

FCC Test Report

Equipment : LCD Tablet
Brand Name : Wacom
Model No. : DTH-2700
FCC ID : HV4DTH2700
Standard : 47 CFR FCC Part 15.209
Operating Band : 667kHz
FCC Classification : DCD
Applicant : Wacom Co., Ltd.
2-510-1, Toyonodai, Kazo-shi,
Saitama 349-1148 Japan

The product sample received on Oct. 09, 2014 and completely tested on Nov. 07, 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
1.1.3	15.203	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	[dBuV]:0.4214950MHz 28.47 (Margin 18.95dB) - AV 34.62 (Margin 22.80dB) - QP	FCC 15.207	Complied
3.2	15.209	Transmitter Radiated Emissions	[dBuV/m at 3m]:375.32MHz 40.64 (Margin 5.36dB) - PK	FCC 15.209	Complied

Revision History

[illegible]

1 General Description

1.1 Information

1.1.1 Manufacturer Information

Manufacturer	Wacom Co., Ltd. 2-510-1, Toyonodai, Kazo-shi, Saitama 349-1148 Japan
Factory 1	Qisda Corporation 157 & 159, Shan-Ying Road, Gueishan, Taoyuan 333, Taiwan
Factory 2	Qisda (Suzhou) Co., Ltd. 169, Zhujiang Road, New District, Suzhou, Jiangsu Province, P.R. China
Factory 3	Qisda Optronics (Suzhou) Co., Ltd. 169, Zhujiang Road, New District, Suzhou, Jiangsu 215129, P.R. China
Factory 4	Qisda Mexicana S.A. De C.V. Calzada Venustiano Carranza, No. 88 Col. Plutarco Elias Calles, Mexocali B.C. Mexico C.P 21376 Mexico
Factory 5	Qisda Electronics (Suzhou) Co., Ltd. 169, Zhujiang Road, New District, Suzhou, Jiangsu 215129, P.R. China

1.1.2 RF General Information

RF General Information			
Frequency Range		667kHz	
Modulation	Ch. Frequency (kHz)	Channel Number	Field Strength (dBuV/m)
Array Coil Pointing	667	1	50.33
Note 1: Field strength performed peak level at 3m.			

1.1.3 Antenna Information

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

1.1.4 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.:
☐	Mounted radio (EUT intended for a limited host system) Host System : Brand Name / Model No.: FCC ID :
☐	Other:

1.1.5 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle	
☐	Operated normally mode for worst duty cycle
☒	Operated test mode for worst duty cycle
Test Signal Duty Cycle (x)	
☒	100.00%

1.1.6 EUT Operational Condition

Supply Voltage	☒ AC mains	☒ DC	
Type of DC Source	☐ From Battery	☒ External DC adapter	☒ From system

Note: The adapter and system supply voltage in the same time

1.2 Accessory and Support Equipment

Accessories Information				
Adapter	Brand Name	Adapter Technoloty	Model Name	STD-24050
	Power Rating	Input:AC 100~240V, 47~63Hz, 1.6A, Output: DC 24V, 5A		
Power Cord	Brand Name	Wacom	Model Name	SCD-A69-01
Digital Pen	Brand Name	Wacom	Model Name	KP-503E
USB Cable	Brand Name	Wacom	Model Name	STJ-A347
	Signal Line	0.3 meter, non-shielded cable, w/o ferrite core		
DVI to HDMI Cable	Brand Name	Wacom	Model Name	INF-A092
Mini-DP to DP Cable	Brand Name	Wacom	Model Name	INF-A093
USB 3.0 Cable	Brand Name	Wacom	Model Name	STJ-A341
DisplayPort Cable	Brand Name	Wacom	Model Name	STJ-A343
HDMI Cable	Brand Name	Wacom	Model Name	STJ-A344
LCD Panel	Brand Name	AUO	Model Name	P270DAN01.0
Wireless Controller	Brand Name	Wacom	Model Name	EKR-100
Wireless Receiver	Brand Name	Wacom	Model Name	INF-A091

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

Support Equipment - AC Conduction and Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5530	R33002

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				
☒	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 Condition		Test Site No.	Test Engineer	Test Environment
AC Conduction		CO04-HY	Zeus	24°C / 47%
Radiated Emission		03CH03-HY	Allen	26.2°C / 48%

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 Mode	Field Strength (dBuV/m at 3m)
Array Coil Pointing	50.33

2.2 Test Channel Frequencies Configuration

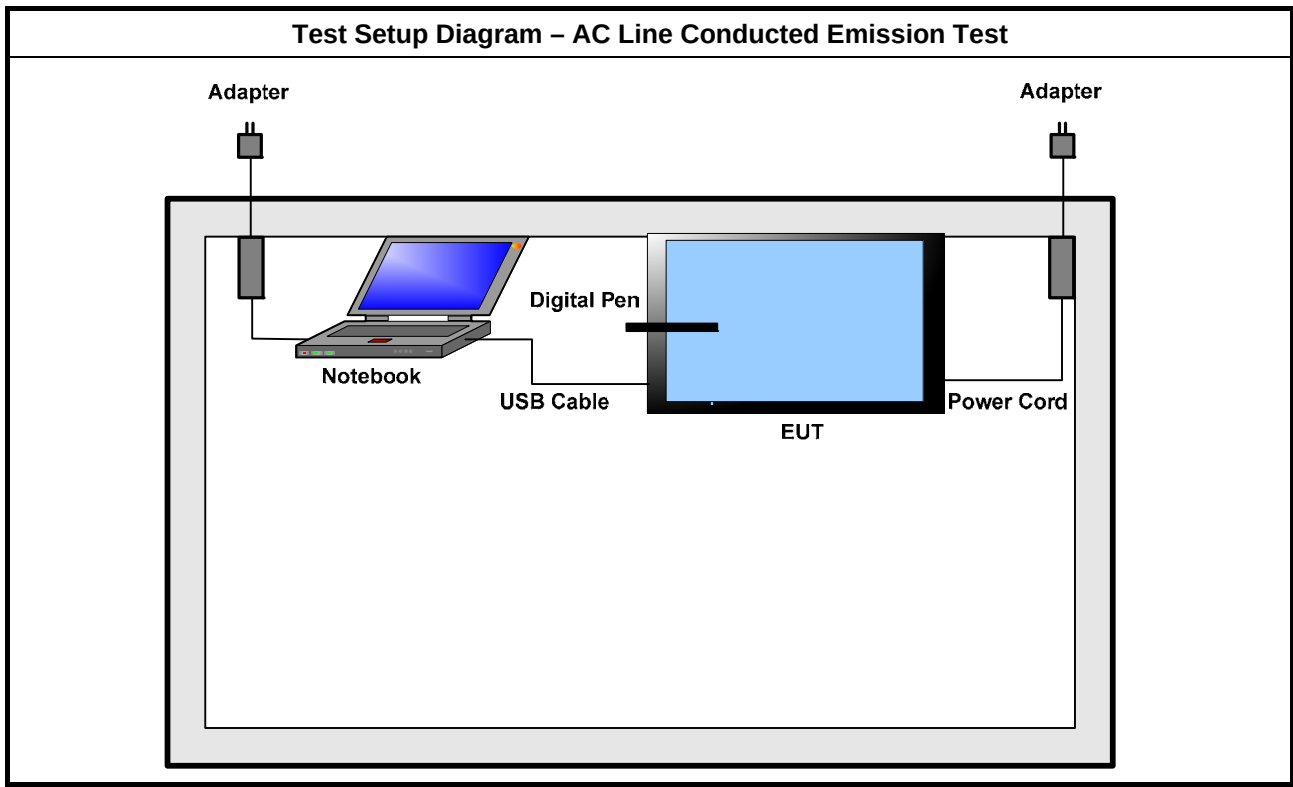
Modulation Mode	Test Channel Frequencies (kHz)
Array Coil Pointing	667-(F1)

2.3 The Worst Case Measurement Configuration

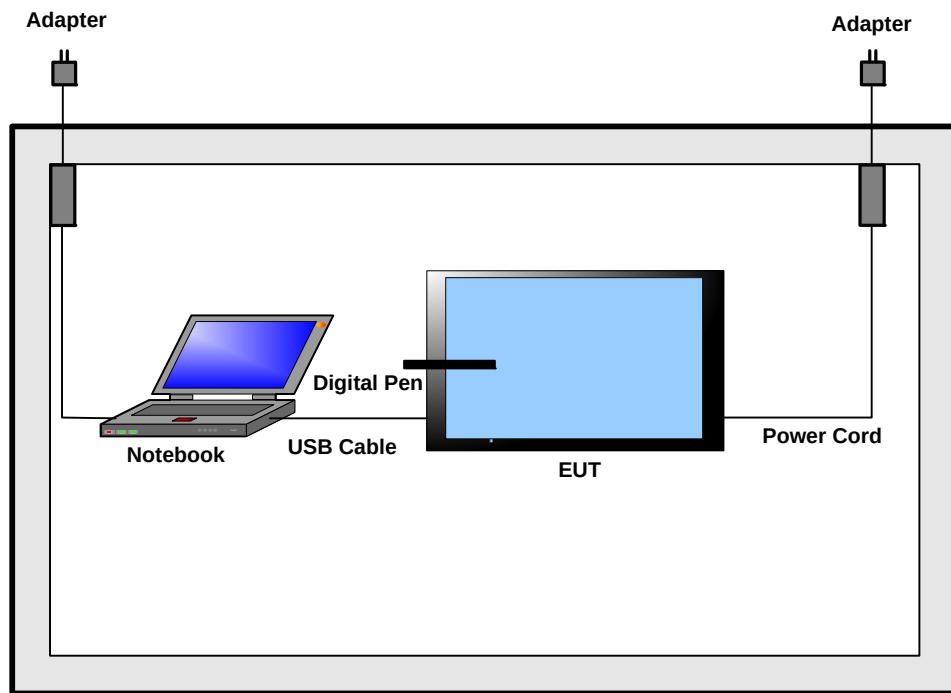
The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	EUT transmit with system and adapter

The Worst Case Mode for Following Conformance Tests			
Tests Item	Emission Bandwidth, Field Strength of Fundamental Emissions Transmitter Radiated Unwanted Emissions		
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 three orthogonal planes. The planes is Y.		
	☐ 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	Operating Mode Description		
1	EUT transmit with system and adapter		
Modulation Mode	Array Coil Pointing		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			

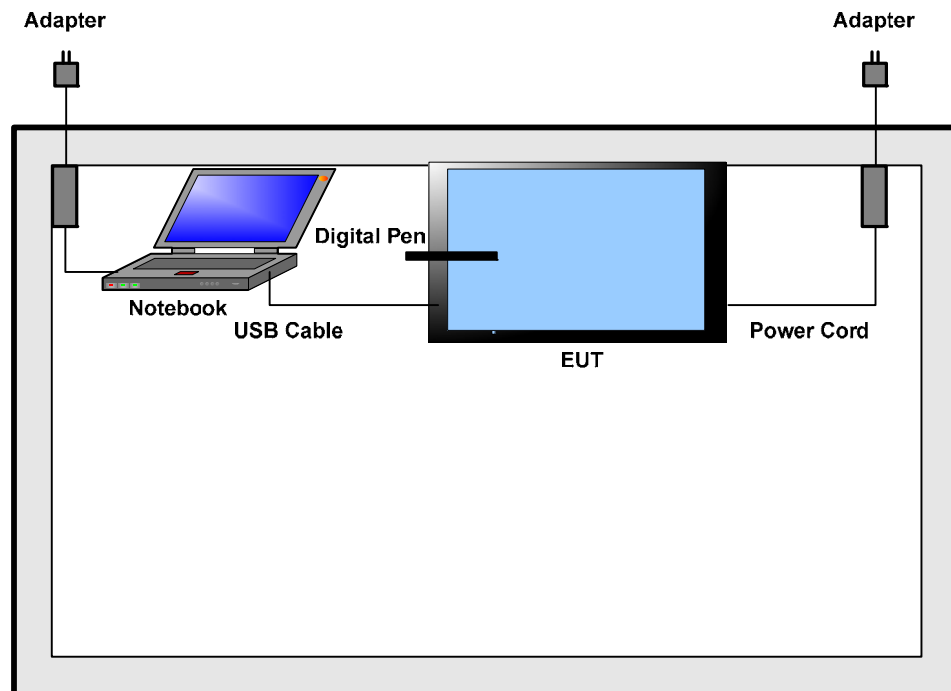
2.4 Test Setup Diagram



Test Setup Diagram - Radiated Test (9kHz-30MHz)



Test Setup Diagram - Radiated Test (30MHz-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.

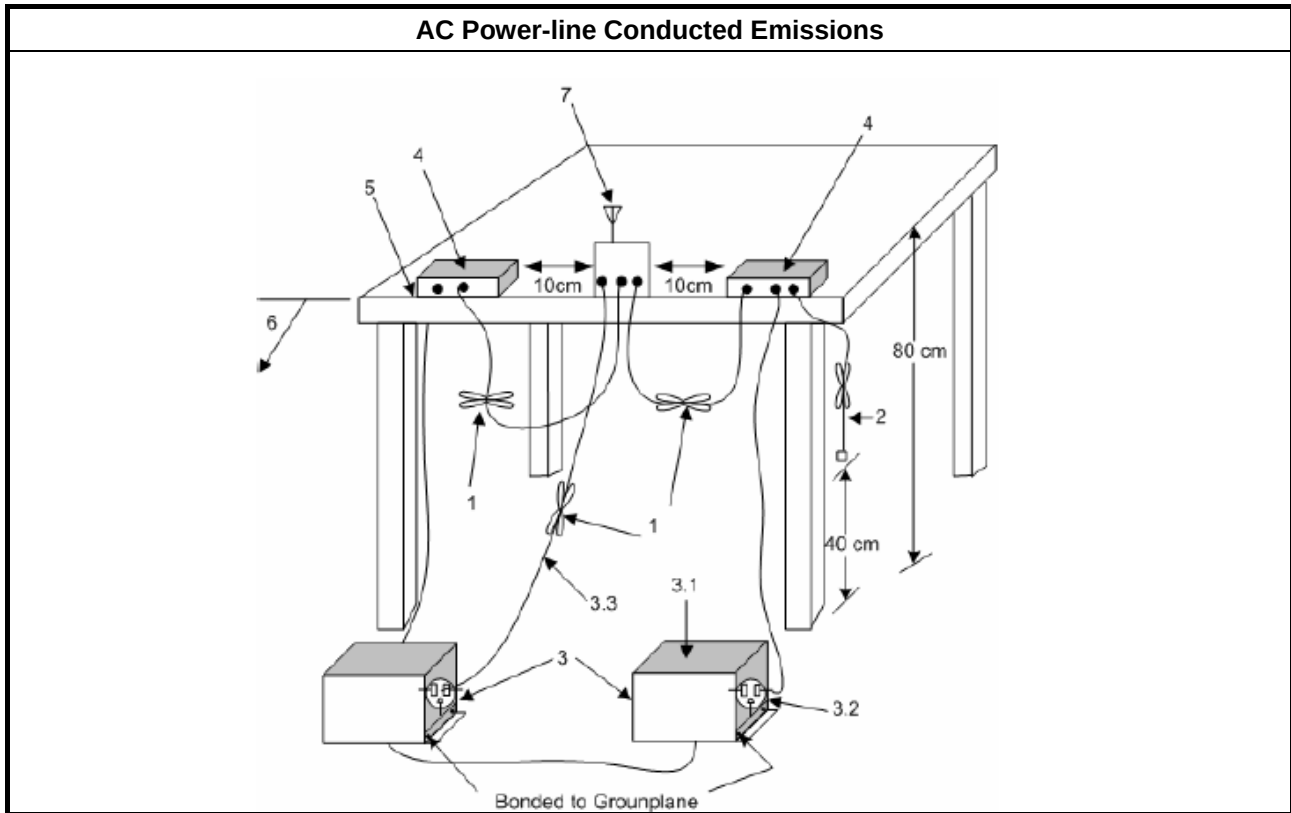
3.1.2 Measuring Instruments

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

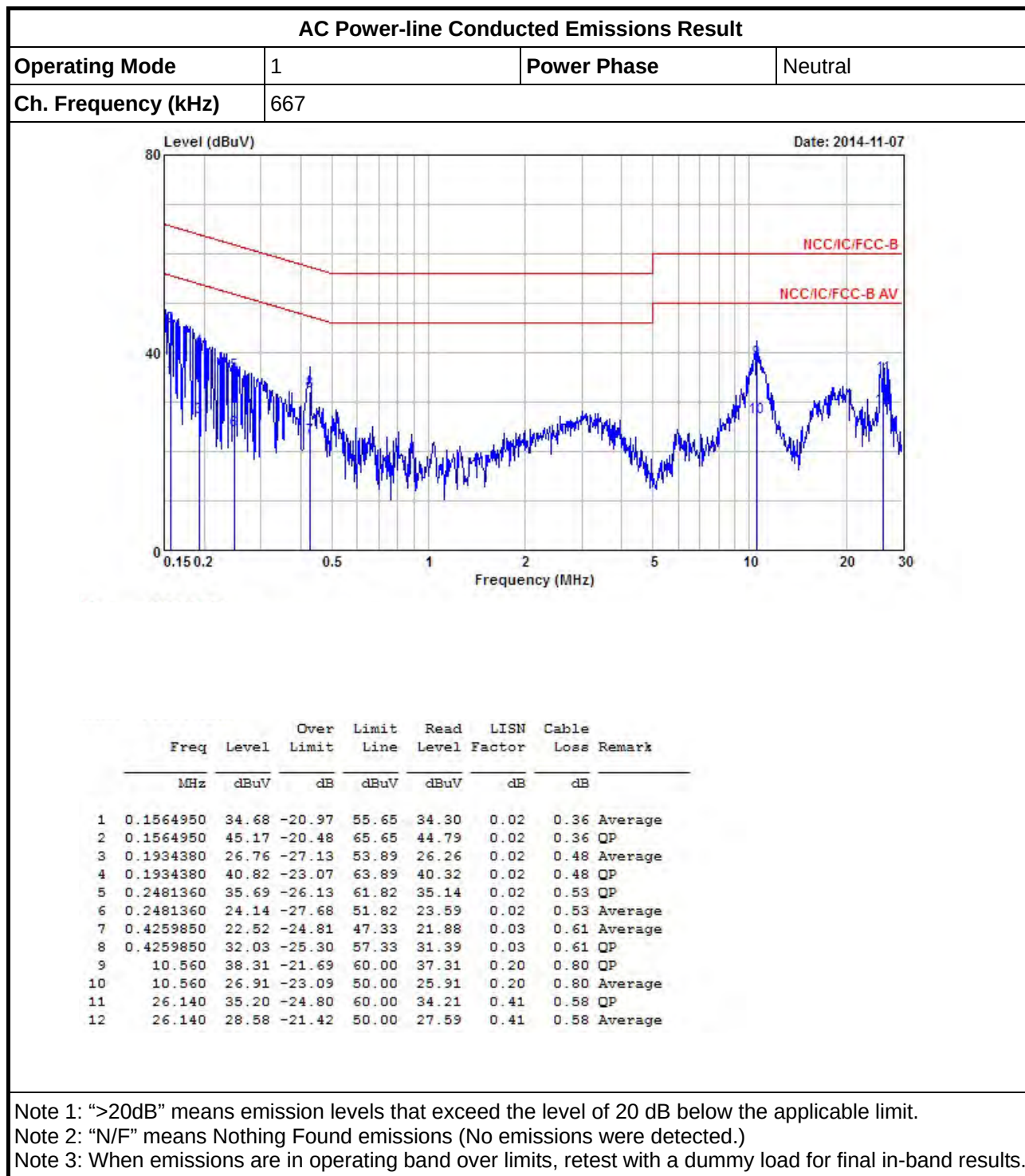
3.1.3 Test Procedures

Test Method	
☒	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

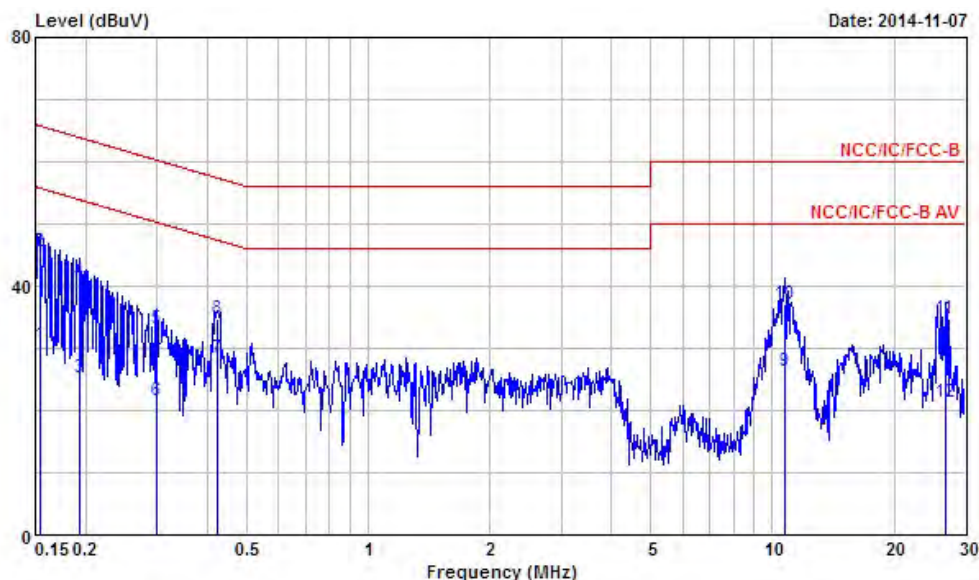


3.1.5 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Ch. Frequency (kHz)	667		



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV		dB	
1	0.1548450	30.56	-25.18	55.74	30.18	0.03	0.35	Average
2	0.1548450	45.56	-20.18	65.74	45.18	0.03	0.35	QP
3	0.1924150	25.26	-28.67	53.93	24.75	0.03	0.48	Average
4	0.1924150	40.75	-23.18	63.93	40.24	0.03	0.48	QP
5	0.2986930	33.04	-27.24	60.28	32.45	0.03	0.56	QP
6	0.2986930	21.69	-28.59	50.28	21.10	0.03	0.56	Average
7	0.4214950	28.47	-18.95	47.42	27.83	0.03	0.61	Average
8	0.4214950	34.62	-22.80	57.42	33.98	0.03	0.61	QP
9	10.730	26.34	-23.66	50.00	25.34	0.20	0.80	Average
10	10.730	37.20	-22.80	60.00	36.20	0.20	0.80	QP
11	26.700	34.84	-25.16	60.00	33.88	0.40	0.56	QP
12	26.700	21.27	-28.73	50.00	20.31	0.40	0.56	Average

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.)

Note 3: When emissions are in operating band over limits, retest with a dummy load for final in-band results.

3.2 Transmitter Radiated Emissions

3.2.1 Transmitter Radiated Emissions Limit

Transmitter Radiated 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.

Note 3: the frequency bands 9-90 kHz, 110-490 kHz measurements employing an average detector and other below 1GHz measurements employing a CISPR quasi-peak detector.

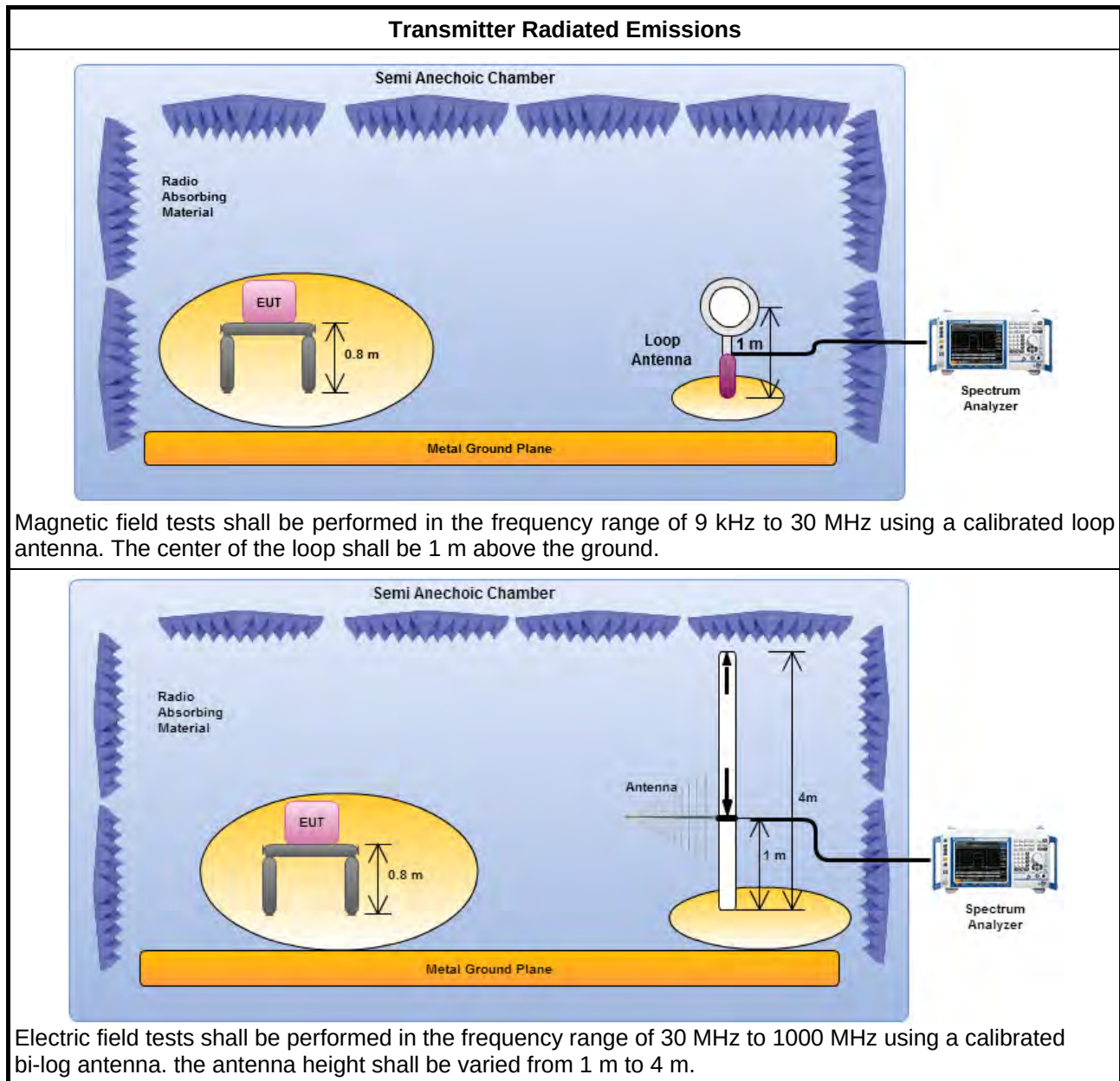
3.2.2 Measuring Instruments

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

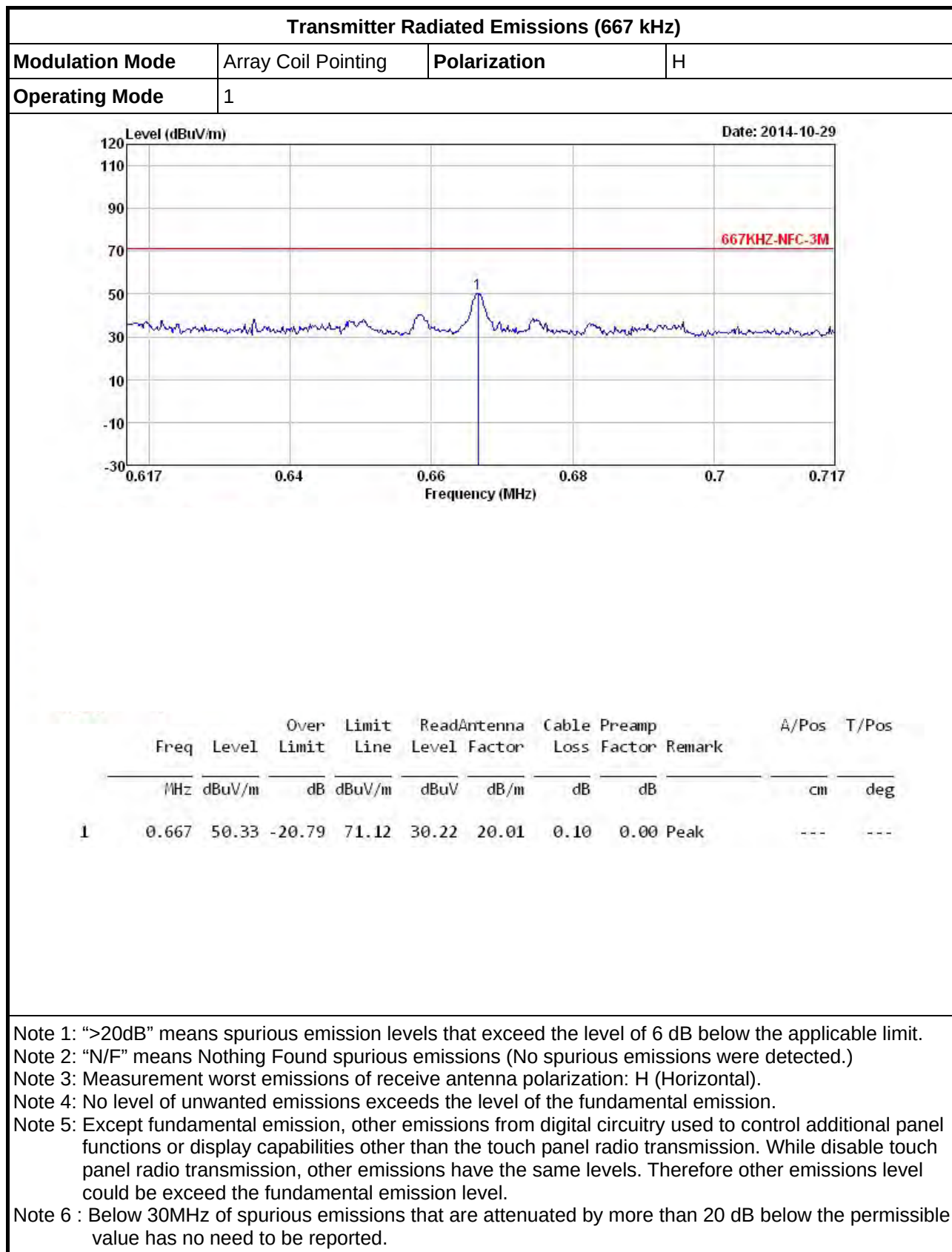
3.2.3 Test Procedures

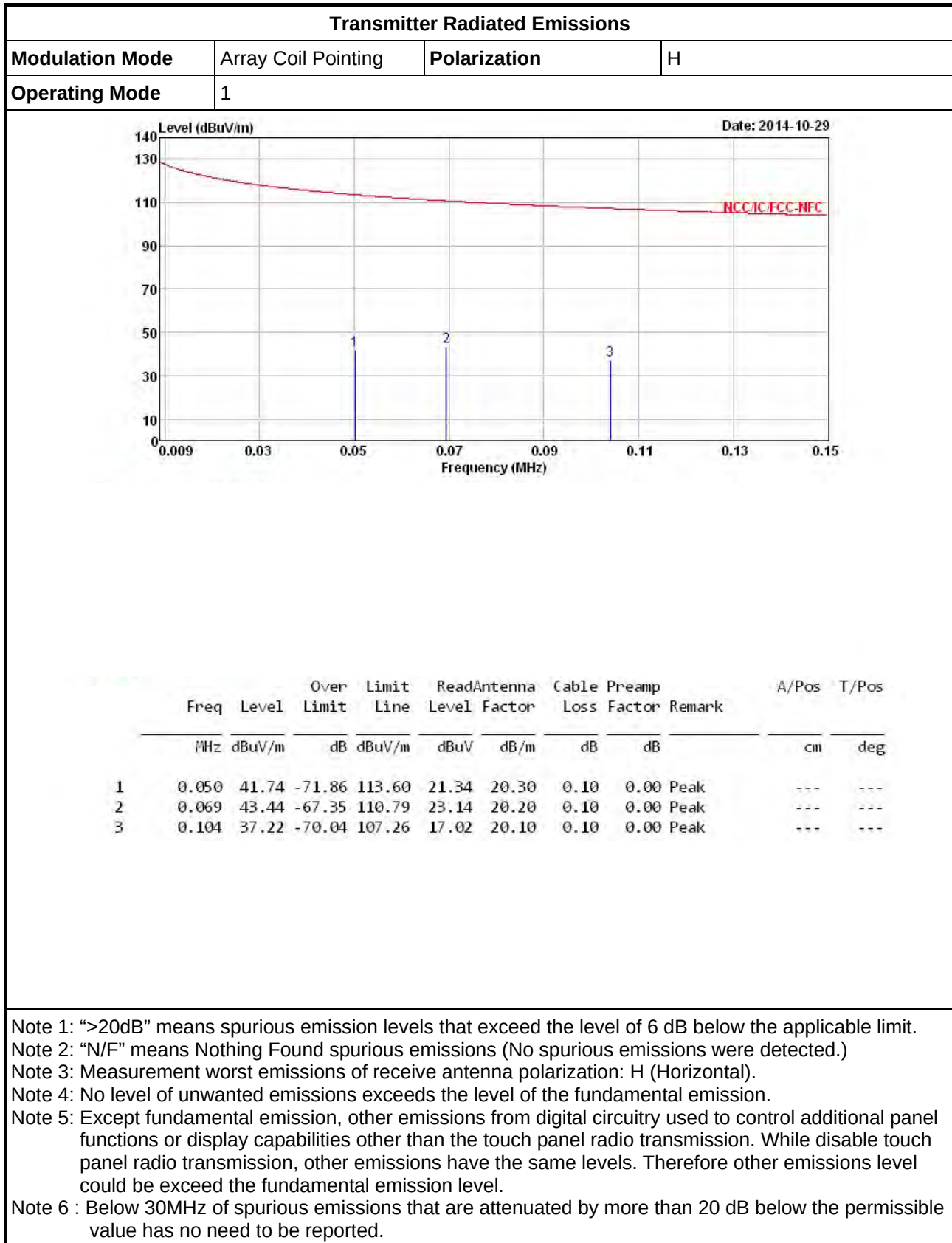
Test Method	
☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m.
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz. The frequency bands 9-90 kHz, 110-490 kHz measurements employing an average detector and other below 30MHz measurements employing a CISPR quasi-peak detector. 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.

3.2.4 Test Setup



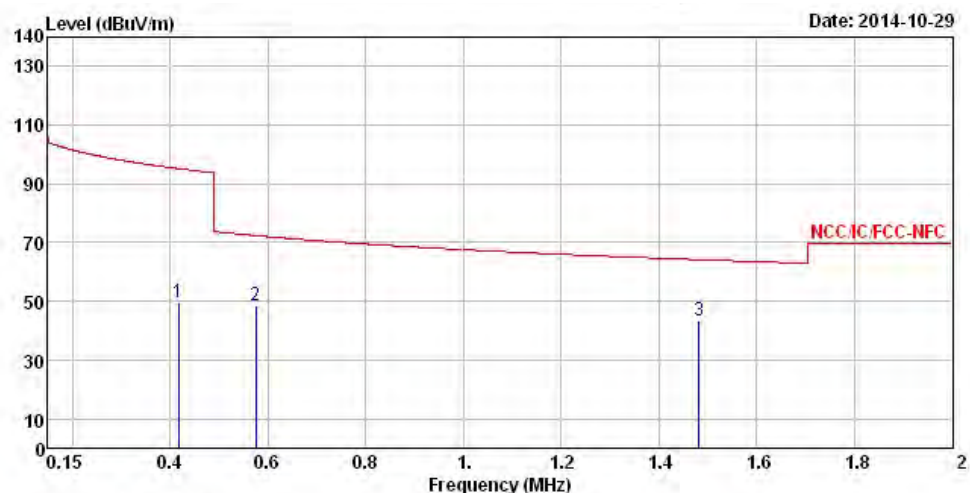
3.2.5 Transmitter Radiated Emissions (Below 30MHz)





Transmitter Radiated Emissions

Modulation Mode	Array Coil Pointing	Polarization	H
Operating Mode	1		



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Preamp	Loss Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	0.416	49.44	-45.78	95.22	29.24	20.10	0.10	0.00 Peak	---	---
2	0.576	48.40	-24.01	72.41	28.24	20.06	0.10	0.00 Peak	---	---
3	1.482	43.31	-20.88	64.19	23.22	19.99	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).

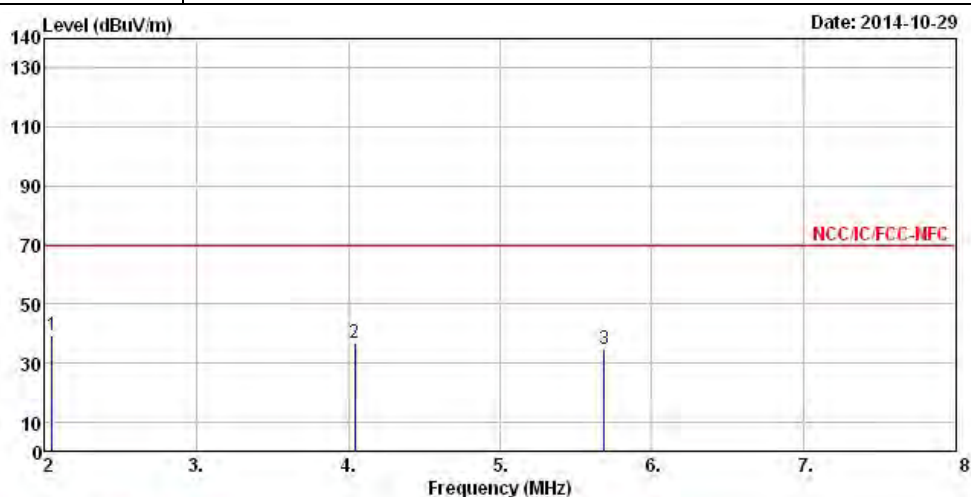
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

Note 6 : Below 30MHz of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

Transmitter Radiated Emissions

Modulation Mode	Array Coil Pointing	Polarization	H
Operating Mode	1		



	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	2.048	39.11	-30.43	69.54	18.91	20.00	0.20	0.00	Peak	---	---
2	4.040	36.87	-32.67	69.54	16.56	20.00	0.31	0.00	Peak	---	---
3	5.684	34.43	-35.11	69.54	14.03	20.03	0.37	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).

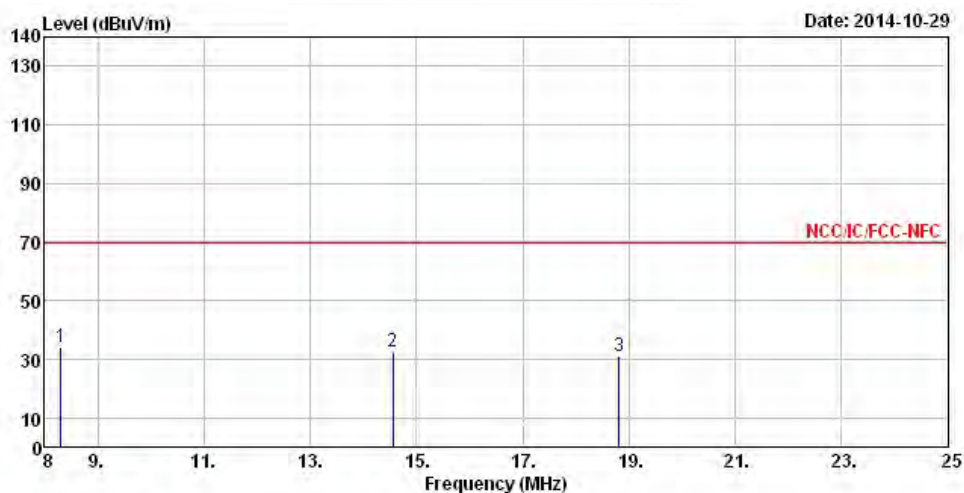
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

Note 6 : Below 30MHz of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

Transmitter Radiated Emissions

Modulation Mode	Array Coil Pointing	Polarization	H
Operating Mode	1		



	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	8.306	34.10	-35.44	69.54	13.56	20.10	0.44	0.00	Peak	---	---
2	14.562	32.43	-37.11	69.54	11.72	20.10	0.61	0.00	Peak	---	---
3	18.812	31.24	-38.30	69.54	10.36	20.18	0.70	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).

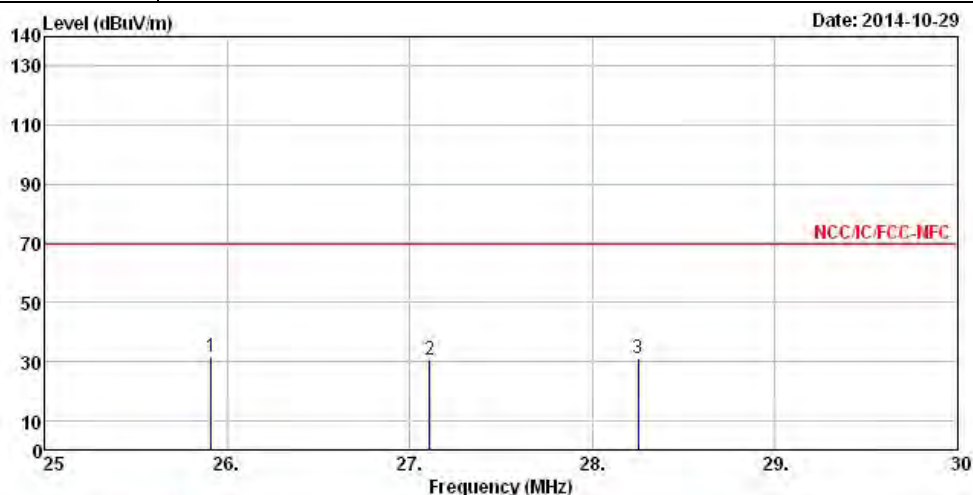
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

Note 6 : Below 30MHz of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

Transmitter Radiated Emissions

Modulation Mode	Array Coil Pointing	Polarization	H
Operating Mode	1		



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	25.910	31.55	-37.99	69.54	10.65	20.10	0.80	0.00 Peak	---	---
2	27.110	30.64	-38.90	69.54	9.73	20.10	0.81	0.00 Peak	---	---
3	28.250	31.08	-38.46	69.54	10.17	20.10	0.81	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.)

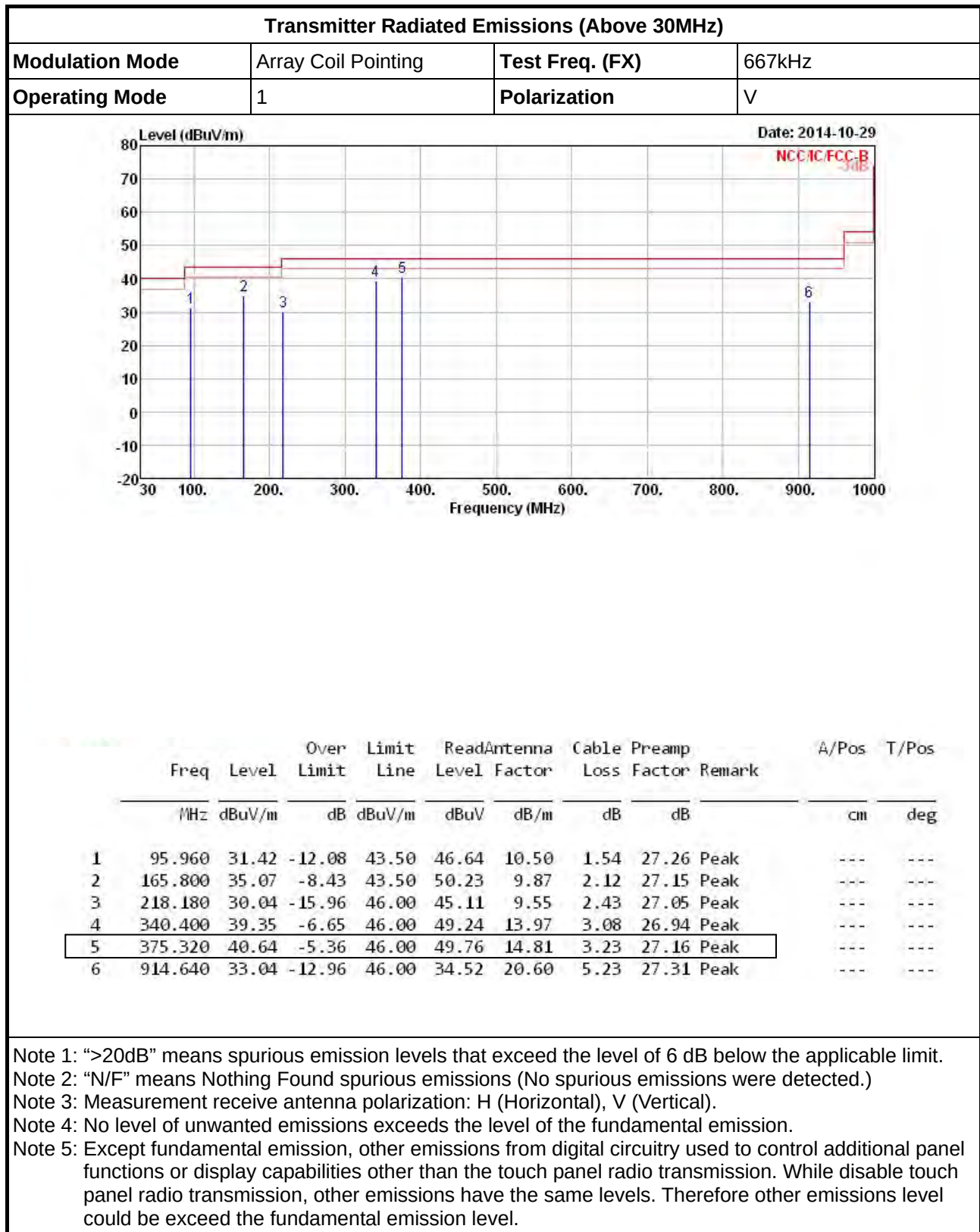
Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).

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

Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

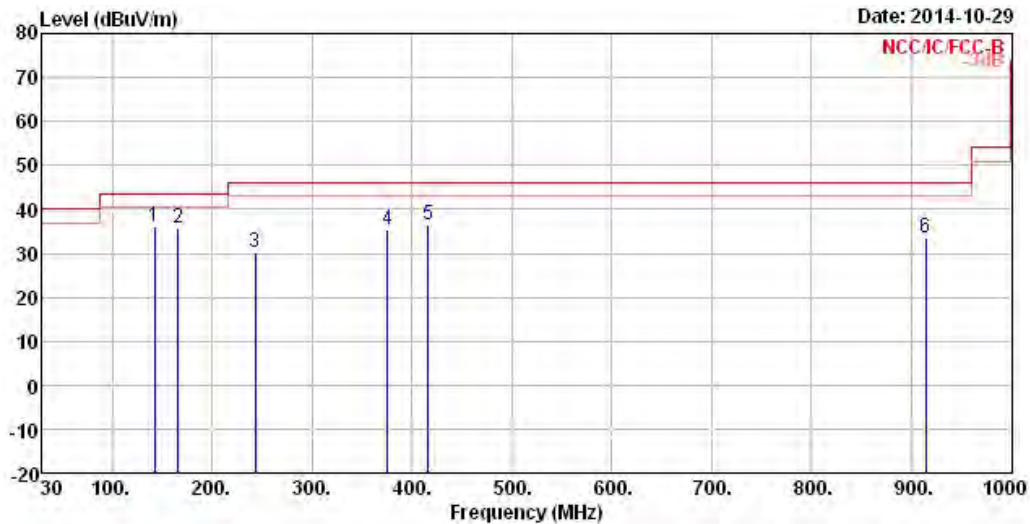
Note 6 : Below 30MHz of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.2.6 Transmitter Radiated Emissions (Above 30MHz)



Transmitter Radiated Emissions (Above 30MHz)

Modulation Mode	Array Coil Pointing	Test Freq. (FX)	667 kHz
Operating Mode	1	Polarization	H



	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	36.19	-7.31	43.50	50.39	10.98	1.98	27.16	Peak	---	---
2	165.800	35.60	-7.90	43.50	50.76	9.87	2.12	27.15	Peak	---	---
3	243.400	30.10	-15.90	46.00	42.38	12.09	2.57	26.94	Peak	---	---
4	375.320	35.40	-10.60	46.00	44.52	14.81	3.23	27.16	Peak	---	---
5	416.060	36.38	-9.62	46.00	44.02	16.39	3.39	27.42	Peak	---	---
6	914.640	33.56	-12.44	46.00	35.04	20.60	5.23	27.31	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 receive antenna polarization: H (Horizontal), V (Vertical).

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

Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

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	Mar. 26, 2014	AC Conduction
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	JAN. 21, 2014	AC Conduction
LISN	EMCO	3810/2NM	9703-1839	9kHz ~ 30MHz	Apr. 21, 2014	AC Conduction
RF Cable-CON	HUBER+SUHNER	RG213/U	7.61183201e+012	9kHz ~ 30MHz	Oct. 31, 2014	AC Conduction

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	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.