.875	38.1	16	10.0	32.1	40.0	-7.9
V	38.420	37.7	16	10.0	31.7	40.0	-8.3
V	47.915	36.4	16	11.0	31.4	40.0	-8.6
V	52.320	36.8	16	11.0	31.8	40.0	-8.2
V	57.115	36.6	16	11.0	31.6	40.0	-8.4
V	64.325	37.9	16	9.0	30.9	40.0	-9.1

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.

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

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 and IC label artwork and the label location are saved with filename: label.pdf.

6.0 Technical Specifications

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

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 and Canada.

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

8.0 **Miscellaneous Information**

The miscellaneous information includes details of the test procedure and measured bandwidth.

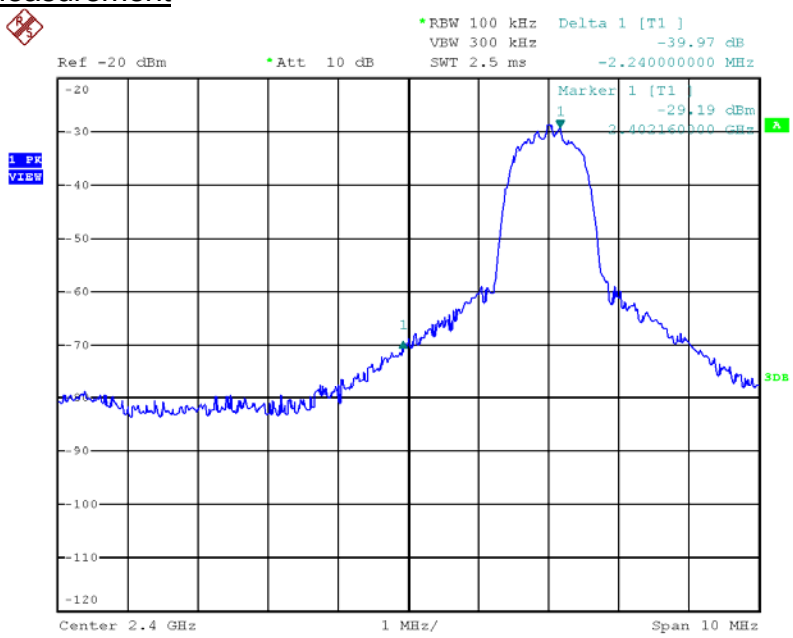
8.1 Measured Bandwidth

From the following plots, they show that the fundamental emissions are confined in the specified band (2400MHz to 2483.5MHz). In case of the fundamental emissions are within two standard bandwidths from the bandedge, the delta measurement technique is used for determining bandedge compliance. Standard bandwidth is the bandwidth specified by ANSI C63.4 (2009) for frequency being measured.

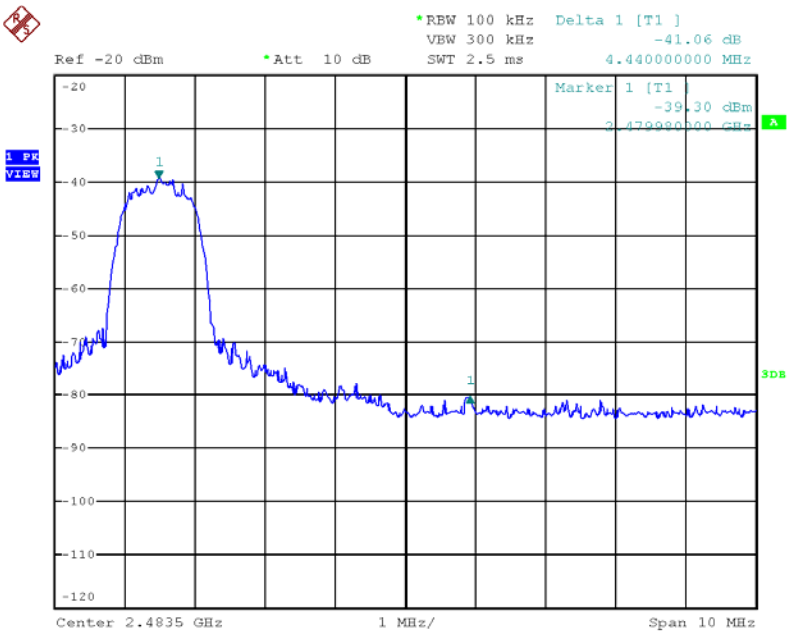
Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50dB below the level of the fundamental or to the general radiated emissions limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

Peak Measurement



Date: 5.MAR.2013 16:05:04



Date: 5.MAR.2013 16:07:42

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

Bandedge compliance is determined by applying marker-delta method, i.e. (Bandedge Plot).

Lower bandedge

Peak Resultant field strength = Fundamental emissions (peak value) – delta from the plot

=97.0 dBµV/m - 40.0 dB
=57.0 dBµV/m

Average Resultant field strength = Fundamental emissions (average value) – delta from the plot

=66.9 dBµV/m - 40.0 dB
=26.9 dBµV/m

Upper bandedge

Peak Resultant field strength = Fundamental emissions (peak value) – delta from the plot

=98.0 dBµV/m - 41.1 dB
=56.9 dBµV/m

Average Resultant field strength = Fundamental emissions (average value) – delta from the plot

=67.9 dBµV/m - 41.1 dB
=26.8 dBµV/m

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74 dBµV/m (Peak Limit) and 54 dBµV/m (Average Limit).

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. The effective period (Teff) is approximately 3.125ms for a digital "1" bit which illustrated on technical specification, with a resolution bandwidth (3dB) of 3MHz, so the pulse desensitivity factor is 0dB.

8.3 Calculation of Average Factor

Based on the Bluetooth Specification Version 2.0 + EDR, the transmitter ON time for each timeslot of Bluetooth is 625μs. DH5 has the maximum duty cycle, which consists of 5 continuous Tx slots and 1 Rx slot. Therefore one hopset take (5+1) x 625μs = 3.75ms. For one period for a pseudo-random hopping through all 79 RF channels, it takes: 79 x 3.75ms = 296.25ms.

The dwell time for DH5 is 5 x 625μs = 3.125ms.

Therefore,

Duty Cycle (DC) = Maximum On time in 100ms/100ms
= 3.125ms/100ms
= 0.03125

Average Factor (AF) of Bluetooth in dB = $20 \log_{10} (0.03125)$
= -30.1 dB

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C 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 transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. 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 EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. 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. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

8.4 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 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. 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.

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

10.0 **Equipment List**

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Biconical Antenna	Log Periodic Antenna
Registration No.	EW-2666	EW-2512	EW-0446
Manufacturer	R&S	EMCO	EMCO
Model No.	ESCI7	3104C	3146
Calibration Date	May 21, 2012	Nov. 15, 2011	Oct. 31, 2011
Calibration Due Date	May 21, 2013	May 15, 2013	Apr. 30, 2013

Equipment	Spectrum Analyzer	Double Ridged Guide Antenna
Registration No.	EW-2188	EW-1133
Manufacturer	AGILENTTECH	EMCO
Model No.	E4407B	3115
Calibration Date	Nov. 05, 2012	Oct. 05, 2012
Calibration Due Date	Nov. 05, 2013	Apr. 05, 2014

2) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN
Registration No.	EW-2666	EW-2874
Manufacturer	R&S	R&S
Model No.	ESCI7	ENV-216
Calibration Date	May 21, 2012	Aug. 15, 2012
Calibration Due Date	May 21, 2013	Aug. 15, 2013

3) Bandedge Measurement

Equipment	Spectrum Analyzer
Registration No.	EW-2249
Manufacturer	R&S
Model No.	FSP30
Calibration Date	Oct. 04, 2012
Calibration Due Date	Oct. 04, 2013

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com