



# RF Test Report

## For

**Applicant Name:** TECNO MOBILE LIMITED  
**Address:** FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25  
SHAN MEI STREET FOTAN NT HONGKONG  
**EUT Name:** Laptop Computer  
**Brand Name:** TECNO  
**Model Number:** T14DA  
**Series Model Number:** Refer to section 2

## Issued By

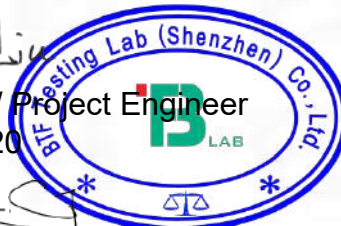
**Company Name:** BTF Testing Lab (Shenzhen) Co., Ltd.  
**Address:** F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park,  
Tantou Community, Songgang Street, Bao'an District, Shenzhen,  
China

**Report Number:** BTF230918R00101  
**Test Standards:** 47 CFR Part 15.247

**Test Conclusion:** Pass  
**FCC ID:** 2ADYY-T14DA  
**Test Date:** 2023-08-29 to 2023-09-19  
**Date of Issue:** 2023-09-20

**Prepared By:**

Chris Liu  
Chris Liu / Project Engineer  
2023-09-20



**Date:**

**Approved By:**

Ryan.CJ  
Ryan.CJ / EMC Manager  
2023-09-20

*Note: All the test results in this report only related to the testing samples. Which can be duplicated completely for the legal use with approval of applicant; it shall not be reproduced except in full without the written approval of BTF Testing Lab (Shenzhen) Co., Ltd., All the objections should be raised within thirty days from the date of issue. To validate the report, you can contact us.*

Revision History		
Version	Issue Date	Revisions Content
R_V0	2023-09-20	Original
<i>Note: Once the revision has been made, then previous versions reports are invalid.</i>		

## Table of Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>5</b>
1.1	Identification of Testing Laboratory .....	5
1.2	Identification of the Responsible Testing Location .....	5
1.3	Announcement .....	5
<b>2</b>	<b>PRODUCT INFORMATION .....</b>	<b>6</b>
2.1	Application Information .....	6
2.2	Manufacturer Information .....	6
2.3	Factory Information .....	6
2.4	General Description of Equipment under Test (EUT) .....	6
2.5	Technical Information .....	6
<b>3</b>	<b>SUMMARY OF TEST RESULTS .....</b>	<b>7</b>
3.1	Test Standards .....	7
3.2	Uncertainty of Test .....	7
3.3	Summary of Test Result .....	7
<b>4</b>	<b>TEST CONFIGURATION .....</b>	<b>8</b>
4.1	Test Equipment List .....	8
4.2	Test Auxiliary Equipment .....	12
4.3	Test Modes .....	12
<b>5</b>	<b>EVALUATION RESULTS (EVALUATION) .....</b>	<b>13</b>
5.1	Antenna requirement .....	13
5.1.1	Conclusion: .....	13
<b>6</b>	<b>RADIO SPECTRUM MATTER TEST RESULTS (RF) .....</b>	<b>14</b>
<b>6.1</b>	<b>Conducted Emission at AC power line .....</b>	<b>14</b>
6.1.1	E.U.T. Operation: .....	14
6.1.2	Test Setup Diagram: .....	14
6.1.3	Test Data: .....	15
<b>6.2</b>	<b>Occupied Bandwidth .....</b>	<b>17</b>
6.2.1	E.U.T. Operation: .....	17
6.2.2	Test Setup Diagram: .....	17
6.2.3	Test Data: .....	17
<b>6.3</b>	<b>Maximum Conducted Output Power .....</b>	<b>18</b>
6.3.1	E.U.T. Operation: .....	18
6.3.2	Test Setup Diagram: .....	19
6.3.3	Test Data: .....	19
<b>6.4</b>	<b>Power Spectral Density .....</b>	<b>20</b>
6.4.1	E.U.T. Operation: .....	20
6.4.2	Test Setup Diagram: .....	20
6.4.3	Test Data: .....	20
<b>6.5</b>	<b>Emissions in non-restricted frequency bands .....</b>	<b>21</b>
6.5.1	E.U.T. Operation: .....	21
6.5.2	Test Setup Diagram: .....	22
6.5.3	Test Data: .....	22
<b>6.6</b>	<b>Band edge emissions (Radiated) .....</b>	<b>23</b>
6.6.1	E.U.T. Operation: .....	23
6.6.2	Test Data: .....	24
<b>6.7</b>	<b>Emissions in restricted frequency bands (below 1GHz) .....</b>	<b>25</b>
6.7.1	E.U.T. Operation: .....	25
6.7.2	Test Data: .....	26

<b>6.8</b>	<b>Emissions in restricted frequency bands (above 1GHz)</b>	<b>28</b>
6.8.1	E.U.T. Operation:	28
6.8.2	Test Data:	29
<b>APPENDIX</b>		<b>30</b>

## 1 Introduction

### 1.1 Identification of Testing Laboratory

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130

### 1.2 Identification of the Responsible Testing Location

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130
FCC Registration Number:	518915
Designation Number:	CN1330

### 1.3 Announcement

- (1) The test report reference to the report template version v0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.
- (5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

## 2 Product Information

### 2.1 Application Information

Company Name:	TECNO MOBILE LIMITED
Address:	FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI STREET FOTAN NT HONGKONG

### 2.2 Manufacturer Information

Company Name:	TECNO MOBILE LIMITED
Address:	FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI STREET FOTAN NT HONGKONG

### 2.3 Factory Information

Company Name:	GUANGXI SHANCHAUN TECHNOLOGY CO LTD
Address:	The Second Floor of Plant C01, Plant C02, Plant C03 and Plant D03

### 2.4 General Description of Equipment under Test (EUT)

EUT Name:	Laptop Computer
Test Model Number:	T14DA
Series Model Number:	N/A
Software Version:	Win 11 home
Hardware Version:	N156EBC01_MB_V11 VB

### 2.5 Technical Information

Power Supply:	Li-ion Battery: 528252-3S1P Rated Voltage: 11.61V Rated Capacity: 6460mAh/75Wh Limited Capacity: 6550mAh/76.04Wh Limited Charge Voltage: 13.35V
Power Adaptor:	Adapter1: DS65-2 Input: 100-240V~50/60Hz 1.5A Max Output: 5.0V---3.0A 9.0V---3.0A 12.0V---3.0A 15.0V---3.0A 20.0V---3.25A 65.0W Adapter2: TCW-A61S-65W Input: 100-240V~50/60Hz 1.5A Max Output: DP: 5.0V---3A 9V---3A 12V---3A 15V---3A 20V---3.25A PPS: 3.3-11V---5A Max
Operation Frequency:	2402MHz to 2480MHz
Number of Channels:	40
Modulation Type:	GFSK
Antenna Type:	Integral Antenna
Antenna Gain#:	3.23 dBi

Note:

#: This report only reflects the worst-case adapter 1 data.

#: The antenna gain provided by the applicant, and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.

### 3 Summary of Test Results

#### 3.1 Test Standards

The tests were performed according to following standards:

**47 CFR Part 15.247:** Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

#### 3.2 Uncertainty of Test

Item	Measurement Uncertainty
Conducted Emission (150 kHz-30 MHz)	±2.64dB
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

#### 3.3 Summary of Test Result

Item	Standard	Requirement	Result
Antenna requirement	47 CFR Part 15.247	Part 15.203	Pass
Conducted Emission at AC power line	47 CFR Part 15.247	47 CFR 15.207(a)	Pass
Occupied Bandwidth	47 CFR Part 15.247	47 CFR 15.247(a)(2)	Pass
Maximum Conducted Output Power	47 CFR Part 15.247	47 CFR 15.247(b)(3)	Pass
Power Spectral Density	47 CFR Part 15.247	47 CFR 15.247(e)	Pass
Emissions in non-restricted frequency bands	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Band edge emissions (Radiated)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Emissions in restricted frequency bands (below 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Emissions in restricted frequency bands (above 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass

## 4 Test Configuration

### 4.1 Test Equipment List

Conducted Emission at AC power line					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00953	2022-11-24	2023-11-23
Coaxial Switcher	SCHWARZBECK	CX210	CX210	2022-11-24	2023-11-23
V-LISN	SCHWARZBECK	NSLK 8127	01073	2022-11-24	2023-11-23
LISN	AFJ	LS16/110VAC	16010020076	2023-02-23	2024-02-22
EMI Receiver	ROHDE&SCHWARZ	ESCI3	101422	2022-11-24	2023-11-23

Occupied Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Maximum Conducted Output Power					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Power Spectral Density					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/



RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

#### Emissions in non-restricted frequency bands

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

#### Band edge emissions (Radiated)

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23

POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

#### Emissions in restricted frequency bands (below 1GHz)

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

#### Emissions in restricted frequency bands (above 1GHz)

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23

POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

## 4.2 Test Auxiliary Equipment

The EUT was tested as an independent device.

## 4.3 Test Modes

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 90.56%) with Fully-charged battery.
<p>The sample was placed (0.1m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y &amp; Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.</p>	

## 5 Evaluation Results (Evaluation)

### 5.1 Antenna requirement

Test Requirement:	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.
-------------------	--

#### 5.1.1 Conclusion:



## 6 Radio Spectrum Matter Test Results (RF)

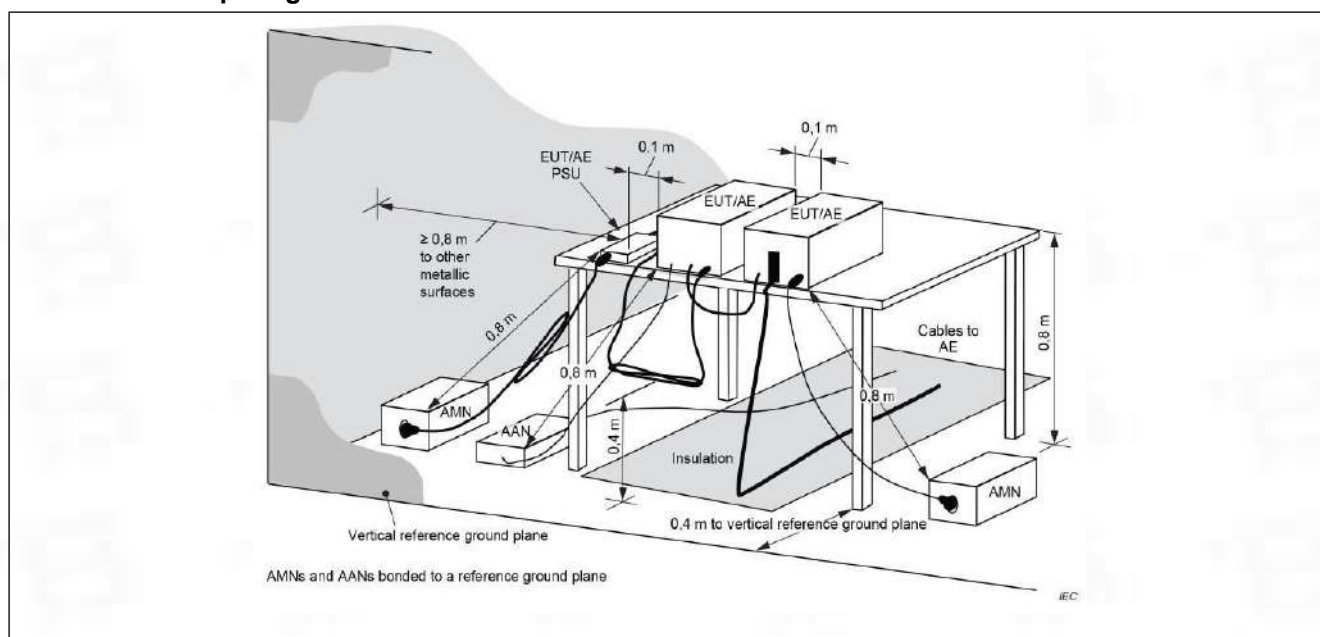
### 6.1 Conducted Emission at AC power line

Test Requirement:	Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 ohms line impedance stabilization network (LISN).		
Test Method:	Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices		
Test Limit:	Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
*Decreases with the logarithm of the frequency.			

### 6.1.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.2 °C
Humidity:	50.5 %
Atmospheric Pressure:	1010 mbar

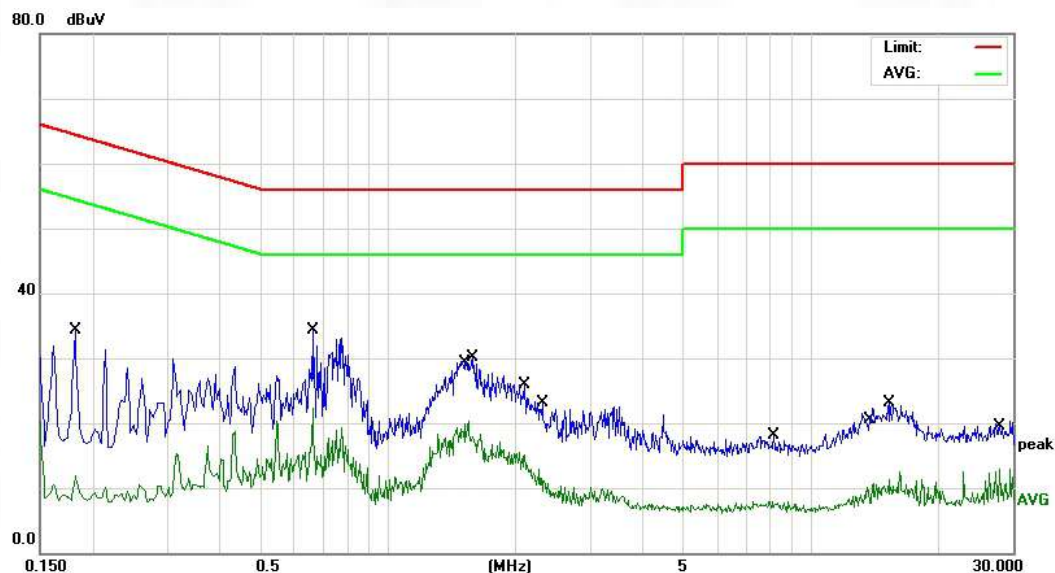
### 6.1.2 Test Setup Diagram:





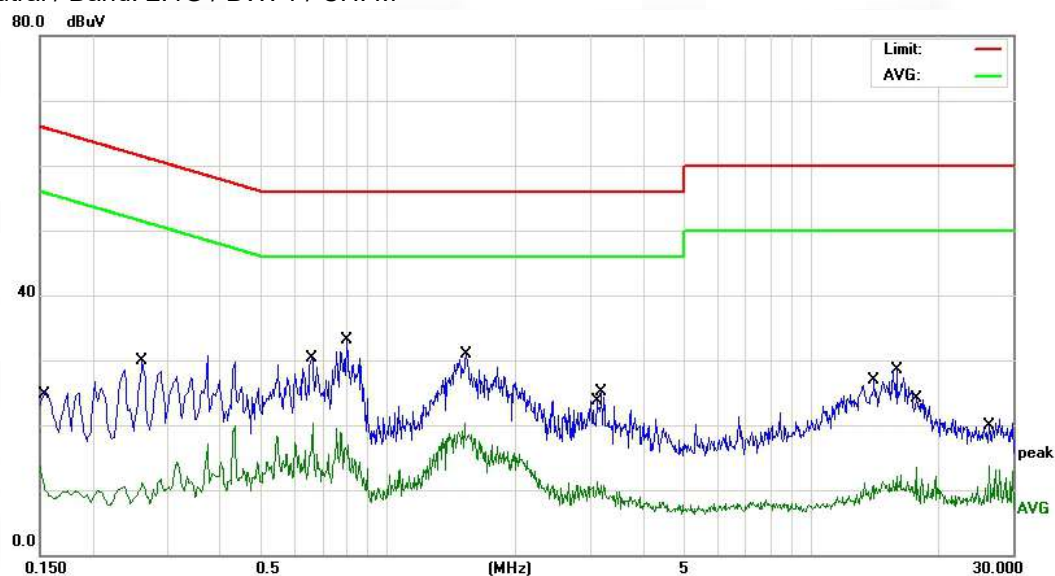
### 6.1.3 Test Data:

Line: Line / Band: 2.4G / BW: 1 / CH: M



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1819	23.86	10.45	34.31	64.39	-30.08	QP
2		0.1819	1.41	10.45	11.86	54.39	-42.53	AVG
3	*	0.6620	23.81	10.53	34.34	56.00	-21.66	QP
4		0.6620	11.83	10.53	22.36	46.00	-23.64	AVG
5		1.5500	9.64	10.64	20.28	46.00	-25.72	AVG
6		1.5820	19.39	10.64	30.03	56.00	-25.97	QP
7		2.1020	15.20	10.71	25.91	56.00	-30.09	QP
8		2.3020	0.83	10.71	11.54	46.00	-34.46	AVG
9		8.1500	7.33	10.80	18.13	60.00	-41.87	QP
10		13.6020	-1.05	11.10	10.05	50.00	-39.95	AVG
11		15.3860	11.95	11.19	23.14	60.00	-36.86	QP
12		27.9980	1.81	11.17	12.98	50.00	-37.02	AVG

Line: Neutral / Band: 2.4G / BW: 1 / CH: M



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1500	3.27	10.45	13.72	55.99	-42.27	AVG
2		0.2620	19.35	10.46	29.81	61.36	-31.55	QP
3		0.6620	9.85	10.53	20.38	46.00	-25.62	AVG
4	*	0.7980	22.52	10.54	33.06	56.00	-22.94	QP
5		1.5140	9.58	10.63	20.21	46.00	-25.79	AVG
6		1.5300	20.23	10.63	30.86	56.00	-25.14	QP
7		3.1380	0.50	10.72	11.22	46.00	-34.78	AVG
8		3.1940	14.39	10.72	25.11	56.00	-30.89	QP
9		14.0820	15.78	11.13	26.91	60.00	-33.09	QP
10		15.9220	17.31	11.17	28.48	60.00	-31.52	QP
11		17.6940	2.28	11.12	13.40	50.00	-36.60	AVG
12		26.3860	2.52	11.14	13.66	50.00	-36.34	AVG



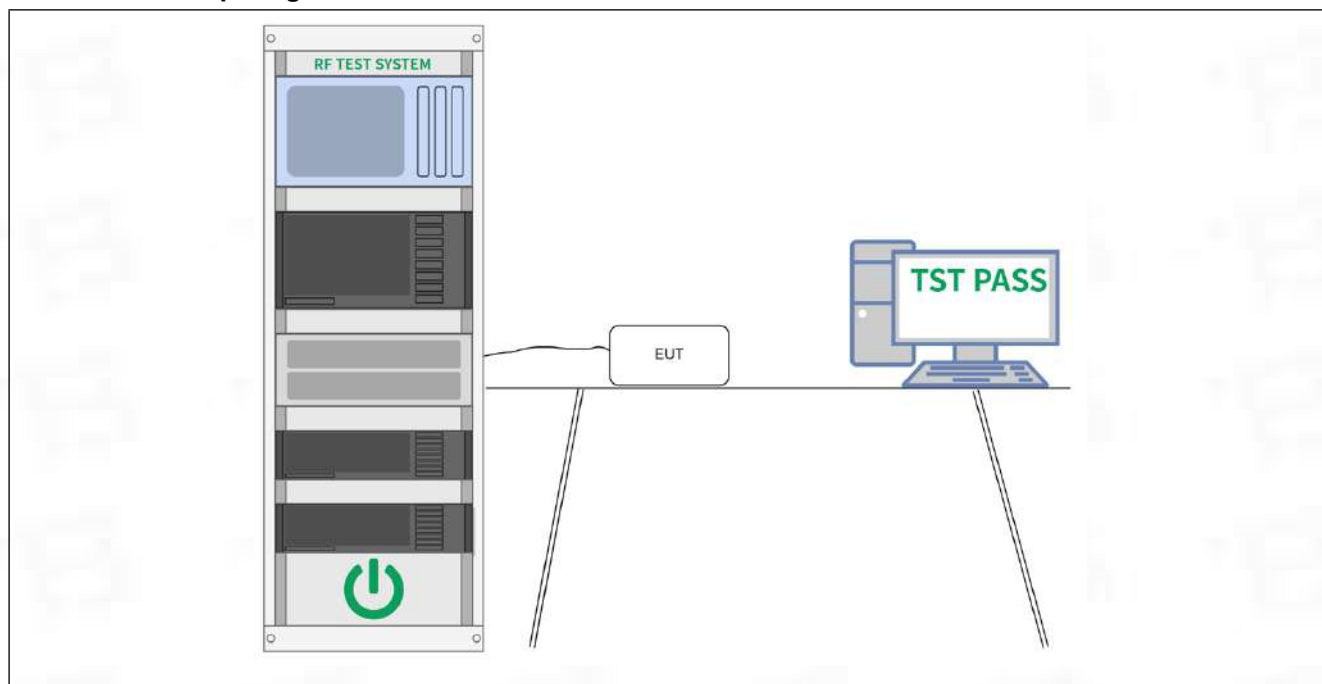
## 6.2 Occupied Bandwidth

Test Requirement:	Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
Test Method:	DTS bandwidth
Test Limit:	Section (a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
Procedure:	a) Set RBW = 100 kHz. b) Set the VBW $\geq [3 \times \text{RBW}]$ . c) Detector = peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 6.2.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.8 °C
Humidity:	49.9 %
Atmospheric Pressure:	1010 mbar

### 6.2.2 Test Setup Diagram:



### 6.2.3 Test Data:

Please Refer to Appendix for Details.

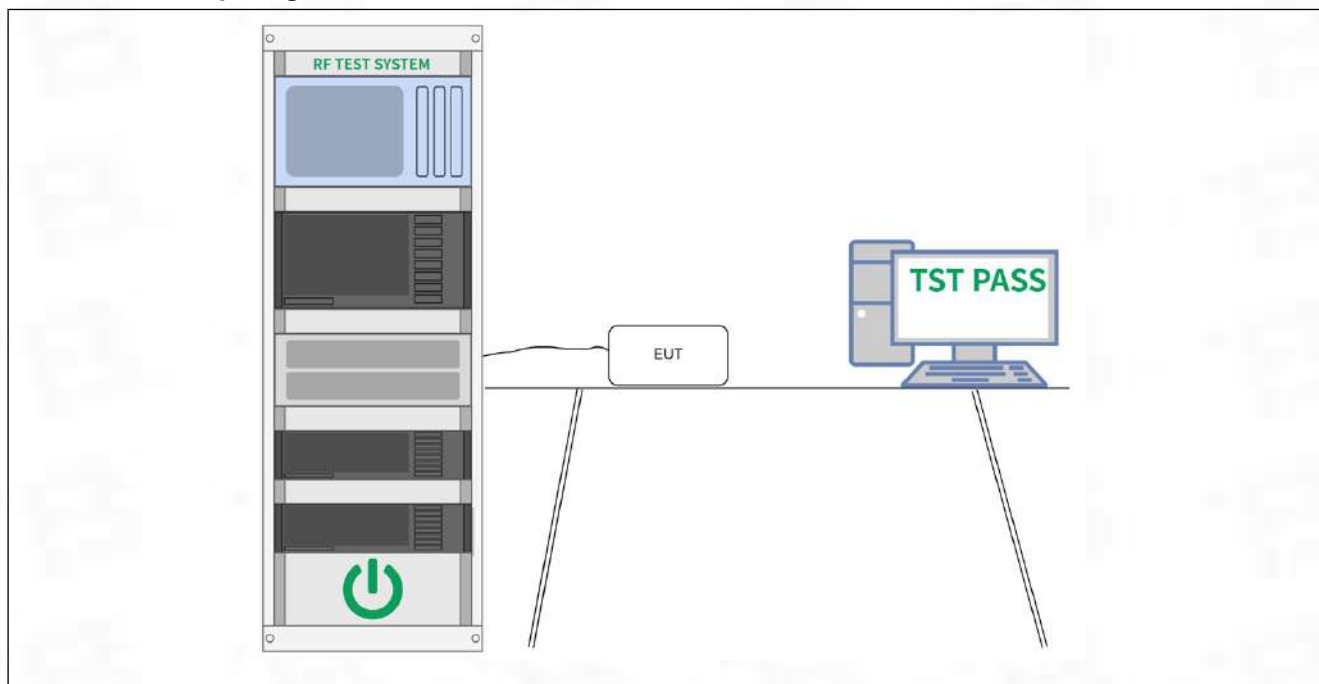
### 6.3 Maximum Conducted Output Power

Test Requirement:	For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
Test Method:	Maximum peak conducted output power
Test Limit:	For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
Procedure:	ANSI C63.10-2013, section 11.9.1 Maximum peak conducted output power

#### 6.3.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.8 °C
Humidity:	49.9 %
Atmospheric Pressure:	1010 mbar

### 6.3.2 Test Setup Diagram:



### 6.3.3 Test Data:

Please Refer to Appendix for Details.

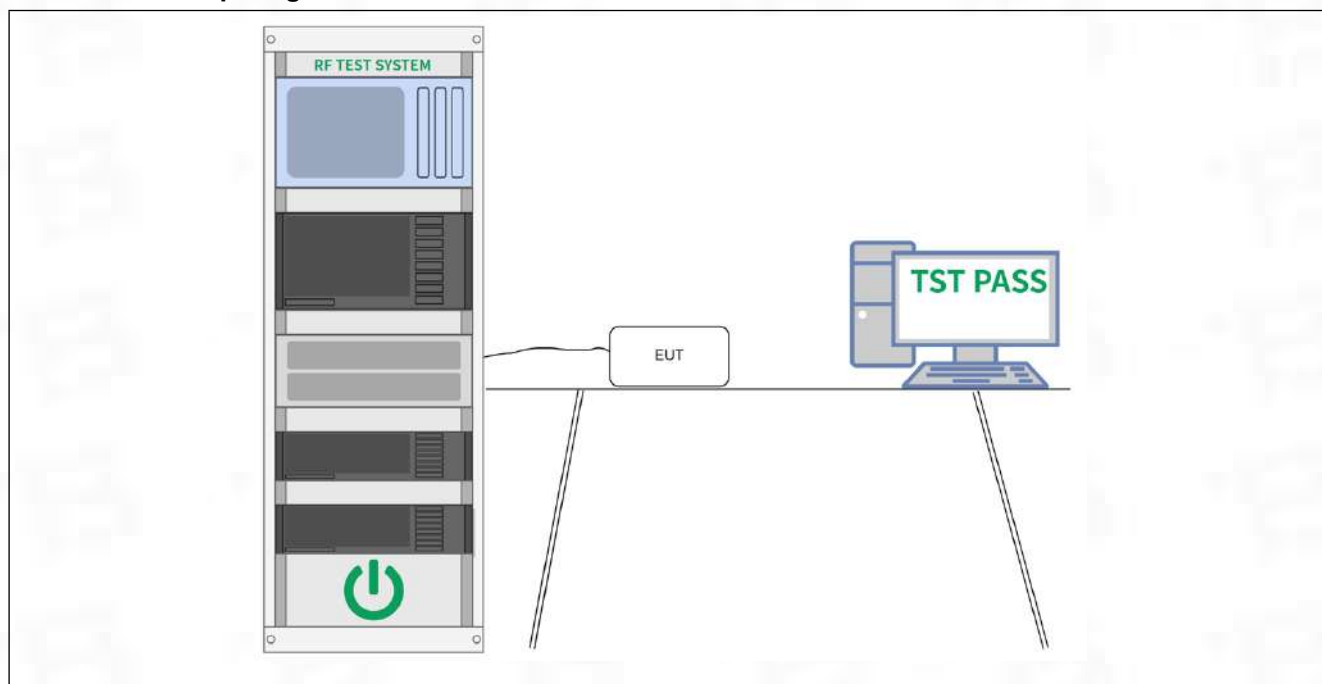
## 6.4 Power Spectral Density

Test Requirement:	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
Test Method:	Maximum power spectral density level in the fundamental emission
Test Limit:	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### 6.4.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.8 °C
Humidity:	49.9 %
Atmospheric Pressure:	1010 mbar

### 6.4.2 Test Setup Diagram:



### 6.4.3 Test Data:

Please Refer to Appendix for Details.

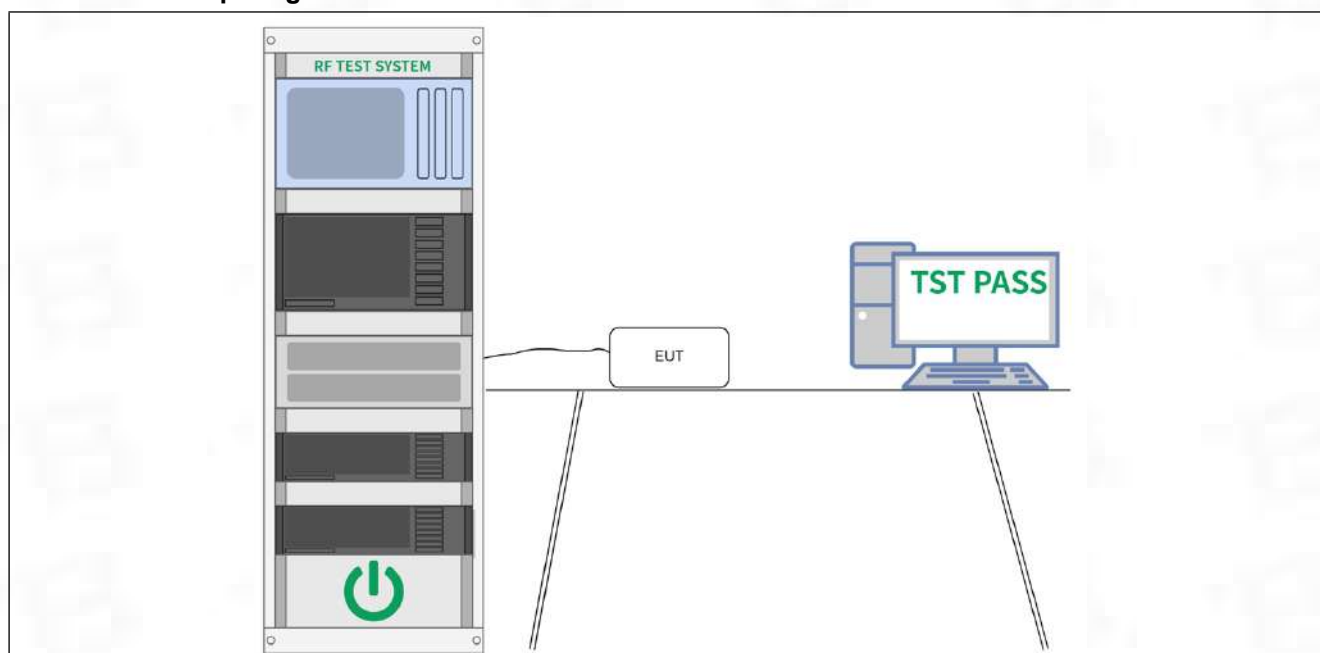
## 6.5 Emissions in non-restricted frequency bands

Test Requirement:	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 Method:	Emissions in nonrestricted frequency bands
Test Limit:	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.
Procedure:	ANSI C63.10-2013 Section 11.11.1, Section 11.11.2, Section 11.11.3

### 6.5.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.8 °C
Humidity:	49.9 %
Atmospheric Pressure:	1010 mbar

### 6.5.2 Test Setup Diagram:



---

**6.5.3 Test Data:**

Please Refer to Appendix for Details.

## 6.6 Band edge emissions (Radiated)

Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`		
Test Method:	Radiated emissions tests		
Test Limit:	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
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.			
Procedure:	ANSI C63.10-2013 section 6.6.4		

### 6.6.1 E.U.T. Operation:

Operating Environment:	
Temperature:	22.1 °C
Humidity:	46.3 %
Atmospheric Pressure:	1010 mbar

### 6.6.2 Test Data:

Test result for GFSK Mode (the worst case)

Frequency	Reading	Correct Factor	Emission Level	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel							
2390	61.83	-8.76	53.07	74	20.93	H	PK
2390	55.29	-8.76	46.53	54	7.47	H	AV
2390	62.10	-8.73	53.37	74	20.63	V	PK
2390	54.88	-8.73	46.15	54	7.85	V	AV
High Channel							
2483.5	60.56	-8.76	51.80	74	22.20	H	PK
2483.5	53.86	-8.76	45.10	54	8.90	H	AV
2483.5	62.11	-8.73	53.38	74	20.62	V	PK
2483.5	56.19	-8.73	47.46	54	6.54	V	AV



## 6.7 Emissions in restricted frequency bands (below 1GHz)

Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`		
Test Method:	Radiated emissions tests		
Test Limit:	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
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.			
Procedure:	ANSI C63.10-2013 section 6.6.4		

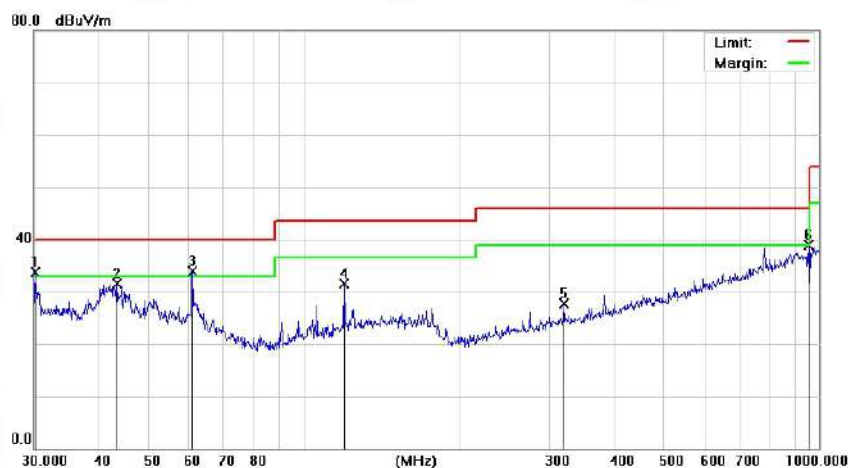
### 6.7.1 E.U.T. Operation:

Operating Environment:	
Temperature:	22.1 °C
Humidity:	46.3 %
Atmospheric Pressure:	1010 mbar

### 6.7.2 Test Data:

Note: All the mode have been tested, and only the worst case of 1M mode are in the report

Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	!	30.2111	31.48	2.19	33.67	40.00	-6.33	QP
2		43.5057	28.35	3.08	31.43	40.00	-8.57	QP
3	*	60.9176	32.20	1.73	33.93	40.00	-6.07	QP
4		119.8556	30.36	1.16	31.52	43.50	-11.98	QP
5		319.9370	24.97	2.81	27.78	46.00	-18.22	QP
6		955.4381	23.91	15.08	38.99	46.00	-7.01	QP

Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	30.0000	50.60	-16.61	33.99	40.00	-6.01	QP
2		42.1542	47.06	-16.52	30.54	40.00	-9.46	QP
3		60.7044	47.65	-16.70	30.95	40.00	-9.05	QP
4		119.8556	48.06	-16.83	31.23	43.50	-12.27	QP
5		177.5092	47.31	-16.81	30.50	43.50	-13.00	QP
6	!	903.3094	53.85	-14.66	39.19	46.00	-6.81	QP

## 6.8 Emissions in restricted frequency bands (above 1GHz)

Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`		
Test Method:	Radiated emissions tests		
Test Limit:	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
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.			
Procedure:	ANSI C63.10-2013 section 6.6.4		

### 6.8.1 E.U.T. Operation:

Operating Environment:	
Temperature:	22.1 °C
Humidity:	46.3 %
Atmospheric Pressure:	1010 mbar

## 6.8.2 Test Data:

Freq. (MHz)	Low channel: 2402MHz						
	Ant.Pol	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4804	V	59.91	41.50	74	54	-14.09	-12.50
7206	V	58.72	39.48	74	54	-15.28	-14.52
4804	H	58.98	39.70	74	54	-15.02	-14.30
7206	H	59.73	40.73	74	54	-14.27	-13.27

Freq. (MHz)	Middle channel: 2440MHz						
	Ant.Pol	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4880	V	58.68	40.06	74	54	-15.32	-13.94
7320	V	59.15	39.62	74	54	-14.85	-14.38
4880	H	59.23	40.95	74	54	-14.77	-13.05
7320	H	58.62	39.62	74	54	-15.38	-14.38

Freq. (MHz)	High channel: 2480 MHz						
	Ant.Pol	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4960	V	59.81	40.36	74	54	-14.19	-13.64
7440	V	59.37	40.24	74	54	-14.63	-13.76
4960	H	59.67	39.72	74	54	-14.33	-14.28
7440	H	58.17	39.17	74	54	-15.83	-14.83

### Note:

1. All emissions not reported were more than 20dB below the specified limit or in the noise floor.
2. Emission Level= Reading Level+Probe Factor +Cable Loss.

Data of measurement within this frequency range shown “--” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

# Appendix

## 1. Bandwidth

### 1.1 BW

#### 1.1.1 Test Result

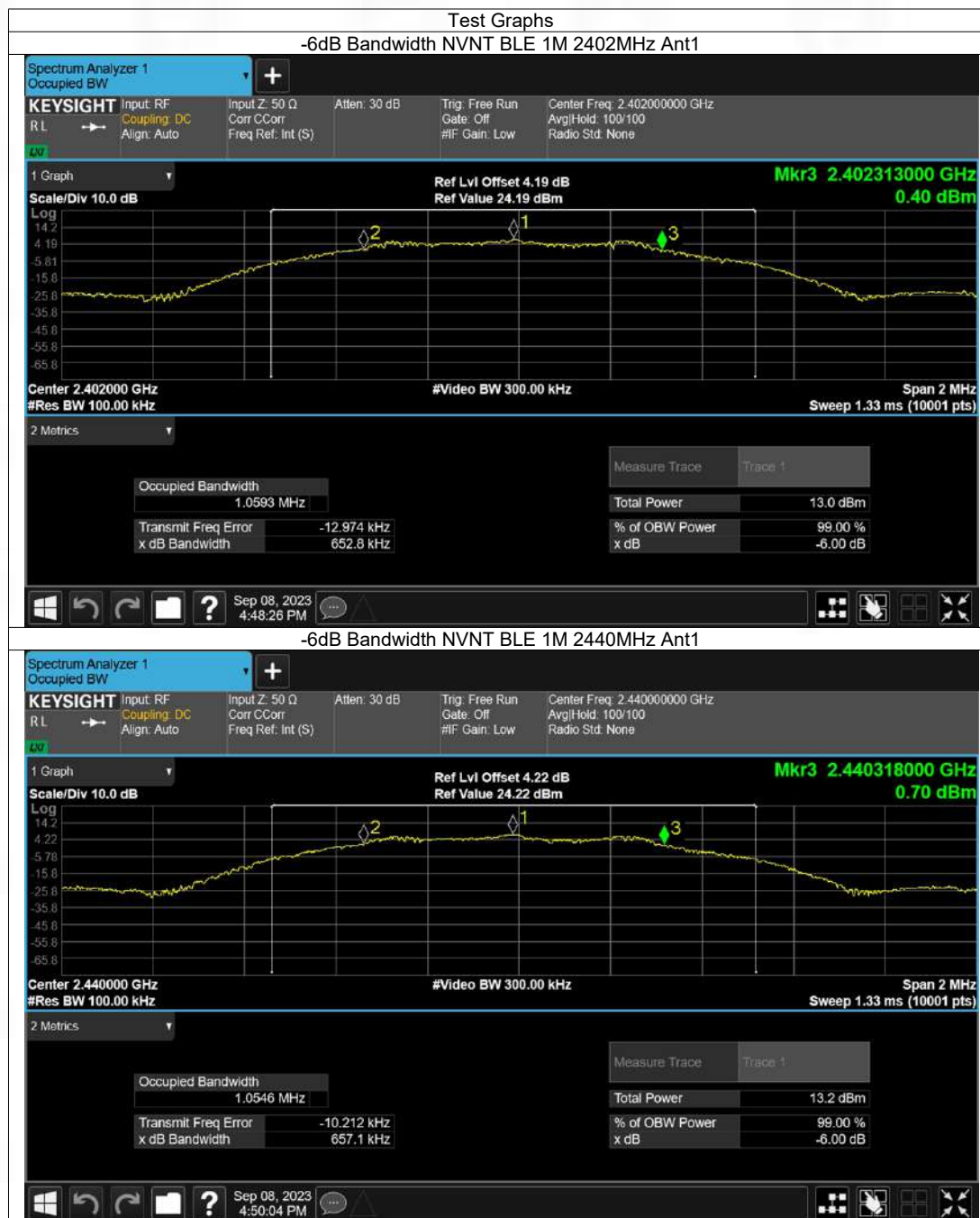
##### BLE 1M

Test channel	6dB Emission Bandwidth (kHz)		
	BT LE mode	Limit	Result
Lowest	0.653	>500k	PASS
Middle	0.657	>500k	
Highest	0.681	>500k	

##### BLE 2M

Test channel	6dB Emission Bandwidth (kHz)		
	BT LE mode	Limit	Result
Lowest	1.103	>500k	PASS
Middle	1.106	>500k	
Highest	1.106	>500k	

## 1.1.2 Test Graph









## 2. Maximum Conducted Output Power

### 2.1 Power

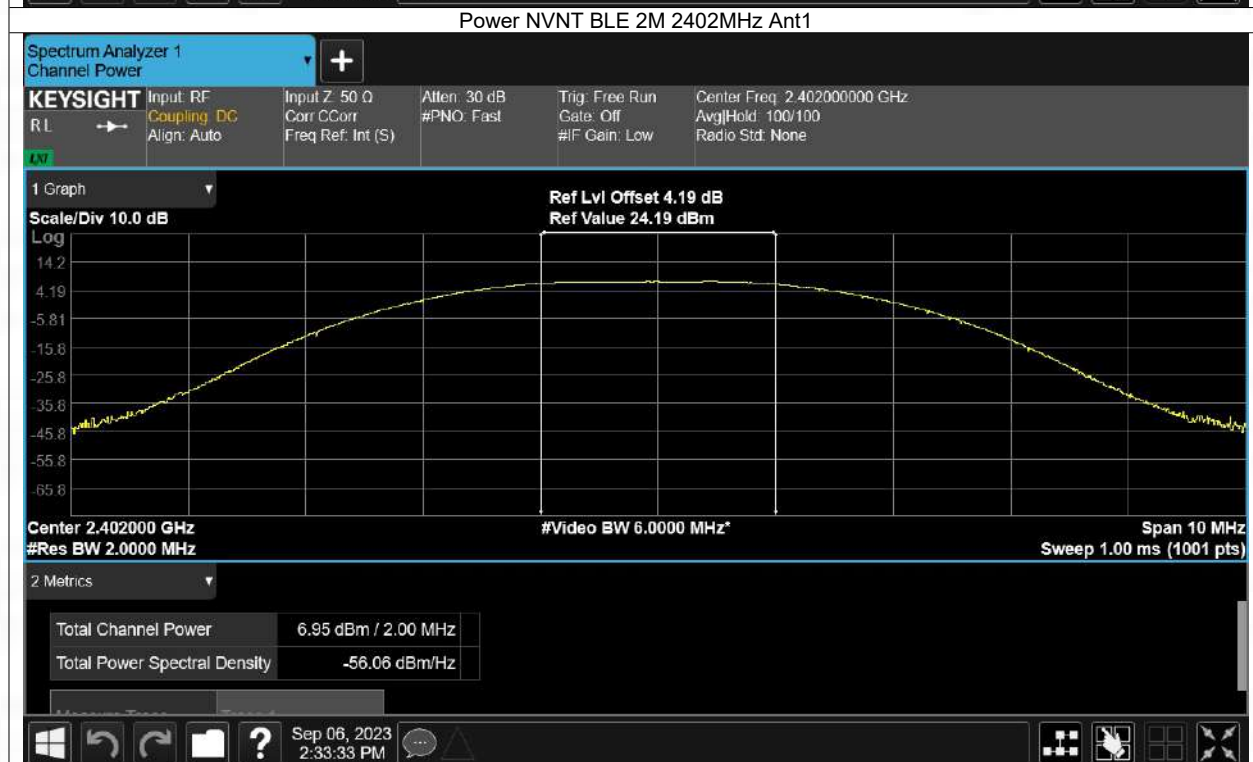
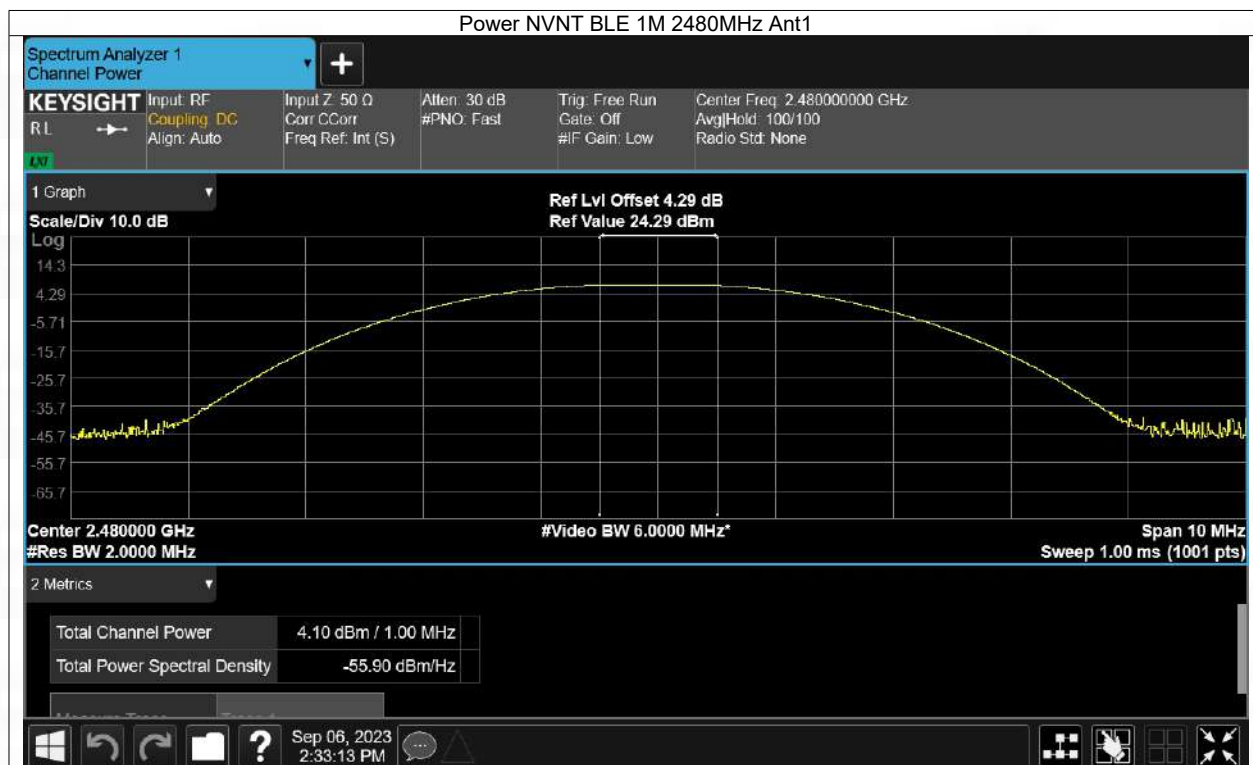
#### 2.1.1 Test Result

BLE 1M			
Test channel	Maximum Conducted Output Power (dBm)	Limit (dBm)	Result
Lowest	4.16	30.00	PASS
Middle	4.16	30.00	PASS
Highest	4.1	30.00	PASS

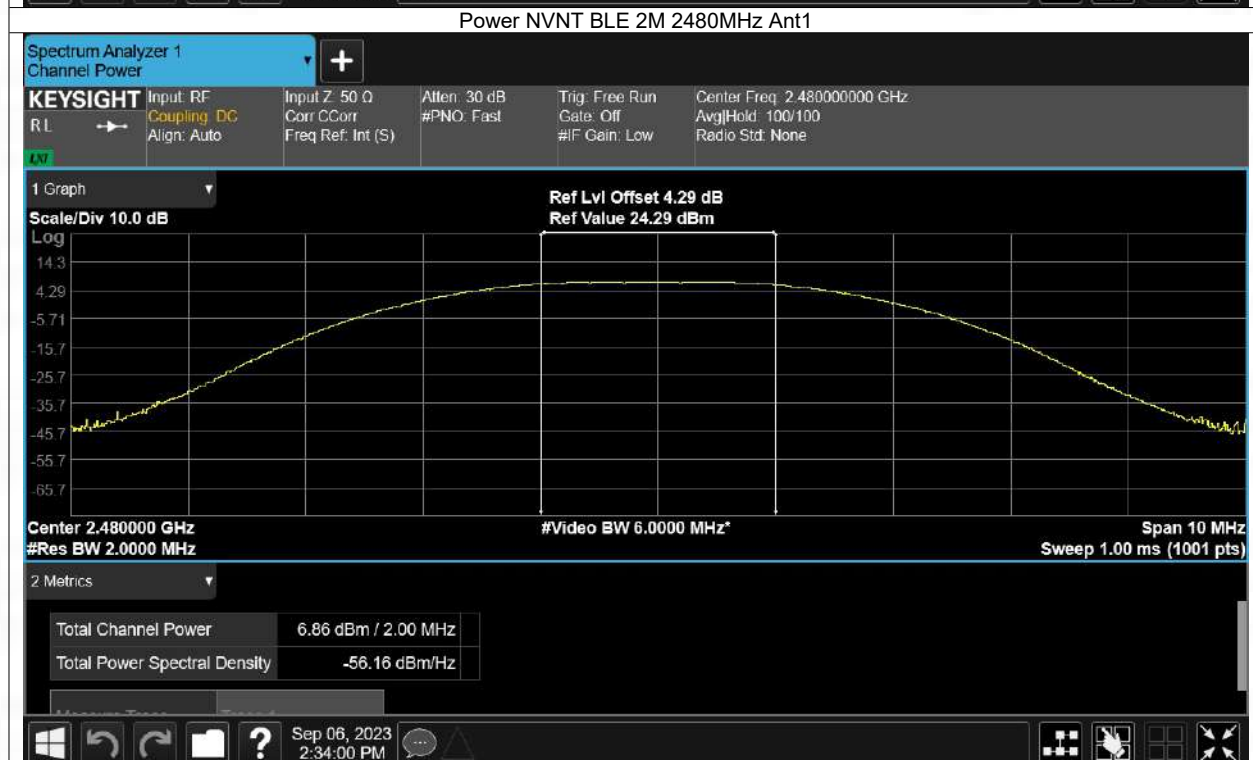
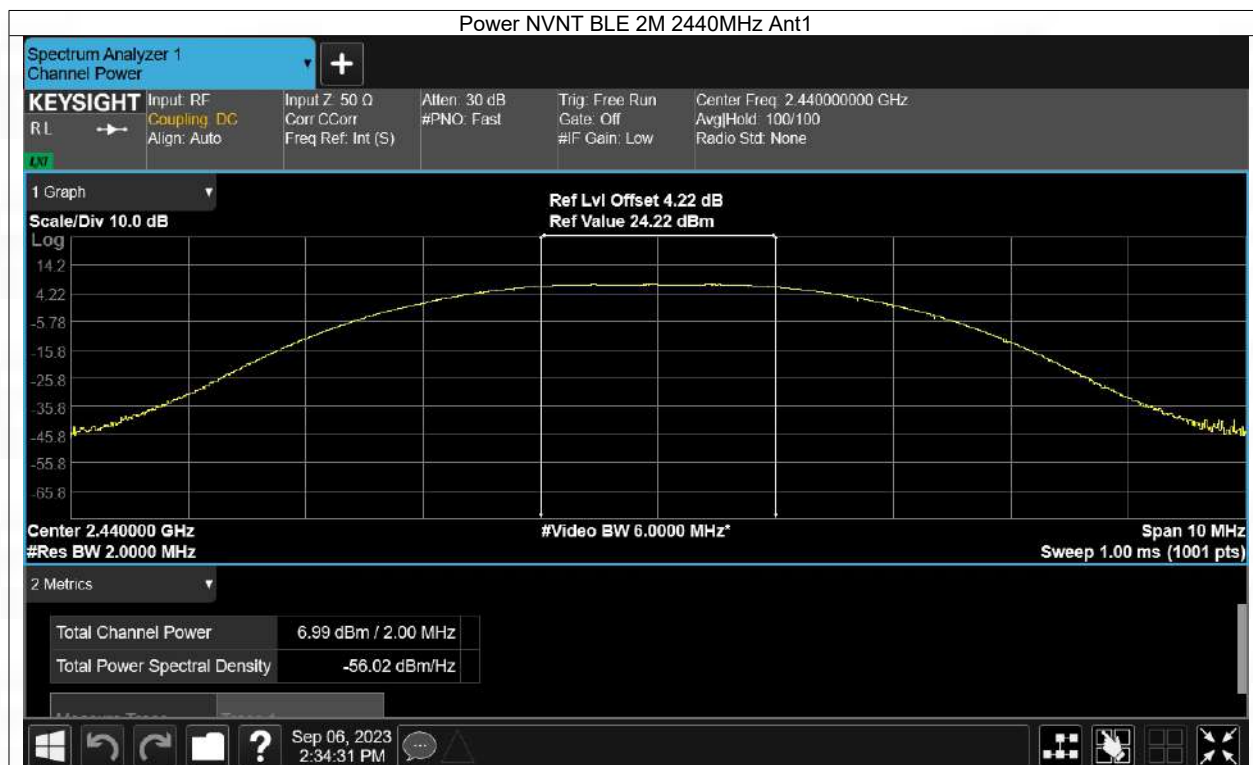
BLE 2M			
Test channel	Maximum Conducted Output Power (dBm)	Limit (dBm)	Result
Lowest	6.95	30.00	PASS
Middle	<b>6.99</b>	30.00	PASS
Highest	6.86	30.00	PASS

## 2.1.2 Test Graph









### 3. Maximum Power Spectral Density

#### 3.1 PSD

##### 3.1.1 Test Result

Test channel	Power Spectral Density (dBm/3kHz)		
	BLE 1M	Limit	Result
Lowest	-7.95	8 dBm/3kHz	PASS
Middle	-8.11	8 dBm/3kHz	
Highest	-8.7	8 dBm/3kHz	

Test channel	Power Spectral Density (dBm/3kHz)		
	BLE 2M	Limit	Result
Lowest	-10.45	8 dBm/3kHz	PASS
Middle	-10.36	8 dBm/3kHz	
Highest	-10.46	8 dBm/3kHz	

### 3.1.2 Test Graph







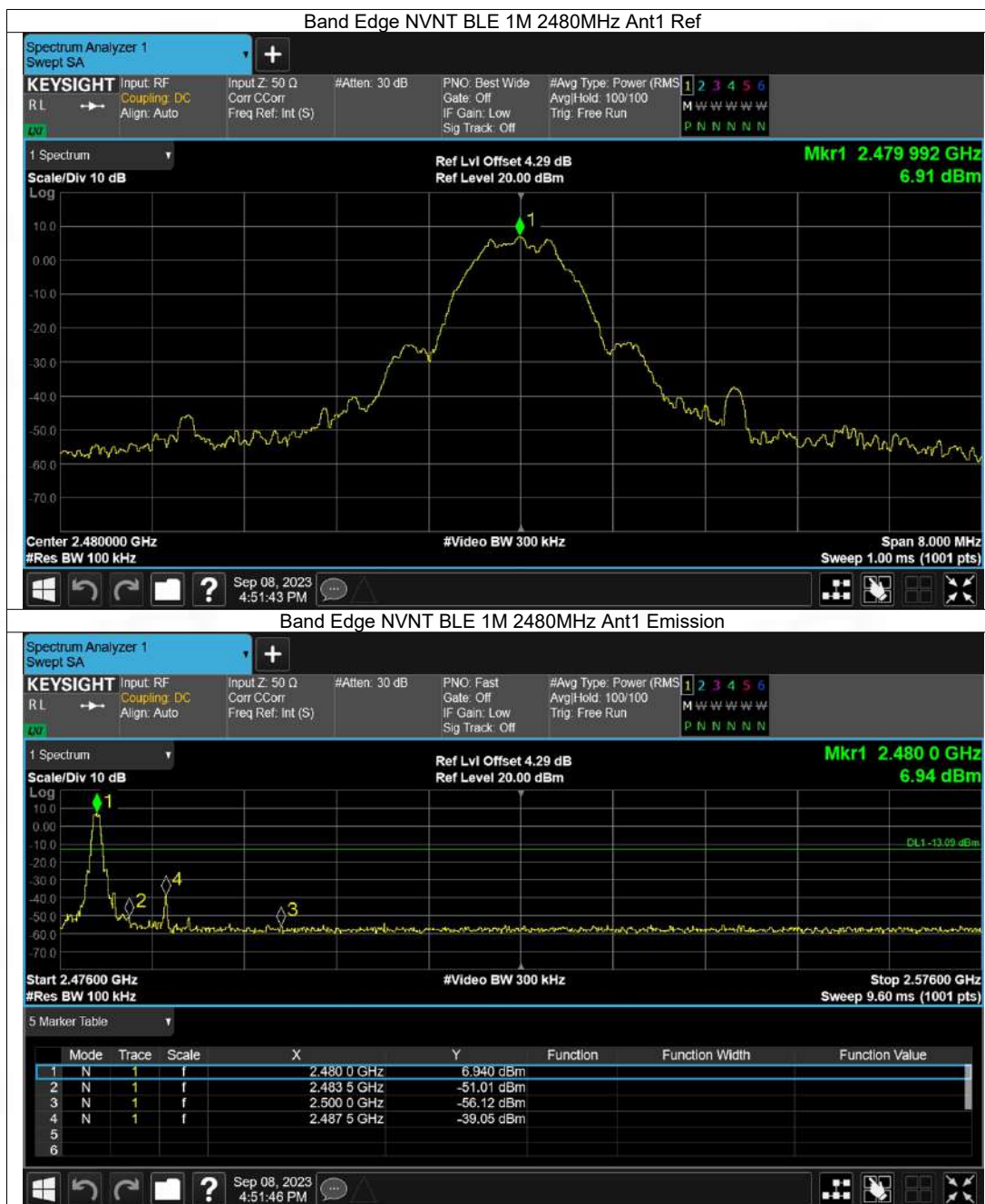


## 4. Unwanted Emissions In Non-restricted Frequency Bands

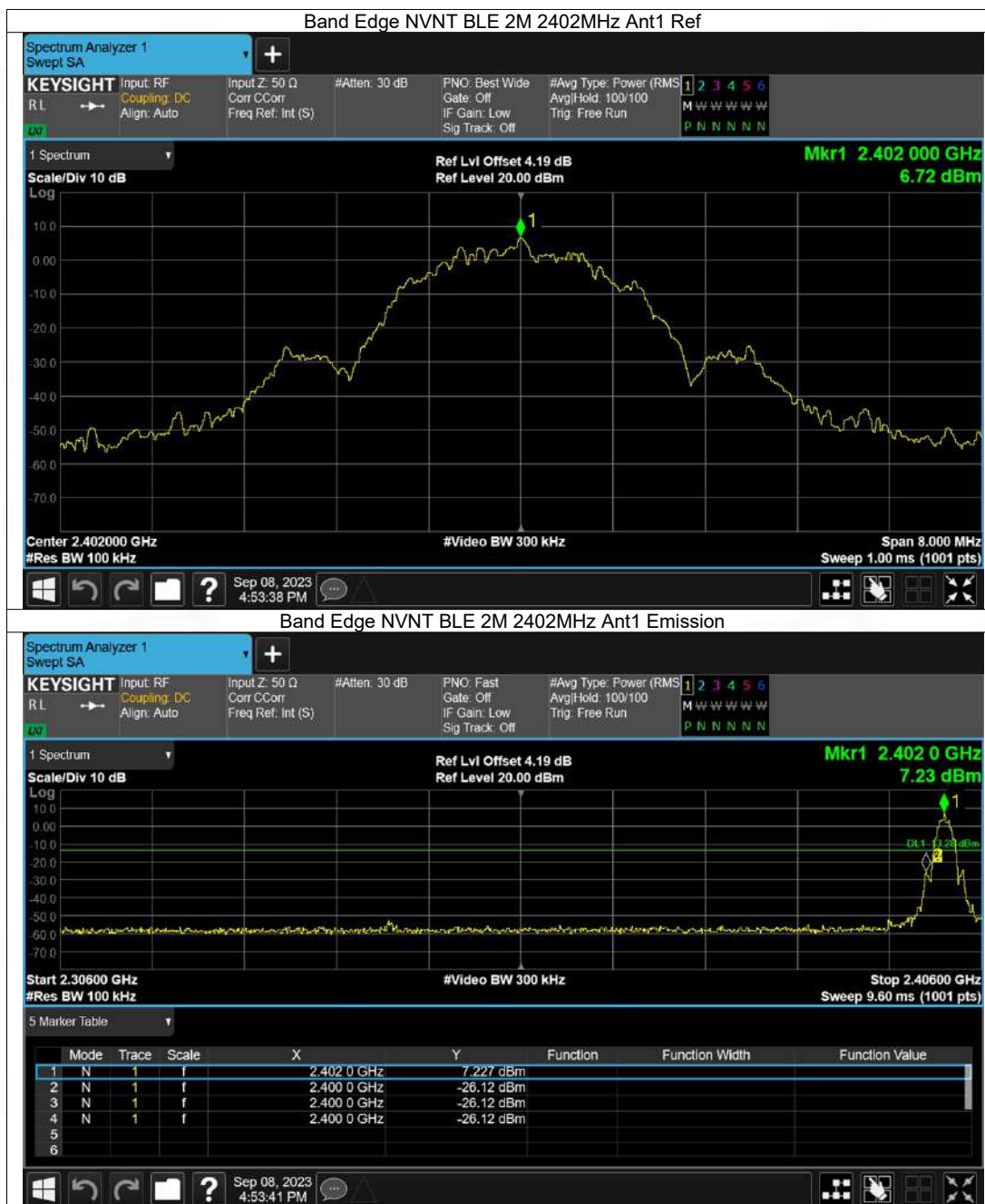
### 4.1.1 Test Result(PASS)

## 4.1.2 Test Graph









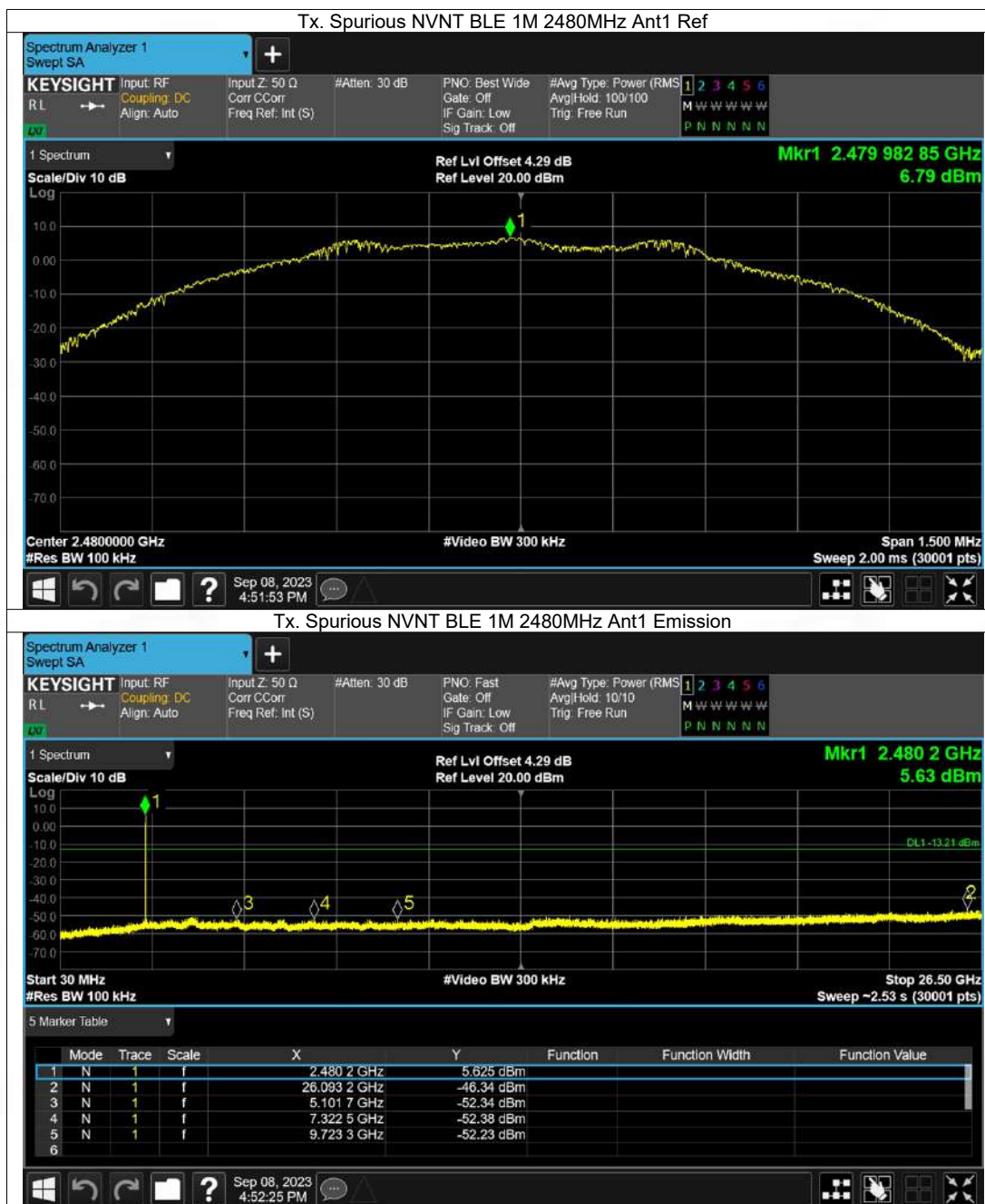


## Conducted RF Spurious Emission



















Test Report Number: BTF230918R00101



BTF Testing Lab (Shenzhen) Co., Ltd.

F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street,  
Bao'an District, Shenzhen, China

[www.btf-lab.com](http://www.btf-lab.com)

**-- END OF REPORT --**