FCC CoC TEST REPORT

Applicant	:	**DUALi Inc.**
Applicant's Address	:	1-309 Innoplex, 552 Woncheon-dong, Youngtong-gu, Suwon, Gyeonggi-do
Manufacturer	:	**DUALi Inc.**
Manufacturer's Address	:	1-309 Innoplex, 552 Woncheon-dong, Youngtong-gu, Suwon, Gyeonggi-do
EUT		
Type of Product	:	SMART CARD READER
Model	:	DE-ABCM
Buyer Model/ Multi Model Number	:	N/A
FCC ID	:	SWUDE-ABCM-S
Serial Number	:	Proto Type
Test Standards:	:	**ANSI C63.4 / 2009**
Rule Parts:	:	**FCC Part 15 Subpart B – Unintentional Radiators**
Equipment Class:	:	**Class B personal computers and peripherals**
Test Date(s)	:	Oct. 7. 2011 ~ Oct. 10. 2011
Test Report	:	SKTEFC-111011-120
Date of Issue	:	Oct. 11. 2011
Overall Test Result	:	**Compliance**

The above equipment was tested by SK Tech Co., Ltd. For compliance with the requirements set forth in FCC Part15 Subpart B mentioned above. The test results show the maximum emission levels emanating from the equipment are within the compliance requirements. The test results of this report only apply to the specific sample tested under stated test conditions.

H.P. Kim / **Test Engineer**

S.H. Yoon / **Technical Manager**

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REVISION HISTORY

Rev. #	Changes of Content	Section Affected	Reviewed by	Date
0	Original Release	All	S.H.Yoon	Oct. 11. 2011

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SUMMARY OF TEST RESULT

EMISSION			
STANDARD	**ITEM**	**CLASS/SEVERITY**	**RESULT**
ANSI C63.4 / 2009 FCC Part 15 Subpart B	AC Power line Conducted Emission Test	Meets Class B limits and minimum passing margin is 13.53 dB at 1.160 MHz.	PASS
	Radiated Emission Test	Meets Class B limits and minimum passing margin is 11.06 dB at 433.90 MHz.	PASS

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1. General

The tests listed in this report have been performed and the results recorded by SK Tech Co., Ltd. in accordance with the procedures stated in each test requirement and specification. As a result, the subject product has been verified to comply with each test specification. The test results relate only to the items tested.

We attest to the accuracy of data. All measurements reported herein were performed by SK TECH Co., Ltd. and were made under Technical Manager's supervision. We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Facilities and Accreditations

2.1 Facilities

All of the measurements described in this report were performed at SK Tech Co., Ltd located in 820-2, Wolmoon Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea.

The test site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. It complies with the Normalized Site Attenuation requirements given in ANSI/IEEE C63.4. The measuring equipment conforms to CISPR 16 requirements for Electromagnetic Noise and Field Strength Instrumentation.

2.2 Accreditations

Our testing laboratories are accredited by the following accreditation bodies in accordance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.

Korea **: KOLAS No.191**

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USA : **NVLAP Lab Code: 200220-0**

The laboratories have been also notified to FCC by RRL as a Conformity Assessment Body, and designated to perform compliance testing on equipment subject to Declaration of Conformity (DOC) and Certification under Parts 15 and 18 of the FCC Rules.

2.3 Test and Measurement Instruments Used

- **Conducted Disturbance**

Name of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESHS10	862970/019	07.2012
Artificial Mains Network	ESH2-Z5	834549/011	07.2012
Artificial Mains Network	ESH3-Z5	836679/018	07.2012
Impedance Stabilization Network	ISN T8	24806	02.2012

- **Radiated Disturbance**

Name of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESVS40	100277	07.2012
Amplifier	8447F	3113A05153	07.2012
Trilog-Broadband Antenna	VULB9168	9168-230	05.2012
Antenna Turntable Driver	5907	91X518	N/A
Antenna Turntable controller	5906	91X519	N/A
EMI TEST RECEIVER	ESPI	101206	07.2012
Log-Periodic Antenna	LP960-2	A080510	01.2012
Pre-Amplifier	MLA-100M18-B02-38	1539546	03.2012

3. EUT Description

The following information has been supplied by the applicant.

Product Specification

Smart Card Interface	Contactless Smart Card (ISO 14443 A/B), MIFARE, FeliCa 2 SAM CARD (ISO7816, T=0,T=1)
Host Interface	USB 2.0 Full Speed (12Mbps), also support USB 1.1
Host Communication	PC/SC or Proprietary
CPU	ARM 32-bit Cortex-M3(72MHz), 64Kbytes Flash, 20Kbytes SRAM
Input Voltage	5V, USB Bus powered
Transmitting frequency	13.56 MHz (nominal)
Current	MAX 250mA depend on antenna size
Connection	4 pin * 2 mm for USB 5 pin * 2 mm for RS-232
Size	70(W) * 45(L) * 8(H)mm
Antenna Matching	Direct matching
Operating Temperature	-20~60℃

4. EUT Operating Conditions

During testing, the EUT was powered with, DC 5 V USB Bus. The worst case test configuration and mode of operation was used all testing. Unless otherwise noted elsewhere in this report, this selection will apply to all testing.

4.1 EUT Operation Modes

The EUT is connected to the PC, and run the test program. Then, put the RFID card on the EUT. Check the connection between EUT and PC through test program. In the testing mode (TYPE A RFID card and TYPE B RFID card), the TYPE B RFID card was tested which was the worst case of test condition.

4.2 Ancillary Equipment

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests.

#	Equipment	Manufacturer	Model No.	Serial No.
1	PC	DELL	D07M	199LRBX
2	LCD Monitor	INNOLUX DISPLAY CORPORATION	E198WFPf	CN-0DM271-72872-813-0KVS
3	Keyboard	CHICONY ELECTRONICS CO., LTD	KU-0225	0004885
4	Mouse	Logitech Inc	M-UV96	N/A
5	RFID CARD(A)	N/A	N/A	N/A
6.	RFID CARD(B)	N/A	N/A	N/A

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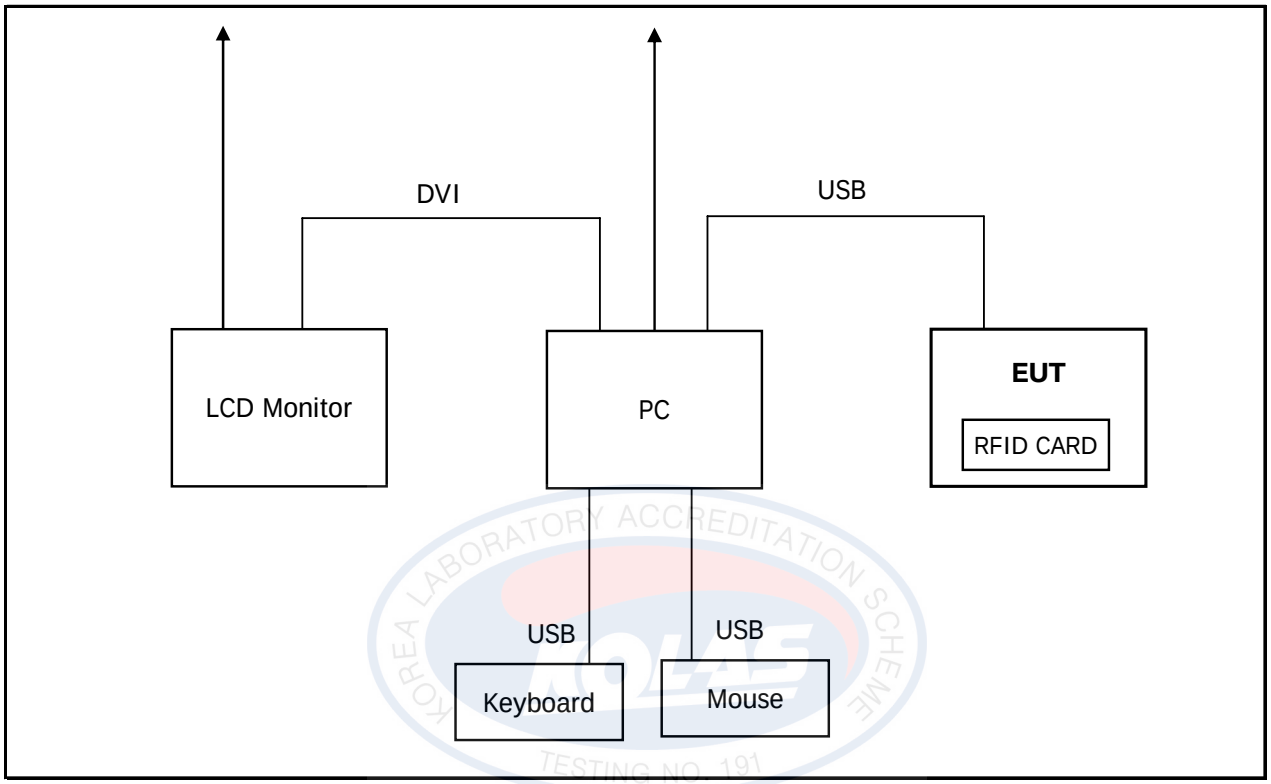
4.3 Interconnection and I/O cables

#	START		END		Cable	
	Name	I/O Port	Name	I/O Port	Length(m)	Shielded/ Unshielded
1	EUT	USB	PC		1.2	Unshielded
2	PC	DVI	LCD Monitor		1.7	Shielded
3	〃	USB	Keyboard		1.9	Shielded
4	〃	USB	Mouse		1.7	Shielded
5	〃	Power	AC Line		1.8	Unshielded
6	LCD Monitor	Power	AC Line		1.8	Unshielded

4.4 Test Configuration

For the actual test configuration, please refer to the related item-photographs of the test setup.



[System Block Diagram of Test Configuration]

4.5 Uncertainty

1) Radiated disturbances from 30 MHz to 1000 MHz at a distance of 3 m and 10 m Expanded Uncertainty

U = k * Uc(xi) = 2 * 2.10 = 4.20 dB

The coverage factor k =2 yields approximately a 95 % level of confidence.

2) Conducted disturbance from 150 KHz to 30 MHz using a 50 Ω/50 μH AMN Expanded uncertainty

U= k * Uc(xi) = 2 * 1.57 = 3.14 dB

The coverage factor k =2 yields approximately a 95 % level of confidence.

※ When the measured emission is positioned within the range of the uncertainty of measurement from the emission limit, the uncertainty of measurement shall be concerned as follow.

Compliance or non-compliance with a disturbance limit shall be determined in the following manner.

If Ulab is less than or equal to Ucispr
- Compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

If Ulab is greater than Ucispr
- Compliance is deemed to occur if no measured disturbance, increased by (Ulab - Ucispr), exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance, increased by (Ulab - Ucispr), exceeds the disturbance limit.

※ If the measurement value is lower or equal to the limit, the EUT is considered to pass the test.

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5. Test Results EMISSION

5.1 Conducted Disturbance at mains terminals

Result		PASS

Test Environment	Temperature	23 ℃
	Humidity	42 % R.H.

Test Procedure	The line-conducted facility is located inside a 2.6 m x 3.6 m x 7.0 m shielded room. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 604-05. A wooden table with 80 cm height is placed 40 cm away from the vertical conducting plane and 1.5 m away from the other side of the shielded room. A Line Impedance Stabilization Network(LISN) that provided a 50ohm/ 50μH coupling impedance are bonded to the shielded room. The EUT was connected to the mains power through a LISN that provided a 50 ohm/ 50 μH coupling impedance for the measuring instrument and the ancillary equipment was also connected to the mains power through the LISN that provided a 50 ohm/ 50 μH coupling impedance with 50 ohm termination. The EMI test receiver was set to frequency range from 150 kHz to 30 MHz and bandwidth at 9 kHz and detector as Quasi-Peak or Average. The AC power line conducted emission was measured between each power line and ground at the power terminal. The initial testing identified the frequency that has the highest emission relative to the limits while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration. The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

Conducted Disturbance Test data

<Quasi-Peak>

Frequency (MHz)	Reading (dBμV)	Line	C/F (dB)	C/L (dB)	Actual (dBμV)	Limit (dBμV)	Margin (dB)
0.210	39.69	N	0.12	0.02	39.83	63.21	23.38
1.055	36.05	L	0.16	0.07	36.28	56.00	19.72
1.160	35.66	L	0.16	0.07	35.89	56.00	20.11
1.265	30.58	L	0.16	0.07	30.81	56.00	25.19
14.030	36.05	L	0.46	0.23	36.74	60.00	23.26
23.895	37.00	L	0.68	0.23	37.91	60.00	22.09

<Average>

Frequency (MHz)	Reading (dBμV)	Line	C/F (dB)	C/L (dB)	Actual (dBμV)	Limit (dBμV)	Margin (dB)
0.210	38.87	N	0.12	0.02	39.01	53.21	14.20
1.055	32.15	L	0.16	0.07	32.38	46.00	13.62
1.160	32.24	L	0.16	0.07	32.47	46.00	13.53
14.030	34.30	L	0.46	0.23	34.99	50.00	15.01
15.250	32.05	L	0.46	0.23	32.74	50.00	17.26
23.895	35.61	L	0.68	0.23	36.52	50.00	13.48

▶ NOTE

*** The frequencies used 13.56 MHz**

*** C/F = Correction Factor**

*** C/L = Cable Loss**

*** LINE: L = Line-PE, N = Neutral-PE**

*** Margin Calculation**

Margin (Q.P) = Limit - Actual

[Actual (Q.P) = Reading (Q.P) + C/F + C/L]

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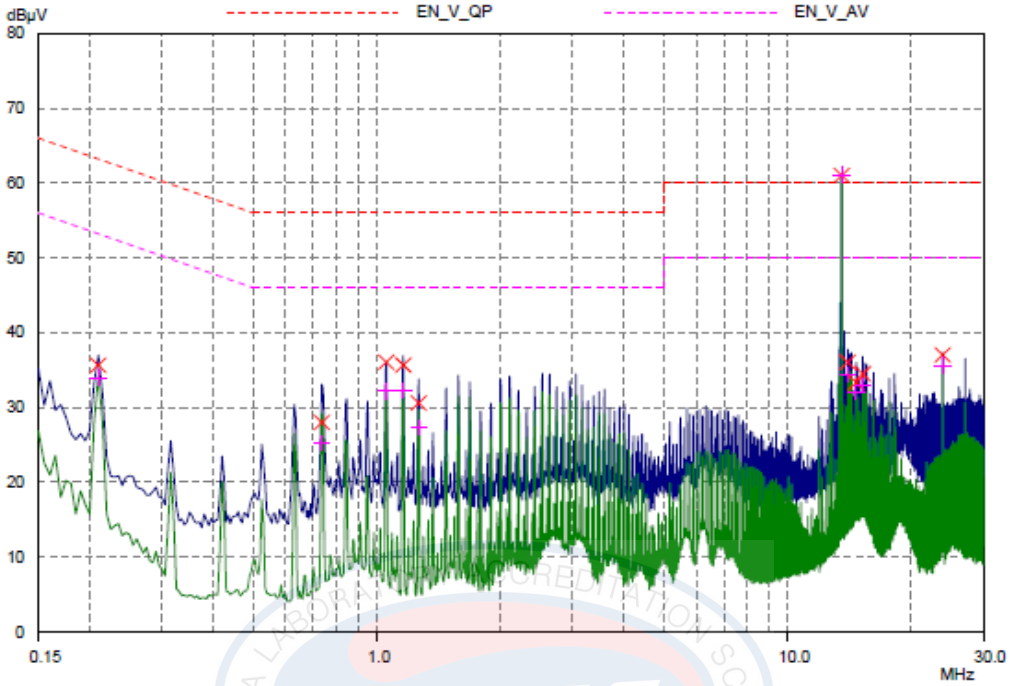
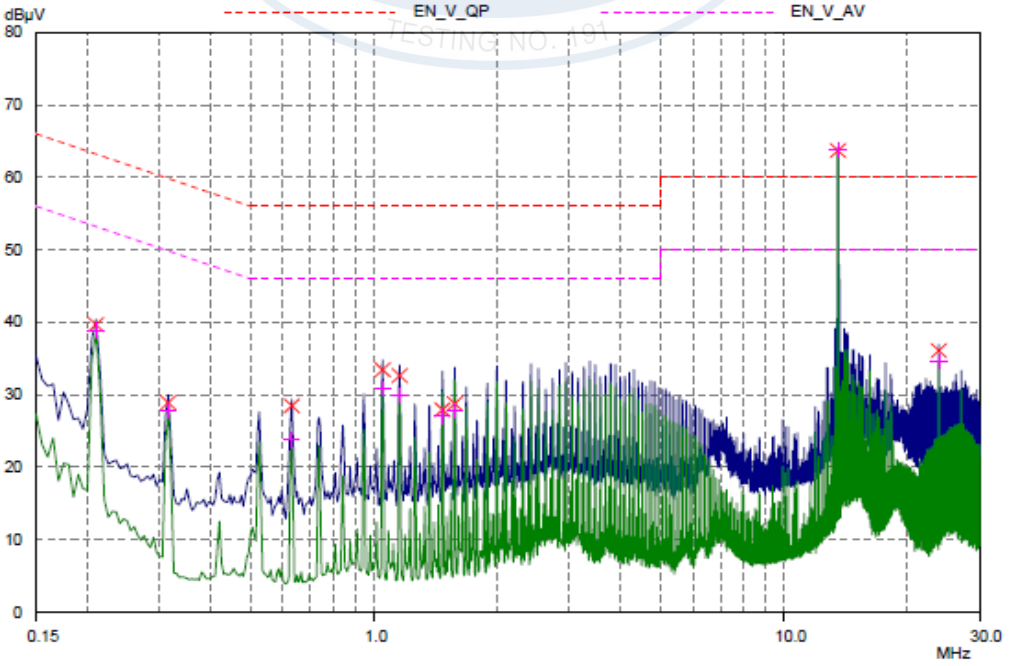
Spectral Diagram, LINE – PE



Spectral Diagram NEUTRAL – PE



5.2 Radiated Disturbance

Result		PASS

Test Environment	**Temperature**	22 ℃
	Humidity	41 % R.H.

Test Procedure	The EUT was placed on a non-conductive table with 0.8 m height. The turntable can rotate 360 degree to determine the position of the maximum emission level. The EUT was set 10 meters away from the receiving antenna that was mounted on a non-conductive master. The antenna can move up and down between 1 to 4 meters to find out the position of the maximum emission level. The floor of the Open Area Test Site(OATS) is covered by a conductive metal ground plane and OATS comply with the Normalized Site Attenuation requirements. The spectrum was scanned from 30 to 1000 MHz using Trilog-Broadband Antenna. Above 1 GHz, linearly polarized Log-Periodic Antenna was used. The initial testing identified the frequency that has the highest emission relative to the limits while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration. The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

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Radiated Disturbance Test data – below 1 GHz

Frequency	Reading	Pol.	Height	Amp Gain	Correction Factor		Data	Limits	Margin
[MHz]	[dBµV]		[m]	[dB]	Antenna	Cable	[dBµV / m]	[dBµV / m]	[dB]
189.93	42.25	H	1.85	27.81	10.79	1.63	26.86	43.52	16.66
216.96	38.62	H	1.62	27.73	10.71	1.75	23.35	46.02	22.67
406.78	43.46	V	1.17	28.25	13.89	2.68	31.78	46.02	14.24
433.90	46.20	H	1.00	28.43	14.47	2.72	34.96	46.02	11.06
542.36	38.52	H	1.00	28.87	16.64	2.97	29.26	46.02	16.76
569.48	43.14	H	2.04	28.88	17.05	3.03	34.34	46.02	11.68

NOTES:

1. All other emission are non-significant.
2. Measurements using CISPR Quasi-Peak mode.
   (Resolution bandwidth: 120 kHz)
3. H = Horizontal, V = Vertical Polarization.
4. Data = Reading – Amp Gain + Correction Factor (Antenna + Cable)
5. Margin = Limits - Data
6. Radiated Measurements at 3-meters.

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Radiated Disturbance Test data – above 1 GHz

Frequency [MHz]	Reading [dBμV]	Pol.	Height [m]	Amp Gain [dB]	Correction Factor		Data [dBμV / m]	Limits [dBμV / m]	Margin [dB]
					Antenna	Cable			
No emission was detected at a level greater than 20dB below limit.									

NOTES:

1. All other emission are non-significant.
2. Measurements using peak and average mode.
   (Resolution bandwidth: 1 MHz, Video bandwidth: 1 MHz)
3. H = Horizontal, V = Vertical Polarization
4. Data = Real Reading – Amp Gain + Correction Factor (Antenna + Cable)
5. Margin = Limits – Data
6. Radiated Measurements at 3-meters

Appendices

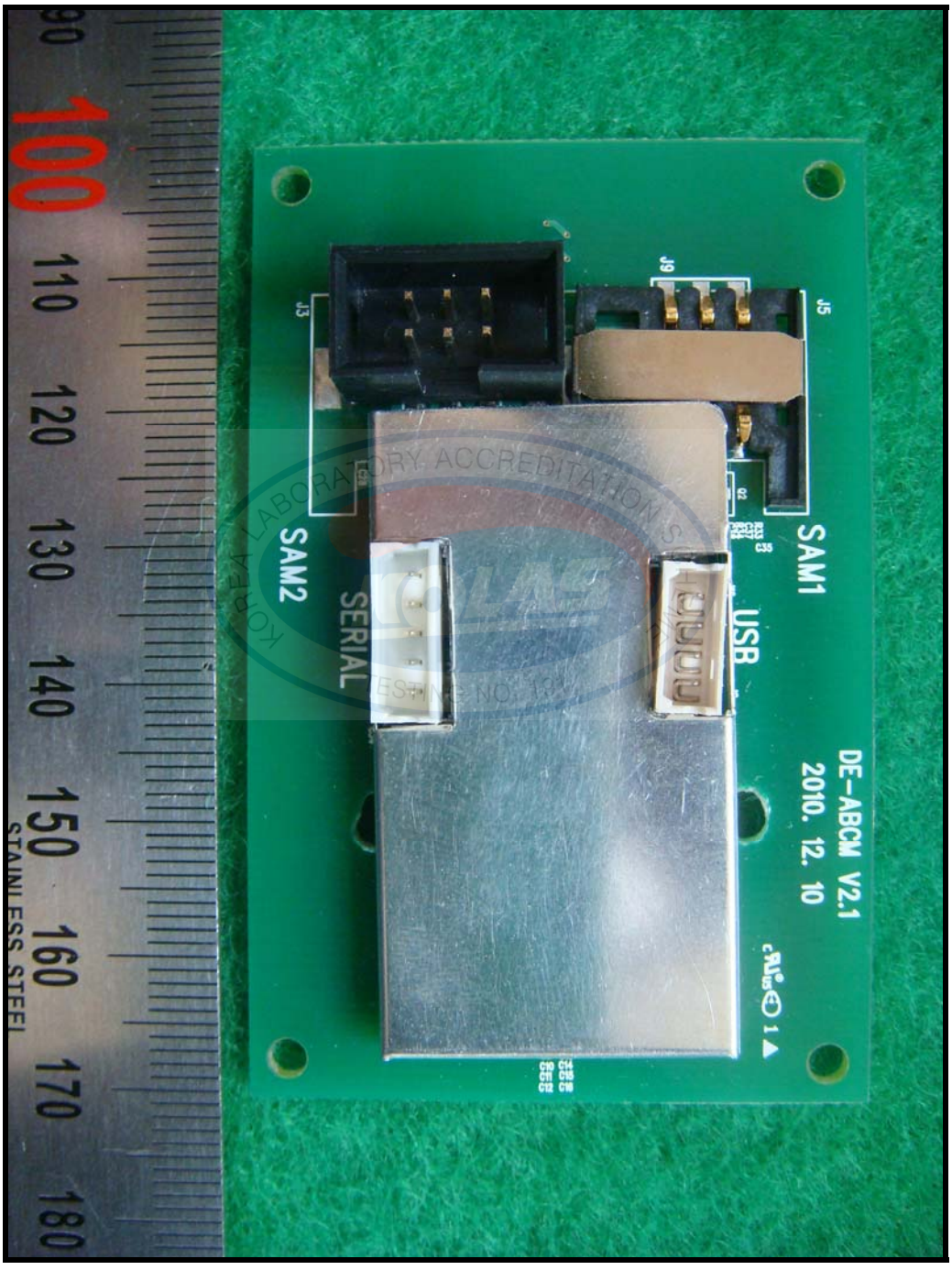
A1: Photograph of test set-Up

A1.1: Conducted Disturbance

A1.2: Radiated Disturbance

A2: EUT Photographs

A2.1: <Front view>



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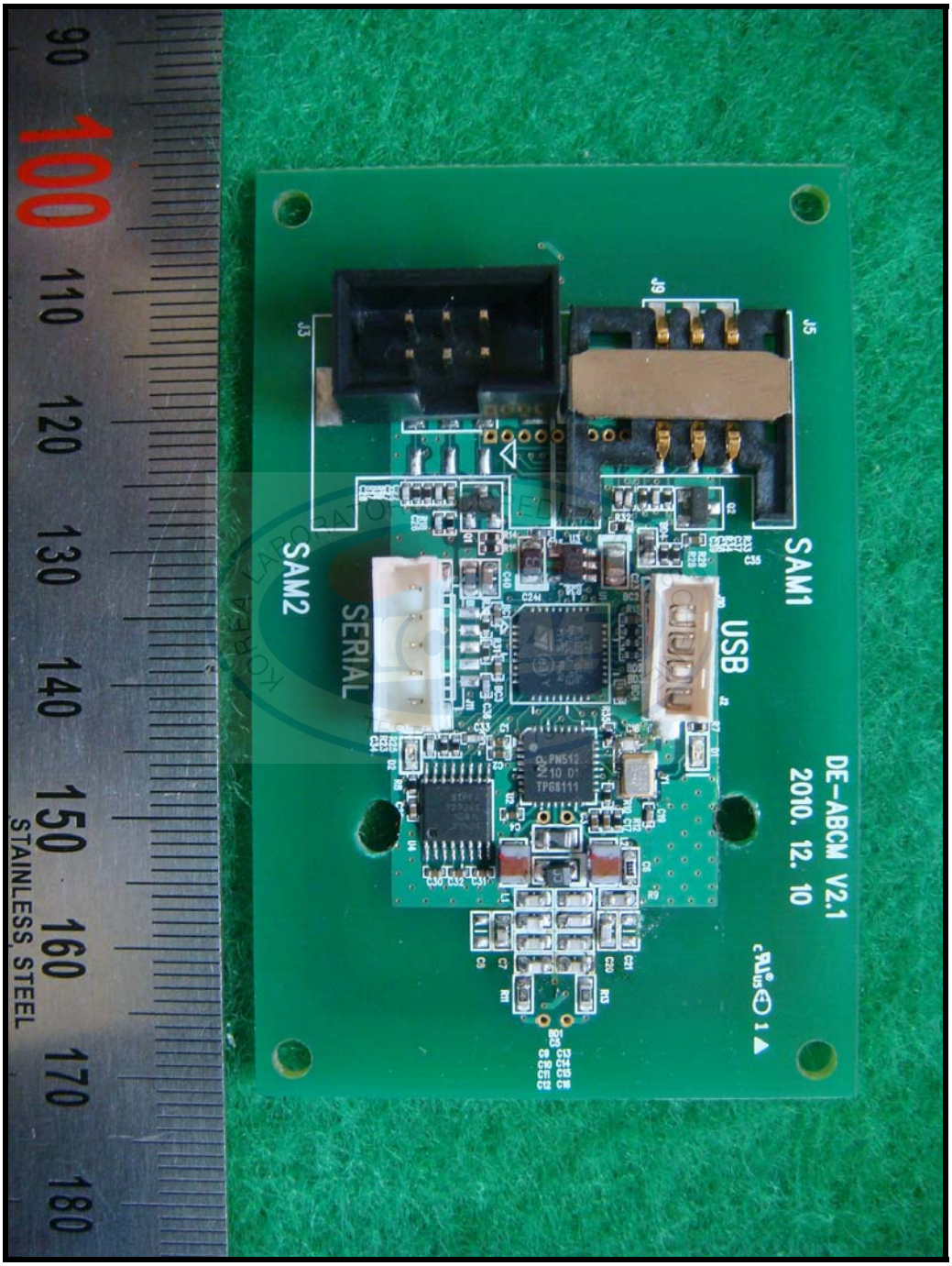
A2.1: <Front view(Remove)>



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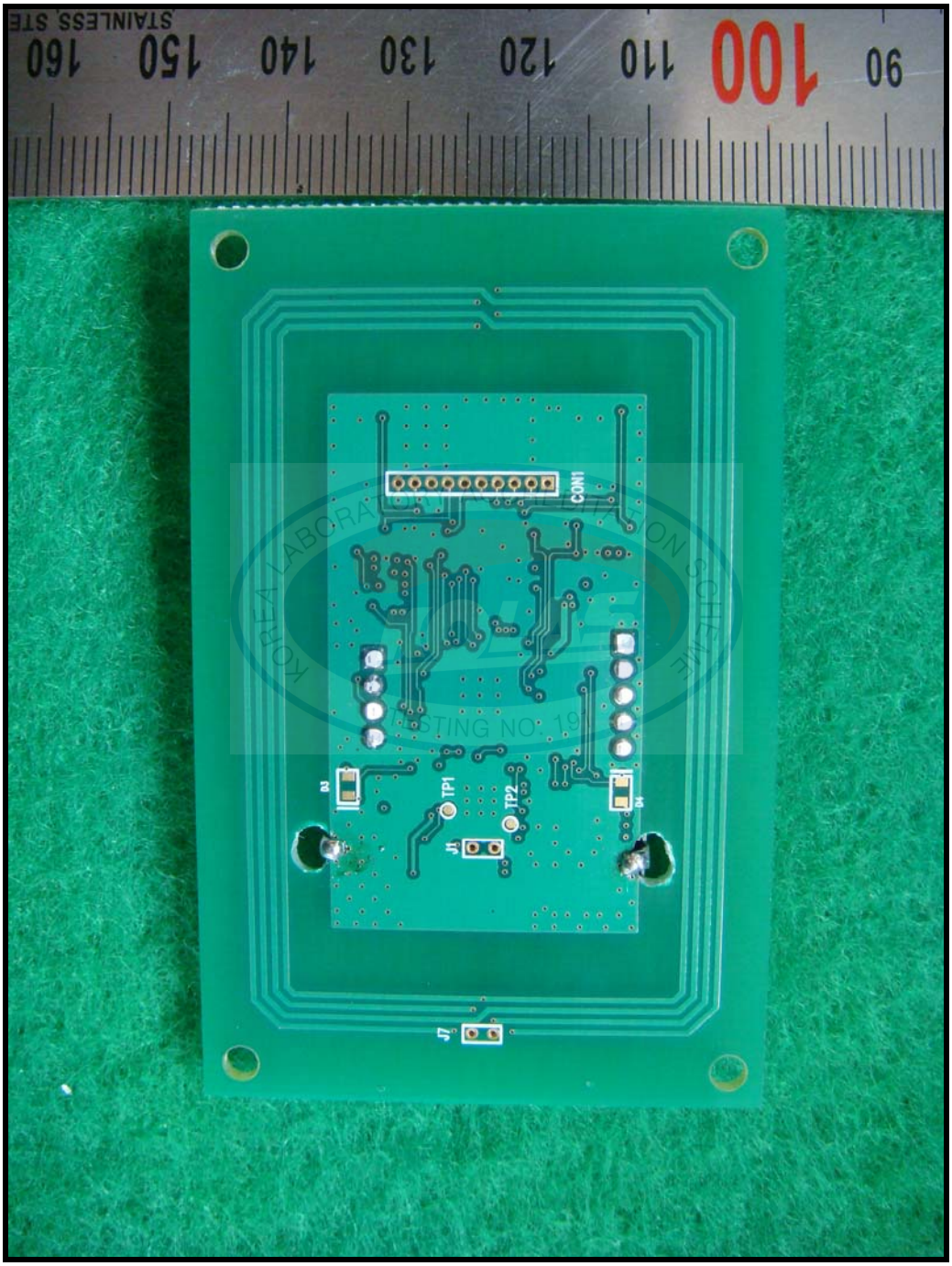
A2.3: <Rear view>



A2.4: <Cable>

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A2.5: <RFID CARD (A) Front>

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A2.6: <RFID CARD (A) Rear>

A2.7: <RFID CARD (B) Front>

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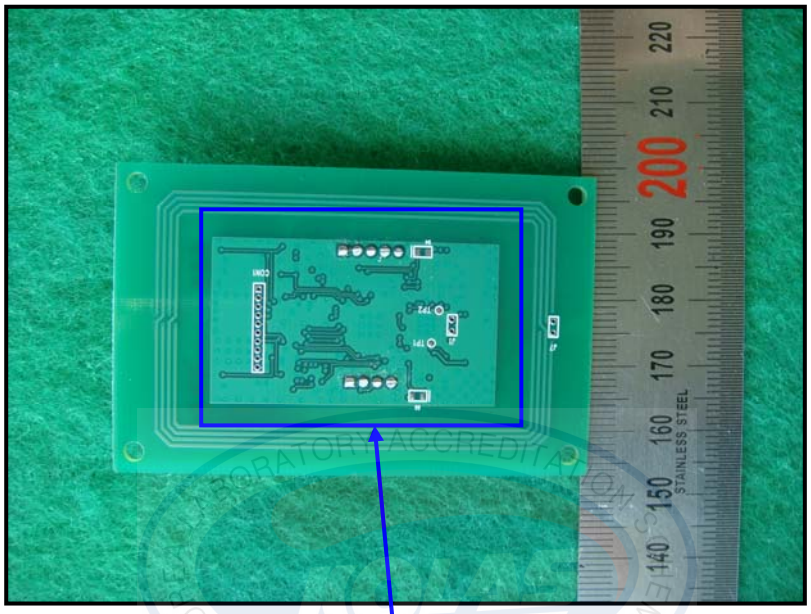
A2.8: <RFID CARD (B) Rear>

A2.9: Photographs of Label Information



FCC ID : SWUDE-ABCM-S CE 1177
SMART CARD Reader
S/W : 111011 5V ⎓, 250mA
Model Name : DE-ABCM
Manufacturer : DUALi Inc. / KOREA
Manufactured Date : 2011.06.03
Product No : DEABCM00000001
Technical support : +82-31-2130074

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES.
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

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REVISION HISTORY

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2. Facilities and Accreditations

2.1 Facilities

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Artificial Mains Network	ESH3-Z5	836679/018	07.2012
Impedance Stabilization Network	ISN T8	24806	02.2012

- **Radiated Disturbance**

Name of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESVS40	100277	07.2012
Amplifier	8447F	3113A05153	07.2012
Trilog-Broadband Antenna	VULB9168	9168-230	05.2012
Antenna Turntable Driver	5907	91X518	N/A
Antenna Turntable controller	5906	91X519	N/A
EMI TEST RECEIVER	ESPI	101206	07.2012
Log-Periodic Antenna	LP960-2	A080510	01.2012
Pre-Amplifier	MLA-100M18-B02-38	1539546	03.2012

3. EUT Description

The following information has been supplied by the applicant.

Product Specification

Smart Card Interface	Contactless Smart Card (ISO 14443 A/B), MIFARE, FeliCa 2 SAM CARD (ISO7816, T=0,T=1)
Host Interface	USB 2.0 Full Speed (12Mbps), also support USB 1.1
Host Communication	PC/SC or Proprietary
CPU	ARM 32-bit Cortex-M3(72MHz), 64Kbytes Flash, 20Kbytes SRAM
Input Voltage	5V, USB Bus powered
Transmitting frequency	13.56 MHz (nominal)
Current	MAX 250mA depend on antenna size
Connection	4 pin * 2 mm for USB 5 pin * 2 mm for RS-232
Size	70(W) * 45(L) * 8(H)mm
Antenna Matching	Direct matching
Operating Temperature	-20~60℃

4. EUT Operating Conditions

During testing, the EUT was powered with, DC 5 V USB Bus. The worst case test configuration and mode of operation was used all testing. Unless otherwise noted elsewhere in this report, this selection will apply to all testing.

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The EUT is connected to the PC, and run the test program. Then, put the RFID card on the EUT. Check the connection between EUT and PC through test program. In the testing mode (TYPE A RFID card and TYPE B RFID card), the TYPE B RFID card was tested which was the worst case of test condition.

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The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests.

#	Equipment	Manufacturer	Model No.	Serial No.
1	PC	DELL	D07M	199LRBX
2	LCD Monitor	INNOLUX DISPLAY CORPORATION	E198WFPf	CN-0DM271-72872-813-0KVS
3	Keyboard	CHICONY ELECTRONICS CO., LTD	KU-0225	0004885
4	Mouse	Logitech Inc	M-UV96	N/A
5	RFID CARD(A)	N/A	N/A	N/A
6.	RFID CARD(B)	N/A	N/A	N/A

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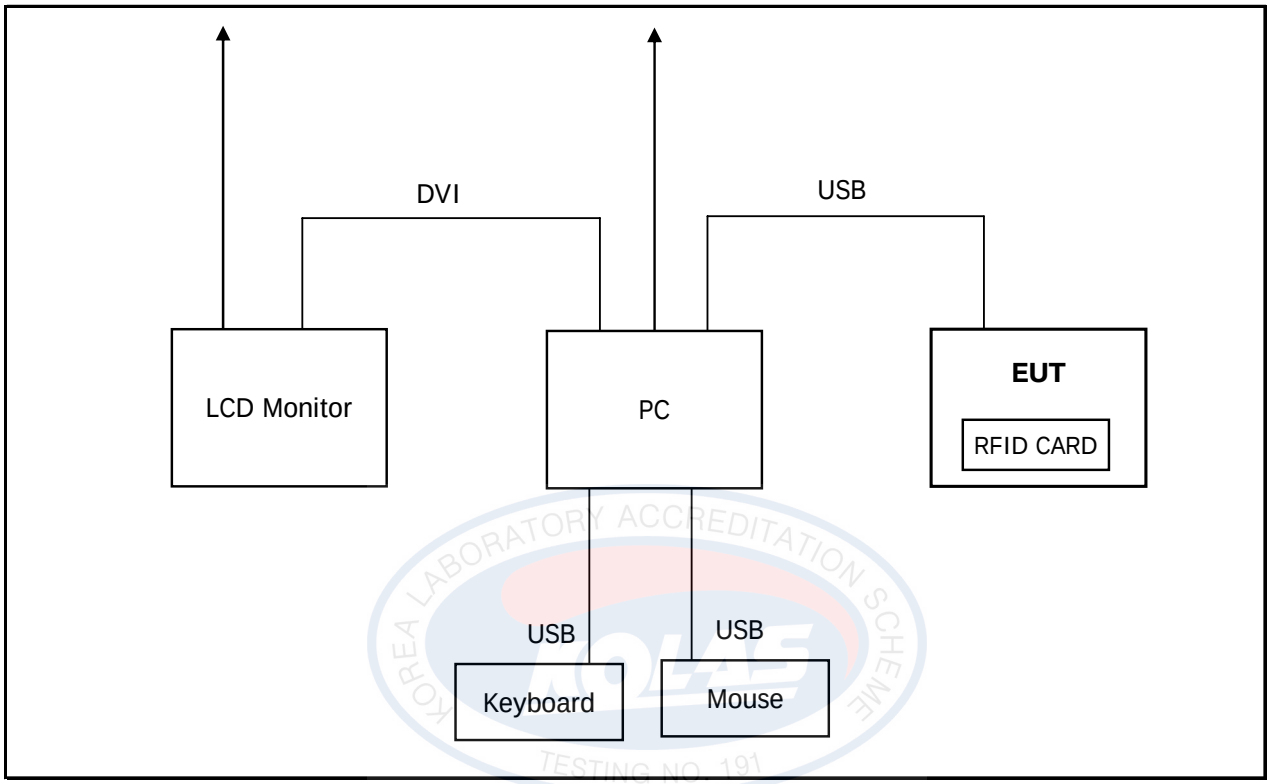
4.3 Interconnection and I/O cables

#	START		END		Cable	
	Name	I/O Port	Name	I/O Port	Length(m)	Shielded/ Unshielded
1	EUT	USB	PC		1.2	Unshielded
2	PC	DVI	LCD Monitor		1.7	Shielded
3	〃	USB	Keyboard		1.9	Shielded
4	〃	USB	Mouse		1.7	Shielded
5	〃	Power	AC Line		1.8	Unshielded
6	LCD Monitor	Power	AC Line		1.8	Unshielded

4.4 Test Configuration

For the actual test configuration, please refer to the related item-photographs of the test setup.



[System Block Diagram of Test Configuration]

4.5 Uncertainty

1) Radiated disturbances from 30 MHz to 1000 MHz at a distance of 3 m and 10 m Expanded Uncertainty

U = k * Uc(xi) = 2 * 2.10 = 4.20 dB

The coverage factor k =2 yields approximately a 95 % level of confidence.

2) Conducted disturbance from 150 KHz to 30 MHz using a 50 Ω/50 μH AMN Expanded uncertainty

U= k * Uc(xi) = 2 * 1.57 = 3.14 dB

The coverage factor k =2 yields approximately a 95 % level of confidence.

※ When the measured emission is positioned within the range of the uncertainty of measurement from the emission limit, the uncertainty of measurement shall be concerned as follow.

Compliance or non-compliance with a disturbance limit shall be determined in the following manner.

If Ulab is less than or equal to Ucispr
- Compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

If Ulab is greater than Ucispr
- Compliance is deemed to occur if no measured disturbance, increased by (Ulab - Ucispr), exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance, increased by (Ulab - Ucispr), exceeds the disturbance limit.

※ If the measurement value is lower or equal to the limit, the EUT is considered to pass the test.

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5. Test Results EMISSION

5.1 Conducted Disturbance at mains terminals

Result		PASS

Test Environment	Temperature	23 ℃
	Humidity	42 % R.H.

Test Procedure	The line-conducted facility is located inside a 2.6 m x 3.6 m x 7.0 m shielded room. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 604-05. A wooden table with 80 cm height is placed 40 cm away from the vertical conducting plane and 1.5 m away from the other side of the shielded room. A Line Impedance Stabilization Network(LISN) that provided a 50ohm/ 50μH coupling impedance are bonded to the shielded room. The EUT was connected to the mains power through a LISN that provided a 50 ohm/ 50 μH coupling impedance for the measuring instrument and the ancillary equipment was also connected to the mains power through the LISN that provided a 50 ohm/ 50 μH coupling impedance with 50 ohm termination. The EMI test receiver was set to frequency range from 150 kHz to 30 MHz and bandwidth at 9 kHz and detector as Quasi-Peak or Average. The AC power line conducted emission was measured between each power line and ground at the power terminal. The initial testing identified the frequency that has the highest emission relative to the limits while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration. The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

Conducted Disturbance Test data

<Quasi-Peak>

Frequency (MHz)	Reading (dBμV)	Line	C/F (dB)	C/L (dB)	Actual (dBμV)	Limit (dBμV)	Margin (dB)
0.210	39.69	N	0.12	0.02	39.83	63.21	23.38
1.055	36.05	L	0.16	0.07	36.28	56.00	19.72
1.160	35.66	L	0.16	0.07	35.89	56.00	20.11
1.265	30.58	L	0.16	0.07	30.81	56.00	25.19
14.030	36.05	L	0.46	0.23	36.74	60.00	23.26
23.895	37.00	L	0.68	0.23	37.91	60.00	22.09

<Average>

Frequency (MHz)	Reading (dBμV)	Line	C/F (dB)	C/L (dB)	Actual (dBμV)	Limit (dBμV)	Margin (dB)
0.210	38.87	N	0.12	0.02	39.01	53.21	14.20
1.055	32.15	L	0.16	0.07	32.38	46.00	13.62
1.160	32.24	L	0.16	0.07	32.47	46.00	13.53
14.030	34.30	L	0.46	0.23	34.99	50.00	15.01
15.250	32.05	L	0.46	0.23	32.74	50.00	17.26
23.895	35.61	L	0.68	0.23	36.52	50.00	13.48

▶ NOTE

*** The frequencies used 13.56 MHz**

*** C/F = Correction Factor**

*** C/L = Cable Loss**

*** LINE: L = Line-PE, N = Neutral-PE**

*** Margin Calculation**

Margin (Q.P) = Limit - Actual

[Actual (Q.P) = Reading (Q.P) + C/F + C/L]

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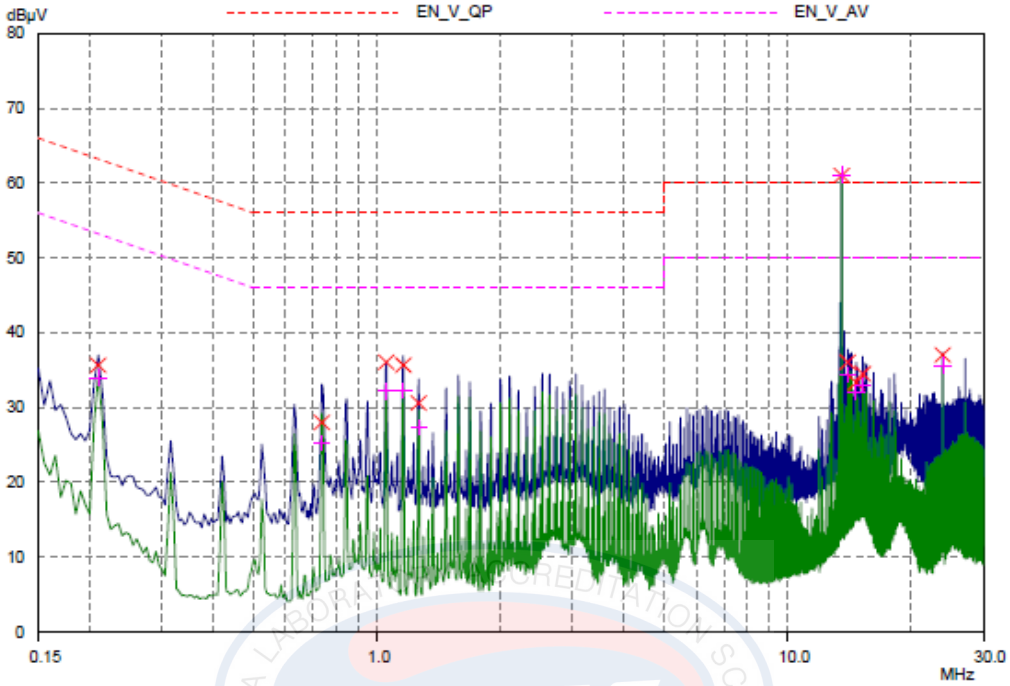
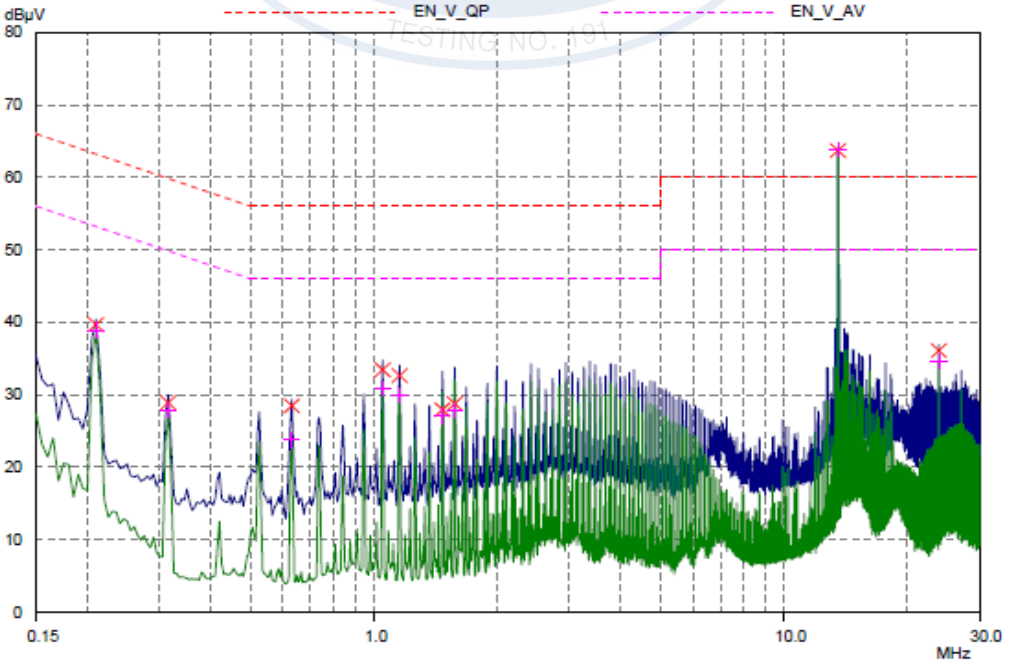
Spectral Diagram, LINE – PE



Spectral Diagram NEUTRAL – PE



5.2 Radiated Disturbance

Result		PASS

Test Environment	**Temperature**	22 ℃
	Humidity	41 % R.H.

Test Procedure	The EUT was placed on a non-conductive table with 0.8 m height. The turntable can rotate 360 degree to determine the position of the maximum emission level. The EUT was set 10 meters away from the receiving antenna that was mounted on a non-conductive master. The antenna can move up and down between 1 to 4 meters to find out the position of the maximum emission level. The floor of the Open Area Test Site(OATS) is covered by a conductive metal ground plane and OATS comply with the Normalized Site Attenuation requirements. The spectrum was scanned from 30 to 1000 MHz using Trilog-Broadband Antenna. Above 1 GHz, linearly polarized Log-Periodic Antenna was used. The initial testing identified the frequency that has the highest emission relative to the limits while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration. The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

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Radiated Disturbance Test data – below 1 GHz

Frequency	Reading	Pol.	Height	Amp Gain	Correction Factor		Data	Limits	Margin
[MHz]	[dBµV]		[m]	[dB]	Antenna	Cable	[dBµV / m]	[dBµV / m]	[dB]
189.93	42.25	H	1.85	27.81	10.79	1.63	26.86	43.52	16.66
216.96	38.62	H	1.62	27.73	10.71	1.75	23.35	46.02	22.67
406.78	43.46	V	1.17	28.25	13.89	2.68	31.78	46.02	14.24
433.90	46.20	H	1.00	28.43	14.47	2.72	34.96	46.02	11.06
542.36	38.52	H	1.00	28.87	16.64	2.97	29.26	46.02	16.76
569.48	43.14	H	2.04	28.88	17.05	3.03	34.34	46.02	11.68

NOTES:

1. All other emission are non-significant.
2. Measurements using CISPR Quasi-Peak mode.
   (Resolution bandwidth: 120 kHz)
3. H = Horizontal, V = Vertical Polarization.
4. Data = Reading – Amp Gain + Correction Factor (Antenna + Cable)
5. Margin = Limits - Data
6. Radiated Measurements at 3-meters.

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Radiated Disturbance Test data – above 1 GHz

Frequency [MHz]	Reading [dBμV]	Pol.	Height [m]	Amp Gain [dB]	Correction Factor		Data [dBμV / m]	Limits [dBμV / m]	Margin [dB]
					Antenna	Cable			
No emission was detected at a level greater than 20dB below limit.									

NOTES:

1. All other emission are non-significant.
2. Measurements using peak and average mode.
   (Resolution bandwidth: 1 MHz, Video bandwidth: 1 MHz)
3. H = Horizontal, V = Vertical Polarization
4. Data = Real Reading – Amp Gain + Correction Factor (Antenna + Cable)
5. Margin = Limits – Data
6. Radiated Measurements at 3-meters

Appendices

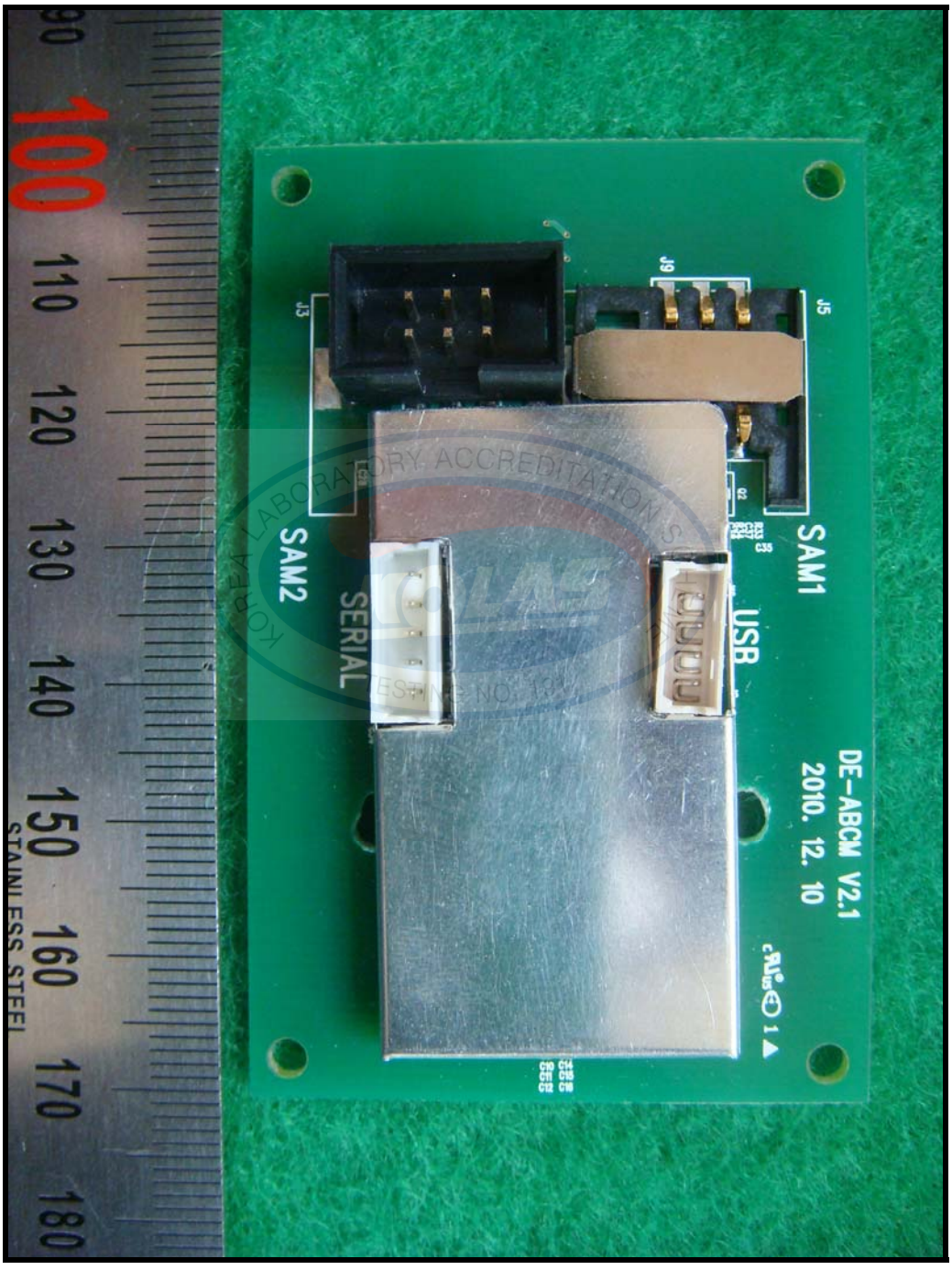
A1: Photograph of test set-Up

A1.1: Conducted Disturbance

A1.2: Radiated Disturbance

A2: EUT Photographs

A2.1: <Front view>



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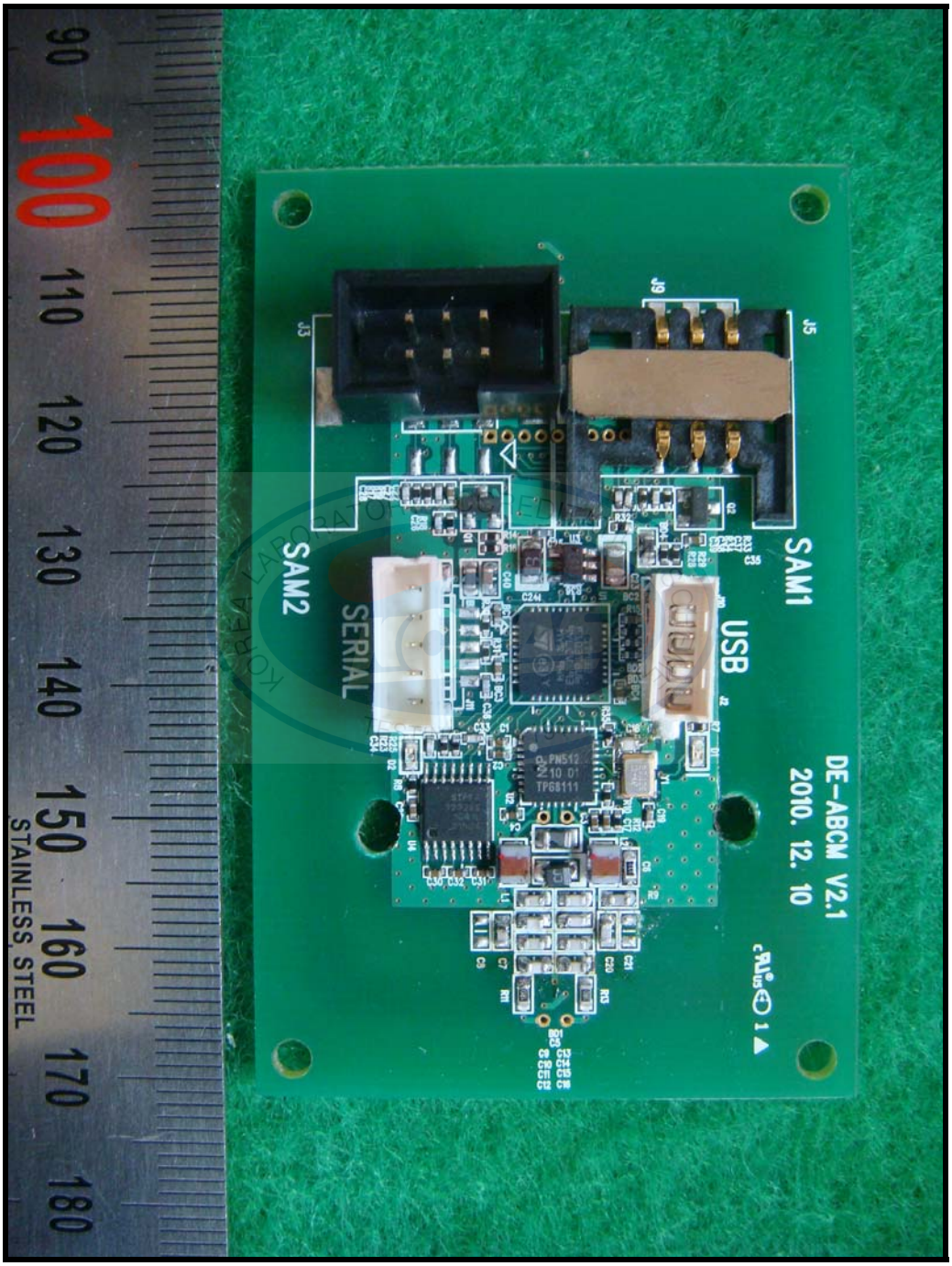
A2.1: <Front view(Remove)>



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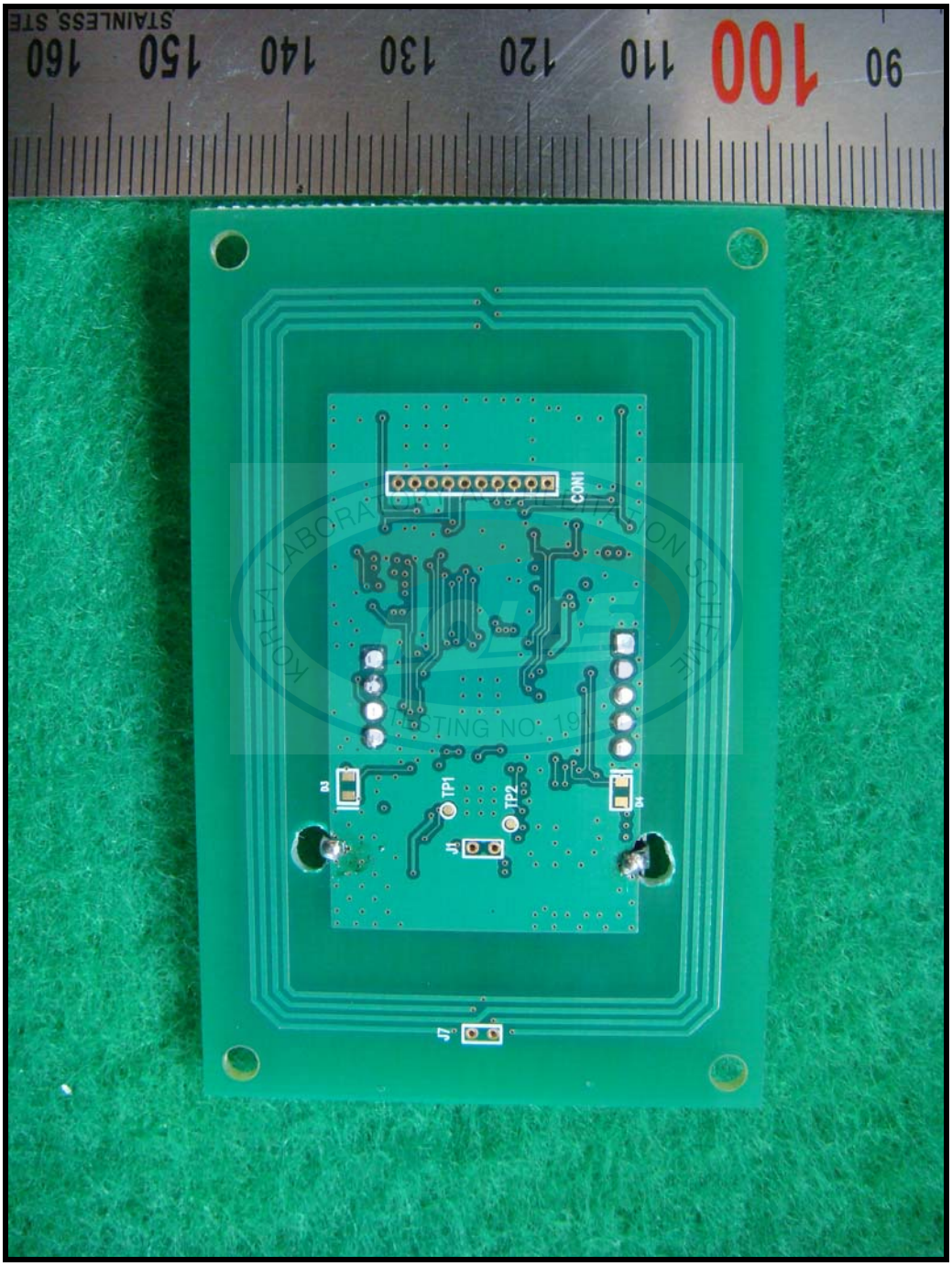
A2.3: <Rear view>



A2.4: <Cable>

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A2.5: <RFID CARD (A) Front>

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A2.6: <RFID CARD (A) Rear>

A2.7: <RFID CARD (B) Front>

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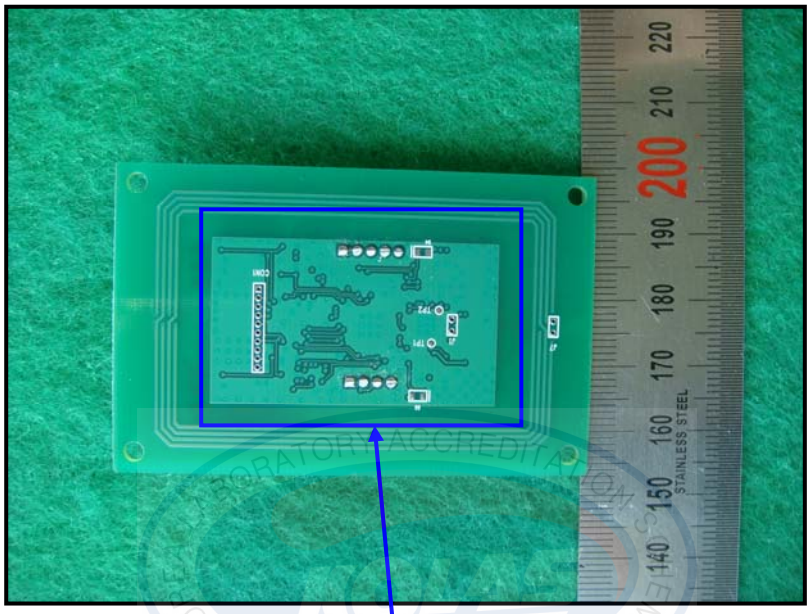
A2.8: <RFID CARD (B) Rear>

A2.9: Photographs of Label Information



FCC ID : SWUDE-ABCM-S CE 1177
SMART CARD Reader
S/W : 111011 5V ⎓, 250mA
Model Name : DE-ABCM
Manufacturer : DUALi Inc. / KOREA
Manufactured Date : 2011.06.03
Product No : DEABCM00000001
Technical support : +82-31-2130074

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES.
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

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