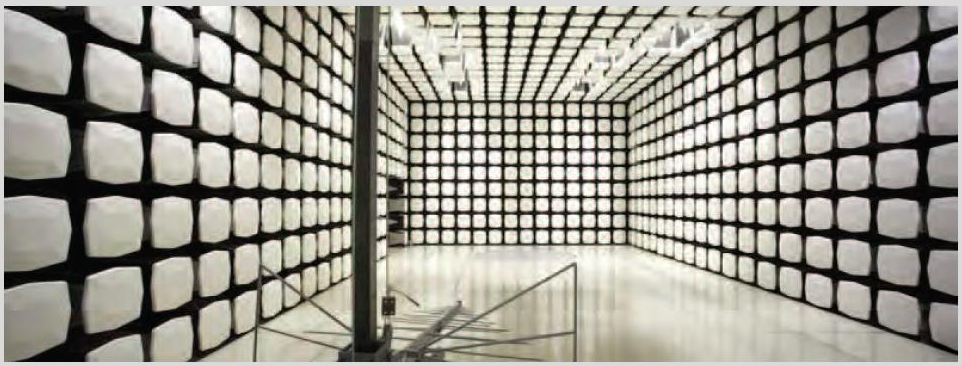
TURCK Inc.

PD67 Handheld RFID Reader

FCC 15.247:2020

RFID Transceiver

Report # TURC0061.1 Rev. 1



NVLAP LAB CODE: 200881-0

CERTIFICATE OF TEST

Last Date of Test: January 23, 2020
TURCK Inc.
EUT: PD67 Handheld RFID Reader

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2019 FCC 15.247:2020	ANSI C63.10:2013

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions (Transmitter)	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
7.5	Duty Cycle	Yes	N/A	Characterization of radio operation.
7.8.2	Carrier Frequency Separation	Yes	Pass	
7.8.3	Number of Hopping Frequencies	Yes	Pass	
7.8.4	Dwell Time	Yes	Pass	
7.8.5	Output Power	Yes	Pass	
7.8.5	Equivalent Isotropic Radiated Power	Yes	Pass	
7.8.6	Band Edge Compliance	Yes	Pass	
7.8.6	Band Edge Compliance - Hopping Mode	Yes	Pass	
7.8.7	Occupied Bandwidth	Yes	Pass	
7.8.8	Spurious Conducted Emissions	Yes	Pass	
11.10.2	Power Spectral Density	No	N/A	Not required for FHSS devices.

Deviations From Test Standards

None

Approved By:

Eric Brandon, Department Manager

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

REVISION HISTORY

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
01	Corrected typo on Output Power units	2020-08-19	8
	Updated configurations to PD67-UNI-NA-RSWBG model (indicates barcode included) for clarity	2020-08-19	9
	Added Power Settings table	2020-08-19	12

ACCREDITATIONS AND AUTHORIZATIONS

United States

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

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This 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 – Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

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

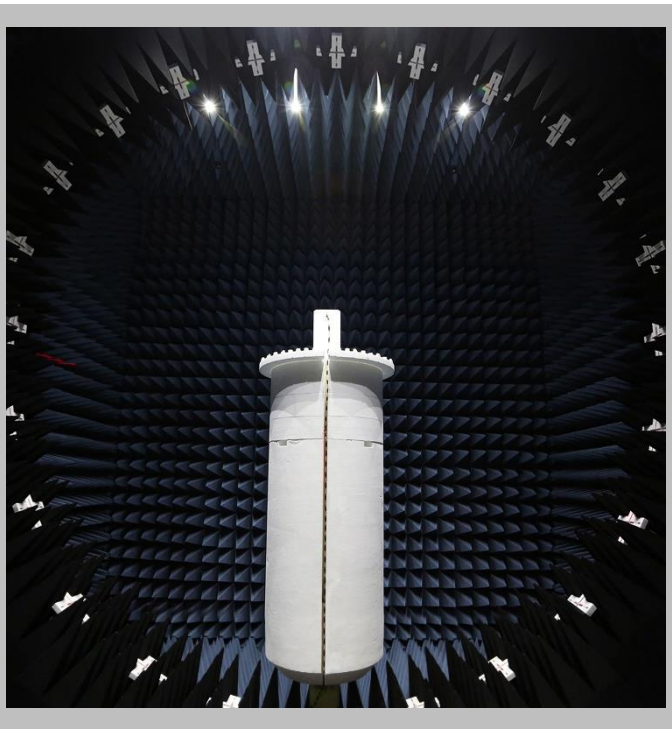
MIC – Recognized by MIC as a CAB for the acceptance of test data.

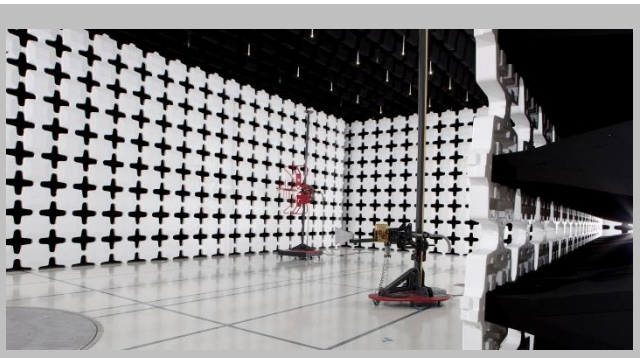
SCOPE

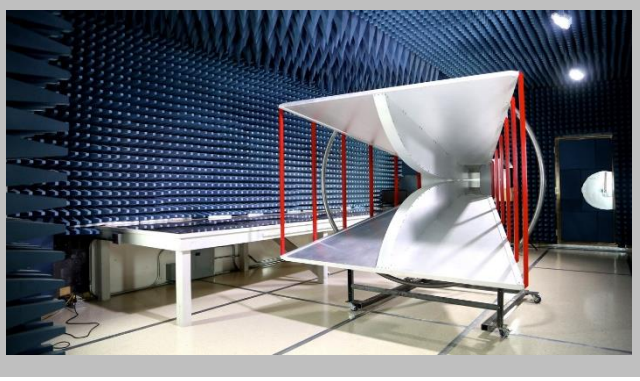
For details on the Scopes of our Accreditations, please visit:
https://www.nwemc.com/emc-testing-accreditations

FACILITIES

California	Minnesota	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-10 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
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.

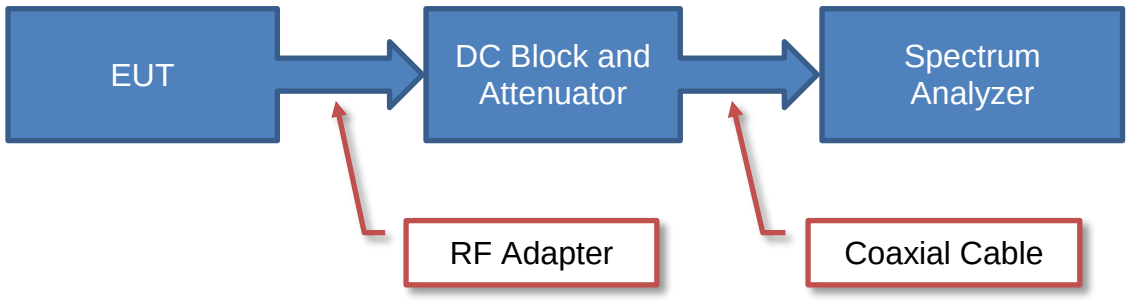
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable test description page. 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.

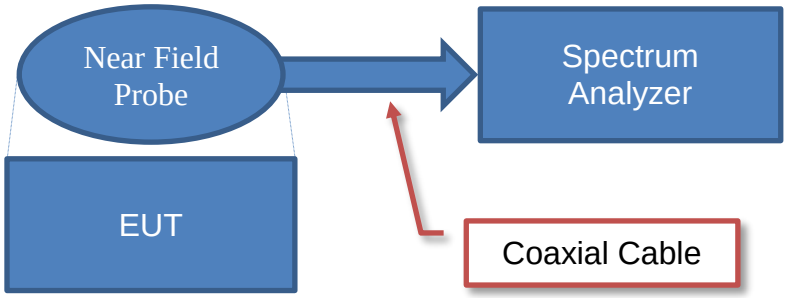
Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

Test Setup Block Diagrams

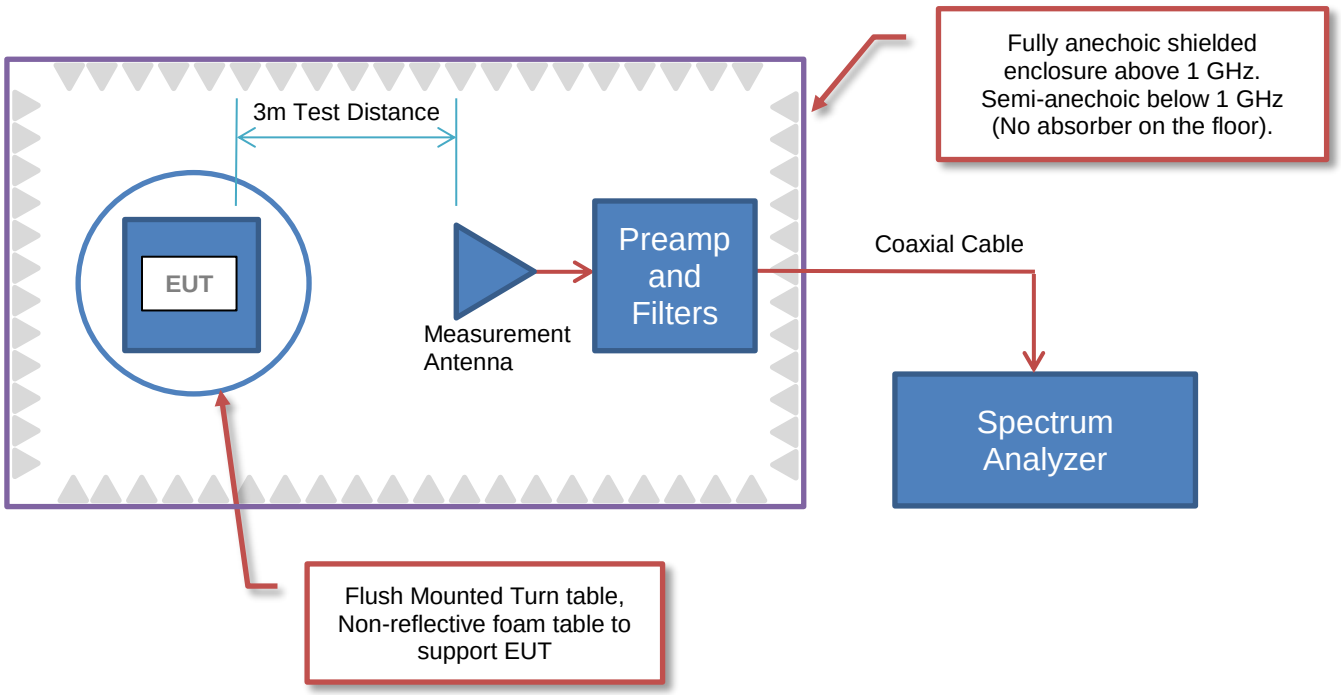
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	TURCK Inc.
Address:	3000 Campus Dr
City, State, Zip:	Plymouth, MN 55441
Test Requested By:	Gabe Selinger
EUT:	PD67 Handheld RFID Reader
First Date of Test:	November 21, 2019
Last Date of Test:	January 23, 2020
Receipt Date of Samples:	November 11, 2019
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
PD67 is a battery operated, handheld device for reading HF and UHF RFID tags, as well as barcodes. It is capable of WiFi communication, and has a USB C interface for battery charging and communication. When transmitting for RFID reading, it has a max output power of about 30dBm. Its duty cycle while transmitting is NOT constant (it is calculated and adjusted every time based on factors such as tag response and reflected power). The user interfaces with the device via 3 buttons, as well as a capacitive touch LCD. The device runs Android as its operating system. The barcode scanner contains a linear LED for aiming purposes, but there is NOT a laser. The battery is Lithium Ion. The device also has GPS capability, via an internal on-board antenna.

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

CONFIGURATIONS

Configuration TURC0058- 5

Software/Firmware Running during test	
Description	**Version**
Firmware	1.19.6

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Handheld RFID Reader	TURCK Inc.	PD67-UNI-NA-RSWBG	T2

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC power adapter	Phihong	AQ15A-050A	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB-C to USB-C	Yes	1m	None	Handheld RFID Reader	AC/DC power adapter

Configuration TURC0058- 7

Software/Firmware Running during test	
Description	**Version**
Firmware	1.19.6

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Handheld RFID Reader	TURCK Inc.	PD67-UNI-NA-RSWBG	T4

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC power adapter	CUI Inc	SWC15-55-NB	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB-C to USB-C	Yes	1m	None	Handheld RFID Reader	AC/DC power adapter

CONFIGURATIONS

Configuration TURC0061- 1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Handheld RFID Reader	TURCK Inc.	PD67-UNI-NA-RSWBG	T10

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Power Supply (RFID Reader)	CUI Inc.	SWC15-S5-NB	N/A

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	1.8 m	No	Power Supply (RFID Reader)	Handheld RFID Reader

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2019-11-21	Powerline Conducted Emissions (Transmitter)	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	2019-11-25	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.
3	2020-01-23	Carrier Frequency Separation	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	2020-01-23	Number of Hopping Frequencies	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	2020-01-23	Dwell Time	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2020-01-23	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.
7	2020-01-23	Equivalent Isotropic Radiated Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2020-01-23	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
9	2020-01-23	Band Edge Compliance - Hopping Mode	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
10	2020-01-23	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.
11	2020-01-23	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWER SETTINGS

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

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types	Position (if multiple channels)	Power Setting
Single Data Rate / Modulation Type	Low Channel	30 dBm
	Mid Channel	30 dBm
	High Channel	30 dBm

POWERLINE CONDUCTED EMISSIONS

element
WTD.2019.4.24.1

TEST DESCRIPTION

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESR7	ARI	2019-07-08	2020-07-08
Cable - Conducted Cable Assembly	Northwest EMC	MNC, HGN, TYK	MNCA	2019-03-13	2020-03-13
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	2019-03-15	2020-03-15

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

TURC0058-5

MODES INVESTIGATED

Tx on Mid ch (915.25 MHz), 30 dBm output power, 100% duty cycle, full modulation

POWERLINE CONDUCTED EMISSIONS

element
WTD.2019.4.24.1

EUT:	PD67 Handheld RFID Reader	Work Order:	TURC0058
Serial Number:	T2	Date:	2019-11-21
Customer:	TURCK Inc.	Temperature:	22.1°C
Attendees:	Gabe Selinger, Matt Wickstron	Relative Humidity:	31.7%
Customer Project:	None	Bar. Pressure:	1017 mb
Tested By:	Andrew Rogstad	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	TURC0058-5

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2019	ANSI C63.10:2013

TEST PARAMETERS

Run #:	19	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

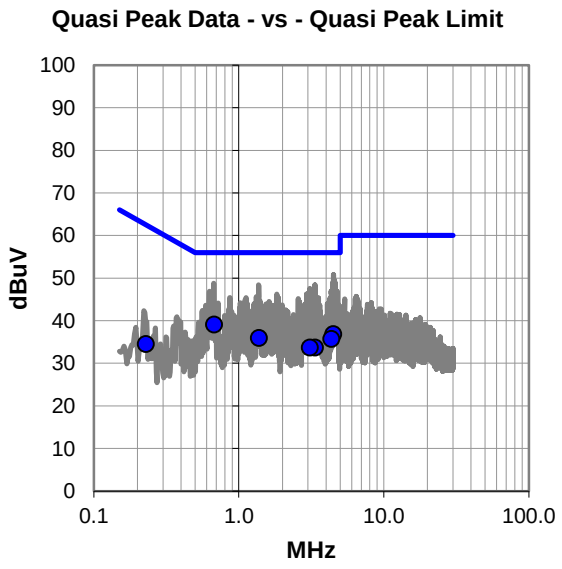
Firmware 1.19.6

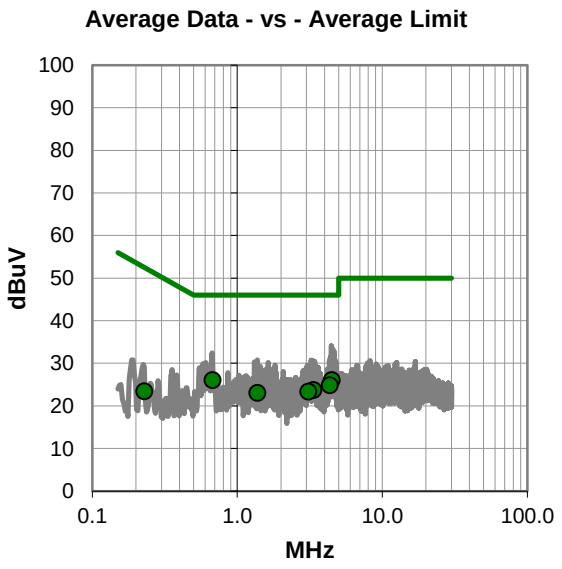
EUT OPERATING MODES

Tx on Mid ch (915.25 MHz), 30 dBm output power, 100% duty cycle, full modulation

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2019.4.24.1

RESULTS - Run #19

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.677	18.5	20.6	39.1	56.0	-16.9
4.494	16.1	20.7	36.8	56.0	-19.2
1.375	15.3	20.6	35.9	56.0	-20.1
4.351	15.0	20.7	35.7	56.0	-20.3
3.355	12.9	20.8	33.7	56.0	-22.3
3.090	13.0	20.7	33.7	56.0	-22.3
0.228	13.8	20.7	34.5	62.5	-28.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.494	5.3	20.7	26.0	46.0	-20.0
0.677	5.4	20.6	26.0	46.0	-20.0
4.351	4.1	20.7	24.8	46.0	-21.2
3.355	2.9	20.8	23.7	46.0	-22.3
3.090	2.6	20.7	23.3	46.0	-22.7
1.375	2.4	20.6	23.0	46.0	-23.0
0.228	2.7	20.7	23.4	52.5	-29.1

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2019.4.24.1

EUT:	PD67 Handheld RFID Reader	Work Order:	TURC0058
Serial Number:	T2	Date:	2019-11-21
Customer:	TURCK Inc.	Temperature:	22.1°C
Attendees:	Gabe Selinger, Matt Wickstron	Relative Humidity:	31.7%
Customer Project:	None	Bar. Pressure:	1017 mb
Tested By:	Andrew Rogstad	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	TURC0058-5

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2019	ANSI C63.10:2013

TEST PARAMETERS

Run #:	20	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

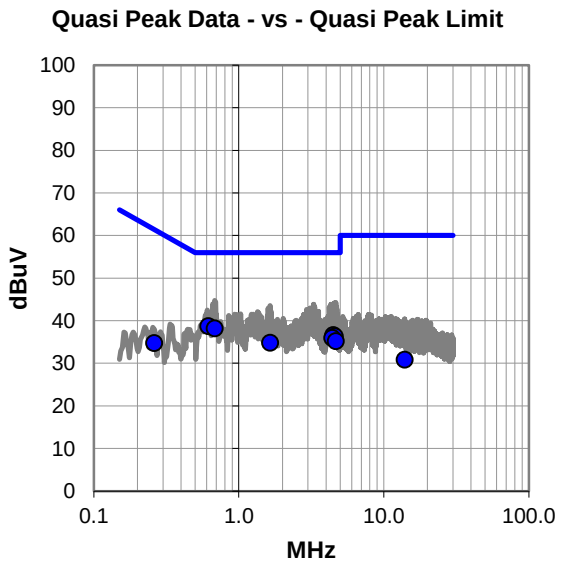
Firmware 1.19.6;

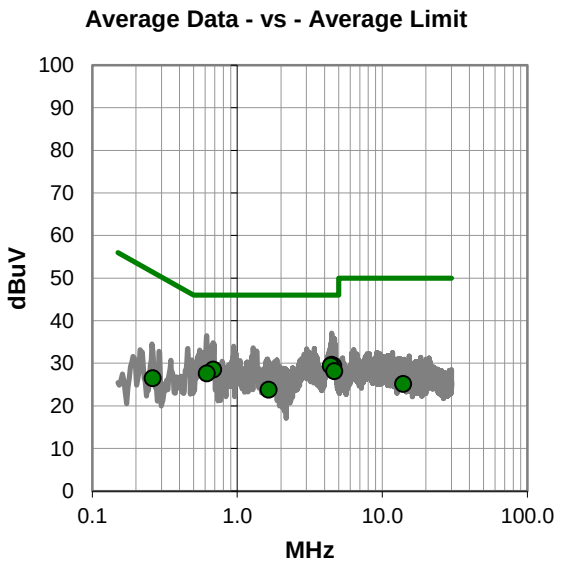
EUT OPERATING MODES

Tx on Mid ch (915.25 MHz), 30 dBm output power, 100% duty cycle, full modulation

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2019.4.24.1

RESULTS - Run #20

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.617	18.2	20.5	38.7	56.0	-17.3
0.684	17.6	20.6	38.2	56.0	-17.8
4.489	15.9	20.7	36.6	56.0	-19.4
4.613	15.6	20.7	36.3	56.0	-19.7
4.418	15.2	20.7	35.9	56.0	-20.1
4.684	14.5	20.7	35.2	56.0	-20.8
1.648	14.2	20.6	34.8	56.0	-21.2
0.261	14.0	20.7	34.7	61.4	-26.7
13.946	9.9	20.9	30.8	60.0	-29.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.489	8.9	20.7	29.6	46.0	-16.4
4.613	8.7	20.7	29.4	46.0	-16.6
4.418	8.7	20.7	29.4	46.0	-16.6
0.684	7.9	20.6	28.5	46.0	-17.5
4.684	7.4	20.7	28.1	46.0	-17.9
0.617	7.1	20.5	27.6	46.0	-18.4
1.648	3.2	20.6	23.8	46.0	-22.2
0.261	5.8	20.7	26.5	51.4	-24.9
13.946	4.2	20.9	25.1	50.0	-24.9

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2019.05.10

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

MODES OF OPERATION

Transmitting on Low channel (902.75 MHz), Mid channel (915.25 MHz), and High channel (927.25 MHz), UHF RFID, 100 % duty cycle, modulated.

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

TURC0058 - 7

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	12400 MHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	8-Feb-2019	12 mo
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	8-Mar-2019	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	8-Feb-2019	12 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	17-Sep-2019	12 mo
Antenna - Double Ridge	ETS-Lindgren	3115	AJQ	16-Jan-2019	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	18-Oct-2019	12 mo
Cable	ESM Cable Corp.	Bilog Cables	MNH	18-Oct-2019	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYD	25-Jan-2018	24 mo
Filter - Band Pass/Notch	K&L Microwave	3TNF-500/1000-N/N	HGS	13-Jul-2019	12 mo
Filter - Low Pass	Micro-Tronics	LPM50003	LFJ	17-Sep-2019	12 mo
Filter - High Pass	Micro-Tronics	HPM50108	LFM	12-Sep-2019	12 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	13-Dec-2018	12 mo

TEST DESCRIPTION

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

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

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

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

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

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

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

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

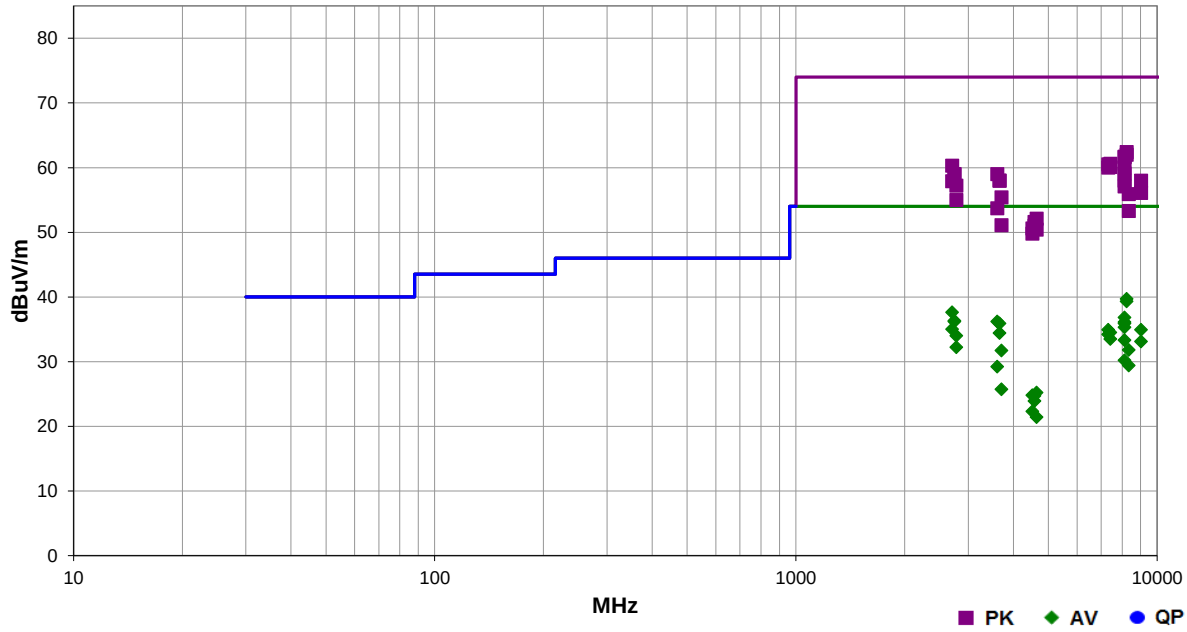
SPURIOUS RADIATED EMISSIONS

EmiR5 2019.08.15.1 PSA-ESCI 2019.05.10

Work Order:	TURC0058	**Date:**	25-Nov-2019		
Project:	None	**Temperature:**	22.3 °C		
Job Site:	MN05	**Humidity:**	32% RH		
Serial Number:	T4	**Barometric Pres.:**	1001 mbar	**Tested by:**	Andrew Rogstad
EUT:	PD67 Handheld RFID Reader				
Configuration:	7				
Customer:	TURCK Inc.				
Attendees:	Gabe Selinger, Matt Wickstron				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting on Low channel (902.75 MHz), Mid channel (915.25 MHz), and High channel (927.25 MHz), UHF RFID, 100 % duty cycle, modulated.				
Deviations:	None				
Comments:	See data comments for EUT orientation and transmit channel. A Duty Cycle Correction Factor (DCCF) of -22.2 dB was added to the average measurements. This is based on a dwell time of 7.757 ms in a 100 millisecond period in the EUT's hopping mode.				

Test Specifications	**Test Method**
FCC 15.247:2019	ANSI C63.10:2013

Run #	50	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
8237.108	69.8	-7.4	1.3	252.0	0.0	0.0	Vert	PK	0.0	62.4	74.0	-11.6	EUT vert, Mid ch.
8237.100	69.4	-7.4	2.4	264.0	0.0	0.0	Horz	PK	0.0	62.0	74.0	-12.0	EUT on side, Mid ch.
8124.667	48.3	13.4	2.2	51.0	0.0	0.0	Vert	PK	0.0	61.7	74.0	-12.3	EUT horz, Low ch.
8124.792	48.2	13.4	1.4	228.9	0.0	0.0	Vert	PK	0.0	61.6	74.0	-12.4	EUT vert, Low ch.
7418.058	47.3	13.3	2.6	278.0	0.0	0.0	Horz	PK	0.0	60.6	74.0	-13.4	EUT on side, High ch.
7322.050	47.0	13.5	1.6	247.9	0.0	0.0	Vert	PK	0.0	60.5	74.0	-13.5	EUT vert, Mid ch.
2708.292	63.2	-2.9	1.4	207.0	0.0	0.0	Vert	PK	0.0	60.3	74.0	-13.7	EUT vert, Low ch.
7418.025	46.8	13.3	1.7	247.9	0.0	0.0	Vert	PK	0.0	60.1	74.0	-13.9	EUT vert, High ch.
8124.792	46.6	13.4	1.3	167.9	0.0	0.0	Horz	PK	0.0	60.0	74.0	-14.0	EUT on side, Low ch.
7321.875	46.5	13.5	2.7	278.0	0.0	0.0	Horz	PK	0.0	60.0	74.0	-14.0	EUT on side, Mid ch.
8237.225	69.3	-7.4	1.3	252.0	-22.2	0.0	Vert	AV	0.0	39.7	54.0	-14.3	EUT vert, Mid ch.
8237.267	68.9	-7.4	2.4	264.0	-22.2	0.0	Horz	AV	0.0	39.3	54.0	-14.7	EUT on side, Mid ch.
8124.500	45.7	13.4	2.2	108.0	0.0	0.0	Horz	PK	0.0	59.1	74.0	-14.9	EUT horz, Low ch.
2745.800	62.0	-3.0	1.6	208.0	0.0	0.0	Horz	PK	0.0	59.0	74.0	-15.0	EUT on side, Mid ch.
2745.733	62.0	-3.0	1.5	200.9	0.0	0.0	Vert	PK	0.0	59.0	74.0	-15.0	EUT vert, Mid ch.
3611.042	58.3	0.7	2.1	239.0	0.0	0.0	Horz	PK	0.0	59.0	74.0	-15.0	EUT on side, Low ch.
8124.750	44.6	13.4	1.5	196.0	0.0	0.0	Horz	PK	0.0	58.0	74.0	-16.0	EUT vert, Low ch.
3661.025	57.2	0.8	4.0	317.0	0.0	0.0	Horz	PK	0.0	58.0	74.0	-16.0	EUT on side, Mid ch.

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
3660.942	57.2	0.8	3.5	263.0	0.0	0.0	Vert	PK	0.0	58.0	74.0	-16.0	EUT vert, Mid ch.
9027.500	64.1	-6.1	2.1	246.0	0.0	0.0	Vert	PK	0.0	58.0	74.0	-16.0	EUT vert, Low ch.
2708.250	60.8	-2.9	1.5	210.0	0.0	0.0	Horz	PK	0.0	57.9	74.0	-16.1	EUT on side, Low ch.
2708.267	62.7	-2.9	1.4	207.0	-22.2	0.0	Vert	AV	0.0	37.6	54.0	-16.4	EUT vert, Low ch.
2781.617	59.9	-2.7	1.5	192.0	0.0	0.0	Vert	PK	0.0	57.2	74.0	-16.8	EUT vert, High ch.
8124.792	43.7	13.4	1.0	48.9	0.0	0.0	Vert	PK	0.0	57.1	74.0	-16.9	EUT on side, Low ch.
8124.750	45.6	13.4	1.4	228.9	-22.2	0.0	Vert	AV	0.0	36.8	54.0	-17.2	EUT vert, Low ch.
2745.775	61.5	-3.0	1.6	208.0	-22.2	0.0	Horz	AV	0.0	36.3	54.0	-17.7	EUT on side, Mid ch.
3611.042	57.7	0.7	2.1	239.0	-22.2	0.0	Horz	AV	0.0	36.2	54.0	-17.8	EUT on side, Low ch.
2745.783	61.4	-3.0	1.5	200.9	-22.2	0.0	Vert	AV	0.0	36.2	54.0	-17.8	EUT vert, Mid ch.
8124.667	44.9	13.4	2.2	51.0	-22.2	0.0	Vert	AV	0.0	36.1	54.0	-17.9	EUT horz, Low ch.
9027.542	62.2	-6.1	1.5	258.9	0.0	0.0	Horz	PK	0.0	56.1	74.0	-17.9	EUT on side, Low ch.
8124.875	44.7	13.4	1.3	167.9	-22.2	0.0	Horz	AV	0.0	35.9	54.0	-18.1	EUT on side, Low ch.
8345.158	62.8	-6.9	2.0	242.0	0.0	0.0	Vert	PK	0.0	55.9	74.0	-18.1	EUT vert, High ch.
3660.950	57.3	0.8	3.5	263.0	-22.2	0.0	Vert	AV	0.0	35.9	54.0	-18.1	EUT vert, Mid ch.
3709.067	54.4	1.0	2.3	232.0	0.0	0.0	Horz	PK	0.0	55.4	74.0	-18.6	EUT on side, High ch.
8124.833	44.1	13.4	2.2	108.0	-22.2	0.0	Horz	AV	0.0	35.3	54.0	-18.7	EUT horz, Low ch.
2708.250	60.1	-2.9	1.5	210.0	-22.2	0.0	Horz	AV	0.0	35.0	54.0	-19.0	EUT on side, Low ch.
2781.692	57.7	-2.7	1.0	211.9	0.0	0.0	Horz	PK	0.0	55.0	74.0	-19.0	EUT on side, High ch.
7322.092	43.6	13.5	2.7	278.0	-22.2	0.0	Horz	AV	0.0	34.9	54.0	-19.1	EUT on side, Mid ch.
9027.508	63.2	-6.1	2.1	246.0	-22.2	0.0	Vert	AV	0.0	34.9	54.0	-19.1	EUT vert, Low ch.
7418.058	43.4	13.3	2.6	278.0	-22.2	0.0	Horz	AV	0.0	34.5	54.0	-19.5	EUT on side, High ch.
3661.017	55.8	0.8	4.0	317.0	-22.2	0.0	Horz	AV	0.0	34.4	54.0	-19.6	EUT on side, Mid ch.
7322.025	42.9	13.5	1.6	247.9	-22.2	0.0	Vert	AV	0.0	34.2	54.0	-19.8	EUT vert, Mid ch.
2781.750	58.9	-2.7	1.5	192.0	-22.2	0.0	Vert	AV	0.0	34.0	54.0	-20.0	EUT vert, High ch.
3610.783	53.0	0.7	1.5	153.9	0.0	0.0	Vert	PK	0.0	53.7	74.0	-20.3	EUT vert, Low ch.
7418.017	42.4	13.3	1.7	247.9	-22.2	0.0	Vert	AV	0.0	33.5	54.0	-20.5	EUT vert, High ch.
8124.750	42.1	13.4	1.5	196.0	-22.2	0.0	Horz	AV	0.0	33.3	54.0	-20.7	EUT vert, Low ch.
8345.158	60.2	-6.9	1.3	231.0	0.0	0.0	Horz	PK	0.0	53.3	74.0	-20.7	EUT on side, High ch.
9027.492	61.4	-6.1	1.5	258.9	-22.2	0.0	Horz	AV	0.0	33.1	54.0	-20.9	EUT on side, Low ch.
2781.750	57.1	-2.7	1.0	211.9	-22.2	0.0	Horz	AV	0.0	32.2	54.0	-21.8	EUT on side, High ch.
4636.450	47.7	4.4	1.8	261.9	0.0	0.0	Horz	PK	0.0	52.1	74.0	-21.9	EUT on side, High ch.
8345.267	60.9	-6.9	2.0	242.0	-22.2	0.0	Vert	AV	0.0	31.8	54.0	-22.2	EUT vert, High ch.
3709.042	52.9	1.0	2.3	232.0	-22.2	0.0	Horz	AV	0.0	31.7	54.0	-22.3	EUT on side, High ch.
4576.058	47.5	4.1	1.5	204.9	0.0	0.0	Horz	PK	0.0	51.6	74.0	-22.4	EUT on side, Mid ch.
3708.958	50.1	1.0	1.4	236.9	0.0	0.0	Vert	PK	0.0	51.1	74.0	-22.9	EUT vert, High ch.
4576.017	46.9	4.1	1.4	325.0	0.0	0.0	Vert	PK	0.0	51.0	74.0	-23.0	EUT vert, Mid ch.
4513.833	46.7	3.9	1.8	318.0	0.0	0.0	Horz	PK	0.0	50.6	74.0	-23.4	EUT on side, Low ch.
4636.217	46.0	4.4	1.5	319.9	0.0	0.0	Vert	PK	0.0	50.4	74.0	-23.6	EUT vert, High ch.
8124.750	39.0	13.4	1.0	48.9	-22.2	0.0	Vert	AV	0.0	30.2	54.0	-23.8	EUT on side, Low ch.
4513.767	45.9	3.9	1.5	336.0	0.0	0.0	Vert	PK	0.0	49.8	74.0	-24.2	EUT vert, Low ch.
8345.242	58.5	-6.9	1.3	231.0	-22.2	0.0	Horz	AV	0.0	29.4	54.0	-24.6	EUT on side, High ch.
3611.000	50.7	0.7	1.5	153.9	-22.2	0.0	Vert	AV	0.0	29.2	54.0	-24.8	EUT vert, Low ch.
3709.000	46.9	1.0	1.4	236.9	-22.2	0.0	Vert	AV	0.0	25.7	54.0	-28.3	EUT vert, High ch.
4636.267	43.0	4.4	1.8	261.9	-22.2	0.0	Horz	AV	0.0	25.2	54.0	-28.8	EUT on side, High ch.
4513.750	43.1	3.9	1.8	318.0	-22.2	0.0	Horz	AV	0.0	24.8	54.0	-29.2	EUT on side, Low ch.
4576.250	42.8	4.1	1.5	204.9	-22.2	0.0	Horz	AV	0.0	24.7	54.0	-29.3	EUT on side, Mid ch.
4576.325	42.0	4.1	1.4	325.0	-22.2	0.0	Vert	AV	0.0	23.9	54.0	-30.1	EUT vert, Mid ch.
4513.783	40.6	3.9	1.5	336.0	-22.2	0.0	Vert	AV	0.0	22.3	54.0	-31.7	EUT vert, Low ch.
4636.333	39.2	4.4	1.5	319.9	-22.2	0.0	Vert	AV	0.0	21.4	54.0	-32.6	EUT vert, High ch.

DUTY CYCLE

XMit 2019.09.05

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
Block - DC	Fairview Microwave	SD3379	AMZ	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	TZP	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	23-Dec-19	23-Dec-20
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20

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 test software provided for operation in a fixed, single channel mode allows the EUT to operate continuously at 100% Duty Cycle.

CARRIER FREQUENCY SEPARATION

XMit 2019.09.05

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
Block - DC	Fairview Microwave	SD3379	AMZ	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	TZP	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	23-Dec-19	23-Dec-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The channel carrier frequencies in the 902-928 MHz band must be separated by 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. The EUT was operated in pseudorandom hopping mode. The spectrum was scanned across two adjacent peaks. The separation between the peaks of these channels was measured.

CARRIER FREQUENCY SEPARATION

TbtTx 2019.08.30.0 XMit 2019.09.05

EUT:	**PD67 Handheld RFID Reader**			**Work Order:**	**TURC0061**
Serial Number:	**T10**			**Date:**	**23-Jan-20**
Customer:	**TURCK Inc.**			**Temperature:**	**23 °C**
Attendees:	**Gabe Selinger**			**Humidity:**	**26.3% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Andrew Rogstad**	**Power:**	**120VAC/60Hz**	**Job Site:**	**MN08**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

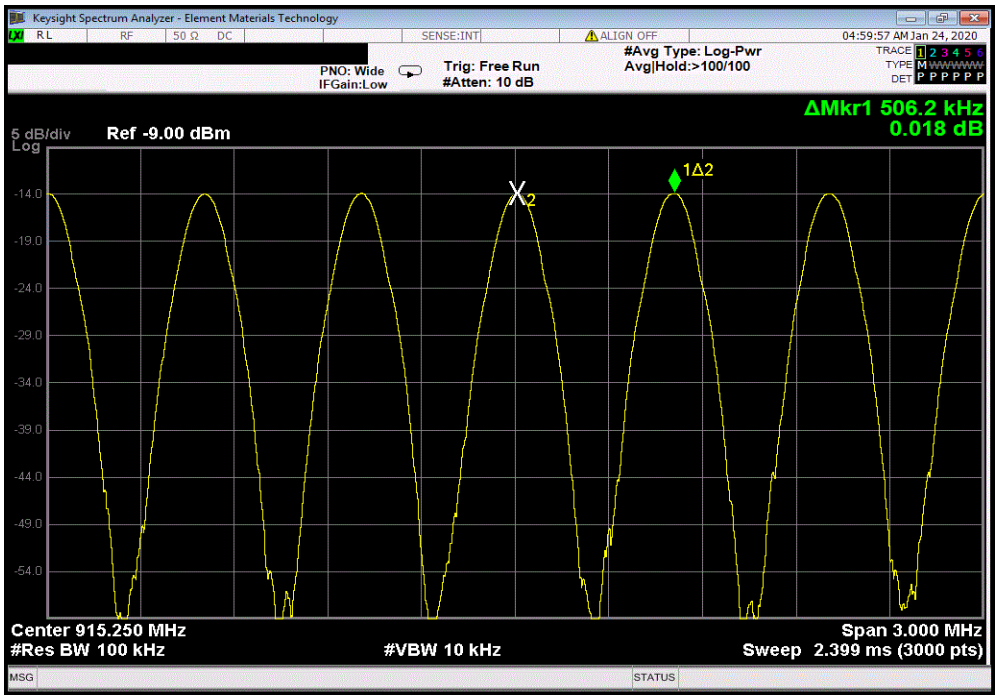
None

Configuration #	**1**	*Signature* Andrew Rogstad

	Value	**Limit (≥)**	**Results**
Hopping Mode			
Full band (902.75 - 927.25 MHz)	0.5 MHz	87 kHz	Pass

CARRIER FREQUENCY SEPARATION

Hopping Mode, Full band (902.75 - 927.25 MHz)						
				Value	Limit (≥)	Results
				0.5 MHz	87 kHz	Pass



NUMBER OF HOPPING FREQUENCIES

XMit 2019.09.05

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
Block - DC	Fairview Microwave	SD3379	AMZ	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	TZP	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	23-Dec-19	23-Dec-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The number of hopping frequencies was measured across the authorized band. The hopping function of the EUT was enabled.

NUMBER OF HOPPING FREQUENCIES

element

TbtTx 2019.08.30.0 XMit 2019.09.05

EUT:	**PD67 Handheld RFID Reader**			**Work Order:**	**TURC0061**
Serial Number:	**T10**			**Date:**	**23-Jan-20**
Customer:	**TURCK Inc.**			**Temperature:**	**23 °C**
Attendees:	**Gabe Selinger**			**Humidity:**	**26.4% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Andrew Rogstad**	**Power:**	**120VAC/60Hz**	**Job Site:**	**MN08**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

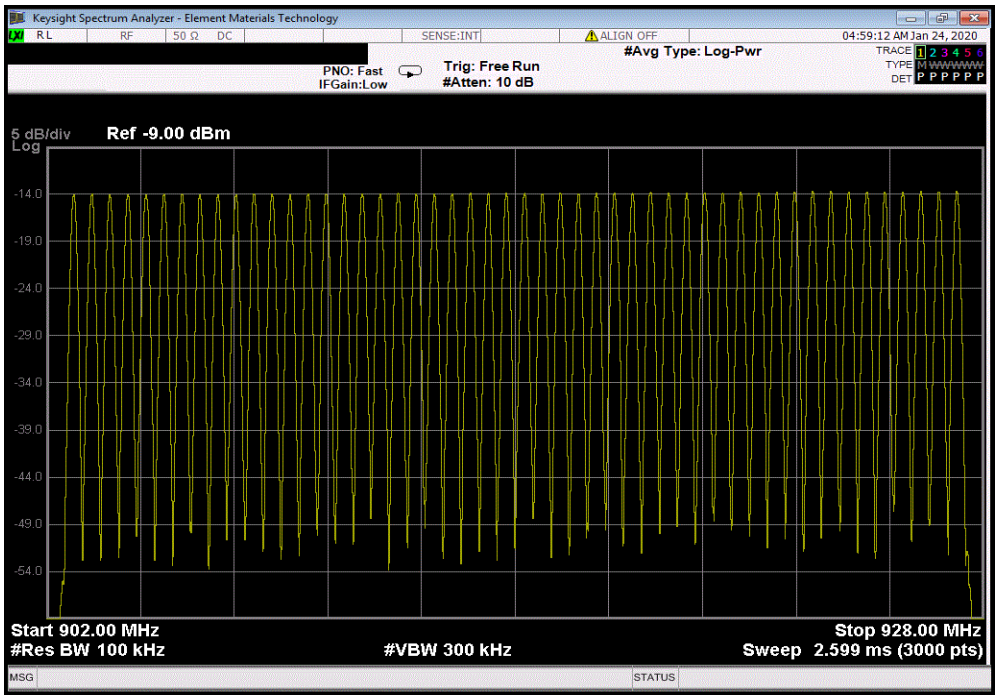
None

Configuration #	**1**	*Signature* Andrew Rogstad

	Number of Channels	**Limit (≥)**	**Results**
Hopping Mode			
Full band (902.75 - 927.25 MHz)	50	50	Pass

NUMBER OF HOPPING FREQUENCIES

Hopping Mode, Full band (902.75 - 927.25 MHz)						
				Number of Channels	Limit (≥)	Results
				50	50	Pass



DWELL TIME

XMit 2019.09.05

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
Block - DC	Fairview Microwave	SD3379	AMZ	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	TZP	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	23-Dec-19	23-Dec-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The hopping function of the EUT was enabled.

The dwell time limit is based on the Number of Hopping Channels * 400 mS. For UHF RFID this would be 50 Channels * 400mS = 20 Sec.

On Time During 20 Sec = Pulse Width * Average Number of Pulses * Scale Factor

- Average Number of Pulses is based on 4 samples.

- Scale Factor = 20 Sec / Screen Capture Sweep Time = 20 Sec / 4 Sec = 5

DWELL TIME

TbtTx 2019.08.30.0 XMit 2019.09.05

EUT:	**PD67 Handheld RFID Reader**			**Work Order:**	**TURC0061**
Serial Number:	**T10**			**Date:**	**23-Jan-20**
Customer:	**TURCK Inc.**			**Temperature:**	**23 °C**
Attendees:	**Gabe Selinger**			**Humidity:**	**26.4% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Andrew Rogstad**	**Power:**	**120VAC/60Hz**	**Job Site:**	**MN08**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

Configuration #	**1**	*Signature*

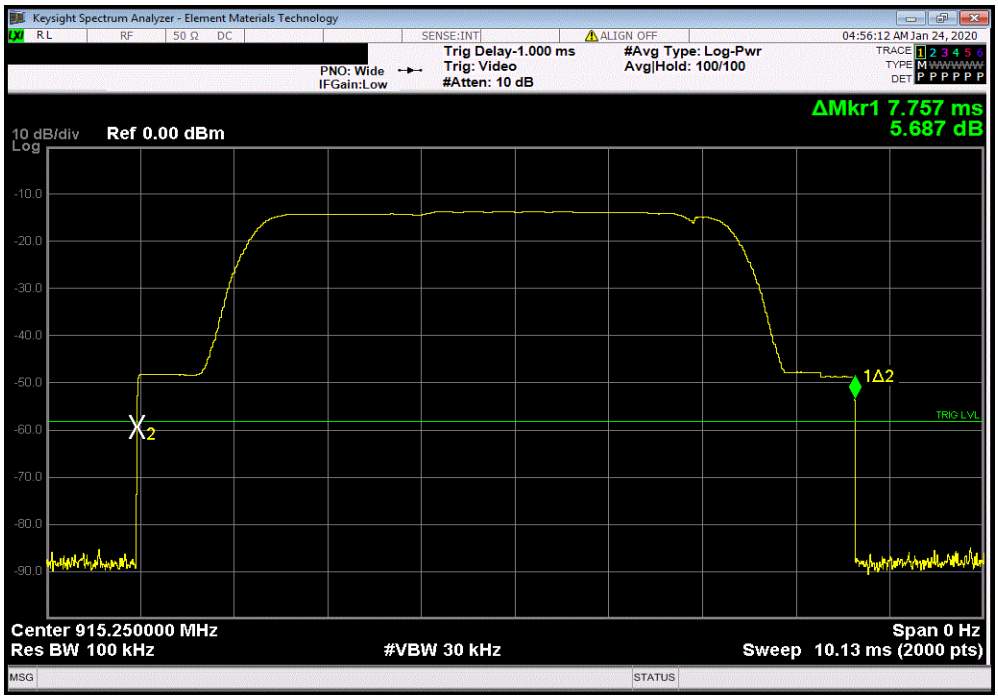
	Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 20 s	Limit (ms)	Results
Hopping Mode							
Full band (902.75 - 927.25 MHz)	7.757	N/A	N/A	N/A	N/A	N/A	N/A
Full band (902.75 - 927.25 MHz)	N/A	9	N/A	N/A	N/A	N/A	N/A
Full band (902.75 - 927.25 MHz)	N/A	8	N/A	N/A	N/A	N/A	N/A
Full band (902.75 - 927.25 MHz)	N/A	9	N/A	N/A	N/A	N/A	N/A
Full band (902.75 - 927.25 MHz)	N/A	9	N/A	N/A	N/A	N/A	N/A
Full band (902.75 - 927.25 MHz)	7.757	N/A	8.75	5	339.37	400	Pass

DWELL TIME

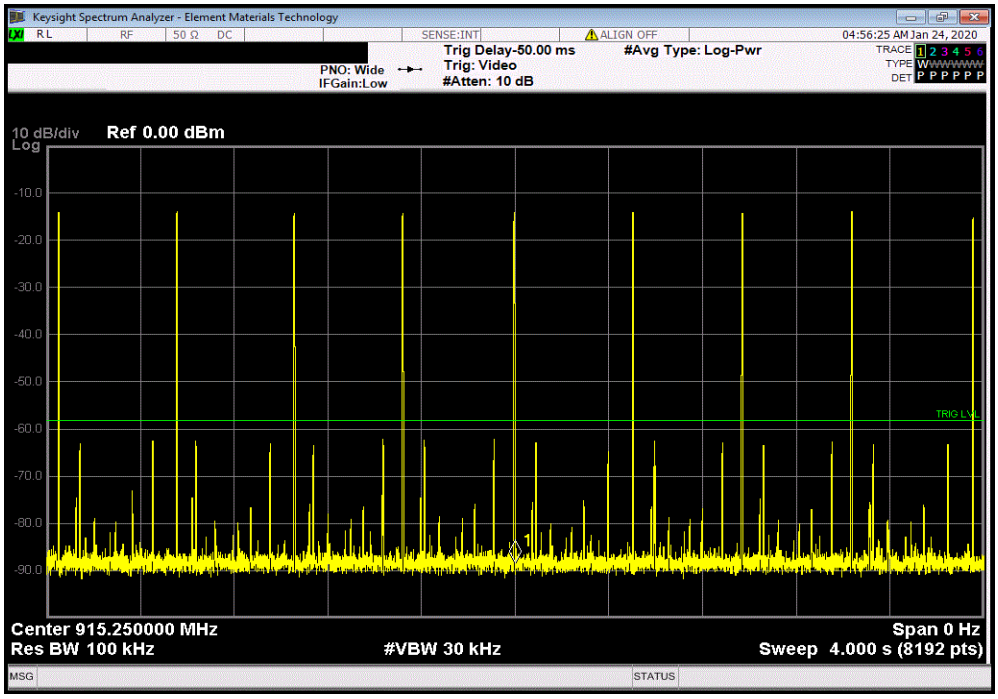
element

TbtTx 2019.08.30.0 XMit 2019.09.05

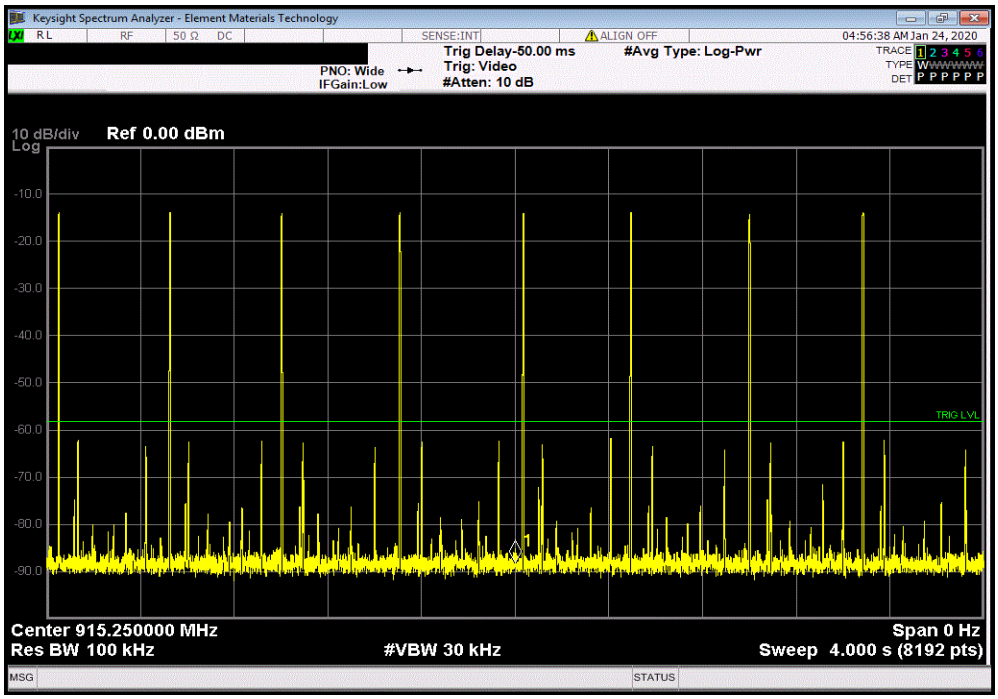
Hopping Mode, Full band (902.75 - 927.25 MHz)						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 20 s	Limit (ms)	Results
7.757	N/A	N/A	N/A	N/A	N/A	N/A



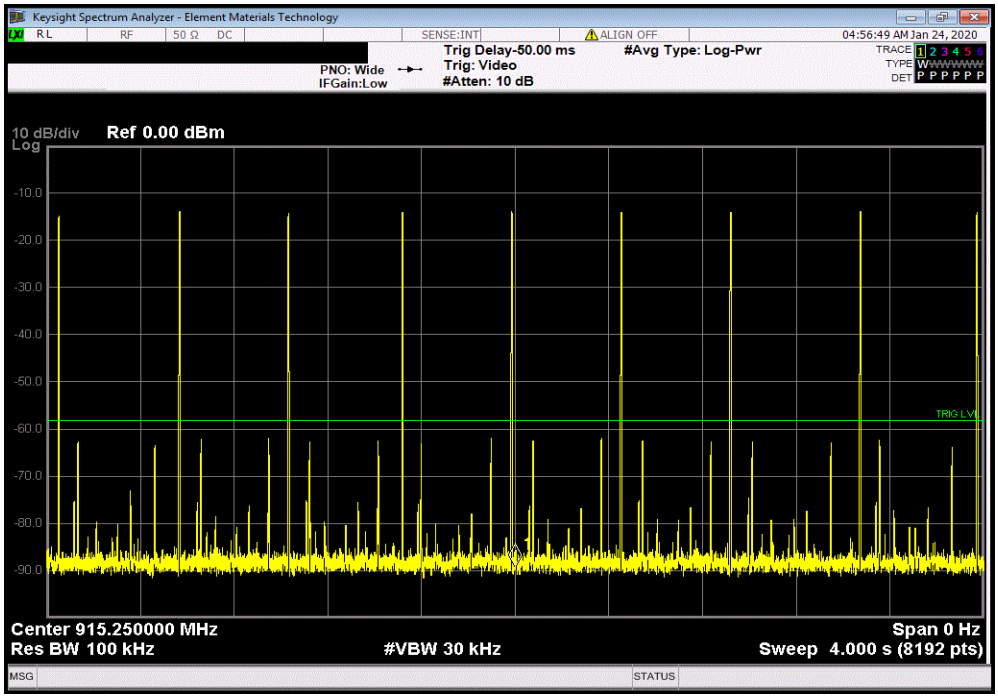
Hopping Mode, Full band (902.75 - 927.25 MHz)						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 20 s	Limit (ms)	Results
N/A	9	N/A	N/A	N/A	N/A	N/A



Hopping Mode, Full band (902.75 - 927.25 MHz)						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 20 s	Limit (ms)	Results
N/A	8	N/A	N/A	N/A	N/A	N/A

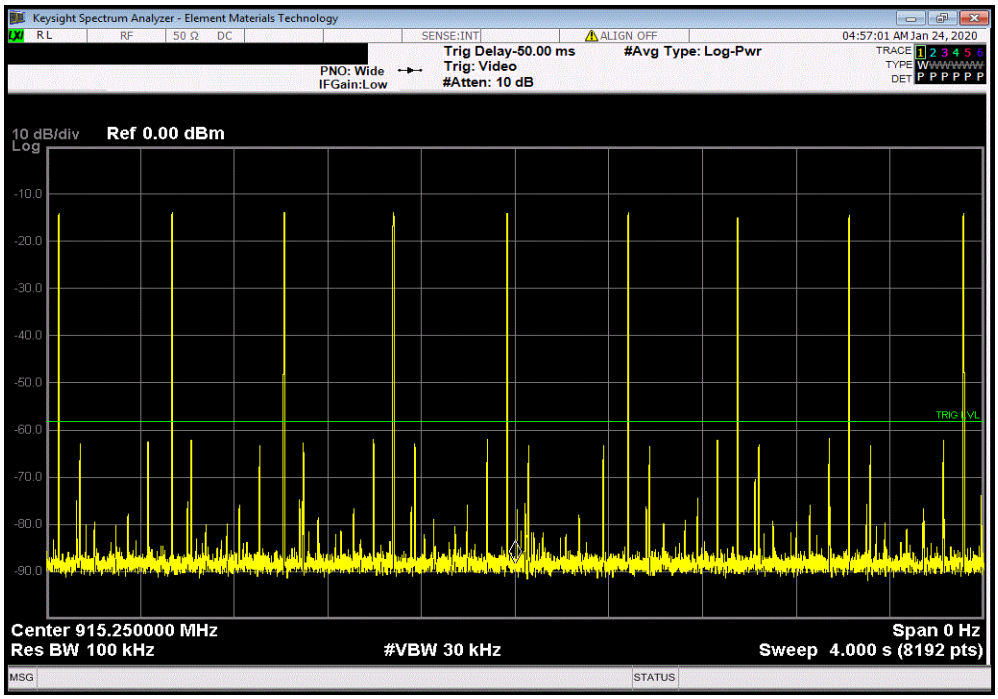


Hopping Mode, Full band (902.75 - 927.25 MHz)						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 20 s	Limit (ms)	Results
N/A	9	N/A	N/A	N/A	N/A	N/A



DWELL TIME

Hopping Mode, Full band (902.75 - 927.25 MHz)						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 20 s	Limit (ms)	Results
N/A	9	N/A	N/A	N/A	N/A	N/A



Hopping Mode, Full band (902.75 - 927.25 MHz)						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 20 s	Limit (ms)	Results
7.757	N/A	8.75	5	339.37	400	Pass

Calculation Only

No Screen Capture Required

OUTPUT POWER

XMit 2019.09.05

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
Block - DC	Fairview Microwave	SD3379	AMZ	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	TZP	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	23-Dec-19	23-Dec-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

The method found in ANSI C63.10:2013 Section 7.8.5 was used for a FHSS radio.

OUTPUT POWER

element

TbtTx 2019.08.30.0 XMit 2019.09.05

EUT:	**PD67 Handheld RFID Reader**			**Work Order:**	**TURC0061**
Serial Number:	**T10**			**Date:**	**23-Jan-20**
Customer:	**TURCK Inc.**			**Temperature:**	**22.8 °C**
Attendees:	**Gabe Selinger**			**Humidity:**	**27.1% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Andrew Rogstad**	**Power:**	**120VAC/60Hz**	**Job Site:**	**MN08**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes the measurement cable, two 20 dB attenuators, and a DC block.

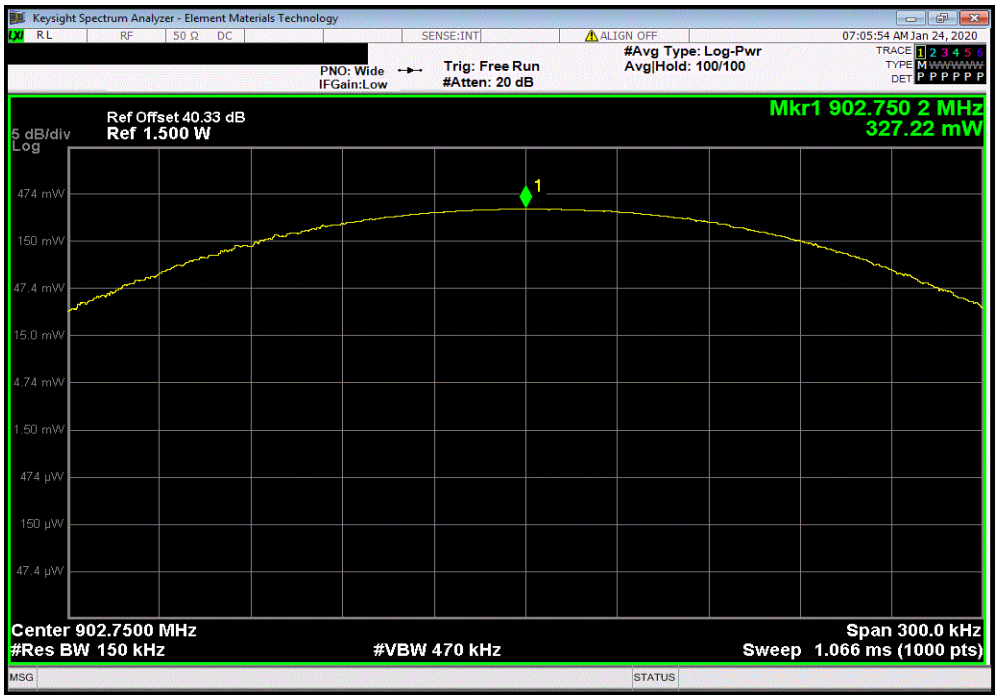
DEVIATIONS FROM TEST STANDARD

None

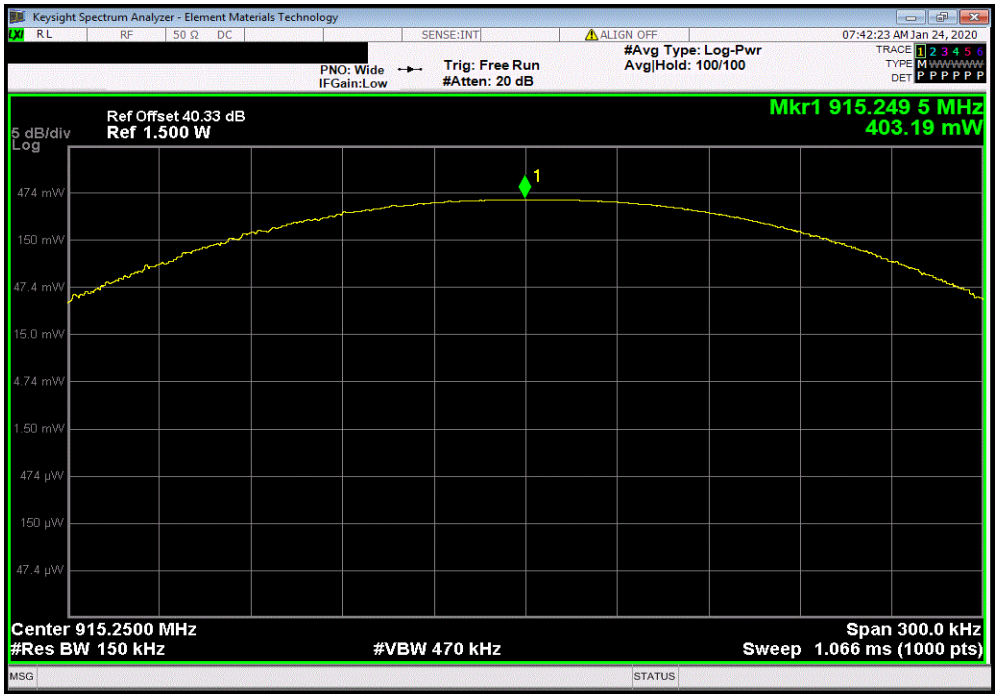
Configuration #	**1**	*Signature* Andrew Rogstad

		Value	**Limit (<)**	**Result**
UHF RFID				
	Low channel (902.75 MHz)	327.22 mW	1 W	Pass
	Mid channel (915.25 MHz)	403.19 mW	1 W	Pass
	High channel (927.25 MHz)	379.46 mW	1 W	Pass

UHF RFID, Low channel (902.75 MHz)						
				Value	Limit (<)	Result
				327.22 mW	1 W	Pass

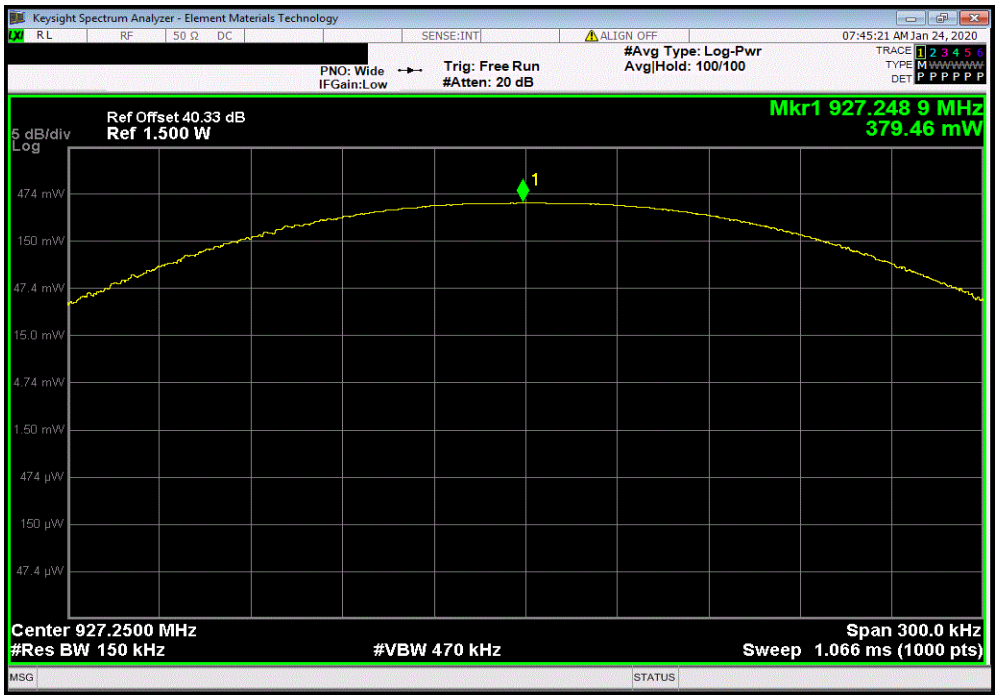


UHF RFID, Mid channel (915.25 MHz)						
				Value	Limit (<)	Result
				403.19 mW	1 W	Pass



OUTPUT POWER

UHF RFID, High channel (927.25 MHz)						
				Value	Limit (<)	Result
				379.46 mW	1 W	Pass



EQUIVALENT ISOTROPIC RADIATED POWER

XMit 2019.09.05

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
Block - DC	Fairview Microwave	SD3379	AMZ	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	TZP	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	23-Dec-19	23-Dec-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

The method found in ANSI C63.10:2013 Section 7.8.5 was used for a FHSS radio.

The antenna gain was added to the conducted peak output power to calculate the EIRP.

EQUIVALENT ISOTROPIC RADIATED POWER

element

TbtTx 2019.08.30.0 XMit 2019.09.05

EUT:	**PD67 Handheld RFID Reader**			**Work Order:**	**TURC0061**
Serial Number:	**T10**			**Date:**	**23-Jan-20**
Customer:	**TURCK Inc.**			**Temperature:**	**22.8 °C**
Attendees:	**Gabe Selinger**			**Humidity:**	**27.1% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Andrew Rogstad**	**Power:**	**120VAC/60Hz**	**Job Site:**	**MN08**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes the measurement cable, two 20 dB attenuators, and a DC block.

DEVIATIONS FROM TEST STANDARD

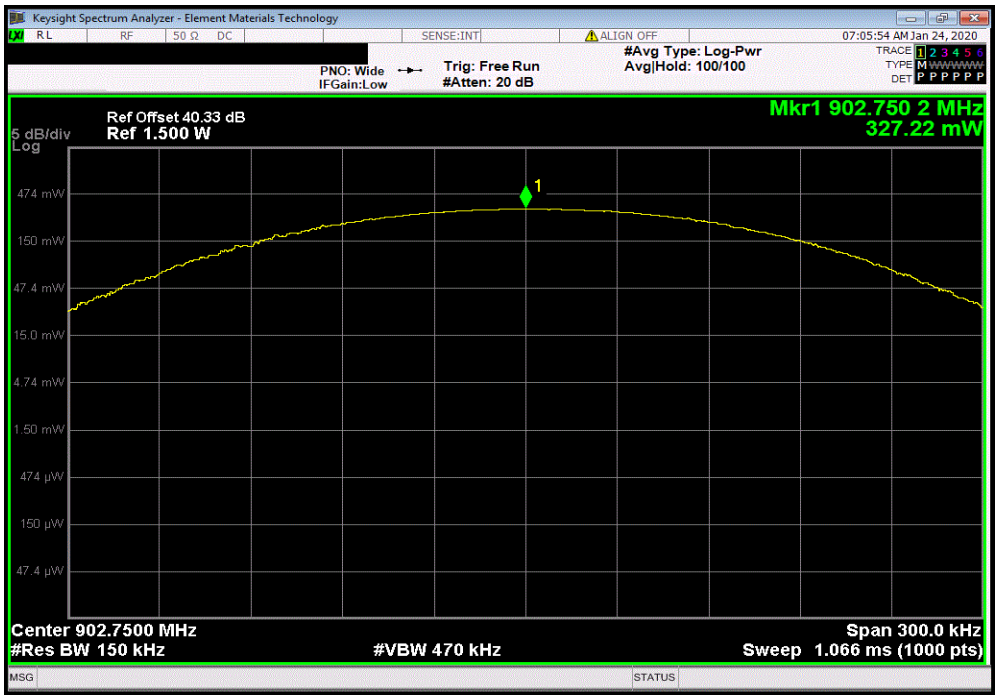
None

Configuration #	**1**	*Signature* Andrew Rogstad

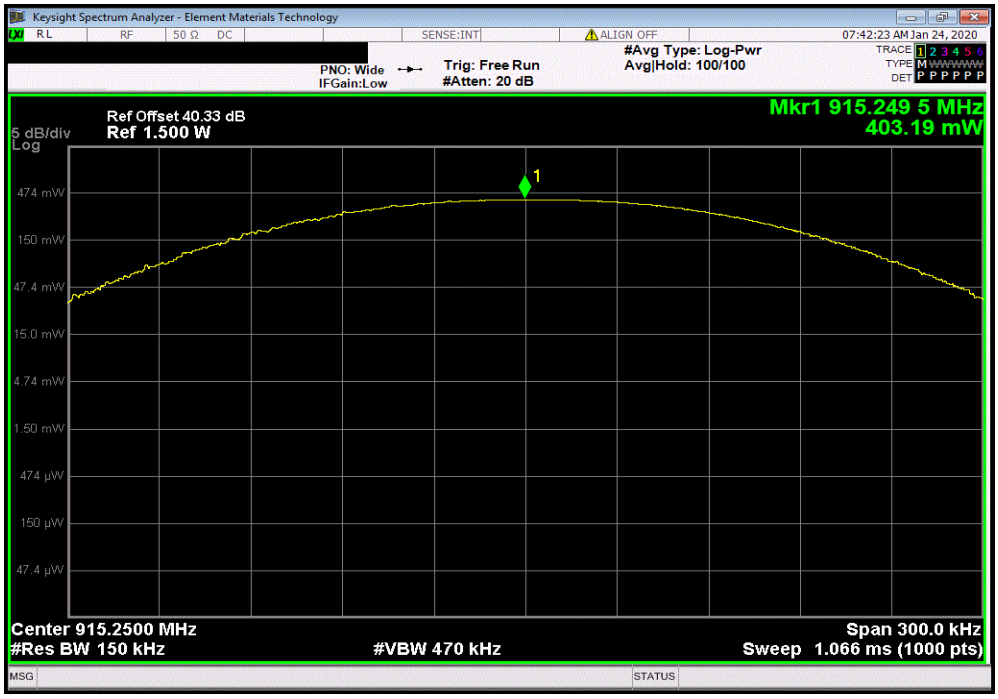
	Measured Value (mW)	Measured Value (dBm)	Antenna Gain (dBi)	Value (dBm)	Limit (dBm) (<)	Result
UHF RFID						
Low channel (902.75 MHz)	327.22	25.15	3	28.15	36	Pass
Mid channel (915.25 MHz)	403.19	26.06	3	29.06	36	Pass
High channel (927.25 MHz)	379.46	25.79	3	28.79	36	Pass

EQUIVALENT ISOTROPIC RADIATED POWER

UHF RFID, Low channel (902.75 MHz)						
	Measured Value (mW)	Measured Value (dBm)	Antenna Gain (dBi)	Value (dBm)	Limit (dBm) (<)	Result
	327.22	25.15	3	28.15	36	Pass

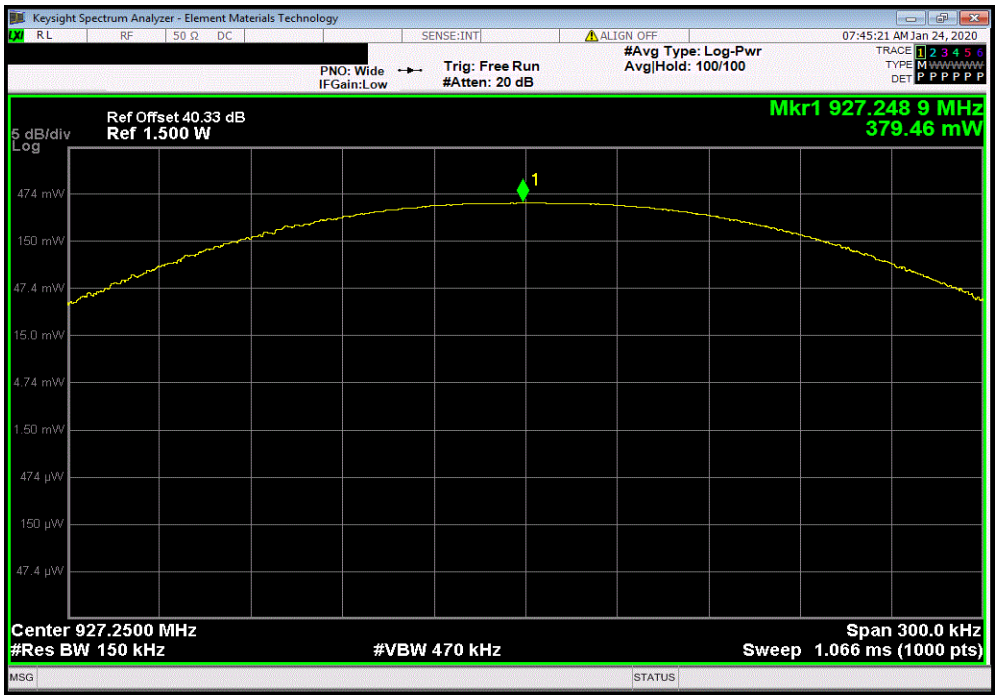


UHF RFID, Mid channel (915.25 MHz)						
	Measured Value (mW)	Measured Value (dBm)	Antenna Gain (dBi)	Value (dBm)	Limit (dBm) (<)	Result
	403.19	26.06	3	29.06	36	Pass



EQUIVALENT ISOTROPIC RADIATED POWER

UHF RFID, High channel (927.25 MHz)						
	Measured Value (mW)	Measured Value (dBm)	Antenna Gain (dBi)	Value (dBm)	Limit (dBm) (<)	Result
	379.46	25.79	3	28.79	36	Pass



BAND EDGE COMPLIANCE

XMit 2019.09.05

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
Block - DC	Fairview Microwave	SD3379	AMZ	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	TZP	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	23-Dec-19	23-Dec-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet in a no hop mode. The channels closest to the band edges were selected.

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

BAND EDGE COMPLIANCE

element

TbtTx 2019.08.30.0 XMit 2019.09.05

EUT:	**PD67 Handheld RFID Reader**			**Work Order:**	**TURC0061**
Serial Number:	**T10**			**Date:**	**23-Jan-20**
Customer:	**TURCK Inc.**			**Temperature:**	**22.7 °C**
Attendees:	**Gabe Selinger**			**Humidity:**	**27% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Andrew Rogstad**	**Power:**	**120VAC/60Hz**	**Job Site:**	**MN08**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes the measurement cable, two 20 dB attenuators, and a DC block

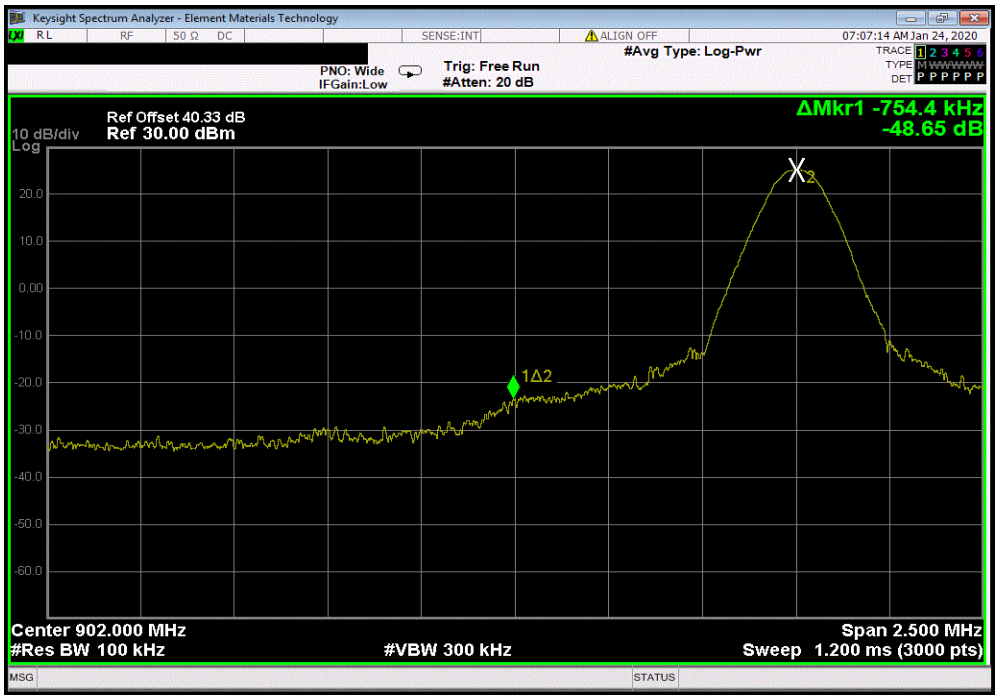
DEVIATIONS FROM TEST STANDARD

None

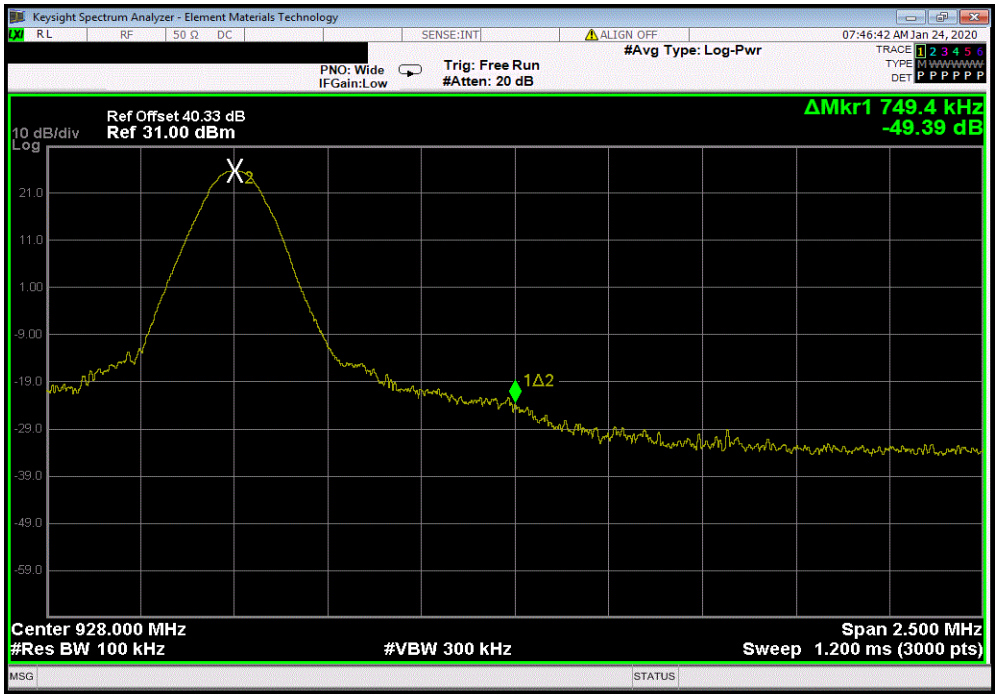
Configuration #	**1**	*Signature* Andrew Rogstad

	Value (dBc)	**Limit ≤ (dBc)**	**Result**
UHF RFID			
Low channel (902.75 MHz)	-48.65	-20	Pass
High channel (927.25 MHz)	-49.39	-20	Pass

UHF RFID, Low channel (902.75 MHz)						
				Value (dBc)	Limit ≤ (dBc)	Result
				-48.65	-20	Pass



UHF RFID, High channel (927.25 MHz)						
				Value (dBc)	Limit ≤ (dBc)	Result
				-49.39	-20	Pass



BAND EDGE COMPLIANCE -HOPPING MODE

XMit 2019.09.05

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
Block - DC	Fairview Microwave	SD3379	AMZ	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	TZP	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	23-Dec-19	23-Dec-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to its normal pseudo-random hopping sequence. The EUT was transmitting at the data rate(s) listed in the datasheet.

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

BAND EDGE COMPLIANCE -HOPPING MODE

element

TbtTx 2019.08.30.0 XMit 2019.09.05

EUT:	**PD67 Handheld RFID Reader**			**Work Order:**	**TURC0061**
Serial Number:	**T10**			**Date:**	**23-Jan-20**
Customer:	**TURCK Inc.**			**Temperature:**	**23 °C**
Attendees:	**Gabe Selinger**			**Humidity:**	**26.7% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Andrew Rogstad**	**Power:**	**120VAC/60Hz**	**Job Site:**	**MN08**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes the measurement cable, two 20 dB attenuators and a DC block.

DEVIATIONS FROM TEST STANDARD

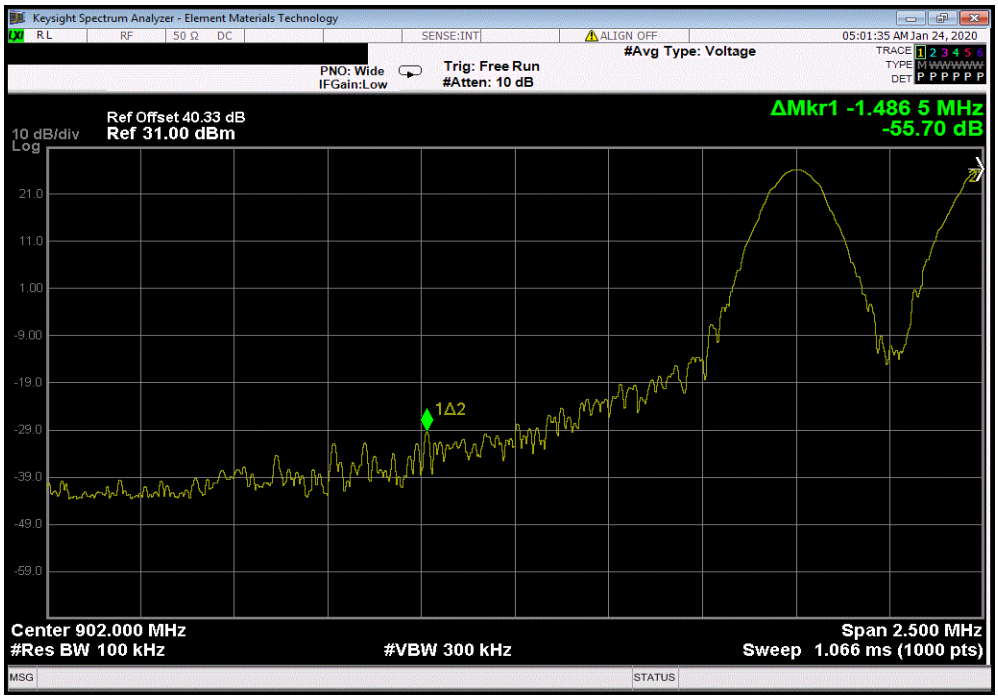
None

Configuration #	**1**	*Signature* Andrew Rogstad

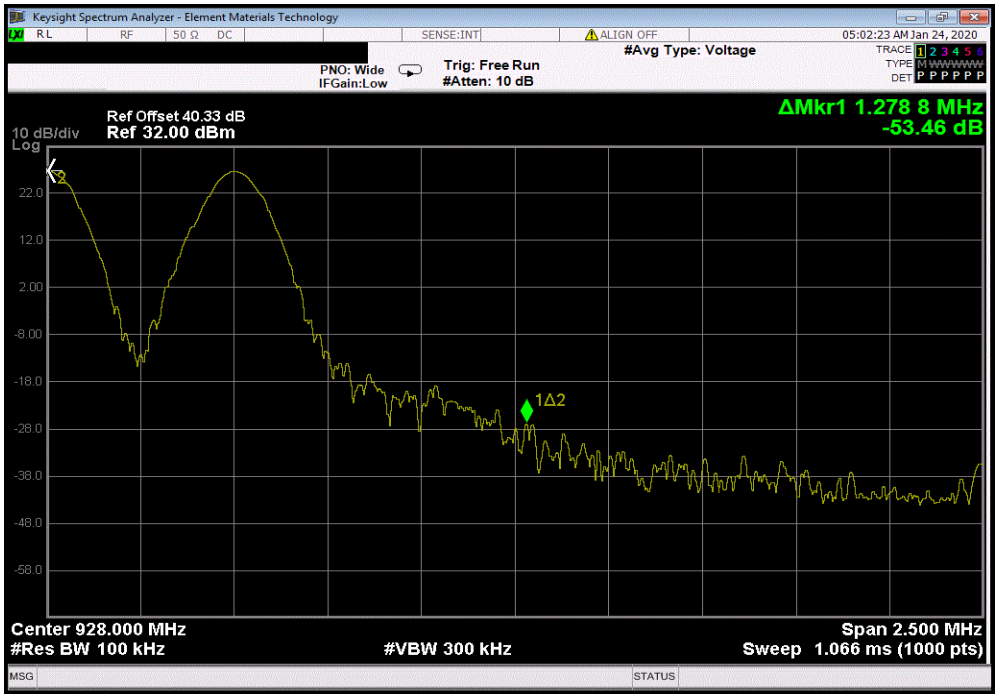
	Value (dBc)	**Limit ≤ (dBc)**	**Result**
Hopping Mode			
Low channel (902.75 MHz)	-55.7	-20	Pass
High channel (927.25 MHz)	-53.46	-20	Pass

BAND EDGE COMPLIANCE -HOPPING MODE

Hopping Mode, Low channel (902.75 MHz)						
				Value (dBc)	Limit ≤ (dBc)	Result
				-55.7	-20	Pass



Hopping Mode, High channel (927.25 MHz)						
				Value (dBc)	Limit ≤ (dBc)	Result
				-53.46	-20	Pass



OCCUPIED BANDWIDTH

XMit 2019.09.05

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
Block - DC	Fairview Microwave	SD3379	AMZ	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	TZP	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	23-Dec-19	23-Dec-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The 20 dB occupied bandwidth was measured with the EUT set to low, medium and high transmit frequencies in the band. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode.

OCCUPIED BANDWIDTH

element

TbtTx 2019.08.30.0 XMit 2019.09.05

EUT:	**PD67 Handheld RFID Reader**			**Work Order:**	**TURC0061**
Serial Number:	**T10**			**Date:**	**23-Jan-20**
Customer:	**TURCK Inc.**			**Temperature:**	**22.7 °C**
Attendees:	**Gabe Selinger**			**Humidity:**	**27.3% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Andrew Rogstad**	**Power:**	**120VAC/60Hz**	**Job Site:**	**MN08**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes the measurement cable, two 20 dB attenuators, and a DC block.

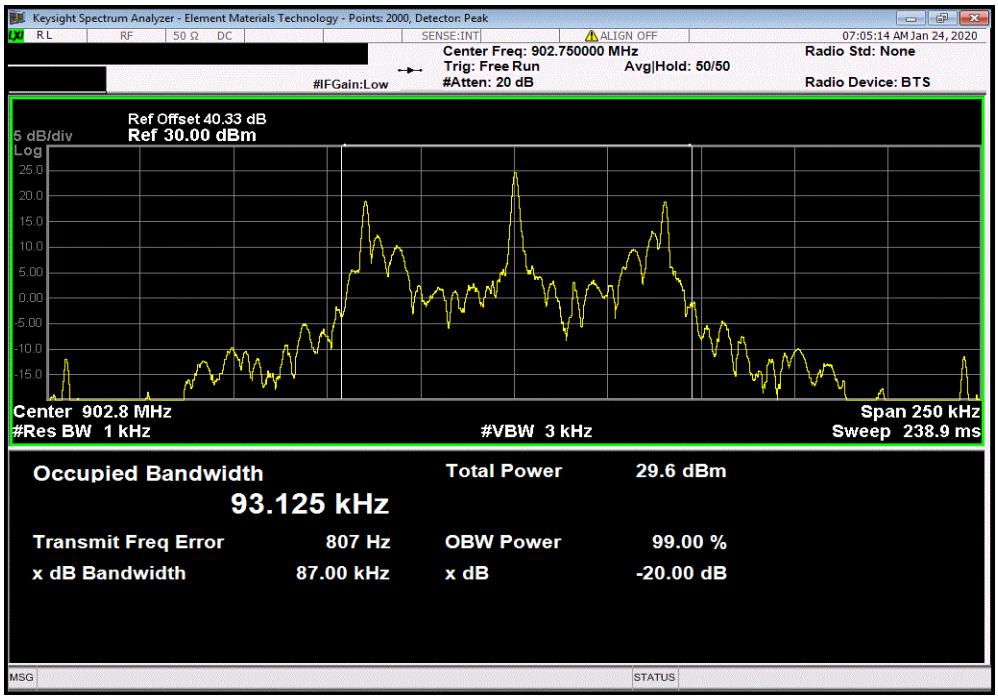
DEVIATIONS FROM TEST STANDARD

None

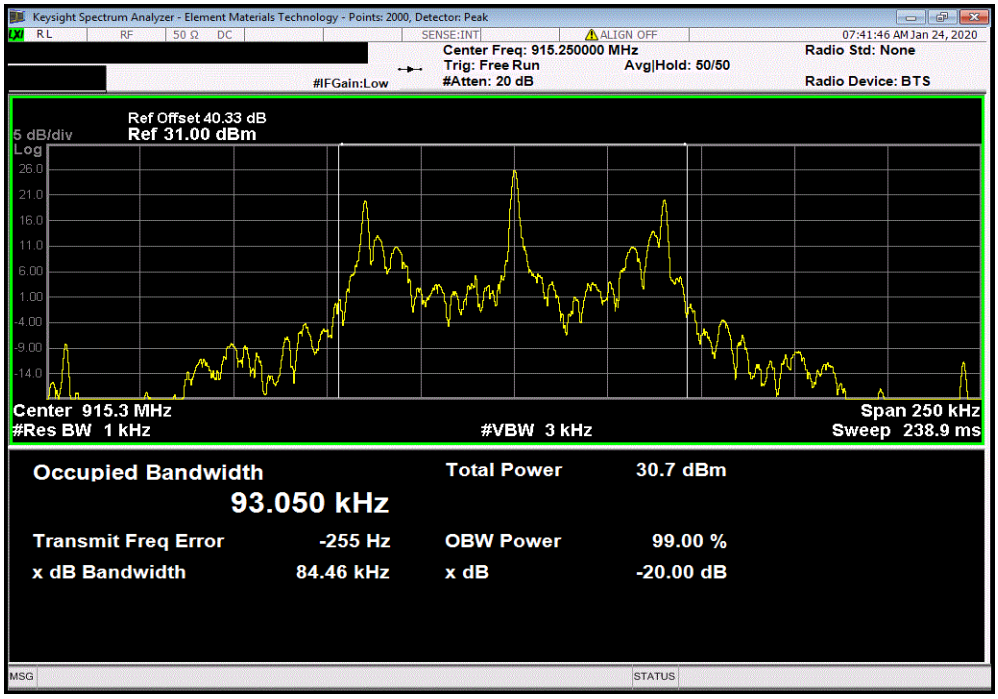
Configuration #	**1**	*Signature* Andrew Rogstad

	Value	**Limit (≤)**	**Result**
UHF RFID			
Low channel (902.75 MHz)	87 kHz	250 kHz	Pass
Mid channel (915.25 MHz)	84.456 kHz	250 kHz	Pass
High channel (927.25 MHz)	84.933 kHz	250 kHz	Pass

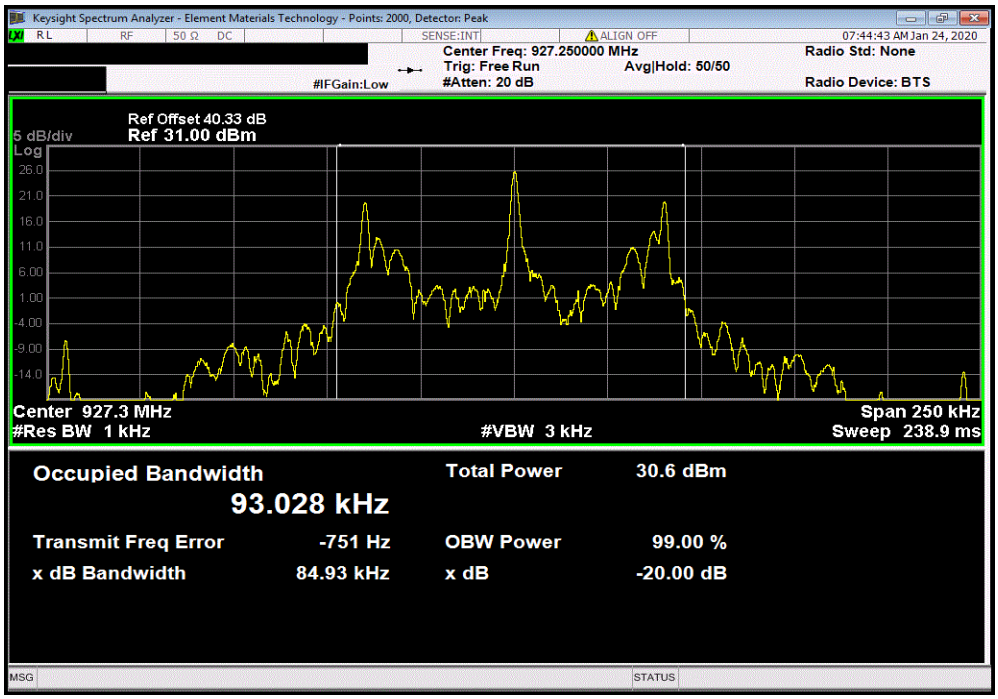
UHF RFID, Low channel (902.75 MHz)						
				Value	Limit (≤)	Result
				87 kHz	250 kHz	Pass



UHF RFID, Mid channel (915.25 MHz)						
				Value	Limit (≤)	Result
				84.456 kHz	250 kHz	Pass



UHF RFID, High channel (927.25 MHz)						
				Value	Limit (≤)	Result
				84.933 kHz	250 kHz	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2019.09.05

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
Block - DC	Fairview Microwave	SD3379	AMZ	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	TZP	9-Nov-19	9-Nov-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	23-Dec-19	23-Dec-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

SPURIOUS CONDUCTED EMISSIONS

TbtTx 2019.08.30.0 XMit 2019.09.05

EUT:	**PD67 Handheld RFID Reader**			**Work Order:**	**TURC0061**
Serial Number:	**T10**			**Date:**	**23-Jan-20**
Customer:	**TURCK Inc.**			**Temperature:**	**22.8 °C**
Attendees:	**Gabe Selinger**			**Humidity:**	**27.1% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Andrew Rogstad**	**Power:**	**120VAC/60Hz**	**Job Site:**	**MN08**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes the measurement cable, two 20 dB attenuators, and a DC block.

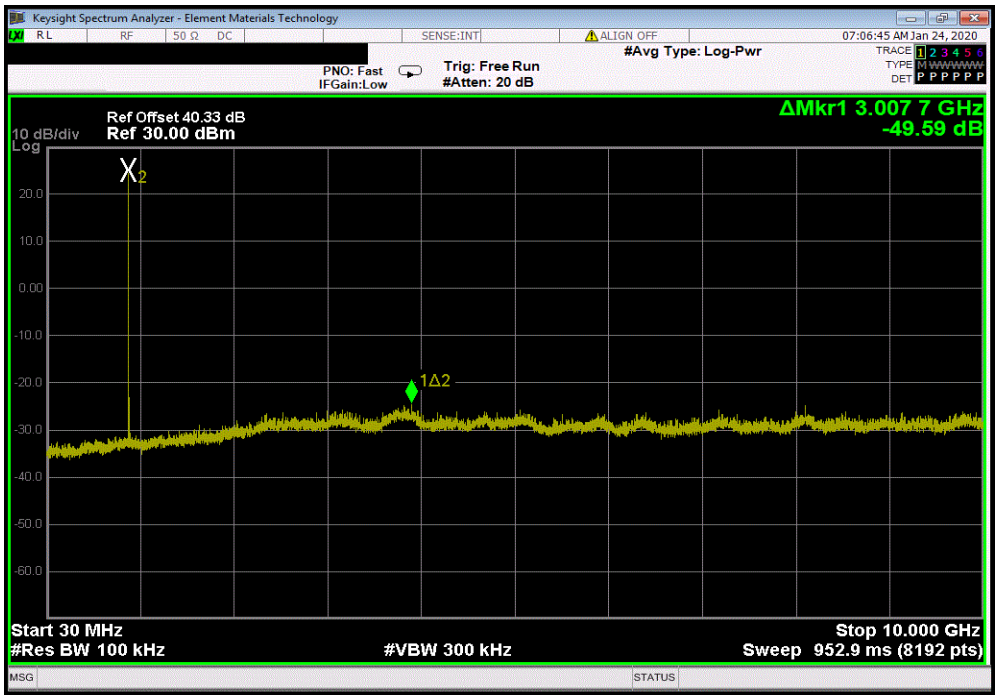
DEVIATIONS FROM TEST STANDARD

None

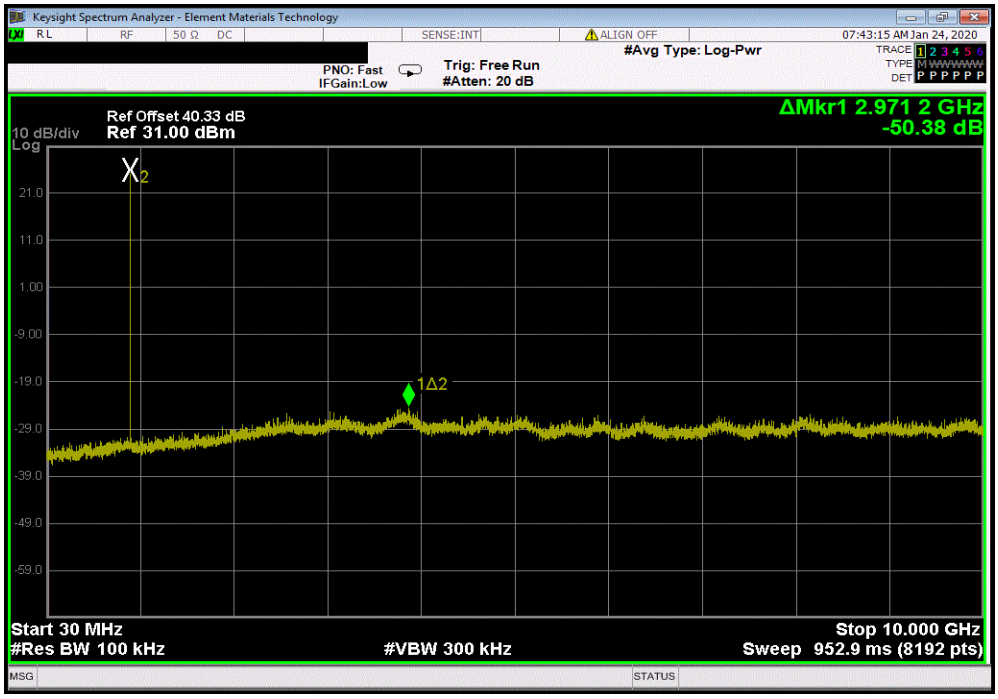
Configuration #	**1**	*Signature* Andrew Rogstad

	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
UHF RFID					
Low channel (902.75 MHz)	30 MHz - 10 GHz	3007.68	-49.59	-20	Pass
Mid channel (915.25 MHz)	30 MHz - 10 GHz	2971.16	-50.38	-20	Pass
High channel (927.25 MHz)	30 MHz - 10 GHz	3047.84	-49.87	-20	Pass

UHF RFID, Low channel (902.75 MHz)				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 10 GHz	3007.68	-49.59	-20	Pass



UHF RFID, Mid channel (915.25 MHz)				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 10 GHz	2971.16	-50.38	-20	Pass



UHF RFID, High channel (927.25 MHz)				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 10 GHz	3047.84	-49.87	-20	Pass