ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name:	**SmartTAG**
Marketing Name:	**Infant Tag**
Brand Name:	**Cadi Scientific**
Model No.:	**STG-836(919), STG-836(925)**
Model Difference:	**STG-836(919) transmits at 919.8MHz, STG-836(925) transmits at 925MHz**
FCC ID:	**VPE-STG-836**
Report No.:	**ER/2012/A0009**
Issue Date:	**Nov. 09, 2012**
FCC Rule Part:	**§15.209**
Prepared for	**CADI SCIENTIFIC PTE LTD** **31 UBI Road 1, #03-00 Aztech Building, Singapore 408694**
Prepared by	**SGS Taiwan Ltd.** **Electronics & Communication Laboratory** **No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803**

VERIFICATION OF COMPLIANCE

Applicant:	CADI SCIENTIFIC PTE LTD 31 UBI Road 1, #03-00 Aztech Building, Singapore 408694
Product Description:	SmartTAG
Marketing Name:	Infant Tag
Brand Name:	Cadi Scientific
Model No.:	STG-836(919), STG-836(925)
FCC ID:	VPE-STG-836
Model Difference:	STG-836(919) transmits at 919.8MHz, STG-836(925) transmits at 925MHz
File Number:	ER/2012/A0009
Date of test:	Oct. 03, 2012 ~ Nov. 02, 2012
Date of EUT Received:	Oct. 03, 2012

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd., Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2009) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.209.

The test results of this report relate only to the tested sample identified in this report.

Test By:	Marcus Tseng	***Date:***	Nov. 09, 2012
	Marcus Tseng / Engineer		
Prepared By:	Cherry Chen	***Date:***	Nov. 09, 2012
	Cherry Chen / Clerk		
Approved By	Jim Chang	***Date:***	Nov. 09, 2012
	Jim Chang / Supervisor		

Version

Version No.	Date	Description
00	Nov. 09, 2012	Initial creation of document

Table of Contents

1. GENERAL INFORMATION

1.1. Product Description

Product Name:	SmartTAG	
Marketing Name:	Infant Tag	
Brand Name:	Cadi Scientific	
Model No.:	STG-836(919), STG-836(925)	
Model Difference:	STG-836(919) transmits at 919.8MHz, STG-836(925) transmits at 925MHz	
Transmit Power	52.86 dBuV/m	
Operation Frequency:	919.8MHz and 925.0MHz	
Channel number:	2 channel	
Modulation Type:	GFSK	
Hardware Version	STG-836 Ver0.34	
Software Version	Version 1	
Power Supply	3Vdc by Battery	
	Battery:	Model No.: CR2032, Supplier: SONY

RFID:

Operating Frequency	125kHz
Transmit Power	< 105dBuV/m at 3m.
Number of Channels	1
Operating Mode	Point-to-Point
Modulation Type:	ASK

The signal is very weak and not able to be capture at all

The EUT is compliance with RFID Standard.

This report applies for RFID.

1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **VPE-STG-836** filing to comply with Section 15.209 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure.

1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2009). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2009. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-4

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

1.5. Special Accessories

Not available for this EUT intended for grant.

1.6. Equipment Modifications

Not available for this EUT intended for grant.

2. System Test Configuration

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The Transmitter was operated in the normal operating mode. the Tx frequency was fixed and continuous which was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Emissions (Not apply in the report)

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7.3.1 of ANSI C63.4-2009.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2009.

2.4. Limitation

(1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range MHz	Limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

(2) Radiated Emission

(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:

(b) In the emission table above, the tighter limit applies at the band edges.

(c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other Sections within this Part and which are required to reduce their nwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Frequency (MHz)	Field strength μV/m	Distance (m)	Field strength at 3m dBμV/m
0.009-0.490	2400/F(KHz)	300	
0.490-1.705	24000/F(KHz)	30	
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Limit Table:

Frequency kHz	Distance m	Limit at 300m dBμV/m	Limit at 30m dBμV/m	Distance Factor dB	Limit dBμV/m at 3m
125	300	25.67	---	80	105.67
250	300	19.65	---	80	99.65
375	300	16.12	---	80	96.12
500	30	---	33.62	40	73.62
625	30	---	31.69	40	71.69
750	30	---	30.10	40	70.10
875	30	---	28.76	40	68.76
1000	30	---	27.60	40	67.60
1125	30	---	26.58	40	66.58
1250	30	---	25.67	40	65.67

Limit Calculation and transfer to 1m test distance:

If the frequency between 9 – 490KHz,

Limit = 20log(2400/f(KHz) + 40log(300/1)

If the frequency between 490 KHz – 1.705MHz

Limit = 20log(24000/f(KHz) + 40log(30/1)

2.5. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

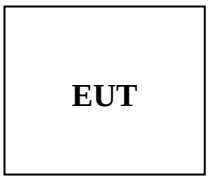


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	FCC ID	Series No.	Data Cable	Power Cord
1.	N/A						

3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207	Conducted Emission	N/A
§15.209	Radiated Emission	Compliant

4. Description of test modes

The EUT has been tested under continuous operating condition. The Frequency 125kHz was chosen for testing.

5. Conducted Emissions Test

5.1. Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

5.2. Test SET-UP (Block Diagram of Configuration)

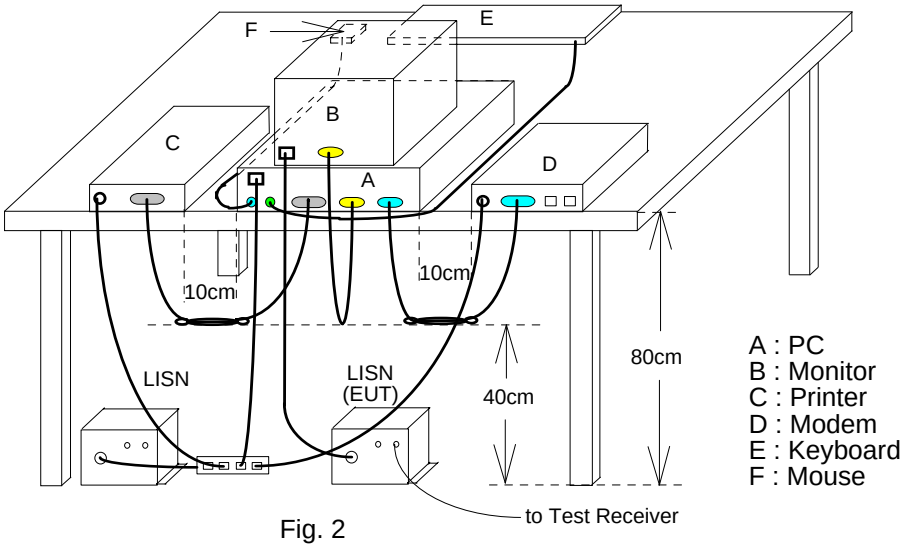


Fig. 2

5.3. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	R&S	ESCI7	100759	05/20/2011	05/19/2013
EMI Receiver	R&S	ESCS 30	828985/004	09/23/2012	09/22/2013
LISN	Rolf-Heine	NNB-2/16Z	99012	03/23/2012	03/22/2013
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	03/23/2012	03/22/2013
Coaxial Cables	N/A	WK CE Cable	N/A	01/05/2012	01/04/2013

5.4. Measurement Result:

N/A. Powered from 3Vdc Li-Ion Battery.

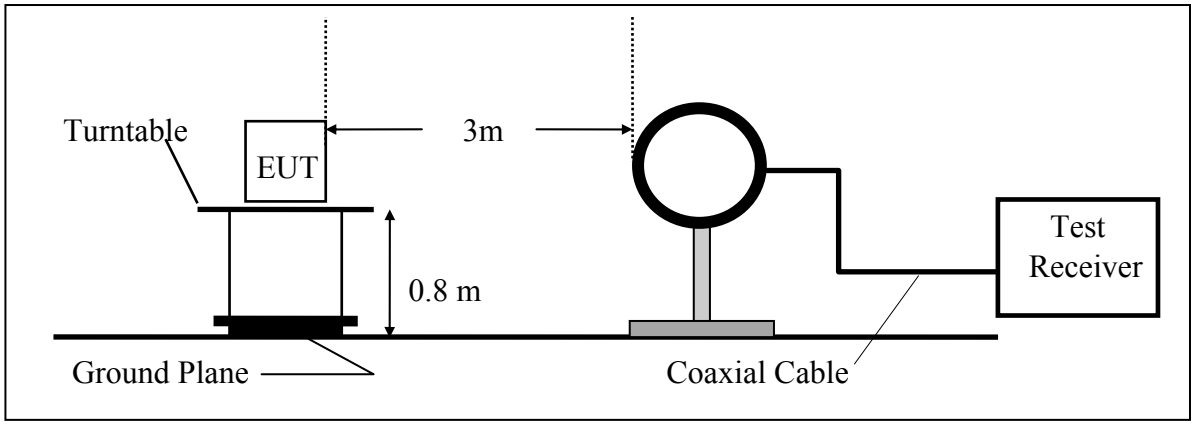
6. Radiated Emission Test

6.1. Measurement Procedure

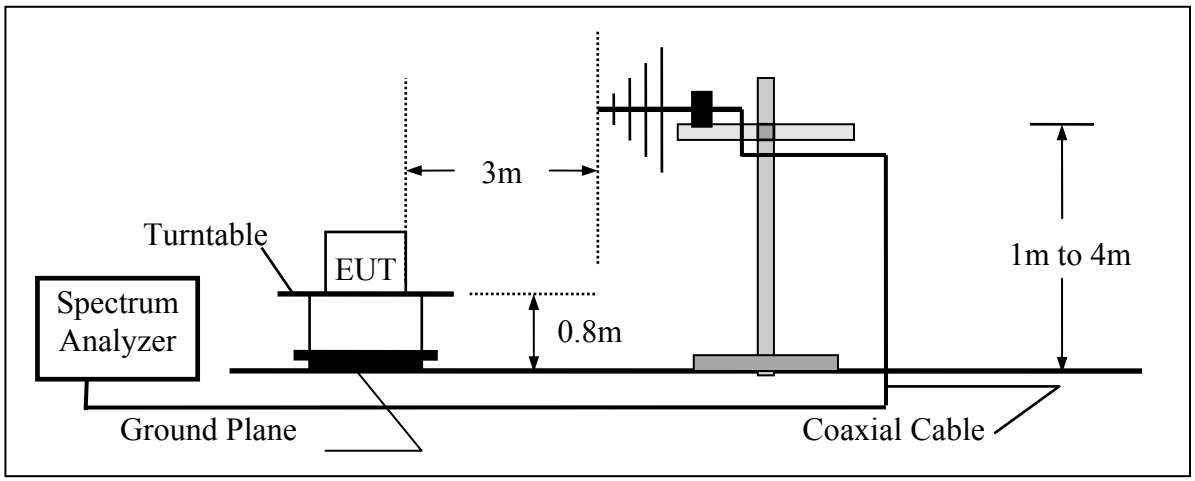
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2. Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



6.3. Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	R&S	ESCI7	100759	05/20/2011	05/19/2013
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/15/2011	04/14/2013
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	02/15/2011	02/14/2013
Spectrum Analyzer	R&S	FSV-30	101398	10/18/2011	10/17/2013
Bilog Antenna	SCHWAZBECK	VULB9168	378	01/10/2012	01/09/2014
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2011	05/18/2013
Horn Antenna	Schwarzbeck	BBHA9170	185	07/11/2011	07/10/2013
Pre-Amplifier	Agilent	8447D	2944A07676	01/04/2012	01/03/2013
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/04/2012	01/03/2013
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M2	02/28/2012	02/28/2013
Attenuator	Mini-Circuit	BW-S10W2+	004	02/28/2012	02/27/2013
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_Rx	9	01/04/2012	01/03/2013
3m Site NSA	SGS	966 chamber	N/A	07/15/2012	07/14/2013

6.4. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

6.5. Measurement Result

Operation Band	:125 KHz	Test Date	:2012-11-02
Fundamental Frequency	:125 KHz	Temp./Humi.	:26.4deg_C/61RH
Operation Mode	:TX 125 KHz	Engineer	:Marcus
EUT Pol.	:E2 PLAN	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
0.125	F	Peak	81.30	12.04	93.34	105.33	-11.99
0.250	H	---					
0.375	H	---					
0.500	H	---					
0.625	H	---					
0.750	H	---					
0.875	H	---					
1.000	H	---					
1.125	H	---					
3.660	S	Peak	39.74	11.73	51.47	69.54	-18.07
8.770	S	Peak	22.53	11.28	33.81	69.54	-35.73
14.480	S	Peak	18.99	10.64	29.63	69.54	-39.91
19.740	S	Peak	14.95	10.43	25.38	69.54	-44.16
26.200	S	Peak	14.76	9.42	24.18	69.54	-45.36
28.090	S	Peak	15.62	9.06	24.68	69.54	-44.86

Operation Band	:125 KHz	Test Date	:2012-11-02
Fundamental Frequency	:125 KHz	Temp./Humi.	:26.4deg_C/61RH
Operation Mode	:TX 125 KHz	Engineer	:Marcus
EUT Pol.	:E2 PLAN	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
0.125	F	Peak	83.21	12.04	95.25	105.33	-10.08
0.250	H	---					
0.375	H	---					
0.500	H	---					
0.625	H	---					
0.750	H	---					
0.875	H	---					
1.000	H	---					
1.125	H	---					
1.250	H	---					
3.900	S	Peak	36.33	11.69	48.02	69.54	-21.52
8.530	S	Peak	21.91	11.30	33.21	69.54	-36.33
9.610	S	Peak	20.00	11.21	31.21	69.54	-38.33
12.180	S	Peak	19.91	10.81	30.72	69.54	-38.82
16.550	S	Peak	16.16	10.65	26.81	69.54	-42.73
25.900	S	Peak	17.70	9.48	27.18	69.54	-42.36

6.6. Measurement Result

Operation Band	:125 KHz	Test Date	:2012-11-02
Fundamental Frequency	:125 KHz	Temp./Humi.	:26.4deg_C/61RH
Operation Mode	:TX 125 KHz	Engineer	:Marcus
EUT Pol.	:E2 PLAN	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
53.28	S	Peak	30.30	-14.14	16.16	40.00	-23.84
159.01	S	Peak	28.91	-12.28	16.63	43.50	-26.87
401.51	S	Peak	29.59	-11.02	18.57	46.00	-27.43
565.44	S	Peak	30.81	-8.27	22.54	46.00	-23.46
816.67	S	Peak	29.50	-4.02	25.48	46.00	-20.52
958.29	S	Peak	29.59	-2.07	27.52	46.00	-18.48

Operation Band	:125 KHz	Test Date	:2012-11-02
Fundamental Frequency	:125 KHz	Temp./Humi.	:26.4deg_C/61RH
Operation Mode	:TX 125 KHz	Engineer	:Marcus
EUT Pol.	:E2 PLAN	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
122.15	S	Peak	30.73	-14.42	16.31	43.50	-27.19
160.95	S	Peak	30.35	-12.36	17.99	43.50	-25.51
383.08	S	Peak	29.79	-11.25	18.54	46.00	-27.46
580.96	S	Peak	30.05	-7.96	22.09	46.00	-23.91
755.56	S	Peak	29.22	-4.88	24.34	46.00	-21.66
935.98	S	Peak	29.20	-2.23	26.97	46.00	-19.03

~ End of Report ~