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.: 13060108HKG-001

ALCO Electronics Ltd.

Application
For
Certification
(Original Grant)
(FCC ID: A2HSBX5065KU)
(IC: 9903A-SBX5065KU)

Transceivers

Prepared and Checked by:

Wong Cheuk Ho, Herbert
Lead Engineer

Approved by:

Chan Chi Hung, Terry
Assistant Supervisor
Date: July 11, 2013

GENERAL INFORMATION

ALCO Electronics Ltd.
BRAND NAME: TOSHIBA
FCC MODEL: SBX5065KU
IC MODEL: SBX5065KC

FCC ID: A2HSBX5065KU
IC: 9903A-SBX5065KU

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:	The 3rd Industrial District, Houjie, Dongguan, Guangdong, P.R.C.
Brand Name:	TOSHIBA
FCC Model:	SBX5065KU
IC Model:	SBX5065KC
Type of EUT:	Transceiver
Description of EUT:	Soundstrip Sound Bar Speaker System
Serial Number:	N/A
FCC ID / IC:	A2HSBX5065KU / 9903A-SBX5065KU
Date of Sample Submitted:	June 04, 2013
Date of Test:	June 17, 2013 to July 11, 2013
Report No.:	13060108HKG-001
Report Date:	July 11, 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

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SUMMARY OF TEST RESULT

ALCO Electronics Ltd.
BRAND NAME: TOSHIBA
FCC MODEL: SBX5065KU
IC MODEL: SBX5065KC

FCC ID: A2HSBX5065KU
IC: 9903A-SBX5065KU

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.

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1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a Soundstrip Sound Bar Speaker System. It can accept analog input sources (RCA aux-in and 3.5mm phone jack line-in), digital input source (TOSLINK optical 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 the 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 wireless module. This 2.4GHz wireless module is operating in the frequency range from 2404.0MHz to 2479.0MHz (16 channels with 5MHz channel spacing). The EUT is powered by 27.5VDC from an AC/DC adaptor. The AC/DC adaptor can accept universal input voltage (100V-240VAC).

The EUT is using non-adaptive frequency hopping as declared by applicant.

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

The Model(s): SBX5065KC are the same as the Model: SBX5065KU in hardware aspect. The difference in model number and brand name serves as marketing strategy.

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 transceivers. (Bluetooth)

The certification procedure of transceiver (with FCC ID: QEC-GWNO) has been authorized by certification procedure. (2.4GHz Wireless Module)

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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.

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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.

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 ALCO Electronics Ltd. 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.

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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. 3 x HDMI cables with 2m long (for termination only)
2. 1 x phone plug audio cable with 2m long (terminated by 47 kohm resistance)
3. 1 x RCA plug audio cable with 2m long (terminated by 47 kohm resistance) (Provided by Intertek)
4. AC/DC Adaptor (Model: APSE092753202WD-G, Input: 100-240VAC 50-60Hz, Output: 27.5VDC 3.2A) (Provided by Applicant)

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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 4958.000 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 7.2 dB

3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 0.389 MHz

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

3.5 Conducted Emission Data

The graph and data table of conducted emission is shown as below.

Judgment: Pass by 18.6 dB

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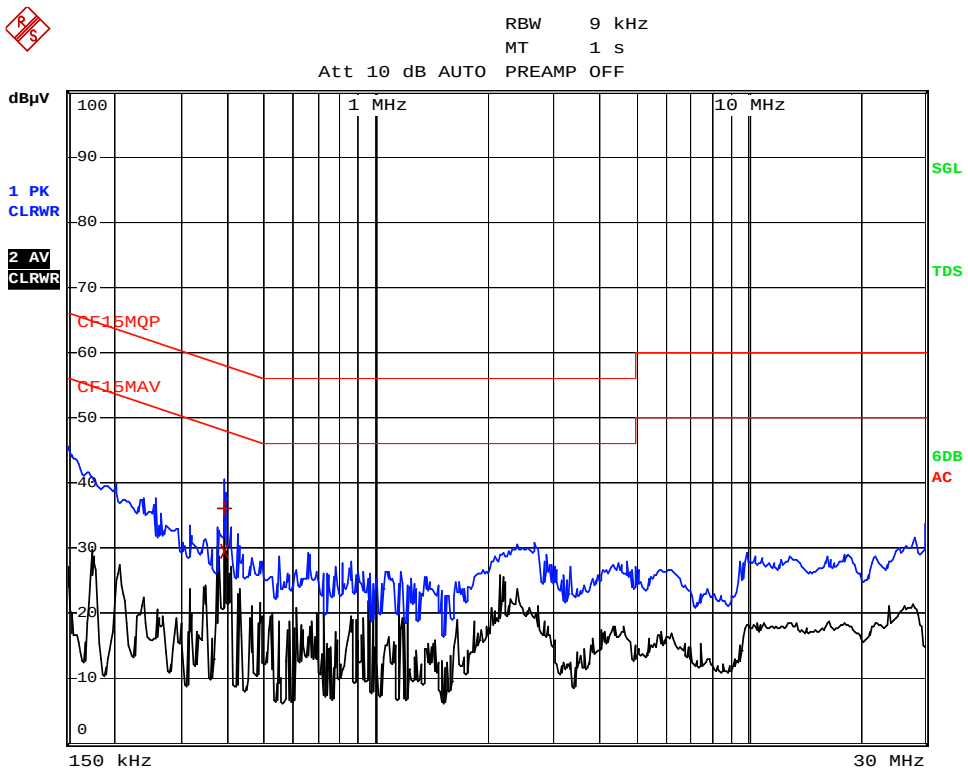
Worse Case Operating Mode: Transmitting

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	388.5 kHz	36.08	N	-22.00
2	CISPR Average	388.5 kHz	29.48	L1	-18.61



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Applicant: ALCO Electronics Ltd. Date of Test: June 17, 2013
Model: SBX5065KU / SBX5065KC
Worst-Case Operating Mode: Transmitting (Bluetooth)

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	102.2	33	29.4	98.6	30.1	68.5	94.0	-25.5
H	4804.000	57.7	33	34.9	59.6	30.1	29.5	54.0	-24.5
H	7206.000	49.3	33	37.9	54.2	30.1	24.1	54.0	-29.9
H	9608.000	48.8	33	40.4	56.2	30.1	26.1	54.0	-27.9
H	12010.000	48.1	33	40.5	55.6	30.1	25.5	54.0	-28.5
H	14412.000	46.2	33	40.0	53.2	30.1	23.1	54.0	-30.9

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	102.2	33	29.4	98.6	114.0	-15.4
H	4804.000	57.7	33	34.9	59.6	74.0	-14.4
H	7206.000	49.3	33	37.9	54.2	74.0	-19.8
H	9608.000	48.8	33	40.4	56.2	74.0	-17.8
H	12010.000	48.1	33	40.5	55.6	74.0	-18.4
H	14412.000	46.2	33	40.0	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. Data was collected by spectrum analyzer with 1MHz resolution bandwidth.

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Applicant: ALCO Electronics Ltd. Date of Test: June 17, 2013
Model: SBX5065KU / SBX5065KC
Worst-Case Operating Mode: Transmitting (Bluetooth)

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	102.7	33	29.4	99.1	30.1	69.0	94.0	-25.0
H	4884.000	57.1	33	34.9	59.0	30.1	28.9	54.0	-25.1
H	7326.000	49.1	33	37.9	54.0	30.1	23.9	54.0	-30.1
H	9768.000	48.6	33	40.4	56.0	30.1	25.9	54.0	-28.1
H	12210.000	47.8	33	40.5	55.3	30.1	25.2	54.0	-28.8
H	14652.000	46.7	33	38.4	52.1	30.1	22.0	54.0	-32.0

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	102.7	33	29.4	99.1	114.0	-14.9
H	4884.000	57.1	33	34.9	59.0	74.0	-15.0
H	7326.000	49.1	33	37.9	54.0	74.0	-20.0
H	9768.000	48.6	33	40.4	56.0	74.0	-18.0
H	12210.000	47.8	33	40.5	55.3	74.0	-18.7
H	14652.000	46.7	33	38.4	52.1	74.0	-21.9

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. Data was collected by spectrum analyzer with 1MHz resolution bandwidth.

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Worst-Case Operating Mode: Transmitting (Bluetooth)

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	102.4	33	29.4	98.8	30.1	68.7	94.0	-25.3
H	4960.000	56.7	33	34.9	58.6	30.1	28.5	54.0	-25.5
H	7440.000	49.2	33	37.9	54.1	30.1	24.0	54.0	-30.0
H	9920.000	48.2	33	40.4	55.6	30.1	25.5	54.0	-28.5
H	12400.000	46.8	33	40.5	54.3	30.1	24.2	54.0	-29.8
H	14880.000	46.8	33	38.4	52.2	30.1	22.1	54.0	-31.9

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	102.4	33	29.4	98.8	114.0	-15.2
H	4960.000	56.7	33	34.9	58.6	74.0	-15.4
H	7440.000	49.2	33	37.9	54.1	74.0	-19.9
H	9920.000	48.2	33	40.4	55.6	74.0	-18.4
H	12400.000	46.8	33	40.5	54.3	74.0	-19.7
H	14880.000	46.8	33	38.4	52.2	74.0	-21.8

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. Data was collected by spectrum analyzer with 1MHz resolution bandwidth.

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Applicant: ALCO Electronics Ltd. Date of Test: July 10, 2013
Model: SBX5065KU / SBX5065KC
Worst-Case Operating Mode: Transmitting (2.4GHz Wireless Module)

Table 4

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 - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2404.000	84.6	33	29.4	81.0	94.0	-13.0
H	4808.000	44.3	33	34.9	46.2	54.0	-7.8
H	7212.000	41.4	33	37.9	46.3	54.0	-7.7
H	9616.000	38.6	33	40.4	46.0	54.0	-8.0
H	12020.000	38.3	33	40.5	45.8	54.0	-8.2
H	14424.000	38.3	33	40.0	45.3	54.0	-8.7

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	2404.000	97.0	33	29.4	93.4	114.0	-20.6
H	4808.000	51.7	33	34.9	53.6	74.0	-20.4
H	7212.000	46.3	33	37.9	51.2	74.0	-22.8
H	9616.000	42.8	33	40.4	50.2	74.0	-23.8
H	12020.000	43.6	33	40.5	51.1	74.0	-22.9
H	14424.000	43.2	33	40.0	50.2	74.0	-23.8

NOTES:
1. Average and Peak Detector are used for emission measurement.
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. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

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Applicant: ALCO Electronics Ltd. Date of Test: July 10, 2013
Model: SBX5065KU / SBX5065KC
Worst-Case Operating Mode: Transmitting (2.4GHz Wireless Module)

Table 5

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 - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2444.000	84.7	33	29.4	81.1	94.0	-12.9
H	4888.000	44.6	33	34.9	46.5	54.0	-7.5
H	7332.000	41.4	33	37.9	46.3	54.0	-7.7
H	9776.000	38.8	33	40.4	46.2	54.0	-7.8
H	12220.000	38.4	33	40.5	45.9	54.0	-8.1
H	14664.000	40.3	33	38.4	45.7	54.0	-8.3

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	2444.000	97.2	33	29.4	93.6	114.0	-20.4
H	4888.000	51.6	33	34.9	53.5	74.0	-20.5
H	7332.000	46.3	33	37.9	51.2	74.0	-22.8
H	9776.000	42.8	33	40.4	50.2	74.0	-23.8
H	12220.000	43.5	33	40.5	51.0	74.0	-23.0
H	14664.000	44.8	33	38.4	50.2	74.0	-23.8

NOTES:
1. Average and Peak Detector are used for emission measurement.
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. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

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Applicant: ALCO Electronics Ltd. Date of Test: July 10, 2013
Model: SBX5065KU / SBX5065KC
Worst-Case Operating Mode: Transmitting (2.4GHz Wireless Module)

Table 6

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 - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2479.000	84.9	33	29.4	81.3	94.0	-12.7
H	4958.000	44.9	33	34.9	46.8	54.0	-7.2
H	7437.000	41.4	33	37.9	46.3	54.0	-7.7
H	9916.000	38.8	33	40.4	46.2	54.0	-7.8
H	12395.000	38.4	33	40.5	45.9	54.0	-8.1
H	14874.000	40.3	33	38.4	45.7	54.0	-8.3

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	2479.000	97.4	33	29.4	93.8	114.0	-20.2
H	4958.000	51.7	33	34.9	53.6	74.0	-20.4
H	7437.000	46.4	33	37.9	51.3	74.0	-22.7
H	9916.000	42.9	33	40.4	50.3	74.0	-23.7
H	12395.000	43.6	33	40.5	51.1	74.0	-22.9
H	14874.000	44.8	33	38.4	50.2	74.0	-23.8

NOTES:
1. Average and Peak Detector are used for emission measurement.
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. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

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

Applicant: ALCO Electronics Ltd. Date of Test: July 10, 2013
Model: SBX5065KU / SBX5065KC
Worst-Case Operating Mode: Simultaneous Transmitting (Bluetooth and 2.4GHz Wireless Module, all channels combinations had been considered)

Table 7

Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	4806.000	38.3	33	34.9	40.2	54.0	-13.8
H	4846.000	36.7	33	34.9	38.6	54.0	-15.4
H	4881.000	37.3	33	34.9	39.2	54.0	-14.8
H	4884.000	36.9	33	34.9	38.8	54.0	-15.2
H	4886.000	36.7	33	34.9	38.6	54.0	-15.4
H	4921.000	38.1	33	34.9	40.0	54.0	-14.0
H	4924.000	37.5	33	34.9	39.4	54.0	-14.6
H	4959.000	38.3	33	34.9	40.2	54.0	-13.8

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	4806.000	39.3	33	34.9	41.2	74.0	-32.8
H	4846.000	38.9	33	34.9	40.8	74.0	-33.2
H	4881.000	39.5	33	34.9	41.4	74.0	-32.6
H	4884.000	39.7	33	34.9	41.6	74.0	-32.4
H	4886.000	39.9	33	34.9	41.8	74.0	-32.2
H	4921.000	39.7	33	34.9	41.6	74.0	-32.4
H	4924.000	39.5	33	34.9	41.4	74.0	-32.6
H	4959.000	37.9	33	34.9	39.8	74.0	-34.2

NOTES: 1. Average and Peak Detector are used for emission measurement.

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. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.

6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

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Applicant: ALCO Electronics Ltd. Date of Test: July 10, 2013
Model: SBX5065KU / SBX5065KC
Worst-Case Operating Mode: Other Digital

Table 8

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)
H	125.365	35.6	16	14.0	33.6	43.5	-9.9
H	179.654	29.5	16	20.0	33.5	43.5	-10.0
H	192.356	35.0	16	16.0	35.0	43.5	-8.5
H	200.130	34.9	16	16.0	34.9	43.5	-8.6
H	210.023	34.6	16	17.0	35.6	43.5	-7.9
H	289.045	27.8	16	22.0	33.8	46.0	-12.2
H	300.013	31.6	16	22.0	37.6	46.0	-8.4
H	365.487	27.2	16	24.0	35.2	46.0	-10.8
H	480.562	24.6	16	26.0	34.6	46.0	-11.4

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.

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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 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.

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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 Measured Bandwidth

The plots 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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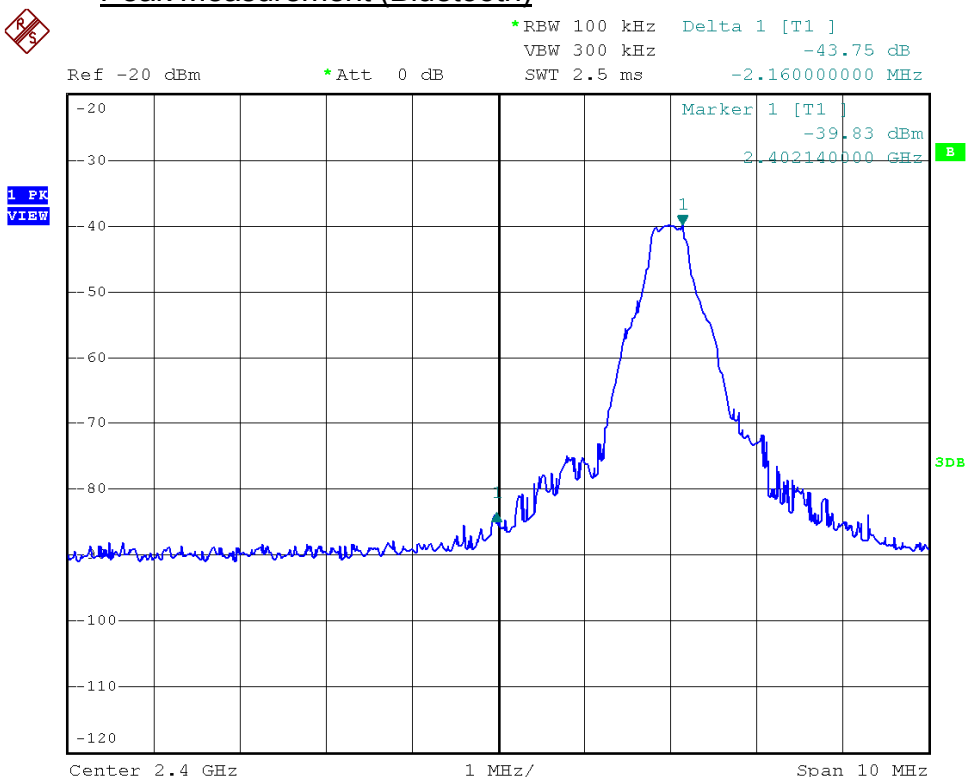
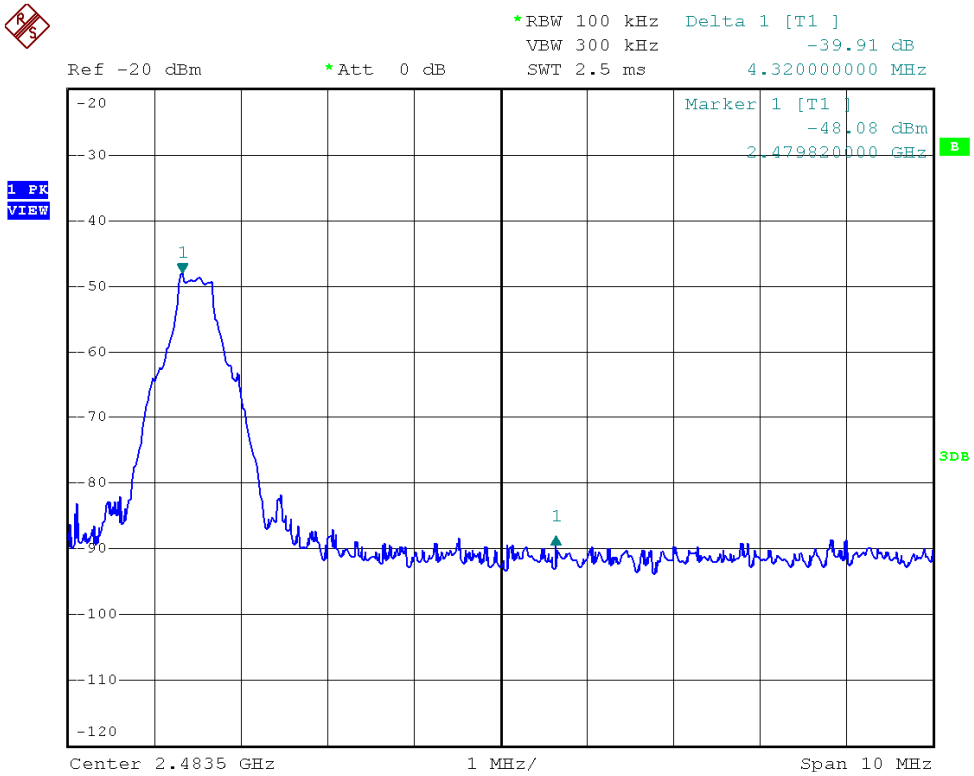
Peak Measurement (Bluetooth)





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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

=98.6 dBµV/m - 43.8 dB
=54.8 dBµV/m

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

=68.5 dBµV/m - 43.8 dB
=24.7 dBµV/m

Upper bandedge

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

=98.8 dBµV/m - 39.9 dB
=58.9 dBµV/m

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

=68.7 dBµV/m - 39.9 dB
=28.8 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).

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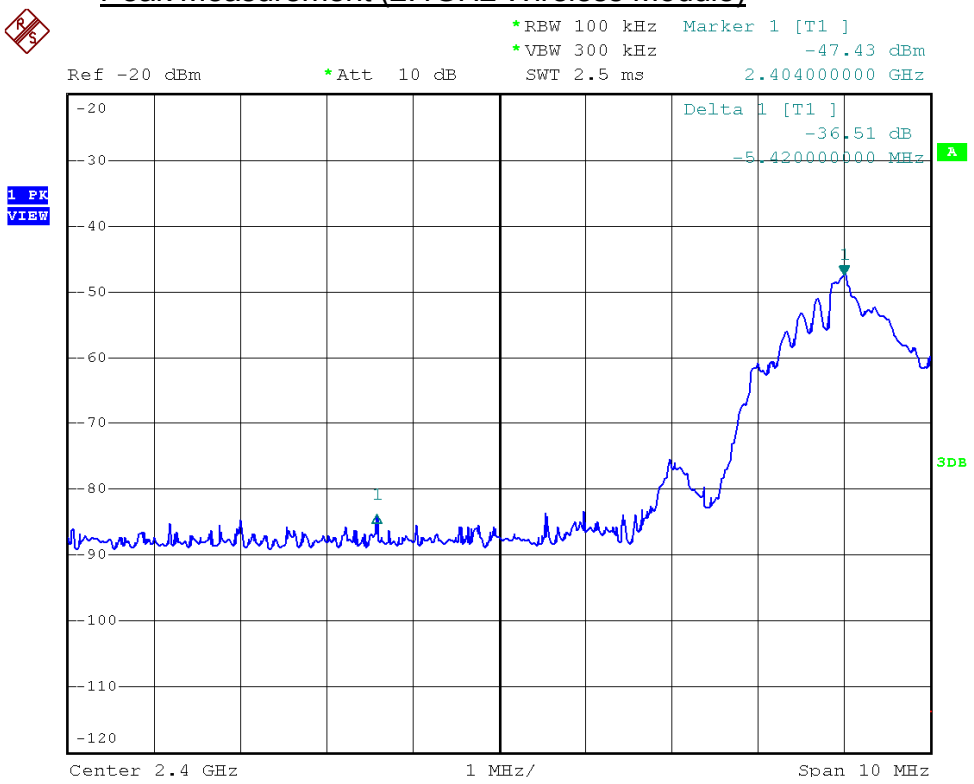
Peak Measurement (2.4GHz Wireless Module)



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Peak Measurement (2.4GHz Wireless module)

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

=93.4 dBµV/m – 36.5 dB
=56.9 dBµV/m

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

=81.0 dBµV/m – 36.5 dB
=44.5 dBµV/m

Upper bandedge

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

=93.8 dBµV/m – 44.3 dB
=49.5 dBµV/m

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

=81.3 dBµV/m – 44.3 dB
=37.0 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

(Bluetooth)
For Bluetooth, pulse desensitivity is not applicable for this device. The effective period (Teff) is approximately 3.75ms for a digital "1" bit which illustrated on technical specification, with a resolution bandwidth (3dB) of 1MHz, so the pulse desensitivity factor is 0dB.

(2.4GHz Wireless module)
For 2.4GHz Wireless Module, pulse desensitivity is not applicable for this device. Since the transmitter transmits the RF signal continuously.

8.3 Calculation of Average Factor

(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) 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

(2.4GHz Wireless module)
For 2.4GHz Wireless Module, 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 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.

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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 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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9.0 **Equipment List**

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Biconical Antenna	Log Periodic Antenna
Registration No.	EW-2500	EW-0954	EW-1042
Manufacturer	R&S	EMCO	EMCO
Model No.	ESCI	3104C	3148
Calibration Date	Mar. 22, 2013	Apr. 30, 2013	Apr. 25, 2012
Calibration Due Date	Feb. 28, 2014	Oct. 30, 2014	Oct. 25, 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-2500	EW-2874
Manufacturer	R&S	R&S
Model No.	ESCI	ENV-216
Calibration Date	Mar. 22, 2013	Aug. 15, 2012
Calibration Due Date	Feb. 28, 2014	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

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