

JAPAN MIC

Radio Test Report

Applicant: AD-II Engineering Inc.
No. 1313-6, Zhongshan Rd., Shengang Dist., Taichung City,
Taiwan (R.O.C.)

Manufacturer: AD-II Engineering Inc.
No. 1313-6, Zhongshan Rd., Shengang Dist., Taichung City,
Taiwan (R.O.C.)

Product Name: Bicycle electronic controller

Brand Name: MICROSHIFT

Model No.: SB-ER3000S-R

Report Number: TERF2506002002ER

Place of Testing SGS Taiwan Ltd. Central RF Lab
No.134, Wu Kung Road, New Taipei Industrial Park, Wuku
District, New Taipei City, Taiwan 24803.

Test Result PASS

Classification of Specified Radio Equipment Article 2 Clause 1 Item 19

Date of EUT Received: May 19, 2025

Date of Test: June 13, 2025~June 30, 2025

Issue Date: July 30, 2025

Approved By: _____

Alex Hsieh

Alex Hsieh

We hereby declare that:

The data presented with this application to be true and correct; and that our testing equipment is regularly serviced and properly calibrated; and We agree to maintain records of data for a minimum of ten (10) years in our laboratory for immediate presentation upon request by the Certification Body.

Measurement was conducted by the following test method:

the test method of Ordinance Concerning Technical Regulations

Conformity Certification etc. of Specified Radio Equipment in Annex 1, the Ministry of Internal Affairs and Communication notification in Annex 43 of Article 88, Paragraph 1 or the test method more than equivalent.

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Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
TERF2506002002ER	00	Original	July 30, 2025	Karen Huang	

Note:

- 1、The remark "*" indicates modification of the report upon requests from certification body.

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1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

1.1 Product Description

Product Name:	Bicycle electronic controller
Brand Name:	MICROSHIFT
Model No.:	SB-ER3000S-R
Hardware Version:	N/A
Firmware Version:	N/A
Power Supply:	3Vdc

1.2 RF Specification

BLE 1M

Type, frequency of F1D 2402MHz-2480MHz(Interval of 2MHz 40ch)

Transmittable radio wave
and declaration output power 0.444 mW

1.3 Antenna Designation

Antenna Type	Polarization (H or V)	Peak Gain (dBi)
Multilayer Chip Antenna	H+V	2.5

Note:

The antenna information is provided by the applicant, and the laboratory shall not be held liable for the accuracy, completeness, or reliability of any applicant-supplied data.

1.4 Assemble

Two housings are permanently joined using ultrasonic welding. The plastic housing will be destroyed when attempting to open.

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2 DESCRIPTION OF TEST

2.1 Test Conditions

Low Voltage

Environment of Test Room	Temperature	22-26	°C
	Humidity	55-60	%

Peak Antenna Gain	2.5	dBi
Declaration Output Power	0.443	mW
Declaration Output Power	-3.532	dBm
E.I.R.P.	-1.032	dBm
Input Voltage	2.97	VDC

Tested Circuit Insertion Loss		0	dB
Burst	ON TIME	0.002105	sec
	OFF TIME	0.000115	sec
	Ratio	94.82	%
Packet Type (Mode)		BT LE_1M	mode

Test Category ; 2.4GHz Band Wideband Low-Power Data Communication System

Normal Voltage

Environment of Test Room	Temperature	22-26	°C
	Humidity	55-60	%

Peak Antenna Gain	2.5	dBi
Declaration Output Power	0.444	mW
Declaration Output Power	-3.523	dBm
E.I.R.P.	-1.023	dBm
Input Voltage	3	VDC

Tested Circuit Insertion Loss		0	dB
Burst	ON TIME	0.00211	sec
	OFF TIME	0.000115	sec
	Ratio	94.83	%
Packet Type (Mode)		BT LE_1M	mode

Test Category ; 2.4GHz Band Wideband Low-Power Data Communication System

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High Voltage

Environment of Test Room	Temperature	22-26	°C
	Humidity	55-60	%

Peak Antenna Gain	2.5	dBi
Declaration Output Power	0.444	mW
Declaration Output Power	-3.523	dBm
E.I.R.P.	-1.023	dBm
Input Voltage	3.3	VDC

Tested Circuit Insertion Loss		0	dB
Burst	ON TIME	0.00211	sec
	OFF TIME	0.000115	sec
	Ratio	94.83	%
Packet Type (Mode)		BT LE_1M	mode

Test Category ;	2.4GHz Band Wideband Low-Power Data Communication System
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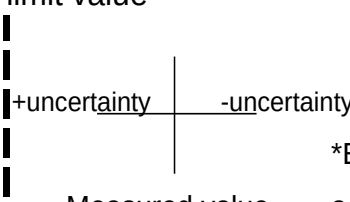
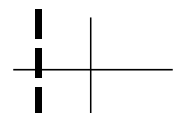
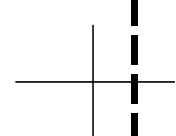
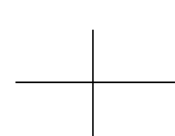
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3 ABOUT UNCERTAINTY OF MEASURED VALUE

- *In this test, the influence of an error or uncertainty may be done according to the following factors.
- Bias of a measurement equipment, Change by aging, Attrition, Noise
 - Skill and capability of an inspector
 - Environment (Temperature, Humidity)
 - Dispersion in a EUT (Equipment Under Test)
 - Uncertainty of calibration of a measurement equipment

Therefore, Synthetic uncertainty is calculated using "k=2" of coverage factor, and about 95% of confidence level shall be obtained.

In consideration of the above, it judged as follows.

JUDGE	Measured value and Standard limit value	
PASS	Case1	 *Even if it takes uncertainty into consideration, a standard limit value is fulfilled.
	Case2	 *Although measured value is in a standard limit value, a limit value won't be fulfilled if uncertainty is taken into consideration.
FAIL	Case3	 *Although measured value exceeds a standard limit value, a limit value will be fulfilled if uncertainty is taken into consideration.
	Case4	 *Even if it takes uncertainty into consideration, a standard limit value isn't fulfilled.

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4 MEASUREMENT EQUIPMENT LIST

Conducted Emission Test Site: Conducted 1						
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL. (mm/dd/yyyy)	Calibration Authority	Cal. Method
Attenuator	Mini-Circuits	BW-S10W2+	3	12/11/2024	SGS	C)
DC Block	Mini-Circuits	BLK-18-S+	2	12/11/2024	SGS	C)
DC Power Supply	Agilent	E3640A	MY52410006	12/30/2024	ETC	C)
EXA Spectrum Analyzer	Agilent	N9010A	MY54200716	10/14/2024	ETC	C)
Power Meter	Anritsu	ML2496A	1242004	10/23/2024	ETC	C)
Power Sensor	Anritsu	MA2411B	1207365	10/23/2024	ETC	C)
Power Sensor	Anritsu	MA2411B	1207368	10/23/2024	ETC	C)
Test Software	SGS	Radio Test Software	Ver. 21	N.C.R	N/A	N/A

Note 1: The validity of measurement equipment is one year from the first day of the following month of the calibration date.

(e.g. If the calibration date is December 15th, 2014, measurement equipment can be used from December 15th, 2014 to December 31st, 2015.)

Note 2: Calibration Method

- a): Calibration conducted by the National Institute of Information and Communications Technology(NICT)(hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1)
- b): Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992)
- c) : Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph(1)
- d) : Calibration conducted by using measuring instruments and other equipment listed in the right column of Table No. 3 attached hereto, which shall have been given any of calibration, etc. listed above from a) to c)

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5 TEST RESULTS:

Low Voltage

BLE 1M

Measurement Frequency		MHz	2402	2480	Limit	Result	NOTES	
Channel Number		Ch.	0	39	-----	-----		
Reading Frequency		MHz	2402.016	2480.016	-----	-----		
Frequency Tolerance		ppm	6.66112	6.45161	-50≤x≤+50	PASS		
Occupied Bandwidth		MHz	1.0633	1.0372	≤26 MHz	PASS		
RF Output Power		mW	0.417	0.443	≤10 mW	PASS		
		dBm	-3.797	-3.532	-----			
RF Output Power Tolerance		%	-5.95	-0.09	≤20	PASS		
Unwanted Emission Strength (TX1)	Under 2387MHz	μW/MHz	0.028814	0.037051	≤2.5uW/MHz	PASS		
		dBm/MHz	-45.404	-44.312	-----			
		MHz	2273.60	2352.20	-----			
	2387-2400MHz	μW/MHz	1.177877	0.014332	≤25uW/MHz	PASS		
		dBm/MHz	-29.289	-48.437	-----			
		MHz	2399.98	2389.12	-----			
	2483.5-2496.5MHz	μW/MHz	0.015754	0.318127	≤25uW/MHz	PASS		
		dBm/MHz	-48.026	-34.974	-----			
		MHz	2487.21	2483.50	-----			
	2496.5 - 12.5GHz	μW/MHz	0.363162	0.428450	≤2.5uW/MHz	PASS		
		dBm/MHz	-34.399	-33.681	-----			
		MHz	7205.00	7440.50	-----			
Secondarily Emitted Radio Wave Strength (RX Spurious) (RX1)		Under 1GHz	nW	0.0181	0.2607	≤4 nW	PASS	
			dBm/100kHz	-77.412	-65.838	-----		
			MHz	730.30	739.80	-----		
		1 - 12.5GHz	nW	0.2298	0.2390	≤20 nW	PASS	
			dBm/MHz	-66.386	-66.216	-----		
		MHz	4814.00	4832.00	-----	-----		
Interference Prevention Function		-----	Good			PASS		

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Normal Voltage

BLE 1M

Measurement Frequency		MHz	2402	2480	Limit	Result	NOTES
Channel Number		Ch.	0	39	-----	-----	
Reading Frequency		MHz	2402.016	2480.017	-----	-----	
Frequency Tolerance		ppm	6.66112	6.85484	-50≤x≤+50	PASS	
Occupied Bandwidth		MHz	1.0526	1.0651	≤26 MHz	PASS	
RF Output Power		mW	0.375	0.410	≤10 mW	PASS	
		dBm	-4.256	-3.877	-----		
RF Output Power Tolerance		%	-8.43	0.11	≤20	PASS	
Unwanted Emission Strength (TX1)	Under 2387MHz	μW/MHz	0.035148	0.046968	≤2.5uW/MHz	PASS	
		dBm/MHz	-44.541	-43.282	-----		
		MHz	2273.90	2351.50	-----		
	2387-2400MHz	μW/MHz	1.246235	0.014781	≤25uW/MHz	PASS	
		dBm/MHz	-29.044	-48.303	-----		
		MHz	2399.96	2393.58	-----		
	2483.5-2496.5MHz	μW/MHz	0.016573	0.384769	≤25uW/MHz	PASS	
		dBm/MHz	-47.806	-34.148	-----		
		MHz	2487.87	2483.54	-----		
	2496.5 - 12.5GHz	μW/MHz	0.337054	0.421599	≤2.5uW/MHz	PASS	
		dBm/MHz	-34.723	-33.751	-----		
		MHz	7205.00	7441.00	-----		
Secondarily Emitted Radio Wave Strength (RX Spurious) (RX1)	Under 1GHz	nW	0.0009	0.0048	≤4 nW	PASS	
		dBm/100kHz	-90.250	-83.158	-----		
		MHz	640.00	730.70	-----		
	1 - 12.5GHz	nW	1.1218	0.2436	≤20 nW	PASS	
		dBm/MHz	-59.501	-66.133	-----		
		MHz	4663.00	4814.00	-----		
Interference Prevention Function		-----	Good			PASS	

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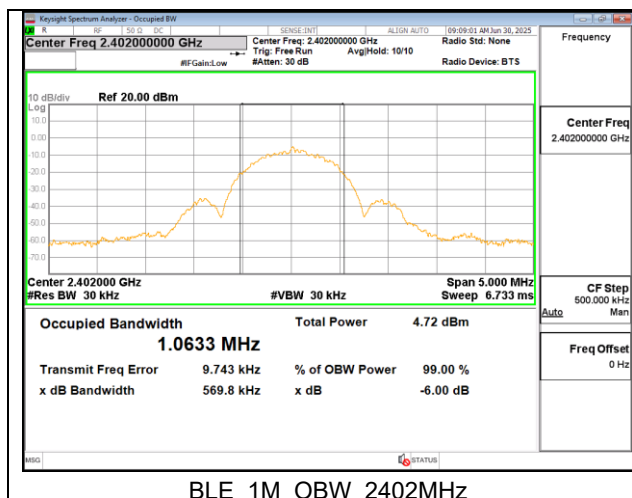
High Voltage

BLE 1M

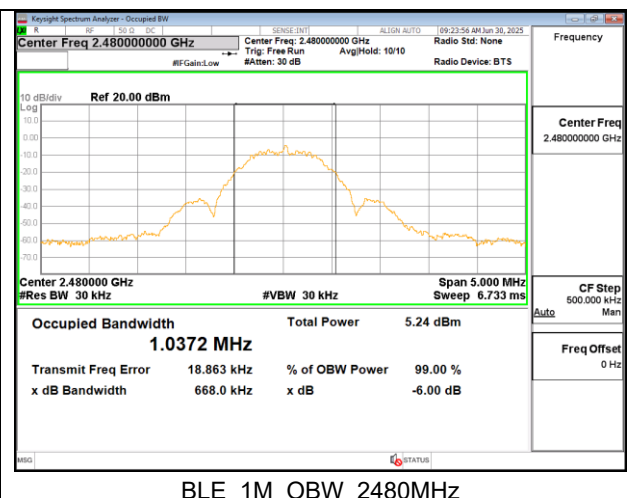
Measurement Frequency		MHz	2402	2480	Limit	Result	NOTES
Channel Number		Ch.	0	39	-----	-----	
Reading Frequency		MHz	2402.016	2480.016	-----	-----	
Frequency Tolerance		ppm	6.66112	6.45161	-50≤x≤+50	PASS	
Occupied Bandwidth		MHz	1.0625	1.0618	≤26 MHz	PASS	
RF Output Power		mW	0.426	0.444	≤10 mW	PASS	
		dBm	-3.711	-3.523	-----		
RF Output Power Tolerance		%	-4.12	-0.07	≤20	PASS	
Unwanted Emission Strength (TX1)	Under 2387MHz	μW/MHz	0.036216	0.020635	≤2.5uW/MHz	PASS	
		dBm/MHz	-44.411	-46.854	-----		
		MHz	2274.10	2352.00	-----		-----
	2387-2400MHz	μW/MHz	1.112756	0.010093	≤25uW/MHz	PASS	
		dBm/MHz	-29.536	-49.960	-----		
		MHz	2399.92	2398.69	-----		-----
	2483.5-2496.5MHz	μW/MHz	0.015581	0.318346	≤25uW/MHz	PASS	
		dBm/MHz	-48.074	-34.971	-----		
		MHz	2488.46	2483.57	-----		-----
	2496.5 - 12.5GHz	μW/MHz	0.310527	0.438632	≤2.5uW/MHz	PASS	
		dBm/MHz	-35.079	-33.579	-----		
		MHz	7206.50	7441.00	-----		-----
Secondarily Emitted Radio Wave Strength (RX Spurious) (RX1)	Under 1GHz	nW	0.0008	0.0052	≤ 4 nW	PASS	
		dBm/100kHz	-90.892	-82.840	-----		
		MHz	745.60	741.10	-----		-----
	1 - 12.5GHz	nW	0.1249	0.1235	≤ 20 nW	PASS	
		dBm/MHz	-69.036	-69.082	-----		
		MHz	4958.00	4958.00	-----	-----	
Interference Prevention Function		-----	Good			PASS	

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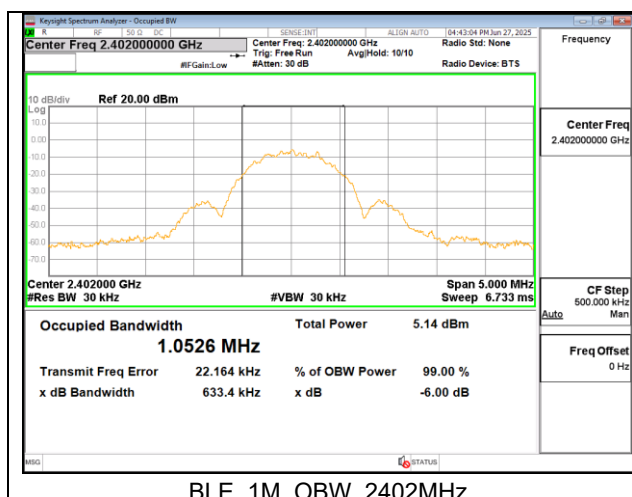


BLE 1M OBW 2402MHz

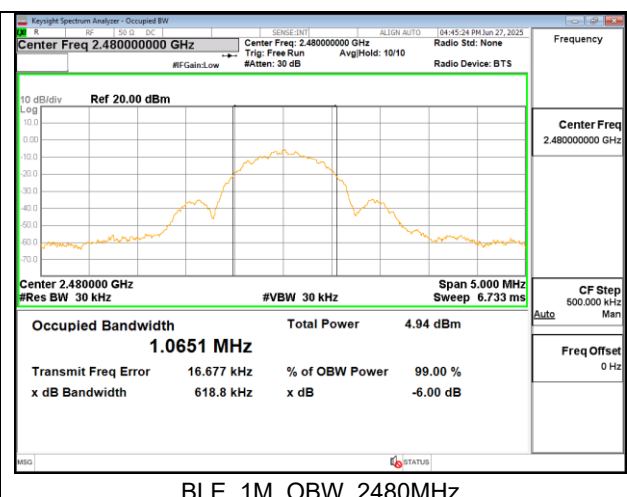


BLE 1M OBW 2480MHz

Normal Voltage



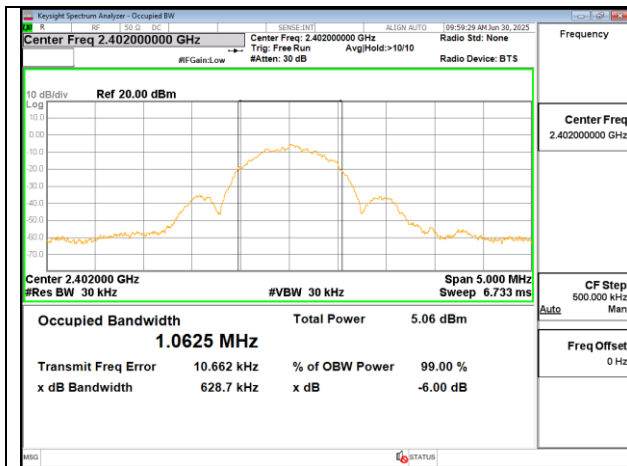
BLE 1M OBW 2402MHz



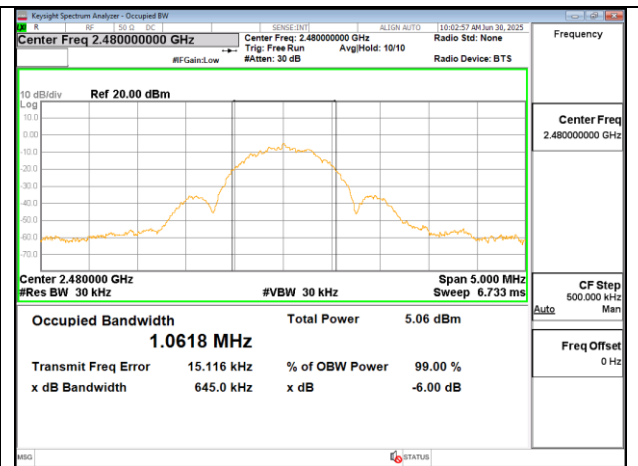
BLE 1M OBW 2480MHz

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BLE 1M OBW 2402MHz

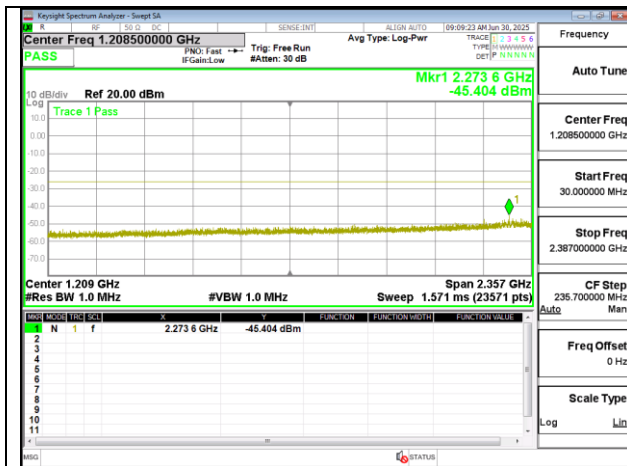


BLE 1M OBW 2480MHz

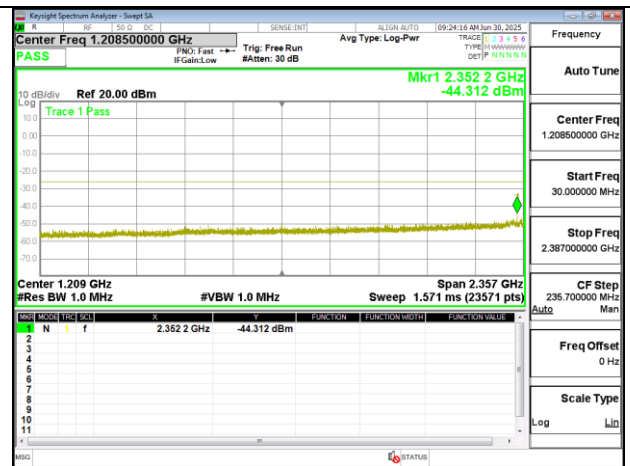
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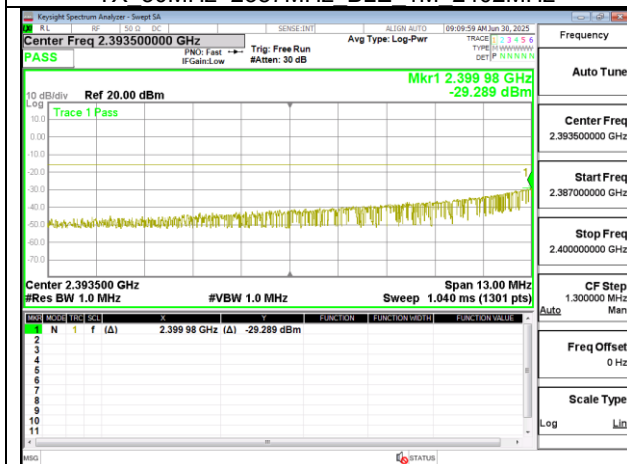
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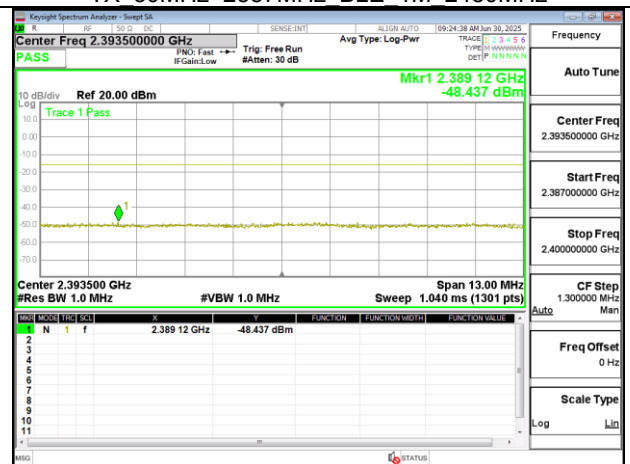
TX 30MHz~2387MHz BLE 1M 2402MHz



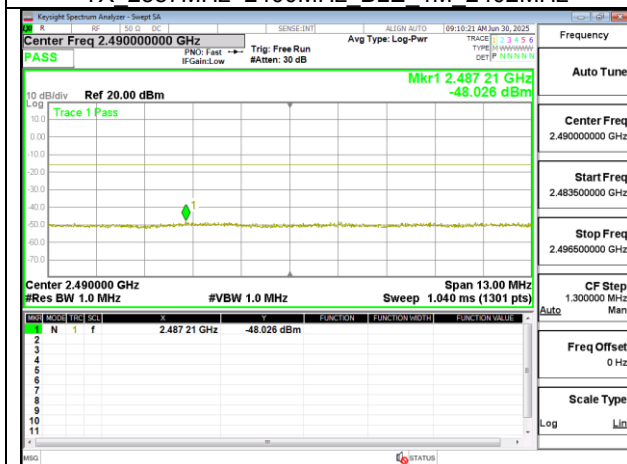
TX 30MHz~2387MHz BLE 1M 2480MHz



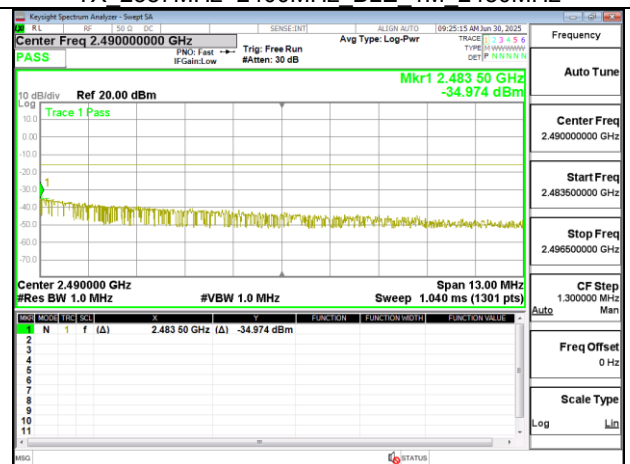
TX 2387MHz~2400MHz BLE 1M 2402MHz



TX 2387MHz~2400MHz BLE 1M 2480MHz



TX 2483.5MHz~2496.5MHz BLE 1M 2402MHz



TX 2483.5MHz~2496.5MHz BLE 1M 2480MHz.png

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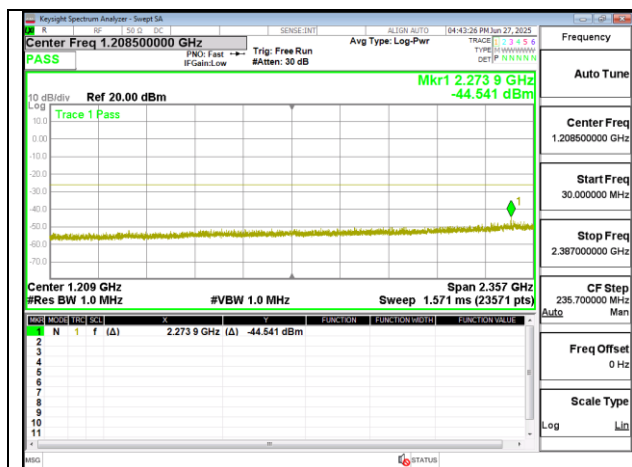
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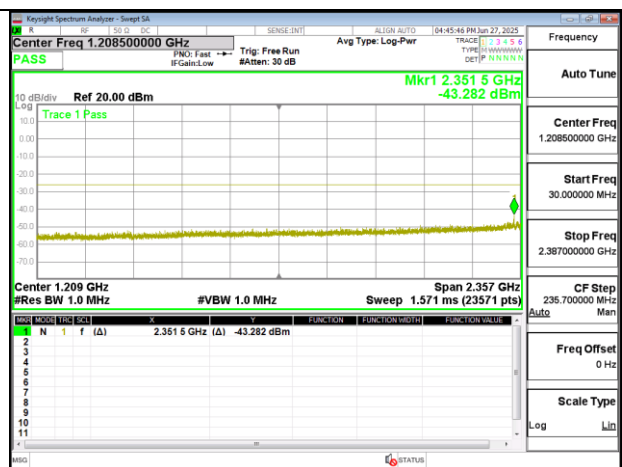
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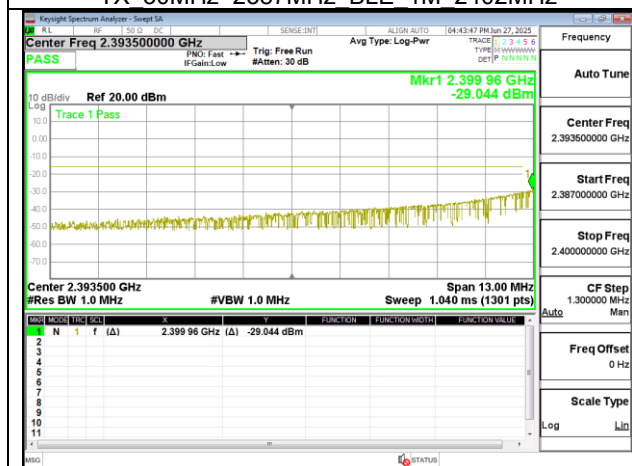
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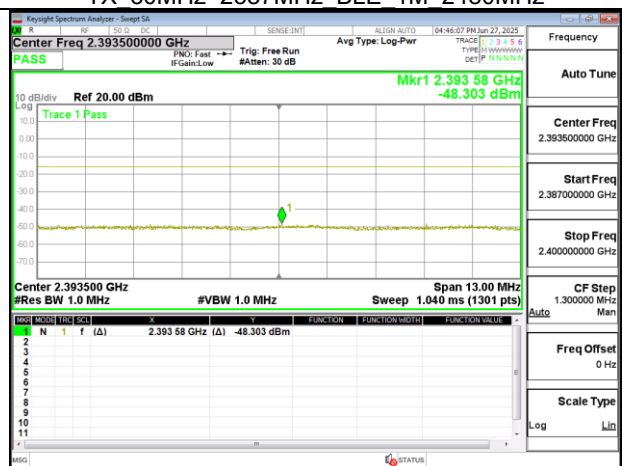
TX 30MHz~2387MHz BLE 1M 2402MHz



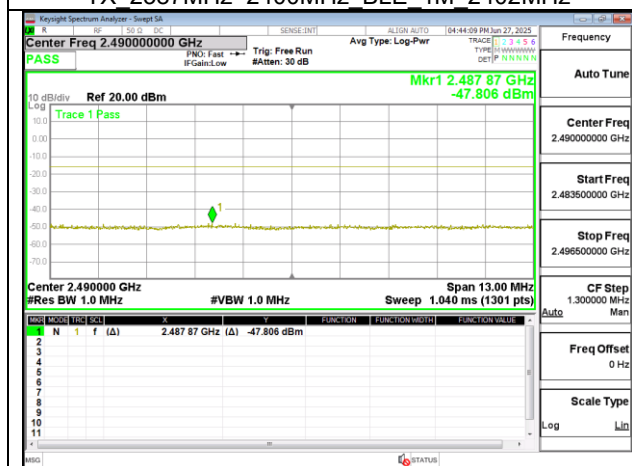
TX 30MHz~2387MHz BLE 1M 2480MHz



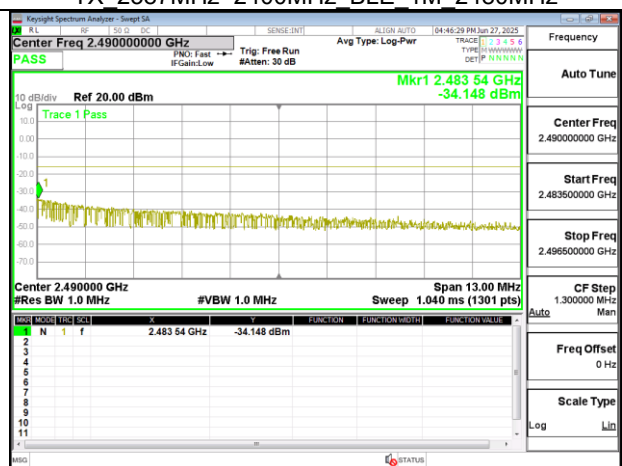
TX 2387MHz~2400MHz BLE 1M 2402MHz



TX 2387MHz~2400MHz BLE 1M 2480MHz



TX 2483.5MHz~2496.5MHz BLE 1M 2402MHz

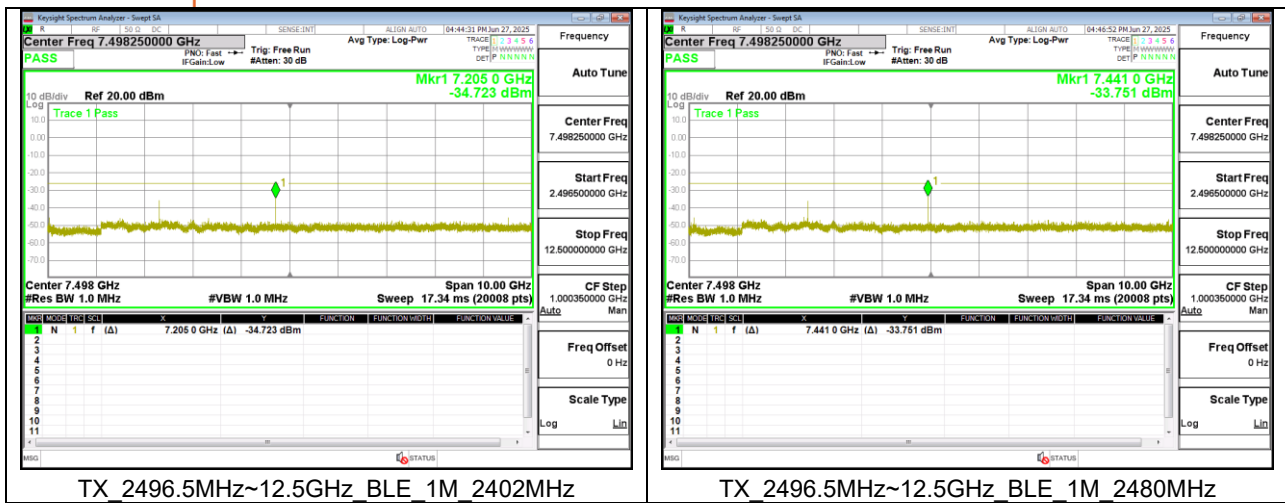


TX 2483.5MHz~2496.5MHz BLE 1M 2480MHz

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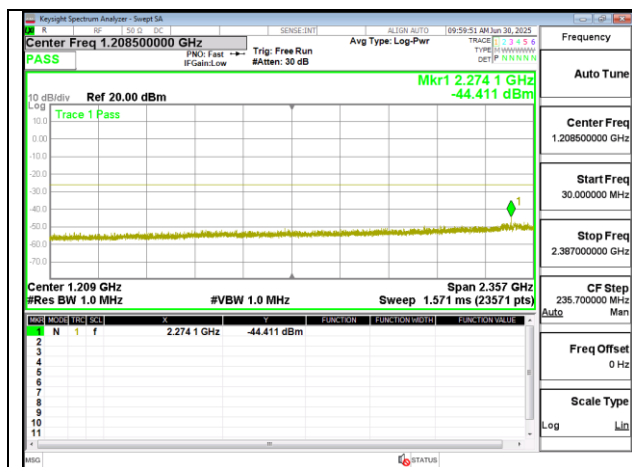
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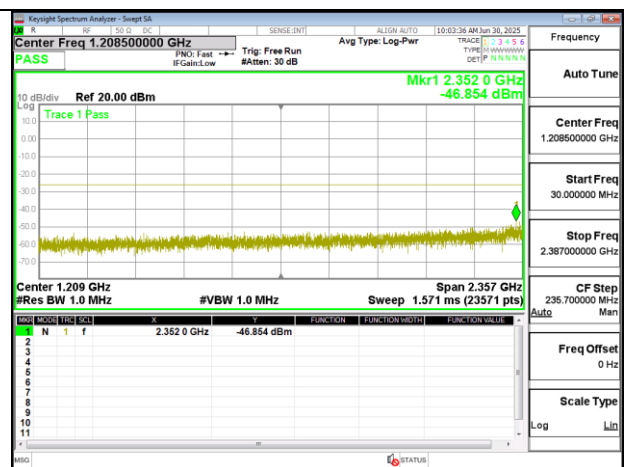


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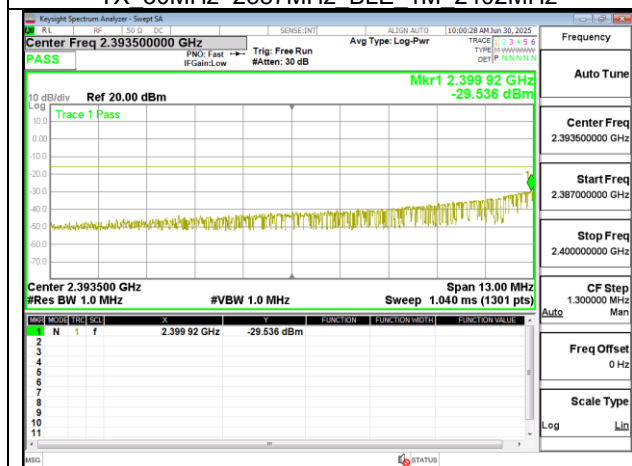
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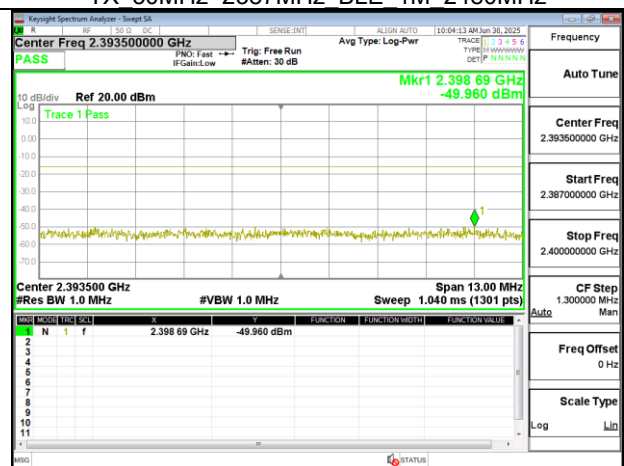
TX 30MHz~2387MHz BLE 1M 2402MHz



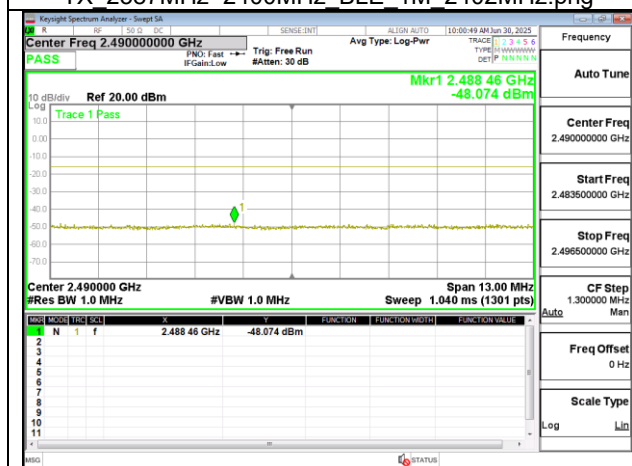
TX 30MHz~2387MHz BLE 1M 2480MHz



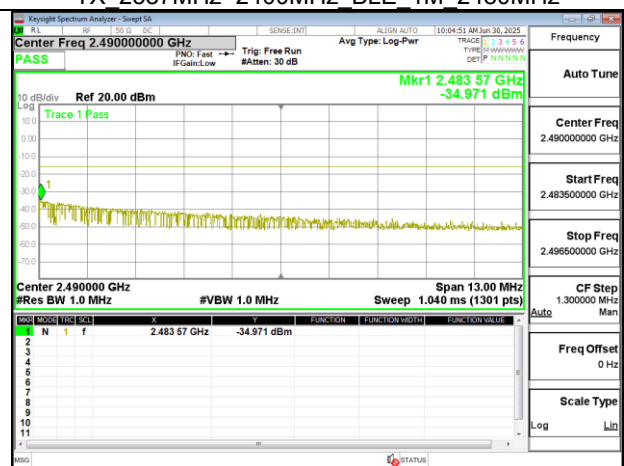
TX 2387MHz~2400MHz BLE 1M 2402MHz.png



TX 2387MHz~2400MHz BLE 1M 2480MHz



TX 2483.5MHz~2496.5MHz BLE 1M 2402MHz

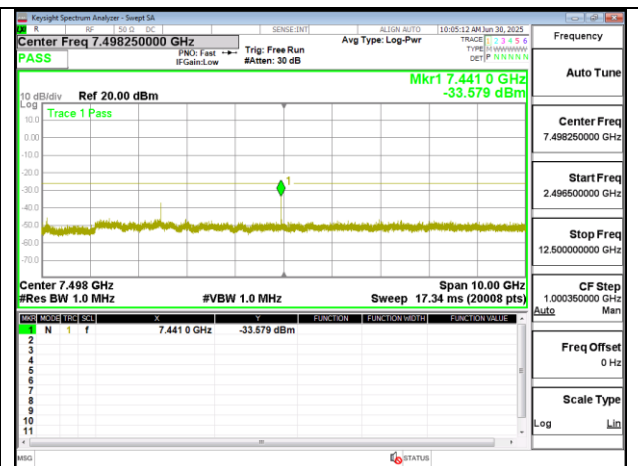
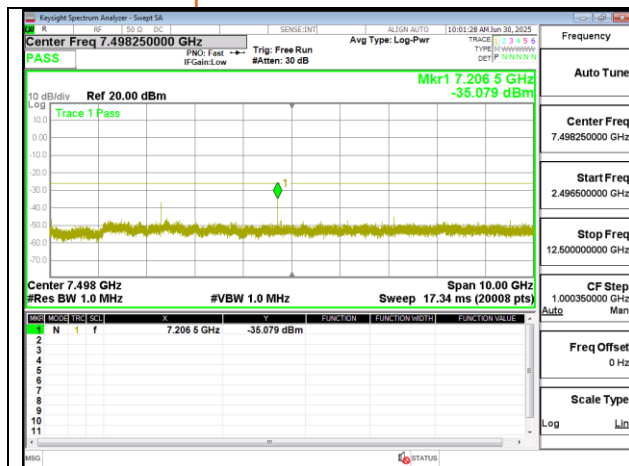


TX 2483.5MHz~2496.5MHz BLE 1M 2480MHz

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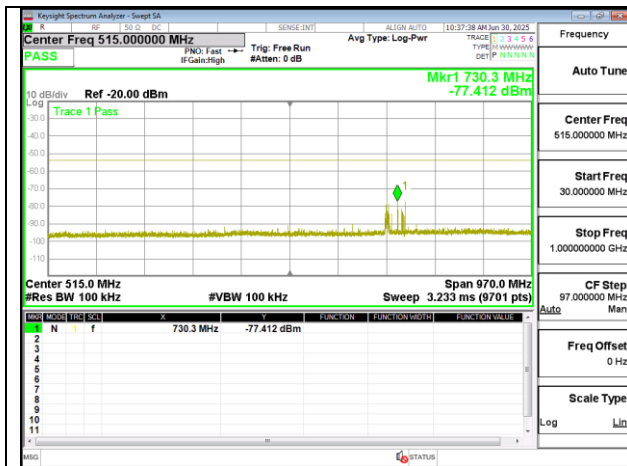
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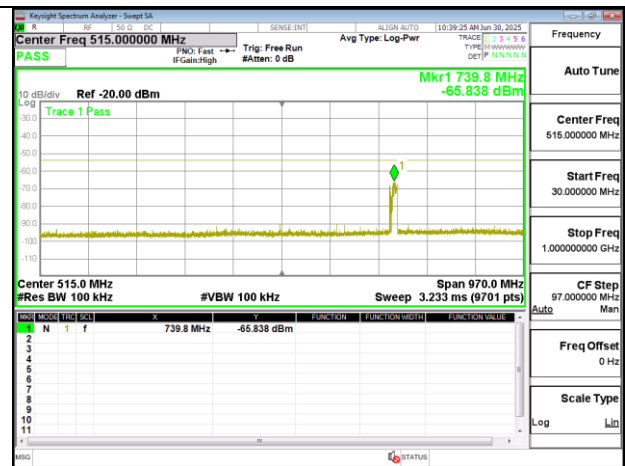


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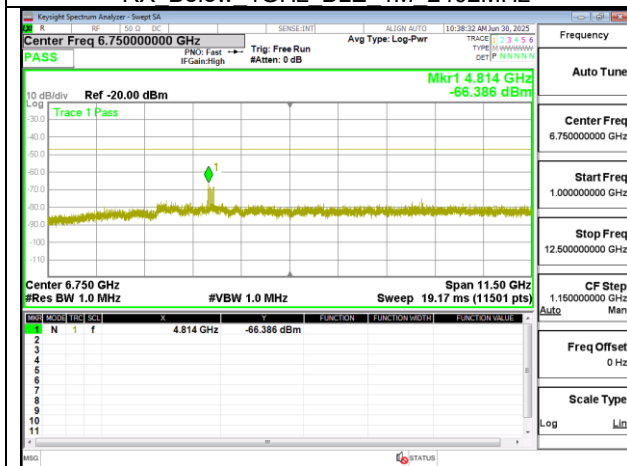
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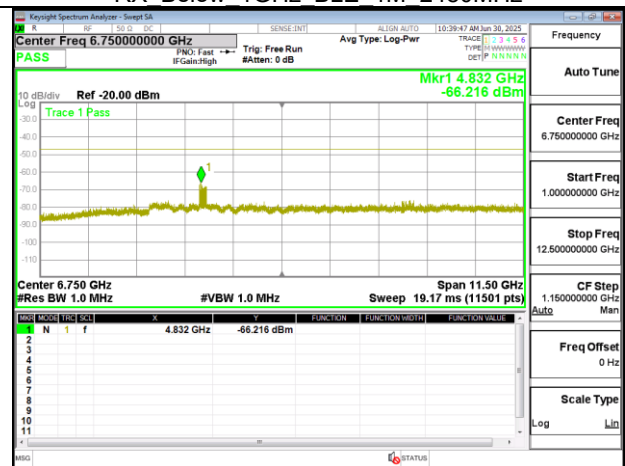
RX Below 1GHz BLE 1M 2402MHz



RX Below 1GHz BLE 1M 2480MHz



RX Above 1GHz BLE 1M 2402MHz



RX Above 1GHz BLE 1M 2480MHz

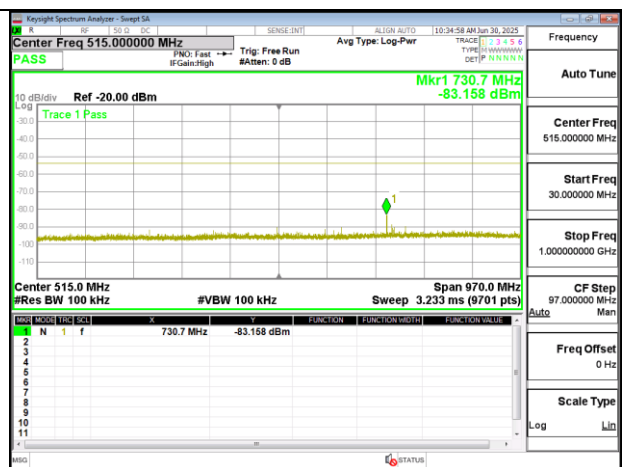
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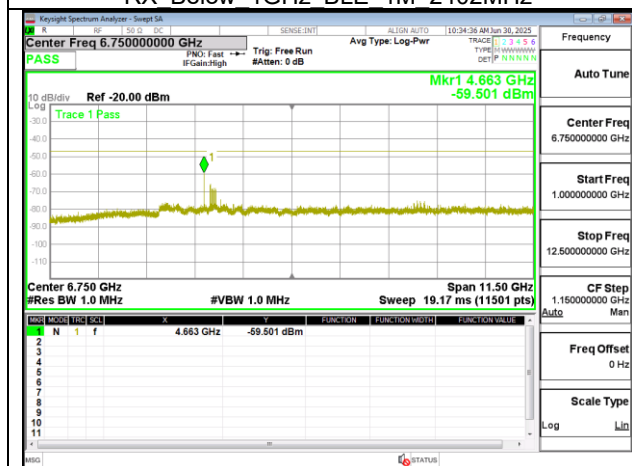
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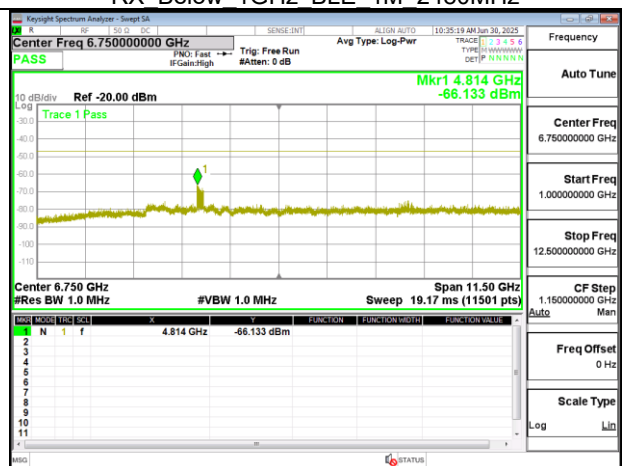
RX Below 1GHz BLE 1M 2402MHz



RX Below 1GHz BLE 1M 2480MHz



RX Above 1GHz BLE 1M 2402MHz

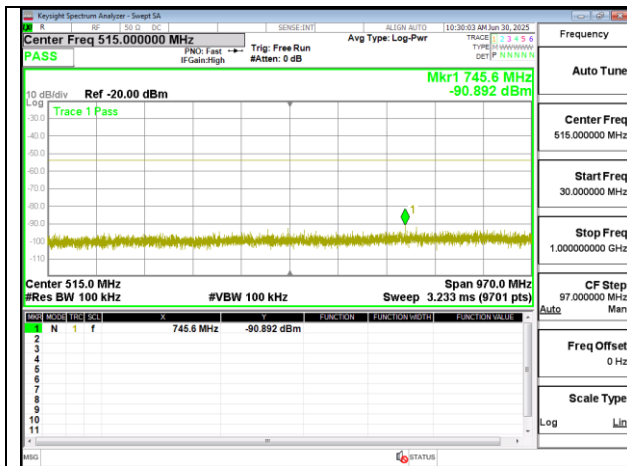


RX Above 1GHz BLE 1M 2480MHz

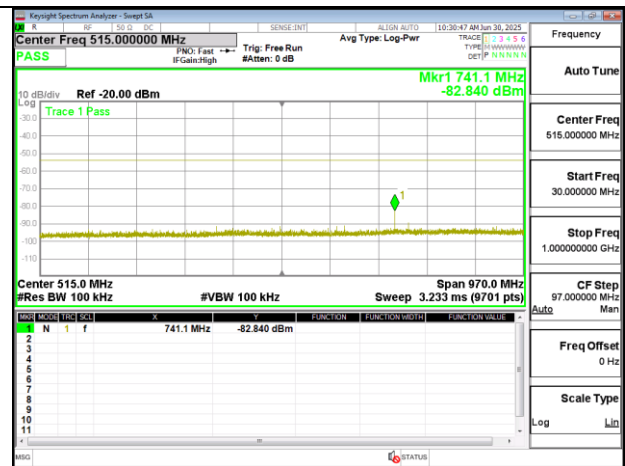
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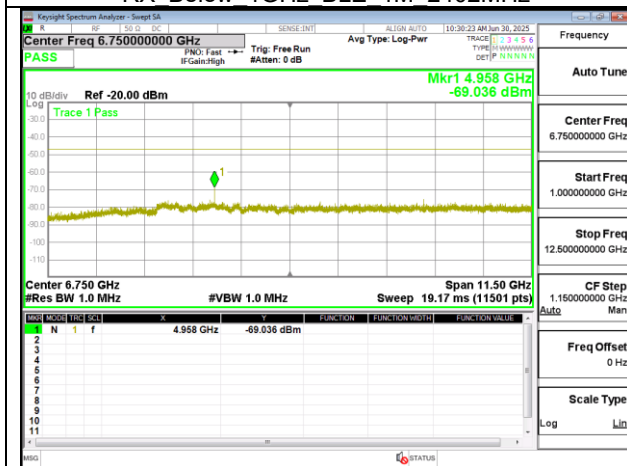
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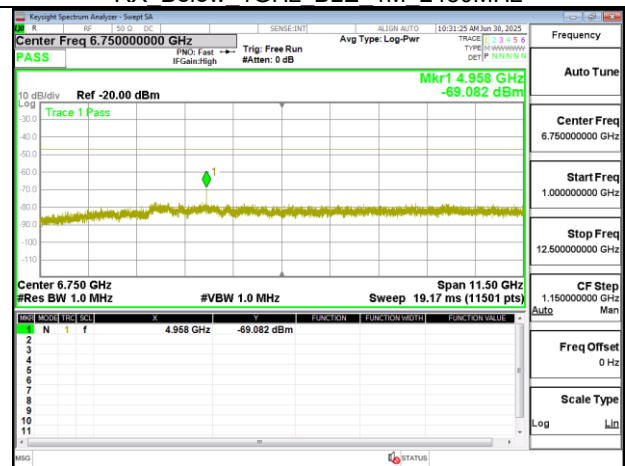
RX Below 1GHz BLE 1M 2402MHz



RX Below 1GHz BLE 1M 2480MHz



RX Above 1GHz BLE 1M 2402MHz



RX Above 1GHz BLE 1M 2480MHz

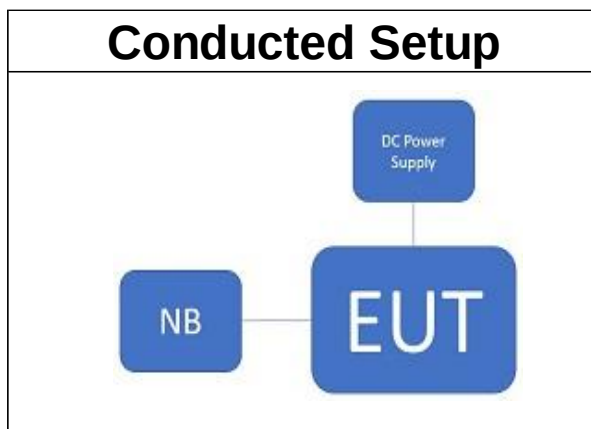
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6 TEST SET UP

6.1 Setup Diagram



~ End of Report ~

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