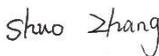
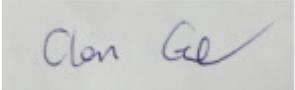


# RF TEST REPORT



Report No.: FCC\_RF\_SL16072901-ICA-001 (without photos) Rev 1.0  
Supersede Report No.: FCC\_RF\_SL16072901-ICA-001 (without photos)

Applicant	Icarus Aviation Ltd
Product Name	Nautilus LifeLine Marine Rescue GPS
Model No.	MOB
Test Standard	RTCM SC11901
Test Method	RTCM SC11901
Date of test	09/30/2016 to 10/14/2016
Issue Date	10/18/2016
Test Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Equipment complied with the specification	[ x ]
Equipment did not comply with the specification	[ ]
This Test Report is Issued Under the Authority of:	
	
Shuo Zhang	Chen Ge
Test Engineer	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  
775 Montague Expressway, Milpitas, CA 95035



775 Montague Expressway, Milpitas, CA 95035, USA • Phone: (+1) 408 526 1188 • Facsimile (+1) 408 526 1088

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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	EMC, RF/Wireless, Telecom, Safety
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_RF_SL16072901-ICA-001 (without photos)	None	Original	10/18/2016
FCC_RF_SL16072901-ICA-001 (without photos) Rev 1.0	Updated product name	Rev 1.0	12/01/2016

## 2 Executive Summary

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

Company: Icarus Aviation Ltd  
Product: Nautilus LifeLine Marine Rescue GPS  
Model: MOB

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1<sup>st</sup> page.

## 3 Customer information

Applicant Name	:	Icarus Aviation Ltd
Applicant Address	:	17, 11191, HORSESHOE WAY
Manufacturer Name	:	Icarus Aviation Ltd
Manufacturer Address	:	17, 11191, HORSESHOE WAY

## 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	:	Nautilus LifeLine Marine Rescue GPS
Model No.	:	MOB
Trade Name	:	ICARUS AVIATION
Serial No.	:	N/A
Input Power	:	6VDC
Date of EUT received	:	09/20/2016
Equipment Class/ Category	:	MSLD
Working Frequencies	:	156.525 MHz, 161.975MHz, 162.025MHz
Port/Connectors	:	6-pin, 3pin serial
Remarks	:	N/A

### 6.2 Radio Description

#### Specifications for Radio:

Radio Type	DSC/AIS
Operating Frequency	156.525 MHz, 161.975MHz, 162.025MHz
Number of Channels	3
Antenna Type	Vertically polarized monopole
Antenna Gain	0 dBi
Antenna Connector Type	Integrated

### 6.3 EUT test modes/configuration Description

Mode		Note
Pre_test_mode_1	RF test	EUT is set to continuously transmit
Pre_test_mode_2		
Pre_test_mode_3		

## 7 Supporting Equipment/Software and cabling Description

### 7.1 Supporting Equipment

Index	Supporting Equipment Description	Model	Serial No	Manu	Note
1	Laptop	E5410	N/A	Dell	-

### 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	USB	Laptop	USB	1M	N/A	-

### 7.3 Test Software Description

Test Item	Software	Description
RF Testing	TereTerm	Set the EUT to continuous transmit

## 8 Test Summary

For DSC:

Test Item	Test standard	Test Method/Procedure	Pass / Fail
Frequency Error	RTCM SC11901 Annex A	RTCM SC11901 Annex A	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Carrier Power	RTCM SC11901 Annex A	RTCM SC11901 Annex A	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Adjacent Channel Power	RTCM SC11901 Annex A	RTCM SC11901 Annex A	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Conducted Spurious emissions	RTCM SC11901 Annex A	RTCM SC11901 Annex A	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Cabinet Radiated Spurious emissions	RTCM SC11901 Annex A	RTCM SC11901 Annex A	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Remark	1. All measurement uncertainties do not take into consideration for all presented test results. 2. 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.		

For AIS:

Test Item	Test standard	Test Method/Procedure	Pass / Fail
Frequency Error	RTCM SC11901 Annex E	RTCM SC11901 Annex E	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Carrier Power	RTCM SC11901 Annex E	RTCM SC11901 Annex E	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Radiated Power	RTCM SC11901 Annex E	RTCM SC11901 Annex E	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Modulation spectrum slotted transmission	RTCM SC11901 Annex E	RTCM SC11901 Annex E	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Conducted Spurious emissions	RTCM SC11901 Annex E	RTCM SC11901 Annex E	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Cabinet Radiated Spurious emissions	RTCM SC11901 Annex E	RTCM SC11901 Annex E	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Remark	1. All measurement uncertainties do not take into consideration for all presented test results. 2. 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.		

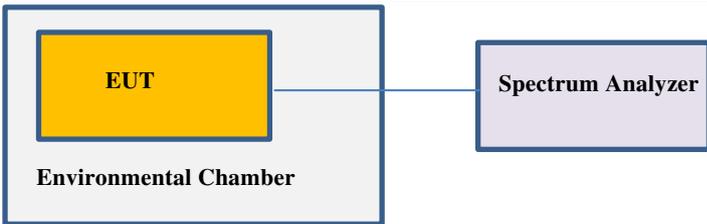
## 9 Measurement Uncertainty

Emissions			
Test Item	Frequency Range	Description	Uncertainty
Radiated Spurious Emissions	150 kHz – 1GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
Radiated Spurious Emissions	1GHz – 40GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+4.3dB/-4.1dB

## 10 Measurements, Examination and Derived Results

### 10.1 Frequency Error

Requirement(s):

Spec	Requirement	Applicable
RTCM SC11901 Annex A	The frequency error under normal conditions shall not exceed $\pm 1.5$ kHz, and under extreme test Conditions shall not exceed $\pm 1.5$ kHz.	<input checked="" type="checkbox"/>
RTCM SC11901 Annex E	The frequency error under normal conditions shall not exceed $\pm 500$ Hz, and under extreme test Conditions shall not exceed $\pm 1$ kHz.	
Test Setup		
Procedure	1. CW Tx 2. Set the center and span enough to clearly see the transmitting frequency 3. Record the value	
Remark	-	
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 Chen Ge at RF Test Site.**

**Test Result:**

**DSC:**

Type	Condition	Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Measured frequency Error (Hz)	Max Allowed(Hz)
Center frequency	25°C	6.0	156.5250	156.5251	100	1500
	-25°C	6.9	156.5250	156.5251	100	1500
	-25°C	5.1	156.5250	156.5251	100	1500
	55°C	6.9	156.5250	156.5252	200	1500
	55°C	5.1	156.5250	156.5252	200	1500

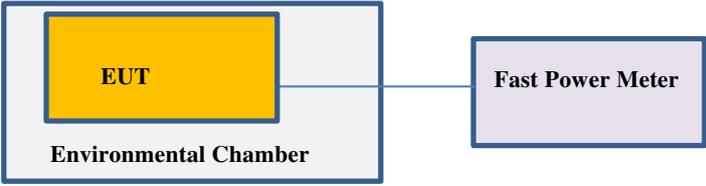
**AIS:**

Type	Condition	Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Measured frequency Error (Hz)	Max Allowed(Hz)
Center frequency	25°C	6.0	161.9750	161.9749	-100	500
	-25°C	6.9	161.9750	161.9749	-100	1000
	-25°C	5.1	161.9750	161.9749	-100	1000
	55°C	6.9	161.9750	161.9749	-100	1000
	55°C	5.1	161.9750	161.9749	-100	1000

Type	Condition	Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Measured frequency Error (Hz)	Max Allowed(Hz)
Center frequency	25°C	6.0	162.0250	162.0251	100	500
	-25°C	6.9	162.0250	162.0251	100	1000
	-25°C	5.1	162.0250	162.0251	100	1000
	55°C	6.9	162.0250	162.0251	100	1000
	55°C	5.1	162.0250	162.0251	100	1000

## 10.2 Carrier Power

### Requirement(s):

Spec	Requirement	Applicable									
RTCM SC11901 Annex A	Normal: With the output power set at maximum, the carrier power shall remain between 0.1 W and 0.5 W and be within $\pm 1.5$ dB of the rated output power under normal test conditions. The output power shall never however drop below 0.1 W.  Extreme: With the output power set at maximum, the carrier power shall remain between 0.1 W and 0.5 W and be within +2 dB, -3 dB of the rated output power under extreme conditions. The output power shall never however drop below 0.1 W.	<input checked="" type="checkbox"/>									
RTCM SC11901 Annex E	The conducted power corrected for antenna gain shall be at least 27dBm	<input checked="" type="checkbox"/>									
Test Setup											
Procedure	The transmitter shall be connected to an artificial antenna and the power delivered to this artificial antenna shall be measured. The measurements shall be made on channel 70, under normal test conditions (subclause 8.1.1.1) and under extreme test conditions (subclause 8.1.1.2).										
Test Date	10/11/2016	<table border="1"> <tr> <td>Environmental condition</td> <td>Temperature</td> <td>24°C</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>52%</td> </tr> <tr> <td></td> <td>Atmospheric Pressure</td> <td>1009mbar</td> </tr> </table>	Environmental condition	Temperature	24°C		Relative Humidity	52%		Atmospheric Pressure	1009mbar
Environmental condition	Temperature	24°C									
	Relative Humidity	52%									
	Atmospheric Pressure	1009mbar									
Remark	-										
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail										

Test Data     Yes                       N/A

Test Plot     Yes (See below)             N/A

Test was done by **Chen Ge** at RF Test Site.

**Test Results**

**DSC:**

Type	Condition	Voltage	Frequency (MHz)	Power (dBm)	Limit (dBm)
Center frequency	25°C	6.0	156.525	26.42	20 - 27
	-25°C	6.9	156.525	26.79	20 - 27
	-25°C	5.1	156.525	26.74	20 - 27
	55°C	6.9	156.525	25.98	20 - 27
	55°C	5.1	156.525	25.79	20 - 27

**AIS: (Antenna Gain = 0dBi)**

Type	Condition	Voltage	Frequency (MHz)	Power (dBm)	Limit (dBm)
Center frequency	25°C	6.0	161.975	27.96	>27
	-25°C	6.9	161.975	28.54	>27
	-25°C	5.1	161.975	28.25	>27
	55°C	6.9	161.975	27.58	>27
	55°C	5.1	161.975	27.65	>27

Type	Condition	Voltage	Frequency (MHz)	Power (dBm)	Limit (dBm)
Center frequency	25°C	6.0	162.025	27.87	>27
	-25°C	6.9	162.025	28.26	>27
	-25°C	5.1	162.025	28.19	>27
	55°C	6.9	162.025	27.68	>27
	55°C	5.1	162.025	27.77	>27

### 10.3 Radiated Power

**Requirement(s):**

Spec	Requirement	Applicable									
RTCM SC11901 Annex E	The radiated power shall be at least 27dBm	<input checked="" type="checkbox"/>									
Test Setup											
Procedure	<p>a) The test antenna shall be raised and lowered through the specified range of heights until a maximum signal level is detected on the measuring receiver.</p> <p>b) The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.</p> <p>c) The maximum signal level detected by the measuring receiver shall be noted.</p> <p>d) The transmitter shall be replaced by a calibrated antenna (substitution antenna) and calibrated RF source.</p> <p>e) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the spurious component detected.</p> <p>f) The substitution antenna shall be connected to a calibrated signal generator.</p> <p>g) The frequency of the calibrated signal generator shall be set to the frequency of the spurious component detected.</p> <p>h) The input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver, if necessary.</p> <p>i) The test antenna shall be raised and lowered through the specified range of heights to ensure that the maximum signal is received.</p> <p>j) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver that is equal to the level noted while the spurious component was measured, corrected for the change of input attenuator setting of the measuring receiver.</p> <p>k) The input level to the substitution antenna shall be recorded as power level, corrected for the change of input attenuator setting of the measuring receiver.</p> <p>l) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.</p> <p>m) The measure of the effective radiated power of the spurious components is larger of the two power levels recorded for spurious component at the input to the substitution antenna, corrected for the gain of the antenna if necessary;</p>										
Test Date	10/11/2016	<table border="0"> <tr> <td>Environmental condition</td> <td>Temperature</td> <td>24°C</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>52%</td> </tr> <tr> <td></td> <td>Atmospheric Pressure</td> <td>1009mbar</td> </tr> </table>	Environmental condition	Temperature	24°C		Relative Humidity	52%		Atmospheric Pressure	1009mbar
Environmental condition	Temperature	24°C									
	Relative Humidity	52%									
	Atmospheric Pressure	1009mbar									
Remark	-										
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail										

**Test Data**    Yes                       N/A

**Test Plot**    Yes (See below)                       N/A

**Test was done by Chen Ge at 10 meter Chamber.**

**Test Result (Worst case)**

**AIS:**

Frequency (MHz)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
161.975	41	150	V	161.975	27.98	0	0.23	27.75	>27
162.025	41	150	V	162.025	27.81	0	0.23	27.58	>27

## 10.4 Adjacent Channel Power

### Requirement(s):

Spec	Requirement	Applicable									
RTCM SC11901 Annex A	The adjacent channel power shall not exceed a value of 70 dB below the carrier power of the transmitter without any need to be below 0.2 $\mu$ W.	<input checked="" type="checkbox"/>									
Test Setup											
Procedure	<p>The adjacent channel power can be measured with a power measuring receiver (referred to in this subclause as the "receiver") which conforms to ITU-R Recommendation SM 332-4:</p> <p>a) The transmitter shall be operated with the output power at maximum under normal test conditions. The output of the transmitter shall be linked to the input of the "receiver" by a connecting device such that the impedance presented to the transmitter is 50 ohms and the level at the "receiver" input is appropriate.</p> <p>b) With the transmitter unmodulated, the tuning of the "receiver" shall be adjusted so that a maximum response is obtained. This is the 0 dB response point. The "receiver" attenuator setting and the reading of the meter shall be recorded.</p> <p>c) The tuning of the "receiver" shall be adjusted away from the carrier so that the "receiver" -6 dB response nearest to the transmitter carrier frequency is located at a displacement from the nominal carrier frequency of 17 kHz.</p> <p>d) The transmitter shall be modulated with 1.25 kHz at a level which is 20 dB higher than that required to produce <math>\pm 3</math> kHz deviation.</p> <p>e) The "receiver" variable attenuator shall be adjusted to obtain the same meter reading as in step b) or a known relation to it.</p> <p>f) The ratio of adjacent channel power to carrier power is the difference between the attenuator settings in steps b) and e), corrected for any differences in the reading of the meter.</p> <p>g) The measurement shall be repeated with the "receiver" tuned to the other side of the carrier. The measurement may be made with the transmitter modulated with normal test modulation, in which case this fact shall be recorded with the test results.</p>										
Test Date	10/11/2016	<table border="1"> <tr> <td>Environmental condition</td> <td>Temperature</td> <td>24°C</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>46%</td> </tr> <tr> <td></td> <td>Atmospheric Pressure</td> <td>1008mbar</td> </tr> </table>	Environmental condition	Temperature	24°C		Relative Humidity	46%		Atmospheric Pressure	1008mbar
Environmental condition	Temperature	24°C									
	Relative Humidity	46%									
	Atmospheric Pressure	1008mbar									
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 **Chen Ge** at RF test site.

**Test Result**

**DSC:**

Frequency (MHz)	ACP (dBc)	Limit (dBc)	Result
156.500	-71.3	-70	Pass
156.550	-70.5	-70	Pass

### 10.5 Modulation spectrum slotted transmission

**Requirement(s):**

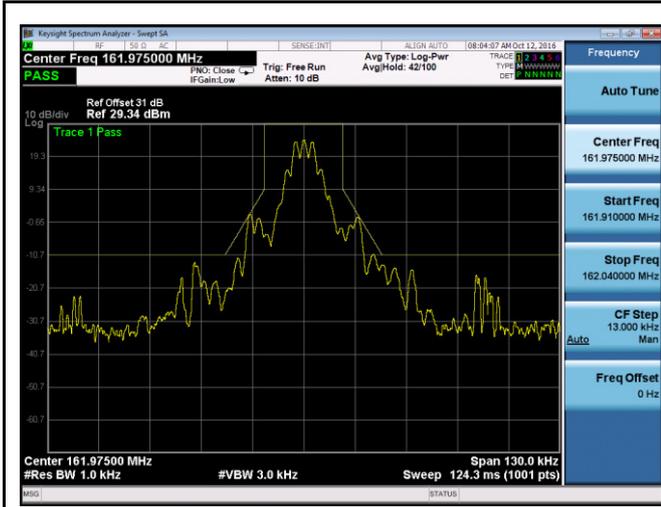
Spec	Requirement	Applicable
RTCM SC11901 Annex E		<input checked="" type="checkbox"/>
Procedure	<p>The transmitter shall be connected to an artificial antenna (see clause 6.4) with a means of measuring the power delivered to the load. The equipment shall be operated from the test power source (clause 6.7.2). Standard test signal number 3 (see clause 6.5.3) shall be used to modulate the transmitter in repeated packets. The measurement shall be made under normal test conditions.</p> <p>To determine the reference peak power and measure the emissions in the adjacent channels, the emission is suitably applied to the input of a spectrum analyser with the following preferred settings:</p> <ul style="list-style-type: none"> <li>• Resolution bandwidth: 1 kHz;</li> <li>• Video bandwidth: 3 kHz;</li> <li>• Scan bandwidth: 150 kHz;</li> <li>• Centre frequency: Carrier frequency AIS1 and AIS2;</li> <li>• Detector type: Peak hold.</li> </ul> <p>A sufficient number of sweeps shall be used and sufficient transmission packets measured to ensure that the emission profile is fully developed. A reference carrier power shall be calculated as being the maximum power within the frequency limits set in clause 8.1.3. The emission profile shall then be normalized so that the reference carrier power is set to 0 dBc. The result is compared to the mask given in figure 4.</p>	
Remark	-	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	

Test Data     Yes                       N/A

Test Plot     Yes (See below)               N/A

Test was done by **Chen Ge** at RF Test Site.

**Test Plots**



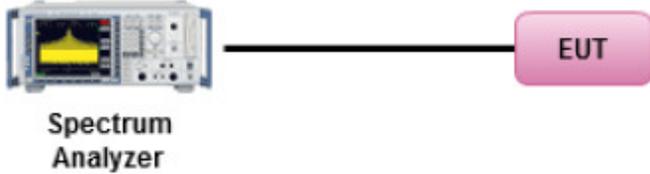
**AIS-1 161.975MHz**



**AIS-2 162.025MHz**

## 10.6 Conducted Spurious Emissions

### Requirement(s):

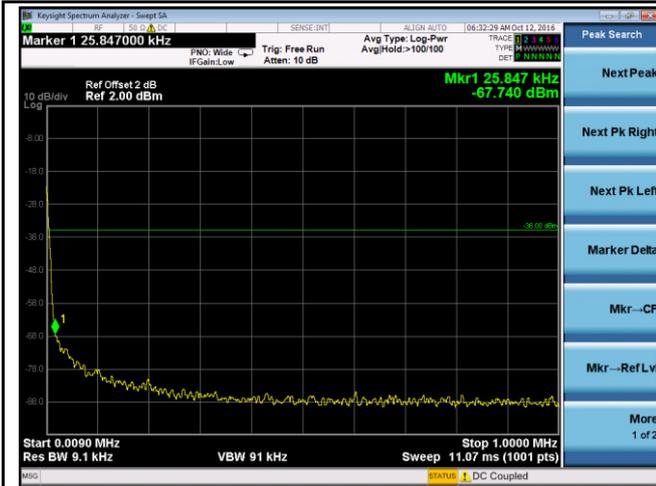
Spec	Requirement	Applicable									
RTCM SC11901 Annex A Annex E	The power of any conducted spurious emission on any discrete frequency shall not exceed 0.25 $\mu$ W.	<input checked="" type="checkbox"/>									
Test Setup	 <p>The diagram shows a Spectrum Analyzer on the left connected by a black line to a pink rounded rectangle labeled 'EUT' on the right. Below the Spectrum Analyzer is the text 'Spectrum Analyzer'.</p>										
Procedure	Conducted spurious emissions shall be measured with the unmodulated transmitter connected to the artificial antenna. The measurements shall be made over a range from 9 kHz to 2 GHz, excluding the channel on which the transmitter is operating and its adjacent channels. The measurements for each spurious emission shall be made using a tuned radio measuring instrument or a spectrum analyzer.										
Test Date	10/11/2016	<table border="1"> <tr> <td>Environmental condition</td> <td>Temperature</td> <td>24°C</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>52%</td> </tr> <tr> <td></td> <td>Atmospheric Pressure</td> <td>1009mbar</td> </tr> </table>	Environmental condition	Temperature	24°C		Relative Humidity	52%		Atmospheric Pressure	1009mbar
Environmental condition	Temperature	24°C									
	Relative Humidity	52%									
	Atmospheric Pressure	1009mbar									
Remark	-										
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail										

Test Data     Yes                       N/A

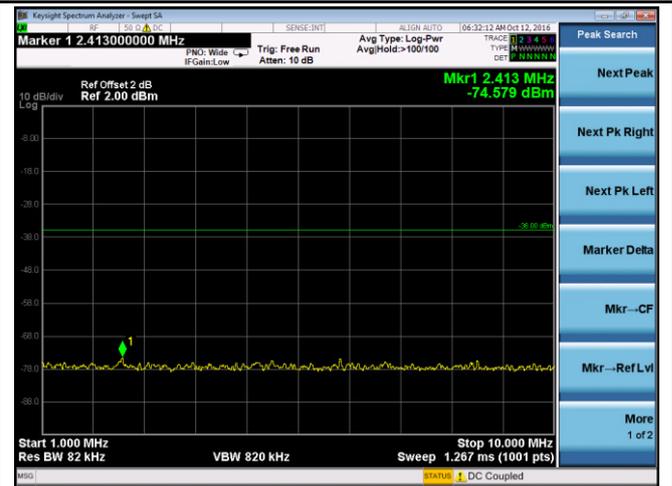
Test Plot     Yes (See below)               N/A

Test was done by **Chen Ge** at RF test site.

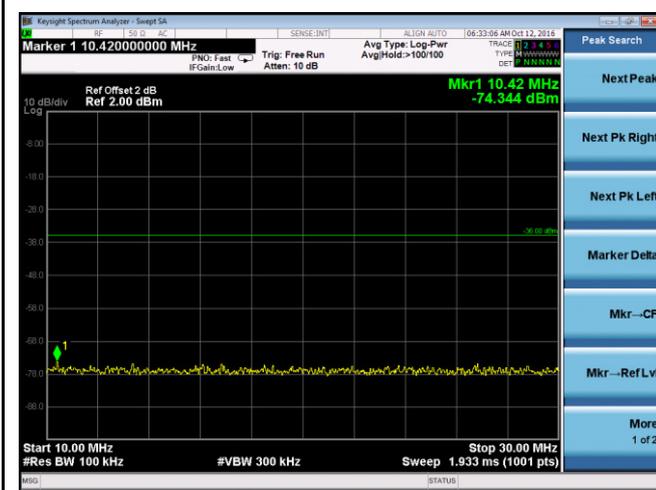
**Test Plot**



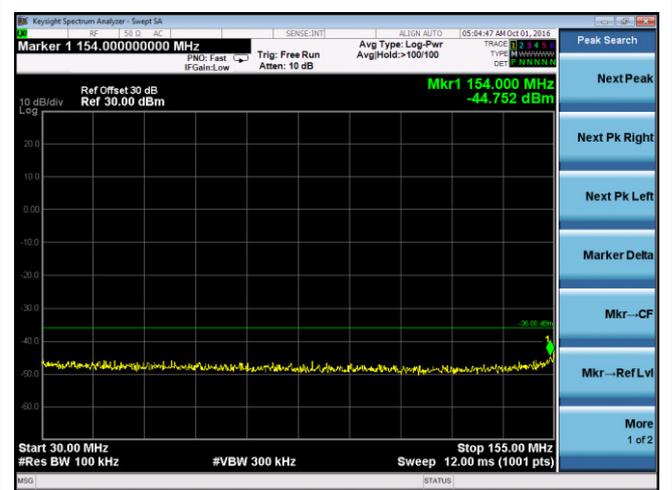
**DSC 9kHz - 1MHz**



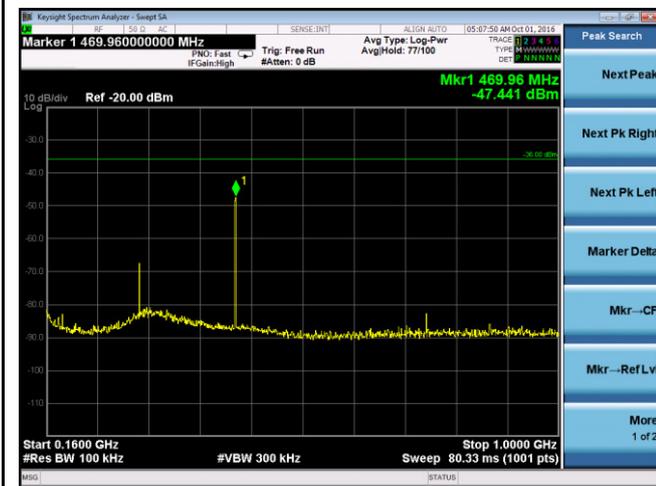
**DSC 1MHz - 10MHz**



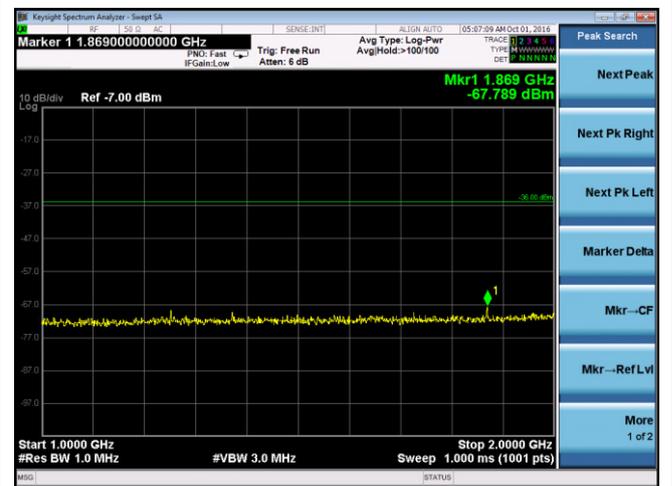
**DSC 10MHz - 30MHz**



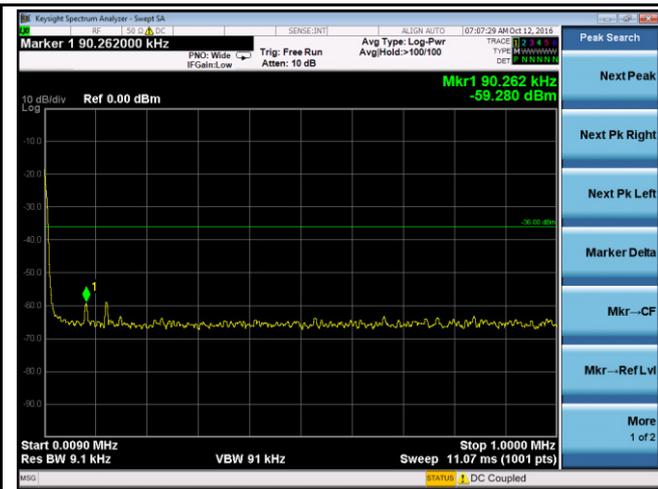
**DSC 30MHz - 155MHz**



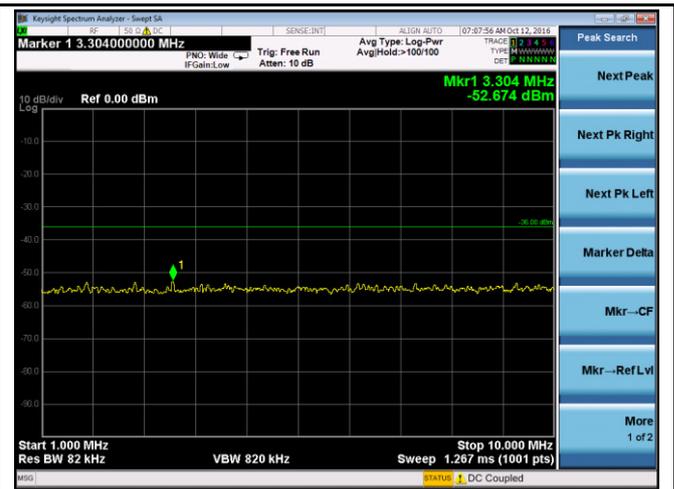
**DSC 160MHz - 1GHz**



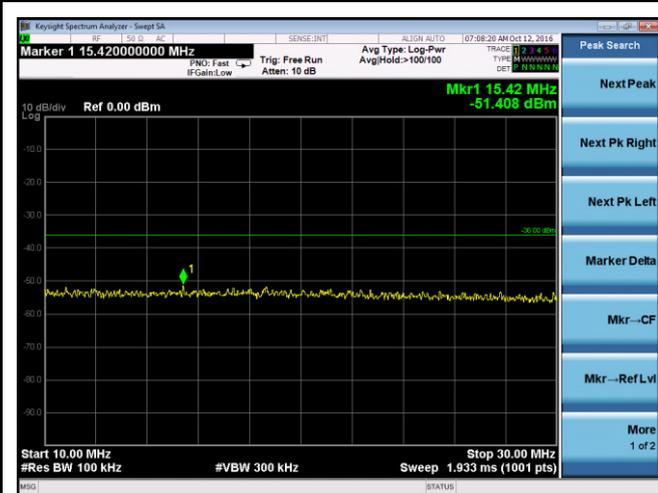
**DSC 1GHz - 2GHz**



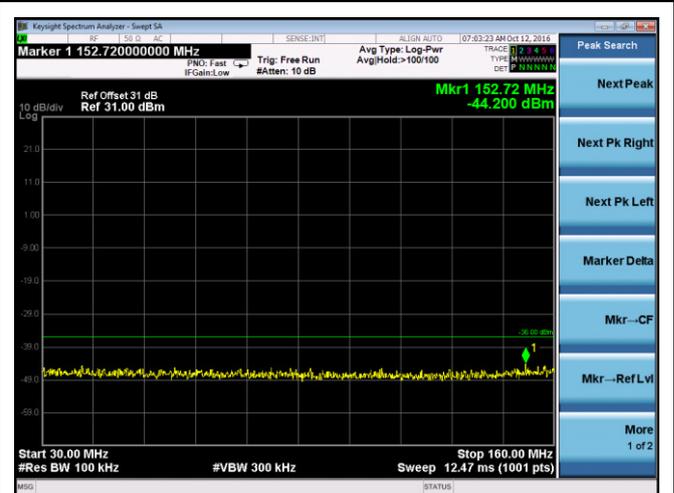
AIS1 9kHz - 1MHz



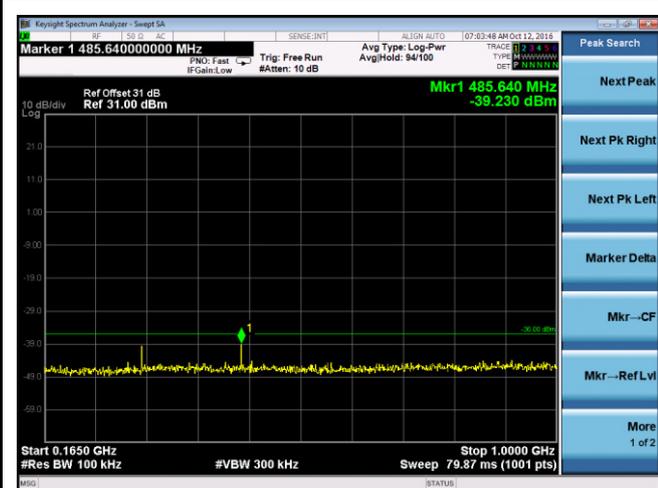
AIS1 1MHz - 10MHz



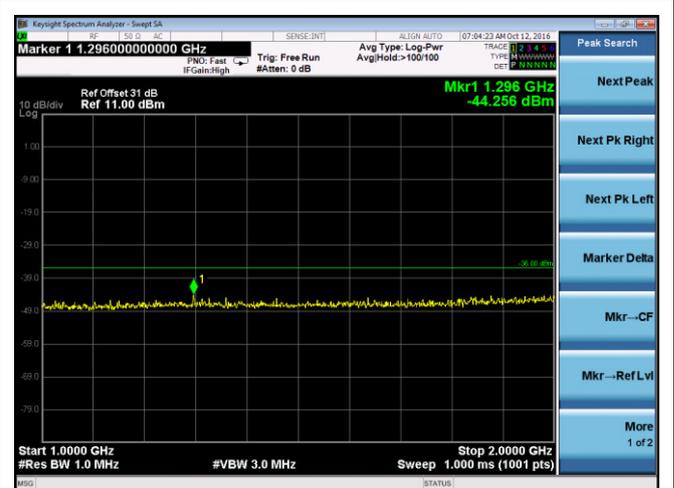
AIS1 10MHz - 30MHz



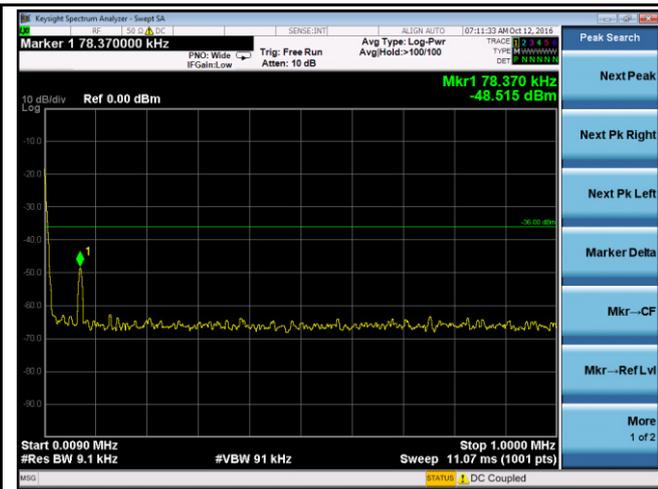
AIS1 30MHz - 160MHz



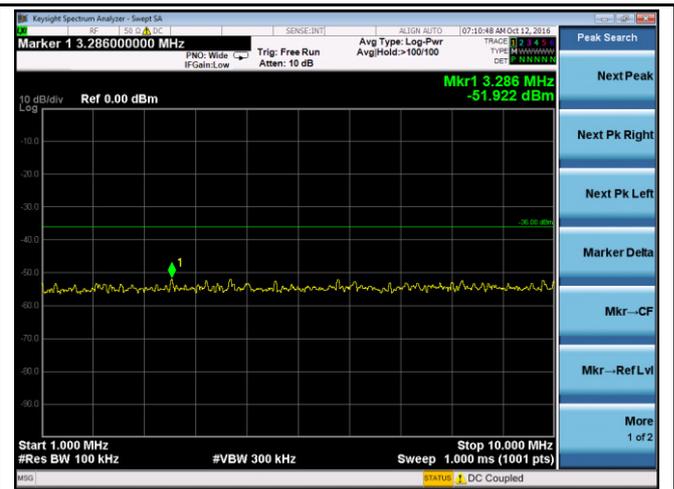
AIS1 165MHz - 1GHz



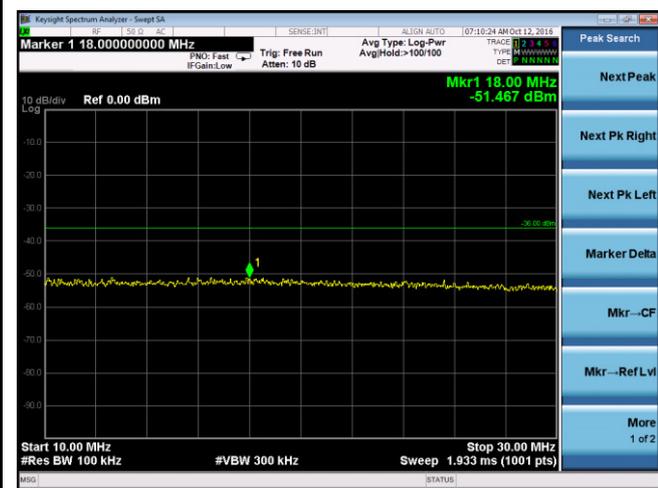
AIS1 1GHz - 2GHz



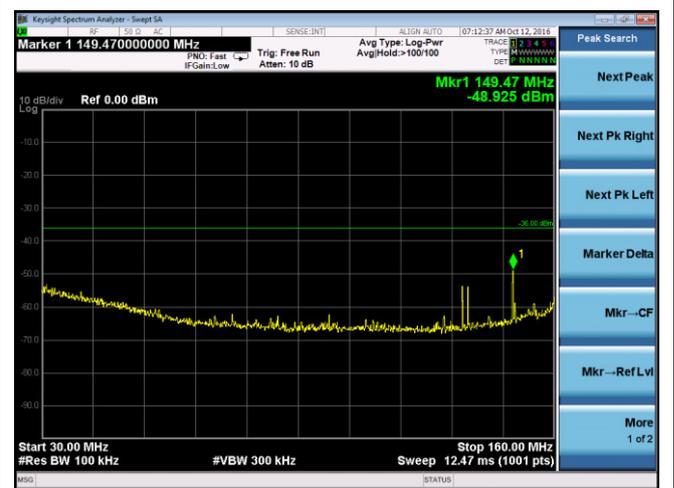
AIS2 9kHz - 1MHz



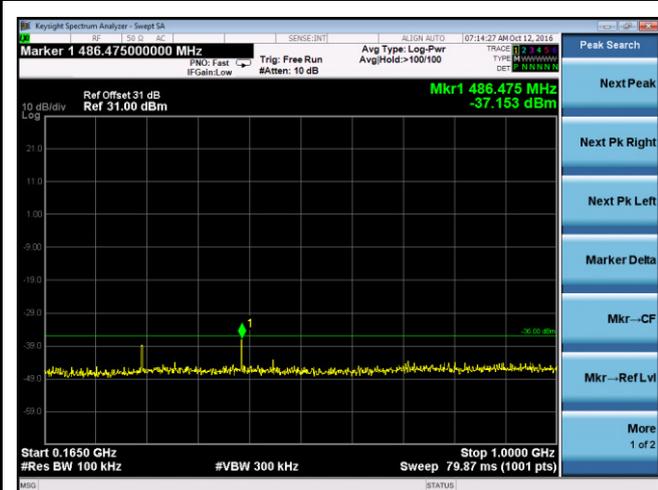
AIS2 1MHz - 10MHz



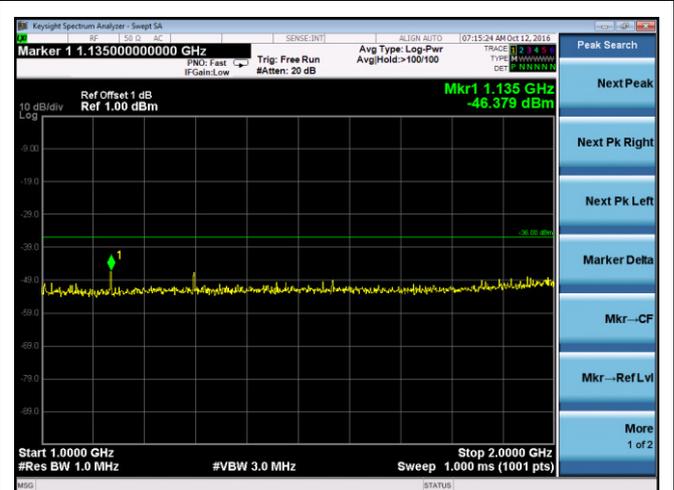
AIS2 10MHz - 30MHz



AIS2 30MHz - 160MHz



AIS2 165MHz - 1GHz



AIS2 1GHz - 2GHz

### 10.7 Cabinet Radiated Emissions

Spec	Requirement	Applicable
RTCM SC11901 Annex A Annex E	The power of any conducted spurious emission on any discrete frequency shall not exceed 0.25 $\mu$ W. (-36dBm)	<input checked="" type="checkbox"/>
Test Setup Below 1GHz		
Test Setup Above 1GHz		
Procedure	Refer to A.4.5.1 in RTCM 11901.0.	
Remark	Measurement was performed up to 2GHz and only worst case was presented.	
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 Chen Ge at 10m chamber.**

## Radiated Emission Test Results (Below 1GHz)

Worst case:

Frequency (MHz)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
43.50	109	150	V	43.50	-65.23	0	0.23	-65.46	-36	-29.46
43.50	58	151	H	43.50	-68.41	0	0.23	-68.64	-36	-32.64
117.59	103	150	V	117.59	-58.58	0	0.27	-58.85	-36	-22.85
117.59	45	152	H	117.59	-62.14	0	0.27	-62.41	-36	-26.41
530.27	155	149	V	528.6	-63.87	0	0.87	-64.74	-36	-28.74
530.27	213	155	H	528.6	-63.74	0	0.87	-64.61	-36	-28.61

Note: Both Horizontal and vertical polarities were investigated. The results above show only the worst case.

## Radiated Emission Test Results (Above 1GHz)

DSC:

Indicated			Test Antenna		Substituted					
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1861.58	-67.21	120	150	V	1861.58	10.89	1.09	-57.41	-36	-21.41
1861.58	-66.99	156	153	H	1861.58	10.89	1.09	-57.19	-36	-21.19
1963.75	-66.65	243	150	V	1963.75	11.04	1.09	-56.70	-36	-20.70
1963.75	-65.82	189	149	H	1963.75	11.04	1.09	-55.87	-36	-19.87

AIS1:

Indicated			Test Antenna		Substituted					
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1754.65	-64.62	125	152	V	1754.65	10.10	1.09	-55.61	-36	-19.61
1754.65	-64.39	166	153	H	1754.65	10.10	1.09	-55.38	-36	-19.38
1525.89	-64.32	203	161	V	1525.89	9.57	1.09	-55.84	-36	-19.84
1525.89	-63.64	88	145	H	1525.89	9.57	1.09	-55.16	-36	-19.16

AIS2:

Indicated			Test Antenna		Substituted					
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1526.84	-64.74	149	151	V	1526.84	9.57	1.09	-56.26	-36	-20.26
1526.84	-64.59	264	166	H	1526.84	9.57	1.09	-56.11	-36	-20.11
1320.18	-63.69	72	148	V	1320.18	7.87	0.94	-56.76	-36	-20.76
1320.18	-63.39	124	148	H	1320.18	7.87	0.94	-56.46	-36	-20.46

## Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
R & S Receiver	ESL6	100178	05/27/2016	1 Year	05/27/2017	<input checked="" type="checkbox"/>
Agilent Spectrum Analyzer	N9010A	10SL0219	08/20/2016	1 Year	08/20/2017	<input checked="" type="checkbox"/>
Preamplifier (100KHz-7GHz)	LPA-6-30	11140711	02/10/2016	1 Year	02/10/2017	<input checked="" type="checkbox"/>
USB RF Power Sensor	7002-006	10SL0190	09/03/2016	1 Year	09/03/2017	<input checked="" type="checkbox"/>
ETS-Lingren Loop Antenna	6512	00049120	08/20/2016	1 Year	08/20/2017	<input checked="" type="checkbox"/>
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	08/15/2016	1 Year	08/15/2017	<input checked="" type="checkbox"/>
Agilent Signal Generator	MXG N5182A	MY47071065	04/12/2016	1 Year	04/12/2017	<input checked="" type="checkbox"/>
Tuned Dipole Antenna 30 - 1000 MHz (4pcs set)	AD-100	40133	10/02/2016	1 Year	10/02/2017	<input checked="" type="checkbox"/>
Test Equity Environment Chamber	1007H	61201	07/31/2016	1 Year	07/31/2017	<input checked="" type="checkbox"/>
10 Meters SAC	10M	N/A	09/05/2016	1 Year	09/05/2017	<input checked="" 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		<a href="#">A1</a> , <a href="#">A2</a> , <a href="#">A3</a> , <a href="#">A4</a> , <a href="#">B1</a> , <a href="#">B2</a> , <a href="#">B3</a> , <a href="#">B4</a> , 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		<b>Radio &amp; Telecommunications Terminal Equipment:</b> EN45001 – EN ISO/IEC 17025
		<b>Electromagnetic Compatibility:</b> EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)	 	<a href="#">Phase I</a> , <a href="#">Phase II</a>
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
Hong Kong OFCA		<b>(Phase II)</b> OFCA Foreign Certification Body for Radio and Telecom
		<b>(Phase I)</b> Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		<b>Radio:</b> Scope A – All Radio Standard Specification in Category I
		<b>Telecom:</b> CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		<p><b>Radio:</b> A1. Terminal equipment for purpose of calling</p> <p><b>Telecom:</b> B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law</p>
Korea CAB Accreditation		<p><b>EMI:</b> KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI</p> <p><b>EMS:</b> 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><b>Radio:</b> 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><b>Telecom:</b> 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		R-3083: Radiation 3 meter site
		C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measurement
Australia CAB Recognition		<p><b>EMC:</b> AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4</p>
		<p><b>Radio communications:</b> 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><b>Telecommunications:</b> 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