

Test Report No. 7191016180-EEC11/03
dated 23 Nov 2011



PSB Singapore

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FORMAL REPORT ON TESTING IN ACCORDANCE WITH
47 CFR FCC Parts 15B & C : 2011
OF A
BITS READER
[Model : SMN-870]
[FCC ID : VPE-SMN870]

TEST FACILITY TÜV SÜD PSB Pte Ltd,
Electrical & Electronics Centre (EEC), Product Services,
No. 1 Science Park Drive, Singapore 118221

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FCC REG. NO. 160581 (3m and 10m Semi-Anechoic Chamber, International Business Park)
99142 (3m and 10m Semi-Anechoic Chamber, Science Park)

IND. CANADA REG. NO. 2932N-1 (10m Semi-Anechoic Chamber, International Business Park)
2932I-1 (3m and 10m Semi-Anechoic Chamber, Science Park)

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QUOTATION NUMBER 219135810

JOB NUMBER 7191016180

TEST PERIOD 16 Sep 2011 – 20 Nov 2011

PREPARED BY

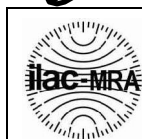
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LA-2007-0380-A
LA-2007-0381-F
LA-2007-0382-B
LA-2007-0383-G
LA-2007-0384-G
LA-2007-0385-E
LA-2007-0386-C
LA-2010-0464-D

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council - Singapore Laboratory Accreditation Scheme. Tests/Calibrations marked "Not SAC-SINGLAS Accredited" in this Report are not included in the SAC-SINGLAS Accreditation Schedule for our laboratory.

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ANNEX A

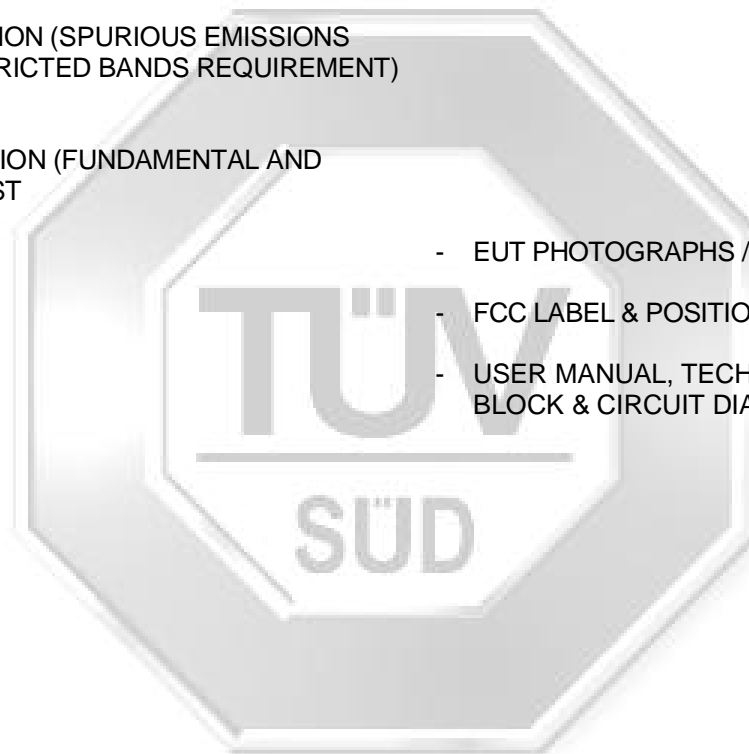
- EUT PHOTOGRAPHS / DIAGRAMS

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TEST SUMMARY

The product was tested in accordance with the customer's specifications.

Test Results Summary

Test Standard	Description	Pass / Fail
47 CFR FCC Part 15: 2011		
15.107(a), 15.207	Conducted Emissions	Pass
15.109(a), 15.205, 15.209	Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)	Pass
15.249(a)	Radiated Emissions (Fundamental and Harmonics)	Pass

Notes

1. The Equipment Under Test (EUT) is to be operated in the two frequencies as listed below. For each frequencies, the EUT was configured to operate in the test mode.
Transmit Frequencies
919.8MHz
925.0MHz
2. The EUT is a Class B device when in non-transmitting state and meets the 47 CFR FCC Part15B Class B requirements.
3. All test measurement procedures are according to ANSI C63.4: 2003.
4. The maximum measured RF power of the Equipment Under Test (EUT) is -37.0dBm.

Modifications

No modifications were made.



PRODUCT DESCRIPTION

Description : The Equipment Under Test (EUT) is a **BITS READER**.

Manufacturer : Cadi Scientific Pte Ltd
31 Ubi Road 1
#03-00 Aztech Building
Singapore 408694

Model Number(s) : SMN-870

FCC ID : VPE-SMN870

Serial Number(s) : Nil

Microprocessor(s) : Microchip PIC18F87J10

Operating Frequency : Transmit @919.8MHz & 925.0MHz

Clock / Oscillator Frequency : 16MHz

Modulation : Gaussian Frequency Shift Keying (GFSK)

Antenna Gain : 0dBi

IF Filter Bandwidth : Nil

Port / Connectors : Refer to manufacturer's user manual / operating manual.

Rated Input Power : 110Vac 60Hz

Operating Temperature : -20°C - 40°C

Accessories : Refer to manufacturer's user manual / operating manual.



SUPPORTING DESCRIPTION DESCRIPTION

Equipment Description (Including Brand Name)	Model, Serial & FCC ID Number	Cable Description (List Length, Type & Purpose)
Dell Laptop	M/N: Inspiron 1420 S/N: H656X1S FCC ID: DoC	2.00m unshielded power cable 2.00m shielded LAN cable
Dell Power Adapter	M/N: LA65NS0-00 S/N: CN-0DF263-74615-69G-341D FCC ID: Nil	2.00m unshielded power cable
UE Power Adapter	M/N: VE15WCP1-0502005SDA S/N: Nil FCC ID: Nil	2.00m unshielded power cable
Vanson Switching Mode Power Supply	M/N: SMP-1000A S/N: Nil FCC ID: Nil	2.00m unshielded power cable
Optoelectronics 1D Barcode Laser Scanner	M/N: OPR-3201 S/N: 005551 FCC ID: Nil	2.00m unshielded cable
Newstar Power Adapter	M/N: NA-1235es S/N: Nil FCC ID: Nil	2.00m unshielded power cable
Cadi Scientific Pte Ltd	M/N: TSS-870 S/N: Nil FCC ID: VPE-TSS870	Nil



EUT OPERATING CONDITIONS

47 CFR FCC Part 15
1. Conducted Emissions
2. Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)
3. Radiated Emissions (Fundamental and Harmonics)
4. Maximum Permissible Exposure
The EUT was exercised by operating in maximum RF transmission with continuous transmission in test mode, i.e transmitting at 919.8MHz and 925MHz channels respectively at one time.





CONDUCTED EMISSION TEST

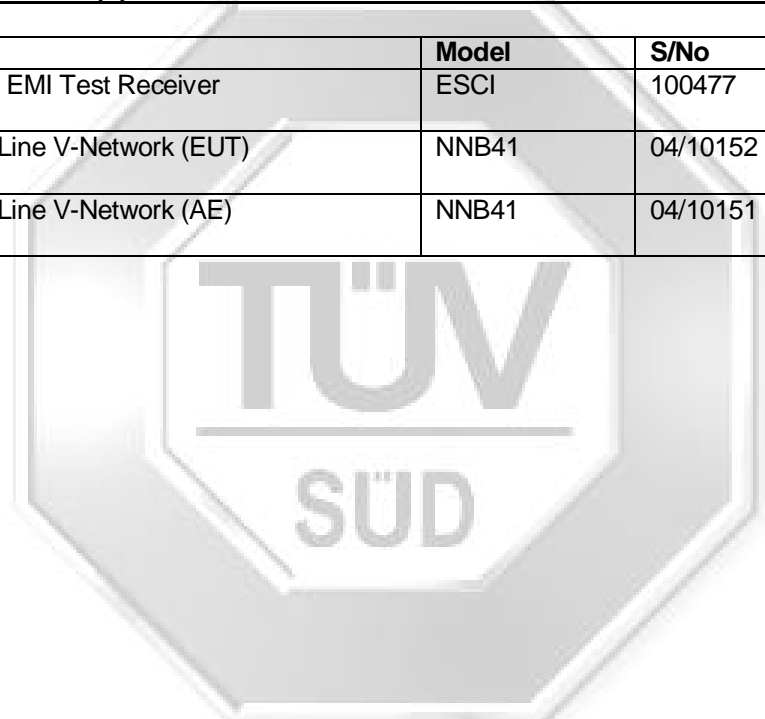
47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Limits

Frequency Range (MHz)	Limit Values (dB μ V)	
	Quasi-peak (QP)	Average (AV)
0.15 - 0.5	66 – 56 *	56 – 46 *
0.5 - 5.0	56	46
5.0 - 30.0	60	50

* Decreasing linearly with the logarithm of the frequency

47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Test Instrumentation

Instrument	Model	S/No	Cal Due Date
Rohde & Schwarz EMI Test Receiver (9kHz-3GHz)	ESCI	100477	24 Sep 2012
Schaffner LISN 2-Line V-Network (EUT) (9kHz-30MHz)	NNB41	04/10152	26 Aug 2012
Schaffner LISN 2-Line V-Network (AE) (9kHz-30MHz)	NNB41	04/10151	13 Sep 2012





CONDUCTED EMISSION TEST

47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Test Setup

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
4. All other supporting equipment were powered separately from another LISN.

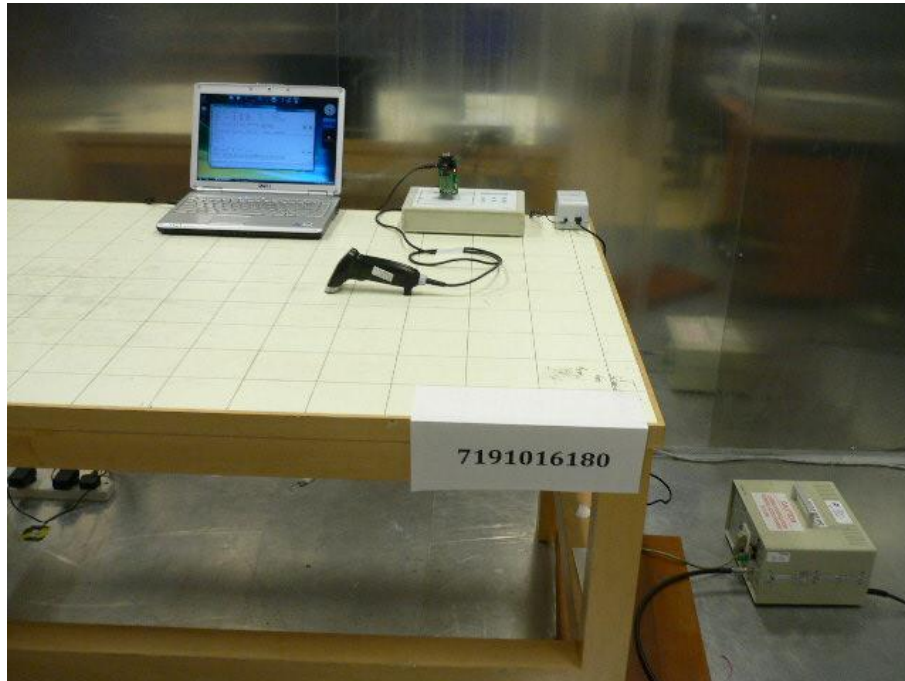
47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A scan was made on the NEUTRAL line over the required frequency range using an EMI test receiver.
3. High peaks, relative to the limit line, were then selected.
4. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 9kHz. Both Quasi-peak and Average measurements were made.
5. Steps 2 to 4 were then repeated for the LIVE line.

Sample Calculation Example

At 20 MHz Q-P limit (Class B) = 1000 μV = 60.0 dBμV
Transducer factor of LISN, pulse limiter & cable loss at 20 MHz = 11.2 dB
Q-P reading obtained directly from EMI Receiver = 40.0 dBμV
(Calibrated for system losses)
Therefore, Q-P margin = 40.0 - 60.0 = -20.0 i.e. 20.0 dB below Q-P limit

CONDUCTED EMISSION TEST



Conducted Emissions Test Setup (Front View)



Conducted Emissions Test Setup (Rear View)



CONDUCTED EMISSION TEST

47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Results

Operating Mode	Transmit @ 919.8MHz	Temperature	25°C
Test Input Power	110V 60Hz	Relative Humidity	40%
Line Under Test	AC Mains	Atmospheric Pressure	1030mbar
Model	SMN-870	Tested By	Kelvin Cheng

Frequency (MHz)	Q-P Value (dBμV)	Q-P Margin (dB)	AV Value (dBμV)	AV Margin (dB)	Line
0.1543	46.1	-19.7	17.8	-38.0	Live
0.4800	21.9	-34.4	7.8	-38.5	Live
0.6267	21.0	-35.0	7.5	-38.5	Live
1.9221	9.8	-46.2	6.8	-39.2	Live
9.7343	16.4	-43.6	10.8	-39.2	Live
19.9952	18.7	-41.3	17.2	-32.8	Live

Operating Mode	Transmit @925.0MHz	Temperature	25°C
Test Input Power	110V 60Hz	Relative Humidity	40%
Line Under Test	AC Mains	Atmospheric Pressure	1030mbar
Model	SMN-870	Tested By	Kelvin Cheng

Frequency (MHz)	Q-P Value (dBμV)	Q-P Margin (dB)	AV Value (dBμV)	AV Margin (dB)	Line
0.1543	46.0	-19.8	17.7	-38.1	Live
0.5110	22.3	-33.7	7.8	-38.2	Live
0.6656	20.6	-35.4	7.6	-38.4	Live
3.6619	10.8	-45.2	6.0	-40.0	Live
8.5173	13.1	-46.9	7.7	-42.3	Live
19.9992	23.0	-37.0	22.0	-28.0	Live

Notes

- All possible modes of operation were investigated from 150kHz to 30MHz. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
- EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:
9kHz - 30MHz
RBW: 9kHz VBW: 30kHz
- Conducted Emissions Measurement Uncertainty
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 9kHz – 30MHz is ±2.2dB.



RADIATED EMISSION TEST

47 CFR FCC Part 15.205 Restricted Bands

MHz		MHz		MHz		GHz	
0.090	- 0.110	16.42	- 16.423	399.9	- 410	4.5	- 5.15
0.495	- 0.505	16.69475	- 16.69525	608	- 614	5.35	- 5.46
2.1735	- 2.1905	16.80425	- 16.80475	960	- 1240	7.25	- 7.75
4.125	- 4.128	25.5	- 25.67	1300	- 1427	8.025	- 8.5
4.17725	- 4.17775	37.5	- 38.25	1435	- 1626.5	9.0	- 9.2
4.20725	- 4.20775	73	- 74.6	1645.5	- 1646.5	9.3	- 9.5
6.215	- 6.218	74.8	- 75.2	1660	- 1710	10.6	- 12.7
6.26775	- 6.26825	108	- 121.94	1718.8	- 1722.2	13.25	- 13.4
6.31175	- 6.31225	123	- 138	2200	- 2300	14.47	- 14.5
8.291	- 8.294	149.9	- 150.05	2310	- 2390	15.35	- 16.2
8.362	- 8.366	156.52475	- 156.52525	2483.5	- 2500	17.7	- 21.4
8.37625	- 8.38675	156.7	- 156.9	2690	- 2900	22.01	- 23.12
8.41425	- 8.41475	162.0125	- 167.17	3260	- 3267	23.6	- 24.0
12.29	- 12.293	167.72	- 173.2	3332	- 3339	31.2	- 31.8
12.51975	- 12.52025	240	- 285	3345.8	- 3358	36.43	- 36.5
12.57675	- 12.57725	322	- 335.4	3600	- 4400	Above 38.6	
13.36	- 13.41						

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Limits

Frequency Range (MHz)	Quasi-Peak Limit Values (dBµV/m) @ 3m
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
Above 960	54.0*

* Above 1GHz, average detector was used. A peak limit of 20dB above the average limit does apply.

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Instrumentation

Instrument	Model	S/No	Cal Due Date
Rohde & Schwarz EMI Test Receiver (20Hz – 26.5GHz)	ESMI	849182/003 848926/007	02 Sep 2012
TDK RF Solutions Hybrid Log Periodic Antenna (30MHz-3GHz)	HLP-3003C	130238	19 Mar 2012
TDK RF Solution Horn Antenna (1GHz-18GHz)	HRN-0118	130256	15 Mar 2012
Sonoma Preamplifier (9kHz – 1GHz)	310N	270640	08 Sep 2012
Toyo MicroWave Preamplifier (1GHz - 18GHz)	TPA0188-36	1005	24 Jun 2012



RADIATED EMISSION TEST

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Setup

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A prescan was carried out to pick the worst emission frequencies from the EUT. For EUT which is a portable device, the prescan was carried out by rotating the EUT through three orthogonal axes to determine which altitude and equipment arrangement produces such emissions.
3. The test was carried out at the selected frequency points obtained from the prescan in step 2. 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.
4. A Quasi-peak measurement was made for that frequency point if it was less than or equal to 1GHz. For frequency point that above 1GHz, both Peak and Average measurements were carried out.
5. Steps 3 and 4 were repeated for the next frequency point, until all selected frequency points were measured.
6. The frequency range covered was from 30MHz to 10th harmonics of the EUT fundamental frequency, using the Bi-log antenna for frequencies from 30MHz up to 1GHz, and the Horn antenna above 1GHz.

Sample Calculation Example

At 300 MHz	Q-P limit (Class B) = 200 μ V/m = 46.0 dB μ V/m
Log-periodic antenna factor & cable loss at 300 MHz = 18.5 dB	
Q-P reading obtained directly from EMI Receiver = 40.0 dB μ V/m (Calibrated level including antenna factors & cable losses)	
Therefore, Q-P margin = 40.0 - 46.0 = -6.0	i.e. 6 dB below Q-P limit

RADIATED EMISSION TEST



Radiated Emissions Test Setup (Front View)



Radiated Emissions Test Setup (Rear View)



RADIATED EMISSION TEST

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Results

Operating Mode	Transmit @ 919.8MHz	Temperature	24°C
Test Input Power	110V 60Hz	Relative Humidity	44%
Test Distance	3m	Atmospheric Pressure	1030mbar
Model	SMN-870	Tested By	Kelvin Cheng

Spurious Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dB μ V/m)	Q-P Margin (dB)	Azimuth (Degrees)	Height (cm)	Polarisation (H/V)
32.6180	18.8	-21.2	320	399	V
44.0170	17.5	-22.5	359	101	V
69.8220	18.9	-21.1	282	173	V
167.4590	12.5	-31.0	23	184	H
199.9920	36.4	-7.1	344	127	H
399.9750	33.7	-12.3	158	102	H

Spurious Emissions ranging from 1GHz – 10GHz

Frequency (GHz)	Peak Value (dB μ V/m)	Peak Margin (dB)	Average Value (dB μ V/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)
3.7428	28.6	-45.4	28.6	-25.4	6	138	H
4.0127	29.4	-44.6	29.3	-24.7	138	392	V
4.4745	31.0	-43.0	31.1	-22.9	311	284	H
4.7375	32.4	-41.6	32.3	-21.7	49	102	H
5.0364	31.6	-42.4	31.6	-22.4	164	399	H
9.0722	26.6	-47.4	26.5	-27.5	193	383	V



RADIATED EMISSION TEST

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Results

Operating Mode	Transmit @ 925.0MHz	Temperature	24°C
Test Input Power	110V 60Hz	Relative Humidity	44%
Test Distance	3m	Atmospheric Pressure	1030mbar
Model	SMN-870	Tested By	Kelvin Cheng

Spurious Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBµV/m)	Q-P Margin (dB)	Azimuth (Degrees)	Height (cm)	Polarisation (H/V)
30.7340	26.4	-13.6	272	103	V
48.2180	18.7	-21.3	286	105	V
66.5220	25.6	-14.4	93	103	V
199.9810	38.4	-5.1	337	134	H
319.9880	32.9	-13.1	278	102	H
399.9860	32.9	-13.1	76	102	H

Spurious Emissions ranging from 1GHz – 10GHz

Frequency (GHz)	Peak Value (dBµV/m)	Peak Margin (dB)	Average Value (dBµV/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)
2.2937	26.5	-47.5	26.5	-27.5	71	119	V
2.9964	26.3	-47.7	26.2	-27.8	242	102	V
3.2362	27.1	-46.9	27.0	-27.0	206	147	H
4.2061	29.8	-44.2	29.7	-24.3	9	104	H
4.5498	32.0	-42.0	31.9	-22.1	351	359	V
4.9631	33.9	-40.1	33.8	-20.2	209	155	V

Notes

- All possible modes of operation were investigated. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- Quasi-peak measurement was used for frequency measurement up to 1GHz. Average and peak measurements were used for emissions above 1GHz. The average measurement was done by measuring the absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
- A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
- EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:
30MHz - 1GHz
 RBW: 120kHz VBW: 1MHz
>1GHz
 RBW: 1MHz VBW: 1MHz
- The upper frequency of radiated emission investigations was according to requirements stated in Section 15.33(a) for intentional radiators & Section 15.33(b) for unintentional radiators.
- The channel in the table refers to the transmit channel of the EUT.
- Radiated Emissions Measurement Uncertainty
 All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 30MHz – 25GHz is ±4.0dB.



RADIATED EMISSION (FUNDAMENTAL AND HARMONICS) TEST

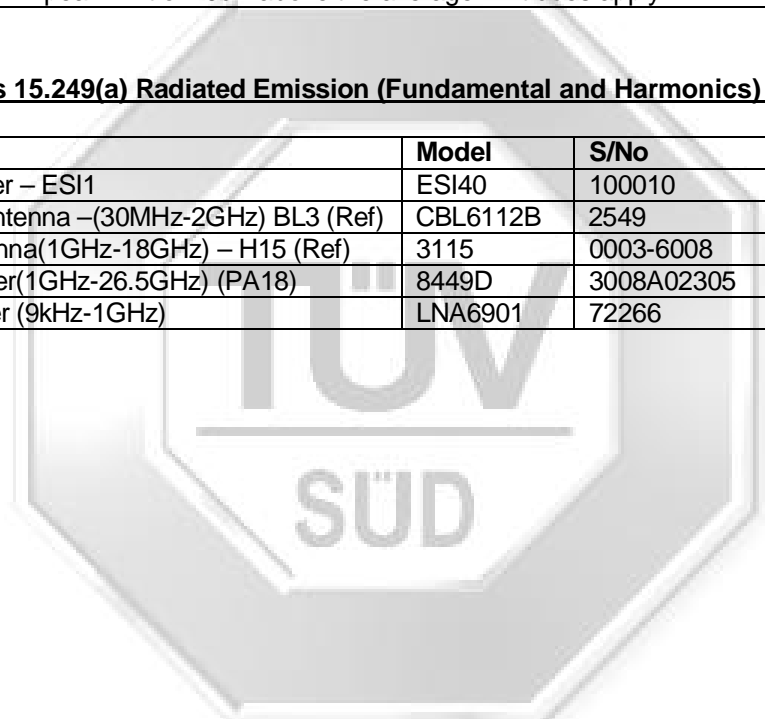
47 CFR FCC Part 15.249(a) Radiated Emission (Fundamental and Harmonics) Limits

Fundamental Frequency (MHz)	Field Strength of Fundamental Limit Values @ 3m (dBµV/m) *	Field Strength of Harmonics Limit Values @ 3m (dBµV/m) *
902 - 928	94.0	54.0
2400 - 2483.5	94.0	54.0
5725 - 5875	94.0	54.0
24000 - 24250	108.0	68.0

* Quasi peak detector was employed for frequency up to 1GHz. For above 1GHz frequency, average detector was used. A peak limit of 20dB above the average limit does apply.

47 CFR FCC Parts 15.249(a) Radiated Emission (Fundamental and Harmonics) Test Instrumentation

Instrument	Model	S/No	Cal Due Date
R&S Test Receiver – ESI1	ESI40	100010	06 Jun 2012
Schaffner Bilog Antenna –(30MHz-2GHz) BL3 (Ref)	CBL6112B	2549	06 Jan 2012
EMCO Horn Antenna(1GHz-18GHz) – H15 (Ref)	3115	0003-6008	20 May 2012
Agilent Preamplifier(1GHz-26.5GHz) (PA18)	8449D	3008A02305	08 Oct 2012
Teseq Preamplifier (9kHz-1GHz)	LNA6901	72266	23 Jun 2012





RADIATED EMISSION (FUNDAMENTAL AND HARMONICS) TEST

47 CFR FCC Part 15.249(a) Radiated Emission (Fundamental and Harmonics) Test Setup

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.

47 CFR FCC Part 15.249(a) Radiated Emission (Fundamental and Harmonics) Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A prescan was carried out to pick the fundamental and harmonics emission frequencies from the EUT. For EUT which is a portable device, the prescan was carried out by rotating the EUT through three orthogonal axes to determine which altitude and equipment arrangement produces such emissions.
3. The test was carried out at the selected frequency points obtained from the prescan in step 2. 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.
4. A Quasi-peak measurement was made for that frequency point if it was less than or equal to 1GHz. For frequency point that above 1GHz, both Peak and Average measurements were carried out.
5. Steps 3 and 4 were repeated for the next frequency point, until all selected frequency points were measured.
6. The frequency range covered was from the EUT fundamental frequency until its 10th harmonics, using the Bi-log antenna for frequencies from 30MHz up to 1GHz, and the Horn antenna above 1GHz.

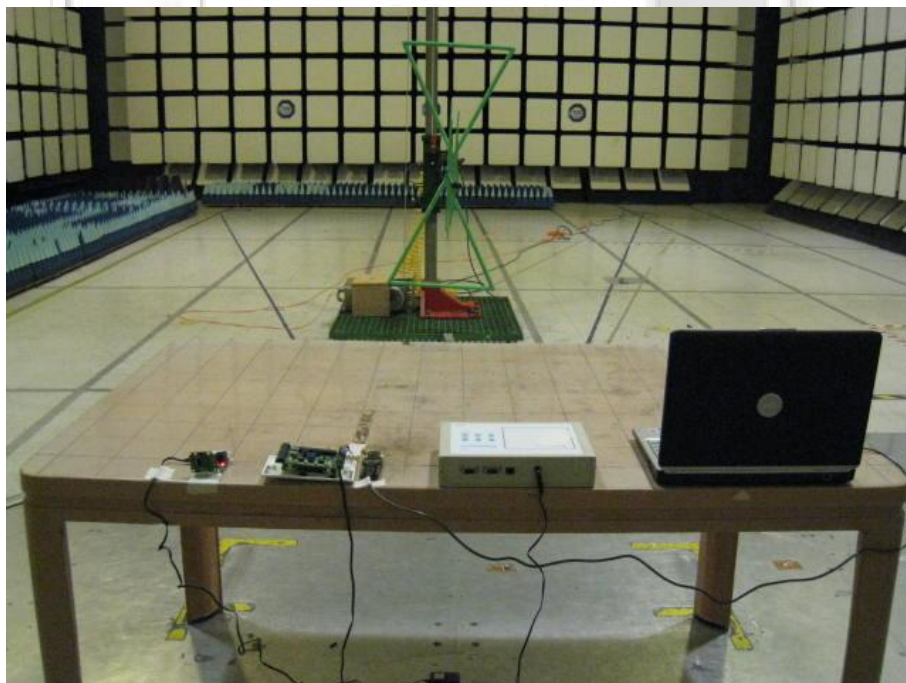
Sample Calculation Example

At 300 MHz	Q-P limit (Class B) = 200 μ V/m = 46.0 dB μ V/m
Log-periodic antenna factor & cable loss at 300 MHz = 18.5 dB	
Q-P reading obtained directly from EMI Receiver = 40.0 dB μ V/m (Calibrated level including antenna factors & cable losses)	
Therefore, Q-P margin = 40.0 - 46.0 = -6.0	i.e. 6 dB below Q-P limit

RADIATED EMISSION (FUNDAMENTAL AND HARMONICS) TEST



Radiated Emissions Test Setup (Front View)



Radiated Emissions Test Setup (Rear View)

RADIATED EMISSION (FUNDAMENTAL AND HARMONICS) TEST

47 CFR FCC Part 15.249(a) Radiated Emission (Fundamental and Harmonics) Results

Test Input Power	110V 60Hz	Temperature	24°C
Test Distance	3m	Relative Humidity	60%
Operating Mode	Transmit @ 919.8MHz	Atmospheric Pressure	1030mbar
Model	SMN-870	Tested By	Zechs Ng Chee Siong

Spurious Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dB μ V/m)	Q-P Margin (dB)	Azimuth (Degrees)	Height (cm)	Polarisation (H/V)	Note
919.8000	46.1	-47.9	148	207	V	Fundamental

Fundamental and harmonics field strength above 1GHz

Frequency (MHz)	Peak Value (dB μ V/m)	Average Value (dB μ V/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)	Note
1839.6000	26.3	25.7	-28.3	303	165	V	Harmonics
2759.4000	26.2	24.3	-29.7	277	100	V	Harmonics
3679.2000	28.6	23.7	-30.3	192	288	V	Harmonics
4599.0000	31.0	30.4	-23.6	8	312	V	Harmonics
5518.8000	31.6	29.1	-24.9	233	399	V	Harmonics
6438.6000	33.7	32.8	-21.2	355	100	V	Harmonics

Test Input Power	110V 60Hz	Temperature	24°C
Test Distance	3m	Relative Humidity	60%
Operating Mode	Transmit @ 925.0MHz	Atmospheric Pressure	1030mbar
Model	SMN-870	Tested By	Zechs Ng Chee Siong

Spurious Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dB μ V/m)	Q-P Margin (dB)	Azimuth (Degrees)	Height (cm)	Polarisation (H/V)	Note
924.9900	39.6	-54.4	303	165	V	Fundamental

Fundamental and harmonics field strength above 1GHz

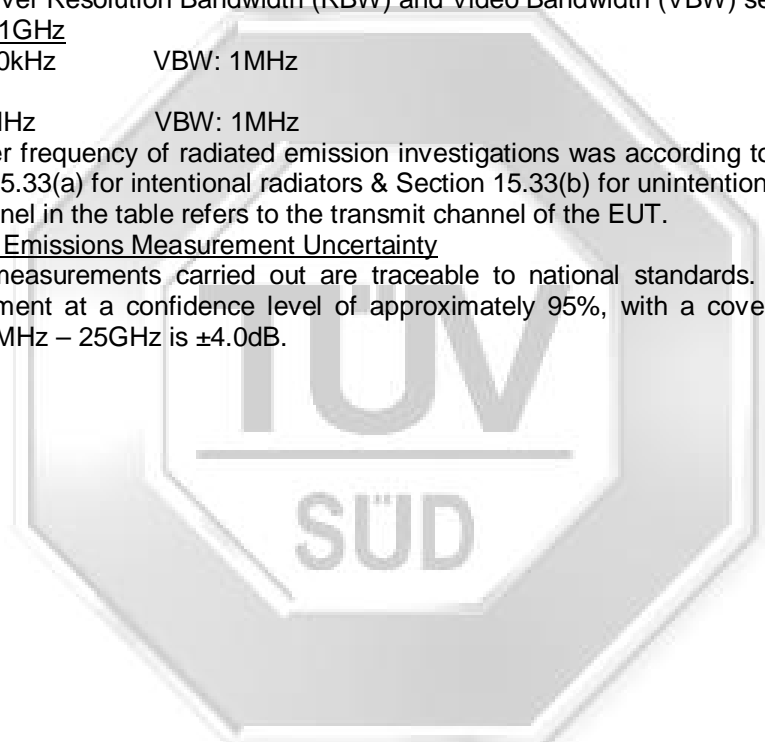
Frequency (MHz)	Peak Value (dB μ V/m)	Average Value (dB μ V/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)	Note
1850.0000	26.5	22.6	-31.4	122	100	V	Harmonics
2775.0000	26.2	25.3	-28.7	143	101	V	Harmonics
3700.0000	28.1	24.7	-29.3	160	101	V	Harmonics
4625.0000	31.9	30.6	-23.4	138	313	V	Harmonics
5550.0000	33.9	32.5	-21.5	285	313	V	Harmonics
6475.0000	34.6	33.6	-20.4	78	188	V	Harmonics



RADIATED EMISSION (FUNDAMENTAL AND HARMONICS) TEST

Notes

1. All possible modes of operation were investigated. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. Quasi-peak measurement was used for frequency measurement up to 1GHz. Average and peak measurements were used for emissions above 1GHz. The average measurement was done by measuring the absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
3. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
4. EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:
30MHz - 1GHz
RBW: 120kHz VBW: 1MHz
>1GHz
RBW: 1MHz VBW: 1MHz
5. The upper frequency of radiated emission investigations was according to requirements stated in Section 15.33(a) for intentional radiators & Section 15.33(b) for unintentional radiators.
6. The channel in the table refers to the transmit channel of the EUT.
7. Radiated Emissions Measurement Uncertainty
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 30MHz – 25GHz is ± 4.0 dB.



Test Report No. 7191016180-EEC11/03
dated 23 Nov 2011



PSB Singapore

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July 2011





EUT PHOTOGRAPHS / DIAGRAMS

ANNEX A

EUT PHOTOGRAPHS FOR BITS READER MODEL SMN-870



7191016180

Front View



7191016180

Rear View

EUT PHOTOGRAPHS / DIAGRAMS

ANNEX A

EUT PHOTOGRAPHS FOR BITS READER MODEL SMN-870

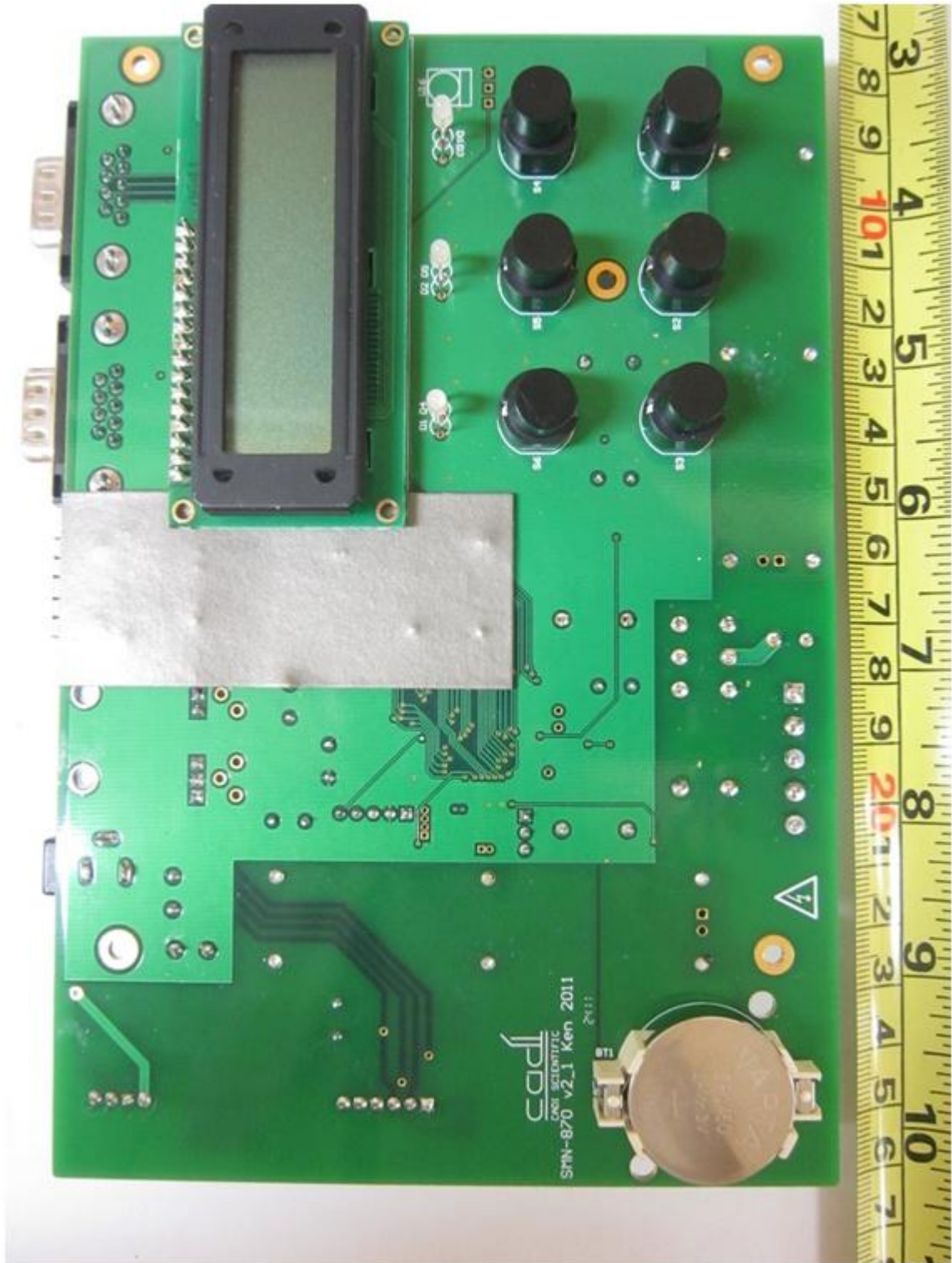


EUT Internal View

EUT PHOTOGRAPHS / DIAGRAMS

ANNEX A

EUT PHOTOGRAPHS FOR BITS READER MODEL SMN-870

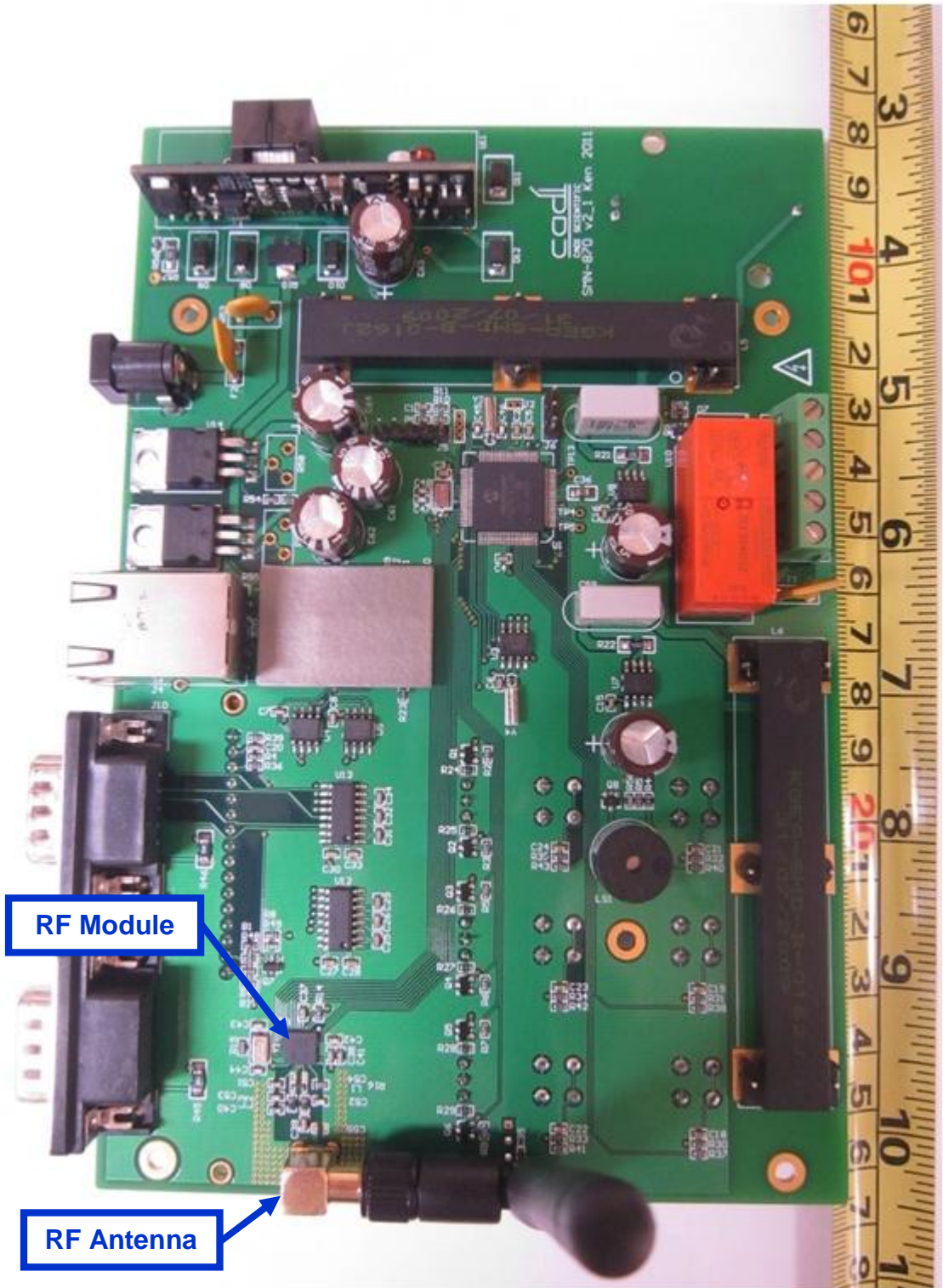


Main-Board PCB Component Side

EUT PHOTOGRAPHS / DIAGRAMS

ANNEX A

EUT PHOTOGRAPHS FOR BITS READER MODEL SMN-870



Main-Board PCB Trace Side



FCC LABEL & POSITION

ANNEX B

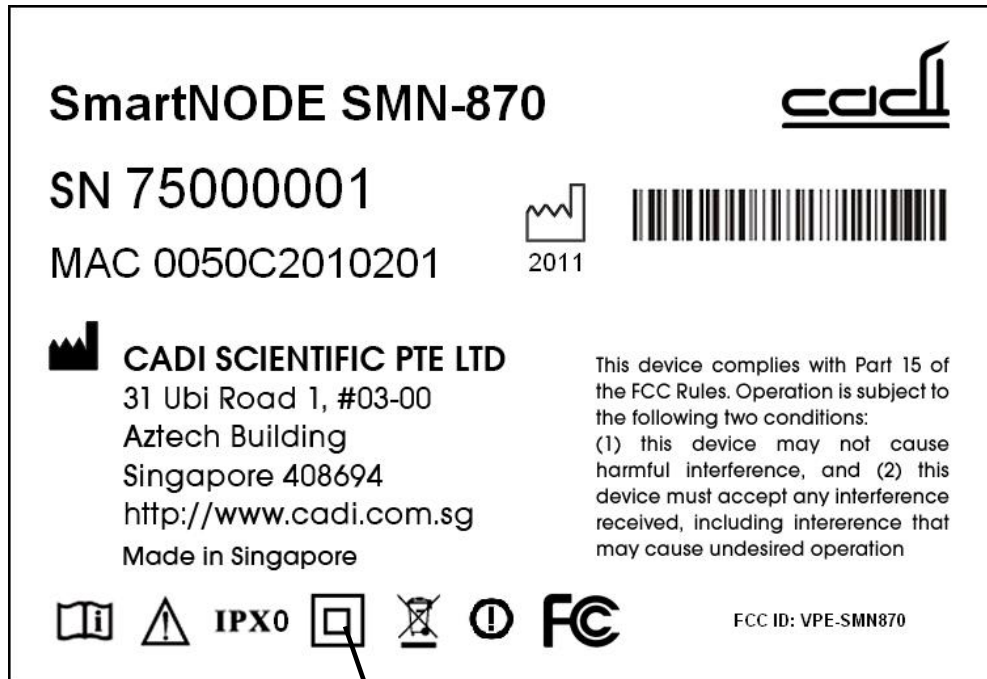


FCC LABEL & POSITION

ANNEX B

Labelling requirements per Section 2.925 & 15.19

The label shown will be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase.



Sample Label



Physical Location of FCC Label on EUT



FCC LABEL & POSITION

ANNEX B





**USER MANUAL TECHNICAL DESCRIPTION BLOCK
& CIRCUIT DIAGRAM**

ANNEX C



ANNEX C
USER MANUAL
TECHNICAL DESCRIPTION
BLOCK & CIRCUIT DIAGRAMS
(Please refer to manufacturer for details)