



TEST REPORT

Report Number. : 14162796-E1V2

Applicant : Wifrost inc
761 De Soto Dr
Palo Alto CA 94303
USA

Model(s) : LT100B

FCC ID : 2A4QULT100B

EUT Description : Wireless TVWS Fixed Base

Test Standard(s) : FCC 47 CFR PART 15 SUBPART H

Date Of Issue:
2023-07-06

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2023-06-22	Initial release	---
V2	2023-07-06	Section 11 updated Section 13.1.4 updated	Henry Laue

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Wifrost inc
761 De Soto Dr
Palo Alto CA 94303
USA

EUT DESCRIPTION: Wireless TVWS Fixed Base

MODEL: LT100B

SERIAL NUMBER: SER80029C555C74(Database), GMH210107000184 (Radio),

DATE TESTED: February 24 & March 3, 2022 (DATABASE)
June 20 2022– May 9, 2023(Radiated & Conducted)

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART H	Comply

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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2. SCOPE

This report documents the results of RF, emissions and database tests for a TVWS Fixed Base Device. This report will demonstrate compliance to the applicable rules in Part 15 Subpart H – White Space Devices.

This report covers testing requirements for Base station.

3. TEST RESULTS SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

FCC Clause	Requirement	Result	Comment
§15.709 (b)(1)	Output Power and PSD	Complies	None
§15.709 (b)(1)	Band-Edge	Complies	None
§15.709 (b)(1)	Adjacent Channel emissions	Complies	None
§15.209	Radiated emissions	Complies	None
§15.709 (c)(4) / §15.207	AC Line Conducted Emissions	Complies	None
§15.713(g)(3)	Fixed WSD registration	Complies	None
§15.711(c)(2)(ii)	Fixed WSD channels of operation	Complies	None
§15.711(h)	Fixed TVDB database update	Complies	None
FCC §15.711(c)(2)(iii) FCC §15.713(a)(1)	48 Hour Channel scheduling	Complies	None
FCC §15.707 FCC §15.711(c) FCC §15.712	WSD Channel Availability	Complies	None
§15.715(f) §15.713(i) §15.711(j)	Security	Complies	None
§15.711(i)	Push Notification to Fixed	Complies	None
§15.711(b)	Location Accuracy	Complies	None
§15.712	Interference Protection requirement	Complies	None
§15.711(c)(2)(ii) §15.715(e)	Fixed Power level reduction	Complies	None

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 15 Subpart H, KDB 416721 D01 v04r01, KDB 662911 D01 Multiple Transmitter Output v02r01 and ANSI C63.10-2013.

5. FACILITIES AND ACCREDITATION

UL Verification Services Inc is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input checked="" type="checkbox"/>	Building 1: 47173 Benicia Street Fremont, California 94538, U.S.A.	US0104	2324A	550739
<input type="checkbox"/>	Building 2: 47266 Benicia Street Fremont, California 94538, U.S.A.	US0104	2324A	550739
<input checked="" type="checkbox"/>	Building 4: 47658 Kato Rd Fremont, California 94538, U.S.A.	US0104	2324A	550739

6. DECISION RULES AND MEASUREMENT UNCERTAINTY

6.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

6.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

6.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U _{Lab}
Conducted Antenna Port Emission Measurement	1.940
Power Spectral Density	2.466
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
RF Power Measurement Direct Method Using Power Meter	0.450 Peak 1.300 Ave.
Time Domain Measurements Using SA	3.39
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz (E-field)	2.84 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz (H-field)	2.87 dB
LogP 3m Horizontal	4.84 dB
LogP 3m Vertical	6.01 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB
Worst Case Occupied Bandwidth	0.09dB / 2.00%

Uncertainty figures are valid to a confidence level of 95%.

6.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.

$$36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$$

7. EQUIPMENT UNDER TEST

7.1. DESCRIPTION OF EUT

The EUT is a UHF TVWS fixed Wireless Base Station.

7.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum power as follows;

BAND	Frequency Range (MHz)	Conducted		EIRP	
		Output Power (dBm)	Output Power (mW)	Output Power (dBm)	Output Power (mW)
UHF	473 -611	22.96	197.70	36.96	4965.92

7.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type, as provided by the manufacturer' are as follows:

Type	Band	Gain	
		Antenna 1	Antenna 2
Panel (Base)	UHF	14 dBi	14 dBi

7.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 2.1.2762.

7.5. WORST-CASE CONFIGURATION AND MODE

For below 30MHz radiated emissions and power line conducted emissions were performed with the EUT set to transmit at the channel with the highest power and PSD.

For Below 1GHz, radiated emissions were performed with the EUT set to transmit at channels 14, 21 and 33.

For Above 1GHz, radiated emissions were performed with the EUT set to transmit at channels 14, 25, and 37.

The EUT was set to only 6MHz bandwidths due to power across bandwidths are the same and 6Mhz bandwidth having the highest PSD.

The EUT supports multiple bandwidths

- 6MHz
- 12MHz
- 18Mhz
- 24MHz

The worst case data rate tested was QPSK.

- BW=6MHz - 8.4Mbps
- BW=12MHz - 16.8Mbps
- BW=18MHz - 25.2Mbps
- BW=24MHz - 33.6Mbps

All final radiated testing was performed with the EUT in the intended orientation as indicated by manufacturer.

7.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
Laptop	Lenovo	TYPE 20L8-S1UV00	PC-134NA9 19/03
AC/DC Adapter	Lenovo	ADLX65YDC2A	8SSA10M13944D1SG8C40F1X
PoE	Phihong Technology Co.,Ltd	POE-1AT	P210400159A1

I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	2	AC	Un-shielded	1	
2	RJ45	2	RJ45	Un-shielded	3	PoE to EUT and data to support laptop
3	SMA	1	SMA	Un-shielded	0.4	Antenna port
4	DC	1	DC	Un-shielded	1	To support Laptop
5	N-Type	1	N-Type	Un-shielded	1	To Panel Antenna

TEST SETUP

For Transmitter test, the laptop was used to program EUT and removed during the tests. Test software exercised the radio card.

For Receiver test, the EUT is connected to a test laptop during the tests. the radio is idle and the ethernet is exercised via pinging.

SUPPORT EQUIPMENT (DATABASE)

Support Equipment List			
Description	Manufacturer	Model	Serial Number
Laptop	Apple	Mac Mini	H2WF5210Q6P0
AC/DC Adapter	Apple	N1716G	6329B12EC
PoE	Phihong Technology Co.,Ltd	POE-1AT	P210400159A1 (Base) 022111404772 (Client)
Router	TP-link	Archer A10	Y205049002466
AC/DC Adapter	TP-link	T120150-2B1	T324691EE
Client	Wifrost	LT100C	KTVWSP18BB2E

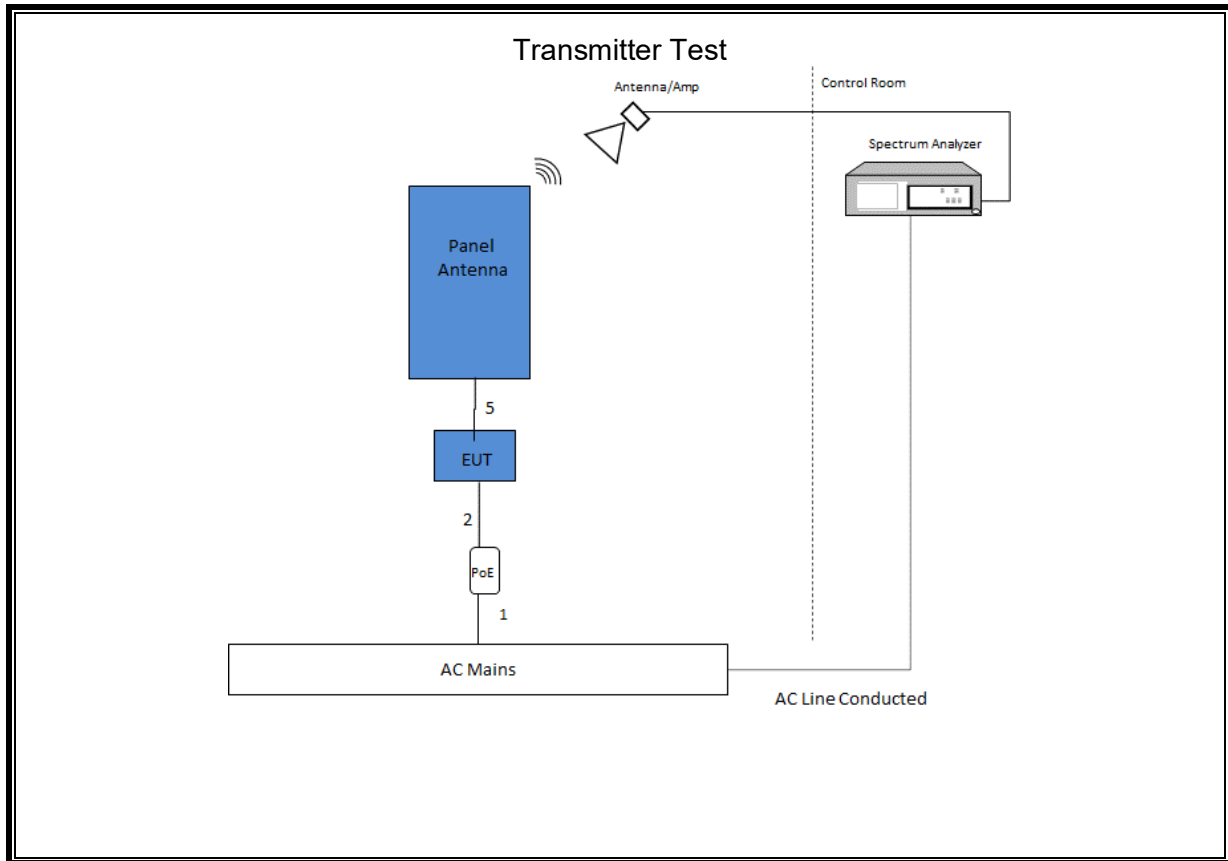
I/O CABLES (DATABASE)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	4	AC	Un-shielded	1	
2	DC	2	DC	Un-shielded	1	
3	RJ45	4	RJ45	Un-shielded	3m	
4	SMA	1	SMA	Un-shielded	0.4	Antenna port

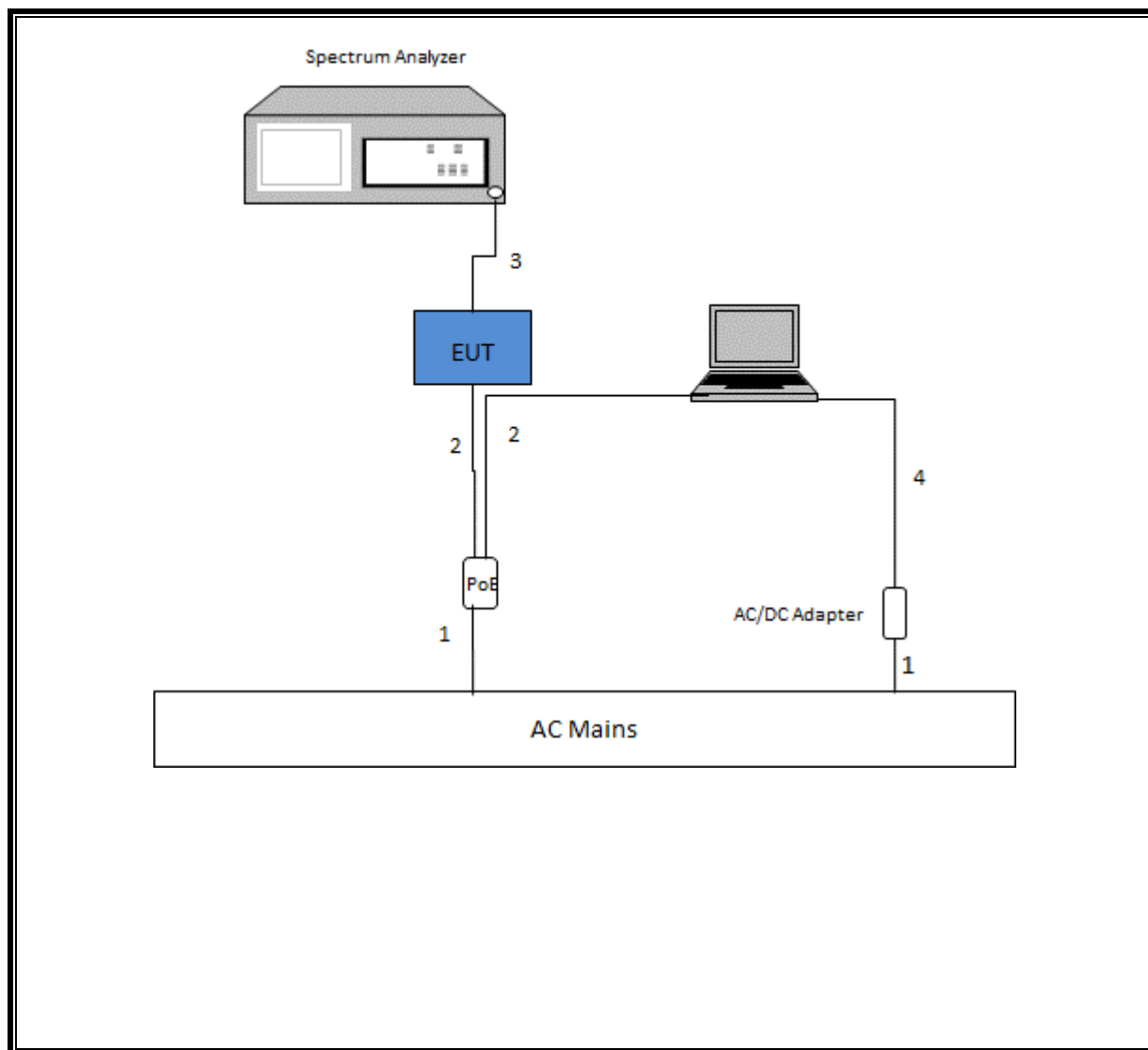
TEST SETUP

The EUT was installed in a typical configuration. The customer provided test software to exercise the EUT during test.

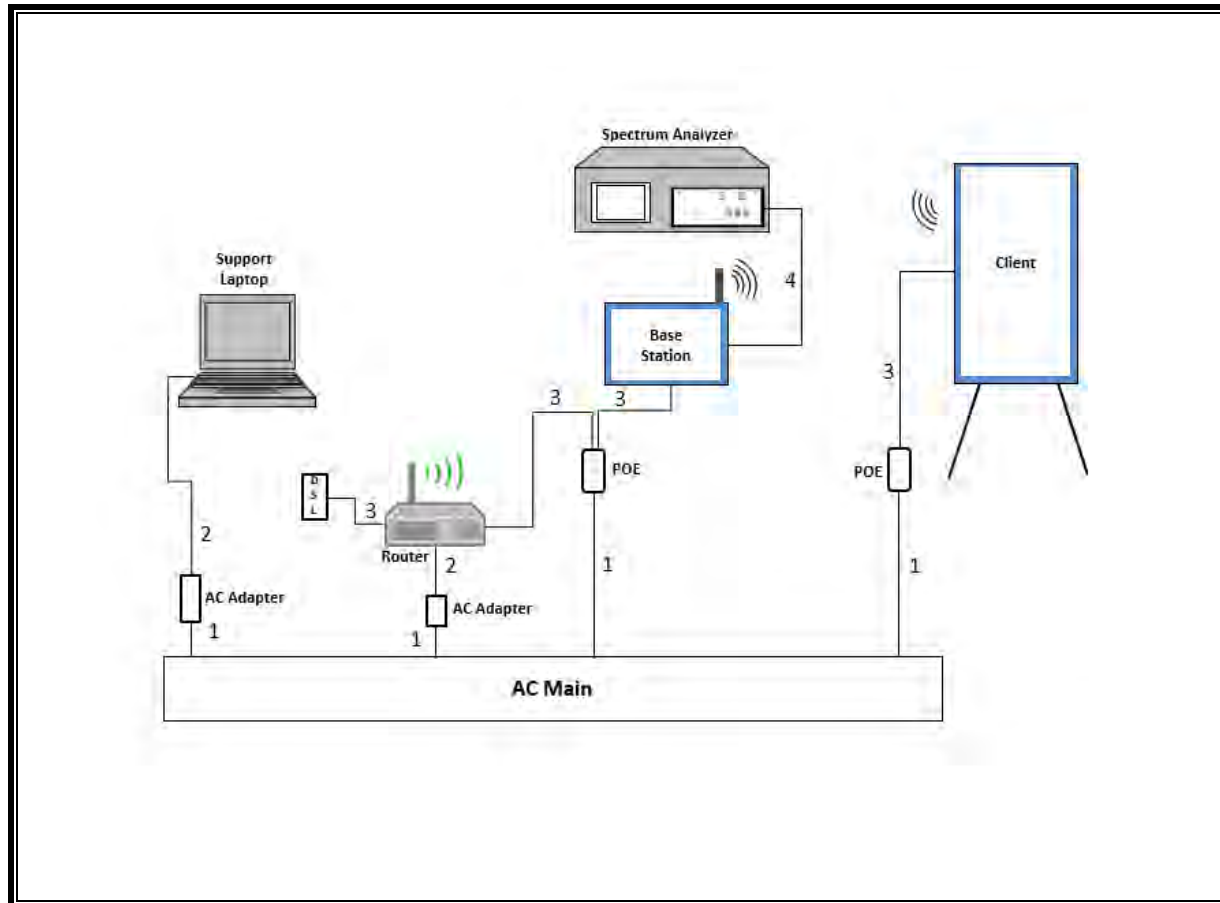
SETUP DIAGRAM FOR RADIATED EMISSIONS TESTS



SETUP DIAGRAM FOR ANTENNA PORT CONDUCTED TESTS



SETUP DIAGRAM FOR DATABASE TESTS



8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
EMI Test Receiver	Rohde & Schwarz	ESW44	191429	2024-02-29	2023-02-16
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB1	80293	2023-08-09	2022-08-09
Amplifier, 10KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310N	29654	2023-08-20	2022-08-20
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	206806	2023-10-07	2022-10-07
RF Filter Box, 1-18GHz	UL EMC	N/A	171013	2023-06-24	2022-06-24
EMI Test Receiver	Rohde & Schwarz	ESW44	225688	2024-02-29	2023-02-14
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO-METRICS	EM-6872	170016	2023-07-19	2022-07-19
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO-METRICS	EM-6871	170014	2023-07-19	2022-07-19
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	80396	2024-01-31	2023-01-27
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	80396	2023-02-01	2022-02-01
Attenuator, 10dB	Mini-Circuits	VAT-10+	231192	Verify Before Use	
Filter, Notch BRF 473MHz 1GHz Max!	EWT PRODUCTS	EWT-14-0337	80460	2024-01-26	2023-01-26
Filter, Notch / BRF 515 MHz	EWT PRODUCTS	EWT-14-0348	80459	2023-07-01	2022-07-01
Filter, Notch BRF 587MHz 1GHz Max!	EWT PRODUCTS	EWT-14-0338	80457	2023-07-01	2022-07-01
Filter, HPF 1GHz (300MHz - 8000MHz)	EWT PRODUCTS	EWT-57-0295	191812	2023-12-19	2022-12-19
AC Line Conducted					
EMI TEST RECEIVER 9kHz - 3.6GHz	ROHDE&SCHWARZ	ESR3	171646	2024/02/29	2023/02/28
L.I.S.N	Fisher Custom Communications, Inc	FCC-LISN 50/250	175765	2024/01/31	2023/01/27
Transient Limiter/ Attenuator	TE	TBFL1	207996	2023/07/15	2022/07/15
Test Software List					
Radiated Software	UL	UL EMC	Ver 9.5		
Antenna Port Software	UL	UL RF	Ver 2022.2.17		
AC Line Conducted Software	UL	UL EMC	Ver 9.5		

TEST EQUIPMENT LIST Database					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Keysight Technologies Inc	E4440A	81034	2024/01/31	2023/01/26
Test Software List					
Antenna Port Software	UL	UL RF	Ver 2022.2.17		

9. MEASUREMENT METHODS

Occupied BW (99%): KDB 416721 D01 v04 Section II, (2)(d).

Output Power / Power Spectral Density (Fixed WSD): KDB 416721 D01 v04 Section II, (2)(c)(i).

Band-Edge Measurement: KDB 416721 D01 v04 Section II (2)(e) (i)

Adjacent Channel Emissions: KDB 416721 D01 v04 Section II (2)(e)(ii)

Beyond Adjacent Channel Emissions: KDB 416721 D01 v04 Section II (2)(e)(iii)

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

10. ANTENNA PORT TEST RESULTS

10.1. OUTPUT POWER AND POWER SPECTRAL DENSITY

LIMITS

§15.709 (c) **Conducted power limits** -Fixed and Mobile devices

(1) The conducted power, PSD and adjacent channel limits for fixed white space devices operating at up to 36 dBm (4000 milliwatts) EIRP shown in the table in paragraph (b)(1) of this section are based on a maximum transmitting antenna gain of 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) The conducted power, PSD, and adjacent channel limits for fixed and mobile white space devices operating at greater than 36 dBm (4,000 milliwatts) EIRP shown in the table in paragraph (b)(1)(iii) of this section are based on a maximum transmitting antenna gain of 12 dBi. If transmitting antennas of directional gain greater than 12 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 12 dBi

(3) Maximum conducted output power is the total transmit power over the occupied bandwidth delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power 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.

Table 1 to Paragraph (b)(1)(iii)

EIRP (6 MHz)	Conducted power limit (6 MHz)	Conducted PSD limit (100 kHz) (dBm)	Conducted adjacent channel emission limit (100 kHz) (dBm)
16 dBm (40 mW)	10 dBm (10 mW)	-7.4	-62.8
20 dBm (100 mW)	14 dBm (25 mW)	-3.4	-58.8
24 dBm (250 mW)	18 dBm (63 mW)	0.6	-54.8
28 dBm (625 mW)	22 dBm (158 mW)	4.6	-50.8
32 dBm (1,600 mW)	26 dBm (400 mW)	8.6	-46.8
36 dBm (4,000 mW)	30 dBm (1,000 mW)	12.6	-42.8
40 dBm (10,000 mW)	30 dBm (1,000 mW)	12.6	-42.8
42 dBm (10,000 mW)	30 dBm (1,000 mW)	12.6	-42.8

DIRECTIONAL ANTENNA GAIN

2 TX DIRECTIONAL ANTENNA GAIN

As per manufacturer declaration, Tx chains are completely uncorrelated for power, PSD, and conducted bandedge. The directional gains are as follows:

Band	Ant 1 Antenna Gain (dBi)	Ant 2 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
UHF	14.00	14.00	14.00

RESULTS

10.1.1. UHF BAND -2TX Antenna – 6MHz

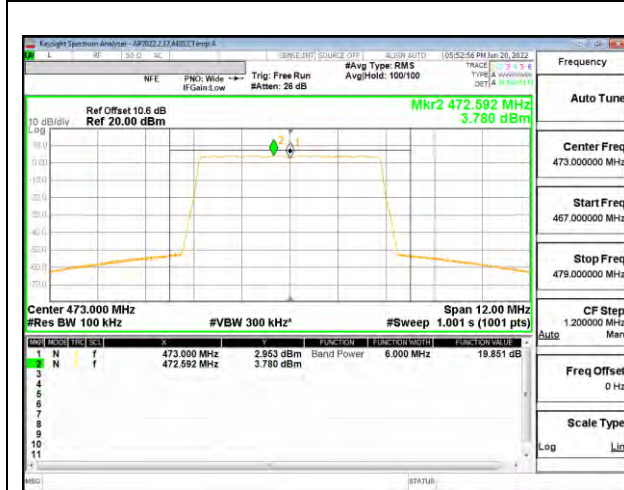
Antenna Gain (dBi)	14.00
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Output Power Results

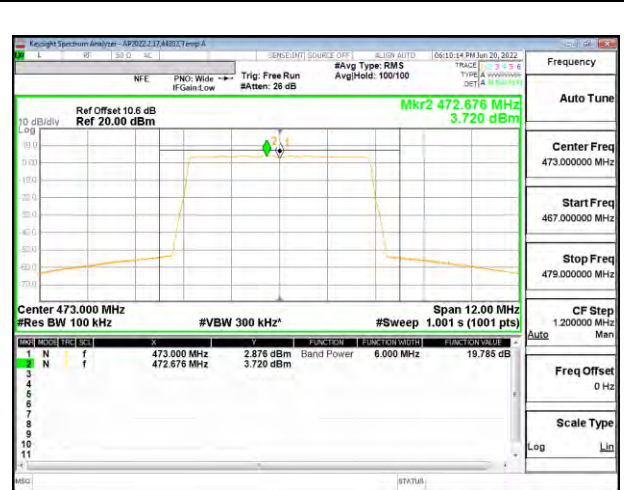
Channel	Frequency (MHz)	Measured Output Power Antenna 1 (dBm)	Measured Output Power Antenna 2 (dBm)	Measured Total Output Power (dBm)	Measured Total EIRP (dBm)	Conducted Power Limit (dBm)	Margin (dBm)
Low	473	19.85	19.79	22.83	36.83	28.00	-5.17
Mid	539	19.96	19.93	22.96	36.96	28.00	-5.04
High	611	19.72	19.63	22.69	36.69	28.00	-5.31

PSD Results

Channel	Frequency (MHz)	Measured Output PSD Antenna 1 (dBm)	Measured Output PSD Antenna 2 (dBm)	Measured Total PSD Power (dBm)	Conducted PSD Limit (dBm)	Margin (dBm)
Low	473	3.78	3.72	6.76	10.60	-3.84
Mid	539	3.91	3.86	6.90	10.60	-3.70
High	611	3.66	3.57	6.62	10.60	-3.98



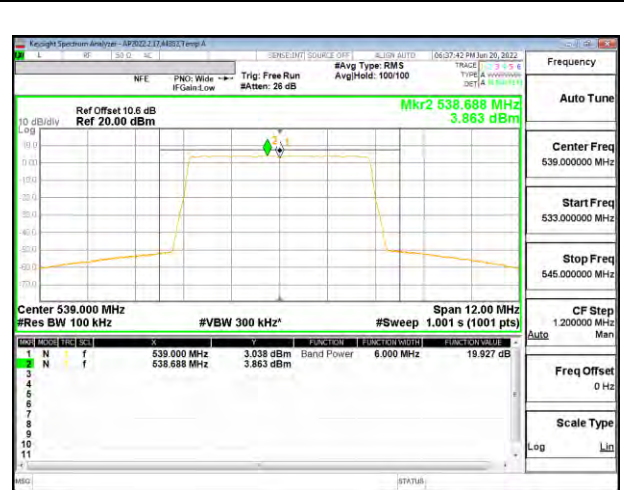
LOW CHANNEL Antenna 1



LOW CHANNEL Antenna 2



MID CHANNEL Antenna 1



MID CHANNEL Antenna 2



HIGH CHANNEL Antenna 1



HIGH CHANNEL Antenna 2

10.1.2. UHF BAND -2TX Antenna – 12MHz

Antenna Gain (dBi)	14.00
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Output Power Results

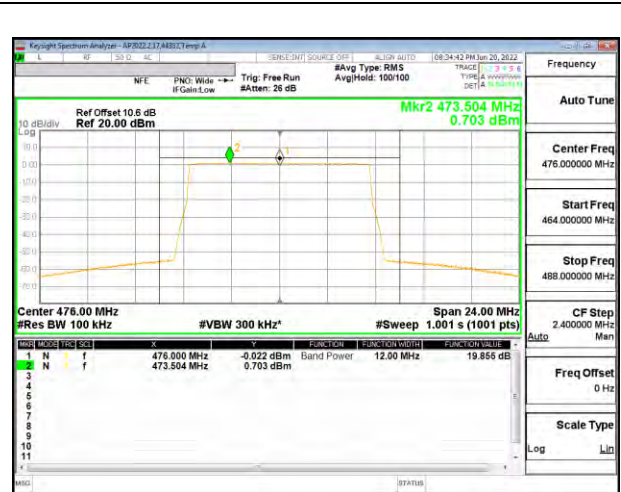
Channel	Frequency (MHz)	Measured Output Power Antenna 1 (dBm)	Measured Output Power Antenna 2 (dBm)	Measured Total Output Power (dBm)	Measured Total EIRP (dBm)	Conducted Power Limit (dBm)	Margin (dBm)
Low	476	19.86	19.86	22.87	36.87	28.00	-5.13
Mid	542	19.86	19.87	22.88	36.88	28.00	-5.12
High	608	19.88	19.64	22.77	36.77	28.00	-5.23

PSD Results

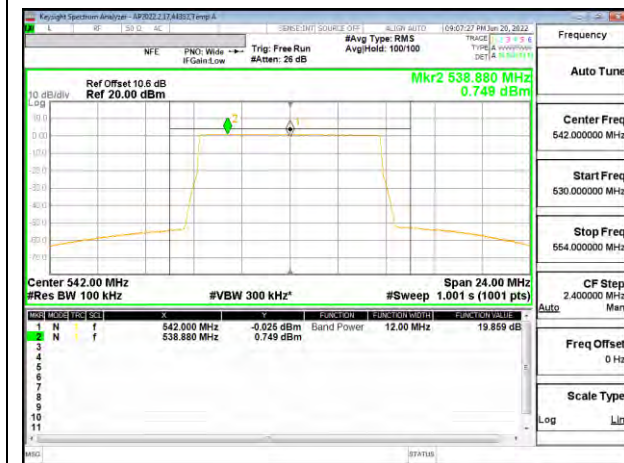
Channel	Frequency (MHz)	Measured Output PSD Antenna 1 (dBm)	Measured Output PSD Antenna 2 (dBm)	Measured Total PSD Power (dBm)	Conducted PSD Limit (dBm)	Margin (dBm)
Low	476	0.71	0.70	3.71	10.60	-6.89
Mid	542	0.75	0.75	3.76	10.60	-6.84
High	608	0.74	0.50	3.63	10.60	-6.97



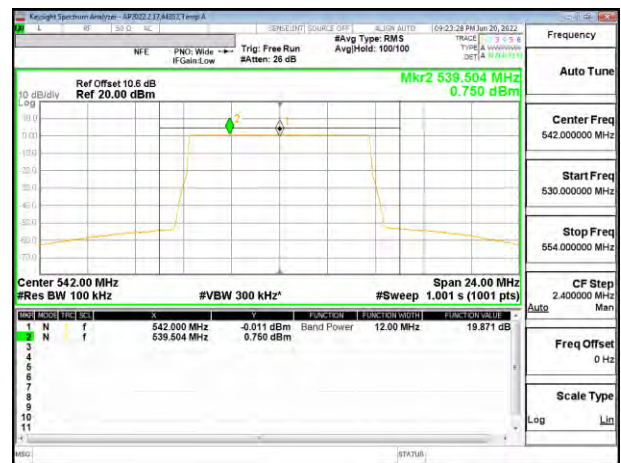
LOW CHANNEL Antenna 1



LOW CHANNEL Antenna 2



MID CHANNEL Antenna 1



MID CHANNEL Antenna 2



HIGH CHANNEL Antenna 1



HIGH CHANNEL Antenna 2

10.1.3. UHF BAND -2TX Antenna – 18MHz

Antenna Gain (dBi)	14.00
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Output Power Results

Channel	Frequency (MHz)	Measured Output Power Antenna 1 (dBm)	Measured Output Power Antenna 2 (dBm)	Measured Total Output Power (dBm)	Measured Total EIRP (dBm)	Conducted Power Limit (dBm)	Margin (dBm)
Low	479	19.88	19.94	22.92	36.92	28.00	-5.08
Mid	539	19.92	19.91	22.92	36.92	28.00	-5.08
High	605	19.88	19.94	22.92	36.92	28.00	-5.08

PSD Results

Channel	Frequency (MHz)	Measured Output PSD Antenna 1 (dBm)	Measured Output PSD Antenna 2 (dBm)	Measured Total PSD Power (dBm)	Conducted PSD Limit (dBm)	Margin (dBm)
Low	479	-0.67	-0.63	2.36	10.60	-8.24
Mid	539	-0.54	-0.54	2.47	10.60	-8.13
High	605	-0.62	-0.57	2.41	10.60	-8.19



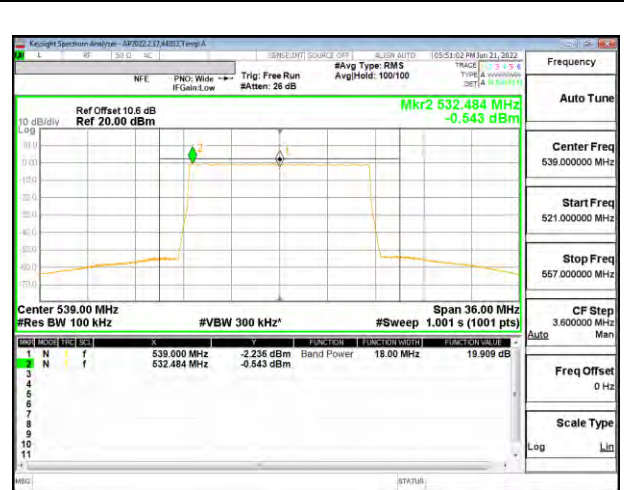
LOW CHANNEL Antenna 1



LOW CHANNEL Antenna 2



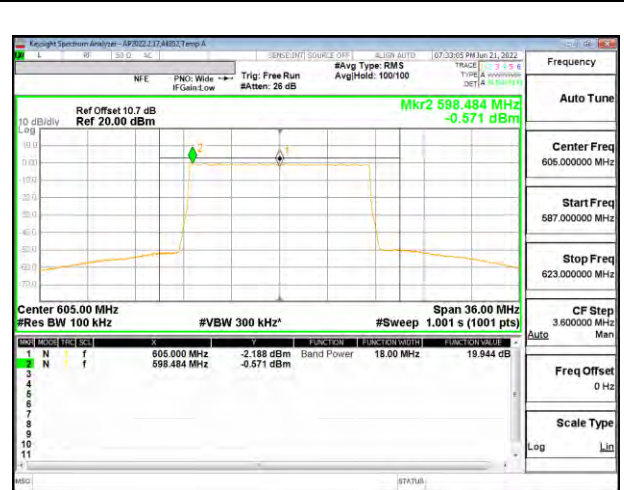
MID CHANNEL Antenna 1



MID CHANNEL Antenna 2



HIGH CHANNEL Antenna 1



HIGH CHANNEL Antenna 2

10.1.4. UHF BAND -2TX Antenna – 24MHz

Antenna Gain (dBi)	14.00
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Output Power Results

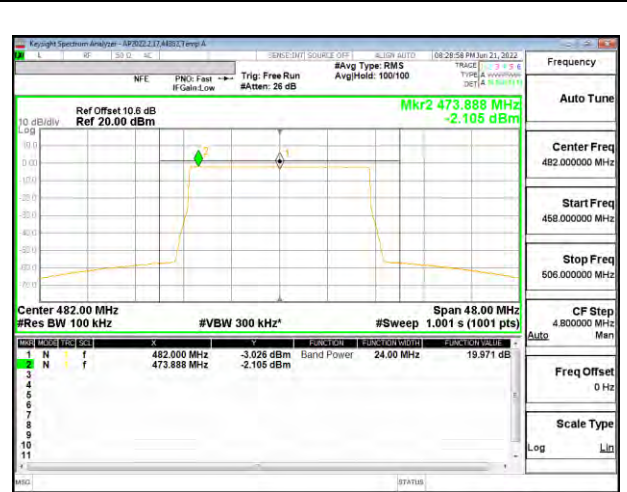
Channel	Frequency (MHz)	Measured Output Power Antenna 1 (dBm)	Measured Output Power Antenna 2 (dBm)	Measured Total Output Power (dBm)	Measured Total EIRP (dBm)	Conducted Power Limit (dBm)	Margin (dBm)
Low	482	19.76	19.97	22.88	36.88	28.00	-5.12
Mid	542	19.72	19.78	22.76	36.76	28.00	-5.24
High	602	19.90	19.89	22.90	36.90	28.00	-5.10

PSD Results

Channel	Frequency (MHz)	Measured Output PSD Antenna 1 (dBm)	Measured Output PSD Antenna 2 (dBm)	Measured Total PSD Power (dBm)	Conducted PSD Limit (dBm)	Margin (dBm)
Low	482	-2.29	-2.11	0.81	10.60	-9.79
Mid	542	-2.22	-2.19	0.81	10.60	-9.79
High	602	-2.10	-2.12	0.90	10.60	-9.70



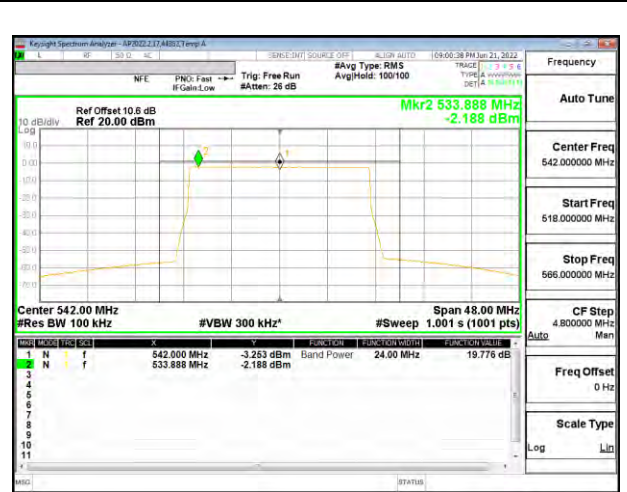
LOW CHANNEL Antenna 1



LOW CHANNEL Antenna 2



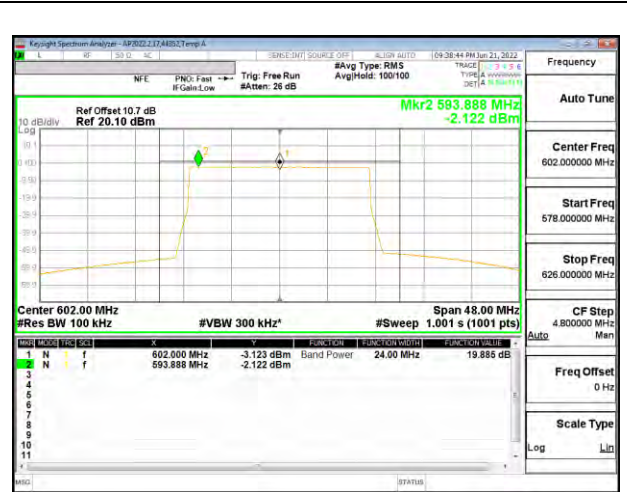
MID CHANNEL Antenna 1



MID CHANNEL Antenna 2



HIGH CHANNEL Antenna 1



HIGH CHANNEL Antenna 2

10.2. BAND-EDGE

LIMITS

§15.709 (b)(1) Fixed White Space Device

(ii) For operation at EIRP levels of 36 dBm (4,000 mW) or less, fixed white space devices may operate at EIRP levels between the values shown in the table in paragraph (b)(1)(iii) of this section provided that the conducted power and the conducted power spectral density (PSD) limits are linearly interpolated between the values shown and the adjacent channel emission limit of the higher value shown in the table is met. Operation at EIRP levels above 36 dBm (4,000 mW) shall follow the requirements for 40 dBm (10,000 mW).

(iii) The conducted power spectral density from a fixed white space device shall not be greater than the values shown in the table in this paragraph (b)(1)(iii) when measured in any 100 kHz band during any time interval of continuous transmission.

Table 1 to Paragraph (b)(1)(iii)

EIRP (6 MHz)	Conducted power limit (6 MHz)	Conducted PSD limit (100 kHz) (dBm)	Conducted adjacent channel emission limit (100 kHz) (dBm)
16 dBm (40 mW)	10 dBm (10 mW)	-7.4	-62.8
20 dBm (100 mW)	14 dBm (25 mW)	-3.4	-58.8
24 dBm (250 mW)	18 dBm (63 mW)	0.6	-54.8
28 dBm (625 mW)	22 dBm (158 mW)	4.6	-50.8
32 dBm (1,600 mW)	26 dBm (400 mW)	8.6	-46.8
36 dBm (4,000 mW)	30 dBm (1,000 mW)	12.6	-42.8
40 dBm (10,000 mW)	30 dBm (1,000 mW)	12.6	-42.8
42 dBm (10,000 mW)	30 dBm (1,000 mW)	12.6	-42.8

RESULTS

Note: Band edge emissions limits are reduced by the amount in dB by which the gain exceeds 12 dBi. Antennas are uncorrelated.

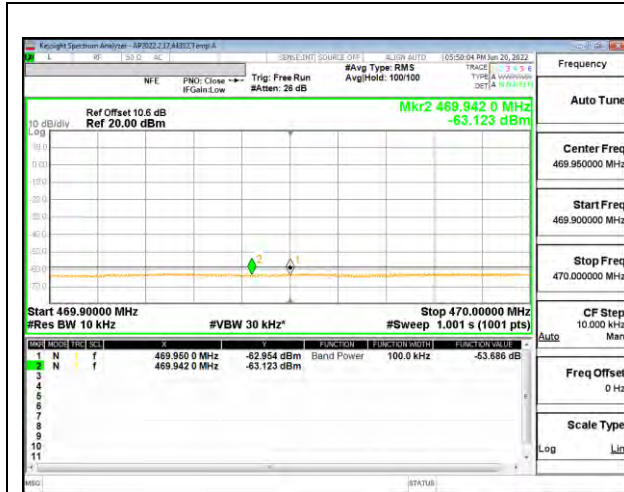
10.2.1. UHF BAND -2TX 6MHz - Antenna 1+2

Lower Band-Edge Emissions

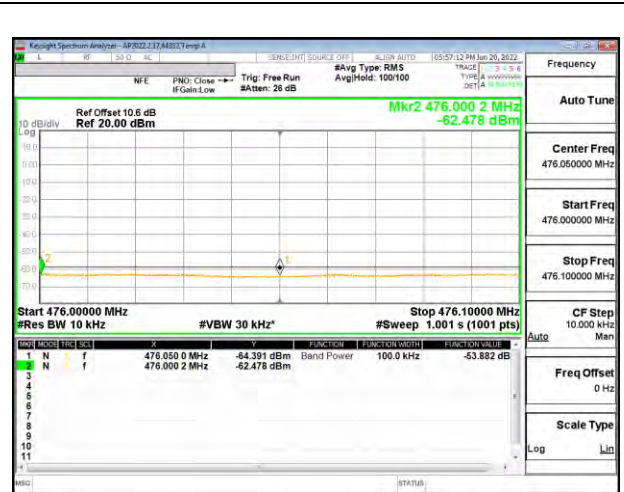
Channel	Frequency (MHz)	Measured Emission Antenna 1 (dBm)	Measured Emission Antenna 2 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	473	-53.69	-54.59	-51.10	-44.8	-6.30
Mid	539	-52.33	-52.48	-49.39	-44.8	-4.59
High	611	-53.72	-54.35	-51.01	-44.8	-6.21

Upper Band-Edge Emissions

Channel	Frequency (MHz)	Measured Emission Antenna 1 (dBm)	Measured Emission Antenna 2 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	473	-53.88	-54.98	-51.39	-44.8	-6.59
Mid	539	-50.46	-51.40	-47.89	-44.8	-3.09
High	611	-51.07	-52.30	-48.63	-44.8	-3.83



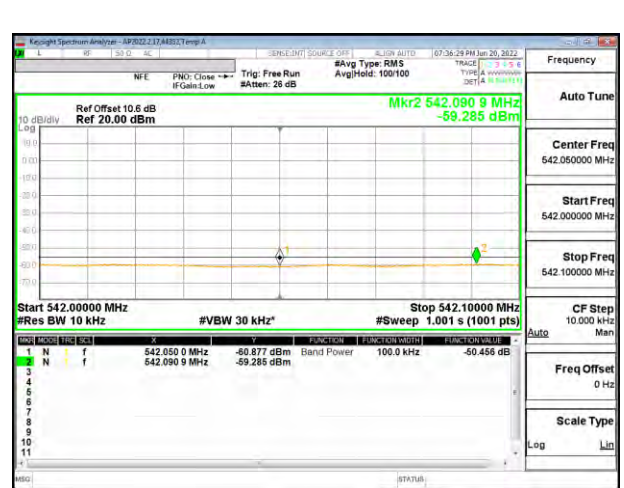
LOW CHANNEL Antenna 1 Lower Edge



LOW CHANNEL Antenna 1 Upper Edge



MID CHANNEL Antenna 1 Lower Edge



MID CHANNEL Antenna 1 Upper Edge



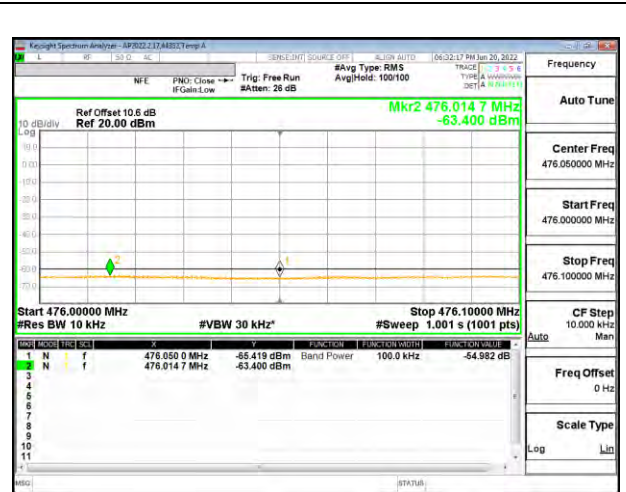
HIGH CHANNEL Antenna 1 Lower Edge



HIGH CHANNEL Antenna 1 Upper Edge



LOW CHANNEL Antenna 2 Lower Edge



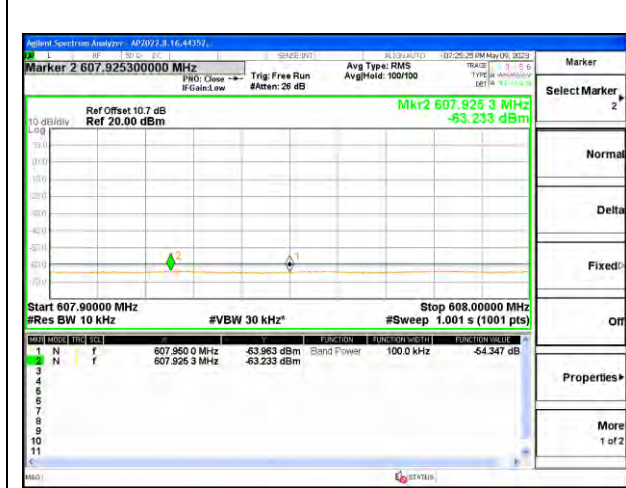
LOW CHANNEL Antenna 2 Upper Edge



MID CHANNEL Antenna 2 Lower Edge



MID CHANNEL Antenna 2 Upper Edge



HIGH CHANNEL Antenna 2 Lower Edge



HIGH CHANNEL Antenna 2 Upper Edge

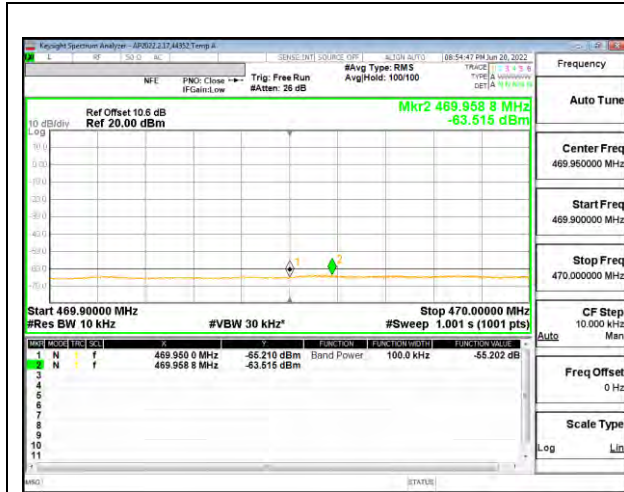
10.2.2. UHF BAND -2TX 12MHz - Antenna 1+2

Lower Band-Edge Emissions

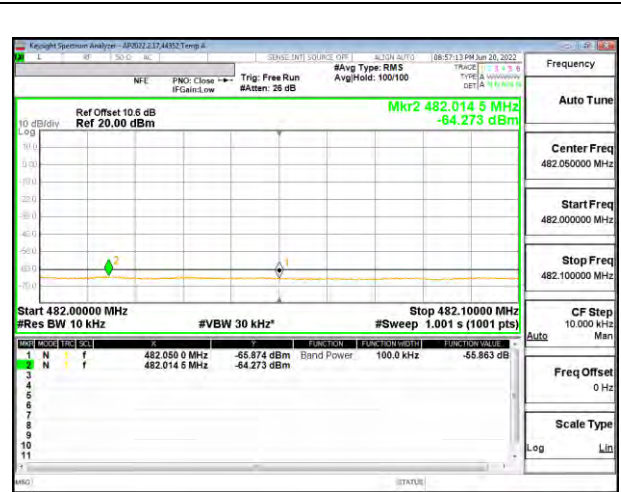
Channel	Frequency (MHz)	Measured Emission Antenna 1 (dBm)	Measured Emission Antenna 2 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	476	-55.20	-56.05	-52.60	-44.8	-7.80
Mid	542	-54.69	-54.71	-51.69	-44.8	-6.89
High	608	-49.96	-53.89	-48.48	-44.8	-3.68

Upper Band-Edge Emissions

Channel	Frequency (MHz)	Measured Emission Antenna 1 (dBm)	Measured Emission Antenna 2 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	476	-55.86	-56.43	-53.13	-44.8	-8.33
Mid	542	-53.32	-53.86	-50.57	-44.8	-5.77
High	608	-48.08	-51.96	-46.59	-44.8	-1.79



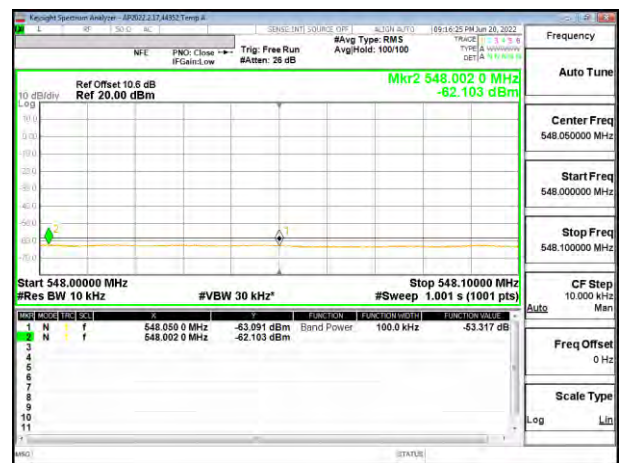
LOW CHANNEL Antenna 1 Lower Edge



LOW CHANNEL Antenna 1 Upper Edge



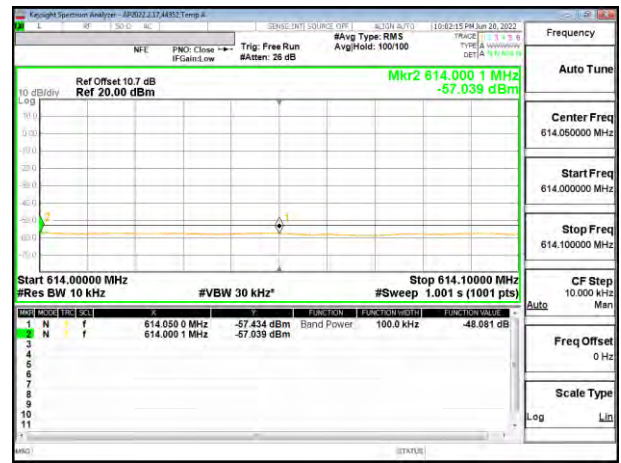
MID CHANNEL Antenna 1 Lower Edge



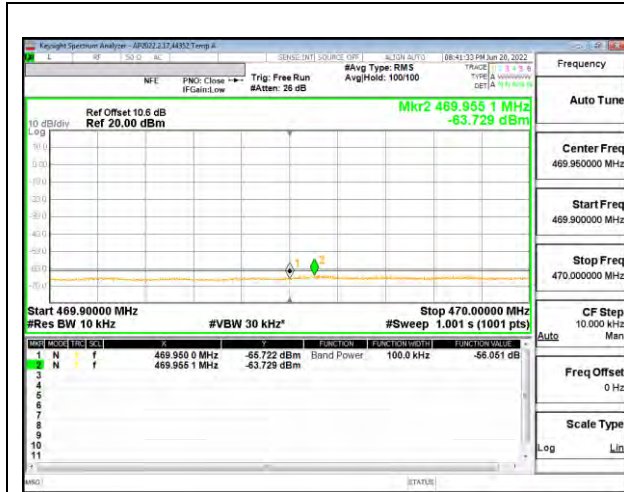
MID CHANNEL Antenna 1 Upper Edge



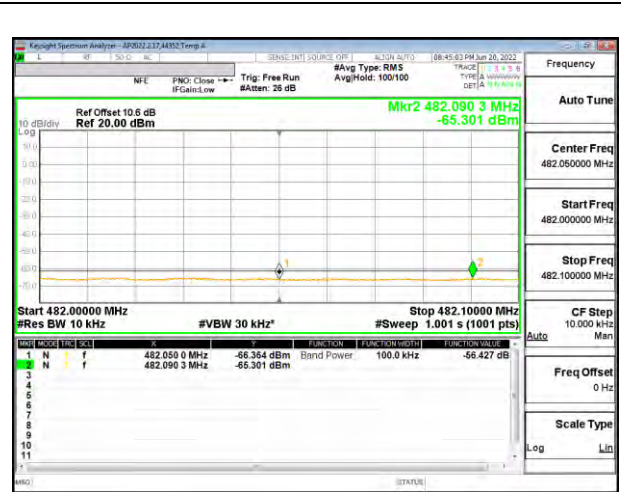
HIGH CHANNEL Antenna 1 Lower Edge



HIGH CHANNEL Antenna 1 Upper Edge



LOW CHANNEL Antenna 2 Lower Edge



LOW CHANNEL Antenna 2 Upper Edge



MID CHANNEL Antenna 2 Lower Edge



MID CHANNEL Antenna 2 Upper Edge



HIGH CHANNEL Antenna 2 Lower Edge



HIGH CHANNEL Antenna 2 Upper Edge

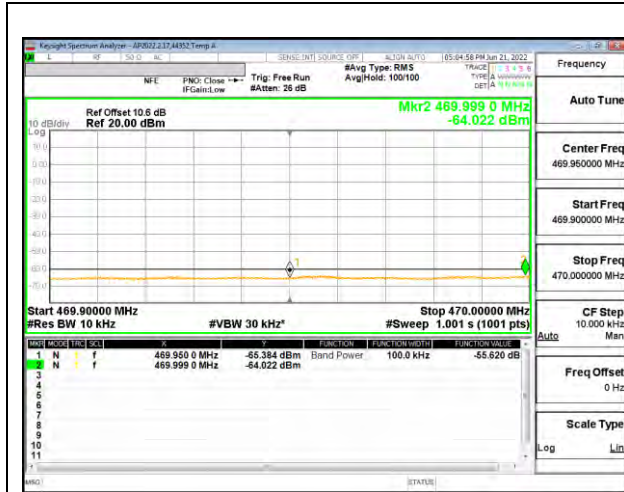
10.2.3. UHF BAND -2TX 18MHz - Antenna 1+2

Lower Band-Edge Emissions

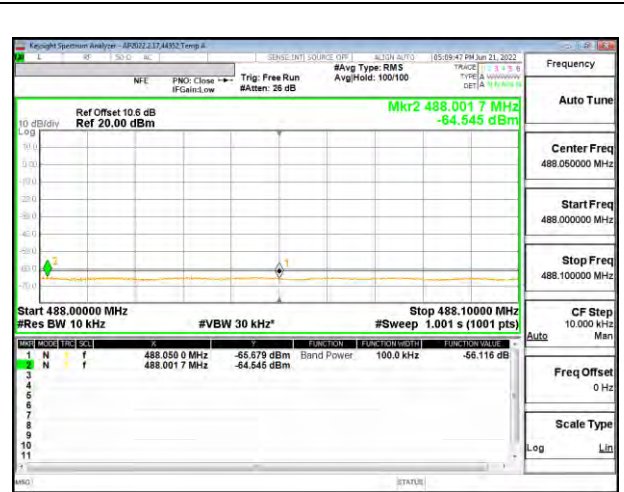
Channel	Frequency (MHz)	Measured Emission Antenna 1 (dBm)	Measured Emission Antenna 2 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	479	-55.62	-56.24	-52.91	-44.8	-8.11
Mid	539	-55.63	-55.66	-52.64	-44.8	-7.84
High	605	-52.54	-52.52	-49.52	-44.8	-4.72

Upper Band-Edge Emissions

Channel	Frequency (MHz)	Measured Emission Antenna 1 (dBm)	Measured Emission Antenna 2 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	479	-56.12	-56.15	-53.12	-44.8	-8.32
Mid	539	-54.10	-54.55	-51.31	-44.8	-6.51
High	605	-50.59	-50.57	-47.57	-44.8	-2.77



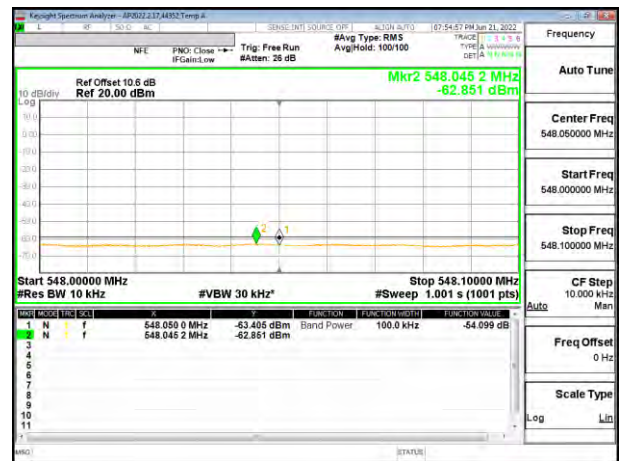
LOW CHANNEL Antenna 1 Lower Edge



LOW CHANNEL Antenna 1 Upper Edge



MID CHANNEL Antenna 1 Lower Edge



MID CHANNEL Antenna 1 Upper Edge



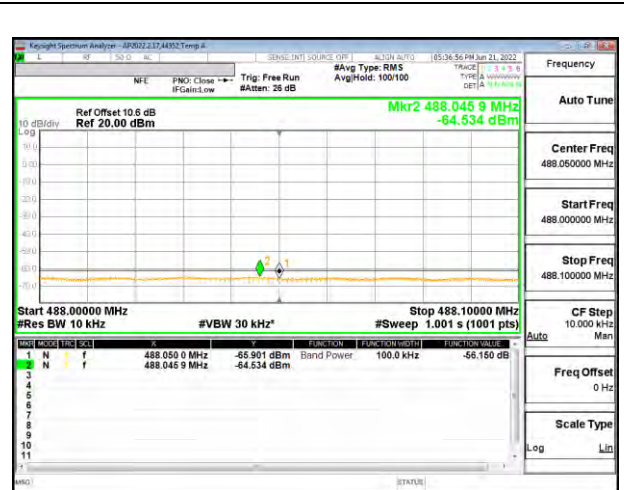
HIGH CHANNEL Antenna 1 Lower Edge



HIGH CHANNEL Antenna 1 Upper Edge



LOW CHANNEL Antenna 2 Lower Edge



LOW CHANNEL Antenna 2 Upper Edge



MID CHANNEL Antenna 2 Lower Edge



MID CHANNEL Antenna 2 Upper Edge



HIGH CHANNEL Antenna 2 Lower Edge



HIGH CHANNEL Antenna 2 Upper Edge

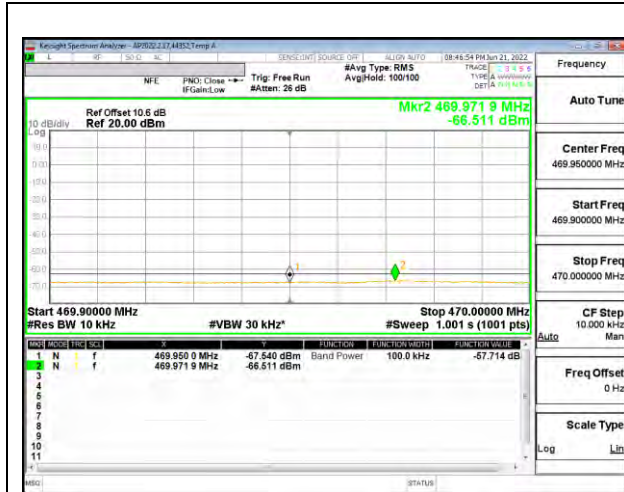
10.2.4. UHF BAND -2TX 24MHz - Antenna 1+2

Lower Band-Edge Emissions

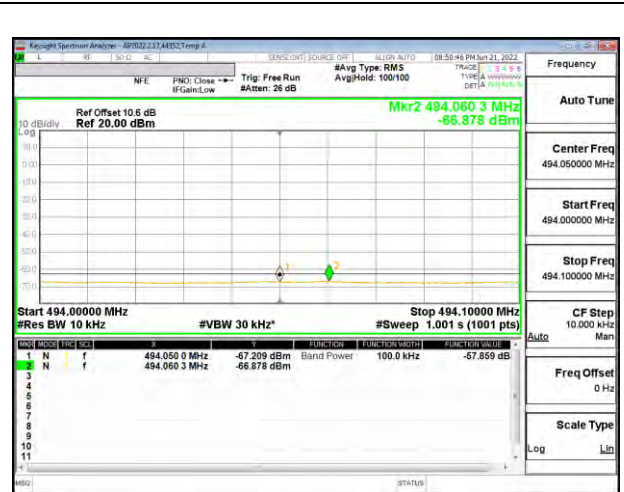
Channel	Frequency (MHz)	Measured Emission Antenna 1 (dBm)	Measured Emission Antenna 2 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	482	-57.71	-57.93	-54.81	-44.8	-10.01
Mid	542	-57.84	-57.56	-54.69	-44.8	-9.89
High	602	-53.27	-55.48	-51.23	-44.8	-6.43

Upper Band-Edge Emissions

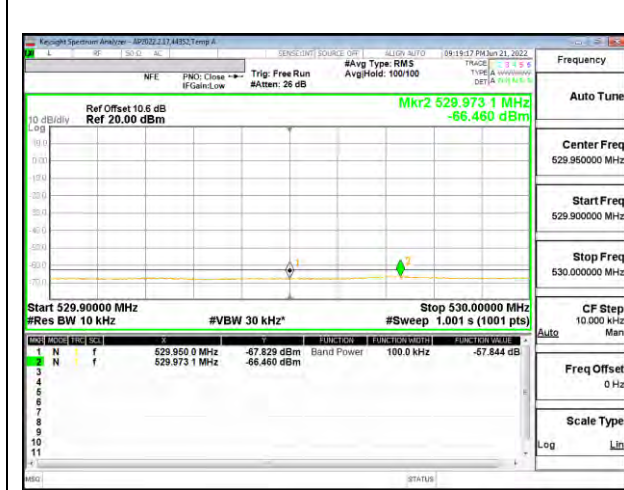
Channel	Frequency (MHz)	Measured Emission Antenna 1 (dBm)	Measured Emission Antenna 2 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	482	-57.86	-57.75	-54.80	-44.8	-10.00
Mid	542	-55.18	-55.88	-52.50	-44.8	-7.70
High	602	-50.49	-52.69	-48.44	-44.8	-3.64



LOW CHANNEL Antenna 1 Lower Edge



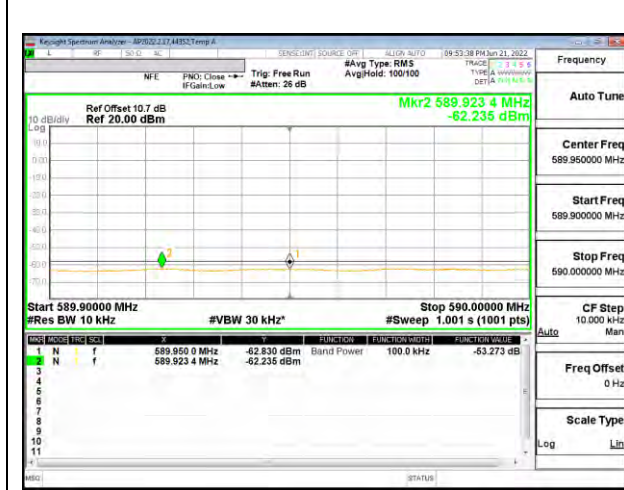
LOW CHANNEL Antenna 1 Upper Edge



MID CHANNEL Antenna 1 Lower Edge



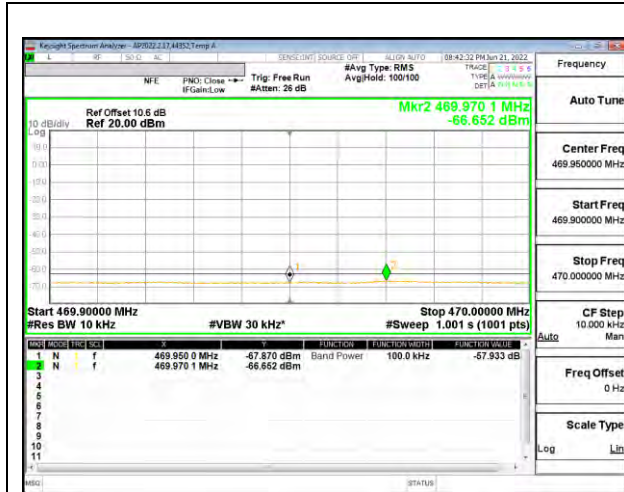
MID CHANNEL Antenna 1 Upper Edge



HIGH CHANNEL Antenna 1 Lower Edge



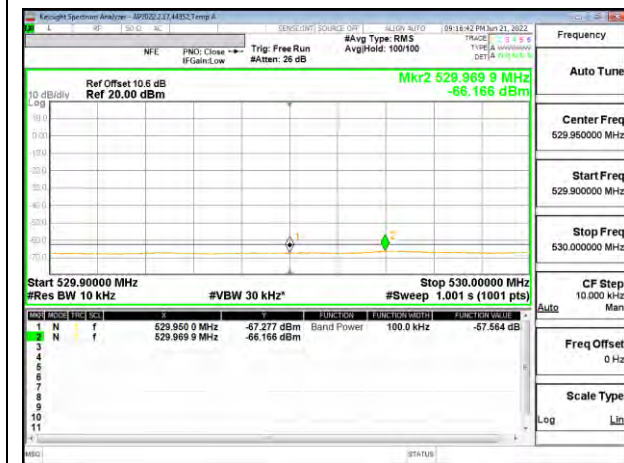
HIGH CHANNEL Antenna 1 Upper Edge



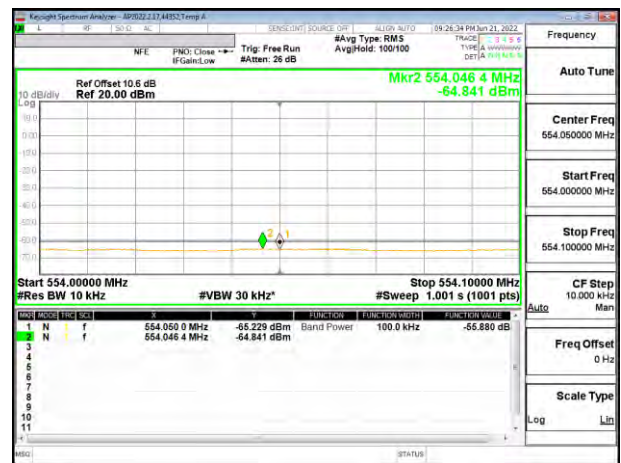
LOW CHANNEL Antenna 2 Lower Edge



LOW CHANNEL Antenna 2 Upper Edge



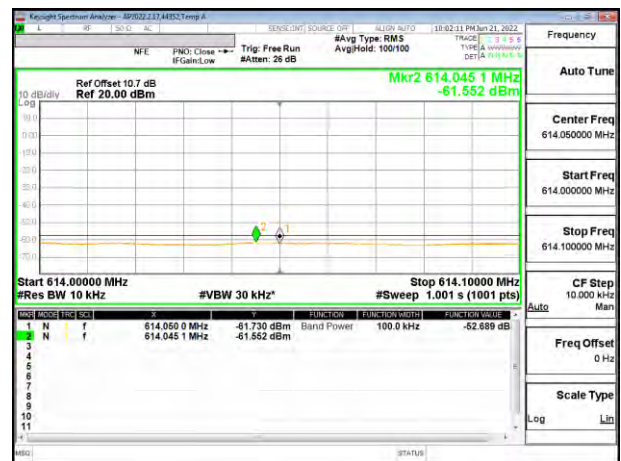
MID CHANNEL Antenna 2 Lower Edge



MID CHANNEL Antenna 2 Upper Edge



HIGH CHANNEL Antenna 2 Lower Edge



HIGH CHANNEL Antenna 2 Upper Edge

10.3. ADJACENT CHANNEL EMISSIONS

LIMITS

§15.709 (d)(1),(3) Fixed White Space Device

(1) The adjacent channel emission limits shown in the tables in paragraph (b)(1) of this section apply in the six megahertz channel immediately adjacent to each white space channel or group of contiguous white space channels in which the white space device is operating.

(3) Emission measurements in the adjacent bands shall be performed using a minimum resolution bandwidth of 100 kHz with an average detector. A narrower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 100 kHz.

Table 1 to Paragraph (b)(1)(iii)

EIRP (6 MHz)	Conducted power limit (6 MHz)	Conducted PSD limit (100 kHz) (dBm)	Conducted adjacent channel emission limit (100 kHz) (dBm)
16 dBm (40 mW)	10 dBm (10 mW)	-7.4	-62.8
20 dBm (100 mW)	14 dBm (25 mW)	-3.4	-58.8
24 dBm (250 mW)	18 dBm (63 mW)	0.6	-54.8
28 dBm (625 mW)	22 dBm (158 mW)	4.6	-50.8
32 dBm (1,600 mW)	26 dBm (400 mW)	8.6	-46.8
36 dBm (4,000 mW)	30 dBm (1,000 mW)	12.6	-42.8
40 dBm (10,000 mW)	30 dBm (1,000 mW)	12.6	-42.8
42 dBm (10,000 mW)	30 dBm (1,000 mW)	12.6	-42.8

RESULTS

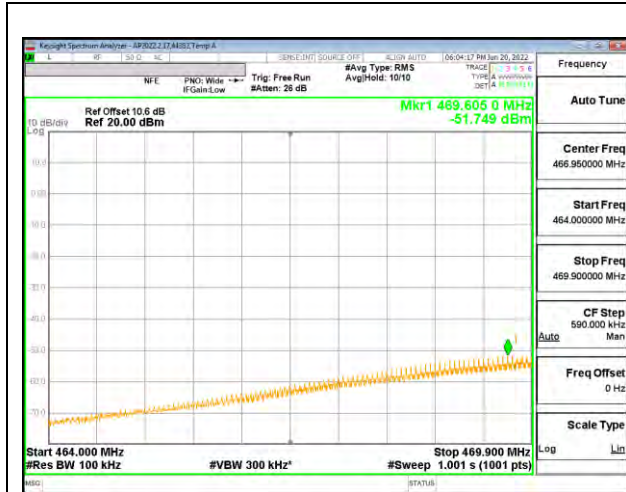
10.3.1. UHF BAND -2TX 6MHz - Antenna 1+2

Lower Adjacent Channel Emissions

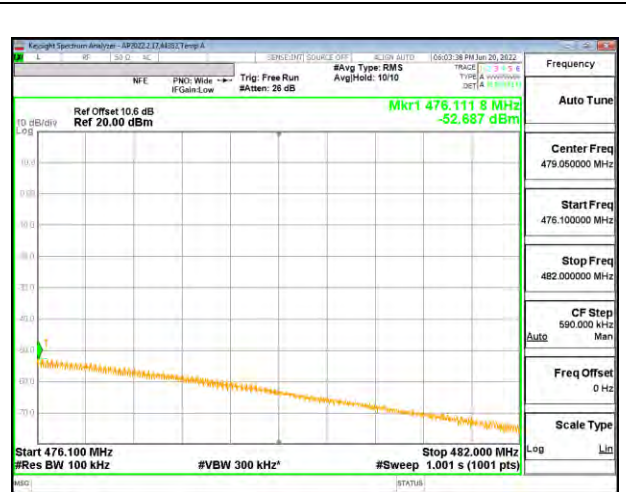
Channel	Frequency (MHz)	Measured Emission Chain 0 (dBm)	Measured Emission Chain 1 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	473	-51.75	-53.29	-49.44	-44.8	-4.64
Mid	539	-51.65	-51.01	-48.30	-44.8	-3.50
High	611	-53.11	-53.61	-50.34	-44.8	-5.54

Upper Adjacent Channel Emissions

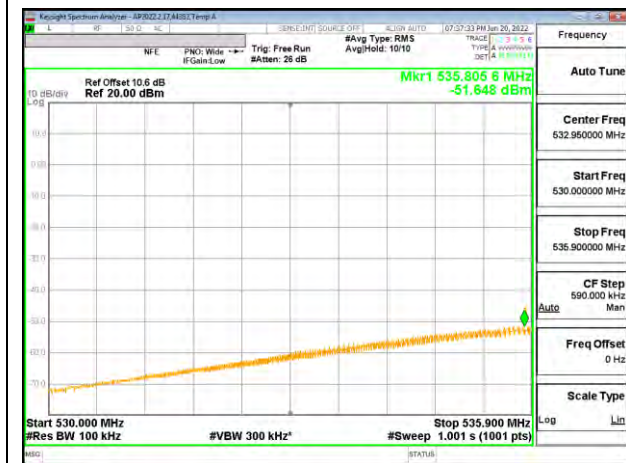
Channel	Frequency (MHz)	Measured Emission Chain 0 (dBm)	Measured Emission Chain 1 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	473	-52.69	-53.06	-49.86	-44.8	-5.06
Mid	539	-49.94	-50.22	-47.07	-44.8	-2.27
High	611	-50.19	-50.19	-47.18	-44.8	-2.38



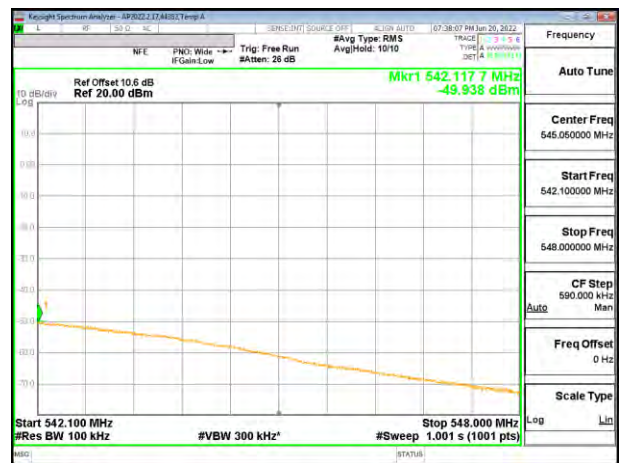
LOW CHANNEL Antenna 1 Lower Edge



LOW CHANNEL Antenna 1 Upper Edge



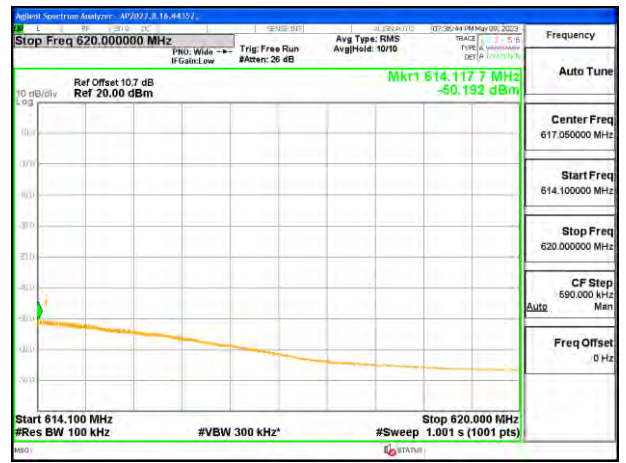
MID CHANNEL Antenna 1 Lower Edge



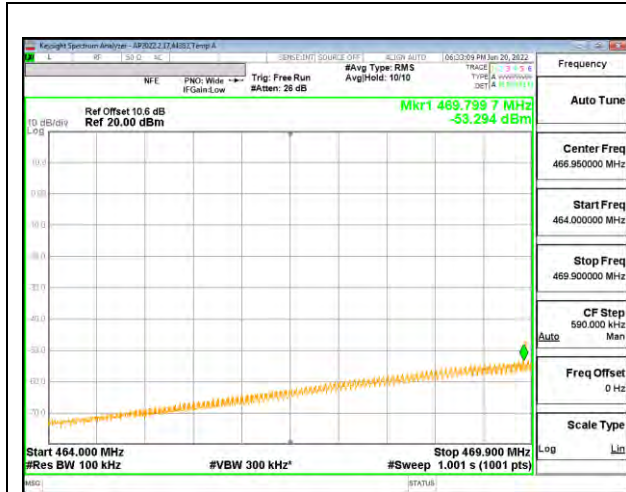
MID CHANNEL Antenna 1 Upper Edge



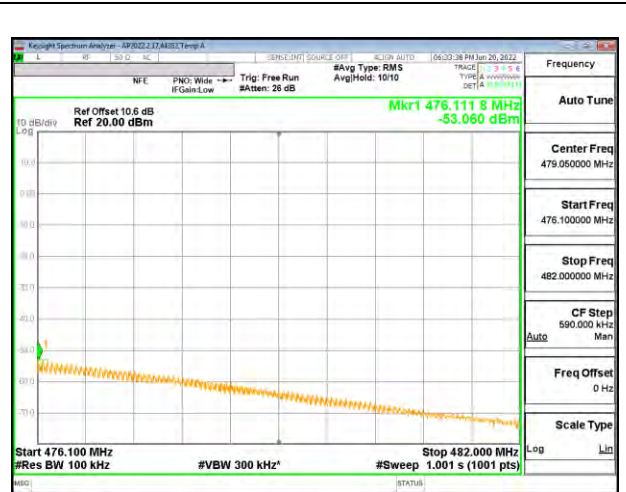
HIGH CHANNEL Antenna 1 Lower Edge



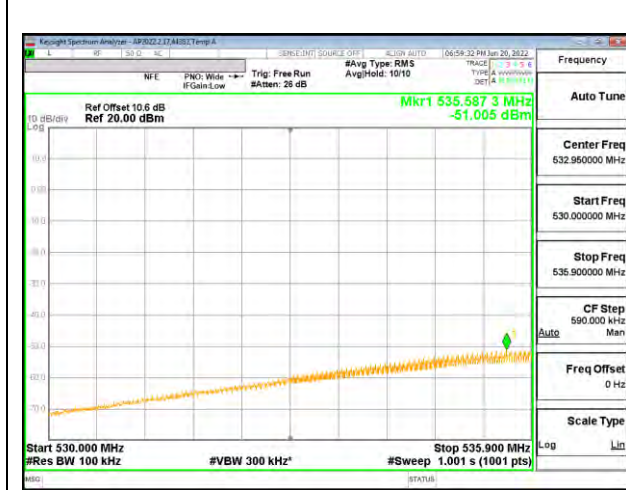
HIGH CHANNEL Antenna 1 Upper Edge



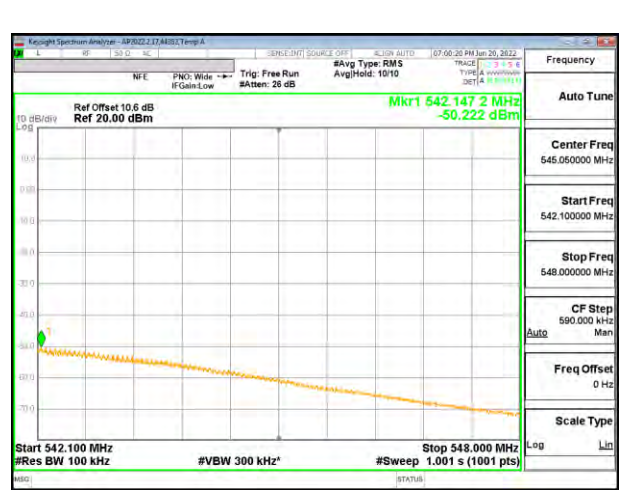
LOW CHANNEL Antenna 2 Lower Edge



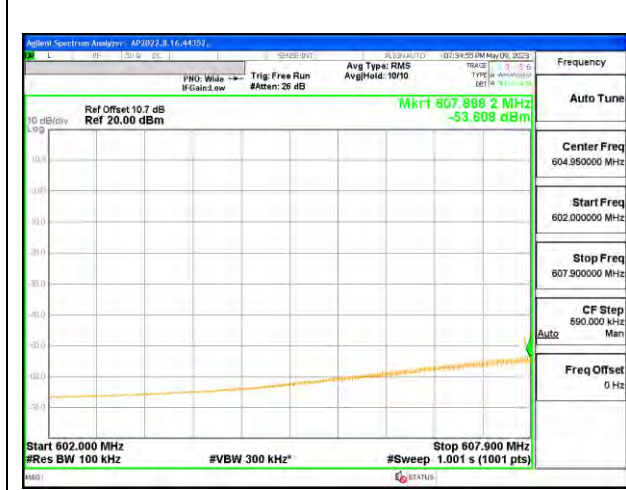
LOW CHANNEL Antenna 2 Upper Edge



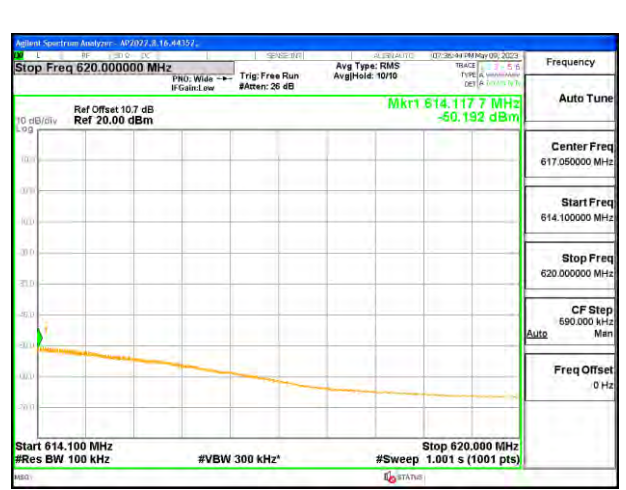
MID CHANNEL Antenna 2 Lower Edge



MID CHANNEL Antenna 2 Upper Edge



HIGH CHANNEL Antenna 2 Lower Edge



HIGH CHANNEL Antenna 2 Upper Edge

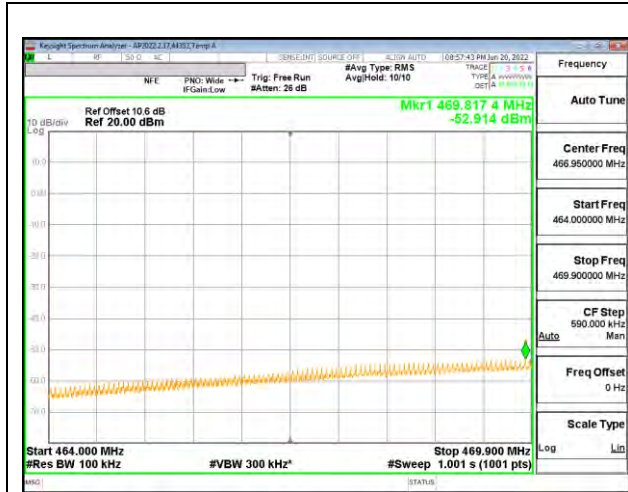
10.3.2. UHF BAND -2TX 12MHz - Antenna 1+2

Lower Adjacent Channel Emissions

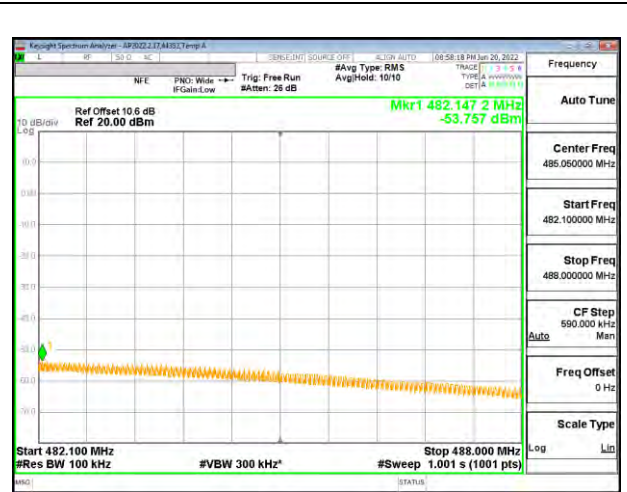
Channel	Frequency (MHz)	Measured Emission Chain 0 (dBm)	Measured Emission Chain 1 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	476	-52.91	-53.57	-50.22	-44.8	-5.42
Mid	542	-53.12	-53.72	-50.40	-44.8	-5.60
High	608	-48.61	-51.38	-46.77	-44.8	-1.97

Upper Adjacent Channel Emissions

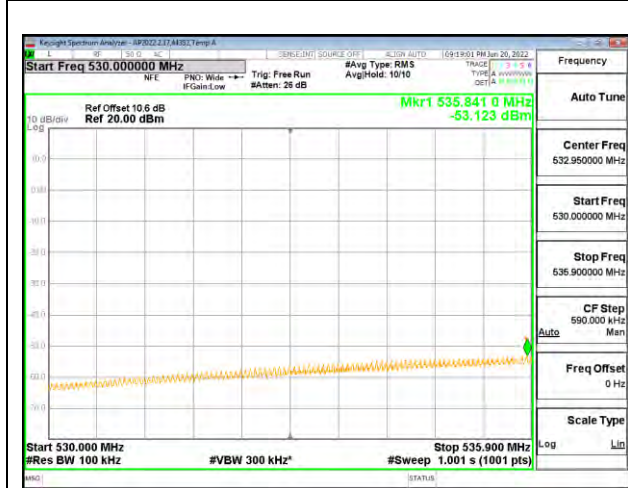
Channel	Frequency (MHz)	Measured Emission Chain 0 (dBm)	Measured Emission Chain 1 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	476	-53.76	-53.93	-50.83	-44.8	-6.03
Mid	542	-51.97	-50.72	-48.29	-44.8	-3.49
High	608	-47.29	-49.98	-45.42	-44.8	-0.62



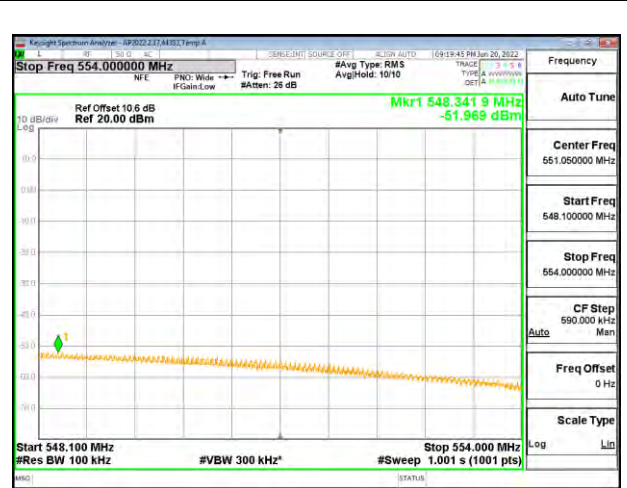
LOW CHANNEL Antenna 1 Lower Edge



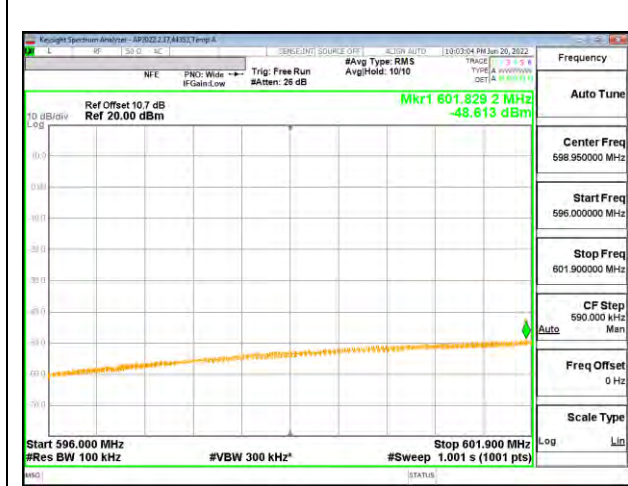
LOW CHANNEL Antenna 1 Upper Edge



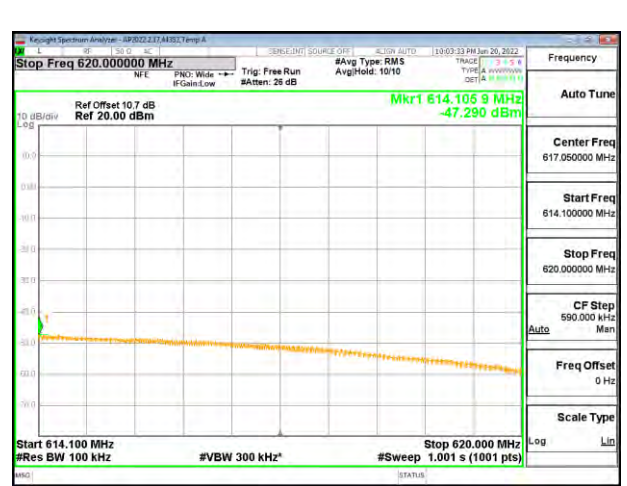
MID CHANNEL Antenna 1 Lower Edge



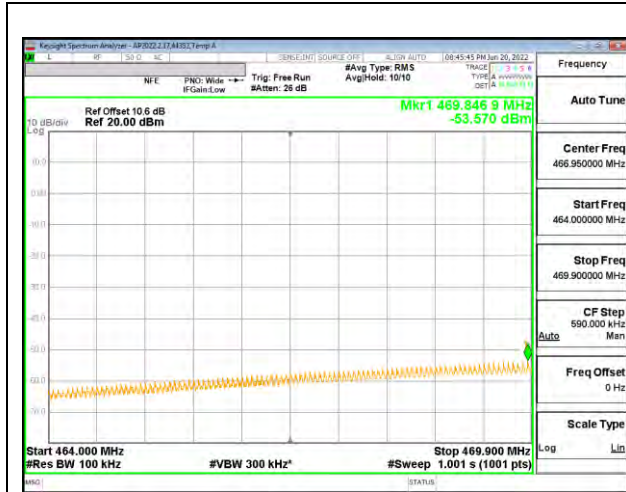
MID CHANNEL Antenna 1 Upper Edge



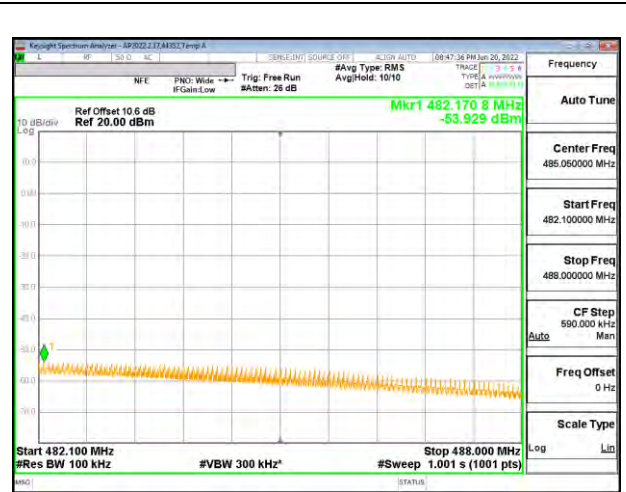
HIGH CHANNEL Antenna 1 Lower Edge



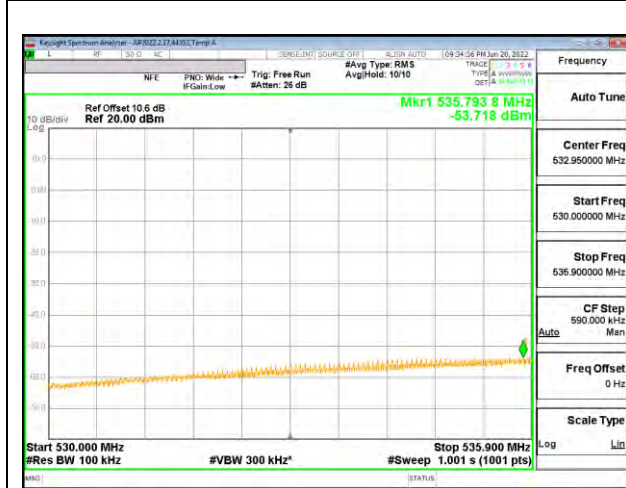
HIGH CHANNEL Antenna 1 Upper Edge



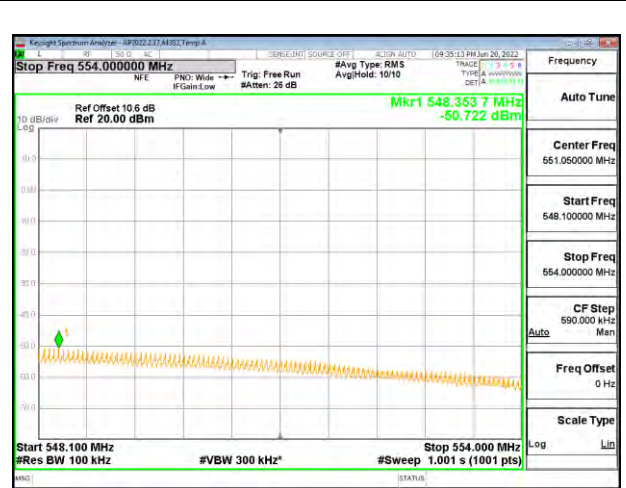
LOW CHANNEL Antenna 2 Lower Edge



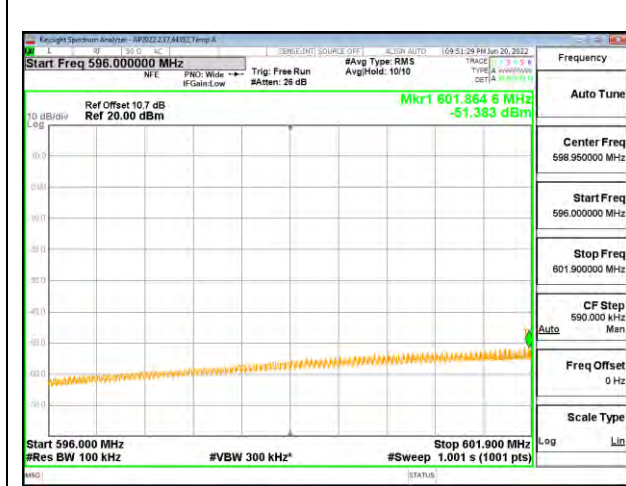
LOW CHANNEL Antenna 2 Upper Edge



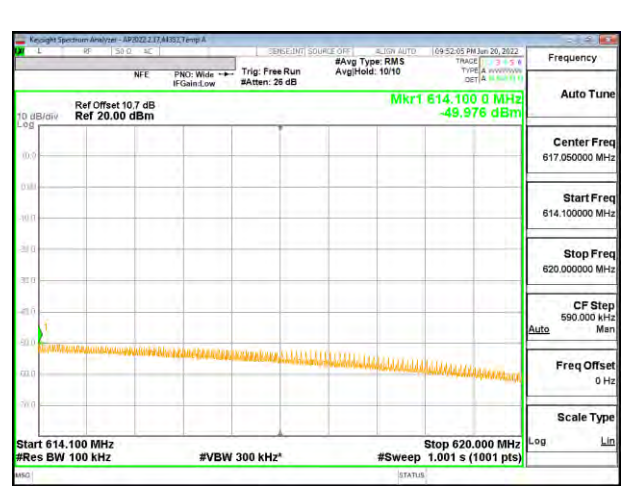
MID CHANNEL Antenna 2 Lower Edge



MID CHANNEL Antenna 2 Upper Edge



HIGH CHANNEL Antenna 2 Lower Edge



HIGH CHANNEL Antenna 2 Upper Edge

10.3.3. UHF BAND -2TX 18MHz - Antenna 1+2

Lower Adjacent Channel Emissions

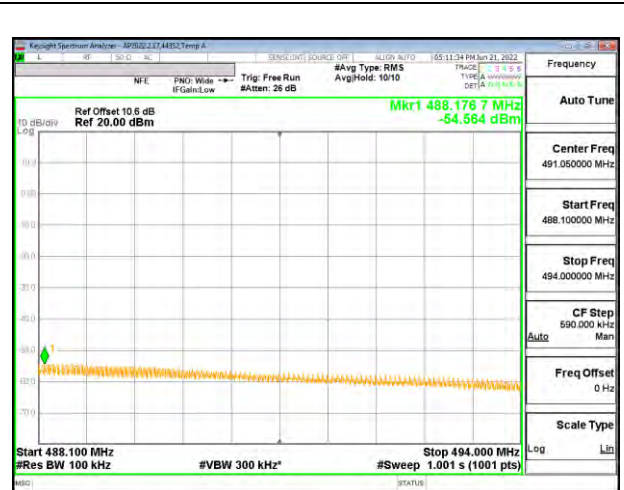
Channel	Frequency (MHz)	Measured Emission Antenna 1 (dBm)	Measured Emission Antenna 2 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	479	-53.62	-53.48	-50.54	-44.8	-5.74
Mid	539	-54.06	-53.94	-50.99	-44.8	-6.19
High	605	-49.17	-49.66	-46.40	-44.8	-1.60

Upper Adjacent Channel Emissions

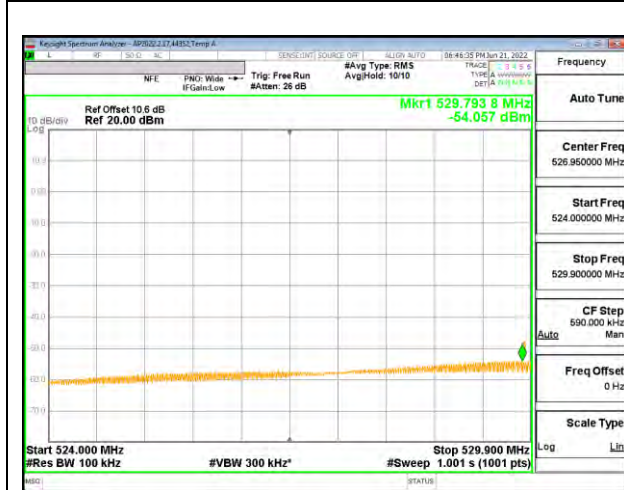
Channel	Frequency (MHz)	Measured Emission Antenna 1 (dBm)	Measured Emission Antenna 2 (dBm)	Measured Total Emission (dBm)	Emissions Limit (dBm)	Worst Case Margin (dBm)
Low	479	-54.56	-53.09	-50.75	-44.8	-5.95
Mid	539	-52.08	-52.72	-49.38	-44.8	-4.58
High	605	-47.78	-49.23	-45.43	-44.8	-0.63



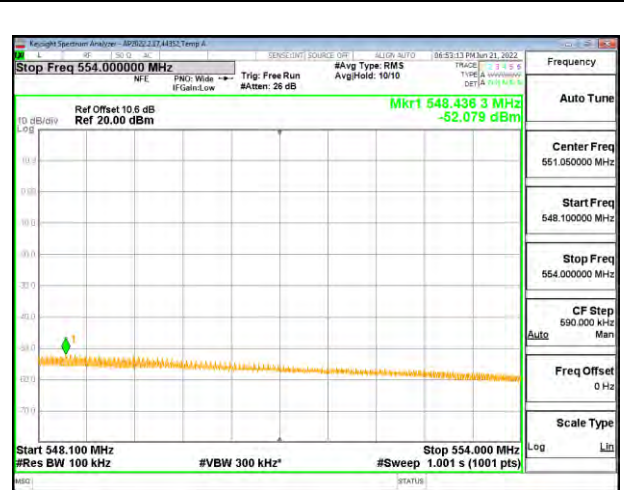
LOW CHANNEL Antenna 1 Lower Edge



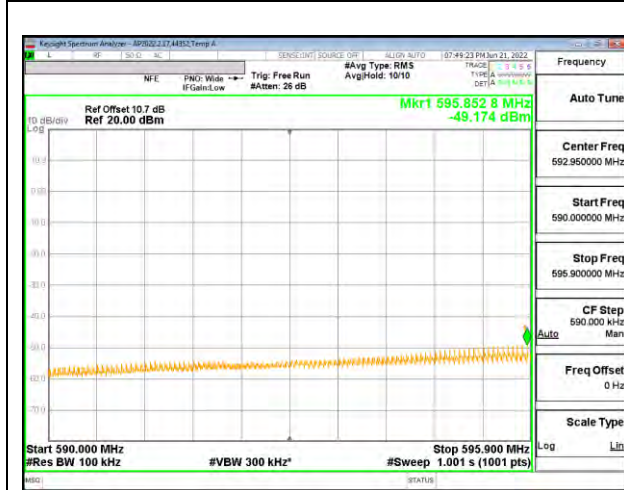
LOW CHANNEL Antenna 1 Upper Edge



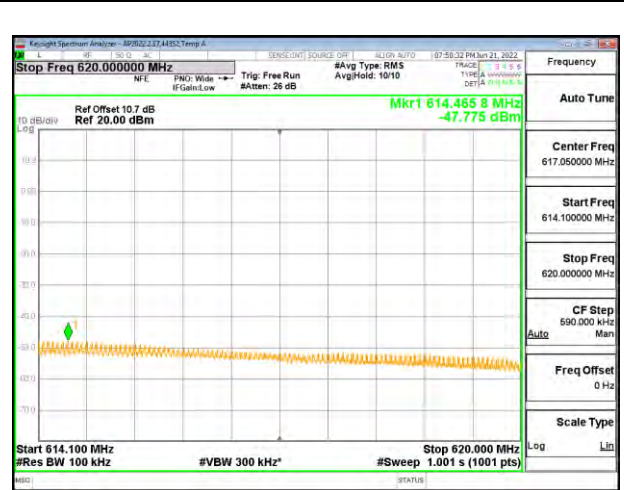
MID CHANNEL Antenna 1 Lower Edge



MID CHANNEL Antenna 1 Upper Edge



HIGH CHANNEL Antenna 1 Lower Edge



HIGH CHANNEL Antenna 1 Upper Edge