FCC PART 15.231

TEST REPORT

For

Quanzhou Juhui Electronics Co., Ltd.

No.288 Changxing Road,Huoju Industrial District,Licheng Area,Quanzhou, Fujian, China

FCC ID: 2ALGNJH-877MAX

Report Type:	**Product Name:**
Original	remote control

Report Number:	XMDN240313-12545E-RF-01
Report Date:	2024-05-10
Reviewed By:	Miles Chen
Approved By:	Rock Liu
Prepared By:	Bay Area Compliance Laboratories Corp. (Xiamen) Unit 102, No. 902 Meifeng South Road, Binhai West Avenue, Science and Technology Innovation Park, Torch High tech Zone XiaMen Tel: +86-592-3200111 www.baclcorp.com.cn

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REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	XMDN240313-12545E-RF-01	R1V1	2024-05-10	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Quanzhou Juhui Electronics Co., Ltd.
Tested Model:	JH-Universal keypad
Product Name:	remote control
Power Supply:	DC 9V from battery
RF Function:	SRD
Operating Band/Frequency:	310-390MHz
Channel Number:	3
Modulation Type:	OOK
Antenna Type:	PCB Antenna
★Maximum Antenna Gain:	0 dBi

Note: The maximum antenna gain is provided by the applicant.

All measurement and test data in this report was gathered from production sample serial number: XMDN240313-12545E-RF-1. (Assigned by the BACL. The EUT supplied by the applicant was received on 2024-03-29)

Objective

This test report is prepared for *Quanzhou Juhui Electronics Co., Ltd.* All the test measurements were performed according to the measurement procedure described in ANSI C63.10-2020.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.209, 15.35(c) and 15.231 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

Measurement Uncertainty

Item		U_{lab}
Radiated Disturbance	9kHz~30MHz	2.59 dB
	30MHz~1GHz	4.79 dB
	1GHz~6GHz	4.6 dB
Occupied Bandwidth		±0.10MHz
Duty Cycle		1%
Temperature		±1℃
Humidity		±5%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Xiamen) to collect test data is located on the Unit 102, No. 902 Meifeng South Road, Binhai West Avenue, Science and Technology Innovation Park, Torch High tech Zone XiaMen.

Bay Area Compliance Laboratories Corp. (Xiamen) Lab is accredited to ISO/IEC 17025 by A2LA (Certificate Number: 7134.01) and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, FCC Registration No.: 485720, the FCC Designation No.: CN1384.

SYSTEM TEST CONFIGURATION

Test Mode and Voltage

The system was configured for testing in a typical mode (as normally used by a typical user).	
Test mode:	Transmitting
Test voltage:	DC 9V
Remark:	During all emission tests, the EUT was configured to measure its highest possible emission level and the worst case's test data was presented in this test report.

Justification

The system was configured in testing mode which was provided by manufacturer.

Channel List:

Channel	Frequency (MHz)
1	310
2	315
3	390

EUT Exercise Software

Engineering Mode was provided by manufacturer.

Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

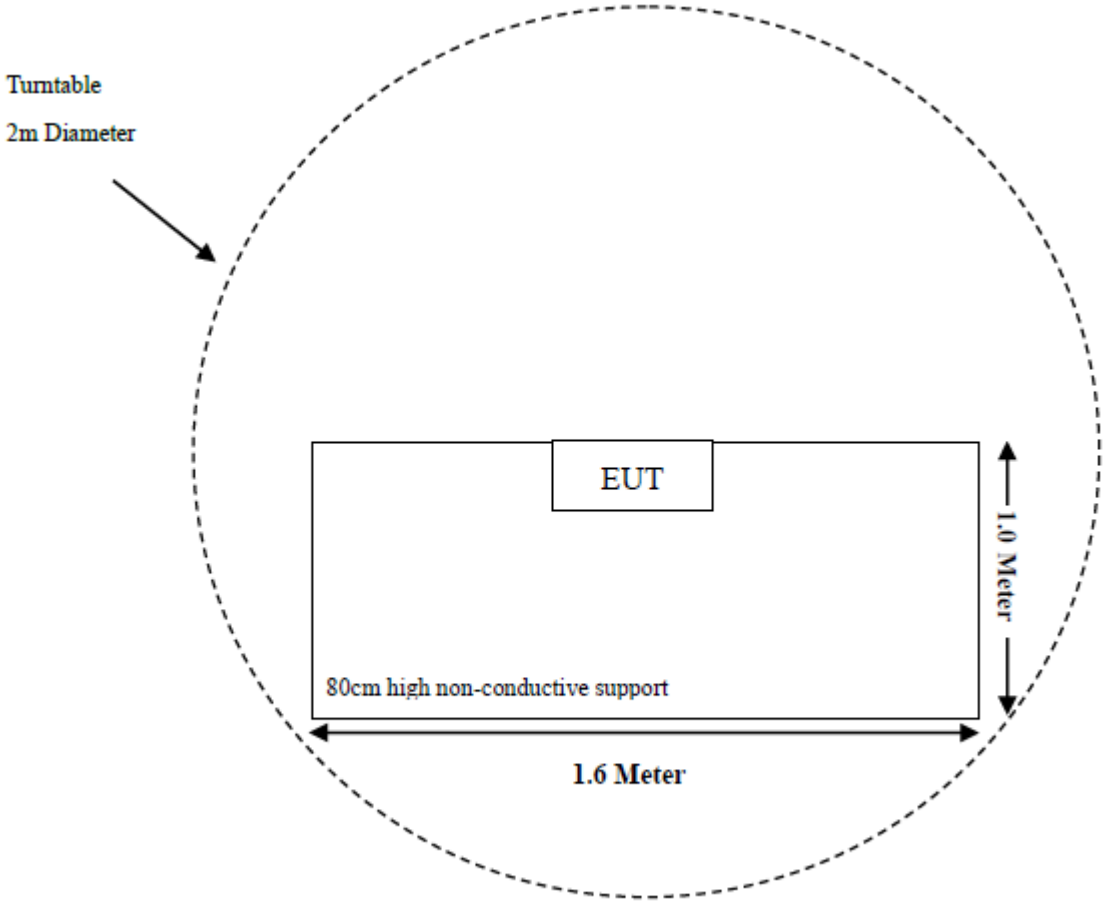
External I/O Cable

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

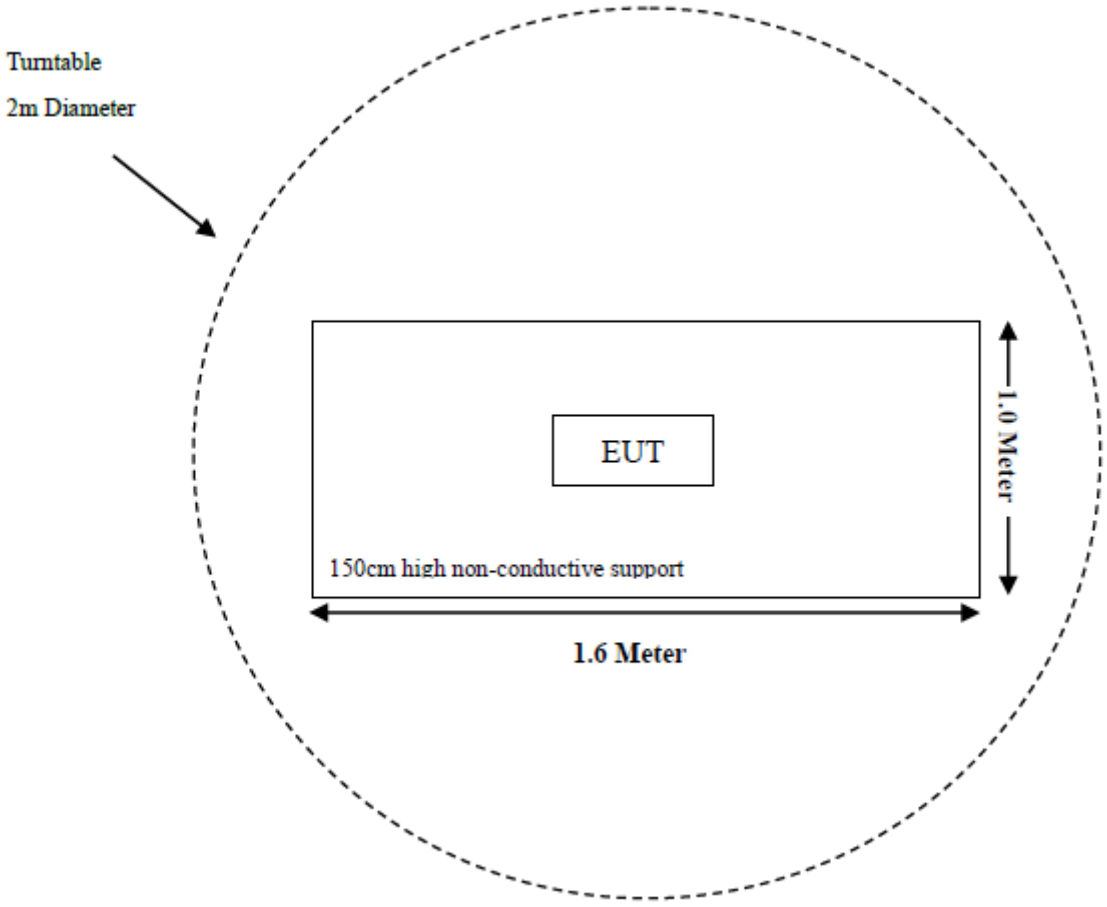
Block Diagram of Test Setup

For Radiated Emissions:

Below 1GHz



Above 1GHz


Turntable
2m Diameter
EUT
150cm high non-conductive support
1.0 Meter
1.6 Meter

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conducted Emissions	Not Applicable (See Note)
§15.205, §15.209, §15.231(b)	Radiated Emissions	Compliant
§15.231 (a) (1)	Deactivation	Compliant
§15.231 (c)	20dB Emission Bandwidth	Compliant
§1.1307	RF Exposure Evaluation	Compliant

Note: The EUT operates on battery power only and cannot be connected to the AC power network.

TEST EQUIPMENT LIST

Test Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emissions Below 1 GHz & RF Test					
EMI Test Receiver	Rohde & Schwarz	ESR	103103	2023/09/12	2024/09/11
Loop Antenna	Rohde & Schwarz	HFH2-Z2	830749/001	2023/07/27	2026/07/26
Coaxial Cable	XINHANGWEIBO	HFH2-CC	335.3609	2023/09/20	2026/09/19
Antenna	Sunol Sciences	JB6	A122022-5	2023/07/27	2026/07/26
Amplifier	Sonoma	310B	120903	2023/09/12	2024/09/11
Coaxial Cable	XINHANGWEIBO	XH400T-N-4M	CC002	2023/08/29	2024/08/28
Coaxial Cable	XINHANGWEIBO	XH460B-N-2M	CC006	2023/08/29	2024/08/28
Coaxial Cable	XINHANGWEIBO	XH460B-N-12M	CC007	2023/08/29	2024/08/28
Test Software	Audix	E3	18621a	N/A	N/A
Radiated Emissions Above 1 GHz					
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102051	2023/09/12	2024/09/11
Double Ridge Guide Horn Antenna	A.H.Systems	SAS-571	1980	2023/07/28	2026/07/27
Preamplifier	A.H.Systems	PAM-0118P	489	2023/09/12	2024/09/11
Coaxial Cable	XINHANGWEIBO	XH800A-N-6M	CC004	2023/08/29	2024/08/28
Coaxial Cable	XINHANGWEIBO	XH800A-N-1M	CC005	2023/08/29	2024/08/28
Test Software	Audix	E3	18621a	N/A	N/A

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

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Antenna Connected Construction

The EUT has a PCB antenna which was permanently attached and the antenna gain is 0dBi; fulfill the requirement of this section. Please refer to EUT photos.

Result: Compliant.

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

Applicable Standard

FCC §15.205, §15.209, §15.231 (b)

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

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

*Linear interpolations.

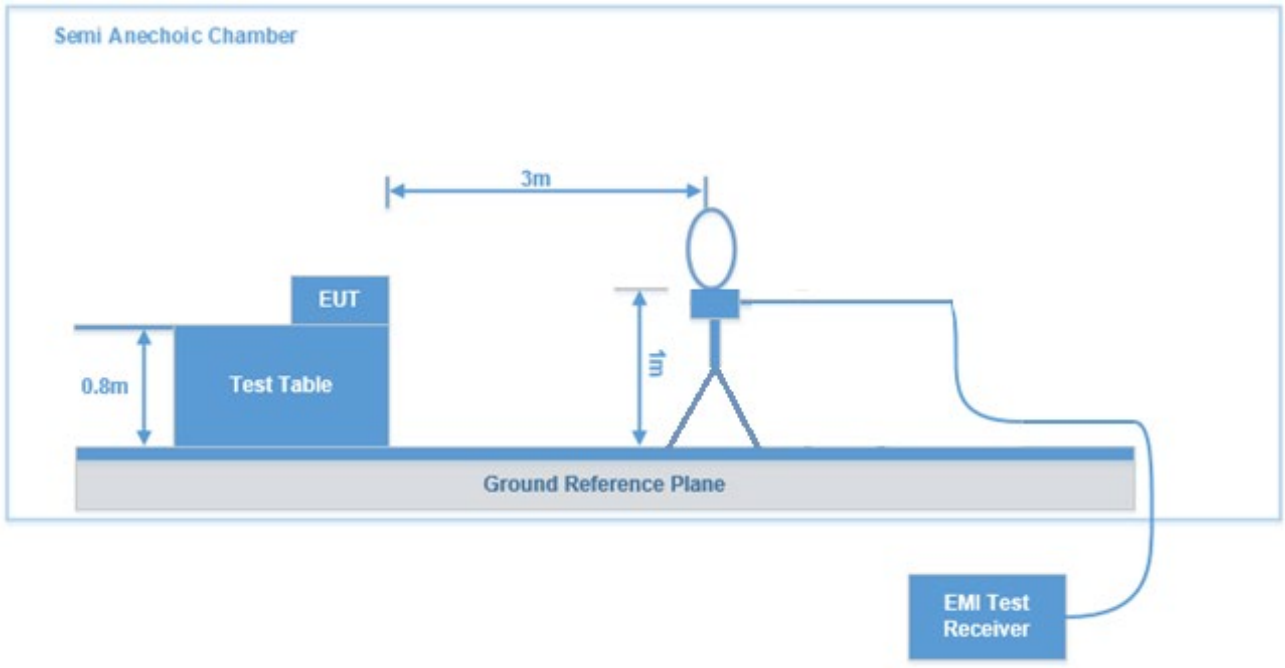
(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

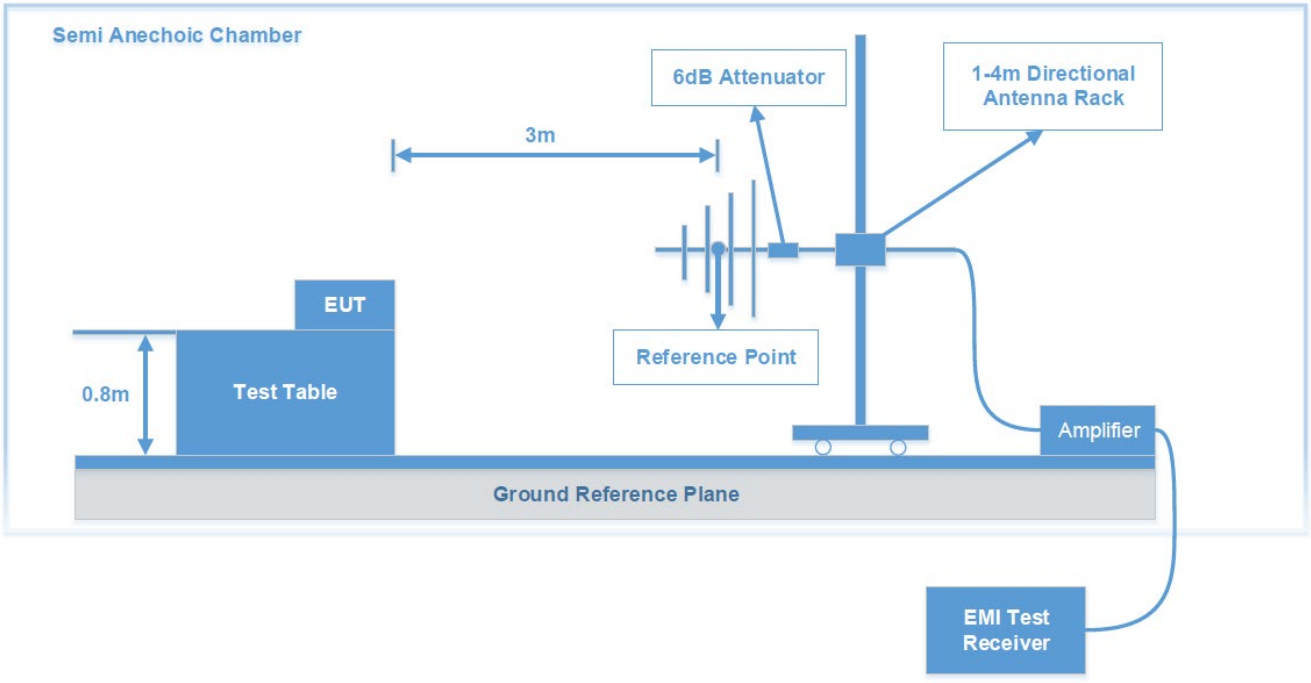
(3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

Test System Setup

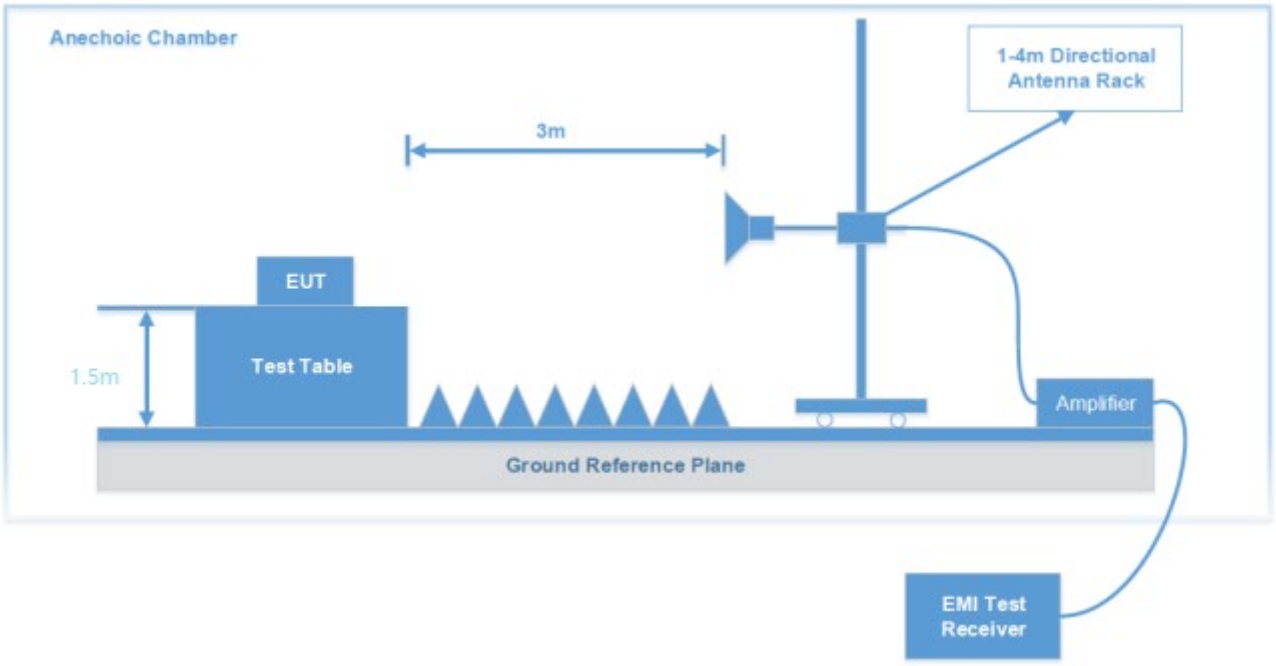
9 kHz-30MHz:



30MHz-1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2020. The specification used was the FCC § 15.205, 15.209 and 15.231.

EMI Test Receiver Setup

The system was investigated from 9 kHz to 4 GHz.

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

Frequency Range	RBW	VBW	IF B/W	Measurement
9 kHz – 150 kHz	200Hz	1 kHz	/	PK
	/	/	200Hz	QP/AV
150 kHz – 30 MHz	10 kHz	30 kHz	/	PK
	/	/	9kHz	QP/AV
30 MHz – 1000 MHz	100 kHz	300 kHz	/	PK
	/	/	120kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK

Test Procedure

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

For each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable. The report shall list the six emissions with the smallest margin relative to the limit, for each of the three antenna orientations (parallel, perpendicular, and ground parallel) unless the margin is greater than 20 dB, then the following statement shall be made: “all emissions were greater than 20 dB below the limit.”

If the measured peak level of the emissions that the measuring receiver reading level plus corrected factor is at least 10 dB below the QP emission limit, there's no need to record the measured QP level of the emissions in the report.

Level &Margin Calculation

The Level 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:

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

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) –Level (dBμV/m)

Test Results Summary

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

Test Data

Environmental Conditions & Test Information

Frequency Range:	Below 1 GHz	Above 1 GHz
Temperature:	20.0℃	20.0℃
Relative Humidity:	62 %	62 %
ATM Pressure:	99.6 kPa~101kPa	99.6 kPa
Test Date:	2024-04-03~2024-05-09	2024-04-03
Test Engineer:	Ash Lin	Ash Lin

Note: Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded.

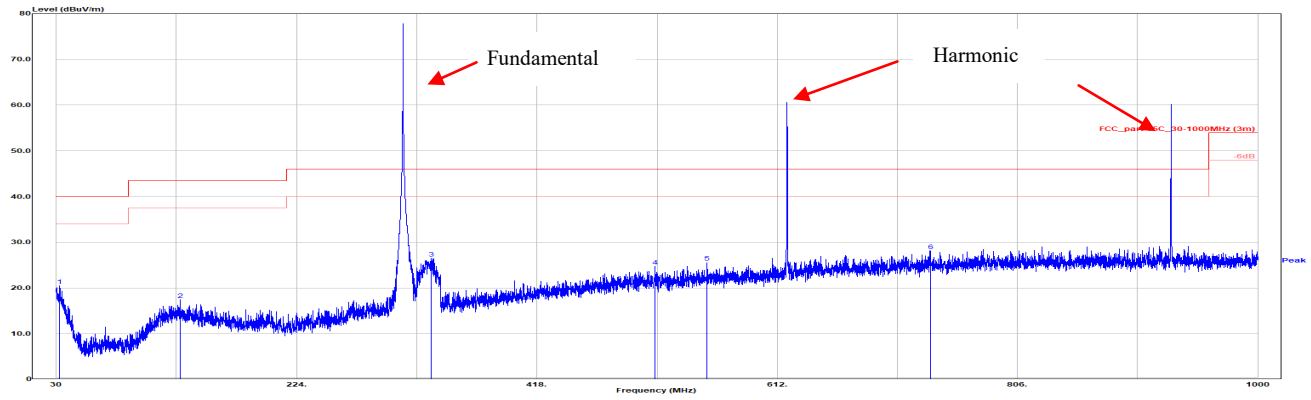
1) 9 kHz~30MHz (Transmit at Maximum output power 390MHz)

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

2） 30MHz~ 1GHz

Date: 2024-04-03 time: 15:56:52

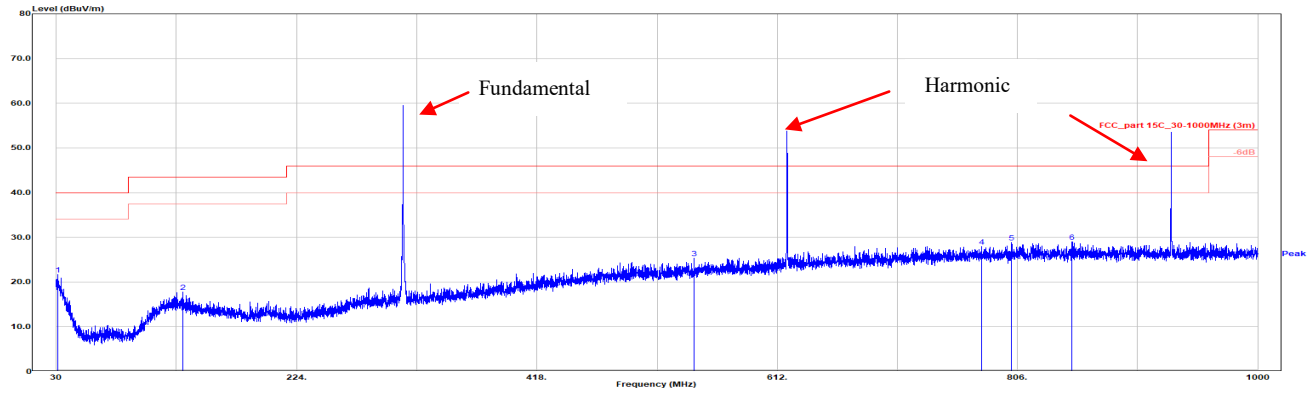
Project No. : XMDN240313-12545E-RF Temp/Humi : 20°C/62%
Test Mode : Transmitting (310MHz) Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
32.619	27.28	-6.74	20.54	40.00	19.46	Horizontal	Peak
129.910	27.55	-10.10	17.45	43.50	26.05	Horizontal	Peak
332.543	34.94	-8.50	26.44	46.00	19.56	Horizontal	Peak
513.157	28.15	-3.40	24.75	46.00	21.25	Horizontal	Peak
555.449	28.18	-2.62	25.56	46.00	20.44	Horizontal	Peak
735.869	27.84	0.31	28.15	46.00	17.85	Horizontal	Peak

Date: 2024-04-03 time: 16:09:02

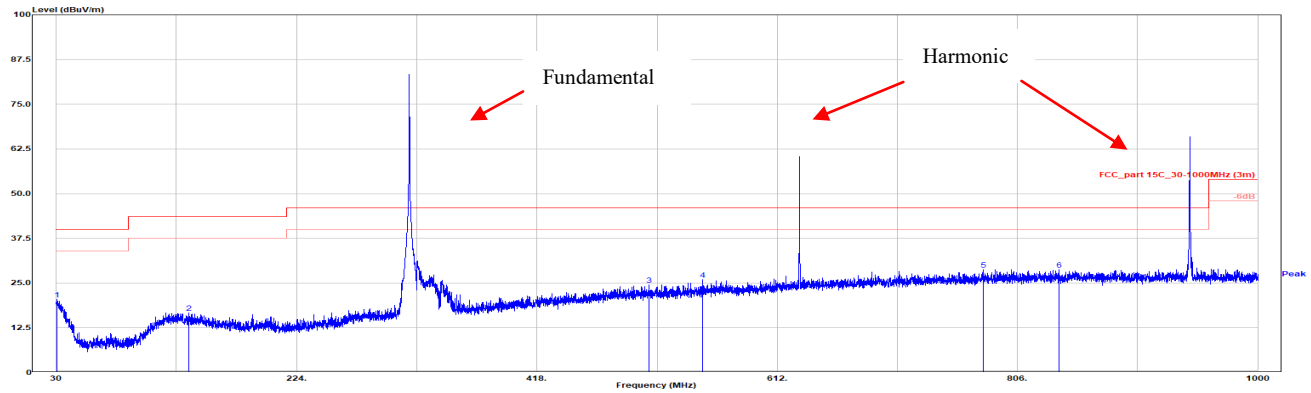
Project No. : XMDN240313-12545E-RF Temp/Humi : 20°C/62%
Test Mode : Transmitting (310MHz) Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
30.970	27.54	-5.84	21.70	40.00	18.30	Vertical	Peak
131.850	27.88	-10.09	17.79	43.50	25.71	Vertical	Peak
544.973	28.26	-2.98	25.28	46.00	20.72	Vertical	Peak
777.191	26.98	1.00	27.98	46.00	18.02	Vertical	Peak
801.344	27.57	1.26	28.83	46.00	17.17	Vertical	Peak
850.038	27.06	1.94	29.00	46.00	17.00	Vertical	Peak

Date: 2024-04-03 time: 16:06:28

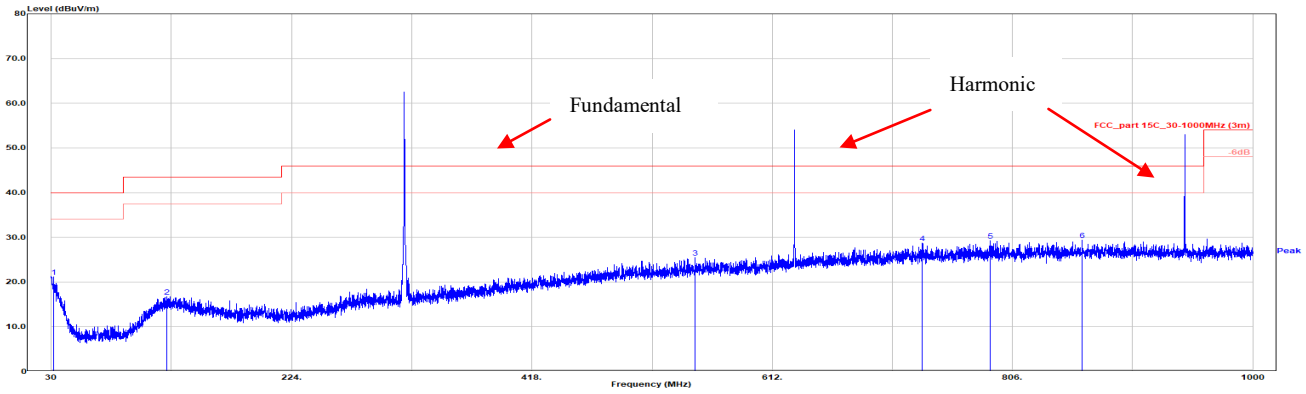
Project No. : XMDN240313-12545E-RF Temp/Humi : 20°C/62%
Test Mode : Transmitting (315MHz) Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
30.582	26.14	-5.74	20.40	40.00	19.60	Horizontal	Peak
137.088	27.08	-10.43	16.65	43.50	26.85	Horizontal	Peak
508.210	27.79	-3.36	24.43	46.00	21.57	Horizontal	Peak
551.957	28.66	-2.70	25.96	46.00	20.04	Horizontal	Peak
778.355	27.68	1.03	28.71	46.00	17.29	Horizontal	Peak
839.174	26.91	1.80	28.71	46.00	17.29	Horizontal	Peak

Date: 2024-04-03 time: 16:10:34

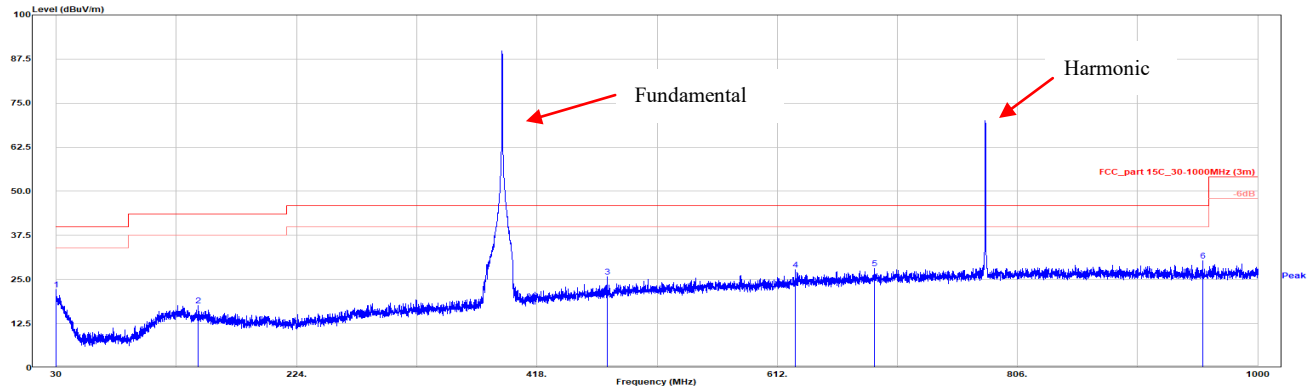
Project No. : XMDN240313-12545E-RF Temp/Humi : 20°C/62%
Test Mode : Transmitting (315MHz) Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
32.037	27.51	-6.42	21.09	40.00	18.91	Vertical	Peak
123.508	26.63	-9.95	16.68	43.50	26.82	Vertical	Peak
549.629	28.25	-2.77	25.48	46.00	20.52	Vertical	Peak
733.347	28.49	0.23	28.72	46.00	17.28	Vertical	Peak
787.667	28.15	1.10	29.26	46.00	16.74	Vertical	Peak
862.357	27.28	2.14	29.41	46.00	16.59	Vertical	Peak

Date: 2024-04-03 time: 15:59:34

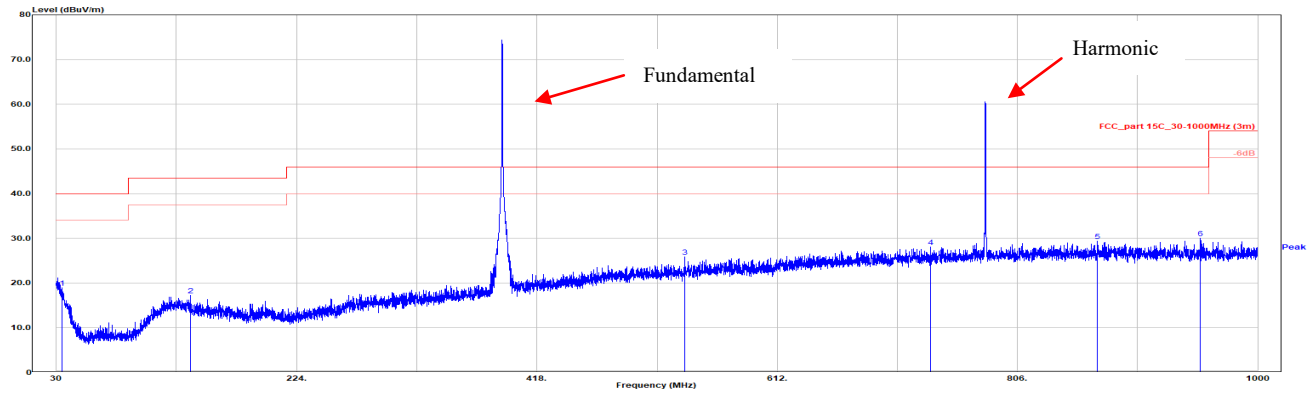
Project No. : XMDN240313-12545E-RF Temp/Humi : 20°C/62%
Test Mode : Transmitting (390MHz) Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
30.000	27.71	-5.60	22.11	40.00	17.89	Horizontal	Peak
144.751	28.59	-10.97	17.62	43.50	25.88	Horizontal	Peak
474.745	29.89	-4.08	25.81	46.00	20.19	Horizontal	Peak
626.744	29.08	-1.39	27.70	46.00	18.30	Horizontal	Peak
690.667	28.57	-0.45	28.12	46.00	17.88	Horizontal	Peak
955.380	26.98	3.27	30.25	46.00	15.75	Horizontal	Peak

Date: 2024-05-09 time: 16:13:56

Project No. : XMDN240313-12545E-RF Temp/Humi : 20°C/62%
Test Mode : Transmitting (390MHz) Tested by : Ash Lin

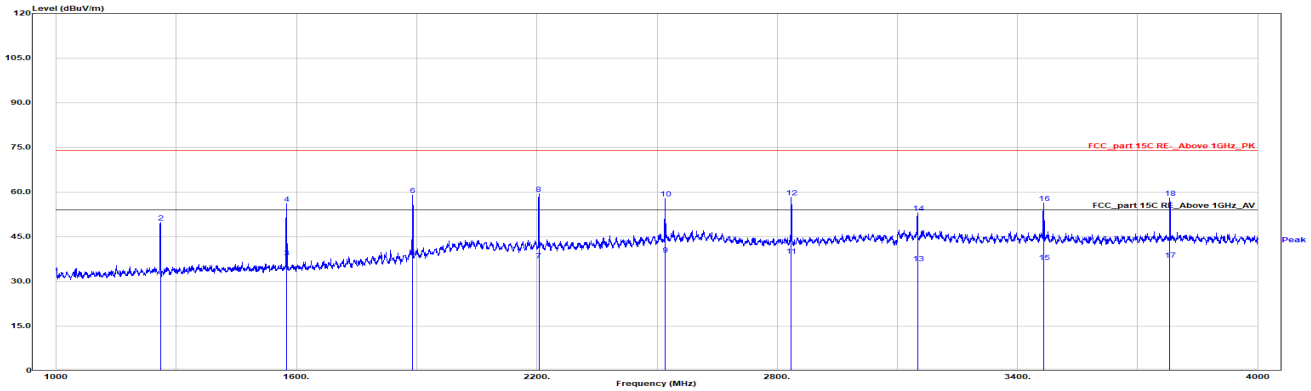


Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
34.656	26.74	-7.86	18.88	40.00	21.12	Vertical	Peak
138.446	27.78	-10.56	17.22	43.50	26.28	Vertical	Peak
537.310	28.89	-3.07	25.82	46.00	20.18	Vertical	Peak
735.772	27.70	0.31	28.01	46.00	17.99	Vertical	Peak
870.214	27.17	2.13	29.30	46.00	16.70	Vertical	Peak
953.731	26.77	3.23	30.00	46.00	16.00	Vertical	Peak

3) Above 1GHz

Date: 2024-04-03 time: 18:23:17

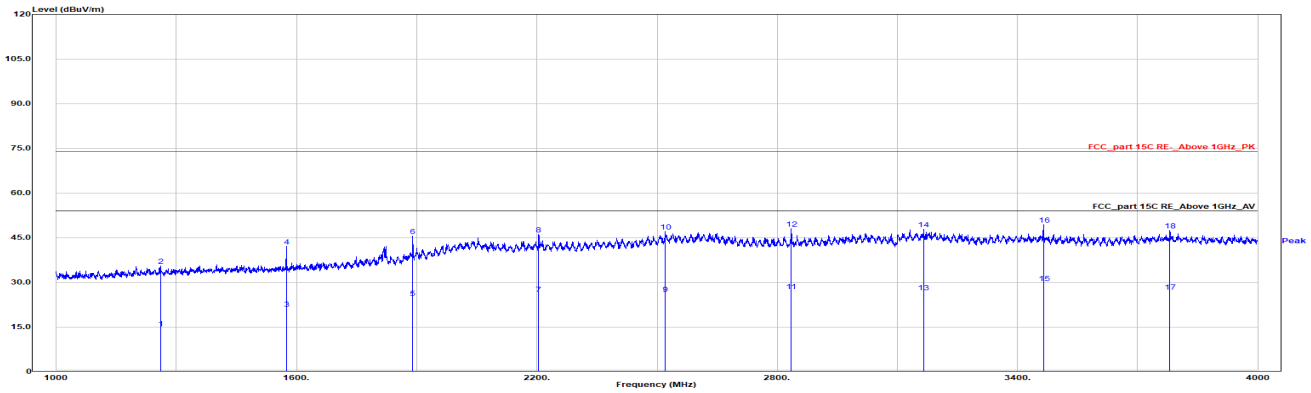
Project No. : XMDN240313-12545E-RF Temp/Humi : 20°C/62%
Test Mode : Transmitting (310MHz) Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
1239.800	61.05	-11.85	49.2	74.00	24.8	horizontal	Peak
1549.800	65.69	-10.2	55.49	74.00	18.51	horizontal	Peak
1859.800	64.38	-6.77	57.61	75.32	17.71	horizontal	Peak
2170.200	61.35	-2.88	58.47	75.32	16.85	horizontal	Peak
2480.400	57.46	-0.85	56.61	75.32	18.71	horizontal	Peak
2789.800	58.56	-0.89	57.67	74.00	16.33	horizontal	Peak
3104.800	51.46	0.86	52.32	75.32	23	horizontal	Peak

Date: 2024-04-03 time: 18:20:06

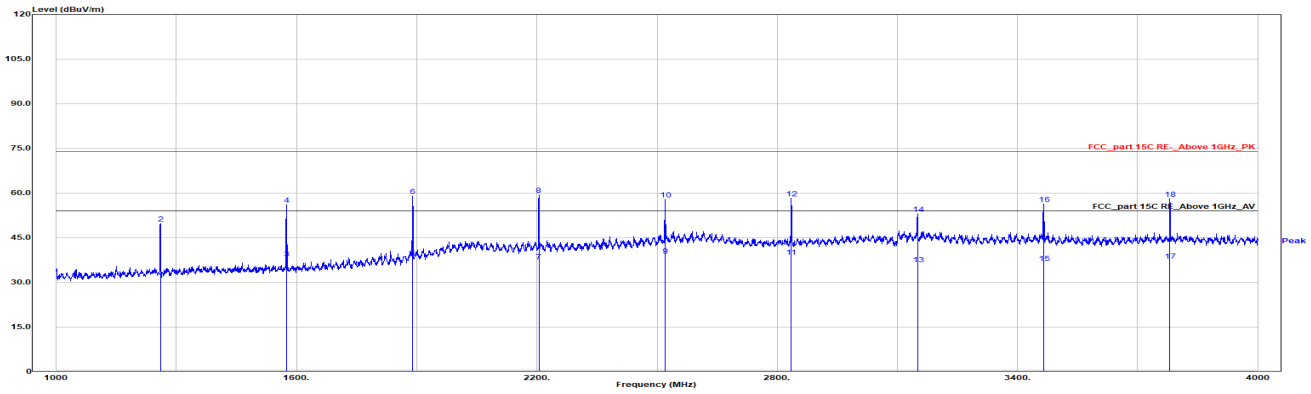
Project No. : XMDN240313-12545E-RF Temp/Humi : 20°C/62%
Test Mode : Transmitting (310MHz) Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
1239.800	46.31	-11.85	34.46	74.00	39.54	vertical	Peak
1549.800	50.97	-10.2	40.77	74.00	33.23	vertical	Peak
1859.800	50.13	-6.77	43.36	75.32	31.96	vertical	Peak
2170.200	47.69	-2.88	44.81	75.32	30.51	vertical	Peak
2480.400	46.18	-0.85	45.33	75.32	29.99	vertical	Peak
2789.800	47.64	-0.89	46.75	74.00	27.25	vertical	Peak
3104.800	45.28	0.86	46.14	75.32	29.18	vertical	Peak

Date: 2024-04-03 time: 18:16:31

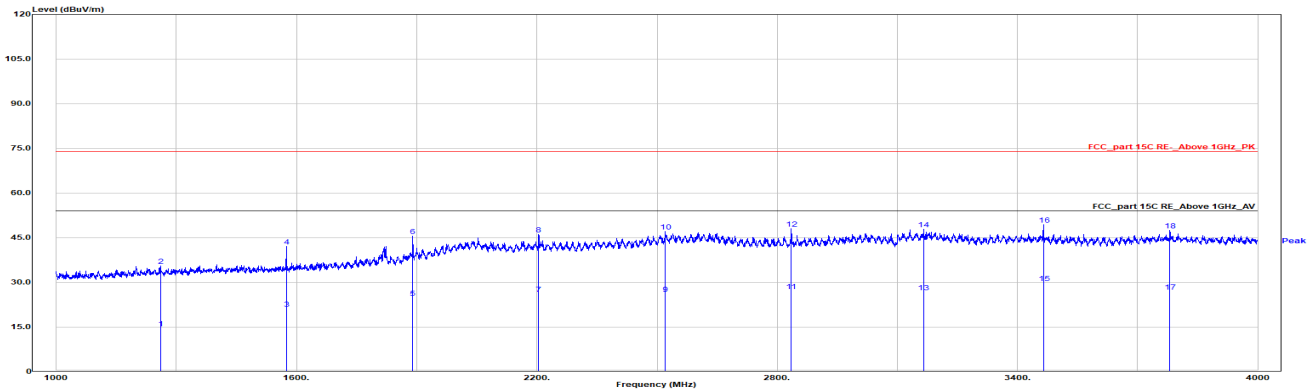
Project No. : XMDN240313-12545E-RF Temp/Humi : 20°C/62%
Test Mode : Transmitting (315MHz) Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
1259.800	61.59	-11.69	49.90	75.62	25.72	horizontal	Peak
1574.800	66.17	-10.00	56.17	74.00	17.83	horizontal	Peak
1889.800	64.92	-5.86	59.06	75.62	16.56	horizontal	Peak
2204.800	61.98	-2.61	59.37	74.00	14.63	horizontal	Peak
2519.800	58.03	-0.17	57.86	75.62	17.76	horizontal	Peak
2834.800	59.01	-0.77	58.24	74.00	15.76	horizontal	Peak
3150.400	52.01	0.98	52.99	75.62	22.63	horizontal	Peak

Date: 2024-04-03 time: 18:00:06

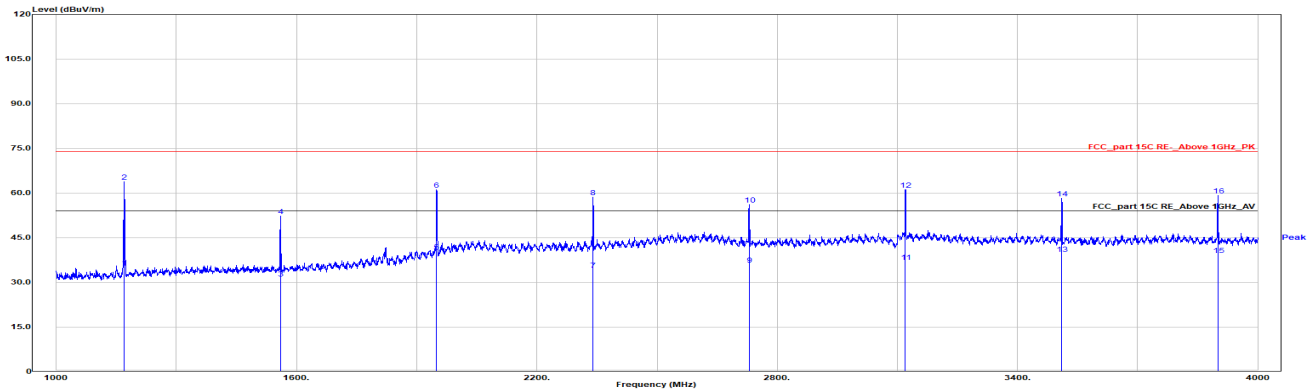
Project No. : XMDN240313-12545E-RF Temp/Humi : 20°C/62%
Test Mode : Transmitting (315MHz) Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
1259.800	47.27	-11.69	35.58	75.62	40.04	vertical	Peak
1574.800	52.07	-10.00	42.07	74.00	31.93	vertical	Peak
1889.800	51.51	-5.86	45.65	75.62	29.97	vertical	Peak
2204.200	48.84	-2.61	46.23	74.00	27.77	vertical	Peak
2520.400	47.24	-0.16	47.08	75.62	28.54	vertical	Peak
2834.800	48.77	-0.77	48.00	74.00	26.00	vertical	Peak
3164.800	46.83	0.99	47.82	75.62	27.8	vertical	Peak

Date: 2024-04-03 time: 18:12:00

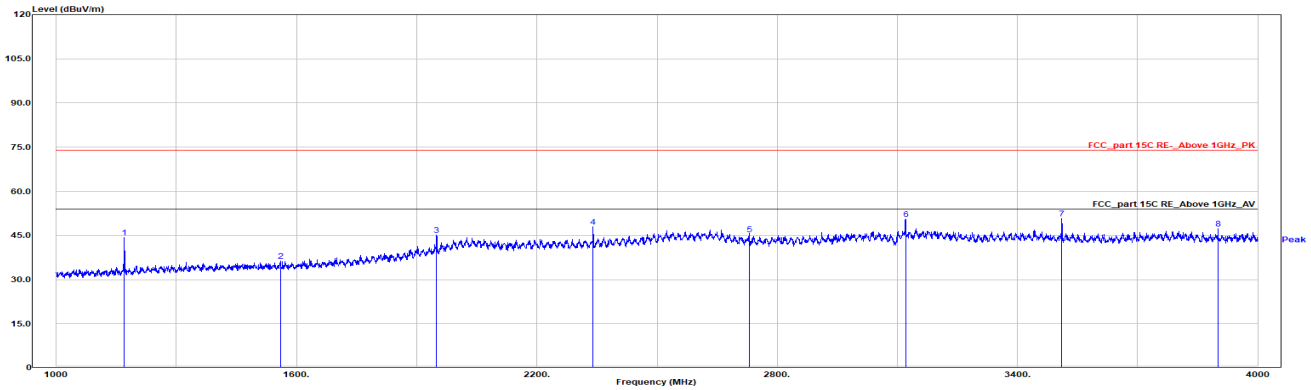
Project No. : XMDN240313-12545E-RF Temp/Humi : 20°C/62%
Test Mode : Transmitting (390MHz) Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
1169.800	76.41	-12.63	63.78	74.00	10.22	horizontal	Peak
1559.800	62.49	-10.12	52.37	74.00	21.63	horizontal	Peak
1949.800	65.61	-4.44	61.17	79.24	18.07	horizontal	Peak
2339.800	60.96	-2.24	58.72	74.00	15.28	horizontal	Peak
2729.800	57.18	-0.93	56.25	74.00	17.75	horizontal	Peak
3119.800	60.31	0.90	61.21	79.24	18.03	horizontal	Peak
3510.400	58.29	-0.09	58.20	79.24	21.04	horizontal	Peak
3900.400	59.20	-0.04	59.16	74.00	14.84	horizontal	Peak

Date: 2024-04-03 time: 18:05:43

Project No. : XMDN240313-12545E-RF Temp/Humi : 20°C/62%
Test Mode : Transmitting (390MHz) Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
1169.800	57.01	-12.63	44.39	74.00	29.61	vertical	Peak
1559.800	46.56	-10.12	36.44	74.00	37.56	vertical	Peak
1949.800	49.65	-4.45	45.20	79.24	34.04	vertical	Peak
2339.800	50.28	-2.23	48.05	74.00	25.95	vertical	Peak
2730.000	46.29	-0.93	45.36	74.00	28.64	vertical	Peak
3120.400	49.57	0.90	50.47	79.24	28.77	vertical	Peak
3510.400	50.96	-0.10	50.86	79.24	28.38	vertical	Peak
3900.400	47.39	-0.04	47.35	74.00	26.65	vertical	Peak

Test Data (the worst and recorded):

310MHz
Peak Strength

Frequency	Receiver	Rx Antenna		Corrected	Limit	Margin
	Reading	Polar	Factor	Amplitude		
MHz	dBµV	H/V	dB/m	dBµV/m	dBµV/m	dB
310.00 *	86.84	H	-9.02	77.82	95.32	17.50
310.00 *	68.47	V	-9.02	59.45	95.32	35.87
620.00	62.19	H	-1.62	60.57	75.32	14.75
620.00	55.42	V	-1.62	53.80	75.32	21.52
930.00	57.34	H	2.86	60.20	75.32	15.12
930.00	50.65	V	2.86	53.51	75.32	21.81
1239.80	61.05	H	-11.85	49.20	74.00	24.80
1239.80	46.31	V	-11.85	34.46	74.00	39.54
1549.80	65.69	H	-10.20	55.49	74.00	18.51
1549.80	50.97	V	-10.20	40.77	74.00	33.23
1859.80	64.38	H	-6.77	57.61	75.32	17.71
1859.80	50.13	V	-6.77	43.36	75.32	31.96
2170.20	61.35	H	-2.88	58.47	75.32	16.85
2170.20	47.69	V	-2.88	44.81	75.32	30.51
2480.40	57.46	H	-0.85	56.61	75.32	18.71
2480.40	46.18	V	-0.85	45.33	75.32	29.99
2789.80	58.56	H	-0.89	57.67	74.00	16.33
2789.80	47.64	V	-0.89	46.75	74.00	27.25
3104.80	51.46	H	0.86	52.32	75.32	23.00
3104.80	45.28	V	0.86	46.14	75.32	29.18

Note:
*: Fundamental

Field Strength (Average)

Frequency (MHz)	Peak Measurement@3m (dBµV/m)	Polar (H/V)	Duty Cycle Correction Factor(dB)	Average Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
310.00 *	77.82	H	-5.35	72.47	75.32	2.85
310.00 *	59.45	V	-5.35	54.10	75.32	21.22
620.00	60.57	H	-5.35	55.22	55.32	0.10
620.00	53.80	V	-5.35	48.45	55.32	6.87
930.00	60.20	H	-5.35	54.85	55.32	0.47
930.00	53.51	V	-5.35	48.16	55.32	7.16
1239.80	49.20	H	-5.35	43.85	54.00	10.15
1239.80	34.46	V	-5.35	29.11	54.00	24.89
1549.80	55.49	H	-5.35	50.14	54.00	3.86
1549.80	40.77	V	-5.35	35.42	54.00	18.58
1859.80	57.61	H	-5.35	52.26	55.32	3.06
1859.80	43.36	V	-5.35	38.01	55.32	17.31
2170.20	58.47	H	-5.35	53.12	55.32	2.20
2170.20	44.81	V	-5.35	39.46	55.32	15.86
2480.40	56.61	H	-5.35	51.26	55.32	4.06
2480.40	45.33	V	-5.35	39.98	55.32	15.34
2789.80	57.67	H	-5.35	52.32	54.00	1.68
2789.80	46.75	V	-5.35	41.40	54.00	12.60
3104.80	52.32	H	-5.35	46.97	55.32	8.35
3104.80	46.14	V	-5.35	40.79	55.32	14.53

Duty Cycle Correction Factor Calculation as below:
Ton=13*0.55+36*0.29 =17.41 ms
Ton+off=32.35ms
Duty Cycle = 17.41/32.35*100%=54%
Duty Cycle Correction Factor = 20*log(Duty Cycle)= -5.35 dB

315MHz
Peak Strength

Frequency	Receiver	Rx Antenna		Corrected	Limit	Margin
	Reading	Polar	Factor	Amplitude		
MHz	dBµV	H/V	dB/m	dBµV/m	dBµV/m	dB
315.00 *	92.23	H	-8.89	83.34	95.62	12.28
315.00 *	71.44	V	-8.89	62.55	95.62	33.07
630.00	61.79	H	-1.37	60.42	75.62	15.20
630.00	55.39	V	-1.37	54.02	75.62	21.60
945.00	62.73	H	3.12	65.85	75.62	9.77
945.00	49.83	V	3.12	52.95	75.62	22.67
1259.80	61.59	H	-11.69	49.90	75.62	25.72
1259.80	47.27	V	-11.69	35.58	75.62	40.04
1574.80	66.17	H	-10.00	56.17	74.00	17.83
1574.80	52.07	V	-10.00	42.07	74.00	31.93
1889.80	64.92	H	-5.86	59.06	75.62	16.56
1889.80	51.51	V	-5.86	45.65	75.62	29.97
2204.80	61.98	H	-2.61	59.37	74.00	14.63
2204.20	48.84	V	-2.61	46.23	74.00	27.77
2519.80	58.03	H	-0.17	57.86	75.62	17.76
2520.40	47.24	V	-0.16	47.08	75.62	28.54
2834.80	59.01	H	-0.77	58.24	74.00	15.76
2834.80	48.77	V	-0.77	48.00	74.00	26.00
3150.40	52.01	H	0.98	52.99	75.62	22.63
3164.80	46.83	V	0.99	47.82	75.62	27.80

Note:
*: Fundamental

Field Strength (Average)

Frequency (MHz)	Peak Measurement@3m (dBµV/m)	Polar (H/V)	Duty Cycle Correction Factor(dB)	Average Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
315.00 *	83.34	H	-12.77	70.57	75.62	5.05
315.00 *	62.55	V	-12.77	49.78	75.62	25.84
630.00	60.42	H	-12.77	47.65	55.62	7.97
630.00	54.02	V	-12.77	41.25	55.62	14.37
945.00	65.85	H	-12.77	53.08	55.62	2.54
945.00	52.95	V	-12.77	40.18	55.62	15.44
1259.80	49.90	H	-12.77	37.13	55.62	18.49
1259.80	35.58	V	-12.77	22.81	55.62	32.81
1574.80	56.17	H	-12.77	43.40	54.00	10.60
1574.80	42.07	V	-12.77	29.30	54.00	24.70
1889.80	59.06	H	-12.77	46.29	55.62	9.33
1889.80	45.65	V	-12.77	32.88	55.62	22.74
2204.80	59.37	H	-12.77	46.60	54.00	7.40
2204.20	46.23	V	-12.77	33.46	54.00	20.54
2519.80	57.86	H	-12.77	45.09	55.62	10.53
2520.40	47.08	V	-12.77	34.31	55.62	21.31
2834.80	58.24	H	-12.77	45.47	54.00	8.53
2834.80	48.00	V	-12.77	35.23	54.00	18.77
3150.40	52.99	H	-12.77	40.22	55.62	15.40
3164.80	47.82	V	-12.77	35.05	55.62	20.57

Duty Cycle Correction Factor Calculation as below:
Ton=8*1.54+7*0.54+6*1.04 =22.37ms
Ton+off=99.26ms
Duty Cycle = 22.37/99.26*100%=23%
Duty Cycle Correction Factor = 20*log(Duty Cycle)= -12.77 dB

390MHz
Peak Strength

Frequency	Receiver	Rx Antenna		Corrected	Limit	Margin
	Reading	Polar	Factor	Amplitude		
MHz	dBµV	H/V	dB/m	dBµV/m	dBµV/m	dB
390.00 *	96.42	H	-6.65	89.77	99.24	9.47
390.00 *	81.01	V	-6.65	74.36	99.24	24.88
780.00	69.05	H	1.07	70.12	79.24	9.12
780.00	59.49	V	1.07	60.56	79.24	18.68
1169.80	76.41	H	-12.63	63.78	74.00	10.22
1169.80	57.01	V	-12.63	44.38	74.00	29.62
1559.80	62.49	H	-10.12	52.37	74.00	21.63
1559.80	46.56	V	-10.12	36.44	74.00	37.56
1949.80	65.61	H	-4.44	61.17	79.24	18.07
1949.80	49.65	V	-4.45	45.20	79.24	34.04
2339.80	60.96	H	-2.24	58.72	74.00	15.28
2339.80	50.28	V	-2.23	48.05	74.00	25.95
2729.80	57.18	H	-0.93	56.25	74.00	17.75
2730.00	46.29	V	-0.93	45.36	74.00	28.64
3119.80	60.31	H	0.90	61.21	79.24	18.03
3120.40	49.57	V	0.90	50.47	79.24	28.77
3510.40	58.29	H	-0.09	58.20	79.24	21.04
3510.40	50.96	V	-0.10	50.86	79.24	28.38
3900.40	59.20	H	-0.04	59.16	74.00	14.84
3900.40	47.39	V	-0.04	47.35	74.00	26.65

Note:
*: Fundamental

Field Strength (Average)

Frequency (MHz)	Peak Measurement@3m (dBµV/m)	Polar (H/V)	Duty Cycle Correction Factor(dB)	Average Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
390.00 *	89.77	H	-12.77	77.00	79.24	2.24
390.00 *	74.36	V	-12.77	61.59	79.24	17.65
780.00	70.12	H	-12.77	57.35	59.24	1.89
780.00	60.56	V	-12.77	47.79	59.24	11.45
1169.80	63.78	H	-12.77	51.01	54.00	2.99
1169.80	44.38	V	-12.77	31.61	54.00	22.39
1559.80	52.37	H	-12.77	39.60	54.00	14.40
1559.80	36.44	V	-12.77	23.67	54.00	30.33
1949.80	61.17	H	-12.77	48.40	59.24	10.84
1949.80	45.20	V	-12.77	32.43	59.24	26.81
2339.80	58.72	H	-12.77	45.95	54.00	8.05
2339.80	48.05	V	-12.77	35.28	54.00	18.72
2729.80	56.25	H	-12.77	43.48	54.00	10.52
2730.00	45.36	V	-12.77	32.59	54.00	21.41
3119.80	61.21	H	-12.77	48.44	59.24	10.80
3120.40	50.47	V	-12.77	37.70	59.24	21.54
3510.40	58.20	H	-12.77	45.43	59.24	13.81
3510.40	50.86	V	-12.77	38.09	59.24	21.15
3900.40	59.16	H	-12.77	46.39	54.00	7.61
3900.40	47.35	V	-12.77	34.58	54.00	19.42

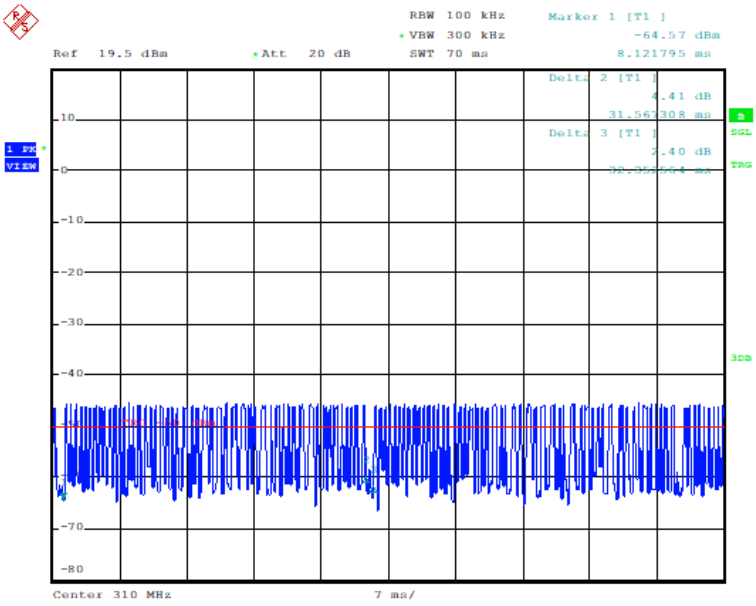
Duty Cycle Correction Factor Calculation as below:
Ton=8*1.55+7*0.56+6*1.07 =22.80ms
Ton+off=100ms
Duty Cycle = 22.80/100*100%=23%
Duty Cycle Correction Factor = 20*log(Duty Cycle)= -12.77 dB

Duty Cycle:

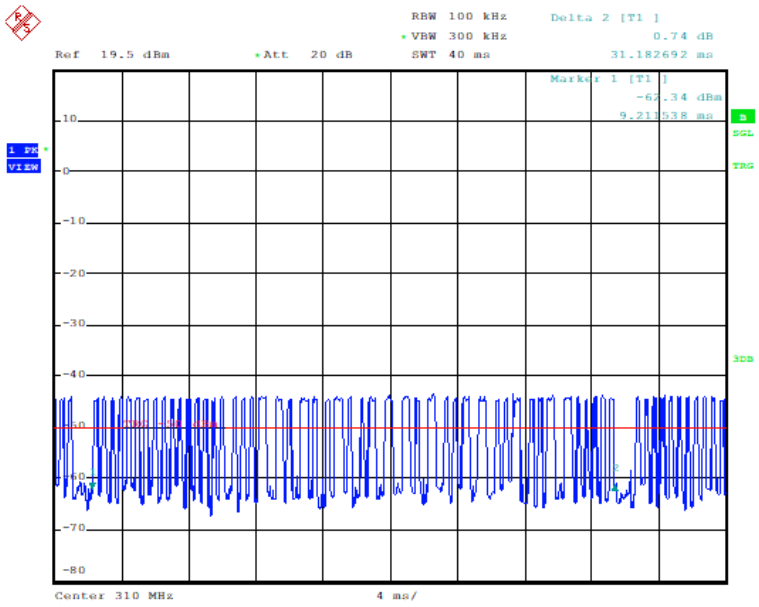
Test Mode:	Transmitting	**Test Engineer:**	Ash Lin
Test Date:	2024-05-09~2024-05-14	**Test Voltage:**	DC 9V from battery
Test Distance:	3M	**Test Frequency:**	310/315/390MHz
Ant. Polarity:	N/A	**Environment:**	Temp.: 24.8℃ Humi.: 47% Atm:99.8kPa

310MHz

Transmission duration

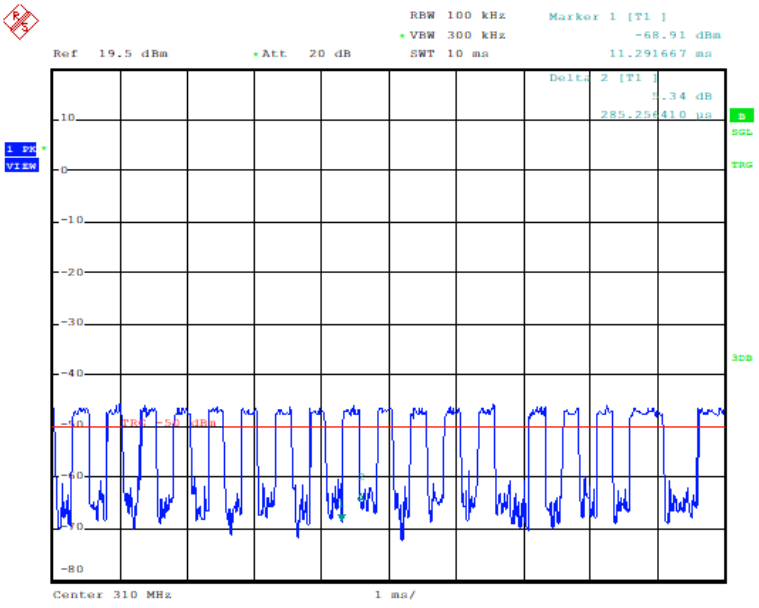


All Pulse



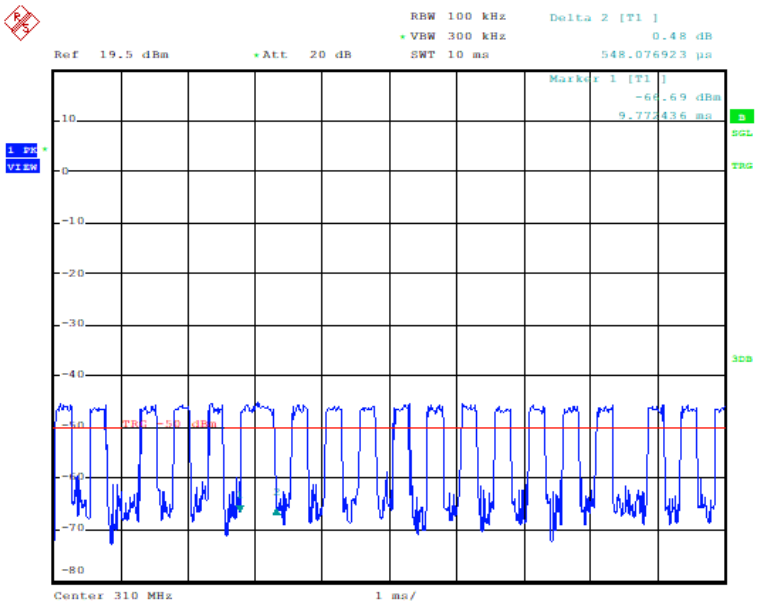
XMDN240313-12545E-RF Ash Lin
Date: 14.MAY.2024 11:40:19

Pulse 1



XMDN240313-12545E-RF Ash Lin
Date: 14.MAY.2024 11:41:50

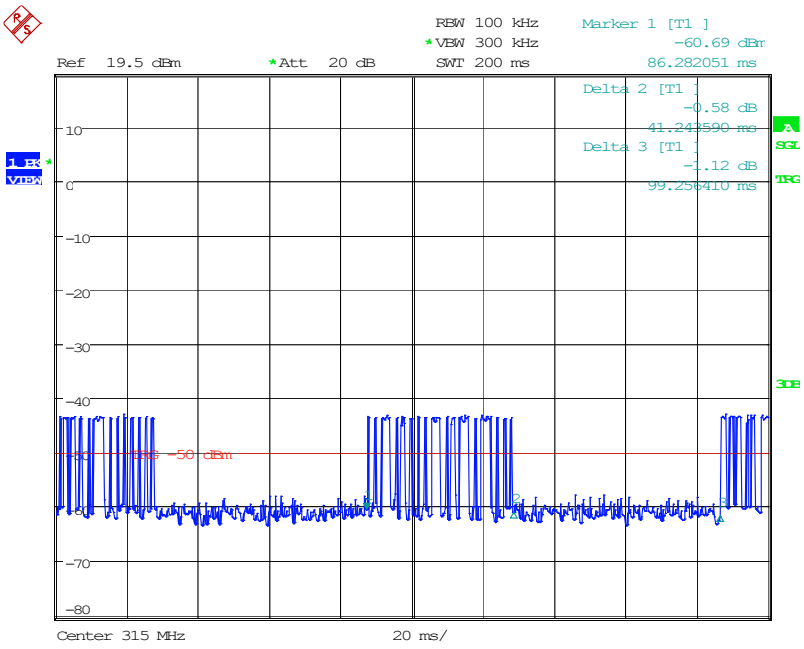
Pulse 2



XMDN240313-12545E-RF Ash Lin
Date: 14.MAY.2024 11:42:52

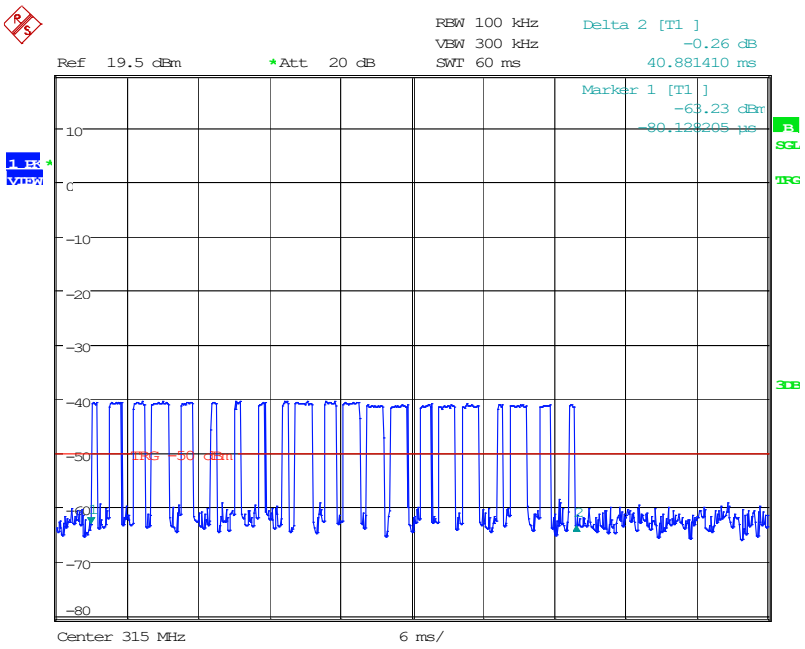
315MHz

Transmission duration



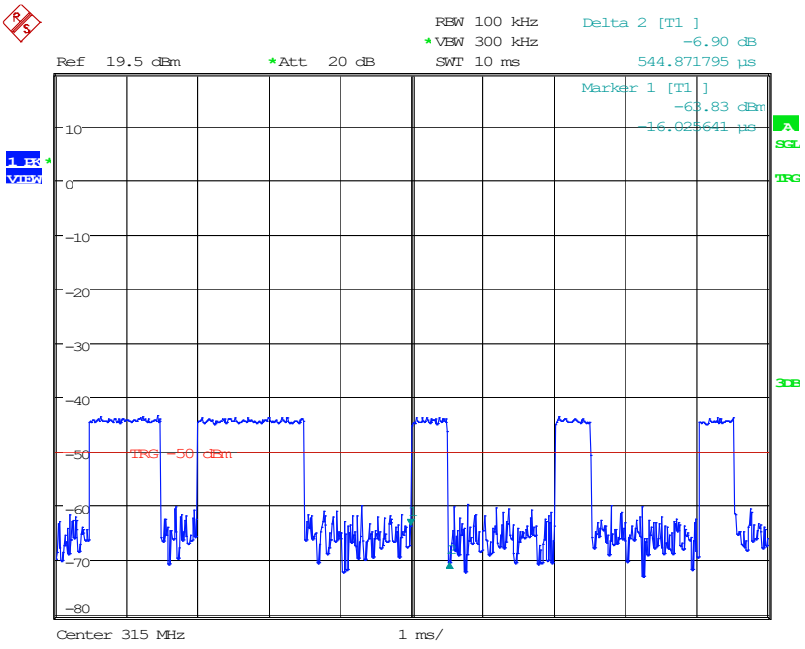
XMDN240313-12545E-RF Ash Lin
Date: 9.MAY.2024 10:52:52

All Pulse



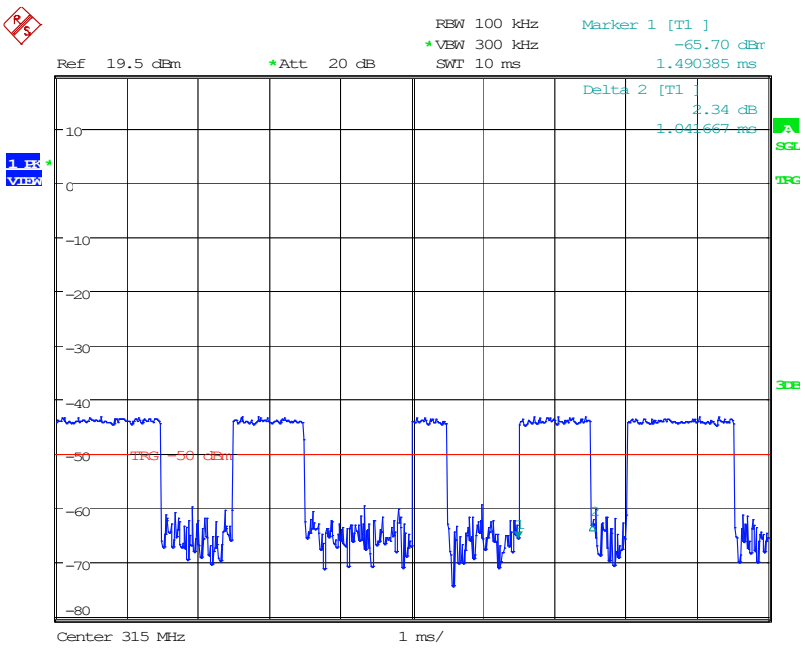
XMDN240313-12545E-RF Ash Lin
Date: 9.MAY.2024 13:22:27

Pulse1



XMDN240313-12545E-RF Ash Lin
Date: 9.MAY.2024 10:57:04

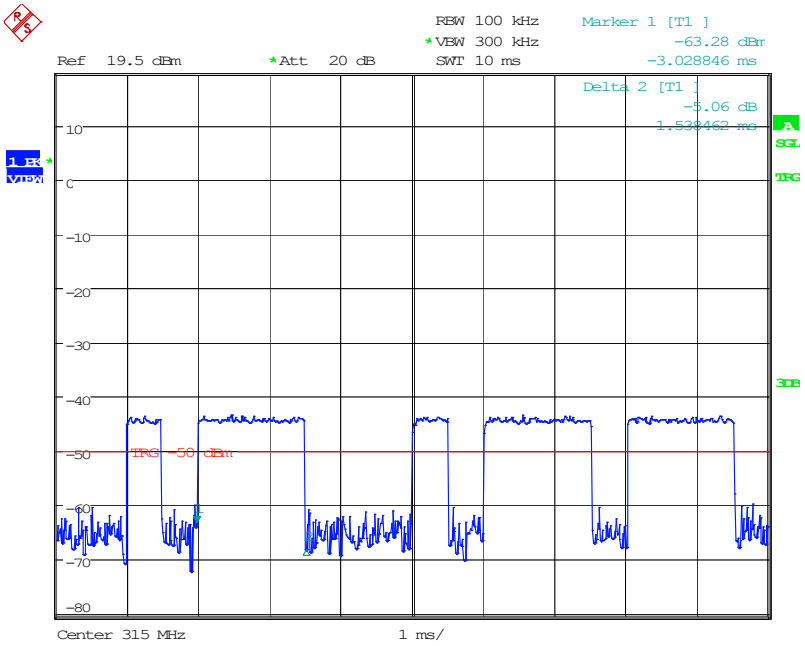
Pulse2



XMDN240313-12545E-RF Ash Lin

Date: 9.MAY.2024 10:58:39

Pulse 3

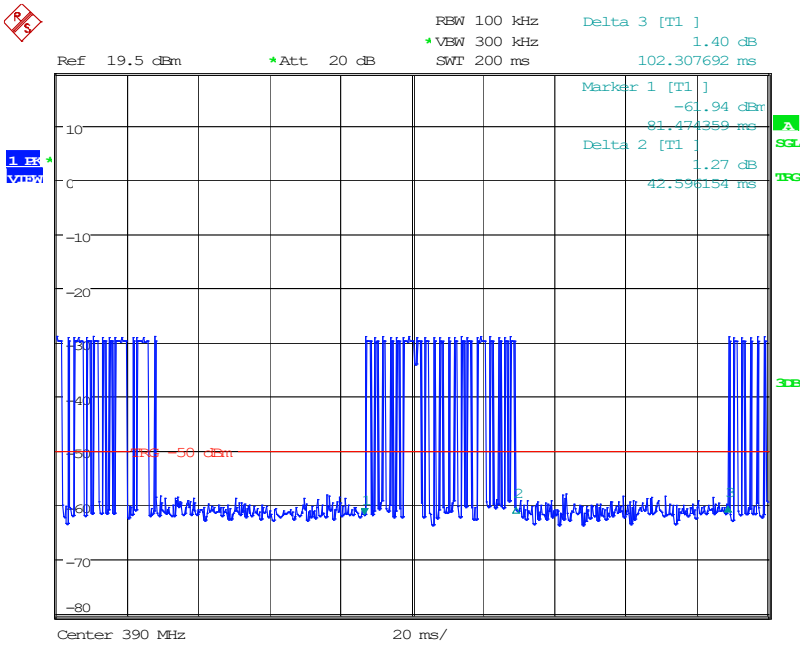


XMDN240313-12545E-RF Ash Lin

Date: 9.MAY.2024 11:00:07

390MHz

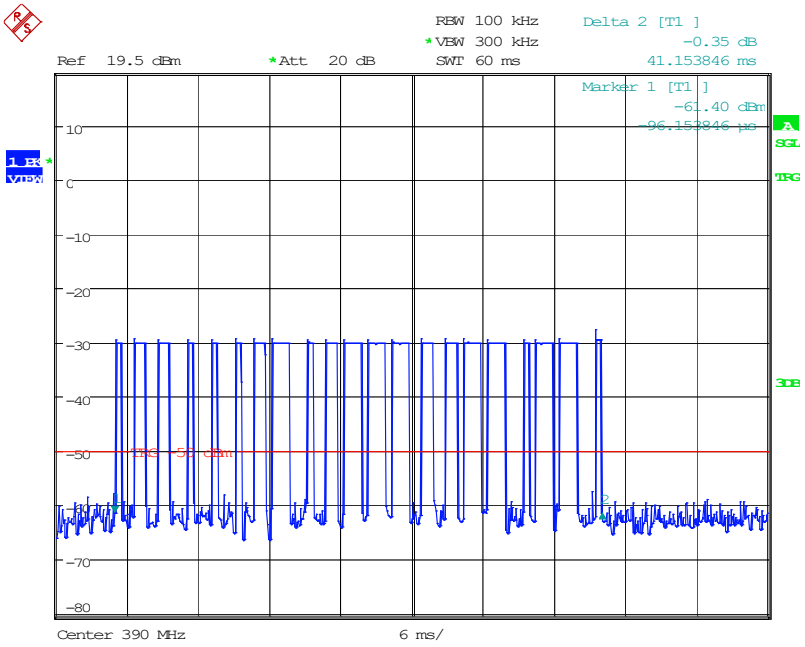
Transmission duration



XMDN240313-12545E-RF Ash Lin

Date: 9.MAY.2024 11:05:11

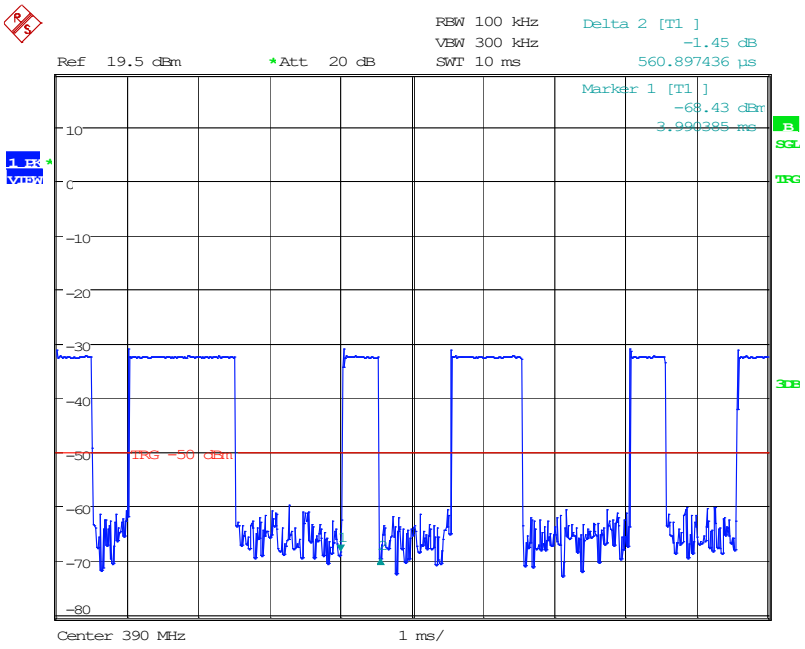
All Pulse



XMDN240313-12545E-RF Ash Lin

Date: 9.MAY.2024 11:07:42

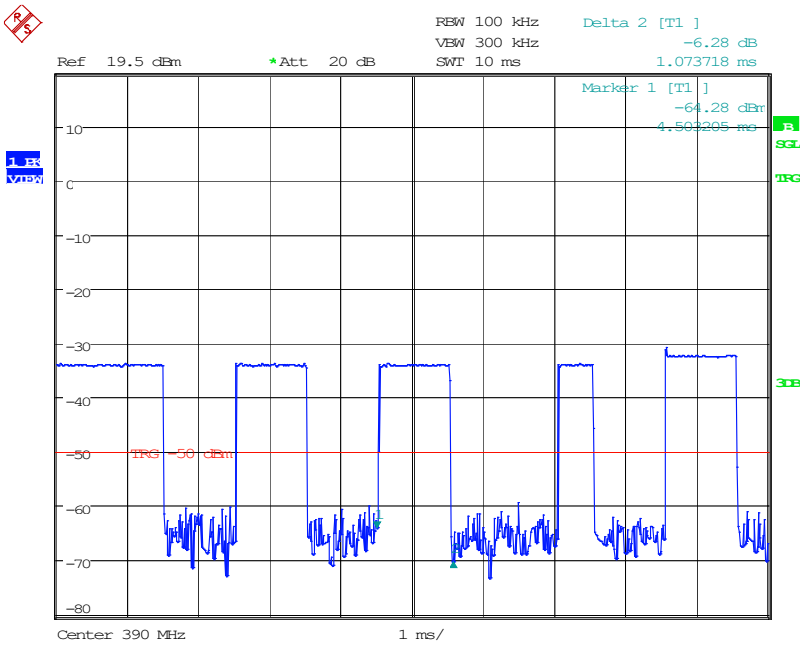
Pulse 1



XMDN240313-12545E-RF Ash Lin

Date: 9.MAY.2024 13:17:35

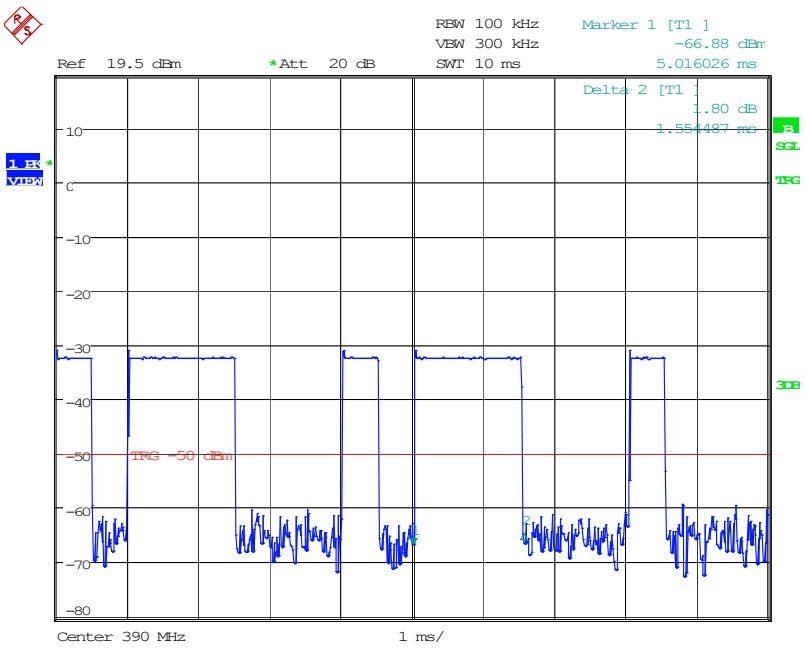
Pulse 2



XMDN240313-12545E-RF Ash Lin

Date: 9.MAY.2024 13:19:00

Pulse 3



XMDN240313-12545E-RF Ash Lin

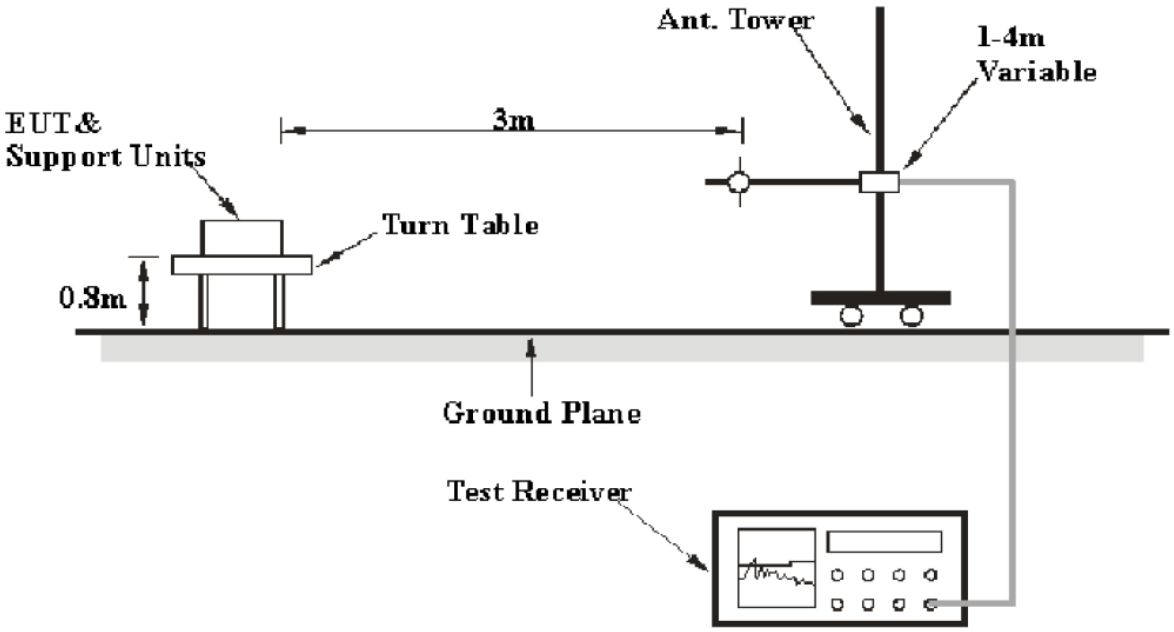
Date: 9.MAY.2024 13:19:40

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

Applicable Standard

Per FCC §15.231(a) (1), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

EUT Setup



Test Procedure

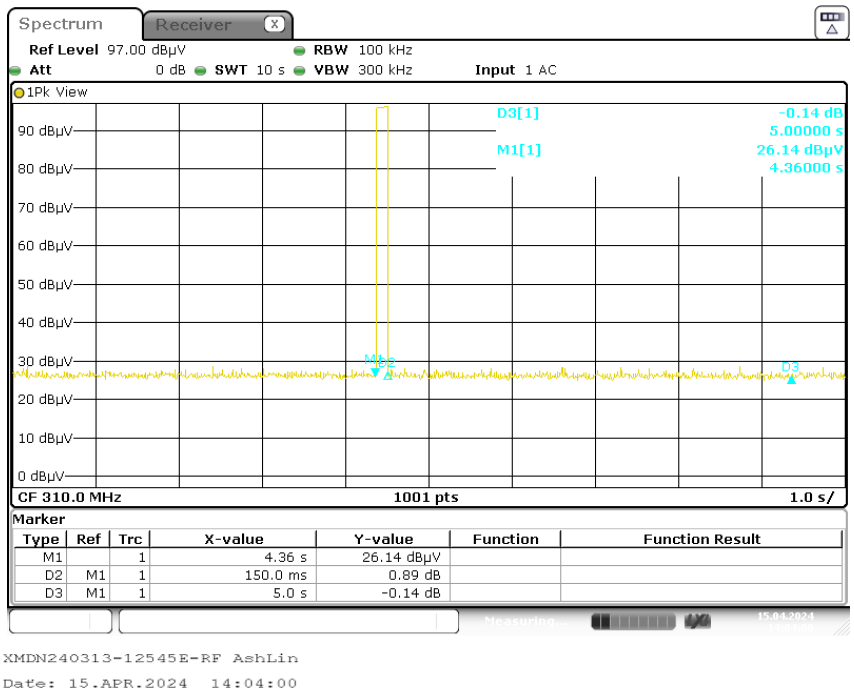
1. With the EUT's antenna attached, the waveform was received by the test antenna which was connected to the spectrum analyzer.
2. Set center frequency of spectrum analyzer=operating frequency.
3. Set the spectrum analyzer as RBW=100k VBW=300k Span=0Hz.
4. Repeat above procedures until all frequency measured was complete.

Test Data

Test Mode:	Transmitting	Test Engineer:	Ash Lin
Test Date:	2024-04-15	Test Voltage:	DC 9V from battery
Test Distance:	3M	Test Frequency:	310MHz
Ant. Polarity:	N/A	Environment:	Temp.: 20.0℃ Humi.: 62% Atm:99.8kPa

Channel Frequency (MHz)	Deactivate Time (s)	Limit (s)	Result
310	0.15	<5	Pass

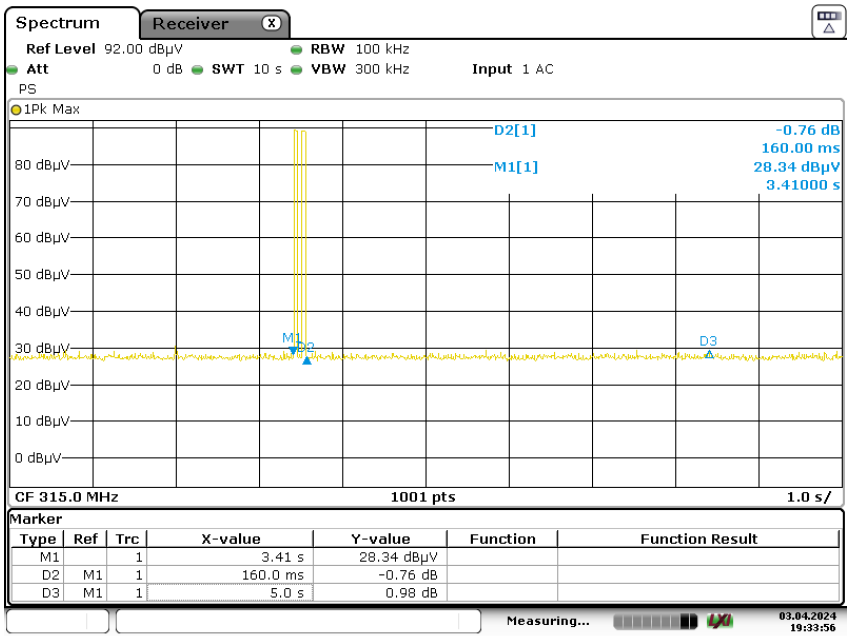
T_{stop} <5s



Test Mode:	Transmitting	Test Engineer:	Ash Lin
Test Date:	2024-04-03	Test Voltage:	DC 9V from battery
Test Distance:	3M	Test Frequency:	315MHz
Ant. Polarity:	N/A	Environment:	Temp.: 20.0℃ Humi.: 62% Atm:99.6kPa

Channel Frequency (MHz)	Deactivate Time (s)	Limit (s)	Result
315	0.16	<5	Pass

T_{stop} <5s



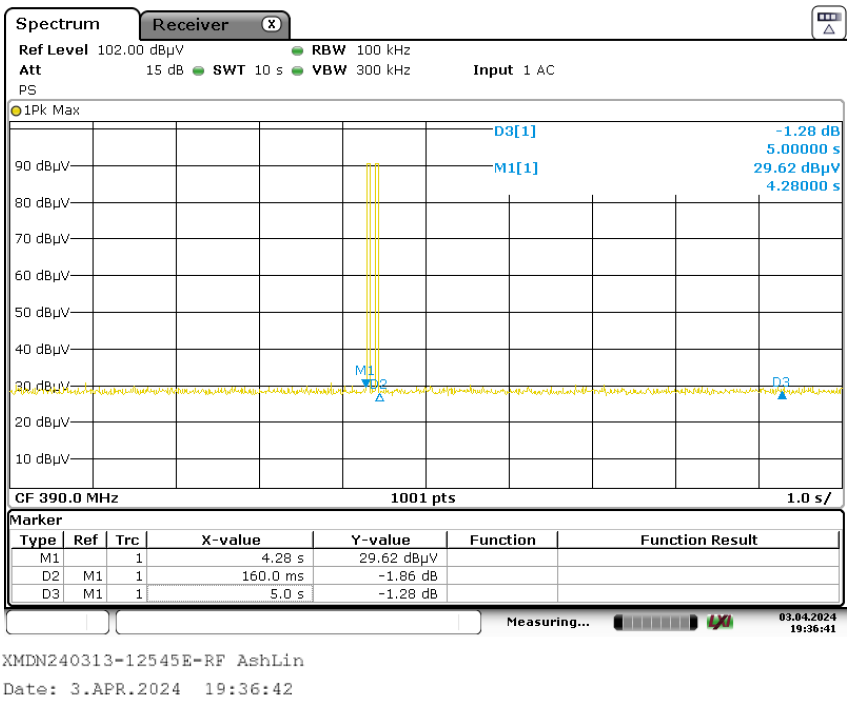
XMDN240313-12545E-RF AshLin

Date: 3.APR.2024 19:33:57

Test Mode:	Transmitting	Test Engineer:	Ash Lin
Test Date:	2024-04-03	Test Voltage:	DC 9V from battery
Test Distance:	3M	Test Frequency:	390MHz
Ant. Polarity:	N/A	Environment:	Temp.: 20.0℃ Humi.: 62% Atm:99.6kPa

Channel Frequency (MHz)	Deactivate Time (s)	Limit (s)	Result
390	0.16	<5	Pass

T_{stop} <5s



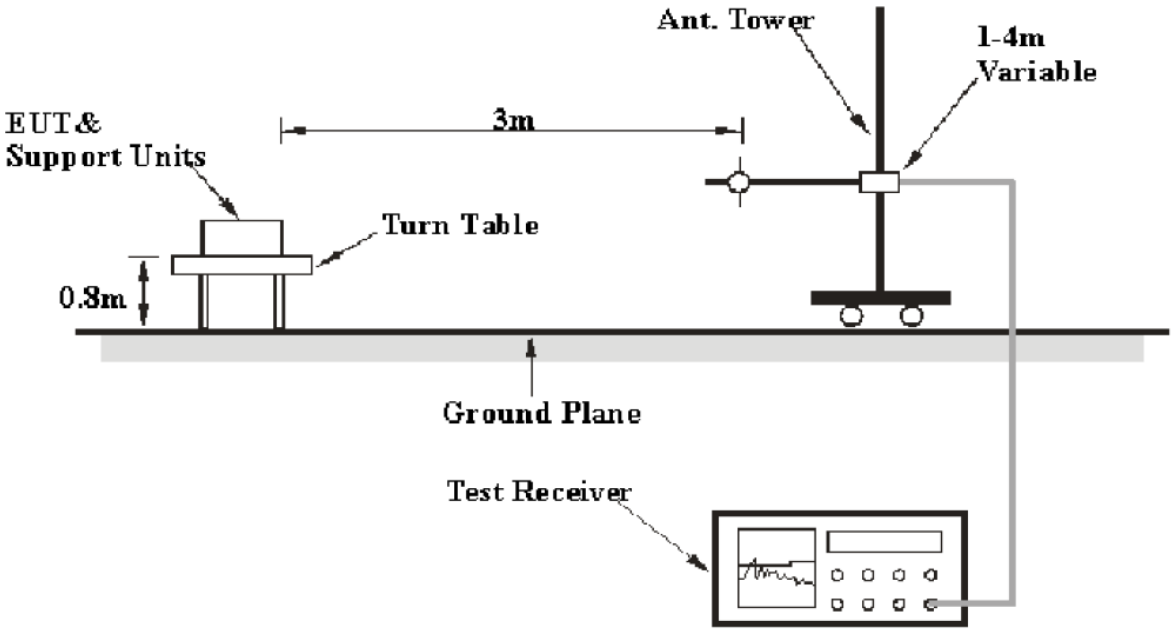
XMDN240313-12545E-RF AshLin
Date: 3.APR.2024 19:36:42

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

Applicable Standard

Per 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

EUT Setup



Test Procedure

According to ANSI C63.10-2013 Section 6.9.2
a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2
d) Steps a) through c) might require iteration to adjust within the specified tolerances.
e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target "−xx dB down" requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
f) Set detection mode to peak and trace mode to max hold.
g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
h) Determine the "− xx dB down amplitude" using [(reference value) − xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.

i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).
j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the "– xx dB down amplitude" determined in step h). If a marker is below this "– xx dB down amplitude" value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the "– xx dB down amplitude" determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.
k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Test Data

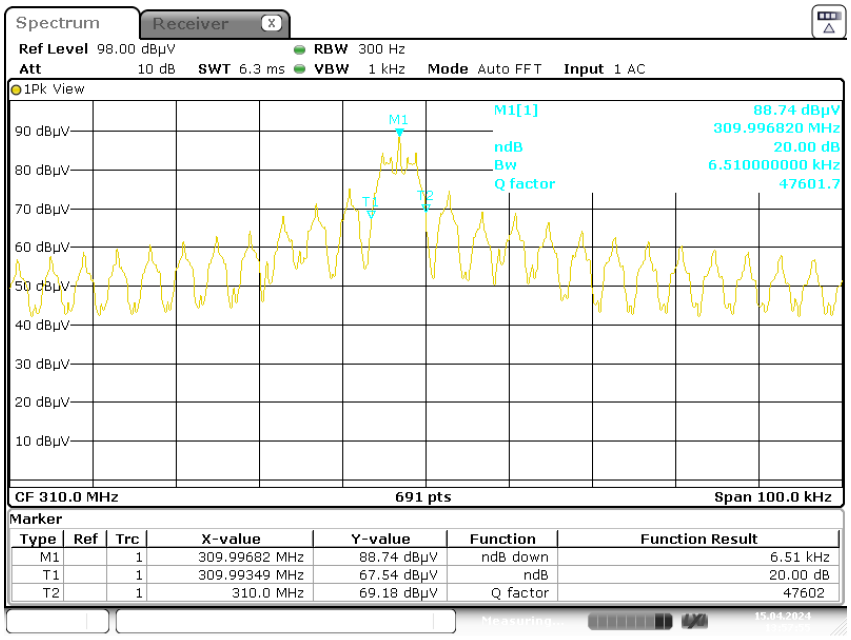
Test Mode:	Transmitting	Test Engineer:	Ash Lin
Test Date:	2024-04-15	Test Voltage:	DC 9V from battery
Test Distance:	3M	Test Frequency:	310MHz
Ant. Polarity:	N/A	Environment:	Temp.: 20.0℃ Humi.: 62% Atm:99.8kPa

OOK modulation:

Channel Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Result
310	6.51	775	Pass

Note: Limit = 0.25% * Center Frequency = 0.25% * 310 MHz = 775 kHz

20 dB Emission Bandwidth



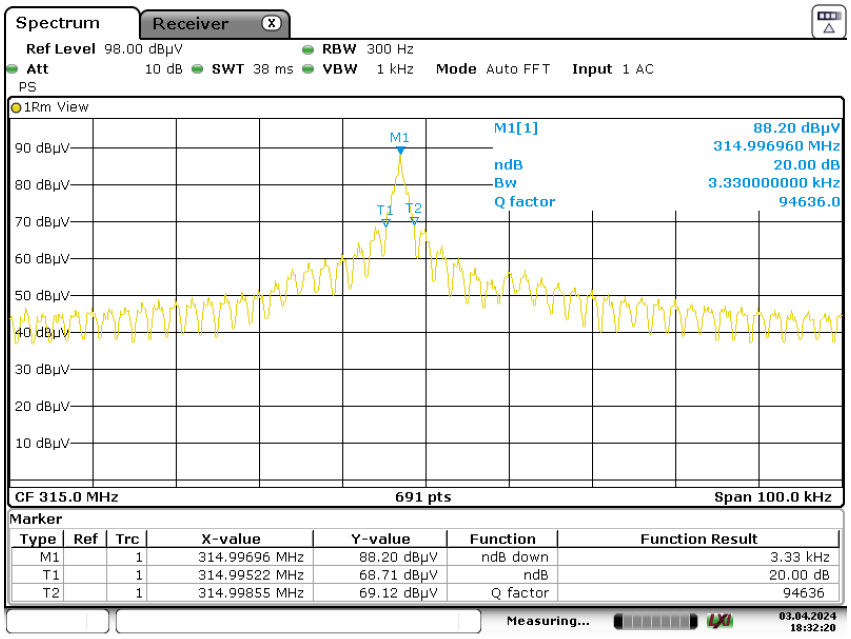
Test Mode:	Transmitting	Test Engineer:	Ash Lin
Test Date:	2024-04-03	Test Voltage:	DC 9V from battery
Test Distance:	3M	Test Frequency:	315MHz
Ant. Polarity:	N/A	Environment:	Temp.: 20.0℃ Humi.: 62% Atm:99.6kPa

OOK modulation:

Channel Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Result
315	3.33	787.5	Pass

Note: Limit = 0.25% * Center Frequency = 0.25% * 315 MHz = 787.5 kHz

20 dB Emission Bandwidth



XMDN240313-12545E-RF AshLin

Date: 3.APR.2024 18:32:20

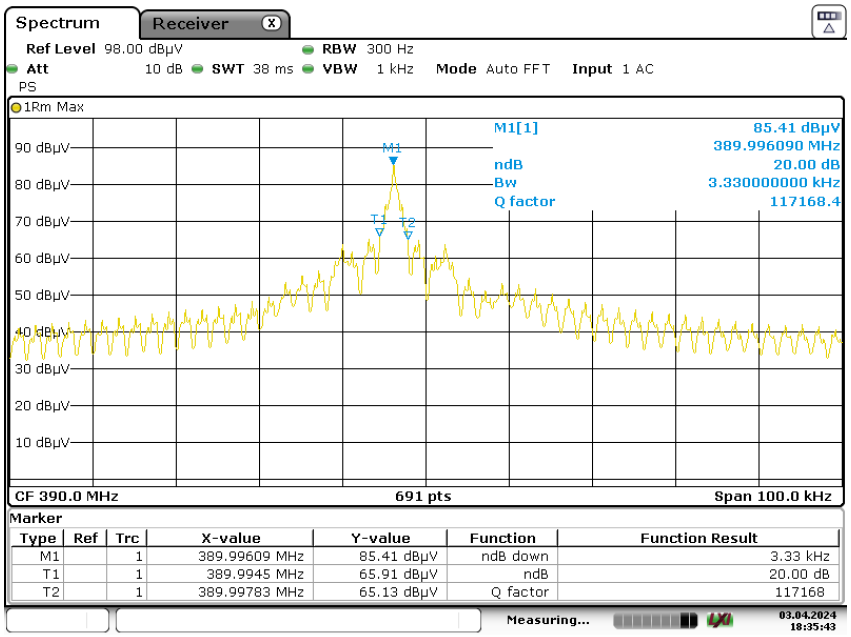
Test Mode:	Transmitting	Test Engineer:	Ash Lin
Test Date:	2024-04-03	Test Voltage:	DC 9V from battery
Test Distance:	3M	Test Frequency:	390MHz
Ant. Polarity:	N/A	Environment:	Temp.: 20.0℃ Humi.: 62% Atm:99.6kPa

OOK modulation:

Channel Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Result
390	3.33	975	Pass

Note: Limit = 0.25% * Center Frequency = 0.25% * 390 MHz = 975 kHz

20 dB Emission Bandwidth



XMDN240313-12545E-RF AshLin

Date: 3.APR.2024 18:35:44

RF EXPOSURE EVALUATION

Applicable Standard

§1.1307(b)(3)(i) For single RF sources (*i.e.*, any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A).

Measurement Result

Frequency(MHz)	Maximum EIRP		1-mW Test Exemption
	dBm	mW	
310-390	-5.43	0.2858	Compliant

Note:
1. Chose the maximum power to do MPE analysis.
2. This device maximum E-Field level is 89.77dBμV/m at 3m, so the EIRP power is -5.43dBm.
3. Pout EIRP (dBm)= Field Strength of Fundamental(dBμV/m)-95.2

Result: Compliant. RF Exposure is exemption.

EUT PHOTOGRAPHS

Please refer to the attachment XMDN240313-12545E-RF-EXP EUT EXTERNAL PHOTOGRAPHS and XMDN240313-12545E-RF-INP EUT INTERNAL PHOTOGRAPHS.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment XMDN240313-12545E-RF-TSP TEST SETUP PHOTOGRAPHS.

Declarations

1. Bay Area Compliance Laboratories Corp. (Xiamen) is not responsible for authenticity of any information provided by the applicant. Information from the applicant that may affect test results are marked with an asterisk "★".

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

3. Unless required by the rule provided by the applicant or product regulations, then 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=2 with the 95.45% confidence interval.

5. This report cannot be reproduced except in full, without prior written approval of Bay Area Compliance Laboratories Corp. (Xiamen).

6. 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.

7. This report may contain standards and test items that are not covered by the accreditation scope and shall be marked with an asterisk "▲".

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