

FCC PART 15.249 TEST REPORT

For

Techwall Electronics Co., Ltd.

24/F, Tower 1, Tern Centre, 237 Queen's Road, Central, Hong Kong

FCC ID: OD9BSM1

Report Type: Original Report	Product Name: Digital Baby Monitor
Report Number: RDG180611008-00B	
Report Date: 2018-07-05	
Reviewed By:	<i>Jerry Zhang</i>
Test Laboratory:	Jerry Zhang EMC Manager Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan). This report must not be used by the customer to claim product certification, approval, or endorsement by A2LA* or any agency of the Federal Government.

* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk “*” .

TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY	3
MEASUREMENT UNCERTAINTY.....	3
TEST FACILITY	4
SYSTEM TEST CONFIGURATION.....	5
JUSTIFICATION	5
EUT EXERCISE SOFTWARE	5
EQUIPMENT MODIFICATIONS	5
BLOCK DIAGRAM OF TEST SETUP	5
SUMMARY OF TEST RESULTS.....	6
FCC§15.203 - ANTENNA REQUIREMENT.....	7
APPLICABLE STANDARD	7
ANTENNA CONNECTOR CONSTRUCTION	7
FCC§15.205, §15.209&§15.249- RADIATED EMISSIONS	8
APPLICABLE STANDARD	8
EUT SETUP	8
TEST EQUIPMENT SETUP	9
TEST PROCEDURE	9
CORRECTED AMPLITUDE & MARGIN CALCULATION	9
TEST EQUIPMENT LIST AND DETAILS.....	10
TEST DATA	10
FCC §15.215(C) – 20 DB BANDWIDTH TESTING.....	15
APPLICABLE STANDARD	15
TEST PROCEDURE	15
TEST EQUIPMENT LIST AND DETAILS.....	15
TEST DATA	15

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	Digital Baby Monitor
EUT Model:	BC-70
FCC ID:	OD9BSM1
Rated Input Voltage:	DC 4.5V
Serial Number:	180611008
EUT Received Date:	2018.06.11

Objective

This type approval report is prepared on behalf of **Techwall Electronics Co., Ltd.** in accordance with Part 2-Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Rules Part 15, Subpart C, and section 15.203, 15.205, 15.215, 15.209 and 15.249 rules.

Related Submittal(s)/Grant(s)

Part of system submissions with FCC ID: OD9BC70PU, FCC ID: OD9BC70BU.

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 and Bay Area Compliance Laboratories Corp. (Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
Unwanted Emissions, radiated	30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~26.5GHz: 5.23 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, 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. : 897218, the FCC Designation No. : CN1220.

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

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

The device employs 4 channels as below list:

Channel	Frequency (MHz)
1	915.80
2	916.00
3	926.80
4	927.00

3channels were tested: 915.80 MHz, 916.00MHz and 927.00MHz

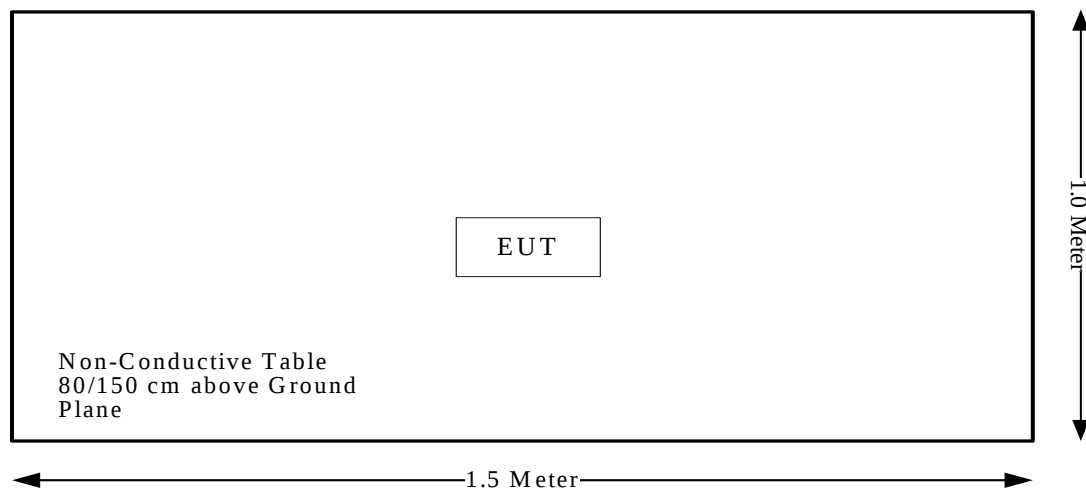
EUT Exercise Software

No software was used in test, the device was configured to engineer mode by manufacturer, test channel switched by keys.

Equipment Modifications

No modifications were made to the EUT.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207(a)	Conduction Emissions	Not Applicable*
15.205, §15.209, §15.249	Radiated Emissions	Compliance
§15.215 (c)	20 dB Bandwidth	Compliance

Note:

Not Applicable*: the EUT is battery operated equipment.

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

Antenna Connector Construction

The EUT has one internal antenna arrangement, and the antenna gain is 0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

FCC§15.205, §15.209&§15.249- RADIATED EMISSIONS**Applicable Standard**

As per FCC§15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

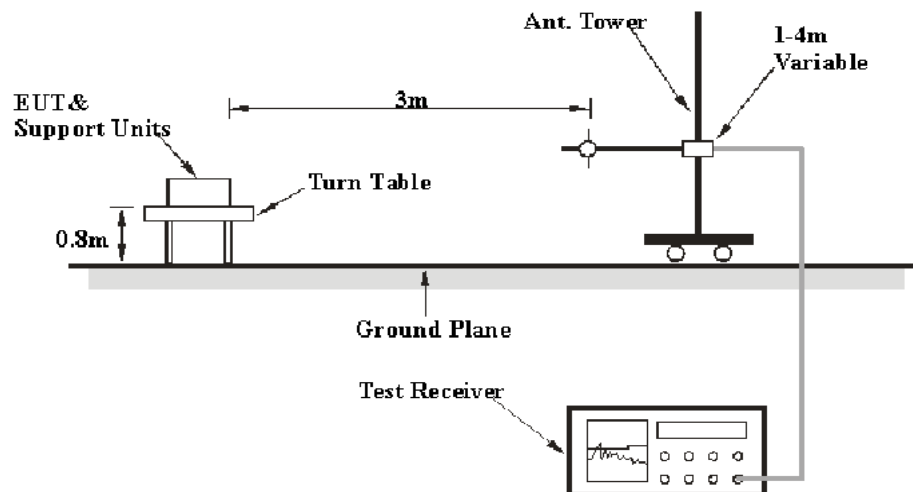
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters.

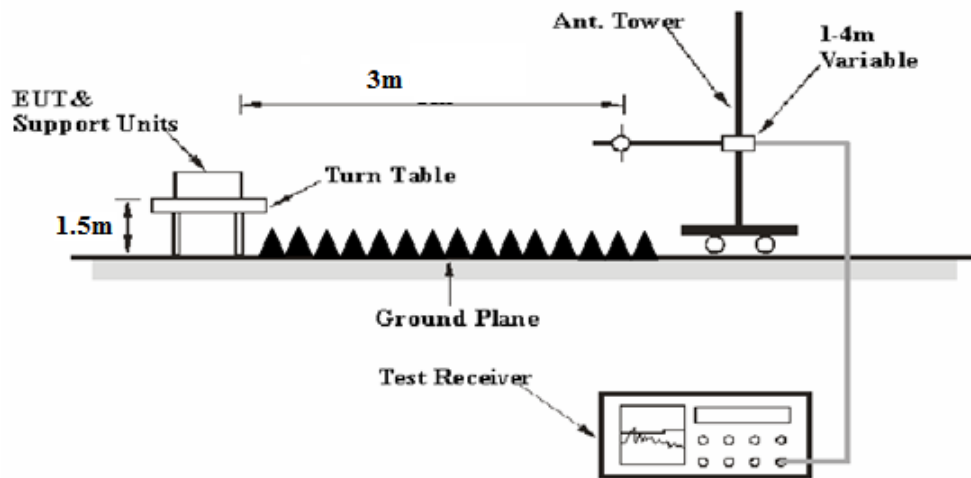
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters distance, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.

Test Equipment Setup

The system was investigated from 30 MHz to 10 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	AV

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 Quasi-peak detection mode from 30 MHz to 1GHz, peak detection mode above 1 GHz.

Corrected Amplitude & Margin Calculation

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

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

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Agilent	Spectrum Analyzer	E4440A	SG43360054	2018-01-04	2019-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

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

Test Data

Environmental Conditions

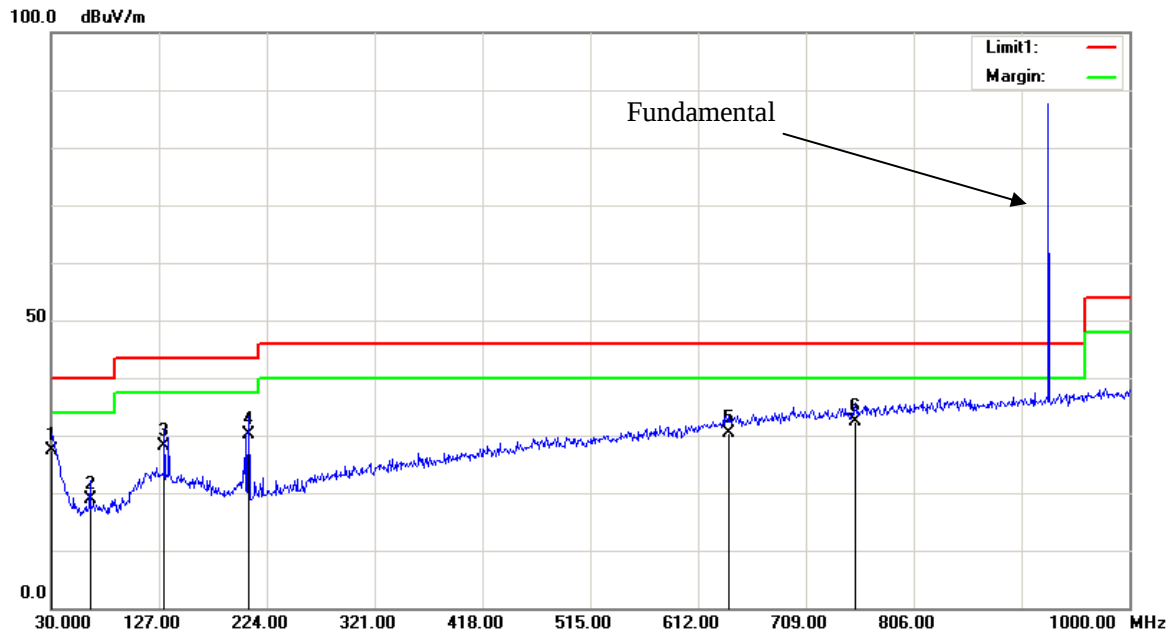
Temperature:	27.0~28.6°C
Relative Humidity:	35~43 %
ATM Pressure:	99.6~101.6kPa

The testing was performed by Vern Shen and Blake Yang on 2018-06-27 to 2018-07-04 .

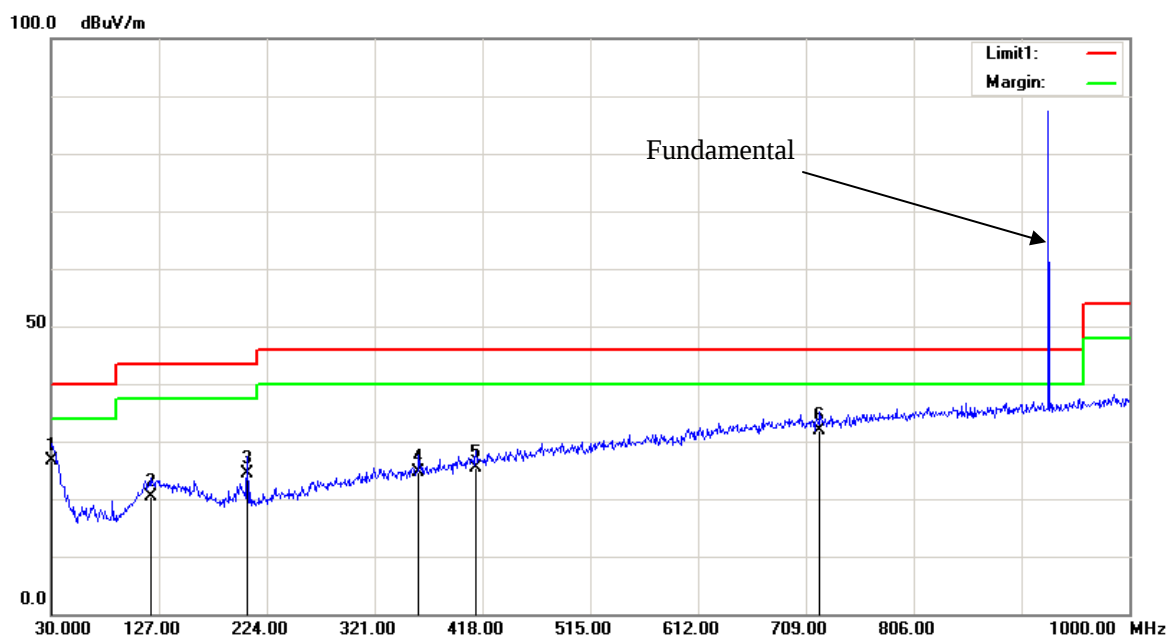
Test Mode: Transmitting

1) 30MHz-1GHz(Worst at Middle Channel)

Horizontal:



Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.0000	-0.57	QP	27.87	27.30	40.00	12.70
64.9200	4.55	QP	14.45	19.00	40.00	21.00
131.8500	7.17	QP	20.93	28.10	43.50	15.40
207.5100	11.90	QP	18.30	30.20	43.50	13.30
640.1300	1.09	QP	29.31	30.40	46.00	15.60
753.6200	1.92	QP	30.58	32.50	46.00	13.50

Vertical:

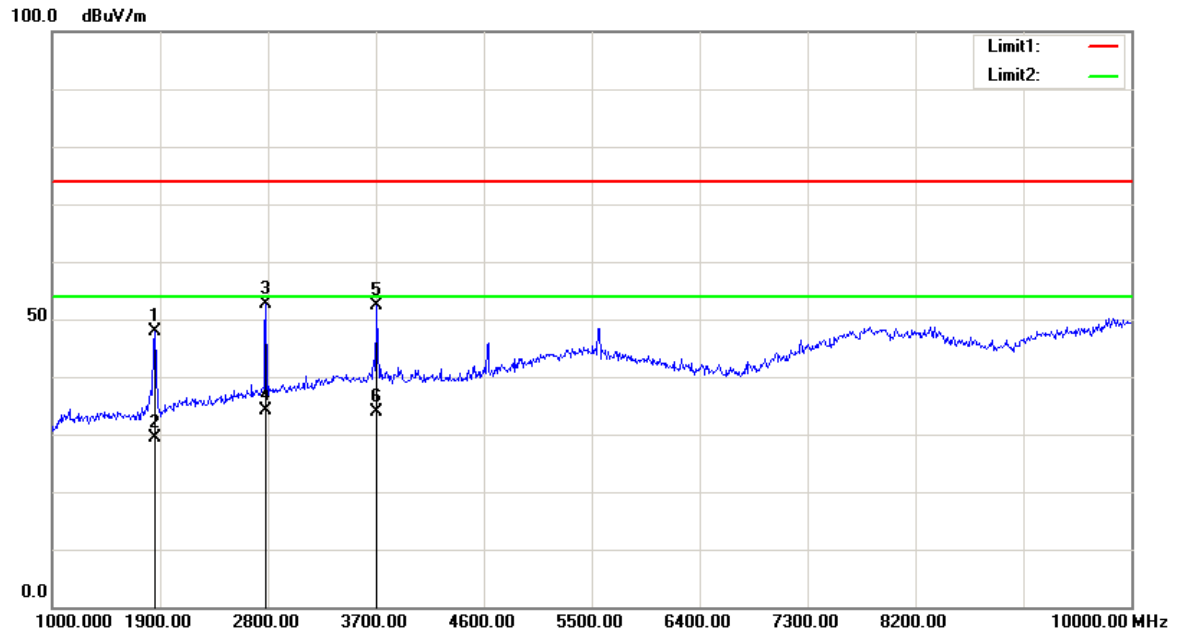
Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.0000	-1.17	QP	27.87	26.70	40.00	13.30
119.2400	-0.49	QP	20.99	20.50	43.50	23.00
206.5400	5.83	QP	18.47	24.30	43.50	19.20
360.7700	1.67	QP	23.03	24.70	46.00	21.30
412.1800	0.72	QP	24.58	25.30	46.00	20.70
721.6100	1.71	QP	30.29	32.00	46.00	14.00

2) Above 1G, Bandedge, and Fundamental field strength:

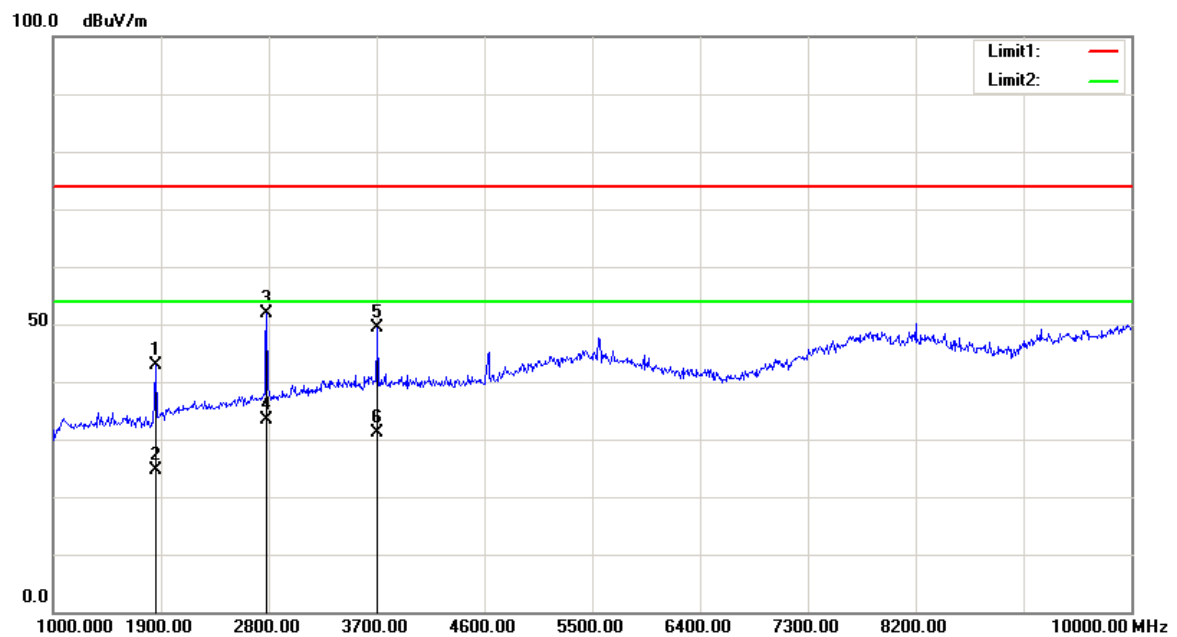
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 915.8 MHz									
915.80	54.60	QP	H	22.40	4.22	0.00	81.22	93.98	12.76
915.80	53.90	QP	V	22.40	4.22	0.00	80.52	93.98	13.46
902.00	5.50	QP	H	22.34	4.29	0.00	32.13	46.00	13.87
1831.60	51.93	PK	H	26.59	1.66	35.95	44.23	74.00	29.77
1831.60	33.63	AV	H	26.59	1.66	35.95	25.93	54.00	28.07
2747.40	53.16	PK	H	29.19	1.91	36.51	47.75	74.00	26.25
2747.40	34.78	AV	H	29.19	1.91	36.51	29.37	54.00	24.63
3663.20	57.02	PK	H	31.66	2.51	37.06	54.13	74.00	19.87
3663.20	38.57	AV	H	31.66	2.51	37.06	35.68	54.00	18.32
Middle Channel: 916 MHz									
916.00	54.50	QP	H	22.40	4.22	0.00	81.12	93.98	12.86
916.00	54.00	QP	V	22.40	4.22	0.00	80.62	93.98	13.36
1832.00	52.19	PK	H	26.59	1.66	35.95	44.49	74.00	29.51
1832.00	33.76	AV	H	26.59	1.66	35.95	26.06	54.00	27.94
2748.00	51.92	PK	H	29.19	1.91	36.51	46.51	74.00	27.49
2748.00	33.54	AV	H	29.19	1.91	36.51	28.13	54.00	25.87
3664.00	55.28	PK	H	31.66	2.51	37.06	52.39	74.00	21.61
3664.00	36.79	AV	H	31.66	2.51	37.06	33.90	54.00	20.10
High Channel: 927 MHz									
927.00	56.10	QP	H	22.54	4.35	0.00	82.99	93.98	10.99
927.00	54.00	QP	V	22.54	4.35	0.00	80.89	93.98	13.09
928.00	5.20	QP	H	22.56	4.34	0.00	32.10	46.00	13.90
1854.00	55.34	PK	H	26.69	1.66	35.99	47.70	74.00	26.30
1854.00	36.97	AV	H	26.69	1.66	35.99	29.33	54.00	24.67
2781.00	57.97	PK	H	29.31	1.93	36.55	52.66	74.00	21.34
2781.00	39.68	AV	H	29.31	1.93	36.55	34.37	54.00	19.63
3708.00	54.22	PK	H	31.76	2.57	37.02	51.53	74.00	22.47
3708.00	35.64	AV	H	31.76	2.57	37.02	32.95	54.00	21.05

Worst Plots(Middle Channel)

Horizontal:



Vertical:



FCC §15.215(c) – 20 dB BANDWIDTH TESTING

Applicable Standard

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
3. Repeat above procedures until all frequencies measured were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05

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

Test Data

Environmental Conditions

Temperature:	27.3 °C
Relative Humidity:	55 %
ATM Pressure:	101.7 kPa

The testing was performed by Vern Shen on 2018-06-27.

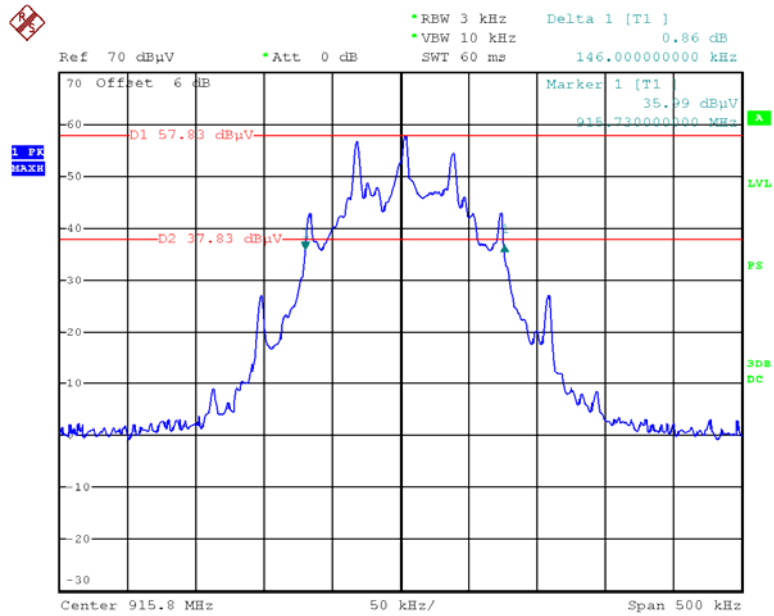
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

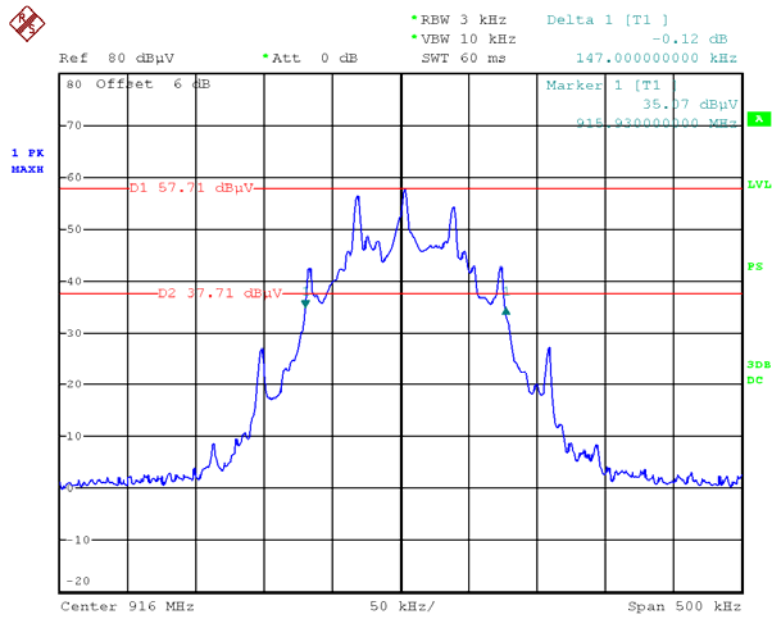
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	915.8	0.146
Middle	916	0.147
High	927	0.146

Low Channel



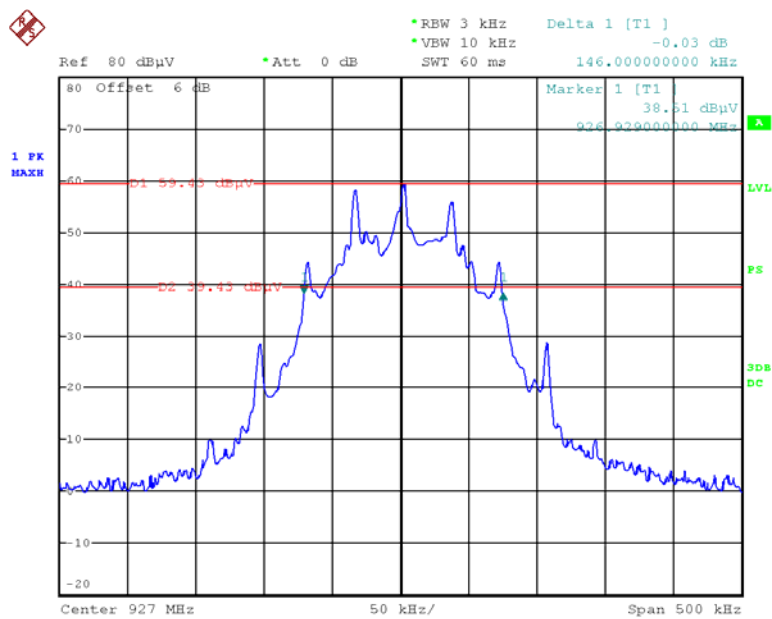
Date: 27.JUN.2018 14:46:56

Middle Channel



Date: 27.JUN.2018 15:12:05

High Channel



Date: 27.JUN.2018 15:39:54

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