

NextGen RF Design

Titan Gateway and Titan Sensor

Report: NGRF0059.0, Issue Date: November 22, 2022



REVISION HISTORY



Revision Description		Date (yyyy-mm-dd)	Page Number
00	None		

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ACCREDITATIONS AND AUTHORIZATIONS



United States

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

A2LA - Each laboratory is accredited by A2LA to ISO / IEC 17025, and as a product certifier to ISO / IEC 17065 which allows Element to certify transmitters to FCC and IC specifications.

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

European Union

European Commission - Recognized as an EU Notified Body validated for the EMCD and RED Directives.

United Kingdom

BEIS - Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

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

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA - Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC - Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA - Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

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

SCOPE

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

<u>California</u> <u>Minnesota</u> <u>Oregon</u> <u>Texas</u> <u>Washington</u>

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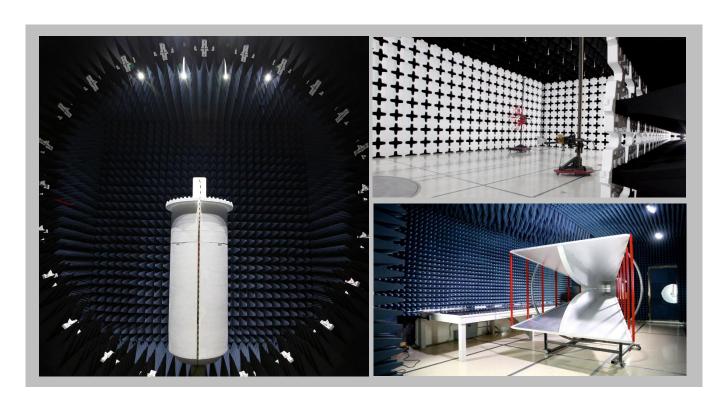
FACILITIES







California	Minnesota	Oregon	Texas	Washington			
Labs OC01-17	Labs MN01-11	Labs EV01-12	Labs TX01-09	Labs NC01-05			
41 Tesla	9349 W Broadway Ave.	6775 NE Evergreen Pkwy #400	3801 E Plano Pkwy	19201 120 th Ave NE			
Irvine, CA 92618	Brooklyn Park, MN 55445	Hillsboro, OR 97124	Plano, TX 75074	Bothell, WA 98011			
(949) 861-8918	(612)-638-5136	(503) 844-4066	(469) 304-5255	(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			



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PRODUCT DESCRIPTION



Client and Equipment under Test (EUT) Information

Company Name:	NextGen RF Design		
Address:	2130 Howard Drive West		
City, State, Zip:	North Mankato, MN 56003		
Test Requested By:	Ross Loven		
EUT:	Titan Gateway and Titan Sensor		
First Date of Test:	November 11, 2022		
Last Date of Test:	November 11, 2022		
Receipt Date of Samples:	November 11, 2022		
Equipment Design Stage:	Preproduction		
Equipment Condition:	No Damage		
Purchase Authorization:	Verified		

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

Gateway system containing a 2.4 GHz LoRa and a pre-approved 802.11bgn 20 MHz SISO radio module. Sensors containing a 2.4 GHz LoRa radio. EAPRO-GTWY, ENVIROALERT Professional Gateway, EAPRO-WTS, ENVIROALERT Professional Wireless Temperature Sensor, EAPRO-WHS, ENVIROALERT Professional Wireless Humidity Sensor, EAPRO-WMFT, ENVIROALERT Professional Wireless Multi-Function Transmitter, EAPRO-WMFT-R, ENVIROALERT Professional Wireless Multi-Function Transmitter with Relay

Testing Objective:

To obtain 2D antenna pattern measurements and calculated antenna performance values.

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CONFIGURATIONS



Configuration NGRF0059-1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Wireless Sensor	WINLAND Electronics, Inc	Titan Sensor	None

Configuration NGRF0059- 2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Wireless Gateway	WINLAND Electronics, Inc	Titan Gateway	None

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MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2022-11-07	2D Polar Plots	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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PSA-ESCI 2022.08.23.0

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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

CW - 2440 MHz

CONFIGURATIONS INVESTIGATED

NGRF0059 - 2

FREQUENCY RANGE INVESTIGATED

Ctort Francisco 2440 MHz	Cton Fraguency	2440 MI I=
Start Frequency 2440 MHz	Stop Frequency	2440 MHz

SAMPLE CALCULATIONS

Max Absolute Gain of AUT = G_ref - (E_ref - E_aut) + L_c

Where:

E aut = electric field strength in dBuV/m L c = AUT setup loss

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	N/A	Double Ridge Horn Cables	EVB	2022-05-03	2023-05-03
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	2021-12-09	2022-12-09
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	2022-03-02	2024-03-02
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Attenuator	S.M. Electronics	SA18H-06	REM	2021-12-02	2022-12-02
Antenna - Double Ridge	EMCO	3115	AHC	2022-07-08	2024-07-08

TEST DESCRIPTION

Measurements were performed in a semi-anichoic chamber. RF absorbing cones were placed on the floor between the measurement antenna and the AUT. The AUT was placed on a 1.8 m high block of foam.

The reference antenna was placed at the center of the 1.8 m block of foam. A CW signal was provided to the reference antenna from a calibrated signal generator through a length of RF Cable. To reduce the effects of the RF cable, the RF cable was lined with ferrite cores running down the length of the cable with a spacing of 10cm between each ferrite. A reference plot was collected.

The AUT was then put into the chamber in place of the reference antenna. The AUT was connected to the signal generator using the RF same cable and connector setup. A polar plot was then collected at the antenna height of maximum field strength. This plot was then compared to the reference antenna scan, and, using the antenna gain (dBi) of the reference antenna the absolute gain of the AUT was calculated.

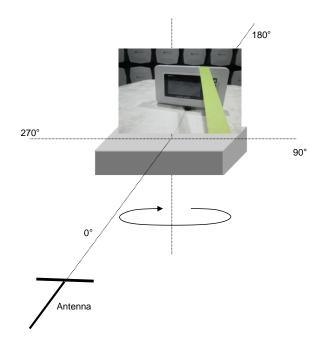
SUMMARY OF RESULTS

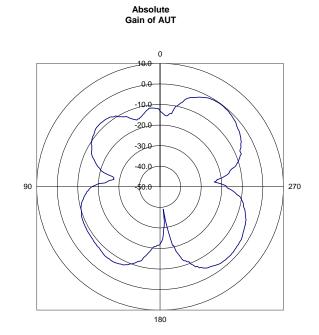
Type	Frequency Range (MHz)	Gain (dBi)
PCB Trace Monopole Antenna 1	2440	2.21
PCB Trace Monopole Antenna 2	2440	1.8

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Work Order: NGRF0059 Date: 2022-11-07 Project: None Temperature: 20.7 °C Job Site: EV01 Humidity: 39.1% RH Serial Number: None Barometric Pres.: 1006 mbar Tested by: Jeff Alcoke EUT: Titan Gatweay Configuration: 2 Customer: None Attendees: None EUT Power: None Operating Mode: CW - 2440 MHz Peviations: None Comments: None Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Horizontal Reference Antenna Relative Gain Max (dBuV/m) 111.39 Antenna Under Test (AUT) Polarity Horizontal AUT Relative Gain Max (dBuV/m) 101.49 Maximum Absolute Gain of AUT (dBi) -0.19 Difference (Reference Antenna - AUT) (dB) 9.90 Average Absolute Gain of AUT (dBi) -10.50 AUT Setup Loss (dB) 0.16 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68					EmiR5 2022.07.06.0	PSA-ESCI 2022.08.23.0
Job Site: EV01 Humidity: 39.1% RH Serial Number: None Barometric Pres.: 1006 mbar Tested by: Jeff Alcoke EUT: Titan Gatweay Configuration: 2 Customer: NextGen RF Design Attendees: None EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Antenna 1 Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Horizontal Reference Antenna Relative Gain Max (dBuV/m) 111.39 Antenna Under Test (AUT) Polarity Horizontal AUT Relative Gain Max (dBuV/m) 101.49 Maximum Absolute Gain of AUT (dBi) -0.19 Difference (Reference Antenna - AUT) (dB) 9.90 Average Absolute Gain of AUT (dBi) -10.50 AUT Setup Loss (dB) 0.16 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	Work Order:	NGRF0059	Date	2022-11-07		1/4
Serial Number: None Barometric Pres.: 1006 mbar Tested by: Jeff Alcoke EUT: Titan Gatweay Configuration: 2 Customer: NextGen RF Design Attendees: None EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Antenna 1 Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Horizontal Reference Antenna Relative Gain Max (dBuV/m) 111.39 Antenna Under Test (AUT) Polarity Horizontal AUT Relative Gain Max (dBuV/m) 101.49 Maximum Absolute Gain of AUT (dBi) -0.19 Difference (Reference Antenna - AUT) (dB) 9.90 Average Absolute Gain of AUT (dBi) -10.50 AUT Setup Loss (dB) 0.16 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	Project:	None	Temperature	20.7 °C		
EUT: Titan Gatweay Configuration: 2 Customer: NextGen RF Design Attendees: None EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Antenna 1 Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Horizontal Aut Reference Antenna Relative Gain Max (dBuV/m) 111.39 Antenna Under Test (AUT) Polarity Horizontal Aut Reference Antenna Relative Gain Max (dBuV/m) 101.49 Maximum Absolute Gain of AUT (dBi) -0.19 Difference (Reference Antenna - AUT) (dB) 9.90 Average Absolute Gain of AUT (dBi) -10.50 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	Job Site:	EV01	Humidity	y: 39.1% RH	000	1
Customer: NextGen RF Design Attendees: None EUT Power: None CW - 2440 MHz Deviations: None Antenna 1 Frequency 2440 Measurement Antenna Polarity Horizontal Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) -0.19 Average Absolute Gain of AUT (dBi) -10.50 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	Serial Number:	None	Barometric Pres	.: 1006 mbar	Tested by: Jeff Alcoke	
Customer: NextGen RF Design Attendees: None EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Antenna 1 Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Horizontal Reference Antenna Relative Gain Max (dBuV/m) 111.39 Antenna Under Test (AUT) Polarity Horizontal AUT Relative Gain Max (dBuV/m) 101.49 Maximum Absolute Gain of AUT (dBi) -0.19 Difference (Reference Antenna - AUT) (dB) 9.90 Average Absolute Gain of AUT (dBi) -10.50 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	EUT:	Titan Gatweay				
Attendees: None EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Antenna 1 Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Horizontal Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) -0.19 Average Absolute Gain of AUT (dBi) -10.50 AUT Setup Loss (dB) 0.16 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	Configuration:	2				
EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Antenna 1 Frequency 2440 Measurement Antenna Polarity Horizontal Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) -0.19 Average Absolute Gain of AUT (dBi) -10.50 Correction Factor (Convert Relative to Absolute Gain) (dB) Operating Mode: CW - 2440 MHz Absolute Gain of Reference Antenna (dBi) 9.55 Reference Antenna Relative Gain Max (dBuV/m) 111.39 AUT Relative Gain Max (dBuV/m) 101.49 Difference (Reference Antenna - AUT) (dB) 9.90 AUT Setup Loss (dB) 0.16 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	Customer:	NextGen RF Design				
Deviations: None Antenna 1 Comments: Frequency 2440 Measurement Antenna Polarity Horizontal Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) -0.19 Average Absolute Gain of AUT (dBi) -10.50 Correction Factor (Convert Relative to Absolute Gain) (dB) None Absolute Gain of Reference Antenna (dBi) 9.55 Reference Antenna Relative Gain Max (dBuV/m) 111.39 AUT Relative Gain Max (dBuV/m) 101.49 Builderence (Reference Antenna - AUT) (dB) 9.90 AVERAGE Absolute Gain of AUT (dBi) -10.50 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	Attendees:	None				
Deviations: None Antenna 1 Comments: Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Horizontal Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) -0.19 Average Absolute Gain of AUT (dBi) -10.50 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	EUT Power:	None				
Antenna 1 Comments: Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Horizontal Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) -0.19 Average Absolute Gain of AUT (dBi) -10.50 Correction Factor (Convert Relative to Absolute Gain) (dB) Antenna 1 Absolute Gain of Reference Antenna (dBi) 9.55 Reference Antenna Relative Gain Max (dBuV/m) 101.49 But Difference (Reference Antenna - AUT) (dB) 9.90 AUT Setup Loss (dB) 0.16 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	Operating Mode:	CW - 2440 MHz				
Frequency 2440 Measurement Antenna Polarity Horizontal Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Correction Factor (Convert Relative to Absolute Gain) (dBi) P.55 Reference Antenna (dBi) 9.55 Reference Antenna Relative Gain Max (dBuV/m) 101.49 Difference (Reference Antenna - AUT) (dB) 9.90 AUT Setup Loss (dB) 0.16 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	Deviations:	None				
Measurement Antenna Polarity Horizontal Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Correction Factor (Convert Relative Gain Max (dBuV/m) AUT Relative Gain Max (dBuV/m) 101.49 9.90 AUT Setup Loss (dB) 0.16 Correction Factor (Convert Relative to Absolute Gain) (dB)	Comments:					
Measurement Antenna Polarity Horizontal Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Correction Factor (Convert Relative Gain Max (dBuV/m) AUT Relative Gain Max (dBuV/m) 101.49 9.90 AUT Setup Loss (dB) 0.16 Correction Factor (Convert Relative to Absolute Gain) (dB)		Frequency	2440	Absolute	e Gain of Reference Antenna (dBi)	9.55
Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) -10.50 AUT Relative Gain Max (dBuV/m) Difference (Reference Antenna - AUT) (dB) AUT Setup Loss (dB) O.16 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	Measure		-		` ,	
Maximum Absolute Gain of AUT (dBi) -0.19 Difference (Reference Antenna - AUT) (dB) 9.90 Average Absolute Gain of AUT (dBi) -10.50 AUT Setup Loss (dB) 0.16 Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68		•			,	101.49
Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68		` ,		Difference	e (Reference Antenna - AUT) (dB)	9.90
Correction Factor (Convert Relative to Absolute Gain) (dB) 101.68	Average Abso	lute Gain of AUT (dBi)	-10.50		AUT Setup Loss (dB)	0.16
	J	,	C	Correction Factor (Conve	ert Relative to Absolute Gain) (dB)	101.68
		3 dB Beamwidth		,	, ()	

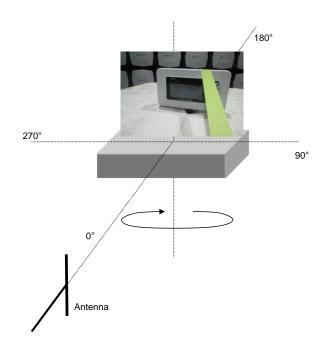


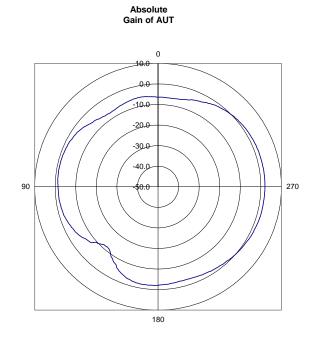


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						EmiR5 2022.07.06.0	PSA-ESCI 2022.08.23.
Work Order:	NGRF0059	D	Date:	2022-11-07			h
Project:	None	Temperat	ture:	20.7 °C	1	///	
Job Site:	EV01	Humic	idity:	39.1% RH	OM,	19/1	12
Serial Number:	None	Barometric Pr	res.:	1006 mbar	Tested by	: Jeff Alcoke	
EUT:	Titan Gatweay		•				
Configuration:	2						
Customer:	NextGen RF Design						
Attendees:	None						
EUT Power:	None						
Operating Mode:	CW - 2440 MHz						
Deviations:	None						
Comments:	Antenna 1						
	Frequency	2440		Absolu	te Gain of Reference A	ntenna (dBi)	9.55
Measure	ment Antenna Polarity	_			tenna Relative Gain M	` ,	110.39
	ler Test (AUT) Polarity				AUT Relative Gain M	` ,	102.69
	lute Gain of AUT (dBi)	2.01		Differen	ce (Reference Antenna	,	7.70
	lute Gain of AUT (dBi)	-2.67			`	up Loss (dB)	0.16
	- (- /		Correct	ion Factor (Con	vert Relative to Absolut	. ,	100.68
	3 dB Beamwidth	103°		- (, (- ,	

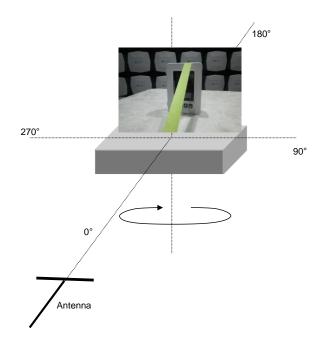


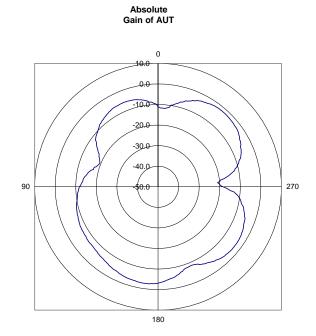


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				EmiR5 2022.07.06.0	PSA-ESCI 2022.08.23.0
Work Order:	NGRF0059	Da	te: 2022-11-07		h
Project:	None	Temperatu	re: 20.7 °C	11/	
Job Site:	EV01	Humid	ity: 39.1% RH	000	182
Serial Number:	None	Barometric Pre	es.: 1006 mbar	Tested by: Jeff Alcoke	
EUT:	Titan Gatweay				
Configuration:	2				
Customer:	NextGen RF Design				
Attendees:	None				
EUT Power:	None				
Operating Mode:	CW - 2440 MHz				
Deviations:	None				
Comments:	Antenna 1				
	Frequency	2440	Absolute	Gain of Reference Antenna (dBi)	9.55
Measure	ment Antenna Polarity	Horizontal	Reference Ante	enna Relative Gain Max (dBuV/m)	111.39
Antenna Und	ler Test (AUT) Polarity	on Side		AUT Relative Gain Max (dBuV/m)	99.89
Maximum Abso	lute Gain of AUT (dBi)	-1.79	Difference	e (Reference Antenna - AUT) (dB)	11.50
Average Abso	lute Gain of AUT (dBi)	-7.63		AUT Setup Loss (dB)	0.16
_			Correction Factor (Conve	ert Relative to Absolute Gain) (dB)	101.68
	3 dB Beamwidth	42°			

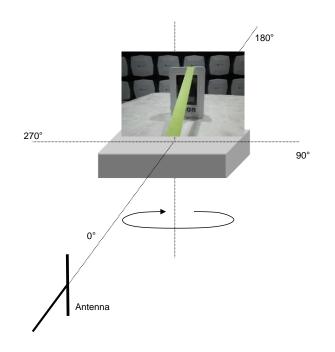


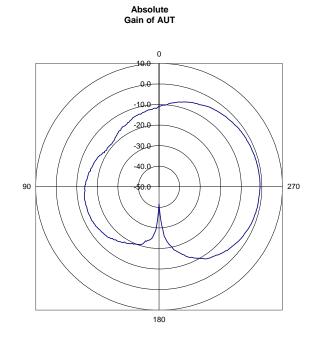


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						EmiR5 2022.07.06.0	PSA-ESCI 2022.08.23.0
Work Order:	NGRF0059	Da	ate: 2	022-11-07		//	h
Project:	None	Temperatu	ure:	20.7 °C	10		
Job Site:	EV01	Humid	lity:	39.1% RH	O CAT	19/10	
Serial Number:	None	Barometric Pro	es.:	006 mbar	Tested by:	Jeff Alcoke	
EUT:	Titan Gatweay						
Configuration:	2						
Customer:	NextGen RF Design						
Attendees:	None						
EUT Power:	None						
Operating Mode:	CW - 2440 MHz						
Deviations:	None						
Comments:	Antenna 1						
	Frequency	2440		Absolute	e Gain of Reference Ant	enna (dBi)	9.55
Measure	ment Antenna Polarity	-			enna Relative Gain Max		110.39
	ler Test (AUT) Polarity				AUT Relative Gain Max	` ,	99.79
	lute Gain of AUT (dBi)	-0.89		Difference	e (Reference Antenna -	'	10.60
	lute Gain of AUT (dBi)	-11.55			` AUT Setup	Loss (dB)	0.16
	- (- /		Correction	Factor (Conv	ert Relative to Absolute	` '	100.68
	3 dB Beamwidth	93°		, -		, , ,	

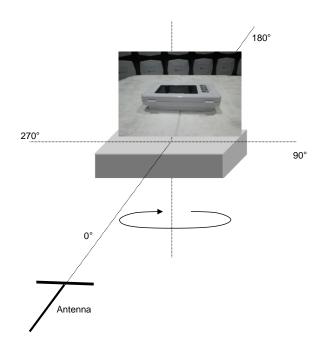


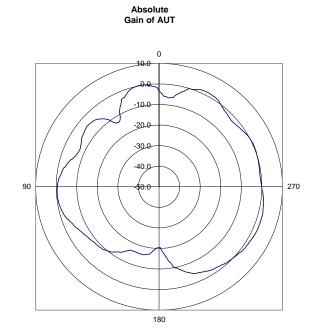


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Work Order:	NGRF0059							
Duningt	110111 0000		Date:	2022-11-07			/	1
Project:	None	Tempera	ature:	20.7 °C		1 1	//	
Job Site:	EV01	Hum	nidity:	39.1% RH		(1)	19/1	1
Serial Number:	None	Barometric F	Pres.:	1006 mbar		Tested by:	Jeff Alcoke	
EUT:	Titan Gatweay		•					
Configuration: 2	2							
Customer:	NextGen RF Design							
Attendees:	None							
EUT Power:	None							
Operating Mode:	CW - 2440 MHz							
Deviations:	None							
Comments:	Antenna 1							
	Frequency	2440		Absol	ute Gain of Re	ference Ante	enna (dBi)	9.55
Measurem	nent Antenna Polarity	Horizontal		Reference A	Intenna Relativ	e Gain Max	(dBuV/m)	111.39
Antenna Unde	er Test (AUT) Polarity	Vertical			AUT Relativ	e Gain Max	(dBuV/m)	103.89
Maximum Absolu	ite Gain of AUT (dBi)	2.21		Differer	nce (Referenc	e Antenna -	AUT) (dB)	7.50
Average Absolu	ite Gain of AUT (dBi)	-4.43				AUT Setup	Loss (dB)	0.16
-			Correc	ction Factor (Cor	nvert Relative	to Absolute (Gain) (dB)	101.68
	3 dB Beamwidth	83°		,			, , ,	

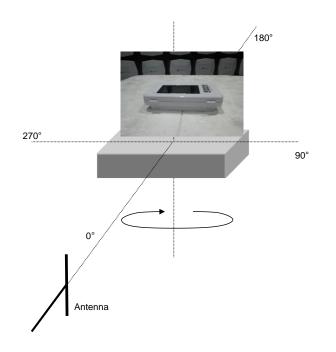


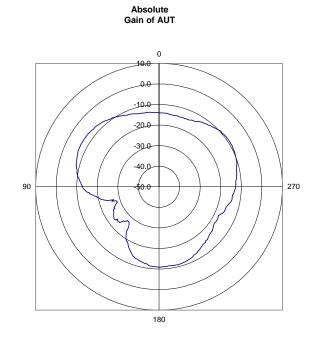


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Work Order: NGRF0059 Date: 2022-11-07 Project: None Temperature: 20.7 °C Job Site: EV01 Humidity: 39.1% RH Serial Number: None Barometric Pres.: 1006 mbar Tested by: Jeff Alcoke EUT: Titan Gatweay Configuration: 2 Customer: NextGen RF Design Attendees: None EUT Power: None	1
Job Site: EV01 Humidity: 39.1% RH Serial Number: None Barometric Pres.: 1006 mbar Tested by: Jeff Alcoke EUT: Titan Gatweay Configuration: 2 Customer: NextGen RF Design Attendees: None	
Serial Number: None Barometric Pres.: 1006 mbar Tested by: Jeff Alcoke EUT: Titan Gatweay Configuration: 2 Customer: NextGen RF Design Attendees: None	
EUT: Titan Gatweay Configuration: 2 Customer: NextGen RF Design Attendees: None	
Configuration: 2 Customer: NextGen RF Design Attendees: None	
Customer: NextGen RF Design Attendees: None	
Attendees: None	
FLIT Dower Mono	
EUT FOWEI: Notice	
Operating Mode: CW - 2440 MHz	
Deviations: None	
Comments: Antenna 1	
Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55	
Measurement Antenna Polarity Vertical Reference Antenna Relative Gain Max (dBuV/m) 110.39	
Antenna Under Test (AUT) Polarity Vertical AUT Relative Gain Max (dBuV/m) 93.89	
Maximum Absolute Gain of AUT (dBi) -6.79 Difference (Reference Antenna - AUT) (dB) 16.50	
Average Absolute Gain of AUT (dBi) -13.99 AUT Setup Loss (dB) 0.16	
Correction Factor (Convert Relative to Absolute Gain) (dB) 100.68	
3 dB Beamwidth 49°	

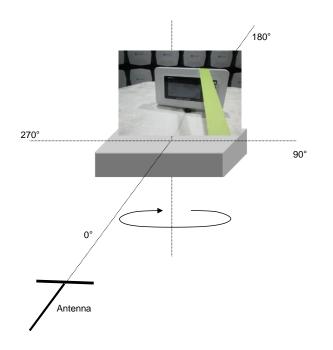


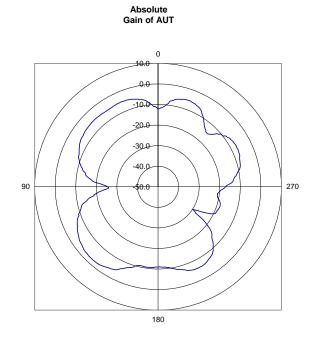


Report No. NGRF0059 14/30



				EmiR5 2022.07.06.0	PSA-ESCI 2022.08.23.0
Work Order:	NGRF0059	Date	2022-11-07		1/4
Project:	None	Temperature	20.7 °C		
Job Site:	EV01	Humidity	7: 39.1% RH	CAT MI	(fee
Serial Number:	None	Barometric Pres.	.: 1006 mbar	Tested by: Jeff Alcoke	
EUT:	Titan Gatweay				
Configuration:	2				
Customer:	NextGen RF Design				
Attendees:	None				
EUT Power:	None				
Operating Mode:	CW - 2440 MHz				
Deviations:	None				
Comments:	Antenna 2				
	Frequency	2440	Absolute	Gain of Reference Antenna (dBi)	9.55
Measure	ment Antenna Polarity			enna Relative Gain Max (dBuV/m)	111.39
	der Test (AUT) Polarity			AUT Relative Gain Max (dBuV/m)	99.29
	lute Gain of AUT (dBi)	-2.40	Difference	e (Reference Antenna - AUT) (dB)	12.10
Average Abso	lute Gain of AUT (dBi)	-10.09		AUT Setup Loss (dB)	0.15
ŭ	,	С	orrection Factor (Conve	ert Relative to Absolute Gain) (dB)	101.69
	3 dB Beamwidth	37°	`	, , ,	

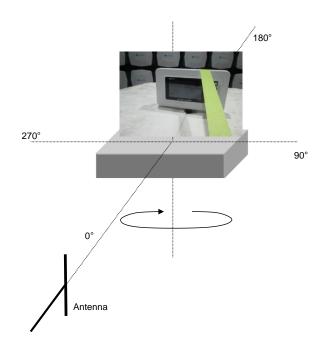


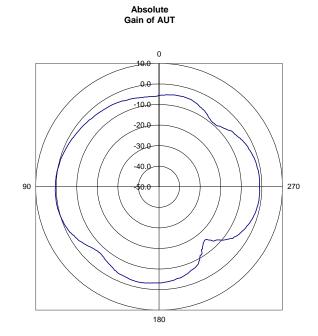


Report No. NGRF0059 15/30



				EmiR5 2022.07.06.0	PSA-ESCI 2022.08.23.0
Work Order:	NGRF0059	Da	ate: 2022-11-07		
Project:	None	Temperatu	re: 20.7 °C		
Job Site:	EV01	Humidi	ity: 39.1% RH		
Serial Number:	None	Barometric Pre	es.: 1006 mbar	Tested by: Jeff Alcoke	
EUT:	Titan Gatweay				
Configuration:	2				
Customer:	NextGen RF Design				
Attendees:	None				
EUT Power:	None				
Operating Mode:	CW - 2440 MHz				
Deviations:	None				
	Antenna 2				
Comments:					
	Frequency	2440	Absolute	e Gain of Reference Antenna (dBi)	9.55
Measure	ment Antenna Polarity	-		enna Relative Gain Max (dBuV/m)	110.39
	der Test (AUT) Polarity			AUT Relative Gain Max (dBuV/m)	101.19
	lute Gain of AUT (dBi)	0.50		e (Reference Antenna - AUT) (dB)	9.20
	lute Gain of AUT (dBi)	-4.17		AUT Setup Loss (dB)	0.15
51-1g-1 11-11			Correction Factor (Conve	ert Relative to Absolute Gain) (dB)	100.69
	3 dB Beamwidth	68°		(42)	

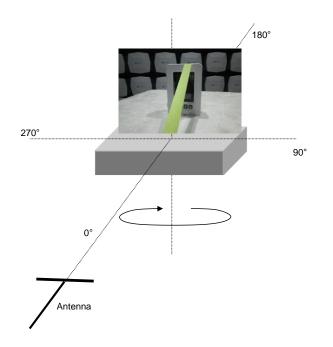


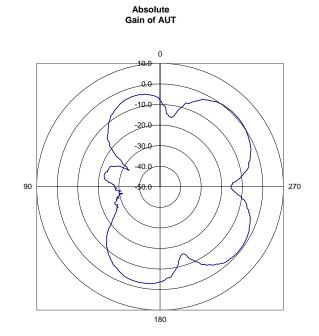


Report No. NGRF0059 16/30



				EmiR5 2022.07.06.0	PSA-ESCI 2022.08.23.0
Work Order:	NGRF0059	Date	2022-11-07	<u> </u>	
Project:	None	Temperature	20.7 °C		
Job Site:	EV01	Humidity	7: 39.1% RH		
Serial Number:	None	Barometric Pres	.: 1006 mbar	Tested by: Jeff Alcoke	
EUT:	Titan Gatweay				
Configuration:	2				
Customer:	NextGen RF Design				
Attendees:	None				
EUT Power:	None				
Operating Mode:	CW - 2440 MHz				
Deviations:	None				
Comments:	Antenna 2				
	Frequency	2440	Absolute	Gain of Reference Antenna (dBi)	9.55
Measure	ment Antenna Polarity	-		enna Relative Gain Max (dBuV/m)	111.39
	ler Test (AUT) Polarity			AUT Relative Gain Max (dBuV/m)	102.29
	lute Gain of AUT (dBi)	0.60		e (Reference Antenna - AUT) (dB)	9.10
	lute Gain of AUT (dBi)	-10.39		AUT Setup Loss (dB)	0.15
: :: 3. ago 7 tago	(42.)		orrection Factor (Conve	ert Relative to Absolute Gain) (dB)	101.69
	3 dB Beamwidth	42°		(42)	

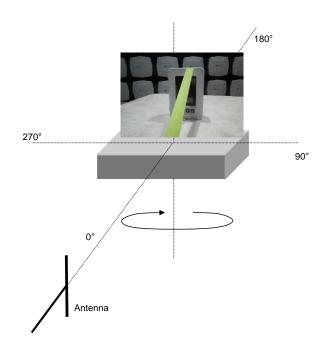


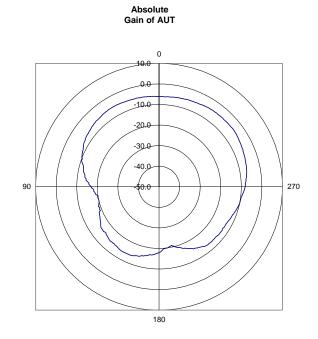


Report No. NGRF0059 17/30



						EmiR5 2022.07.06.0	PSA-ESCI 2022.08.23
Work Order:	NGRF0059		Date: 2022	-11-07			1
Project:	None	Temperat	ture: 20.	7 °C		// /	
Job Site:	EV01	Humi	dity: 39.1	% RH	O CA	19/	Som
Serial Number:	None	Barometric P	res.: 1006	6 mbar	Tested b	y: Jeff Alcoke	
EUT:	Titan Gatweay						
Configuration:	2						
Customer:	NextGen RF Design						
Attendees:	None						
EUT Power:	None						
Operating Mode:	CW - 2440 MHz						
Deviations:	None						
	Antenna 2						
Comments:							
	Frequency	2440		Absolute 0	Gain of Reference A	Antenna (dBi)	9.55
Measure	ment Antenna Polarity	-	Refe		na Relative Gain M	` ,	110.39
	ler Test (AUT) Polarity				UT Relative Gain M	,	96.29
	lute Gain of AUT (dBi)	-4.40			(Reference Antenna	,	14.10
	lute Gain of AUT (dBi)	-11.01			`	tup Loss (dB)	0.15
7g - 1 1			Correction Fa	ctor (Convert	t Relative to Absolu		100.69
	3 dB Beamwidth	143°		(/ (/	

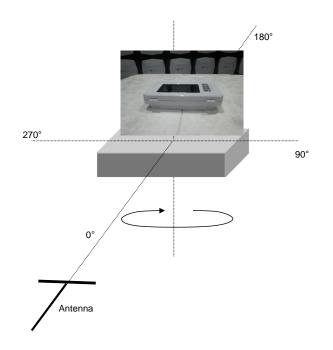


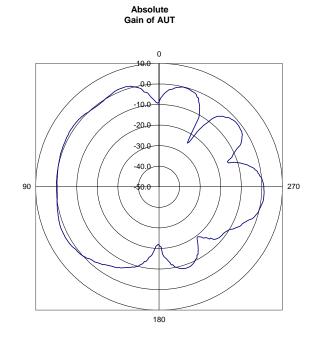


Report No. NGRF0059 18/30



				EmiR5 202	2.07.06.0 PS	A-ESCI 2022.08.23.0
Work Order:	NGRF0059	D	2022-11-07		-/ //	7
Project:	None	Temperat	ure: 20.7 °C			
Job Site:	EV01	Humi	dity: 39.1% RH	Cent 1	5/182	
Serial Number:	None	Barometric Pi	res.: 1006 mbar	Tested by: Jeff A	lcoke	
EUT:	Titan Gatweay					
Configuration:	2					
Customer:	NextGen RF Design					
Attendees:	None					
EUT Power:	None					
Operating Mode:	CW - 2440 MHz					
Deviations:	None					
Comments:	Antenna 2					
	Frequency	2440	Absolu	ute Gain of Reference Antenna	(dBi) 9.55	
Measurer	ment Antenna Polarity	Horizontal	Reference A	ntenna Relative Gain Max (dBu	V/m) 111.39	
Antenna Und	er Test (AUT) Polarity	Vertical		AUT Relative Gain Max (dBu	V/m) 103.49	
Maximum Absol	ute Gain of AUT (dBi)	1.80	Differer	nce (Reference Antenna - AUT)	(dB) 7.90	
Average Absol	ute Gain of AUT (dBi)	-4.64		AUT Setup Loss	(dB) 0.15	
-			Correction Factor (Cor	nvert Relative to Absolute Gain)	(dB) 101.69	
	3 dB Beamwidth	125°	`	,	` '	

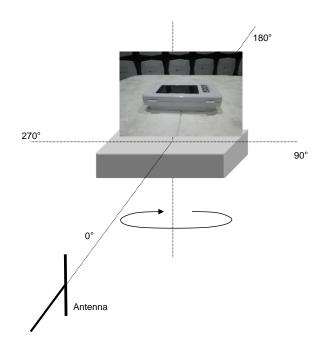


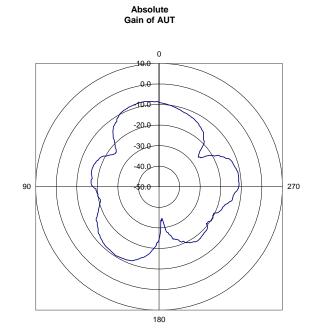


Report No. NGRF0059 19/30



				EmiR5 2022.07.06.0	PSA-ESCI 2022.08.23.0
Work Order:	NGRF0059	Dat	te: 2022-11-07		h
Project:	None	Temperatur	re: 20.7 °C	11/6/	
Job Site:	EV01	Humidit	ty: 39.1% RH	000	182
Serial Number:	None	Barometric Pres	s.: 1006 mbar	Tested by: Jeff Alcoke	
EUT:	Titan Gatweay				
Configuration:	2				
Customer:	NextGen RF Design				
Attendees:	None				
EUT Power:	None				
Operating Mode:	CW - 2440 MHz				
Deviations:	None				
Comments:	Antenna 2				
	Frequency	2440	Absolut	te Gain of Reference Antenna (dBi)	9.55
Measure	ment Antenna Polarity	-		tenna Relative Gain Max (dBuV/m)	110.39
	ler Test (AUT) Polarity			AUT Relative Gain Max (dBuV/m)	92.69
	lute Gain of AUT (dBi)	-8.00	Difference	ce (Reference Antenna - AUT) (dB)	17.70
	lute Gain of AUT (dBi)	-16.11		AUT Setup Loss (dB)	0.15
	- ()	-	Correction Factor (Conv	vert Relative to Absolute Gain) (dB)	100.69
	3 dB Beamwidth	46°			





Report No. NGRF0059 20/30



PSA-ESCI 2022.08.23.0



Report No. NGRF0059 21/30



PSA-ESCI 2022.08.23.0

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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

CW - 2440 MHz

CONFIGURATIONS INVESTIGATED

NGRF0059 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency 2440 MHz	Stop Frequency	2440 MHz

SAMPLE CALCULATIONS

Max Absolute Gain of AUT = G_ref - (E_ref - E_aut) + L_c

Where:

G_ref = gain of reference antenna (dBi)

E_ref = electric field strength in dBuV/m

 $E_aut = electric field strength in dBuV/m$ $L_c = AUT setup loss$

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due	
Cable	N/A	Double Ridge	EVB	2022-05-03	2023-05-03	
Cable	N/A	Horn Cables	EVD	2022-05-05		
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	2021-12-09	2022-12-09	
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	2022-03-02	2024-03-02	
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20	
Attenuator	S.M. Electronics	SA18H-06	REM	2021-12-02	2022-12-02	
Antenna - Double Ridge	EMCO	3115	AHC	2022-07-08	2024-07-08	

TEST DESCRIPTION

Measurements were performed in a semi-anichoic chamber. RF absorbing cones were placed on the floor between the measurement antenna and the AUT. The AUT was placed on a 1.8 m high block of foam.

The reference antenna was placed at the center of the 1.8 m block of foam. A CW signal was provided to the reference antenna from a calibrated signal generator through a length of RF Cable. To reduce the effects of the RF cable, the RF cable was lined with ferrite cores running down the length of the cable with a spacing of 10cm between each ferrite. A reference plot was collected.

The AUT was then put into the chamber in place of the reference antenna. The AUT was connected to the signal generator using the RF same cable and connector setup. A polar plot was then collected at the antenna height of maximum field strength. This plot was then compared to the reference antenna scan, and, using the antenna gain (dBi) of the reference antenna the absolute gain of the AUT was calculated.

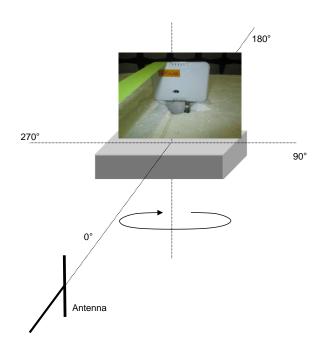
SUMMARY OF RESULTS

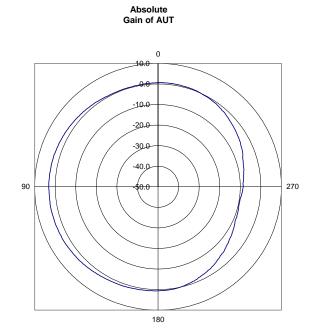
Туре	Frequency Range (MHz)	PK Gain (dBi)
PCB Trace Monopole Antenna	2440	3.16

Report No. NGRF0059 22/30



Work Order: NGRF0059 Date: 2022-11-07 Project: None Temperature: 20.8 °C Job Site: EV01 Humidity: 39.2% RH Serial Number: None Barometric Pres.: 1006 mbar Tested by: Jeff Alcoke EUT: Titan Sensor Configuration: 1 Customer: None Attendees: None EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Vertical Reference Antenna Relative Gain Max (dBuV/m) 110.39 Antenna Under Test (AUT) Polarity Horizontal AUT Relative Gain Max (dBuV/m) 103.89 Maximum Absolute Gain of AUT (dBi) 3.16 Difference (Reference Antenna - AUT) (dB) 6.50 Average Absolute Gain of AUT (dBi) -1.04 Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73 3 dB Beamwidth 214°					EmiR5 2022.07.06.0	PSA-ESCI 2022.08.23.0
Job Site: EV01 Humidity: 39.2% RH Serial Number: None Barometric Pres.: 1006 mbar Tested by: Jeff Alcoke EUT: Titan Sensor Configuration: 1 Customer: NextGen RF Design Attendees: None EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Comments: None Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Vertical Reference Antenna Relative Gain Max (dBuV/m) 110.39 Antenna Under Test (AUT) Polarity Horizontal AUT Relative Gain Max (dBuV/m) 103.89 Maximum Absolute Gain of AUT (dBi) 3.16 Average Absolute Gain of AUT (dBi) -1.04 Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73	Work Order:	NGRF0059	Dat	e: 2022-11-07		1/4
Serial Number: None Barometric Pres.: 1006 mbar Tested by: Jeff Alcoke EUT: Titan Sensor Configuration: 1 Customer: NextGen RF Design Attendees: None EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Vertical Reference Antenna Relative Gain Max (dBuV/m) 110.39 Antenna Under Test (AUT) Polarity Horizontal AUT Relative Gain Max (dBuV/m) 103.89 Maximum Absolute Gain of AUT (dBi) 3.16 Difference (Reference Antenna - AUT) (dB) 6.50 Average Absolute Gain of AUT (dBi) -1.04 Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73	Project:	None	Temperatur	'e: 20.8 °C		
EUT: Titan Sensor Configuration: 1 Customer: NextGen RF Design Attendees: None EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Vertical Reference Antenna Relative Gain Max (dBuV/m) 110.39 Antenna Under Test (AUT) Polarity Horizontal AUT Relative Gain Max (dBuV/m) 103.89 Maximum Absolute Gain of AUT (dBi) 3.16 Difference (Reference Antenna - AUT) (dB) 6.50 Average Absolute Gain of AUT (dBi) -1.04 Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73	Job Site:	EV01	Humidit	y: 39.2% RH	000	182
Customer: NextGen RF Design Attendees: None EUT Power: None CW - 2440 MHz Deviations: None Comments: None Frequency 2440 Measurement Antenna Polarity Vertical Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) 3.16 Average Absolute Gain of AUT (dBi) -1.04 Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73	Serial Number:	None	Barometric Pres	s.: 1006 mbar	Tested by: Jeff Alcoke	
Customer: NextGen RF Design Attendees: None EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Comments: None Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Vertical Reference Antenna Relative Gain Max (dBuV/m) 110.39 Antenna Under Test (AUT) Polarity Horizontal AUT Relative Gain Max (dBuV/m) 103.89 Maximum Absolute Gain of AUT (dBi) 3.16 Difference (Reference Antenna - AUT) (dB) 6.50 Average Absolute Gain of AUT (dBi) -1.04 AUT Setup Loss (dB) 0.11 Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73	EUT:	Titan Sensor				
Attendees: None EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Frequency 2440 Measurement Antenna Polarity Vertical Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) 3.16 Average Absolute Gain of AUT (dBi) -1.04 AUT Setup Loss (dB) 0.11 Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73	Configuration:	1				
EUT Power: None Operating Mode: CW - 2440 MHz Deviations: None Frequency 2440 Measurement Antenna Polarity Vertical Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) 3.16 Average Absolute Gain of AUT (dBi) 4.04 Average Absolute Gain of AUT (dBi) 4.04 Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73	Customer:	NextGen RF Design				
Deviations: None Comments: Frequency 2440 Measurement Antenna Polarity Vertical Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) Average Absolute Gain of AU	Attendees:	None				
Deviations: None Frequency 2440 Measurement Antenna Polarity Vertical Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi)	EUT Power:	None				
Comments: Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Vertical Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) 3.16 Average Absolute Gain of AUT (dBi) -1.04 Correction Factor (Convert Relative to Absolute Gain) (dB) None Reference Antenna (dBi) 9.55 Reference Antenna Relative Gain Max (dBuV/m) 110.39 AUT Relative Gain Max (dBuV/m) 103.89 AUT Setup Loss (dB) 0.11 Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73	Operating Mode:	CW - 2440 MHz				
Frequency 2440 Absolute Gain of Reference Antenna (dBi) 9.55 Measurement Antenna Polarity Vertical Reference Antenna Relative Gain Max (dBuV/m) 110.39 Antenna Under Test (AUT) Polarity Horizontal AUT Relative Gain Max (dBuV/m) 103.89 Maximum Absolute Gain of AUT (dBi) 3.16 Average Absolute Gain of AUT (dBi) -1.04 Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73	Deviations:	None				
Measurement Antenna Polarity Vertical Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Correction Factor (Convert Relative Gain Max (dBuV/m) AUT Relative Gain Max (dBuV/m) 103.89 AUT Setup Loss (dB) 0.11 Correction Factor (Convert Relative to Absolute Gain) (dB)	Comments:					
Measurement Antenna Polarity Vertical Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) Correction Factor (Convert Relative Gain Max (dBuV/m) AUT Relative Gain Max (dBuV/m) 103.89 AUT Setup Loss (dB) 0.11 Correction Factor (Convert Relative to Absolute Gain) (dB)		Frequency	2440	Absolute	e Gain of Reference Antenna (dBi)	9.55
Antenna Under Test (AUT) Polarity Horizontal Maximum Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) -1.04 AUT Relative Gain Max (dBuV/m) 6.50 AUT Setup Loss (dB) 0.11 Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73	Measure		-		` ,	
Maximum Absolute Gain of AUT (dBi) Average Absolute Gain of AUT (dBi) -1.04 -1.04 -1.04 Difference (Reference Antenna - AUT) (dB) AUT Setup Loss (dB) 0.11 Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73		•				
Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73		` ,			` ,	
Correction Factor (Convert Relative to Absolute Gain) (dB) 100.73	Average Abso	lute Gain of AUT (dBi)	-1.04		AUT Setup Loss (dB)	0.11
		- (- /	(Correction Factor (Conv	. ,	100.73
		3 dB Beamwidth		((***)	

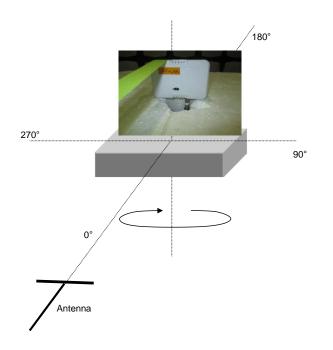


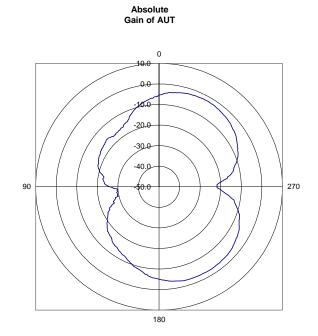


Report No. NGRF0059 23/30



							EmiR5 2022.07.06.0	PSA-ES	CI 2022.08.23.0
Work Order:	NGRF0059		Date:	2022-11-07	_		/	1	
Project:	None	Temper	ature:	20.8 °C		1 1			
Job Site:	EV01	Hun	nidity:	39.2% RH		(1)	19/	82	_
Serial Number:	None	Barometric	Pres.:	1006 mbar		Tested by:	Jeff Alcoke		
EUT:	Titan Sensor								
Configuration:	1								
Customer:	NextGen RF Design								
Attendees:	None								
EUT Power:	None								
Operating Mode:	CW - 2440 MHz								
Deviations:	None								
Comments:	None								
	Frequency	2440		Absolu	ute Gain of R	eference An	tenna (dBi)	9.55	
Measure	ment Antenna Polarity	-		Reference A			` ,	111.39	
	ler Test (AUT) Polarity					ive Gain Max	,	99.59	
	lute Gain of AUT (dBi)	-2.14		Differer	nce (Referenc		` ,	11.80	
	lute Gain of AUT (dBi)	-11.45			•	AUT Setup	Loss (dB)	0.11	
ŭ	,		Corre	ection Factor (Con	vert Relative	to Absolute	Gain) (dB)	101.73	
	3 dB Beamwidth	56°		`			, , ,		

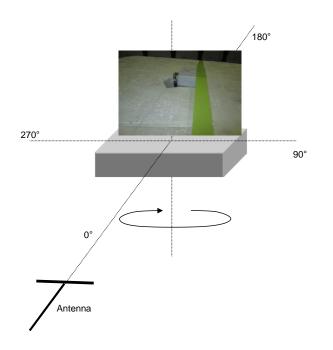


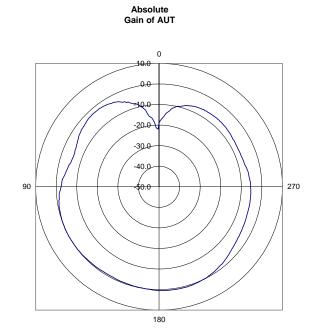


Report No. NGRF0059 24/30



							EmiR5 2022.07.06.0	PSA-E	SCI 2022.08.23.0
Work Order:	NGRF0059		Date:	2022-11-07			//	1/1	
Project:	None	Tempera	ature:	20.8 °C			//		
Job Site:	EV01	Hum	nidity:	39.2% RH			19/	82	$\overline{}$
Serial Number:	None	Barometric I	Pres.:	1006 mbar	٦	Tested by:	Jeff Alcoke		
EUT:	Titan Sensor								
Configuration:	1								
Customer:	NextGen RF Design								
Attendees:	None								
EUT Power:	None								
Operating Mode:	CW - 2440 MHz								
Deviations:	None								
Comments:	None								
	Frequency	2440		Absolu	te Gain of Re	ference Ant	enna (dBi)	9.55	
Measure	ment Antenna Polarity	-		Reference An			, ,	111.39	
	ler Test (AUT) Polarity				AUT Relativ		,	102.29	
	lute Gain of AUT (dBi)	0.56		Differen	ce (Reference		` ,	9.10	
	lute Gain of AUT (dBi)	-4.16			`	AUT Setup	, , ,	0.11	
9	(* /		Correc	ction Factor (Con			` '	101.73	
	3 dB Beamwidth	135°		(, (- ,		
	5 db beanwidth	133							

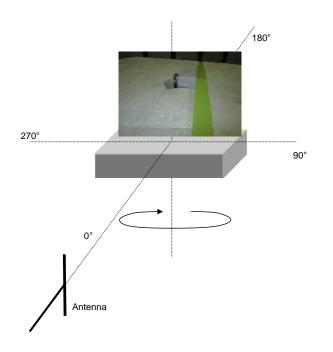


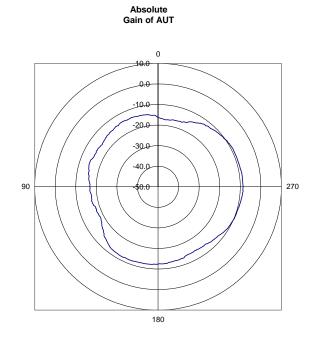


Report No. NGRF0059 25/30



							EmiR5 2022.07.06.0	PSA	x-ESCI 2022.08.23.0
Work Order:	NGRF0059		Date:	2022-11-07	_		/	1	7
Project:	None	Temper	ature:	20.8 °C		1 1			
Job Site:	EV01	Hun	nidity:	39.2% RH		(1)	19/	82	_
Serial Number:	None	Barometric	Pres.:	1006 mbar		Tested by:	Jeff Alcoke		
EUT:	Titan Sensor								
Configuration:	1								
Customer:	NextGen RF Design								
Attendees:	None								
EUT Power:	None								
Operating Mode:	CW - 2440 MHz								
Deviations:	None								
Comments:	None								
	Frequency	2440		Absolu	ute Gain of Re	eference An	tenna (dBi)	9.55	
Measure	ment Antenna Polarity	_			ntenna Relati		` '	110.39	
Antenna Und	ler Test (AUT) Polarity	Vertical			AUT Relati	ve Gain Max	κ (dBuV/m)	92.19	
	lute Gain of AUT (dBi)	-8.54		Differer	nce (Referenc		,	18.20	
	lute Gain of AUT (dBi)	-13.42			•	AUT Setup	Loss (dB)	0.11	
ŭ	,		Corre	ection Factor (Cor	nvert Relative	to Absolute	Gain) (dB)	100.73	
	3 dB Beamwidth	83°		,			, , ,		

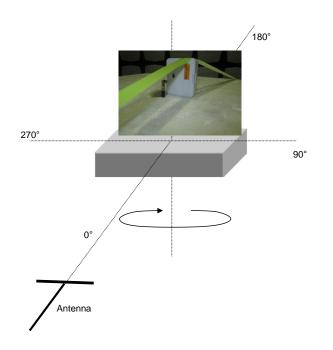


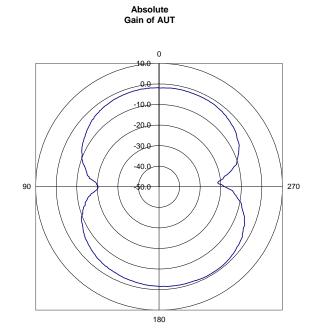


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						E	miR5 2022.07.06.0	PSA-ESCI	2022.08.23.0
Work Order:	NGRF0059		Date:	2022-11-07			//	1	
Project:	None	Tempera	ature:	20.8 °C	_ /		//		
Job Site:	EV01	Hum	nidity:	39.2% RH		7/	19/	199	_
Serial Number:	None	Barometric I	Pres.:	1006 mbar	T	ested by: J	eff Alcoke		
EUT:	Titan Sensor								
Configuration:	1								
Customer:	NextGen RF Design								
Attendees:	None								
EUT Power:	None								
Operating Mode:	CW - 2440 MHz								
Deviations:	None								
Comments:	None								
	Frequency	2440		Absolut	te Gain of Refe	erence Ante	nna (dBi)	9.55	
Measure	ment Antenna Polarity	-			tenna Relative		` ,	111.39	
	ler Test (AUT) Polarity				AUT Relative	,	,	101.09	
	lute Gain of AUT (dBi)	-0.64		Difference	ce (Reference		,	10.30	
	lute Gain of AUT (dBi)	-5.71			`	AUT Setup L	, , ,	0.11	
	- (- /		Corre	ection Factor (Conv			` ,	101.73	
	3 dB Beamwidth	98°		(, (*)		

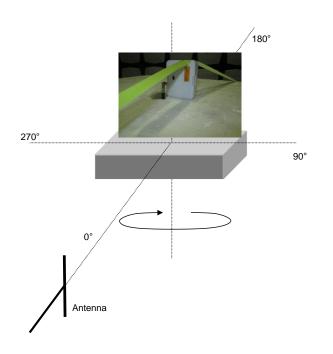


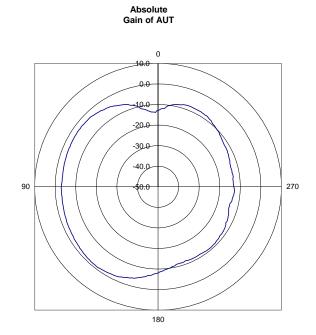


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				EmiR5 2022.07.06.0	PSA-ESCI 2022.08.23.0
Work Order:	NGRF0059	Date	2022-11-07		h
Project:	None	Temperature	20.8 °C	1966	
Job Site:	EV01	Humidity	7: 39.2% RH	CAT MI	199
Serial Number:	None	Barometric Pres.	.: 1006 mbar	Tested by: Jeff Alcoke	
EUT:	Titan Sensor				
Configuration:	1				
Customer:	NextGen RF Design				
Attendees:	None				
EUT Power:	None				
Operating Mode:	CW - 2440 MHz				
Deviations:	None				
Comments:	None				
	Frequency	2440	Absolute	e Gain of Reference Antenna (dBi)	9.55
Measure	ment Antenna Polarity			enna Relative Gain Max (dBuV/m)	110.39
	er Test (AUT) Polarity			AUT Relative Gain Max (dBuV/m)	99.69
	lute Gain of AUT (dBi)	-1.04	Difference	e (Reference Antenna - AUT) (dB)	10.70
Average Absol	lute Gain of AUT (dBi)	-7.65		AUT Setup Loss (dB)	0.11
Ŭ	,	С	orrection Factor (Conve	ert Relative to Absolute Gain) (dB)	100.73
	3 dB Beamwidth	130°	,		

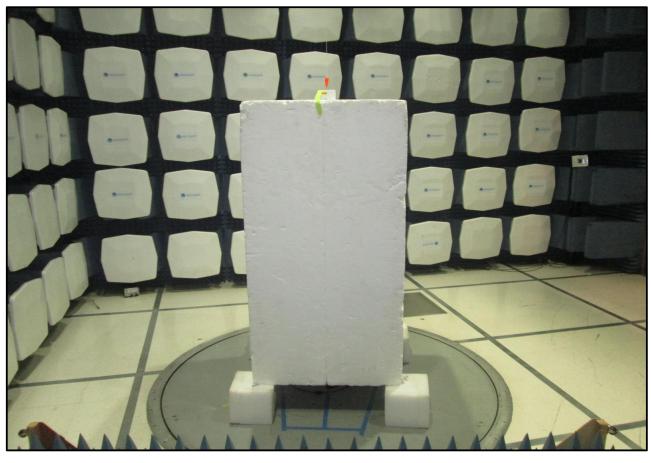




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End of Test Report

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