

RF TEST REPORT



Report No.: FCC_IC_RF_SL17041101_SEV-023R2
 Supersede Report No.: None

Applicant	Xirgo Technologies, LLCt		
Product Name	XT3630F		
Model No.	XT3630F		
Test Standard	47CFR15.247 RSS-247 Issue 2, February 2017		
Test Method	ANCI C63.4:2014 RSS-Gen Issue 4.0, Nov 2014 FCC Public Notice DA 00-705, 558074 D01 DTS Meas Guidance v03r04		
FCC ID	GKM- XT3630F		
IC ID	10281A-XT3630F		
Date of test	05/22/2017		
Issue Date	06/2/2017		
Test Result	<u>Pass</u>	Fail	
Equipment complied with the specification			[x]
Equipment did not comply with the specification			[]
 Cipher Test Engineer		 Chen Ge Engineer Reviewer	
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only			

Issued By:
SIEMIC Laboratories
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Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC, RF/Wireless, Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless, Telecom
Taiwan	BSMI, NCC, NIST	EMC, RF, Telecom, Safety
Hong Kong	OFTA, NIST	RF/Wireless, Telecom
Australia	NATA, NIST	EMC, RF, Telecom, Safety
Korea	KCC/RRA, NIST	EMI, EMS, RF, Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety EMC, RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom, Safety
Israel	MOC, NIST	EMC, RF, Telecom, Safety

Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC, RF, Telecom
Canada	IC FCB, NIST	EMC, RF, Telecom
Singapore	iDA, NIST	EMC, RF, Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC_IC_RF_SL17041101_SEV-023R2	None	Original	06/2/2017

2 Executive Summary

The purpose of this test program was to demonstrate compliance of the following product

Company: Xirgo Technologies, LLC
Product: XT3630F
Model: XT3630F

against the current Stipulated Standards. The ADTHRIWHC 204450-02 RF module (FCC ID: YV8-204450, IC ID: 9922A-204450)) has demonstrated compliance with the Stipulated Standard listed on 1st page.

3 Customer information

Applicant Name	:	Xirgo Technologies, LLC
Applicant Address	:	188 Camino Ruiz Camarillo, CA 93012
Manufacturer Name	:	Xirgo Technologies, LLC
Manufacturer Address	:	188 Camino Ruiz Camarillo, CA 93012

4 Test site information

Lab performing tests	SIEMIC Laboratories
Lab Address	775 Montague Expressway, Milpitas, CA 95035
FCC Test Site No.	881796
IC Test Site No.	4842D-2
VCCI Test Site No.	A0133

5 Modification

Index	Item	Description	Note
-	-	-	-

6 EUT Information

6.1 EUT Description

Product Name	XT3630F
Model No.	XT3630F
Trade Name	XT3630F
Serial No.	D41707000627F1K
8Host Model No.	N/A
Input Power	8-24VDC
Power Adapter Manu/Model	N/A
Power Adapter SN	N/A
Date of EUT received	04/14/2017
Equipment Class/ Category	DSSS
Port/Connectors	8-pin Micro-Fit Connector

6.2 Radio Description

Spec for Radio -

Radio Type	
Operating Frequency	902.104-902.296 MHz
Modulation	BPSK
Number of Channels	54
Antenna Type	Chip Antenna
Antenna Gain	-0.5 dBi
Antenna Connector Type	Attached to PCBA

6.3 EUT test modes/configuration Description

Test mode

Test Mode		Note
Test_mode_1	Transmitting continuously	-
Test_mode_2		-
Test_mode_3		-
Test_mode_4		-
Remark:		

6.4 EUT Photos - External



EUT Front View



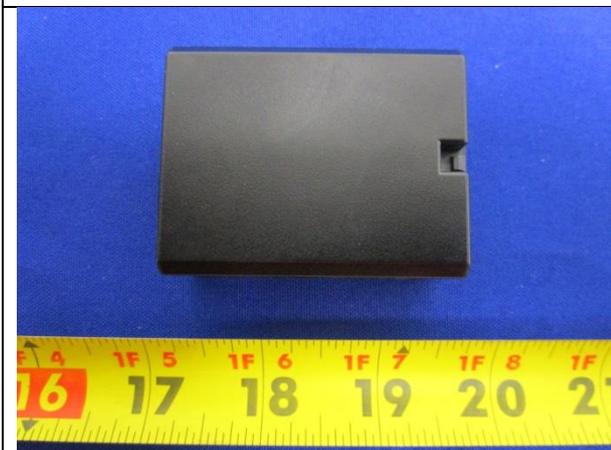
EUT Top View



EUT Left Side View



EUT Right Side View



EUT Bottom View



EUT Rear View

6.5 EUT Photos - Internal



EUT Open Chassis View

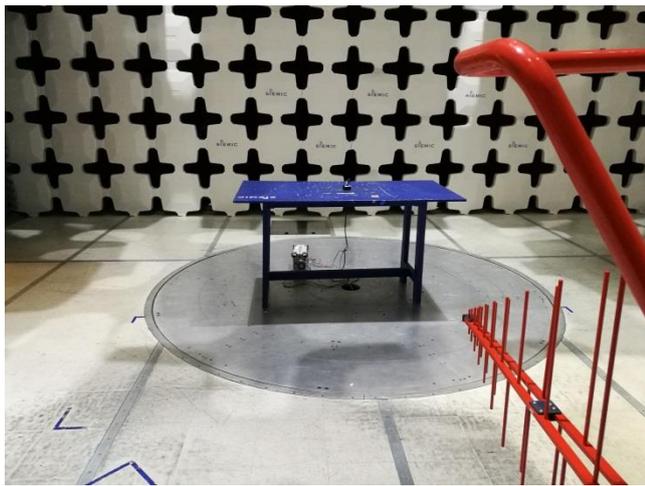


EUT Antenna Board - Top View

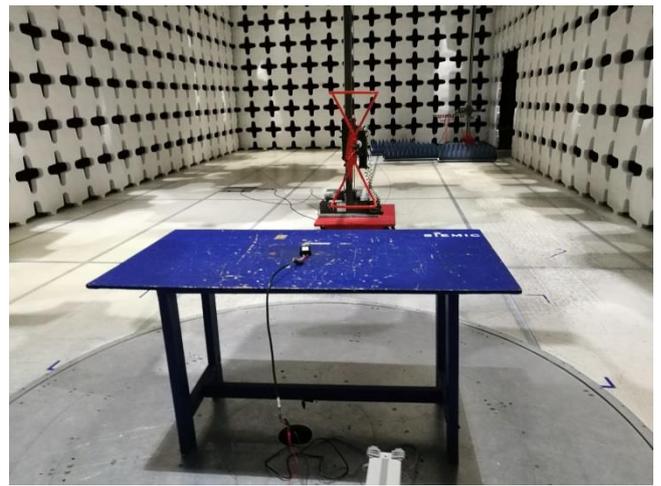


EUT Antenna Board - Bottom View

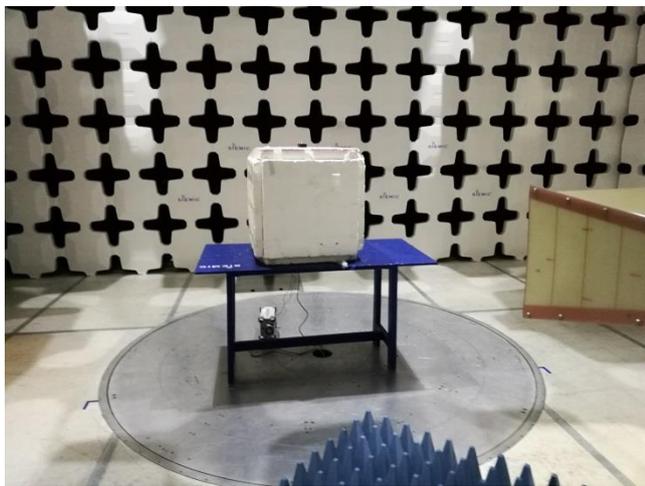
6.6 EUT Test Setup Photos



EUT Radiated Emissions (<1GHz) – Front View



EUT Radiated Emissions (<1GHz) – Rear View



EUT Radiated Emissions (>1GHz) – Front View



EUT Radiated Emissions (>1GHz) – Rear View

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	E555	SL10H42791	ThinkPad	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
USB	EUT	Pin	Laptop	USB	1	Unshielded	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	MSP-51001-e5	Set the EUT to test mode

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Occupied Bandwidth	FCC	15.247 (a)(1)	FCC	-	<input checked="" type="checkbox"/> Pass
	IC	RSS Gen Issue4(4.6)	IC	-	<input type="checkbox"/> N/A
20 dB Bandwidth	FCC	15.247 (a)(2)	FCC	FCC Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass
	IC	RSS247 (5.1.3)	IC	-	<input type="checkbox"/> N/A
Number of Hopping Channels	FCC	15.247 (a)(1)	FCC	-	<input checked="" type="checkbox"/> Pass
	IC	RSS247 (5.3)	IC	-	<input type="checkbox"/> N/A
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	FCC Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass
	IC	RSS247 (5.5)	IC	-	<input type="checkbox"/> N/A
Time of Occupancy	FCC	15.247 (a)(1)	FCC	FCC Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass
	IC	RSS247 (5.3.1)	IC	-	<input type="checkbox"/> N/A
Output Power	FCC	15.247(b)	FCC	FCC Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
	IC	RSS247 (5.4.1)	IC	-	
	IC	RSS247 (5.4)	IC	-	
	IC	RSS Gen Issue4(3.2)	IC	-	
Remark	<ol style="list-style-type: none"> All measurement uncertainties do not take into consideration for all presented test results. The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual. The EUT is a frequency hopping system. 				

9 Measurement Uncertainty

9.1 Radiated Emissions (30MHz to 1GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- NSA Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Filter Insertion Loss	0.25	Normal	2	1	0.125
Antenna Factor	0.65	Normal	2	1	0.325
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.86605081
PRF Response	1.5	Rectangular	1.732	1	0.86605081
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
NSA Calibration	4.0	U-Shape	1.414	1	2.8288543
Combined Standard Uncertainty					3.0059131
Expanded Uncertainty (K=2)					6.0118262

The total derived measurement uncertainty is +/- 6.00 dB.

9.2 Radiated Emissions (1GHz to 40GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- VSWR Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.0692840
Cable Insertion Loss	0.21	Normal	2	1	0.1050000
Filter Insertion Loss	0.25	Normal	2	1	0.1250000
Antenna Factor	0.65	Normal	2	1	0.3250000
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.8660508
PRF Response	1.5	Rectangular	1.732	1	0.8660508
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
VSWR Calibration	2.0	U-Shape	1.414	1	1.4144272
Combined Standard Uncertainty					4.2363
Expanded Uncertainty (K=2)					8.4726

The total derived measurement uncertainty is +/- 8.47 dB.

9.3 RF conducted measurement

The test is to measure the RF output power from the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the Reference Level Uncertainty
- Uncertainty of variable attenuators
- Uncertainty of cables
- Uncertainty due to the mismatches

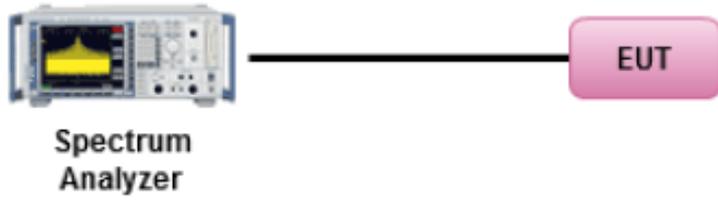
Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Reference Level	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Attenuator	0.25	Normal	2	1	0.125
Mismatch	0.25	U-Shape	1.414	1	0.1768033
Combined Standard Uncertainty					0.476087
Expanded Uncertainty (K=2)					0.952174

The total derived measurement uncertainty is +/- 0.95 dB.

10 Measurements, Examination and Derived Results

10.1 20dB Bandwidth & 99% Bandwidth

Requirement(s):

Spec	Requirement	Applicable									
47 CFR §15.247 (a) RSS-247 (5.1.3)	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.	<input checked="" type="checkbox"/>									
RSS Gen Issue 4.0 (4.6.1)	99% BW: For FCC reference only; required by IC.	<input checked="" type="checkbox"/>									
Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>										
Procedure	<p><u>20dB Emission bandwidth measurement procedure</u></p> <ol style="list-style-type: none"> 1. Set RBW \geq 1% of 20dB Bandwidth 2. Set the video bandwidth (VBW) \geq RBW. 3. Detector = Peak. 4. Trace mode = max hold. 5. Sweep = auto couple. 6. Allow the trace to stabilize. <p><u>99% Occupied bandwidth measurement procedure</u></p> <ul style="list-style-type: none"> - Allow the trace to stabilize. - Use the spectrum analyser built-in measurement function to determine the 99% OBW. <ul style="list-style-type: none"> o Set RBW = close to 1% of the selected span as is o Set VBW = 3 x RBW o Detector = Peak o Trace mode = max hold o Sweep = auto couple 										
Test Date	05/22/2017	<table border="0"> <tr> <td>Environmental condition</td> <td>Temperature</td> <td>24°C</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>46.3%</td> </tr> <tr> <td></td> <td>Atmospheric Pressure</td> <td>1019mbar</td> </tr> </table>	Environmental condition	Temperature	24°C		Relative Humidity	46.3%		Atmospheric Pressure	1019mbar
Environmental condition	Temperature	24°C									
	Relative Humidity	46.3%									
	Atmospheric Pressure	1019mbar									
Remark	-										
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail										

Test Data Yes N/A

Test Plot Yes N/A

Test was done by CIPHER at RF test site.

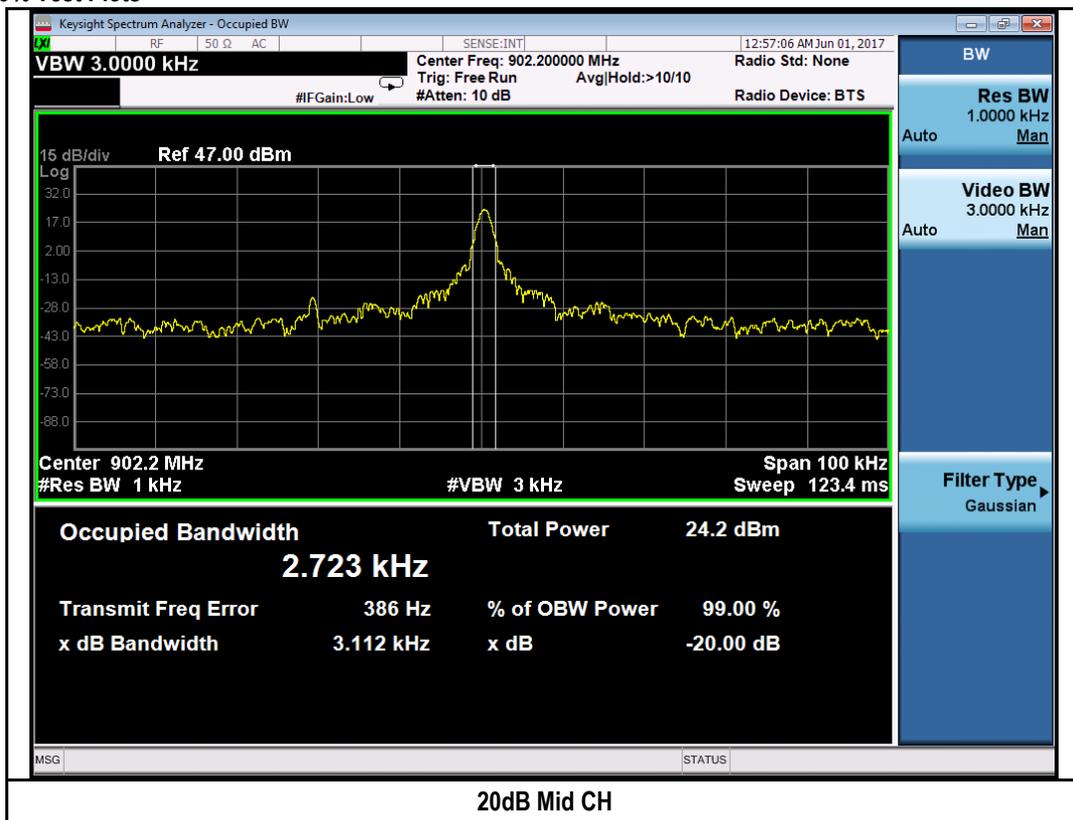
20dB Bandwidth Test Result

Type	Freq (MHz)	Test mode	CH	20dB Bandwidth (KHz)
20dB OBW	902.2	Con-TX	Mid	3.112

99% Bandwidth Test Result

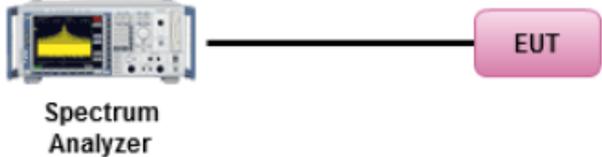
Type	Freq (MHz)	Test mode	CH	99% Bandwidth (KHz)
99% OBW	902.2	Con-TX	Mid	2.723

20 dB & 99% Test Plots



10.2 Number of Hopping Channel

Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.247 RSS-247 (5.3)	For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz	☒
Test Setup	 <p>Spectrum Analyzer ——— EUT</p>	
Procedure	<u>Number of hopping frequencies procedure</u> <ol style="list-style-type: none"> 1. The EUT must have its hopping function enabled 2. Span = the frequency band of operation. 3. Resolution (or IF) Bandwidth (RBW) \geq 1% of the span. 4. Video (or Average) Bandwidth (VBW) \geq RBW. 5. Detector = peak. 6. Sweep time = auto couple. 7. Trace mode = max hold. 8. Allow trace to fully stabilize. 9. Save the plot 	
Test Date	05/22/2017	Environmental condition Temperature 24°C Relative Humidity 46.3% Atmospheric Pressure 1019mbar
Remark	-	
Result	☒ Pass ☐ Fail	

Test Data ☒ Yes ☐ N/A

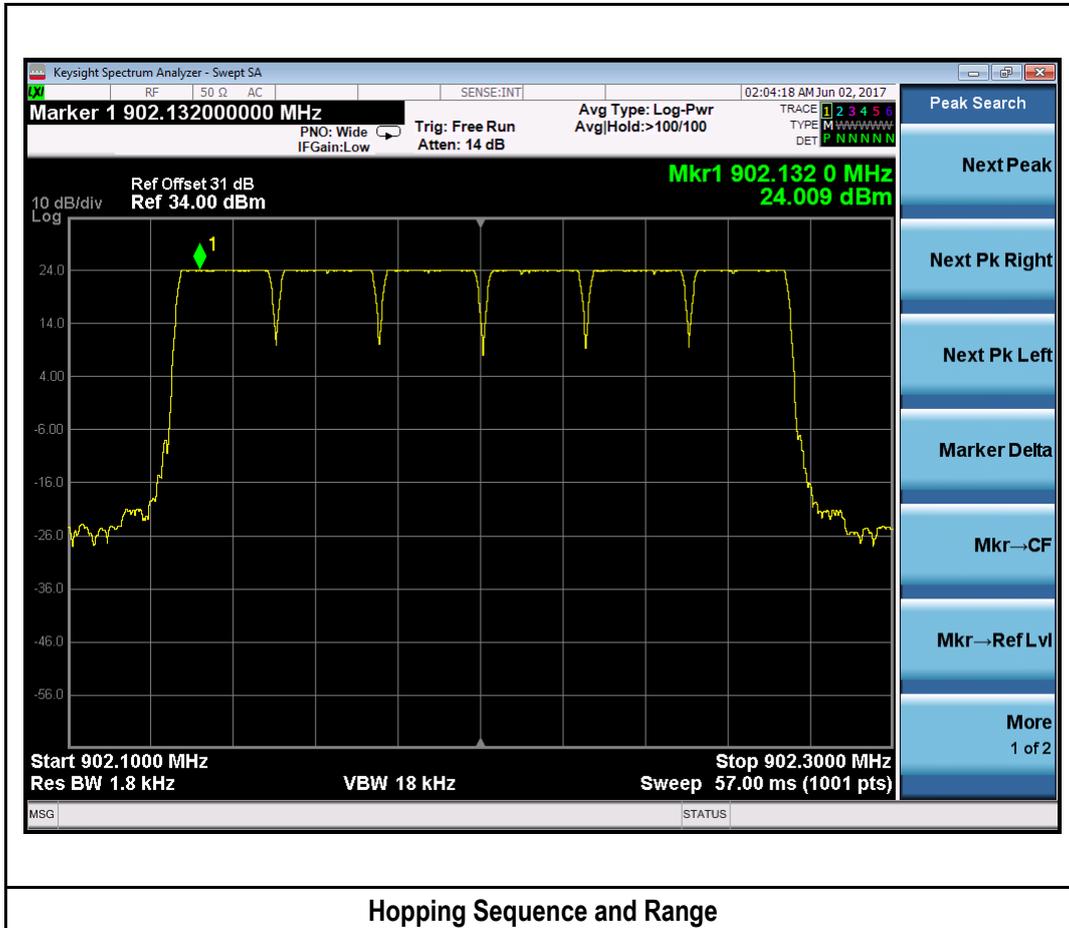
Test Plot ☒ Yes ☐ N/A

Test was done by CIPHER at RF test site.

Hopping Sequence measurement results

Freq (MHz)	Number of Hopping Channels
902.104-902.296	54

Test Plots



10.3 Peak Output Power

Requirement(s):

Spec	Requirement	Applicable									
47 CFR §15.247 (b) RSS-247 (5.4.1)	For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels. The power is converted from watt to dBm, therefore, 1 watt = 30 dBm.	<input checked="" type="checkbox"/>									
Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>										
Procedure	<p><u>Maximum output power measurement procedure</u></p> <ul style="list-style-type: none"> - Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel. - RBW > 1% of the 20 dB bandwidth of the emission being measured; - VBW >= RBW. - Detector = peak. - Sweep time = auto couple. - Trace mode = max hold. - Allow trace to fully stabilize. - Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power. 										
Test Date	05/22/2017	<table border="1"> <tr> <td>Environmental condition</td> <td>Temperature</td> <td>22.1°C</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>45.5%</td> </tr> <tr> <td></td> <td>Atmospheric Pressure</td> <td>1019mbar</td> </tr> </table>	Environmental condition	Temperature	22.1°C		Relative Humidity	45.5%		Atmospheric Pressure	1019mbar
Environmental condition	Temperature	22.1°C									
	Relative Humidity	45.5%									
	Atmospheric Pressure	1019mbar									
Remark	-										
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail										

Test Data Yes N/A

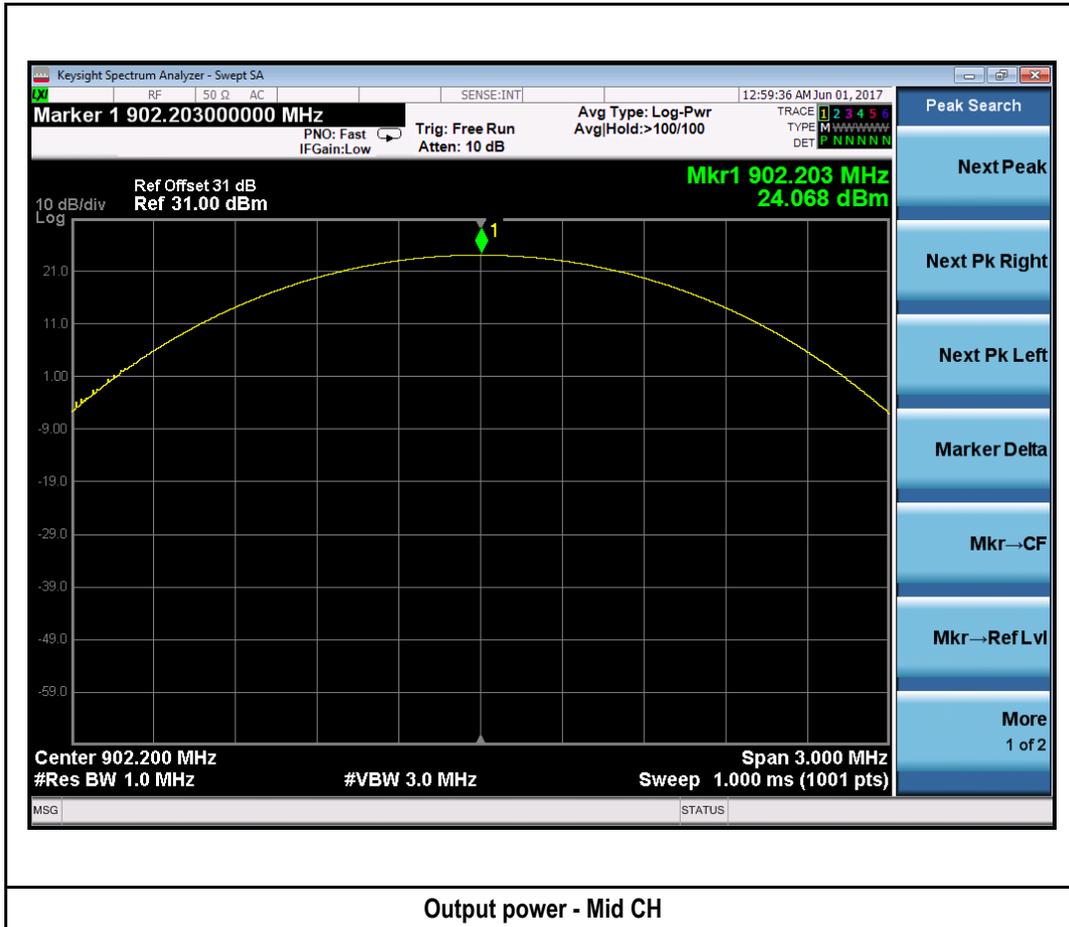
Test Plot Yes N/A

Test was done by CIPHER at RF test site.

Output Power Test Result

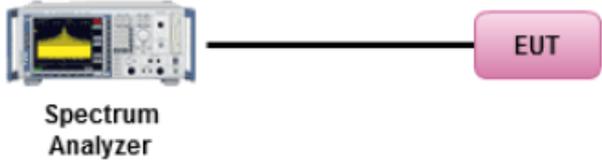
Type	Freq (MHz)	Test mode	CH	Peak Output Power (dBm)	Limit (dBm)	Result
Output power	902.2	Cont-TX	Mid	24.068	30	Pass

Test Plots



10.4 Time of Occupancy

Requirement(s):

Spec	Requirement	Applicable									
47 CFR §15.247 RSS-247 (5.3.1)	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz	<input checked="" type="checkbox"/>									
Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>										
Procedure	<u>Channel Separation procedure</u> <ol style="list-style-type: none"> 1. The EUT must have its hopping function enabled. 2. Span = zero span 3. centered on a hopping channel 4. RBW = 1 MHz; VBW >= RBW 5. Sweep = as necessary to capture the entire dwell time per hopping channel. 6. Detector = Peak. 7. Trace mode = max hold. 8. If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. 										
Test Date	05/22/2017	<table border="1"> <tr> <td>Environmental condition</td> <td>Temperature</td> <td>23°C</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>45%</td> </tr> <tr> <td></td> <td>Atmospheric Pressure</td> <td>1019mbar</td> </tr> </table>	Environmental condition	Temperature	23°C		Relative Humidity	45%		Atmospheric Pressure	1019mbar
Environmental condition	Temperature	23°C									
	Relative Humidity	45%									
	Atmospheric Pressure	1019mbar									
Remark	Dwell Time equals to the number of repetition times in each channel in 20 seconds multiply by the time of occupancy in each hopping frequency.										
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail										

Test Data Yes N/A

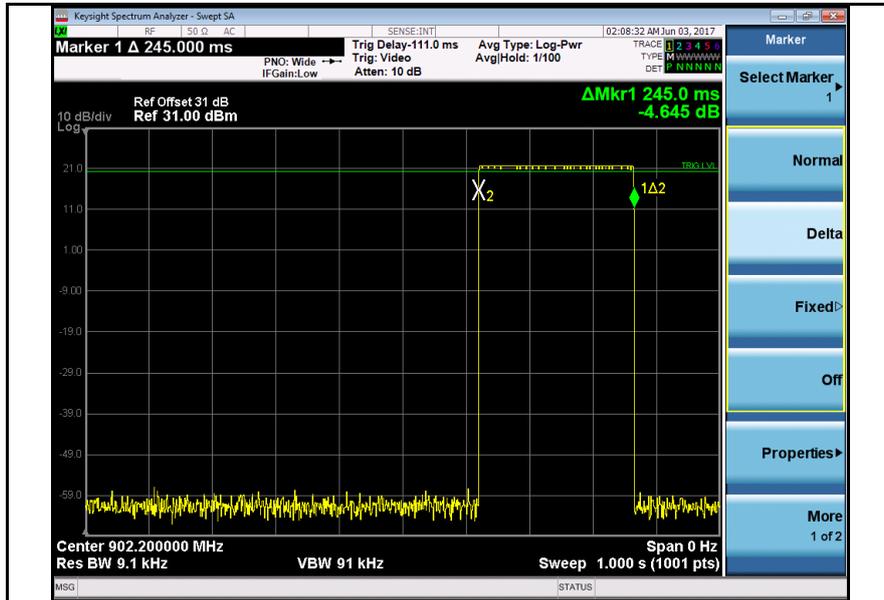
Test Plot Yes N/A

Test was done by CIPHER at RF test site.

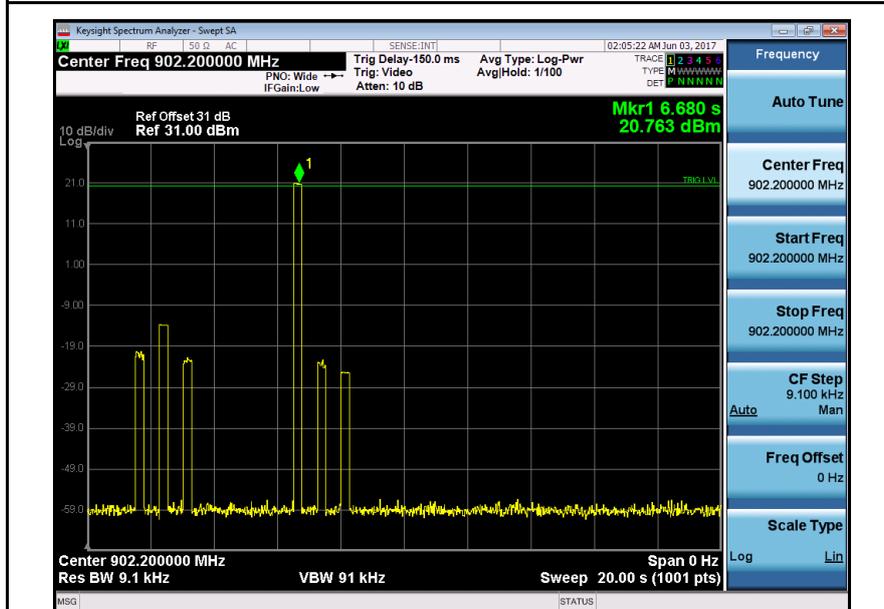
Dwell Time Test Result

Mode	Frequency (MHz)	Type	Measurement (Sec)	Calculated Dwell Time(Sec)	Limit (Sec)
TX	902.2	Single Pulse time (Sec)	0.245	0.245	0.4
TX	902.2	Cycle time(Sec)	0.245		

Test Plots

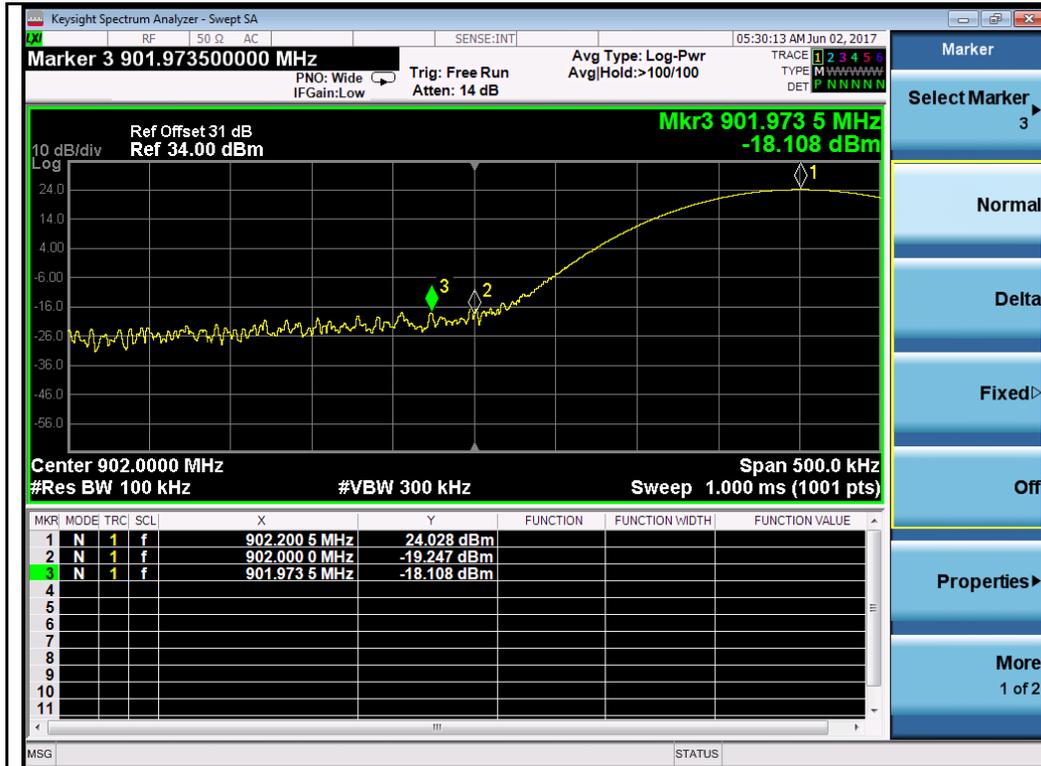


Single Pulse Time

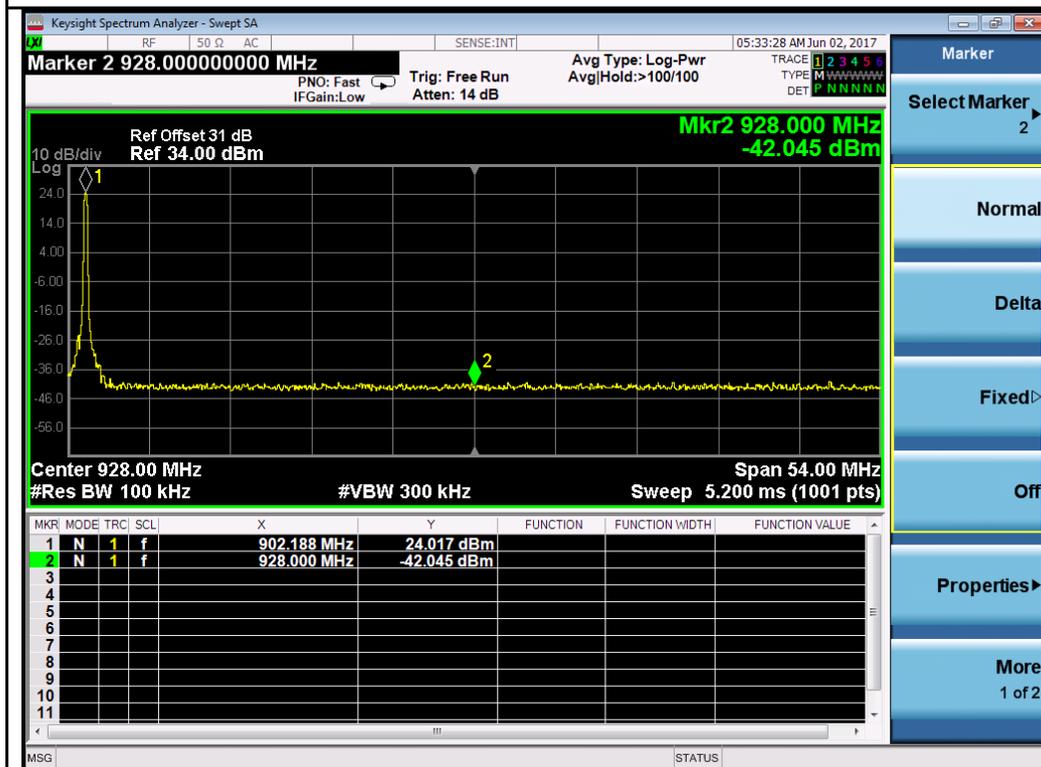


Cycle Time 20S

Test Plots



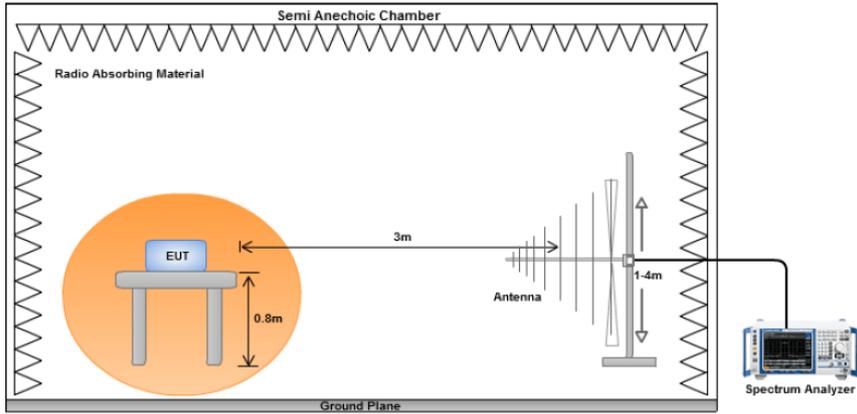
Band Edge-Mid CH



Band Edge-Mid CH

10.6 Radiated Emissions below 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable												
47CFR§15.247(d), RSS247(5.5)	a)	Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table: The tighter limit applies at the band edges	☒												
		<table border="1"> <thead> <tr> <th>Frequency range (MHz)</th> <th>Field Strength (uV/m)</th> <th>Measurement Distance (m)</th> </tr> </thead> <tbody> <tr> <td>30 – 88</td> <td>100</td> <td>3</td> </tr> <tr> <td>88 – 216</td> <td>150</td> <td>3</td> </tr> <tr> <td>216 – 960</td> <td>200</td> <td>3</td> </tr> <tr> <td>Above 960</td> <td>500</td> <td>3</td> </tr> </tbody> </table>		Frequency range (MHz)	Field Strength (uV/m)	Measurement Distance (m)	30 – 88	100	3	88 – 216	150	3	216 – 960	200	3
Frequency range (MHz)	Field Strength (uV/m)	Measurement Distance (m)													
30 – 88	100	3													
88 – 216	150	3													
216 – 960	200	3													
Above 960	500	3													
Test Setup															
Procedure		<ol style="list-style-type: none"> The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. The EUT was then rotated to the direction that gave the maximum emission. Finally, the antenna height was adjusted to the height that gave the maximum emission. A Quasi-peak measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured. 													
Remark		The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.													
Result		☒ Pass ☐ Fail													

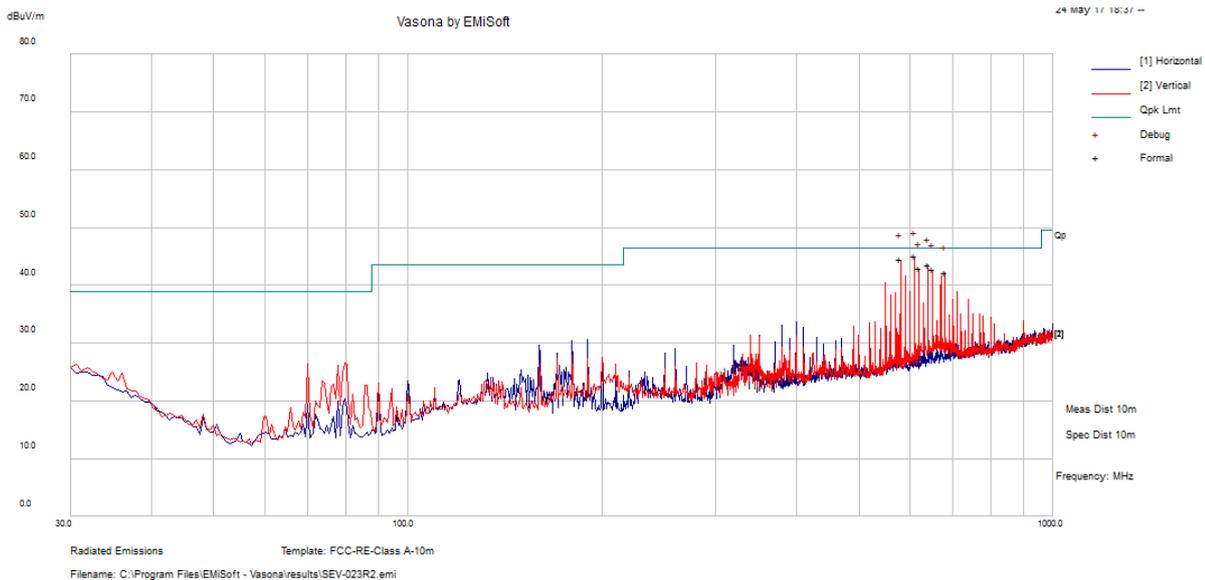
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Anish Kumar at 10 meter Chamber.

Radiated Emission Test Results (Below 1GHz)

Test specification	below 1GHz		Result	Pass
Environmental Conditions:	Temp (°C):	22.7		
	Humidity (%):	45.7		
	Atmospheric (mbar):	1011.5		
Mains Power:	12Vdc			
Tested by:	Anish Kumar			
Test Date:	5/22/2017			
Remarks:	Tx at 902.2MHz			

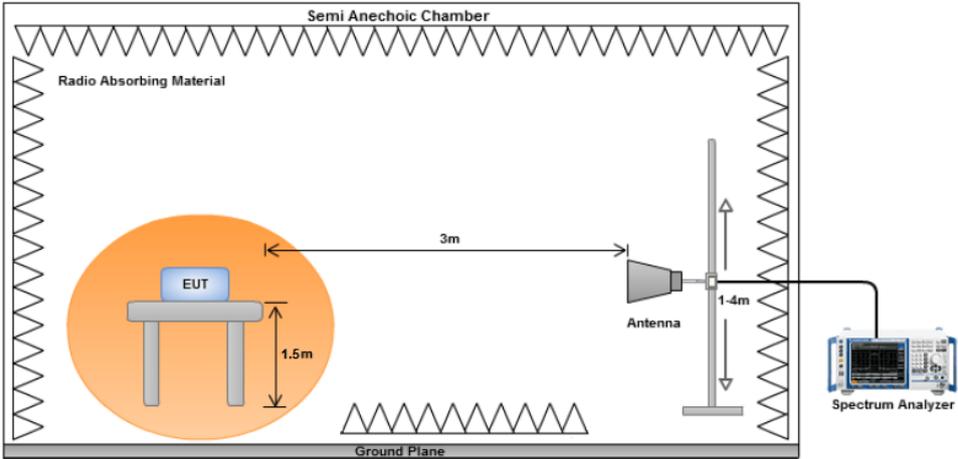


30MHz – 1000MHz at 3 meters

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
609.96	48.34	13.98	-17.19	45.14	Quasi Max	V	267	340	46.40	-1.26	Pass
579.95	47.78	13.90	-17.16	44.52	Quasi Max	V	290	330	46.40	-1.88	Pass
639.94	45.89	14.11	-16.38	43.62	Quasi Max	V	228	346	46.40	-2.78	Pass
619.95	46.02	14.03	-16.94	43.1	Quasi Max	V	274	346	46.40	-3.30	Pass
649.95	44.97	14.15	-16.30	42.82	Quasi Max	V	225	339	46.40	-3.58	Pass
679.95	43.89	14.26	-15.86	42.29	Quasi Max	V	237	341	46.40	-4.11	Pass

10.7 Radiated Spurious Emissions above 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d), RSS247 (5.5)	a)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required <input checked="" type="checkbox"/> 20 dB down <input type="checkbox"/> 30 dB down	<input checked="" type="checkbox"/>
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	<input checked="" type="checkbox"/>
Test Setup			
Procedure	<ol style="list-style-type: none"> The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. The EUT was then rotated to the direction that gave the maximum emission. Finally, the antenna height was adjusted to the height that gave the maximum emission. An average measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured. 		
Remark	The EUT was scanned up to 40GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case. There isn't outstanding emission found at the edge of restricted frequency.		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data Yes (See below) N/A

Test Plot Yes (See below) N/A

Test was done by Anish Kumar at 10 meter Chamber.

Radiated Emission Test Results (Above 1GHz)

Test specification	Above 1GHz		Result	Pass
Environmental Conditions:	Temp (°C):	22.7		
	Humidity (%)	44.7		
	Atmospheric (mbar):	1011.5		
Mains Power:	12Vdc			
Tested by:	Anish Kumar			
Test Date:	5/22/2017			
Remarks:	Tx at 902.2MHz			

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
7285.61	36.77	4.09	0.09	40.95	Peak Max	V	139	87	74	-33.05	Pass
4921.05	42.29	5.43	-5.14	42.58	Peak Max	H	117	196	74	-31.42	Pass
7276.91	38.69	4.1	0.08	42.87	Peak Max	V	119	94	74	-31.13	Pass
4856.54	42.09	5.35	-5.06	42.39	Peak Max	H	182	166	74	-31.61	Pass
7292.13	35.95	4.09	0.1	40.14	Peak Max	V	128	126	74	-33.86	Pass
7377.02	35.47	4.06	-0.21	39.32	Peak Max	H	376	340	74	-34.68	Pass
7285.61	23.21	4.09	0.09	27.4	Average Max	V	139	87	54	-26.6	Pass
4921.05	24.4	5.43	-5.14	24.69	Average Max	H	117	196	54	-29.31	Pass
7276.91	23.16	4.1	0.08	27.33	Average Max	V	119	94	54	-26.67	Pass
4856.54	24.22	5.35	-5.06	24.52	Average Max	H	182	166	54	-29.48	Pass
7292.13	22.92	4.09	0.1	27.11	Average Max	V	128	126	54	-26.89	Pass
7377.02	22.79	4.06	-0.21	26.63	Average Max	H	376	340	54	-27.37	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESIB 40	100179	05/23/2015	1 Year	05/23/2016	<input checked="" type="checkbox"/>
CHASE LISN	MN2050B	1018	08/07/2015	1 Year	08/07/2016	<input checked="" type="checkbox"/>
Radiated Emissions						
R & S Receiver	ESL6	100178	05/27/2015	1 Year	05/27/2016	<input checked="" type="checkbox"/>
R & S Receiver	ESIB 40	100179	05/23/2015	1 Year	05/23/2016	<input checked="" type="checkbox"/>
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	03/04/2016	1 Year	03/04/2017	<input checked="" type="checkbox"/>
Preamplifier (100KHz-7GHz)	LPA-6-30	11140711	02/19/2016	1 Year	02/19/2017	<input checked="" type="checkbox"/>
ETS-Lingren Loop Antenna	6512	00049120	05/12/2015	1 Year	05/12/2016	<input type="checkbox"/>
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	08/12/2015	1 Year	08/12/2016	<input checked="" type="checkbox"/>
Horn Antenna (1-26.5GHz)	3115	10SL0059	08/25/2015	1 Year	08/25/2016	<input checked="" type="checkbox"/>
Tuned Dipole Antenna 30 - 1000 MHz (4pcs set)	AD-100	40133	10/02/2015	1 Year	10/02/2016	<input type="checkbox"/>
3 Meters SAC	3M	N/A	08/08/2015	1 Year	08/08/2016	<input checked="" type="checkbox"/>
10 Meters SAC	10M	N/A	09/05/2015	1 Year	09/05/2016	<input checked="" type="checkbox"/>
RF Conducted Measurement						
Spectrum Analyzer	N9010A	10SL0219	08/20/2015	1 Year	08/20/2016	<input checked="" type="checkbox"/>
Agilent Signal Generator	MXG N5182A	MY47071065	04/06/2015	1 Year	04/06/2016	<input type="checkbox"/>
R & S Receiver	ESIB 40	100179	05/23/2015	1 Year	05/23/2016	<input type="checkbox"/>
Test Equity Environment Chamber	1007H	61201	07/31/2015	1 Year	07/31/2016	<input type="checkbox"/>
USB RF Power Sensor	7002-006	10SL0190	09/03/2015	1 Year	09/03/2016	<input type="checkbox"/>

Annex B. SIEMIC Accreditation

Accreditations	Document	Scope / Remark
ISO 17025 (A2LA)		Please see the documents for the detailed scope
ISO Guide 65 (A2LA)		Please see the documents for the detailed scope
TCB Designation		A1, A2, A3, A4, B1, B2, B3, B4, C
FCC DoC Accreditation		FCC Declaration of Conformity Accreditation
FCC Site Registration		3 meter site
FCC Site Registration		10 meter site
IC Site Registration		3 meter site
IC Site Registration		10 meter site
EU NB		Radio Equipment: EN45011: EN ISO/IEC 17065
		Electromagnetic Compatibility: EN45011 – EN ISO/IEC 17065
Singapore iDA CB(Certification Body)	 	Phase I, Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
Hong Kong OFCA		(Phase II) OFCA Foreign Certification Body for Radio and Telecom
		(Phase I) Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		Radio: Scope A – All Radio Standard Specification in Category I
		Telecom: CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		<p>Radio: A1. Terminal equipment for purpose of calling</p> <p>Telecom: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law</p>
Korea CAB Accreditation		<p>EMI: KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI</p> <p>EMS: KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS</p>
		<p>Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68</p> <p>Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4</p>
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		<p>R-3083: Radiation 3 meter site</p> <p>C-3421: Main Ports Conducted Interference Measurement</p> <p>T-1597: Telecommunication Ports Conducted Interference Measurement</p>
Australia CAB Recognition		<p>EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4</p>
		<p>Radiocommunications: AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771</p> <p>Telecommunications: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1</p>
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016, AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2