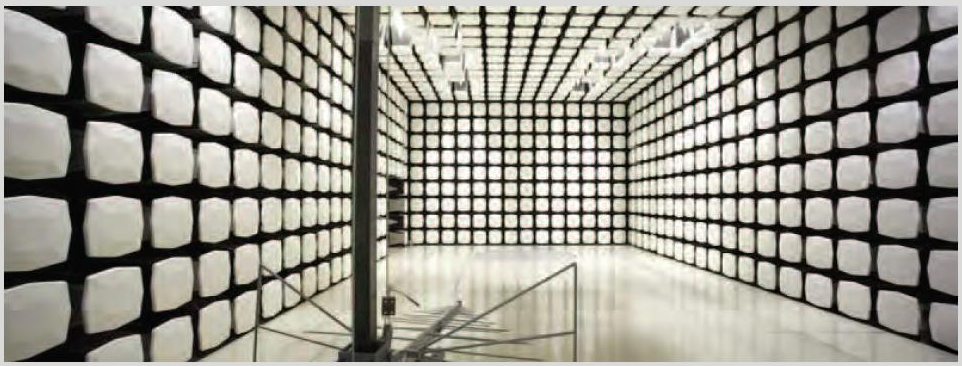
Descartes Systems (USA) LLC

PLT003

EN 300 328 V2.2.2:2019-07

Bluetooth Low Energy

Report: DESC0001.4 Rev. 1, Issue Date: July 27, 2022



CERT #3310.02

CERTIFICATE OF TEST

Last Date of Test: June 09, 2022
Descartes Systems (USA) LLC
EUT: PLT003

Radio Equipment Testing

Standards

Specification	Method
EN 300 328 V2.2.2:2019-07	EN 300 328 V2.2.2:2019-07

Results

Test Description	Result	Specification Section(s)	Method Section(s)	Comments
Accumulated Transmit Time, Frequency Occupation, Hopping Sequence	N/A	4.3.1.4	5.4.4	Not required unless EUT is a FHSS device.
Hopping Frequency Separation	N/A	4.3.1.5	5.4.5	Not required unless EUT is a FHSS device.
RF Output Power	Pass	4.3.2.2	5.4.2	
Power Spectral Density	Pass	4.3.2.3	5.4.3	
Duty Cycle, Tx-Sequence, Tx-Gap	N/A	4.3.2.4	5.4.4	Not required for adaptive equipment.
Medium Utilization	N/A	4.3.2.5	5.4.2	Not required for adaptive equipment.
Adaptivity	N/A	4.3.2.6	5.4.6	Not required for a device with a rated power of less than 10 dBm.
Occupied Channel Bandwidth	Pass	4.3.2.7	5.4.7	
Transmitter Unwanted Emissions in the OOB Domain	Pass	4.3.2.8	5.4.8	
Transmitter Unwanted Emissions in the Spurious Domain	Pass	4.3.2.9	5.4.9	
Receiver Spurious Emissions	N/A	4.3.2.10	5.4.10	Not required for a device which does not have a receive mode.
Receiver Blocking	N/A	4.3.2.11	5.4.11	Not required for a device which does not have a receive mode.
Geo-Location Capability	N/A	4.3.2.12	N/A	Not required. Manufacturer's declaration if implemented.
Application Form For Testing	N/A	N/A	Annex E	Not required to test. Annex must be filled out by the manufacturer and included in the test report.

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	Version added to the standard.	2022-07-27	1
	Updated the mod log to show 6/9 for each respective test.	2022-07-27	13
	Added appendix with Annex E and corrected order on CoT	2022-07-27	2, 47

ACCREDITATIONS AND AUTHORIZATIONS

element
2021.09.01

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.

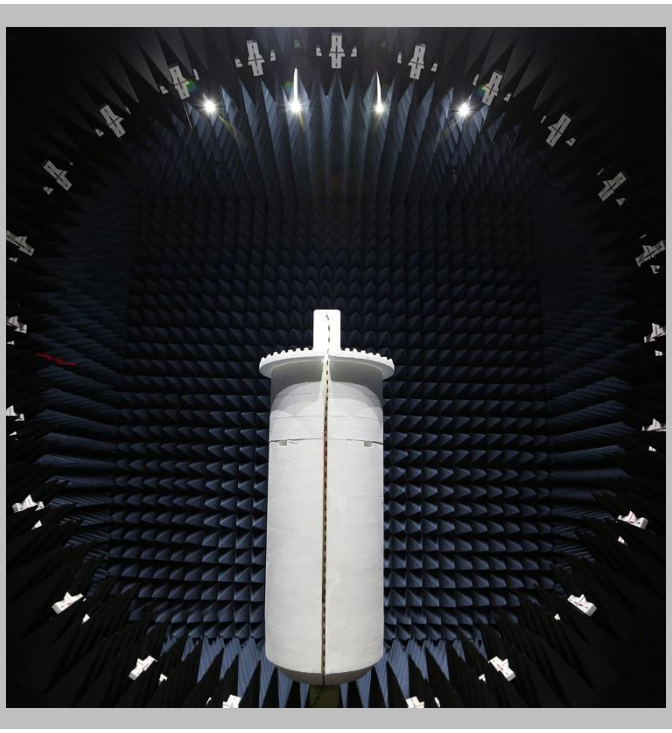
SCOPE

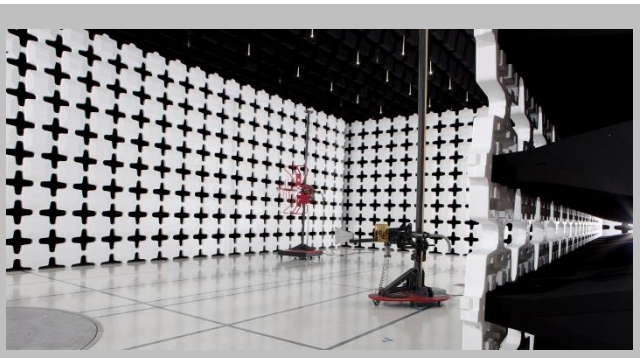
For details on the Scopes of our Accreditations, please visit:

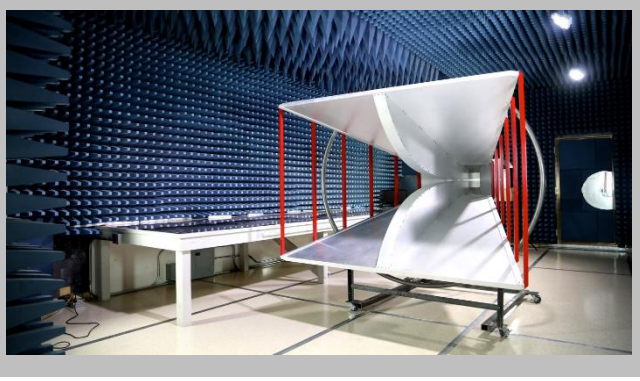
California Minnesota Oregon Texas Washington

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

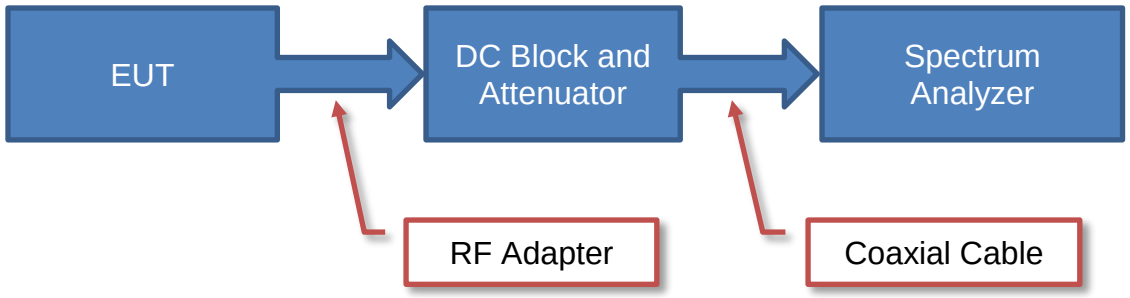
TEST SETUP BLOCK DIAGRAMS

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.

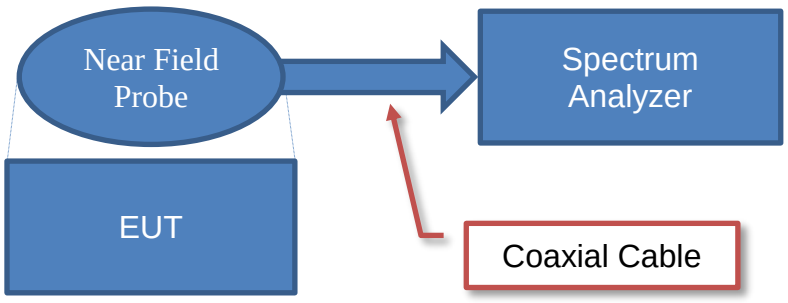
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

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

Near Field Test Fixture Measurements

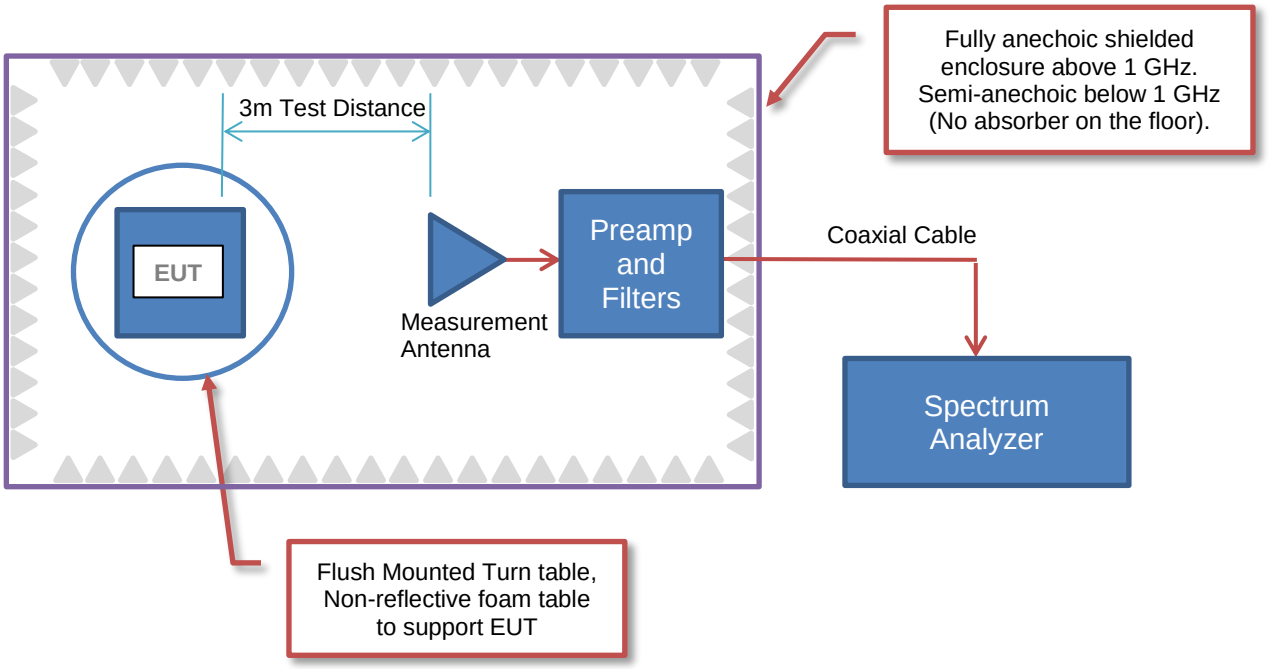


Sample Calculation (logarithmic units)

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**

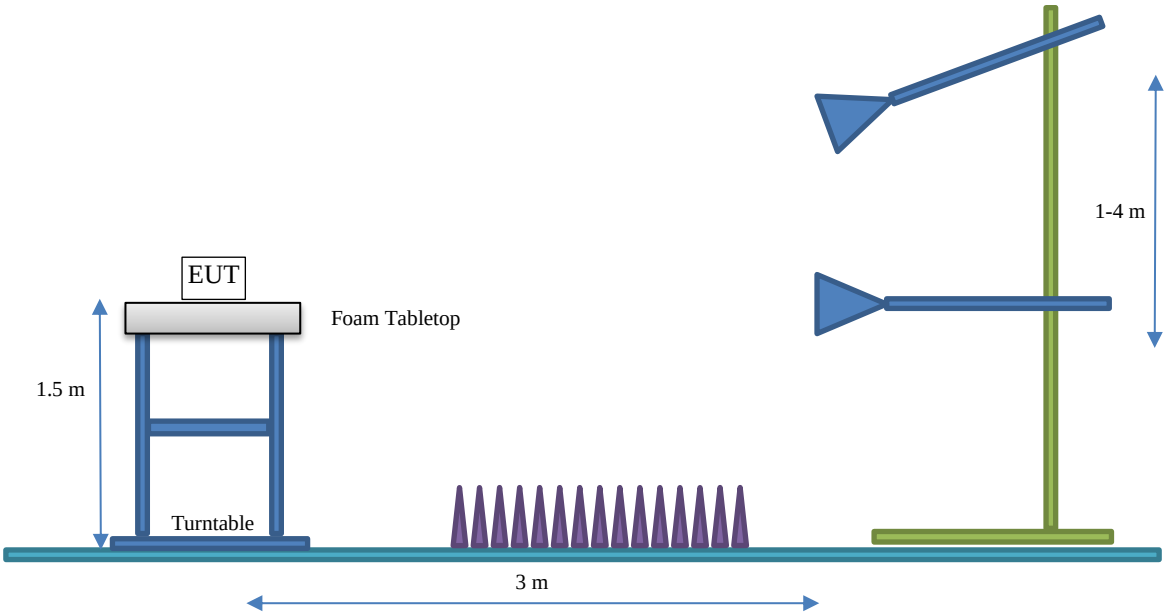
Radiated Power (ERP/EIRP):

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:	Descartes Systems (USA) LLC
Address:	37 N Orange Ave #500
City, State, Zip:	Orlando, FL 32801
Test Requested By:	Maria Vivas
EUT:	PLT003
First Date of Test:	June 9, 2022
Last Date of Test:	June 9, 2022
Receipt Date of Samples:	June 9, 2022
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Bluetooth Low Energy (BLE) tag used to monitor movement of goods and equipment. Each tag is made up of an Nordic nRF52810-QCAA module encased in a housing. Also included is three lithium cell batteries. It is adverting each 10 seconds

Testing Objective:
To demonstrate compliance of the Bluetooth radio to Article 3.2 of the RED

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)
Pillar	Manufacturer	2400-2500	-0.4

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

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting (dBm)
BLE / 1 Mbps	DTS	37	2402	4
		38	2426	
		39	2480	

CONFIGURATIONS

Configuration DESC0001- 8

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

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
BLE Beacon Tag	COREInsight	PLT003	1
BLE Beacon Tag	COREInsight	PLT003	2
BLE Beacon Tag	COREInsight	PLT003	3

Configuration DESC0001- 9

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

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
BLE Beacon Tag	COREInsight	PLT003	4
BLE Beacon Tag	COREInsight	PLT003	6

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2022-06-09	Transmitter Unwanted Emissions in the Spurious Domain	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2022-06-09	RF 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	2022-06-09	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.
4	2022-06-09	Occupied Channel 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.
5	2022-06-09	Transmitter Unwanted Emissions in the OOB Domain	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

RF OUTPUT POWER

XMit 2022.02.07.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-1-1-H/AC	TBI	NCR	NCR
Meter - Multimeter	Tektronix	DMM912	MMH	2022-03-02	2025-03-02
Thermometer	Omegaette	HH311	DTY	2021-02-04	2024-02-04
Generator - Signal	Agilent	N5183A	TID	2021-05-04	2023-05-04
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2022-03-14	2023-03-14
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2022-03-14	2023-03-14
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2021-12-05	2022-12-05
Meter - Power	ETS-Lindgren	7002-006	SRT	2022-06-01	2023-06-01
Attenuator	S.M. Electronics	SA26B-20	AUY	2022-03-15	2023-03-15
Block - DC	Fairview Microwave	SD3379	AMW	2022-03-14	2023-03-14
Directional Coupler	Fairview Microwave	MC2047-10	RGT	2021-07-01	2022-07-01
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and an ETSI EN 300 328 compliant RF Power Sensor which only measures across the high time of the burst of the carrier. The measured level was offset by the cable loss, attenuator, and DC block that was used between the power sensor and EUT. This offset was determined prior to testing using a signal generator and spectrum analyzer.

The RF output power was measured with the EUT set to the channels and modes called out in the data sheets.

The observed duty cycle was noted but not needed to calculate the EIRP.

EIRP = Max Measured Power + Antenna gain (dBi)

The measurements were made under normal test and extreme test conditions.

RF OUTPUT POWER

TbtTx 2022.05.02.0 XMit 2022.02.07.0

EUT:	**PLT003**			**Work Order:**	**DESC0001**
Serial Number:	**See configuration**			**Date:**	**9-Jun-22**
Customer:	**Descartes Systems (USA) LLC**			**Temperature:**	**22.4 °C**
Attendees:	**None**			**Humidity:**	**47.1% RH**
Project:	**None**			**Barometric Pres.:**	**1016 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**3.0 VDC**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
EN 300 328 V2.2.2:2019-07	EN 300 328 V2.2.2:2019-07

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

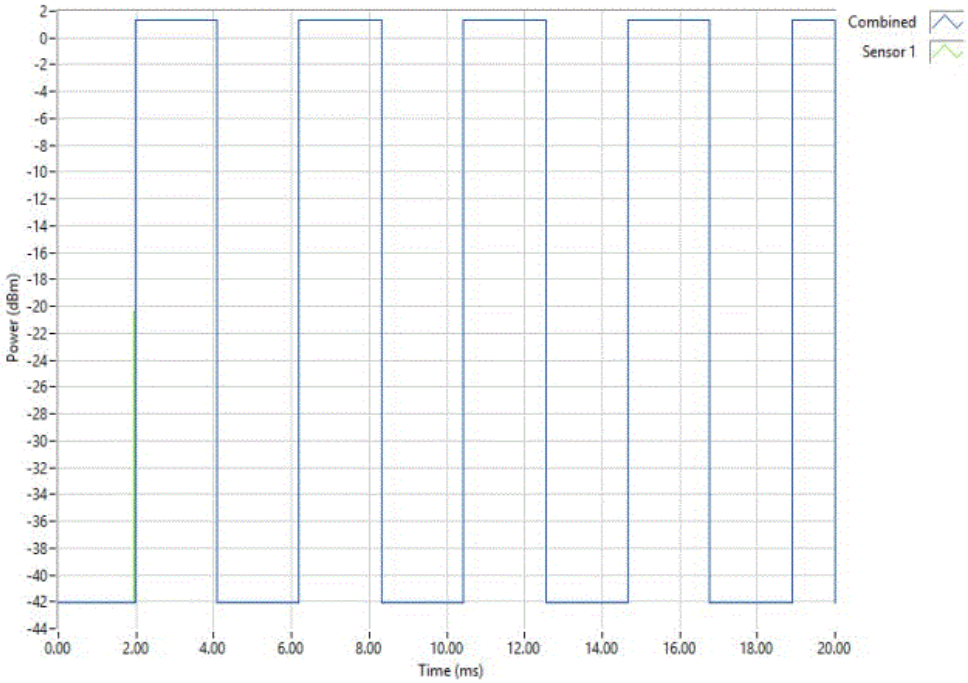
None

Configuration #	**8**	*Signature*

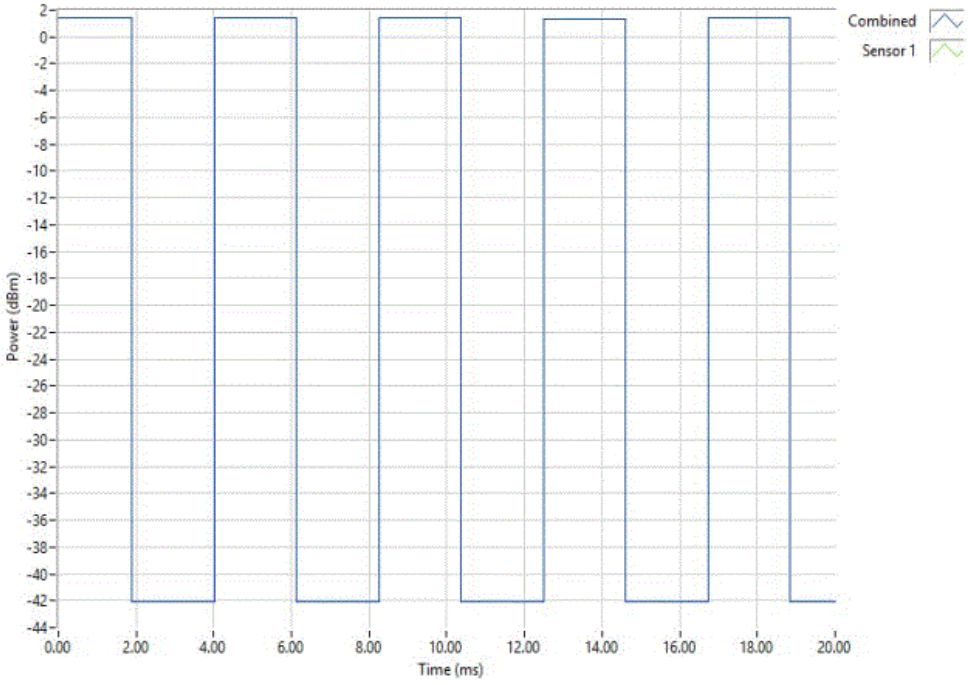
	Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
Normal Test Conditions						
BLE/GFSK 1 Mbps, Low Channel, 2402 MHz	1.28	49.92	-0.4	0.9	20	Pass
BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz	1.41	49.917	-0.4	1	20	Pass
BLE/GFSK 1 Mbps, High Channel, 2480 MHz	1.76	49.908	-0.4	1.4	20	Pass
Extreme Temperature, +60°C						
BLE/GFSK 1 Mbps, Low Channel, 2402 MHz	0.88	49.914	-0.4	0.5	20	Pass
BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz	1.02	49.92	-0.4	0.6	20	Pass
BLE/GFSK 1 Mbps, High Channel, 2480 MHz	1.41	49.92	-0.4	1	20	Pass
Extreme Temperature, -20°C						
BLE/GFSK 1 Mbps, Low Channel, 2402 MHz	2.2	49.917	-0.4	1.8	20	Pass
BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz	2.2	49.926	-0.4	1.8	20	Pass
BLE/GFSK 1 Mbps, High Channel, 2480 MHz	1.99	49.917	-0.4	1.6	20	Pass

RF OUTPUT POWER

Normal Test Conditions, BLE/GFSK 1 Mbps, Low Channel, 2402 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
	1.28	49.92	-0.4	0.9	20	Pass

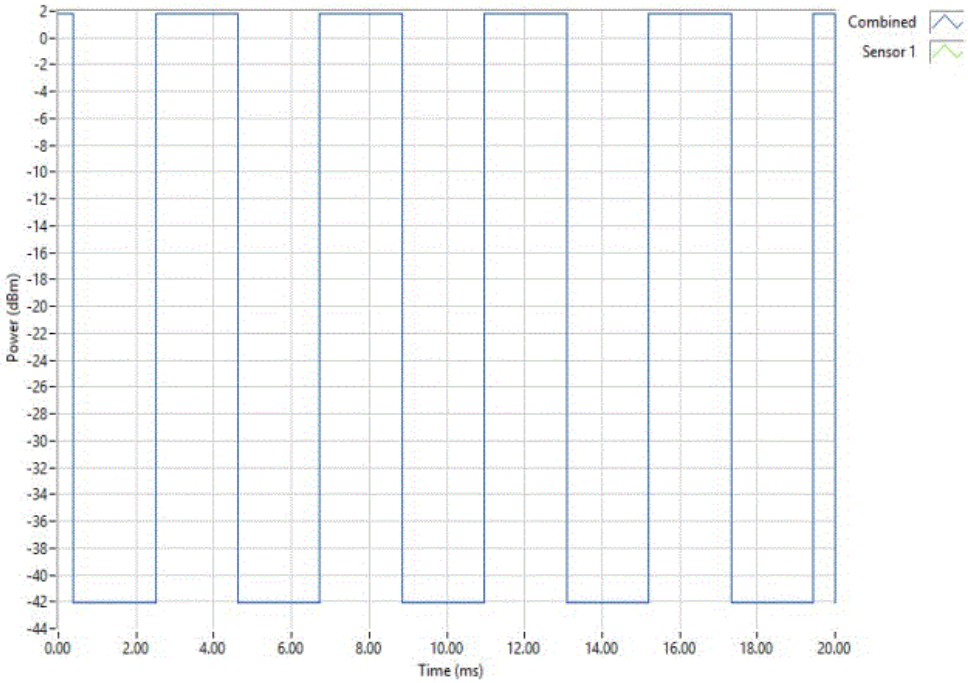


Normal Test Conditions, BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
	1.41	49.917	-0.4	1	20	Pass

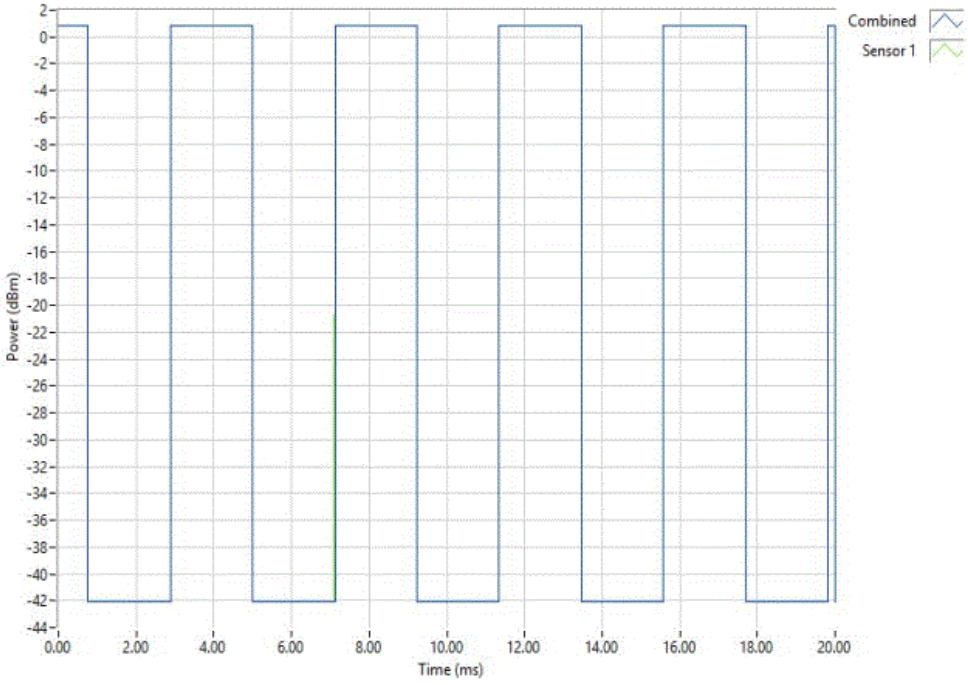


RF OUTPUT POWER

Normal Test Conditions, BLE/GFSK 1 Mbps, High Channel, 2480 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
	1.76	49.908	-0.4	1.4	20	Pass

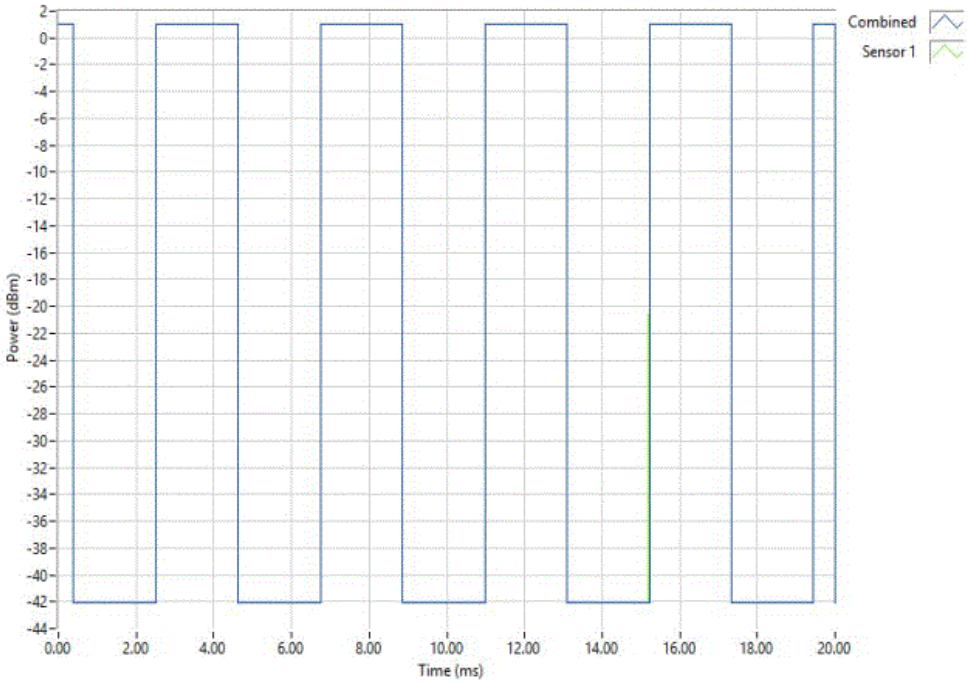


Extreme Temperature, +60°C, BLE/GFSK 1 Mbps, Low Channel, 2402 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
	0.88	49.914	-0.4	0.5	20	Pass

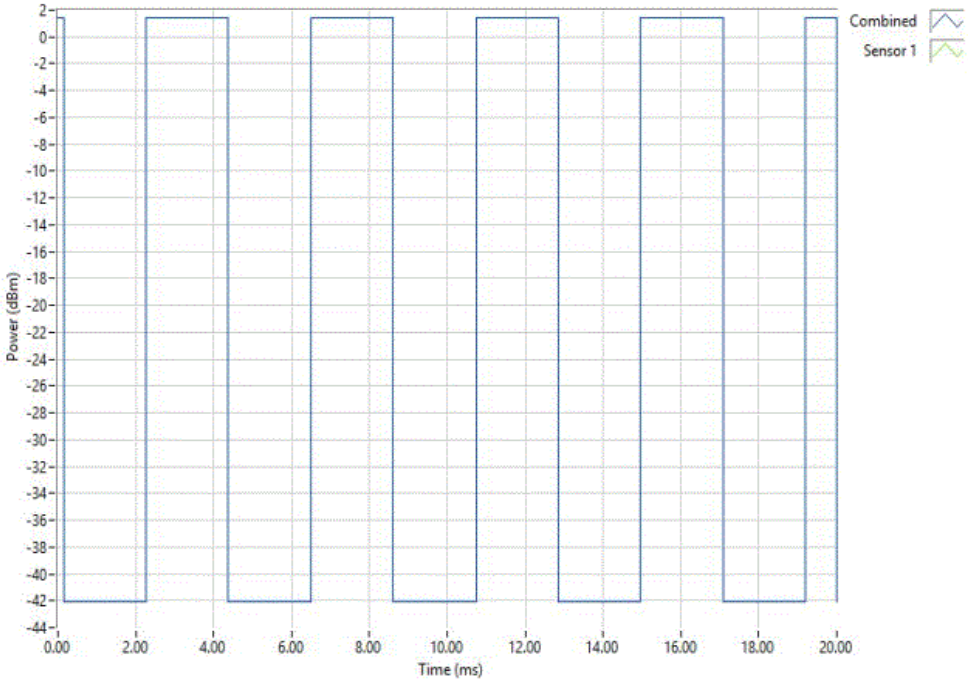


RF OUTPUT POWER

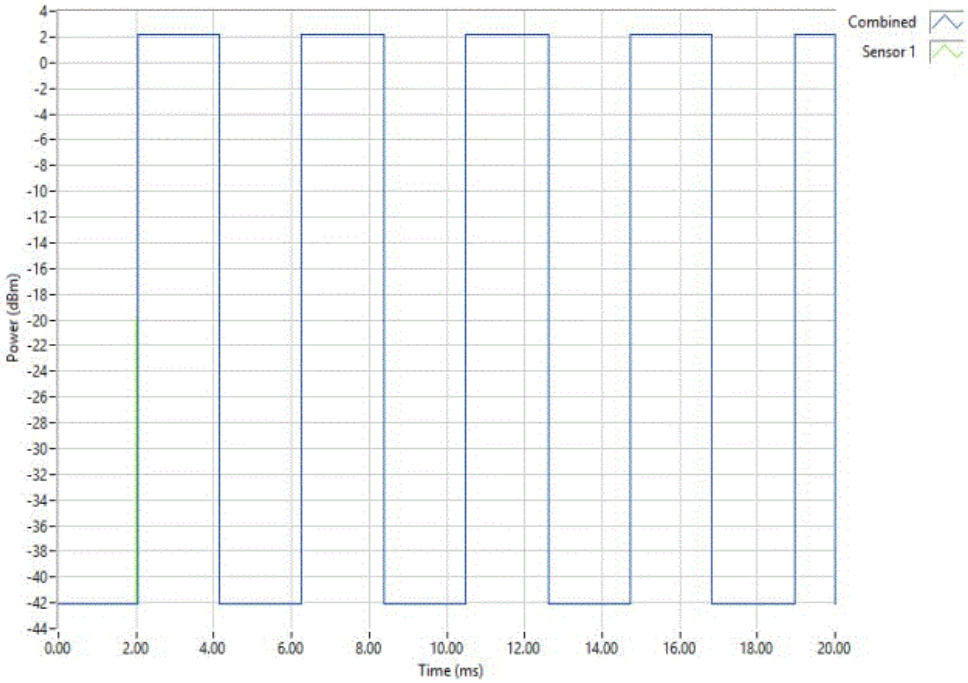
Extreme Temperature, +60°C, BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
	1.02	49.92	-0.4	0.6	20	Pass



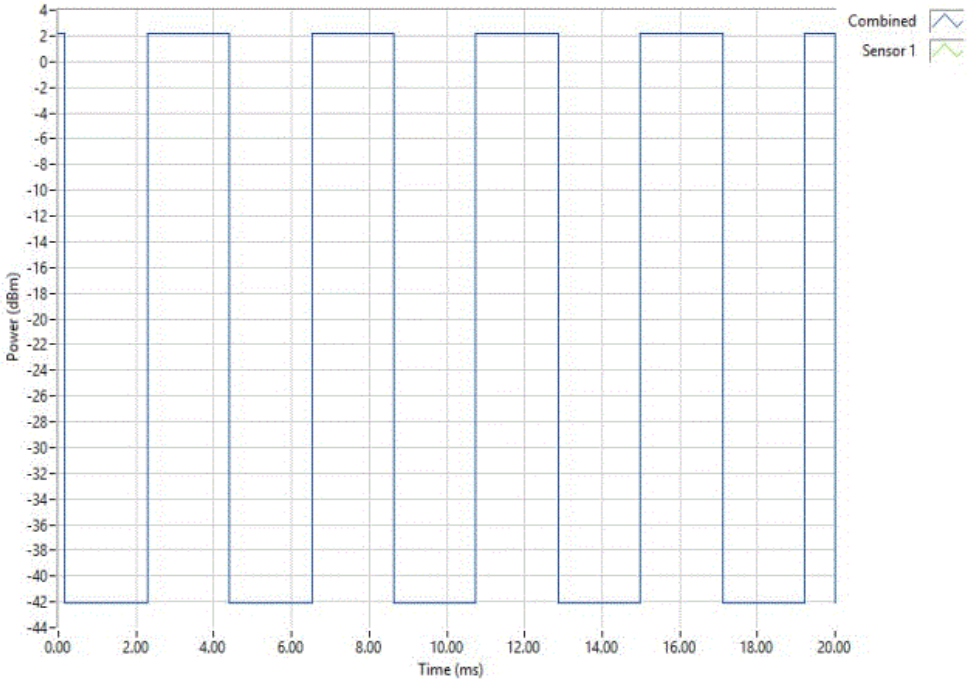
Extreme Temperature, +60°C, BLE/GFSK 1 Mbps, High Channel, 2480 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
	1.41	49.92	-0.4	1	20	Pass



Extreme Temperature, -20°C, BLE/GFSK 1 Mbps, Low Channel, 2402 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
	2.2	49.917	-0.4	1.8	20	Pass

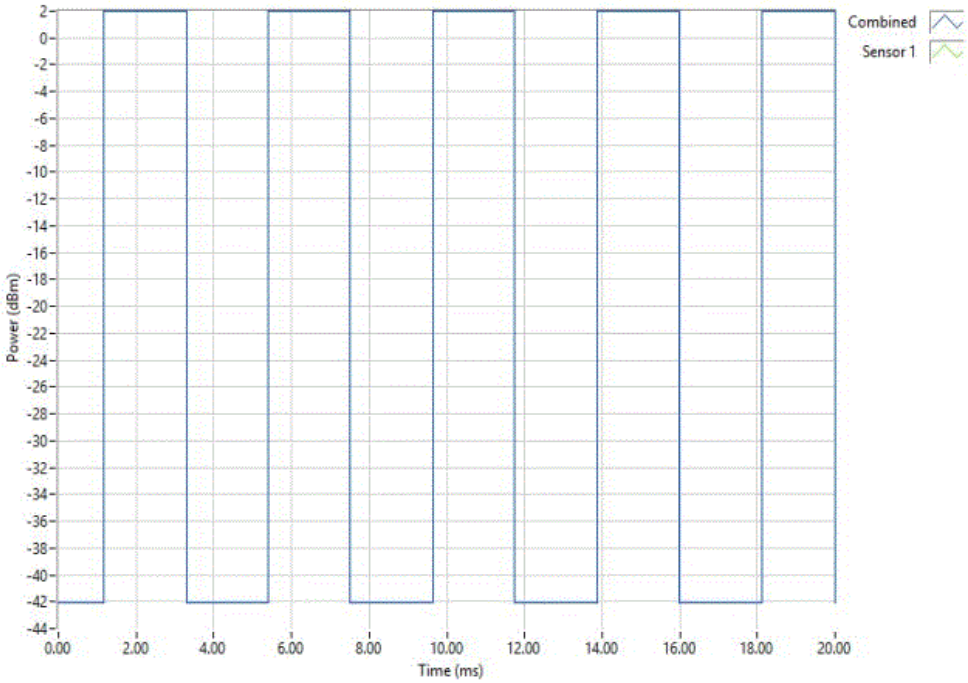


Extreme Temperature, -20°C, BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
	2.2	49.926	-0.4	1.8	20	Pass

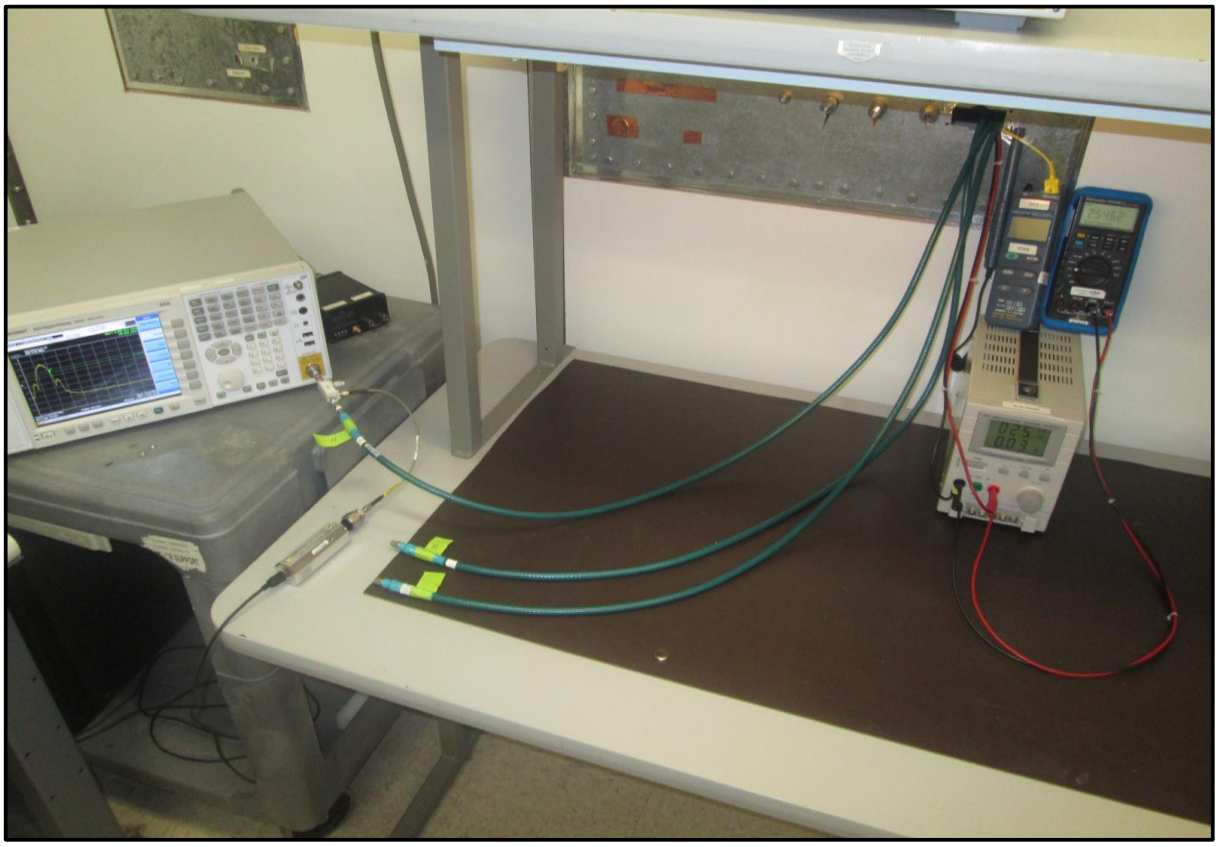


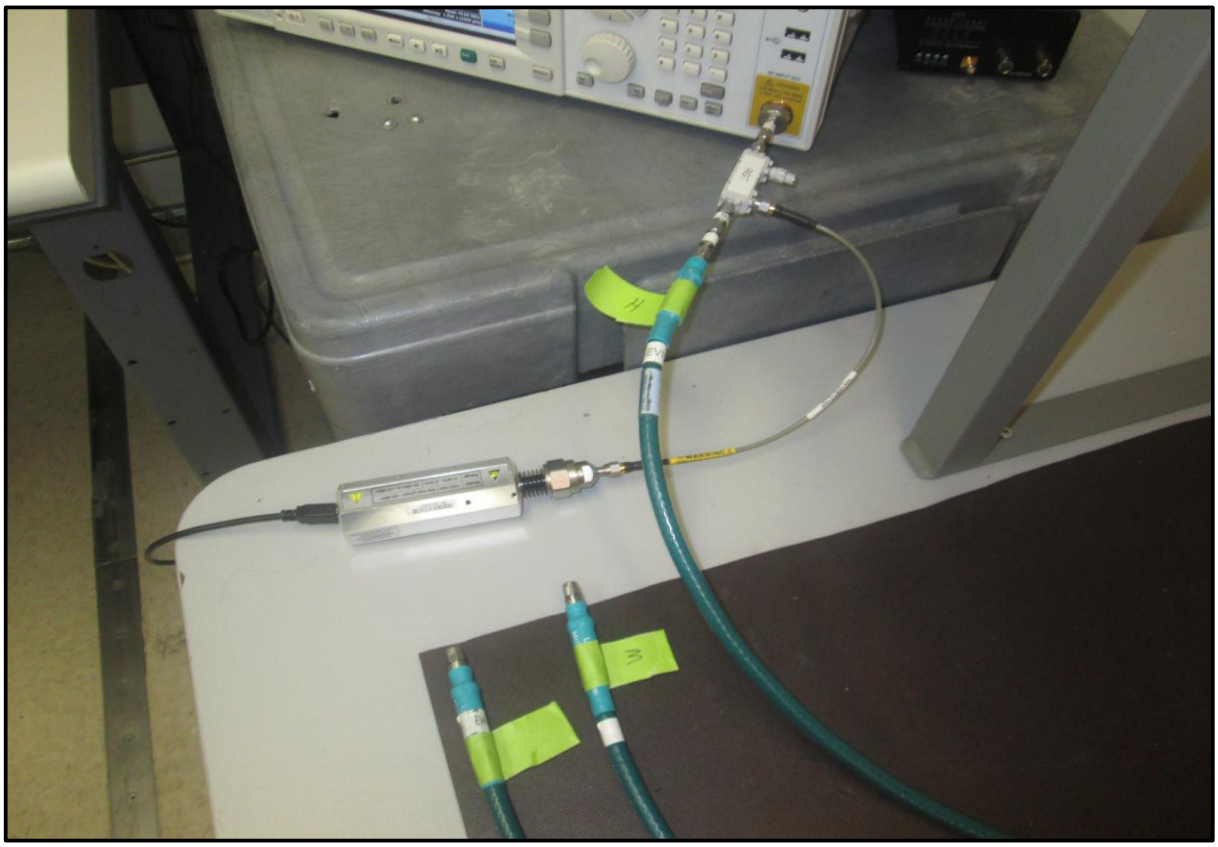
RF OUTPUT POWER

Extreme Temperature, -20°C, BLE/GFSK 1 Mbps, High Channel, 2480 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
	1.99	49.917	-0.4	1.6	20	Pass

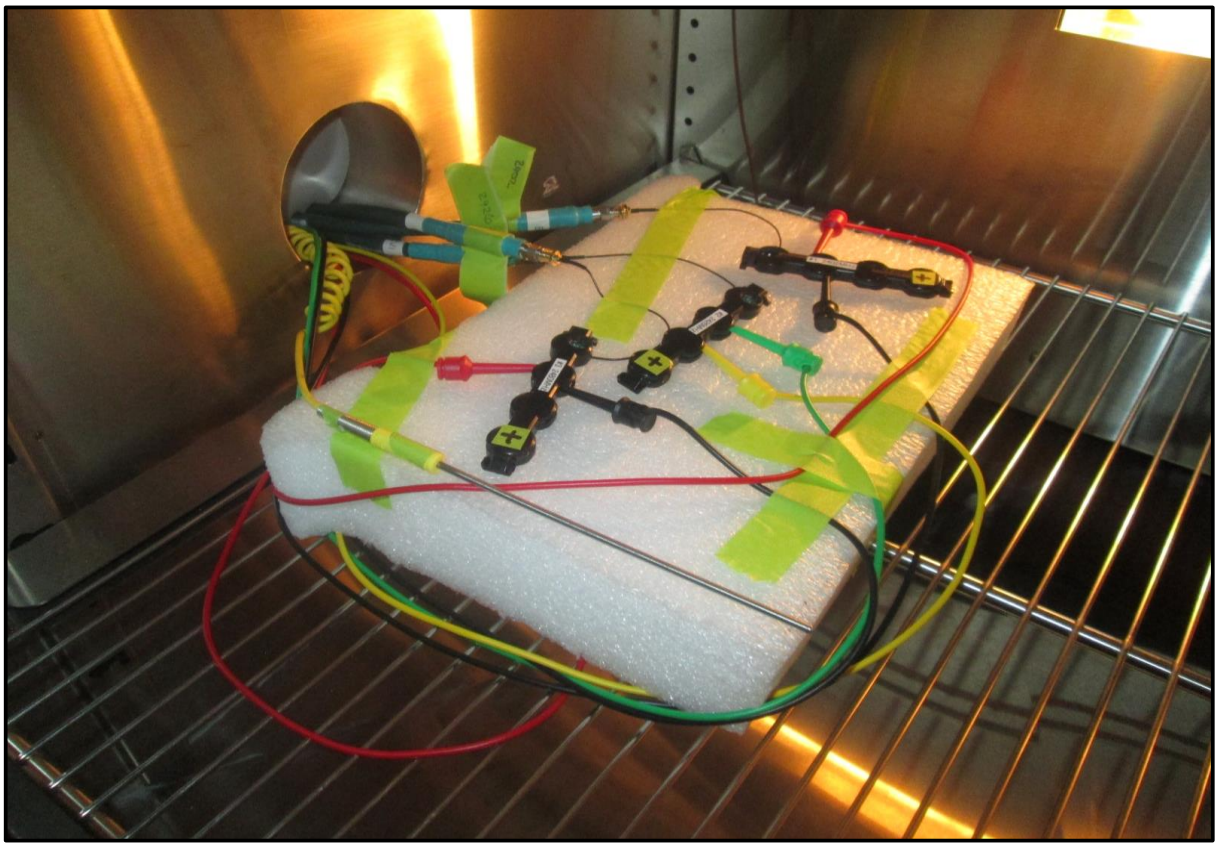


XMit 2022.02.07.0



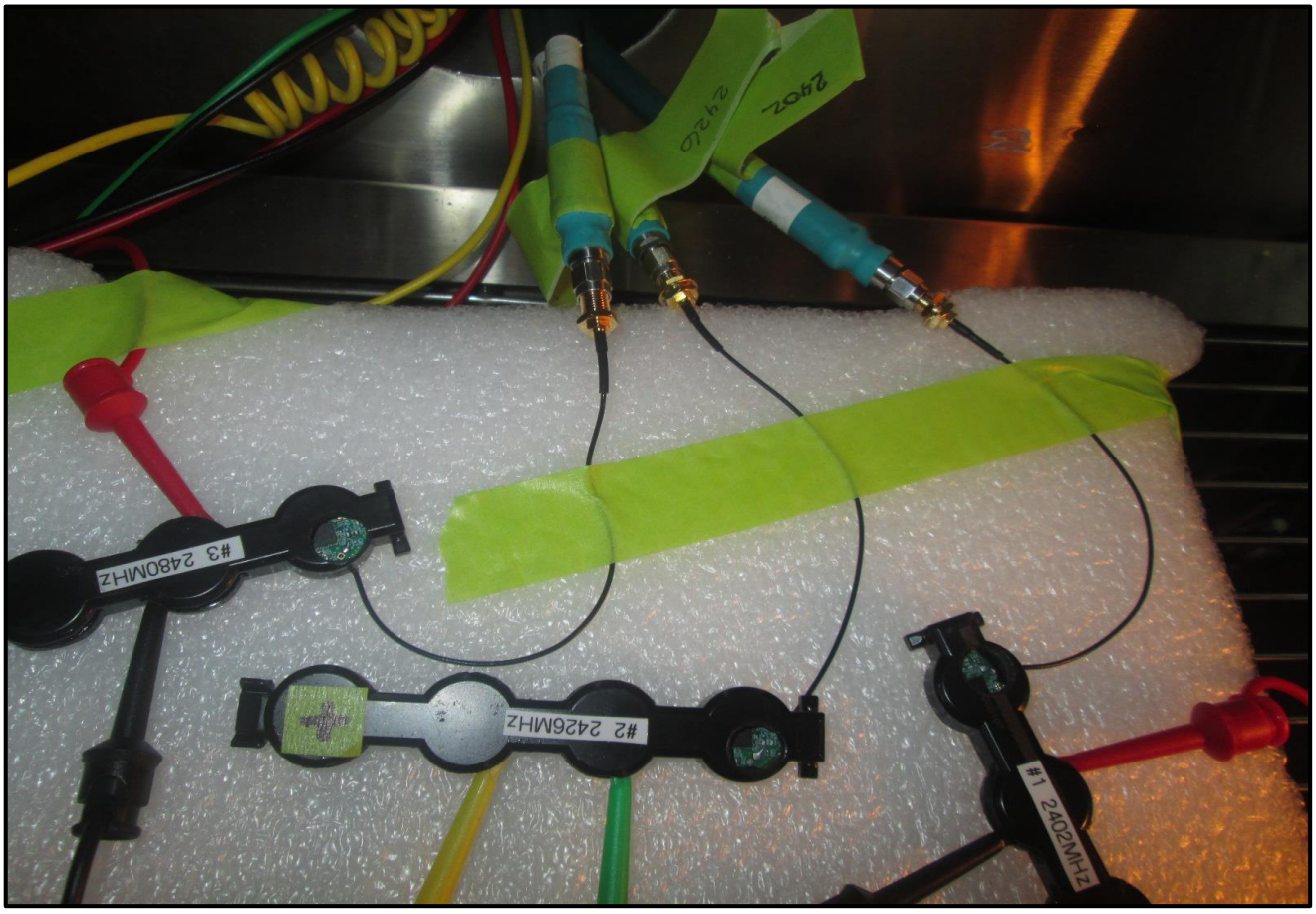


XMit 2022.02.07.0



RF OUTPUT POWER

XMit 2022.02.07.0



POWER SPECTRAL DENSITY

XMit 2022.02.07.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TID	2021-05-04	2023-05-04
Meter - Multimeter	Tektronix	DMM912	MMH	2022-03-02	2025-03-02
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2021-12-05	2022-12-05
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2022-03-14	2023-03-14
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2022-03-14	2023-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2022-03-15	2023-03-15
Block - DC	Fairview Microwave	SD3379	AMW	2022-03-14	2023-03-14
Directional Coupler	Fairview Microwave	MC2047-10	RGT	2021-07-01	2022-07-01
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

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

The Power Spectral Density was measured with the EUT set to the channels and modes called out in the data sheets.

The EUT antenna gain and duty cycle were used to calculate the output power of the EUT, and included in the calculations for Power Spectral Density. The measurements were made under normal test conditions.

The spectrum analyzer was set to a 10kHz RBW and 30kHz VBW, while utilizing an RMS detector. A total of 8350 points were captured across the spectrum. The traces were captured both graphically and in point format. The data points were normalized based on RF Output Power (EIRP) measurements located elsewhere in this report.

The reported Power Spectral Density is the highest sum for any 1MHz window in the specified spectrum.

POWER SPECTRAL DENSITY

element

TbtTx 2022.05.02.0 XMit 2022.02.07.0

EUT:	**PLT003**			**Work Order:**	**DESC0001**
Serial Number:	**See configuration**			**Date:**	**9-Jun-22**
Customer:	**Descartes Systems (USA) LLC**			**Temperature:**	**22.4 °C**
Attendees:	**None**			**Humidity:**	**47.1% RH**
Project:	**None**			**Barometric Pres.:**	**1017 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**3.0 VDC**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
EN 300 328 V2.2.2:2019-07	EN 300 328 V2.2.2:2019-07

COMMENTS

None

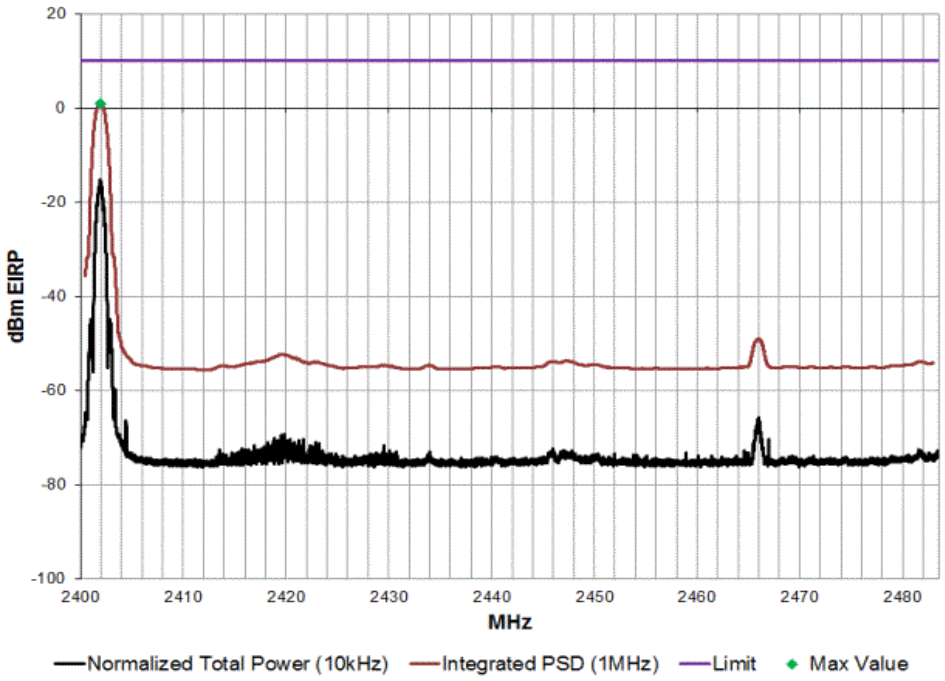
DEVIATIONS FROM TEST STANDARD

None

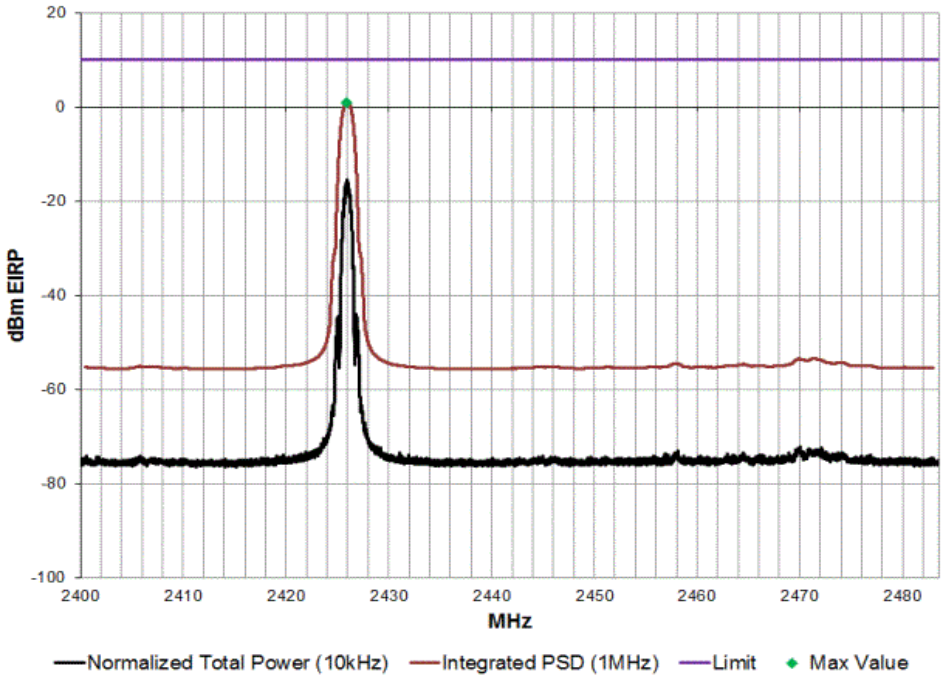
Configuration #	**8**	*Signature*

	EIRP (dBm)	EIRP PSD (dBm/MHz)	Limit (dBm/MHz)	Results
Normal Test Conditions				
BLE/GFSK 1 Mbps, Low Channel, 2402 MHz	0.9	0.8	10	Pass
BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz	1	0.9	10	Pass
BLE/GFSK 1 Mbps, High Channel, 2480 MHz	1.4	1.3	10	Pass

Normal Test Conditions, BLE/GFSK 1 Mbps, Low Channel, 2402 MHz						
	EIRP (dBm)			EIRP PSD (dBm/MHz)	Limit (dBm/MHz)	Results
	0.9			0.8	10	Pass

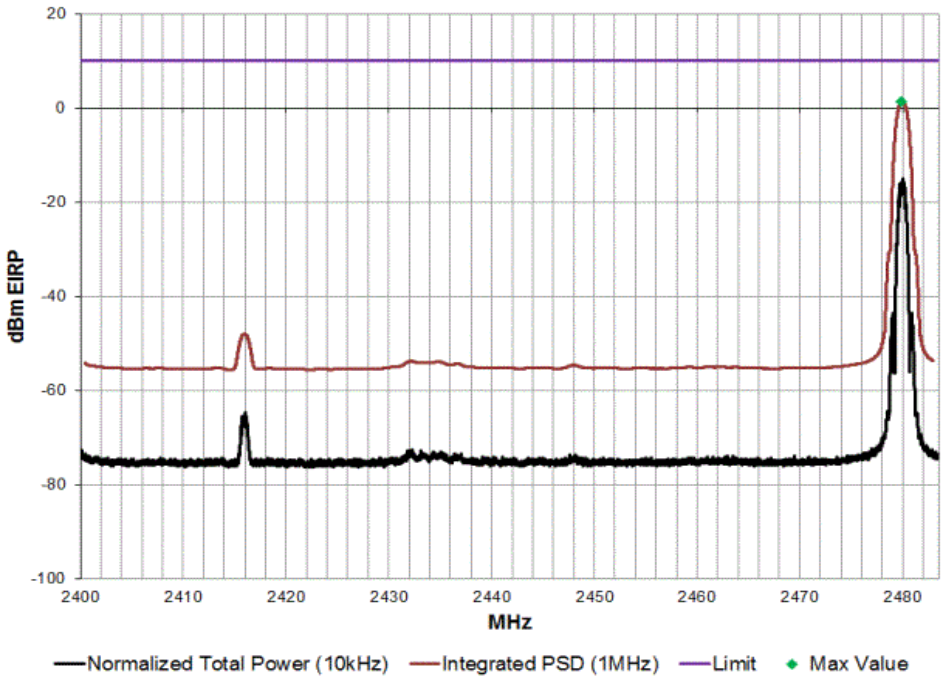


Normal Test Conditions, BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz						
	EIRP (dBm)			EIRP PSD (dBm/MHz)	Limit (dBm/MHz)	Results
	1			0.9	10	Pass



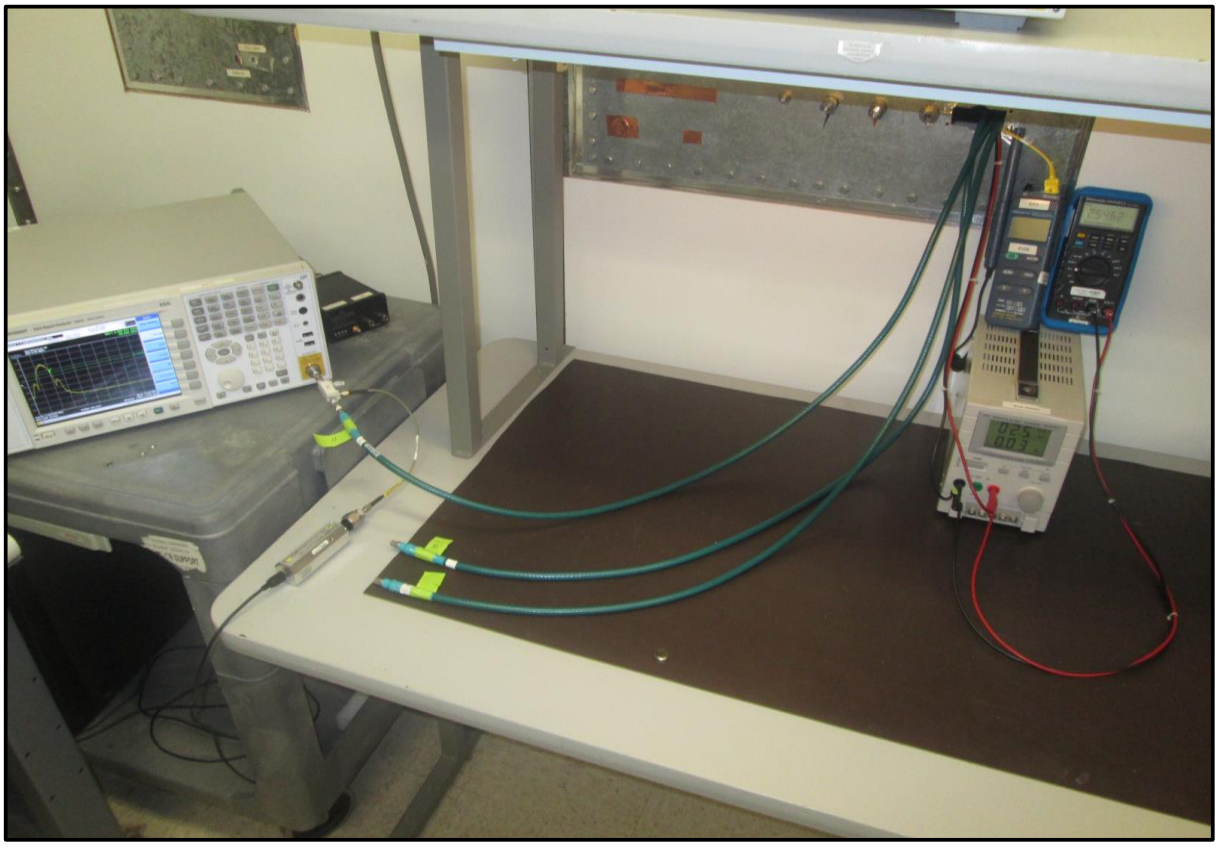
POWER SPECTRAL DENSITY

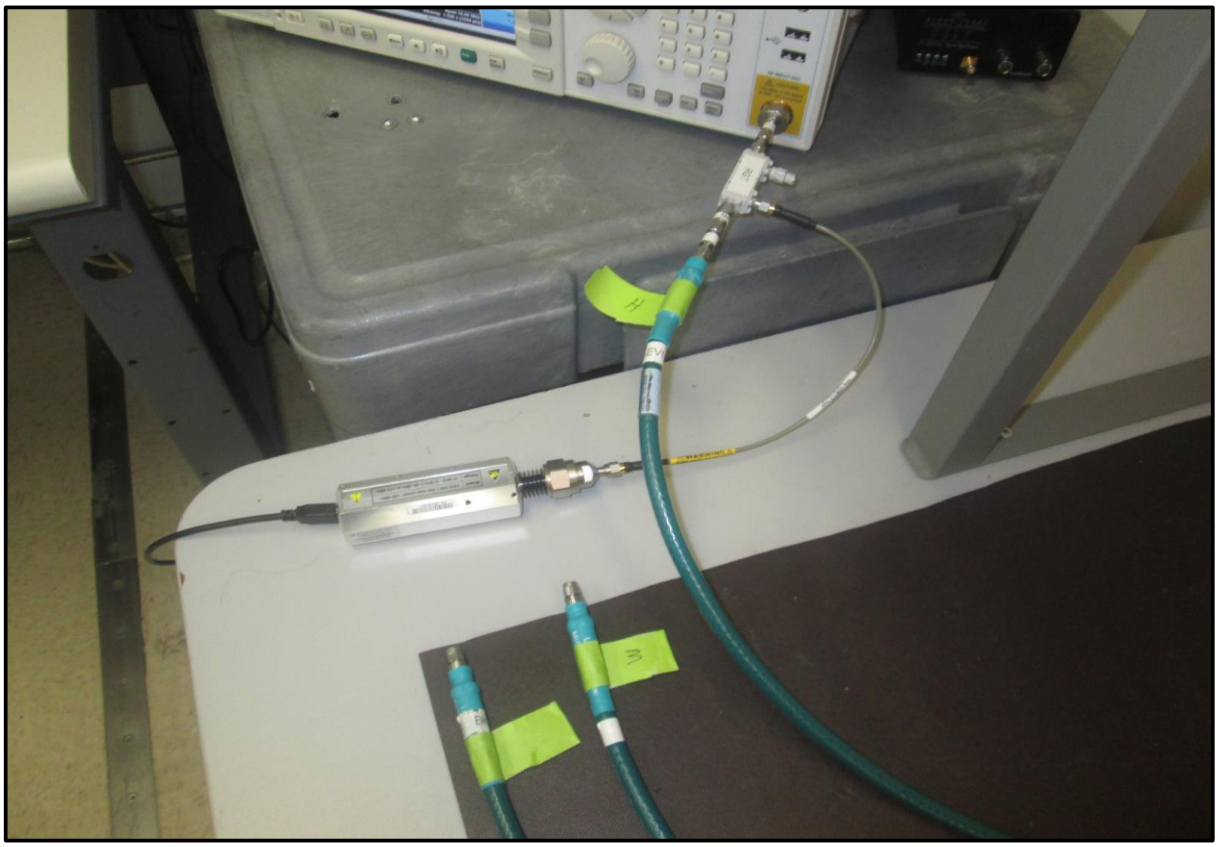
Normal Test Conditions, BLE/GFSK 1 Mbps, High Channel, 2480 MHz						
	EIRP (dBm)			EIRP PSD (dBm/MHz)	Limit (dBm/MHz)	Results
	1.4			1.3	10	Pass



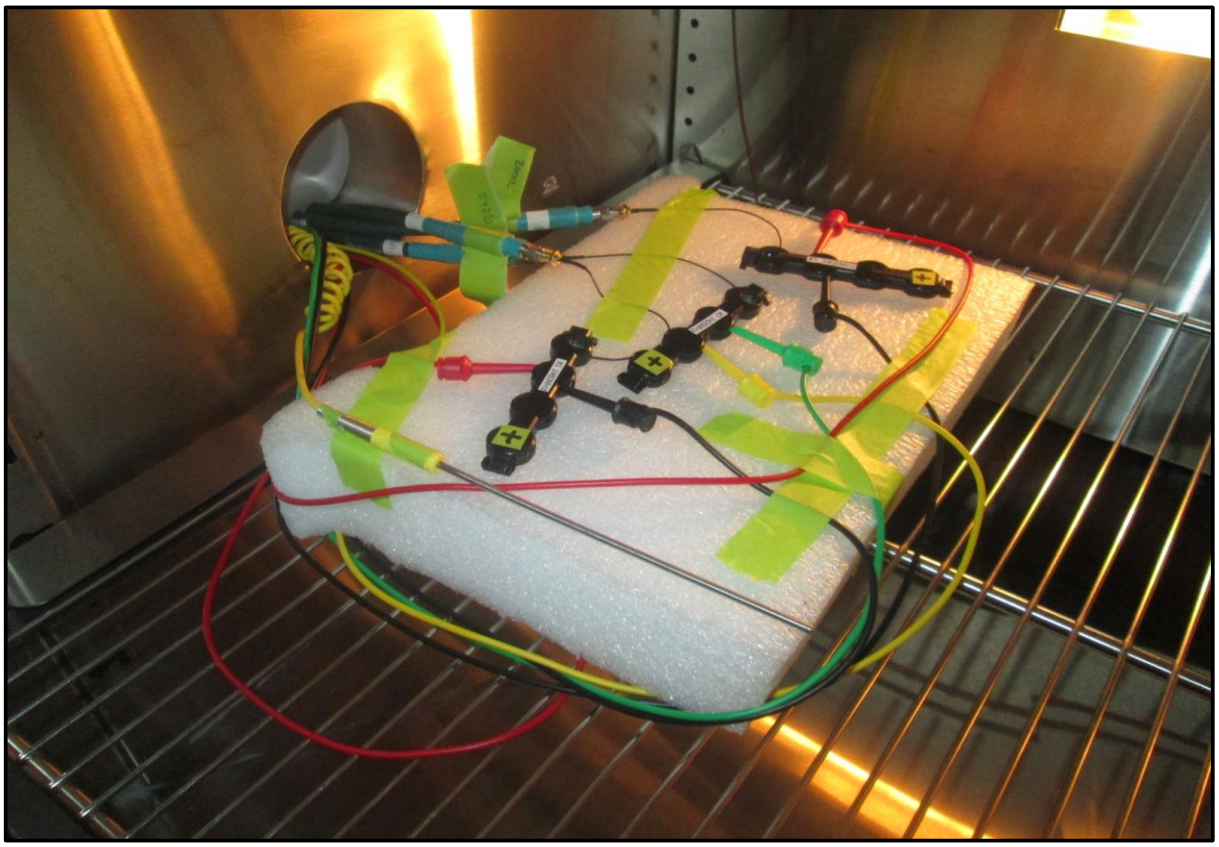
POWER SPECTRAL DENSITY

XMit 2022.02.07.0



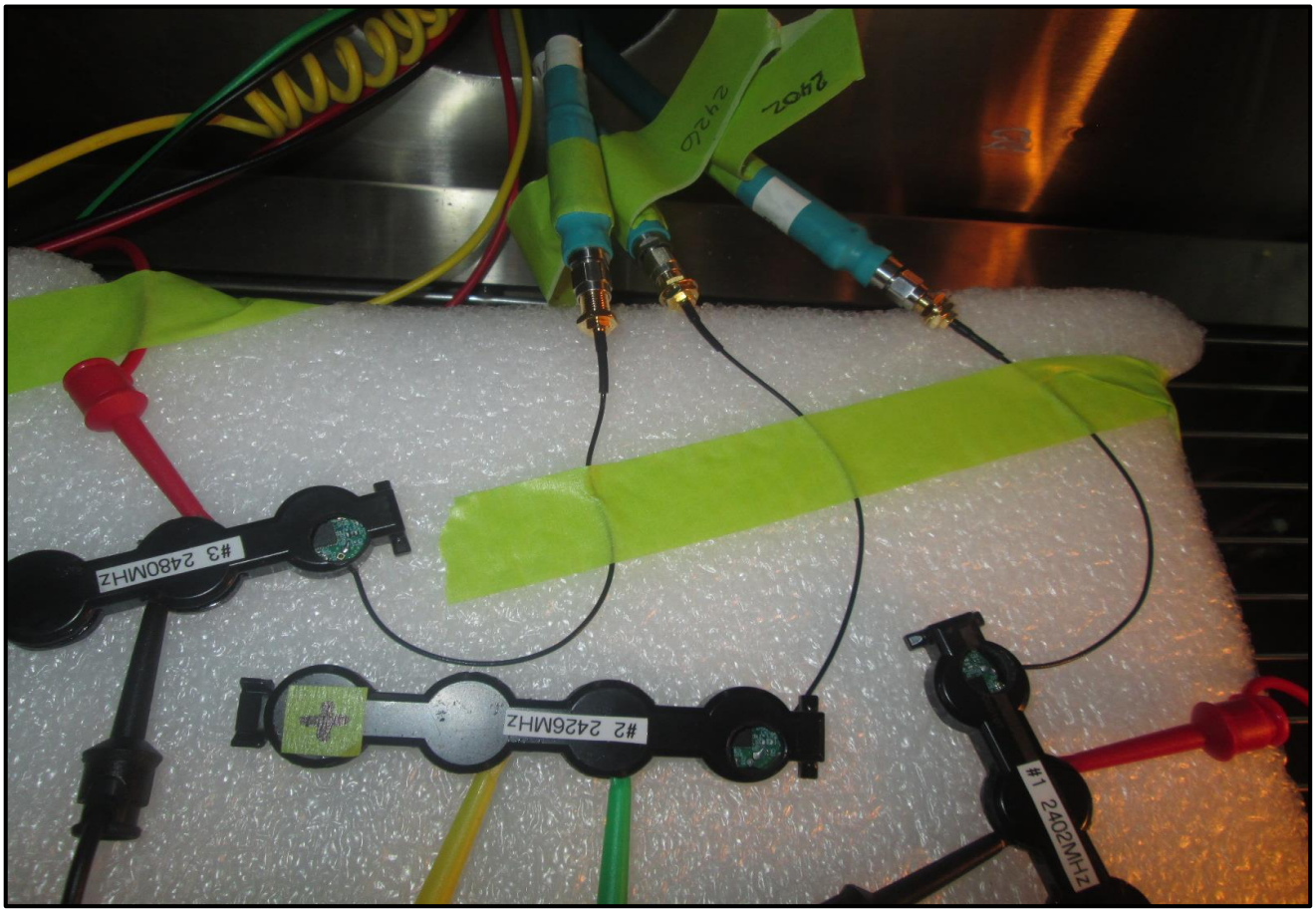



CAUTION
DO NOT DISTURB
TEST IN PROGRESS
CSZ
P-8



POWER SPECTRAL DENSITY

XMit 2022.02.07.0



OCCUPIED CHANNEL BANDWIDTH

XMit 2022.02.07.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TID	2021-05-04	2023-05-04
Meter - Multimeter	Tektronix	DMM912	MMH	2022-03-02	2025-03-02
Cable	Micro-Coax	D150A-1-0720-200	EVI	2021-12-05	2022-12-05
Cable	Micro-Coax	D150A-1-0720-200	EVK	2022-03-14	2023-03-14
Cable	Micro-Coax	D150A-1-0720-200	EVH	2022-03-14	2023-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2022-03-15	2023-03-15
Block - DC	Fairview Microwave	SD3379	AMW	2022-03-14	2023-03-14
Directional Coupler	Fairview Microwave	MC2047-10	RGT	2021-07-01	2022-07-01
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

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

The occupied channel bandwidth was measured with the EUT set to the channels and modes as listed on the data sheets. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode. The 99% occupied bandwidth measurement was made using the spectrum analyzer built in Occupied Bandwidth measurement function. The analyzer was set to a span equaling 2 times the nominal bandwidth, with a RBW of 1% of the span, VBW of 3 times the RBW, and utilizing an RMS detector.

OCCUPIED CHANNEL BANDWIDTH

element

TbtTx 2022.05.02.0 XMit 2022.02.07.0

EUT:	**PLT003**			**Work Order:**	**DESC0001**
Serial Number:	**See configuration**			**Date:**	**9-Jun-22**
Customer:	**Descartes Systems (USA) LLC**			**Temperature:**	**22.3 °C**
Attendees:	**None**			**Humidity:**	**47.2% RH**
Project:	**None**			**Barometric Pres.:**	**1015 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**3.0 VDC**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
EN 300 328 V2.2.2:2019-07	EN 300 328 V2.2.2:2019-07

COMMENTS

None

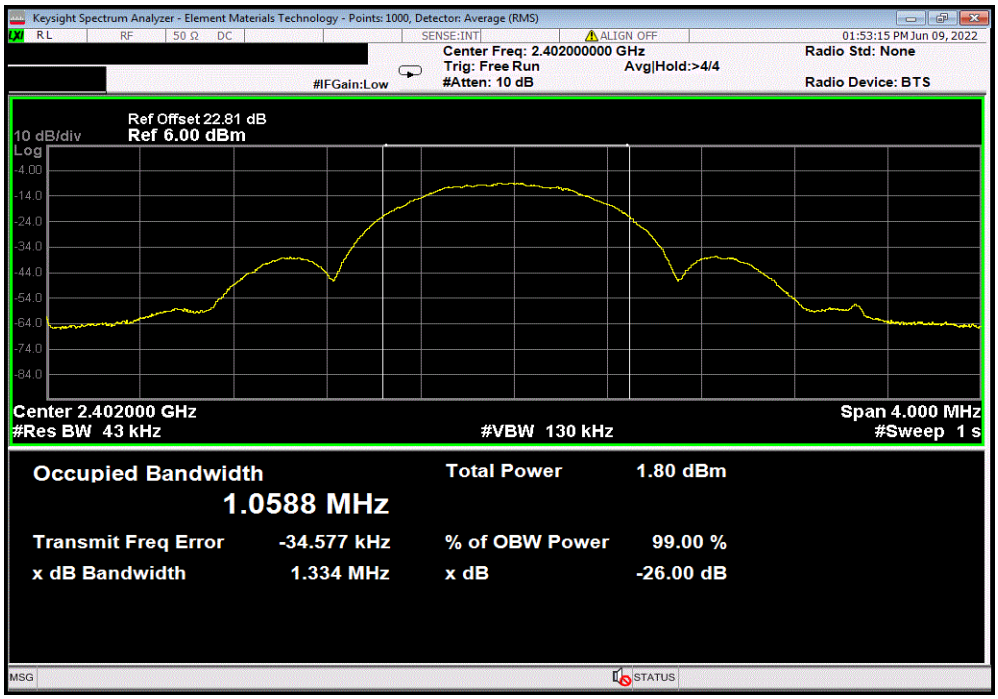
DEVIATIONS FROM TEST STANDARD

None

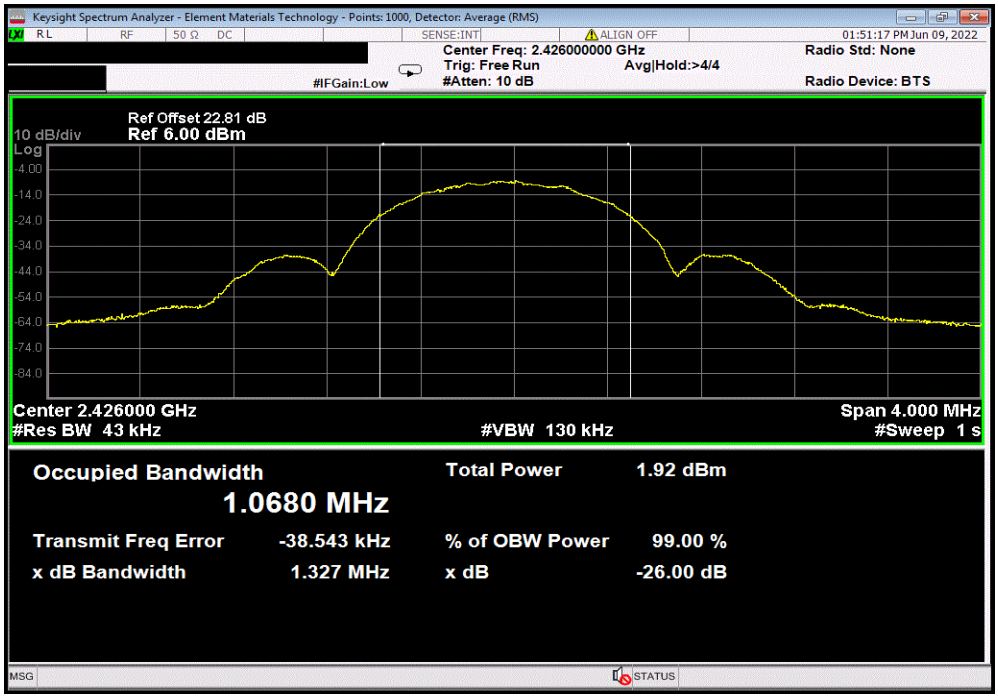
Configuration #	**8**	*Signature*

	Value	**Limit (≤)**	**Result**
Normal Test Conditions			
BLE/GFSK 1 Mbps, Low Channel, 2402 MHz	1.059 MHz	20 MHz	Pass
BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz	1.068 MHz	20 MHz	Pass
BLE/GFSK 1 Mbps, High Channel, 2480 MHz	1.077 MHz	20 MHz	Pass

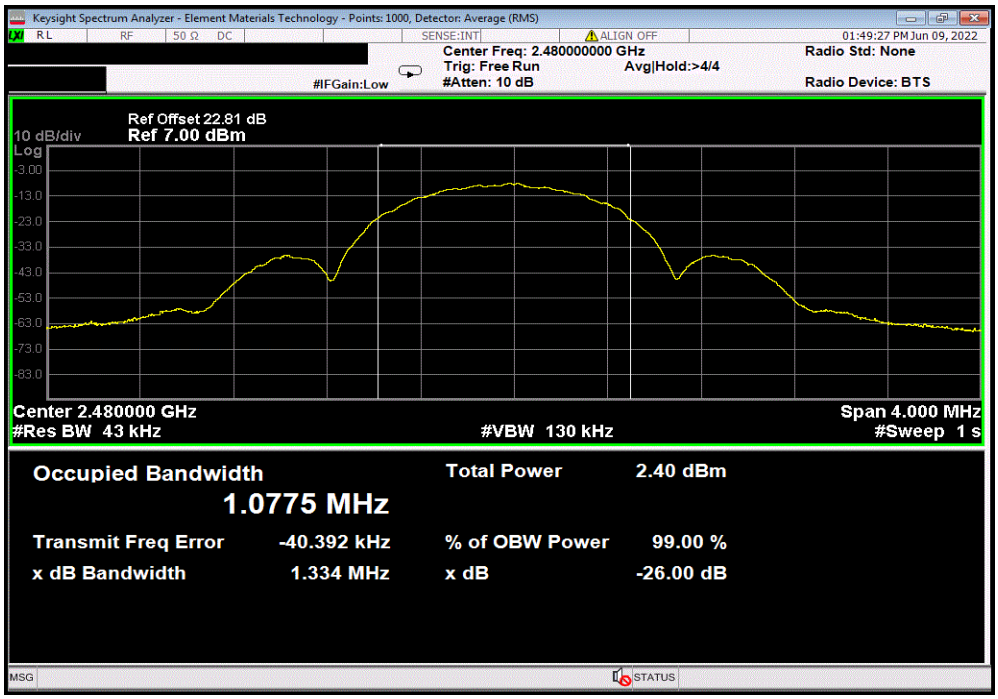
Normal Test Conditions, BLE/GFSK 1 Mbps, Low Channel, 2402 MHz						
				Value	Limit (≤)	Result
				1.059 MHz	20 MHz	Pass



Normal Test Conditions, BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz						
				Value	Limit (≤)	Result
				1.068 MHz	20 MHz	Pass

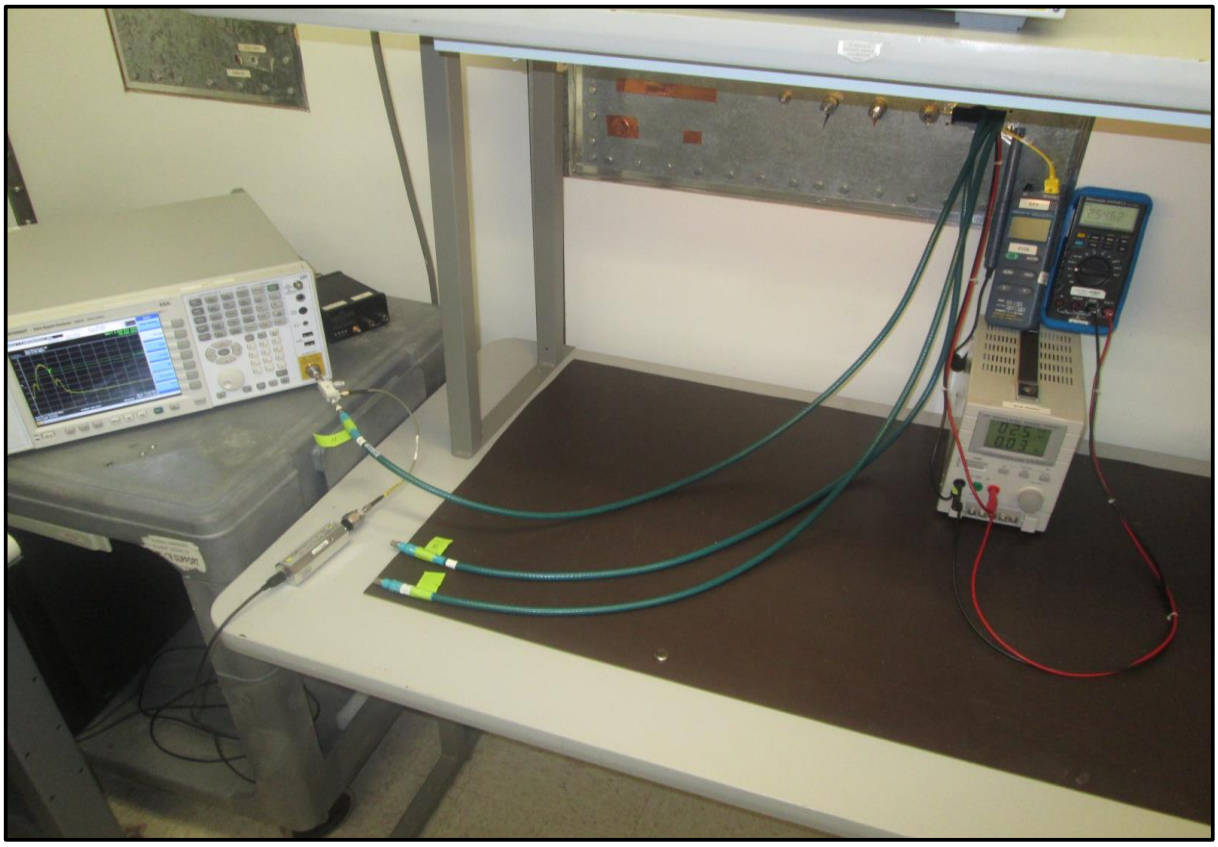


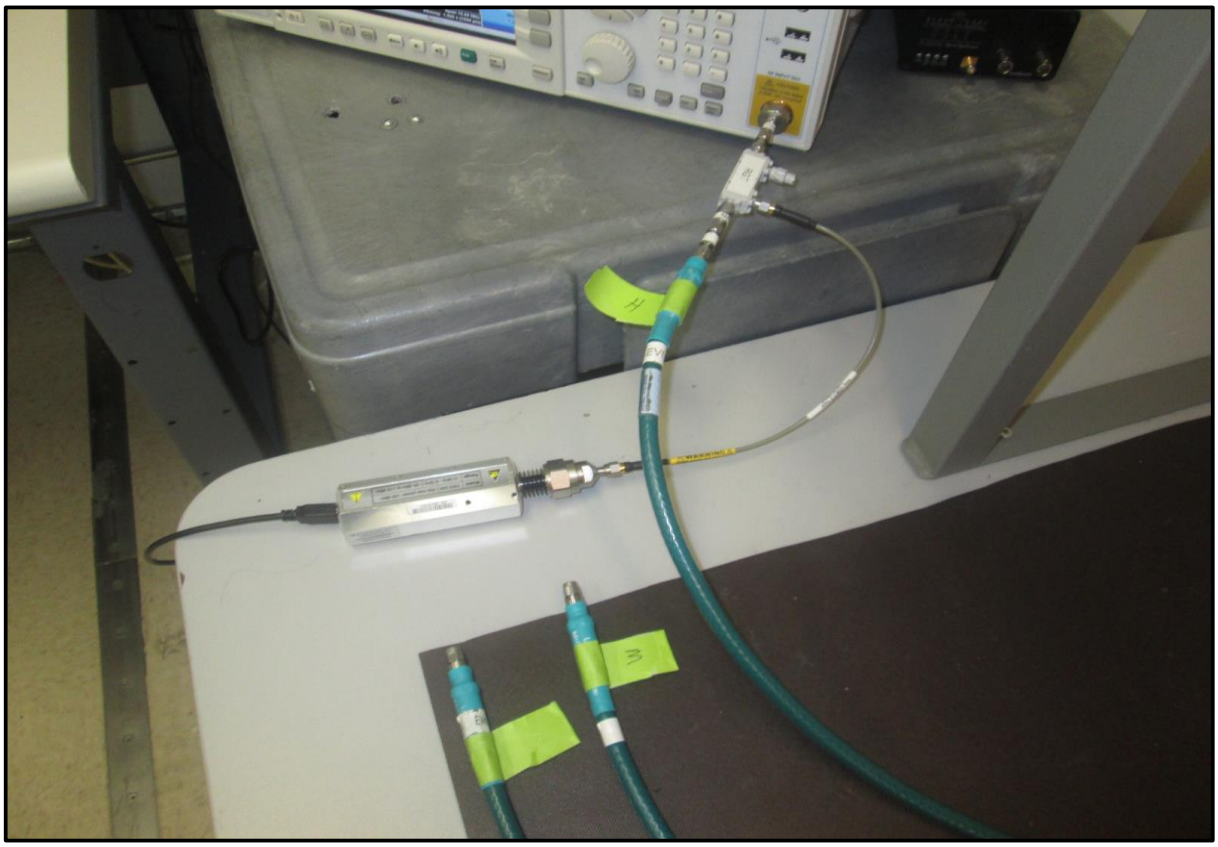
Normal Test Conditions, BLE/GFSK 1 Mbps, High Channel, 2480 MHz						
				Value	Limit (≤)	Result
				1.077 MHz	20 MHz	Pass



OCCUPIED CHANNEL BANDWIDTH

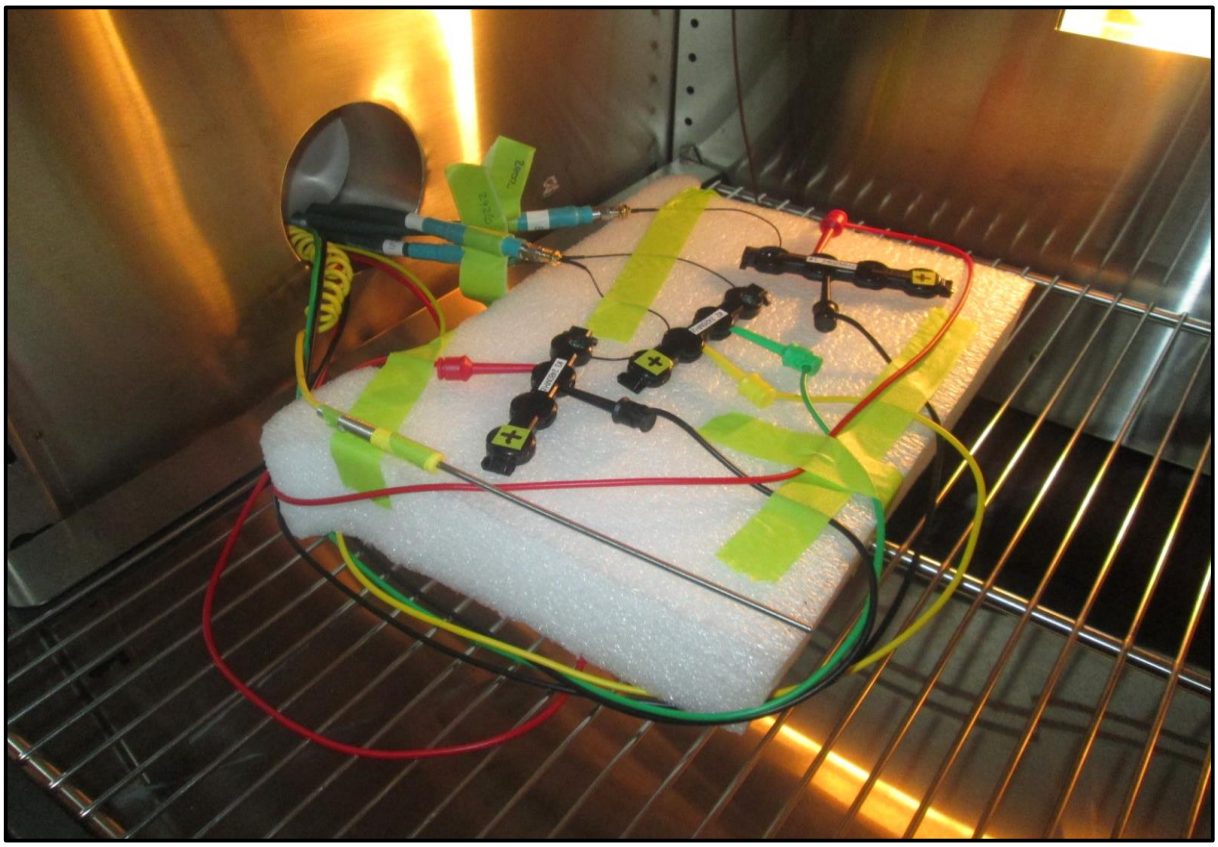
XMit 2022.02.07.0





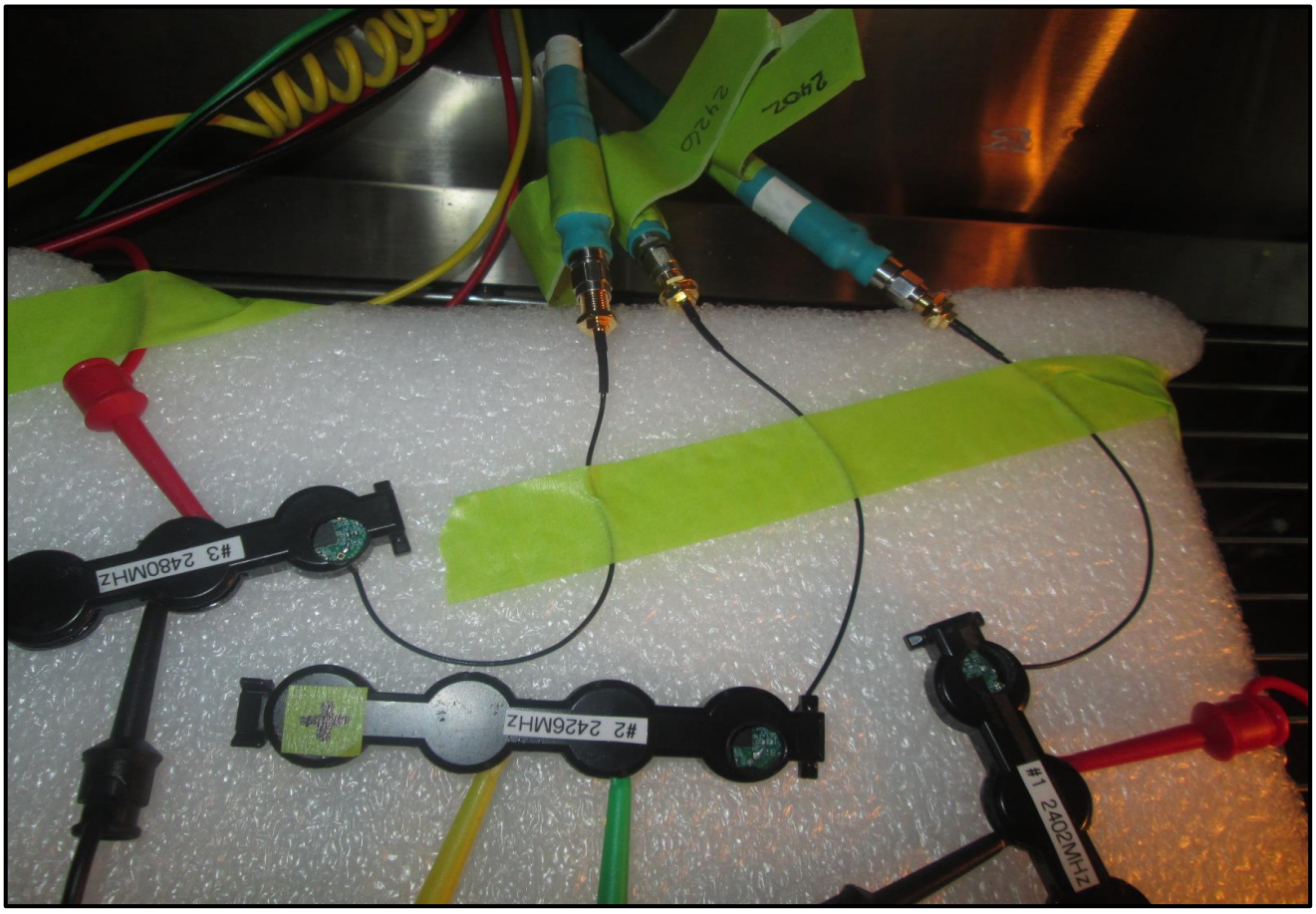
OCCUPIED CHANNEL BANDWIDTH

XMit 2022.02.07.0



OCCUPIED CHANNEL BANDWIDTH

XMit 2022.02.07.0



TRANSMITTER UNWANTED EMISSIONS IN THE OOB DOMAIN

XMit 2022.02.07.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TID	2021-05-04	2023-05-04
Meter - Multimeter	Tektronix	DMM912	MMH	2022-03-02	2025-03-02
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2021-12-05	2022-12-05
Cable	Micro-Coax	UFD150A-1-0720-200200	EVK	2022-03-14	2023-03-14
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2022-03-14	2023-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2022-03-15	2023-03-15
Block - DC	Fairview Microwave	SD3379	AMW	2022-03-14	2023-03-14
Directional Coupler	Fairview Microwave	MC2047-10	RGT	2021-07-01	2022-07-01
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

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

The measurement was made using a RMS detector, with a 1 MHz RBW and 3 MHz VBW. The level of emissions shall be measured using a RMS Average detector with the Time Domain Power function.

The frequency ranges of the limit steps are dependent on the measured Occupied Channel Bandwidth (contained elsewhere in the report)

The declared antenna assembly gain (dBi) was added to the measurement system offset.

The Screen Captures show compliance to each OOB steps/spans as defined in the Transmit Mask.

TRANSMITTER UNWANTED EMISSIONS IN THE OOB DOMAIN

TbtTx 2022.05.02.0 XMit 2022.02.07.0

EUT:	**PLT003**			**Work Order:**	**DESC0001**
Serial Number:	**See configuration**			**Date:**	**9-Jun-22**
Customer:	**Descartes Systems (USA) LLC**			**Temperature:**	**22.4 °C**
Attendees:	**None**			**Humidity:**	**47.2% RH**
Project:	**None**			**Barometric Pres.:**	**1016 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**3.0 VDC**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
EN 300 328 V2.2.2:2019-07	EN 300 328 V2.2.2:2019-07

COMMENTS

None

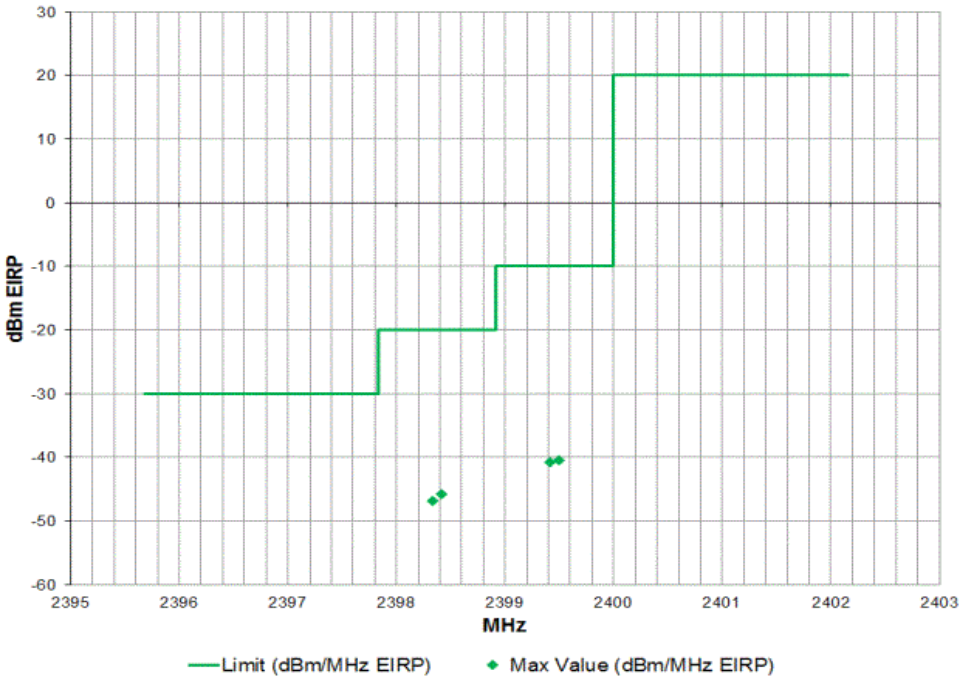
DEVIATIONS FROM TEST STANDARD

None

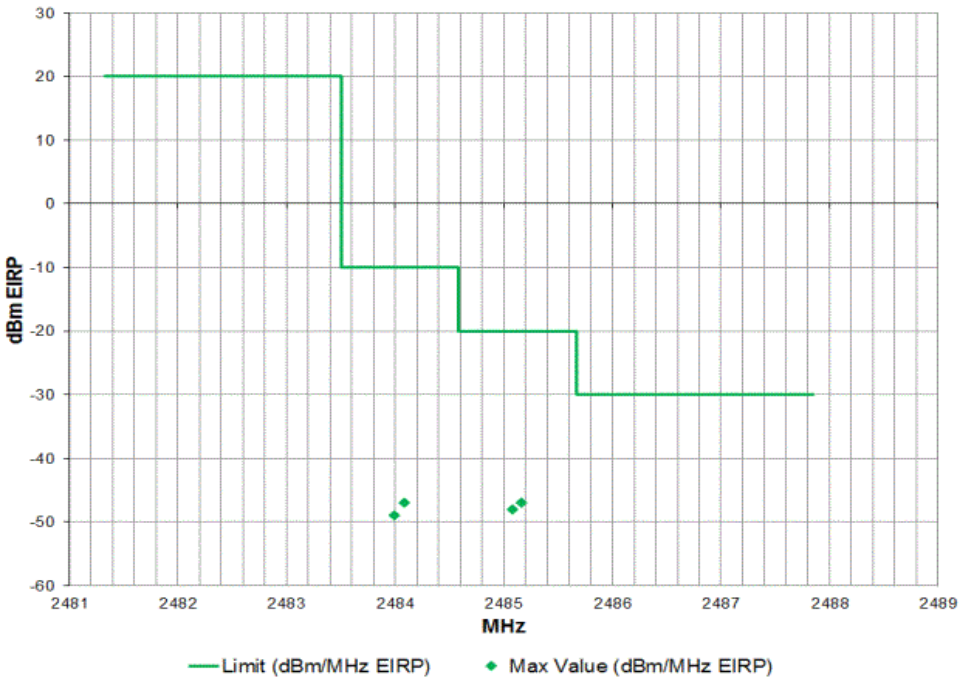
Configuration #	**8**	*Signature*

	Value (dBm/MHz)	Limit (dBm/MHz)	Value (dBm/MHz)	Limit (dBm/MHz)	Result
Normal Test Conditions					
BLE/GFSK 1 Mbps, Low Channel, 2402 MHz	-40.5	-10	-45.9	-20	Pass
BLE/GFSK 1 Mbps, High Channel, 2480 MHz	-47	-10	-47	-20	Pass

Normal Test Conditions, BLE/GFSK 1 Mbps, Low Channel, 2402 MHz						
		Value (dBm/MHz)	Limit (dBm/MHz)	Value (dBm/MHz)	Limit (dBm/MHz)	Result
		-40.5	-10	-45.9	-20	Pass

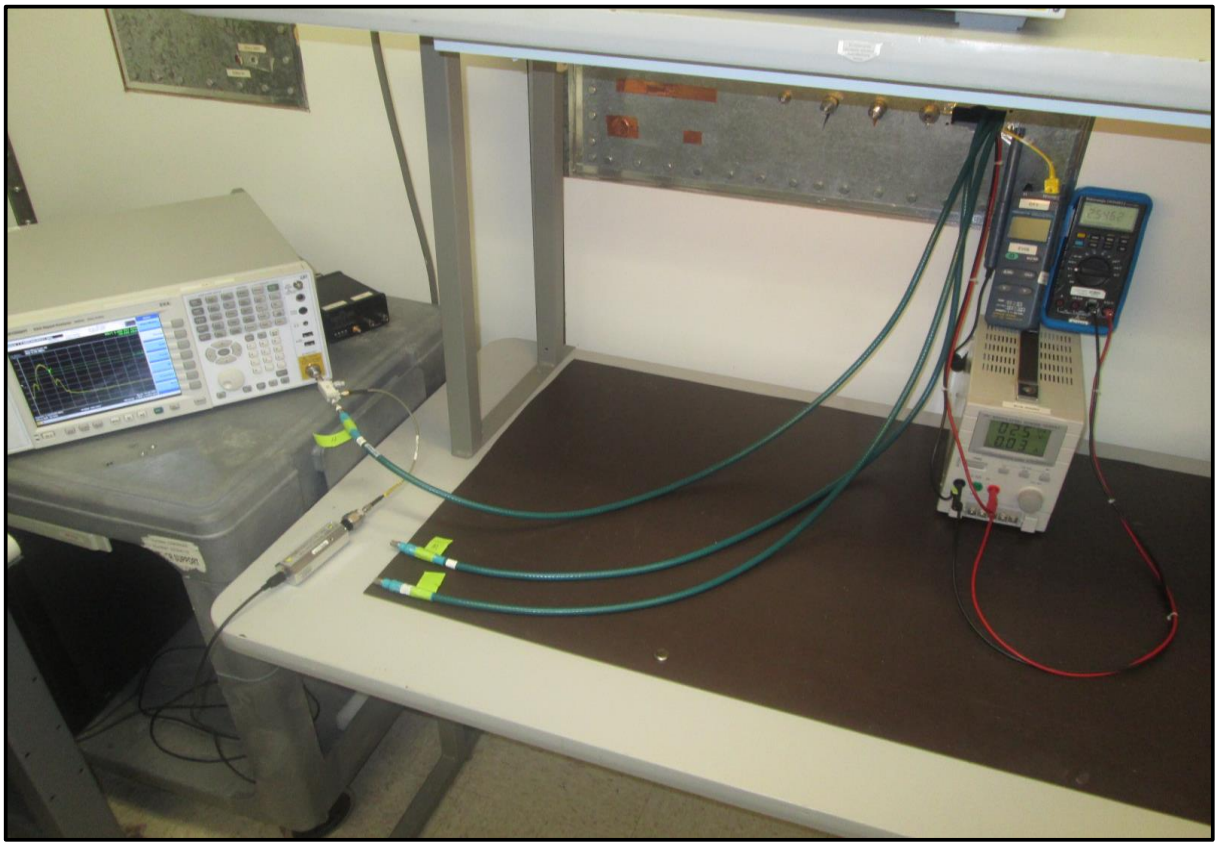


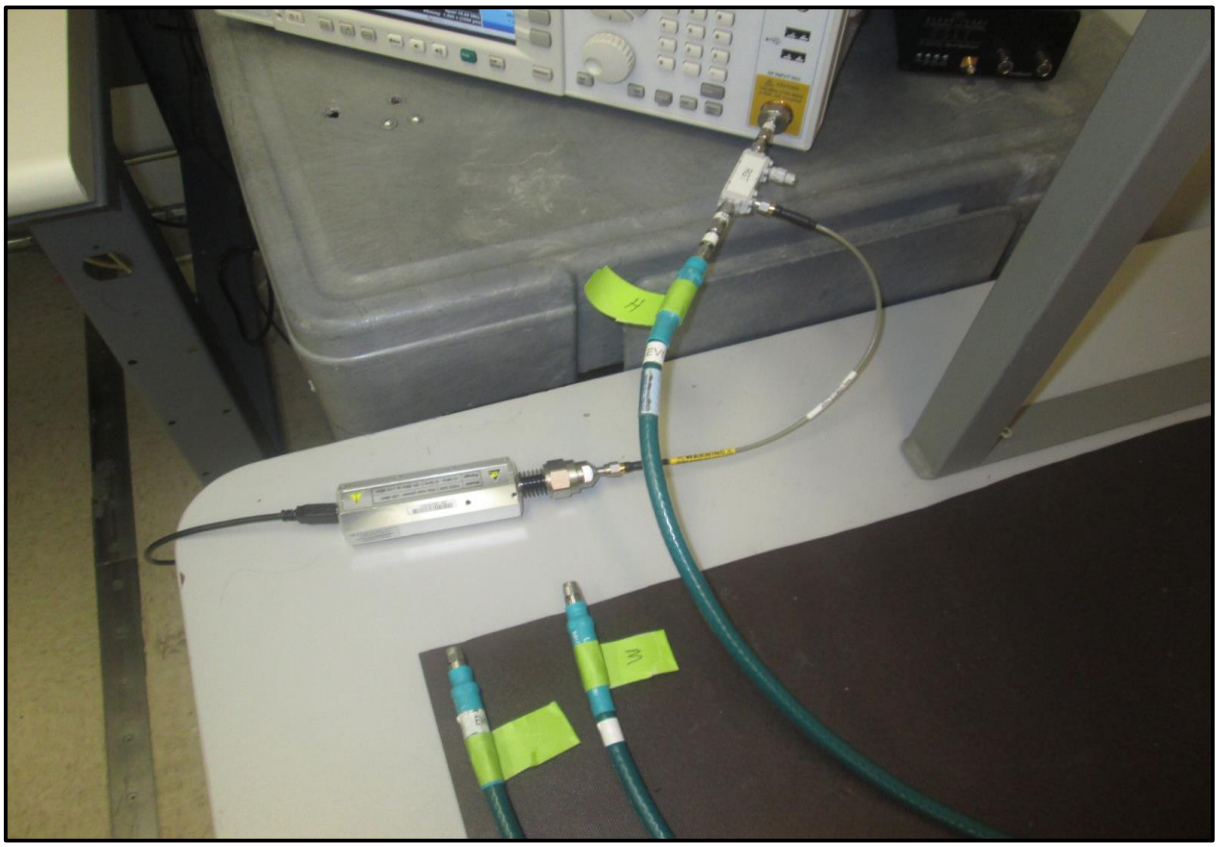
Normal Test Conditions, BLE/GFSK 1 Mbps, High Channel, 2480 MHz						
		Value (dBm/MHz)	Limit (dBm/MHz)	Value (dBm/MHz)	Limit (dBm/MHz)	Result
		-47	-10	-47	-20	Pass



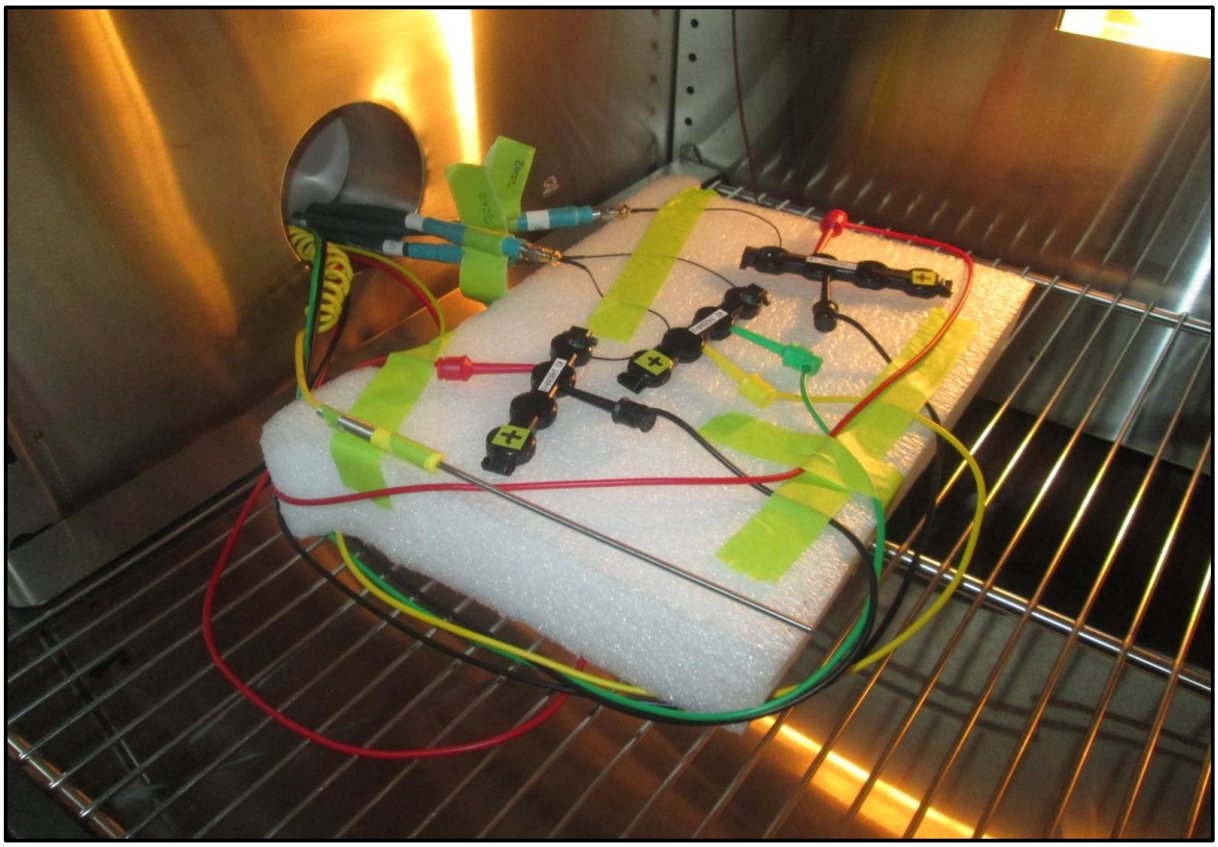
TRANSMITTER UNWANTED EMISSIONS IN THE OOB DOMAIN

XMit 2022.02.07.0



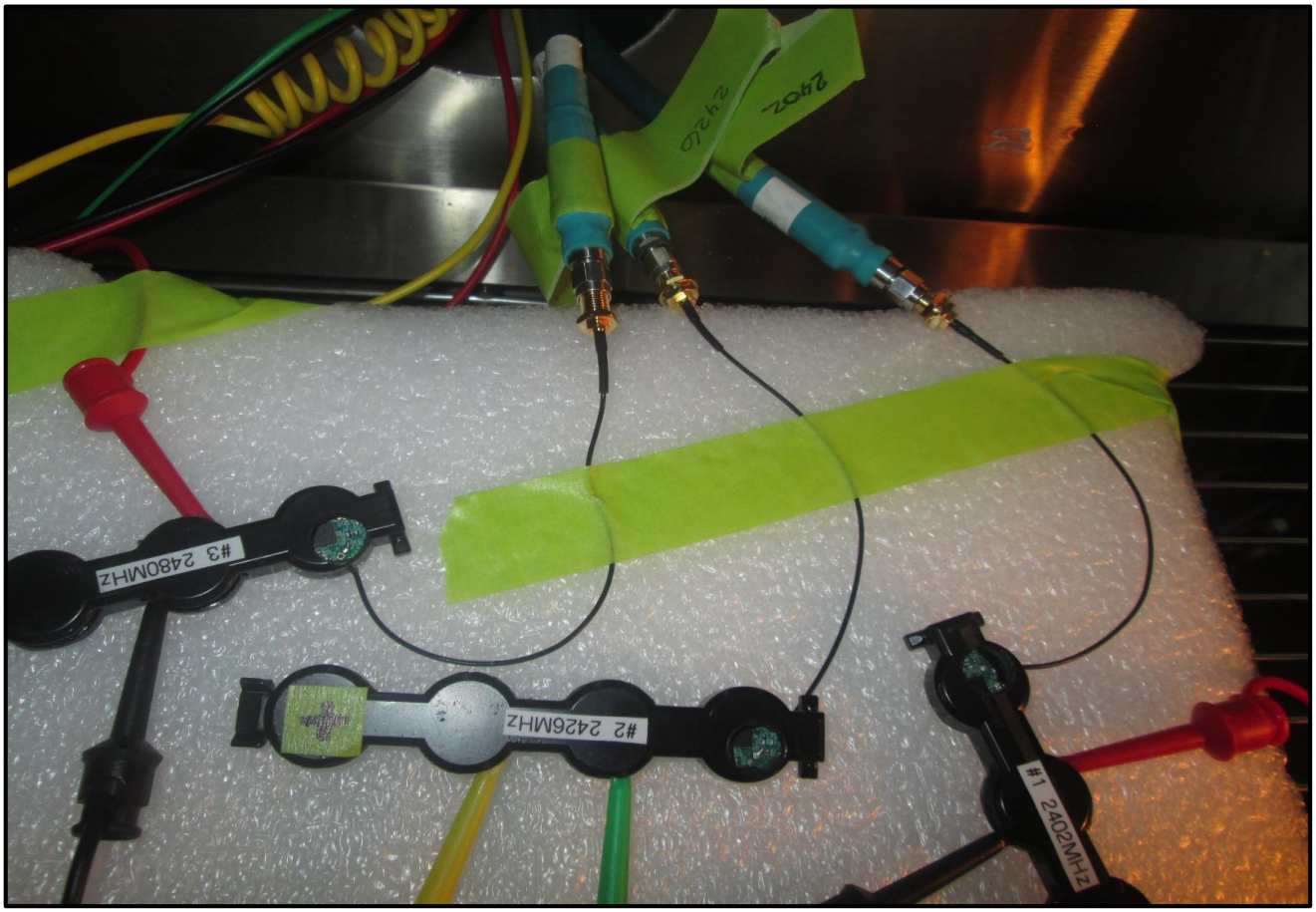


XMit 2022.02.07.0



TRANSMITTER UNWANTED EMISSIONS IN THE OOB DOMAIN

XMit 2022.02.07.0



TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

element
WTD.2021.09.21.0
EmiR5 2022.03.10.0
PSA-ESCI 2022.1.12.0

TEST DESCRIPTION

The EUT was operated in a worst-case configuration in transmit mode. The spectrum was scanned from 30 MHz to 12.75 GHz with the EUT set to its lowest and highest transmit frequencies.

While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height (1-4 meters) and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity. The amplitude and frequency of the highest emissions were noted. The EUT was then replaced with a substitution antenna that varies depending on the frequency range of the emission. A ½ wave dipole that is successively tuned to each of the highest spurious emissions is utilized from 400-1000 MHz. Below 400 MHz, a small biconical antenna is utilized due to the increasing size of the dipole to match the ½ wavelength. Above 1 GHz, a horn antenna is utilized.

A signal generator is then connected to the substitution antenna and its output is adjusted to match the level previously noted for each frequency. The output of the signal generator is recorded, and by factoring in the cable loss to the substitution antenna and its gain (dBi); the radiated power (dBm) for each radiated spurious emission is determined.

Emissions radiated by the cabinet and the antenna identified during the pre-scans were measured using a RMS Average detector with the Time Domain Power function. If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	2021-12-09	2022-12-09
Antenna - Biconilog	EMCO	3142B	AXJ	2021-03-03	2023-03-03
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	2021-11-17	2022-11-17
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	2022-05-03	2023-05-03
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	2021-11-17	2022-11-17
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2021-11-17	2022-11-17
Cable	N/A	Bilog Cables	EVA	2021-11-17	2022-11-17
Cable	N/A	Double Ridge Horn Cables	EVB	2022-05-03	2023-05-03
Cable	None	Standard Gain Horn Cables	EVF	2021-11-17	2022-11-17
Attenuator	Coaxicom	3910-20	AXZ	2022-02-10	2023-02-10
Filter - High Pass	Micro-Tronics	HPM50111	HFO	2021-11-17	2022-11-17
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	2022-03-02	2024-03-02
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Power Sensor	Spanawave	80701A	SPL	2022-05-31	2023-05-31
Meter - Power	Spanawave	8651A	SOT	2022-05-31	2023-05-31

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 12750 MHz

POWER INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

DESC0001-9

MODES INVESTIGATED

BLE, GFSK, 1 Mbps, Low Channel = 2402 MHz, High Channel = 2480 MHz

TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

element
WTD.2021.09.21.0
EmiR5 2022.03.10.0
PSA-ESCI 2022.1.12.0

EUT:	PLT003	Work Order:	DESC0001
Serial Number:	See configuration	Date:	2022-06-09
Customer:	Descartes Systems (USA) LLC	Temperature:	22.4°C
Attendees:	None	Relative Humidity:	47.5%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mb
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	DESC0001-9

TEST SPECIFICATIONS

Specification:	Method:
EN 300 328 V2.2.2:2019-07	EN 300 328 V2.2.2:2019-07

TEST PARAMETERS

Run #:	27	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

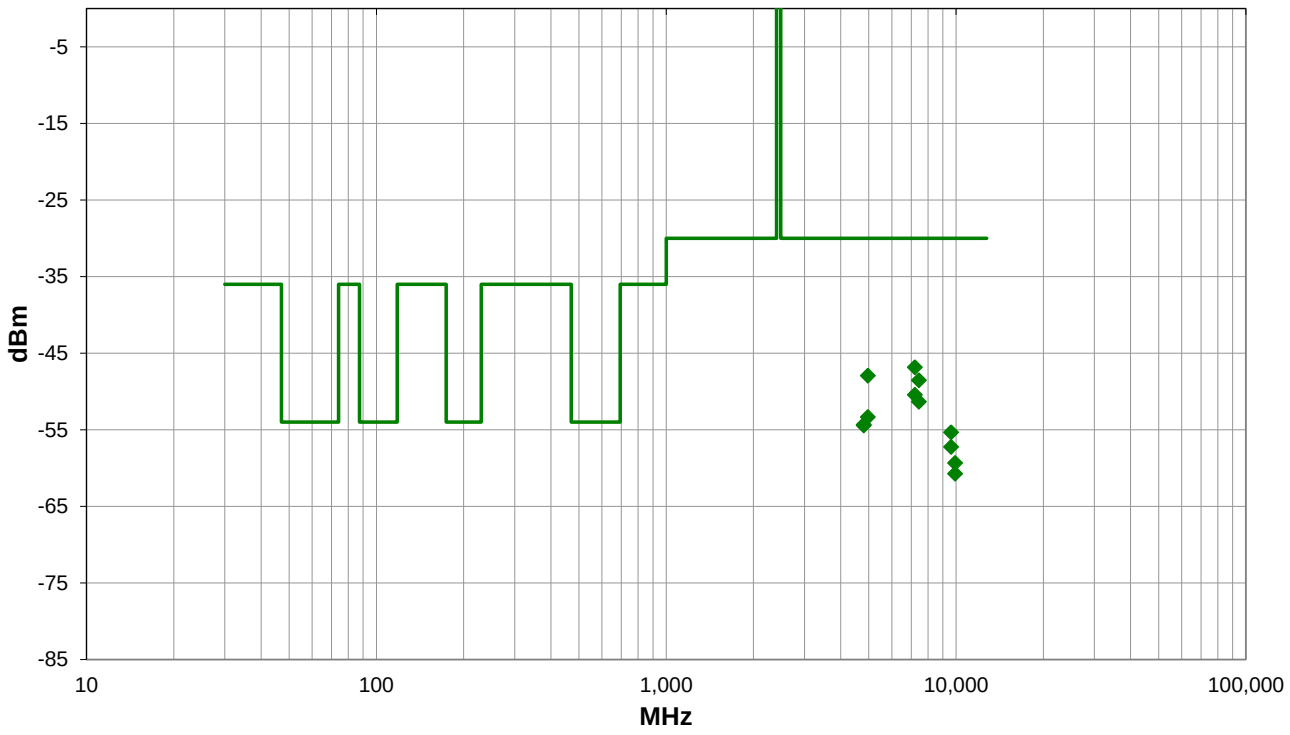
None

EUT OPERATING MODES

BLE, GFSK, 1 Mbps, Low Channel = 2402 MHz, High Channel = 2480 MHz

DEVIATIONS FROM TEST STANDARD

None



Run #: 27 ■ PK ◆ AV ● QP

TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

element
WTD.2021.09.21.0
EmiR5 2022.03.10.0
PSA-ESCI 2022.1.12.0

RESULTS - Run #27

Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
7206.375	2.5	66.0	Horz	AV	20.8E-9	-46.8	-30.0	-16.8	Low Ch, EUT Horz
4959.925	2.3	127.0	Horz	AV	16.1E-9	-47.9	-30.0	-17.9	High Ch, EUT Horz
7440.408	1.5	249.0	Vert	AV	14.0E-9	-48.5	-30.0	-18.5	High Ch, EUT Horz
7206.408	2.3	66.0	Vert	AV	9.1E-9	-50.4	-30.0	-20.4	Low Ch, EUT Horz
7440.483	2.0	36.0	Horz	AV	7.4E-9	-51.3	-30.0	-21.3	High Ch, EUT Horz
4959.925	3.1	271.0	Vert	AV	4.6E-9	-53.3	-30.0	-23.3	High Ch, EUT Horz
4801.500	1.5	332.0	Horz	AV	3.7E-9	-54.3	-30.0	-24.3	Low Ch, EUT Horz
4801.567	1.5	128.0	Vert	AV	3.6E-9	-54.4	-30.0	-24.4	Low Ch, EUT Horz
9606.983	1.0	352.0	Horz	AV	2.9E-9	-55.3	-30.0	-25.3	Low Ch, EUT Horz
9606.942	1.0	224.0	Vert	AV	1.9E-9	-57.2	-30.0	-27.2	Low Ch, EUT Horz
9920.692	1.0	13.0	Horz	AV	1.2E-9	-59.3	-30.0	-29.3	High Ch, EUT Horz
9920.758	2.9	288.0	Vert	AV	845.5E-12	-60.7	-30.0	-30.7	High Ch, EUT Horz

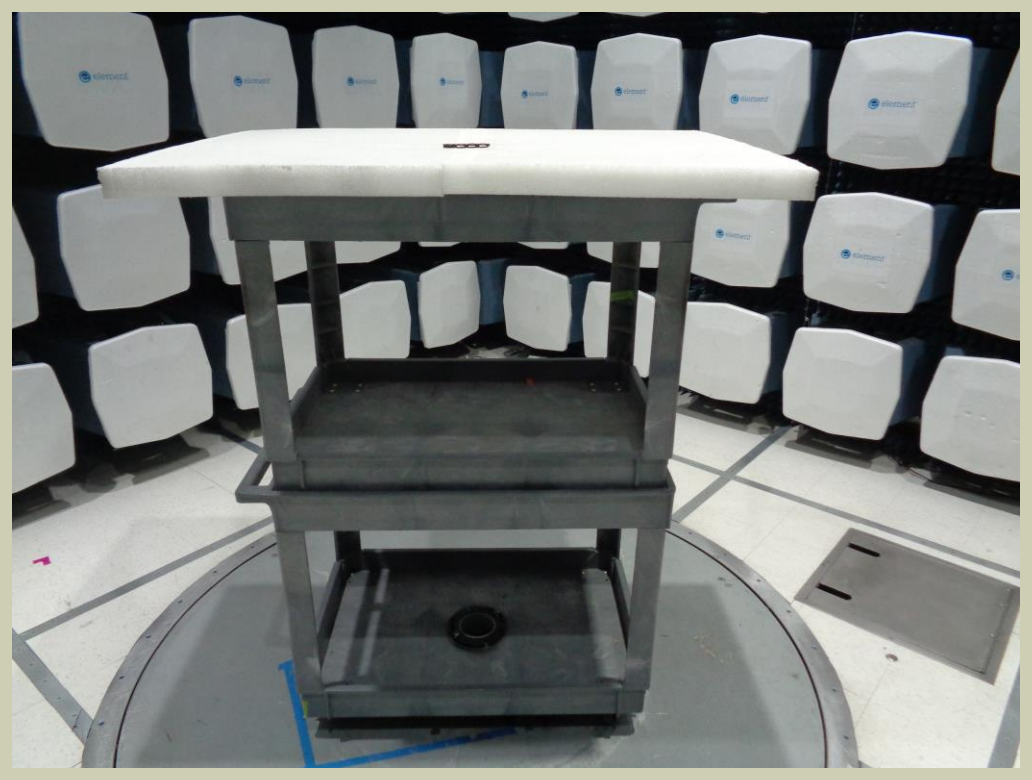
CONCLUSION

Pass

Tested By

TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

element
WTD.2021.09.21.0
EmiR5 2022.03.10.0
PSA-ESCI 2022.1.12.0



APPENDIX

Annex E (informative): Application form for testing

E.1 Introduction

Notwithstanding the provisions of the copyright clause related to the text of the present document, ETSI grants that users of the present document may freely reproduce the application form pro forma in this annex so that it can be used for its intended purposes and may further publish the completed application form.

The form contained in this annex may be used by the manufacturer to comply with the requirement contained in clause 5.4.1 to provide the necessary information about the equipment to the test laboratory prior to the testing. It contains product information as well as other information which might be required to define which configurations are to be tested, which tests are to be performed as well the test conditions.

This application form should form an integral part of the test report.

E.2 Information as required by ETSI EN 300 328 V2.2.2, clause 5.4.1

In accordance with ETSI EN 300 328, clause 5.4.1, the following information is provided by the manufacturer.

a) The type of wideband data transmission equipment:

☐ FHSS

■ non-FHSS

b) In case of FHSS:

- In case of non-Adaptive FHSS equipment:

  The number of Hopping Frequencies: ……..

- In case of Adaptive FHSS equipment:

  The maximum number of Hopping Frequencies: ……..

  The minimum number of Hopping Frequencies: ……..

- The (average) dwell time: ……..

c) Adaptive/non-adaptive equipment:

■ non-adaptive Equipment

☐ adaptive Equipment without the possibility to switch to a non-adaptive mode

☐ adaptive Equipment which can also operate in a non-adaptive mode

d) In case of adaptive equipment:

The maximum Channel Occupancy Time implemented by the equipment: ..... ms

☐ The equipment has implemented an LBT mechanism

- In case of non-FHSS equipment:

  ☐ The equipment is Frame Based equipment

  ☐ The equipment is Load Based equipment

☐ The equipment can switch dynamically between Frame Based and Load Based equipment

The CCA time implemented by the equipment: ..... µs

The equipment has implemented a DAA mechanism

The equipment can operate in more than one adaptive mode

e) In case of non-adaptive Equipment:

The maximum RF Output Power (e.i.r.p.): 4 ……. dBm

The maximum (corresponding) Duty Cycle: 0.23 …… %

Equipment with dynamic behaviour, that behaviour is described here. (e.g. the different combinations of duty cycle and corresponding power levels to be declared):

production samples: 7 beacons in 60 seconds each 20ms 4dBm 1Mbps duty cycle samples: 99-100% duty cycle misc. data over BLE advertising channels 4dBm 1Mbps

f) The worst case operational mode for each of the following tests:

- RF Output Power
  BLE, 1 Mbps, GFSK
- Power Spectral Density
  BLE, 1 Mbps, GFSK
- Duty cycle, Tx-Sequence, Tx-gap
  BLE, 1 Mbps, GFSK
- Accumulated Transmit time, Frequency Occupation & Hopping Sequence (only for FHSS equipment)
  N/A as non FHSS equipment
- Hopping Frequency Separation (only for FHSS equipment)
  N/A as non FHSS equipment
- Medium Utilization
  BLE, 1 Mbps, GFSK
- Adaptivity & Receiver Blocking
  N/A as non-adaptive equipment
- Nominal Channel Bandwidth
  BLE, 1 Mbps, GFSK
- Transmitter unwanted emissions in the OOB domain
  BLE, 1 Mbps, GFSK
- Transmitter unwanted emissions in the spurious domain
  BLE, 1 Mbps, GFSK
- Receiver spurious emissions
  N/A EUT is a Beacon and does not have a receive mode

g) The different transmit operating modes (tick all that apply):

☒ Operating mode 1: Single Antenna Equipment

☒ Equipment with only one antenna

☐ Equipment with two diversity antennas but only one antenna active at any moment in time

☐ Smart Antenna Systems with two or more antennas, but operating in a (legacy) mode where only one antenna is used (e.g. IEEE 802.11™ legacy mode in smart antenna systems)

☐ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming

☐ Single spatial stream/Standard throughput/(e.g. IEEE 802.11™ legacy mode)

☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1

☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2

NOTE 1: Add more lines if more channel bandwidths are supported.

☐ Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming

☐ Single spatial stream/Standard throughput (e.g. IEEE 802.11™ legacy mode)

☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1

☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2

NOTE 2: Add more lines if more channel bandwidths are supported.

h) In case of Smart Antenna Systems:

- The number of Receive chains: .....
- The number of Transmit chains: .....

☐ symmetrical power distribution

☐ asymmetrical power distribution

In case of beam forming, the maximum (additional) beam forming gain: ..... dB

NOTE: The additional beam forming gain does not include the basic gain of a single antenna.

i) Operating Frequency Range(s) of the equipment:

- Operating Frequency Range 1: 2402 ..... MHz to 2480 ..... MHz
- Operating Frequency Range 2: ..... MHz to ..... MHz

NOTE: Add more lines if more Frequency Ranges are supported.

j) Nominal Channel Bandwidth(s):

- Nominal Channel Bandwidth 1: 2 ..... MHz
- Nominal Channel Bandwidth 2: ..... MHz

NOTE: Add more lines if more channel bandwidths are supported.

k) Type of Equipment (stand-alone, combined, plug-in radio device, etc.):

☒ Stand-alone

☐ Combined Equipment

☐ Plug-in radio device

☐ Other .....

l) The normal and the extreme operating conditions that apply to the equipment:

Normal operating conditions (if applicable):

Operating temperature: 20 °C

Other (please specify if applicable): room temp

Extreme operating conditions:

Operating temperature range: Minimum: -20 °C Maximum 60 °C

Other (please specify if applicable): …… Minimum: …… Maximum ……

Details provided are for the: ■ stand-alone equipment

☐ combined equipment

☐ test jig

m) The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p. levels:

- Antenna Type:

  ■ Integral Antenna (information to be provided in case of conducted measurements)

  Antenna Gain: -0.4 dBi

  If applicable, additional beamforming gain (excluding basic antenna gain): ..... dB

  ■ Temporary RF connector provided

  ☐ No temporary RF connector provided

  ☐ Dedicated Antennas (equipment with antenna connector)

  ☐ Single power level with corresponding antenna(s)

  ☐ Multiple power settings and corresponding antenna(s)

  Number of different Power Levels: .....

  Power Level 1: ..... dBm

  Power Level 2: ..... dBm

  Power Level 3: ..... dBm

NOTE 1: Add more lines in case the equipment has more power levels.

NOTE 2: These power levels are conducted power levels (at antenna connector).

- For each of the Power Levels, provide the intended antenna assemblies, their corresponding gains (G) and the resulting e.i.r.p. levels also taking into account the beamforming gain (Y) if applicable

Power Level 1: 4 dBm

Number of antenna assemblies provided for this power level: 1

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1	-0.4	4	H2UB6D1K1B0100 manufactured by Unictron Technologies Corporation
2			
3			
4			

NOTE 3: Add more rows in case more antenna assemblies are supported for this power level.

Power Level 2: ..... dBm

Number of antenna assemblies provided for this power level: .....

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			

NOTE 4: Add more rows in case more antenna assemblies are supported for this power level.

Power Level 3: ..... dBm

Number of antenna assemblies provided for this power level: .....

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			

NOTE 5: Add more rows in case more antenna assemblies are supported for this power level.

n) The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined equipment or test jig in case of plug-in devices:

Details provided are for the: ☒ stand-alone equipment

☐ combined equipment

☐ test jig

Supply Voltage ☐ AC mains State AC voltage …….. V

☒ DC State DC voltage 3…….. V

In case of DC, indicate the type of power source

☐ Internal Power Supply

☐ External Power Supply or AC/DC adapter

☒ Battery

☐ Other: .....

o) Describe the test modes available which can facilitate testing:

Production mode (beacon 7 times each 60 seconds. 20ms each beacon)

Separate sample with high duty cycle beaconing misc. data over BLE advertising channels

p) The equipment type (e.g. Bluetooth®, IEEE 802.11™, IEEE 802.15.4™, proprietary, etc.):

Bluetooth low energy (BLE) beacon device

q) If applicable, the statistical analysis referred to in clause 5.4.1 q)

(to be provided as separate attachment)

r) If applicable, the statistical analysis referred to in clause 5.4.1 r)

(to be provided as separate attachment)

s) Geo-location capability supported by the equipment:

☐ Yes

☐ The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user

■ No

E.3 Configuration for testing (see clause 5.3.2.3 of ETSI EN 300 328 V2.2.2)

From all combinations of conducted power settings and intended antenna assembly(ies) specified in clause 5.4.1 m), specify the combination resulting in the highest e.i.r.p. for the radio equipment.

Unless otherwise specified in ETSI EN 300 328, this power setting is to be used for testing against the requirements of ETSI EN 300 328. In case there is more than one such conducted power setting resulting in the same (highest) e.i.r.p. level, the highest power setting is to be used for testing. See also ETSI EN 300 328, clause 5.3.2.3.

Highest overall e.i.r.p. value:	4.....	dBm	
Corresponding Antenna assembly gain:	-0.4	dBi	Antenna Assembly #: .....
Corresponding conducted power setting: (also the power level to be used for testing)	4.....	dBm	Listed as Power Setting #: .....

E.4 Additional information provided by the manufacturer

E.4.1 Modulation

ITU Class(es) of emission: GFSK modulation

Can the transmitter operate unmodulated? ☐ yes ■ no

E.4.2 Duty Cycle

The transmitter is intended for: ☐ Continuous duty

■ Intermittent duty

■ Continuous operation possible for testing purposes

E.4.3 About the UUT

■ The equipment submitted are representative production models

☐ If not, the equipment submitted are pre-production models?

☐ If pre-production equipment are submitted, the final production equipment will be identical in all respects with the equipment tested

☐ If not, supply full details

E.4.4 Additional items and/or supporting equipment provided

☒ Spare batteries (e.g. for portable equipment)

☐ Battery charging device

☐ External Power Supply or AC/DC adapter

☐ Test jig or interface box

☐ RF test fixture (for equipment with integrated antennas)

☐ Combined equipment Manufacturer: .....

Model #: .....

Model name: .....

☒ User Manual

☐ Technical documentation (Handbook and circuit diagrams)

End of Test Report