



FCC PART 15.231

TEST REPORT

For

Blinds To Go

101 East State Route 4 Paramus, NJ 07652 USA

FCC ID:2AIQDBTGLINKV616

Report Type: Original report	Product Type: BTG Link Wi-Fi Universal Remote
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Report Number: RKS160624001-00B	
Report Date: 2016-07-06	
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Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The Blinds To Go's product, model number: BTG RF mini 1 (FCC ID: 2AIQDBTGLINKV616) or the "EUT" in this report is a BTG Link Wi-Fi Universal Remote, which was measured approximately: 55 mm (L) x 55 mm (W)x 64.5 mm(H). rated input voltage: DC5V.

** Note: The product ' s series model number: BTG RF mini 1,RFMINI, RF mini, RFMINI-BTG2. The difference between them was explained in the attached declaration letter.*

** All measurement and test data in this report was gathered from production sample serial number: 20160504002 (Assigned by BACL, Kunshan). The EUT was received on 2016-05-04.*

Objective

This report is prepared on behalf of Blinds To Go, All the test measurements were performed according to the measurement procedure described in ANSI C63.10 – 2013.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209, 15.35(c) and 15.231 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submissions with FCC ID: 2AIQDBTGLINKV616.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10 - 2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Lab Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz, and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the Chenghu Road, Kunshan Development Zone No.248, Kunshan, Jiangsu, China.

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) 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 December 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.10 - 2013.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Justification

The system was configured in testing mode which was provided by manufacturer.

EUT Exercise Software

No exercise software.

Support Equipment List and Details

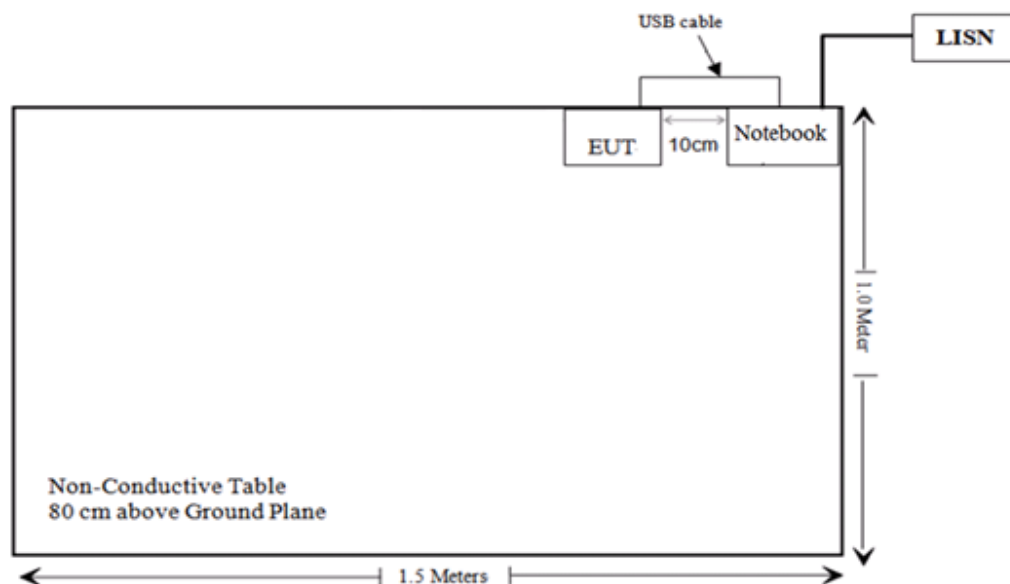
Manufacturer	Description	Model	Serial Number
DELL	PC	GX620	D65874152

External I/O Cable

Cable Description	Shielding Type	Length (m)	From Port	To
USB Cable	Unshielding	0.9	EUT	PC

Block Diagram of Test Setup

For conducted emission



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207	AC Line Conducted Emission	Compliance
§ 15.205, §15.209, §15.231 (e)	Radiated Emission Test	Compliance
§ 15.231 (c)	20dB Bandwidth Testing	Compliance
§ 15.231 (e)	Transmission and silent period testing	Compliance

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

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.

Antenna Connected Construction

The EUT has an internal antenna welded on the PCB and the antenna gain is -10.5dBi, which complied with 15.203. Please refer to the EUT Internal photos.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

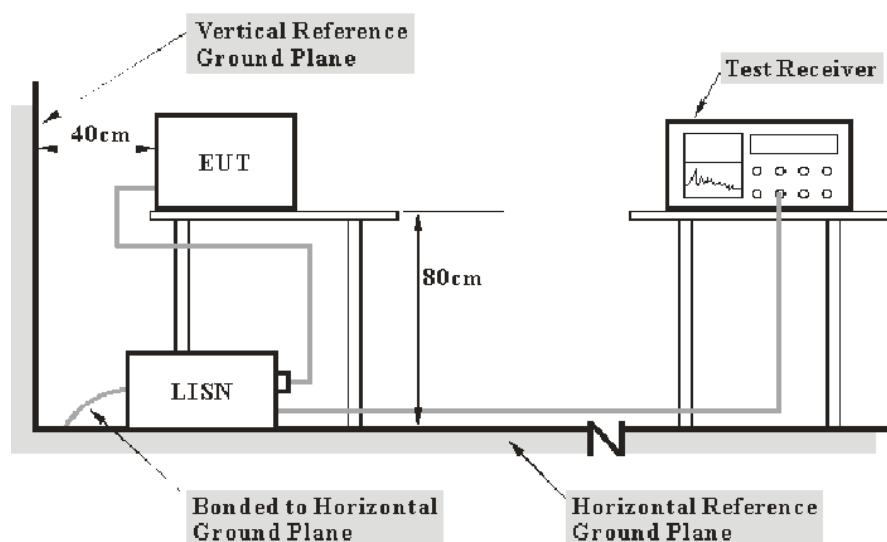
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Kunshan) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report.

Port	Expanded Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

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 measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

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:

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	934115/007	2015-11-12	2016-11-11
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2015-11-12	2016-11-11
Rohde & Schwarz	LISN	ESH3-Z5	892239/018	2016-06-23	2017-06-22
Rohde & Schwarz	Pulse limiter	ESH3-Z2	879940/0058	2016-06-19	2017-06-18
Rohde & Schwarz	CE Test software	EMC 32	V 09.10.0	--	--
MICRO-COAX	Coaxial line	UFB-293B-1-0480-50X50	97F0173	2015-10-01	2016-10-01

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

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

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

Test Results Summary

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

13.13dB at 0.170000 in the **Neutral** conducted mode

Refer to CISPR16-4-2 and CISPR 16-4-1, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cisp}$$

In BACL, $U_{(Lm)}$ is less than U_{cisp} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

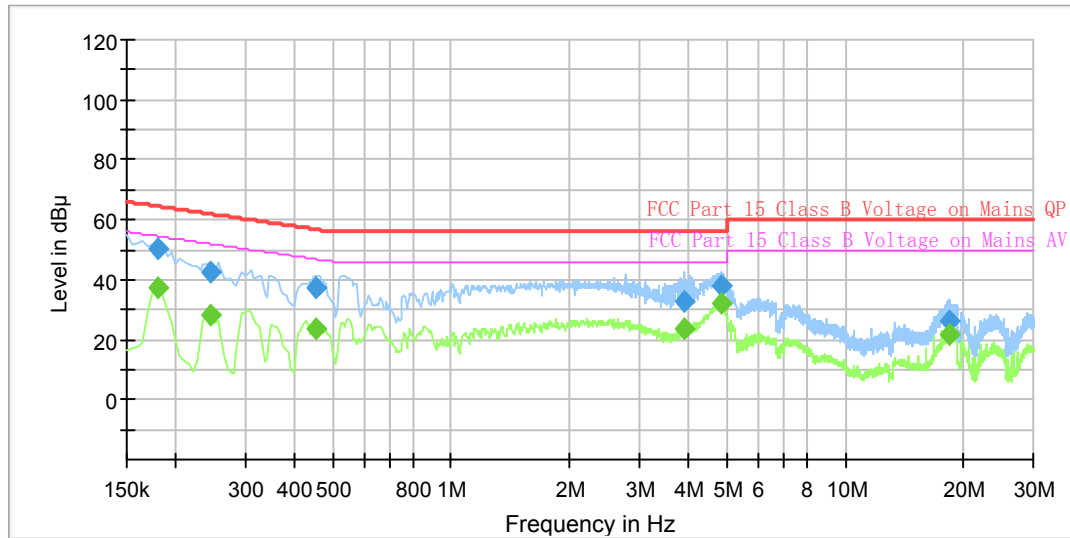
Test Data

Environmental Conditions

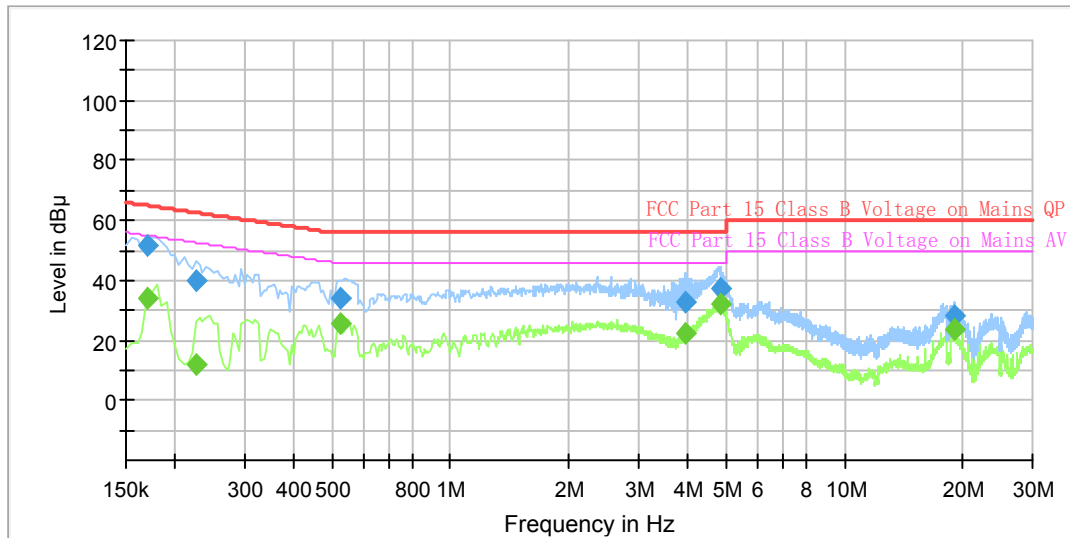
Temperature:	27 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on 2016-06-22.

EUT operation mode: Transmitting

AC 120V/60 Hz, Line

Frequency (MHz)	QuasiPeak (dBμV)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.180000	---	37.14	9.000	L1	11.0	17.35	54.49	Compliance
0.180000	50.13	---	9.000	L1	11.0	14.36	64.49	Compliance
0.245000	---	28.31	9.000	L1	11.0	23.61	51.92	Compliance
0.245000	42.76	---	9.000	L1	11.0	19.16	61.92	Compliance
0.455000	---	23.37	9.000	L1	11.0	23.41	46.78	Compliance
0.455000	37.55	---	9.000	L1	11.0	19.23	56.78	Compliance
3.895000	---	23.67	9.000	L1	11.3	22.33	46.00	Compliance
3.895000	32.56	---	9.000	L1	11.3	23.44	56.00	Compliance
4.85500	---	32.11	9.000	L1	11.3	13.89	46.00	Compliance
4.85500	38.22	---	9.000	L1	11.3	17.78	56.00	Compliance
18.350000	---	21.67	9.000	L1	11.4	28.33	50.00	Compliance
18.350000	26.27	---	9.000	L1	11.4	33.73	60.00	Compliance

AC 120V/60 Hz, Neutral

Frequency (MHz)	QuasiPeak (dBμV)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.170000	---	34.15	9.000	N	11.0	20.81	54.96	Compliance
0.170000	51.83	---	9.000	N	11.0	13.13	64.96	Compliance
0.225000	---	12.08	9.000	N	11.0	40.55	52.63	Compliance
0.225000	40.23	---	9.000	N	11.0	22.40	62.63	Compliance
0.525000	---	25.33	9.000	N	11.0	20.67	46.00	Compliance
0.525000	33.83	---	9.000	N	11.0	22.17	56.00	Compliance
3.940000	---	22.53	9.000	N	11.3	23.47	46.00	Compliance
3.940000	32.72	---	9.000	N	11.3	23.28	56.00	Compliance
4.835000	---	31.78	9.000	N	11.4	14.22	46.00	Compliance
4.835000	37.57	---	9.000	N	11.4	18.43	56.00	Compliance
19.105000	---	23.42	9.000	N	11.4	26.58	50.00	Compliance
19.105000	28.27	---	9.000	N	11.4	31.73	60.00	Compliance

Note:

- 1) Corr.=LISN VDF (Voltage Division Factor) + Cable Loss
- 2) Corrected Amplitude = Reading + Corr.
- 3) Margin = Limit –Corrected Amplitude

FCC §15.205, §15.209, §15.231 (e) - RADIATED EMISSIONS TEST**Applicable Standard**

FCC §15.205, §15.209, §15.231 (e)

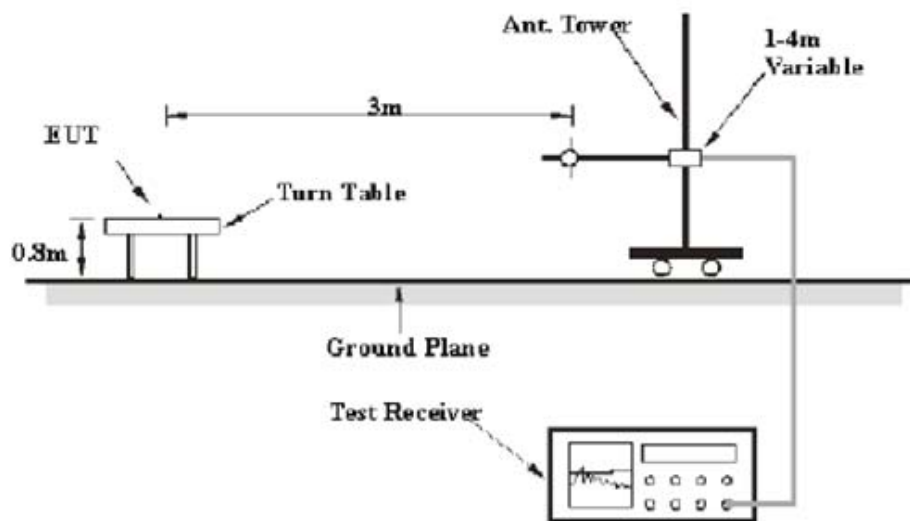
Measurement Uncertainty

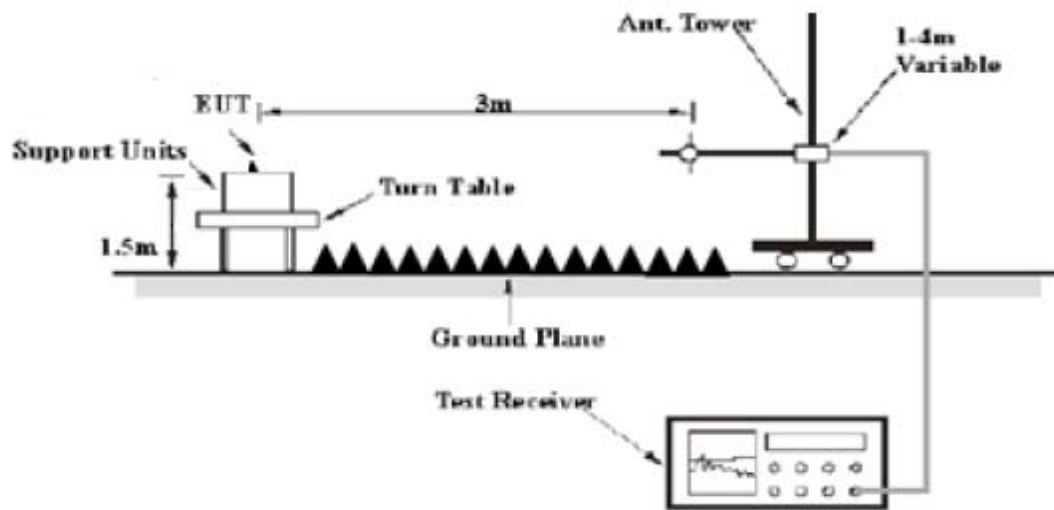
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency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

Based on CISPR 16-4-2:2011, the expanded combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Kunshan) is 5.91 dB for 30MHz-1GHz and 4.92 dB for above 1GHz, 1.95dB for conducted measurement at antenna port. And the uncertainty will not be taken into consideration for the test data recorded in the report

EUT Setup

Below 1 GHz:



Above 1 GHz:

The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10 - 2013. The specification used was the FCC 15 § 15.209, 15.205 and 15.231.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 5 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000MHz	100 kHz	300 kHz	100kHz	QP
1000 MHz – 5000 MHz	1MHz	3MHz	/	PK

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrument	Amplifier	330	171377	2015-09-16	2016-09-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-11-12	2016-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2015-11-07	2016-11-06
ETS	Horn Antenna	3115	6229	2015-11-07	2016-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Mini	Pre-amplifier	ZVA-183-S+	857001418	2015-09-16	2016-09-16
champrotek	Chamber	Chamber A	1#	2015-09-17	2016-09-17
R&S	Auto test Software	EMC32	V 09.10.0	-	-
BACL	RF cable	KS-LAB-A01	KS-LAB-A01	2015-12-16	2016-12-15
BACL	RF cable	KS-LAB-A02	KS-LAB-A02	2015-12-16	2016-12-15

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied 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 emissions, 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.

Applicable Standard

According to §15.231 (e), 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 emission (microvolts/meter)
40.66-40.70	1,000	100
70-130	500	50
130-174	500 to 1,500 *	50 to 150 *
174-260	1,500	150
260-470	1,500 to 5,000 *	150 to 500*
Above 470	5,000	500

*Linear interpolations.

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 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

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

Test Results Summary

According to the data in the following table, the EUT complied with the CFR47 §15.205, §15.209, § 15.231 (e), with the worst margin reading of:

4.48 dB at 433.92 MHz in the Vertical polarization

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

*The testing was performed by Matt Yao on 2016-07-04.
Test mode: Transmitting*

Field Strength (Peak)

Frequency (MHz)	Maximum Reading (dBuV)	RX Antenna		Cable Loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	15.231(e)	
		Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
433.92	96.69	V	15.50	1.40	25.20	88.39	92.87	4.48
433.92	90.22	H	15.50	1.40	25.20	81.92	92.87	10.95
867.84	45.76	H	22.40	2.30	25.20	45.26	72.87	27.61
867.84	43.39	V	22.40	2.30	25.20	42.89	72.87	29.98
1301.76	51.78	H	24.50	2.90	31.10	48.08	74.00	25.92
1301.76	52.24	V	24.50	2.90	31.10	48.54	74.00	25.46

Field Strength (Average)

Frequency (MHz)	Peak Measurement @3m (dBμV/m)	Antenna Polarity (H/V)	Duty Cycle Correction Factor (dB)	Average Amp. (dBμV/m)	15.231(e)	
					Limit (dBμV/m)	Margin (dB)
433.92	88.39	H	-23.14	65.25	72.87	7.62
433.92	81.92	V	-23.14	58.78	72.87	14.09
867.84	45.26	H	-23.14	22.12	52.87	30.75
867.84	42.89	V	-23.14	19.75	52.87	33.12
1301.76	48.08	H	-23.14	24.94	54.00	29.06
1301.76	48.54	V	-23.14	25.40	54.00	28.60

Note:

Calculate Average value based on duty cycle correction factor:

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

$$= 6.97 \text{ ms} * 1$$

$$= 6.97 \text{ ms}$$

$$\text{Duty cycle} = T_{on}/T_p$$

$$= 6.97/100$$

$$= 0.0697$$

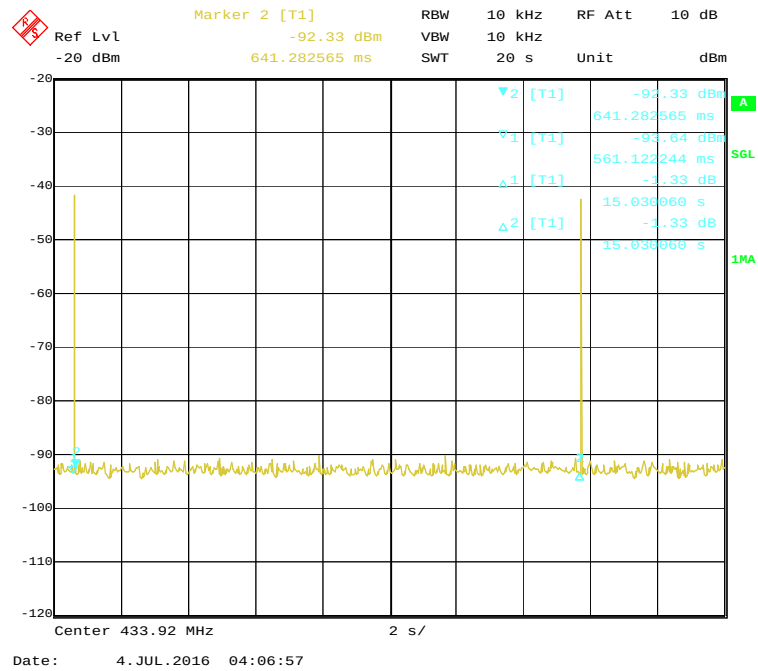
$$\text{Duty cycle factor} = 20 * \log(\text{duty cycle})$$

$$= -23.14 \text{ dB}$$

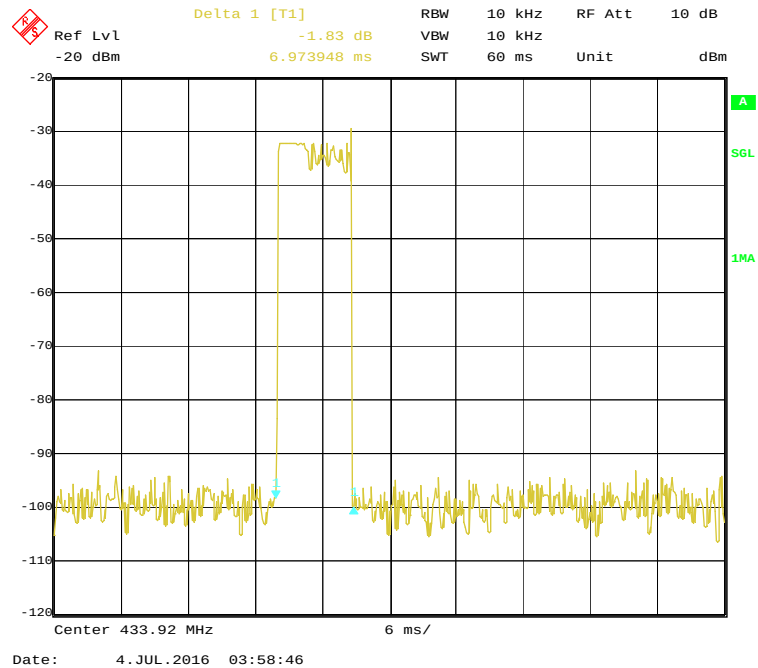
$$\text{Average} = \text{Peak} + \text{Duty cycle factor}$$

Please refer to the following plot.

$$T_{on1} + T_{Silent} = 15.03s$$



$$T_{on1}$$



§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	SIGNAL ANALYZER	FSV40	101116	2015-09-02	2016-09-02
BACL	RF cable	KS-LAB-A01	KS-LAB-A01	2015-12-16	2016-12-15
BACL	Attenuator	KS-LAB-A06	KS-LAB-A06	2015-12-16	2016-12-15

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

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:	26 °C
Relative Humidity:	53 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on 2016-06-22

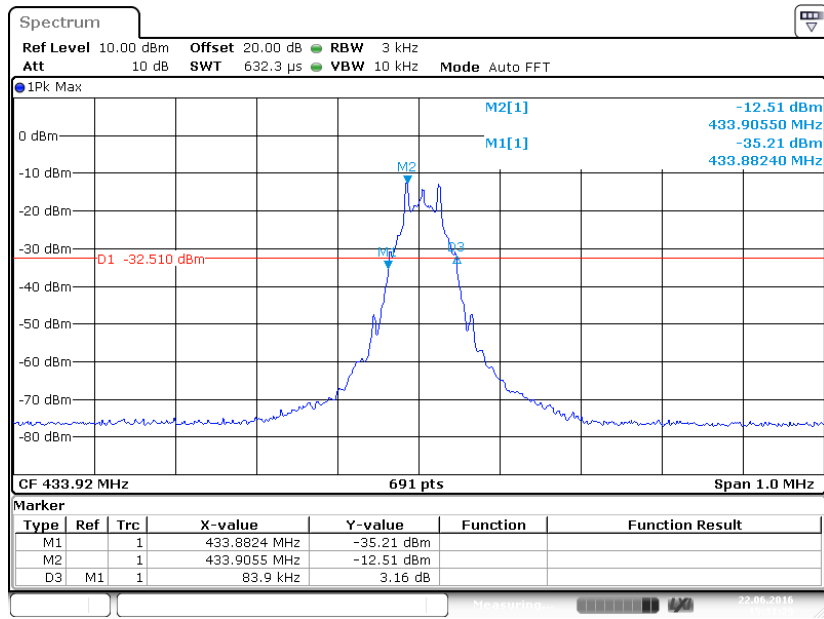
Test Mode: Transmitting

Please refer to following table and plot.

Channel Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Result
433.92	83.9	1084.8	Pass

Note: Limit = 0.25% * Center Frequency = 0.25% * 433.92 MHz = 1084.8 kHz
20dB Bandwidth=83.9 kHz<1084.8 kHz

20 dB Bandwidth



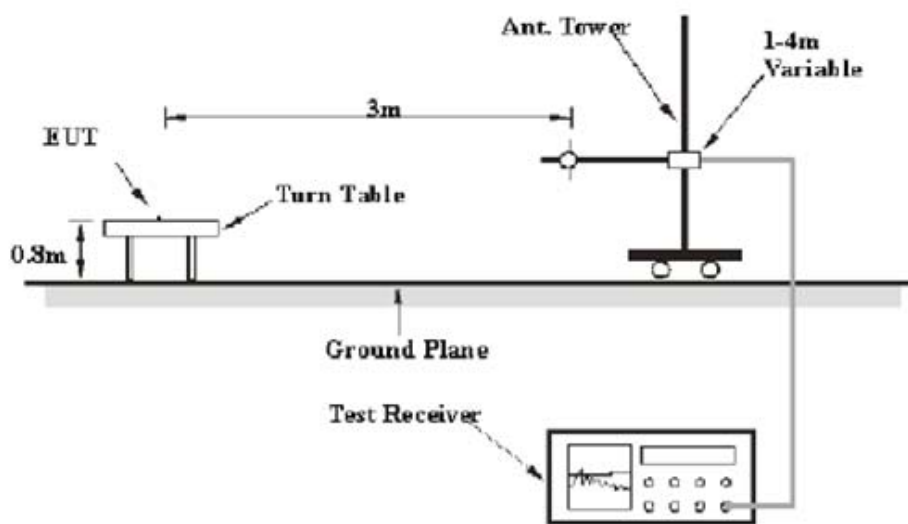
Date: 22 JUN 2016 15:31:29

FCC §15.231(e) – TRANSMISSION AND SILENT PERIOD TESTING

Applicable Standard

Per 15.231(e), devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

EUT Setup



The deactivation test was performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10- 2013. The specification used was the FCC 15.231(e) limits.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrument	Amplifier	330	171377	2015-09-16	2016-09-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-11-12	2016-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2015-11-07	2016-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
champrotek	Chamber	Chamber A	1#	2015-09-17	2016-09-17
R&S	Auto test Software	EMC32	V 09.10.0	-	-
BACL	RF cable	KS-LAB-A01	KS-LAB-A01	2015-12-16	2016-12-15
BACL	RF cable	KS-LAB-A02	KS-LAB-A02	2015-12-16	2016-12-15

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	26 °C
Relative Humidity:	53 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on 2016-07-04.

Test Mode: Transmitting

Please refer to following table and plot.

Deactivation

Transmission period (s)	Limit (s)	Result
0.00697	< 1	Pass

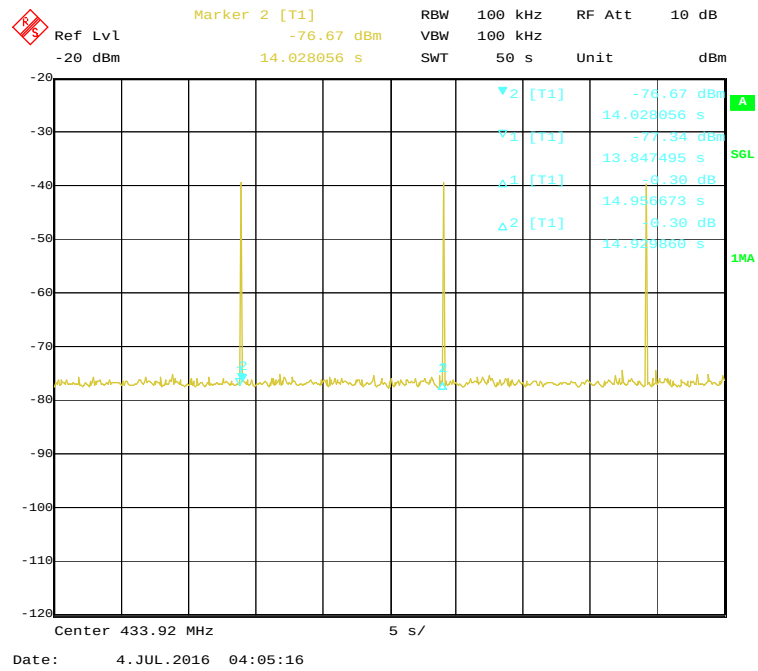
Silent period

Silent period (s)	Limit (s)	Result
14.957	> 10	Pass

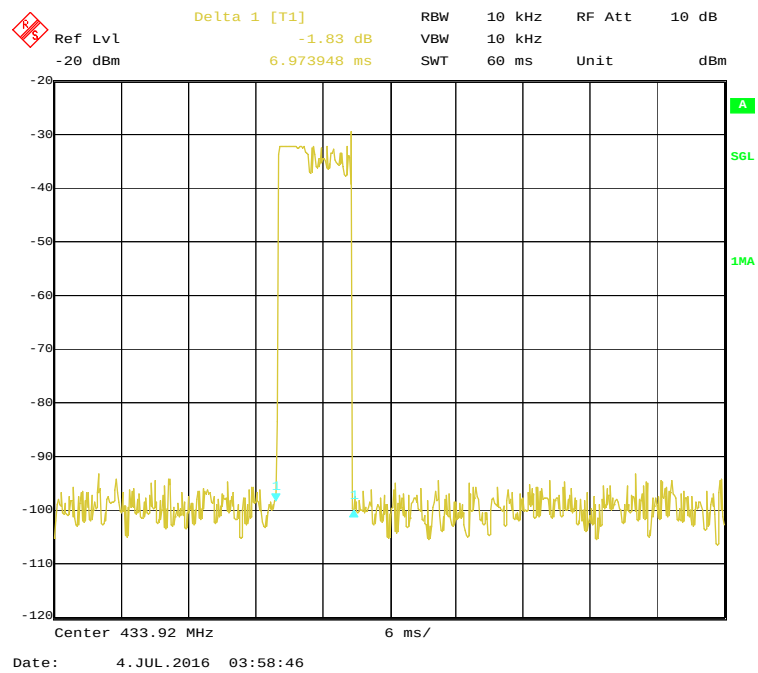
Note: The silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

The duration time is $0.00697s$, $0.00697 \times 30 = 0.2091s$.

Silent period



Transmission period



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