



# FCC Test Report

**Equipment** : Rugged Tablet Computer  
**Brand Name** : AAEON  
**Model Name** : xRTC-700Mx (x - Where x may be any combination of alphanumeric characters or "-"or blank.)  
**FCC ID** : OHBRTC700MWBGH  
**Standard** : 47 CFR FCC Part 15.225  
**Operating Band** : 13.553 – 13.567 MHz (channel freq. 13.56 MHz)  
**FCC Classification** : DXX  
**Applicant** : AAEON Technology Inc.  
**Manufacturer** : 5F, No. 135, Lane 235, Pao Chiao Rd., Taipei, Taiwan

The product sample received on May 10, 2016 and completely tested on Jun. 13, 2016. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 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:



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Kevin Liang / 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]: 24.92MHz 36.03 (Margin 13.97dB) - AV 45.09 (Margin 14.91dB) - QP	FCC 15.207	Complied
3.2	15.215(c)	Emission Bandwidth	20dB Bandwidth 2.86 [kHz] FL: 13.55890MHz FH: 13.56176 MHz	Fall in band $F_L \geq 13.553$ MHz $F_H \leq 13.567$ MHz	Complied
3.3	15.225(a)~(d)	Field Strength of Fundamental Emissions and Spectrum Mask	Fundamental Emissions peak: 55.88 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]: 753.620MHz 41.45 (Margin 4.55dB) - PK	FCC 15.209	Complied
3.5	15.225(e)	Frequency Stability	38.94 ppm	$\pm 0.01\%$ (100ppm)	Complied



## Revision History



## 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 18092 (ASK)	13.56	1	55.88
Note 1: Field strength performed 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	
Presentation of Equipment	<input checked="" type="checkbox"/> Production ; <input type="checkbox"/> Pre-Production ; <input 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

Duty Cycle Operation Restriction			
The transmitter is used for		The transmitter is operated	
<input checked="" type="checkbox"/>	Inductive applications	<input checked="" type="checkbox"/>	Automatically triggered
<input type="checkbox"/>	Duty cycle fixed mode	<input checked="" type="checkbox"/>	Duty cycle random mode
Duty cycle mode - NFC-A (ISO 14443-3A)			
Declare transmitter duty cycle / 1 hour =		100%	
Duty cycle Limit			
<input type="checkbox"/>	Class 1 - < 0.1 %	<input type="checkbox"/>	Class 2 - < 1.0 %
<input type="checkbox"/>	Class 3 - < 10 %	<input checked="" type="checkbox"/>	Class 4 - Up to 100 %
Duty cycle mode - NFC-F ( ISO 18092)			
Declare transmitter duty cycle / 1 hour =		100%	
Duty cycle Limit			
<input type="checkbox"/>	Class 1 - < 0.1 %	<input type="checkbox"/>	Class 2 - < 1.0 %
<input type="checkbox"/>	Class 3 - < 10 %	<input checked="" type="checkbox"/>	Class 4 - Up to 100 %
Duty cycle mode - NFC-V (ISO 15693)			
Declare transmitter duty cycle / 1 hour =		100%	
Duty cycle Limit			
<input type="checkbox"/>	Class 1 - < 0.1 %	<input type="checkbox"/>	Class 2 - < 1.0 %
<input type="checkbox"/>	Class 3 - < 10 %	<input checked="" type="checkbox"/>	Class 4 - Up to 100 %

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"/> From Host System	<input checked="" type="checkbox"/> External AC adapter	<input checked="" type="checkbox"/> Battery



## 1.2 Accessories and Support Equipment

Accessories				
AC Adapter	Brand Name	FSP	Model Name	FSP036-RBBN2
	Power Rating	I/P: 100 -240Vac, 1.2A, O/P: 12 Vdc, 3 A		
	Power Cord	1.2 meter, non-shielded cable, with one ferrite core		
Battery 1	Brand Name	Getac	Model Name	RTC600S
	Power Rating	7.4 Vdc, 530 mAh	Type	Li-ion, 2S1P
Battery 2	Brand Name	Getac	Model Name	RTC600H
	Power Rating	7.4Vdc, 1530 mAh	Type	Li-ion, 2S1P
LCD Panel	Brand Name	INNOLUX	Model Name	N070ICG-LD1

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

Support Equipment - AC Conduction				
No.	Equipment	Brand Name	Model Name	FCC ID
1	LCD Monitor	DELL	2410f	DoC
2	USB 2.0 Flash	TRANSCEND	JetFlash V85	DoC
3	SIM Card	R&S	N/A	N/A
4	RFID Card	N/A	N/A	N/A
5	Headset	WHAWK	03-MSD301	N/A
6	SD Card	SamDisk	4GB	DoC
7	RS232 Terminal Load (Client Provide)	N/A	N/A	N/A
8	Base Station (Remote Workstation)	R&S	CMU 200(3G)	N/A
9	Bluetooth Headset (Remote Workstation)	SONY	Z354	N/A

Support Equipment - RF Conducted and Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	RFID Card	N/A	N/A	N/A

## 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 C63.10-2013
- ◆ FCC KDB 174176



## 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 District, Tao Yuan City, Taiwan, R.O.C.	
TEL : 886-3-327-3456 FAX : 886-3-327-0973			
Test Site Registration Number: 553509			
Test Condition	Test Site No.	Test Engineer	Test Environment
AC Conduction	CO01-HY	Ryan	25°C / 58%
RF Conducted	TH06-HY	Howard	23.5°C / 63%
Radiated Emission	03CH03-HY	Terry	21.3°C / 53%

## 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	55.88

### 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

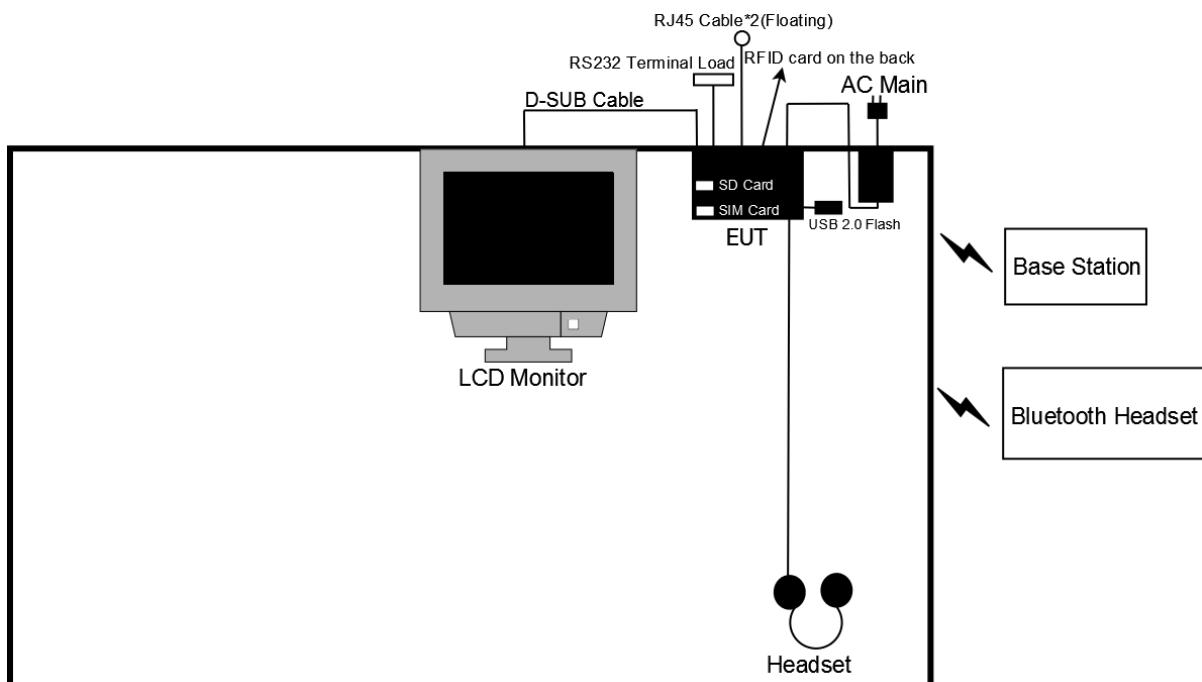
The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	EUT with adapter & transmitting with antenna terminal



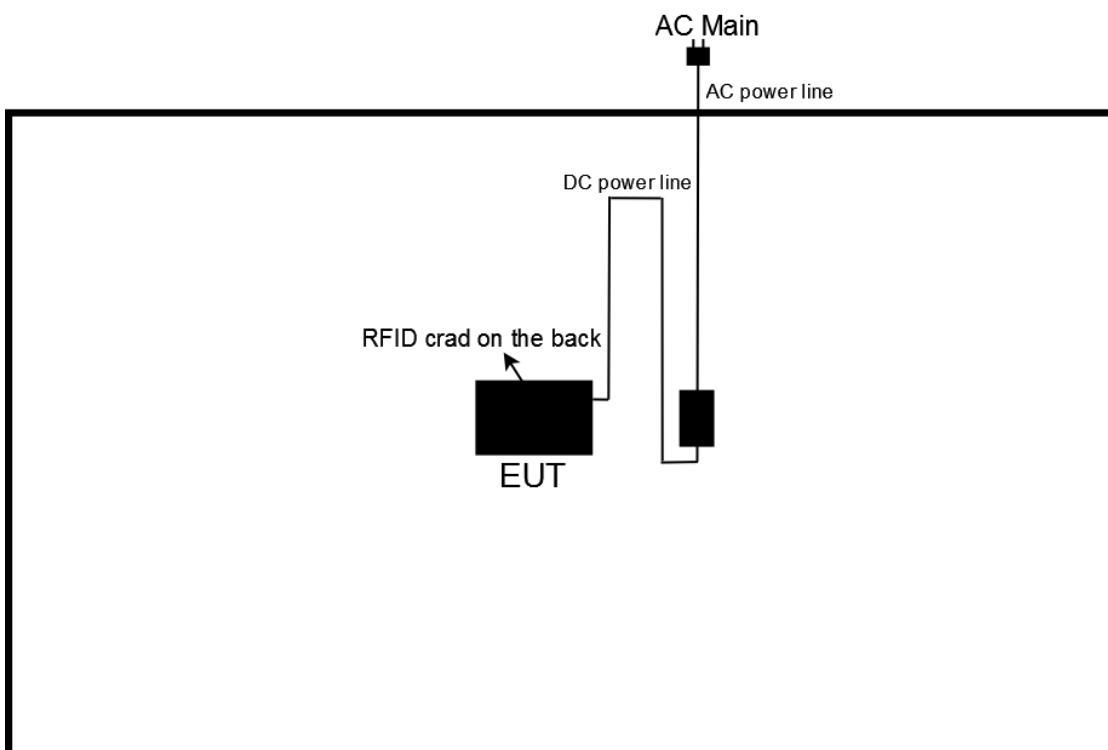
The Worst Case Mode for Following Conformance Tests			
<b>Tests Item</b>	Emission Bandwidth, Field Strength of Fundamental Emissions Spectrum Mask, Transmitter Radiated Unwanted Emissions Frequency Stability		
<b>Test Condition</b>	Radiated measurement		
<b>User Position</b>	<input type="checkbox"/> 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 three 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 three orthogonal planes.		
<b>Pretest Mode</b>	<input checked="" type="checkbox"/> 1.EUT Built in NFC A type		
	<input checked="" type="checkbox"/> 2.EUT Built in NFC F type		
	<input checked="" type="checkbox"/> 3.EUT Built in NFC V type		
The Pretest Mode 2 is the worst case with the following test modes.			
<b>Operating Mode</b>	Operating Mode Description		
1	EUT with adapter & transmitting		
<b>Modulation Mode</b>	NFC-Read/Write		
<b>Orthogonal Planes of EUT</b>	<b>X Plane</b>	<b>Y Plane</b>	<b>Z Plane</b>
			
<b>Worst Planes of EUT</b>		V	

## 2.4 Test Setup Diagram

Test Setup Diagram - AC Line Conducted Emission Test



Test Setup Diagram - Radiated 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.

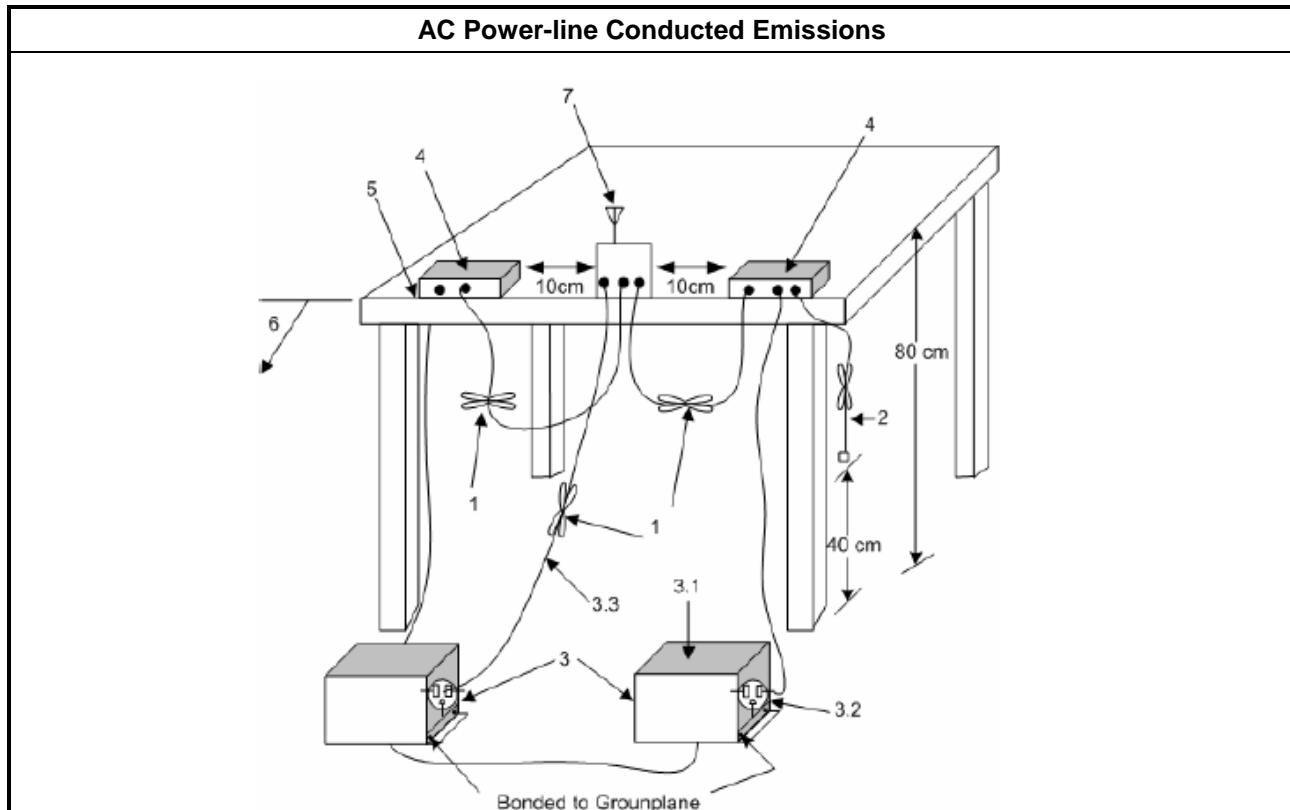
##### 3.1.2 Measuring Instruments

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

##### 3.1.3 Test Procedures

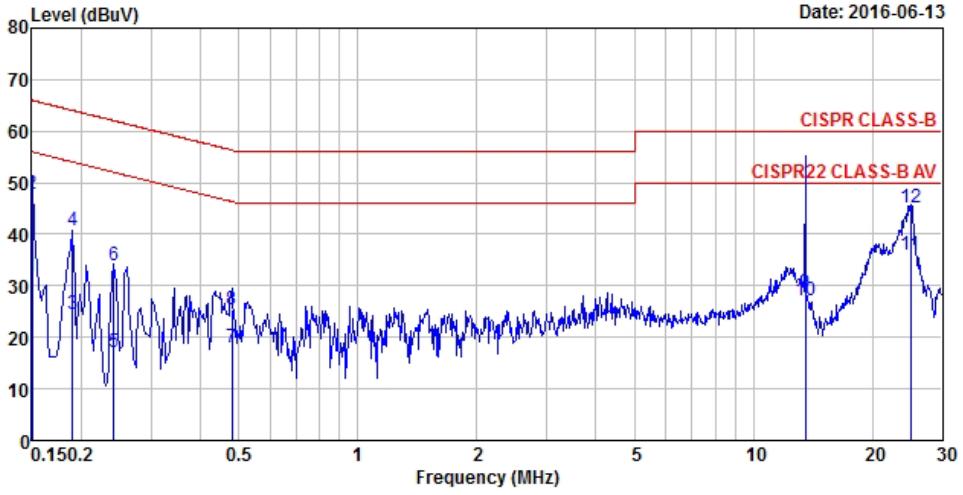
Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.
<input checked="" type="checkbox"/> If AC conducted emissions fall in operating band, then following below test method confirm final result.
<input type="checkbox"/> Accept measurements 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



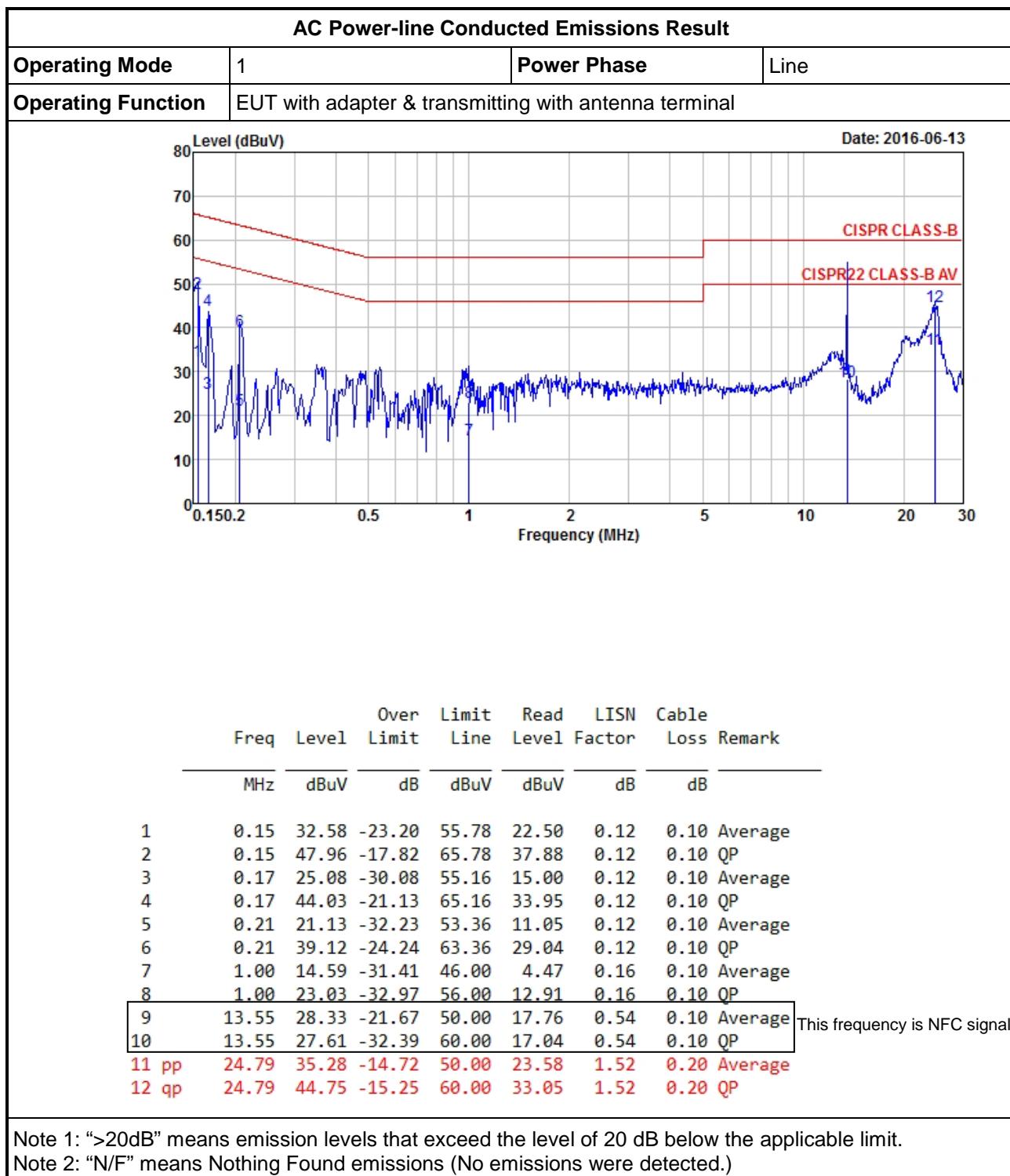


## 3.1.5 Test Result of AC Power-line Conducted Emissions

AC Power-line Conducted Emissions Result																																																																																																																																						
Operating Mode	1	Power Phase		Neutral																																																																																																																																		
Operating Function	EUT with adapter & transmitting with antenna terminal																																																																																																																																					
								Date: 2016-06-13																																																																																																																														
<table><thead><tr><th></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>0.15</td><td>31.99</td><td>-24.01</td><td>56.00</td><td>21.93</td><td>0.10</td><td>0.10</td><td>Average</td></tr><tr><td>2</td><td>0.15</td><td>47.70</td><td>-18.30</td><td>66.00</td><td>37.64</td><td>0.10</td><td>0.10</td><td>QP</td></tr><tr><td>3</td><td>0.19</td><td>24.46</td><td>-29.56</td><td>54.02</td><td>14.41</td><td>0.09</td><td>0.10</td><td>Average</td></tr><tr><td>4</td><td>0.19</td><td>40.73</td><td>-23.29</td><td>64.02</td><td>30.68</td><td>0.09</td><td>0.10</td><td>QP</td></tr><tr><td>5</td><td>0.24</td><td>17.21</td><td>-34.83</td><td>52.04</td><td>7.16</td><td>0.09</td><td>0.10</td><td>Average</td></tr><tr><td>6</td><td>0.24</td><td>34.00</td><td>-28.04</td><td>62.04</td><td>23.95</td><td>0.09</td><td>0.10</td><td>QP</td></tr><tr><td>7</td><td>0.48</td><td>17.90</td><td>-28.42</td><td>46.32</td><td>7.84</td><td>0.10</td><td>0.10</td><td>Average</td></tr><tr><td>8</td><td>0.48</td><td>25.29</td><td>-31.03</td><td>56.32</td><td>15.23</td><td>0.10</td><td>0.10</td><td>QP</td></tr><tr><td>9</td><td>13.55</td><td>28.67</td><td>-21.33</td><td>50.00</td><td>18.11</td><td>0.53</td><td>0.10</td><td>Average</td></tr><tr><td>10</td><td>13.55</td><td>27.07</td><td>-32.93</td><td>60.00</td><td>16.51</td><td>0.53</td><td>0.10</td><td>QP</td></tr><tr><td>11 pp</td><td>24.92</td><td>36.03</td><td>-13.97</td><td>50.00</td><td>24.58</td><td>1.27</td><td>0.20</td><td>Average</td></tr><tr><td>12 qp</td><td>24.92</td><td>45.09</td><td>-14.91</td><td>60.00</td><td>33.64</td><td>1.27</td><td>0.20</td><td>QP</td></tr></tbody></table> <td data-kind="ghost"></td>		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark		MHz	dBuV	dB	dBuV	dBuV	dB	dB		1	0.15	31.99	-24.01	56.00	21.93	0.10	0.10	Average	2	0.15	47.70	-18.30	66.00	37.64	0.10	0.10	QP	3	0.19	24.46	-29.56	54.02	14.41	0.09	0.10	Average	4	0.19	40.73	-23.29	64.02	30.68	0.09	0.10	QP	5	0.24	17.21	-34.83	52.04	7.16	0.09	0.10	Average	6	0.24	34.00	-28.04	62.04	23.95	0.09	0.10	QP	7	0.48	17.90	-28.42	46.32	7.84	0.10	0.10	Average	8	0.48	25.29	-31.03	56.32	15.23	0.10	0.10	QP	9	13.55	28.67	-21.33	50.00	18.11	0.53	0.10	Average	10	13.55	27.07	-32.93	60.00	16.51	0.53	0.10	QP	11 pp	24.92	36.03	-13.97	50.00	24.58	1.27	0.20	Average	12 qp	24.92	45.09	-14.91	60.00	33.64	1.27	0.20	QP								
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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).

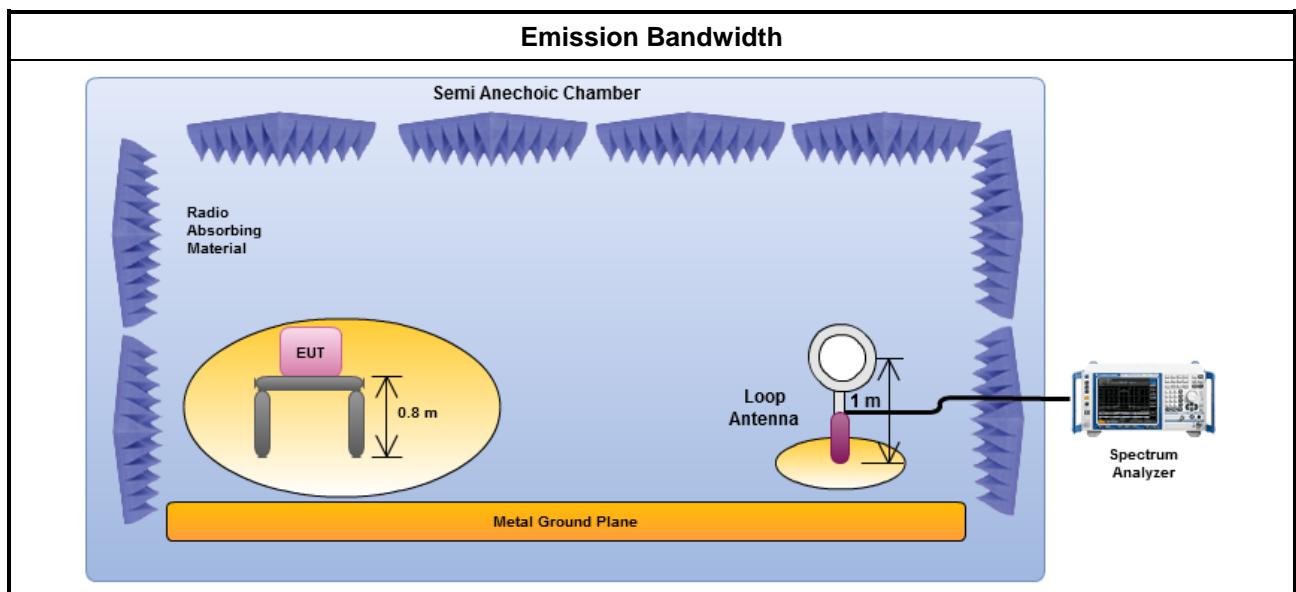
### 3.2.2 Measuring Instruments

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

### 3.2.3 Test Procedures

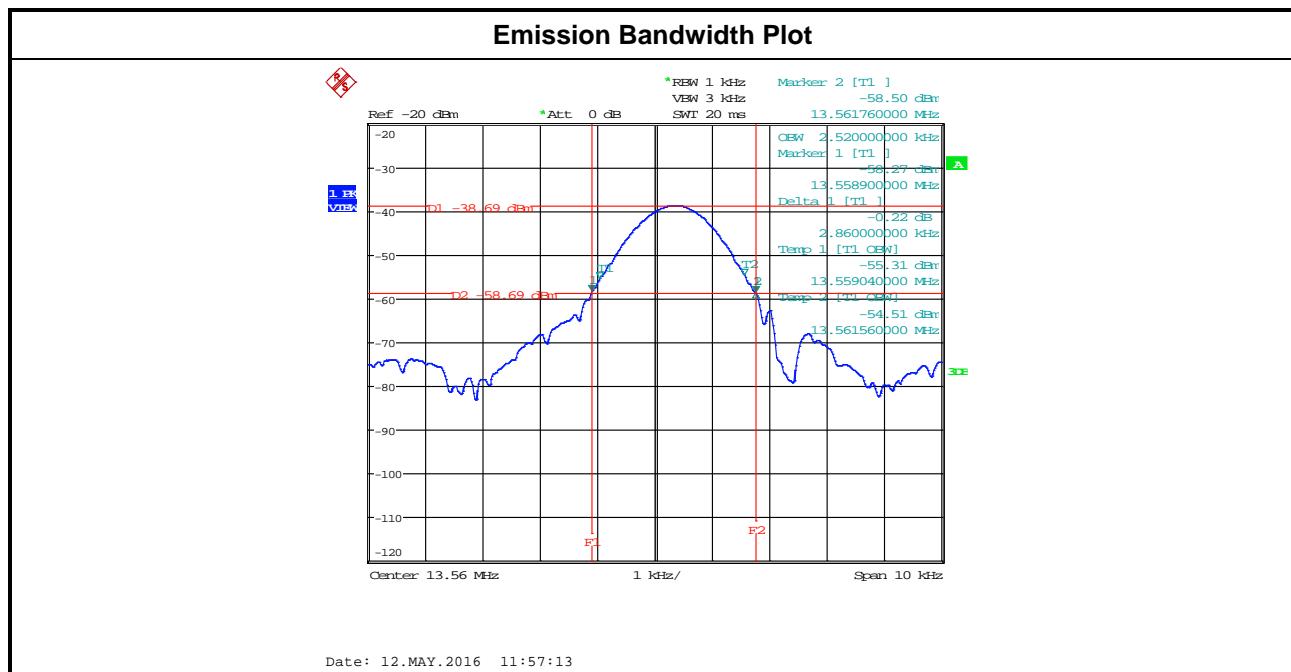
Test Method
<input checked="" type="checkbox"/> For the emission bandwidth refer ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
<input checked="" type="checkbox"/> For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and 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 (MHz)	F <sub>H</sub> at 20dB BW (MHz)	99% Bandwidth (kHz)
NFC-Read/Write	13.56	2.86	13.55890	13.56176	2.52
Limit		N/A	13.553	13.567	N/A
Result			Complied		





### 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

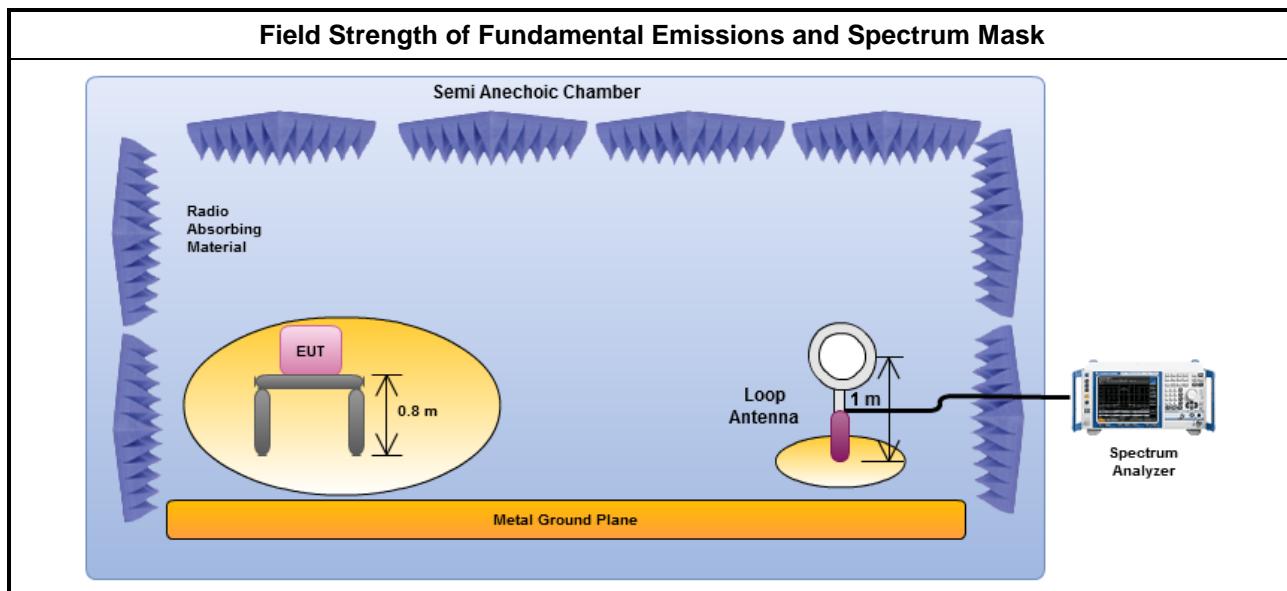
#### 3.3.2 Measuring Instruments

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.

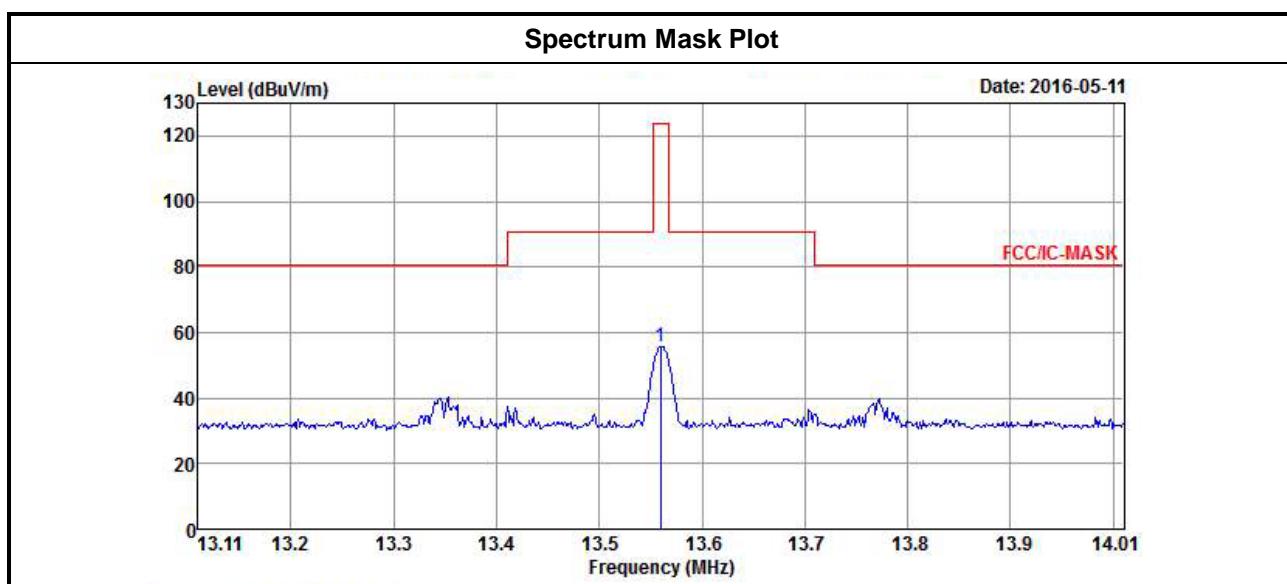
### 3.3.4 Test Setup



### 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	13.56	55.88	H	68.12	124.00
Result		Complied			

Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal).





## 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.

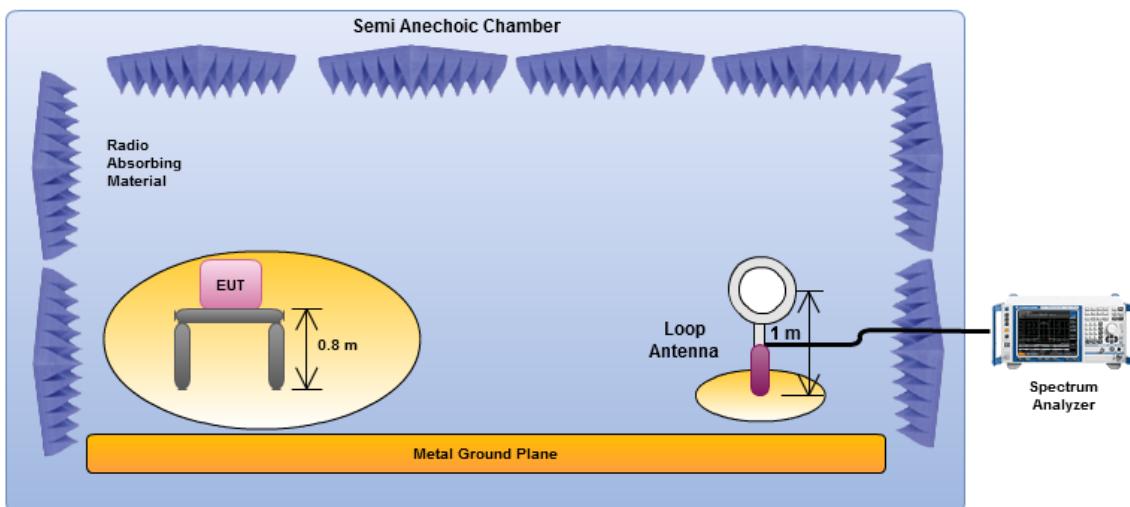


### 3.4.3 Test Procedures

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. <ul style="list-style-type: none"><li><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.</li><li><input checked="" type="checkbox"/> The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).</li></ul>
<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.

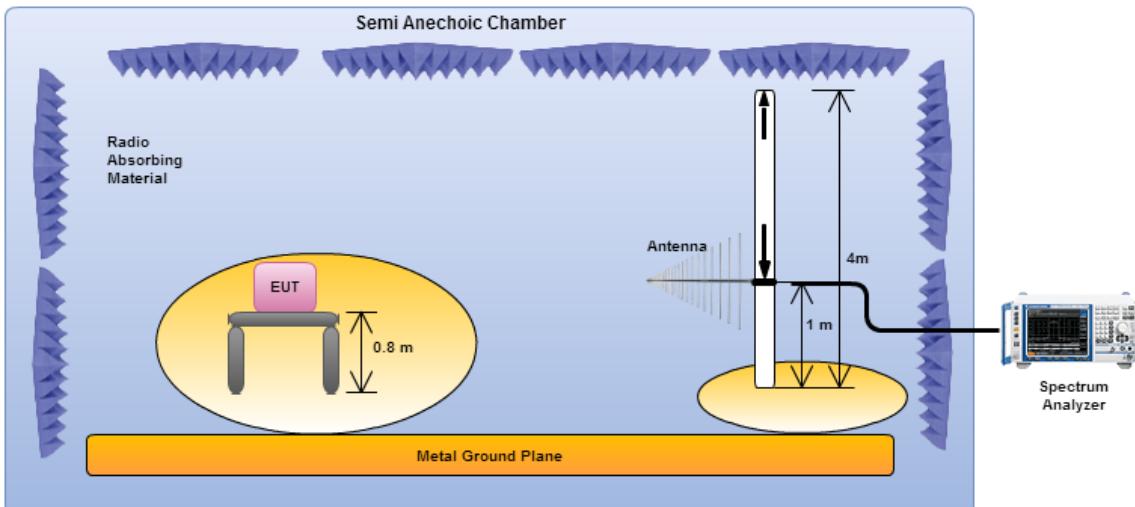
### 3.4.4 Test Setup

#### Transmitter Radiated Unwanted Emissions



Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna. The center of the loop shall be 1 m above the ground.

#### Transmitter Radiated Bandedge Emissions



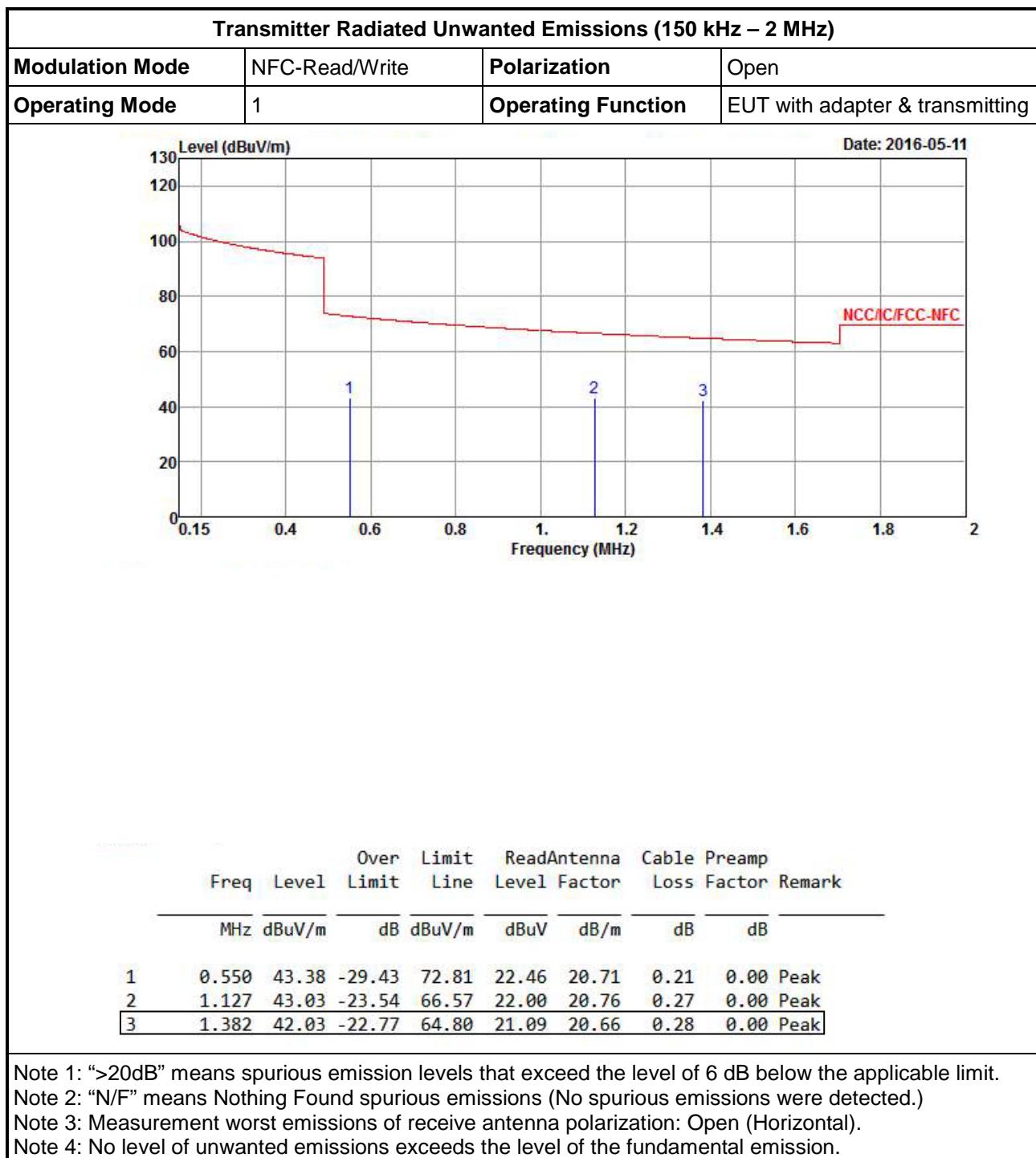
Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna. the antenna height shall be varied from 1 m to 4 m.

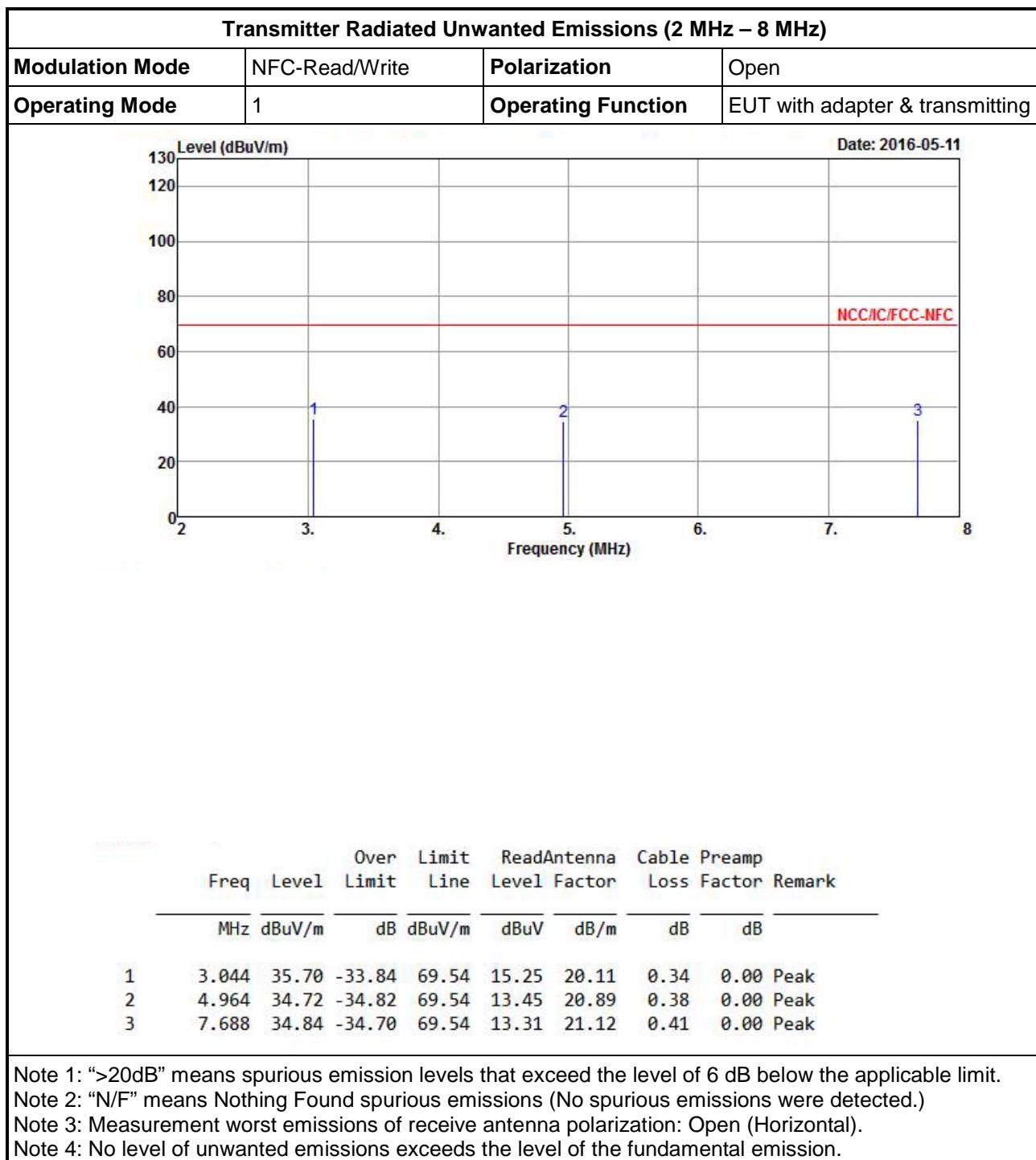


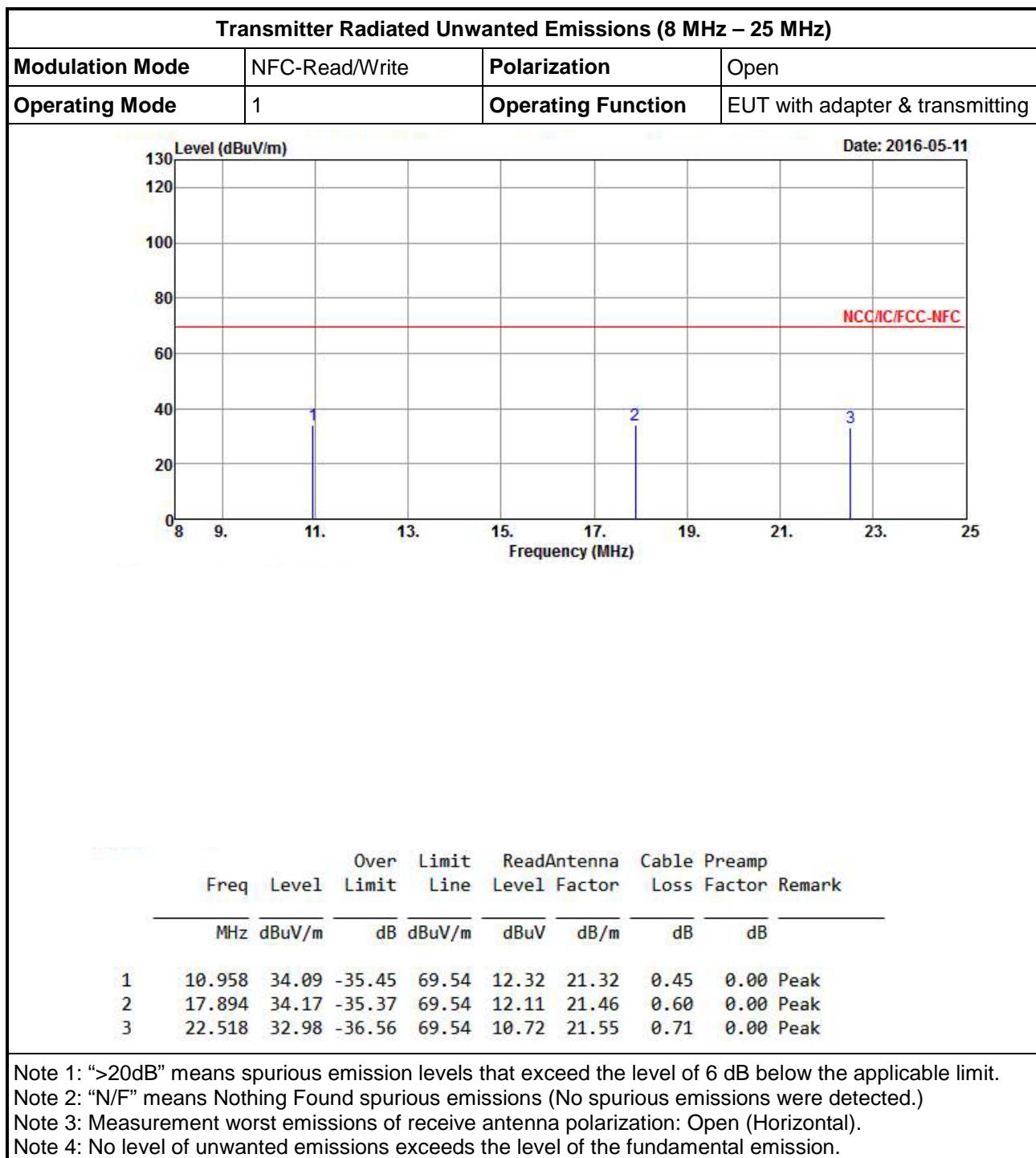
### 3.4.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

Transmitter Radiated Unwanted Emissions (9 kHz –150 kHz)									
Modulation Mode	NFC-Read/Write		Polarization		Open				
Operating Mode	1		Operating Function		EUT with adapter & transmitting				
Date: 2016-05-11									
Level (dBuV/m)	130	120	110	100	90	80	70	60	50
0.009	0.03	0.05	0.07	0.09	0.11	0.13	0.15		
Frequency (MHz)									
1	48.91	-64.64	113.55	27.86	20.90	0.15	0.00	Peak	
2	42.61	-66.63	109.24	21.46	21.00	0.15	0.00	Peak	
3	40.12	-66.78	106.90	18.86	21.10	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: Open (Horizontal).  
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.



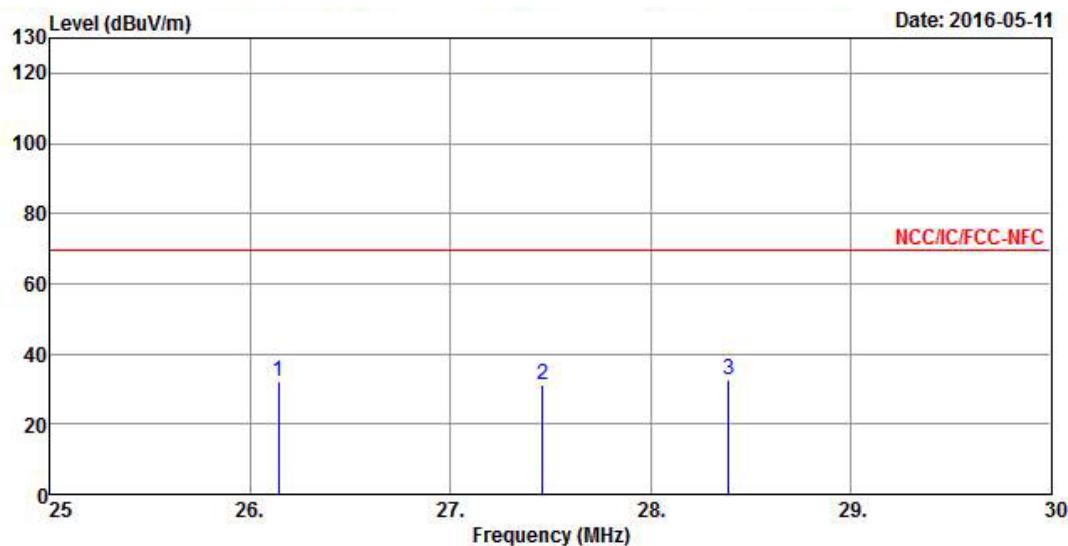






## Transmitter Radiated Unwanted Emissions (25 MHz – 30 MHz)

Modulation Mode	NFC-Read/Write	Polarization	Open
Operating Mode	1	Operating Function	EUT with adapter & transmitting



Freq	Level	Over Limit		Read	Antenna	Cable	Preamp	Loss Factor	Remark
		Line	Limit						
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	26.140	32.30	-37.24	69.54	9.92	21.62	0.76	0.00	Peak
2	27.460	31.22	-38.32	69.54	8.81	21.65	0.76	0.00	Peak
3	28.390	32.53	-37.01	69.54	10.09	21.67	0.77	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.)

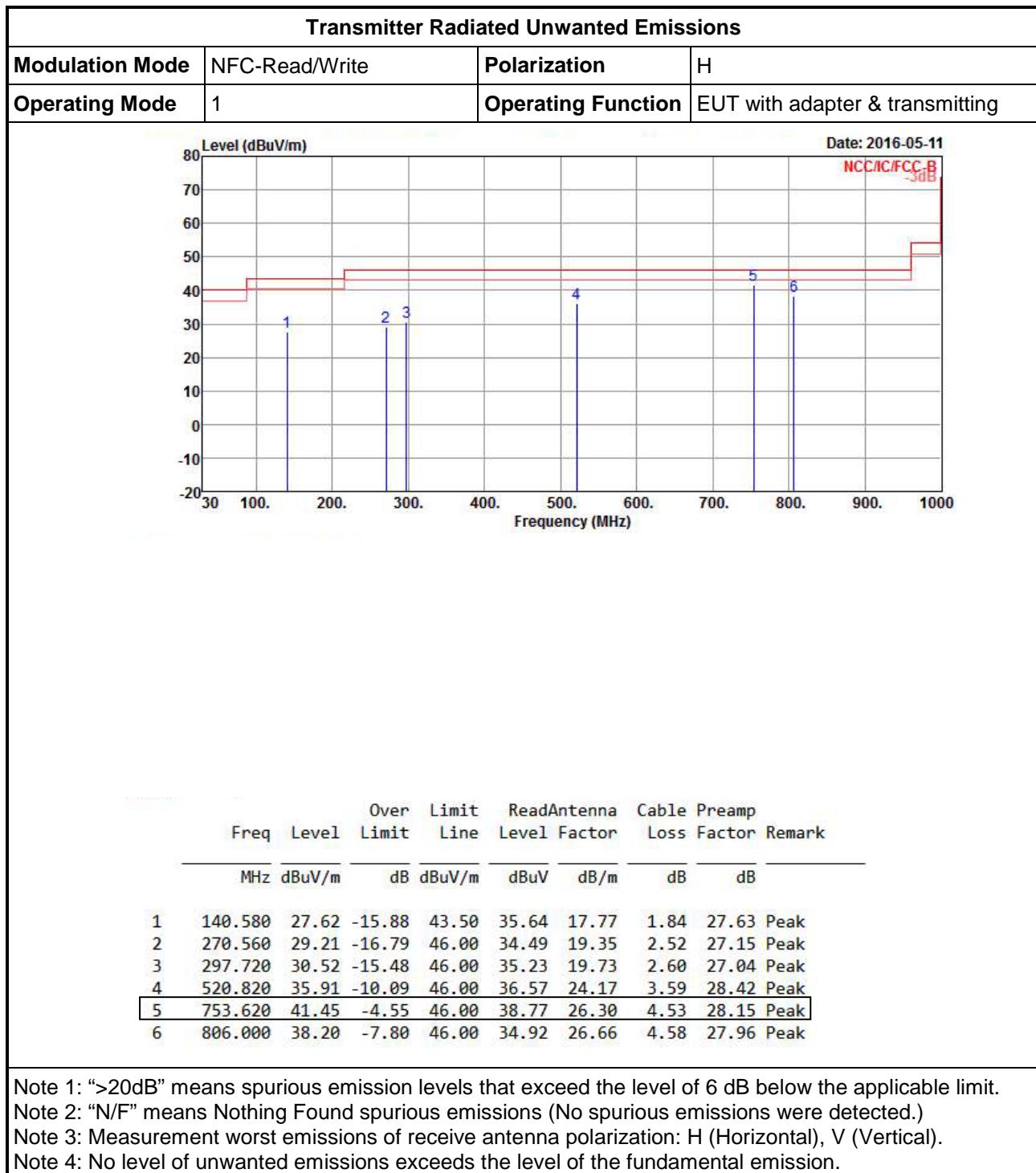
Note 3: Measurement worst emissions of receive antenna polarization: Open (Horizontal).

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



## 3.4.6 Transmitter Radiated Unwanted Emissions (Above 30MHz)





## 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).

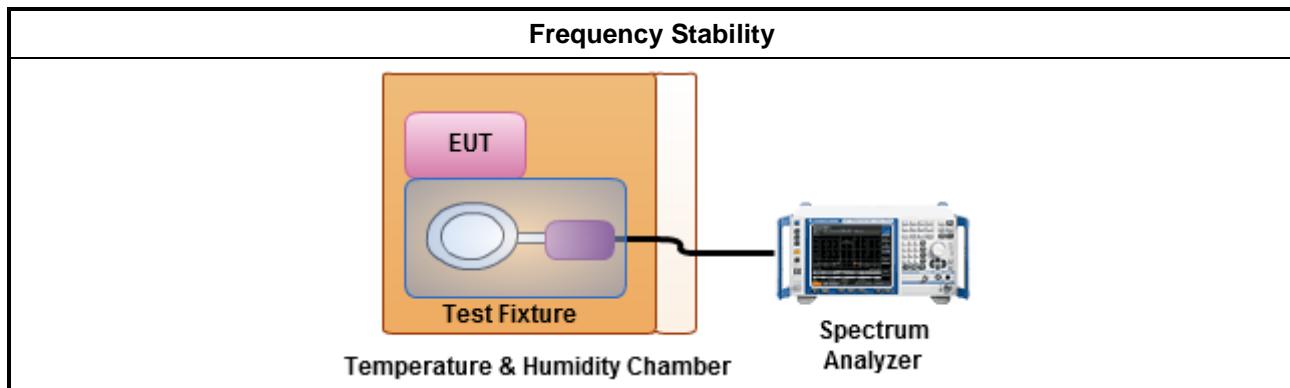
### 3.5.2 Measuring Instruments

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										
Test date: May 12, 2016			Frequency (MHz)				Freq Error (ppm)			
Condition	Modulation Mode	Freq. (MHz)	0 min	2 min	5 min	10 min	0 min	2 min	5 min	10 min
T <sub>20°C</sub> V <sub>max</sub>	CW	13.56	13.56034	13.56034	13.56034	13.56034	25.07	25.07	25.07	25.07
T <sub>20°C</sub> V <sub>min</sub>	CW	13.56	13.56036	13.56036	13.56036	13.56036	26.55	26.55	26.70	26.70
T <sub>50°C</sub> V <sub>nom</sub>	CW	13.56	13.56026	13.56026	13.56026	13.56025	19.17	19.17	19.03	18.73
T <sub>40°C</sub> V <sub>nom</sub>	CW	13.56	13.56028	13.56028	13.56028	13.56028	20.65	20.65	20.28	20.28
T <sub>30°C</sub> V <sub>nom</sub>	CW	13.56	13.56030	13.56031	13.56031	13.56030	22.12	22.86	22.86	22.12
T <sub>20°C</sub> V <sub>nom</sub>	CW	13.56	13.56034	13.56032	13.56034	13.56035	25.07	23.60	25.07	25.52
T <sub>10°C</sub> V <sub>nom</sub>	CW	13.56	13.56042	13.56042	13.56042	13.56043	30.97	31.19	31.19	31.42
T <sub>0°C</sub> V <sub>nom</sub>	CW	13.56	13.56046	13.56046	13.56047	13.56047	33.92	33.70	34.51	34.51
T <sub>-10°C</sub> V <sub>nom</sub>	CW	13.56	13.56048	13.56046	13.56046	13.56044	35.40	33.92	33.92	32.30
T <sub>-20°C</sub> V <sub>nom</sub>	CW	13.56	13.56050	13.56052	13.56052	13.56053	36.87	38.35	38.35	38.94
Limit (ppm)			-				100			
Result			Complied							

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

### AC Conduction

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
EMC Receiver	KETSIGHT	N9038A	MY54130031	20Hz ~ 8.4GHz	Apr. 14, 2016	Apr. 13, 2017
LISN	MessTec	NNB-2/16Z	2001/009	9kHz ~ 30MHz	Oct. 21, 2015	Oct. 20, 2016
LISN	MessTec	NNB-2/16Z	99079	9kHz ~ 30MHz	Sep. 21, 2015	Sep. 20, 2016
EMI Filter	LINDGREN	LRE-2060	1004	< 450Hz	N/A	N/A
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832010001	9kHz ~ 30MHz	Feb. 27, 2016	Feb. 26, 2017

### RF Conducted

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101500	9KHz~40GHz	May 12, 2016	May 11, 2017
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100°C	Apr. 25, 2016	Apr. 24, 2017
DC Power Source	G.W.	GPS-3030DD	GEN865896	DC 0V ~ 30V	Jan. 14, 2016	Jan. 13, 2017

### Radiated Emissions

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Nov. 28, 2015	Nov. 27, 2016
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	May 10, 2016	May 09, 2017
Spectrum	R&S	FSV40	101513	9kHz ~ 40GHz	Feb. 16, 2016	Feb. 15, 2017
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 18, 2015	Sep. 17, 2016

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	Feb. 02, 2015	Feb. 01, 2017