

# FCC Test Report

**Equipment** : Personal Computer  
**Brand Name** : SONY  
**Model No.** : SVF13NA1UL  
**FCC ID** : AK8SVF13NA1UL  
**Standard** : 47 CFR FCC Part 15.225  
**Operating Band** : 13.553 – 13.567 MHz (channel freq. 13.56 MHz)  
**Equipment Class** : DXX  
**Applicant** : Sony Corporation  
**Manufacturer** : 1-7-1 Konan, Minato-ku, Tokyo 108-0075, Japan  
**NFC Module** : SONY / RC-S640/IC

The product sample received on Aug. 08, 2013 and completely tested on Oct. 16, 2013. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

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:

  
Wayne Hsu / Assistant Manager





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### APPENDIX A. TEST PHOTOS

### APPENDIX B. PHOTOGRAPHS OF EUT



### Summary of Test Result

Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
1.1.2	15.203	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	[dBuV]: 0.1834550MHz 43.36 (Margin 10.97dB) - AV 59.02 (Margin 5.31dB) - QP	FCC 15.207	Complied
3.2	15.215(c)	Emission Bandwidth	20dB Bandwidth 2.84 [kHz] F <sub>L</sub> : 13.55855 MHz F <sub>H</sub> : 13.56139 MHz	Fall in band F <sub>L</sub> ≥ 13.553 MHz F <sub>H</sub> ≤ 13.567 MHz	Complied
3.3	15.225(a)~(d)	Field Strength of Fundamental Emissions and Spectrum Mask	Fundamental Emissions quasi peak:53.69 dBuV/m at 3m Device complies with spectrum mask – refer to test data	124 dBuV/m at 3	Complied
3.4	15.225(d)	Transmitter Radiated Unwanted Emissions	[dBuV/m at 3m]: 256.980MHz 44.21 (Margin 1.79dB) - QP	FCC 15.209	Complied
3.5	15.225(e)	Frequency Stability	22.12 ppm	± 0.01% (100ppm)	Complied



# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

RF General Information				
Frequency Range	Modulation	Ch. Frequency (MHz)	Channel Number	Field Strength (dBuV/m)
13.553 – 13.567 MHz	ISO 14443-2 (ASK)	13.56	1	53.69
Note 1: Field strength performed quasi peak level at 3m.				

### 1.1.2 Antenna Information

Antenna Category	
<input type="checkbox"/>	Equipment placed on the market without antennas
<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 type="checkbox"/> Pre-Production ; <input checked="" type="checkbox"/> Prototype
Type of EUT	
<input checked="" type="checkbox"/>	Stand-alone
<input 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 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle	
<input checked="" type="checkbox"/>	Operated test mode for worst duty cycle
Test Signal Duty Cycle (x)	Voltage Duty Factor [dB] – (20 log 1/x)
<input checked="" type="checkbox"/> 100%	0

### 1.1.5 EUT Operational Condition

Supply Voltage	<input checked="" type="checkbox"/> AC mains	<input checked="" type="checkbox"/> DC	
Type of DC Source	<input type="checkbox"/> Internal DC supply	<input checked="" type="checkbox"/> External DC adapter	<input checked="" type="checkbox"/> Li-on Battery



### 1.2 Accessories

Accessories Information				
AC Adapter	Brand Name	SONY	Model Name	VGP-AC19V73
	Power Rating	I/P: 100-240V ~ 1.0A 50/60Hz O/P1: 19.5V $\overline{\text{---}}$ 2.0A ; O/P2: 5.0V $\overline{\text{---}}$ 1.0A		
Li-ion Battery	Brand Name	SONY	Model Name	VGP-BPS41

Reminder: Regarding to more detail and other information, please refer to user manual.

### 1.3 Support Equipment

Support Equipment- AC Line Conducted Emission Test				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Printer	EPSON	C61	DoC
2	(USB) Mouse	Microsoft	1004	DoC
3	Identity Badge	-	-	-
4	Wireless AP (Remote Workstation)	ASUS	RT-AC66U	MSQ-RTAC66U
5	Bluetooth Headset (Remote Workstation)	Sony Ericsson	Z354	PY7DDA-2006

Support Equipment- Radiated Emission Test				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Identity Badge	-	-	-

### 1.4 Testing Applied Standards

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

- ◆ 47 CFR FCC Part 15
- ◆ ANSI C63.10-2009
- ◆ FCC KDB 174176

### 1.5 Testing Location Information

Testing Location			
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1 <sup>st</sup> 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 Environment
AC Conduction	CO04-HY	Zeus	22°C / 57%
RF Conducted	TH01-HY	Wie	25°C / 65%
Radiated Emission	03CH02-HY	Daniel	26°C / 57%

### 1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty			
Test Item		Uncertainty	Limit
AC power-line conducted emissions		±2.26 dB	N/A
Emission bandwidth		±1.42 %	N/A
Unwanted emissions, conducted	9 – 150 kHz	±0.38 dB	N/A
	0.15 – 30 MHz	±0.42 dB	N/A
	30 – 1000 MHz	±0.51 dB	N/A
All emissions, radiated	9 – 150 kHz	±2.49 dB	N/A
	0.15 – 30 MHz	±2.28 dB	N/A
	30 – 1000 MHz	±2.56 dB	N/A
Temperature		±0.8 °C	N/A
Humidity		±3 %	N/A
DC and low frequency voltages		±3 %	N/A
Time		±1.42 %	N/A
Duty Cycle		±1.42 %	N/A

## 2 Test Configuration of EUT

### 2.1 The Worst Case Modulation Configuration

Modulation Used for Conformance Testing	
Modulation Mode	Field Strength (dBuV/m at 3 m)
NFC-Read/Write	53.69

### 2.2 Test Channel Frequencies Configuration

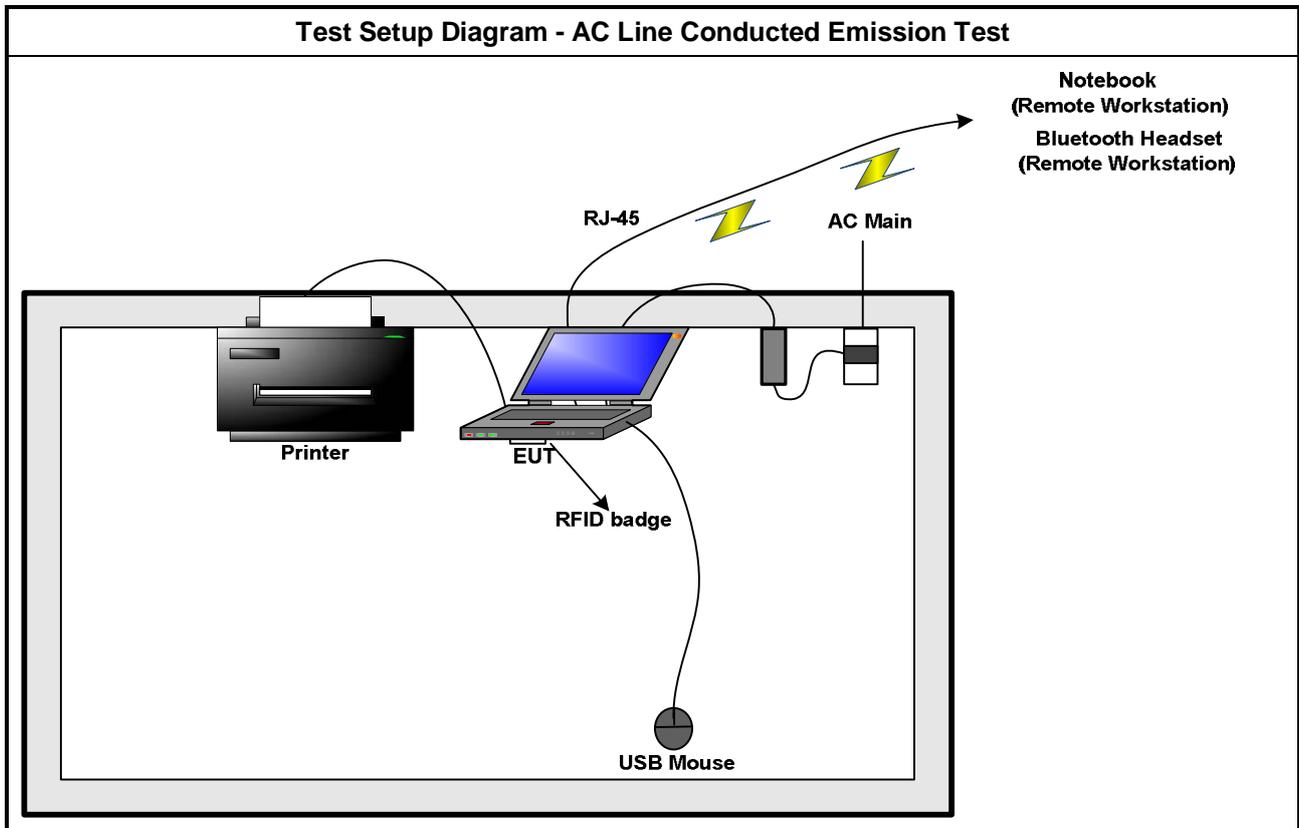
Test Channel Frequencies Configuration	
Modulation Mode	Test Channel Frequencies (MHz) – FX (Frequencies Abbreviations)
NFC-Read/Write	13.56-(F1)

### 2.3 The Worst Case Measurement Configuration

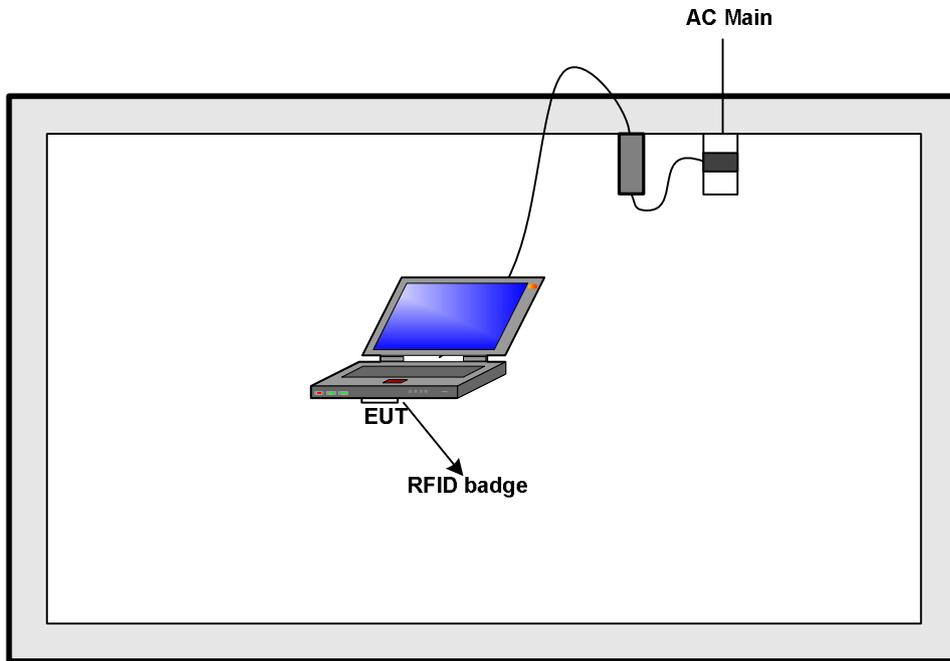
The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	AC Power & Radio link

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emission Bandwidth, Field Strength of Fundamental Emissions Spectrum Mask, Transmitter Radiated Unwanted Emissions Frequency Stability
Test Condition	Radiated measurement
User Position	<input checked="" type="checkbox"/> EUT will be placed in fixed position. <input type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. EUT shall be performed two orthogonal planes. <input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed two or three orthogonal planes.
Operating Mode < 1GHz	<input checked="" type="checkbox"/> 1. AC Power & Radio link
Modulation Mode	NFC-Read/Write

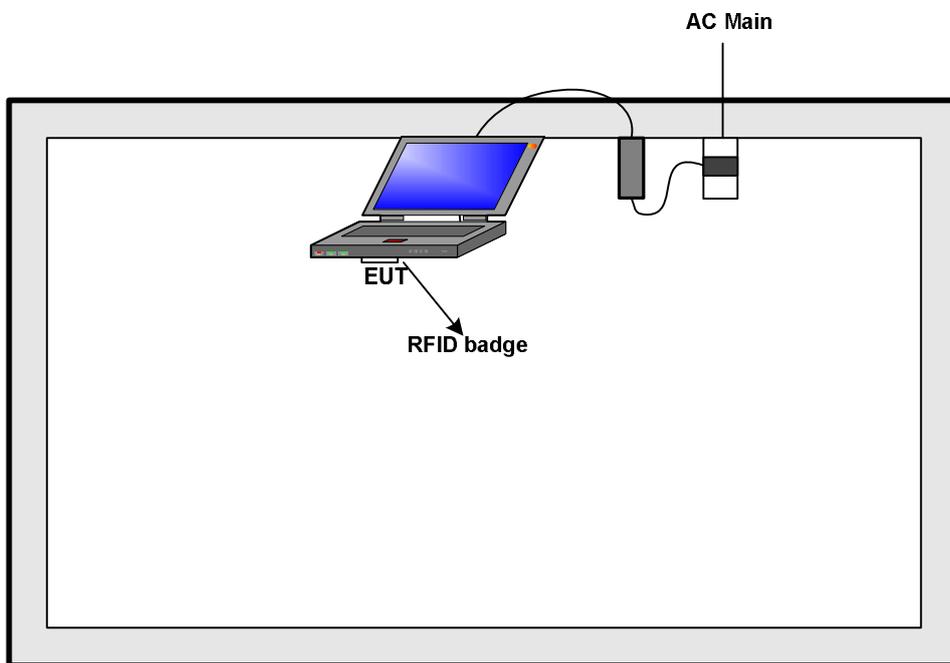
## 2.4 Test Setup Diagram



Test Setup Diagram - Radiated Below 30MHz Test



Test Setup Diagram - Radiated Above 30MHz Test



### 3 Transmitter Test Result

#### 3.1 AC Power-line Conducted Emissions

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

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: \* Decreases with the logarithm of the frequency.

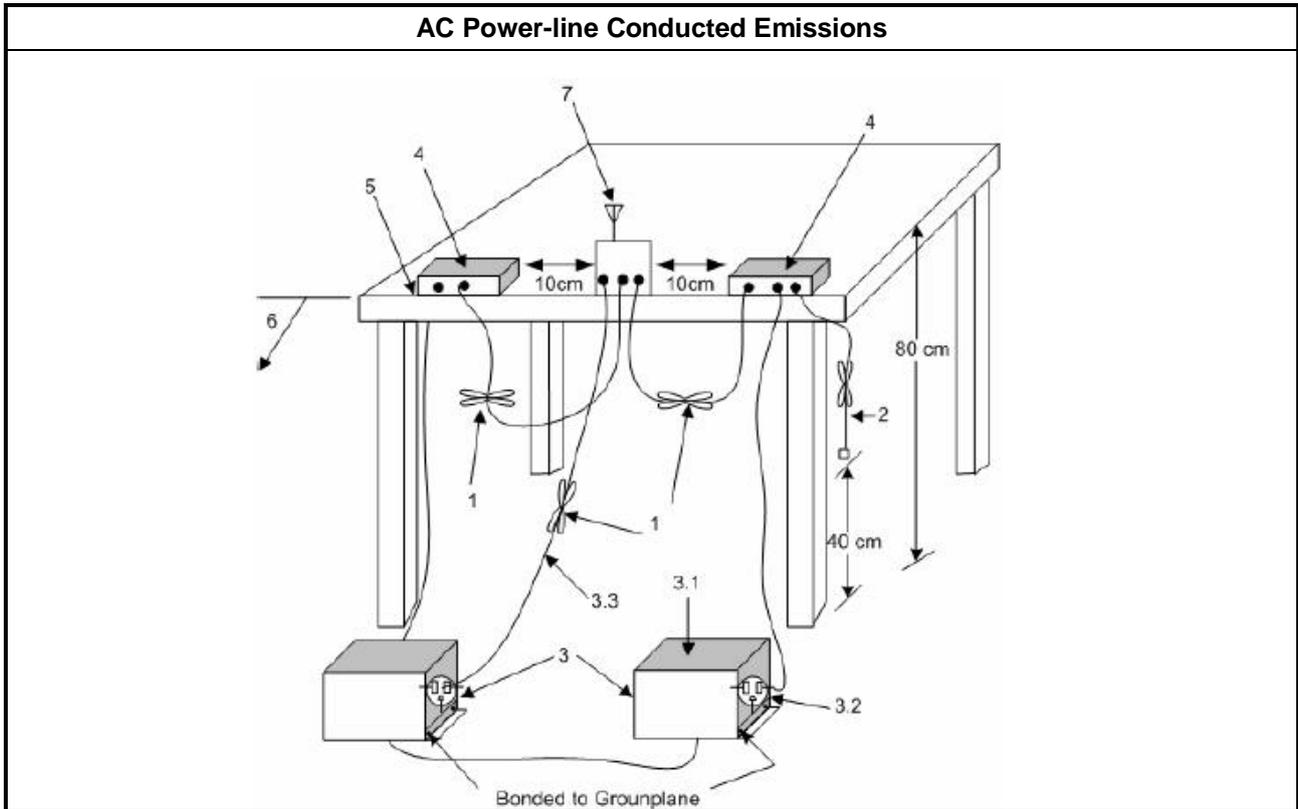
##### 3.1.2 Measuring Instruments

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

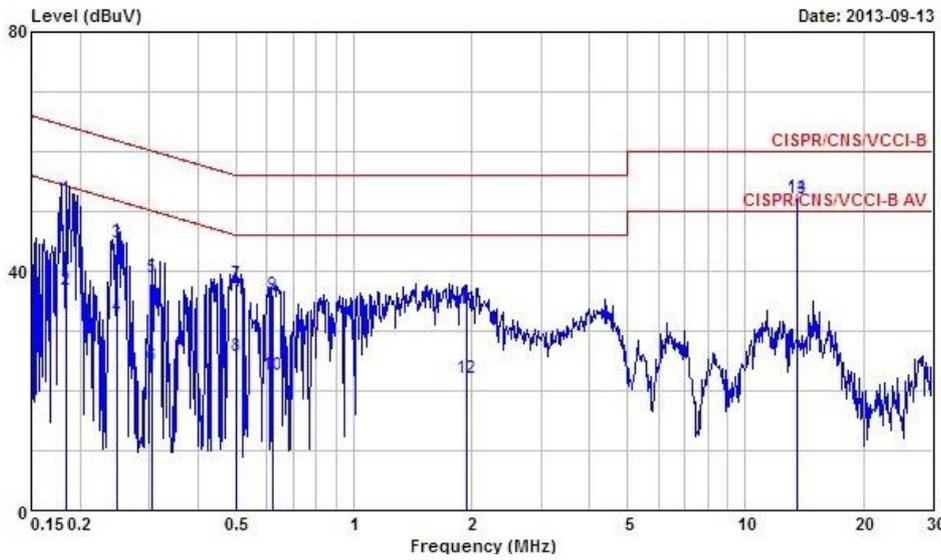
##### 3.1.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.
<input checked="" type="checkbox"/>	If AC conducted emissions fall in operating band, then following below test method confirm final result.
<input type="checkbox"/>	Accept measurements done with a suitable dummy load replacing the antenna under the following conditions: (1) Perform the AC line conducted tests with the antenna connected to determine compliance with FCC 15.207 limits outside the transmitter's fundamental emission band; (2) Retest with a dummy load to determine compliance with FCC 15.207 limits within the transmitter's fundamental emission band.
<input checked="" type="checkbox"/>	For a device with a permanent antenna operating at or below 30 MHz, accept measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions: (1) Perform the AC line conducted tests with the permanent antenna to determine compliance with the FCC 15.207 limits outside the transmitter's fundamental emission band; (2) Retest with a dummy load in lieu of the permanent antenna to determine compliance with the FCC 15.207 limits within the transmitter's fundamental emission band.

### 3.1.4 Test Setup

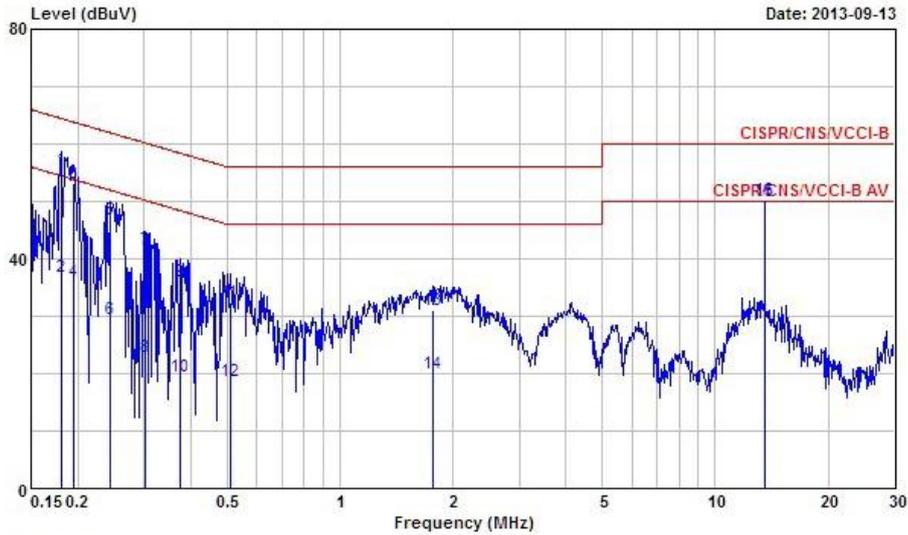


### 3.1.5 Test Result of AC Power-line Conducted Emissions

AC Power-line Conducted Emissions Result																																																																																																																																																			
Operating Mode	1	Power Phase	Neutral																																																																																																																																																
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<table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th>Line</th> <th>Freq</th> <th>Level</th> <th>Over Limit</th> <th>Limit Line</th> <th>Read Level</th> <th>LISN Factor</th> <th>Cable Loss</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV</th> <th>dB</th> <th>dBuV</th> <th>dBuV</th> <th>dB</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr><td>1</td><td>0.1844300</td><td>52.03</td><td>-12.25</td><td>64.28</td><td>51.65</td><td>0.23</td><td>0.15</td><td>QP</td></tr> <tr><td>2</td><td>0.1844300</td><td>36.96</td><td>-17.32</td><td>54.28</td><td>36.58</td><td>0.23</td><td>0.15</td><td>Average</td></tr> <tr><td>3</td><td>0.2494540</td><td>44.80</td><td>-16.98</td><td>61.78</td><td>44.47</td><td>0.23</td><td>0.10</td><td>QP</td></tr> <tr><td>4</td><td>0.2494540</td><td>32.29</td><td>-19.49</td><td>51.78</td><td>31.96</td><td>0.23</td><td>0.10</td><td>Average</td></tr> <tr><td>5</td><td>0.3050910</td><td>38.94</td><td>-21.16</td><td>60.10</td><td>38.62</td><td>0.22</td><td>0.10</td><td>QP</td></tr> <tr><td>6</td><td>0.3050910</td><td>24.11</td><td>-25.99</td><td>50.10</td><td>23.79</td><td>0.22</td><td>0.10</td><td>Average</td></tr> <tr><td>7</td><td>0.5020260</td><td>37.96</td><td>-18.04</td><td>56.00</td><td>37.62</td><td>0.22</td><td>0.12</td><td>QP</td></tr> <tr><td>8</td><td>0.5020260</td><td>25.77</td><td>-20.23</td><td>46.00</td><td>25.43</td><td>0.22</td><td>0.12</td><td>Average</td></tr> <tr><td>9</td><td>0.6205370</td><td>35.93</td><td>-20.07</td><td>56.00</td><td>35.56</td><td>0.22</td><td>0.15</td><td>QP</td></tr> <tr><td>10</td><td>0.6205370</td><td>22.61</td><td>-23.39</td><td>46.00</td><td>22.24</td><td>0.22</td><td>0.15</td><td>Average</td></tr> <tr><td>11</td><td>1.950</td><td>33.70</td><td>-22.30</td><td>56.00</td><td>33.15</td><td>0.25</td><td>0.30</td><td>QP</td></tr> <tr><td>12</td><td>1.950</td><td>22.18</td><td>-23.82</td><td>46.00</td><td>21.63</td><td>0.25</td><td>0.30</td><td>Average</td></tr> <tr><td>13</td><td>13.560</td><td>52.22</td><td>-7.78</td><td>60.00</td><td>51.57</td><td>0.48</td><td>0.17</td><td>QP</td></tr> <tr><td>14</td><td>13.560</td><td>52.47</td><td>2.47</td><td>50.00</td><td>51.82</td><td>0.48</td><td>0.17</td><td>Average</td></tr> </tbody> </table> <p style="text-align: right; margin-top: 5px;">→ This frequency is NFC signal.</p>				Line	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark		MHz	dBuV	dB	dBuV	dBuV	dB	dB		1	0.1844300	52.03	-12.25	64.28	51.65	0.23	0.15	QP	2	0.1844300	36.96	-17.32	54.28	36.58	0.23	0.15	Average	3	0.2494540	44.80	-16.98	61.78	44.47	0.23	0.10	QP	4	0.2494540	32.29	-19.49	51.78	31.96	0.23	0.10	Average	5	0.3050910	38.94	-21.16	60.10	38.62	0.22	0.10	QP	6	0.3050910	24.11	-25.99	50.10	23.79	0.22	0.10	Average	7	0.5020260	37.96	-18.04	56.00	37.62	0.22	0.12	QP	8	0.5020260	25.77	-20.23	46.00	25.43	0.22	0.12	Average	9	0.6205370	35.93	-20.07	56.00	35.56	0.22	0.15	QP	10	0.6205370	22.61	-23.39	46.00	22.24	0.22	0.15	Average	11	1.950	33.70	-22.30	56.00	33.15	0.25	0.30	QP	12	1.950	22.18	-23.82	46.00	21.63	0.25	0.30	Average	13	13.560	52.22	-7.78	60.00	51.57	0.48	0.17	QP	14	13.560	52.47	2.47	50.00	51.82	0.48	0.17	Average
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AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	AC Power & Radio link with AP the NFC is normal function with antenna		



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1805620	55.52	-8.94	64.46	55.25	0.11	0.16	QP
2	0.1805620	36.86	-17.60	54.46	36.59	0.11	0.16	Average
3	0.1944650	53.03	-10.81	63.84	52.81	0.11	0.11	QP
4	0.1944650	35.96	-17.88	53.84	35.74	0.11	0.11	Average
5	0.2429320	46.86	-15.14	62.00	46.65	0.11	0.10	QP
6	0.2429320	29.45	-22.55	52.00	29.24	0.11	0.10	Average
7	0.3034790	41.54	-18.61	60.15	41.34	0.10	0.10	QP
8	0.3034790	23.02	-27.13	50.15	22.82	0.10	0.10	Average
9	0.3751190	36.07	-22.32	58.39	35.87	0.10	0.10	QP
10	0.3751190	19.37	-29.02	48.39	19.17	0.10	0.10	Average
11	0.5100690	32.29	-23.71	56.00	32.06	0.10	0.13	QP
12	0.5100690	18.60	-27.40	46.00	18.37	0.10	0.13	Average
13	1.760	31.04	-24.96	56.00	30.63	0.13	0.28	QP
14	1.760	19.96	-26.04	46.00	19.55	0.13	0.28	Average
15	13.560	50.08	-9.92	60.00	49.64	0.27	0.17	QP
16 X	13.560	50.18	0.18	50.00	49.74	0.27	0.17	Average

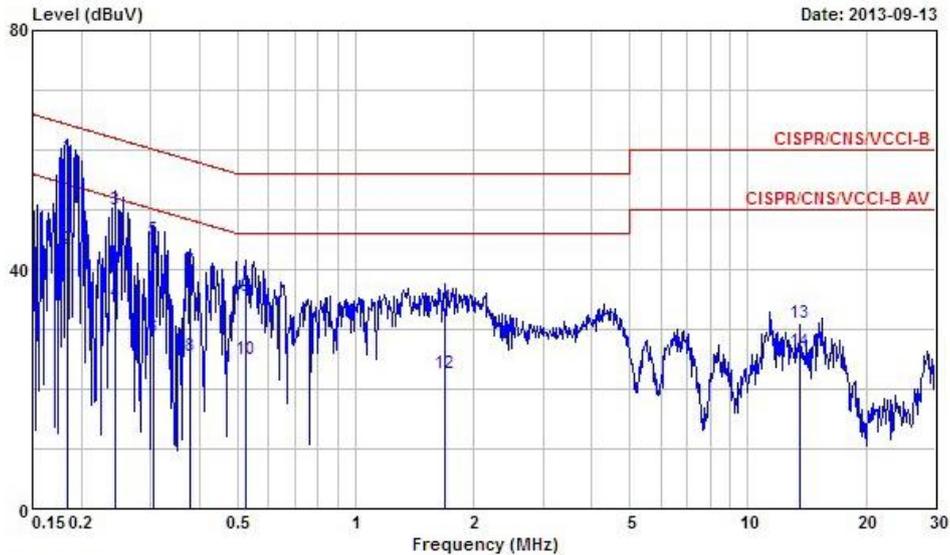
→ This frequency is NFC signal.

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	Neutral
Operating Function	AC Power & Radio link with AP the NFC is normal function and antenna terminal		



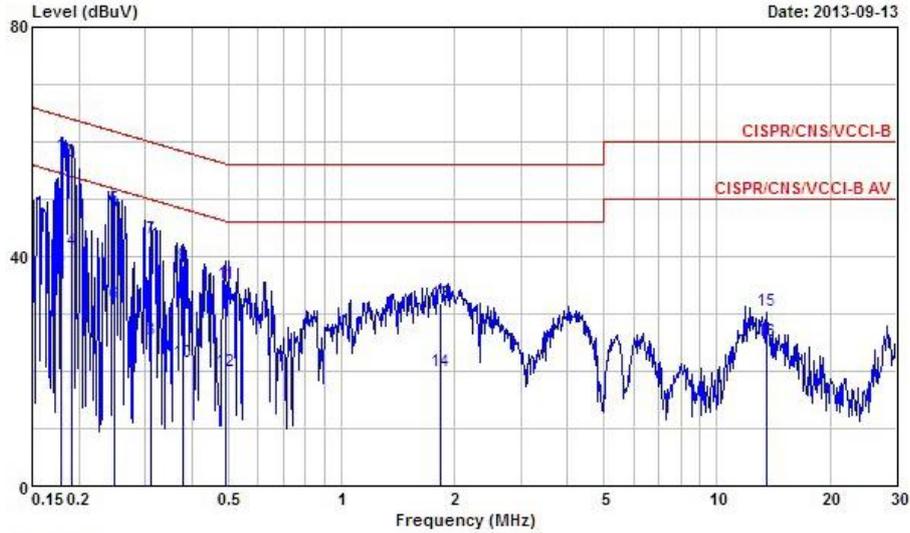
	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1834550	59.02	-5.31	64.33	58.64	0.23	0.15	QP
2	0.1834550	43.36	-10.97	54.33	42.98	0.23	0.15	Average
3	0.2429320	50.10	-11.90	62.00	49.77	0.23	0.10	QP
4	0.2429320	34.57	-17.43	52.00	34.24	0.23	0.10	Average
5	0.3050910	45.00	-15.10	60.10	44.68	0.22	0.10	QP
6	0.3050910	28.55	-21.55	50.10	28.23	0.22	0.10	Average
7	0.3771120	39.86	-18.48	58.34	39.54	0.22	0.10	QP
8	0.3771120	25.51	-22.83	48.34	25.19	0.22	0.10	Average
9	0.5237620	35.61	-20.39	56.00	35.26	0.22	0.13	QP
10	0.5237620	24.90	-21.10	46.00	24.55	0.22	0.13	Average
11	1.680	33.77	-22.23	56.00	33.24	0.25	0.28	QP
12	1.680	22.53	-23.47	46.00	22.00	0.25	0.28	Average
13	13.560	31.08	-28.92	60.00	30.43	0.48	0.17	QP
14	13.560	26.19	-23.81	50.00	25.54	0.48	0.17	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	AC Power & Radio link with AP the NFC is normal function and antenna terminal		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1786590	57.59	-6.96	64.55	57.31	0.11	0.17	QP
2	0.1786590	37.13	-17.42	54.55	36.85	0.11	0.17	Average
3	0.1903870	56.55	-7.47	64.02	56.31	0.11	0.13	QP
4	0.1903870	41.16	-12.86	54.02	40.92	0.11	0.13	Average
5	0.2494540	48.30	-13.48	61.78	48.09	0.11	0.10	QP
6	0.2494540	31.77	-20.01	51.78	31.56	0.11	0.10	Average
7	0.3099790	43.25	-16.72	59.97	43.05	0.10	0.10	QP
8	0.3099790	25.42	-24.55	49.97	25.22	0.10	0.10	Average
9	0.3791160	38.29	-20.01	58.30	38.09	0.10	0.10	QP
10	0.3791160	21.45	-26.85	48.30	21.25	0.10	0.10	Average
11	0.4914980	35.15	-20.99	56.14	34.93	0.10	0.12	QP
12	0.4914980	20.09	-26.05	46.14	19.87	0.10	0.12	Average
13	1.840	31.82	-24.18	56.00	31.40	0.13	0.29	QP
14	1.840	20.02	-25.98	46.00	19.60	0.13	0.29	Average
15	13.560	30.51	-29.49	60.00	30.07	0.27	0.17	QP
16	13.560	25.38	-24.62	50.00	24.94	0.27	0.17	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.)

### 3.2 Emission Bandwidth

#### 3.2.1 Emission Bandwidth Limit

20dB Bandwidth Limit	
<input checked="" type="checkbox"/>	Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (13.553 – 13.567 MHz).

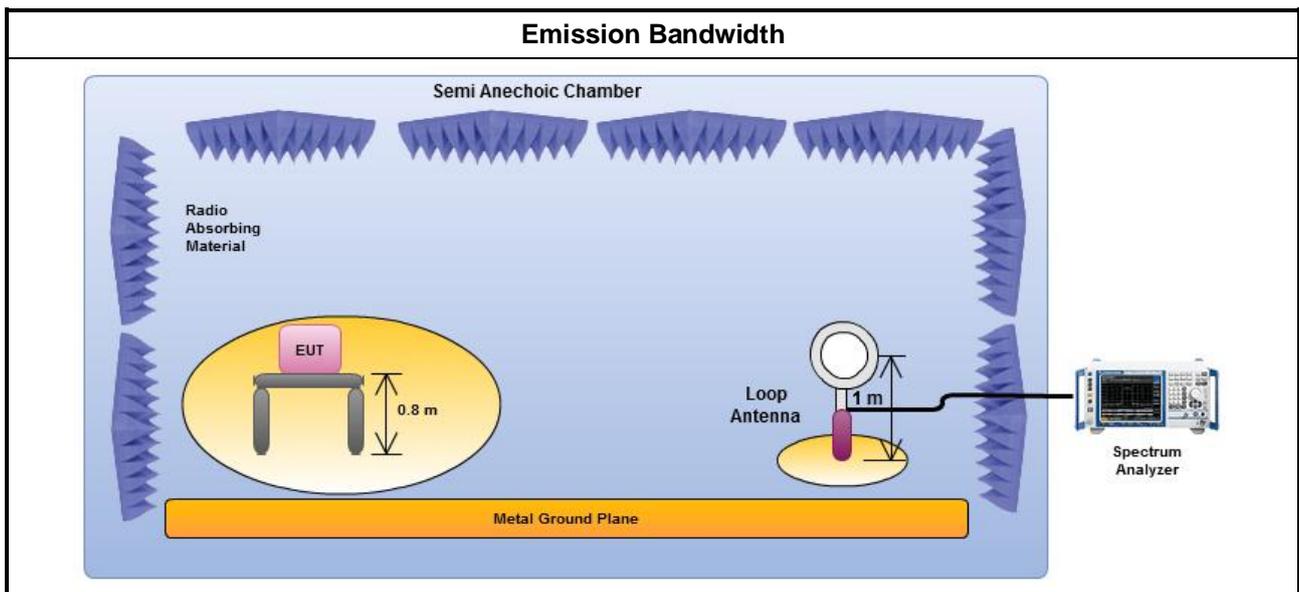
#### 3.2.2 Measuring Instruments

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

#### 3.2.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	For the emission bandwidth refer ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
<input checked="" type="checkbox"/>	For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level.

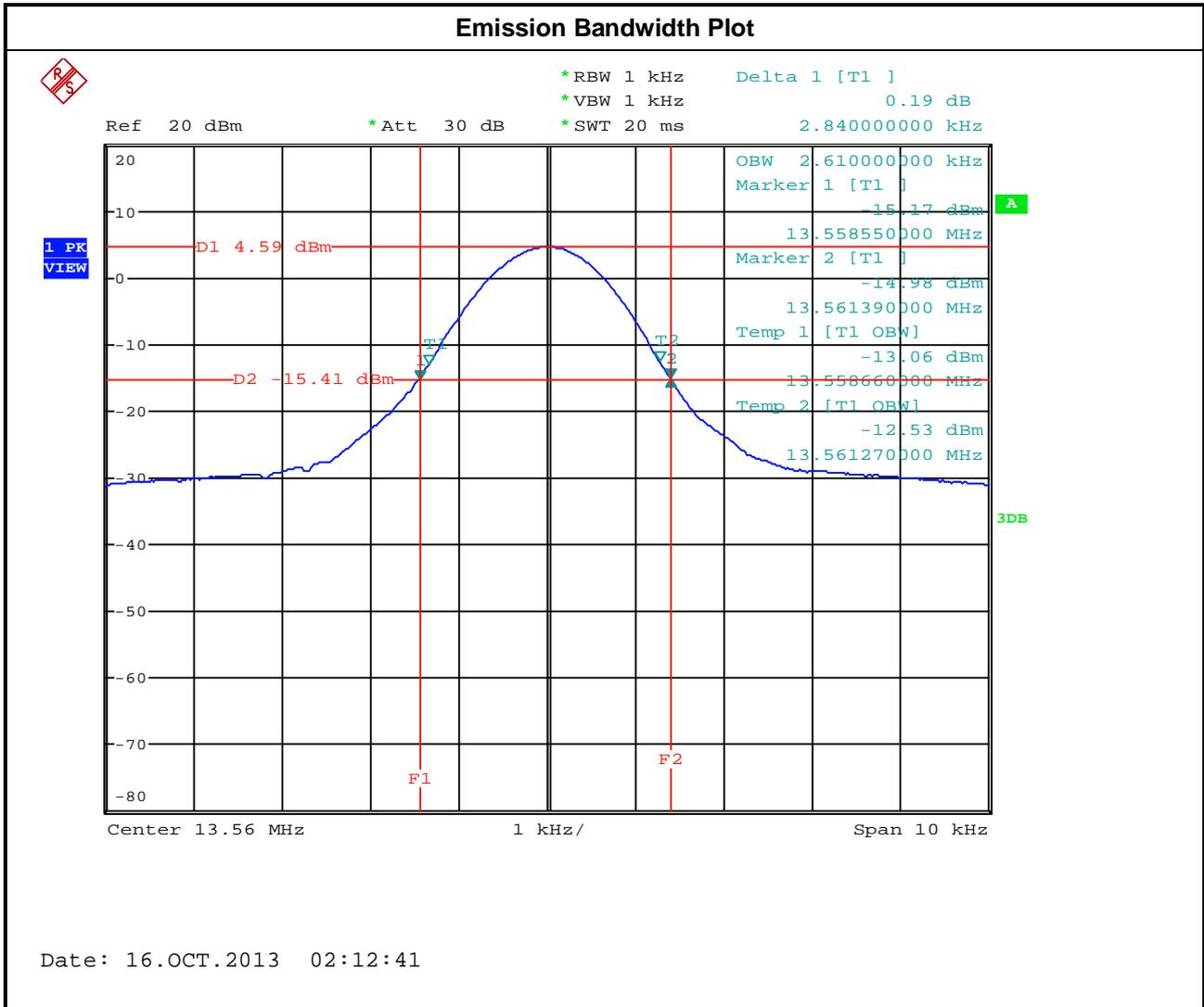
#### 3.2.4 Test Setup





3.2.5 Test Result of Emission Bandwidth

Occupied Channel Bandwidth Result					
Modulation Mode	Frequency (MHz)	20dB Bandwidth (kHz)	F <sub>L</sub> at 20dB BW (kHz)	F <sub>H</sub> at 20dB BW (MHz)	99% Bandwidth (kHz)
NFC-Read/Write	13.56	2.84	13.55855	13.56139	2.61
<b>Limit</b>		<b>N/A</b>	<b>13.553</b>	<b>13.567</b>	<b>N/A</b>
<b>Result</b>		<b>Complied</b>			



### 3.3 Field Strength of Fundamental Emissions and Spectrum Mask

#### 3.3.1 Field Strength of Fundamental Emissions and Spectrum Mask Limit

Field Strength of Fundamental Emissions					
Emissions	(uV/m)@30m	(dBuV/m)@30m	(dBuV/m)@10m	(dBuV/m)@3m	(dBuV/m)@1m
Fundamental	15848	84.0	103.1	124.0	143.1
Quasi peak measurement of the fundamental.					

Spectrum Mask					
Freq. of Emission (MHz)	(uV/m)@30m	(dBuV/m)@30m	(dBuV/m)@10m	(dBuV/m)@3m	(dBuV/m)@1m
1.705~13.110	30	29.5	48.6	69.5	88.6
13.110~13.410	106	40.5	59.6	80.5	99.6
13.410~13.553	334	50.5	69.6	90.5	109.6
13.553~13.567	15848	84.0	103.1	124.0	143.1
13.567~13.710	334	50.5	69.6	90.5	109.6
13.710~14.010	106	40.5	59.6	80.5	99.6
14.010~30.000	30	29.5	48.6	69.5	88.6

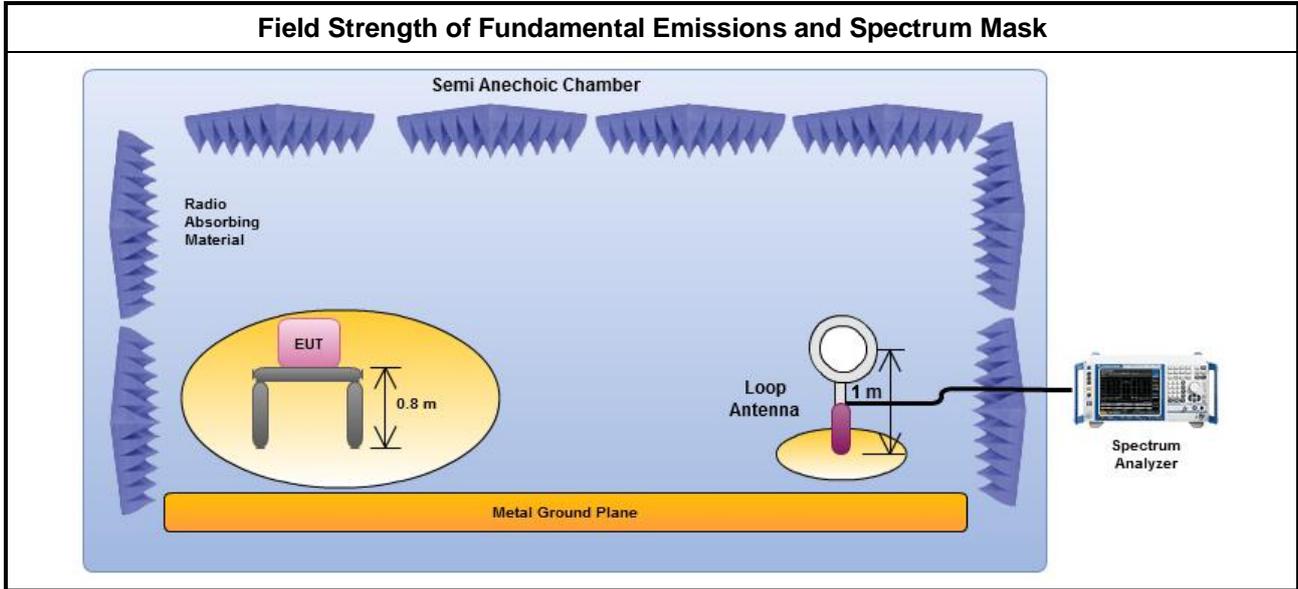
#### 3.3.2 Measuring Instruments

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

#### 3.3.3 Test Procedures

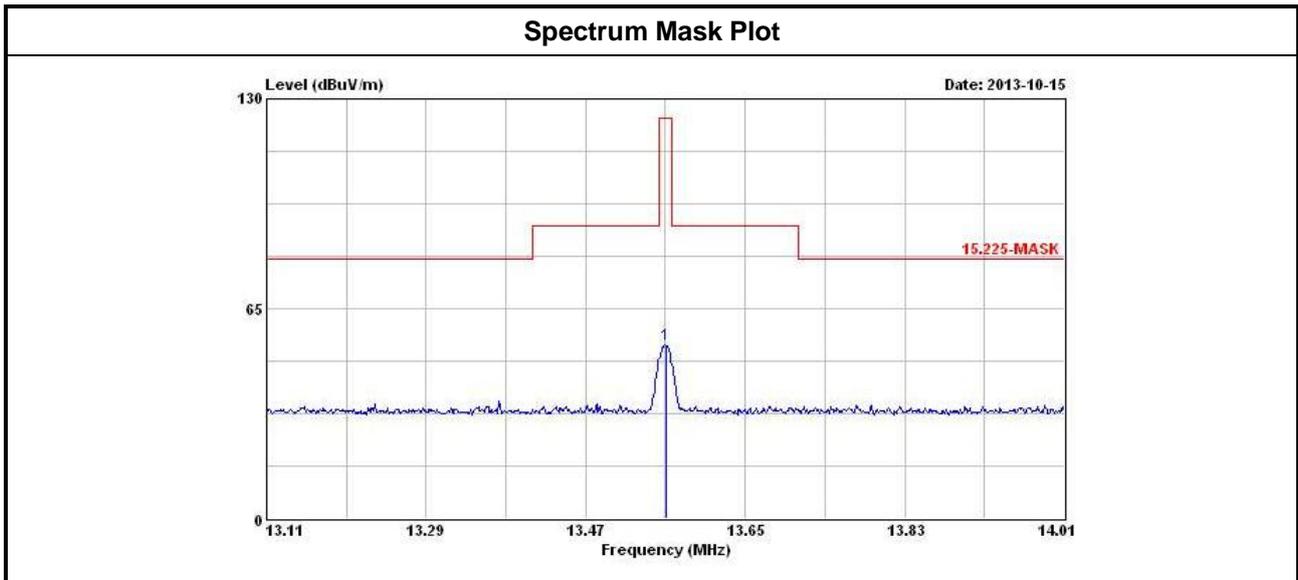
Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.
<input checked="" type="checkbox"/>	At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be following below methods.
<input type="checkbox"/>	The results shall be extrapolated to the specified distance by making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
<input checked="" type="checkbox"/>	The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
<input checked="" type="checkbox"/>	For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level.

### 3.3.4 Test Setup



### 3.3.5 Test Result of Field Strength of Fundamental Emissions and Spectrum Mask

Field Strength of Fundamental Emissions Result					
Modulation Mode	Frequency (MHz)	Fundamental (dBuV/m)@3m	Polarization	Margin (dB)	Limit (dBuV/m)@3m
NFC-Read/Write	F1	53.69	H	70.31	124
<b>Result</b>		<b>Complied</b>			
Note 1: Measurement worst emissions of receive antenna polarization: V (Vertical).					



### 3.4 Transmitter Radiated Unwanted Emissions

#### 3.4.1 Transmitter Radiated Unwanted Emissions Limit

Transmitter Radiated Unwanted Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

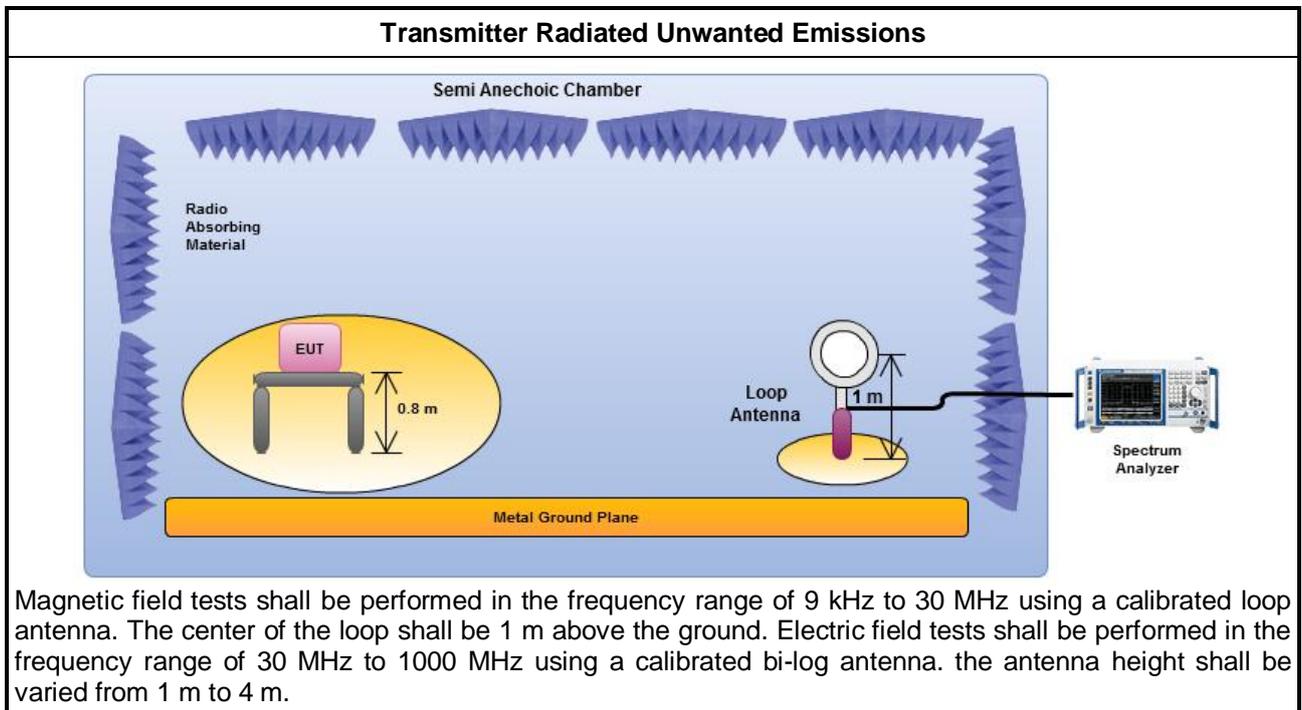
#### 3.4.2 Measuring Instruments

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

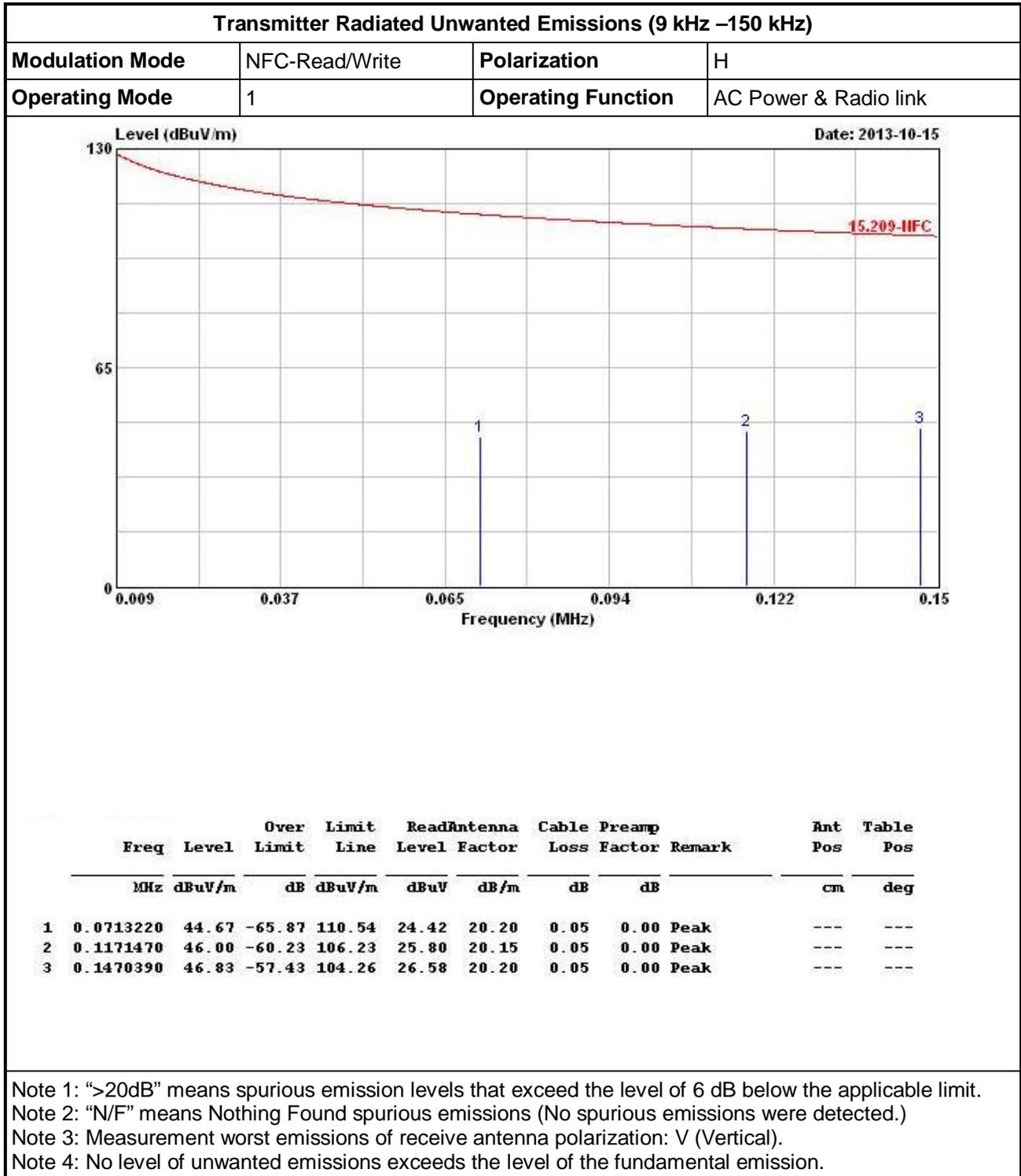
### 3.4.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.
<input checked="" type="checkbox"/>	At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be following below methods.
<input type="checkbox"/>	The results shall be extrapolated to the specified distance by making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
<input checked="" type="checkbox"/>	The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
<input checked="" type="checkbox"/>	For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level.
<input checked="" type="checkbox"/>	The any unwanted emissions level shall not exceed the fundamental emission level.
<input checked="" type="checkbox"/>	All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

### 3.4.4 Test Setup



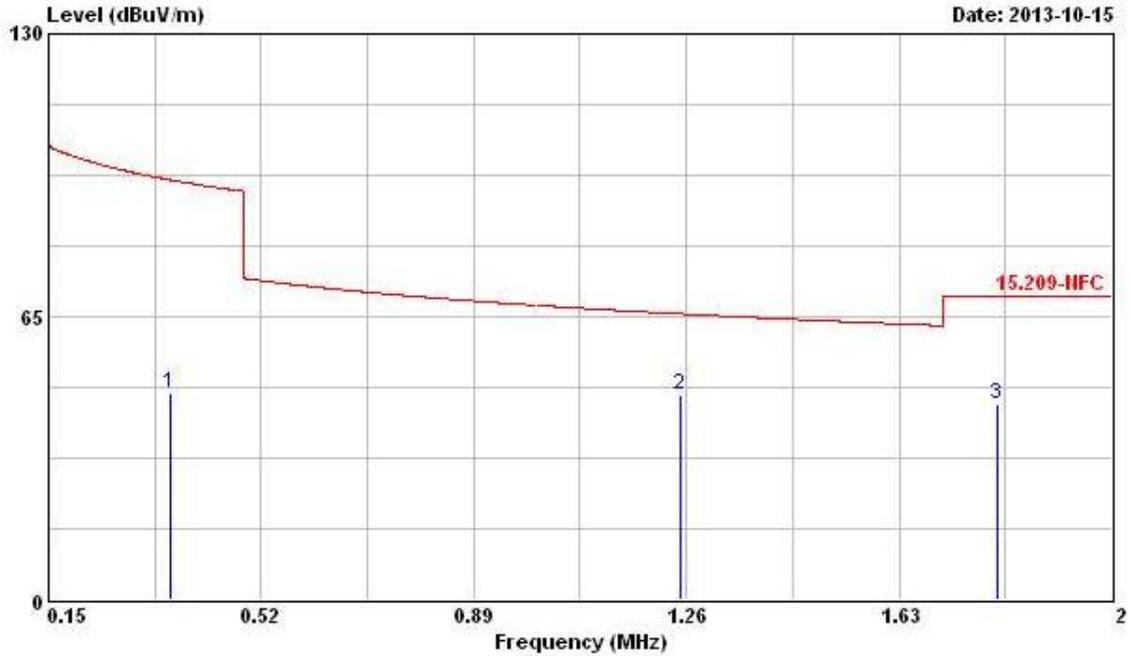
### 3.4.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)





Transmitter Radiated Unwanted Emissions (150 kHz – 2 MHz)

Modulation Mode	NFC-Read/Write	Polarization	H
Operating Mode	1	Operating Function	AC Power & Radio link



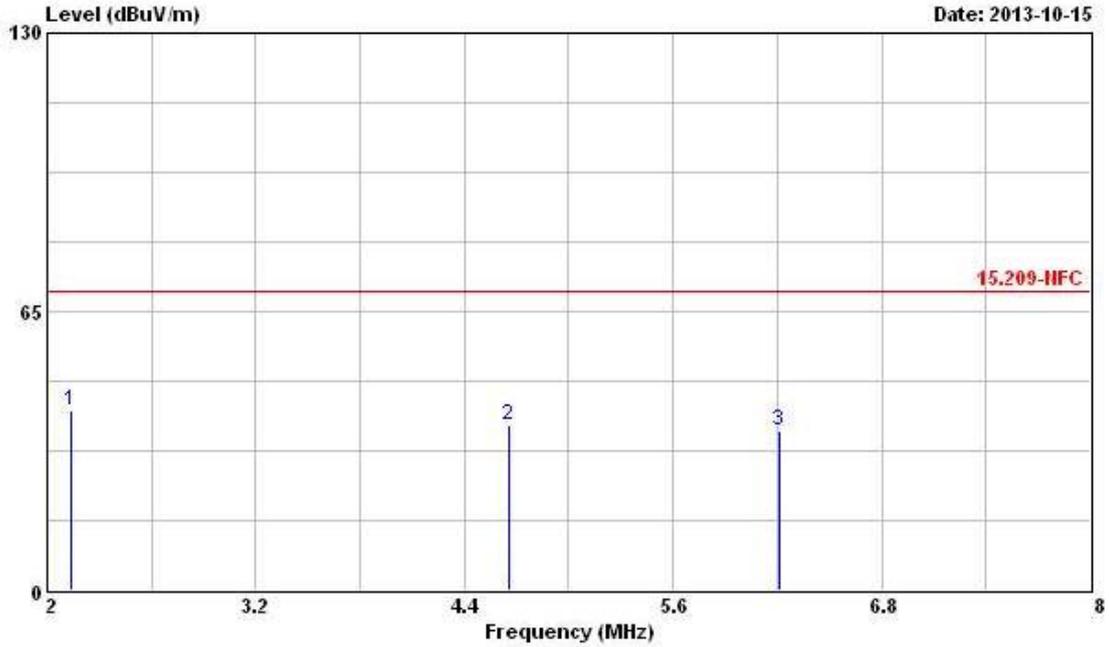
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg
1	0.3609000	47.47	-48.99	96.46	27.32	20.10	0.05	0.00	Peak	---	---
2	1.250	46.83	-18.84	65.67	26.78	19.95	0.10	0.00	Peak	---	---
3	1.800	44.79	-24.75	69.54	24.63	20.00	0.16	0.00	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).  
 Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.



Transmitter Radiated Unwanted Emissions (2 MHz – 8 MHz)

Modulation Mode	NFC-Read/Write	Polarization	H
Operating Mode	1	Operating Function	AC Power & Radio link



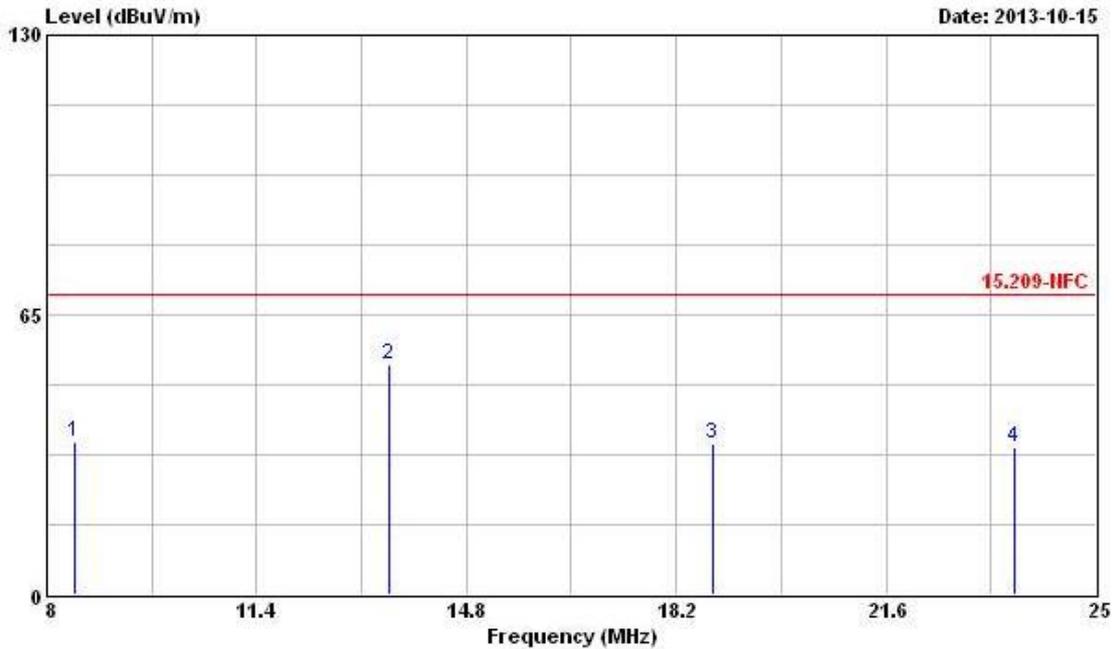
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2.140	41.89	-27.65	69.54	21.73	20.00	0.16	0.00	Peak	---	---
2	4.660	38.55	-30.99	69.54	18.29	20.04	0.22	0.00	Peak	---	---
3	6.210	37.17	-32.37	69.54	16.81	20.08	0.28	0.00	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).  
 Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.



Transmitter Radiated Unwanted Emissions (8 MHz – 25 MHz)

Modulation Mode	NFC-Read/Write	Polarization	H
Operating Mode	1	Operating Function	AC Power & Radio link



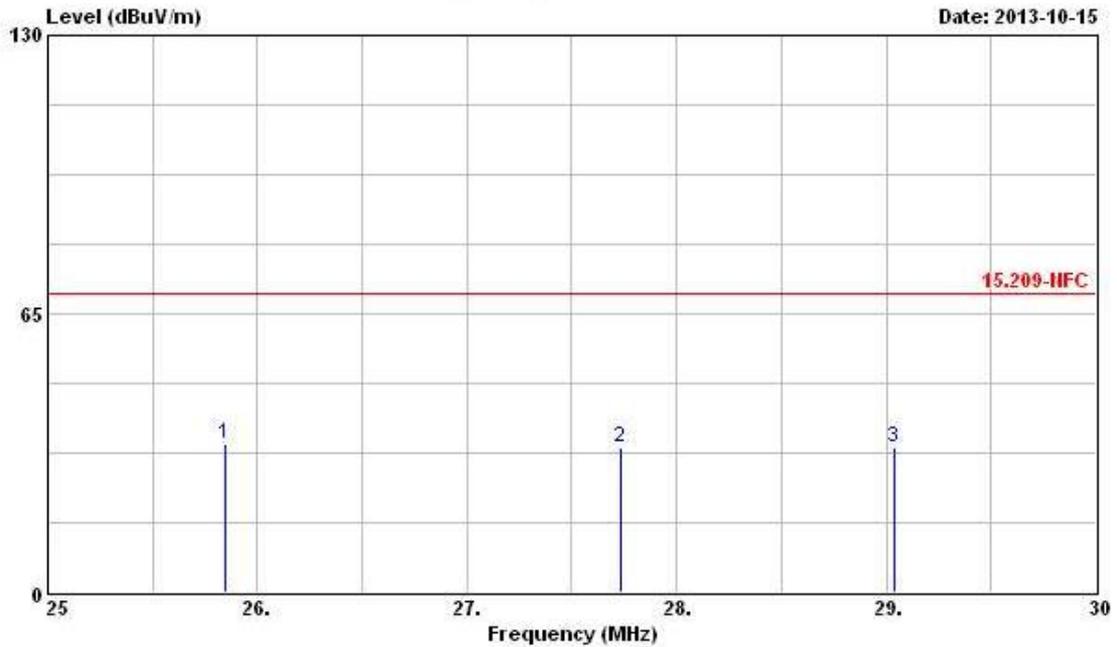
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	8.460	35.66	-33.88	69.54	15.23	20.10	0.33	0.00	Peak	---	---
2 @	13.540	53.33	-16.21	69.54	32.75	20.10	0.48	0.00	Peak	---	---
3 @	18.780	34.92	-34.62	69.54	14.16	20.18	0.58	0.00	Peak	---	---
4	23.670	34.40	-35.14	69.54	13.61	20.13	0.66	0.00	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).  
 Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.



Transmitter Radiated Unwanted Emissions (25 MHz – 30 MHz)

Modulation Mode	NFC-Read/Write	Polarization	H
Operating Mode	1	Operating Function	AC Power & Radio link

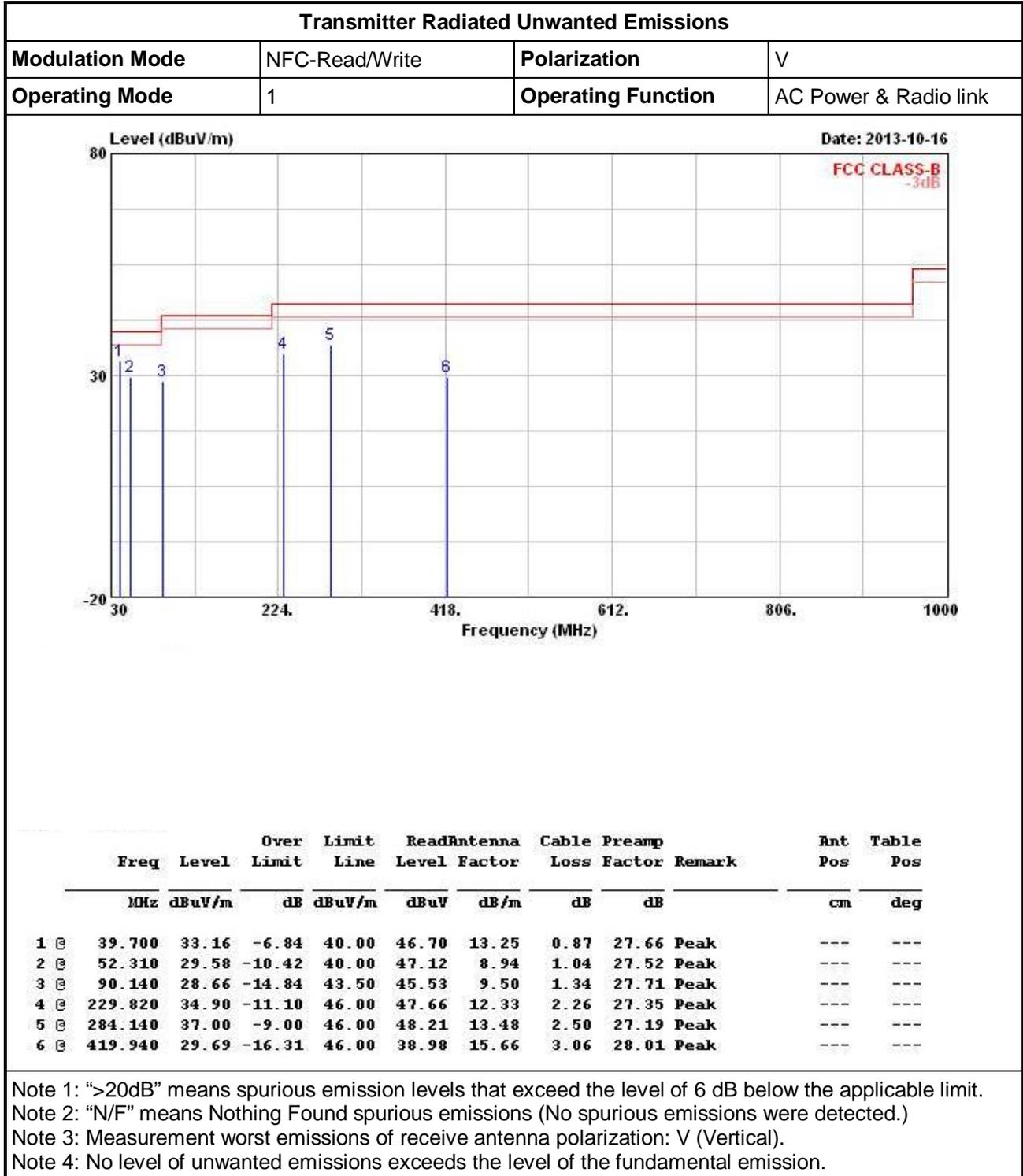


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	25.850	34.46	-35.08	69.54	13.66	20.10	0.70	0.00	Peak	---	---
2	27.730	33.66	-35.88	69.54	12.84	20.10	0.72	0.00	Peak	---	---
3	29.040	33.92	-35.62	69.54	13.06	20.10	0.76	0.00	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).  
 Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

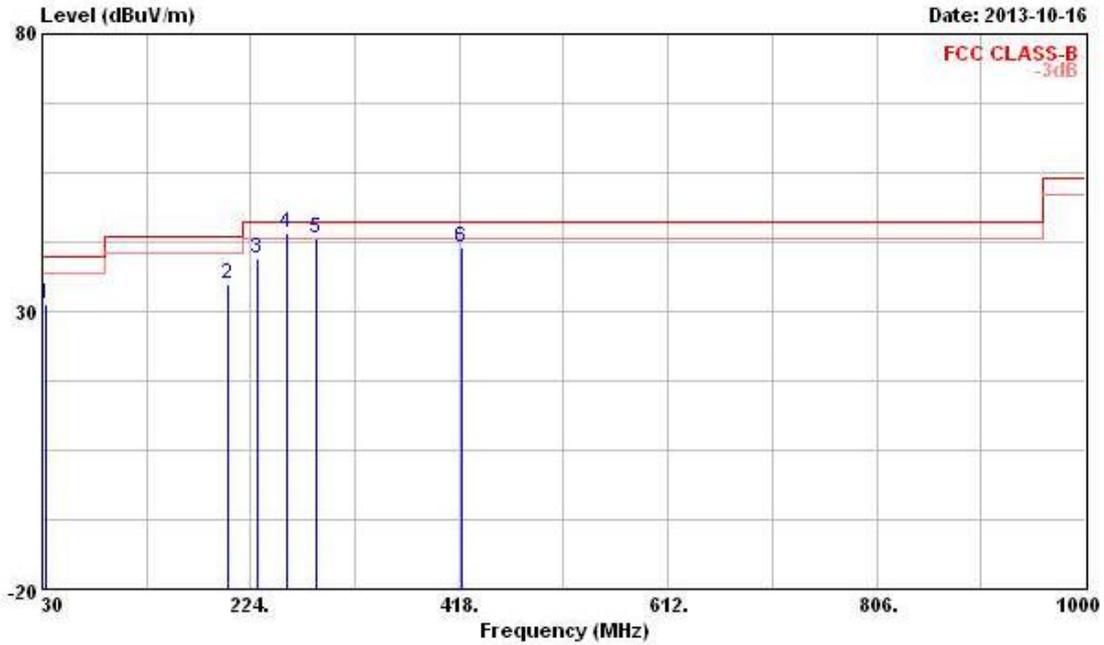


3.4.6 Transmitter Radiated Unwanted Emissions (Above 30MHz)





Transmitter Radiated Unwanted Emissions			
Modulation Mode	NFC-Read/Write	Polarization	H
Operating Mode	1	Operating Function	AC Power & Radio link



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	32.910	31.33	-8.67	40.00	43.18	15.11	0.79	27.75	Peak	---	---
2	202.660	35.02	-8.48	43.50	48.90	11.45	2.09	27.42	Peak	---	---
3	229.820	39.48	-6.52	46.00	52.24	12.33	2.26	27.35	Peak	---	---
4	256.980	44.21	-1.79	46.00	55.97	13.10	2.41	27.27	QP	---	---
5	284.140	43.20	-2.80	46.00	54.41	13.48	2.50	27.19	QP	---	---
6	419.940	41.61	-4.39	46.00	50.90	15.66	3.06	28.01	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).  
 Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

### 3.5 Frequency Stability

#### 3.5.1 Frequency Stability Limit

Frequency Stability Limit	
<input checked="" type="checkbox"/>	Carrier frequency stability shall be maintained to $\pm 0.01\%$ ( $\pm 100$ ppm).

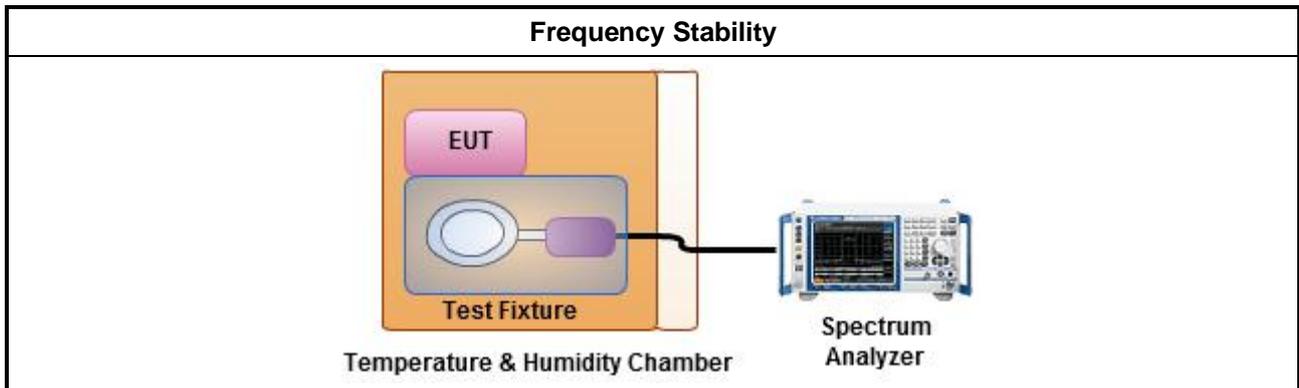
#### 3.5.2 Measuring Instruments

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

#### 3.5.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.8 for frequency stability tests
<input checked="" type="checkbox"/>	Frequency stability with respect to ambient temperature
<input checked="" type="checkbox"/>	Frequency stability when varying supply voltage
<input type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.

#### 3.5.4 Test Setup



**3.5.5 Test Result of Frequency Stability**

Frequency Stability Result		
Power Level	1	Frequency Stability Max. Deviation Limit < 100 ppm
Condition	Freq. (MHz)	10 min
T <sub>20°C</sub> V <sub>max</sub>	13.56	0.00
T <sub>20°C</sub> V <sub>min</sub>	13.56	0.00
T <sub>50°C</sub> V <sub>nom</sub>	13.56	-22.12
T <sub>40°C</sub> V <sub>nom</sub>	13.56	-22.12
T <sub>30°C</sub> V <sub>nom</sub>	13.56	0.00
T <sub>20°C</sub> V <sub>nom</sub>	13.56	0.00
T <sub>10°C</sub> V <sub>nom</sub>	13.56	0.00
T <sub>0°C</sub> V <sub>nom</sub>	13.56	22.12
T <sub>-10°C</sub> V <sub>nom</sub>	13.56	22.12
T <sub>-20°C</sub> V <sub>nom</sub>	13.56	22.12
<b>Result</b>		<b>Complied</b>
Note 1: Measure at 85 % [V <sub>min</sub> ] and 115 % [V <sub>max</sub> ] of the nominal voltage [V <sub>nom</sub> ]. The nominal voltage refer test report clause 1.1.5 for EUT operational condition.		



## 4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz ~ 2.75GHz	Mar. 26, 2013	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 21, 2013	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz ~ 30MHz	Apr. 18, 2013	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	7.61183201e+012	9kHz ~ 30MHz	Nov. 09, 2012	Conduction (CO04-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	101013	9KHz ~ 40GHz	Jan. 29, 2013	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100°C	Nov. 21, 2012	Conducted (TH01-HY)
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jul. 16, 2013	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	May 11, 2013	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100kHz ~ 1.3GHz	Jul. 17, 2013	Radiation (03CH02-HY)
Spectrum Analyzer	R&S	FSP40	100593	9kHz ~ 40GHz	Oct. 03, 2013	Radiation (03CH02-HY)
Receiver	R&S	ESU26	1302.6005.26	20Hz ~ 26.5GHz	Apr. 02, 2013	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	Oct. 22, 2012	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 10, 2012	Radiation (03CH02-HY)
Turn Table	Chaintek Instruments	3000	MF7802058	0~ 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	MF	MF7802	MF780208205	1 ~ 4 m	N/A	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz ~ 30 MHz	Dec. 02, 2012	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is two year.