

TEST REPORT

Report No.: HK11100108-1

Lightspeed Technologies Inc.

Application
For
Certification
(Original Grant)
(FCC ID: ORV-FCCB)
(IC: 1732B-FCCB)

Transceiver

Prepared and Checked by:

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Date: November 30, 2011

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GENERAL INFORMATION

Lightspeed Technologies Inc.

BRAND NAME: Lightspeed, MODEL: FCCB

FCC ID: ORV-FCCB

IC: 1732B-FCCB

Grantee:	Lightspeed Technologies Inc.
Grantee Address:	11509 SW Herman Rd., Tualatin, OR 97062, USA.
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Manufacturer:	Lightspeed Technologies Inc.
Manufacturer Address:	11509 SW Herman Rd., Tualatin, OR 97062, USA.
Brand Name:	Lightspeed
Model:	FCCB
Type of EUT:	Transceiver
Description of EUT:	FLEXCAT Charging Base Station
Serial Number:	N/A
FCC ID / IC	ORV-FCCB / 1732B-FCCB
Date of Sample Submitted:	October 04, 2011
Date of Test:	October 11, 2011
Report No.:	HK11100108-1
Report Date:	November 30, 2011
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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IC: 1732B-FCCB

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SUMMARY OF TEST RESULT

Lightspeed Technologies Inc.

BRAND NAME: Lightspeed, MODEL: FCCB

FCC ID: ORV-FCCB

IC: 1732B-FCCB

TEST SPECIFICATION	REFERENCE	RESULTS
Maximum Peak Output Power	15.247(b), (c) / RSS-210 A8.4	Pass
6 dB Bandwidth	15.247(a)(2) / RSS-210 A8.2	Pass
Maximum Power Density	15.247(e) / RSS-210 A8.2	Pass
Out of Band Antenna Conducted Emission	15.247(d) / RSS-210 A8.5	Pass
Radiated Emission in Restricted Bands	15.247(d)	Pass
Radiated Spurious Emissions	15.247(d) / RSS-210 A8.5	Pass
Transmitter Power Line Conducted Emissions	15.207 / RSS-Gen 7.2.2	Pass
Digital Device Radiated emissions	15.109 / ICES-003	Pass
Antenna Requirement	15.203	Pass (See Note 1)
Receiver Radiated Emissions	RSS-210 2.5	Pass

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.

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1.0 General Description

1.1 Product Description

The Equipment under test (EUT) is a transceiver for a charging base unit of an Audio system for group learning machine. This device has contains two RF features on it. One is IEEE 802.15.4 standard (Zigbee) RF4CE portion and one is DECT RF portion. For RF4CE portion, which is operating at 2425MHz, 2450MHz and 2475MHz. There are three channels were used. Once the EUT received the control signal from the corresponding handheld remote control. It will transfer the control signal to DECT portion for communicate with speaker and belt-pack.

Key specification of base station;

- DC Power Input: 16V / 2.0A
- Cradle Charging: 1-4 group speakers; 1-2 teacher belt-packs; 1-2 handheld remotes
- DC Charge out: 16V / 0.3A for 1-2 additional group speakers
- Audio Inputs: 3.5mm stereo x 2
- Wireless communication: DECT 1.9 GHz wideband for audio connections; RF4CE for control signals

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: ORV-FCHRC and IC: 1732B-FCHRC) is being processed as the same time of this application.

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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 (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.

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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 (2003).

The device was powered by AC/DC Adaptor (Model: DSA-0421S-14 1, Input: 100-240VAC~50/60Hz 1.2A, Output: 16VDC 2A).

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 placed on turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

The set-up configuration is according to the client's instruction for testing.

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 Lightspeed Technologies Inc. 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. AC/DC Adaptor (Provided by Applicant)
(Model: DSA-0421S-14 1, Input: 100-240VAC~50/60Hz 1.2A, Output: 16VDC 2A)
2. Walkman (Provided by Intertek)
3. iPod (Provided by Intertek)
4. 0.93 meter audio cable X2 (Provided by Intertek)
5. 2 x FLEXCAT Student Group Speaker, Model: FCGS, FCC ID: ORV- FCGS
(Supplied by Client)
6. 2 x DC charging cables for optional group speakers with 1 meter long
(Supplied by Client)

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

Assume a receiver reading of 52.0 dB μ V 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 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V/m	
AF = 7.4 dB	RR = 18.0 dB μ V
CF = 1.6 dB	LF = 9.0 dB
AG = 29.0 dB	
AV = 5.0 dB	
FS = RR + LF	
FS = 18 + 9 = 27 dB μ V/m	

Level in μ V/m = Common Antilogarithm [(27 dB μ V/m)/20] = 22.4 μ V/m

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3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 4850.000 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 2.6 dB

3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 2.706 MHz

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

3.5 Conducted Emission Data

For electronic filing, the graph and data table of conducted emission is saved with filename: conducted.pdf.

Judgment: Passed by 17.47 dB

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4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(3):

Test Setup:

The antenna power of the EUT was connected to the input of a spectrum analyzer. Cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm).

Frequency (MHz)	Maximum Antenna Gain = 1.5 dBi	
	Output in dBm	Output in mWatt
Lowest Channel: 2425.000	-1.55	0.70
Middle Channel: 2450.000	-1.73	0.67
Highest Channel: 2475.000	-2.01	0.63

EUT dBm max. output level = -1.55 dBm (+30 dBm or less)

Cable loss: 0.3 dB

Limit: = 30 dBm

Refer to the following plots for Conducted Output Power.

Plot B1A: Lowest Channel Output Power
Plot B1B: Middle Channel Output Power
Plot B1C: Highest Channel Output Power

For electronic filing, the above plots are saved with filename: maxop.pdf.

For RF Safety, the information is saved with filename: RF exposure.pdf.

4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Frequency (MHz)	6 dB Bandwidth (kHz)
2425.000	1616
2450.000	1616
2475.000	1616

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Cable loss: 0.3 dB

Limit: at least 500kHz

Refer to the following plots for 6dB bandwidth sharp.

Plot B2A: Lowest Channel 6dB RF bandwidth

Plot B2B: Middle Channel 6dB RF bandwidth

Plot B3C: Highest Channel 6dB RF bandwidth

For electronic filing, the above plots are saved with filename: 6dB.pdf

4.3 Maximum Power Density Reading, FCC Rule 15.247(e)

The spectrum analyzer RES BW was set to 3kHz. In order to look for a peak, the START and STOP frequencies were set to the band edges of the maximum output passband. If there is no clear maximum amplitude in any given portion of the band, it may be necessary to make measurements at a number of bands defined by several START and STOP frequency pairs.

Frequency Span = 1.5 MHz

Sweep Time = 500 seconds

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are added to the analyzer raw readings.

Frequency (MHz)	Power Density (dBm/3kHz)
2425.000	-15.43
2450.000	-16.10
2475.000	-15.78

Peak Power Density = -15.43 dBm/3kHz

Cable loss: 0.3 dB

Limit: 8dBm/ 3kHz

Refer to the following plots for Power density data.

Plot B3A: Lowest Channel Power Density

Plot B3B: Middle Channel Power Density

Plot B3C: Highest Channel Power Density

For electronic filing, the above plots are saved with filename: maxpd.pdf

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4.4 Out of Band Conducted Emissions, FCC Rule 15.247(d)

In any 100 kHz bandwidth outside the EUT passband, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20dB below that of the maximum in-band 100 kHz emission, or else shall meet the general limits for radiated emissions at frequencies outside the passband, whichever results in lower attenuation.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

The plots showed all spurious emission up to the tenth harmonic. They were found to be at least 20 dB below the highest level of the desired power in the passband.

Refer to the following plots for out of band conducted emissions data:

Plot B4A1 – B4A2: Lowest Channel Emissions
Plot B4B1 – B4B2: Middle Channel Emissions
Plot B4C1 – B4C2: Highest Channel Emissions
Plot B4D1 – B4D2: Modulation Product Emissions

For the electronic filing, the above plots are saved with filename: obantcon.pdf

4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(d):

For out of band emissions that are close to or that exceed the 20dB attenuation requirement described in the specification, radiated measurements were performed at a 3m separation distance to determine whether these emissions complied with the general radiated emission requirement.

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b), (c):

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. All measurements were performed with peak detection unless otherwise specified.

The following data list the significant emission frequencies, the limit and the margin of compliance.

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Frequency (MHz)	OATS radiated field strength at carrier frequency measured at 3m (dB μ V/m)	Attenuation (dBc)	Calculated radiated field strength at the bandage (dB μ V/m)
2483.5	Peak	53.46	Peak
	92.6		39.14

Limit:

The average radiated field strength at bandedge should be smaller than 54 dB μ V/m and the peak radiated field strength at bandedge should be smaller than 74 dB μ V/m. Therefore, the resultant field strength meets the general radiated emission limit in section 15.209.

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4.7 Radiated Spurious Emissions

Applicant: Lightspeed Technologies Inc.
 Model: FCCB
 Worst-Case Operating Mode: Tx

Date of Test: October 11, 2011

Table 1
Radiated Emissions
Pursuant to FCC Part 15 Section 15.247: Emissions Requirement

Lowest Channel

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Average Factor (dB)	Calculated at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
H	4850.000	49.5	33	34.9	51.4	0	51.4	54.0	-2.6
H	7275.000	45.7	33	37.9	50.6	0	50.6	54.0	-3.4
H	9700.000	42.8	33	40.4	50.2	0	50.2	54.0	-3.8
H	12125.000	42.1	33	40.5	49.6	0	49.6	54.0	-4.4
H	14550.000	43.8	33	38.4	49.2	0	49.2	54.0	-4.8

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
H	4850.000	49.5	33	34.9	51.4	74.0	-22.6
H	7275.000	45.7	33	37.9	50.6	74.0	-23.4
H	9700.000	42.8	33	40.4	50.2	74.0	-23.8
H	12125.000	42.1	33	40.5	49.6	74.0	-24.4
H	14550.000	43.8	33	38.4	49.2	74.0	-24.8

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. The simultaneous transmission was investigated and no new emissions were found, when radiated data for simultaneous transmission is no worse than individual tests.

* Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000MHz and average limit for frequencies over 1000MHz.

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Applicant: Lightspeed Technologies Inc.
 Model: FCCB
 Worst-Case Operating Mode: Tx

Date of Test: October 11, 2011

Table 2
Radiated Emissions
Pursuant to FCC Part 15 Section 15.247: Emissions Requirement

Middle Channel

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Average Factor (dB)	Calculated at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
H	4900.000	49.4	33	34.9	51.3	0	51.3	54.0	-2.7
H	7350.000	45.6	33	37.9	50.5	0	50.5	54.0	-3.5
H	9800.000	42.8	33	40.4	50.2	0	50.2	54.0	-3.8
H	12250.000	42.3	33	40.5	49.8	0	49.8	54.0	-4.2
H	14700.000	44.0	33	38.4	49.4	0	49.4	54.0	-4.6

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
H	4900.000	49.4	33	34.9	51.3	74.0	-22.7
H	7350.000	45.6	33	37.9	50.5	74.0	-23.5
H	9800.000	42.8	33	40.4	50.2	74.0	-23.8
H	12250.000	42.3	33	40.5	49.8	74.0	-24.2
H	14700.000	44.0	33	38.4	49.4	74.0	-24.6

- 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. The simultaneous transmission was investigated and no new emissions were found, when radiated data for simultaneous transmission is no worse than individual tests.
- * Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000MHz and average limit for frequencies over 1000MHz.

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Applicant: Lightspeed Technologies Inc.
 Model: FCCB
 Worst-Case Operating Mode: Tx

Date of Test: October 11, 2011

Table 3
Radiated Emissions
Pursuant to FCC Part 15 Section 15.247: Emissions Requirement

Highest Channel

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Average Factor (dB)	Calculated at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
H	4950.000	49.3	33	34.9	51.2	0	51.2	54.0	-2.8
H	7425.000	45.2	33	37.9	50.1	0	50.1	54.0	-3.9
H	9900.000	42.6	33	40.4	50.0	0	50.0	54.0	-4.0
H	12375.000	42.1	33	40.5	49.6	0	49.6	54.0	-4.4
H	14850.000	43.9	33	38.4	49.3	0	49.3	54.0	-4.7

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
H	4950.000	49.3	33	34.9	51.2	74.0	-22.8
H	7425.000	45.2	33	37.9	50.1	74.0	-23.9
H	9900.000	42.6	33	40.4	50.0	74.0	-24.0
H	12375.000	42.1	33	40.5	49.6	74.0	-24.4
H	14850.000	43.9	33	38.4	49.3	74.0	-24.7

- 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. The simultaneous transmission was investigated and no new emissions were found, when radiated data for simultaneous transmission is no worse than individual tests.
- * Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000MHz and average limit for frequencies over 1000MHz.

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Applicant: Lightspeed Technologies Inc.
Model: FCCB
Worst-Case Operating Mode: On

Date of Test: October 11, 2011

Table 4
Radiated Emissions
Pursuant to Part 15 Section 109: Emissions Requirement

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	38.285	39.9	16	10.0	33.9	40.0	-6.1
V	45.372	39.6	16	10.0	33.6	40.0	-6.4
H	54.685	39.4	16	11.0	34.4	40.0	-5.6
H	108.275	36.5	16	14.0	34.5	43.5	-9.0
H	132.429	35.2	16	14.0	33.2	43.5	-10.3
H	165.386	31.6	16	17.0	32.6	43.5	-10.9

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.

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Applicant: Lightspeed Technologies Inc.
 Model: FCCB
 Worst-Case Operating Mode: Rx

Date of Test: October 11, 2011

Table 5
Radiated Emissions
Pursuant to RSS210 Emissions Requirement

Lowest Channel

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	2425.000	44.2	33	29.4	40.6	54.0	-13.4
V	4850.000	38.5	33	34.9	40.4	54.0	-13.6
V	7275.000	35.1	33	37.9	40.0	54.0	-14.0
V	9700.000	32.4	33	40.4	39.8	54.0	-14.2
V	12125.000	32.1	33	40.5	39.6	54.0	-14.4

Middle Channel

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	2450.000	44.1	33	29.4	40.5	54.0	-13.5
V	4900.000	38.5	33	34.9	40.4	54.0	-13.6
V	7350.000	35.4	33	37.9	40.3	54.0	-13.7
V	9800.000	32.2	33	40.4	39.6	54.0	-14.4
V	12250.000	31.9	33	40.5	39.4	54.0	-14.6

High Channel

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	2475.000	44.4	33	29.4	40.8	54.0	-13.2
V	4950.000	38.5	33	34.9	40.4	54.0	-13.6
V	7425.000	35.2	33	37.9	40.1	54.0	-13.9
V	9900.000	32.4	33	40.4	39.8	54.0	-14.2
V	12375.000	31.9	33	40.5	39.4	54.0	-14.6

NOTES: 1. Peak Detector Data unless otherwise stated.

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

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

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

INTERTEK TESTING SERVICES

5.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.pdf and internal photos.pdf.

6.0 Product Labelling

For electronics filing, the FCC ID and IC label artwork and the label location are saved with filename: label.pdf.

7.0 Technical Specifications

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

8.0 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.

9.0 Discussion Pulse Desensitivity

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

9.1 Calculation of Average Factor

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

INTERTEK TESTING SERVICES

9.2 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.

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

INTERTEK TESTING SERVICES

9.2 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.

10.0 Confidentiality Request

For electronic filing, a preliminary copy of the confidentiality request is saved with filename: request.pdf.

INTERTEK TESTING SERVICES

11.0 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	Jan. 25, 2011	Apr. 14, 2010	Apr. 26, 2010
Calibration Due Date	Jan. 25, 2012	Oct. 14, 2011	Oct. 26, 2011

Equipment	Spectrum Analyzer	Double Ridged Guide Antenna
Registration No.	EW-2253	EW-1133
Manufacturer	R&S	EMCO
Model No.	FSP40	3115
Calibration Date	Nov. 23, 2010	Mar. 02, 2011
Calibration Due Date	Nov. 23, 2011	Sep. 02, 2012

2) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN	Pulse Limiter
Registration No.	EW-2251	EW-0192	EW-0698
Manufacturer	R&S	R&S	R&S
Model No.	ESCI	ESH3-Z5	ESH3-Z2
Calibration Date	May 06, 2011	Nov. 30, 2010	Mar. 11, 2011
Calibration Due Date	May 06, 2012	Nov. 30, 2011	Mar. 11, 2012

3) Bandedge Measurement

Equipment	Spectrum Analyzer 30GHz
Registration No.	EW-2249
Manufacturer	R&S
Model No.	FSP30
Calibration Date	Oct. 22, 2010
Calibration Due Date	Oct. 22, 2011