RF TEST REPORT

SIEMIC
A Bureau Veritas Group Company

Report No.: FCC_IC_ L19040501-SEV-802-Co-location
Supersede Report No.:

Applicant	:	Xirgo Technologies, LLC
Product Name	:	XT6264
Model No.	:	XT6264
Test Standard	:	47 CFR 15.247 47 CFR Part 22, 24, 27 RSS 130, 132, 133, 139 RSS 247 Issue 2, February 2017
Test Method	:	RSS Gen Issue 5, April 2018 ANSI C63.10: 2013
FCC ID	:	1.Cellular module : XMR201903EG25G 2.BLE/ZIGBEE module: GKM-XT6264
IC ID		1.Cellular module : 10224A-201903EG25G 2.BLE/ZIGBEE module: 10281A-XT6264
Dates of test	:	06/03/2019
Issue Date	:	06/19/2019
Test Result	:	☒ Pass ☐ Fail
Equipment complied with the specification [X] Equipment did not comply with the specification [ ]		

This Test Report is Issued Under the Authority of:	
Gary Chou	
Gary Chou	**Chen Ge**
Test Engineer	Engineer Reviewer

Issued By:
SIEMIC Laboratories
775 Montague Expressway, Milpitas, 95035 CA

ilac-MRA
A2LA ACCREDITED
TESTING CERT # 2742-01

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_SL19040501-SEV-802-Co-location	None	Original	06/19/2019

2 Executive Summary

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

Company: Xirgo Technologies, LLC
Product: XT6264
Model: XT6264

against the current Stipulated Standards. The specified model product stated above 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.	540430
IC Test Site No.	4842D
VCCI Test Site No.	A0133

5 Modification

Index	Item	Description	Note
-	-	-	-

6 EUT Information

6.1 EUT Description

Product Name	XT6264
Model No.	XT6264
Trade Name	Xirgo
Serial No.	MD191700019
Input Power	30 Vdc
Date of EUT received	06/08/2019
Equipment Class/ Category	DTS
Port/Connectors	N/A

6.2 Radio Description

Spec for Zigbee Radio:

Radio Type	Zigbee
Operating Frequency	2405-2480MHz
Modulation	DSSS
Channel Spacing	5 MHz
Antenna Type	CHIP
Antenna Gain	1.5 dBi
Antenna Connector Type	N/A

Spec for BT Radio

Radio Type	Bluetooth
Operating Frequency	2402-2480MHz
Modulation	GFSK
Channel Spacing	2 MHz
Antenna Type	CHIP
Antenna Gain	1.5 dBi
Antenna Connector Type	N/A

Spec for GSM Radio:

BLE, ZIGBEE and LTE is the worst case simultaneous transmission

Spec for WCDMA Radio:

Item	WCDMA	WCDMA
Operating Band /Radio Type	WCDMA Band II	WCDMA Band V
Bandwidth	3.84MHz	3.84MHz
Modulation	QPSK	QPSK
Tx Frequency Range (MHz)	1850 – 1910 MHz	824 – 849 MHz
Rx Frequency Range (MHz)	1930 – 1990 MHz	869 – 894 MHz
Antenna Type	PCB Antenna	PCB Antenna
Antenna Gain	4 dBi	5 dBi
Antenna Connector Type	N/A	N/A

Spec for LTE Radio:

Item	LTE	LTE	LTE	LTE
Operating Band /Radio Type	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 12
Bandwidth	5MHz, 10MHz, 15MHz, 20MHz	5MHz, 10MHz, 15MHz, 20MHz	5MHz, 10MHz	5MHz, 10MHz
Modulation	QPSK/16QAM/64QAM	QPSK/16QAM/64QAM	QPSK/16QAM/64QAM	QPSK/16QAM/64QAM
Frequency (MHz)	TX: 1850 - 1910 MHz RX: 1930 - 1990 MHz	TX: 1710 - 1755 MHz RX: 2110 - 2155 MHz	TX: 824 - 849 MHz RX: 869 - 894 MHz	TX: 699 - 716 MHz RX: 729 - 746 MHz
Antenna Type	PCB Antenna	PCB Antenna	PCB Antenna	PCB Antenna
Antenna Gain	4 dBi	3.9 dBi	5 dBi	3.5 dBi
Antenna Connector Type	N/A	N/A	N/A	N/A

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	PP01L Latitude E5440	F1WPF12	Dell	-
2	DC Power Supply	DP712	DP7B182100068	RIGOL	-

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-RS232	LAPTOP	USB	EUT	RS232	1	Unshielded	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	PUTTY	Set the EUT to transmit continuously in diferent test modes and channels

8 Test Summary

Requirement

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Radiated Spurious Emissions	FCC	15.247(d)	FCC	ANSI C63.10:2013 558074 D01 DTS Meas Guidance v03r05	☒ Pass ☐ N/A
	IC	RSS Gen	IC	RSS Gen Issue 5: 2018	
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.				

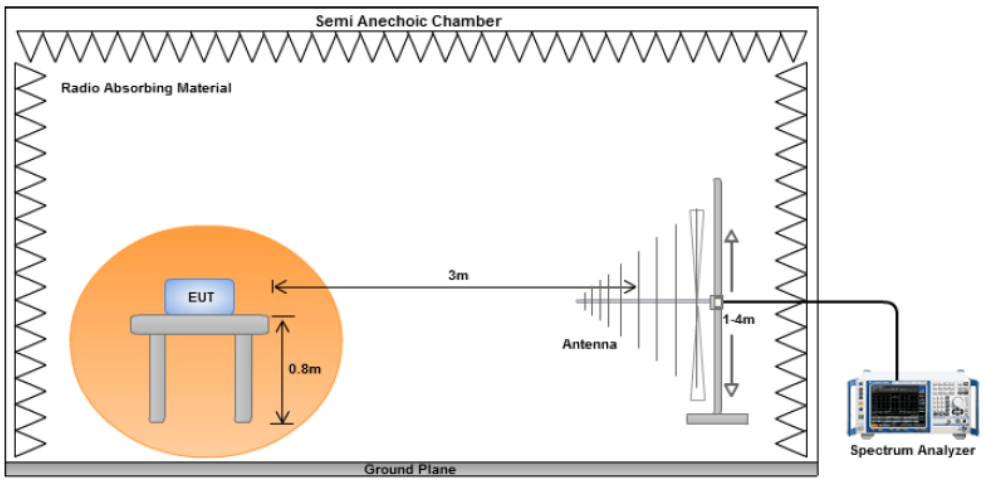
9 Measurement Uncertainty

Emissions			
Test Item	**Frequency Range**	**Description**	**Uncertainty**
AC Conducted Emissions	150KHz – 30MHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2	±3.5dB
RF conducted measurement	150KHz – 40GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2	±0.95dB
Radiated Spurious Emissions	30MHz – 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)	±6dB
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)	±6dB

10 Measurements, Examination and Derived Results

10.1 Radiated Spurious Emissions below 1GHz

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.247(d)
RSS210(A8.5)</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th></tr>
<tr><td>30 – 88</td><td>100</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 960</td><td>200</td></tr>
<tr><td>Above 960</td><td>500</td></tr>
</table></td><td>☒</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. 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:
a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
b. The EUT was then rotated to the direction that gave the maximum emission.
c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. A Quasi-peak measurement was then made for that frequency point.
4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</td></tr>
<tr><td>Remark</td><td colspan="3">The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.</td></tr>
<tr><td>Result</td><td colspan="3">☒ Pass ☐ Fail</td></tr>
</table>

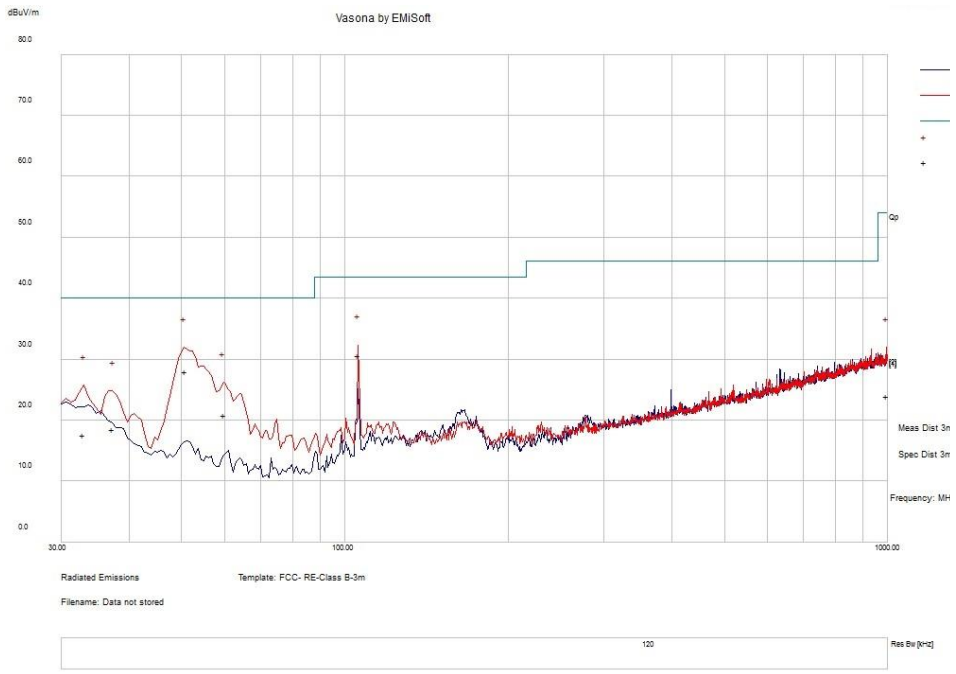
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Gary Chou at 10m chamber.

Radiated Emission Test Results (Below 1GHz)

Test specification	Below 1GHz			
Environmental Conditions:	Temp (°C):	26.1	Result	Pass
	Humidity (%)	47.5		
	Atmospheric (mbar):	1020		
Mains Power:	30 Vdc			
Tested by:	Gary Chou			
Test Date:	06/13/2019			
Remarks:	BLE, ZIGBEE and LTE is the worst case simultaneous transmission			

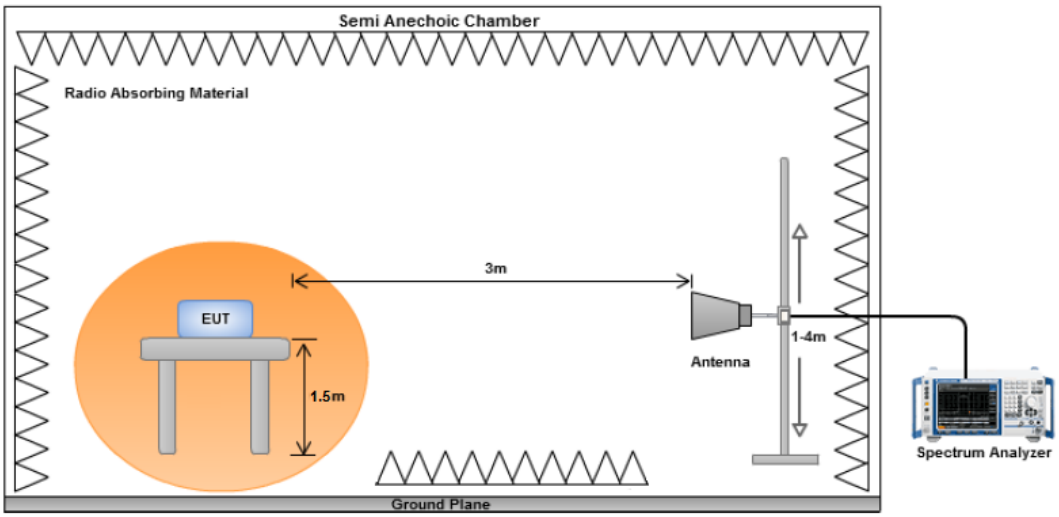


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
50.782	43.25	11.45	-26.61	28.09	Quasi Max	V	102	217	40	-11.91	Pass
105.643	43.13	11.92	-24.31	30.74	Quasi Max	V	347	240	43.5	-12.76	Pass
59.952	36.42	11.51	-27.35	20.58	Quasi Max	V	105	171	40	-19.42	Pass
32.941	21.56	11.16	-14.81	17.91	Quasi Max	V	113	144	40	-22.09	Pass
37.262	25.28	11.25	-18.31	18.22	Quasi Max	V	115	11	40	-21.78	Pass
995.213	19.39	16.21	-11.76	23.84	Quasi Max	V	164	202	54	-30.16	Pass

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

10.2 Radiated Spurious Emissions between 1GHz – 18GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d) RSS210(A8.5)	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 ☐ 20 dB down ☒ 30 dB down	☒
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	☒
Test Setup			
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. 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: a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. An average measurement was then made for that frequency point. 4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.		
Remark	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	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Gary Chou at 10m chamber.

Radiated Emission Test Results (Above 1GHz)

BLE, ZIGBEE and LTE is the worst case simultaneous transmission

Above 1GHz-BLE, ZIGBEE and LTE transmit simultaneously

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
1671.42	36.29	7.09	-14.29	29.09	Peak Max	H	314	144	74	-44.91	Pass
1754.36	61.25	7	-13.44	54.81	Peak Max	H	175	283	74	-19.19	Pass
7259.41	33.44	4.1	0.06	37.6	Peak Max	H	361	239	74	-36.4	Pass
16769.16	37.29	1.14	5.77	44.2	Peak Max	H	175	351	74	-29.8	Pass
1671.23	24.37	7.09	-14.29	17.17	Average Max	H	314	144	54	-36.83	Pass
1754.46	58.46	7	-13.44	52.02	Average Max	H	175	283	54	-1.98	Pass
7259.52	21.53	4.1	0.06	25.69	Average Max	H	361	239	54	-28.31	Pass
16769.29	24.28	1.14	5.77	31.19	Average Max	H	175	351	54	-22.81	Pass

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

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Radiated Emissions						
50GHz Spectrum Analyzer	N9030B (PXA)	MY57140374	7/22/2018	1 Year	7/22/2019	☑
Hybrid Antenna (30MHz - 6GHz)	JB6	A111717	3/9/2019	1 Year	3/9/2020	☑
Pre-Amplifier (1GHz - 26.5GHz)	8449B	3008A00715	5/16/2019	1 Year	5/16/2020	☑
Horn Antenna	3115	10SL0059	01/26/2017	2 Year	01/26/2020	☑
RF Pre-Amplifier (9kHz - 6.5GHz)	LPA-6-30	11170601	7/23/2018	1 Year	7/23/2019	☑

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 & Telecommunications Terminal Equipment:** EN45001 – EN ISO/IEC 17025
		Electromagnetic Compatibility: EN45001 – EN ISO/IEC 17025
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		**Radio**: A1. Terminal equipment for purpose of calling **Telecom**: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law
Korea CAB Accreditation		**EMI:** KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI **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
		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
		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
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		**EMC:** AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4
		Radio communications: 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
		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
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