

**CFR 47 FCC PART 15 SUBPART C
ISED RSS-247 Issue 4**

TEST REPORT

For

Dongle

MODEL NUMBER: M220D

REPORT NUMBER: 4791858882-9-RF-1

ISSUE DATE: August 27, 2025

**FCC ID: A5M-M220D
IC: 5903G-M220D**

Prepared for

**FCC:Lenovo (Beijing) Limited
IC:LENOVO CHINA**

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	August 27, 2025	Initial Issue	

Summary of Test Results

Test Item	Clause	Limit/Requirement	Result
Antenna Requirement	N/A	FCC 15.203 RSS-GEN Clause 6.8	Pass
AC Power Line Conducted Emission	ANSI C63.10-2020 Clause 6.2	FCC Part 15.207	Pass
Conducted Output Power	ANSI C63.10-2020 Clause 7.8.5	FCC 15.247 (b) (1) RSS-247 Clause 6.2.3.2	Pass
20 dB Bandwidth and 99% Occupied Bandwidth	ANSI C63.10-2020 Clause 6.9.2 & 6.9.3	FCC 15.247 (a) (1) RSS-247 Clause 6.2.3.1 (a) RSS-Gen Clause 6.7	Pass
Carrier Hopping Channel Separation	ANSI C63.10-2020 Clause 7.8.2	FCC 15.247 (a) (1) RSS-247 Clause 6.2.3.1 (a)	Pass
Number of Hopping Frequency	ANSI C63.10-2020 Clause 7.8.3	15.247 (a) (1) III RSS-247 Clause 6.2.3.1 (b)	Pass
Time of Occupancy (Dwell Time)	ANSI C63.10-2020 Clause 7.8.4	15.247 (a) (1) III RSS-247 Clause 6.2.3.1 (b)	Pass
Conducted Bandedge and Spurious Emission	ANSI C63.10-2020 Clause 6.10.4 & Clause 7.8.7	FCC 15.247 (d) RSS-247 Clause 6.6	Pass
Radiated Band edge and Spurious Emission	ANSI C63.10-2020 Clause 6.3 & 6.5 & 6.6 & 7.8.8	FCC 15.247 (d) FCC 15.209 FCC 15.205 RSS-247 Clause 6.6 RSS-GEN Clause 8.9 RSS-GEN Clause 8.10	Pass
Duty Cycle	ANSI C63.10-2020, Clause 11.6	None; for reporting purposes only.	Pass

Note:

1. N/A: In this whole report not applicable.
2. For ISED, this report is also performed according to ANSI C63.10-2020+Cor.1-2023 standards.

*This test report is only published to and used by the applicant, and it is not for evidence purpose in China.

*The measurement result for the sample received is <Pass> according to <CFR 47 FCC PART 15 SUBPART C, ISED RSS-247 Issue 4> when <Simple Acceptance> decision rule is applied.

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: FCC:Lenovo (Beijing) Limited
 IC:LENOVO CHINA
 Address: FCC Address:201-H2-6, Floor 2, Building 2, No.6 Shangdi West
 Road,Haidian District, Beijing, China
 IC Address:No.6 Chuang Ye Road, Shangdi Information Industry
 Haidan District, Beijing 100085 China

Manufacturer Information

Company Name: FCC:Lenovo (Beijing) Limited
 IC:LENOVO CHINA
 Address: FCC Address:201-H2-6, Floor 2, Building 2, No.6 Shangdi West
 Road,Haidian District, Beijing, China
 IC Address:No.6 Chuang Ye Road, Shangdi Information Industry
 Haidan District, Beijing 100085 China

EUT Information

EUT Name: Dongle
 Model: M220D
 Brand: Lenovo
 Sample Received Date: July 9, 2025
 Sample Status: Normal
 Sample ID: 8687642
 Date of Tested: July 22, 2025 to August 27, 2025

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 FCC PART 15 SUBPART C ISED RSS-247 Issue 4	Pass

Prepared By:



Johnson Liu

Laboratory Engineer

Checked By:



Kebo Zhang

Operations Leader

Approved By:



Stephen Guo

Operations Manager

2. TEST METHODOLOGY

All tests were performed in accordance with the standard CFR 47 FCC PART 15 SUBPART C ISED RSS-247 Issue 4, KDB 558074 D01 15.247 Meas Guidance v05r02, 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part 2, ANSI C63.10-2020, ANSI C63.10-2020+Cor.1-2023 and ISED RSS-GEN Issue 5.

3. FACILITIES AND ACCREDITATION

	<p>A2LA (Certificate No.: 4102.01) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p>FCC (FCC Designation No.: CN1187) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.</p> <p>Accreditation Certificate</p> <p>ISED (Company No.: 21320) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046.</p> <p>VCCI (Registration No.: C-20202, G-20240, R-20248 and T-20202) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber E, the VCCI registration No. is G-20240 and R-20248 Shielding Room F, the VCCI registration No. is C-20202 and T-20202</p>
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Note 1:

All tests measurement facilities use to collect the measurement data are located at Room 101, Building 2, No.4, Information Road, Songshan Lake, Dongguan, Guangdong, China.

Note 2:

The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

Note 3:

For below 30 MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30 MHz had been correlated to measurements performed on an OFS.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction emission	3.62 dB
Radiated Emission (Included Fundamental Emission) (9 kHz ~ 30 MHz)	2.2 dB
Radiated Emission (Included Fundamental Emission) (30 MHz ~ 1 GHz)	4.00 dB
Radiated Emission (Included Fundamental Emission) (1 GHz ~ 18 GHz)	5.78 dB (1 GHz ~ 18 GHz)
	5.23 dB (18 GHz ~ 26 GHz)
Duty Cycle	±0.028%
20dB Emission Bandwidth and 99% Occupied Bandwidth	±0.0196%
Carrier Frequency Separation	±1.9%
Maximum Conducted Output Power	±0.743 dB
Number of Hopping Channel	±1.9%
Time of Occupancy	±0.028%
Conducted Band-edge Compliance	±1.328 dB
Conducted Unwanted Emissions In Non-restricted Frequency Bands	±0.746 dB (9 kHz ~ 1 GHz) ±1.328dB (1 GHz ~ 26 GHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name	Dongle
Model	M220D

Frequency Range:	2402 MHz to 2480 MHz
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Type of Modulation:	SRD 2.4G
Normal Test Voltage:	DC 5V

5.2. CHANNEL LIST

Channel	Frequency (MHz)						
01	2402	21	2422	41	2442	61	2462
02	2403	22	2423	42	2443	62	2463
03	2404	23	2424	43	2444	63	2464
04	2405	24	2425	44	2445	64	2465
05	2406	25	2426	45	2446	65	2466
06	2407	26	2427	46	2447	66	2467
07	2408	27	2428	47	2448	67	2468
08	2409	28	2429	48	2449	68	2469
09	2410	29	2430	49	2450	69	2470
10	2411	30	2431	50	2451	70	2471
11	2412	31	2432	51	2452	71	2472
12	2413	32	2433	52	2453	72	2473
13	2414	33	2434	53	2454	73	2474
14	2415	34	2435	54	2455	74	2475
15	2416	35	2436	55	2456	75	2476
16	2417	36	2437	56	2457	76	2477
17	2418	37	2438	57	2458	77	2478
18	2419	38	2439	58	2459	78	2479
19	2420	39	2440	59	2460	79	2480
20	2421	40	2441	60	2461	/	/

5.3. MAXIMUM POWER

Test Mode	Frequency (MHz)	Channel Number	Maximum Peak Output Power (dBm)
SRD 2.4G	2402 ~ 2480	1-79[79]	-1.45

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
SRD 2.4G	CH 01(Low Channel), CH 40(MID Channel), CH 79(High Channel)	2402 MHz, 2441 MHz, 2480 MHz
SRD 2.4G		Hopping

5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band				
Test Software		N/A		
Modulation Type	Transmit Antenna Number	Test Software setting value		
		CH 01	CH 40	CH 79
SRD 2.4G	1	0	0	0

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2402 ~ 2480	PCB Antenna	2.97

Test Mode	Transmit and Receive Mode	Description
SRD 2.4G	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.

5.7. SUPPORT UNITS FOR SYSTEM TEST

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Remark
1	PC	Lenovo	E14	/
2	AC Adaptor	Lenovo	ADLX65YCC3D	Input: AC 100-240V, 1.8A, 50-60Hz Output: DC 20V, 3.25A, 65.0W Max

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB	/	/	1.0	/

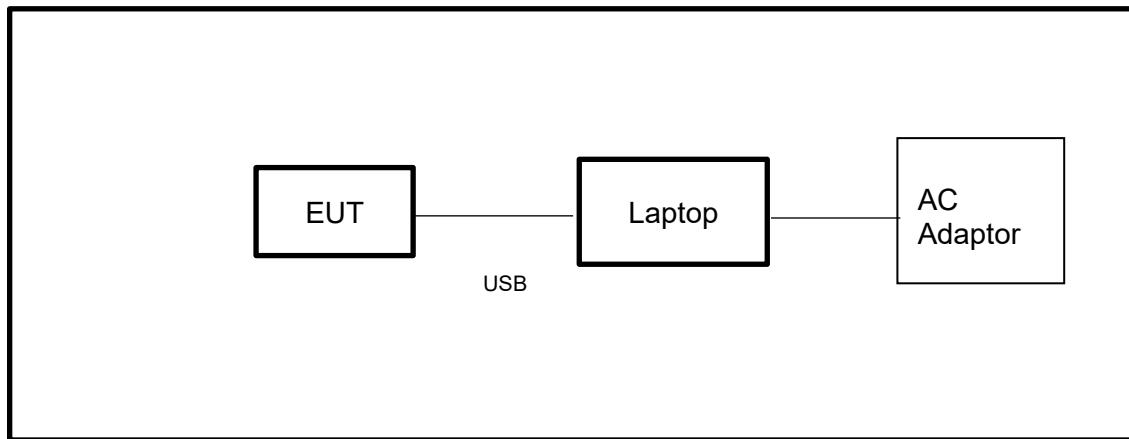
ACCESSORIES

Item	Accessory	Brand Name	Model Name	Description
1	Mouse	Lenovo	M220	FCC ID: A5M-M220 IC: 5903G-M220

TEST SETUP

The EUT can be operated in engineering mode via the laptop software.

SETUP DIAGRAM FOR TESTS



Note: AC Adaptor only use for AC POWER LINE CONDUCTED EMISSION test

6. MEASURING EQUIPMENT AND SOFTWARE USED

R&S TS 8997 Test System					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
Power sensor, Power Meter	R&S	OSP120	100921	Dec.27,2024	Dec.26,2025
Vector Signal Generator	R&S	SMBV100A	261637	Sep.28, 2024	Sep.27, 2025
Signal Generator	R&S	SMB100A	178553	Sep.28, 2024	Sep.27, 2025
Signal Analyzer	R&S	FSV40	101118	Sep.28, 2024	Sep.27, 2025
Software					
Description		Manufacturer		Name	
For R&S TS 8997 Test System		Rohde & Schwarz		EMC 32	
Tonsend RF Test System					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
Wireless Connectivity Tester	R&S	CMW270	1201.0002N75-102	Sep.13, 2024	Sep.12, 2025
MXA Signal Analyzer	Keysight	N9010B	MY57110124	May.15,2025	May.14,2026
MXG Vector Signal Generator	Keysight	N5182B	MY56200284	Sep.28, 2024	Sep.27, 2025
MXG Vector Signal Generator	Keysight	N5172B	MY56200301	Sep.28, 2024	Sep.27, 2025
DC power supply	Keysight	E3642A	MY55159130	Sep.28, 2024	Sep.27, 2025
Temperature & Humidity Chamber	SANMOOD	SG-80-CC-2	2088	Sep.28, 2024	Sep.27, 2025
Attenuator	Aglient	8495B	2814a12853	Sep.28, 2024	Sep.27, 2025
RF Control Unit	Tonsend	JS0806-2	23B80620666	Dec.27,2024	Dec.26,2025
Software					
Description		Manufacturer		Name	
Tonsend SRD Test System		Tonsend		JS1120-3 RF Test System	
				V3.2.22	

Conducted Emissions					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
EMI Test Receiver	R&S	ESR3	101961	Sep.28, 2024	Sep.27, 2025
Two-Line V-Network	R&S	ENV216	101983	Sep.28, 2024	Sep.27, 2025
Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Sep.28, 2024	Sep.27, 2025
Software					
Description		Manufacturer		Name	Version
Test Software for Conducted Emissions		Farad		EZ-EMC	Ver. UL-3A1

Radiated Emissions(Below 1G)					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Sep.28, 2024	Sep.27, 2025
Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	June 28, 2024	June.27 2027
Preamplifier	HP	8447D	2944A09099	Sep.28, 2024	Sep.27, 2025
Loop antenna	Schwarzbeck	1519B	00008	Dec.09, 2024	Dec.08, 2027
Software					
Description		Manufacturer		Name	Version
Test Software for Radiated Emissions		Farad		EZ-EMC	Ver. UL-3A1

Radiated Emissions(Above 1G)					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
Signal Analyzer	R&S	FSV40	101117	Sep.28, 2024	Sep.27, 2025
Preamplifier	TDK	PA-02-001-3000	TRS-302-00051	Sep.28, 2024	Sep.27, 2025
Horn Antenna	ETS-Lindgren	3117	00213191	Feb.7,2023	Feb.6,2026
Preamplifier	TDK	PA-02-0118	TRS-305-00067	Sep.28, 2024	Sep.27, 2025
High Gain Horn Antenna	Schwarzbeck	BBHA-9170	697	Jun. 30, 2024	Jun. 29, 2027
Preamplifier	TDK	PA-02-2	TRS-307-00002	Sep.28, 2024	Sep.27, 2025
Preamplifier	TDK	PA-02-3	TRS-308-00002	Sep.28, 2024	Sep.27, 2025
Highpass Filter	Wainwright	WHKX10-2700-3000-1800-40SS	24	Sep.28, 2024	Sep.27, 2025
Software					

Description	Manufacturer	Name	Version
Test Software for Radiated Emission	Tonscend	JS32-RE	5.0.0
Test Software for Radiated Emissions	Farad	EZ-EMC	Ver. UL-3A1

Other Instrument					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
Temperature humidity probe	OMEGA	ITHX-SD-5	18470007	Oct.8, 2024	Oct.7, 2025
Barometer	Yiyi	Baro	N/A	Oct.10, 2024	Oct.9, 2025
Attenuator	Agilent	8495B	2814a12853	Sep.28, 2024	Sep.27, 2025

7. ANTENNA PORT TEST RESULTS

7.1. CONDUCTED OUTPUT POWER

LIMITS

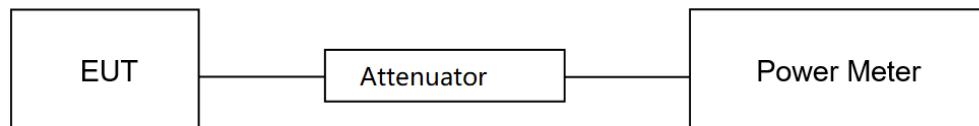
CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 4			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247 (b) (1) ISED RSS-247 Clause 6.2.3.2	Peak Conducted Output Power	Hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel: 1 watt or 30 dBm; Hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel: 125 mW or 21 dBm	2400-2483.5

TEST PROCEDURE

Connect the EUT to a low loss RF cable from the antenna port to the power sensor (video bandwidth is greater than the occupied bandwidth).

Measure peak emission level, the indicated level is the peak output power, after any corrections for external attenuators and cables.

TEST SETUP



TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	51.1%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

TEST DATE / ENGINEER

Test Date	July 22, 2025	Test By	Walker Yuan
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TEST RESULTS

Please refer to section "Test Data" - Appendix B

7.2. 20 DB BANDWIDTH AND 99% OCCUPIED BANDWIDTH

LIMITS

CFR 47FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 4			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247 (a) (1) RSS-247 Clause 6.2.3.1 (a)	20 dB Bandwidth	None; for reporting purposes only.	2400-2483.5
ISED RSS-Gen Clause 6.7	99 % Occupied Bandwidth	None; for reporting purposes only.	2400-2483.5

TEST PROCEDURE

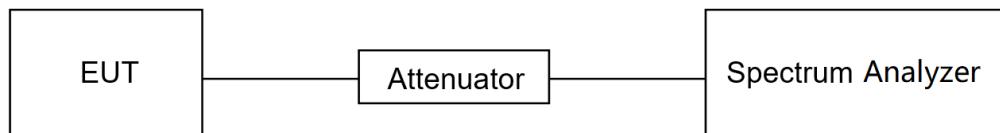
Refer to ANSI C63.10-2020 clause 6.9.

Connect the EUT to the spectrum analyzer and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	For 20 dB Bandwidth: 1 % to 5 % of the 20 dB bandwidth For 99 % Occupied Bandwidth: 1 % to 5 % of the occupied bandwidth
VBW	For 20 dB Bandwidth: approximately $3 \times$ RBW For 99 % Occupied Bandwidth: $\geq 3 \times$ RBW
Span	Approximately 2 to 3 times the 20dB bandwidth
Trace	Max hold
Sweep	Auto couple

a) Use the occupied bandwidth function of the instrument, allow the trace to stabilize and report the measured 99 % occupied bandwidth and 20 dB Bandwidth.

TEST SETUP



TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	51.1%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

TEST DATE / ENGINEER

Test Date	July 22, 2025	Test By	Walker Yuan
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TEST RESULTS

Please refer to section "Test Data" - Appendix C&D

7.3. CARRIER HOPPING CHANNEL SEPARATION

LIMITS

CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 4			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247 (a) (1) ISED RSS-247 Clause 6.2.3.1 (a)	Carrier Frequency Separation	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel.	2400-2483.5

TEST PROCEDURE

Refer to ANSI C63.10-2020 clause 7.8.2.

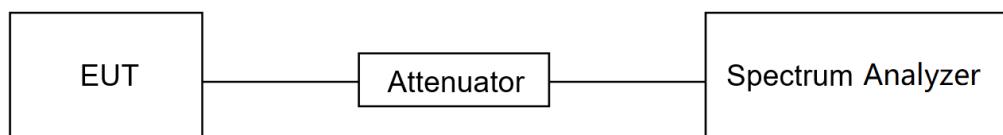
Connect the EUT to the spectrum analyzer and use the following settings:

Center Frequency	The center frequency of the channel under test
Span	wide enough to capture the peaks of two adjacent channels
Detector	Peak
RBW	Start with the RBW set to approximately 30 % of the channel spacing; adjust as necessary to best identify the center of each individual channel.
VBW	\geq RBW
Trace	Max hold
Sweep time	Auto couple

Allow the trace to stabilize and use the marker-delta function to determine the separation between the peaks of the adjacent channels.

Compliance of an EUT with the appropriate regulatory limit shall be determined.

TEST SETUP



TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	51.1%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

TEST DATE / ENGINEER

Test Date	July 22, 2025	Test By	Walker Yuan
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TEST RESULTS

Please refer to section "Test Data" - Appendix E

7.4. NUMBER OF HOPPING FREQUENCY

LIMITS

CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 4		
Section	Test Item	Limit
CFR 47 15.247 (a) (1) III ISED RSS-247 Clause 6.2.3.1 (b)	Number of Hopping Frequency	at least 15 hopping channels

TEST PROCEDURE

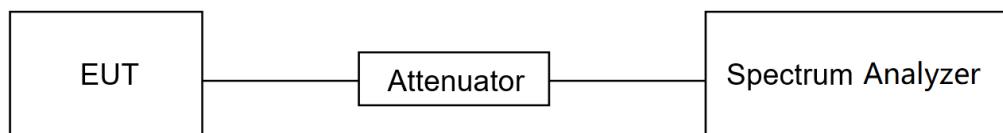
Refer to ANSI C63.10-2020 clause 7.8.3.

Connect the EUT to the spectrum Analyzer and use the following settings:

Detector	Peak
RBW	To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
VBW	\geq RBW
Span	The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
Trace	Max hold
Sweep time	Auto couple

Set EUT to transmit maximum output power and switch on frequency hopping function. then set enough count time (larger than 5000 times) to get all the hopping frequency channel displayed on the screen of spectrum analyzer, count the quantity of peaks to get the number of hopping channels.

TEST SETUP



TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	51.1%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

TEST DATE / ENGINEER

Test Date	July 22, 2025	Test By	Walker Yuan
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TEST RESULTS

Please refer to section "Test Data" - Appendix F

7.5. TIME OF OCCUPANCY (DWELL TIME)

LIMITS

CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 4		
Section	Test Item	Limit
CFR 47 15.247 (a) (1) III ISED RSS-247 Clause 6.2.3.1 (b)	Time of Occupancy (Dwell Time)	The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed.

TEST PROCEDURE

Refer to ANSI C63.10-2020 clause 7.8.4.

Connect the EUT to the spectrum Analyzer and use the following settings:

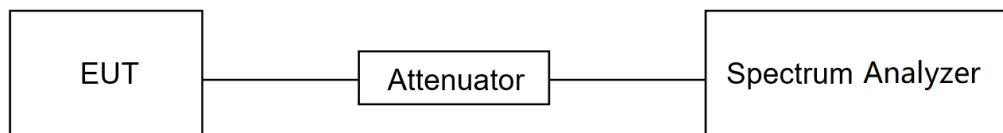
Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	1 MHz
VBW	\geq RBW
Span	Zero span, centered on a hopping channel
Trace	Max hold
Sweep time	As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel

Use the marker-delta function to determine the transmit time per hop (Burst Width). If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.

For FHSS Mode (79 Channel):

SRD 2.4G Dwell Time: $Burst\ Width \times (1600/2) \times 31.6 / (\text{channel number})$

TEST SETUP



TEST ENVIRONMENT

Temperature	23.3°C	Relative Humidity	64.5%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

TEST DATE / ENGINEER

Test Date	August 27, 2025	Test By	Walker Yuan
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TEST RESULTS

Please refer to section "Test Data" - Appendix G

7.6. CONDUCTED BANDEDGE AND SPURIOUS EMISSION

LIMITS

CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 4		
Section	Test Item	Limit
CFR 47 FCC §15.247 (d) ISED RSS-247 6.6	Conducted Spurious Emission	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

Refer to ANSI C63.10-2020 clause 7.8.7.

Connect the EUT to the spectrum analyzer and use the following settings for reference level measurement:

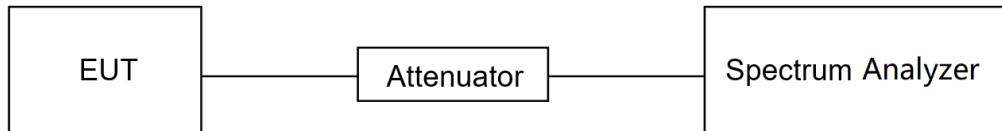
Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times$ RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level.

Change the settings for emission level measurement:

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times$ RBW
measurement points	\geq span/RBW
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum

TEST SETUP**TEST ENVIRONMENT**

Temperature	22.3°C	Relative Humidity	51.1%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

TEST DATE / ENGINEER

Test Date	July 22, 2025	Test By	Walker Yuan
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TEST RESULTS

Please refer to section "Test Data" - Appendix H&I&J

7.7. DUTY CYCLE

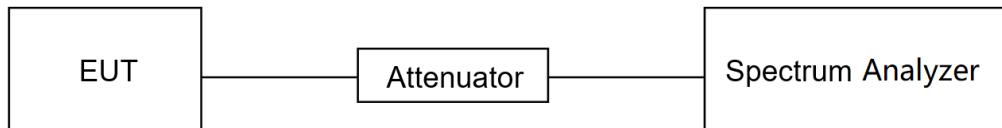
LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Refer to ANSI C63.10-2020 Zero – Span Spectrum Analyzer method.

TEST SETUP



TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	51.1%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

TEST DATE / ENGINEER

Test Date	July 22, 2025	Test By	Walker Yuan
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TEST RESULTS

Please refer to section "Test Data" - Appendix A

8. RADIATED TEST RESULTS

LIMITS

Please refer to CFR 47 FCC §15.205 and §15.209.

Please refer to ISED RSS-GEN Clause 8.9 and Clause 8.10.

Radiation Disturbance Test Limit for FCC (Class B) (9 kHz-1 GHz)

Emissions radiated outside of the specified frequency bands above 30 MHz			
Frequency Range (MHz)	Field Strength Limit (μ V/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m	
		Quasi-Peak	
30 - 88	100		40
88 - 216	150		43.5
216 - 960	200		46
Above 960	500		54
Above 1000	500	Peak	Average
		74	54

FCC Emissions radiated outside of the specified frequency bands below 30 MHz		
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

ISED General field strength limits at frequencies below 30 MHz

Table 6 – General field strength limits at frequencies below 30 MHz

Frequency	Magnetic field strength (H-Field) (μ A/m)	Measurement distance (m)
9 - 490 kHz ^{Note 1}	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

ISED Restricted bands please refer to ISED RSS-GEN Clause 8.10

Table 7 – Restricted frequency bands ^{Note 1}		
MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.028	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.877 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 - 3287	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 26.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138		

Note 1: Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

FCC Restricted bands of operation refer to FCC §15.205 (a):

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

Note: ¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6c

TEST PROCEDURE

Below 30 MHz

The setting of the spectrum analyzer

RBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
VBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
Sweep	Auto

1. The testing follows the guidelines in ANSI C63.10-2020 clause 6.4.
2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80 cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1 m height antenna tower.
5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.
6. For measurement below 1 GHz, 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 and average detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak and average detector and reported.
7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field 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 site based on KDB 414788.
8. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω . For example, the measurement frequency X kHz resulted in a level of Y dB_V/m, which is equivalent to $Y - 51.5 = Z$ dB_A/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

Below 1 GHz and above 30 MHz

The setting of the spectrum analyzer

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2020 clause 6.5.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80 cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement below 1 GHz, 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 3 dB 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.

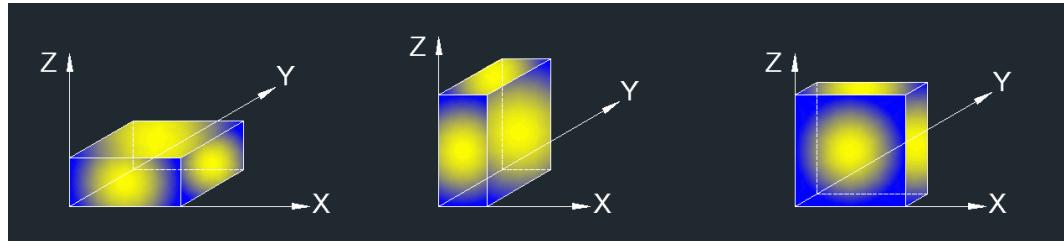
Above 1 GHz

The setting of the spectrum analyzer

RBW	1 MHz
VBW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2020 clause 6.6.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 1.5 m above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement above 1 GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.
6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 7.7. ON TIME AND DUTY CYCLE.

X axis, Y axis, Z axis positions:



Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

For Restricted Bandedge:**Note:**

1. Measurement = Reading Level + Correct Factor.
2. If the peak values are less than the average limit of 54 dBuV/m, the average result is deemed to comply with average limit.
3. PK=Peak: Peak detector.
4. AV=Average: $VBW=1/Ton$, where: Ton is the transmitting duration.
5. For the transmitting duration, please refer to clause 7.7.
6. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.
7. Both horizontal and vertical have been tested, only the worst data was recorded in the report.
8. All modes have been tested, but only the worst data was recorded in the report.

For Radiate Spurious emission (9 kHz ~ 30 MHz):**Note:**

1. Measurement = Reading Level + Correct Factor.
2. If the peak values are less than the QP limit, the QP result is deemed to comply with QP limit.
3. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.
4. All modes have been tested, but only the worst data was recorded in the report.
5. $dBuA/m = dBuV/m - 20\log_{10}[120\pi] = dBuV/m - 51.5$

For Radiate Spurious Emission (30 MHz ~ 1 GHz):**Note:**

1. Result Level = Read Level + Correct Factor.
2. If the peak values are less than the QP limit, the QP result is deemed to comply with QP limit.
3. All modes have been tested, but only the worst data was recorded in the report.

For Radiate Spurious Emission (1 GHz ~ 3 GHz):

1. Measurement = Reading Level + Correct Factor.
2. If the peak values are less than the average limit of 54 dBuV/m, the average result is deemed to comply with average limit.
3. Peak: Peak detector.
4. AVG: $VBW=1/Ton$, where: Ton is the transmitting duration.
5. For the transmitting duration, please refer to clause 7.7.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. All modes have been tested, but only the worst data was recorded in the report.

For Radiate Spurious Emission (3 GHz ~ 18 GHz):

Note:

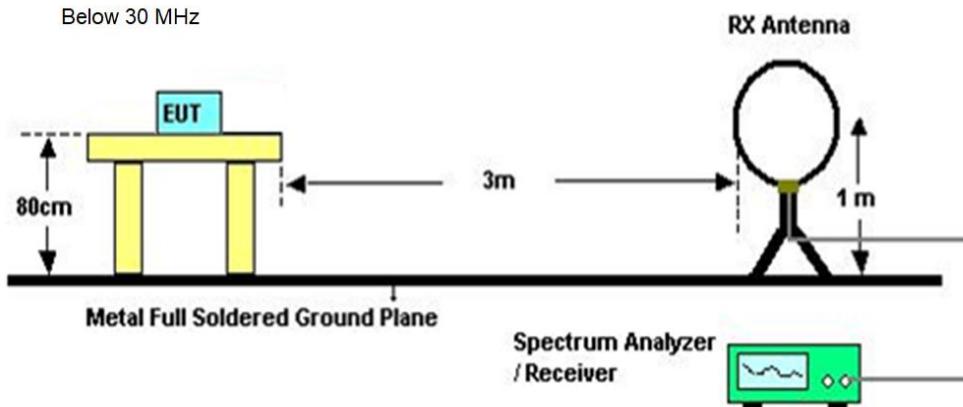
1. Peak Result = Reading Level + Correct Factor.
2. If the peak values are less than the average limit of 54 dBuV/m, the average result is deemed to comply with average limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.
5. For the transmitting duration, please refer to clause 7.7.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. All modes have been tested, but only the worst data was recorded in the report.

For Radiate Spurious emission (18 GHz ~ 26 GHz):

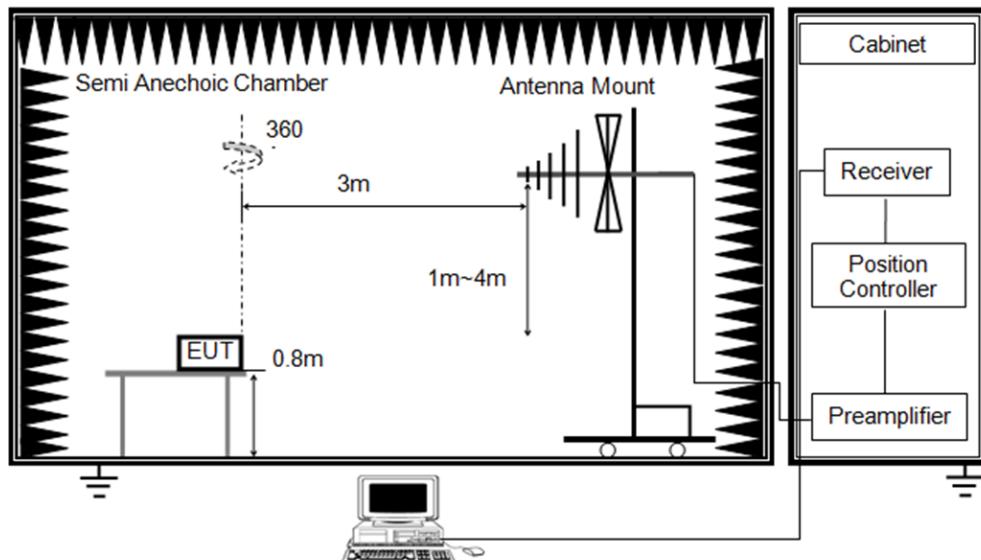
Note:

1. Measurement = Reading Level + Correct Factor.
2. If the peak values are less than the average limit of 54 dBuV/m, the average result is deemed to comply with average limit.
3. Peak: Peak detector.
4. All modes have been tested, but only the worst data was recorded in the report.

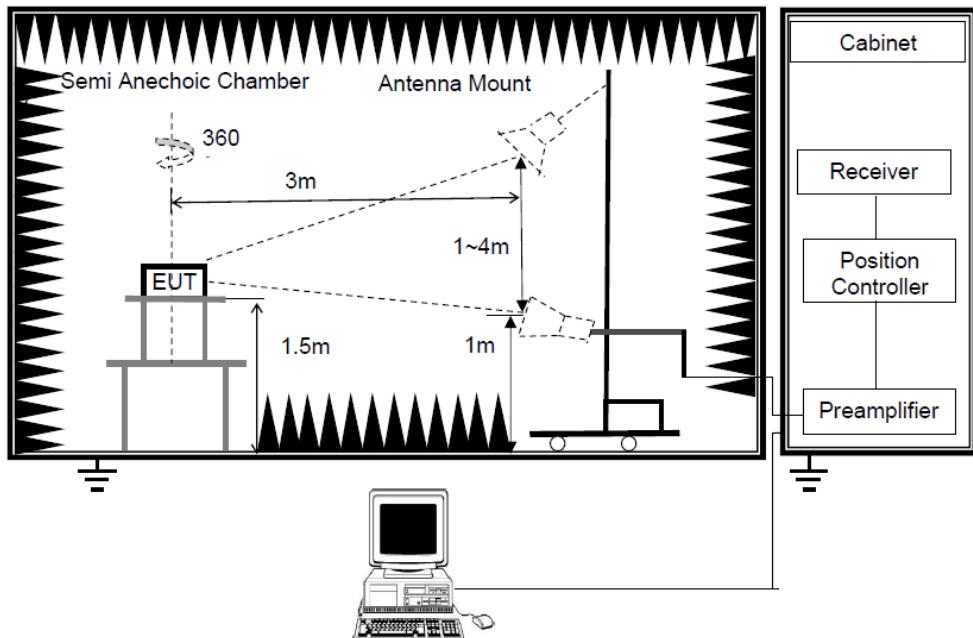
TEST SETUP



Below 1 GHz and above 30 MHz



Above 1GHz



TEST ENVIRONMENT

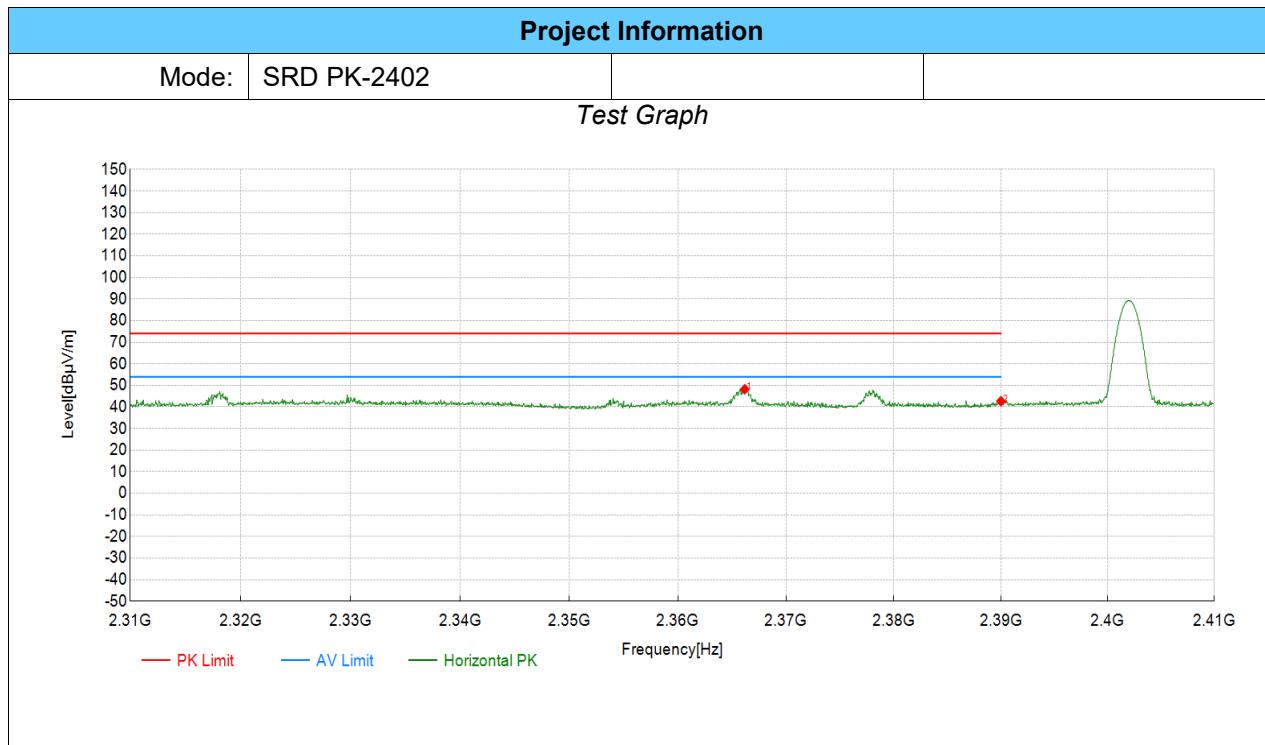
Temperature	23.1°C	Relative Humidity	64.5%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

TEST DATE / ENGINEER

Test Date	July 26, 2025	Test By	Luca Li
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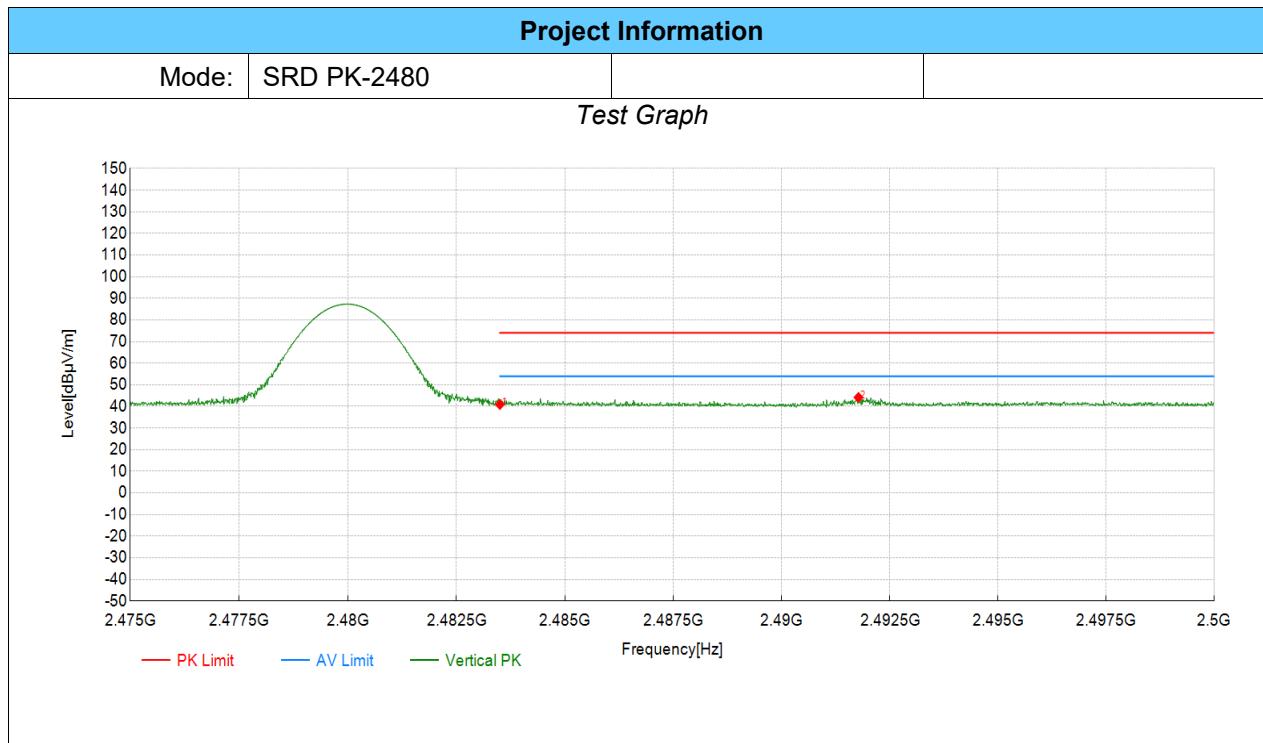
TEST RESULTS

8.1. RESTRICTED BANDEDGE



Data List									
NO.	Frequency [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB/m]	Limit [dB μ V/m]	Margin [dB]	Det	Pol	Verdict
1	2366.18	43.57	48.21	4.64	74.00	25.79	PK	Horizontal	PASS
2	2390.00	38.07	42.67	4.60	74.00	31.33	PK	Horizontal	PASS

Note:(1)Level=Reading+Factor
 (2)Margin=Limit-Level

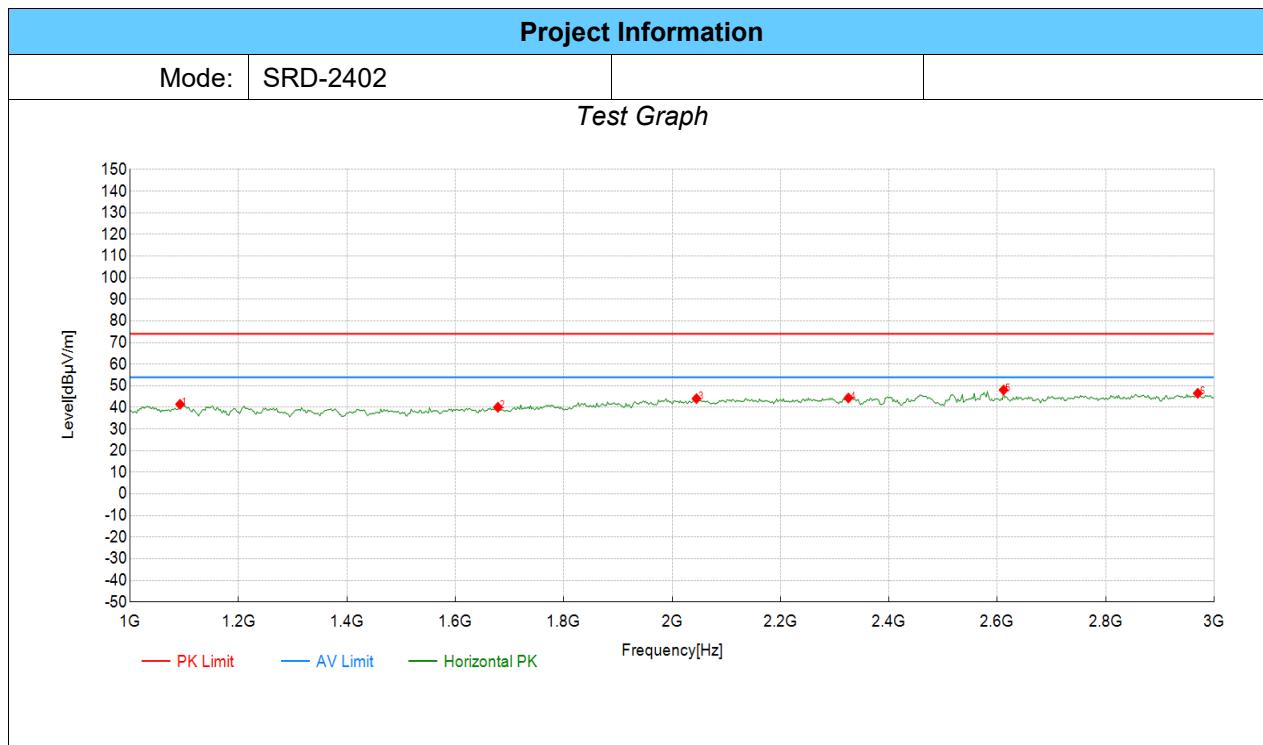


Data List									
NO.	Frequency [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	2483.50	36.32	40.90	4.58	74.00	33.10	PK	Vertical	PASS
2	2491.77	39.44	44.18	4.74	74.00	29.82	PK	Vertical	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level

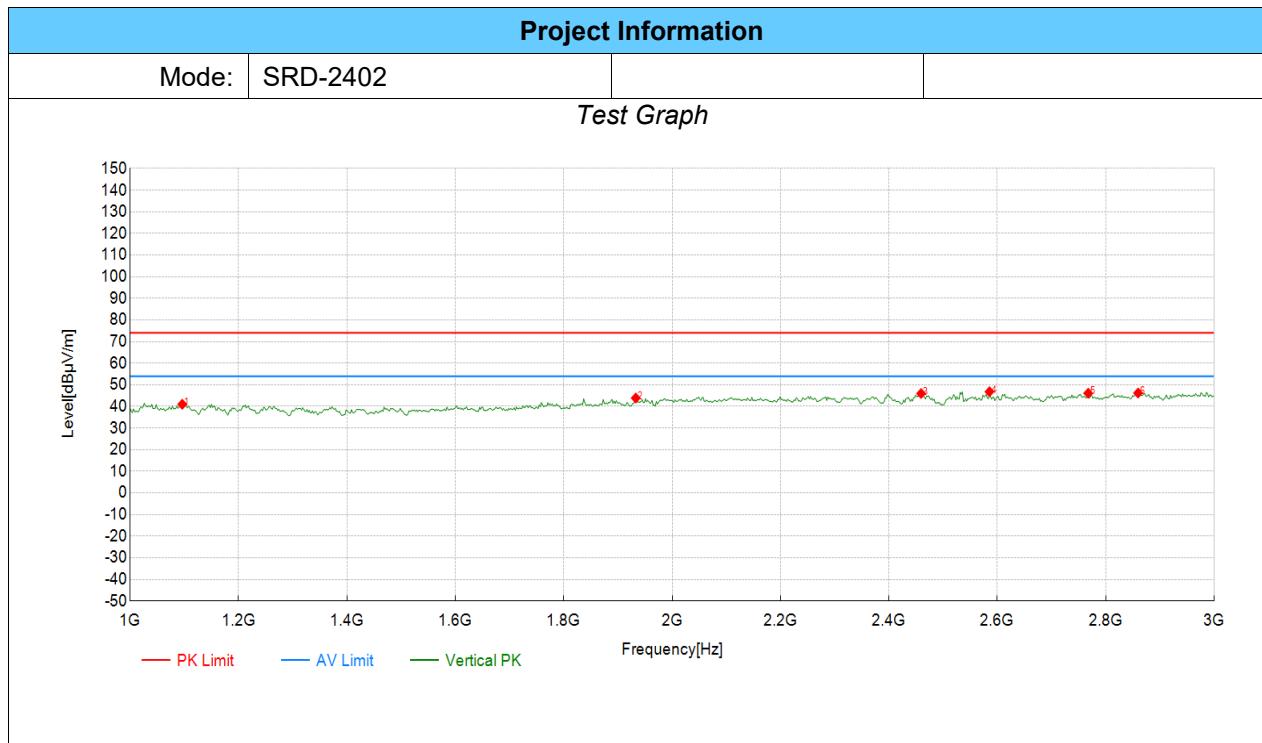
8.2. SPURIOUS EMISSIONS(1 GHZ~3 GHZ)



Data List									
NO.	Frequency [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	1092.09	53.35	41.46	-11.89	74.00	32.54	PK	Horizontal	PASS
2	1678.68	51.00	40.08	-10.92	74.00	33.92	PK	Horizontal	PASS
3	2045.05	51.36	44.09	-7.27	74.00	29.91	PK	Horizontal	PASS
4	2325.33	50.95	44.38	-6.57	74.00	29.62	PK	Horizontal	PASS
5	2611.61	54.06	48.07	-5.99	74.00	25.93	PK	Horizontal	PASS
6	2969.97	51.59	46.53	-5.06	74.00	27.47	PK	Horizontal	PASS

Note:(1)Level=Reading+Factor

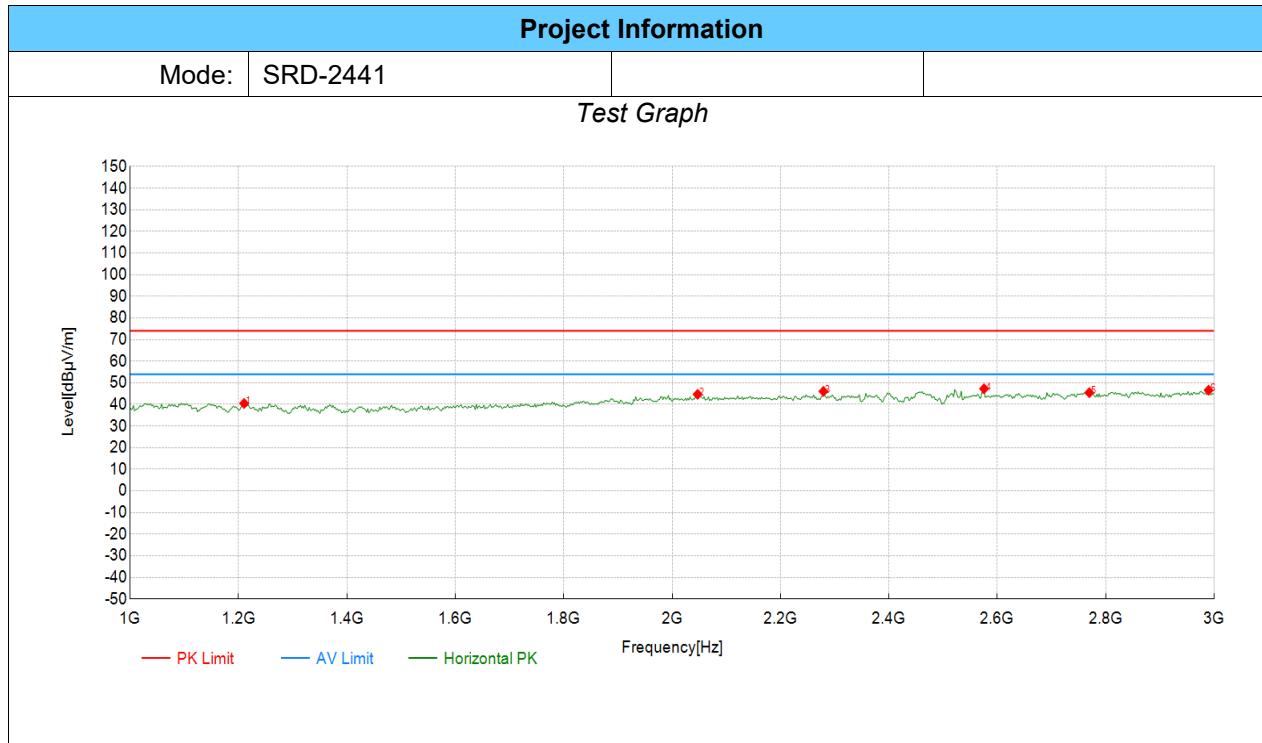
(2)Margin=Limit-Level



Data List									
NO.	Frequency [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Det	Pol	Verdict
1	1096.10	52.89	41.00	-11.89	74.00	33.00	PK	Vertical	PASS
2	1932.93	52.12	43.90	-8.22	74.00	30.10	PK	Vertical	PASS
3	2459.46	52.35	45.98	-6.37	74.00	28.02	PK	Vertical	PASS
4	2585.59	52.89	46.83	-6.06	74.00	27.17	PK	Vertical	PASS
5	2767.77	51.65	46.13	-5.52	74.00	27.87	PK	Vertical	PASS
6	2859.86	51.49	46.21	-5.28	74.00	27.79	PK	Vertical	PASS

Note:(1)Level=Reading+Factor

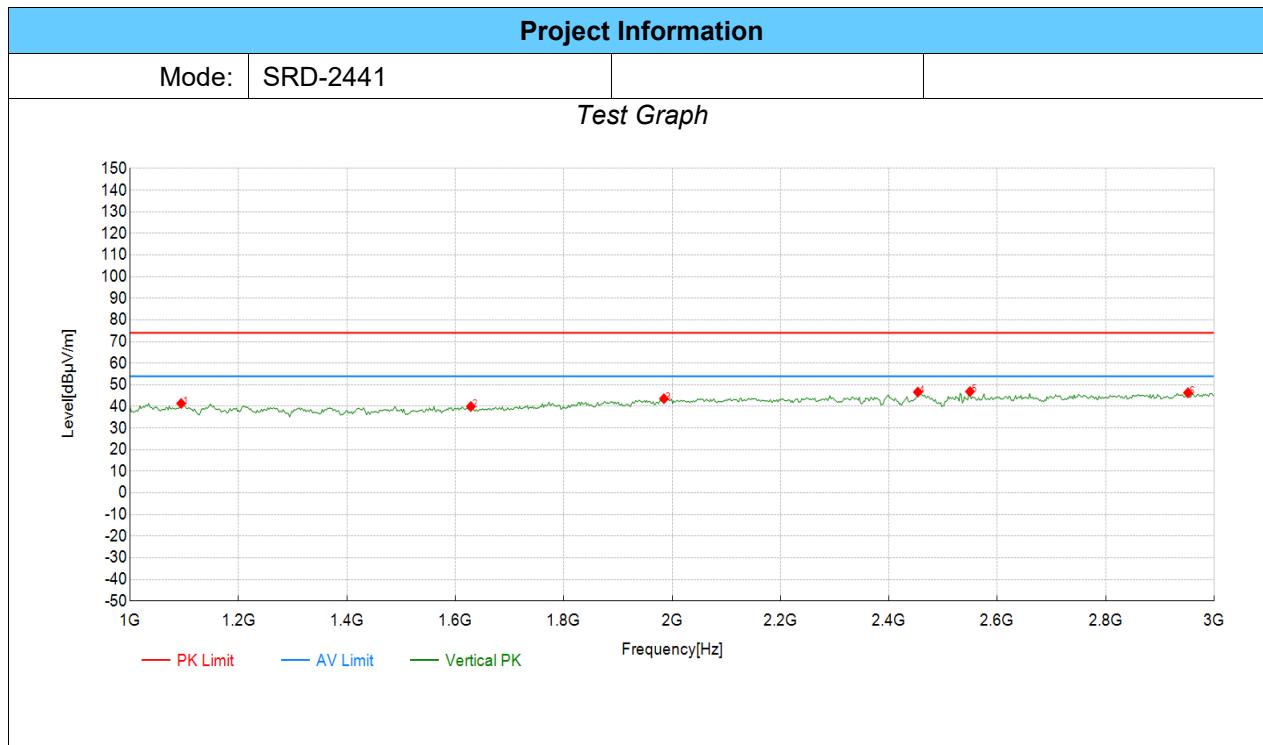
(2)Margin=Limit-Level



Data List									
NO.	Frequency [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	1210.21	52.40	40.47	-11.93	74.00	33.53	PK	Horizontal	PASS
2	2047.05	51.96	44.70	-7.26	74.00	29.30	PK	Horizontal	PASS
3	2279.28	52.70	46.05	-6.65	74.00	27.95	PK	Horizontal	PASS
4	2575.58	53.37	47.27	-6.10	74.00	26.73	PK	Horizontal	PASS
5	2769.77	50.96	45.45	-5.51	74.00	28.55	PK	Horizontal	PASS
6	2989.99	51.61	46.59	-5.02	74.00	27.41	PK	Horizontal	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level

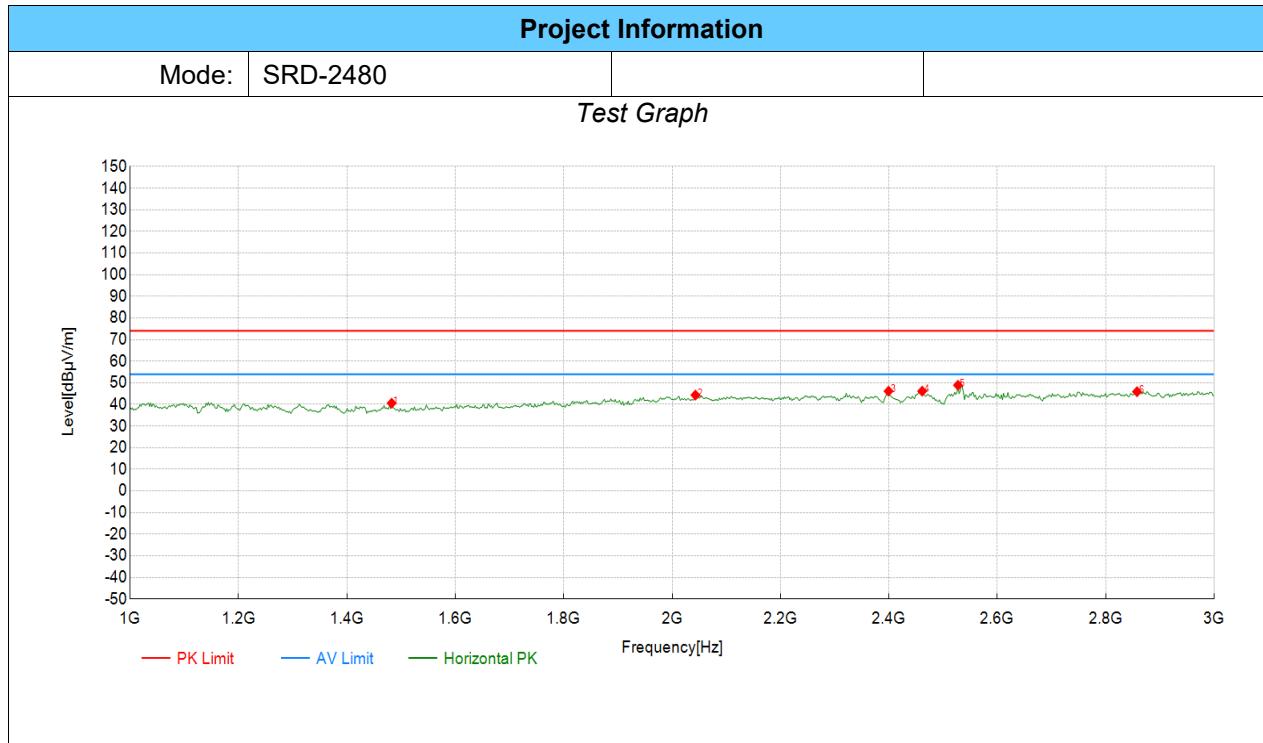


Data List

NO.	Frequency [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	1094.09	53.26	41.37	-11.89	74.00	32.63	PK	Vertical	PASS
2	1628.63	51.35	39.97	-11.38	74.00	34.03	PK	Vertical	PASS
3	1984.98	51.17	43.58	-7.59	74.00	30.42	PK	Vertical	PASS
4	2453.45	53.03	46.65	-6.38	74.00	27.35	PK	Vertical	PASS
5	2549.55	53.05	46.87	-6.18	74.00	27.13	PK	Vertical	PASS
6	2951.95	51.38	46.29	-5.09	74.00	27.71	PK	Vertical	PASS

Note:(1)Level=Reading+Factor

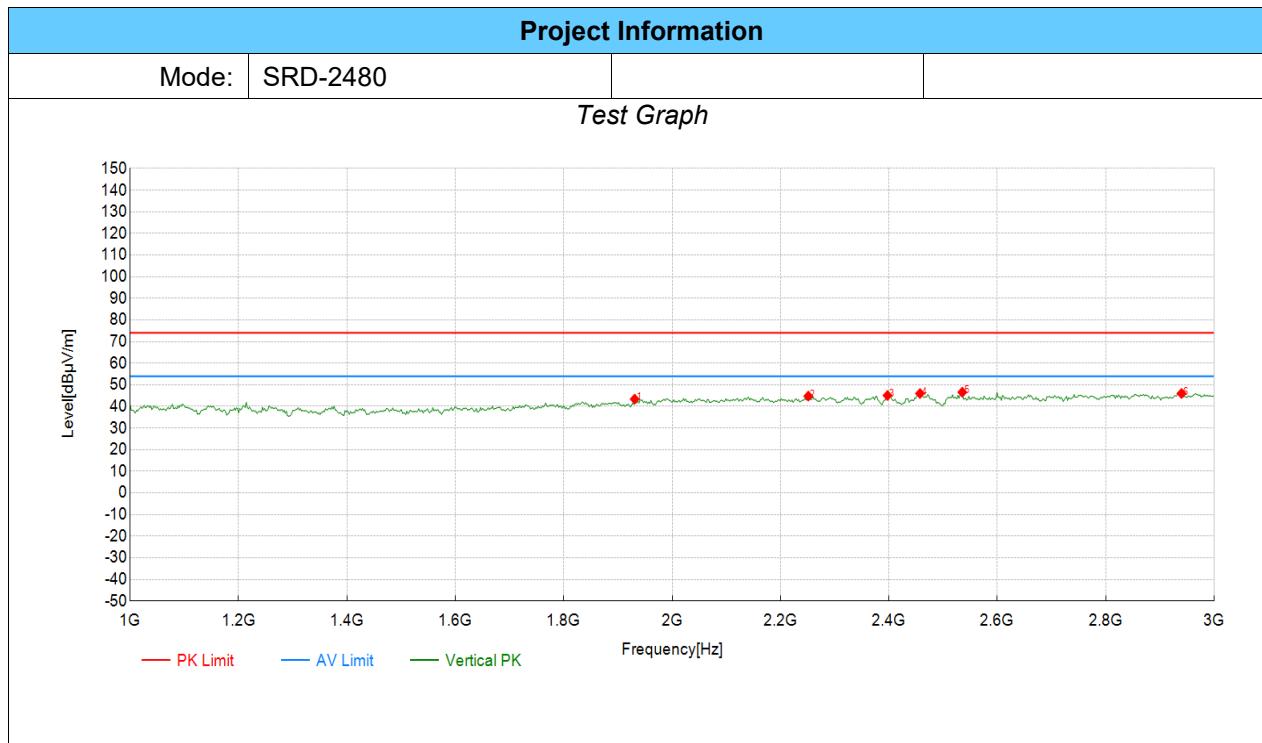
(2)Margin=Limit-Level



Data List									
NO.	Frequency [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	1482.48	53.11	40.59	-12.52	74.00	33.41	PK	Horizontal	PASS
2	2043.04	51.61	44.33	-7.28	74.00	29.67	PK	Horizontal	PASS
3	2399.40	52.58	46.13	-6.45	74.00	27.87	PK	Horizontal	PASS
4	2461.46	52.50	46.14	-6.36	74.00	27.86	PK	Horizontal	PASS
5	2527.53	55.12	48.88	-6.24	74.00	25.12	PK	Horizontal	PASS
6	2857.86	51.19	45.90	-5.29	74.00	28.10	PK	Horizontal	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level



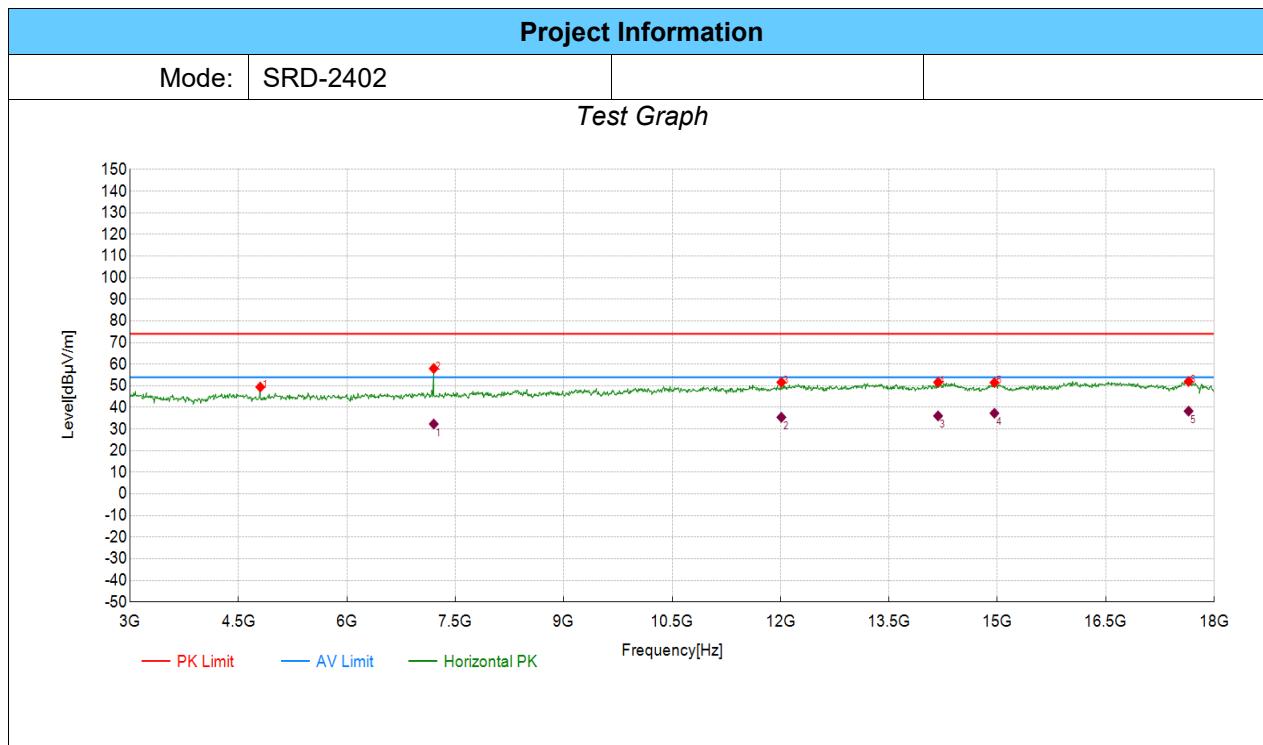
Data List

NO.	Frequency [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB/m]	Limit [dB μ V/m]	Margin [dB]	Det	Pol	Verdict
1	1930.93	51.64	43.40	-8.24	74.00	30.60	PK	Vertical	PASS
2	2251.25	51.50	44.80	-6.70	74.00	29.20	PK	Vertical	PASS
3	2397.40	51.54	45.09	-6.45	74.00	28.91	PK	Vertical	PASS
4	2457.46	52.36	45.99	-6.37	74.00	28.01	PK	Vertical	PASS
5	2535.54	52.79	46.58	-6.21	74.00	27.42	PK	Vertical	PASS
6	2939.94	51.14	46.01	-5.13	74.00	27.99	PK	Vertical	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level

8.3. SPURIOUS EMISSIONS(3 GHZ~18 GHZ)

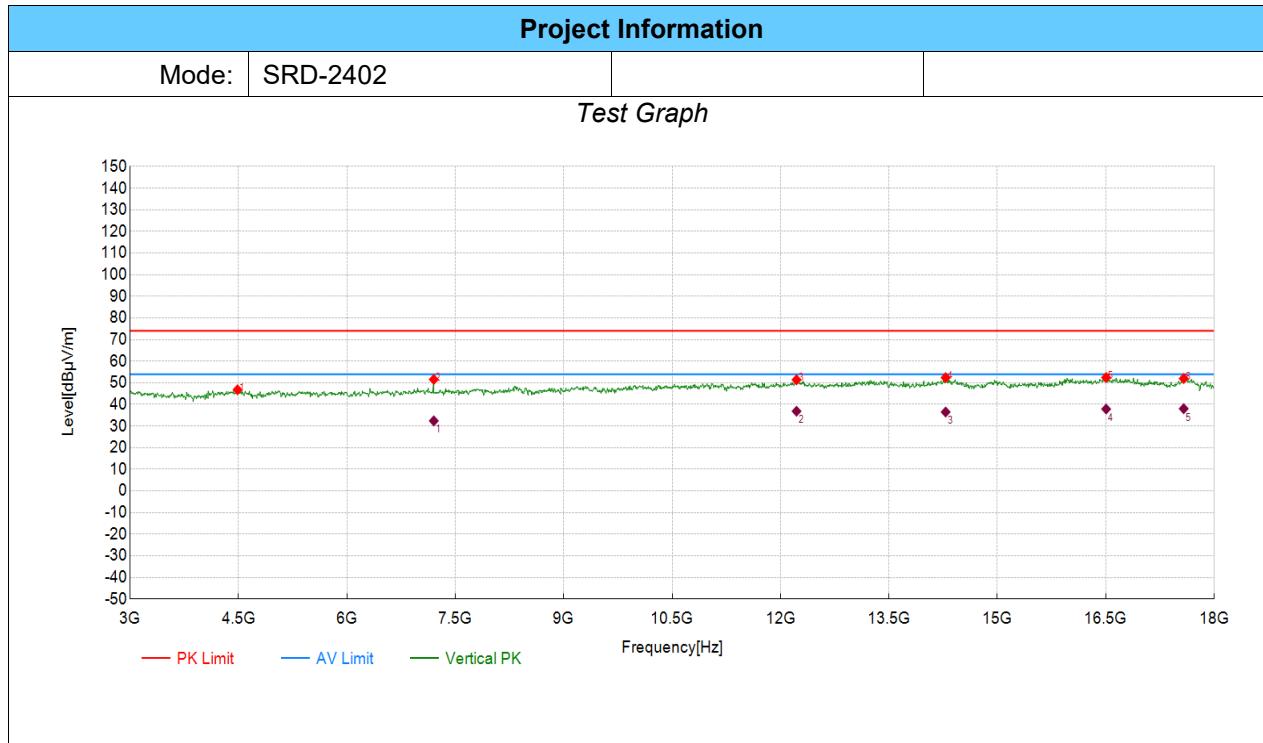


Data List									
NO.	Frequency [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	4800.90	52.79	49.43	-3.36	74.00	24.57	PK	Horizontal	PASS
2	7202.10	56.88	58.00	1.12	74.00	16.00	PK	Horizontal	PASS
3	12012.01	45.41	51.62	6.21	74.00	22.38	PK	Horizontal	PASS
4	14180.59	42.81	51.62	8.81	74.00	22.38	PK	Horizontal	PASS
5	14960.98	43.45	51.49	8.04	74.00	22.51	PK	Horizontal	PASS
6	17647.32	39.57	51.99	12.42	74.00	22.01	PK	Horizontal	PASS

Final Data List								
NO.	Frequency [MHz]	Factor [dB/m]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Pol	Verdict
1	7202.08	1.12	31.21	32.33	54.00	21.67	Horizontal	PASS
2	12011.99	6.21	29.23	35.44	54.00	18.56	Horizontal	PASS
3	14180.57	8.81	27.28	36.09	54.00	17.91	Horizontal	PASS
4	14960.99	8.04	29.27	37.31	54.00	16.69	Horizontal	PASS
5	17647.37	12.42	25.88	38.30	54.00	15.70	Horizontal	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level



Data List

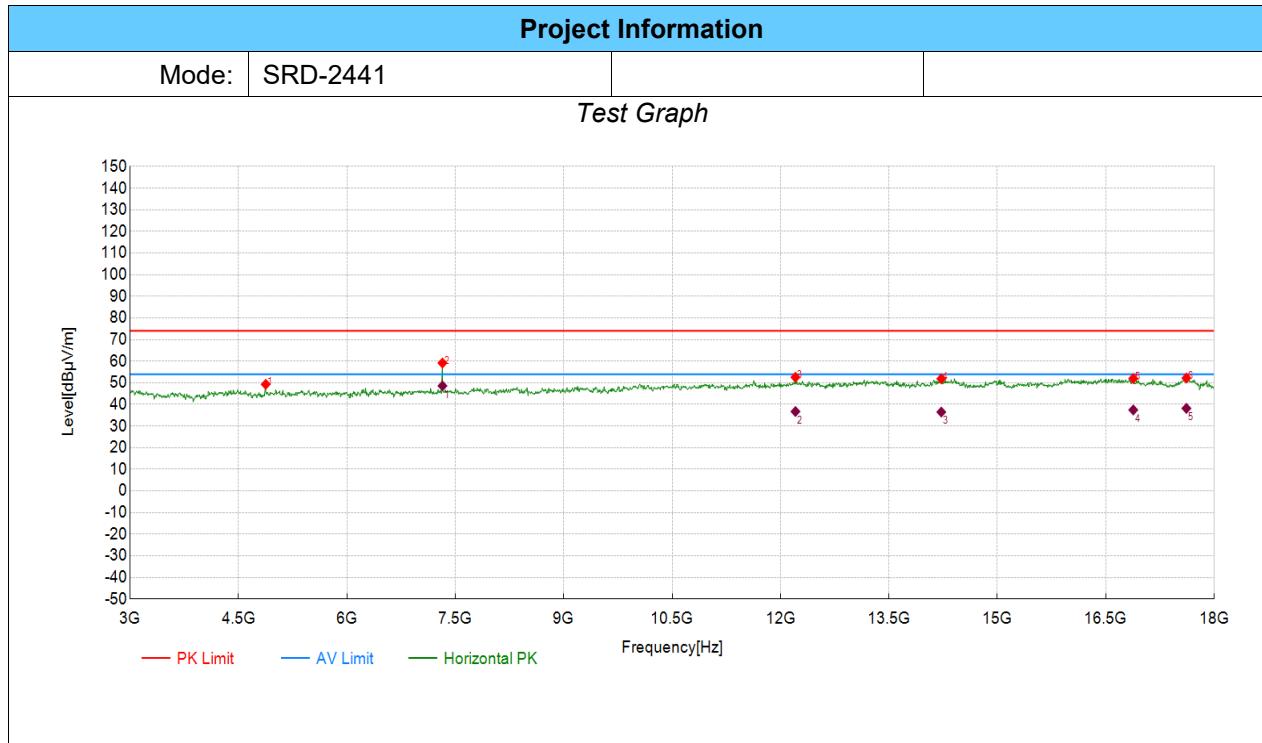
NO.	Frequency [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	4485.74	49.56	46.77	-2.79	74.00	27.23	PK	Vertical	PASS
2	7202.10	50.44	51.56	1.12	74.00	22.44	PK	Vertical	PASS
3	12222.11	44.81	51.39	6.58	74.00	22.61	PK	Vertical	PASS
4	14285.64	43.82	52.39	8.57	74.00	21.61	PK	Vertical	PASS
5	16506.75	42.09	52.47	10.38	74.00	21.53	PK	Vertical	PASS
6	17579.79	39.67	51.99	12.32	74.00	22.01	PK	Vertical	PASS

Final Data List

NO.	Frequency [MHz]	Factor [dB/m]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Pol	Verdict
1	7202.08	1.12	31.27	32.39	54.00	21.61	Vertical	PASS
2	12222.07	6.58	30.28	36.86	54.00	17.14	Vertical	PASS
3	14285.65	8.57	27.93	36.50	54.00	17.50	Vertical	PASS
4	16506.79	10.38	27.49	37.87	54.00	16.13	Vertical	PASS
5	17579.78	12.32	25.71	38.03	54.00	15.97	Vertical	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level

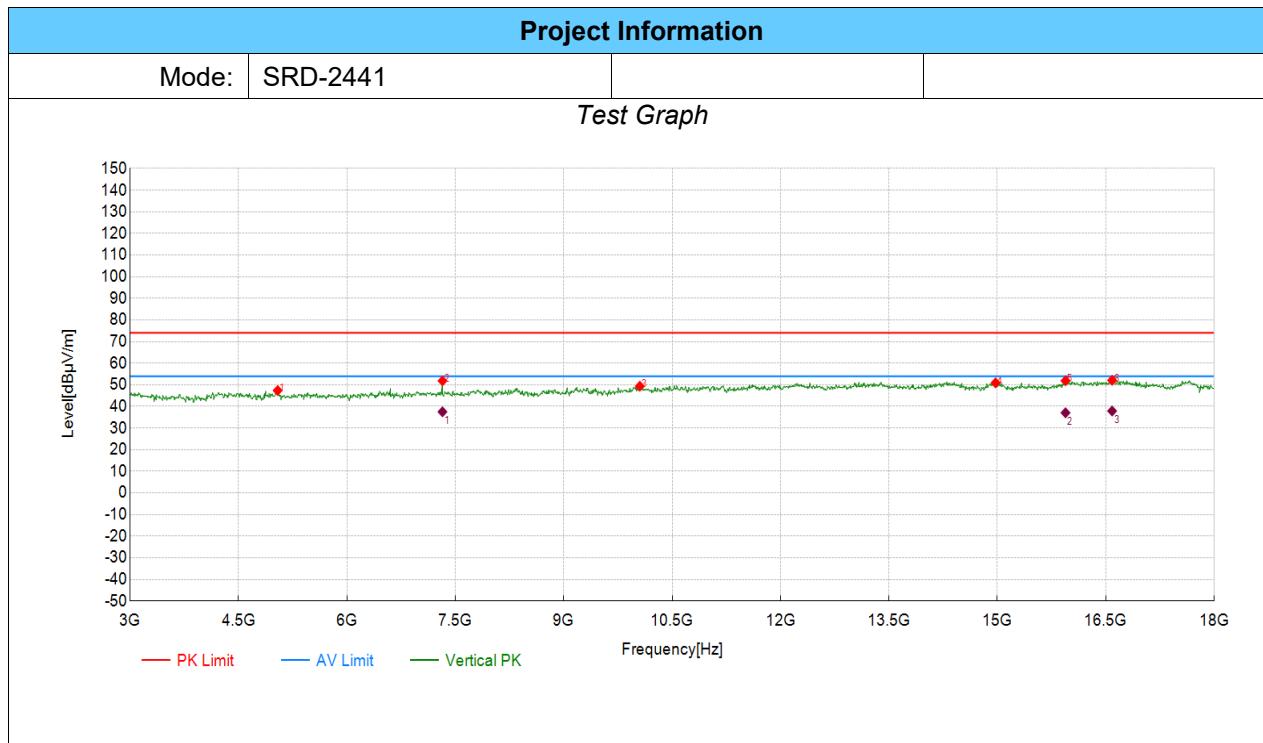


Data List									
NO.	Frequency [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	4875.94	52.27	49.31	-2.96	74.00	24.69	PK	Horizontal	PASS
2	7322.16	57.89	59.17	1.28	74.00	14.83	PK	Horizontal	PASS
3	12207.10	45.93	52.57	6.64	74.00	21.43	PK	Horizontal	PASS
4	14225.61	43.07	51.88	8.81	74.00	22.12	PK	Horizontal	PASS
5	16881.94	41.19	52.02	10.83	74.00	21.98	PK	Horizontal	PASS
6	17617.31	39.75	52.22	12.47	74.00	21.78	PK	Horizontal	PASS

Final Data List								
NO.	Frequency [MHz]	Factor [dB/m]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Pol	Verdict
1	7322.20	1.28	47.31	48.59	54.00	5.41	Horizontal	PASS
2	12207.10	6.64	30.08	36.72	54.00	17.28	Horizontal	PASS
3	14225.60	8.81	27.68	36.49	54.00	17.51	Horizontal	PASS
4	16881.97	10.83	26.63	37.46	54.00	16.54	Horizontal	PASS
5	17617.35	12.47	25.71	38.18	54.00	15.82	Horizontal	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level



Data List

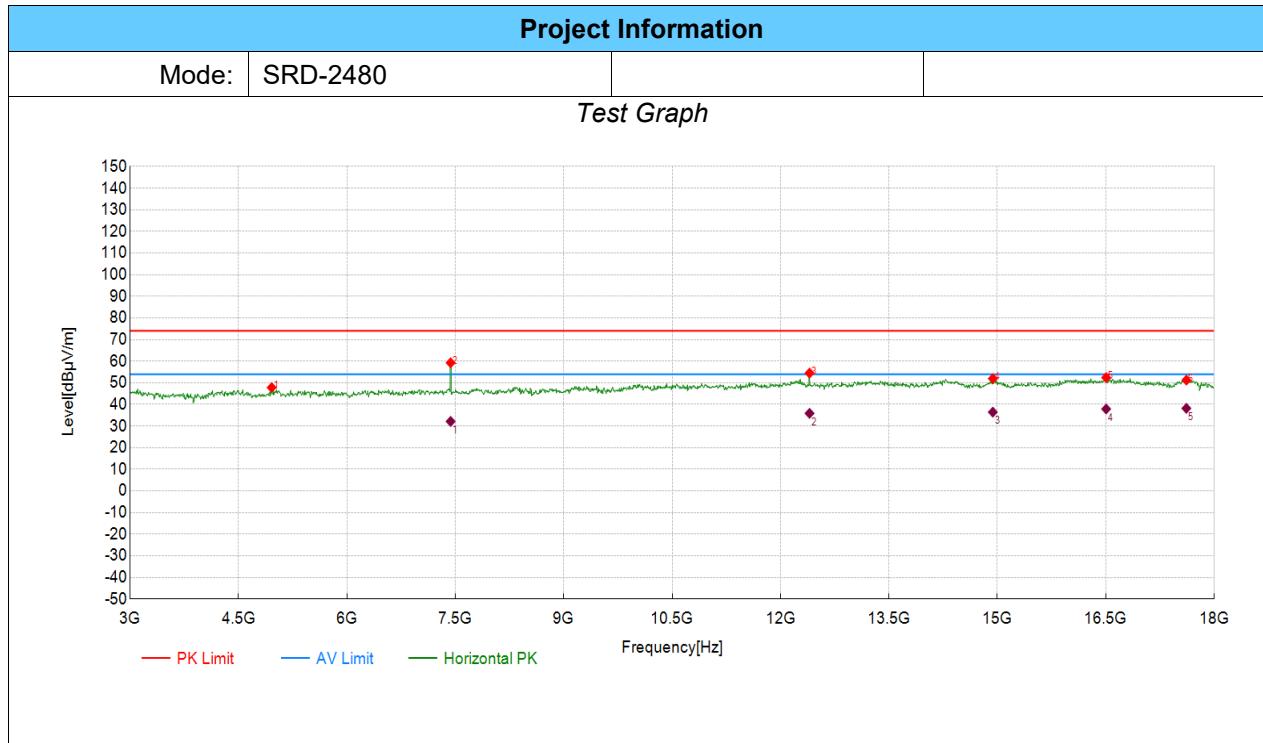
NO.	Frequency [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB/m]	Limit [dB μ V/m]	Margin [dB]	Det	Pol	Verdict
1	5041.02	49.84	47.39	-2.45	74.00	26.61	PK	Vertical	PASS
2	7322.16	50.55	51.83	1.28	74.00	22.17	PK	Vertical	PASS
3	10053.53	45.10	49.35	4.25	74.00	24.65	PK	Vertical	PASS
4	14975.99	42.80	50.90	8.10	74.00	23.10	PK	Vertical	PASS
5	15943.97	42.72	51.89	9.17	74.00	22.11	PK	Vertical	PASS
6	16589.29	41.45	52.10	10.65	74.00	21.90	PK	Vertical	PASS

Final Data List

NO.	Frequency [MHz]	Factor [dB/m]	AV Reading [dB μ V/m]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Pol	Verdict
1	7322.21	1.28	36.24	37.52	54.00	16.48	Vertical	PASS
2	15943.99	9.17	27.90	37.07	54.00	16.93	Vertical	PASS
3	16589.31	10.65	27.24	37.89	54.00	16.11	Vertical	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level



Data List

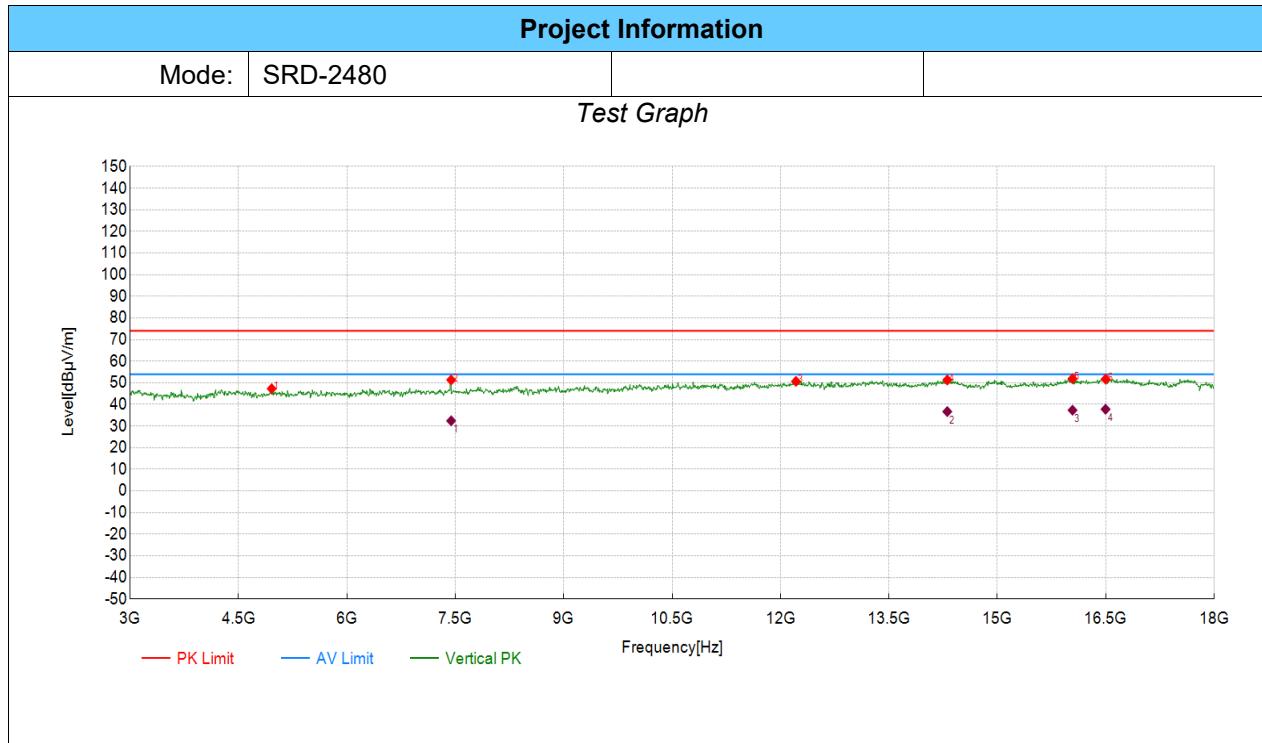
NO.	Frequency [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	4958.48	50.34	47.82	-2.52	74.00	26.18	PK	Horizontal	PASS
2	7434.72	57.95	59.28	1.33	74.00	14.72	PK	Horizontal	PASS
3	12402.20	48.50	54.50	6.00	74.00	19.50	PK	Horizontal	PASS
4	14938.47	43.97	51.94	7.97	74.00	22.06	PK	Horizontal	PASS
5	16506.75	42.05	52.43	10.38	74.00	21.57	PK	Horizontal	PASS
6	17617.31	38.78	51.25	12.47	74.00	22.75	PK	Horizontal	PASS

Final Data List

NO.	Frequency [MHz]	Factor [dB/m]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Pol	Verdict
1	7434.74	1.33	30.82	32.15	54.00	21.85	Horizontal	PASS
2	12402.22	6.00	29.88	35.88	54.00	18.12	Horizontal	PASS
3	14938.48	7.97	28.48	36.45	54.00	17.55	Horizontal	PASS
4	16506.80	10.38	27.52	37.90	54.00	16.10	Horizontal	PASS
5	17617.29	12.47	25.73	38.20	54.00	15.80	Horizontal	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level



Data List

NO.	Frequency [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	4958.48	49.80	47.28	-2.52	74.00	26.72	PK	Vertical	PASS
2	7442.22	50.01	51.33	1.32	74.00	22.67	PK	Vertical	PASS
3	12214.61	44.06	50.67	6.61	74.00	23.33	PK	Vertical	PASS
4	14308.15	42.83	51.30	8.47	74.00	22.70	PK	Vertical	PASS
5	16041.52	42.31	51.93	9.62	74.00	22.07	PK	Vertical	PASS
6	16499.25	41.35	51.70	10.35	74.00	22.30	PK	Vertical	PASS

Final Data List

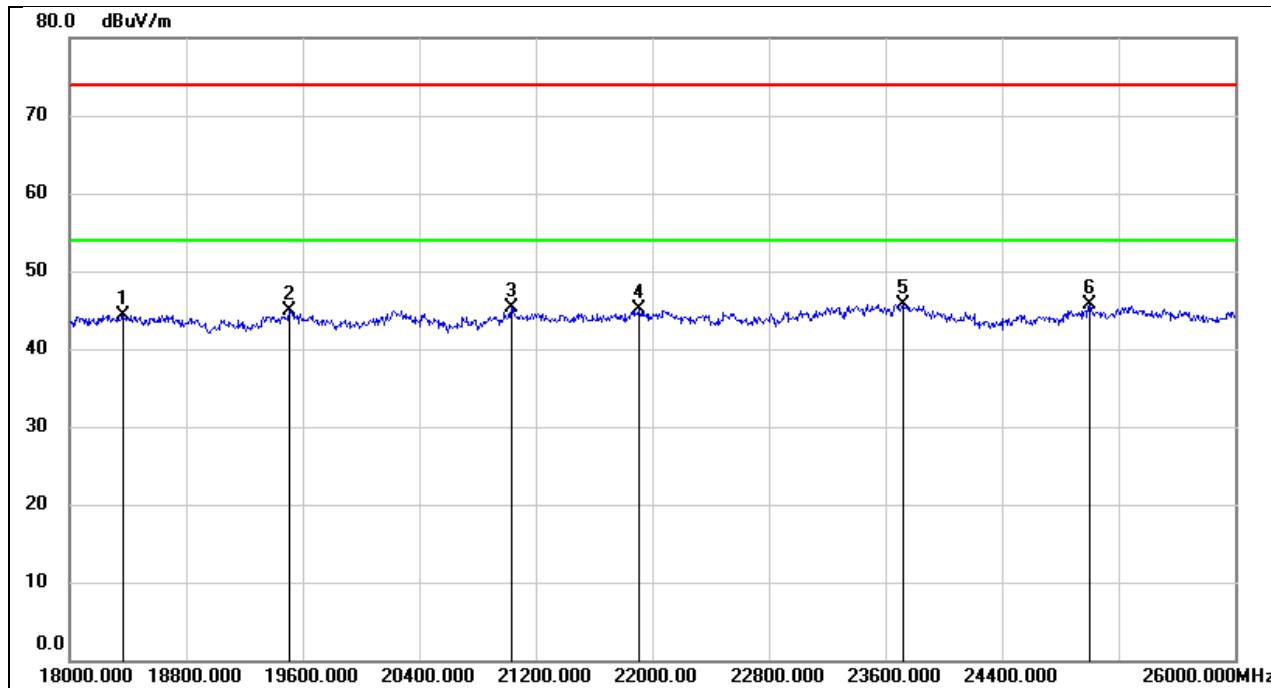
NO.	Frequency [MHz]	Factor [dB/m]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Pol	Verdict
1	7442.21	1.32	31.11	32.43	54.00	21.57	Vertical	PASS
2	14308.19	8.47	28.21	36.68	54.00	17.32	Vertical	PASS
3	16041.57	9.62	27.71	37.33	54.00	16.67	Vertical	PASS
4	16499.24	10.35	27.43	37.78	54.00	16.22	Vertical	PASS

Note: (1)Level=Reading+Factor

(2)Margin=Limit-Level

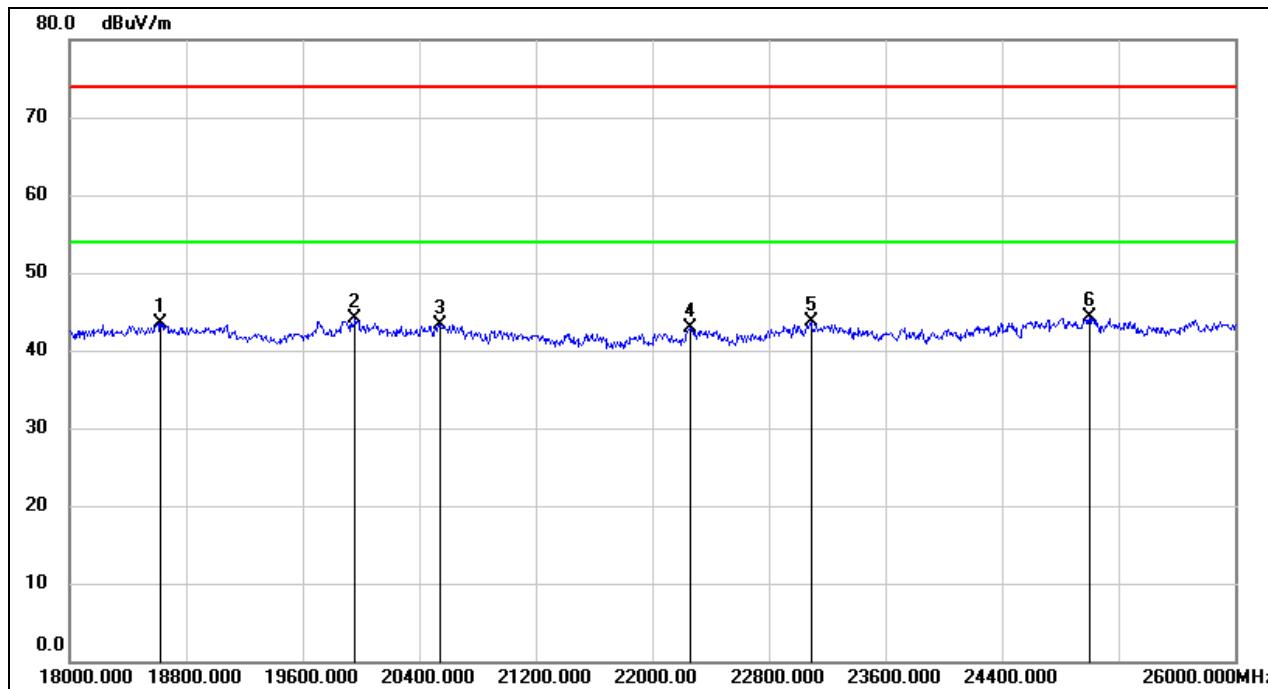
8.4. SPURIOUS EMISSIONS(18 GHZ~26 GHZ)

Test Mode:	SRD 2.4G	Frequency(MHz):	2402
Polarity:	Horizontal	Test Voltage:	DC 5V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18368.000	49.79	-5.41	44.38	74.00	-29.62	peak
2	19504.000	50.47	-5.54	44.93	74.00	-29.07	peak
3	21032.000	50.15	-4.87	45.28	74.00	-28.72	peak
4	21904.000	49.43	-4.42	45.01	74.00	-28.99	peak
5	23720.000	48.83	-3.18	45.65	74.00	-28.35	peak
6	25000.000	47.86	-2.10	45.76	74.00	-28.24	peak

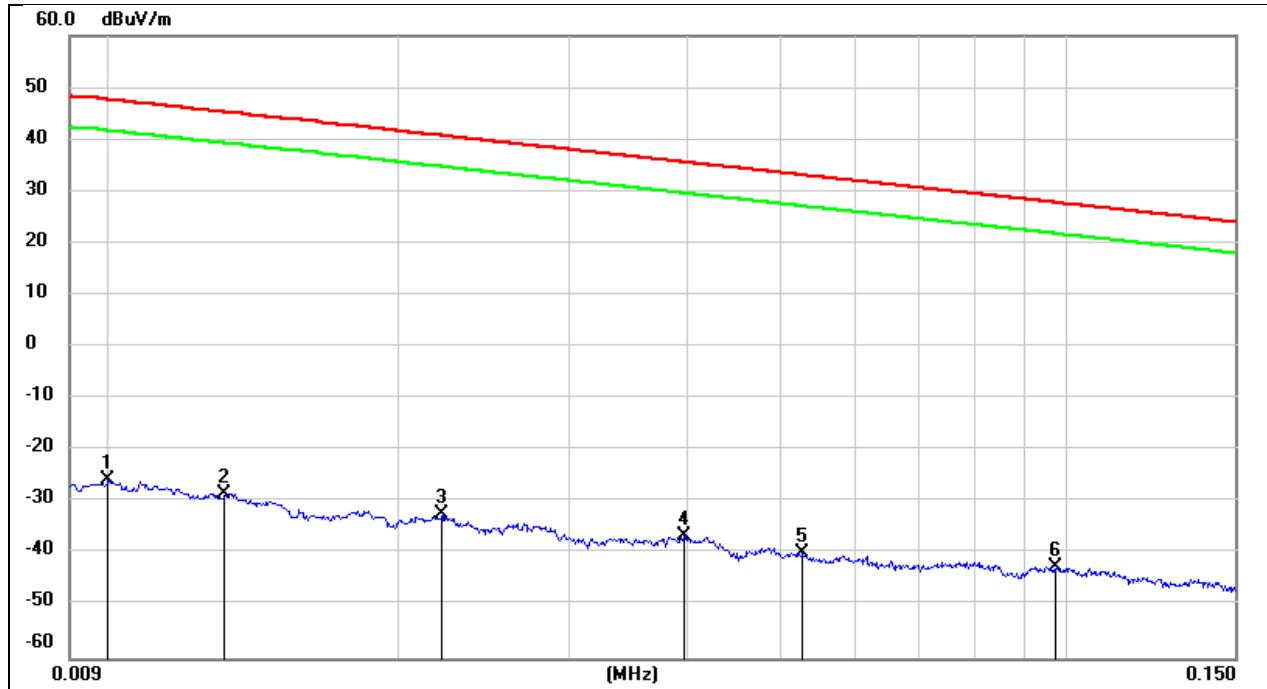
Test Mode:	SRD 2.4G	Frequency(MHz):	2402
Polarity:	Vertical	Test Voltage:	DC 5V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18624.000	48.83	-5.34	43.49	74.00	-30.51	peak
2	19960.000	49.56	-5.42	44.14	74.00	-29.86	peak
3	20544.000	48.61	-5.31	43.30	74.00	-30.70	peak
4	22256.000	47.16	-4.22	42.94	74.00	-31.06	peak
5	23088.000	47.02	-3.41	43.61	74.00	-30.39	peak
6	25000.000	46.37	-2.10	44.27	74.00	-29.73	peak

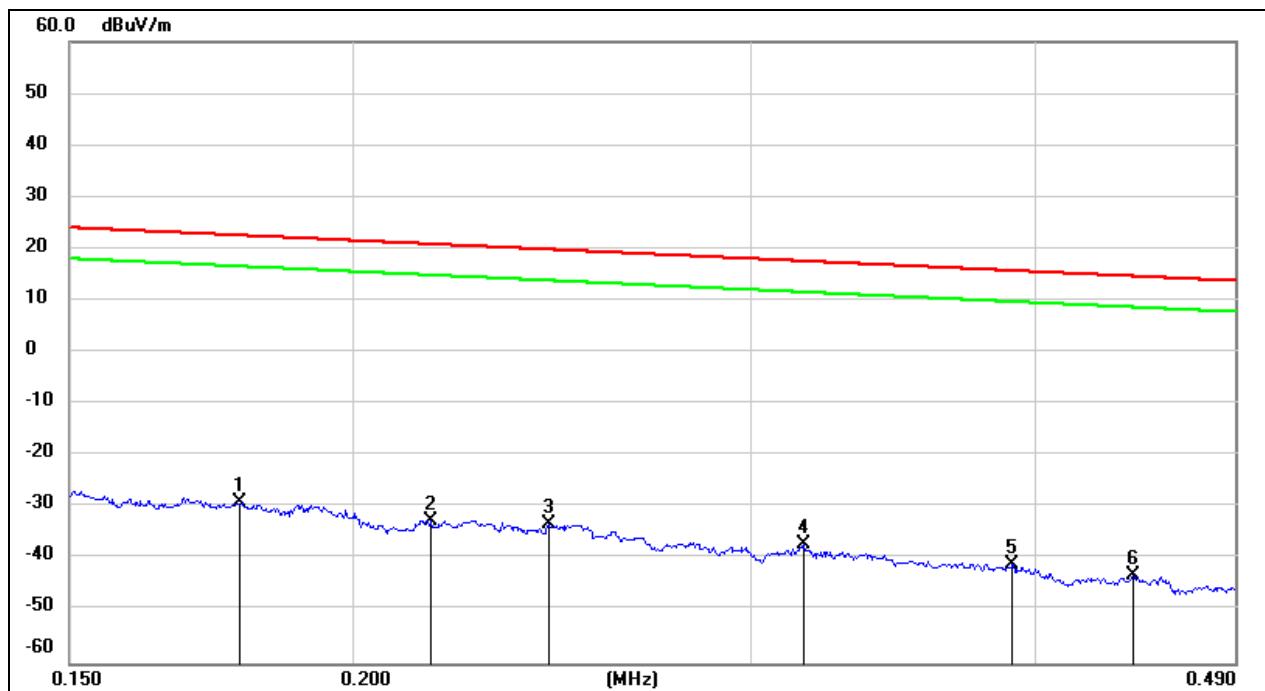
8.5. SPURIOUS EMISSIONS(9 KHZ~30 MHZ)

Test Mode:	SRD 2.4G	Frequency(MHz):	2402
Polarity:	Horizontal	Test Voltage:	DC 5V



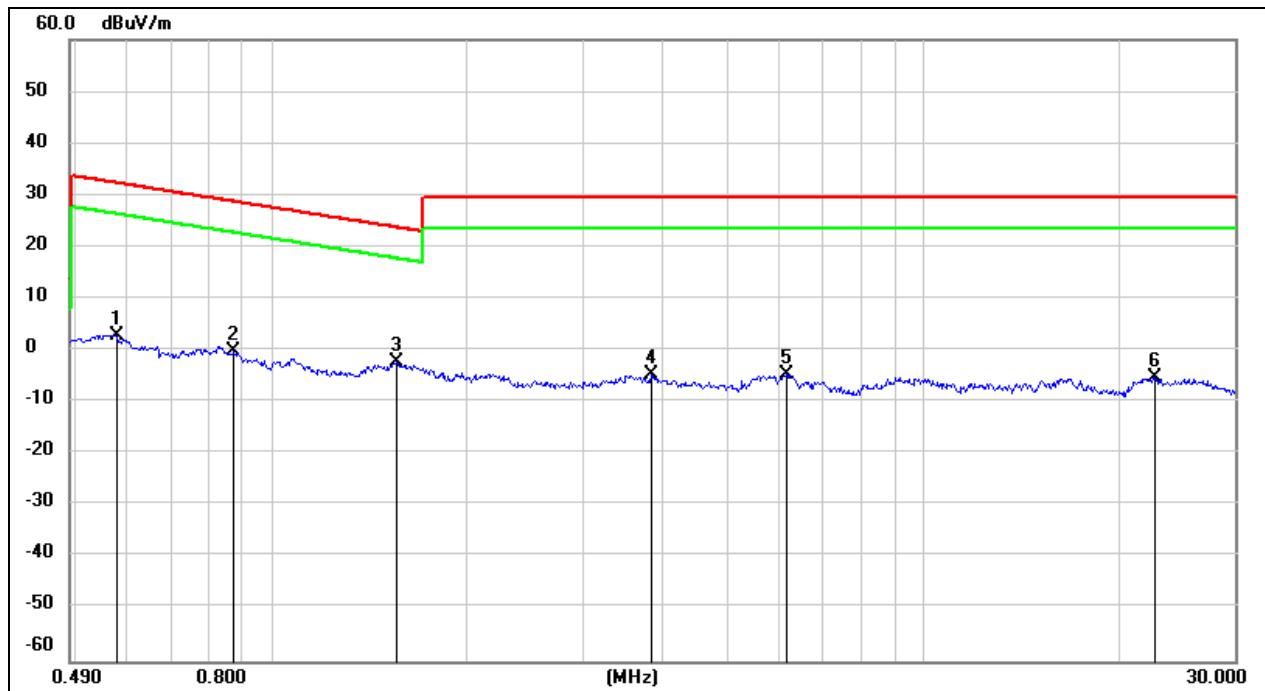
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	FCC Result (dBuV/m)	FCC Limit (dBuV/m)	ISED Result (dBuA/m)	ISED Limit (dBuA/m)	Margin (dB)	Remark
1	0.0100	75.72	-101.40	-25.68	47.60	-77.18	-3.90	-73.28	peak
2	0.0131	72.97	-101.38	-28.41	45.25	-79.91	-6.25	-73.66	peak
3	0.0221	69.13	-101.35	-32.22	40.71	-83.72	-10.79	-72.93	peak
4	0.0396	65.11	-101.43	-36.32	35.65	-87.82	-15.85	-71.97	peak
5	0.0529	61.80	-101.49	-39.69	33.13	-91.19	-18.37	-72.82	peak
6	0.0974	59.27	-101.78	-42.51	27.83	-94.01	-23.67	-70.34	peak

Test Mode:	SRD 2.4G	Frequency(MHz):	2402
Polarity:	Horizontal	Test Voltage:	DC 5V



No.	Frequency	Reading	Correct	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.1785	72.81	-101.68	-28.87	22.57	-80.37	-28.93	-51.44	peak
2	0.2164	69.27	-101.75	-32.48	20.90	-83.98	-30.60	-53.38	peak
3	0.2442	68.53	-101.79	-33.26	19.85	-84.76	-31.65	-53.11	peak
4	0.3163	64.70	-101.87	-37.17	17.60	-88.67	-33.90	-54.77	peak
5	0.3911	61.01	-101.95	-40.94	15.76	-92.44	-35.74	-56.70	peak
6	0.4415	58.85	-102.01	-43.16	14.70	-94.66	-36.80	-57.86	peak

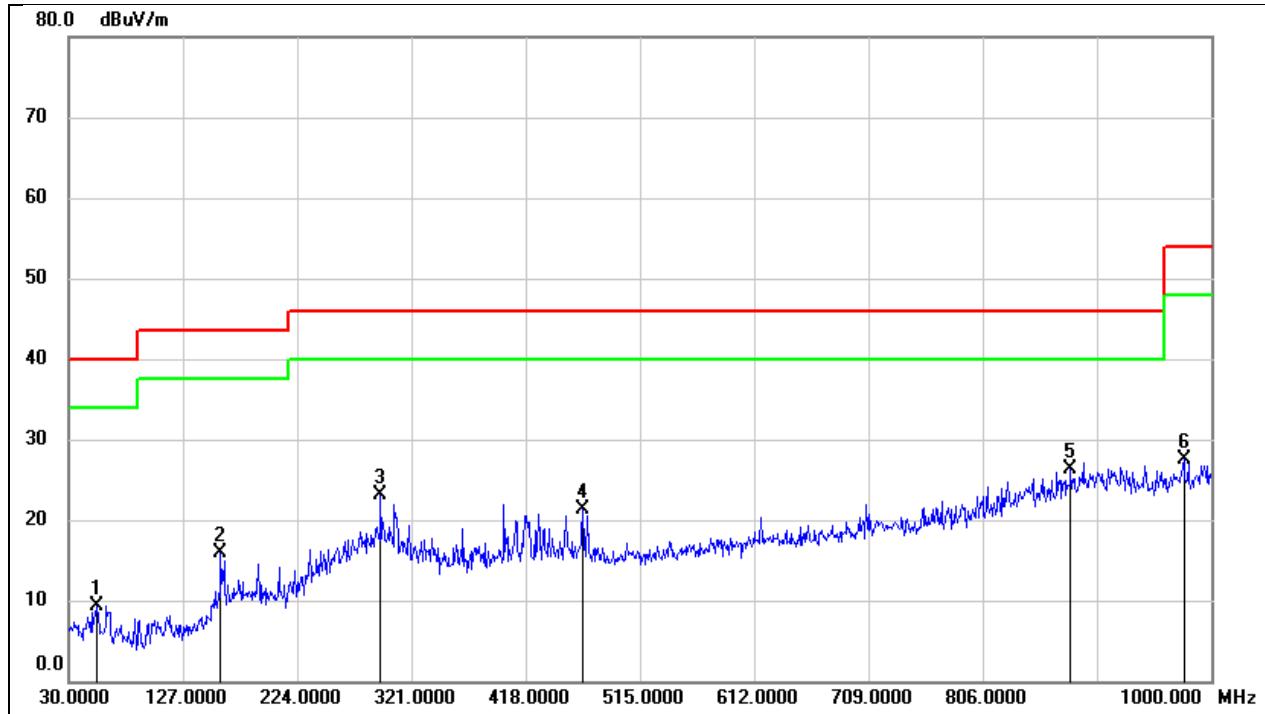
Test Mode:	SRD 2.4G	Frequency(MHz):	2402
Polarity:	Horizontal	Test Voltage:	DC 5V



No.	Frequency	Reading	Correct	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.5800	64.83	-62.08	2.75	32.33	-48.75	-19.17	-29.58	peak
2	0.8750	61.93	-62.19	-0.26	28.76	-51.76	-22.74	-29.02	peak
3	1.5564	59.68	-62.02	-2.34	23.76	-53.84	-27.74	-26.10	peak
4	3.8246	56.70	-61.38	-4.68	29.54	-56.18	-21.96	-34.22	peak
5	6.1558	56.68	-61.33	-4.65	29.54	-56.15	-21.96	-34.19	peak
6	22.6520	55.52	-60.63	-5.11	29.54	-56.61	-21.96	-34.65	peak

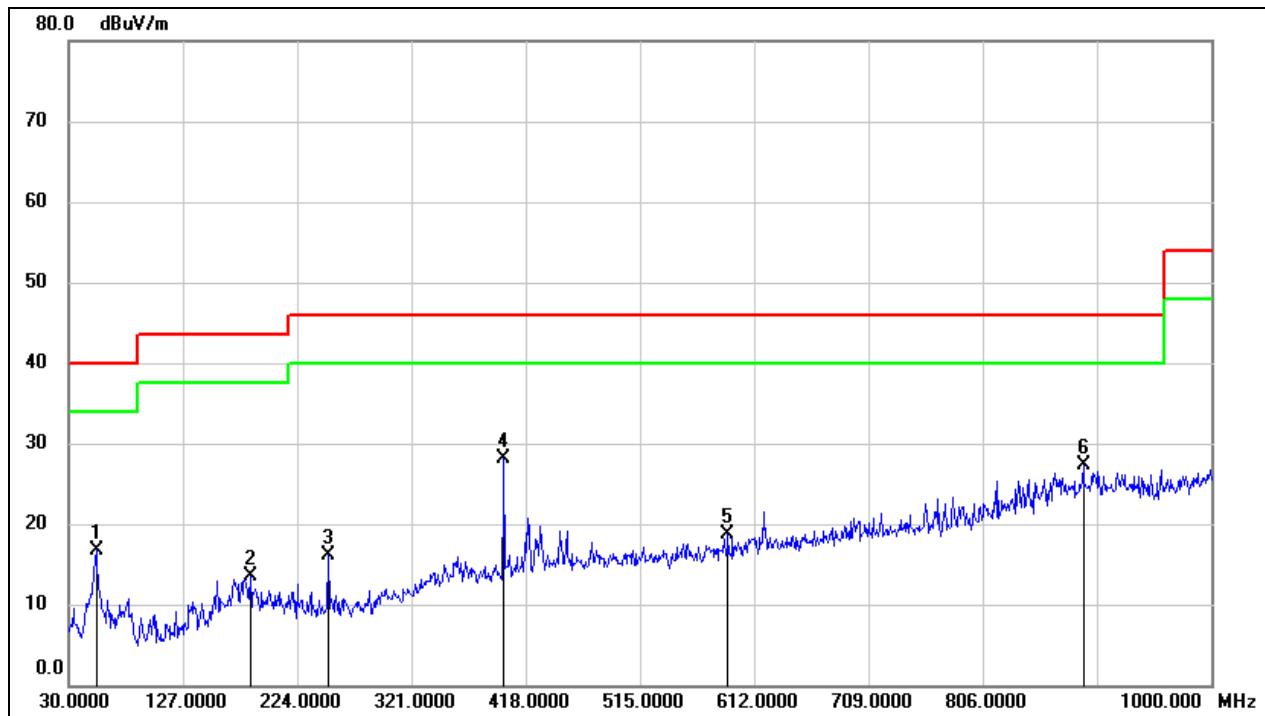
8.6. SPURIOUS EMISSIONS(30 MHZ~1 GHZ)

Test Mode:	SRD 2.4G	Frequency(MHz):	2402
Polarity:	Horizontal	Test Voltage:	DC 5V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	53.2800	24.39	-15.03	9.36	40.00	-30.64	QP
2	159.0100	28.77	-12.84	15.93	43.50	-27.57	QP
3	294.8100	34.94	-11.82	23.12	46.00	-22.88	QP
4	466.5000	29.37	-7.99	21.38	46.00	-24.62	QP
5	880.6900	27.01	-0.77	26.24	46.00	-19.76	QP
6	976.7200	27.98	-0.45	27.53	54.00	-26.47	QP

Test Mode:	SRD 2.4G	Frequency(MHz):	2402
Polarity:	Vertical	Test Voltage:	DC 5V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	53.2800	31.75	-15.03	16.72	40.00	-23.28	QP
2	184.2300	25.32	-11.89	13.43	43.50	-30.07	QP
3	250.1900	30.75	-14.56	16.19	46.00	-29.81	QP
4	399.5700	37.69	-9.61	28.08	46.00	-17.92	QP
5	589.6900	24.70	-6.01	18.69	46.00	-27.31	QP
6	891.3600	27.90	-0.59	27.31	46.00	-18.69	QP

9. ANTENNA REQUIREMENT

REQUIREMENT

Please refer to FCC part 15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Please refer to FCC part 15.247(b)(4)

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DESCRIPTION

Pass

10. AC POWER LINE CONDUCTED EMISSION

LIMITS

Please refer to CFR 47 FCC §15.207 (a) and ISED RSS-Gen Clause 8.8

FREQUENCY (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

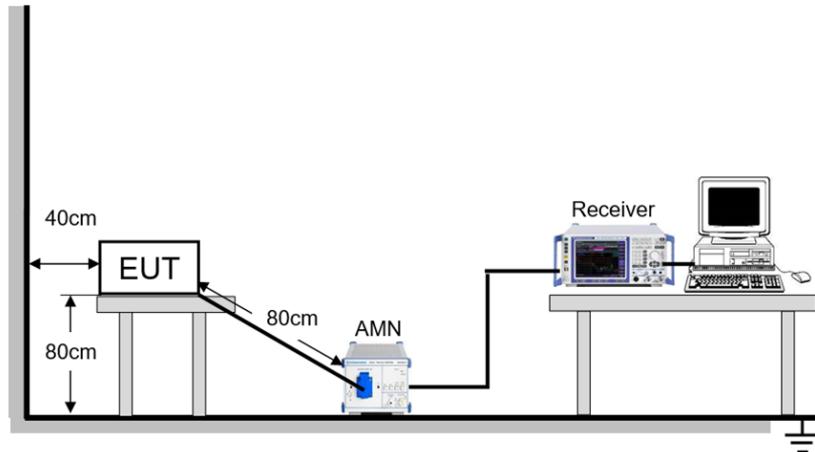
TEST PROCEDURE

Refer to ANSI C63.10-2020 clause 6.2.

The EUT is put on a table of non-conducting material that is 80 cm high. The vertical conducting wall of shielding is located 40 cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2020. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9 kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

TEST SETUP



TEST ENVIRONMENT

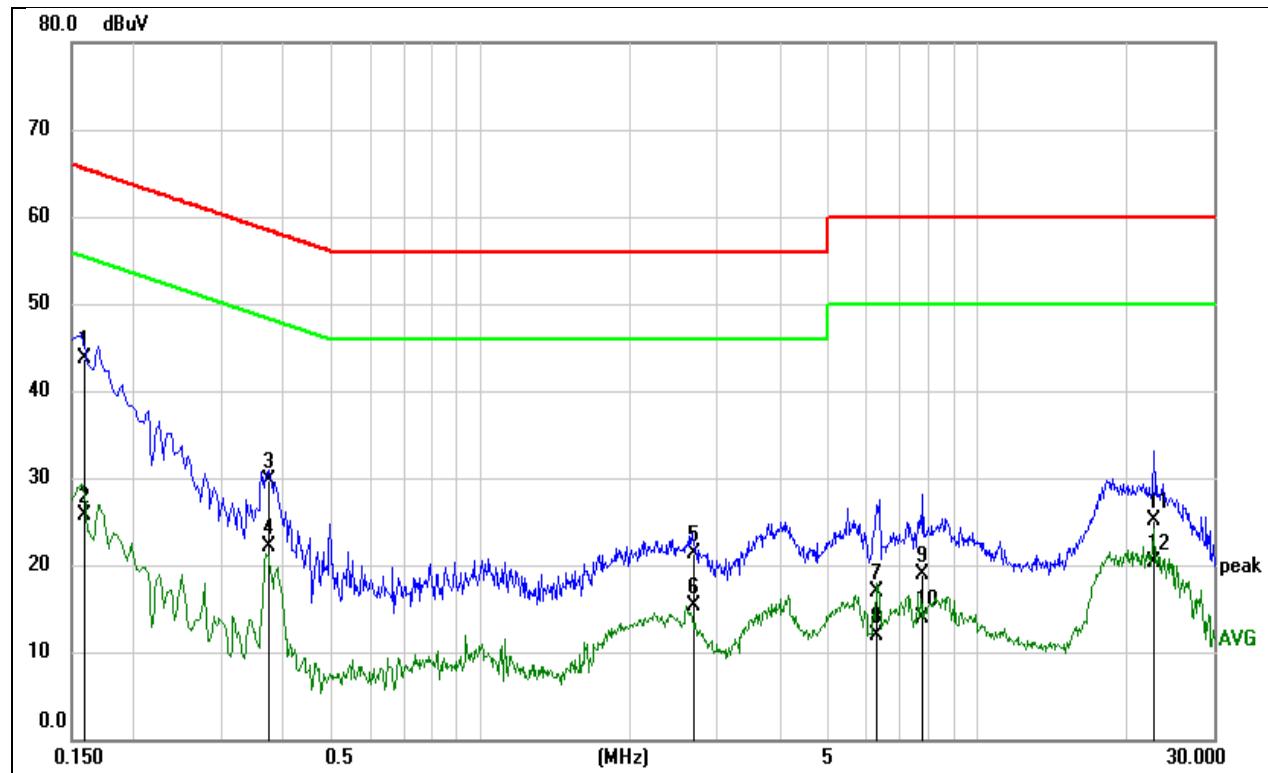
Temperature	24.2°C	Relative Humidity	57%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V_60Hz

TEST DATE / ENGINEER

Test Date	July 28, 2025	Test By	Deacon Tan
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TEST RESULTS

Test Mode:	SRD 2.4G	Frequency(MHz):	2402
Line:	Line		



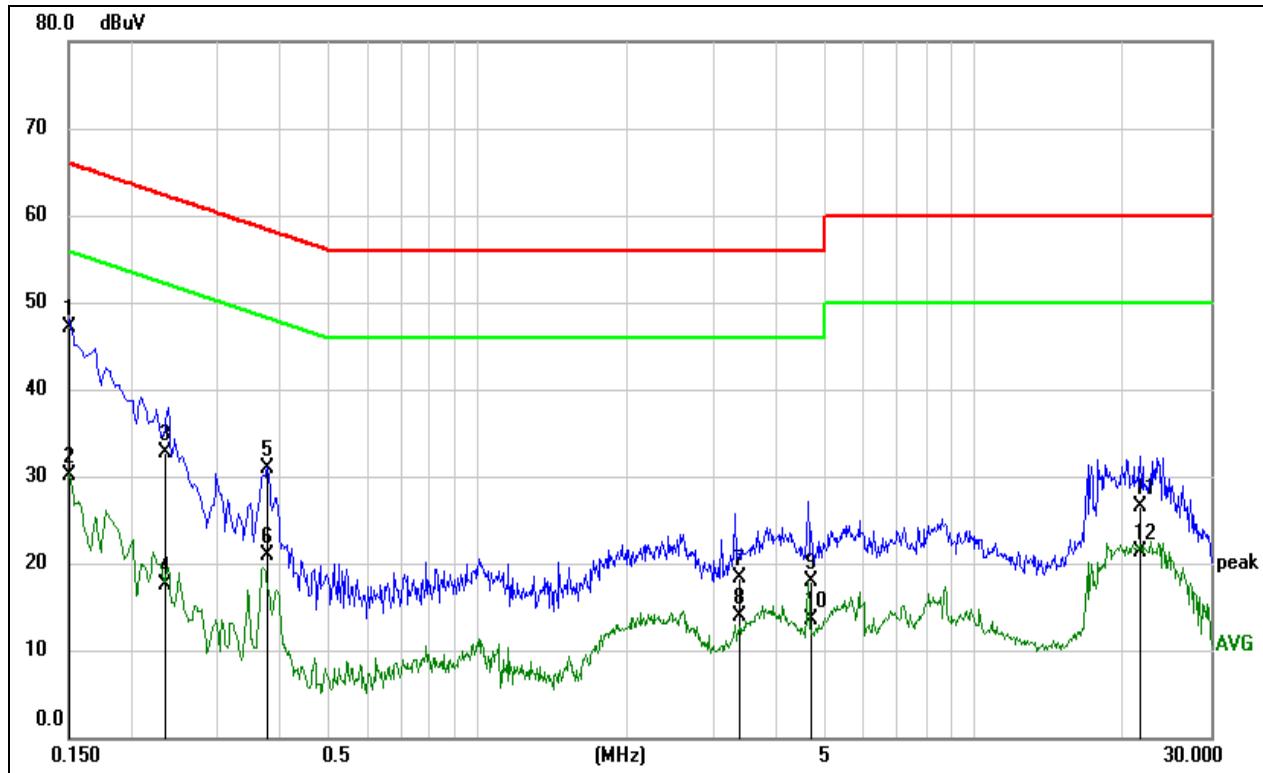
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1593	33.94	9.72	43.66	65.50	-21.84	QP
2	0.1593	15.98	9.72	25.70	55.50	-29.80	AVG
3	0.3741	20.00	9.64	29.64	58.41	-28.77	QP
4	0.3741	12.40	9.64	22.04	48.41	-26.37	AVG
5	2.7034	11.57	9.73	21.30	56.00	-34.70	QP
6	2.7034	5.66	9.73	15.39	46.00	-30.61	AVG
7	6.2687	7.24	9.73	16.97	60.00	-43.03	QP
8	6.2687	2.18	9.73	11.91	50.00	-38.09	AVG
9	7.8386	9.27	9.73	19.00	60.00	-41.00	QP
10	7.8386	4.12	9.73	13.85	50.00	-36.15	AVG
11	22.7026	15.44	9.72	25.16	60.00	-34.84	QP
12	22.7026	10.51	9.72	20.23	50.00	-29.77	AVG

Note:

1. Result = Reading + Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz ~ 150 kHz), 9 kHz (150 kHz ~ 30 MHz).
4. Step size: 80 Hz (0.009 MHz ~ 0.15 MHz), 4 kHz (0.15 MHz ~ 30 MHz), Scan time: auto.

Note: All the modes have been tested, only the worst data was recorded in the report.

Test Mode:	SRD 2.4G	Frequency(MHz):	2402
Line:	Neutral		



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1502	37.42	9.64	47.06	65.99	-18.93	QP
2	0.1502	20.43	9.64	30.07	55.99	-25.92	AVG
3	0.2348	23.03	9.64	32.67	62.28	-29.61	QP
4	0.2348	7.83	9.64	17.47	52.28	-34.81	AVG
5	0.3776	21.18	9.64	30.82	58.33	-27.51	QP
6	0.3776	11.30	9.64	20.94	48.33	-27.39	AVG
7	3.3766	8.61	9.63	18.24	56.00	-37.76	QP
8	3.3766	4.19	9.63	13.82	46.00	-32.18	AVG
9	4.6960	8.26	9.65	17.91	56.00	-38.09	QP
10	4.6960	3.82	9.65	13.47	46.00	-32.53	AVG
11	21.6200	16.70	9.72	26.42	60.00	-33.58	QP
12	21.6200	11.64	9.72	21.36	50.00	-28.64	AVG

Note:

1. Result = Reading + Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz ~ 150 kHz), 9 kHz (150 kHz ~ 30 MHz).
4. Step size: 80 Hz (0.009 MHz ~ 0.15 MHz), 4 kHz (0.15 MHz ~ 30 MHz), Scan time: auto.

Note: All the modes have been tested, only the worst data was recorded in the report.

11. TEST DATA

11.1. APPENDIX A:DUTY CYCLE

Test Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)	Final setting For VBW (kHz)
SRD 2.4G	0.348	1.262	0.2758	27.58	5.59	2.87	3

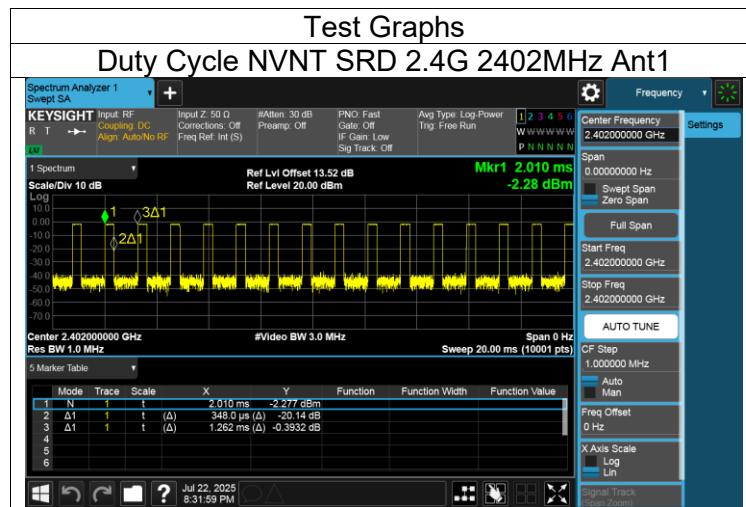
Note:

Duty Cycle Correction Factor=10log (1/x).

Where: x is Duty Cycle (Linear)

Where: T is On Time

If that calculated VBW is not available on the analyzer then the next higher value should be used.



11.2. APPENDIX B:MAXIMUM CONDUCTED OUTPUT POWER

Mode	Frequency (MHz)	Antenna	Total Power (dBm)	Limit (dBm)	Verdict
SRD 2.4G	2402	Ant1	-1.45	≤30	Pass
SRD 2.4G	2441	Ant1	-1.57	≤30	Pass
SRD 2.4G	2480	Ant1	-1.81	≤30	Pass

11.3. APPENDIX C:-20DB BANDWIDTH

Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Verdict
SRD 2.4G	2402	Ant1	1.077	Pass
SRD 2.4G	2441	Ant1	1.075	Pass
SRD 2.4G	2480	Ant1	1.063	Pass



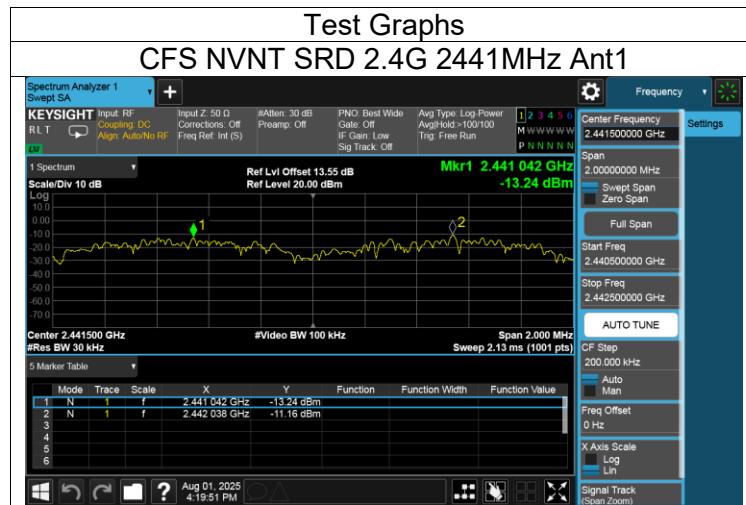
11.4. APPENDIX D: OCCUPIED CHANNEL BANDWIDTH

Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
SRD 2.4G	2402	Ant1	1.04
SRD 2.4G	2441	Ant1	1.034
SRD 2.4G	2480	Ant1	1.031



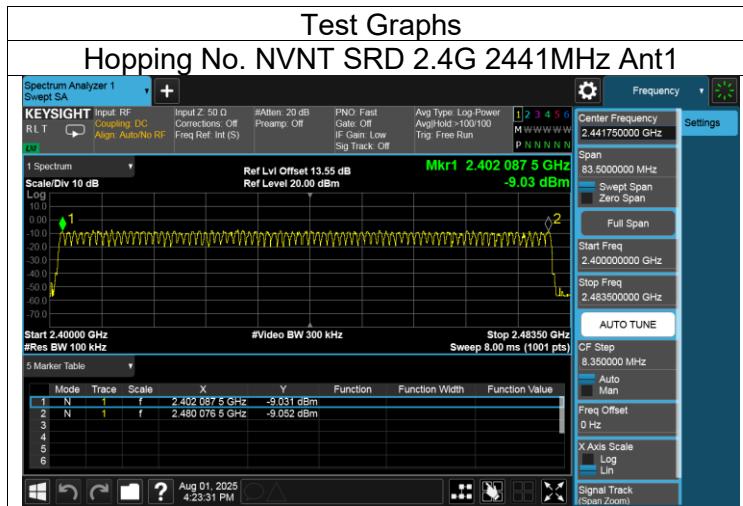
11.5. APPENDIX E: CARRIER FREQUENCIES SEPARATION

Mode	Antenna	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
SRD 2.4G	Ant1	2441.042	2442.038	0.996	≥0.717	Pass



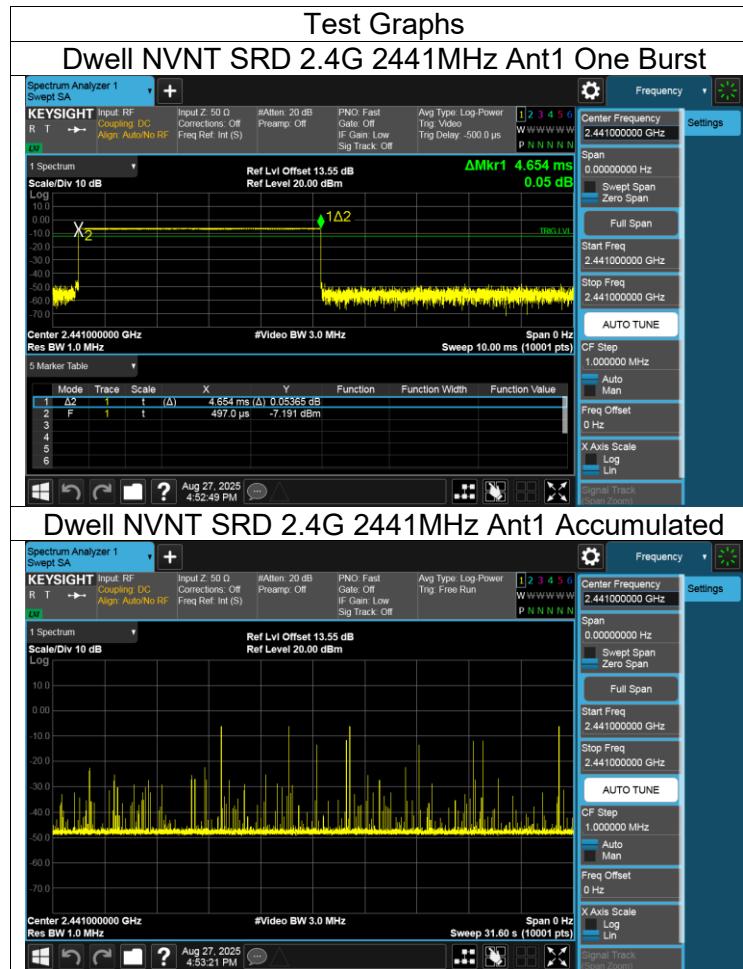
11.6. APPENDIX F:NUMBER OF HOPPING CHANNEL

Mode	Antenna	Hopping Number	Limit	Verdict
SRD 2.4G	Ant1	79	≥15	Pass



11.7. APPENDIX G:DWELL TIME

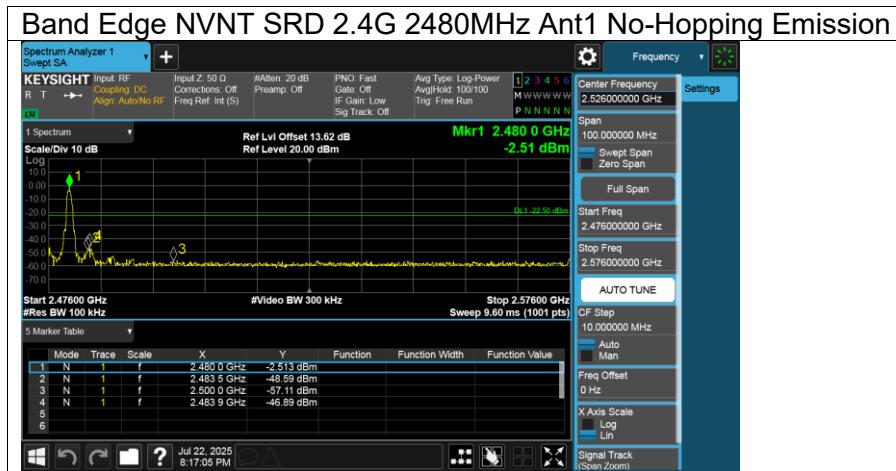
Mode	Frequency (MHz)	Antenna	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
SRD 2.4G	2441	Ant1	4.654	18.616	4	31600	400	Pass



11.8. APPENDIX H:BAND EDGE

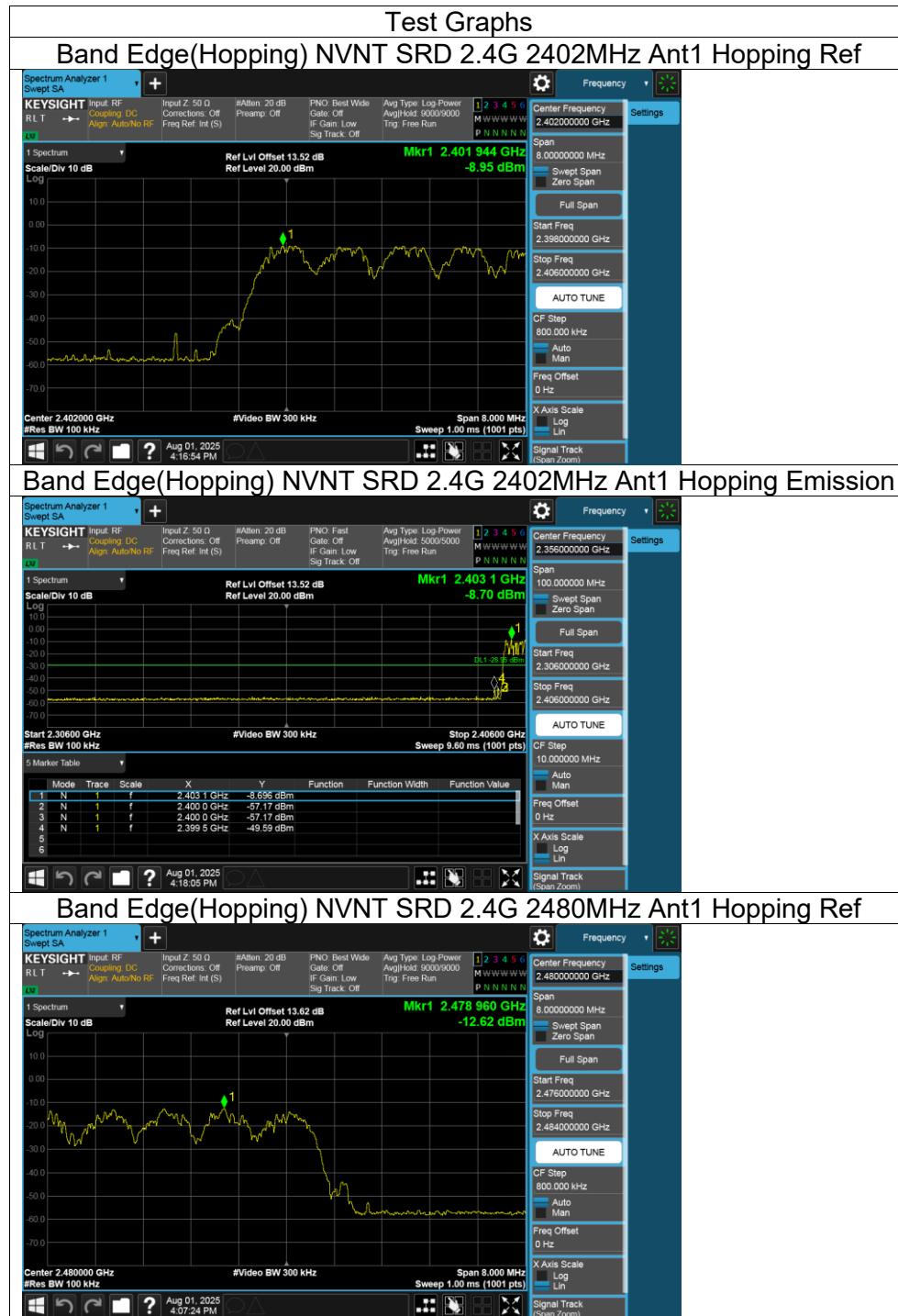
Mode	Frequency (MHz)	Antenna	Hopping Mode	Verdict
SRD 2.4G	2402	Ant1	No-Hopping	Pass
SRD 2.4G	2480	Ant1	No-Hopping	Pass

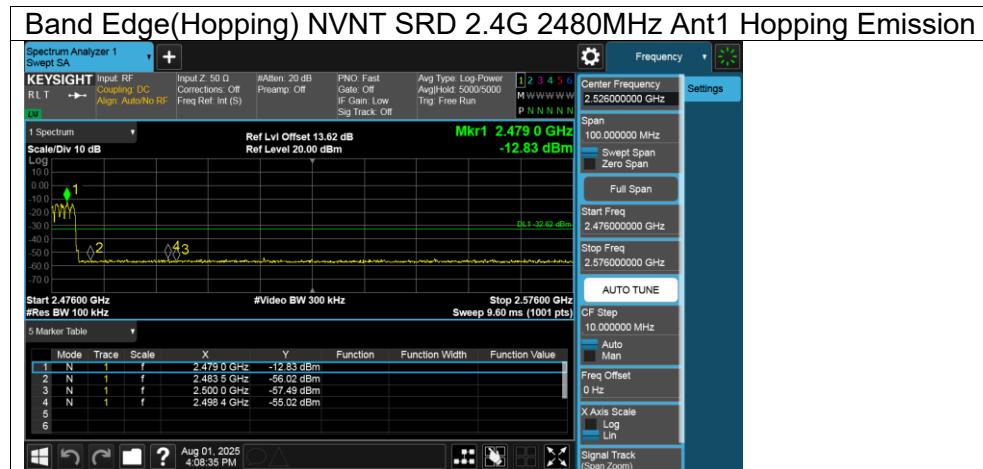




11.9. APPENDIX I:BAND EDGE(HOPPING)

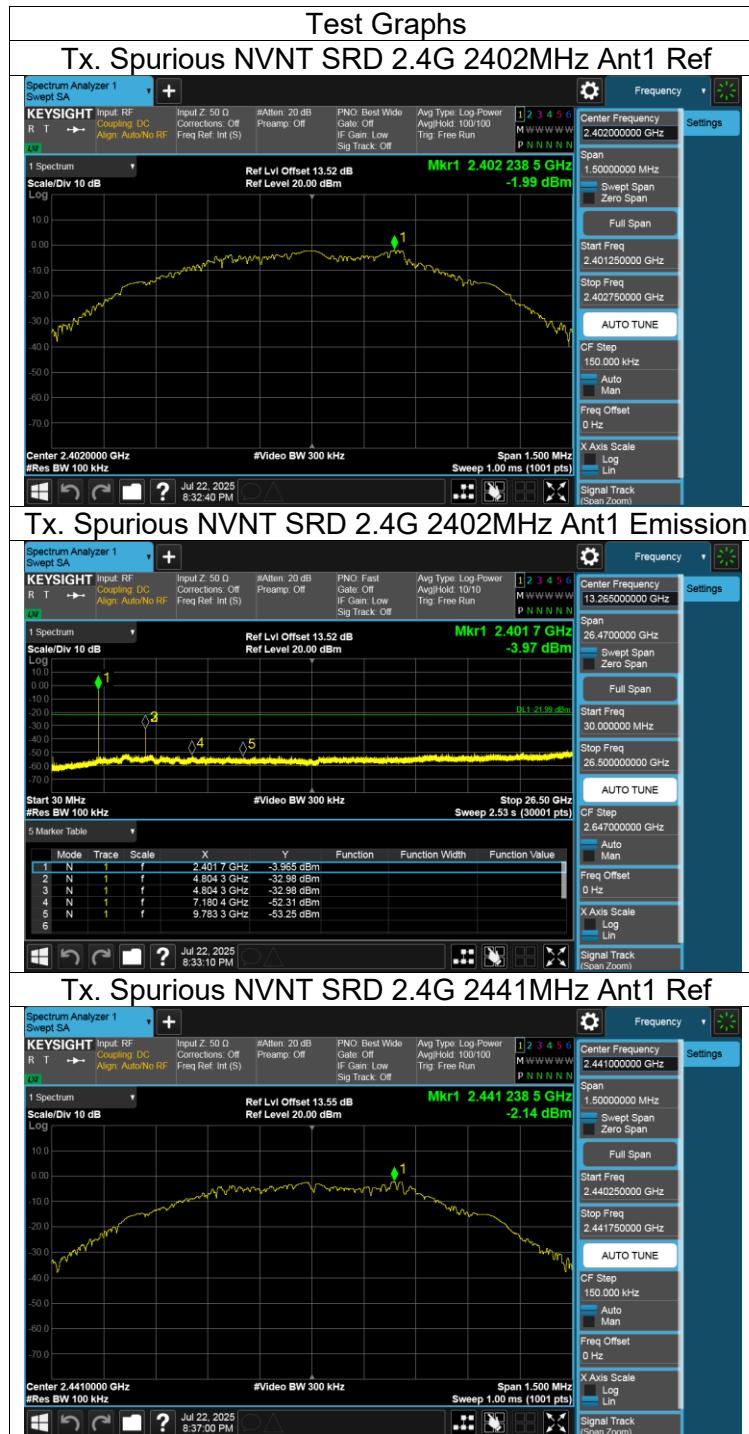
Mode	Frequency (MHz)	Antenna	Hopping Mode	Verdict
SRD 2.4G	2402	Ant1	Hopping	Pass
SRD 2.4G	2480	Ant1	Hopping	Pass

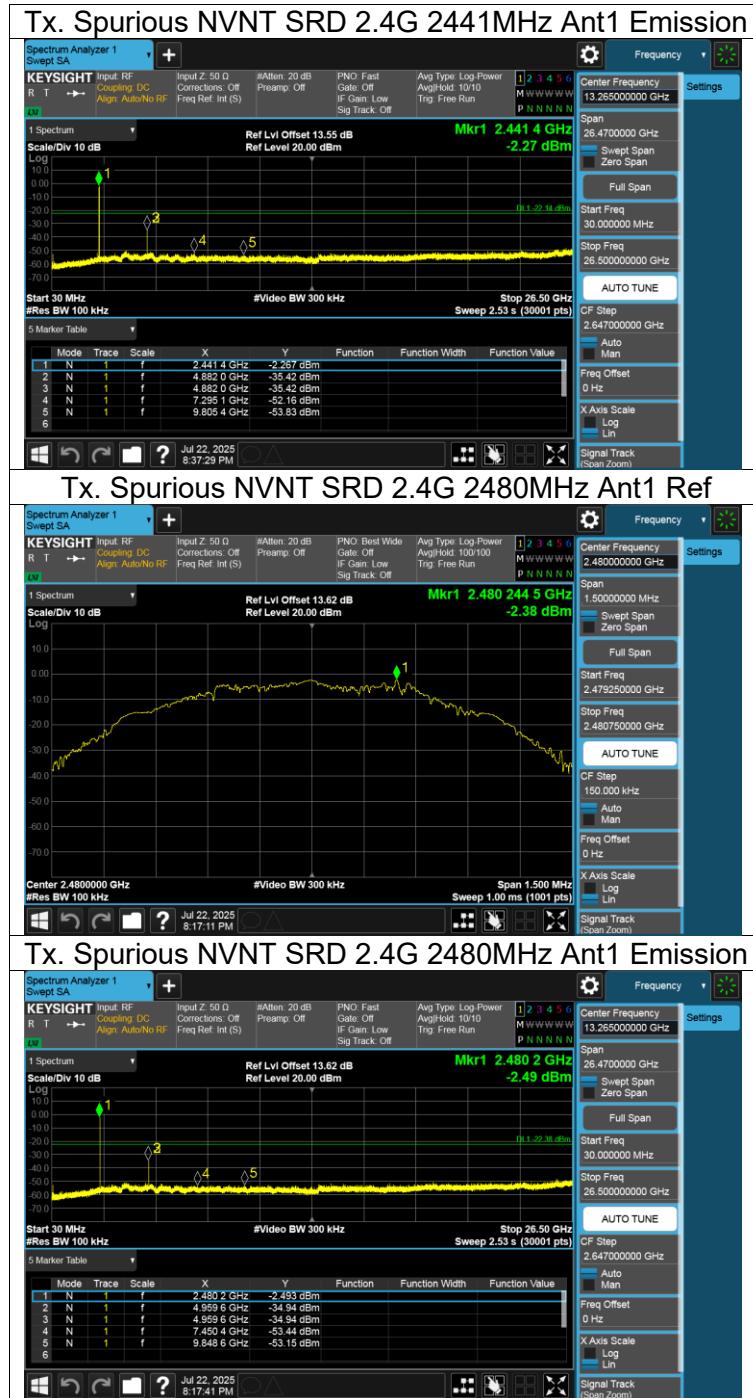




11.10. APPENDIX J:CONDUCTED RF SPURIOUS EMISSION

Mode	Frequency (MHz)	Antenna	Verdict
SRD 2.4G	2402	Ant1	Pass
SRD 2.4G	2441	Ant1	Pass
SRD 2.4G	2480	Ant1	Pass





END OF REPORT