

# **Electromagnetic Compatibility Partial Test Report**

*Prepared in accordance with parts of*

**EN 301 489-1 V2.1.1 (2017-02)**

**ETSI EN 301 489-51 V1.1.1 (2016-11),**

On

## **Radar Sensor Sentry-ST8X Series Side Defender – SDR Series**

Prepared for:

**Preco Electronics  
10335 West Emerald Street  
Boise, ID 83704  
U.S.A.**

Prepared by:

**TUV Rheinland of North America, Inc.  
1279 Quarry Lane, Ste. A  
Pleasanton, CA 94566  
U.S.A.**

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### Revisions

<b>Revision No.</b>	<b>Date</b>	<b>Reason for Change</b>	<b>Author</b>
0	11/16/2017	Original Document	EM
1	11/29/2017	Added statement regarding gap analysis Included reference to previous report	EM

Note: Latest revision report will replace all previous reports.

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### ATTESTATION OF TEST RESULTS

<b>Client:</b>	Preco Electronics 10335 West Emerald Street Boise, ID 83704 U.S.A.	John Fadgen Tel. 208-323-7130 jfadgen@preco.com
<b>Model Name:</b>	Sentry and Side Defender	<b>Serial Number:</b> 0706D80456
<b>Model Numbers:</b>	ST8X Series SDR Series	<b>Date(s) Tested:</b> November 8, 2017
<b>Test Locations:</b>	TUV Rheinland of North America 1279 Quarry Lane, Ste. A Pleasanton, CA 94566 U.S.A. Tel. (925) 249-9123	
<b>Test Specifications:</b>	ETSI EN 301 489-1 V2.1.1 (2017-02), ETSI EN 301 489-51 V1.1.1 (2016-11), EN 61000-4-3:2006/A1:2008/A2:2010	
<b>Test Result:</b>	<b>The above product was found to be Compliant to the above test standard(s)</b>	
<b>Prepared by:</b> Eddie Mariscal		<b>Reviewed by:</b> David Spencer
_____ November 29, 2017 <small>Date Name Signature</small>		_____ November 29, 2017 <small>Date Name Signature</small>
<b>Other aspects:</b>	None	
<h2>Pleasanton</h2>		
		
US5251	Testing Cert #3331.02	2932D-1
		
		1097 (A-0032)

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## 1 General Information

### 1.1 Scope

This report is intended to document the status of conformance with the listed standards based on the results of testing performed on November 8, 2017 on the Radar Sensor, Model No.: ST8X Series, manufactured by Preco Electronics. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

This report is intended to cover the deviation test cases between the former executed testing in conformance with EN 301 489-1 V1.9.1 and the updated standard EN 301 489-1 V2.1.1.

A gap analysis between the two versions of the standards was performed and it was determined that the only relevant test case for this particular device are the following:

-Radiated Immunity from 2.7 – 6.0GHz

Previous testing is documented in The Compliance Management Group report number 8655-2.

### 1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT (Equipment Under Test) in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

### 1.3 Summary of Test Results

<b>Applicant</b>	Preco Electronics 10335 West Emerald Street Boise, ID 83704 U.S.A.
<b>Contact</b>	John Fadgen
<b>Tel.</b>	208-323-7130
<b>E-mail</b>	jfadgen@preco.com
<b>Description</b>	Radar Sensor
<b>Model Name</b>	Sentry and Side Defender
<b>Model Number</b>	ST8X Series and SDR Series
<b>Serial Number</b>	0706D80456
<b>Input Power</b>	9 - 33 VDC
<b>Test Date(s)</b>	November 8, 2017

Standards	Description	Severity Level or Limit	Criteria	Test Result
ETSI EN 301 489-1 V2.1.1 (2017-02) Product Family Standard	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU	See called out basic standards below	See Below	Complies
ETSI EN 301 489-51 V1.1.1 (2016-11) Product Family Standard	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband data transmission systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU	See called out basic standards below	See Below	Complies
EN 61000-4-3:2006/A1:2008/A2:2010 Basic test standard	Radiated Electromagnetic Field Immunity	3 V/m, 2700 - 6000 MHz 80%, 1 kHz, AM	A	Complies

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## 2 Laboratory Information

### 2.1 Accreditations & Endorsements

#### 2.1.1 US Federal Communications Commission



TUV Rheinland of North America EMC test facilities located at 1279 Quarry Lane, Ste. A, Pleasanton, CA, 94566, and 5015 Brandin Ct, Fremont, CA. 94538, are recognized by the Commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Pleasanton Registration No. US5254). The laboratory Scopes of Accreditation include Title 47 CFR Parts 15, 18 and 90. The accreditations are updated every three years.

#### 2.1.2 A2LA



TUV Rheinland of North America EMC test facilities are accredited by the American Association for Laboratory Accreditation (A2LA). The laboratories have been assessed and accredited by A2LA in accordance with ISO Standard 17025:2005 (Testing Certificate #3331.02). The Scope of Laboratory Accreditation includes emission and immunity testing. The accreditations are updated annually.

#### 2.1.3 Industry Canada



Industry  
Canada

Industrie  
Canada

The Pleasanton 5-meter Semi-Anechoic Chamber, Registration No. 2932M-1, has been accepted by Industry Canada to perform testing to 3 and 5 meters based on the test procedures described in ANSI C63.4-2009. The Fremont 10-meter Semi-Anechoic Chamber, Registration No. 2932D-1, has been accepted by Industry Canada to perform testing to 3 and 10 meters based on the test procedures described in ANSI C63.4-2009.

#### 2.1.4 Japan – VCCI



The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America EMC test facilities located at 1279 Quarry Lane, Ste. A, Pleasanton, CA, 94566, and 5015 Brandin Ct, Fremont, CA. 94538, have been assessed and approved in accordance with the Regulations for Voluntary Control Measures.

VCCI Registration No. for Pleasanton: A-0031

## 2.2 Test Facilities and EMC Software

Test facilities are located at 1279 Quarry Lane, Ste. A, Pleasanton, California 94566, U.S.A. and 5015 Brandin Ct, Fremont, CA. 94538. (Fremont is the Pleasanton Annex).

### 2.2.1 Emission Test Facility

The Semi-Anechoic Chambers and AC Line Conducted measurement facilities used to collect radiated and conducted emissions data have been constructed in accordance with ANSI C63.7:1992. The Fremont 10 meter semi-anechoic chamber has been measured in accordance with and verified to comply with the theoretical volumetric normalized site attenuation of ANSI C63.4:2009 and SVSWR requirements of CISPR 16-1-4 Consol. Ed. 3.0 (2010-04), at test distances of 3 and 10 meters. This site has been described in reports dated November 1st, 2006, submitted to the FCC, and accepted by letter dated November 28, 2006. The site is listed with the FCC and accredited by A2LA (Testing Certificate #3331.02). The Pleasanton 5 meter semi-anechoic chamber has been verified to comply with the theoretical volumetric normalized site attenuation of ANSI C63.4:2009 and SVSWR requirements of CISPR 16-1-4 Consol. Ed. 3.0 (2010-04) at a test distance of 3 meters. This site has been described in reports dated November 1st, 2006, submitted to the FCC, and accepted by letter dated November 28, 2006. The site is listed with the FCC and accredited by A2LA (Testing Certificate #3331.02).

### 2.2.2 Immunity Test Facility

ESD, EFT, Surge, PQF: These tests are performed in an environmentally controlled room with a 3.7 m x 3.7 m x 3.175 mm thick aluminum floor connected to PE ground. For ESD testing, tabletop equipment is placed on an insulated mat with a surface resistivity of  $10^9$  Ohms/square on a 1.6 m x 0.8 m x 0.8 m high non-conductive table with a 3.175 mm aluminum top (Horizontal Coupling Plane). The HCP is connected to the main ground plane via a low impedance ground strap through two 470 k $\Omega$  resistors. The Vertical Coupling Plane consists of an aluminum plate 50 cm x 50 cm x 3.175 mm thick. The VCP is connected to the main ground plane via a low impedance ground strap through two 470 k $\Omega$  resistors. For each of the other tests, the HCP is removed.

RF Field Immunity testing is performed in a 10m semi-anechoic chamber with absorber added to floor.

RF Conducted and Magnetic Field Immunity testing is performed on a 4.9 m x 3.7 m x 3.175 mm thick aluminum ground plane which is connected to one end of the anechoic chamber.

All test areas allow a minimum distance of 1 meter from the EUT to walls or conducting objects.



**2.2.3 EMC Software - Fremont**

Manufacturer	Name	Version	Test Type
Hewlett-Packard	HP85876B	A.01.00 970825	Radiated & Conducted Emissions
EMISoft	Vasona	5.0	Radiated & Conducted Emissions
ETS-Lindgren	TILE	4.2.A	Radiated Emissions > 1 GHz
ETS-Lindgren	TILE	V.3.4.K.22	Radiated & Conducted Immunity
Haefely	WinFEAT	1.6.3	Surge
Thermo Electron - Keytek	CEWare32	3.0	EFT/Surge/Voltage Dips & Interrupt
Voltech	IEC61000-3	1.15.07RC	Harmonic & Flicker

**2.2.4 EMC Software - Pleasanton**

Manufacturer	Name	Version	Test Type
ETS-Lindgren	TILE	3.4.K.14 @ 4.0.A.5	Radiated & Conducted Emissions
EMISoft	Vasona	5.0	Radiated & Conducted Emissions
Agilent	Agilent MXE	A.11.02	Radiated & Conducted Emissions
ETS-Lindgren	TILE	3.4.K.14	Radiated & Conducted Immunity
Thermo Electron - Keytek	CEWare32	4.00	EFT/Surge/Voltage Dips & Interrupt
Voltech	IEC61000-3	1.21.07RC2	Harmonic & Flicker

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## 2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1<sup>st</sup> Edition, 1995.

*The Combined Standard Uncertainty* is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or co-variances of these other quantities weighted according to how the measurement result varies with changes in these quantities. The term standard uncertainty is the result of a measurement expressed as a standard deviation.

*The Expanded Uncertainty* defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand. The fraction may be viewed as the coverage probability or level of confidence of the interval.

### 2.3.1 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{RAW} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: RAW = Measured level before correction (dB $\mu$ V)  
AMP = Amplifier Gain (dB)  
CBL = Cable Loss (dB)  
ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V/m}}{20}}$$

#### Sample radiated emissions calculation @ 30 MHz

$$\text{Measurement} + \text{Antenna Factor} - \text{Amplifier Gain} + \text{Cable loss} = \text{Radiated Emissions (dB}\mu\text{V/m)}$$

$$25 \text{ dB}\mu\text{V/m} + 17.5 \text{ dB} - 20 \text{ dB} + 1.0 \text{ dB} = 23.5 \text{ dB}\mu\text{V/m}$$

### 2.3.2 Measurement Uncertainty Emissions

Per CISPR 16-4-2	$U_{lab}$	$U_{cispr}$
<b>Radiated Disturbance @ 10 meters</b>		
30 – 1,000 MHz	2.25 dB	4.51 dB
<b>Radiated Disturbance @ 3 meters</b>		
30 – 1,000 MHz	2.26 dB	4.52 dB
1 – 6 GHz	2.12 dB	4.25 dB
6 – 18 GHz	2.47 dB	4.93 dB
<b>Conducted Disturbance @ Mains Terminals</b>		
150 kHz – 30 MHz	1.09 dB	2.18 dB

#### Voltech PM6000A

The estimated expanded uncertainty for harmonic current and flicker measurements is $\pm 5.0\%$ .	Per CISPR 16-4-2
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### 2.3.3 Measurement Uncertainty Immunity

The estimated expanded uncertainty for ESD immunity measurements is $\pm 8.2\%$ .	Per IEC 61000-4-2
The estimated expanded uncertainty for radiated immunity measurements is $\pm 4.10$ dB.	Per IEC 61000-4-3
The estimated expanded uncertainty for EFT fast transient immunity measurements is $\pm 5.84\%$ .	Per IEC 61000-4-4
The estimated expanded uncertainty for surge immunity measurements is $\pm 5.84 \%$ .	Per IEC 61000-4-4
The estimated expanded uncertainty for conducted immunity measurements with CDN is $\pm 3.66$ dB	Per IEC 61000-4-6
The estimated expanded uncertainty for power frequency magnetic field immunity is $\pm 11.6\%$ .	Per IEC 61000-4-8
The estimated expanded uncertainty for voltage variation and interruption measurements is $\pm 3.48\%$ .	Per IEC 61000-4-11

The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

## 2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2005. Equipment calibration records are kept on file at the test facility.

## 2.5 Measurement Equipment Used

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal mm/dd/yy	Next Cal mm/dd/yy	Test
Horn Antenna Immunity	EMCO	3115	9602-4676	NCR	NCR	RI
RF Power Meter	Agilent	E4418B	MY45103859	01/19/2017	01/19/2018	RI
Power Sensor	HP	8481A	US37295801	01/19/2017	01/19/2018	RI
Signal Generator	Anritsu	MG3694A	042803	01/17/2017	01/17/2018	RI
RF Amp 1 - 18 GHz	IFI	STS181-20	K334-1206	NCR	NCR	RI
Field Probe	Holiday	HI-4455	104653	02/25/2017	02/25/2018	RI

Note: CE=Conducted Emissions, CI=Conducted Immunity, DP=Disturbance Power, EFT=Electrical Fast Transients, ESD=Electrostatic Discharge, FLI=Flicker, HAR=Harmonics, MF=Magnetic Field Immunity, NCR=No Calibration Required, RE=Radiated Emissions, RI=Radiated Immunity, SI=Surge Immunity, VDSI=Voltage Dips and Short Interruptions

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### **3 Product Information**

#### **3.1 Product Description**

See Section 4.4.

#### **3.2 Equipment Modifications**

No modifications were needed to bring product into compliance.

#### **3.3 Test Plan**

The EUT product information, test configuration, mode of operation, test types, test procedures, test levels, pass/failure criteria, in this report were carried out per the product test plan located in Appendix A of this report.



Figure 1 - Photo of EUT – Interrogator – Front View



Figure 2 - Photo of EUT – Interrogator – Back View

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Figure 3 - Photo of EUT – Display Unit – Front View



Figure 4 - Photo of EUT – Display Unit – Back View

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### 3.4 Radiated Immunity

This test is to evaluate the performance of the EUT when subjected to radiated electromagnetic fields.

#### 3.4.1 Test Overview

<b>Results</b>	<b>Complies</b> (as tested per this report)		<b>Test Date(s)</b>	November 6, 2017			
<b>Standard</b>	EN 61000-4-3:2006/A1:2008/A2:2010						
<b>Model Number</b>	ST8X Series and SDR Series		<b>Serial #</b>	0706D80456			
<b>Configuration</b>	See test plan for details.						
<b>Test Setup</b>	Tested in 3-meter Chamber, EUT placed on table: see test plan for details.						
<b>EUT Powered By</b>	9VDC						
<b>Environmental Conditions</b>	November 6, 2017	<b>Temp</b>	23° C	<b>Humidity</b>	55%	<b>Pressure</b>	1002 mbar
<b>Frequency Range</b>	2700 - 6000 MHz		<b>Level</b>	3 V/m			
<b>Modulation</b>	80%, 1 kHz, AM		<b>Orientations</b>	0°, 90°, 180°, 270°			
<b>Step Size</b>	1%		<b>Dwell</b>	3 Sec			
<b>Perf. Criteria</b>	A		<b>Perf. Verification</b>	See test plan			
<b>Mod to EUT</b>	None		<b>Test Performed By</b>	Eddie Mariscal			

#### 3.4.2 Test Procedure

Testing was performed according to the test plan. The EUT was placed on a wooden table 3 meters from the field-generating antenna. The field strength was set prior to placing the EUT in the chamber at the specified level with no modulation applied. The isotropic field probe was placed adjacent to the EUT to monitor the presence of field during the test. The tests were performed in 1% steps, from 2700 - 6000 MHz for each of vertical and horizontal polarizations. The test was performed by rotating the table in the clockwise direction in successive steps of 90°, subsequent exposures being designated as 0°, 90°, 180° and 270°.

#### 3.4.3 Acceptable Climatic Conditions

Unless otherwise specified by the committee responsible for the generic or product standard, the climatic conditions in the laboratory shall be within any limits specified for the operation of the EUT and the test equipment by their respective manufacturers.

Tests shall not be performed if the relative humidity is so high as to cause condensation on the EUT or the test equipment.

#### 3.4.4 Deviations

There were no deviations from the test methodology listed in the test plan for the Radiated Immunity test.

#### 3.4.5 Final Test

The EUT met the performance criteria requirement as specified in the test plan of this report and in the standards.



**3.4.6 Final Data**

<b>EUT Side</b>	<b>Antenna Polarization Horizontal (H) or Vertical (V)</b>	<b>Performance Criteria</b>	<b>Test Result: Complies or Not Compliant</b>
Front	H	NDP	Complies
Front	V	NDP	Complies
Rear	H	NDP	Complies
Rear	V	NDP	Complies
Top	H	NDP	Complies
Top	V	NDP	Complies
Bottom	H	NDP	Complies
Bottom	V	NDP	Complies

**NDP** = No degradation of performance observed

**DP-X** = Degradation of performance to criteria X.

**NT** = Not Tested

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### 3.4.7 Photos



Figure 5 - Radiated Immunity Test Setup Setup - 2700 MHz - 6000 MHz Front



Figure 4 - Radiated Immunity Test Setup -2700 MHz - 6000 MHz Rear

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## Appendix A

### 4 Test Plan

This test report is intended to follow the test plan outlined herein unless otherwise stated. The test plan provides product information, reference standards, and testing details. The product information was provided by the client. Test procedure information will reference standards or internal TUV Rheinland NA procedures.

#### 4.1 General Information

<b>Client</b>	Preco Electronics
<b>Address</b>	10335 West Emerald Street Boise, ID 83704 U.S.A.
<b>Contact Person</b>	John Fadgen
<b>Telephone</b>	208-323-7130
<b>e-mail</b>	jfadgen@preco.com

#### 4.2 EUT Designation

<b>Model Name</b>	Sentry and Side Defender
<b>Model Number(s)</b>	ST8X Series and SDR Series

The manufacturer declares that the following models are electrically identical:

Sentry	Model ST87
Sentry	Model ST82
Side Defender	Model SDR

Only the Sentry Model ST87 was evaluated.

#### 4.3 EUT Description

Radar Sensor
--------------

#### 4.4 Equipment Under Test (EUT) Description

The PreView® Sentry™ is a small, rugged, short/medium range radar sensor designed by Preco® Electronics for use in heavy duty applications, such as trucks/busses, construction, mining, waste, utilities, and other applications requiring a robust, high-performance radar.

#### 4.5 Product Environment(s)

<input type="checkbox"/>	<b>Domestic/Residential</b>	<input type="checkbox"/>	<b>Hospital</b>
<input type="checkbox"/>	<b>Light Industrial/Commercial</b>	<input type="checkbox"/>	<b>Small Clinic</b>
<input type="checkbox"/>	<b>Industrial</b>	<input type="checkbox"/>	<b>Doctor's office</b>
<input type="checkbox"/>	<b>Telecommunications Center</b>	<input type="checkbox"/>	<b>Other than Telecommunications Center</b>
<input checked="" type="checkbox"/>	<b>Other</b>	<b>Vehicular installations</b>	

\*Check all that apply

**4.6 Applicable Documents**

<b>Standards</b>	<b>Description</b>
ETSI EN 301 489-1 V2.1.1 (2017-02) Product Family Standard Emissions	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article
ETSI EN 301 489-51 V1.1.1 (2016-11) Product Family Standard Immunity	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband data transmission systems; Harmonised Standard covering the essential
EN 61000-4-3:2006/A1:2008/A2:2010 Basic test standard	Radiated Electromagnetic Field Immunity

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#### 4.7 EUT Electrical Power Information

Name	# of Phases	Type	Input DC Voltage		Current Max	Power Max
			Min	Max		
EUT	1 <input type="checkbox"/> 3 <input type="checkbox"/> None <input checked="" type="checkbox"/>	AC <input type="checkbox"/> DC <input checked="" type="checkbox"/> Host <input type="checkbox"/> Batteries <input type="checkbox"/>	9V	33V	0.50A	16.5 W
<b>Notes</b>	None					

#### 4.8 EUT Clock/Oscillator Frequencies

Reference Designation	Speed (MHz)	Type
Not provided by client	NA	<input type="checkbox"/> Oscillator <input type="checkbox"/> Interface

##### 4.8.1 Radiated Emissions, Upper Frequency

<input type="checkbox"/>	Less than 108 MHz	Scan to 1 GHz
<input type="checkbox"/>	Less than 500 MHz	Scan to 2 GHz
<input type="checkbox"/>	Less than 1000 MHz	Scan to 5 GHz
<input type="checkbox"/>	Greater than 1000 MHz	Scan to 5 <sup>th</sup> Harmonic or 40 GHz (whichever is lower)

Emissions testing is not within the scope of this project.

#### 4.9 Electrical Support Equipment

Reference Designation	Manufacturer	Model	Serial Number
DC Power Supply	Agilent	T420	MY40004331

#### 4.10 Non - Electrical Support Equipment

Reference Designation	Manufacturer	Model	Serial Number or Description (e.g., Type of Gas or Liquid)
N/A			

#### 4.11 EUT Equipment/Cabling Information

EUT Port	Connected To	Cable Type				
		Length (Meters)	Shielded Yes / No	Bead Yes / No		
Power	DC Power supply	2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

#### 4.12 EUT Operating Frequency Range

24.00 – 24.25 GHz

#### 4.13 EUT Test Program

The EUT was configured in a normal operating state.

#### 4.14 EUT Modes of Operation

The EUT was placed in a normal operating mode.

#### 4.15 Monitoring of EUT during Testing

The EUT was monitored via two means:

1. The LEDs on the operator display were monitored for any error codes.
2. The audio was monitored for any unintentional alerts.

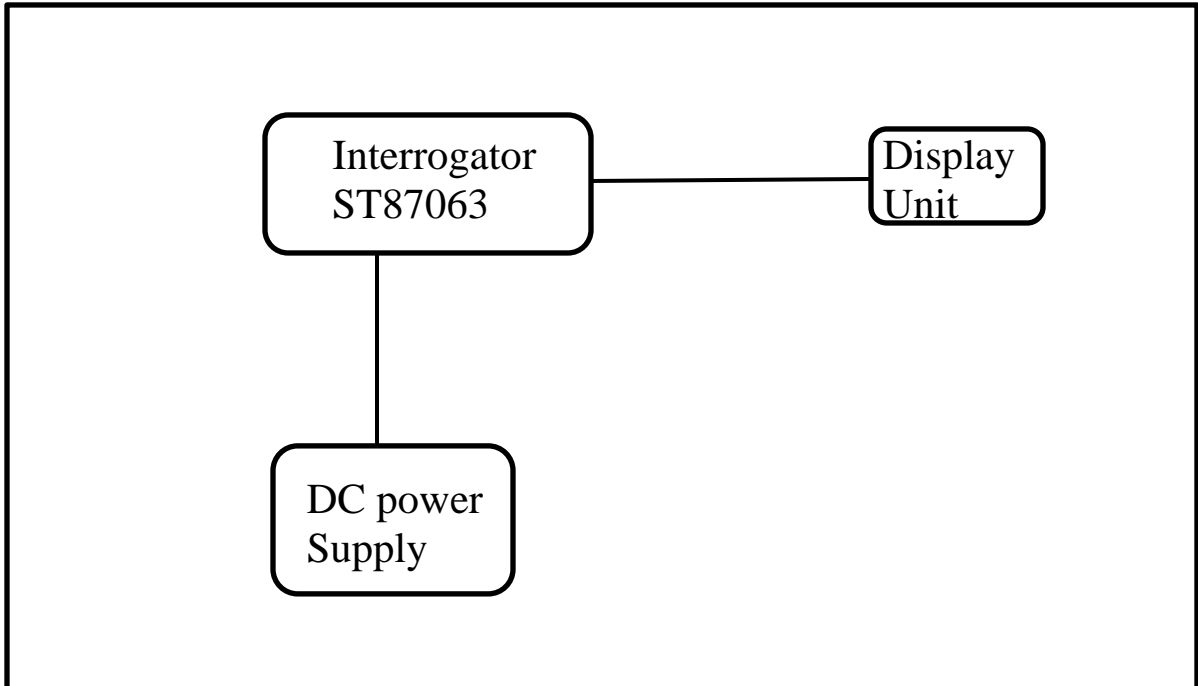
#### 4.16 EUT Configuration

##### 4.16.1 Description

Configuration		Description
1		Normal operating mode
Notes	None	



### 4.16.2 Block Diagram



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## 4.17 Immunity

### 4.17.1 Performance Criteria

The following criteria descriptions come from the product test standard. The standard calls out one of the below performance criteria for each test type.

#### **Performance Criteria for Continuous phenomena applied to Transmitters (CT):**

Performance Criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

#### **Performance Criteria for Transient phenomena applied to Transmitters (TT):**

Performance Criteria B shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

#### **Performance criteria for Continuous phenomena applied to Receivers (CR):**

Performance Criteria A shall apply

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

#### **Performance criteria for Transient phenomena applied to Receivers (TR):**

Performance Criteria B shall apply

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

## 4.17.2 Radiated Immunity

### 4.17.2.1 Radiated Immunity Test Setup

<b>Standard</b>	ETSI EN 301 489-51 V1.1.1 (2016-11) EN 61000-4-3:2006/A1:2008/A2:2010	<b>TUV Test Procedure</b>	MS-0005188
<b>Perf. Criteria</b>	A	<b>Perf. Verification</b>	See Section 4.14
<b>Frequency Range</b>	2700 - 6000 MHz	<b>Level</b>	3 V/m
<b>Modulation</b>	80%, 1 kHz, AM	<b>Step Size</b>	1%
<b>Configuration</b>	See Section 4.15		
<b>Notes</b>	None		

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## **END OF REPORT**

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