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**TEST REPORT**

**Report No.: 14010723HKG-002**

**ALCO Electronics Ltd.**

Application  
For  
Certification  
(Original Grant)  
**(FCC ID: A2HABX3250)**  
**(IC: 9903A-ABX3250)**

Transceiver

Prepared and Checked by:

Approved by:

A handwritten signature in black ink, appearing to read 'Herbert', is written over a horizontal line.

Wong Cheuk Ho, Herbert  
Lead Engineer

A handwritten signature in black ink, appearing to read 'Terry', is written over a horizontal line.

Chan Chi Hung, Terry  
Supervisor  
Date: March 03, 2014

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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-ellsemko.com



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### GENERAL INFORMATION

**ALCO Electronics Ltd.**  
**BRAND NAME: TOSHIBA, MODEL: ABX3250KN**

**FCC ID: A2HABX3250**  
**IC: 9903A-ABX3250**

Grantee:	ALCO Electronics Ltd.
Grantee Address:	11/F., Zung Fu Industrial Building, 1067 King's Road, Quarry Bay, Hong Kong.
Contact Person:	Peggy Suen
Tel:	852-2562 6121
Fax:	852-2597 5201
e-mail:	peggy@alco.com.hk
Manufacturer:	Dongguan Houjie Alco Electronics General Factory
Manufacturer Address:	Gong Ye Xi Road, Houjie Technology Industrial Park, Houjie, Dongguan, Guangdong P.R.C. 523960 China
Brand Name:	TOSHIBA
Model:	ABX3250KN
Type of EUT:	Transceiver
Description of EUT:	Audio Base Speaker System
Serial Number:	N/A
FCC ID / IC:	A2HABX3250 / 9903A-ABX3250
Date of Sample Submitted:	January 17, 2014
Date of Test:	January 17, 2014 to February 24, 2014
Report No.:	14010723HKG-002
Report Date:	March 03, 2014
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

Report No.: 14010723HKG-002

FCC ID: A2HABX3250

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## SUMMARY OF TEST RESULT

**ALCO Electronics Ltd.**  
**BRAND NAME: TOSHIBA, MODEL: ABX3250KN**

**FCC ID: A2HABX3250**  
**IC: 9903A-ABX3250**

TEST SPECIFICATION	REFERENCE	RESULTS
Transmitter Power Line Conducted Emissions	15.207 / RSS-Gen 7.2.4	Pass
Transmitter Field Strength and Bandedge Requirement	15.249 / RSS-210 A2.9	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, 2012 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 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 expected variations in temperature and supply voltage were considered.

Report No.: 14010723HKG-002  
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## 1.0 General Description

### 1.1 Product Description

The Equipment Under Test (EUT) is an Audio Base Speaker System. It can accept analog input sources (RCA aux-in and 3.5mm phone jack line-in), digital input sources (TOSLINK optical digital audio and HDMI) and wireless Bluetooth device. The Bluetooth module in the EUT is operating in the frequency range from 2402MHz to 2480MHz (79 channels with 1MHz channel spacing). The EUT supports NFC function to connect Bluetooth communication when it is touched with NFC enabled device. The audio signal is amplified and fed to the built-in stereo loudspeakers. The EUT can send audio data to the separate wireless subwoofer via a 2.4GHz digital wireless module, which is operating in the frequency range from 2404MHz to 2479MHz (16 channels with 5MHz channel spacing). The EUT is powered by 120VAC 60Hz.

The NFC tag in EUT is a passive data device, which is powered by RF field of external reader.

Antenna Type; Internal, Integral

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



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## 1.2 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.

## 1.3 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.



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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 120VAC.

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.

For simultaneous transmission, both Bluetooth module and 2.4GHz Digital Wireless module are also switched on when taking radiated emission for determining worst-case spurious emission.

### 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.



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## 2.5 Support Equipment List and Description

1. 3 x 2m HDMI cable (with termination)
2. 1 x 2m 3.5 phone-jack audio cable (with termination)
3. 1 x 2m RCA jack audio cable (with termination)  
(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 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  
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



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### 3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 14424.000 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 5.1 dB

### 3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 0.150 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 12.3 dB



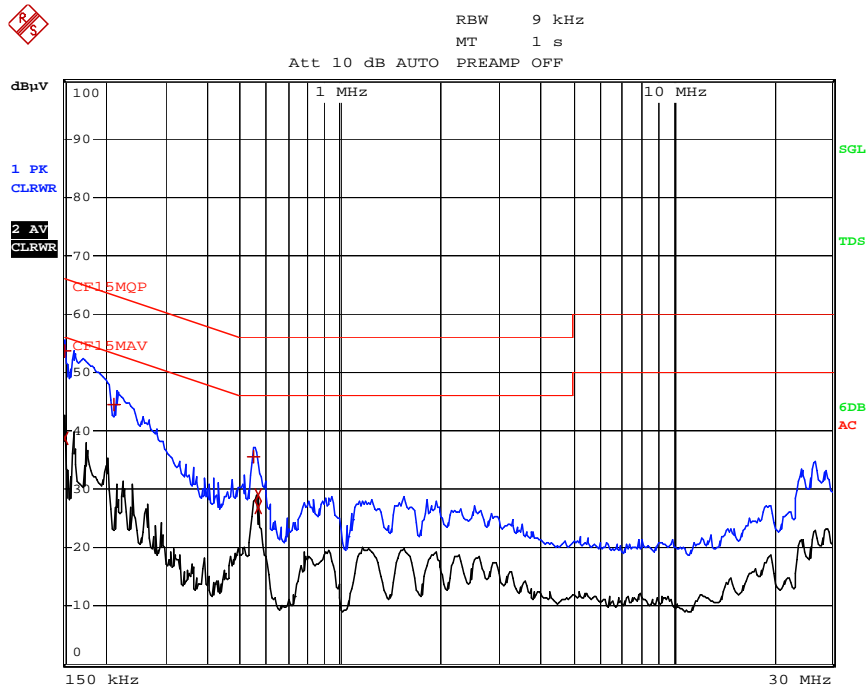
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Worst-Case Operating Mode: Transmitting (Bluetooth and 2.4GHz Digital Wireless)



EDIT PEAK LIST (Final Measurement Results)				
TRACE		FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
Trace1:	CF15MQP			
Trace2:	CF15MAV			
Trace3:	---			
1	Quasi Peak	150 kHz	53.68 N gnd	-12.31
2	CISPR Average	150 kHz	38.66 N gnd	-17.33
1	Quasi Peak	213 kHz	44.54 N gnd	-18.54
1	Quasi Peak	550.5 kHz	35.61 N gnd	-20.38
2	CISPR Average	564 kHz	29.12 N gnd	-16.87
2	CISPR Average	568.5 kHz	26.85 N gnd	-19.14

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Applicant: ALCO Electronics Ltd.

Date of Test: February 24, 2014

Model: ABX3250KN

Worst-Case Operating Mode: Transmitting (Bluetooth)

Table 1

**Radiated Emissions  
Pursuant to FCC Part 15 Section 15.249 Requirement**

Lowest Channel

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB $\mu$ V/m)	Average Factor (dB)	Calculated at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2402.000	100.4	33	29.4	96.8	24	72.8	94.0	-21.2
<b>H</b>	<b>4804.000</b>	<b>46.7</b>	<b>33</b>	<b>34.9</b>	<b>48.6</b>	<b>24</b>	<b>24.6</b>	<b>54.0</b>	<b>-29.4</b>
H	7206.000	43.5	33	37.9	48.4	24	24.4	54.0	-29.6
H	9608.000	40.8	33	40.4	48.2	24	24.2	54.0	-29.8
<b>H</b>	<b>12010.000</b>	<b>41.0</b>	<b>33</b>	<b>40.5</b>	<b>48.5</b>	<b>24</b>	<b>24.5</b>	<b>54.0</b>	<b>-29.5</b>
H	14412.000	41.3	33	40.0	48.3	24	24.3	54.0	-29.7

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2402.000	100.4	33	29.4	96.8	114.0	-17.2
<b>H</b>	<b>4804.000</b>	<b>46.7</b>	<b>33</b>	<b>34.9</b>	<b>48.6</b>	<b>74.0</b>	<b>-25.4</b>
H	7206.000	43.5	33	37.9	48.4	74.0	-25.6
H	9608.000	40.8	33	40.4	48.2	74.0	-25.8
<b>H</b>	<b>12010.000</b>	<b>41.0</b>	<b>33</b>	<b>40.5</b>	<b>48.5</b>	<b>74.0</b>	<b>-25.5</b>
H	14412.000	41.3	33	40.0	48.3	74.0	-25.7

- 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.

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Applicant: ALCO Electronics Ltd.  
Model: ABX3250KN  
Worst-Case Operating Mode: Transmitting (Bluetooth)

Date of Test: February 24, 2014

Table 2

**Radiated Emissions  
Pursuant to FCC Part 15 Section 15.249 Requirement**

Middle Channel

Polarization	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	2441.000	99.0	33	29.4	95.4	24	71.4	94.0	-22.6
<b>H</b>	<b>4882.000</b>	<b>46.3</b>	<b>33</b>	<b>34.9</b>	<b>48.2</b>	<b>24</b>	<b>24.2</b>	<b>54.0</b>	<b>-29.8</b>
<b>H</b>	<b>7323.000</b>	<b>43.5</b>	<b>33</b>	<b>37.9</b>	<b>48.4</b>	<b>24</b>	<b>24.4</b>	<b>54.0</b>	<b>-29.6</b>
H	9764.000	40.8	33	40.4	48.2	24	24.2	54.0	-29.8
<b>H</b>	<b>12205.000</b>	<b>41.0</b>	<b>33</b>	<b>40.5</b>	<b>48.5</b>	<b>24</b>	<b>24.5</b>	<b>54.0</b>	<b>-29.5</b>
H	14646.000	42.9	33	38.4	48.3	24	24.3	54.0	-29.7

Polarization	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	2441.000	99.0	33	29.4	95.4	114.0	-18.6
<b>H</b>	<b>4882.000</b>	<b>46.3</b>	<b>33</b>	<b>34.9</b>	<b>48.2</b>	<b>74.0</b>	<b>-25.8</b>
<b>H</b>	<b>7323.000</b>	<b>43.5</b>	<b>33</b>	<b>37.9</b>	<b>48.4</b>	<b>74.0</b>	<b>-25.6</b>
H	9764.000	40.8	33	40.4	48.2	74.0	-25.8
<b>H</b>	<b>12215.000</b>	<b>41.0</b>	<b>33</b>	<b>40.5</b>	<b>48.5</b>	<b>74.0</b>	<b>-25.5</b>
H	14656.000	42.9	33	38.4	48.3	74.0	-25.7

- 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.

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Applicant: ALCO Electronics Ltd.  
Model: ABX3250KN  
Worst-Case Operating Mode: Transmitting (Bluetooth)

Date of Test: February 24, 2014

Table 3

**Radiated Emissions  
Pursuant to FCC Part 15 Section 15.249 Requirement**

Highest Channel

Polarization	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	98.8	33	29.4	95.2	24	71.2	94.0	-22.8
<b>H</b>	<b>4960.000</b>	<b>46.4</b>	<b>33</b>	<b>34.9</b>	<b>48.3</b>	<b>24</b>	<b>24.3</b>	<b>54.0</b>	<b>-29.7</b>
<b>H</b>	<b>7440.000</b>	<b>43.4</b>	<b>33</b>	<b>37.9</b>	<b>48.3</b>	<b>24</b>	<b>24.3</b>	<b>54.0</b>	<b>-29.7</b>
H	9920.000	41.1	33	40.4	48.5	24	24.5	54.0	-29.5
<b>H</b>	<b>12400.000</b>	<b>40.9</b>	<b>33</b>	<b>40.5</b>	<b>48.4</b>	<b>24</b>	<b>24.4</b>	<b>54.0</b>	<b>-29.6</b>
H	14880.000	42.9	33	38.4	48.3	24	24.3	54.0	-29.7

Polarization	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	98.8	33	29.4	95.2	114.0	-18.8
<b>H</b>	<b>4960.000</b>	<b>46.4</b>	<b>33</b>	<b>34.9</b>	<b>48.3</b>	<b>74.0</b>	<b>-25.7</b>
<b>H</b>	<b>7440.000</b>	<b>43.4</b>	<b>33</b>	<b>37.9</b>	<b>48.3</b>	<b>74.0</b>	<b>-25.7</b>
H	9920.000	41.1	33	40.4	48.5	74.0	-25.5
<b>H</b>	<b>12400.000</b>	<b>40.9</b>	<b>33</b>	<b>40.5</b>	<b>48.4</b>	<b>74.0</b>	<b>-25.6</b>
H	14880.000	42.9	33	38.4	48.3	74.0	-25.7

- 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.



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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.



Applicant: ALCO Electronics Ltd.

Date of Test: February 24, 2014

Model: ABX3250KN

Worst-Case Operating Mode: Transmitting (2.4GHz Digital Wireless)

Table 4

**Radiated Emissions  
Pursuant to FCC Part 15 Section 15.249 Requirement**

Lowest Channel

Polarization	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	2404.000	90.2	33	29.4	86.6	0	86.6	94.0	-7.4
<b>H</b>	<b>4808.000</b>	<b>41.6</b>	<b>33</b>	<b>34.9</b>	<b>43.5</b>	<b>0</b>	<b>43.5</b>	<b>54.0</b>	<b>-10.5</b>
H	7212.000	41.6	33	37.9	46.5	0	46.5	54.0	-7.5
H	9616.000	41.1	33	40.4	48.5	0	48.5	54.0	-5.5
<b>H</b>	<b>12020.000</b>	<b>40.8</b>	<b>33</b>	<b>40.5</b>	<b>48.3</b>	<b>0</b>	<b>48.3</b>	<b>54.0</b>	<b>-5.7</b>
H	14424.000	41.9	33	40.0	48.9	0	48.9	54.0	-5.1

Polarization	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	2404.000	90.2	33	29.4	86.6	114.0	-27.4
<b>H</b>	<b>4808.000</b>	<b>41.6</b>	<b>33</b>	<b>34.9</b>	<b>43.5</b>	<b>74.0</b>	<b>-30.5</b>
H	7212.000	41.6	33	37.9	46.5	74.0	-27.5
H	9616.000	41.1	33	40.4	48.5	74.0	-25.5
<b>H</b>	<b>12020.000</b>	<b>40.8</b>	<b>33</b>	<b>40.5</b>	<b>48.3</b>	<b>74.0</b>	<b>-25.7</b>
H	14424.000	41.9	33	40.0	48.9	74.0	-25.1

- 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.
  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.



Valued Quality. Delivered.

Issuing Laboratory:  
Intertek Testing Services Hong Kong Limited

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Applicant: ALCO Electronics Ltd.

Date of Test: February 24, 2014

Model: ABX3250KN

Worst-Case Operating Mode: Transmitting (2.4GHz Digital Wireless)

Table 5

**Radiated Emissions  
Pursuant to FCC Part 15 Section 15.249 Requirement**

Middle Channel

Polarization	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	2444.000	90.4	33	29.4	86.8	0	86.8	94.0	-7.2
<b>H</b>	<b>4888.000</b>	<b>41.8</b>	<b>33</b>	<b>34.9</b>	<b>43.7</b>	<b>0</b>	<b>43.7</b>	<b>54.0</b>	<b>-10.3</b>
<b>H</b>	<b>7332.000</b>	<b>41.9</b>	<b>33</b>	<b>37.9</b>	<b>46.8</b>	<b>0</b>	<b>46.8</b>	<b>54.0</b>	<b>-7.2</b>
H	9776.000	41.2	33	40.4	48.6	0	48.6	54.0	-5.4
<b>H</b>	<b>12220.000</b>	<b>40.9</b>	<b>33</b>	<b>40.5</b>	<b>48.4</b>	<b>0</b>	<b>48.4</b>	<b>54.0</b>	<b>-5.6</b>
H	14664.000	43.0	33	38.4	48.4	0	48.4	54.0	-5.6

Polarization	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	2444.000	90.4	33	29.4	86.8	114.0	-27.2
<b>H</b>	<b>4888.000</b>	<b>41.8</b>	<b>33</b>	<b>34.9</b>	<b>43.7</b>	<b>74.0</b>	<b>-30.3</b>
<b>H</b>	<b>7332.000</b>	<b>41.9</b>	<b>33</b>	<b>37.9</b>	<b>46.8</b>	<b>74.0</b>	<b>-27.2</b>
H	9776.000	41.2	33	40.4	48.6	74.0	-25.4
<b>H</b>	<b>12220.000</b>	<b>40.9</b>	<b>33</b>	<b>40.5</b>	<b>48.4</b>	<b>74.0</b>	<b>-25.6</b>
H	14664.000	43.0	33	38.4	48.4	74.0	-25.6

- 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.
  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.





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Issuing Laboratory:  
Intertek Testing Services Hong Kong Limited

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Applicant: ALCO Electronics Ltd.

Date of Test: February 24, 2014

Model: ABX3250KN

Worst-Case Operating Mode: Transmitting (2.4GHz Digital Wireless)

Table 6

**Radiated Emissions  
Pursuant to FCC Part 15 Section 15.249 Requirement**

Highest Channel

Polarization	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	2479.000	92.0	33	29.4	88.4	0	88.4	94.0	-5.6
<b>H</b>	<b>4958.000</b>	<b>41.9</b>	<b>33</b>	<b>34.9</b>	<b>43.8</b>	<b>0</b>	<b>43.8</b>	<b>54.0</b>	<b>-10.2</b>
<b>H</b>	<b>7437.000</b>	<b>41.9</b>	<b>33</b>	<b>37.9</b>	<b>46.8</b>	<b>0</b>	<b>46.8</b>	<b>54.0</b>	<b>-7.2</b>
H	9916.000	41.1	33	40.4	48.5	0	48.5	54.0	-5.5
<b>H</b>	<b>12395.000</b>	<b>41.0</b>	<b>33</b>	<b>40.5</b>	<b>48.5</b>	<b>0</b>	<b>48.5</b>	<b>54.0</b>	<b>-5.5</b>
H	14874.000	42.8	33	38.4	48.2	0	48.2	54.0	-5.8

Polarization	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	2479.000	92.0	33	29.4	88.4	114.0	-25.6
<b>H</b>	<b>4958.000</b>	<b>41.9</b>	<b>33</b>	<b>34.9</b>	<b>43.8</b>	<b>74.0</b>	<b>-30.2</b>
<b>H</b>	<b>7437.000</b>	<b>41.9</b>	<b>33</b>	<b>37.9</b>	<b>46.8</b>	<b>74.0</b>	<b>-27.2</b>
H	9916.000	41.1	33	40.4	48.5	74.0	-25.5
<b>H</b>	<b>12395.000</b>	<b>41.0</b>	<b>33</b>	<b>40.5</b>	<b>48.5</b>	<b>74.0</b>	<b>-25.5</b>
H	14874.000	42.8	33	38.4	48.2	74.0	-25.8

- 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.



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Issuing Laboratory:  
Intertek Testing Services Hong Kong Limited

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Applicant: ALCO Electronics Ltd.

Date of Test: February 24, 2014

Model: ABX3250KN

Worst-Case Operating Mode: Simultaneous Transmitting (Bluetooth and 2.4GHz Digital Wireless)

Table 7

**Radiated Emissions  
Pursuant to FCC Part 15 Section 15.209 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	62.975	40.8	16	10.0	34.8	40.0	-5.2
V	66.043	41.8	16	9.0	34.8	40.0	-5.2
H	192.202	35.8	16	16.0	35.8	43.5	-7.7
H	210.422	30.9	16	17.0	31.9	43.5	-11.6
H	213.456	34.7	16	17.0	35.7	43.5	-7.8
H	224.206	33.5	16	18.0	35.5	46.0	-10.5
H	300.010	34.0	16	22.0	40.0	46.0	-6.0
<b>H</b>	<b>324.022</b>	<b>32.1</b>	<b>16</b>	<b>24.0</b>	<b>40.1</b>	<b>46.0</b>	<b>-5.9</b>
H	357.814	26.3	16	24.0	34.3	46.0	-11.7
H	363.960	25.3	16	24.0	33.3	46.0	-12.7
H	376.252	26.2	16	24.0	34.2	46.0	-11.8
H	443.896	25.8	16	26.0	35.8	46.0	-10.2
H	486.030	24.5	16	26.0	34.5	46.0	-11.5
H	810.053	21.9	16	31.0	36.9	46.0	-9.1

NOTES: 1. Quasi-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. 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.



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Issuing Laboratory:  
Intertek Testing Services Hong Kong Limited

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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 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.

### 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).



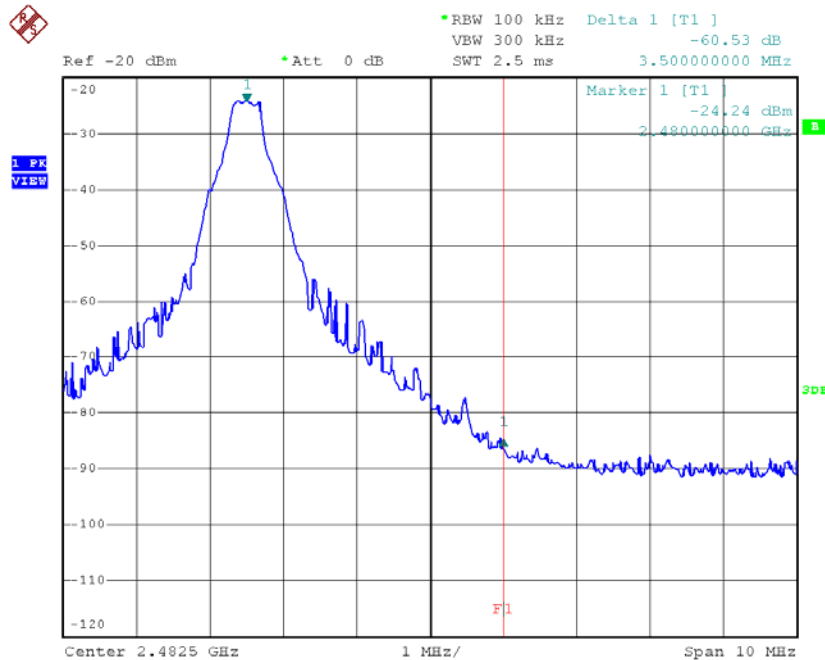
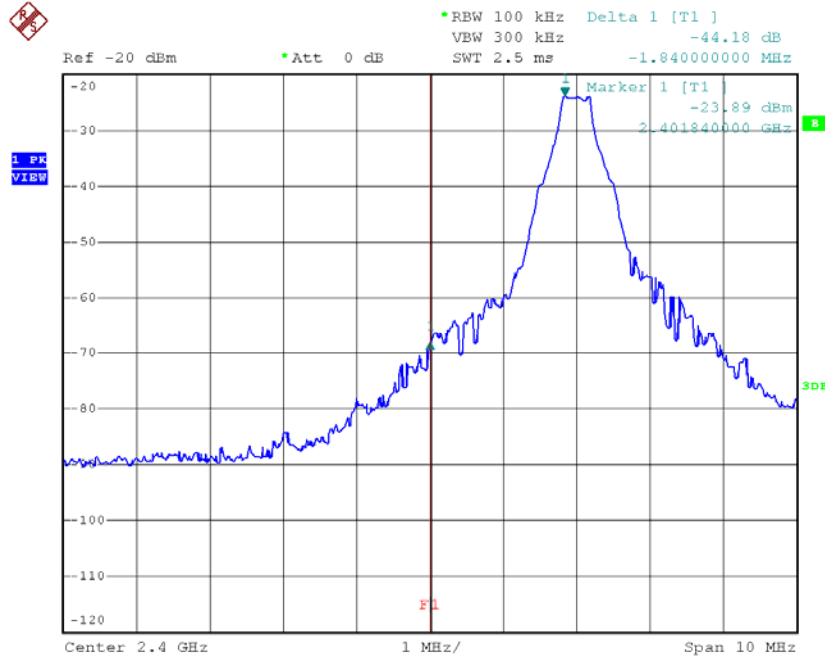
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Issuing Laboratory:  
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### Bluetooth



Issuing Laboratory:  
Intertek Testing Services Hong Kong Limited

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### Peak Measurement (Bluetooth)

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

=96.8 dB $\mu$ V/m - 44.2 dB  
=52.6 dB $\mu$ V/m

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

=72.8 dB $\mu$ V/m - 44.2 dB  
=28.6 dB $\mu$ V/m

Upper bandedge

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

=95.2 dB $\mu$ V/m - 60.5 dB  
=34.7 dB $\mu$ V/m

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

=71.2 dB $\mu$ V/m - 60.5 dB  
=10.7 dB $\mu$ V/m

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



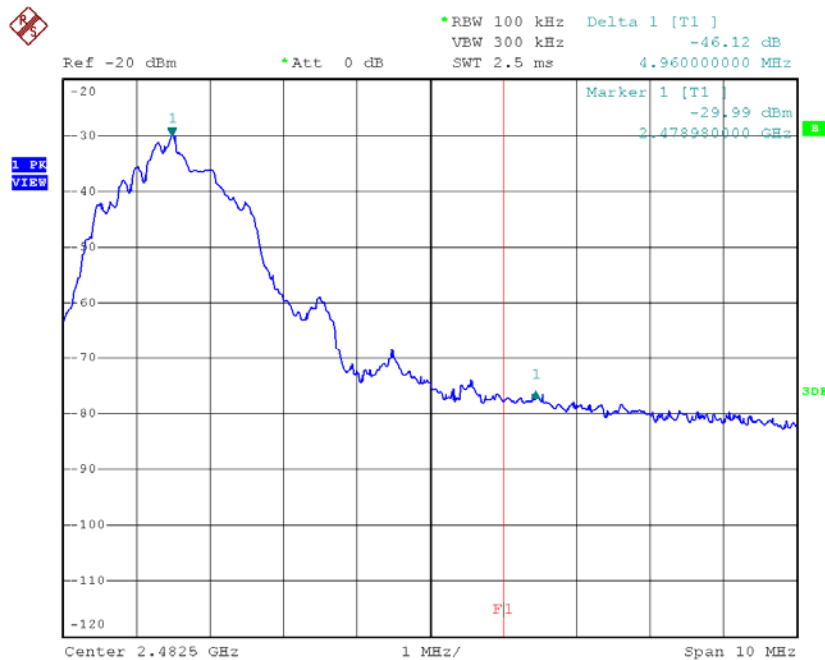
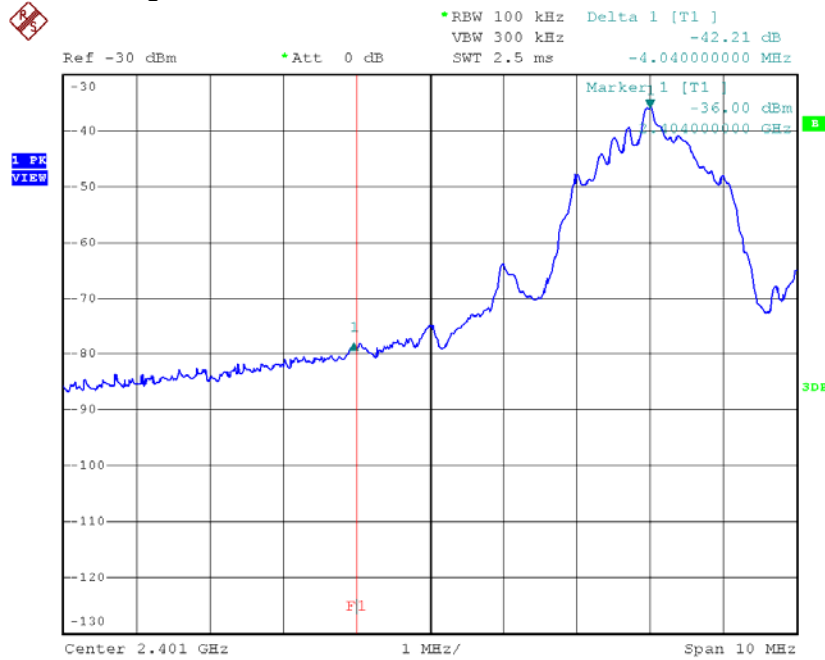
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Issuing Laboratory:  
Intertek Testing Services Hong Kong Limited

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### 2.4GHz Digital Wireless



Issuing Laboratory:  
Intertek Testing Services Hong Kong Limited

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### Peak Measurement (2.4GHz Digital Wireless)

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

$$\begin{aligned} &=86.6 \text{ dB}\mu\text{V/m} - 42.2 \text{ dB} \\ &=44.4 \text{ dB}\mu\text{V/m} \end{aligned}$$

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

$$\begin{aligned} &=86.6 \text{ dB}\mu\text{V/m} - 42.2 \text{ dB} \\ &=44.4 \text{ dB}\mu\text{V/m} \end{aligned}$$

Upper bandedge

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

$$\begin{aligned} &=88.4 \text{ dB}\mu\text{V/m} - 46.1 \text{ dB} \\ &=42.3 \text{ dB}\mu\text{V/m} \end{aligned}$$

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

$$\begin{aligned} &=88.4 \text{ dB}\mu\text{V/m} - 46.1 \text{ dB} \\ &=42.3 \text{ dB}\mu\text{V/m} \end{aligned}$$

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



Issuing Laboratory:  
Intertek Testing Services Hong Kong Limited

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## 8.2 Discussion of Pulse Desensitization

For Bluetooth: Pulse desensitivity is not applicable for this device. The effective period (Teff) is approximately 6.25ms for a digital “1” bit which illustrated on technical specification, with a resolution bandwidth (3dB) of 1MHz, so the pulse desensitivity factor is 0dB.

For 2.4GHz Digital Wireless: Pulse desensitivity is not applicable for this device, since the transmitter transmits the RF signal continuously.

## 8.3 Calculation of Average Factor

For Bluetooth: Based on the Bluetooth Specification Version 3.0 + 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  $(5+1) \times 625\mu\text{s} = 3.75\text{ms}$ . For one period for a pseudo-random hopping through at least 20 RF channels in adaptive mode (worst case), it take:  $20 \times 3.75\text{ms} = 75\text{ms}$ .

The dwell time for DH5 is  $5 \times 625\mu\text{s} = 3.125\text{ms}$ .

For the worst case calculation, there are two transmissions might occur in 100ms. Therefore,

$$\begin{aligned} \text{Duty Cycle (DC)} &= \text{Maximum On time in } 100\text{ms}/100\text{ms} \\ &= 3.125\text{ms} \times 2/100\text{ms} \\ &= 0.0625 \end{aligned}$$

$$\begin{aligned} \text{Average Factor (AF) of Bluetooth in dB} &= 20 \log_{10} (0.0625) \\ &= -24\text{dB} \end{aligned}$$

For 2.4GHz Digital Wireless:

The average factor is not applicable for this device as the transmitted signal is a continuously signal.



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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. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.



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Issuing Laboratory:  
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#### 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 desensitization 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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## 9.0 Equipment List

### 1) Radiated Emissions Test

Equipment	EMI Test Receiver	Biconical Antenna	Log Periodic Antenna
Registration No.	EW-2500	EW-0954	EW-0446
Manufacturer	R&S	EMCO	EMCO
Model No.	ESCI	3104C	3146
Calibration Date	Mar. 22, 2013	Apr. 30, 2013	Apr. 30, 2013
Calibration Due Date	Feb. 28, 2014	Oct. 30, 2014	Oct. 30, 2014

Equipment	Spectrum Analyzer	Double Ridged Guide Antenna	Broad-Band Horn Antenna
Registration No.	EW-2253	EW-1133	EW-1679
Manufacturer	R&S	EMCO	SCHWARZBECK
Model No.	FSP40	3115	BBHA9170
Calibration Date	Apr. 24, 2013	Oct. 05, 2012	Apr. 01, 2013
Calibration Due Date	Apr. 24, 2014	Apr. 05, 2014	Apr. 01, 2014

### 2) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN
Registration No.	EW-2500	EW-2501
Manufacturer	R&S	R&S
Model No.	ESCI	ENV-216
Calibration Date	Mar. 22, 2013	Dec. 25, 2013
Calibration Due Date	Feb. 28, 2014	Nov. 30, 2014

### 3) Bandedge Measurement

Equipment	Spectrum Analyzer
Registration No.	EW-2249
Manufacturer	R&S
Model No.	FSP30
Calibration Date	Oct. 28, 2013
Calibration Due Date	Oct. 28, 2014

- End of Report -