



NVLAP LAB CODE 200707-0




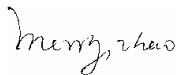
FCC PART 15.231 MEASUREMENT AND TEST REPORT

For

Kenyazi Investment Limited

Flat A-1, 8/F., Yip Fung Industrial Building, 28-36 Kwai Fung Crescent,
Kwai Fong, N.T. Hong Kong

FCC ID: PKH-CBELL675XX

Report Type: Original Report	Product Type: Cluster Bells
Test Engineer: Sula Huang	
Report Number: RSZ09053101	
Report Date: 2009-07-10	
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk “*” (Rev 2)

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Kenyazi Investment Limited's* product, model: *Item Number : 675xx (FCC ID:PKH-CBELL675XX)* or the "EUT" as referred to in this report is a *Cluster Bells* which measures approximately: 20.0 cm L x 14.0 cm W x 7.0 cm H, rated input voltage: DC 1.5V \times 4 Battery or DC 6V adapter. The EUT's frequency of fundamental is 433.96 \pm 200 kHz.

Adapter Information: Ktec AC ADAPTOR
MODEL: KA12D060040024U
INPUT: 120V AC 60Hz 65mA
OUTPUT: 6V DC 400mA

** All measurement and test data in this report was gathered from production sample serial number: 0905075(Assigned by BACL, Shenzhen). The EUT was received on 2009-05-31.*

EUT Photograph



Objective

This document is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4-2003.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209 and 15.231 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 measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 21, 2007. 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 has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



NVLAP LAB CODE 200707-0

The current scope of accreditations can be found at
<http://ts.nist.gov/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

Special Accessories

The special accessories were provided by Bay Area Compliance Laboratories Corp. (Shenzhen).

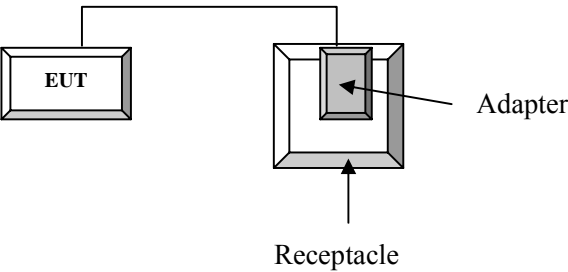
Equipment Modifications

No modifications were made to the unit tested.

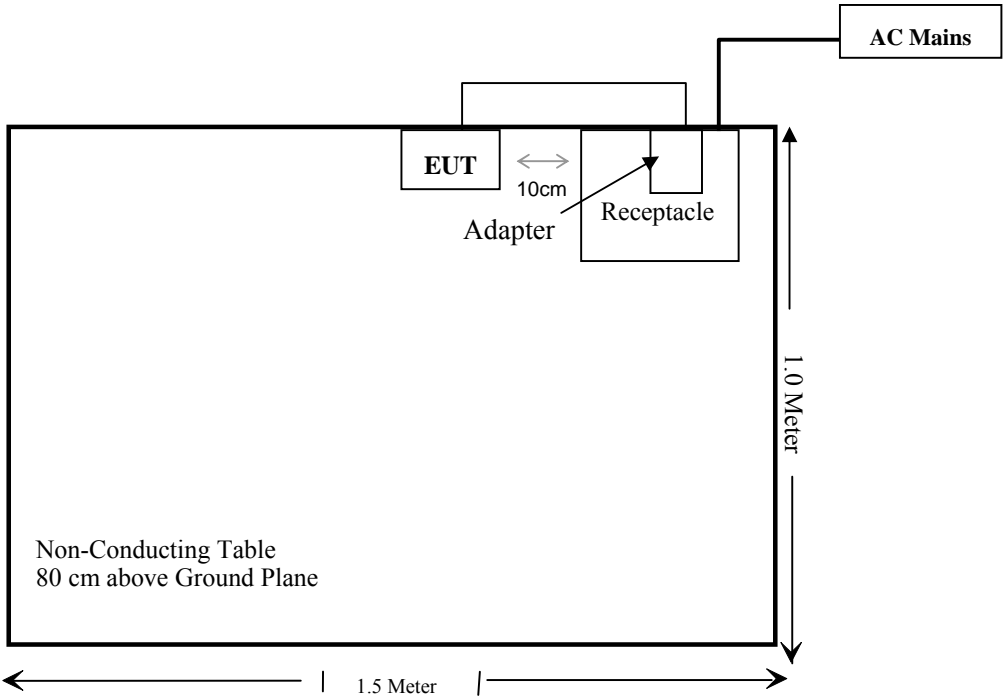
External I/O Cable

Cable Description	Length (m)	From Port	To
Unshielded Detachable DC Power Cable	1.90	Adapter	EUT
Unshielded Undetachable Control Cable	1.90	Lamp	EUT

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band	Compliant
§15.209	General Requirement	Compliant
§15.207 (a)	Conducted Emissions	Compliant
§15.231 (b)	Radiated Emissions	Compliant
§15.231 (c)	20 dB Bandwidth Testing	Compliant
§15.231 (a)(1)	Deactivation Testing	Compliant
§15.231(a)	Duty Cycle	N/A

CFR47 §15.203 - ANTENNA REQUIREMENT

Standard Applicable

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The antenna of the EUT is a printed loop antenna on PCB. The maximum gain is 1dBi. The EUT use permanently attached antenna.

Result: Compliant.

Please refer to the EUT Internal photos.

CFR47 §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

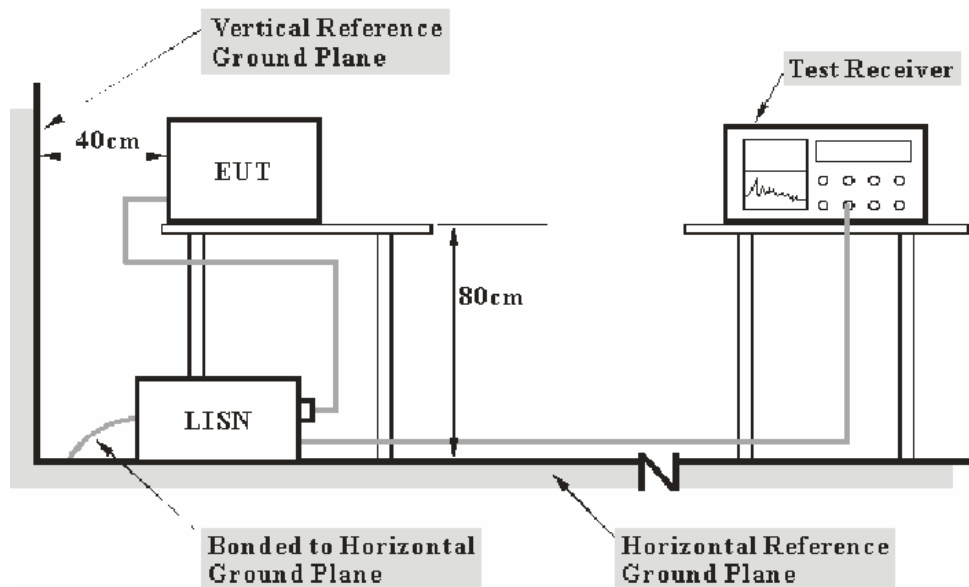
CFR47 §15.207

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is ± 2.4 dB.

EUT Setup



- Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

<i>Frequency Range</i>	<i>IF B/W</i>
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12208	N/A	N/A
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2009-04-28	2010-04-27
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2009-04-28	2010-04-27

* Com-Power's LISN were used as the supporting equipment.

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

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

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

4.90 dB at 12.0000 MHz in the Line conductor mode

Test Data**Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

* The testing was performed by Sula Huang on 2009-06-10.

Test Mode: Transmitting

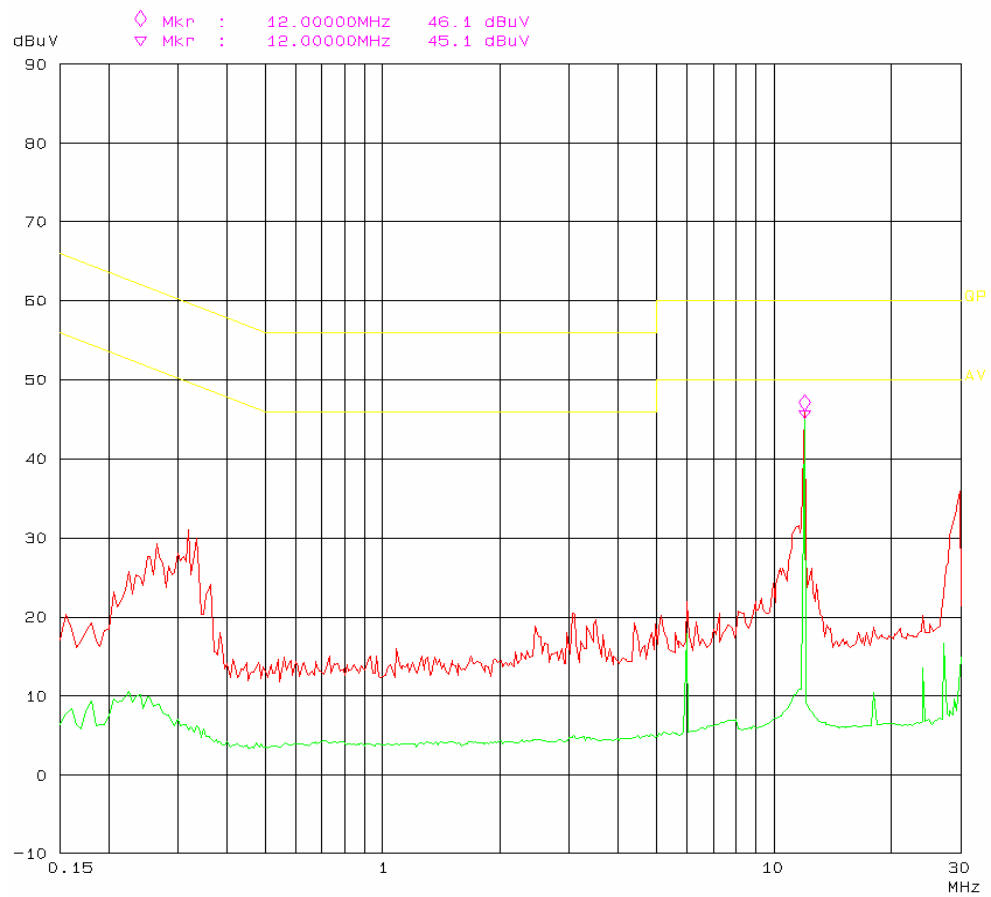
Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	Amplitude (dBμV)	Detector (QP/AV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)
12.0000	45.10	AV	Line	50.00	4.90
12.0000	43.90	AV	Neutral	50.00	6.10
12.0000	46.10	QP	Line	60.00	13.90
12.0000	44.70	QP	Neutral	60.00	15.30
29.9550	35.90	QP	Line	60.00	24.10
29.8900	33.90	QP	Neutral	60.00	26.10
0.3100	32.60	QP	Neutral	59.97	27.37
0.3200	31.00	QP	Line	59.71	28.71
0.2600	29.80	QP	Neutral	61.43	31.63
0.2650	29.30	QP	Line	61.27	31.97
30.0000	17.80	AV	Neutral	50.00	32.20
6.0000	17.80	AV	Line	50.00	32.20
6.0000	17.10	AV	Neutral	50.00	32.90
27.1200	17.00	AV	Neutral	50.00	33.00
27.1200	16.60	AV	Line	50.00	33.40
0.2250	27.30	QP	Neutral	62.63	35.33
24.0000	13.60	AV	Line	50.00	36.40
6.0000	22.00	QP	Line	60.00	38.00
6.0000	21.80	QP	Neutral	60.00	38.20
5.1550	20.30	QP	Line	60.00	39.70
0.2250	11.50	AV	Neutral	52.63	41.13
0.2600	9.90	AV	Neutral	51.43	41.53
0.2250	10.60	AV	Line	52.63	42.03
0.3200	5.70	AV	Line	49.71	44.01

Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.

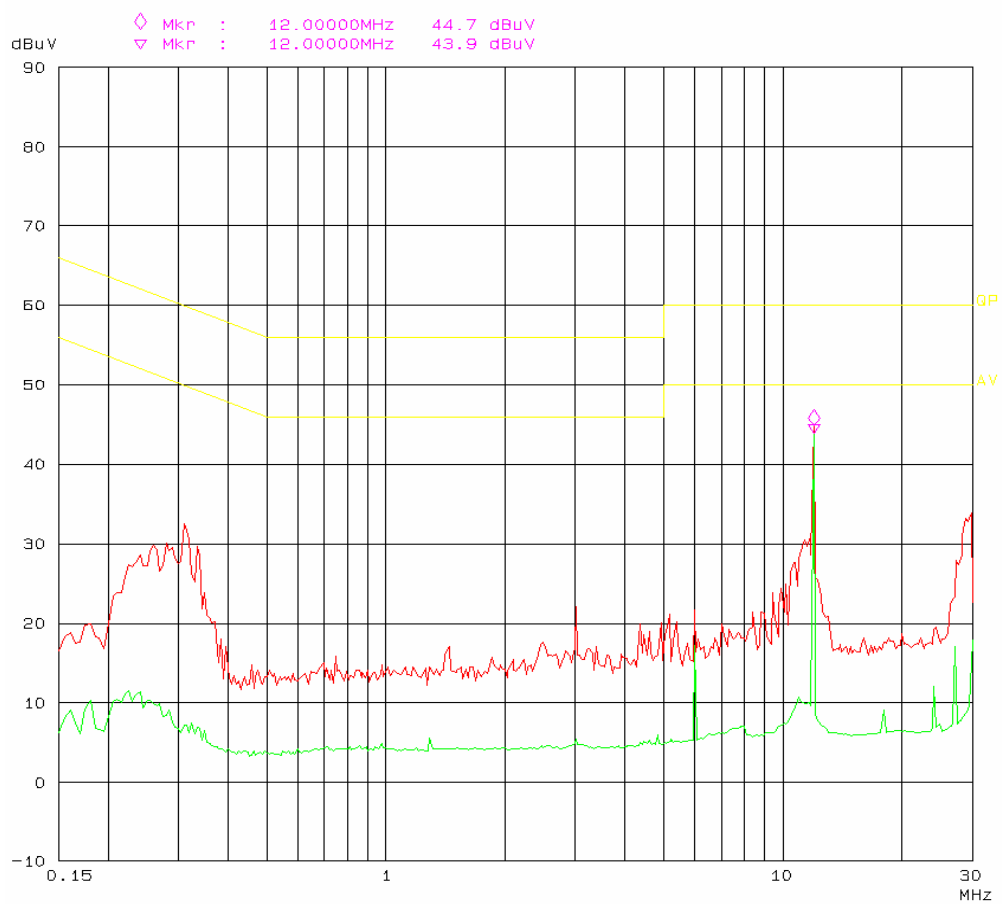
Conducted Emission FCC PART 15.207

EUT: Cluster Bells
Manuf: Kenya Investment Limited
Op Cond: Transmitting
Operator: Sula
Test Spec: AC 120V/60HZ Line
Comment: Temp: 25 Hum: 56%



Conducted Emission FCC PART 15.207

EUT: Cluster Bells
Manuf: Kenya Investment Limited
Op Cond: Transmitting
Operator: Sula
Test Spec: AC120V/60HZ Neutral
Comment: Temp: 25 Hum: 56%



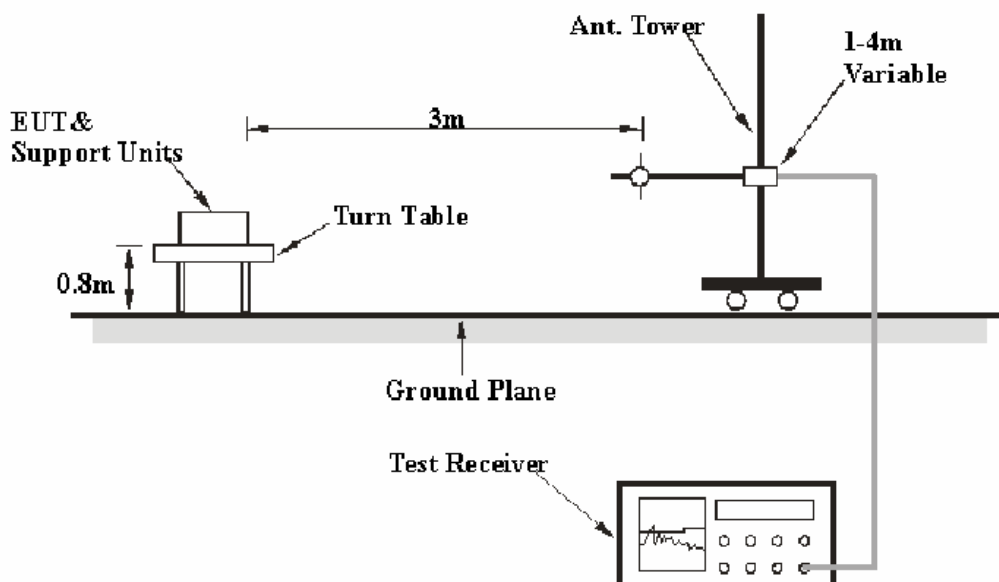
CFR47 §15.205, §15.209, §15.231 (b) - RADIATED EMISSIONS

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 best estimate of the uncertainty of a radiation emission measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ± 4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4 - 2003. The specification used was the FCC 15 § 15.209 and 15.231.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 5 GHz.

During the radiated emission test, the test receiver was set with the following configurations:

<i>Frequency Range</i>	<i>RBW</i>	<i>VBW</i>
30 – 1000 MHz	100 kHz	300 kHz
1000 MHz – 5 GHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2008-08-02	2009-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-11-07	2009-11-06
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2009-03-11	2010-03-11
HP	Amplifier	8449B	3008A00277	2008-09-12	2009-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2008-09-25	2009-09-25

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Peak and Average detection mode.

Standard Applicable

According to §15.231(b), 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 3,370 *	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 for frequency ranges 130 - 174 MHz and 260 - 470 MHz.

The above field strength limits are specified at a distance of 3-meters the tighter limits apply at the band edges.

Corrected Amplitude & Margin Calculation

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

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 5.8dB means the emission is 5.8dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Data

Environmental Conditions

Temperature:	22 ° C
Relative Humidity:	50 %
ATM Pressure:	100.9 kPa

The testing was performed by Sula Huang on 2009-06-12.

Test Mode: Transmitting

Field Strength of Peak Emission

Frequency (MHz)	S.A. Reading (dBuV/m)	Detector (PK/AV)	Direction Degree	Test Antenna			Cable Loss (dB)	Duty Cycle Factor (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dBuV/m)	FCC Part 15.231		
				Height (m)	Polar H/V	Factor (dB/m)					Limit (dBuV/m)	Margin (dB)	Remarks
30 – 1000 MHz													
108.080	55.48	QP	180	1.48	H	10.9	0.52	0	25.75	41.15	43.5	2.35	Spurious
433.967	85.86	PK	76	1.11	H	14.5	1.73	0	25.96	76.13	100.8	24.67	Fund.
433.967	75.48	PK	293	2.55	V	14.5	1.73	0	25.96	65.75	100.8	35.05	Fund.
867.934	37.96	PK	360	3.00	H	19.9	3.86	0	25.64	36.08	80.8	44.72	Harmonic
867.934	36.55	PK	327	1.91	V	19.9	3.86	0	25.64	34.67	80.8	46.13	Harmonic
Above 1 GHz													
1301.901	48.65	PK	176	1.7	H	26.70	5.37	0	34.6	46.12	74	27.88	Harmonic
1301.901	47.73	PK	23	1.0	V	25.80	5.37	0	34.6	44.30	74	29.70	Harmonic
1735.868	50.82	PK	90	1.6	H	28.30	5.99	0	34.2	50.91	80.8	29.89	Harmonic
1735.868	49.88	PK	235	1.5	V	28.80	5.99	0	34.2	50.47	80.8	30.33	Harmonic

Field Strength of Average Emission							
Frequency (MHz)	Peak Measurement @ 3 m (dBmV/m)	Antenna Polar (H/V)	Duty Cycle (dB)	Cord. Amp. (dBmV/m)	FCC 15.231 Limit (dBmV/m)	Margin (dB)	Comment
30 – 1000 MHz							
433.967	76.13	H	-7.25	68.88	80.8	11.92	Fund.
433.967	65.75	V	-7.25	58.50	80.8	22.30	Fund.
867.95	36.08	H	-7.25	28.83	60.8	31.97	Harmonic
867.95	34.67	V	-7.25	27.42	60.8	33.38	Harmonic
Above 1 GHz							
1301.76	46.12	H	-7.25	38.87	54.0	15.13	Harmonic
1301.76	44.30	V	-7.25	37.05	54.0	16.95	Harmonic
1735.72	50.91	H	-7.25	43.66	60.8	17.14	Harmonic
1735.72	50.47	V	-7.25	43.22	60.8	17.58	Harmonic

Note: *Calculate Average value based on Duty Cycle correction factor:

$$\text{Duty Cycle} = T_{\text{on}} / (T_{\text{on}} + T_{\text{off}}) = 10.68 / 24.6 = 0.4341$$

$$\text{Duty Factor Factor} = 20 \log (\text{Duty Cycle}) = 20 \log (0.4341) = -7.25 \text{ dB}$$

$$\text{Average} = \text{Peak} + \text{Duty Cycle Factor}$$

CFR47 §15.231(c) - 20dB BANDWIDTH TESTING

Requirement

Per 15.231(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. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-11-07	2009-11-06
HP	Amplifier	8447E	1937A01046	2008-11-15	2009-11-15
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2009-04-12	2010-04-12

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

With the EUT's antenna attached, the waveform was received by the test antenna which was connected to the spectrum analyzer, plot the 20 dB bandwidth.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

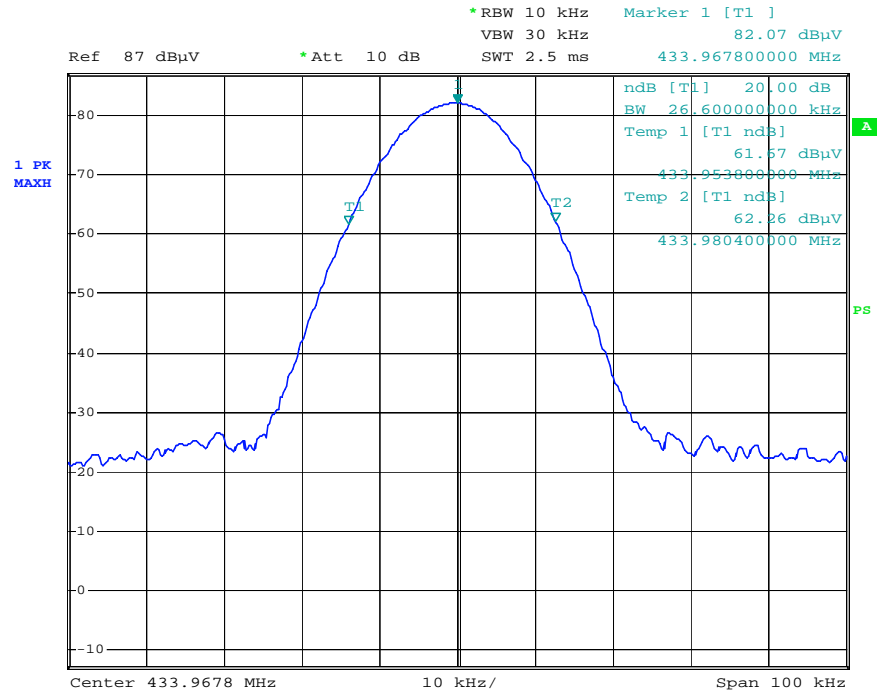
The testing was performed by Sula Huang on 2009-06-29.

Test Mode: Transmitting

Please refer to following table and plot.

Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Part 15.231 Limit (MHz)	Result
433.967	26.6	1.0849	Pass

Note: 20 dB Bandwidth Limit = 0.25% * center frequency = 0.25% * 433.967MHz = 1.0849 MHz

20 dB Occupied Bandwidth

Date: 29.JUN.2009 21:34:21

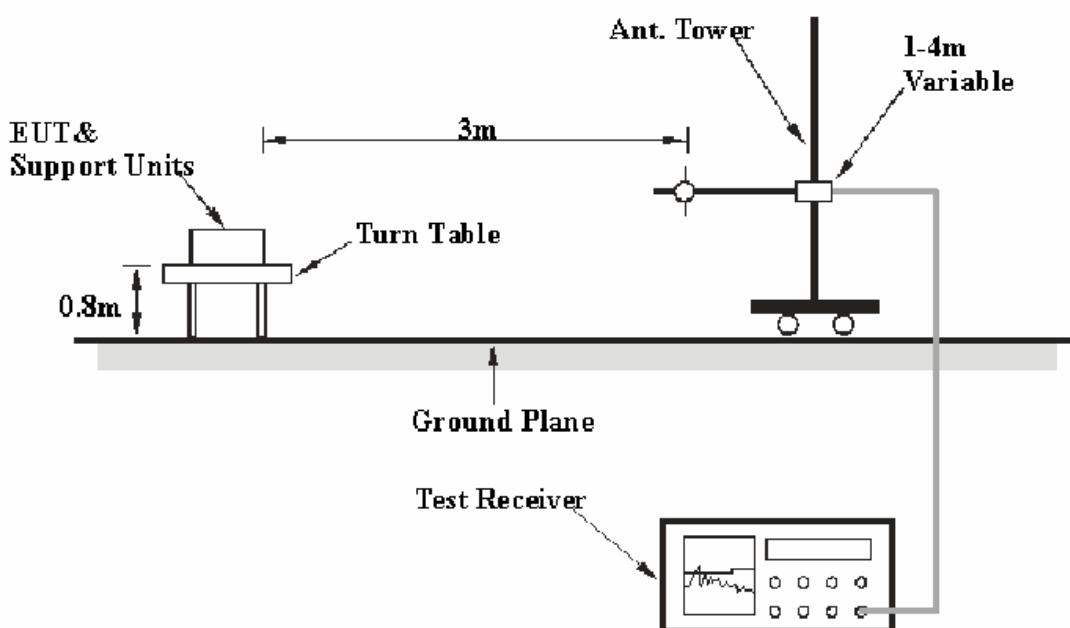
CFR47 §15.231(a) - DEACTIVATION TESTING

Requirement

Per 15.231(a)

- (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

EUT Setup



The deactivation test was performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4 - 2003. The specification used was the FCC 15.231(a) limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-11-07	2009-11-06
HP	Amplifier	8447E	1937A01046	2008-11-15	2009-11-15
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2009-04-12	2010-04-12

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Data**Environmental Conditions**

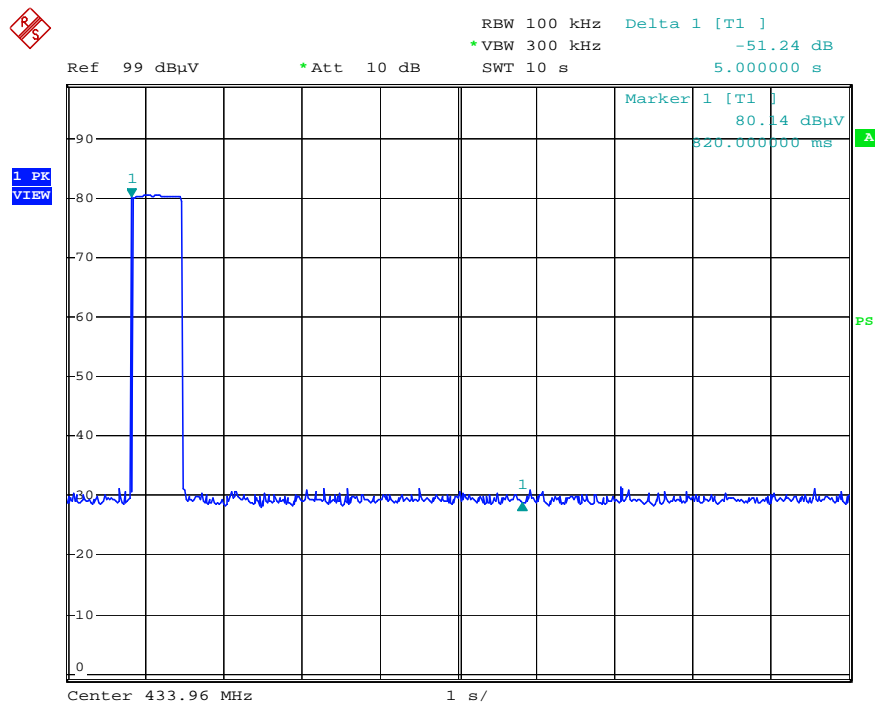
Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	103.2 kPa

The testing was performed by Sula Huang on 2009-06-09.

Test Mode: Transmitting

Test Result: Compliant.

Please refer to following plot



Date: 9.JUL.2009 19:41:36

CFR47 §15.231- DUTY CYCLE

Limit

Nil (No dedicated limit specified in the Rules).

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2008-10-16	2009-10-16

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer=operating frequency.
4. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Span=0Hz.
5. Repeat above procedures until all frequency measured was complete.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	103.2 kPa

The testing was performed by Sula Huang on 2009-06-09.

Test Mode: Transmitting

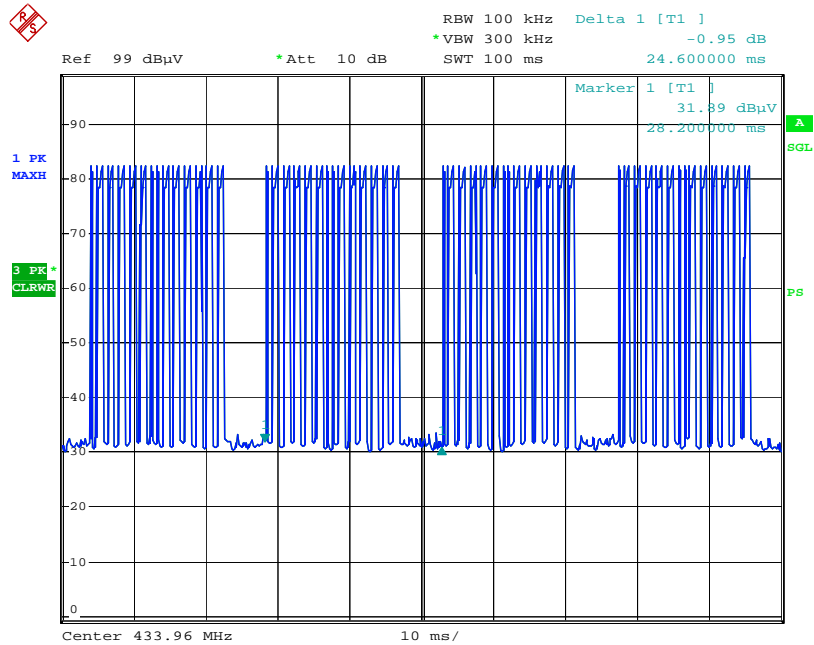
Test Result: Compliant.

$$T_{on} = T_{on1}N_1 + T_{on2}N_2 + \dots + T_{onn}N_n$$

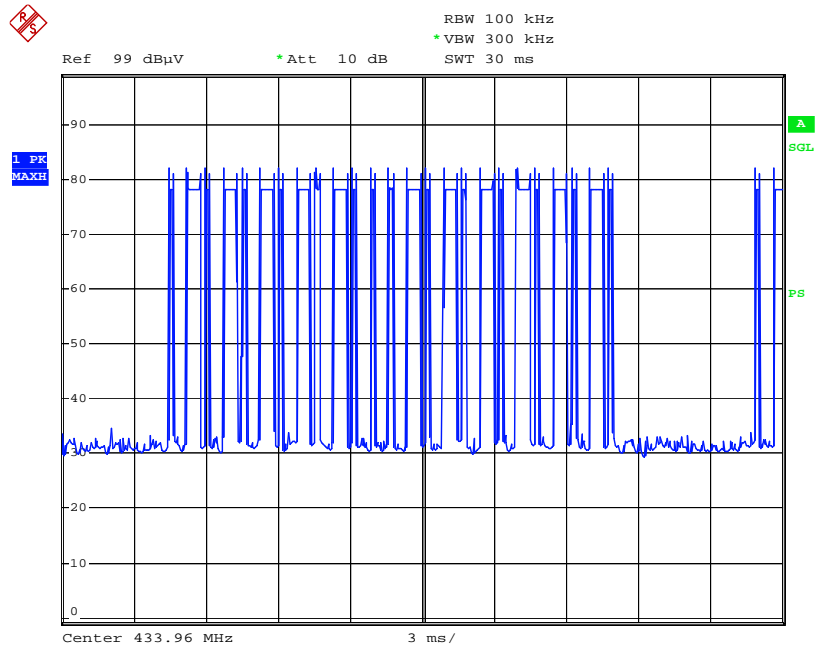
$$= 640 \mu s * 11 + 260 \mu s * 14 = 7040 + 3640 = 10680 \mu s = 10.68 \text{ ms}$$

$$\text{Duty Cycle Factor} = 20 \log (T_{on}/T_p) = 20 \log (10.68/24.6) = - 7.25 \text{ dB}$$

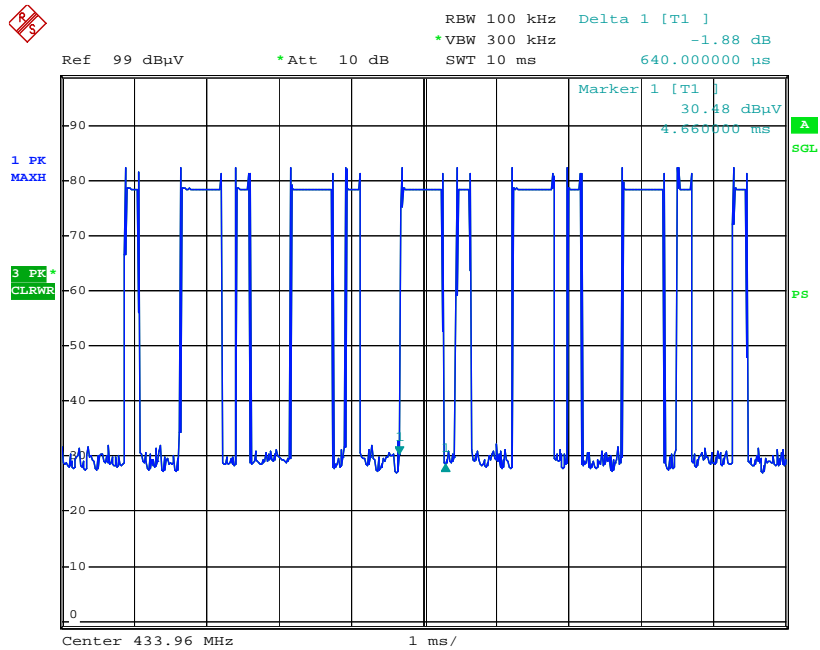
Please refer to following plot



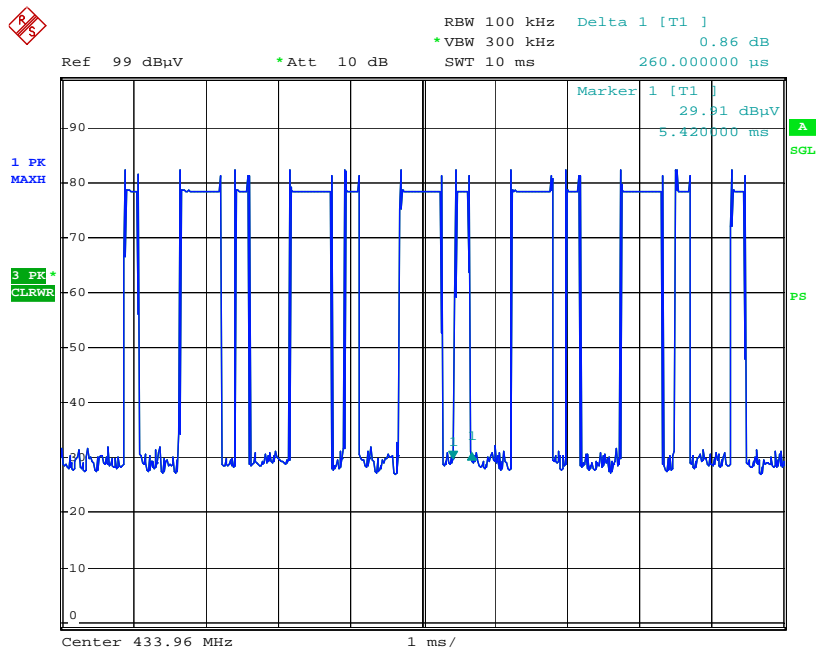
Date: 9.JUL.2009 19:16:24



Date: 9.JUL.2009 20:48:06



Date: 9.JUL.2009 19:21:35



Date: 9.JUL.2009 19:22:39

*****END OF REPORT*****