TESTING LABORATORY
CERTIFICATE#4323.01

FCC PART 15.247

TEST REPORT

For

Shanghai Sunmi Technology Co.,Ltd.

Room 605, Block 7, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai 200433 China

FCC ID: 2AH25ND0C0

Report Type:	**Product Type:**
Original Report	Trigger Handle

Test Engineer:	Chris Wang
Report Number:	RKSA200217001-00A
Report Date:	2020-05-15
Reviewed By:	Oscar Ye EMC Manager
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road,Kunshan,Jiangsu province,China Tel: +86-0512-86175000 Fax: +86-0512-88934268 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. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Shanghai Sunmi Technology Co.,Ltd.
Tested Model:	ND0C0
Product Type:	Trigger Handle
Power Supply:	DC 5V from Adapter or DC 3.6V from Battery
RF Function:	SRD
Operating Band/Frequency:	902.5~927.5 MHz
Channel Number:	51
Channel Separation:	0.5 MHz
Antenna Type:	PCB Antenna
Maximum Antenna Gain	4.00 dBi

**All measurement and test data in this report was gathered from production sample serial number: 20200217001. (Assigned by the BACL. The EUT supplied by the applicant was received on 2020-02-17)*

Objective

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

The tests were performed in order to determine compliance with FCC 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 15B JAB Submittal with FCC ID: 2AH25ND0C0

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 and FCC KDB 558074 D01 15.247 Meas Guidance v05r02.

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

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19 dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0℃
Humidity		6%

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. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

Available Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	902.5	13	909	26	915.5	39	922
1	903	14	909.5	27	916	40	922.5
2	903.5	15	910	28	916.5	41	923
3	904	16	910.5	29	917	42	923.5
4	904.5	17	911	30	917.5	43	924
5	905	18	911.5	31	918	44	924.5
6	905.5	19	912	32	918.5	45	925
7	906	20	912.5	33	919	46	925.5
8	906.5	21	913	34	919.5	47	926
9	907	22	913.5	35	920	48	926.5
10	907.5	23	914	36	920.5	49	927
11	908	24	914.5	37	921	50	927.5
12	908.5	25	915	38	921.5	/	/

EUT was tested with channel 0, 25, 50.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

RF test tool:UHFDemo.exe

Pre-scan with all the data rates, and the worst case was performed as below:

Frequency(MHz)	Power Setting
902.5	Default
915.0	Default
927.5	Default

Support Equipment List and Details

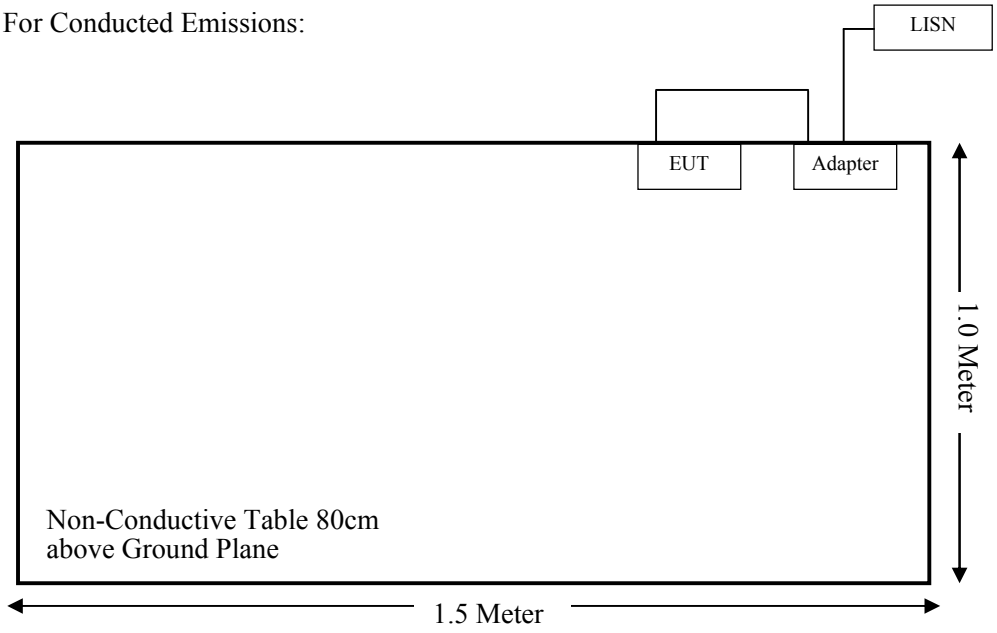
Manufacturer	Description	Model	Serial Number
/	Adapter	/	/

External I/O Cable

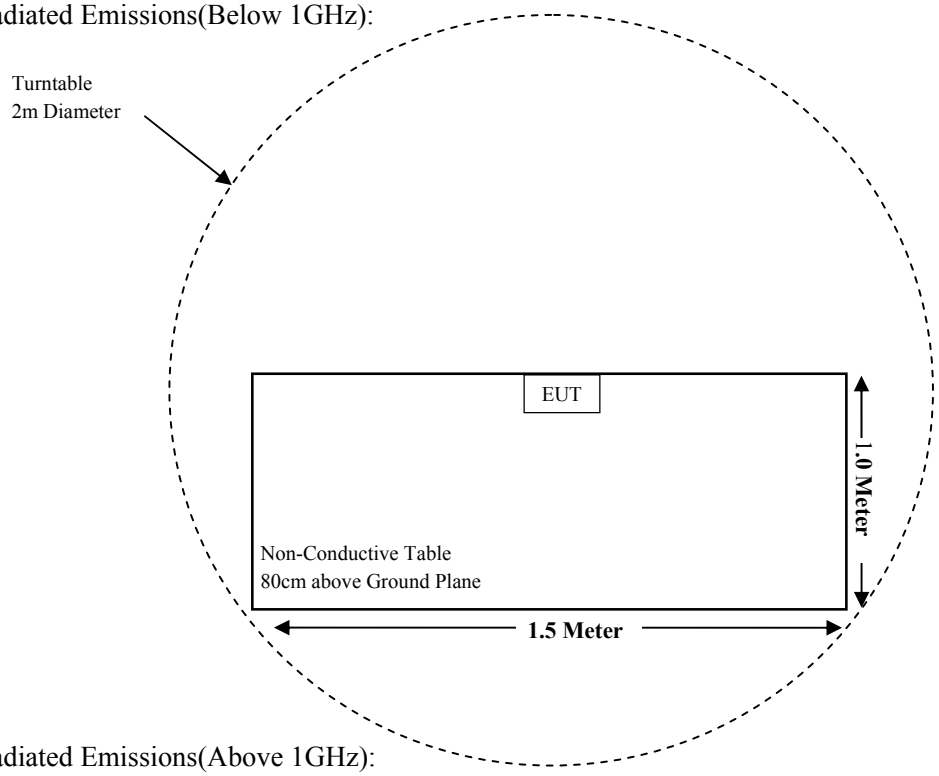
Cable Description	Length (m)	From Port	To
Power cable	1.0	EUT	Adapter
Power cable	1.0	Adapter	LISN

Block Diagram of Test Setup

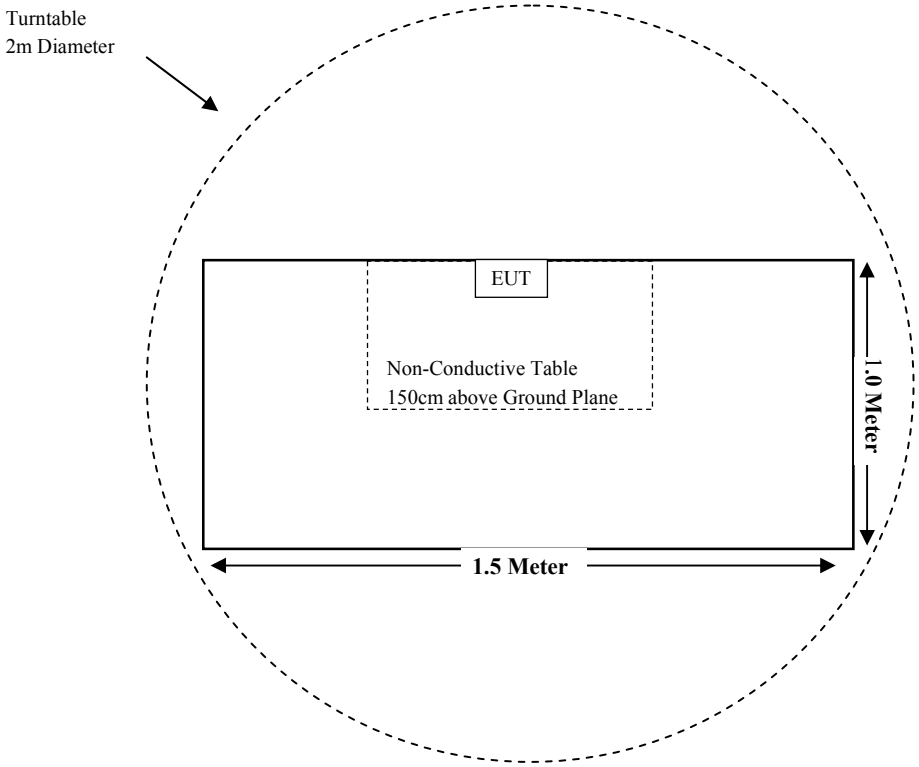
For Conducted Emissions:



For Radiated Emissions(Below 1GHz):



For Radiated Emissions(Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307(b)(1)& §2.1093	RF Exposure Information	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.247(d)	Spurious Emissions at Antenna Port	Compliant
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliant
§15.247(a)(1) (i)	20 dB Emission Bandwidth	Compliant
§15.247(a)(1)	Channel Separation Test	Compliant
§15.247(a)(1)(i)	Time of Occupancy (Dwell Time)	Compliant
§15.247(a)(1)(i)	Quantity of hopping channel Test	Compliant
§15.247(b)(2)	Peak Output Power Measurement	Compliant
§15.247(d)	Band Edge	Compliant
§15.247(e)	Power Spectral Density	Not Applicable (See Note)

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test（Chamber 1#）					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2019-12-14	2020-12-13
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2017-12-26	2020-12-25
Sonoma Instrument	Pre-amplifier	310N	171205	2019-08-14	2020-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
Narda	Attenuator	10dB	010	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-8	008	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2019-08-15	2020-08-14
Radiated Emission Test（Chamber 2#）					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2020-04-01	2021-03-31
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2017-07-15	2020-07-14
A.H.Systems, inc	Amplifier	2641-1	491	2020-02-20	2021-02-19
MICRO-TRONICS	Notch Filter	BRC50722	G013	2019-08-05	2020-08-04
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2019-12-12	2020-12-11
MICRO-COAX	Coaxial Cable	Cable-11	011	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2019-08-15	2020-08-14
RF Conducted Test					
Rohde & Schwarz	EMI Test Receiver	ESIB26	100146	2019-12-14	2020-12-13
Narda	Attenuator	10dB	010	2019-08-15	2020-08-14
Signify	RF Cable	Signify C01	C01	Each Time	N/A
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2019-08-05	2020-08-04
Rohde & Schwarz	LISN	ENV216	3560655016	2019-11-30	2020-11-29
Audix	Test Software	e3	V9	N/A	N/A
Rohde & Schwarz	Pulse limiter	ESH3-Z2	0357.8810.54	2020-01-10	2021-01-09
MICRO-COAX	Coaxial Cable	Cable-15	015	2019-08-15	2020-08-14

*** 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).

FCC §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

FCC§1.1307,§2.1093.

Test Result

Compliant, please refer to the SAR report: RKSA200217001-20A.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

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 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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has a PCB Antenna, which the antenna gain is 4.00 dBi; fulfill the requirement of this section. Please refer to the EUT photos.

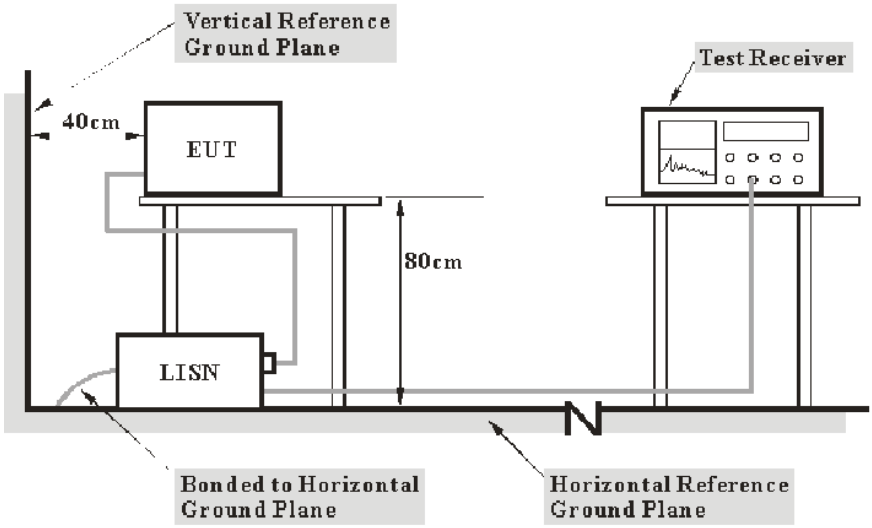
Result: Compliant.

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

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.

Factor & Over Limit Calculation

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

Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)

The "**Over Limit**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit of 7 dB means the emission is 7 dB above the limit. The equation for Over Limit calculation is as follows:

Over Limit (dB) = Read level (dBµV) + Factor (dB) - Limit (dBµV)

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data

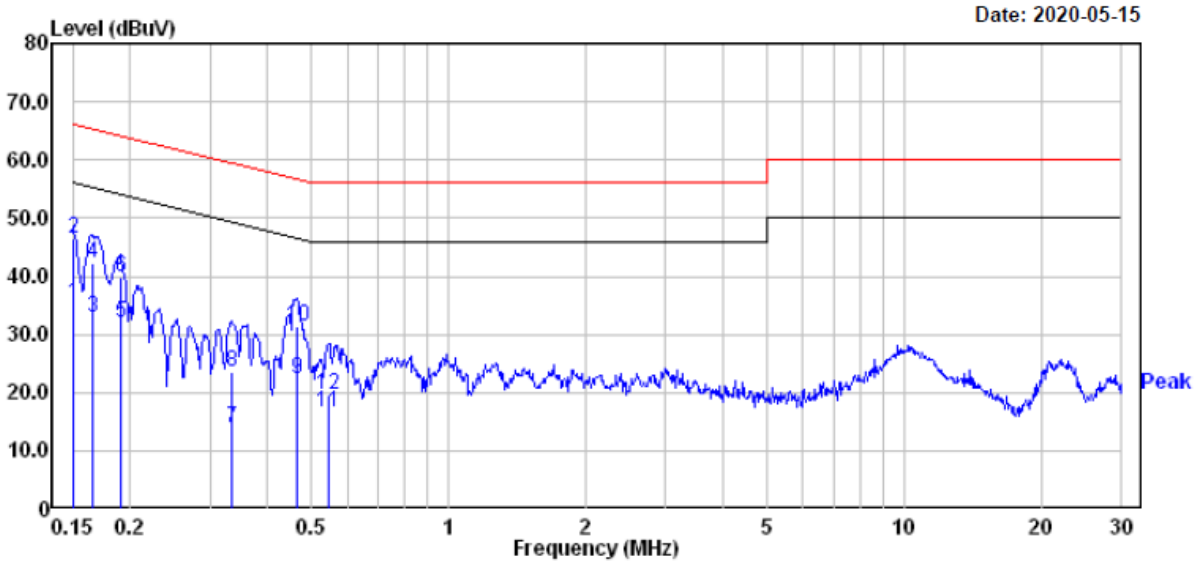
Environmental Conditions

Temperature:	23.5 ℃
Relative Humidity:	51 %
ATM Pressure:	101.1 kPa

The testing was performed by Chris Wang on 2020-05-15.

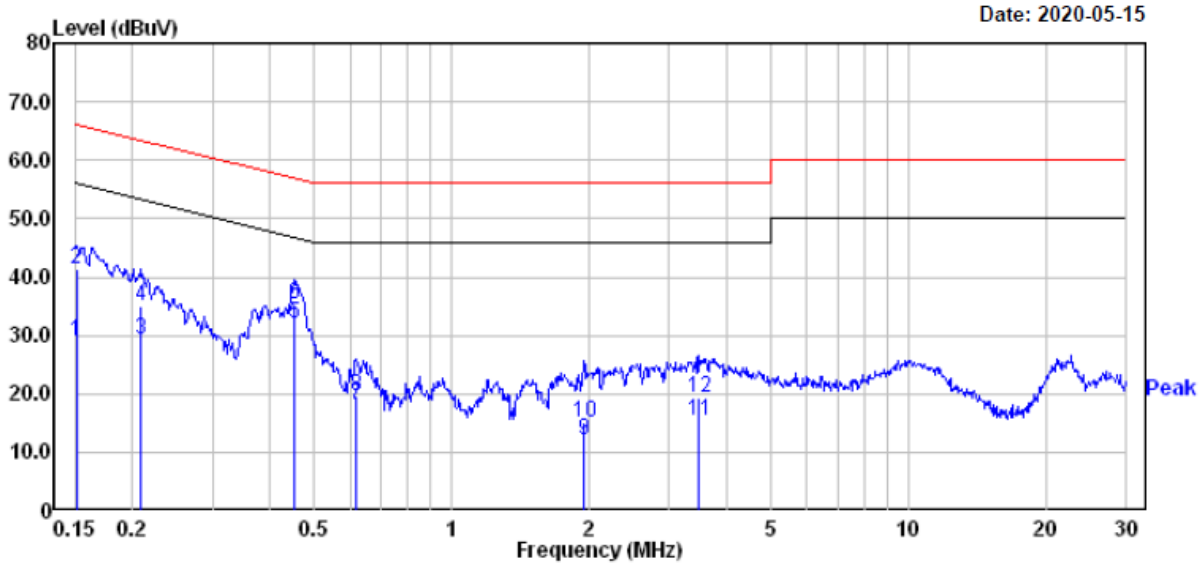
EUT operation mode: Charging

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	15.50	19.82	35.32	56.00	-20.68	Average
2	0.150	26.60	19.82	46.42	66.00	-19.58	QP
3	0.165	13.20	19.83	33.03	55.21	-22.18	Average
4	0.165	22.40	19.83	42.23	65.21	-22.98	QP
5	0.190	12.10	19.82	31.92	54.02	-22.10	Average
6	0.190	20.10	19.82	39.92	64.02	-24.10	QP
7	0.334	-5.91	19.82	13.91	49.35	-35.44	Average
8	0.334	3.69	19.82	23.51	59.35	-35.84	QP
9	0.464	2.50	19.75	22.25	46.63	-24.38	Average
10	0.464	11.70	19.75	31.45	56.63	-25.18	QP
11	0.544	-3.10	19.75	16.65	46.00	-29.35	Average
12	0.544	0.00	19.75	19.75	56.00	-36.25	QP

AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.151	9.10	19.82	28.92	55.96	-27.04	Average
2	0.151	21.40	19.82	41.22	65.96	-24.74	QP
3	0.209	9.40	19.82	29.22	53.23	-24.01	Average
4	0.209	15.20	19.82	35.02	63.23	-28.21	QP
5	0.454	12.20	19.75	31.95	46.80	-14.85	Average
6	0.454	15.50	19.75	35.25	56.80	-21.55	QP
7	0.617	-1.60	19.75	18.15	46.00	-27.85	Average
8	0.617	-0.20	19.75	19.55	56.00	-36.45	QP
9	1.949	-7.70	19.83	12.13	46.00	-33.87	Average
10	1.949	-4.70	19.83	15.13	56.00	-40.87	QP
11	3.491	-4.10	19.46	15.36	46.00	-30.64	Average
12	3.491	-0.20	19.46	19.26	56.00	-36.74	QP

Note:
1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
2) Over Limit (dB) = Read level (dBµV) + Factor (dB) - Limit (dBµV)

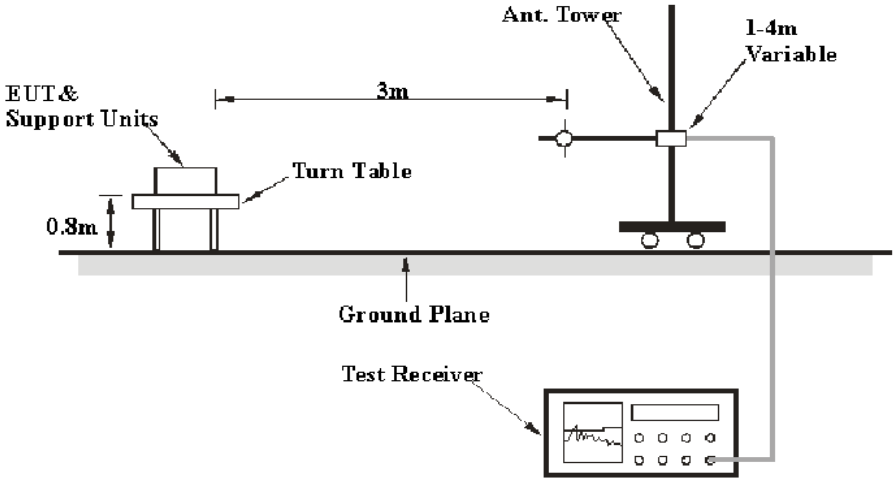
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

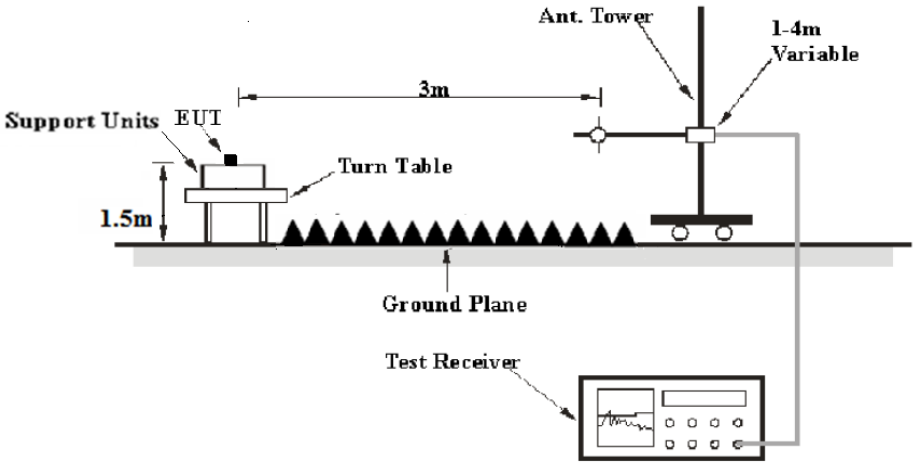
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1 GHz:



Above 1GHz:



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 15.209, and FCC 15.247 limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 10 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz - 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1GHz	1MHz	3 MHz	/	PK
	1MHz	3 MHz	/	Ave

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.

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:

Corrected Amplitude (dBµV /m) = Meter Reading (dBµV) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

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:

Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

Test Data

Environmental Conditions

Temperature:	22.3℃
Relative Humidity:	50%
ATM Pressure:	101.2 kPa

The testing was performed by Chris Wang on 2020-03-30.

EUT operation mode: Transmitting

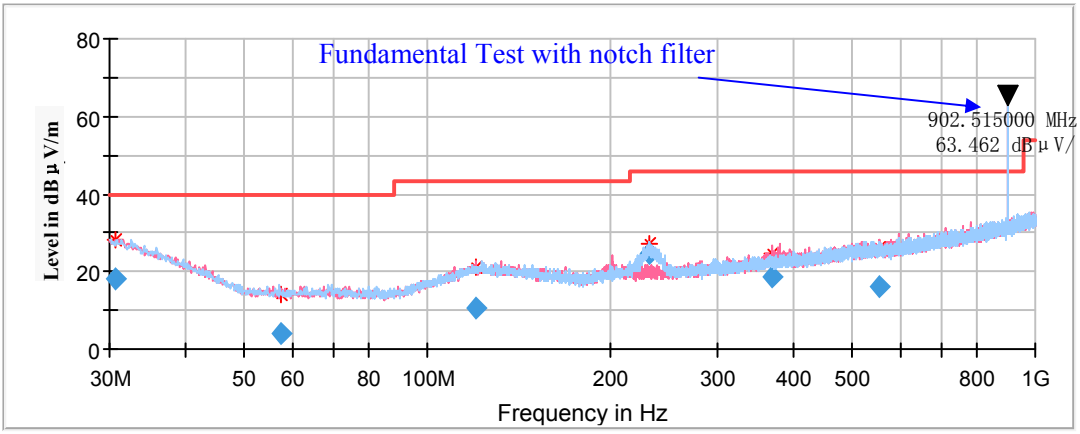
Spurious Emission Test:

30MHz-1GHz

*(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **low channel of operation in X-axis of orientation** was recorded)*

Note:

1. This test was performed with the 902-928MHz notch filter.



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	QuasiPeak (dBµV/m)	Height (cm)	Polar (H/V)				
30.67	17.98	100	V	51	-4.4	40.00	22.02
57.56	4.20	100	H	219	-17.8	40.00	35.80
120.10	10.65	200	V	293	-11.2	43.50	32.85
231.75	24.67	100	H	99	-12.2	46.00	21.33
369.34	18.37	200	V	164	-8.8	46.00	27.63
552.36	16.01	200	V	39	-5.6	46.00	29.99

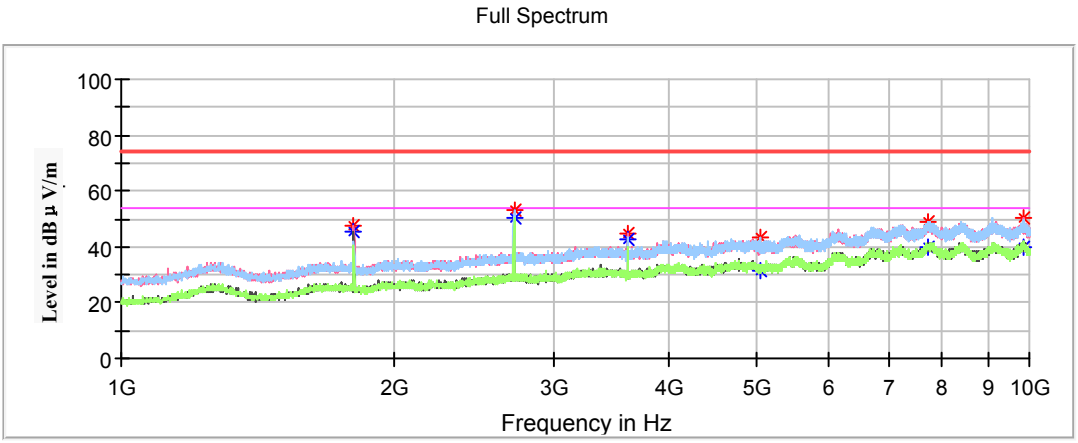
1GHz-10GHz

*(Pre-scan in the X,Y and Z axes of orientation, the worst case **X-axis of orientation** was recorded.)*

Note:

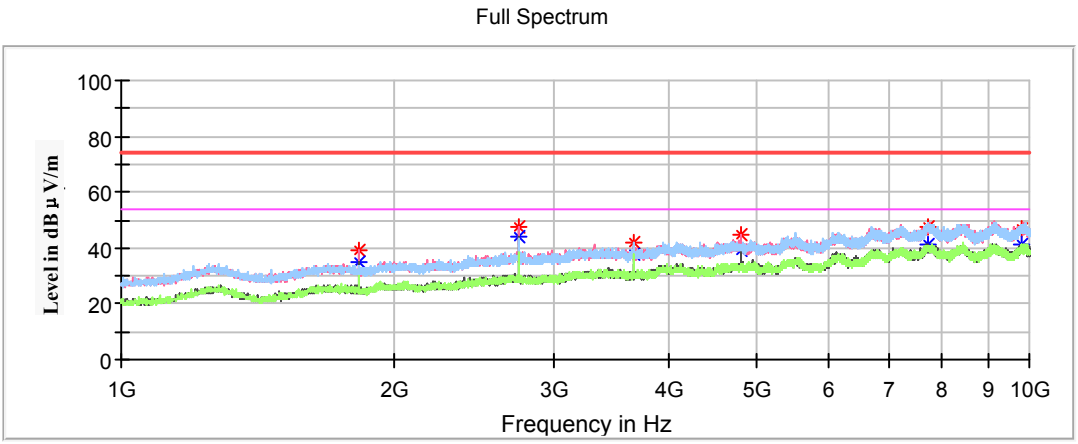
1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)
   Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
   Margin (dB) = Limit (dBμV/m) - Corrected Amplitude (dBμV /m)

Low Channel: 902.5 MHz



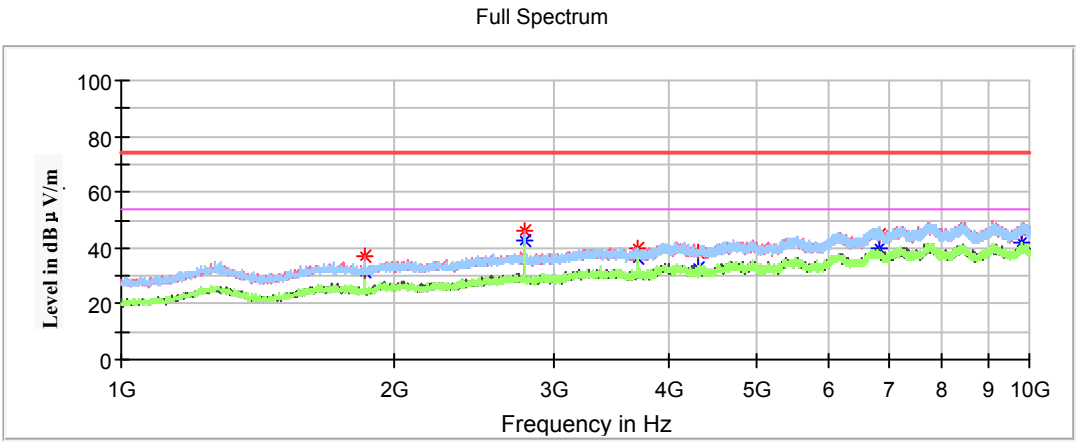
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1855.00	---	31.22	200	V	2	-15.0	54	22.78
1855.00	36.88	---	200	V	2	-15.0	74	37.12
2782.00	---	42.88	200	V	2	-11.1	54	11.12
2782.00	45.95	---	200	V	2	-11.1	74	28.05
3709.90	---	36.48	150	H	133	-8.1	54	17.52
3709.90	39.89	---	150	H	133	-8.1	74	34.11
4319.20	---	32.95	150	V	358	-6.5	54	21.05
4319.20	38.40	---	200	V	133	-6.5	74	35.60
6833.80	---	39.81	150	V	208	-0.4	54	14.19
6833.80	44.60	---	150	V	208	-0.4	74	29.40
9825.40	---	42.23	150	V	0	2.0	54	11.77
9825.40	46.38	---	150	V	0	2.0	74	27.62

Middle Channel: 915.0 MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1829.80	---	35.26	200	V	329	-15.1	54	18.74
1829.80	39.43	---	200	V	329	-15.1	74	34.57
2745.10	---	44.28	200	V	0	-11.3	54	9.72
2745.10	47.56	---	200	V	0	-11.3	74	26.44
3659.50	---	38.05	200	H	31	-8.2	54	15.95
3659.50	42.15	---	200	H	31	-8.2	74	31.85
4804.30	---	39.39	150	V	236	-5.6	54	14.61
4804.30	44.81	---	150	V	236	-5.6	74	29.19
7720.30	---	41.27	200	V	34	1.4	54	12.73
7720.30	47.45	---	150	V	307	1.4	74	26.55
9828.10	---	41.58	150	V	61	2.0	54	12.42
9828.10	47.20	---	200	V	21	2.0	74	26.80

High Channel: 927.5 MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1855.00	---	31.22	200	V	2	-15.0	54	22.78
1855.00	36.88	---	200	V	2	-15.0	74	37.12
2782.00	---	42.88	200	V	2	-11.1	54	11.12
2782.00	45.95	---	200	V	2	-11.1	74	28.05
3709.90	---	36.48	150	H	133	-8.1	54	17.52
3709.90	39.89	---	150	H	133	-8.1	74	34.11
4319.20	---	32.95	150	V	358	-6.5	54	21.05
4319.20	38.40	---	200	V	133	-6.5	74	35.60
6833.80	---	39.81	150	V	208	-0.4	54	14.19
6833.80	44.60	---	150	V	208	-0.4	74	29.40
9825.40	---	42.23	150	V	0	2.0	54	11.77
9825.40	46.38	---	150	V	0	2.0	74	27.62

Restricted Bands Emissions Test:

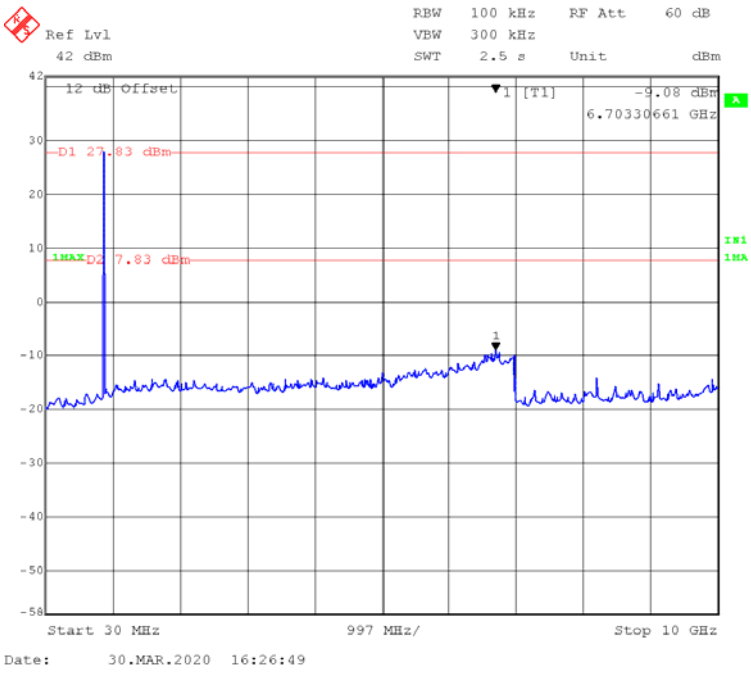
*(Pre-scan in the X, Y and Z axes of orientation, the worst case **X-axis of orientation** was recorded.)*

Note:
1. The test is performed with a 10dB Attenuator.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)
   Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
   Margin (dB) = Limit (dBμV/m) - Corrected Amplitude (dBμV/m)

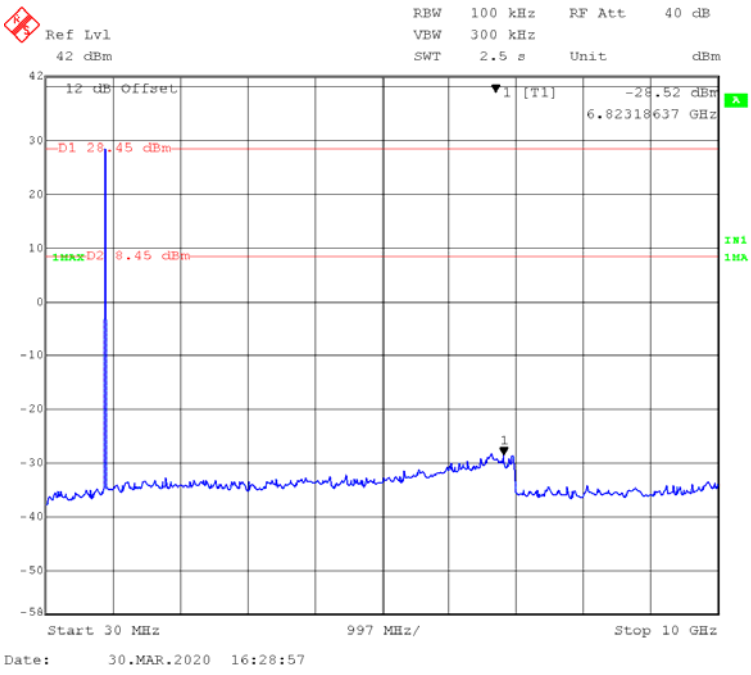
Frequency (MHz)	Corrected Amplitude (dBμV/m)	Detector (PK/QP/Ave.)	Rx Antenna Height (cm)	Rx Antenna Polar (H/V)	Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
Channel Frequency: 902.50 MHz								
902.00	40.56	QP	100	V	320	0.20	46	5.44
902.00	36.18	QP	200	H	254	0.20	46	9.82
Channel Frequency: 927.50 MHz								
928.00	39.26	QP	200	V	25	0.75	46	6.74
928.00	35.71	QP	100	H	12	0.75	46	10.29

Conducted Spurious Emissions at Antenna Port:

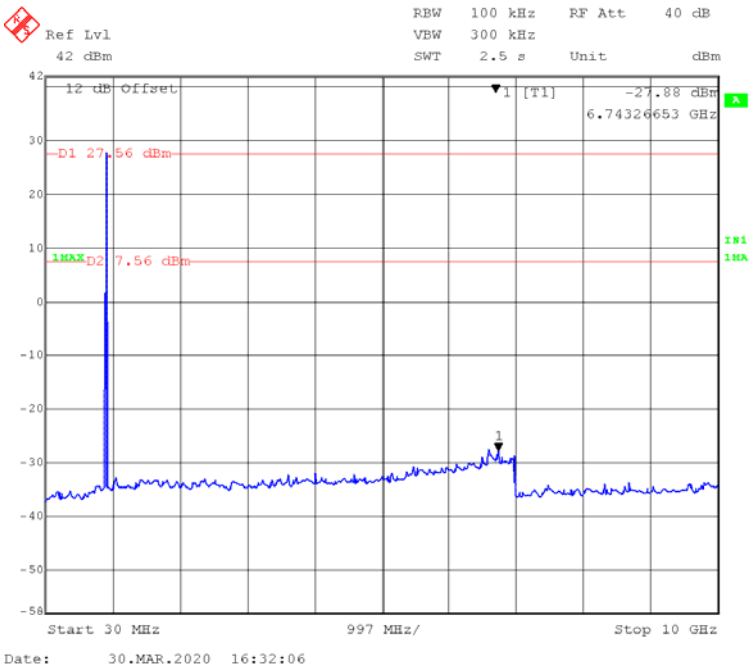
Low Channel



Middle Channel



High Channel



FCC §15.247(a) (1)-CHANNEL SEPARATION TEST

Applicable Standard

(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Test Procedure

1. Set the EUT in transmitting mode, maxhold the channel.
2. Set the adjacent channel of the EUT and maxhold another trace.
3. Measure the channel separation.

Test Data

Environmental Conditions

Temperature:	24.1 ℃
Relative Humidity:	49 %
ATM Pressure:	101.0 kPa

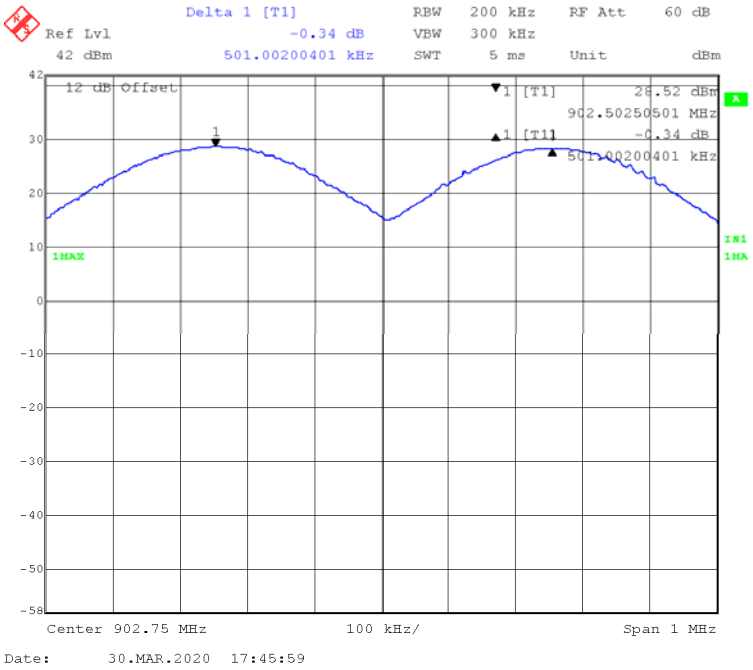
The testing was performed by Chris Wang on 2020-03-30.

EUT operation mode: Transmitting

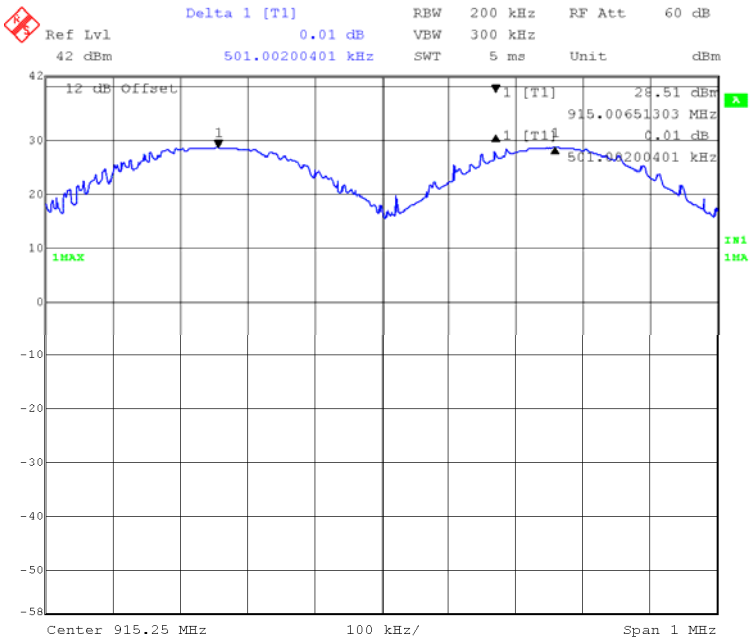
Test Result: Compliant.

Channel	Frequency (MHz)	Channel Separation (kHz)	Limit (kHz)	Result
Low	902.5	501.002	≥72.144	Pass
Adjacent	903.0			
Middle	915.0	501.002	≥77.154	Pass
Adjacent	915.5			
High	927.5	501.002	≥87.174	Pass
Adjacent	927.0			

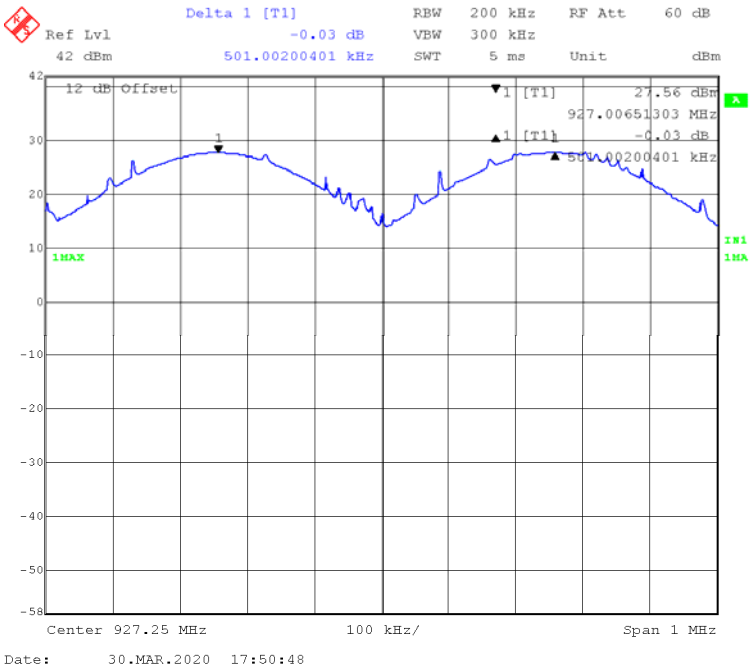
Low Channel



Middle Channel



High Channel



FCC §15.247(a) (1) (i)– 20 dB EMISSION BANDWIDTH

Applicable Standard

(i) 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 without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. 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 Data

Environmental Conditions

Temperature:	24.5 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2020-03-30.

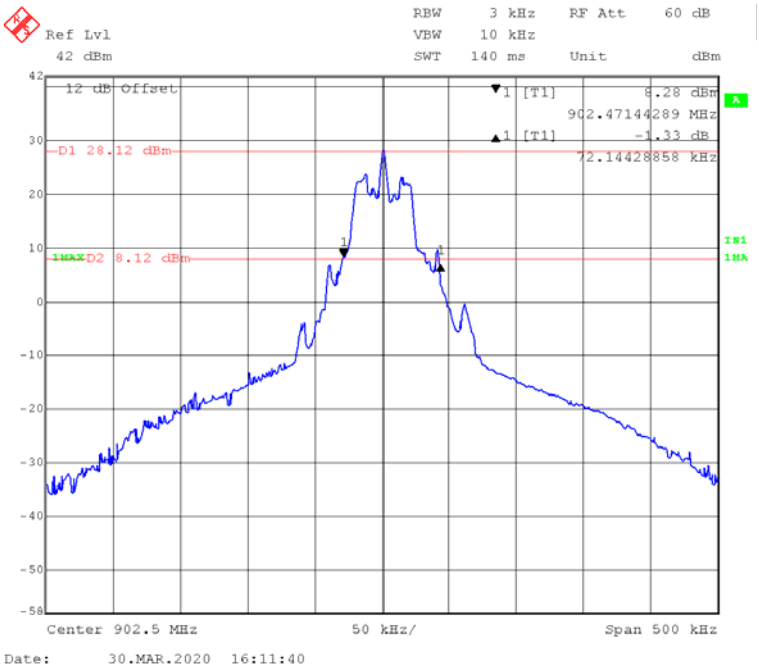
EUT operation mode: Transmitting

Test Result: Compliant.

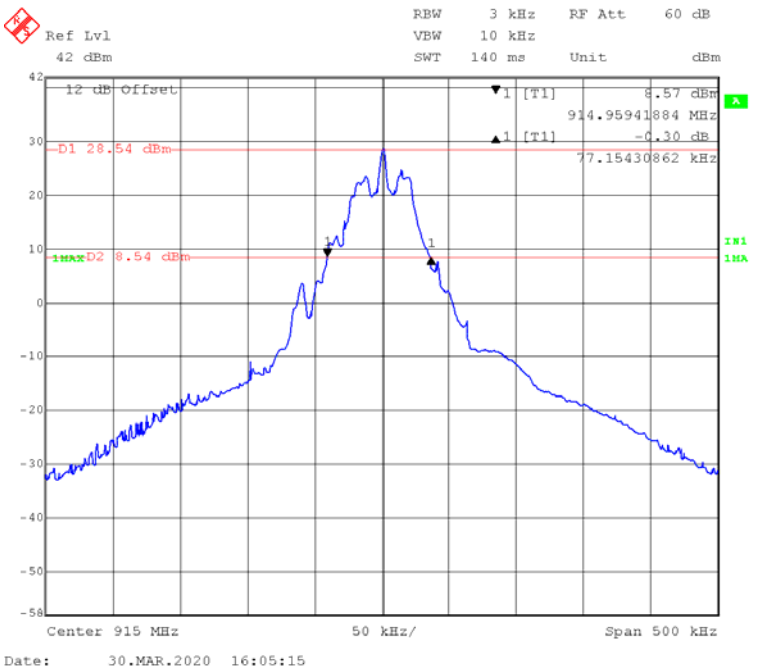
EUT operation mode: Transmitting

Channel	Frequency (MHz)	20 dB Emission Bandwidth (kHz)	Limit (kHz)
Low	902.5	72.144	≤500
Middle	915.0	77.154	≤500
High	927.5	87.174	≤500

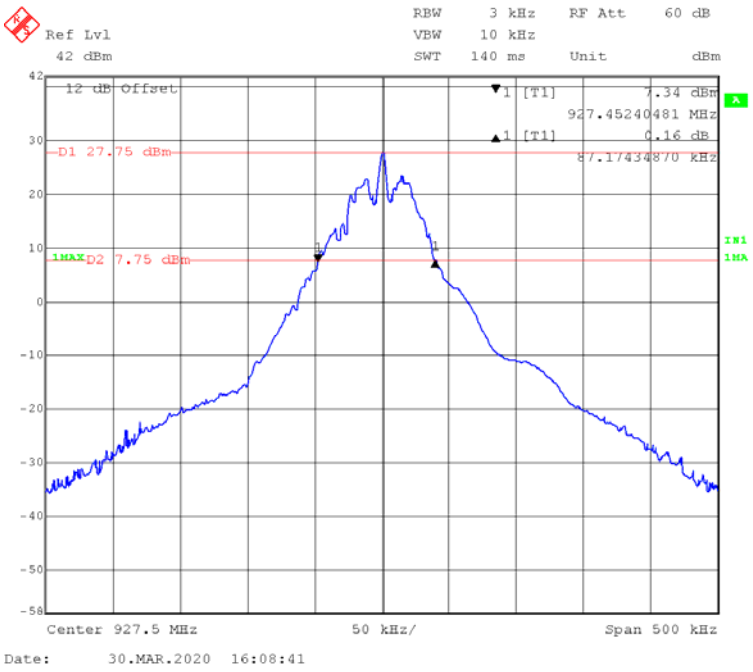
Low Channel



Middle Channel



High Channel



FCC §15.247(a) (1) (i)-QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

(i) 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 Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	49 %
ATM Pressure:	101.0 kPa

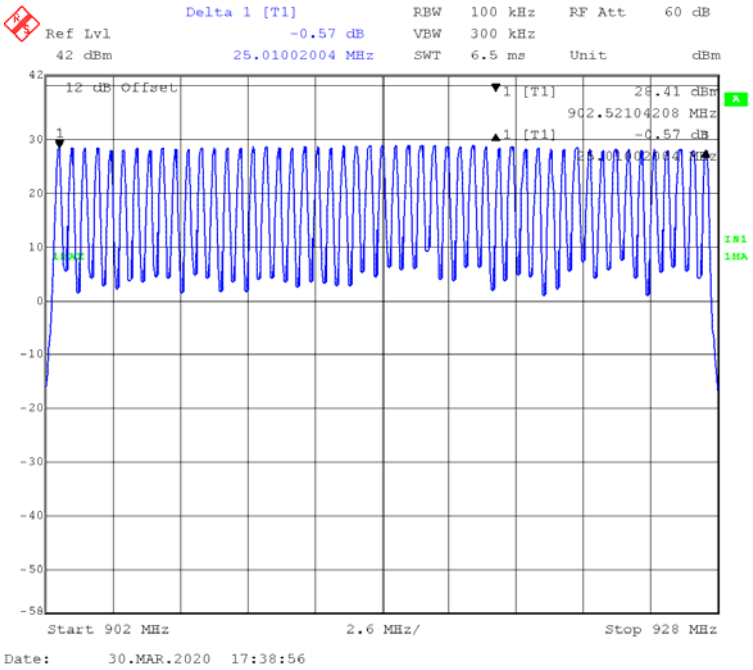
The testing was performed by Chris Wang on 2020-03-30.

EUT operation mode: Transmitting

Test Result: Compliant.

Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)
902~928	51	≥50

Number of Hopping Channels



FCC §15.247(a) (1) (i) - TIME OF OCCUPANCY (DWELL TIME)

Applicable Standard

(i) 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; Spectrum SPAN was set as 0. Sweep was set as 20 (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Test Data

Environmental Conditions

Temperature:	24.2 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

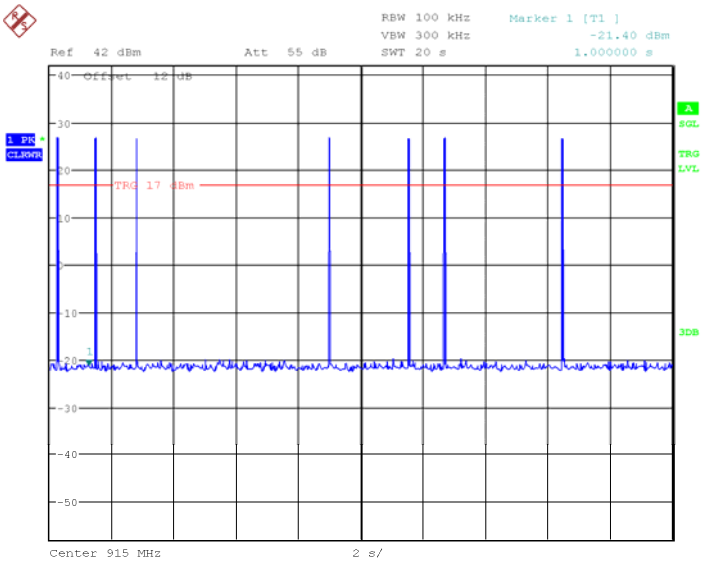
The testing was performed by Chris Wang on 2020-04-30.

EUT operation mode: Transmitting

Test Result: Compliant.

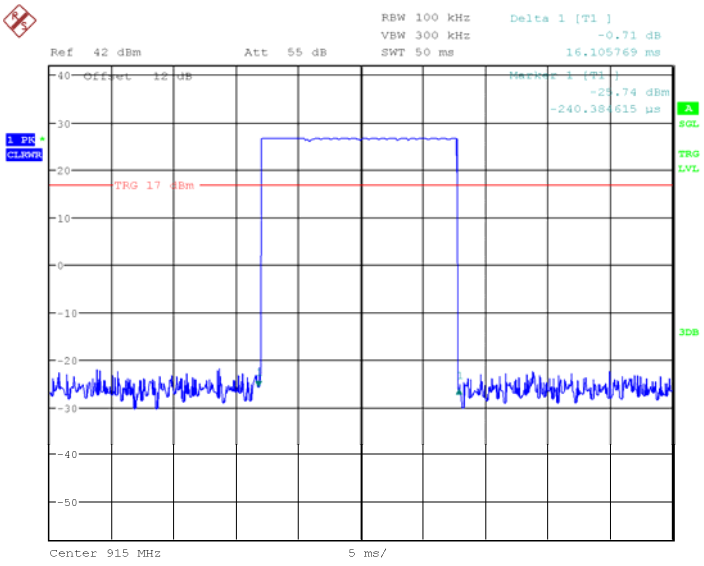
Pulse Width (ms)	Pulse Number	Dwell Time (s)	Limit (s)	Result
16.106	7	0.113	≤0.4	Pass
Note:Dwell time = Pulse time*N Observed time = 20 s				

Number of Pulses



Date: 30.APR.2020 00:14:01

Single Pulse



Date: 30.APR.2020 00:25:55

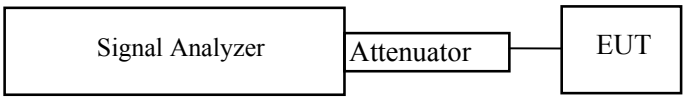
FCC §15.247(b) (2) - MAXIMUM CONDUCTED OUTPUT POWER

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

a. Use the following spectrum analyzer settings:
   1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
   2) RBW > 20 dB bandwidth of the emission being measured.
   3) VBW ≥ RBW.
   4) Sweep: Auto.
   5) Detector function: Peak.
   6) Trace: Max hold.
b. Allow trace to stabilize.
c. Use the marker-to-peak function to set the marker to the peak of the emission.
d. The indicated level is the peak output power, after any corrections for external attenuators and cables.
e. A plot of the test results and setup description shall be included in the test report.



Test Data

Environmental Conditions

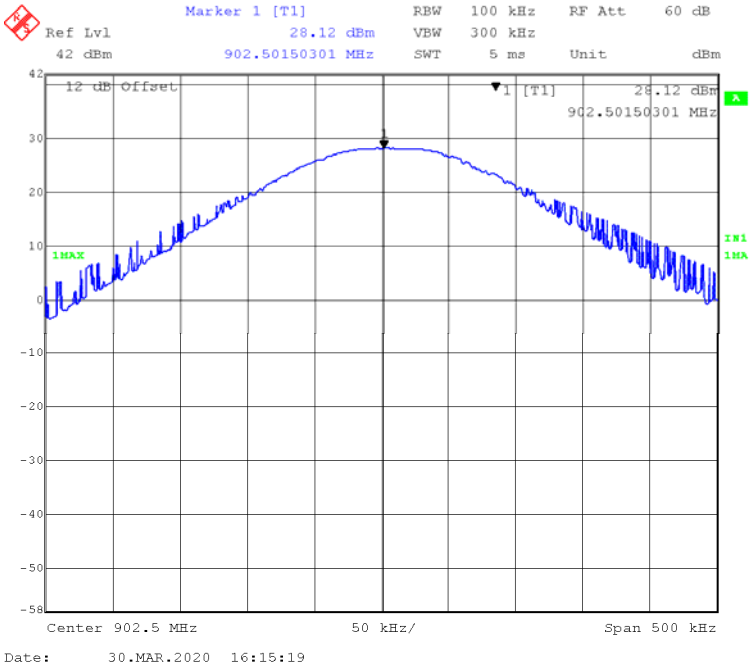
Temperature:	24.2℃
Relative Humidity:	49 %
ATM Pressure:	101.2 kPa

The testing was performed by Chris Wang on 2020-03-30.

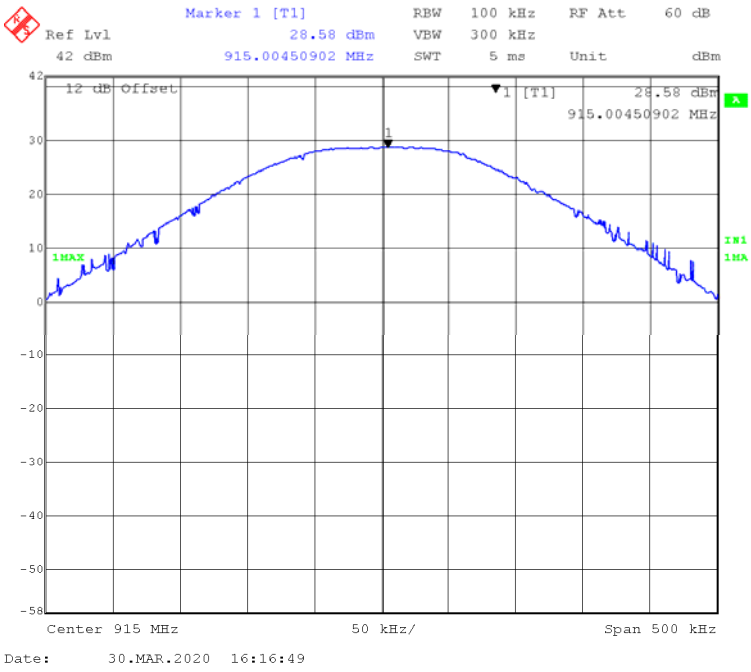
EUT operation mode: Transmitting

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Limit (dBm)	Result
Low	902.5	28.12	30	Pass
Middle	915.0	28.58	30	Pass
High	927.5	27.80	30	Pass

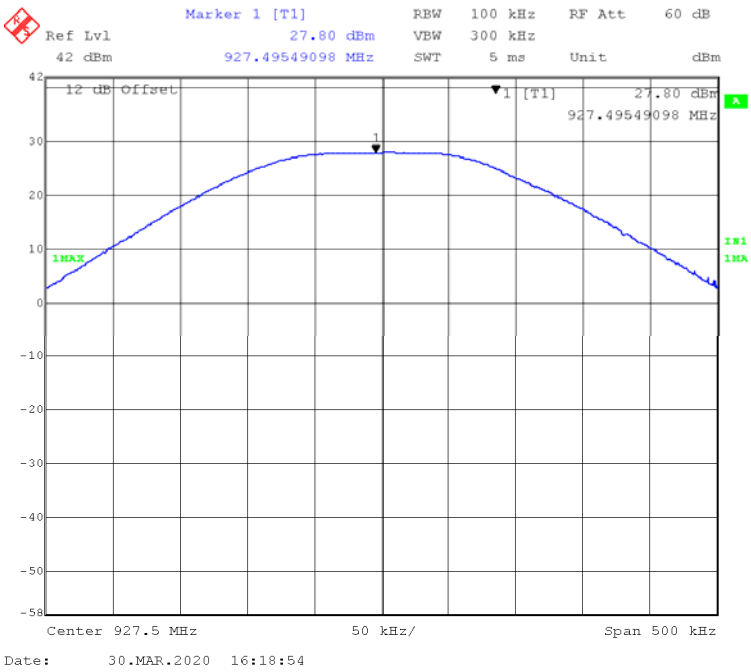
Low Channel



Middle Channel



High Channel



FCC §15.247(d) - BAND EDGE

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

According to ANSI C63.10-2013 sub-clause 6.10.

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 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the middleest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the middleest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Data

Environmental Conditions

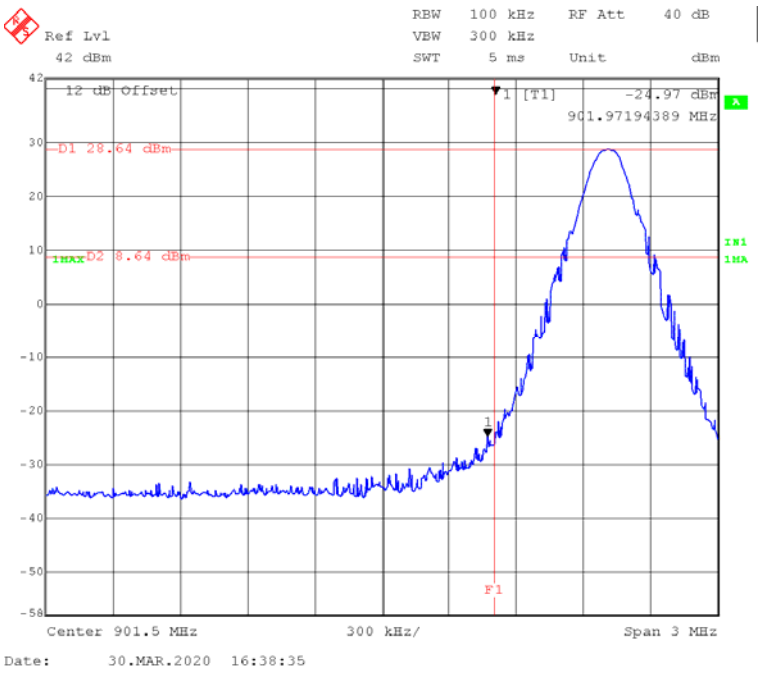
Temperature:	25℃
Relative Humidity:	50 %
ATM Pressure:	101.2 kPa

The testing was performed by Chris Wang on 2020-03-30.

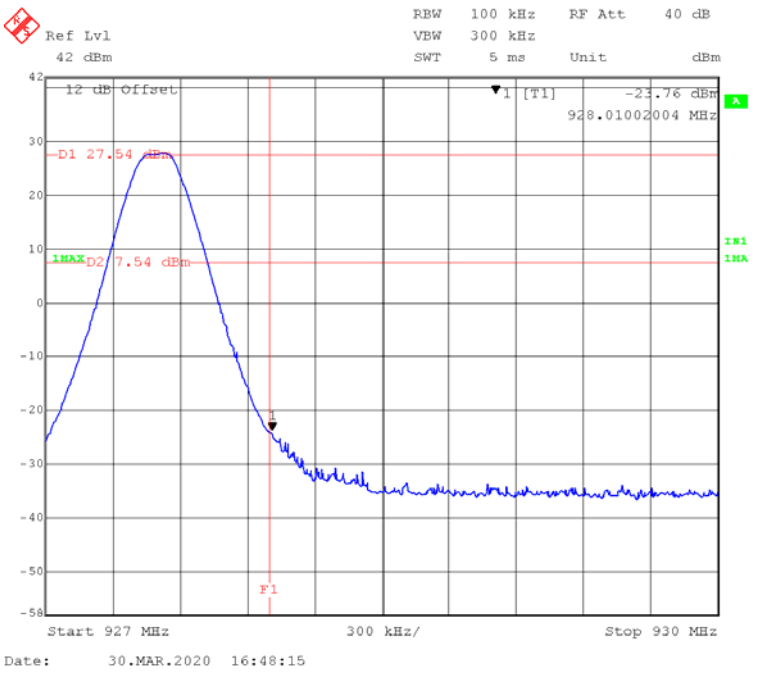
EUT operation mode: Transmitting

Test Result: Compliant.

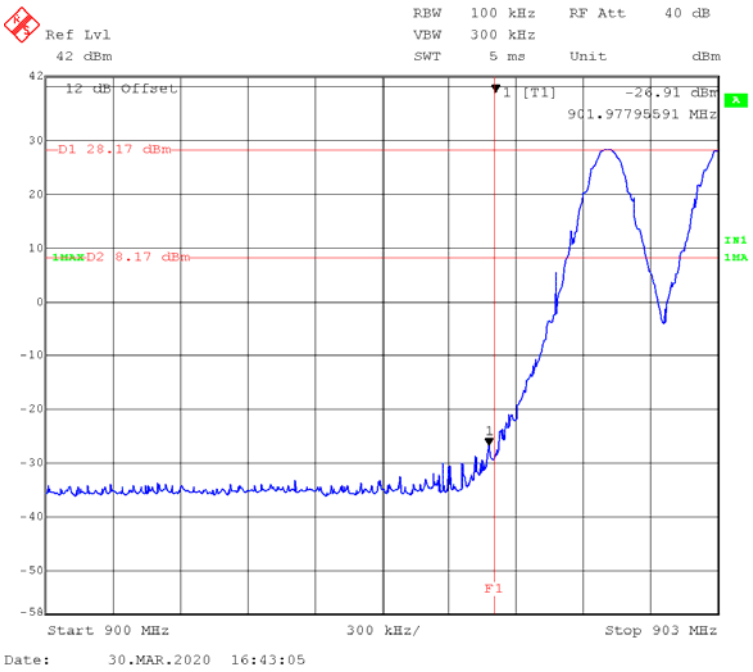
Left Side



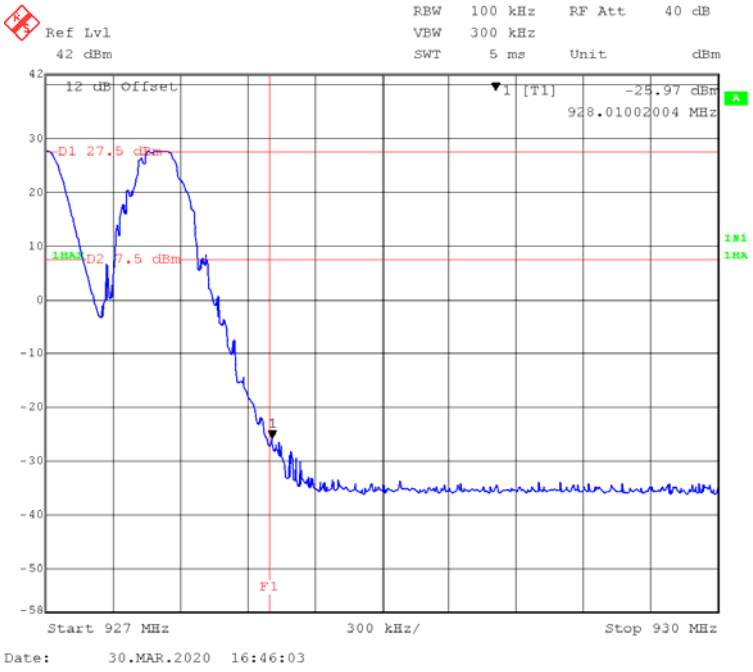
Right Side



Left Side-Hopping



Right Side-Hopping



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