Lab Code: 200167-0

FCC PART 15.231
MEASUREMENT AND TEST REPORT

For

K&J Electronics

#103-603, Buchun Techno-Park
#364, Samjung-dong, Ojung-gu,
Buchun-city, Kyunggi-do, Korea 421-809

FCC ID: UNYEWPT202
Model: EWPT-202

Report Type:	**Product Type:**
☒ Class II Permissive Change: Supplemental Report (rev.1)	Outdoor Wireless Motion Sensor

Test Engineer:	Xiao Ming Hu
Report Number:	R07111215-a
Report Date:	2007-12-11
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DOCUMENT REVISION HISTORY

Revision #	Report Number	Description of Revision	Date of Revision
0	R07111215	Original Report	2007-12-04
1	R07111215-a	Revised Company Address	2007-12-11

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *K&J Electronics* product, FCC ID: *UNYEWPT202*, model: *EWPT-202* of the EUT as hereinafter referred is an Infrared Sensor/ Transmitter. The device is designed to act as an entry/exit sensor employed for commercial, industrial or areas of high foot traffic. The EUT wirelessly transmits notifications of exit or entry to a separate receiver which contains the digital counter as well audio notification.

Mechanical Description

The *K&J Electronics* product, *FCCID: UNYEWPT202* in this report is a Infrared Sensor/ Transmitter which measures approximately 110 mm (L) x 75 mm (W) x 60 mm (H) and weighs approximately 650 g (including AC/DC adapter). The EUT is of metallic construction and designed to operate at 315 MHz.

** The test data gathered are from production sample, serial numbers: 08398 (receiver SN: 08199), and 08397 (receiver SN: 08200), assigned by the manufacturer.*

EUT Photo

Additional Photos in Exhibit C

Objective

This Class II Permissive Change supplemental report is prepared on behalf of *K&J Electronics* in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commissions rules.

K&J has changed the circuit board layout as well as the processor; the testing featured in this report was conducted in order to verify continued compliance with the applicable FCC part 15 rules.

Related Submittal(s)/Grant(s)

No Related Submittals

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 –2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurements were performed at BACL.

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values range from $\pm$2.0 for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL.

Detailed instrumentation measurement uncertainties can be found in BACL report QAP-018.

Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test sites at BACL have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: C-2463 and R-2698. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm

SYSTEM TEST CONFIGURATION

Justification

The EUT was tested in accordance with ANSI C63.4-2003.

EUT Exercise Software

None, the EUT was exercised in normal operating mode as detailed in the *K&J Electronics* provided instructions.

Special Accessories

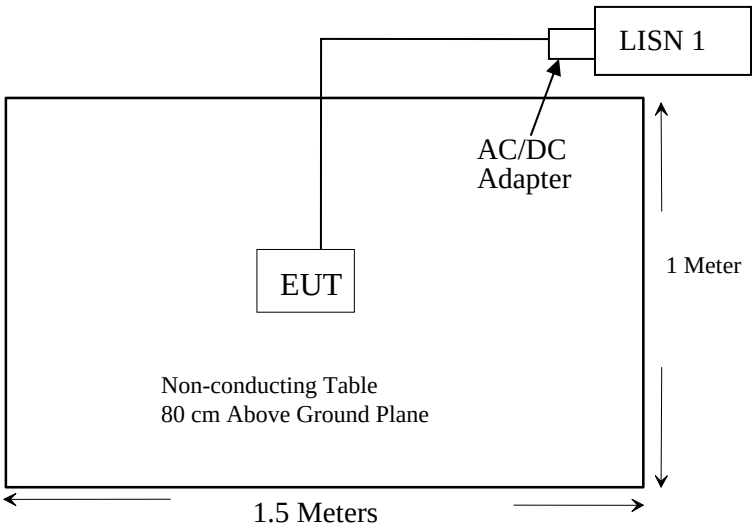
None.

Equipment Modifications

No modifications were made to the EUT.

Test Setup Block Diagram (for radiated/field strength testing)

5 meter semi-anechoic chamber



SUMMARY OF TEST RESULTS

FCC Rules	Requirements	Result
§15.203	Antenna Requirement	Compliant*
§15.205	Restricted Bands of Operation	Compliant*
§15.207	**Conducted Emissions**	**Compliant**
§15.209	Radiated Emissions, General Requirements	Compliant*
§15.231 (a)	**Periodic operation at 40.66 MHz, 40.70 MHz and above 70 MHz**	**Compliant**
§15.231 (a) (1)	5 second manual deactivation	N/A**
§15.231 (a) (2)	5 second automatic deactivation	Compliant*
§15.231 (a) (3)	Non predetermined transmission intervals. Aggregate Tx <2s/hr.	N/A**
§15.231 (a) (4)	Transmissions during an emergency	N/A**
§15.231 (a) (5)	15.211 (a)(1) & (a)(2) may be up to 10 seconds during professional installation	N/A**
§15.231 (b)	**Field strength of emissions**	**Compliant**
§15.231 (b) (1)	Field strength limits at 3 meters	Compliant*
§15.231 (b) (2)	Field strength; average or QP, 15.35 for averaging pulsed emissions and for limiting peak emissions) or QP detector	Compliant*
§15.231 (b) (3)	F/S Limits of spurious emissions	Compliant*
§15.231 (c)	**Emission B/W**	**Compliant**
§15.231 (d)	40.66–40.70 MHz; Frequency and Voltage Tolerance	N/A**
§15.231 (e)	Relaxed restrictions with reduced F/S limits	N/A**

** Please see original K&J Electronics submission for FCC ID UNYEWPT202 (BACL project number R0609216) for detailed test results.*
*** N/A: The device either does not employ functionality relating to the specific requirement or employs alternate functionality covered by the standard.*

§15.207 – CONDUCTED EMISSIONS

Applicable Standard

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

☒ **Compliant** ☐ **N/A**

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Solar Electronics CO	Artificial-Mains Network	9252-50-R-24-N	0511213	2007-07-31
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.595 0K03	100044	2007-02-19

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emissions test, the power cord of the EUT was connected to the mains outlet of the LISN-1.

All data was recorded in the peak detection mode, quasi-peak and average.

Test Results Summary

According to the recorded data, the EUT complied with the FCC part 15 subpart C Conducted emissions limits, with the worst margin reading of:

-35.5 dB at **4.344000 MHz** in the **Hot** conductor mode
-35.5 dB at **3.592500 MHz** in the **Neutral** conductor mode

Conducted Emissions Test Data

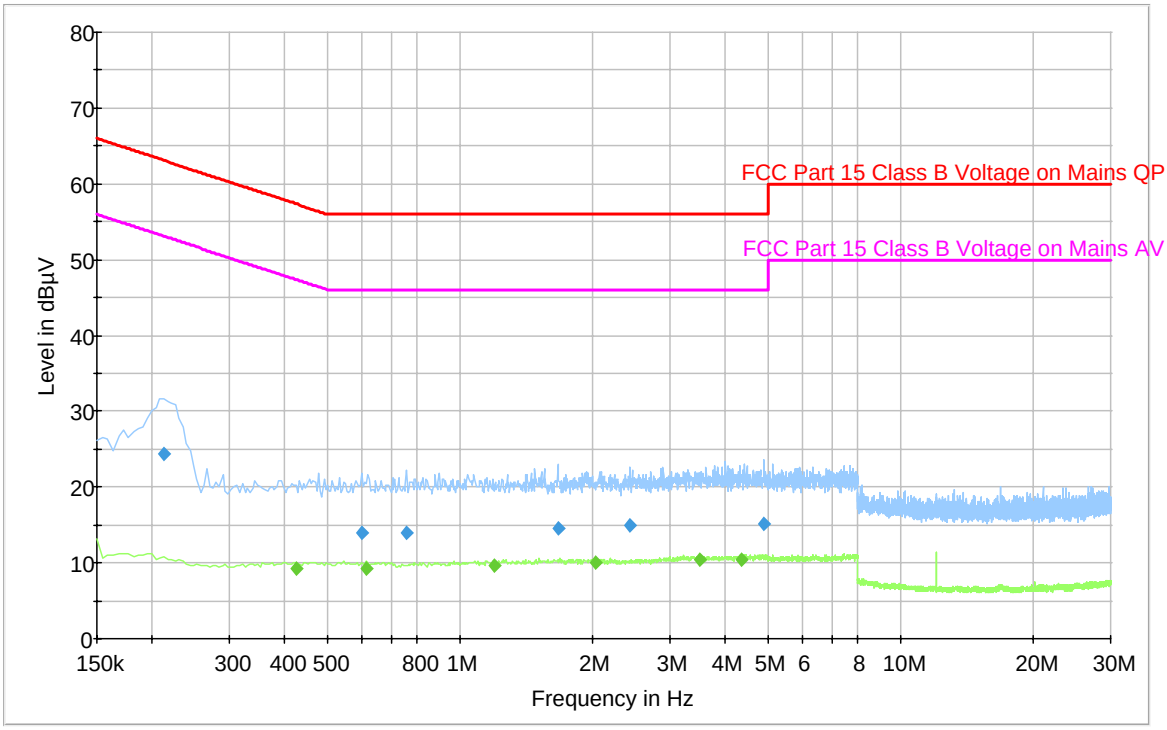
Environmental Conditions

Temperature:	20 °C
Relative Humidity:	40 %
ATM Pressure:	101.2 kPa

**Testing was performed by Xiao Ming Hu 2007-11-30.*

Conducted Emissions Test Plot & data

120 V/ 60 Hz – Hot Conductor



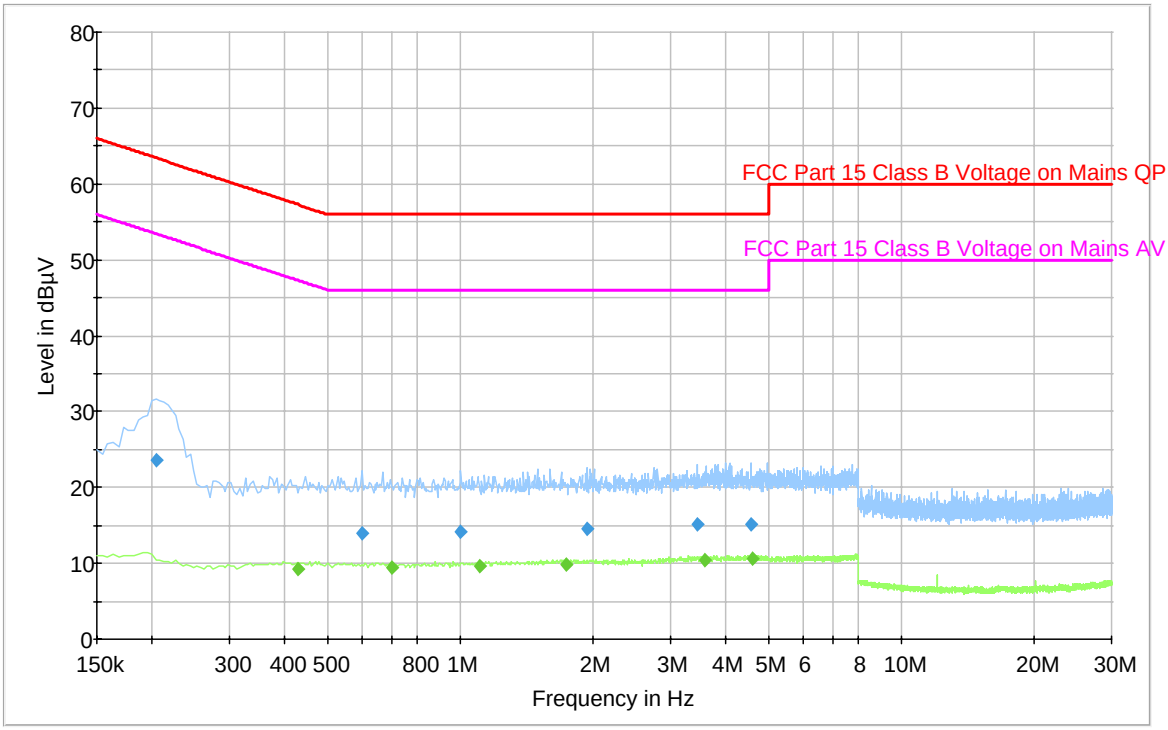
QP Measurements

Frequency (MHz)	Quasi-Peak (dBµV)	Conductor (Hot/Neutral)	Limit (dBµV)	Margin (dB)
0.213000	24.4	Hot	63.1	-38.6
4.897500	15.2	Hot	56.0	-40.8
2.431500	14.9	Hot	56.0	-41.1
1.671000	14.6	Hot	56.0	-41.4
0.600000	14.0	Hot	56.0	-42.0
0.757500	14.0	Hot	56.0	-42.0

Average Measurements

Frequency (MHz)	Average (dBµV)	Conductor (Hot/Neutral)	Limit (dBµV)	Margin (dB)
4.344000	10.5	Hot	46.0	-35.5
3.516000	10.4	Hot	46.0	-35.6
2.035500	10.1	Hot	46.0	-35.9
1.194000	9.6	Hot	46.0	-36.4
0.613500	9.3	Hot	46.0	-36.7
0.424500	9.2	Hot	47.4	-38.2

120 V/ 60 Hz – Neutral Conductor



QP Measurements

Frequency (MHz)	Quasi-Peak (dBµV)	Conductor (Hot/Neutral)	Limit (dBµV)	Margin (dB)
0.204000	23.5	Neutral	63.4	-39.9
3.448500	15.2	Neutral	56.0	-40.8
4.560000	15.2	Neutral	56.0	-40.8
1.945500	14.6	Neutral	56.0	-41.4
1.005000	14.1	Neutral	56.0	-41.9
0.600000	14.0	Neutral	56.0	-42.0

Average Measurements

Frequency (MHz)	Average (dBµV)	Conductor (Hot/Neutral)	Limit (dBµV)	Margin (dB)
3.592500	10.5	Neutral	46.0	-35.5
4.614000	10.5	Neutral	46.0	-35.5
1.734000	9.9	Neutral	46.0	-36.1
1.108500	9.6	Neutral	46.0	-36.4
0.699000	9.3	Neutral	46.0	-36.7
0.429000	9.2	Neutral	47.3	-38.1

§15.231(a) – PERIODIC OPERATION IN THE BAND 40.66 – 40.70 MHz AND ABOVE 70 MHz

Applicable Standard Requirement

(a) The provisions of this Section are restricted to periodic operation within the band 40.66 - 40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this Section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:

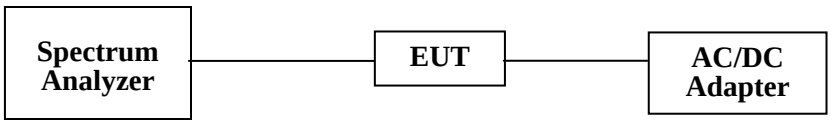
(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Spectrum Analyzer	E4446A	US44300386	2007-04-26

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

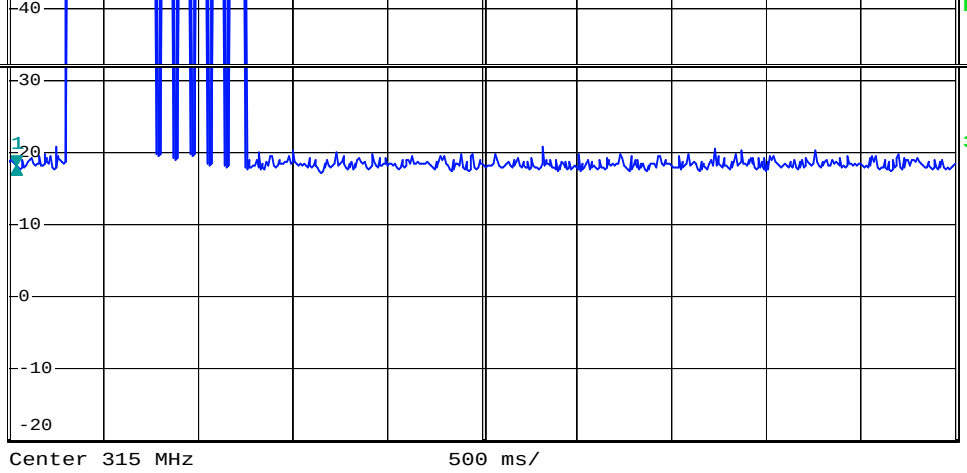
Test Setup Diagram



Environmental Conditions

Temperature:	20 °C
Relative Humidity:	40 %
ATM Pressure:	101.2 kPa

**Testing was performed by Xiao Ming Hu 2007-11-30.*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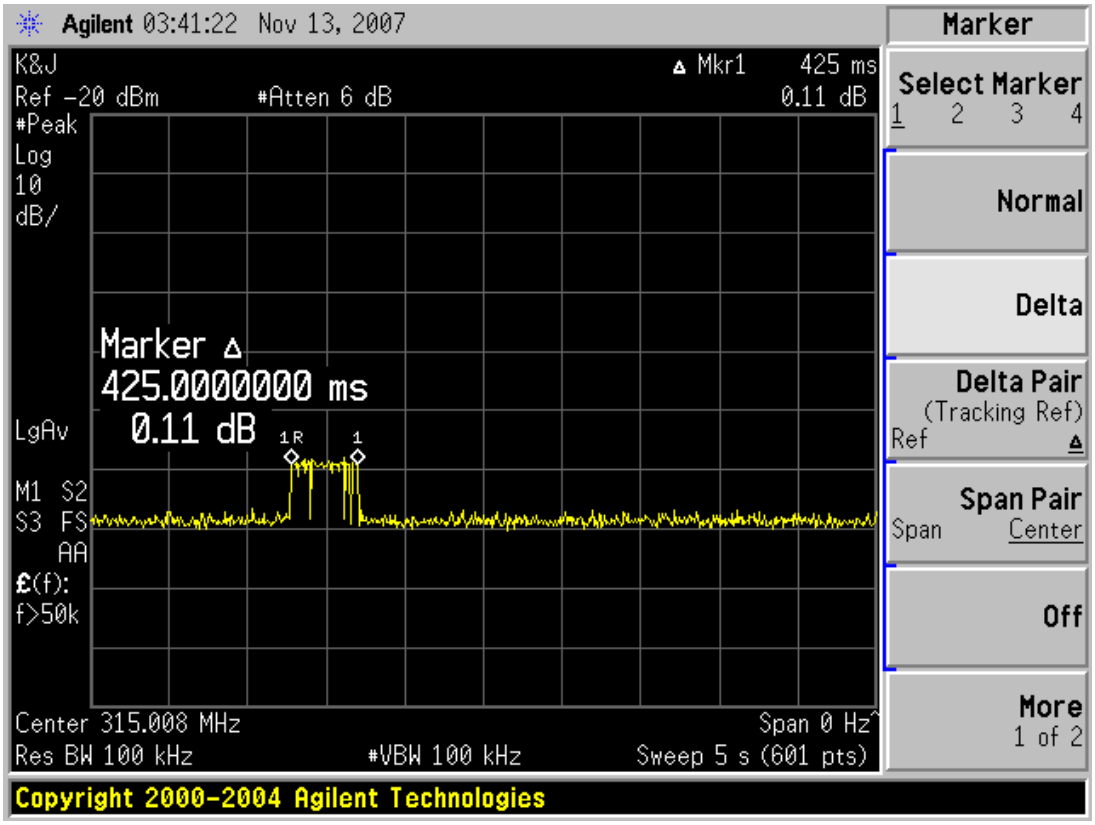
-20
-10
0
-10
-20
3DB
Center 315 MHz
500 ms/

Date:


Agilent 03:41:22 Nov 13, 2007
K&J
Ref -20 dBm
#Atten 6 dB
Mkr1 425 ms
0.11 dB
#Peak
Log
10
dB/
Marker Δ
425.0000000 ms
0.11 dB
1R
1
LgAv
M1 S2
S3 FS
AA
£(f):
f>50k
Center 315.008 MHz
Res BW 100 kHz
#VBW 100 kHz
Span 0 Hz
Sweep 5 s (601 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
Copyright 2000-2004 Agilent Technologies

§15.231(b) – FIELD STRENGTH OF EMISSIONS

Applicable Standard Requirement

(b): In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750**	125 to 375**
174-260	3,750	375
260-470	3,750 to 12,500**	375 to 1,250**
Above 470	12,500	1,250

***Linear interpolations*

☒ **Compliant** ☐ **N/A**

b(1): The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

☒ **Compliant** ☐ **N/A**

b(2): Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

☒ **Compliant** ☐ **N/A**

Radiated Emissions EUT Setup

The radiated emission tests were performed in the closed chamber 3-meter test site, using the setup in accordance with ANSI C63.4 - 2003. The specification used was the FCC Subpart C limits.

The spacing between the peripherals was 10 centimeters.

The EUT was placed on the center of the back edge on the test table.

Spectrum Analyzer Setup

According to FCC CFR 47, Section 15.33, the EUT was tested to 5GHz.

During the radiated emission test, the CISPR quasi-peak detection was employed:

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Sonoma Instruments	Pre amplifier	317	260406	2007-02-03
Sunol Sciences	Combination Antenna	JB3 Antenna	A013105	2007-02-11
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.595 OK03	100044	2007-02-07
Sunol Sciences	System Controller	SC99V	122303-1	N/R

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

According to §15.231, Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emission, based on the average value of the measured emissions. As an alternative, compliance with the limits may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude – FCC Limit

Corrected For Pulse Operation

When the transmitter is activated automatically, it will, in the worst case, transmit pulse position modulated (PPM) data. Within any given 100ms window, the worst case total on time occurs is 20.75ms.

Total transmission on time in 100ms sweep time = (1*3.017) + (9*1.467) + (9*0.5) = 20.72ms

Duty Cycle = 20log [(20.72/32.83) ms] = -4.0 dB

Environnemental Conditions

Temperature:	20°C
Relative Humidity:	40 %
ATM Pressure:	101.2 kPa

**Testing was performed by Xiao Ming Hu 2007-11-30.*

Summary of Test Results

According to the data in the following table, the EUT complied with the FCC 15.231(b) standards and had the worst margin reading of:

-20.6 dB at **1575 MHz** in the **Vertical** polarization.

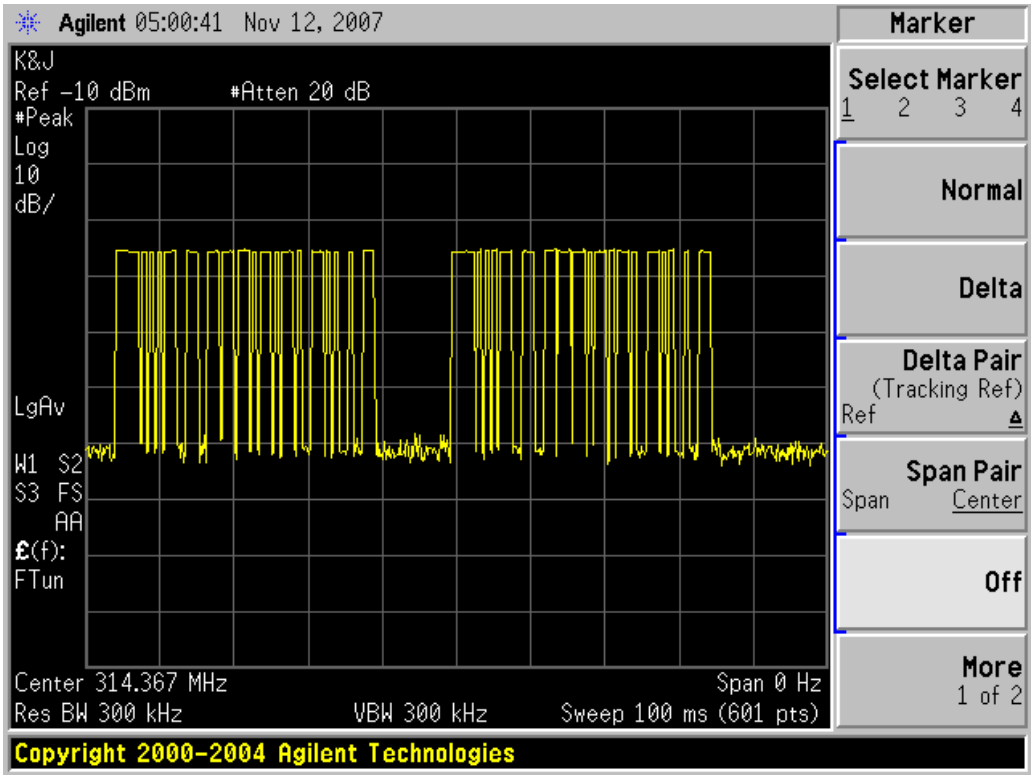
Radiated Emissions Test Data, 3 meters

Frequency (MHz)	Meter Reading (dBuV)	Detector PK/QP/AV	Azimuth Degrees	ANT. Height (m)	Polar (H / V)	Correction Factor (dB)	Duty Cycle (dB)	Corrected Amp. dBuV/m	FCC 15.231	
									Limit dBuV/m	Margin (dB)
1575	46.8	PK	286	1.0	V	-7.8	-4.0	35.0 (Ave)	55.6	-20.6
315	81.0	PK	222	1.0	H	-22.1	-4.0	54.9 (Ave)	75.6	-20.7
945	49.1	PK	144	1.0	H	-12.6	-4.0	32.5 (Ave)	55.6	-23.1
1260	44.4	PK	273	1.0	V	-10.3	-4.0	30.1 (Ave)	55.6	-25.5
630	46.6	PK	98	1.0	V	-16.2	-4.0	26.4 (Ave)	55.6	-29.2
1575	46.8	PK	286	1.0	V	-7.8	0	39.0 (Ave)	75.6	-36.6
315	81.0	PK	222	1.0	H	-22.1	0	58.9 (Ave)	95.6	-36.7
945	49.1	PK	144	1.0	H	-12.6	0	36.5 (Ave)	75.6	-39.1
1260	44.4	PK	273	1.0	V	-10.3	0	34.1 (Ave)	75.6	-41.5
630	46.6	PK	98	1.0	V	-16.2	0	30.4 (Ave)	75.6	-45.2

Note: For Peak, Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain
For Average, Correction Factor = Duty Cycle (-4.0 dB).

☒ **Compliant** ☐ **N/A**

Please refer to the following plots for test result details



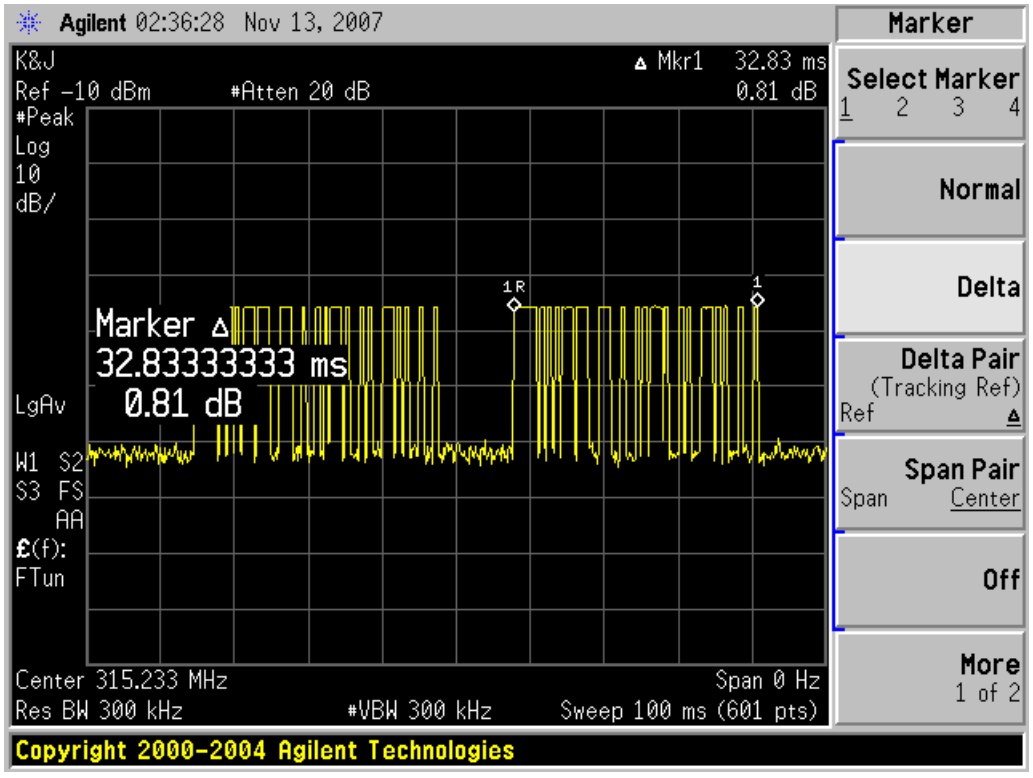


Figure a: The Pulse transmission pattern in 100ms sweep time. (Total of 2 wide pulses, 18 mid-size pulses and 18 narrow pulses)

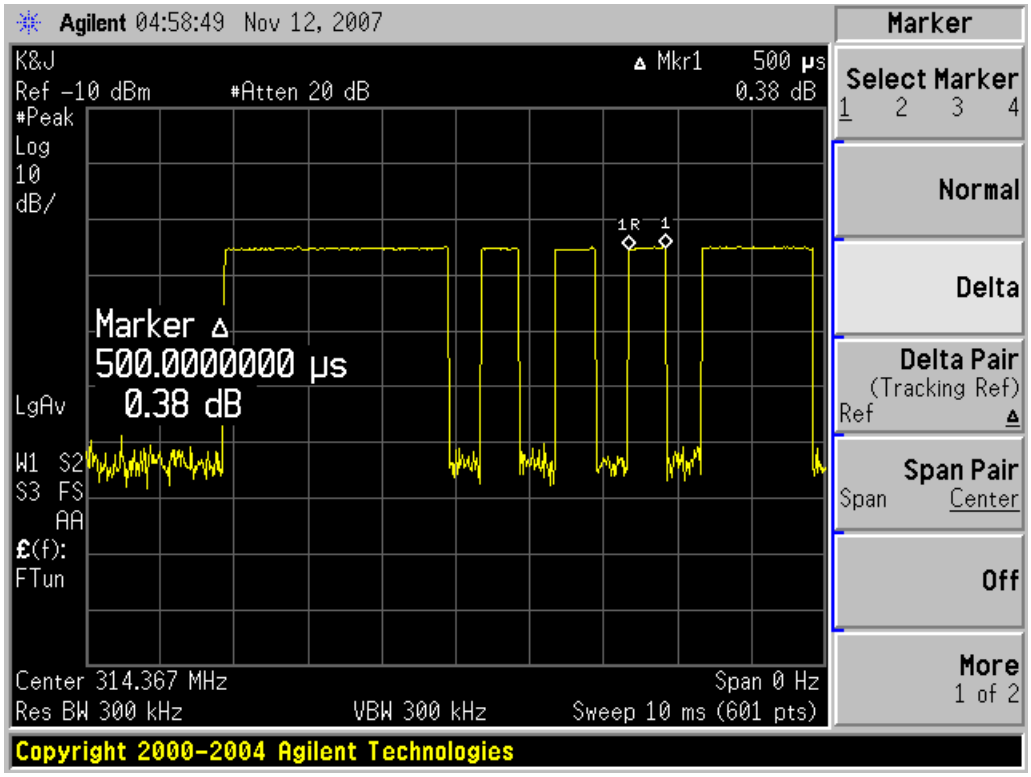


Figure b1: The Pulse width of <u>narrow</u> pulse. Pulse width = 0.5 ms

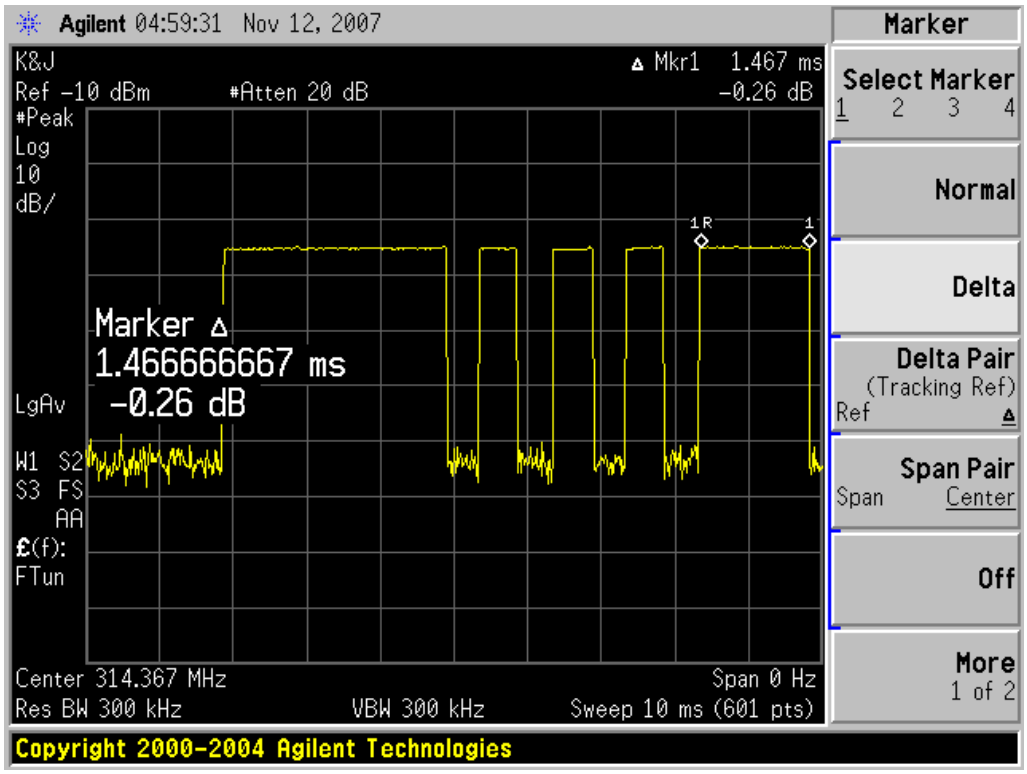


Figure b2: The Pulse width of <u>mid sized</u> pulse. Pulse width = 1.467 ms

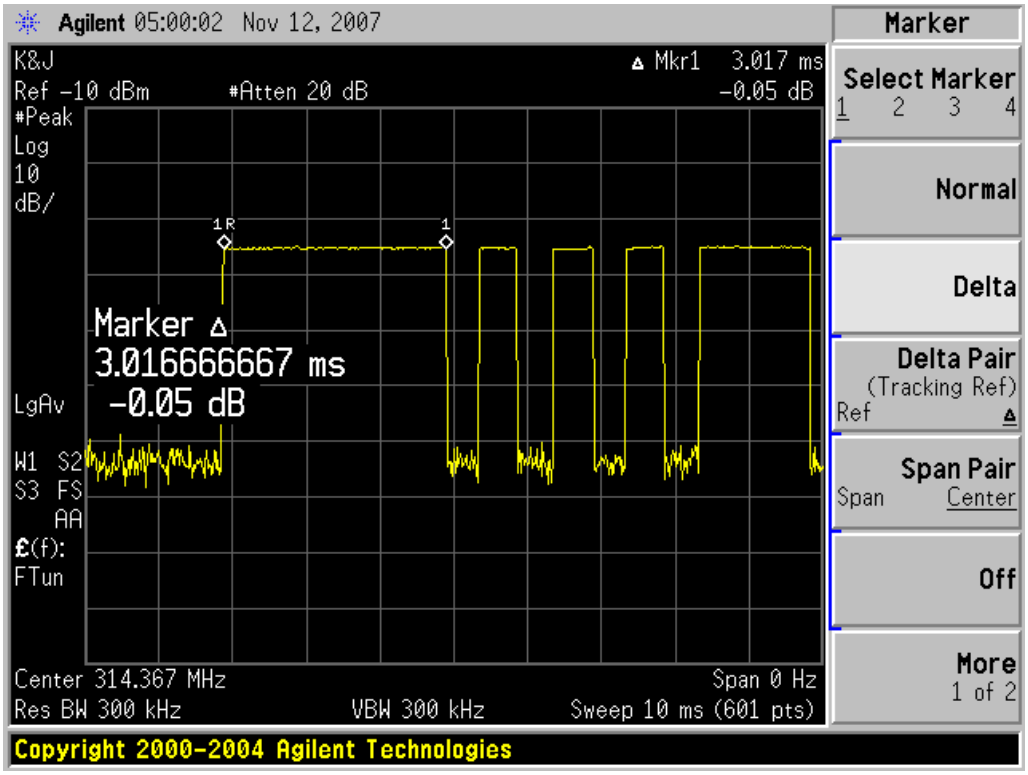


Figure b3: The Pulse width of wide pulse. Pulse width = 3.017 ms

§15.231(c) – EMISSIONS BANDWIDTH

Applicable Standard Requirement

(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

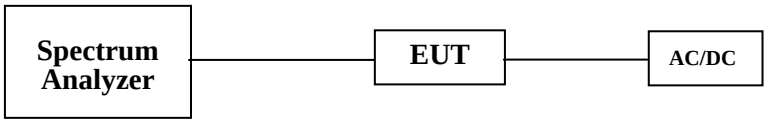
☒ **Compliant** ☐ **N/A**

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.595 0K03	100044	2007-02-19

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Setup Diagram



Environmental Conditions

Temperature:	20 °C
Relative Humidity:	40 %
ATM Pressure:	101.2 kPa

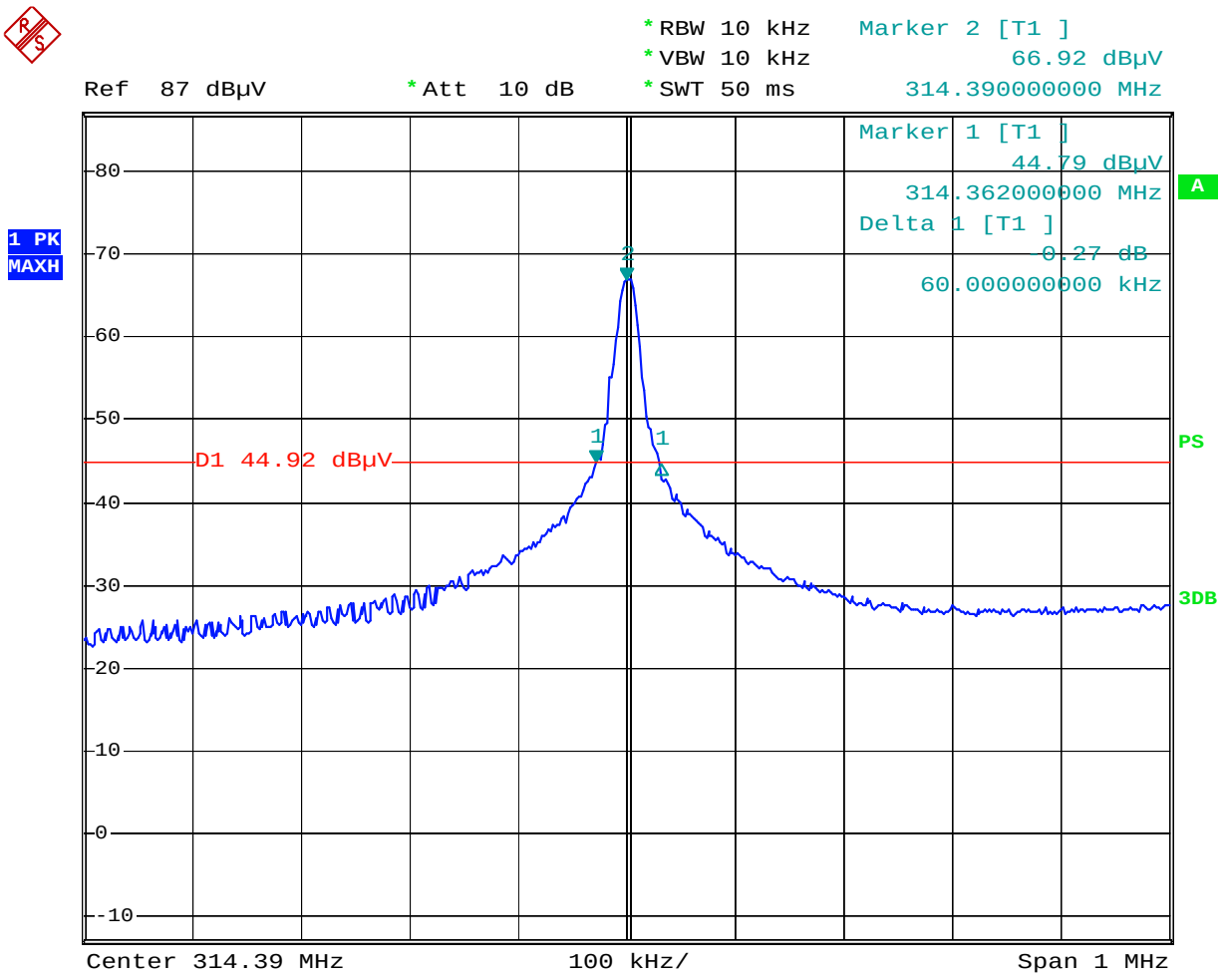
**Testing was performed by Xiao Ming Hu 2007-11-30.*

Test Result

Limit = Fundamental Frequency X 0.25%; 314.39 MHz × 0.25% = 785.98 kHz

Fund. Frequency (MHz)	20 dB Bandwidth Emission (kHz)	Limit (kHz)	Result
314.39	60	785.98	Compliant

Please refer to the following plot for test result details



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