TEST REPORT

Applicant Name:	Bytech NY Inc.
Address:	2585 West 13th Street, Brooklyn NY 11223, New York, United States
Report Number:	2401V84724E-RF-00
FCC ID:	2AHN6-DE3

Test Standard (s)

FCC PART 15.249

Sample Description

Product Type:	2.4G Wireless Vin Keypad-dongle
Model No.:	DE3
Multiple Model(s) No.:	N/A
Trade Mark:	N/A
Date Received:	2024/07/16
Issue Date:	2024/08/14

Test Result:	Pass▲

▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Jojo Guo
RF Engineer

Approved By:

Michelle Zeng
RF Supervisor

Note: The information marked# is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "▼".

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	2401V84724E-RF-00	Original Report	2024/08/14

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	2.4G Wireless Vin Keypad-dongle
Tested Model	DE3
Multiple Model(s)	N/A
Frequency Range	2402-2480MHz
Maximum E-field strength	99.65 dBuV/m@3m
Modulation Technique	GFSK
Antenna Specification[#]	2.58dBi (provided by the applicant)
Voltage Range	DC 5V from USB port
Sample serial number	2OFF-2 (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	N/A

Objective

This test report is in accordance with Part 2-Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

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

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF Frequency		213.55 Hz(k=2, 95% level of confidence)
RF output power, conducted		0.72 dB(k=2, 95% level of confidence)
Unwanted Emission, conducted		1.75 dB(k=2, 95% level of confidence)
AC Power Lines Conducted Emissions	9kHz-150kHz	3.94dB(k=2, 95% level of confidence)
	150kHz-30MHz	3.84dB(k=2, 95% level of confidence)
Radiated Emissions	9kHz - 30MHz	3.30dB(k=2, 95% level of confidence)
	30MHz~200MHz (Horizontal)	4.48dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	4.55dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	4.85dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.05dB(k=2, 95% level of confidence)
	1GHz - 6GHz	5.35dB(k=2, 95% level of confidence)
	6GHz - 18GHz	5.44dB(k=2, 95% level of confidence)
	18GHz - 40GHz	5.16dB(k=2, 95% level of confidence)
Temperature		±1℃
Humidity		±1%
Supply voltages		±0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. 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. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 715558, the FCC Designation No. : CN5045.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing by manufacturer.

Frequency Channel List:

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2402	11	2422	21	2442	31	2462
2	2404	12	2424	22	2444	32	2464
3	2406	13	2426	23	2446	33	2466
4	2408	14	2428	24	2448	34	2468
5	2410	15	2430	25	2450	35	2470
6	2412	16	2432	26	2452	36	2472
7	2414	17	2434	27	2454	37	2474
8	2416	18	2436	28	2456	38	2476
9	2418	19	2438	29	2458	39	2478
10	2420	20	2440	30	2460	40	2480

Note: Test on Channel 1, 20 and 40.

EUT Exercise Software

"FCC TEST TOOL V2.4.0 #" exercise software was used.

Equipment Modifications

No modifications were made to the unit tested.

Support Equipment List and Details

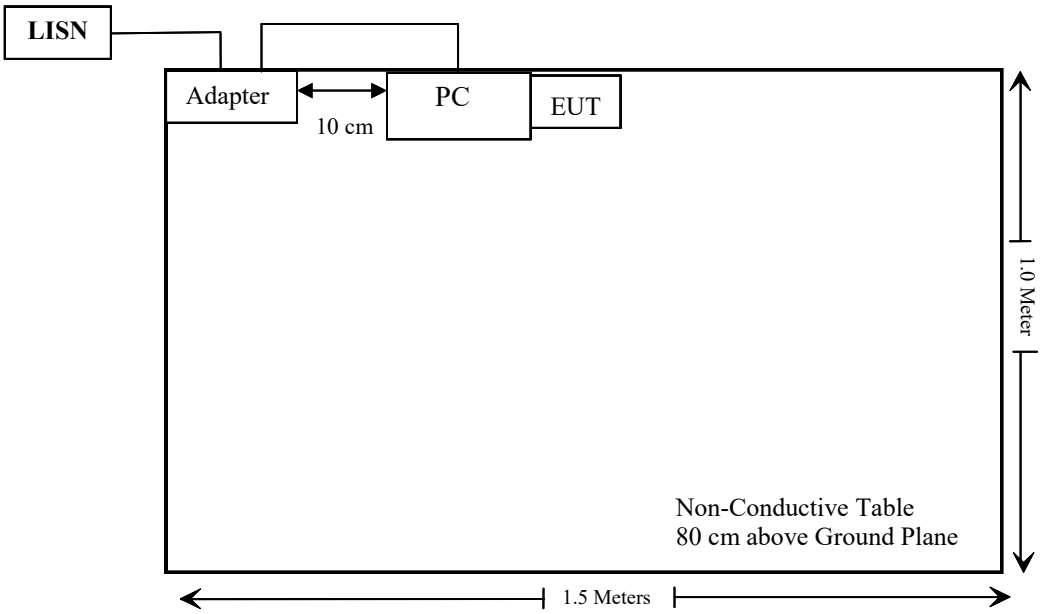
Manufacturer	Description	Model	Serial Number
Lenovo	PC	TIANYI510Pro-18ICB	R3NO28B21001
XED	Adapter	XED-UL050100CU	Unknown

Support Cable Descriptions

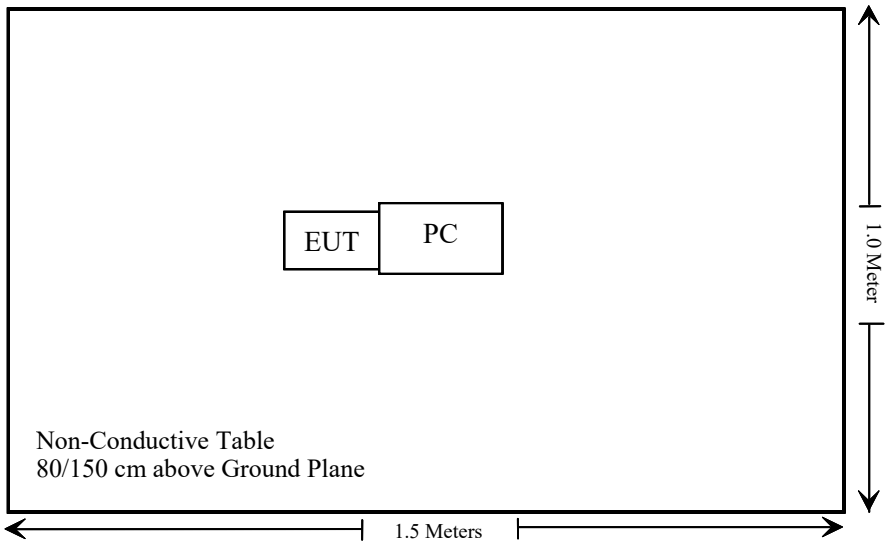
Cable Description	Length (m)	From/Port	To
Un-shielding Un-detachable DC Cable	0.8	Adapter	PC
Un-shielding Detachable AC Cable	1.8	Adapter	LISN

Block Diagram of Test Setup

For conducted emissions:



For Radiated Emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b) (1) &§2.1093	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conduction Emissions	Compliant
15.205, §15.209, §15.249(d)	Radiated Emissions& Outside of Band Emission	Compliant
§15.215 (c)	20 dB Bandwidth	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2024/01/16	2025/01/15
Rohde & Schwarz	LISN	ENV216	101613	2024/01/16	2025/01/15
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2024/05/21	2025/05/20
Unknown	CE Cable	Unknown	UF A210B-1-0720-504504	2024/05/21	2025/05/20
Audix	EMI Test software	E3	191218(V9)	NCR	NCR
Radiated Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2024/01/16	2025/01/15
Sonoma instrument	Pre-amplifier	310 N	186238	2024/05/21	2025/05/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2026/07/19
Unknown	Cable	Chamber A Cable 1	N/A	2024/06/18	2025/06/17
Unknown	Cable	XH500C	J-10M-A	2024/06/18	2025/06/17
BACL	Active Loop Antenna	1313-1A	4031911	2024/05/14	2027/05/13
Unknown	Cable	2Y194	0735	2024/05/21	2025/05/20
Unknown	Cable	PNG214	1354	2024/05/21	2025/05/20
Audix	EMI Test software	E3	19821b(V9)	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2024/03/27	2025/03/26
COM-POWER	Pre-amplifier	PA-122	181919	2024/06/18	2025/06/17
Schwarzbeck	Horn Antenna	BBHA9120D(1201)	1143	2023/07/26	2026/07/25
The Electro-Mechanics Co.	Horn Antenna	3115	9107-3694	2024/06/06	2027/06/05
Unknown	RF Cable	KMSE	735	2024/06/18	2025/06/17
Unknown	RF Cable	UFA147	219661	2024/06/18	2025/06/17
Unknown	RF Cable	XH750A-N	J-10M	2024/06/18	2025/06/17
JD	Multiplex Switch Test Control Set	DT7220FSU	DQ77926	2024/06/18	2025/06/17
A.H.System	Pre-amplifier	PAM-1840VH	190	2024/06/18	2025/06/17
Electro-Mechanics Co	Horn Antenna	3116	2026	2023/09/18	2026/09/17
UTIFLEX	RF Cable	NO. 13	232308-001	2024/06/18	2025/06/17
Audix	EMI Test software	E3	191218(V9)	NCR	NCR

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) 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) (1) & §2.1093- RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

Result

Mode	Frequency (MHz)	Maximum E-Field (dBuV/m@3m)	Maximum EIRP(dBm)	Maximum EIRP (mW)	Distance (mm)	Calculated value	Threshold (1-g SAR)	SAR Test Exclusion
GFSK	2402-2480	99.65	4.45	2.79	5	0.9	3	Yes

Note: EIRP = E-Field – 95.2 @3m

Result: Compliant.

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Antenna Connector Construction

The EUT has a PCB antenna which was permanently attached and the antenna gain# is 2.58dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Antenna Type	Antenna Gain# (dBi)	Impedance	Frequency Range
PCB	2.58	50Ω	2402-2480MHz

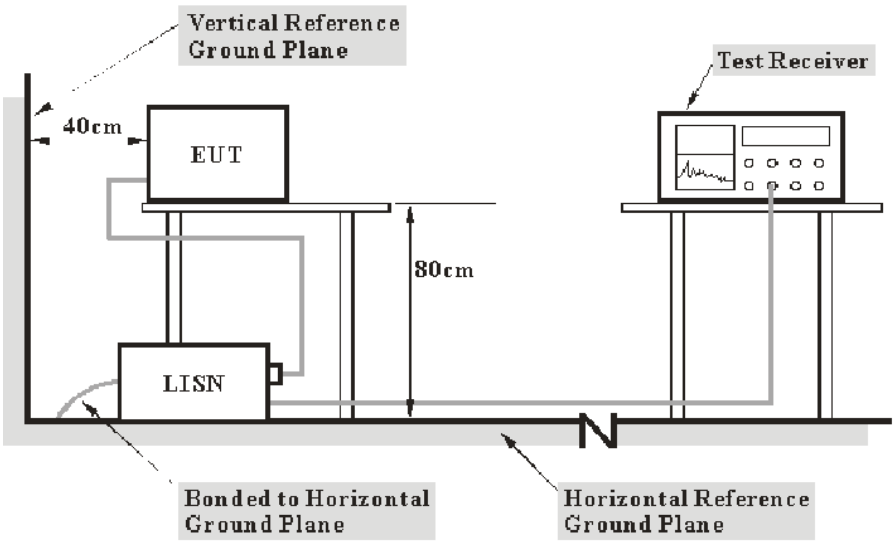
Result: Compliant.

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.

The spacing between the peripherals was 10 cm.

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

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) and Cable Loss. The basic equation is as follows:

Factor = LISN VDF + Cable Loss

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 below the limit. The equation for calculation is as follows:

Over Limit = Level – Limit
Level = Read Level + Factor

Note: The term "cable loss" refers to the combination of a cable and a 10dB transient limiter (attenuator).

Test Data

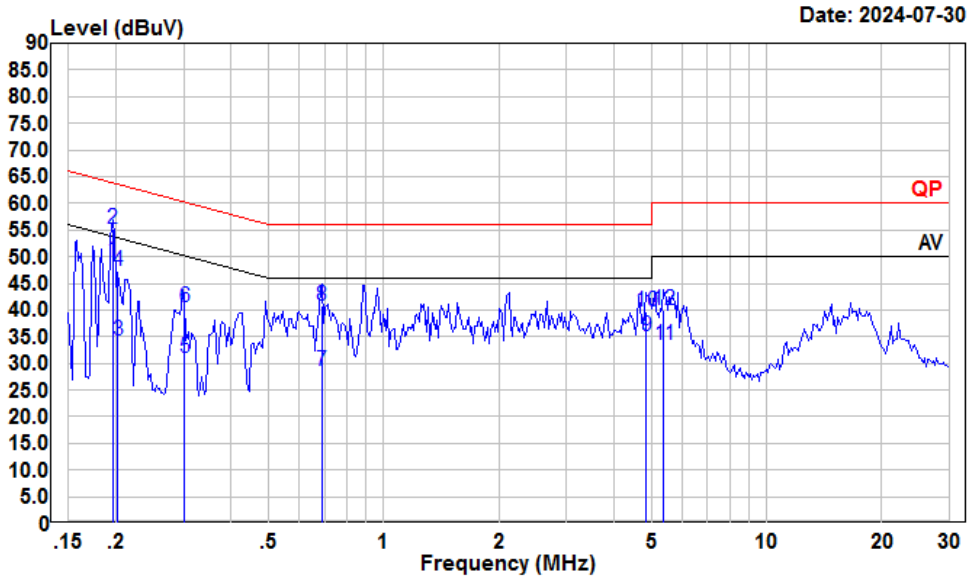
Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	72 %
ATM Pressure:	101 kPa

The testing was performed by Macy Shi on 2024-07-30.

EUT operation mode: Transmitting (Maximum output power mode, low channel)

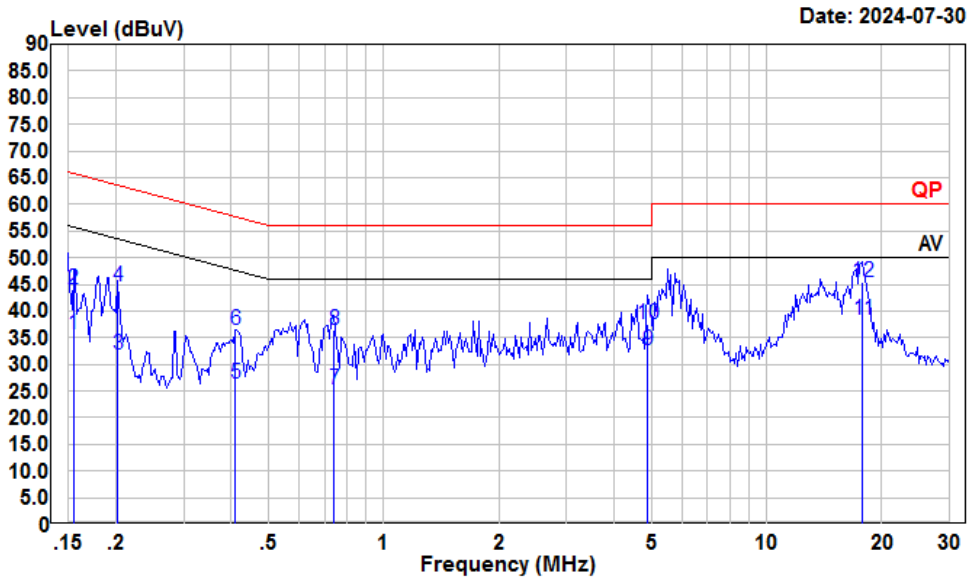
AC 120V/60 Hz, Line



Condition: Line
Project : 2401V84724E-RF
tester : Macy.shi
Note : 2.4G

	Freq	Read Level	LISN Level	Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.195	28.87	49.36	10.40	10.09	53.80	-4.44	Average
2	0.195	34.78	55.27	10.40	10.09	63.80	-8.53	QP
3	0.202	13.71	34.20	10.40	10.09	53.54	-19.34	Average
4	0.202	26.95	47.44	10.40	10.09	63.54	-16.10	QP
5	0.302	10.64	31.06	10.31	10.11	50.19	-19.13	Average
6	0.302	19.99	40.41	10.31	10.11	60.19	-19.78	QP
7	0.690	8.02	28.56	10.39	10.15	46.00	-17.44	Average
8	0.690	20.31	40.85	10.39	10.15	56.00	-15.15	QP
9	4.848	14.52	35.17	10.47	10.18	46.00	-10.83	Average
10	4.848	19.02	39.67	10.47	10.18	56.00	-16.33	QP
11	5.390	12.74	33.43	10.51	10.18	50.00	-16.57	Average
12	5.390	19.32	40.01	10.51	10.18	60.00	-19.99	QP

AC 120V/60 Hz, Neutral



Condition: Neutral
Project : 2401V84724E-RF
tester : Macy.shi
Note : 2.4G

	Freq	Read Level	LISN Level	Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.155	15.27	35.63	10.24	10.12	55.74	-20.11	Average
2	0.155	23.65	44.01	10.24	10.12	65.74	-21.73	QP
3	0.202	11.09	31.78	10.60	10.09	53.54	-21.76	Average
4	0.202	23.98	44.67	10.60	10.09	63.54	-18.87	QP
5	0.410	5.64	26.50	10.76	10.10	47.64	-21.14	Average
6	0.410	15.52	36.38	10.76	10.10	57.64	-21.26	QP
7	0.743	4.70	25.31	10.47	10.14	46.00	-20.69	Average
8	0.743	15.95	36.56	10.47	10.14	56.00	-19.44	QP
9	4.900	12.13	32.71	10.40	10.18	46.00	-13.29	Average
10	4.900	16.84	37.42	10.40	10.18	56.00	-18.58	QP
11	17.849	17.80	38.27	10.28	10.19	50.00	-11.73	Average
12	17.849	25.03	45.50	10.28	10.19	60.00	-14.50	QP

FCC§15.205, §15.209 & §15.249(d) - RADIATED EMISSIONS

Applicable Standard

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

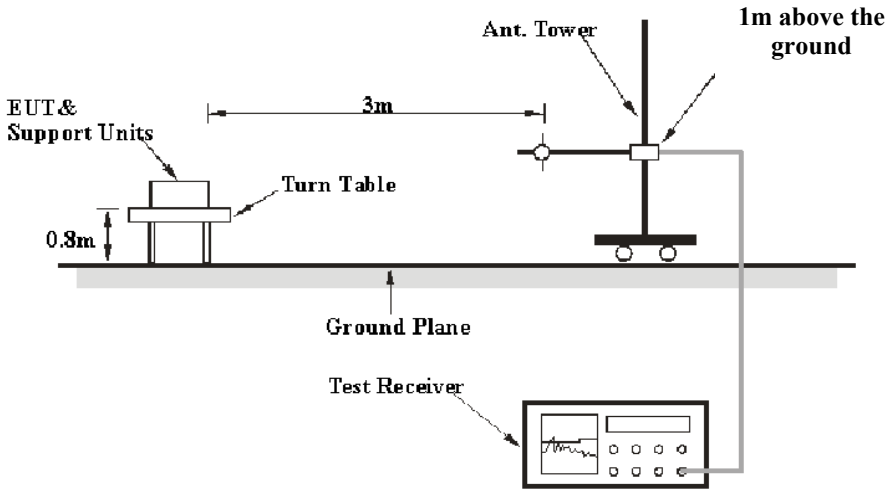
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

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

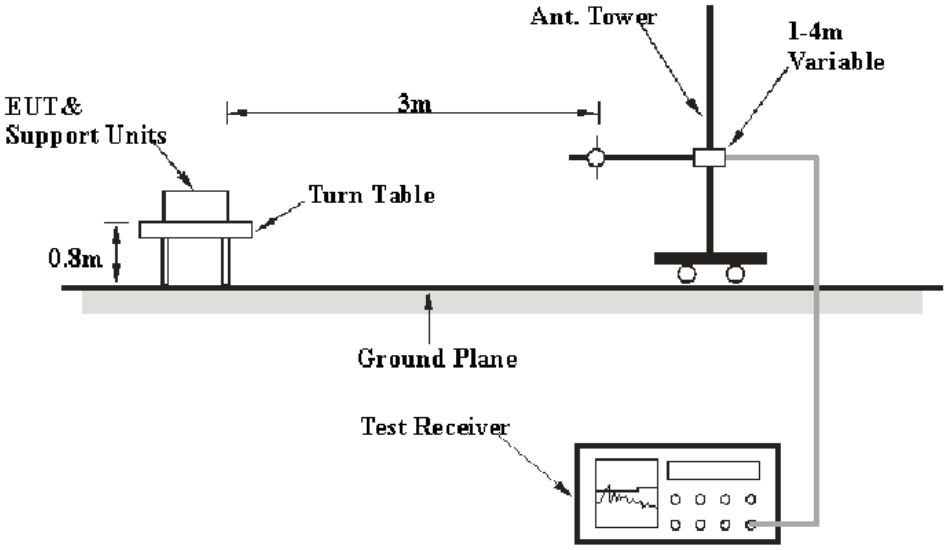
As per FCC§15.249 (d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

EUT Setup

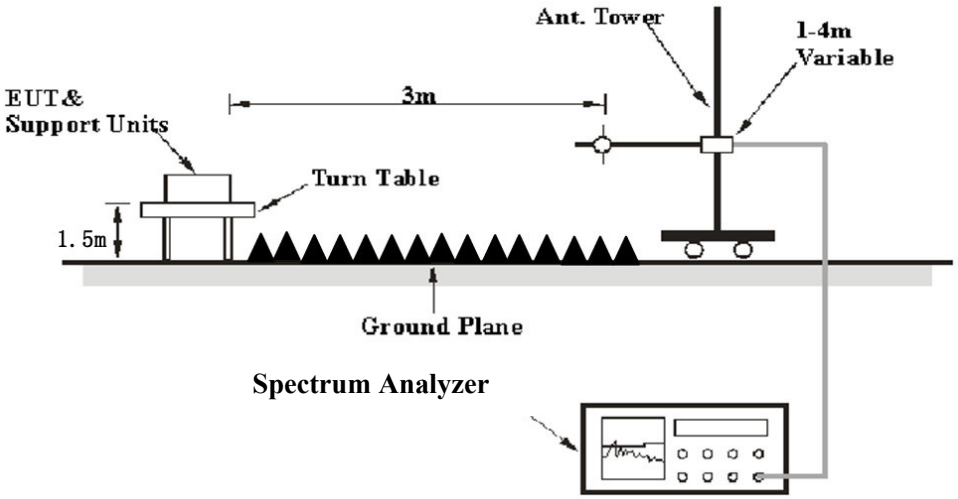
9 kHz-30MHz:



30MHz-1GHz:



Above 1GHz:



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

EMI Test Receiver & Spectrum Analyzer Setup

The EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
9 kHz – 150 kHz	/	/	200 Hz	QP
	300 Hz	1 kHz	/	PK
150 kHz – 30 MHz	/	/	9 kHz	QP
	10 kHz	30 kHz	/	PK
30 MHz – 1000 MHz	/	/	120 kHz	QP
	100 kHz	300 kHz	/	PK
Above 1 GHz	Harmonics & Band Edge			
	1MHz	3 MHz	/	PK
	Average Emission Level=Peak Emission Level+20*log(Duty cycle)			
	Other Emissions			
	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Average

For Duty cycle measurement:

Use the duty cycle factor correction factor method per 15.35(c).
Duty cycle=On time/100milliseconds, On time=N1*L1+N2*L2+…Nn-1*Ln-1+Nn*Ln,
Where N1 is number of type 1 pulses, L1 is length of type 1 pulse, etc.

Test Procedure

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

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane for below 1GHz or 1.5 meter for above 1GHz, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

All final data was recorded in Quasi-peak detection mode except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz, average detection modes for frequency bands 9–90 kHz and 110–490 kHz, peak and average detection modes for frequencies above 1 GHz.

For 9 kHz-30MHz, 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.

All emissions under the average limit and under the noise floor have not recorded in the report.

Factor & Over Limit/Margin Calculation

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

Factor = Antenna Factor + Cable Loss - Amplifier Gain

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

Over Limit = Level – Limit; Margin = Limit–Corrected Amplitude
Level / Corrected Amplitude = Read Level + Factor

Test Data

Environmental Conditions

Temperature:	22~25.5 ℃
Relative Humidity:	50~54 %
ATM Pressure:	101 kPa

The testing was performed by Anson Su on 2024-08-05 for below 1GHz and Sadow Tan and Dylan Yang from 2024-07-29 to 2024-08-09 for above 1GHz.

EUT operation mode: Transmitting

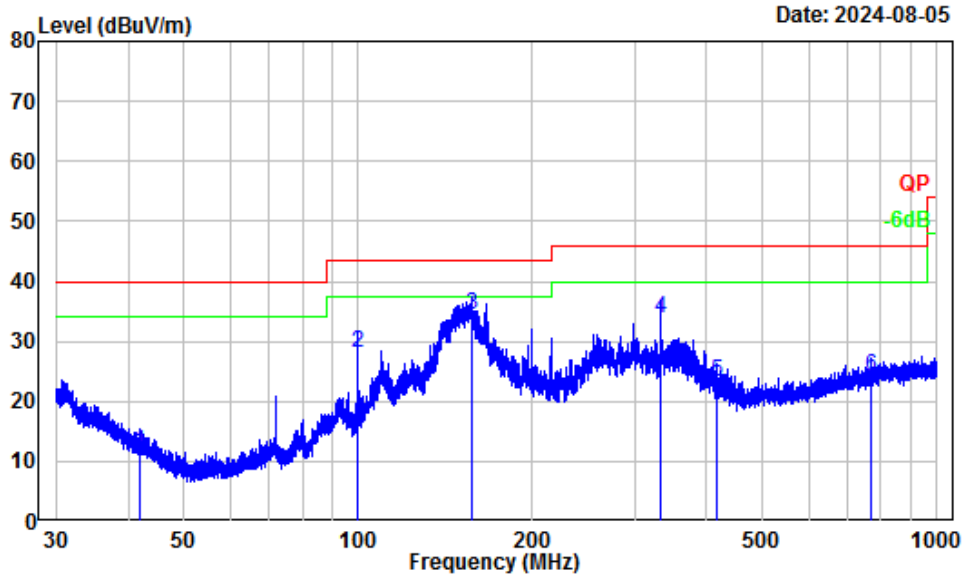
Note: Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded

9 kHz-30MHz: *(Maximum output power mode, low channel)*

The amplitude of spurious emissions attenuated more than 20 dB below the limit was not recorded.

30MHz-1GHz: *(Maximum output power mode, low channel)*

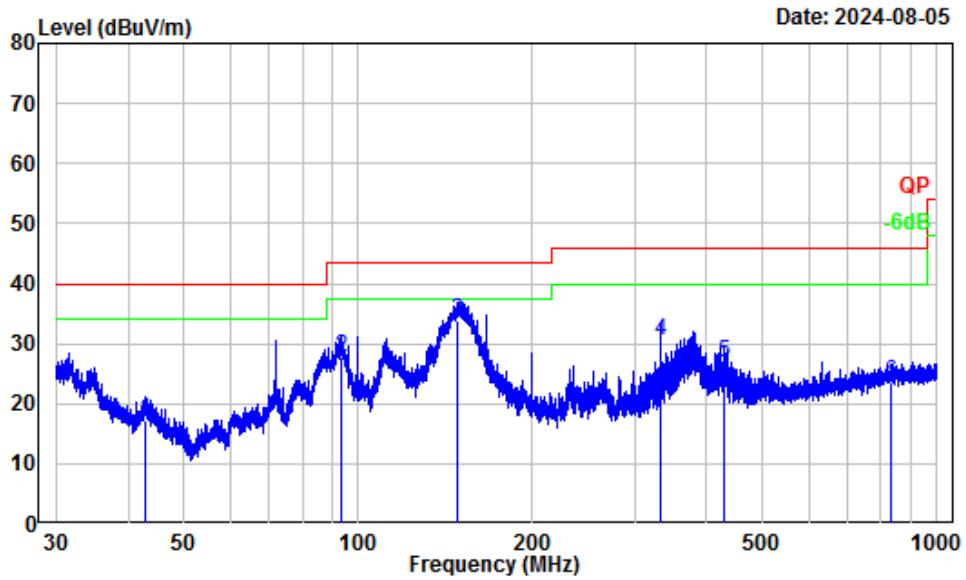
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number: 2401V84724E-RF
Note : 2.4G
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	41.88	-13.42	24.91	11.49	40.00	-28.51	QP
2	99.57	-15.98	44.03	28.05	43.50	-15.45	QP
3	157.01	-12.64	47.09	34.45	43.50	-9.05	QP
4	333.10	-10.51	44.20	33.69	46.00	-12.31	QP
5	416.36	-8.13	31.44	23.31	46.00	-22.69	QP
6	768.07	-2.62	26.86	24.24	46.00	-21.76	QP

Vertical



Site : Chamber A
Condition : 3m Vertical
Project Number: 2401V84724E-RF
Note : 2.4G
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	42.86	-13.98	31.21	17.23	40.00	-22.77	QP
2	93.32	-17.28	45.11	27.83	43.50	-15.67	QP
3	148.77	-12.39	46.11	33.72	43.50	-9.78	QP
4	333.10	-10.51	41.01	30.50	46.00	-15.50	QP
5	429.15	-7.90	34.71	26.81	46.00	-19.19	QP
6	832.22	-1.87	25.46	23.59	46.00	-22.41	QP

Above 1GHz:

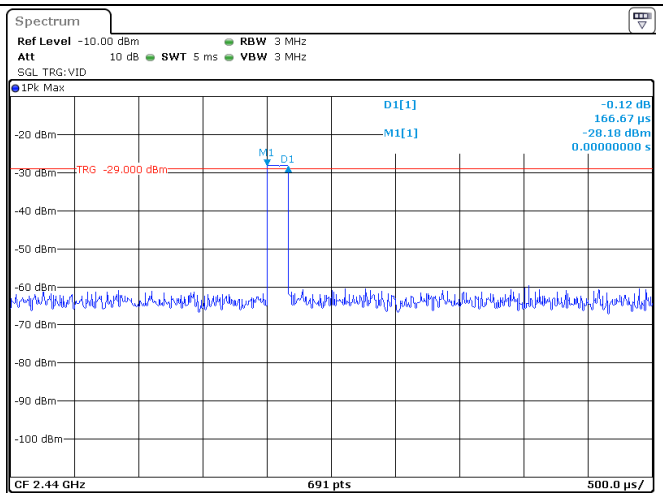
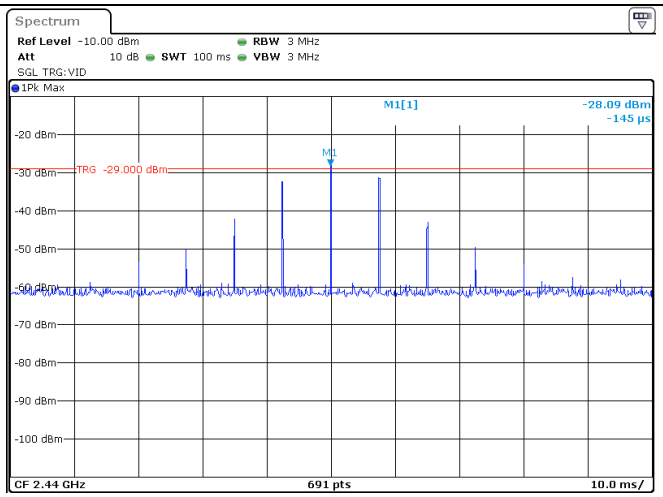
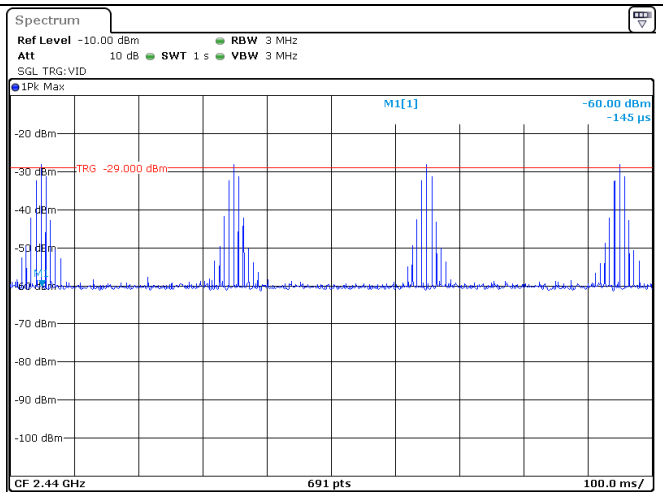
Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Absolute Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/AV					
Low Channel							
2402.00	102.78	PK	H	-3.13	99.65	114	-14.35
2402.00	100.43	PK	V	-3.13	97.30	114	-16.70
2377.67	54.77	PK	H	-2.93	51.84	74.00	-22.16
2377.21	55.42	PK	V	-2.93	52.49	74.00	-21.51
4804.00	58.87	PK	H	1.69	60.56	74.00	-13.44
4804.00	58.41	PK	V	1.69	60.10	74.00	-13.90
Middle Channel							
2440.00	102.24	PK	H	-3.13	99.11	114	-14.89
2440.00	101.32	PK	V	-3.13	98.19	114	-15.81
4880.00	57.07	PK	H	1.69	58.76	74.00	-15.24
4880.00	58.11	PK	V	1.69	59.80	74.00	-14.20
High Channel							
2480.00	101.79	PK	H	-3.17	98.62	114	-15.38
2480.00	101.20	PK	V	-3.17	98.03	114	-15.97
2483.50	70.49	PK	H	-3.17	67.32	74.00	-6.68
2483.50	69.94	PK	V	-3.17	66.77	74.00	-7.23
2483.51	70.78	PK	H	-3.17	67.61	74.00	-6.39
2483.51	70.73	PK	V	-3.17	67.56	74.00	-6.44
4960.00	57.41	PK	H	2.77	60.18	74.00	-13.82
4960.00	59.16	PK	V	2.77	61.93	74.00	-12.07

Note:
Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Absolute Level (Corrected Amplitude） = Factor + Reading
Margin = Absolute Level - Limit
The other spurious emission which is 20dB to the limit or in noise floor level was not recorded.

Field Strength of Average							
Frequency (MHz)	**Peak Measurement @3m (dBµV/m)**	**Polar (H/V)**	**Duty Cycle Corrected Factor (dB)**	**Average Level (dBµV/m)**	**Limit (dBµV/m)**	**Margin (dB)**	**Comment**
Low Channel							
2402.00	99.65	H	-55.55	44.10	94	-49.90	Fundamental
2402.00	97.3	V	-55.55	41.75	94	-52.25	Fundamental
2377.67	51.84	H	-55.55	-3.71	54.00	-57.71	Bandedge
2377.21	52.49	V	-55.55	-3.06	54.00	-57.06	Bandedge
4804.00	60.56	H	-55.55	5.01	54.00	-48.99	Harmonic
4804.00	60.1	V	-55.55	4.55	54.00	-49.45	Harmonic
Middle Channel							
2440.00	99.11	H	-55.55	43.56	94	-50.44	Fundamental
2440.00	98.19	V	-55.55	42.64	94	-51.36	Fundamental
4880.00	58.76	H	-55.55	3.21	54.00	-50.79	Harmonic
4880.00	59.8	V	-55.55	4.25	54.00	-49.75	Harmonic
High Channel							
2480.00	98.62	H	-55.55	43.07	94	-50.93	Fundamental
2480.00	98.03	V	-55.55	42.48	94	-51.52	Fundamental
2483.50	67.32	H	-55.55	11.77	54.00	-42.23	Bandedge
2483.50	66.77	V	-55.55	11.22	54.00	-42.78	Bandedge
2483.51	67.61	H	-55.55	12.06	54.00	-41.94	Bandedge
2483.51	67.56	V	-55.55	12.01	54.00	-41.99	Bandedge
4960.00	60.18	H	-55.55	4.63	54.00	-49.37	Harmonic
4960.00	61.93	V	-55.55	6.38	54.00	-47.62	Harmonic

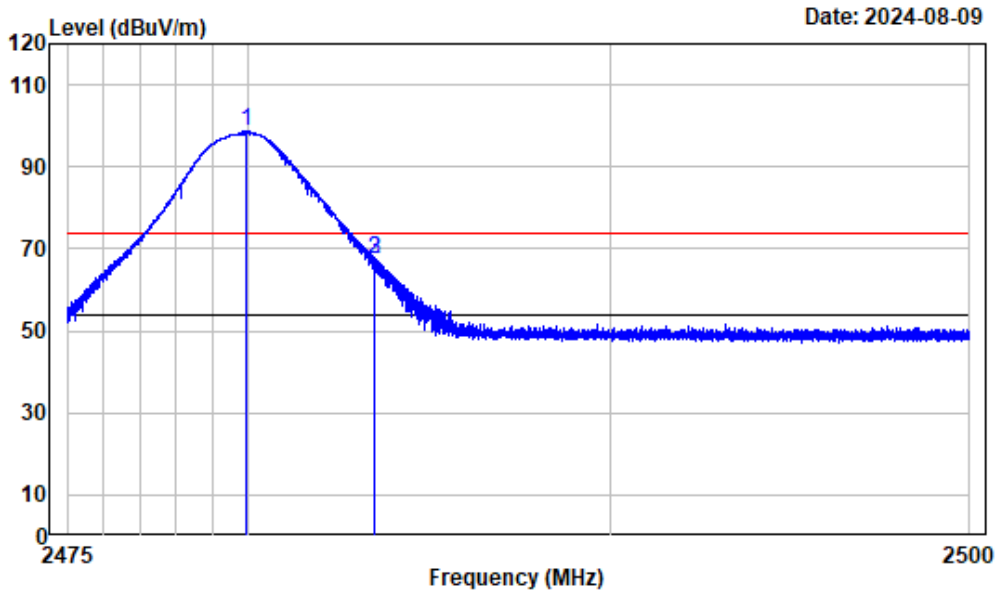
Note:
Average level= Peak level+ Duty Cycle Corrected Factor
Margin = Average level - Limit

Duty cycle = Ton/100ms = 0.167/100=0.00167
Duty Cycle Corrected Factor = 20lg (Duty cycle) = 20lg0.00167 = -55.55

Duty Cycle (5ms)	
Duty Cycle (100ms)	
Duty Cycle (1s)	

Test plots for Band Edge Measurements (Radiated):

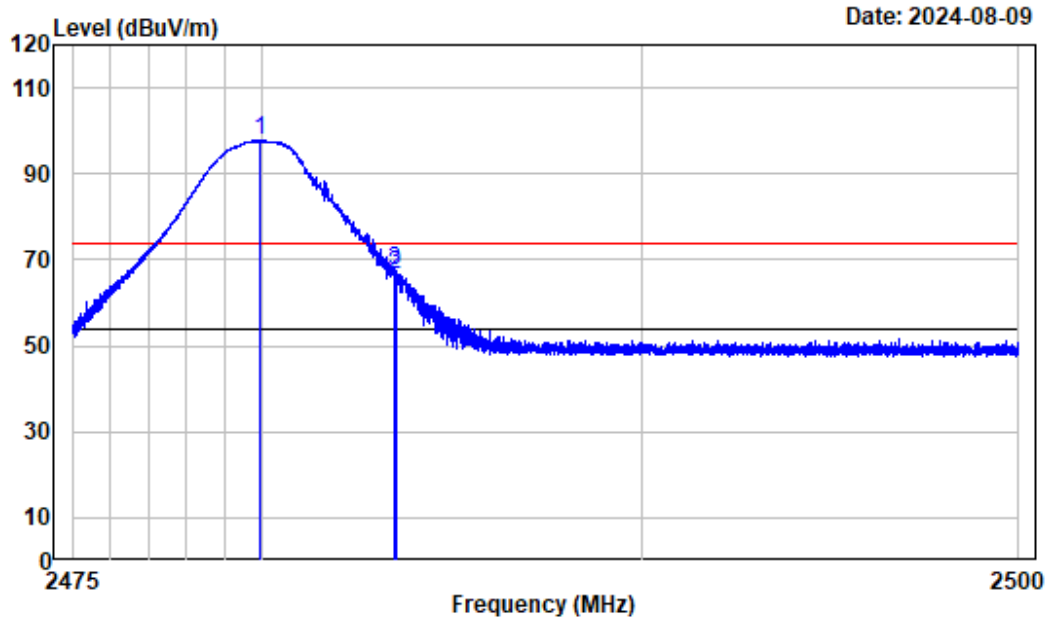
Test Channel:	2480MHz	Ant. Polar. :	Horizontal



Condition : Horizontal
Project No.: 2401V84724E-RF
Tester : Dylan.Yang
Note : 2480

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2479.934	-3.17	101.79	98.62	114.00	-15.38	Peak
2	2483.500	-3.17	70.49	67.32	74.00	-6.68	Peak
3	2483.506	-3.17	70.78	67.61	74.00	-6.39	Peak

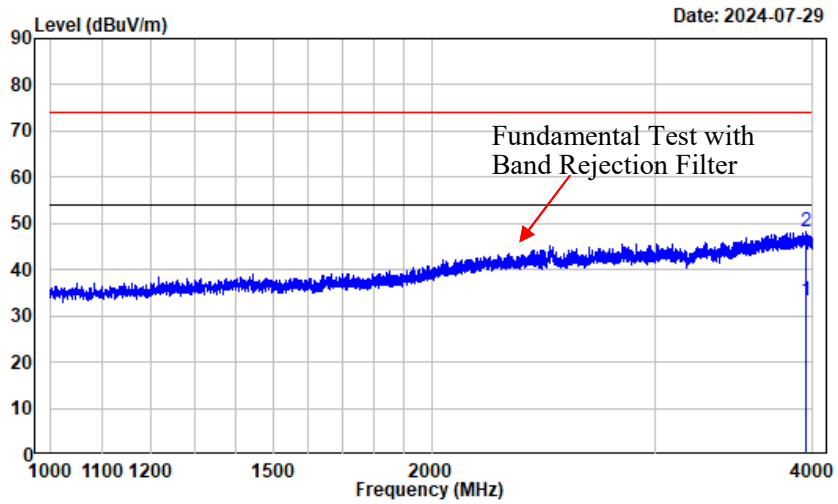
Test Channel:	2480MHz	Ant. Polar. :	Vertical

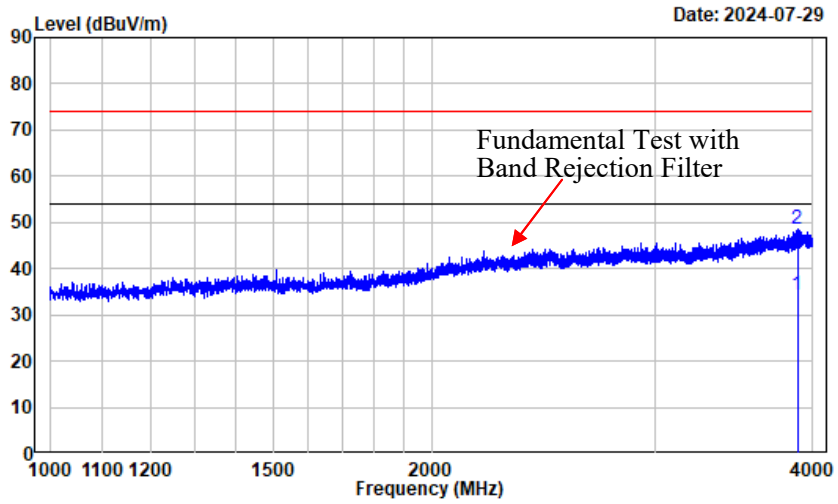


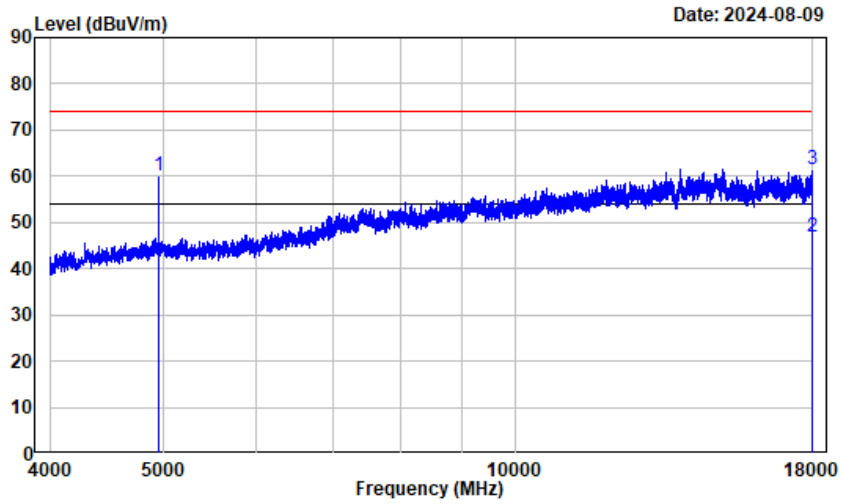
Condition : Vertical
Project No.: 2401V84724E-RF
Tester : Dylan.Yang
Note : 2480

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2479.947	-3.17	101.20	98.03	114.00	-15.97	Peak
2	2483.500	-3.17	69.94	66.77	74.00	-7.23	Peak
3	2483.509	-3.17	70.73	67.56	74.00	-6.44	Peak

Listed with harmonic margin test plot:

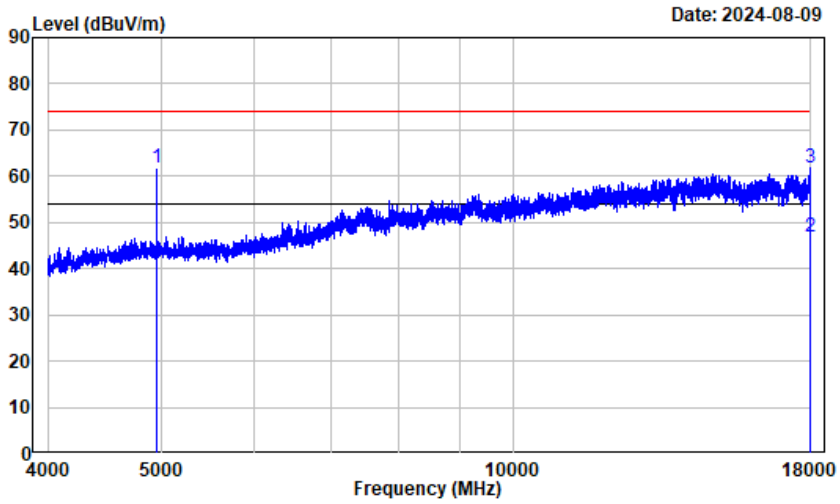
Horizontal	
1-4GHz	 Condition : Horizontal Project No.: 2401V84724E-RF Tester : Sadow Tan Note : 2480 Freq / Factor / Read Level / Level / Limit Line / Over Limit / Remark MHz / dB/m / dBuV / dBuV/m / dBuV/m / dB 1 3952.750 -0.17 33.45 33.28 54.00 -20.72 Average 2 3952.750 -0.17 48.56 48.39 74.00 -25.61 Peak

Vertical	
1-4GHz	 Condition : Vertical Project No.: 2401V84724E-RF Tester : Sadow Tan Note : 2480 | | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark | | | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | | | 1 | 3890.125 | -0.57 | 34.71 | 34.14 | 54.00 | -19.86 | Average | | 2 | 3890.125 | -0.57 | 49.11 | 48.54 | 74.00 | -25.46 | Peak |

Horizontal	
4-18GHz	 Condition : Horizontal Project No.: 2401V84724E-RF Tester : Dylan.Yang Note : 2480 Freq / Factor / Read Level / Level / Limit Line / Over Limit / Remark MHz / dB/m / dBuV / dBuV/m / dBuV/m / dB 1 4960.000 2.77 57.41 60.18 74.00 -13.82 Peak 2 18000.000 24.62 22.15 46.77 54.00 -7.23 Average 3 18000.000 24.62 36.90 61.52 74.00 -12.48 Peak

Vertical

4-18GHz

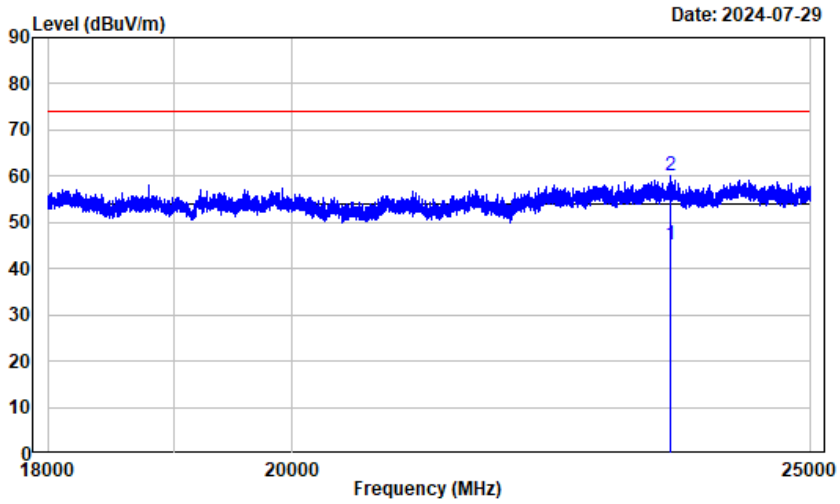


Condition : Vertical
Project No.: 2401V84724E-RF
Tester : Dylan.Yang
Note : 2480

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	4960.000	2.77	59.16	61.93	74.00	-12.07	Peak
2	17982.500	24.49	22.54	47.03	54.00	-6.97	Average
3	17982.500	24.49	37.44	61.93	74.00	-12.07	Peak

Horizontal

18-25GHz

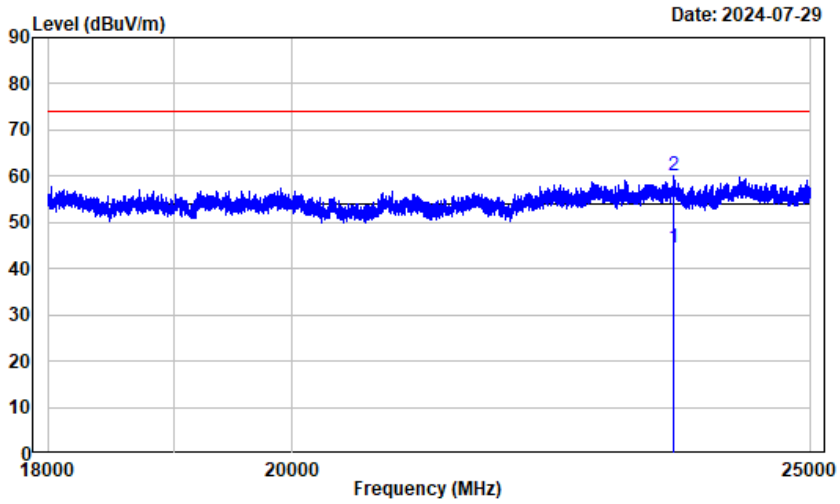


Condition : Horizontal
Project No.: 2401V84724E-RF
Tester : Sadow Tan
Note : 2480

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	23533.500	17.47	27.64	45.11	54.00	-8.89	Average
2	23533.500	17.47	42.56	60.03	74.00	-13.97	peak

Vertical

18-25GHz



Condition : Vertical
Project No.: 2401V84724E-RF
Tester : Sadow Tan
Note : 2480

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	23566.750	17.50	26.99	44.49	54.00	-9.51	Average
2	23566.750	17.50	42.54	60.04	74.00	-13.96	peak

FCC§15.215(c) - 20dB EMISSION BANDWIDTH

Applicable Standard

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

Test Procedure

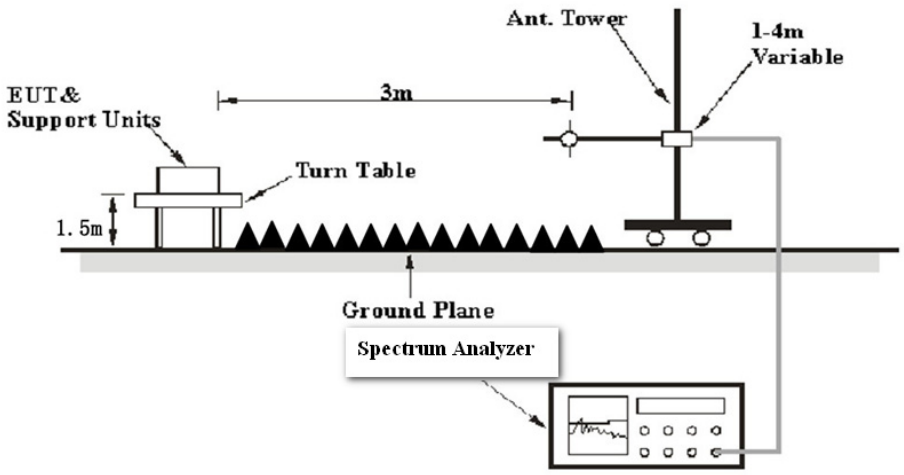
Test Method: ANSI C63.10-2013 Clause 7.8.7 & Clause 6.9.2

The following conditions shall be observed for measuring the occupied bandwidth and 20 dB bandwidth:
• The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

• The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.

• The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / 20 dB bandwidth if the device is not transmitting continuously.

• The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW/ 20dB bandwidth and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.



Test Data

Environmental Conditions

Temperature:	22 ℃
Relative Humidity:	54 %
ATM Pressure:	101 kPa

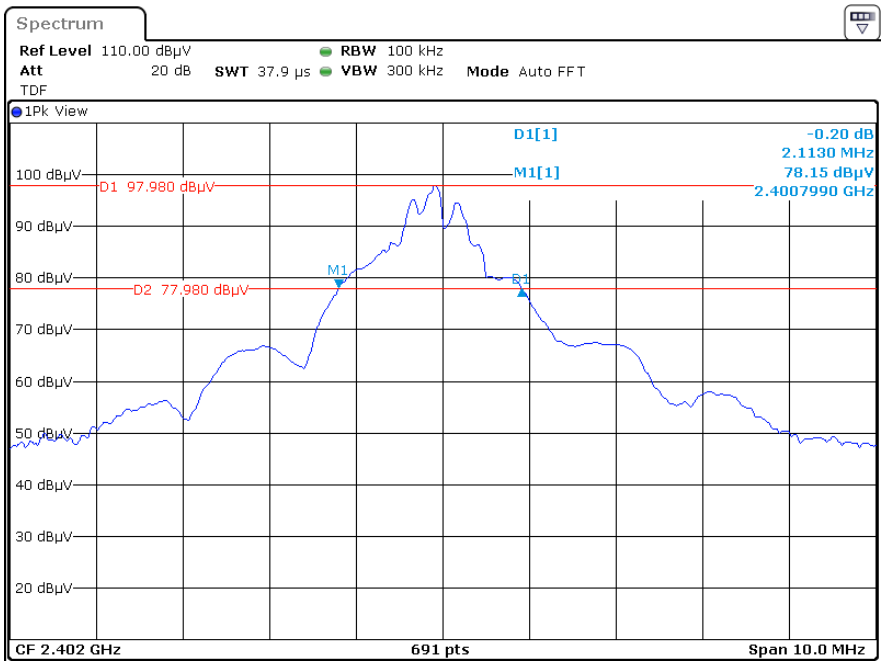
The testing was performed by Sadow Tan on 2024-08-12.

EUT operation mode: Transmitting

Please refer to the following table and plots.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
Low	2402	2.113
Middle	2440	2.098
High	2480	2.098

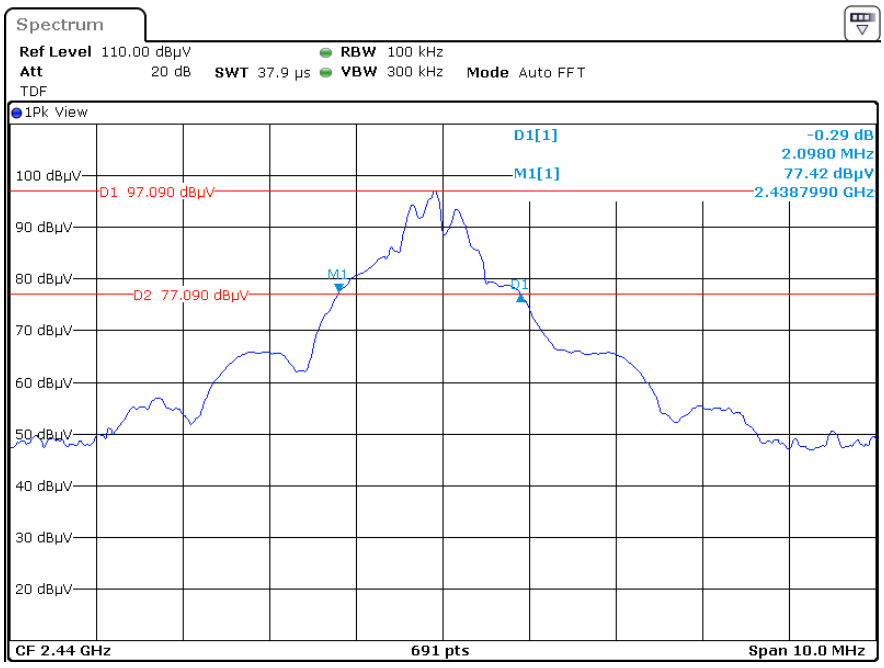
Low channel



ProjectNo.:2401V84724E-RF Tester:Sadow Tan

Date: 12.AUG.2024 16:14:19

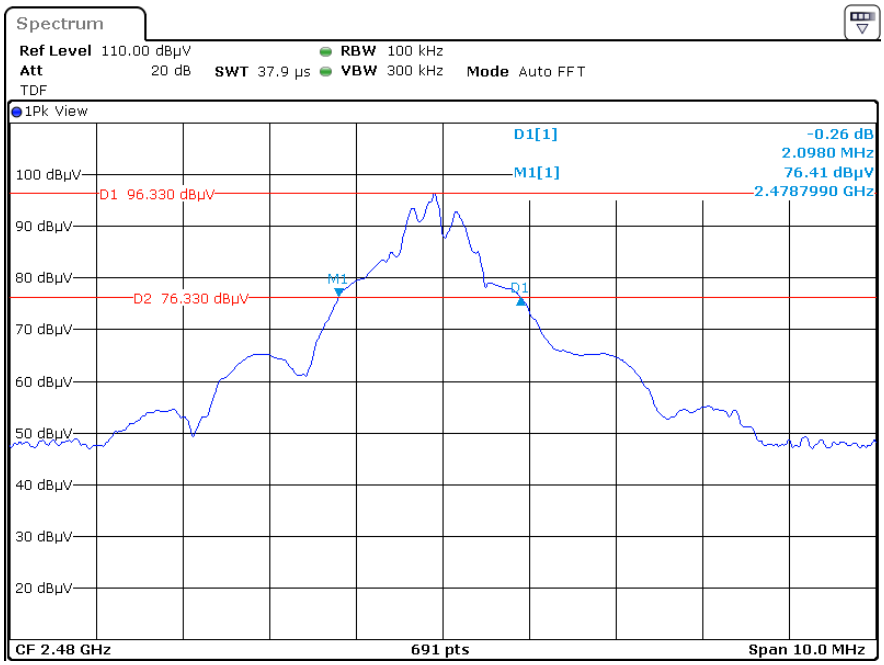
Middle Channel



ProjectNo.:2401V84724E-RF Tester:Sadow Tan

Date: 12.AUG.2024 16:16:14

High Channel



ProjectNo.:2401V84724E-RF Tester:Sadow Tan

Date: 12.AUG.2024 16:18:06

EUT PHOTOGRAPHS

Please refer to the attachment 2401V84724E-RF External photo and 2401V84724E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2401V84724E-RF Test Setup photo.

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