

# 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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### Summary of Test Result

Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
1.1.1	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
1.1.2	15.203	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied
3.1	15.225(d)	Transmitter Radiated Unwanted Emissions	[dBuV/m at 3m]: 256.980MHz 44.21 (Margin 1.79dB) - QP	FCC 15.209	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 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 --- 2.0A ; O/P2: 5.0V --- 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				
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
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	
Unwanted emissions, conducted	9 – 150 kHz	±0.38 dB
	0.15 – 30 MHz	±0.42 dB
	30 – 1000 MHz	±0.51 dB
All emissions, radiated	9 – 150 kHz	±2.49 dB
	0.15 – 30 MHz	±2.28 dB
	30 – 1000 MHz	±2.56 dB

## 2 Test Configuration of EUT

### 2.1 The Worst Case Modulation Configuration

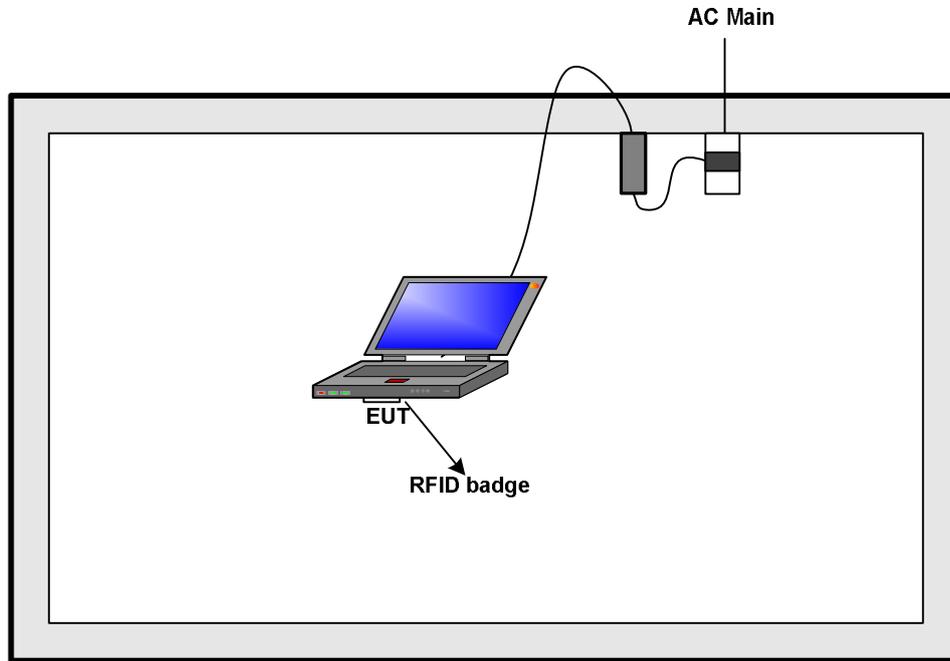
Modulation Used for Conformance Testing	
Modulation Mode	Field Strength (dBuV/m at 3 m)
NFC-Read/Write	53.69

### 2.2 The Worst Case Measurement Configuration

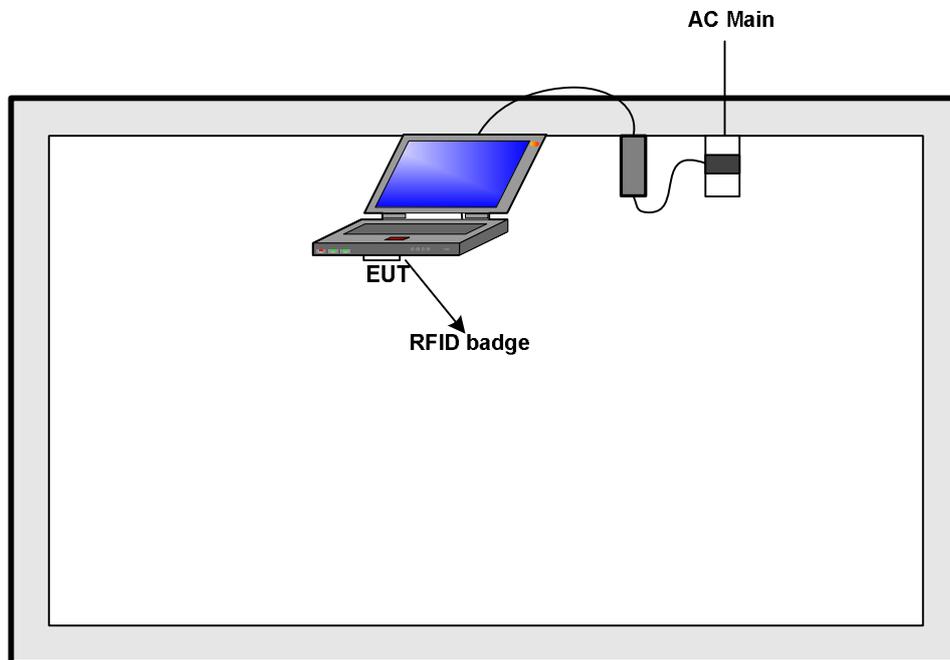
The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	Transmitter Radiated Unwanted Emissions
<b>Test Condition</b>	Radiated measurement
<b>User Position</b>	<input type="checkbox"/> EUT will be placed in fixed position.
	<input checked="" type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. EUT shall be performed two orthogonal planes. The worst planes is X.
	<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.
<b>Operating Mode &lt; 1GHz</b>	<input checked="" type="checkbox"/> 1. AC Power & Radio link
<b>Modulation Mode</b>	NFC-Read/Write
<b>Orthogonal Planes of EUT</b>	<b>X Plane</b>
	
	<b>Z Plane</b>
	

## 2.3 Test Setup Diagram

Test Setup Diagram - Radiated Below 30MHz Test



Test Setup Diagram - Radiated Above 30MHz Test



### 3 Transmitter Test Result

#### 3.1 Transmitter Radiated Unwanted Emissions

##### 3.1.1 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.

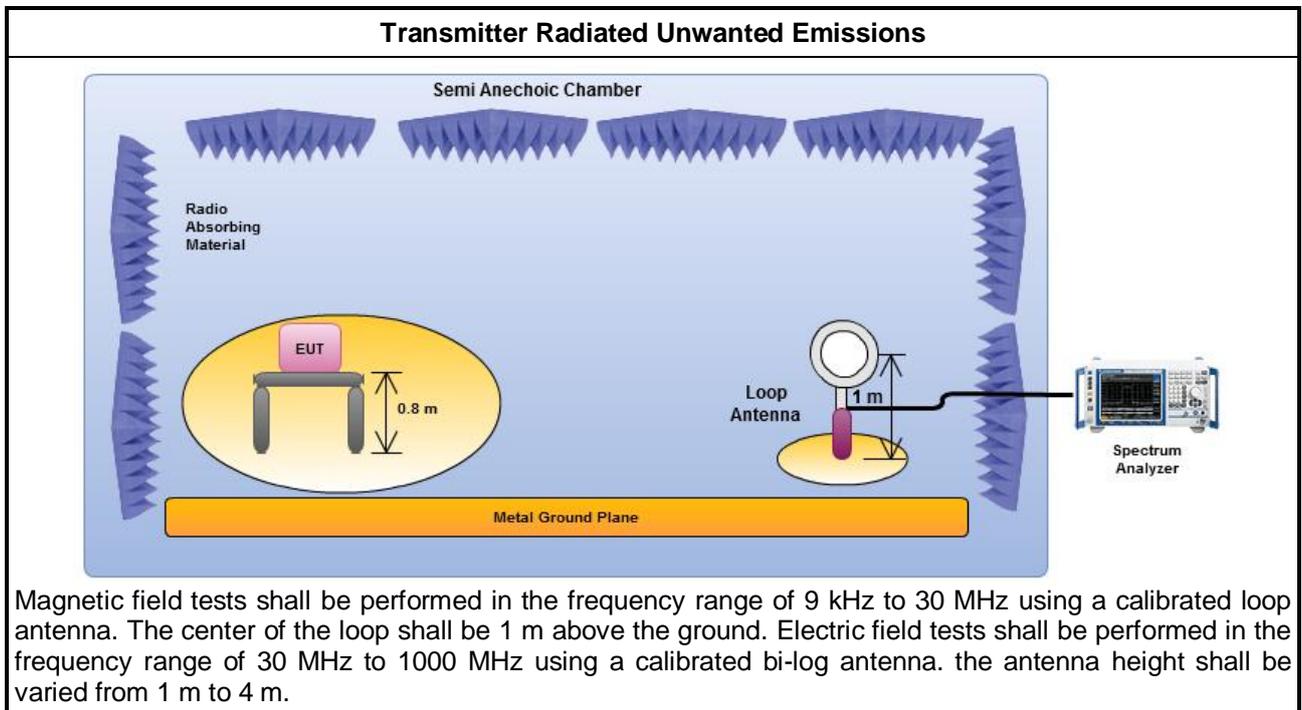
##### 3.1.2 Measuring Instruments

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

### 3.1.3 Test Procedures

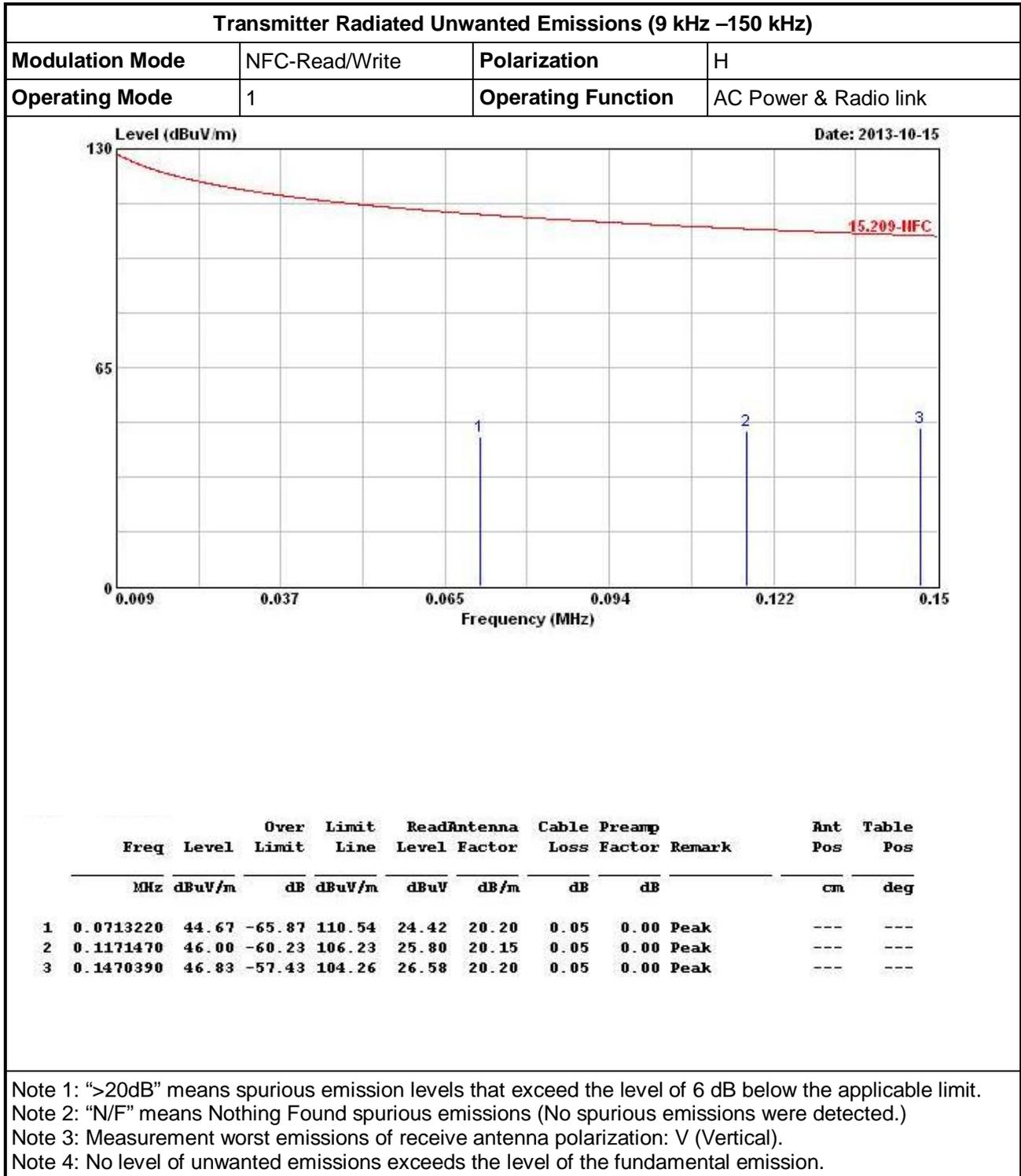
Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.
<input checked="" 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.

### 3.1.4 Test Setup





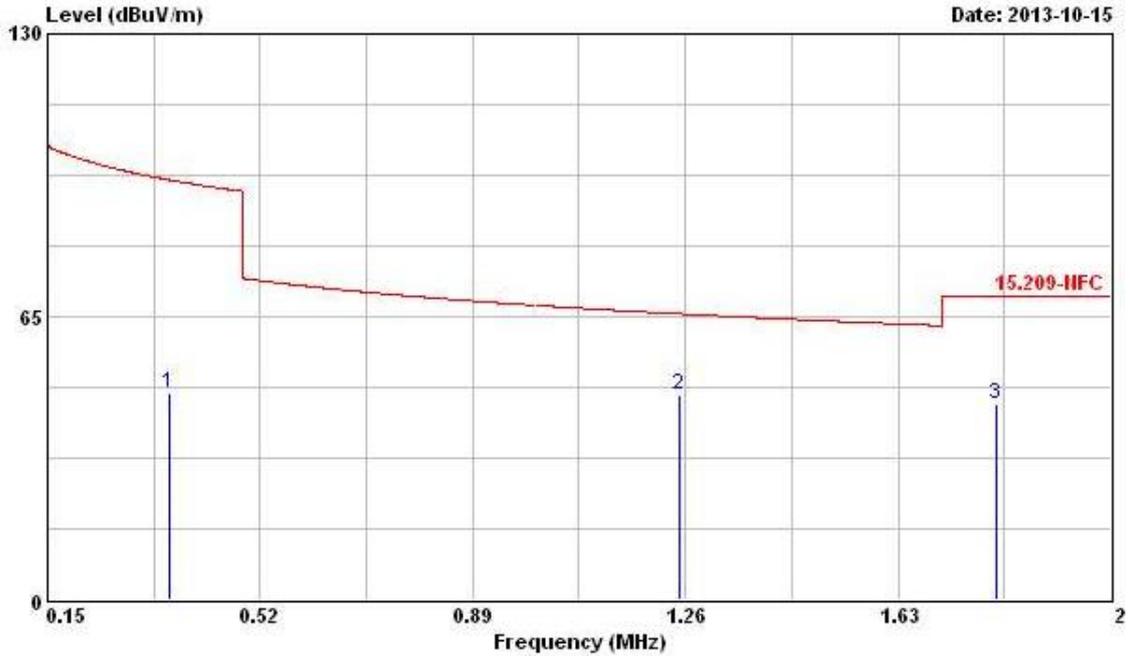
3.1.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)





Transmitter Radiated Unwanted Emissions (150 kHz – 2 MHz)

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



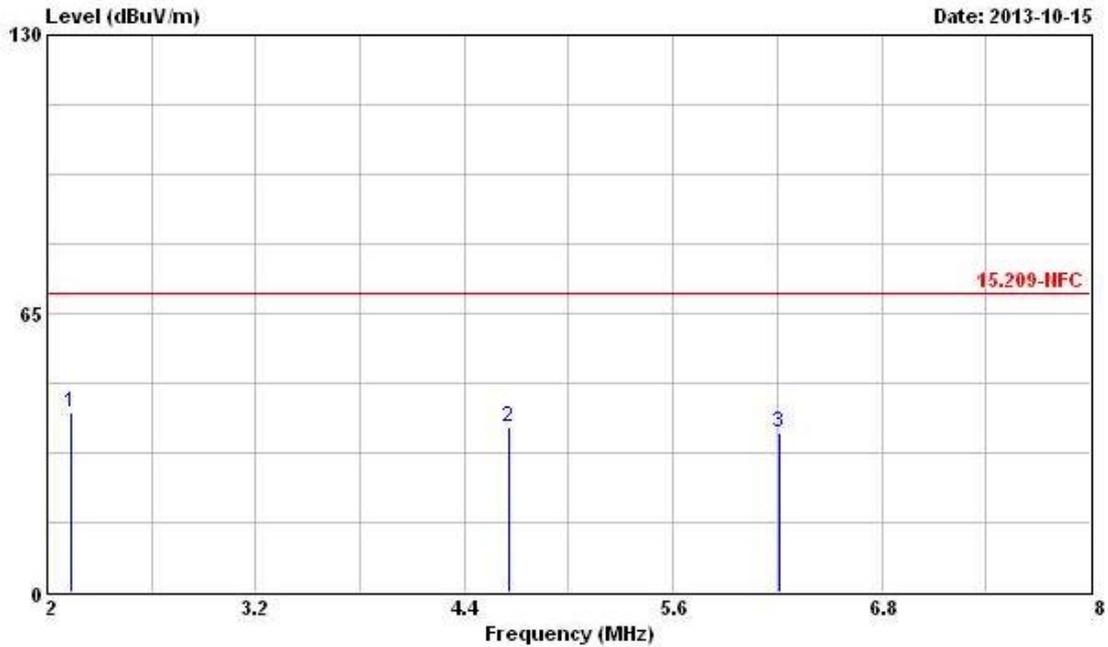
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg
1	0.3609000	47.47	-48.99	96.46	27.32	20.10	0.05	0.00	Peak	---	---
2	1.250	46.83	-18.84	65.67	26.78	19.95	0.10	0.00	Peak	---	---
3	1.800	44.79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



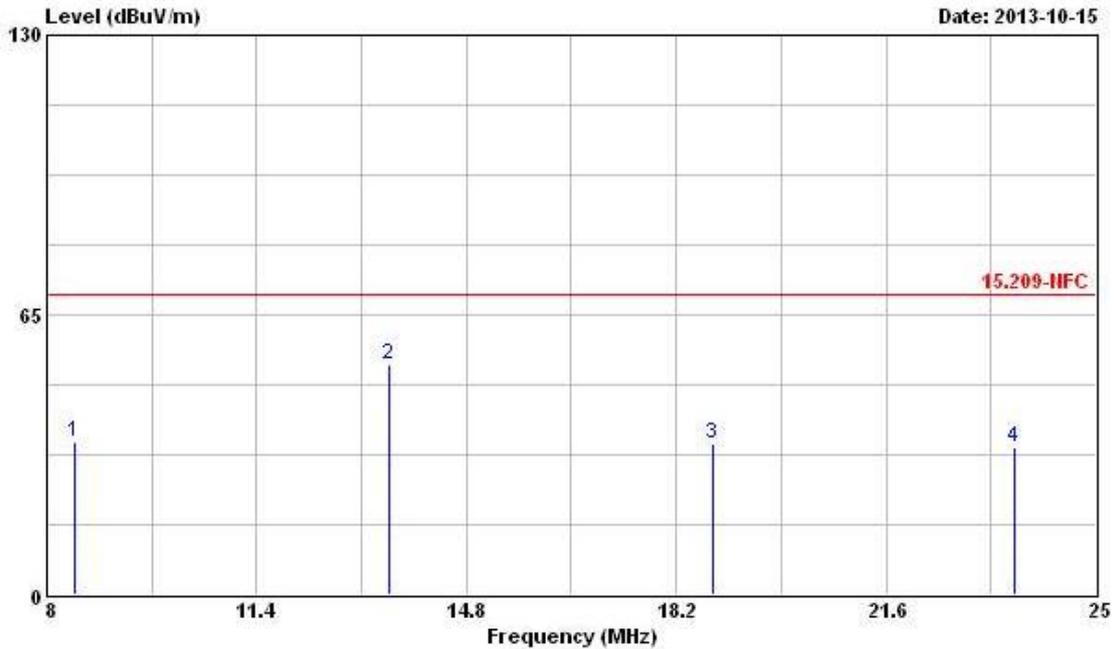
	Over	Limit	ReadAntenna	Cable Preamp		Ant	Table				
Freq	Level	Limit	Level	Loss	Factor	Pos	Pos				
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	cm	deg				
1 @	2.140	41.89	-27.65	69.54	21.73	20.00	0.16	0.00	Peak	---	---
2 @	4.660	38.55	-30.99	69.54	18.29	20.04	0.22	0.00	Peak	---	---
3 @	6.210	37.17	-32.37	69.54	16.81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

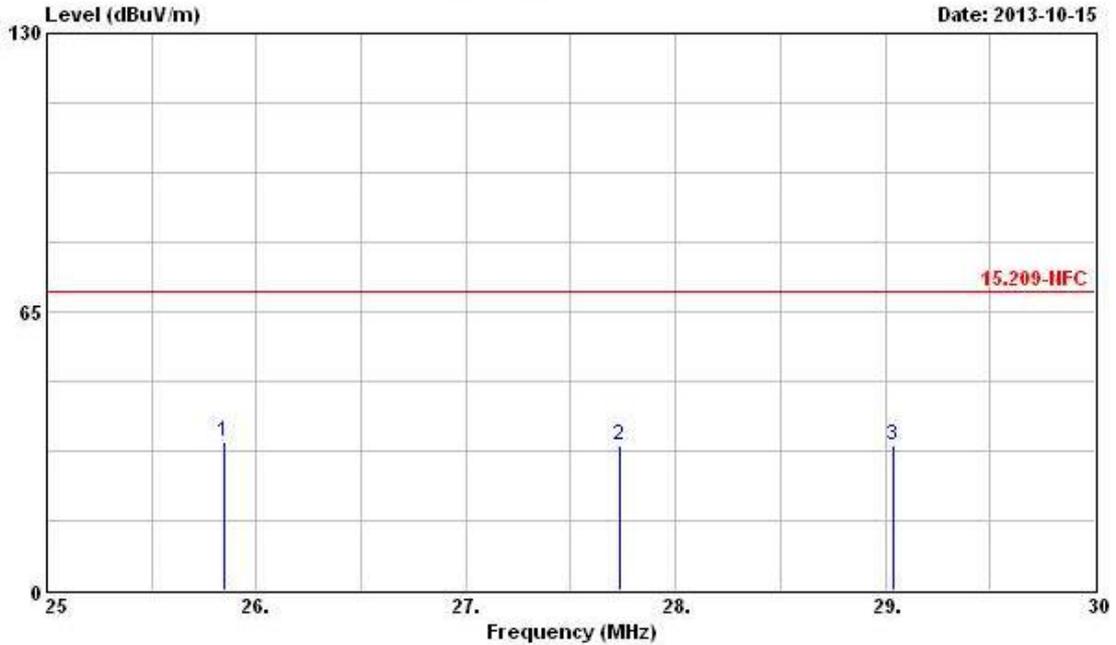


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8.460	35.66	-33.88	69.54	15.23	20.10	0.33	0.00	Peak	---	---
2	13.540	53.33	-16.21	69.54	32.75	20.10	0.48	0.00	Peak	---	---
3	18.780	34.92	-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

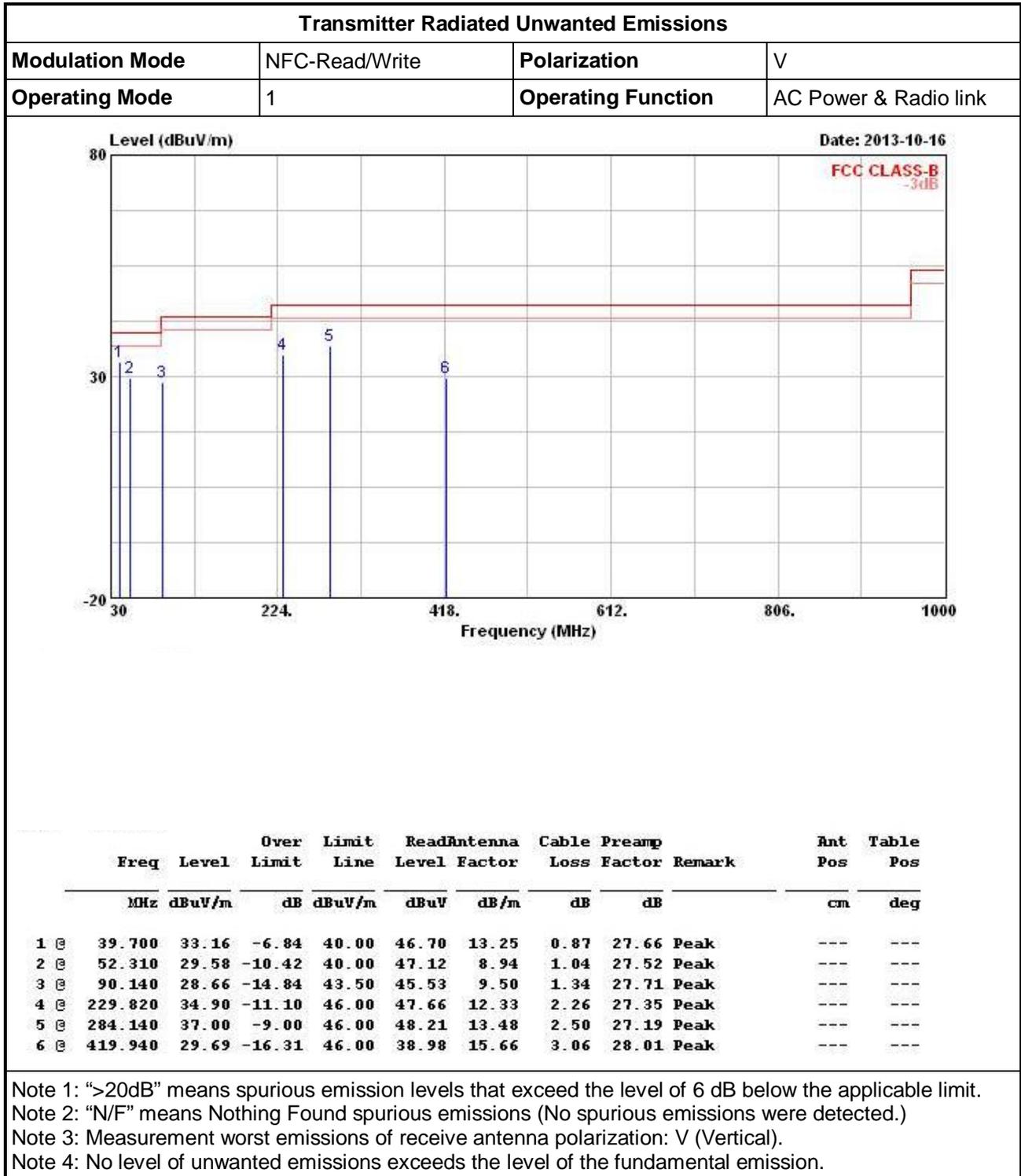


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	25.850	34.46	-35.08	69.54	13.66	20.10	0.70	0.00	Peak	---	---
2	27.730	33.66	-35.88	69.54	12.84	20.10	0.72	0.00	Peak	---	---
3	29.040	33.92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

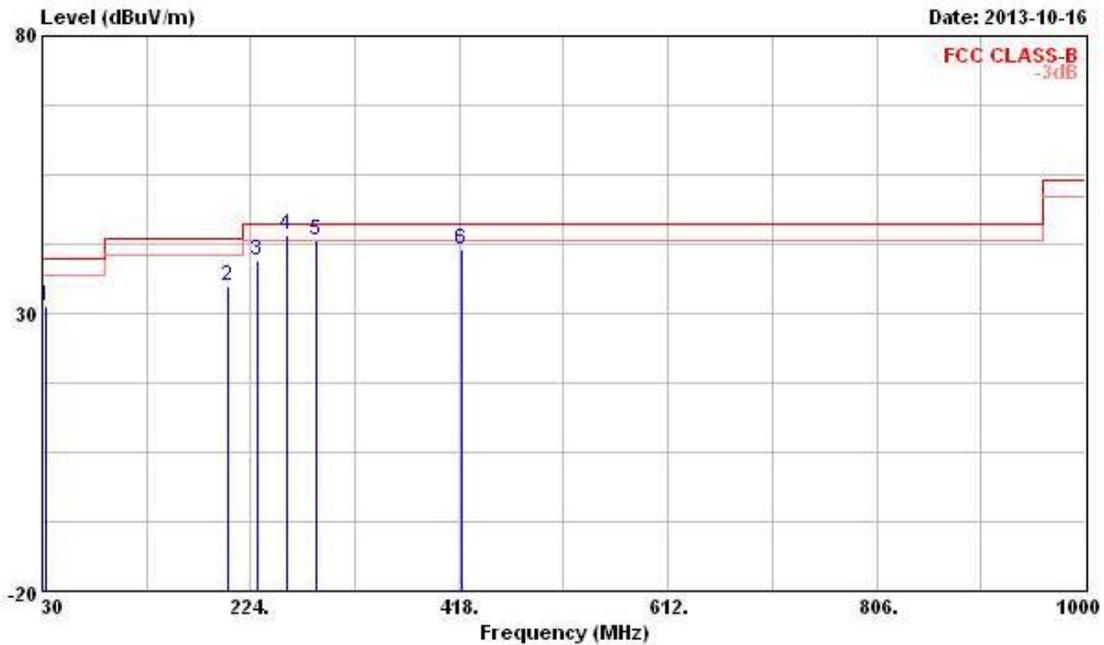


3.1.6 Transmitter Radiated Unwanted Emissions (Above 30MHz)





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.



## 4 Test Equipment and Calibration Data

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.