

FCC Test Report

FCC ID : 2AEXESECURESKANX200
Equipment : SecureScan ID Scanner
Brand Name : Plustek
Model Name : X200, SI501-A66 ; X2*****;S*****;S***** (The"" can be 0-9, A-Z, "+", "-", "Plus", "Pro" or blank for marketing purpose)
Applicant/ Manufacturer : Plustek Inc.
13F-1, No. 3, Yuan Qu St., 115 Nankang, Taipei, Taiwan
Standard : 47 CFR FCC Part 15.225

The product was received on Jan. 02, 2020, and testing was started from May 22, 2020 and completed on Jun. 02, 2020. 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 United States 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.



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

[illegible]

Summary of Test Result

Report Clause	Ref. Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.215(c)	Emission Bandwidth	PASS	-
3.3	15.225(a)~(d)	Field Strength of Fundamental Emissions and Spectrum Mask	PASS	-
3.4	15.225(d)	Transmitter Radiated Unwanted Emissions	PASS	-
3.5	15.225(e)	Frequency Stability	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: Sam Tsai

Report Producer: Yunha Liou

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information				
Frequency Range	Modulation Mode	Ch. Frequency (MHz)	Channel Number	Field Strength (dBuV/m)
13.553 – 13.567 MHz	NFC-B (ISO 14443-3B)	13.56	1	69.02
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)
☐	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)

Antenna General Information		
No.	Ant. Cat.	Ant. Type
1	Integral	NFC 13.56MHZ

1.1.3 EUT Information

Operational Condition	
EUT Power Type	From AC Adapter
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

Duty Cycle Operation Restriction	
The transmitter is used for	The transmitter is operated
☒ Inductive applications	☒ Automatically triggered
☐ Duty cycle fixed mode	☒ Duty cycle random mode
☒ Duty cycle mode - NFC-A (ISO 14443-3A)	
Declare transmitter duty cycle / 1 hour =	100%
☒ Duty cycle mode - NFC-B (ISO 14443-3B)	
Declare transmitter duty cycle / 1 hour =	100%
☐ Duty cycle mode - NFC-F (ISO 18092)	
Declare transmitter duty cycle / 1 hour =	100%
☐ Duty cycle mode - NFC-V (ISO 15693)	
Declare transmitter duty cycle / 1 hour =	100%

1.1.5 Table for Multiple Listing

The brand/model names in the following table are all refer to the identical product.

Brand Name	Model Name	Description
Plustek	X200	All the models are identical, the difference model served as marketing strategy.
	SI501-A66	
	X2*****;S*****;s***** ** (The "*" can be 0-9, A-Z, "+", "-", "Plus", "Pro" or blank for marketing purpose)	

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

The following reference test guidance is not within the scope of accreditation of TAF:

- ♦ KDB 414788 D01 v01r01

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.			

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Edward	21.4~23.5°C / 59~65%	02/Jun/2020
RF Conducted	TH01-HY	Barry	22.7~23.9°C / 65~69%	01/Jun/2020
Radiated Emission	03CH03-HY	Jeff	23.6~25.4°C / 51~58%	22/May/2020~ 23/May/2020

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)	0.9 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.7 dB	Confidence levels of 95%
Conducted Emission	1.0 dB	Confidence levels of 95%
Temperature	0.41 °C	Confidence levels of 95%
Humidity	3.4 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Condition

Condition Item	Abbreviation/Remark	Remark
Frequency Stability	Tnom	20°C
-	Tmin	-20°C
-	Tmax	50°C
-	Vnom	120V
-	Vmin	102V
-	Vmax	132V

2.2 The Worst Case Configuration

Modulation Used for Conformance Testing		
Mode	Test Channel Frequencies (MHz)	Field Strength (dBuV/m at 3 m)
NFC	13.56	69.02

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
Operating Mode	CTX
	☒ 1. Adapter Mode

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emission Bandwidth, Frequency Stability
Test Condition	Conducted measurement

The Worst Case Mode for Following Conformance Tests	
Tests Item	Field Strength of Fundamental Emissions Spectrum Mask, Transmitter Radiated Unwanted Emissions
Test Condition	Radiated measurement
Pretest Mode	☒ 1. NFC-A (ISO 14443-3A)
	☒ 2. NFC-B (ISO 14443-3B)
	☐ 3. NFC-F (ISO 18092)
	☐ 4. NFC-V (ISO 15693)
Mode 2 configuration was pretested and found to be the worst case and measured during the test.	
Operating Mode	CTX
	☒ 1. Adapter Mode
Orthogonal Planes of EUT	Z Plane
	

2.4 Accessories

Accessories Information				
AC Adapter	Brand Name	ENG	Model Name	6A-181WP24
	Power Rating	I/P:100 – 240 Vac,0.6 A,O/P:24 Vdc,0.75 A		
	DC Power Cord	1.8 meter, non-shielded cable, with ferrite core		
USB CABLE	Brand Name	-	Model Name	-
	Signal Line	1.5 meter, D-shielded cable, with ferrite core		

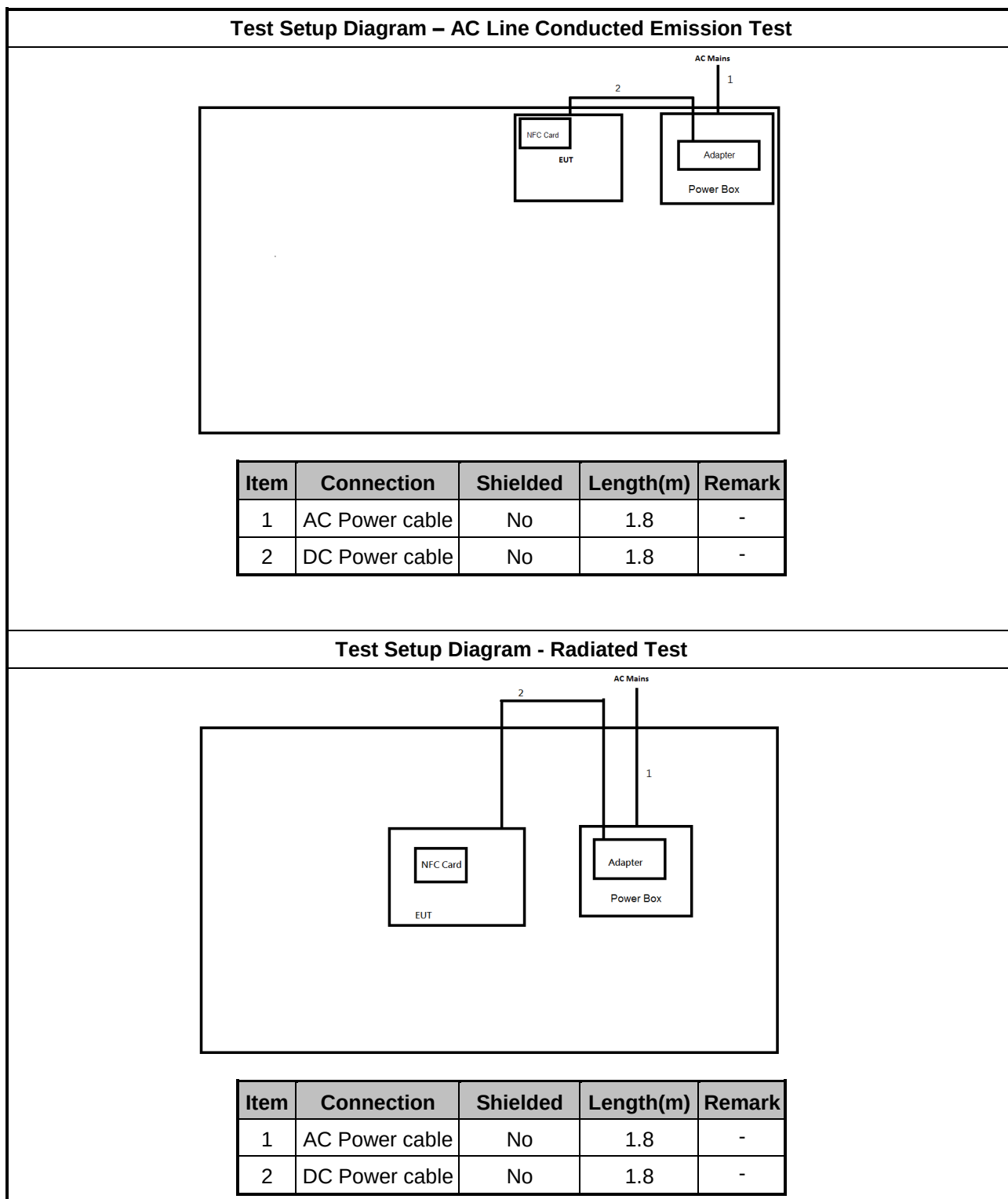
Reminder: Regarding to more detail and other information, please refer to user manual.

2.5 Support Equipment

Support Equipment – AC Conduction / Radiated					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	NFC Card	SPORTON	SPORTON	-	-
2	Notebook	DELL	P48F	-	-
3	Adapter for NB	DELL	AA90PM111	-	-
4	AC Power Cable for NB	Power sync	PW-GPC180-3	-	-

Support Equipment – Conducted					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	AC Power Source	GW	APS-9102	-	-
2	Notebook	DELL	E5410	-	-
3	Adapter for NB	DELL	HA65NM130	-	-
4	NFC Card	-	-	-	-

2.6 Test Setup Diagram



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.

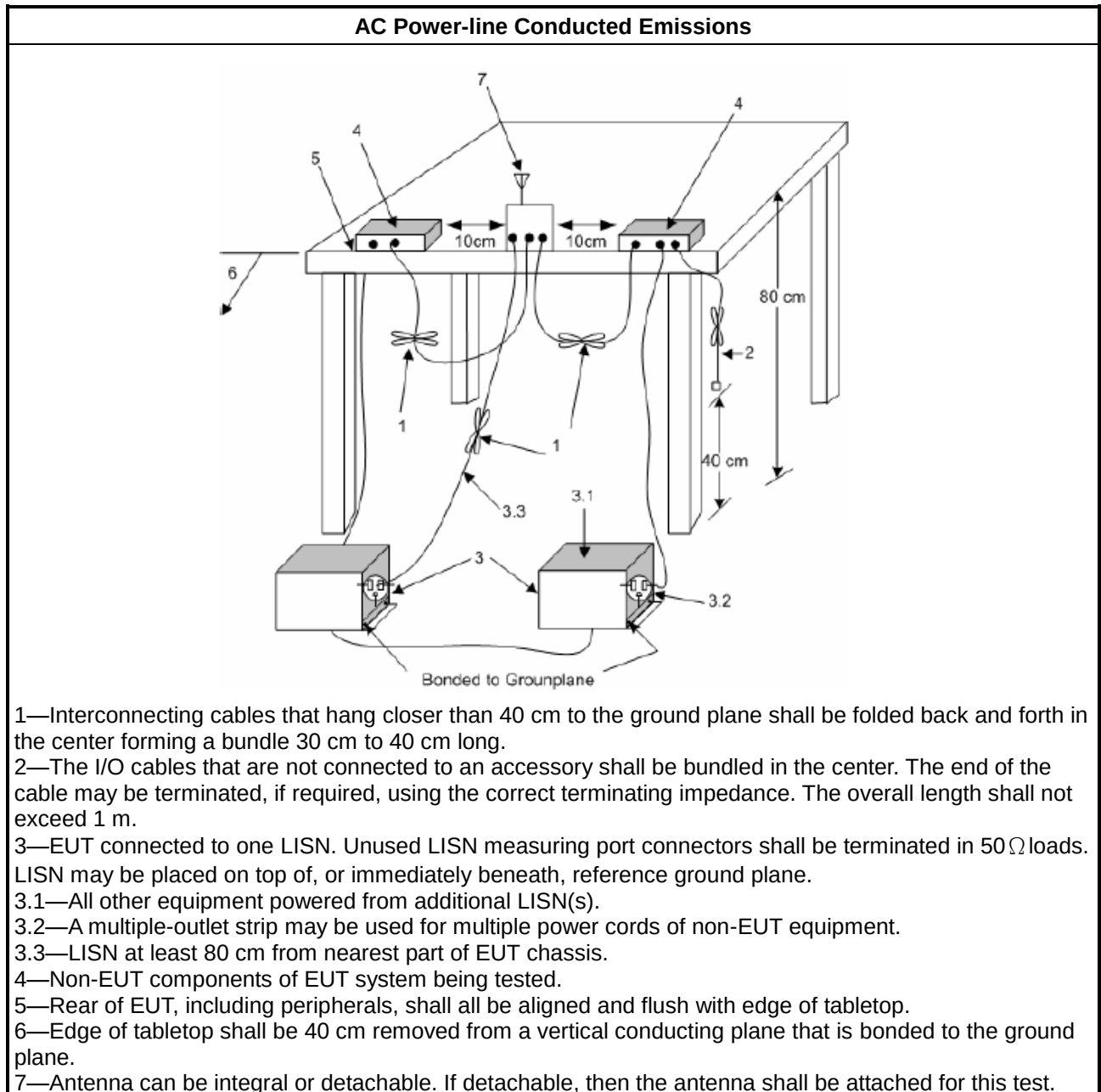
3.1.2 Measuring Instruments

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

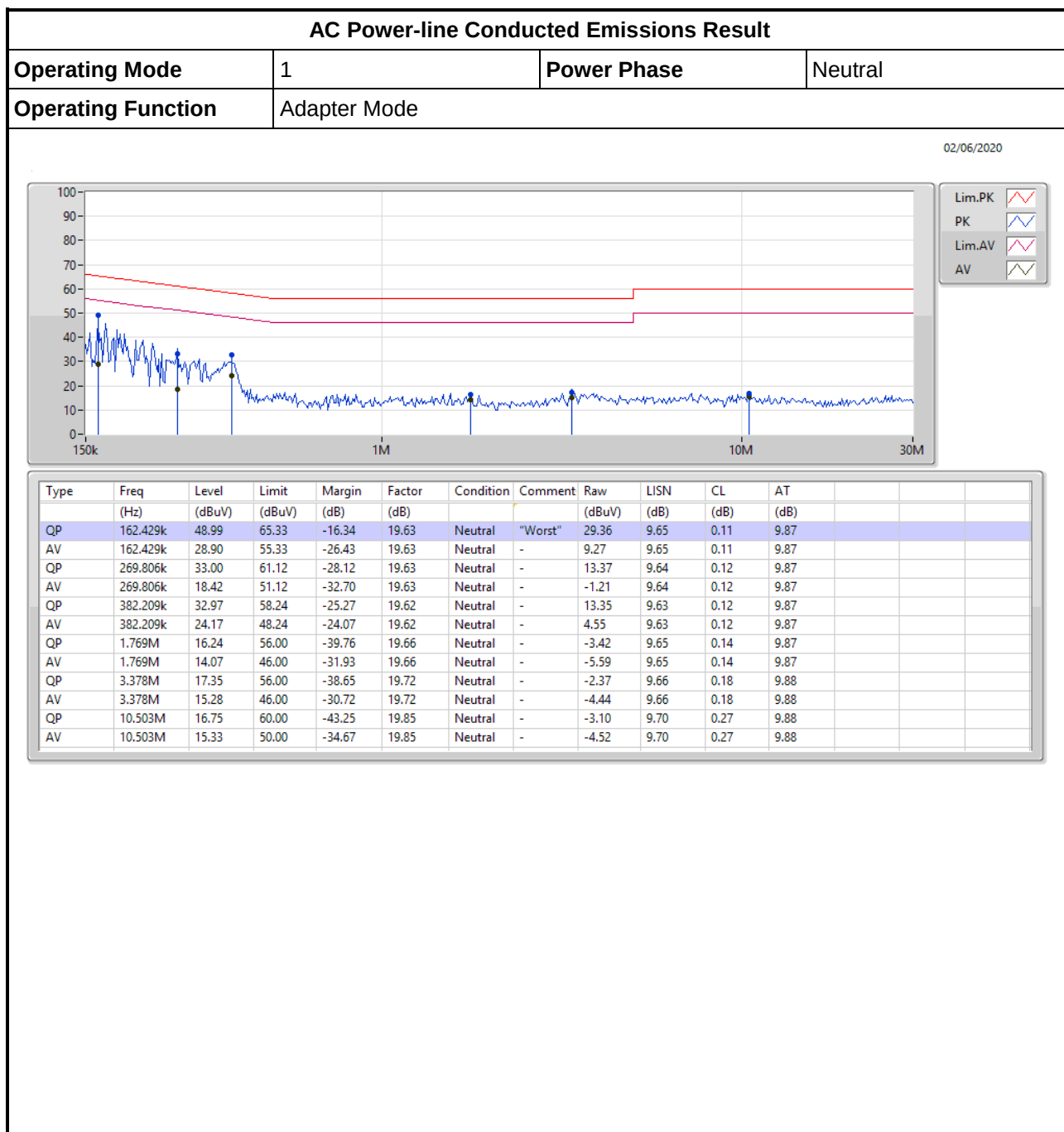
3.1.3 Test Procedures

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



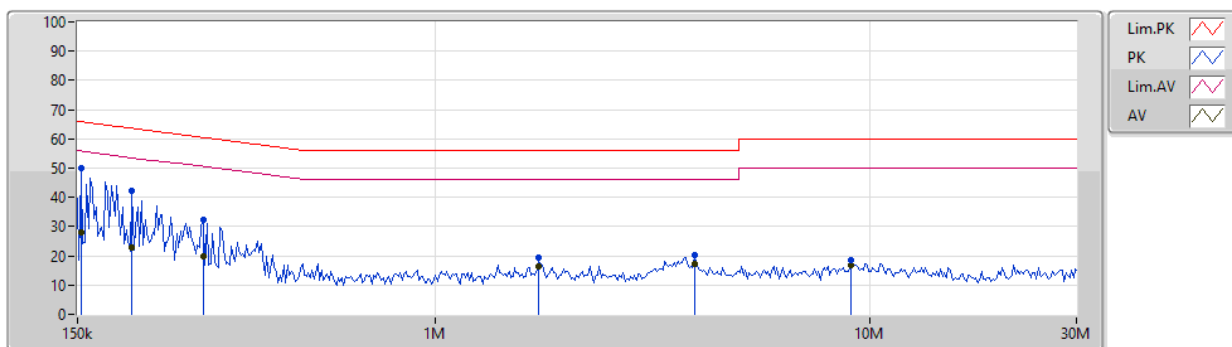
3.1.5 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	Adapter Mode		

02/06/2020



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	153.015k	50.13	65.83	-15.70	19.64	Line	"Worst"	30.49	9.66	0.11	9.87			
AV	153.015k	27.85	55.83	-27.98	19.64	Line	-	8.21	9.66	0.11	9.87			
QP	200.176k	42.11	63.61	-21.50	19.63	Line	-	22.48	9.65	0.11	9.87			
AV	200.176k	22.82	53.61	-30.79	19.63	Line	-	3.19	9.65	0.11	9.87			
QP	292.162k	32.44	60.46	-28.02	19.63	Line	-	12.81	9.64	0.12	9.87			
AV	292.162k	19.71	50.46	-30.75	19.63	Line	-	0.08	9.64	0.12	9.87			
QP	1.734M	19.48	56.00	-36.52	19.66	Line	-	-0.18	9.65	0.14	9.87			
AV	1.734M	16.18	46.00	-29.82	19.66	Line	-	-3.48	9.65	0.14	9.87			
QP	3.961M	20.45	56.00	-35.55	19.73	Line	-	0.72	9.66	0.19	9.88			
AV	3.961M	17.19	46.00	-28.81	19.73	Line	-	-2.54	9.66	0.19	9.88			
QP	9.047M	18.66	60.00	-41.34	19.83	Line	-	-1.17	9.69	0.26	9.88			
AV	9.047M	16.62	50.00	-33.38	19.83	Line	-	-3.21	9.69	0.26	9.88			

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 (13.553 – 13.567 MHz).

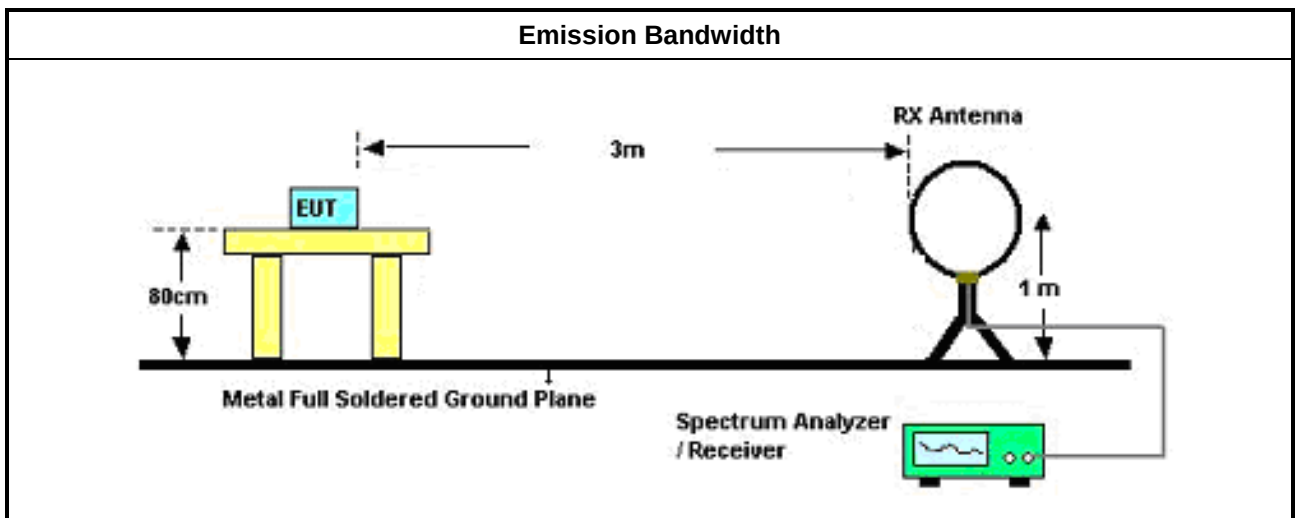
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method	
☒	Because the measured signal is CW or CW-like adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.
☒	For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level.

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Summary

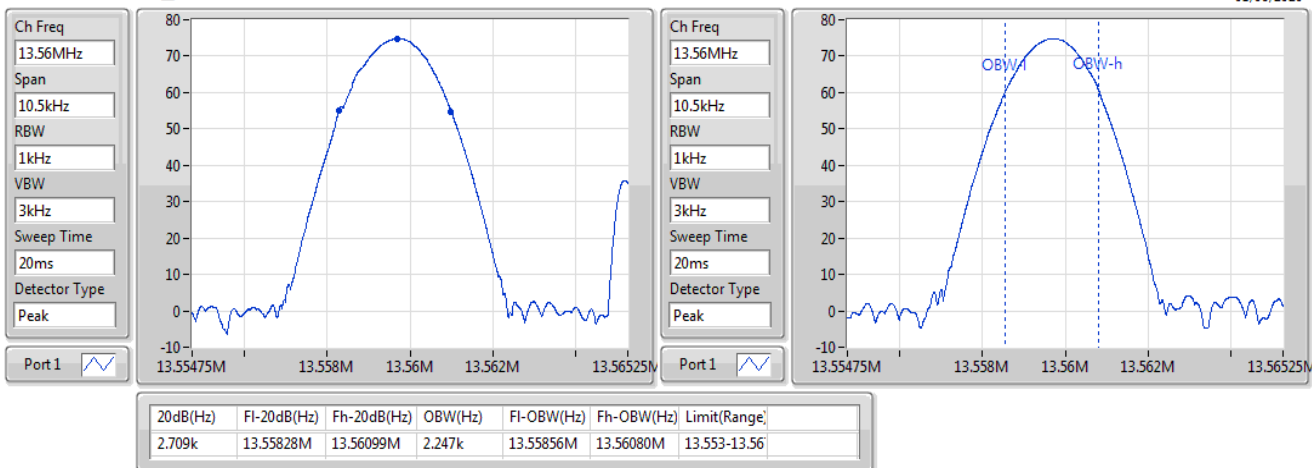
Mode	20dB (Hz)	FI-20dB (Hz)	Fh-20dB (Hz)	OBW (Hz)	Limit (Range)
13.553-13.567MHz	-	-	-	-	-
NFC	2.709k	13.55828M	13.56099M	2.247k	13.553-13.567

Result

Mode	Result	20dB (Hz)	FI-20dB (Hz)	Fh-20dB (Hz)	OBW (Hz)	FI-OBW (Hz)	Fh-OBW (Hz)	Limit (Range)
NFC	-	-	-	-	-	-	-	-
13.56MHz_TnomVnom	Pass	2.709k	13.55828M	13.56099M	2.247k	13.55856M	13.56080M	13.553-13.567

NFC
13.56MHz_TnomVnom
EBW

01/06/2020



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 For FCC					
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 For FCC					
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

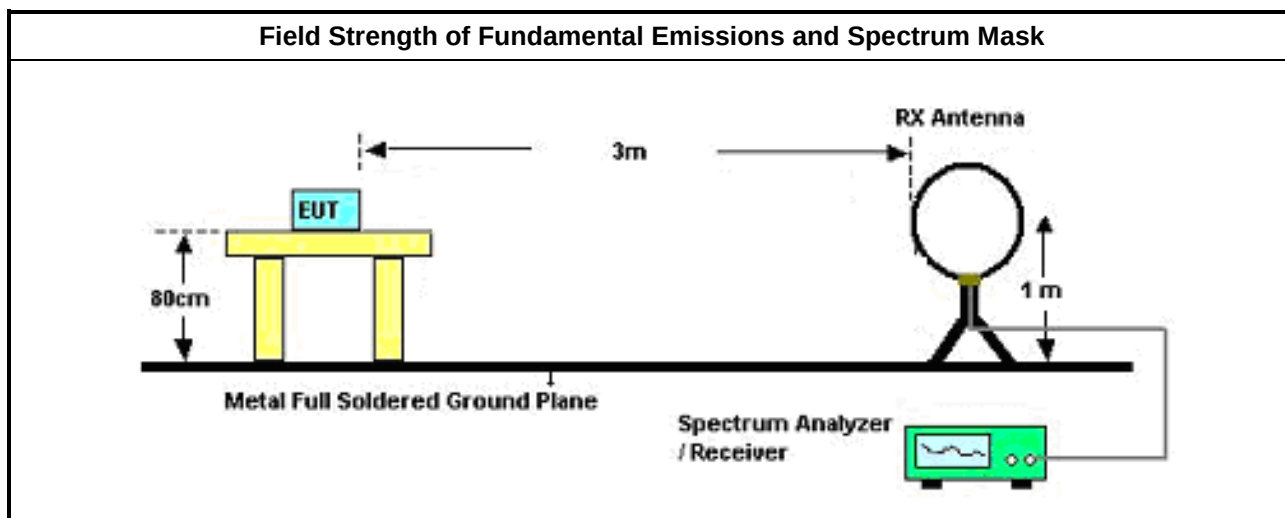
3.3.2 Measuring Instruments

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.

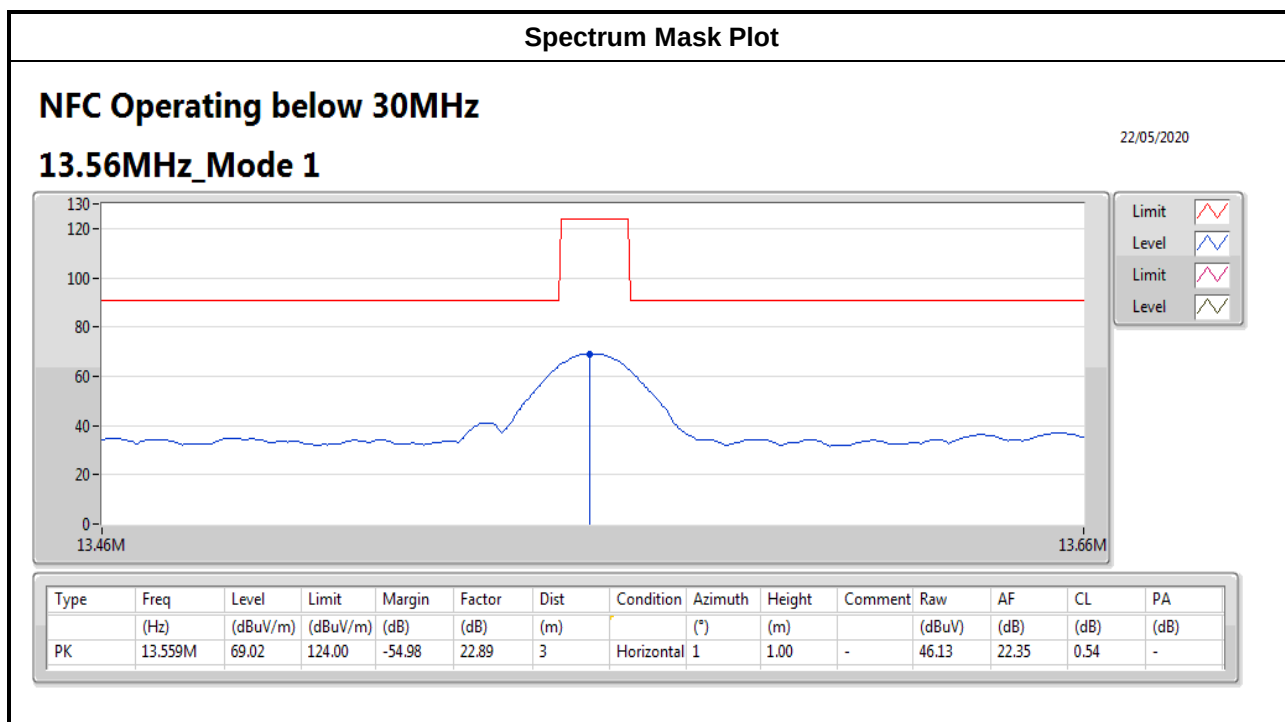
3.3.4 Test Setup



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-B (ISO 14443-3B)	13.56	69.02	H	-54.98	124.00
Result		Complied			

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



3.4 Transmitter Radiated Unwanted Emissions

3.4.1 Transmitter Radiated Unwanted Emissions Limit

Transmitter Radiated Unwanted Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

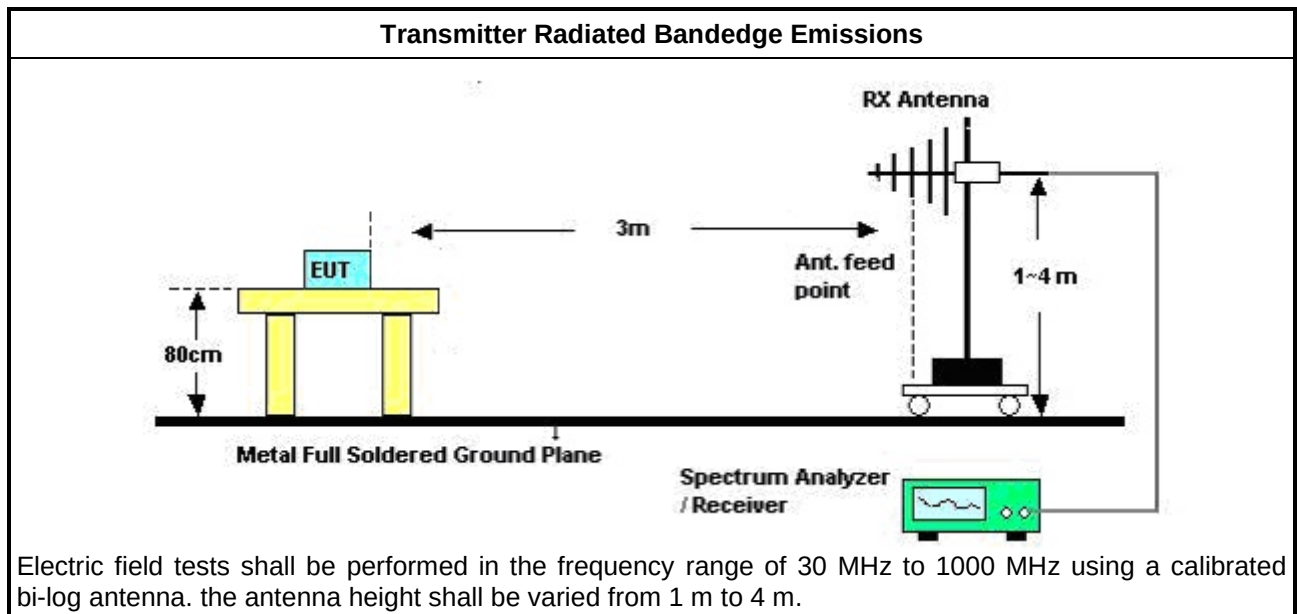
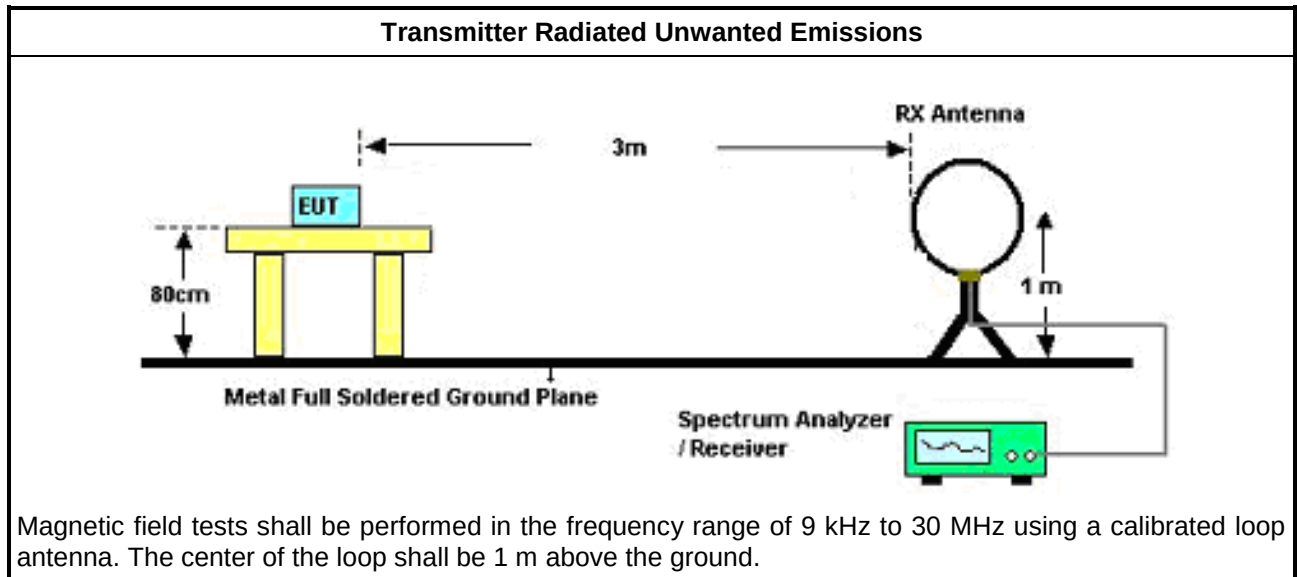
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

Test Method	
☒	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.
☒	KDB 414788 D01 v01r01 Open-Field Test Sites and Chamber Correlation Justification.
☐	Based on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in regulations; however, an attempt should be made to avoid making measurements in the near field.
☐	Open-field site and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

3.4.4 Test Setup



3.4.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Azimuth (°)	Height (m)	Comments
13.553-13.567MHz	-	-	-	-	-	-	-	-	-	-	-
NFC	Pass	PK	27.134M	55.81	69.50	-13.69	23.79	3	360	1.00	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Azimuth (°)	Height (m)	Comments
NFC	-	-	-	-	-	-	-	-	-	-	-
13.56MHz_Mode 1	Pass	PK	13.559M	69.02	124.00	-54.98	22.89	3	1	1.00	-
13.56MHz_Mode 1	Pass	PK	24.228k	28.48	119.90	-91.42	20.95	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	41.712k	28.45	115.19	-86.74	21.27	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	96.984k	34.56	107.85	-73.29	20.06	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	27.134M	55.81	69.50	-13.69	23.79	3	360	1.00	-
13.56MHz_Mode 1	Pass	PK	2.001M	44.54	69.50	-24.96	20.21	3	360	1.00	-
13.56MHz_Mode 1	Pass	PK	627.6k	46.89	71.65	-24.76	20.61	3	360	1.00	-

NFC Operating below 30MHz

22/05/2020

13.56MHz_Mode 1

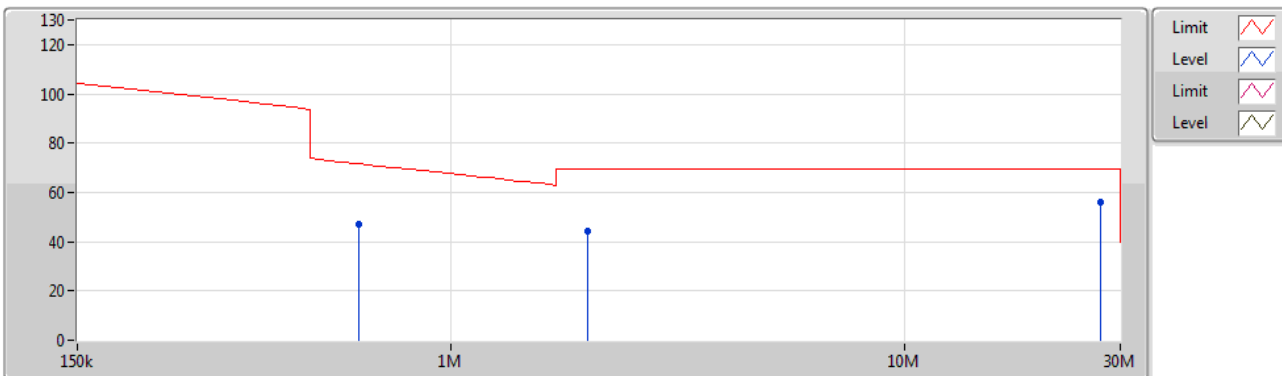


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	24.228k	28.48	119.90	-91.42	20.95	3	Horizontal	0	1.00	-	7.53	20.89	0.06	-
PK	41.712k	28.45	115.19	-86.74	21.27	3	Horizontal	0	1.00	-	7.18	21.20	0.07	-
PK	96.984k	34.56	107.85	-73.29	20.06	3	Horizontal	0	1.00	-	14.50	19.96	0.10	-

NFC Operating below 30MHz

22/05/2020

13.56MHz_Mode 1



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	27.134M	55.81	69.50	-13.69	23.79	3	Horizontal	360	1.00	-	32.02	23.03	0.76	-
PK	2.001M	44.54	69.50	-24.96	20.21	3	Horizontal	360	1.00	-	24.33	20.02	0.19	-
PK	627.6k	46.89	71.65	-24.76	20.61	3	Horizontal	360	1.00	-	26.28	20.47	0.14	-

3.4.6 Transmitter Radiated Unwanted Emissions (Above 30MHz)

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Azimuth (°)	Height (m)	Comments
13.553-13.567MHz	-	-	-	-	-	-	-	-	-	-	-
NFC	Pass	QP	515M	41.98	46.00	-4.02	-1.59	3	216	1.84	-

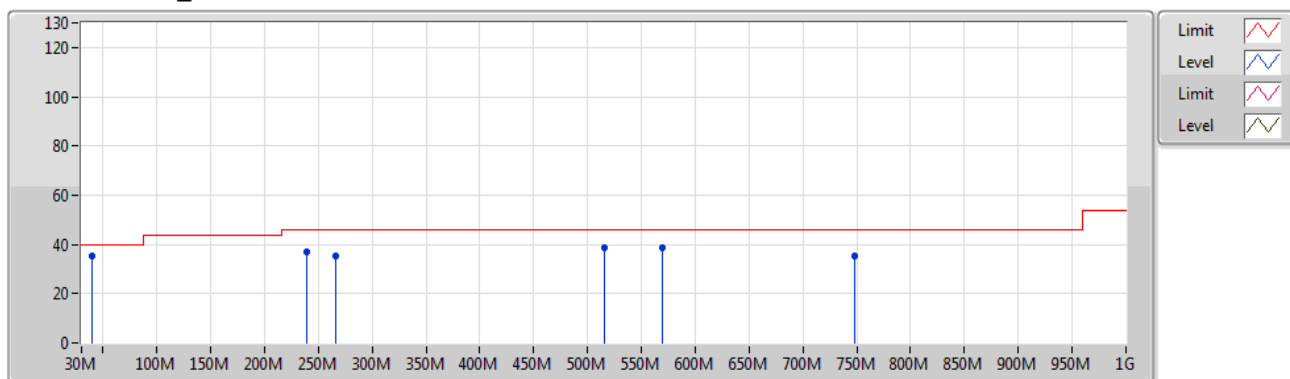
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Azimuth (°)	Height (m)	Comments
NFC	-	-	-	-	-	-	-	-	-	-	-
13.56MHz_Mode 1	Pass	PK	39.7M	35.25	40.00	-4.75	-8.75	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	239.52M	36.84	46.00	-9.16	-7.88	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	266.68M	35.13	46.00	-10.87	-5.81	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	515M	38.47	46.00	-7.53	-1.59	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	569.32M	38.42	46.00	-7.58	-0.35	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	747.8M	35.27	46.00	-10.73	1.41	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	39.7M	31.72	40.00	-8.28	-8.75	3	360	1.00	-
13.56MHz_Mode 1	Pass	PK	239.52M	40.45	46.00	-5.55	-7.88	3	360	1.00	-
13.56MHz_Mode 1	Pass	PK	293.84M	39.13	46.00	-6.87	-5.52	3	360	1.00	-
13.56MHz_Mode 1	Pass	PK	487.84M	40.15	46.00	-5.85	-1.66	3	360	1.00	-
13.56MHz_Mode 1	Pass	PK	747.8M	39.53	46.00	-6.47	1.41	3	360	1.00	-
13.56MHz_Mode 1	Pass	QP	515M	41.98	46.00	-4.02	-1.59	3	216	1.84	-

NFC Operating above 30MHz

23/05/2020

13.56MHz_Mode 1

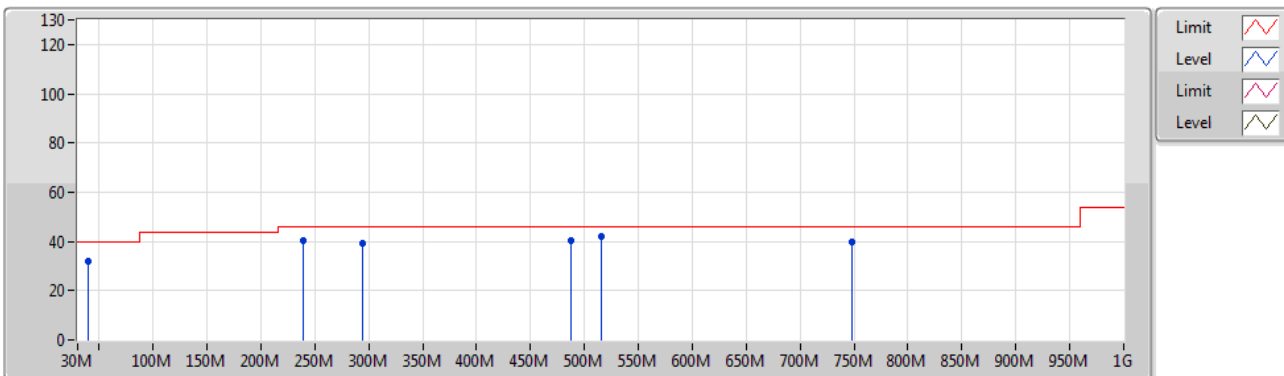


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	39.7M	35.25	40.00	-4.75	-8.75	3	Vertical	0	1.00	-	44.00	17.81	0.99	27.55
PK	239.52M	36.84	46.00	-9.16	-7.88	3	Vertical	0	1.00	-	44.72	16.33	2.54	26.75
PK	266.68M	35.13	46.00	-10.87	-5.81	3	Vertical	0	1.00	-	40.94	18.18	2.70	26.69
PK	515M	38.47	46.00	-7.53	-1.59	3	Vertical	0	1.00	-	40.06	22.51	3.76	27.86
PK	569.32M	38.42	46.00	-7.58	-0.35	3	Vertical	0	1.00	-	38.77	23.69	3.98	28.02
PK	747.8M	35.27	46.00	-10.73	1.41	3	Vertical	0	1.00	-	33.86	24.83	4.59	28.01

NFC Operating above 30MHz

23/05/2020

13.56MHz_Mode 1



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	39.7M	31.72	40.00	-8.28	-8.75	3	Horizontal	360	1.00	-	40.47	17.81	0.99	27.55
PK	239.52M	40.45	46.00	-5.55	-7.88	3	Horizontal	360	1.00	-	48.33	16.33	2.54	26.75
PK	293.84M	39.13	46.00	-6.87	-5.52	3	Horizontal	360	1.00	-	44.65	18.28	2.86	26.66
PK	487.84M	40.15	46.00	-5.85	-1.66	3	Horizontal	360	1.00	-	41.81	22.48	3.63	27.77
PK	747.8M	39.53	46.00	-6.47	1.41	3	Horizontal	360	1.00	-	38.12	24.83	4.59	28.01
QP	515M	41.98	46.00	-4.02	-1.59	3	Horizontal	216	1.84	-	43.57	22.51	3.76	27.86

3.5 Frequency Stability

3.5.1 Frequency Stability Limit

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

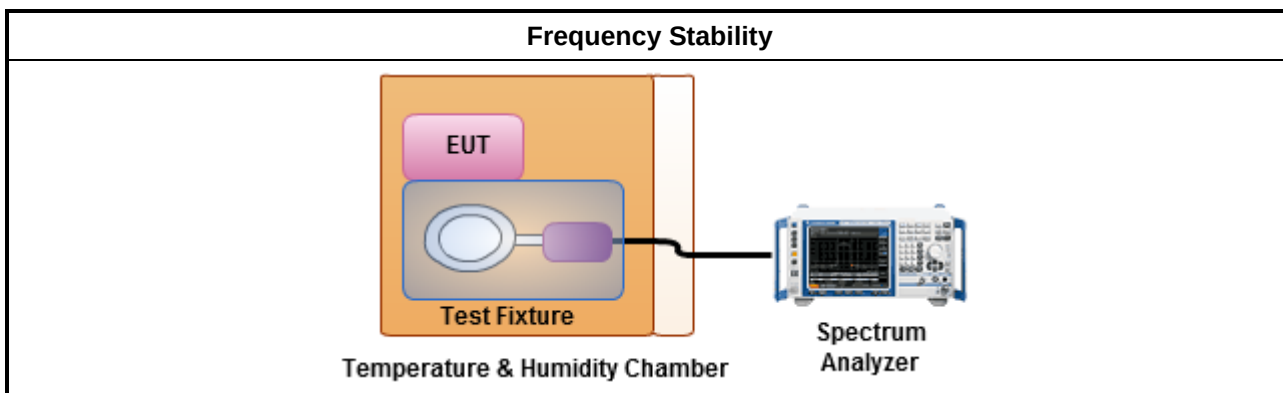
3.5.2 Measuring Instruments

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



3.5.5 Test Result of Frequency Stability

Summary

Mode	Result	Ch (Hz)	Center (Hz)	ppm	Limit (ppm)	Port	Remark
13.553-13.567MHz	-	-	-	-	-	-	-
NFC	Pass	13.56M	13.559691M	22.7784	100	1	0 min

Result

Mode	Result	Ch (Hz)	Center (Hz)	ppm	Limit (ppm)	Port	Remark
NFC	-	-	-	-	-	-	-
13.56MHz_-20°C	Pass	13.56M	13.559727M	20.1327	100	1	0 min
13.56MHz_-20°C	Pass	13.56M	13.559749M	18.5195	100	1	2 min
13.56MHz_-20°C	Pass	13.56M	13.559734M	19.6165	100	1	5 min
13.56MHz_-20°C	Pass	13.56M	13.559714M	21.1007	100	1	10 min
13.56MHz_-10°C	Pass	13.56M	13.559738M	19.3584	100	1	0 min
13.56MHz_-10°C	Pass	13.56M	13.559738M	19.3584	100	1	2 min
13.56MHz_-10°C	Pass	13.56M	13.559726M	20.1973	100	1	5 min
13.56MHz_-10°C	Pass	13.56M	13.559736M	19.4875	100	1	10 min
13.56MHz_0°C	Pass	13.56M	13.559728M	20.0682	100	1	0 min
13.56MHz_0°C	Pass	13.56M	13.559717M	20.8426	100	1	2 min
13.56MHz_0°C	Pass	13.56M	13.559739M	19.2294	100	1	5 min
13.56MHz_0°C	Pass	13.56M	13.559736M	19.4875	100	1	10 min
13.56MHz_10°C	Pass	13.56M	13.559739M	19.2294	100	1	0 min
13.56MHz_10°C	Pass	13.56M	13.559738M	19.3584	100	1	2 min
13.56MHz_10°C	Pass	13.56M	13.559726M	20.1973	100	1	5 min
13.56MHz_10°C	Pass	13.56M	13.559735M	19.552	100	1	10 min
13.56MHz_30°C	Pass	13.56M	13.559736M	19.4875	100	1	0 min
13.56MHz_30°C	Pass	13.56M	13.559694M	22.5848	100	1	2 min
13.56MHz_30°C	Pass	13.56M	13.559714M	21.1007	100	1	5 min
13.56MHz_30°C	Pass	13.56M	13.559702M	22.0041	100	1	10 min
13.56MHz_40°C	Pass	13.56M	13.559734M	19.6165	100	1	0 min
13.56MHz_40°C	Pass	13.56M	13.559732M	19.7456	100	1	2 min
13.56MHz_40°C	Pass	13.56M	13.559734M	19.6165	100	1	5 min
13.56MHz_40°C	Pass	13.56M	13.559732M	19.7456	100	1	10 min
13.56MHz_50°C	Pass	13.56M	13.559724M	20.3263	100	1	0 min
13.56MHz_50°C	Pass	13.56M	13.559724M	20.3909	100	1	2 min
13.56MHz_50°C	Pass	13.56M	13.559713M	21.1652	100	1	5 min
13.56MHz_50°C	Pass	13.56M	13.55972M	20.649	100	1	10 min
13.56MHz_20°C-132V	Pass	13.56M	13.559744M	18.8422	100	1	0 min
13.56MHz_20°C-132V	Pass	13.56M	13.559735M	19.552	100	1	2 min
13.56MHz_20°C-132V	Pass	13.56M	13.559735M	19.552	100	1	5 min
13.56MHz_20°C-132V	Pass	13.56M	13.559737M	19.4229	100	1	10 min
13.56MHz_20°C-120V	Pass	13.56M	13.559691M	22.7784	100	1	0 min



Mode	Result	Ch (Hz)	Center (Hz)	ppm	Limit (ppm)	Port	Remark
13.56MHz_20°C-120V	Pass	13.56M	13.559696M	22.4558	100	1	2 min
13.56MHz_20°C-120V	Pass	13.56M	13.559694M	22.5848	100	1	5 min
13.56MHz_20°C-120V	Pass	13.56M	13.559701M	22.0686	100	1	10 min
13.56MHz_20°C-102V	Pass	13.56M	13.559746M	18.7131	100	1	0 min
13.56MHz_20°C-102V	Pass	13.56M	13.559736M	19.4875	100	1	2 min
13.56MHz_20°C-102V	Pass	13.56M	13.559735M	19.552	100	1	5 min
13.56MHz_20°C-102V	Pass	13.56M	13.559737M	19.4229	100	1	10 min

4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
EMC Receiver	R&S	ESR	102171	9kHz ~ 7GHz	26/Jun/2019	25/Jun/2020
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	05/Nov/2019	04/Nov/2020
RF Cable-CON	MTJ	RG142	CB002-CO	9kHz ~ 200MHz	23/Sep/2019	22/Sep/2020
AC POWER	APC	AFC-11005G	F310050055	47Hz ~ 63Hz 5 ~ 300V	NCR	NCR
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9kHz ~ 30MHz	24/Sep/2019	23/Sep/2020

NCR:Non-Calibration required.

Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101029	10kHz ~ 40GHz	01/Oct/2019	30/Sep/2020
Loop Antenna	TESEQ	HLA 6120	31244	9kHz ~ 30MHz	16/Mar/2020	15/Mar/2021
*TEMP & humidity Chamber	Giant Force	GTH-225-40-CP-AR	MAA1611-005	-40 ~ 100°C 10 ~ 98%RH	09/Dec/2019	08/Dec/2020

Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	30/Aug/2019	29/Aug/2020
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	14/Apr/2020	13/Apr/2021
EMI Test Receiver	R&S	ESR3	102051	9kHz ~ 3.6GHz	28/May/2019	27/May/2020
Bilog Antenna & 6dB Attenuator	SCHAFFNER / EMCI	CBL6112B / N-6-05	22237 / AT-N-0603	30MHz ~ 1GHz	19/Apr/2020	18/Apr/2021
Signal Analyzer	R&S	FSV40	101500	10Hz ~ 40GHz	15/Aug/2019	14/Aug/2020
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	18/Mar/2020	17/Mar/2021
Loop Antenna	TESEQ	HLA 6120	31244	9kHz ~ 30MHz	16/Mar/2020	15/Mar/2021