

Project No: TM-2506000323P
Report No.: TMWK2506002547KR

FCC ID: ELVNTRZI

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FCC RADIO TEST REPORT

Test Standard : FCC Part 15.231

Product name : Transceiver

Model No. : REC-2N4A-3D

Trade name : EXCALIBUR

Operation Freq. : 433.92 MHz

Test Result : Pass

Statements of Conformity : Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10-2020+COR.1-2023 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc. (Wugu Laboratory)

Approved by:

Sehni, Hu

Sehni Hu
Supervisor

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	August 15, 2025	Initial Issue	ALL	Peggy Tsai

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Nutek Corporation No.167, Lane 235, Bauchiau Rd., Xindian District, New Taipei City
Manufacturer	Nutek Corporation No.167, Lane 235, Bauchiau Rd., Xindian District, New Taipei City
Equipment	Transceiver
Model Name	REC-2N4A-3D
Model Discrepancy	N/A
Trade Name	EXCALIBUR
Received Date	June 20, 2025
Date of Test	July 14 ~ 30, 2025
Periodic operation	<input checked="" type="checkbox"/> (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. <input type="checkbox"/> (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation <input type="checkbox"/> (3) Periodic transmissions at regular predetermined intervals are not permitted. <input type="checkbox"/> (4) Periodic transmissions (lower field strength): each transmission is not greater than 1 sec and the silent period between transmissions is at least 30 times the duration of the transmission but in no case less than 10 sec.
Power Operation	Power from Power supply (DC 12V)
Operation Frequency	433.92 MHz
H/W Version	EZ26A
S/W Version	NSZ10

Remark:

- For more details, please refer to the User's manual of the EUT.
- Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

1.2 EUT CHANNEL INFORMATION

Frequency Range	433.92 MHz
Modulation Type	ASK

Remark:

Refer as ANSI C63.10-2020+COR.1-2023 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
<input checked="" type="checkbox"/> 1 MHz or less	1	Middle
<input type="checkbox"/> 1 MHz to 10 MHz	2	1 near top and 1 near bottom
<input type="checkbox"/> More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Type	<input type="checkbox"/> PIFA <input type="checkbox"/> PCB <input type="checkbox"/> Coils <input checked="" type="checkbox"/> Helical Spring Antenna
Antenna Brand / Model Name	Brand: Nutek Model: ESR601A1
Antenna Gain	Gain: 1.046 dBi

Notes:

1.The antenna(s) of the EUT are permanently attached and there are no provisions for connection to an external antenna. So the EUT complies with the requirements of §15.203.

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	± 2.21 dB
Channel Bandwidth	± 2.79 dB
Radiated Emission_9kHz-30MHz	± 3.492 dB
Radiated Emission_30MHz-200MHz	± 3.683 dB
Radiated Emission_200MHz-1GHz	± 3.966 dB
Radiated Emission_1GHz-6GHz	± 5.063 dB

Remark:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan.

CAB identifier: TW1309

Test site	Test Engineer	Remark
AC Conduction Room	-	Not applicable, because EUT doesn't connect to AC Main Source direct.
Radiation	Ben Yang 、Tony Chao	-
RF Conducted	David Li	-

Remark: 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. :444940, the FCC Designation No.:TW1309

1.6 INSTRUMENT CALIBRATION

Conducted_FCC_15_231_433M					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Power Supply	MOTECH	PPS1208	12033120005	2024-10-16	2025-10-15
Loop Probe	LANGER EMV-TECHNIK	RF-R 50-1	02-2644	2024-12-20	2025-12-19
EXA Signal Analyzer	Keysight	N9010A	MY53400256	2024-11-19	2025-11-18
Software	N/A				

966A_Radiated					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Signal Analyzer	KEYSIGHT	N9010A	MY52220817	2025-03-05	2026-03-04
Active Loop Antenna	COM-POWER	AL-130	121051	2025-02-18	2026-02-17
Thermo-Hygro Meter	HTC	HTC-1	HTC-D06	2025-05-26	2026-05-25
Bi-Log Antenna	Sunol Sciences	JB3	A030105&532	2025-06-26	2026-06-25
Preamplifier	EMEC	EM330	060609	2025-02-20	2026-02-19
Cable	Huber+Suhner	104PEA	20995+21000+182330	2024-08-07	2025-08-06
Horn Antenna	ETC	MCTD 1209	DRH13M02003	2024-12-20	2025-12-19
Preamplifier	HP	8449B	3008A00965	2024-12-18	2025-12-17
Cable	EMCI	EMC101G	221012+230205+250412	2025-04-24	2026-04-23
Site Validation	CCS	966A	N/A	2024-08-03	2025-08-02
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Software	e3 V9-210616c				

Remark:

- Each piece of equipment is scheduled for calibration once a year.
- N.C.R. = No Calibration Required.

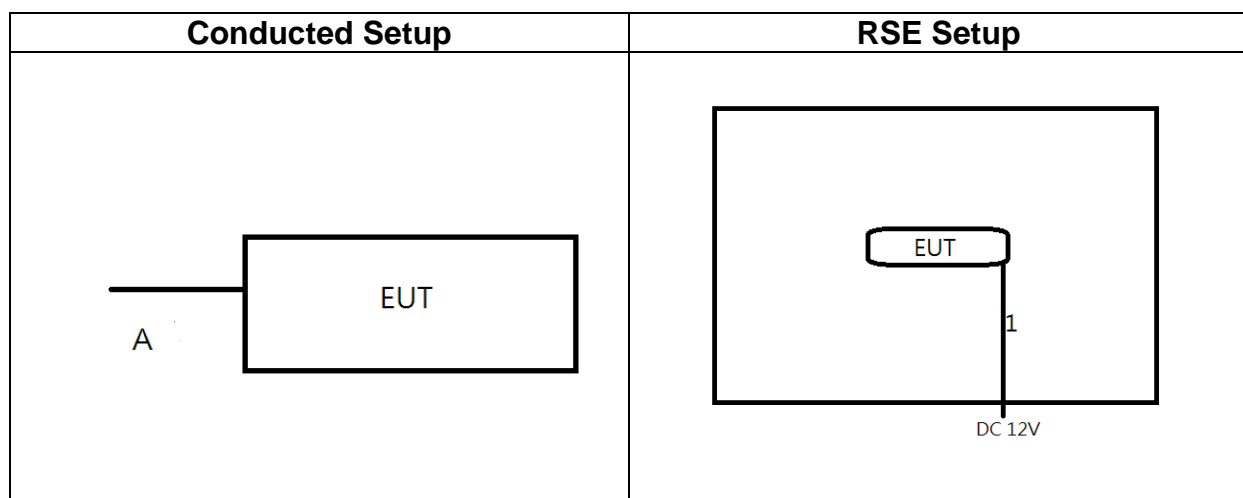
1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

EUT Accessories Equipment						
No.	Equipment	Brand	Model	Series No.	FCC ID	IC
	N/A					

Support Equipment (Conducted)					
No.	Equipment	Brand	Model	Series No.	FCC ID
A	Cable	N/A	N/A	N/A	N/A

Support Equipment (RSE)					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	DC Cable	MISUMI	MCR3S-RE	N/A	N/A

1.8 TEST SETUP DIAGRAM



1.9 TEST PROGRAM

This EUT uses push buttons, to set the frequency, modulation, and power to allow the sample to continuously transmit .

1.10 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10-2020+Cor.1-2023, FCC 15.231.

2. TEST SUMMARY

FCC Standard Sec.	Chapter	Test Item	Result
15.207	4.1	AC Power-line Conducted Emission	Not applicable
15.231(c)	4.2	Emission Bandwidth	Pass
15.231(b)	4.3	Fundamental Emission	Pass
15.205, 15.209, 15.231 (b)	4.4	Transmitter Radiated Emission	Pass
15.231(a)	4.5	Operation Restriction	Pass
15.203	4.6	Antenna Requirement	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	433.92 MHz
RF Field strength	<u>Peak: 99.01 dBuv/m</u> <u>Average: 78.01 dBuv/m</u>

Remark: Field strength performed Average level at 3m.

3.2 THE WORST MODE OF MEASUREMENT

Radiated Emission Measurement Above 1G	
Test Condition	Radiated Emission Above 1G
Power supply Mode	Mode 1: EUT power by Power supply (12V)
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Worst Position	<input type="checkbox"/> Placed in fixed position. <input type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input checked="" type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1: EUT power by Power supply (12V)
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(Y-Plane) were recorded in this report

3.3 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

According to FCC 15.231(b), 15.231(e),

(b) In addition to the provisions of §15.205, 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	2,250	225
70-130	1,250	125
130-174	¹ 1,250 to 3,750	¹ 125 to 375
174-260	3,750	375
260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

¹Linear 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.

(e) Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section, provided the intentional radiator complies with the provisions of paragraphs (b) through (d) of this section, except the field strength table in paragraph (b) of this section is replaced by the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	1,000	100
70-130	500	50
130-174	500 to 1,500 ¹	50 to 150 ¹
174-260	1,500	150
260-470	1,500 to 5,000 ¹	150 to 500 ¹
Above 470	5,000	500

¹Linear interpolations.

In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

3.4 EUT DUTY CYCLE

Temperature: 23.5°C

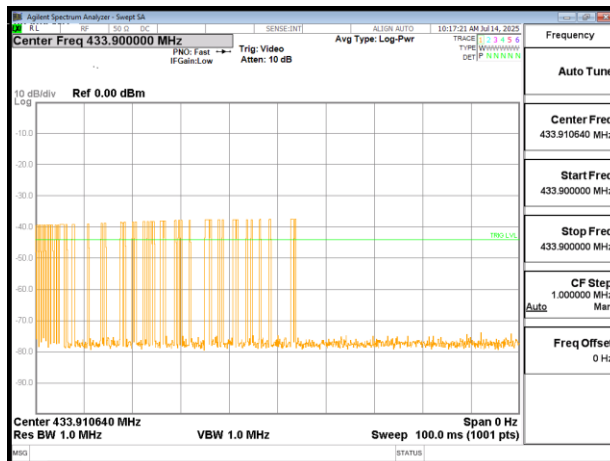
Test Date: July 14, 2025

Humidity: 62% RH

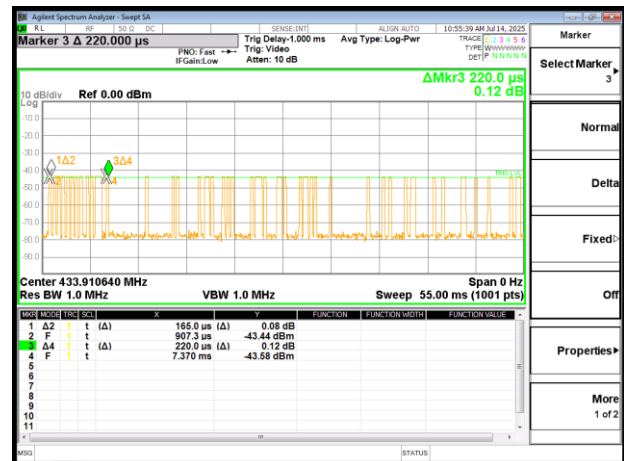
Tested by: David Li

Duty Cycle		
TX ON (ms)	Duty Cycle (%)	Duty Factor(dB)
10.835	0.11	-19.30

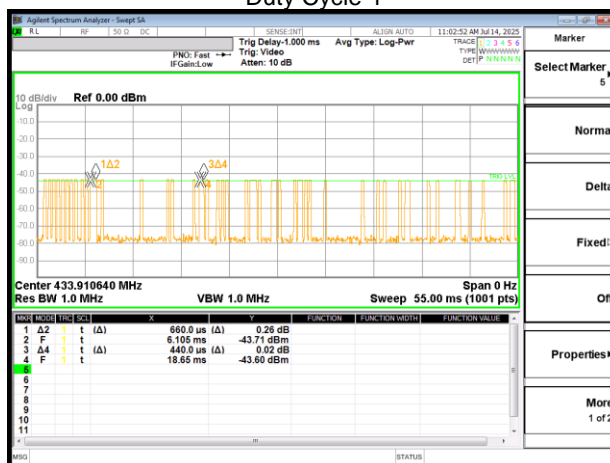
DUTY CYCLE



Duty Cycle-1



Duty Cycle-2



Duty Cycle-3

Notes:

- The transmitter duty cycle was measured using a spectrum analyser in the time domain and calculated by $20 \log(\text{Time(on)} / [\text{Period or } 100 \text{ ms whichever is the lesser}])$
- The EUT transmits for a Time(on) of $165 \times 15 + 220 \times 20 + 440 \times 6 + 660 \times 2 = 10.835$ milliseconds within the specified 100ms period.
 $20 \log(\text{Time(on)} / [\text{Period or } 100 \text{ ms whichever is the lesser}])$
 $20 \log(10.835 / 100) = -19.3 \text{ dB}$

4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a),

Frequency Range (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

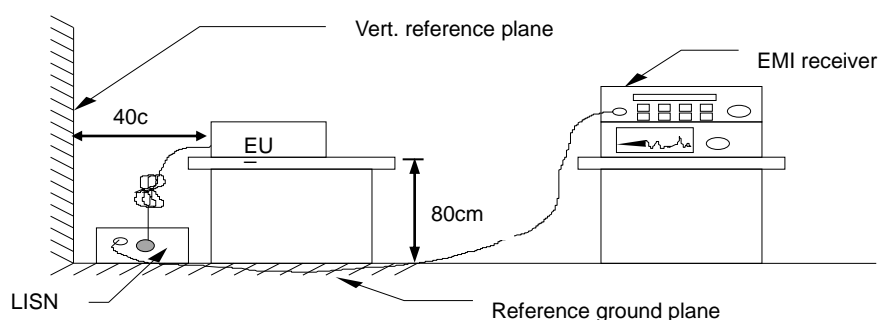
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI C63.10-2020+Cor.1-2023 clause 6.2,

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete

4.1.3 Test Setup



4.1.4 Test Result

Not applicable, because EUT doesn't connect to AC Main Source direct.

4.2 EMISSION BANDWIDTH

4.2.1 Test Limit

According to §15.231(c),

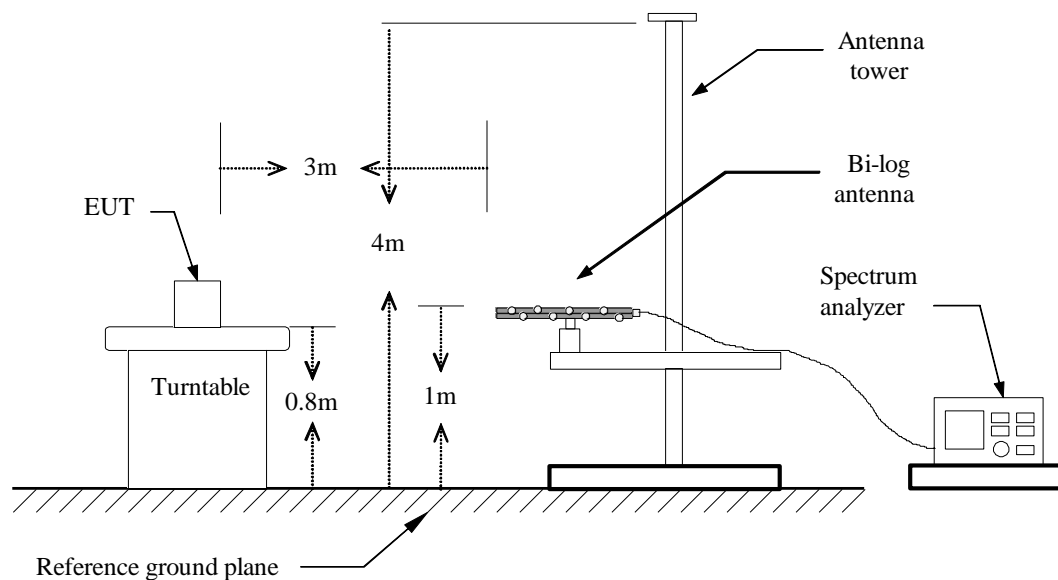
Limit	<input checked="" type="checkbox"/> 70 MHz – 900 MHz : $F_c * 0.25 \%$ <input type="checkbox"/> Above 900 MHz : $F_c * 0.5 \%$
-------	---

4.2.2 Test Procedure

Test method Refer as ANSI C63.10-2020+Cor.1-2023 clause 6.9.2,

SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, Trace mode = Max hold, Sweep = Auto. Measure the maximum width of the emission that is constrained by the frequencies associated with the Occupied Bandwidth (99%) and 20dB Bandwidth.

4.2.3 Test Setup



4.2.4 Test Result

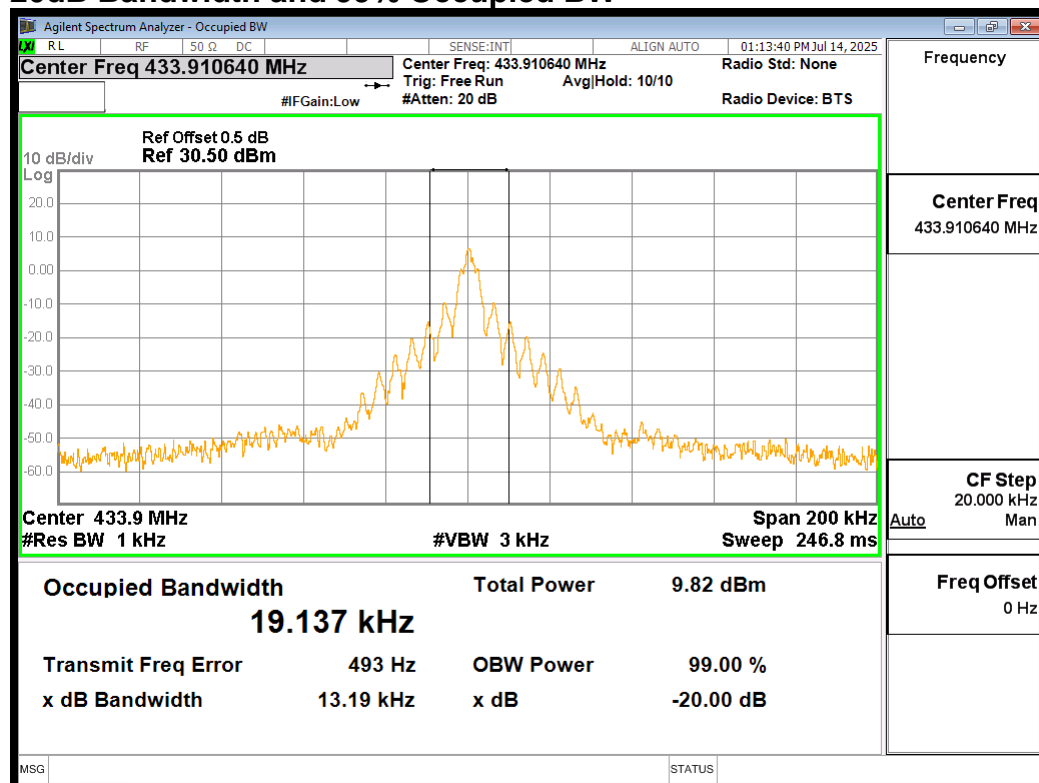
Temperature: 23.5°C Test Date: July 14, 2025
Humidity: 62% RH Tested by: David Li

Spectrum Bandwidth				
Frequency (MHz)	20dB Bandwidth (KHz)	20dB Bandwidth Limits (MHz)	99% Occupied BW (KHz)	99% Bandwidth Limits (MHz)
433.91064	13.19	1.085	19.137	1.085

Note: Since the RBW cannot reach 1%, the condition of ANSI C63.10a-2024 RBW: 1kHz is used.

Test Data

20dB Bandwidth and 99% Occupied BW



4.3 FIELD STRENGTH OF FUNDAMENTAL

4.3.1 Test Limit

According to §15.231(b),

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 interpolation with frequency, f, in MHz:

For 130-174 MHz: Field Strength ($\mu\text{V/m}$) = $(56.81818 \times f) - 6136.3636$

For 260-470 MHz: Field Strength ($\mu\text{V/m}$) = $(41.6667 \times f) - 7083.3333$

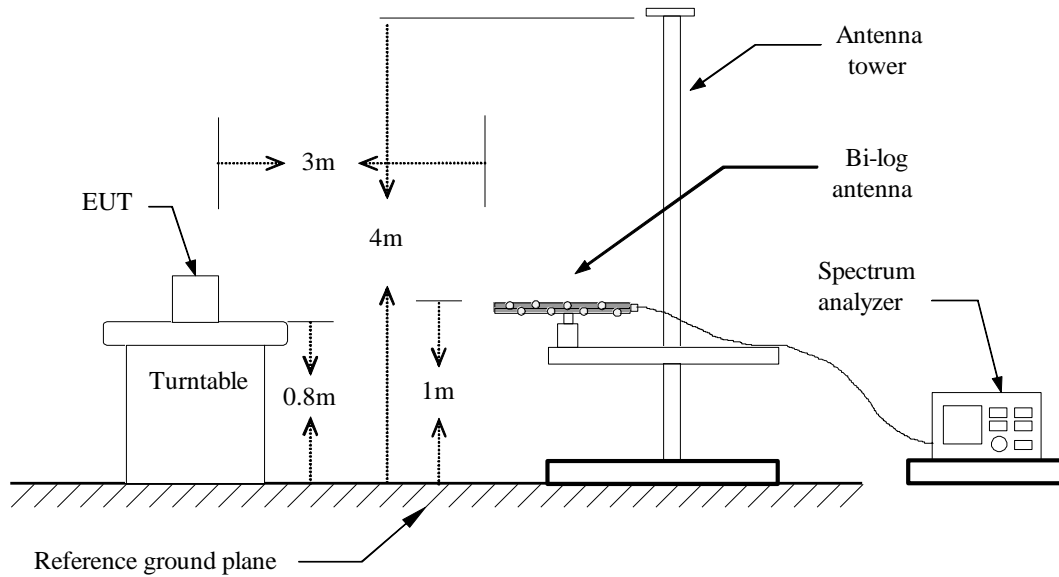
Note 1: Frequency bands 225-328.6 MHz and 335.4-399.9 MHz are designated for the exclusive use of the Government of Canada. Manufacturers should be aware of possible harmful interference and degradation of their licence-exempt radio equipment in these frequency bands.

4.3.2 Test Procedure

Test method Refer as ANSI C63.10-2020+Cor.1-2023 clause 4.1.4 and clause 6.5

clause 4.1.4	<input checked="" type="checkbox"/> 4.1.4.2.2: Measurement Peak value. <input type="checkbox"/> 4.1.4.2.3: Duty cycle $\geq 100\%$. <input checked="" type="checkbox"/> 4.1.4.2.4: Measurement Average value.
--------------	--

4.3.3 Test Setup

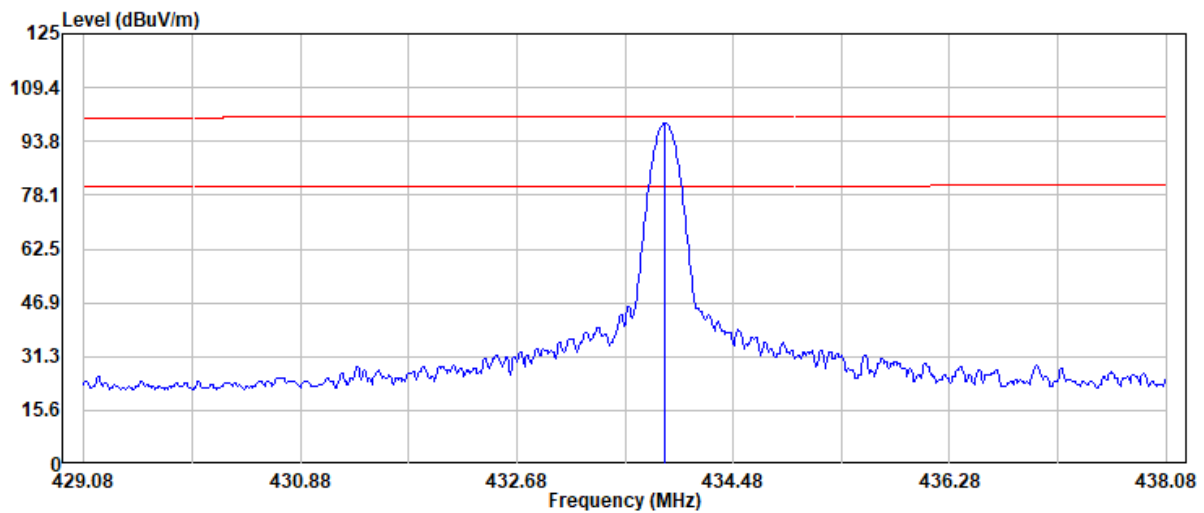


4.3.4 Test Result

Test Data

Project No : TM-2506000323P
Operation Band : 433 MHz
Frequency : 433.9 MHz
Operation Mode : Main
EUT Pol : E1
Setting :

Test Date : 2025-07-30
Temp./Humi. : 25.5/52
Antenna Pol. : VERTICAL
Engineer : Tony.Chao
Test Chamber : 966A



Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
433.91	104.77	-5.76	99.01	100.83	-1.82	Peak
433.91	99.01	-19.30	79.71	80.83	-1.12	Average

Note:

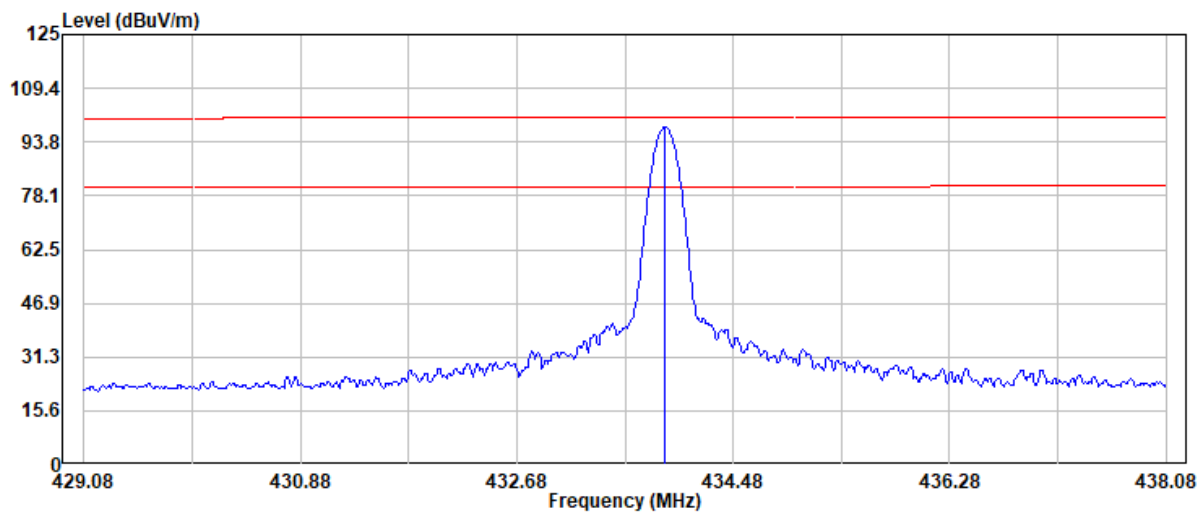
1. Fundamental measured method setting on spectrum, RBW=100 kHz, VBW=100kHz and Detector=Peak.
2. Actual FS=Read Level+Factor
3. Margin=Actual FS-Limit
4. Average result = Peak result + Duty factor = 99.01 – 19.30 = 79.71 (dBuV/m)
5. 260MHz ~ 470MHz limit is $(41.6667 \times f) - 7083.3333$
Limit = 20 Log (10996.68116 uV/m)= 80.83 dBuV/m

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Project No : TM-2506000323P
Operation Band : 433 MHz
Frequency : 433.9 MHz
Operation Mode : Main
EUT Pol : E1
Setting :

Test Date : 2025-07-30
Temp./Humi. : 25.5/52
Antenna Pol. : HORIZONTAL
Engineer : Tony.Chao
Test Chamber : 966A



Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
433.91	103.83	-5.76	98.07	100.83	-2.76	Peak
433.91	98.07	-19.30	78.77	80.83	-2.06	Average

Note:

1. Fundamental measured method setting on spectrum, RBW=100 kHz, VBW=100kHz and Detector=Peak.
2. Actual FS=Read Level+Factor
3. Margin=Actual FS-Limit
4. Average result = Peak result + Duty factor = 98.07 – 19.30 = 78.77 (dBuV/m)
5. 260MHz ~ 470MHz limit is $(41.6667 \times f) - 7083.3333$
Limit = 20 Log (10996.68116 uV/m)= 80.83 dBuV/m

4.4 RADIATION UNWANTED EMISSION

4.4.1 Test Limit

According to §15.231(b) and §15.209, §15.205

Unwanted emissions limit follow the table or the FCC Part 15.209, whichever limit permits higher field strength.

According to §15.231(b),

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 interpolation with frequency, f, in MHz:

For 130-174 MHz: Field Strength ($\mu\text{V/m}$) = $(56.81818 \times f) - 6136.3636$

For 260-470 MHz: Field Strength ($\mu\text{V/m}$) = $(41.6667 \times f) - 7083.3333$

Below 30MHz

Frequency (MHz)	Field Strength				
	($\mu\text{V/m}$)	(dB $\mu\text{V/m}$)	Measurement Distance (meter)	(dB $\mu\text{V/m}$)	Measurement Distance (meter)
0.009 - 0.490	2400/F(kHz)	48.52 – 13.80	300	128.52–104.84	3
0.490 - 1.705	24000/F(kHz)	33.80 – 22.97	30	73.80– 62.97	3
1.705 – 30.0	30	29.54	30	69.54	3

Above 30MHz

Frequency (MHz)	Field Strength		Measurement Distance (meter)
	($\mu\text{V/m}$)	(dB $\mu\text{V/m}$)	
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

4.4.2 Test Procedure

Test method Refer as ANSI C63.10-2020+Cor.1-2023

<input checked="" type="checkbox"/> Unwanted Emission	<input checked="" type="checkbox"/> clause 4.1.4.2.2: Measurement Peak value. <input type="checkbox"/> clause 4.1.4.2.3: Duty cycle $\geq 100\%$. <input checked="" type="checkbox"/> clause 4.1.4.2.4: Measurement Average value.
<input checked="" type="checkbox"/> Radiated Emission	<input checked="" type="checkbox"/> clause 6.4: below 30 MHz and test distance is 3m. <input checked="" type="checkbox"/> clause 6.5: below 30 MHz -1 GHz and test distance is 3m. <input checked="" type="checkbox"/> clause 6.6: Above 30 MHz and test distance is 3m.

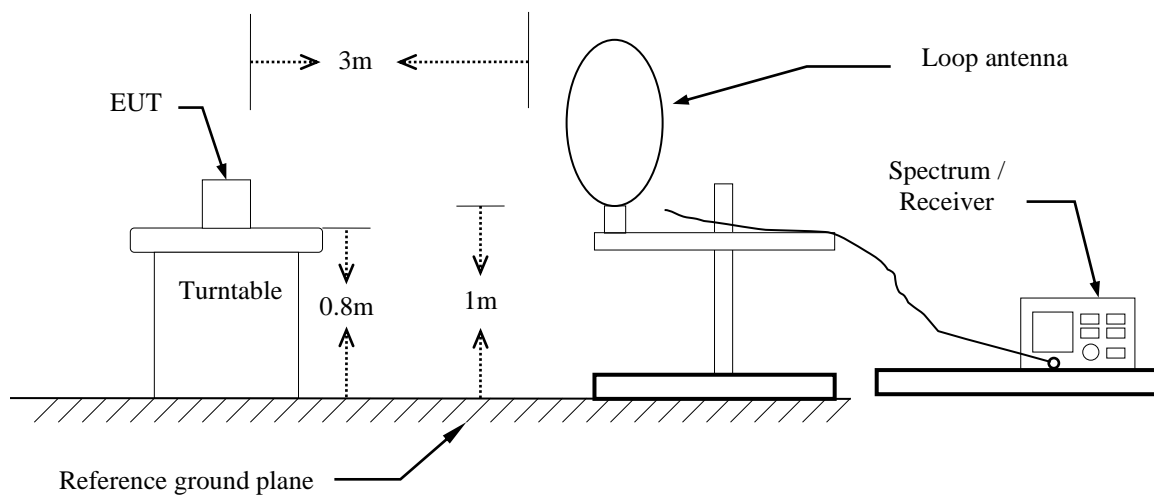
- The EUT is placed on a turntable, which is 0.8m for test below 1GHz and 1.5m for test above 1GHz, above ground plane.
- The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- Set the spectrum analyzer in the following setting as:
Below 1GHz:
RBW=100kHz / VBW=300kHz / Sweep=AUTO
Above 1GHz:
(a)PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
(b)AVERAGE: RBW=1MHz, and consider the duty cycle factor
- Repeat above procedures until the measurements for all frequencies are complete.

Remark.

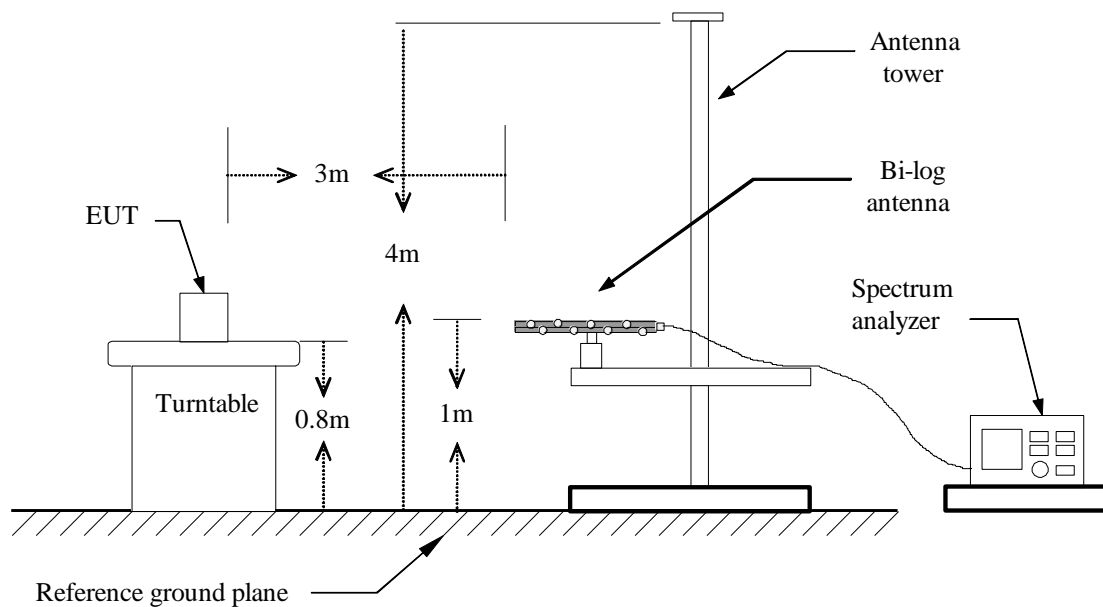
- Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
- No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).

4.4.3 Test Setup

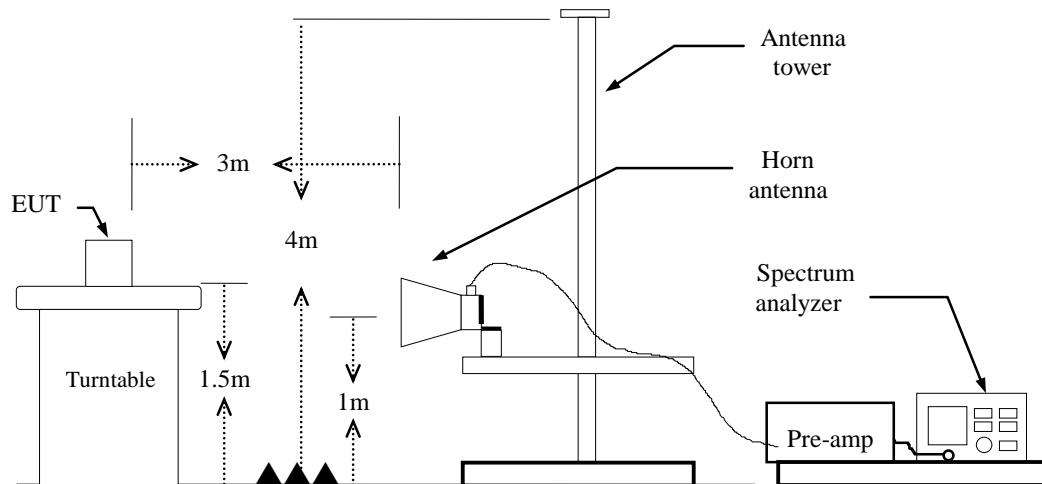
9kHz ~ 30MHz



30MHz ~ 1 GHz



Above 1 GHz



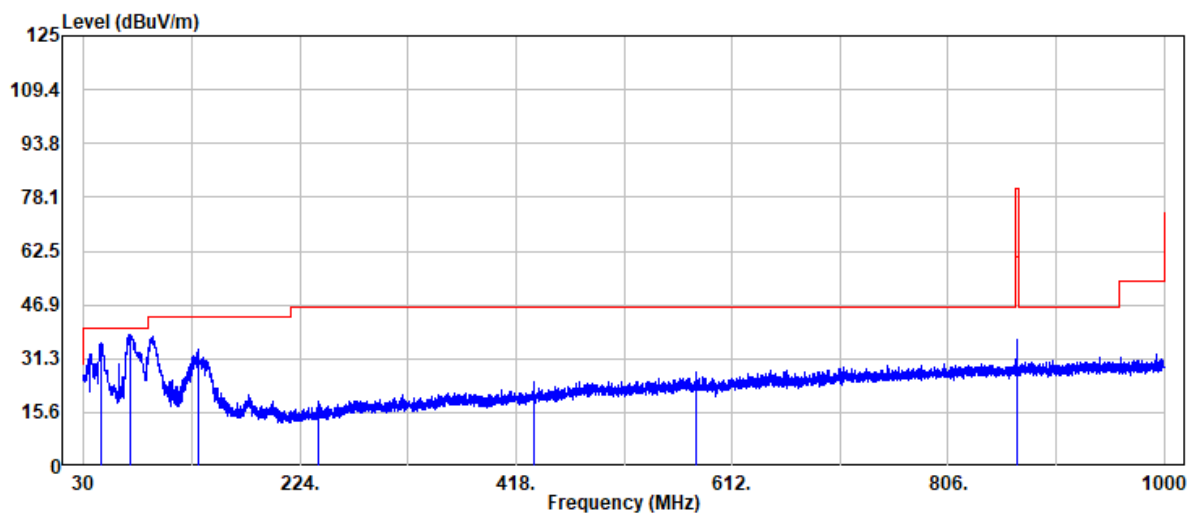
4.4.4 Test Result

Pass.

Below 1GHz

Project No : TM-2506000323P
Operation Band : 433 MHz
Frequency : 433.9 MHz
Operation Mode : TX
EUT Pol : E1
Setting :

Test Date : 2025-07-30
Temp./Humi. : 25.5/52
Antenna Pol. : VERTICAL
Engineer : Ben.Yang
Test Chamber : 966A



Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
45.64	49.72	-13.92	35.80	40.00	-4.20	Peak
72.07	53.74	-15.61	38.13	40.00	-1.87	Peak
132.21	43.69	-9.96	33.73	43.50	-9.77	Peak
240.01	30.39	-11.39	19.00	46.00	-27.00	Peak
433.88	30.34	-5.76	24.58	46.00	-21.42	Peak
579.99	30.38	-3.14	27.24	46.00	-18.76	Peak
867.80	35.76	1.14	36.90	80.83	-43.93	Peak

Note:

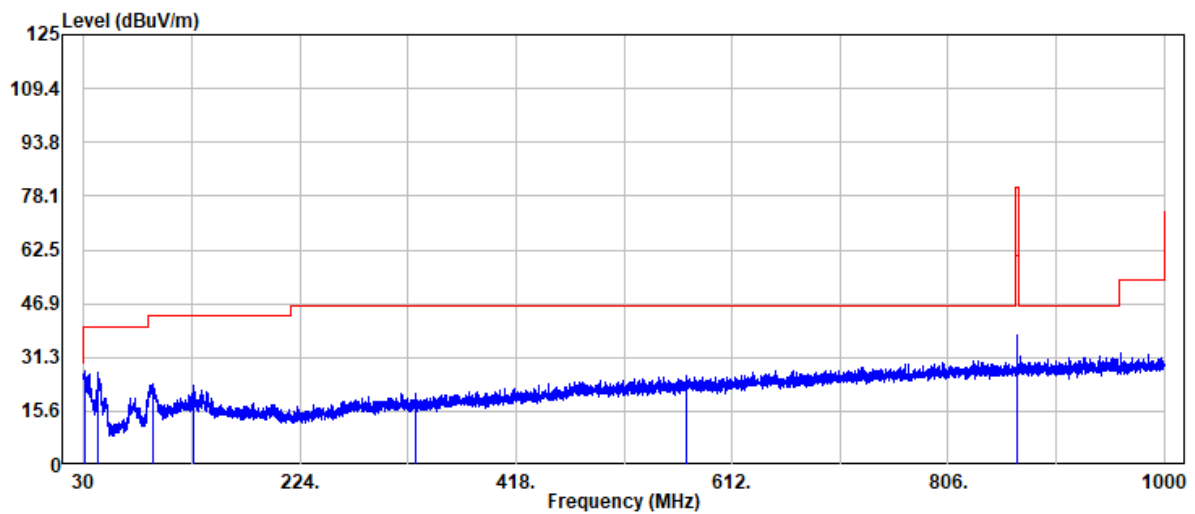
1. Actual FS = Read Level + Factor
2. Margin = Actual FS - Limit

Project No: TM-2506000323P
Report No.: TMWK2506002547KR

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Project No : TM-2506000323P
Operation Band : 433 MHz
Frequency : 433.9 MHz
Operation Mode : TX
EUT Pol : E1
Setting :

Test Date : 2025-07-30
Temp./Humi. : 25.5/52
Antenna Pol. : HORIZONTAL
Engineer : Ben.Yang
Test Chamber : 966A



Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
30.73	30.52	-3.27	27.25	40.00	-12.75	Peak
43.10	39.16	-12.31	26.85	40.00	-13.15	Peak
91.96	39.25	-15.70	23.55	43.50	-19.95	Peak
128.46	32.60	-9.70	22.90	43.50	-20.60	Peak
328.15	29.71	-8.79	20.92	46.00	-25.08	Peak
571.50	28.93	-3.14	25.79	46.00	-20.21	Peak
867.80	36.57	1.14	37.71	80.83	-43.12	Peak

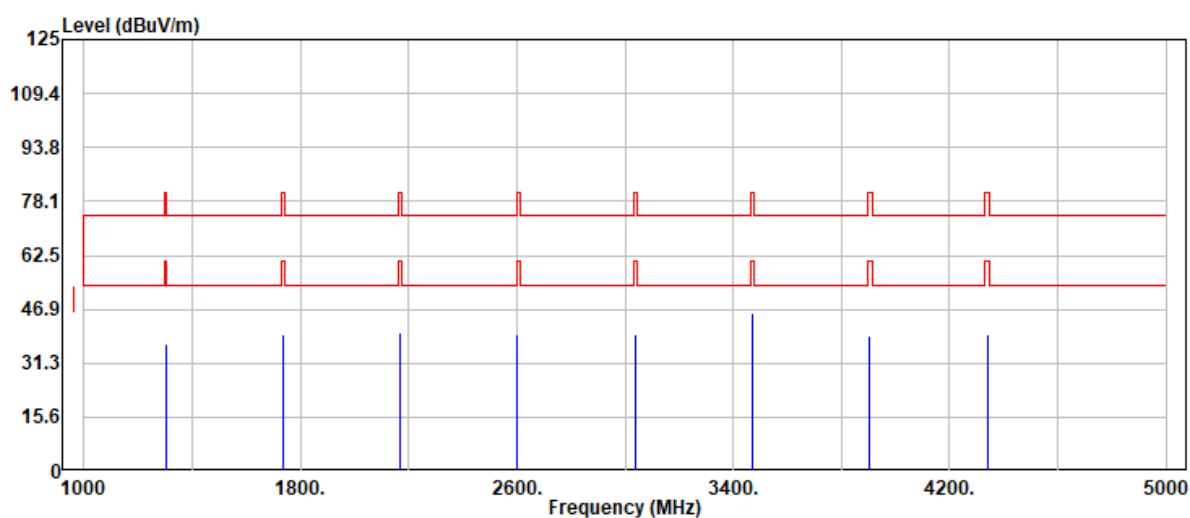
Note:

1. Actual FS = Read Level + Factor
2. Margin = Actual FS - Limit

Above 1GHz

Project No : TM-2506000323P
Operation Band : 433 MHz
Frequency : 433.9 MHz
Operation Mode : TX
EUT Pol : E1
Setting :

Test Date : 2025-07-30
Temp./Humi. : 25.5/52
Antenna Pol. : VERTICAL
Engineer : Tony.Chao
Test Chamber : 966A



Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
1301.70	43.94	-7.27	36.67	80.83	-44.16	Peak
1735.60	45.64	-6.15	39.49	80.83	-41.34	Peak
2169.50	42.79	-2.92	39.87	80.83	-40.96	Peak
2603.40	41.91	-2.41	39.50	80.83	-41.33	Peak
3037.30	41.46	-2.04	39.42	80.83	-41.41	Peak
3471.20	46.47	-0.89	45.58	80.83	-35.25	Peak
3905.10	38.42	0.94	39.36	80.83	-41.47	Peak
4339.00	37.93	1.56	39.49	80.83	-41.34	Peak

Remark:

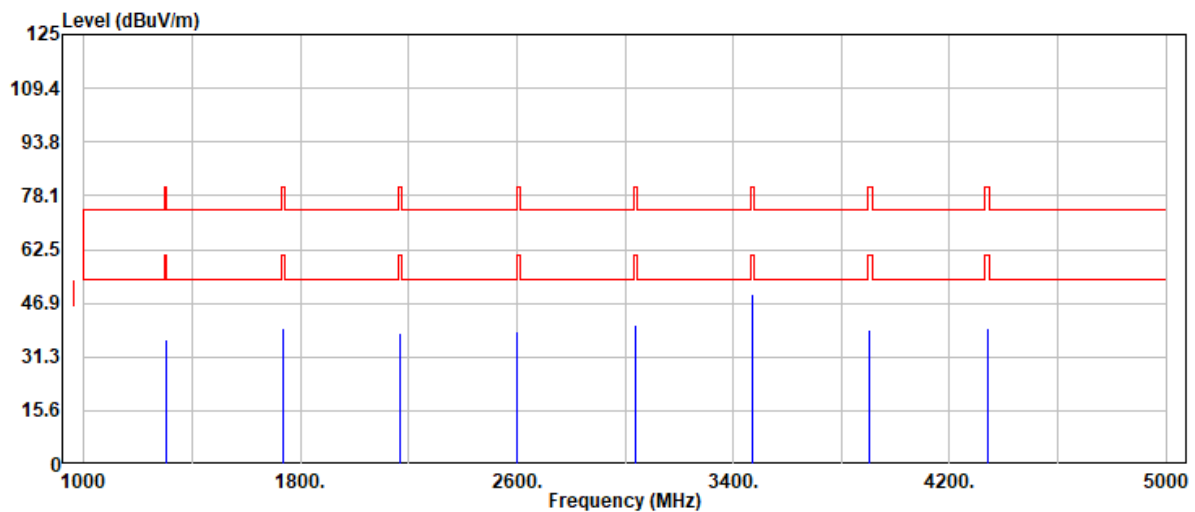
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit.
3. Actual FS = Read Level + Factor
4. Margin = Actual FS - Limit

Project No: TM-2506000323P
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Project No : TM-2506000323P
Operation Band : 433 MHz
Frequency : 433.9 MHz
Operation Mode : TX
EUT Pol : E1
Setting :

Test Date : 2025-07-30
Temp./Humi. : 25.5/52
Antenna Pol. : HORIZONTAL
Engineer : Tony.Chao
Test Chamber : 966A



Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
1301.70	43.67	-7.27	36.40	80.83	-44.43	Peak
1735.60	46.00	-6.15	39.85	80.83	-40.98	Peak
2169.50	41.28	-2.92	38.36	80.83	-42.47	Peak
2603.40	41.29	-2.41	38.88	80.83	-41.95	Peak
3037.30	42.56	-2.04	40.52	80.83	-40.31	Peak
3471.20	50.43	-0.89	49.54	80.83	-31.29	Peak
3905.10	38.08	0.94	39.02	80.83	-41.81	Peak
4339.00	38.05	1.56	39.61	80.83	-41.22	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit.
3. Actual FS = Read Level + Factor
4. Margin = Actual FS - Limit

4.5 OPERATION RESTRICTION

4.5.1 Test Limit

According to §15.231(a)(1)

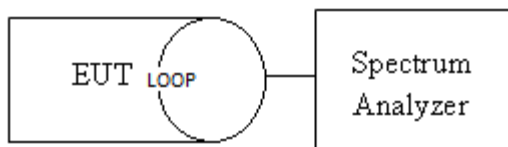
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

4.5.2 Test Procedure

Test method Refer as ANSI C63.10-2020+Cor.1-2023 clause 7.4

Set the RBW=1MHz, VBW=1MHz, Detector = Peak, Trace mode = Max hold, Sweep = 10s. Measure

4.5.3 Test Setup



4.5.4 Test Result

Temperature: 23.5°C Test Date: July 14, 2025
Humidity: 62% RH Tested by: David Li

Dwell Time		
Dwell Time (ms)	Limit (s)	Result
1100	< 5	Pass

Test Data

DWELL TIME



4.6 ANTENNA REQUIREMENT

§ 15.203 Antenna requirement.

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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. 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 Type	<input type="checkbox"/> PIFA <input type="checkbox"/> PCB <input type="checkbox"/> Coils <input checked="" type="checkbox"/> Helical Spring Antenna
Antenna Brand / Model Name	Brand: Nutek Model: ESR601A1
Antenna Gain	Gain: 1.046 dBi

Remark:

1.The antenna(s) of the EUT are permanently attached and there are no provisions for connection to an external antenna. So the EUT complies with the requirements of §15.203.

- End of Test Report -