FCC Test Report

Equipment	:	**Rugged Tablet Computer**
Brand Name	:	**AAEON**
Model Name	:	**xRTC-600Ax (x - Where x may be any combination of alphanumeric characters or "-"or blank.)**
FCC ID	:	**OHBRTC600AWBGH**
Standard	:	**47 CFR FCC Part 15.225**
Operating Band	:	**13.110 – 14.010 MHz (channel freq. 13.56 MHz)**
FCC Classification	:	**DXX**
Applicant **Manufacturer**	:	**AAEON Technology Inc.** 5F, No. 135, Lane 235, Pao Chiao Rd.,Taipei, Taiwan

The product sample received on May 27, 2015 and completely tested on Jun. 22, 2015. 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

Testing Laboratory
1190

Table of Contents

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]: 0.1590020MHz 43.01 (Margin 12.51dB) - AV 53.65 (Margin 11.87dB) - QP	FCC 15.207	Complied
3.2	15.215(c)	Emission Bandwidth	20dB Bandwidth 2.66 [kHz] FL: 13.55938 MHz FH: 13.56202 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:58.10 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]: 759.44MHz 38.04 (Margin 7.96dB) - Peak	FCC 15.209	Complied
3.5	15.225(e)	Frequency Stability	63.42 ppm	± 0.01% (100ppm)	Complied

Revision History

Report No.	Version	Description	Issued Date
FR552692AR	Rev. 01	Initial issue of report	Jul. 09, 2015

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)**
13.110 – 14.010 MHz	ISO 14443-2 (ASK)	13.56	1	58.10
Note 1: Field strength performed peak level at 3m.				

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

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 AC adapter	☒ Li-ion Battery

1.2 Accessories and Support Equipment

Accessories				
AC Adapter 1	Brand Name	L.T.E.	Model Name	LTE24E-S2-2
	Power Rating	I/P:100-240Vac, 1A, O/P: 12Vdc, 2A		
Battery 1	Brand Name	Getac	Model Name	RTC600S
	Vendor	7.4 Vdc, 1530 mAh	Power Rating	Li-ion, 2S1P
Battery 2	Brand Name	Getac	Model Name	RTC600H
	Vendor	7.4 Vdc, 1530 mAh	Power Rating	Li-ion, 2S1P
LCD Panel	Brand Name	TIANMA	Model Name	TM057JDHP04-00

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

Support Equipment - AC Conduction & Radiated Emission			
No.	**Equipment**	**Brand Name**	**Model Name**
1	Identity Badge	-	-

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 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 Condition	Test Site No.	Test Engineer	Test Environment
AC Conduction	CO04-HY	Zeus	22℃ / 64%
RF Conducted	TH01-HY	Jason	22.9℃ / 62.7%
Radiated Emission	03CH03-HY	Hunter	23.4°C / 56.9%

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 ℃
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	58.10

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)

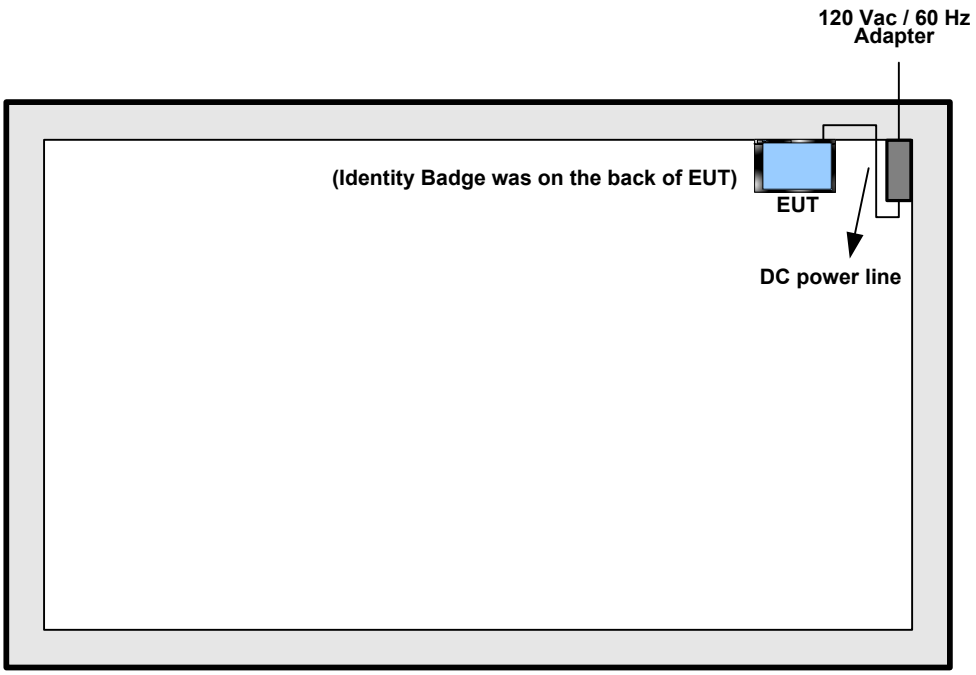
2.3 The Worst Case Measurement Configuration

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	EUT with adapter & transmitting with antenna
2	EUT with adapter & transmitting with antenna terminal

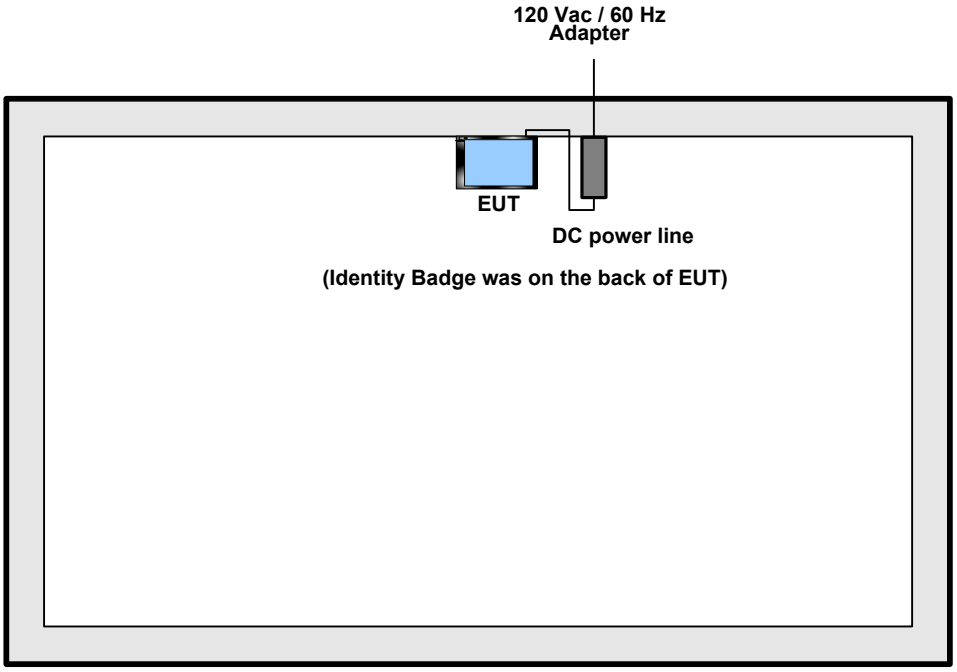
The Worst Case Mode for Following Conformance Tests			
Tests Item	Emission Bandwidth, Field Strength of Fundamental Emissions Spectrum Mask, Transmitter Radiated Unwanted Emissions, Frequency Stability		
Test Condition	Radiated measurement		
User Position	☐ EUT will be placed in fixed position.		
	☐ EUT will be placed in mobile position and operating multiple positions. EUT shall be performed two orthogonal planes.		
	☒ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed three orthogonal planes.		
Operating Mode < 1GHz	☒ 1. EUT with adapter & transmitting		
Modulation Mode	NFC-Read/Write		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
			
Worst Planes of EUT		V	

2.4 Test Setup Diagram

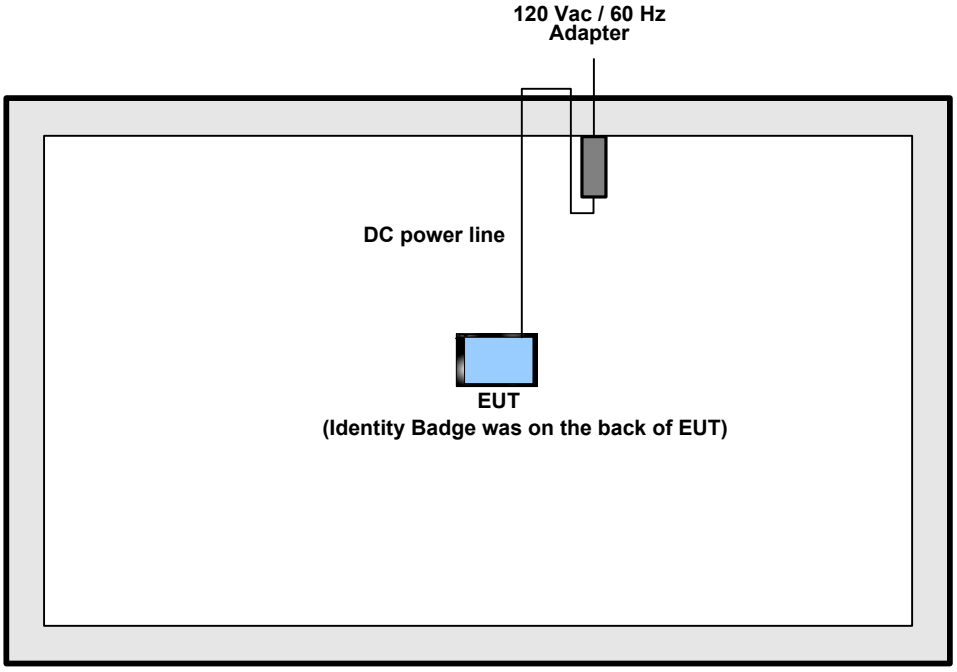
Test Setup Diagram - AC Line Conducted Emission Test



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

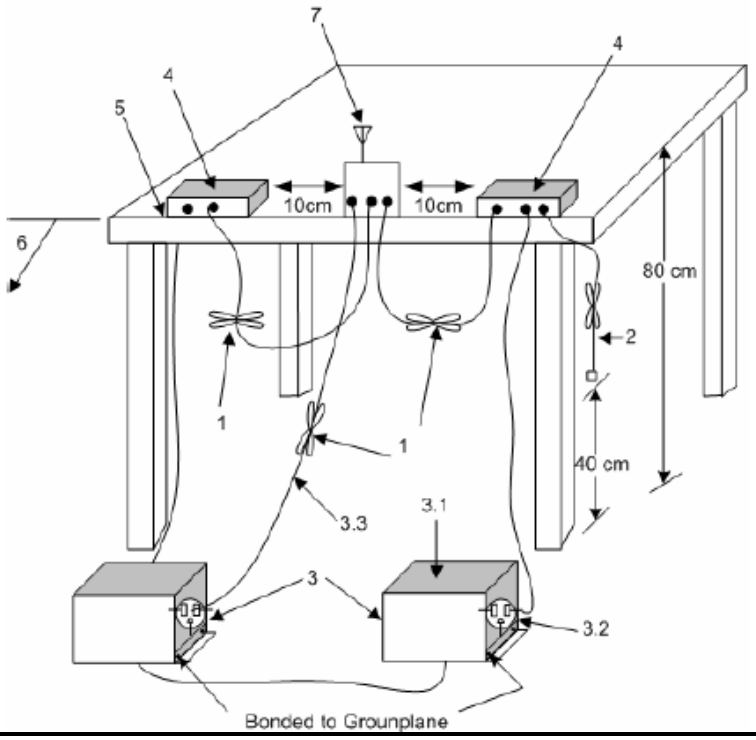
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method	
☒	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.

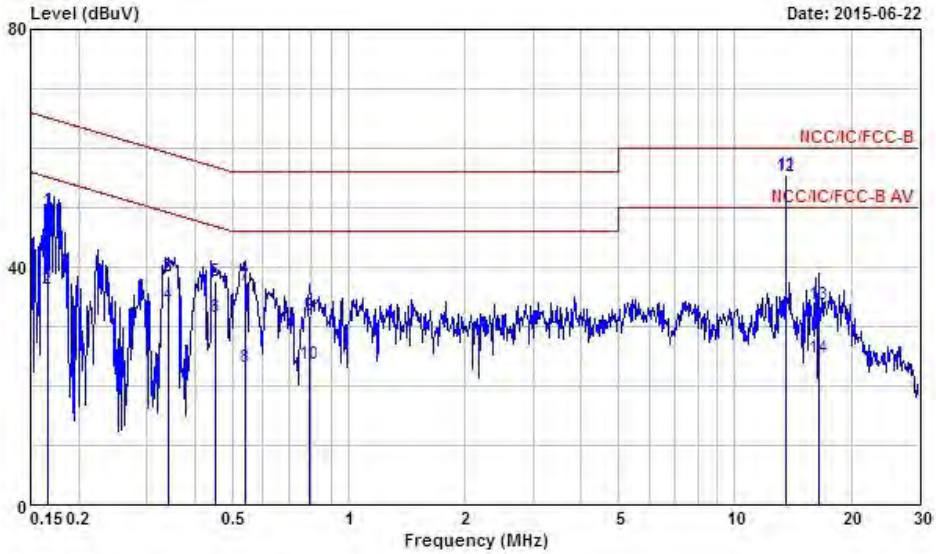
3.1.4 Test Setup

AC Power-line Conducted Emissions



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		

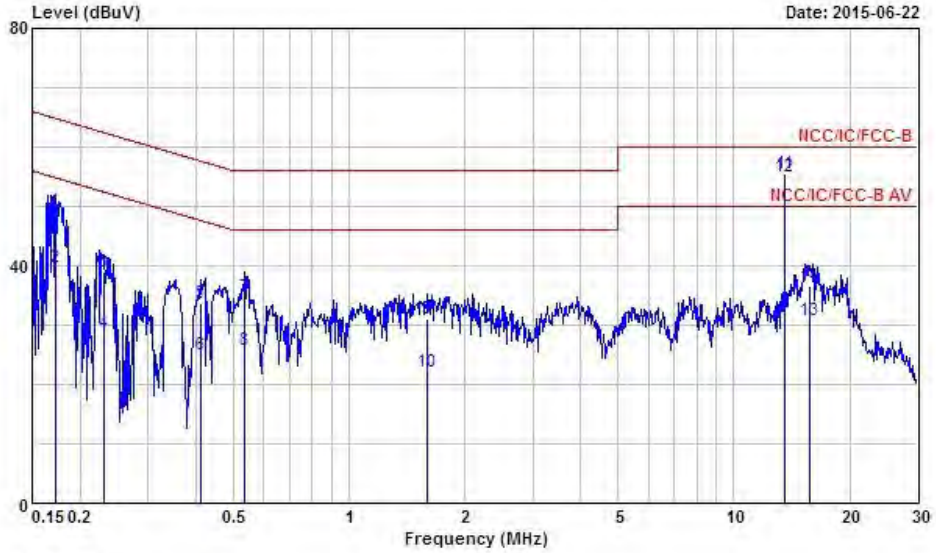


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1658860	49.56	-15.60	65.16	49.10	0.07	0.39	QP
2	0.1658860	36.43	-18.73	55.16	35.97	0.07	0.39	Average
3	0.3409970	38.54	-20.64	59.18	37.89	0.07	0.58	QP
4	0.3409970	33.79	-15.39	49.18	33.14	0.07	0.58	Average
5	0.4515500	37.56	-19.29	56.85	36.86	0.07	0.63	QP
6	0.4515500	31.60	-15.25	46.85	30.90	0.07	0.63	Average
7	0.5378230	36.91	-19.09	56.00	36.17	0.08	0.66	QP
8	0.5378230	23.05	-22.95	46.00	22.31	0.08	0.66	Average
9	0.7917990	31.79	-24.21	56.00	30.96	0.08	0.75	QP
10	0.7917990	23.72	-22.28	46.00	22.89	0.08	0.75	Average
11 @	13.560	55.63	5.63	50.00	54.52	0.31	0.80	Average
12 @	13.560	55.15	-4.85	60.00	54.04	0.31	0.80	QP
13	16.490	33.64	-26.36	60.00	32.52	0.35	0.77	QP
14	16.490	24.73	-25.27	50.00	23.61	0.35	0.77	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**	Line
Operating Function	EUT with adapter & transmitting with antenna		

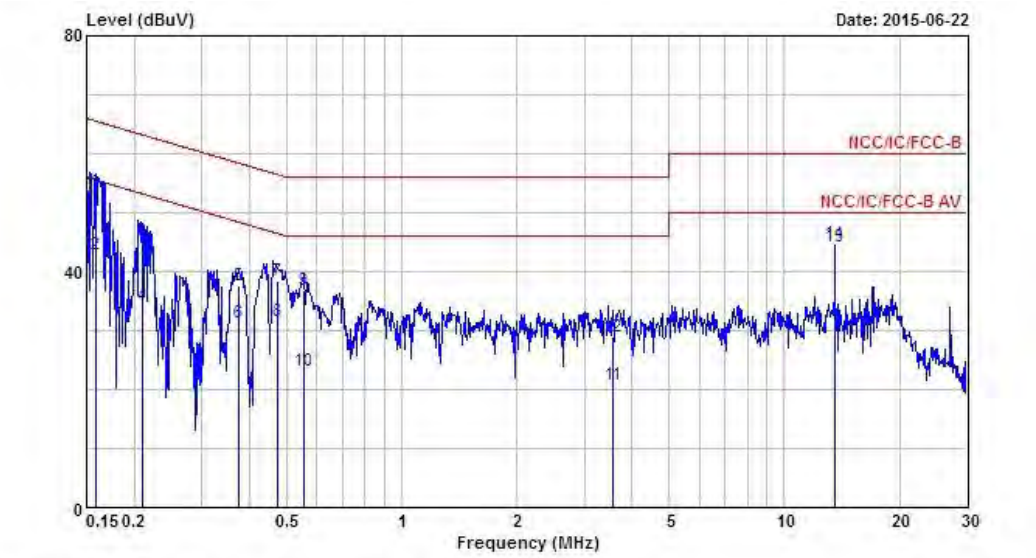


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1721540	49.32	-15.54	64.86	48.85	0.05	0.42	QP
2	0.1721540	39.62	-15.24	54.86	39.15	0.05	0.42	Average
3	0.2303960	38.95	-23.49	62.44	38.37	0.06	0.52	QP
4	0.2303960	28.70	-23.74	52.44	28.12	0.06	0.52	Average
5	0.4126560	33.80	-23.79	57.59	33.12	0.07	0.61	QP
6	0.4126560	25.00	-22.59	47.59	24.32	0.07	0.61	Average
7	0.5349810	34.73	-21.27	56.00	34.00	0.07	0.66	QP
8	0.5349810	25.78	-20.22	46.00	25.05	0.07	0.66	Average
9	1.600	31.01	-24.99	56.00	30.12	0.09	0.80	QP
10	1.600	22.20	-23.80	46.00	21.31	0.09	0.80	Average
11 @	13.560	55.61	5.61	50.00	54.52	0.29	0.80	Average
12 @	13.560	55.13	-4.87	60.00	54.04	0.29	0.80	QP
13	15.720	30.82	-19.18	50.00	29.72	0.31	0.79	Average
14	15.720	36.61	-23.39	60.00	35.51	0.31	0.79	QP

→ 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	EUT with adapter & transmitting with antenna terminal		

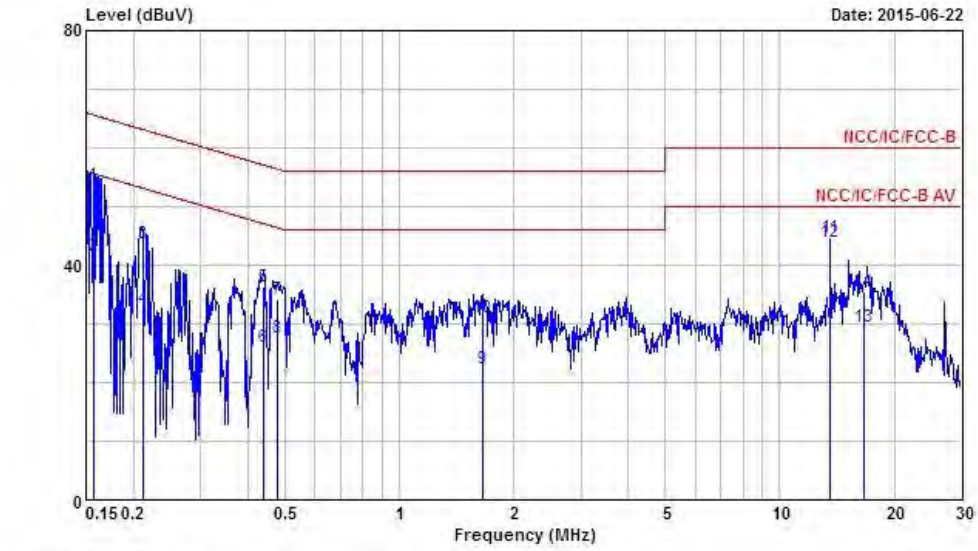


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1590020	53.65	-11.87	65.52	53.21	0.07	0.37	QP
2	0.1590020	43.01	-12.51	55.52	42.57	0.07	0.37	Average
3	0.2094380	45.29	-17.94	63.23	44.71	0.07	0.51	QP
4	0.2094380	34.31	-18.92	53.23	33.73	0.07	0.51	Average
5	0.3751190	37.74	-20.65	58.39	37.08	0.07	0.59	QP
6	0.3751190	31.30	-17.09	48.39	30.64	0.07	0.59	Average
7	0.4736030	38.33	-18.12	56.45	37.62	0.07	0.64	QP
8	0.4736030	31.59	-14.86	46.45	30.88	0.07	0.64	Average
9	0.5551950	36.92	-19.08	56.00	36.17	0.08	0.67	QP
10	0.5551950	23.06	-22.94	46.00	22.31	0.08	0.67	Average
11	3.570	20.80	-25.20	46.00	19.95	0.13	0.72	Average
12	3.570	28.88	-27.12	56.00	28.03	0.13	0.72	QP
13	13.560	44.09	-15.91	60.00	42.98	0.31	0.80	QP
14	13.560	44.63	-5.37	50.00	43.52	0.31	0.80	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**	Line
Operating Function	EUT with adapter & transmitting with antenna terminal		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1564950	53.56	-12.09	65.65	53.15	0.05	0.36	QP
2	0.1564950	41.48	-14.17	55.65	41.07	0.05	0.36	Average
3	0.2116700	43.75	-19.39	63.14	43.18	0.06	0.51	QP
4	0.2116700	32.67	-20.47	53.14	32.10	0.06	0.51	Average
5	0.4397440	36.42	-20.65	57.07	35.73	0.07	0.62	QP
6	0.4397440	26.10	-20.97	47.07	25.41	0.07	0.62	Average
7	0.4786490	34.22	-22.14	56.36	33.51	0.07	0.64	QP
8	0.4786490	27.57	-18.79	46.36	26.86	0.07	0.64	Average
9	1.650	22.26	-23.74	46.00	21.37	0.09	0.80	Average
10	1.650	31.07	-24.93	56.00	30.18	0.09	0.80	QP
11 @	13.560	44.61	-5.39	50.00	43.52	0.29	0.80	Average
12	13.560	44.07	-15.93	60.00	42.98	0.29	0.80	QP
13	16.660	29.58	-20.42	50.00	28.49	0.32	0.77	Average
14	16.660	35.65	-24.35	60.00	34.56	0.32	0.77	QP

→ 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.)

3.2 Emission Bandwidth

3.2.1 Emission Bandwidth Limit

20dB Bandwidth Limit
☒ Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (13.110 – 14.010 MHz).

3.2.2 Measuring Instruments

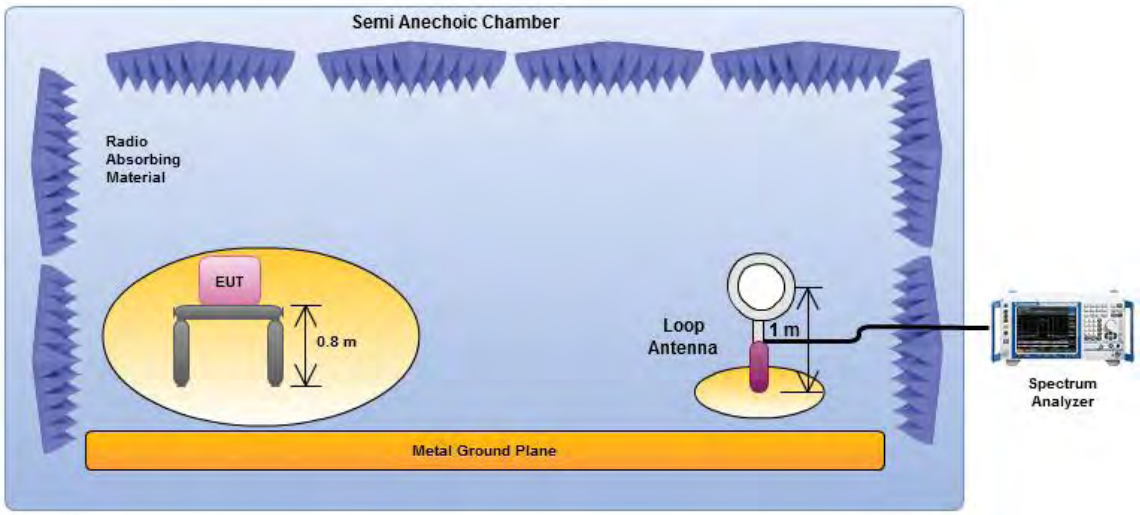
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method
☒ For the emission bandwidth refer ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
☒ 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

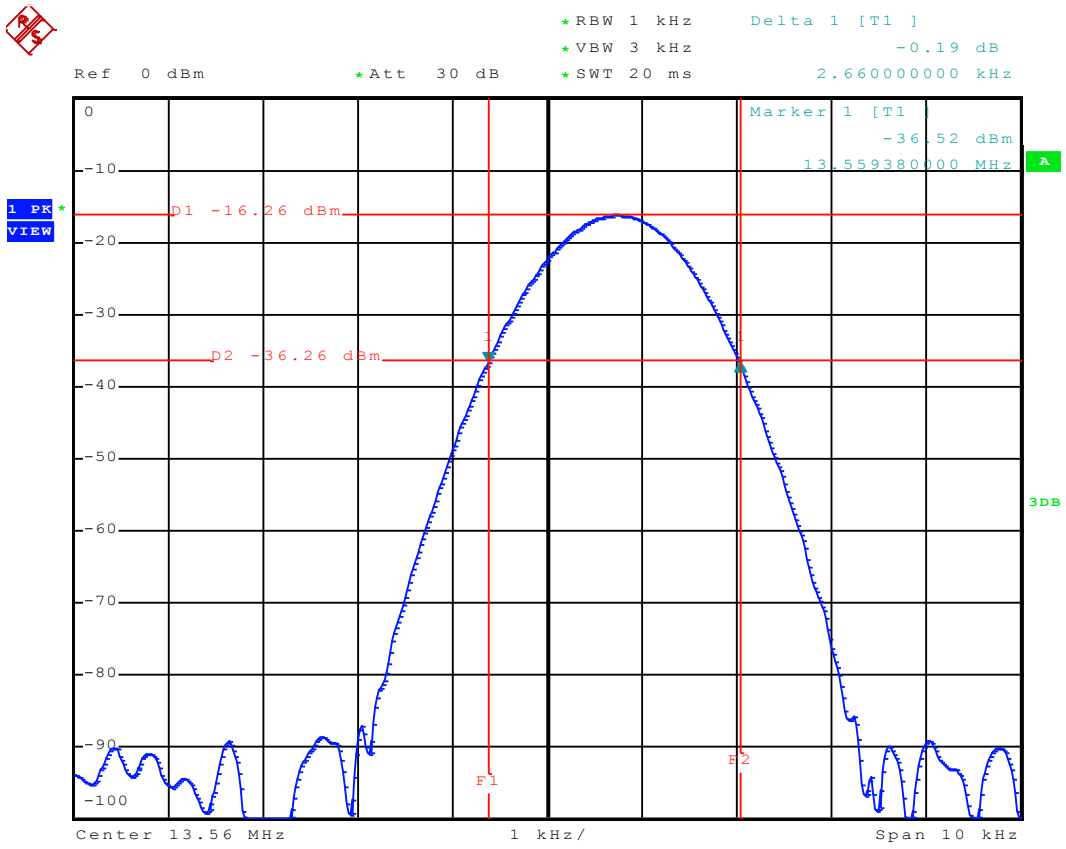
Emission Bandwidth



3.2.5 Test Result of Emission Bandwidth

Occupied Channel Bandwidth Result					
Modulation Mode	**Frequency (MHz)**	**20dB Bandwidth (kHz)**	**F_L at 20dB BW (MHz)**	**F_H at 20dB BW (MHz)**	**99% Bandwidth (kHz)**
NFC-Read/Write	13.56	2.66000	13.55938	13.56202	2.24000
Limit		**N/A**	**13.110**	**14.010**	**N/A**
Result		**Complied**			

Emission Bandwidth Plot



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

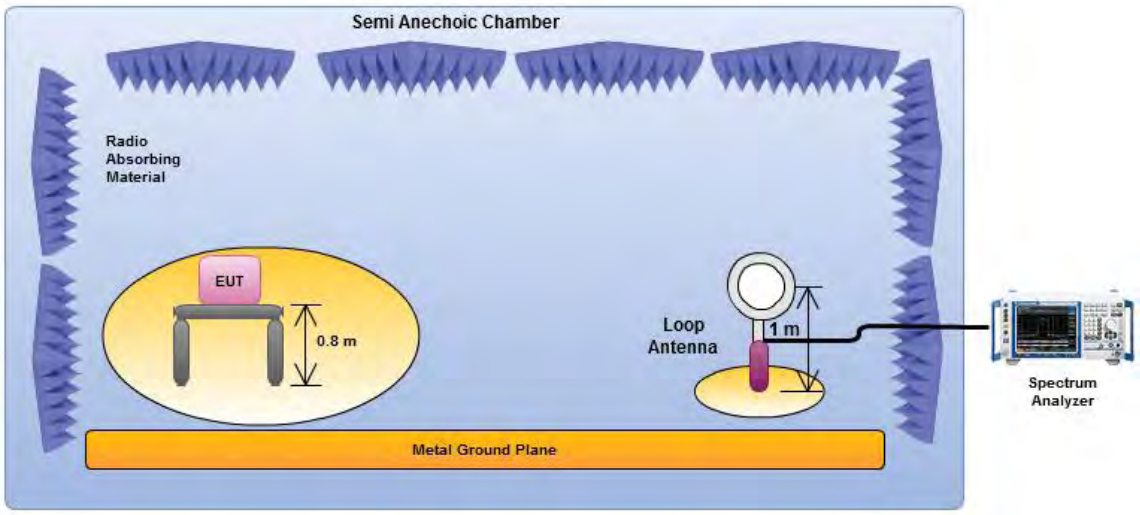
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
☒	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.

3.3.4 Test Setup

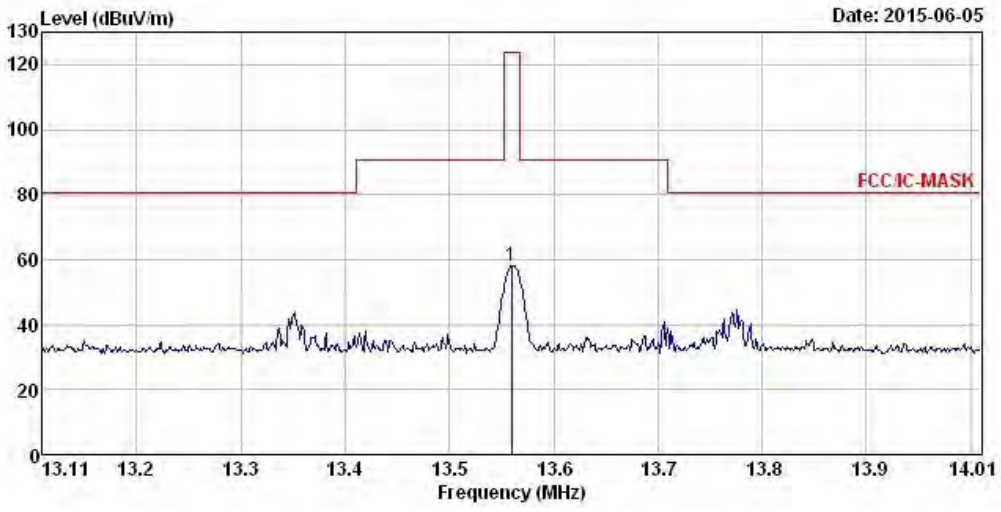
Field Strength of Fundamental Emissions and Spectrum Mask



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	58.10	H	65.90	124.00
Result		**Complied**			
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal).					

Spectrum Mask Plot



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

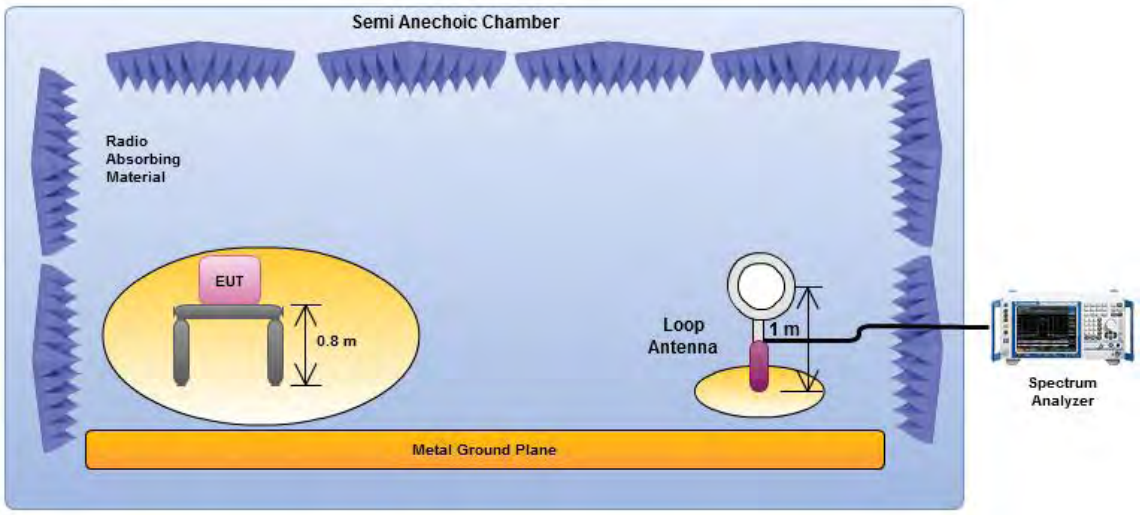
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method	
☒	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.

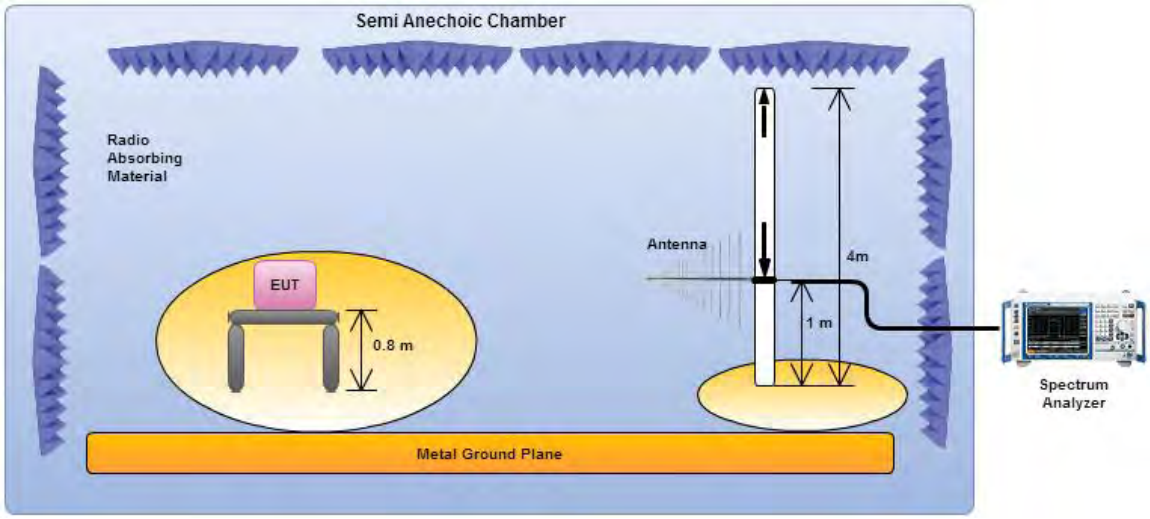
3.4.4 Test Setup

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.

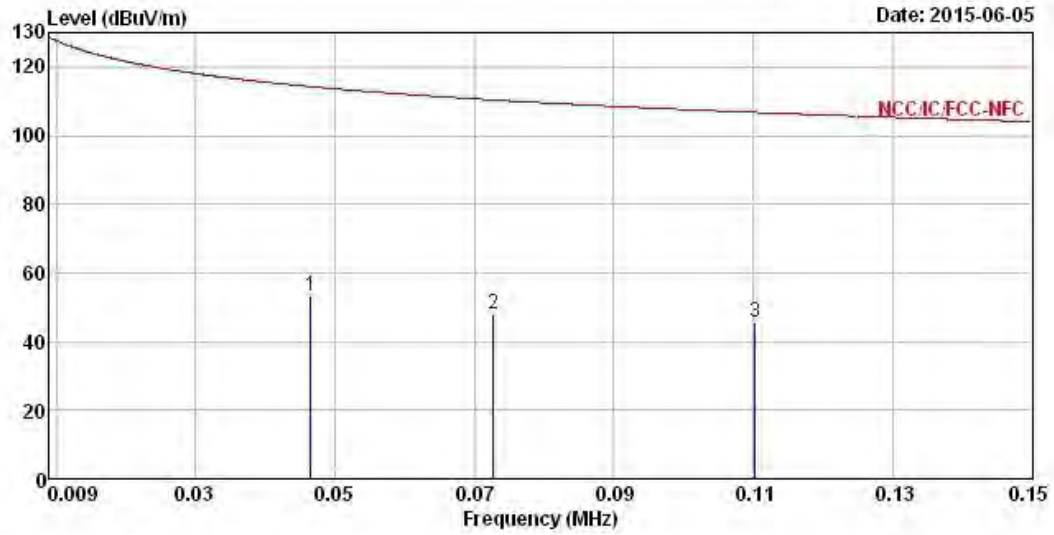
Transmitter Radiated Unwanted Emissions



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)

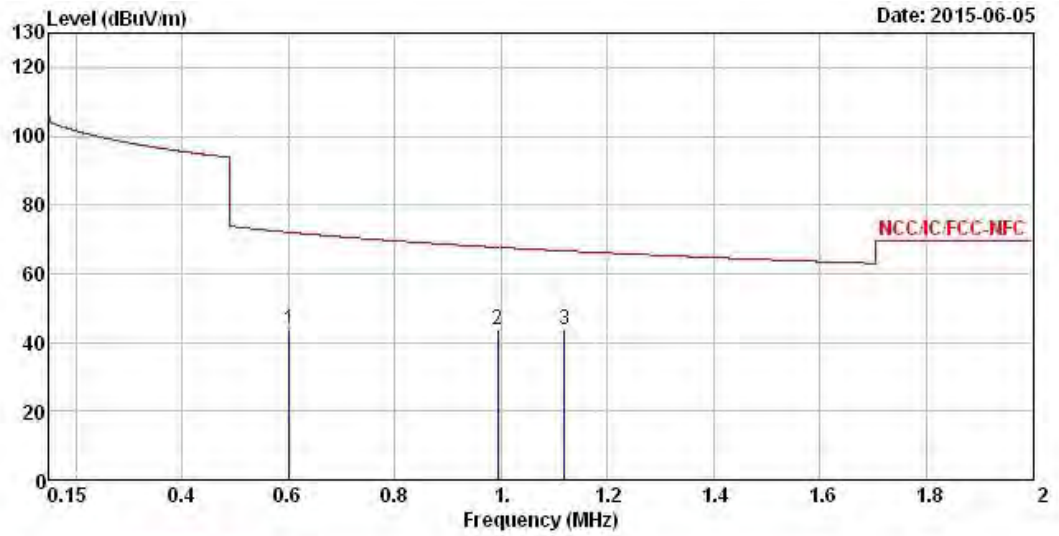
Transmitter Radiated Unwanted Emissions (9 kHz – 150 kHz)			
Modulation Mode	NFC-Read/Write	**Polarization**	H
Operating Mode	1		



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	0.047	53.15	-61.11	114.26	32.15	20.90	0.10	0.00	Peak
2	0.073	48.05	-62.32	110.37	26.95	21.00	0.10	0.00	Peak
3	0.110	45.80	-60.96	106.76	24.60	21.10	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.

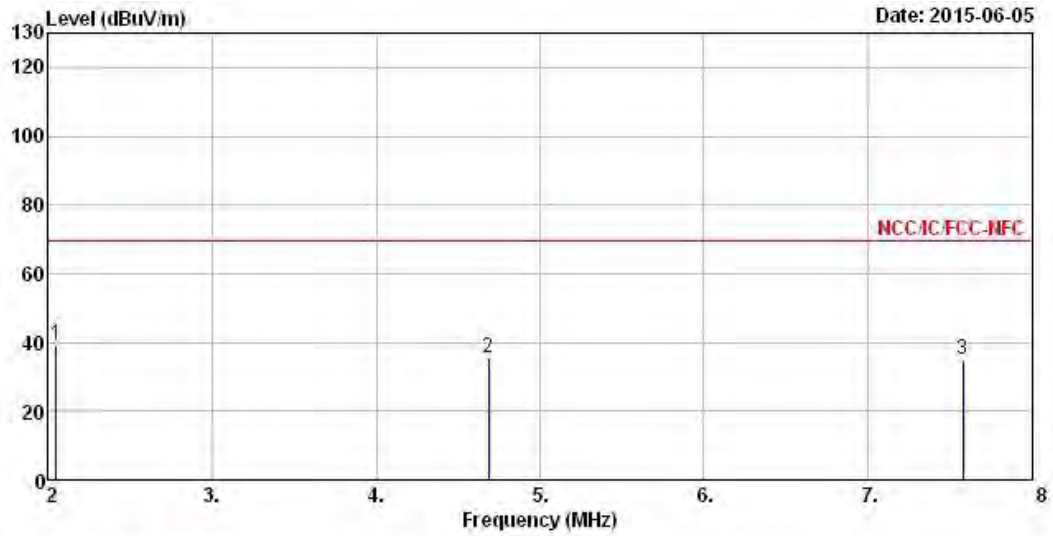
Transmitter Radiated Unwanted Emissions (150 kHz – 2 MHz)			
Modulation Mode	NFC-Read/Write	**Polarization**	H
Operating Mode	1		



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	0.601	43.84	-28.19	72.03	23.02	20.72	0.10	0.00	Peak
2	0.994	43.48	-24.19	67.67	22.58	20.80	0.10	0.00	Peak
3	1.119	43.44	-23.19	66.63	22.58	20.76	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.

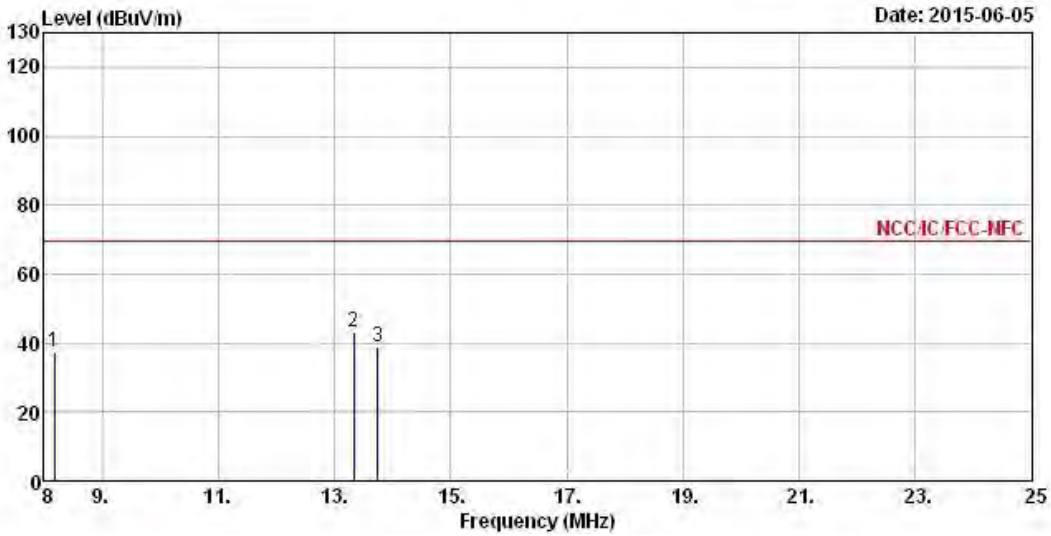
Transmitter Radiated Unwanted Emissions (2 MHz – 8 MHz)			
Modulation Mode	NFC-Read/Write	**Polarization**	H
Operating Mode	1		



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2.048	39.36	-30.18	69.54	18.73	20.43	0.20	0.00	Peak
2	4.688	35.28	-34.26	69.54	14.16	20.78	0.34	0.00	Peak
3	7.580	34.84	-34.70	69.54	13.29	21.11	0.44	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.

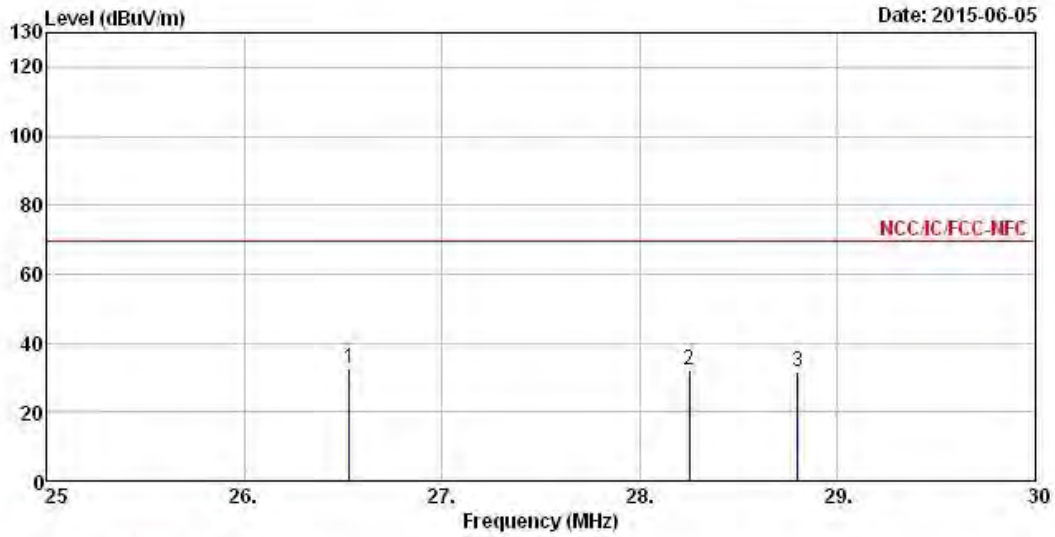
Transmitter Radiated Unwanted Emissions (8 MHz – 25 MHz)			
Modulation Mode	NFC-Read/Write	**Polarization**	H
Operating Mode	1		



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8.170	37.21	-32.33	69.54	15.62	21.15	0.44	0.00	Peak
2	13.338	43.13	-26.41	69.54	21.19	21.37	0.57	0.00	Peak
3	13.746	38.90	-30.64	69.54	16.94	21.37	0.59	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		

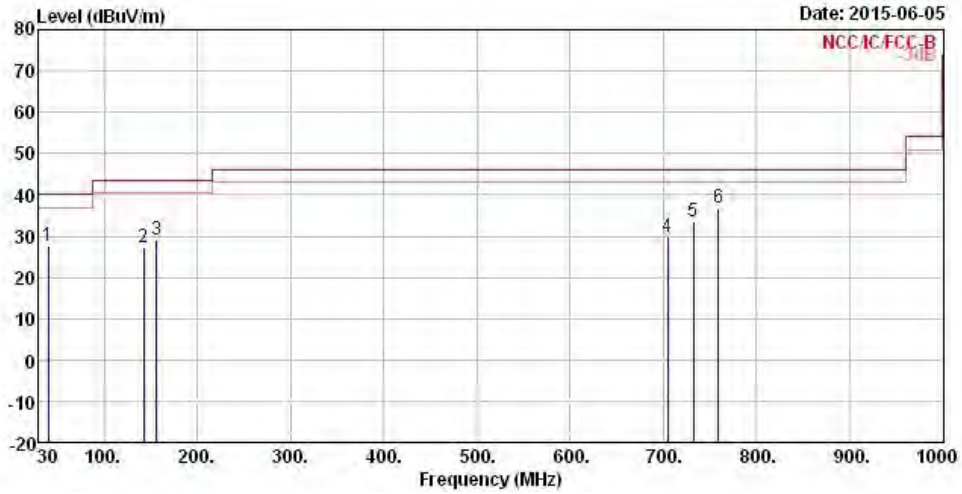


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	26.530	32.45	-37.09	69.54	10.01	21.63	0.81	0.00	Peak
2	28.250	32.23	-37.31	69.54	9.75	21.67	0.81	0.00	Peak
3	28.800	31.69	-37.85	69.54	9.19	21.68	0.82	0.00	Peak

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.

3.4.6 Transmitter Radiated Unwanted Emissions (Above 30MHz)

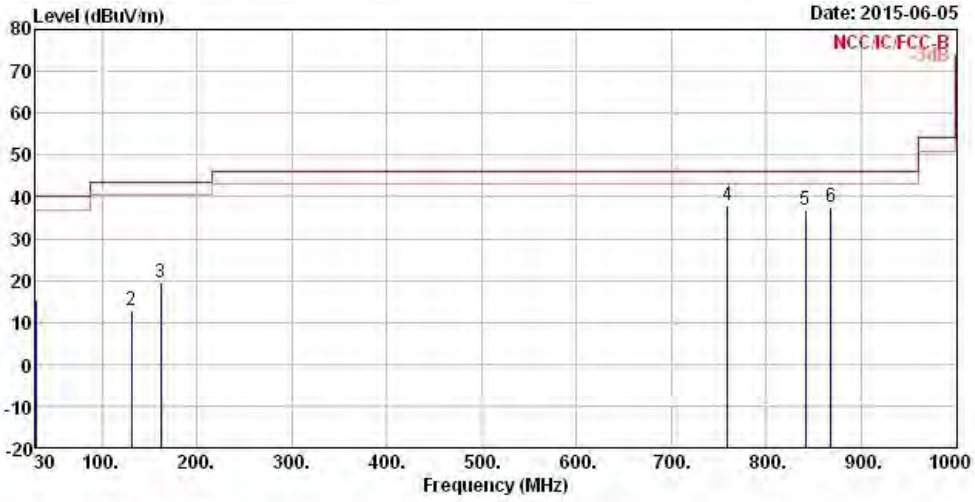
Transmitter Radiated Unwanted Emissions			
Modulation Mode	NFC-Read/Write	**Polarization**	V
Operating Mode	1		



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	39.700	27.77	-12.23	40.00	41.57	12.72	1.02	27.54	Peak
2	142.520	27.26	-16.24	43.50	41.64	10.82	1.98	27.18	Peak
3	156.100	28.95	-14.55	43.50	44.30	9.72	2.06	27.13	Peak
4	705.120	29.72	-16.28	46.00	34.48	18.58	4.57	27.91	Peak
5	732.280	33.59	-12.41	46.00	37.54	19.31	4.62	27.88	Peak
6	759.440	36.76	-9.24	46.00	40.50	19.39	4.71	27.84	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			
Modulation Mode	NFC-Read/Write	**Polarization**	H
Operating Mode	1		



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	30.000	15.38	-24.62	40.00	24.19	17.94	0.82	27.57	Peak
2	130.880	12.97	-30.53	43.50	26.70	11.61	1.88	27.22	Peak
3	161.920	19.42	-24.08	43.50	34.86	9.57	2.10	27.11	Peak
4	759.440	38.04	-7.96	46.00	41.78	19.39	4.71	27.84	Peak
5	840.920	36.88	-9.12	46.00	39.78	19.89	4.93	27.72	Peak
6	868.080	37.42	-8.58	46.00	39.89	20.18	5.02	27.67	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.

3.5 Frequency Stability

3.5.1 Frequency Stability Limit

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

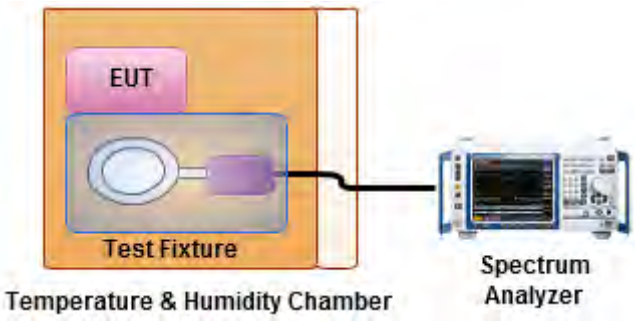
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method	
☒	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.

3.5.4 Test Setup

Frequency Stability


3.5.5 Test Result of Frequency Stability

Test date: Jun. 09, 2015		Frequency Stability Result
Power Level	1	Frequency Stability Max. Deviation Limit < 100 ppm
Condition	Freq. (MHz)	10 min
$T_{20°C}$Vmax	13.56074	54.57
$T_{20°C}$Vmin	13.56074	54.57
$T_{50°C}$Vnom	13.56070	51.62
$T_{40°C}$Vnom	13.56070	51.62
$T_{30°C}$Vnom	13.56070	51.62
$T_{20°C}$Vnom	13.56074	54.57
$T_{10°C}$Vnom	13.56080	59.00
$T_{0°C}$Vnom	13.56082	60.47
$T_{-10°C}$Vnom	13.56084	61.95
$T_{-20°C}$Vnom	13.56086	63.42
Result		Complied
Note 1: Measure at 85 % [Vmin] and 115 % [Vmax] of the nominal voltage [Vnom]. 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	Apr. 15, 2015	AC Conduction
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 22, 2015	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

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP 40	100004	9KHz~40GHz	Feb. 25, 2015	RF Conducted
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100℃	Nov. 25, 2014	RF Conducted
DC Power Source	G.W.	GPS-3030DD	GEN865896	DC 0V ~ 30V	Jan. 16, 2015	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. 29, 2014	Radiated Emission
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	May 11, 2015	Radiated Emission
Spectrum	R&S	FSP40	100004	9kHz ~ 40GHz	Apr. 02, 2015	Radiated Emission
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 20, 2014	Radiated Emission
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 15, 2014	Radiated Emission
Turn Table	EM Electronics	EM Electronics	060615	0 ~ 360 degree	N/A	Radiated Emission
Antenna Mast	MF	MF-7802	MF780208179	1 ~ 4 m	N/A	Radiated Emission

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	Feb. 02, 2015	Radiated Emission

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