RADIO TEST REPORT

Product	:	Tire Pressure Monitoring System
Model Name	:	AI SENSOR
FCC ID	:	W55AISDB3N4
Test Regulation	:	FCC 47 CFR Part 15 Subpart C (Section 15.231)
Received Date	:	2023/5/29
Test Date	:	2023/6/12 ~ 2023/6/16
Issued Date	:	2023/7/3
Applicant	:	Oro Technology Co., Ltd. 3F, No.29, 21st Road, Industrial Park, Taichung 408, Taiwan
Issued By	:	Underwriters Laboratories Taiwan Co., Ltd. Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Testing Laboratory
3398

REVISION HISTORY

Original Test Report No.: 4790838020-US-R0-V0

Revision	Test report No.	Date	Page revised	Contents
Original	4790838020-US-R0-V0	2023/7/3	-	Initial issue

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1. Attestation of Test Results

APPLICANT:	Oro Technology Co., Ltd. 3F, No.29, 21st Road, Industrial Park, Taichung 408, Taiwan
MANUFACTURER:	Oro Technology Co., Ltd. 3F, No.29, 21st Road, Industrial Park, Taichung 408, Taiwan
EUT DESCRIPTION:	Tire Pressure Monitoring System
BRAND:	ORO
MODEL:	AI SENSOR
SAMPLE STAGE:	Design Verification Test sample
DATE of TESTED:	2023/6/12 ~ 2023/6/16

APPLICABLE STANDARDS	
STANDARD	**Test Results**
FCC 47 CFR PART 15 Subpart C (Section 15.231)	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

Sally Lu Date : 2023/7/3
Project Handler

Approved and Authorized By:

Kent Liu Date : 2023/7/3
Senior Laboratory Engineer

2. Summary of Test Results

Summary of Test Results		
FCC Clause	**Test Items**	**Result**
15.209 / 15.231(b)	Radiated Emissions	PASS
15.231(c)	Emission Bandwidth Test	PASS
15.231(a)	Deactivation Time Measurement	PASS

3. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398.

4. Measurement Uncertainty

For statement of conformity, Simple acceptance (Section 4.3.4 of ISO Guide 115) was applied as decision rule for measurement in this test report.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor k=2.

Determining compliance based on the results of the compliance measurement, not considering measurement instrumentation uncertainty.

Measurement	Frequency	Uncertainty
Conducted disturbance at mains terminals ports	150kHz ~ 30MHz	±3.1 dB
RF Conducted	9 kHz - 40GHz	±2.3 dB
Radiated disturbance below 30MHz	9 kHz - 30 MHz	±3.2 dB
Radiated disturbance below 1 GHz	30MHz ~ 1GHz	±6.1 dB
Radiated disturbance above 1 GHz	1GHz ~ 40GHz	±5.1 dB

5. Equipment under Test

5.1. Description of EUT

Product	Tire Pressure Monitoring System
Brand Name	ORO
Model Name	AI SENSOR
Operating Frequency	315 MHz 433.92 MHz
Modulation	315 MHz: ASK 433.92 MHz: FSK
Transfer Rate	9600 bps
Number of Channel	2
Maximum Output Power	315 MHz: 68.44 dBuV/m 433.92 MHz: 74.88 dBuV/m
Normal Voltage	3Vdc from battery
Sample ID	6121411 & 6121412
Software Version	Continuous transmission by powering on

Note:

1. The EUT contains following accessory devices:

Product	Brand	Model	Description
Valve	ORO	S02VA00014	-

2. The EUT could be supplied with rechargeable battery as the following table:

Brand Name	Model	Description
Murata	CR2050W	3V Lithium battery

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual, the laboratory shall not be held responsible.

5.2. Channel List

2 channels are provided to this EUT:

Channel	Frequency (MHz)
1	315

Channel	Frequency (MHz)
1	433.92

5.3. Test Condition

Test Item	Test Site No.	Environmental Condition	Input Power	Test Date	Tested by
Antenna Port Conducted Measurement	SR4	22~25°C/ 56~61%RH	3Vdc	2023/06/12~ 2023/06/16	Jubo Shen
Radiated Spurious Emission	966-2	22~25°C/ 56~61%RH	3Vdc	2023/06/12~ 2023/06/16	Jubo Shen

FCC Test Firm Registration Number: 498077

Sample Calculation:

Radiated Spurious Emission:

- Where relevant, the follow sample calculation is provided:
  Result Value (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).
  Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
  Example: Result Value (34.5dBuV/m) = Reading Value (40.1dBuV) + Antenna Factor (18.7dB/m) + Cable Loss (4.2dB) - Preamp Factor (28.5dB).

AC power Line Conducted Emission:

- Where relevant, the follow sample calculation is provided:
  Result Value (dBuV) = Reading Value (dBuV) + Correction Factor (dB).
  Correction Factor (dB) = Insertion loss(dB) + Cable loss(dB).
  Example: Result Value (53.7dBuV) = Reading Value (35.1dBuV) + Insertion loss(18.1dB) + Cable loss(0.5dB).

5.4. Description of Available Antennas

Ant. No.	Transmitter Circuit	Brand Name	Model Name	Ant. Type	Maximum Gain (dBi)
1	Chain (0)	ORO	M02AN00004	Monopole	315MHz: -20.89 433MHz: -19.90

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual, the laboratory shall not be held responsible.

5.5. Test Mode Applicability and Tested Channel Detail

- The fundamental of the EUT was investigated in three orthogonal axes X-Y/Y-Z/X-Z, it was determined that Y-Z plane was worst-case. Therefore, all final radiated testing was performed with the EUT in Y-Z plane.
- The EUT has 3Vdc power source from battery. The test data of the 3Vdc was recorded in this report.
- For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

315MHz

Test Item	Modulation Type	Available Channel	Test Channel	Data Rate
Radiated Emissions	ASK	1	1	9600 bps
Radiated Emissions (Below 1GHz)	ASK	1	1	9600 bps
Antenna Port Conducted Measurement	ASK	1	1	9600 bps

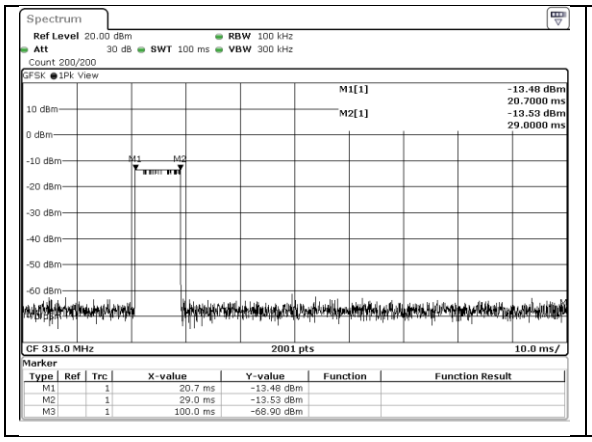
433.92MHz

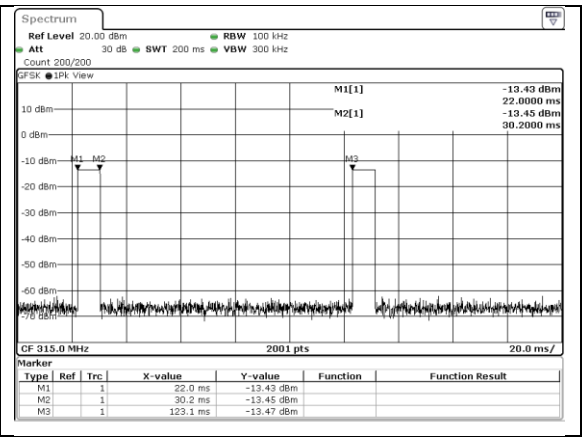
Test Item	Modulation Type	Available Channel	Test Channel	Data Rate
Radiated Emissions	FSK	1	1	9600 bps
Radiated Emissions (Below 1GHz)	FSK	1	1	9600 bps
Antenna Port Conducted Measurement	FSK	1	1	9600 bps

5.6. Duty Cycle of Test Signal

Mode	TX on (ms)	TX on+off (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
315MHz	8.300	100.000	8.30%	-21.62

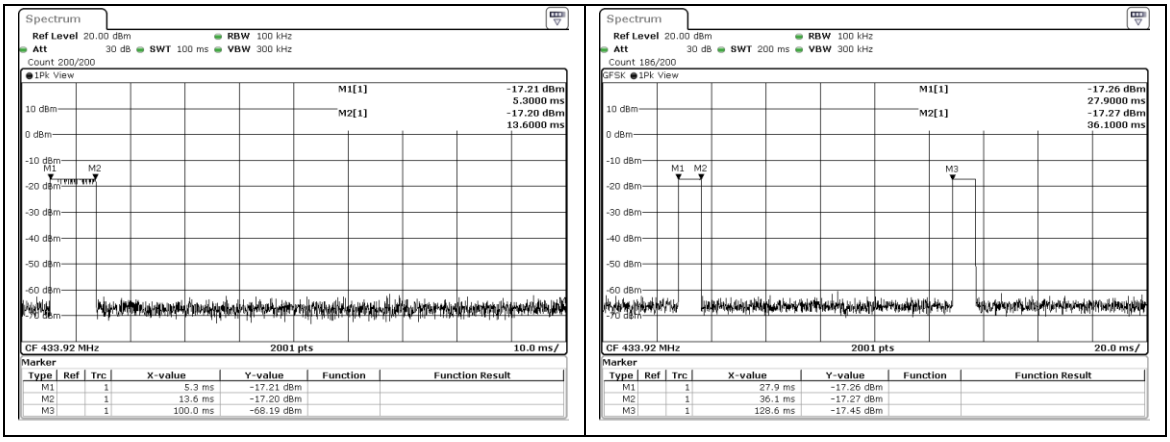
AVG factor = 20*Log (duty cycle in 100ms) = 20*Log(0.083) = -21.62 dB
Duty Cycle Correction Factor for Emission AVG Factor = -21.62 dB
Because= -21.62 less than -20, so Duty Cycle Correction Factor = -20 dB
AVG= Peak + duty cycle correction factor
AVG= Peak -20 dB





Mode	TX on (ms)	TX on+off (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
433.92MHz	8.300	100.000	8.30%	-21.62

AVG factor = 20*Log (duty cycle in 100ms) = 20*Log(0.083) = -21.62 dB
Duty Cycle Correction Factor for Emission AVG Factor = -21.62 dB
Because= -21.62 less than -20, so Duty Cycle Correction Factor = -20 dB
AVG= Peak + duty cycle correction factor
AVG= Peak -20 dB



6. Test Equipment

Test Equipment List					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date**	**Expired date**
Radiated Spurious Emission					
Spectrum Analyzer	Keysight	N9010A	MY56070827	2023/4/7	2024/4/6
EMI Test Receiver	Rohde & Schwarz	ESR7	101754	2022/12/13	2023/12/12
Loop Antenna	ETS lindgren	6502	00213440	2023/1/4	2024/1/3
Trilog-Broadband Antenna with 5dB Attenuator	Schwarzbeck & EMCI	VULB 9168 & N-6-05	774 & AT-N0538	2023/2/13	2024/2/12
Horn Antenna (1-18 GHz)	Schwarzbeck	BBHA 9120 D	01690	2022/12/21	2023/12/20
Preamplifier (30-1000 MHz)	EMCI	EMC330E	980405	2023/6/7	2024/6/6
Preamplifier (1-18 GHz)	EMCI	EMC051835BE	980406	2023/2/17	2024/2/16
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-4 & 170425-2	2022/12/1	2023/11/30

UL Software		
Description	**Name**	**Version**
Radiated measurement	e3	6.191211 (V6)
Conducted measurement	RF-Conducted-FCC 15247	ver 1.0

7. Description of Test Setup

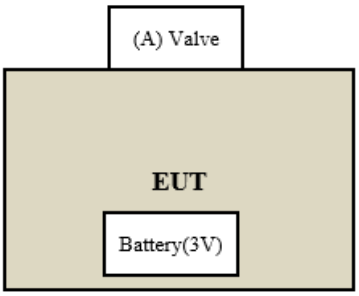
Support Equipment

ID	Equipment	Brand Name	Model Name	S/N	Remark
A	Valve	ORO	S02VA00014	NA	Provide by client

Test Setup

Continuous transmission by powering on.

Setup Diagram for Test



Under Table

Remote Site

8. Test Results

8.1. Radiated Spurious Emission

Requirements

Limits of Radiated Emission Measurement

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious	
	uV/meter	dBuV/meter	uV/meter	dBuV/meter
40.66 ~ 40.70	2250	67.04	225	48.04
70 ~ 130	1250	61.94	125	41.94
130 ~ 174	1250 ~ 3750	61.94 ~ 71.48	125 ~ 375	41.94 ~ 51.48
174 ~ 260	3750	71.48	375	51.48
260 ~ 470	3750 ~ 12500	71.48 ~ 81.94	375 ~ 1250	51.48 ~ 61.94
Above 470	12500	81.94	1250	61.94

Note:
1. Where F is the frequency in MHz, the formula for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F)-6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F)-7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.
2. The above field strength limits are specified at a distance of 3meters. The tighter limits apply at the band edges.

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequency(MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:
1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Test Procedures

[For 9 kHz ~ 30 MHz]

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. For measurement below 30MHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

NOTE:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

[For above 30 MHz]

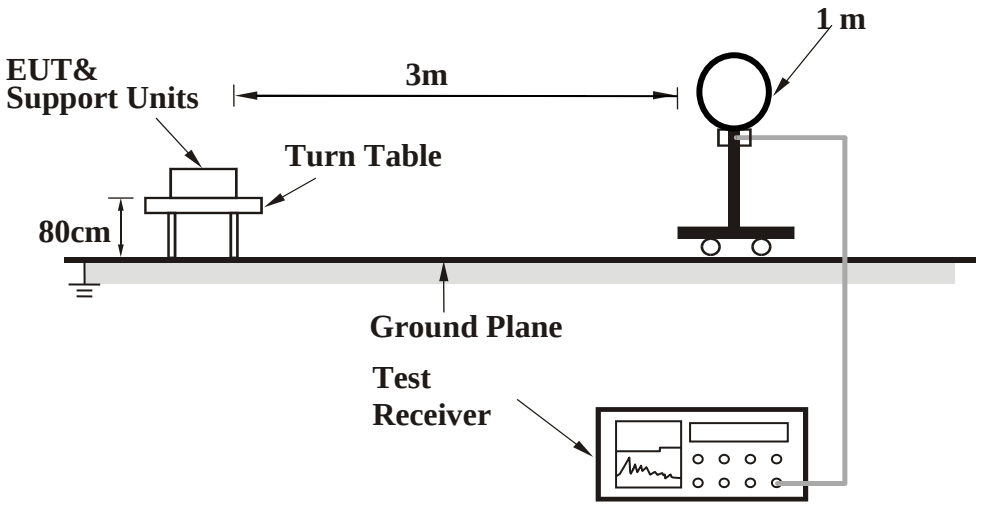
a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
b. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
d. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
e. Test data of Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
f. Test data of Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
g. Test data of Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
h. Test data of Notation "@" = Fundamental Frequency
i. Test data of Notation " * " = The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.

Test Setup

<Frequency Range 9 kHz ~ 30 MHz>



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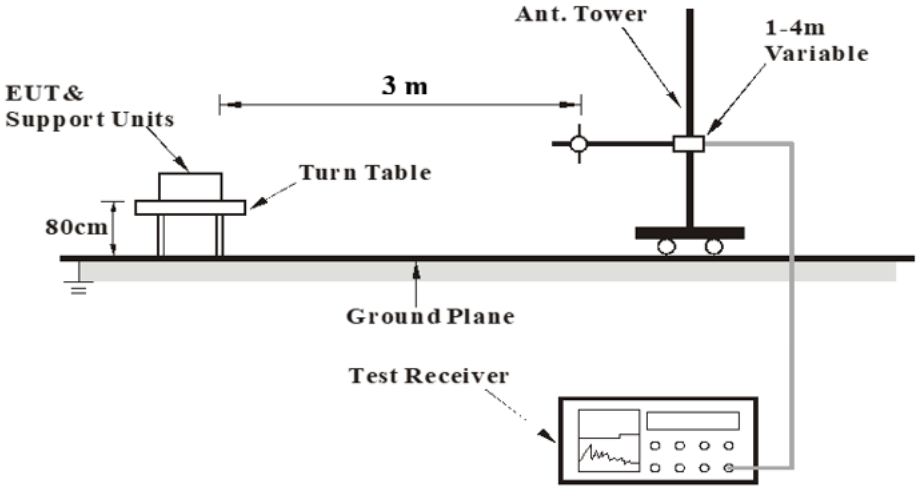
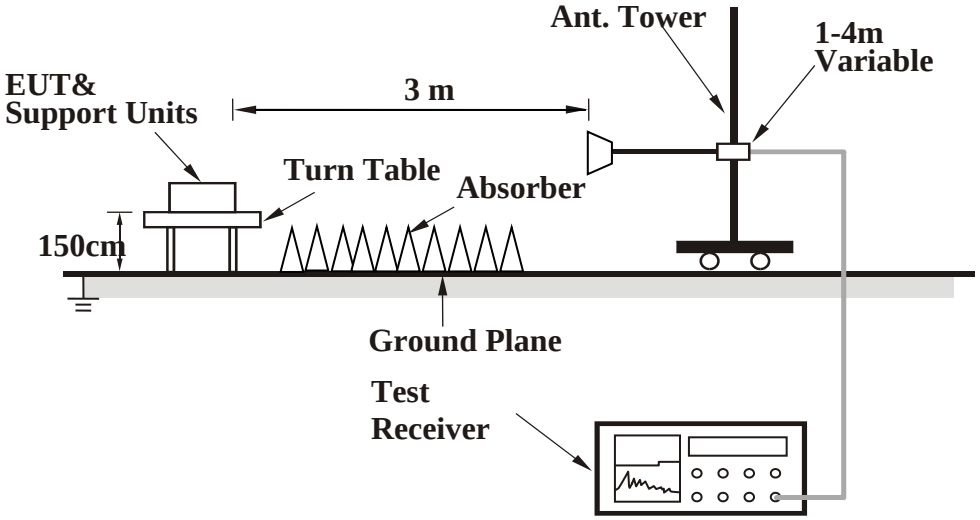


<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the Setup Configurations.

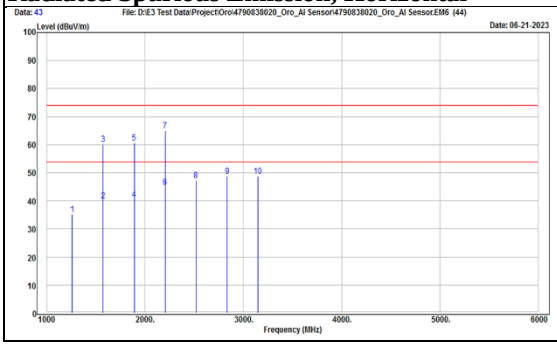
Test Data

Above 1 GHz

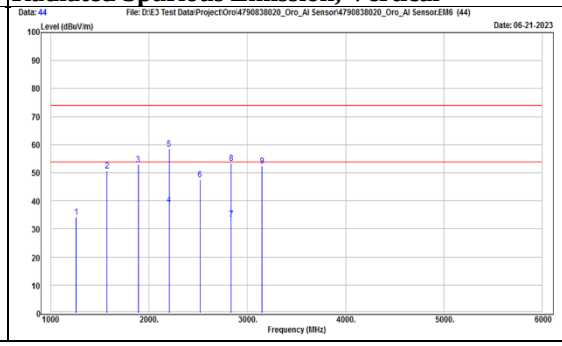
Mode	ASK(315MHz)	Channel	1

Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal	*	1260	44.03	-8.82	35.21	74	-38.79	PK
		1575	68.33	-8.25	60.08	74	-13.92	PK
		1575	48.33	-8.25	40.08	54	-13.92	AVG
		1890	67.45	-6.87	60.58	74	-13.42	PK
		1890	47.45	-6.87	40.58	54	-13.42	AVG
		2205	69.36	-4.4	64.96	74	-9.04	PK
		2205	49.36	-4.4	44.96	54	-9.04	AVG
	*	2520	51.73	-4.3	47.43	74	-26.57	PK
	*	2835	51.88	-3	48.88	74	-25.12	PK
	*	3150	50.66	-1.76	48.9	74	-25.1	PK
Vertical	*	1260	43.14	-8.82	34.32	74	-39.68	PK
	*	1575	59.05	-8.25	50.8	74	-23.2	PK
	*	1890	59.84	-6.87	52.97	74	-21.03	PK
		2205	62.88	-4.4	58.48	74	-15.52	PK
		2205	42.88	-4.4	38.48	54	-15.52	AVG
	*	2520	51.94	-4.3	47.64	74	-26.36	PK
		2835	56.4	-3	53.4	74	-20.6	PK
		2835	36.4	-3	33.4	54	-20.6	AVG
	*	3150	54.1	-1.76	52.34	74	-21.66	PK

TX, ASK(315MHz) (Ch 1)
Radiated Spurious Emission, Horizontal



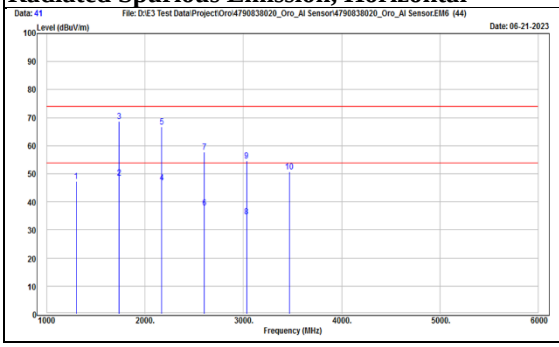
TX, ASK(315MHz) (Ch 1)
Radiated Spurious Emission, Vertical



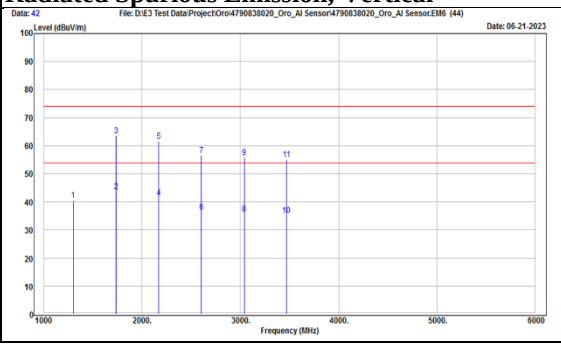
Mode	FSK(433.92MHz)	Channel	1

Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal	*	1301.76	55.87	-8.55	47.32	74	-26.68	PK
		1735.68	76.43	-7.85	68.58	74	-5.42	PK
		1735.68	56.43	-7.85	48.58	54	-5.42	AVG
		2169.6	71.39	-4.6	66.79	74	-7.21	PK
		2169.6	51.39	-4.6	46.79	54	-7.21	AVG
		2605	61.81	-4	57.81	74	-16.19	PK
		2605	41.81	-4	37.81	54	-16.19	AVG
		3035	56.69	-2.05	54.64	74	-19.36	PK
		3035	36.69	-2.05	34.64	54	-19.36	AVG
		3470	52.59	-1.88	50.71	74	-23.29	PK
Vertical	*	1301.76	49.07	-8.55	40.52	74	-33.48	PK
		1735.68	71.46	-7.85	63.61	74	-10.39	PK
		1735.68	51.46	-7.85	43.61	54	-10.39	AVG
		2169.6	66.17	-4.6	61.57	74	-12.43	PK
		2169.6	46.17	-4.6	41.57	54	-12.43	AVG
		2605	60.5	-4	56.5	74	-17.5	PK
		2605	40.5	-4	36.5	54	-17.5	AVG
		3040	57.75	-2.04	55.71	74	-18.29	PK
		3040	37.75	-2.04	35.71	54	-18.29	AVG
		3470	56.98	-1.88	55.1	74	-18.9	PK
		3470	36.98	-1.88	35.1	54	-18.9	AVG

TX, FSK(433.92MHz) (Ch 1)
Radiated Spurious Emission, Horizontal



TX, FSK(433.92MHz) (Ch 1)
Radiated Spurious Emission, Vertical

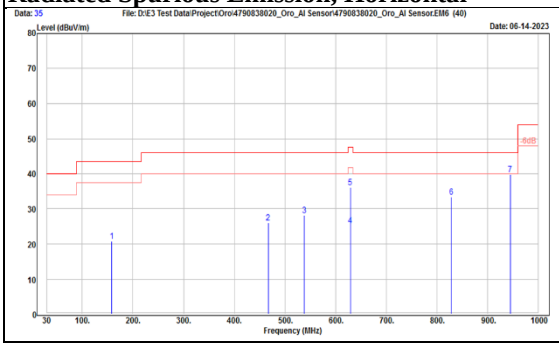


Below 1 GHz

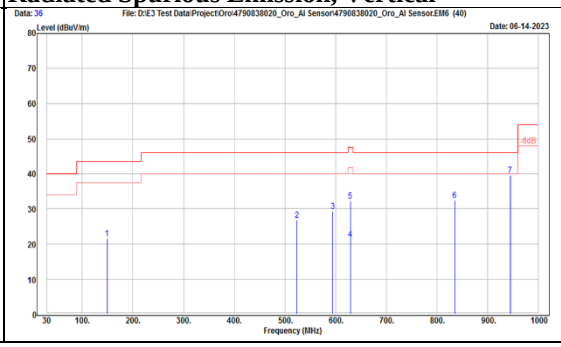
Mode	ASK(315MHz)	Channel	1

Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		158.04	41.12	-20.35	20.77	43.5	-22.73	PK
		467.47	40.41	-14.32	26.09	46	-19.91	PK
		538.28	41.13	-13.03	28.1	46	-17.9	PK
		629.46	46.85	-10.68	36.17	47.66	-11.49	PK
		629.46	35.85	-10.68	25.17	47.66	-22.49	AVG
		828.31	40.68	-7.26	33.42	46	-12.58	PK
		944.71	45.1	-5.35	39.75	46	-6.25	PK
Vertical		149.31	42.13	-20.66	21.47	43.5	-22.03	PK
		523.73	40.18	-13.29	26.89	46	-19.11	PK
		594.54	40.76	-11.37	29.39	46	-16.61	PK
		629.46	43.01	-10.68	32.33	47.66	-15.33	PK
		629.46	32.01	-10.68	21.33	47.66	-26.33	AVG
		835.1	39.63	-7.12	32.51	46	-13.49	PK
		944.71	45.02	-5.35	39.67	46	-6.33	PK

TX, ASK(315MHz) (Ch 1)
Radiated Spurious Emission, Horizontal



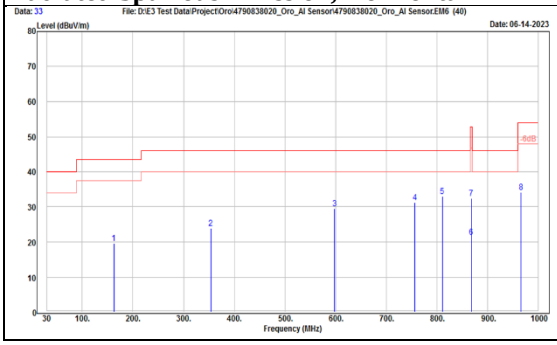
TX, ASK(315MHz) (Ch 1)
Radiated Spurious Emission, Vertical



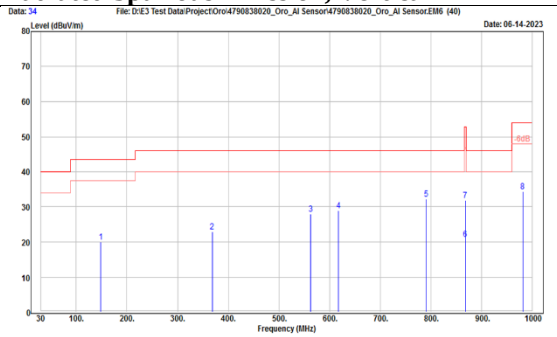
Mode	FSK(433.92MHz)	Channel	1

Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		162.89	36.98	-17.33	19.65	43.5	-23.85	PK
		353.98	38.84	-14.99	23.85	46	-22.15	PK
		598.42	37.65	-8.13	29.52	46	-16.48	PK
		756.53	36.19	-4.93	31.26	46	-14.74	PK
		810.85	37.37	-4.41	32.96	46	-13.04	PK
		868.08	36.11	-3.69	32.42	52.87	-20.45	PK
		868.08	25.11	-3.69	21.42	52.87	-31.45	AVG
		966.05	36.41	-2.17	34.24	54	-19.76	PK
Vertical		148.34	37.79	-17.73	20.06	43.5	-23.44	PK
		368.53	37.3	-14.4	22.9	46	-23.1	PK
		562.53	37.27	-9.4	27.87	46	-18.13	PK
		617.82	36.66	-7.7	28.96	46	-17.04	PK
		790.48	36.78	-4.64	32.14	46	-13.86	PK
		868.08	35.56	-3.69	31.87	52.87	-21	PK
		868.08	24.56	-3.69	20.87	52.87	-32	AVG
		981.57	36.5	-2.19	34.31	54	-19.69	PK

TX, FSK(433.92MHz) (Ch 1)
Radiated Spurious Emission, Horizontal



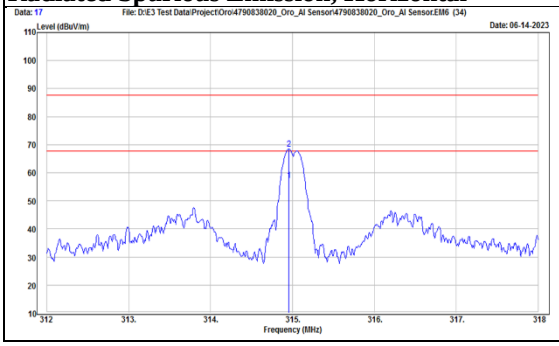
TX, FSK(433.92MHz) (Ch 1)
Radiated Spurious Emission, Vertical



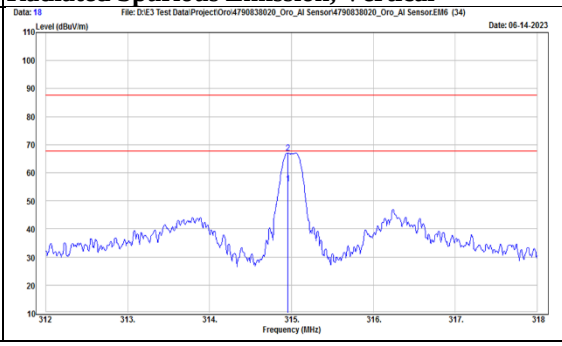
Mode	Fundamental ASK(315MHz)	Channel	1

Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		315	87.16	-18.72	68.44	87.66	-19.22	PK
		315	76.16	-18.72	57.44	67.66	-10.22	AVG
Vertical		315	85.85	-18.72	67.13	87.66	-20.53	PK
		315	74.85	-18.72	56.13	67.66	-11.53	AVG

TX, Fundamental ASK(315MHz) (Ch 1)
Radiated Spurious Emission, Horizontal

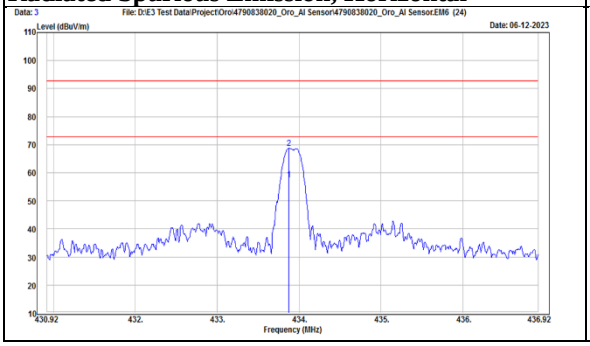
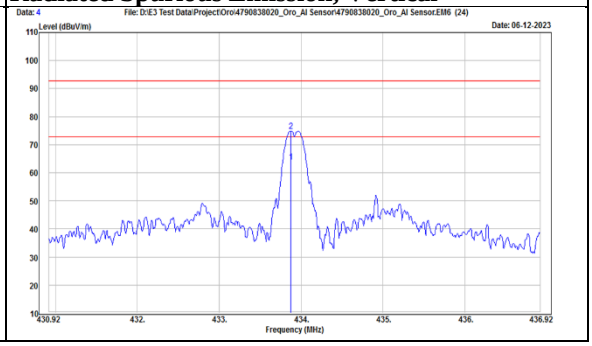


TX, Fundamental ASK(315MHz) (Ch 1)
Radiated Spurious Emission, Vertical



Mode	Fundamental FSK(433.92MHz)	Channel	1

Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		433.92	73.95	-5.27	68.68	92.87	-24.19	PK
		433.92	62.95	-5.27	57.68	72.87	-15.19	AVG
Vertical		433.92	80.15	-5.27	74.88	92.87	-17.99	PK
		433.92	69.15	-5.27	63.88	72.87	-8.99	AVG

TX, Fundamental FSK(433.92MHz) (Ch 1) Radiated Spurious Emission, Horizontal	TX, Fundamental FSK(433.92MHz) (Ch 1) Radiated Spurious Emission, Vertical
	

9 kHz ~ 30 MHz Data:

For 9 kHz to 30 MHz radiated emission have performed all modes of operation were investigated. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

No non-compliance noted:

KDB 414788 D01 OATS and Chamber Correlation Justification

- Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

- OATs and chamber correlation testing had been performed and chamber measured test results is the worst case test result.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open area 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.

8.2. 20dB Bandwidth Measurement

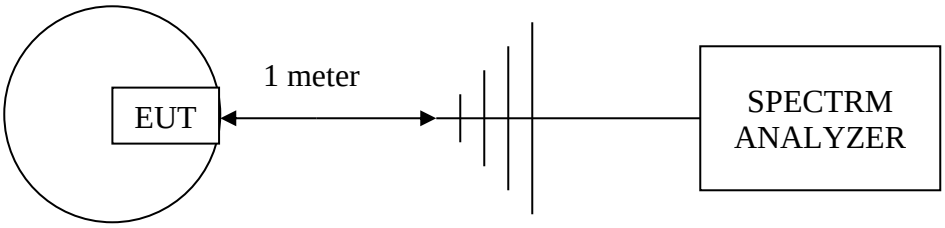
Requirements

Limits of 20dB Bandwidth Measurement

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for device operating above 70 MHz and below 900 MHz.

Fundamental Frequency (MHz)	Limit of Emission Bandwidth (kHz)
315	787.5
433.92	1084.80

Test Setup



Test Instruments

Refer to section 6 to get information of above instrument.

Test Procedure

a. The EUT was placed on the turn table.
b. The signal was coupled to the spectrum analyzer through an antenna.
c. Set the resolution bandwidth to 3 kHz and video bandwidth to 10 kHz then select Peak function to scan the channel frequency.
d. The emission bandwidth was measured and recorded.

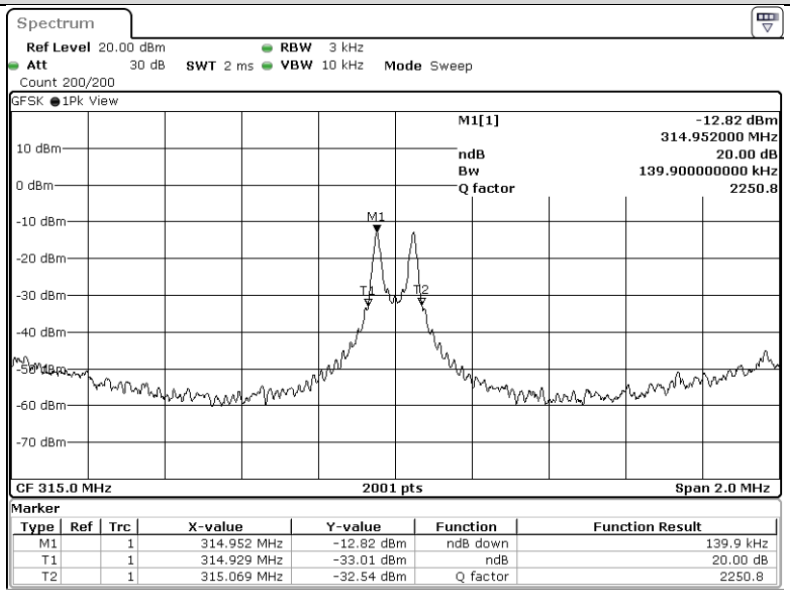
Deviation from Test Standard

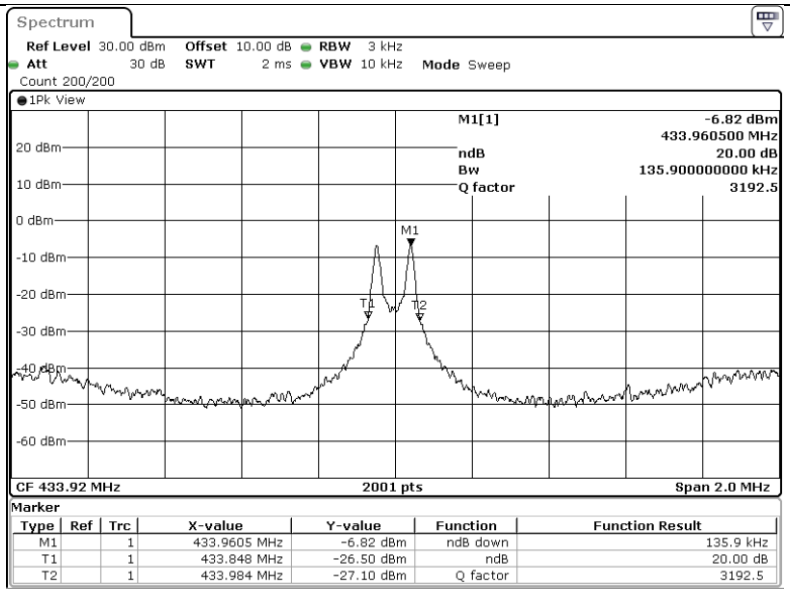
No deviation.

Test Data

Channel	Frequency (MHz)	20dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass / Fail
1	315	139.9	787.5	PASS
1	433.92	139.9	1084.80	PASS

SPECTRUM PLOT OF VALUE





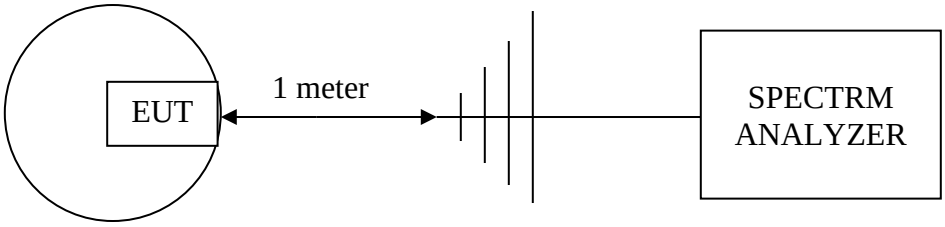
8.3. Deactivation Time Measurement

Requirements

Limits of Deactivation Time Measurement

(1) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
(2) For automatically limiting operation 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.

Test Setup



Test Instruments

Refer to section 6 to get information of above instrument.

Test Procedure

a. The EUT was placed on the turning table.

b. The signal was coupled to the spectrum analyzer through an antenna.

c. Set the resolution bandwidth to 100kHz and video bandwidth to 100kHz. The spectrum analyser was turned to the centre frequency of the transmitter's and the analyser's marker function was used to determine the duration of transmission.

d. The transmission duration was measured and recorded.

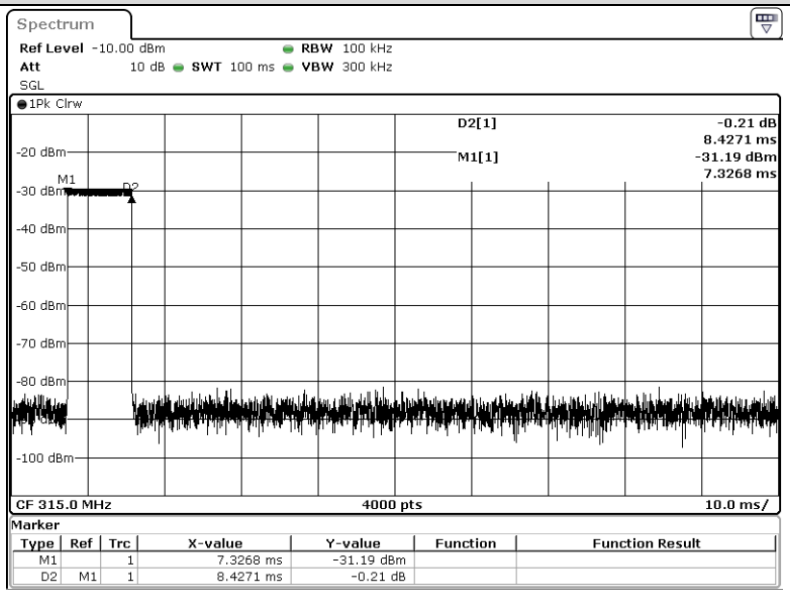
Deviation from Test Standard

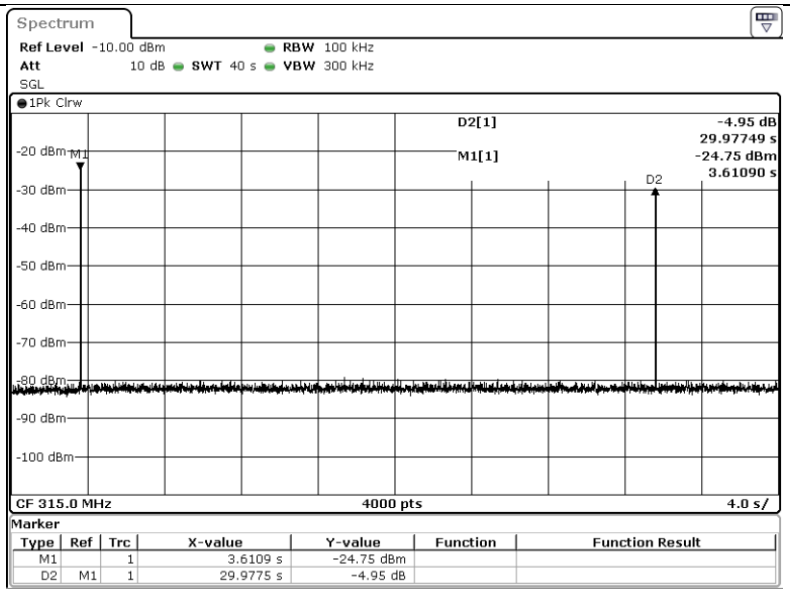
No deviation.

Test Data

Frequency (MHz)	Tx on time (ms)	Tx on time Limit (s)	Idle time (s)	Idle time Limit (s)	Pass/Fail
315	8.43	<1	29.98	10	PASS

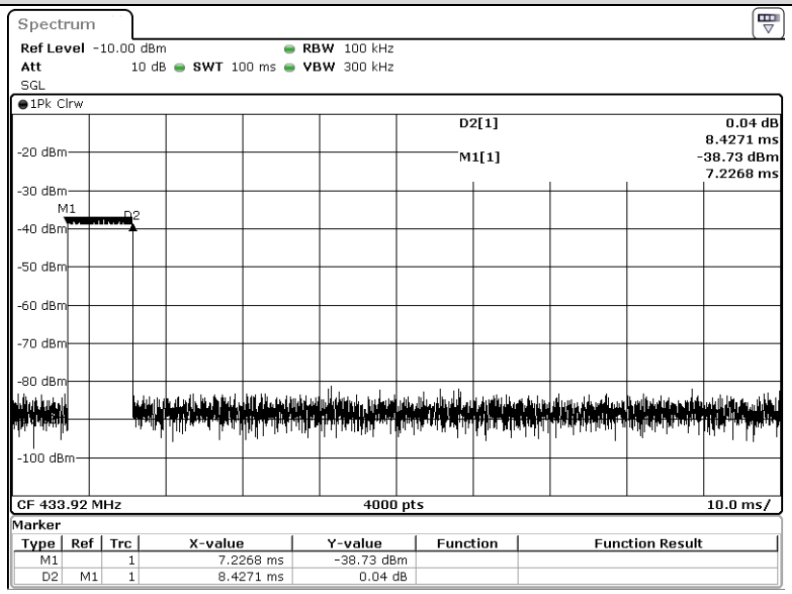
SPECTRUM PLOT OF VALUE

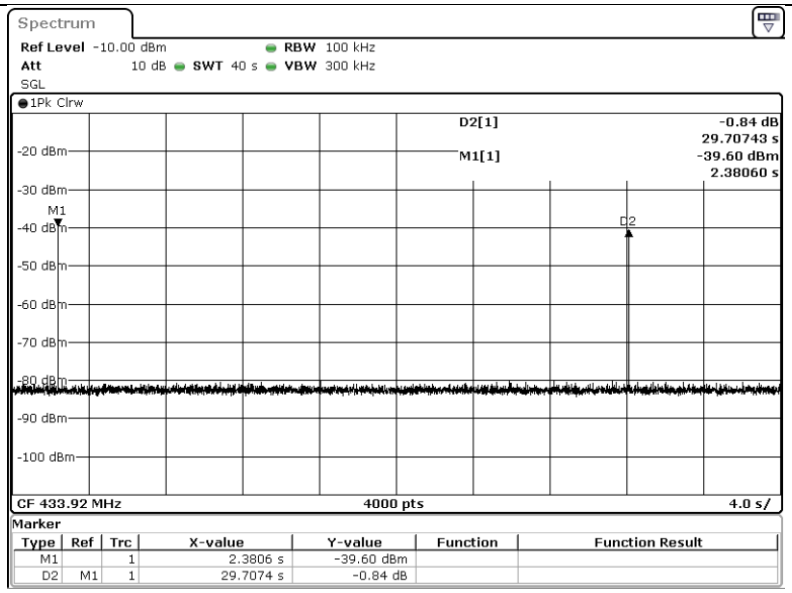




Frequency (MHz)	Tx on time (ms)	Tx on time Limit (s)	Idle time (s)	Idle time Limit (s)	Pass/Fail
433.92	8.42	<1	29.70	10	PASS

SPECTRUM PLOT OF VALUE





END OF REPORT