

<b>Prüfbericht-Nr.:</b> <i>Test report no.:</i>	CN22477Z (P15C-2.4GHz) 001	<b>Auftrags-Nr.:</b> <i>Order no.:</i>	238548384	Seite 1 von 23 Page 1 of 23	
<b>Kunden-Referenz-Nr.:</b> <i>Client reference no.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date:</i>	2022-09-29		
<b>Auftraggeber:</b> <i>Client:</i>	Trans Electric Co., Ltd 771 Sec.2 Chungshan Rd, Huatang, Changhua, Taiwan 503				
<b>Prüfgegenstand:</b> <i>Test item:</i>	Wireless Rear Speaker Kit				
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type no.:</i>	RF-WRSK18				
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	FCC Part 15C Test report (2.4GHz)				
<b>Prüfgrundlage:</b> <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.247				
<b>Wareneingangsdatum:</b> <i>Date of sample receipt:</i>	2022-10-03				
<b>Prüfmuster-Nr.:</b> <i>Test sample no.:</i>	A003346768-005 A003346768-006				
<b>Prüfzeitraum:</b> <i>Testing period:</i>	2022-10-28 - 2022-10-31				
<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>	<b>genehmigt von:</b> <i>authorized by:</i>				
<b>Datum:</b> <i>Date:</i> 2022-11-03	 Ethan Shao		 Brenda Chen		
<b>Stellung / Position:</b>	Assistant Project Engineer	<b>Ausstellungsdatum:</b> <i>Issue date:</i> 2022-11-03	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	5 = mangelhaft N/T = nicht getestet
* 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 = poor N/T = not tested
<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>					

## TEST SUMMARY

Report Section	FCC Clause	Test Item	Result
5.1.1	15.247(b) & 15.203	Antenna Requirement	Pass
5.1.2	15.247(b)(3)	Peak Output Power	Pass
5.1.3	15.247(a)(2)	6 dB Bandwidth	Pass
5.1.3	2.1049	99% Occupied Bandwidth	Pass
5.1.4	15.247(e)	Power Spectral Density	Pass
5.1.5	15.247(d)	Conducted Spurious Emissions and Band Edges	Pass
5.1.6	15.247(d) & 15.205 & 15.209	Radiated Spurious Emissions and Band Edges	Pass
-	15.207	Mains Conducted Emission	Not Applicable

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

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**APPENDIX A - TEST RESULT OF CONDUCTED**

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

**APPENDIX SP - PHOTOGRAPHS OF TEST SETUP**

**APPENDIX EP - PHOTOGRAPHS OF EUT**

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### HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
CN22477Z (P15C-2.4GHz) 001	Original Release	2022-11-03

## 1. General Remarks

### 1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

**Appendix A - Test Result of Conducted**

**Appendix B - Test Result of Radiated Emissions**

**Appendix SP - Photographs of Test Setup**

**Appendix EP - Photographs of EUT**

### Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.247 FCC 47CFR Part 2: Subpart J Section 2.1049 ANSI C63.10:2013 KDB 558074 D01 15.247 Meas Guidance v05r02

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



### 3. General Product Information

#### 3.1 Product Function and Intended Use

The EUT is a Wireless Rear Speaker Kit. It contains a 2.4GHz 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	Wireless Rear Speaker Kit
Type Identification	RF-WRSK18
FCC ID	BY4WSK3000N

##### Technical Specification of EUT

Item	EUT information
Operating Frequency	2404 MHz ~ 2478 MHz
Channel Number	37
Operation Voltage	5Vdc (Adapter)
Modulation	GFSK
Maximum Output Power (mW)	5.78
Antenna Information	Refer to 5.1.1
Accessory Device	Refer to 4.4

### **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 test modes were adapted accordingly in reference to the instructions for use.

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output expected by the customer and is going to be fixed on the firmware of the final end product.

#### Table for Parameters of Test Software Setting

Frequency (MHz)	Power Setting
2404	7.5dbm
2440	8.1dbm
2478	8.1dbm

### 4.2 Carrier Frequency and Channel

Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2404	19	2444
1	2406	20	2446
2	2408	21	2448
3	2410	22	2450
4	2412	23	2452
5	2414	24	2454
6	2416	25	2456
7	2418	26	2458
8	2420	27	2460
9	2422	28	2462
10	2424	29	2464
11	2428	30	2466
12	2430	31	2468
13	2432	32	2470
14	2434	33	2472
15	2436	34	2474
16	2438	35	2476
17	2440	36	2478
18	2442		

### 4.3 Test Operation and Test Software

Setup for testing: Test samples are provided with a modified firmware which makes it possible to control them through a button on the controller.

This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed as below.

Test Software	EMI_Test_Tool V2.0
---------------	--------------------

The samples were used as follows:

A003346768-005

A003346768-006

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

EUT Configure Mode	Applicable To				Description
	Antenna Port Conducted Measurement	Radiated Spurious Emissions above 1 GHz	Radiated Spurious Emissions below 1 GHz	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 X-plane.
2. "-" means no effect.

#### Antenna Port Conducted Measurement

- 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)	Date Rate (Mbps)
-	2404 to 2478	2404, 2440, 2478	-

#### Radiated Spurious Emissions (Above 1 GHz)

- 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)	Date Rate (Mbps)
-	2404 to 2478	2404, 2440, 2478	-

#### Radiated Spurious Emissions (Below 1 GHz)

- 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)	Date Rate (Mbps)
-	2404 to 2478	2404	-

#### Test Condition

Test Item	Ambient Temperature	Relative Humidity	Tested by
Conducted Measurement	23.1 °C	52.9 %	Andy Chen
Radiated Spurious Emissions above 1 GHz	22.6-24.5 °C	52-54 %	Roger Liao
Radiated Spurious Emissions below 1 GHz	22.6-24.5 °C	52-54 %	Roger Liao

## 4.4 Special Accessories and Auxiliary Equipment

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

### Accessory of EUT

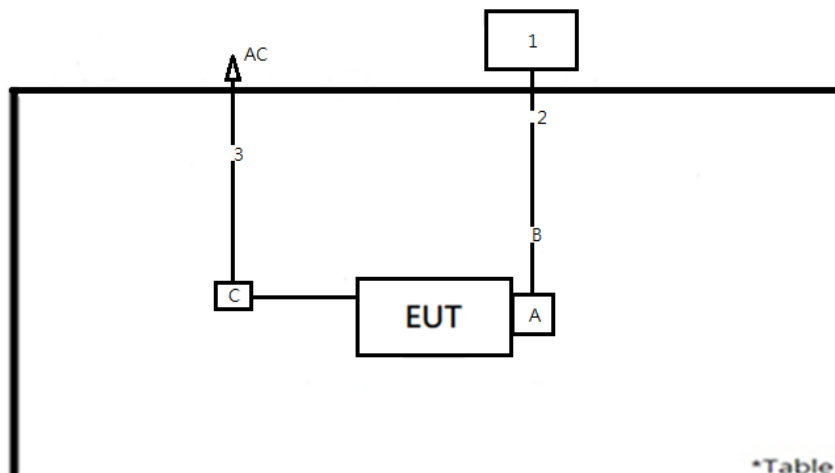
No.	Product	Brand	Model	Description
C	Switching Power Supply	Trans	S003ATU0500060	I/P: 100-240 Vac, 50/60 Hz, 150mA O/P: 5.0 Vdc, mA Radiated Test

### Support Unit

Radiated Test					
No.	Description	Brand	Model	S/N	Remark
A	Fixture	Telink	Trans-01	-	-
B	Mini to USB	Trans	Trans-02	-	150 cm shielded cable with core
1	Notebook	Lenovo	81BL	MP1DCD6Y	-
2	USB to USB	TUV	TUV-03	-	300 cm non-shielded cable w/o core
3	Power Cord	TUV	TUV-01	-	200 cm non-shielded cable w/o core
Conducted Test					
-	Notebook	HP	TPN-C139	CND93662VF	NB-17

## 4.5 Test Setup Diagram

<Radiated Spurious Emissions mode>



## 5. Test Results

### 5.1 Transmitter Requirement & Test Suites

#### 5.1.1 Antenna Requirement

**Requirement** Use of approved antennas only

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 1.1 dBi. The antenna is a PCB 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 Peak Output Power

**Limit** 1 watt (30 dBm)

**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
Power Meter	Anritsu	ML2495A	1901008	2022/3/15	2023/3/14	2022/10/31	2022/10/31
Power Sensor	Anritsu	MA2411B	1725269	2022/3/15	2023/3/14	2022/10/31	2022/10/31

#### Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

**Test Result****Peak Output Power**

&lt;SRD 2.4GHz&gt;

Channel	Channel Frequency	Peak Output Power		Limit (dBm)
	(MHz)	(dBm)	(mW)	
Low Channel	2404	5.72	3.73	30
Middle Channel	2440	7.35	5.43	30
High Channel	2478	7.62	5.78	30

**Average Power**

&lt;SRD 2.4GHz&gt;

Channel	Channel Frequency	Average Power	
	(MHz)	(dBm)	(mW)
Low Channel	2404	5.59	3.62
Middle Channel	2440	7.24	5.30
High Channel	2478	7.53	5.66

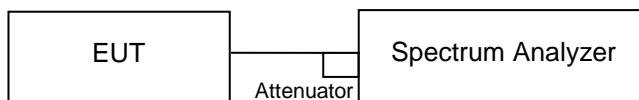


### 5.1.3 6 dB Bandwidth and 99% Occupied Bandwidth

**Limit** The minimum 6 dB bandwidth shall be at least 500 kHz.

**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	FSV40	101512	2022/2/24	2023/2/23	2022/10/31	2022/10/31

#### Test Procedure

- a. Set resolution bandwidth (RBW) = 100 kHz
- b. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
- f. For 99% occupied bandwidth measurement, 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 PEAK. 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

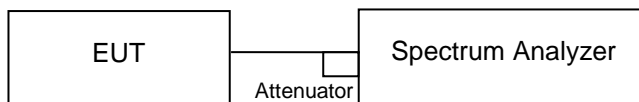
Please refer to Appendix A.

### 5.1.4 Power Spectral Density

**Limit**

The power spectral density shall not be greater than 8 dBm in any 3 kHz band.

**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	FSV40	101512	2022/2/24	2023/2/23	2022/10/31	2022/10/31

**Test Procedure**

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- d. Set the VBW  $\geq 3 \times \text{RBW}$ .
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

**Test Results**

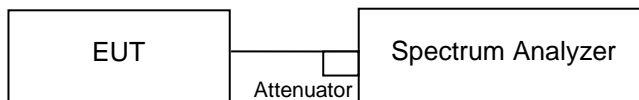
Please refer to Appendix A.

### 5.1.5 Conducted Spurious Emissions and Frequency Band Edges Measured in 100kHz Bandwidth

**Limit**

20 dB (below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.)

**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	FSV40	101512	2022/2/24	2023/2/23	2022/10/31	2022/10/31

**Test Procedure**

Measurement procedure REF

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

Measurement procedure OOB

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

**Test Results**

Please refer to Appendix A.

## 5.1.6 Radiated Spurious Emissions and Band Edges

### Limit

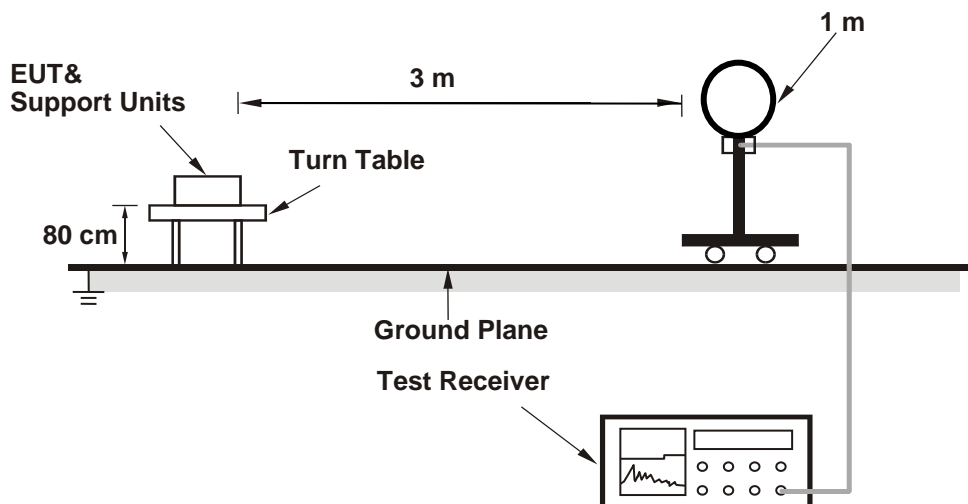
Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

Emissions radiated outside the restricted and authorized frequency bands must either comply with the radiated emission limits specified for the restricted bands or in §15.247(d).

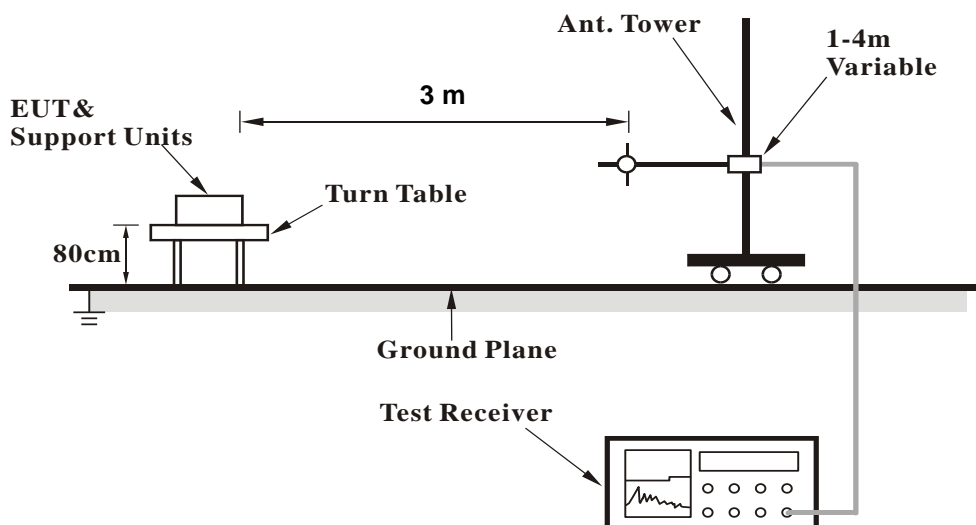
**Kind of Test Site**                      3m Semi-Anechoic Chamber

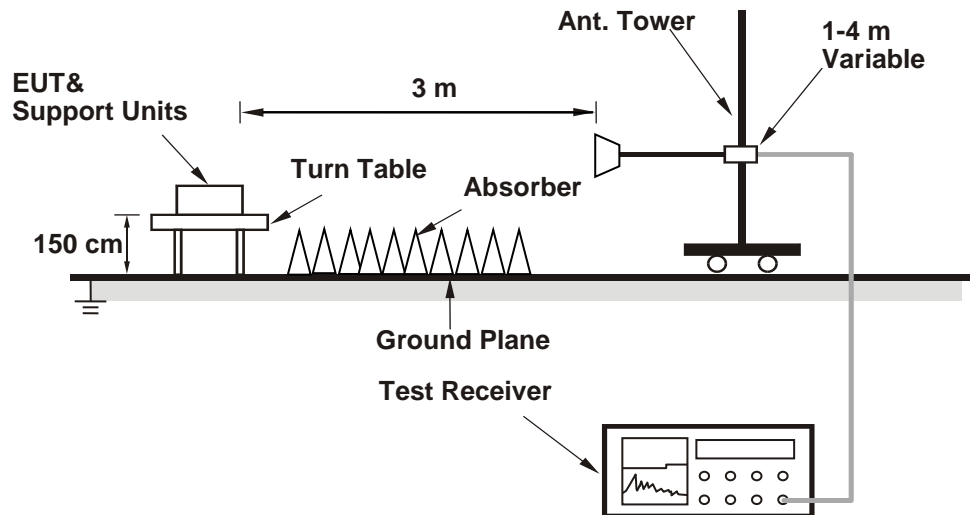
### Test Setup

#### <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**

Test Date: 2022/10/28

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
<b>Above 1GHz</b>					
Signal Analyzer	R&S	FSV40	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
<b>30MHz-1GHz</b>					
Receiver	R&S	ESR7	102109	2022/2/25	2023/2/24
Bilog Antenna	SCHWARZBECK	VULB-9168	00949	2022/5/29	2023/5/28
LF-AMP	Agilent	8447D	2727A05146	2022/2/16	2023/2/15
<b>Below 30MHz</b>					
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 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. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98 %) or 10 Hz (Duty cycle  $\geq 98$  %) for Average detection (AV) at frequency above 1 GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. 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.

**Prüfbericht - Nr.: CN22477Z (P15C-2.4GHz) 001**  
*Test Report No.*

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**Test Results**

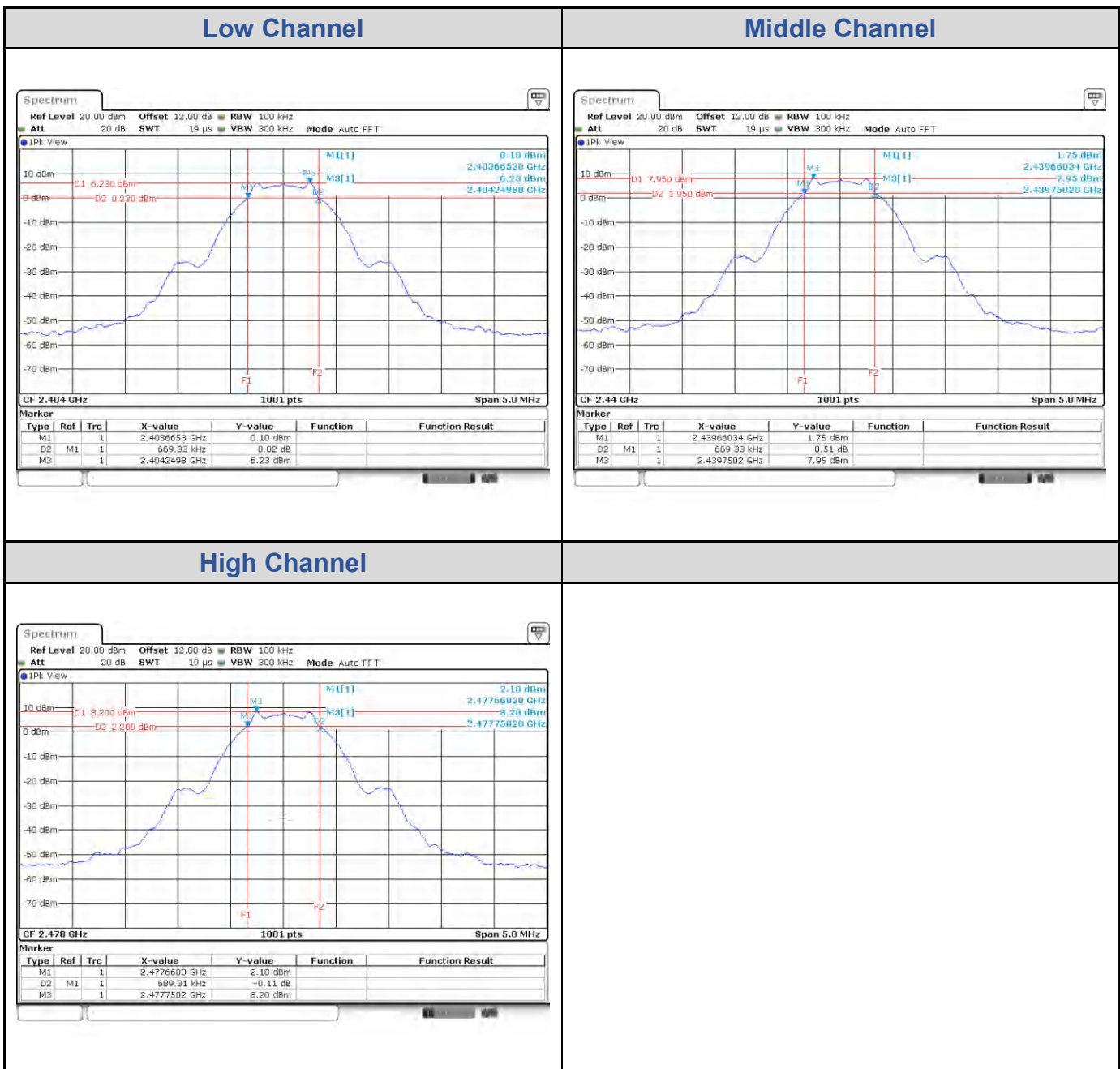
Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)  
Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

Please refer to Appendix B.

## Appendix A: Test Results of Conducted Test

### Test Result of 6 dB Bandwidth

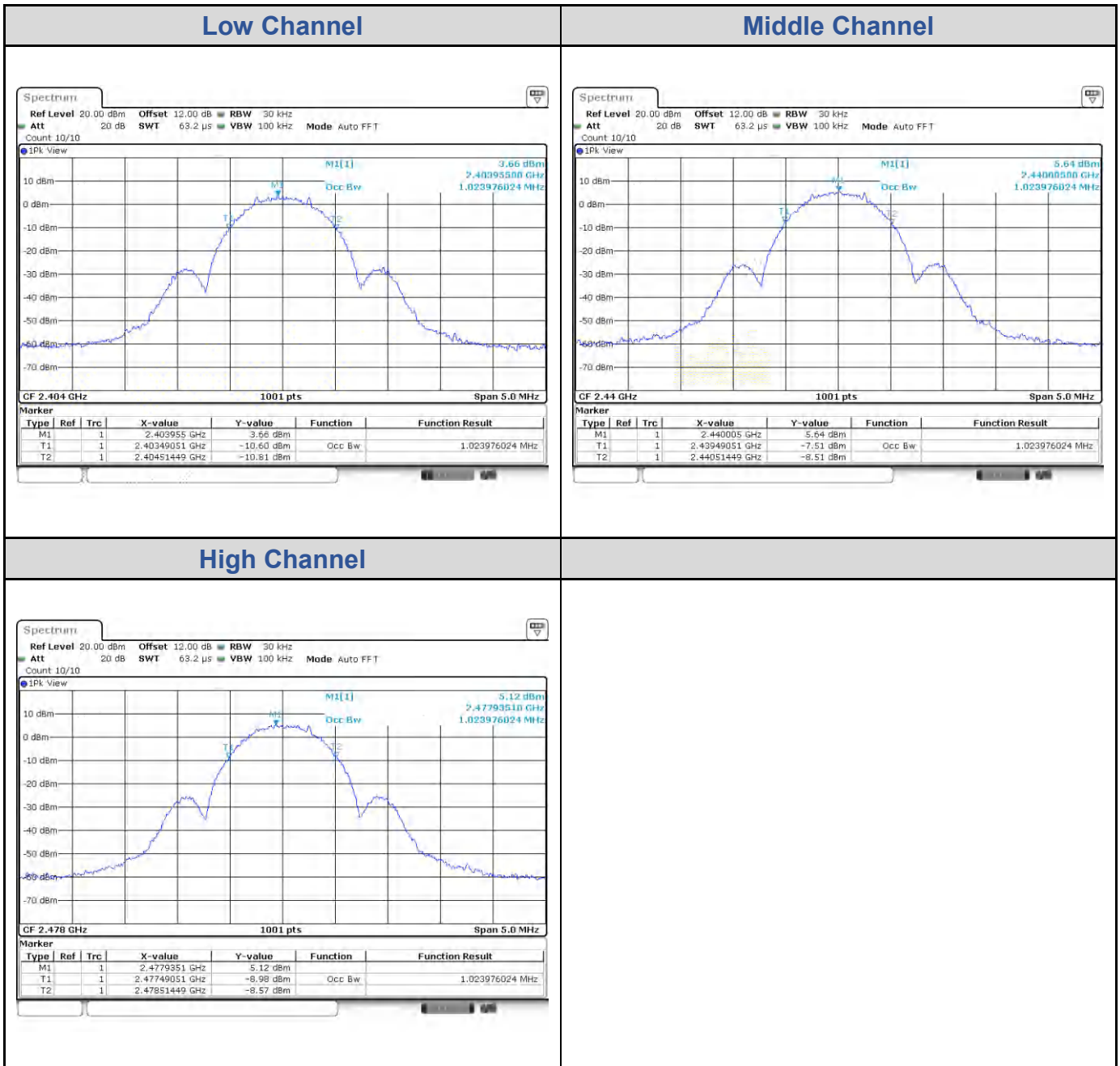
Channel	Channel Frequency (MHz)	6 dB Bandwidth (kHz)	Limit (kHz)	Result
Low Channel	2404	669.33	> 500	Pass
Middle Channel	2440	669.33	> 500	Pass
High Channel	2478	689.31	> 500	Pass





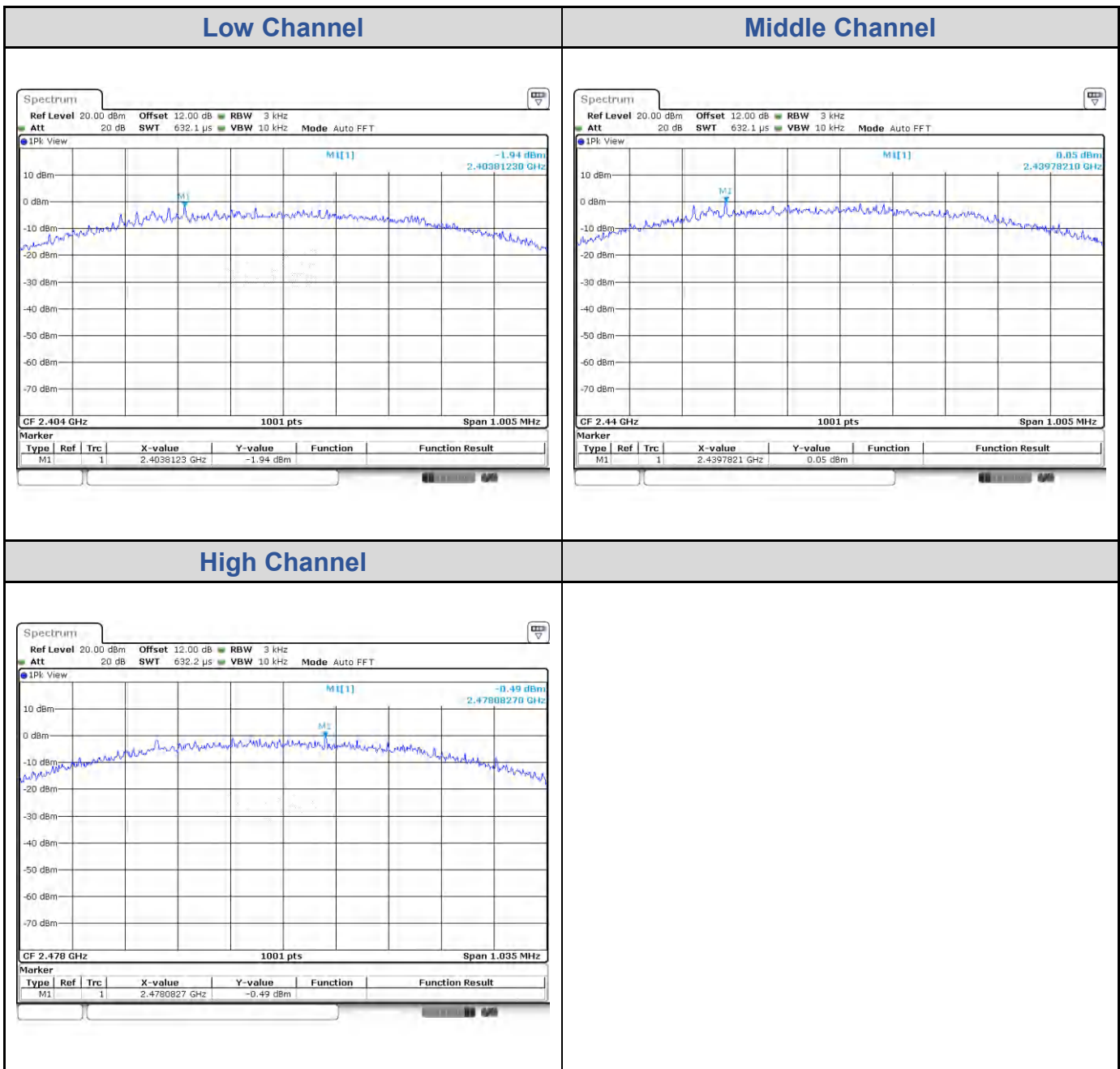
**Test Result of 99% Occupied Bandwidth**

Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)
Low Channel	2404	1.02
Middle Channel	2440	1.02
High Channel	2478	1.02

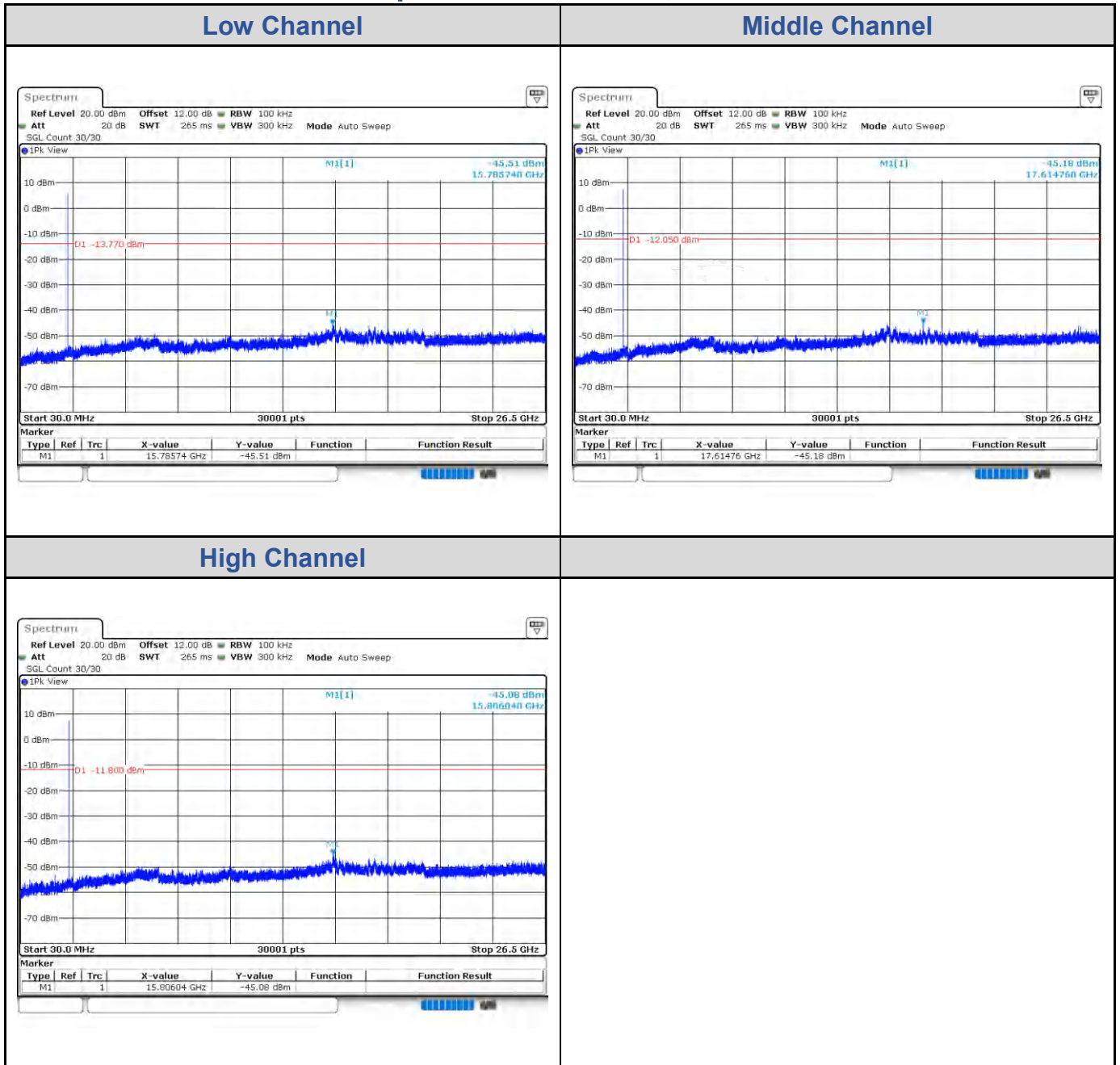


## Test Result of Power Spectral Density

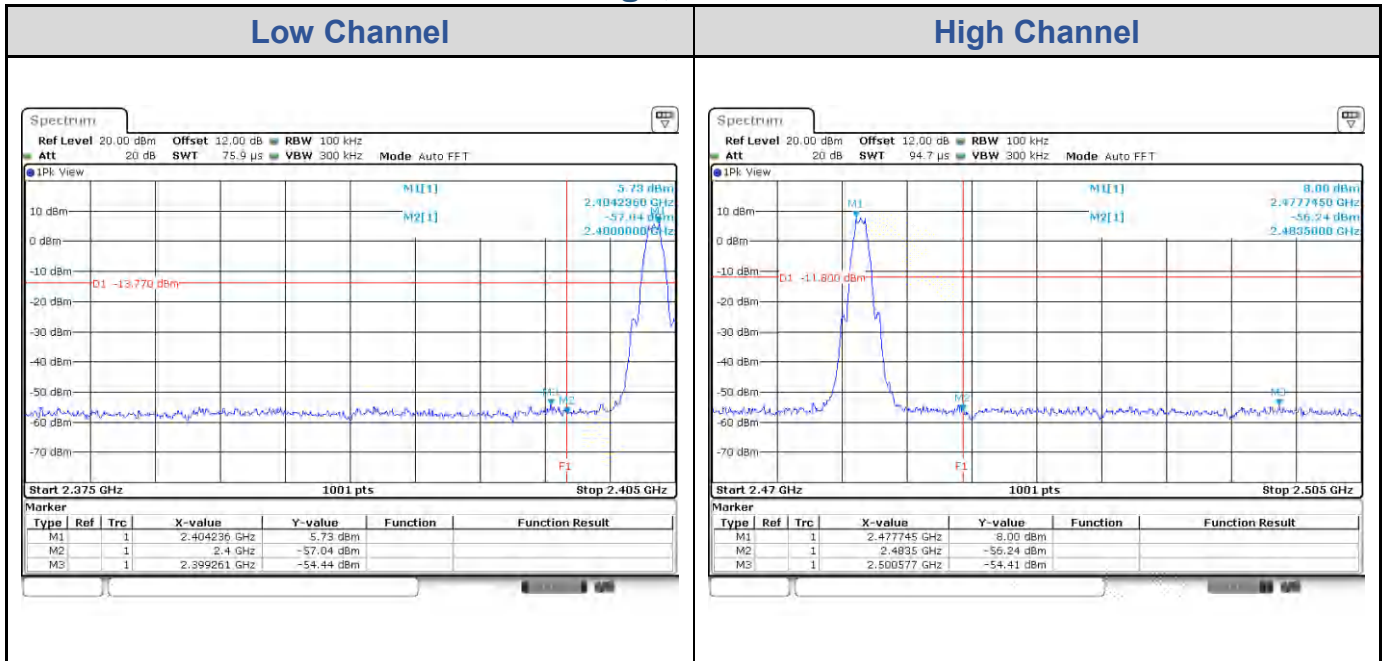
Channel	Channel Frequency (MHz)	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	2404	-1.94	8	Pass
Middle Channel	2440	0.05	8	Pass
High Channel	2478	-0.49	8	Pass



### Test Result of Conducted Spurious Emissions, Tx Mode



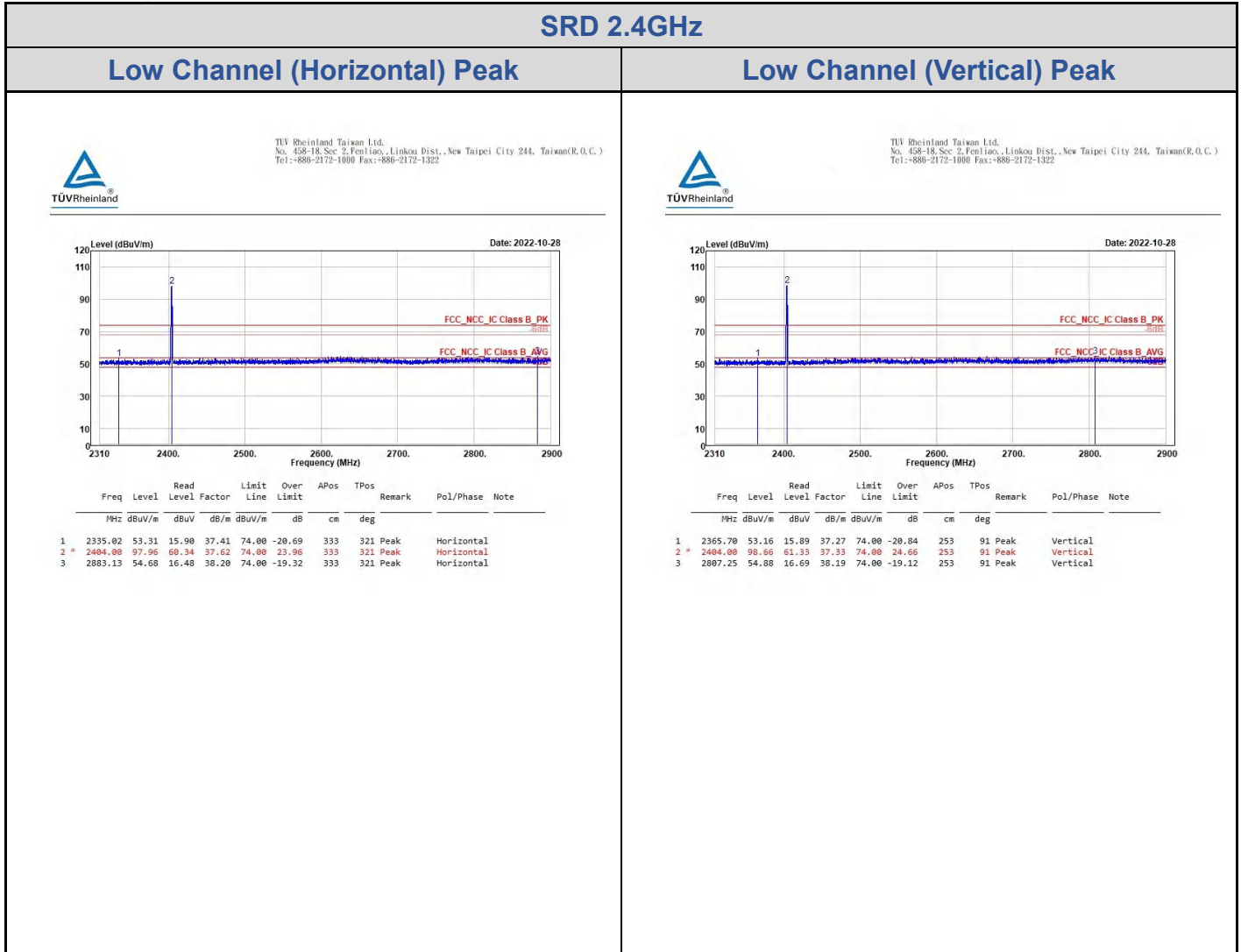
### Test Result of Conducted Band Edge, Tx Mode



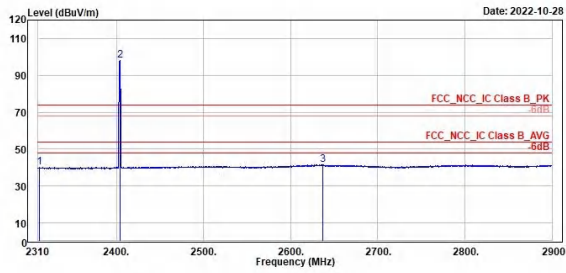
# Appendix B: Test Results of Radiated Spurious Emissions & Mains

## Conducted Emission Test

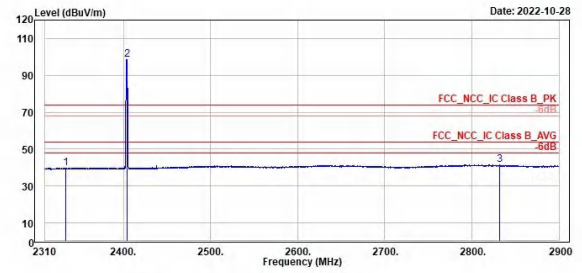
### Band Edges, 2.31GHz ~ 2.9GHz



**SRD 2.4GHz**
**Low Channel (Horizontal) Average**
**Low Channel (Vertical) Average**

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note								
1	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg											
1	2311.89	40.05	2.72	37.33	54.00	-13.95	333	321	Average	Horizontal									
2 *	2404.00	97.91	60.29	37.62	54.00	43.91	333	321	Average	Horizontal									
3	2636.51	41.42	3.23	38.19	54.00	-12.58	333	321	Average	Horizontal									


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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note								
1	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg											
1	2333.95	39.80	2.66	37.14	54.00	-14.20	253	91	Average	Vertical									
2 *	2404.00	98.62	61.29	37.33	54.00	44.62	253	91	Average	Vertical									
3	2831.32	41.55	3.34	38.21	54.00	-12.45	253	91	Average	Vertical									

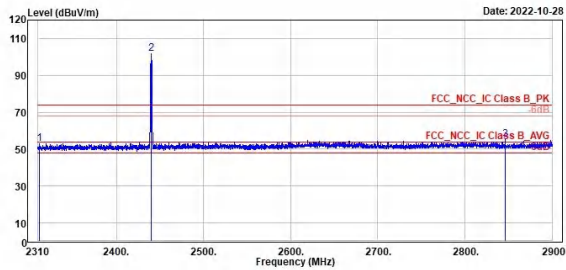
SRD 2.4GHz

Middle Channel (Horizontal) Peak

Middle Channel (Vertical) Peak



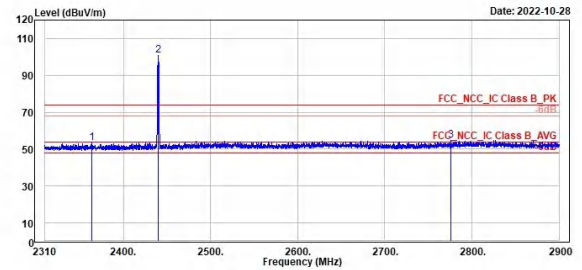
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Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	2311.42	52.94	15.61	37.33	74.00	-21.06	269	360	Peak	Horizontal	
2 *	2448.00	101.59	63.93	37.66	74.00	27.59	269	360	Peak	Horizontal	
3	2845.96	55.38	17.34	38.04	74.00	-18.62	269	360	Peak	Horizontal	



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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	2364.28	53.24	15.97	37.27	74.00	-20.76	272	294	Peak	Vertical	
2 *	2448.00	100.68	63.24	37.44	74.00	26.68	272	294	Peak	Vertical	
3	2776.22	54.70	16.60	38.10	74.00	-19.30	272	294	Peak	Vertical	



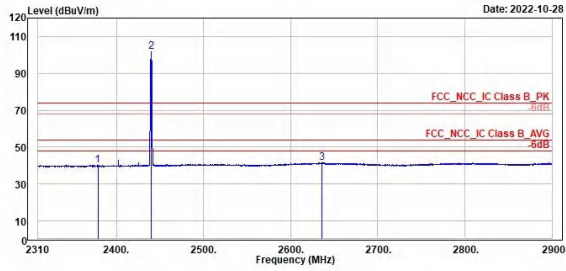
SRD 2.4GHz

Middle Channel (Horizontal) Average

Middle Channel (Vertical) Average



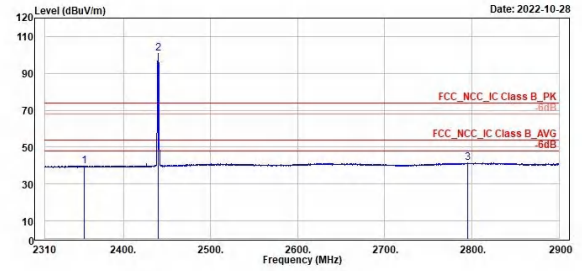
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1	2	3	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
2378.79	40.13	2.58	37.55	54.00	-13.87	269	360	Average	Horizontal		
2448.00	101.55	63.89	37.66	54.00	47.55	269	360	Average	Horizontal		
2635.92	41.45	3.26	38.19	54.00	-12.55	269	360	Average	Horizontal		



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1	2	3	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
2355.31	39.86	2.60	37.26	54.00	-14.14	272	294	Average	Vertical		
2448.00	100.64	63.20	37.44	54.00	46.64	272	294	Average	Vertical		
2795.22	41.58	3.42	38.16	54.00	-12.42	272	294	Average	Vertical		



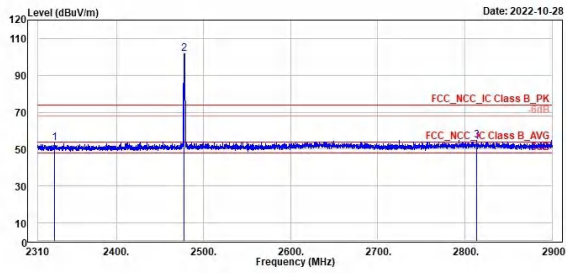
SRD 2.4GHz

High Channel (Horizontal) Peak

High Channel (Vertical) Peak



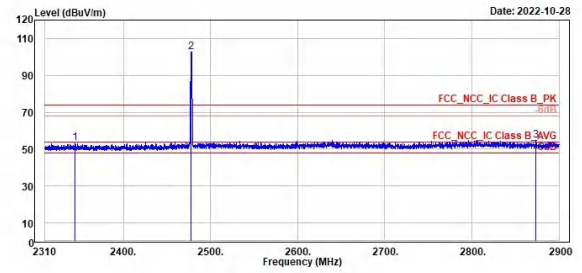
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1	2	3
2329.23	2478.00	2813.62
53.40	101.00	54.93
16.01	64.21	16.87
37.39	37.59	38.06
74.00	74.00	74.00
-20.60	27.80	-19.07
260	260	260
360	360	360
Peak	Peak	Peak
Horizontal	Horizontal	Horizontal



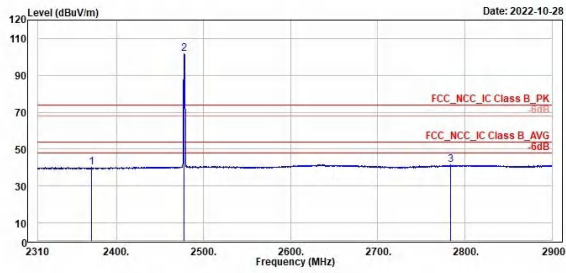
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1	2	3
2344.57	2478.00	2873.21
53.59	102.73	54.95
16.37	65.06	16.83
37.22	37.67	38.12
74.00	74.00	74.00
-20.41	28.73	-19.05
335	335	335
247	247	247
Peak	Peak	Peak
Vertical	Vertical	Vertical

**SRD 2.4GHz**
**High Channel (Horizontal) Average**
**High Channel (Vertical) Average**

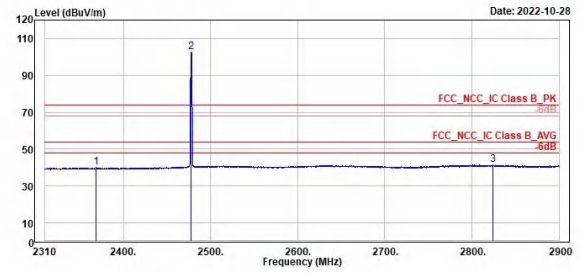

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
MHz	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note								
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg											
2371.60	40.10	2.58	37.52	54.00	-13.90	260	360	Average	Horizontal										
2478.00	101.76	64.17	37.59	54.00	47.76	260	360	Average	Horizontal										
2783.18	41.52	3.46	38.06	54.00	-12.48	260	360	Average	Horizontal										



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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
MHz	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note								
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg											
2368.76	39.93	2.65	37.28	54.00	-14.07	335	247	Average	Vertical										
2478.00	102.70	65.03	37.67	54.00	48.70	335	247	Average	Vertical										
2824.01	41.41	3.20	38.21	54.00	-12.59	335	247	Average	Vertical										

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

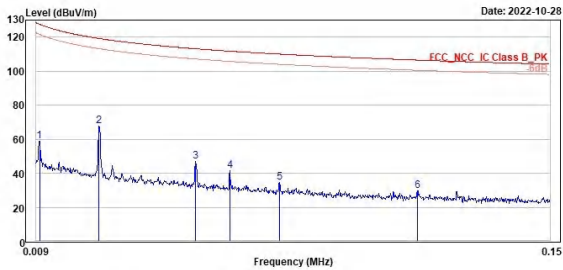
SRD 2.4GHz

(Open) Low Channel 9kHz~150kHz

(Open) Low Channel 150kHz~30MHz



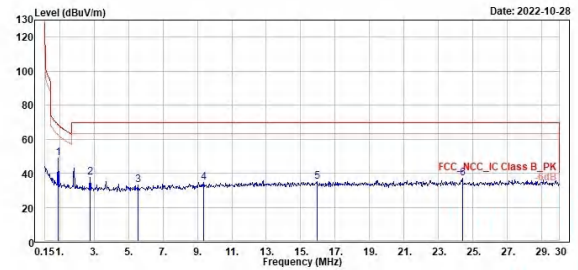
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Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	0.01	58.99	41.28	17.71	127.60	-68.61	100	318 QP	Open
2	0.03	67.92	48.74	19.18	119.18	-51.26	100	288 QP	Open
3	0.05	46.80	27.55	19.25	113.13	-66.33	100	6 QP	Open
4	0.06	41.72	22.68	19.04	111.72	-79.00	100	254 QP	Open
5	0.08	34.81	16.07	18.74	110.00	-75.19	100	136 QP	Open
6	0.11	29.51	11.24	18.27	106.49	-76.98	100	88 QP	Open



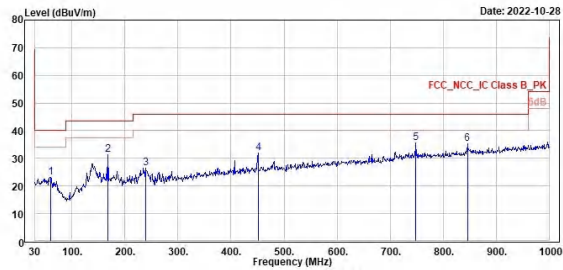
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Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	0.93	49.02	29.81	19.21	68.27	-19.25	100	130 QP	Open
2	2.78	37.54	18.07	19.47	69.50	-31.96	100	130 QP	Open
3	5.55	33.24	13.69	19.55	69.50	-36.26	100	155 QP	Open
4	9.34	34.77	13.66	21.11	69.50	-34.73	100	38 QP	Open
5	15.94	34.96	13.16	21.80	69.50	-34.54	100	190 QP	Open
6	24.39	36.96	14.73	22.23	69.50	-32.54	100	333 QP	Open

**Spurious Emissions, Tx Mode, 30MHz ~ 1GHz**
**SRD 2.4GHz**
**Low Channel (Horizontal)**
**Low Channel (Vertical)**

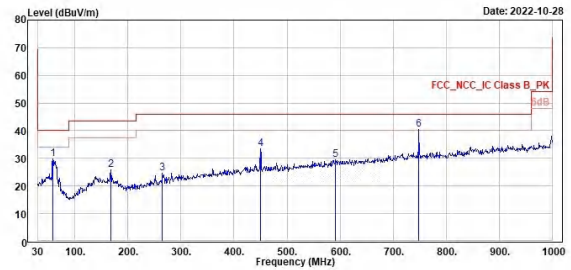

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Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	59.18	23.18	30.17	-6.99	40.00	-16.82	238	360	QP
2	167.74	31.41	37.30	-5.89	43.50	-12.09	200	162	QP
3	238.55	26.46	33.22	-6.76	46.00	-19.54	300	17	QP
4	458.98	31.83	33.83	-2.00	46.00	-14.17	300	96	QP
5	748.77	35.69	33.00	2.69	46.00	-10.31	200	67	QP
6	845.77	35.35	31.32	4.03	46.00	-10.65	200	238	QP



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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	58.13	29.88	36.68	-6.80	40.00	-10.12	200	257	QP
2	167.74	25.89	31.78	-5.89	43.50	-17.61	200	232	QP
3	264.74	24.70	30.71	-6.01	46.00	-21.30	200	72	QP
4	458.01	33.47	35.48	-2.01	46.00	-12.53	100	164	QP
5	591.63	29.42	29.28	0.14	46.00	-16.58	200	269	QP
6	748.77	40.36	37.67	2.69	46.00	-5.64	100	182	QP

Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz

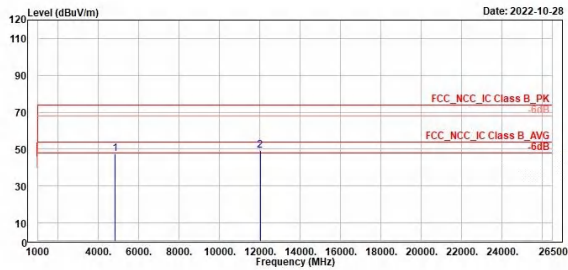
SRD 2.4GHz

Low Channel (Horizontal)

Low Channel (Vertical)



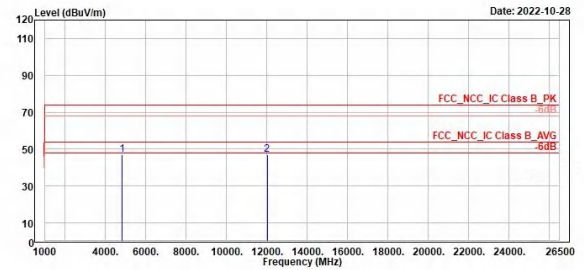
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Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	4885.00	47.66	56.67	-9.01	74.00	-26.34	200	142 Peak	Horizontal	
2	12020.00	49.19	48.66	0.53	74.00	-24.81	200	19 Peak	Horizontal	



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Freq	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			
1	4885.00	47.08	56.47	-9.39	74.00	-26.92	300	157 Peak	Vertical	
2	12020.00	47.00	46.57	0.43	74.00	-27.00	129	360 Peak	Vertical	

SRD 2.4GHz

Middle Channel (Horizontal)

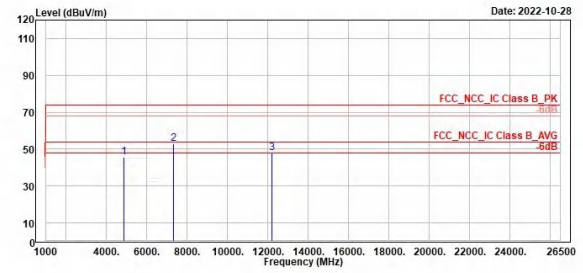
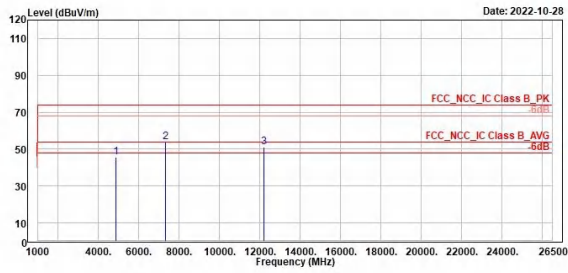
Middle Channel (Vertical)



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Freq	Level	Read Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	4889.00	45.42	54.42	-9.00	74.00	-28.58	200	173 Peak	Horizontal	
2	7320.00	53.72	60.23	-6.51	74.00	-29.28	231	360 Peak	Horizontal	
3	12200.00	51.00	50.12	0.88	74.00	-23.00	200	17 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	4889.00	45.73	55.09	-9.36	74.00	-28.27	300	146 Peak	Vertical	
2	7320.00	52.79	59.42	-6.63	74.00	-21.21	211	360 Peak	Vertical	
3	12200.00	47.86	46.98	0.88	74.00	-26.14	113	360 Peak	Vertical	

SRD 2.4GHz

High Channel (Horizontal)

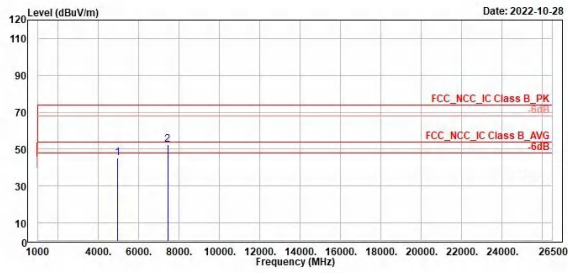
High Channel (Vertical)



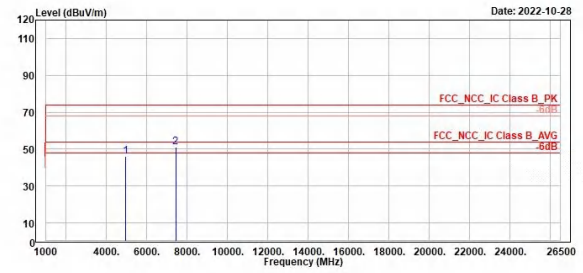
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Freq	Level	Read Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	4956.00	45.24	54.11	-8.87	74.00	-28.76	200	44 Peak	Horizontal	
2	7434.00	52.46	58.70	-6.24	74.00	-21.54	259	360 Peak	Horizontal	



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	4956.00	45.95	55.21	-9.26	74.00	-28.05	200	185 Peak	Vertical	
2	7434.00	51.10	57.68	-6.58	74.00	-22.90	300	360 Peak	Vertical	