



**SPORTON LAB.**

Certificate No: EH331333

# CERTIFICATE OF COMPLIANCE



**EQUIPMENT : BL600 Series Bluetooth Low Energy Module**

**MODEL NO. : BL600-SA, BL600-SC, BL600-ST**

**APPLICANT : Laird Technolgies**

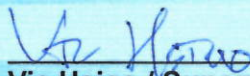
11160 Thompson Ave. Lenexa, Kansas 66219 USA



**I HEREBY**

**CERTIFY THAT:**

The product sample completely tested on **Apr. 10, 201**. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in **EN 301 489-1 V1.9.2 (2011-09)** and **EN 301 489-17 V2.2.1 (2012-09)** and shown compliance with the applicable technical standards. The equipment under R&TTE Directive 1999/5/EC of article 3.1(b) harmonized essential for the EMC requirements.

  
**Vic Hsiao / Supervisor**

# CE EMC TEST REPORT

**Equipment** : BL600 Series Bluetooth Low Energy Module  
**Brand Name** : Laird Technologies  
**Model No.** : BL600-SA, BL600-SC, BL600-ST  
**Standard** : EN 301 489-1 V1.9.2 (2011-09)  
EN 301 489-17 V2.2.1 (2012-09)  
**Applicant** : Laird Technologies  
**Manufacturer** : 11160 Thompson Ave. Lenexa, Kansas 66219  
USA

The product sample received on Apr. 08, 2013 and completely tested on Apr. 10, 2013. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in EN 301 489-1 V1.9.2 (2011-09) and shown compliance with the applicable technical standards. The equipment under R&TTE Directive 1999/5/EC of article 3.1b harmonized essential for the EMC requirements.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

  
\_\_\_\_\_  
Vic Hsiao / Supervisor



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## Summary of Test Result

<b>EN 301 489-1 V1.9.2 (2011-09) Emission Tests and Conformance Test Specifications</b>				
<b>Report Clause</b>	<b>Ref. Std. Clause</b>	<b>Test Standard</b>	<b>Description of Test</b>	<b>Result</b>
3.1	8.4	EN 55022:2006/A1:2007	AC Power Conducted Emissions	Complied
-	8.7	EN 55022:2006/A1:2007	Telecom Port Conducted Emissions	-
-	8.3	EN 55022:2006/A1:2007	DC Power Conducted Emissions	-
-	8.2	EN 55022:2006/A1:2007	Radiated Emissions	-
-	8.5	EN 61000-3-2:2006/A1:2009/A2:2009	Harmonic Current Emissions	-
-	8.6	EN 61000-3-3:2008	Voltage Fluctuations and Flicker	-
Note: The EUT consumes the DC power from the battery, therefore, emission tests are not applicable.				

<b>EN 301 489-1 V1.9.2 (2011-09) Immunity Tests and Conformance Test Specifications</b>				
<b>Report Clause</b>	<b>Ref. Std. Clause</b>	<b>Test Standard</b>	<b>Description of Test</b>	<b>Result</b>
4.1	9.3	EN 61000-4-2:2009	ESD (EUT of Enclosure)	Complied
4.2	9.2	EN 61000-4-3:2006/A1:2008/A2:2010	RS (EUT of Enclosure)	Complied
-	9.4	EN 61000-4-4:2004/A1:2010	EFT (EUT of AC Power Port)	-
-	9.4	EN 61000-4-4:2004/A1:2010	EFT (EUT of Telecom Port)	-
-	9.4	EN 61000-4-4:2004/A1:2010	EFT (EUT of Signal Port)	-
-	9.8	EN 61000-4-5:2006	Surge (EUT of AC Power Port)	-
-	9.8	EN 61000-4-5:2006	Surge (EUT of Telecom Port)	-
-	9.5	EN 61000-4-6:2009	CS (EUT of AC Power Port)	-
-	9.5	EN 61000-4-6:2009	CS (EUT of Telecom Port)	-
-	9.5	EN 61000-4-6:2009	CS (EUT of Signal Port)	-
-	9.5	EN 61000-4-6:2009	CS (EUT of DC Port)	-
-	9.7	EN 61000-4-11:2004	DIP (EUT of AC Power Port)	-
-	9.6	ISO 7637-2:2004	Vehicular Surge (EUT of DC Port)	-
Note 1: equipment w/o telecom port.				



SPORTON INTERNATIONAL INC.  
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# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

RF General Information		
Frequency Range (MHz)	Evaluation Mode	Application
2402-2480	2.4GHz Bluetooth	Wideband Data Transmission

### 1.1.2 Antenna Information

Antenna Category	
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input type="checkbox"/>	External antenna (dedicated antennas)

### 1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	<input type="checkbox"/> Production ; <input checked="" type="checkbox"/> Pre-Production ; <input type="checkbox"/> Prototype
Type of EUT	
<input type="checkbox"/>	Stand-alone
<input checked="" type="checkbox"/>	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: ...
<input type="checkbox"/>	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ...
<input type="checkbox"/>	Other:

### 1.1.4 EUT Operational Condition

Supply Voltage	<input type="checkbox"/> AC mains	<input checked="" type="checkbox"/> DC	
Type of DC Source	<input type="checkbox"/> Internal DC supply	<input checked="" type="checkbox"/> From Host	<input type="checkbox"/> Battery
Operational Voltage	<input checked="" type="checkbox"/> 3.3 V		

## 1.2 Accessories and Support Equipment

Accessories				
No.	Equipment	Brand Name	Model Name	Serial No.
1	-	-	-	-

### <EMI>

Support Equipment				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	Latitude E5420	-
2	Printer	EPSON	XP-30	-
3	USB Mouse	DELL	MS111-L	-
4	Notebook (remote station)	DELL	Latitude E5420	-
5	Dongle (provided by client)	-	-	-

### <EMS>

Support Equipment				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	Latitude E5420	-
2	Notebook	Acer	V3-571G	-
3	Dongle (provided by client)	-	-	-

## 1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

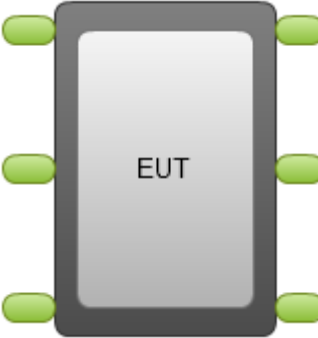
- EN 301 489-1 V1.9.2 (2011-09)
- EN 301 489-17 V2.2.1 (2012-09)

## 1.4 Testing Location Information

Testing Location				
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.		
		TEL : 886-3-327-3456 FAX : 886-3-327-0973		
Test Condition		Test Site No.	Test Engineer	Test Date
AC Conducted		CO04-HY	Bill Hsiao	Apr. 10, 2013
ES01-HY		ESD	Mars Chen	Apr. 08, 2013
RS01-HY		RS (80-1000 MHz)	Mars Chen	Apr. 08, 2013
RS01-HY		RS (1400-2700 MHz)	Mars Chen	Apr. 08, 2013

## 2 Test Configuration of EUT

### 2.1 EUT Particular Interface Port

EUT Particular Interface Port		
<input type="checkbox"/> AC power port	<input checked="" type="checkbox"/> Enclosure port	<input checked="" type="checkbox"/> Antenna ports
		<input type="checkbox"/> External
<input checked="" type="checkbox"/> DC power port		<input checked="" type="checkbox"/> Integral antenna w/o ports
<input type="checkbox"/> AC/DC power supply		<input type="checkbox"/> Telecom/Signal ports
<input checked="" type="checkbox"/> DC/DC power supply		(S) <input type="checkbox"/> USB; cable ≤ 3 m
<input type="checkbox"/> DC power cable ≤ 3 m		(T) <input type="checkbox"/> LAN; indoor cable > 3 m
<input type="checkbox"/> DC power cable > 3 m	(T) <input type="checkbox"/> WAN; outdoor cable > 3 m	(T) <input type="checkbox"/> PSTN; outdoor cable > 3 m
<input type="checkbox"/> Earth port		<input type="checkbox"/> Other____;
<p>An interface, which uses optical fiber, is not a port for the purposes of testing because it does not interact with the electromagnetic environment within the frequency range</p>		



## 2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	AC power-line conducted emissions
<b>Condition</b>	AC power-line conducted measurement for line and neutral Test Voltage: 230Vac / 50Hz
<b>Operating Mode</b>	<b>Operating Mode Description</b>
1	Radio Link

EN 301 489-17 V2.2.1 (2012-09) Following Performance Criteria for Transient Phenomena (CT, CR)	
<b>Tests Item</b>	ESD (EUT of Enclosure)
<b>Performance Criteria</b>	Performance criteria A. manufacturer declares that the EUT shall operate as intended with no loss of user function. This user function means that the EUT shall be maintained wideband data communication link.
<b>Special Conditions</b>	N/A
<b>Operating Mode</b>	<b>Operating Mode Description</b>
1	Radio Link

EN 301 489-17 V2.2.1 (2012-09) Following Performance Criteria for Continuous Phenomena (CT, CR)	
<b>Tests Item</b>	RS (EUT of Enclosure)
<b>Performance Criteria</b>	Performance criteria A. manufacturer declares that the EUT shall operate as intended with no loss of user function. This user function means that the EUT shall be maintained wideband data communication link.
<b>Special Conditions</b>	N/A
<b>Operating Mode</b>	<b>Operating Mode Description</b>
1	Radio Link

## 2.3 EUT Operating Location

EUT Operating Location	
<input type="checkbox"/>	Equipment operating in telecommunication centre.
<input checked="" type="checkbox"/>	Equipment operating in locations other than telecommunication centre.

### 3 Emission Tests Result

#### 3.1 AC Power-line Conducted Emissions

##### 3.1.1 AC Power-line Conducted Emissions

AC Power-line Conducted Emissions Limit	
<input checked="" type="checkbox"/>	The equipment shall meet the class B limits given in EN 55022.
<input type="checkbox"/>	Alternatively, for equipment intended to be used in telecommunication centers only, the class A limits given in EN 55022 may be used.

AC Power-line Conducted Emissions Class A limits		
Frequency range MHz	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	79	66
0.50 to 30	73	60

Note 1: The lower limit shall apply at the transition frequency.

AC Power-line Conducted Emissions Class B limits		
Frequency range MHz	Limits (dB $\mu$ V)	
	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.  
 Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

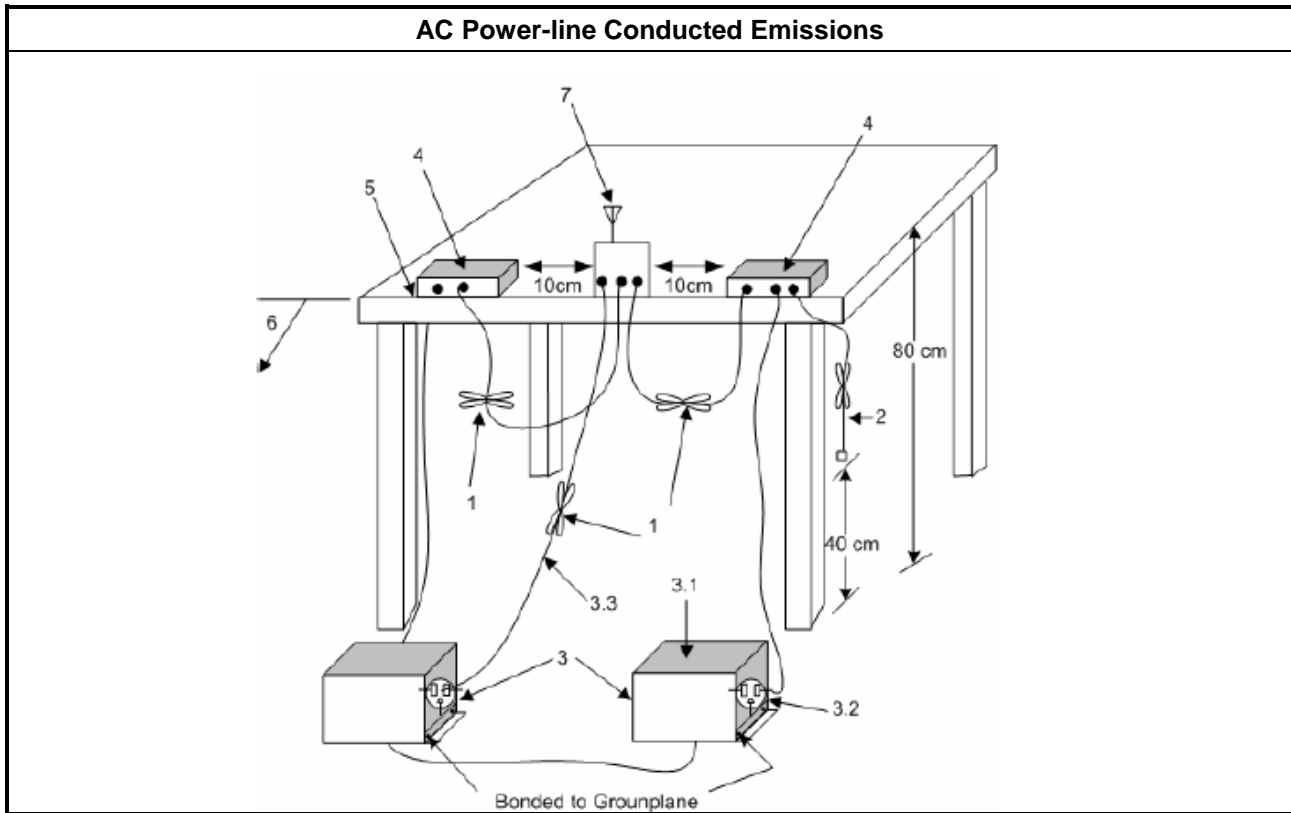
##### 3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

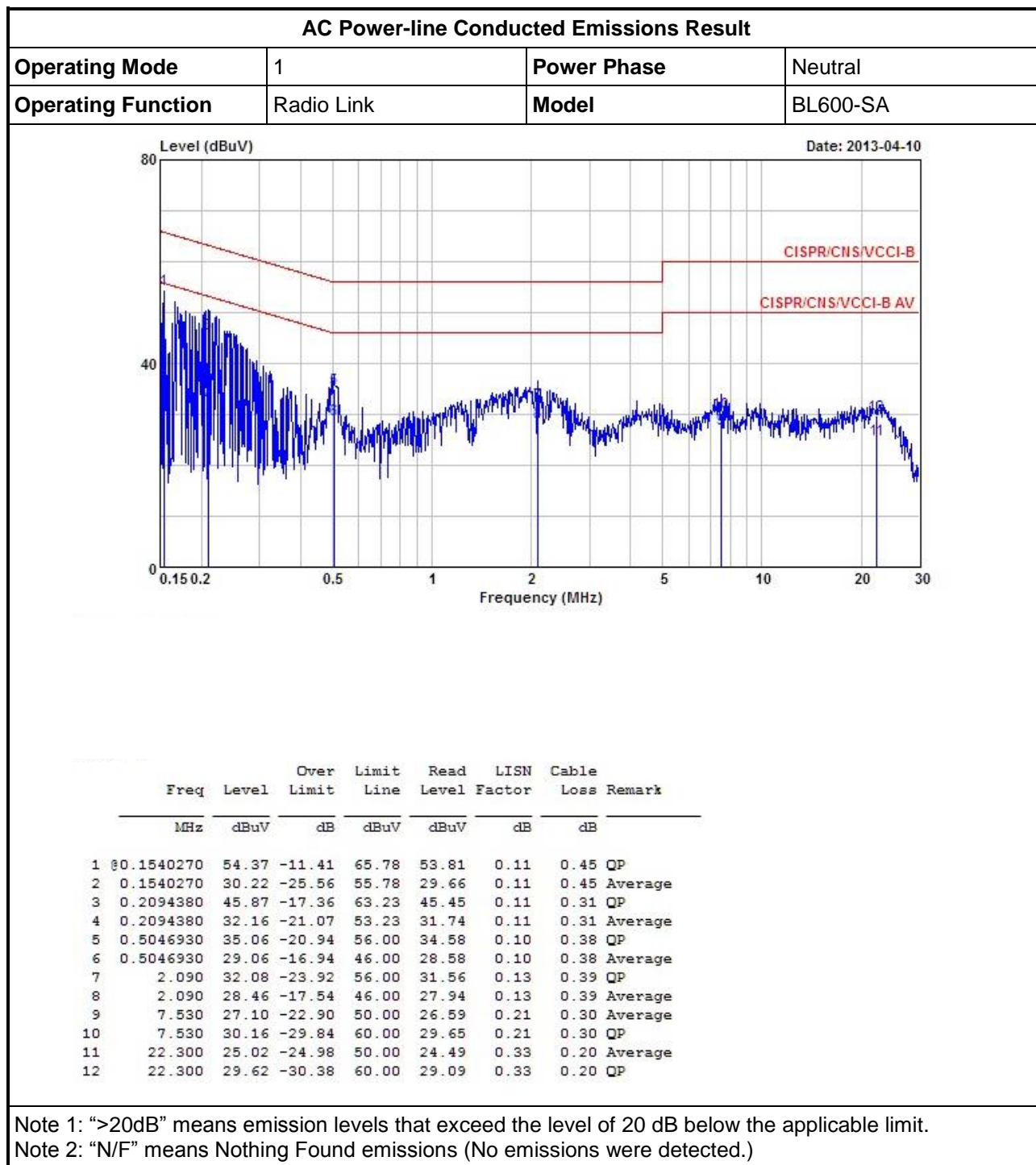
##### 3.1.3 Test Procedures

Test Method – General Information	
<input checked="" type="checkbox"/>	Refer as EN 55022, clause 9 for AC power-line conducted emissions method.

### 3.1.4 Test Setup

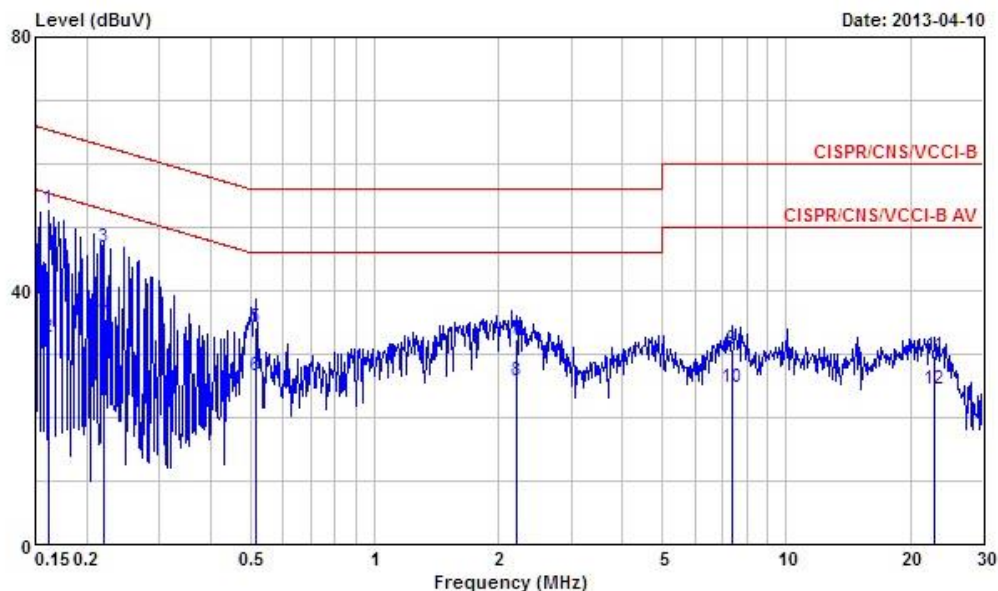


### 3.1.5 Test Result of AC Power-line Conducted Emissions



**AC Power-line Conducted Emissions Result**

<b>Operating Mode</b>	1	<b>Power Phase</b>	Line
<b>Operating Function</b>	Radio Link	<b>Model</b>	BL600-SA



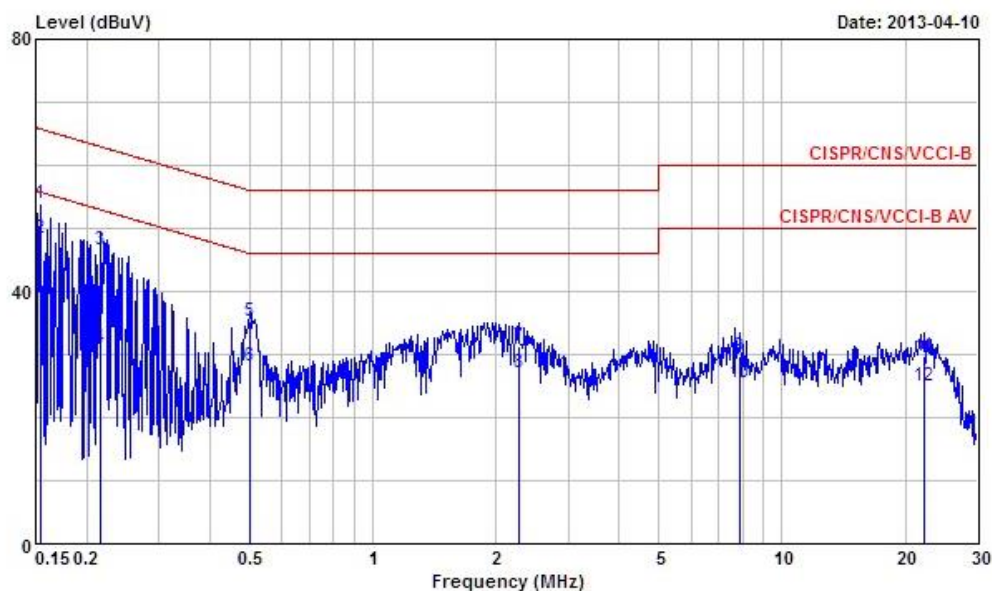
	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1615500	52.85	-12.53	65.38	52.19	0.24	0.42	QP
2	0.1615500	32.68	-22.70	55.38	32.02	0.24	0.42	Average
3	0.2196670	46.86	-15.97	62.83	46.32	0.23	0.31	QP
4	0.2196670	36.18	-16.65	52.83	35.64	0.23	0.31	Average
5	0.5155030	34.18	-21.82	56.00	33.59	0.22	0.37	QP
6	0.5155030	26.68	-19.32	46.00	26.09	0.22	0.37	Average
7	2.210	32.45	-23.55	56.00	31.80	0.26	0.39	QP
8	2.210	25.91	-20.09	46.00	25.26	0.26	0.39	Average
9	7.410	30.69	-29.31	60.00	30.01	0.38	0.30	QP
10	7.410	24.75	-25.25	50.00	24.07	0.38	0.30	Average
11	22.900	29.63	-30.37	60.00	28.82	0.61	0.20	QP
12	22.900	24.45	-25.55	50.00	23.64	0.61	0.20	Average

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

**AC Power-line Conducted Emissions Result**

<b>Operating Mode</b>	1	<b>Power Phase</b>	Neutral
<b>Operating Function</b>	Radio Link	<b>Model</b>	BL600-SC, ANT: PCB Dipole



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.1540270	53.83	-11.95	65.78	53.27	0.11	0.45	QP
2	@0.1540270	48.47	-7.31	55.78	47.91	0.11	0.45	Average
3	0.2162030	46.56	-16.40	62.96	46.14	0.11	0.31	QP
4	0.2162030	30.96	-22.00	52.96	30.54	0.11	0.31	Average
5	0.5020260	35.38	-20.62	56.00	34.90	0.10	0.38	QP
6	0.5020260	28.19	-17.81	46.00	27.71	0.10	0.38	Average
7	2.270	31.36	-24.64	56.00	30.85	0.13	0.38	QP
8	2.270	27.15	-18.85	46.00	26.64	0.13	0.38	Average
9	7.890	29.85	-30.15	60.00	29.33	0.22	0.30	QP
10	7.890	25.54	-24.46	50.00	25.02	0.22	0.30	Average
11	22.300	29.64	-30.36	60.00	29.11	0.33	0.20	QP
12	22.300	24.89	-25.11	50.00	24.36	0.33	0.20	Average

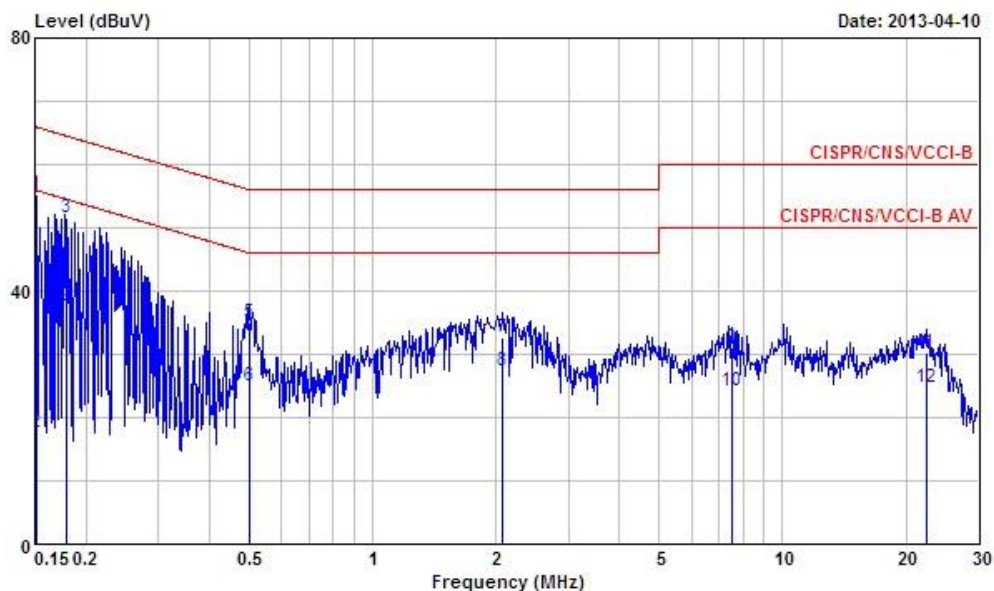
Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)



**AC Power-line Conducted Emissions Result**

Operating Mode	1	Power Phase	Line
Operating Function	Radio Link	Model	BL600-SC, ANT: PCB Dipole



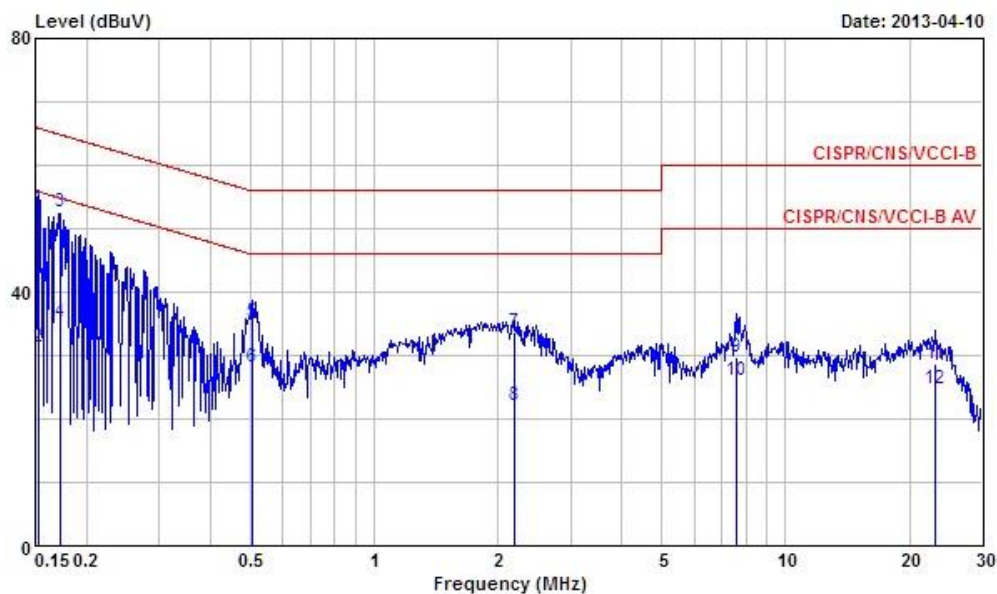
	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1515980	55.29	-10.62	65.91	54.59	0.24	0.46	QP
2	0.1515980	17.63	-38.28	55.91	16.93	0.24	0.46	Average
3	0.1796080	51.60	-12.90	64.50	51.01	0.23	0.36	QP
4	0.1796080	37.23	-17.27	54.50	36.64	0.23	0.36	Average
5	0.4993730	35.12	-20.89	56.01	34.52	0.22	0.38	QP
6	0.4993730	24.93	-21.08	46.01	24.33	0.22	0.38	Average
7	2.080	32.73	-23.27	56.00	32.09	0.25	0.39	QP
8	2.080	27.28	-18.72	46.00	26.64	0.25	0.39	Average
9	7.530	30.98	-29.02	60.00	30.30	0.38	0.30	QP
10	7.530	24.08	-25.92	50.00	23.40	0.38	0.30	Average
11	22.420	30.17	-29.83	60.00	29.37	0.60	0.20	QP
12	22.420	24.76	-25.24	50.00	23.96	0.60	0.20	Average

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

**AC Power-line Conducted Emissions Result**

<b>Operating Mode</b>	1	<b>Power Phase</b>	Neutral
<b>Operating Function</b>	Radio Link	<b>Model</b>	BL600-SC, ANT: Dipole



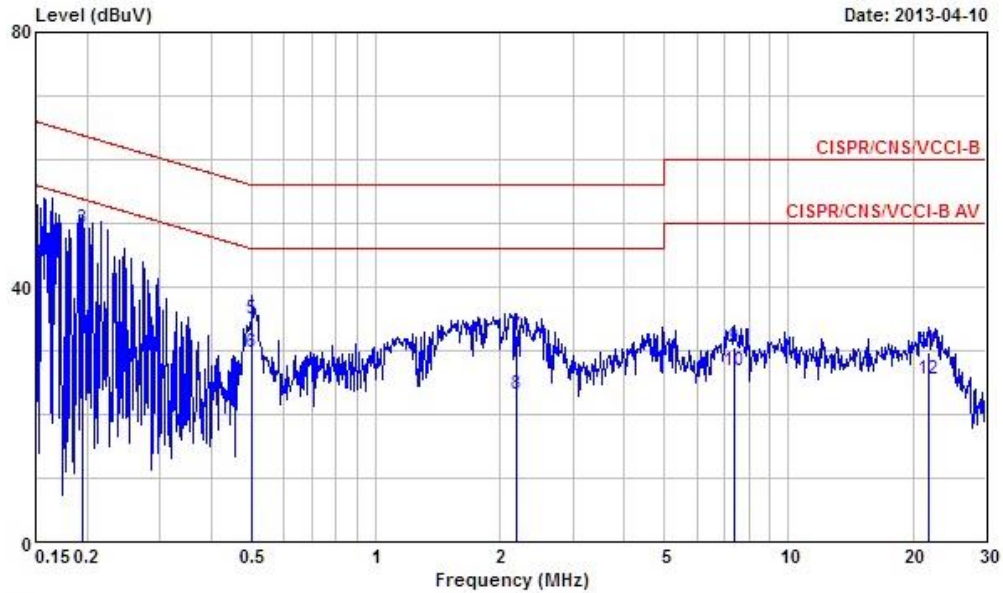
	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1532130	53.18	-12.64	65.82	52.61	0.11	0.46	QP
2	0.1532130	31.37	-24.45	55.82	30.80	0.11	0.46	Average
3	0.1721540	52.53	-12.33	64.86	52.04	0.11	0.38	QP
4	0.1721540	35.20	-19.66	54.86	34.71	0.11	0.38	Average
5	0.5046930	35.26	-20.74	56.00	34.78	0.10	0.38	QP
6	0.5046930	28.09	-17.91	46.00	27.61	0.10	0.38	Average
7	2.200	33.58	-22.42	56.00	33.06	0.13	0.39	QP
8	2.200	22.12	-23.88	46.00	21.60	0.13	0.39	Average
9	7.570	29.80	-30.20	60.00	29.29	0.21	0.30	QP
10	7.570	26.12	-23.88	50.00	25.61	0.21	0.30	Average
11	23.140	28.80	-31.20	60.00	28.27	0.33	0.20	QP
12	23.140	24.83	-25.17	50.00	24.30	0.33	0.20	Average

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

**AC Power-line Conducted Emissions Result**

<b>Operating Mode</b>	1	<b>Power Phase</b>	Line
<b>Operating Function</b>	Radio Link	<b>Model</b>	BL600-SC, ANT: Dipole

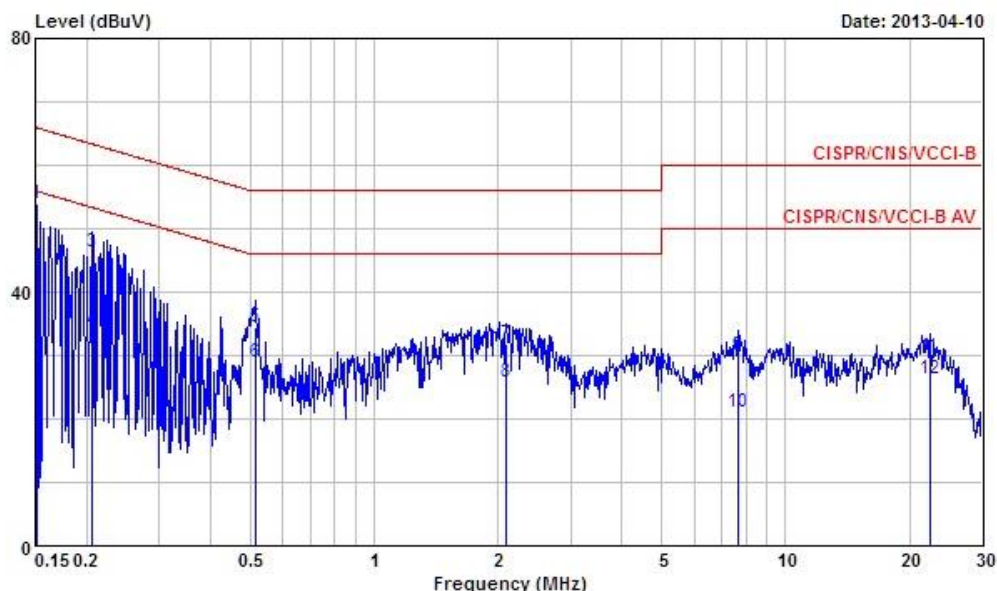


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1500000	54.28	-11.72	66.00	53.58	0.24	0.46	QP
2	0.1500000	42.45	-13.55	56.00	41.75	0.24	0.46	Average
3	0.1944650	49.08	-14.76	63.84	48.54	0.23	0.31	QP
4	0.1944650	34.71	-19.13	53.84	34.17	0.23	0.31	Average
5	0.5020260	34.88	-21.12	56.00	34.28	0.22	0.38	QP
6	0.5020260	29.67	-16.33	46.00	29.07	0.22	0.38	Average
7	2.190	32.36	-23.64	56.00	31.71	0.26	0.39	QP
8	2.190	23.11	-22.89	46.00	22.46	0.26	0.39	Average
9	7.410	30.61	-29.39	60.00	29.93	0.38	0.30	QP
10	7.410	26.95	-23.05	50.00	26.27	0.38	0.30	Average
11	21.830	29.64	-30.36	60.00	28.84	0.60	0.20	QP
12	21.830	25.57	-24.43	50.00	24.77	0.60	0.20	Average

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

**AC Power-line Conducted Emissions Result**

<b>Operating Mode</b>	1	<b>Power Phase</b>	Neutral
<b>Operating Function</b>	Radio Link	<b>Model</b>	BL600-ST



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1515980	54.03	-11.88	65.91	53.46	0.11	0.46	QP
2	0.1515980	37.75	-18.16	55.91	37.18	0.11	0.46	Average
3	0.2061360	46.35	-17.01	63.36	45.94	0.11	0.30	QP
4	0.2061360	33.82	-19.54	53.36	33.41	0.11	0.30	Average
5	0.5127790	34.42	-21.58	56.00	33.95	0.10	0.37	QP
6	0.5127790	29.06	-16.94	46.00	28.59	0.10	0.37	Average
7	2.100	31.86	-24.14	56.00	31.34	0.13	0.39	QP
8	2.100	25.76	-20.24	46.00	25.24	0.13	0.39	Average
9	7.690	29.96	-30.04	60.00	29.45	0.21	0.30	QP
10	7.690	21.11	-28.89	50.00	20.60	0.21	0.30	Average
11	22.420	29.71	-30.29	60.00	29.18	0.33	0.20	QP
12	22.420	26.22	-23.78	50.00	25.69	0.33	0.20	Average

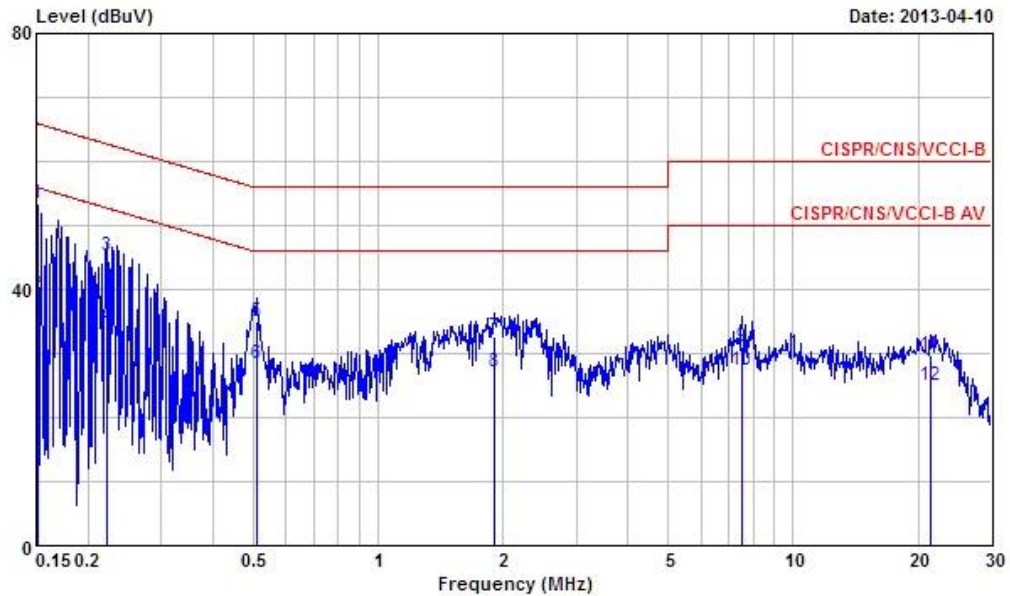
Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)



**AC Power-line Conducted Emissions Result**

<b>Operating Mode</b>	1	<b>Power Phase</b>	Line
<b>Operating Function</b>	Radio Link	<b>Model</b>	BL600-ST



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1515980	53.46	-12.45	65.91	52.76	0.24	0.46	QP
2	0.1515980	39.13	-16.78	55.91	38.43	0.24	0.46	Average
3	0.2220070	45.13	-17.61	62.74	44.58	0.23	0.32	QP
4	0.2220070	34.12	-18.62	52.74	33.57	0.23	0.32	Average
5	0.5100690	35.08	-20.92	56.00	34.49	0.22	0.37	QP
6	0.5100690	28.54	-17.46	46.00	27.95	0.22	0.37	Average
7	1.900	32.67	-23.33	56.00	32.03	0.25	0.39	QP
8	1.900	27.04	-18.96	46.00	26.40	0.25	0.39	Average
9	7.530	31.02	-28.98	60.00	30.34	0.38	0.30	QP
10	7.530	27.37	-22.63	50.00	26.69	0.38	0.30	Average
11	21.370	29.62	-30.38	60.00	28.83	0.59	0.20	QP
12	21.370	24.93	-25.07	50.00	24.14	0.59	0.20	Average

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

## 4 Immunity Tests Result

### 4.1 Electrostatic Discharge (ESD)

#### 4.1.1 Electrostatic Discharge (ESD) Performance Criteria

Electrostatic Discharge (ESD) Performance Criteria		
Test Discharge	Discharge Test Voltage (kV)	Performance Criteria
Contact Discharges	$\pm 2 / \pm 4$	TT, TR (B)
Air Discharge	$\pm 2 / \pm 4 / \pm 8$	TT, TR (B)

Air discharges and contact charges are estimated to enclosure of EUT on all connectors and conducting surfaces.

#### 4.1.2 Measuring Instruments

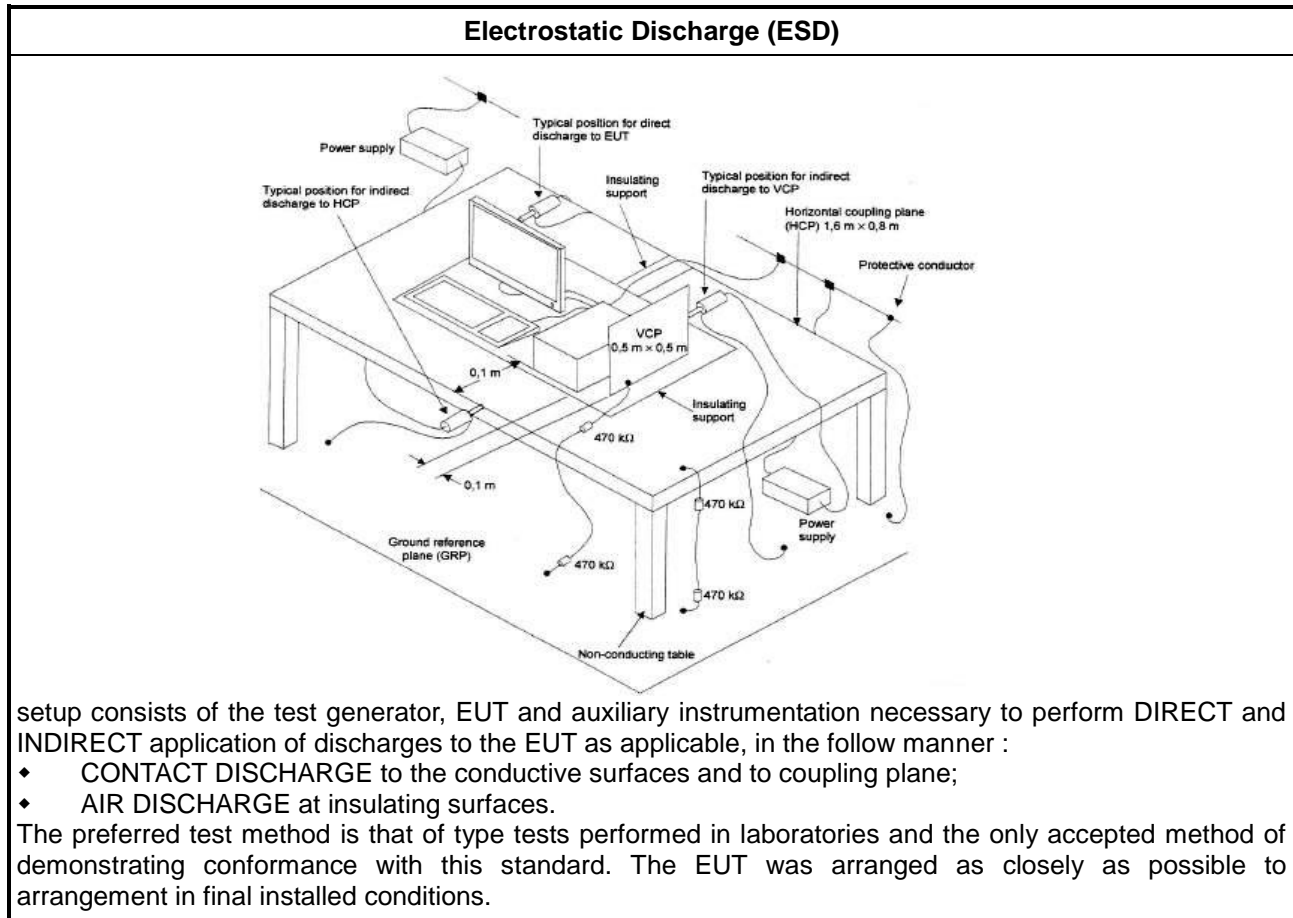
Refer a test equipment and calibration data table in this test report.

#### 4.1.3 Test Procedures

Method of measurement:	
<input checked="" type="checkbox"/>	Refer as EN 61000-4-2, for electrostatic discharge method.
<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>In the case of air discharge testing the climatic conditions shall be within the following ranges: <ul style="list-style-type: none"> <li>- ambient temperature: 15°C to 35°C;</li> <li>- relative humidity : 30% to 60%;</li> <li>- atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).</li> </ul> </li> <li>Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.</li> <li>The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.</li> <li>The test shall be performed with both air discharge and contact discharge. On preselected points at least 10 single discharges (in the most sensitive polarity) shall be applied on air discharge. On preselected points at least 10 single discharges (in the most sensitive polarity) shall be applied on contact discharge.</li> <li>For the time interval between successive single discharges an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.</li> <li>In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.</li> <li>In the case of painted surface covering a conducting substrate, the following procedure shall be adopted: <ul style="list-style-type: none"> <li>- If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.</li> <li>- Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.</li> <li>- The contact discharge test shall not be applied to such surfaces.</li> </ul> </li> <li>In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.</li> </ul>



#### 4.1.4 Test Setup



**4.1.5 Test Result of Electrostatic Discharge (ESD)**
**Model: BL600-SA**

Contact Discharges Result		
Operating Mode	1	
Operating Function	Radio Link	
Test Point	Discharge Test Voltage (kV)	Performance Criteria
HCP (at front, left, right, rear)	$\pm 2 / \pm 4$	A
VCP (at front, left, right, rear)	$\pm 2 / \pm 4$	A
Observation	No performance degradation was observed.	
Result	Complied	

**Model: BL600-SC, ANT: PCB Dipole**

Contact Discharges Result		
Operating Mode	1	
Operating Function	Radio Link	
Test Point	Discharge Test Voltage (kV)	Performance Criteria
HCP (at front, left, right, rear)	$\pm 2 / \pm 4$	A
VCP (at front, left, right, rear)	$\pm 2 / \pm 4$	A
Observation	No performance degradation was observed.	
Result	Complied	

**Model: BL600-SC, ANT: Dipole**

Contact Discharges Result		
<b>Operating Mode</b>	1	
<b>Operating Function</b>	Radio Link	
<b>Test Point</b>	<b>Discharge Test Voltage (kV)</b>	<b>Performance Criteria</b>
HCP (at front, left, right, rear)	$\pm 2 / \pm 4$	A
VCP (at front, left, right, rear)	$\pm 2 / \pm 4$	A
<b>Observation</b>	No performance degradation was observed.	
<b>Result</b>	<b>Complied</b>	

**Model: BL600-ST**

Contact Discharges Result		
<b>Operating Mode</b>	1	
<b>Operating Function</b>	Radio Link	
<b>Test Point</b>	<b>Discharge Test Voltage (kV)</b>	<b>Performance Criteria</b>
HCP (at front, left, right, rear)	$\pm 2 / \pm 4$	A
VCP (at front, left, right, rear)	$\pm 2 / \pm 4$	A
<b>Observation</b>	No performance degradation was observed.	
<b>Result</b>	<b>Complied</b>	

## 4.2 Radio Frequency Electromagnetic Field (RS)

### 4.2.1 Radio Frequency Electromagnetic Field (RS) Performance Criteria

Radio Frequency Electromagnetic Field (RS) Performance Criteria		
Frequency Range	Test Field Strength (V/m)	Performance Criteria
80 MHz – 1 GHz	3	CT, CR (A)
1.4 GHz – 2.7 GHz	3	CT, CR (A)
<b>Exclusion Bands</b>	The receiver exclusion band extends from: lower limit = lowest allocated band edge frequency -5 % upper limit = highest allocated band edge frequency +5 %.	

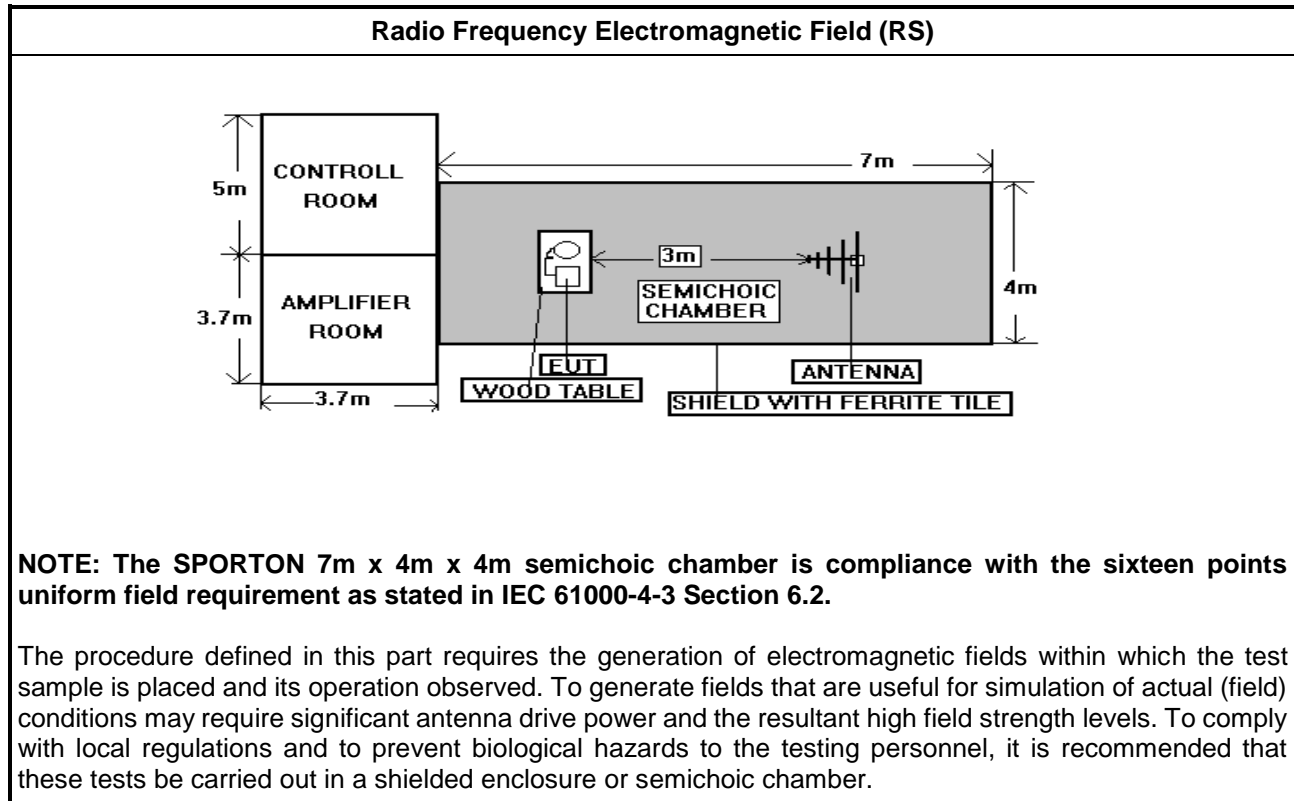
### 4.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 4.2.3 Test Procedures

Method of measurement:	
<input checked="" type="checkbox"/>	Refer as EN 61000-4-3, for radio frequency electromagnetic field disturbance method.
<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>The test level shall be 3 V/m (measured unmodulated). The test signal shall be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1000 Hz. If the wanted signal is modulated at 1000 Hz, then an audio signal of 400 Hz shall be used;</li> <li>The test shall be performed over the frequency range 80 MHz to 1000 MHz and 1400 MHz to 2700 MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers;</li> <li>For receivers and transmitters the stepped frequency increments shall be 1 % frequency increment of the momentary used frequency, unless specified otherwise in the part of EN 301 489 series dealing with the relevant type of radio equipment;</li> <li>Further product related spot frequency tests may be specified in the relevant part of EN 301 489 series dealing with the particular type of radio equipment;</li> <li>Responses on receivers occurring at discrete frequencies, which are narrow band responses, shall be disregarded from the test;</li> <li>The frequencies selected and used during the test shall be recorded in the test report.</li> </ul>

#### 4.2.4 Test Setup



**4.2.5 Test Result of Radio Frequency Electromagnetic Field (RS)**

Radio Frequency Electromagnetic Field (RS) Result				
<b>Operating Mode</b>	1			
<b>Operating Function</b>	Radio Link			
<b>Model</b>	BL600-SA			
Frequency Range	Test Field Strength (V/m)	Polarity	Azimuth	Performance Criteria
80 MHz – 1 GHz	3	V&H	0	A
80 MHz – 1 GHz	3	V&H	90	A
80 MHz – 1 GHz	3	V&H	180	A
80 MHz – 1 GHz	3	V&H	270	A
1.4 GHz – 2.7 GHz	3	V&H	0	A
1.4 GHz – 2.7 GHz	3	V&H	90	A
1.4 GHz – 2.7 GHz	3	V&H	180	A
1.4 GHz – 2.7 GHz	3	V&H	270	A
<b>Observation</b>	No performance degradation was observed.			
<b>Result</b>	<b>Complied</b>			

Radio Frequency Electromagnetic Field (RS) Result				
<b>Operating Mode</b>	1			
<b>Operating Function</b>	Radio Link			
<b>Model</b>	BL600-SC, ANT: PCB Dipole			
Frequency Range	Test Field Strength (V/m)	Polarity	Azimuth	Performance Criteria
80 MHz – 1 GHz	3	V&H	0	A
80 MHz – 1 GHz	3	V&H	90	A
80 MHz – 1 GHz	3	V&H	180	A
80 MHz – 1 GHz	3	V&H	270	A
1.4 GHz – 2.7 GHz	3	V&H	0	A
1.4 GHz – 2.7 GHz	3	V&H	90	A
1.4 GHz – 2.7 GHz	3	V&H	180	A
1.4 GHz – 2.7 GHz	3	V&H	270	A
<b>Observation</b>	No performance degradation was observed.			
<b>Result</b>	<b>Complied</b>			



Radio Frequency Electromagnetic Field (RS) Result				
<b>Operating Mode</b>	1			
<b>Operating Function</b>	Radio Link			
<b>Model</b>	BL600-SC, ANT: Dipole			
Frequency Range	Test Field Strength (V/m)	Polarity	Azimuth	Performance Criteria
80 MHz – 1 GHz	3	V&H	0	A
80 MHz – 1 GHz	3	V&H	90	A
80 MHz – 1 GHz	3	V&H	180	A
80 MHz – 1 GHz	3	V&H	270	A
1.4 GHz – 2.7 GHz	3	V&H	0	A
1.4 GHz – 2.7 GHz	3	V&H	90	A
1.4 GHz – 2.7 GHz	3	V&H	180	A
1.4 GHz – 2.7 GHz	3	V&H	270	A
<b>Observation</b>	No performance degradation was observed.			
<b>Result</b>	<b>Complied</b>			

Radio Frequency Electromagnetic Field (RS) Result				
<b>Operating Mode</b>	1			
<b>Operating Function</b>	Radio Link			
<b>Model</b>	BL600-ST			
Frequency Range	Test Field Strength (V/m)	Polarity	Azimuth	Performance Criteria
80 MHz – 1 GHz	3	V&H	0	A
80 MHz – 1 GHz	3	V&H	90	A
80 MHz – 1 GHz	3	V&H	180	A
80 MHz – 1 GHz	3	V&H	270	A
1.4 GHz – 2.7 GHz	3	V&H	0	A
1.4 GHz – 2.7 GHz	3	V&H	90	A
1.4 GHz – 2.7 GHz	3	V&H	180	A
1.4 GHz – 2.7 GHz	3	V&H	270	A
<b>Observation</b>	No performance degradation was observed.			
<b>Result</b>	<b>Complied</b>			

## 5 Uncertainty

### 5.1 For EMS Uncertainty

#### 5.1.1 ESD Immunity (IEC 61000-4-2)

##### ♦ Negative Discharge Current

From Standard			
2kV	First Peak Current	Current at 30ns	Current at 60ns
Nominal	7.5	4	2
Min	6.75	2.8	1.4
Max	8.25	5.2	2.6
Tolerance in %	10%	30%	30%

From calibration certificate					
Measured First Peak Current	1st Peak Worst case. +5%	Measured Current at 30ns	30ns Worst case. +5%	Measured Current at 60ns	60ns Worst case. -5%
7.48	7.85	4.2	4.41	2.01	2.11
---	6.75	---	2.8	---	1.4
---	8.25	---	5.2	---	2.6

4kV	First Peak Current	Current at 30ns	Current at 60ns
Nominal	15	8	4
Min	13.5	5.6	2.8
Max	16.5	10.4	5.2
Tolerance in %	10%	30%	30%

First Peak Current	1st Peak Worst case. +5%	Measured Current at 30ns	30ns Worst case. +5%	Measured Current at 60ns	60ns Worst case. +5%
15.12	15.88	8.03	8.43	3.68	3.86
---	13.5	---	5.6	---	2.8
---	16.5	---	10.4	---	5.2

6kV	First Peak Current	Current at 30ns	Current at 60ns
Nominal	22.5	12	6
Min	20.25	8.4	4.2
Max	24.75	15.6	7.8
Tolerance in %	10%	30%	30%

First Peak Current	1st Peak Worst case. -5%	Measured Current at 30ns	30ns Worst case. +5%	Measured Current at 60ns	60ns Worst case. +5%
22.78	23.92	12.37	12.99	5.45	5.72
---	20.25	---	8.4	---	4.2
---	24.75	---	15.6	---	7.8

From Standard			
8kV	First Peak Current	Current at 30ns	Current at 60ns
Nominal	30	16	8
Min	27	11.2	5.6
Max	33	20.8	10.4
Tolerance in %	10%	30%	30%

From calibration certificate					
First Peak Current	1st Peak Worst case. +5%	Measured Current at 30ns	30ns Worst case. +5%	Measured Current at 60ns	60ns Worst case. +5%
30.26	31.77	16.13	16.94	7.39	7.76
---	27	---	11.2	---	5.6
---	33	---	20.8	---	10.4

**♦ Negative Discharge Voltage**

Standard Parameters			
Indicated Voltage (kV)	Tolerance (%)	Max. (kV)	Min. (kV)
2	10	2.20	1.80
4	10	4.40	3.60
6	10	6.60	5.40
8	10	8.80	7.20
15	10	16.50	13.50

Measured Values (kV)
2.05
4.027
5.955
7.916
14.839

**♦ Negative Rise Time**

Standard Parameters	
T max.	1ns
T min	0.7ns

Measured Values			
Indicated Voltage	Measured Rise Time	Worst Case max. +6%	Worst Case min. -6%
2kV	0.851	0.902	0.799
4kV	0.780	0.268	0.733
6kV	0.750	0.795	0.705
8kV	0.772	0.818	0.726

It has been demonstrated that the ESD generator meets the specified requirements in the standard with at least a 95% confidence.

**5.1.2 RF Radiated Immunity (IEC 61000-4-3)**

Symbol	Source of Uncertainty	Value	Probability distribution	Divisor	$u(y)$
$F_{SM}$	Felds Strength monitor	1.5	Normal 2	2.000	0.75
$FS_{AW}$	Field Strength acceptability window	0.50	Rectangular	1.732	0.29
$PAH$	Power Amplifier Harmonics	0.50	Rectangular	1.732	0.29
$R_S$	Measurement System Repeatability	0.50	normal 1	1.000	0.50
$REUT$	Repeatability of EUT	0.00	normal 1	1.000	0.00
$u_c(F_S)$	Combined Standard Uncertainty		normal		0.83
$U(F_S)$	Expanded Uncertainty		normal k= 2		1.66

Specified Level (V/m)	Test level (V/m)
For 1 Volts	1.25
For 3 Volts	3.33
For 10 Volts	11.22

## 6 Test Equipment and Calibration Data

EMI	Conducted Emission				
Test Site	Conduction / (CO04-HY)				
Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date
EMC Receiver	R&S	ESCS 30	100174	9kHz ~ 2.75GHz	Mar. 26, 2013
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 21, 2013
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz ~ 30MHz	Apr. 20, 2012
RF Cable-CON	HUBER+SUHNER	RG213/U	7.61183201e+012	9kHz ~ 30MHz	Nov. 09, 2012
ISN	TESEQ	ISN T800	30330	9kHz ~ 30MHz	Mar. 15, 2013
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A
CDN	TESEQ	M016	25100	150kHz ~ 26MHz	Mar. 11, 2013
CDN	TESEQ	M016	25103	150kHz ~ 26MHz	Mar. 11, 2013
50 ohm terminal	N/A	N/A	TM012	N/A	Feb. 26, 2013
50 ohm terminal	N/A	N/A	CON-04-02	N/A	Feb. 26, 2013
50 ohm terminal	N/A	N/A	CON-04-01	N/A	Apr. 20, 2012
50 ohm terminal	N/A	N/A	CON-04-03	N/A	Feb. 26, 2013
50 ohm terminal	N/A	N/A	CON-01-04	N/A	Feb. 26, 2013
Note: Calibration Interval of instruments listed above is one year.					

EMS	ESD				
Test Site	CS01-HY (CS), ES01-HY (ESD), EX01-HY (EFT, Surge, DIP, Flicker)				
Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date
ESD Simulator	KEYTEK	MZ-15/EC	0711355	Air: 0 ~15kV Contact: 0 ~ 8kV	Apr. 12, 2012
Note: Calibration Interval of instruments listed above is one year.					

<b>EMS</b>	RS (80 MHz - 1 GHz)				
<b>Test Site</b>	RS01-HY (RS)				
<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Characteristics</b>	<b>Calibration Date</b>
Probe	ETS-LINDGREN	HI-6005	00052473	0.1MHz - 5GHz	Sep. 12, 2012
Amplifier	AR	250W 1000AM1	0332909	80MHz ~ 1GHz	Mar. 06, 2013
DUAL DIRECTIONAL COUPLER	AMPLIFIER& RESEARCH	DC7144A	312782	80~1GHz	Oct. 12, 2012
Antenna	FRANKONIA	BTA-L	02002L	26MHz~1GHz	May 03, 2012
INTEGRATED MEASUREMENT SYSTEM	ROHDE& SCHWARZ	IMS	100007	9kHz~3GHz	Mar. 14, 2013
NRP-Z91 POWER SENSOR 6GHZ	ROHDE& SCHWARZ	NRP-Z91 1168.8004.02	100095	9kHz~3GHz	Mar. 14, 2013
Note: Calibration Interval of instruments listed above is one year.					

<b>EMS</b>	RS (1 GHz - 3 GHz)				
<b>Test Site</b>	RS01-HY (RS)				
<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Characteristics</b>	<b>Calibration Date</b>
Probe	ETS-LINDGREN	HI-6005	00052473	0.1MHz - 5GHz	Sep. 12, 2012
Amplifier	AMPLIFIER& RESEARCH	30S1G3	312505	800M~3GHz	Oct. 12, 2012
DUAL DIRECTIONAL COUPLER	AMPLIFIER& RESEARCH	DC6180A	312453	0.8 ~ 4.2GHz	Oct. 12, 2012
Antenna	ROHDE& SCHWARZ	HL046E	4065.5960.02-100076-CD	26MHz~3GHz	May 03, 2012
INTEGRATED MEASUREMENT SYSTEM	ROHDE& SCHWARZ	IMS	100007	9kHz~3GHz	Mar. 14, 2013
NRP-Z91 POWER SENSOR 6GHZ	ROHDE& SCHWARZ	NRP-Z91 1168.8004.02	100095	9kHz~3GHz	Mar. 14, 2013
Note: Calibration Interval of instruments listed above is one year.					

## 7 Certification of TAF Accreditation



Certificate No. : L1190-130110

財團法人全國認證基金會  
Taiwan Accreditation Foundation

### Certificate of Accreditation

This is to certify that

**Sporton International Inc.**  
**EMC & Wireless Communications Laboratory**  
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,  
Taiwan, R.O.C.

**is accredited in respect of laboratory**

<b>Accreditation Criteria</b>	: ISO/IEC 17025:2005
<b>Accreditation Number</b>	: 1190
<b>Originally Accredited</b>	: December 15, 2003
<b>Effective Period</b>	: January 10, 2013 to January 09, 2016
<b>Accredited Scope</b>	: Testing Field, see described in the Appendix
<b>Specific Accreditation Program</b>	: Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities



Jay-San Chen  
President, Taiwan Accreditation Foundation  
Date: January 10, 2013

P1, total 20 pages



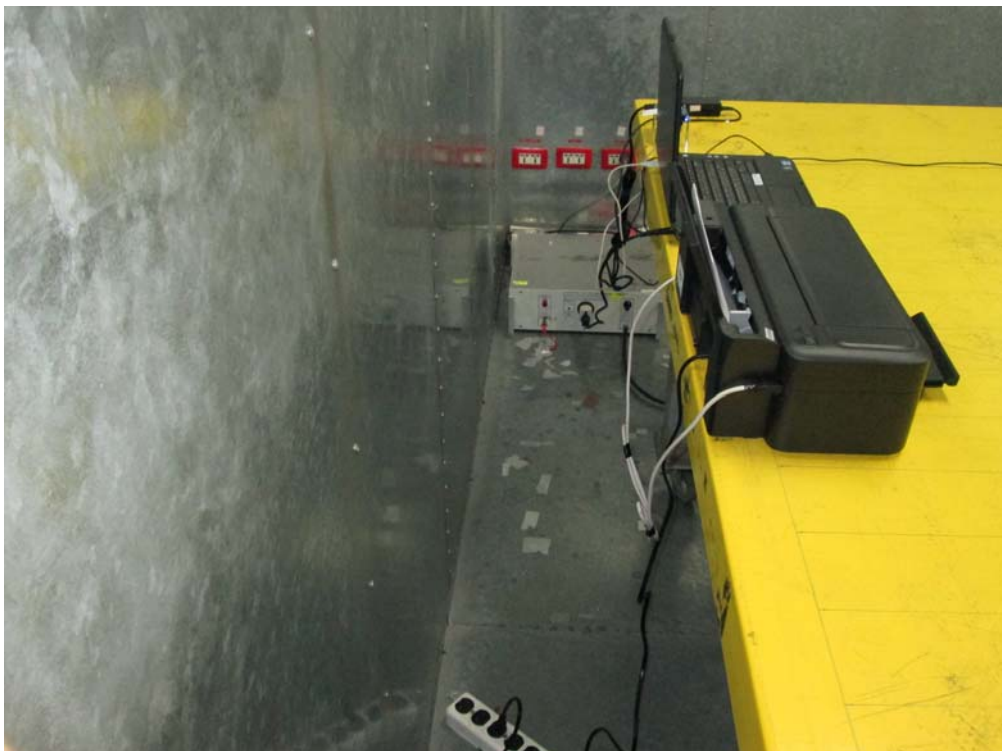
## Appendix A. Test Photos

**BL600-SA**

### AC Power Conducted Emissions



### AC Power Conducted Emissions



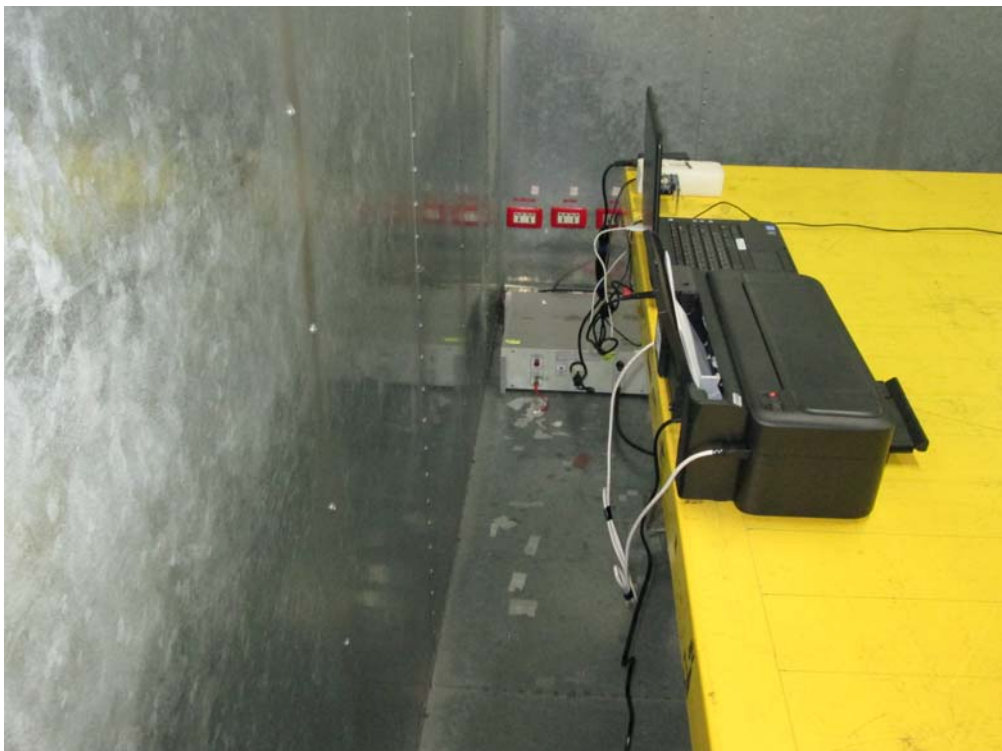
**AC Power Conducted Emissions**



**BL600-SC, ANT: PCB Dipole**  
**AC Power Conducted Emissions**



**AC Power Conducted Emissions**



**AC Power Conducted Emissions**



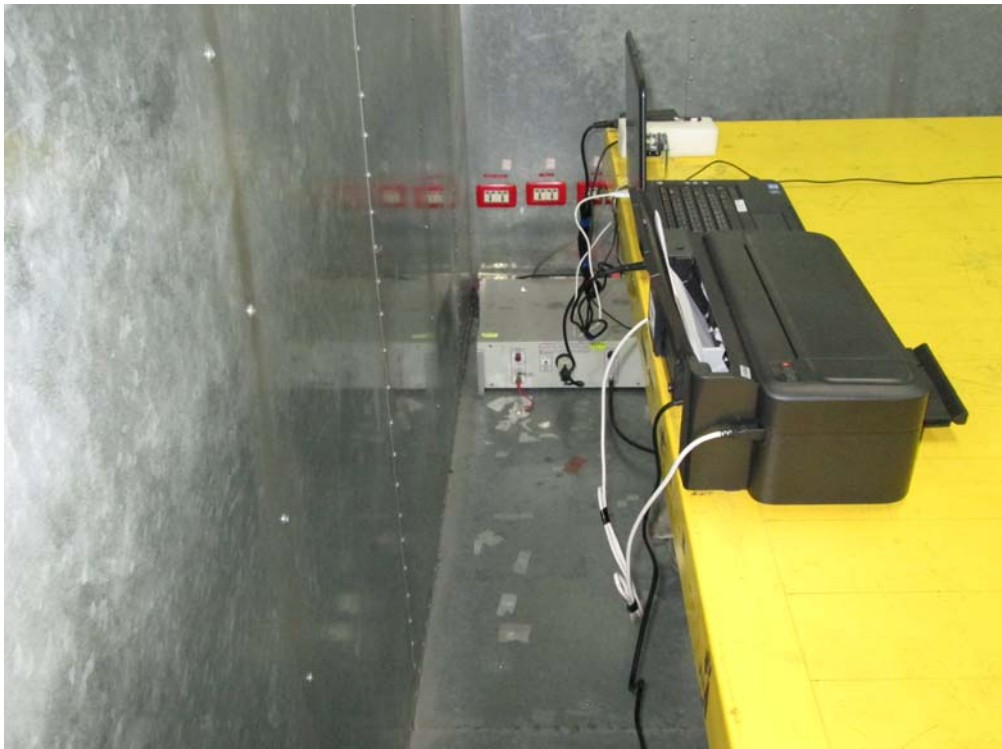


**BL600-SC, ANT: Dipole**

**AC Power Conducted Emissions**



**AC Power Conducted Emissions**



**AC Power Conducted Emissions**



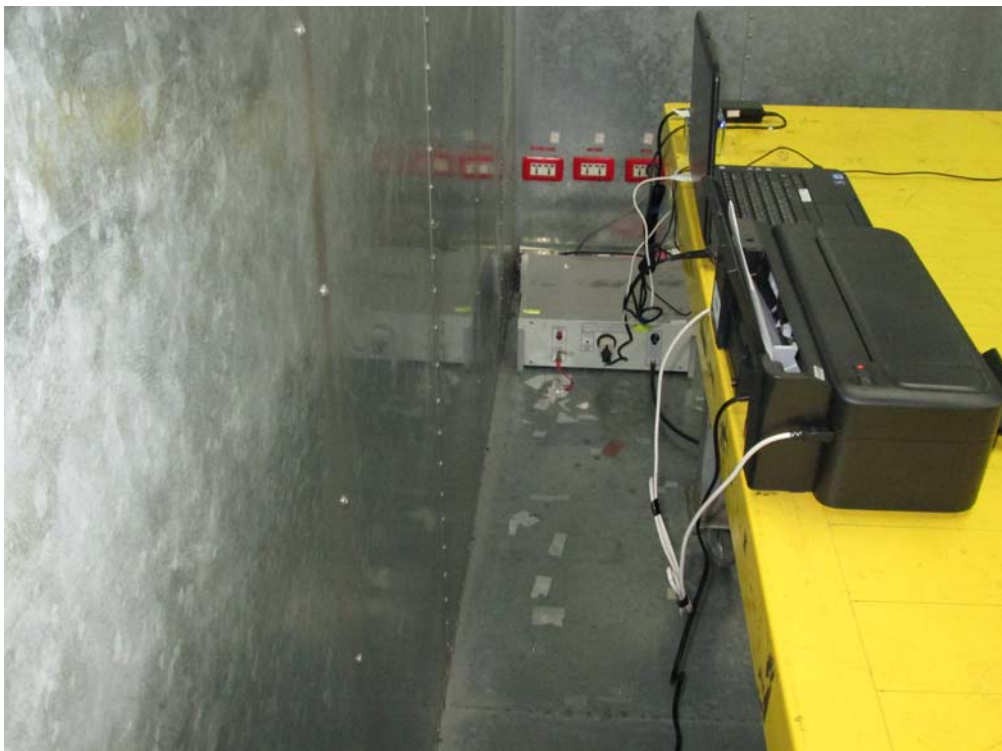


**BL600-ST**

**AC Power Conducted Emissions**



**AC Power Conducted Emissions**



**AC Power Conducted Emissions**



**BL600-SA**

**ESD**

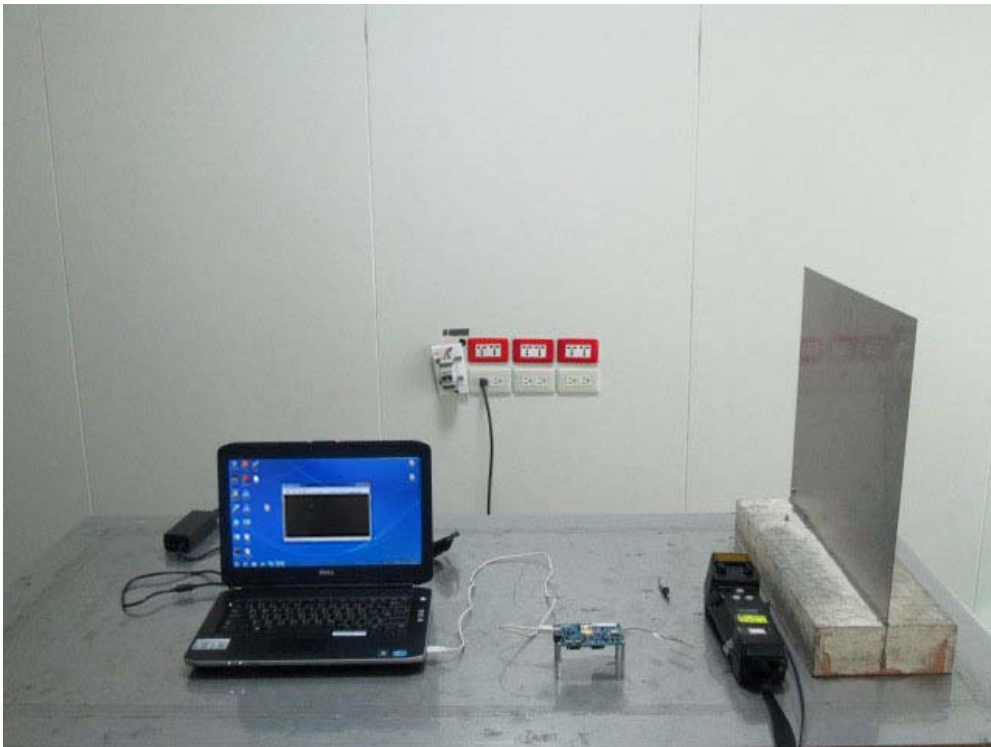


**ESD**



BL600-SC, ANT: PCB Dipole

ESD



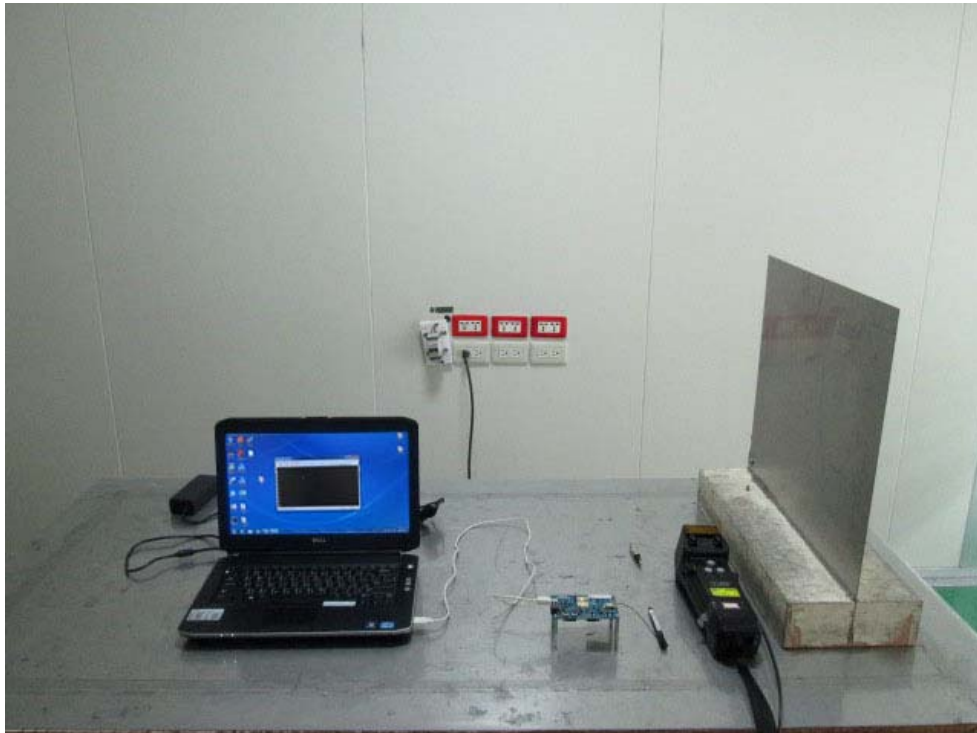
ESD





**BL600-SC, ANT: Dipole**

**ESD**

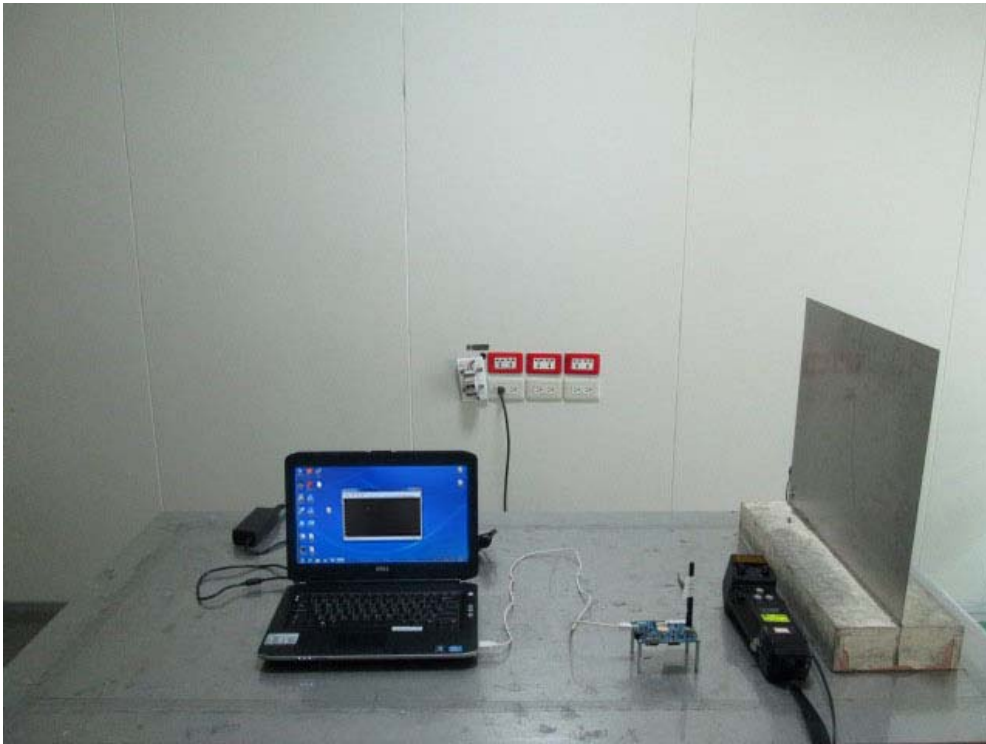


**ESD**



BL600-ST

ESD



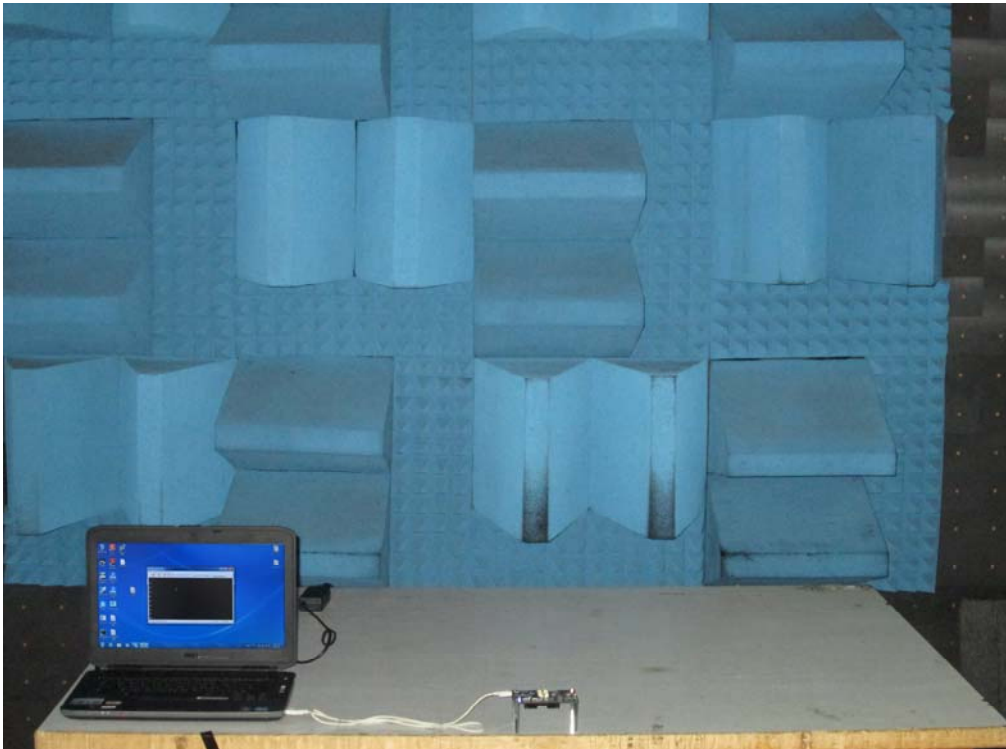
ESD





**BL600-SA**

**RS**

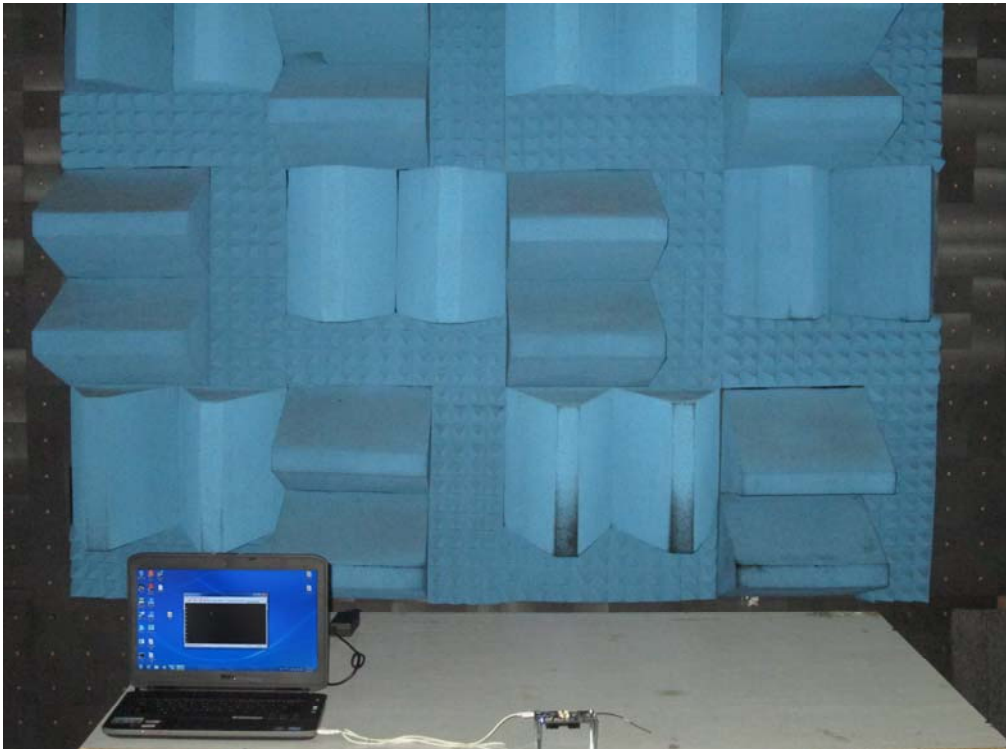


**RS**



**BL600-SC, ANT: PCB Dipole**

**RS**

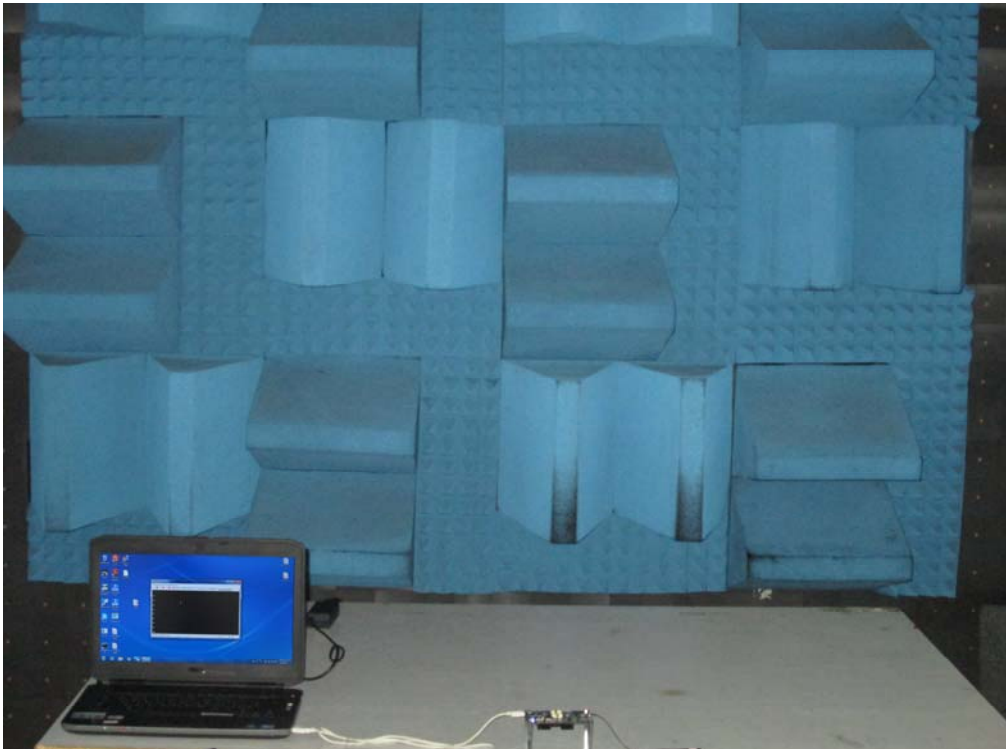


**RS**



**BL600-SC, ANT: Dipole**

**RS**

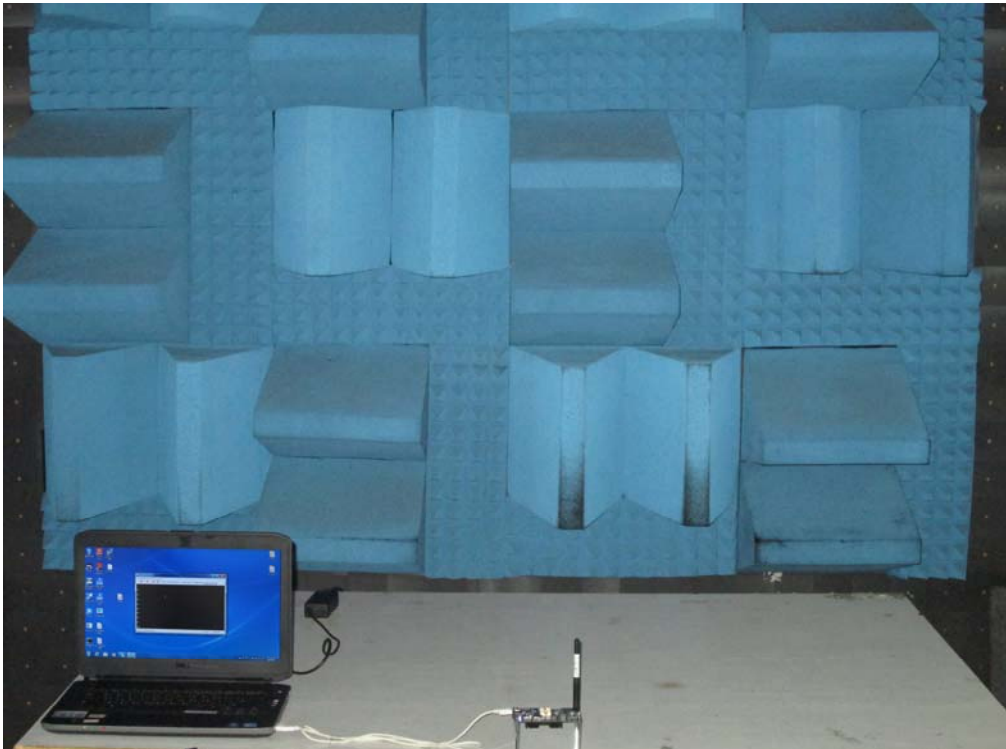


**RS**



**BL600-ST**

**RS**



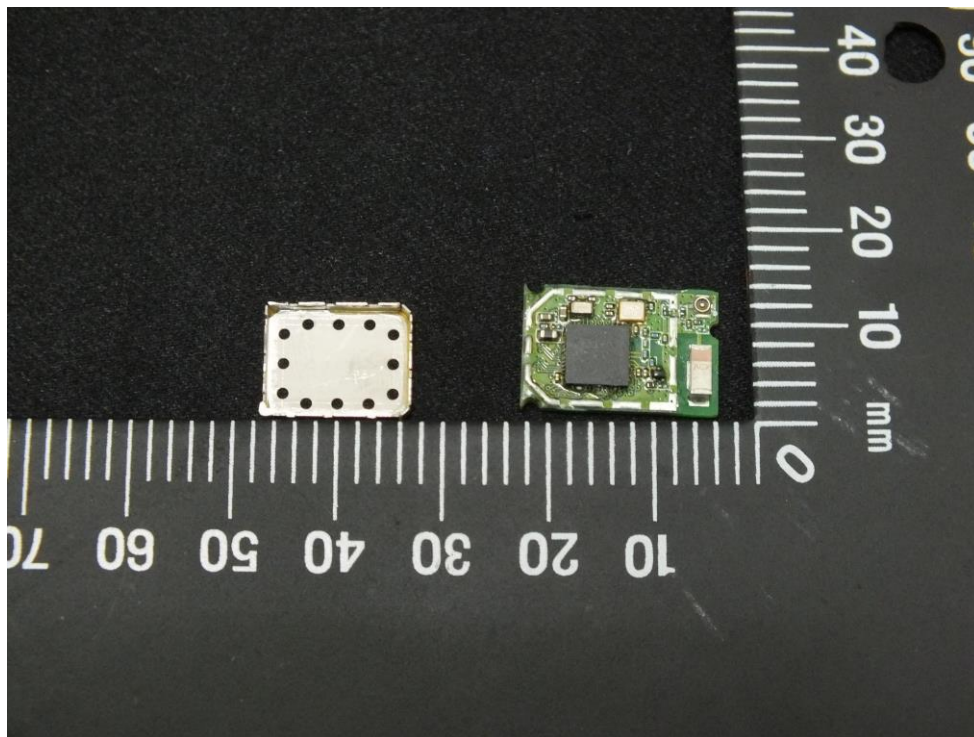
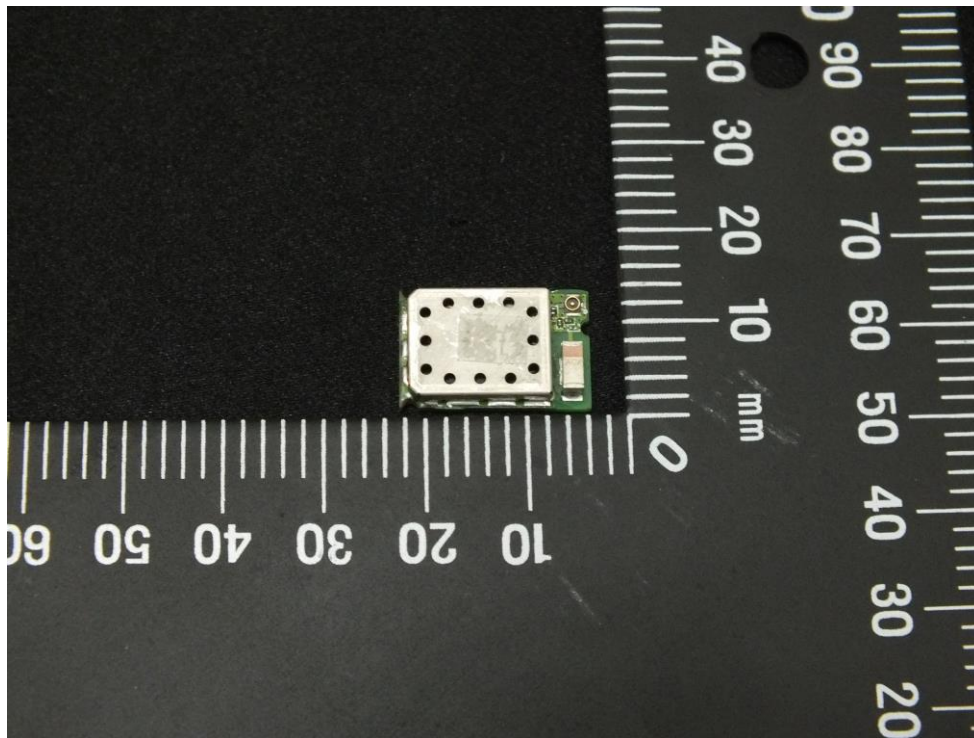
**RS**

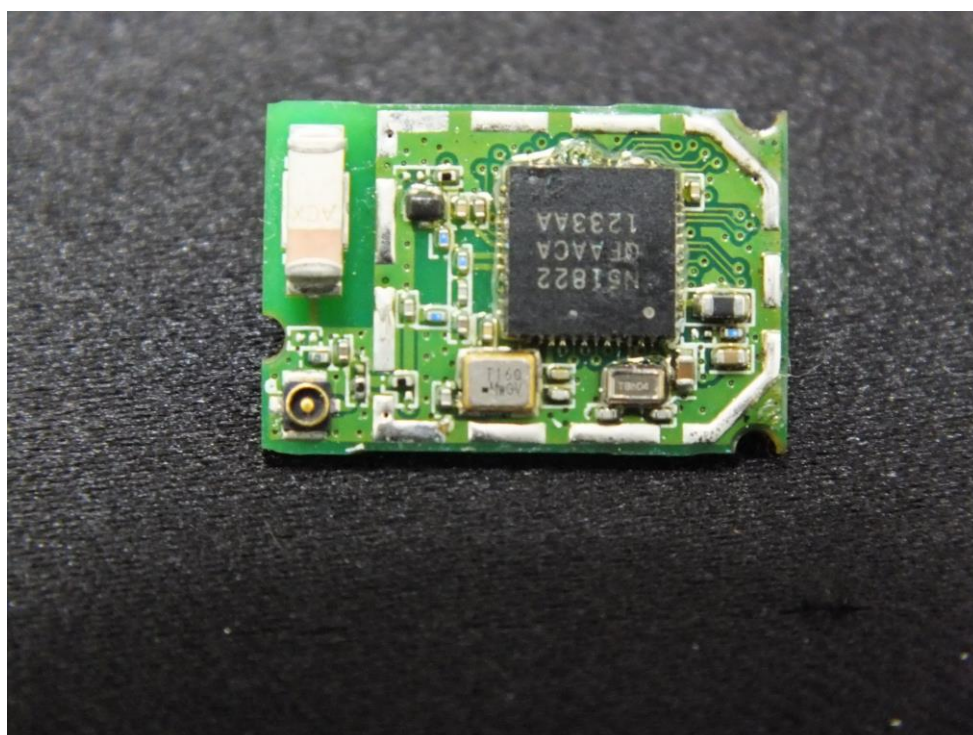
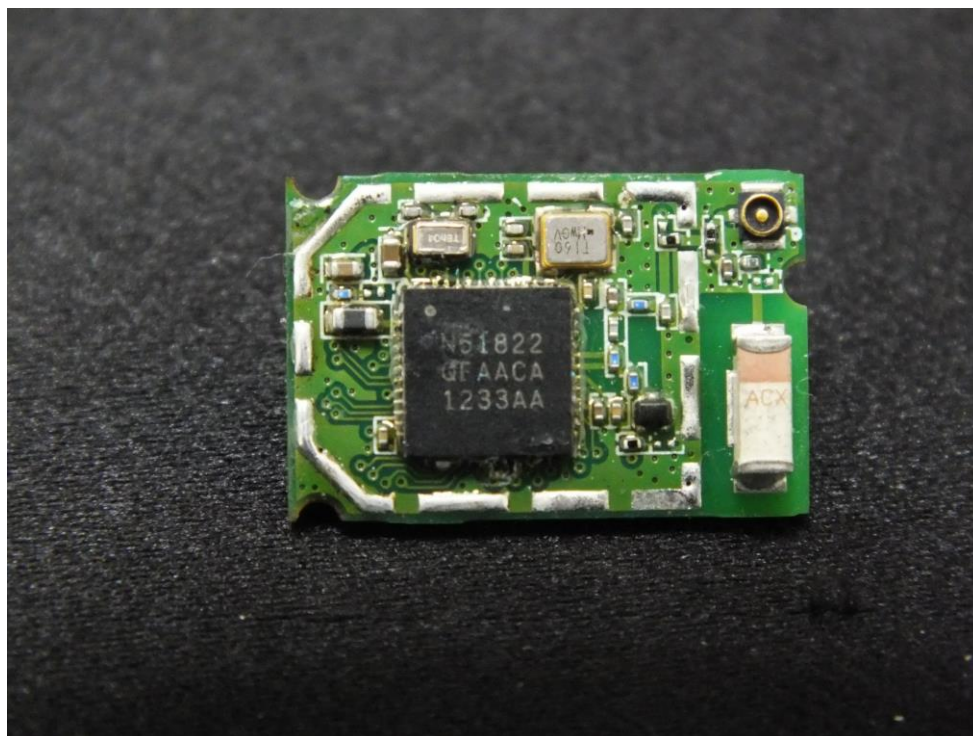




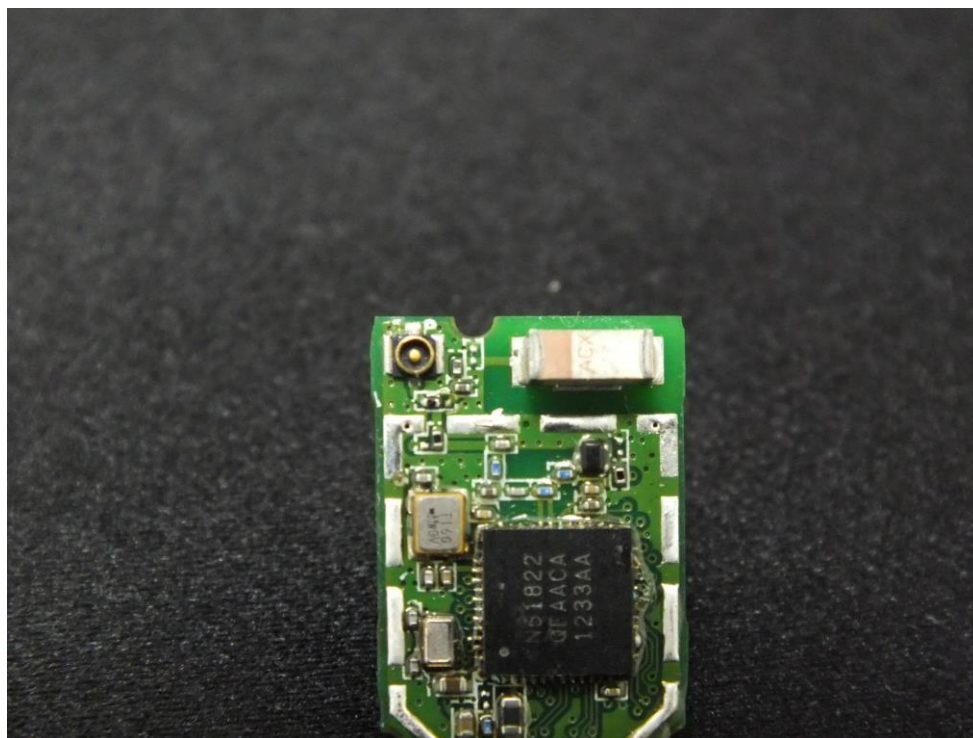
## Appendix B. Photographs of EUT

### BL600-SA



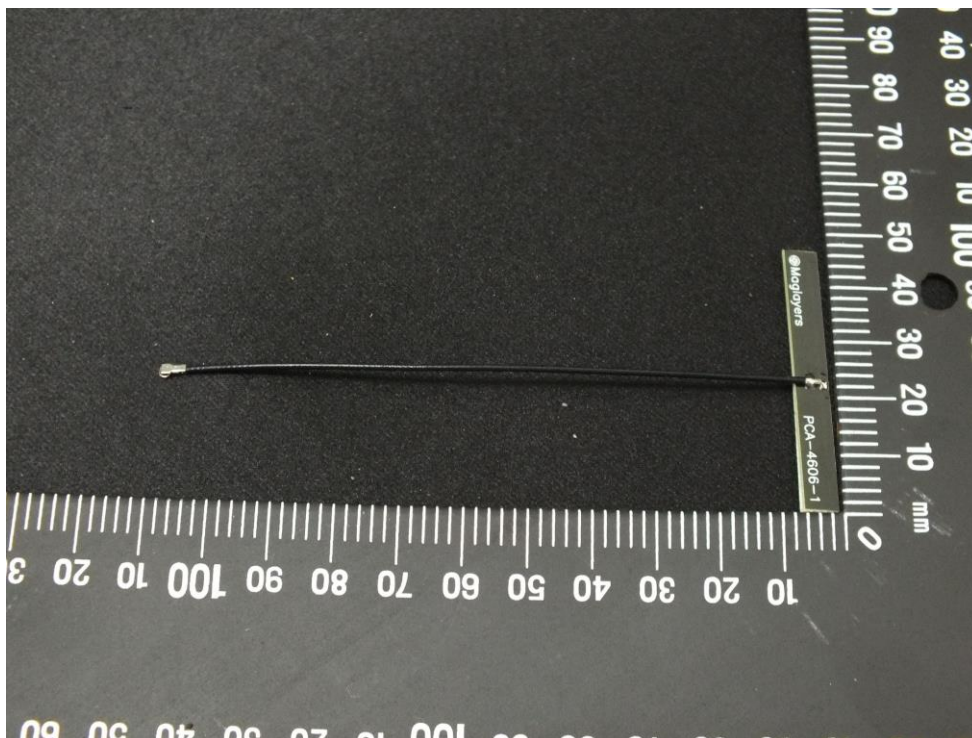
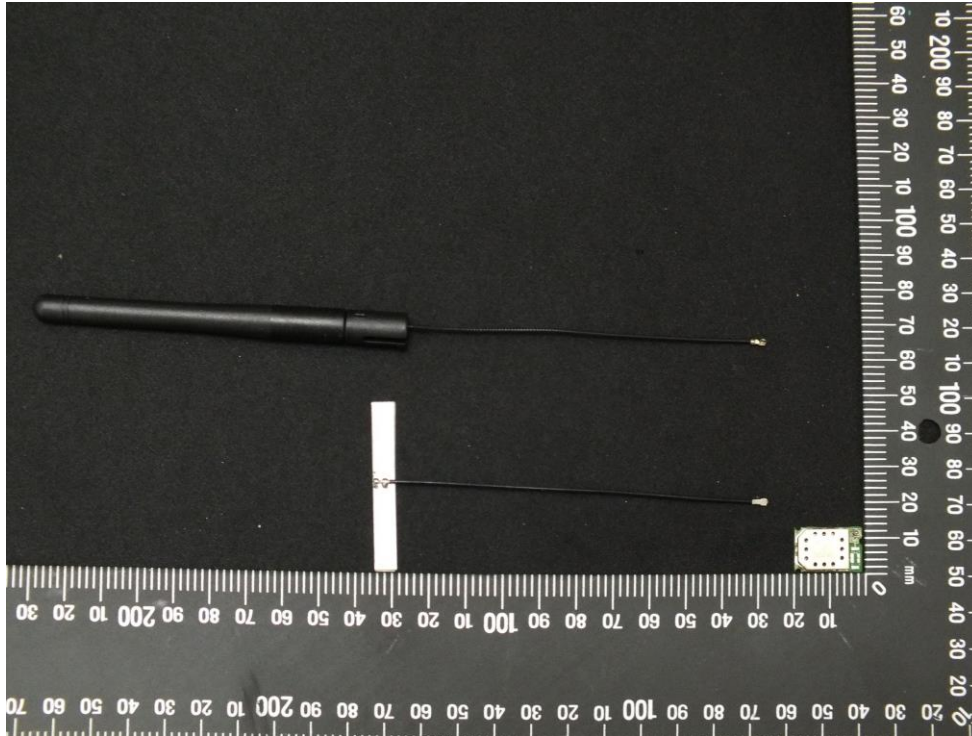


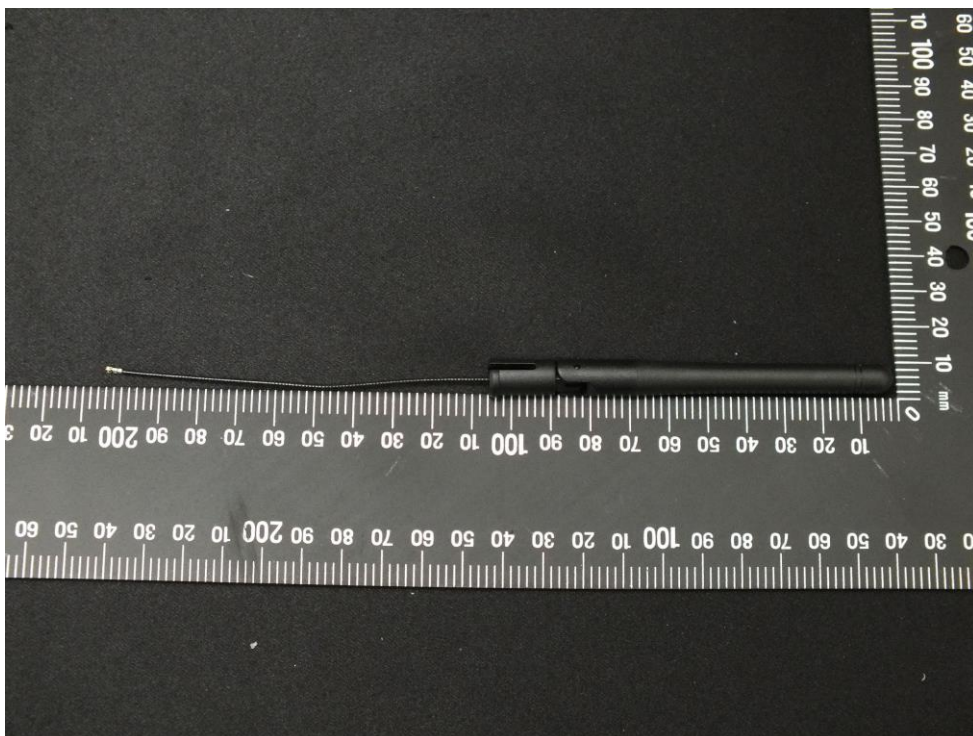
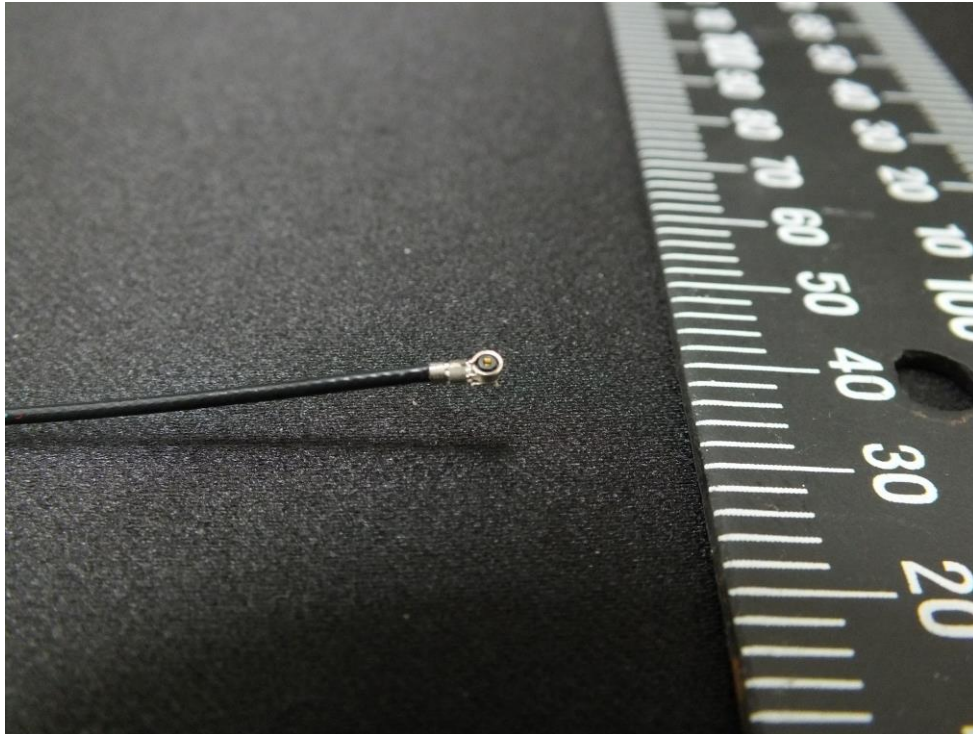




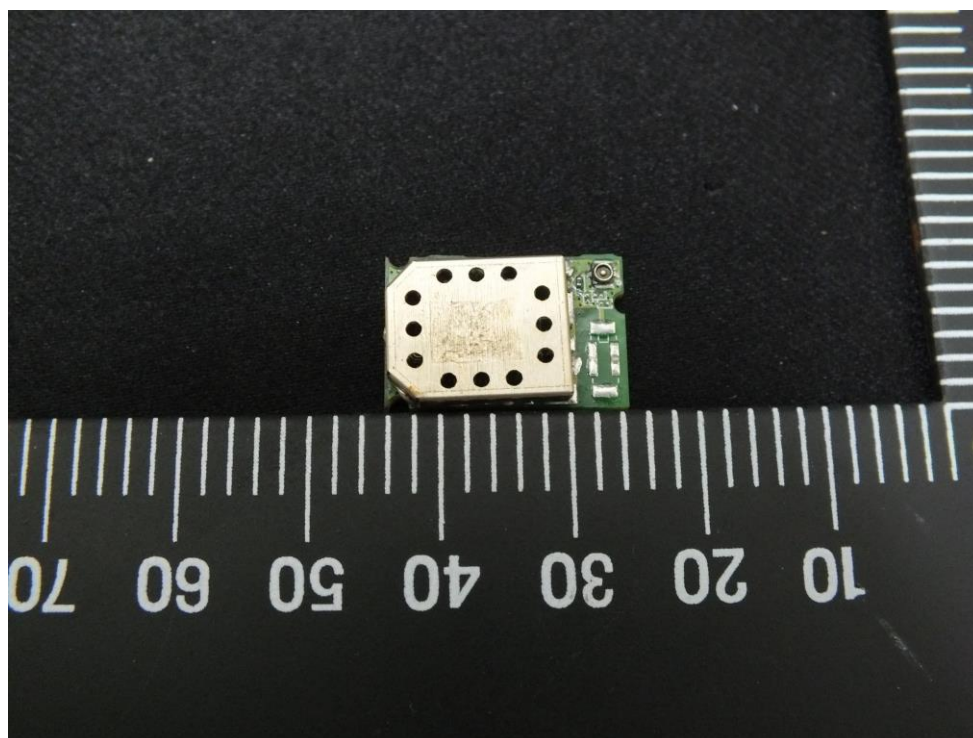


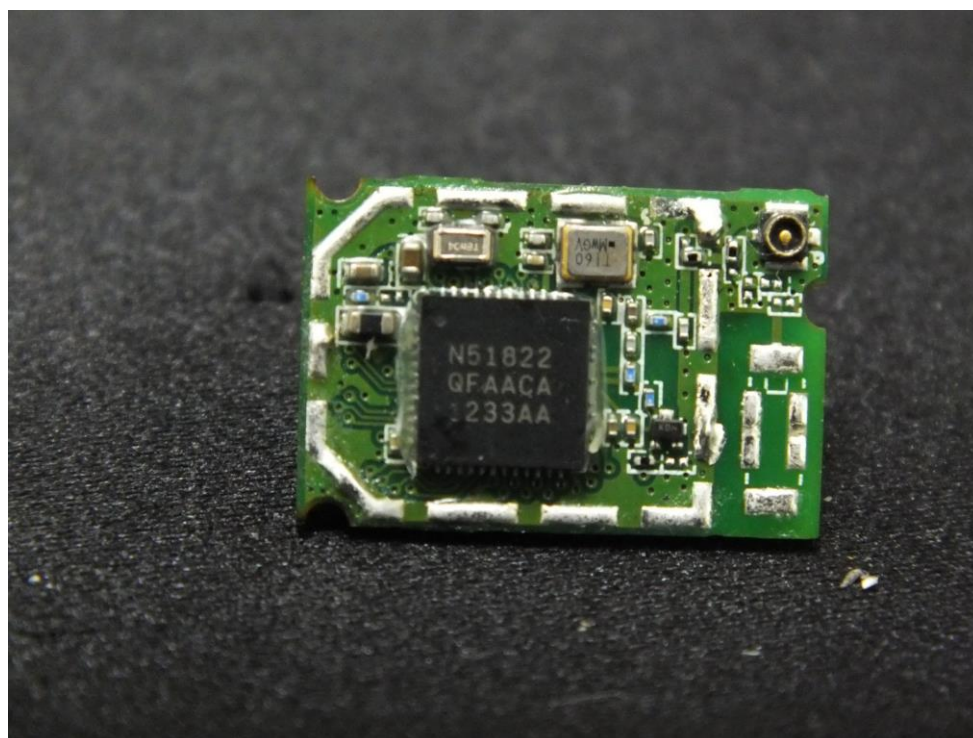
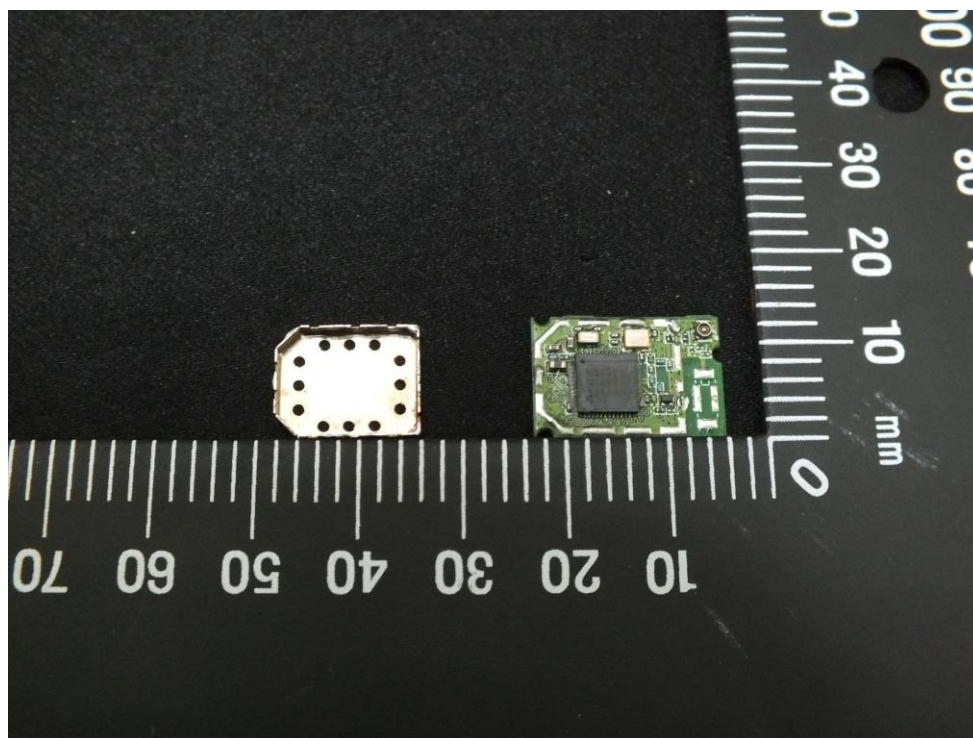
BL600-SC



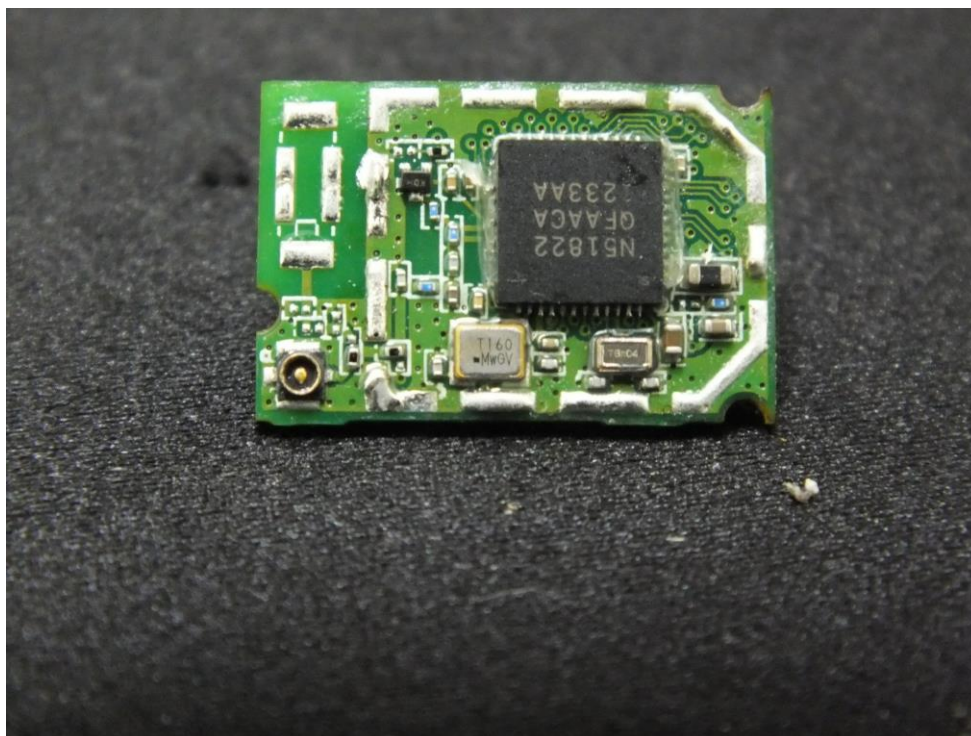












BL600-ST

