

Prüfbericht-Nr.: <i>Test report no.:</i>	CN25TFBU 001	Auftrags-Nr.: <i>Order no.:</i>	48272428	Seite 1 von 27 Page 1 of 27
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2025-02-04	
Auftraggeber: <i>Client:</i>	Premium Parts Wholesale, Ltd 2 Park Plaza, Suite 1140, Irvine, CA 92614			
Prüfgegenstand: <i>Test item:</i>	Tire Pressure Monitoring Sensor			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	APTPMS			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C Test report (315 MHz & 433.92 MHz)			
Prüfgrundlage: <i>Test specification:</i>	FCC CFR47 Part 15: Subpart C Section 15.231			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2025-02-17			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003926751-001~002 A003926751-005~006 A003926751-009, 010 A003926751-013, 014 A003926751-025~029 A003926751-030~032			
Prüfzeitraum: <i>Testing period:</i>	2025-02-19 - 2025-03-04			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Taipei Testing Site			
Prüflaboratorium: <i>Testing laboratory:</i>	Taipei Testing Laboratories			
Prüfergebnis*: <i>Test result*:</i>	Pass			
zusammengestellt von: <i>compiled by:</i>	 Ryan Chen		genehmigt von: <i>authorized by:</i>	 Brenda Chen
Datum: <i>Date:</i>	2025-03-12		Ausstellungsdatum: <i>Issue date:</i>	2025-03-12
Stellung / Position:	Senior Project Manager		Stellung / Position:	Senior Project Manager
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>				
Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>				
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory F(ail) = failed a.m. test specification(s)	4 = sufficient N/A = not applicable
5 = mangelhaft N/T = nicht getestet				
5 = poor N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

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Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. <i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i>
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3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i> <i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2023, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2023, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>

TEST SUMMARY

Report Section	FCC Clause	Test Item	Result
5.1.1	15.203	Antenna Requirement	Pass
5.1.2	15.231(c)	20 dB Bandwidth and Occupied Bandwidth	Pass
5.1.3	15.231(e)	Pulse Width / TX Gap	Pass
5.1.4	15.231(e)	Field Strength of Fundamental Emissions	Pass
5.1.5	15.231(e) & 15.205 & 15.209	Radiated Spurious Emissions	Pass
-	15.207	Mains Conducted Emission	Not Applicable

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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APPENDIX B - TEST RESULT OF RADIATED SPURIOUS EMISSIONS FOR LARGE INDUCTOR OF 315MHz

APPENDIX C - TEST RESULT OF RADIATED SPURIOUS EMISSIONS FOR SMALL INDUCTOR OF 433.92MHz

APPENDIX D - TEST RESULT OF RADIATED SPURIOUS EMISSIONS FOR LARGE INDUCTOR OF 433.92MHz

APPENDIX SP - PHOTOGRAPHS OF TEST SETUP

APPENDIX EP - PHOTOGRAPHS OF EUT

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HISTORY OF THIS TEST REPORT

Revision	Description	Date Issued
R01	Original Release	2025-03-12

1. General Remarks

1.1 Complementary Materials

The following attachments are integral parts of this test report:

Appendix A - Test Result of Radiated Spurious Emissions for Small Inductor of 315MHz

Appendix B - Test Result of Radiated Spurious Emissions for Large Inductor of 315MHz

Appendix C - Test Result of Radiated Spurious Emissions for small Inductor of 433.92MHz

Appendix D - Test Result of Radiated Spurious Emissions for Large Inductor of 433.92MHz

Appendix SP - Photographs of Test Setup

Appendix EP - Photographs of EUT

Test Specifications

The following standards were applied.

Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.231 ANSI C63.10:2013

1.2 Decision Rule of Conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

2. Test Sites

2.1 Test Laboratory

Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

Taipei Testing Laboratories

No.458-18, Sec. 2, Fenliao Rd., Linkou Dist.,
New Taipei City 244
Taiwan (R.O.C.)
FCC Registration No.: 180491
ISED Registration No.: 25563

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95% level of confidence.

Emission Measurement Uncertainty

Parameter	Uncertainty
Radiated Emission (9 kHz ~ 30 MHz)	± 1.15 dB
Radiated Emission (30 MHz ~ 200 MHz)	± 1.30 dB
Radiated Emission (200 MHz ~ 1 GHz)	± 1.30 dB
Radiated Emission (1 GHz ~ 18 GHz)	± 1.54 dB
Radiated Emission (18 GHz ~ 40 GHz)	± 2.52 dB
Mains Conducted Emission	± 1.65 dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a Tire Pressure Monitoring Sensor working at 315 MHz & 433.92 MHz.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	Tire Pressure Monitoring Sensor
Type Identification	APTPMS
FCC ID	2BNJPAPTPMS

Technical Specification of EUT

Item	EUT information
Operating Frequency	315 MHz, 433.92 MHz
Operation Voltage	3 Vdc
Modulation	ASK & FSK
Antenna Information	Refer to 5.1.1
Accessory Device	Refer to 4.3

3.3 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.4 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum emission level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: Test samples are modified to continuous transmitter mode which makes it possible to transmit when power on.

The samples were used as follows:

A003926751-001~002

A003926751-005~006

A003926751-009, 010

A003926751-013, 014

A003926751-025~029

A003926751-030~032

Full test was applied on all test modes, but only worst case was shown.

EUT Configure Mode	Applicable To					Description
	20 dB Bandwidth	Pulse Width / TX Gap	Field Strength of Fundamental Emissions	Radiated Spurious Emissions	Mains Conducted Emission	
-	√	√	√	√	√	-

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when position on **Z-plane**.
2. "-" means no effect.
3. There are 2 types of inductors evaluated in this report, including small (worst-case) and large.

20 dB Bandwidth

- ☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)
-	315	315
-	433.92	433.92

Pulse Width / TX Gap

- ☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)
-	315	315
-	433.92	433.92

Field Strength of Fundamental

- ☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)
-	315	315
-	433.92	433.92

Radiated Spurious Emissions

- ☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)
-	315	315
-	433.92	433.92

Test Condition

Test Item	Ambient Temperature	Relative Humidity	Tested by
20 dB Bandwidth	21.8-23.1 °C	54.7-58 %	Andy Chen
Pulse Width / TX Gap	21.8-23.1 °C	54.7-58 %	Andy Chen
Field Strength of Fundamental	22.8-54.7 °C	53-58 %	Roger Liao
Radiated Spurious Emissions	22.8-54.7 °C	53-58 %	Roger Liao

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Accessory of EUT

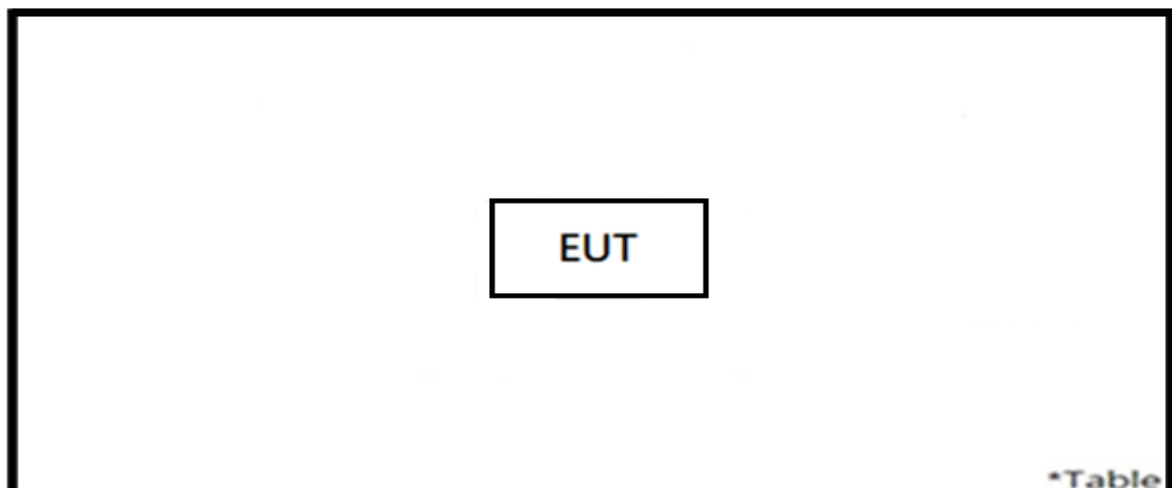
No.	Product	Brand	Model	Description
-	Battery	Panasonic	CR205HR	3Vdc, 345 mAh

Support Unit

None.

4.4 Test Setup Diagram

<Radiated Spurious Emissions Mode>



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

Requirement Use of approved antennas only

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 0 dBi. The antenna is monopole antenna with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

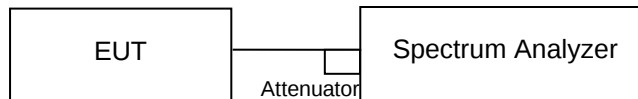
5.1.2 20 dB Bandwidth and Occupied Bandwidth

Limit

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.

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2024/02/22	2025/02/21	2025/2/19	2025/2/20

Test Procedures

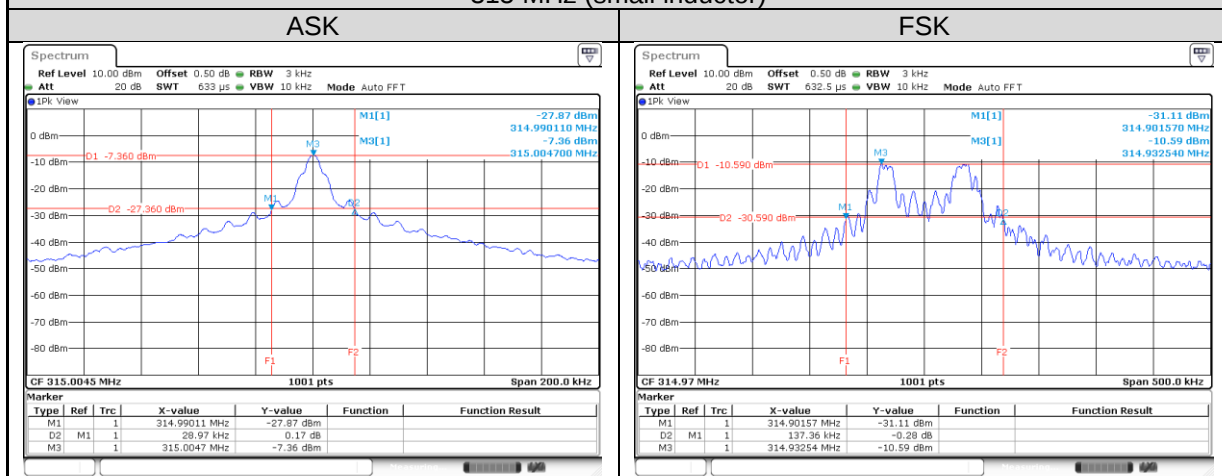
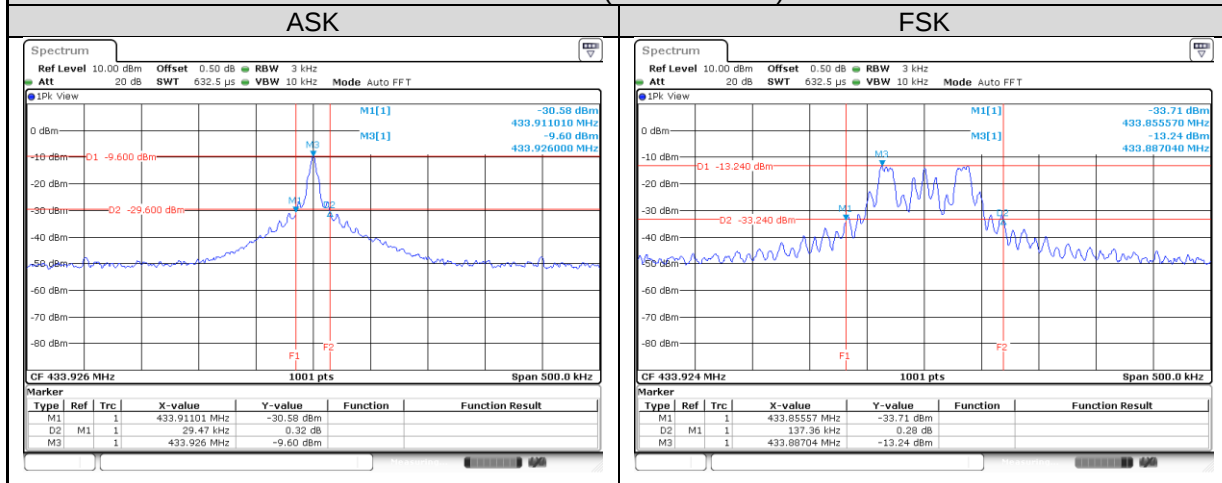
- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
- Repeat above procedures until all frequencies measured were complete.
- For occupied bandwidth, the transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to Sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

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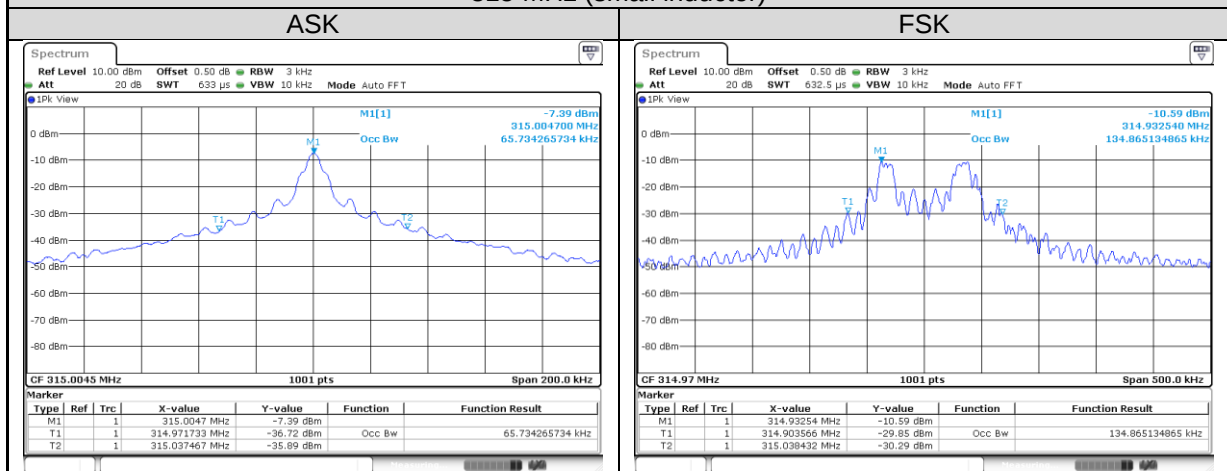
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Test Results

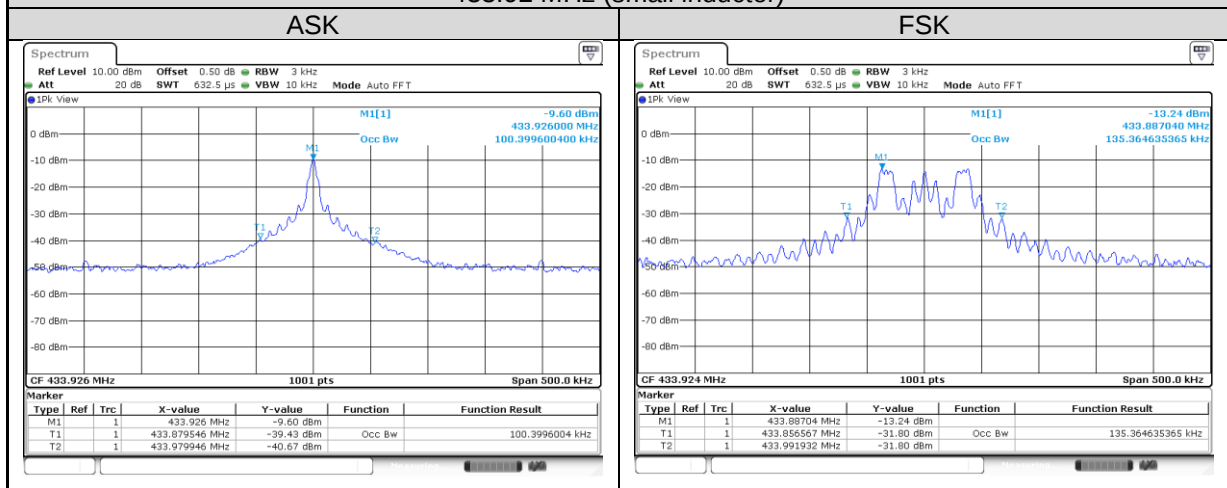
Inductor Size	Channel Frequency (MHz)	Modulation	20 dB Bandwidth (kHz)	Limit (kHz)
Small	315	ASK	28.97	787.5
		FSK	137.36	
	433.92	ASK	29.47	1084.8
		FSK	137.36	

Plot of 20 dB Bandwidth
315 MHz (small inductor)

433.92 MHz (small inductor)


Inductor Size	Channel Frequency (MHz)	Modulation	Occupied Bandwidth (kHz)
Small	315	ASK	65.73
		FSK	134.87
	433.92	ASK	100.40
		FSK	135.36

Plot of Occupied Bandwidth
 315 MHz (small inductor)


433.92 MHz (small inductor)



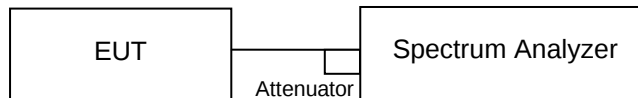
5.1.3 Pulse Width/TX Gap

Limit

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.

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2024/02/22	2025/02/21	2025/2/19	2025/2/20

Test Procedures

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- Measure the transmission time (Pulse width) and stop duration of a transmission period (TX gap).
- Repeat above procedures until all frequencies measured were complete.

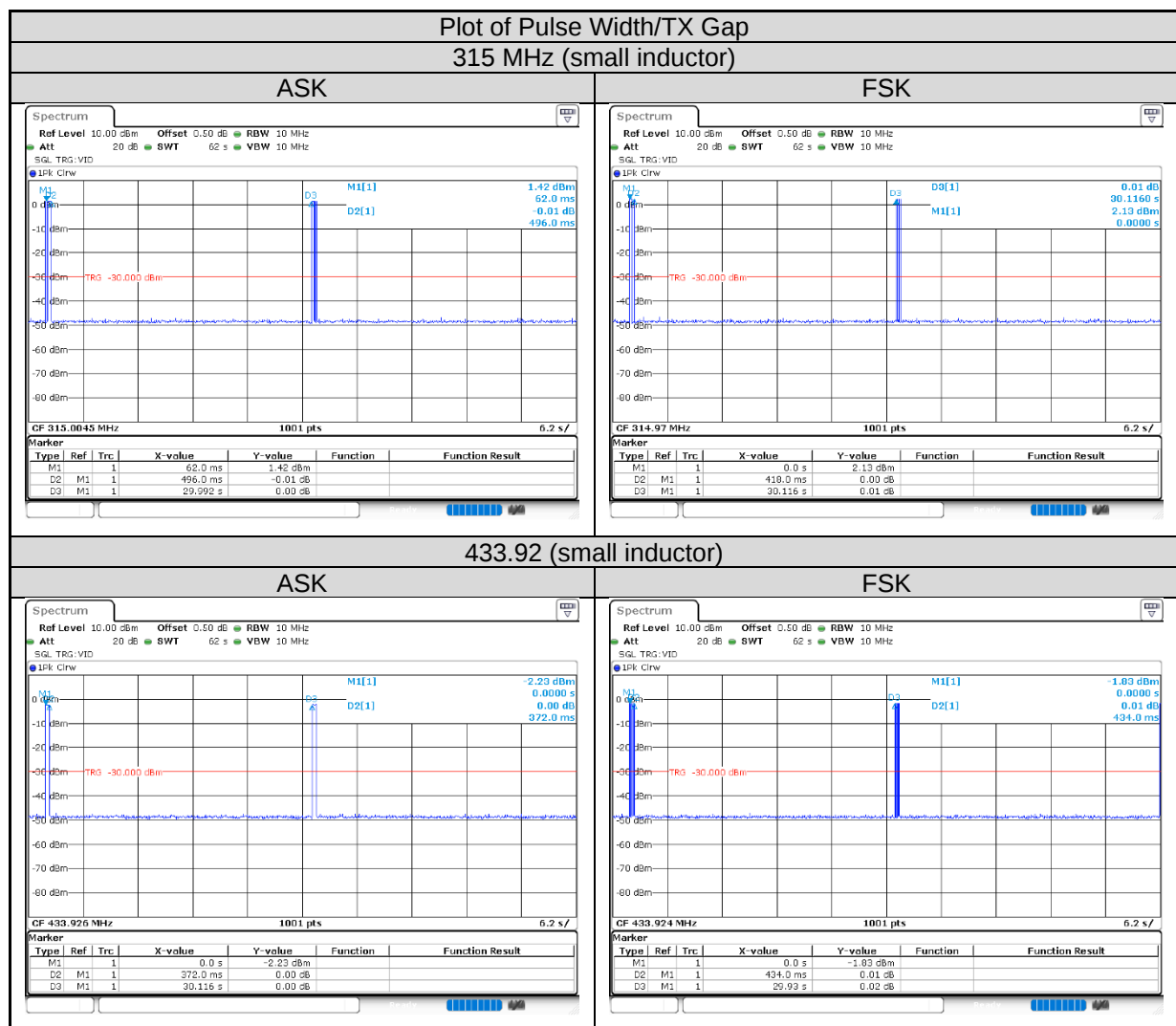
Test Results

Inductor Size	Channel Frequency (MHz)	Transmission Time (ms)	Transmission Time*30 (s)	Silence Period (s)	Limit (s)	Result
Smal	315	496.0	14.88	30.00	Transmission Time*30 < Silence Period	Pass
	315	410.0	12.30	30.12		Pass
	433.92	372.0	11.16	30.12		Pass
	433.92	434.0	13.02	29.93		Pass

Note:

D2 = Transmission time

D3 = Silence Period

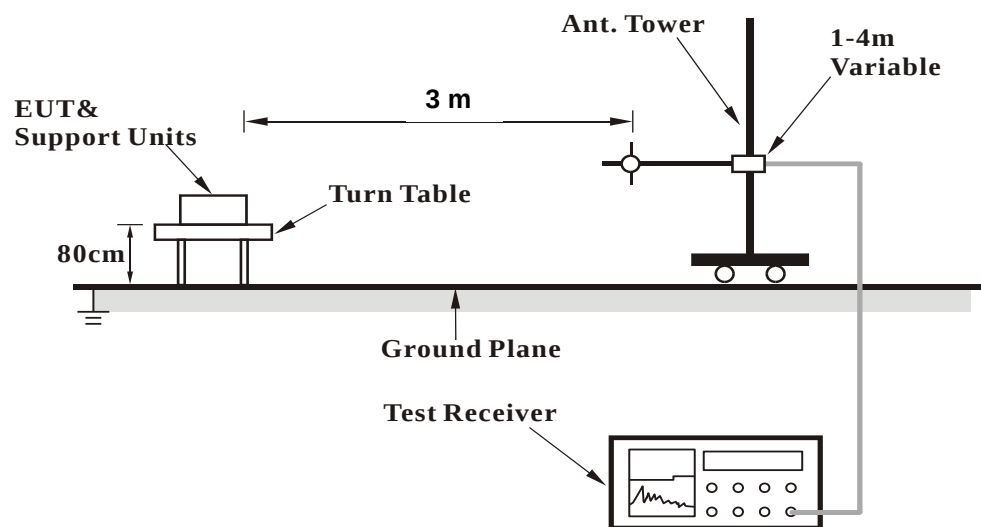


5.1.4 Field Strength of Fundamental Emissions

Limit Refer to §15.231(b) for reference

Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Test Instruments

Test Date: 2025/3/3 ~ 2025/3/4

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Above 1 GHz					
Signal Analyzer	R&S	FSV40	101508	2024/4/23	2025/4/22
Horn Antenna	ETS-Lindgren	3117	00218930	2024/12/10	2025/12/9
Amplifier	EM	EM01G18GA	060967	2024/4/2	2025/4/1
Microwave Cable	HUBER+SUHNER	SUCOFLEX 102A	801026/2EA	2024/6/5	2025/4/1
Microwave Cable	HUBER+SUHNER	SUCOFLEX 102EA	800897/2EA	2024/6/5	2025/4/1
Microwave Cable	HUBER+SUHNER	SUCOFLEX 102EA	800902/2EA	2024/6/5	2025/4/1
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A
30 MHz – 1 GHz					
Receiver	R&S	ESR7	102109	2024/7/4	2025/7/3
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2024/3/21	2025/3/20
LF-AMP	Agilent	8447D	2944a107722	2024/3/21	2025/3/20
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104	MY37202/4	2024/3/22	2025/3/21
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104EA	800056/4EA	2024/3/22	2025/3/21
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104	804680/4	2024/3/22	2025/3/21
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A
Below 30 MHz					
Receiver	R&S	ESR7	102109	2024/7/4	2025/7/3
Loop Antenna	SCHWARZBECK	FMZB 1519B	00215	2024/12/11	2025/12/10
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104EA	800056/4EA	2024/3/22	2025/3/21
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104	804680/4	2024/3/22	2025/3/21
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A

Test Procedures

- The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode.

Note:

- All modes of operation were investigated and the worst-case emissions are reported.
- The Radiated Emissions testing was performed in the X(E1), Y(H) and Z(E2) axis orientation. The worst-case Axis orientation is recorded in this test report.

Test Results

Inductor Size	Modulation	Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Antenna Orientation	Detector or calculated value
Small	ASK	315.00	47.53	67.66	Horizontal	Average
			65.36	87.66		Peak
			47.07	67.66	Vertical	Average
			65.37	87.66		Peak
Large			41.77	67.66	Horizontal	Average
			61.66	87.66		Peak
			46.48	67.66	Vertical	Average
			63.03	87.66		Peak
Small	FSK		64.97	67.66	Horizontal	Average
			66.46	87.66		Peak
			65.01	67.66	Vertical	Average
			67.01	87.66		Peak
Large			61.62	67.66	Horizontal	Average
			63.67	87.66		Peak
			64.64	67.66	Vertical	Average
			66.47	87.66		Peak

Note:

With linear interpolations, the formulas for calculating the maximum permitted fundamental field strengths is as follows:

$$315\text{MHz}, \mu\text{V/m at 3 meters} = 16.6667 \times (315\text{MHz}) - 2833.3333 = 2416.68 \mu\text{V/m}$$

$$20\log(2416.68) = 67.66 \text{ dB } \mu\text{V/m (Average Limit)}$$

$$67.66 + 20 = 87.66 \text{ dB } \mu\text{V/m (Peak Limit)}$$

Inductor Size	Modulation	Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Antenna Orientation	Detector or calculated value
Small	ASK	433.92	52.62	72.87	Horizontal	Average
			70.95	92.87		Peak
			50.07	72.87	Vertical	Average
			68.51	92.87		Peak
Large			51.32	72.87	Horizontal	Average
			69.14	92.87		Peak
			48.94	72.87	Vertical	Average
			66.64	92.87		Peak
Small	FSK		69.48	72.87	Horizontal	Average
			71.34	92.87		Peak
			67.11	72.87	Vertical	Average
			69.08	92.87		Peak
Large			69.17	72.87	Horizontal	Average
			70.98	92.87		Peak
			66.32	72.87	Vertical	Average
			68.59	92.87		Peak

Note:

With linear interpolations, the formulas for calculating the maximum permitted fundamental field strengths is as follows:

[433.92MHz](#), $\mu\text{V/m}$ at 3 meters = $16.6667 \times (433.92\text{MHz}) - 2833.3333 = 4398.68 \mu\text{V/m}$

$20\log(4398.68) = 72.87 \text{ dB}\mu\text{V/m}$ (Average Limit)

$72.87 + 20 = 92.87 \text{ dB}\mu\text{V/m}$ (Peak Limit)

Please refer to Appendix A – D for the details.

5.1.5 Radiated Spurious Emissions

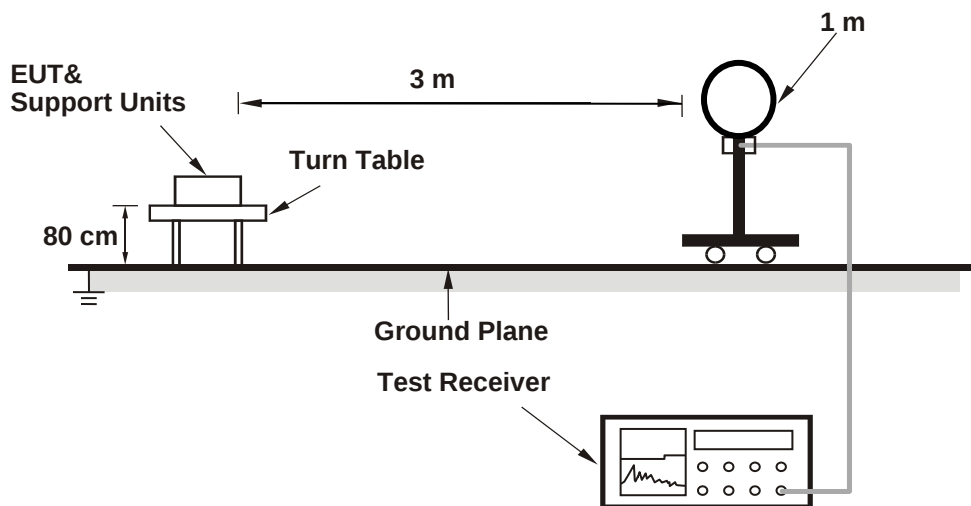
Limit

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

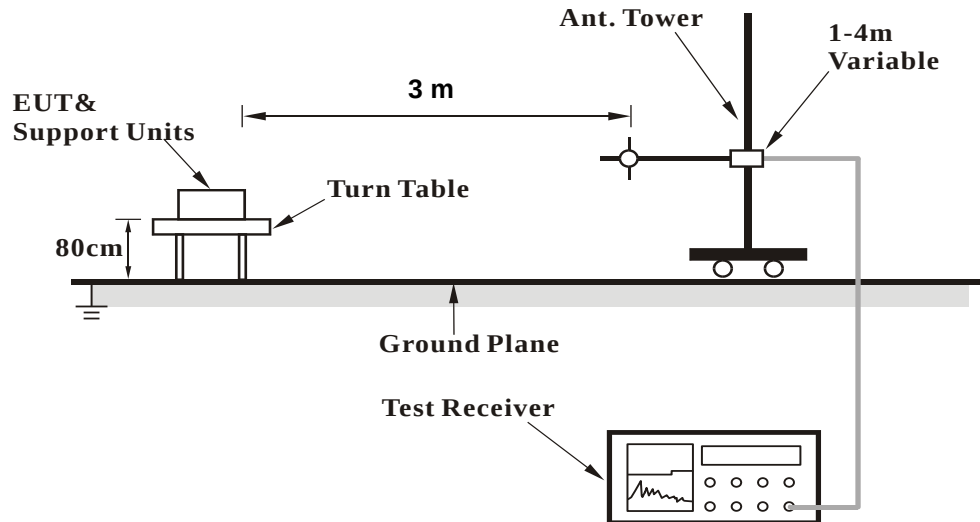
Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup

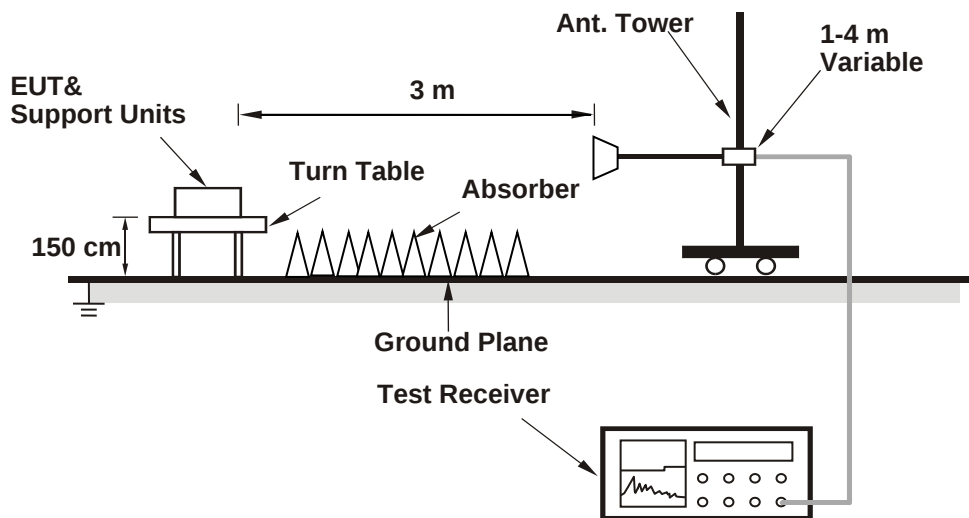
<Radiated Emissions below 30 MHz>



<Radiated Emissions 30 MHz to 1 GHz>



<Radiated Emissions above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Test Instruments

Please refer to 5.1.4 Instruments

Test Procedures**For Radiated Emissions below 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 (OPEN), perpendicular (CLOSE), and ground-parallel (GROUND) 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. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated Emissions above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) 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. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected 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:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.
3. The Radiated Emissions testing was performed in the X(E1), Y(H) and Z(E2) axis orientation. The worst-case Axis orientation is recorded in this test report.
4. The emission levels of other frequencies (including the 10th harmonic of the highest fundamental frequency) are very lower than the limit and are not shown in the test report.

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Test Results

Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – Amplifier (dB)

Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

Please refer to Appendix A - D.

Appendix A: Test Results of Radiated Spurious Emissions for Small Inductor of 315MHz

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

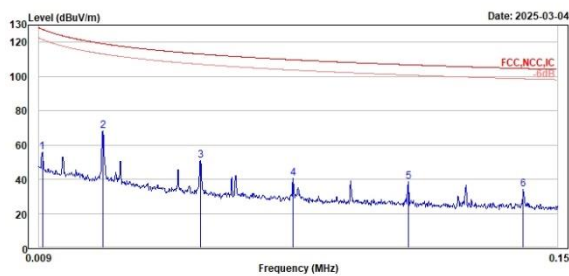
315MHz, ASK

9kHz~150kHz(Open)

150kHz~30MHz(Open)



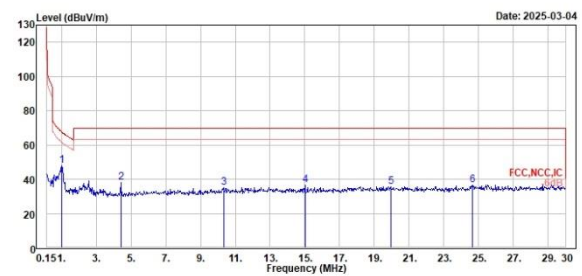
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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	0.01	55.74	37.63	18.11	127.00	-71.06	100	360 Peak	Open	
2	0.03	68.01	48.18	19.83	119.13	-51.12	100	193 Peak	Open	
3	0.05	50.95	32.27	18.68	113.11	-62.16	100	75 Peak	Open	
4	0.08	40.78	22.50	18.28	109.74	-68.96	100	133 Peak	Open	
5	0.11	38.54	20.46	18.08	106.82	-68.28	100	301 Peak	Open	
6	0.14	34.83	15.76	18.27	104.63	-70.60	100	269 Peak	Open	



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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	1.02	47.81	29.03	18.78	67.47	-19.66	100	227 Peak	Open	
2	4.42	38.21	18.73	19.48	69.50	-31.29	100	226 Peak	Open	
3	10.33	34.87	13.51	21.36	69.50	-34.63	100	289 Peak	Open	
4	15.02	36.35	14.79	21.56	69.50	-33.15	100	175 Peak	Open	
5	19.94	35.55	12.74	22.81	69.50	-33.95	100	33 Peak	Open	
6	24.63	36.77	13.87	22.90	69.50	-32.73	100	94 Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

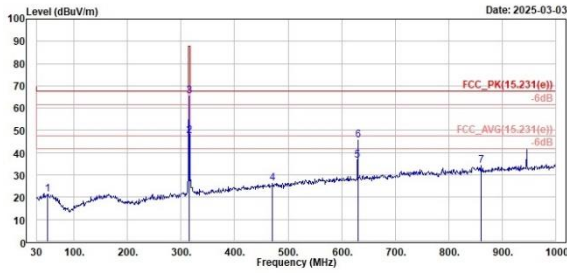
315MHZ, ASK

Horizontal

Vertical



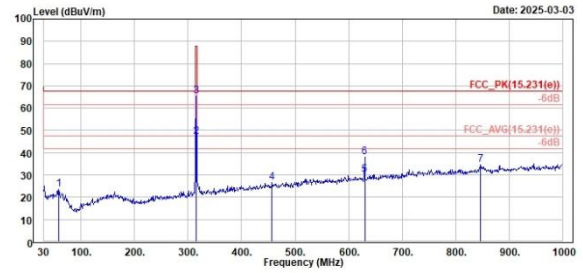
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	Freq	Level	Read	Factor	Limit	Over	Apos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	50.37	21.17	28.12	-6.95	67.66	-46.49	193	360	Peak	Horizontal	
2	315.00	47.53	53.28	-5.75	67.66	-20.13	100	334	Average	Horizontal	
3	315.00	65.36	71.11	-5.75	87.66	-22.30	100	334	Peak	Horizontal	
4	475.35	26.26	28.87	-2.61	67.66	-41.40	200	340	Peak	Horizontal	
5	630.00	36.50	35.93	0.57	47.66	-11.16	122	360	Average	Horizontal	
6	630.00	45.45	44.86	0.59	67.66	-22.21	122	360	Peak	Horizontal	
7	846.32	34.14	29.88	4.26	67.66	-33.52	186	360	Peak	Horizontal	



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	Freq	Level	Read	Factor	Limit	Over	Apos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	50.13	23.48	30.78	-7.30	67.66	-44.18	200	360	Peak	Vertical	
2	315.00	47.07	52.82	-5.75	67.66	-20.59	200	237	Average	Vertical	
3	315.00	65.37	71.12	-5.75	87.66	-22.29	200	237	Peak	Vertical	
4	456.80	26.60	29.39	-2.79	67.66	-41.06	200	199	Peak	Vertical	
5	630.00	30.19	29.62	0.57	47.66	-17.47	180	249	Average	Vertical	
6	630.00	38.04	37.47	0.57	67.66	-29.62	180	249	Peak	Vertical	
7	846.74	34.69	30.44	4.25	67.66	-32.97	200	170	Peak	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

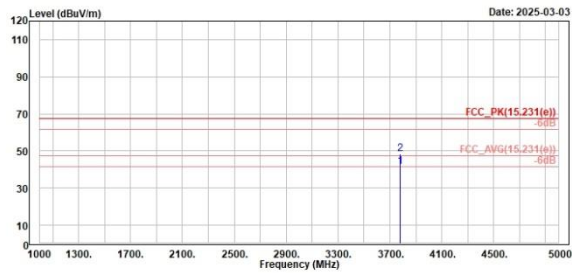
315MHZ, ASK

Horizontal

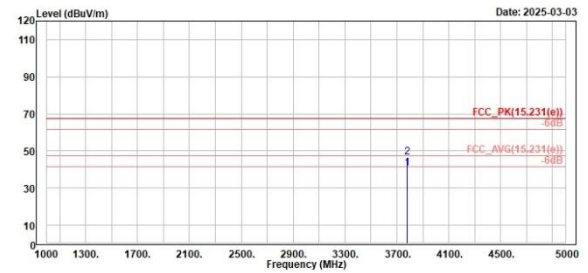
Vertical



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Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

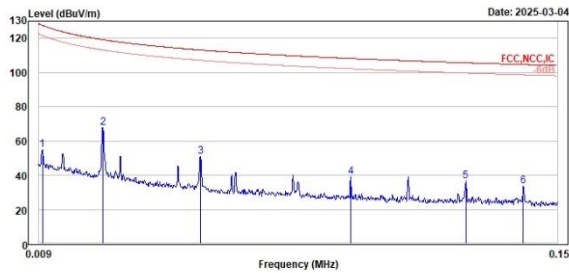
315MHz, FSK

9kHz~150kHz(Open)

150kHz~30MHz(Open)



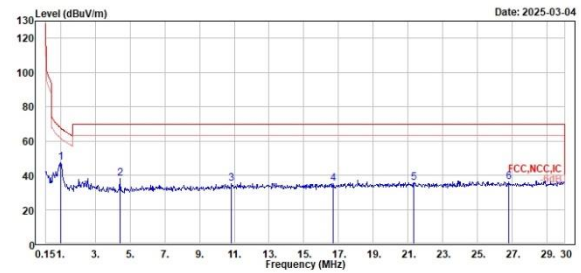
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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	0.01	54.66	36.55	18.11	127.00	-72.94	100	92 Peak	Open	
2	0.03	67.91	48.08	19.83	119.13	-51.22	100	360 Peak	Open	
3	0.05	50.76	32.08	18.68	113.11	-62.35	100	17 Peak	Open	
4	0.09	39.24	21.22	18.02	108.16	-68.92	100	50 Peak	Open	
5	0.13	36.73	18.55	18.18	105.66	-68.93	100	249 Peak	Open	
6	0.14	33.84	15.57	18.27	104.63	-70.79	100	140 Peak	Open	



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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	1.02	47.35	28.57	18.78	67.47	-20.12	100	272 Peak	Open	
2	4.42	37.84	18.36	19.48	69.50	-31.66	100	39 Peak	Open	
3	18.84	35.07	13.60	21.47	69.50	-34.43	100	300 Peak	Open	
4	16.69	35.26	13.11	22.15	69.50	-34.24	100	43 Peak	Open	
5	21.31	35.66	13.12	22.54	69.50	-33.84	100	39 Peak	Open	
6	26.78	35.97	13.02	22.95	69.50	-33.53	100	116 Peak	Open	

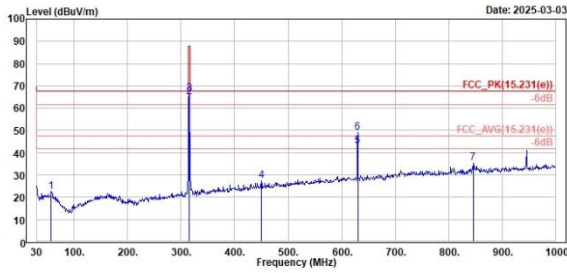
Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

315MHZ, FSK

Horizontal



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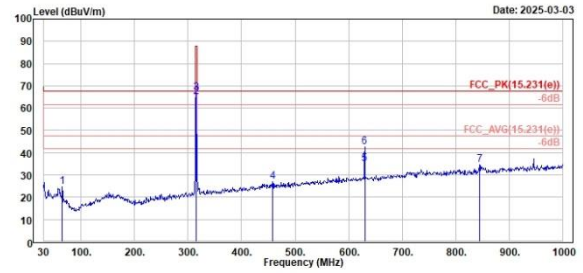


	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	57.16	22.51	29.57	-7.06	67.66	-45.15	200	32	Peak	Horizontal	
2	315.00	64.97	70.72	-5.75	67.66	-2.69	100	360	Average	Horizontal	
3	315.00	66.46	72.21	-5.75	67.66	-21.20	100	360	Peak	Horizontal	
4	450.01	27.53	30.17	-2.64	67.66	-40.13	200	151	Peak	Horizontal	
5	630.00	43.09	42.52	0.57	47.66	-4.57	118	360	Average	Horizontal	
6	630.00	49.02	48.45	0.57	67.66	-18.64	118	360	Peak	Horizontal	
7	845.77	35.34	31.11	4.23	67.66	-32.32	200	1	Peak	Horizontal	

Vertical



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	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	64.92	24.69	33.10	-8.41	67.66	-42.97	200	354	Peak	Vertical	
2	315.00	65.01	70.76	-5.75	67.66	-2.65	200	239	Average	Vertical	
3	315.00	67.01	72.76	-5.75	67.66	-20.65	200	239	Peak	Vertical	
4	457.77	27.11	29.92	-2.81	67.66	-40.55	200	80	Peak	Vertical	
5	630.00	34.79	34.22	0.57	47.66	-12.87	100	230	Average	Vertical	
6	630.00	42.45	41.88	0.57	67.66	-25.21	100	230	Peak	Vertical	
7	844.00	34.73	30.52	4.21	67.66	-32.93	100	39	Peak	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

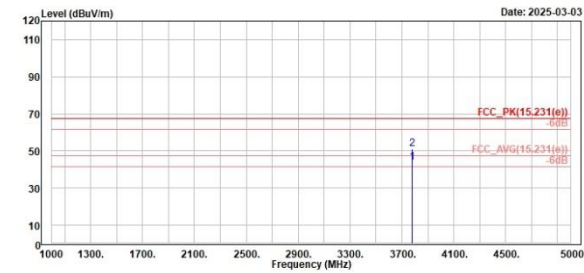
315MHZ, FSK

Horizontal

Vertical



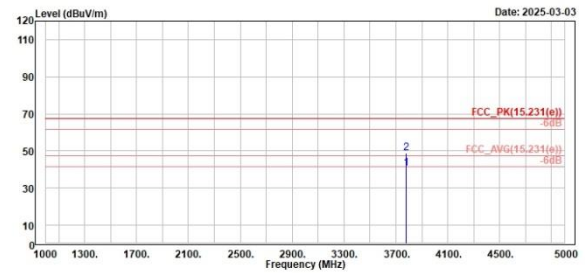
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	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	3780.00	44.00	36.17	7.83	47.66	-3.66	100	340	Average	Horizontal	
2	3780.00	51.31	43.48	7.83	67.66	-16.35	100	340	Peak	Horizontal	



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	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	3780.00	40.76	32.93	7.83	47.66	-6.90	300	360	Average	Vertical	
2	3780.00	48.91	41.08	7.83	67.66	-18.75	300	360	Peak	Vertical	

Appendix B: Test Results of Radiated Spurious Emissions for Large Inductor of 315MHz

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

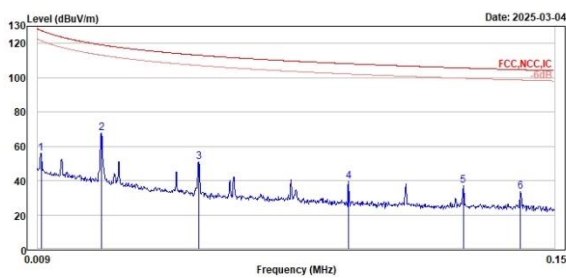
315MHz, ASK

9kHz~150kHz(Open)

150kHz~30MHz(Open)



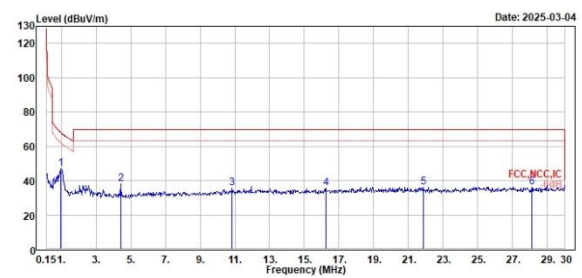
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Peak	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.01	55.70	37.59	18.11	127.60	-71.90	100	102	Peak	Open	
2	0.03	67.53	47.70	19.83	119.13	-51.60	100	326	Peak	Open	
3	0.05	51.09	32.41	18.68	113.11	-62.02	100	78	Peak	Open	
4	0.09	39.57	21.55	18.02	108.16	-68.59	100	238	Peak	Open	
5	0.13	37.15	18.97	18.18	105.66	-68.51	100	335	Peak	Open	
6	0.14	35.62	15.35	18.27	104.63	-71.01	100	4	Peak	Open	



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Peak	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.99	46.83	28.04	18.79	67.73	-20.90	100	99	Peak	Open	
2	4.42	37.83	18.35	19.48	69.50	-31.67	100	7	Peak	Open	
3	10.84	35.69	14.22	21.47	69.50	-33.81	100	83	Peak	Open	
4	16.24	35.49	13.52	21.97	69.50	-34.01	100	292	Peak	Open	
5	21.88	36.31	13.93	22.38	69.50	-33.19	100	40	Peak	Open	
6	28.12	36.18	13.16	23.02	69.50	-33.32	100	59	Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

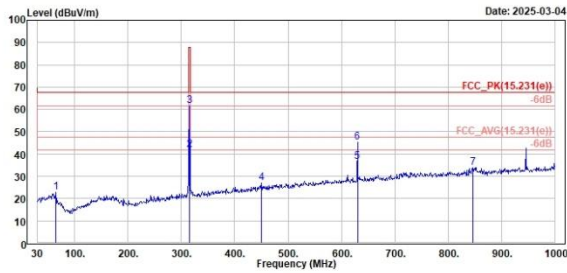
315MHZ, ASK

Horizontal

Vertical



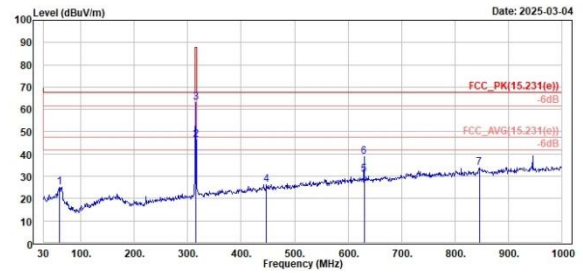
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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	63.95	22.72	38.96	-8.24	67.66	-44.94		200		183 Peak	Horizontal	
2	315.00	41.77	47.52	-5.75	67.66	-25.89		100		338 Average	Horizontal	
3	315.00	61.66	67.41	-5.75	67.66	-26.00		100		338 Peak	Horizontal	
4	450.01	27.06	29.70	-2.64	67.66	-40.60		100		78 Peak	Horizontal	
5	630.00	36.60	36.03	0.57	47.66	-11.06		138		360 Average	Horizontal	
6	630.00	45.39	44.82	0.57	67.66	-22.27		138		360 Peak	Horizontal	
7	846.74	33.99	29.74	4.25	67.66	-33.67		200		210 Peak	Horizontal	



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	68.07	25.16	32.56	-7.40	67.66	-42.50		200		360 Peak	Vertical	
2	315.00	40.48	52.23	-11.75	67.66	-27.18		200		43 Average	Vertical	
3	315.00	63.03	68.78	-5.75	67.66	-24.63		200		43 Peak	Vertical	
4	447.10	26.25	29.01	-2.76	67.66	-41.41		200		8 Peak	Vertical	
5	630.00	30.64	30.07	0.57	47.66	-17.02		100		196 Average	Vertical	
6	630.00	38.77	38.20	0.57	67.66	-28.89		100		196 Peak	Vertical	
7	845.77	34.00	29.77	4.23	67.66	-33.66		100		239 Peak	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

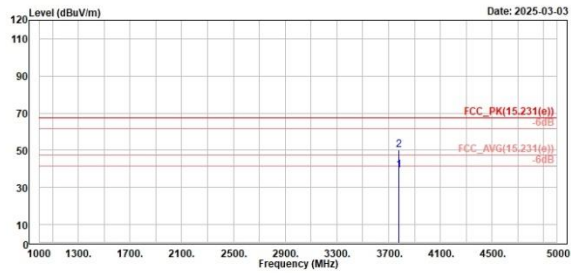
315MHZ, ASK

Horizontal

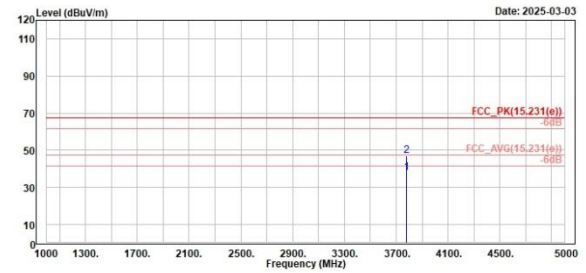
Vertical



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Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

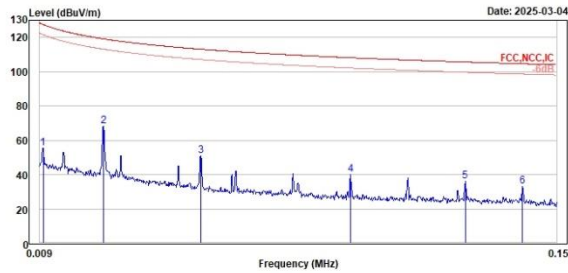
315MHz, FSK

9kHz~150kHz(Open)

150kHz~30MHz(Open)



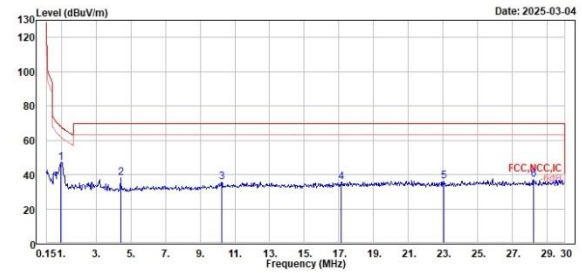
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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	0.01	55.45	37.34	18.11	127.00	-72.15	100	68	Peak	Open	
2	0.03	67.99	48.16	19.83	119.13	-51.14	100	48	Peak	Open	
3	0.05	50.95	32.27	18.68	113.11	-62.16	100	325	Peak	Open	
4	0.09	39.99	21.97	18.02	108.16	-68.17	100	302	Peak	Open	
5	0.13	36.04	17.86	18.18	105.66	-69.62	100	111	Peak	Open	
6	0.14	33.27	15.00	18.27	104.63	-71.36	100	79	Peak	Open	



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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	0.99	46.92	28.13	18.79	67.73	-20.61	100	245	Peak	Open	
2	4.42	30.29	18.81	19.48	69.50	-31.21	100	358	Peak	Open	
3	10.24	35.59	14.25	21.34	69.50	-33.91	100	126	Peak	Open	
4	17.13	35.76	13.44	22.32	69.50	-33.74	100	344	Peak	Open	
5	23.04	36.20	14.14	22.06	69.50	-33.30	100	175	Peak	Open	
6	28.21	36.83	13.79	23.04	69.50	-32.67	100	258	Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

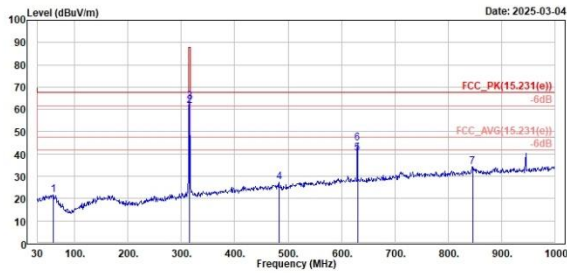
315MHz, FSK

Horizontal

Vertical



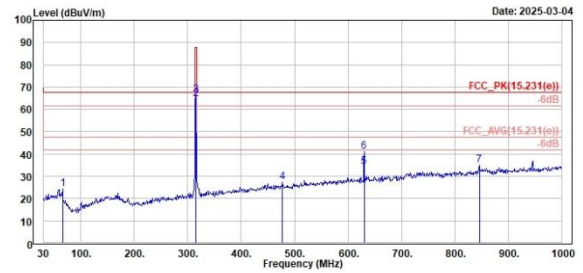
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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	59.10	21.55	28.85	-7.30	67.66	-46.11		200		261 Peak	Horizontal	
2	315.00	61.62	67.37	-5.75	67.66	-6.04		200		137 Average	Horizontal	
3	315.00	63.67	69.42	-5.75	67.66	-23.99		200		137 Peak	Horizontal	
4	482.99	27.31	29.63	-2.32	67.66	-40.35		100		194 Peak	Horizontal	
5	630.00	40.26	39.69	0.57	47.66	-7.40		112		360 Average	Horizontal	
6	630.00	44.75	44.18	0.57	67.66	-22.91		112		360 Peak	Horizontal	
7	845.77	34.22	29.99	4.23	67.66	-33.44		100		204 Peak	Horizontal	



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	65.89	24.32	33.10	-8.78	67.66	-43.34		174		360 Peak	Vertical	
2	315.00	64.64	70.39	-5.75	67.66	-3.02		200		53 Average	Vertical	
3	315.00	66.47	72.22	-5.75	67.66	-21.19		200		53 Peak	Vertical	
4	477.17	27.45	29.88	-2.43	67.66	-40.21		200		352 Peak	Vertical	
5	630.00	34.08	33.51	0.57	47.66	-13.58		100		229 Average	Vertical	
6	630.00	41.11	40.54	0.57	67.66	-26.55		100		229 Peak	Vertical	
7	845.77	34.84	30.61	4.23	67.66	-32.82		100		212 Peak	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

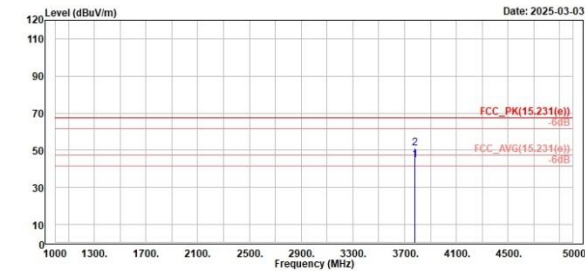
315MHZ, FSK

Horizontal

Vertical



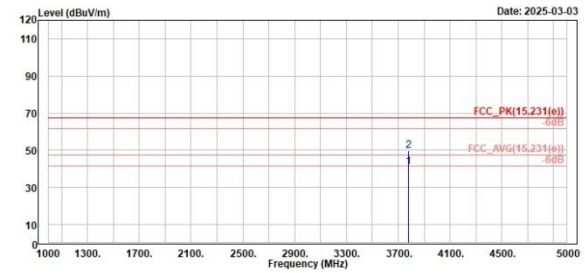
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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	3780.00	44.51	36.68	7.83	47.66	-3.15	300	349 Average	Horizontal	
2	3780.00	51.19	43.36	7.83	67.66	-16.47	300	349 Peak	Horizontal	



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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	3780.00	41.05	33.22	7.83	47.66	-6.61	100	240 Average	Vertical	
2	3780.00	49.51	41.68	7.83	67.66	-18.15	100	240 Peak	Vertical	

Appendix C: Test Results of Radiated Spurious Emissions for Small Inductor of 433.92MHz

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

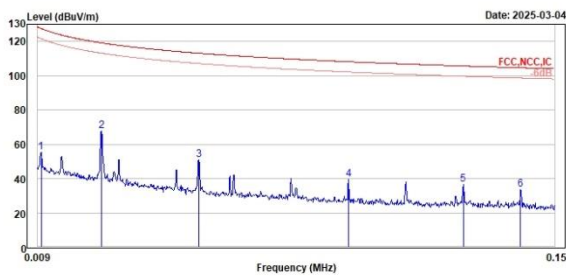
433.92MHz, ASK

9kHz~150kHz(Open)

150kHz~30MHz(Open)



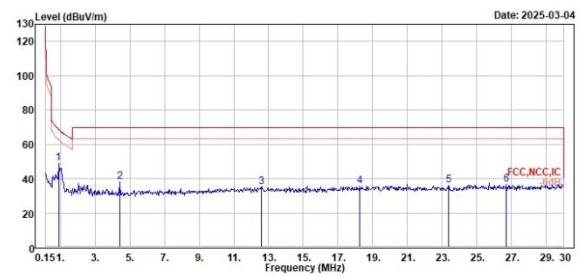
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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	0.01	55.32	37.21	18.11	127.60	-72.28	100	123	Peak	Open		
2	0.03	67.80	47.97	19.83	119.13	-51.33	100	317	Peak	Open		
3	0.05	51.06	32.38	18.68	113.11	-62.05	100	193	Peak	Open		
4	0.09	39.55	21.53	18.02	108.16	-68.61	100	190	Peak	Open		
5	0.13	36.70	18.52	18.18	105.66	-68.96	100	267	Peak	Open		
6	0.14	33.74	15.47	18.27	104.63	-70.89	100	347	Peak	Open		



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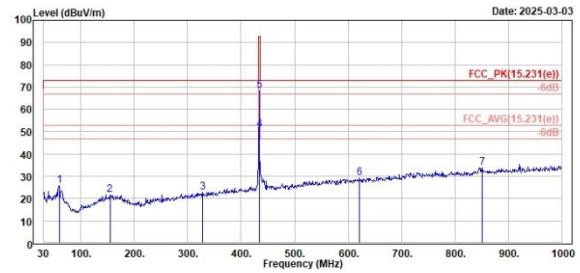
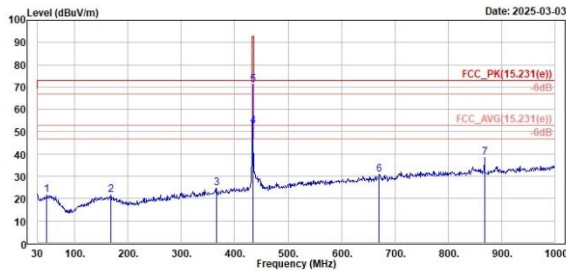
	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	0.90	48.88	30.81	18.87	68.56	-19.68	100	67	Peak	Open		
2	4.42	38.81	18.53	19.48	69.50	-31.49	100	18	Peak	Open		
3	12.60	35.15	13.55	21.60	69.50	-34.35	100	166	Peak	Open		
4	18.24	35.80	13.18	22.62	69.50	-33.70	100	88	Peak	Open		
5	23.37	36.14	14.82	22.12	69.50	-33.36	100	206	Peak	Open		
6	26.72	36.62	13.69	22.93	69.50	-32.88	100	158	Peak	Open		

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

433.92MHz, ASK

Horizontal

Vertical



Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	47.46	21.81	28.94	-7.13	72.87	-51.06	200		188 Peak	Horizontal	
2	167.74	21.49	28.23	-6.74	72.87	-51.38	200		300 Peak	Horizontal	
3	365.62	24.54	29.12	-4.58	72.87	-48.33	100		13 Peak	Horizontal	
4	433.92	52.62	55.89	-3.27	72.87	-20.25	200		330 Average	Horizontal	
5	433.92	70.95	74.22	-3.27	92.87	-21.92	200		330 Peak	Horizontal	
6	671.17	30.89	29.46	1.43	72.87	-41.98	200		62 Peak	Horizontal	
7	858.08	38.24	34.04	4.20	72.87	-34.63	100		40 Peak	Horizontal	

Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	59.10	25.96	33.26	-7.30	72.87	-46.91	200		187 Peak	Vertical	
2	154.16	21.55	28.49	-6.94	72.87	-51.32	200		145 Peak	Vertical	
3	327.79	22.89	28.34	-5.45	72.87	-49.58	100		67 Peak	Vertical	
4	433.92	50.87	54.14	-3.27	72.87	-22.00	200		65 Average	Vertical	
5	433.92	68.51	71.78	-3.27	92.87	-24.36	200		65 Peak	Vertical	
6	621.70	29.11	28.57	0.54	72.87	-43.76	200		155 Peak	Vertical	
7	858.62	33.90	29.58	4.32	72.87	-38.97	200		153 Peak	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

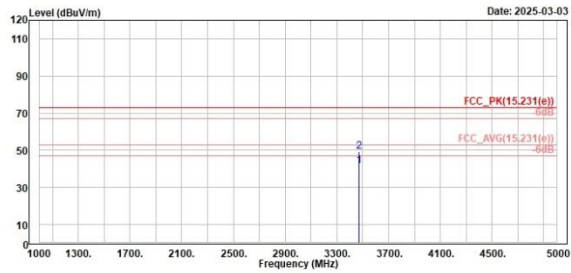
433.92MHz, ASK

Horizontal

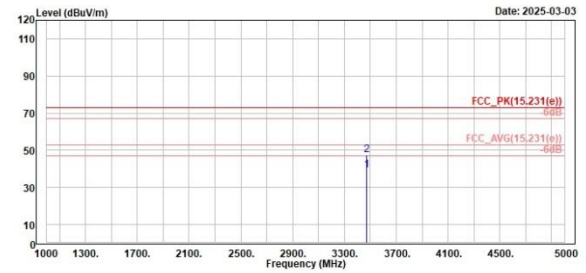
Vertical



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Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

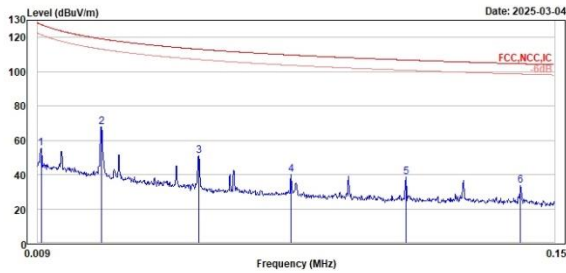
433.92MHz, FSK

9kHz~150kHz(Open)

150kHz~30MHz(Open)



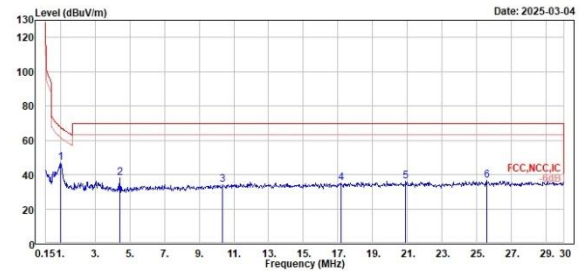
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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	0.01	55.17	37.06	18.11	127.00	-72.43	100	53	Peak	Open	
2	0.03	67.76	47.93	19.83	119.13	-51.37	100	360	Peak	Open	
3	0.05	51.12	32.44	18.68	113.11	-61.99	100	87	Peak	Open	
4	0.08	40.26	21.98	18.28	109.74	-69.48	100	361	Peak	Open	
5	0.11	38.55	20.47	18.08	106.82	-68.27	100	153	Peak	Open	
6	0.14	33.65	15.38	18.27	104.63	-70.98	100	360	Peak	Open	



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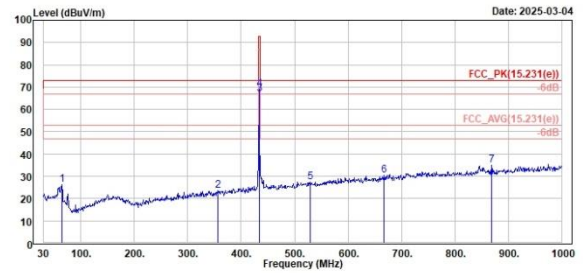
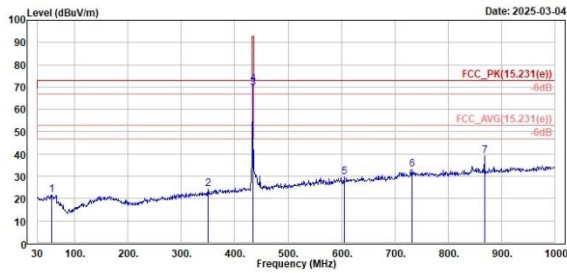
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	1.02	46.78	28.00	18.78	67.47	-20.69	100	276	Peak	Open	
2	4.42	30.11	18.63	19.48	69.50	-31.39	100	324	Peak	Open	
3	18.36	34.11	12.75	21.36	69.50	-35.39	100	68	Peak	Open	
4	17.16	34.94	12.61	22.33	69.50	-34.56	100	148	Peak	Open	
5	20.90	36.06	13.41	22.65	69.50	-33.44	100	178	Peak	Open	
6	25.55	36.51	13.51	23.00	69.50	-32.99	100	360	Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

433.92MHz, FSK

Horizontal

Vertical



Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	56.19	21.73	28.75	-7.02	72.87	-51.14	100	347	Peak	Horizontal	
2	350.10	24.38	29.55	-5.17	72.87	-48.49	157	360	Peak	Horizontal	
3	433.92	69.48	72.75	-3.27	72.87	-3.39	200	339	Average	Horizontal	
4	433.92	71.34	74.61	-3.27	92.87	-21.53	200	339	Peak	Horizontal	
5	605.21	29.70	29.32	0.38	72.87	-43.17	200	174	Peak	Horizontal	
6	732.28	33.19	36.93	2.26	72.87	-39.68	100	18	Peak	Horizontal	
7	868.08	39.01	34.01	4.20	72.87	-33.86	100	16	Peak	Horizontal	

Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	63.95	26.12	34.36	-8.24	72.87	-46.75	195	360	Peak	Vertical	
2	350.89	23.99	28.32	-4.93	72.87	-49.48	100	229	Peak	Vertical	
3	433.92	67.11	70.38	-3.27	72.87	-5.76	200	67	Average	Vertical	
4	433.92	69.08	72.35	-3.27	92.87	-23.79	200	67	Peak	Vertical	
5	528.58	27.41	28.66	-1.25	72.87	-45.46	200	21	Peak	Vertical	
6	667.29	30.38	29.08	1.30	72.87	-42.49	100	43	Peak	Vertical	
7	868.08	34.85	30.65	4.20	72.87	-38.02	200	56	Peak	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

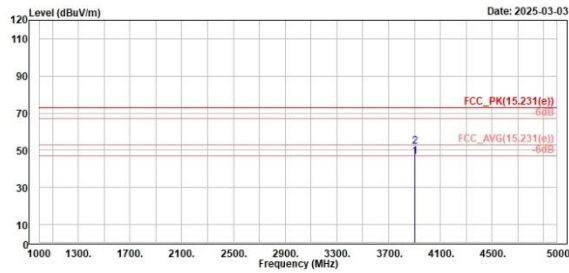
433.92MHz, FSK

Horizontal

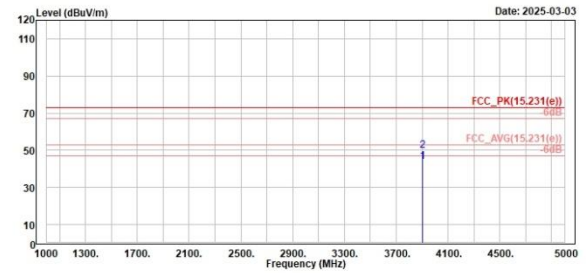
Vertical



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Appendix D: Test Results of Radiated Spurious Emissions for Large Inductor of 433.92MHz

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

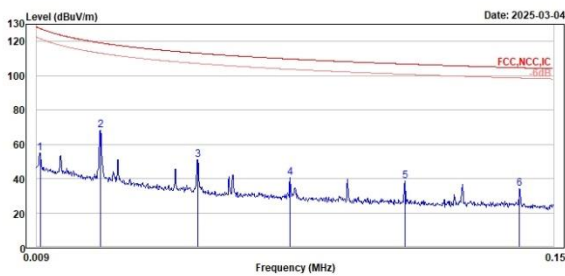
433.92MHz, ASK

9kHz~150kHz(Open)

150kHz~30MHz(Open)



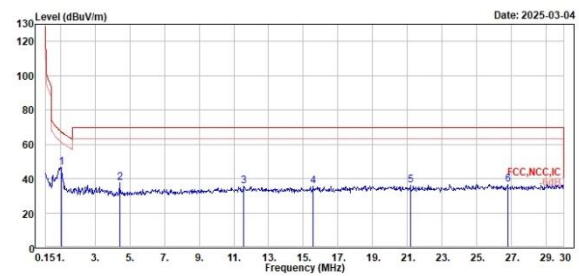
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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	0.01	54.90	36.79	18.11	127.50	-72.70	100	260 Peak	Open	
2	0.03	67.97	40.14	19.83	119.13	-51.16	100	257 Peak	Open	
3	0.05	51.10	32.42	18.68	113.11	-62.01	100	269 Peak	Open	
4	0.08	40.50	22.22	18.28	109.74	-69.24	100	123 Peak	Open	
5	0.11	38.35	20.27	18.08	106.82	-68.47	100	164 Peak	Open	
6	0.14	34.05	15.78	18.27	104.63	-70.58	100	158 Peak	Open	



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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	1.05	46.45	27.67	18.78	67.22	-20.77	100	177 Peak	Open	
2	4.42	37.61	18.13	19.48	69.50	-31.89	100	224 Peak	Open	
3	11.58	35.43	13.80	21.63	69.50	-34.67	100	360 Peak	Open	
4	15.58	35.79	14.06	21.73	69.50	-33.71	100	97 Peak	Open	
5	21.16	36.26	13.68	22.58	69.50	-33.24	100	296 Peak	Open	
6	26.78	36.40	13.45	22.95	69.50	-33.10	100	89 Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

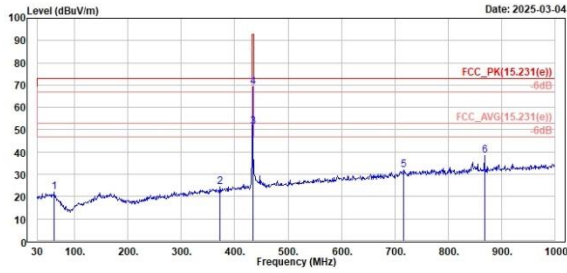
433.92MHz, ASK

Horizontal

Vertical



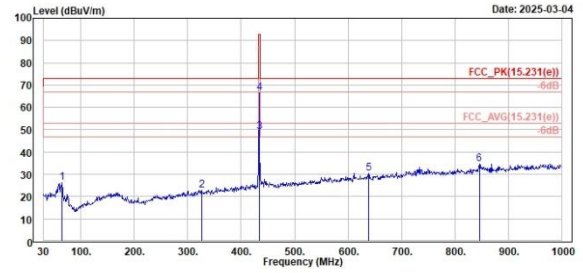
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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	62.81	21.93	29.79	-7.86	72.87	-50.94		100		118 Peak	Horizontal	
2	372.41	24.48	28.96	-4.48	72.87	-48.39		100		186 Peak	Horizontal	
3	433.92	51.32	54.59	-3.27	72.87	-21.55		200		342 Average	Horizontal	
4	433.92	69.14	72.41	-3.27	92.87	-23.73		200		342 Peak	Horizontal	
5	716.76	31.76	29.56	2.20	72.87	-41.11		200		360 Peak	Horizontal	
6	868.08	38.28	34.08	4.20	72.87	-34.59		100		360 Peak	Horizontal	



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	63.95	26.16	34.48	-8.24	72.87	-46.71		200		120 Peak	Vertical	
2	329.85	22.88	28.40	-5.52	72.87	-49.99		200		130 Peak	Vertical	
3	433.92	48.94	52.21	-3.27	72.87	-23.93		200		224 Average	Vertical	
4	433.92	66.64	69.91	-3.27	92.87	-26.23		200		224 Peak	Vertical	
5	639.16	30.34	29.37	0.97	72.87	-42.53		100		256 Peak	Vertical	
6	845.77	34.77	30.54	4.23	72.87	-38.10		200		298 Peak	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

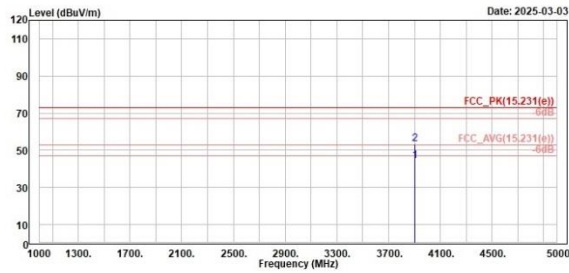
433.92MHz, ASK

Horizontal

Vertical



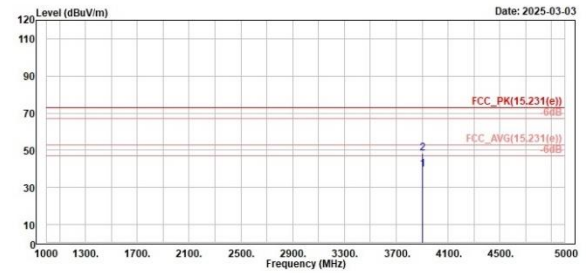
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	Freq	Level	Read	Level	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	Factor	dBuV	dBm	dBuV/m	dB	cm	deg		
1	3905.28	44.20	36.20	8.00	52.87	-8.67	300	312	Average	Horizontal	
2	3905.28	53.24	45.24	8.00	72.87	-19.63	300	312	Peak	Horizontal	



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	Freq	Level	Read	Level	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	Factor	dBuV	dBm	dBuV/m	dB	cm	deg		
1	3905.28	39.49	31.49	8.00	52.87	-13.38	100	320	Average	Vertical	
2	3905.28	48.56	40.56	8.00	72.87	-24.31	100	320	Peak	Vertical	

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

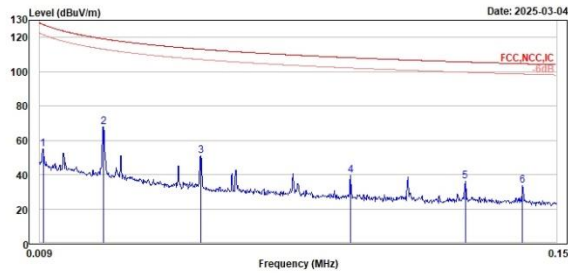
433.92MHz, FSK

9kHz~150kHz(Open)

150kHz~30MHz(Open)



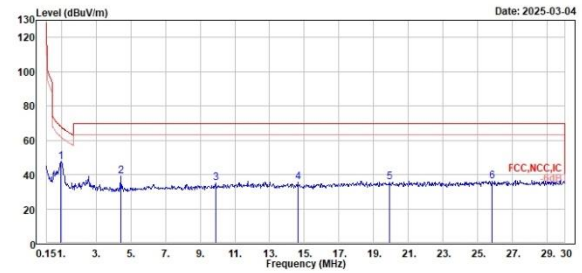
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	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.01	55.10	36.99	18.11	127.00	-72.50	100		63 Peak	Open	
2	0.03	67.74	47.91	19.83	119.13	-51.39	100		192 Peak	Open	
3	0.05	50.87	32.19	18.68	113.11	-62.24	100		182 Peak	Open	
4	0.09	39.53	21.51	18.02	108.16	-68.63	100		324 Peak	Open	
5	0.13	36.21	18.03	18.18	105.66	-69.45	100		215 Peak	Open	
6	0.14	33.48	15.21	18.27	104.63	-71.15	100		273 Peak	Open	



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	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.99	47.24	28.45	18.79	67.73	-20.49	100		63 Peak	Open	
2	4.42	39.14	19.66	19.48	69.50	-30.36	100		1 Peak	Open	
3	9.88	35.10	13.87	21.23	69.50	-34.40	100		185 Peak	Open	
4	14.63	35.46	13.91	21.55	69.50	-34.04	100		181 Peak	Open	
5	19.91	35.75	12.94	22.81	69.50	-33.75	100		360 Peak	Open	
6	25.82	36.22	13.35	22.87	69.50	-33.28	100		234 Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

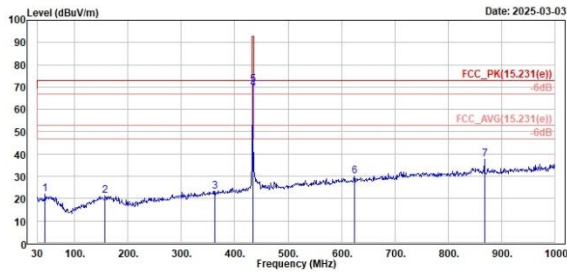
433.92MHz, FSK

Horizontal

Vertical



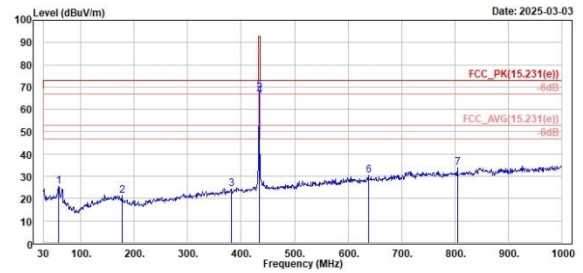
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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	44.55	21.99	29.38	-7.39	72.87	-50.88	200		21	Peak	Horizontal	
2	157.07	21.15	28.08	-6.93	72.87	-51.72	100		81	Peak	Horizontal	
3	362.71	23.27	27.99	-4.72	72.87	-49.60	100		146	Peak	Horizontal	
4	433.92	69.17	72.44	-3.27	72.87	-3.70	200		321	Average	Horizontal	
5	433.92	70.98	74.25	-3.27	92.87	-21.89	200		321	Peak	Horizontal	
6	624.61	29.90	29.35	0.55	72.87	-42.97	100		297	Peak	Horizontal	
7	868.08	37.83	33.63	4.20	72.87	-35.04	100		357	Peak	Horizontal	



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	58.13	25.51	32.81	-7.30	72.87	-47.36	180		360	Peak	Vertical	
2	176.47	21.42	28.72	-7.30	72.87	-51.45	200		34	Peak	Vertical	
3	382.11	24.44	28.79	-4.35	72.87	-48.43	100		169	Peak	Vertical	
4	433.92	66.32	69.59	-3.27	72.87	-6.55	129		360	Average	Vertical	
5	433.92	68.59	71.86	-3.27	92.87	-24.28	129		360	Peak	Vertical	
6	638.19	30.33	29.40	0.93	72.87	-42.54	200		281	Peak	Vertical	
7	885.03	33.81	30.14	3.67	72.87	-39.06	100		300	Peak	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

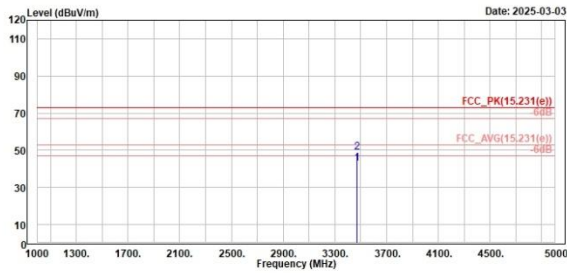
433.92MHz, FSK

Horizontal

Vertical



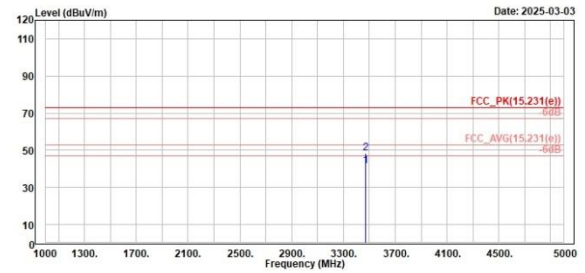
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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	3471.36	42.92	35.79	7.13	52.87	-9.95	245	368 Average	Horizontal	
2	3471.36	48.96	41.83	7.13	72.87	-23.91	245	368 Peak	Horizontal	



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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	3471.36	41.74	34.61	7.13	52.87	-11.13	180	93 Average	Vertical	
2	3471.36	48.40	41.27	7.13	72.87	-24.47	180	93 Peak	Vertical	