ACCREDITED
TESTING LABORATORY
CERTIFICATE # 4821.01

BACL
Bay Area Compliance Labs Corp.

FCC PART 15.231

TEST REPORT

For

Polygroup Trading Limited

Unit 606, Fairmont House, 8 Cotton Tree Drive, Central, Hong Kong, China

FCC ID: 2APJZ-CW003

Report Type:	**Product Type:**
Original Report	Remote controller

Report Number:	RSZ190228810-00
Report Date:	2019-04-16
Reviewed By:	Xiangguang Kong Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

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The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Remote controller
Model	PDT-003-29V
Frequency Range	434MHz
Field Strength	68.49 dBuV/m@3m
Modulation Technique	ASK
Antenna Specification	PCB Antenna, 0dBi
Voltage Range	DC 3V from battery
Date of Test	2019/03/22~2019/04/16
Sample serial number	190228810
Received date	2019/02/28
Sample/EUT Status	Good condition

Objective

This test report is prepared on behalf of *Polygroup Trading Limited.* 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, section 15.203, 15.205, 15.209, 15.35(c) and 15.231 rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

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 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.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF Output Power with Power meter		±0.5dB
RF conducted test with spectrum		±1.5dB
AC Power Lines Conducted Emissions		±1.95dB
Radiated Emissions	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±3℃
Humidity		±6%
Supply voltages		±0.4%

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing by manufacturer.

Operating frequency:434 MHz.

Special Accessories

No special accessories was used

Equipment Modifications

No modification was made to the EUT.

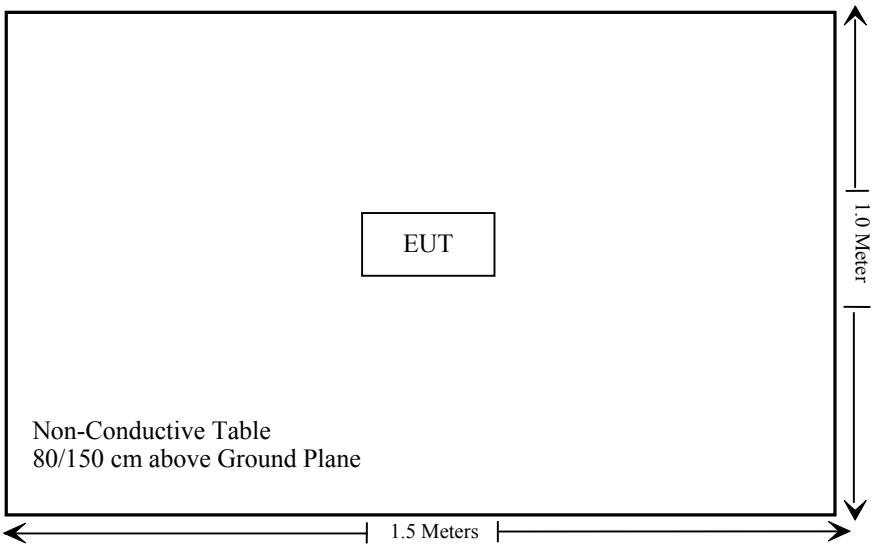
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

Cable Description	Length (m)	From / Port	To
/	/	/	/

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Not Applicable
§15.205, §15.209, §15.231(b)	Radiated Emissions	Compliance
§15.231 (c)	20dB Emission Bandwidth	Compliance
§15.231 (a) (1)	Deactivation	Compliance

Not Applicable: The EUT was powered by battery only.

TEST EQUIPMENT LIST AND DETAILS

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
A.H.System	Horn Antenna	SAS-200/571	135	2018-09-01	2021-08-31
Rohde & Schwarz	Spectrum Analyzer	FSV40	101473	2018-06-22	2019-06-22
COM-POWER	Pre-amplifier	PA-122	181919	2018-11-12	2019-11-12
Sonoma Instrument	Amplifier	310N	186238	2018-11-12	2019-11-12
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03 -101746-zn	2018-07-11	2019-07-11
Rohde & Schwarz	Spectrum Analyzer	FSU26	200120	2019-03-02	2020-03-01
Ducommun technologies	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2018-11-12	2019-11-12
Ducommun technologies	RF Cable	104PEA	218124002	2018-11-12	2019-11-12
Ducommun technologies	RF Cable	RG-214	1	2018-11-19	2019-05-21
Ducommun technologies	RF Cable	RG-214	2	2018-11-12	2019-11-12

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

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 Connector Construction

The EUT has one internal antenna arrangement, which used a unique coupling to this product. And the antenna is 0dBi; fulfill the requirement of this section. Please refer to EUT photos.

Result: Compliant.

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

Applicable Standard

FCC §15.205, §15.209, §15.231 (b)

According to FCC §15.231(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

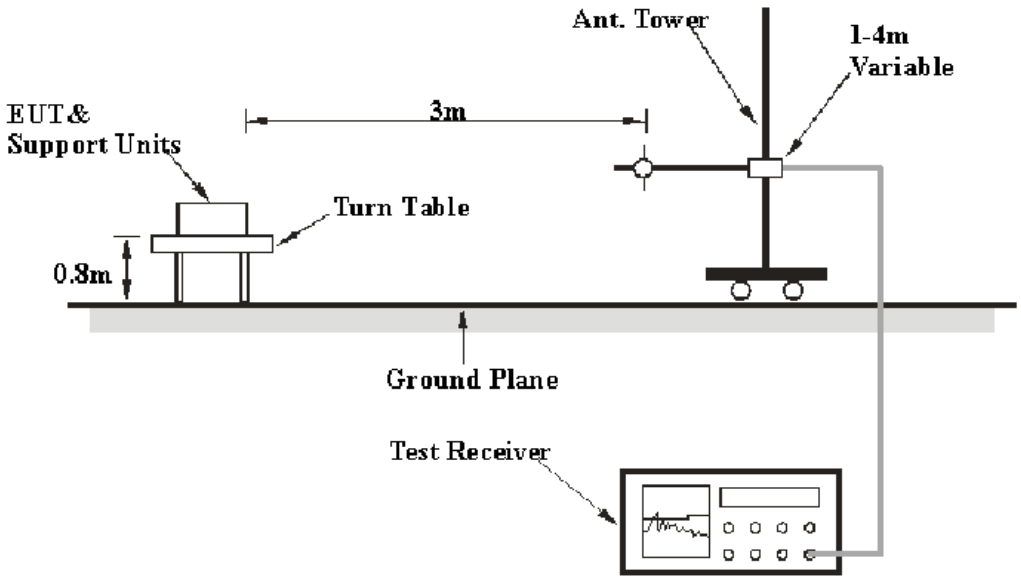
Fundamental frequency (MHz)	Field Strength of Fundamental (Microvolts /meter)	Field Strength of spurious emissions ((Microvolts /meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750**	125 to 375**
174-260	3750	375
260-470	3750 to 12500**	375 to 1250**
Above 470	12500	1250

*Linear interpolations.

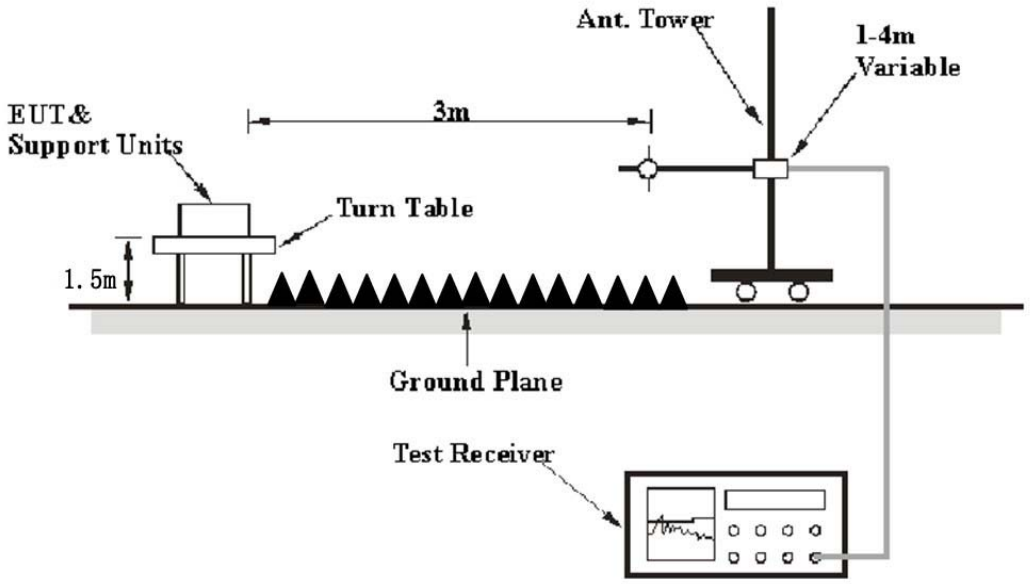
The above field strength limits are specified at a distance of 3-meters the tighter limits apply at the band edges.

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 test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK

Test Procedure

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

All final data was recorded in the Quasi-peak detection mode from 30MHz to 1GHz, Peak and average detection mode above 1 GHz.

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:

Corrected Amplitude = Meter Reading + Antenna Loss + Cable Loss - Amplifier Gain

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

Margin = Limit –Corrected Amplitude

Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.205, §15.209, §15.231 (b)

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.

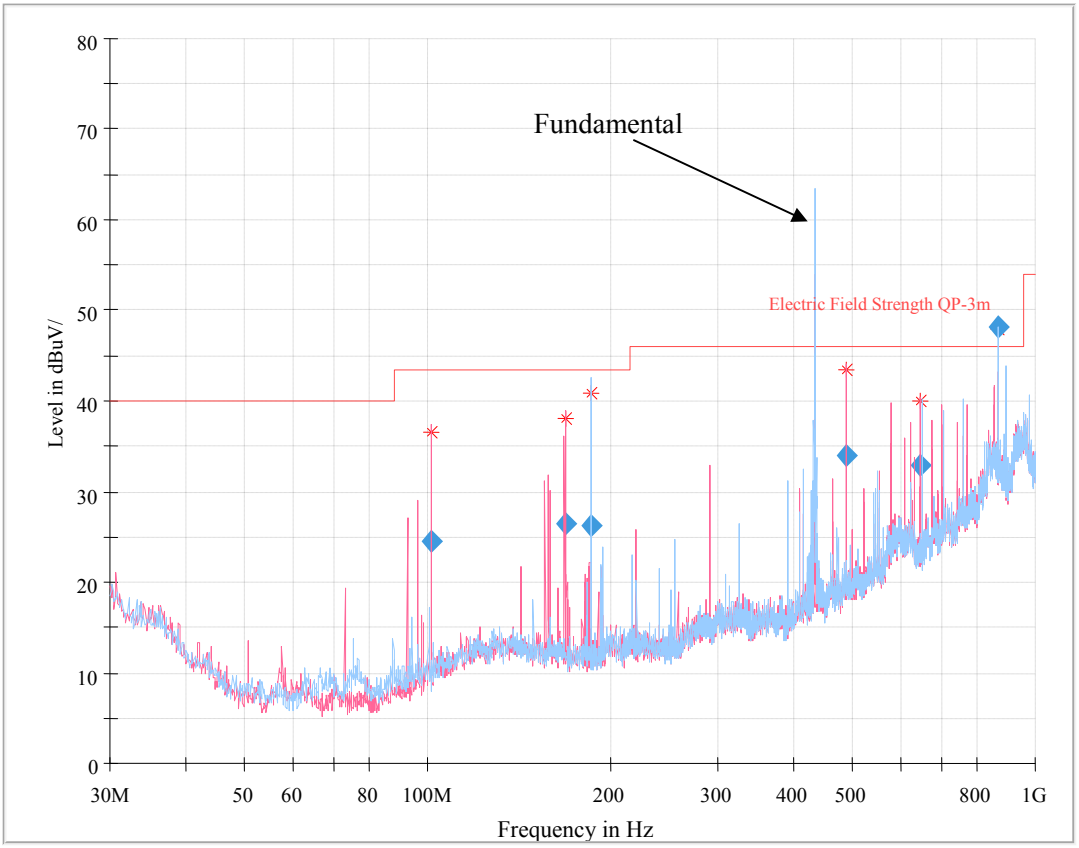
Test Data

Environmental Conditions

Temperature:	25~26 ℃
Relative Humidity:	50~55 %
ATM Pressure:	100.9~101.1 kPa

The testing was performed by Andy Yu on 2019-03-22.

Test mode: Transmitting



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Detector (PK/QP/Ave.)	Antenna Height (cm)	Antenna Polarity	Turntable Position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
101.648500	24.44	QP	305.0	V	337.0	-16.9	43.50	19.06
168.806750	26.42	QP	141.0	V	277.0	-14.9	43.50	17.08
185.541625	26.27	QP	319.0	H	16.0	-15.2	43.50	17.23
489.868000	34.06	QP	154.0	V	325.0	-7.4	46.00	11.94
645.690875	32.86	QP	190.0	V	321.0	-3.4	46.00	13.14
868.260750	48.22	QP	105.0	H	199.0	5.9	60.83	12.61

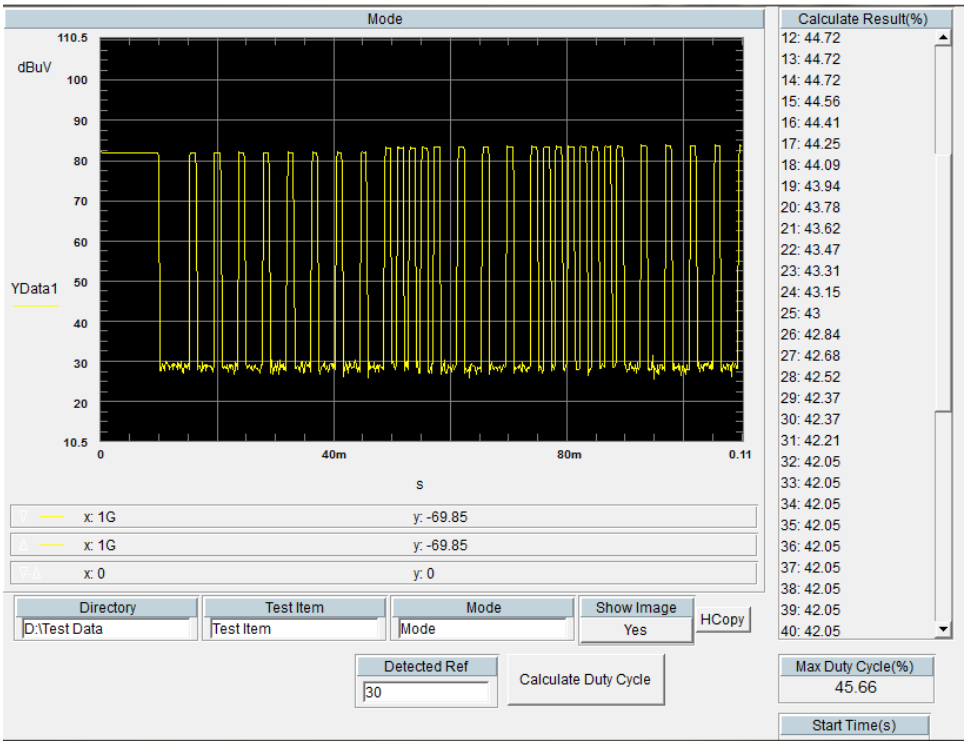
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.231(b)		
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)	Comment
434	77.40	PK	264	101	H	-8.91	68.49	100.83	32.34	Fundamental
434	76.15	PK	76	224	V	-8.91	67.24	100.83	33.59	Fundamental
868	43.27	PK	287	101	H	5.90	49.17	80.83	31.66	Spurious
868	38.26	PK	156	152	V	5.90	44.16	80.83	36.67	Spurious
1302	50.40	PK	109	160	H	-1.95	48.45	74	25.55	Spurious
1302	62.60	PK	250	230	V	-1.95	60.65	74	13.35	Spurious
1736	52.49	PK	146	250	H	-1.62	50.87	80.83	29.96	Spurious
1736	56.79	PK	358	180	V	-1.62	55.17	80.83	25.66	Spurious
2170	60.57	PK	333	180	H	-0.16	60.41	80.83	20.42	Spurious
2170	56.74	PK	305	200	V	-0.16	56.58	80.83	24.25	Spurious
2604	48.25	PK	137	150	H	0.29	48.54	80.83	32.29	Spurious
2604	49.81	PK	281	110	V	0.29	50.10	80.83	30.73	Spurious

Field Strength of Average							
Frequency (MHz)	Peak Measurement (dBμV/m)	Polar (H/V)	Duty Cycle Correction Factor (dB)	Corrected Ampitude (dBμV/m)	FCC Part 15.231(b)		
					Limit (dBμV/m)	Margin (dB)	Comment
434	68.49	H	-6.80	61.69	80.83	19.14	Fundamental
434	67.24	V	-6.80	60.44	80.83	20.39	Fundamental
868	49.17	H	-6.80	42.37	60.83	18.46	Spurious
868	44.16	V	-6.80	37.36	60.83	22.97	Spurious
1302	48.45	H	-6.80	41.65	54	12.35	Spurious
1302	60.65	V	-6.80	53.85	54	0.15	Spurious
1736	50.87	H	-6.80	44.07	60.83	16.76	Spurious
1736	55.17	V	-6.80	48.37	60.83	12.46	Spurious
2170	60.41	H	-6.80	53.61	60.83	7.22	Spurious
2170	56.58	V	-6.80	49.78	60.83	11.05	Spurious
2604	48.54	H	-6.80	41.74	60.83	19.09	Spurious
2604	50.10	V	-6.80	43.3	60.83	17.53	Spurious

Note:

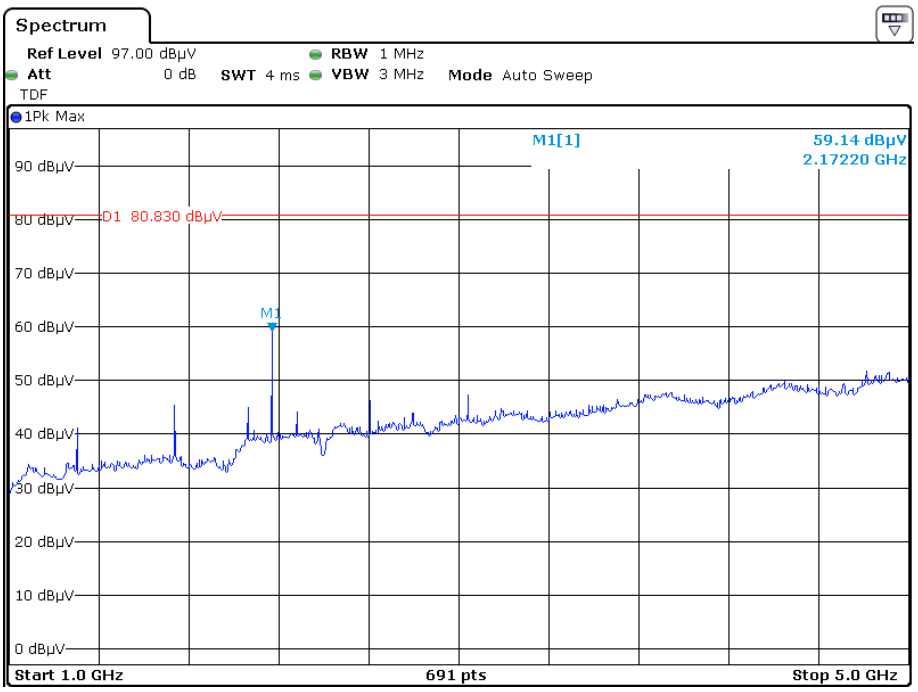
Corrected Amplitude = Corrected Factor + Reading
Corrected Factor = Antenna factor (Rx) + cable loss – amplifier factor
Margin = Limit - Corr. Amplitude
Ave. = PK + 20*log(Duty Cycle)
Duty cycle factor = 20*log(Ton/Tp) = 20*log(45.66/100) = -6.80

Duty Cycle



Note: Test with normal use sample for Duty cycle.

Pre-scan-Horizontal



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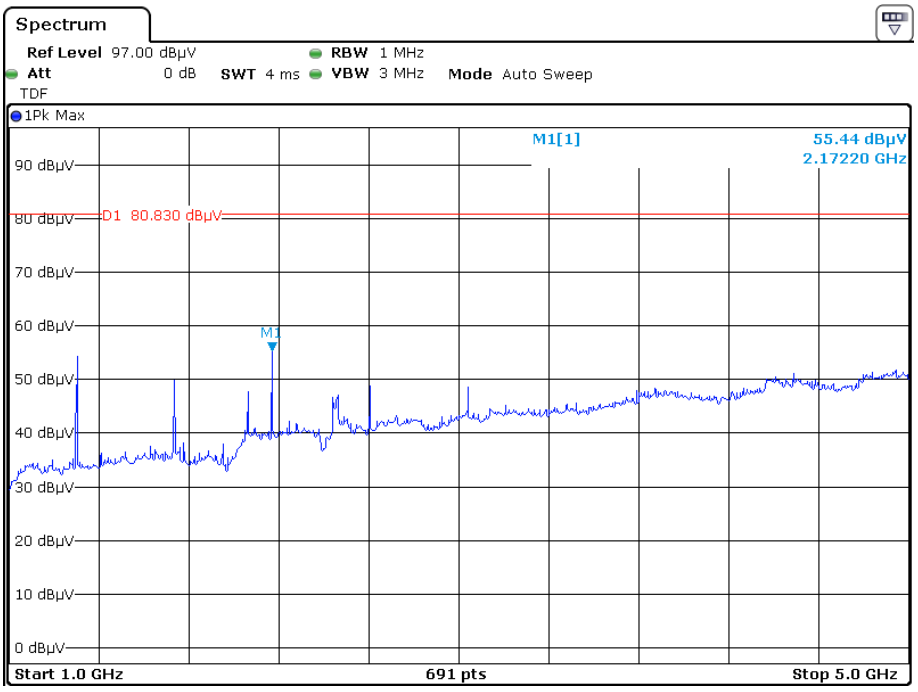
Pre-scan - Vertical



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FCC §15.231(a) (1) - DEACTIVATION TESTING

Applicable Standard

Per FCC §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.

Test Procedure

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

Test Data

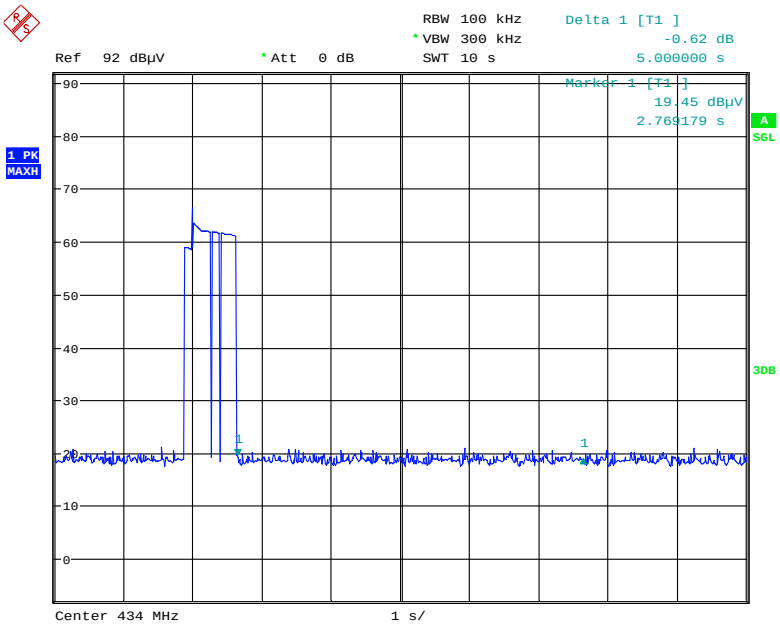
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	53 %
ATM Pressure:	100.1 kPa

The testing was performed by Andy Yu on 2019-04-16.

Test mode: Transmitting

Test Result: Compliant. This product will cease transmission within 5 seconds after activation. Please refer to following plots.



FCC §15.231(c) – 20 dB EMISSION BANDWIDTH TESTING

Applicable Standard

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 Procedure

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

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	53 %
ATM Pressure:	100.1 kPa

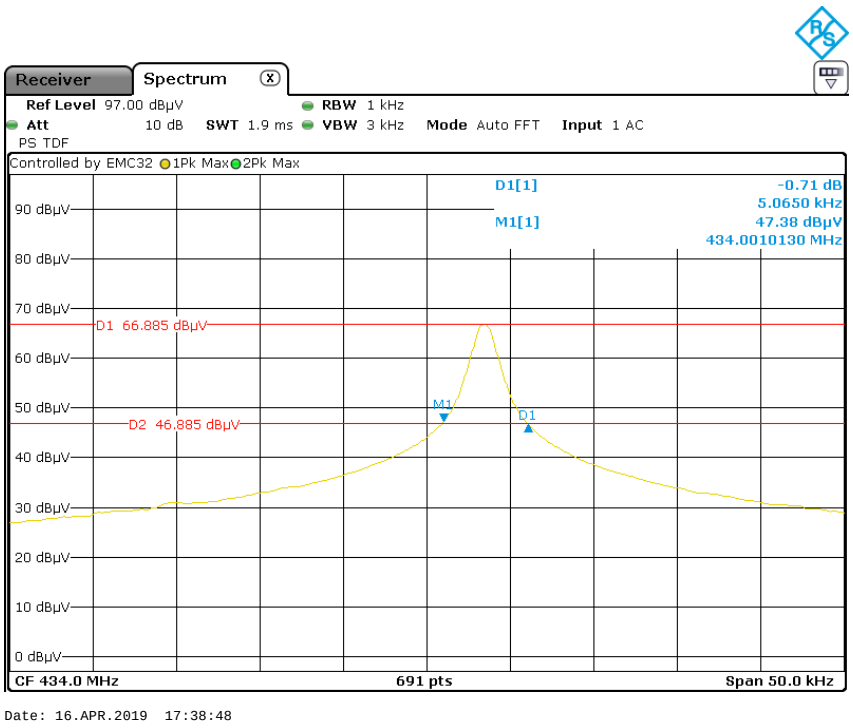
The testing was performed by Andy Yu on 2019-04-16.

Test Mode: Transmitting

Please refer to following table and plots.

Channel Frequency (MHz)	20 dB Emission Bandwidth (kHz)	＜Limit (kHz)	Result
434	5.065	1085	Pass

20 dB Emission Bandwidth



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