MicroTransponder, Inc.

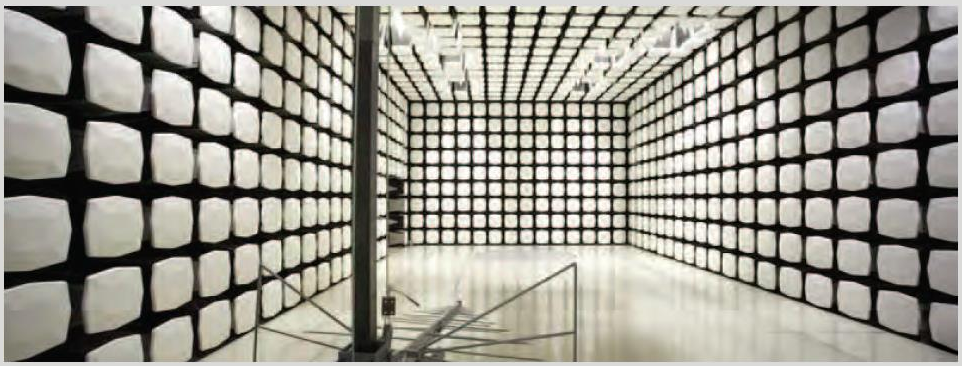
Model 2100 Wireless Transmitter

EN 301 839 V2.1.1:2016

FCC Part 95I:2021

MICS Radio

Report: MIER0005.5 Rev. 2, Issue Date: December 20, 2021



ACCREDITED
CERT #3310.02

CERTIFICATE OF TEST

Last Date of Test: October 26, 2021
MicroTransponder, Inc.
EUT: Model 2100 Wireless Transmitter

Radio Equipment Testing

Standards

Specification	Method
EN 301 839 V2.1.1:2016	EN 301 839 V2.1.1:2016
FCC Part 95I:2021	FCC Part 95I:2021

Results

Method Clause	Test Description	Applied	Results	Comments
5.3.7.1.3	LBT Threshold Power Level	Yes	Pass	
5.3.7.1.4	Monitoring System Bandwidth	Yes	Pass	
5.3.7.1.5.1.1	Monitoring System Scan Cycle Time	Yes	Pass	
5.3.7.1.5.1.2	Minimum Channel Monitoring Period	Yes	Pass	
5.3.7.1.6	Channel Access Based On Ambient Levels	Yes	Pass	
5.3.7.1.7	Discontinuation Of A MICS Session	Yes	Pass	
5.3.7.1.8	Use Of Pre-Scanned Alternative Channel	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Kyle Holgate, Operations 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
01	Added FCC Part 95I to certificate of test.	2021-11-22	2
02	Updated EUT name to ” Model 2100 Wireless Transmitter” and serial number to “00132”	2021-12-20	All pages

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.

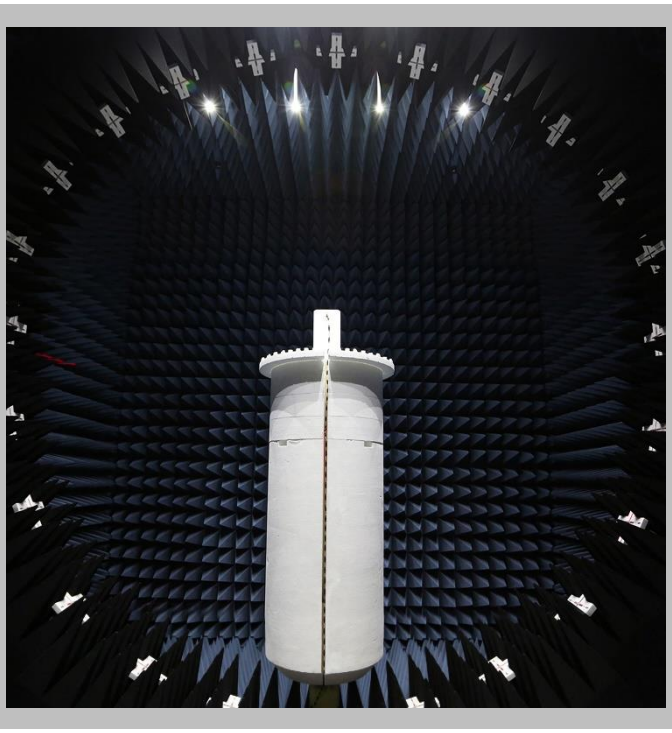
SCOPE

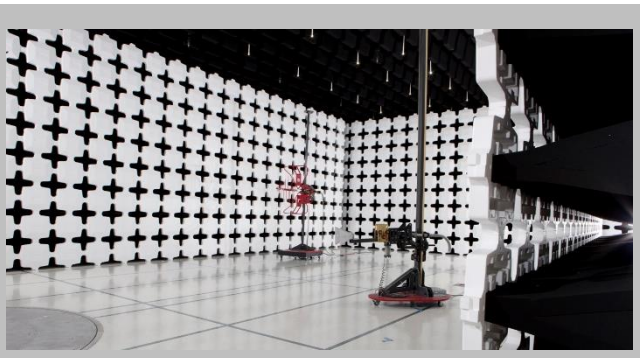
For details on the Scopes of our Accreditations, please visit:

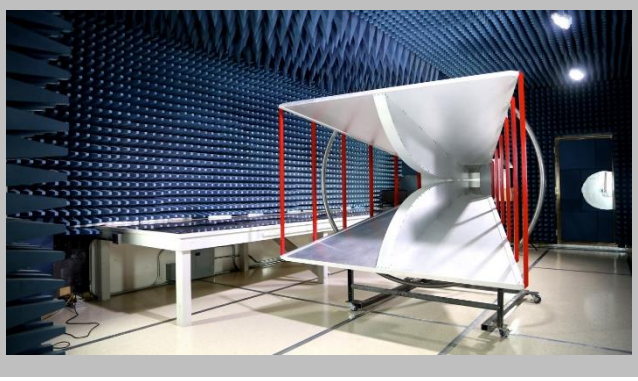
California Minnesota Oregon Texas Washington

FACILITIES

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.

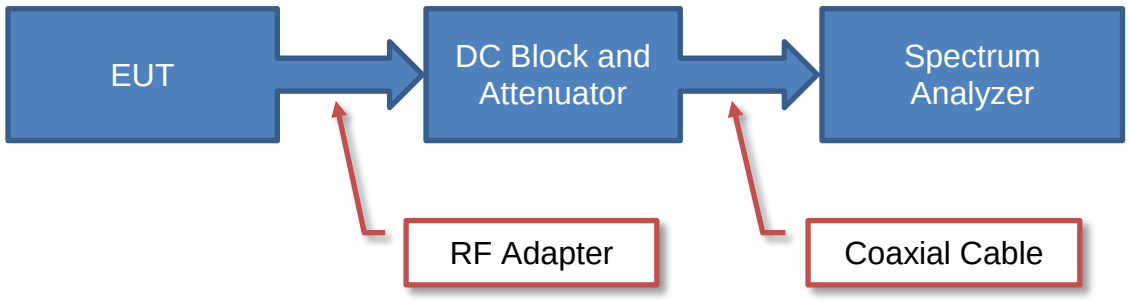
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found in the table below. A lab specific 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

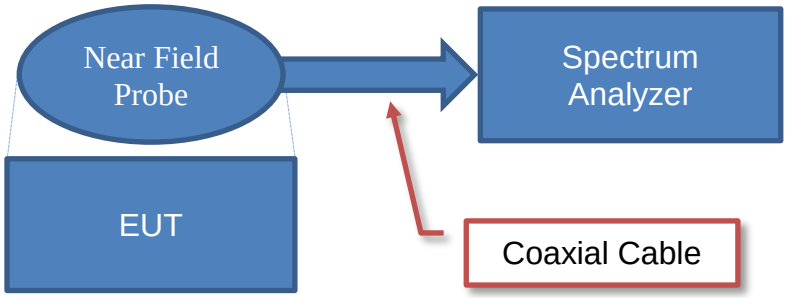
Antenna Port Conducted Measurements



Sample Calculation

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

Near Field Test Fixture Measurements

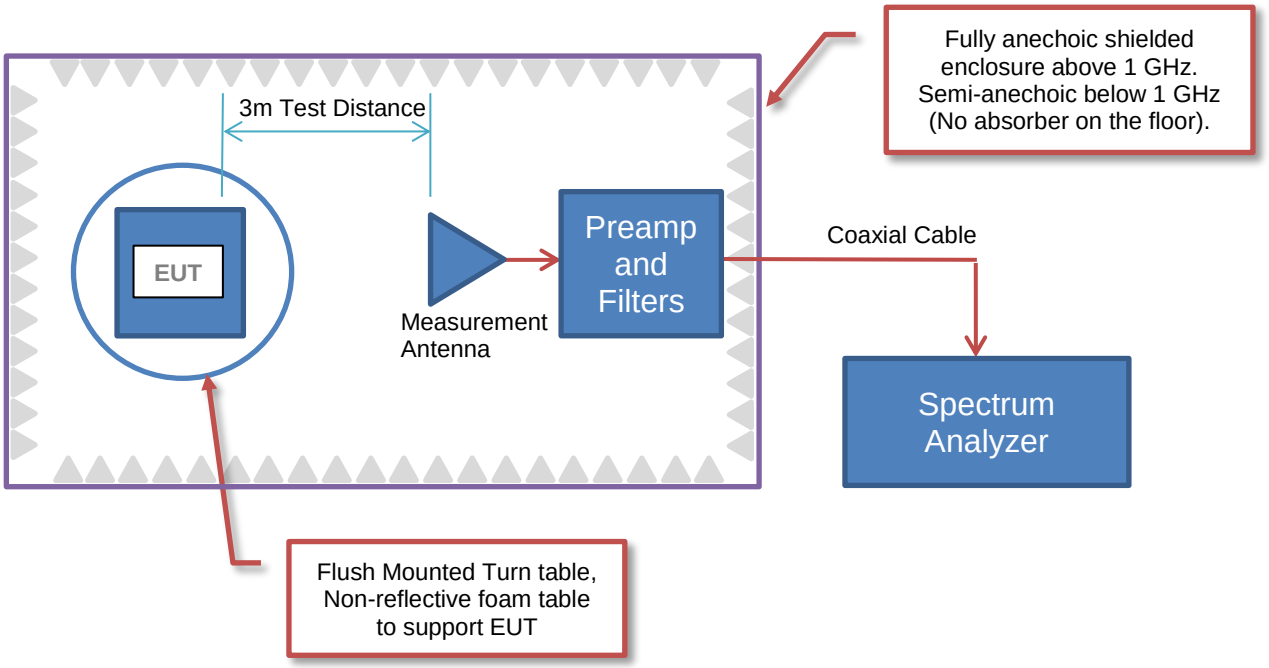


Sample Calculation

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

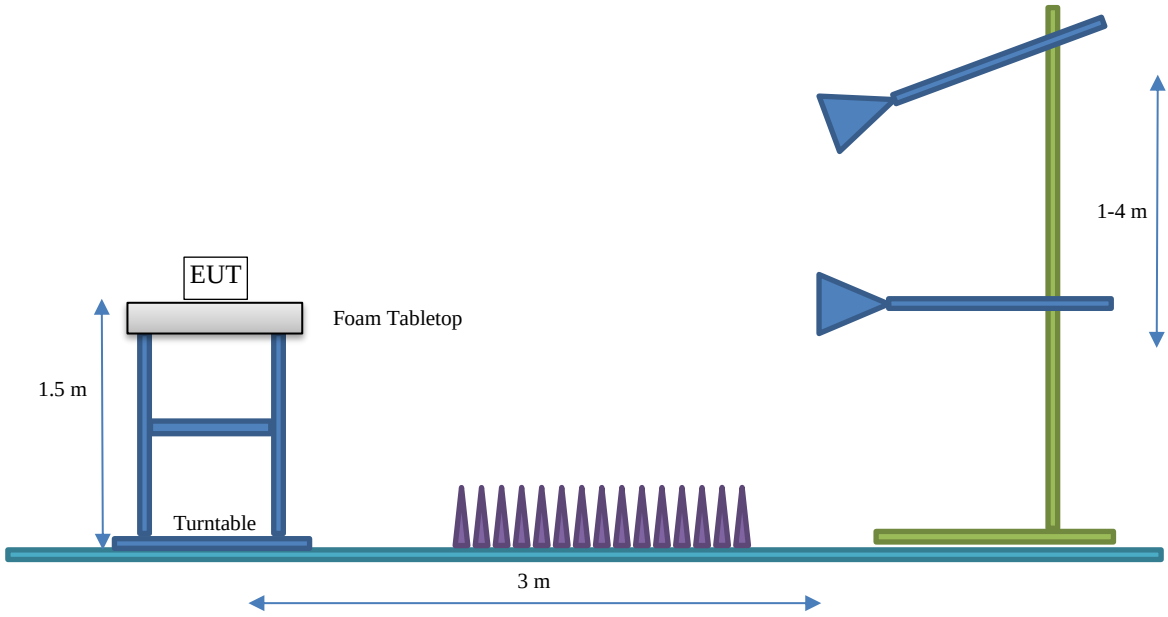
TEST SETUP BLOCK DIAGRAMS

Spurious Radiated Emissions



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:	MicroTransponder, Inc.
Address:	2802 Flintrock Trace Ste 226
City, State, Zip:	Austin, TX 78738
Test Requested By:	Chester Buress
EUT:	Model 2100 Wireless Transmitter
First Date of Test:	October 26, 2021
Last Date of Test:	October 26, 2021
Receipt Date of Samples:	October 14, 2021
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
The Wolfgang System is a medical system for the treatment of Stroke. It is composed of an implantable device, the Wolfgang Implantable Pulse Generator (IPG), the Wolfgang Programmer Interface (PI) and the Stroke Application and Programming Software (SAPS). The Wolfgang PI, connected to the Laptop, is used to coordinate the stimulation by communicating wirelessly with the implant. The Wolfgang Programmer Interface and the Stroke Application and Programming Software are products designed and manufactured by CCC. The Laptop is an off-the-shelf device, selected by MTI, which comply with applicable IEC/ISO safety standards. These components shall be configured as a system and tested per this test plan.

Testing Objective:
To demonstrate compliance of the MICS radio to Article 3.2 of the RED and FCC part 95I.

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.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Measured Gain (dBi) *reported by manufacturer	Peak Gain (dBi) *antenna data sheet
¼ wave monopole	Manufacturer	400 - 406	-12	-8.7

The EUT was tested using the power settings provided by the manufacturer:

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types	Data Rate	Channel	Frequency (MHz)	Power Setting (dBm)
2FSK-Fallback	200 kbits/s	4	403.350	-4

CONFIGURATIONS

Configuration MIER0005- 4

Software/Firmware Running during test	
Description	**Version**
RDP	6.6

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Transmitter	MicroTransponder, Inc.	Model 2100 Wireless Transmitter	00132

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Neurostimulator	MicroTransponder, Inc.	1001	0708
Laptop	Dell	Vostro 15 3000	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop power supply	Dell	00285K	CN-00285K-CH200-16G-0DR0-A10

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	1.6 m	No	Laptop PC	Wireless Transmitter

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-10-26	LBT Threshold Power Level	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	2021-10-26	Monitoring System 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.
3	2021-10-26	Monitoring System Scan Cycle Time	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	2021-10-26	Minimum Channel Monitoring Period	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	2021-10-26	Channel Access Based On Ambient Levels	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	2021-10-26	Discontinuation Of A MICS Session	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	2021-10-26	Use Of Pre-Scanned Alternative Channel	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed

LBT THRESHOLD POWER LEVEL

element

XMit 2020.12.30.0

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	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Power Splitter/Combiner	Mini-Circuits	ZX 10-2-20-S+	PSF	2021-10-25	2022-10-25
Power Splitter/Combiner	Picosecond Pulse Labs	5350-218	PSG	2021-10-25	2022-10-25
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Generator - Signal	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR
Directional Coupler	Fairview Microwave	SMC4035-10	IRZ	2021-10-25	2022-10-25
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

Measurement of the monitoring system threshold power, defined in 47 CFR 95.2559(a)(3) and (4), is necessary to evaluate the channel access performance of the MedRadio system.

A spectrum analyzer was used to verify the path loss between the signal generator and The EUT per figure 1 below. The EUT was then configured according to the figure 2 below.

The signal generator was set to multi-tone operation to cause equal interference across the entire band. The amplitude of the multi-tone signals (out of operation region) were set to the LBT threshold of 10*LOG(Bandwidth) - 150 + Antenna Gain + 3 dB.

The spectrum analyzer was set to measure the transmit band of 402-405 MHz. A communication session was established between the EUT and the active medical implant (MICS Implant AMI).

A second signal generator was configured to inject a CW tone on the intended frequency (Fc), with the amplitude set to the LBT threshold - 6 dB, and raised by 1 dB increments until the EUT choose a different channel to start a session. Screen captures were provided to show the EUT behavior at the different LBT threshold levels.

The signal generator amplitude at Fc was then measured and with the spectrum analyzer. Per clause 5.3.7.1.3.3, an additional 4 dB was subtracted from the measured value and reported in the data sheet. The reported power level was then compared to the calculated LBT threshold level for the EUT. The recorded power level shall be less than or equal to the calculated LBT threshold power level.

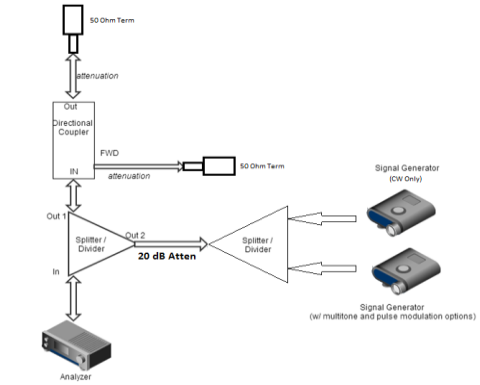


Figure 1

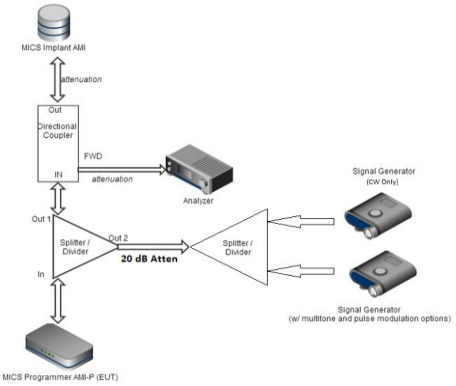


Figure 2

LBT THRESHOLD POWER LEVEL

XMit 2020.12.30.0

EUT:	Model 2100 Wireless Transmitter			**Work Order:**	MIER0005
Serial Number:	00132			**Date:**	26-Oct-21
Customer:	MicroTransponder, Inc.			**Temperature:**	22.8 °C
Attendees:	None			**Humidity:**	45% RH
Project:	None			**Barometric Pres.:**	1009.48 mbar
Tested by:	Jeff Alcoke	**Power:**	USB via 110VAC/60Hz	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
EN 301 839 V2.1.1:2016	EN 301 839 V2.1.1:2016
FCC 95I:2021	FCC 95I:2021

COMMENTS

20 dB Bandwidth = 239.021 kHz, client provided measued antenna gain = -12 dBi, antenna data sheet antenna gain = -8.7 dBi
Calculated LBT Threshold (LBT) using antenna gain of -12 dBi = 10 * Log(Bandwidth) - 150 + Antenna Gain = 10*Log(239021) -150 + (-12) = -108.22 dBm.
Calculated LBT Threshold (LBT) using antenna gain of -8.7 dBi = 10 * Log(Bandwidth) - 150 + Antenna Gain = 10*Log(239021) -150 + (-8.7) = -104.92 dBm.
Testing performed using worst case LBT of -108.22 dBm

DEVIATIONS FROM TEST STANDARD

None

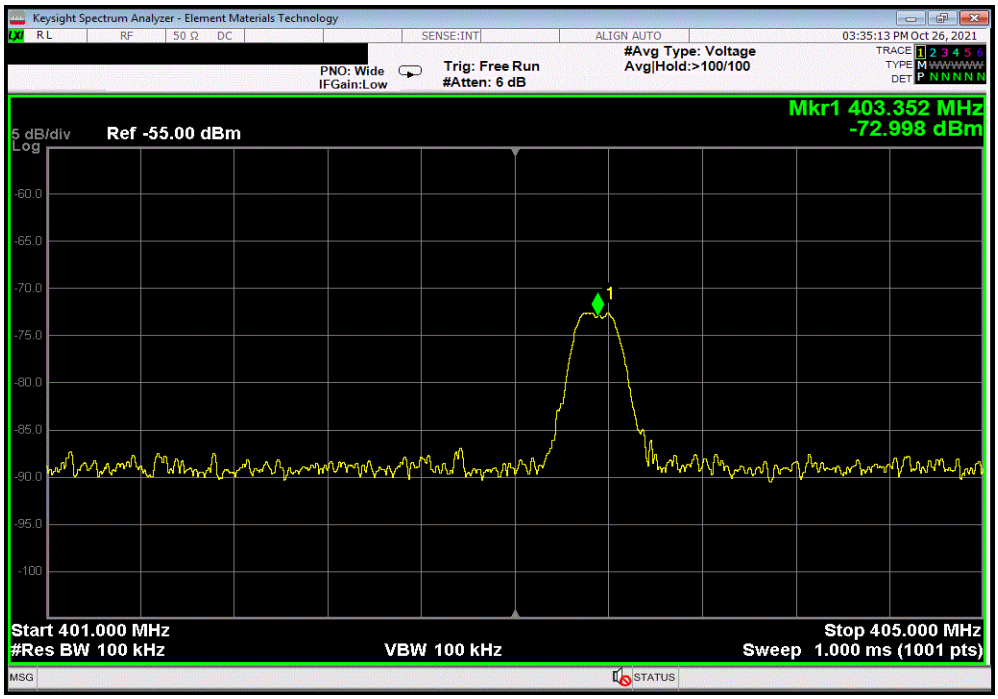
Configuration #	4	Signature

	Value (kHz)	Sig Gen -4dB (dBm)	Limit ≤ (dBm)	Result
LBT -6 dB	N/A	N/A	N/A	N/A
LBT +1 dB	N/A	N/A	N/A	N/A
LBT +2 dB	N/A	-110.12	-108.22	Pass

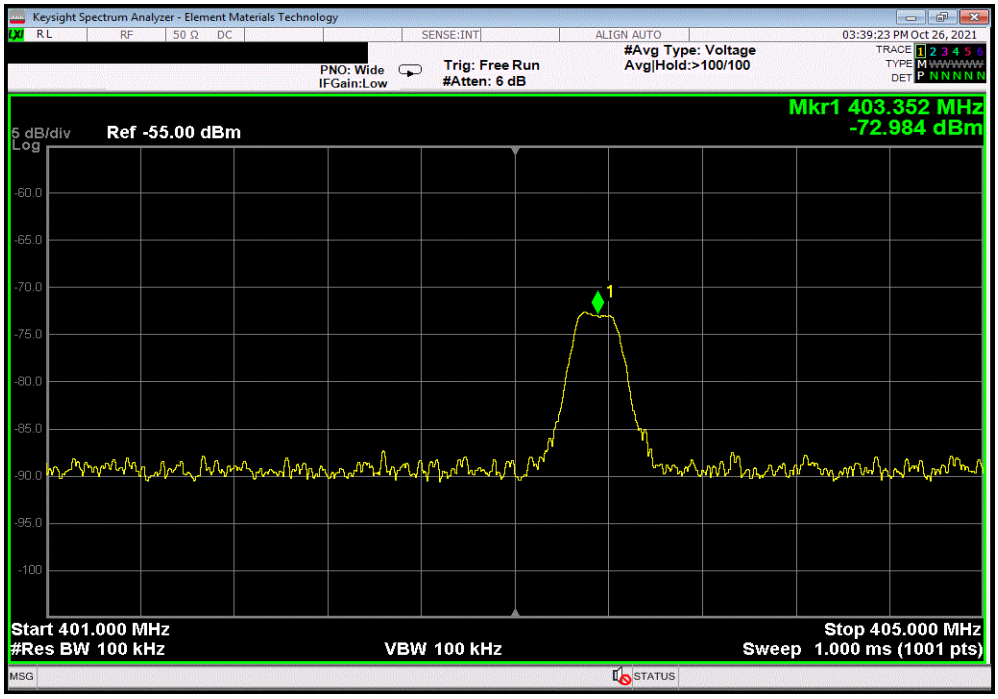
LBT THRESHOLD POWER LEVEL

XMit 2020.12.30.0

LBT -6 dB						
			Value (kHz)	Sig Gen -4dB (dBm)	Limit ≤ (dBm)	Result
			N/A	N/A	N/A	N/A



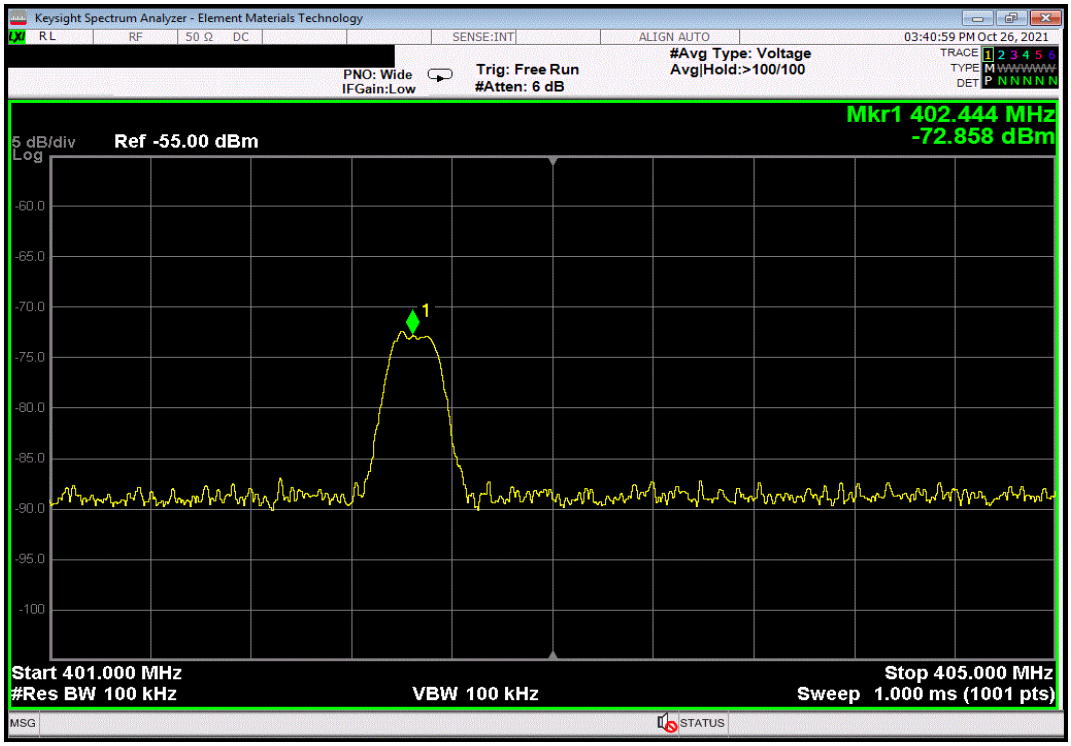
LBT +1 dB						
			Value (kHz)	Sig Gen -4dB (dBm)	Limit ≤ (dBm)	Result
			N/A	N/A	N/A	N/A



LBT THRESHOLD POWER LEVEL

XMit 2020.12.30.0

LBT +2 dB							
				Value (kHz)	Sig Gen -4dB (dBm)	Limit ≤ (dBm)	Result
				N/A	-110.12	-108.22	Pass



MONITORING SYSTEM BANDWIDTH

XMit 2020.12.30.0

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.

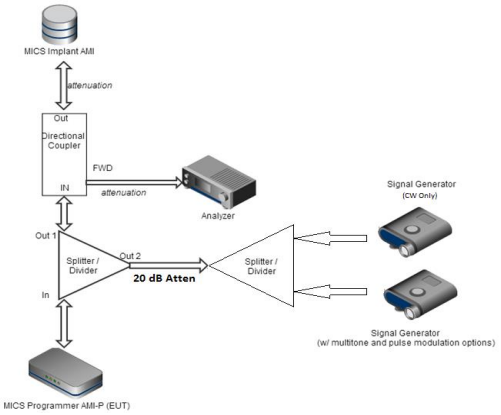
TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Power Splitter/Combiner	Mini-Circuits	ZX 10-2-20-S+	PSF	2021-10-25	2022-10-25
Power Splitter/Combiner	Mini-Circuits	ZX 10-2-20-S+	PSF	2021-10-25	2022-10-25
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Generator - Signal	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR
Directional Coupler	Fairview Microwave	SMC4035-10	IRZ	2021-10-25	2022-10-25
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

Per 47 CFR 95.2559(a)(1), the monitoring system bandwidth, measured at its 20 dB down points, must be equal to or greater than the MedRadio emission bandwidth of the intended transmission.

The EUT was configured according to the following block diagram:



One signal generator was set to multi-tone operation to cause equal interference across the entire band except for the intended frequency (Fc). The amplitude of the multi-tone signals (out of operation region) were set to the LBT threshold of 10*LOG(Bandwidth) - 150 + Antenna Gain + 3 dB.

The spectrum analyzer was set to measure the transmit band of 402-405 MHz. A communication session was started with the implant. A second signal generator was configured to a inject CW blocking frequency at the intended frequency (Fc). The amplitude was set to a level above the LBT threshold, and lowered by 1 dB increments until the EUT chooses the intended frequency (Fc) to start a session on. This is known as Pa.

The blocking frequency at Fc was then lowered to Fc – 20 dB Bandwidth / 2. The amplitude was then raised until the EUT chooses a channel other than Fc, known as Pb. This was repeated with the blocking frequency raised to Fc + 20 dB Bandwidth / 2, known as Pc.

The signal generator amplitude at Fc was measured at each point. The value D1 was found by subtracting the amplitude at Pa from the amplitude at Pb. Similarly, the value D2 was found by subtracting the amplitude at Pa from the amplitude at Pc. The values D1 and D2 were compared against the limit to determine compliance.

MONITORING SYSTEM BANDWIDTH

XMit 2020.12.30.0

EUT:	**Model 2100 Wireless Transmitter**			**Work Order:**	**MIER0005**
Serial Number:	**00132**			**Date:**	**26-Oct-21**
Customer:	**MicroTransponder, Inc.**			**Temperature:**	**24 °C**
Attendees:	**None**			**Humidity:**	**43.2% RH**
Project:	**None**			**Barometric Pres.:**	**1009 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**USB via 110VAC/60Hz**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
EN 301 839 V2.1.1:2016	EN 301 839 V2.1.1:2016
FCC 95I:2021	FCC 95I:2021

COMMENTS

20 dB Bandwidth = 239.021 kHz, Antenna Gain = -12 dBi.

DEVIATIONS FROM TEST STANDARD

None

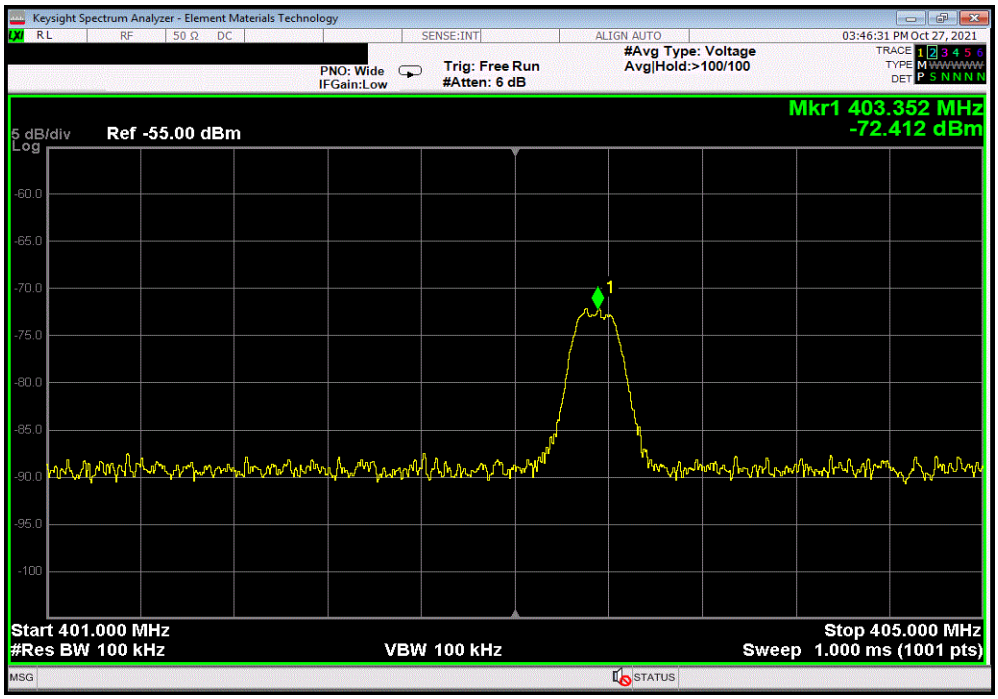
Configuration #	**4**	*Signature* 

	Measured Value (dBm)	**Value D1, D2 (dB)**	**Limit < (dB)**	**Result**
(Pa) = Fc	-107.12	N/A	N/A	N/A
(Pb) = Fc - Emissions BW/2	-94.12	13	20	Pass
(Pc) = Fc + Emissions BW/2	-91.12	16	20	Pass

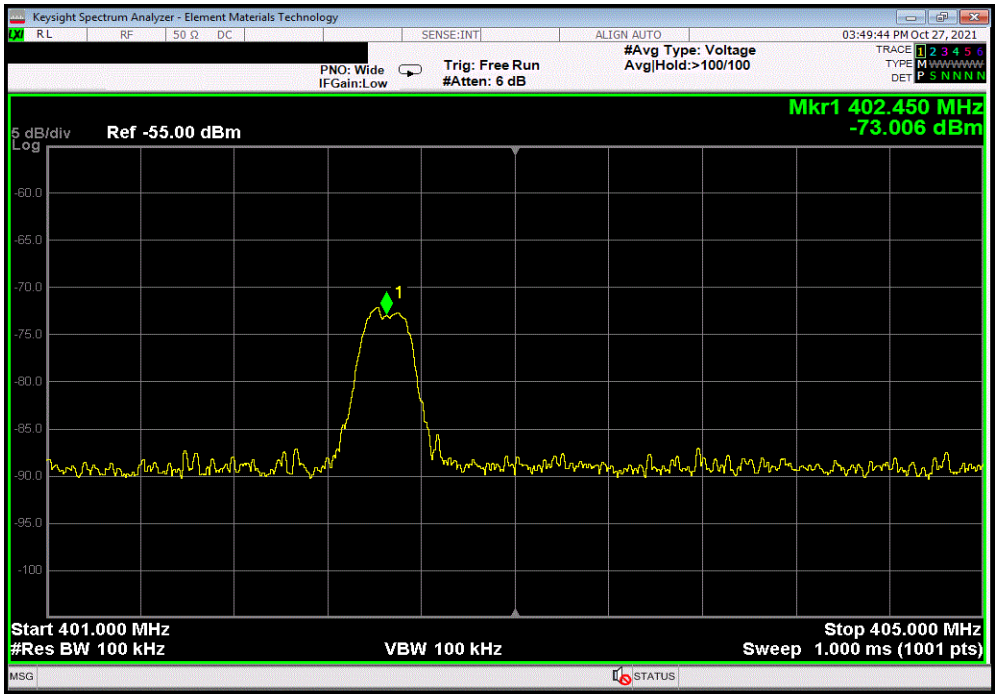
MONITORING SYSTEM BANDWIDTH

XMit 2020.12.30.0

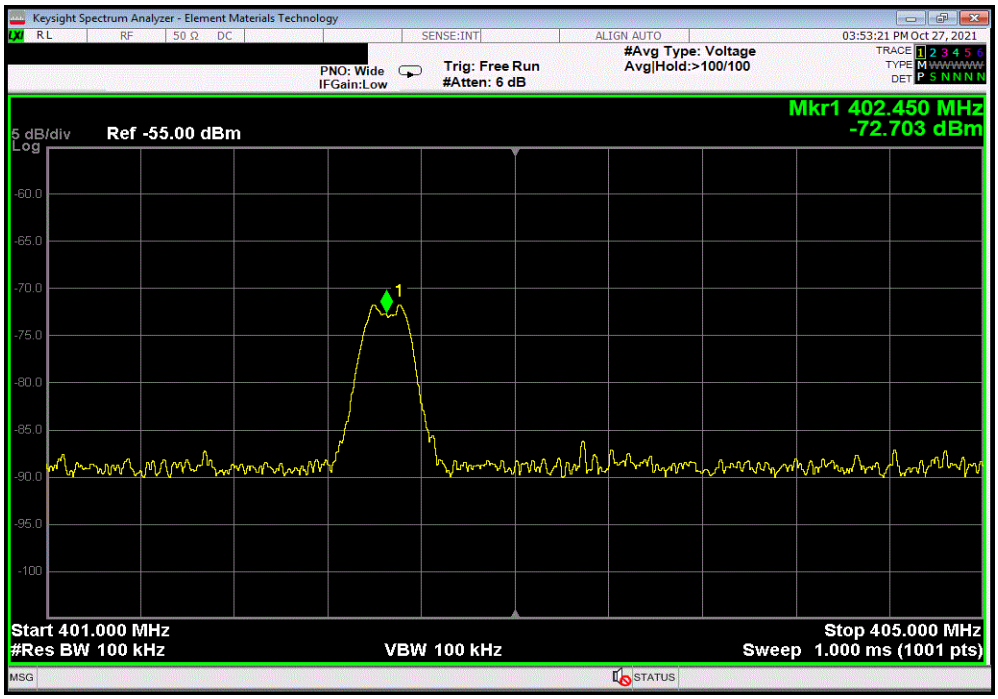
(Pa) = Fc						
		Measured Value (dBm)		Value D1, D2 (dB)	Limit < (dB)	Result
		-107.12		N/A	N/A	N/A



(Pb) = Fc - Emissions BW/2						
		Measured Value (dBm)		Value D1, D2 (dB)	Limit < (dB)	Result
		-94.12		13	20	Pass



(Pc) = Fc + Emissions BW/2						
		Measured Value (dBm)		Value D1, D2 (dB)	Limit < (dB)	Result
		-91.12		16	20	Pass



MONITORING SYSTEM SCAN CYCLE TIME

XMit 2020.12.30.0

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.

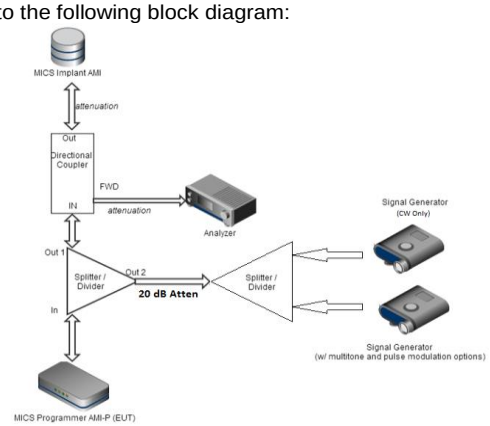
TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Power Splitter/Combiner	Mini-Circuits	ZX 10-2-20-S+	PSF	2021-10-25	2022-10-25
Power Splitter/Combiner	Picosecond Pulse Labs	5350-218	PSG	2021-10-25	2022-10-25
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Generator - Signal	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR
Directional Coupler	Fairview Microwave	SMC4035-10	IRZ	2021-10-25	2022-10-25
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

Per 47 CFR 95.2559(a)(2), within 5 seconds prior to initiating a MedRadio communications session, circuitry associated with a MedRadio programmer/control transmitter must monitor the channel or channels the system devices intend to occupy.

The EUT was configured according to the following block diagram:



One signal generator was set to multi-tone operation to cause equal interference across the entire band except for the intended frequency (Fc). The second signal generator was configured to a CW signal on the intended frequency (Fc). The spectrum analyzer was set to zero span with a sweep time equal to 10 seconds.

The CW signal on the intended frequency (Fc) was then removed. At the same time, the EUT was set to seek a session with the implantable device. The delay between Fc becoming available and the EUT establishing a session was measured.

MONITORING SYSTEM SCAN CYCLE TIME

element

XMit 2020.12.30.0

EUT:	**Model 2100 Wireless Transmitter**			**Work Order:**	**MIER0005**
Serial Number:	**00132**			**Date:**	**26-Oct-21**
Customer:	**MicroTransponder, Inc.**			**Temperature:**	**23.4 °C**
Attendees:	**None**			**Humidity:**	**44.3% RH**
Project:	**None**			**Barometric Pres.:**	**1014 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**USB via 110VAC/60Hz**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
EN 301 839 V2.1.1:2016	EN 301 839 V2.1.1:2016
FCC 95I:2021	FCC 95I:2021

COMMENTS

20 dB Bandwidth = 239.021 kHz, Antenna Gain = -12 dBi.

DEVIATIONS FROM TEST STANDARD

None

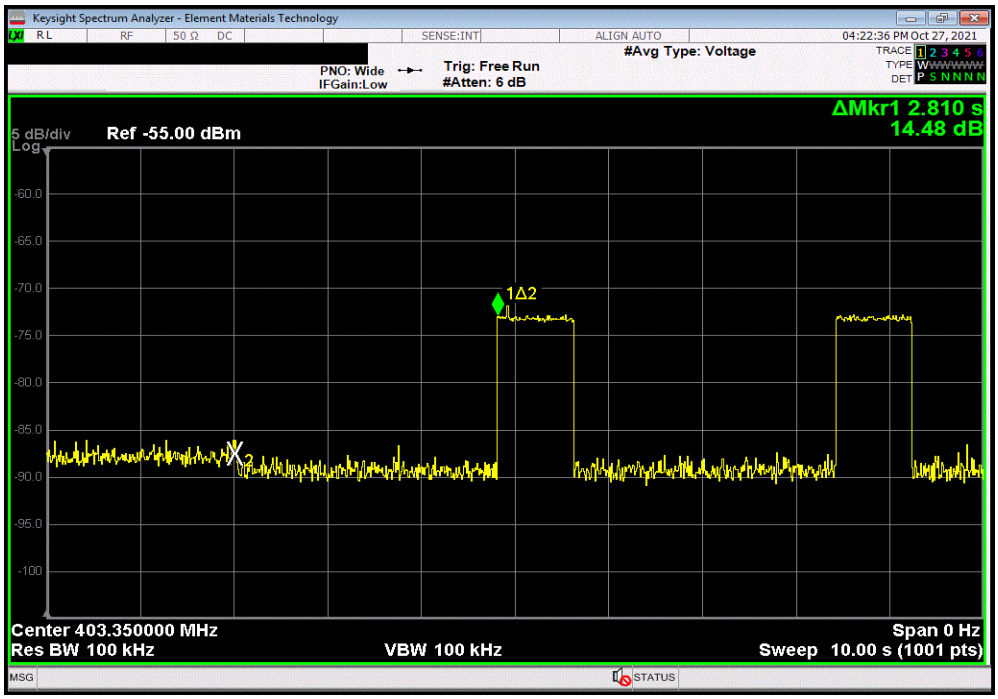
Configuration #	**4**	*Signature* 

	Value (Seconds)	**Limit < (Seconds)**	**Result**
Sample 1	2.81	5	Pass
Sample 2	2.36	5	Pass
Sample 3	3.65	5	Pass
Sample 4	3.60	5	Pass
Sample 5	3.23	5	Pass
Sample 6	3.64	5	Pass
Sample 7	2.60	5	Pass
Sample 8	2.63	5	Pass
Sample 9	2.81	5	Pass
Sample 10	3.50	5	Pass

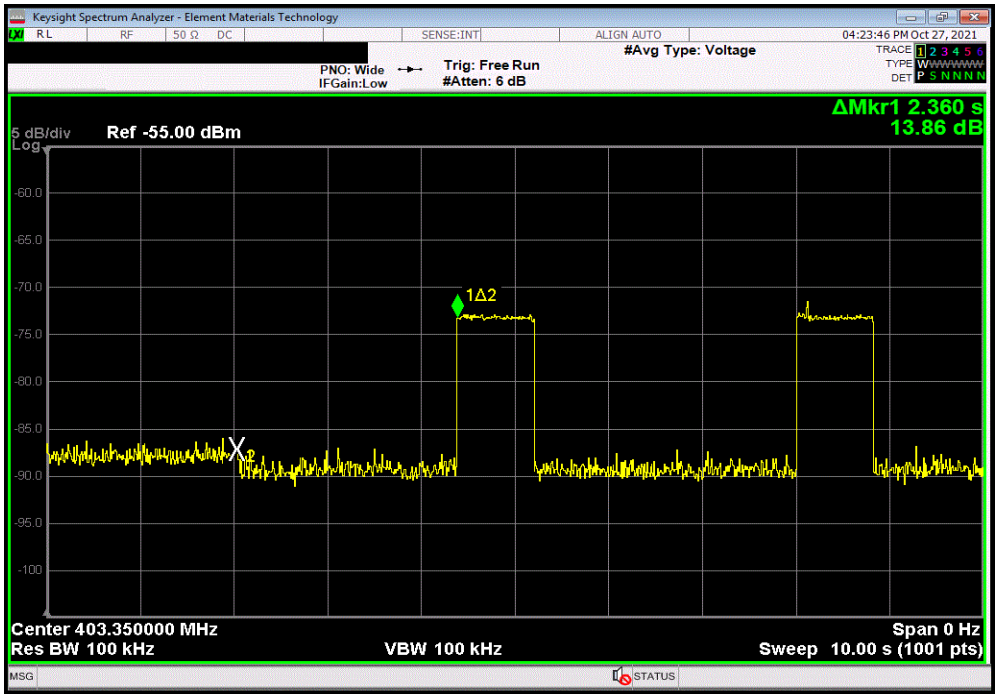
MONITORING SYSTEM SCAN CYCLE TIME

XMit 2020.12.30.0

Sample 1						
				Value (Seconds)	Limit < (Seconds)	Result
				2.81	5	Pass



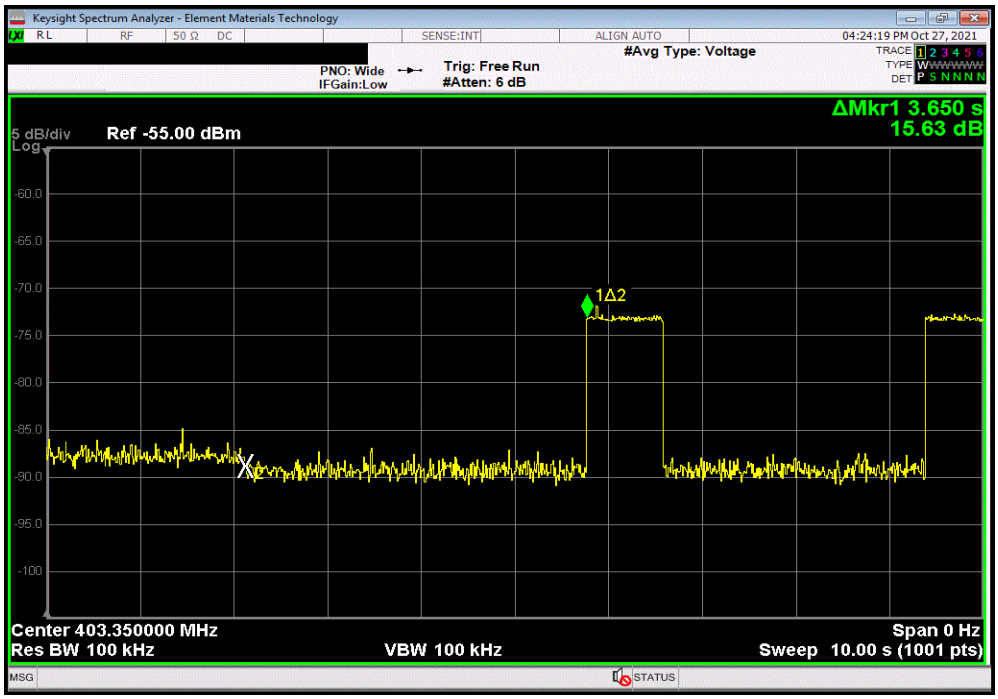
Sample 2						
				Value (Seconds)	Limit < (Seconds)	Result
				2.36	5	Pass



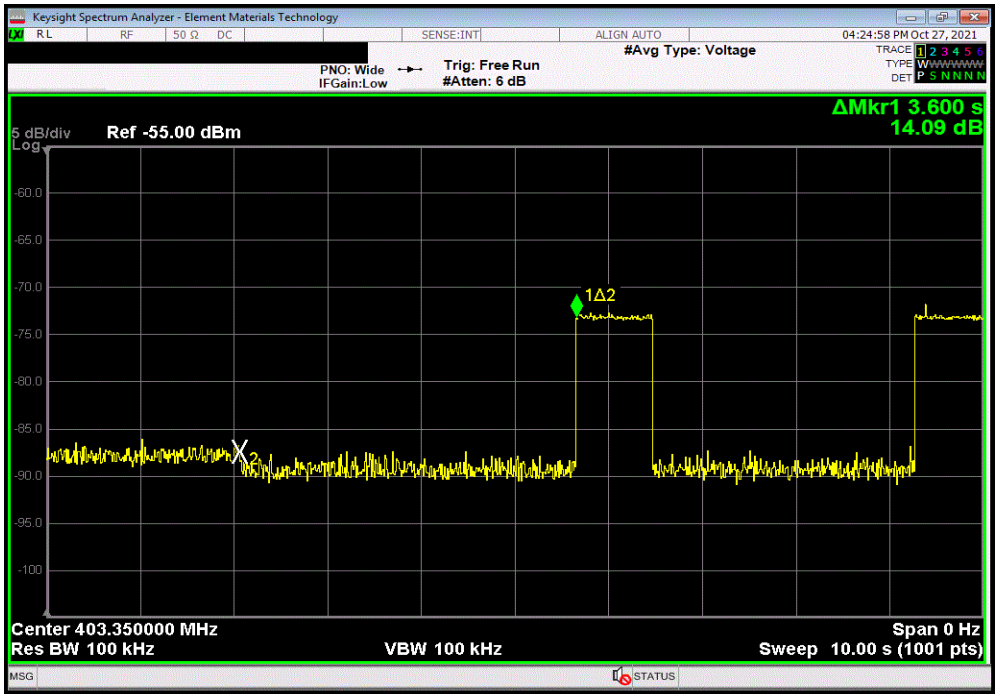
MONITORING SYSTEM SCAN CYCLE TIME

XMit 2020.12.30.0

Sample 3						
				Value (Seconds)	Limit < (Seconds)	Result
				3.65	5	Pass



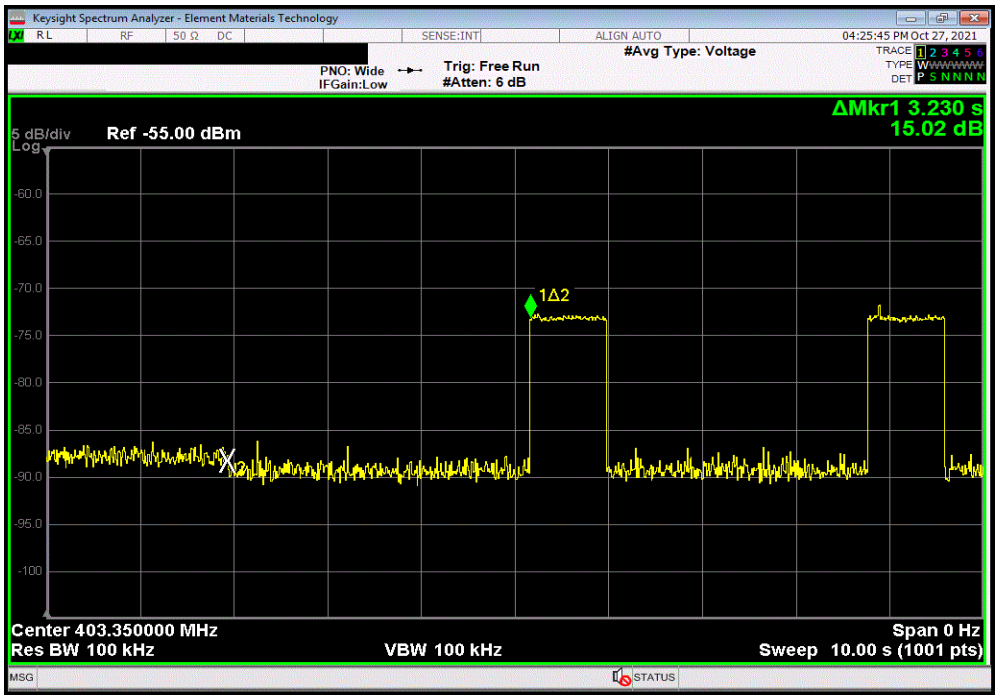
Sample 4						
				Value (Seconds)	Limit < (Seconds)	Result
				3.6	5	Pass



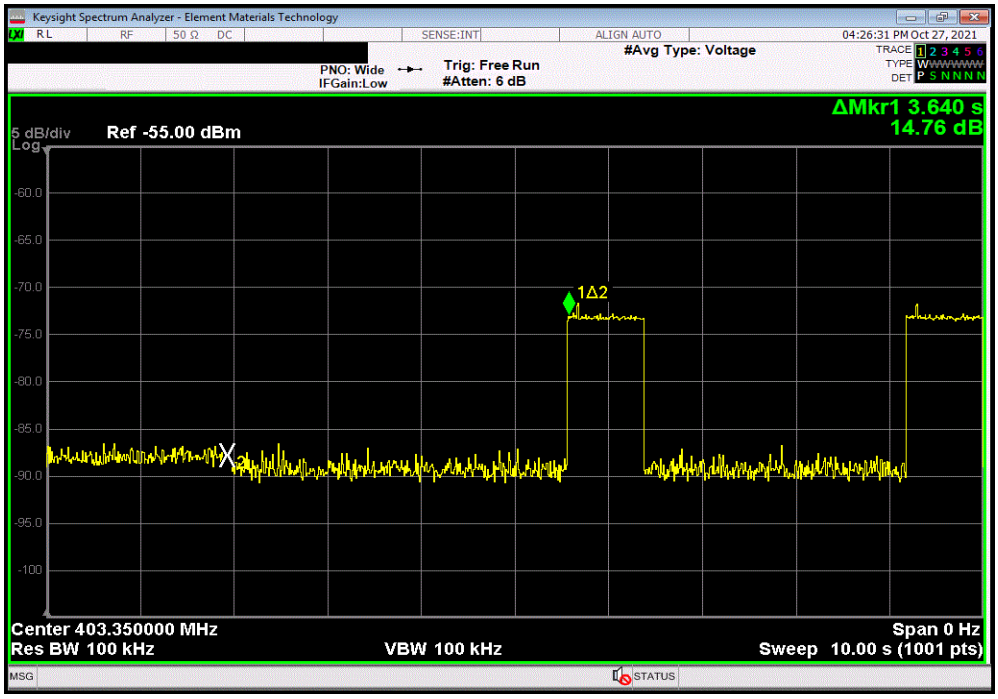
MONITORING SYSTEM SCAN CYCLE TIME

XMit 2020.12.30.0

Sample 5						
				Value (Seconds)	Limit < (Seconds)	Result
				3.23	5	Pass



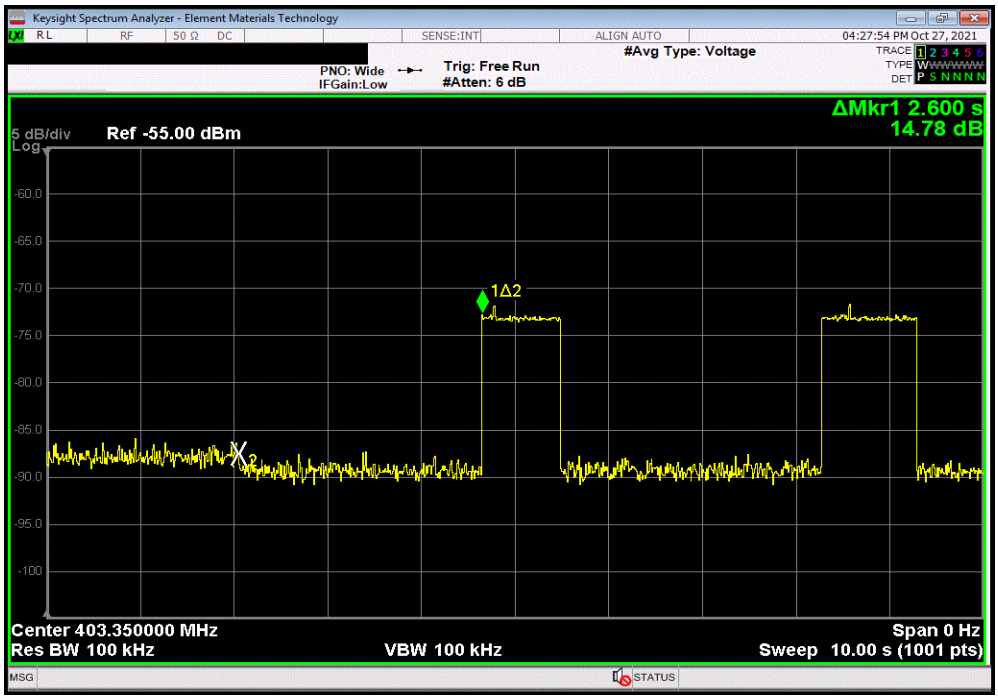
Sample 6						
				Value (Seconds)	Limit < (Seconds)	Result
				3.64	5	Pass



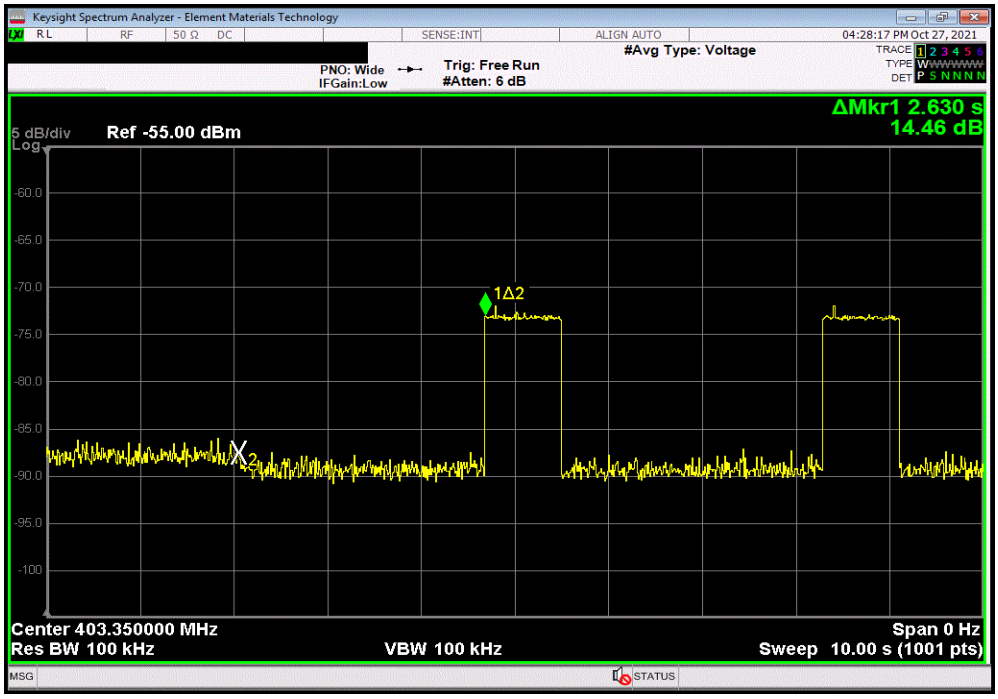
MONITORING SYSTEM SCAN CYCLE TIME

XMit 2020.12.30.0

Sample 7							
					Value (Seconds)	Limit < (Seconds)	Result
					2.6	5	Pass



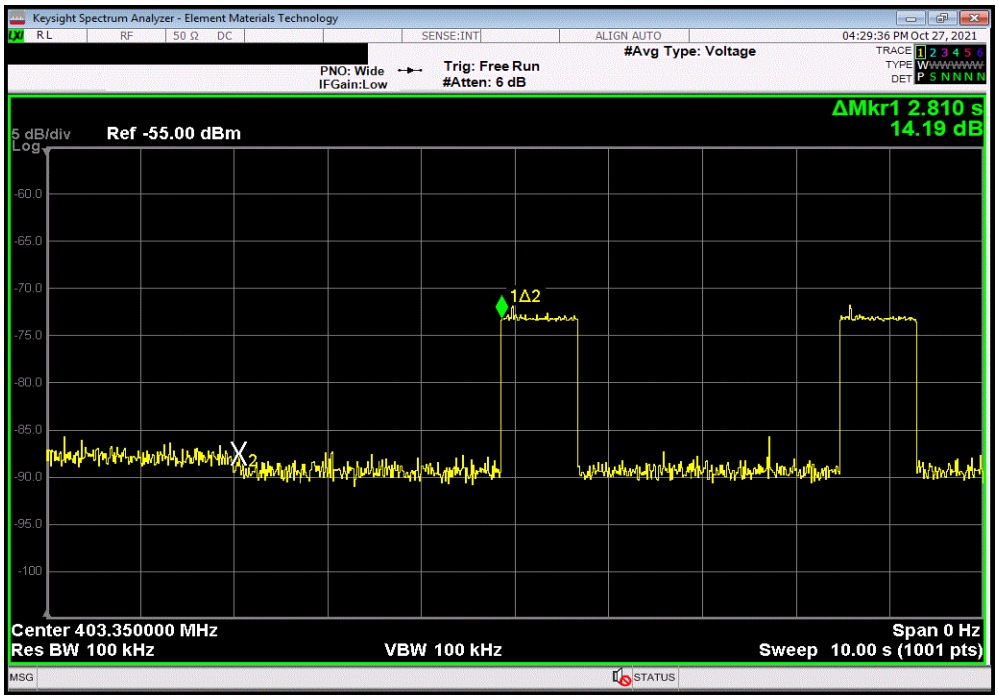
Sample 8							
					Value (Seconds)	Limit < (Seconds)	Result
					2.63	5	Pass



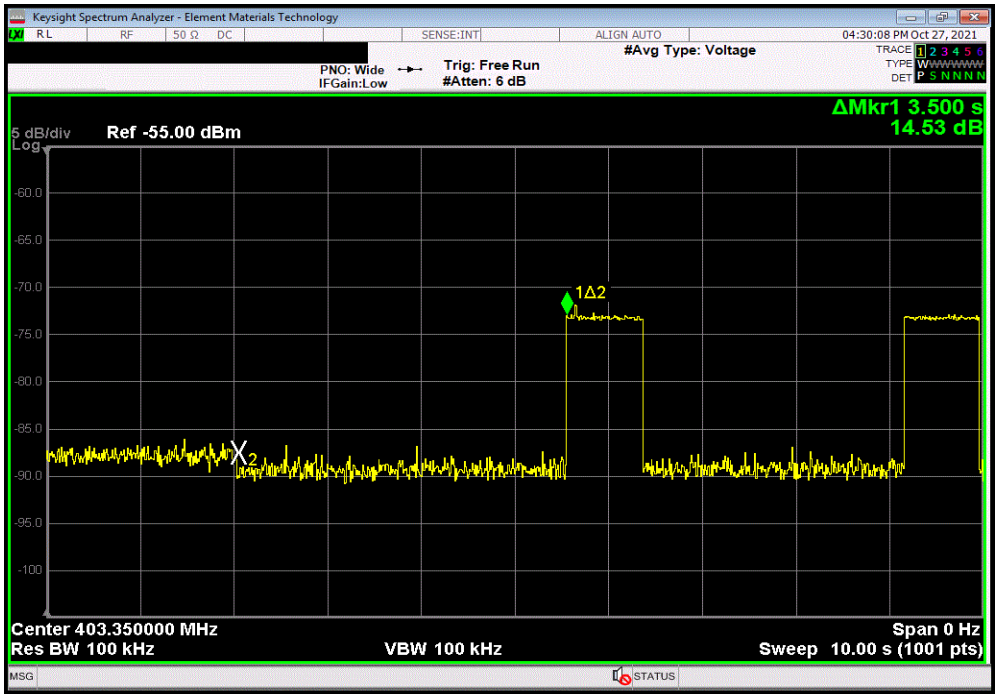
MONITORING SYSTEM SCAN CYCLE TIME

XMit 2020.12.30.0

Sample 9						
				Value (Seconds)	Limit < (Seconds)	Result
				2.81	5	Pass



Sample 10						
				Value (Seconds)	Limit < (Seconds)	Result
				3.5	5	Pass



MINIMUM CHANNEL MONITORING PERIOD

XMit 2020.12.30.0

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.

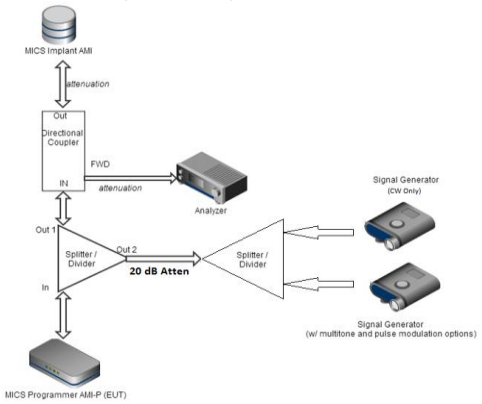
TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Power Splitter/Combiner	Mini-Circuits	ZX 10-2-20-S+	PSF	2021-10-25	2022-10-25
Power Splitter/Combiner	Picosecond Pulse Labs	5350-218	PSG	2021-10-25	2022-10-25
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Generator - Signal	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR
Directional Coupler	Fairview Microwave	SMC4035-10	IRZ	2021-10-25	2022-10-25
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

Per 47 CFR 95.2559(a)(2), circuitry associated with a MedRadio programmer/control transmitter must monitor the channel or channels the system devices intend to occupy for a minimum of 10 milliseconds per channel.

The EUT was configured according to the following block diagram:



A signal generator was set to multi-tone operation to cause equal interference across the entire band, except one channel (Fc) was left available. The multi-tone operation (out of operation region) was also set to Pulse modulation with a Period of 10 mS, and a Pulse Width of 0.1 mS. The second (CW only) signal generator was not used for this test, but remained in the test setup. The spectrum analyzer was set to measure the transmit band of 402-405 MHz.

The EUT was set to seek a session with the implantable device. The EUT was verified to connect on the available channel with multiple screen captures.

MINIMUM CHANNEL MONITORING PERIOD

element

XMit 2020.12.30.0

EUT:	**Model 2100 Wireless Transmitter**			**Work Order:**	**MIER0005**
Serial Number:	**00132**			**Date:**	**26-Oct-21**
Customer:	**MicroTransponder, Inc.**			**Temperature:**	**23.4 °C**
Attendees:	**None**			**Humidity:**	**44.3% RH**
Project:	**None**			**Barometric Pres.:**	**1014 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**USB via 110VAC/60Hz**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
EN 301 839 V2.1.1:2016	EN 301 839 V2.1.1:2016
FCC 95I:2021	FCC 95I:2021

COMMENTS

20 dB Bandwidth = 239.021 kHz, Antenna Gain = -12 dBi.

DEVIATIONS FROM TEST STANDARD

None

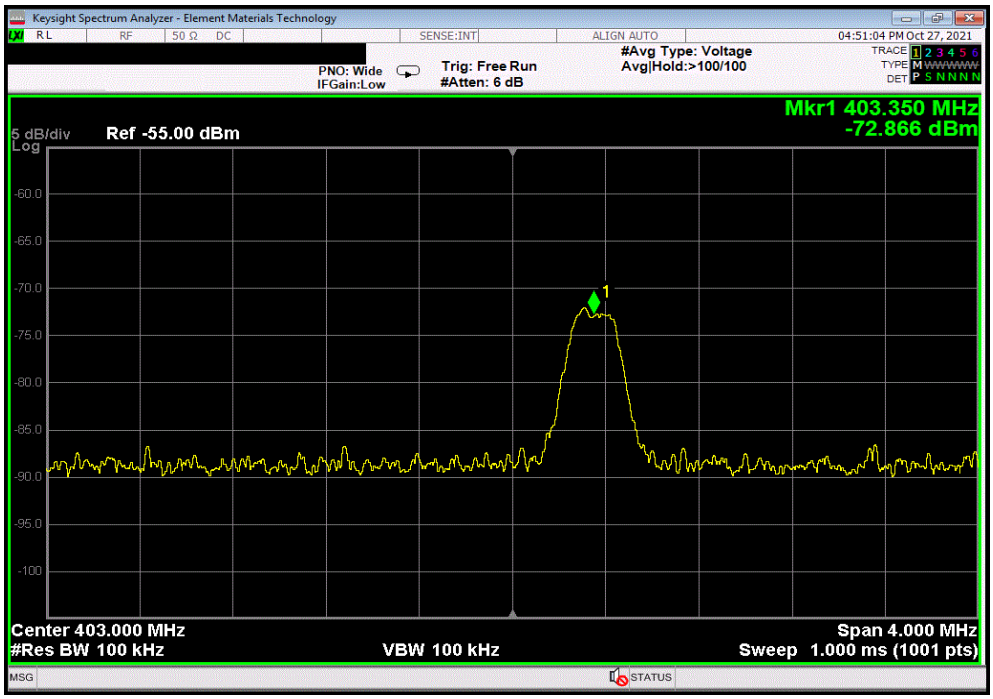
Configuration #	**4**	*Signature* 

	Transmit on Channel (Fc)	**Limit**	**Result**
Sample 1	Yes	Yes	Pass
Sample 2	Yes	Yes	Pass
Sample 3	Yes	Yes	Pass
Sample 4	Yes	Yes	Pass
Sample 5	Yes	Yes	Pass
Sample 6	Yes	Yes	Pass
Sample 7	Yes	Yes	Pass
Sample 8	Yes	Yes	Pass
Sample 9	Yes	Yes	Pass
Sample 10	Yes	Yes	Pass

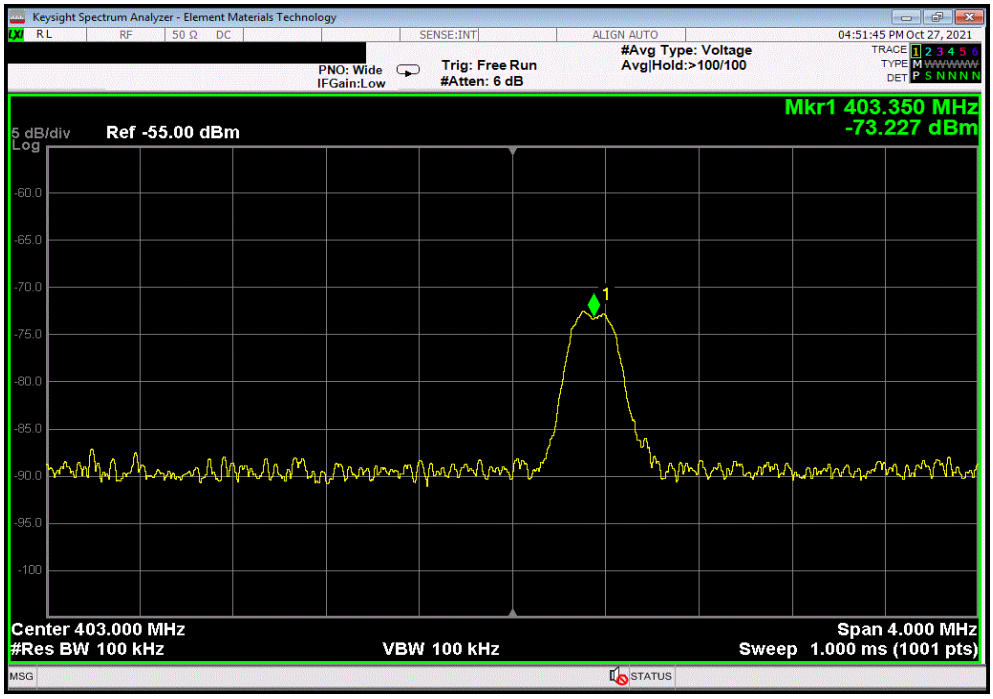
MINIMUM CHANNEL MONITORING PERIOD

XMit 2020.12.30.0

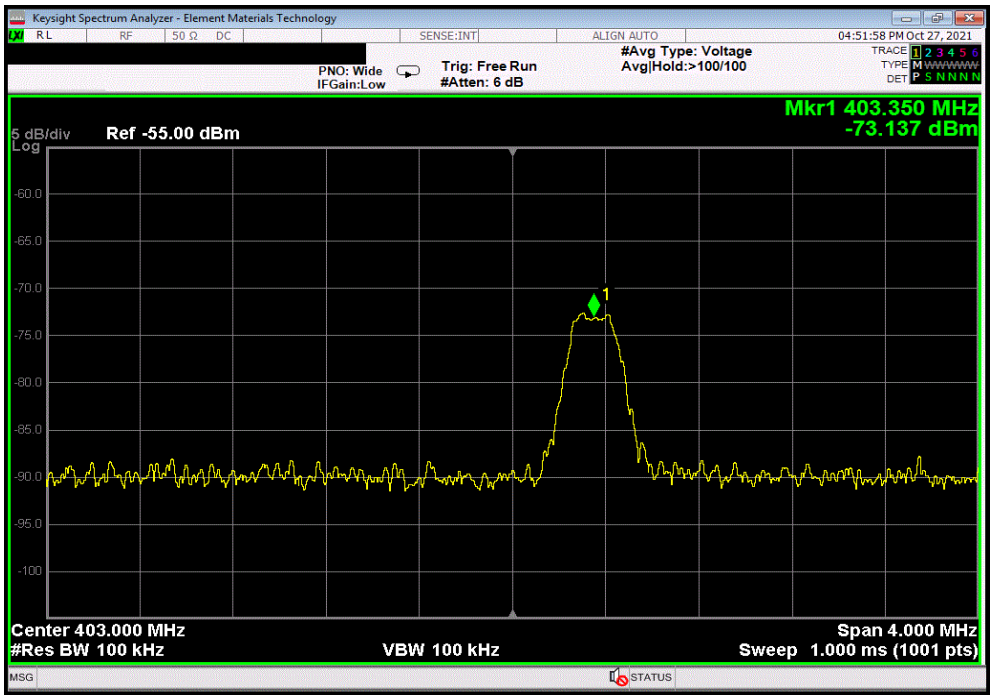
Sample 1							
					Transmit on Channel (Fc)	Limit	Result
					Yes	Yes	Pass



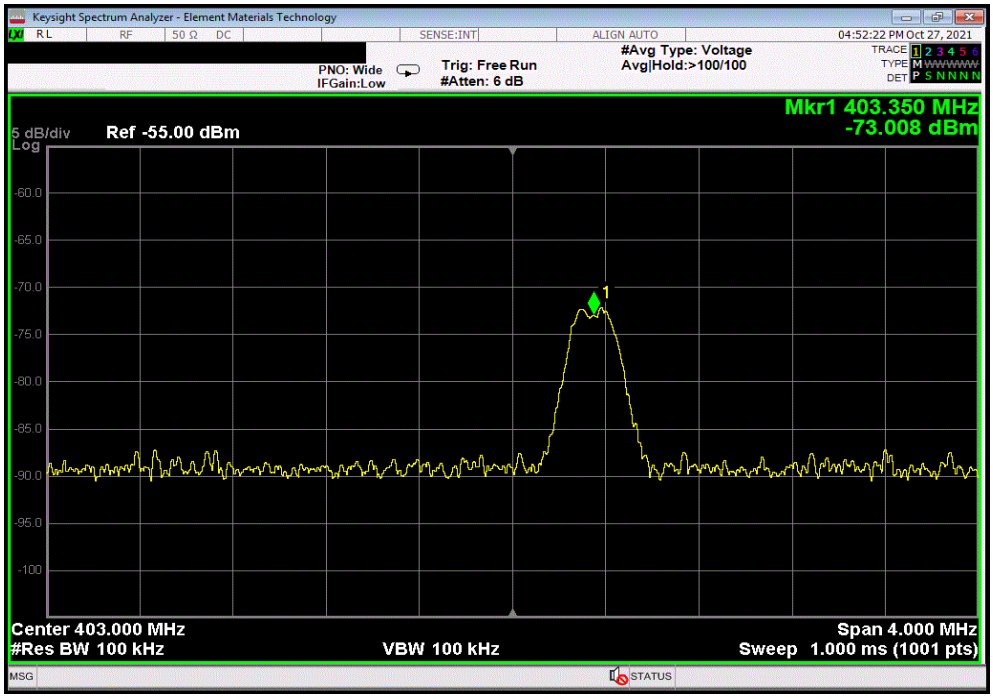
Sample 2							
					Transmit on Channel (Fc)	Limit	Result
					Yes	Yes	Pass



Sample 3						
				Transmit on Channel (Fc)	Limit	Result
				Yes	Yes	Pass



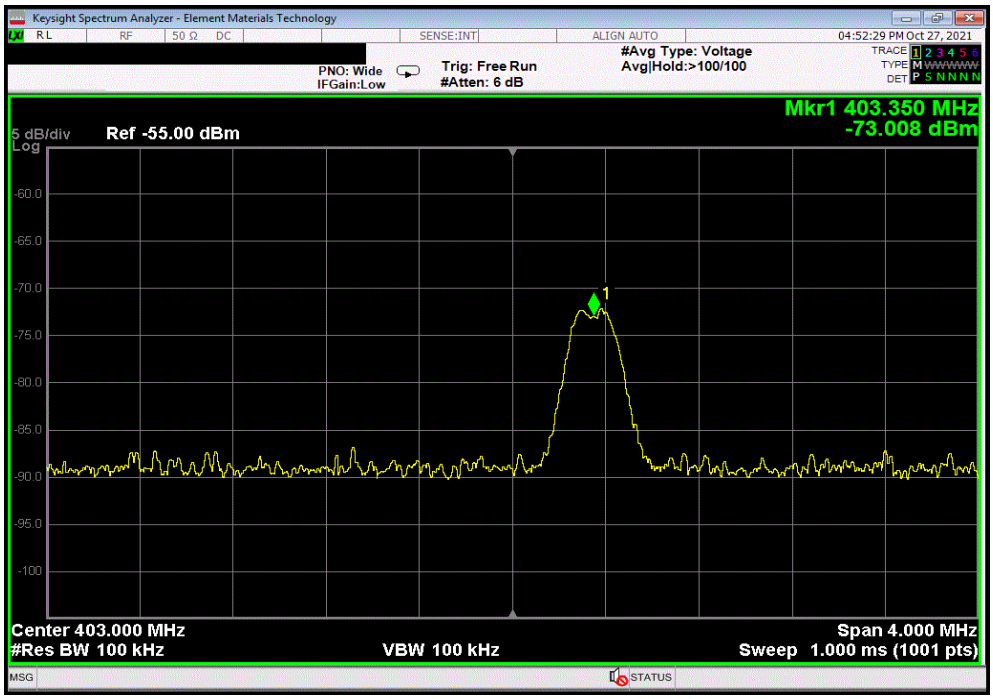
Sample 4						
				Transmit on Channel (Fc)	Limit	Result
				Yes	Yes	Pass



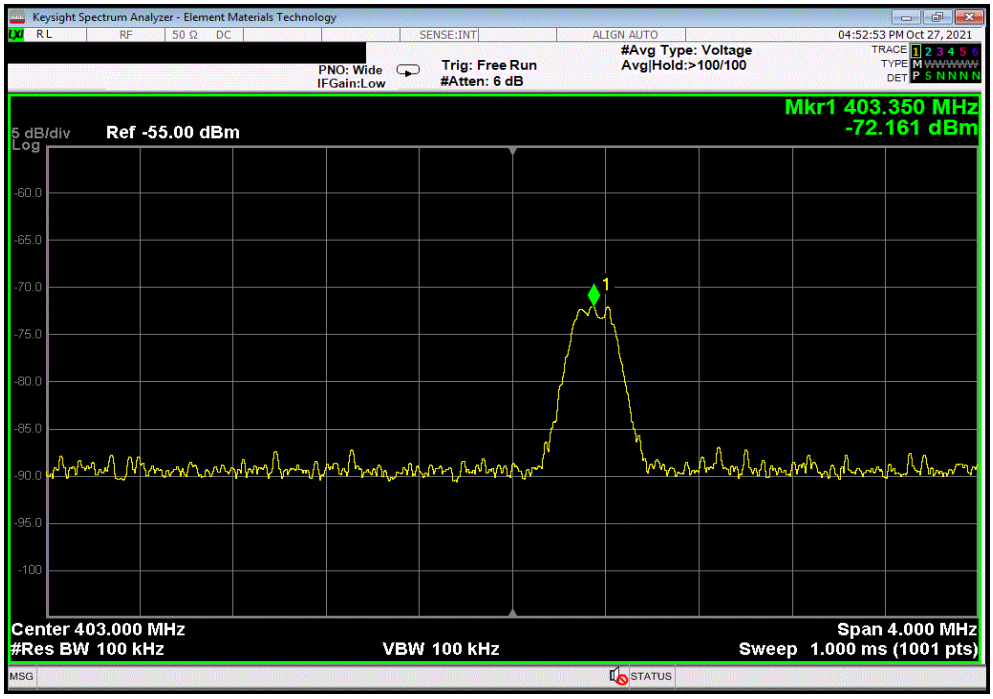
MINIMUM CHANNEL MONITORING PERIOD

XMit 2020.12.30.0

Sample 5						
				Transmit on Channel (Fc)	Limit	Result
				Yes	Yes	Pass



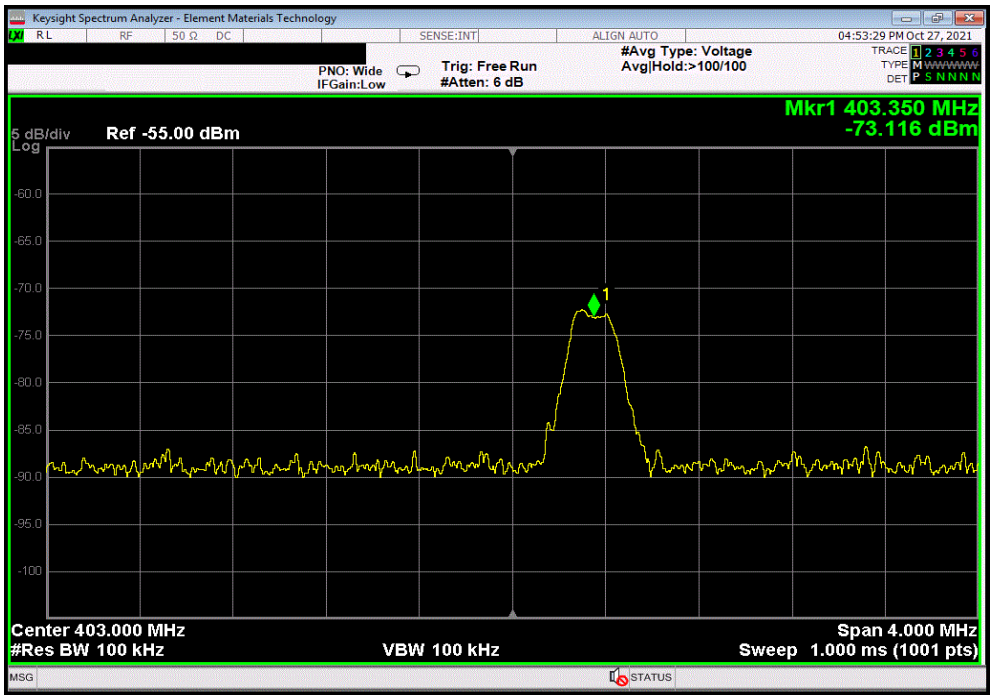
Sample 6						
				Transmit on Channel (Fc)	Limit	Result
				Yes	Yes	Pass



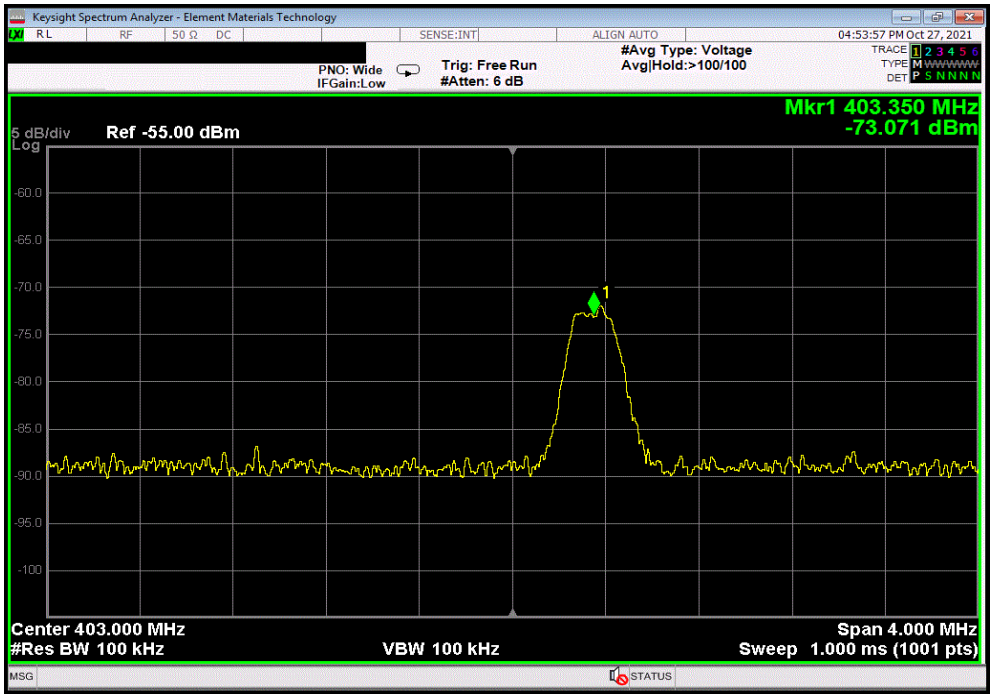
MINIMUM CHANNEL MONITORING PERIOD

XMit 2020.12.30.0

Sample 7						
				Transmit on Channel (Fc)	Limit	Result
				Yes	Yes	Pass



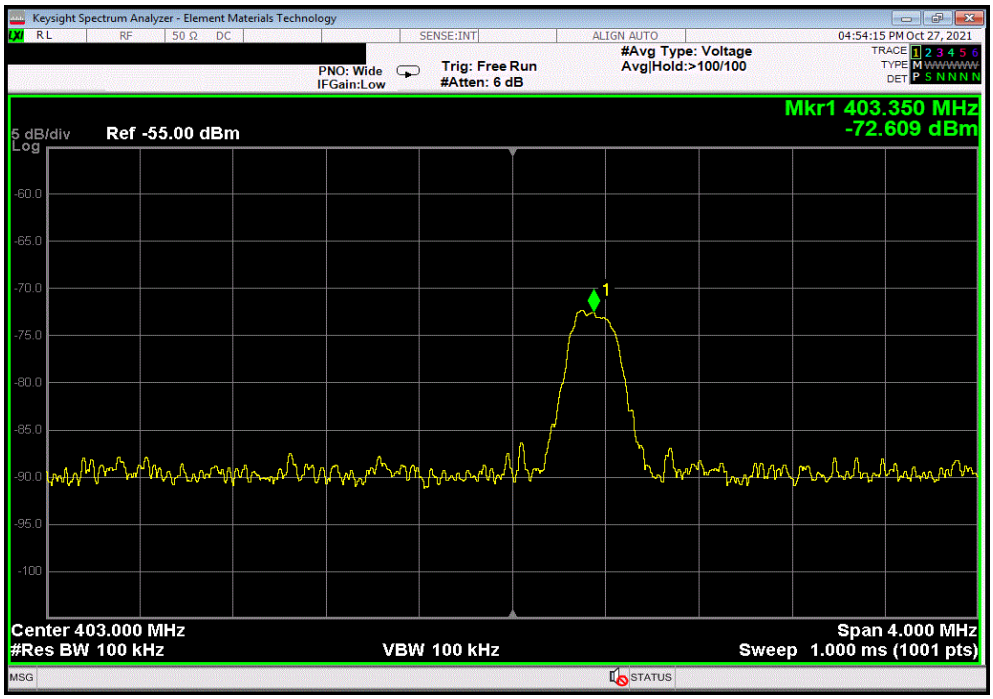
Sample 8						
				Transmit on Channel (Fc)	Limit	Result
				Yes	Yes	Pass



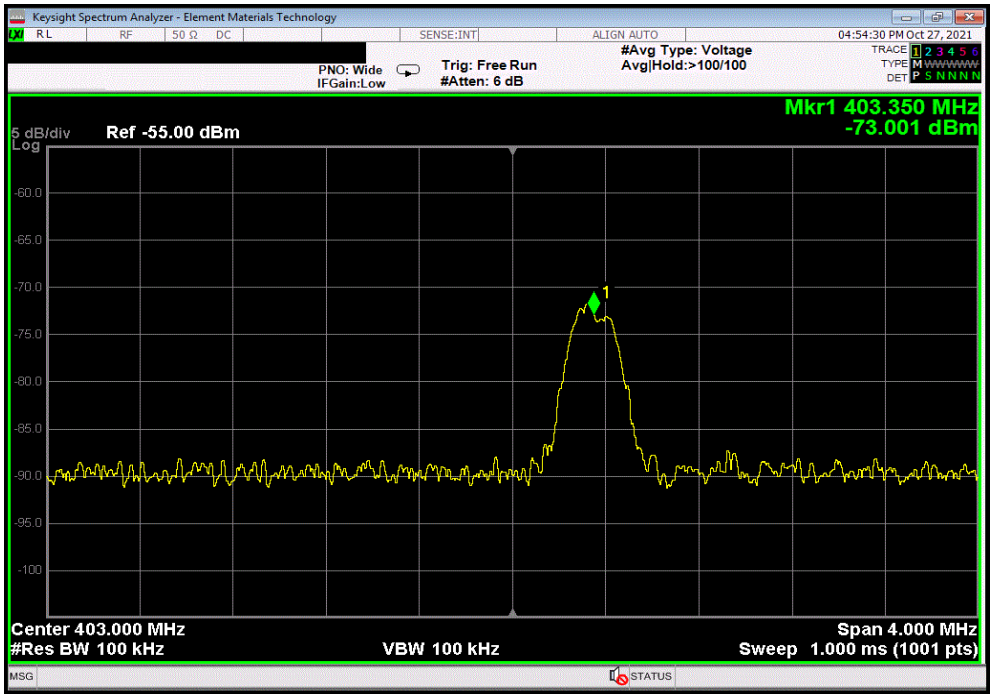
MINIMUM CHANNEL MONITORING PERIOD

XMit 2020.12.30.0

Sample 9						
				Transmit on Channel (Fc)	Limit	Result
				Yes	Yes	Pass



Sample 10						
				Transmit on Channel (Fc)	Limit	Result
				Yes	Yes	Pass



CHANNEL ACCESS BASED ON AMBIENT LEVELS

XMit 2020.12.30.0

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.

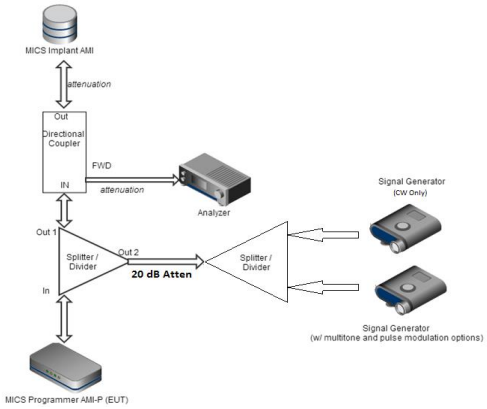
TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Power Splitter/Combiner	Mini-Circuits	ZX 10-2-20-S+	PSF	2021-10-25	2022-10-25
Power Splitter/Combiner	Picosecond Pulse Labs	5350-218	PSG	2021-10-25	2022-10-25
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Generator - Signal	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR
Directional Coupler	Fairview Microwave	SMC4035-10	IRZ	2021-10-25	2022-10-25
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

Per 47 CFR 95.2559(a)(5), MedRadio transmitters that are capable of operating on multiple channels may transmit on the alternate channel accessible by the device with the lowest monitored ambient power level.

The EUT was configured according to the following block diagram:



One signal generator was set to multi-tone operation to cause equal interference across the entire band except for the intended frequency (Fc). The amplitude of the multi-tone signals (out of operation region) were set to 10 dB above the LBT threshold: 10*LOG(Bandwidth) - 150 + Antenna Gain + 10 dB. The multi-tone generator was further configured to provide a least interfered channel (LIC) at amplitude of LBT threshold +3 dB.

The second (CW only) signal generator was configured to the intended frequency (Fc) with the amplitude set to the LBT threshold -3 dB. A communication session was established and the EUT was verified to transmit on Fc.

The amplitude of CW signal generator at Fc was then raised to the LBT threshold + 6 dB. The operating channel of the EUT was verified to transmit on LIC.

The spectrum analyzer was set to measure the transmit band of 402-405 MHz. Screen captures were provided to show the EUT behavior at the different LBT threshold levels.

CHANNEL ACCESS BASED ON AMBIENT LEVELS

XMit 2020.12.30.0

EUT:	**Model 2100 Wireless Transmitter**			**Work Order:**	**MIER0005**
Serial Number:	**00132**			**Date:**	**26-Oct-21**
Customer:	**MicroTransponder, Inc.**			**Temperature:**	**22.8 °C**
Attendees:	**None**			**Humidity:**	**45% RH**
Project:	**None**			**Barometric Pres.:**	**1009.48 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**USB via 110VAC/60Hz**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
EN 301 839 V2.1.1:2016	EN 301 839 V2.1.1:2016
FCC 95I:2021	FCC 95I:2021

COMMENTS

20 dB Bandwidth = 239.021 kHz, Antenna Gain = -12 dBi.

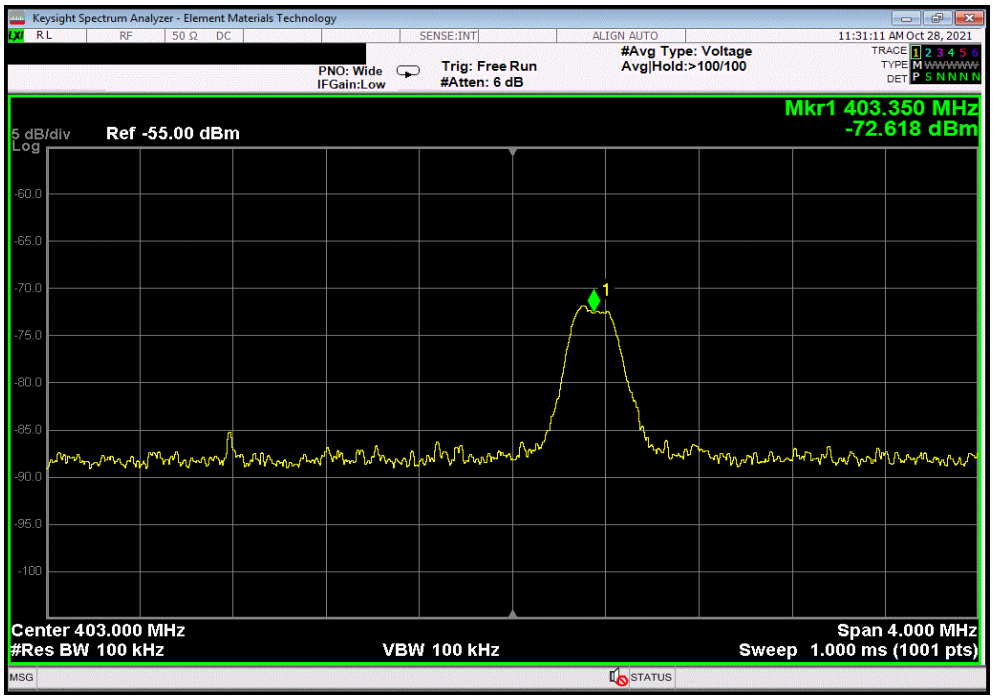
DEVIATIONS FROM TEST STANDARD

None

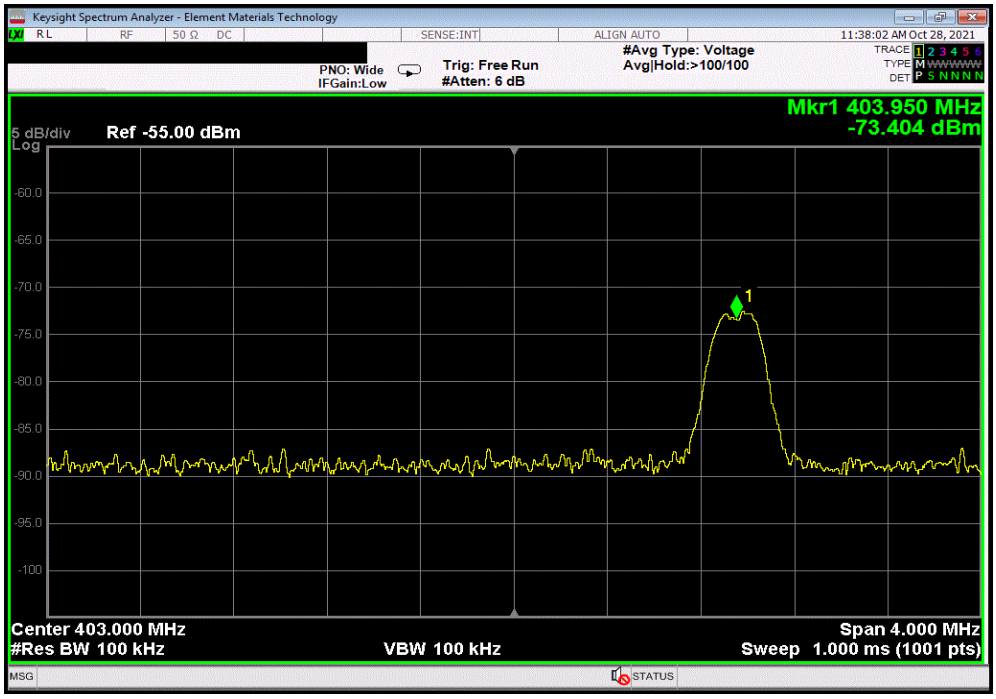
Configuration #	**4**	*Signature*

	Transmit on LIC	**Transmit on Fc**	**Limit (LIC)**	**Result**
Fc LBT Threshold -3 dB	No	Yes	No	Pass
Fc LBT Threshold +6 dB	Yes	No	Yes	Yes

Fc LBT Threshold -3 dB						
			Transmit on LIC	Transmit on Fc	Limit (LIC)	Result
			No	Yes	No	Pass



Fc LBT Threshold +6 dB						
			Transmit on LIC	Transmit on Fc	Limit (LIC)	Result
			Yes	No	Yes	Yes



DISCONTINUATION OF A MICS SESSION

XMit 2020.12.30.0

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.

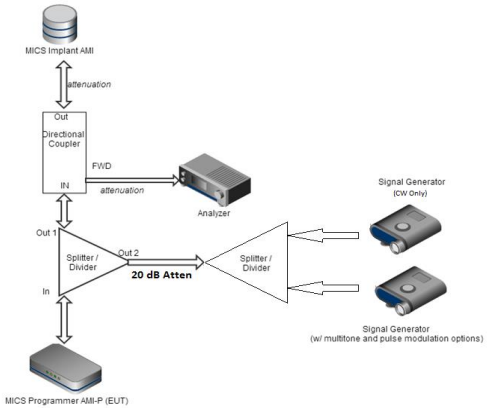
TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Power Splitter/Combiner	Mini-Circuits	ZX 10-2-20-S+	PSF	2021-10-25	2022-10-25
Power Splitter/Combiner	Picosecond Pulse Labs	5350-218	PSG	2021-10-25	2022-10-25
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Generator - Signal	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR
Directional Coupler	Fairview Microwave	SMC4035-10	IRZ	2021-10-25	2022-10-25
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

Per 47 CFR 95.2557(a), MedRadio transmitters may transmit in the 401-406 MHz band in accordance with the provisions of § 95.2559(a) for no more than 5 seconds without the communications of data.

The EUT was configured according to the following block diagram:



One signal generator was set to multi-tone operation to cause equal interference across the entire band. The amplitude of the multi-tone signals (out of operation region) were set to the LBT threshold of 10*LOG(Bandwidth) - 150 + Antenna Gain + 10 dB. The multi-tone generator was further configured to provide a least interfered channel (LIC) at amplitude of LBT threshold +3 dB.

The second (CW only) signal generator was configured to the intended frequency (Fc) with the amplitude set to the LBT threshold + 6 dB. A communication session was established between the EUT and the MICS Implant AMI

The spectrum analyzer was zero span to measure the time between the removal of the MICS Implant AMI and when the EUT does not transmit on the LIC.

As the MICS Implant AMI was removed, the Fc was set to the LBT threshold -3 dB. The MICS implant was added back to the setup and communication was re-established.

It was verified the initial communication channel was the LIC, the time between the MICS Implant AMI being removed from the field and communication attempts on the LIC channel was less than 5 seconds, and that the communication channel after communication was re-established was not on the LIC.

DISCONTINUATION OF A MICS SESSION

element

XMit 2020.12.30.0

EUT:	**Model 2100 Wireless Transmitter**			**Work Order:**	**MIER0005**
Serial Number:	**00132**			**Date:**	**26-Oct-21**
Customer:	**MicroTransponder, Inc.**			**Temperature:**	**23.4 °C**
Attendees:	**None**			**Humidity:**	**44.3% RH**
Project:	**None**			**Barometric Pres.:**	**1014 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**USB via 110VAC/60Hz**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
EN 301 839 V2.1.1:2016	EN 301 839 V2.1.1:2016
FCC 95I:2021	FCC 95I:2021

COMMENTS

20 dB Bandwidth = 239.021 kHz, Antenna Gain = -12 dBi.

DEVIATIONS FROM TEST STANDARD

None

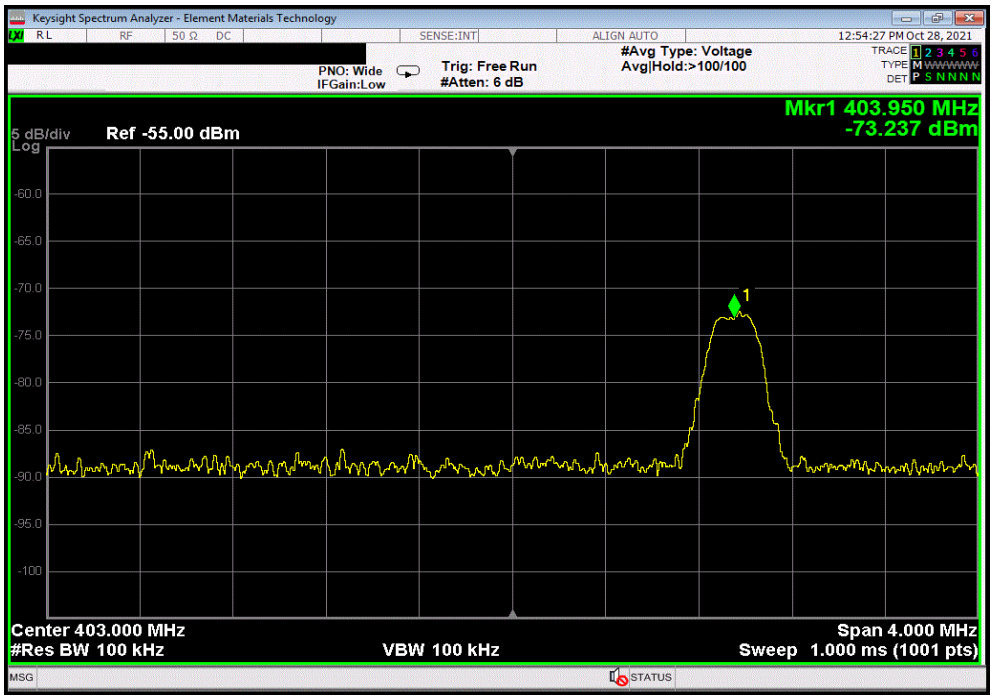
Configuration #	**4**	*Signature*

	Transmit on Channel (LIC)	Transmit on Channel (Fc)	Value (Second)	Transmit on LIC (Limit)	Transmit on Fc (Limit)	Limit < (Second)	Result
LIC	Yes	N/A	N/A	Yes	N/A	N/A	Pass
20s Sweep	Yes	N/A	3.02	Yes	N/A	5	Pass
Fc	N/A	Yes	N/A	N/A	Yes	N/A	Pass

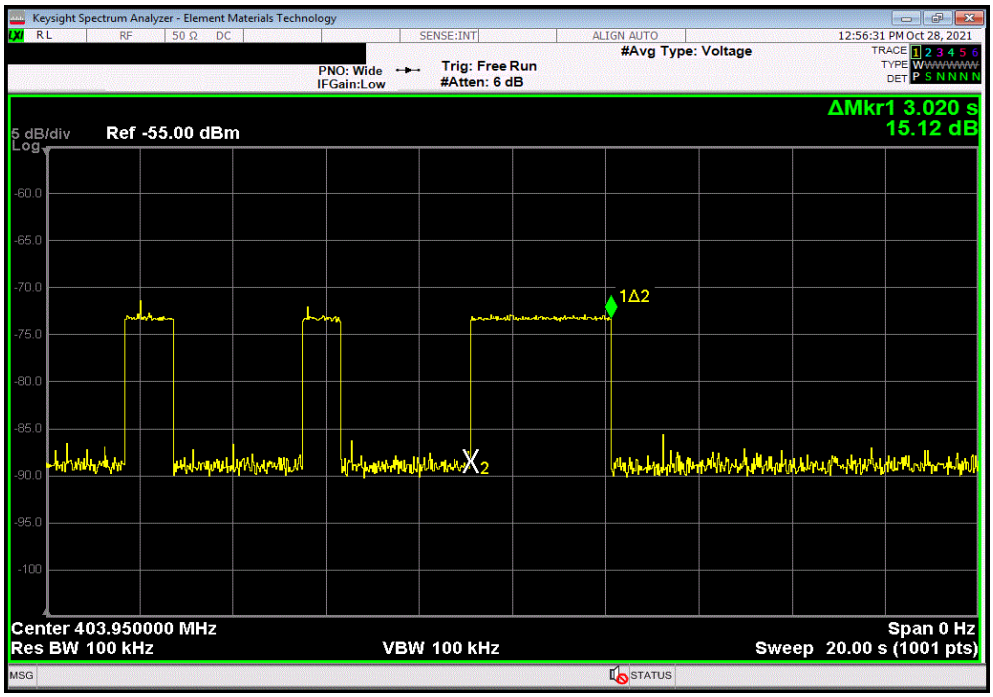
DISCONTINUATION OF A MICS SESSION

XMit 2020.12.30.0

LIC						
Transmit on Channel (LIC)	Transmit on Channel (Fc)	Value (Second)	Transmit on LIC (Limit)	Transmit on Fc (Limit)	Limit < (Second)	Result
Yes	N/A	N/A	Yes	N/A	N/A	Pass



20s Sweep						
Transmit on Channel (LIC)	Transmit on Channel (Fc)	Value (Second)	Transmit on LIC (Limit)	Transmit on Fc (Limit)	Limit < (Second)	Result
Yes	N/A	3.02	Yes	N/A	5	Pass

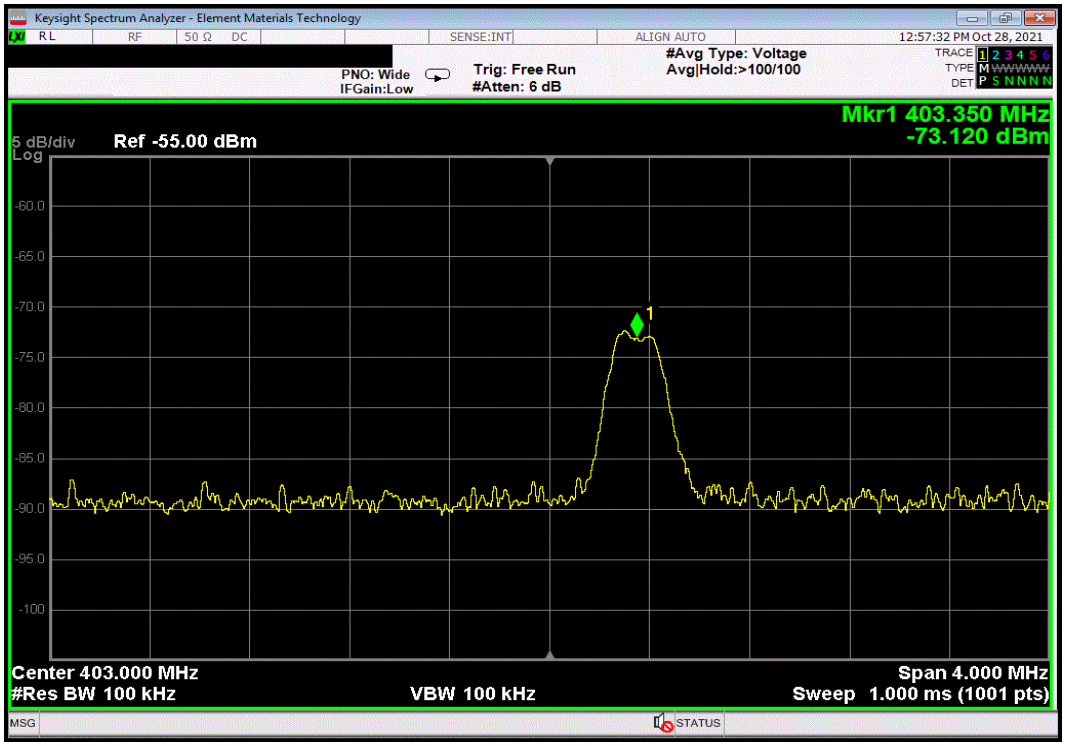


DISCONTINUATION OF A MICS SESSION

element

XMit 2020.12.30.0

Fc						
Transmit on Channel (LIC)	Transmit on Channel (Fc)	Value (Second)	Transmit on LIC (Limit)	Transmit on Fc (Limit)	Limit < (Second)	Result
N/A	Yes	N/A	N/A	Yes	N/A	Pass



USE OF PRE-SCANNED ALTERNATIVE CHANNEL

XMit 2020.12.30.0

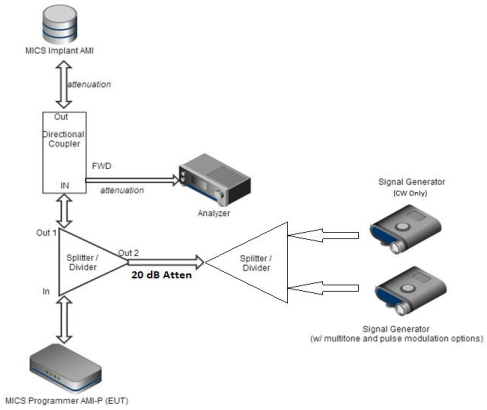
Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this 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	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Power Splitter/Combiner	Mini-Circuits	ZX 10-2-20-S+	PSF	2021-10-25	2022-10-25
Power Splitter/Combiner	Picosecond Pulse Labs	5350-218	PSG	2021-10-25	2022-10-25
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Generator - Signal	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR
Directional Coupler	Fairview Microwave	SMC4035-10	IRZ	2021-10-25	2022-10-25
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

The EUT was configured according to the following block diagram:



One signal generator was set to multi-tone operation to cause equal interference across the entire band. The amplitude of the multi-tone signals (out of operation region) were set to the LBT threshold of 10*LOG(Bandwidth) - 150 + Antenna Gain + 10 dB. The multi-tone generator was further configured provide a least interfered channel (LIC) with amplitude set to the LBT threshold + 3 dB.

The second (CW only) signal generator was configured to the intended frequency (Fc) with the amplitude set to the LBT threshold - 3 dB. A communication session was established between the EUT and the MICS implant AMI and it was verified to transmit on Fc.

While the session was still active a second least interfered channel (LIC2) was configured on the multi-tone generator with amplitude set to the LBT threshold - 2 dB. The amplitude of the CW only generator operating on Fc was then raised to the LBT threshold + 6 dB.

The spectrum analyzer was set to measure the transmit band of 402-405 MHz. Screen captures were provided to show the EUT behavior. The EUT was verified to transmit on LIC2, which shows that the EUT does not use pre-scanned alternate channels. Thus no further tests are necessary to meet 47 CFR 95.2559(a)(6) and EN 301 839 section 4.2.3.1.1.

USE OF PRE-SCANNED ALTERNATIVE CHANNEL

XMit 2020.12.30.0

EUT:	**Model 2100 Wireless Transmitter**			**Work Order:**	**MIER0005**
Serial Number:	**00132**			**Date:**	**26-Oct-21**
Customer:	**MicroTransponder, Inc.**			**Temperature:**	**23.4 °C**
Attendees:	**None**			**Humidity:**	**44.3% RH**
Project:	**None**			**Barometric Pres.:**	**1014 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**USB via 110VAC/60Hz**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
EN 301 839 V2.1.1:2016	EN 301 839 V2.1.1:2016
FCC 95I:2021	FCC 95I:2021

COMMENTS

20 dB Bandwidth = 239.021 kHz, Antenna Gain = -12 dBi.

DEVIATIONS FROM TEST STANDARD

None

Configuration #	**4**	*Signature*

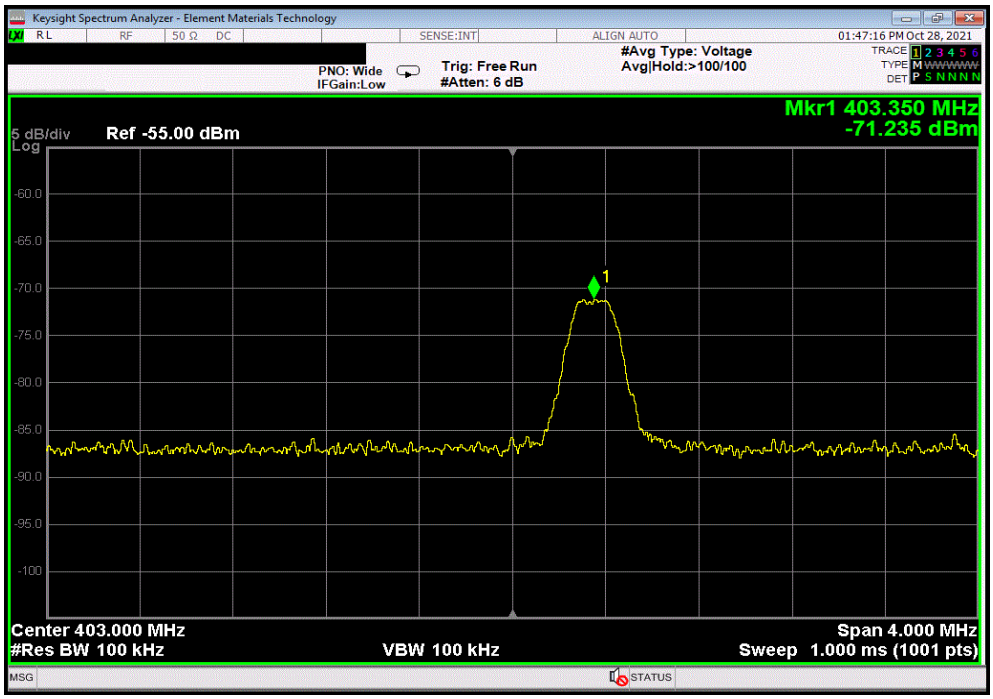
	Transmit on LIC	**Transmit on LIC2**	**Transmit on Fc**	**Limit**	**Result**
Initial on Fc	No	No	Yes	N/A	N/A
LIC2 Available	No	Yes	No	N/A	N/A

USE OF PRE-SCANNED ALTERNATIVE CHANNEL

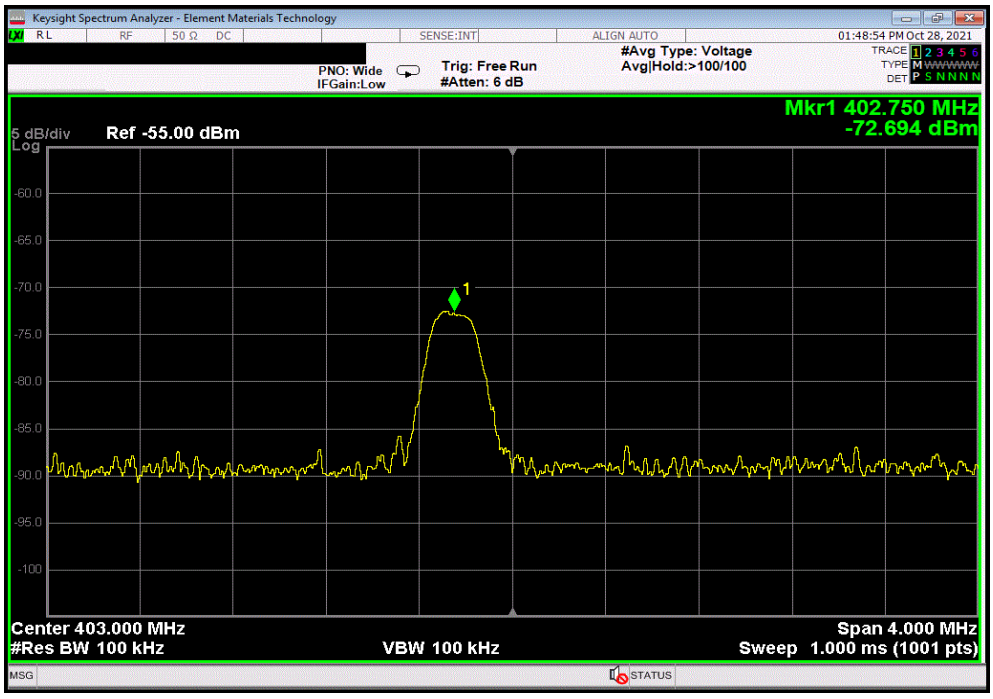
element

XMit 2020.12.30.0

Initial on Fc						
		Transmit on LIC	Transmit on LIC2	Transmit on Fc	Limit	Result
		No	No	Yes	N/A	N/A



LIC2 Available						
		Transmit on LIC	Transmit on LIC2	Transmit on Fc	Limit	Result
		No	Yes	No	N/A	N/A



End of Test Report