



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: 2AH25T8910

Report Type: Original Report	Product Type: Handheld Wireless Terminal
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Report Number:	RKSA201026002-00G
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Shanghai Sunmi Technology Co.,Ltd.
Tested Model:	Handheld Wireless Terminal
Product Type:	T8910
Power Supply:	DC 3.8V from battery and DC 5V from external power supply
RF Function:	SRD
Operating Band/Frequency:	915.0~924.8 MHz
Channel Number:	50
Channel Separation:	0.2 MHz
Antenna Type:	Ceramic antenna
*Maximum Antenna Gain	-0.5 dBi

Adapter1 Information:

Model: TPA-23A050200UU01

Input: AC 100-240V, 50/60Hz, 0.3A

Output: DC 5.0V, 2000mA

Adapter2 Information:

Model: UC13US

Input: AC 100-240V, 50/60Hz, 0.35A

Output: DC 5.0V, 2.0A

Note: The Maximum Antenna Gain was declared by the manufacturer.

*All measurement and test data in this report was gathered from production sample serial number: RKSA201026002-1 (Assigned by the BACL. The EUT supplied by the applicant was received on 2020-10-26.)

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 15.247 DTS submissions with FCC ID: 2AH25T8910
FCC Part 15.247 DSS for BT3.0 submissions with FCC ID: 2AH25T8910
FCC Part 22H/24E/27/90 PCE submissions with FCC ID: 2AH25T8910
FCC Part 15.407 NII submissions with FCC ID: 2AH25T8910
FCC Part 15.225 DXX submissions with FCC ID: 2AH25T8910
FCC Part 15B JBP submissions with FCC ID: 2AH25T8910

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°C
Humidity		6%

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	915.0	13	917.6	26	920.2	39	922.8
1	915.2	14	917.8	27	920.4	40	923.0
2	915.4	15	918.0	28	920.6	41	923.2
3	915.6	16	918.2	29	920.8	42	923.4
4	915.8	17	918.4	30	921.0	43	923.6
5	916.0	18	918.6	31	921.2	44	923.8
6	916.2	19	918.8	32	921.4	45	924.0
7	916.4	20	919.0	33	921.6	46	924.2
8	916.6	21	919.2	34	921.8	47	924.4
9	916.8	22	919.4	35	922.0	48	924.6
10	917.0	23	919.6	36	922.2	49	924.8
11	917.2	24	919.8	37	922.4	/	/
12	917.4	25	920.0	38	922.6	/	/

EUT was tested with channel 0, 25, 49.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

RF test tool: The EUT tested in engineering mode.

Frequency (MHz)	Power level setting
915.0	22
920.0	22
924.8	22

Note: The power level setting was declared by the applicant.

Support Equipment List and Details

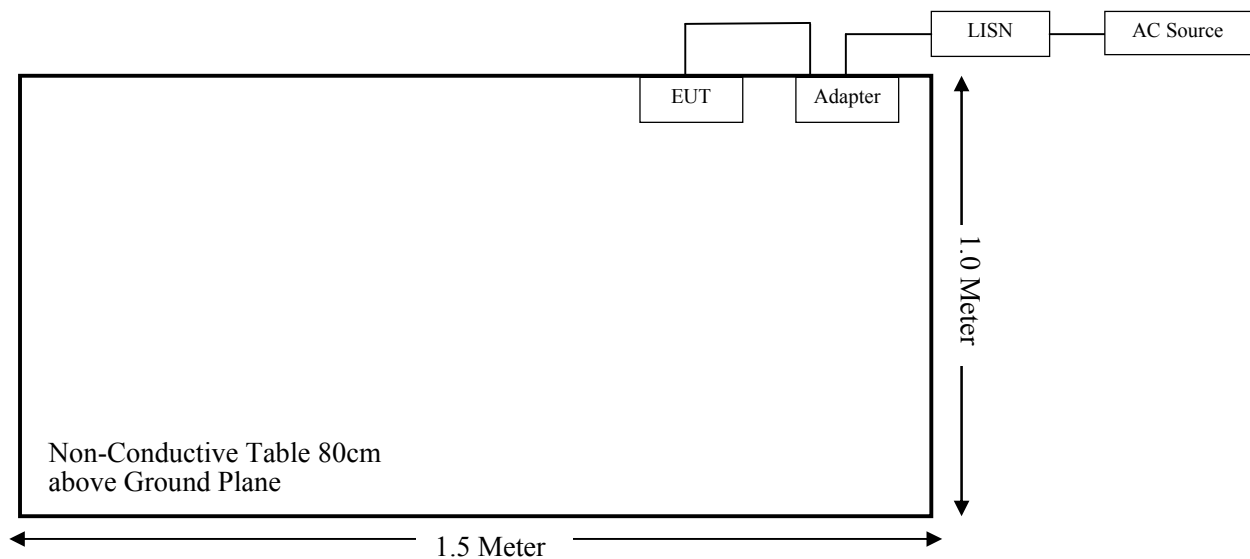
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

Cable Description	Length (m)	From Port	To
Power cable1	1.0	EUT	Adapter
Power cable2	1.0	Adapter	LISN/AC Source

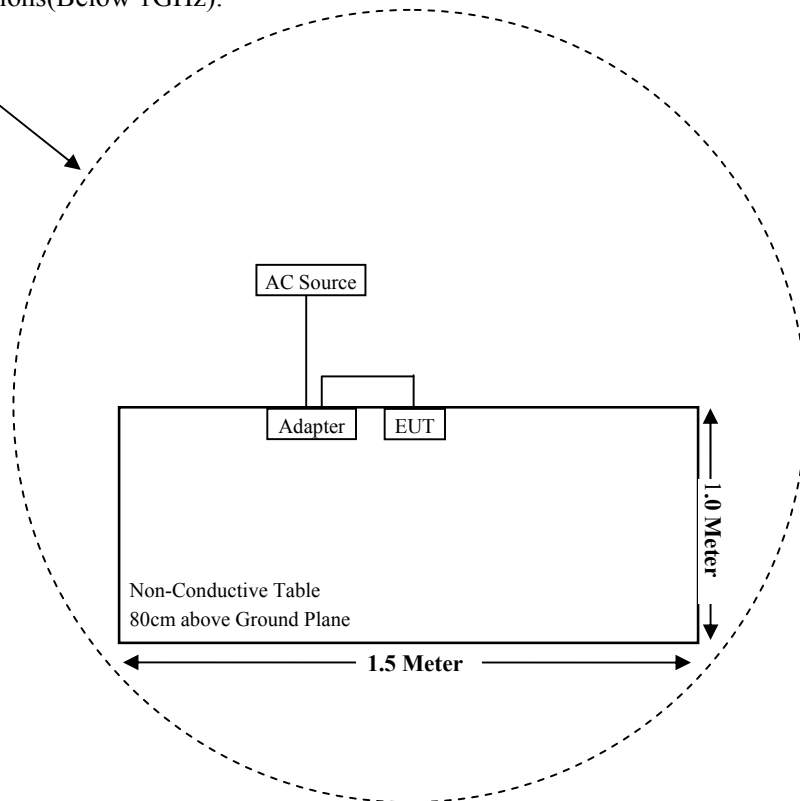
Block Diagram of Test Setup

For Conducted Emissions:



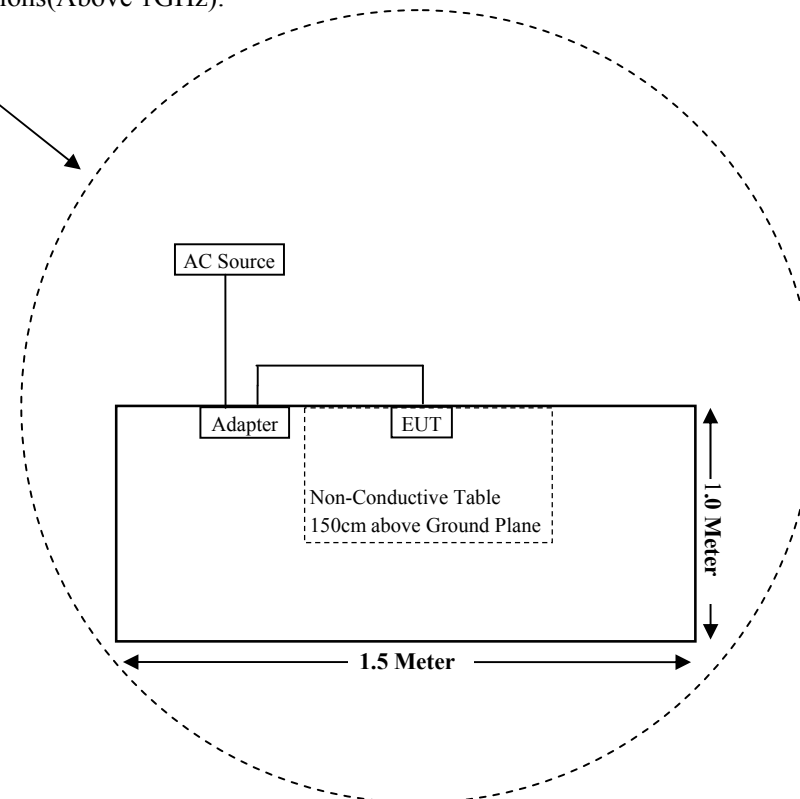
For Radiated Emissions(Below 1GHz):

Turntable
2m Diameter



For Radiated Emissions(Above 1GHz):

Turntable
2m Diameter



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	2020-12-14	2021-12-13
Sunol Sciences	Broadband Antenna	JB3	A090314-1	2020-08-05	2023-08-04
Sonoma Instrument	Pre-amplifier	310N	171205	2020-08-14	2021-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
Narda	Attenuator	10dB	010	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-8	008	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2020-08-15	2021-08-14
MICRO-TRONICS	Notch Filter	BRC50722	G013	2020-08-05	2021-08-04
Radiated Emission Test (Chamber 2#)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2020-04-01	2021-03-31
ETS-LINDGREN	Horn Antenna	3115	9311-4159	2020-07-15	2023-07-14
A.H.Systems, inc	Amplifier	2641-1	512	2020-08-14	2021-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2020-12-12	2021-12-11
MICRO-COAX	Coaxial Cable	Cable-11	011	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2020-08-15	2021-08-14
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSV40	10111	2020-07-28	2021-07-27
Narda	Attenuator	10dB	010	2020-08-15	2021-08-14
Sunmi	RF Cable	Sunmi C01	C01	Each Time	N/A
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2020-07-28	2021-07-27
Rohde & Schwarz	LISN	ENV216	101115	2019-12-14	2020-12-13
Audix	Test Software	e3	V9	--	--
Rohde & Schwarz	Pulse limiter	ESH3-Z2	100552	2020-08-10	2021-08-09
MICRO-COAX	Coaxial Cable	Cable-15	015	2020-08-15	2021-08-14

* **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: RKSA201026002-20B

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 ceramic antenna, which the antenna gain is -0.5 dBi; fulfill the requirement of this section. Please refer to the EUT photos.

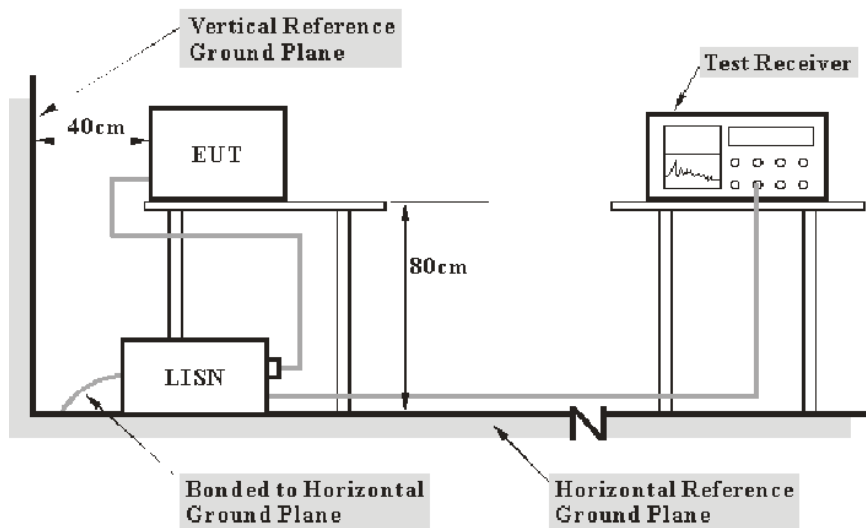
Result: Compliant.

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:

$$\text{Factor (dB)} = \text{LISN VDF (dB)} + \text{Cable Loss (dB)} + \text{Transient Limiter Attenuation (dB)}$$

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:

$$\text{Over Limit (dB)} = \text{Read level (dB}\mu\text{V)} + \text{Factor (dB)} - \text{Limit (dB}\mu\text{V)}$$

Test Results Summary

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

Test Data

Environmental Conditions

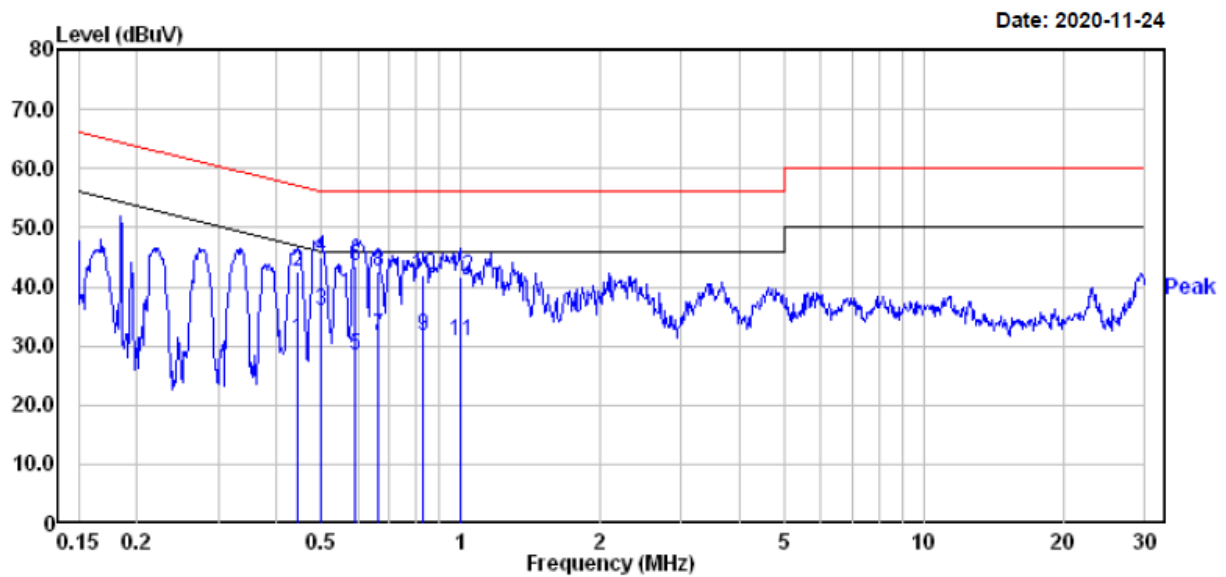
Temperature:	24.6~24.7 °C
Relative Humidity:	50~51 %
ATM Pressure:	101.1~101.7 kPa

The testing was performed by CK Huang from 2020-11-24 to 2020-11-30.

EUT operation mode: Charging

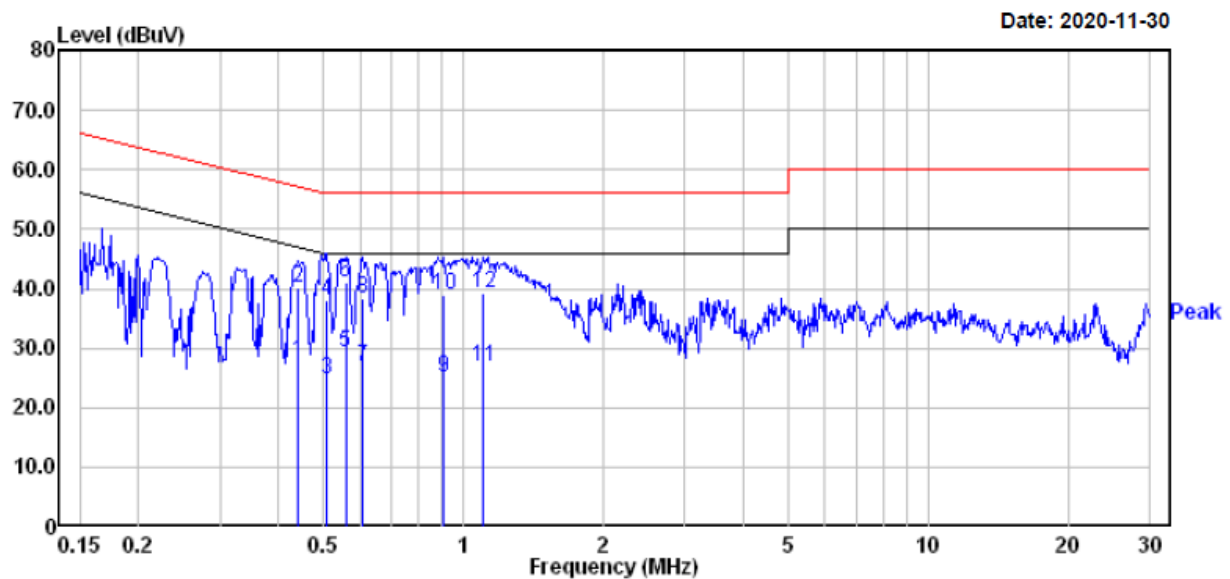
Note: Both Adapter1 and Adapter2 have been tested, the worst Adapter1 data were recorded in this report.

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.444	11.20	19.75	30.95	46.98	-16.03	Average
2	0.444	22.90	19.75	42.65	56.98	-14.33	QP
3	0.499	16.20	19.76	35.96	46.01	-10.05	Average
4	0.499	25.20	19.76	44.96	56.01	-11.05	QP
5	0.592	8.70	19.75	28.45	46.00	-17.55	Average
6	0.592	23.80	19.75	43.55	56.00	-12.45	QP
7	0.661	12.00	19.75	31.75	46.00	-14.25	Average
8	0.661	22.80	19.75	42.55	56.00	-13.45	QP
9	0.830	12.00	19.71	31.71	46.00	-14.29	Average
10	0.830	22.20	19.71	41.91	56.00	-14.09	QP
11	1.000	11.00	19.82	30.82	46.00	-15.18	Average
12	1.000	21.90	19.82	41.72	56.00	-14.28	QP

AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.442	7.90	19.75	27.65	47.02	-19.37	Average
2	0.442	20.50	19.75	40.25	57.02	-16.77	QP
3	0.507	5.00	19.76	24.76	46.00	-21.24	Average
4	0.507	18.40	19.76	38.16	56.00	-17.84	QP
5	0.558	9.60	19.75	29.35	46.00	-16.65	Average
6	0.558	21.30	19.75	41.05	56.00	-14.95	QP
7	0.608	7.00	19.75	26.75	46.00	-19.25	Average
8	0.608	18.70	19.75	38.45	56.00	-17.55	QP
9	0.904	5.30	19.73	25.03	46.00	-20.97	Average
10	0.904	19.20	19.73	38.93	56.00	-17.07	QP
11	1.106	7.01	19.81	26.82	46.00	-19.18	Average
12	1.106	19.51	19.81	39.32	56.00	-16.68	QP

Note:

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

2) Over Limit (dB) = Read level (dBuV) + Factor (dB) - Limit (dBuV)

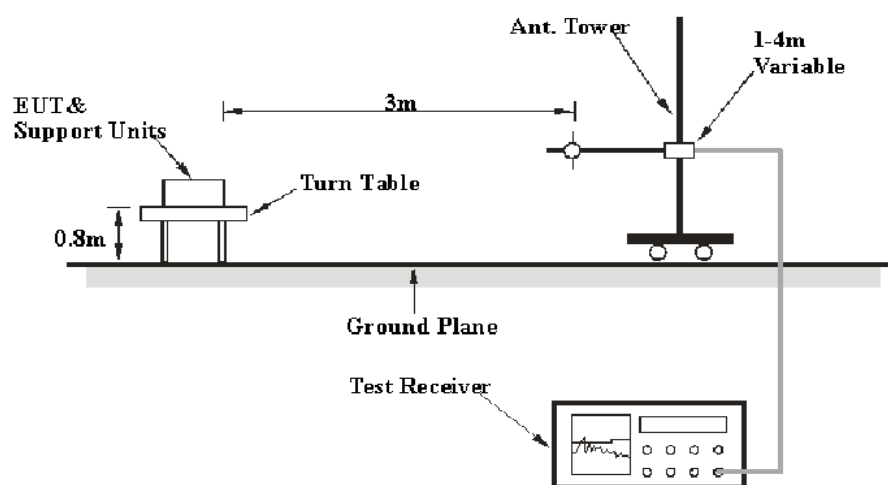
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

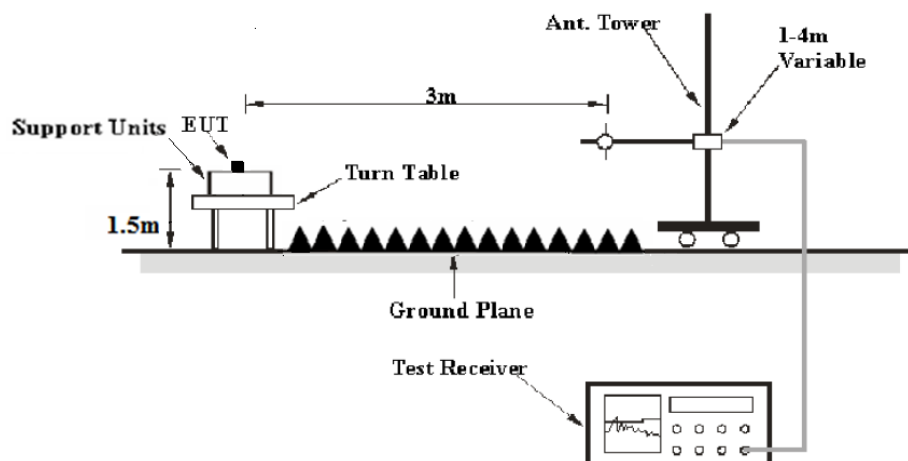
FCC §15.247 (d); §15.209; §15.205;

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 (dB μ V /m) = Meter Reading (dB μ V) + 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 (dB μ V/m) - Corrected Amplitude (dB μ V /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:	24.7~24.9 °C
Relative Humidity:	50~51 %
ATM Pressure:	101.2~101.3 kPa

The testing was performed by CK Huang from 2021-01-25 to 2021-01-26.

EUT operation mode: Transmitting

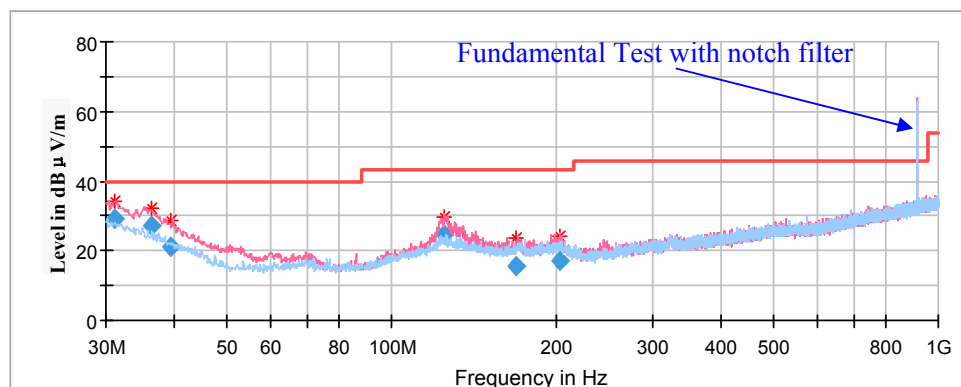
Note: Both Adapter1 and Adapter2 have been tested, the worst Adapter1 data were recorded in this report.

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 Y-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)				
31.127295	29.01	100.0	V	15.0	-4.6	40.00	10.99
36.287750	26.92	100.0	V	182.0	-8.1	40.00	13.08
39.463650	21.31	100.0	V	152.0	-10.2	40.00	18.69
124.311500	24.63	100.0	V	164.0	-10.5	43.50	18.87
168.777550	15.52	100.0	V	224.0	-12.4	43.50	27.98
203.619400	17.26	100.0	V	314.0	-11.1	43.50	26.24

1GHz-10GHz

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

Note:

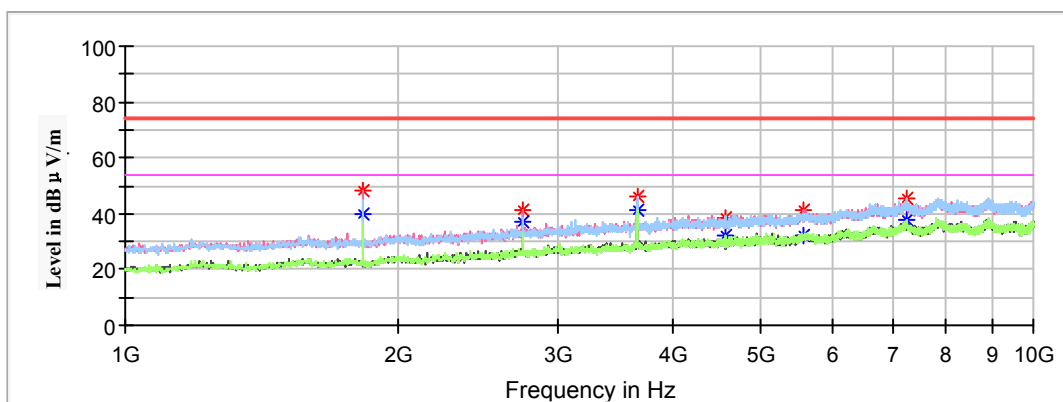
1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)

Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)

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

Low Channel: 915.0 MHz

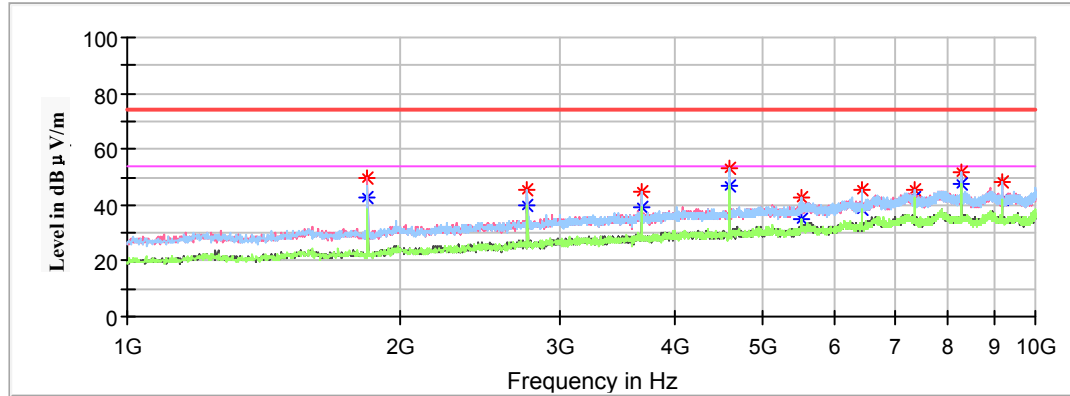
Full Spectrum



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)				
1829.600000	47.94	---	200.0	V	161.0	-15.1	74.00	26.06
1829.600000	---	40.04	200.0	V	161.0	-15.1	54.00	13.96
2744.200000	41.06	---	200.0	V	226.0	-11.3	74.00	32.94
2744.200000	---	36.90	200.0	V	226.0	-11.3	54.00	17.10
3658.800000	46.50	---	150.0	V	110.0	-8.2	74.00	27.50
3658.800000	---	41.12	150.0	V	110.0	-8.2	54.00	12.88
4575.100000	---	32.23	200.0	H	180.0	-6.1	54.00	21.77
4575.100000	38.24	---	200.0	H	180.0	-6.1	74.00	35.76
5588.300000	41.19	---	150.0	V	256.0	-3.7	74.00	32.81
5588.300000	---	32.05	150.0	V	256.0	-3.7	54.00	21.95
7249.200000	45.13	---	200.0	H	218.0	0.5	74.00	28.87
7249.200000	---	37.54	200.0	H	218.0	0.5	54.00	16.46

Middle Channel: 920.0 MHz

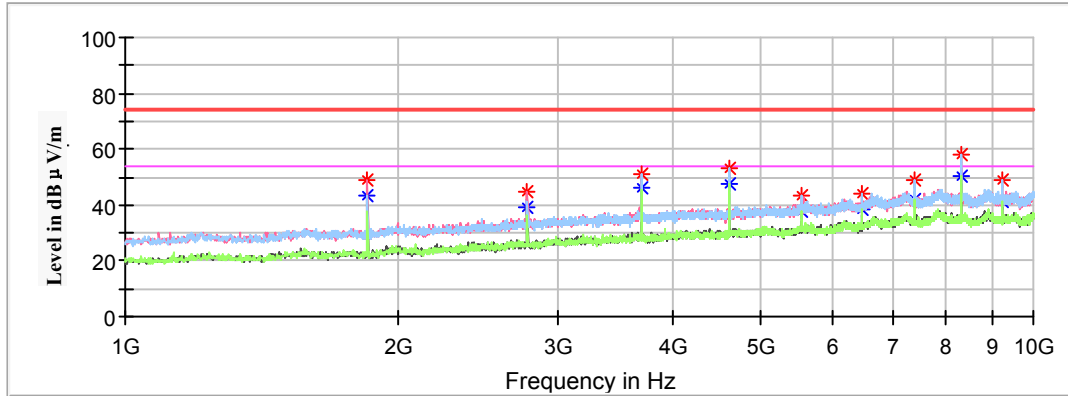
Full Spectrum



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)				
1838.100000	---	42.38	150.0	V	352.0	-15.1	54.00	11.62
1838.100000	49.78	---	150.0	V	352.0	-15.1	74.00	24.22
2759.500000	---	39.60	200.0	V	257.0	-11.2	54.00	14.40
2759.500000	45.69	---	200.0	V	257.0	-11.2	74.00	28.31
3679.200000	---	39.32	150.0	H	244.0	-8.2	54.00	14.68
3679.200000	44.93	---	150.0	H	244.0	-8.2	74.00	29.07
4598.900000	52.93	---	150.0	H	179.0	-6.0	74.00	21.07
4598.900000	---	47.11	150.0	H	179.0	-6.0	54.00	6.89
5518.600000	---	35.03	150.0	H	231.0	-3.9	54.00	18.97
5518.600000	42.52	---	150.0	H	231.0	-3.9	74.00	31.48
6440.000000	---	38.49	200.0	H	227.0	-1.4	54.00	15.51
6440.000000	45.68	---	200.0	H	227.0	-1.4	74.00	28.32
7359.700000	---	42.33	150.0	H	231.0	0.7	54.00	11.67
7359.700000	45.67	---	150.0	H	231.0	0.7	74.00	28.33
8279.400000	---	47.53	200.0	H	201.0	1.5	54.00	6.47
8279.400000	51.50	---	200.0	H	201.0	1.5	74.00	22.50
9199.100000	---	42.14	150.0	H	283.0	2.0	54.00	11.86
9199.100000	48.12	---	150.0	H	283.0	2.0	74.00	25.88

High Channel: 924.8 MHz

Full Spectrum



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)				
1848.300000	---	43.23	200.0	V	167.0	-15.0	54.00	10.77
1848.300000	48.99	---	200.0	V	167.0	-15.0	74.00	25.01
2773.100000	---	39.43	200.0	V	155.0	-11.2	54.00	14.57
2773.100000	44.60	---	200.0	V	155.0	-11.2	74.00	29.40
3697.900000	---	46.13	150.0	V	123.0	-8.1	54.00	7.87
3697.900000	51.14	---	150.0	V	123.0	-8.1	74.00	22.86
4622.700000	---	47.57	200.0	H	173.0	-6.0	54.00	6.43
4622.700000	53.36	---	200.0	H	173.0	-6.0	74.00	20.64
5547.500000	---	37.63	200.0	H	173.0	-3.8	54.00	16.37
5547.500000	43.46	---	200.0	H	173.0	-3.8	74.00	30.54
6472.300000	---	38.12	150.0	H	233.0	-1.3	54.00	15.88
6472.300000	43.98	---	150.0	H	233.0	-1.3	74.00	30.02
7397.100000	---	41.81	150.0	H	233.0	0.8	54.00	12.19
7397.100000	49.04	---	150.0	H	233.0	0.8	74.00	24.96
8321.900000	58.18	---	200.0	H	237.0	1.5	74.00	15.82
8321.900000	---	50.64	200.0	H	237.0	1.5	54.00	3.36
9248.400000	---	41.09	200.0	H	249.0	2.0	54.00	12.91
9248.400000	49.07	---	200.0	H	249.0	2.0	74.00	24.93

Restricted Bands Emissions Test:

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

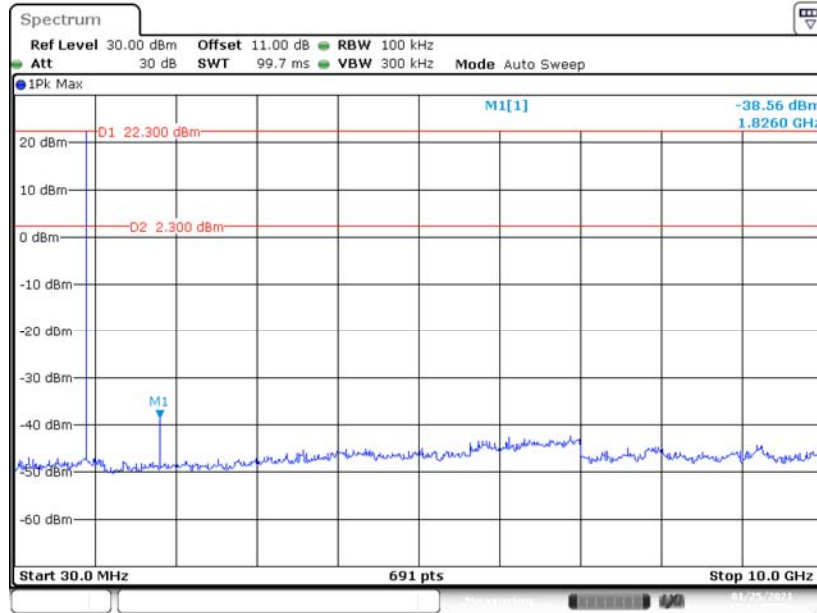
Note:

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	Detector	Rx Antenna		Turntable	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	(dBμV/m)		(PK/QP/Ave.)	Height (cm)	Polar (H/V)			
Channel Frequency: 915.0 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: 924.8 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

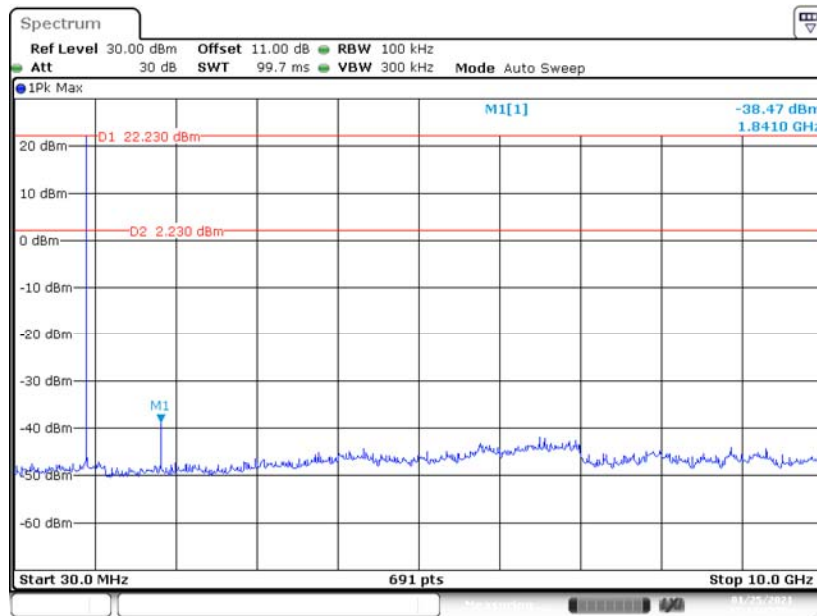
Conducted Spurious Emissions at Antenna Port:

Low Channel



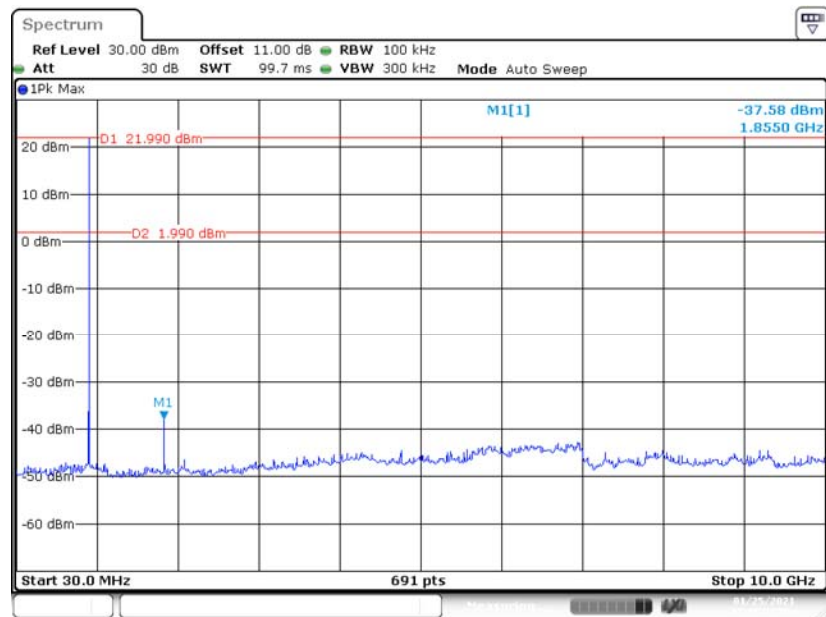
Date: 25 JAN 2021 13:13:59

Middle Channel



Date: 25 JAN 2021 13:14:42

High Channel



Date: 25 JAN 2021 13:15:21

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:	24.7 °C
Relative Humidity:	49 %
ATM Pressure:	101.0 kPa

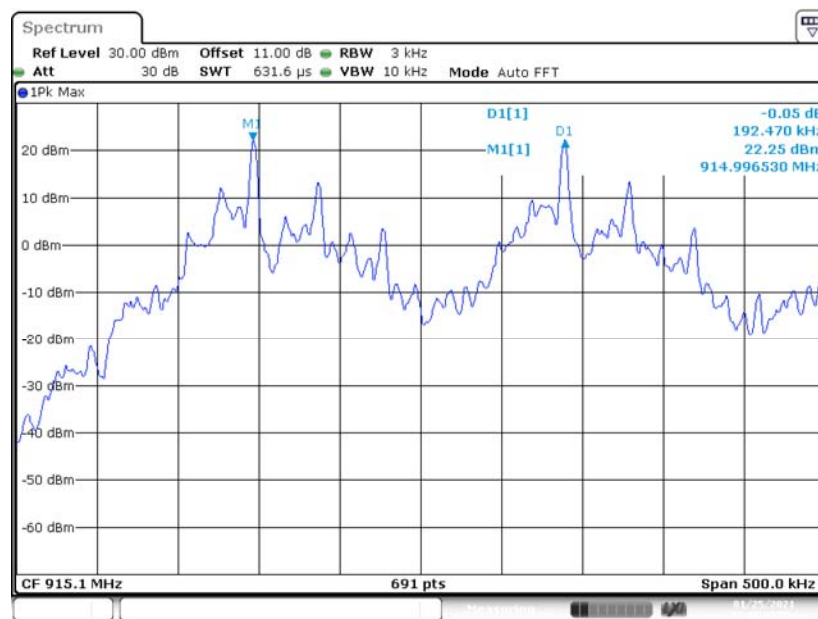
The testing was performed by CK Huang on 2021-01-25.

EUT operation mode: Transmitting

Test Result: Compliant.

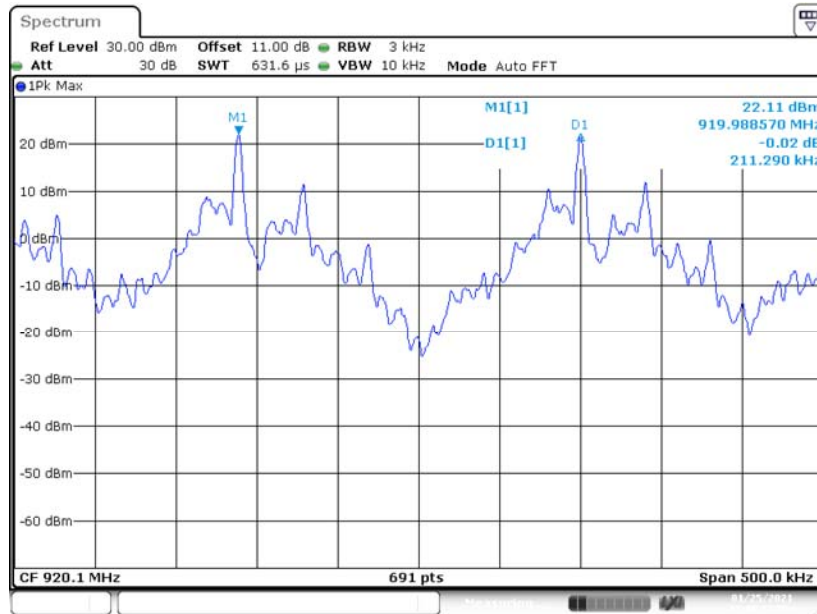
Channel	Frequency (MHz)	Channel Separation (kHz)	Limit (kHz)	Result
Low	915.0	192.470	≥ 121.56	Pass
Adjacent	915.2			
Middle	920.0	211.290	≥ 74.53	Pass
Adjacent	920.2			
High	924.8	192.470	≥ 75.98	Pass
Adjacent	924.6			

Low Channel



Date: 25 JAN 2021 13:06:30

Middle Channel



Date: 25 JAN 2021 13:07:57

High Channel



Date: 25 JAN 2021 13:08:53

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

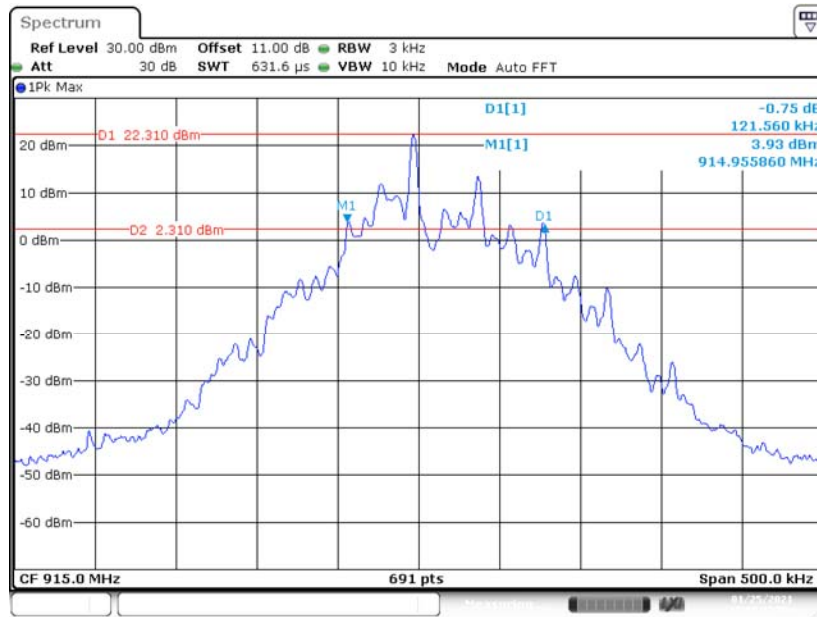
The testing was performed by CK Huang on 2021-01-25.

EUT operation mode: Transmitting

Test Result: Compliant.

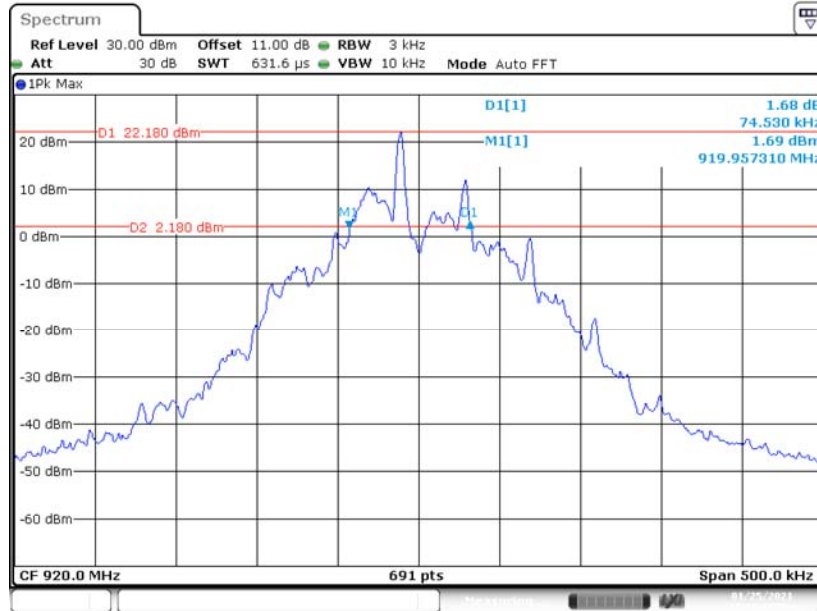
Channel	Frequency (MHz)	20 dB Emission Bandwidth (kHz)	Limit (kHz)
Low	915.0	121.56	≤250
Middle	920.0	74.53	≤250
High	924.8	75.98	≤250

Low Channel



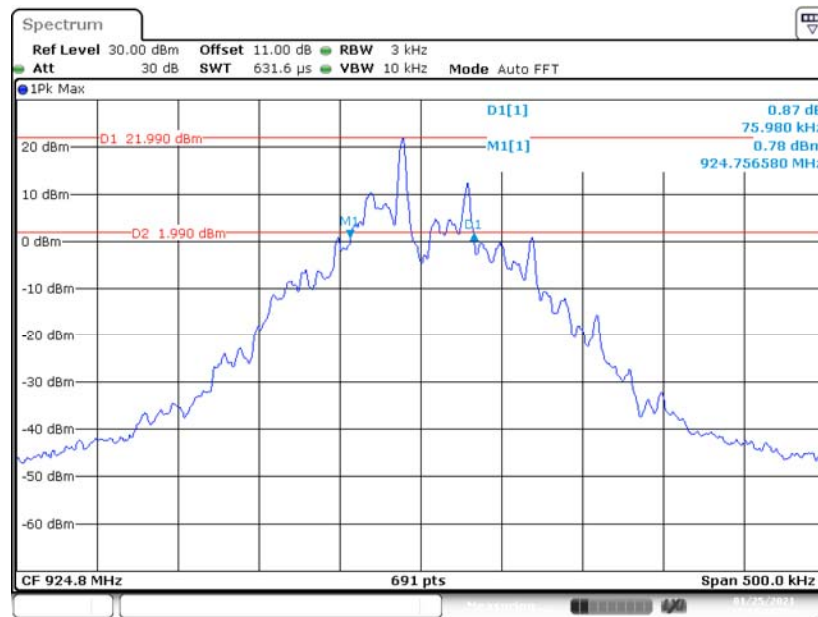
Date: 25 JAN 2021 12:52:12

Middle Channel



Date: 25 JAN 2021 12:54:05

High Channel



Date: 25 JAN 2021 12:51:06

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:	24.9 °C
Relative Humidity:	49 %
ATM Pressure:	101.0 kPa

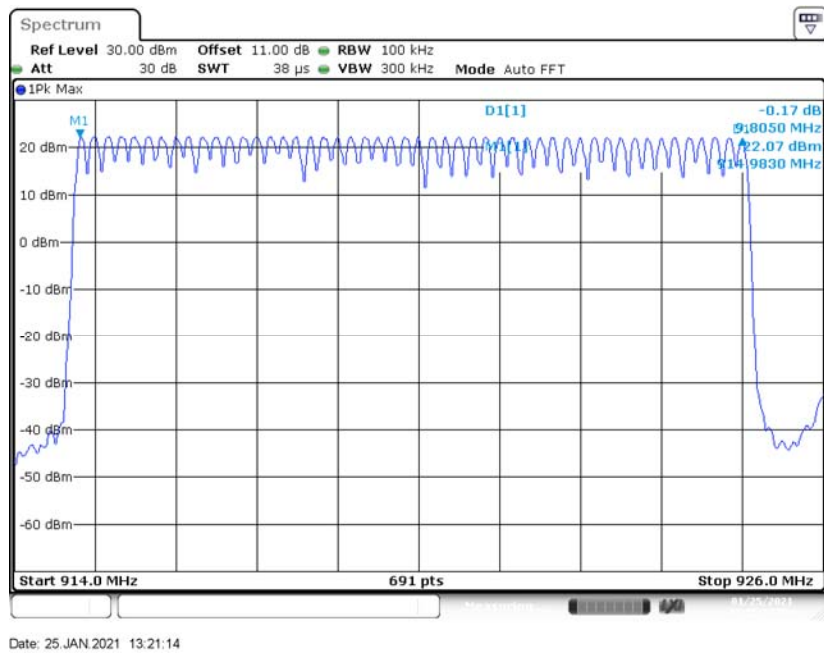
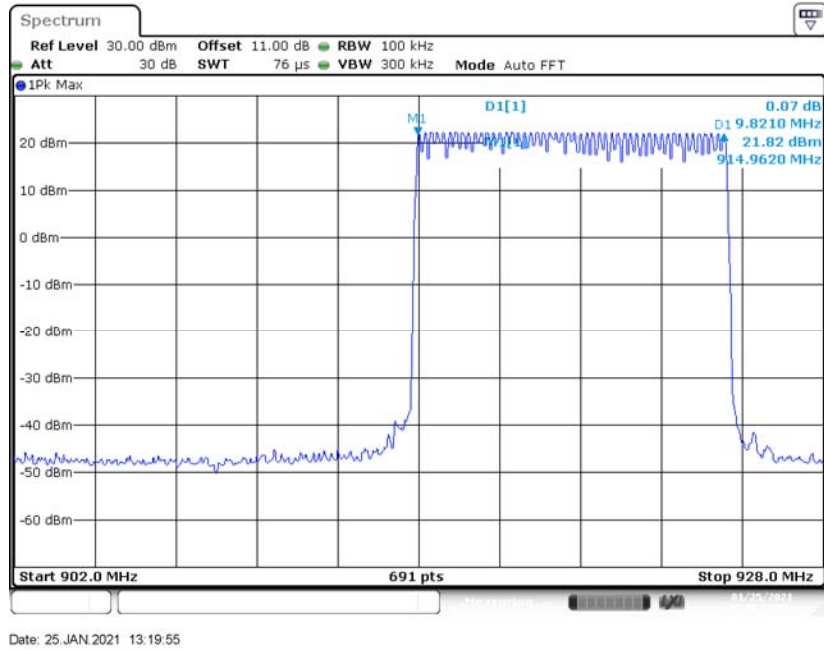
The testing was performed by CK Huang on 2021-01-25.

EUT operation mode: Transmitting

Test Result: Compliant.

Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)
902~928	50	≥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 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

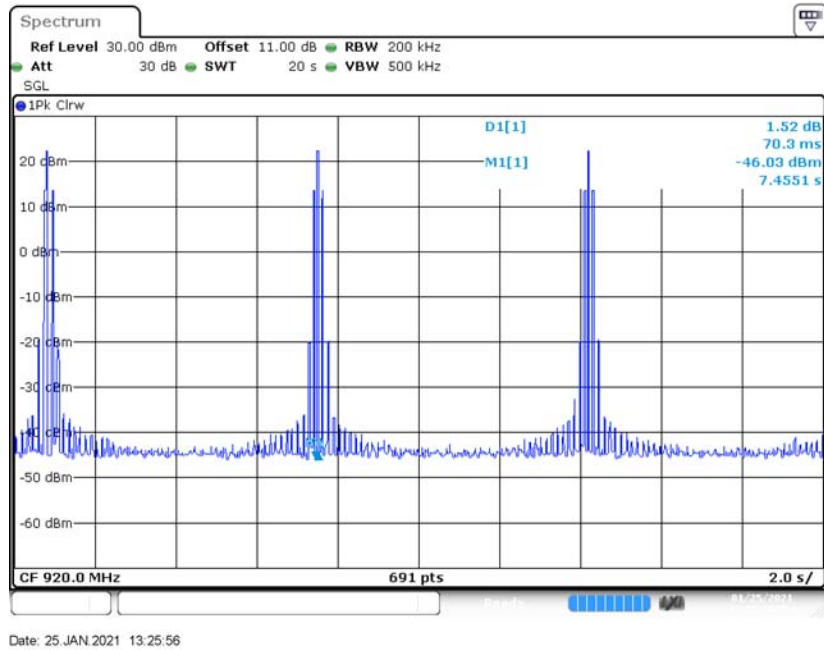
The testing was performed by CK Huang on 2021-01-25.

EUT operation mode: Transmitting

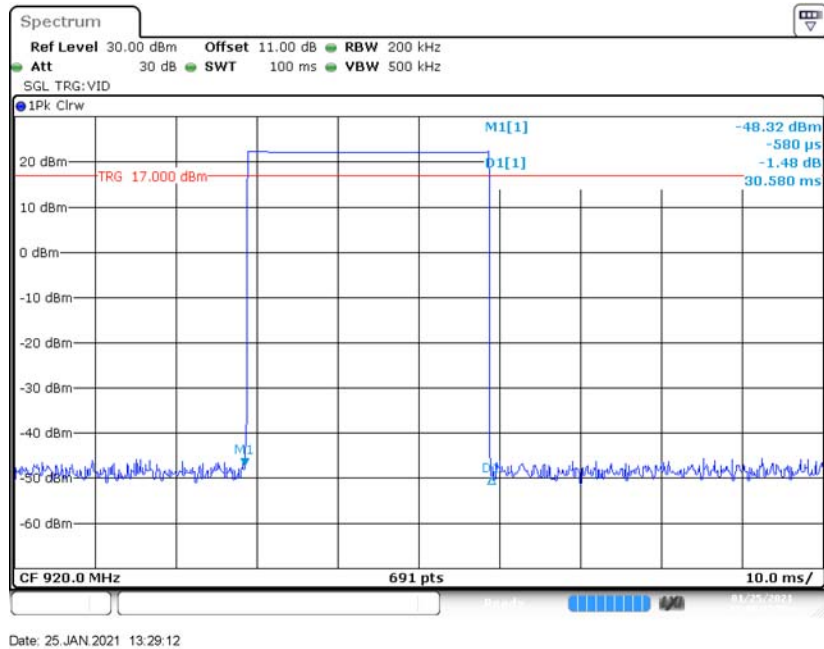
Test Result: Compliant.

Pulse Width	Pulse Number	Dwell Time	Limit	Result
(ms)		(s)	(s)	
30.58	3	0.092	≤0.4	Pass
Note: Dwell time = Pulse time*N Observed time = 20 s				

Number of Pulses



Single Pulse



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 $\geq$ 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

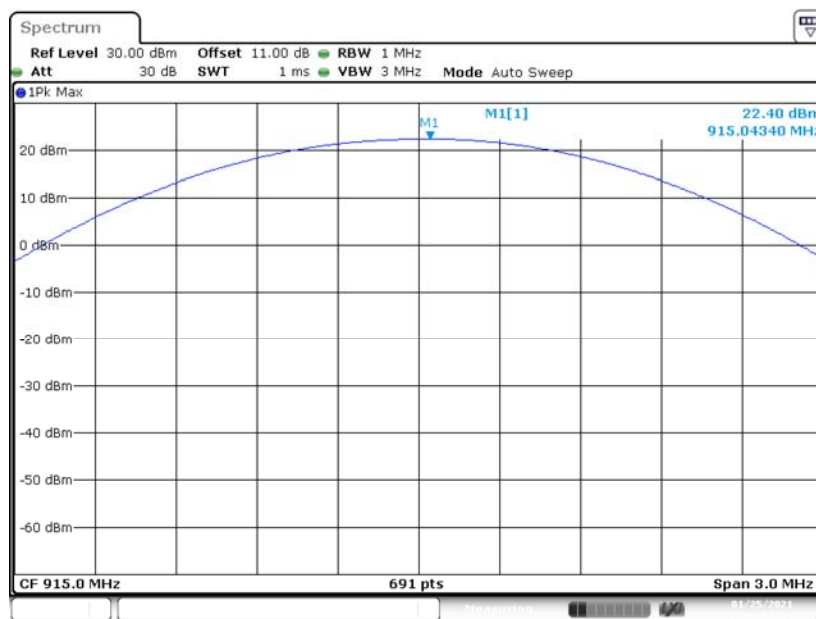
Temperature:	24.2°C
Relative Humidity:	49 %
ATM Pressure:	101.2 kPa

The testing was performed by CK Huang on 2021-01-25.

EUT operation mode: Transmitting

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Limit (dBm)	Result
Low	915.0	22.40	30	Pass
Middle	920.0	22.25	30	Pass
High	924.8	22.11	30	Pass

Low Channel



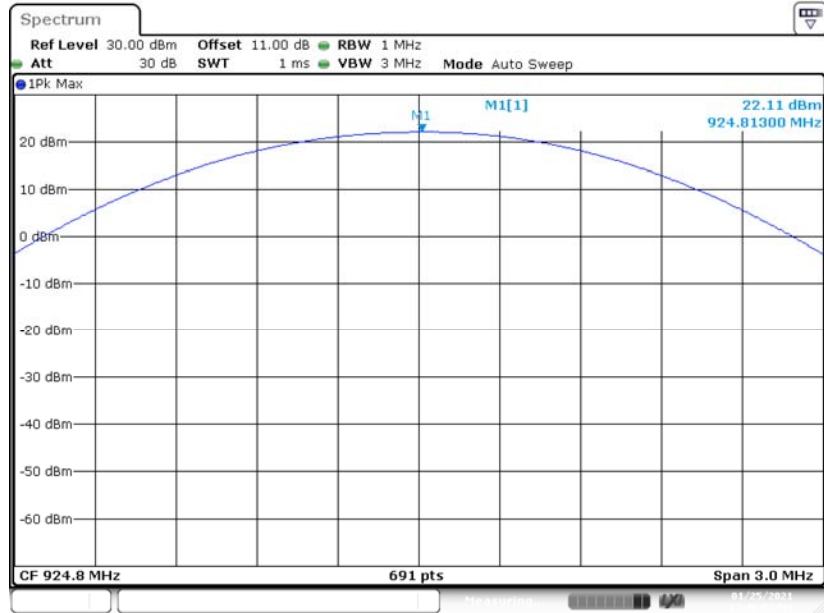
Date: 25. JAN. 2021 12:43:03

Middle Channel



Date: 25 JAN 2021 12:46:07

High Channel



Date: 25 JAN 2021 12:46:52

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

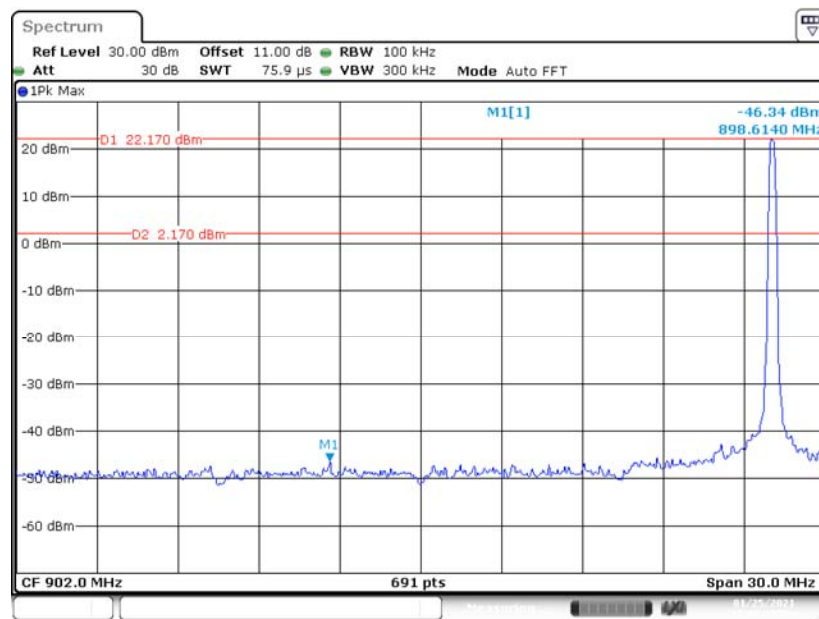
Temperature:	24.7 °C
Relative Humidity:	50 %
ATM Pressure:	101.2 kPa

The testing was performed by CK Huang on 2021-01-25.

EUT operation mode: Transmitting

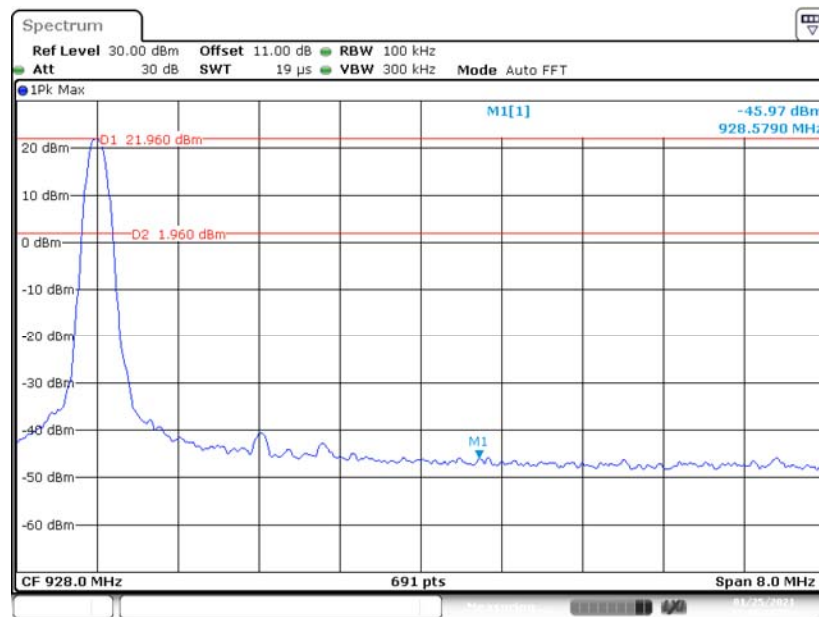
Test Result: Compliant.

Left Side



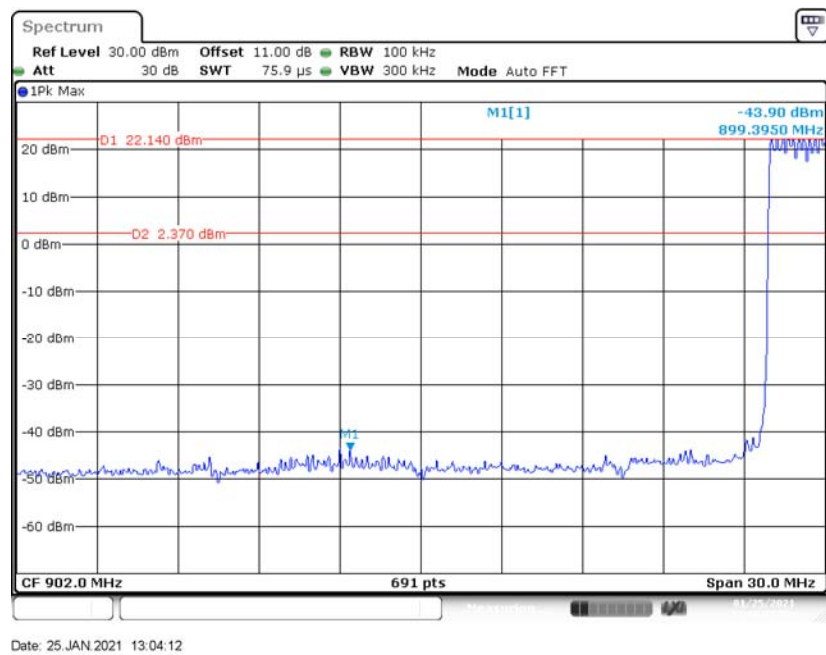
Date: 25 JAN 2021 12:59:30

Right Side

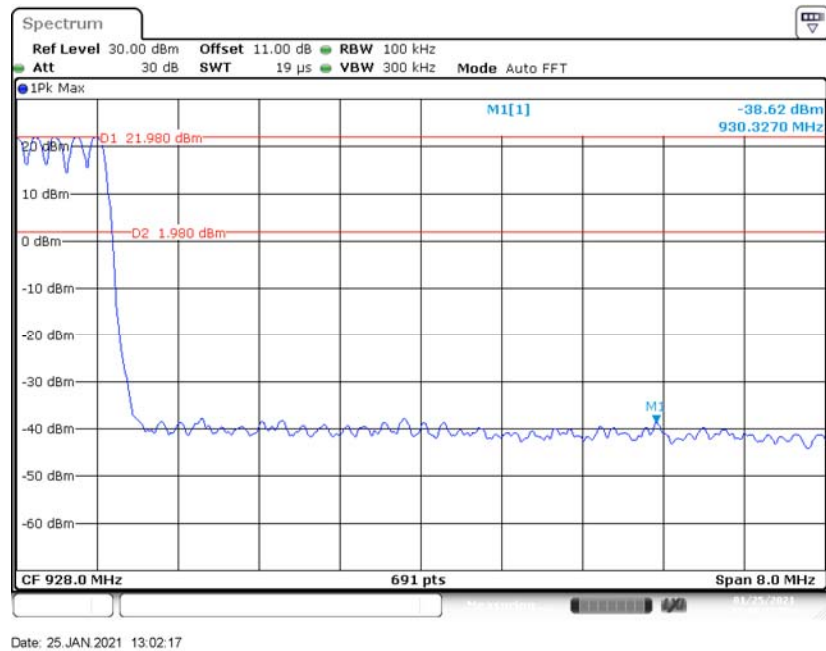


Date: 25 JAN 2021 13:01:07

Left Side-Hopping



Right Side-Hopping



Declarations

1: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

2: Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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

4: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

5: This report cannot be reproduced except in full, without prior written approval of the Company.

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