

TEST REPORT

Applicant Name: CHERUBINI S.p.A.
Address: Via Adige, 55 Bedizzole (BS) Italy
Report Number: 2501Q13185E-RF-00
FCC ID: 2AOG9MISTRAL

Test Standard (s)

FCC PART 15.231

Sample Description

Product Type: Wireless vibrating wind sensor
Model No.: MISTRAL
Multiple Model(s) No.: N/A
Trade Mark: CHERUBINI
Date Received: 2025/02/25
Issue Date: 2025/06/18

Test Result:	Pass▲
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▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

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Ekko Wu
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Approved By:

Michelle Zeng

Michelle Zeng
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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.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	2501Q13185E-RF-00	Original Report	2025/06/18

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Wireless vibrating wind sensor
Tested Model	MISTRAL
Multiple Model(s)	N/A
Frequency Range	433.92MHz
Maximum E-Field	78.02 dBuV/m@3m
Modulation Technique	OOK
Voltage Range	DC 3V from battery
Sample number	2YRG-1 (RF Conducted Test) 2YRG-2 (Radiated Test) (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	N/A

Objective

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.

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.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		109.2kHz(k=2, 95% level of confidence)
AC Power Lines Conducted Emissions	9kHz-150kHz	3.63dB(k=2, 95% level of confidence)
	150kHz-30MHz	3.66dB(k=2, 95% level of confidence)
Radiated Emissions	9kHz - 30MHz	3.60dB(k=2, 95% level of confidence)
	30MHz~200MHz (Horizontal)	5.32dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	5.43dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	5.77dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.73dB(k=2, 95% level of confidence)
	1GHz - 6GHz	5.34dB(k=2, 95% level of confidence)
	6GHz - 18GHz	5.40dB(k=2, 95% level of confidence)
Temperature		±1°C
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.

Special Accessories

No special accessories was used

Equipment Modifications

No modification was made to the EUT.

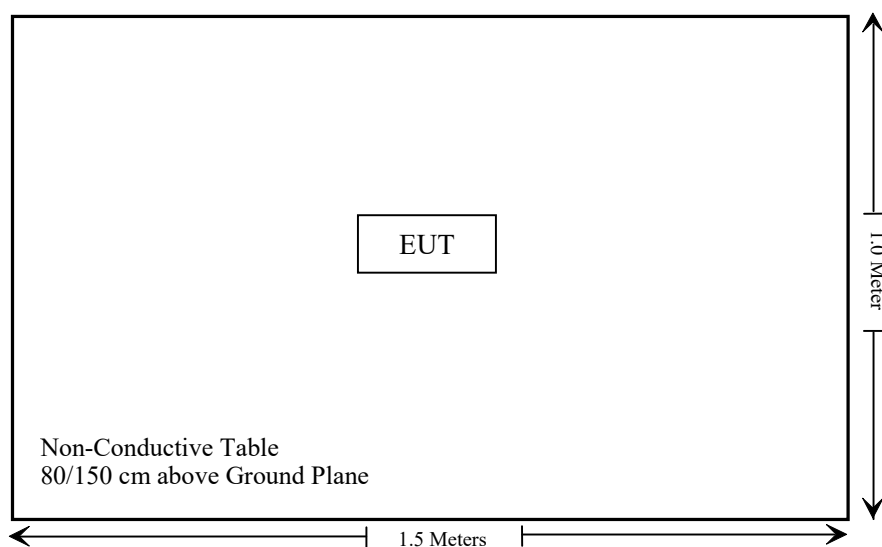
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

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

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 1.1307 (b) & §2.1091	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	Conducted Emissions	Not Applicable
§15.205, §15.209, §15.231(b)	Radiated Emissions	Compliant
§15.231 (c)	20dB Emission Bandwidth	Compliant
§15.231 (a) (2)	Deactivation	Compliant

Not Applicable: The EUT is powered by battery only.

TEST EQUIPMENT LIST AND DETAILS

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2024/12/04	2025/12/03
Sonoma instrument	Pre-amplifier	310 N	186238	2024/05/21	2025/05/20
Sonoma instrument	Pre-amplifier	310 N	186238	2025/04/29	2026/04/28
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	Chamber A Cable 1	N/A	2025/04/29	2026/04/28
Unknown	Cable	XH500C	J-10M-A	2024/06/18	2025/06/17
Unknown	Cable	XH500C	J-10M-A	2025/04/29	2026/04/28
BACL	Active Loop Antenna	1313-1A	4031911	2024/05/14	2027/05/13
Unknown	Cable	2Y194	0735	2024/12/04	2025/12/03
Unknown	Cable	PNG214	1354	2024/12/04	2025/12/03
Audix	EMI Test software	E3	19821b(V9)	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2024/03/27	2025/03/26
Rohde & Schwarz	Spectrum Analyzer	FSU26	200982	2024/09/20	2025/09/19
A.H.System	Preamplifier	PAM-0118P	489	2024/11/15	2025/11/14
Schwarzbeck	Horn Antenna	BBHA9120D (1201)	1143	2023/07/26	2026/07/25
Unknown	RF Cable	KMSE	735	2024/12/06	2025/12/05
Unknown	RF Cable	UFA147	219661	2024/12/06	2025/12/05
Unknown	RF Cable	XH750A-N	J-10M	2024/12/06	2025/12/05
JD	Filter Switch Unit	DT7220FSU	DS79906	2024/09/09	2025/09/08
JD	Multiplex Switch Test Control Set	DT7220SCU	DS79903	2024/09/09	2025/09/08
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSV40	101473	2024/12/04	2025/12/03
MARCONI	10dB Attenuator	6534/3	2942	2024/06/27	2025/06/26

* **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) & §2.1091 - RF EXPOSURE**Applicable Standard**

According to FCC §2.1091 and §1.1307(b), 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 D04 Interim General RF Exposure Guidance v01, clause 2.1.2 – 1-mW test Exemption:

Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.

This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

Test Result:

For worst case:

Mode	Frequency (MHz)	Maximum E-Field (dBuV/m@3m)	Maximum EIRP		Test Exemption (mW)
			(dBm)	(mW)	
SRD	433.92	78.02	-17.18	0.019	1

Note 1: The Maximum EIRP= Maximum E-Field -95.2

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 arrangement which was permanently attached. And the antenna gain is 0 dBi; 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:

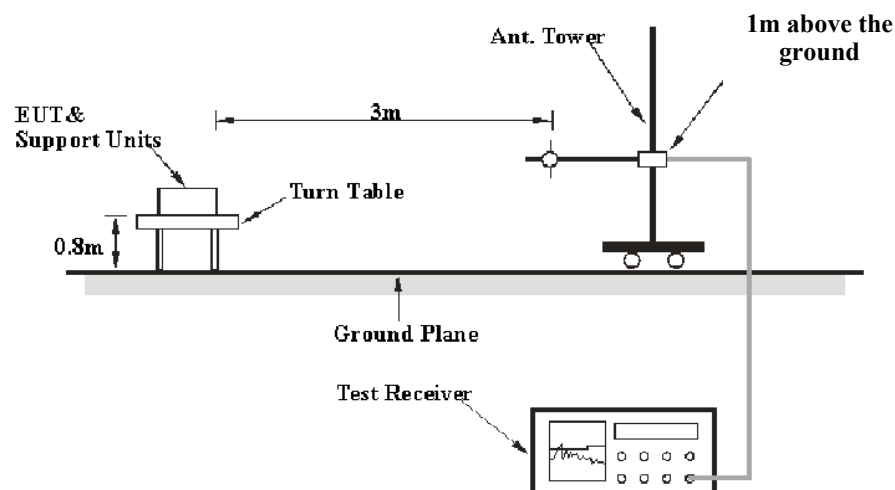
Fundamental frequency (MHz)	Field Strength of Fundamental (Microvolts /meter)	Field Strength of spurious emissions ((Microvolts /meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750**	125 to 375**
174-260	3750	375
260-470	3750 to 12500**	375 to 1250**
Above 470	12500	1250

*Linear interpolations.

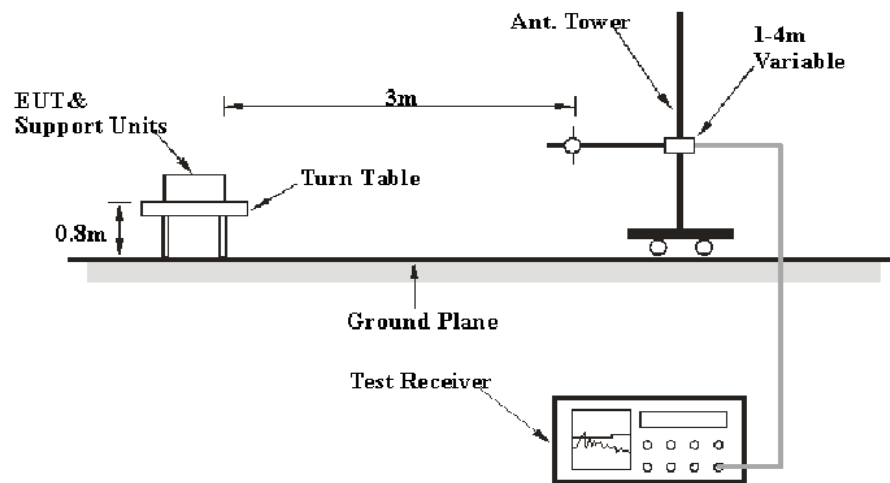
The above field strength limits are specified at a distance of 3-meters the tighter limits apply at the band edges.

EUT Setup

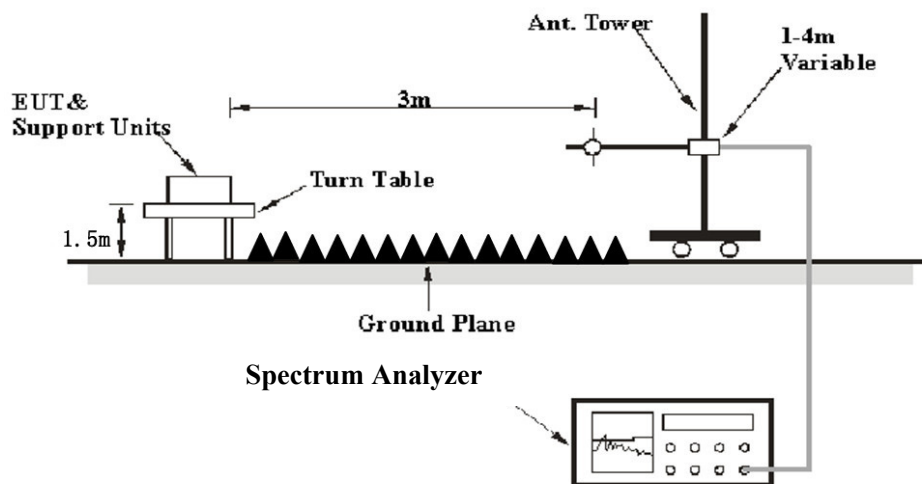
9 kHz-30MHz:



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 § 15.209, 15.205 and 15.231.

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	Detector
9 kHz – 150 kHz	/	/	200 Hz	QP	QP
	300 Hz	1 kHz	/	PK	Peak
150 kHz – 30 MHz	/	/	9 kHz	QP	QP
	10 kHz	30 kHz	/	PK	Peak
30 MHz – 1000 MHz	/	/	120 kHz	QP	QP
	100 kHz	300 kHz	/	PK	Peak
Above 1 GHz	Harmonics				
	1MHz	3 MHz	/	PK	Peak
	Average Emission Level=Peak Emission Level+20*log(Duty cycle)				
	Band Edge & Other Emissions				
	1MHz	3 MHz	/	PK	Peak
	1MHz	≥10 Hz	/	Average	Peak

For Duty cycle measurement:

Use the duty cycle factor correction factor method per 15.35(c).

Duty cycle=On time/100milliseconds, On time= $N_1 \cdot L_1 + N_2 \cdot L_2 + \dots + N_{n-1} \cdot L_{n-1} + N_n \cdot L_n$,

Where N_1 is number of type 1 pulses, L_1 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.

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.

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

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:

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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:

$$\begin{aligned} \text{Over Limit/Margin} &= \text{Level / Corrected Amplitude} - \text{Limit} \\ \text{Level / Corrected Amplitude} &= \text{Read Level} + \text{Factor} \end{aligned}$$

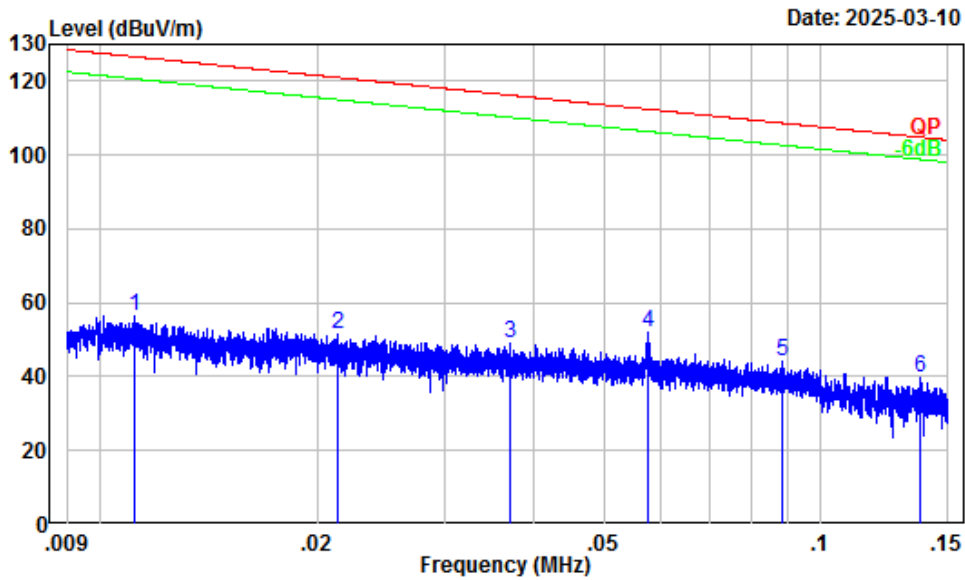
Test Data

Environmental Conditions

Temperature:	22.9~23.5°C
Relative Humidity:	51~54 %
ATM Pressure:	101.1~101.3 kPa

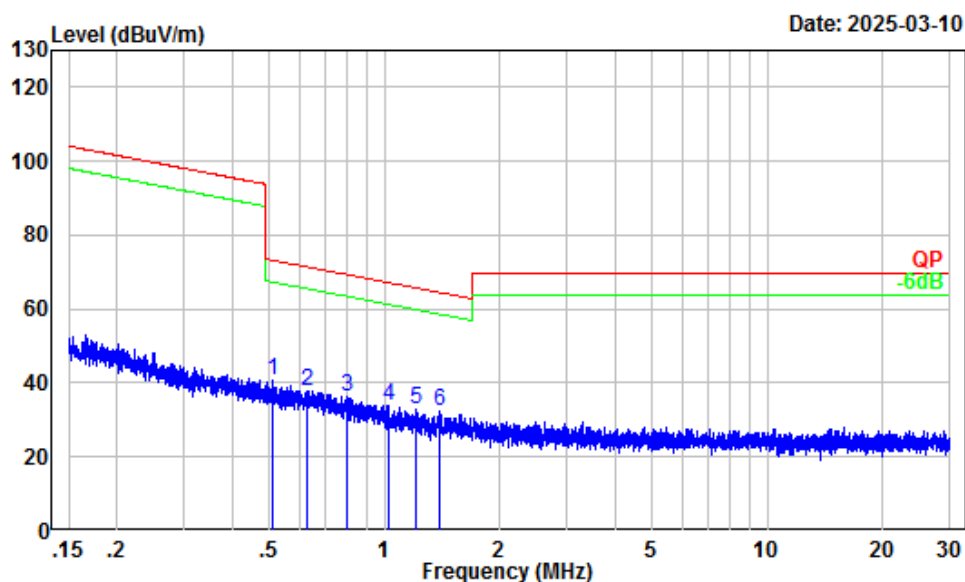
The testing was performed by Anson Su and Cheeb Huang from 2025-03-10 to 2025-06-18 for below 1GHz, Visen Wu on 2025-05-28 for above 1GHz.

Test mode: Transmitting (Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded)

9 kHz-30MHz:*Parallel was the worst*

Site : Chamber A
Condition : 3m
Project Number : 2501Q13185E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 0.3/1kHz
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.01	32.08	24.28	56.36	126.66	-70.30	Peak
2	0.02	30.14	21.52	51.66	121.01	-69.35	Peak
3	0.04	27.76	21.25	49.01	116.23	-67.22	Peak
4	0.06	25.64	26.25	51.89	112.39	-60.50	Peak
5	0.09	22.83	21.52	44.35	108.69	-64.34	Peak
6	0.14	19.81	20.04	39.85	104.87	-65.02	Peak

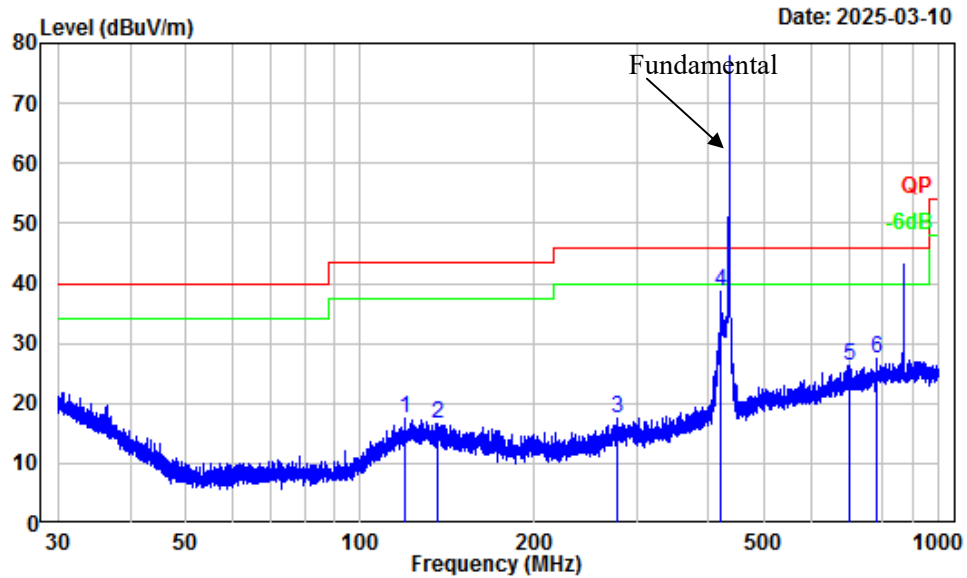


Site : Chamber A
 Condition : 3m
 Project Number : 2501Q13185E-RF
 Test Mode : Transmitting
 Detector: Peak RBW/VBW: 10/30kHz
 Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.51	6.25	34.38	40.63	73.40	-32.77	Peak
2	0.63	4.79	33.09	37.88	71.56	-33.68	Peak
3	0.80	2.69	33.82	36.51	69.44	-32.93	Peak
4	1.03	1.12	32.74	33.86	67.23	-33.37	Peak
5	1.21	0.60	32.28	32.88	65.75	-32.87	Peak
6	1.40	0.08	32.16	32.24	64.49	-32.25	Peak

30MHz – 1 GHz:

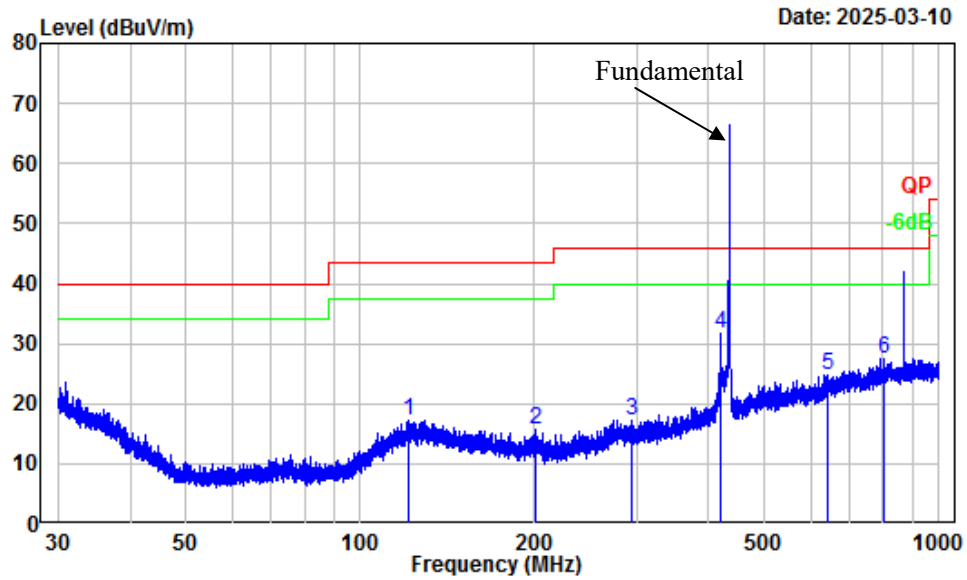
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number : 2501Q13185E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Anson Su

	Freq	Factor	Read Level	Limit Level	Over Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	119.75	-11.47	29.07	17.60	43.50	-25.90	Peak
2	136.04	-11.60	28.27	16.67	43.50	-26.83	Peak
3	277.95	-11.28	28.78	17.50	46.00	-28.50	Peak
4	420.40	-7.93	46.66	38.73	46.00	-7.27	Peak
5	701.76	-3.48	29.76	26.28	46.00	-19.72	Peak
6	780.29	-2.36	29.76	27.40	46.00	-18.60	Peak

Vertical



Site : Chamber A
 Condition : 3m Vertical
 Project Number : 2501Q13185E-RF
 Test Mode : Transmitting
 Detector: Peak RBW/VBW: 100/300kHz
 Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	120.75	-11.37	28.53	17.16	43.50	-26.34	Peak
2	201.22	-13.15	28.72	15.57	43.50	-27.93	Peak
3	294.89	-11.21	28.52	17.31	46.00	-28.69	Peak
4	420.40	-7.93	39.67	31.74	46.00	-14.26	Peak
5	642.02	-4.24	29.00	24.76	46.00	-21.24	Peak
6	802.14	-2.13	29.62	27.49	46.00	-18.51	Peak

Frequency (MHz)	Reading (dBμV)	Detector (PK)	Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
433.92	85.78	PK	H	-7.76	78.02	100.83	-22.81	Fundamental
433.92	74.26	PK	V	-7.76	66.50	100.83	-34.33	Fundamental

Frequency (MHz)	Reading (dBμV)	Detector	Polar (H / V)	Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1301.76	63.56	PK	H	-14.44	49.12	74	-24.88
1301.76	57.26	PK	V	-14.44	42.82	74	-31.18
1735.68	76.87	PK	H	-13.98	62.89	80.83	-17.94
1735.68	60.56	PK	V	-13.98	46.58	80.83	-34.25
2169.60	75.24	PK	H	-11.30	63.94	80.83	-16.89
2169.60	61.86	PK	V	-11.30	50.56	80.83	-30.27
2603.52	74.65	PK	H	-10.77	63.88	80.83	-16.95
2603.52	64.76	PK	V	-10.77	53.99	80.83	-26.84
3037.44	72.86	PK	H	-10.08	62.78	80.83	-18.05
3037.44	60.87	PK	V	-10.08	50.79	80.83	-30.04
3471.36	68.98	PK	H	-10.16	58.82	80.83	-22.01
3471.36	58.74	PK	V	-10.16	48.58	80.83	-32.25

Note:

Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

Corrected Amplitude/Level = Factor + Reading

Margin = Corrected Amplitude/Level - Limit

The other spurious emission which is in the noise floor level was not recorded.

Note: For the fundamental, the peak value is less than the limit of average that can meet the limit of the average value, so just peak value was recorded

Field Strength of Average							
Frequency (MHz)	Peak Measurement @3m (dBμV/m)	Polar (H/V)	Duty Cycle Correction Factor (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
1301.76	49.12	H	-7.29	41.83	54	-12.17	Harmonic
1301.76	42.82	V	-7.29	35.53	54	-18.47	Harmonic
1735.68	62.89	H	-7.29	55.6	60.83	-5.23	Harmonic
1735.68	46.58	V	-7.29	39.29	60.83	-21.54	Harmonic
2169.60	63.94	H	-7.29	56.65	60.83	-4.18	Harmonic
2169.6	50.56	V	-7.29	43.27	60.83	-17.56	Harmonic
2603.52	63.88	H	-7.29	56.59	60.83	-4.24	Harmonic
2603.52	53.99	V	-7.29	46.7	60.83	-14.13	Harmonic
3037.44	62.78	H	-7.29	55.49	60.83	-5.34	Harmonic
3037.44	50.79	V	-7.29	43.5	60.83	-17.33	Harmonic
3471.36	58.82	H	-7.29	51.53	60.83	-9.30	Harmonic
3471.36	48.58	V	-7.29	41.29	60.83	-19.54	Harmonic

Note:

Corrected Amplitude = Peak Measurement + Duty Cycle Correction Factor

Margin = Corrected Amplitude - Limit

Duty Cycle:

Ton1 = 0.046 ms

Ton2 = 22*0.19=4.18 ms

Ton3 = 32*0.393=12.576ms

Ton4 = 34*0.777=26.418ms

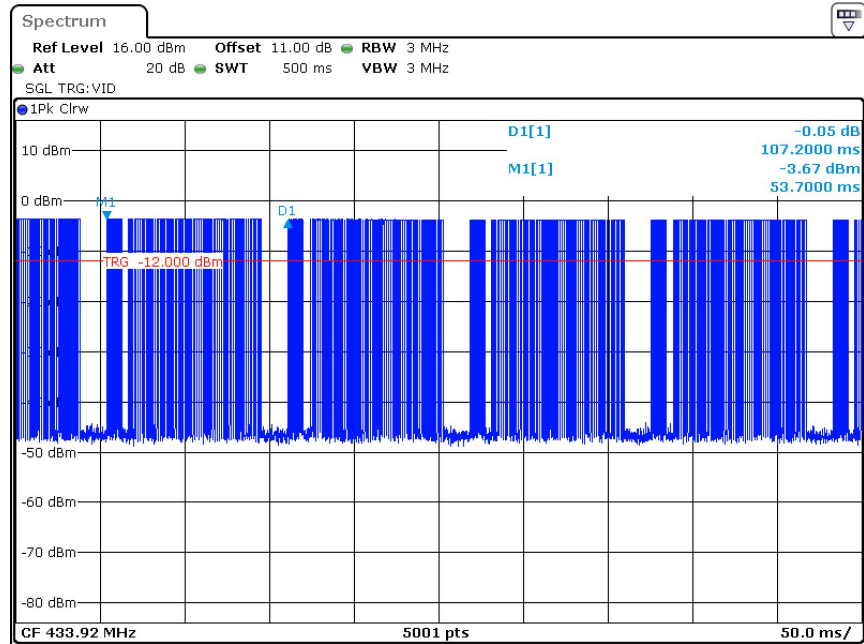
Ton= Ton1+ Ton2+ Ton3+ Ton4

Tp = 100ms

Duty cycle = Ton/Tp = 43.22/100*100%=43.22%

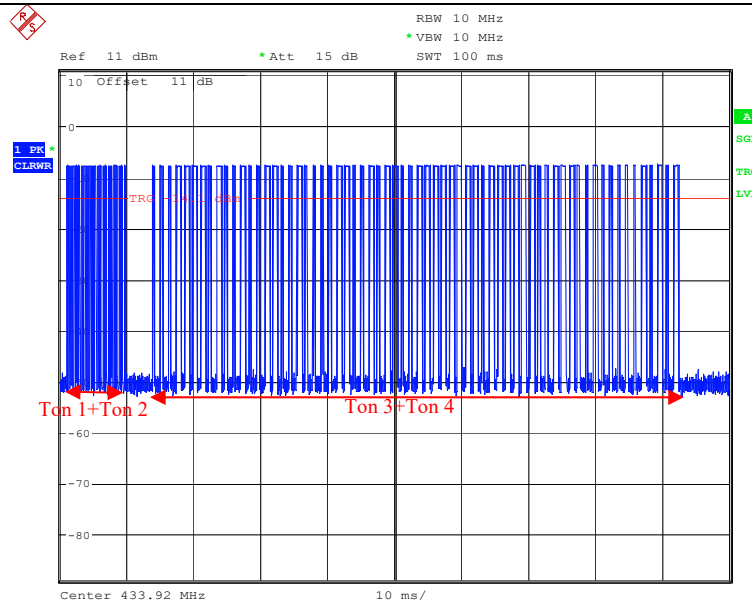
Duty Cycle Corrected Factor = 20lg (Duty cycle) = 20lg(0.4322) = -7.29

**Duty Cycle
(500ms)**



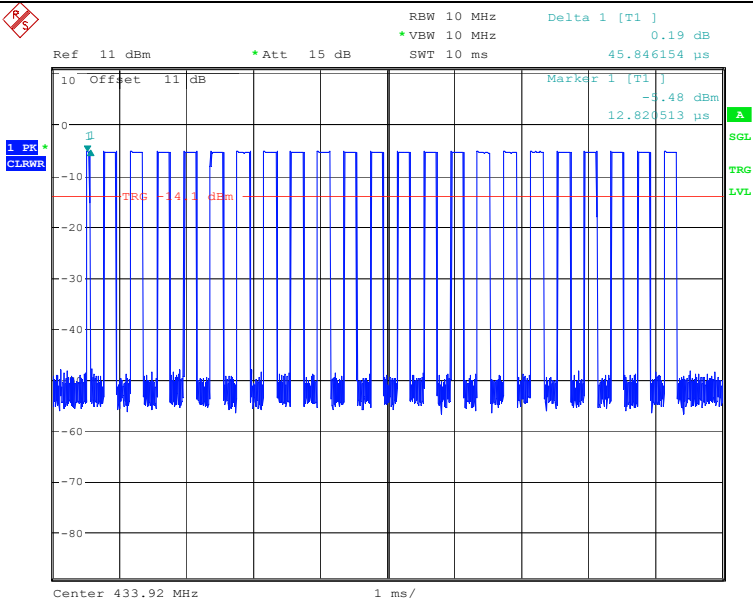
ProjectNo.:2501Q13185E-RF Tester:Cheeb Huang
Date: 18.JUN.2025 12:41:57

**Duty Cycle
(100ms)**



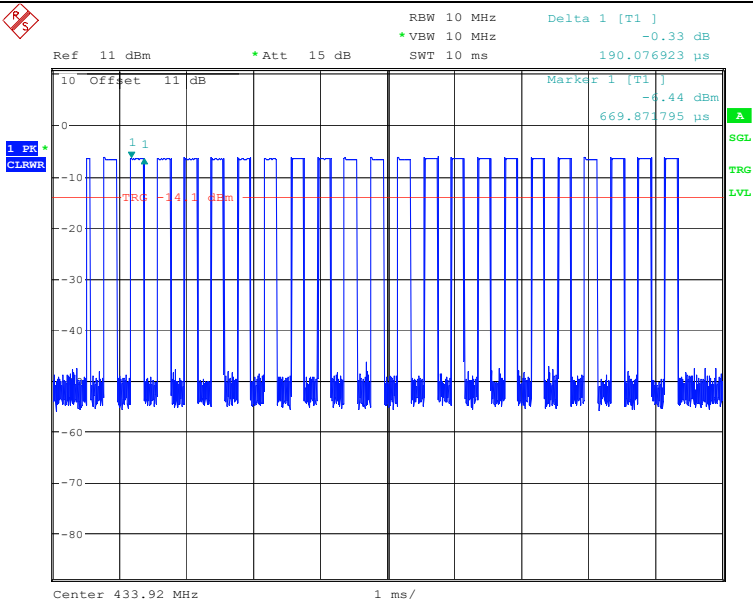
ProjectNo.:2501Q13185E-RF Tester:Cheeb Huang
Date: 5.JUN.2025 16:14:37

Pulse Width
(Ton1)



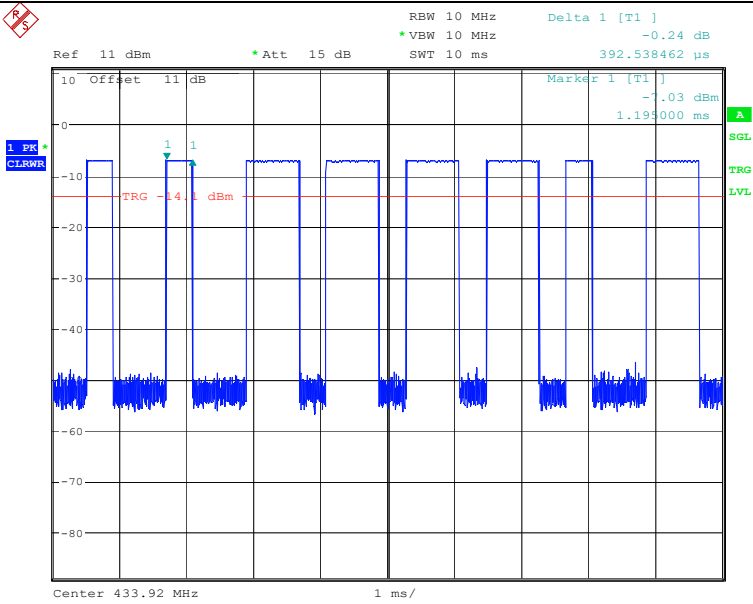
ProjectNo.:2501Q13185E-RF Tester:Cheeb Huang
Date: 5.JUN.2025 15:49:46

Pulse Width
(Ton2)



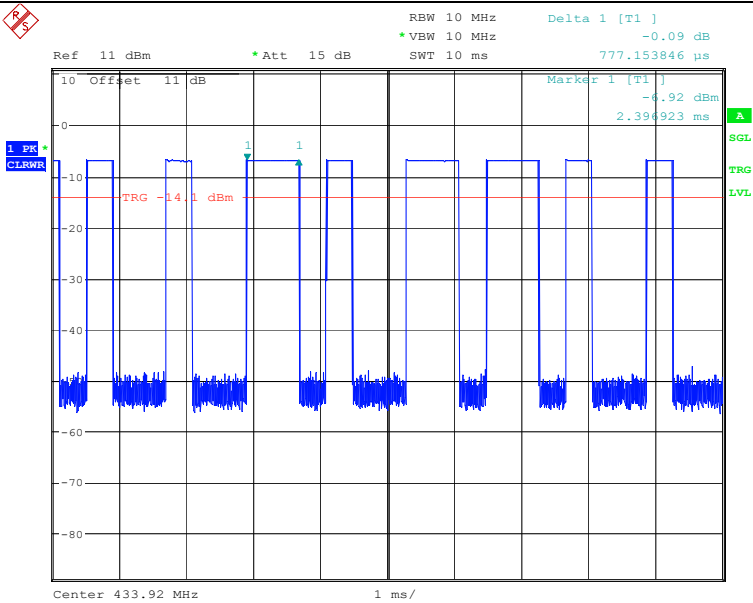
ProjectNo.:2501Q13185E-RF Tester:Cheeb Huang
Date: 5.JUN.2025 15:51:16

Pulse Width
(Ton3)



ProjectNo.:2501Q13185E-RF Tester:Cheeb Huang
Date: 5.JUN.2025 16:19:05

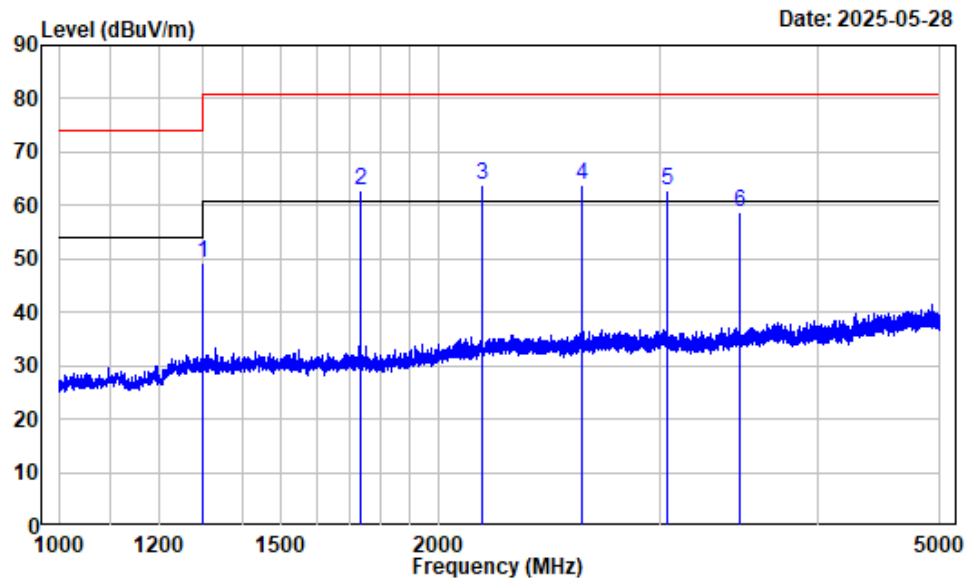
Pulse Width
(Ton4)



ProjectNo.:2501Q13185E-RF Tester:Cheeb Huang
Date: 5.JUN.2025 16:19:41

1 GHz - 5 GHz:

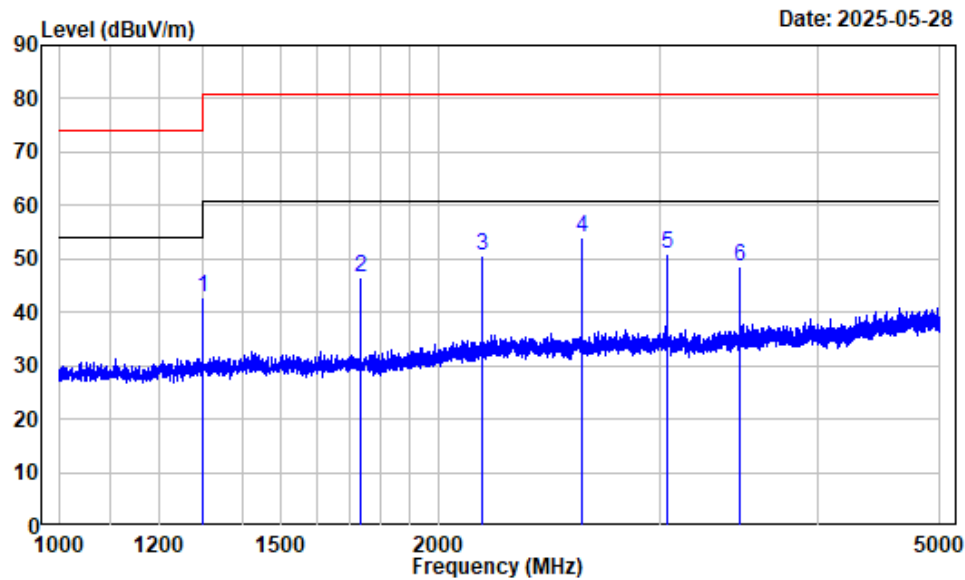
Horizontal-Peak



Condition : Horizontal
Project No. : 2501Q13185E-RF
Tester : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 433.92

	Freq Factor		Read Level		Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	Line	Limit	
1	1301.760	-14.44	63.56	49.12	74.00	-24.88	Peak
2	1735.680	-13.98	76.87	62.89	80.83	-17.94	Peak
3	2169.600	-11.30	75.24	63.94	80.83	-16.89	Peak
4	2603.520	-10.77	74.65	63.88	80.83	-16.95	Peak
5	3037.440	-10.08	72.86	62.78	80.83	-18.05	Peak
6	3471.360	-10.16	68.98	58.82	80.83	-22.01	Peak

Vertical--Peak



Condition : Vertical
Project No. : 2501Q13185E-RF
Tester : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 433.92

	Freq Factor		Read Level	Level	Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1301.760	-14.44	57.26	42.82	74.00	-31.18	Peak
2	1735.680	-13.98	60.56	46.58	80.83	-34.25	Peak
3	2169.600	-11.30	61.86	50.56	80.83	-30.27	Peak
4	2603.520	-10.77	64.76	53.99	80.83	-26.84	Peak
5	3037.440	-10.08	60.87	50.79	80.83	-30.04	Peak
6	3471.360	-10.16	58.74	48.58	80.83	-32.25	Peak

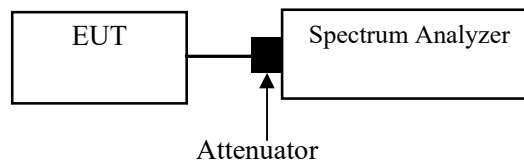
FCC §15.231(a) (2) - DEACTIVATION TESTING

Applicable Standard

Per FCC §15.231(a) (2), A transmitter activated automatically shall cease transmission within 5 seconds after activation.

Test Procedure

1. The EUT is setting to the transmit mode, 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=1MHz/ VBW=3MHz/ Span=0Hz.
4. Repeat above procedures until all frequency measured was complete.



Test Data

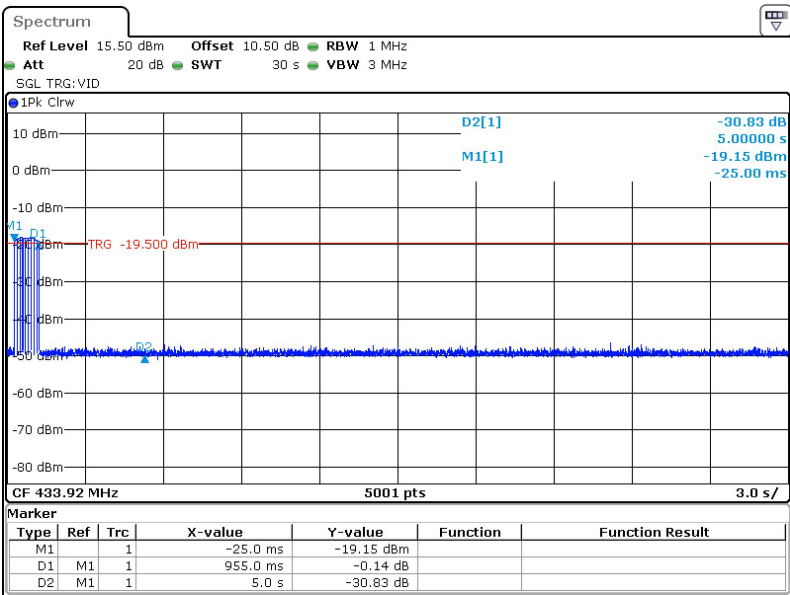
Environmental Conditions

Temperature:	22 °C
Relative Humidity:	54%
ATM Pressure:	102.1 kPa

The testing was performed by Cheeb Huang on 2025-06-18.

Test mode: Transmitting

Test Result: Compliant. This product will cease transmission within 5 seconds after activation. Please refer to following plots.



ProjectNo.:2501Q13185E-RF Tester:Cheeb Huang
Date: 18.JUN.2025 12:56:11

FCC §15.231(c) - 20 dB 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.

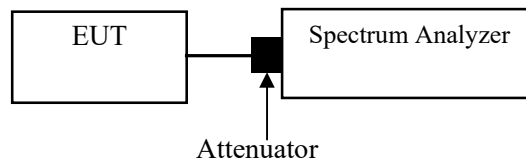
Test Procedure

Test Method: ANSI C63.10-2020 Clause 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 at least 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 4.1.6.2.
- 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 $[(\text{reference value}) - xx]$. 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 dBc 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 dBc bandwidth shall be reported by providing spectral 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

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	54%
ATM Pressure:	102.1 kPa

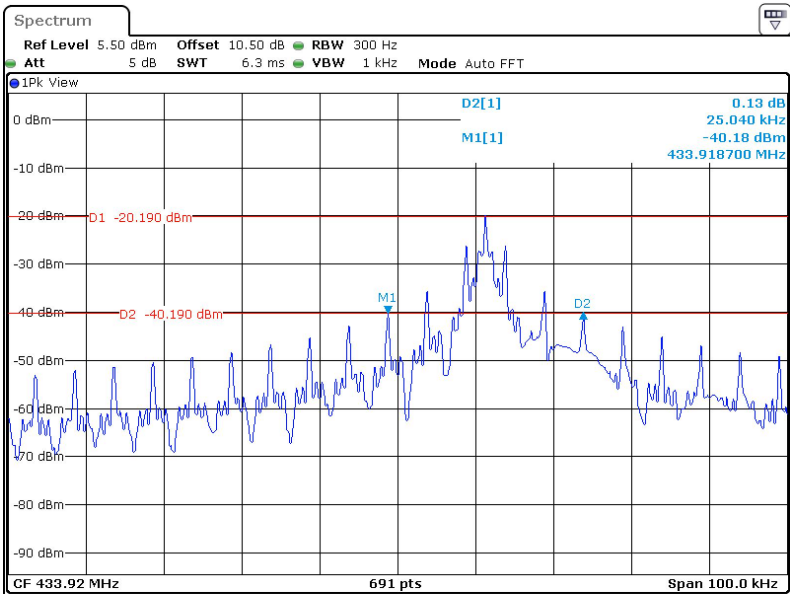
The testing was performed by Cheeb Huang on 2025-04-08.

Test Mode: Transmitting

Please refer to following table and plots.

Channel Frequency (MHz)	20dB Emission Bandwidth (kHz)	Limit (kHz)
433.92	25.04	1085

20 dB Emission Bandwidth



ProjectNo.:2501Q13185E-RF Tester:Cheeb Huang
Date: 8.APR.2025 16:59:35

EUT PHOTOGRAPHS

Please refer to the attachment 2501Q13185E-RF External photo and 2501Q13185E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2501Q13185E-RF Test Setup photo.

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