



Test report No. : 4790323504A-US-R1-V0  
Page : 1 of 42  
Issued date : 2022/3/22  
FCC ID : RLY21GM01

## RADIO TEST REPORT

**Product** : ALPHA Wireless Gaming Mouse  
**Model Name** : ALPHAWL-BKCWW  
**FCC ID** : RLY21GM01  
**Test Regulation** : FCC 47 CFR Part 15 Subpart C (Section 15.247)  
**Received Date** : 2022/2/24  
**Test Date** : 2022/3/1 ~ 2022/3/15  
**Issued Date** : 2022/3/22

**Applicant** : ADATA Technology Co., Ltd.  
2F., No.258, Lian Cheng Rd., Chung Ho Dist., New Taipei  
City 235, Taiwan (R.O.C.)

**Issued By** : Underwriters Laboratories Taiwan Co., Ltd.  
Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd.,  
Zhudong Township, Hsinchu County, Taiwan



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Doc No: 17-EM-F0876 / 6.0





## Table of Contents

<b>1. Attestation of Test Results .....</b>	<b>4</b>
<b>2. Summary of Test Results .....</b>	<b>5</b>
<b>3. Test Methodology and Reference Procedures.....</b>	<b>6</b>
<b>4. Facilities and Accreditation .....</b>	<b>6</b>
<b>5. Measurement Uncertainty .....</b>	<b>7</b>
<b>6. Equipment under Test .....</b>	<b>8</b>
6.1. Description of EUT .....	8
6.2. Channel List .....	9
6.3. Test Condition.....	9
6.4. Description of Available Antennas .....	9
6.5. Test Mode Applicability and Tested Channel Detail.....	10
6.6. Duty cycle .....	11
<b>7. Test Equipment.....</b>	<b>12</b>
<b>8. Description of Test Setup.....</b>	<b>14</b>
<b>9. Test Results.....</b>	<b>16</b>
9.1. 6dB Bandwidth .....	16
9.2. Conducted Output Power .....	18
9.3. Power Spectral Density .....	20
9.4. Conducted Out of Band Emission.....	22
9.5. Radiated Spurious Emission .....	26
9.6. AC Power Line Conducted Emission .....	39

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Test report No. : 4790323504A-US-R1-V0  
Page : 4 of 42  
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## 1. Attestation of Test Results

**APPLICANT:** ADATA Technology Co., Ltd.  
2F., No.258, Lian Cheng Rd., Chung Ho Dist., New Taipei City 235,  
Taiwan (R.O.C.)

**EUT DESCRIPTION:** ALPHA Wireless Gaming Mouse

**BRAND:** XPG

**MODEL:** ALPHAWL-BKCWW

**SAMPLE STAGE:** Engineering Verification Test sample

**DATE of TESTED:** 2022/3/1 ~ 2022/3/15

APPLICABLE STANDARDS	
STANDARD	Test Results
FCC 47 CFR PART 15 Subpart C (Section 15.247)	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

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Project Handler

Date : 2022/3/22

Approved and Authorized By:

Kent Liu  
Senior Project Engineer

Date : 2022/3/22

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## 2. Summary of Test Results

Summary of Test Results		
FCC Clause	Test Items	Result
15.247(a)(2)	6dB Bandwidth	PASS
15.247(b)	Conducted Output Power	PASS
15.247(e)	Power Spectral Density	PASS
15.247(d)	Antenna Port Emission	PASS
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS
15.207	AC Power Conducted Emission	PASS
15.203	Antenna Requirement	PASS

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### 3. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with 47 CFR FCC Part 2, KDB558074 D01 Meas Guidance v05r02, KDB414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013.

### 4. Facilities and Accreditation

<b>Test Location</b>	Underwriters Laboratories Taiwan Co., Ltd.
<b>Address</b>	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
<b>Accreditation Certificate</b>	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398.

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## 5. Measurement Uncertainty

For statement of conformity, accuracy method (Section 8.2.4 and 8.2.5 of ISO Guide 98-4) was applied as decision rule for measurement in this test report.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor  $k=2$ .

Measurement	Frequency	Uncertainty
Conducted disturbance at mains terminals ports	150kHz ~ 30MHz	$\pm 3.1$ dB
RF Conducted	9 kHz - 40GHz	$\pm 1.9$ dB
Radiated disturbance below 30MHz	9 kHz - 30 MHz	$\pm 1.9$ dB
Radiated disturbance below 1 GHz	30MHz ~ 1GHz	$\pm 5.4$ dB
Radiated disturbance above 1 GHz	1GHz ~ 40GHz	$\pm 4.7$ dB

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## 6. Equipment under Test

### 6.1. Description of EUT

<b>Product</b>	ALPHA Wireless Gaming Mouse
<b>Brand Name</b>	XPG
<b>Model Name</b>	ALPHAWL-BKCWW
<b>Operating Frequency</b>	2403MHz ~ 2475MHz
<b>Modulation</b>	GFSK
<b>Transfer Rate</b>	Up to 2 Mbps
<b>Number of Channel</b>	5
<b>Maximum Output Power</b>	8.54 dBm
<b>Normal Voltage</b>	5Vdc from USB 3.7Vdc from Battery
<b>Sample ID</b>	Conducted Test: 4707996 Radiated Test: 4707995

Note:

1. The EUT contains following accessory devices:

<b>Product</b>	<b>Brand</b>	<b>Model</b>	<b>Description</b>
USB Cable	PENGJI	41-200-0538-100S	Length: 1.8m

2. The EUT could be supplied with rechargeable battery as the following table:

<b>Brand Name</b>	<b>Model</b>	<b>Description</b>
Hang Zhou Future Power Technology Co., Ltd	FT603048P	3.7Vdc, 900mAh

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual.

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## 6.2. Channel List

5 channels are provided to this EUT:

Channel	Frequency (MHz)
1	2403
2	2423
3	2440
4	2461
5	2475

## 6.3. Test Condition

Test Item	Test Site No.	Environmental Condition	Input Power	Test Date	Tested by
Antenna Port Conducted Measurement	SR4	22~24.8°C/ 67.7~69%RH	5Vdc from USB	2022/03/07~ 2022/03/15	WaterNil Guan
Radiated Spurious Emission	966-2	22~26°C/ 62~68%RH	5Vdc from USB	2022/03/01~ 2022/03/11	WaterNil Guan
AC power Line Conducted Emission	SR1	23~24°C/ 67~68%RH	5Vdc from USB	2022/03/07~ 2022/03/08	WaterNil Guan

FCC Test Firm Registration Number: 498077

## 6.4. Description of Available Antennas

Ant. No.	Transmitter Circuit	Brand Name	Model Name	Ant. Type	Maximum Gain (dBi)
1	Chain (0)	WoodStone	2.4GHZ ANTENNA	PCB	-0.42

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual.

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## 6.5. Test Mode Applicability and Tested Channel Detail

- For Antenna Port Conducted Measurement, this item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- The EUT has two power source types: 3.7Vdc from battery and 5Vdc from USB, above two types were pre-tested, the worst case was found in the 5Vdc. Therefore, only the test data of the 5Vdc was recorded in this report.
- For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.
- For below 1 GHz radiated emission and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Test Item	Modulation Type	Available Channel	Test Channel	Data Rate
Radiated Emissions	GFSK	1 to 5	1,3,5	SRD
Radiated Emissions (Below 1GHz)	GFSK	1 to 5	5	SRD
AC Power Line Conducted Emission	GFSK	1 to 5	5	SRD
Antenna Port Conducted Measurement	GFSK	1 to 5	1,3,5	SRD

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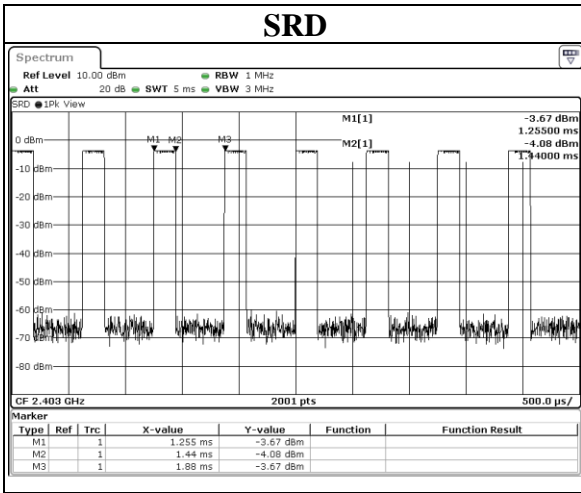
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### 6.6. Duty cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle	Duty Factor (dB)	VBW Set (above 1GHz)
SRD	0.185	0.625	0.30	5.29	10kHz



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## 7. Test Equipment

Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Expired date
Radiated Spurious Emission					
Spectrum Analyzer	Keysight	N9010A	MY56070827	2021/11/9	2022/11/8
EMI Test Receiver	Rohde & Schwarz	ESR7	101754	2021/12/10	2022/12/9
Loop Antenna	ETS lindgren	6502	00213440	2021/12/23	2022/12/22
Trilog-Broadband Antenna with 5dB Attenuator	Schwarzbeck & EMCI	VULB 9168 & N-6-05	774 & AT-N0538	2022/2/8	2023/2/7
Horn Antenna (1-18 GHz)	Schwarzbeck	BBHA 9120 D	01690	2021/12/13	2022/12/12
Horn Antenna (18-40 GHz)	Schwarzbeck	BBHA 9170	781	2021/12/17	2022/12/16
Preamplifier (30-1000 MHz)	EMCI	EMC330E	980405	2021/6/8	2022/6/7
Preamplifier (1-18 GHz)	EMCI	EMC051835BE	980406	2022/2/16	2023/2/15
Preamplifier (18-40GHz)	EMCI	EMC184040SEE	980426	2021/5/19	2022/5/18
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-4 & 170425-2	2021/12/3	2022/12/2
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-1 & 170214-2	2021/12/3	2022/12/2

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Test report No. : 4790323504A-US-R1-V0  
Page : 13 of 42  
Issued date : 2022/3/22  
FCC ID : RLY21GM01

Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Expired date
Antenna Port Conducted Measurement					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101490	2021/9/7	2022/9/6
Pulse Power Sensor	Anritsu	MA2411B	1531202	2021/12/22	2022/12/21
Power Meter	Anritsu	ML2495A	1645002	2021/12/22	2022/12/21
AC power Line Conducted Emission					
EMI Test Receiver	Rohde & Schwarz	ESR7	101753	2021/11/15	2022/11/14
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	2021/8/30	2022/8/29
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	2021/8/26	2022/8/25
Cables	TITAN	CFD200	T0732ACFD20 020A300-2	2021/4/7	2022/4/6

UL Software		
Description	Name	Version
Radiated measurement	e3	6.191211 (V6)
Conducted measurement	RF Conducted Test Tools	ver 2.4.0.620b
AC power Line Conducted Emission	EZ_EMG	UL-3A1.2

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Test report No. : 4790323504A-US-R1-V0  
Page : 14 of 42  
Issued date : 2022/3/22  
FCC ID : RLY21GM01

## 8. Description of Test Setup

### Support Equipment

ID	Equipment	Brand Name	Model Name	S/N	Remark
A	Laptop	Lenovo	T460	PC0FWU5Y	Provide by lab

### I/O Cables

ID	Equipment	Brand Name	Model Name	Length (m)	Remark
1	USB Cable	PENGJI	41-200-0538-100S	1.8	Provide by Client

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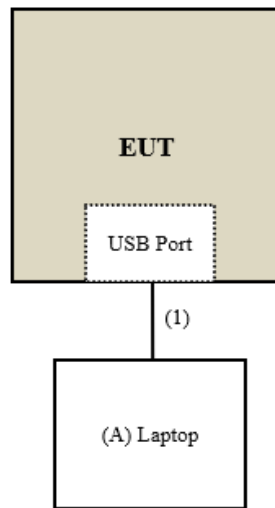
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## Test Setup

Controlled using a bespoke application (Bus Hound 6.01) on a test Notebook. The application was used to enable a continuous transmission mode and to select the test channels, data rates, modulation schemes and power setting as required.

## Setup Diagram for Test



**Under Table**

**Remote Site**

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## 9. Test Results

### 9.1. 6dB Bandwidth

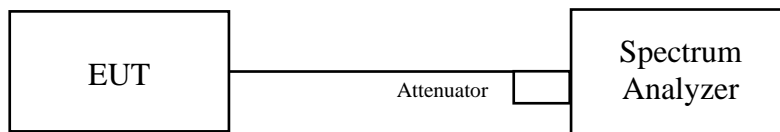
#### Requirements

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

#### Test procedure

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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.

#### Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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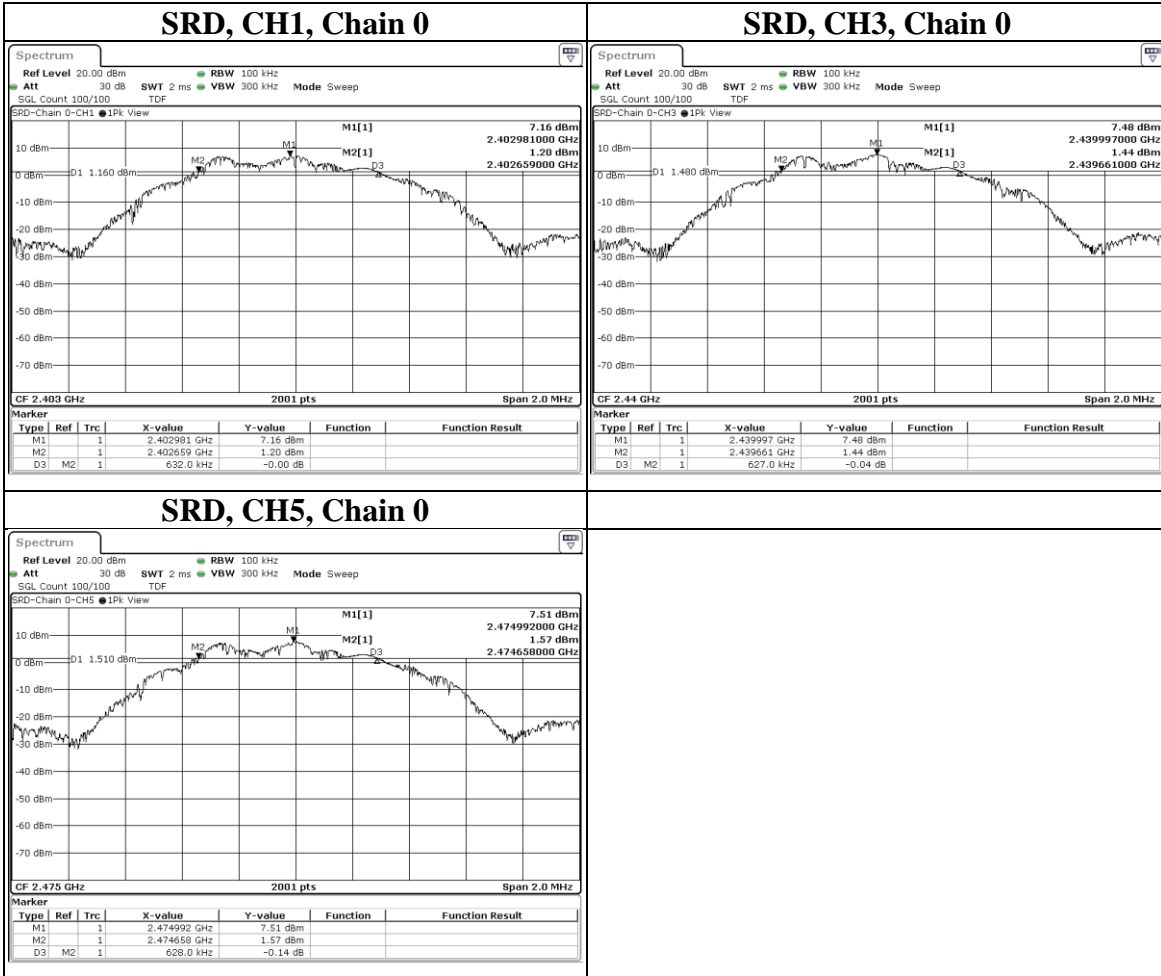
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**Test Data**

Mode	CH	Freq (MHz)	6dB BW (MHz)	Limit (MHz)	Result
SRD	1	2403	0.632	0.5	Pass
SRD	3	2440	0.627	0.5	Pass
SRD	5	2475	0.628	0.5	Pass



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## 9.2. Conducted Output Power

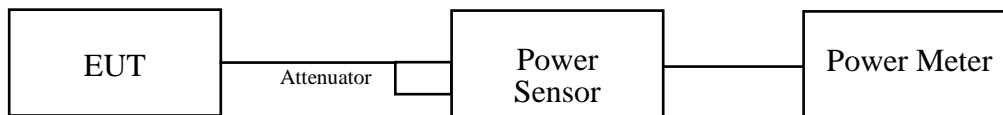
### Requirements

For systems using digital modulation in the 2400-2483.5 MHz bands: 1 Watt.

### Test Procedure

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.

### Test Setup



The loss between RF output port of the EUT and the input port of the Power Meter has been taken into consideration.

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## Test Data

### Peak Power

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2403	6.471	8.11	30	PASS
3	2440	6.982	8.44	30	PASS
5	2475	7.145	8.54	30	PASS

### Average Power (Reference Only)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2403	6.368	8.04
3	2440	6.855	8.36
5	2475	6.998	8.45

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### 9.3. Power Spectral Density

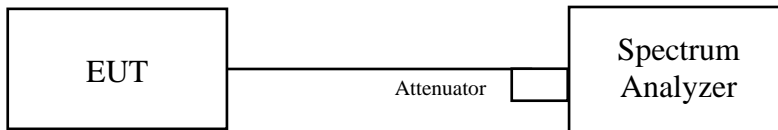
#### Requirements

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 kHz.

#### 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 Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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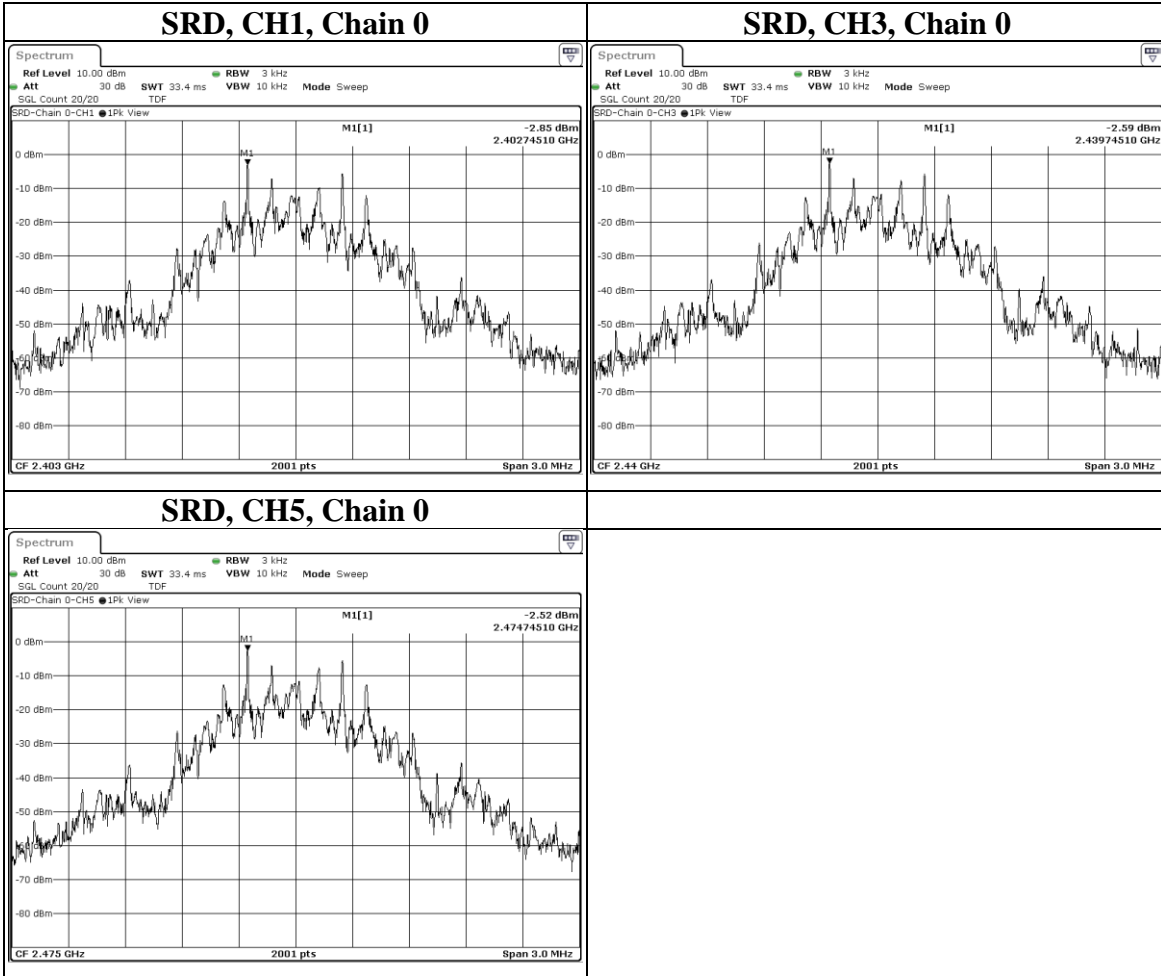
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**Test Data**

Mode	CH	Freq (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
SRD	1	2403	-2.85	8	Pass
SRD	3	2440	-2.59	8	Pass
SRD	5	2475	-2.52	8	Pass



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## 9.4. Conducted Out of Band Emission

### Requirements

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b) (3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209 (a) is not required.

### Test procedure

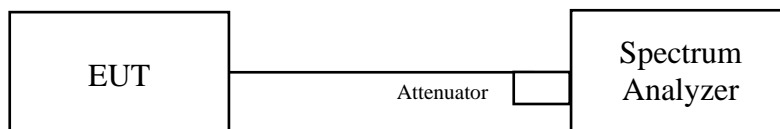
Measurement Procedure REF

- Set the RBW = 100 kHz.
- Set the VBW  $\geq$  300 kHz.
- Set the span to 1.5 times the DTS bandwidth.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

Measurement Procedure OOBE

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

### Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

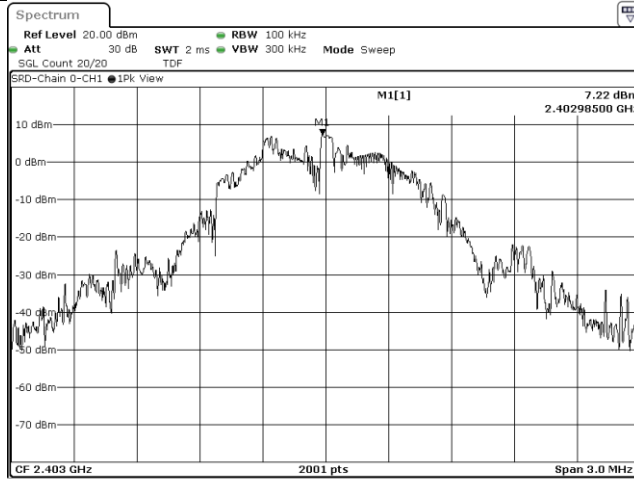
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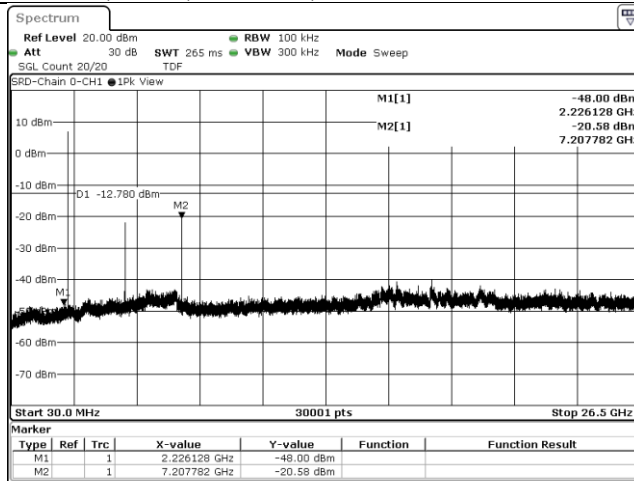


### Test Data

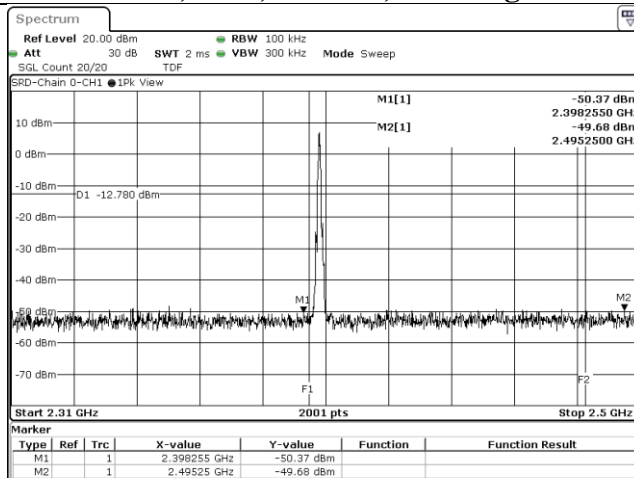
#### SRD, CH1, Chain 0, Reference



#### SRD, CH1, Chain 0, Conducted Emission



#### SRD, CH1, Chain 0, Bandedge



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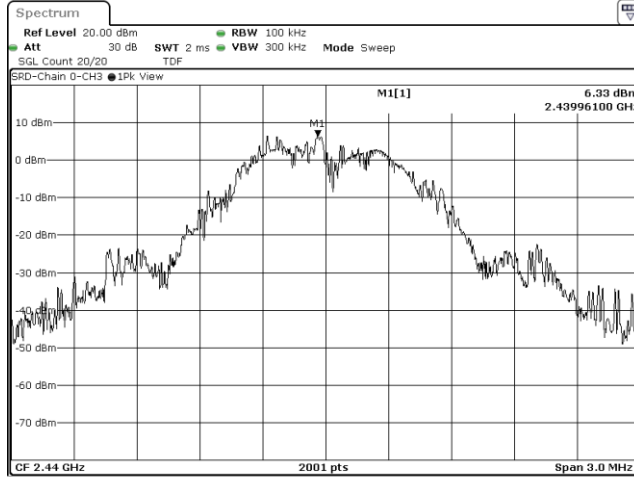
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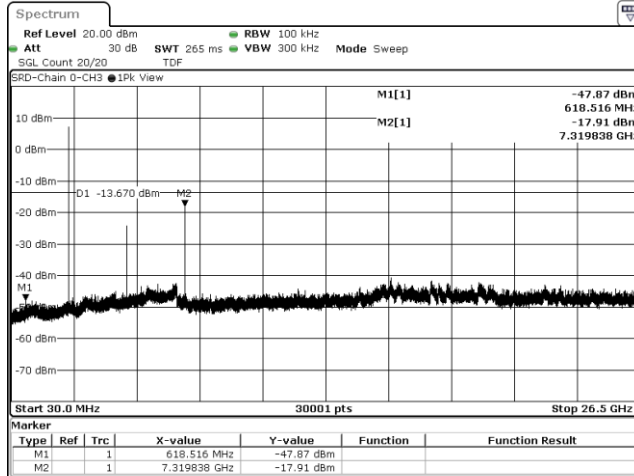
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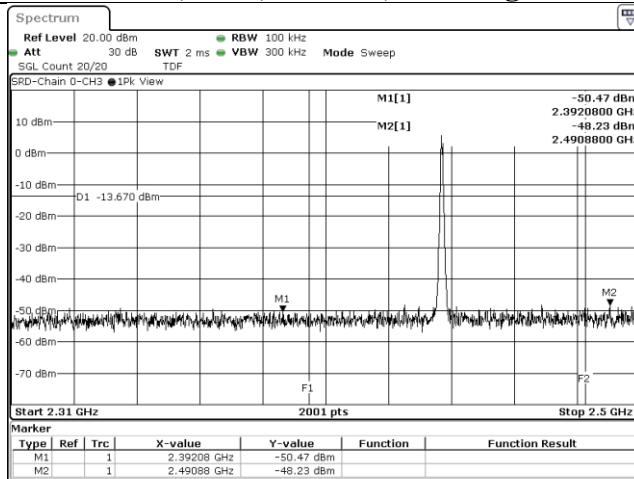
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### SRD, CH3, Chain 0, Conducted Emission



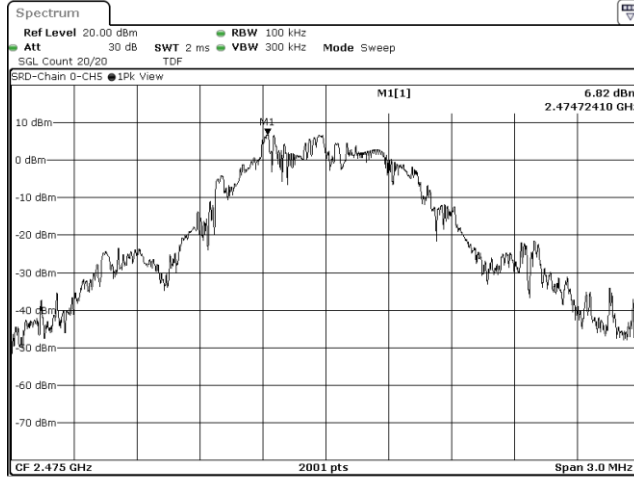
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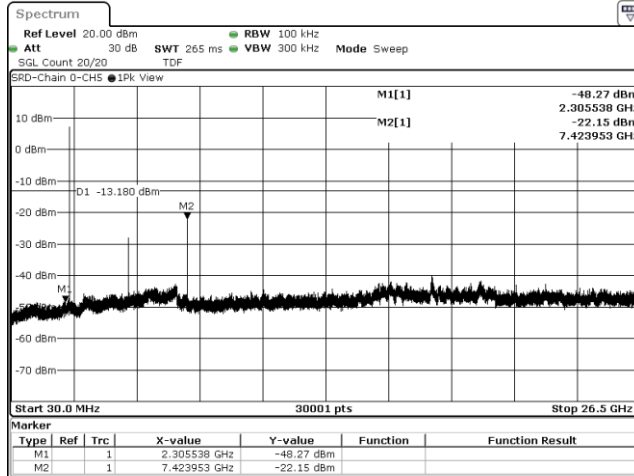




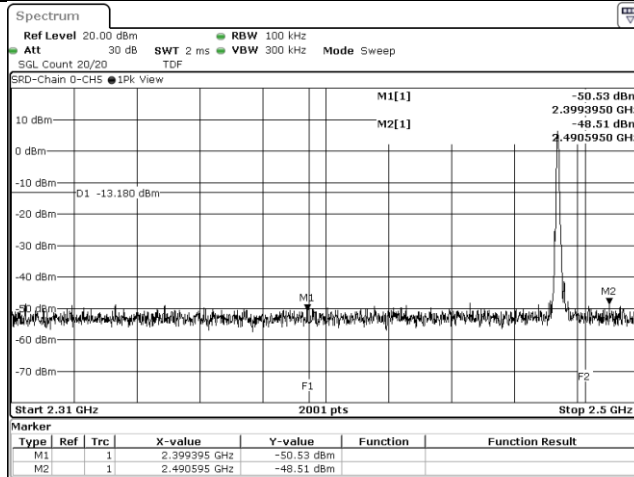
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### SRD, CH5, Chain 0, Conducted Emission



### SRD, CH5, Chain 0, Bandedge



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## 9.5. Radiated Spurious Emission

### Requirements

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequency(MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

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Doc No: 17-EM-F0876 / 6.0



## Test Procedures

[For 9 kHz ~ 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, perpendicular, and ground-parallel 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. For measurement below 30MHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

[For above 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) 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. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
- f. The test-receiver system was set to peak and average detects 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.

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Note:

- a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- b. 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 1GHz.
- c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle  $< 98\%$ ) or 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.

Configuration	Average	
	RBW	VBW
SRD	1MHz	Refer to section 6.6 for duty cycle.

- d. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
- e. Test data of Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
- f. Test data of Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
- g. Test data of Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
- h. Test data of Notation "@" = Fundamental Frequency
- i. Test data of Notation "\*" = The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.

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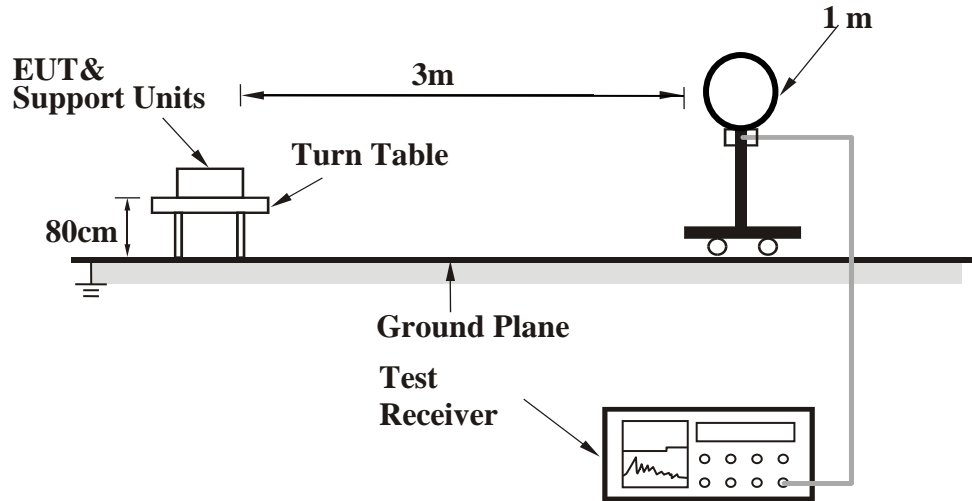
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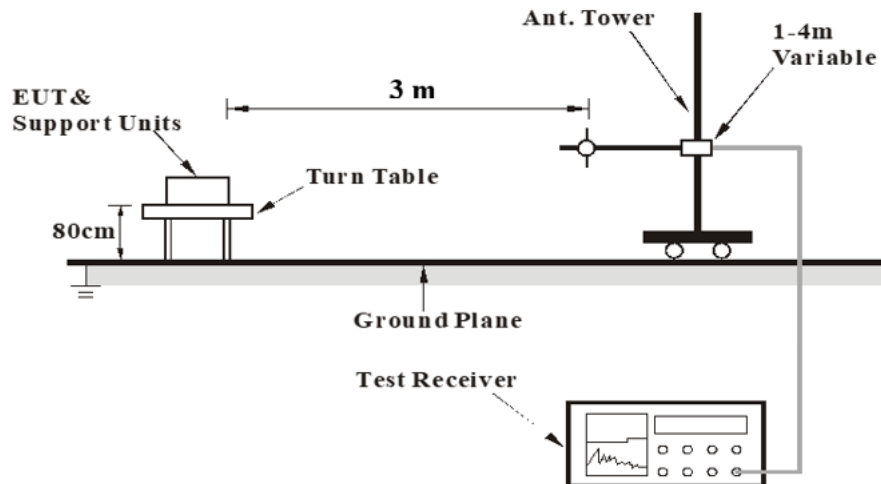
Doc No: 17-EM-F0876 / 6.0

## Test Setup

<Frequency Range 9 kHz ~ 30 MHz>

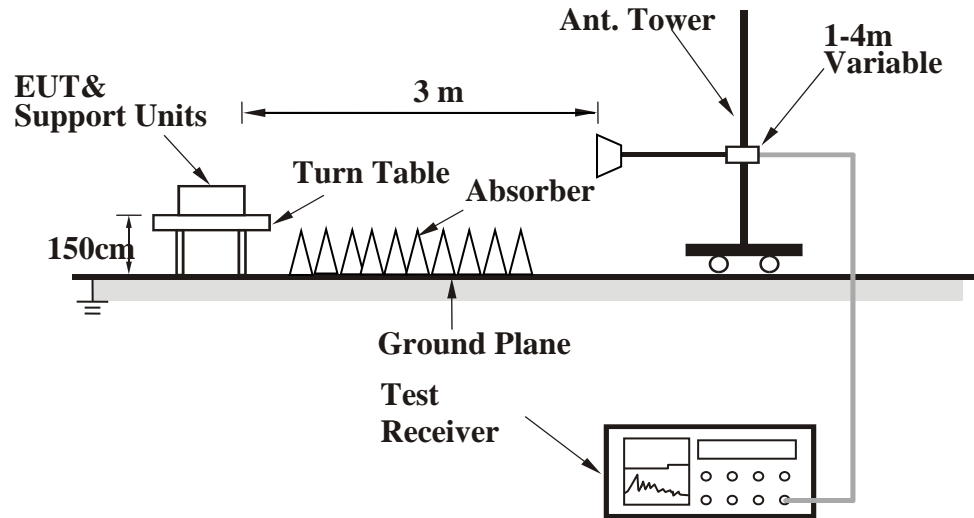


<Frequency Range 30 MHz ~ 1 GHz >





<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the Setup Configurations.

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## Test Data

### Above 1 GHz

Mode	SRD	Channel	1
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Polarization	Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
		(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
Horizontal		2324.25	41.28	15.87	57.15	74	-16.85	PK
		2359.59	30.81	15.88	46.69	54	-7.31	AVG
	@	2403	82.66	15.81	98.47	N/A	N/A	AVG
	@	2403	83.1	15.81	98.91	N/A	N/A	PK
	*	4806	37.37	2.33	39.7	74	-34.3	PK
Vertical		2327.67	30.59	15.87	46.46	54	-7.54	AVG
		2357.88	41.36	15.89	57.25	74	-16.75	PK
	@	2403	77.86	15.81	93.67	N/A	N/A	PK
	@	2403	77.66	15.81	93.47	N/A	N/A	AVG
	*	4806	39.71	2.33	42.04	74	-31.96	PK

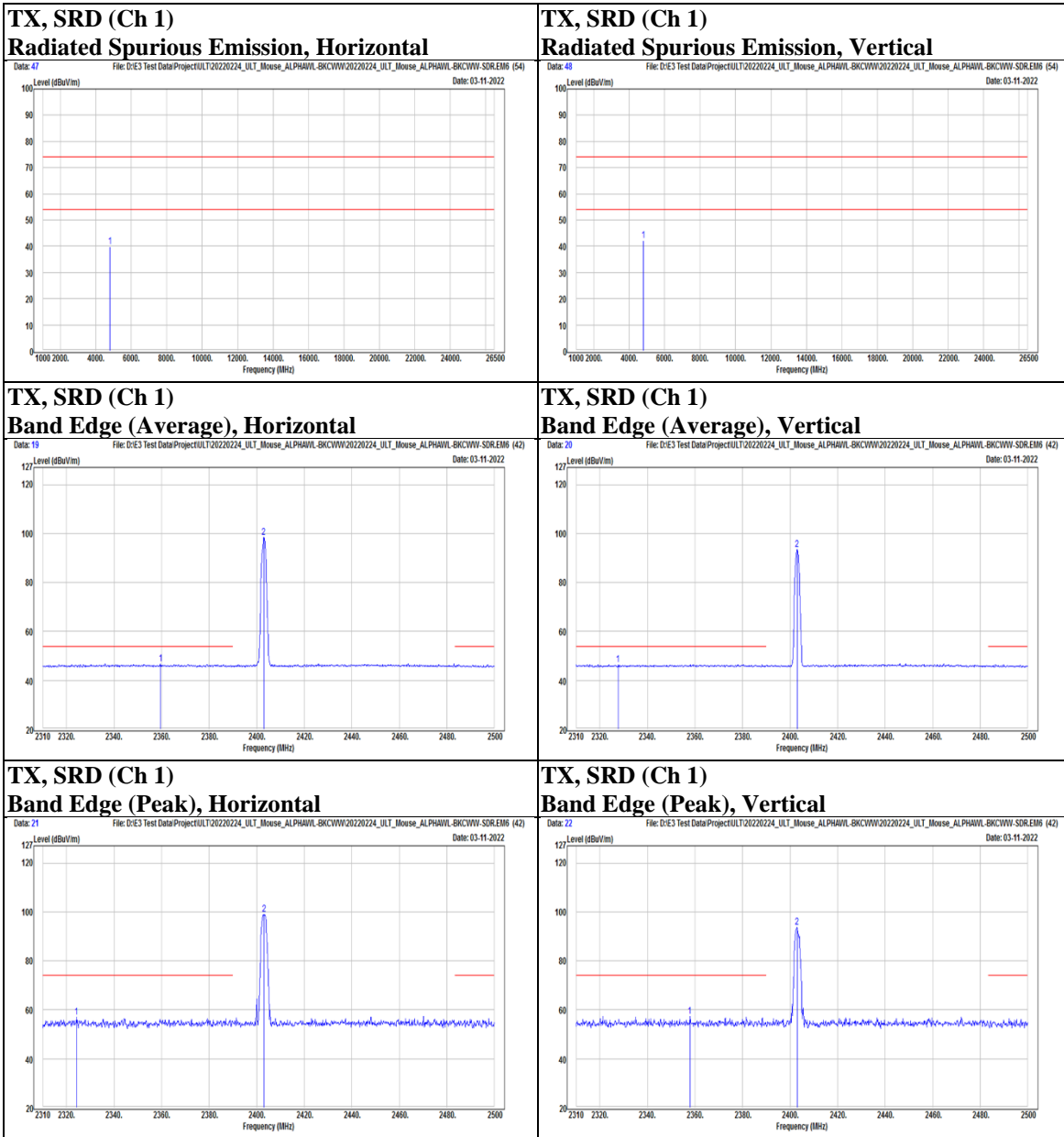
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Doc No: 17-EM-F0876 / 6.0







Test report No. : 4790323504A-US-R1-V0  
Page : 33 of 42  
Issued date : 2022/3/22  
FCC ID : RLY21GM01

Mode	SRD	Channel	3
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Polarization	Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
		(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
Horizontal		2333.56	30.93	15.88	46.81	54	-7.19	AVG
		2386.19	41.17	15.83	57	74	-17	PK
	@	2440	80.27	15.94	96.21	N/A	N/A	PK
	@	2440	79.49	15.94	95.43	N/A	N/A	AVG
		2485.94	39.63	15.67	55.3	74	-18.7	PK
		2485.94	30.67	15.67	46.34	54	-7.66	AVG
	*	4880	37.55	2.41	39.96	74	-34.04	PK
Vertical		2332.61	41.28	15.88	57.16	74	-16.84	PK
		2339.64	30.52	15.89	46.41	54	-7.59	AVG
	@	2440	77.67	15.94	93.61	N/A	N/A	PK
	@	2440	73.81	15.94	89.75	N/A	N/A	AVG
		2490.5	30.58	15.62	46.2	54	-7.8	AVG
		2492.59	40.81	15.61	56.42	74	-17.58	PK
	*	4880	41.17	2.41	43.58	74	-30.42	PK

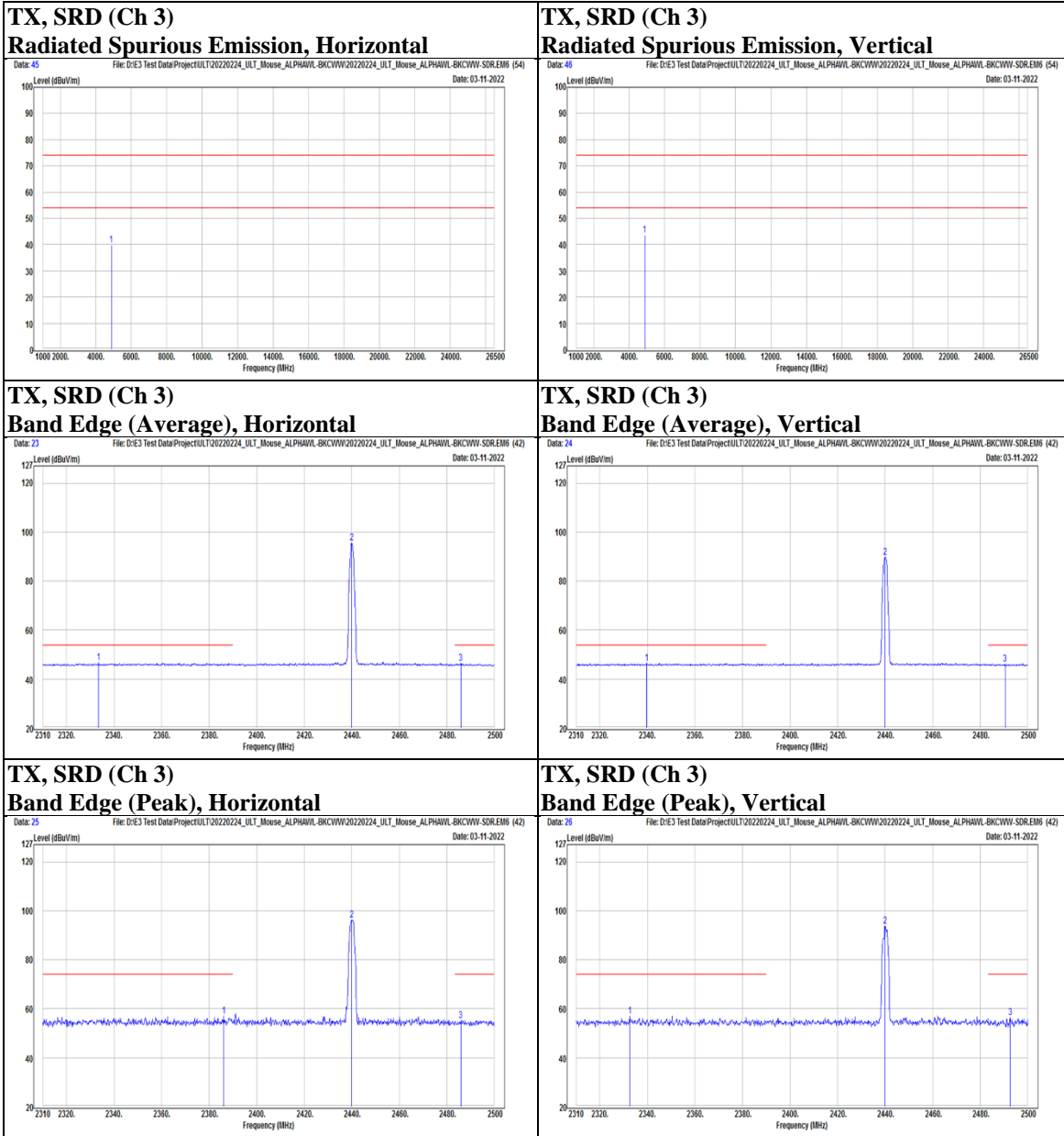
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Doc No: 17-EM-F0876 / 6.0





Test report No. : 4790323504A-US-R1-V0  
Page : 35 of 42  
Issued date : 2022/3/22  
FCC ID : RLY21GM01

Mode	SRD	Channel	5
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Polarization	Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
		(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
Horizontal	@	2475	77.77	15.76	93.53	N/A	N/A	PK
	@	2475	76.85	15.76	92.61	N/A	N/A	AVG
		2484.04	30.59	15.68	46.27	54	-7.73	AVG
		2498.29	41.71	15.57	57.28	74	-16.72	PK
	*	4950	38.39	2.38	40.77	74	-33.23	PK
Vertical	@	2475	75.71	15.76	91.47	N/A	N/A	PK
	@	2475	75.1	15.76	90.86	N/A	N/A	AVG
		2485.75	40.74	15.67	56.41	74	-17.59	PK
		2486.32	30.63	15.67	46.3	54	-7.7	AVG
	*	4950	40.85	2.38	43.23	74	-30.77	PK

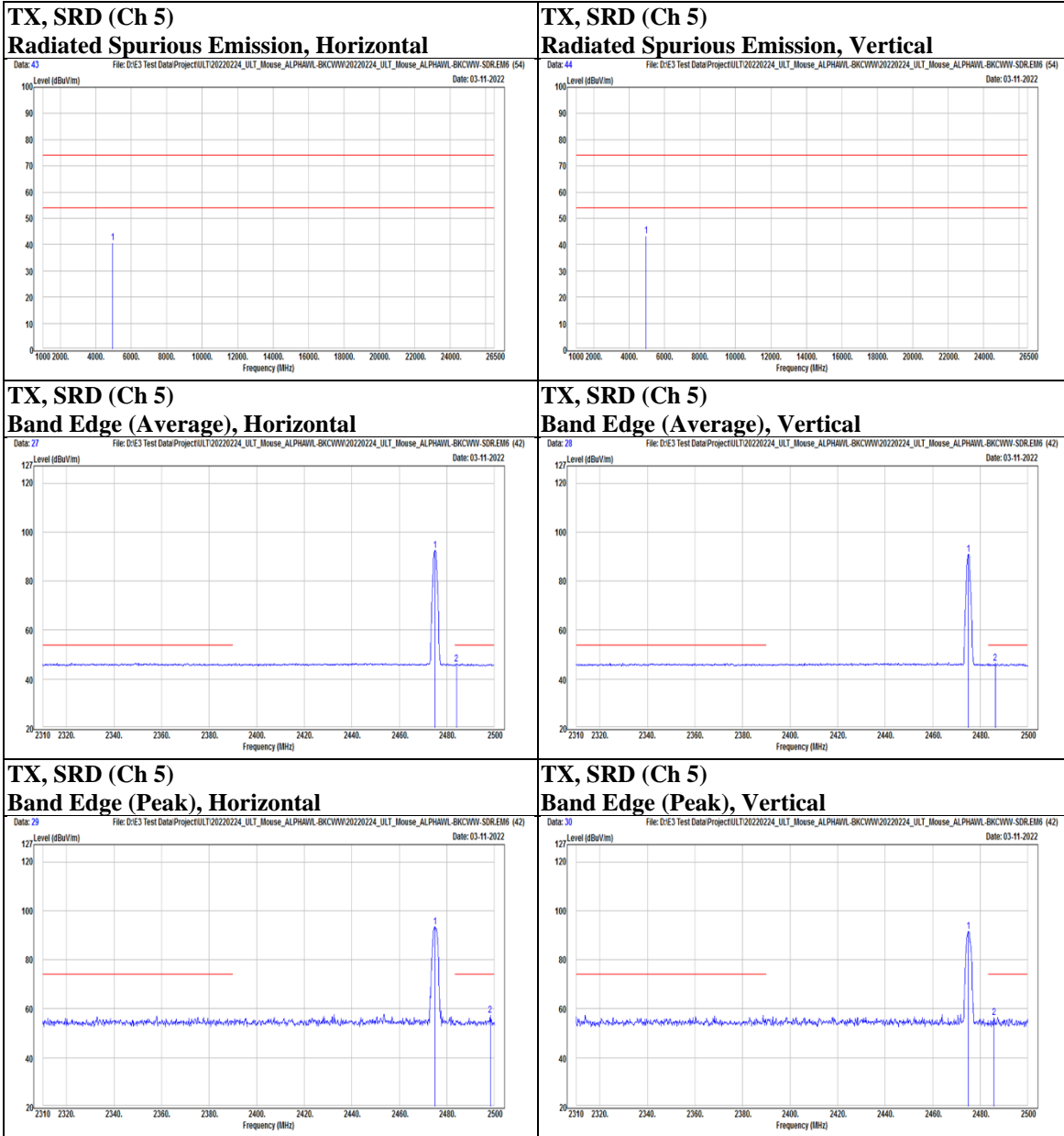
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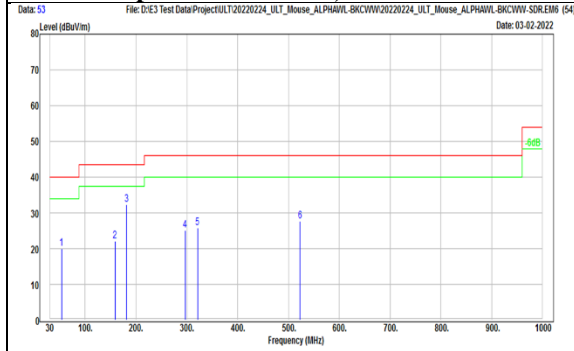
**Below 1 GHz**

Mode	SRD	Channel	5
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Polarization	Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
		(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
Horizontal		53.28	31.12	-11.16	19.96	40	-20.04	PK
		159.01	33.37	-11.21	22.16	43.5	-21.34	PK
		181.32	44.86	-12.59	32.27	43.5	-11.23	PK
		296.75	35.15	-10.13	25.02	46	-20.98	PK
		321	35.15	-9.32	25.83	46	-20.17	PK
		522.76	31.67	-4	27.67	46	-18.33	PK
Vertical		49.4	34.31	-11.19	23.12	40	-16.88	PK
		153.19	34.97	-11.36	23.61	43.5	-19.89	PK
		180.35	39.64	-12.51	27.13	43.5	-16.37	PK
		331.67	31.35	-8.99	22.36	46	-23.64	PK
		430.61	30.68	-6.26	24.42	46	-21.58	PK
		537.31	30.46	-3.59	26.87	46	-19.13	PK

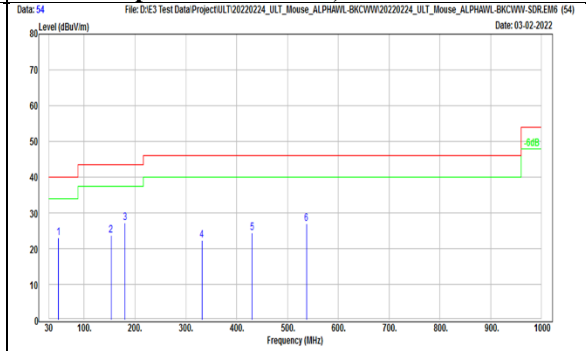
**TX, SRD (Ch 5)**

**Radiated Spurious Emission, Horizontal**



**TX, SRD (Ch 5)**

**Radiated Spurious Emission, Vertical**



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Test report No. : 4790323504A-US-R1-V0  
Page : 38 of 42  
Issued date : 2022/3/22  
FCC ID : RLY21GM01

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#### **9 kHz ~ 30 MHz Data:**

For 9 kHz to 30 MHz radiated emission have performed all modes of operation were investigated. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

No non-compliance noted:

#### **KDB 414788 D01 OATS and Chamber Correlation Justification**

- Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

- OATs and chamber correlation testing had been performed and chamber measured test results is the worst case test result.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

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## 9.6. AC Power Line Conducted Emission

### Requirements

Frequency (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.
2. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
3. Test data of Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB).
4. Test data of Margin(dB) = Result value (dBuV) - Limit value (dBuV).
5. Test data of Correction Factor (dB) = Insertion loss(dB) + Cable loss(dB).

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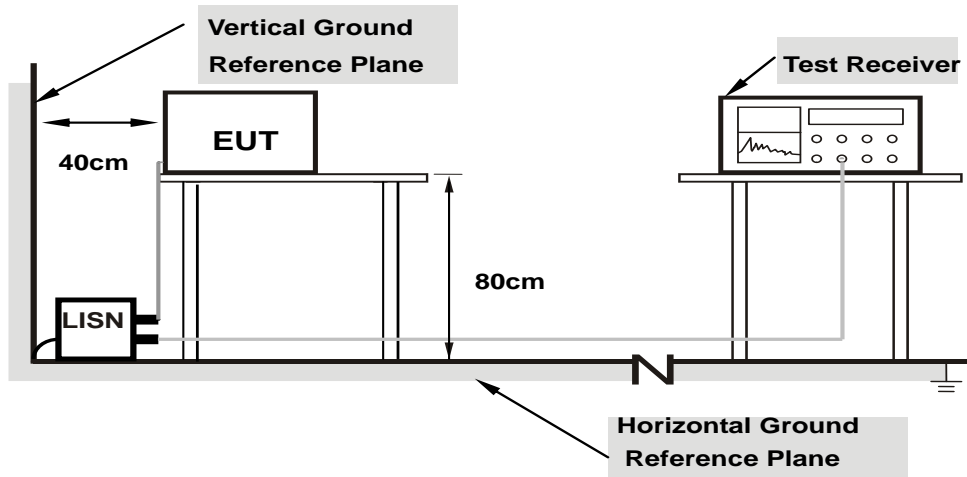
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## Test Setup



**Note: 1.Support units were connected to second LISN.**

For the actual test configuration, please refer to the Setup Configurations.

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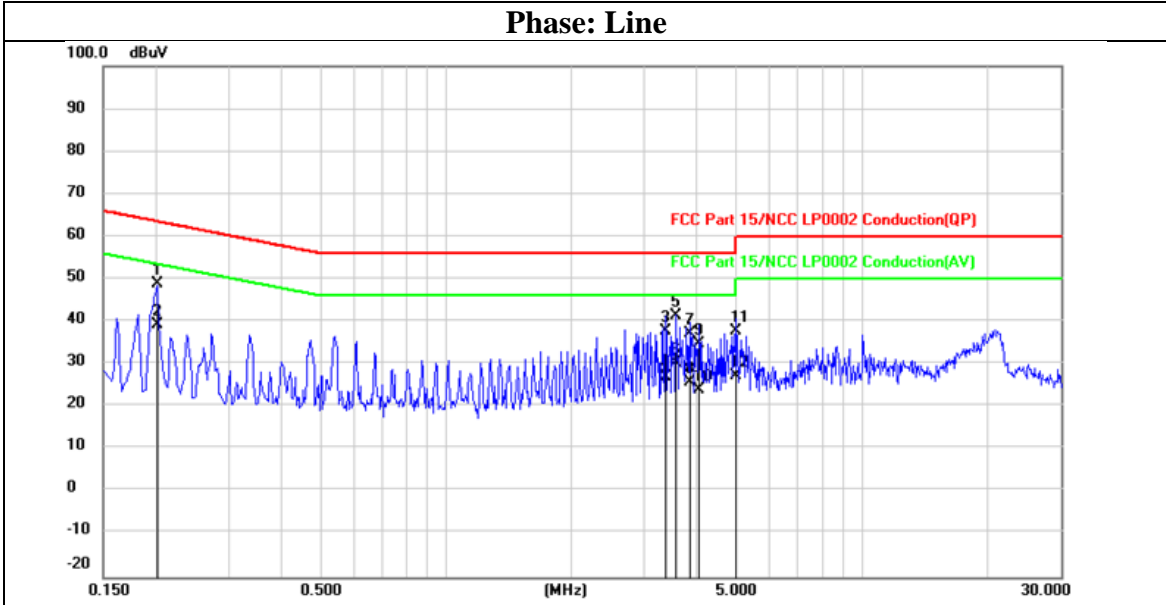
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**Test Data**

Mode	SRD_TX2475	Channel	5
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2020	29.51	19.48	48.99	63.53	-14.54	QP
2	0.2020	19.69	19.48	39.17	53.53	-14.36	AVG
3	3.3780	18.11	19.55	37.66	56.00	-18.34	QP
4	3.3780	7.32	19.55	26.87	46.00	-19.13	AVG
5	3.5820	21.92	19.56	41.48	56.00	-14.52	QP
6	3.5820	10.56	19.56	30.12	46.00	-15.88	AVG
7	3.8540	17.47	19.57	37.04	56.00	-18.96	QP
8	3.8540	6.15	19.57	25.72	46.00	-20.28	AVG
9	4.0580	15.32	19.57	34.89	56.00	-21.11	QP
10	4.0580	4.49	19.57	24.06	46.00	-21.94	AVG
11	5.0020	18.27	19.59	37.86	60.00	-22.14	QP
12	5.0020	7.72	19.59	27.31	50.00	-22.69	AVG

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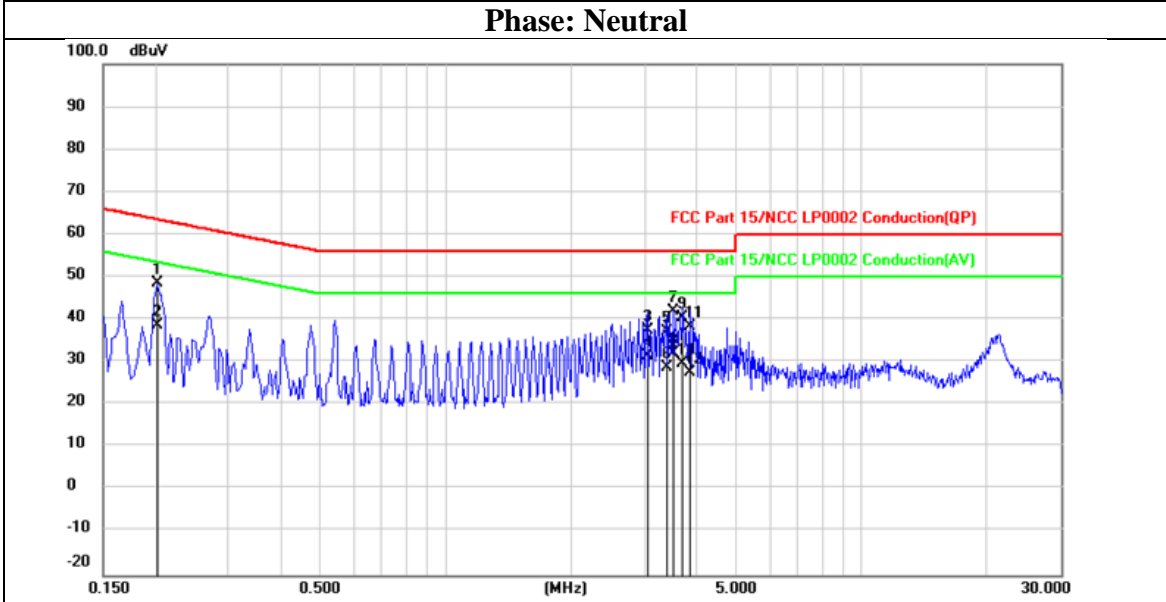
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Mode	SRD_TX2475	Channel	5
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2020	29.02	19.48	48.50	63.53	-15.03	QP
2	0.2020	19.22	19.48	38.70	53.53	-14.83	AVG
3	3.0420	17.88	19.54	37.42	56.00	-18.58	QP
4	3.0420	11.97	19.54	31.51	46.00	-14.49	AVG
5	3.3820	17.50	19.54	37.04	56.00	-18.96	QP
6	3.3820	9.17	19.54	28.71	46.00	-17.29	AVG
7	3.5140	22.55	19.55	42.10	56.00	-13.90	QP
8	3.5140	12.40	19.55	31.95	46.00	-14.05	AVG
9	3.7180	20.77	19.56	40.33	56.00	-15.67	QP
10	3.7180	10.11	19.56	29.67	46.00	-16.33	AVG
11	3.8500	18.77	19.57	38.34	56.00	-17.66	QP
12	3.8500	8.13	19.57	27.70	46.00	-18.30	AVG

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