



TESTING LABORATORY
CERTIFICATE #4820.01



FCC PART 15.247 TEST REPORT

For

Techwall Electronics Co. Ltd.

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

FCC ID: OD9VBC-68BU

Report Type: Original Report	Product Name: BEBECARE iQ HD Smart and safe Baby Monitor
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		BEB CARE iQ HD Smart and safe Baby Monitor
EUT Model:		VBC-68
Rated Input Voltage:		DC 5V from adapter
Adapter Information	Model:	S012B0501500U
	Input:	100-240V DC~50/60Hz, Max400mA
	Output:	5.0Vdc, 1500mA
External Dimension:		90mm(L)* 90mm(W)* 110mm(H)
Serial Number:		181115003
EUT Received Date:		2018-11-21

Objective

This report is prepared on behalf of **Techwall Electronics Co. Ltd.** in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communications Commission's rules.

The tests were performed in order to determine the EUT compliance with FCC Rules Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submissions with FCC ID: OD9VBC-68BU.
Part of system submissions with FCC ID: OD9BC70PU.

Test Methodology

All measurements detailed in this test report were performed in accordance with ANSI C63.10-2013 "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices". And 558074 D01 15.247 Meas Guidance v05.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
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
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1 °C
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 lab has been recognized as the FCC accredited lab 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 lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode. 57 channels were used as below:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	915.8	16	918.8	31	921.8	46	924.8
2	916	17	919	32	922	47	925
3	916.2	18	919.2	33	922.2	48	925.2
4	916.4	19	919.4	34	922.4	49	925.4
5	916.6	20	919.6	35	922.6	50	925.6
6	916.8	21	919.8	36	922.8	51	925.8
7	917	22	920	37	923	52	926
8	917.2	23	920.2	38	923.2	53	926.2
9	917.4	24	920.4	39	923.4	54	926.4
10	917.6	25	920.6	40	923.6	55	926.6
11	917.8	26	920.8	41	923.8	56	926.8
12	918	27	921	42	924	57	927
13	918.2	28	921.2	43	924.2	/	/
14	918.4	29	921.4	44	924.4	/	/
15	918.6	30	921.6	45	924.6	/	/

Channel 1, 29, 57 were selected to test.

EUT Exercise Software

The Engineering Mode configured the maximum power level as default setting.

Equipment Modifications

No modification was made to the EUT.

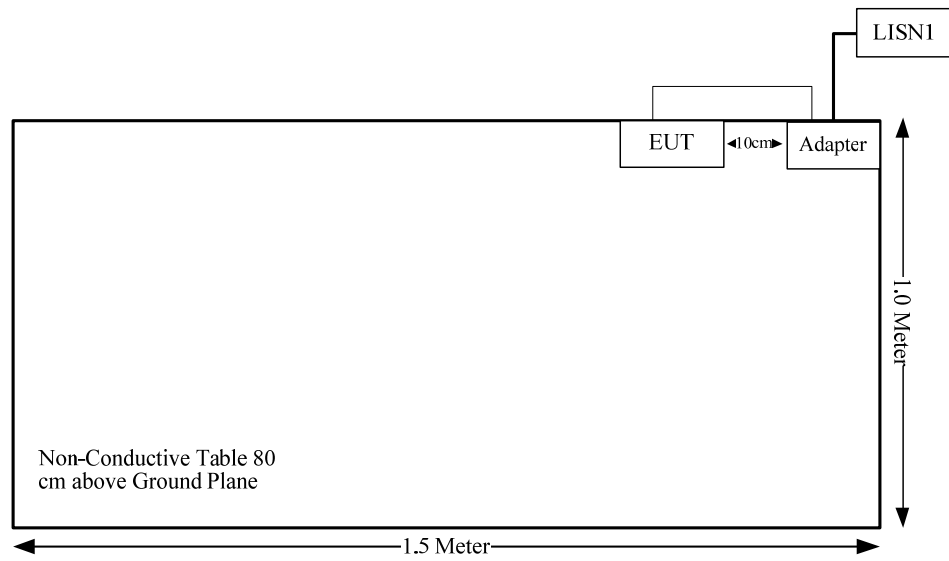
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Unknown	AC/DC switching adapter	S012B0501500U	/

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From	To
Adapter cable	no	no	2.0	Adapter	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(1)	20 dB Bandwidth	Compliance
§15.247(a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

FCC §15.247 (i), §1.1310, §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i) and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculation Formula:

Prediction of power density at the distance of the applicable MPE limit:

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

Frequency Range (MHz)	Antenna Gain		Maximum Power Including Tolerance		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2412-2462	2.5	1.78	23	200	20.00	0.07	1.0
915.8-927	0	1	16	39.81	20.00	0.008	0.61

Note: The Maximum Power Including Tolerance was declared by manufacturer.

The WLAN and 900MHz can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$$=S_{WLAN}/S_{limit-WLAN} + S_{900M}/S_{limit-900M}$$

$$=0.07/1 + 0.008/0.61$$

$$=0.08$$

$$< 1.0$$

Result: Compliance, The device meets FCC MPE at 20 cm distance

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

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

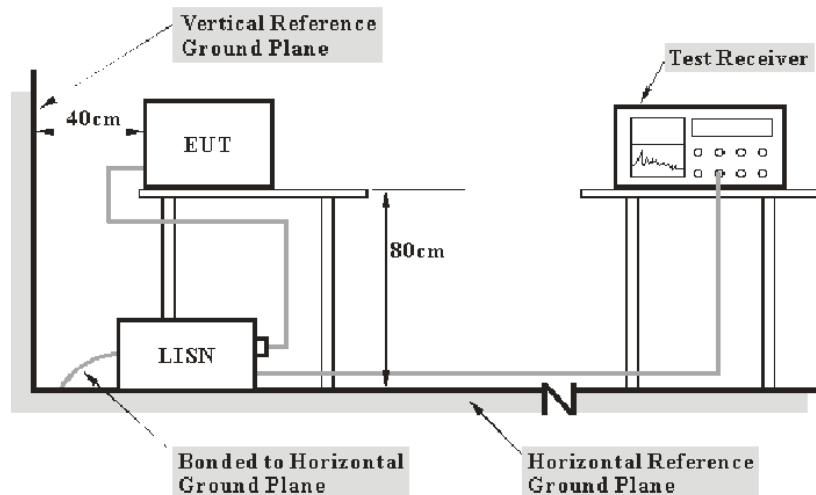
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207(a)

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 C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to the main LISN with a 120 V/60 Hz AC 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 first 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.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

Herein,

V_C : corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF: voltage division factor of AMN or ISN

The “**Margin**” column of the following data tables indicates the degree of compliance within 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	ESCS 30	830245/006	2017-12-11	2018-12-11
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2018-09-05	2019-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2017-12-08	2018-12-08

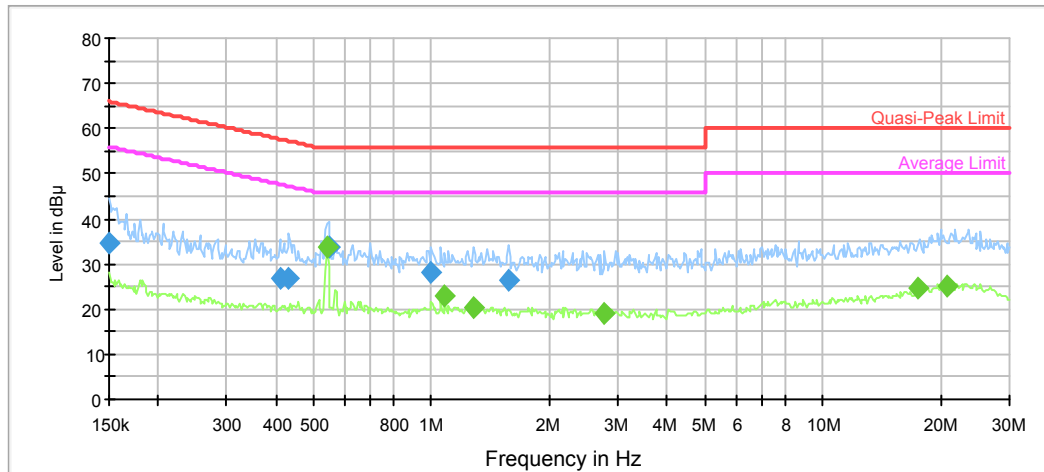
* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

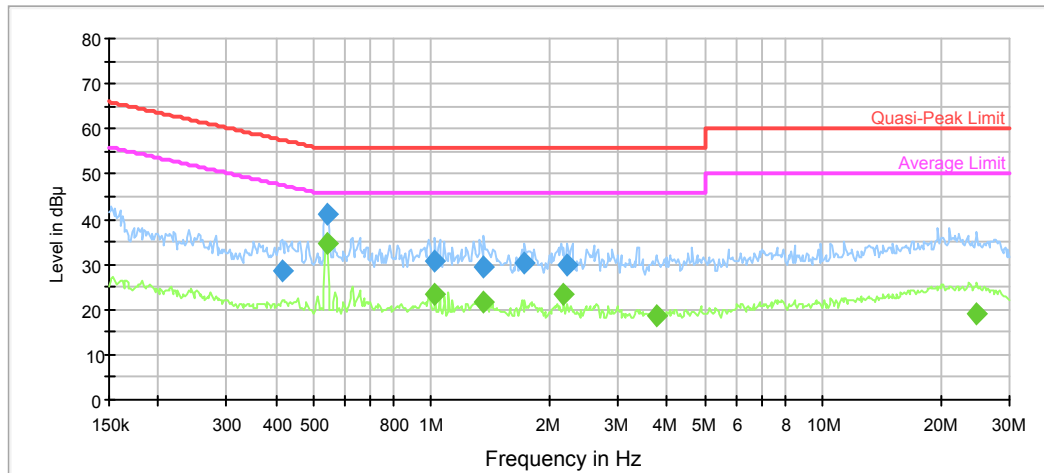
Temperature:	28.2 °C
Relative Humidity:	56 %
ATM Pressure:	100.2 kPa

The testing was performed by Ade Xiao on 2018-12-03.

Test Mode: Transmitting**AC120V, 60 Hz, Line:**

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	34.6	9.000	L1	11.2	31.4	66.0	Compliance
0.409372	26.9	9.000	L1	10.0	30.8	57.7	Compliance
0.432855	26.8	9.000	L1	9.9	30.4	57.2	Compliance
0.545378	33.8	9.000	L1	9.9	22.2	56.0	Compliance
0.999305	28.2	9.000	L1	9.8	27.8	56.0	Compliance
1.573796	26.5	9.000	L1	9.7	29.5	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.541050	33.8	9.000	L1	9.9	12.2	46.0	Compliance
1.082190	23.1	9.000	L1	9.8	22.9	46.0	Compliance
1.279307	20.5	9.000	L1	9.8	25.5	46.0	Compliance
2.771062	18.9	9.000	L1	9.8	27.1	46.0	Compliance
17.459396	24.5	9.000	L1	10.0	25.5	50.0	Compliance
20.804674	25.1	9.000	L1	10.1	24.9	50.0	Compliance

AC120V, 60 Hz, Neutral:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.415949	28.7	9.000	N	9.9	28.8	57.5	Compliance
0.541050	41.0	9.000	N	9.8	15.0	56.0	Compliance
1.023481	30.8	9.000	N	9.8	25.2	56.0	Compliance
1.363512	29.5	9.000	N	9.8	26.5	56.0	Compliance
1.731709	30.1	9.000	N	9.8	25.9	56.0	Compliance
2.216927	30.0	9.000	N	9.8	26.0	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.541050	34.7	9.000	N	9.8	11.3	46.0	Compliance
1.023481	23.5	9.000	N	9.8	22.5	46.0	Compliance
1.363512	21.6	9.000	N	9.8	24.4	46.0	Compliance
2.181877	23.2	9.000	N	9.8	22.8	46.0	Compliance
3.781003	18.7	9.000	N	9.8	27.3	46.0	Compliance
24.790919	19.1	9.000	N	10.1	30.9	50.0	Compliance

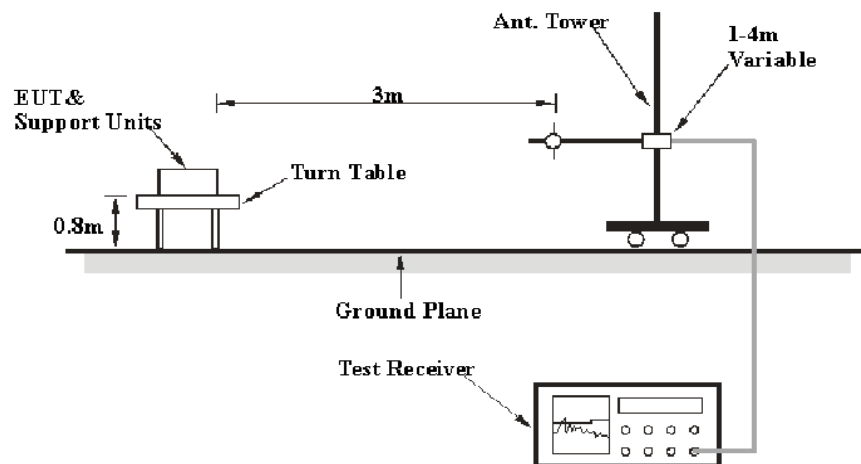
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

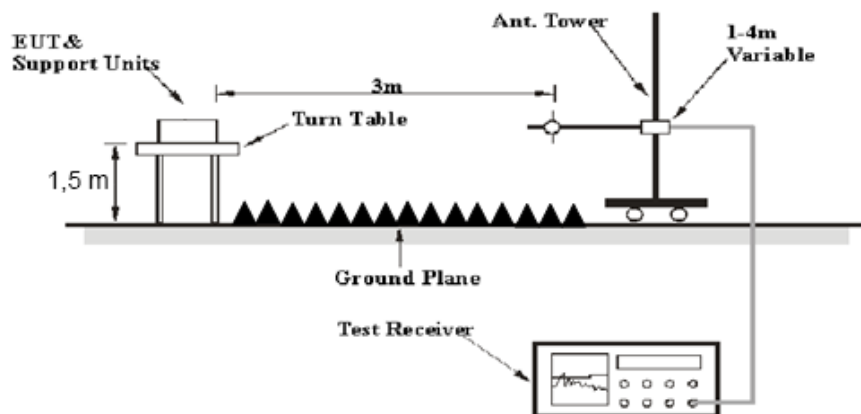
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission Below 1GHz tests were performed in the 3 meters chamber test site A, above 1GHz tests were performed in the 3 meters chamber test site B, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 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.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 9.5 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.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz - 1 GHz, peak and average detection modes for frequencies above 1 GHz.

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
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2018-09-05	2019-09-05
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
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
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2018-09-05	2019-09-05
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2018-09-05	2019-09-05

* **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).

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 Data

Environmental Conditions

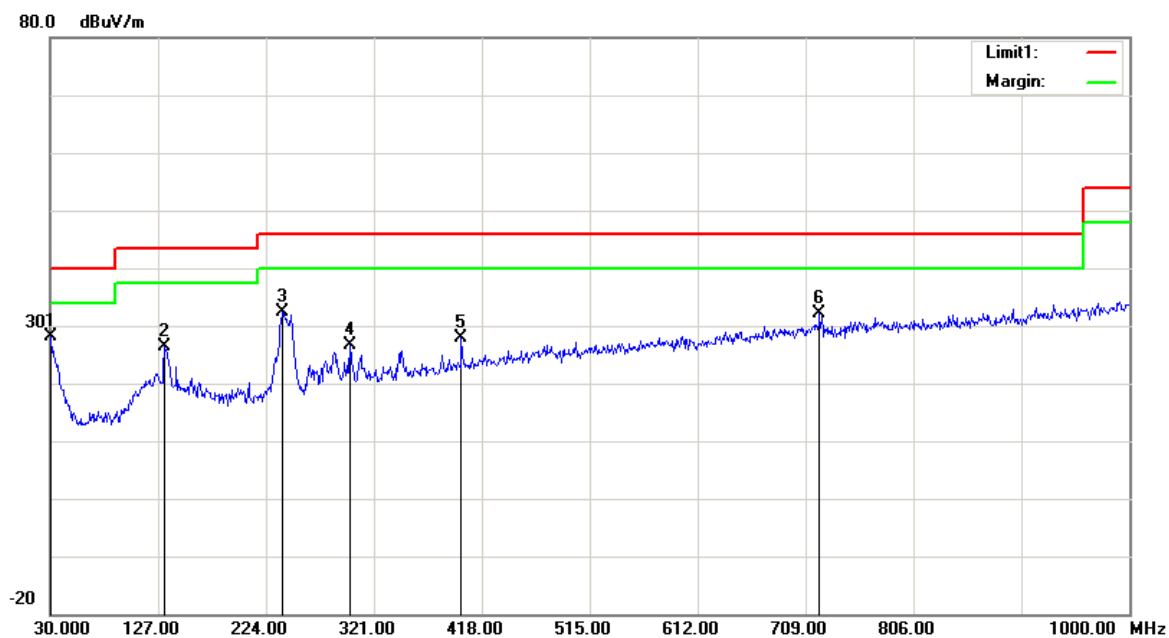
Temperature:	24.5~25.4 °C
Relative Humidity:	39~45%
ATM Pressure:	100.3 kPa

* The testing was performed by Neil Liao & Tyler Pan on 2018-12-03.

Test Mode: Transmitting

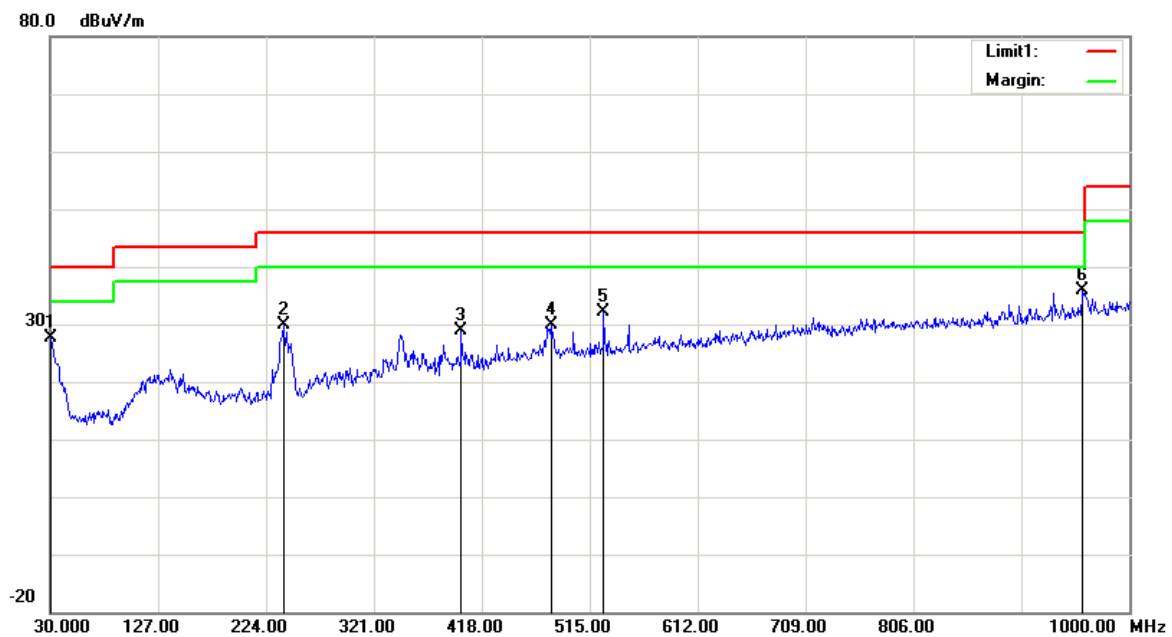
1) 30MHz-1GHz (low channel was the worst)

Horizontal:



Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
30.0000	26.29	peak	1.76	28.05	40.00	11.95
132.8200	31.41	peak	-4.95	26.46	43.50	17.04
238.5500	38.50	peak	-6.07	32.43	46.00	13.57
299.6600	30.55	peak	-3.85	26.70	46.00	19.30
399.5700	29.90	peak	-2.02	27.88	46.00	18.12
721.6100	28.71	peak	3.33	32.04	46.00	13.96

Note: Peak value meets QP limit, so QP value doesn't need to be recorded.

Vertical:

Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
30.9700	26.67	peak	0.95	27.62	40.00	12.38
239.5200	35.77	peak	-5.98	29.79	46.00	16.21
399.5700	30.83	peak	-2.02	28.81	46.00	17.19
480.0800	30.16	peak	-0.24	29.92	46.00	16.08
527.6100	31.89	peak	0.28	32.17	46.00	13.83
958.2900	39.11	peak	-3.19	35.92	46.00	10.08

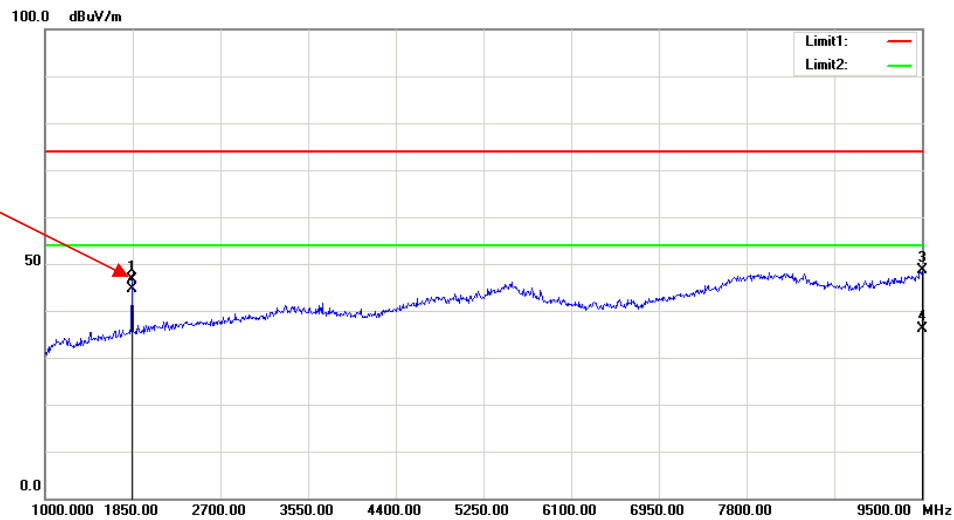
Note: Peak value meets QP limit, so QP value doesn't need to be recorded.

2) Fundamental/Band Edge/Above 1GHz emission:

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	80.31	QP	H	22.40	4.22	0.00	106.93	N/A	N/A
915.80	75.46	QP	V	22.40	4.22	0.00	102.08	N/A	N/A
902.00	13.56	QP	H	22.34	4.29	0.00	40.19	86.93	46.74
1831.60	54.41	PK	H	26.59	1.66	35.95	46.71	74.00	27.29
1831.60	52.30	AV	H	26.59	1.66	35.95	44.60	54.00	9.40
2747.40	45.31	PK	H	29.19	1.91	36.51	39.90	74.00	34.10
2747.40	32.89	AV	H	29.19	1.91	36.51	27.48	54.00	26.52
3663.20	45.64	PK	H	31.66	2.51	37.06	42.75	74.00	31.25
3663.20	33.21	AV	H	31.66	2.51	37.06	30.32	54.00	23.68
Middle Channel: 921.4 MHz									
921.40	79.30	QP	H	22.43	4.30	0.00	106.03	N/A	N/A
921.40	78.34	QP	V	22.43	4.30	0.00	105.07	N/A	N/A
1842.80	54.11	PK	H	26.64	1.66	35.97	46.44	74.00	27.56
1842.80	52.03	AV	H	26.64	1.66	35.97	44.36	54.00	9.64
2764.20	44.89	PK	H	29.25	1.92	36.53	39.53	74.00	34.47
2764.20	32.46	AV	H	29.25	1.92	36.53	27.10	54.00	26.90
3685.60	45.52	PK	H	31.71	2.55	37.03	42.75	74.00	31.25
3685.60	33.10	AV	H	31.71	2.55	37.03	30.33	54.00	23.67
High Channel: 927 MHz									
927.00	78.87	QP	H	22.54	4.35	0.00	105.76	N/A	N/A
927.00	77.78	QP	V	22.54	4.35	0.00	104.67	N/A	N/A
928.00	22.51	QP	H	22.56	4.34	0.00	49.41	85.76	36.35
1854.00	53.26	PK	H	26.69	1.66	35.99	45.62	74.00	28.38
1854.00	51.11	AV	H	26.69	1.66	35.99	43.47	54.00	10.53
2781.00	44.93	PK	H	29.31	1.93	36.55	39.62	74.00	34.38
2781.00	32.56	AV	H	29.31	1.93	36.55	27.25	54.00	26.75
3708.00	45.61	PK	H	31.76	2.57	37.02	42.92	74.00	31.08
3708.00	33.17	AV	H	31.76	2.57	37.02	30.48	54.00	23.52

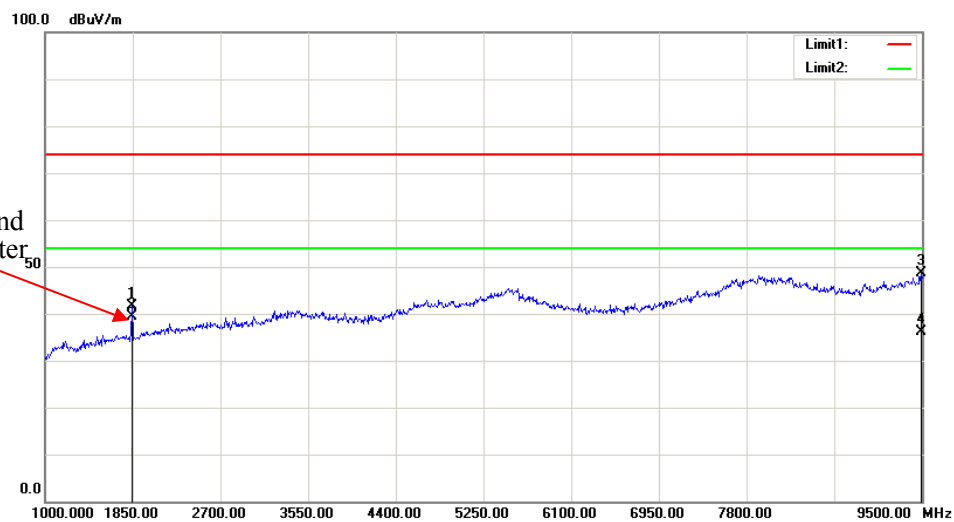
Worst plots (low channel)
Horizontal

Fundamental
Test with Band
Rejection Filter



Vertical

Fundamental
Test with Band
Rejection Filter



FCC §15.247(a) (1) - CHANNEL SEPARATION TEST**Applicable Standard**

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.50 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	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 Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace.
3. Measure the channel separation.

Test Data**Environmental Conditions**

Temperature:	24.2 °C
Relative Humidity:	36 %
ATM Pressure:	99.8 kPa

* The testing was performed by Tiago Huang on 2018-12-17.

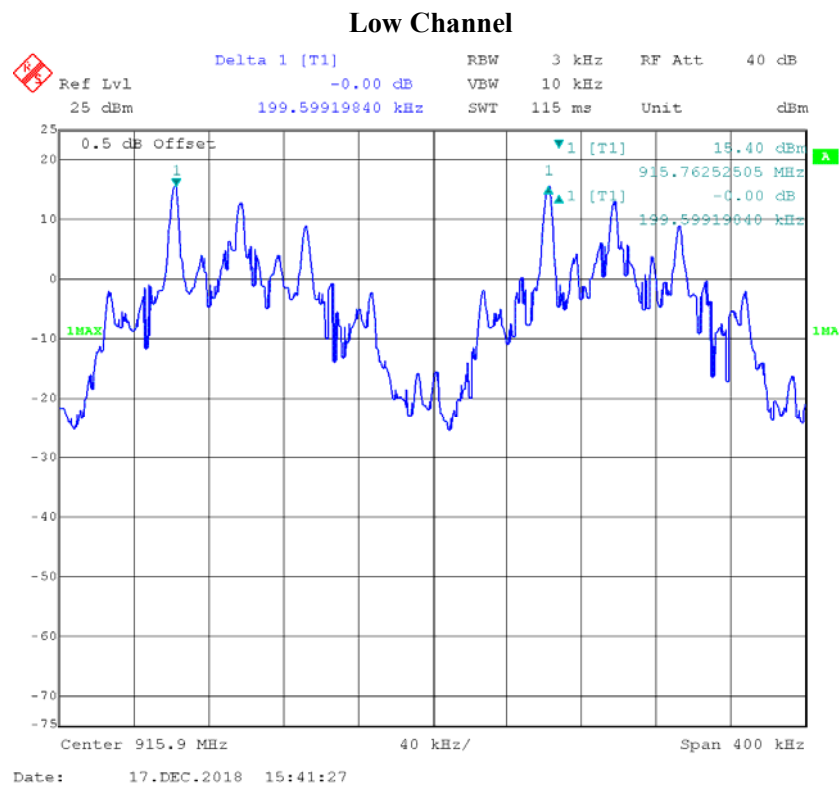
Test Result: Compliance.

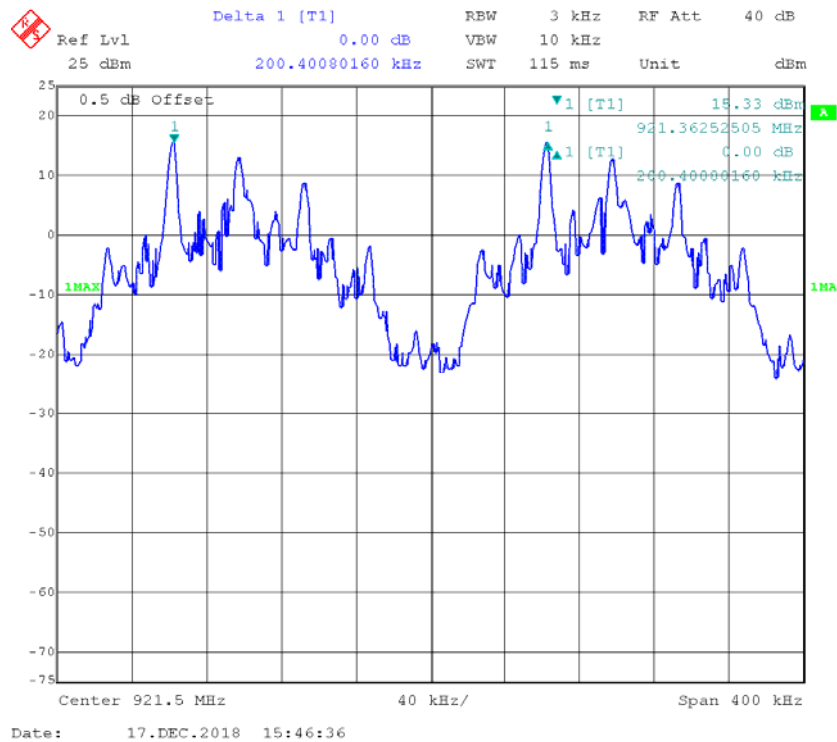
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)
Low	915.8	0.20	0.145
Middle	921.4	0.20	0.145
High	927	0.20	0.144

Note: Limit= 20dB bandwidth



Middle Channel**High Channel**

FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING

Applicable Standard

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	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:	24.2 °C
Relative Humidity:	36 %
ATM Pressure:	99.8 kPa

* The testing was performed by Tiago Huang on 2018-12-17.

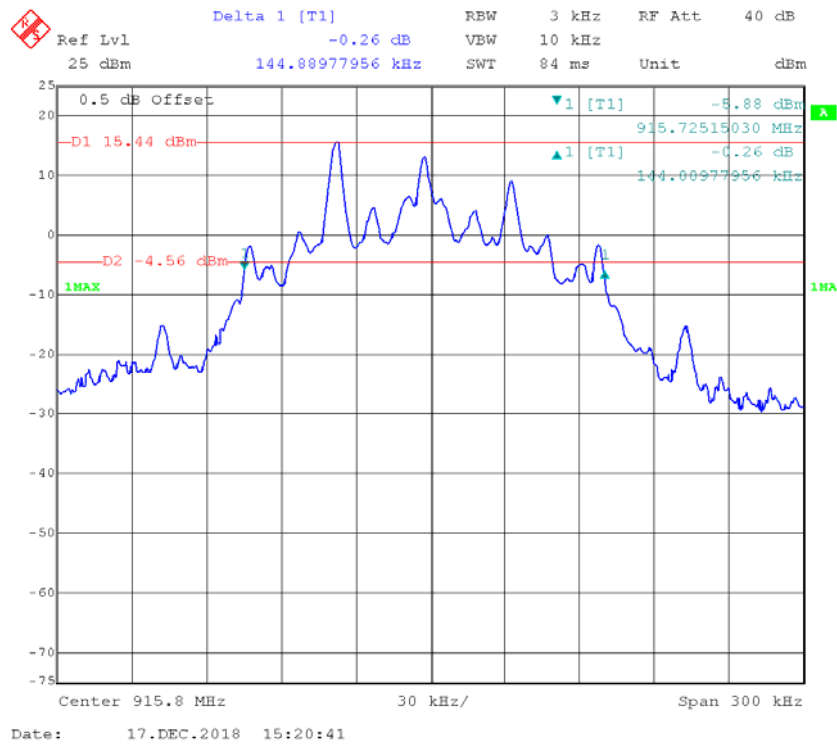
Test Result: Compliance.

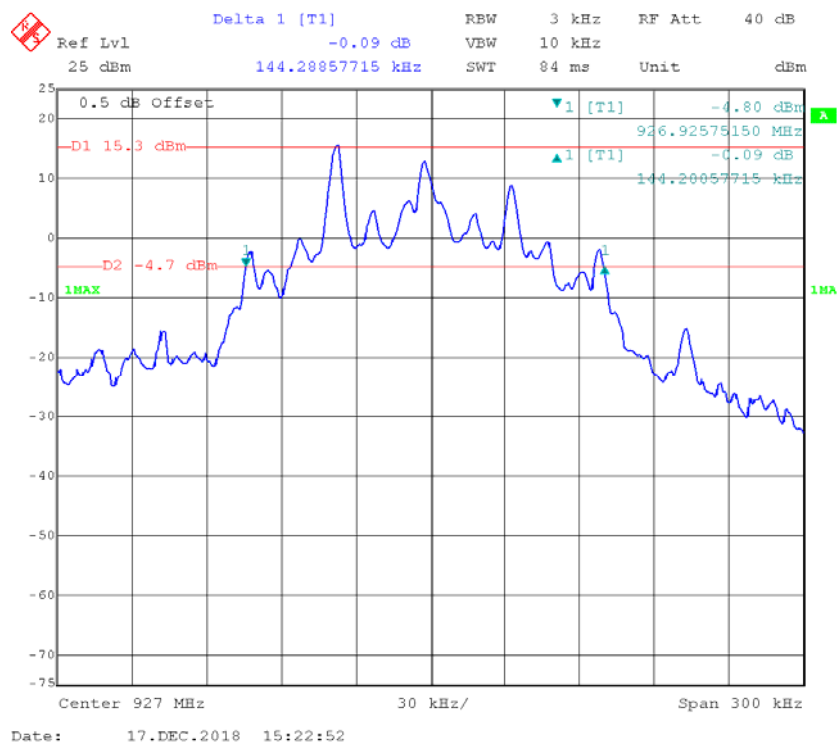
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	Limit (kHz)
Low	915.8	145	500
Middle	921.4	145	500
High	927	144	500

Low Channel



Middle Channel**High Channel**

FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST**Applicable Standard**

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	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:	24.2 °C
Relative Humidity:	36 %
ATM Pressure:	99.8 kPa

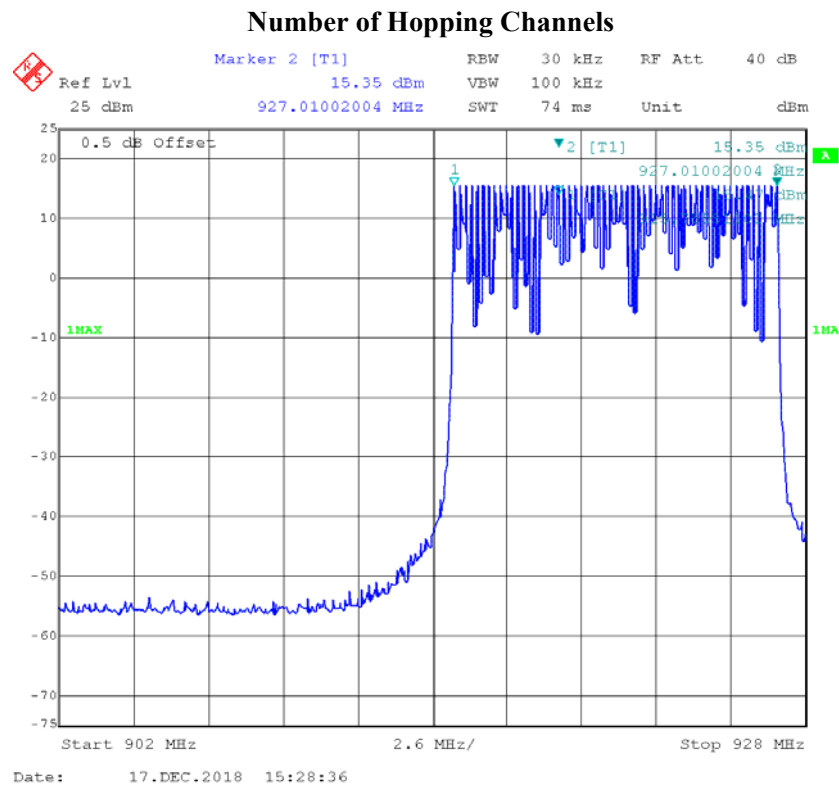
* The testing was performed by Tiago Huang on 2018-12-17.

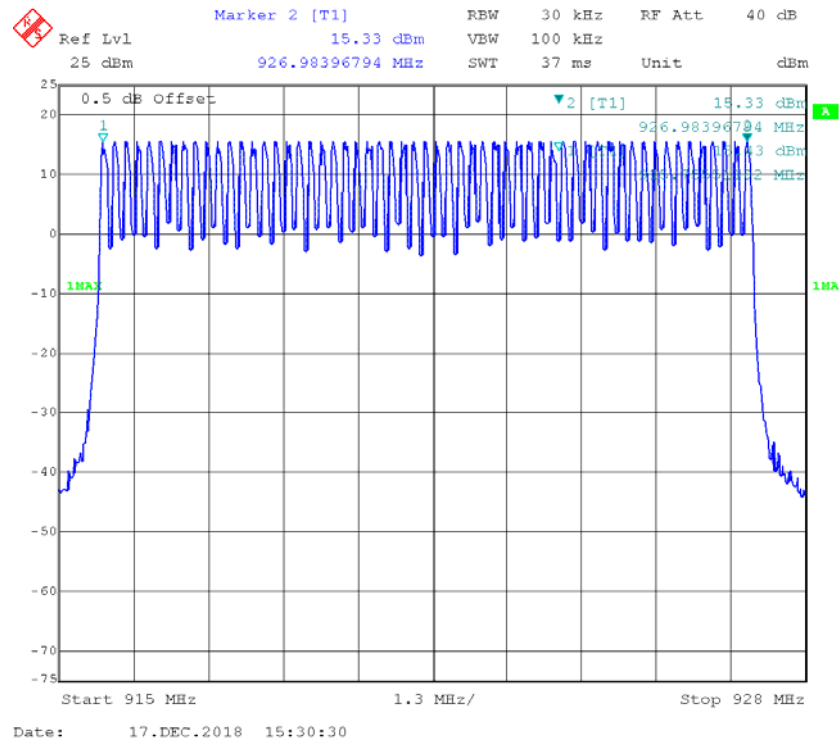
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
902-928	57	≥15





FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWEELL TIME)**Applicable Standard**

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Test Procedure

The EUT was worked in channel hopping; the time of single pulses was tested.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	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:	24.2 °C
Relative Humidity:	36 %
ATM Pressure:	99.8 kPa

* The testing was performed by Tiago Huang on 2018-12-17.

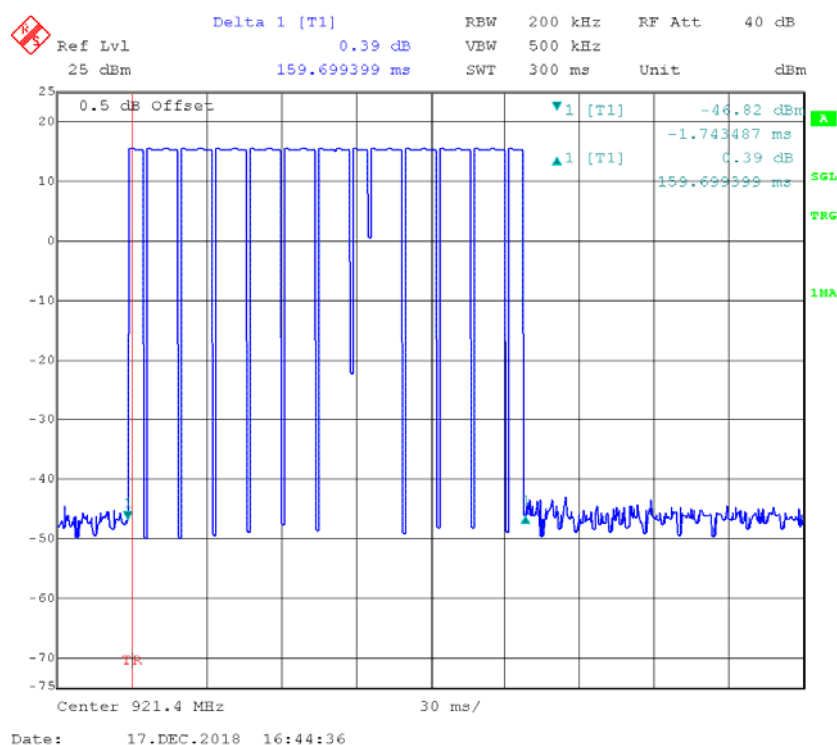
Test Result: Compliance.

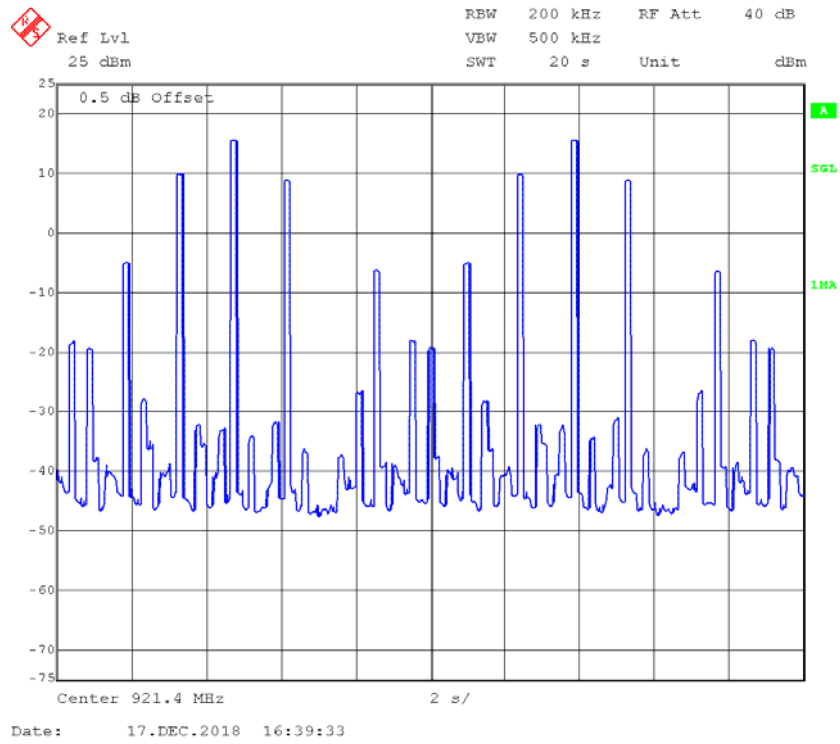
Please refer to following tables and plots

Test Mode: Transmitting (Worst Case)

Channel	Frequency (MHz)	Pulse width (ms)	Real Observed Period(s)	Hops in Observed Period	Result (s)	Limit (s)
Middle	921.4	159.7	20	2	0.32	0.4
Note: Dwell time=Pulse time (ms) × Hops in observed period Real observed period=20s						

Middle Channel





FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

Test Procedure

1. Place the EUT on a bench and set in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	USB Wideband Power Sensor	U2021XA	MY5425009	2018-03-21	2019-03-21
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	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:	24.2 °C
Relative Humidity:	36 %
ATM Pressure:	99.8 kPa

* The testing was performed by Tiago Huang on 2018-12-17.

Test Result: Compliance.

Test Mode: Transmitting

Channel	Frequency (MHz)	Peak Conducted Output power (dBm)	Limit (dBm)
Low	915.8	15.23	30
Middle	921.4	15.23	30
High	927	15.11	30

FCC §15.247(d) - BAND EDGES TESTING

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW/ VBW of spectrum analyzer to 100/300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	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).

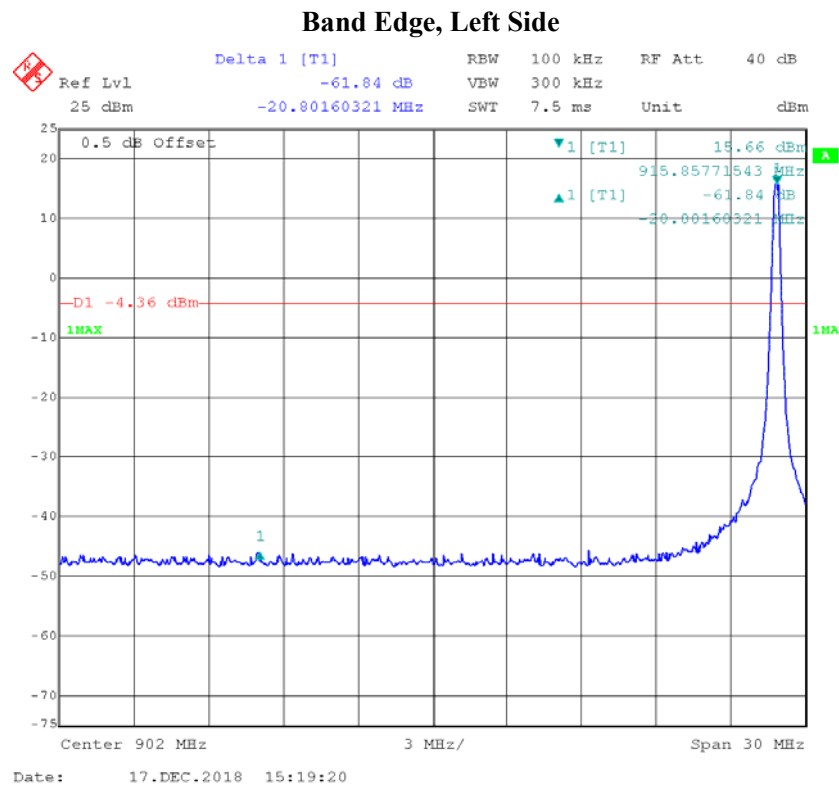
Test Data**Environmental Conditions**

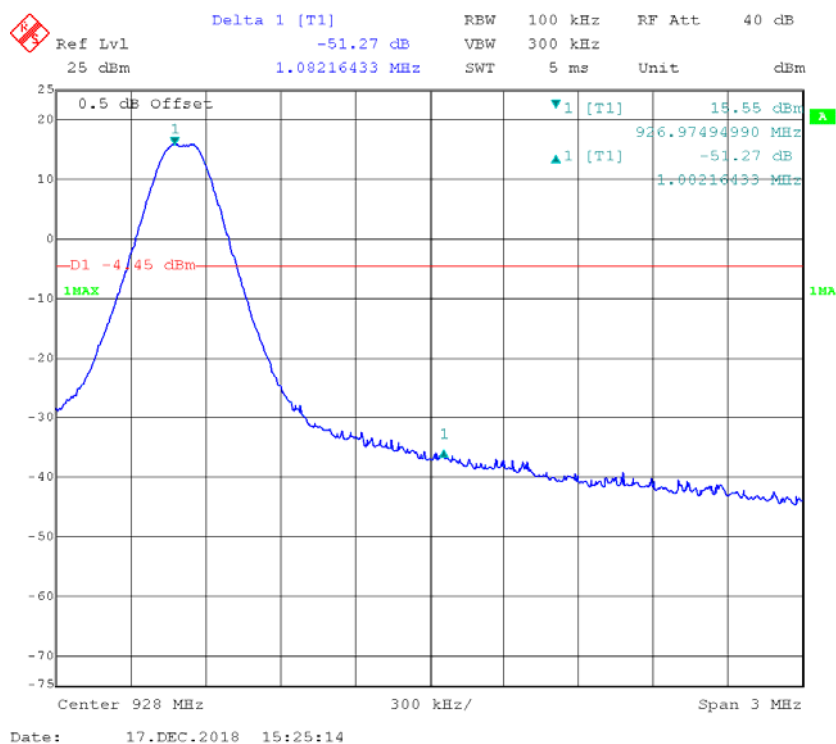
Temperature:	24.2 °C
Relative Humidity:	36 %
ATM Pressure:	99.8 kPa

* The testing was performed by Tiago Huang on 2018-12-17.

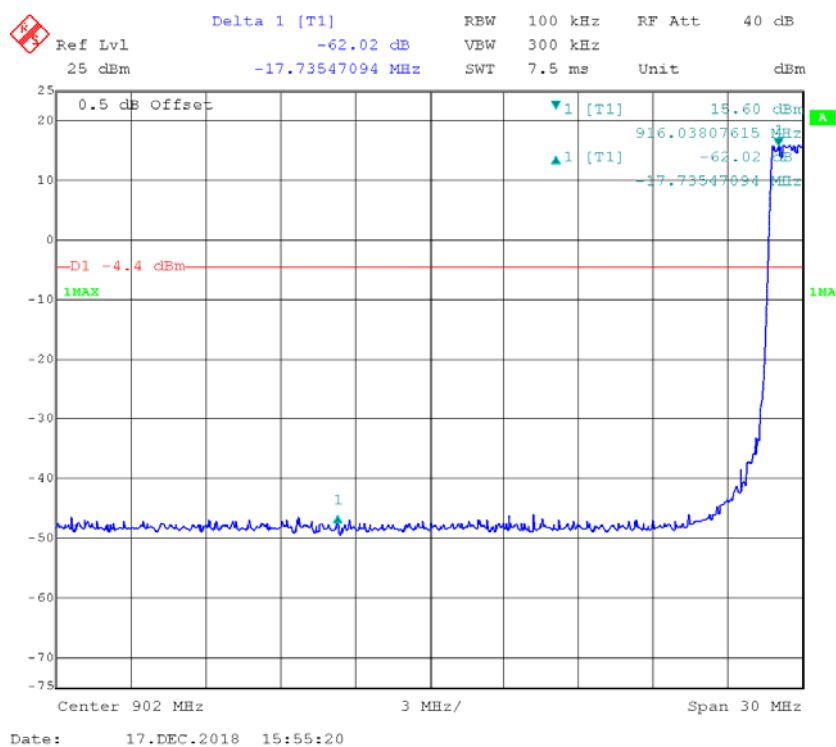
Test Result: Compliance

Single channel:

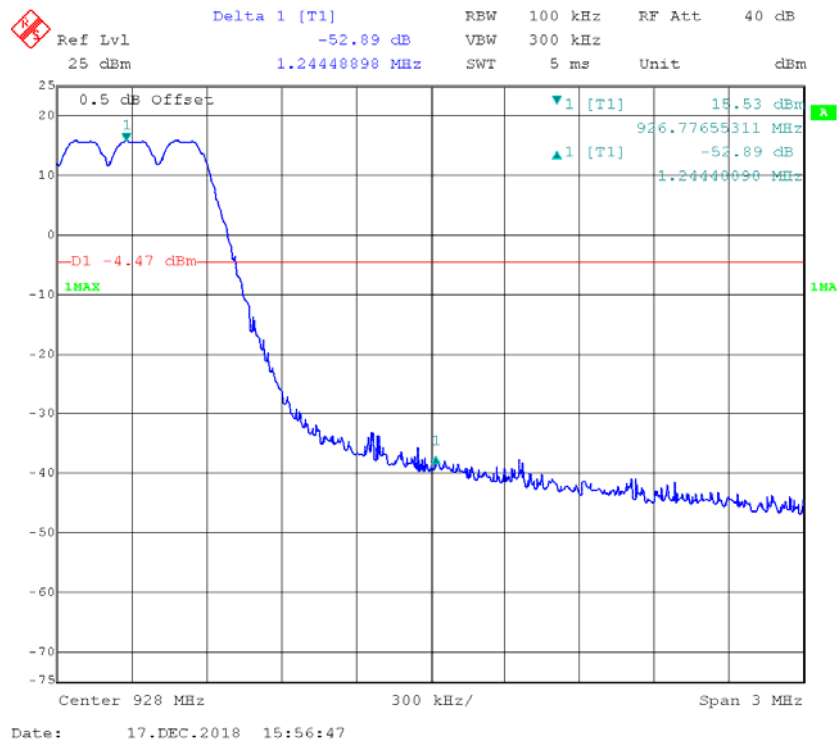


Band Edge, Right Side

Hopping channel:

Band Edge, Left Side

Band Edge, Right Side



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