



FCC Test Report

Equipment : Residential Fire and Burglar Control Unit
Brand Name : technicolor
Model No. : DLC-200C US
FCC ID : D6XDLC200
Standard : 47 CFR FCC Part 15.249
Operating Band : 902 MHz – 928 MHz
FCC Classification : DXX
Applicant : TECOM CO., LTD.
No. 23 R&D Road 2, Science-Based Industrial Park,
Hsin-Chu Taiwan
Manufacturer : Global Brands Manufacture (DongGuan) Ltd.
Yue Yuan Industrial Estate, Huang Jiang Zhen,
DongGuan City, GuangDong Province, China

The product sample received on Apr. 30, 2015 and completely tested on May 12, 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:

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]:0.1893810MHz 29.95 (Margin 24.11dB) - AV 51.33 (Margin 12.73dB) - QP	FCC 15.207	Complied
3.2	15.215(c)	Emission Bandwidth	0.1266 MHz; fall in band	Information only	Complied
3.3	15.249(a)	Fundamental Emissions	[dBuV/m at 3m]: 93.92(Margin 0.08dB) - quasi peak	[dBuV/m at 3m]: quasi peak: 94	Complied
3.4	15.249(a)/(d)	Transmitter Radiated Unwanted Emissions	[dBuV/m at 3m]:35.82MHz 36.77 (Margin 3.23dB) - QP	Harmonics: 54 dBuV/m@3m Other band: 50 dB or FCC 15.209, whichever is the lesser attenuation.	Complied



Revision History





1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information				
Frequency Range (MHz)	Modulation	Ch. Frequency (MHz)	Total Channel Number	Fundamental Field Strength (dBuV/m)
902-928	FSK	911.78 ~ 919.78	4	93.92

Note 1: Field strength performed quasi peak level at 3m.

1.1.2 Antenna Information

Antenna Category	
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input type="checkbox"/>	External antenna (dedicated antennas) ; Unique antenna connector

1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
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

Operated Mode for Worst Duty Cycle	
Test Signal Duty Cycle (x)	Duty Cycle Correction Factor [dB] – (20 log x)
<input checked="" type="checkbox"/> 5.32%	12.74
If worst duty < 100%, average emission = peak emission + 20 log x	

Note 1: RF Output Power Plots w/o Duty Factor

1.1.5 EUT Operational Condition

Supply Voltage	<input checked="" type="checkbox"/> AC mains	<input checked="" type="checkbox"/> DC	
Type of DC Source	<input type="checkbox"/> Internal DC supply	<input checked="" type="checkbox"/> From PoE	<input checked="" type="checkbox"/> Battery



1.2 Support Equipment

Support Equipment - RF Conducted			
No.	Equipment	Brand Name	Model Name
1	Notebook	Dell	E5540

Support Equipment - Radiated Emission & AC Conduction			
No.	Equipment	Brand Name	Model Name
1	PoE	PHIHONG	POE31U-1AT

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

1.4 Testing Location Information

Testing Location				
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1 st 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: FCC 636805				
Test Condition	Test Site No.	Test Engineer	Test Environment	
AC Conduction	CO04-HY	Zeus	20 °C / 55 %	
RF Conducted	TH01-HY	Shiming	23.4 °C / 62 %	
Radiated Emission	03CH03-HY	Terry	23.3 °C / 52 %	



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	±2.3 dB	
Emission bandwidth, 6dB bandwidth	±0.6 %	
RF output power, conducted	±0.1 dB	
Power density, conducted	±0.6 dB	
Unwanted emissions, conducted	9 – 150 kHz	±0.4 dB
	0.15 – 30 MHz	±0.4 dB
	30 – 1000 MHz	±0.6 dB
	1 – 18 GHz	±0.5 dB
	18 – 40 GHz	±0.5 dB
	40 – 200 GHz	N/A
All emissions, radiated	9 – 150 kHz	±2.5 dB
	0.15 – 30 MHz	±2.3 dB
	30 – 1000 MHz	±2.6 dB
	1 – 18 GHz	±3.6 dB
	18 – 40 GHz	±3.8 dB
	40 – 200 GHz	N/A
Temperature	±0.8 °C	
Humidity	±5 %	
DC and low frequency voltages	±0.9 %	
Time	±1.4 %	
Duty Cycle	±0.6 %	



2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

Modulation Used for Conformance Testing	
Test Mode	Field Strength (dBuV/m at 3 m)
AFM-Transmit	93.92

2.2 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration	
Test Mode	Test Channel Frequencies (MHz)
AFM-Transmit	911.78-(F1), 919.78-(F2)

2.3 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter		
Frequency	911.78 MHz	919.78 MHz
Power Setting	0x53	0x53

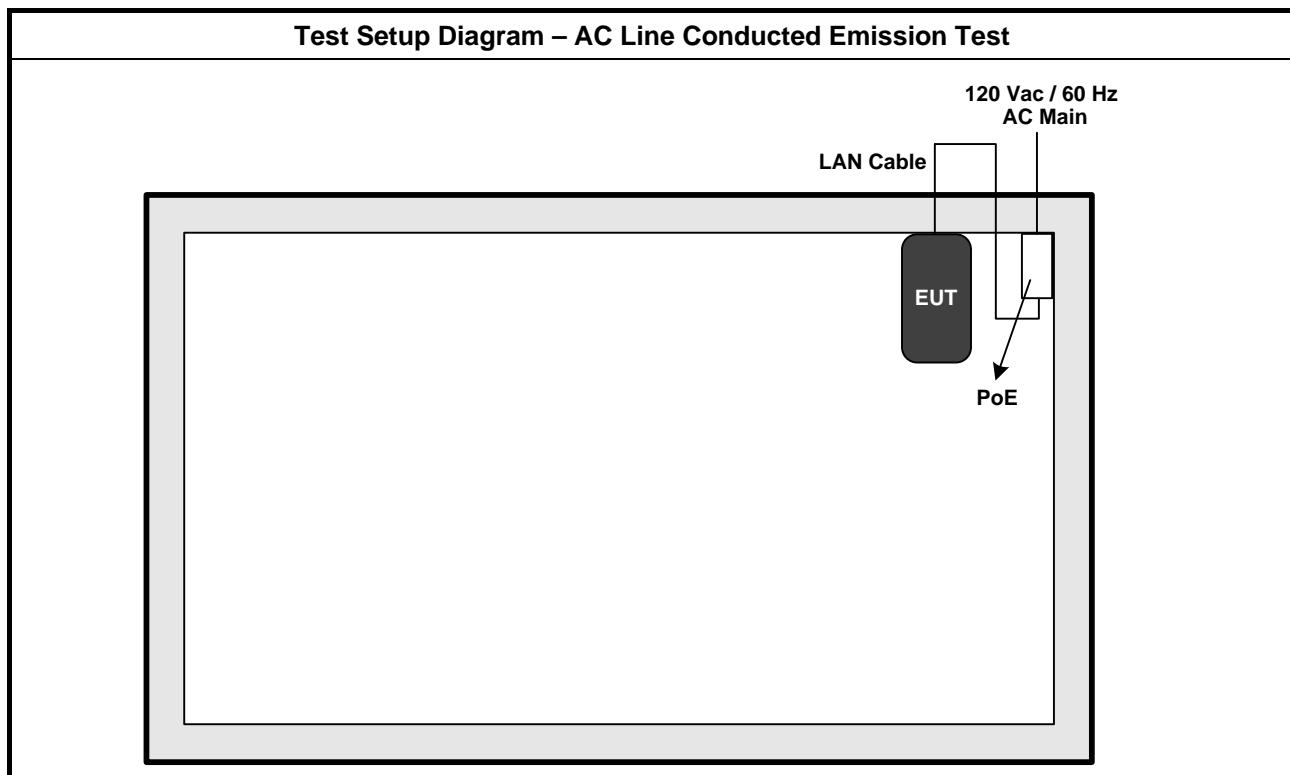


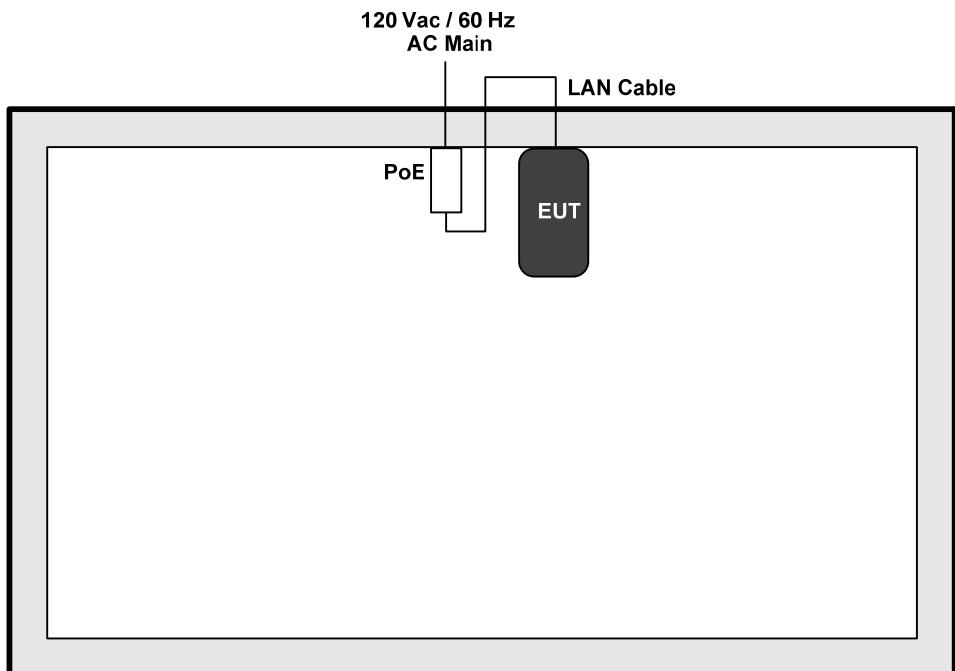
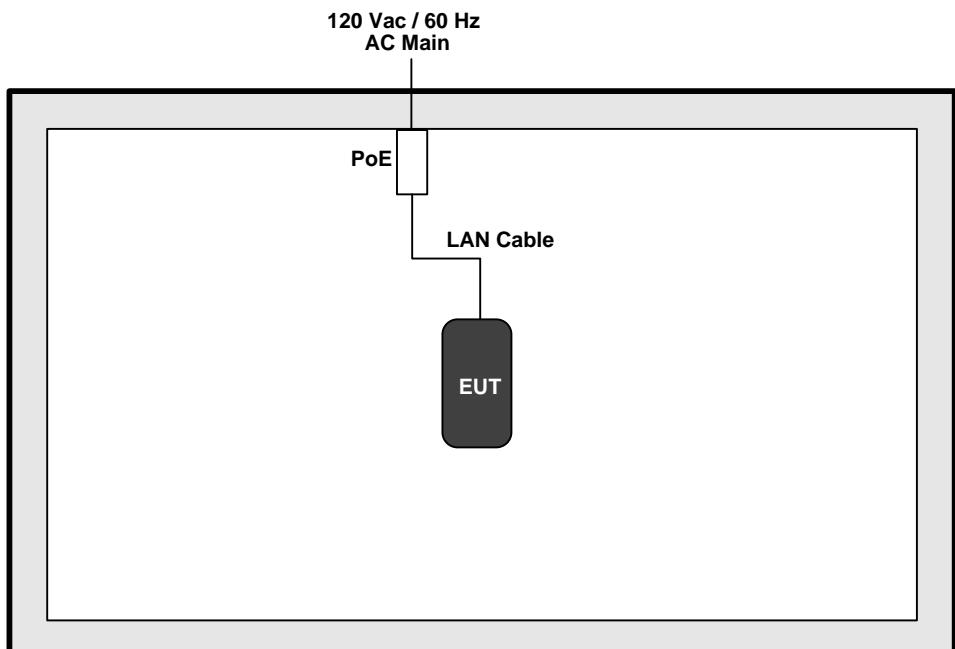
2.4 The Worst Case Measurement Configuration

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 (120Vac / 60Hz)
Operating Mode	Operating Mode Description
1	PoE & Transmit

The Worst Case Mode for Following Conformance Tests									
Tests Item	Emission Bandwidth, Fundamental Emissions, Radiated Unwanted Emissions								
Test Condition	Radiated measurement								
User Position	<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.								
Operating Mode	1. PoE & Transmit								
Test Mode	AFM-Transmit								
Orthogonal Planes of EUT	<table><thead><tr><th></th><th>X Plane</th><th>Y Plane</th><th>Z Plane</th></tr></thead><tbody><tr><td></td><td></td><td></td><td></td></tr></tbody></table>		X Plane	Y Plane	Z Plane				
	X Plane	Y Plane	Z Plane						
Worst Planes of EUT	V								

2.5 Test Setup Diagram



Test Setup Diagram - Radiated Test Below 1GHz**Test Setup Diagram - Radiated Test Above 1GHz**

3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

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

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

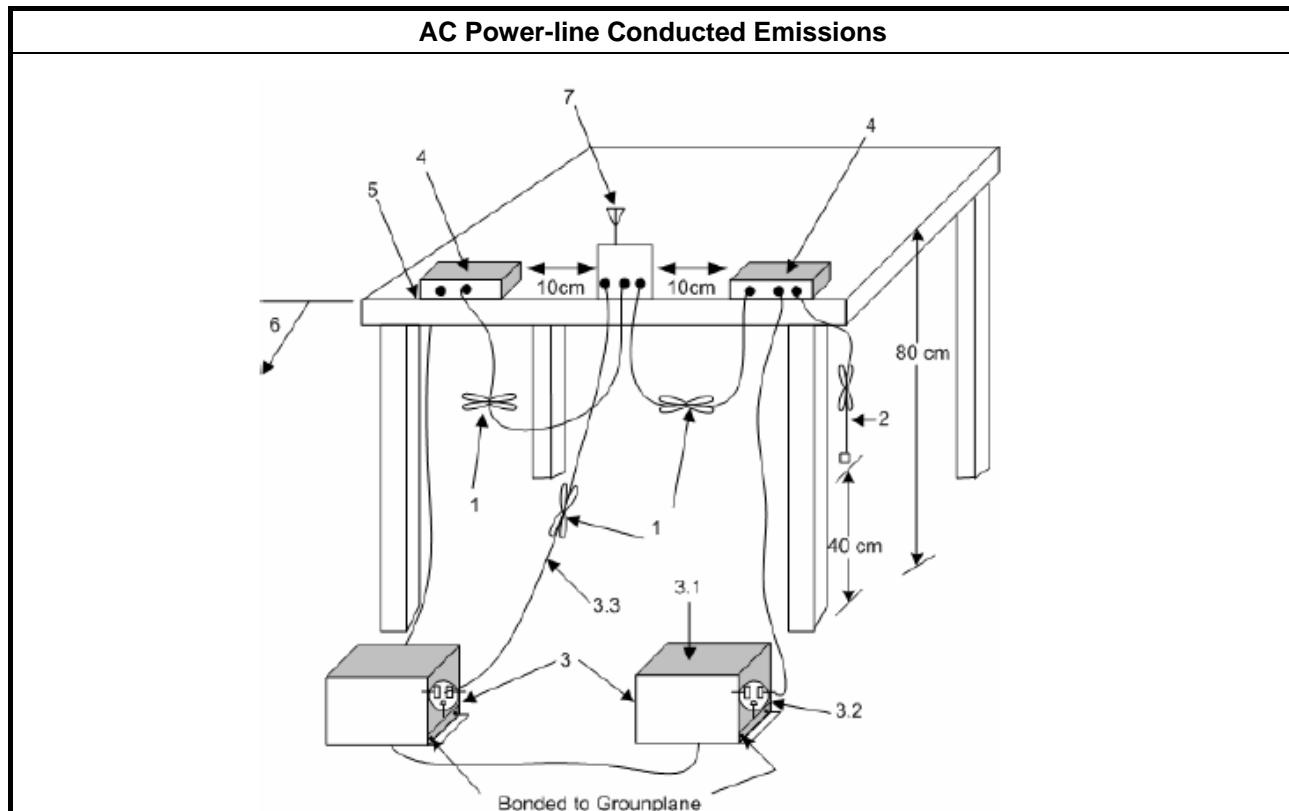
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

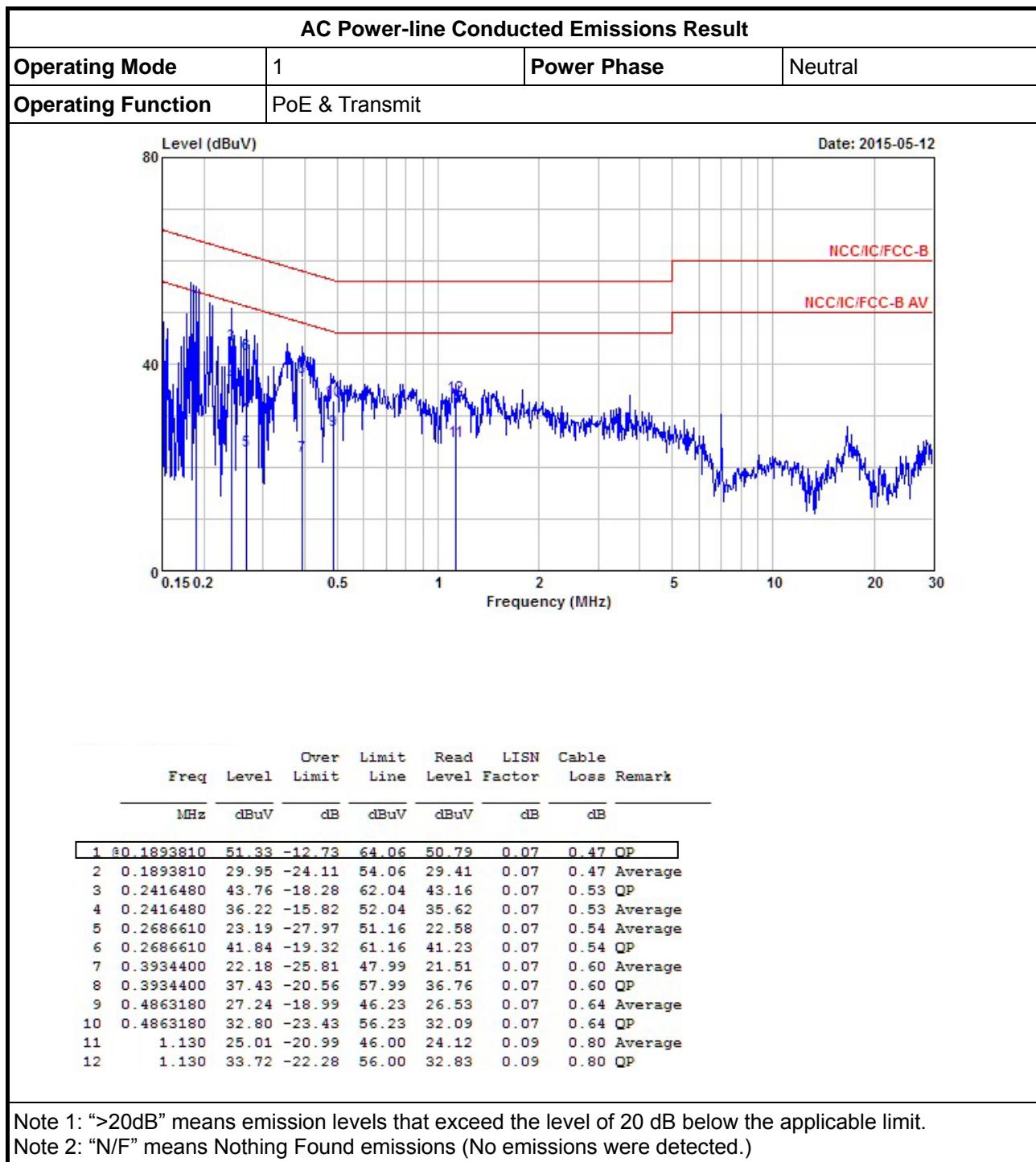
Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

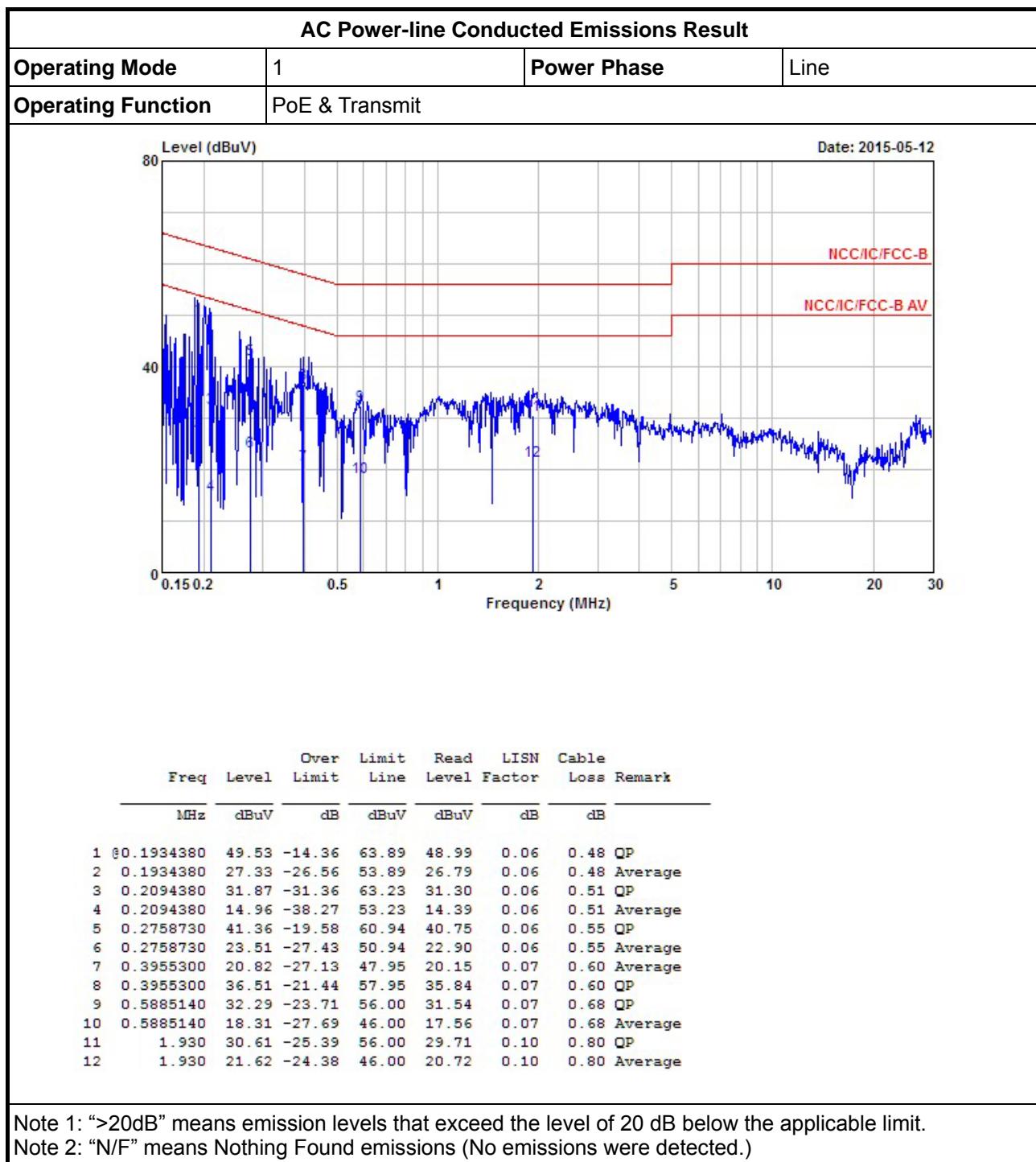
3.1.4 Test Setup





3.1.5 Test Result of AC Power-line Conducted Emissions





3.2 Emission Bandwidth

3.2.1 Emission Bandwidth Limit

Emission Bandwidth Limit	
<input checked="" type="checkbox"/> Emission bandwidth falls completely within authorized band.	

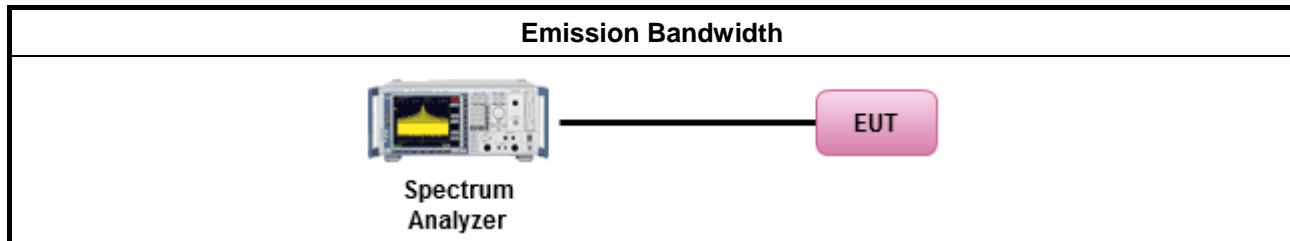
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

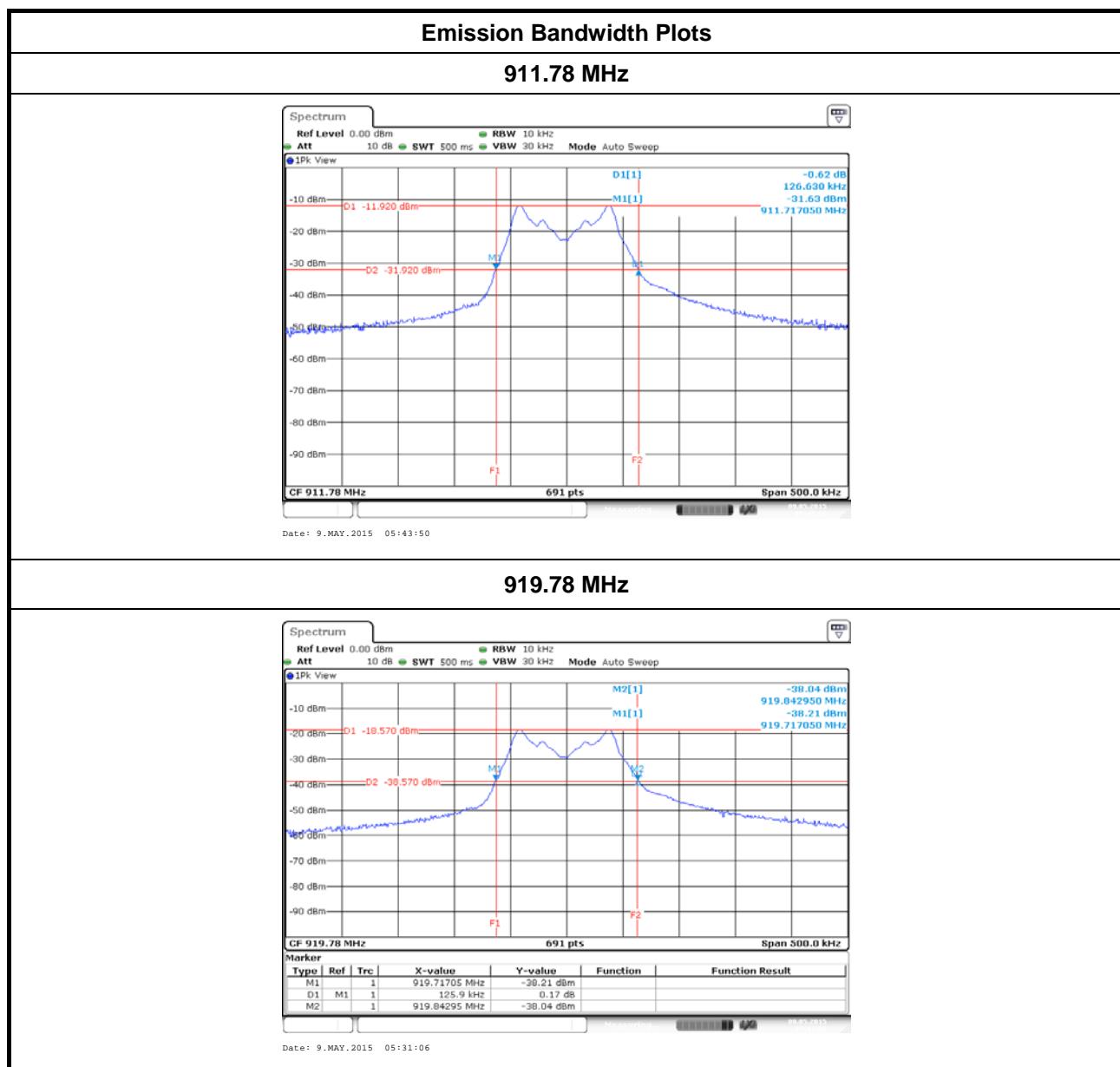
Test Method	
<input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.9.1 for 20 dB emission bandwidth and 99% occupied bandwidth measurement.	

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Emission Bandwidth Result					
Modulation Mode	Frequency (MHz)	99% Bandwidth (MHz)	F _L at 20dB BW (MHz)	F _H at 20dB BW (MHz)	20dB BW (MHz)
AFM-Transmit	911.78	0.1208	911.7171	-	0.1266
AFM-Transmit	919.78	0.1215	-	919.8429	0.1259
Limit		N/A	902	928	N/A
Result			Complied		



3.3 Fundamental Emissions

3.3.1 Fundamental Emissions Limit

Fundamental Emissions E-Field Strength Limit (3m)	
<input checked="" type="checkbox"/>	902-928 MHz Band: 94 dBuV/m (quasi peak)
<input type="checkbox"/>	2400-2483.5 MHz Band: 94 dBuV/m (average)
<input type="checkbox"/>	5725-5785 MHz Band: 94 dBuV/m (average)

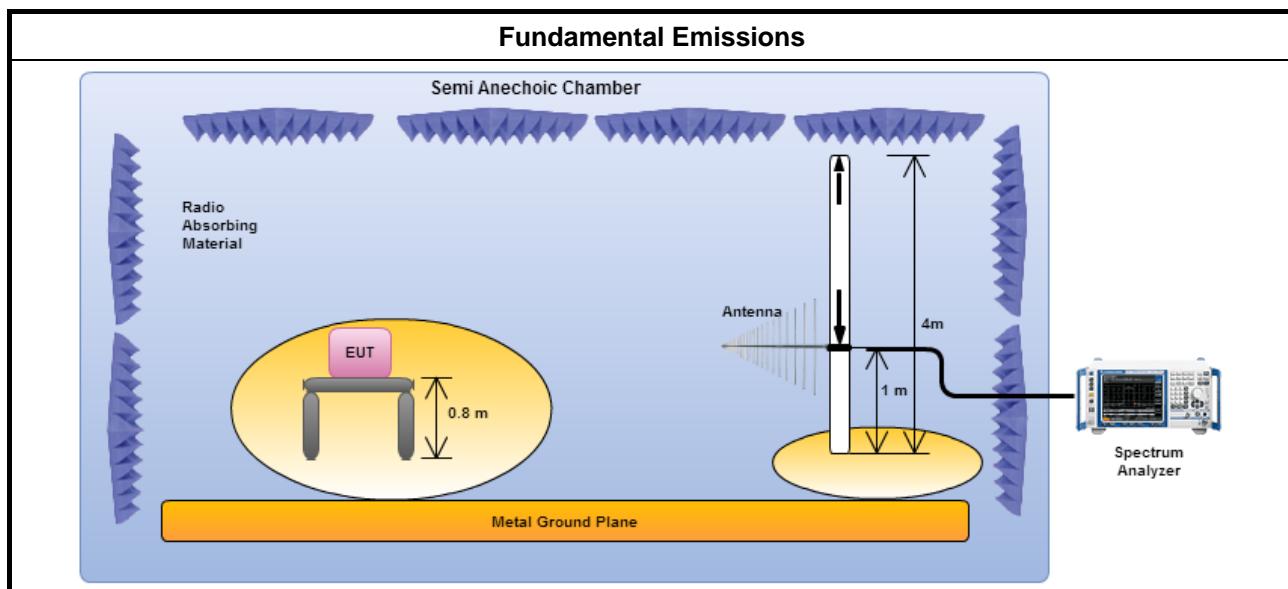
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle ≥ 100 or by duty cycle correction factor].
<input checked="" type="checkbox"/>	For the transmitter emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) – Duty cycle $\geq 100\%$.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions. Adjusted by a “duty cycle correction factor”, derived from $20\log(dwell\ time/100\ ms)$. Average emission = peak emission + $20\log(duty\ cycle)$.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions and test distance is 3m.

3.3.4 Test Setup





3.3.5 Test Result of Fundamental Emissions

Field Strength of Fundamental Emissions Result					
Modulation Mode	Frequency (MHz)	Fundamental (dBuV/m)@3m	Margin (dB)	Limit (dBuV/m)@3m	Type
AFM-Transmit	911.78	93.92	0.08	94	QP
AFM-Transmit	919.78	92.27	1.73	94	QP
Result		Complied			

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



3.4 Transmitter Radiated Unwanted Emissions

3.4.1 Transmitter Radiated Unwanted Emissions Limit

Transmitter Radiated Unwanted Emissions Limit	
Harmonics:	
<input checked="" type="checkbox"/> 54 dBuV/m (average)	
Other Unwanted Emissions:	
<input checked="" type="checkbox"/> 50 dB below the level of the fundamental or FCC 15.209, whichever is the lesser attenuation.	

3.4.2 Measuring Instruments

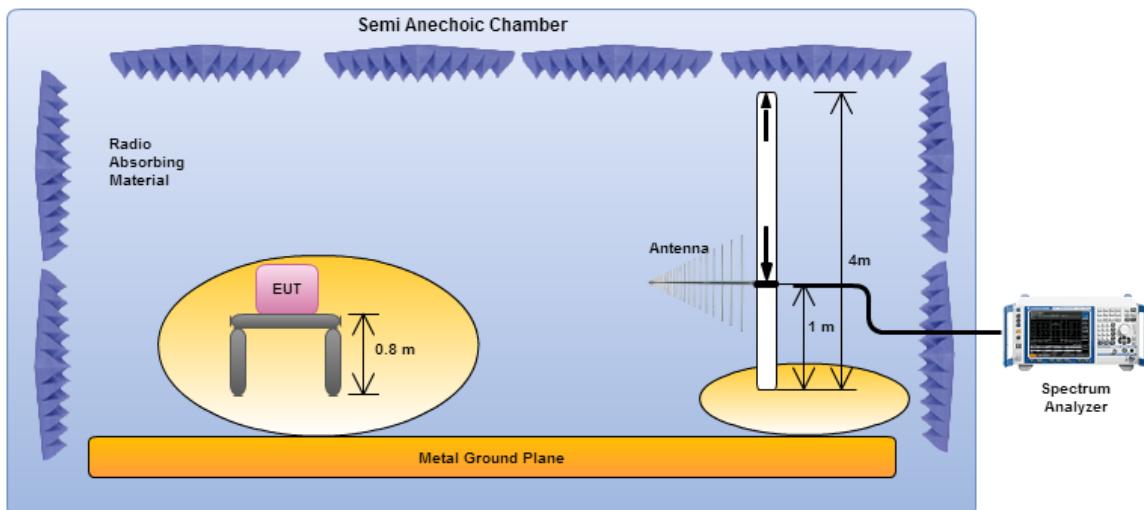
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method – General Information	
<input checked="" type="checkbox"/>	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).
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.2 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
<input checked="" type="checkbox"/>	For the transmitter unwanted emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) – Duty cycle \geq 100%.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions. Adjusted by a “duty cycle correction factor”, derived from $20\log(dwell\ time/100\ ms)$. Average emission = peak emission + $20\log(duty\ cycle)$.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
<input checked="" type="checkbox"/>	For the transmitter bandedge emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.2 for band-edge testing.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.3 for marker-delta method for band-edge measurements.
<input checked="" type="checkbox"/>	For radiated measurement.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1 GHz and test distance is 3m.
<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.

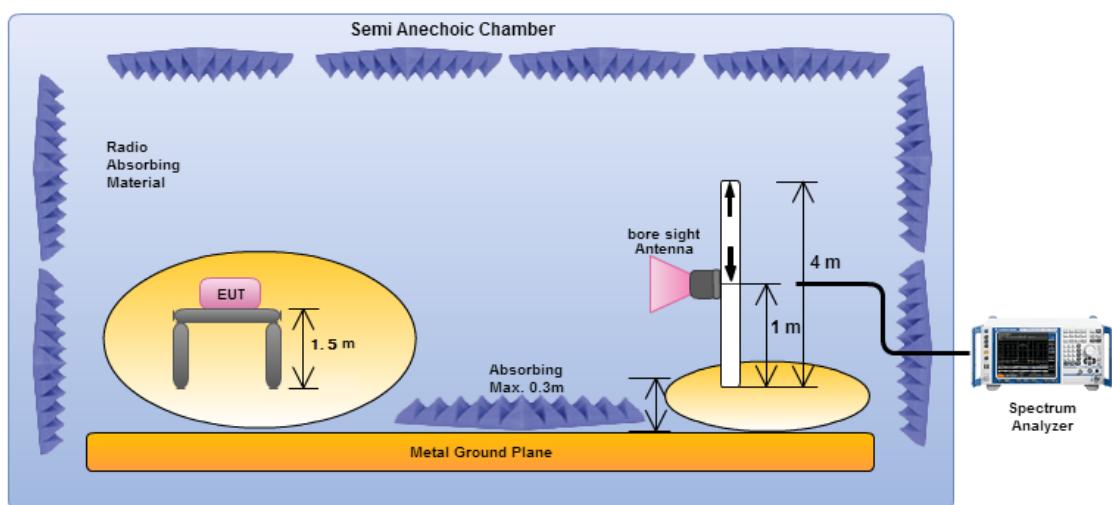
3.4.4 Test Setup

Transmitter Radiated Unwanted Emissions (below 1GHz)



Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna. Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna.

Transmitter Radiated Unwanted Emissions (Above 1GHz)



Electric field tests shall be performed in the frequency range of 1 GHz to 10th harmonic of highest fundamental frequency or 40 GHz using a calibrated horn antenna.

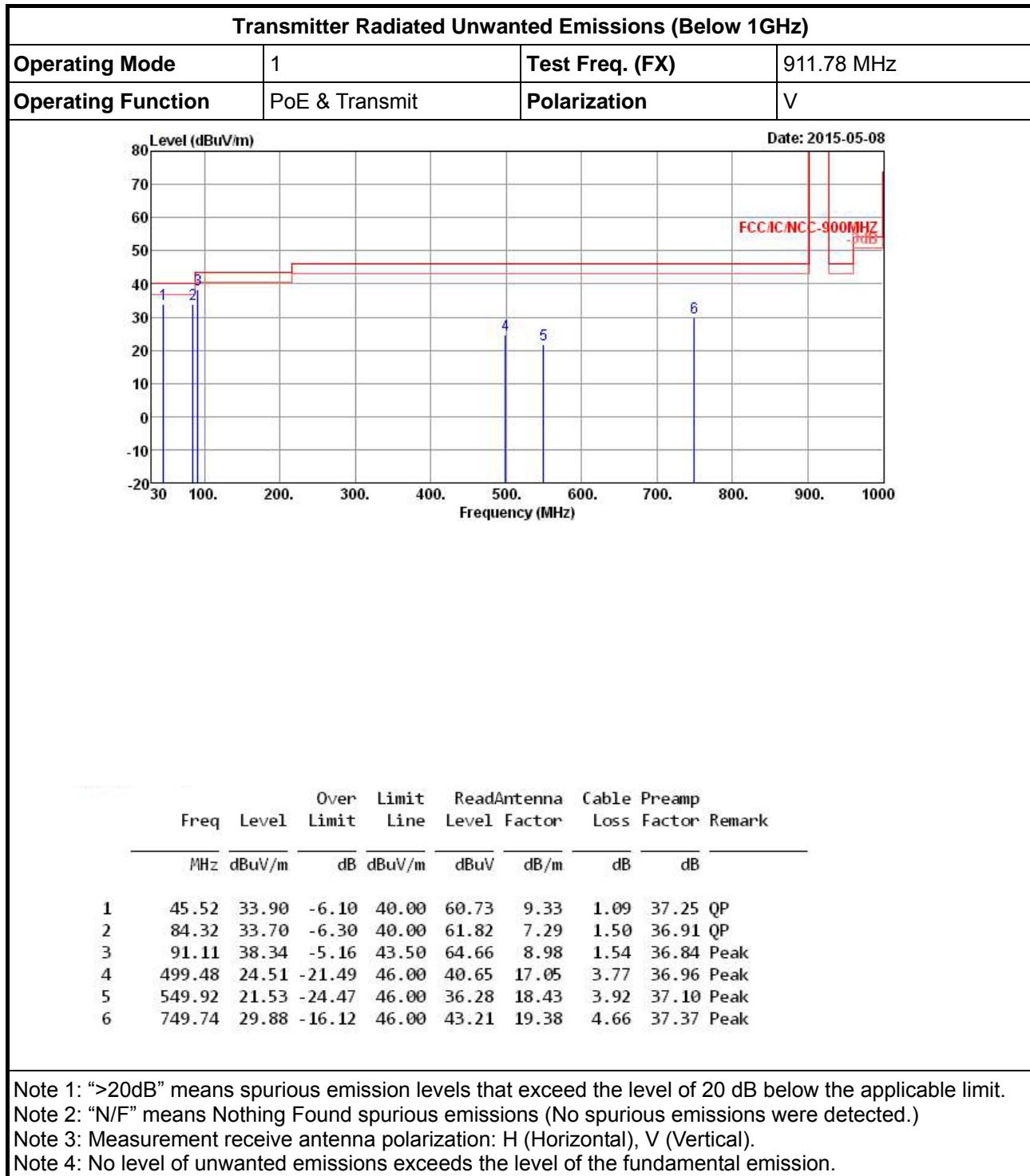
Note: FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 02, 2014.

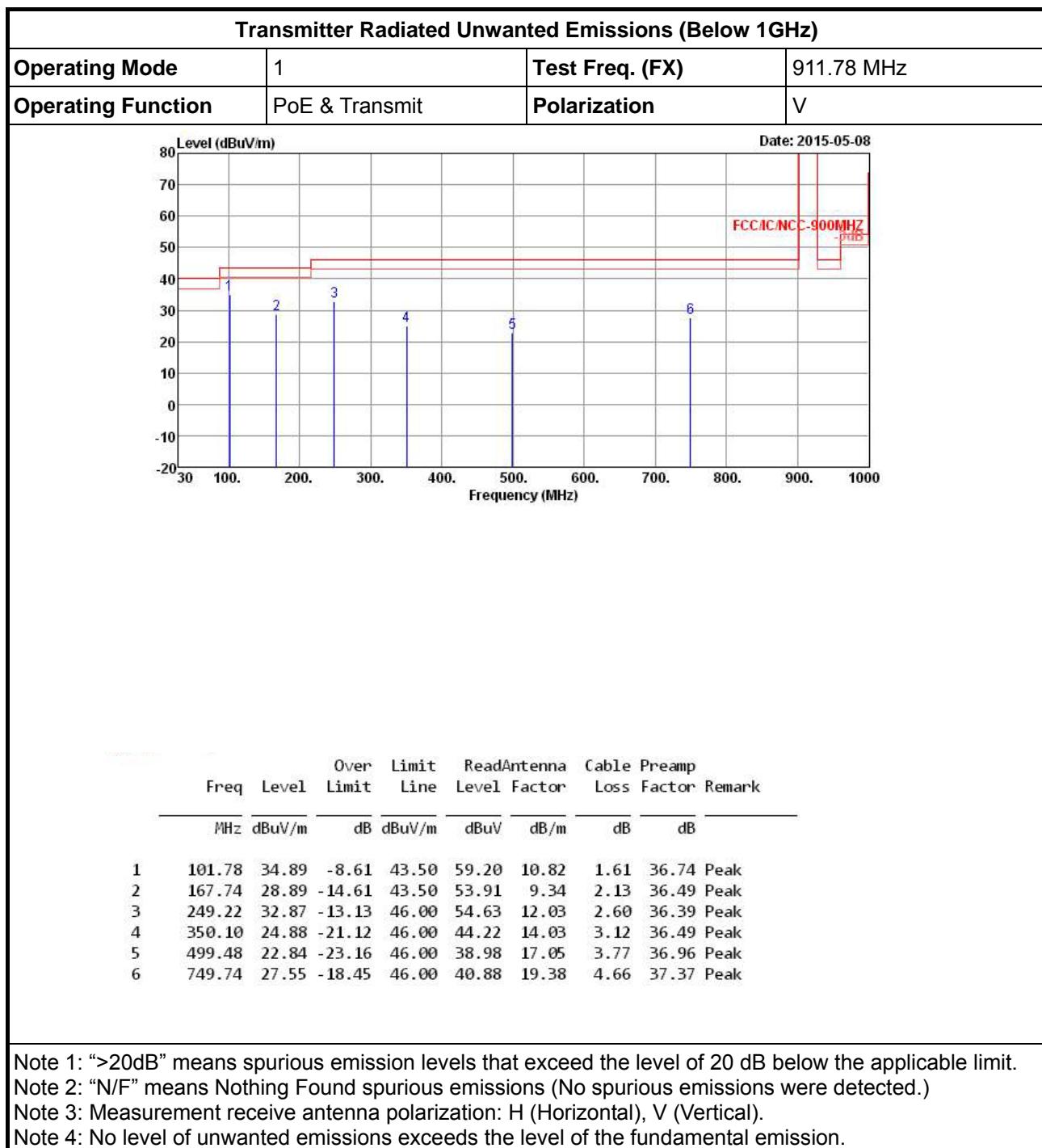
3.4.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

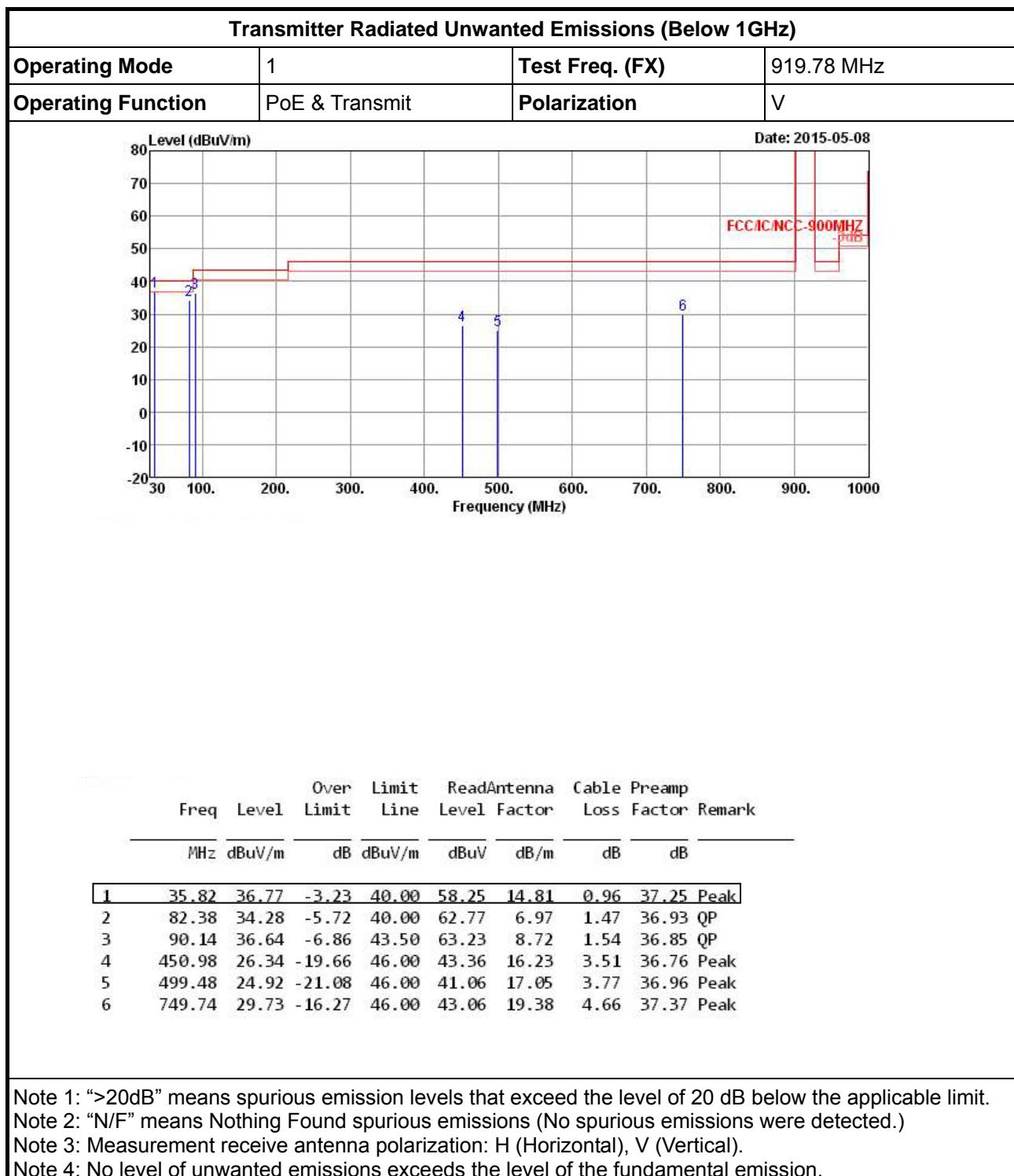
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

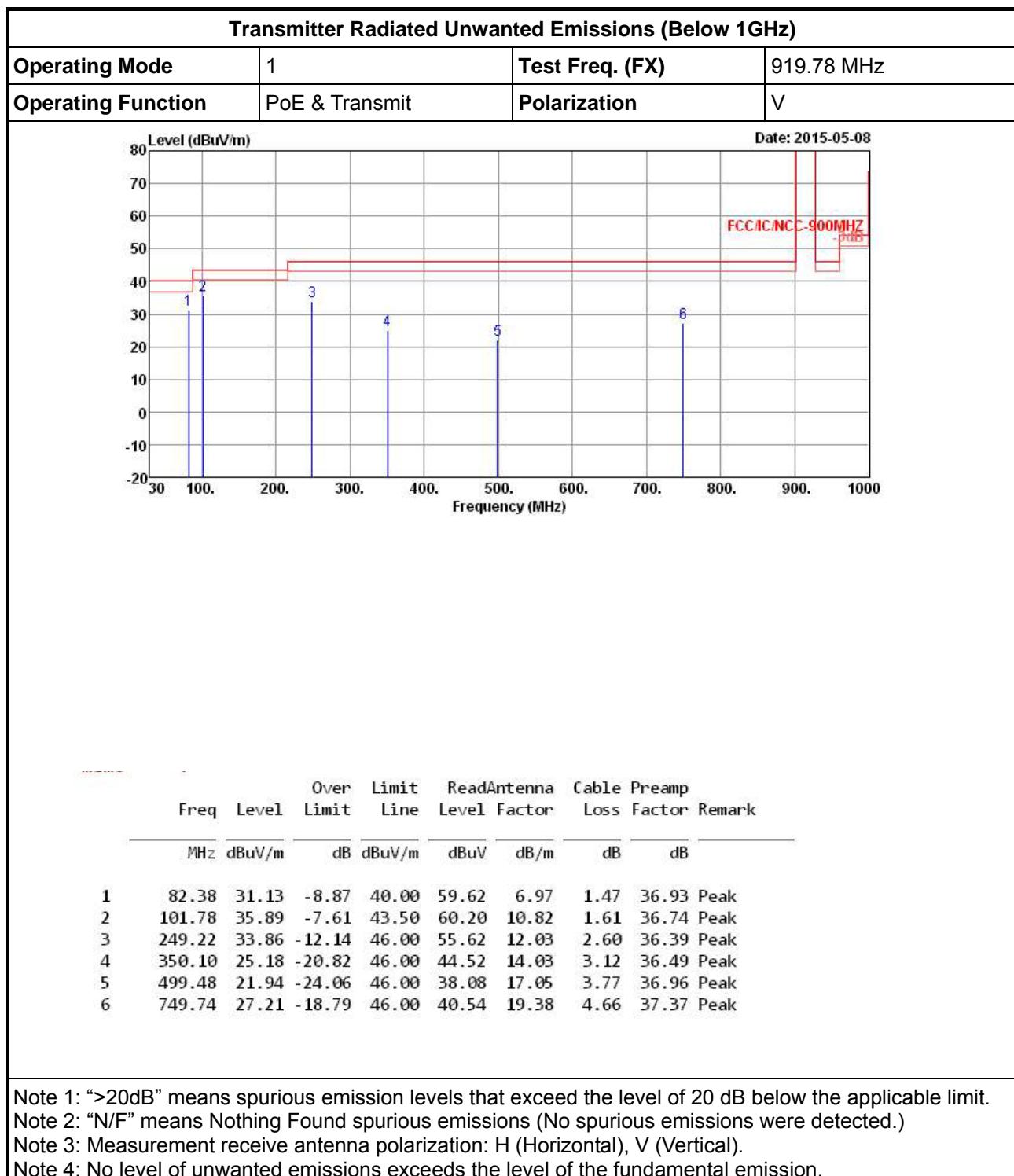


3.4.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)



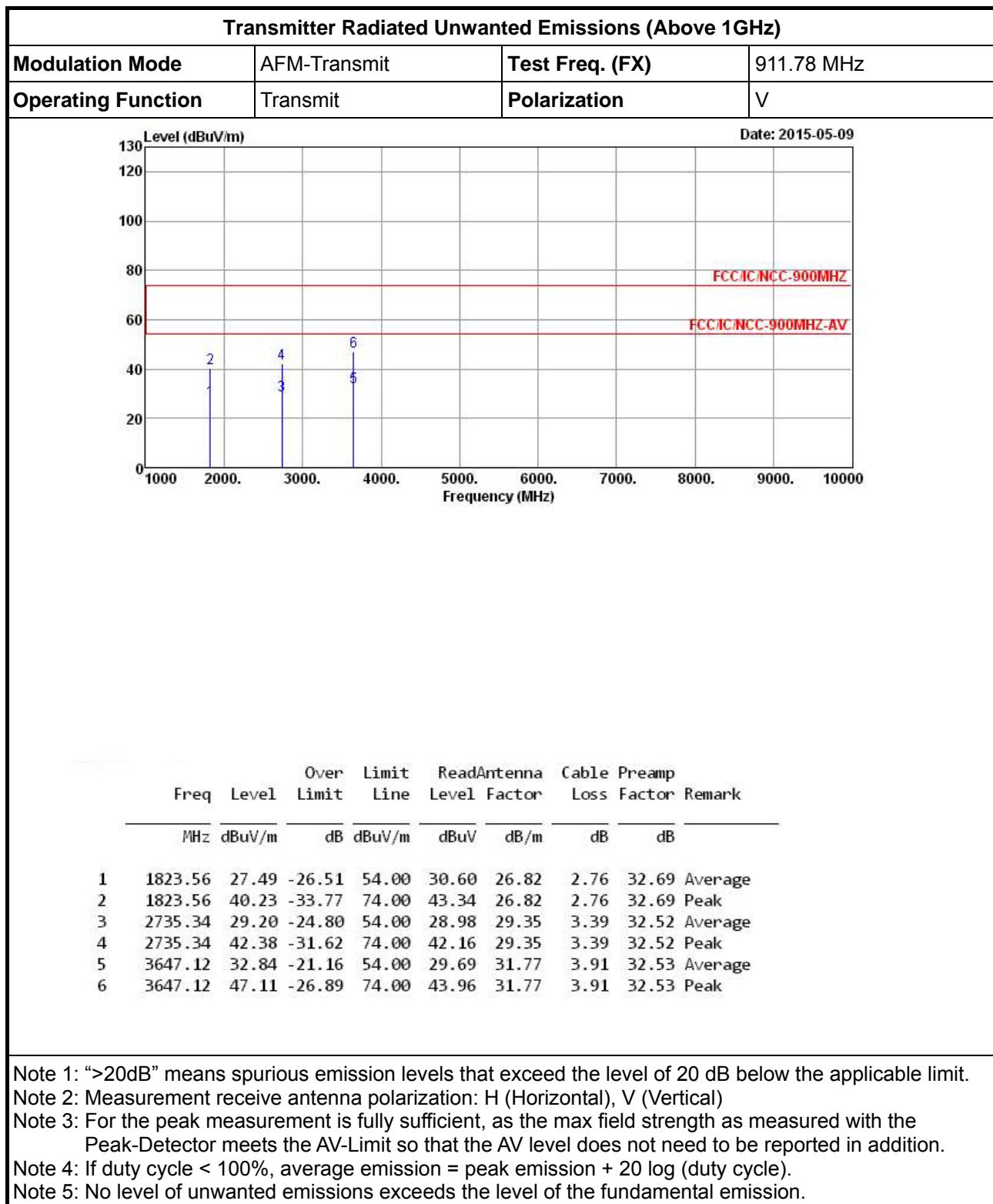


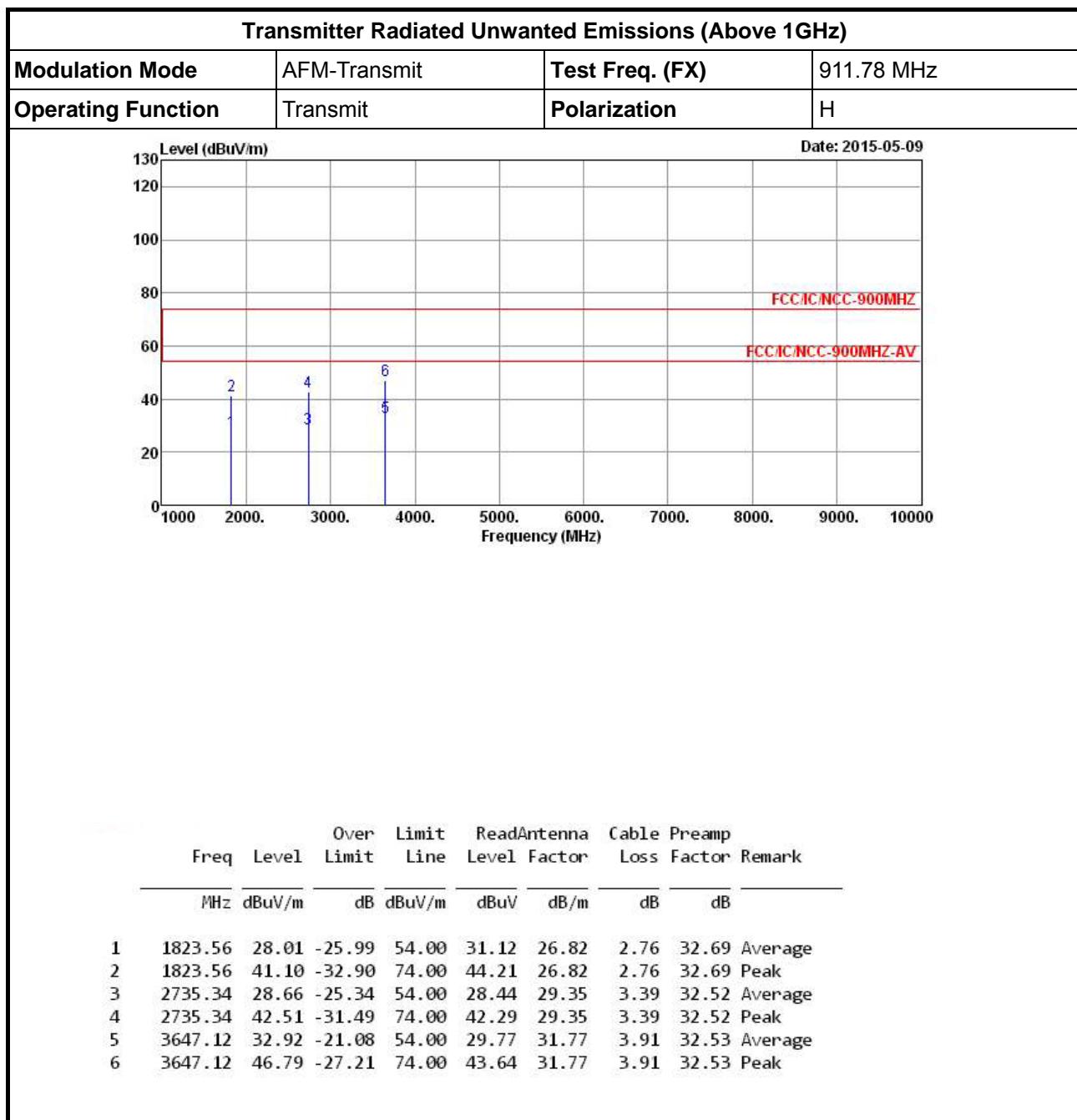






3.4.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)





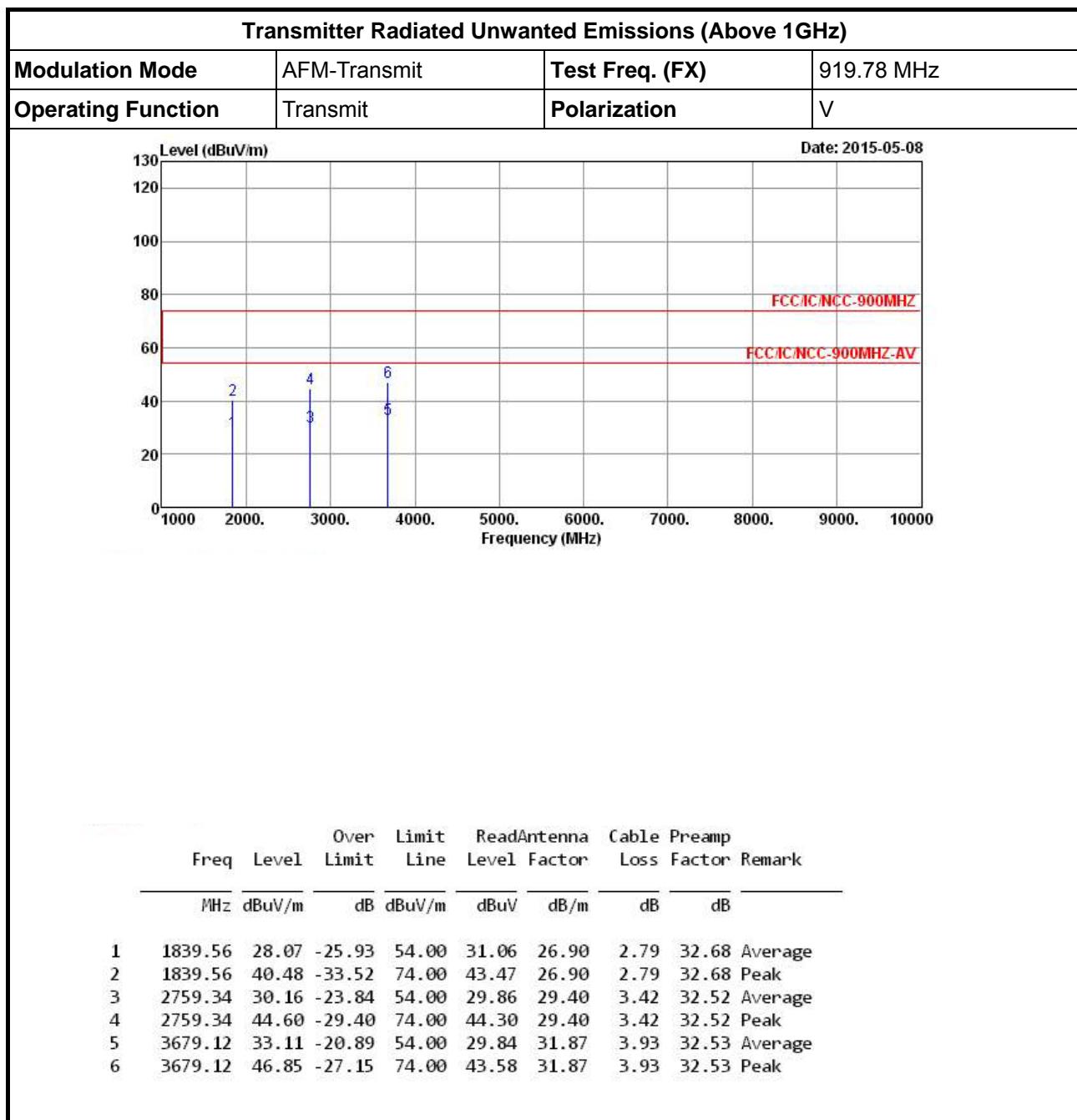
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 3: For the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 4: If duty cycle < 100%, average emission = peak emission + 20 log (duty cycle).

Note 5: No level of unwanted emissions exceeds the level of the fundamental emission.



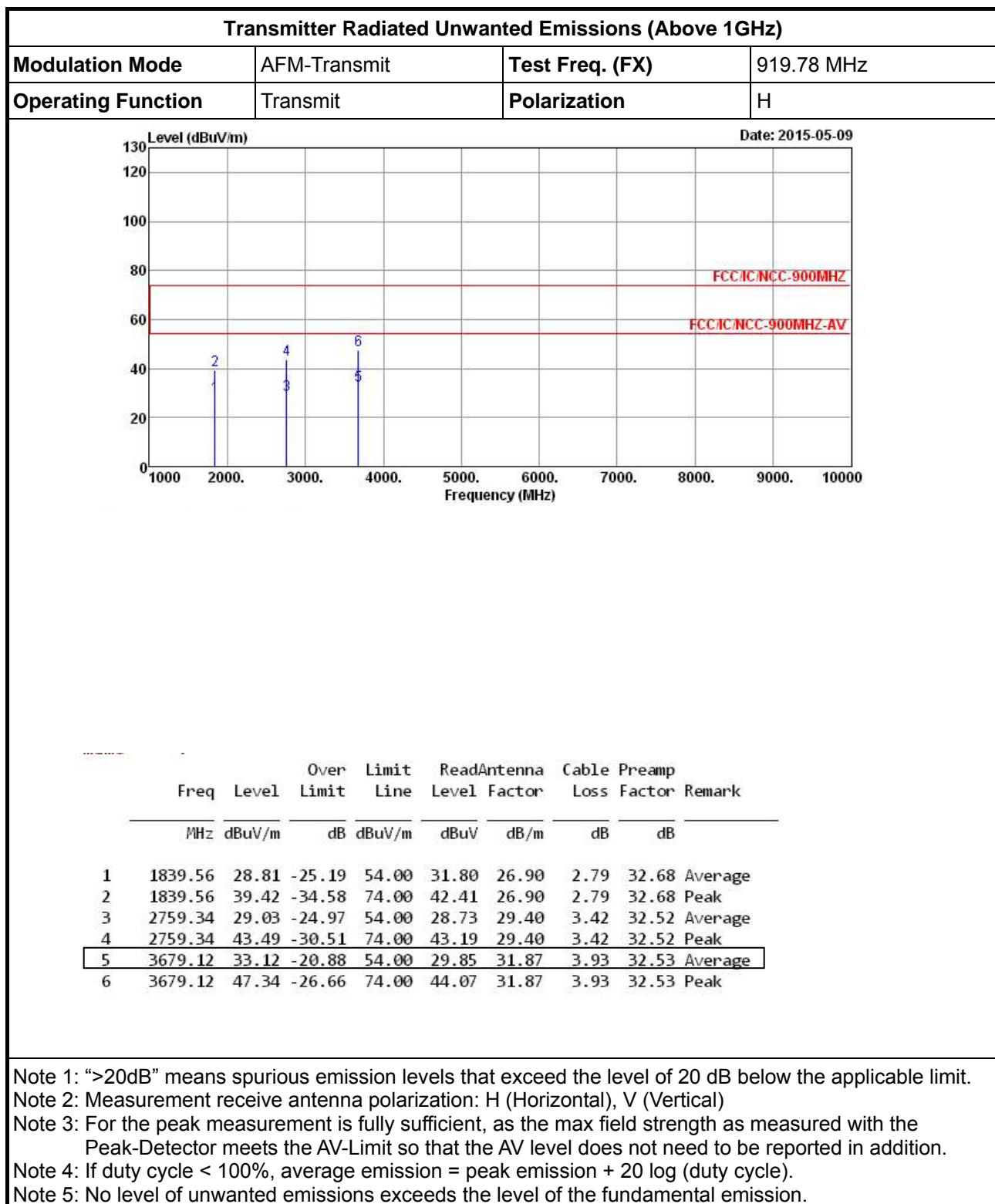
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 3: For the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 4: If duty cycle < 100%, average emission = peak emission + 20 log (duty cycle).

Note 5: No level of unwanted emissions exceeds the level of the fundamental emission.



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

Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 3: For the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 4: If duty cycle < 100%, average emission = peak emission + 20 log (duty cycle).

Note 5: No level of unwanted emissions exceeds the level of the fundamental emission.



3.4.8 Transmitter Radiated Bandedge Emissions

902-928 MHz Transmitter Radiated Bandedge Emissions									
Modulation Mode	Test Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Freq. (MHz) AV	Level (dBuV/m) AV	Limit (dBuV/m) AV	Pol.
AFM-Transmit	911.78	3	901.84	41.81	46	-	-	-	H
AFM-Transmit	919.78	3	928.00	43.03	46	-	-	-	H

Note 1: Measurement worst emissions of receive antenna polarization.



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	FSV 40	101500	9KHz~40GHz	May 05, 2015	RF Conducted
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jul. 15, 2014	RF Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 31, 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. 29, 2014	Radiation
Amplifier	EMC	EMC9135	980232	9kHz ~ 1GHz	Jan. 27, 2015	Radiation
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	Sep. 01, 2014	Radiation
Spectrum	R&S	FSP40	100004	9kHz ~ 40GHz	Apr. 02, 2015	Radiation
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 20, 2014	Radiation
Horn Antenna	ETS • LINDGREN	3115	6741	1GHz ~ 18GHz	Jul. 11, 2014	Radiation
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	18GHz ~ 40GHz	Jan. 27, 2015	Radiation
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 15, 2014	Radiation
RF Cable-high	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Dec. 12, 2014	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	9 kHz~30 MHz	Feb. 02, 2015	Radiation

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



SPORTON LAB.

FCC Test Report

Report No. : FR630406AA

Appendix A. Test Photos