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HOKLAS 005 TEST

TEST REPORT

Report No.: 15030169HKG-001R1

WowWee Group Limited

Application
For
Certification
(Original Grant)
(FCC ID: OKP0890)
(IC: 7091A-0890)

Transceiver

This report supersedes previous report with report number(s) 15030169HKG-001 dated April 17, 2015.

Prepared and Checked by:

Josie Yao
Engineer

Approved by:

Chan Chi Hung, Terry
Senior Supervisor
Date: July 10, 2015

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HOKLAS 005 TEST

GENERAL INFORMATION

Grantee:	WowWee Group Limited
Grantee Address:	Energy Plaza, Suite 301A-C, 92 Granville Road, T.S.T. East, Kowloon, Hong Kong.
Contact Person:	Dennis Tsoi
Tel:	(852) 2739 5288
Fax:	(852) 2724 6931
e-mail:	dennistsoi@wowwee.com.hk
Manufacturer:	WowWee Group Limited
Manufacturer Address:	Energy Plaza, Suite 301A-C, 92 Granville Road, T.S.T. East, Kowloon, Hong Kong.
Brand Name:	WowWee
FCC Model:	0890
FCC Additional Model:	0891, 0895
IC Model:	0890
Type of EUT:	Transceiver
Description of EUT:	Miposaur (0890) Girl Miposaur (0891) Miposaur w/ Rechargeable Kit (0895)
Serial Number:	N/A
FCC ID / IC:	OKP0890 / 7091A-0890
Date of Sample Submitted:	March 05, 2015
Date of Test:	March 05, 2015 to March 23, 2015
Report No.:	15030169HKG-001R1
Report Date:	July 10, 2015
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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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

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SUMMARY OF TEST RESULT

TEST SPECIFICATION	REFERENCE	RESULTS
Radiated Emission Radiated Emission on the Bandedge	15.249, 15.209 / RSS-210 A2.9, RSS-210 2.5	Pass
Radiated Emission in Restricted Bands	15.205 / RSS-210 2.2	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2013 Edition
RSS-210 Issue 8, December 2010
RSS-Gen Issue 4, December 2014

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.

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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

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2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
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1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a 2.4GHz Bluetooth 4.0 transceiver (Dinosaur), which is operating at 2402MHz to 2480MHz (40 channels with 2MHz channel spacing). The EUT is powered by 6VDC (4 X 1.5V "AA" batteries). The EUT has a power ON/OFF switch and a LED. When the EUT is switched ON, the LED will be on. Press the correct icon in the App of the Smartphone, the EUT will pair with the relating Smartphone. After pairing, the EUT can be controlled to move forward, backward, left and right by the corresponding Bluetooth device. There is a ball with IR function also. The EUT will chase for the ball when choosing the "Ball Mode" in the App.

The Model: 0891 and 0895 are the same as the Model: 0890 in hardware aspect.
0891 and 0890 are different in color only.
0895 and 0890 are different in color and 0895 is equipped with Rechargeable Kit.

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 3m Chamber. Preliminary scans were performed in the 3m Chamber 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 3m Chamber 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 and IC.

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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 new DC6.0V (4 x 1.5 AA Batteries).

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 unit was operated standalone and placed in the center of the turntable.

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 Measurement Uncertainty

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

2.5 Support Equipment List and Description

N/A.

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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 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 32 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
RR = 18.0 dBµV
LF = 9.0 dB
FS = RR + LF
FS = 18 + 9 = 27 dBµV/m

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

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3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 14412 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 8.4 dB

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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: WowWee Group Limited Date of Test: March 23, 2015
Model: 0890
Worst-Case Operating Mode: Transmitting (Bluetooth 4.0 BLE)

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	96.7	33	29.4	93.1	49.3	43.8	94.0	-50.2
H	***4804.000***	***56.9***	***33***	***34.9***	***58.8***	***49.3***	***9.5***	***54.0***	***-44.5***
V	7206.000	50.3	33	37.9	55.2	49.3	5.9	54.0	-48.1
V	9608.000	52.6	33	40.4	60.0	49.3	10.7	54.0	-43.3
V	***12010.000***	***55.6***	***33***	***40.5***	***63.1***	***49.3***	***13.8***	***54.0***	***-40.2***
V	14412.000	58.6	33	40.0	65.6	49.3	16.3	54.0	-37.7

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	2402.000	96.7	33	29.4	93.1	114.0	-20.9
H	***4804.000***	***56.9***	***33***	***34.9***	***58.8***	***74.0***	***-15.2***
V	7206.000	50.3	33	37.9	55.2	74.0	-18.8
V	9608.000	52.6	33	40.4	60.0	74.0	-14.0
V	***12010.000***	***55.6***	***33***	***40.5***	***63.1***	***74.0***	***-10.9***
V	14412.000	58.6	33	40.0	65.6	74.0	-8.4

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.

5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

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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: WowWee Group Limited Date of Test: March 23, 2015
Model: 0890
Worst-Case Operating Mode: Transmitting (Bluetooth 4.0 BLE)

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	2440.000	96.4	33	29.4	92.8	49.3	43.5	94.0	-50.5
H	***4880.000***	***56.8***	***33.0***	***34.9***	***58.7***	***49.3***	***9.4***	***54.0***	***-44.6***
V	***7320.000***	***50.1***	***33.0***	***37.9***	***55.0***	***49.3***	***5.7***	***54.0***	***-48.3***
V	9760.000	42.0	33.0	40.4	49.4	49.3	0.1	54.0	-53.9
V	***12200.000***	***44.3***	***33.0***	***40.5***	***51.8***	***49.3***	***2.5***	***54.0***	***-51.5***
V	14640.000	47.8	33	38.4	53.2	49.3	3.9	54.0	-50.1

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	2440.000	96.4	33	29.4	92.8	114.0	-21.2
H	***4880.000***	***56.8***	***33***	***34.9***	***58.7***	***74.0***	***-15.3***
V	***7320.000***	***50.1***	***33***	***37.9***	***55.0***	***74.0***	***-19.0***
V	9760.000	42.0	33	40.4	49.4	74.0	-24.6
V	***12200.000***	***44.3***	***33***	***40.5***	***51.8***	***74.0***	***-22.2***
V	14640.000	47.8	33	38.4	53.2	74.0	-20.8

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.

5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

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: WowWee Group Limited Date of Test: March 23, 2015
Model: 0890
Worst-Case Operating Mode: Transmitting (Bluetooth 4.0 BLE)

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	96.1	33	29.4	92.5	49.3	43.2	94.0	-50.8
H	***4960.000***	***56.4***	***33***	***34.9***	***58.3***	***49.3***	***9.0***	***54.0***	***-45.0***
V	***7440.000***	***44.0***	***33***	***37.9***	***48.9***	***49.3***	***-0.4***	***54.0***	***-54.4***
V	9920.000	42.4	33	40.4	49.8	49.3	0.5	54.0	-53.5
V	***12400.000***	***43.9***	***33***	***40.5***	***51.4***	***49.3***	***2.1***	***54.0***	***-51.9***
V	14880.000	48.3	33	38.4	53.7	49.3	4.4	54.0	-49.6

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	96.1	33	29.4	92.5	114.0	-21.5
H	***4960.000***	***56.4***	***33***	***34.9***	***58.3***	***74.0***	***-15.7***
V	***7440.000***	***44.0***	***33***	***37.9***	***48.9***	***74.0***	***-25.1***
V	9920.000	42.4	33	40.4	49.8	74.0	-24.2
V	***12400.000***	***43.9***	***33***	***40.5***	***51.4***	***74.0***	***-22.6***
V	14880.000	48.3	33	38.4	53.7	74.0	-20.3

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.

5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

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

s

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.

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8.0 Miscellaneous Information

The miscellaneous information includes details of the test procedure and measured bandwidth / calculation of factor such as pulse desensitization and averaging factor (calculation and timing diagram).

8.1 Radiated Emission on the Bandedge

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).

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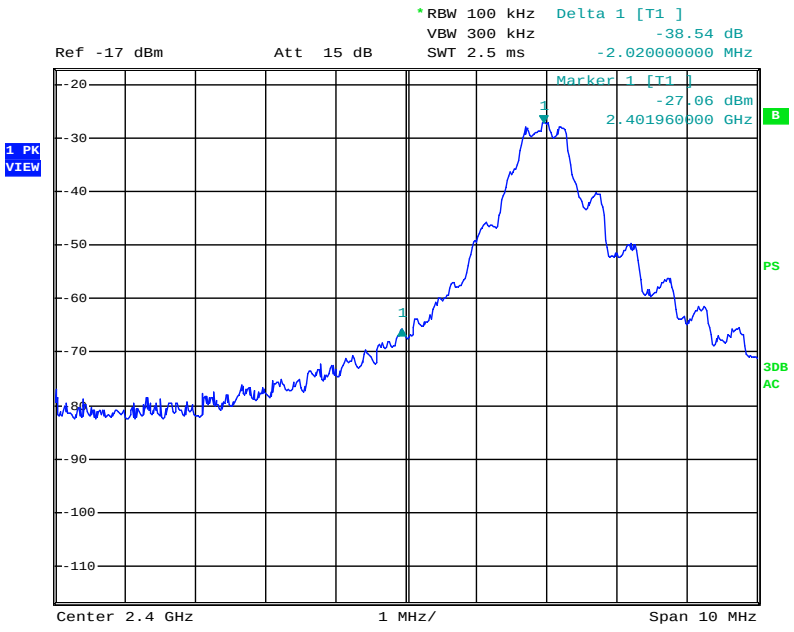
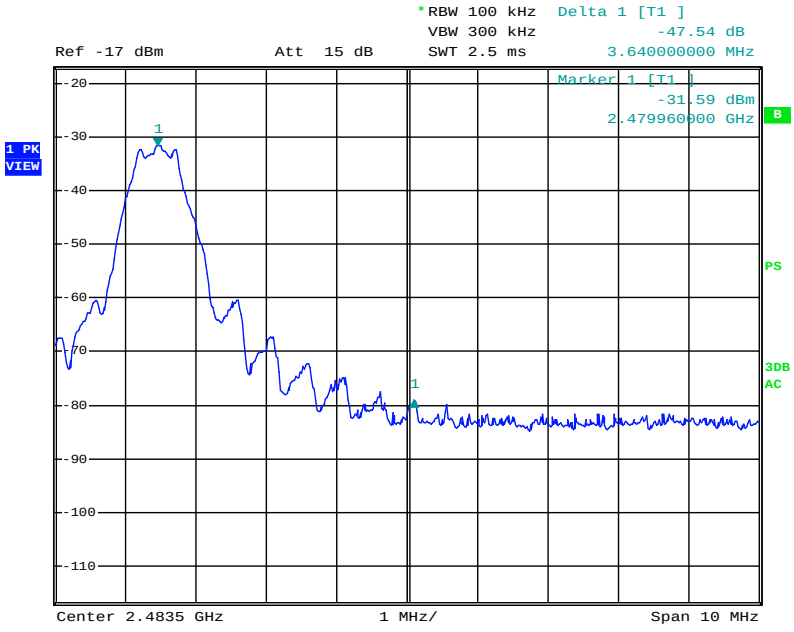
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

Peak Measurement





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Peak Measurement

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

=93.1 dBµV/m – 38.5 dB
=54.6 dBµV/m

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

=43.8 dBµV/m – 38.5 dB
=5.3 dBµV/m

Upper bandedge

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

=92.5 dBµV/m – 47.5 dB
=45.0 dBµV/m

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

=43.2 dBµV/m – 47.5 dB
=-4.3 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).

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8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. The effective period (Teff) is approximately 0.34ms for a digital "1" bit which illustrated on technical specification, with a resolution bandwidth (3dB) of 1MHz, so the pulse desensitivity factor is 0dB.

8.3 Calculation of Average Factor

The duty cycle is simply the on-time divided by the period:

The duration of one cycle = 100ms

Effective period of the cycle = 1*0.34 = 0.34ms

DC = 0.34/100 = 0.0034

Therefore, the averaging factor is found by 20log 0.0034 = -49.3dB.

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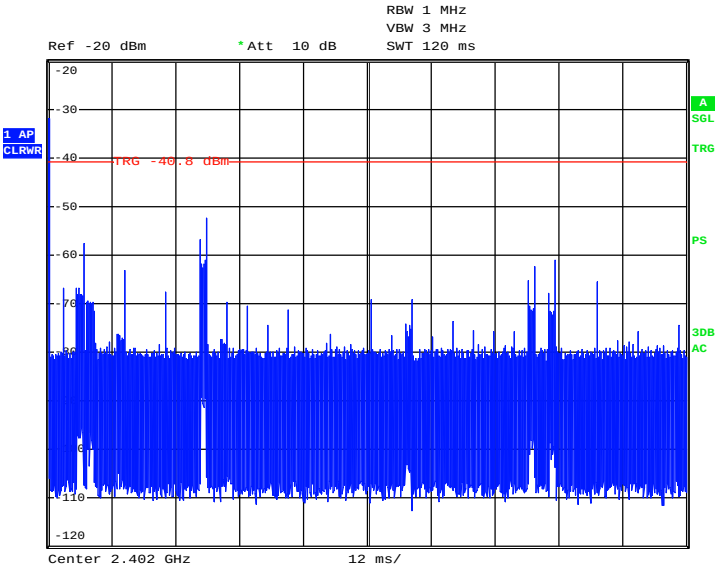
Average Factor



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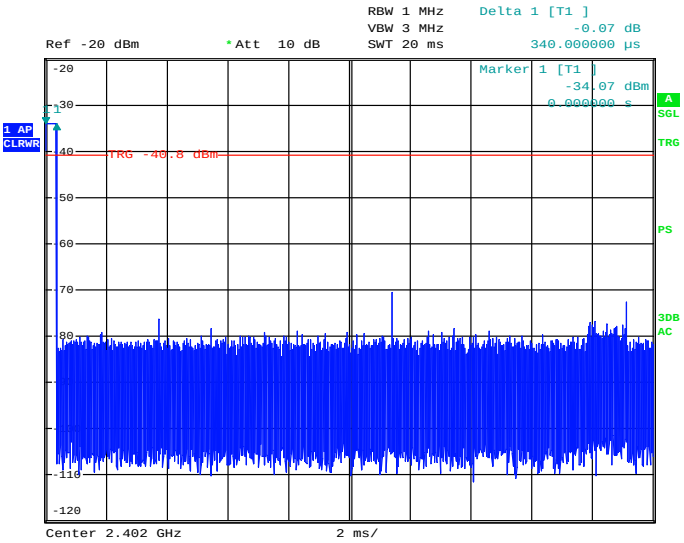

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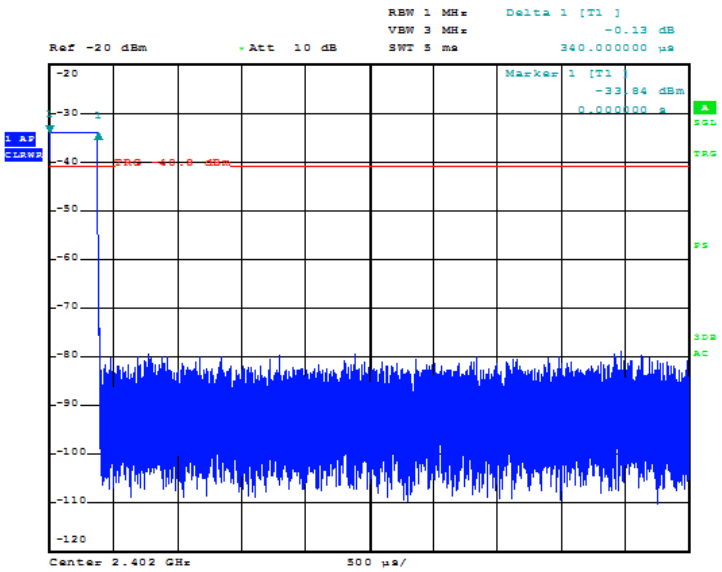
Average Factor



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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 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.

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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.

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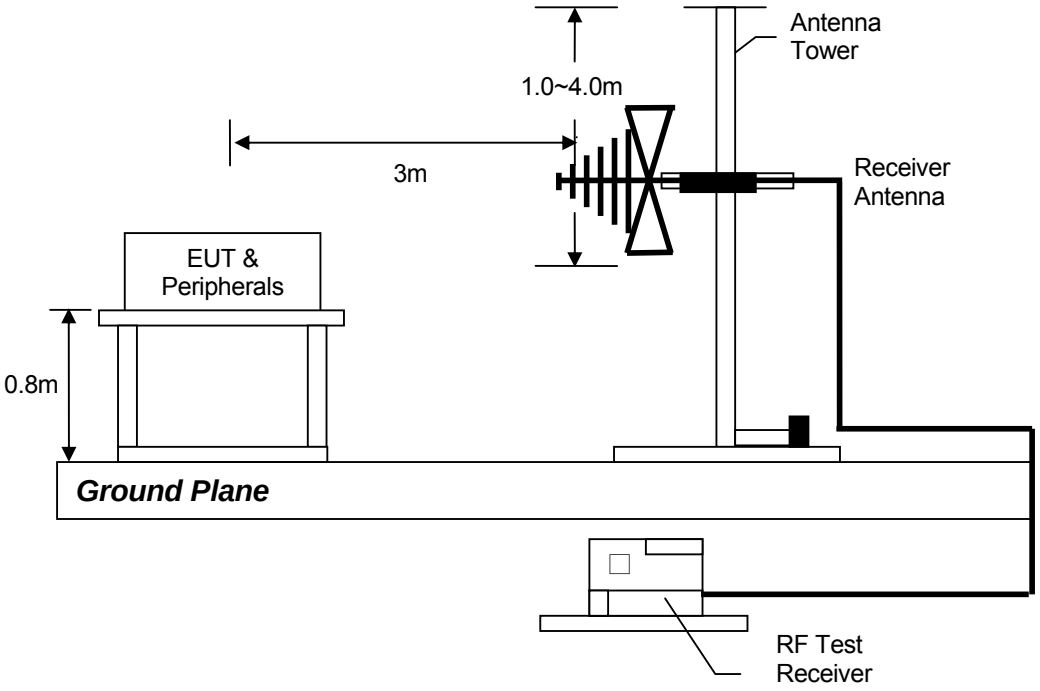
8.4.1 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



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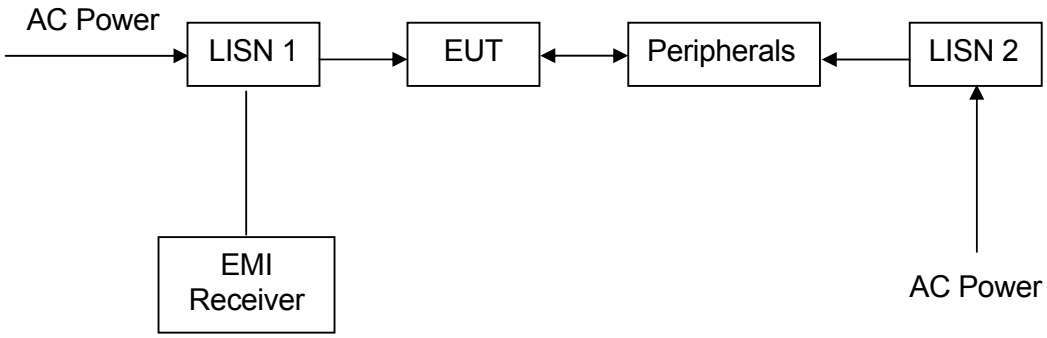
8.4.2 Conducted Emission Test Procedures

For tabletop equipment, the EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table. For floor-standing equipment, the EUT and all cables were insulated, if required, from the ground plane by up to 12 mm of insulating material. The EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were moved to find the maximum emission.

8.4.3 Conducted Emission Test Setup



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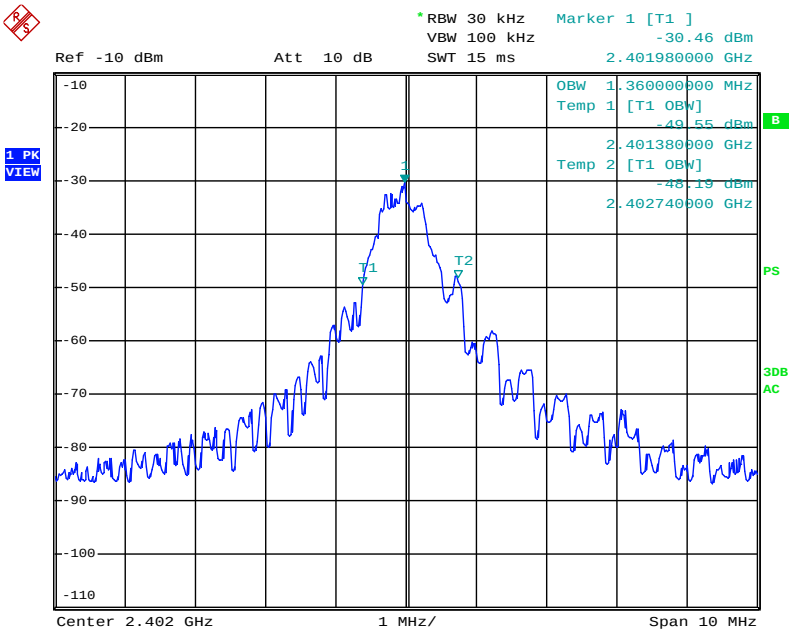
8.5 Occupied Bandwidth

Occupied Bandwidth Results: (Bluetooth 4.0 BLE)

Bluetooth	Occupied Bandwidth (MHz)
Low Channel: 2402	1.36
Middle Channel: 2440	1.30
High Channel: 2480	1.04

The worst case is shown as below:



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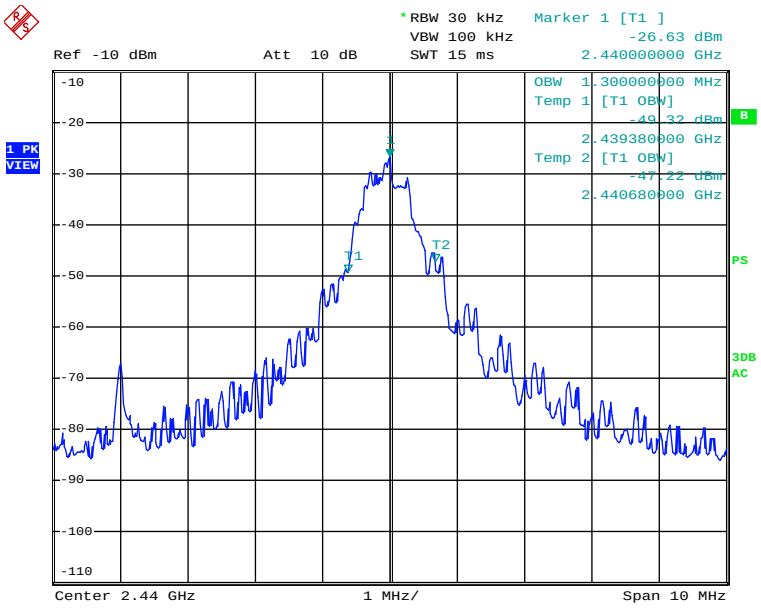

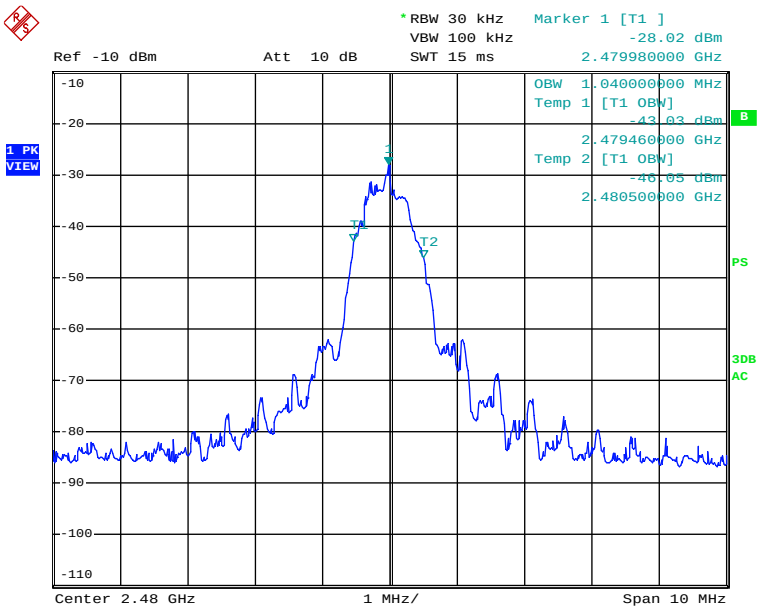

Date: 13.MAR.2015 11:17:13

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9.0 **Equipment List**

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer	BiConiLog Antenna
Registration No.	EW-3095	EW-2253	EW-3061
Manufacturer	R&S	R&S	EMCO
Model No.	ESCI	FSP40	3412E
Calibration Date	Oct. 16, 2014	May 08, 2014	Jul. 17, 2014
Calibration Due Date	Oct. 16, 2015	May 08, 2015	Jul. 17, 2015

Equipment	Double Ridged Guide Antenna
Registration No.	EW-1133
Manufacturer	EMCO
Model No.	3115
Calibration Date	Apr. 30, 2014
Calibration Due Date	Oct. 30, 2015

2) Bandedge Measurement

Equipment	Spectrum Analyzer
Registration No.	EW-2329
Manufacturer	R&S
Model No.	FSP3
Calibration Date	Jun. 19, 2014
Calibration Due Date	Jun. 19, 2015

END OF TEST REPORT

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