FCC Radio Test Report

FCC ID	:	**VRSHSD-0087-Q**
Equipment	:	**LCD Monitor**
Brand Name	:	**HP**
Model Name	:	**HSD-0087-Q**
Marketing Name	:	**Engage 16t FHD Monitor, Engage 16t FHD No Stand Monitor , Engage 16t FHD Magnetic Strip Reader Monitor, Engage 16t FHD Magnetic Strip Reader No Stand Monitor, HP Engage 16t No Stand RPOS Touch Monitor, HP Engage 16t NS Touch Mon, HP Engage 16t RPOS Touch Monitor, HP Engage 16t Touch Mon**
Applicant	:	**Qisda Corporation** 157, Shan-Ying Road, Gueishan, Taoyuan 333, Taiwan , R.O.C.
Manufacturer	:	**Qisda Corporation** NO. 157 & 159, SHANYING RD., GUEISHAN DIST., TAOYUAN CITY 33341, TAIWAN, R.O.C.
Standard	:	**47 CFR FCC Part 15.225**

The product was received on Jan. 20, 2021, and testing was started from Feb. 09, 2021 and completed on Feb. 18, 2021. We, SPORTON INTERNATIONAL INC. Hsinhua 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. Hsinhua Laboratory, the test report shall not be reproduced except in full.

Approved by: Allen Lin

SPORTON INTERNATIONAL INC. Hsinhua 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
FR111925AR	01	Initial issue of report	Mar. 10, 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: Debby Hung

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information					
Frequency Range(MHz)	**Type**	**Mode**	**Ch. Frequency (MHz)**	**Channel Number**	**Field Strength (dBuV/m)**
13.553 – 13.567	NFC-A (ISO 14443-3A) NFC-B (ISO 14443-3B) NFC-F (ISO 18092) NFC-V (ISO 15693)	NFC	13.56	1	63.62

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

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector
1	CHILITAG	CT-NFC-B325-01 A	Loop antenna	N/A

1.1.3 EUT Information

Operational Condition		
EUT Power Type		From Adapter
Factory	1	Qisda (Suzhou) Co., Ltd.
	2	Qisda Czech s.r.o
	3	Qisda Optronics (Suzhou) Co., Ltd.
	4	Shanghai Hewiett-Packard Co., Ltd.
	5	HP Singapore Personal Service Division Asia
	6	Hewiett-Packard Company

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 SKU in the following table are all refer to the identical product.

SKU	Model Name	MSR
1	16t	X
2	16ts	V

SKU 1 was pretested and found to be the worst case and measured during the test.

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

Test Lab.：Sporton International Inc. Hsinhua Laboratory				
☒ Hsinhua **(TAF:** 3785**)**	**ADD:** No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, 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**
RF Conducted	TH01-HY	Vivi	20.1~26.9°C / 50~60%	09/Feb/2021
Radiated	03CH03-HY	Billy	20.1~22.5°C / 50~60%	10/Feb/2021~18/Feb/2021
AC Conduction	CO04-HY	Daniel	20.4~21.7°C / 51~62%	10/Feb/2021~11/Feb/2021
☐ Wen 33rd.St. **(TAF:** 3785**)**	**ADD:** No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)			
	TEL: 886-3-318-0787	**FAX:** 886-3-318-0287		
Test site Designation No. TW0008 with FCC.				

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
TnomVnom	Tnom	20°C
-	Vnom	120V
Freq. Stability	Abbreviation	Remark
-20°C	-	-
-10°C	-	-
0°C	-	-
10°C	-	-
20°C	-	-
30°C	-	-
40°C	-	-
50°C	-	-
20°C-138V	-	-
20°C-120V	-	-
20°C-102V	-	-

2.2 Test Channel Mode

Test Software Version	Engage-NFC-tool

Mode	Power Setting
NFC	-
13.56MHz	default

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 3 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	**Y Plane**
	
Worst Planes of EUT	V

2.4 Accessories

Accessories				
AC Adapter	Brand Name	HP	Model Name	TPN-DA17
	Manufacturer	Delta		
	Power Rating	I/P: 100 - 240Vac, 1.7A, O/P: 19.5 Vdc, 3.33A		
	Power Cord	1.75 meter, shielded cable,w/o ferrite core		
USB-A to USB-C Cable	Brand Name	HOTRON	Model Name	TY.5K390.01D
	Power Cord	1.75meter, shielded cable, w/o ferrite core		
USB-C to USB-C Cable	Brand Name	GREATCHINACOM	Model Name	TY.5K390.01A
	Power Cord	1.75meter, shielded cable, w/o ferrite core		
Display Cable	Brand Name	Comlink	Model Name	TY.5K390.01B
	Power Cord	1.65meter, shielded cable, w/o ferrite core		
POWER Cable	Brand Name	I-SHENG	Model Name	SP-305B+IS-034
	Power Cord	1.65meter, non-shielded cable, w/o ferrite core		

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

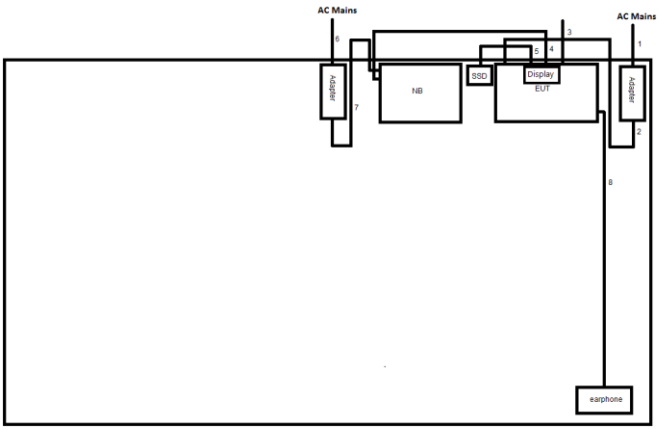
2.5 Support Equipment

Support Equipment - AC Conduction & Radiated			
No.	**Equipment**	**Brand Name**	**Model Name**
1	AC Power cable	Power Sync	PW-GPC180-3
2	Notebook	Lenovo	TP00106A
3	AC Adapter (for NB)	Lenovo	ADLX65YDC3D
4	Earphone	Apple	MD827FE/A
5	Display	HP	TPC-TR01

Support Equipment - RF Conducted			
No.	**Equipment**	**Brand Name**	**Model Name**
1	Notebook	DELL	E5410
2	Adapter for NB	DELL	HA65NM130

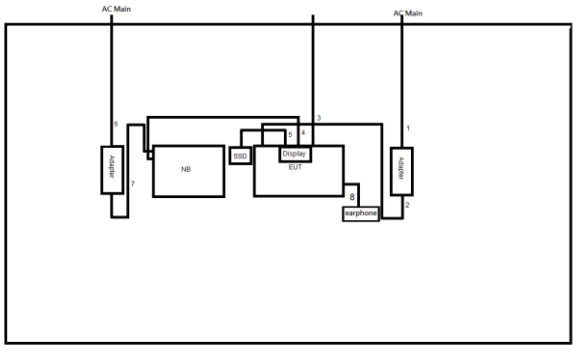
2.6 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power cable	No	1.65	-
2	DC Power cable	YES	1.75	-
3	Display Cable	YES	1.65	-
4	USB-C to USB-C Cable	YES	1.75	-
5	USB-A to USB-C Cable	YES	1.75	-
6	AC Power cable	No	1.8	-
7	DC Power cable	No	1.8	-
8	Audio cable	No	1.25	-

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power cable	No	1.65	-
2	DC Power cable	YES	1.75	-
3	Display Cable	YES	1.65	-
4	USB-C to USB-C Cable	YES	1.75	-
5	USB-A to USB-C Cable	YES	1.75	-
6	AC Power cable	No	1.8	-
7	DC Power cable	No	1.8	-
8	Audio cable	No	1.25	-

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

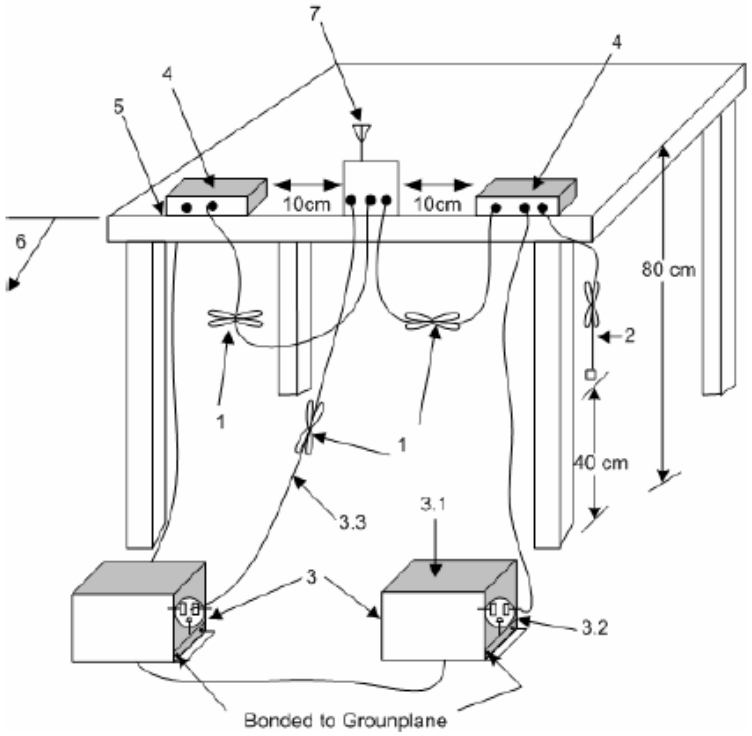
Test Method	
☒	Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.
☒	If AC conducted emissions fall in operating band, then following below test method confirm final result.
☐	Accept measurements done with a suitable dummy load replacing the antenna under the following conditions: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

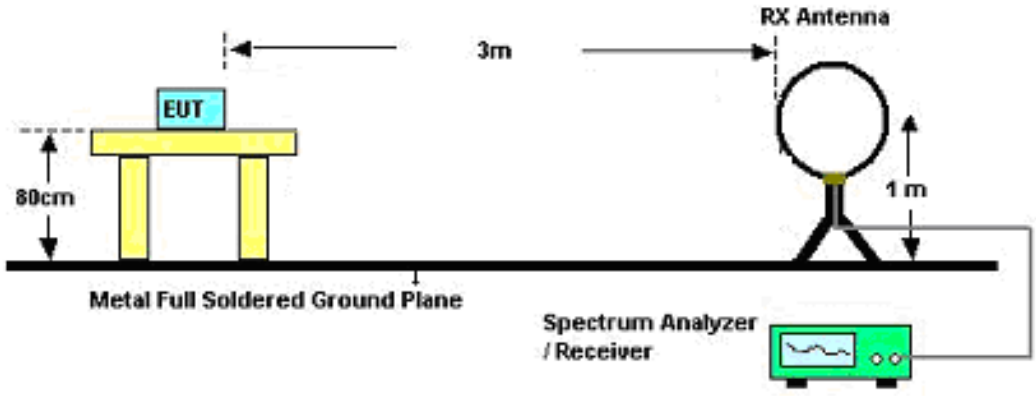
Refer a test equipment and calibration data table in this test report.

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

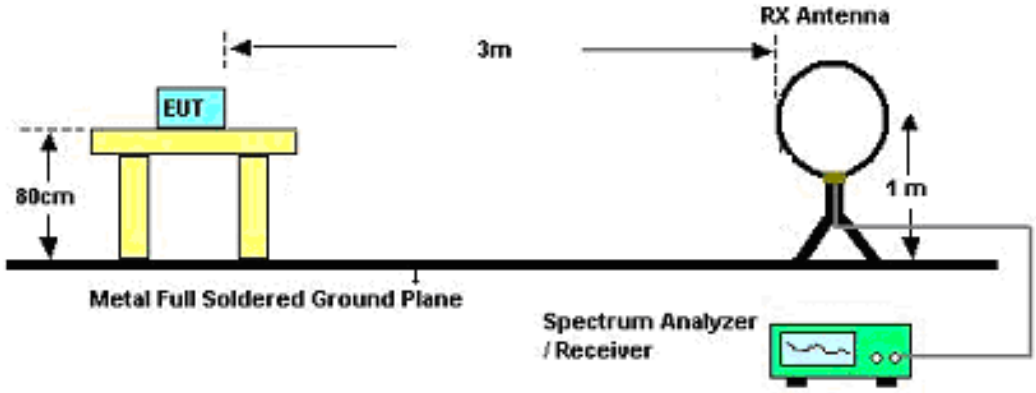
Test Method	
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.
☒	At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements; however, an attempt should be made to avoid making measurements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

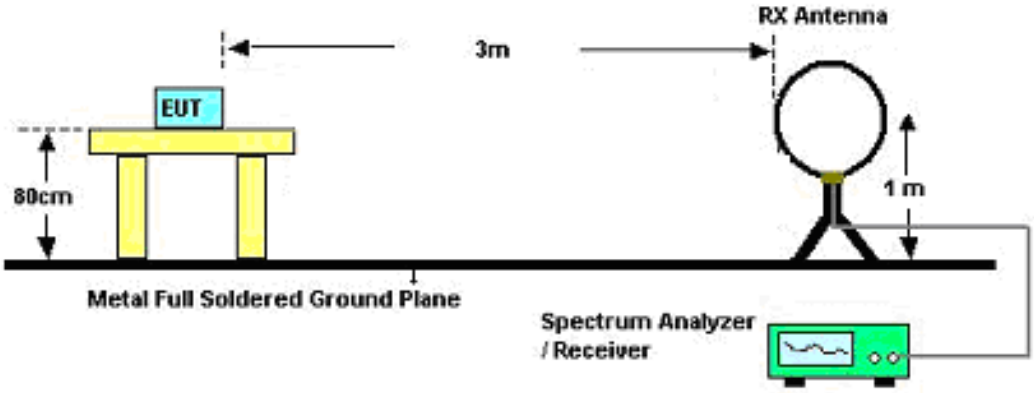
Test Method		
☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m.	
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.	
☒	At frequencies below 30 MHz, measurements may be performed at a distance closer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

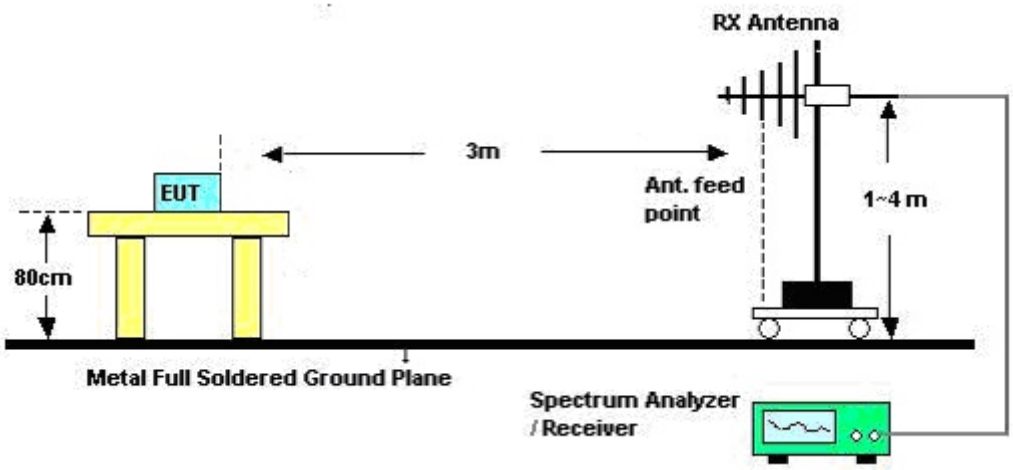
3.4.5 Test Setup

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 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

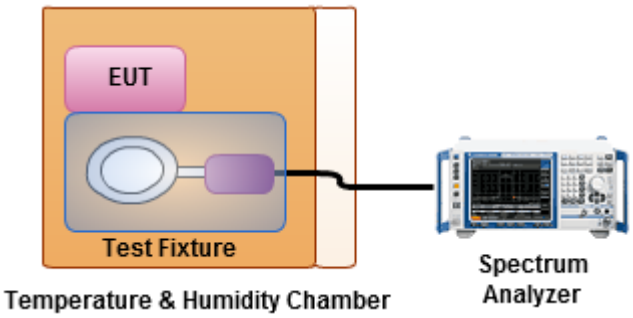
Refer a test equipment and calibration data table in this test report.

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 / Brand Name	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 / Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSV 40	101013	10Hz~40GHz	19/Mar/2020	18/Mar/2021
Programmable Temp. & Humi. Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20~100℃	15/May/2020	14/May/2021

Instrument for Radiated Test

Instrument	Manufacturer / Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	06/Aug/2020	05/Aug/2021
Signal Analyzer	R&S	FSV40	101500	10Hz~40GHz	19/Aug/2020	18/Aug/2021
Amplifier	HP	8447D	2944A08033	10kHz~1.3GHz	14/Apr/2020	13/Apr/2021
Bilog Antenna & 6dB Attenuator	SCHAFFNER / EMCI	CBL6112B / N-6-05	22237 / AT-N-0603	30MHz~1GHz	25/Oct/2020	24/Oct/2021
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz~30MHz	19/Jun/2020	18/Jun/2021
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	18/Mar/2020	17/Mar/2021
Loop Antenna	TESEQ	HLA 6120	31244	9kHz~30MHz	16/Mar/2020	15/Mar/2021

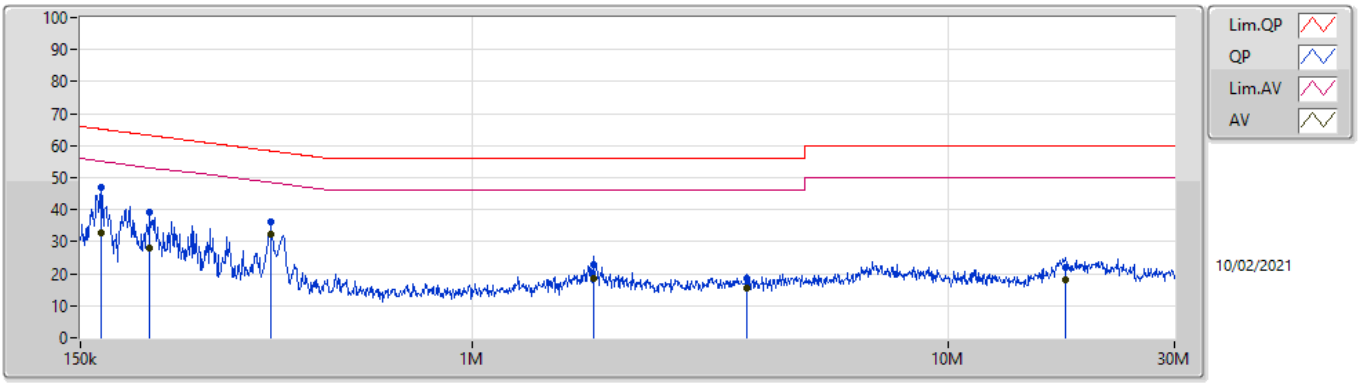
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	377.206k	32.31	48.33	-16.02	Line

Mode Configure

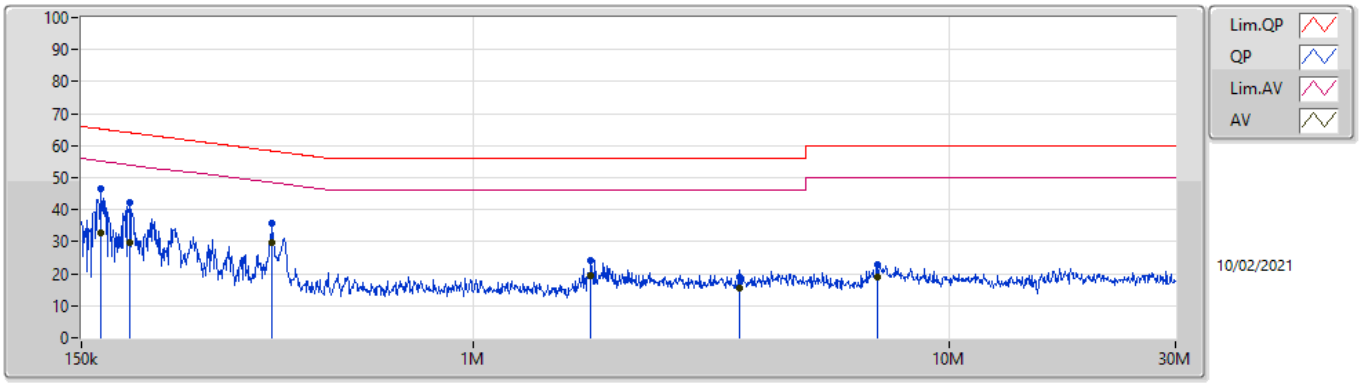
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition	Comments
Mode 1	Pass	QP	165.743k	46.82	65.18	-18.36	Line	-
Mode 1	Pass	AV	165.743k	32.78	55.18	-22.40	Line	-
Mode 1	Pass	QP	209.76k	39.17	63.21	-24.04	Line	-
Mode 1	Pass	AV	209.76k	28.03	53.21	-25.18	Line	-
Mode 1	Pass	QP	377.206k	36.23	58.33	-22.10	Line	-
Mode 1	Pass	AV	377.206k	32.31	48.33	-16.02	Line	-
Mode 1	Pass	QP	1.797M	22.80	56.00	-33.20	Line	-
Mode 1	Pass	AV	1.797M	18.35	46.00	-27.65	Line	-
Mode 1	Pass	QP	3.79M	18.65	56.00	-37.35	Line	-
Mode 1	Pass	AV	3.79M	15.69	46.00	-30.31	Line	-
Mode 1	Pass	QP	17.696M	21.81	60.00	-38.19	Line	-
Mode 1	Pass	AV	17.696M	18.16	50.00	-31.84	Line	-
Mode 1	Pass	QP	165.082k	46.54	65.20	-18.66	Neutral	-
Mode 1	Pass	AV	165.082k	32.70	55.20	-22.50	Neutral	-
Mode 1	Pass	QP	189.08k	42.27	64.07	-21.80	Neutral	-
Mode 1	Pass	AV	189.08k	29.77	54.07	-24.30	Neutral	-
Mode 1	Pass	QP	377.206k	35.59	58.33	-22.74	Neutral	-
Mode 1	Pass	AV	377.206k	29.88	48.33	-18.45	Neutral	-
Mode 1	Pass	QP	1.768M	23.96	56.00	-32.04	Neutral	-
Mode 1	Pass	AV	1.768M	19.38	46.00	-26.62	Neutral	-
Mode 1	Pass	QP	3.627M	19.16	56.00	-36.84	Neutral	-
Mode 1	Pass	AV	3.627M	15.73	46.00	-30.27	Neutral	-
Mode 1	Pass	QP	7.065M	22.91	60.00	-37.09	Neutral	-
Mode 1	Pass	AV	7.065M	18.99	50.00	-31.01	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	165.743k	46.82	65.18	-18.36	19.60	Line	-	27.22	9.69	0.01	9.90
AV	165.743k	32.78	55.18	-22.40	19.60	Line	-	13.18	9.69	0.01	9.90
QP	209.76k	39.17	63.21	-24.04	19.59	Line	-	19.58	9.68	0.01	9.90
AV	209.76k	28.03	53.21	-25.18	19.59	Line	-	8.44	9.68	0.01	9.90
QP	377.206k	36.23	58.33	-22.10	19.59	Line	-	16.64	9.67	0.02	9.90
AV	377.206k	32.31	48.33	-16.02	19.59	Line	-	12.72	9.67	0.02	9.90
QP	1.797M	22.80	56.00	-33.20	19.56	Line	-	3.24	9.68	0.08	9.80
AV	1.797M	18.35	46.00	-27.65	19.56	Line	-	-1.21	9.68	0.08	9.80
QP	3.79M	18.65	56.00	-37.35	19.70	Line	-	-1.05	9.69	0.12	9.89
AV	3.79M	15.69	46.00	-30.31	19.70	Line	-	-4.01	9.69	0.12	9.89
QP	17.696M	21.81	60.00	-38.19	19.85	Line	-	1.96	9.68	0.27	9.90
AV	17.696M	18.16	50.00	-31.84	19.85	Line	-	-1.69	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	165.082k	46.54	65.20	-18.66	19.60	Neutral	-	26.94	9.69	0.01	9.90
AV	165.082k	32.70	55.20	-22.50	19.60	Neutral	-	13.10	9.69	0.01	9.90
QP	189.08k	42.27	64.07	-21.80	19.59	Neutral	-	22.68	9.68	0.01	9.90
AV	189.08k	29.77	54.07	-24.30	19.59	Neutral	-	10.18	9.68	0.01	9.90
QP	377.206k	35.59	58.33	-22.74	19.59	Neutral	-	16.00	9.67	0.02	9.90
AV	377.206k	29.88	48.33	-18.45	19.59	Neutral	-	10.29	9.67	0.02	9.90
QP	1.768M	23.96	56.00	-32.04	19.55	Neutral	-	4.41	9.68	0.07	9.80
AV	1.768M	19.38	46.00	-26.62	19.55	Neutral	-	-0.17	9.68	0.07	9.80
QP	3.627M	19.16	56.00	-36.84	19.69	Neutral	-	-0.53	9.69	0.11	9.89
AV	3.627M	15.73	46.00	-30.27	19.69	Neutral	-	-3.96	9.69	0.11	9.89
QP	7.065M	22.91	60.00	-37.09	19.79	Neutral	-	3.12	9.71	0.18	9.90
AV	7.065M	18.99	50.00	-31.01	19.79	Neutral	-	-0.80	9.71	0.18	9.90

Summary

Mode	20dB (Hz)	OBW (Hz)
13.553-13.567MHz	-	-
NFC	2.59k	2.213k

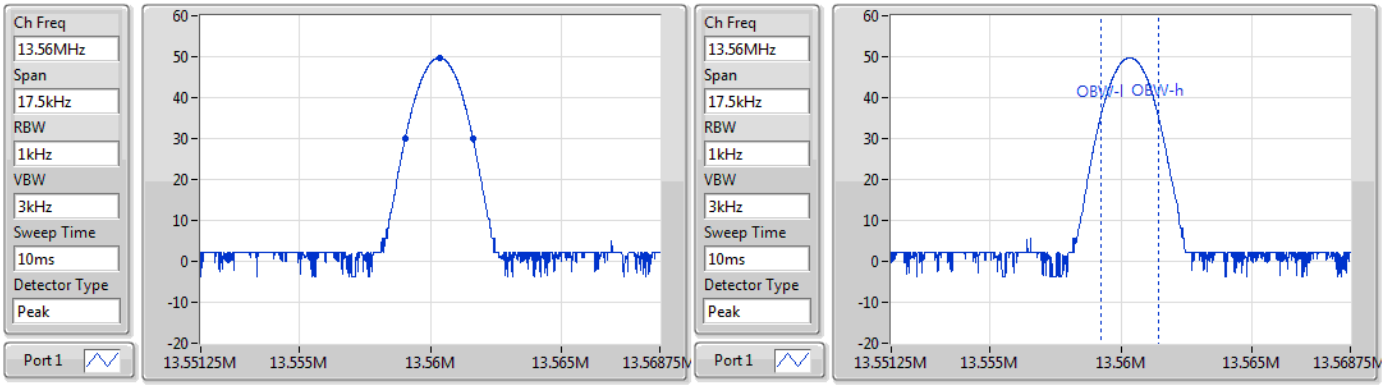
Result

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	2.59k	13.55904M	13.56163M	2.213k	13.55922M	13.56143M	13.553-13.567

NFC **EBW**

13.56MHz_TnomVnom

09/02/2021



20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Range
2.59k	13.55904M	13.56163M	2.213k	13.55922M	13.56143M	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	1.583M	52.02	63.66	-11.64	20.34	3	0	1.00	-

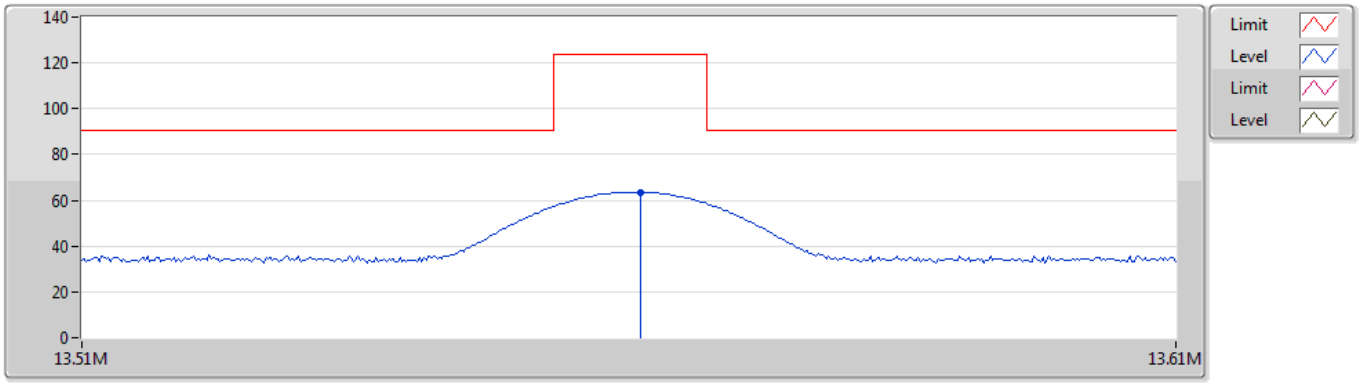
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Azimuth (°)	Height (m)	Comments
NFC	-	-	-	-	-	-	-	-	-	-	-
13.56MHz_adapter	Pass	PK	13.561M	63.62	124.00	-60.38	22.82	3	360	1.00	-
13.56MHz_adapter	Pass	PK	22.818k	56.73	120.42	-63.69	20.84	3	360	1.00	-
13.56MHz_adapter	Pass	PK	41.712k	58.11	115.19	-57.08	21.25	3	360	1.00	-
13.56MHz_adapter	Pass	PK	98.112k	50.21	107.75	-57.54	19.99	3	360	1.00	-
13.56MHz_adapter	Pass	PK	567.9k	55.96	72.52	-16.56	20.60	3	0	1.00	-
13.56MHz_adapter	Pass	PK	1.105M	49.82	66.77	-16.95	20.51	3	0	1.00	-
13.56MHz_adapter	Pass	PK	1.583M	52.02	63.66	-11.64	20.34	3	0	1.00	-

NFC Operating below 30MHz

18/02/2021

13.56MHz_adapter

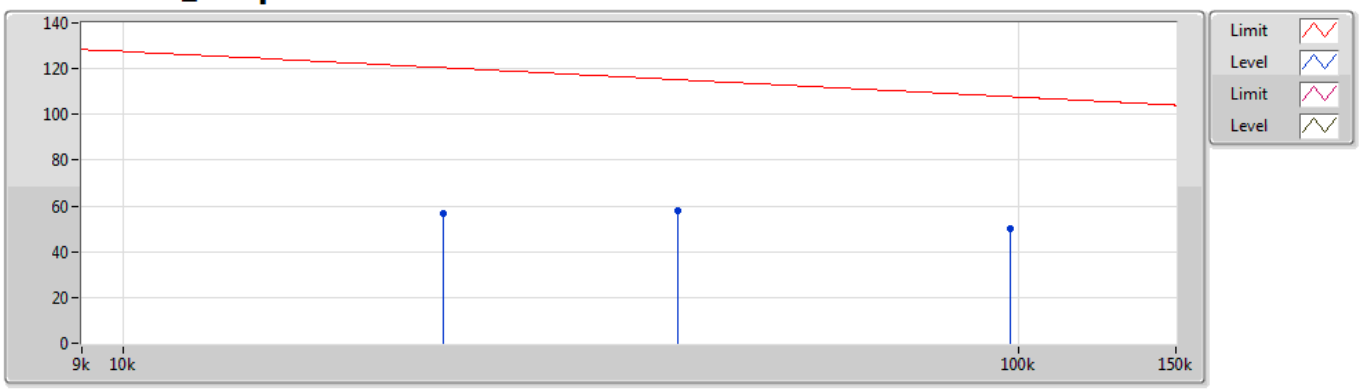


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	13.561M	63.62	124.00	-60.38	22.82	3	Horizontal	360	1.00	-	40.80	22.28	0.54	-

NFC Operating below 30MHz

18/02/2021

13.56MHz_adapter

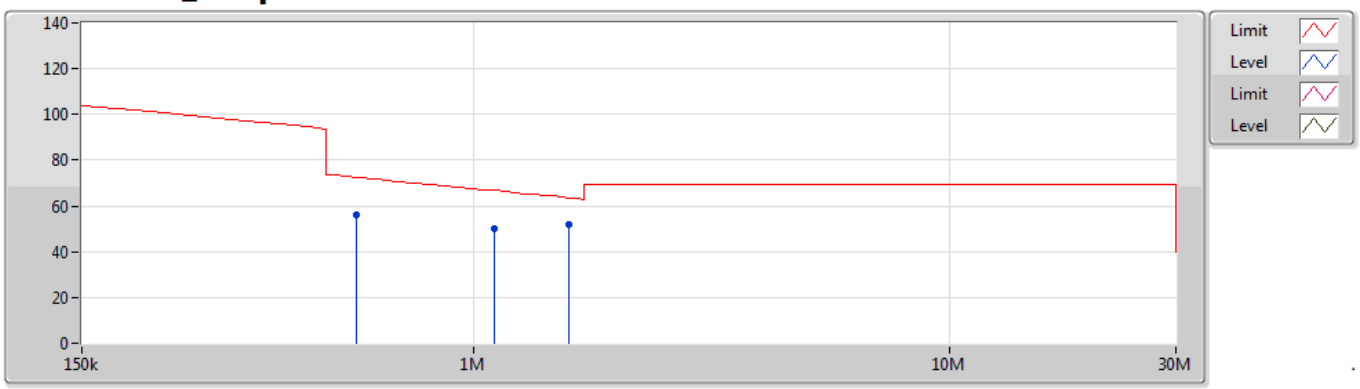


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	22.818k	56.73	120.42	-63.69	20.84	3	Horizontal	360	1.00	-	35.89	20.80	0.04	-
PK	41.712k	58.11	115.19	-57.08	21.25	3	Horizontal	360	1.00	-	36.86	21.20	0.05	-
PK	98.112k	50.21	107.75	-57.54	19.99	3	Horizontal	360	1.00	-	30.22	19.93	0.06	-

NFC Operating below 30MHz

17/02/2021

13.56MHz_adapter



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	567.9k	55.96	72.52	-16.56	20.60	3	Horizontal	0	1.00	-	35.36	20.48	0.12	-
PK	1.105M	49.82	66.77	-16.95	20.51	3	Horizontal	0	1.00	-	29.31	20.35	0.16	-
PK	1.583M	52.02	63.66	-11.64	20.34	3	Horizontal	0	1.00	-	31.68	20.15	0.19	-

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	743.92M	40.97	46.00	-5.03	2.13	3	360	3.00	-

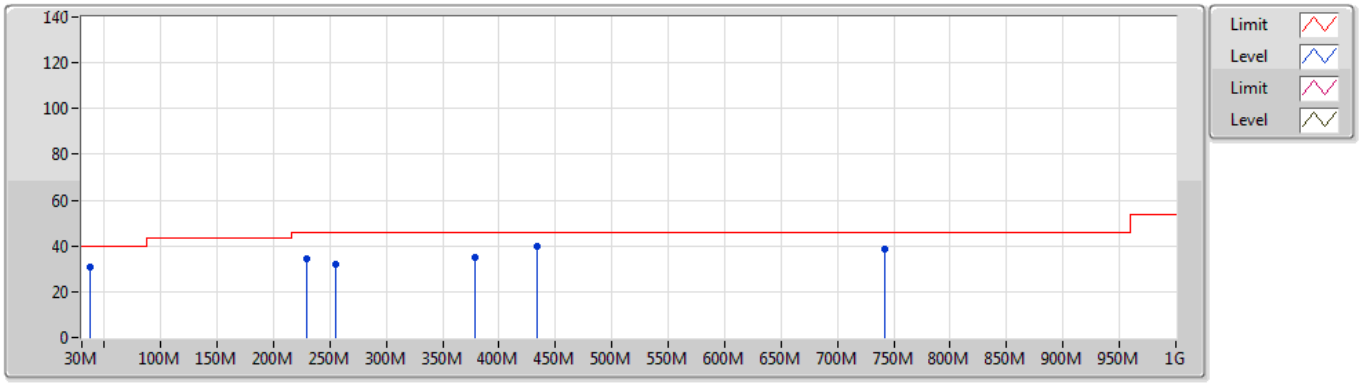
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Azimuth (°)	Height (m)	Comments
NFC	-	-	-	-	-	-	-	-	-	-	-
13.56MHz_adapter	Pass	PK	37.76M	31.02	40.00	-8.98	-7.40	3	0	3.00	-
13.56MHz_adapter	Pass	PK	229.82M	34.49	46.00	-11.51	-8.91	3	0	3.00	-
13.56MHz_adapter	Pass	PK	255.04M	31.99	46.00	-14.01	-5.72	3	0	3.00	-
13.56MHz_adapter	Pass	PK	379.2M	35.22	46.00	-10.78	-3.71	3	0	3.00	-
13.56MHz_adapter	Pass	PK	433.52M	39.94	46.00	-6.06	-2.26	3	0	3.00	-
13.56MHz_adapter	Pass	PK	741.98M	38.70	46.00	-7.30	2.04	3	0	3.00	-
13.56MHz_adapter	Pass	PK	33.88M	28.28	40.00	-11.72	-5.33	3	360	3.00	-
13.56MHz_adapter	Pass	PK	175.5M	29.67	43.50	-13.83	-10.24	3	360	3.00	-
13.56MHz_adapter	Pass	PK	229.82M	38.60	46.00	-7.40	-8.91	3	360	3.00	-
13.56MHz_adapter	Pass	PK	379.2M	35.18	46.00	-10.82	-3.71	3	360	3.00	-
13.56MHz_adapter	Pass	PK	406.36M	37.80	46.00	-8.20	-2.66	3	360	3.00	-
13.56MHz_adapter	Pass	PK	743.92M	40.97	46.00	-5.03	2.13	3	360	3.00	-

NFC Operating above 30MHz

17/02/2021

13.56MHz_adapter

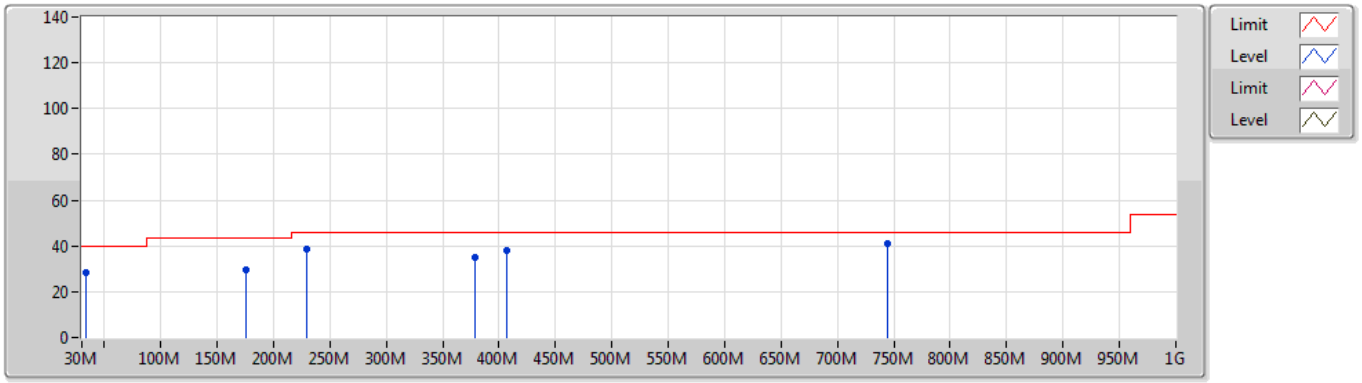


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	37.76M	31.02	40.00	-8.98	-7.40	3	Vertical	0	3.00	-	38.42	19.19	0.96	27.55
PK	229.82M	34.49	46.00	-11.51	-8.91	3	Vertical	0	3.00	-	43.40	15.40	2.48	26.79
PK	255.04M	31.99	46.00	-14.01	-5.72	3	Vertical	0	3.00	-	37.71	18.35	2.63	26.70
PK	379.2M	35.22	46.00	-10.78	-3.71	3	Vertical	0	3.00	-	38.93	20.19	3.22	27.12
PK	433.52M	39.94	46.00	-6.06	-2.26	3	Vertical	0	3.00	-	42.20	21.91	3.37	27.54
PK	741.98M	38.70	46.00	-7.30	2.04	3	Vertical	0	3.00	-	36.66	25.48	4.57	28.01

NFC Operating above 30MHz

17/02/2021

13.56MHz_adapter



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	33.88M	28.28	40.00	-11.72	-5.33	3	Horizontal	360	3.00	-	33.61	21.33	0.90	27.56
PK	175.5M	29.67	43.50	-13.83	-10.24	3	Horizontal	360	3.00	-	39.91	14.65	2.15	27.04
PK	229.82M	38.60	46.00	-7.40	-8.91	3	Horizontal	360	3.00	-	47.51	15.40	2.48	26.79
PK	379.2M	35.18	46.00	-10.82	-3.71	3	Horizontal	360	3.00	-	38.89	20.19	3.22	27.12
PK	406.36M	37.80	46.00	-8.20	-2.66	3	Horizontal	360	3.00	-	40.46	21.34	3.31	27.31
PK	743.92M	40.97	46.00	-5.03	2.13	3	Horizontal	360	3.00	-	38.84	25.56	4.58	28.01

Summary

Mode	Result	Ch (Hz)	Center (Hz)	ppm	Limit (ppm)	Port	Remark
13.553-13.567MHz	-	-	-	-	-	-	-
NFC	Pass	13.56M	13.5604M	29.4856	100	1	0 min

Result

Mode	Result	Ch (Hz)	Center (Hz)	ppm	Limit (ppm)	Port	Remark
NFC	-	-	-	-	-	-	-
13.56MHz_-20°C	Pass	13.56M	13.560381M	28.1307	100	1	0 min
13.56MHz_-20°C	Pass	13.56M	13.560381M	28.0662	100	1	2 min
13.56MHz_-20°C	Pass	13.56M	13.560381M	28.0662	100	1	5 min
13.56MHz_-20°C	Pass	13.56M	13.560381M	28.1307	100	1	10 min
13.56MHz_-10°C	Pass	13.56M	13.560395M	29.0985	100	1	0 min
13.56MHz_-10°C	Pass	13.56M	13.560394M	29.034	100	1	2 min
13.56MHz_-10°C	Pass	13.56M	13.560395M	29.0985	100	1	5 min
13.56MHz_-10°C	Pass	13.56M	13.560395M	29.163	100	1	10 min
13.56MHz_0°C	Pass	13.56M	13.560333M	24.5821	100	1	0 min
13.56MHz_0°C	Pass	13.56M	13.560333M	24.5821	100	1	2 min
13.56MHz_0°C	Pass	13.56M	13.560334M	24.6466	100	1	5 min
13.56MHz_0°C	Pass	13.56M	13.560334M	24.6466	100	1	10 min
13.56MHz_10°C	Pass	13.56M	13.560333M	24.5821	100	1	0 min
13.56MHz_10°C	Pass	13.56M	13.560334M	24.6466	100	1	2 min
13.56MHz_10°C	Pass	13.56M	13.560334M	24.6466	100	1	5 min
13.56MHz_10°C	Pass	13.56M	13.560335M	24.7111	100	1	10 min
13.56MHz_20°C	Pass	13.56M	13.56035M	25.808	100	1	-
13.56MHz_30°C	Pass	13.56M	13.5604M	29.4856	100	1	0 min
13.56MHz_30°C	Pass	13.56M	13.560398M	29.3566	100	1	2 min
13.56MHz_30°C	Pass	13.56M	13.560399M	29.4211	100	1	5 min
13.56MHz_30°C	Pass	13.56M	13.560398M	29.3566	100	1	10 min
13.56MHz_40°C	Pass	13.56M	13.560393M	28.9695	100	1	0 min
13.56MHz_40°C	Pass	13.56M	13.560392M	28.9049	100	1	2 min
13.56MHz_40°C	Pass	13.56M	13.560392M	28.9049	100	1	5 min
13.56MHz_40°C	Pass	13.56M	13.560393M	28.9695	100	1	10 min
13.56MHz_50°C	Pass	13.56M	13.560385M	28.3888	100	1	0 min
13.56MHz_50°C	Pass	13.56M	13.560386M	28.4533	100	1	2 min
13.56MHz_50°C	Pass	13.56M	13.560387M	28.5178	100	1	5 min
13.56MHz_50°C	Pass	13.56M	13.560387M	28.5178	100	1	10 min
13.56MHz_20°C-138V	Pass	13.56M	13.560336M	24.7757	100	1	0 min
13.56MHz_20°C-138V	Pass	13.56M	13.560335M	24.7111	100	1	2 min
13.56MHz_20°C-138V	Pass	13.56M	13.560334M	24.6466	100	1	5 min
13.56MHz_20°C-138V	Pass	13.56M	13.560334M	24.6466	100	1	10 min
13.56MHz_20°C-120V	Pass	13.56M	13.560333M	24.5821	100	1	0 min
13.56MHz_20°C-120V	Pass	13.56M	13.560334M	24.6466	100	1	2 min
13.56MHz_20°C-120V	Pass	13.56M	13.560333M	24.5821	100	1	5 min
13.56MHz_20°C-120V	Pass	13.56M	13.560335M	24.7111	100	1	10 min
13.56MHz_20°C-102V	Pass	13.56M	13.560333M	24.5821	100	1	0 min
13.56MHz_20°C-102V	Pass	13.56M	13.560333M	24.5821	100	1	2 min
13.56MHz_20°C-102V	Pass	13.56M	13.560335M	24.7111	100	1	5 min
13.56MHz_20°C-102V	Pass	13.56M	13.560334M	24.6466	100	1	10 min