



<b>Prüfbericht-Nr.:</b> <i>Test report no.:</i>	CN232PAD (P15C-SRD) 001	<b>Auftrags-Nr.:</b> <i>Order no.:</i>	48221412	Seite 1 von 26 Page 1 of 26
<b>Kunden-Referenz-Nr.:</b> <i>Client reference no.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date:</i>	2023-07-05	
<b>Auftraggeber:</b> <i>Client:</i>	CUB ELECPARTS INC. No. 6, Lane 546, Sec. 6, Changlu Road, Fuhsin Township, Changhua County, Taiwan			
<b>Prüfgegenstand:</b> <i>Test item:</i>	TPMS PSG E type Uni Sensor			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type no.:</i>	TPM108, TPM108XXX, TPM108-XXX, B121-XXXXXX, B121-XXXXXX-XXX, B121-046, B121-046XXX-XXX (X= 0-9, A-Z, a-z)			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	FCC Part 15C Test report			
<b>Prüfgrundlage:</b> <i>Test specification:</i>	FCC CFR47 Part 15: Subpart C Section 15.231			
<b>Wareneingangsdatum:</b> <i>Date of sample receipt:</i>	2023-08-10			
<b>Prüfmuster-Nr.:</b> <i>Test sample no.:</i>	A003537076-005, 006 A003537076-010, 011			
<b>Prüfzeitraum:</b> <i>Testing period:</i>	2023-08-14 - 2023-08-16			
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	EMC/RF Taipei Testing Site			
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	Taipei Testing Laboratories			
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass			
<b>zusammengestellt von:</b> <i>compiled by:</i>	 Ryan Chen	<b>genehmigt von:</b> <i>authorized by:</i>	 Brenda Chen	
<b>Datum:</b> <i>Date:</i>	2023-08-23	<b>Ausstellungsdatum:</b> <i>Issue date:</i>	2023-08-23	
<b>Stellung / Position:</b>	Senior Project Manager	<b>Stellung / Position:</b>	Senior Project Manager	
<b>Sonstiges / Other:</b>				
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <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
<p><b>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.</b>  <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></p>				

## TEST SUMMARY

Report Section	FCC Clause	Test Item	Result
5.1.1	15.203	Antenna Requirement	Pass
5.1.2	15.231(e)	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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*Test Report No.*

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**APPENDIX A - TEST RESULT OF RADIATED EMISSIONS**

**APPENDIX SP - PHOTOGRAPHS OF TEST SETUP**

**APPENDIX EP - PHOTOGRAPHS OF EUT**

## HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
CN232PAD (P15C-SRD) 001	Original Release	2023-08-23

## 1. General Remarks

### 1.1 Complementary Materials

The following attachments are integral parts of this test report:

**Appendix A - Test Result of Radiated Emissions**  
**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)	$\pm 1.15$ dB
Radiated Emission (30 MHz ~ 200 MHz)	$\pm 1.30$ dB
Radiated Emission (200 MHz ~ 1 GHz)	$\pm 1.30$ dB
Radiated Emission (1 GHz ~ 18 GHz)	$\pm 1.54$ dB
Radiated Emission (18 GHz ~ 40 GHz)	$\pm 2.52$ dB
Mains Conducted Emission	$\pm 1.65$ dB



### 3. General Product Information

#### 3.1 Product Function and Intended Use

The EUT is a TPMS PSG E type Uni Sensor working at 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	TPMS PSG E type Uni Sensor
Type Identification	TPM108, TPM108XXX, TPM108-XXX, B121-XXXXXXX, B121-XXXXXX-XXX, B121-046, B121-046XXX-XXX (X= 0-9, A-Z, a-z)
FCC ID	ZPNTPM108

##### 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

Note:

- All models are listed as below.

Model Type	Type Identification	Difference
Main	TPM108	All models are electrically identical, different model names are for marketing purpose.
Series	TPM108XXX	
	TPM108-XXX	
	B121-XXXXXXX	
	B121-XXXXXX-XXX	
	B121-046	
	B121-046XXX-XXX	

### 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 provided firmware for each channel. It was used to enable the operation modes listed as below.

Test Software	None.
---------------	-------

The samples were used as follows:

A003537076-005, 006 for 315MHz

A003537076-010, 011 for 433.92MHz

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 Y-plane.
2. "-" means no effect.

#### 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	22.9-23.5 °C	60.1-62.3 %	Blake Wang
Pulse Width / TX Gap	22.9-23.5 °C	60.1-62.3 %	Blake Wang
Field Strength of Fundamental	19.8-20.9 °C	52-57 %	Chuan Chu
Radiated Spurious Emissions	19.8-20.9 °C	52-57 %	Chuan Chu

### 4.3 Special Accessories and Auxiliary Equipment

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

**Accessory of EUT**

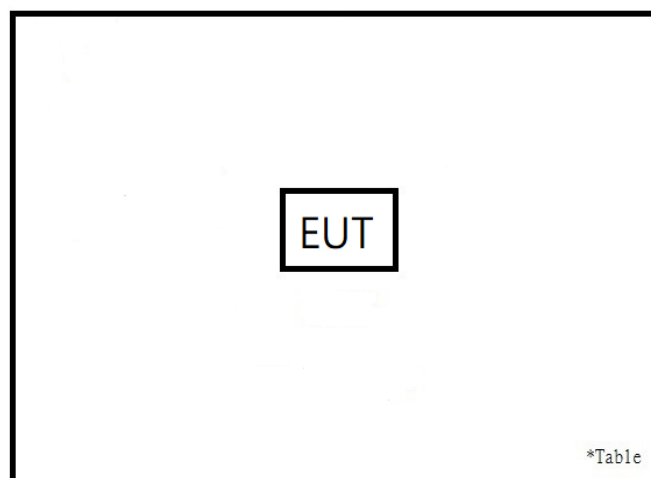
None.

**Support Unit**

None.

### 4.4 Test Setup Diagram

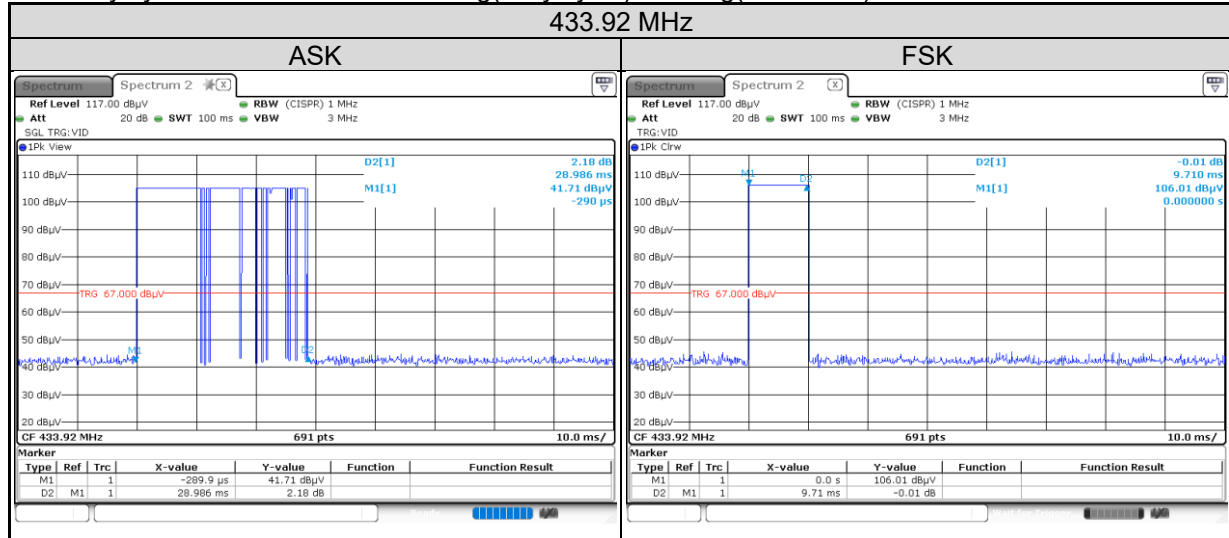
<Radiated Spurious Emissions Mode>



## 4.5 Duty Cycle of Test Signal

ASK Duty cycle correction factor =  $20 \log(\text{Duty cycle}) = 20 \log(28.986/100) = -10.76$

FSK Duty cycle correction factor =  $20 \log(\text{Duty cycle}) = 20 \log(9.710/100) = -20.26$



## 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 a small loop 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.

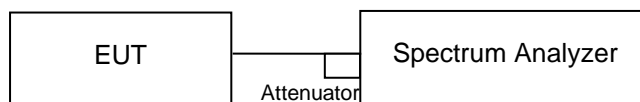
## 5.1.2 20 dB Bandwidth and Occupied Bandwidth

### 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

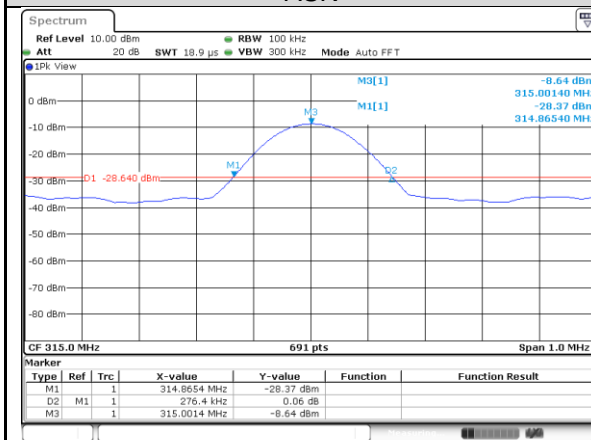
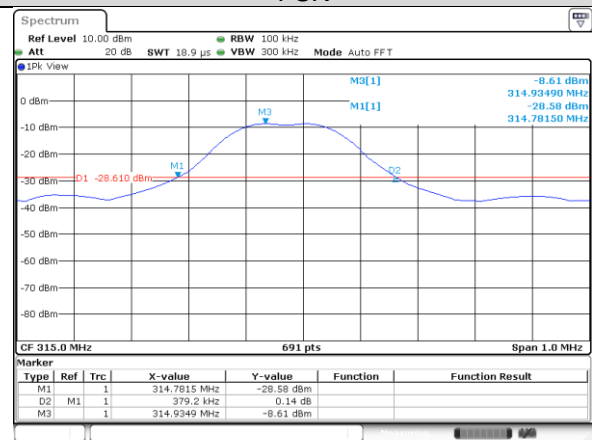
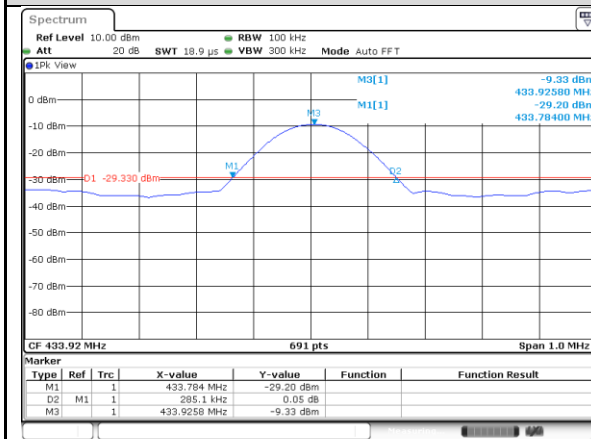
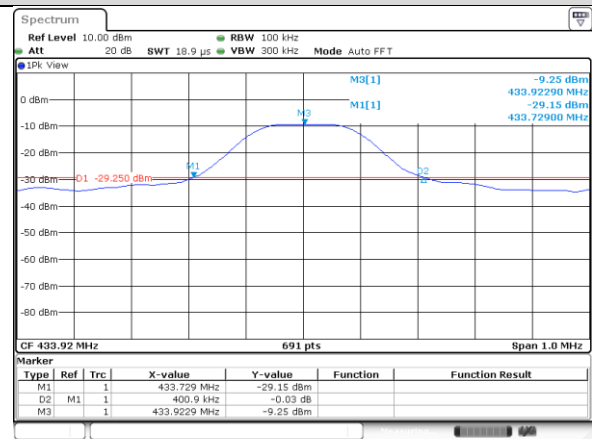
Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/2/23	2024/2/22	2023/8/16	2023/8/16

### Test Procedures

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. 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.
- c. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.
- e. 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.

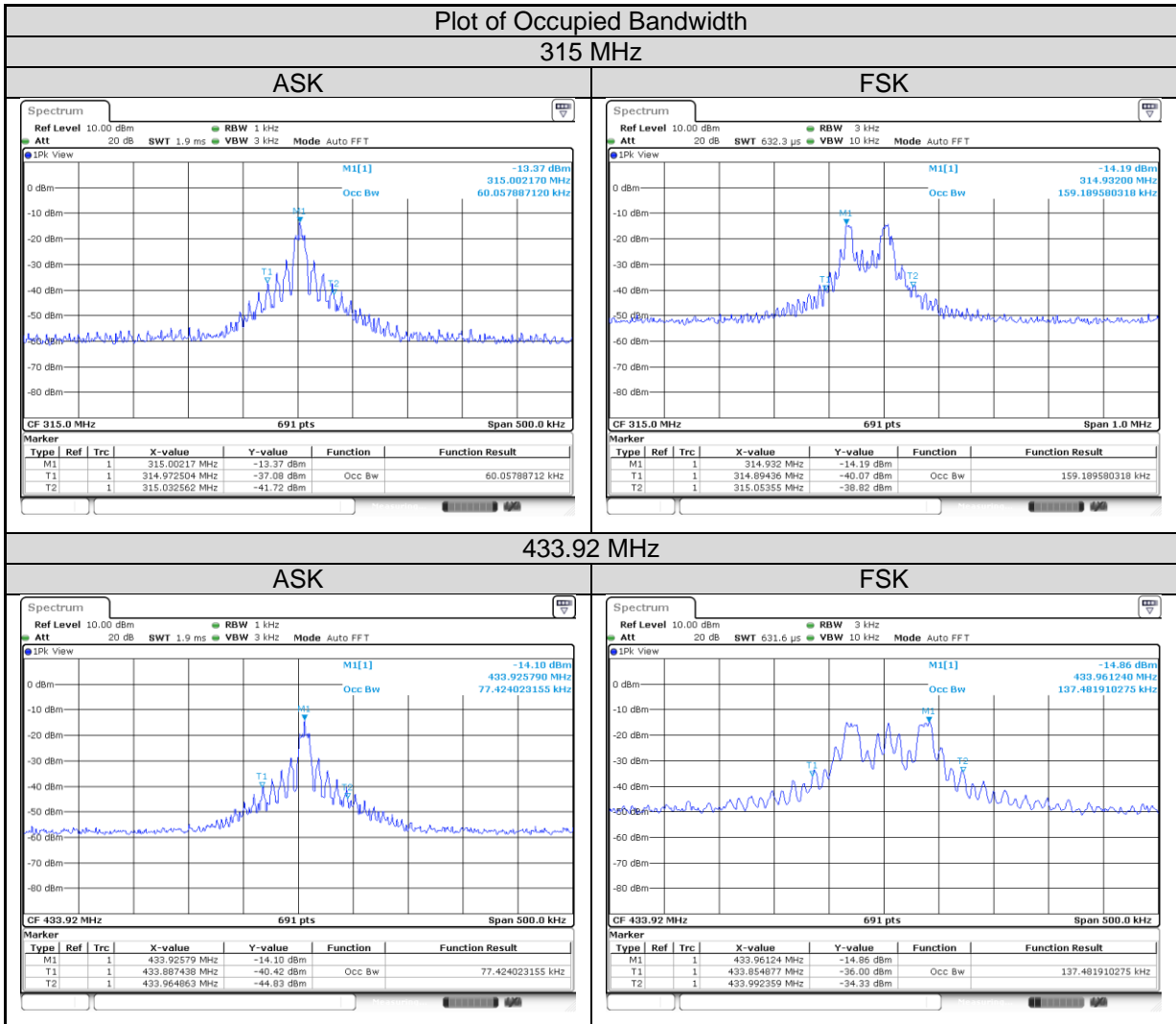
**Test Results**

Channel Frequency (MHz)	Modulation	20 dB Bandwidth (kHz)	Limit (kHz)
315	ASK	276.4	787.5
	FSK	379.2	
433.92	ASK	285.1	1085
	FSK	400.9	

**Plot of 20 dB Bandwidth**
**315 MHz**
**ASK**

**FSK**

**433.92 MHz**
**ASK**

**FSK**




Channel Frequency (MHz)	Modulation	Occupied Bandwidth (kHz)
315	ASK	60.06
	FSK	159.19
433.92	ASK	77.42
	FSK	137.48



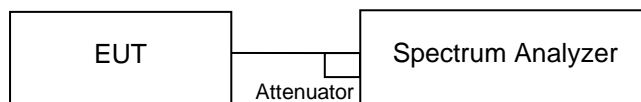
### 5.1.3 Pulse Width/TX Gap

#### Limit

The device has automatic control mechanism such that each transmission time (Pulse width) is shorter than 1 second, and stop duration of a transmission period (TX gap) is longer than 10 seconds and is not shorter than transmission time multiplied by 30.

**Kind of Test Site**                      Shielded room

#### Test Setup



#### Test Instruments

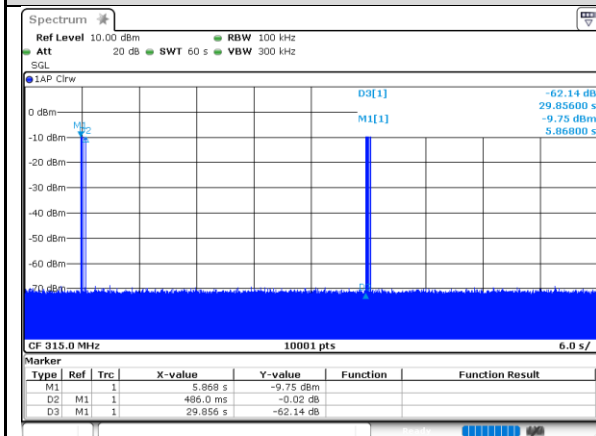
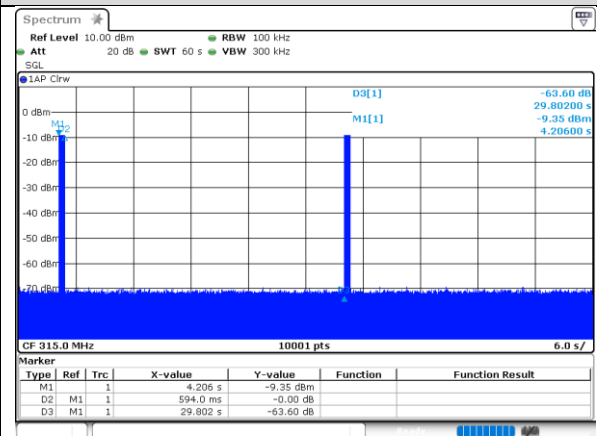
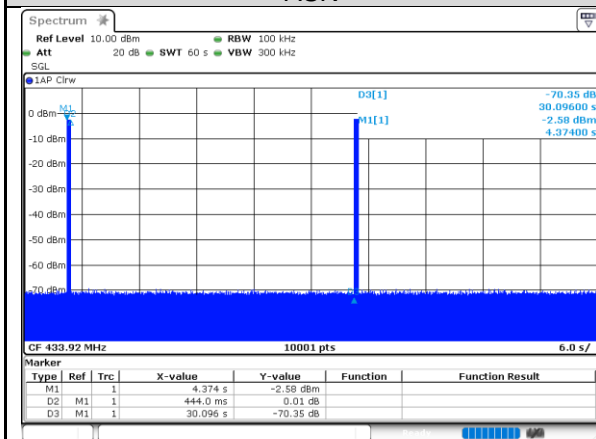
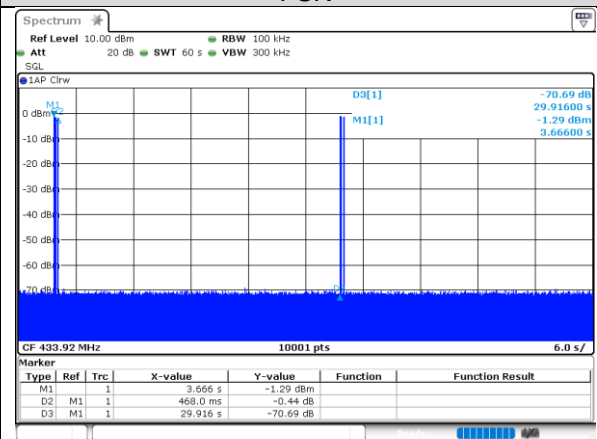
Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/2/23	2024/2/22	2023/8/16	2023/8/16

#### Test Procedures

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. 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.
- c. Measure the transmission time (Pulse width) and stop duration of a transmission period (TX gap).
- d. Repeat above procedures until all frequencies measured were complete.

**Test Results**

Channel Frequency (MHz)	Modulation	Pulse Width (ms)	Limit (ms)	TX gap (s)	Limit (s)	Result
315	ASK	486	< 1000	29.856	>14.580	Pass
	FSK	594		29.802	>17.820	
433.92	ASK	440	< 1000	30.096	>13.200	Pass
	FSK	468		29.916	>14.040	

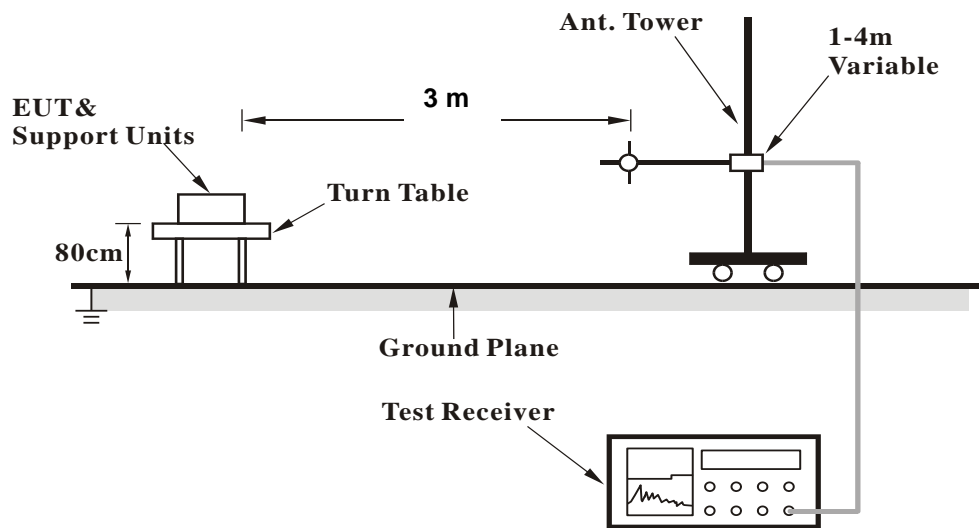
**Plot of Pulse Width/TX Gap**
**315 MHz**
**ASK**

**FSK**

**433.92 MHz**
**ASK**

**FSK**


### 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: 2023/8/14 ~ 2023/8/15

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Above 1GHz					
Signal Analyzer	R&S	FSV40	101508	2023/4/20	2024/4/19
Horn Antenna	ETS-Lindgren	3117	00218929	2022/12/8	2023/12/7
HF-AMP + AC source	EMCI	EMC051845SE	980633	2023/2/22	2024/2/21
HF-AMP + AC source	EMCI	EMC184045SE	980657	2023/2/16	2024/2/15
Horn Antenna	SCHWARZBECK	BBHA 9170	00218930	2022/12/8	2023/12/7
30MHz-1GHz					
Receiver	R&S	ESR7	102109	2023/2/24	2024/2/23
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2023/3/31	2024/3/29
LF-AMP	Agilent	8447D	2944A107722	2023/3/22	2024/3/21
Below 30MHz					
Receiver	R&S	ESR7	102109	2023/2/24	2024/2/23
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2023/3/31	2024/3/29

**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(E axis orientation. The worst-case Axis orientation is recorded in this test report.

**Test Results**

Modulation	Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Antenna Orientation	Detector or calculated value
ASK	315.00	67.43	87.66	Horizontal	Peak
	315.00	56.63	67.66		Average
	315.00	73.63	87.66	Vertical	Peak
	315.00	62.73	67.66		Average
	433.92	76.11	92.87	Horizontal	Peak
	433.92	65.35	72.87		Average
	433.92	75.01	92.87	Vertical	Peak
	433.92	60.56	72.87		Average
FSK	315.00	68.77	87.66	Horizontal	Peak
	315.00	54.03	67.66		Average
	315.00	67.03	87.66	Vertical	Peak
	315.00	51.93	67.66		Average
	433.92	74.99	92.87	Horizontal	Peak
	433.92	54.73	72.87		Average
	433.92	73.77	92.87	Vertical	Peak
	433.92	53.54	72.87		Average

**Note:**

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

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

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

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

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

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

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

Please refer to Appendix A for the details.

## 5.1.5 Radiated Spurious Emissions

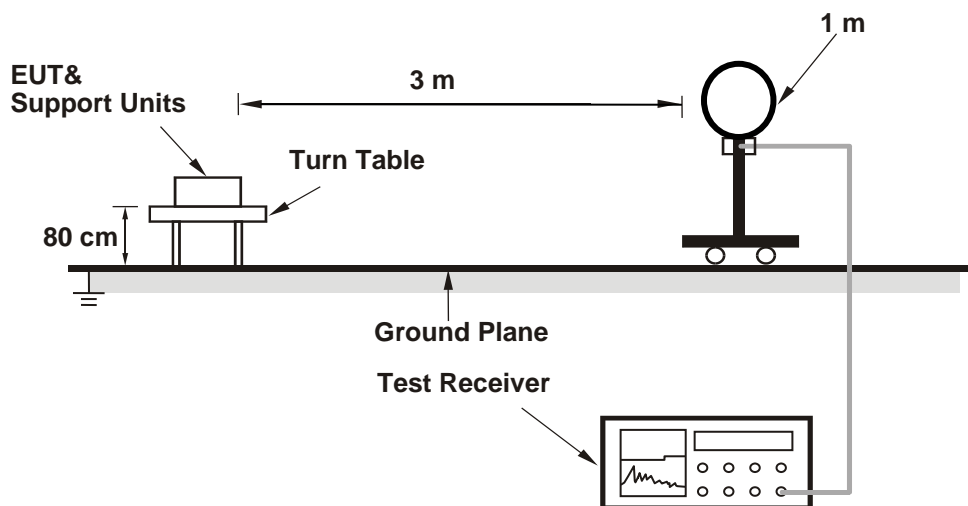
### Limit

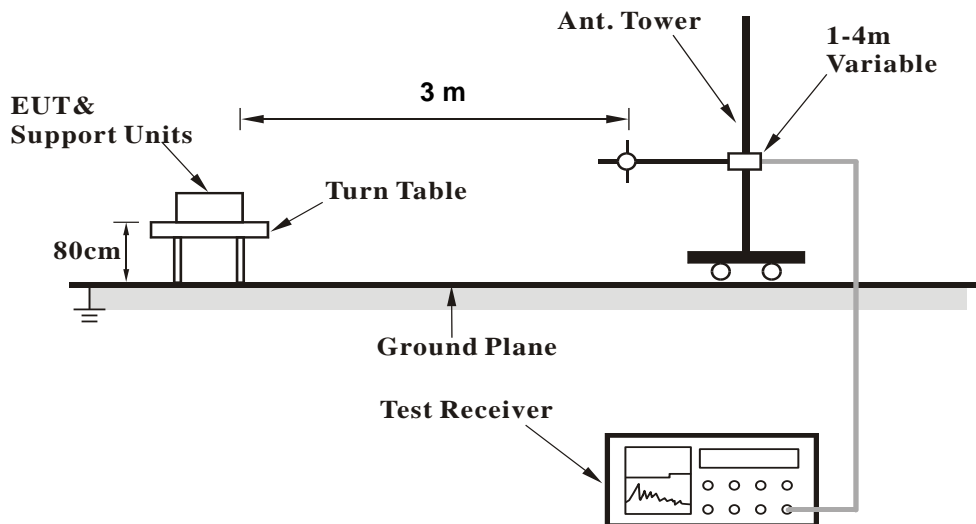
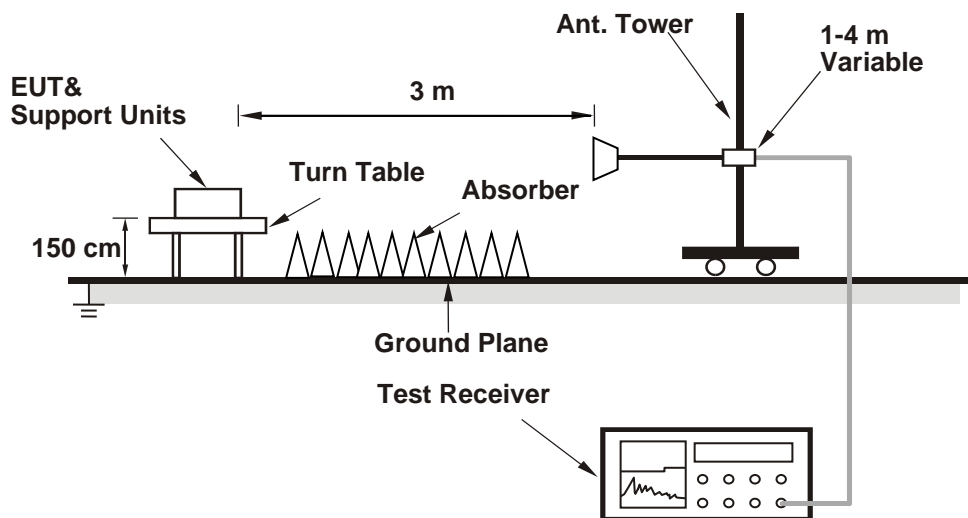
Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

**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.

**Prüfbericht - Nr.:** CN232PAD (P15C-SRD) 001  
*Test Report No.*

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**Test Results**

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

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

Please refer to Appendix A.

# Appendix A: Test Results of Radiated Spurious Emissions

ASK

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

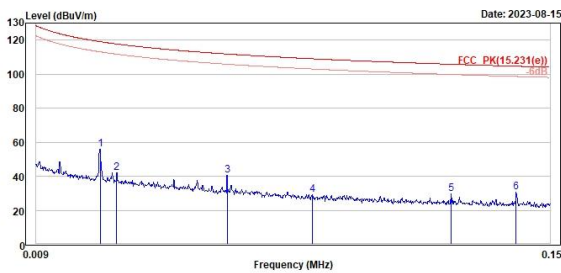
## 315MHz

### 9kHz~150kHz(Open)

### 150kHz~30MHz(Open)



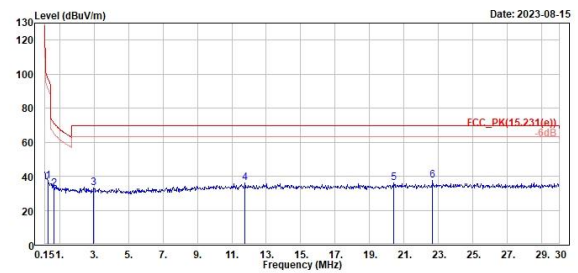
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Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	0.03	56.05	37.09	18.96	119.08	-63.03	100	58	Peak	Open	
2	0.03	42.25	23.05	19.20	117.73	-75.48	100	187	Peak	Open	
3	0.06	40.75	21.90	18.85	111.82	-71.07	100	162	Peak	Open	
4	0.08	29.06	16.77	18.29	109.04	-79.98	100	368	Peak	Open	
5	0.12	29.48	11.46	18.02	105.00	-76.32	100	65	Peak	Open	
6	0.14	30.47	12.38	18.09	104.63	-74.16	100	316	Peak	Open	



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Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	0.33	36.83	18.08	18.75	97.26	-60.43	100	315	Peak	Open	
2	0.69	32.43	13.50	18.93	70.86	-38.43	100	336	Peak	Open	
3	2.99	33.00	13.37	19.63	69.50	-36.50	100	97	Peak	Open	
4	11.76	35.87	14.19	21.68	69.50	-33.63	100	164	Peak	Open	
5	20.42	36.33	14.09	22.24	69.50	-33.17	100	14	Peak	Open	
6	22.66	37.76	15.50	22.26	69.50	-31.74	100	74	Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

315MHz

Horizontal

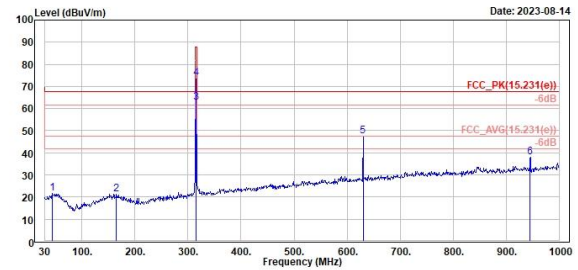
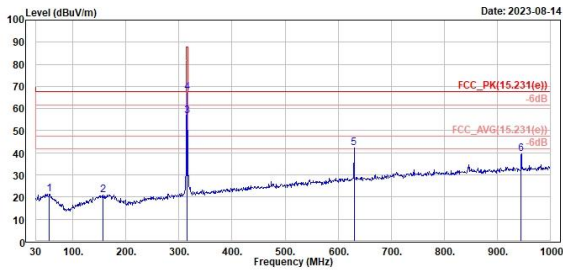
Vertical



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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	55.22	21.42	28.61	-7.19	67.66	-46.24	129	360 Peak	Horizontal
2	157.07	21.07	28.17	-7.10	67.66	-46.59	100	274 Peak	Horizontal
3	315.00	56.63	62.90	-6.27	67.66	-11.03	100	190 Average	Horizontal
4	315.00	67.43	73.70	-6.27	87.66	-20.23	100	190 Peak	Horizontal
5	630.00	42.38	41.99	0.39	67.66	-25.28	210	360 Peak	Horizontal
6	945.00	39.71	34.82	4.89	67.66	-27.95	100	172 Peak	Horizontal

Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	43.58	21.49	28.98	-7.49	67.66	-46.17	363	360 Peak	Vertical
2	164.83	21.44	28.39	-6.95	67.66	-46.22	300	18 Peak	Vertical
3	315.00	62.73	69.00	-6.27	67.66	-4.93	200	211 Average	Vertical
4	315.00	73.63	79.90	-6.27	87.66	-14.03	200	211 Peak	Vertical
5	630.00	47.39	47.00	0.39	67.66	-20.27	100	242 Peak	Vertical
6	945.00	38.20	33.31	4.89	67.66	-29.46	100	63 Peak	Vertical

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

315MHz

Horizontal

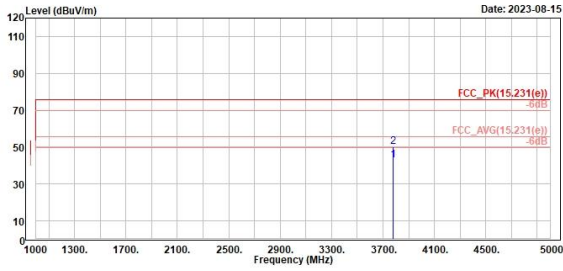
Vertical



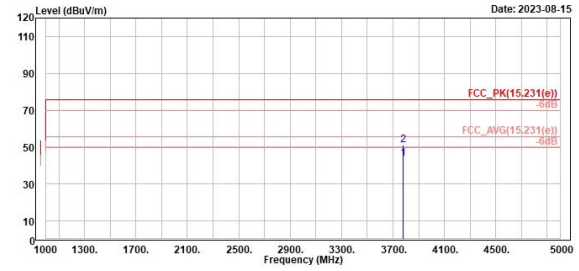
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1	2	Read Level	Read Level Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
3788.00	42.78	54.67	-11.89	55.62	-12.84	300	205	Average	Horizontal	
3788.00	50.22	62.11	-11.89	75.62	-25.40	300	205	Peak	Horizontal	



1	2	Read Level	Read Level Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
3788.00	44.01	55.90	-11.89	55.62	-11.61	100	1	Average	Vertical	
3788.00	51.12	63.01	-11.89	75.62	-24.50	100	1	Peak	Vertical	

FSK

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

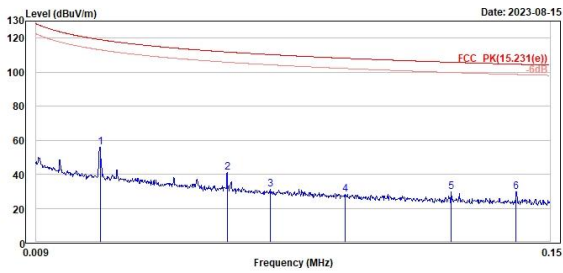
315MHz

9kHz~150kHz(Open)

150kHz~30MHz(Open)



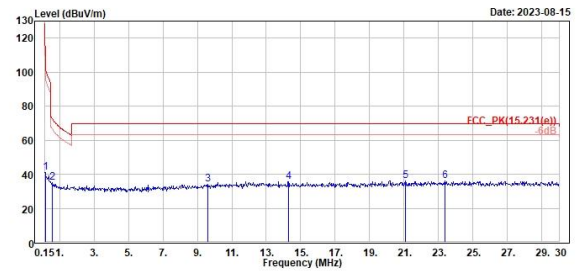
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Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	0.03	55.95	36.99	18.96	119.08	-63.13	100	189	Peak	Open	
2	0.06	41.14	22.29	18.85	111.82	-70.68	100	182	Peak	Open	
3	0.07	31.21	12.65	18.56	110.29	-79.08	100	349	Peak	Open	
4	0.09	28.38	10.31	18.07	108.16	-79.78	100	325	Peak	Open	
5	0.12	29.47	11.45	18.02	105.00	-76.33	100	267	Peak	Open	
6	0.14	29.79	11.70	18.09	104.63	-74.84	100	98	Peak	Open	



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Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	0.18	41.22	22.97	18.25	102.50	-61.28	100	272	Peak	Open	
2	0.60	35.07	16.17	18.90	72.07	-37.00	100	311	Peak	Open	
3	9.61	34.01	12.62	21.39	69.50	-35.49	100	234	Peak	Open	
4	14.30	35.50	13.65	21.85	69.50	-34.00	100	324	Peak	Open	
5	21.07	36.29	14.04	22.25	69.50	-33.21	100	48	Peak	Open	
6	23.37	35.86	13.59	22.27	69.50	-33.64	100	360	Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

315MHz

Horizontal

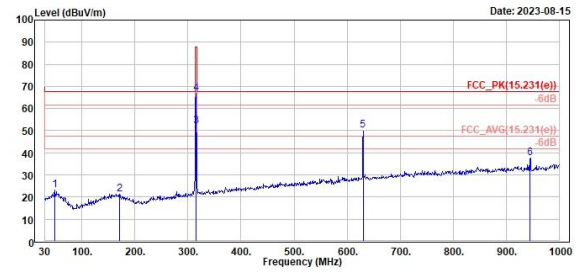
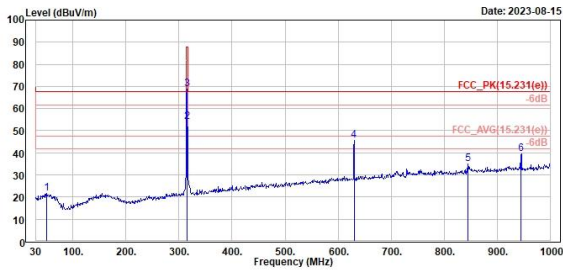
Vertical



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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	58.37	21.56	28.46	-6.90	67.66	-46.10	300	77 Peak	Horizontal
2	315.00	54.03	60.30	-6.27	67.66	-13.63	100	179 Average	Horizontal
3	315.00	68.77	75.04	-6.27	67.66	-18.89	100	179 Peak	Horizontal
4	630.00	45.54	45.15	0.39	67.66	-22.12	226	233 Peak	Horizontal
5	644.00	34.90	31.18	3.72	67.66	-32.76	174	360 Peak	Horizontal
6	945.00	39.55	34.66	4.89	67.66	-28.11	100	330 Peak	Horizontal

Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	48.43	23.02	29.93	-6.91	67.66	-44.64	100	174 Peak	Vertical
2	170.65	21.33	28.53	-7.20	67.66	-46.33	200	250 Peak	Vertical
3	315.00	51.93	58.20	-6.27	67.66	-15.73	200	214 Average	Vertical
4	315.00	67.03	73.30	-6.27	67.66	-20.63	200	214 Peak	Vertical
5	630.00	50.01	49.62	0.39	67.66	-17.65	100	241 Peak	Vertical
6	945.00	37.82	32.93	4.89	67.66	-29.84	100	34 Peak	Vertical

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

315MHz

Horizontal

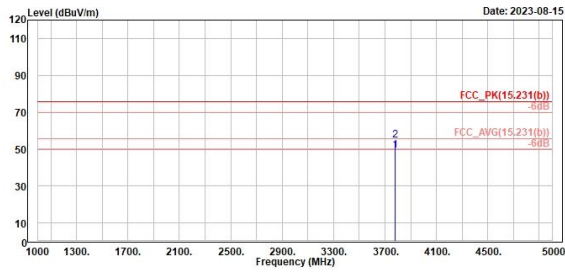
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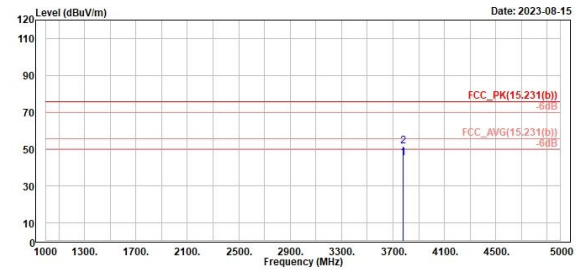
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Freq	Level	Read Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	3788.00	49.13	61.02	-11.89	55.62	-6.49	400	227 Average	Horizontal	
2	3788.00	54.66	66.55	-11.89	75.62	-20.96	400	227 Peak	Horizontal	



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	3788.00	45.03	56.92	-11.89	55.62	-10.59	242	0 Average	Vertical	
2	3788.00	51.41	63.30	-11.89	75.62	-24.21	242	0 Peak	Vertical	



ASK

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

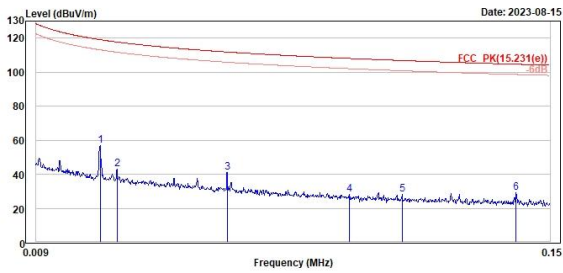
433.92MHZ

9kHz~150kHz(Open)

150kHz~30MHz(Open)



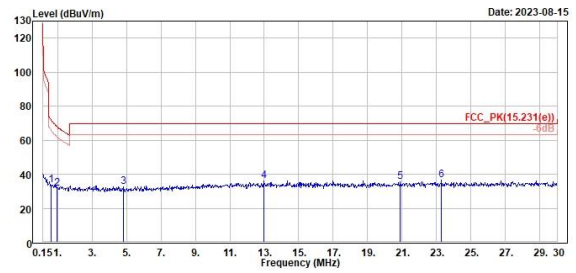
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Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	0.03	56.67	37.71	18.96	119.08	-62.41	100	162	Peak	Open	
2	0.03	42.99	23.79	19.20	117.69	-74.70	100	360	Peak	Open	
3	0.06	41.21	22.36	18.85	111.82	-70.61	100	172	Peak	Open	
4	0.10	28.09	10.04	18.05	108.04	-79.95	100	23	Peak	Open	
5	0.11	28.11	10.14	17.97	106.82	-78.71	100	336	Peak	Open	
6	0.14	29.39	11.30	18.09	104.63	-75.24	100	164	Peak	Open	



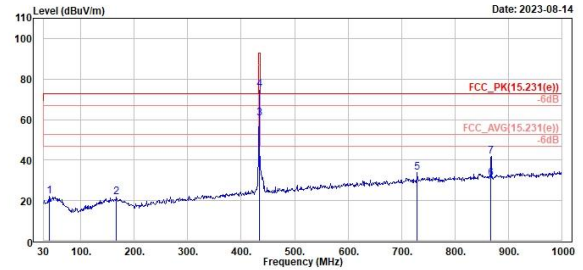
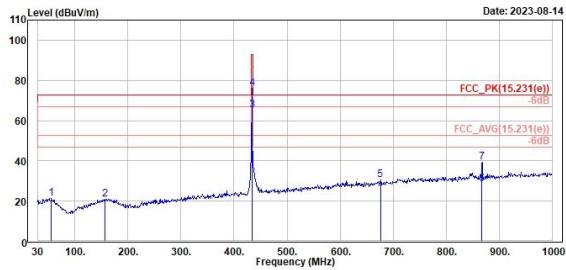
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Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	0.63	33.46	14.55	18.91	71.65	-38.19	100	239	Peak	Open	
2	0.96	31.60	12.55	19.05	68.00	-36.40	100	27	Peak	Open	
3	4.84	32.79	13.29	19.50	69.50	-36.71	100	179	Peak	Open	
4	12.96	35.09	14.13	21.76	69.50	-33.61	100	305	Peak	Open	
5	20.90	35.59	13.34	22.25	69.50	-33.91	100	309	Peak	Open	
6	23.28	36.45	14.18	22.27	69.50	-33.05	100	5	Peak	Open	

**Spurious Emissions, Tx Mode, 30MHz ~ 1GHz**
**433.92MHZ**
**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	55.22	21.19	28.38	-7.19	72.87	-51.68	300	31 Peak	Horizontal
2	156.10	20.85	27.97	-7.12	72.87	-52.02	200	233 Peak	Horizontal
3	433.92	65.35	69.04	-3.69	72.87	-7.52	200	1 Average	Horizontal CF
4	433.92	76.11	79.80	-3.69	92.87	-16.76	200	1 Peak	Horizontal
5	676.02	30.72	29.85	0.87	72.87	-42.15	100	307 Peak	Horizontal
6	867.84	28.56	24.75	3.81	52.87	-24.31	100	27 Average	Horizontal CF
7	867.84	39.33	35.52	3.81	72.87	-33.54	100	27 Peak	Horizontal

Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	40.67	22.30	30.21	-7.91	72.87	-50.57	200	200 Peak	Vertical
2	166.77	21.75	28.68	-6.93	72.87	-51.12	367	360 Peak	Vertical
3	433.92	60.56	64.25	-3.69	72.87	-12.31	123	360 Average	Vertical CF
4	433.92	75.01	78.70	-3.69	92.87	-17.86	123	360 Peak	Vertical
5	729.37	33.04	32.17	0.87	72.87	-39.03	306	360 Peak	Vertical
6	867.84	31.06	27.25	3.81	52.87	-21.81	200	196 Average	Vertical CF
7	867.84	41.84	38.03	3.81	72.87	-31.03	200	196 Peak	Vertical

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

433.92MHz

Horizontal

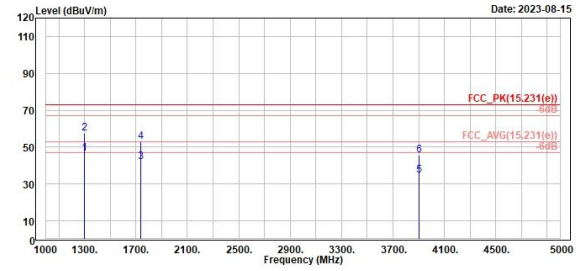
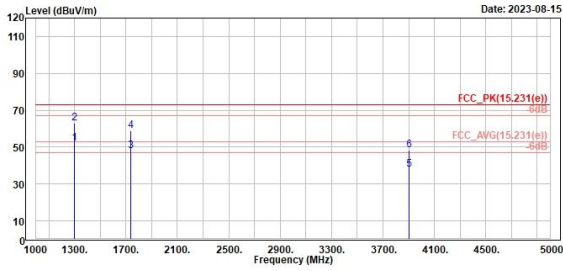
Vertical



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Item	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	1301.76	52.23	71.17	-18.94	52.87	-0.64	380	360	Average	Horizontal	CF
2	1301.76	62.99	81.93	-18.94	72.87	-9.88	380	360	Peak	Horizontal	CF
3	1735.68	48.07	65.65	-17.58	52.87	-4.80	319	360	Average	Horizontal	CF
4	1735.68	58.68	76.26	-17.58	72.87	-14.19	319	360	Peak	Horizontal	CF
5	3905.28	37.02	49.40	-11.58	52.87	-15.85	300	232	Average	Horizontal	CF
6	3905.28	46.58	60.16	-11.58	72.87	-24.29	300	232	Peak	Horizontal	CF

Item	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	1301.76	46.67	65.61	-18.94	52.87	-6.20	400	259	Average	Vertical	CF
2	1301.76	57.43	76.37	-18.94	72.87	-15.44	400	259	Peak	Vertical	CF
3	1735.68	42.17	59.75	-17.58	52.87	-10.70	300	251	Average	Vertical	CF
4	1735.68	52.93	70.51	-17.58	72.87	-19.94	300	251	Peak	Vertical	CF
5	3905.28	34.74	46.32	-11.58	52.87	-18.13	100	288	Average	Vertical	CF
6	3905.28	45.50	57.08	-11.58	72.87	-27.37	100	288	Peak	Vertical	CF

FSK

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

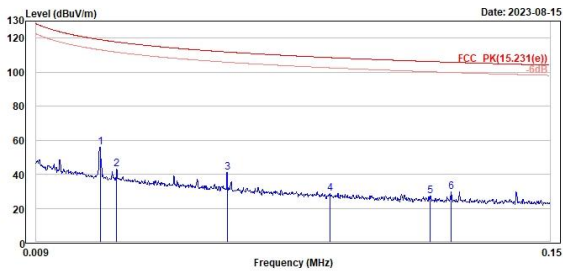
433.92MHz

9kHz~150kHz(Open)

150kHz~30MHz(Open)



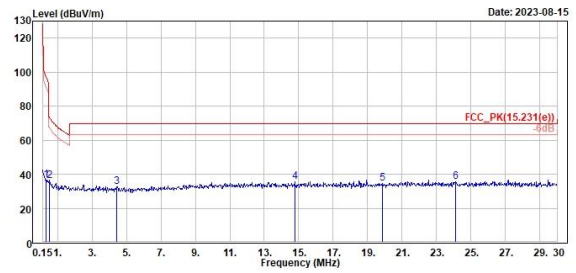
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Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	0.03	55.85	36.89	18.96	119.08	-63.23	100	331	Peak	Open	
2	0.03	42.91	23.71	19.20	117.73	-74.82	100	35	Peak	Open	
3	0.06	41.06	22.21	18.85	111.82	-70.76	100	318	Peak	Open	
4	0.09	28.70	10.53	18.17	108.54	-79.84	100	100	Peak	Open	
5	0.12	27.34	9.34	18.00	106.22	-78.88	100	22	Peak	Open	
6	0.12	29.72	11.70	18.02	105.80	-76.08	100	137	Peak	Open	



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Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	0.33	36.47	17.72	18.75	97.26	-60.79	100	289	Peak	Open	
2	0.54	36.23	17.36	18.87	72.99	-36.76	100	33	Peak	Open	
3	4.45	32.77	13.24	19.53	69.50	-36.73	100	150	Peak	Open	
4	14.78	35.45	13.56	21.89	69.50	-34.05	100	328	Peak	Open	
5	19.88	34.83	12.60	22.23	69.50	-34.67	100	131	Peak	Open	
6	24.12	35.47	13.19	22.28	69.50	-34.03	100	342	Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

433.92MHz

Horizontal

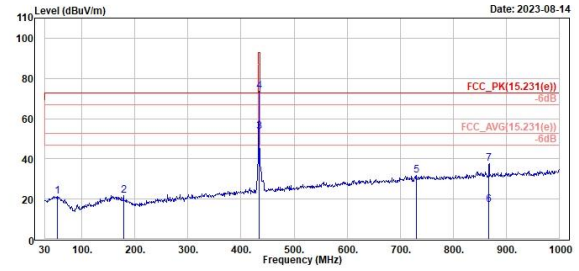
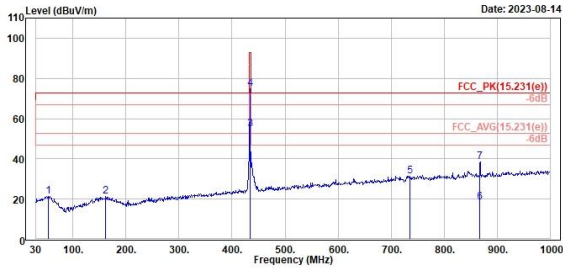
Vertical



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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	53.28	21.44	28.35	-6.91	72.87	-51.43	100	298 Peak	Horizontal
2	161.92	21.27	28.24	-6.97	72.87	-51.60	100	225 Peak	Horizontal
3	433.92	54.73	58.42	-3.69	72.87	-18.14	200	360 Average	Horizontal CF
4	433.92	74.99	78.68	-3.69	92.87	-17.88	200	360 Peak	Horizontal
5	736.16	31.56	29.57	1.99	72.87	-41.31	100	273 Peak	Horizontal
6	867.84	18.21	14.40	3.81	52.87	-34.66	100	102 Average	Horizontal CF
7	867.84	38.48	34.67	3.81	72.87	-34.39	100	102 Peak	Horizontal

Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	53.28	21.21	28.12	-6.91	72.87	-51.66	395	360 Peak	Vertical
2	178.41	21.72	29.59	-7.87	72.87	-51.15	200	331 Peak	Vertical
3	433.92	53.54	57.23	-3.69	72.87	-19.33	100	70 Average	Vertical CF
4	433.92	73.77	77.46	-3.69	92.87	-19.10	100	70 Peak	Vertical
5	730.34	31.72	30.02	1.70	72.87	-41.15	300	20 Peak	Vertical
6	867.84	17.33	13.52	3.81	52.87	-35.54	200	87 Average	Vertical CF
7	867.84	37.60	33.79	3.81	72.87	-35.27	200	87 Peak	Vertical

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

433.92MHz

Horizontal

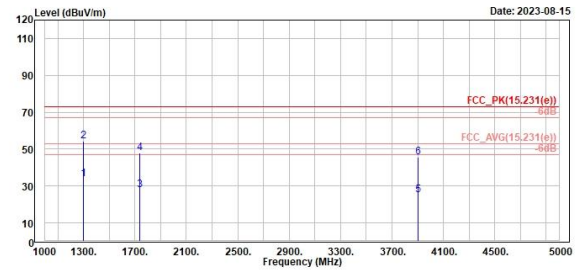
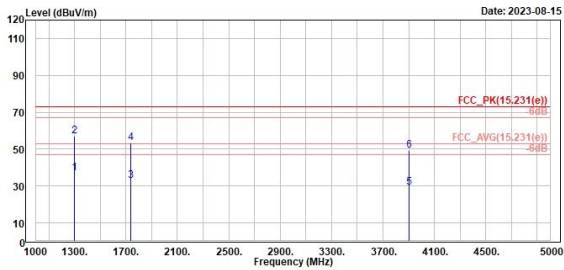
Vertical



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Item	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	1301.76	36.89	55.83	-18.94	52.87	-15.98	200	360	Average	Horizontal	CF
2	1301.76	57.15	76.09	-18.94	72.87	-15.72	200	360	Peak	Horizontal	
3	1735.68	32.98	50.56	-17.58	52.87	-19.89	200	360	Average	Horizontal	CF
4	1735.68	53.24	70.82	-17.58	72.87	-19.63	200	360	Peak	Horizontal	
5	3905.28	28.99	40.57	-11.58	52.87	-23.88	100	223	Average	Horizontal	CF
6	3905.28	49.25	60.83	-11.58	72.87	-23.62	100	223	Peak	Horizontal	

Item	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	1301.76	33.89	52.83	-18.94	52.87	-18.98	300	62	Average	Vertical	CF
2	1301.76	54.15	73.09	-18.94	72.87	-18.72	300	62	Peak	Vertical	
3	1735.68	27.85	45.43	-17.58	52.87	-25.02	300	270	Average	Vertical	CF
4	1735.68	48.11	65.69	-17.58	72.87	-24.76	300	270	Peak	Vertical	
5	3905.28	25.16	36.74	-11.58	52.87	-27.71	400	360	Average	Vertical	CF
6	3905.28	45.42	57.00	-11.58	72.87	-27.45	400	360	Peak	Vertical	