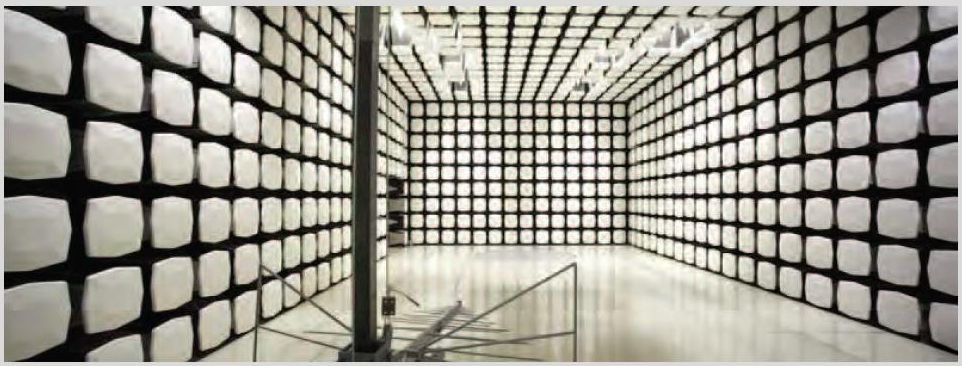
Multi-Tech Systems, Inc.

Models Tested: MTCAP3-LNA7D, MTCAP3-EN

Part Numbers Tested:
MTCAP3-LNA7D-A23UEA-L
MTCAP3-LNA7D-A23UEA-D
MTCAP3-EN-A23UEA-D
MTCAP3-EN-A23UEA-L

902 - 928 MHz Other Wideband (DTS) transceiver
FCC 15.247:2024

Report: MLTI0253.6 Rev. 1, Issue Date: February 29, 2024



CERT #3310.05

CERTIFICATE OF TEST

Last Date of Test: January 26, 2024
Multi-Tech Systems, Inc.
EUT: MTCAP3-LNA7D-A23UEA-L, MTCAP3-LNA7D-A23UEA-D, MTCAP3-EN-A23UEA-D, MTCAP3-EN-A23UEA-L

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2024	ANSI C63.10:2013, KDB 558074
FCC 15.247:2024	

Results

Test Description	Result	Specification Section(s)	Method Section(s)	Comments
Band Edge Compliance	Pass	15.247(d), KDB 558074 -11	11.11	
Band Edge Compliance - Hopping Mode	N/A	15.247(d)	7.8.6	Not required for DTS devices.
Carrier Frequency Separation	N/A	15.247(a)(1)	7.8.2	Not required for DTS devices.
DTS Bandwidth (6 dB)	Pass	15.247(a), KDB 558074 -8.2	11.8.2	
Duty Cycle	N/A	15.247, KDB 558074 -6.0	11.6	Operates at 100%.
Dwell Time	N/A	15.247(a)(1)	7.8.4	Not required for DTS devices.
Equivalent Isotropic Radiated Power	Pass	15.247(b), KDB 558074 -9.1.1	11.9.1.1	
Number of Hopping Frequencies	N/A	15.247(a)(1)	7.8.3	Not required for DTS devices.
Occupied Bandwidth (99%)	Pass	15.247(a), KDB 558074 -8.2	6.9.3	
Output Power	Pass	15.247(b), KDB 558074 -9.1.1	11.9.1.1	
Power Spectral Density	Pass	15.247(e), KDB 558074 -10.2	11.10.2	
Powerline Conducted Emissions (Transmitter)	Pass	15.207	6.2	
Spurious Conducted Emissions	Pass	15.247(d), KDB 558074 -11	11.11	
Spurious Radiated Emissions	Pass	15.247(d), KDB 558074 -12.1, 13.2	6.5, 6.6, 11.12.1, 11.13.2	

Deviations From Test Standards

None

Approved By:

Trevor Buls

Trevor Buls, Principal EMC Test Engineer

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

REVISION HISTORY

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
00	None		
01	Various documentation cleanup throughout. Added Spurious Radiated Emissions testing on 2 additional model variants (MTCAP-EN)	2024-01-24	All
	Added configurations for MLTI0344	2024-01-24	14
	Updated test dates	2024-01-24	2, 10, 15

ACCREDITATIONS AND AUTHORIZATIONS

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Each laboratory is accredited by A2LA to ISO / IEC 17025, and as a product certifier to ISO / IEC 17065 which allows Element to certify transmitters to FCC and IC specifications.

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

European Union

European Commission – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

United Kingdom

BEIS – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

SCOPE

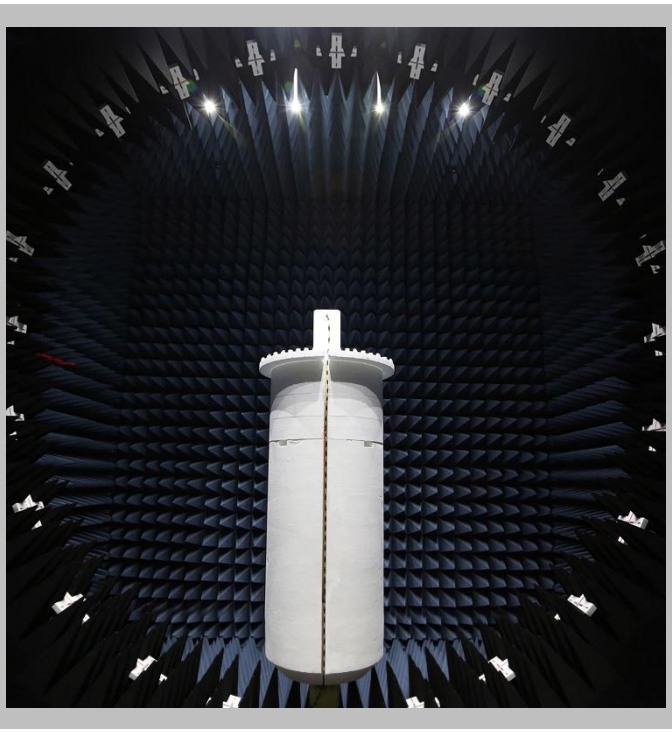
For details on the Scopes of our Accreditations, please visit:

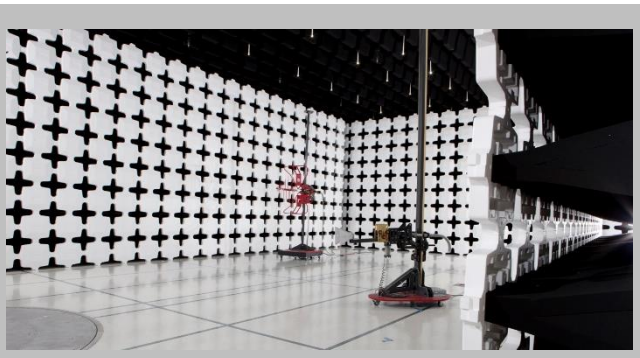
California Minnesota Oregon Texas Washington

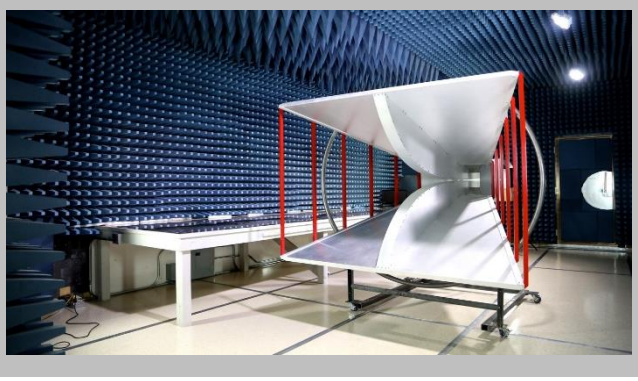
FACILITIES

element
2020.12.15

California	Minnesota	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
A2LA				
Lab Code: 3310.04	Lab Code: 3310.05	Lab Code: 3310.02	Lab Code: 3310.03	Lab Code: 3310.06
Innovation, Science and Economic Development Canada				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
BSMI				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI				
A-0029	A-0109	A-0108	A-0201	A-0110
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157







MEASUREMENT UNCERTAINTY

element
TMU.2015.07.10

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found in the table below. A lab specific value may also be found in the applicable test description section. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	3.2 dB	-3.2 dB

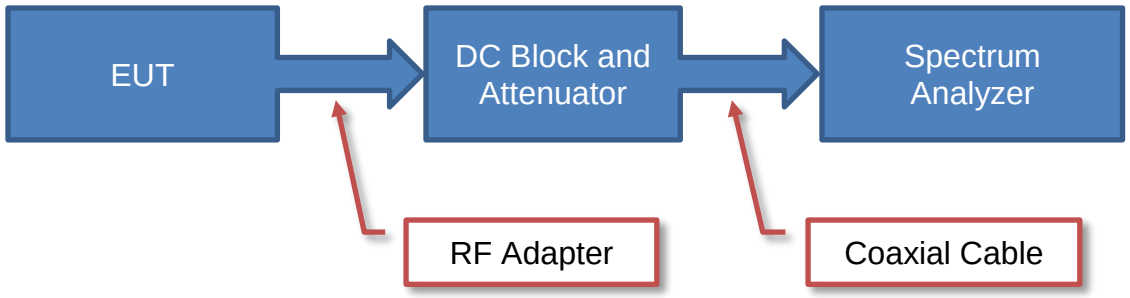
TEST SETUP BLOCK DIAGRAMS

Measurement Bandwidths

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Unless otherwise stated, measurements were made using the bandwidths and detectors specified. No video filter was used.

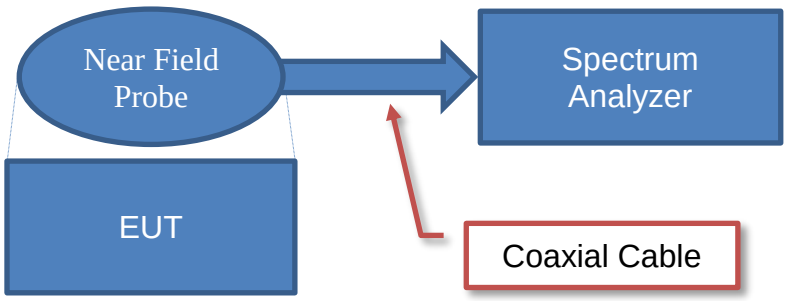
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

Near Field Test Fixture Measurements

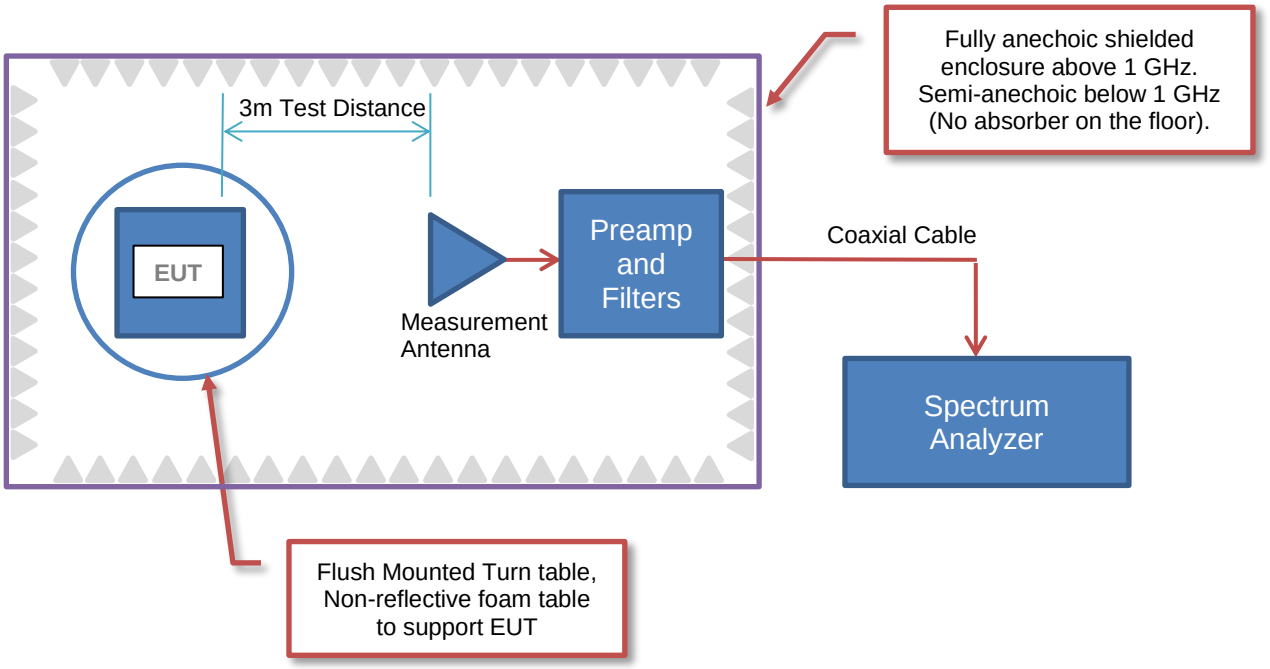


Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

Measured Level (Amplitude)		Factor: Antenna Factor		Factor: Cable Factor		Factor: Amplifier Gain		Distance Adjustment Factor		External Attenuation		Field Strength
42.6	+	28.6	+	3.1	-	40.8	+	0.0	+	0.0	=	**33.5**

Conducted Emissions:

Measured Level (Amplitude)		Factor: Transducer Factor		Factor: Cable Factor		External Attenuation		Adjusted Level
26.7	+	0.3	+	0.1	+	20.0	=	**47.1**

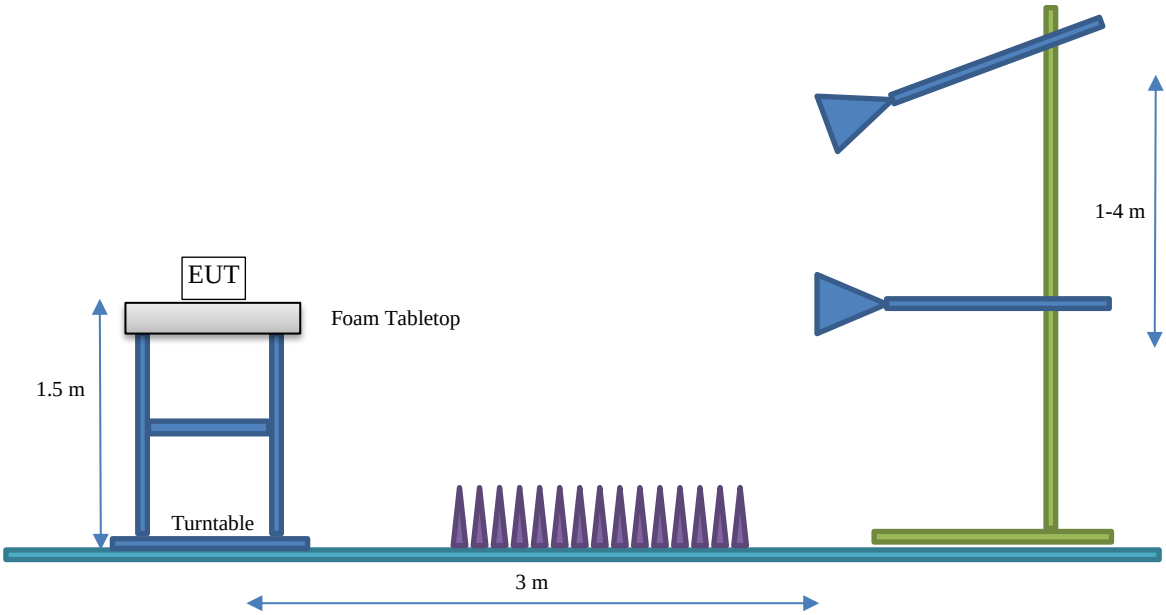
Radiated Power (ERP/EIRP) – Substitution Method:

Measured Level into Substitution Antenna (Amplitude dBm)		Substitution Antenna Factor (dBi)		EIRP to ERP (if applicable)		Measured power (dBm ERP/EIRP)
10.0	+	6.0	-	2.15	=	**13.9/16.0**

TEST SETUP BLOCK DIAGRAMS

Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



PRODUCT DESCRIPTION

Client and Equipment under Test (EUT) Information

Company Name:	Multi-Tech Systems, Inc.
Address:	2205 Woodale Drive
City, State, Zip:	Saint Paul, MN 55112
Test Requested By:	Tim Gunn
EUT:	MTCAP3-LNA7D-A23UEA-L MTCAP3-LNA7D-A23UEA-D MTCAP3-EN-A23UEA-D MTCAP3-EN-A23UEA-L
First Date of Test:	October 14, 2022
Last Date of Test:	January 24, 2024
Receipt Date of Samples:	October 14, 2022
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

The MultiTech Conduit® AP conveniently provides deep in-building connectivity and improved performance for network operators and enterprises connecting thousands of IoT assets by harnessing the power of the LoRaWAN® protocol.
Easy to deploy, the Conduit AP access point extends LoRa® connectivity in commercial buildings like hotels, convention centers, offices and retail facilities providing coverage in difficult to reach areas cell tower or rooftop deployments may not penetrate.
The Conduit AP offers a development environment for software developers and IT professionals alike. mPower™ edge intelligence features an easy-to-use graphical interface set-up and includes a built-in LoRa Network Server and Packet Forwarder to connect locally clustered assets on a private LoRaWAN network directly to your choice of IoT data platforms. The Conduit AP extends complex processing to the edge to reduce upstream communication and operational costs. The Conduit AP provides Ethernet IP backhaul or optional 4G-LTE IP backhaul.
Commercial buildings and retail facilities present unique installation challenges for installers, specifically in regards to the Access Point location and the availability of power. The Conduit AP offers models with several power options including Power over Ethernet that overcome these challenges and simplify the installation process.

Testing Objective:

Seeking to demonstrate compliance under FCC 15.247 for operation in the 902 - 928 MHz Band.

Client provided justification:

Test report contains the following models. Full testing was performed on MTCAP3-LNA7D-A23UEA-L and testing on the other models was limited to Spurious Radiated Emissions.

MTCAP3-LNA7D-A23UEA-D – cellular and external LoRa antenna
MTCAP3-LNA7D-A23UEA-L – cellular and internal LoRa antenna
MTCAP3-EN-A23UEA-D – non Cellular and external LoRa antenna
MTCAP3-EN-A23UEA-L – non Cellular and internal LoRa antenna

POWER SETTINGS AND ANTENNAS

The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information. The power settings below reflect the maximum power that the EUT is allowed to transmit at during normal operation.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
External Dipole	Quectel (PN: YEIN002AA)	902-928	2.5
Isolated Magnetic Dipole (Internal Chip)	Ethertronics/AVX M620720	902-928	0.75

The EUT was tested using the power settings provided by the manufacturer which were based upon:

☒ Test software settings Test software/firmware installed on EUT: mPower 6.0.0-296-g8f6e0b6
☐ Rated power settings

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types	Position (if multiple channels)	Power Setting
CSS Modulation Spreading Factor 10	Low Channel (923.3 MHz)	PA1, PWID17
	Mid Channel (925.1 MHz)	PA1, PWID17
	High Channel (927.5 MHz)	PA1, PWID17

CONFIGURATIONS

Configuration MLTI0253- 12

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
MTCAP3	Multi-Tech Systems, Inc.	MTCAP3-LNA7D-A23UEA-L	106
AC Adapter (EUT)	MEGA Electronics INC.	FJ-SW1260502500DN	N/A

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Lenovo	Thinkpad T430	PBXZVHX
AC Adapter (Laptop)	Lenovo	ADLX90NLT2A	N/A

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Cable (EUT)	No	1.5m	No	MTCAP3	AC Adapter (EUT)
AC Cable (Laptop)	No	1.5 m	No	AC Adapter (Laptop)	AC Mains
DC Cable (Laptop)	No	1.5 m	No	Laptop	AC Adapter (Laptop)
Ethernet Cable	No	>3m	No	MTCAP3	Laptop

Configuration MLTI0253- 13

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
MTCAP3	Multi-Tech Systems, Inc.	MTCAP3-LNA7D-A23UEA-D	107
AC Adapter (EUT)	MEGA Electronics INC.	FJ-SW1260502500DN	N/A

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Lenovo	Thinkpad T430	PBXZVHX
AC Adapter (Laptop)	Lenovo	ADLX90NLT2A	N/A

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Cable (EUT)	No	1.5m	No	MTCAP3	AC Adapter (EUT)
AC Cable (Laptop)	No	1.5 m	No	AC Adapter (Laptop)	AC Mains
DC Cable (Laptop)	No	1.5 m	No	Laptop	AC Adapter (Laptop)
Ethernet Cable	No	>3m	No	MTCAP3	Laptop

CONFIGURATIONS

Configuration MLTI0253- 23

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
MTCAP3	Multi-Tech Systems, Inc.	MTCAP3-LNA7D-A23UEA-L	106
AC Adapter (EUT)	MEGA Electronics INC.	FJ-SW1260502500DN	3

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Lenovo	Thinkpad	13513

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Cable (EUT)	No	1.5m	No	MTCAP3	AC Adapter (EUT)
Ethernet Cable	No	>3 m	No	MTCAP3	Laptop

CONFIGURATIONS

Configuration MLTI0344-1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
MTCAP3-EN-A23UEA-D	Multi-Tech Systems, Inc.	MTCAP3-EN-A23UEA-D	22696218

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Power Supply	Mega Electronics	FJ-SW1260502500DN	MJSW1260502500DN

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Lenovo	P15s	PF 2Z531G

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	1.2m	No	Power Supply	AC Mains
Ethernet Cable	No	10m	No	MTCAP3-EN	Laptop

Configuration MLTI0344-2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
MTCAP3-EN-A23UEA-L	Multi-Tech Systems, Inc.	MTCAP3-EN-A23UEA-L	22828082

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Power Supply	Mega Electronics	FJ-SW1260502500DN	MJSW1260502500DN

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Lenovo	P15s	PF 2Z531G

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	1.2m	No	Power Supply	AC Mains
Ethernet Cable	No	10m	No	MTCAP3-EN	Laptop

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2022-10-14	Spurious Conducted Emissions	Modified from delivered configuration.	Tight shield installed, authorized by Michael Bendzick.	EUT remained at Element following the test.
2	2022-10-19	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2022-10-25	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2022-10-25	Equivalent Isotropic Radiated Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2022-10-25	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2022-10-25	DTS Bandwidth (6 dB)	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	2022-10-25	Occupied Bandwidth (99%)	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2022-10-25	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
9	2022-10-25	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client following the test.
10	2024-01-24	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Gauss Instruments	TDEMI 30M	ARS	2022-04-20	2023-04-20
Cable - Conducted Cable Assembly	Northwest EMC	MNC, HGN, TYK	MNCA	2022-03-07	2023-03-07
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	2022-04-04	2023-04-04

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	3.2 dB	-3.2 dB

CONFIGURATIONS INVESTIGATED

MLTI0253-23

MODES INVESTIGATED

Transmitting LoRa Mid Channel (925.1 MHz), modulated, spreading factor 10. PA 1 PWID 19

POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

EUT:	MTCAP3-LNA7D-A23UEA-L	Work Order:	MLTI0253
Serial Number:	106	Date:	2022-10-19
Customer:	Multi-Tech Systems, Inc.	Temperature:	22.9°C
Attendees:	Michael Bendzick	Relative Humidity:	21.9%
Customer Project:	None	Bar. Pressure (PMSL):	1018 mb
Tested By:	Christopher Heintzelman	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	MLTI0253-23

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2022	ANSI C63.10:2013

TEST PARAMETERS

Run #:	62	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

Tight Shield installed.

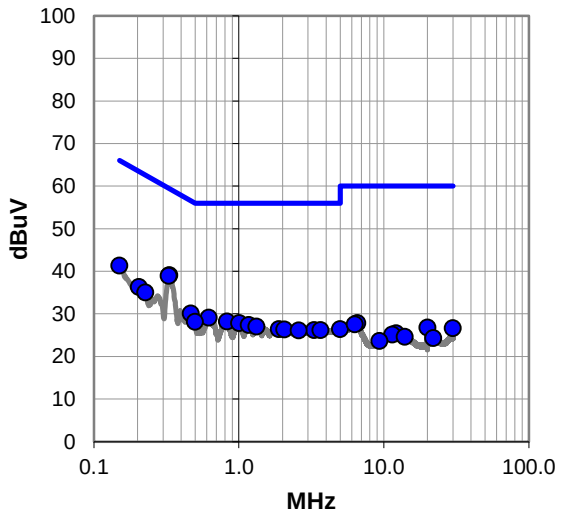
EUT OPERATING MODES

Transmitting LoRa Mid Channel (925.1 MHz), modulated, spreading factor 10. PA 1 PWID 19

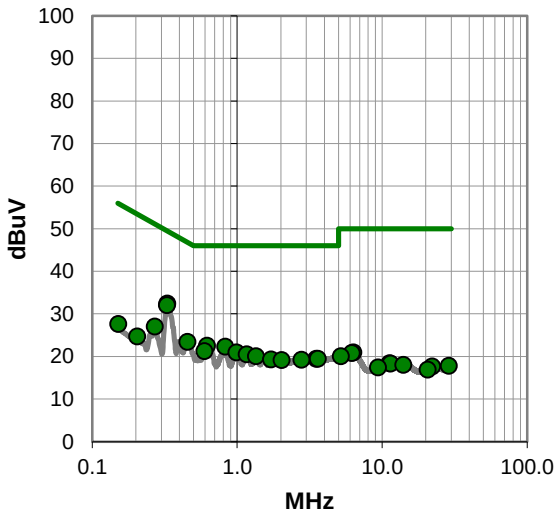
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

RESULTS - Run #62

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.332	18.8	20.3	39.1	59.4	-20.3
0.329	18.6	20.3	38.9	59.5	-20.6
0.150	20.6	20.7	41.3	66.0	-24.7
0.466	9.8	20.3	30.1	56.6	-26.5
0.620	8.8	20.3	29.1	56.0	-26.9
0.205	15.9	20.4	36.3	63.4	-27.1
0.226	14.6	20.4	35.0	62.6	-27.6
0.831	8.0	20.2	28.2	56.0	-27.8
0.498	7.8	20.3	28.1	56.0	-27.9
1.004	7.6	20.2	27.8	56.0	-28.2
1.171	7.2	20.2	27.4	56.0	-28.6
1.323	6.8	20.2	27.0	56.0	-29.0
1.886	6.1	20.3	26.4	56.0	-29.6
4.997	5.8	20.6	26.4	56.0	-29.6
2.060	6.0	20.3	26.3	56.0	-29.7
3.305	5.7	20.5	26.2	56.0	-29.8
3.664	5.7	20.5	26.2	56.0	-29.8
2.588	5.7	20.4	26.1	56.0	-29.9
6.574	7.1	20.7	27.8	60.0	-32.2
6.313	6.8	20.7	27.5	60.0	-32.5
20.002	5.1	21.7	26.8	60.0	-33.2
29.999	4.1	22.5	26.6	60.0	-33.4
12.149	4.0	21.4	25.4	60.0	-34.6
11.430	3.7	21.4	25.1	60.0	-34.9
13.966	3.2	21.4	24.6	60.0	-35.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.330	12.1	20.3	32.4	49.5	-17.1
0.329	11.7	20.3	32.0	49.5	-17.5
0.455	3.1	20.3	23.4	46.8	-23.4
0.618	2.2	20.3	22.5	46.0	-23.5
0.829	2.1	20.2	22.3	46.0	-23.7
0.271	6.7	20.3	27.0	51.1	-24.1
0.596	0.9	20.3	21.2	46.0	-24.8
0.988	0.7	20.2	20.9	46.0	-25.1
1.168	0.3	20.2	20.5	46.0	-25.5
1.348	-0.2	20.2	20.0	46.0	-26.0
3.507	-1.1	20.5	19.4	46.0	-26.6
3.607	-1.1	20.5	19.4	46.0	-26.6
1.717	-1.0	20.3	19.3	46.0	-26.7
2.779	-1.2	20.4	19.2	46.0	-26.8
2.033	-1.2	20.3	19.1	46.0	-26.9
0.152	6.9	20.7	27.6	55.9	-28.3
0.205	4.3	20.4	24.7	53.4	-28.7
6.357	0.2	20.7	20.9	50.0	-29.1
6.189	0.1	20.7	20.8	50.0	-29.2
5.199	-0.6	20.6	20.0	50.0	-30.0
11.285	-3.0	21.4	18.4	50.0	-31.6
11.442	-3.1	21.4	18.3	50.0	-31.7
13.998	-3.4	21.4	18.0	50.0	-32.0
28.846	-4.6	22.4	17.8	50.0	-32.2
22.119	-4.3	21.9	17.6	50.0	-32.4

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

EUT:	MTCAP3-LNA7D-A23UEA-L	Work Order:	MLTI0253
Serial Number:	106	Date:	2022-10-19
Customer:	Multi-Tech Systems, Inc.	Temperature:	22.9°C
Attendees:	Michael Bendzick	Relative Humidity:	21.9%
Customer Project:	None	Bar. Pressure (PMSL):	1018 mb
Tested By:	Christopher Heintzelman	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	MLTI0253-23

TEST SPECIFICATIONS

Specification	Method:
FCC 15.207:2022	ANSI C63.10:2013

TEST PARAMETERS

Run #:	63	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

Tight Shield installed. Power supply 3.

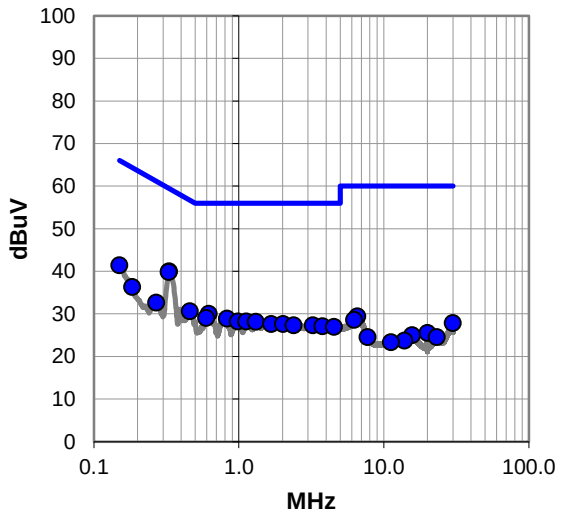
EUT OPERATING MODES

Transmitting LoRa Mid Channel (925.1 MHz), modulated, spreading factor 10. PA 1 PWID 19

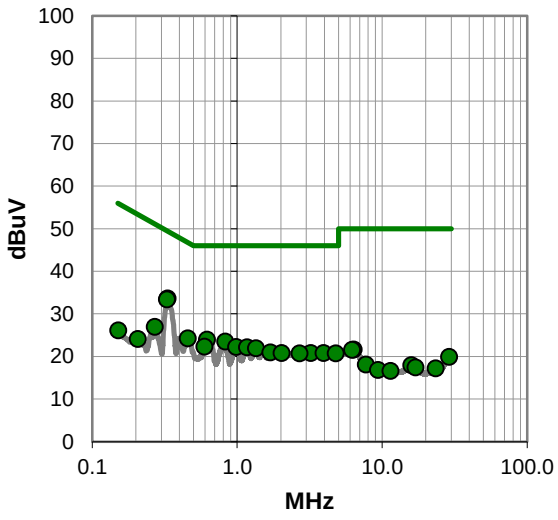
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

RESULTS - Run #63

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.330	19.7	20.3	40.0	59.5	-19.5
0.329	19.5	20.3	39.8	59.5	-19.7
0.150	20.7	20.7	41.4	66.0	-24.6
0.618	9.7	20.3	30.0	56.0	-26.0
0.460	10.3	20.3	30.6	56.7	-26.1
0.594	8.7	20.3	29.0	56.0	-27.0
0.831	8.7	20.2	28.9	56.0	-27.1
0.983	8.0	20.2	28.2	56.0	-27.8
1.125	8.0	20.2	28.2	56.0	-27.8
1.311	7.9	20.2	28.1	56.0	-27.9
0.184	15.8	20.5	36.3	64.3	-28.0
1.671	7.3	20.3	27.6	56.0	-28.4
2.015	7.3	20.3	27.6	56.0	-28.4
0.269	12.3	20.3	32.6	61.1	-28.5
2.388	6.9	20.4	27.3	56.0	-28.7
3.235	6.8	20.5	27.3	56.0	-28.7
3.766	6.6	20.5	27.1	56.0	-28.9
4.538	6.4	20.5	26.9	56.0	-29.1
6.571	8.7	20.7	29.4	60.0	-30.6
6.252	7.9	20.7	28.6	60.0	-31.4
29.998	5.3	22.5	27.8	60.0	-32.2
19.993	3.8	21.7	25.5	60.0	-34.5
15.687	3.5	21.5	25.0	60.0	-35.0
7.716	3.7	20.8	24.5	60.0	-35.5
23.232	2.5	22.0	24.5	60.0	-35.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.332	13.3	20.3	33.6	49.4	-15.8
0.329	13.1	20.3	33.4	49.5	-16.1
0.618	3.6	20.3	23.9	46.0	-22.1
0.831	3.3	20.2	23.5	46.0	-22.5
0.457	3.9	20.3	24.2	46.8	-22.6
0.594	2.0	20.3	22.3	46.0	-23.7
0.983	2.0	20.2	22.2	46.0	-23.8
1.171	1.9	20.2	22.1	46.0	-23.9
1.349	1.7	20.2	21.9	46.0	-24.1
0.271	6.6	20.3	26.9	51.1	-24.2
1.694	0.6	20.3	20.9	46.0	-25.1
2.031	0.5	20.3	20.8	46.0	-25.2
3.218	0.3	20.5	20.8	46.0	-25.2
3.943	0.3	20.5	20.8	46.0	-25.2
2.690	0.3	20.4	20.7	46.0	-25.3
4.801	0.1	20.6	20.7	46.0	-25.3
6.375	0.9	20.7	21.6	50.0	-28.4
6.229	0.8	20.7	21.5	50.0	-28.5
0.206	3.7	20.4	24.1	53.3	-29.2
0.152	5.4	20.7	26.1	55.9	-29.8
29.024	-2.6	22.5	19.9	50.0	-30.1
7.749	-2.8	20.9	18.1	50.0	-31.9
15.896	-3.7	21.6	17.9	50.0	-32.1
16.981	-4.2	21.6	17.4	50.0	-32.6
23.437	-4.8	22.0	17.2	50.0	-32.8

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.
For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.
The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.
If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.
Measurements within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.
Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of 10*log(1/dc).

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Biconilog	ETS Lindgren	3142D	AXO	2021-09-14	2023-09-14
Cable	ESM Cable Corp.	Bilog Cables	MNH	2022-10-08	2023-10-08
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	2022-10-08	2023-10-08
Antenna - Double Ridge	ETS Lindgren	3115	AJQ	2021-01-25	2023-01-25
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	2022-01-18	2023-01-18
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2022-01-18	2023-01-18
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	NCR
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	2022-01-18	2023-01-18
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	2022-01-18	2023-01-18
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	2022-01-18	2023-01-18
Attenuator	Fairview Microwave	SA18E-20	TWZ	2022-08-27	2023-08-27
Filter - Band Pass/Notch	K&L Microwave	3TNF-500/1000-N/N	HGS	2022-06-22	2023-06-22
Filter - Low Pass	Micro-Tronics	LPM50003	LFJ	2022-08-27	2023-08-27
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2022-06-10	2023-06-10
Attenuator	Fairview Microwave	SA18E-10	TYA	2022-08-27	2023-08-27
Filter - High Pass	Micro-Tronics	HPM50108	LFM	2022-08-27	2023-08-27

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 18 GHz

POWER INVESTIGATED

110VAC/60Hz

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

CONFIGURATIONS INVESTIGATED

MLTI0253-12
MLTI0253-13

MODES INVESTIGATED

Transmitting LoRa modulated, PA: 1, PWID: 19, Bw 500 kHz, Spread Factor: 10

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

EUT:	MTCAP3-LNA7D-A23UEA-D	Work Order:	MLTI0253
Serial Number:	107	Date:	2022-10-14
Customer:	Multi-Tech Systems, Inc.	Temperature:	21.8°C
Attendees:	Michael Bendzick	Relative Humidity:	27.6%
Customer Project:	None	Bar. Pressure (PMSL):	1024 mb
Tested By:	Chris Patterson	Job Site:	MN05
Power:	110VAC/60Hz	Configuration:	MLTI0253-13

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2022	ANSI C63.10:2013

TEST PARAMETERS

Run #:	159	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

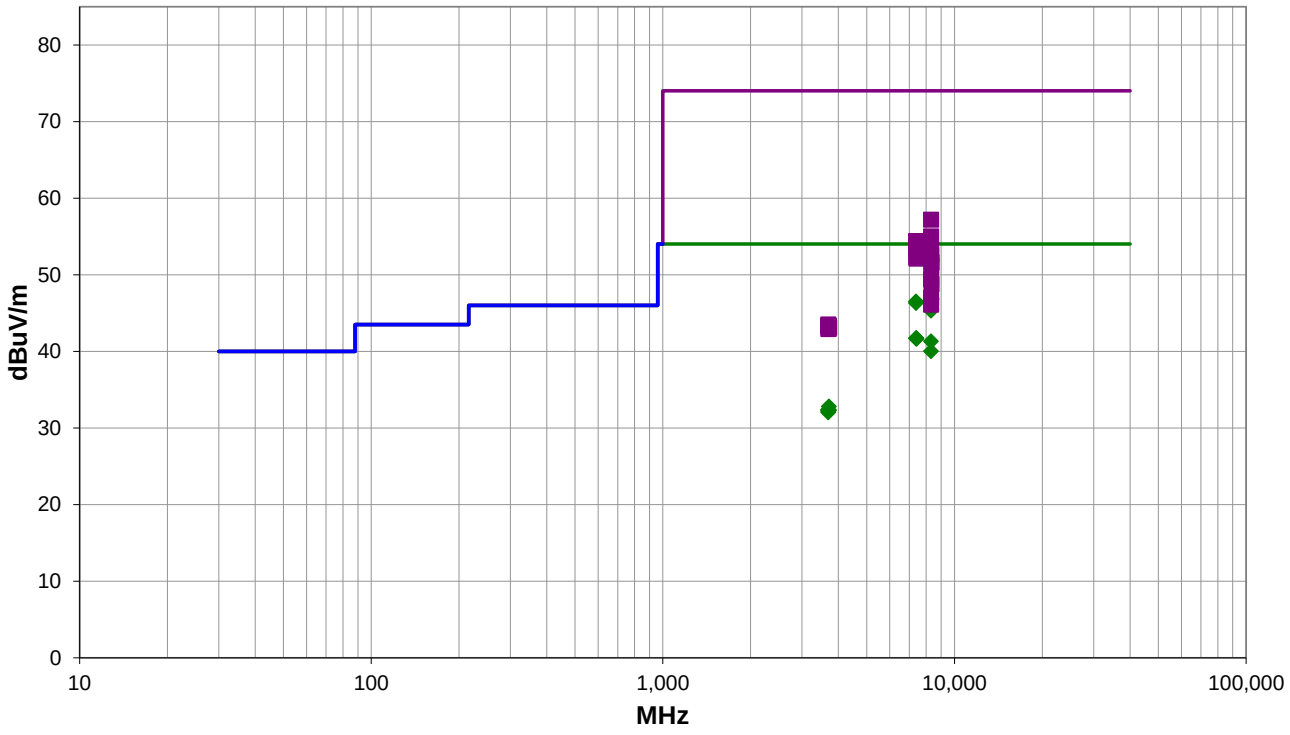
None

EUT OPERATING MODES

Transmitting LoRa modulated, PA: 1, PWID: 19, Bw 500 kHz, Spread Factor: 10

DEVIATIONS FROM TEST STANDARD

None



Run #: 159 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

RESULTS - Run #159

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
8308.370	57.6	-4.1	1.7	335.0	3.0	0.0	Horz	AV	0.0	53.5	54.0	-0.5	EUT Vert, Low Ch
8308.580	55.6	-4.1	2.0	31.9	3.0	0.0	Vert	AV	0.0	51.5	54.0	-2.5	EUT On Side, Low Ch
8308.320	53.2	-4.1	2.6	336.9	3.0	0.0	Vert	AV	0.0	49.1	54.0	-4.9	EUT Horz, Low Ch
8325.150	52.8	-4.0	2.0	26.0	3.0	0.0	Horz	AV	0.0	48.8	54.0	-5.2	EUT Vert, Mid Ch
8349.500	50.8	-4.0	1.9	318.0	3.0	0.0	Horz	AV	0.0	46.8	54.0	-7.2	EUT Vert, High Ch
8324.730	50.7	-4.1	1.9	358.9	3.0	0.0	Vert	AV	0.0	46.6	54.0	-7.4	EUT On Side, Mid Ch
7385.400	34.9	11.6	3.9	358.0	3.0	0.0	Vert	AV	0.0	46.5	54.0	-7.5	EUT On Side, Low Ch
7385.070	34.7	11.6	1.5	45.9	3.0	0.0	Horz	AV	0.0	46.3	54.0	-7.7	EUT Vert, Low Ch
8345.920	49.5	-4.0	2.1	358.9	3.0	0.0	Vert	AV	0.0	45.5	54.0	-8.5	EUT On Side, High Ch
8308.200	49.4	-4.1	2.0	92.9	3.0	0.0	Horz	AV	0.0	45.3	54.0	-8.7	EUT On Side, Low Ch
7399.800	30.1	11.6	1.5	91.0	3.0	0.0	Horz	AV	0.0	41.7	54.0	-12.3	EUT Vert, Mid Ch
7395.010	30.1	11.6	3.3	156.9	3.0	0.0	Vert	AV	0.0	41.7	54.0	-12.3	EUT On Side, Mid Ch
7409.620	30.0	11.7	1.5	227.0	3.0	0.0	Vert	AV	0.0	41.7	54.0	-12.3	EUT On Side, High Ch
7407.670	29.9	11.7	1.5	346.0	3.0	0.0	Horz	AV	0.0	41.6	54.0	-12.4	EUT Vert, High Ch
8307.990	45.4	-4.1	2.4	328.0	3.0	0.0	Vert	AV	0.0	41.3	54.0	-12.7	EUT Vert, Low Ch
8309.490	44.1	-4.1	2.5	73.9	3.0	0.0	Horz	AV	0.0	40.0	54.0	-14.0	EUT Horz, Low Ch
8308.120	61.3	-4.1	1.7	335.0	3.0	0.0	Horz	PK	0.0	57.2	74.0	-16.8	EUT Vert, Low Ch
8307.700	59.1	-4.1	2.0	31.9	3.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	EUT On Side, Low Ch
7386.150	42.8	11.6	3.9	358.0	3.0	0.0	Vert	PK	0.0	54.4	74.0	-19.6	EUT On Side, Low Ch
7385.480	42.6	11.6	1.5	45.9	3.0	0.0	Horz	PK	0.0	54.2	74.0	-19.8	EUT Vert, Low Ch
8307.740	57.5	-4.1	2.6	336.9	3.0	0.0	Vert	PK	0.0	53.4	74.0	-20.6	EUT Horz, Low Ch
7410.550	41.5	11.7	1.5	91.0	3.0	0.0	Horz	PK	0.0	53.2	74.0	-20.8	EUT Vert, Mid Ch
3710.620	32.1	0.7	1.5	23.0	3.0	0.0	Vert	AV	0.0	32.8	54.0	-21.2	EUT On Side, High Ch
8323.900	56.7	-4.1	2.0	26.0	3.0	0.0	Horz	PK	0.0	52.6	74.0	-21.4	EUT Vert, Mid Ch
7418.120	40.7	11.8	1.5	346.0	3.0	0.0	Horz	PK	0.0	52.5	74.0	-21.5	EUT Vert, High Ch
3692.700	31.7	0.7	3.1	66.0	3.0	0.0	Horz	AV	0.0	32.4	54.0	-21.6	EUT Vert, Low Ch
3692.910	31.6	0.7	1.5	292.0	3.0	0.0	Vert	AV	0.0	32.3	54.0	-21.7	EUT On Side, Low Ch
7395.800	40.7	11.6	3.3	156.9	3.0	0.0	Vert	PK	0.0	52.3	74.0	-21.7	EUT On Side, Mid Ch
3720.000	31.5	0.8	1.5	221.0	3.0	0.0	Horz	AV	0.0	32.3	54.0	-21.7	EUT Vert, High Ch
3695.280	31.5	0.7	3.3	319.9	3.0	0.0	Horz	AV	0.0	32.2	54.0	-21.8	EUT Vert, Mid Ch
7407.790	40.4	11.7	1.5	227.0	3.0	0.0	Vert	PK	0.0	52.1	74.0	-21.9	EUT On Side, High Ch
3695.190	31.3	0.7	1.5	310.0	3.0	0.0	Vert	AV	0.0	32.0	54.0	-22.0	EUT On Side, Mid Ch
8347.000	55.6	-4.0	1.9	318.0	3.0	0.0	Horz	PK	0.0	51.6	74.0	-22.4	EUT Vert, High Ch
8323.820	55.3	-4.1	1.9	358.9	3.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	EUT On Side, Mid Ch
8307.660	53.5	-4.1	2.0	92.9	3.0	0.0	Horz	PK	0.0	49.4	74.0	-24.6	EUT On Side, Low Ch
8345.290	52.8	-4.0	2.1	358.9	3.0	0.0	Vert	PK	0.0	48.8	74.0	-25.2	EUT On Side, High Ch
8309.990	51.1	-4.1	2.4	328.0	3.0	0.0	Vert	PK	0.0	47.0	74.0	-27.0	EUT Vert, Low Ch
8311.200	50.2	-4.1	2.5	73.9	3.0	0.0	Horz	PK	0.0	46.1	74.0	-27.9	EUT Horz, Low Ch
3695.320	42.8	0.7	1.5	292.0	3.0	0.0	Vert	PK	0.0	43.5	74.0	-30.5	EUT On Side, Low Ch
3688.360	42.6	0.7	3.3	319.9	3.0	0.0	Horz	PK	0.0	43.3	74.0	-30.7	EUT Vert, Mid Ch
3709.120	42.6	0.7	1.5	23.0	3.0	0.0	Vert	PK	0.0	43.3	74.0	-30.7	EUT On Side, High Ch
3719.420	42.3	0.8	1.5	221.0	3.0	0.0	Horz	PK	0.0	43.1	74.0	-30.9	EUT Vert, High Ch

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
3700.020	42.3	0.7	1.5	310.0	3.0	0.0	Vert	PK	0.0	43.0	74.0	-31.0	EUT On Side, Mid Ch
3697.320	42.1	0.8	3.1	66.0	3.0	0.0	Horz	PK	0.0	42.9	74.0	-31.1	EUT Vert, Low Ch

CONCLUSION
Pass

Tested By

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

EUT:	MTCAP3-LNA7D-A23UEA-L	Work Order:	MLTI0253
Serial Number:	106	Date:	2022-10-14
Customer:	Multi-Tech Systems, Inc.	Temperature:	21.8°C
Attendees:	Michael Bendzick	Relative Humidity:	27.6%
Customer Project:	None	Bar. Pressure (PMSL):	1024 mb
Tested By:	Chris Patterson	Job Site:	MN05
Power:	110VAC/60Hz	Configuration:	MLTI0253-12

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2022	ANSI C63.10:2013

TEST PARAMETERS

Run #:	171	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

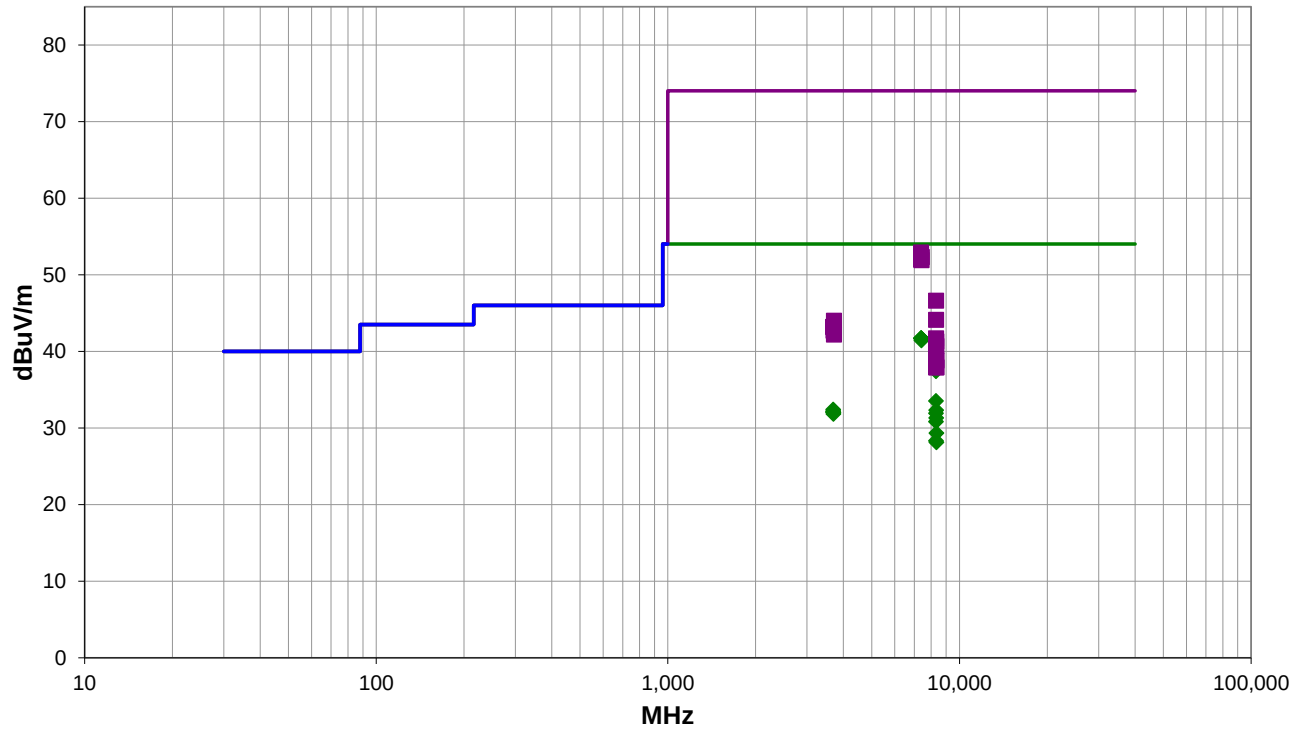
Tight shield installed

EUT OPERATING MODES

Transmitting LoRa modulated, PA: 1, PWID: 19, Bw 500 kHz, Spread Factor: 10

DEVIATIONS FROM TEST STANDARD

None



Run #: 171 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

RESULTS - Run #171

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7395.230	30.1	11.6	1.5	157.9	3.0	0.0	Horz	AV	0.0	41.7	54.0	-12.3	EUT On Side, Low Ch
7392.730	30.1	11.6	1.5	318.9	3.0	0.0	Vert	AV	0.0	41.7	54.0	-12.3	EUT Horz, Low Ch
7391.680	30.1	11.6	3.3	0.0	3.0	0.0	Vert	AV	0.0	41.7	54.0	-12.3	EUT Horz, Mid Ch
7393.010	30.1	11.6	1.5	150.9	3.0	0.0	Horz	AV	0.0	41.7	54.0	-12.3	EUT On Side, Mid Ch
7407.710	29.9	11.7	1.5	188.0	3.0	0.0	Horz	AV	0.0	41.6	54.0	-12.4	EUT On Side, High Ch
7407.750	29.7	11.7	1.5	186.9	3.0	0.0	Vert	AV	0.0	41.4	54.0	-12.6	EUT Horz, High Ch
8308.530	44.9	-4.1	2.0	301.9	3.0	0.0	Horz	AV	0.0	40.8	54.0	-13.2	EUT On Side, Low Ch
8308.530	41.5	-4.1	2.1	357.0	3.0	0.0	Vert	AV	0.0	37.4	54.0	-16.6	EUT Horz, Low Ch
8308.280	37.6	-4.1	1.7	348.9	3.0	0.0	Vert	AV	0.0	33.5	54.0	-20.5	EUT Vert, Low Ch
7388.300	41.3	11.6	1.5	150.9	3.0	0.0	Horz	PK	0.0	52.9	74.0	-21.1	EUT On Side, Mid Ch
3693.410	31.7	0.7	3.8	308.9	3.0	0.0	Horz	AV	0.0	32.4	54.0	-21.6	EUT On Side, Low Ch
7387.400	40.8	11.6	1.5	318.9	3.0	0.0	Vert	PK	0.0	52.4	74.0	-21.6	EUT Horz, Low Ch
7395.780	40.7	11.6	1.5	157.9	3.0	0.0	Horz	PK	0.0	52.3	74.0	-21.7	EUT On Side, Low Ch
8324.860	36.4	-4.1	1.5	84.0	3.0	0.0	Horz	AV	0.0	32.3	54.0	-21.7	EUT On Side, Mid Ch
7428.000	40.6	11.7	1.5	188.0	3.0	0.0	Horz	PK	0.0	52.3	74.0	-21.7	EUT On Side, High Ch
3693.910	31.5	0.7	1.5	297.9	3.0	0.0	Vert	AV	0.0	32.2	54.0	-21.8	EUT Horz, Low Ch
3693.020	31.4	0.7	1.5	48.9	3.0	0.0	Vert	AV	0.0	32.1	54.0	-21.9	EUT Horz, Mid Ch
7389.130	40.4	11.6	3.3	0.0	3.0	0.0	Vert	PK	0.0	52.0	74.0	-22.0	EUT Horz, Mid Ch
3692.650	31.3	0.7	1.5	63.0	3.0	0.0	Horz	AV	0.0	32.0	54.0	-22.0	EUT On Side, Mid Ch
3701.620	31.3	0.7	1.5	199.9	3.0	0.0	Horz	AV	0.0	32.0	54.0	-22.0	EUT On Side, High Ch
8310.910	36.0	-4.1	1.5	286.0	3.0	0.0	Horz	AV	0.0	31.9	54.0	-22.1	EUT Vert, Low Ch
7415.500	40.2	11.7	1.5	186.9	3.0	0.0	Vert	PK	0.0	51.9	74.0	-22.1	EUT Horz, High Ch
3701.000	31.1	0.7	1.5	289.9	3.0	0.0	Vert	AV	0.0	31.8	54.0	-22.2	EUT Horz, High Ch
8324.360	35.4	-4.1	2.5	318.0	3.0	0.0	Vert	AV	0.0	31.3	54.0	-22.7	EUT Horz, Mid Ch
8308.280	34.9	-4.1	1.2	12.0	3.0	0.0	Vert	AV	0.0	30.8	54.0	-23.2	EUT On Side, Low Ch
8345.580	33.3	-4.0	1.5	27.0	3.0	0.0	Vert	AV	0.0	29.3	54.0	-24.7	EUT Horz, High Ch
8309.200	32.4	-4.1	1.5	214.9	3.0	0.0	Horz	AV	0.0	28.3	54.0	-25.7	EUT Horz, Low Ch
8346.290	32.1	-4.0	2.3	88.9	3.0	0.0	Horz	AV	0.0	28.1	54.0	-25.9	EUT On Side, High Ch
8308.950	50.7	-4.1	2.0	301.9	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	EUT On Side, Low Ch
8311.580	48.2	-4.1	2.1	357.0	3.0	0.0	Vert	PK	0.0	44.1	74.0	-29.9	EUT Horz, Low Ch
3709.400	43.3	0.7	1.5	63.0	3.0	0.0	Horz	PK	0.0	44.0	74.0	-30.0	EUT On Side, Mid Ch
3687.870	42.5	0.7	3.8	308.9	3.0	0.0	Horz	PK	0.0	43.2	74.0	-30.8	EUT On Side, Low Ch
3696.030	42.5	0.7	1.5	297.9	3.0	0.0	Vert	PK	0.0	43.2	74.0	-30.8	EUT Horz, Low Ch
3710.520	42.4	0.7	1.5	48.9	3.0	0.0	Vert	PK	0.0	43.1	74.0	-30.9	EUT Horz, Mid Ch
3701.210	42.0	0.7	1.5	199.9	3.0	0.0	Horz	PK	0.0	42.7	74.0	-31.3	EUT On Side, High Ch
3713.170	41.4	0.8	1.5	289.9	3.0	0.0	Vert	PK	0.0	42.2	74.0	-31.8	EUT Horz, High Ch
8310.160	45.8	-4.1	1.7	348.9	3.0	0.0	Vert	PK	0.0	41.7	74.0	-32.3	EUT Vert, Low Ch
8324.070	45.4	-4.1	1.5	84.0	3.0	0.0	Horz	PK	0.0	41.3	74.0	-32.7	EUT On Side, Mid Ch
8308.700	44.8	-4.1	1.2	12.0	3.0	0.0	Vert	PK	0.0	40.7	74.0	-33.3	EUT On Side, Low Ch
8324.690	44.8	-4.1	2.5	318.0	3.0	0.0	Vert	PK	0.0	40.7	74.0	-33.3	EUT Horz, Mid Ch
8311.990	43.1	-4.1	1.5	286.0	3.0	0.0	Horz	PK	0.0	39.0	74.0	-35.0	EUT Vert, Low Ch
8346.170	42.8	-4.0	1.5	27.0	3.0	0.0	Vert	PK	0.0	38.8	74.0	-35.2	EUT Horz, High Ch

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
8308.740	42.0	-4.1	1.5	214.9	3.0	0.0	Horz	PK	0.0	37.9	74.0	-36.1	EUT Horz, Low Ch
8345.210	41.9	-4.0	2.3	88.9	3.0	0.0	Horz	PK	0.0	37.9	74.0	-36.1	EUT On Side, High Ch

CONCLUSION
Pass

Tested By

SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of 10*log(1/dc).

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Double Ridge	ETS Lindgren	3115	AIP	2022-07-20	2024-07-20
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	2024-01-08	2025-01-08
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2024-01-08	2025-01-08
Filter - High Pass	Micro-Tronics	HPM50108	LFM	2023-10-11	2024-10-11
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2023-02-06	2024-02-06
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	NCR
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	2024-01-08	2025-01-08
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	2024-01-08	2025-01-08
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	2024-01-08	2025-01-08

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

FREQUENCY RANGE INVESTIGATED

1 GHz TO 18 GHz

POWER INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

MLTI0344-1
MLTI0344-2

MODES INVESTIGATED

Transmitting LoRa Low, Mid and High Channels (923.3, 925.1 and 927.5 MHz) modulated, PA: 1, PWID: 19, Bw 500 kHz, Spread Factor: 10

SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	MTCAP3-EN-A23UEA-D	Work Order:	MLTI0344
Serial Number:	22696218	Date:	2024-01-26
Customer:	Multi-Tech Systems, Inc.	Temperature:	21.9°C
Attendees:	Marcus Glass	Relative Humidity:	30.8%
Customer Project:	None	Bar. Pressure (PMSL):	1021 mb
Tested By:	Marcelo Aguayo	Job Site:	MN05
Power:	110VAC/60Hz	Configuration:	MLTI0344-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	13	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

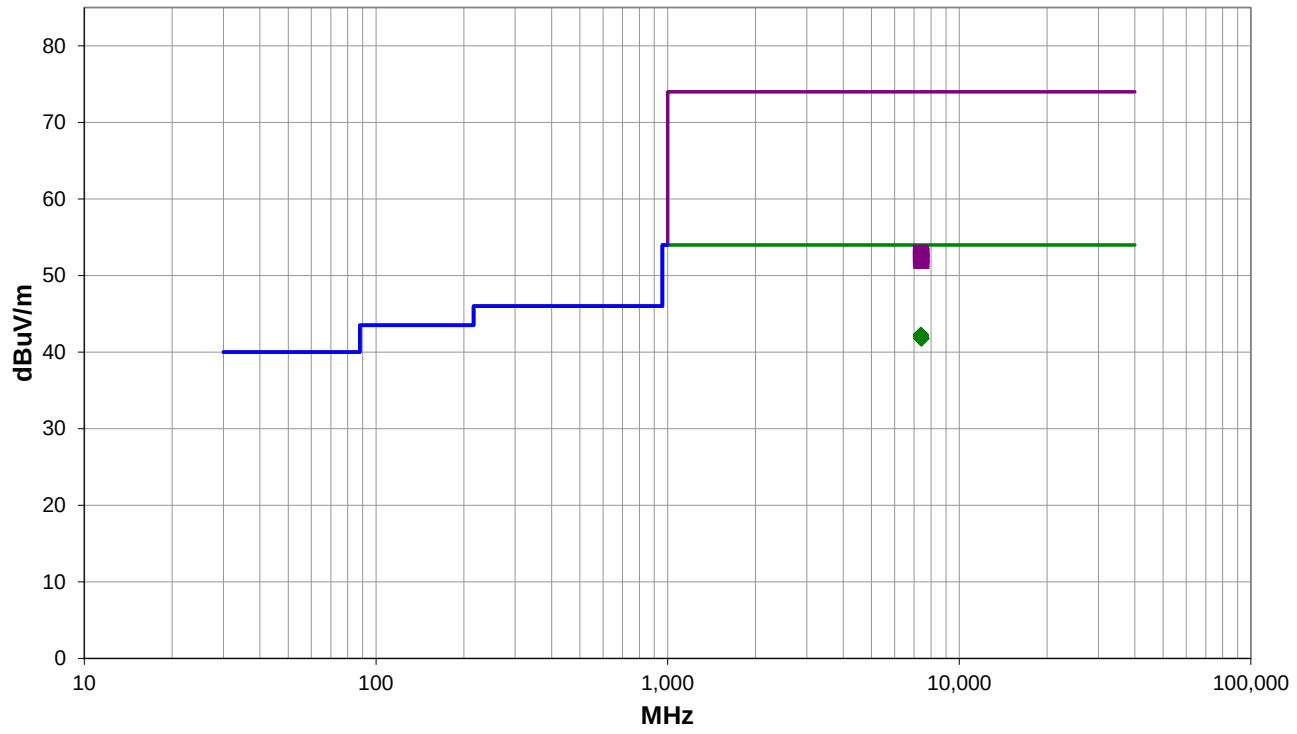
None

EUT OPERATING MODES

Transmitting LoRa Low, Mid and High Channels (923.3, 925.1 and 927.5 MHz) modulated, PA: 1, PWID: 19, Bw 500 kHz, Spread Factor: 10

DEVIATIONS FROM TEST STANDARD

None



Run #: 13 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #13

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7384.650	29.8	12.5	1.3	347.9	3.0	0.0	Horz	AV	0.0	42.3	54.0	-11.7	EUT Vert, Low Ch
7386.200	29.7	12.5	1.5	239.0	3.0	0.0	Horz	AV	0.0	42.2	54.0	-11.8	EUT Horz, Low Ch
7383.933	29.7	12.5	1.5	199.9	3.0	0.0	Vert	AV	0.0	42.2	54.0	-11.8	EUT Vert, Low Ch
7385.342	29.6	12.5	1.5	336.9	3.0	0.0	Vert	AV	0.0	42.1	54.0	-11.9	EUT Horz, Low Ch
7386.583	29.6	12.5	1.5	286.0	3.0	0.0	Horz	AV	0.0	42.1	54.0	-11.9	EUT On Side, Low Ch
7384.167	29.6	12.5	1.4	102.9	3.0	0.0	Vert	AV	0.0	42.1	54.0	-11.9	EUT On Side, Low Ch
7402.833	29.3	12.5	1.5	148.0	3.0	0.0	Horz	AV	0.0	41.8	54.0	-12.2	EUT Vert, Mid Ch
7402.317	29.3	12.5	1.5	30.0	3.0	0.0	Vert	AV	0.0	41.8	54.0	-12.2	EUT Vert, Mid Ch
7418.575	29.3	12.5	3.3	4.0	3.0	0.0	Horz	AV	0.0	41.8	54.0	-12.2	EUT Vert, High Ch
7417.525	29.3	12.5	1.5	42.9	3.0	0.0	Vert	AV	0.0	41.8	54.0	-12.2	EUT Vert, High Ch
7384.883	40.5	12.5	1.5	239.0	3.0	0.0	Horz	PK	0.0	53.0	74.0	-21.0	EUT Horz, Low Ch
7385.708	40.3	12.4	1.5	286.0	3.0	0.0	Horz	PK	0.0	52.7	74.0	-21.3	EUT On Side, Low Ch
7387.833	40.2	12.5	1.4	102.9	3.0	0.0	Vert	PK	0.0	52.7	74.0	-21.3	EUT On Side, Low Ch
7402.000	40.2	12.5	1.5	30.0	3.0	0.0	Vert	PK	0.0	52.7	74.0	-21.3	EUT Vert, Mid Ch
7384.183	40.1	12.5	1.5	199.9	3.0	0.0	Vert	PK	0.0	52.6	74.0	-21.4	EUT Vert, Low Ch
7417.825	40.1	12.5	1.5	42.9	3.0	0.0	Vert	PK	0.0	52.6	74.0	-21.4	EUT Vert, High Ch
7384.175	40.0	12.5	1.3	347.9	3.0	0.0	Horz	PK	0.0	52.5	74.0	-21.5	EUT Vert, Low Ch
7384.225	39.8	12.5	1.5	336.9	3.0	0.0	Vert	PK	0.0	52.3	74.0	-21.7	EUT Horz, Low Ch
7403.067	39.6	12.5	1.5	148.0	3.0	0.0	Horz	PK	0.0	52.1	74.0	-21.9	EUT Vert, Mid Ch
7419.000	39.4	12.5	3.3	4.0	3.0	0.0	Horz	PK	0.0	51.9	74.0	-22.1	EUT Vert, High Ch

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	MTCAP3-EN-A23UEA-L	Work Order:	MLTI0344
Serial Number:	22828082	Date:	2024-01-26
Customer:	Multi-Tech Systems, Inc.	Temperature:	22°C
Attendees:	Marcus Glass	Relative Humidity:	31.3%
Customer Project:	None	Bar. Pressure (PMSL):	1022 mb
Tested By:	Marcelo Aguayo	Job Site:	MN05
Power:	110VAC/60Hz	Configuration:	MLTI0344-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	29	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

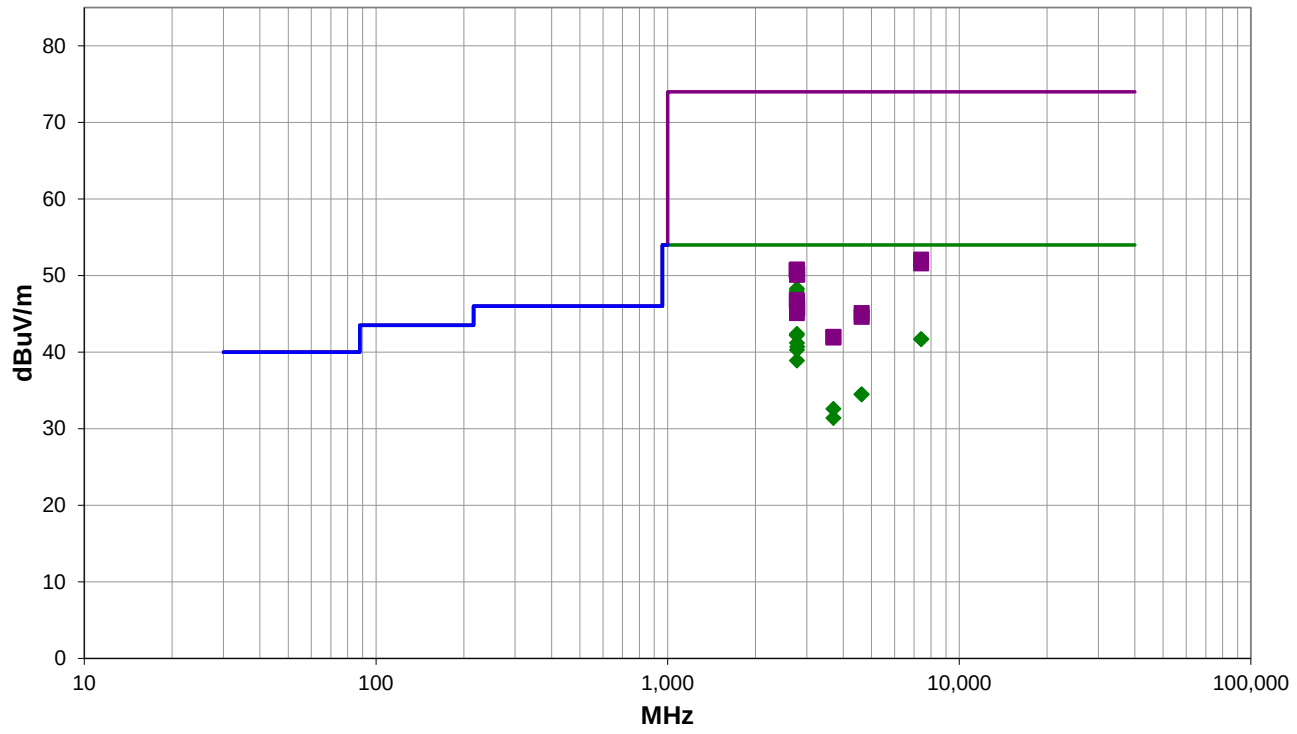
None

EUT OPERATING MODES

Transmitting LoRa Low, Mid and High Channels (923.3, 925.1 and 927.5 MHz) modulated, PA: 1, PWID: 19, Bw 500 kHz, Spread Factor: 10

DEVIATIONS FROM TEST STANDARD

None



Run #: 29 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #29

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2775.033	50.7	-2.4	2.2	69.0	3.0	0.0	Horz	AV	0.0	48.3	54.0	-5.7	EUT Vert, Mid Ch
2770.250	50.5	-2.5	1.6	40.0	3.0	0.0	Horz	AV	0.0	48.0	54.0	-6.0	EUT Vert, Low Ch
2774.942	49.9	-2.4	3.2	47.0	3.0	0.0	Horz	AV	0.0	47.5	54.0	-6.5	EUT On Side, Mid Ch
2782.142	49.1	-2.4	2.6	37.0	3.0	0.0	Horz	AV	0.0	46.7	54.0	-7.3	EUT Vert, High Ch
2774.892	44.8	-2.4	1.1	106.0	3.0	0.0	Vert	AV	0.0	42.4	54.0	-11.6	EUT Vert, Mid Ch
2770.217	44.7	-2.5	1.3	74.9	3.0	0.0	Vert	AV	0.0	42.2	54.0	-11.8	EUT Vert, Low Ch
7398.883	29.2	12.5	1.5	357.9	3.0	0.0	Horz	AV	0.0	41.7	54.0	-12.3	EUT Vert, Mid Ch
7400.892	29.2	12.5	1.2	357.0	3.0	0.0	Vert	AV	0.0	41.7	54.0	-12.3	EUT Vert, Mid Ch
2774.900	43.6	-2.4	1.5	145.0	3.0	0.0	Vert	AV	0.0	41.2	54.0	-12.8	EUT Horz, Mid Ch
2782.125	43.1	-2.4	1.2	73.9	3.0	0.0	Vert	AV	0.0	40.7	54.0	-13.3	EUT Vert, High Ch
2775.100	42.7	-2.4	1.1	257.0	3.0	0.0	Vert	AV	0.0	40.3	54.0	-13.7	EUT On Side, Mid Ch
2775.117	41.3	-2.4	1.5	209.0	3.0	0.0	Horz	AV	0.0	38.9	54.0	-15.1	EUT Horz, Mid Ch
4623.133	30.1	4.4	1.5	185.0	3.0	0.0	Horz	AV	0.0	34.5	54.0	-19.5	EUT Vert, Mid Ch
4623.017	30.1	4.4	1.5	153.9	3.0	0.0	Vert	AV	0.0	34.5	54.0	-19.5	EUT Vert, Mid Ch
3700.258	31.8	0.8	1.9	47.0	3.0	0.0	Horz	AV	0.0	32.6	54.0	-21.4	EUT Vert, Mid Ch
7398.750	39.6	12.5	1.2	357.0	3.0	0.0	Vert	PK	0.0	52.1	74.0	-21.9	EUT Vert, Mid Ch
7398.683	39.1	12.5	1.5	357.9	3.0	0.0	Horz	PK	0.0	51.6	74.0	-22.4	EUT Vert, Mid Ch
3700.483	30.6	0.8	1.5	48.9	3.0	0.0	Vert	AV	0.0	31.4	54.0	-22.6	EUT Vert, Mid Ch
2774.958	53.2	-2.4	2.2	69.0	3.0	0.0	Horz	PK	0.0	50.8	74.0	-23.2	EUT Vert, Mid Ch
2769.342	53.2	-2.5	1.6	40.0	3.0	0.0	Horz	PK	0.0	50.7	74.0	-23.3	EUT Vert, Low Ch
2781.925	52.6	-2.4	2.6	37.0	3.0	0.0	Horz	PK	0.0	50.2	74.0	-23.8	EUT Vert, High Ch
2775.283	52.5	-2.4	3.2	47.0	3.0	0.0	Horz	PK	0.0	50.1	74.0	-23.9	EUT On Side, Mid Ch
2770.575	49.3	-2.5	1.3	74.9	3.0	0.0	Vert	PK	0.0	46.8	74.0	-27.2	EUT Vert, Low Ch
2775.208	49.1	-2.4	1.1	106.0	3.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	EUT Vert, Mid Ch
2775.575	49.0	-2.4	1.5	145.0	3.0	0.0	Vert	PK	0.0	46.6	74.0	-27.4	EUT Horz, Mid Ch
2782.158	48.1	-2.4	1.2	73.9	3.0	0.0	Vert	PK	0.0	45.7	74.0	-28.3	EUT Vert, High Ch
2774.958	48.0	-2.4	1.1	257.0	3.0	0.0	Vert	PK	0.0	45.6	74.0	-28.4	EUT On Side, Mid Ch
2774.942	47.5	-2.4	1.5	209.0	3.0	0.0	Horz	PK	0.0	45.1	74.0	-28.9	EUT Horz, Mid Ch
4627.708	40.7	4.4	1.5	185.0	3.0	0.0	Horz	PK	0.0	45.1	74.0	-28.9	EUT Vert, Mid Ch
4624.375	40.2	4.4	1.5	153.9	3.0	0.0	Vert	PK	0.0	44.6	74.0	-29.4	EUT Vert, Mid Ch
3700.817	41.2	0.8	1.9	47.0	3.0	0.0	Horz	PK	0.0	42.0	74.0	-32.0	EUT Vert, Mid Ch
3699.742	41.1	0.8	1.5	48.9	3.0	0.0	Vert	PK	0.0	41.9	74.0	-32.1	EUT Vert, Mid Ch

CONCLUSION

Pass

Tested By

DUTY CYCLE

TEST DESCRIPTION

The Duty Cycle (x) were measured for each of the EUT operating modes. The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum.

The duty cycle was calculated by dividing the transmission pulse duration (T) by the total period of a single on and total off time.

The EUT operates at 100% Duty Cycle.

OUTPUT POWER

XMit 2022.02.07.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	18B5W-26	RFY	2022-05-30	2023-05-30
Attenuator	Fairview Microwave	SA18S5W-20	RFX	2022-05-30	2023-05-30
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2022-09-10	2023-09-10
Block - DC	Fairview Microwave	SD3379	AMI	2022-09-10	2023-09-10
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2022-04-25	2023-04-25
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

Prior to measuring output power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Maximum Conducted Output Power. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The method AVGSA-2 in section 11.9.2.2.4 of ANSI C63.10:2013 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

OUTPUT POWER

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	MTCAP3-LNA7D-A23UEA-L			**Work Order:**	MLTI0253
Serial Number:	106			**Date:**	25-Oct-22
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	22 °C
Attendees:	Michael Bendzick			**Humidity:**	31.9% RH
Project:	None			**Barometric Pres.:**	1011 mbar
Tested by:	Christopher Heintzelman	**Power:**	110VAC/60Hz	**Job Site:**	MN11

TEST SPECIFICATIONS	Test Method
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes measurement cable, attenuator, and DC block. Power level PA1 PWID17, Spreading factor 10.

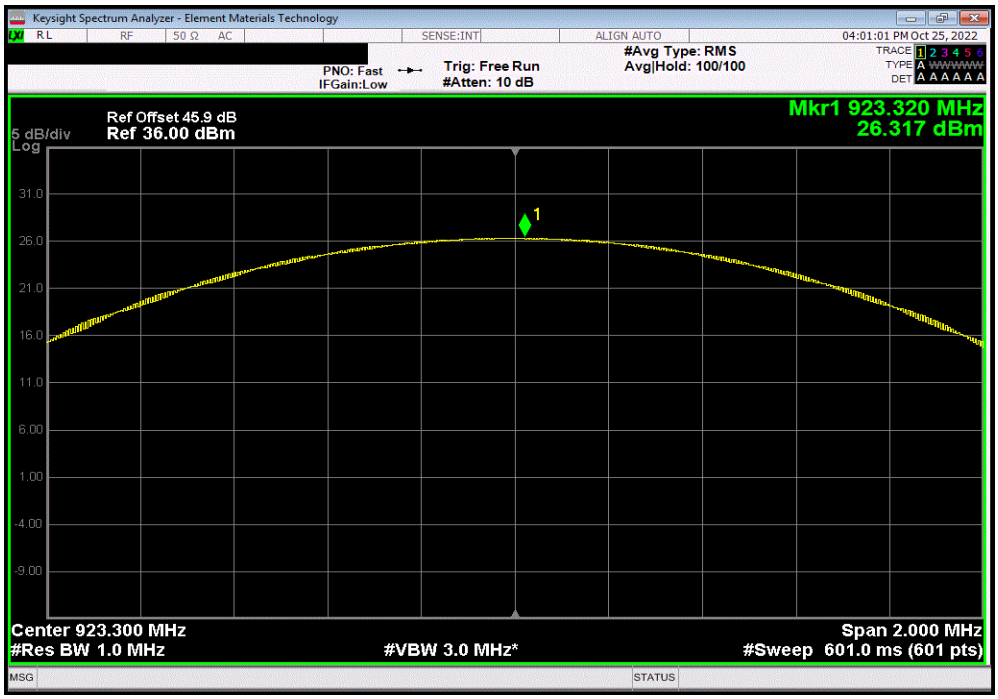
DEVIATIONS FROM TEST STANDARD

None

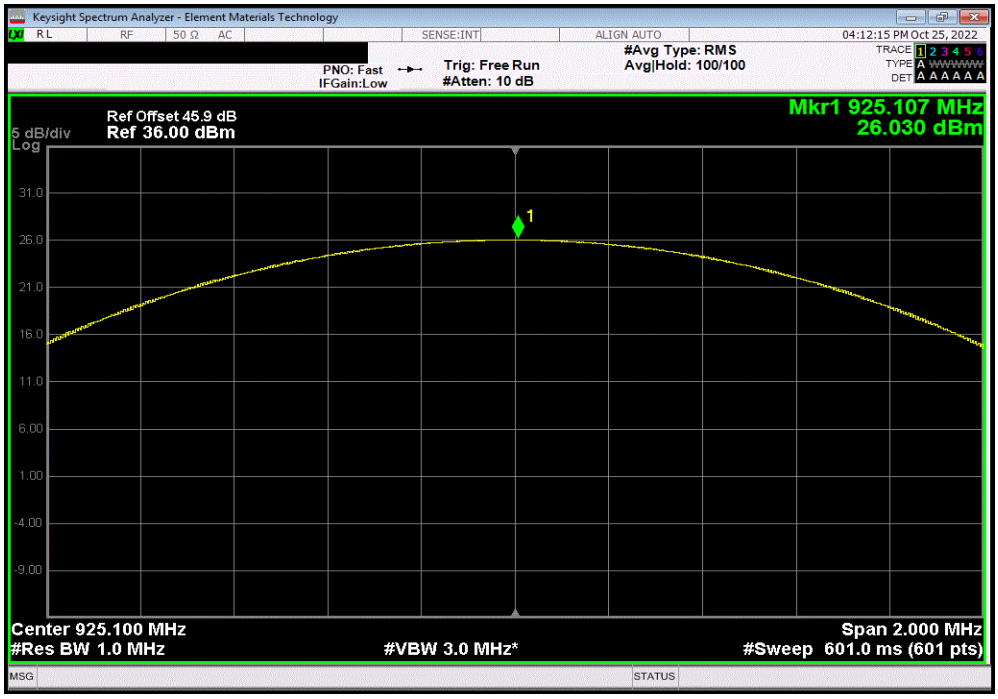
Configuration #	12	Signature

	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
500 kHz Bandwidth					
Low Channel, 923.3 MHz	26.317	0	26.3	30	Pass
Mid Channel, 925.1 MHz	26.03	0	26	30	Pass
High Channel, 927.5 MHz	25.104	0	25.1	30	Pass

500 kHz Bandwidth, Low Channel, 923.3 MHz						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		26.317	0	26.3	30	Pass

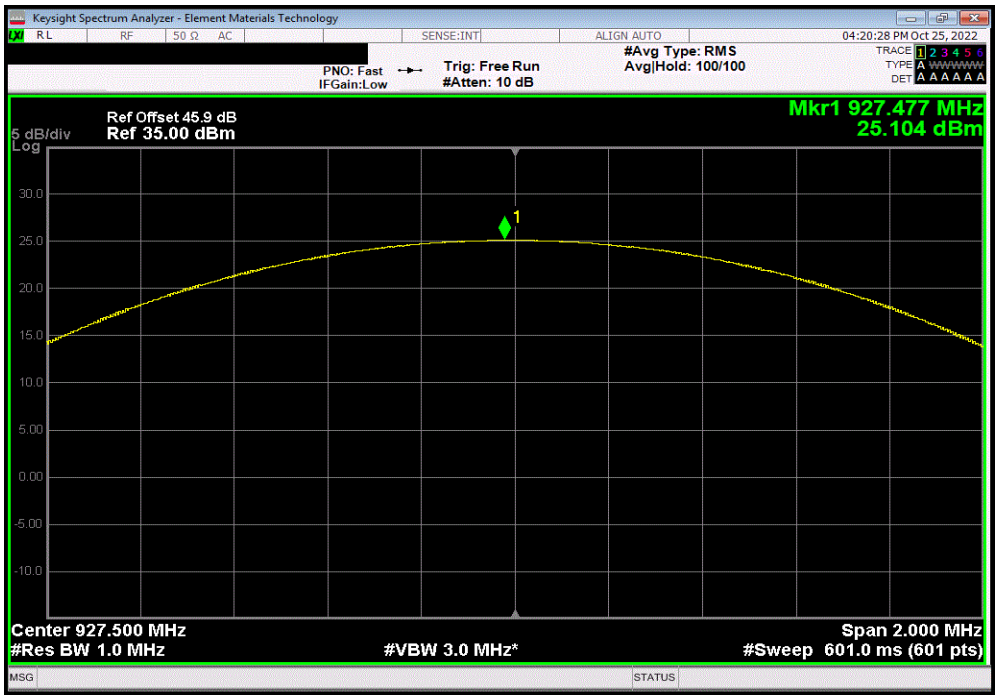


500 kHz Bandwidth, Mid Channel, 925.1 MHz						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		26.03	0	26	30	Pass



OUTPUT POWER

500 kHz Bandwidth, High Channel, 927.5 MHz						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		25.104	0	25.1	30	Pass



EQUIVALENT ISOTROPIC RADIATED POWER

XMit 2022.02.07.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	18B5W-26	RFY	2022-05-30	2023-05-30
Attenuator	Fairview Microwave	SA18S5W-20	RFX	2022-05-30	2023-05-30
Block - DC	Fairview Microwave	SD3379	AMI	2022-09-10	2023-09-10
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2022-09-10	2023-09-10
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2022-04-25	2023-04-25
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

Prior to measuring output power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Maximum Conducted Output Power. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The method AVGSA-2 in section 11.9.2.2.4 of ANSI C63.10:2013 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

The AVGSA-2 method was modified as the emissions bandwidth (B) was less than the available resolution bandwidth (RBw) of the spectrum analyzer. RBw was set wider than B. This follows the guidance of section 11.9.1.1 and is equivalent to a measurement with a power meter AVGPM per section 11.9.2.3.

Equivalent Isotropic Radiated Power (EIRP) = Max Measured Power + Antenna gain (dBi)

EQUIVALENT ISOTROPIC RADIATED POWER

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	MTCAP3-LNA7D-A23UEA-L			**Work Order:**	MLTI0253
Serial Number:	106			**Date:**	25-Oct-22
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	22 °C
Attendees:	Michael Bendzick			**Humidity:**	31.9% RH
Project:	None			**Barometric Pres.:**	1011 mbar
Tested by:	Christopher Heintzelman	**Power:**	110VAC/60Hz	**Job Site:**	MN11

TEST SPECIFICATIONS	Test Method
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes measurement cable, attenuator, and DC block. Power level PA1 PWID17, Spreading factor 10.

DEVIATIONS FROM TEST STANDARD

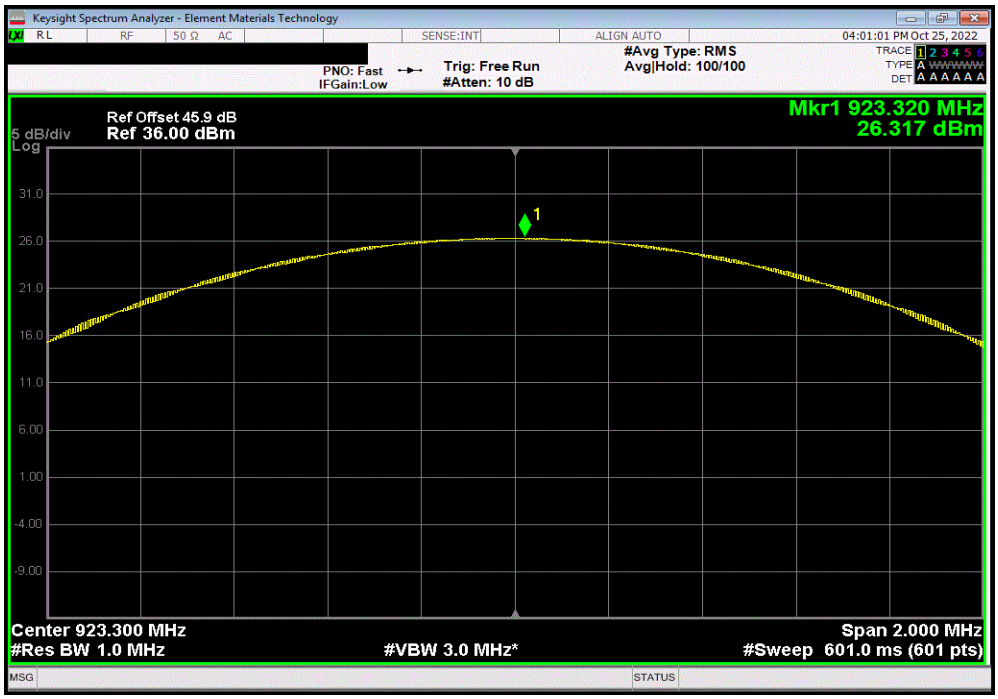
None

Configuration #	12	Signature

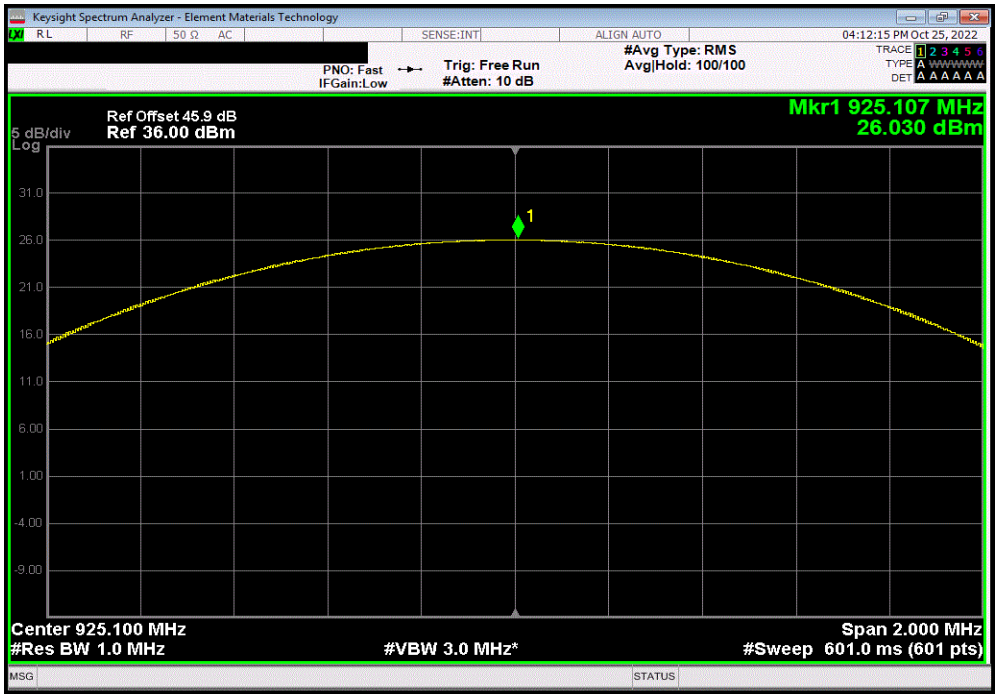
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
500 kHz Bandwidth							
Low Channel, 923.3 MHz	26.317	0	26.3	2.5	28.8	36	Pass
Mid Channel, 925.1 MHz	26.03	0	26	2.5	28.5	36	Pass
High Channel, 927.5 MHz	25.104	0	25.1	2.5	27.6	36	Pass

EQUIVALENT ISOTROPIC RADIATED POWER

500 kHz Bandwidth, Low Channel, 923.3 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
26.317	0	26.3	2.5	28.8	36	Pass

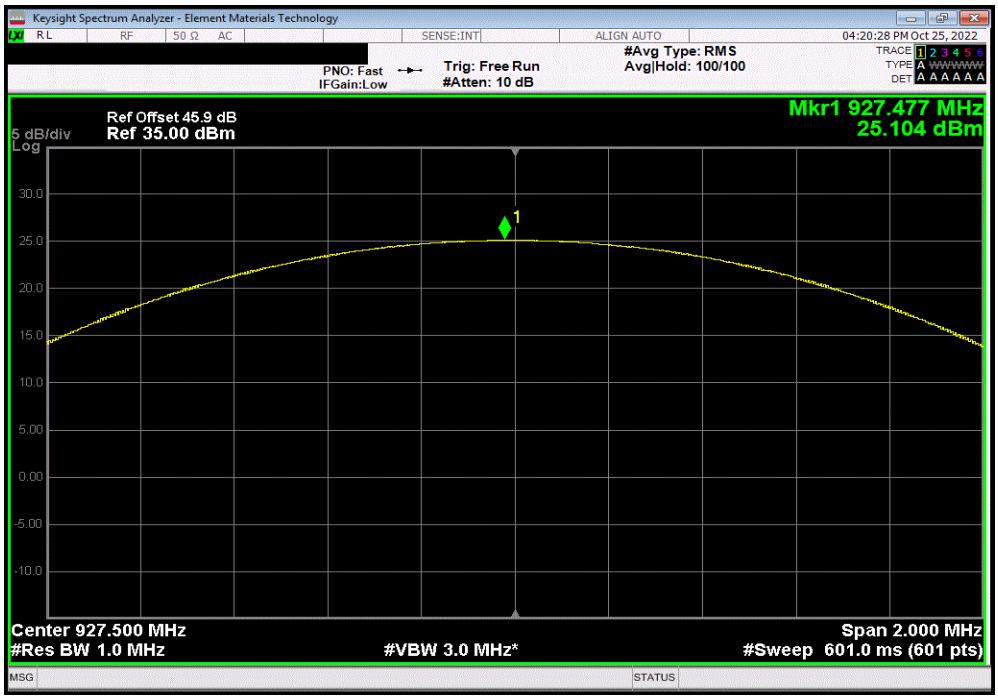


500 kHz Bandwidth, Mid Channel, 925.1 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
26.03	0	26	2.5	28.5	36	Pass



EQUIVALENT ISOTROPIC RADIATED POWER

500 kHz Bandwidth, High Channel, 927.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
25.104	0	25.1	2.5	27.6	36	Pass



BAND EDGE COMPLIANCE

XMit 2022.02.07.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Attenuator	Fairview Microwave	18B5W-26	RFY	2022-05-30	2023-05-30
Attenuator	Fairview Microwave	SA18S5W-20	RFX	2022-05-30	2023-05-30
Block - DC	Fairview Microwave	SD3379	AMI	2022-09-10	2023-09-10
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2022-09-10	2023-09-10
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2022-04-25	2023-04-25

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

BAND EDGE COMPLIANCE

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	MTCAP3-LNA7D-A23UEA-L			**Work Order:**	MLTI0253
Serial Number:	106			**Date:**	25-Oct-22
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	22 °C
Attendees:	Michael Bendzick			**Humidity:**	32.1% RH
Project:	None			**Barometric Pres.:**	1011 mbar
Tested by:	Christopher Heintzelman	**Power:**	110VAC/60Hz	**Job Site:**	MN11

TEST SPECIFICATIONS	Test Method
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes measurement cable, attenuator, and DC block.

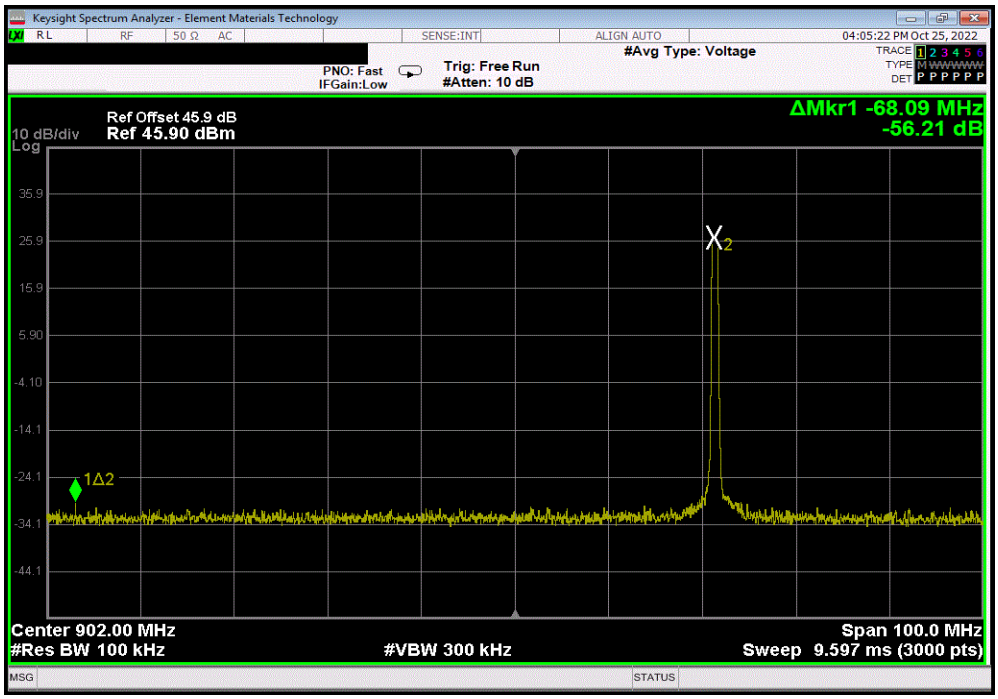
DEVIATIONS FROM TEST STANDARD

None

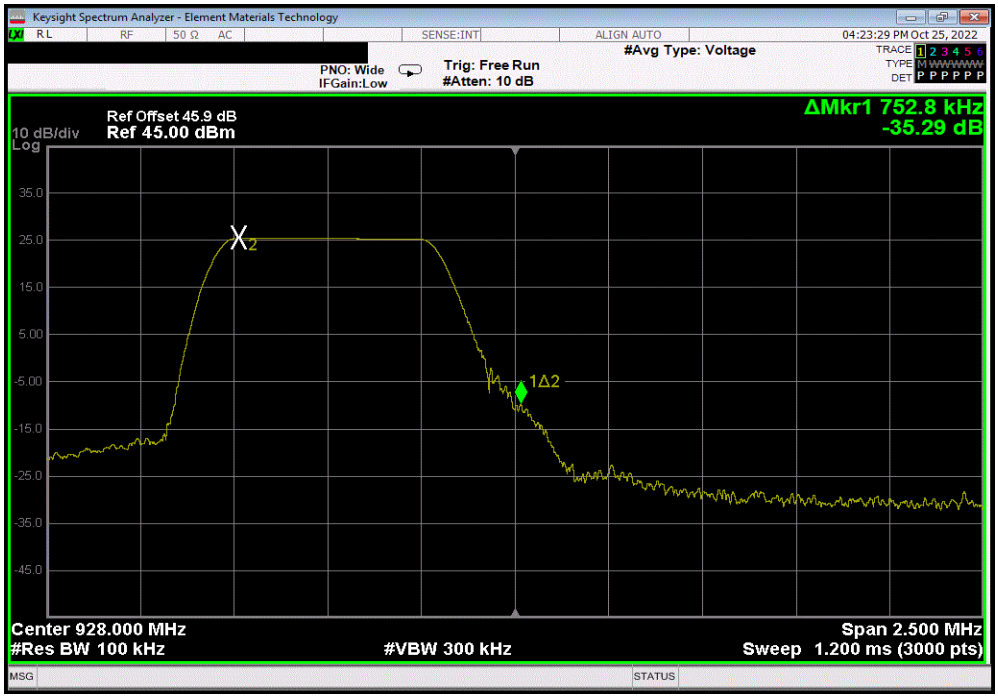
Configuration #	12	Signature

	Value (dBc)	Limit ≤ (dBc)	Result
500 kHz Bandwidth			
Low Channel, 923.3 MHz	-56.21	-30	Pass
High Channel, 927.5 MHz	-35.29	-30	Pass

500 kHz Bandwidth, Low Channel, 923.3 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-56.21	-30	Pass



500 kHz Bandwidth, High Channel, 927.5 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-35.29	-30	Pass



DTS BANDWIDTH (6 dB)

XMit 2022.02.07.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2022-09-10	2023-09-10
Attenuator	Fairview Microwave	18B5W-26	RFY	2022-05-30	2023-05-30
Attenuator	Fairview Microwave	SA18S5W-20	RFX	2022-05-30	2023-05-30
Block - DC	Fairview Microwave	SD3379	AMI	2022-09-10	2023-09-10
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2022-04-25	2023-04-25

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The EUT was set to the channels and modes listed in the datasheet.

The 6dB DTS bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

DTS BANDWIDTH (6 dB)

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**MTCAP3-LNA7D-A23UEA-L**			**Work Order:**	**MLTI0253**
Serial Number:	**106**			**Date:**	**25-Oct-22**
Customer:	**Multi-Tech Systems, Inc.**			**Temperature:**	**22 °C**
Attendees:	**Michael Bendzick**			**Humidity:**	**31.9% RH**
Project:	**None**			**Barometric Pres.:**	**1011 mbar**
Tested by:	**Christopher Heintzelman**	**Power:**	**110VAC/60Hz**	**Job Site:**	**MN11**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes measurement cable, attenuator, and DC block.

DEVIATIONS FROM TEST STANDARD

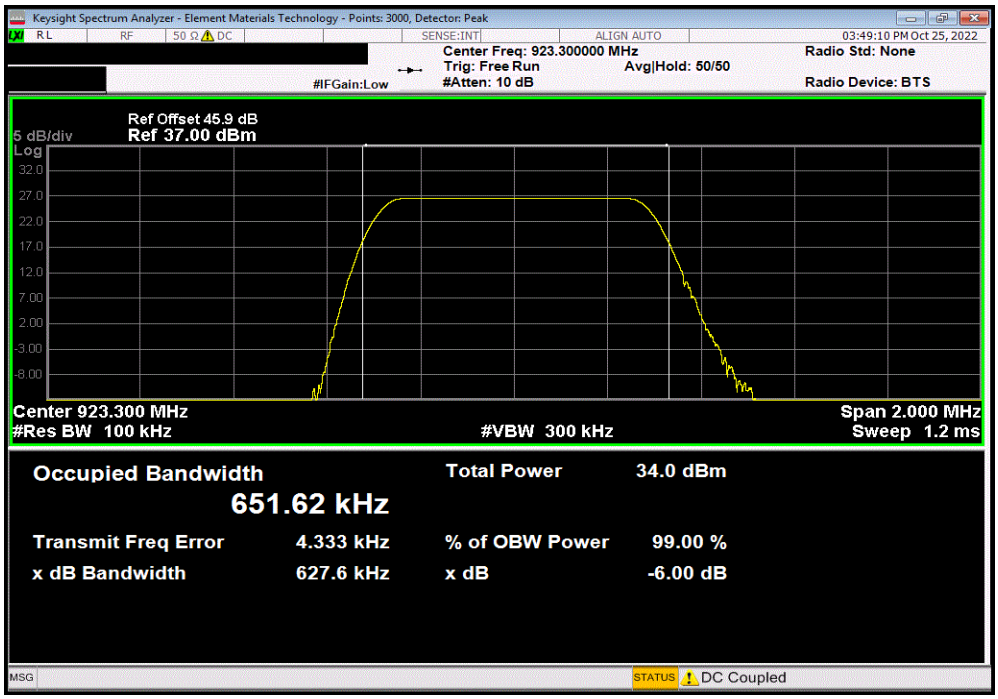
None

Configuration #	**12**	*Signature*

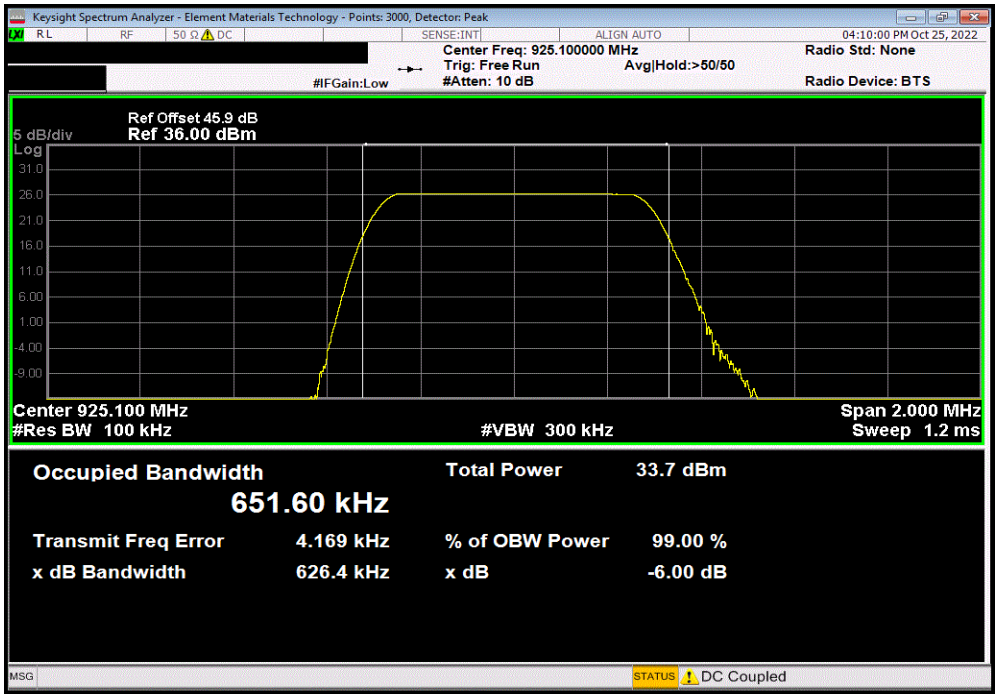
	Value (kHz)	**Limit (>)**	**Result**
500 kHz Bandwidth			
Low Channel, 923.3 MHz	627.61 kHz	500 kHz	Pass
Mid Channel, 925.1 MHz	626.404 kHz	500 kHz	Pass
High Channel, 927.5 MHz	626.924 kHz	500 kHz	Pass

DTS BANDWIDTH (6 dB)

500 kHz Bandwidth, Low Channel, 923.3 MHz						
				Value (kHz)	Limit (>)	Result
				627.61 kHz	500 kHz	Pass

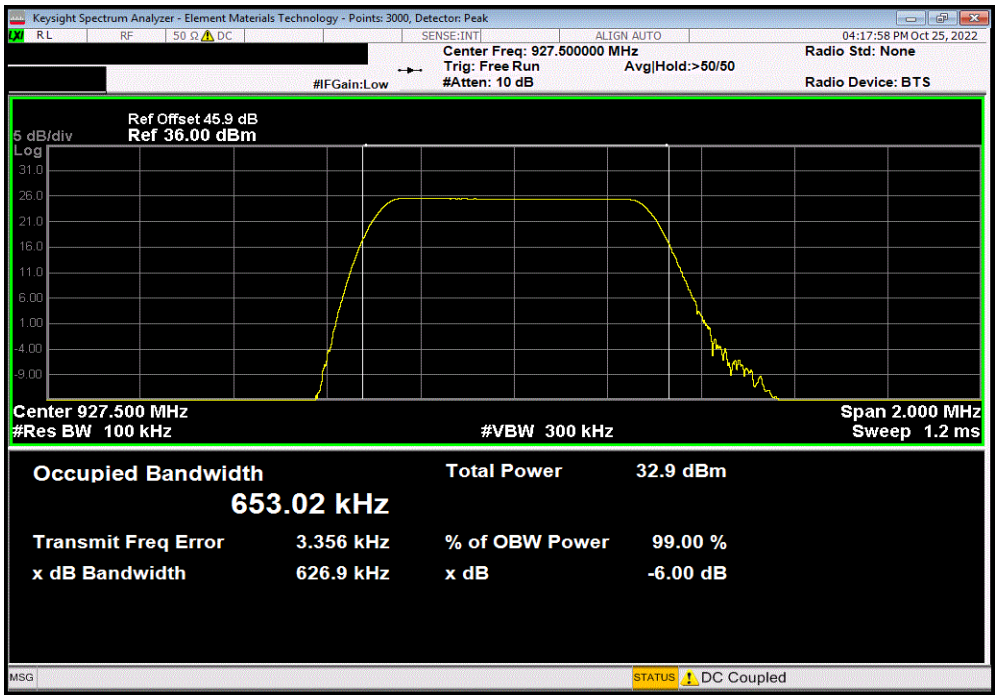


500 kHz Bandwidth, Mid Channel, 925.1 MHz						
				Value (kHz)	Limit (>)	Result
				626.404 kHz	500 kHz	Pass



DTS BANDWIDTH (6 dB)

500 kHz Bandwidth, High Channel, 927.5 MHz						
				Value (kHz)	Limit (>)	Result
				626.924 kHz	500 kHz	Pass



OCCUPIED BANDWIDTH (99%)

XMit 2022.02.07.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	SA18S5W-20	RFX	2022-05-30	2023-05-30
Attenuator	Fairview Microwave	18B5W-26	RFY	2022-05-30	2023-05-30
Block - DC	Fairview Microwave	SD3379	AMI	2022-09-10	2023-09-10
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2022-09-10	2023-09-10
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2022-04-25	2023-04-25

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The 99% occupied bandwidth was measured with the EUT configured for continuous modulated operation.

Per ANSI C63.10:2013, 6.9.3, the spectrum analyzer was configured as follows:

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) of the spectrum analyzer was set to the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. The analyzer sweep time was set to auto to prevent video filtering or averaging. A sample detector was used unless the device was not able to be operated in a continuous transmit mode, in which case a peak detector was used.

The spectrum analyzer occupied bandwidth measurement function was used to sum the power of the transmission in linear terms to obtain the 99% bandwidth.

OCCUPIED BANDWIDTH (99%)

element

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**MTCAP3-LNA7D-A23UEA-L**			**Work Order:**	**MLTI0253**
Serial Number:	**106**			**Date:**	**25-Oct-22**
Customer:	**Multi-Tech Systems, Inc.**			**Temperature:**	**22 °C**
Attendees:	**Michael Bendzick**			**Humidity:**	**31.8% RH**
Project:	**None**			**Barometric Pres.:**	**1011 mbar**
Tested by:	**Christopher Heintzelman**	**Power:**	**110VAC/60Hz**	**Job Site:**	**MN11**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes measurement cable, attenuator, and DC block.

DEVIATIONS FROM TEST STANDARD

None

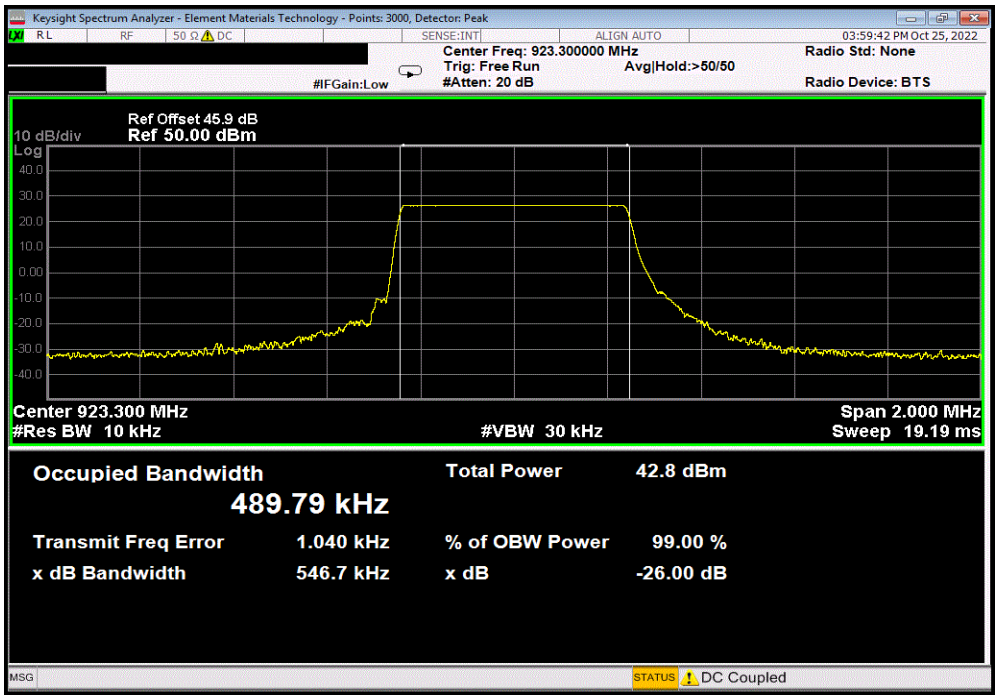
Configuration #	**12**	*Signature*

		Value	**Limit**	**Result**
500 kHz Bandwidth				
	Low Channel, 923.3 MHz	489.789 kHz	N/A	N/A
	Mid Channel, 925.1 MHz	489.779 kHz	N/A	N/A
	High Channel, 927.5 MHz	490.718 kHz	N/A	N/A

OCCUPIED BANDWIDTH (99%)

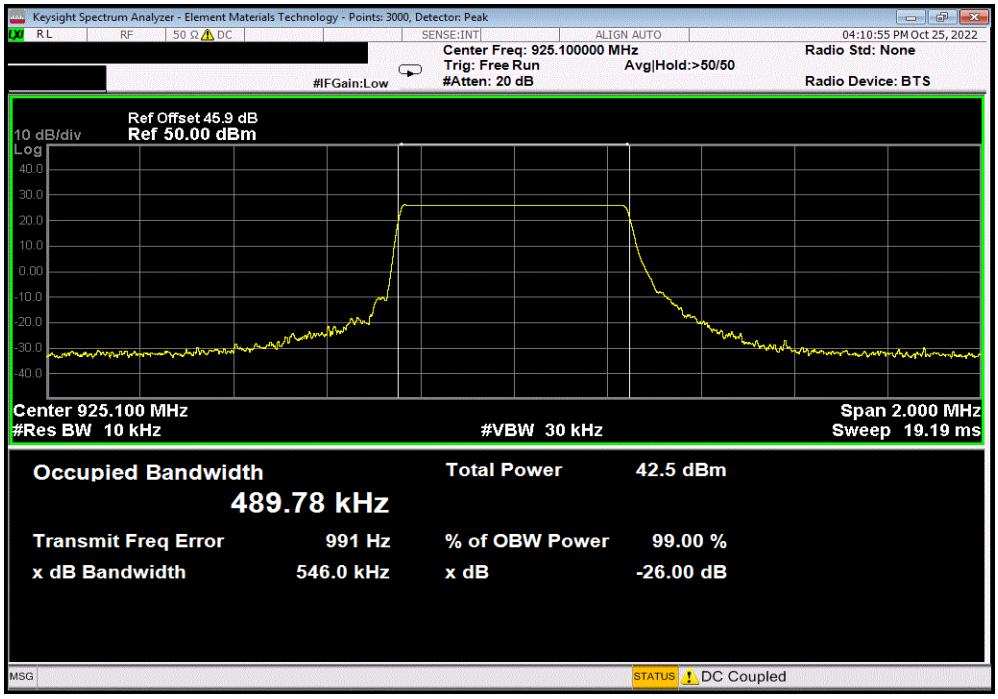
500 kHz Bandwidth, Low Channel, 923.3 MHz

				Value	Limit	Result
				489.789 kHz	N/A	N/A



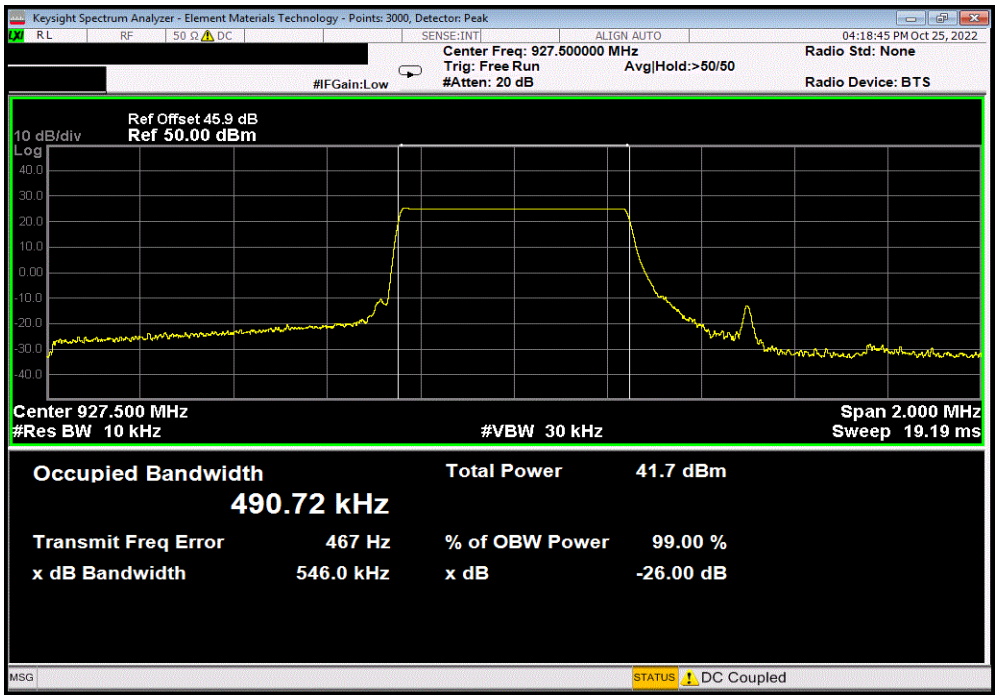
500 kHz Bandwidth, Mid Channel, 925.1 MHz

				Value	Limit	Result
				489.779 kHz	N/A	N/A



OCCUPIED BANDWIDTH (99%)

500 kHz Bandwidth, High Channel, 927.5 MHz						
				Value	Limit	Result
				490.718 kHz	N/A	N/A



SPURIOUS CONDUCTED EMISSIONS

XMit 2022.02.07.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	18B5W-26	RFY	2022-05-30	2023-05-30
Attenuator	Fairview Microwave	SA18S5W-20	RFX	2022-05-30	2023-05-30
Block - DC	Fairview Microwave	SD3379	AMI	2022-09-10	2023-09-10
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2022-09-10	2023-09-10
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2022-04-25	2023-04-25

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the fundamental was measured with a 100 kHz resolution bandwidth and the highest value was recorded. The rest of the spectrum was then measured with a 100 kHz resolution bandwidth and the highest value was found. The difference between the value found on the fundamental and the rest of the spectrum was compared against the limit to determine compliance.

The reference level offset for the fundamental screen capture was based on a measured value of the loss between the spectrum analyzer and the EUT which was verified at the time of test. The remaining screen capture(s) use an internal transducer factor on the analyzer to correct the displayed trace based on the cable loss over frequency. The reference level offset for the additional screen capture(s) is then based on the expected attenuator value and any other losses.

Fundamental Offset = Ref Lvl Offset showing measured composite factor of all losses

Remaining Screen capture(s) Offset = “Internal” cable loss factor not shown on screen capture + Ref Lvl Offset showing expected attenuator value and any other losses

SPURIOUS CONDUCTED EMISSIONS

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**MTCAP3-LNA7D-A23UEA-L**			**Work Order:**	**MLTI0253**
Serial Number:	**106**			**Date:**	**25-Oct-22**
Customer:	**Multi-Tech Systems, Inc.**			**Temperature:**	**21.9 °C**
Attendees:	**Michael Bendzick**			**Humidity:**	**31.9% RH**
Project:	**None**			**Barometric Pres.:**	**1011 mbar**
Tested by:	**Christopher Heintzelman**	**Power:**	**110VAC/60Hz**	**Job Site:**	**MN11**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes measurement cable, attenuator, and DC block.

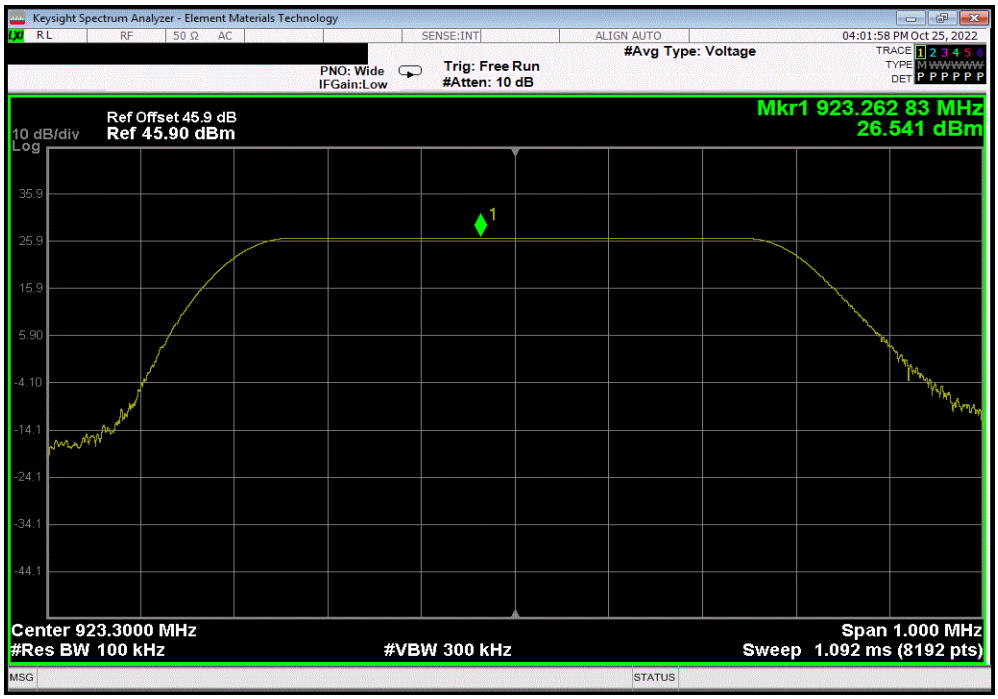
DEVIATIONS FROM TEST STANDARD

None

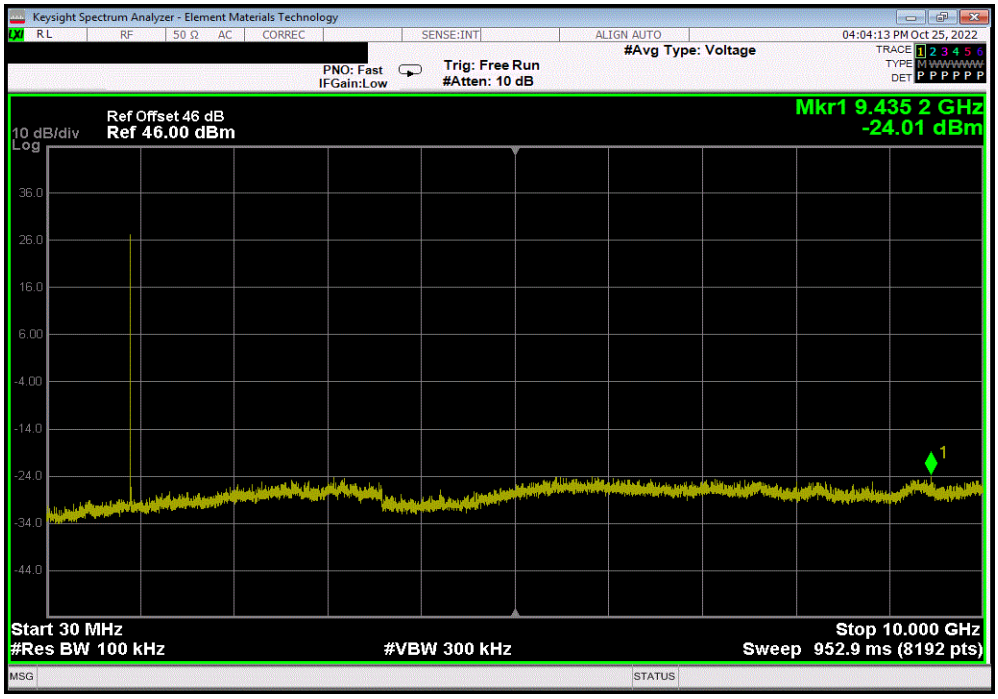
Configuration #	**12**	*Signature*

		Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
500 kHz Bandwidth						
	Low Channel, 923.3 MHz	Fundamental	923.26	N/A	N/A	N/A
	Low Channel, 923.3 MHz	30 MHz - 10 GHz	9435.22	-50.55	-30	Pass
	Mid Channel, 925.1 MHz	Fundamental	924.87	N/A	N/A	N/A
	Mid Channel, 925.1 MHz	30 MHz - 10 GHz	6022.22	-49.71	-30	Pass
	High Channel, 927.5 MHz	Fundamental	927.28	N/A	N/A	N/A
	High Channel, 927.5 MHz	30 MHz - 10 GHz	5341.82	-48.98	-30	Pass

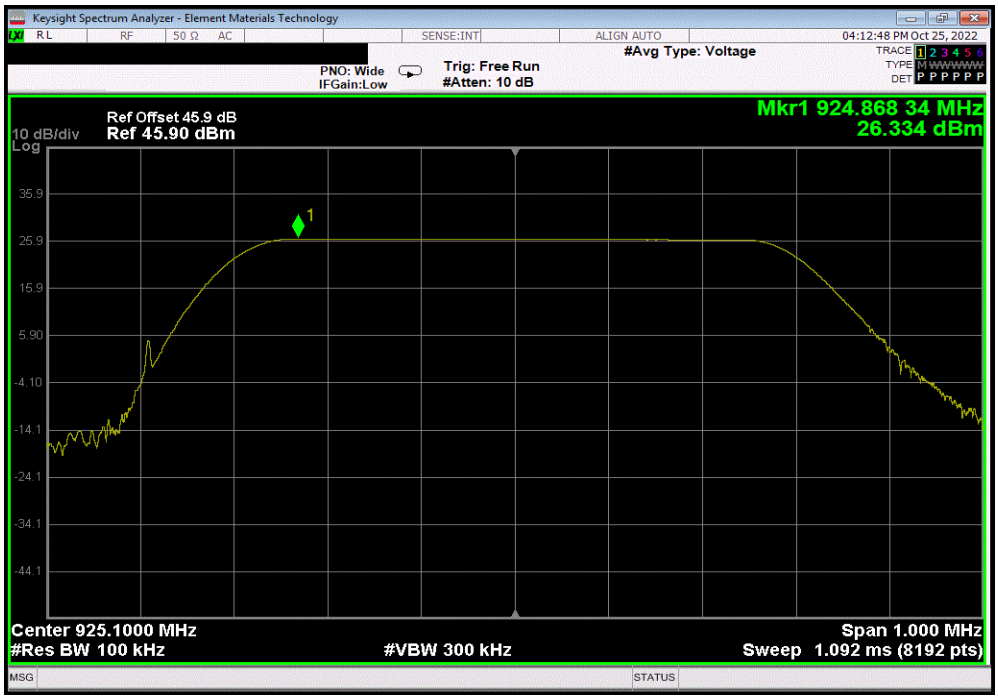
500 kHz Bandwidth, Low Channel, 923.3 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental	923.26	N/A	N/A	N/A



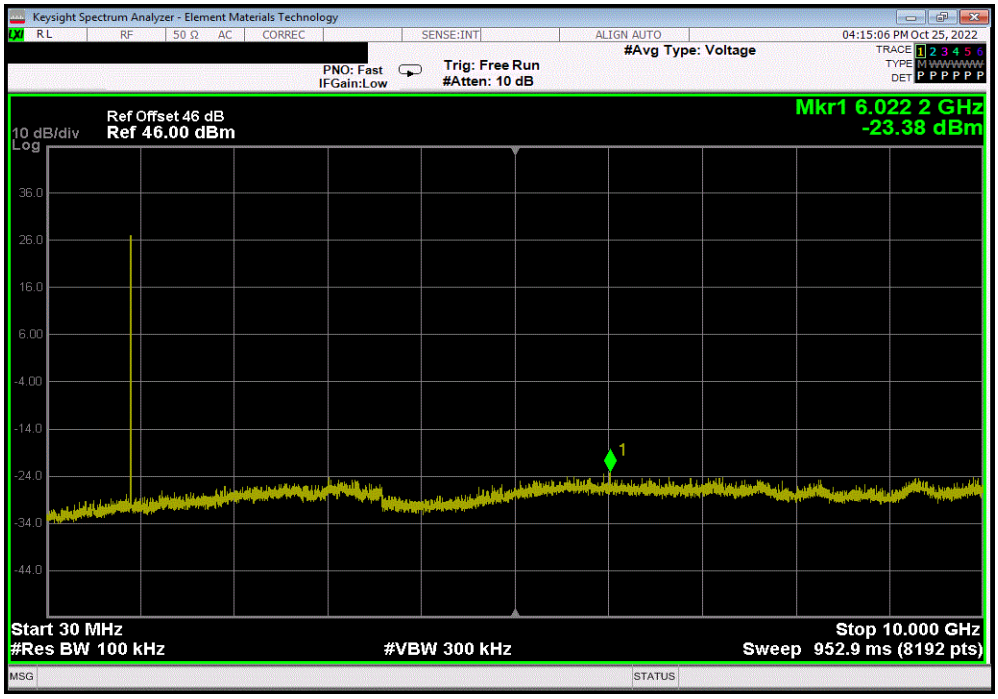
500 kHz Bandwidth, Low Channel, 923.3 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 10 GHz	9435.22	-50.55	-30	Pass



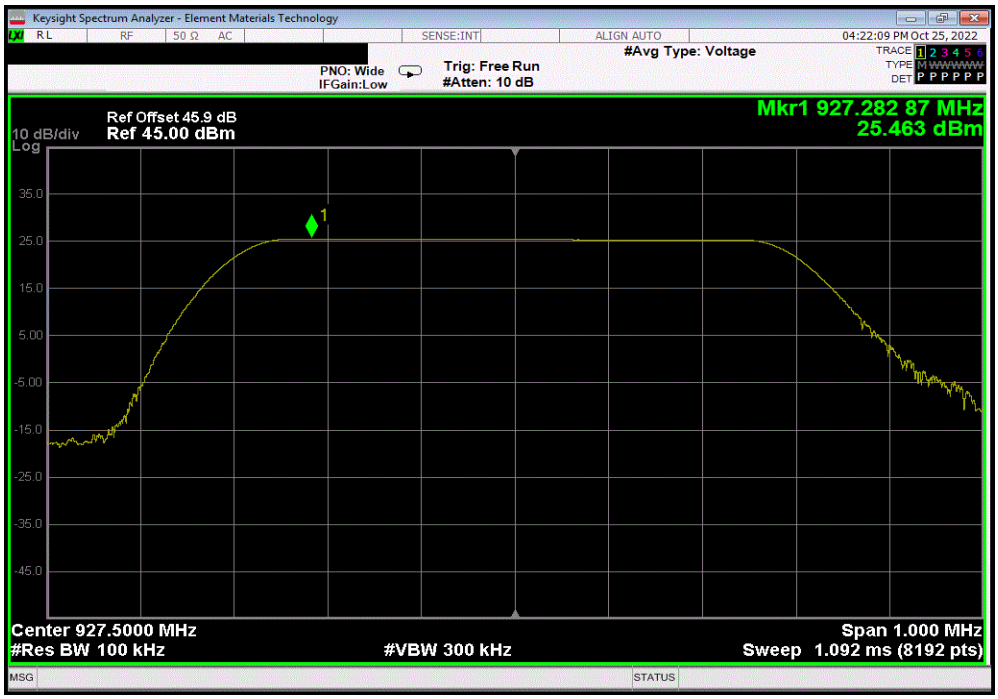
500 kHz Bandwidth, Mid Channel, 925.1 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental	924.87	N/A	N/A	N/A



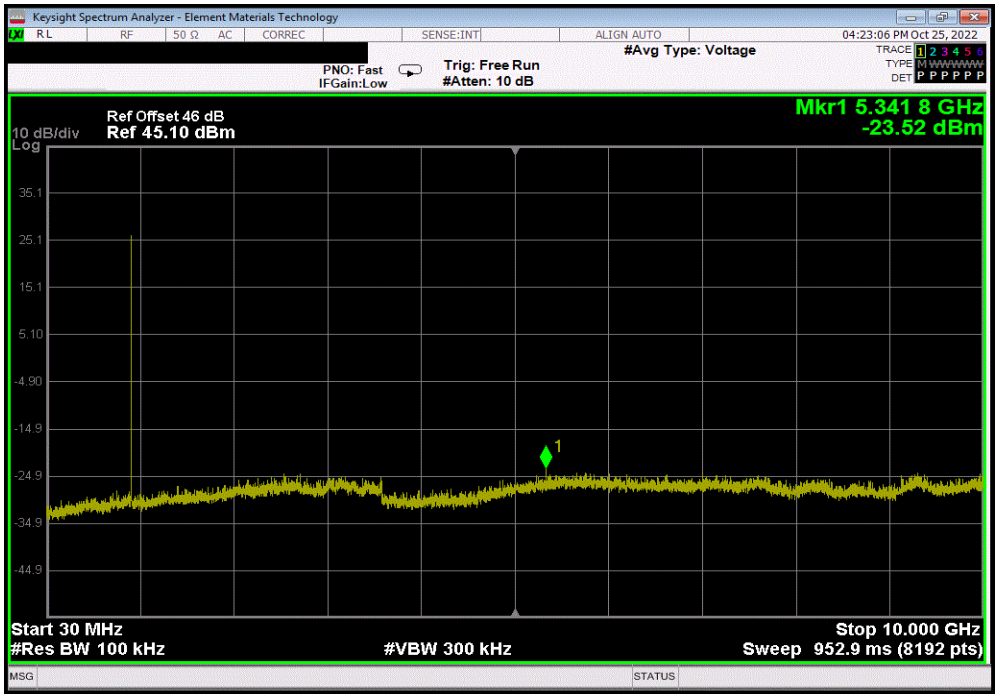
500 kHz Bandwidth, Mid Channel, 925.1 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 10 GHz	6022.22	-49.71	-30	Pass



500 kHz Bandwidth, High Channel, 927.5 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental	927.28	N/A	N/A	N/A



500 kHz Bandwidth, High Channel, 927.5 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 10 GHz	5341.82	-48.98	-30	Pass



POWER SPECTRAL DENSITY

XMit 2022.02.07.0

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TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	18B5W-26	RFY	2022-05-30	2023-05-30
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Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2022-09-10	2023-09-10
Block - DC	Fairview Microwave	SD3379	AMI	2022-09-10	2023-09-10
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2022-04-25	2023-04-25

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The power spectral density was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

The method AVGPSD-1 in section 11.10.3 of ANSI C63.10:2013 was used to make the measurement. This method uses trace averaging and RMS detection across the full power of the burst. This method is allowed as the same method has been used to determine the conducted output power.

POWER SPECTRAL DENSITY

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**MTCAP3-LNA7D-A23UEA-L**			**Work Order:**	**MLTI0253**
Serial Number:	**106**			**Date:**	**25-Oct-22**
Customer:	**Multi-Tech Systems, Inc.**			**Temperature:**	**21.9 °C**
Attendees:	**Michael Bendzick**			**Humidity:**	**31.9% RH**
Project:	**None**			**Barometric Pres.:**	**1011 mbar**
Tested by:	**Christopher Heintzelman**	**Power:**	**110VAC/60Hz**	**Job Site:**	**MN11**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes measurement cable, attenuator, and DC block. Power level PA1 PWID17, Spreading factor 10.

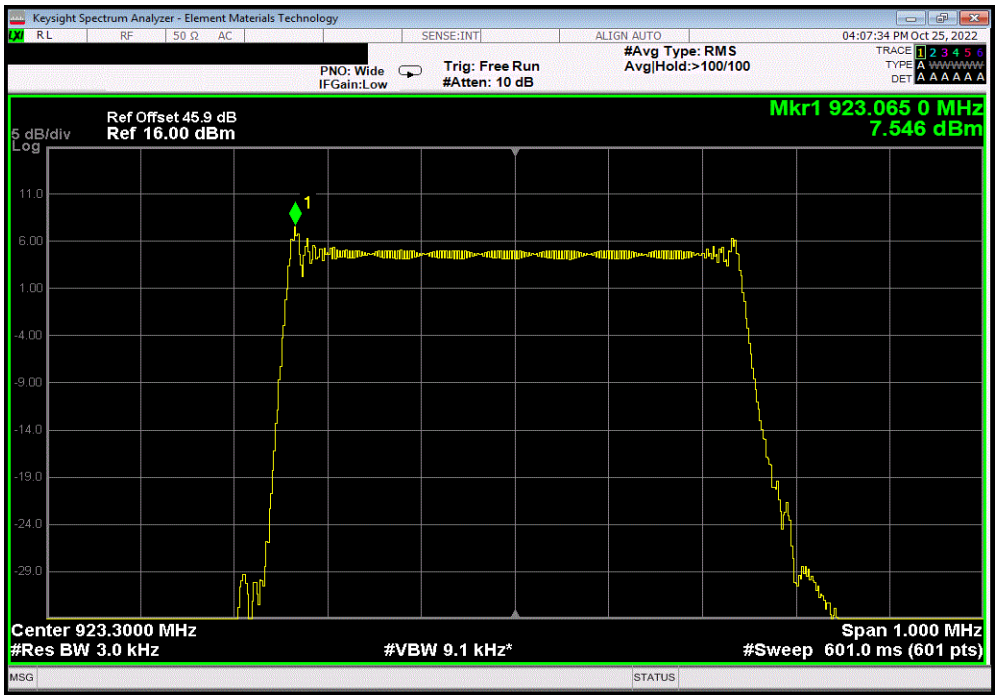
DEVIATIONS FROM TEST STANDARD

None

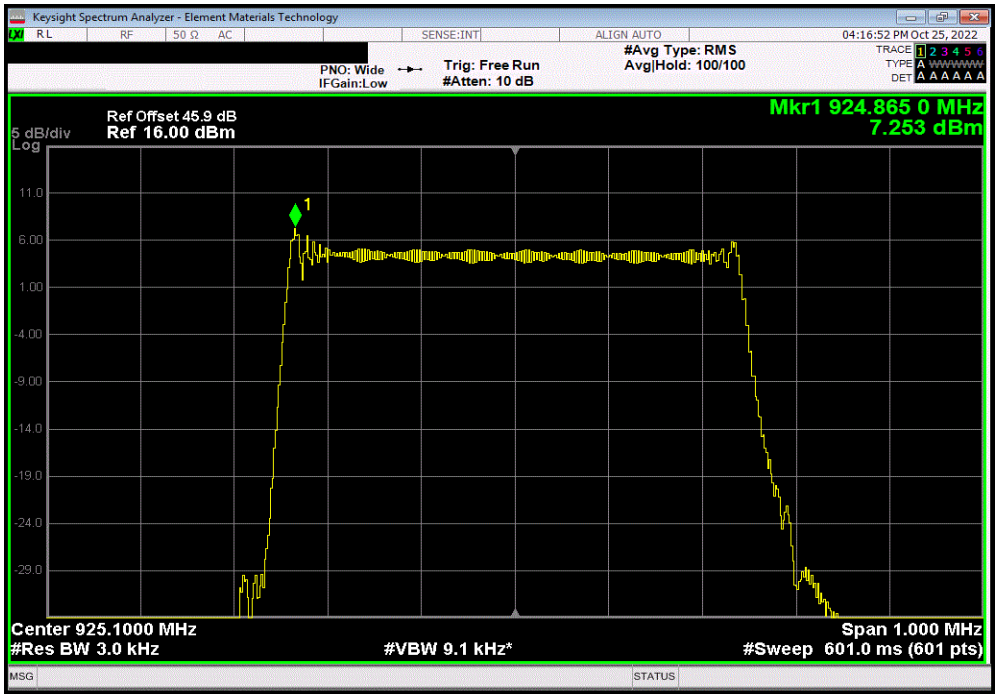
Configuration #	**12**	*Signature*

	Value dBm/3kHz	**Limit 10*Log(1/DC) dBm**	**Results**
500 kHz Bandwidth			
Low Channel, 923.3 MHz	7.546	8	N/A
Mid Channel, 925.1 MHz	7.253	8	N/A
High Channel, 927.5 MHz	6.454	8	N/A

500 kHz Bandwidth, Low Channel, 923.3 MHz						
				Value dBm/3kHz	Limit 0*Log(1/DC) dB	Results
				7.546	8	N/A



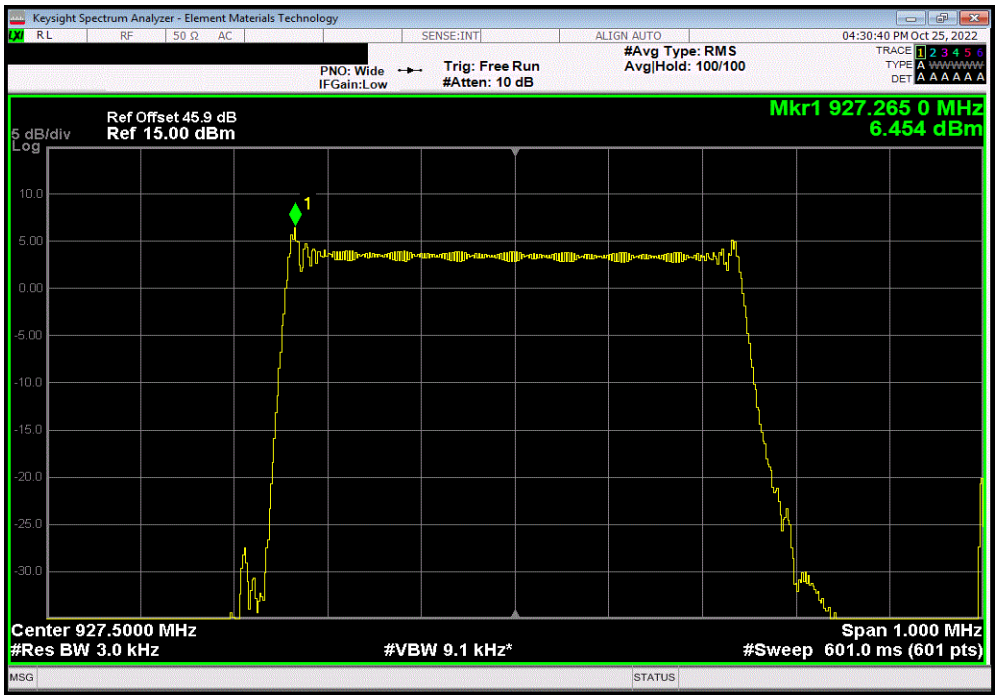
500 kHz Bandwidth, Mid Channel, 925.1 MHz						
				Value dBm/3kHz	Limit 0*Log(1/DC) dB	Results
				7.253	8	N/A



POWER SPECTRAL DENSITY

TbtTx 2022.06.03.0 XMit 2022.02.07.0

500 kHz Bandwidth, High Channel, 927.5 MHz						
				Value dBm/3kHz	Limit 0*Log(1/DC) dB	Results
				6.454	8	N/A



End of Test Report