





Prüfbericht-Nr.: CN229O0X (P15C-SRD) Auftrags-Nr.: Seite 1 von 23 238542471 Order no .: Page 1 of 23 001 Test report no.: Kunden-Referenz-Nr.: N/A Auftragsdatum: 2022-04-25 Order date: Client reference no.: Auftraggeber: CUB ELECPARTS INC. Client: No. 6, Lane 546, Sec. 6, Changlu Road, Fuhsin Township, Changhua County, Taiwan Prüfgegenstand: Uni Sensor EVO Test item: Bezeichnung / Typ-Nr.: TPM103,TPM103xxx \ B121-040 \ B121-040XXX \ B121-042 \ B121-042XXX \ Identification / Type no.: B121-XXXXXX (X= 0-9, A-Z, a-z) Auftrags-Inhalt: FCC Part 15C Test report Order content: Prüfgrundlage: Test specification: FCC CFR47 Part 15: Subpart C Section 15.231 Wareneingangsdatum: 2022-04-28 Date of sample receipt: Prüfmuster-Nr.: A003252050-008~011 Test sample no: A003252050-003~005&007 Prüfzeitraum: 2022-05-03 - 2022-09-08 Testing period: Ort der Prüfung: **EMC/RF** Taipei Testing Place of testing: Prüflaboratorium: Taipei Testing Laboratories Testing laboratory: Prüfergebnis\*: Pass Test result\*: überprüft von: genehmigt von: compiled by: authorized by: Boerla Ch Ausstellungsdatum: Datum: Date: 2022-09-12 Issue date: 2022-09-12 Rvan Chen Brenda Chen Senior Project Manager **Stellung** / Position: Stellung / Position: Senior Project Manager Sonstiges / Other: Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt Condition of the test item at delivery: Test item complete and undamaged \* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/T = nicht getestet N/A = nicht anwendbar 2 = good3 = satisfactory 4 = sufficient 5 = poor\* Legend: 1 = very good P(ass) = passed a.m. test specification(s) N/A = not applicable F(ail) = failed a.m. test specification(s) N/T = not testedDieser 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.

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



Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001

Seite 2 von 23 Page 2 of 23

Test Report No.

# **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(a)	Pulse Width / TX Gap	
5.1.4	15.231(b)	Field Strength of Fundamental Emissions	Pass
5.1.5	15.231(b) & 15.205 & 15.209	Radiated Spurious Emissions	Pass
-	15.207	Mains Conducted Emission	N/A

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



Test Report No.

Prüfbericht - Nr.: CN

# CN229O0X (P15C-SRD) 001

Seite 3 von 23 Page 3 of 23

### **Contents**

HIST	ORY OF THIS TEST REPORT	4
1.	GENERAL REMARKS	5
1.1	COMPLEMENTARY MATERIALS	5
1.2	DECISION RULE OF CONFORMITY	5
2.	TEST SITES	6
2.1	TEST LABORATORY	6
2.2	TEST FACILITY	6
2.3	Traceability	7
2.4	CALIBRATION	7
2.5	MEASUREMENT UNCERTAINTY	7
3.	GENERAL PRODUCT INFORMATION	8
3.1	PRODUCT FUNCTION AND INTENDED USE	8
3.2	SYSTEM DETAILS AND RATINGS	8
3.3	NOISE GENERATING AND NOISE SUPPRESSING PARTS	9
3.4	SUBMITTED DOCUMENTS	9
4.	TEST SET-UP AND OPERATION MODES	10
4.1	PRINCIPLE OF CONFIGURATION SELECTION	10
4.2	TEST OPERATION AND TEST SOFTWARE	10
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	11
4.4	TEST SETUP DIAGRAM	11
5.	Test Results	12
5.1	TRANSMITTER REQUIREMENT & TEST SUITES	
5.1. 5.1.		
5. 1. 5. 1.		
5.1.	4 Field Strength of Fundamental Emissions	18
5.1.	5 Radiated Spurious Emissions	21

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

**APPENDIX SP - PHOTOGRAPHS OF TEST SETUP** 

**APPENDIX EP - PHOTOGRAPHS OF EUT** 



Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001
Test Report No.

Seite 4 von 23 Page 4 of 23

### **HISTORY OF THIS TEST REPORT**

Report No.	Description	Date Issued	
CN229O0X (P15C-SRD) 001	Original Release	2022-09-12	



Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001

Seite 5 von 23 Page 5 of 23

Test Report No.

### 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.



Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001
Test Report No.

Seite 6 von 23 Page 6 of 23

## 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.: 226631 ISED Registration No.: 25563



Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001

Seite 7 von 23 Page 7 of 23

Test Report No.

### 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 basics 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)	± 1.32 dB
Radiated Emission (200 MHz ~ 1 GHz)	± 1.31 dB
Radiated Emission (1 GHz ~ 18 GHz)	± 1.53 dB
Radiated Emission (18 GHz ~ 40 GHz)	± 2.50 dB
Mains Conducted Emission	± 1.65 dB



Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001

Seite 8 von 23 Page 8 of 23

Test Report No.

# 3. General Product Information

### 3.1 Product Function and Intended Use

The EUT is a Uni Sensor EVO. It contains 315 MHz & 433.92 MHz compatible module enabling the user to communicate data through a wireless interface.

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	Uni Sensor EVO	
Type Identification	TPM103,TPM103xxx \ B121-040 \ B121-040XXX \ B121-042 \ B121-042XXX \ B121-XXXXXXX (X= 0-9, A-Z, a-z)	
FCC ID	ZPNTPM103	

#### **Technical Specification of EUT**

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

#### Note:

#### 1. All models are listed as below.

Model Type	Type Identification	Difference	
Main	TPM103		
	TPM103xxx		
	B121-040	All models are electrically identical, different	
Series	B121-040XXX	model names are for marketing purpose and	
	B121-042	appearance.	
	B121-042XXX		
	B121-XXXXXX		



Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001

Seite 9 von 23 Page 9 of 23

Test Report No.

# 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



Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001

**Seite 10 von 23**Page 10 of 23

Test Report No.

# 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.

The samples were used as follows:

A003252050-008~011

A003252050-003~005&007

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

	Applicable To					
EUT Configure Mode	20 dB Bandwidth		Field Strength of Fundamental Emissions	Radiated Spurious Emissions	Mains Conducted Emission	Description
-	V	$\sqrt{}$	V	V	-	-

#### Note:

#### 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	

<sup>1.</sup> The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when position on **Z-plane**.

<sup>2. &</sup>quot;-" means no effect.



**Prüfbericht - Nr.:** 

CN229O0X (P15C-SRD) 001

**Seite 11 von 23**Page 11 of 23

Test Report No.

#### **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	18-23 °C	59-68 %	Nick Hsu
Pulse Width / TX Gap	18-23 °C	59-68 %	Nick Hsu
Field Strength of Fundamental	23.7-24.6 °C	52-55 %	Ray Huang
Radiated Spurious Emissions	23.7-24.6 °C	52-55 %	Ray Huang

# 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>





Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001
Test Report No.

**Seite 12 von 23**Page 12 of 23

-

### 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.



Prüfbericht - Nr.:

CN229O0X (P15C-SRD) 001

**Seite 13 von 23**Page 13 of 23

Test Report No.

### 5.1.2 20 dB Bandwidth and Occupied Bandwidth

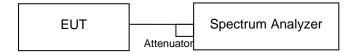
#### Limit

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	Manufacturer	Tuno	S/N	Calibration	Calibration	Test Date	
Equipment	Manufacturer	Туре	3/IN	Date	Due Date	From	Until
Spectrum Analyzer	R&S	FSV40	101512	2022/2/24	2023/2/23	2022/5/3	2022/7/12

#### **Test Procedures**

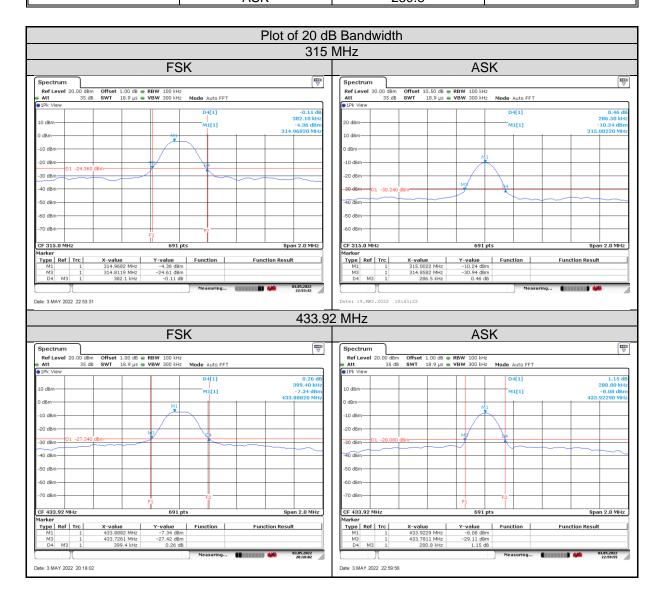
- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the 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.



Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001
Test Report No.

**Seite 14 von 23**Page 14 of 23

Test Results							
Channel Frequency (MHz)	Modulation	20 dB Bandwidth (kHz)	Limit (kHz)				
315	FSK	382.1	787.5				
	ASK	286.5	767.5				
433.92	FSK	399.4	1084.8				
	ASK	280.8	1004.0				



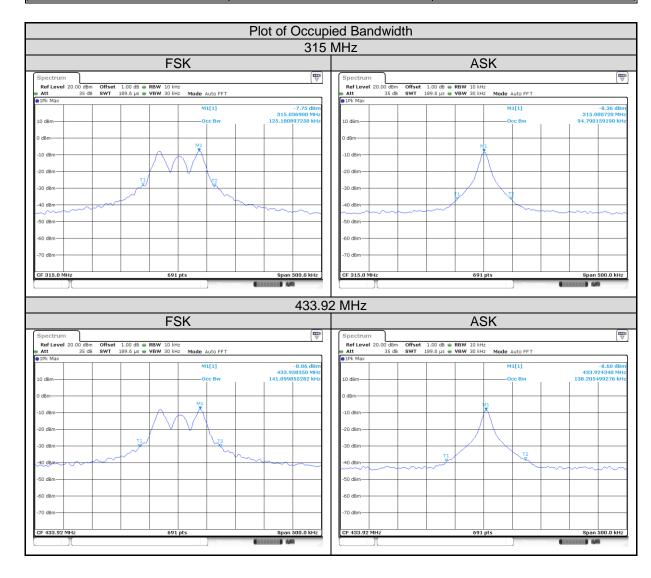


Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001

**Seite 15 von 23** *Page 15 of 23* 

Test Report No.

Channel Frequency (MHz)	Modulation	Occupied Bandwidth (kHz)
315	FSK	125.18
	ASK	94.79
433.03	FSK	141.10
433.92	ASK	138.21





Prüfbericht - Nr.:

CN229O0X (P15C-SRD) 001

**Seite 16 von 23** *Page 16 of 23* 

Test Report No.

### 5.1.3 Pulse Width/TX Gap

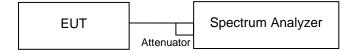
#### Limit

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	Manufacturer	Type	S/N	Calibration	Calibration	Test Date	
Equipment	iviariuiacturei	rype	3/IN	Date	Due Date	From	Until
Spectrum Analyzer	R&S	FSV40	101512	2022/2/24	2023/2/23	2022/5/3	2022/7/12

#### **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.



### Prüfbericht - Produkte

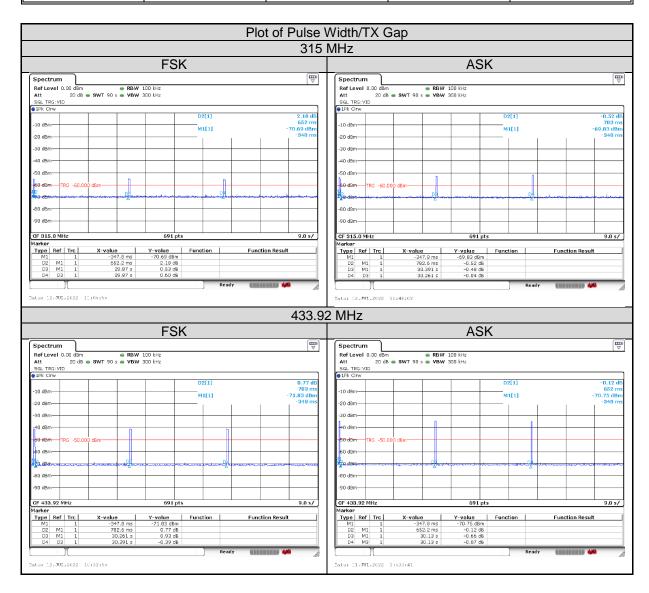
Test Report - Products

Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001
Test Report No.

**Seite 17 von 23**Page 17 of 23

#### **Test Results**

Channel Frequency (MHz)	Modulation	Pulse Width (ms)	Limit (ms)	Result	
245	FSK	652.2	- 1000	Door	
315	ASK	782.6	< 1000	Pass	
422.02	FSK	782.6	- 1000	Door	
433.92	ASK	652.2	< 1000	Pass	





Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001

**Seite 18 von 23** *Page 18 of 23* 

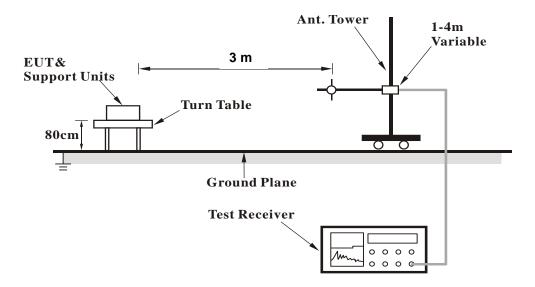
Test Report No.

### **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).



Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001

**Seite 19 von 23** *Page 19 of 23* 

Test Report No.

#### **Test Instruments**

Kind of Equipment	Manufacturer	Туре	S/N	Calibration Date	Calibration Due Date	
		Above 1 GHz				
Signal Analyzer			101509	2022/4/22	2023/4/21	
Horn Antenna	ETS-Lindgren	3117	00218929	2021/11/25	2022/11/24	
HF-AMP + AC source	EMCI	EMC051845SE	980635	2022/1/20	2023/1/19	
HF-AMP + AC source	EMCI	EMC184045SE	980656	2022/1/20	2023/1/19	
Horn Antenna	SCHWARZBECK	BBHA 9170	00887	2022/3/29	2023/3/28	
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A	
30 MHz ~ 1 GHz						
Receiver	R&S	ESR7	102109	2022/2/25	2023/2/24	
Bilog Antenna	Bilog Antenna SCHWARZBECK VULB-9168 LF-AMP Agilent 8447D		00949	2022/5/29	2023/5/28	
LF-AMP			2727A05146	2022/2/16	2023/2/15	
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A	
		Below 30 MHz				
Receiver	R&S	ESR7	102109	2022/2/25	2023/2/24	
Microwave Cable	SUCOFLEX 104EA	800056/4EA	804680/4	2022/3/22	2023/3/21	
Loop Antenna	SCHWARZBECK	FMZB 1519B	00215	2021/12/8	2022/12/7	
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A	



Test Report No.

### Prüfbericht - Nr.: CN229O0X

CN229O0X (P15C-SRD) 001

**Seite 20 von 23**Page 20 of 23

#### **Test Procedures**

- a. 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.
- 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 peak and average detect function and specified bandwidth with maximum hold mode.

#### Note:

- 1. All modes of operation were investigated and the worst-case emissions are reported.
- 2. 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**

Modulation	Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Antenna Orientation	Detector or calculated value
	315.00	44.00	67.66	Horizontal	Average
	315.00	65.87	87.66	попиона	Peak
	315.00	46.30	67.66	Vertical	Average
FSK	315.00	66.08	87.66	vertical	Peak
FSK	433.92	50.05	72.87	Horizontal	Average
	433.92	70.24	92.87	Honzontai	Peak
	433.92	39.65	72.87	Vertical	Average
	433.92	66.36	92.87	vertical	Peak
	315.00	37.48	67.66	Horizontal	Average
	315.00	56.38	87.66	Honzontai	Peak
	315.00	38.04	67.66	Vertical	Average
ASK	315.00	57.37	87.66	vertical	Peak
ASK	433.92	60.04	72.87	Horizontal	Average
	433.92	72.77	92.87	попиона	Peak
	433.92	57.25	72.87	Vertical	Average
	433.92	70.04	92.87	verticai	Peak

#### Note:

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

315MHz,  $\mu$  V/m at 3 meters = 16.6667 x (315MHz) - 2833.3333 = 2416.68  $\mu$  V/m

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

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

433.92MHz,  $\mu$ V/m at 3 meters = 16.6667 x (433.92MHz) - 2833.3333 = 4398.68  $\mu$ V/m 20log (4398.68) = 72.87 dB $\mu$ V/m (Average Limit) 72.87 + 20 = 92.87 dB $\mu$ V/m (Peak Limit)

Please refer to Appendix A for the details.



Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001

**Seite 21 von 23**Page 21 of 23

Test Report No.

### 5.1.5 Radiated Spurious Emissions

#### Limit

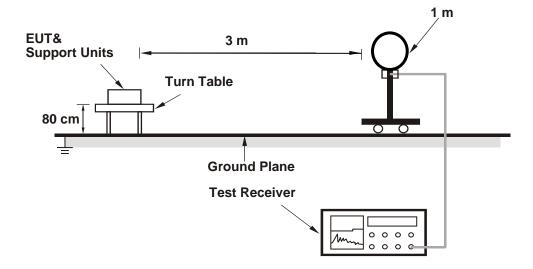
Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

**Kind of Test Site** 

3m Semi-Anechoic Chamber

#### **Test Setup**

<Radiated Emissions below 30 MHz>



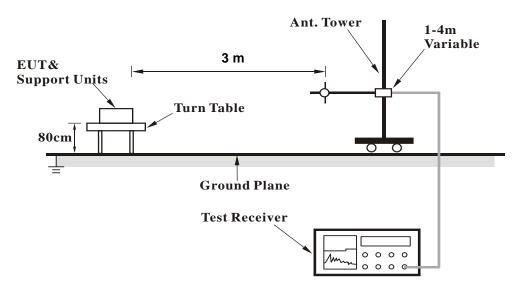


# Prüfbericht - Nr.: CN229O0X (P15C-SRD) 001

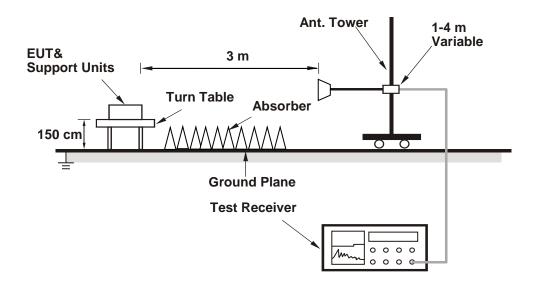
**Seite 22 von 23**Page 22 of 23

Test Report No.

#### <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



Prüfbericht - Nr.:

CN229O0X (P15C-SRD) 001

**Seite 23 von 23** *Page 23 of 23* 

Test Report No.

#### **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.

#### **Test Results**

Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

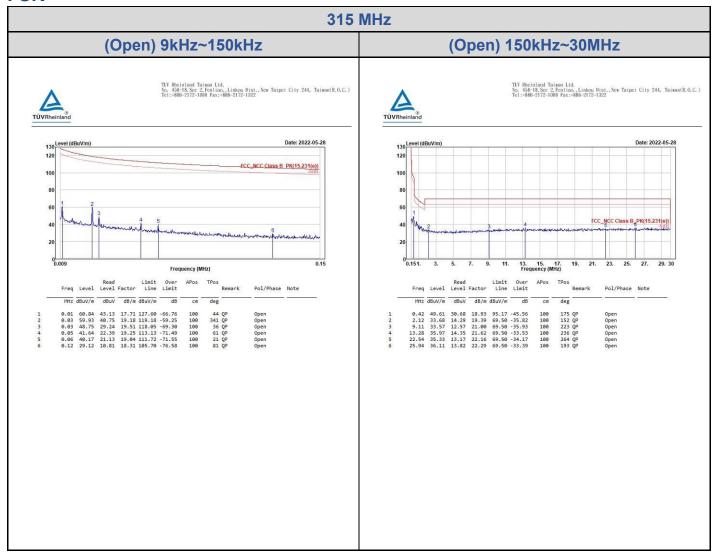
Please refer to Appendix A.

# CN229O0X (P15C-SRD) 001

Seite A1 von A16
Page A1 of A16

# **Appendix A: Test Results of Radiated Spurious Emissions**

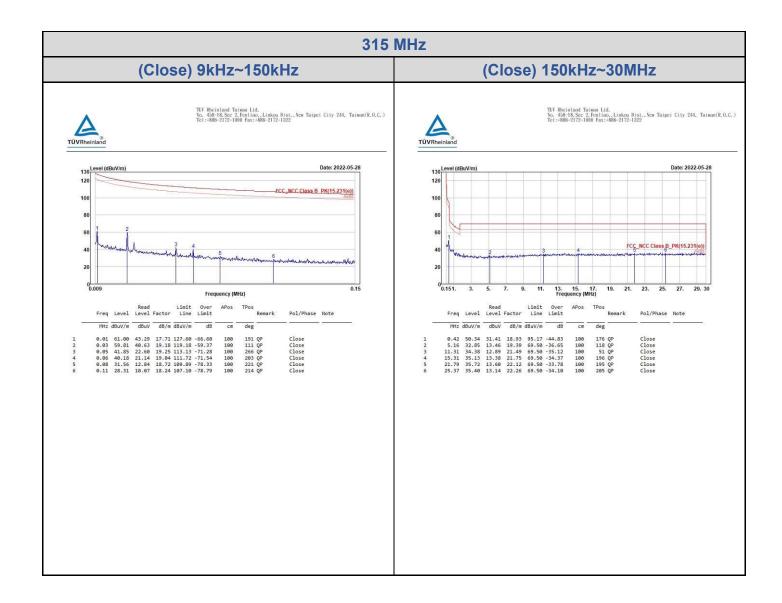
# Spurious Emissions, Tx Mode, 9kHz ~ 30MHz FSK





# CN229O0X (P15C-SRD) 001

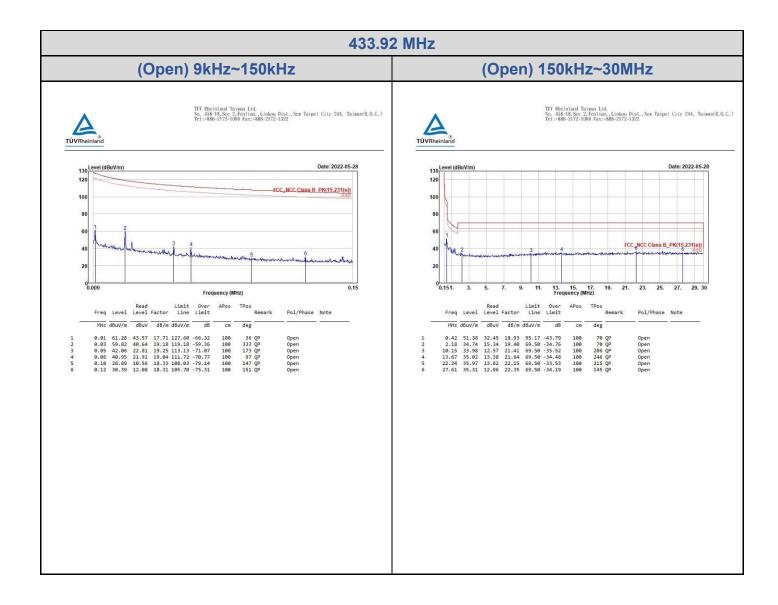
Seite A2 von A16
Page A2 of A16





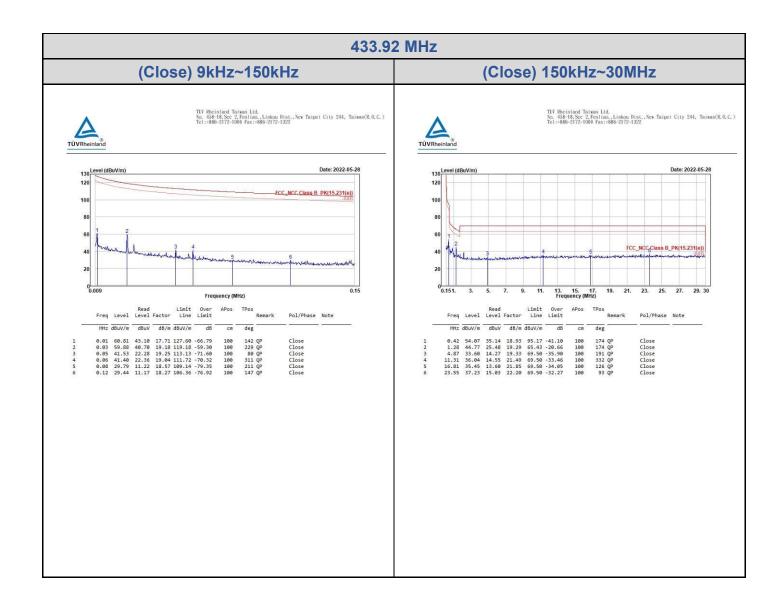
# CN229O0X (P15C-SRD) 001

Page A3 of A16





# CN229O0X (P15C-SRD) 001



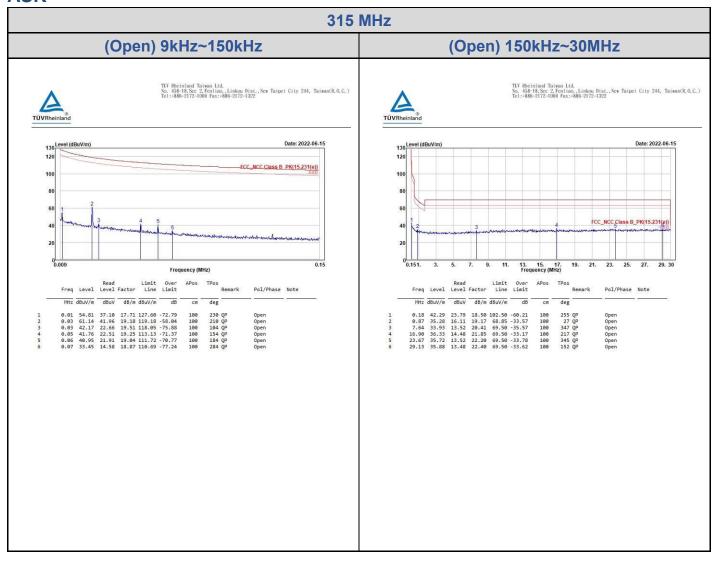


# CN229O0X (P15C-SRD) 001

Seite A5 von A16

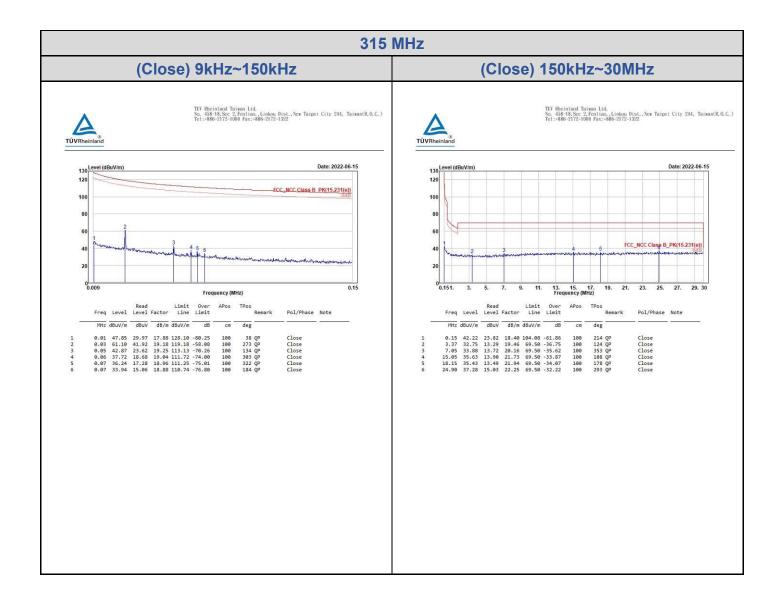
Page A5 of A16

### **ASK**





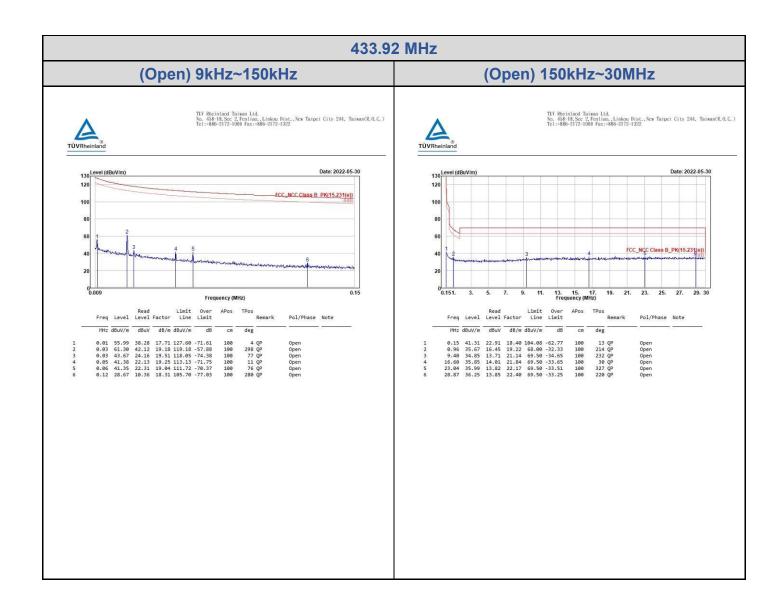
# CN229O0X (P15C-SRD) 001





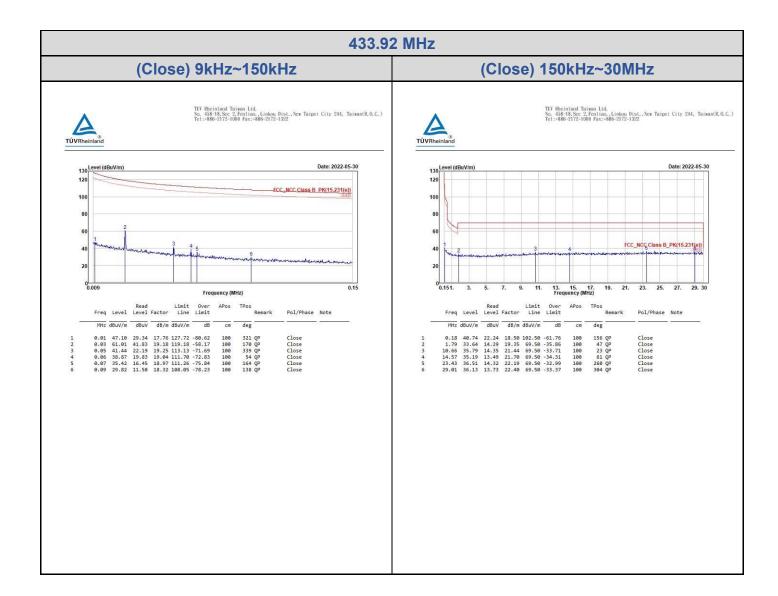
# CN229O0X (P15C-SRD) 001

Seite A7 von A16
Page A7 of A16





# CN229O0X (P15C-SRD) 001

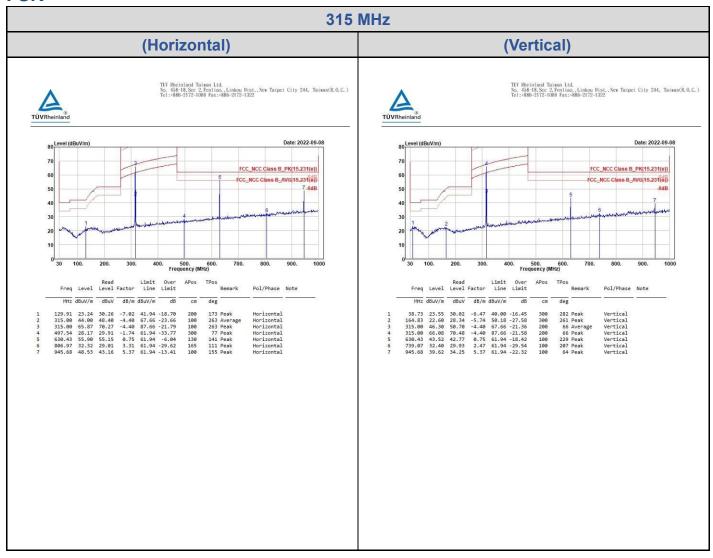


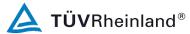


# CN229O0X (P15C-SRD) 001

Seite A9 von A16
Page A9 of A16

# Spurious Emissions, Tx Mode, 30MHz ~ 1GHz FSK





# CN229O0X (P15C-SRD) 001

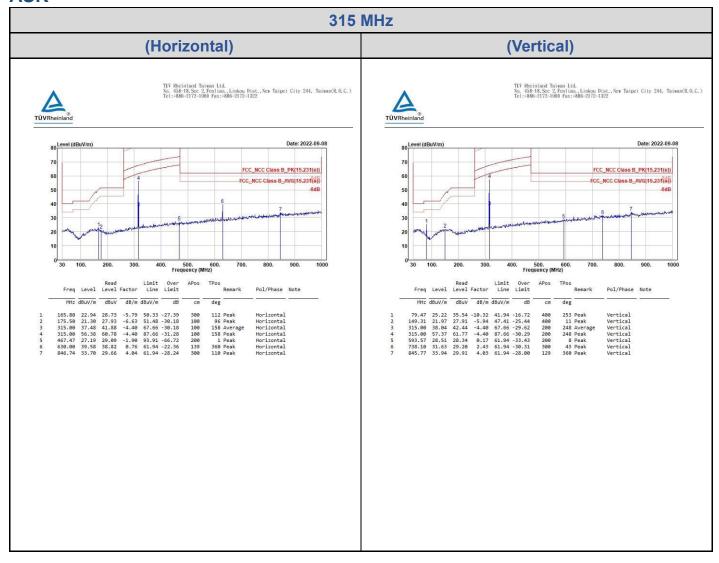




CN229O0X (P15C-SRD) 001

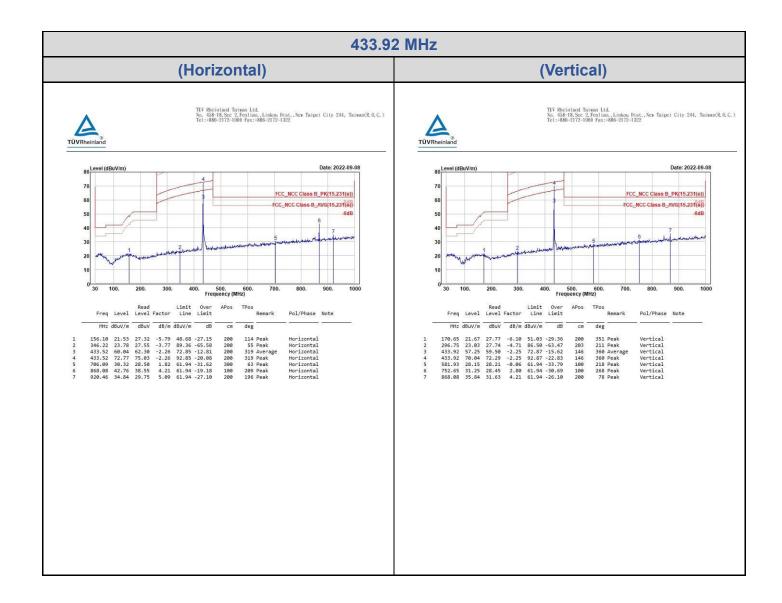
Seite A11 von A16
Page A11 of A16

### **ASK**





# CN229O0X (P15C-SRD) 001

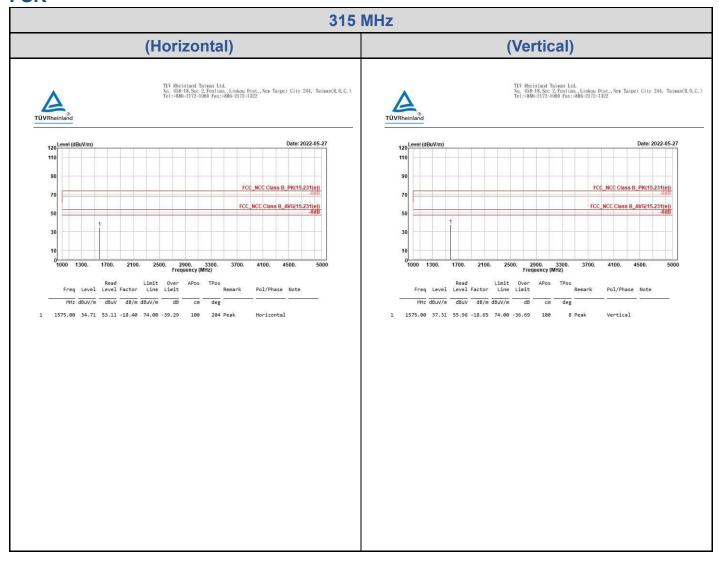




# CN229O0X (P15C-SRD) 001

Seite A13 von A16
Page A13 of A16

# Spurious Emissions, Tx Mode, 1GHz ~ 5GHz FSK





# CN229O0X (P15C-SRD) 001

Seite A14 von A16
Page A14 of A16

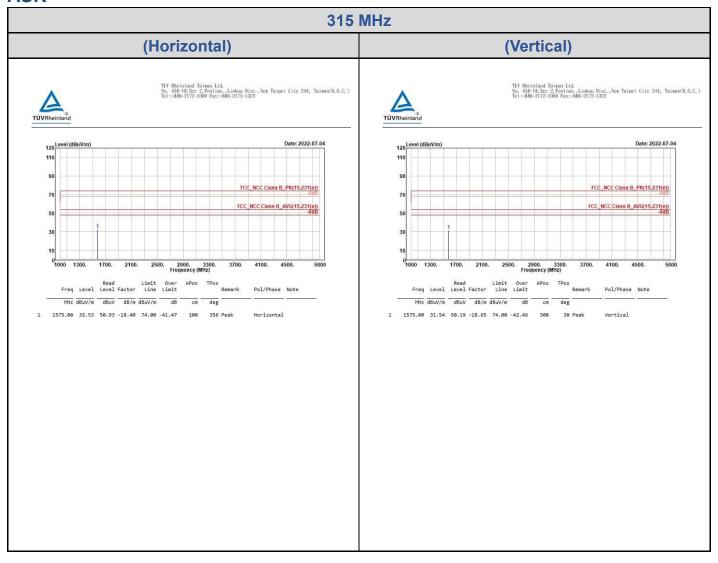




CN229O0X (P15C-SRD) 001

Seite A15 von A16
Page A15 of A16

### **ASK**





# CN229O0X (P15C-SRD) 001

