

FCC Radio Test Report

FCC ID : C3K2103
Equipment : Portable Computing Device
Brand Name : Microsoft
Model Name : 2103
Applicant : Microsoft Corporation
One Microsoft Way Redmond, WA 98052-6399, U.S.A
Manufacturer : Microsoft Corporation
One Microsoft Way Redmond, WA 98052-6399, U.S.A
Standard : 47 CFR FCC Part 15.225

The product was received on Sep. 12, 2024, and testing was started from Sep. 20, 2024 and completed on Sep. 25, 2024. 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: Jackson Tsai

SPORTON INTERNATIONAL INC. Hsinhua Laboratory

No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



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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(e)	Frequency Stability	PASS	-
3.4	15.225(a)~(d)	Field Strength of Fundamental Emissions and Spectrum Mask	PASS	-
3.5	15.225(d)	Transmitter Radiated Unwanted Emissions	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: Ben Tseng

Report Producer: Julie Tseng

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 @3m)	Field Strength (dBuV/m @30m)	Remark
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	48.30	8.30	Display 1
					49.68	9.68	Display 2

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	AWAN	NFC ANT Hunter-6T VN	Loop antenna	N/A

Note: All measurements were performed radiated and therefore additional antenna gain documentation is not required.

1.1.3 EUT Information

Identify EUT	
S/N	Display1: BK33C6B24343R3 / Display 2: BK33C4R24343R3
Operational Condition	
EUT Power Type	From AC Adapter / Battery
Type of EUT	
<input checked="" type="checkbox"/>	Stand-alone
<input type="checkbox"/>	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.:
<input type="checkbox"/>	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.:
<input type="checkbox"/>	Other:

1.1.4 Test Signal Duty Cycle

Duty Cycle Operation Restriction	
The transmitter is used for	The transmitter is operated
<input checked="" type="checkbox"/> Inductive applications	<input checked="" type="checkbox"/> Automatically triggered
<input type="checkbox"/> Duty cycle fixed mode	<input checked="" type="checkbox"/> Duty cycle random mode
<input checked="" type="checkbox"/> Duty cycle mode - NFC-A (ISO 14443-3A)	
Declare transmitter duty cycle / 1 hour =	100%
<input checked="" type="checkbox"/> Duty cycle mode - NFC-B (ISO 14443-3B)	
Declare transmitter duty cycle / 1 hour =	100%
<input checked="" type="checkbox"/> Duty cycle mode - NFC-F (ISO 18092)	
Declare transmitter duty cycle / 1 hour =	100%
<input checked="" type="checkbox"/> 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

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
<input checked="" type="checkbox"/> 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. TW3785 with FCC.				
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Wayne Chiu	22.1~22.6°C / 53~57%	24/Sep/2024~25/Sep/2024
RF Conducted	TH07-HY	Yuna Lin	23.1~23.5°C / 50~55%	20/Sep/2024~21/Sep/2024
Radiated	03CH03-HY	CoCo Shang Kung	22.2~23.4°C / 51~53%	23/Sep/2024~25/Sep/2024
<input type="checkbox"/> 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
AC Power-line Conducted Emissions	4.53 dB	Confidence levels of 95%
Emission Bandwidth	0.005 MHz	Confidence levels of 95%
Frequency Stability	5 ppm	Confidence levels of 95%
Field Strength of Fundamental Emissions and Spectrum Mask	2.5 dB	Confidence levels of 95%
Transmitter Radiated Unwanted Emissions	4.8 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
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	N/A
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Note: The EUT transmits RF signal continuously by itself.

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 Test Voltage: 120Vac / 60Hz
Operating Mode	CTX
	1. Adapter Mode

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

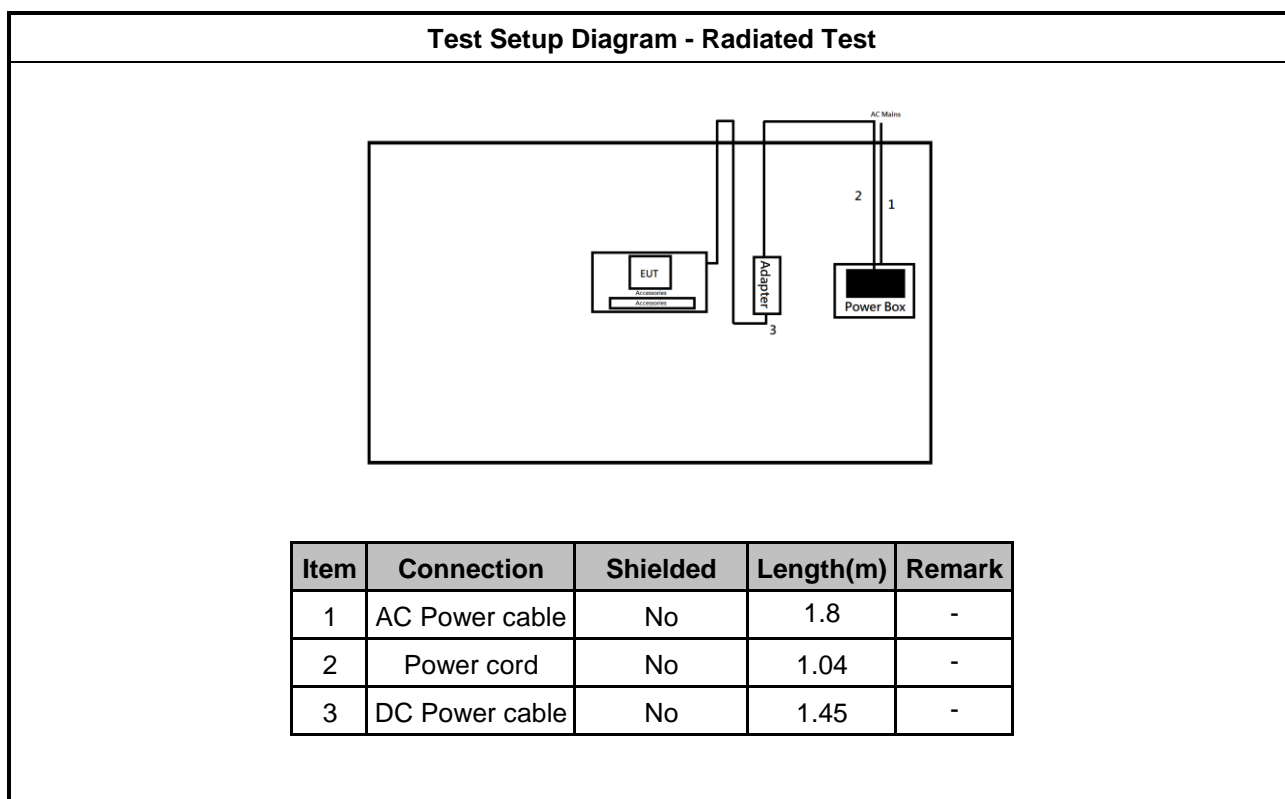
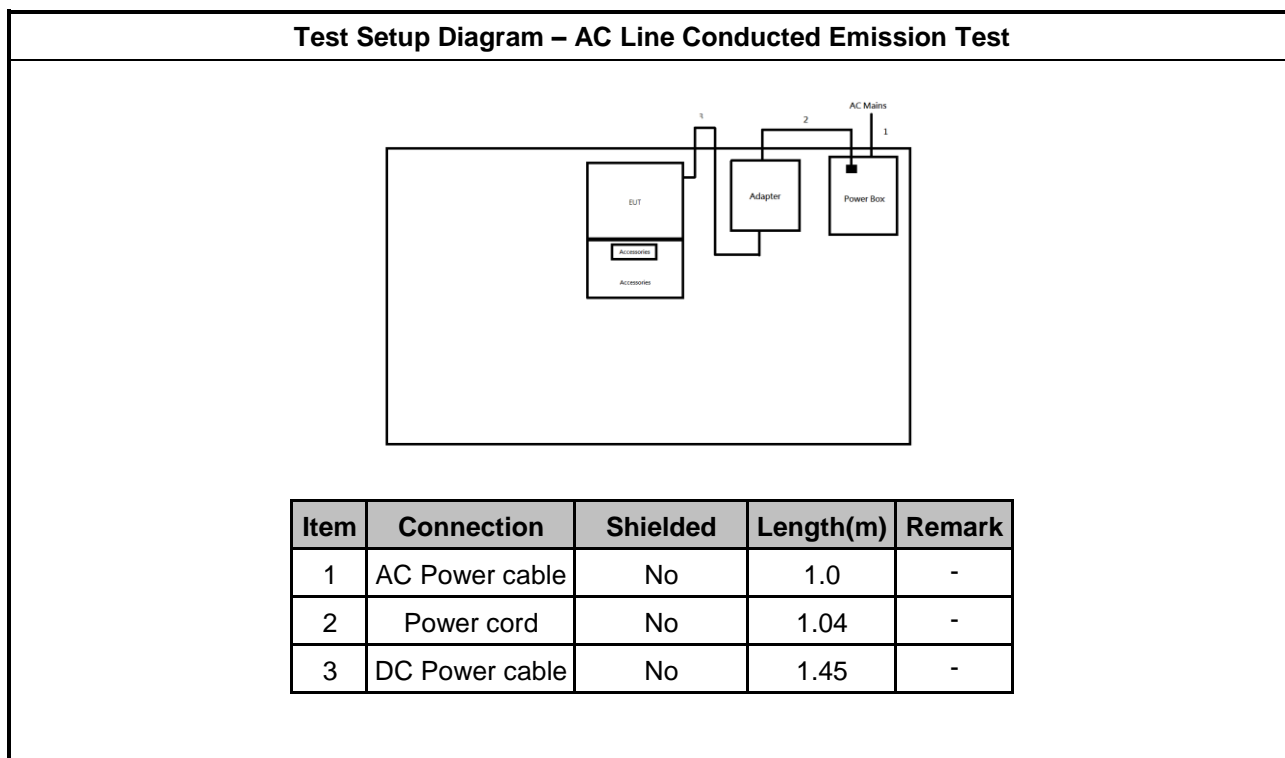
The Worst Case Mode for Following Conformance Tests			
Tests Item	Field Strength of Fundamental Emissions and Spectrum Mask Transmitter Radiated Unwanted Emissions		
Test Condition	Radiated measurement		
Pretest Mode	<input checked="" type="checkbox"/> 1.	NFC-A (ISO 14443-3A)	
	<input checked="" type="checkbox"/> 2.	NFC-B (ISO 14443-3B)	
	<input checked="" type="checkbox"/> 3.	NFC-F (ISO 18092)	
	<input checked="" type="checkbox"/> 4.	NFC-V (ISO 15693)	
Mode 1 configuration was pretested and found to be the worst case and measured during the test.			
Operating Mode	Mode 2		
Six EUT configure modes were pretest, only the worst case was performed and recorded in this test report. EUT configure modes are described in the operational description.			
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			
Worst Planes of EUT			V

2.4 Support Equipment

Support Equipment – AC Conduction					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	AC Adapter 39W	Microsoft	1963	-	Provided by Customer
2	Accessory	Microsoft	1962	-	Provided by Customer
3	Accessory	Microsoft	2082	-	Provided by Customer
4	Power Cord	WELLSHIN	X908885-005	-	Provided by Customer

Support Equipment – Radiated					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	AC Adapter 39W	Microsoft	1963	-	Provided by Customer
2	Accessory	Microsoft	1962	-	Provided by Customer
3	Accessory	Microsoft	2082	-	Provided by Customer
4	Power Cord	WELLSHIN	X908885-005	-	Provided by Customer

2.5 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

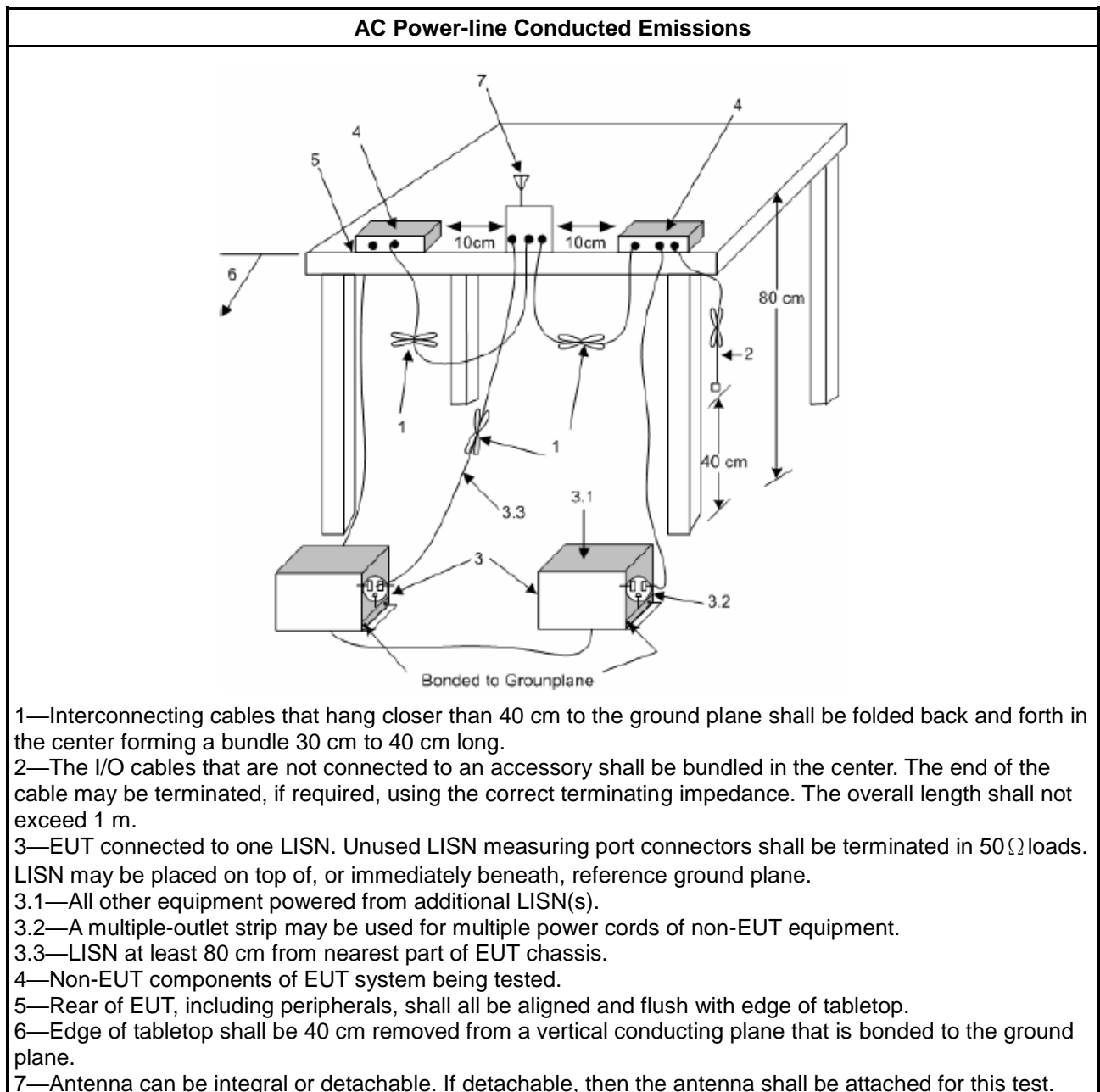
Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.
<input checked="" type="checkbox"/>	If AC conducted emissions fall in operating band, then following below test method confirm final result.
<input type="checkbox"/>	Accept measurements 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.
<input checked="" type="checkbox"/>	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



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	
<input checked="" type="checkbox"/>	Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (13.553 – 13.567).

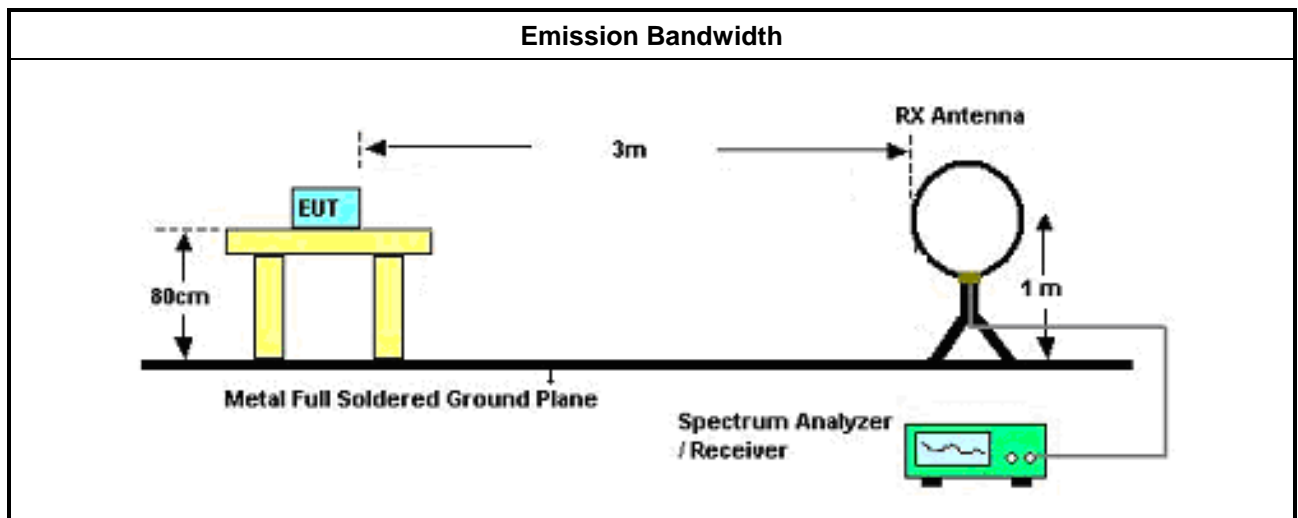
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	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

Refer as Appendix B

3.3 Frequency Stability

3.3.1 Frequency Stability Limit

Frequency Stability Limit	
<input checked="" type="checkbox"/>	Carrier frequency stability shall be maintained to $\pm 0.01\%$ (± 100 ppm).

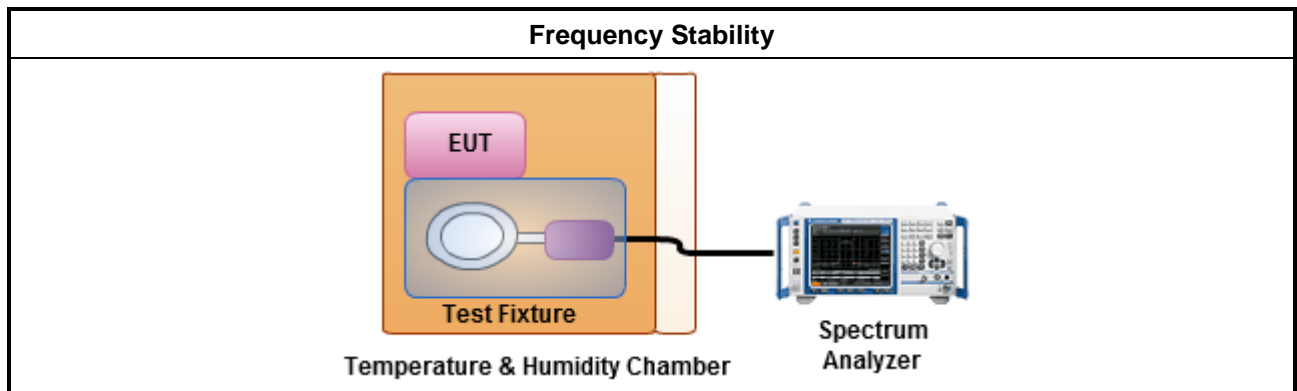
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

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

3.3.4 Test Setup



3.3.5 Test Result of Frequency Stability

Refer as Appendix C

3.4 Field Strength of Fundamental Emissions and Spectrum Mask

3.4.1 Field Strength of Fundamental Emissions and Spectrum Mask Limit

Field Strength of Fundamental Emissions and Spectrum Mask					
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					
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

3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

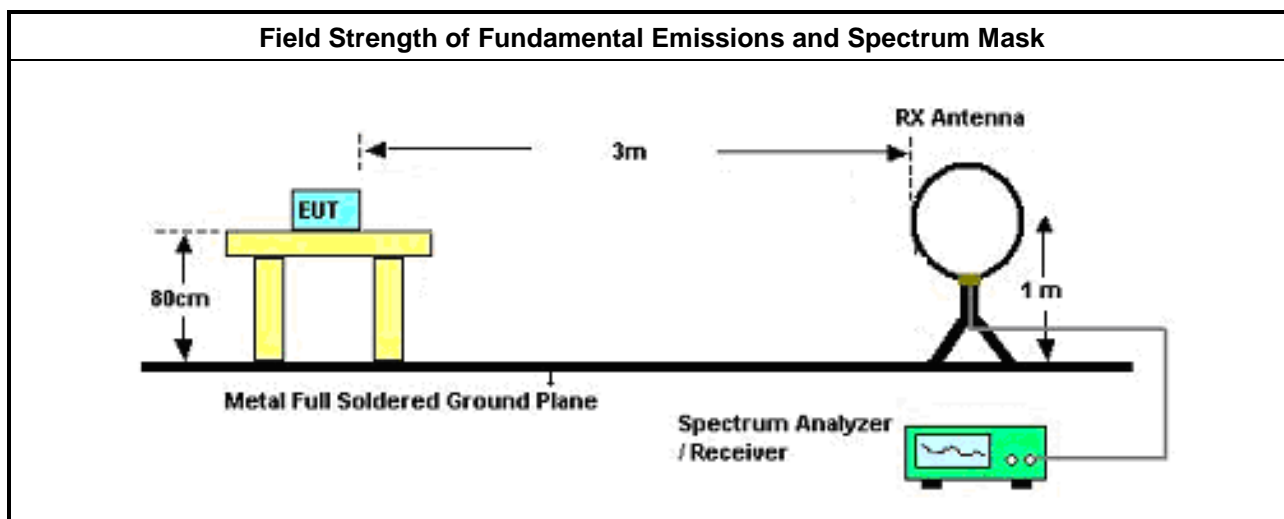
Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.
<input checked="" type="checkbox"/>	At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements; 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.
<input type="checkbox"/>	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.
<input checked="" type="checkbox"/>	The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement. The parallel orientation was found to be the worst case scenario.

3.4.4 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamplifier Factor).

3.4.5 Test Setup



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

Refer as Appendix D

3.5 Transmitter Radiated Unwanted Emissions

3.5.1 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.

3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

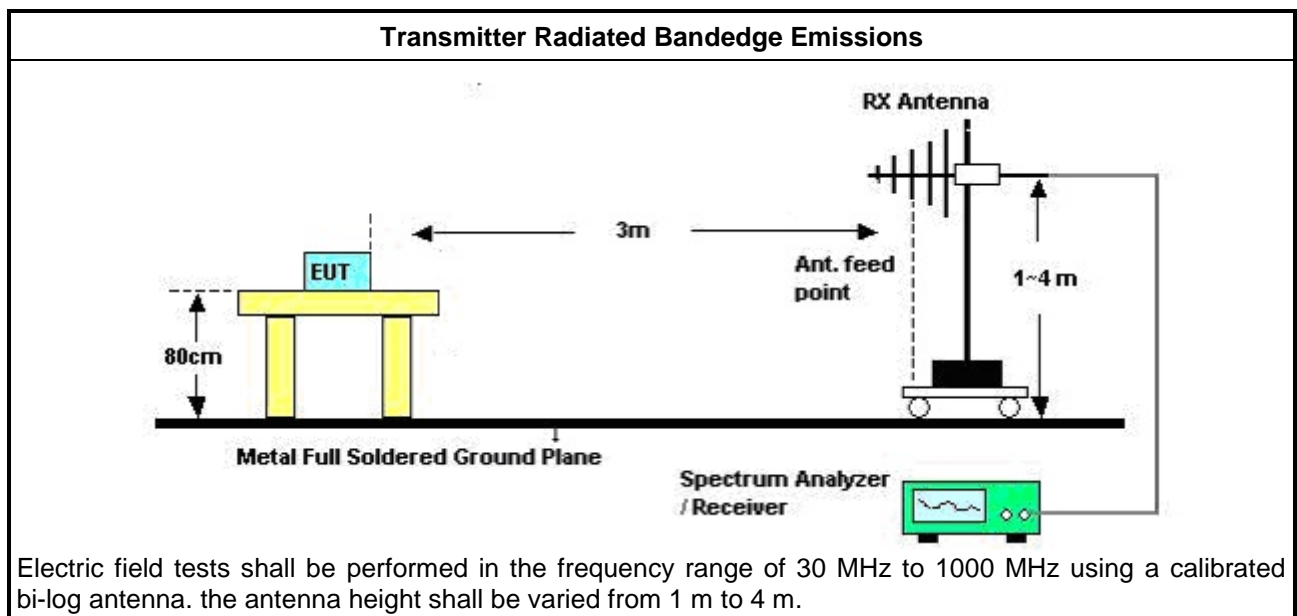
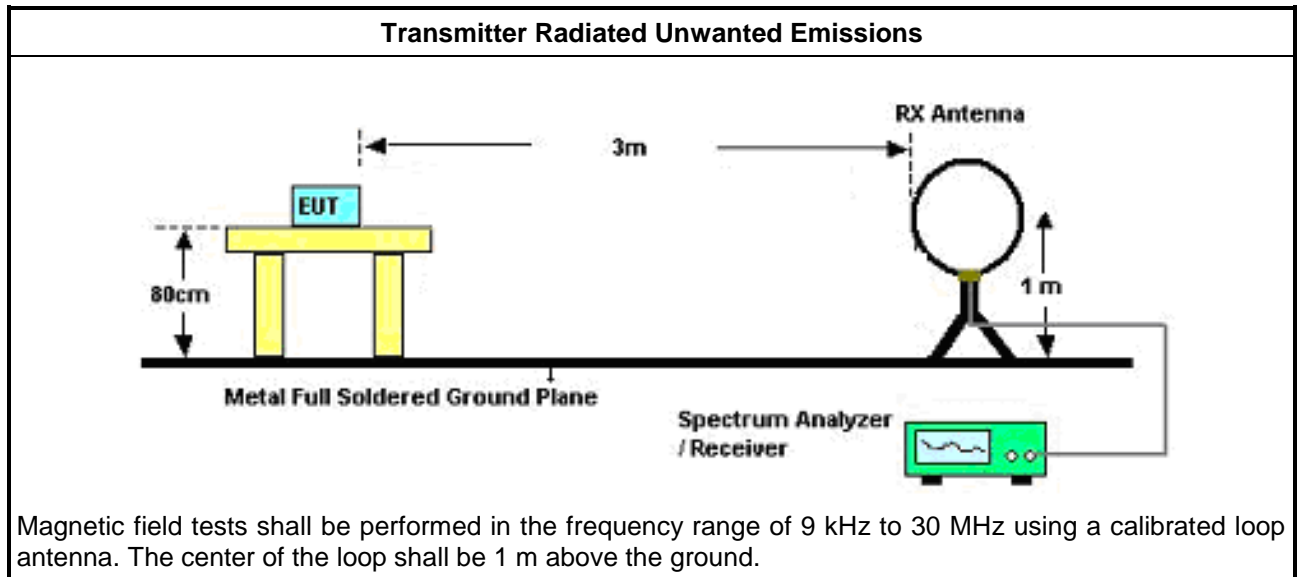
Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.
<input checked="" type="checkbox"/>	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.
<input type="checkbox"/>	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.
<input checked="" type="checkbox"/>	The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	The any unwanted emissions level shall not exceed the fundamental emission level.
<input checked="" type="checkbox"/>	All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.
<input checked="" type="checkbox"/>	KDB 414788 D01 v01r01 Open-Field Test Sites and Chamber Correlation Justification.
<input type="checkbox"/>	<ul style="list-style-type: none"> 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.
<input type="checkbox"/>	<ul style="list-style-type: none"> Open-field site and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

3.5.4 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamplifier Factor)

3.5.5 Test Setup



3.5.6 Transmitter Radiated Unwanted Emissions

Refer as Appendix D

4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer / Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
EMI Test Receiver	ROHDE & SCHWARZ	ESR3	102051	9kHz ~ 3.6GHz	17/May/2024	16/May/2025
Two-Line V-Network	ROHDE & SCHWARZ	ENV 216	101274	9kHz ~ 30MHz	18/Jun/2024	17/Jun/2025
RF Cable 5m	TITAN	TITAN	CO04-cable-01	9 kHz~200MHz	27/Feb/2024	26/Feb/2025
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9kHz ~ 30MHz	18/Oct/2023	17/Oct/2024
Software	Sporton	SENSE-EMI	V5.11.3	-	NCR	NCR

NCR: No Calibration Required

Instrument for Conducted Test

Instrument	Manufacturer / Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSV 40	101515	9kHz~40GHz	02/Feb/2024	01/Feb/2025
SMB100A Signal Generator	R&S	SMB100A	181147	100kHz~40GHz	20/Oct/2023	19/Oct/2024
Programmable Temp. & Humi. Chamber	Giant Force	GTH-225-40-CP-AR	MAA1311-008	-40~100℃	07/Jun/2024	06/Jun/2025
SENSE-NFC	Sporton	V5.11.0	N/A	N/A	N/A	N/A
Field Probe	LANGER	LF-R 400	02-1207	N/A	N/A	N/A

Instrument for Radiated Test

Instrument	Manufacturer / Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	14/Jul/2024	13/Jul/2025
Signal Analyzer	R&S	FSV40	101500	10Hz~40GHz	26/Oct/2023	25/Oct/2024
Amplifier	Aglient	8447D	2944A08033	100kHz ~ 1.3 GHz	13/Sep/2024	12/Sep/2025
Bilog Antenna & 6dB Attenuator	SCHAFFNER / EMC	CBL6112B / N-6-05	22237 / AT-N-0603	30MHz~1GHz	15/Oct/2023	14/Oct/2024
RF Cable-R03m	Jye Bao	RG142	03CH03-cable-02	30MHz~1GHz	12/Jun/2024	11/Jun/2025
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz~30MHz	12/Jun/2024	11/Jun/2025
Loop Antenna	TESEQ	HLA 6120	31244	9kHz~30MHz	19/Mar/2024	18/Mar/2025
EMI Test Receiver	R&S	ESR3	102052	9kHz~3.6GHz	03/May/2024	02/May/2025
SENSE-NFC	Sporton	V5.11.1	N/A	N/A	N/A	N/A



Conducted Emissions at Powerline_Display 1

Appendix A.1

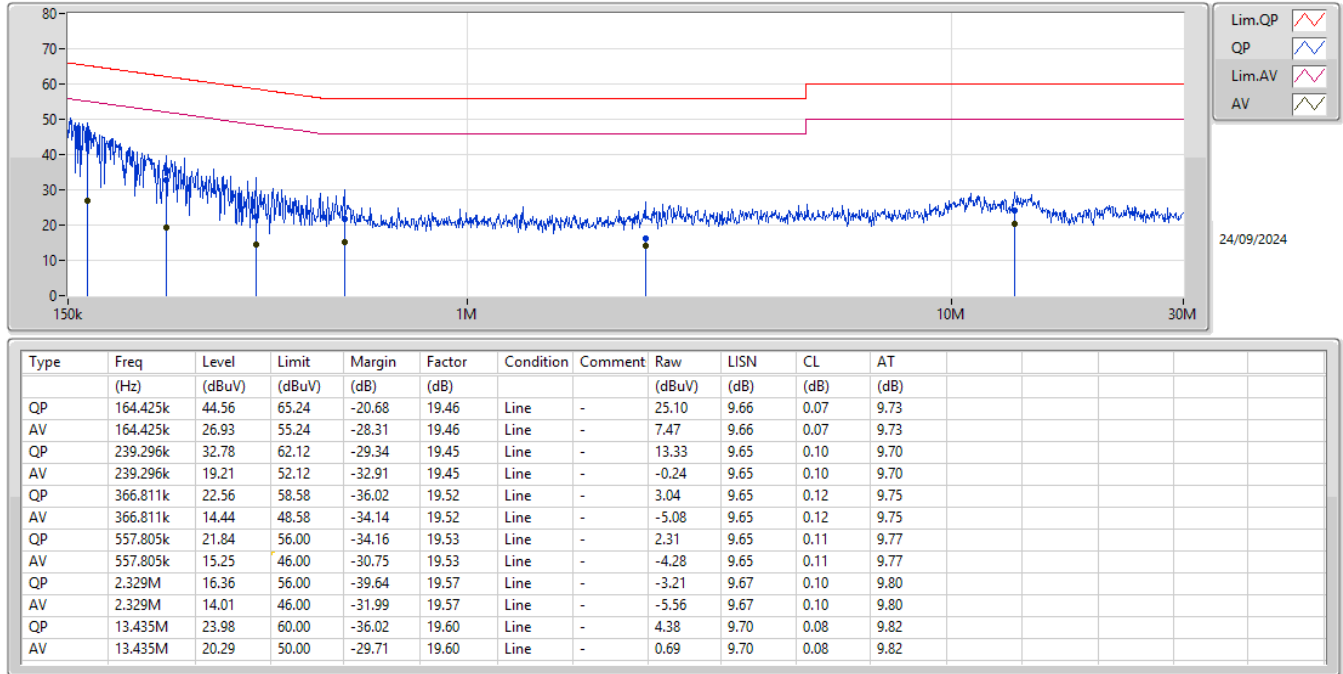
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	QP	156.109k	46.42	65.67	-19.25	Neutral

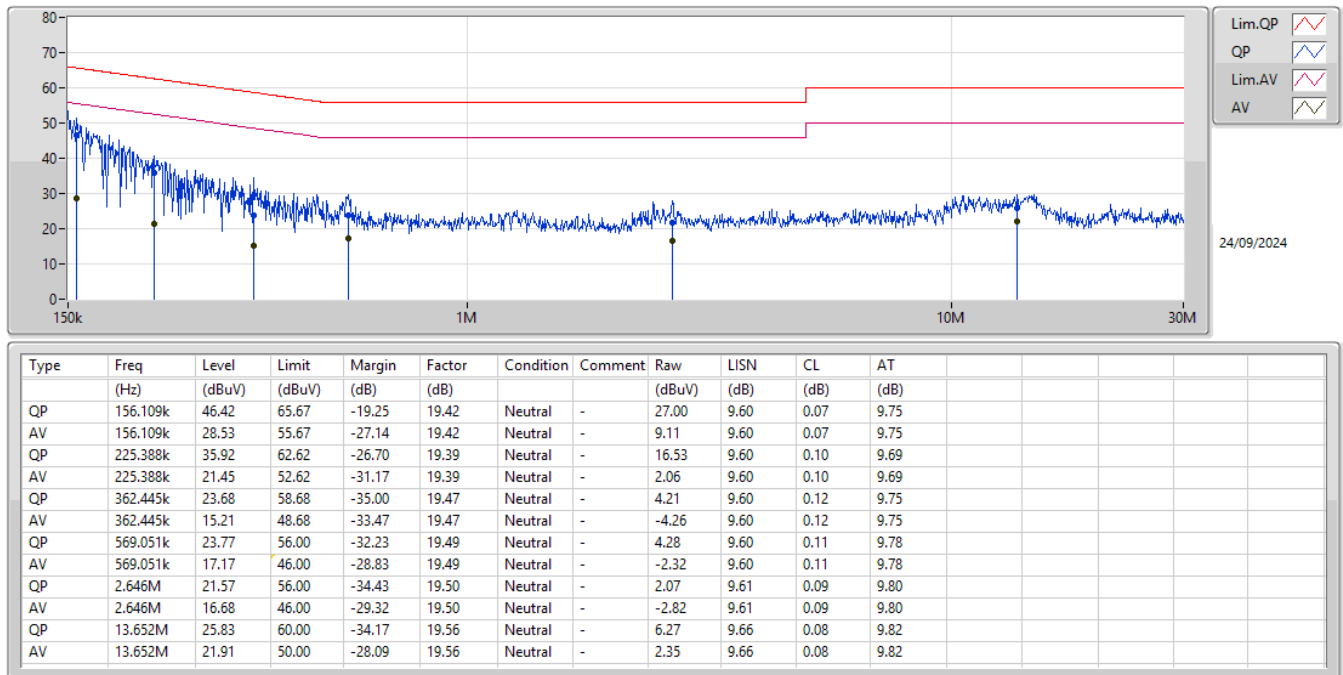
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition	Comments
Mode 1	Pass	QP	164.425k	44.56	65.24	-20.68	Line	-
Mode 1	Pass	AV	164.425k	26.93	55.24	-28.31	Line	-
Mode 1	Pass	QP	239.296k	32.78	62.12	-29.34	Line	-
Mode 1	Pass	AV	239.296k	19.21	52.12	-32.91	Line	-
Mode 1	Pass	QP	366.811k	22.56	58.58	-36.02	Line	-
Mode 1	Pass	AV	366.811k	14.44	48.58	-34.14	Line	-
Mode 1	Pass	QP	557.805k	21.84	56.00	-34.16	Line	-
Mode 1	Pass	AV	557.805k	15.25	46.00	-30.75	Line	-
Mode 1	Pass	QP	2.329M	16.36	56.00	-39.64	Line	-
Mode 1	Pass	AV	2.329M	14.01	46.00	-31.99	Line	-
Mode 1	Pass	QP	13.435M	23.98	60.00	-36.02	Line	-
Mode 1	Pass	AV	13.435M	20.29	50.00	-29.71	Line	-
Mode 1	Pass	QP	156.109k	46.42	65.67	-19.25	Neutral	-
Mode 1	Pass	AV	156.109k	28.53	55.67	-27.14	Neutral	-
Mode 1	Pass	QP	225.388k	35.92	62.62	-26.70	Neutral	-
Mode 1	Pass	AV	225.388k	21.45	52.62	-31.17	Neutral	-
Mode 1	Pass	QP	362.445k	23.68	58.68	-35.00	Neutral	-
Mode 1	Pass	AV	362.445k	15.21	48.68	-33.47	Neutral	-
Mode 1	Pass	QP	569.051k	23.77	56.00	-32.23	Neutral	-
Mode 1	Pass	AV	569.051k	17.17	46.00	-28.83	Neutral	-
Mode 1	Pass	QP	2.646M	21.57	56.00	-34.43	Neutral	-
Mode 1	Pass	AV	2.646M	16.68	46.00	-29.32	Neutral	-
Mode 1	Pass	QP	13.652M	25.83	60.00	-34.17	Neutral	-
Mode 1	Pass	AV	13.652M	21.91	50.00	-28.09	Neutral	-

Conducted Emissions at Powerline_Mode 1



Conducted Emissions at Powerline_Mode 1





Conducted Emissions at Powerline_Display 2

Appendix A.2

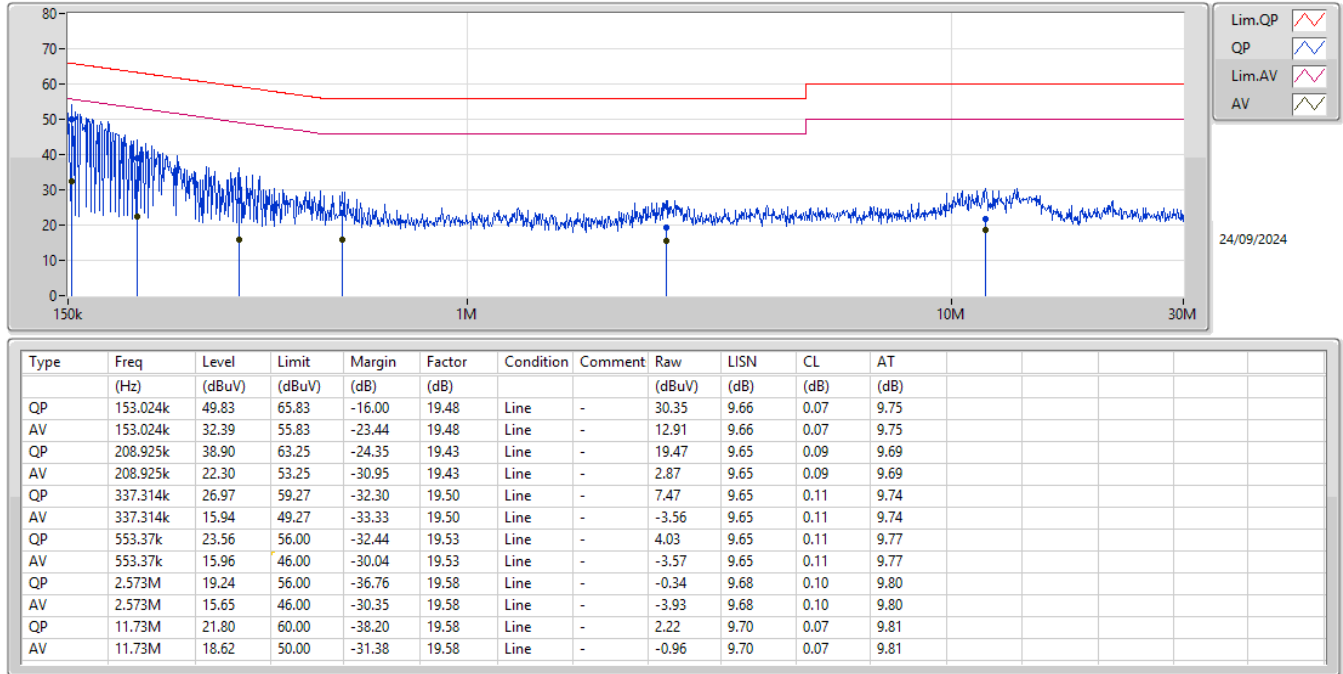
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	QP	153.024k	49.83	65.83	-16.00	Line

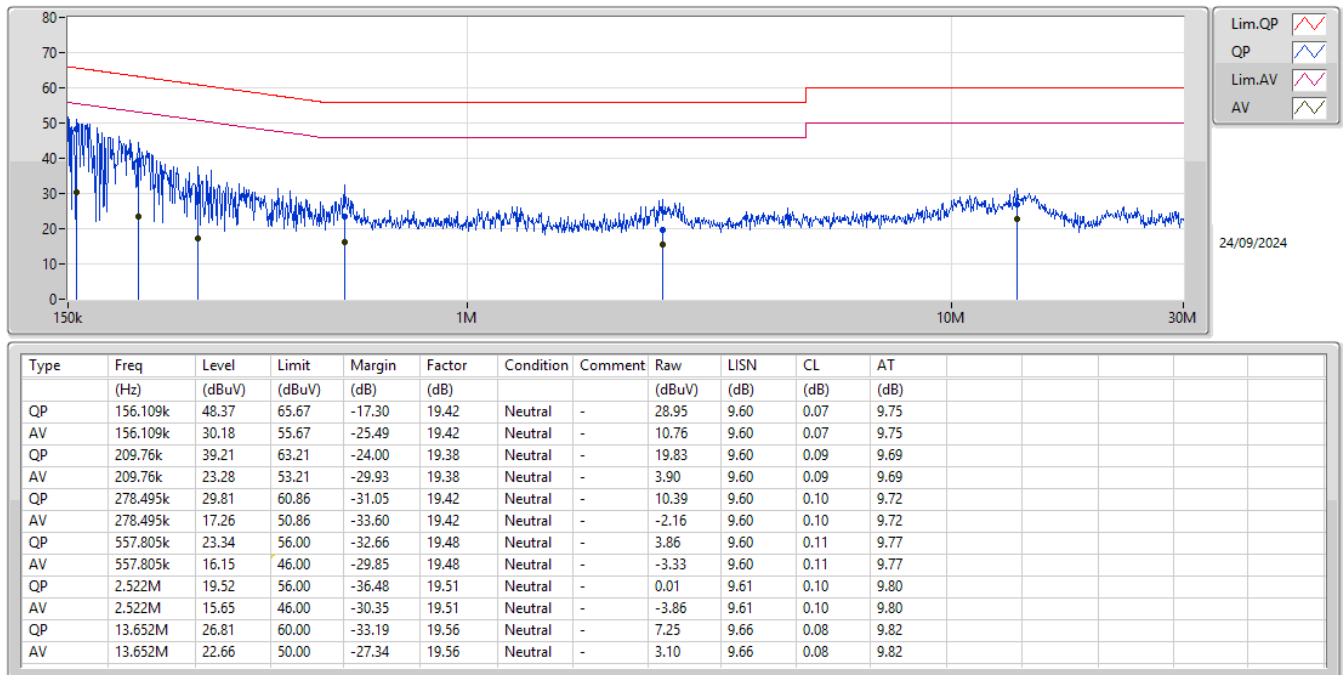
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition	Comments
Mode 1	Pass	QP	153.024k	49.83	65.83	-16.00	Line	-
Mode 1	Pass	AV	153.024k	32.39	55.83	-23.44	Line	-
Mode 1	Pass	QP	208.925k	38.90	63.25	-24.35	Line	-
Mode 1	Pass	AV	208.925k	22.30	53.25	-30.95	Line	-
Mode 1	Pass	QP	337.314k	26.97	59.27	-32.30	Line	-
Mode 1	Pass	AV	337.314k	15.94	49.27	-33.33	Line	-
Mode 1	Pass	QP	553.37k	23.56	56.00	-32.44	Line	-
Mode 1	Pass	AV	553.37k	15.96	46.00	-30.04	Line	-
Mode 1	Pass	QP	2.573M	19.24	56.00	-36.76	Line	-
Mode 1	Pass	AV	2.573M	15.65	46.00	-30.35	Line	-
Mode 1	Pass	QP	11.73M	21.80	60.00	-38.20	Line	-
Mode 1	Pass	AV	11.73M	18.62	50.00	-31.38	Line	-
Mode 1	Pass	QP	156.109k	48.37	65.67	-17.30	Neutral	-
Mode 1	Pass	AV	156.109k	30.18	55.67	-25.49	Neutral	-
Mode 1	Pass	QP	209.76k	39.21	63.21	-24.00	Neutral	-
Mode 1	Pass	AV	209.76k	23.28	53.21	-29.93	Neutral	-
Mode 1	Pass	QP	278.495k	29.81	60.86	-31.05	Neutral	-
Mode 1	Pass	AV	278.495k	17.26	50.86	-33.60	Neutral	-
Mode 1	Pass	QP	557.805k	23.34	56.00	-32.66	Neutral	-
Mode 1	Pass	AV	557.805k	16.15	46.00	-29.85	Neutral	-
Mode 1	Pass	QP	2.522M	19.52	56.00	-36.48	Neutral	-
Mode 1	Pass	AV	2.522M	15.65	46.00	-30.35	Neutral	-
Mode 1	Pass	QP	13.652M	26.81	60.00	-33.19	Neutral	-
Mode 1	Pass	AV	13.652M	22.66	50.00	-27.34	Neutral	-

Conducted Emissions at Powerline_Mode 1



Conducted Emissions at Powerline_Mode 1



Summary

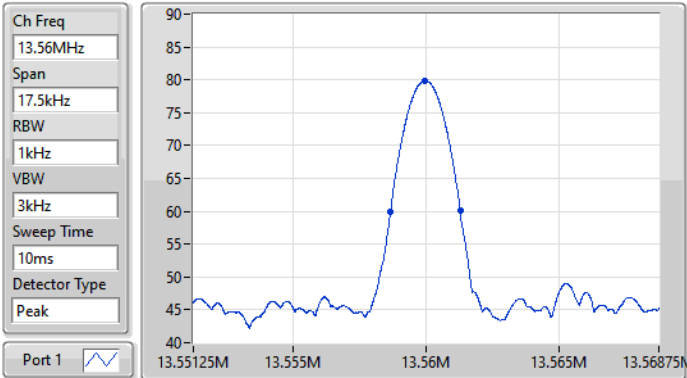
Mode	20dB (Hz)	FI-20dB (Hz)	Fh-20dB (Hz)	OBW (Hz)	Limit (Range)
13.553-13.567MHz	-	-	-	-	-
NFC	2.616k	13.55866M	13.56128M	2.423k	13.553-13.567

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	2.616k	13.55866M	13.56128M	2.423k	13.55877M	13.56119M	13.553-13.567

NFC

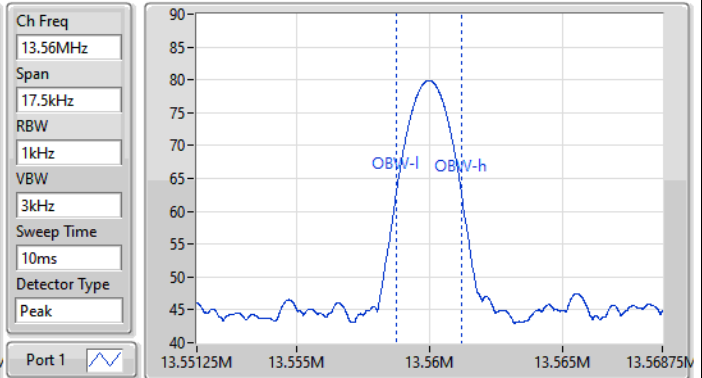
13.56MHz_TnomVnom



20dB(Hz)	FI-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	FI-OBW(Hz)	Fh-OBW(Hz)	Limit(Range)
2.616k	13.55866M	13.56128M	2.423k	13.55877M	13.56119M	13.553-13.56

EBW

20/09/2024





Summary

Mode	Result	Ch (Hz)	Center (Hz)	ppm	Limit (ppm)	Port	Remark
13.553-13.567MHz	-	-	-	-	-	-	-
NFC	Pass	13.56M	13.559934M	4.9035	100	1	5 min

Result

Mode	Result	Ch (Hz)	Center (Hz)	ppm	Limit (ppm)	Port	Remark
NFC	-	-	-	-	-	-	-
13.56MHz_-20°C	Pass	13.56M	13.559986M	1.0323	100	1	0 min
13.56MHz_-20°C	Pass	13.56M	13.559982M	1.3549	100	1	2 min
13.56MHz_-20°C	Pass	13.56M	13.559973M	2.0001	100	1	5 min
13.56MHz_-20°C	Pass	13.56M	13.559981M	1.4194	100	1	10 min
13.56MHz_-10°C	Pass	13.56M	13.560009M	0.6452	100	1	0 min
13.56MHz_-10°C	Pass	13.56M	13.560011M	0.8388	100	1	2 min
13.56MHz_-10°C	Pass	13.56M	13.56001M	0.7742	100	1	5 min
13.56MHz_-10°C	Pass	13.56M	13.560024M	1.742	100	1	10 min
13.56MHz_0°C	Pass	13.56M	13.560011M	0.8388	100	1	0 min
13.56MHz_0°C	Pass	13.56M	13.560008M	0.5807	100	1	2 min
13.56MHz_0°C	Pass	13.56M	13.559999M	0.0645	100	1	5 min
13.56MHz_0°C	Pass	13.56M	13.560013M	0.9678	100	1	10 min
13.56MHz_10°C	Pass	13.56M	13.559977M	1.6775	100	1	0 min
13.56MHz_10°C	Pass	13.56M	13.55999M	0.7742	100	1	2 min
13.56MHz_10°C	Pass	13.56M	13.559984M	1.1614	100	1	5 min
13.56MHz_10°C	Pass	13.56M	13.559981M	1.4194	100	1	10 min
13.56MHz_20°C	Pass	13.56M	13.559977M	1.6775	100	1	0 min
13.56MHz_20°C	Pass	13.56M	13.559969M	2.2582	100	1	2 min
13.56MHz_20°C	Pass	13.56M	13.559964M	2.6453	100	1	5 min
13.56MHz_20°C	Pass	13.56M	13.559962M	2.8389	100	1	10 min
13.56MHz_30°C	Pass	13.56M	13.559958M	3.097	100	1	0 min
13.56MHz_30°C	Pass	13.56M	13.559962M	2.7744	100	1	2 min
13.56MHz_30°C	Pass	13.56M	13.559958M	3.097	100	1	5 min
13.56MHz_30°C	Pass	13.56M	13.559953M	3.4841	100	1	10 min
13.56MHz_40°C	Pass	13.56M	13.55995M	3.6776	100	1	0 min
13.56MHz_40°C	Pass	13.56M	13.559945M	4.0648	100	1	2 min
13.56MHz_40°C	Pass	13.56M	13.559948M	3.8712	100	1	5 min
13.56MHz_40°C	Pass	13.56M	13.559953M	3.4841	100	1	10 min
13.56MHz_50°C	Pass	13.56M	13.559939M	4.5164	100	1	0 min
13.56MHz_50°C	Pass	13.56M	13.559941M	4.3874	100	1	2 min
13.56MHz_50°C	Pass	13.56M	13.559934M	4.9035	100	1	5 min
13.56MHz_50°C	Pass	13.56M	13.559941M	4.3228	100	1	10 min
13.56MHz_20°C-138V	Pass	13.56M	13.559975M	1.8711	100	1	0 min
13.56MHz_20°C-138V	Pass	13.56M	13.559965M	2.5808	100	1	2 min
13.56MHz_20°C-138V	Pass	13.56M	13.559967M	2.4518	100	1	5 min
13.56MHz_20°C-138V	Pass	13.56M	13.559961M	2.9034	100	1	10 min
13.56MHz_20°C-120V	Pass	13.56M	13.559973M	2.0001	100	1	0 min
13.56MHz_20°C-120V	Pass	13.56M	13.559969M	2.3227	100	1	2 min
13.56MHz_20°C-120V	Pass	13.56M	13.559983M	1.2904	100	1	5 min
13.56MHz_20°C-120V	Pass	13.56M	13.559964M	2.6453	100	1	10 min
13.56MHz_20°C-102V	Pass	13.56M	13.559974M	1.9356	100	1	0 min
13.56MHz_20°C-102V	Pass	13.56M	13.559962M	2.7744	100	1	2 min
13.56MHz_20°C-102V	Pass	13.56M	13.55997M	2.1937	100	1	5 min



Frequency Stability

Appendix C

Mode	Result	Ch (Hz)	Center (Hz)	ppm	Limit (ppm)	Port	Remark
13.56MHz_20°C-102V	Pass	13.56M	13.55997M	2.1937	100	1	10 min



Summary

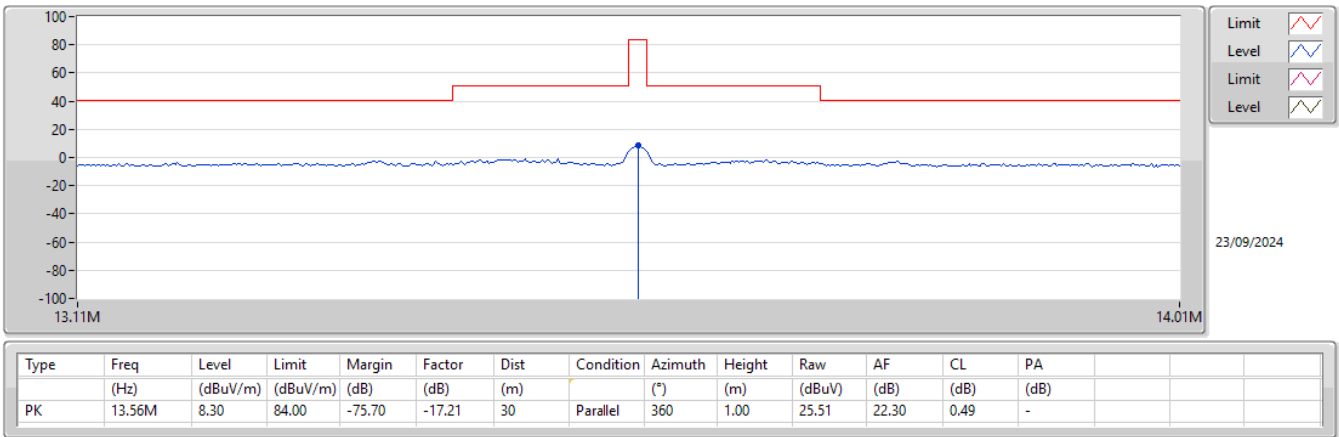
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Azimuth (°)	Height (m)
13.553-13.567MHz	-	-	-	-	-	-	-	-	-
NFC	Pass	PK	30M	30.16	40.00	-9.84	3	360	1.00

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Azimuth (°)	Height (m)
NFC	-	-	-	-	-	-	-	-	-
13.56MHz_TX	Pass	PK	30M	30.16	40.00	-9.84	3	360	1.00
13.56MHz_TX	Pass	PK	97.9M	23.35	43.50	-20.15	3	360	1.00
13.56MHz_TX	Pass	PK	152.22M	23.05	43.50	-20.45	3	360	1.00
13.56MHz_TX	Pass	PK	256.98M	24.40	46.00	-21.60	3	360	1.00
13.56MHz_TX	Pass	PK	336.52M	28.01	46.00	-17.99	3	360	1.00
13.56MHz_TX	Pass	PK	452.92M	29.19	46.00	-16.81	3	360	1.00
13.56MHz_TX	Pass	PK	30M	23.18	40.00	-16.82	3	0	1.00
13.56MHz_TX	Pass	PK	117.3M	20.79	43.50	-22.71	3	0	1.00
13.56MHz_TX	Pass	PK	150.28M	27.23	43.50	-16.27	3	0	1.00
13.56MHz_TX	Pass	PK	191.02M	25.29	43.50	-18.21	3	0	1.00
13.56MHz_TX	Pass	PK	266.68M	29.97	46.00	-16.03	3	0	1.00
13.56MHz_TX	Pass	PK	330.7M	28.54	46.00	-17.46	3	0	1.00

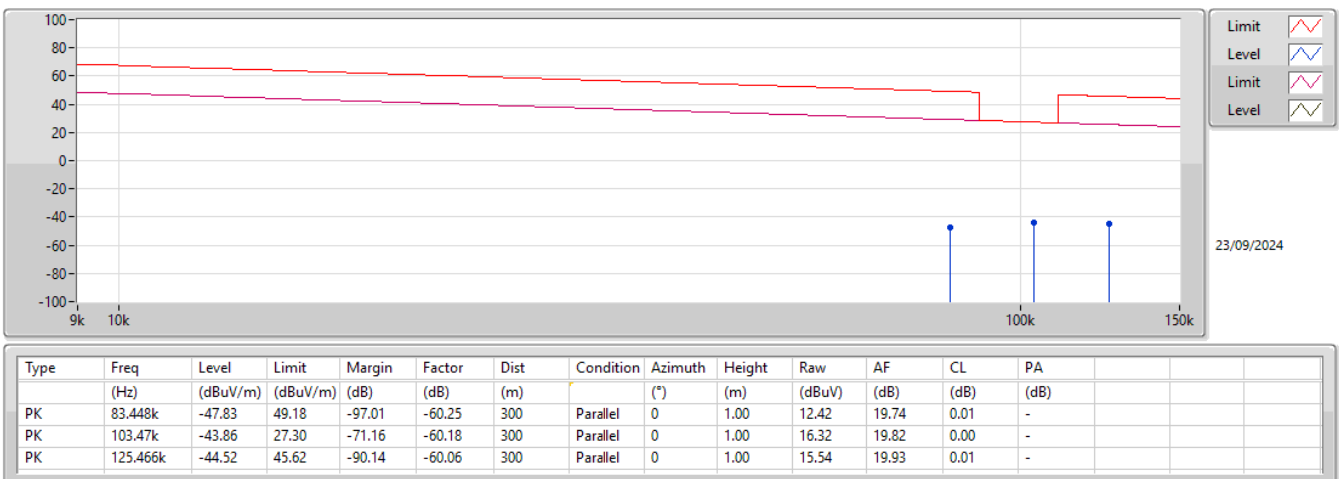
13.553-13.567MHz_NFC

13.56MHz_TX



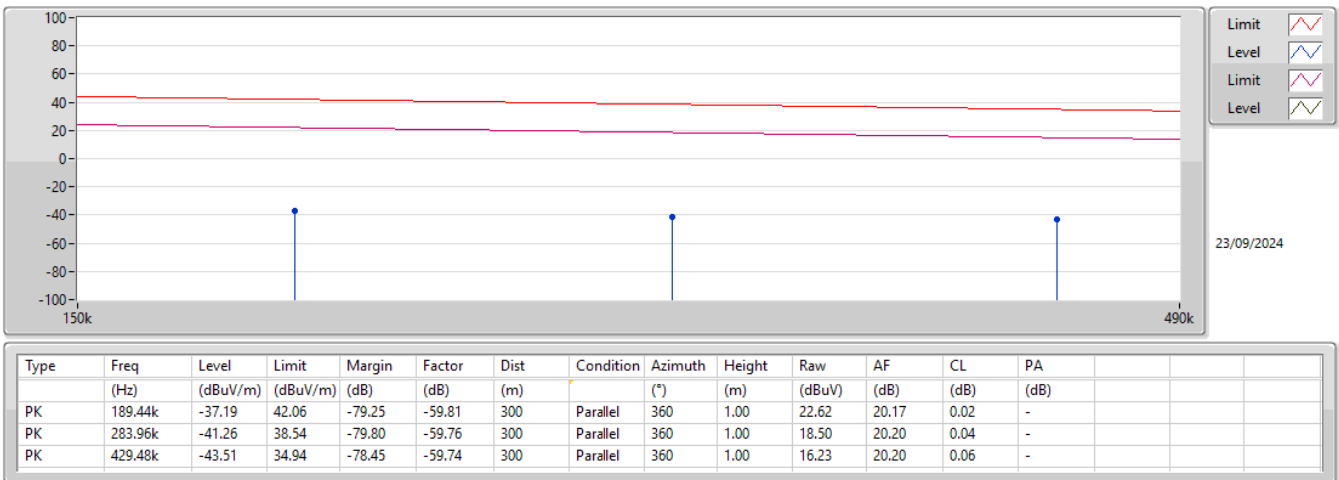
13.553-13.567MHz_NFC

13.56MHz_TX



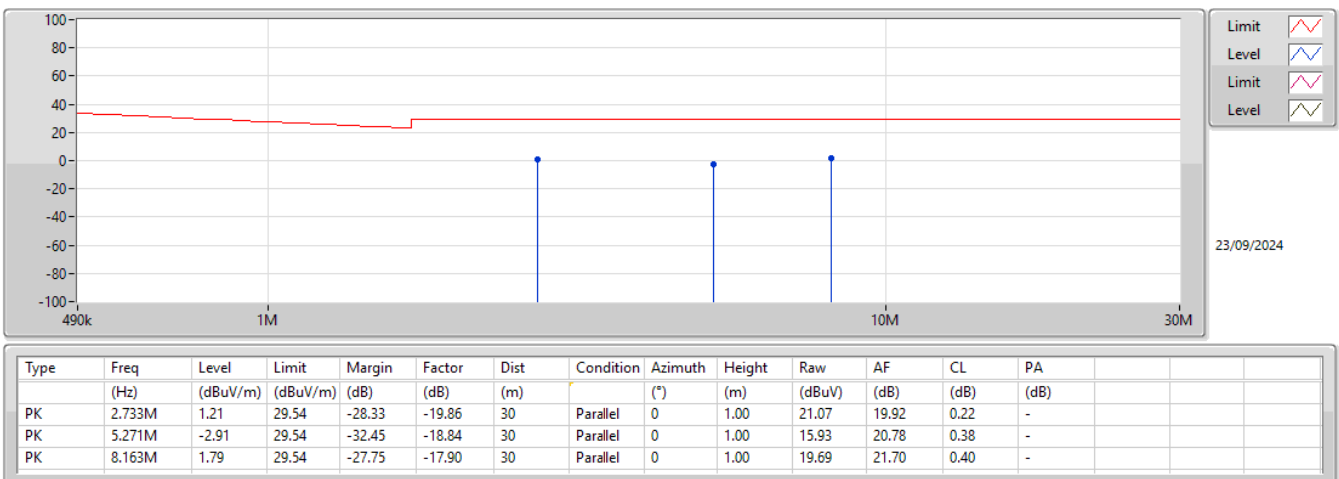
13.553-13.567MHz_NFC

13.56MHz_TX



13.553-13.567MHz_NFC

13.56MHz_TX





Summary

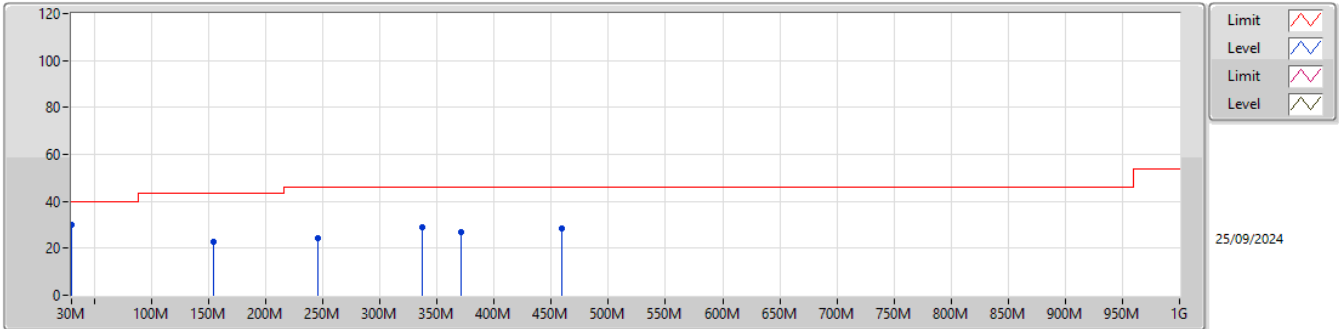
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Azimuth (°)	Height (m)
13.553-13.567MHz	-	-	-	-	-	-	-	-	-
NFC	Pass	PK	30M	30.02	40.00	-9.98	3	360	1.00

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Azimuth (°)	Height (m)
NFC	-	-	-	-	-	-	-	-	-
13.56MHz_TX	Pass	PK	30M	30.02	40.00	-9.98	3	360	1.00
13.56MHz_TX	Pass	PK	154.16M	22.51	43.50	-20.99	3	360	1.00
13.56MHz_TX	Pass	PK	245.34M	24.24	46.00	-21.76	3	360	1.00
13.56MHz_TX	Pass	PK	336.52M	29.12	46.00	-16.88	3	360	1.00
13.56MHz_TX	Pass	PK	371.44M	26.88	46.00	-19.12	3	360	1.00
13.56MHz_TX	Pass	PK	458.74M	28.40	46.00	-17.60	3	360	1.00
13.56MHz_TX	Pass	PK	30M	23.68	40.00	-16.32	3	0	1.00
13.56MHz_TX	Pass	PK	150.28M	27.30	43.50	-16.20	3	0	1.00
13.56MHz_TX	Pass	PK	260.86M	30.77	46.00	-15.23	3	0	1.00
13.56MHz_TX	Pass	PK	330.7M	28.89	46.00	-17.11	3	0	1.00
13.56MHz_TX	Pass	PK	435.46M	26.80	46.00	-19.20	3	0	1.00
13.56MHz_TX	Pass	PK	530.52M	29.55	46.00	-16.45	3	0	1.00

13.553-13.567MHz_NFC

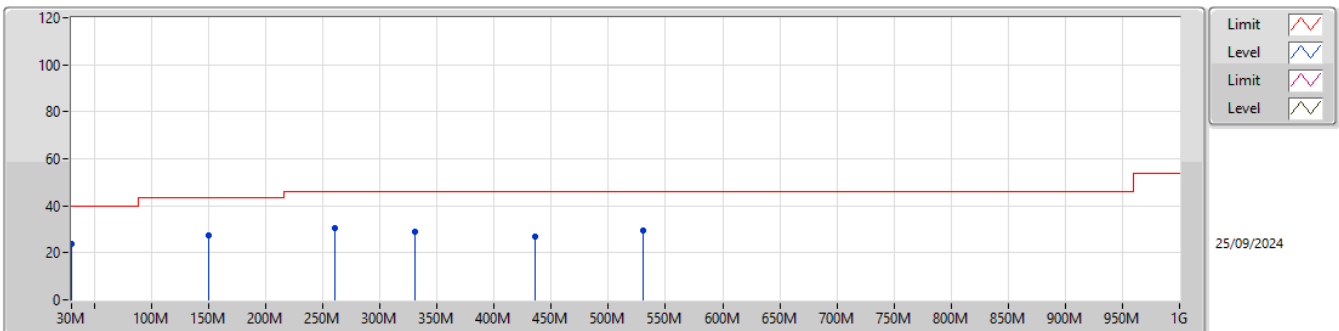
13.56MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Raw	AF	CL	PA				
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	(dBuV)	(dB)	(dB)	(dB)				
PK	30M	30.02	40.00	-9.98	-3.78	3	Vertical	360	1.00	33.80	23.49	0.24	27.51				
PK	154.16M	22.51	43.50	-20.99	-10.23	3	Vertical	360	1.00	32.74	15.24	1.66	27.13				
PK	245.34M	24.24	46.00	-21.76	-7.49	3	Vertical	360	1.00	31.73	17.12	2.15	26.76				
PK	336.52M	29.12	46.00	-16.88	-5.52	3	Vertical	360	1.00	34.64	19.01	2.43	26.96				
PK	371.44M	26.88	46.00	-19.12	-4.64	3	Vertical	360	1.00	31.52	20.01	2.59	27.24				
PK	458.74M	28.40	46.00	-17.60	-2.44	3	Vertical	360	1.00	30.84	22.51	2.96	27.91				

13.553-13.567MHz_NFC

13.56MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Raw	AF	CL	PA				
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	(dBuV)	(dB)	(dB)	(dB)				
PK	30M	23.68	40.00	-16.32	-3.78	3	Horizontal	0	1.00	27.46	23.49	0.24	27.51				
PK	150.28M	27.30	43.50	-16.20	-9.95	3	Horizontal	0	1.00	37.25	15.58	1.61	27.14				
PK	260.86M	30.77	46.00	-15.23	-5.95	3	Horizontal	0	1.00	36.72	18.60	2.18	26.73				
PK	330.7M	28.89	46.00	-17.11	-5.59	3	Horizontal	0	1.00	34.48	18.93	2.40	26.92				
PK	435.46M	26.80	46.00	-19.20	-2.87	3	Horizontal	0	1.00	29.67	22.04	2.84	27.75				
PK	530.52M	29.55	46.00	-16.45	-1.15	3	Horizontal	0	1.00	30.70	23.67	3.35	28.17				



Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Azimuth (°)	Height (m)	Comments
13.553-13.567MHz	-	-	-	-	-	-	-	-	-	-
NFC	Pass	PK	8.163M	1.79	29.54	-27.75	30	360	1.00	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Azimuth (°)	Height (m)	Comments
NFC	-	-	-	-	-	-	-	-	-	-
13.56MHz_TX	Pass	PK	13.558M	9.68	84.00	-74.32	30	360	1.00	-
13.56MHz_TX	Pass	PK	51.018k	-44.91	53.44	-98.35	300	360	1.00	-
13.56MHz_TX	Pass	PK	62.58k	-36.72	51.68	-88.40	300	360	1.00	-
13.56MHz_TX	Pass	PK	138.438k	-53.30	44.78	-98.08	300	360	1.00	-
13.56MHz_TX	Pass	PK	220.04k	-39.29	40.74	-80.03	300	360	1.00	-
13.56MHz_TX	Pass	PK	284.64k	-41.68	38.52	-80.20	300	360	1.00	-
13.56MHz_TX	Pass	PK	377.12k	-42.52	36.08	-78.60	300	360	1.00	-
13.56MHz_TX	Pass	PK	3.382M	-3.01	29.54	-32.55	30	360	1.00	-
13.56MHz_TX	Pass	PK	5.035M	-3.62	29.54	-33.16	30	360	1.00	-
13.56MHz_TX	Pass	PK	8.163M	1.79	29.54	-27.75	30	360	1.00	-

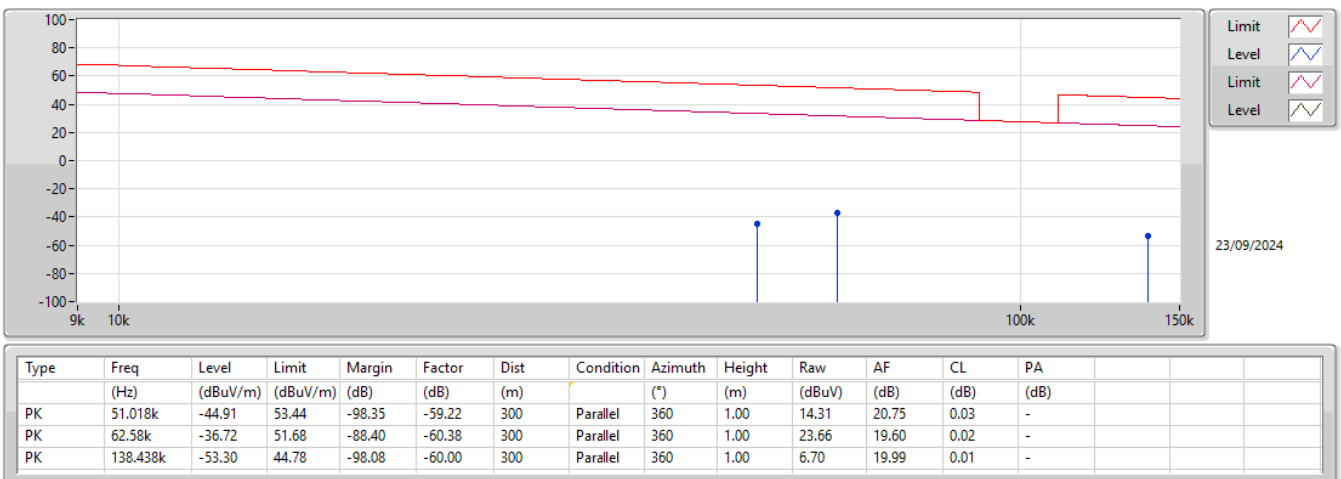
13.553-13.567MHz_NFC

13.56MHz_TX



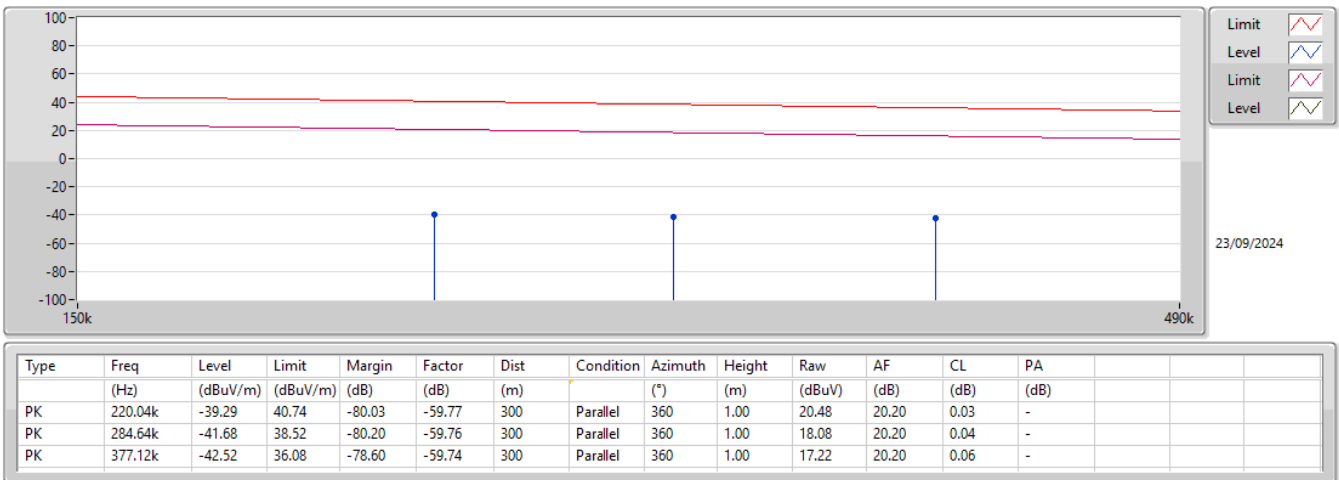
13.553-13.567MHz_NFC

13.56MHz_TX



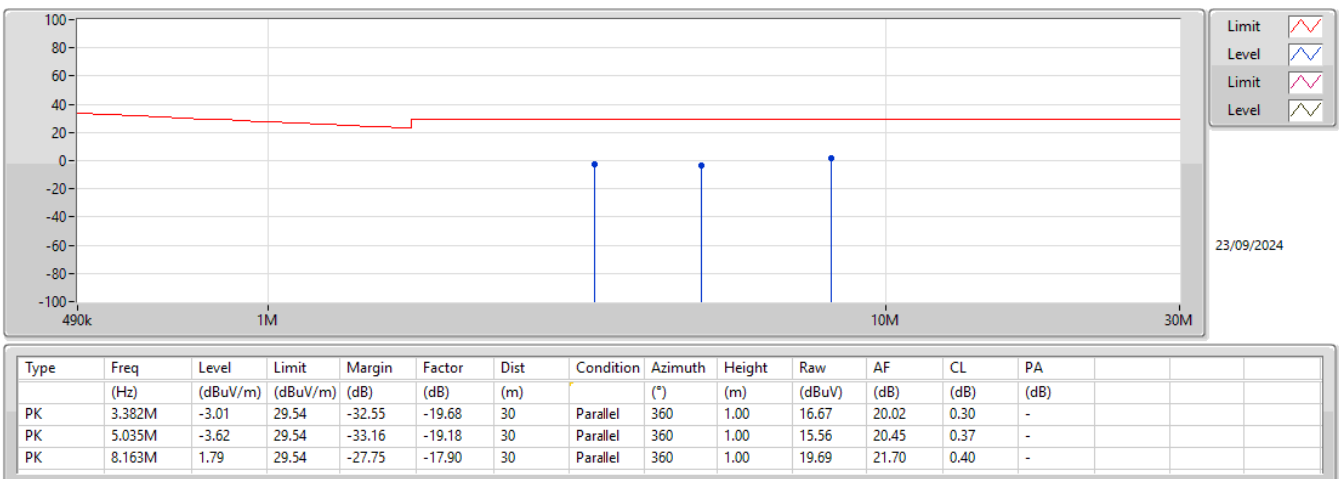
13.553-13.567MHz_NFC

13.56MHz_TX



13.553-13.567MHz_NFC

13.56MHz_TX





Summary

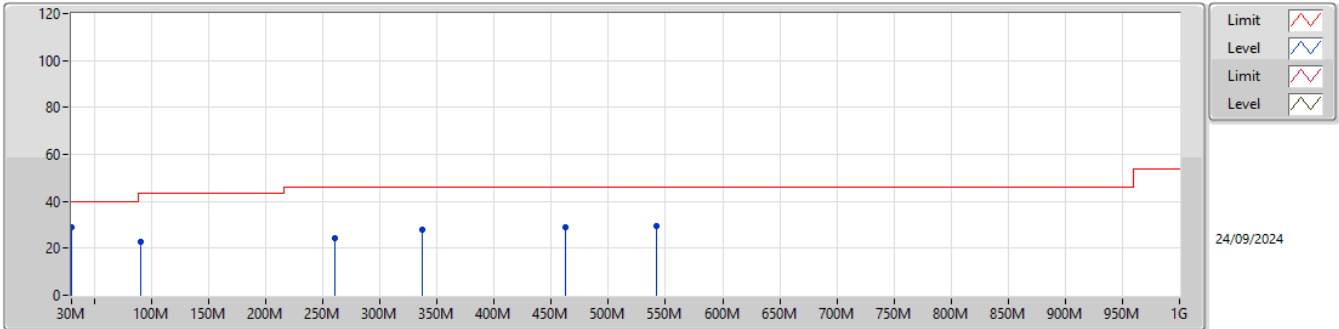
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Azimuth (°)	Height (m)	Comments
13.553-13.567MHz	-	-	-	-	-	-	-	-	-	-
NFC	Pass	PK	30M	29.17	40.00	-10.83	3	360	1.00	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Azimuth (°)	Height (m)	Comments
NFC	-	-	-	-	-	-	-	-	-	-
13.56MHz_TX	Pass	PK	30M	29.17	40.00	-10.83	3	360	1.00	-
13.56MHz_TX	Pass	PK	90.14M	22.93	43.50	-20.57	3	360	1.00	-
13.56MHz_TX	Pass	PK	260.86M	24.16	46.00	-21.84	3	360	1.00	-
13.56MHz_TX	Pass	PK	336.52M	27.80	46.00	-18.20	3	360	1.00	-
13.56MHz_TX	Pass	PK	462.62M	29.06	46.00	-16.94	3	360	1.00	-
13.56MHz_TX	Pass	PK	542.16M	29.46	46.00	-16.54	3	360	1.00	-
13.56MHz_TX	Pass	PK	30M	23.56	40.00	-16.44	3	0	1.00	-
13.56MHz_TX	Pass	PK	152.22M	26.58	43.50	-16.92	3	0	1.00	-
13.56MHz_TX	Pass	PK	191.02M	24.19	43.50	-19.31	3	0	1.00	-
13.56MHz_TX	Pass	PK	251.16M	29.99	46.00	-16.01	3	0	1.00	-
13.56MHz_TX	Pass	PK	330.7M	28.92	46.00	-17.08	3	0	1.00	-
13.56MHz_TX	Pass	PK	540.22M	29.58	46.00	-16.42	3	0	1.00	-

13.553-13.567MHz_NFC

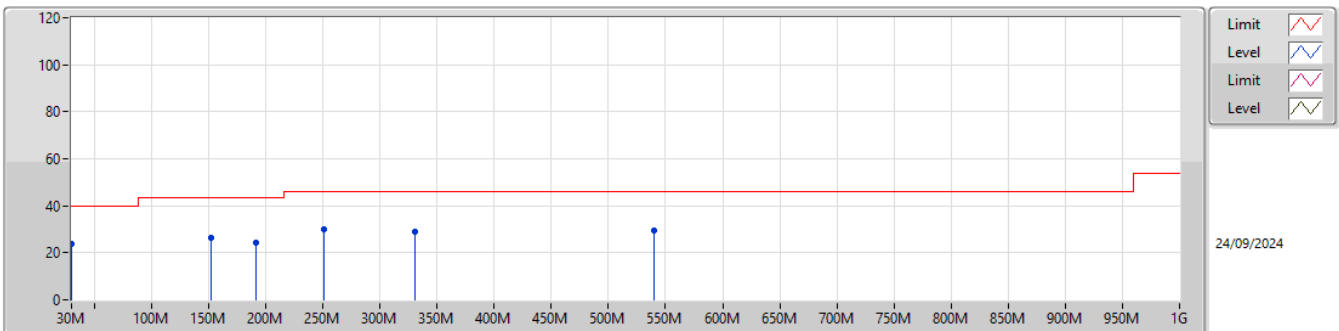
13.56MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Raw	AF	CL	PA				
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	(dBuV)	(dB)	(dB)	(dB)				
PK	30M	29.17	40.00	-10.83	-3.78	3	Vertical	360	1.00	32.95	23.49	0.24	27.51				
PK	90.14M	22.93	43.50	-20.57	-12.06	3	Vertical	360	1.00	34.99	14.35	0.91	27.32				
PK	260.86M	24.16	46.00	-21.84	-5.95	3	Vertical	360	1.00	30.11	18.60	2.18	26.73				
PK	336.52M	27.80	46.00	-18.20	-5.52	3	Vertical	360	1.00	33.32	19.01	2.43	26.96				
PK	462.62M	29.06	46.00	-16.94	-2.33	3	Vertical	360	1.00	31.39	22.61	2.99	27.93				
PK	542.16M	29.46	46.00	-16.54	-0.08	3	Vertical	360	1.00	29.54	24.70	3.39	28.17				

13.553-13.567MHz_NFC

13.56MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Raw	AF	CL	PA				
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	(dBuV)	(dB)	(dB)	(dB)				
PK	30M	23.56	40.00	-16.44	-3.78	3	Horizontal	0	1.00	27.34	23.49	0.24	27.51				
PK	152.22M	26.58	43.50	-16.92	-10.15	3	Horizontal	0	1.00	36.73	15.36	1.63	27.14				
PK	191.02M	24.19	43.50	-19.31	-10.76	3	Horizontal	0	1.00	34.95	14.25	1.98	26.99				
PK	251.16M	29.99	46.00	-16.01	-6.87	3	Horizontal	0	1.00	36.86	17.71	2.16	26.74				
PK	330.7M	28.92	46.00	-17.08	-5.59	3	Horizontal	0	1.00	34.51	18.93	2.40	26.92				
PK	540.22M	29.58	46.00	-16.42	-0.12	3	Horizontal	0	1.00	29.70	24.67	3.38	28.17				

—THE END—