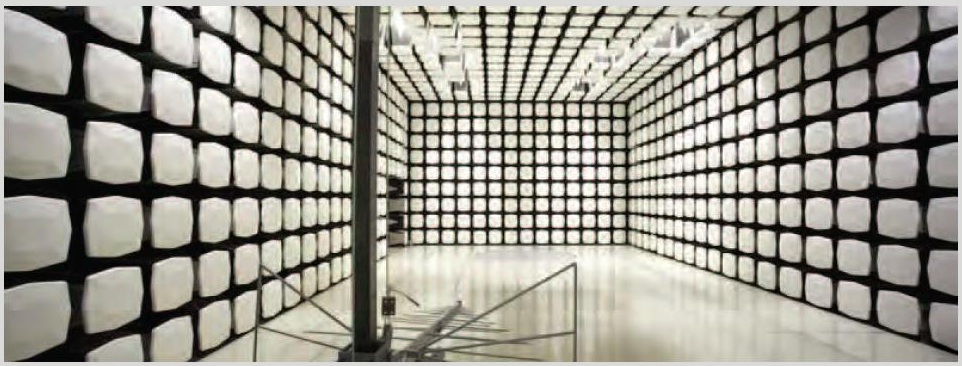
NAL Research Corporation

SHOUT sp Handheld Iridium Smartphone

FCC 25 Subpart C:2021

1.6 GHz Satellite Radio

Report: PCTE0003.1 Rev. 1, Issue Date: June 2, 2022



NVLAP LAB CODE: 200630-0

CERT #3310.02

CERTIFICATE OF TEST

Last Date of Test: October 1, 2021
NAL Research Corporation
EUT: SHOUT sp Handheld Iridium Smartphone

Radio Equipment Testing

Standards

Specification	Method
FCC 25 Subpart C: 2021	ANSI C63.26:2015

Results

Specification clause	Method Clause	Test Description	Applied	Results	Comments
N/A	5.2.4.3.4	Duty Cycle	Yes	N/A	Characterization of radio operation
2.1046	5.2.4.3.2	Conducted Output Power	Yes	N/A	Characterization of radio operation
25.204	5.2.4.5	Power Spectral Density	Yes	Pass	
2.1049	5.4	Occupied Bandwidth	Yes	Pass	
25.202 (f)	5.5	Spurious Radiated Emissions	Yes	Pass	
25.202 (d)	5.6	Frequency Stability	Yes	Pass	
25.202 (f)	5.7	Spurious Emissions at the Antenna Terminals	Yes	Pass	
25.202	5.7	Spurious Emissions at the Antenna Terminals - Emissions Mask	Yes	Pass	
25.216	5.7	Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio navigation-Satellite Service	Yes	Pass	
2.1047 (d)	N/A	Modulation characteristics	No	N/A	Not required to test. Assumes manufacturer will support this requirement through an attestation

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 both accreditations bodies to the report to reflect Elements transitions to A2LA	2021-09-03	1, 3-6
	The test description has been updated for carrier off state from -70dBW to -80 dBW	2022-05-17	57
	Added screen captures for 25.216c, which covers the 1559 - 1605 MHz range	2022-05-17	59, 61, 63
	Changed Output Power test name to Power Spectral Density.	2022-05-17	27-30
	Removed extraneous copy and paste values under the last screen capture.	2022-05-17	45
	Changed the rule from FCC PART 25:2021 to FCC Part 25 Subpart C:2022, and 1.6 GHz Cellular radio to 1.6 GHz Satellite radio	2022-05-17	1
	Added Duty Cycle as a line item and added the rule parts	2022-05-17	2
	Removed cellular and added "satellite" to the functional description, and testing objective.	2022-05-17	11
	Updated EUT Model Number	2022-05-17	13-15
	Antenna and power settings have been added to the report.	2022-05-17	12
	Updated calibration info for equipment code TLE	2022-05-17	31
	Added duty cycle data module	2022-05-17	17-21
	Corrected the spelling error.	2022-05-17	28
	Updated the CoT to include Power Spectral Density	2022-05-17	2
	Added the authorized bandwidth and mask values from 25.202(f) to the test description.	2022-05-17	53
	Values are now a %, the test description has been updated as well.	2022-05-17	38 - 45
	The resultant value is now based off the assigned frequency.	2022-05-17	39 - 45
	Updated the test description to better fit how the measurement was performed.	2022-05-17	30
	The limit line color has been corrected to an AVG limit.	2022-05-17	36
	Updated block diagram added to the report.	2022-05-17	8-10

ACCREDITATIONS AND AUTHORIZATIONS

element
2021.02.26

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.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

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.

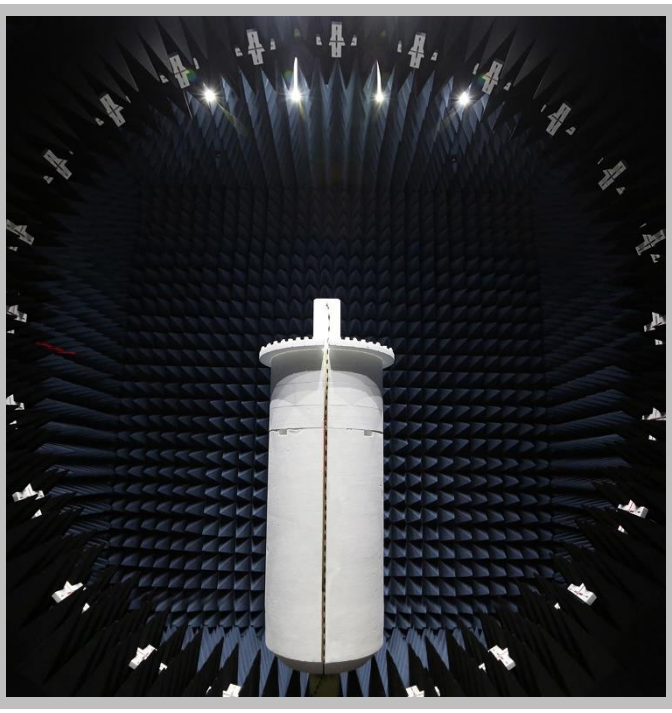
SCOPE

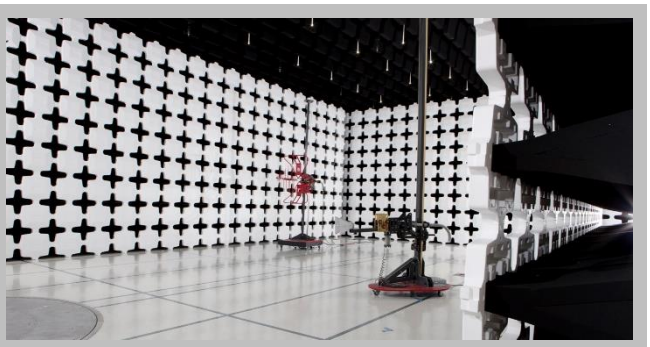
For details on the Scopes of our Accreditations, please visit:

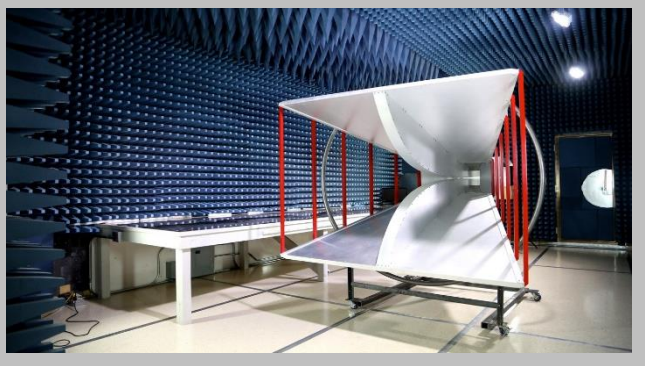
California Minnesota Oregon Texas Washington

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
NVLAP				
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
BSMI				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI				
A-0029	A-0109	A-0108	A-0201	A-0110
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157







MEASUREMENT UNCERTAINTY

element
TMU.2015.07.10

Measurement Uncertainty

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

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

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

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

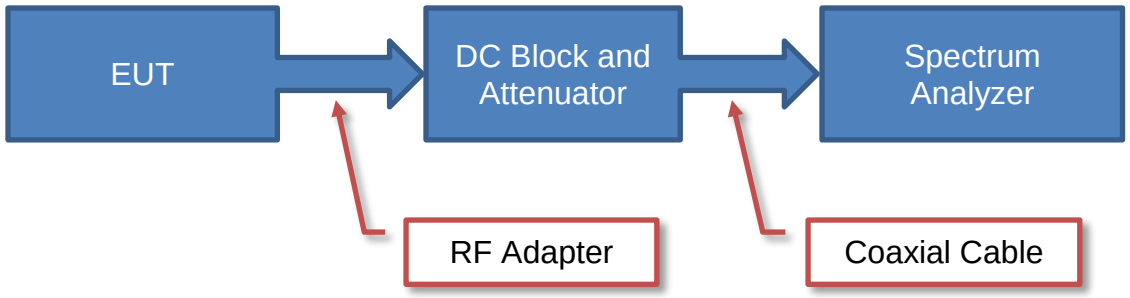
TEST SETUP BLOCK DIAGRAMS

Measurement Bandwidths

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

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

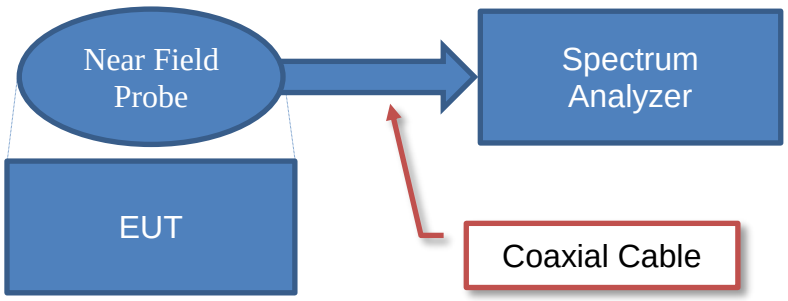
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

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

Near Field Test Fixture Measurements

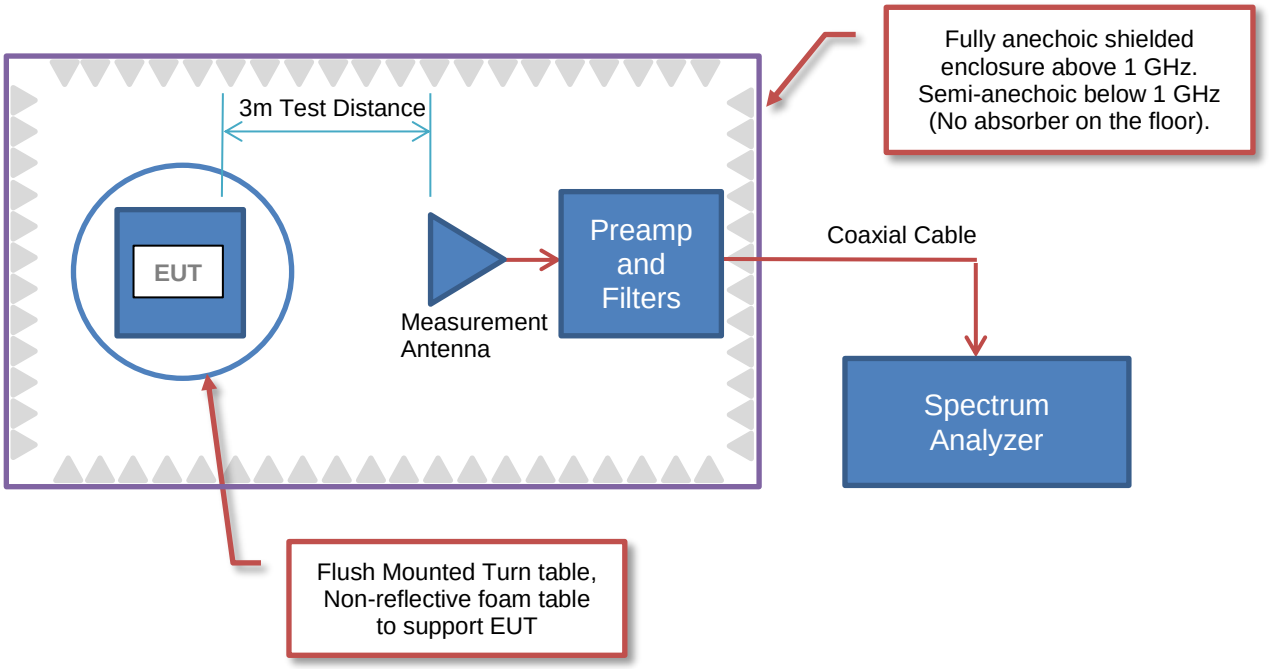


Sample Calculation (logarithmic units)

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

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

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

Conducted Emissions:

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

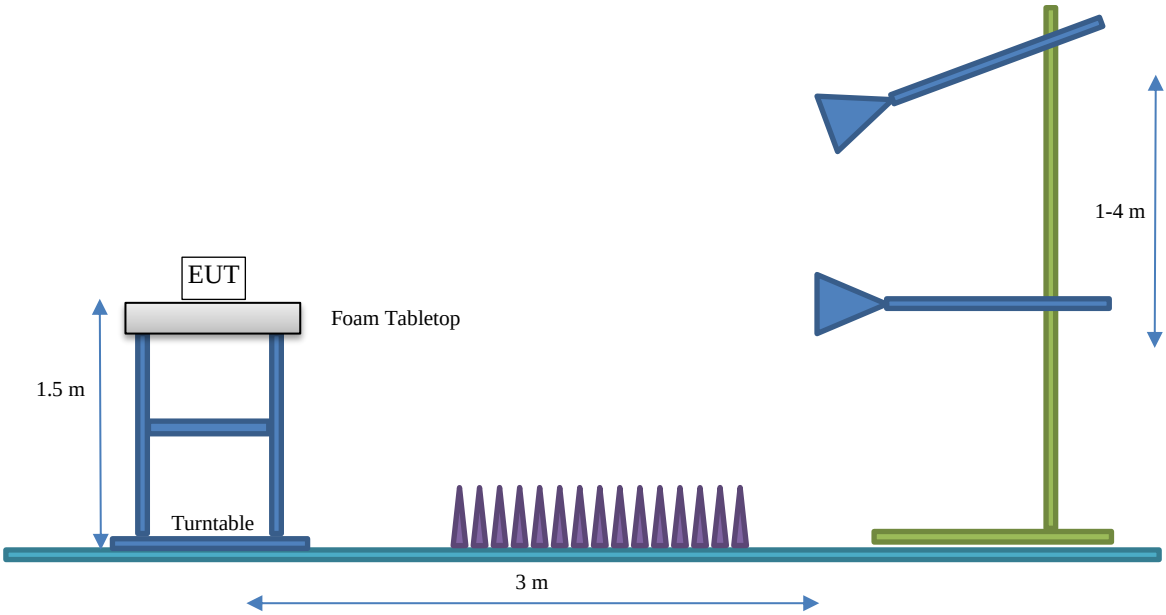
Radiated Power (ERP/EIRP):

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

TEST SETUP BLOCK DIAGRAMS

Bore Sighting (>1GHz)

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



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	NAL Research Corporation
Address:	11100 Endeavor Ct Suite 300
City, State, Zip:	Manassas, VA 20109
Test Requested By:	Andy Shiltz
EUT:	SHOUT sp Handheld Iridium Smartphone
First Date of Test:	May 27, 2021
Last Date of Test:	October 1, 2021
Receipt Date of Samples:	May 27, 2021
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Handheld Iridium Smartphone with 1.6 GHz satellite radio and 802.11bgn / Bluetooth FHSS and BLE radios. FCC ID: 2AXMS-SHOUTSPR1 Equipment class: TNE

Testing Objective:
To demonstrate compliance of the satellite radio to FCC part 25 requirements.

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)	Gain (dBi)
RHCP helical decafilar	Manufacturer	1616-1626.5	2.74

The EUT was tested using the maximum power settings.

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types	Position	Frequency (MHz)	Power Setting (dBm)
DE-QPSK	Low Channel	1616.020833	37.7
	Mid Channel	1621.020833	37.7
	High Channel	1625.979167	37.7

CONFIGURATIONS

Configuration PCTE0003- 2

Software/Firmware Running during test	
Description	**Version**
Iridium TX Tester	1.0.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
SHOUT sp Handheld Iridium Smartphone	NAL Research Corporation	433-93281-001	FCC 1

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Inspiron	20976051206
AC/DC Adapter	Dell	LA45NM140	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable (Power)	Yes	1.0 m	No	SHOUT sp Handheld Iridium Smartphone	Laptop
USB Cable x2	Yes	1.1 m	No	SHOUT sp Handheld Iridium Smartphone	Unterminated
AC Power	No	1.0 m	No	AC/DC Adapter	AC Power
DC Power	No	1.8 m	No	AC/DC Adapter	Laptop
USB Cable (com)	Yes	1.1 m	No	SHOUT sp Handheld Iridium Smartphone	Laptop

CONFIGURATIONS

Configuration PCTE0003- 6

Software/Firmware Running during test	
Description	**Version**
Iridium TX Tester	1.0.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
SHOUT sp Handheld Iridium Smartphone	NAL Research Corporation	433-93281-001	FCC 2

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Latitude E5450	5z9B063
Earbuds	Betron	MK23	None
AC Adapter	Dell	LA65NM130	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Extension Cable	Yes	1.1 m	No	USB Cable	Laptop
USB Cable x2	Yes	1.1 m	No	SHOUT sp Handheld Iridium Smartphone	Unterminated
USB Cable	Yes	1.1 m	No	SHOUT sp Handheld Iridium Smartphone	USB Extension Cable
Headphones	No	1.2 m	No	Earbuds	SHOUT sp Handheld Iridium Smartphone
USB Cable (Power)	Yes	1.8 m	No	SHOUT sp Handheld Iridium Smartphone	Laptop
DC Power	No	2.0 m	No	Laptop	AC Adapter
AC Power	No	1.0 m	No	AC Adapter	AC Power

CONFIGURATIONS

Configuration PCTE0003- 7

Software/Firmware Running during test	
Description	**Version**
Iridium TX Tester	1.0.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
SHOUT sp Handheld Iridium Smartphone	NAL Research Corporation	433-93281-001	FCC 1

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Inspiron	20976051206
AC/DC Adapter	Dell	LA45NM140	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable (com)	Yes	1.1 m	No	Phone	USB extension
USB Cable x2	Yes	1.1 m	No	SHOUT sp Handheld Iridium Smartphone	Unterminated
AC Power	No	1.0 m	No	AC/DC Adapter	AC Power
DC Power	No	1.8 m	No	AC/DC Adapter	Laptop
USB Extension Cable	Yes	1.1 m	No	USB Cable	Laptop
DC Power	No	2.0 m	No	SHOUT sp Handheld Iridium Smartphone	Lab DC power supply

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-05-27	Occupied 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.
2	2021-05-27	Conducted Output Power	Tested as delivered to Test Station	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2021-05-27	Spurious Emissions at the Antenna Terminals	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	2021-08-25	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.
5	2021-08-27	Frequency Stability	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	2021-09-29	Power Spectral Density	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	2021-10-01	Spurious Emissions at the Antenna Terminals – Emissions Masks	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2021-10-01	Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radionavigation-Satellite Service	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

DUTY CYCLE

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
Cable	Micro-Coax	D150A-1-0720-200	EVH	2021-03-14	2022-03-14
Attenuator	Fairview Microwave	SA18N5WA-30	TLE	2021-07-22	2022-07-22
Attenuator	Fairview Microwave	SA18N5WA-20	TWD	2021-02-16	2022-02-16
Block - DC	Fairview Microwave	SD3074	AMF	NCR	NCR
Generator - Signal	Agilent	E8257D	TGX	2020-01-07	2022-01-07
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	2021-04-08	2022-04-08

TEST DESCRIPTION

The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

There is no compliance requirement to be met by this test, so therefore no Pass / Fail criteria.

The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum.

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

If the transmit duty cycle < 98 percent, burst gating may have been used during some of the other tests in this report to only take the measurement during the burst duration.

DUTY CYCLE

TbtTx 2021.03.19.1 XMit 2020.12.30.0

EUT:	**SHOUT sp Handheld Iridium Smartphone**			**Work Order:**	**PCTE0003**
Serial Number:	**Sample 1**			**Date:**	**27-May-21**
Customer:	**NAL Research Corporation**			**Temperature:**	**23.2 °C**
Attendees:	**None**			**Humidity:**	**46.1% RH**
Project:	**None**			**Barometric Pres.:**	**1024 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**5.0 VDC via USB**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 25:2021	ANSI C63.26:2015

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

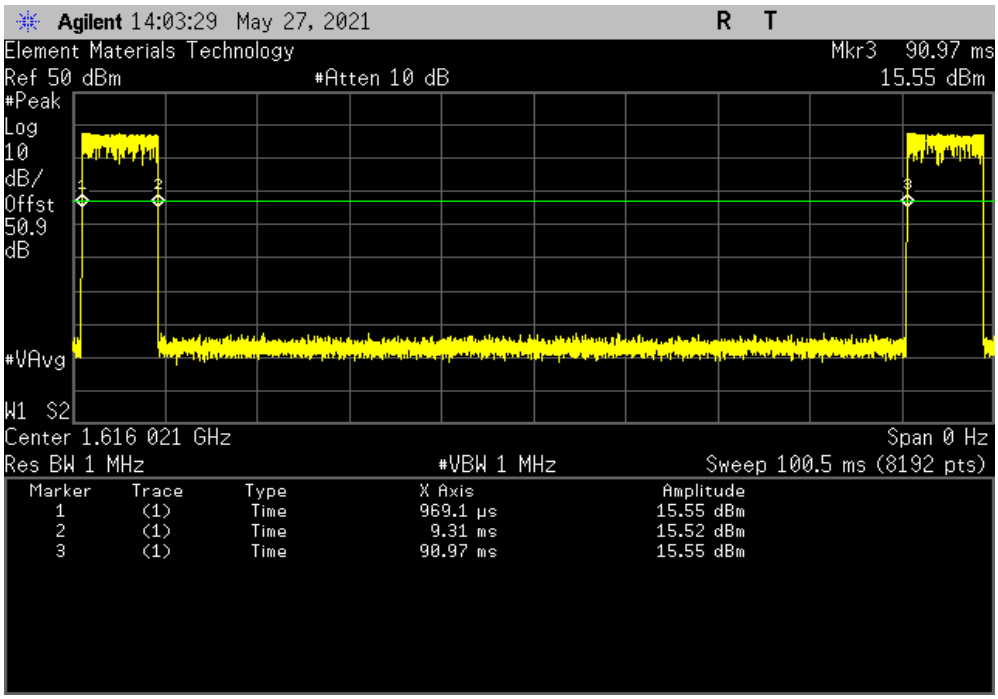
None

Configuration #	**2**	*Signature*

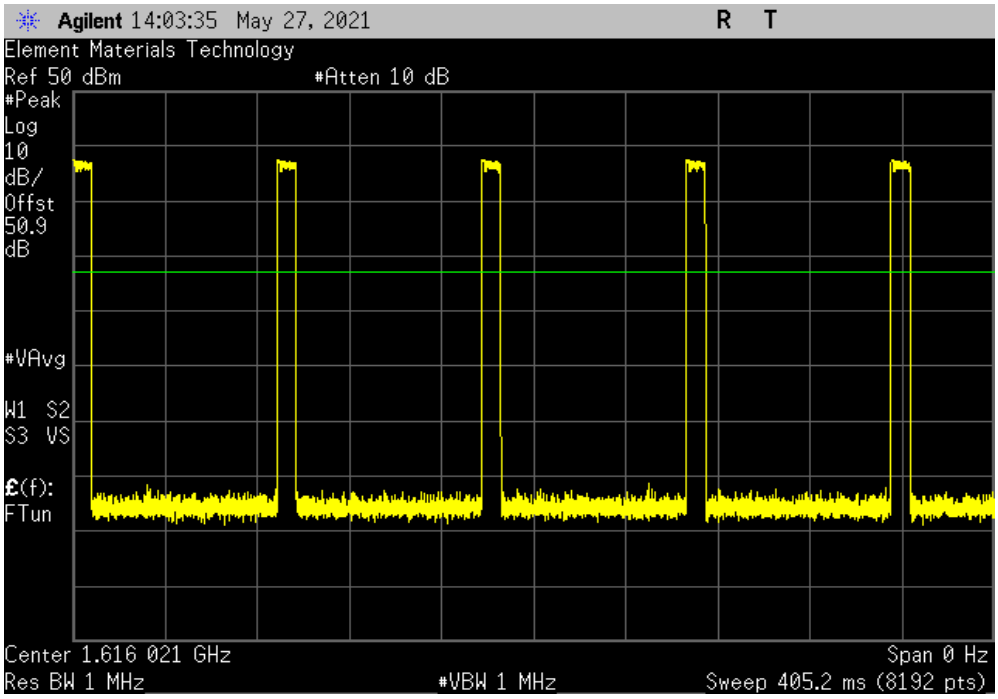
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
Transmit, DE-QPSK						
Low Ch. 1, 1616.020833 MHz	8.341 ms	89.999 ms	1	9.3	N/A	N/A
Low Ch. 1, 1616.020833 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Ch. 121, 1621.020833 MHz	8.283 ms	90.006 ms	1	9.2	N/A	N/A
Mid Ch. 121, 1621.020833 MHz	N/A	N/A	5	N/A	N/A	N/A
High Ch. 240, 1625.979167 MHz	8.301 ms	90.006 ms	1	9.2	N/A	N/A
High Ch. 240, 1625.979167 MHz	N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE

Transmit, DE-QPSK, Low Ch. 1, 1616.020833 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	8.341 ms	89.999 ms	1	9.3	N/A	N/A

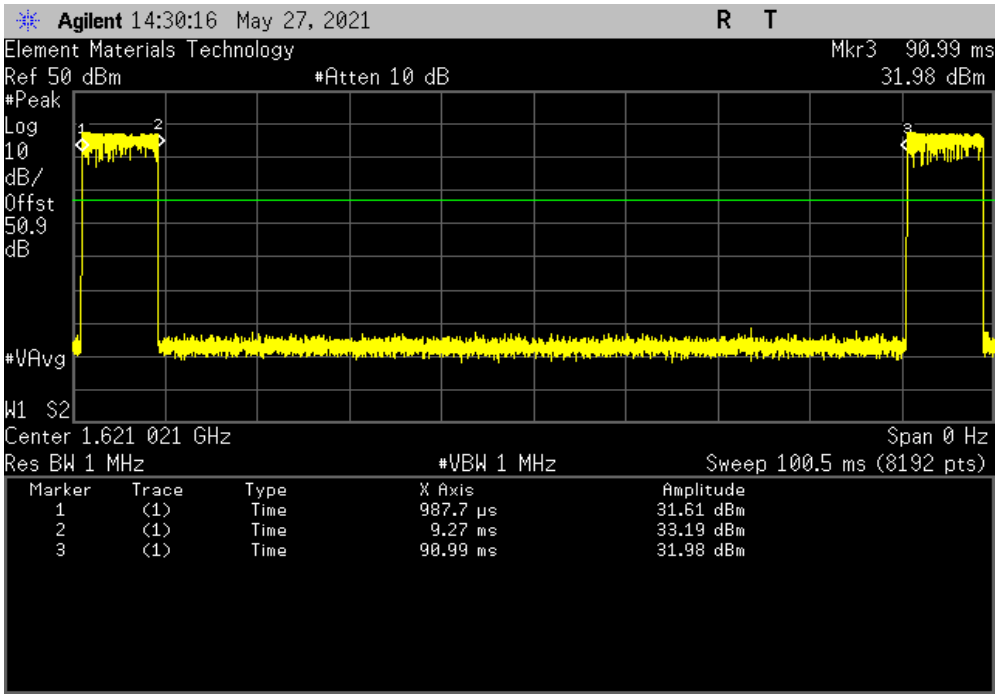


Transmit, DE-QPSK, Low Ch. 1, 1616.020833 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

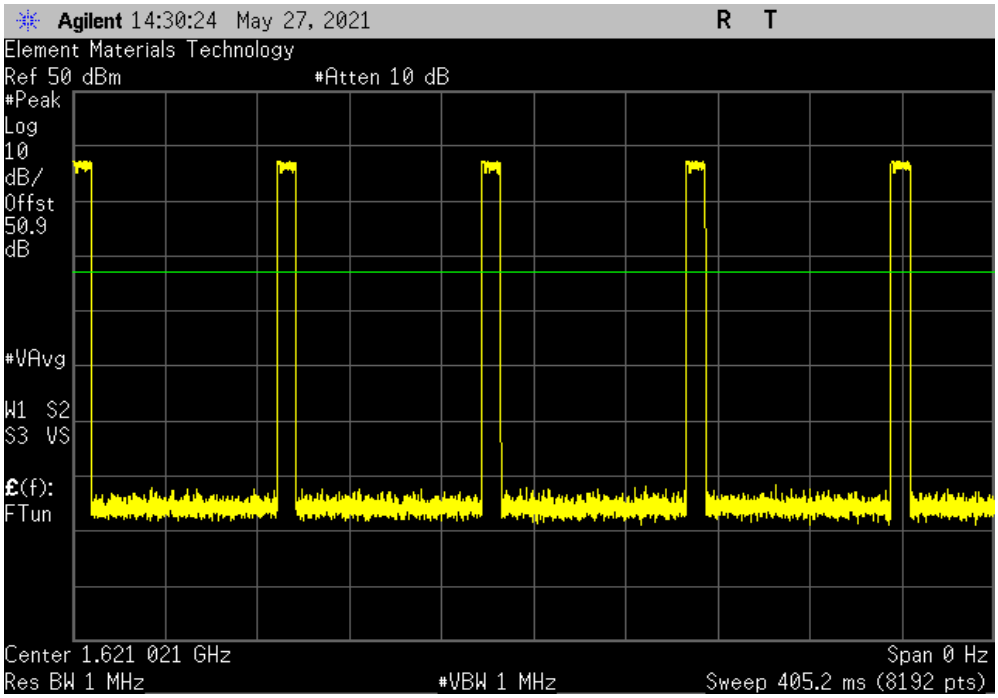


DUTY CYCLE

Transmit, DE-QPSK, Mid Ch. 121, 1621.020833 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	8.283 ms	90.006 ms	1	9.2	N/A	N/A

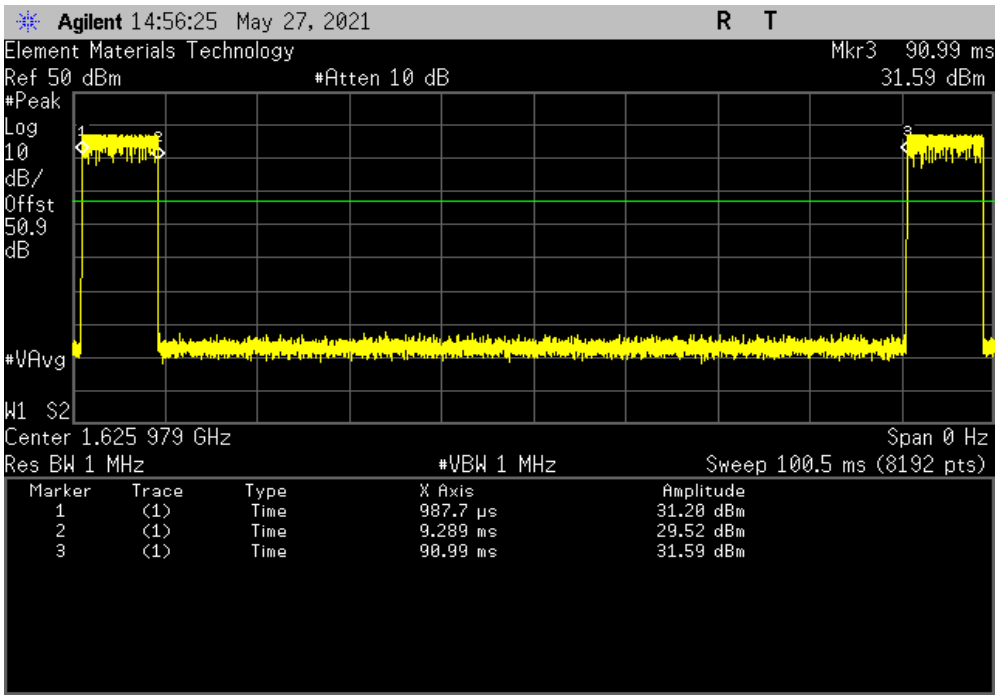


Transmit, DE-QPSK, Mid Ch. 121, 1621.020833 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

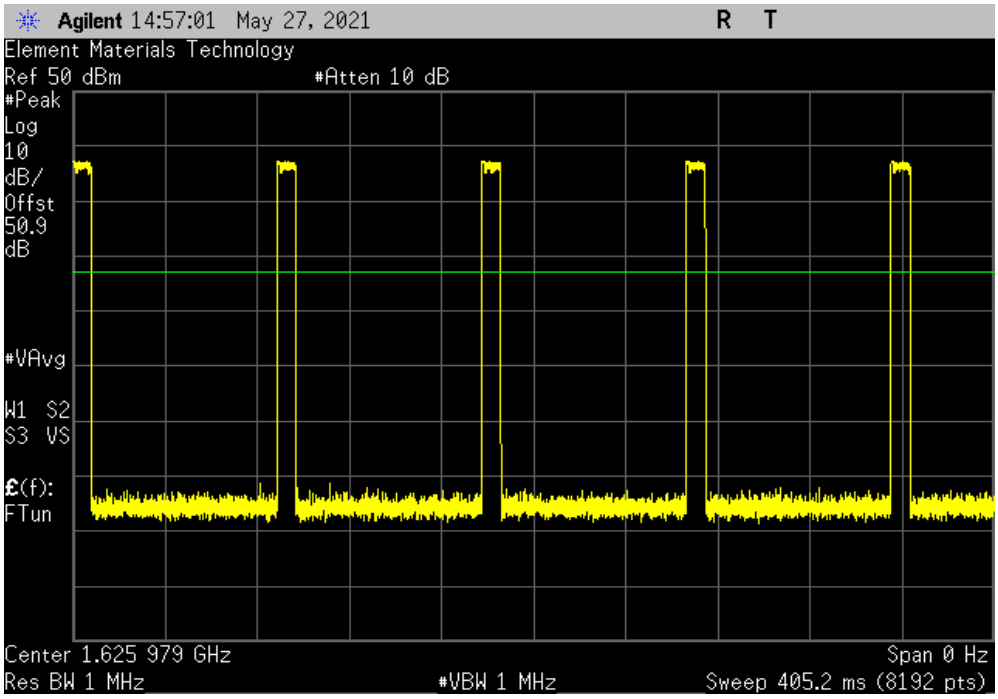


DUTY CYCLE

Transmit, DE-QPSK, High Ch. 240, 1625.979167 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	8.301 ms	90.006 ms	1	9.2	N/A	N/A



Transmit, DE-QPSK, High Ch. 240, 1625.979167 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



CONDUCTED OUTPUT POWER

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
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	2021-04-08	2022-04-08
Generator - Signal	Agilent	E8257D	TGX	2020-01-07	2022-01-07
Block - DC	Fairview Microwave	SD3074	AMF	NCR	NCR
Attenuator	Fairview Microwave	SA18N5WA-20	TWD	2021-02-16	2022-02-16
Attenuator	Fairview Microwave	SA18N5WA-30	TLE	2021-07-22	2022-07-22
Cable	Micro-Coax	D150A-1-0720-200	EVH	2021-03-14	2022-03-14

TEST DESCRIPTION

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

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

The method in section 5.2.4.3.2 of ANSI C63.26:2015 was used to make the measurement.

The spectrum analyzer was configured to the following settings:

Span = 2x to 3x OBW
RBW ≥ OWB
VBW ≥ 3x RBW
Detector = RMS
Sweep = single

The sweep time is:

Sweep time ≥ 10 * [number of points in sweep] * [transmission period]

Where:
The transmission period is the (on + off) time

A peak marker was used to indicate the maximum level.

Following the measurement a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured value.

CONDUCTED OUTPUT POWER

element

TbtTx 2021.03.19.1 XMit 2020.12.30.0

EUT:	**SHOUT sp Handheld Iridium Smartphone**			**Work Order:**	**PCTE0003**
Serial Number:	**FCC 1**			**Date:**	**27-May-21**
Customer:	**NAL Research Corporation**			**Temperature:**	**23 °C**
Attendees:	**None**			**Humidity:**	**46.3% RH**
Project:	**None**			**Barometric Pres.:**	**1024 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**5.0 VDC via USB**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 2.1046:2021	ANSI C63.26:2015

COMMENTS

From the duty cycle data included in this report, the transmission period of the radio is 90.012 mS. The sweep time calculated to be 10 * [101 points] * [90.012 mS] * 1 S / 1000 mS = 90.9 S.

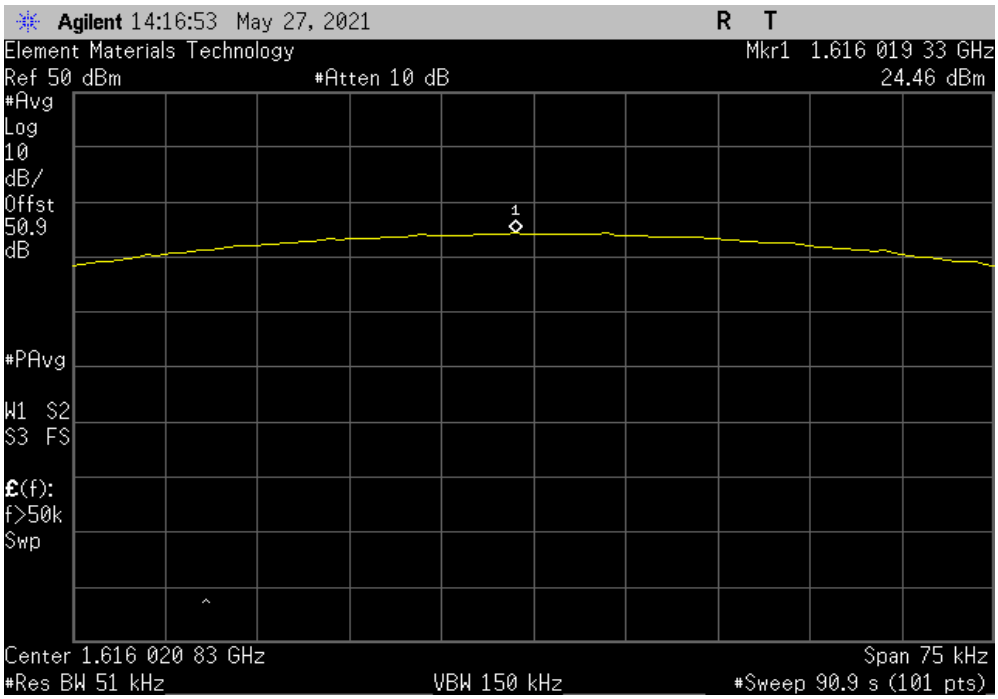
DEVIATIONS FROM TEST STANDARD

None

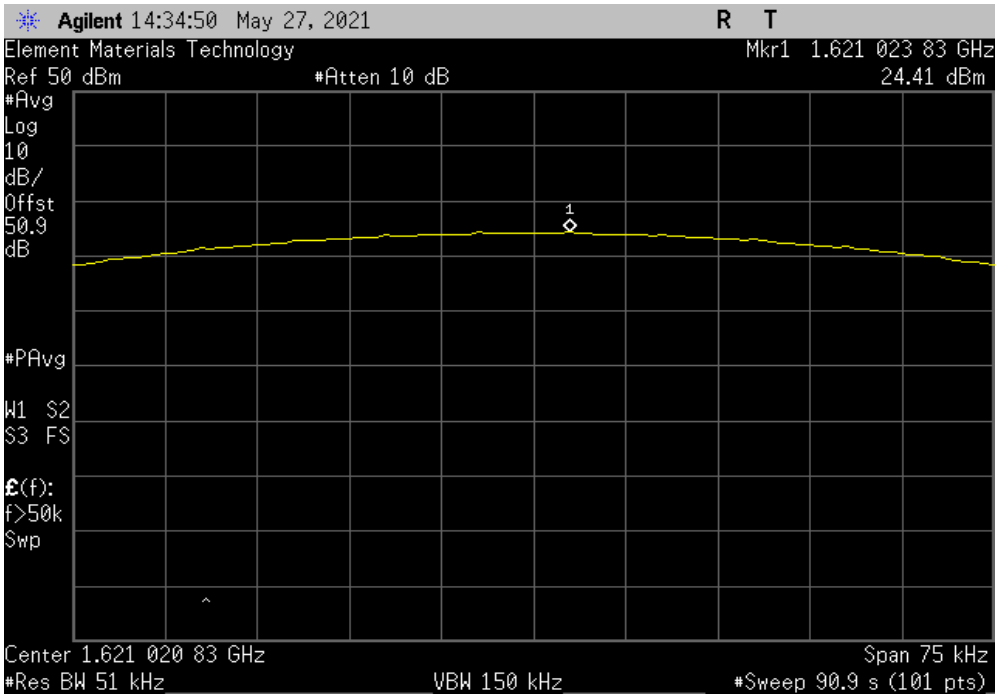
Configuration #	**2**	*Signature*

	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit (dBW)	Results
Transmit, DE-QPSK							
Low Ch. 1, 1616.020833 MHz	24.463	10.3	2.74	37.5	7.5	N/A	N/A
Mid Ch. 121, 1621.020833 MHz	24.406	10.4	2.74	37.5	7.5	N/A	N/A
High Ch. 240, 1625.979167 MHz	24.304	10.4	2.74	37.4	7.4	N/A	N/A

Transmit, DE-QPSK, Low Ch. 1, 1616.020833 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit (dBW)	Results
24.463	10.3	2.74	37.5	7.5	N/A	N/A

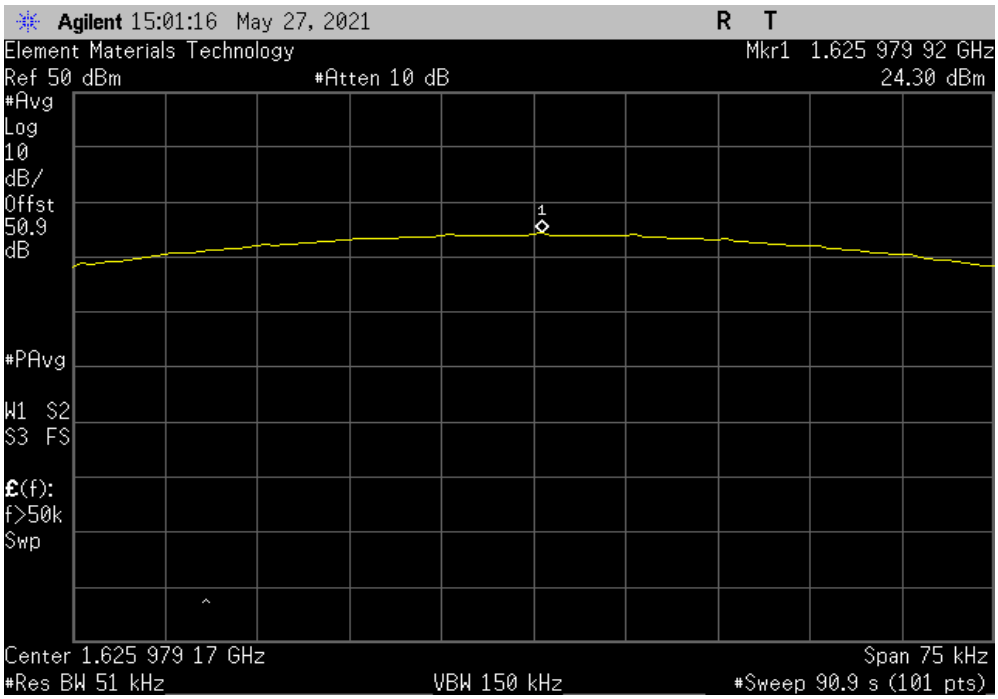


Transmit, DE-QPSK, Mid Ch. 121, 1621.020833 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit (dBW)	Results
24.406	10.4	2.74	37.5	7.5	N/A	N/A



CONDUCTED OUTPUT POWER

Transmit, DE-QPSK, High Ch. 240, 1625.979167 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit (dBW)	Results
24.304	10.4	2.74	37.4	7.4	N/A	N/A



POWER SPECTRAL DENSITY

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
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFO	2021-07-06	2022-07-06
Generator - Signal	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Block - DC	Fairview Microwave	SD3379	AMW	2021-07-06	2022-07-06
Attenuator	S.M Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Attenuator	Fairview Microwave	18B5W-26	RFZ	2021-07-16	2022-07-16
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2021-03-14	2022-03-14

TEST DESCRIPTION

The Power Spectral Density (PSD) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

Prior to measuring PSD; the transmission pulse duration (T) was measured. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The method in section 5.2.4.5 of ANSI C63.26:2015 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer using an RMS detector. Following the measurement, a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured value.

Where trace averaging was not employed, the method allows for a single sweep measurement where the sweep time is:

Sweep time ≥ 10 * [number of points in sweep] * [transmission period]

Where:
The transmission period is the (on + off) time.

The spectrum analyzer was configured with an RBW of 4.3 kHz and VBW of 13 kHz. A marker was then placed to identify the maximum PSD instead of summing the power across the OBW. The antenna gain and a correction factor which consists of an upward correction for Duty Cycle, and a downward correction factor to make the result relative to any 4 kHz band as per the requirement in 25.204(a) was added to the marker value. The corrected value is noted and compared to the limit.

EIRP = AVG Cond Pwr + Correction Factor + Antenna Gain

POWER SPECTRAL DENSITY

TbtTx 2021.03.19.1 XMit 2020.12.30.0

EUT:	SHOUT sp Handheld Iridium Smartphone			Work Order:	PCTE0003
Serial Number:	FCC 1			Date:	29-Sep-21
Customer:	NAL Research Corporation			Temperature:	23 °C
Attendees:	None			Humidity:	46.3% RH
Project:	None			Barometric Pres.:	1024 mbar
Tested by:	Jeff Alcoke	Power:	5.0 VDC via USB	Job Site:	EV06

TEST SPECIFICATIONS	Test Method
FCC 25:2021	ANSI C63.26:2015

COMMENTS

The transmission period of the radio is 90.012 mS. The sweep time calculated to be 10 * [201 points] * [90.012 mS] * 1 S / 1000 mS = 180.9 S.
Correction Factor = Duty Cycle Correction Factor + 10*log(RBW used / reference RBW)= 10.4 dB + 10*log(4.3 kHz / 4 kHz) = 10.4 + (-0.3) = 10.1 dB.

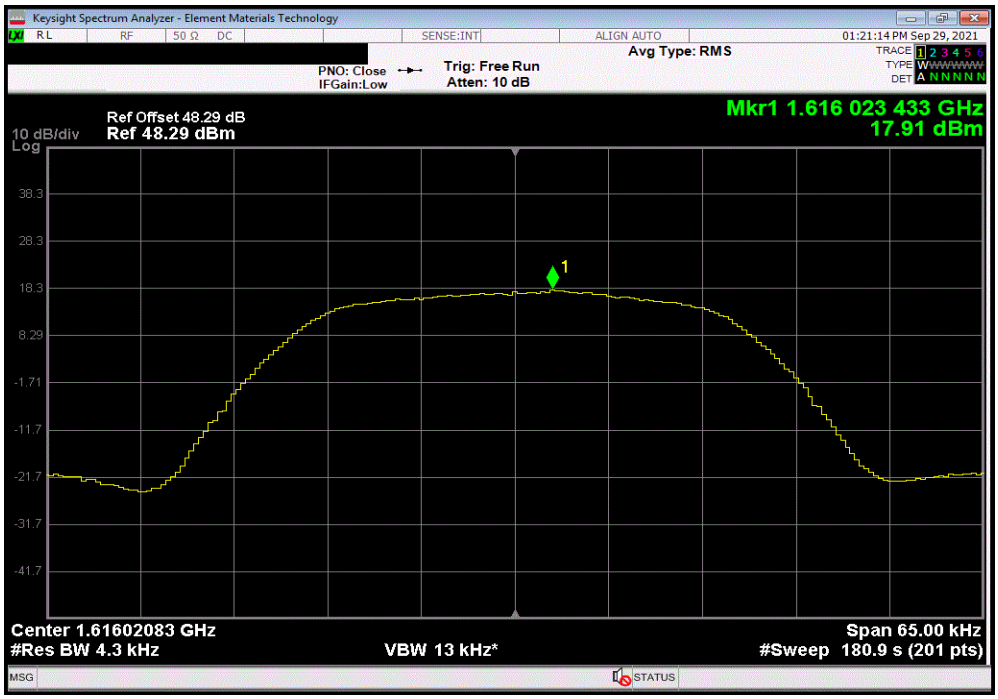
DEVIATIONS FROM TEST STANDARD

None

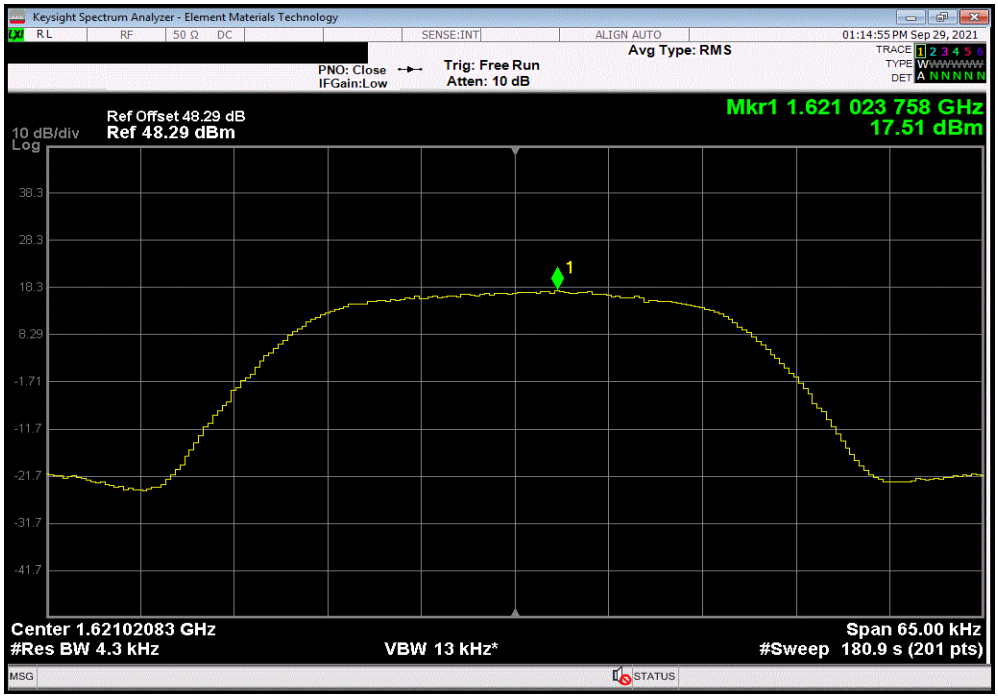
Configuration #	2	Signature

	Avg Cond Pwr (dBm)	Correction Factor (dB)	Antenna Gain (dBi)	EIRP (dBm/4kHz)	EIRP (dBW/4kHz)	Limit (dBW/4kHz)	Results
Transmit, DE-QPSK							
Low Ch. 1, 1616.020833 MHz	17.91	10.1	2.74	30.75	0.75	≤ 40	Pass
Mid Ch. 121, 1621.020833 MHz	17.51	10.1	2.74	30.35	0.35	≤ 40	Pass
High Ch. 240, 1625.979167 MHz	17.72	10.1	2.74	30.56	0.56	≤ 40	Pass

Transmit, DE-QPSK, Low Ch. 1, 1616.020833 MHz						
Avg Cond Pwr (dBm)	Correction Factor (dB)	Antenna Gain (dBi)	EIRP (dBm/4kHz)	EIRP (dBW/4kHz)	Limit (dBW/4kHz)	Results
17.91	10.1	2.74	30.75	0.75	≤ 40	Pass

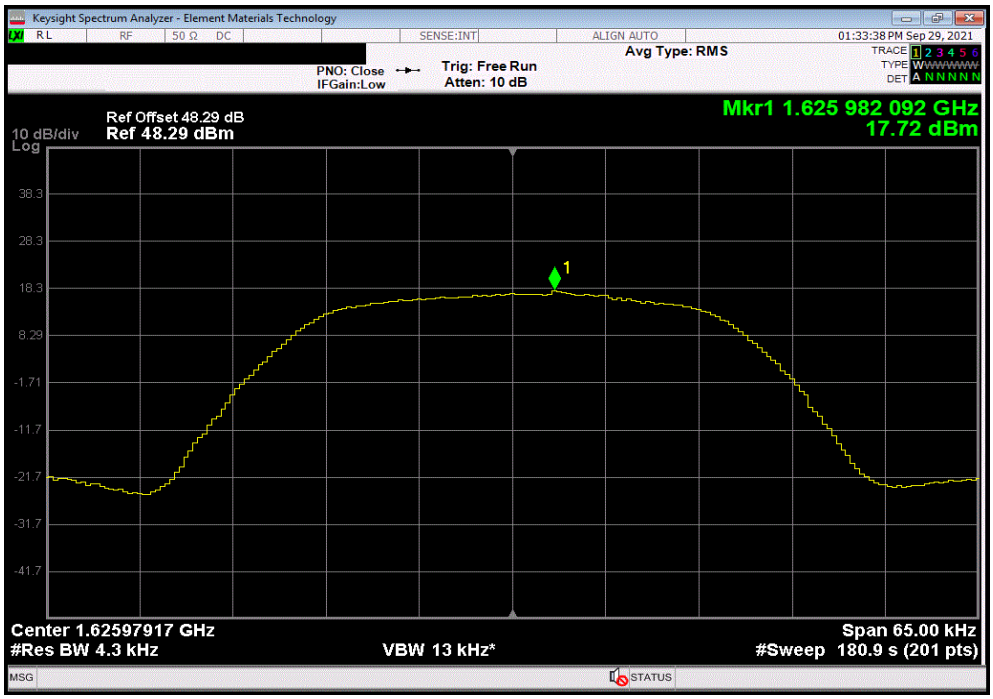


Transmit, DE-QPSK, Mid Ch. 121, 1621.020833 MHz						
Avg Cond Pwr (dBm)	Correction Factor (dB)	Antenna Gain (dBi)	EIRP (dBm/4kHz)	EIRP (dBW/4kHz)	Limit (dBW/4kHz)	Results
17.51	10.1	2.74	30.35	0.35	≤ 40	Pass



POWER SPECTRAL DENSITY

Transmit, DE-QPSK, High Ch. 240, 1625.979167 MHz						
Avg Cond Pwr (dBm)	Correction Factor (dB)	Antenna Gain (dBi)	EIRP (dBm/4kHz)	EIRP (dBW/4kHz)	Limit (dBW/4kHz)	Results
17.72	10.1	2.74	30.56	0.56	≤ 40	Pass



OCCUPIED 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
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	2021-04-08	2022-04-08
Generator - Signal	Agilent	E8257D	TGX	2020-01-07	2022-01-07
Block - DC	Fairview Microwave	SD3074	AMF	NCR	NCR
Attenuator	Fairview Microwave	SA18N5WA-20	TWD	2021-02-16	2022-02-16
Attenuator	Fairview Microwave	SA18N5WA-30	TLE	2020-07-24	2021-07-24
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2021-03-14	2022-03-14

TEST DESCRIPTION

An RF signal generator was used to create the modulated signal(s) listed in the datasheets. These signals were input into the EUT.

The spectrum analyzer settings were as follows:

- RBW = Approx. 1% of the emission bandwidth (B). This was an iterative process to determine the RBW based on the emissions bandwidth (B).
- VBW= > RBW
- A peak detector was used
- Trace max hold.

The spectrum analyzer occupied bandwidth measurement function was then used to measure the 26 dB and 99% emission bandwidth.

There is no required limit to be met in the rule part for this test. The purpose of the test is to both report the results and to utilize the emission bandwidth for setting the channel power integration bandwidth during conducted output power testing.

OCCUPIED BANDWIDTH

element

TbtTx 2021.03.19.1 XMit 2020.12.30.0

EUT:	**SHOUT sp Handheld Iridium Smartphone**			**Work Order:**	**PCTE0003**
Serial Number:	**FCC 1**			**Date:**	**27-May-21**
Customer:	**NAL Research Corporation**			**Temperature:**	**23 °C**
Attendees:	**None**			**Humidity:**	**46.5% RH**
Project:	**None**			**Barometric Pres.:**	**1024 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**5.0 VDC via USB**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 2.1049:2021	ANSI C63.26:2015

COMMENTS

Please reference data comments below for channel and EUT orientaiton.

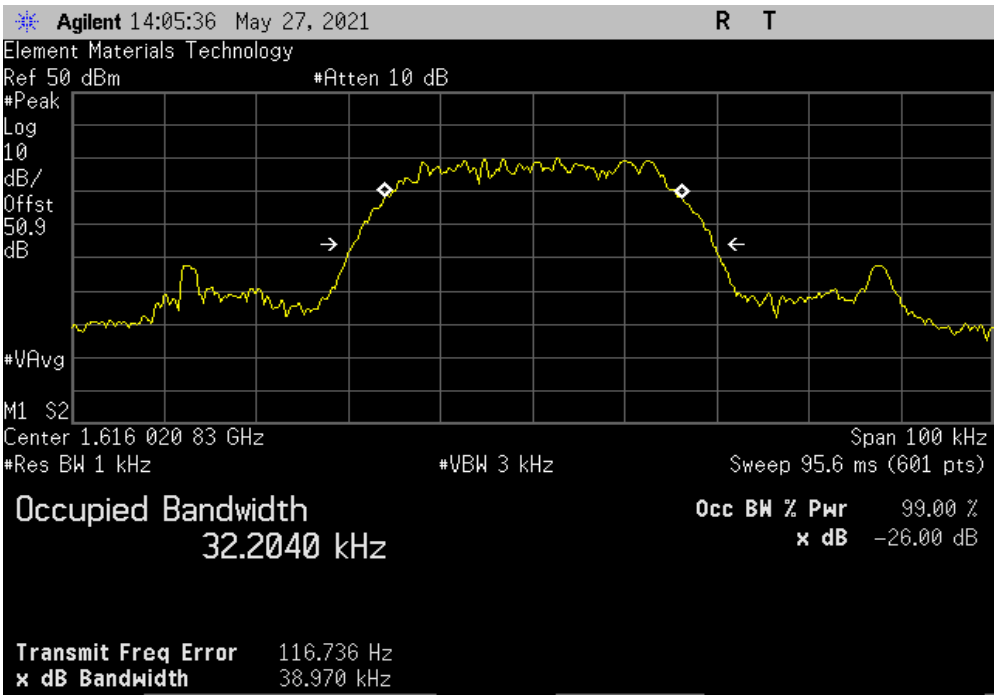
DEVIATIONS FROM TEST STANDARD

None

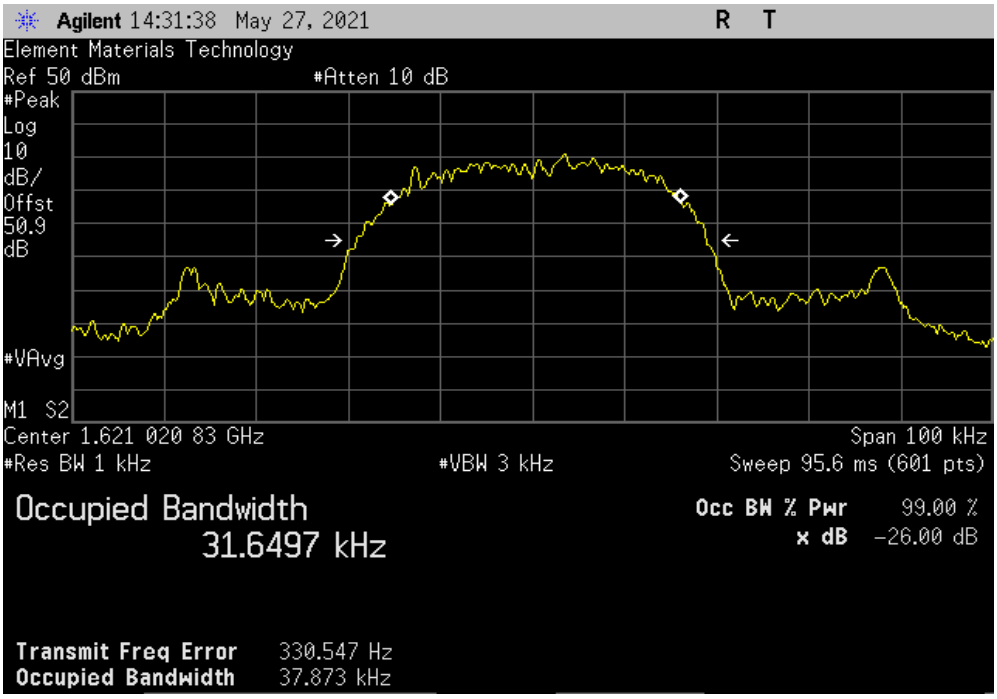
Configuration #	**2**	*Signature*

	26 dB Occupied BW (kHz)	**99% Occupied BW (kHz)**	**Limit**	**Result**
Transmit, DE-QPSK				
Low Ch. 1, 1616.020833 MHz	38.97	32.204	N/A	Pass
Mid Ch. 121, 1621.020833 MHz	37.873	31.649	N/A	Pass
High Ch. 240, 1625.979167 MHz	38.208	31.632	N/A	Pass

Transmit, DE-QPSK, Low Ch. 1, 1616.020833 MHz						
			26 dB Occupied BW (kHz)	99% Occupied BW (kHz)	Limit	Result
			38.97	32.204	N/A	Pass

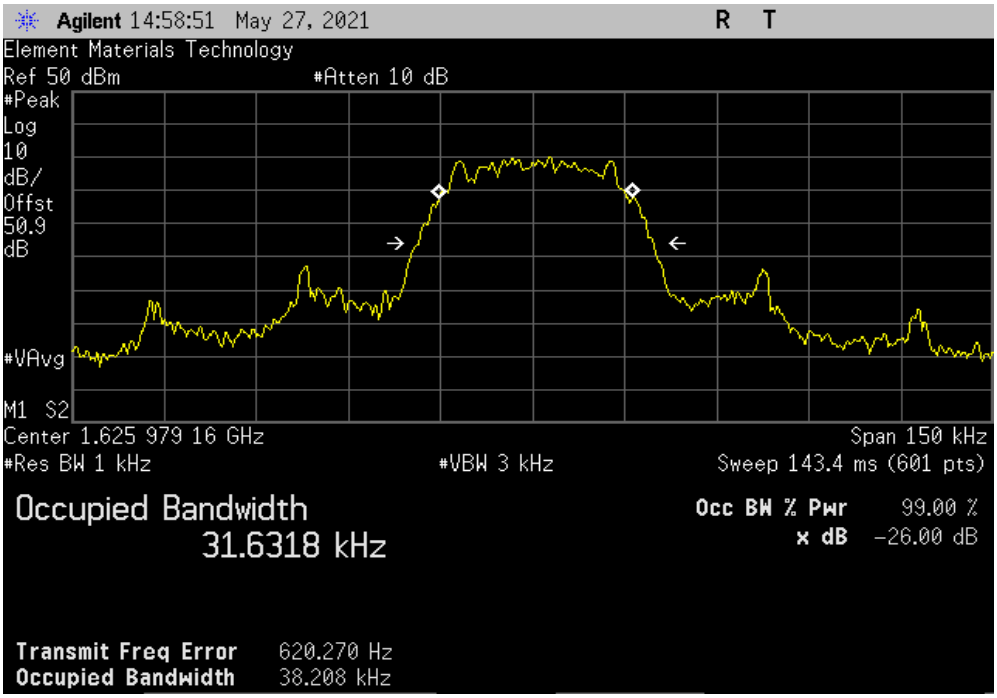


Transmit, DE-QPSK, Mid Ch. 121, 1621.020833 MHz						
			26 dB Occupied BW (kHz)	99% Occupied BW (kHz)	Limit	Result
			37.873	31.649	N/A	Pass



OCCUPIED BANDWIDTH

Transmit, DE-QPSK, High Ch. 240, 1625.979167 MHz						
			26 dB Occupied BW (kHz)	99% Occupied BW (kHz)	Limit	Result
			38.208	31.632	N/A	Pass



SPURIOUS RADIATED EMISSIONS

element
WTD.2021.05.19.0
EmiR5 2021.06.24.0
PSA-ESCI 2021.03.17.0

TEST DESCRIPTION

The fundamental emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height (1-4 meters) and polarization and manipulating the EUT antenna in 3 orthogonal planes. The antenna port of the EUT was terminated with a 50Ω load. The EUT was transmitting while set at the lowest channel, a middle channel, and the highest channel available. The amplitude and frequency were noted.

For emissions with more than 20dB of margin, the EIRP was calculated using equations found in ANSI C63.26:2015, Clause 5.2.7. For emissions with less than 20 dB of margin, The EUT was replaced with a horn antenna. A signal generator was connected to the horn antenna and its output was adjusted to match the level previously noted for each frequency. The output of the signal generator was recorded, and by factoring in the gain (dBi) of the horn antenna the effective radiated power for each emission was determined.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	2020-12-08	2021-12-08
Antenna - Biconilog	Teseq	CBL 6141B	AXR	2020-10-13	2022-10-13
Antenna - Double Ridge	EMCO	3115	AHC	2020-07-01	2022-07-01
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	NCR
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	2020-11-17	2021-11-17
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	2020-11-17	2021-11-17
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	2020-11-18	2021-11-18
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2020-11-18	2021-11-18
Cable	N/A	Bilog Cables	EVA	2020-11-17	2021-11-17
Cable	N/A	Double Ridge Horn Cables	EVB	2020-11-17	2021-11-17
Cable	None	Standard Gain Horns Cable	EVF	2020-11-18	2021-11-18
Attenuator	Coaxicom	3910-20	AXZ	2021-02-15	2022-02-15
Filter - Low Pass	Micro-Tronics	LPM50004	LFD	2021-02-15	2022-02-15
Filter - High Pass	Micro-Tronics	HPM50111	HFO	2020-11-17	2021-11-17

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 18 GHz

POWER INVESTIGATED

5.0 VDC via USB

CONFIGURATIONS INVESTIGATED

PCTE0003-6

MODES INVESTIGATED

Tx, DE-QPSK, 10% duty cycle, Ch 1 = 1616.020883 MHz, Ch 121 = 1621.020833 MHz, and Ch 240 = 1625.979167 MHz

SPURIOUS RADIATED EMISSIONS

element
WTD.2021.05.19.0
EmiR5 2021.06.24.0
PSA-ESCI 2021.03.17.0

EUT:	SHOUT sp Handheld Iridium Smartphone	Work Order:	PCTE0003
Serial Number:	FCC 2	Date:	2021-08-25
Customer:	NAL Research Corporation	Temperature:	23.7°C
Attendees:	None	Relative Humidity:	42.8%
Customer Project:	None	Bar. Pressure:	1019 mb
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	5.0 VDC via USB	Configuration:	PCTE0003-6

TEST SPECIFICATIONS

Specification:	Method:
FCC 25:2021	ANSI C63.26:2015

TEST PARAMETERS

Run #:	71	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

Due to the duty cycle of the EUT, a peak detector was used to ensure the peak emissions were captured. A peak detector is considered worst case as compared to an average detector.

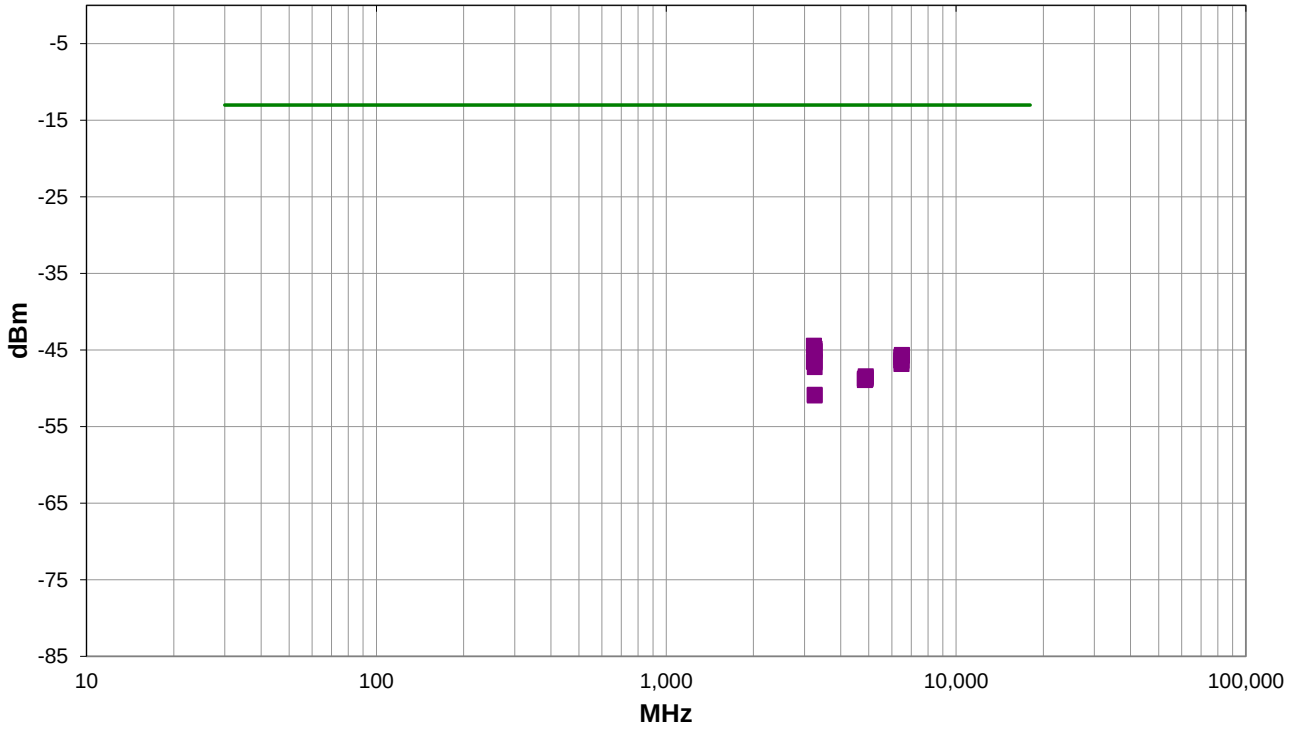
Please reference data comments below for channel and EUT orientation.

EUT OPERATING MODES

Tx, DE-QPSK, 10% duty cycle, Ch 1 = 1616.020883 MHz, Ch 121 = 1621.020833 MHz, and Ch 240 = 1625.979167 MHz

DEVIATIONS FROM TEST STANDARD

None



Run #: 71 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2021.05.19.0
EmiR5 2021.06.24.0
PSA-ESCI 2021.03.17.0

RESULTS - Run #71

Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
3232.190	1.91	179.0	Vert	PK	36.1E-9	-44.4	-13.0	-31.4	Ch 1, EUT on Side
3252.052	1.58	180.0	Vert	PK	32.9E-9	-44.8	-13.0	-31.8	Ch 240, EUT on Side
3252.010	1.16	144.0	Vert	PK	30.7E-9	-45.1	-13.0	-32.1	Ch 240, EUT Horz
3242.157	1.7	180.0	Vert	PK	30.0E-9	-45.2	-13.0	-32.2	Ch 121, EUT on Side
6502.753	1.5	208.0	Vert	PK	27.4E-9	-45.6	-13.0	-32.6	Ch 240, EUT on Side
6504.512	1.5	225.0	Horz	PK	26.7E-9	-45.7	-13.0	-32.7	Ch 240, EUT Horz
6462.880	1.0	343.0	Vert	PK	25.5E-9	-45.9	-13.0	-32.9	Ch 1, EUT on Side
6466.063	1.5	83.0	Horz	PK	23.3E-9	-46.3	-13.0	-33.3	Ch 1, EUT Horz
6484.722	1.5	260.0	Vert	PK	22.8E-9	-46.4	-13.0	-33.4	Ch 121, EUT on Side
3241.965	1.13	274.0	Horz	PK	22.8E-9	-46.4	-13.0	-33.4	Ch 121, EUT Horz
3231.857	3.5	135.0	Horz	PK	22.2E-9	-46.5	-13.0	-33.5	Ch 1, EUT Horz
3251.943	1.0	134.0	Horz	PK	21.7E-9	-46.6	-13.0	-33.6	Ch 240, EUT Horz
6482.497	2.0	22.0	Horz	PK	20.8E-9	-46.8	-13.0	-33.8	Ch 121, EUT Horz
3252.018	1.49	162.0	Horz	PK	18.9E-9	-47.2	-13.0	-34.2	Ch 240, EUT on Side
4878.407	1.5	356.0	Vert	PK	14.4E-9	-48.4	-13.0	-35.4	Ch 240, EUT on Side
4878.773	4.0	225.0	Horz	PK	13.7E-9	-48.6	-13.0	-35.6	Ch 240, EUT Horz
4845.735	1.5	360.0	Vert	PK	13.4E-9	-48.7	-13.0	-35.7	Ch 1, EUT on Side
4864.977	2.97	79.0	Vert	PK	13.1E-9	-48.8	-13.0	-35.8	Ch 121, EUT on Side
4863.793	1.5	150.0	Horz	PK	13.1E-9	-48.8	-13.0	-35.8	Ch 121, EUT Horz
4846.193	1.73	0.0	Horz	PK	12.8E-9	-48.9	-13.0	-35.9	Ch 1, EUT Horz
3251.893	1.5	37.0	Vert	PK	8.3E-9	-50.8	-13.0	-37.8	Ch 240, EUT Vert
3251.885	3.0	315.0	Horz	PK	8.1E-9	-50.9	-13.0	-37.9	Ch 240, EUT Vert

CONCLUSION

Pass

Tested By

FREQUENCY STABILITY

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
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-2-SCT/AC	TBI	NCR	NCR
Meter - Multimeter	Tektronix	DMM912	MMH	2019-02-15	2022-02-15
Thermometer	Omegaette	HH311	DTY	2021-02-04	2024-02-04
Power Supply - DC	Topward	TPS-2000	TPD	NCR	NCR
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2021-03-14	2022-03-14
Attenuator	Fairview Microwave	SA18N5WA-20	TWD	2021-02-16	2022-02-16
Attenuator	Fairview Microwave	SA18N5WA-30	TLE	2021-07-22	2022-07-22
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

The trace was max held to capture the entire envelope of the carrier. A maker was placed at the peak of the envelope. The marker delta function was used moving the delta marker until the -20 dBc point is reached (f_high). The marker delta function was reset while maintaining its location at f_high, the delta marker was moved again to the lowest frequency (f_low) that has th same amplitude as f_high.

The mean frequency is calculated using the following:

(f_high + f_low) / 2

Where, f_low = f_high + marker delta

The primary supply voltage was varied from 85 % to 115% of the nominal voltage Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-30 ° to +50° C) and at 10°C intervals.

Error % = |(Mean Frequency / Assigned Frequency - 1)| * 100

FREQUENCY STABILITY

element

XMit 2020.12.30.0

EUT:	SHOUT sp Handheld Iridium Smartphone			**Work Order:**	PCTE0003
Serial Number:	FCC 1			**Date:**	27-Aug-21
Customer:	NAL Research Corporation			**Temperature:**	22.9 °C
Attendees:	None			**Humidity:**	46.5% RH
Project:	None			**Barometric Pres.:**	1024 mbar
Tested by:	Jeff Alcoke	**Power:**	4.2 VDC	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 25:2021	ANSI C63.26:2015

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

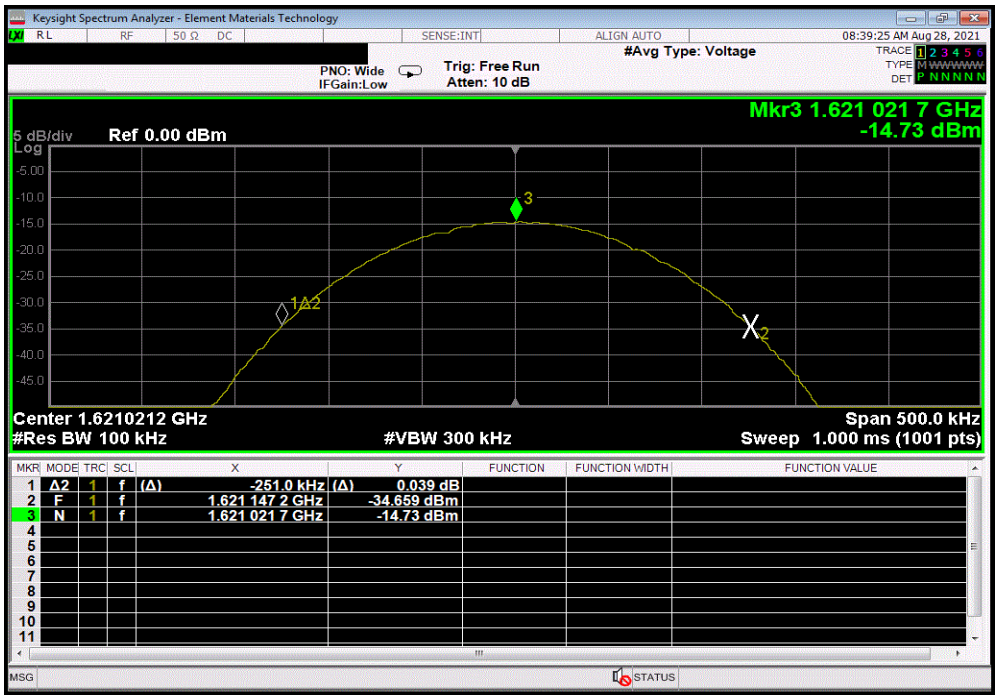
Configuration #	7	Signature

	f_high (Hz)	f_low (Hz)	Mean (Hz)	Assigned (Hz)	Error (%)	Limit (%)	Result
Ch 121, 1621.020833 MHz							
Nominal voltage, 4.2 VDC	1621147200	1620896200	1621021700	1621020833	0.00005	≤ 0.001	Pass
Minimum operational voltage, 3.4 VDC	1621147200	1620896200	1621021700	1621020833	0.00005	≤ 0.001	Pass
Nominal voltage, 50°C	1621147700	1620896200	1621021950	1621020833	0.00007	≤ 0.001	Pass
Nominal voltage, 40°C	1621146200	1620895700	1621020950	1621020833	0.00001	≤ 0.001	Pass
Nominal voltage, 30°C	1621147700	1620895200	1621021450	1621020833	0.00004	≤ 0.001	Pass
Nominal voltage, 20°C	1621147700	1620896200	1621021950	1621020833	0.00007	≤ 0.001	Pass
Nominal voltage, 10°C	1621147700	1620895700	1621021700	1621020833	0.00005	≤ 0.001	Pass
Nominal voltage, 0°C	1621147200	1620894700	1621020950	1621020833	0.00001	≤ 0.001	Pass
Nominal voltage, -10°C	1621147200	1620896200	1621021700	1621020833	0.00005	≤ 0.001	Pass
Nominal voltage, -20°C	1621146200	1620894700	1621020450	1621020833	0.00002	≤ 0.001	Pass
Nominal voltage, -30°C	1621146200	1620894700	1621020450	1621020833	0.00002	≤ 0.001	Pass

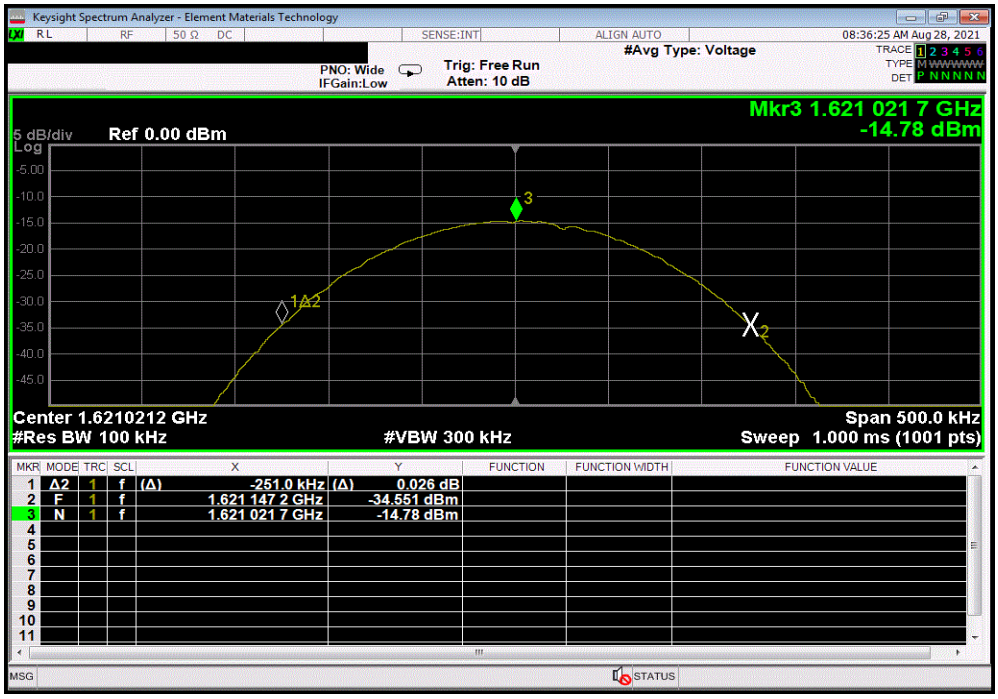
FREQUENCY STABILITY

XMit 2020.12.30.0

Ch 121, 1621.020833 MHz, Nominal voltage, 4.2 VDC						
f_high (Hz)	f_low (Hz)	Mean (Hz)	Assigned (Hz)	Error (%)	Limit (%)	Result
1621147200	1620896200	1621021700	1621020833	0.00005	≤ 0.001	Pass



Ch 121, 1621.020833 MHz, Minimum operational voltage, 3.4 VDC						
f_high (Hz)	f_low (Hz)	Mean (Hz)	Assigned (Hz)	Error (%)	Limit (%)	Result
1621147200	1620896200	1621021700	1621020833	0.00005	≤ 0.001	Pass

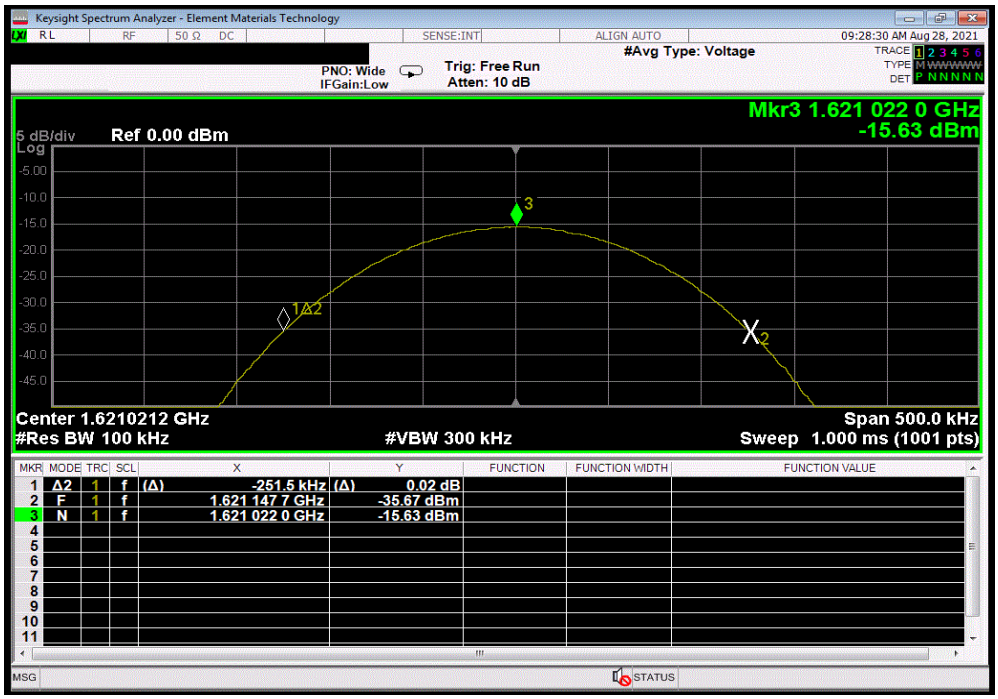


FREQUENCY STABILITY

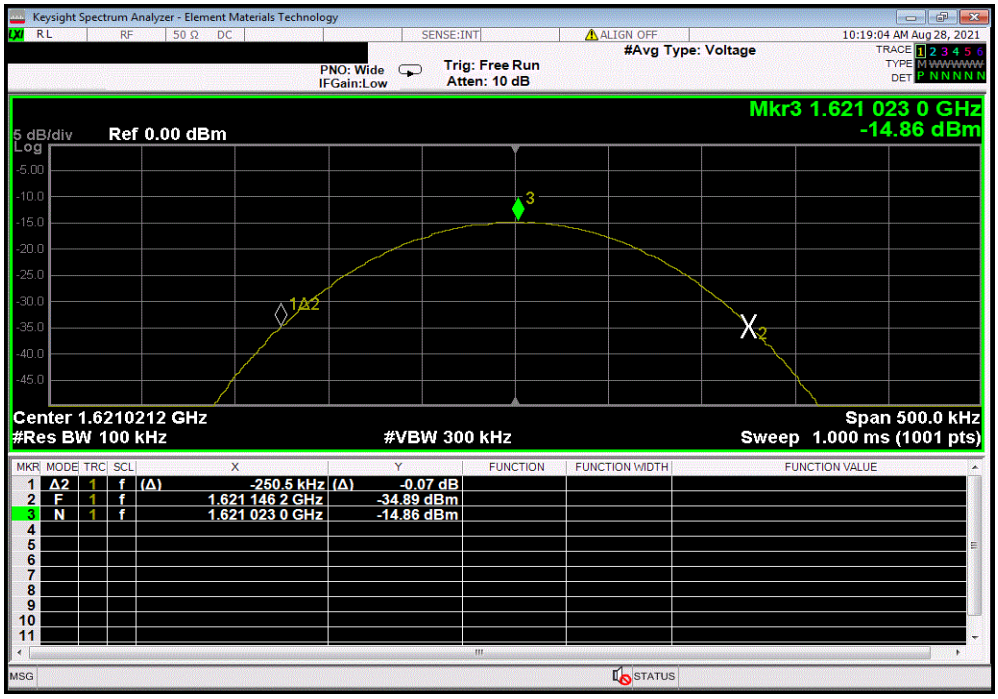
element

XMit 2020.12.30.0

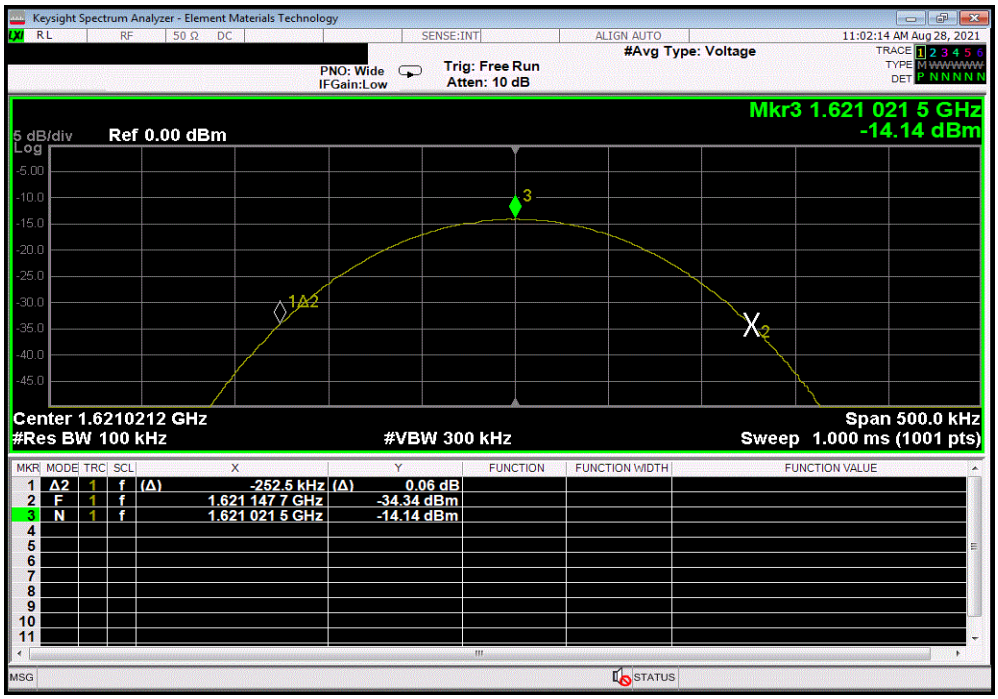
Ch 121, 1621.020833 MHz, Nominal voltage, 50°C						
f_high (Hz)	f_low (Hz)	Mean (Hz)	Assigned (Hz)	Error (%)	Limit (%)	Result
1621147700	1620896200	1621021950	1621020833	0.00007	≤ 0.001	Pass



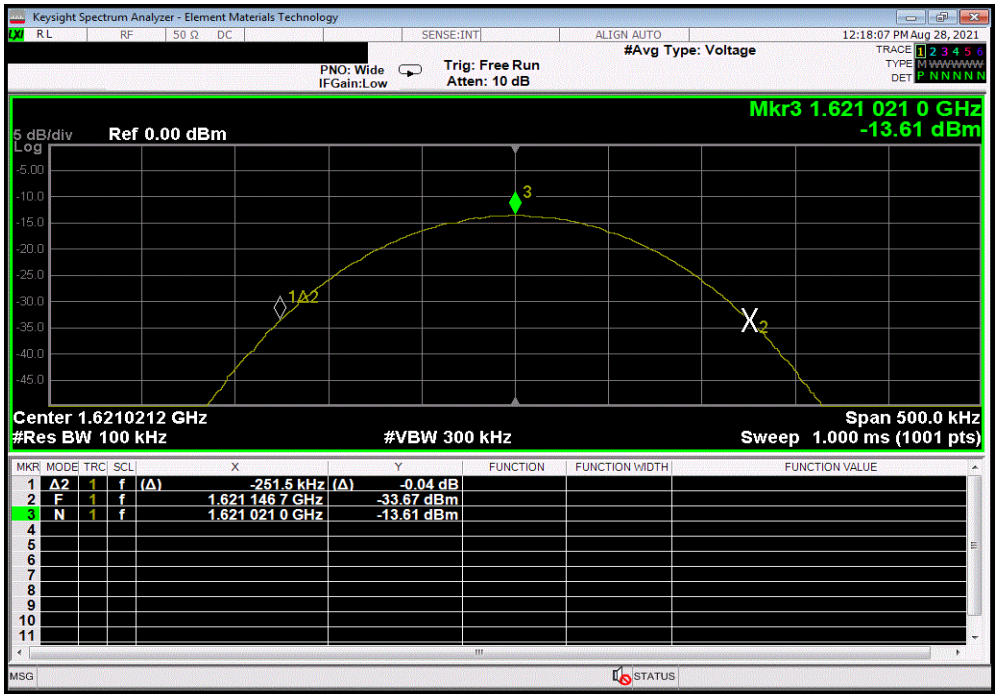
Ch 121, 1621.020833 MHz, Nominal voltage, 40°C						
f_high (Hz)	f_low (Hz)	Mean (Hz)	Assigned (Hz)	Error (%)	Limit (%)	Result
1621146200	1620895700	1621020950	1621020833	0.00001	≤ 0.001	Pass



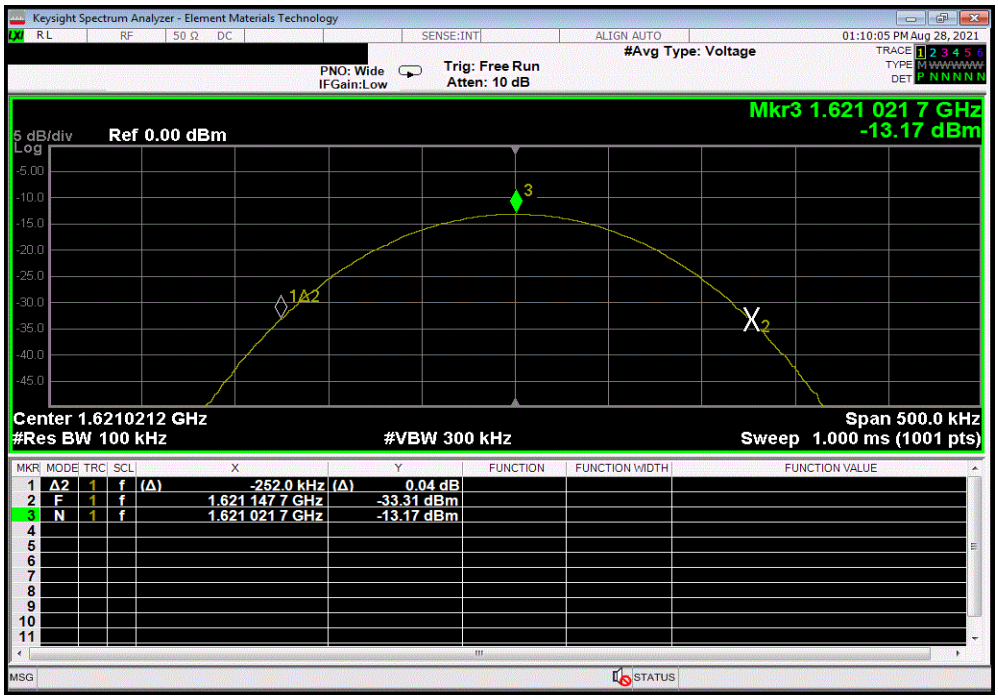
Ch 121, 1621.020833 MHz, Nominal voltage, 30°C						
f_high (Hz)	f_low (Hz)	Mean (Hz)	Assigned (Hz)	Error (%)	Limit (%)	Result
1621147700	1620895200	1621021450	1621020833	0.00004	≤ 0.001	Pass



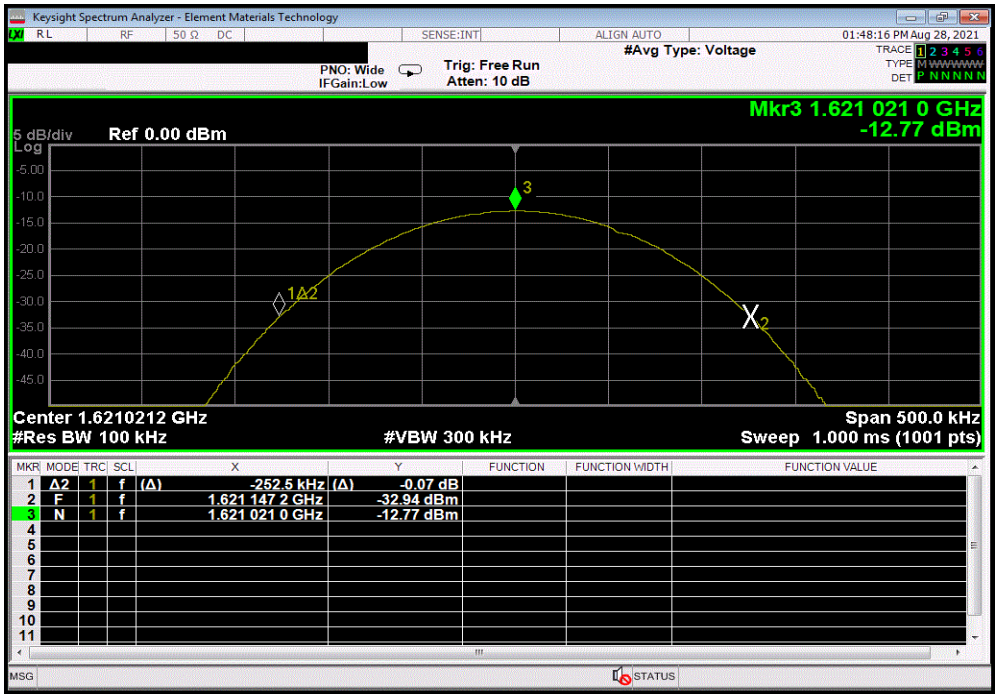
Ch 121, 1621.020833 MHz, Nominal voltage, 20°C						
f_high (Hz)	f_low (Hz)	Mean (Hz)	Assigned (Hz)	Error (%)	Limit (%)	Result
1621147700	1620896200	1621021950	1621020833	0.00007	≤ 0.001	Pass



Ch 121, 1621.020833 MHz, Nominal voltage, 10°C						
f_high (Hz)	f_low (Hz)	Mean (Hz)	Assigned (Hz)	Error (%)	Limit (%)	Result
1621147700	1620895700	1621021700	1621020833	0.00005	≤ 0.001	Pass



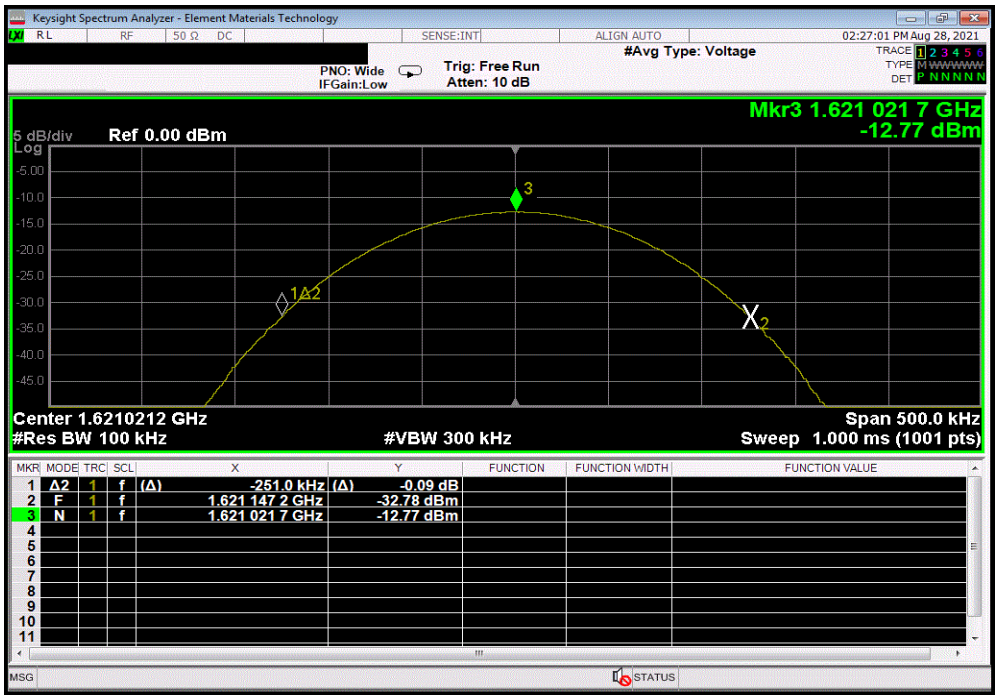
Ch 121, 1621.020833 MHz, Nominal voltage, 0°C						
f_high (Hz)	f_low (Hz)	Mean (Hz)	Assigned (Hz)	Error (%)	Limit (%)	Result
1621147200	1620894700	1621020950	1621020833	0.00001	≤ 0.001	Pass



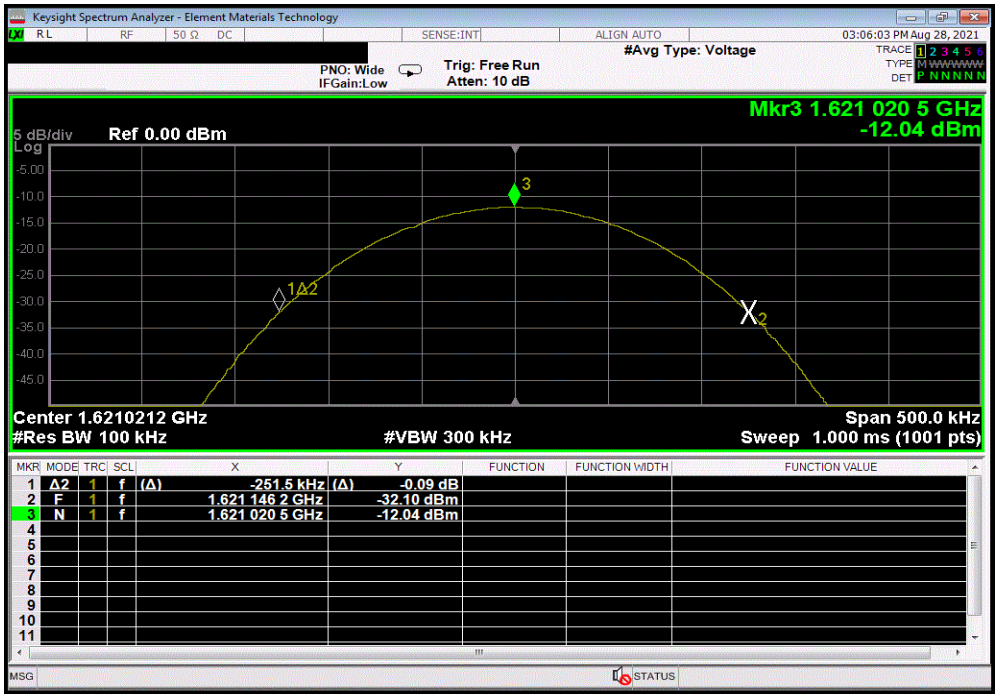
FREQUENCY STABILITY

XMit 2020.12.30.0

Ch 121, 1621.020833 MHz, Nominal voltage, -10°C						
f_high (Hz)	f_low (Hz)	Mean (Hz)	Assigned (Hz)	Error (%)	Limit (%)	Result
1621147200	1620896200	1621021700	1621020833	0.00005	≤ 0.001	Pass



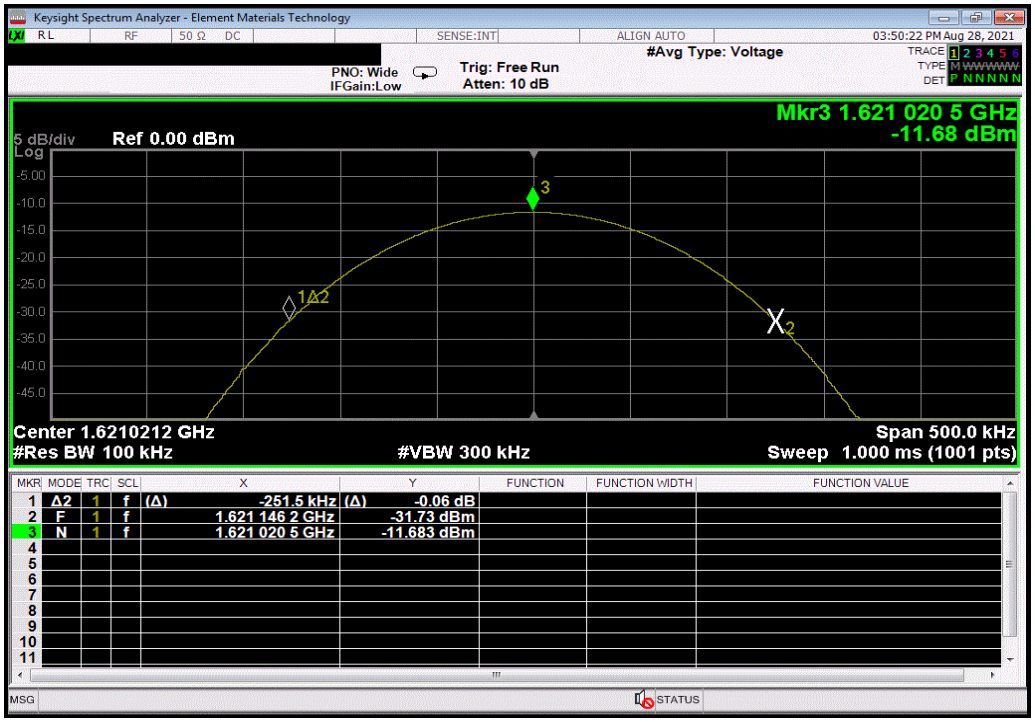
Ch 121, 1621.020833 MHz, Nominal voltage, -20°C						
f_high (Hz)	f_low (Hz)	Mean (Hz)	Assigned (Hz)	Error (%)	Limit (%)	Result
1621146200	1620894700	1621020450	1621020833	0.00002	≤ 0.001	Pass



FREQUENCY STABILITY

XMit 2020.12.30.0

Ch 121, 1621.020833 MHz, Nominal voltage, -30°C						
f_high (Hz)	f_low (Hz)	Mean (Hz)	Assigned (Hz)	Error (%)	Limit (%)	Result
1621146200	1620894700	1621020450	1621020833	0.00002	≤ 0.001	Pass



SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

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
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2021-03-14	2022-03-14
Attenuator	Fairview Microwave	SA18N5WA-30	TLE	2020-07-24	2021-07-24
Attenuator	Fairview Microwave	SA18N5WA-20	TWD	2021-02-16	2022-02-16
Block - DC	Fairview Microwave	SD3074	AMF	NCR	NCR
Generator - Signal	Agilent	E8257D	TGX	2020-01-07	2022-01-07
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	2021-04-08	2022-04-08

TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the spectrum investigated up to the 10th harmonic. The spectrum analyzer was configured with an RBW and VBW of 1 MHz and 3 MHz respectfully with the trace set to max hold using an RMS detector. The highest emission in each band was noted and compared to the limit.

SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

element

TbtTx 2021.03.19.1 XMit 2020.12.30.0

EUT:	**SHOUT sp Handheld Iridium Smartphone**			**Work Order:**	**PCTE0003**
Serial Number:	**FCC 1**			**Date:**	**27-May-21**
Customer:	**NAL Research Corporation**			**Temperature:**	**23 °C**
Attendees:	**None**			**Humidity:**	**46.2% RH**
Project:	**None**			**Barometric Pres.:**	**1024 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**5.0 VDC via USB**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 25:2021	ANSI C63.26:2015

COMMENTS

None

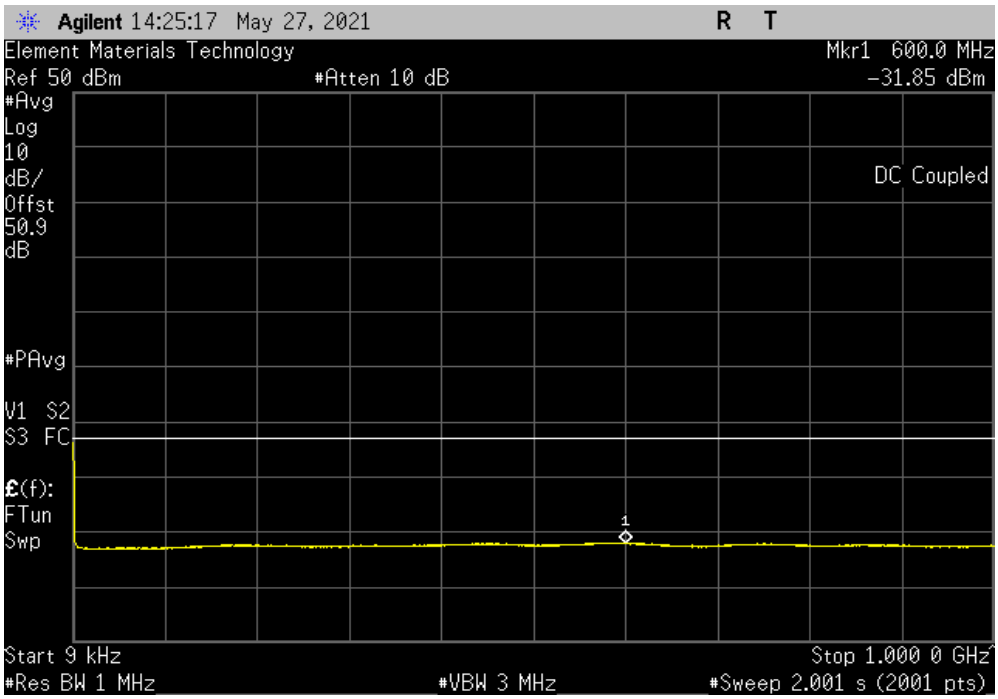
DEVIATIONS FROM TEST STANDARD

None

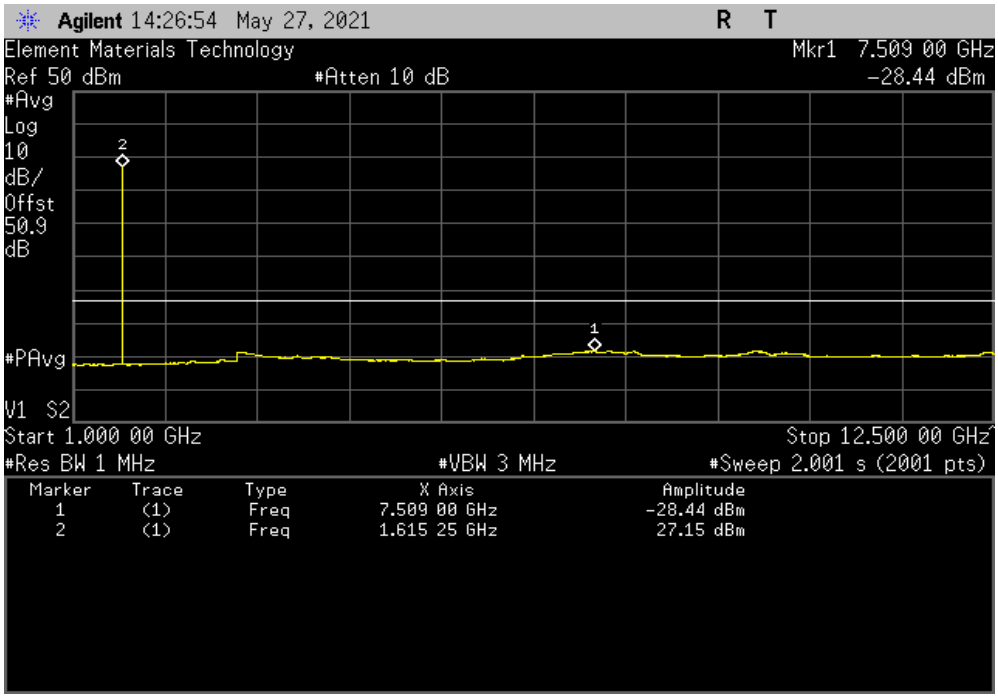
Configuration #	**2**	*Signature*

	Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
Transmit, DE-QPSK					
Low Ch. 1, 1616.020833 MHz	9 kHz - 1 GHz	600	-31.85	-13	Pass
Low Ch. 1, 1616.020833 MHz	1 GHz - 12.5 GHz	7509	-28.44	-13	Pass
Low Ch. 1, 1616.020833 MHz	12.5 GHz - 17 GHz	15004.25	-27.04	-13	Pass
Mid Ch. 121, 1621.020833 MHz	9 kHz - 1 GHz	592.5	-31.81	-13	Pass
Mid Ch. 121, 1621.020833 MHz	1 GHz - 12.5 GHz	7497.5	-28.54	-13	Pass
Mid Ch. 121, 1621.020833 MHz	12.5 GHz - 17 GHz	15886.25	-26.96	-13	Pass
High Ch. 240, 1625.979167 MHz	9 kHz - 1 GHz	589	-31.84	-13	Pass
High Ch. 240, 1625.979167 MHz	1 GHz - 12.5 GHz	7520.5	-28.59	-13	Pass
High Ch. 240, 1625.979167 MHz	12.5 GHz - 17 GHz	15897.5	-27.06	-13	Pass

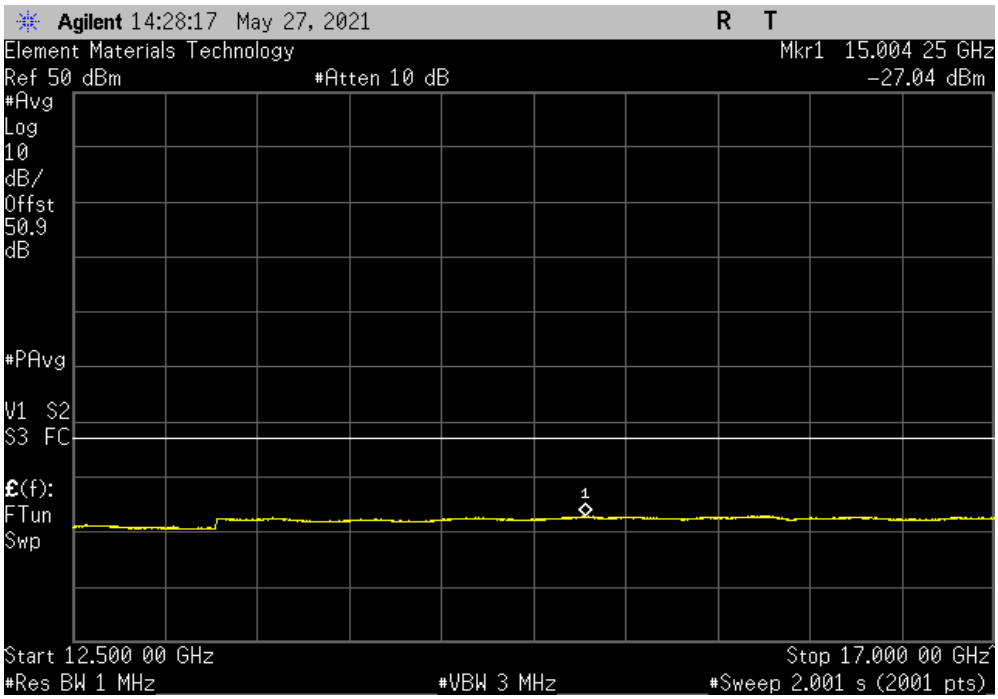
Transmit, DE-QPSK, Low Ch. 1, 1616.020833 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
9 kHz - 1 GHz		600	-31.85	-13	Pass



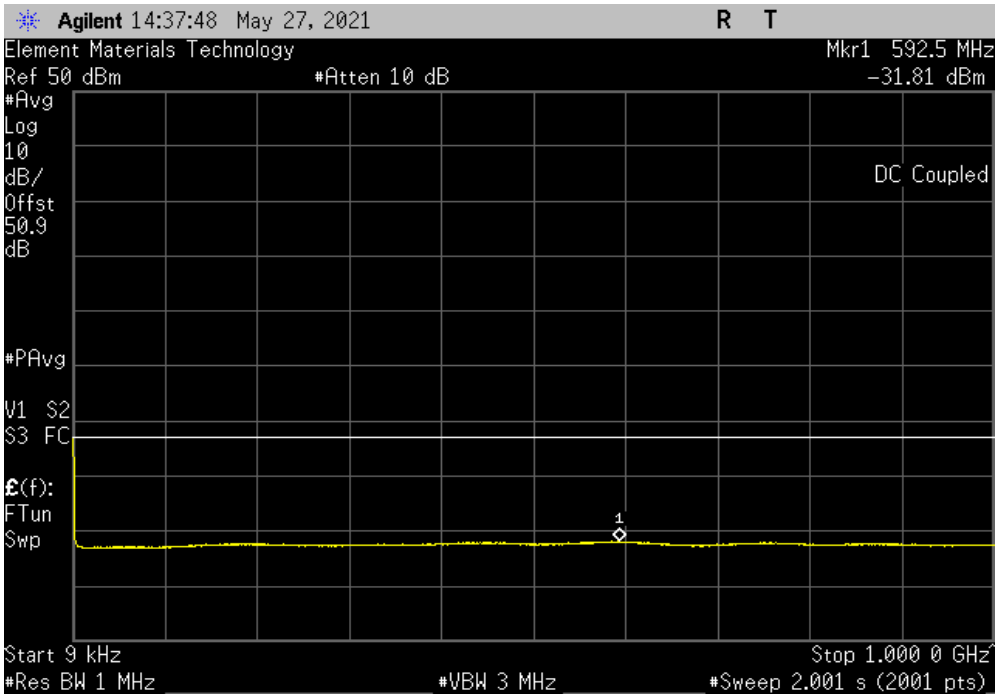
Transmit, DE-QPSK, Low Ch. 1, 1616.020833 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
1 GHz - 12.5 GHz	7509	-28.44	-13	Pass



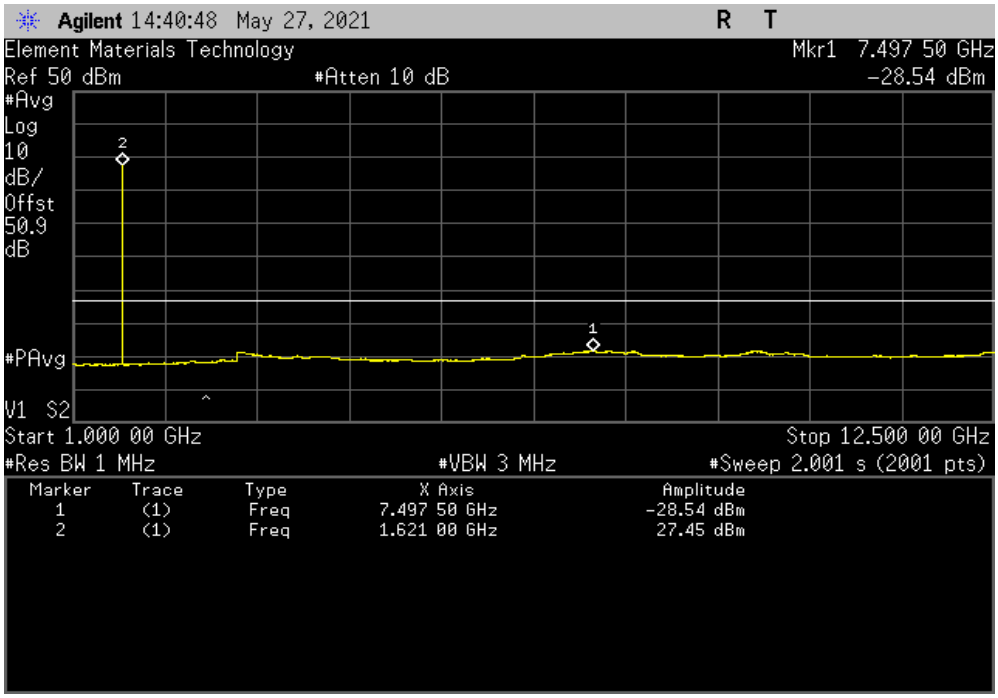
Transmit, DE-QPSK, Low Ch. 1, 1616.020833 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
12.5 GHz - 17 GHz	15004.25	-27.04	-13	Pass



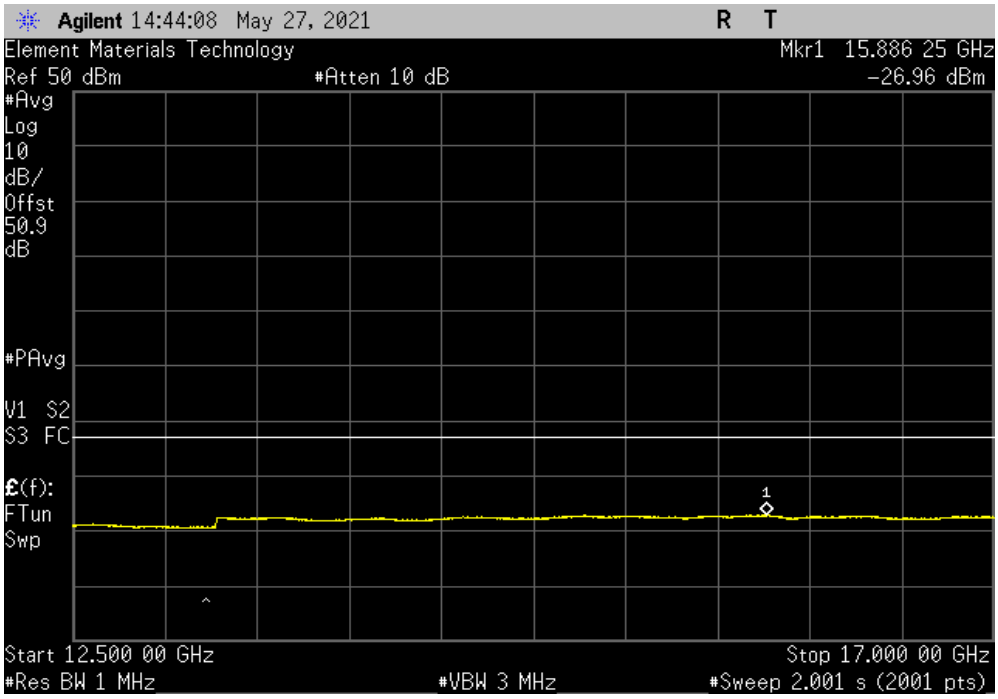
Transmit, DE-QPSK, Mid Ch. 121, 1621.020833 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
9 kHz - 1 GHz		592.5	-31.81	-13	Pass



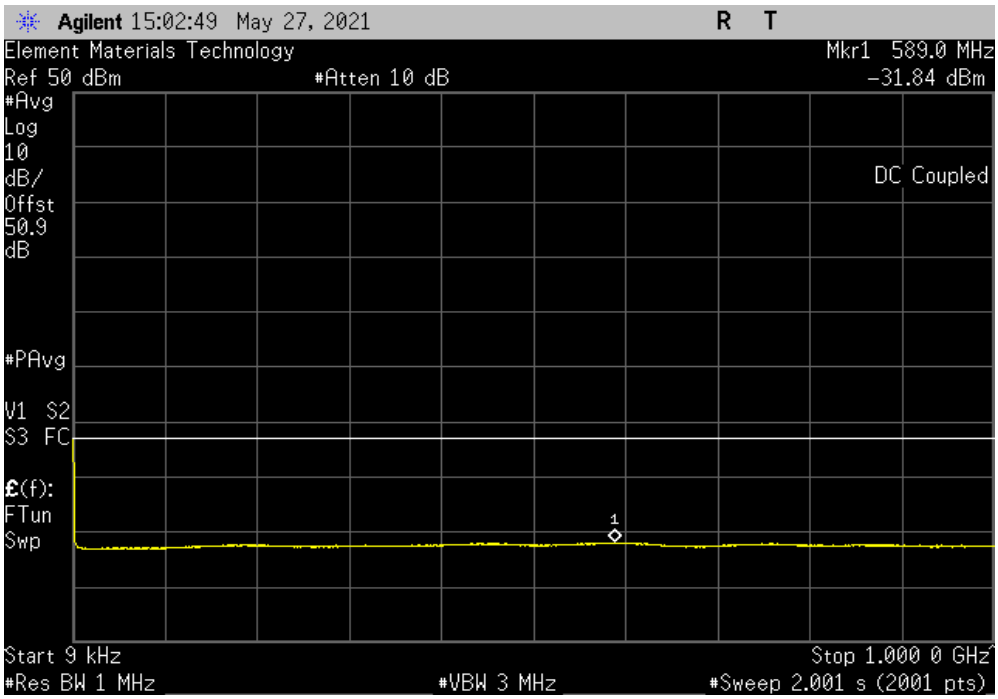
Transmit, DE-QPSK, Mid Ch. 121, 1621.020833 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBm)**	**Limit (dBm)**	**Result**
1 GHz - 12.5 GHz	7497.5	-28.54	-13	Pass



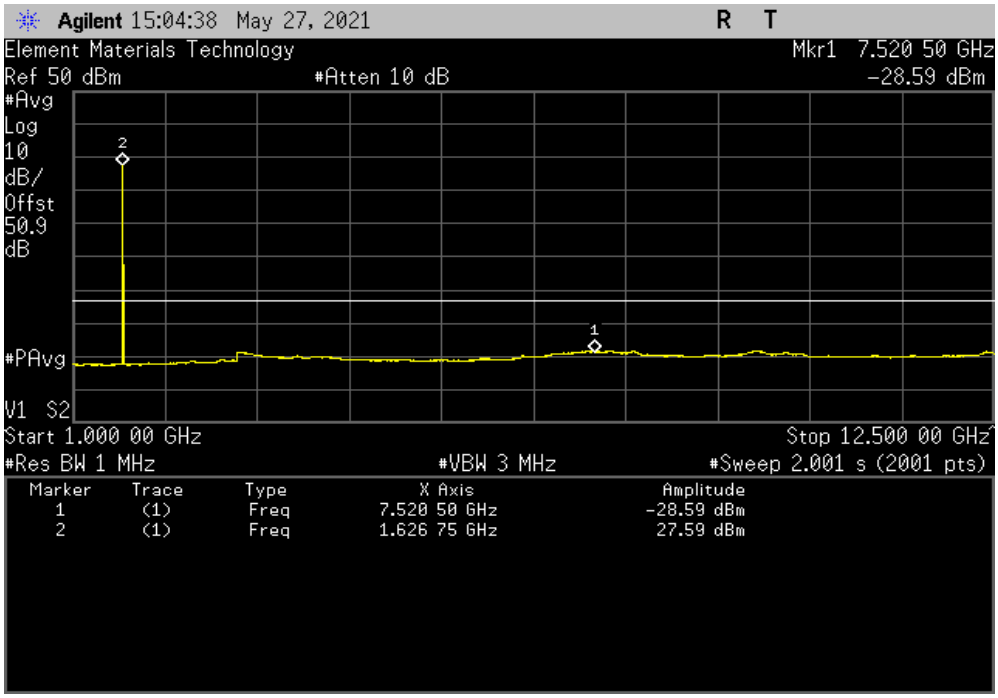
Transmit, DE-QPSK, Mid Ch. 121, 1621.020833 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBm)**	**Limit (dBm)**	**Result**
12.5 GHz - 17 GHz	15886.25	-26.96	-13	Pass



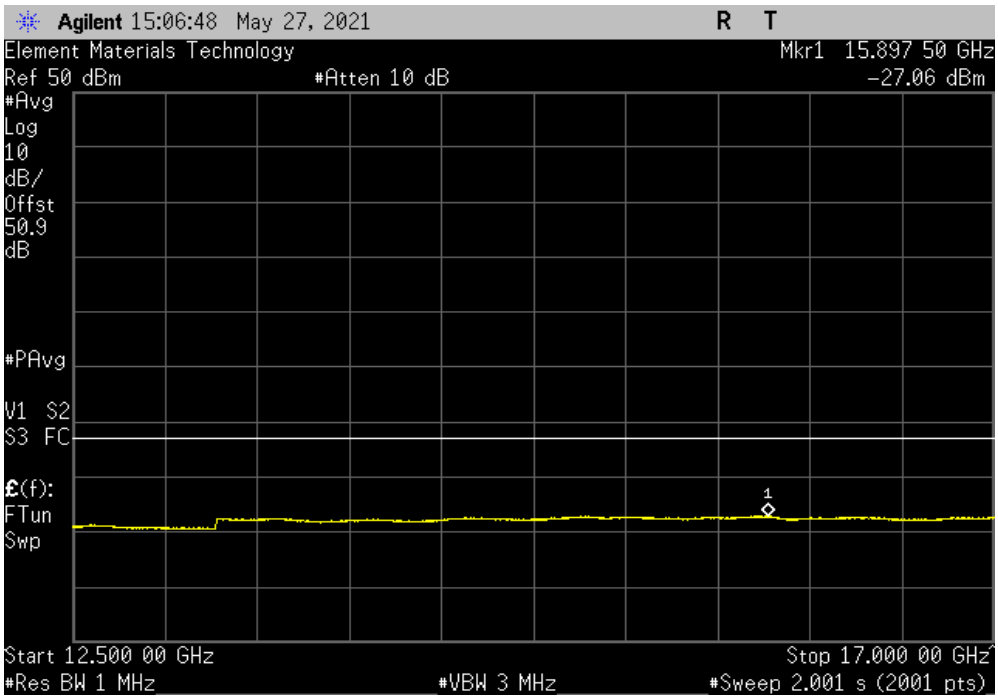
Transmit, DE-QPSK, High Ch. 240, 1625.979167 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
9 kHz - 1 GHz		589	-31.84	-13	Pass



Transmit, DE-QPSK, High Ch. 240, 1625.979167 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
1 GHz - 12.5 GHz	7520.5	-28.59	-13	Pass



Transmit, DE-QPSK, High Ch. 240, 1625.979167 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBm)**	**Limit (dBm)**	**Result**
12.5 GHz - 17 GHz	15897.5	-27.06	-13	Pass



SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS - EMISSIONS MASK

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
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFO	2021-07-06	2022-07-06
Generator - Signal	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Block - DC	Fairview Microwave	SD3379	AMW	2021-07-06	2022-07-06
Attenuator	S.M Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Attenuator	Fairview Microwave	18B5W-26	RFZ	2021-07-16	2022-07-16
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2021-03-14	2022-03-14

TEST DESCRIPTION

The EUT was transmitting at its default max power using the channels and modes called out in the following data sheets. The spectrum analyzer was configured to a RBW and VBW of 3 kHz and 9.1 kHz respectfully with the trace set to max hold using and RMS detector. An additional reference level offset was added to make the resultant measurement relative to any 4kHz band as per the requirement as called out in 25.202(f).

The mask specified in clause 25.202(f) was applied using an authorized bandwidth of 41.667 kHz.

1. In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;

2. In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: 35 dB;

3. In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;

SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS - EMISSIONS MASK

XMit 2020.12.30.0

EUT:	**SHOUT sp Handheld Iridium Smartphone**			**Work Order:**	**PCTE0003**
Serial Number:	**FCC 1**			**Date:**	**1-Oct-21**
Customer:	**NAL Research Corporation**			**Temperature:**	**22.5**
Attendees:	**None**			**Humidity:**	**44%**
Project:	**None**			**Barometric Pres.:**	**1018.6 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**5.0 VDC via USB**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 25:2021	ANSI C63.26:2015

COMMENTS

Reference level offset includes: DC block, attenuation, measurement cable, and an additional correction for reducted RBW. The additonal correction was calculated using 10 * log (specfied RBW / measurement RBW) = 10*log(4 kHz / 3 kHz) = 1.25 dB.

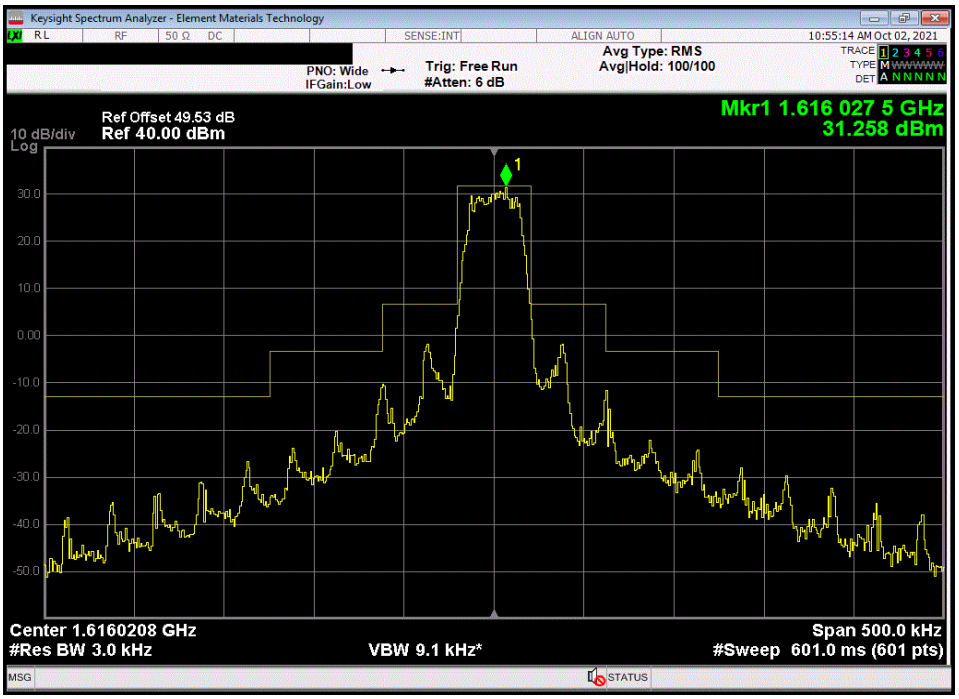
DEVIATIONS FROM TEST STANDARD

None

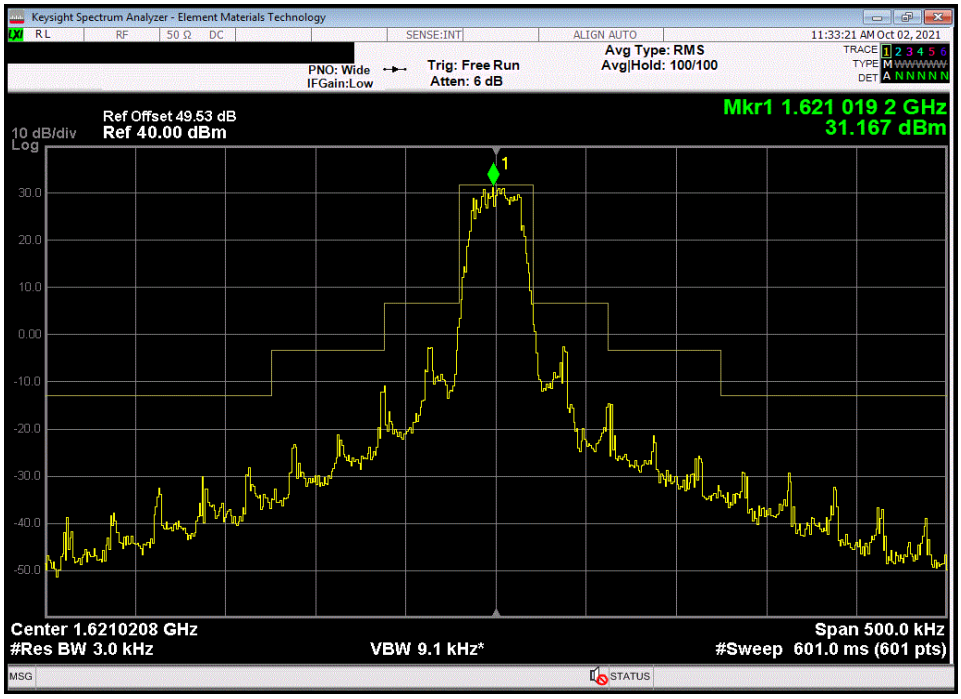
Configuration #	**2**	*Signature*

	Value	**Limit**	**Result**
Tx, DE-QPSK			
Low Ch. 1, 1616.020833 MHz	See Graph	See Graph	Pass
Mid Ch. 121, 1621.020833 MHz	See Graph	See Graph	Pass
High Ch. 240, 1625.979167 MHz	See Graph	See Graph	Pass

Tx, DE-QPSK, Low Ch. 1, 1616.020833 MHz						
				Value	Limit	Result
				See Graph	See Graph	Pass



Tx, DE-QPSK, Mid Ch. 121, 1621.020833 MHz						
				Value	Limit	Result
				See Graph	See Graph	Pass



SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS - EMISSIONS MASK

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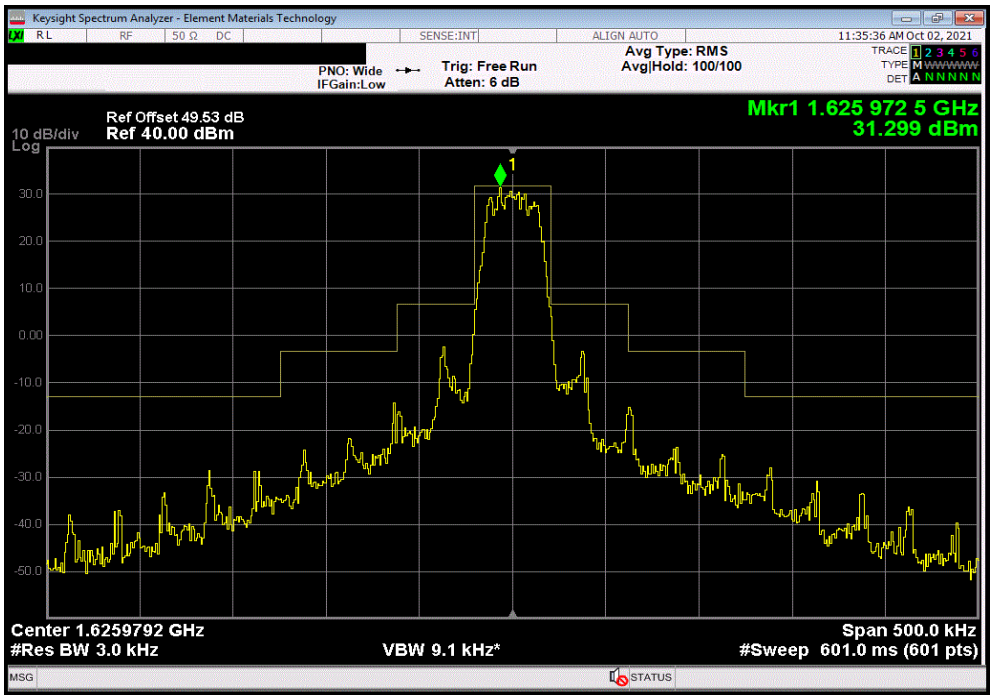
Tx, DE-QPSK, High Ch. 240, 1625.979167 MHz						
				Value	Limit	Result
				See Graph	See Graph	Pass



LIMITS ON EMISSIONS FROM MOBILE EARTH STATIONS FOR PROTECTION OF AERONAUTICAL RADIONAVIGATION-SATELLITE SERVICE

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2021-03-14	2022-03-14
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Attenuator	Fairview Microwave	SA18N5WA-6	TYT	2021-07-22	2022-07-22
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06
Generator - Signal	Agilent	N5181A	TIG	2020-04-16	2023-04-16

TEST DESCRIPTION

The EUT was set to transmit at its maximum power using the modulation as described by the manufacturer. Antenna port emissions were measured at the RF output terminal of the EUT via a cable, attenuation and DC block on the RF input of the spectrum analyzer.

Analyzer plots collected in the 1559 – 1605 MHz band-segments with the EUT transmitting using the following parameters:

-70 dBW / MHz EIRP
-80 dBW / kHz EIRP

Analyzer plots collected in the 1605 – 1610 MHz band-segments with the EUT transmitting using the following parameters:

-70 dBW / MHz EIRP at 1605 MHz to -10 dBW / MHz EIRP at 1610 MHz
-80 dBW / kHz EIRP at 1605 MHz to -20 dBW / kHz EIRP at 1610 MHz

Analyzer plot was collected in the following band with the EUT configured to standby / carrier off state:

-80 dBW / MHz EIRP at 1559 MHz to 1610 MHz

LIMITS ON EMISSIONS FROM MOBILE EARTH STATIONS FOR PROTECTION OF AERONAUTICAL RADIONAVIGATION-SATELLITE SERVICE

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EUT:	**SHOUT sp Handheld Iridium Smartphone**			**Work Order:**	**PCTE0003**
Serial Number:	**FCC 1**			**Date:**	**1-Oct-21**
Customer:	**NAL Research Corporation**			**Temperature:**	**23.2 °C**
Attendees:	**None**			**Humidity:**	**46.1% RH**
Project:	**None**			**Barometric Pres.:**	**1024 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**5.0 VDC via USB**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 25:2021	ANSI C63.26:2015

COMMENTS

Reference level offset includes: DC block, 6 dB attenuation, measurement cable, and the EUTs antenna gain.

DEVIATIONS FROM TEST STANDARD

Configuration #	**2**	*Signature*

		Value	**Limit**	**Result**
Transmit, DE-QPSK				
	Low Ch. 1616.020833 MHz			
	1559 - 1605 MHz, 1 MHz RBW	See Graph	See Graph	Pass
	1559 - 1605 MHz, 1 kHz RBW	See Graph	See Graph	Pass
	1605 - 1610 MHz, 1 MHz RBW	See Graph	See Graph	Pass
	1605 - 1610 MHz, 1 kHz RBW	See Graph	See Graph	Pass
	Mid Ch. 1621.020833 MHz			
	1559 - 1605 MHz, 1 MHz RBW	See Graph	See Graph	Pass
	1559 - 1605 MHz, 1 kHz RBW	See Graph	See Graph	Pass
	1605 - 1610 MHz, 1 MHz RBW	See Graph	See Graph	Pass
	1605 - 1610 MHz, 1 kHz RBW	See Graph	See Graph	Pass
	High Ch. 1625.979167 MHz			
	1559 - 1605 MHz, 1 MHz RBW	See Graph	See Graph	Pass
	1559 - 1605 MHz, 1 kHz RBW	See Graph	See Graph	Pass
	1605 - 1610 MHz, 1 MHz RBW	See Graph	See Graph	Pass
	1605 - 1610 MHz, 1 kHz RBW	See Graph	See Graph	Pass
Carrier off state				
	1559 MHz - 1610 MHz	See Graph	See Graph	Pass

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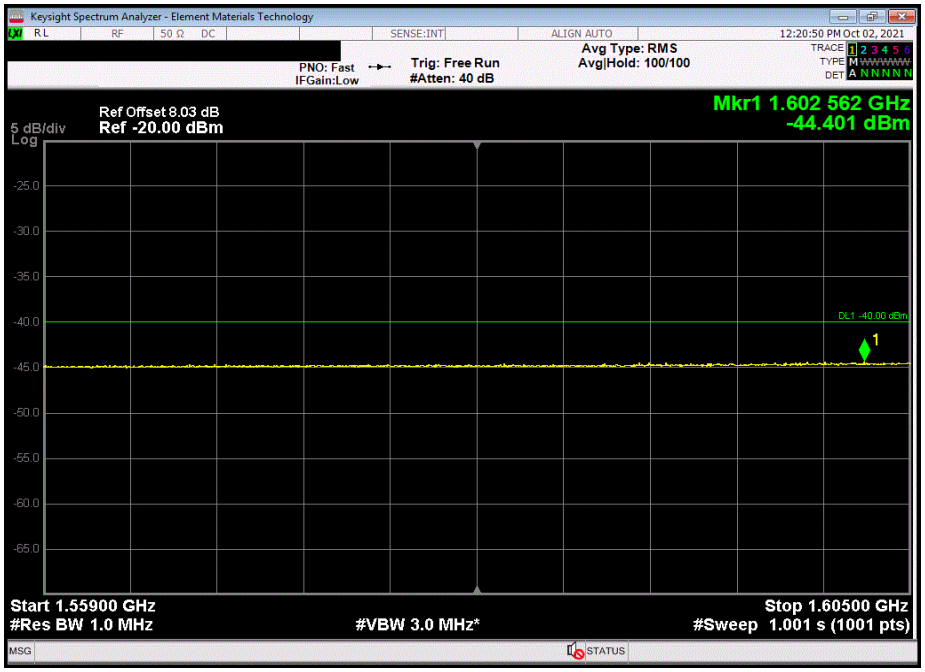
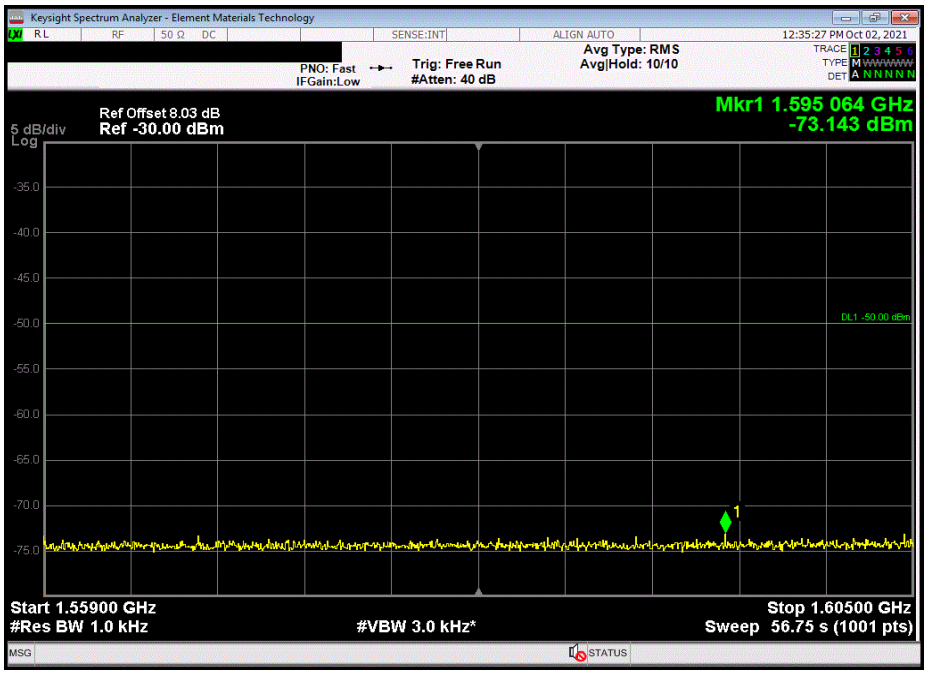
Transmit, DE-QPSK, Low Ch. 1616.020833 MHz, 1559 - 1605 MHz, 1 MHz RBW

				Value	Limit	Result
				See Graph	See Graph	Pass



Transmit, DE-QPSK, Low Ch. 1616.020833 MHz, 1559 - 1605 MHz, 1 kHz RBW

				Value	Limit	Result
				See Graph	See Graph	Pass



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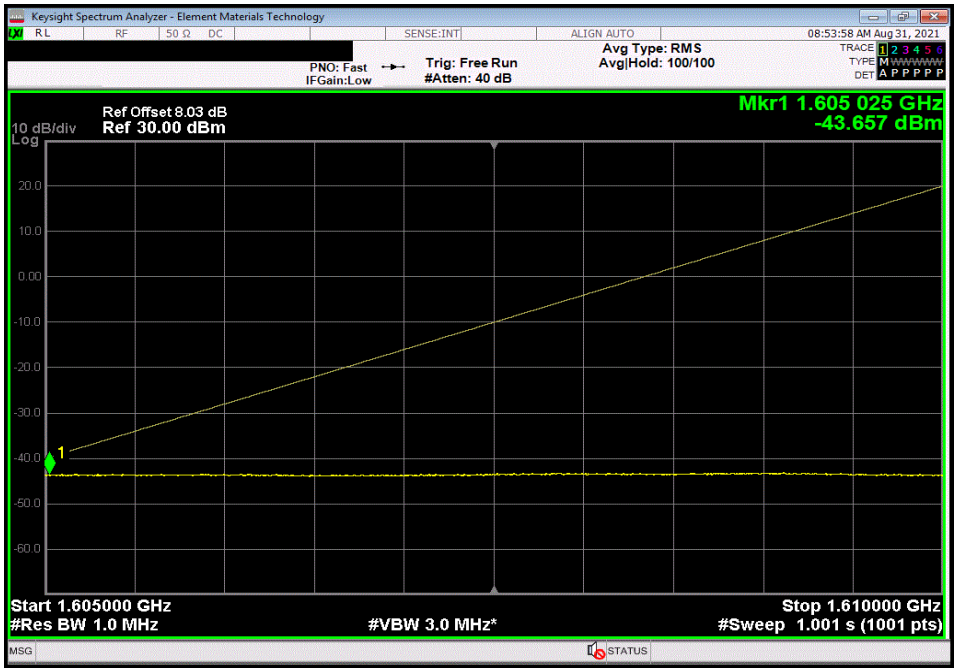
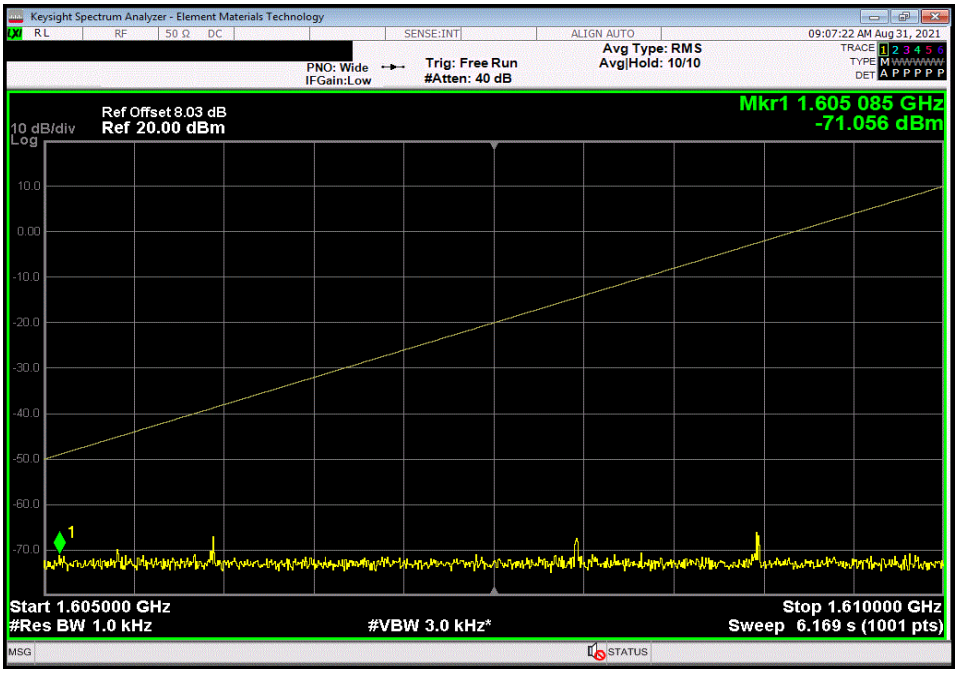
Transmit, DE-QPSK, Low Ch. 1616.020833 MHz, 1605 - 1610 MHz, 1 MHz RBW

				Value	Limit	Result
				See Graph	See Graph	Pass



Transmit, DE-QPSK, Low Ch. 1616.020833 MHz, 1605 - 1610 MHz, 1 kHz RBW

				Value	Limit	Result
				See Graph	See Graph	Pass



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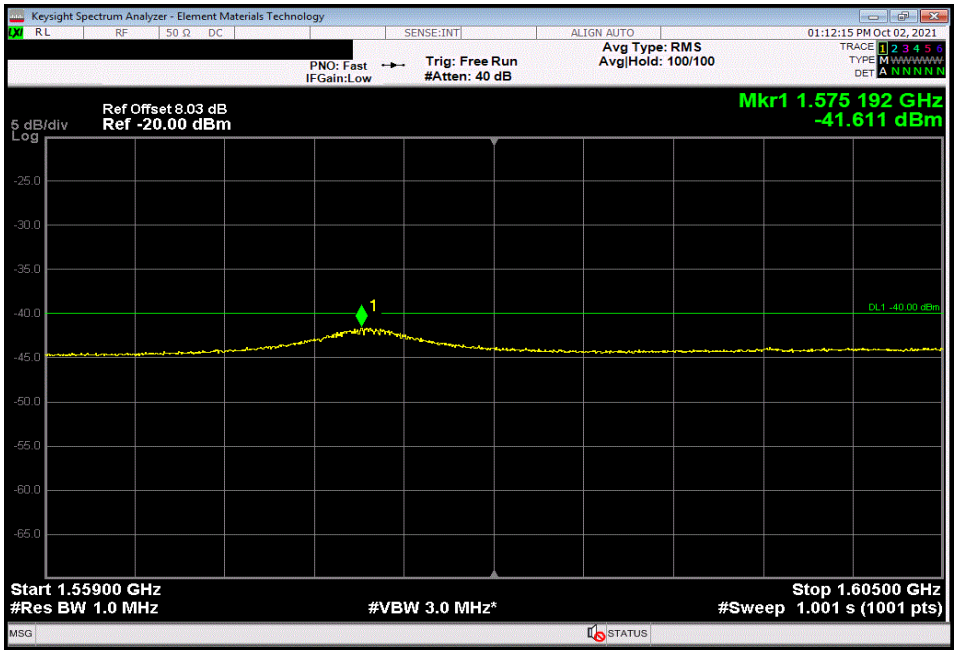
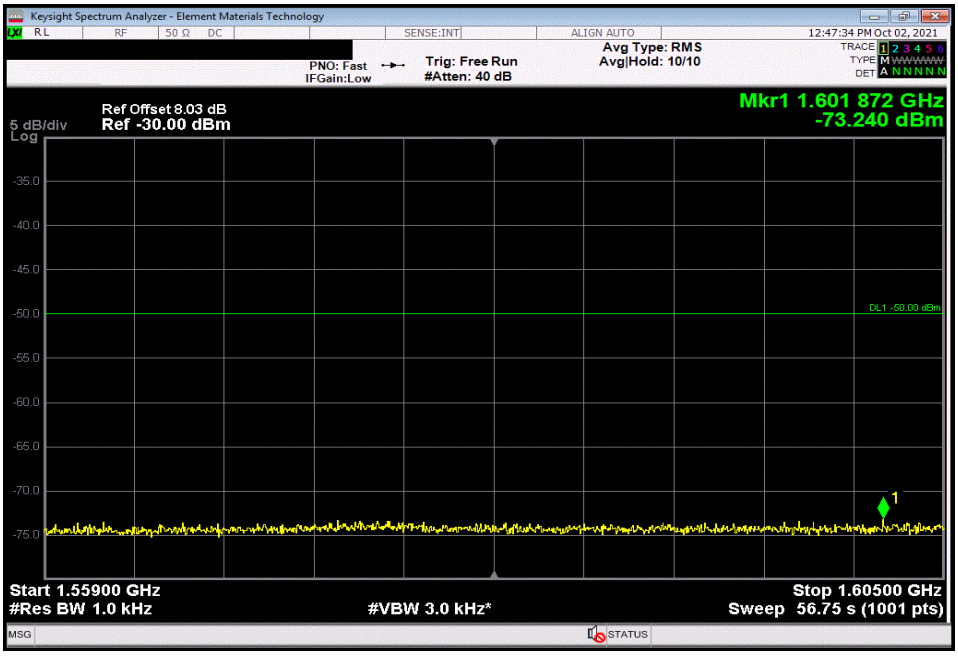
Transmit, DE-QPSK, Mid Ch. 1621.020833 MHz, 1559 - 1605 MHz, 1 MHz RBW

				Value	Limit	Result
				See Graph	See Graph	Pass



Transmit, DE-QPSK, Mid Ch. 1621.020833 MHz, 1559 - 1605 MHz, 1 kHz RBW

				Value	Limit	Result
				See Graph	See Graph	Pass



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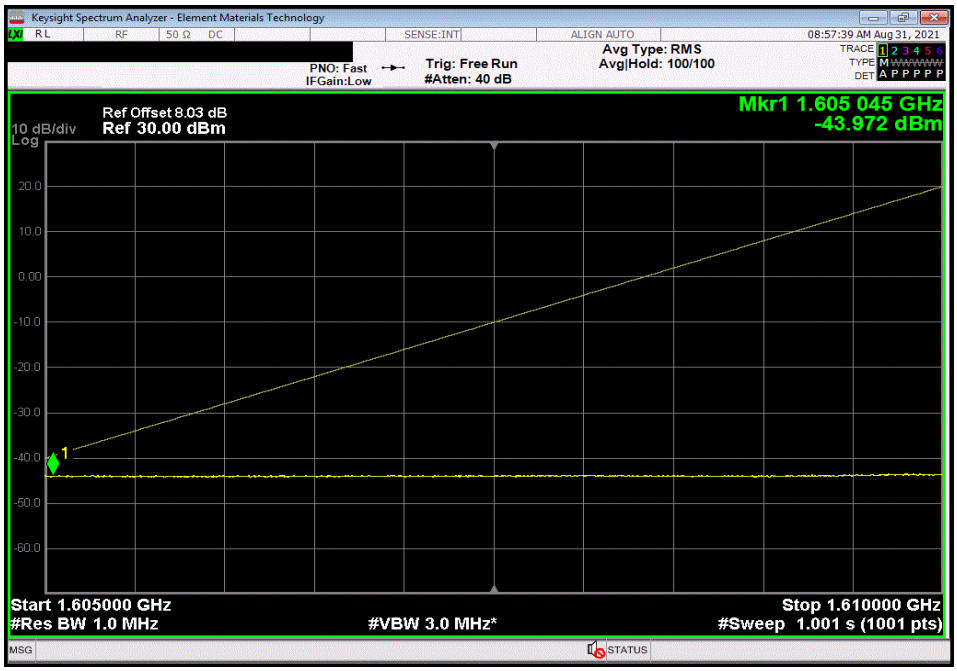
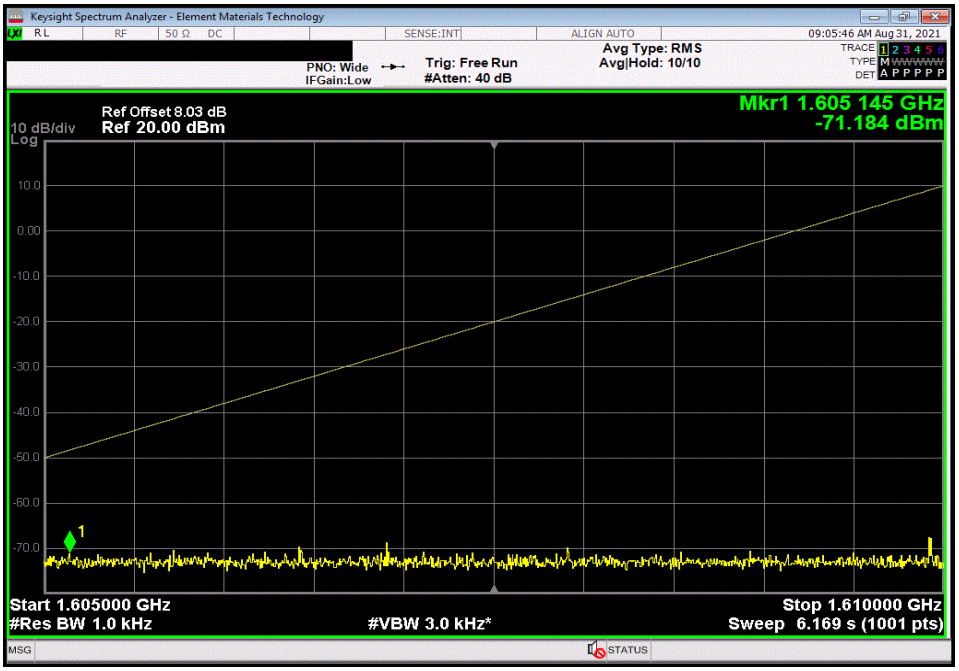
Transmit, DE-QPSK, Mid Ch. 1621.020833 MHz, 1605 - 1610 MHz, 1 MHz RBW

				Value	Limit	Result
				See Graph	See Graph	Pass



Transmit, DE-QPSK, Mid Ch. 1621.020833 MHz, 1605 - 1610 MHz, 1 kHz RBW

				Value	Limit	Result
				See Graph	See Graph	Pass



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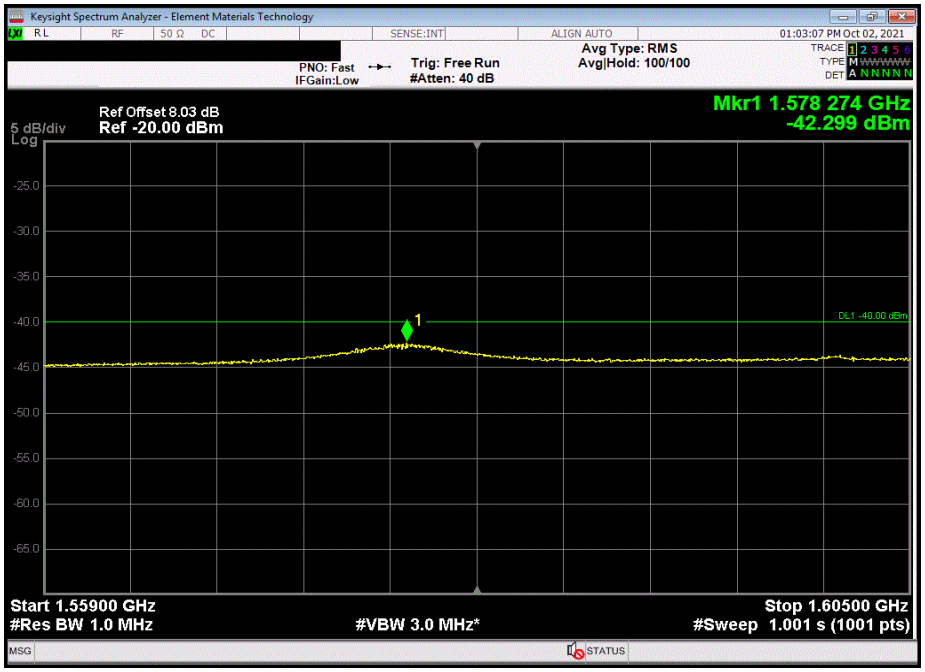
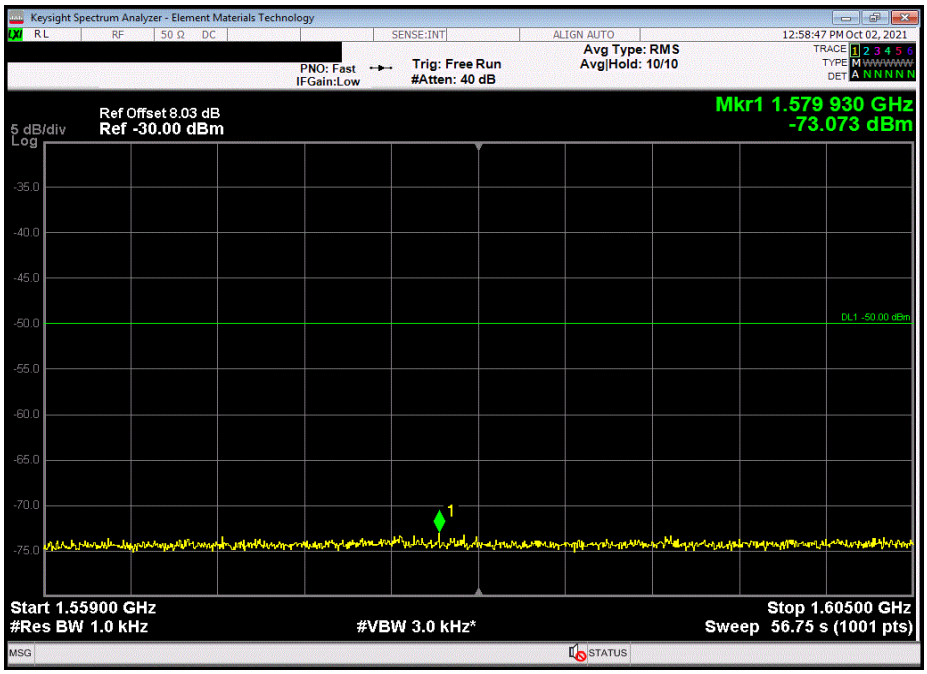
Transmit, DE-QPSK, High Ch. 1625.979167 MHz, 1559 - 1605 MHz, 1 MHz RBW

				Value	Limit	Result
				See Graph	See Graph	Pass



Transmit, DE-QPSK, High Ch. 1625.979167 MHz, 1559 - 1605 MHz, 1 kHz RBW

				Value	Limit	Result
				See Graph	See Graph	Pass



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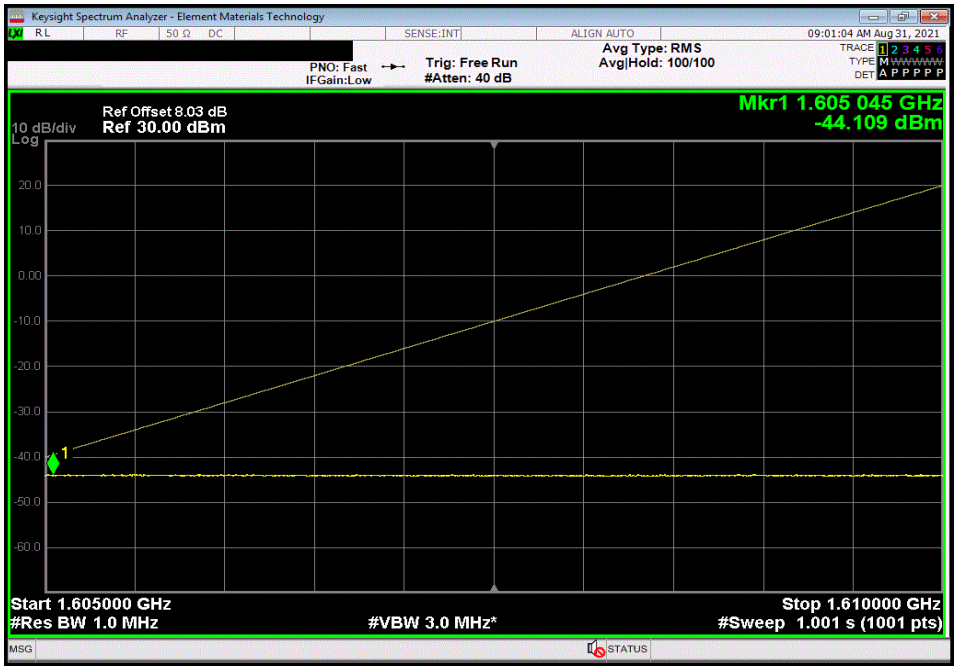
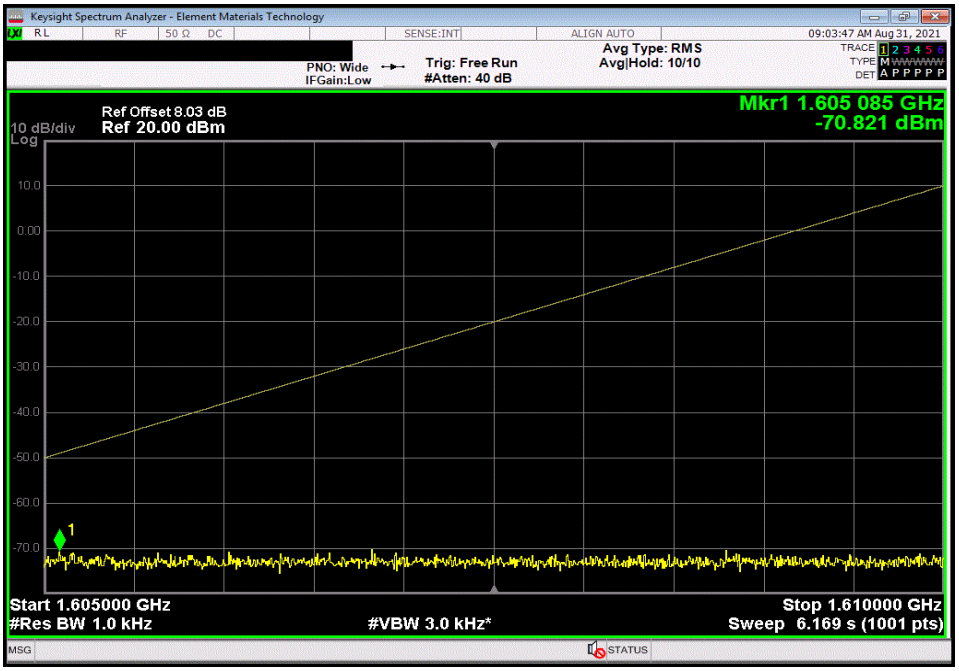
Transmit, DE-QPSK, High Ch. 1625.979167 MHz, 1605 - 1610 MHz, 1 MHz RBW

				Value	Limit	Result
				See Graph	See Graph	Pass



Transmit, DE-QPSK, High Ch. 1625.979167 MHz, 1605 - 1610 MHz, 1 kHz RBW

				Value	Limit	Result
				See Graph	See Graph	Pass



LIMITS ON EMISSIONS FROM MOBILE EARTH STATIONS FOR PROTECTION OF AERONAUTICAL RADIONAVIGATION-SATELLITE SERVICE

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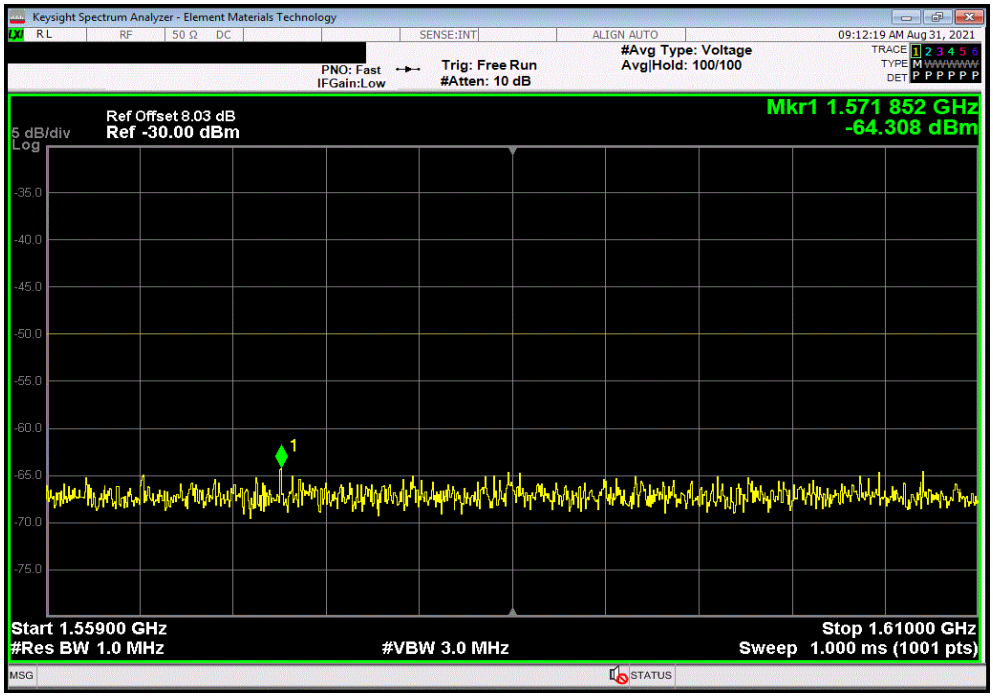
Carrier off state, 1559 MHz - 1610 MHz							
					Value	Limit	Result
					See Graph	See Graph	Pass



End of Test Report