FCC RADIO TEST REPORT

FCC ID	:	HV4PTH460
Equipment	:	Pen tablet
Brand Name	:	Wacom
Model Name	:	PTH-460*******(*) may be alphanumeric/symbol or blank.
Applicant/ Manufacturer	:	Wacom Co., Ltd. 2-510-1, Toyonodai, Kazo-shi, Saitama, 349-1148 Japan
Standard	:	47 CFR FCC Part 15.209

The product was received on Dec. 03, 2018, and testing was started from Dec. 13, 2018 and completed on Dec. 18, 2018. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Allen Lin

Approved by: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FR8N2621AP	01	Initial issue of report	Jan. 11, 2019
FR8N2621AP	02	Revised typo This report is the latest version replacing for the report issued on Jan. 11, 2019	Jan. 18, 2019
FR8N2621AP	03	The Model Name was revised. This report is the latest version replacing for the report issued on Jan. 11, 2019	Jan. 21, 2019

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.3	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.209	Transmitter Radiated Emissions	PASS	-
3.3	15.215(c)	Emission Bandwidth	PASS	-

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
None.

Reviewed by: Jackson Tsai

Report Producer: Jenny Yang

1 General Description

1.1 Information

1.1.1 Product Details

The difference between the report no. : N/A	
The Difference	N/A

Evaluated Test Items	N/A

1.1.2 RF General Information

RF General Information			
Frequency		**667kHz**	
Modulation	**Ch. Frequency (kHz)**	**Channel Number**	**Field Strength (dBuV/@1m)**
ASK	667	1	54.74
Note 1: Field strength performed peak level at 1m.			

1.1.3 Antenna Information

Antenna Category	
☒	Integral antenna (antenna permanently attached)
	☐ Temporary RF connector provided
	☒ No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.
☐	External antenna (dedicated antennas)
	☐ Single power level with corresponding antenna(s).
	☐ Multiple power level and corresponding antenna(s).

No.	Ant. Cat.	Ant. Type
1	Integral	Array Coli Pointing

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.: …
☐	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: …
☐	Other:

1.1.5 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle
☒ Operated normal 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 AC adapter	☒ From System

1.2 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

1.3 Testing Location Information

Testing Location			
☒	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)	
		TEL : 886-3-327-3456	FAX : 886-3-327-0973
Test site Designation No. TW1190 with FCC.			
☐	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)	
		TEL : 886-3-656-9065	FAX : 886-3-656-9085
Test site Designation No. TW0006 with FCC.			

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Daniel	22.7°C / 55%	13/Dec/2018
RF Conducted	TH01-HY	Streak	23.3°C / 63%	13/Dec/2018
Radiated Emission	03CH02-HY	Lego	23°C / 55%	18/Dec/2018

1.4 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)

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.54 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	1.6 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.9 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.3 dB	Confidence levels of 95%
Temperature	0.7 ℃	Confidence levels of 95%
Humidity	4 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

Transmitter Mode	Field Strength (dBuV/m@1m)	Field Strength (dBuV/m@3m)
Touch Panel	54.74	35.66

2.2 Test Channel Frequencies Configuration

Modulation	Test Channel Frequencies (kHz)
ASK	667

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	USB Mode

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.		
	☒ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions.		
Operating Mode	Operating Mode Description		
1	USB Mode		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
			
Worst Planes of EUT		V	

2.4 Accessory and Support Equipment

Accessories Information				
Battery	**Brand Name**	Wacom	**Model Name**	APP00203
	Manufacturer	APACK	**SN**	APP-12F-A45D4I-ACE-1
	Power Rating	3.7Vdc, 1350 mAh	**Type**	Li-ion, Y
Pen Stand	**Brand Name**	Wacom	**Model Name**	PST-A066
Digital Pen	**Brand Name**	Wacom	**Model Name**	KP-504E
USB Type-C Cable	**In/Out door**	In door		
	Power Cord	2meter, shielded cable, w/o ferrite core		

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

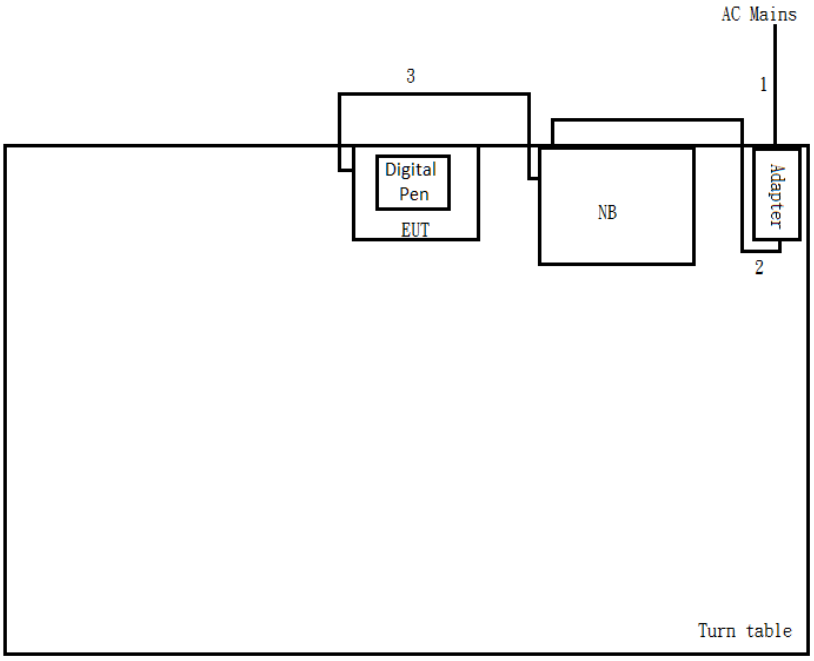
Support Equipment - RF Conducted			
No.	**Equipment**	**Brand Name**	**Model Name**
1	Notebook	DELL	E5410
2	Adapter for NB	DELL	HA65NM130
3	AC Power Source	GW	APS-9102

Support Equipment - AC Line Conducted Emission			
No.	**Equipment**	**Brand Name**	**Model Name**
1	Notebook	DELL	E4300

Support Equipment - Radiated Emission			
No.	**Equipment**	**Brand Name**	**Model Name**
1	Notebook	HP	ProBook-5220m

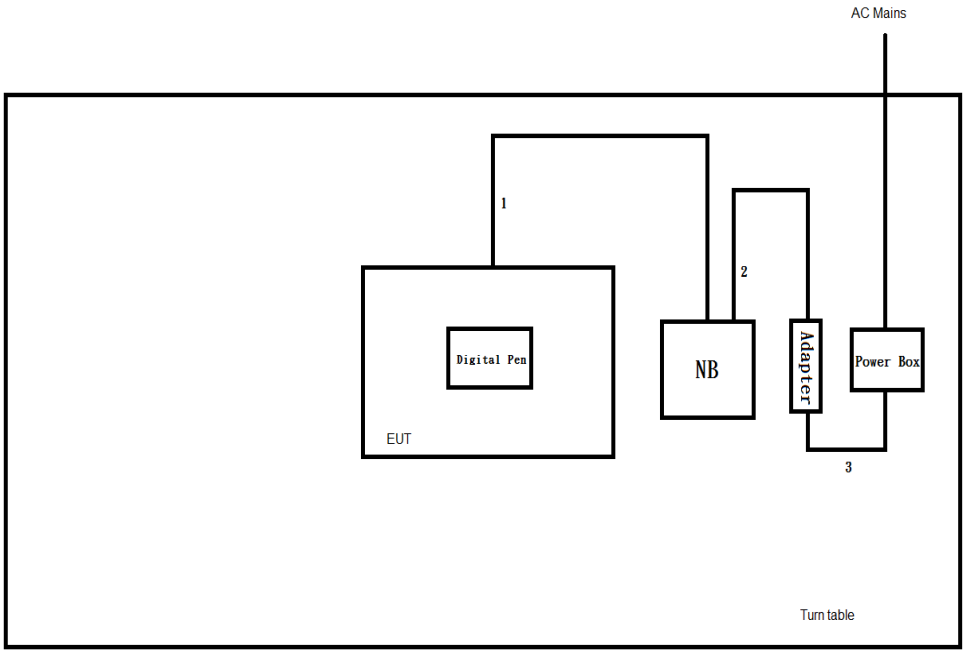
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power line	No	1.8	-
2	DC Power line	No	1.8	-
3	USB Type-C Cable	No	2	-

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)	Remark
1	USB Type-C Cable	No	2	-
2	DC Power line	No	1	-
3	AC Power line	No	1	-

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

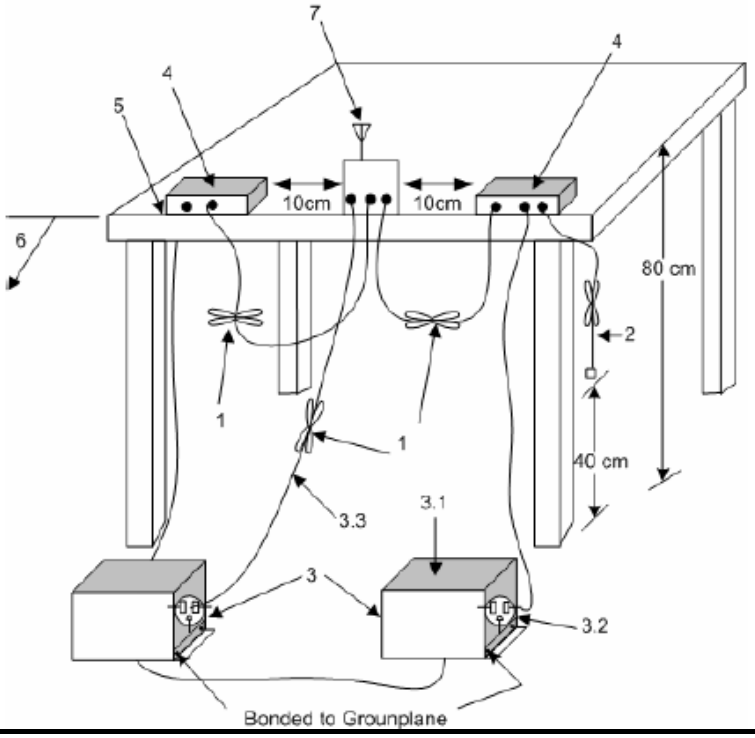
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method	
☒	Refer as ANSI C63.10-2013, 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.

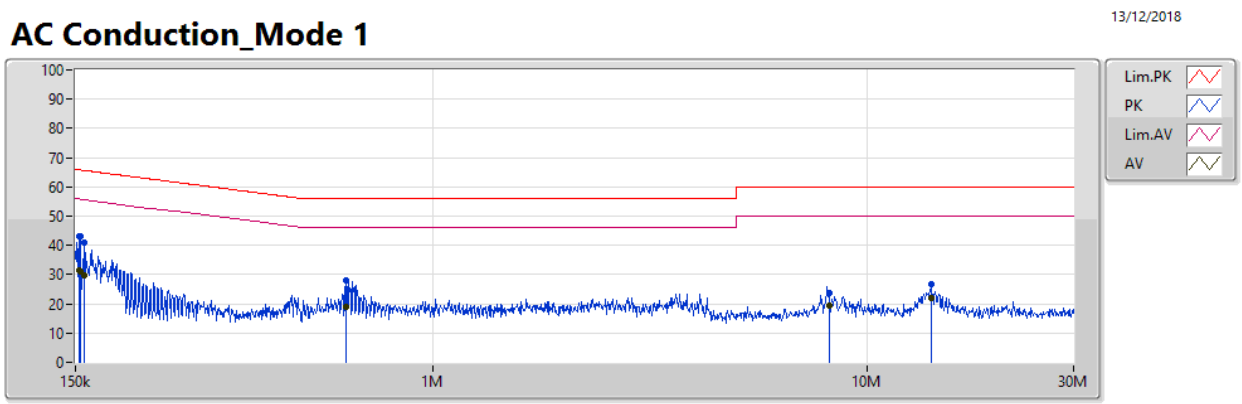
3.1.4 Test Setup

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
Ch. Frequency (kHz)	667		



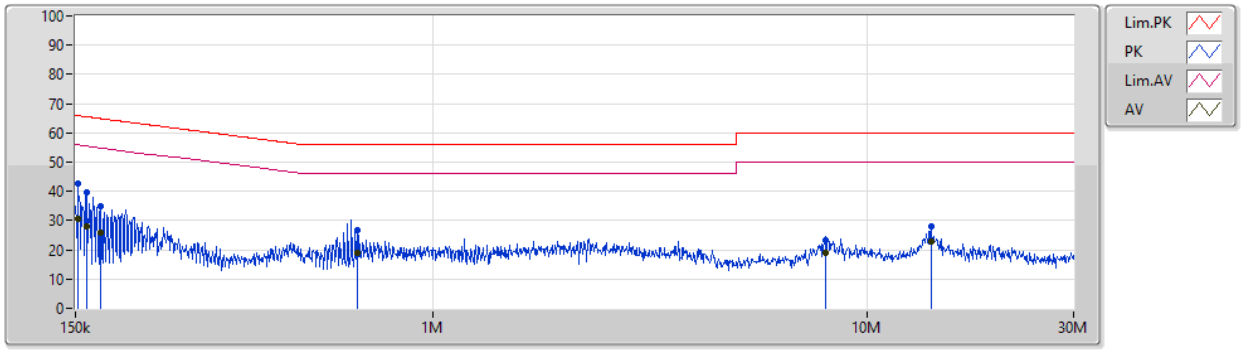
Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	153.003k	43.30	65.83	-22.53	19.48	Neutral	"Worst"	23.82	9.60	0.01	9.87
AV	153.003k	31.65	55.83	-24.18	19.48	Neutral	-	12.17	9.60	0.01	9.87
QP	153.582k	43.00	65.81	-22.81	19.48	Neutral	-	23.52	9.60	0.01	9.87
AV	153.582k	31.08	55.81	-24.73	19.48	Neutral	-	11.60	9.60	0.01	9.87
QP	157.444k	41.09	65.60	-24.51	19.48	Neutral	-	21.61	9.60	0.01	9.87
AV	157.444k	29.82	55.60	-25.78	19.48	Neutral	-	10.34	9.60	0.01	9.87
QP	632.188k	28.17	56.00	-27.83	19.48	Neutral	-	8.69	9.59	0.01	9.88
AV	632.188k	19.16	46.00	-26.84	19.48	Neutral	-	-0.32	9.59	0.01	9.88
QP	8.234M	23.59	60.00	-36.41	19.61	Neutral	-	3.98	9.66	0.06	9.89
AV	8.234M	19.27	50.00	-30.73	19.61	Neutral	-	-0.34	9.66	0.06	9.89
QP	14.089M	26.54	60.00	-33.46	19.66	Neutral	-	6.88	9.67	0.09	9.90
AV	14.089M	22.04	50.00	-27.96	19.66	Neutral	-	2.38	9.67	0.09	9.90

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.

AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Line
Ch. Frequency (kHz)	667		

AC Conduction_Mode 1

13/12/2018



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	152.062k	42.73	65.89	-23.16	19.48	Line	"Worst"	23.25	9.60	0.01	9.87
AV	152.062k	30.54	55.89	-25.35	19.48	Line	-	11.06	9.60	0.01	9.87
QP	159.443k	39.77	65.48	-25.71	19.48	Line	-	20.29	9.60	0.01	9.87
AV	159.443k	28.04	55.48	-27.44	19.48	Line	-	8.56	9.60	0.01	9.87
QP	171.033k	35.05	64.91	-29.86	19.48	Line	-	15.57	9.60	0.01	9.87
AV	171.033k	26.06	54.91	-28.85	19.48	Line	-	6.58	9.60	0.01	9.87
QP	669.004k	26.93	56.00	-29.07	19.49	Line	-	7.44	9.60	0.01	9.88
AV	669.004k	18.82	46.00	-27.18	19.49	Line	-	-0.67	9.60	0.01	9.88
QP	8.061M	23.47	60.00	-36.53	19.61	Line	-	3.86	9.66	0.06	9.89
AV	8.061M	19.16	50.00	-30.84	19.61	Line	-	-0.45	9.66	0.06	9.89
QP	14.143M	28.00	60.00	-32.00	19.64	Line	-	8.36	9.65	0.09	9.90
AV	14.143M	22.98	50.00	-27.02	19.64	Line	-	3.34	9.65	0.09	9.90

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

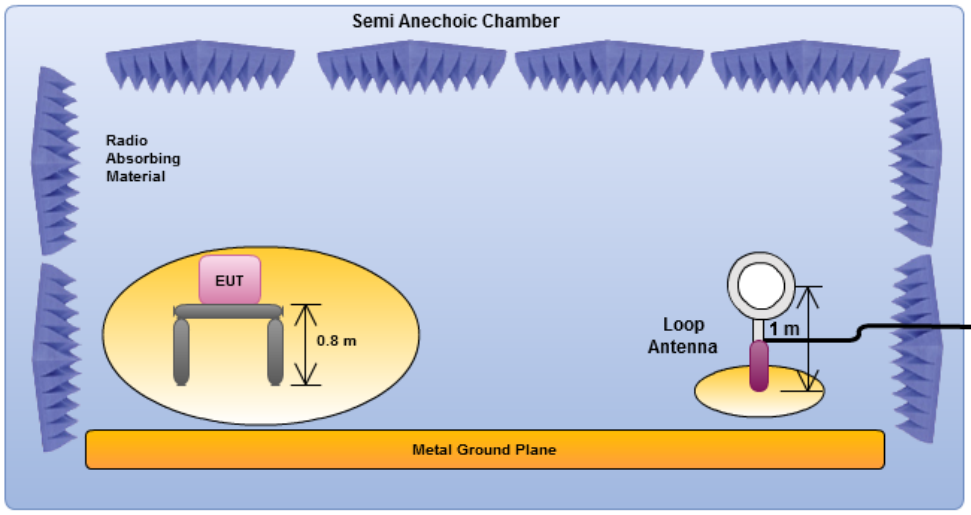
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

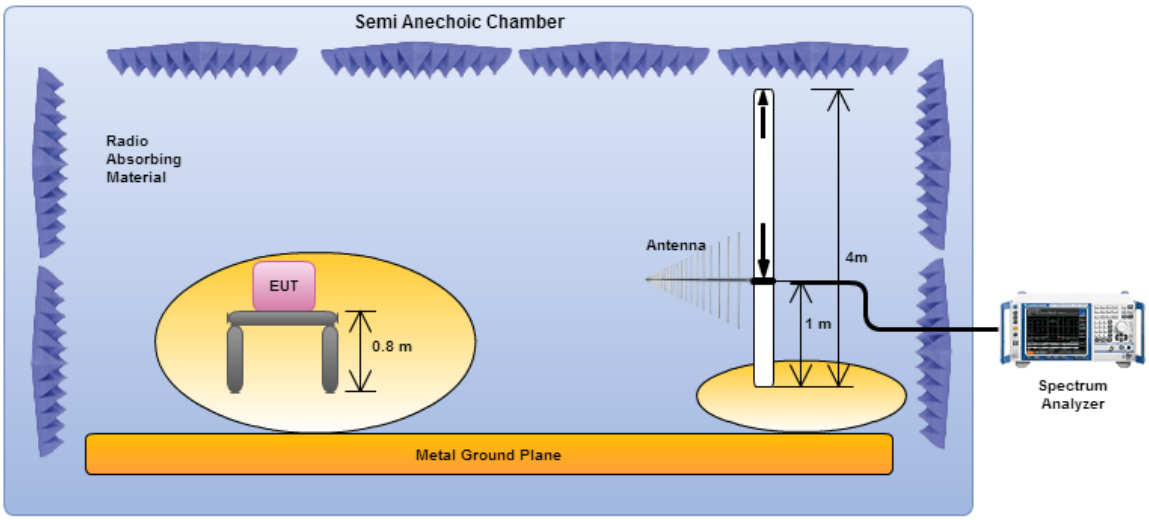
Test Method	
☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m. Note : The test distance of radiated emissions from 662kHz to 672kHz is 1m.
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz. The frequency bands 9-90 kHz, 110-490 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. Note: If fundamental emission level is smaller than noise at 3m , we will change distance to 1m.
☐	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

Transmitter Radiated Emissions



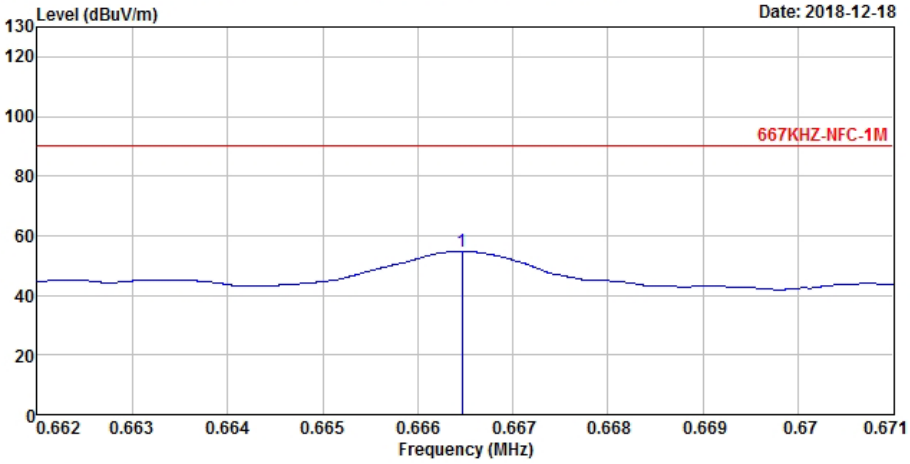
Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna. The center of the loop shall be 1 m above the ground.



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.

3.2.5 Transmitter Radiated Emissions (Below 30MHz)

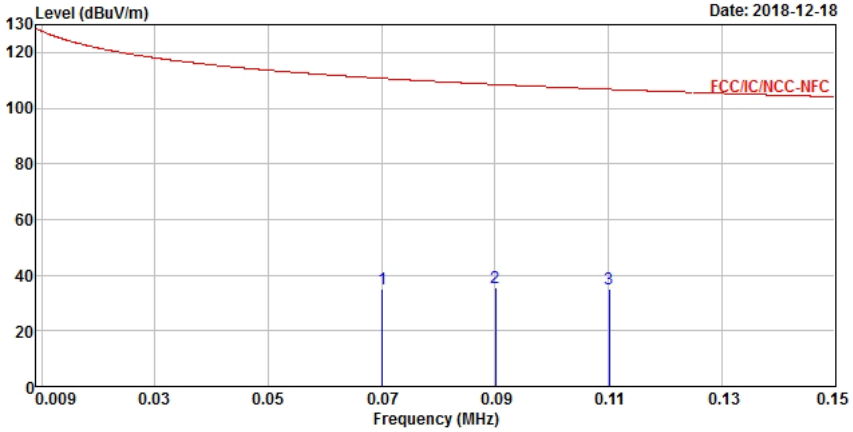
Transmitter Radiated Emissions (667 kHz)			
Mode	Touch Panel	**Test Freq.(kHz)**	667
Operating Mode	1	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV		cm	deg
1	0.6664660	54.74	-35.47	90.21	34.37	Peak	100	223

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. /Test fundamental emission at 1m.
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.

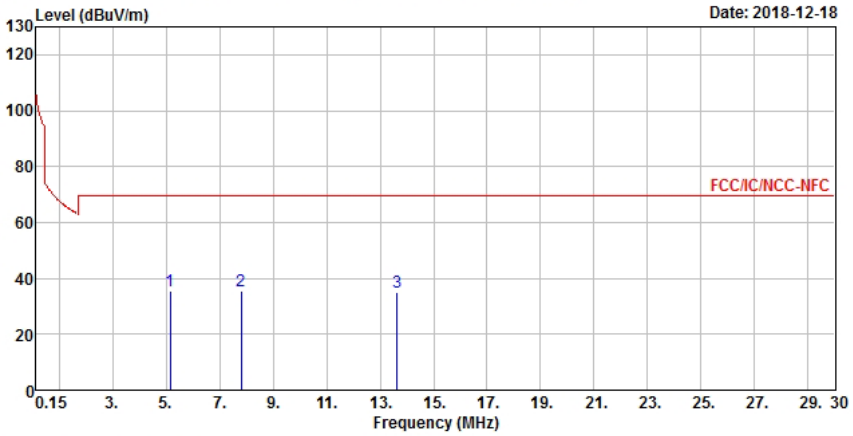
Transmitter Radiated Emissions (9kHz~150kHz)			
Mode	Touch Panel	**Test Freq.(kHz)**	667
Operating Mode	1	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV		cm	deg
1	0.0700530	35.25	-75.45	110.70	14.31	Peak	100	0
2	0.0900750	35.49	-73.03	108.52	14.71	Peak	100	0
3	0.1100970	34.88	-71.89	106.77	14.19	Peak	100	0

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 (150kHz~30MHz)			
Mode	Touch Panel	**Test Freq.(kHz)**	667
Operating Mode	1	**Polarization**	H

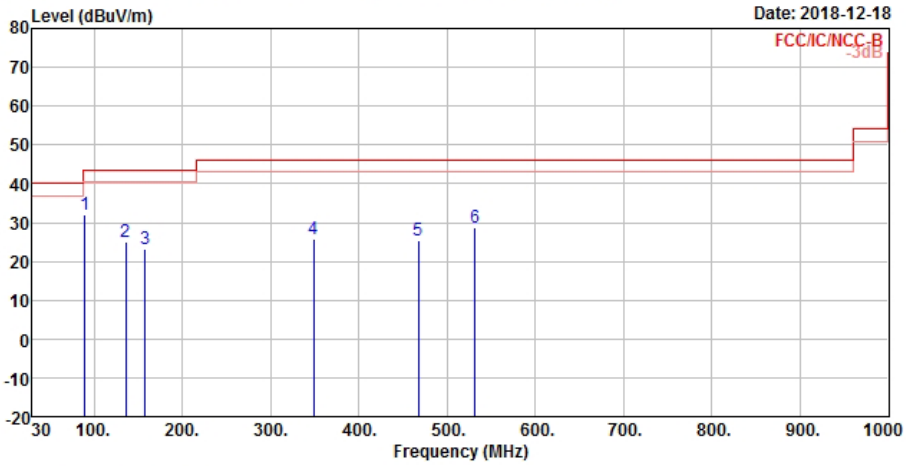


	Freq	Level	Over Limit	Limit Line	Read Level	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV		cm	deg
1	5.1648000	35.31	-34.23	69.54	14.58	Peak	100	360
2	7.8214500	35.36	-34.18	69.54	14.21	Peak	100	360
3	13.642200	35.18	-34.36	69.54	13.35	Peak	100	360

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)

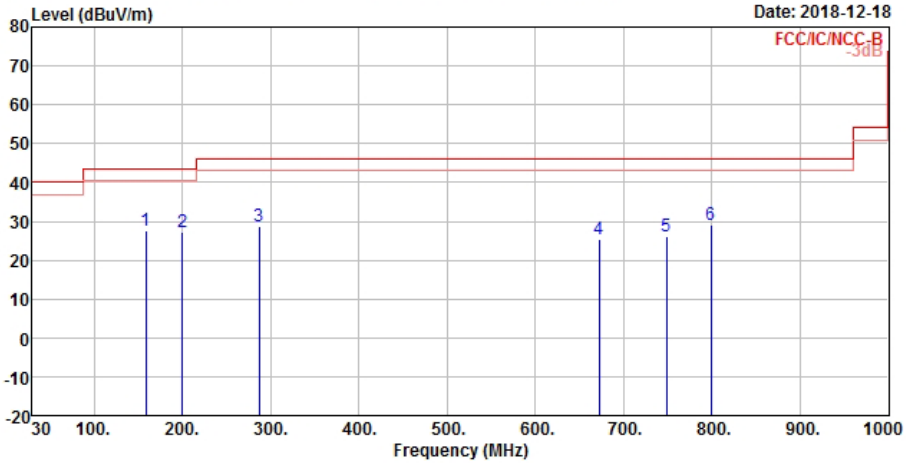
Transmitter Radiated Emissions (Above 30MHz)			
Mode	Touch Panel	**Test Freq.(kHz)**	667
Operating Mode	1	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read Level	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV		cm	deg
1	89.170000	32.01	-11.49	43.50	45.96	Peak	100	0
2	135.73000	25.06	-18.44	43.50	36.18	Peak	100	0
3	158.04000	23.22	-20.28	43.50	35.54	Peak	100	0
4	349.13000	25.91	-20.09	46.00	33.87	Peak	100	0
5	467.47000	25.26	-20.74	46.00	31.06	Peak	100	0
6	531.49000	28.88	-17.12	46.00	34.32	Peak	100	0

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.

Transmitter Radiated Emissions (Above 30MHz)			
Mode	Touch Panel	**Test Freq.(kHz)**	667
Operating Mode	1	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV		cm	deg
1	159.01000	27.52	-15.98	43.50	39.87	Peak	0	360
2	199.75000	27.11	-16.39	43.50	40.06	Peak	0	360
3	287.05000	28.61	-17.39	46.00	37.63	Peak	0	360
4	672.14000	25.52	-20.48	46.00	29.78	Peak	0	360
5	748.77000	26.25	-19.75	46.00	29.45	Peak	0	360
6	799.21000	28.90	-17.10	46.00	31.81	Peak	0	360

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.

3.3 Emission Bandwidth

3.3.1 Emission Bandwidth Limit

Emission Bandwidth Limit
N/A

3.3.2 Measuring Instruments

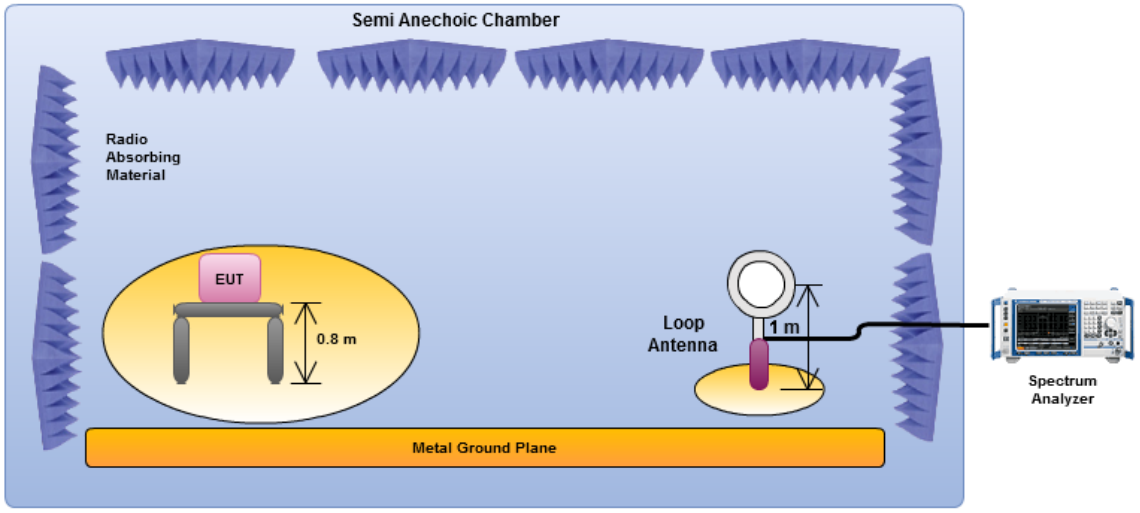
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
☒	For the emission bandwidth refer ANSI C63.10, clause 6.9.3 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.

3.3.4 Test Setup

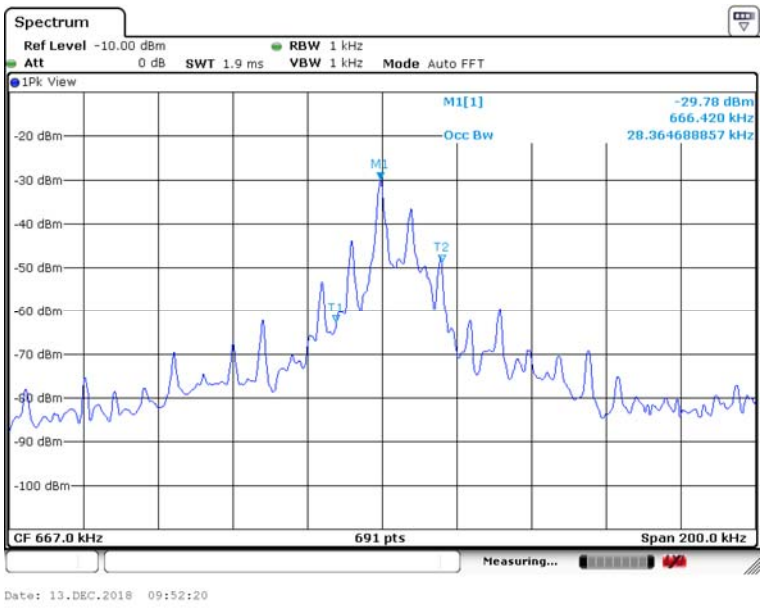
Emission Bandwidth



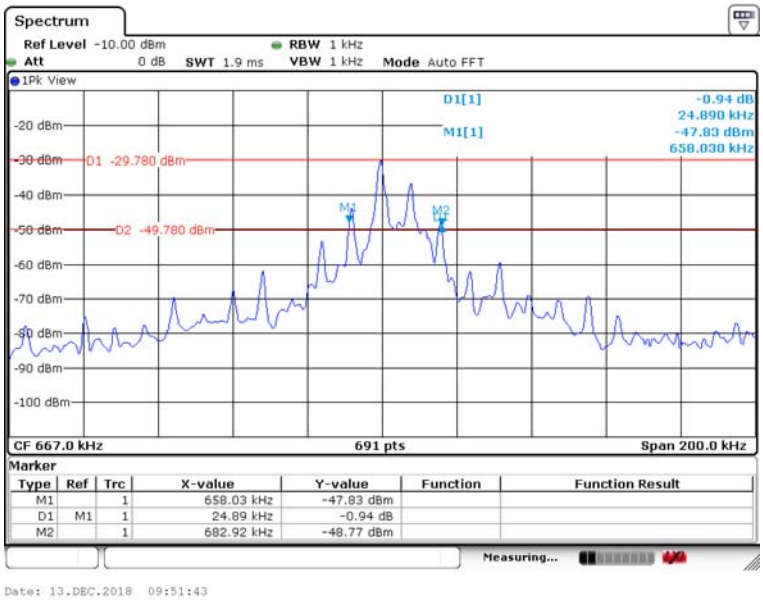
3.3.5 Test Result of Emission Bandwidth

Occupied Channel Bandwidth Result			
Transmitter Mode	**Frequency (kHz)**	**99% Bandwidth (kHz)**	**20dB Bandwidth (kHz)**
Touch Panel	667	28.36	24.89
Limit		**N/A**	
Result		**Complied**	

Emission Bandwidth Plot - 99% Bandwidth



Emission Bandwidth Plot - 20dB Bandwidth



4 Test Equipment and Calibration Data

<AC Power-line Conducted Emissions>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
EMC Receiver	R&S	ESR	102051	9KHz ~ 3.6GHz	03/May/2018	02/May/2019
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	08/Nov/2018	07/Nov/2019
RF Cable-CON	MTJ	RG142	CB002-CO	9kHz ~ 200MHz	17/Sep/2018	16/Sep/2019
AC POWER	APC	AFC-11005G	F310050055	47Hz~63Hz 5~300V	NCR	NCR
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9 kHz ~ 30 MHz	12/Oct/2018	11/Oct/2019

NCR : Non-Calibration Require

<RF Conducted>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101013	9kHz~40GHz	05/Feb/2018	04/Feb/2019
Loop Antenna	TESEQ	HLA 6120	31244	9kHz ~ 30MHz	28/Mar/2018	27/Mar/2019

<Radiated Emission>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	19/Oct/2018	18/Oct/2019
Amplifier	Agilent	8447D	2944A11149	100kHz ~ 1.3GHz	27Jul/2018	02/Jul/2019
Spectrum Analyzer	Rohde & Schwarz	FSP40	100593	9KHz - 40GHz	12/Dec/2017	11/Dec/2018
EMI Test Receiver	Rohde & Schwarz	ESCS 30	838251/003	9kHz ~ 2.75GHz	04/Jul/2018	03/Jul/2019
RF Cable-R03m	Jye Bao	RG142	CB017	9kHz ~ 1GHz	19/Jan/2018	18/Jan/2019
Bilog Antenna & 5dB Attenuator	SCHAFFNER / MTJ	CBL 6112B / MTJ6102-05	2723 / 2	30MHz ~ 1GHz	08/Sep/2018	07/Sep/2019
Loop Antenna	TESEQ	HLA 6120	31244	9k-30MHz	29/Mar/2018	28/Mar/2019