

Prüfbericht-Nr.: <i>Test report no.:</i>	CN24Z4FJ 001	Auftrags-Nr.: <i>Order no.:</i>	48251711	Seite 1 von 24 Page 1 of 24
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2024-09-03	
Auftraggeber: <i>Client:</i>	KTI Hydraulics, Inc. 1311 Valencia Ave. Tustin, California 92780 United States			
Prüfgegenstand: <i>Test item:</i>	WIRELESS KEY FOB for KWR REMOTE CONTROLLER			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	397-9, Series Model:397-8;397-10;397-11			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C Test report			
Prüfgrundlage: <i>Test specification:</i>	FCC CFR47 Part 15: Subpart C Section 15.231			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2024-09-11			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003815548-001			
Prüfzeitraum: <i>Testing period:</i>	2024-09-12 - 2024-10-18			
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>	2024-10-23	Ausstellungsdatum: <i>Issue date:</i>	2024-10-23	
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>				

Prüfbericht-Nr.: CN24Z4FJ 001
Test report no.:

Seite 2 von 24
Page 2 of 24

Anmerkungen
Remarks

- | | |
|----------|--|
| 1 | <p>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.</p> <p><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></p> |
| 2 | <p>Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. Informationen zur Verifizierung der Authentizität unserer Dokumente erhalten Sie auf folgender Webseite: go.tuv.com/digital-signature</p> <p><i>As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. For information on verifying the authenticity of our documents, please visit the following website: go.tuv.com/digital-signature</i></p> |
| 3 | <p>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.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.
Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p> |
| 4 | <p>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 115:2021, 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.</p> <p><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 115:2021, 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></p> |

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	Pass
5.1.4	15.231(e)	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	Not Applicable

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

Contents

HISTORY OF THIS TEST REPORT	6
1. GENERAL REMARKS	7
1.1 COMPLEMENTARY MATERIALS.....	7
1.2 DECISION RULE OF CONFORMITY	7
2. TEST SITES	8
2.1 TEST LABORATORY	8
2.2 TEST FACILITY.....	8
2.3 TRACEABILITY	9
2.4 CALIBRATION	9
2.5 MEASUREMENT UNCERTAINTY	9
3. GENERAL PRODUCT INFORMATION.....	10
3.1 PRODUCT FUNCTION AND INTENDED USE	10
3.2 SYSTEM DETAILS AND RATINGS.....	10
3.3 NOISE GENERATING AND NOISE SUPPRESSING PARTS	11
3.4 SUBMITTED DOCUMENTS.....	11
4. TEST SET-UP AND OPERATION MODES.....	12
4.1 PRINCIPLE OF CONFIGURATION SELECTION	12
4.2 TEST OPERATION AND TEST SOFTWARE.....	12
4.3 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	13
4.4 TEST SETUP DIAGRAM	13
5. TEST RESULTS	14
5.1 TRANSMITTER REQUIREMENT & TEST SUITES	14
5.1.1 Antenna Requirement	14
5.1.2 20 dB Bandwidth and Occupied Bandwidth	15
5.1.3 Pulse Width/TX Gap.....	17
5.1.4 Field Strength of Fundamental Emissions	19
5.1.5 Radiated Spurious Emissions	22

Prüfbericht - Nr.: **CN24Z4FJ 001**
Test Report No.

Seite 5 von 24
Page 5 of 24

APPENDIX A - TEST RESULT OF RADIATED EMISSIONS

APPENDIX SP - PHOTOGRAPHS OF TEST SETUP

APPENDIX EP - PHOTOGRAPHS OF EUT

Prüfbericht - Nr.: **CN24Z4FJ 001**
Test Report No.

Seite 6 von 24
Page 6 of 24

HISTORY OF THIS TEST REPORT

Revision	Description	Date Issued
R01	Original Release	2024-10-23

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)	± 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 WIRELESS KEY FOB for KWR REMOTE CONTROLLER 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	WIRELESS KEY FOB for KWR REMOTE CONTROLLER
Type Identification	397-9, Series Model:397-8;397-10;397-11
FCC ID	2BKVFKWR-00X

Technical Specification of EUT

Item	EUT information
Operating Frequency	433.92 MHz
Operation Voltage	12Vdc
Modulation	OOK
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	397-9	All models are electrically identical, different model names are for different cover and buttons. Please refer to Appendix EP for the details.
Series	397-8	
	397-10	
	397-11	

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.

Test Software	N/A
---------------	-----

The samples were used as follows:

A003815548-001

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.

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)
-	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)
-	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)
-	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)
-	433.92	433.92

Test Condition

Test Item	Ambient Temperature	Relative Humidity	Tested by
20 dB Bandwidth	24.1-24.5 °C	56-58 %	Nick Guan
Pulse Width / TX Gap	24.1-24.5 °C	56-58 %	Nick Guan
Field Strength of Fundamental	21.1-21.9 °C	60-64 %	Roger Liao
Radiated Spurious Emissions	21.1-21.9 °C	60-64 %	Roger Liao

4.3 Special Accessories and Auxiliary Equipment

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

Accessory of EUT

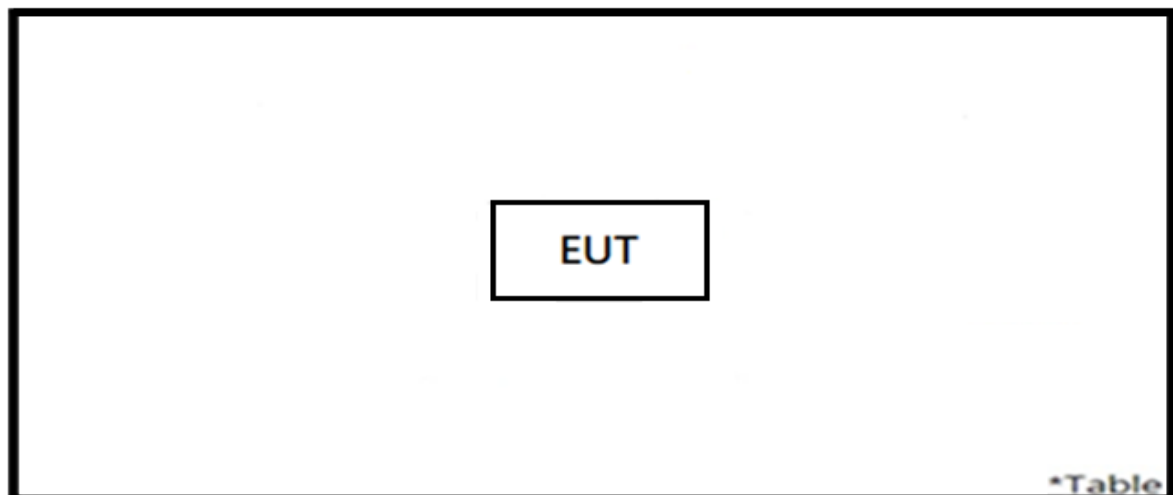
None.

Support Unit

None.

4.4 Test Setup Diagram

<Radiated Spurious Emissions Mode>



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

Requirement Use of approved antennas only

The antenna is a printed PCB trace 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.

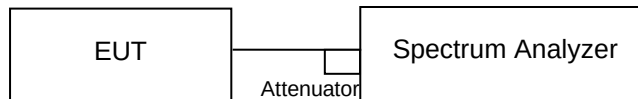
5.1.2 20 dB Bandwidth and Occupied Bandwidth

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	2024/9/12	2024/9/12

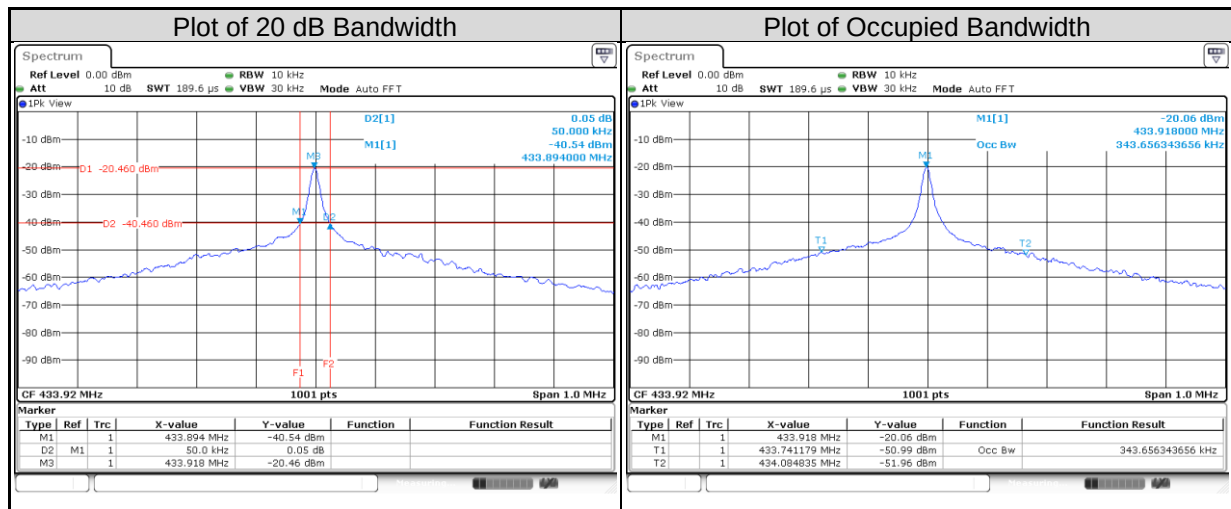
Test Procedures

- 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.

Test Results

Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Limit (kHz)
433.92	50.00	1084.80

Channel Frequency (MHz)	Occupied Bandwidth (kHz)
433.92	343.66



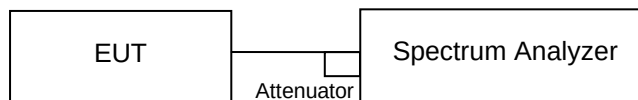
5.1.3 Pulse Width/TX Gap

Limit

For operation in 314-316 MHz and 433-435 MHz: A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds being released. A transmitter activated automatically shall cease transmission within 5 seconds after activation.

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	2024/9/12	2024/9/12

Test Procedures

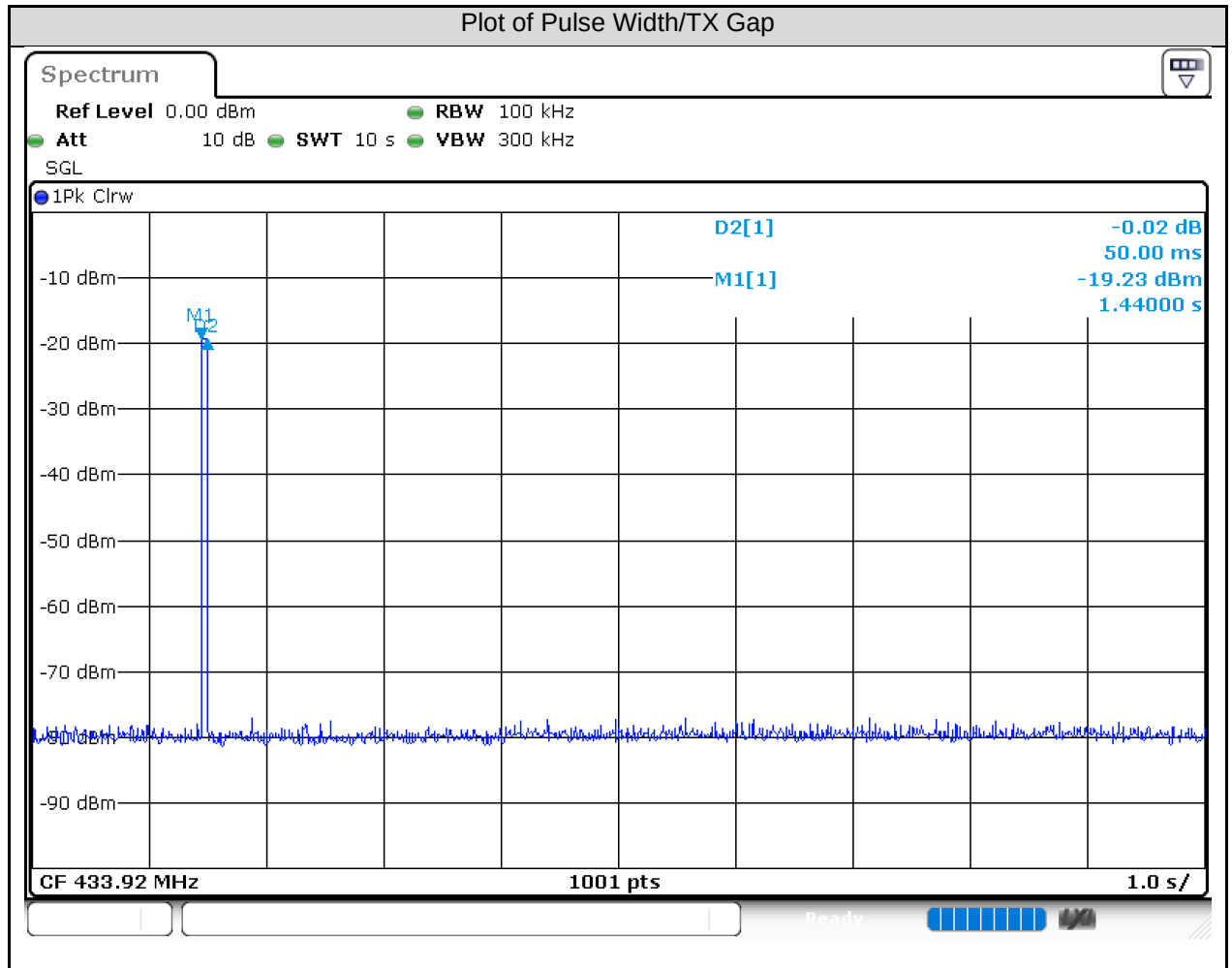
- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring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

Prüfbericht - Nr.: CN24Z4FJ 001
Test Report No.

Seite 18 von 24
Page 18 of 24

Test Results

Channel Frequency (MHz)	Pulse Width (ms)	Limit (ms)	Result
433.92	50	5000	Pass

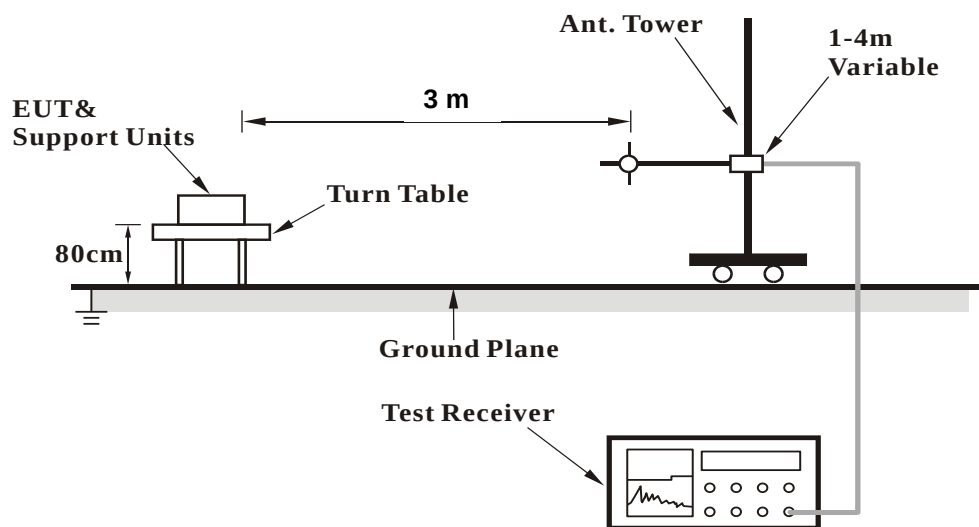


5.1.4 Field Strength of Fundamental Emissions

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.: CN24Z4FJ 001
Test Report No.

Seite 20 von 24
Page 20 of 24

Test Instruments

Test Date: 2024/10/18

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Above 1 GHz					
Signal Analyzer	R&S	FSV40	101509	2024/4/24	2025/4/23
Horn Antenna	ETS-Lindgren	3117	00218930	2023/12/7	2024/12/5
Amplifier	EM	EM01G18GA	60967	2024/4/2	2025/4/1
HF-AMP + AC source	EMCI	EMC184045SE	980657	2024/1/24	2025/1/22
Horn Antenna	SCHWARZBECK	BBHA 9170	00887	2024/4/1	2025/3/31
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A
30 MHz – 1 GHz					
Signal Analyzer	R&S	FSV40	101509	2024/4/24	2025/4/23
Horn Antenna	ETS-Lindgren	3117	00218930	2023/12/7	2024/12/5
Amplifier	EM	EM01G18GA	60967	2024/4/2	2025/4/1
HF-AMP + AC source	EMCI	EMC184045SE	980657	2024/1/24	2025/1/22
Horn Antenna	SCHWARZBECK	BBHA 9170	00887	2024/4/1	2025/3/31
Below 30 MHz					
Receiver	R&S	ESR7	102109	2024/2/23	2025/2/21
Loop Antenna	SCHWARZBECK	FMZB 1519B	00215	2024/1/4	2025/1/2
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A

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.
3. Duty cycle factor: Transmission on time = 62.5ms, duty cycle = 62.5/100 = 0.625ms, the factor is $20 \cdot \log(0.625) = -4.08\text{dB}$

Test Results

The EUT employs pulsed operation.

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Antenna Orientation	Detector or calculated value
433.92	84.15	100.83	Horizontal	Peak
433.92	80.07	80.83		Average
433.92	66.93	100.83	Vertical	Peak
433.92	62.85	80.83		Average

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

$$433.92\text{MHz}, \mu\text{V/m at 3 meters} = 41.6667 \times (433.92\text{MHz}) - 7083.3333 = 10996.68 \mu\text{V/m}$$

$$20\log(10996.68) = 80.83 \text{ dB}\mu\text{V/m (Average Limit)}$$

$$80.82 + 20 = 100.83 \text{ dB}\mu\text{V/m (Peak Limit)}$$

5.1.5 Radiated Spurious Emissions

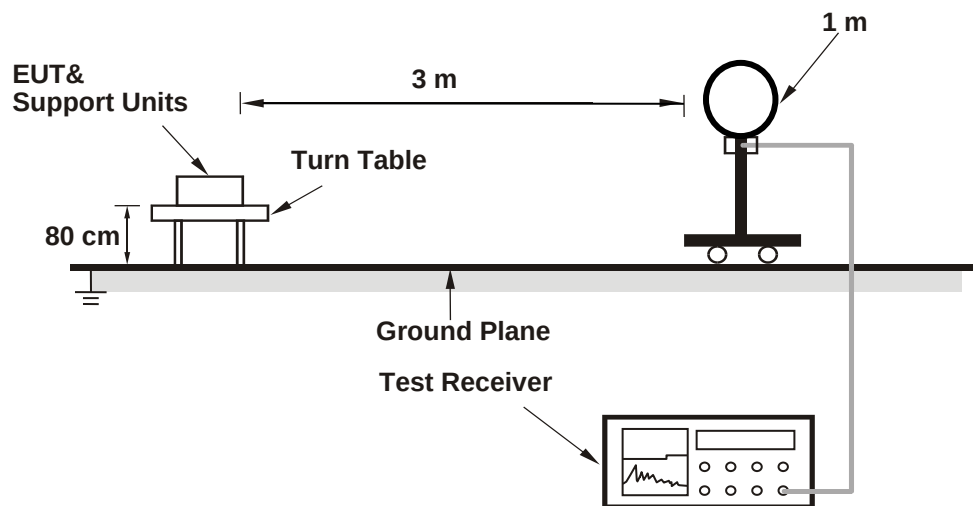
Limit

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).

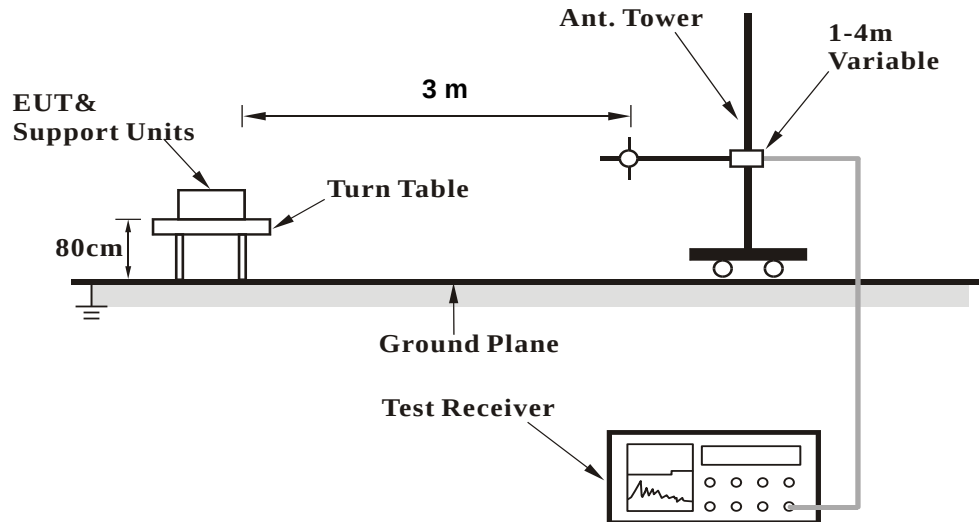
Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup

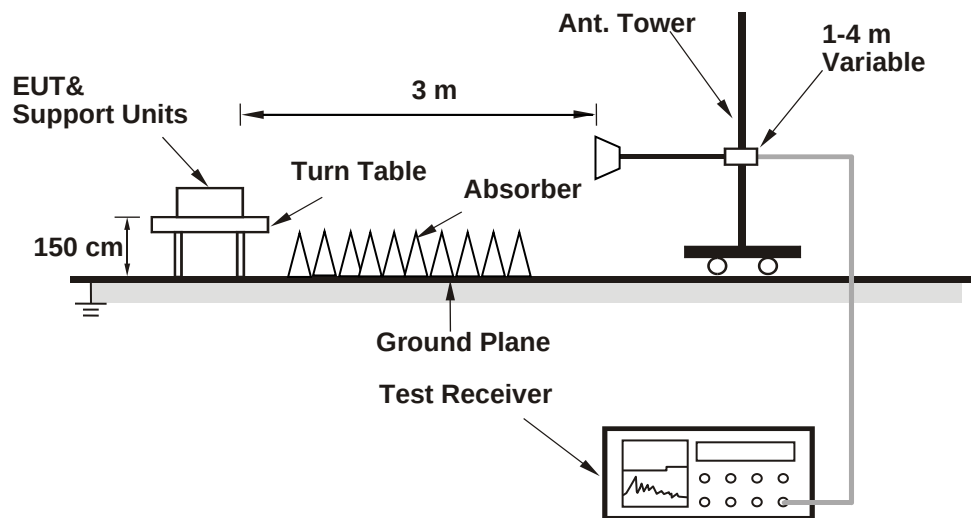
<Radiated Emissions below 30 MHz>



<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.

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.

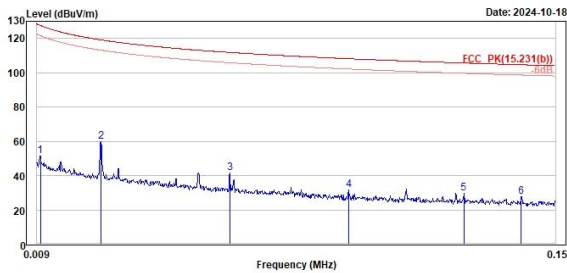
Appendix A: Test Results of Radiated Spurious Emissions

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

9kHz~150kHz(Open)



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec. 2, Fenhua Rd., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

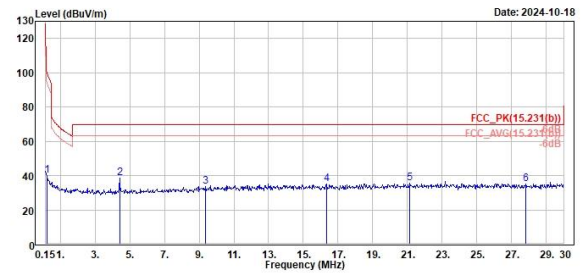


	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	0.01	51.44	33.13	18.31	127.60	-76.16	100	92 Peak	Open	
2	0.03	60.06	40.51	19.55	119.13	-59.07	100	79 Peak	Open	
3	0.06	41.39	22.10	19.29	111.82	-70.43	100	99 Peak	Open	
4	0.09	31.59	12.94	18.65	108.16	-76.57	100	27 Peak	Open	
5	0.13	29.65	11.06	18.59	105.66	-76.01	100	282 Peak	Open	
6	0.14	27.79	9.16	18.63	104.63	-76.84	100	139 Peak	Open	

150kHz~30MHz(Open)



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec. 2, Fenhua Rd., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



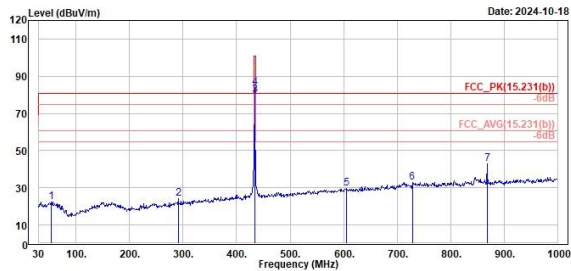
	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	0.24	39.99	21.14	18.85	100.01	-60.02	100	93 Peak	Open	
2	4.42	38.53	19.18	19.35	69.50	-36.97	100	331 Peak	Open	
3	9.37	33.40	12.59	20.81	69.50	-36.10	100	137 Peak	Open	
4	16.33	34.85	13.69	21.76	69.50	-34.65	100	354 Peak	Open	
5	21.13	35.47	13.24	22.23	69.50	-34.03	100	220 Peak	Open	
6	27.82	35.19	12.76	22.43	69.50	-34.31	100	181 Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

Horizontal



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec. 2, Fenhiao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

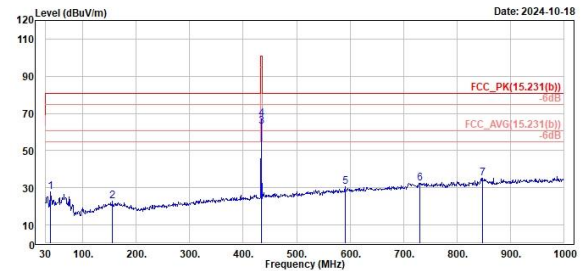


	Freq	Level	Read	Limit	Over			
	MHz	dBuV/m	Level Factor	Line	Limit Remark	Pol/Phase	Note	
	MHz	dBuV/m	dB/m	dBuV/m	dB			
1	53.28	22.37	29.29	-6.92	80.83 -58.46 Peak	Horizontal		
2	290.93	24.00	30.34	-6.34	80.83 -56.83 Peak	Horizontal		
3	433.92	80.07	83.34	-3.27	80.83 -0.76 Average	Horizontal	CF	
4	433.92	84.15	87.42	-3.27	100.83 -16.68 Peak	Horizontal		
5	696.16	29.49	29.10	0.39	80.83 -51.34 Peak	Horizontal		
6	728.40	32.78	30.63	2.15	80.83 -48.05 Peak	Horizontal		
7	868.08	42.77	38.57	4.20	80.83 -38.06 Peak	Horizontal		

Vertical



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec. 2, Fenhiao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



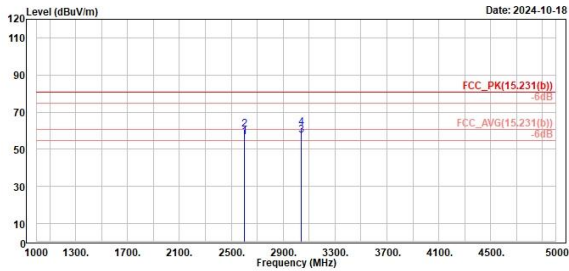
	Freq	Level	Read	Limit	Over			
	MHz	dBuV/m	Level Factor	Line	Limit Remark	Pol/Phase	Note	
	MHz	dBuV/m	dB/m	dBuV/m	dB			
1	39.70	27.87	35.72	-7.85	80.83 -52.96 Peak	Vertical		
2	155.13	23.03	29.89	-6.86	80.83 -57.80 Peak	Vertical		
3	433.92	62.85	66.12	-3.27	80.83 -17.98 Average	Vertical	CF	
4	433.92	66.93	70.20	-3.27	100.83 -33.90 Peak	Vertical		
5	590.66	30.55	30.59	-0.04	80.83 -50.28 Peak	Vertical		
6	730.34	32.62	30.46	2.16	80.83 -48.21 Peak	Vertical		
7	847.71	35.34	31.06	4.28	80.83 -45.49 Peak	Vertical		

Spurious Emissions, Tx Mode, 1GHz ~ 5GHz

Horizontal



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec. 2, Fongfiao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



Vertical



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec. 2, Fongfiao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

