

FCC Test Report

Equipment : 7777-01XX
Brand Name : Orderman
Model No. : 7777-01XX
Marketing Name : NCR Orderman7 +
FCC ID : JEH-7777-01XX
Standard : 47 CFR FCC Part 15.225
Operating Band : 13.110 – 14.010 MHz (channel freq. 13.56 MHz)
FCC Classification : DXX
Applicant : NCR Corporation
Address : 2651 Satellite Blvd. Duluth, GA 30096 USA
Manufacturer : Universal Global Scientific Industrial Co., Ltd.
Address : 141, Lane 351, Sec.1, Taiping Road,
Tsaotuen, Nantou 54261, Taiwan

The product sample received on Nov. 5, 2014 and completely tested on Dec. 1, 2014. 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:


Vic Hsiao / Supervisor



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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]: 0.4040020MHz 42.01 (Margin 15.76dB) - QP 37.02 (Margin 10.75dB) - AV	FCC 15.207	Complied
3.2	15.225 (a)~(d)	Field Strength of Fundamental Emissions and Spectrum Mask	Fundamental Emissions peak:53.53 dBuV/m at 3m Device complies with spectrum mask – refer to test data	124 dBuV/m at 3	Complied
3.3	15.225(d)	Transmitter Radiated Unwanted Emissions	[dBuV/m at 3m]: 66.860MHz 31.59 (Margin 8.41dB) - Peak	FCC 15.209	Complied
3.4	15.225(e)	Frequency Stability	36.87 ppm	± 0.01% (100ppm)	Complied



SPORTON INTERNATIONAL INC.
TEL : 886-3-327-3456
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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)	Co-location
13.110 – 14.010 MHz	ISO 14443-2 (ASK)	13.56	1	53.53	Yes
Note 1: Field strength performed peak level at 3m. Note 2: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating NFC+OSR+RFID+Wi-Fi and NFC+OSR+RFID+BT)					

1.1.2 Antenna Information

Antenna Category	
☐	Equipment placed on the market without antennas
☒	Integral antenna (antenna permanently attached)
☐	External antenna (dedicated antennas)

1.1.3 Type of EUT

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

1.1.4 Test Signal Duty Cycle

Duty Cycle Operation Restriction			
The transmitter is used for		The transmitter is operated	
☒	Inductive applications	☒	Automatically triggered
☐	Duty cycle fixed mode	☒	Duty cycle random mode
Duty cycle mode - ISO 14443 Type A			
Declare transmitter duty cycle / 1 hour =		100%	
Duty cycle Limit			
☐	Class 1 - < 0.1 %	☐	Class 2 - < 1.0 %
☐	Class 3 - < 10 %	☒	Class 4 - Up to 100 %
Duty cycle mode - ISO 14443 Type B			
Declare transmitter duty cycle / 1 hour =		100%	
Duty cycle Limit			
☐	Class 1 - < 0.1 %	☐	Class 2 - < 1.0 %
☐	Class 3 - < 10 %	☒	Class 4 - Up to 100 %
Duty cycle mode - ISO18092 Type F			
Declare transmitter duty cycle / 1 hour =		100%	
Duty cycle Limit			
☐	Class 1 - < 0.1 %	☐	Class 2 - < 1.0 %
☐	Class 3 - < 10 %	☒	Class 4 - Up to 100 %
Remark: Type F was the worst case and it was recorded in this report.			
Duty cycle mode - ISO15693 Type V			
Declare transmitter duty cycle / 1 hour =		100%	
Duty cycle Limit			
☐	Class 1 - < 0.1 %	☐	Class 2 - < 1.0 %
☐	Class 3 - < 10 %	☒	Class 4 - Up to 100 %

Operated Mode for Worst Duty Cycle	
☒ Operated test mode for worst duty cycle	
Test Signal Duty Cycle (x)	Voltage Duty Factor [dB] – (20 log 1/x)
☒ 100%	0

1.1.5 EUT Operational Condition

Supply Voltage	☐ AC mains	☒ DC	- -
Type of DC Source	☐ Internal DC supply	☒ External DC Service Station	☒ From Li-ion Battery

1.2 Accessories and Support Equipment

Accessories Information				
Li-ion Battery	Brand Name	NCR	Model Name	7777-0105-8801
	Power Rating	3.7V  3150mAh		
LCD Panel	Brand Name	LG Display	Model Name	LH500WX1-SD03
Camera	Brand Name	Ability	Model Name	BD56A555
WiFi Module	Brand Name	USI	Model Name	WM-BAN-BM-07_S
OSR Module	Brand Name	TI	Model Name	CC1125
RFID Module	Brand Name	Melexis	Model Name	MLX90109
NFC Module	Brand Name	NXP	Model Name	PN547

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

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Service Station (Provide by customer)	Orderman	7779-0201-8801	-
2	Debug Board (Provide by customer)	-	-	-
3	Adapter	Meanwell	GSM36U12-P5L	-

1.3 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

1.4 Testing Location Information

Testing Location						
☒	HWA YA	ADD	:	No. 52, Hwa Ya 1 st 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 Site Registration Number: FCC 636805						
Test Condition		Test Site No.		Test Engineer		Test Environment
AC Conduction		CO04-HY		Zeus		22°C / 52%
RF Conducted		TH01-HY		Candy		23°C / 62%
Radiated Emission		03CH03-HY		Allen		24°C / 57%

1.5 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
AC power-line conducted emissions		±2.2 dB
Emission bandwidth		±1.4 %
Unwanted emissions, conducted	9 – 150 kHz	±0.3 dB
	0.15 – 30 MHz	±0.4 dB
	30 – 1000 MHz	±0.5 dB
All emissions, radiated	9 – 150 kHz	±2.4 dB
	0.15 – 30 MHz	±2.2 dB
	30 – 1000 MHz	±2.5 dB
Temperature		±0.8 °C
Humidity		±3 %
DC and low frequency voltages		±3 %
Time		±1.4 %
Duty Cycle		±1.4 %

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	53.53

2.2 Test Channel Frequencies Configuration

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

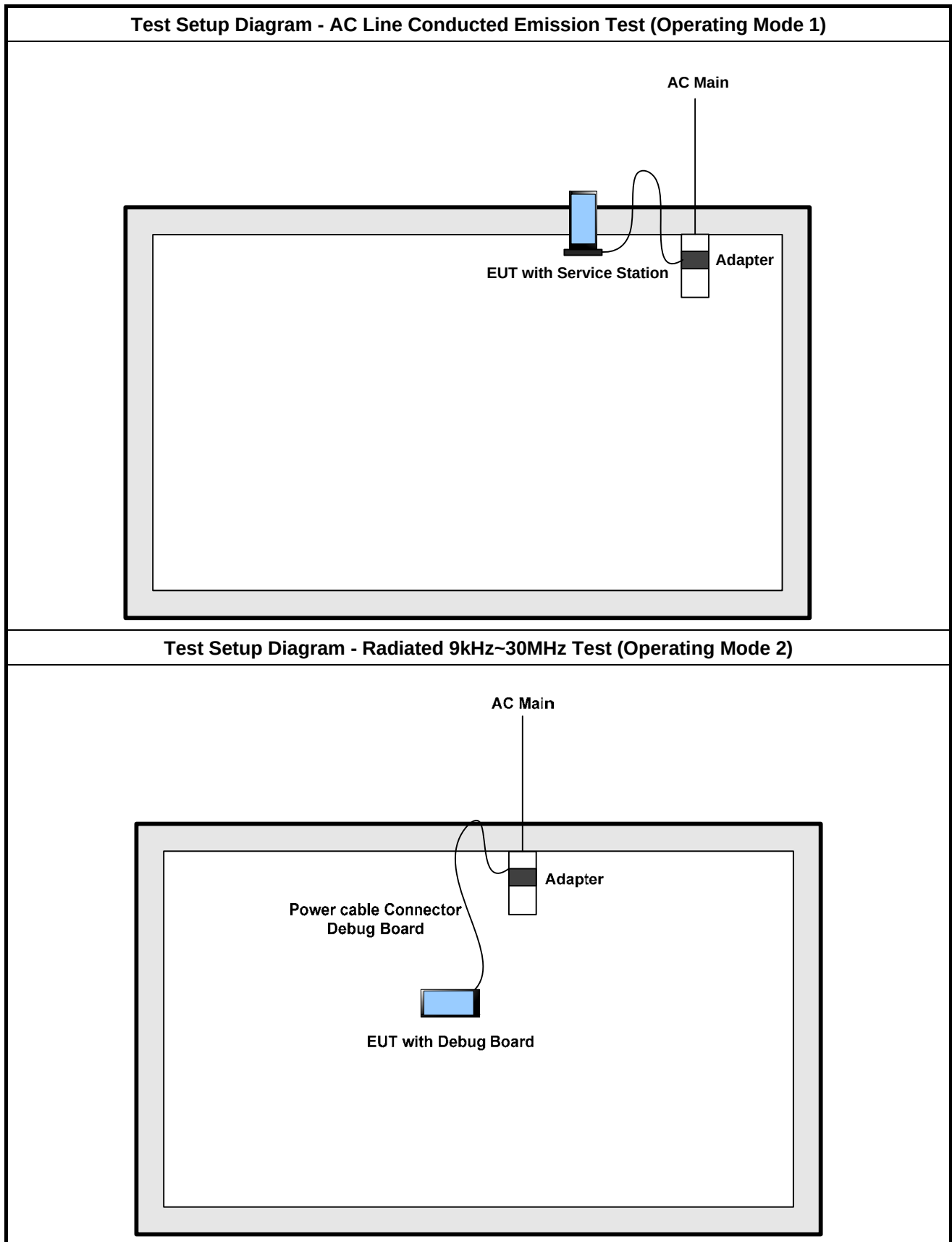
2.3 The Worst Case Measurement Configuration

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
	Operating Mode Description
	1. EUT with Service Station Charge Mode

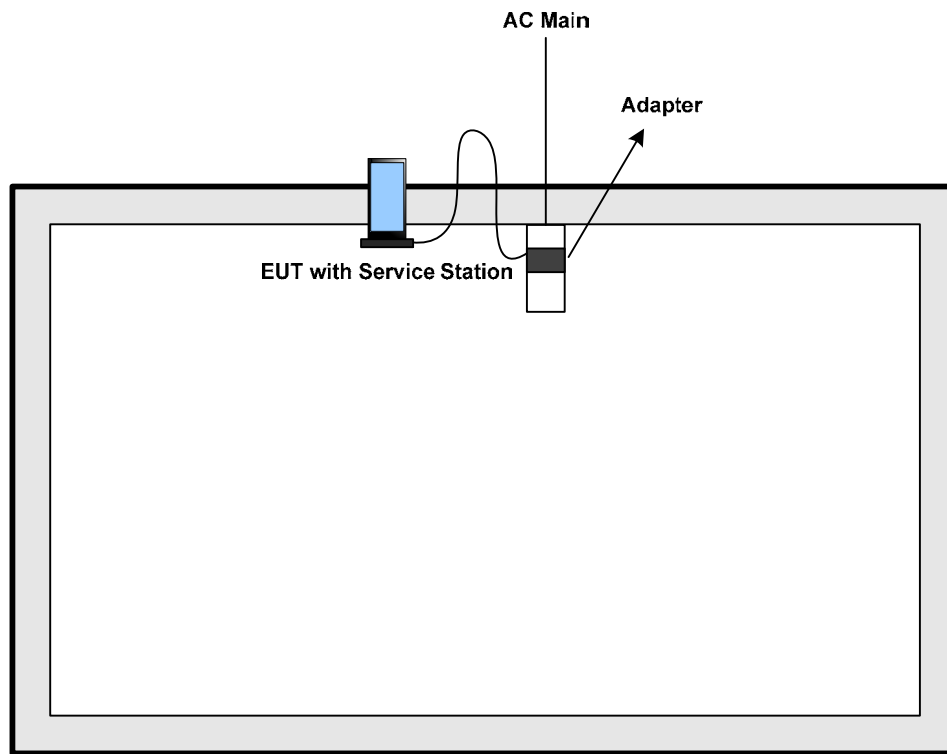
The Worst Case Mode for Following Conformance Tests			
Tests Item		Emission Bandwidth, Field Strength of Fundamental Emissions Spectrum Mask, Transmitter Radiated Unwanted Emissions Frequency Stability	
Test Condition		Radiated measurement	
User Position		☐ EUT will be placed in fixed position.	
X Plane	Y Plane	Z Plane	☐ EUT will be placed in mobile position and operating multiple positions.
			☒ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed three orthogonal planes. The worst planes is Y.
Operating Mode (Below 30MHz)		Operating Mode Description	
		2. EUT with AC power via Debug Board Transmitter	
Operating Mode (Above 30MHz)		1. EUT with Service Station Charge Mode	
		2. EUT with AC power via Debug Board Transmitter	
Modulation Mode		NFC-Read/Write	
Remark		NFC Type A, B, F, V were all evaluated here. Type B was the worst case so it was recorded in this report.	

Note: The RF Function will be off when the EUT charge with Service Station.

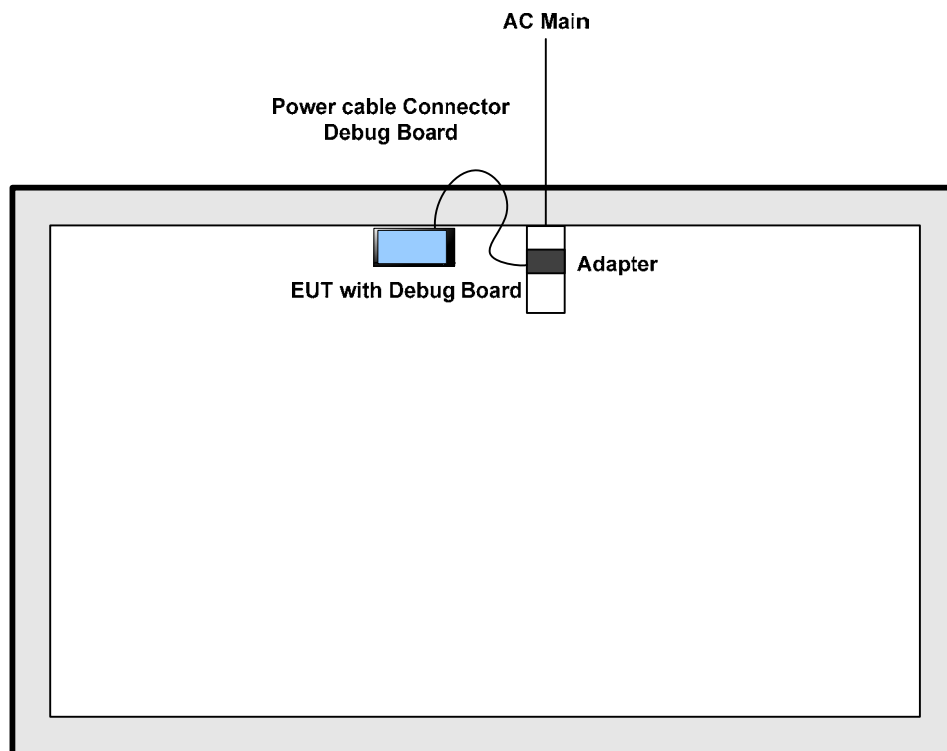
2.4 Test Setup Diagram



Test Setup Diagram - Radiated 30MHz~1GHz Test (Operating Mode 1)



Test Setup Diagram - Radiated 30MHz~1GHz Test (Operating Mode 2)



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.

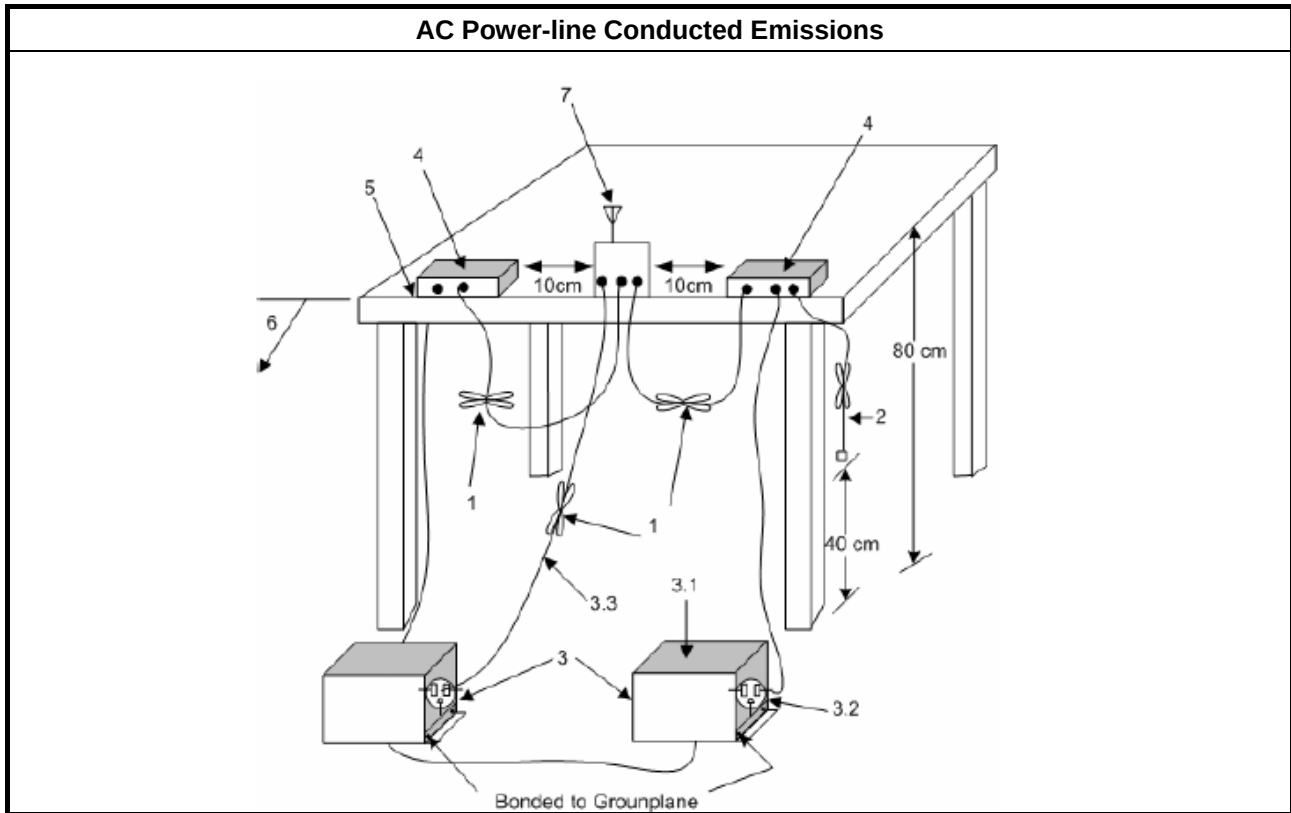
3.1.2 Measuring Instruments

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

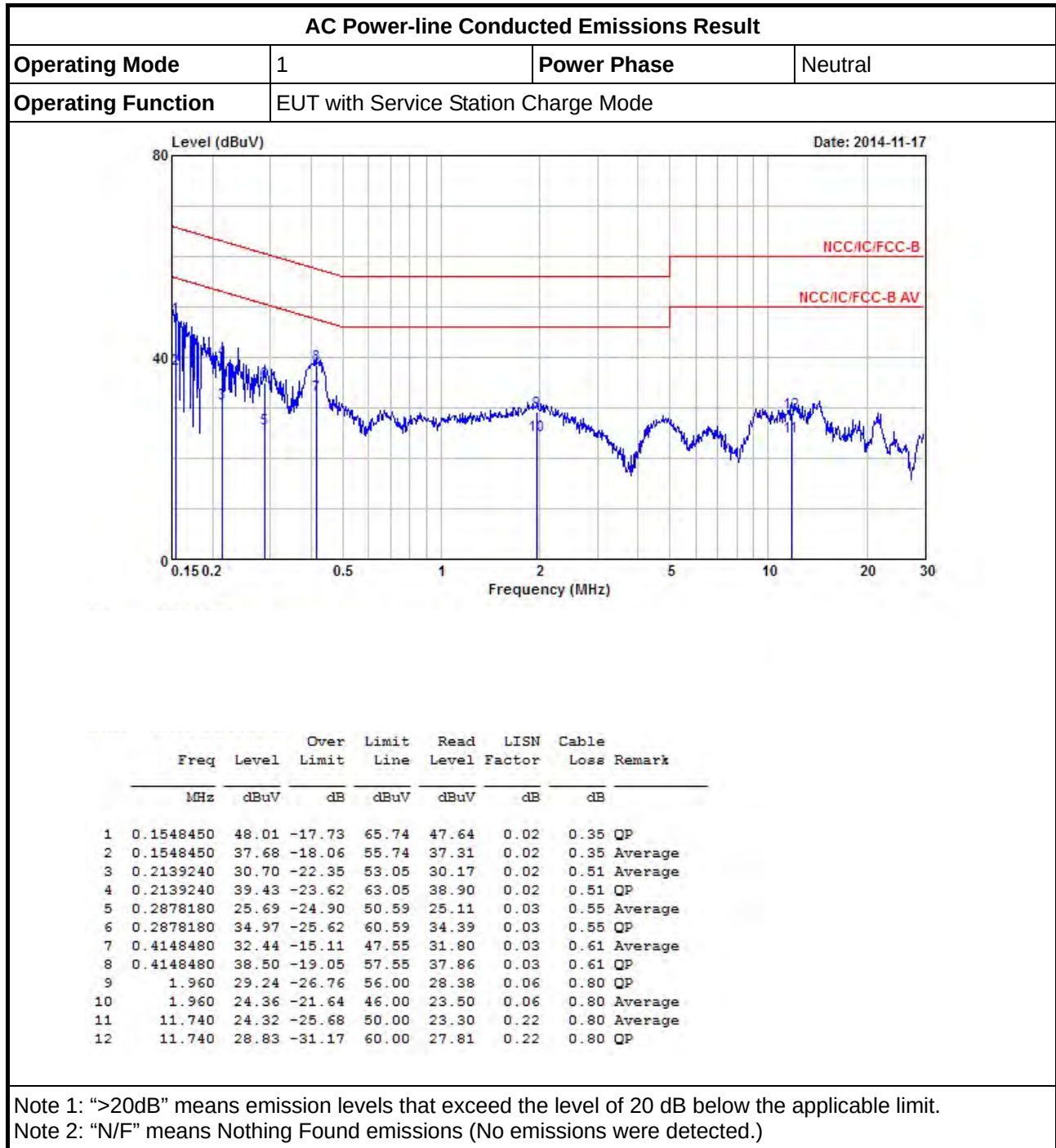
3.1.3 Test Procedures

Test Method	
☒	Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.
☒	If AC conducted emissions fall in operating band, then following below test method confirm final result.
☐	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.
☒	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

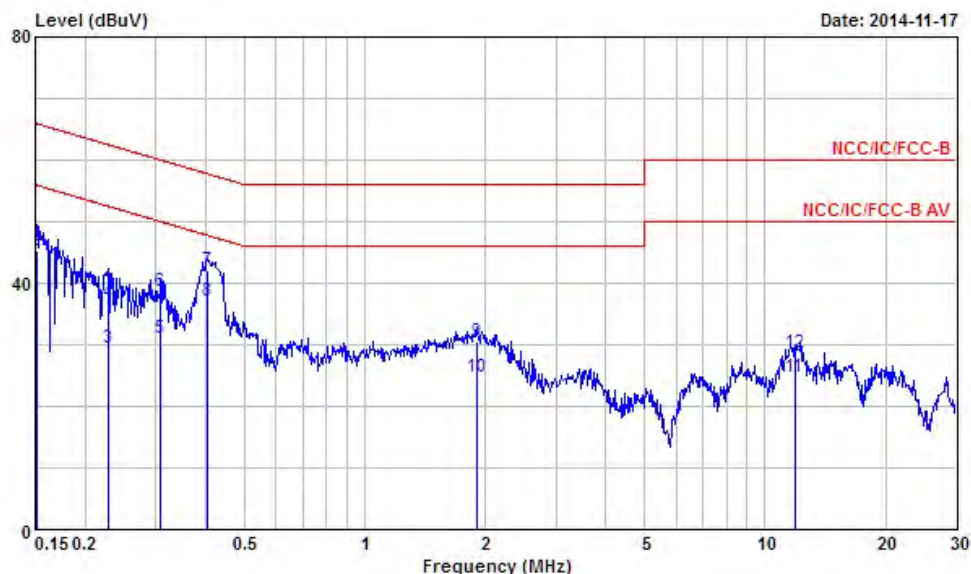


3.1.5 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	EUT with Service Station Charge Mode		



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1515980	34.40	-21.51	55.91	34.03	0.03	0.34	Average
2	0.1515980	45.23	-20.68	65.91	44.86	0.03	0.34	QP
3	0.2279670	29.58	-22.94	52.52	29.03	0.03	0.52	Average
4	0.2279670	36.95	-25.57	62.52	36.40	0.03	0.52	QP
5	0.3083410	30.93	-19.09	50.02	30.34	0.03	0.56	Average
6	0.3083410	38.55	-21.47	60.02	37.96	0.03	0.56	QP
7	0.4040020	42.01	-15.76	57.77	41.38	0.03	0.60	QP
8	0.4040020	37.02	-10.75	47.77	36.39	0.03	0.60	Average
9	1.900	30.65	-25.35	56.00	29.78	0.07	0.80	QP
10	1.900	24.61	-21.39	46.00	23.74	0.07	0.80	Average
11	11.870	24.65	-25.35	50.00	23.63	0.22	0.80	Average
12	11.870	28.81	-31.19	60.00	27.79	0.22	0.80	QP

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 Field Strength of Fundamental Emissions and Spectrum Mask

3.2.1 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

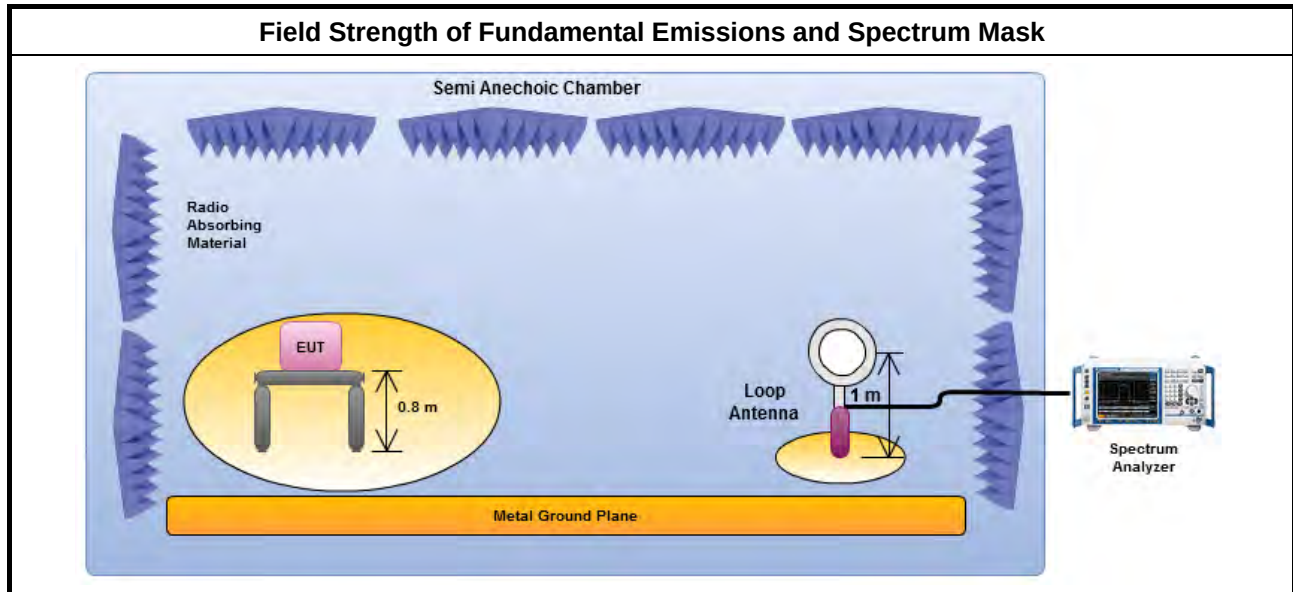
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

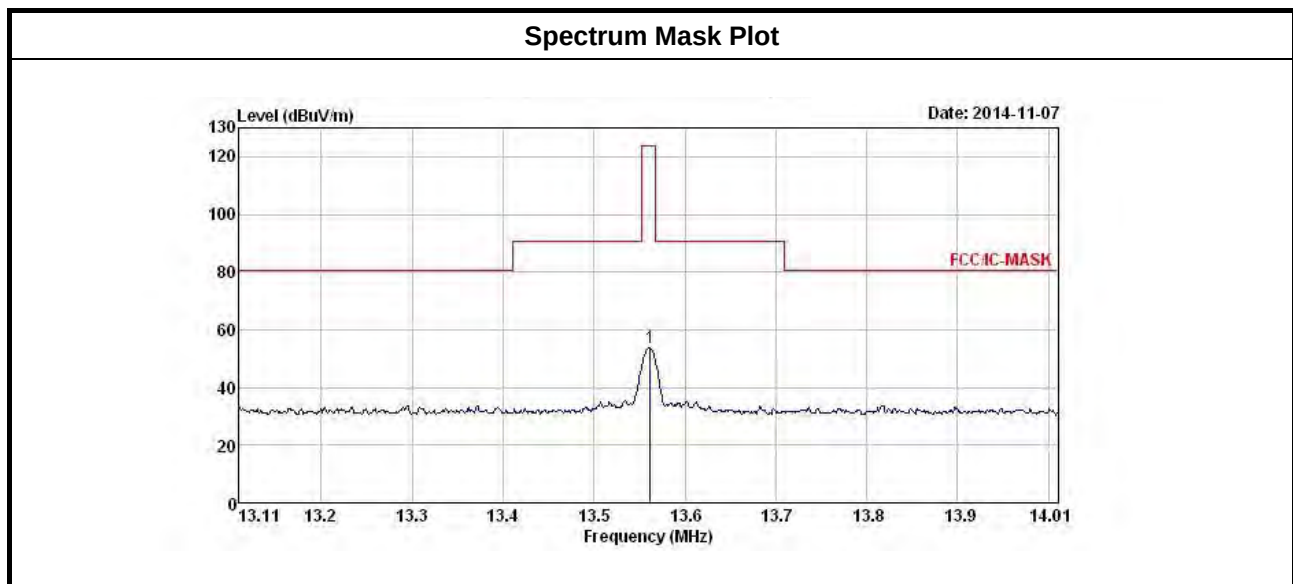
Test Method	
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.
☒	At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements; however, an attempt should be made to avoid making measurements 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.
☐	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.
☒	The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
☒	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 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	13.56	53.53	H	70.47	124.00
Result		Complied			
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal).					



3.3 Transmitter Radiated Unwanted Emissions

3.3.1 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.

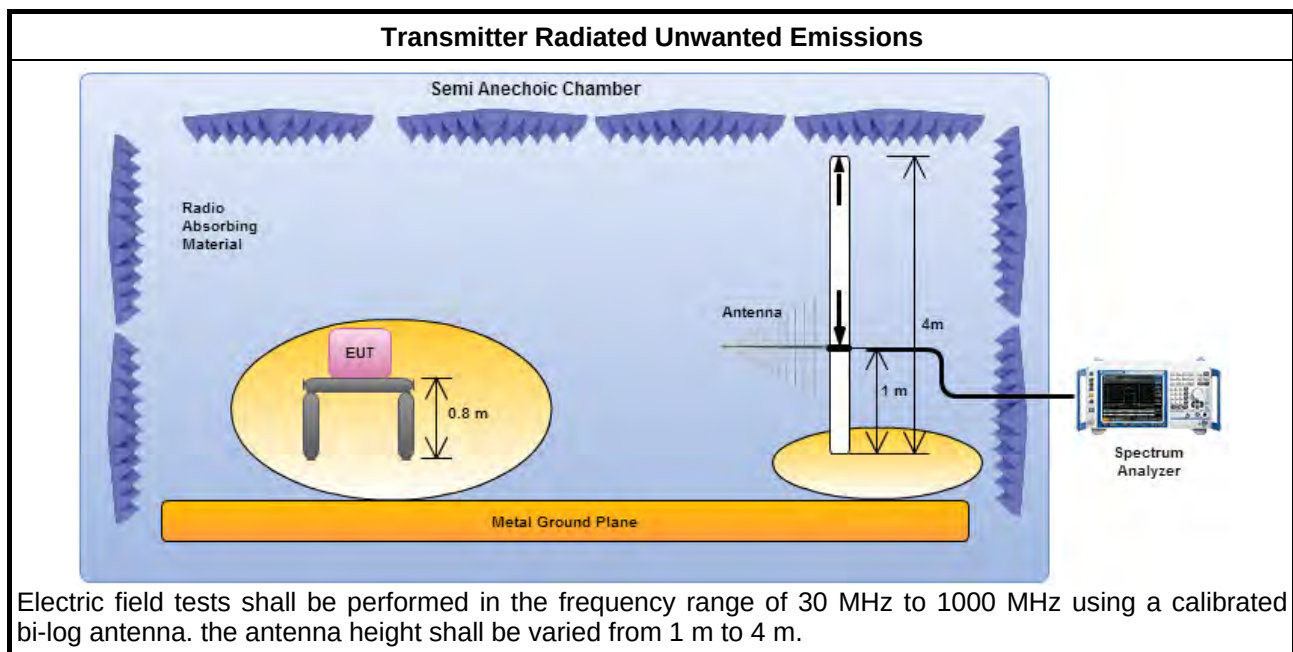
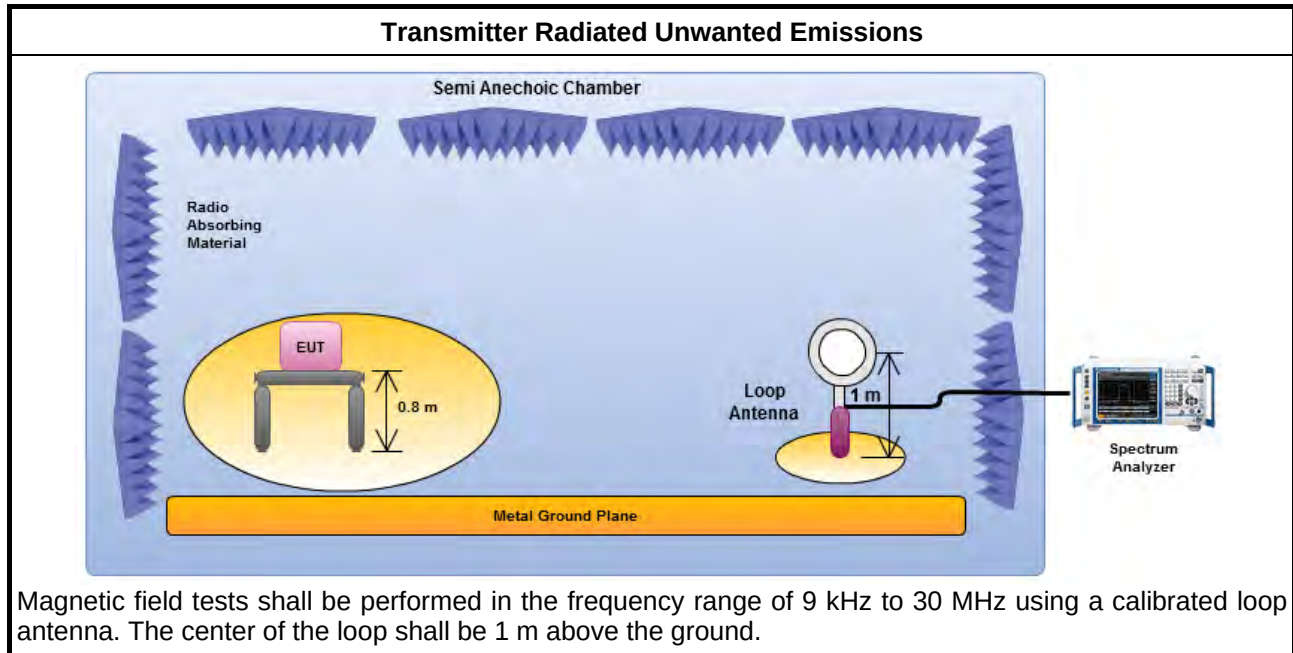
3.3.2 Measuring Instruments

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

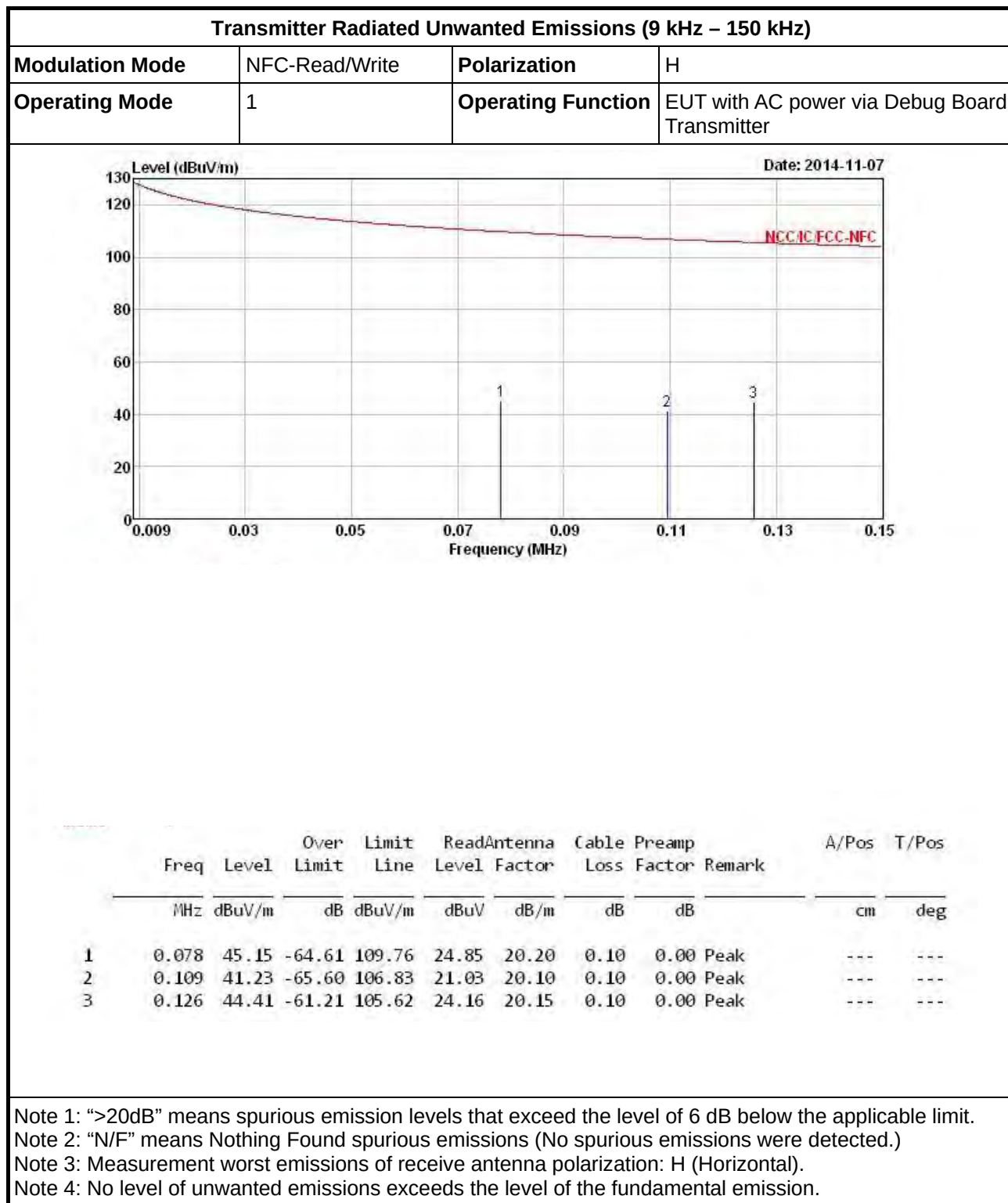
3.3.3 Test Procedures

Test Method	
☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m.
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.
☒	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.
☐	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.
☒	The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
☒	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.
☒	The any unwanted emissions level shall not exceed the fundamental emission level.
☒	All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.3.4 Test Setup

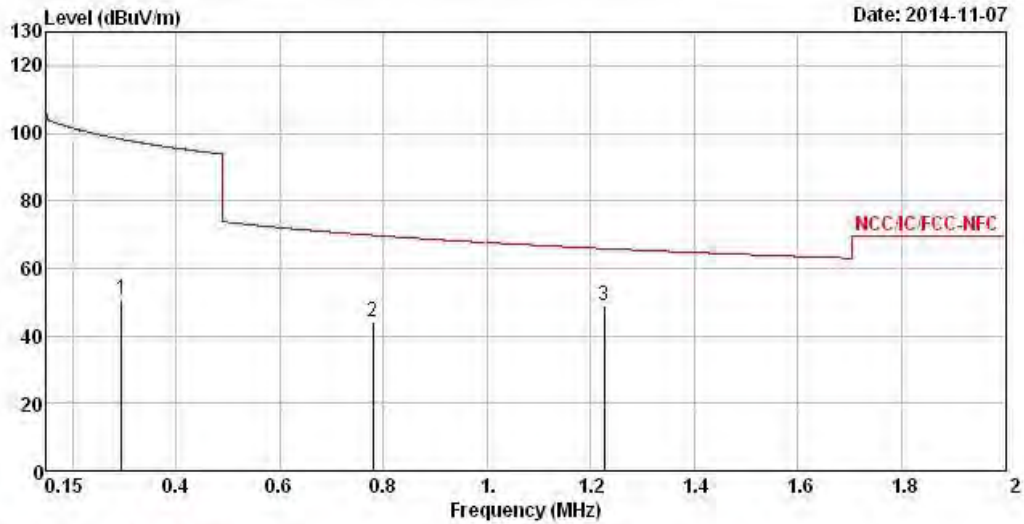


3.3.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)



Transmitter Radiated Unwanted Emissions (150 kHz –2 MHz)

Modulation Mode	NFC-Read/Write	Polarization	H
Operating Mode	1	Operating Function	EUT with AC power via Debug Board Transmitter

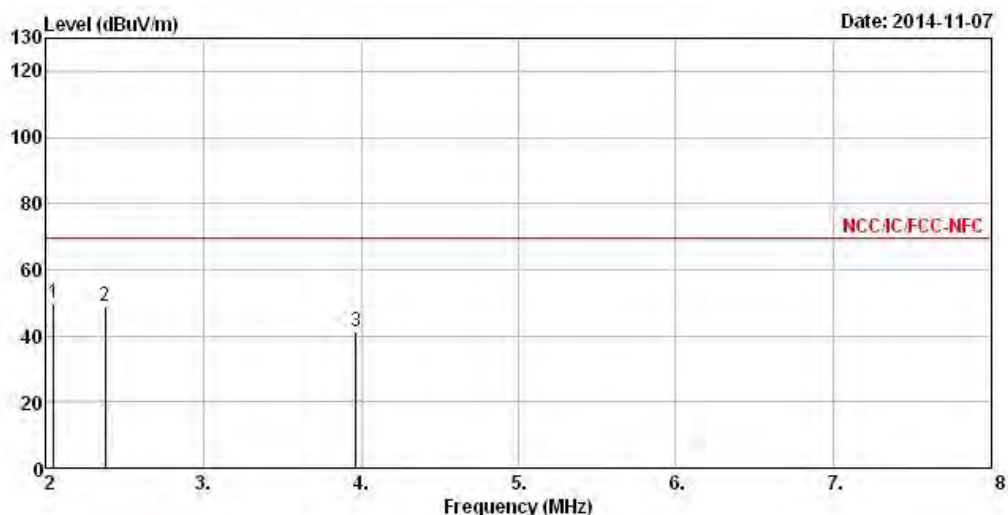


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	/MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	0.294	51.08	-47.16	98.24	30.88	20.10	0.10	0.00	Peak	---	---
2	0.779	44.29	-25.49	69.78	24.22	19.97	0.10	0.00	Peak	---	---
3	1.227	49.16	-16.67	65.83	29.11	19.95	0.10	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: H (Horizontal).
 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	EUT with AC power via Debug Board Transmitter



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2.048	49.86	-19.68	69.54	29.66	20.00	0.20	0.00	Peak	---	---
2	2.372	48.74	-20.80	69.54	28.54	20.00	0.20	0.00	Peak	---	---
3	3.968	41.48	-28.06	69.54	21.17	20.00	0.31	0.00	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

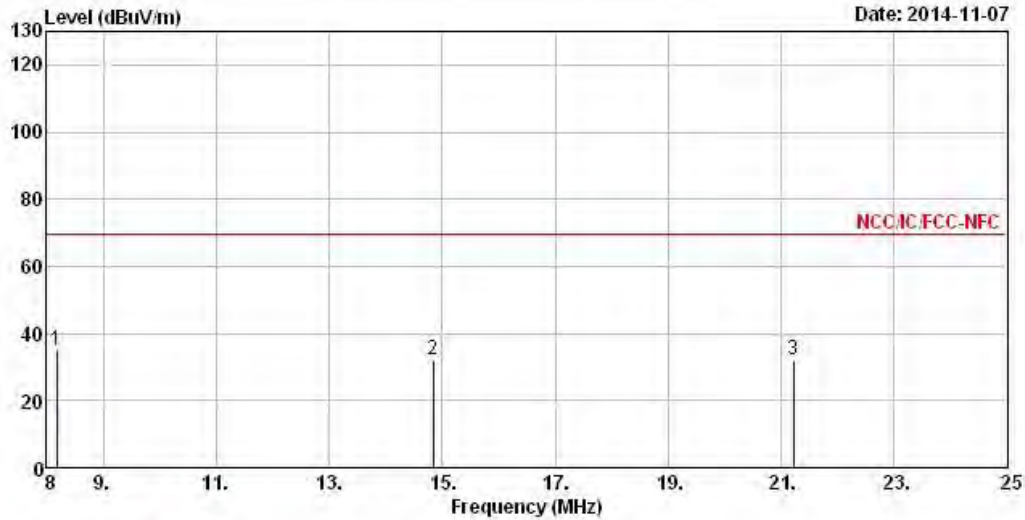
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).

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	EUT with AC power via Debug Board Transmitter

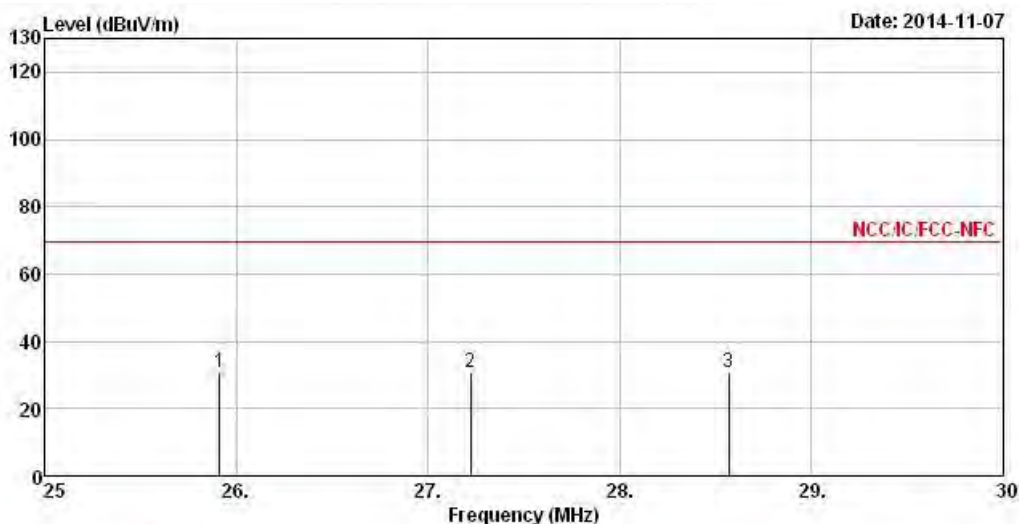


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	8.170	34.82	-34.72	69.54	14.28	20.10	0.44	0.00 Peak	---	---
2	14.834	32.32	-37.22	69.54	11.61	20.10	0.61	0.00 Peak	---	---
3	21.226	32.35	-37.19	69.54	11.43	20.18	0.74	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: H (Horizontal).
 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	EUT with AC power via Debug Board Transmitter



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	25.910	30.91	-38.63	69.54	10.01	20.10	0.80	0.00	Peak	---	---
2	27.220	30.65	-38.89	69.54	9.74	20.10	0.81	0.00	Peak	---	---
3	28.570	30.55	-38.99	69.54	9.63	20.10	0.82	0.00	Peak	---	---

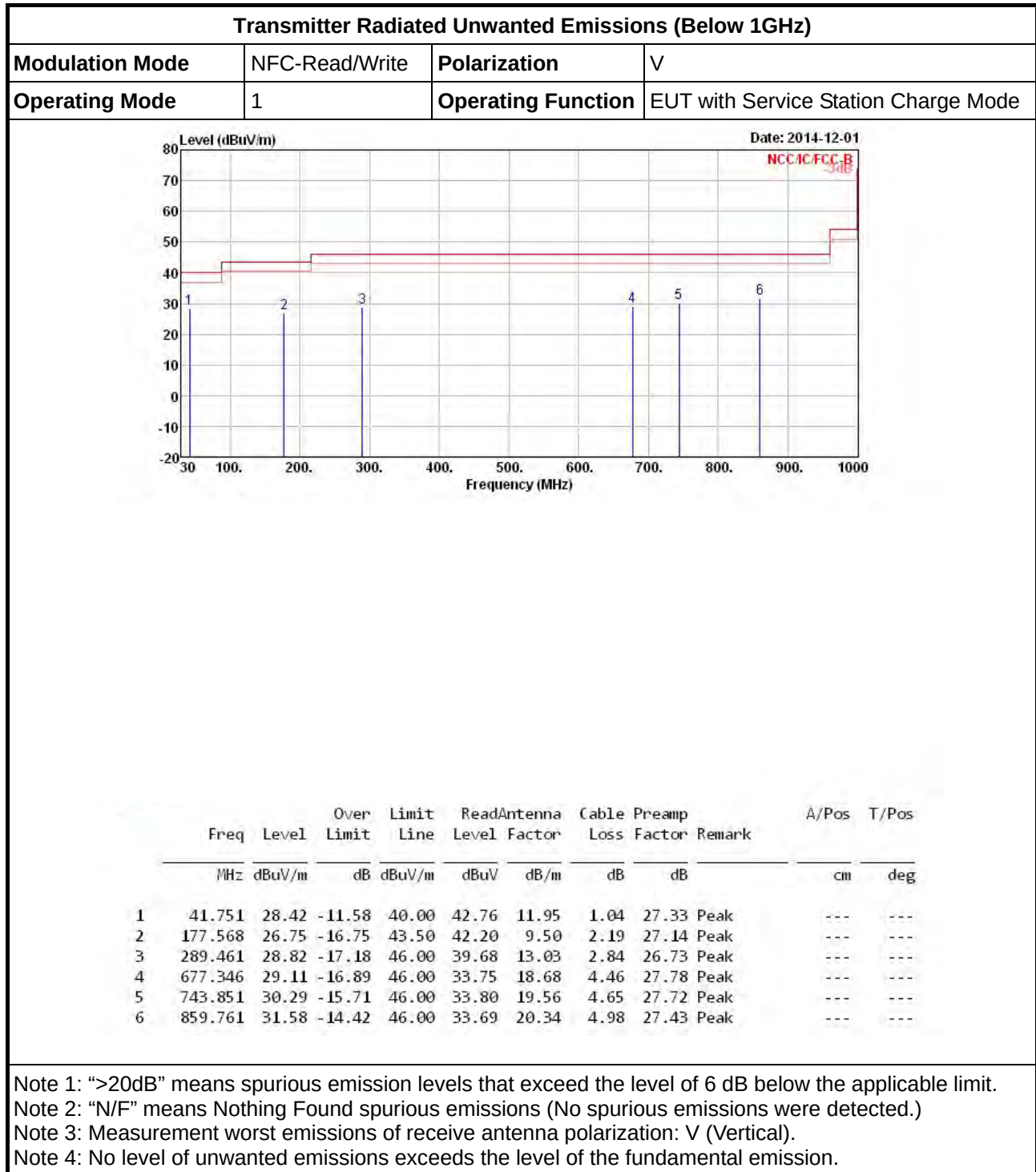
Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

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

Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).

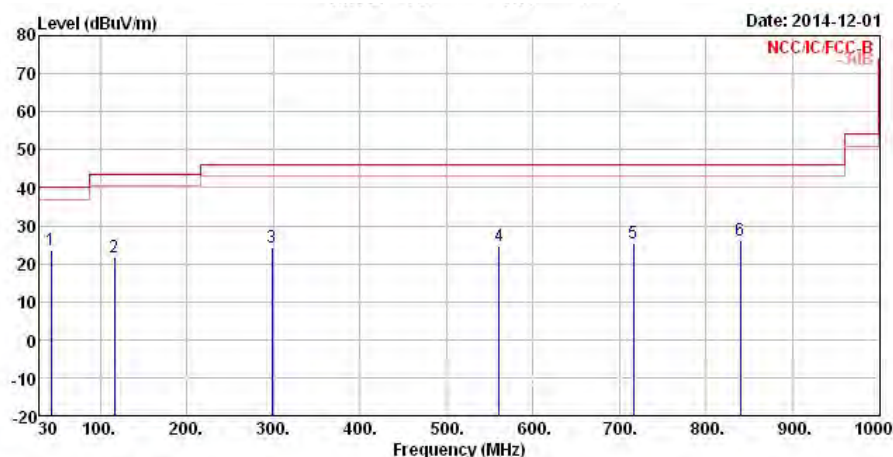
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

3.3.6 Transmitter Radiated Unwanted Emissions (Above 30MHz)



Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation Mode	NFC-Read/Write	Polarization	H
Operating Mode	1	Operating Function	EUT with Service Station Charge Mode



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	43.421	23.62	-16.38	40.00	39.08	10.82	1.06	27.34	Peak	---	---
2	116.253	21.69	-21.81	43.50	34.97	12.15	1.75	27.18	Peak	---	---
3	298.150	24.26	-21.74	46.00	34.87	13.19	2.89	26.69	Peak	---	---
4	561.238	24.75	-21.25	46.00	30.31	18.31	3.97	27.84	Peak	---	---
5	715.853	25.37	-20.63	46.00	29.44	19.10	4.59	27.76	Peak	---	---
6	839.457	26.12	-19.88	46.00	28.49	20.19	4.93	27.49	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

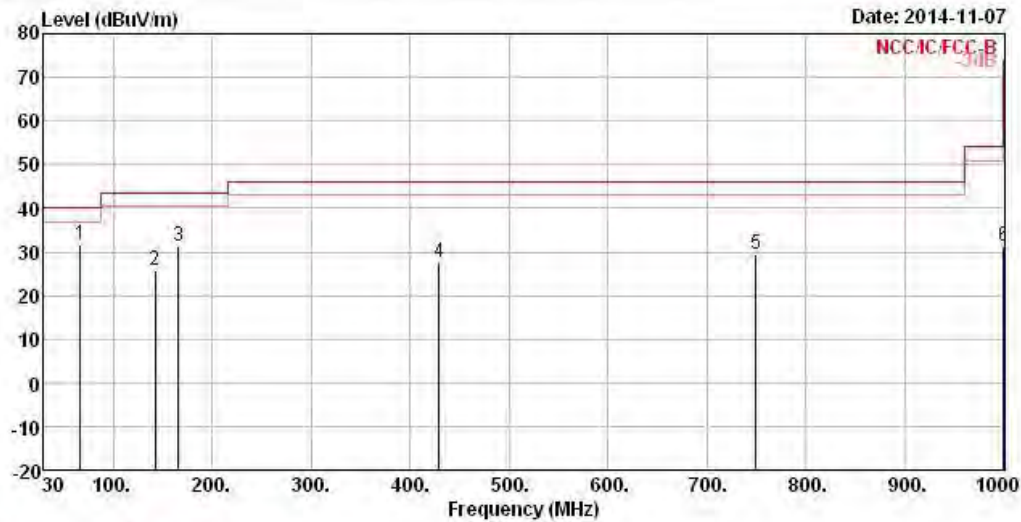
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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 (Below 1GHz)

Modulation Mode	NFC-Read/Write	Polarization	V
Operating Mode	2	Operating Function	EUT with AC power via Debug Board Transmitter



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	66.860	31.59	-8.41	40.00	51.07	6.62	1.32	27.42	Peak	---	---
2	142.520	25.83	-17.67	43.50	40.03	10.98	1.98	27.16	Peak	---	---
3	165.800	31.25	-12.25	43.50	46.41	9.87	2.12	27.15	Peak	---	---
4	429.640	27.54	-18.46	46.00	35.28	16.33	3.44	27.51	Peak	---	---
5	749.740	29.51	-16.49	46.00	33.02	19.54	4.66	27.71	Peak	---	---
6	1000.000	31.26	-42.74	74.00	31.94	21.24	5.51	27.43	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

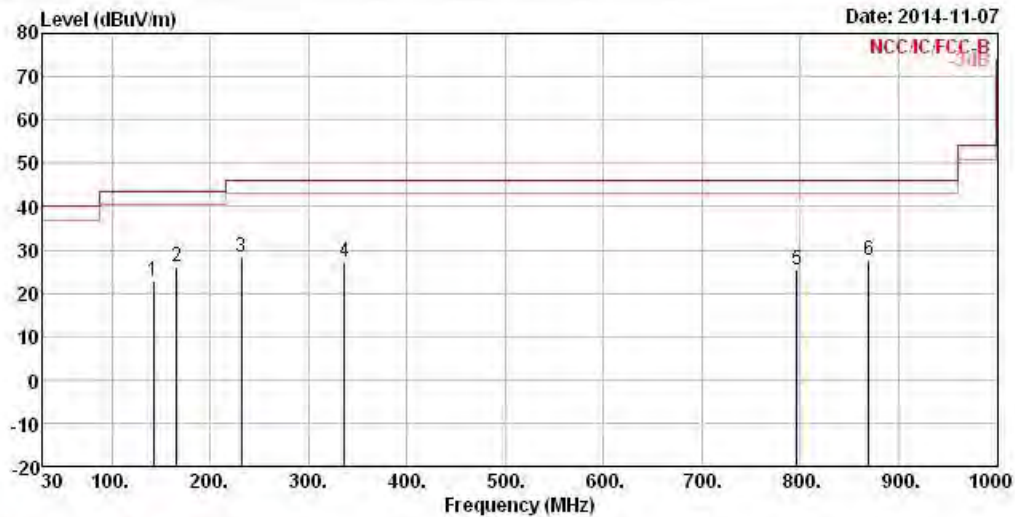
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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 (Below 1GHz)

Modulation Mode	NFC-Read/Write	Polarization	H
Operating Mode	2	Operating Function	EUT with AC power via Debug Board Transmitter



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	142.520	22.84	-20.66	43.50	37.04	10.98	1.98	27.16	Peak	---	---
2	165.800	25.98	-17.52	43.50	41.14	9.87	2.12	27.15	Peak	---	---
3	231.760	28.34	-17.66	46.00	42.09	10.73	2.51	26.99	Peak	---	---
4	336.520	27.27	-18.73	46.00	37.23	13.89	3.06	26.91	Peak	---	---
5	796.300	25.44	-20.56	46.00	28.51	19.66	4.90	27.63	Peak	---	---
6	870.020	27.73	-18.27	46.00	29.52	20.57	5.03	27.39	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 Frequency Stability

3.4.1 Frequency Stability Limit

Frequency Stability Limit	
☒	Carrier frequency stability shall be maintained to $\pm 0.01\%$ (± 100 ppm).

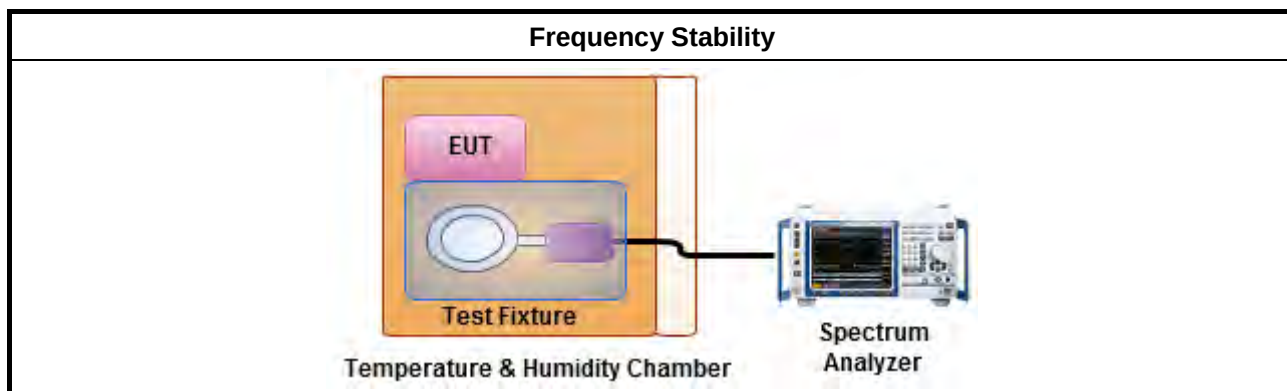
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

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

3.4.4 Test Setup



3.4.5 Test Result of Frequency Stability

Test date: Jul. 26, 2014		Frequency Stability Result
Power Level	1	Frequency Stability Max. Deviation Limit < 100 ppm
Condition	Freq. (MHz)	10 min
T _{20°C} V _{max}	13.56040	29.50
T _{20°C} V _{min}	13.56050	36.87
T _{50°C} V _{nom}	13.56040	29.50
T _{40°C} V _{nom}	13.56050	36.87
T _{30°C} V _{nom}	13.56050	36.87
T _{20°C} V _{nom}	13.56050	36.87
T _{10°C} V _{nom}	13.56040	29.50
T _{0°C} V _{nom}	13.56050	36.87
T _{-10°C} V _{nom}	13.56050	36.87
T _{-20°C} V _{nom}	13.56040	29.50
Result		Complied
Note 1: Measure at 85 % [V _{min}] and 115 % [V _{max}] of the nominal voltage [V _{nom}]. The nominal voltage refer test report clause 1.1.2 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	Apr. 14, 2014	AC Conduction
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 22, 2014	AC Conduction
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	Oct. 31, 2014	AC Conduction
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	AC Conduction
BT Station	R&S	CBT	100959	N/A	Mar. 10, 2014	AC Conduction

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. 25, 2014	RF Conducted
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jul. 15, 2014	RF Conducted
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100℃	Nov. 19, 2014	RF Conducted

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	03CH03-HY	30MHz ~ 1GHz 3m	Nov. 30, 2013 Nov. 29, 2014 (Update)	Radiation
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	May 05, 2014	Radiation
Spectrum	R&S	FSP40	100004	9kHz ~ 40GHz	Mar. 27, 2014	Radiation
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 20, 2014	Radiation
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 16, 2013	Radiation
Turn Table	EM Electronics	EM Electronics	060615	0 ~ 360 degree	N/A	Radiation
Antenna Mast	MF	MF-7802	MF780208179	1 ~ 4 m	N/A	Radiation

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	9kHz ~ 30MHz	Dec. 02, 2012	Radiation

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