FCC Test Report

FCC ID	:	**2AEIM-WC4**
Equipment	:	**Wireless Phone Charger**
Brand Name	:	**Tesla**
Model Name	:	**WC4**
Applicant	:	**Tesla Motors, Inc. 3500 Deer Creek Road Palo Alto, California US 94304 United States Of America**
Manufacturer	:	**Tesla Motors, Inc. 3500 Deer Creek Road Palo Alto, California US 94304 United States Of America**
Standard	:	**47 CFR FCC Part 15.225**

The product was received on Sep. 25, 2020, and testing was started from Oct. 21, 2020 and completed on Dec. 16, 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 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.

Approved by: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FR092529AR	01	Initial issue of report	Jan. 11, 2021

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: Ann Hou

1 General Description

1.1 Information

The EUT has two NFC chips and it could transmit/receive simultaneously, and the worst case measured during the test.

1.1.1 RF General Information

RF General Information					
Frequency Range(MHz)	**Type**	**Mode**	**Ch. Frequency (MHz)**	**Channel Number**	**Worst Field Strength (dBuV/m)**
13.553 – 13.567	NFC-A (ISO 14443-3A)	NFC	13.56	1	64.76

Note :
- Field strength performed peak level at 3m.
- Uses a ASK modulation.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type
1	-	-	LOOP PCB

1.1.3 EUT Information

Identify EUT	
NFC Chip	Brand Name : ST25R3914 / Model Name : WC4
Operational Condition	
EUT Power Type	From DC Power Supply
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%	

1.2 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	Daniel	20.5~22.8°C / 51~61%	14/Dec/2020~ 16/Dec/2020
RF Conducted	TH06-HY	Alan	20.1~26.9°C / 50~60%	30/Nov/2020
Radiated Emission	03CH02-HY	Daniel	20.2~22.5°C / 52~64%	21/Oct/2020~ 12/Dec/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	-40°C
-	Tmax	85°C
-	Vnom	12V
-	Vmin	10.8V
-	Vmax	13.2V

2.2 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. DC Power Supply 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 1 configuration was pretested and found to be the worst case and measured during the test.	
Operating Mode	CTX
	1. DC Power Supply mode
Orthogonal Planes of EUT	**Z Plane**
	

2.3 Support Equipment

Support Equipment - AC Conduction				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	DC Power Supply	GW	GPR-3510HD	-
2	AC Power Cable for DC Power Supply	Power sync	PW-GPC180-3	-
3	DC Power cable	MiSUMi	WTN1227-RED	-
4	DC Power cable	MiSUMi	WTN1227-BLACK	-
5	DC Power cable	GW	GPR-3510HD-01-RED	-
6	DC Power cable	GW	GPR-3510HD-01-BLACK	-

Note: Support equipment No.3, 4 was provided by customer.

Support Equipment - RF Conducted				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E5410	-
2	Adapter for Notebook	DELL	HA65NM130	-
3	DC Power Supply	GW	GPS-3030DD	-
4	DC Power cable	MiSUMi	WTN1227-RED	-
5	DC Power cable	MiSUMi	WTN1227-BLACK	-
6	DC Power cable	GW	GPR-3510HD-01-RED	-
7	DC Power cable	GW	GPR-3510HD-01-BLACK	-

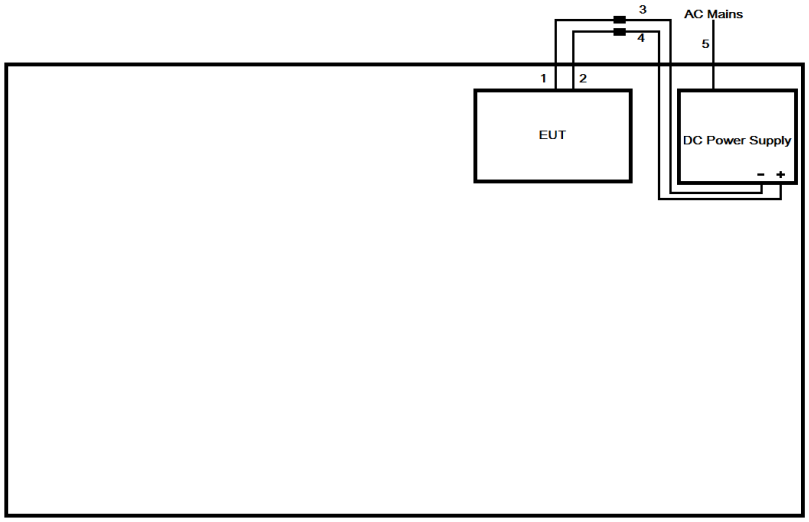
Note: Support equipment No.4, 5 was provided by customer.

Support Equipment - Radiated				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	DC Power Supply	GW	GPR-3510HD	-
2	AC Power Cable for DC Power Supply	Power sync	PW-GPC180-3	-
3	DC Power cable	MiSUMi	WTN1227-RED	-
4	DC Power cable	MiSUMi	WTN1227-BLACK	-
5	DC Power cable	GW	GPR-3510HD-01-RED	-
6	DC Power cable	GW	GPR-3510HD-01-BLACK	-

Note: Support equipment No.3, 4 was provided by customer.

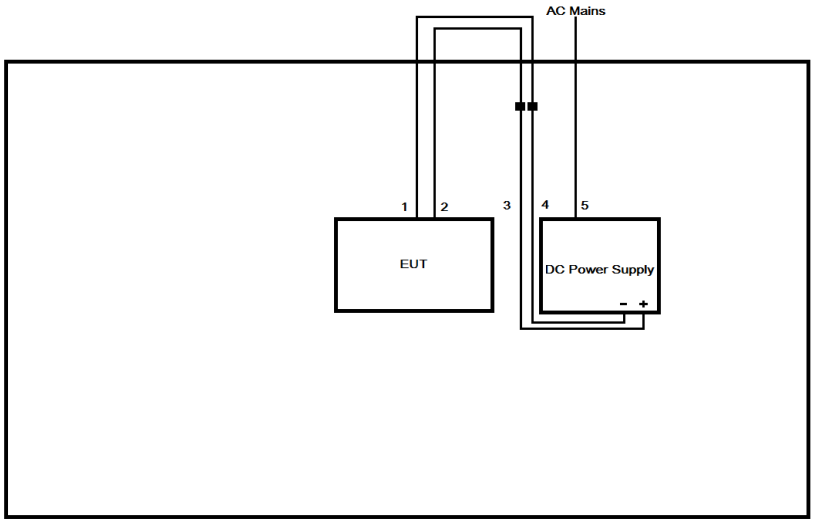
2.4 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)
1	DC Power cable(-)	No	1.7
2	DC Power cable(+)	No	1.7
3	DC Power cable(-)	No	1.0
4	DC Power cable(+)	No	1.0
5	AC Power cable	No	1.8

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)
1	DC Power cable(-)	No	1.7
2	DC Power cable(+)	No	1.7
3	DC Power cable(+)	No	1.0
4	DC Power cable(-)	No	1.0
5	AC Power cable	No	1.8

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

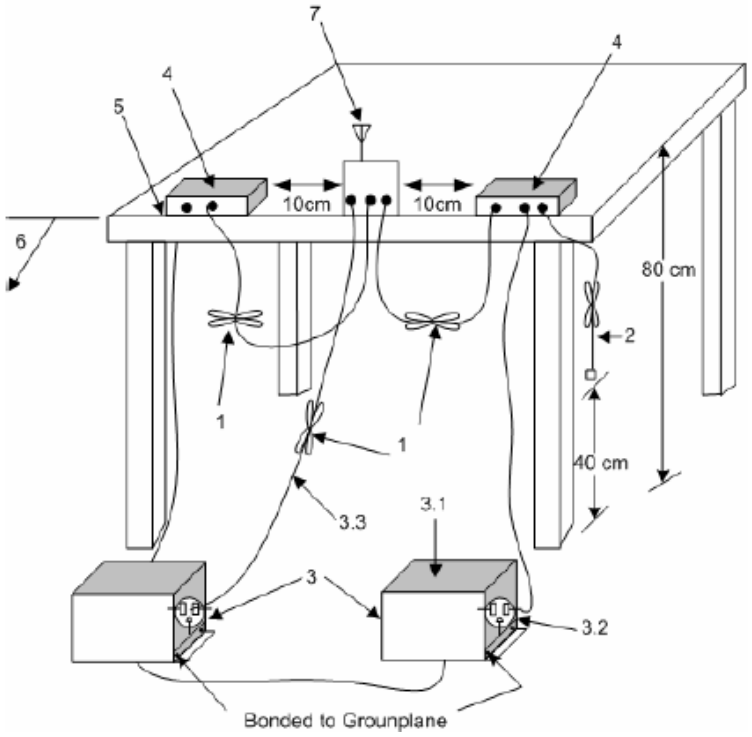
Test Method	
☒	Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.
☒	If AC conducted emissions fall in operating band, then following below test method confirm final result.
☐	Accept measurements done with a suitable dummy load replacing the antenna under the following conditions: (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 Measurement Results Calculation

The measured Level is calculated using:
Corrected Reading: Raw(Read Level) +LISN(LISN Factor) + CL(Cable Loss) + AT(Attenuator).

3.1.5 Test Setup

AC Power-line Conducted Emissions



1—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.
2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50Ω loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
3.1—All other equipment powered from additional LISN(s).
3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
3.3—LISN at least 80 cm from nearest part of EUT chassis.
4—Non-EUT components of EUT system being tested.
5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

3.1.6 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

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).

3.2.2 Measuring Instruments

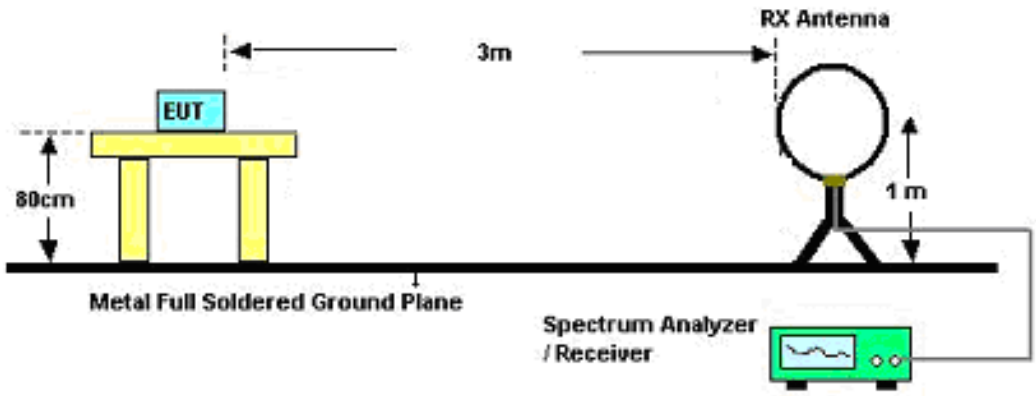
Refer a test equipment and calibration data table in this test report.

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

Emission Bandwidth



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

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

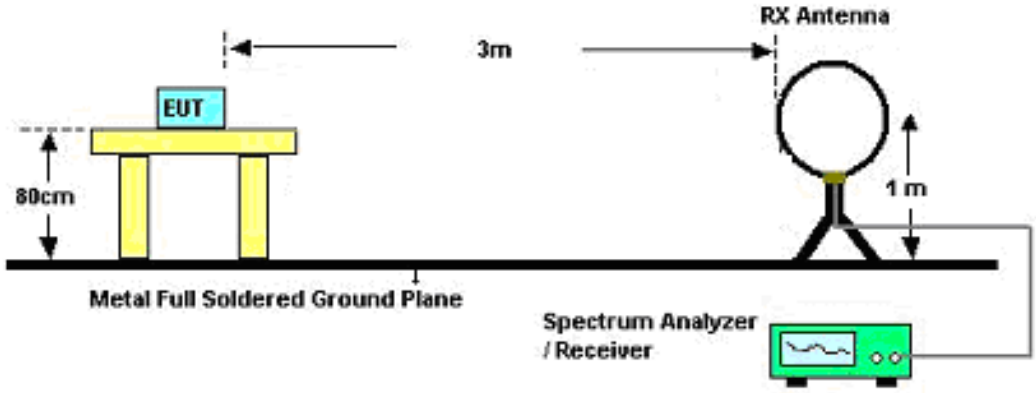
Test Method	
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.
☒	At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements; however, an attempt should be made to avoid making measurements 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 Measurement Results Calculation

The measured Level is calculated using:
Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor).

3.3.5 Test Setup

Field Strength of Fundamental Emissions and Spectrum Mask



3.3.6 Test Result of Field Strength of Fundamental Emissions and Spectrum Mask

Refer as Appendix C

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

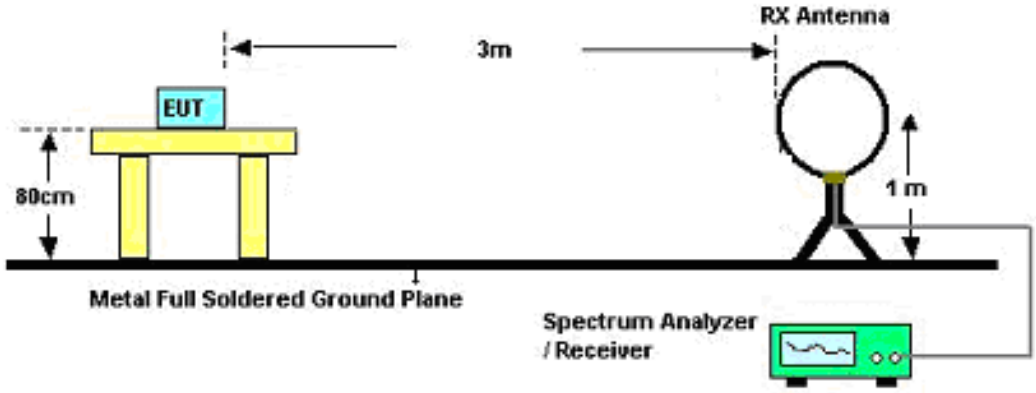
Test Method		
☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m.	
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.	
☒	At frequencies below 30 MHz, measurements may be performed at a distance closer 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 Measurement Results Calculation

The measured Level is calculated using:
Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor)

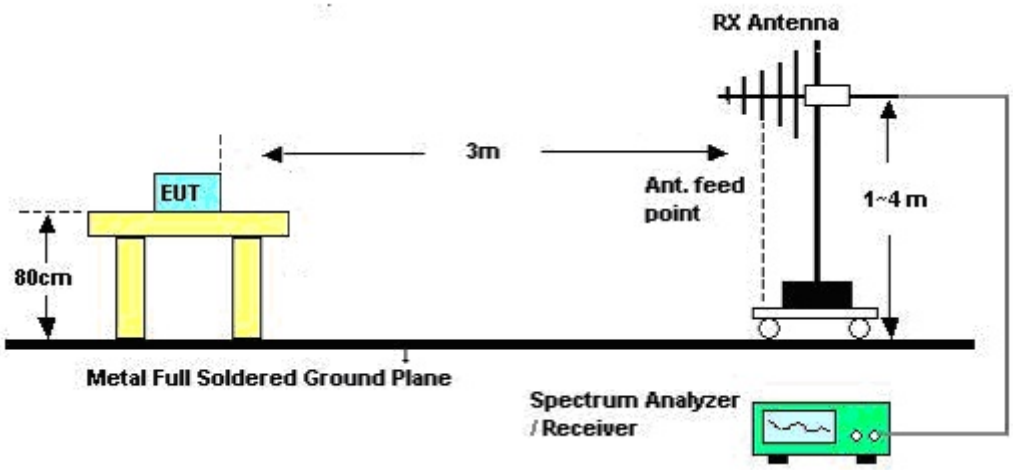
3.4.5 Test Setup

Transmitter Radiated Unwanted Emissions



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

Transmitter Radiated Bandedge Emissions



Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna. the antenna height shall be varied from 1 m to 4 m.

3.4.6 Test Result of Transmitter Radiated Unwanted Emissions

Refer as Appendix C

3.5 Frequency Stability

3.5.1 Frequency Stability Limit

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

3.5.2 Measuring Instruments

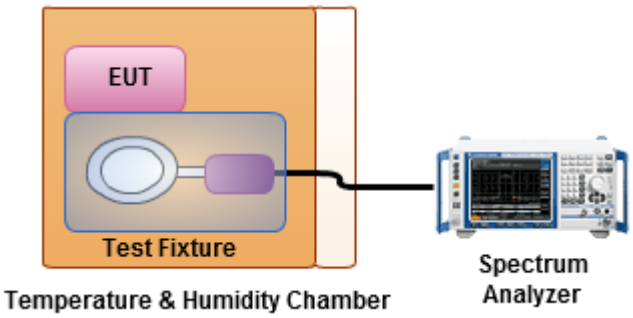
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method	
☒	Refer as ANSI C63.10, clause 6.8 for frequency stability tests
	☒ Frequency stability with respect to ambient temperature
	☒ Frequency stability when varying supply voltage
☐	For conducted measurement.
☒	For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.

3.5.4 Test Setup

Frequency Stability



3.5.5 Test Result of Frequency Stability

Refer as Appendix D

4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR3	102051	9kHz ~ 3.6GHz	29/May/2020	28/May/2021
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	11/Nov/2020	10/Nov/2021
RF Cable-CON	MTJ	RG142	CB002-CO	9kHz ~ 200MHz	31/Aug/2020	30/Aug/2021
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9kHz ~ 30MHz	21/Sep/2020	20/Sep/2021

Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSV 40	101029	10Hz~40GHz	19/Oct/2020	18/Oct/2021
Programmable Temp. & Humi. Chamber	Giant Force	GTH-225-40-CP-AR	MAA1611-005	-40~100℃	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	03CH02-HY	30MHz~1GHz 3m	04/Aug/2020	03/Aug/2021
Signal Analyzer	R&S	FSP40	100593	9kHz~40GHz	27/Feb/2020	26/Feb/2021
Amplifier	Agilent	8447D	2944A11149	100kHz~1.3GHz	30/Jun/2020	29/Jun/2021
Bilog Antenna & 5dB Attenuator	SCHAFFNER / MTJ	CBL 6112B / MTJ6102-05	2723 / 2	30MHz~1GHz	06/Sep/2020	05/Sep/2021
RF Cable-R03m	Jye Bao	RG142	CB017	9kHz~30MHz	20/Jun/2020	19/Jun/2021
RF Cable-R03m	Jye Bao	RG142	CB017	30MHz~1GHz	25/Mar/2020	24/Mar/2021
RF Cable-R03m	HUBER+SUHNER	SUCOFLEX104	805193/4+805192 /4	1GHz~40GHz	08/Apr/2020	07/Apr/2021
Loop Antenna	TESEQ	HLA 6120	31244	9kHz~30MHz	16/Mar/2020	15/Mar/2021
EMI Test Receiver	R&S	ESR3	102051	9kHz~3.6GHz	29/May/2020	28/May/2021

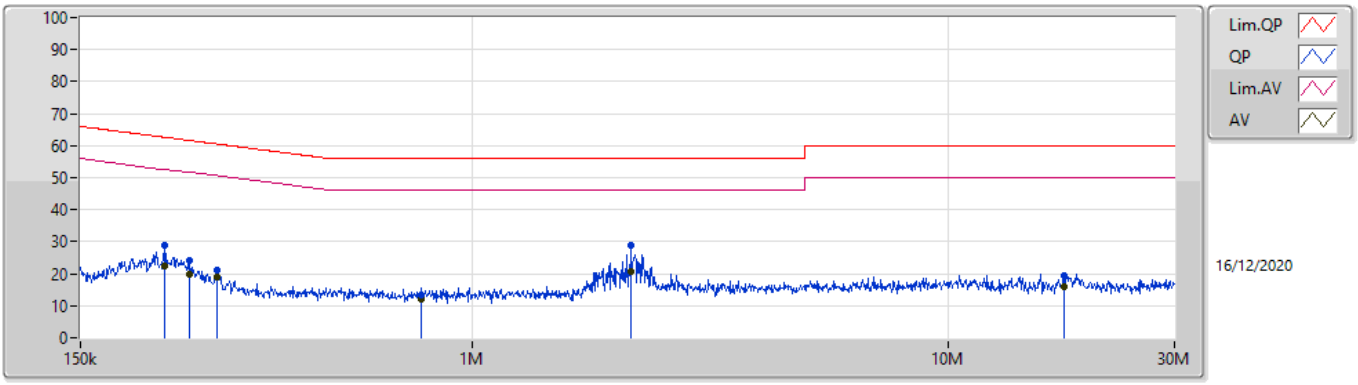
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	2.15M	20.68	46.00	-25.32	Line

Mode Configure

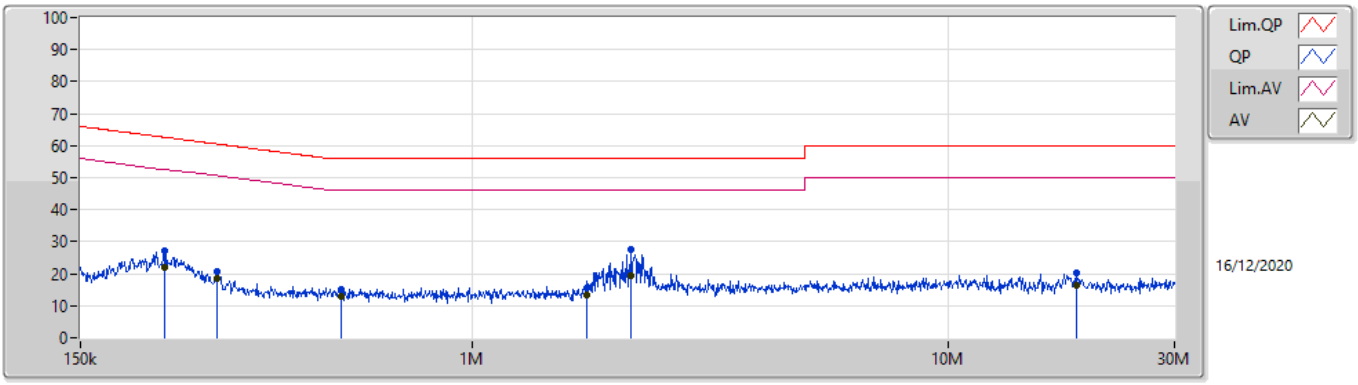
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition	Comments
Mode 1	Pass	QP	225.388k	28.80	62.62	-33.82	Line	-
Mode 1	Pass	AV	225.388k	22.49	52.62	-30.13	Line	-
Mode 1	Pass	QP	255.079k	24.12	61.58	-37.46	Line	-
Mode 1	Pass	AV	255.079k	19.93	51.58	-31.65	Line	-
Mode 1	Pass	QP	290.996k	21.04	60.49	-39.45	Line	-
Mode 1	Pass	AV	290.996k	18.97	50.49	-31.52	Line	-
Mode 1	Pass	QP	780.036k	13.50	56.00	-42.50	Line	-
Mode 1	Pass	AV	780.036k	11.93	46.00	-34.07	Line	-
Mode 1	Pass	QP	2.15M	28.71	56.00	-27.29	Line	-
Mode 1	Pass	AV	2.15M	20.68	46.00	-25.32	Line	“Worst”
Mode 1	Pass	QP	17.626M	19.26	60.00	-40.74	Line	-
Mode 1	Pass	AV	17.626M	15.84	50.00	-34.16	Line	-
Mode 1	Pass	QP	225.388k	27.06	62.62	-35.56	Neutral	-
Mode 1	Pass	AV	225.388k	22.08	52.62	-30.54	Neutral	-
Mode 1	Pass	QP	290.996k	20.77	60.49	-39.72	Neutral	-
Mode 1	Pass	AV	290.996k	18.73	50.49	-31.76	Neutral	-
Mode 1	Pass	QP	529.596k	15.09	56.00	-40.91	Neutral	-
Mode 1	Pass	AV	529.596k	13.04	46.00	-32.96	Neutral	-
Mode 1	Pass	QP	1.747M	15.64	56.00	-40.36	Neutral	-
Mode 1	Pass	AV	1.747M	13.55	46.00	-32.45	Neutral	-
Mode 1	Pass	QP	2.15M	27.39	56.00	-28.61	Neutral	-
Mode 1	Pass	AV	2.15M	19.28	46.00	-26.72	Neutral	“Worst”
Mode 1	Pass	QP	18.713M	20.19	60.00	-39.81	Neutral	-
Mode 1	Pass	AV	18.713M	16.43	50.00	-33.57	Neutral	-

Conducted Emissions at Powerline_Mode 1



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	225.388k	28.80	62.62	-33.82	19.59	Line	-	9.21	9.68	0.01	9.90
AV	225.388k	22.49	52.62	-30.13	19.59	Line	-	2.90	9.68	0.01	9.90
QP	255.079k	24.12	61.58	-37.46	19.59	Line	-	4.53	9.68	0.01	9.90
AV	255.079k	19.93	51.58	-31.65	19.59	Line	-	0.34	9.68	0.01	9.90
QP	290.996k	21.04	60.49	-39.45	19.59	Line	-	1.45	9.67	0.02	9.90
AV	290.996k	18.97	50.49	-31.52	19.59	Line	-	-0.62	9.67	0.02	9.90
QP	780.036k	13.50	56.00	-42.50	19.54	Line	-	-6.04	9.67	0.04	9.83
AV	780.036k	11.93	46.00	-34.07	19.54	Line	-	-7.61	9.67	0.04	9.83
QP	2.15M	28.71	56.00	-27.29	19.57	Line	-	9.14	9.68	0.08	9.81
AV	2.15M	20.68	46.00	-25.32	19.57	Line	"Worst"	1.11	9.68	0.08	9.81
QP	17.626M	19.26	60.00	-40.74	19.85	Line	-	-0.59	9.68	0.27	9.90
AV	17.626M	15.84	50.00	-34.16	19.85	Line	-	-4.01	9.68	0.27	9.90

Conducted Emissions at Powerline_Mode 1



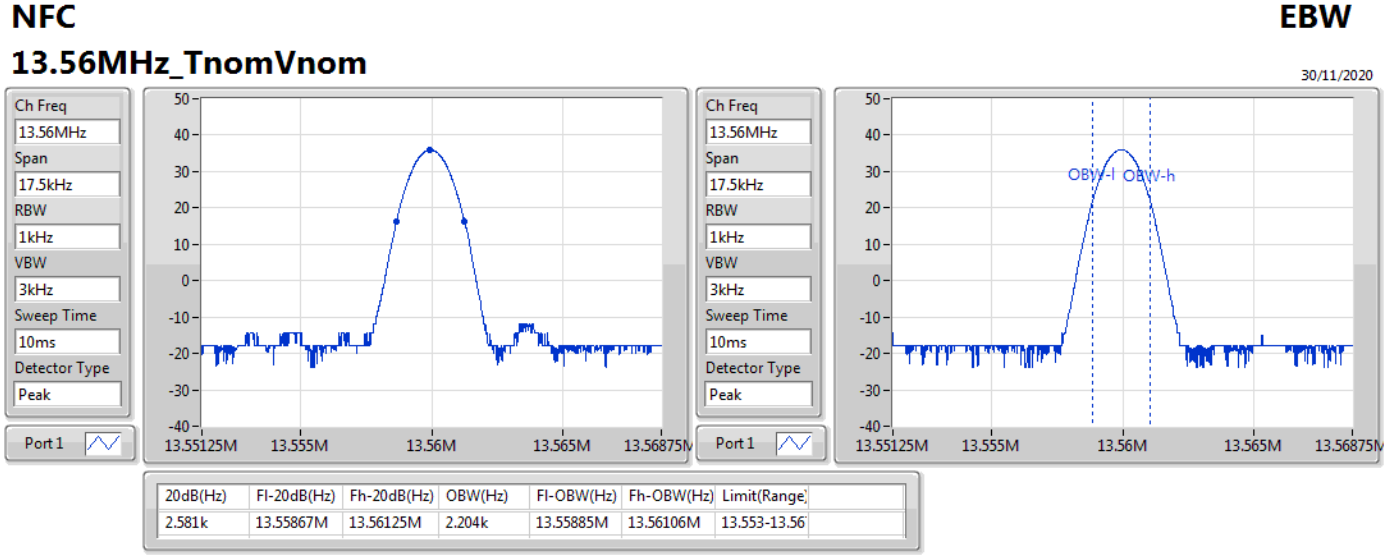
Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	225.388k	27.06	62.62	-35.56	19.59	Neutral	-	7.47	9.68	0.01	9.90
AV	225.388k	22.08	52.62	-30.54	19.59	Neutral	-	2.49	9.68	0.01	9.90
QP	290.996k	20.77	60.49	-39.72	19.59	Neutral	-	1.18	9.67	0.02	9.90
AV	290.996k	18.73	50.49	-31.76	19.59	Neutral	-	-0.86	9.67	0.02	9.90
QP	529.596k	15.09	56.00	-40.91	19.57	Neutral	-	-4.48	9.67	0.03	9.87
AV	529.596k	13.04	46.00	-32.96	19.57	Neutral	-	-6.53	9.67	0.03	9.87
QP	1.747M	15.64	56.00	-40.36	19.55	Neutral	-	-3.91	9.68	0.07	9.80
AV	1.747M	13.55	46.00	-32.45	19.55	Neutral	-	-6.00	9.68	0.07	9.80
QP	2.15M	27.39	56.00	-28.61	19.57	Neutral	-	7.82	9.68	0.08	9.81
AV	2.15M	19.28	46.00	-26.72	19.57	Neutral	"Worst"	-0.29	9.68	0.08	9.81
QP	18.713M	20.19	60.00	-39.81	19.93	Neutral	-	0.26	9.75	0.28	9.90
AV	18.713M	16.43	50.00	-33.57	19.93	Neutral	-	-3.50	9.75	0.28	9.90

Summary

Mode	20dB (Hz)	OBW (Hz)
13.553-13.567MHz		
NFC	2.581k	2.204k

Result

Mode	Result	20dB (Hz)	Fl-20dB (Hz)	Fh-20dB (Hz)	OBW (Hz)	Fl-OBW (Hz)	Fh-OBW (Hz)	Limit (Range)
NFC	-	-	-	-	-	-	-	-
13.56MHz_TnomVnom	Pass	2.581k	13.55867M	13.56125M	2.204k	13.55885M	13.56106M	13.553-13.567


NFC
EBW
13.56MHz_TnomVnom
30/11/2020
Ch Freq
13.56MHz
Span
17.5kHz
RBW
1kHz
VBW
3kHz
Sweep Time
10ms
Detector Type
Peak
Port 1
50
40
30
20
10
0
-10
-20
-30
-40
13.55125M
13.555M
13.56M
13.565M
13.56875M
OBW-l
OBW-h
20dB(Hz)
Fl-20dB(Hz)
Fh-20dB(Hz)
OBW(Hz)
Fl-OBW(Hz)
Fh-OBW(Hz)
Limit(Range)
2.581k
13.55867M
13.56125M
2.204k
13.55885M
13.56106M
13.553-13.56

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	2.06M	49.39	69.50	-20.11	20.21	3	360	1.00	-

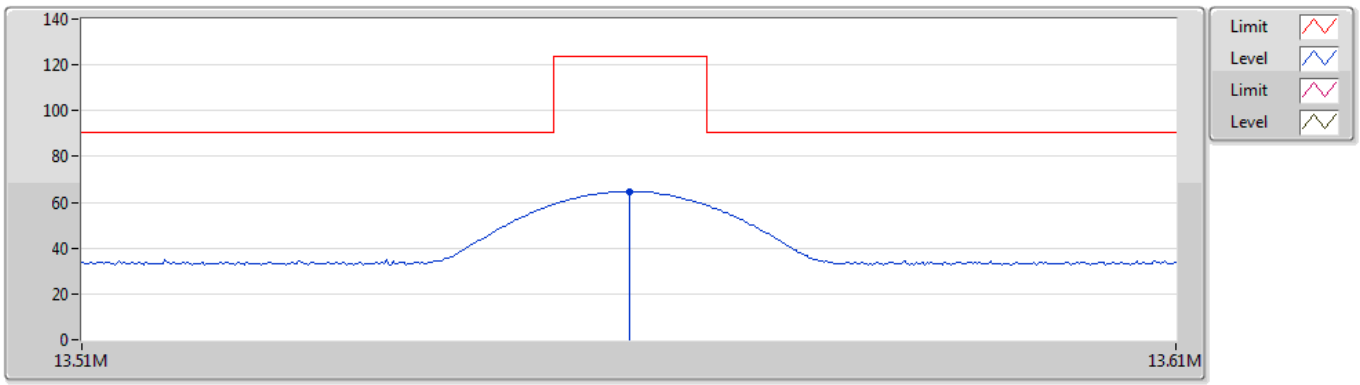
Result

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	13.56M	64.76	124.00	-59.24	22.92	3	136	1.00	-
13.56MHz_Mode 1	Pass	PK	9k	46.24	128.50	-82.26	19.74	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	14.076k	42.11	124.62	-82.51	20.14	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	46.506k	36.48	114.23	-77.75	21.25	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	1.165M	41.68	66.31	-24.63	20.48	3	360	1.00	-
13.56MHz_Mode 1	Pass	PK	1.762M	42.95	69.50	-26.55	20.28	3	360	1.00	-
13.56MHz_Mode 1	Pass	PK	2.06M	49.39	69.50	-20.11	20.21	3	360	1.00	-

NFC Operating below 30MHz

09/12/2020

13.56MHz_Mode 1

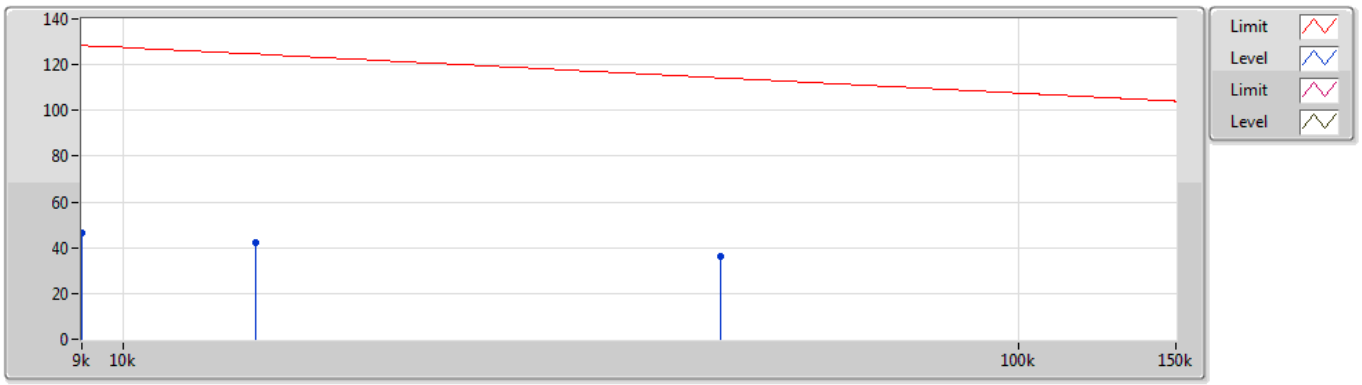


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	13.56M	64.76	124.00	-59.24	22.92	3	Horizontal	136	1.00	-	41.84	22.35	0.57	-

NFC Operating below 30MHz

09/12/2020

13.56MHz_Mode 1

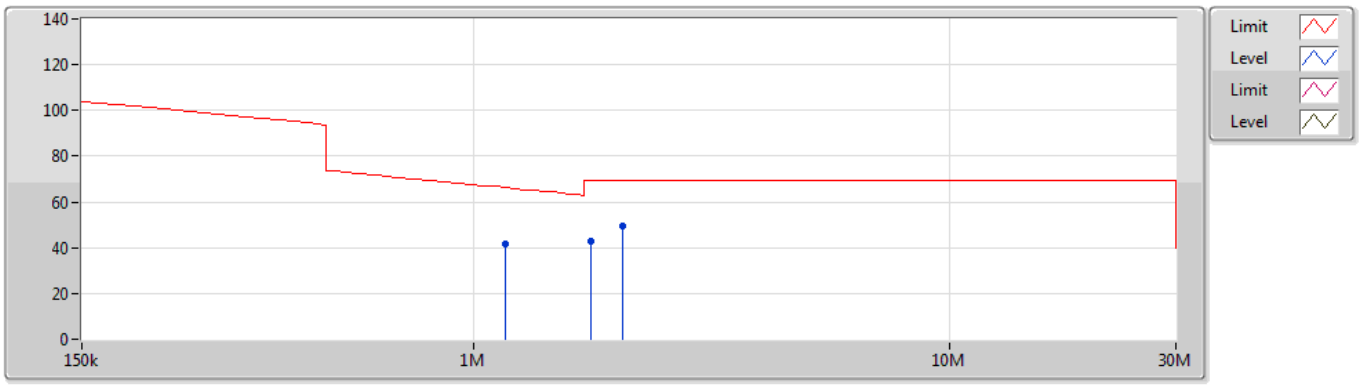


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	9k	46.24	128.50	-82.26	19.74	3	Horizontal	0	1.00	-	26.50	19.70	0.04	-
PK	14.076k	42.11	124.62	-82.51	20.14	3	Horizontal	0	1.00	-	21.97	20.10	0.04	-
PK	46.506k	36.48	114.23	-77.75	21.25	3	Horizontal	0	1.00	-	15.23	21.20	0.05	-

NFC Operating below 30MHz

09/12/2020

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	1.165M	41.68	66.31	-24.63	20.48	3	Horizontal	360	1.00	-	21.20	20.32	0.16	-
PK	1.762M	42.95	69.50	-26.55	20.28	3	Horizontal	360	1.00	-	22.67	20.09	0.19	-
PK	2.06M	49.39	69.50	-20.11	20.21	3	Horizontal	360	1.00	-	29.18	20.01	0.20	-

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	39.7M	36.91	40.00	-3.09	-8.55	3	347	1.00	-

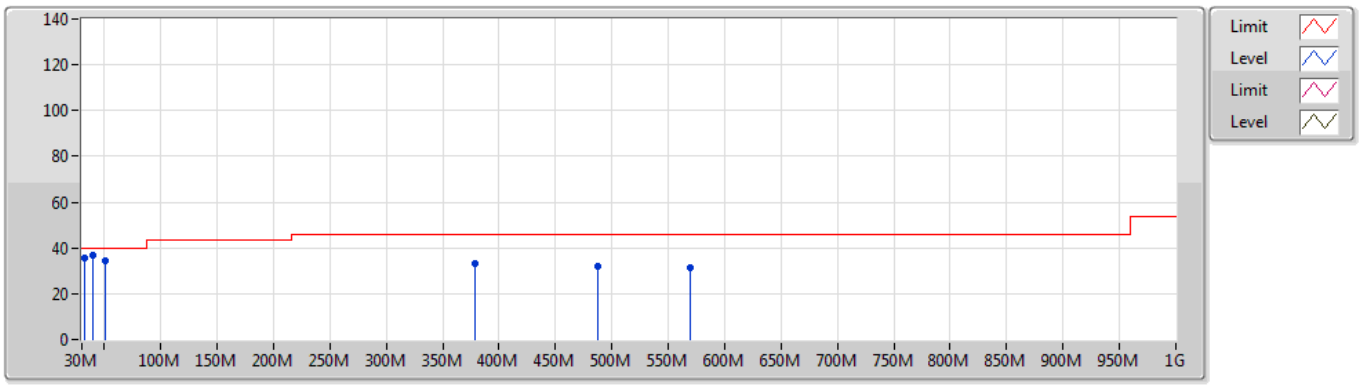
Result

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	31.94M	35.79	40.00	-4.21	-4.32	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	51.34M	34.41	40.00	-5.59	-13.89	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	379.2M	33.41	46.00	-12.59	-4.46	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	487.84M	31.95	46.00	-14.05	-2.01	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	569.32M	31.42	46.00	-14.58	-0.62	3	0	1.00	-
13.56MHz_Mode 1	Pass	QP	39.7M	36.91	40.00	-3.09	-8.55	3	347	1.00	-
13.56MHz_Mode 1	Pass	PK	39.7M	31.79	40.00	-8.21	-8.55	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	51.34M	32.79	40.00	-7.21	-13.89	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	144.46M	28.82	43.50	-14.68	-9.93	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	379.2M	42.48	46.00	-3.52	-4.46	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	406.36M	40.51	46.00	-5.49	-3.34	3	0	1.00	-
13.56MHz_Mode 1	Pass	PK	460.68M	36.32	46.00	-9.68	-2.53	3	0	1.00	-

NFC Operating above 30MHz

09/12/2020

13.56MHz_Mode 1

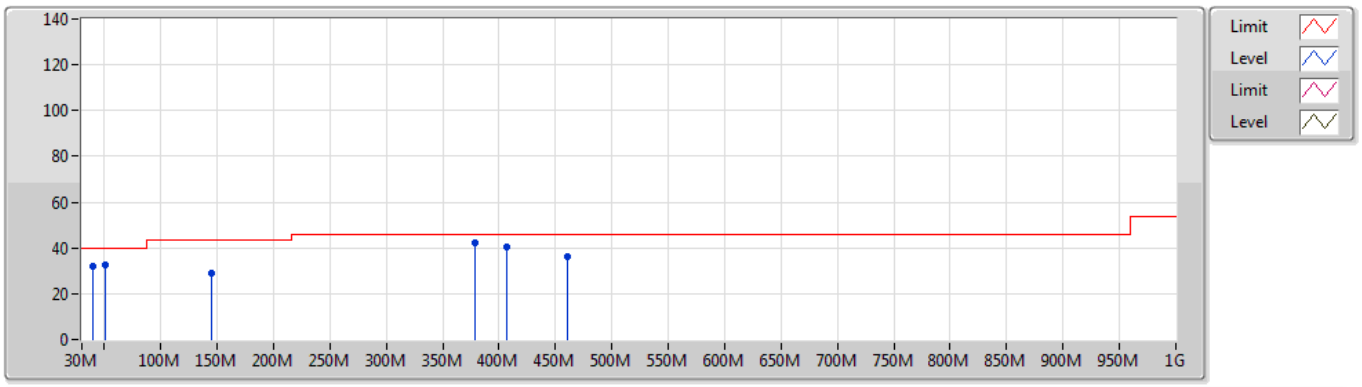


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	31.94M	35.79	40.00	-4.21	-4.32	3	Vertical	0	1.00	-	40.11	22.03	0.74	27.09
PK	51.34M	34.41	40.00	-5.59	-13.89	3	Vertical	0	1.00	-	48.30	12.83	1.00	27.72
PK	379.2M	33.41	46.00	-12.59	-4.46	3	Vertical	0	1.00	-	37.87	20.18	2.92	27.56
PK	487.84M	31.95	46.00	-14.05	-2.01	3	Vertical	0	1.00	-	33.96	22.79	3.43	28.23
PK	569.32M	31.42	46.00	-14.58	-0.62	3	Vertical	0	1.00	-	32.04	24.04	3.68	28.34
QP	39.7M	36.91	40.00	-3.09	-8.55	3	Vertical	347	1.00	-	45.46	17.89	0.89	27.33

NFC Operating above 30MHz

09/12/2020

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	31.79	40.00	-8.21	-8.55	3	Horizontal	0	1.00	-	40.34	17.89	0.89	27.33
PK	51.34M	32.79	40.00	-7.21	-13.89	3	Horizontal	0	1.00	-	46.68	12.83	1.00	27.72
PK	144.46M	28.82	43.50	-14.68	-9.93	3	Horizontal	0	1.00	-	38.75	15.95	1.72	27.60
PK	379.2M	42.48	46.00	-3.52	-4.46	3	Horizontal	0	1.00	-	46.94	20.18	2.92	27.56
PK	406.36M	40.51	46.00	-5.49	-3.34	3	Horizontal	0	1.00	-	43.85	21.40	3.03	27.77
PK	460.68M	36.32	46.00	-9.68	-2.53	3	Horizontal	0	1.00	-	38.85	22.32	3.26	28.11

Summary

Mode	Result	Ch (Hz)	Center (Hz)	ppm	Limit (ppm)	Port	Remark
13.553-13.567MHz	-	-	-	-	-	-	-
NFC	Pass	13.56M	13.559763M	17.5249	100	1	10 min

Result

Mode	Result	Ch (Hz)	Center (Hz)	ppm	Limit (ppm)	Port	Remark
NFC	-	-	-	-	-	-	-
13.56MHz_-40°C	Pass	13.56M	13.560119M	8.7747	100	1	0 min
13.56MHz_-40°C	Pass	13.56M	13.560122M	8.9683	100	1	2 min
13.56MHz_-40°C	Pass	13.56M	13.560122M	8.9683	100	1	5 min
13.56MHz_-40°C	Pass	13.56M	13.560122M	8.9683	100	1	10 min
13.56MHz_-30°C	Pass	13.56M	13.560138M	10.1942	100	1	0 min
13.56MHz_-30°C	Pass	13.56M	13.56014M	10.3232	100	1	2 min
13.56MHz_-30°C	Pass	13.56M	13.560139M	10.2587	100	1	5 min
13.56MHz_-30°C	Pass	13.56M	13.560145M	10.7103	100	1	10 min
13.56MHz_-20°C	Pass	13.56M	13.560131M	9.678	100	1	0 min
13.56MHz_-20°C	Pass	13.56M	13.560131M	9.678	100	1	2 min
13.56MHz_-20°C	Pass	13.56M	13.560124M	9.1618	100	1	5 min
13.56MHz_-20°C	Pass	13.56M	13.560128M	9.4199	100	1	10 min
13.56MHz_-10°C	Pass	13.56M	13.560143M	10.5813	100	1	0 min
13.56MHz_-10°C	Pass	13.56M	13.560143M	10.5813	100	1	2 min
13.56MHz_-10°C	Pass	13.56M	13.560143M	10.5168	100	1	5 min
13.56MHz_-10°C	Pass	13.56M	13.560142M	10.4522	100	1	10 min
13.56MHz_0°C	Pass	13.56M	13.560003M	0.2581	100	1	0 min
13.56MHz_0°C	Pass	13.56M	13.560004M	0.3226	100	1	2 min
13.56MHz_0°C	Pass	13.56M	13.560004M	0.3226	100	1	5 min
13.56MHz_0°C	Pass	13.56M	13.560004M	0.3226	100	1	10 min
13.56MHz_10°C	Pass	13.56M	13.560142M	10.4522	100	1	0 min
13.56MHz_10°C	Pass	13.56M	13.56014M	10.3232	100	1	2 min
13.56MHz_10°C	Pass	13.56M	13.560141M	10.3877	100	1	5 min
13.56MHz_10°C	Pass	13.56M	13.56014M	10.3232	100	1	10 min
13.56MHz_20°C	Pass	13.56M	13.560077M	5.6778	100	1	0 min
13.56MHz_20°C	Pass	13.56M	13.560077M	5.6778	100	1	2 min
13.56MHz_20°C	Pass	13.56M	13.560077M	5.6778	100	1	5 min
13.56MHz_20°C	Pass	13.56M	13.560077M	5.6778	100	1	10 min
13.56MHz_30°C	Pass	13.56M	13.560052M	3.8067	100	1	0 min
13.56MHz_30°C	Pass	13.56M	13.560051M	3.7422	100	1	2 min
13.56MHz_30°C	Pass	13.56M	13.560055M	4.0648	100	1	5 min
13.56MHz_30°C	Pass	13.56M	13.560051M	3.7422	100	1	10 min
13.56MHz_40°C	Pass	13.56M	13.559976M	1.8066	100	1	0 min
13.56MHz_40°C	Pass	13.56M	13.559976M	1.8066	100	1	2 min
13.56MHz_40°C	Pass	13.56M	13.559977M	1.6775	100	1	5 min
13.56MHz_40°C	Pass	13.56M	13.559975M	1.8711	100	1	10 min
13.56MHz_50°C	Pass	13.56M	13.559901M	7.2908	100	1	0 min
13.56MHz_50°C	Pass	13.56M	13.559897M	7.6134	100	1	2 min
13.56MHz_50°C	Pass	13.56M	13.559903M	7.1617	100	1	5 min
13.56MHz_50°C	Pass	13.56M	13.559902M	7.2262	100	1	10 min
13.56MHz_60°C	Pass	13.56M	13.559862M	10.1942	100	1	0 min
13.56MHz_60°C	Pass	13.56M	13.559861M	10.2587	100	1	2 min
13.56MHz_60°C	Pass	13.56M	13.559864M	10.0006	100	1	5 min

Mode	Result	Ch (Hz)	Center (Hz)	ppm	Limit (ppm)	Port	Remark
13.56MHz_60°C	Pass	13.56M	13.55986M	10.3232	100	1	10 min
13.56MHz_70°C	Pass	13.56M	13.559766M	17.2913	100	1	0 min
13.56MHz_70°C	Pass	13.56M	13.559765M	17.3559	100	1	2 min
13.56MHz_70°C	Pass	13.56M	13.559764M	17.4204	100	1	5 min
13.56MHz_70°C	Pass	13.56M	13.559763M	17.4849	100	1	10 min
13.56MHz_80°C	Pass	13.56M	13.59786M	17.2905	100	1	0 min
13.56MHz_80°C	Pass	13.56M	13.559862M	17.3489	100	1	2 min
13.56MHz_80°C	Pass	13.56M	13.560122M	17.4582	100	1	5 min
13.56MHz_80°C	Pass	13.56M	13.560139M	17.4955	100	1	10 min
13.56MHz_85°C	Pass	13.56M	13.559766M	17.3013	100	1	0 min
13.56MHz_85°C	Pass	13.56M	13.559765M	17.3659	100	1	2 min
13.56MHz_85°C	Pass	13.56M	13.559764M	17.5104	100	1	5 min
13.56MHz_85°C	Pass	13.56M	13.559763M	17.5249	100	1	10 min
13.56MHz_20°C-13.2V	Pass	13.56M	13.560071M	5.2261	100	1	0 min
13.56MHz_20°C-13.2V	Pass	13.56M	13.560071M	5.2261	100	1	2 min
13.56MHz_20°C-13.2V	Pass	13.56M	13.56007M	5.1616	100	1	5 min
13.56MHz_20°C-13.2V	Pass	13.56M	13.56006M	4.4519	100	1	10 min
13.56MHz_20°C-12V	Pass	13.56M	13.560073M	5.4197	100	1	0 min
13.56MHz_20°C-12V	Pass	13.56M	13.560071M	5.2261	100	1	2 min
13.56MHz_20°C-12V	Pass	13.56M	13.560073M	5.3552	100	1	5 min
13.56MHz_20°C-12V	Pass	13.56M	13.56007M	5.1616	100	1	10 min
13.56MHz_20°C-10.8V	Pass	13.56M	13.560066M	4.9035	100	1	0 min
13.56MHz_20°C-10.8V	Pass	13.56M	13.560066M	4.9035	100	1	2 min
13.56MHz_20°C-10.8V	Pass	13.56M	13.560063M	4.6454	100	1	5 min
13.56MHz_20°C-10.8V	Pass	13.56M	13.560066M	4.839	100	1	10 min