

### **Pehratek Products**

Remote Control for XM-5000 RF FCC 15.231:2022 Low Power Radio

Report: PEHR0004.6, Issue Date: June 20, 2022









#### Last Date of Test: June 6, 2022 Pehratek Products EUT: Remote Control for XM-5000 RF

### **Radio Equipment Testing**

#### Standards

Specification	Method
FCC 15.231:2022	ANSI C63.10:2013

#### Results

Method Clause	Lest Description		Results	Comments
6.2	Powerline Conducted Emissions (Transmitter)	No	N/A	Not required for a battery powered EUT.
6.5, 6.6	Field Strength of Fundamental	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
6.9.2	Emissions Bandwidth	Yes	Pass	
7.5	Duty Cycle	Yes	Pass	

#### **Deviations From Test Standards**

None

#### **Approved By:**

Eric Brandon, Department Manager

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		

# 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.

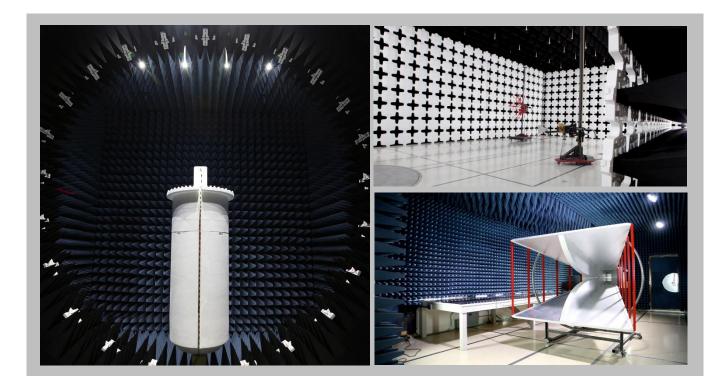
	SCOPE					
	For details on the Scopes of our Accreditations, please visit:					
<u>California</u>	California Minnesota Oregon Texas Washington					

# **FACILITIES**





<b>California</b> Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs MN01-11         Labs EV01-12         Labs TX01-09           9349 W Broadway Ave.         6775 NE Evergreen Pkwy #400         3801 E Plano Pkwy           Brooklyn Park, MN 55445         Hillsboro, OR 97124         Plano, TX 75074						
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**



#### **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**

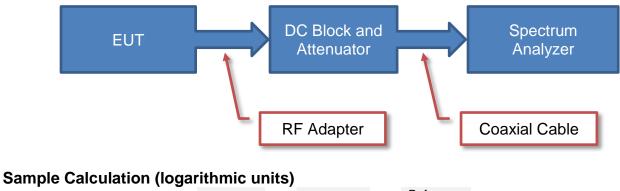


#### **Measurement Bandwidths**

Frequency Range Peak Data (MHz) (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**

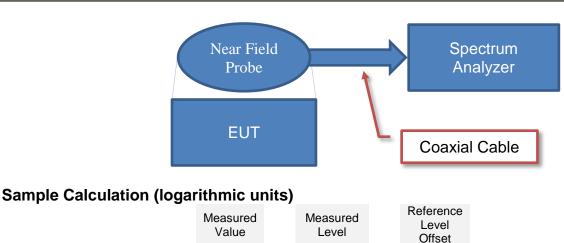


-	Measured Value	-	Measured Level		Reference Level Offset
	71.2	=	42.6	+	28.6

#### **Near Field Test Fixture Measurements**

71.2

=



42.6

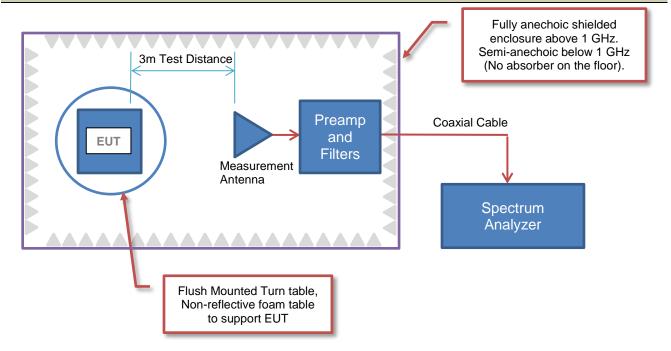
+

28.6

# **TEST SETUP BLOCK DIAGRAMS**



#### **Emissions Measurements**

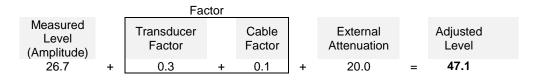


#### Sample Calculation (logarithmic units)

#### **Radiated Emissions:**

			Factor								
Measured Level (Amplitude)	ntenna Factor		Cable 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:**

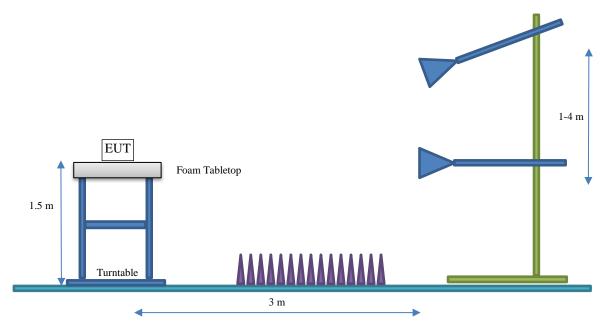


# **TEST SETUP BLOCK DIAGRAMS**



#### 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:	Pehratek Products
Address:	9285 Pierson Lake Road
City, State, Zip:	Chaska, MN 55318
Test Requested By:	Jim Pehringer
EUT:	Remote Control for XM-5000 RF
First Date of Test:	March 2, 2022
Last Date of Test:	June 6, 2022
Receipt Date of Samples:	March 2, 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:

Visual Reinforcement Apparatus (VRA/COR). Utilizes a periodic radio to send short bursts of data which triggers a nearby visual reinforcement audiometer, typically for distraction purposes.

#### **Testing Objective:**

To demonstrate compliance to FCC 15.231 specifications.

# **CONFIGURATIONS**



### Configuration PEHR0004-4

Software/Firmware Running During Test				
Description Version				
Continuous Test Firmware	1.0			

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
XM-5000 RF Remote	Pehratek Products	None	Sample 1

#### Configuration PEHR0004-7

Software/Firmware Running During Test					
Description	Version				
Timing Test Firmware	1.1				

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
XM-5000 RF Remote	Pehratek Products	None	Sample 2

# **MODIFICATIONS**



### **Equipment Modifications**

Item	Date	Test	Modification	Note	Disposition of EUT
1	2022-03-02	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2022-03-02	Spurious Radiated 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	2022-03-03	Emissions Bandwidth	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	2022-06-06	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

# **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)

Туре	Provided by:	Frequency Range (MHz)	Gain (dBi)
Monopole	Manufacturer	433 MHz	1.9 dBi

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

□ Test software settings

 $\boxtimes$  Rated power settings

#### SETTINGS FOR ALL TESTS IN THIS REPORT

XM-5000 and remote control	Power Setting	
Periodic	-5 dBm	

# FIELD STRENGTH OF FUNDAMENTAL



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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

#### MODES OF OPERATION

 RF remote transmitting at 434 MHz

 POWER SETTINGS INVESTIGATED

 Battery

 CONFIGURATIONS INVESTIGATED

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1000 MHz

Stop Frequency

#### FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz

#### SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

#### TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	2021-05-18	2022-05-18
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079 and SA18E-10	AOO	2022-01-24	2023-01-24
Cable	Element	Biconilog Cable	MNX	2022-01-24	2023-01-24
Antenna - Biconilog	Ametek	CBL 6141B	AYS	2021-03-09	2023-03-09

#### **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

#### **TEST DESCRIPTION**

The antennas to be used with the EUT were tested. The EUT was configured for continuous un-modulated CW operation at its single transmit frequency. The field strength of the transmit frequency was maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT in 3 orthogonal planes (per ANSI C63.10:2013).

Peak measurements were made with a resolution bandwidth of 100 kHz and a video bandwidth of 300 kHz for measurements at or below 1 GHz. A duty cycle correction factor was added to the peak readings to mathematically derive the average levels. The supporting screen captures and duty cycle calculation is contained in the "Duty Cycle" module in this report.

# FIELD STRENGTH OF FUNDAMENTAL



									EmiR5 2021.12.28.2	PSA-ESCI 2022.1.12.0
	Wor	k Order:			Date:	2022-0	03-02	1 1	6	74-
		Project:		1	Temperature:	23.7	°C	1 l	1	M
		Job Site:			Humidity:	25%				
	Serial I	Number:	1	Baro	metric Pres.:	1023	mbar	Teste	d by: Chris Patte	son
		EUT:	Remote Control for X	A-5000	RF					
	Config	guration:	4							
	Cı	istomer:	Pehratek Products							
	Att	tendees:	None							
_	EU	F Power:								
Op	peratin	g Mode:	RF remote transmittin	g at 434	MHZ					
		-								
	Dev	viations:	None							
			Duty Cycle Correctior	Factor	= 20 log [((1)(12.0	01))/100]	= -18.4 dB	3		
	Cor	mments:								
				_						
Test S	Specifi	ications					Test Meth	od		
FCC 1	15.231	(b):2022	•				ANSI C63.			
R	un #	19	Test Distance (m)	3	Antenna H	eight(s)		1 to 4(m)	Results	Pass
	110 —								1	
	100 🗕									
	100									
	90 +									
						_				
	80 -					-				
	70 -									
3										
Š	60					•↓				
dBuV/m	60 -					Ī				
qE										
	50 +									
	40 +									
	30 -									
	30									
	20 +									
	10 🗕									
	433.	.0	433	5		434.0		43	4.5	435.0
						MHz				
						101112			PK	🔶 AV 🛛 🗢 QP
					Duty Cyclo		Delority/			

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
433.955	89.0	1.1	1.2	144.0	-18.4	0.0	Vert	AV	0.0	71.7	80.8	-9.1	EUT Vert
433.995	88.3	1.1	2.0	232.0	-18.4	0.0	Horz	AV	0.0	71.0	80.8	-9.8	EUT Horz
433.970	88.0	1.1	2.3	240.0	-18.4	0.0	Horz	AV	0.0	70.7	80.8	-10.1	EUT On Side
433.955	89.0	1.1	1.2	144.0		0.0	Vert	PK	0.0	90.1	100.8	-10.7	EUT Vert
433.995	88.3	1.1	2.0	232.0		0.0	Horz	PK	0.0	89.4	100.8	-11.4	EUT Horz
433.970	88.0	1.1	2.3	240.0		0.0	Horz	PK	0.0	89.1	100.8	-11.7	EUT On Side
434.005	82.4	1.1	1.1	143.0	-18.4	0.0	Vert	AV	0.0	65.1	80.8	-15.7	EUT On Side
434.005	82.4	1.1	1.1	143.0		0.0	Vert	PK	0.0	83.5	100.8	-17.3	EUT On Side
433.975	80.4	1.1	2.1	148.0	-18.4	0.0	Vert	AV	0.0	63.1	80.8	-17.7	EUT Horz
433.975	80.4	1.1	2.1	148.0		0.0	Vert	PK	0.0	81.5	100.8	-19.3	EUT Horz
434.000	78.7	1.1	3.2	232.0	-18.4	0.0	Horz	AV	0.0	61.4	80.8	-19.4	EUT Vert
434.000	78.7	1.1	3.2	232.0		0.0	Horz	PK	0.0	79.8	100.8	-21.0	EUT Vert

# SPURIOUS RADIATED EMISSIONS



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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

#### MODES OF OPERATION

#### RF remote transmitting at 434 MHz

#### POWER SETTINGS INVESTIGATED

Battery

#### **CONFIGURATIONS INVESTIGATED**

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#### FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz Stop Frequency 8200 MHz	
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#### SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	2021-05-18	2022-05-18
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	2022-01-24	2023-01-24
Cable	Element	Double Ridge Guide Horn Cables	MNV	2022-01-24	2023-01-24
Antenna - Double Ridge	ETS Lindgren	3115	AIB	2020-09-03	2022-09-03
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079 and SA18E-10	AOO	2022-01-24	2023-01-24
Cable	Element	Biconilog Cable	MNX	2022-01-24	2023-01-24
Antenna - Biconilog	Ametek	CBL 6141B	AYS	2021-03-09	2023-03-09

#### 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

#### **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 frequency in each operational band 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, 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 = Calculated Average based on Peak and Duty Cycle Correction Factor

Peak measurements were made with a resolution bandwidth of 100 kHz and a video bandwidth of 300 kHz for measurements at or below 1 GHz. Above 1 GHz, a resolution bandwidth of 1 MHz and a video bandwidth of 3 MHz was used.

A duty cycle correction factor was added to the peak readings to mathematically derive the average levels. The supporting screen captures and duty cycle calculation is contained in the "Duty Cycle" module in this report.

# SPURIOUS RADIATED EMISSIONS



					EmiR5 2021.12.28.2	PSA-ESCI 2022.1.1
Work Ord	er: PEHR0004	Date:	2022-03-02	1 1	$D \neq$	1
Proje		Temperature:	22.7 °C	18	171	
Job S		Humidity:	25.7% RH			
Serial Numb		Barometric Pres.:	1021 mbar	Tested	by: Chris Patterson	
E	JT: Remote Control for X	(M-5000 RF				
Configurati						
Custom	er: Pehratek Products					
Attende	es: None					
EUT Pow	er: Battery					
Operating Mo	<b>DF 1 1 1 1 1</b>	ng at 434 MHz				
Deviatio	ns: None					
Commer		n Factor = 20 log [((1)(12	2.01))/100] = -18.4 df	8		
st Specificatio CC 15.231(b):20			Test Meth ANSI C63			
<b>Run #</b> 13	Test Distance (m)	) 3 Antenna	Height(s)	1 to 4(m)	Results	Pass
80						
60						
40						
30				▲	*	
20						
10						
0						
10		100	MHz	1000	■ PK ◆ 4	10000

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
867.970	56.5	10.3	2.1	249.0	-18.4	0.0	Horz	AV	0.0	48.4	60.8	-12.4	EUT Horz
1302.040	65.5	-5.7	3.6	310.0	-18.4	0.0	Vert	AV	0.0	41.4	54.0	-12.6	EUT On Side
1301.880	64.5	-5.7	1.7	27.0	-18.4	0.0	Horz	AV	0.0	40.4	54.0	-13.6	EUT Horz
867.970	56.5	10.3	2.1	249.0		0.0	Horz	PK	0.0	66.8	80.8	-14.0	EUT Horz
1302.040	65.5	-5.7	3.6	310.0		0.0	Vert	PK	0.0	59.8	74.0	-14.2	EUT On Side
1301.880	64.5	-5.7	1.7	27.0		0.0	Horz	PK	0.0	58.8	74.0	-15.2	EUT Horz
1301.830	62.5	-5.7	1.3	117.0	-18.4	0.0	Horz	AV	0.0	38.4	54.0	-15.6	EUT On Side
1301.960	62.3	-5.7	1.5	46.0	-18.4	0.0	Vert	AV	0.0	38.2	54.0	-15.8	EUT Vert
1301.790	62.2	-5.7	3.7	249.0	-18.4	0.0	Horz	AV	0.0	38.1	54.0	-15.9	EUT Vert
1302.080	61.9	-5.7	4.0	312.0	-18.4	0.0	Vert	AV	0.0	37.8	54.0	-16.2	EUT Horz
1301.830	62.5	-5.7	1.3	117.0		0.0	Horz	PK	0.0	56.8	74.0	-17.2	EUT On Side
1301.960	62.3	-5.7	1.5	46.0		0.0	Vert	PK	0.0	56.6	74.0	-17.4	EUT Vert
1301.790	62.2	-5.7	3.7	249.0		0.0	Horz	PK	0.0	56.5	74.0	-17.5	EUT Vert

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
1302.080	61.9	-5.7	4.0	312.0		0.0	Vert	PK	0.0	56.2	74.0	-17.8	EUT Horz
1735.920	63.3	-4.4	3.7	72.0	-18.4	0.0	Horz	AV	0.0	40.5	60.8	-20.3	EUT Horz
867.915	47.1	10.3	2.3	149.0	-18.4	0.0	Vert	AV	0.0	39.0	60.8	-21.8	EUT On Side
1735.920	63.3	-4.4	3.7	72.0		0.0	Horz	PK	0.0	58.9	80.8	-21.9	EUT Horz
867.915	47.1	10.3	2.3	149.0		0.0	Vert	PK	0.0	57.4	80.8	-23.4	EUT On Side
1735.750	54.2	-4.4	1.5	149.0	-18.4	0.0	Vert	AV	0.0	31.4	60.8	-29.4	EUT On Side
1735.750	54.2	-4.4	1.5	149.0		0.0	Vert	PK	0.0	49.8	80.8	-31.0	EUT On Side
2170.250	48.7	-1.4	3.0	76.0	-18.4	0.0	Horz	AV	0.0	28.9	60.8	-31.9	EUT Horz
2170.040	47.4	-1.4	1.1	239.0	-18.4	0.0	Vert	AV	0.0	27.6	60.8	-33.2	EUT On Side
2170.250	48.7	-1.4	3.0	76.0		0.0	Horz	PK	0.0	47.3	80.8	-33.5	EUT Horz
2170.040	47.4	-1.4	1.1	239.0		0.0	Vert	PK	0.0	46.0	80.8	-34.8	EUT On Side

**EMISSIONS BANDWIDTH** 



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
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079 and SA18E-10	AOO	2022-01-24	2023-01-24
Cable	Element	Biconilog Cable	MNX	2022-01-24	2023-01-24
Antenna - Biconilog	Ametek	CBL 6141B	AYS	2021-03-09	2023-03-09
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	2021-05-18	2022-05-18

#### **TEST DESCRIPTION**

The measurement was made in a radiated configuration of the fundamental with the carrier fully maximized for its highest radiated power.

The 20 dB occupied bandwidth is required to be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.

### **EMISSIONS BANDWIDTH**



							XMit 2022.02.07.0
EUT:	Remote Control for XM-5	000 RF			Work Order:	PEHR0004	
Serial Number:	1				Date:	3-Mar-22	
Customer:	Pehratek Products				Temperature:	22.2 °C	
Attendees:	None				Humidity:	21.4% RH	
Project:					Barometric Pres.:		
Tested by:	Chris Patterson		Pov	ver: Battery	Job Site:	MN09	
TEST SPECIFICAT	IONS			Test Method			
FCC 15.231:2022				ANSI C63.10:2013			
COMMENTS							
	-	434 MHz (0.0025) = 1.085 MHz	. Modulation type FS	κ.			
DEVIATIONS FROM	M TEST STANDARD						
None							
Configuration #	4	Signature	Cl	Ptt			
					Measured OBW (kHz)	OBW Limit (MHz)	Result
Occupied Bandwidt	n				79.175	≤ 1.085	Pass

### **EMISSIONS BANDWIDTH**







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	Element	Biconilog Cable	MNX	2022-01-24	2023-01-24
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079 and SA18E-10	AOO	2022-01-24	2023-01-24
Antenna - Biconilog	Ametek	CBL 6141B	AYS	2021-03-09	2023-03-09
Probe - Near Field Set	ETS Lindgren	7405	IPO	NCR	NCR
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2021-09-12	2022-09-12
Attenuator	INMET	64671 6A-10dB	AUI	2021-08-04	2022-08-04
Block - DC	Fairview Microwave	SD3379	AMI	2021-08-13	2022-08-13
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2021-04-16	2022-04-16
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	2021-05-18	2022-05-18

#### TEST DESCRIPTION

The measurement was made in a radiated configuration of the fundamental with the carrier fully maximized for its highest radiated power.

For software controlled or pre-programmed devices, the manufacturer shall declare the duty cycle class or classes for the equipment under test. For manually operated or event dependant devices, with or without software controlled functions, the manufacturer shall declare whether the device once triggered, follows a pre-programmed cycle, or whether the transmission is constant until the trigger is released or manually reset. The manufacturer shall also give a description of the application for the device and include a typical usage pattern. The typical usage pattern as declared by the manufacturer shall be used to determine the duty cycle and hence the duty class.

Where an acknowledgement is required, the additional transmitter on-time shall be included and declared by the manufacturer.

To derive average emission measurements, a duty cycle correction factor was utilized:

Duty Cycle = On time/100 milliseconds (or the period, whichever is less)

Where "On time" = N1L1 +N2L2 +....

Where N1 is the number of type 1 pulses, L1 is length of type 1 pulses, N2 is the number of type 2 pulses, L2 is the length of type 2 pulses, etc.

Therefore, Duty Cycle = (N1L1 +N2L2 +...)/100mS or T, whichever is less. (Where T is the period of the pulse train.)

The measured values for the EUT's pulse train are as follows:

Period = 100 mSec Pulsewidth of Type 1 Pulse = 12.01 mSec Number of Type 1 Pulses = 1

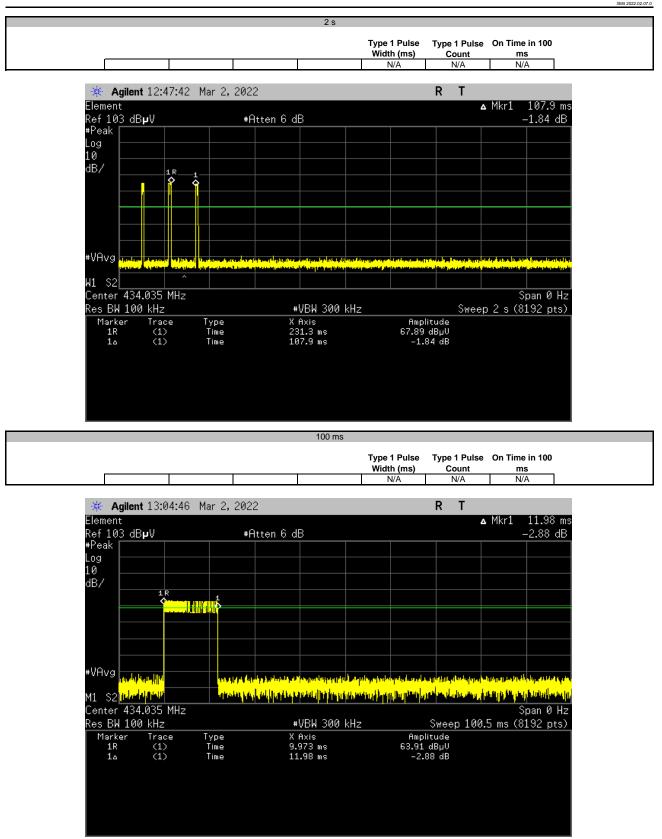
Duty Cycle Correction Factor = 20 log [((1)(12.01))/100] = -18.4 dB

The duty cycle correction factor of -18.4 dB was added to the peak readings to mathematically derive the average levels. Peak measurements were made with a resolution bandwidth of 100kHz and a video bandwidth of 300kHz.

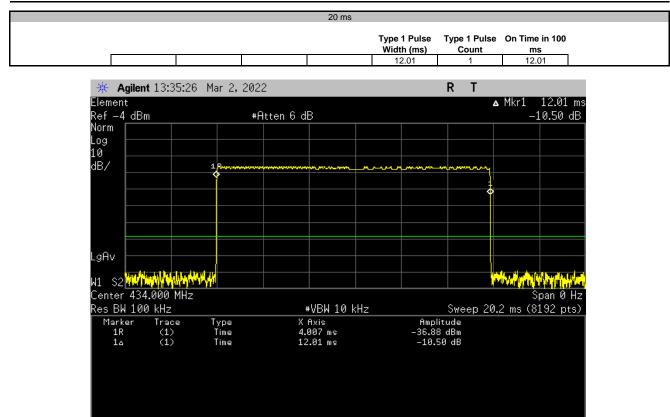


ECC 15.231:2022     ANSI C63.10:2013       COMMENTS       SRF remote transmitting at 434 MHz. Modulation type FSK.       DEVIATIONS FROM TEST STANDARD       None       Configuration #       4       Signature       Vidth (ms)       Count       MVA       N/A       N/A       N/A								XMit 2022.02.07.
Customer:     Pehratek Products     Temperature:     22.3 °C       Attendees:     None     Humidity:     20.9% RH       Project:     None     Barometric Pres:     1036 mbar       Tested by:     Chris Patterson     Power:     Barometric Pres:     1036 mbar       Tested by:     Chris Patterson     Power:     Barometric Pres:     1036 mbar       Test BetCFICATIONS     Test Method     FCC 15.231:2022     ANSI C63.10:2013       COMMENTS     ANSI C63.10:2013     Common State     State       Configuration #     4     Signature     Signature	EUT: Ren	note Control for XM-5	5000 RF					
Attendees:     None     Humidity:     20.9% RH       Project:     None     Barometric Press:     1036 mbar       Tested by:     Chris Patterson     Job Site:     MN09       TEST SPECIFICATIONS     Test Method     Job Site:     MN09       CC 15.231:2022     ANSI C63.10:2013     Job Site:     MN09       COMMENTS     Signature     Job Site:     MN09	Serial Number: 1							
Project:     None     Barometric Pres.:     1036 mbar       Tested by:     Chris Patterson     Job Site:     MN09       EST SPECIFICATIONS     Test Method     Step 201       CC 15.231:2022     ANSI C63.10:2013       COMMENTS     Step 201       Step 201     Step 201       Deviation #     4       Signature     Type 1 Pulse     Type 1 Pulse     On Time in 100       Width (ms)     Count     ms       N/A     N/A     N/A       N/A     N/A     N/A	Customer: Peh	ratek Products						
Tested by:     Chris Patterson     Power:     Battery     Job Site:     MN09       TEST SPECIFICATIONS     Test Method       FCC 15.231:2022     ANSI C63.10:2013       OMMENTS       COMMENTS       SPECIFICATIONS FROM TEST STANDARD       OPEVIATIONS FROM TEST STANDARD       OPEVIATIONS FROM TEST STANDARD       Signature       Type 1 Pulse       Type 1 Pulse       On Time in 100       Width (ms)       OUNT       Signature								
Test Method       CC 15.231:2022       ANSI C63.10:2013       COMMENTS       COMMENTS       RF remote transmitting at 434 MHz. Modulation type FSK.       DEVIATIONS FROM TEST STANDARD       None       Configuration #       4       Signature       Type 1 Pulse       Type 1 Pulse       On Time in 100       Width (ms)       Count       ms       N/A       N/A       N/A       N/A								
ECC 15.231:2022     ANSI C63.10:2013       COMMENTS       SRF remote transmitting at 434 MHz. Modulation type FSK.       DEVIATIONS FROM TEST STANDARD       None       Configuration #       4       Signature       Vidth (ms)       Count       MVA       N/A       N/A       N/A	Tested by: Chr	is Patterson			Power: Battery	Job Site:	MN09	
COMMENTS RF remote transmitting at 434 MHz. Modulation type FSK. DeVIATIONS FROM TEST STANDARD None Configuration # 4 Signature Type 1 Pulse Type 1 Pulse On Time in 100 Width (ms) Count ms N/A N/A N/A 00 ms N/A N/A N/A	TEST SPECIFICATIONS	6			Test Method			
RF remote transmitting at 434 MHz. Modulation type FSK.       DEVIATIONS FROM TEST STANDARD       None     Type 1 Pulse     Type 1 Pulse     Type 1 Pulse     On Time in 100       Configuration #     4     Signature       Signature     Vidth (ms)     Count     ms       2 s     N/A     N/A       100 ms     N/A     N/A	FCC 15.231:2022				ANSI C63.10:2013			
RF remote transmitting at 434 MHz. Modulation type FSK.       DEVIATIONS FROM TEST STANDARD       None     Type 1 Pulse     Type 1 Pulse     Type 1 Pulse     On Time in 100       Configuration #     4     Signature       Signature     Vidth (ms)     Count     ms       2 s     N/A     N/A       100 ms     N/A     N/A								
DEVIATIONS FROM TEST STANDARD None Configuration # 4 Signature Signature Type 1 Pulse Type 1 Pulse On Time in 100 Width (ms) Count ms N/A N/A N/A N/A N/A N/A N/A	COMMENTS							
Configuration #     4     Signature       Signature     Type 1 Pulse     Type 1 Pulse     On Time in 100       Width (ms)     Count     ms       00 ms     N/A     N/A     N/A	DEVIATIONS FROM TE	ST STANDARD						
Signature Type 1 Pulse Type 1 Pulse On Time in 100 Width (ms) Count ms 100 ms N/A	None							
Width (ms)         Count         ms           2 s         N/A         N/A         N/A           100 ms         N/A         N/A         N/A	Configuration #	4	Signature	C	e PA			
2 s N/A N/A N/A N/A 100 ms N/A N/A N/A						Type 1 Pulse	Type 1 Pulse	On Time in 100
00 ms N/A N/A N/A						Width (ms)	Count	ms
	2 s					N/A	N/A	N/A
'0 ms 12.01 1 12.01	100 ms					N/A	N/A	N/A
	20 ms					12.01	1	12.01











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
Probe - Near Field Set	ETS Lindgren	7405	IPO	NCR	NCR
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2021-09-12	2022-09-12
Block - DC	Fairview Microwave	SD3379	AMI	2021-08-13	2022-08-13
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2022-04-25	2023-04-25

#### TEST DESCRIPTION

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer.

For software controlled or pre-programmed devices, the manufacturer shall declare the duty cycle class or classes for the equipment under test. For manually operated or event dependant devices, with or without software controlled functions, the manufacturer shall declare whether the device once triggered, follows a pre-programmed cycle, or whether the transmission is constant until the trigger is released or manually reset. The manufacturer shall also give a description of the application for the device and include a typical usage pattern. The typical usage pattern as declared by the manufacturer shall be used to determine the duty cycle and hence the duty class.

It was verified that the transmitter stopped transmitting within 5 seconds of the button being released. This was checked for when the button was held for longer than 5 seconds and for when the button was pressed for a short period of time. The time between button release and the end of transmission was measured and compared against the limit to determine compliance.



	emote Control for XM-5000 RF			Wo	k Order:	PEHR0004	
Serial Number: 2					Date:	6-Jun-22	
Customer: P	ehratek Products			Tem	perature:	20.6 °C	
Attendees: N	lone			ŀ	umidity:	49.5% RH	
Project: N	lone			Baromet	ic Pres.:	1010 mbar	
	hristopher Heintzelman	Powe	r: Battery		Job Site:	MN08	
EST SPECIFICATIO	NS		Test Method				
CC 15.231:2022			ANSI C63.10:2013				
COMMENTS			-				
The value indicates h	now many seconds the last transmission occurre	a after the release of the butto	on. RF remote transmitting at 4	34 MHZ. Modulation type FSK.			
The value indicates h	-	d after the release of the butto	on. RF remote transmitting at 4	34 MHZ. Modulation type FSK.			
DEVIATIONS FROM 1	-	1	Heuften	44 MHZ. MOQUATION TYPE FSK.			
DEVIATIONS FROM 1 Jone	TEST STANDARD	1	-		e (s)	Limit (s)	Result
DEVIATIONS FROM 1 lone	TEST STANDARD	1	-			Limit (s) 5.0	Result Pass
DEVIATIONS FROM T lone Configuration #	7 Signature	1	-	Valu	3		
DEVIATIONS FROM T lone Configuration #	7 Signature s, 240 second span s, 60 second span	1	-	Valu 0	3 .1	5.0	Pass
DEVIATIONS FROM 1 Jone	TEST STANDARD 7 Signature s, 240 second span s, 60 second span 0 second span 0 second span	1	-	Valu 0 -0	3 .1 0	5.0 5.0	Pass Pass



	Button held 20 seconds	s, 240 second span		
		Value (s)	Limit (s)	Result
		0.29	5.0	Pass
Keysight Spectrum Analyzer - Element Ma     RL     RF     S0 Ω AC				02:17:22 PM Jun 06, 2022
<b>LX/</b> RL RF 50Ω AC	PNO: Wide Trig: Free R	ALIGN AUTO Avg Type: I Run	Log-Pwr	TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N
	IFGain:Low #Atten: 20 d	iB		Mkr1 20.29 s
10 dB/div Ref 2.00 dBm				-2.26 dB
-8.00				
-18.0 - 122				
-38.0				
-48.0				
-68.0	and an investment of the state of		hallow of the second	مرجع بالمعارية ومعالمة ومعالم
-78.0				
Center 434.000000 MHz				Span 0 Hz
Res BW 30 kHz	#VBW 100 kHz		-	40.0 s (1001 pts)
MKR         MODE         TRC         SCL         X           1         Δ2         1         t         (Δ)           2         N         1         t	Υ         FUNC           20.29 s         (Δ)         -2.26 dB           2.126 s         -21.74 dBm	TION FUNCTION WIDTH	FUNCTION	I VALUE
3 4				
5 6 7				E
8				
9				التيا
	m.	STATUS		
10	Button held 20 second:			
	Button held 20 second:		Limit (s)	Result
	Button held 20 seconds	s, 60 second span	Limit (s) 5.0	Result Pass
MSG Keysight Spectrum Analyzer - Element Ma	terials Technology	s, 60 second span Value (s) -0.1		Pass
MSG	terials Technology SENSE:INT PNO: Wide →→ Trig: Free R	s, 60 second span Value (s) -0.1 ALIGN AUTO Avg Type: I	5.0	Pass
MSG Keysight Spectrum Analyzer - Element Ma	terials Technology SENSE:INT	s, 60 second span Value (s) -0.1 ALIGN AUTO Avg Type: I	5.0	Pass 02:20:26 PMJun 06, 2022 TRACE 12.34 5.6 TYPE DET PNNNNN
10     RL     RF     50 Ω     AC       10     dB/div     Ref     2.00 dBm	terials Technology SENSE:INT PNO: Wide →→ Trig: Free R	s, 60 second span Value (s) -0.1 ALIGN AUTO Avg Type: I	5.0	Pass 02:20:26 PM Jun 06, 2022 TRACE 12:34 56 TYPE WWWWWWWWW
10       MSG       MSG       Δ       Keysight Spectrum Analyzer - Element Ma       QM     RL       RE     50 Ω       AC       10 dB/div     Ref       2.00 dBm	terials Technology SENSE:INT PNO: Wide →→ Trig: Free R	s, 60 second span Value (s) -0.1 ALIGN AUTO Avg Type: I	5.0	Pass 02:20:26 PMJun 06, 2022 TRACE 12.34 5.6 TYPE DET PNNNNN
10         Image: Constraint of the sector of the sec	terials Technology SENSE:INT PNO: Wide IFGain:Low #Atten: 20 d	s, 60 second span Value (s) -0.1 ALIGN AUTO Avg Type: I	5.0	Pass 02:20:26 PMJun 06, 2022 TRACE 12.34 5 6 TYPE DET PNNNNN
10         Image: Constraint of the second sec	terials Technology SENSE:INT PNO: Wide IFGain:Low #Atten: 20 d	s, 60 second span Value (s) -0.1 ALIGN AUTO Avg Type: I	5.0	Pass 02:20:26 PMJun 06, 2022 TRACE 12.34 5 6 TYPE DET PNNNNN
10	terials Technology SENSE:INT PNO: Wide IFGain:Low #Atten: 20 d	s, 60 second span Value (s) -0.1 ALIGN AUTO Avg Type: I	5.0	Pass 02:20:26 PMJun 06, 2022 TRACE 12.34 5 6 TYPE DET PNNNNN
Image: Non-Section of the section of the s	terials Technology SENSE:INT PNO: Wide IFGain:Low 1Δ2	s, 60 second span Value (s) -0.1 ALIGN AUTO Avg Type: I	5.0	Pass 02:20:26 PMJun 06, 2022 TRACE 12.34 5 6 TYPE DET PNNNNN
10	terials Technology SENSE:INT PNO: Wide IFGain:Low 1Δ2	s, 60 second span Value (s) -0.1 ALIGN AUTO Avg Type: I	5.0	Pass 02:20:26 MJun 06, 2022 TRACE 23 4 5 6 TYPE WWWWW DET P NNNNN Mkr1 19.93 s -1.84 dB
10 dB/div Ref 2.00 dBm 10 dBm 10 dV R Ref 2.00 dBm 10 dB/div Ref 2.00 dBm 10 dV R R R R R R R R R R R R R R R R R R	terials Technology PNO: Wide IFGain:Low Trig: Free R #Atten: 20 of TA2	s, 60 second span Value (s) -0.1 ALIGN AUTO Avg Type: I	5.0	Pass 02:20:26 PM Jun 06, 2022 TRACE 2 3 4 3 0 TYPE WWWWWW OUT P NNNNN Mkr1 19.93 s -1.84 dB
10         1           MSG	terials Technology PNO: Wide IFGain:Low Trig: Free R #Atten: 20 d 1Δ2 μ μ μ μ μ μ μ μ μ μ μ μ μ	s, 60 second span Value (s) O.1 ALIGN AUTO Avg Type: I B	5.0	Pass 02:20:20 PU Jun 06:2022 TRACE 234 5 G UPE PNNNNN Mkr1 19.93 s -1.84 dB
10         Image: Constraint of the sector of the sec	terials Technology PNO: Wide → Trig: Free R IFGain:Low 1Δ2 1Δ2 1Δ2 #VBW 100 kHz	s, 60 second span Value (s) O.1 ALIGN AUTO Avg Type: I B	5.0	Pass 02:20:20 PU Jun 06:2022 TRACE 234 5 G UPE PNNNNN Mkr1 19.93 s -1.84 dB
10         1           MSG	terials Technology PNO: Wide Trig: Free R IFGain:Low Trig: Free R #Atten: 20 d 1Δ2 #VBW 100 kHz FUNC 19.93 s (Δ) -1.84 dB	s, 60 second span Value (s) O.1 ALIGN AUTO Avg Type: I B	5.0	Pass 02:20:20 PU Jun 06:2022 TRACE 234 5 G UPE PNNNNN Mkr1 19.93 s -1.84 dB
10         Image: Constraint of the sector of the sec	terials Technology PNO: Wide Trig: Free R IFGain:Low Trig: Free R #Atten: 20 d 1Δ2 #VBW 100 kHz FUNC 19.93 s (Δ) -1.84 dB	s, 60 second span Value (s) O.1 ALIGN AUTO Avg Type: I B	5.0	Pass 02:20:20 PU Jun 06:2022 TRACE 234 5 G UPE PNNNNN Mkr1 19.93 s -1.84 dB
10         11           MSG	terials Technology PNO: Wide Trig: Free R IFGain:Low Trig: Free R #Atten: 20 d 1Δ2 #VBW 100 kHz FUNC 19.93 s (Δ) -1.84 dB	s, 60 second span Value (s) O.1 ALIGN AUTO Avg Type: I B	5.0	Pass 02:20:20 PU Jun 06:2022 TRACE 234 5 G UPE PNNNNN Mkr1 19.93 s -1.84 dB



	Button single press 240 se	econd span		
		Value (s)	Limit (s)	Result
		4.0	5.0	Pass
Keysight Spectrum Analyzer - Element Ma				
XIRL RF 50Ω AC		ALIGN AUTO Avg Type: L	_og-Pwr	02:11:25 PM Jun 06, 2022 TRACE 1 2 3 4 5 6 TYPE WWWWW DET P N N N N N
	PNO: Wide Irig: Free Run IFGain:Low #Atten: 20 dB			
10 dB/div Ref 2.00 dBm				Mkr2 5.726 s -20.01 dBm
Log				
-18.0 <b>2</b> 1Δ2				
-28.0				
-48.0				
-58.0				
-78.0	alautor-literate antipersonal area and black approximated area	مانغانى سېغى <sup>الىر</sup> ىيىدىلى رو <mark>لى مىدەرولىم</mark>	de-malandor de angen	weeks wet an and an and a second second
-88.0				
Center 434.000000 MHz Res BW 30 kHz	#\/B\M 100 kHz		Swoon	Span 0 Hz 240.0 s (1001 pts)
MKR MODE TRC SCL X	#VBW 100 kHz	FUNCTION WIDTH	Sweep 4	
1 Δ2 1 t (Δ) 2 N 1 t	3.965 s (Δ) -4.65 dB 5.726 s -20.01 dBm			
3 4 5				
6				
8 9 10				
11				
	III			•
MSG	ц	STATUS		
•	" Button single press 60 se			•
•	" Button single press 60 se	cond span Value (s)	Limit (s)	Result
•	Button single press 60 se	cond span	Limit (s) 5.0	Result Pass
Keysight Spectrum Analyzer - Element Ma	terials Technology	cond span Value (s) 4.0		Pass
K C	terials Technology SENSE:INT PNO: Wide →→ Trig: Free Run	cond span Value (s)	5.0	Pass
Keysight Spectrum Analyzer - Element Ma	terials Technology	cond span Value (s) 4.0	5.0 _og-Pwr	Pass 01:54:53 PM Jun 06, 2022 TRACE 12 34 5 6 TYPE DET P NNNNN
Keysight Spectrum Analyzer - Element Ma RL RF 50 Ω AC	terials Technology SENSE:INT PNO: Wide →→ Trig: Free Run	cond span Value (s) 4.0	5.0 _og-Pwr	Pass
Keysight Spectrum Analyzer - Element Ma RL RF 50 Ω AC	terials Technology SENSE:INT PNO: Wide →→ Trig: Free Run	cond span Value (s) 4.0	5.0 _og-Pwr	Pass 01:54:53 PM Jun 06, 2022 TRACE 23 4 5 6 TYPE DET PNNNN Mkr2 685.6 ms
Keysight Spectrum Analyzer - Element Ma RL RF 50 Ω AC 10 dB/div Ref 2.00 dBm	terials Technology SENSE:INT PNO: Wide →→ Trig: Free Run	cond span Value (s) 4.0	5.0 _og-Pwr	Pass 01:54:53 PM Jun 06, 2022 TRACE 23 4 5 6 TYPE DET PNNNN Mkr2 685.6 ms
Keysight Spectrum Analyzer - Element Ma RL RF 50 Ω AC 10 dB/div Ref 2.00 dBm -0 g -0.00 -18 0 2 -14 2	terials Technology SENSE:INT PNO: Wide →→ Trig: Free Run	cond span Value (s) 4.0	5.0 _og-Pwr	Pass 01:54:53 PM Jun 06, 2022 TRACE 23 4 5 6 TYPE DET PNNNN Mkr2 685.6 ms
Keysight Spectrum Analyzer - Element Ma M           M RL         RF         50 Ω         AC           10 dB/div         Ref 2.00 dBm           -8.00         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00         -         -         -         -           -8.00	terials Technology SENSE:INT PNO: Wide →→ Trig: Free Run	cond span Value (s) 4.0	5.0 _og-Pwr	Pass 01:54:53 PM Jun 06, 2022 TRACE 23 4 5 6 TYPE DET PNNNN Mkr2 685.6 ms
Keysight Spectrum Analyzer - Element Ma           Keysight Spectrum Analyzer - Element Ma           RL         RF           SO         AC	terials Technology PNO: Wide → Trig: Free Run IFGain:Low #Atten: 20 dB	cond span Value (s) 4.0	5.0 _og-Pwr	Pass 01:54:53 PM Jun 06, 2022 TRACE 23 4 5 6 TYPE DET PNNNN Mkr2 685.6 ms
Keysight Spectrum Analyzer - Element Ma (X)           RL         RF         50 Ω         AC           10 dB/div         Ref 2.00 dBm           -280         -280           -380         -480           -580         -480           -780	terials Technology PNO: Wide → Trig: Free Run IFGain:Low #Atten: 20 dB	cond span Value (s) 4.0	5.0 _og-Pwr	Pass 01:54:53 PM Jun 06, 2022 TRACE 23 4 5 6 TYPE DET PNNNN Mkr2 685.6 ms
Keysight Spectrum Analyzer - Element Ma           Keysight Spectrum Analyzer - Element Ma           M RL         RF           50 g         AC           10 dB/div         Ref 2.00 dBm           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -           -8.00         -	terials Technology PNO: Wide → Trig: Free Run IFGain:Low #Atten: 20 dB	cond span Value (s) 4.0	5.0 _og-Pwr	Pass
Keysight Spectrum Analyzer - Element Ma (X)           RL         RF         50 Ω         AC           10 dB/div         Ref 2.00 dBm           -280         -280           -380         -480           -580         -480           -780	terials Technology PNO: Wide → Trig: Free Run IFGain:Low #Atten: 20 dB	cond span Value (s) 4.0	5.0	Pass 01:54:53 PM Jun 06, 2022 TRACE 23 4 5 6 TYPE DET PNNNN Mkr2 685.6 ms
Keysight Spectrum Analyzer - Element Ma           Center 434.000000 MHz           Center 434.000000 MHz           Center 434.000000 MHz           Kes BW 30 KHz	terials Technology PNO: Wide IFGain:Low → Trig: Free Run #Atten: 20 dB	cond span Value (s) 4.0	5.0	Pass
Keysight Spectrum Analyzer - Element Ma           X         RL         Ref         S0 Q         Acc           10         dB/div         Ref         2.00 dBm         400	tterials Technology PNO: Wide IFGain:Low → Trig: Free Run #Atten: 20 dB	cond span Value (s) 4.0 ALIGN AUTO AVg Type: L	5.0 Log-Pwr	Pass
Keysight Spectrum Analyzer - Element Ma           MSG           10 dB/div         Ref         2.00 dBm           8.00         2         1         Δ           18.00         2         1         Δ         2           18.00         2         1         Δ         2         1         Δ           19.00         2         1         Δ         2         1         Δ         2         1         Δ         2         1         Δ         2         1         Δ         2         1         Δ         2         1         Δ         2         1         Δ         2         1         Δ         2         1         Δ         2         1         Δ         2         1         Δ         2         1         Δ         2         Δ         2         1         Δ	tterials Technology PNO: Wide IFGain:Low → Trig: Free Run #Atten: 20 dB #Atten: 20 dB #Atten: 20 dB #Atten: 20 dB #Atten: 20 dB	cond span Value (s) 4.0 ALIGN AUTO AVg Type: L	5.0 Log-Pwr	Pass
Keysight Spectrum Analyzer - Element Ma           Keysight Spectrum Analyzer - Element Ma           M RL         RF         50 Ω         AC           IO         dB/div         Ref 2.00 dBm         AC           IO         Q         I         I         I         I           IO         Center 434.000000 MHz         Res BW 30 kHz         X         X         I         I         I         I         I         X         I         X         I         X         I         X         I         X         I         X         I         X         I         X         I         X         I         X         I         X         I         X         I         X         I         X         I         X         I         X         I         X         I         X         I         X <thx< th="">         X         X         X</thx<>	tterials Technology PNO: Wide IFGain:Low → Trig: Free Run #Atten: 20 dB #Atten: 20 dB #Atten: 20 dB #Atten: 20 dB #Atten: 20 dB	cond span Value (s) 4.0 ALIGN AUTO AVg Type: L	5.0 Log-Pwr	Pass
Keysight Spectrum Analyzer - Element Ma           Keysight Spectrum Analyzer - Element Ma           Keysight Spectrum Analyzer - Element Ma           Centre 1         S0 Ω         AC           10 dB/div         Ref         2.00 dBm           0 dB/div         Ref         2.00 dBm           2 a         1 Δ2         1 Δ2           3 a         2 a         1 t           3 a         1 t         3 a           4 a         5 a         5 a           7 a         1 t         3 a	tterials Technology PNO: Wide IFGain:Low → Trig: Free Run #Atten: 20 dB #Atten: 20 dB #Atten: 20 dB #Atten: 20 dB #Atten: 20 dB	cond span Value (s) 4.0 ALIGN AUTO AVg Type: L	5.0 Log-Pwr	Pass



	Bullo	n single press 5 sec	shu span		
			Value (s)	Limit (s)	Result
			4.1	5.0	Pass
Keysight Spectrum Analyzer - Element Materia	ls Technology				
LXI RL RF 50Ω AC		SENSE:INT	ALIGN AUTO		01:51:56 PM Jun 06, 2022
	PNO: Wide ↔		Avg Type:	Log-Pwr	TRACE 1 2 3 4 5 6 TYPE WWWWW DET P NNNN
					Mkr2 435.6 ms -23.90 dBm
10 dB/div Ref 2.00 dBm	1		1		-23.90 uBm
-8.00					
-18.0 2					14.2
-28.0					, ↓1∆2
-38.0					
-48.0					
-58.0					
-68.0	enterrophysically references in	a har hatar a har a litter t	Sound the many and the state		
-78.0		a financial and a static field and a static field.			Viller Fron A state where the series
-88.0					
Center 434.000000 MHz					Span 0 Hz
Res BW 30 kHz	#VE	3W 100 kHz		Sweep :	5.000 s (1001 pts)
MKR MODE TRC SCL X	ļ Y	FUNCTION	FUNCTION WIDTH	FUNCTIO	N VALUE
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	4.075 s (Δ) -5 35.6 ms -23.9	.33 dB 0 dBm			
3	20.0				
4					E
6					
8					
9					
11					



End of Test Report