TEST REPORT

Report No.: HK12051434-2

ALCO Electronics Ltd.

Application
For
Certification
(Original Grant)
(FCC ID: A2HSBX4250KN)
(IC: 9903A-SBX4250KN)

Transceiver

Prepared and Checked by:

Signed On File
Wong Cheuk Ho, Herbert
Engineer

Approved by:

Digitally signed by Terry Chan
Location: Intertek Testing Services Hong Kong Ltd.

Chan Chi Hung, Terry
Assistant Supervisor
Date: July 16, 2012

GENERAL INFORMATION

ALCO Electronics Ltd.
BRAND NAME: TOSHIBA, MODEL: SBX4250KN
FCC ID: A2HSBX4250KN
IC: 9903A-SBX4250KN

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:	2562 6121
Fax:	2597 5201
e-mail:	peggy@alco.com.hk
Manufacturer:	Dongguan Houjie Alco Elect General Fty
Manufacturer Address:	The 3rd Industrial District, Houjie, Dongguan, Guangdong, P.R.C.
Brand Name:	TOSHIBA
Model:	SBX4250KN
Type of EUT:	Transceiver
Description of EUT:	Sound Bar Speaker System
Serial Number:	N/A
FCC ID / IC:	A2HSBX4250KN / 9903A-SBX4250KN
Date of Sample Submitted:	May 23, 2012
Date of Test:	June 22, 2012
Report No.:	HK12051434-2
Report Date:	July 16, 2012
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

SUMMARY OF TEST RESULT

ALCO Electronics Ltd.
BRAND NAME: TOSHIBA, MODEL: SBX4250KN
FCC ID: A2HSBX4250KN
IC: 9903A-SBX4250KN

TEST SPECIFICATION	REFERENCE	RESULTS
Maximum Peak Output Power	15.247(b), (c) / RSS-210 A8.4	N/A
Hopping Channel Carrier Frequencies Separation	15.247(e) / RSS-210 A8.1	N/A
20dB Bandwidth of the Hopping Channel	15.247(a) / RSS-210 A8.1	N/A
Number of Hopping Frequencies	15.247(e) / RSS-210 A8.1	N/A
Average Time of Occupancy of Hopping Frequency	15.247(e) / RSS-210 A8.1	N/A
Antenna Conducted Spurious Emissions	15.247(d) / RSS-210 A8.5	N/A
Radiated Spurious Emissions	15.247(d) / RSS-210 A8.5	N/A
RF Exposure Compliance	15.247(i) / RSS-Gen 5.6	N/A
Transmitter Power Line Conducted Emissions	15.207 / RSS-Gen 7.2.4	Pass
Transmitter Field Strength	15.227 / RSS-310 3.8	N/A
Transmitter Field Strength	15.229 / RSS-210 A2.7	N/A
Transmitter Field Strength, Bandwidth and Timing Requirement	15.231(a) / RSS-210 A1.1.1	N/A
Transmitter Field Strength, Bandwidth and Timing Requirement	15.231(e) / RSS-210 A1.1.5	N/A
Transmitter Field Strength and Bandwidth Requirement	15.239 / RSS-210 A2.8	N/A
Transmitter Field Strength and Bandwidth Requirement	15.249 / RSS-210 A2.9	Pass
Transmitter Field Strength and Bandwidth Requirement	15.235 / RSS-310 3.9	N/A
Receiver / Digital Device Radiated Emissions	15.109 / RSS-210 2.5	N/A
Digital Device Conducted Emissions	15.107 / ICES-003	N/A

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.

Table of Contents

1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is Soundbar unit of the Sound Bar Speaker System. The EUT contains a pair of built-in stereo loudspeaker. It can accept input sources including aux-in, line-in, digital audio (optical) HDMI and Bluetooth device. The Bluetooth module in the EUT operating in the frequency range from 2402MHz to 2480MHz (79 channels with 1MHz channel spacing).

The system includes a separate wireless subwoofer unit in the product package. The audio signal is sent via the 2.4GHz Digital Wireless modules between the EUT and the subwoofer unit. The frequency range occupied by the 2.4GHz Digital Wireless modules for this product is 2404.5MHz - 2479.5MHz (16 channels with 5MHz channel spacing).

In this EUT, RF output power of Bluetooth is set at -8dBm during test. RF output power of 2.4GHz Digital Wireless Module is set at -12dBm during test.

The EUT is powered by 120VAC.

Antenna Type : Internal, Integral

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

1.2 Related Submittal(s) Grants

The Certification procedure of transceiver for this transceiver (with FCC ID: A2HSB93719SSW) is being processed as the same time of this application.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). 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.

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 (2003).

The device was powered by 120VAC 60Hz.

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.

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. Software Blue Tools
2. IBM ThinkPad X40 (MIS-1486)

3.0 Emission Results

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG - AV

where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

FS = RR + LF

where FS = Field Strength in dBµV/m
RR = RA - AG - AV in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

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

RR = 18.0 dBµV
LF = 9.0 dB

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

3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 2480.000 MHz

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

3.3 Radiated Emission Data

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

Judgment: Passed by 4.0 dB

3.4 Conducted Emission Configuration Photograph

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 over 20dB margin

Applicant: ALCO Electronics Ltd. Date of Test: June 22, 2012
Model: SBX4250KN
Worst-Case Operating Mode: Transmitting (2.4GHz Digital Wireless Module)

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)
V	2404.500	83.6	33	29.4	80.0	0	80.0	94.0	-14.0
V	4809.000	39.8	33	34.9	41.7	0	41.7	54.0	-12.3
V	7213.500	39.5	33	37.9	44.4	0	44.4	54.0	-9.6
V	9618.000	38.4	33	40.4	45.8	0	45.8	54.0	-8.2
V	12022.500	38.8	33	40.5	46.3	0	46.3	54.0	-7.7
V	14427.000	40.8	33	40.0	47.8	0	47.8	54.0	-6.2

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)
V	2404.500	83.6	33	29.4	80.0	114.0	-34.0
V	4809.000	39.8	33	34.9	41.7	74.0	-32.3
V	7213.500	39.5	33	37.9	44.4	74.0	-29.6
V	9618.000	38.4	33	40.4	45.8	74.0	-28.2
V	12022.500	38.8	33	40.5	46.3	74.0	-27.7
V	14427.000	40.8	33	40.0	47.8	74.0	-26.2

NOTES: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative sign in the column shows value below limit.

4. Horn antenna is used for the emission over 1000MHz.

Applicant: ALCO Electronics Ltd. Date of Test: June 22, 2012
Model: SBX4250KN
Worst-Case Operating Mode: Transmitting (2.4GHz Digital Wireless Module)

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)
V	2444.500	84.6	33	29.4	81.0	0	81.0	94.0	-13.0
V	4889.000	39.4	33	34.9	41.3	0	41.3	54.0	-12.7
V	7333.500	39.8	33	37.9	44.7	0	44.7	54.0	-9.3
V	9778.000	38.1	33	40.4	45.5	0	45.5	54.0	-8.5
V	12222.500	39.3	33	40.5	46.8	0	46.8	54.0	-7.2
V	14667.000	42.5	33	38.4	47.9	0	47.9	54.0	-6.1

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)
V	2444.500	84.6	33	29.4	81.0	114.0	-33.0
V	4889.000	39.4	33	34.9	41.3	74.0	-32.7
V	7333.500	39.8	33	37.9	44.7	74.0	-29.3
V	9778.000	38.1	33	40.4	45.5	74.0	-28.5
V	12222.500	39.3	33	40.5	46.8	74.0	-27.2
V	14667.000	42.5	33	38.4	47.9	74.0	-26.1

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.

Applicant: ALCO Electronics Ltd. Date of Test: June 22, 2012
Model: SBX4250KN
Worst-Case Operating Mode: Transmitting (2.4GHz Digital Wireless Module)

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)
V	2479.500	84.8	33	29.4	81.2	0	81.2	94.0	-12.8
V	4959.000	39.7	33	34.9	41.6	0	41.6	54.0	-12.4
V	7438.500	39.5	33	37.9	44.4	0	44.4	54.0	-9.6
V	9918.000	38.2	33	40.4	45.6	0	45.6	54.0	-8.4
V	12397.500	39.2	33	40.5	46.7	0	46.7	54.0	-7.3
V	14877.000	42.0	33	38.4	47.4	0	47.4	54.0	-6.6

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)
V	2479.500	84.8	33	29.4	81.2	114.0	-32.8
V	4959.000	39.7	33	34.9	41.6	74.0	-32.4
V	7438.500	39.5	33	37.9	44.4	74.0	-29.6
V	9918.000	38.2	33	40.4	45.6	74.0	-28.4
V	12397.500	39.2	33	40.5	46.7	74.0	-27.3
V	14877.000	42.0	33	38.4	47.4	74.0	-26.6

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.

Applicant: ALCO Electronics Ltd. Date of Test: June 22, 2012
Model: SBX4250KN
Worst-Case Operating Mode: Transmitting (Bluetooth)

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 - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	2402.000	91.6	33	29.4	88.0	0	88.0	94.0	-6.0
V	4804.000	46.7	33	34.9	48.6	0	48.6	54.0	-5.4
V	7206.000	40.6	33	37.9	45.5	0	45.5	54.0	-8.5
V	9608.000	39.2	33	40.4	46.6	0	46.6	54.0	-7.4
V	12010.000	41.0	33	40.5	48.5	0	48.5	54.0	-5.5
V	14412.000	41.4	33	40.0	48.4	0	48.4	54.0	-5.6

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)
V	2402.000	91.6	33	29.4	88.0	114.0	-26.0
V	4804.000	46.7	33	34.9	48.6	74.0	-25.4
V	7206.000	40.6	33	37.9	45.5	74.0	-28.5
V	9608.000	39.2	33	40.4	46.6	74.0	-27.4
V	12010.000	41.0	33	40.5	48.5	74.0	-25.5
V	14412.000	41.4	33	40.0	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.

Applicant: ALCO Electronics Ltd. Date of Test: June 22, 2012
Model: SBX4250KN
Worst-Case Operating Mode: Transmitting (Bluetooth)

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 - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	2442.000	92.6	33	29.4	89.0	0	89.0	94.0	-5.0
V	4884.000	46.6	33	34.9	48.5	0	48.5	54.0	-5.5
V	7326.000	41.1	33	37.9	46.0	0	46.0	54.0	-8.0
V	9768.000	39.4	33	40.4	46.8	0	46.8	54.0	-7.2
V	12210.000	41.4	33	40.5	48.9	0	48.9	54.0	-5.1
V	14652.000	42.8	33	38.4	48.2	0	48.2	54.0	-5.8

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)
V	2442.000	92.6	33	29.4	89.0	114.0	-25.0
V	4884.000	46.6	33	34.9	48.5	74.0	-25.5
V	7326.000	41.1	33	37.9	46.0	74.0	-28.0
V	9768.000	39.4	33	40.4	46.8	74.0	-27.2
V	12210.000	41.4	33	40.5	48.9	74.0	-25.1
V	14652.000	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.

Applicant: ALCO Electronics Ltd. Date of Test: June 22, 2012
Model: SBX4250KN
Worst-Case Operating Mode: Transmitting (Bluetooth)

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 - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	2480.000	93.6	33	29.4	90.0	0	90.0	94.0	-4.0
V	4960.000	46.9	33	34.9	48.8	0	48.8	54.0	-5.2
V	7440.000	40.8	33	37.9	45.7	0	45.7	54.0	-8.3
V	9920.000	39.0	33	40.4	46.4	0	46.4	54.0	-7.6
V	12400.000	40.8	33	40.5	48.3	0	48.3	54.0	-5.7
V	14880.000	42.6	33	38.4	48.0	0	48.0	54.0	-6.0

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)
V	2480.000	93.6	33	29.4	90.0	114.0	-24.0
V	4960.000	46.9	33	34.9	48.8	74.0	-25.2
V	7440.000	40.8	33	37.9	45.7	74.0	-28.3
V	9920.000	39.0	33	40.4	46.4	74.0	-27.6
V	12400.000	40.8	33	40.5	48.3	74.0	-25.7
V	14880.000	42.6	33	38.4	48.0	74.0	-26.0

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.

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.

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

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 (2003) 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).

Peak Measurement (2.4GHz Digital Wireless Module)

Bandedge compliance is determined by applying marker-delta method, i.e. (2.4GHz Digital Wireless Module Bandedge Plot).

Lower bandedge (2.4GHz Digital Wireless Module)

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

=80.0 dBµV/m – 31.2 dB
=48.8 dBµV/m

Upper bandedge (2.4GHz Digital Wireless Module)

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

=81.2 dBµV/m – 31.9 dB
=49.3 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).

8.1 Measured Bandwidth (Cont'd)

Peak Measurement (Bluetooth)

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

Lower bandedge (Bluetooth)

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

=88.0 dBµV/m – 50.4 dB
=37.6 dBµV/m

Upper bandedge (Bluetooth)

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

=90.0 dBµV/m – 55.2 dB
=34.8 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).

8.2 Discussion Pulse Desensitivity

Pulse desensitivity is not applicable for this device. Since the transmitter transmits the RF signal continuously.

8.3 Calculation of Average Factor

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

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 - 2003. 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.

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 - 2003.

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

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

9.0 **Equipment List**

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer
Registration No.	EW-2500	EW-2188
Manufacturer	R&S	AGILENTTECH
Model No.	ESCI	E4407B
Calibration Date	Feb. 24, 2012	Sep. 26, 2011
Calibration Due Date	Feb. 24, 2013	Sep. 26, 2012

Equipment	Double Ridged Guide Antenna	14m Double Shield RF Cable (20MHz - 6GHz)
Registration No.	EW-1133	EW-2528
Manufacturer	EMCO	RADIALL
Model No.	3115	nm / br5d / sma 14m
Calibration Date	Mar. 02, 2011	Nov. 29, 2011
Calibration Due Date	Sep. 02, 2012	Dec. 14, 2012

Equipment	14m Double Shield RF Cable (9kHz - 6GHz)	14m RF High Frequency Cable (1 - 18)GHz	RF Amplifiers (100MHz to 12GHz) 2 Pieces
Registration No.	EW-2375	EW-2552	EW-1779
Manufacturer	RADIALL	RADIALL	MITEQ
Model No.	n m/br56/bnc m 14m	SHF5M sma m - sma m ra	AMF-4D-001120-34-13P
Calibration Date	Sep. 09, 2011	Aug. 17, 2011	Aug. 04, 2011
Calibration Due Date	Sep. 12, 2012	Sep. 03, 2012	Aug. 01, 2012

2) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN
Registration No.	EW-2500	EW-2041
Manufacturer	R&S	KYORITSU
Model No.	ESCI	KNW-403D
Calibration Date	Feb. 24, 2012	Jan. 05, 2012
Calibration Due Date	Feb. 24, 2013	Dec. 31, 2012

3) Bandedge Measurement

Equipment	Spectrum Analyzer
Registration No.	EW-1792
Manufacturer	R&S
Model No.	FSP40
Calibration Date	Sep. 28, 2011
Calibration Due Date	Sep. 28, 2012