



# FCC RADIO TEST REPORT

FCC ID : 2A4DH-3908  
Equipment : Charging Stand  
Model Name : ZE9TAH  
Applicant : Amazon.com Services LLC  
410 Terry Avenue N Seattle, WA  
98109-5210 United States  
Standard : FCC Part 15 Subpart C §15.225

The product was received on Sep. 02, 2022 and testing was performed from Sep. 14, 2022 to Apr. 13, 2023. We, Sporton International (USA) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International (USA) Inc., the test report shall not be reproduced except in full.

Approved by: Abi Lin

**Sporton International (USA) Inc.**  
1175 Montague Expressway, Milpitas, CA 95035



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## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.207	AC Power Line Conducted Emissions	Pass	11.36 dB under the limit at 0.15MHz
3.2	15.215(c)	20dB Spectrum Bandwidth	Pass	-
	2.1049	99% OBW Spectrum Bandwidth	Reporting only	-
3.3	15.225(e)	Frequency Stability	Pass	-
3.4	15.225(a)(b)(c)	Field Strength of Fundamental Emissions	Pass	Max level 30.88 dB $\mu$ V/m at 13.56 MHz
3.5	15.225(d) 15.209	Radiated Spurious Emissions	Pass	9.13 dB under the limit at 40.67MHz
3.6	15.203	Antenna Requirements	Pass	-

**Conformity Assessment Condition:**

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty".

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.



# 1. General Description

## 1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Charging Stand
Model Name	ZE9TAH
FCC ID	2A4DH-3908
EUT supports Radios application	WPT

## 1.2 Product Specification of Equipment Under Test

Product Specification is subject to this standard	
Transmitter Frequency Range	13.553 ~ 13.567MHz
Channel Number	1
20dBW	2.58 KHz
99%OBW	2.19 KHz
Antenna Type	Loop Antenna
Type of Modulation	ASK

## 1.3 Modification of EUT

No modifications made to the EUT during the testing.



### 1.4 Testing Location

<b>Test Site</b>	Sporton International (USA) Inc.		
<b>Test Site Location</b>	1175 Montague Expressway, Milpitas, CA 95035 TEL: (408) 904-3300		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		
	TH01-CA	CO01-CA	03CH01-CA
<b>Test Engineer</b>	Liliana Gonzalez	Leo Liu	Fu Chen
<b>Temperature</b>	19~22 °C	18~23 °C	24~26 °C
<b>Relative Humidity</b>	31.1~34.2 %	37~45 %	42.9~47.5 %

**Note:** The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: US 1250

### 1.5 Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.225
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01
- ♦ ANSI C63.10-2013

**Remark:**

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

## 2. Test Configuration of Equipment Under Test

### 2.1 Descriptions of Test Mode

Investigation has been done on all the possible configurations.

The following table is a list of the test modes shown in this test report.

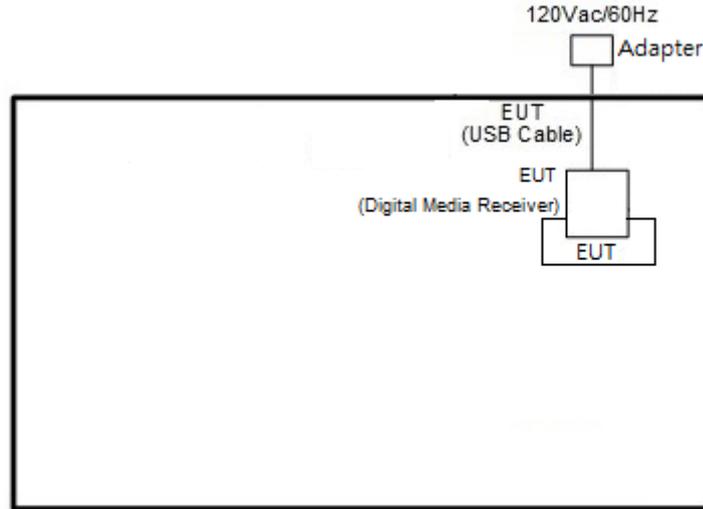
Test Items	
AC Power Line Conducted Emissions	Field Strength of Fundamental Emissions
20dB Spectrum Bandwidth	Frequency Stability
Radiated Emissions 9kHz~30MHz	Radiated Emissions 30MHz~1GHz

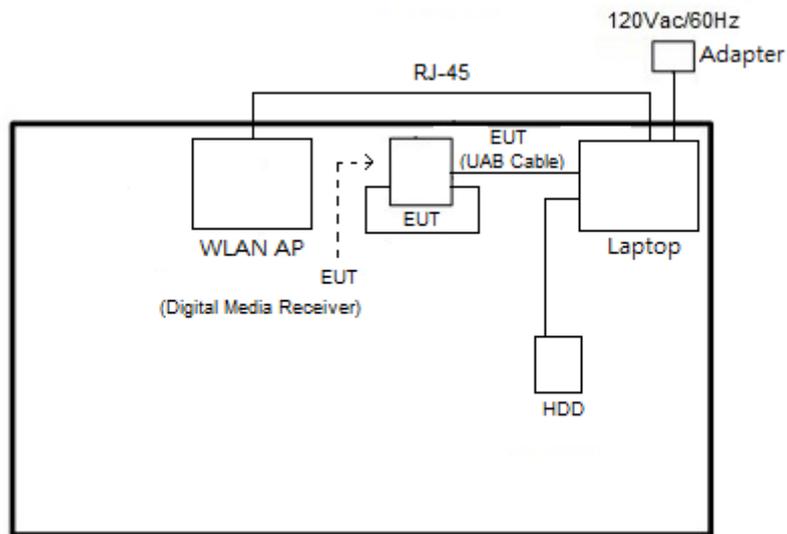
Test Cases	
<b>AC Conducted Emission</b>	Mode 1 : WPT (NFC Tx) charging from Charging Stand + USB cable + Adapter (Battery < 20%)
	Mode 2 : WPT (NFC Tx) charging from Charging Stand + USB cable + Laptop (Battery < 20%)
	Mode 3 : WPT (NFC Tx) charging from Charging Stand (charger with terminated load) + USB cable + Adapter (Battery < 20%)
	Mode 4 : WPT (NFC Tx) charging from Charging Stand (charger with terminated load) + USB cable + Laptop (Battery < 20%)
<b>Remark:</b> The worst case of Conducted Emission is mode 2; only the test data of it was reported.	

## 2.2 Connection Diagram of Test System

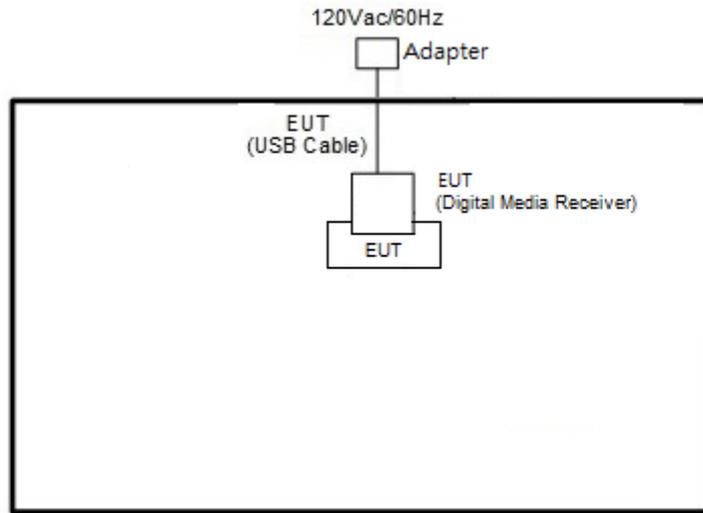
### <AC Conducted Emission with Adapter Mode>



### <AC Conducted Emission with Laptop Mode>



<NFC Tx Mode>



### 2.3 Table for Supporting Units

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Adapter	Amazon	FANA7R	N/A	N/A	N/A
2.	HDD	WD	WDBYNN001 0BBL-WESN	FCC DoC	Unshielded, 0.3 m	N/A
3.	WLAN AP	Asus	RT-AC66U B1	N/A	N/A	Unshielded, 1.8 m
4.	Laptop	DELL	Latitude3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

### 2.4 EUT Operation Test Setup

A pair of glasses is charged wirelessly by a charging stand which is powered by an adapter, once the glasses and the stand are paired up, signals will be continuously transmitted in between for communicating and charging purposes.

### 3. Test Results

#### 3.1 AC Power Line Conducted Emissions Measurement

##### 3.1.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

For terminal test result, the testing follows FCC KDB 174176.

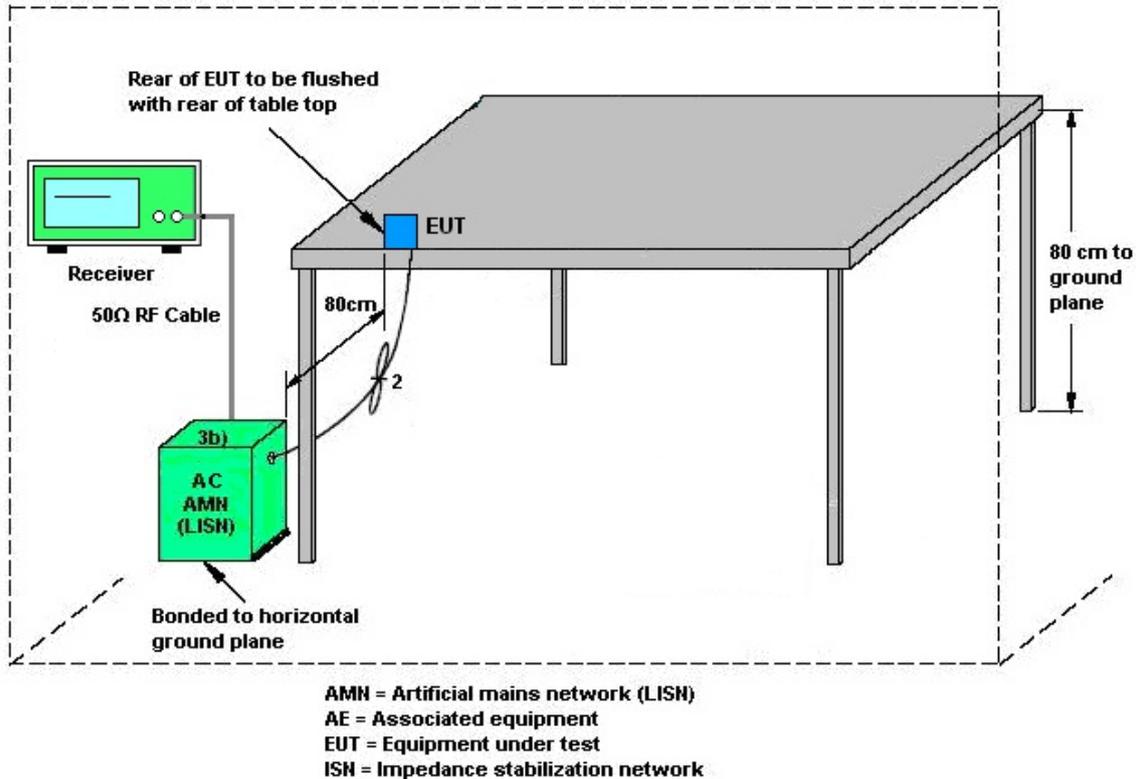
##### 3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

##### 3.1.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

### 3.1.4 Test setup



### 3.1.5 Test Result of AC Conducted Emission

Please refer to Appendix A.

**Note:**

(1) with antenna

Remark: 13.56MHz is the NFC RF fundamental signal.

(2) with dummy load

Remark: Only the fundamental NFC signal needs to be retested per C63.4.

## 3.2 20dB and 99% OBW Spectrum Bandwidth Measurement

### 3.2.1 Limit

Intentional radiators must be designed to ensure that the 20 dB and 99% emission bandwidth in the specific band 13.553~13.567 MHz.

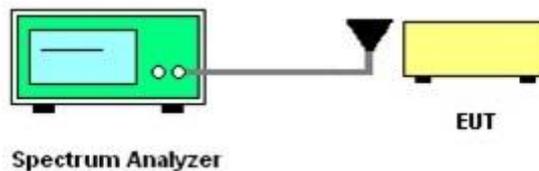
### 3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

### 3.2.3 Test Procedures

1. The spectrum analyzer connected via a receive antenna placed near the EUT in peak Max Hold Mode.
2. The resolution bandwidth of 1 kHz and the video bandwidth of 3 kHz were used.
3. Measured the spectrum width with power higher than 20 dB below carrier.
4. Measured the 99% OBW.

### 3.2.4 Test Setup



### 3.2.5 Test Result of Near Field Test Items

Please refer to Appendix B.

### 3.3 Frequency Stability Measurement

#### 3.3.1 Limit

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed by using a new battery.

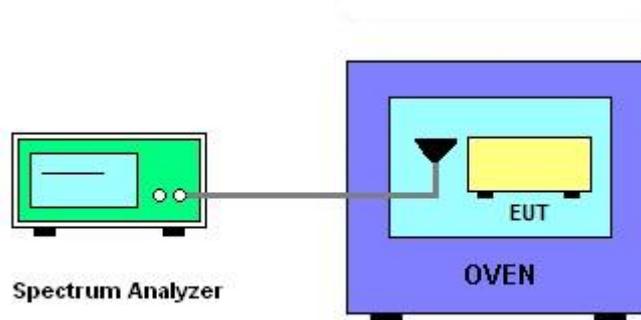
#### 3.3.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

#### 3.3.3 Test Procedures

1. The spectrum analyzer connected via a receive antenna placed near the EUT.
2. EUT has transmitted signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire emissions bandwidth.
4. Set RBW = 1 kHz, VBW = 3 kHz with peak detector and maxhold settings.
5. The  $f_c$  is declaring of channel frequency. Then the frequency error formula is  $(f_c - f) / f_c \times 10^6$  ppm and the limit is less than  $\pm 100$ ppm.
6. Extreme temperature rule is -20°C~50°C.

#### 3.3.4 Test Setup



#### 3.3.5 Test Result of Near Field Test Items

Please refer to Appendix B.



### 3.4 Field Strength of Fundamental Emissions and Mask Measurement

#### 3.4.1 Limit

Rules and specifications	FCC CFR 47 Part 15 section 15.225			
Description	Compliance with the spectrum mask is tested with RBW set to 9kHz.			
Freq. of Emission (MHz)	Field Strength (μV/m) at 30m	Field Strength (dBμV/m) at 30m	Field Strength (dBμV/m) at 10m	Field Strength (dBμV/m) at 3m
1.705~13.110	30	29.5	48.58	69.5
13.110~13.410	106	40.5	59.58	80.5
13.410~13.553	334	50.5	69.58	90.5
13.553~13.567	15848	84.0	103.08	124.0
13.567~13.710	334	50.5	69.58	90.5
13.710~14.010	106	40.5	59.58	80.5
14.010~30.000	30	29.5	48.58	69.5

**Remark:**

- 1. The field strength test result is in 3m test distance, follow test rules the test data use distance extrapolation factor and reported in this report at 30m test result.
- 2. Distance extrapolation factor =  $40 \log(\text{specific distance} / \text{test distance})$  (dB)

#### 3.4.2 Measuring Instruments

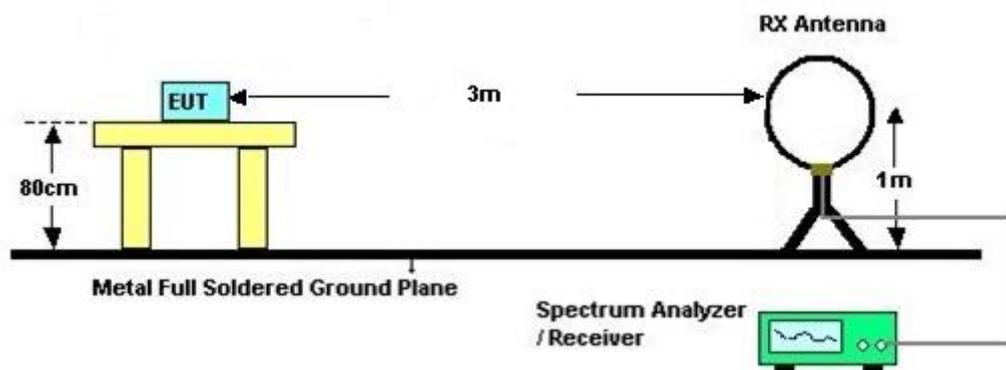
Please refer to the measuring equipment list in this test report.

### 3.4.3 Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT is placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower is placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable is rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the receiving antenna is fixed at one meter above ground to find the maximum emissions field strength.
4. For Fundamental emissions, use the receiver to measure QP reading.
5. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
6. Compliance with the spectrum mask is tested with RBW set to 9 kHz.  
Note: Emission level (dB $\mu$ V/m) = 20 log Emission level ( $\mu$ V/m).

### 3.4.4 Test Setup

For radiated test below 30MHz



### 3.4.5 Test Result of Field Strength of Fundamental Emissions and Mask

Please refer to Appendix C.



### 3.5 Radiated Emissions Measurement

#### 3.5.1 Limit

The field strength of any emissions which appear outside of 13.110 ~14.010MHz band shall not exceed the general radiated emissions limits.

Frequencies (MHz)	Field Strength (µV/m)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

#### 3.5.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

#### 3.5.3 Measuring Instrument Setting

The following table is the setting of receiver:

Receiver Parameter	Setting
Attenuation	Auto
Frequency Range: 9kHz~150kHz	RBW 200Hz for QP
Frequency Range: 150kHz~30MHz	RBW 9kHz for QP
Frequency Range: 30MHz~1000MHz	RBW 120kHz for Peak

**Note:** The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz and 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

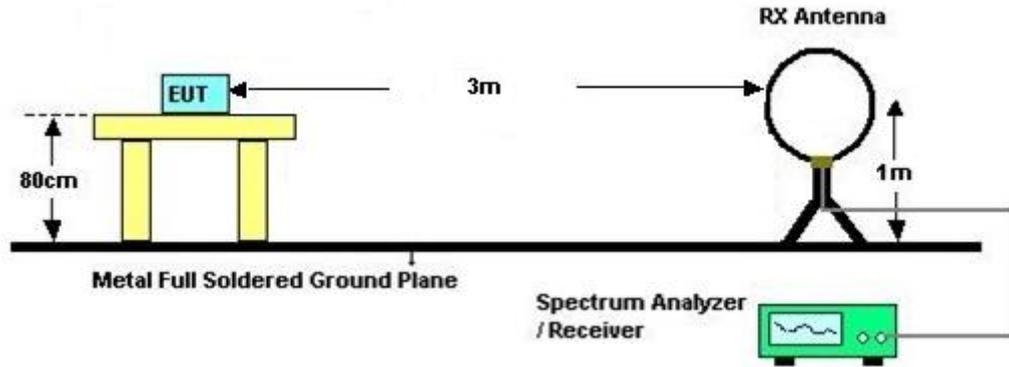


### 3.5.4 Test Procedures

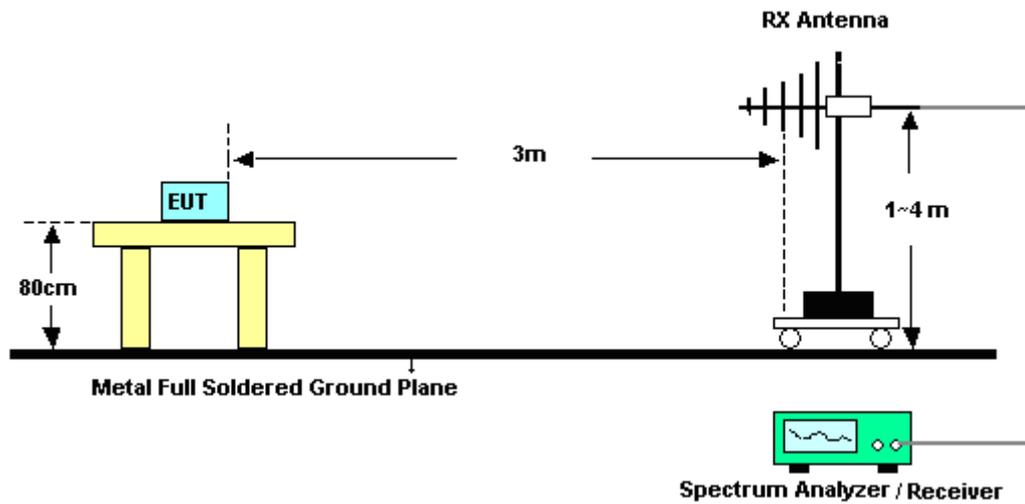
1. Configure the EUT according to ANSI C63.10. The EUT is placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower is placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable is rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna is varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower is scanned (from 1 M to 4 M) and then the turntable is rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
7. In case the emission is lower than 30 MHz, loop antenna has to be used for measurement and the recorded data shall be QP measured by receiver.
8. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-“.

### 3.5.5 Test Setup

For radiated test below 30MHz



For radiated test above 30MHz



### 3.5.6 Test Result of Radiated Emissions Measurement

Please refer to Appendix C.

**Remark:** There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.



## **3.6 Antenna Requirements**

### **3.6.1 Standard Applicable**

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

### **3.6.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.



## 4. List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100840	9kHz~30MHz	Jul. 05, 2022	Sep. 16, 2022~ Sep. 17, 2022	Jul. 04, 2023	Radiation (03CH01-CA)
Bilog Antenna	TESEQ	6111D	54683	30MHz~1GHz	Oct. 15, 2021	Sep. 16, 2022~ Sep. 17, 2022	Oct. 14, 2022	Radiation (03CH01-CA)
Amplifier	SONOMA	310N	372241	N/A	May 09, 2022	Sep. 16, 2022~ Sep. 17, 2022	May 08, 2023	Radiation (03CH01-CA)
EMI Test Receiver	Rohde & Schwarz	ESU26	100049	4.73 SP5	Jun. 01, 2022	Sep. 16, 2022~ Sep. 17, 2022	May 31, 2023	Radiation (03CH01-CA)
Filter	Wainwright	WHK20/1000C7 /40SS	SN1	20MHz High Pass Filter	Jul. 21, 2022	Sep. 16, 2022~ Sep. 17, 2022	Jul. 20, 2023	Radiation (03CH01-CA)
RF Cable	HUBER+SUHNER	SUCOFLEX 102	8015932/2, 8015762/2, 6015772/2	N/A	Aug. 08, 2022	Sep. 16, 2022~ Sep. 17, 2022	Aug. 07, 2023	Radiation (03CH01-CA)
Hygrometer	TESEO	608-H1	45142559	N/A	Sep. 12, 2022	Sep. 16, 2022~ Sep. 17, 2022	Sep. 11, 2023	Radiation (03CH01-CA)
Controller	ChainTek	EM-1000	060881	5.11	N/A	Sep. 16, 2022~ Sep. 17, 2022	N/A	Radiation (03CH01-CA)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Sep. 16, 2022~ Sep. 17, 2022	N/A	Radiation (03CH01-CA)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Sep. 16, 2022~ Sep. 17, 2022	N/A	Radiation (03CH01-CA)
Software	Audix	E3	N/A	6.2009-8-24d	N/A	Sep. 16, 2022~ Sep. 17, 2022	N/A	Radiation (03CH01-CA)
LISN	TESEQ	NNB51	47407	N/A	May 10, 2022	Sep. 14, 2022 Sep. 22, 2022	May 09, 2023	Conduction (CO01-CA)
LISN	TESEQ	NNB51	47415	N/A	May 10, 2022	Sep. 14, 2022 Sep. 22, 2022	May 09, 2023	Conduction (CO01-CA)
EMI Test Receiver	R&S	ESR7	102177	9kHz~7GHz	May 31, 2022	Sep. 14, 2022 Sep. 22, 2022	May 30, 2023	Conduction (CO01-CA)
Pulse limiter with 10dB attenuation	R&S	VTSD 9561-F N	9561-F- N00412	N/A	Jul. 05, 2022	Sep. 14, 2022 Sep. 22, 2022	Jul. 04, 2023	Conduction (CO01-CA)
Test Software	R&S	EMC32 V10.30.0	N/A	N/A	N/A	Sep. 14, 2022 Sep. 22, 2022	N/A	Conduction (CO01-CA)
Hygrometer	Testo	608-H1	45141354	N/A	Jul. 27, 2022	Jan. 25, 2023~ Apr. 13, 2023	Jul. 26, 2023	Near Field (TH01-CA)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101089	10Hz-40GHz	Jun. 01, 2022	Jan. 25, 2023~ Apr. 13, 2023	May 31, 2023	Near Field (TH01-CA)
Loop Antenna	Langer EMV-Technik	02-1641;101067	02-1641	N/A	Apr. 25, 2022	Jan. 25, 2023~ Apr. 13, 2023	Apr. 24, 2023	Near Field (TH01-CA)
Temperature & Humidity Chamber	ESPEC	SH-642	93012171	N/A	Sep. 06, 2022	Jan. 25, 2023~ Apr. 13, 2023	Sep. 05, 2023	Near Field (TH01-CA)
Power Supply	GW Instek	SPS-606	GES851982	N/A	May 11, 2022	Jan. 25, 2023~ Apr. 13, 2023	May 10, 2023	Near Field (TH01-CA)



## 5. Measurement Uncertainty

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.0 dB
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### Uncertainty of Radiated Emission Measurement (9 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.9 dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.0 dB
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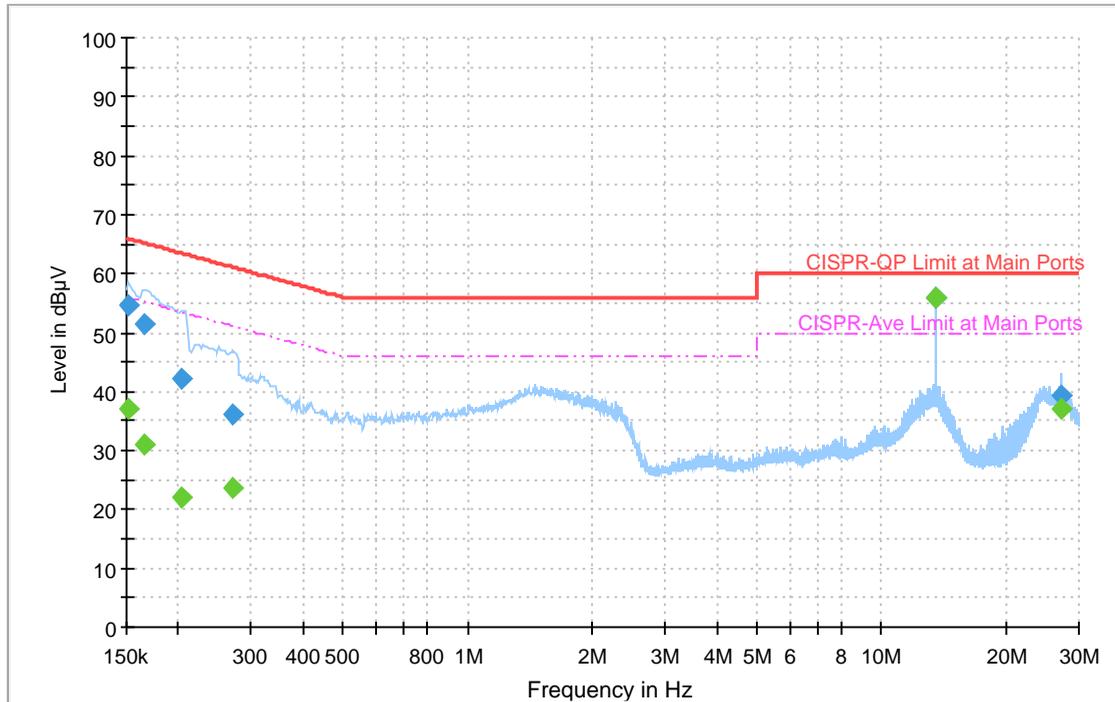


## **Appendix A. Test Results of Conducted Emission Test**

# Original

Site: CO01-CA  
 Power: From system  
 Project: 220714002  
 Mode: 2

Full Spectrum

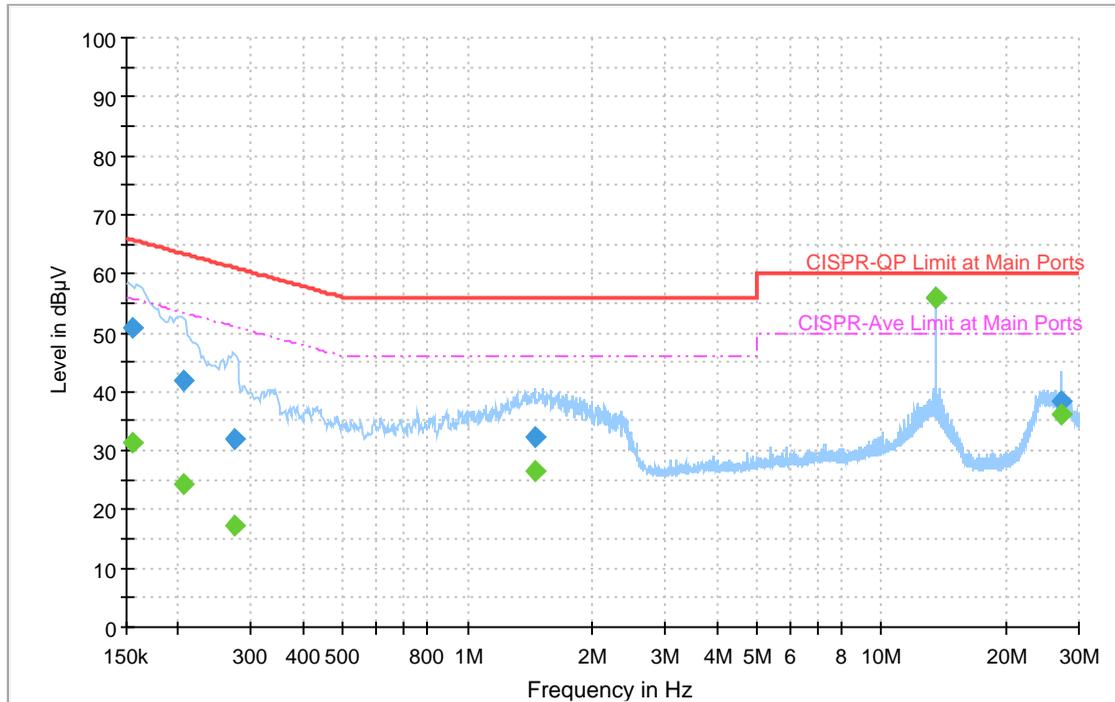


# Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.151310	---	37.22	55.93	18.71	L1	OFF	20.3
0.151310	54.57	---	65.93	11.36	L1	OFF	20.3
0.164931	---	31.04	55.21	24.17	L1	OFF	20.3
0.164931	51.56	---	65.21	13.65	L1	OFF	20.3
0.202857	---	21.96	53.49	31.53	L1	OFF	20.3
0.202857	42.11	---	63.49	21.38	L1	OFF	20.3
0.270447	---	23.56	51.10	27.54	L1	OFF	20.3
0.270447	36.15	---	61.10	24.95	L1	OFF	20.3
13.560063	---	55.89	50.00	-5.89	L1	OFF	20.5
13.560063	56.03	---	60.00	3.97	L1	OFF	20.5
27.118977	---	36.99	50.00	13.01	L1	OFF	20.6
27.118977	39.20	---	60.00	20.80	L1	OFF	20.6

Site: CO01-CA  
 Power: From system  
 Project: 220714002  
 Mode: 2

Full Spectrum



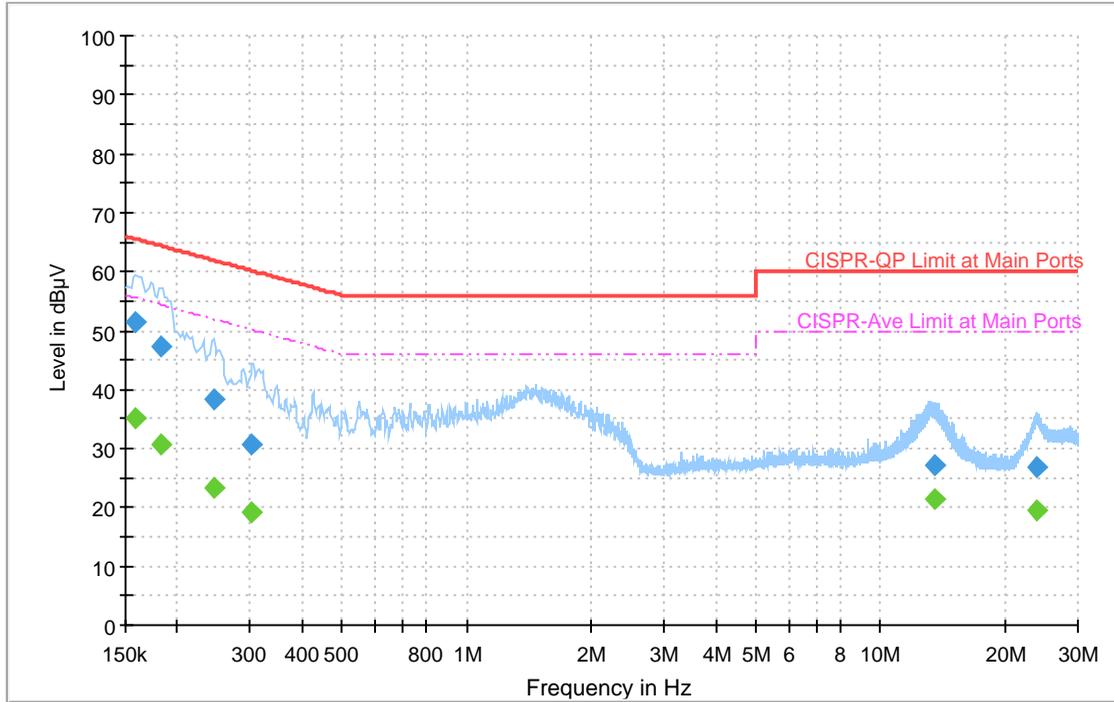
## Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154185	---	31.25	55.77	24.52	N	OFF	20.3
0.154185	50.84	---	65.77	14.93	N	OFF	20.3
0.204918	---	24.16	53.41	29.25	N	OFF	20.3
0.204918	41.95	---	63.41	21.46	N	OFF	20.3
0.272292	---	17.33	51.05	33.72	N	OFF	20.3
0.272292	32.08	---	61.05	28.97	N	OFF	20.3
1.449141	---	26.38	46.00	19.62	N	OFF	20.3
1.449141	32.28	---	56.00	23.72	N	OFF	20.3
13.559586	---	55.88	50.00	-5.88	N	OFF	20.5
13.559586	56.01	---	60.00	3.99	N	OFF	20.5
27.117951	---	36.18	50.00	13.82	N	OFF	20.6
27.117951	38.47	---	60.00	21.53	N	OFF	20.6

# Terminal

Site: CO01-CA  
 Power: From system  
 Project: 220714002  
 Mode: 2

Full Spectrum

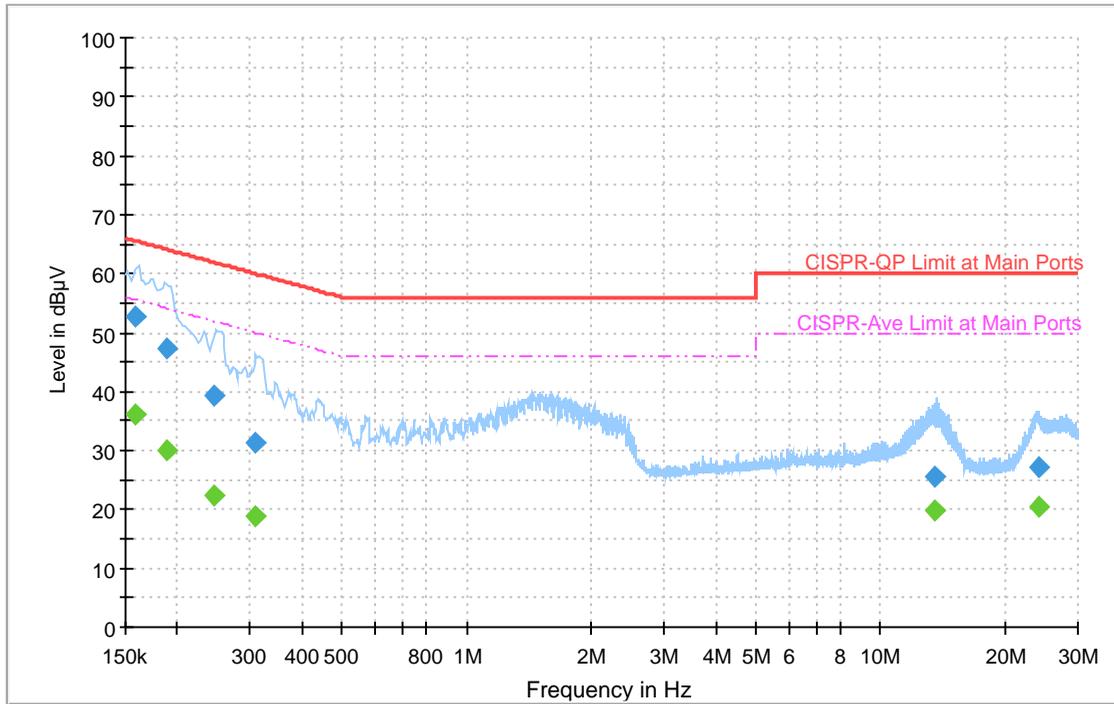


## Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.158847	---	35.13	55.52	20.39	L1	OFF	20.3
0.158847	51.35	---	65.52	14.17	L1	OFF	20.3
0.182337	---	30.79	54.38	23.59	L1	OFF	20.3
0.182337	47.37	---	64.38	17.01	L1	OFF	20.3
0.244689	---	23.20	51.94	28.74	L1	OFF	20.3
0.244689	38.22	---	61.94	23.72	L1	OFF	20.3
0.300939	---	19.01	50.22	31.21	L1	OFF	20.3
0.300939	30.65	---	60.22	29.57	L1	OFF	20.3
13.564725	---	21.46	50.00	28.54	L1	OFF	20.5
13.564725	27.31	---	60.00	32.69	L1	OFF	20.5
23.889273	---	19.45	50.00	30.55	L1	OFF	20.6
23.889273	26.82	---	60.00	33.18	L1	OFF	20.6

Site: CO01-CA  
 Power: From system  
 Project: 220714002  
 Mode: 2

Full Spectrum



## Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.157956	---	36.14	55.57	19.43	N	OFF	20.3
0.157956	52.86	---	65.57	12.71	N	OFF	20.3
0.189141	---	29.96	54.07	24.11	N	OFF	20.3
0.189141	47.42	---	64.07	16.65	N	OFF	20.3
0.244797	---	22.22	51.93	29.71	N	OFF	20.3
0.244797	39.33	---	61.93	22.60	N	OFF	20.3
0.309579	---	18.89	49.98	31.09	N	OFF	20.3
0.309579	31.20	---	59.98	28.78	N	OFF	20.3
13.568163	---	19.81	50.00	30.19	N	OFF	20.5
13.568163	25.63	---	60.00	34.37	N	OFF	20.5
24.216018	---	20.48	50.00	29.52	N	OFF	20.5
24.216018	27.29	---	60.00	32.71	N	OFF	20.5



# Appendix B. Test Results of Near Field Test Items

## B1. Test Result of 20dB Spectrum Bandwidth

Test mode	NFC Tx	Test Frequency (MHz)	13.56																																																								
<table border="1"> <thead> <tr> <th>Type</th> <th>Ref</th> <th>Trc</th> <th>X-value</th> <th>Y-value</th> <th>Function</th> <th>Function Result</th> </tr> </thead> <tbody> <tr> <td>M1</td> <td>1</td> <td></td> <td>13.55991 MHz</td> <td>-9.67 dBm</td> <td>ndB down</td> <td>2.577 kHz</td> </tr> <tr> <td>T1</td> <td>1</td> <td></td> <td>13.558621 MHz</td> <td>-29.77 dBm</td> <td>ndB</td> <td>20.00 dB</td> </tr> <tr> <td>T2</td> <td>1</td> <td></td> <td>13.561199 MHz</td> <td>-29.79 dBm</td> <td>Q factor</td> <td>5261.0</td> </tr> </tbody> </table>		Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		13.55991 MHz	-9.67 dBm	ndB down	2.577 kHz	T1	1		13.558621 MHz	-29.77 dBm	ndB	20.00 dB	T2	1		13.561199 MHz	-29.79 dBm	Q factor	5261.0	<table border="1"> <thead> <tr> <th>Type</th> <th>Ref</th> <th>Trc</th> <th>X-value</th> <th>Y-value</th> <th>Function</th> <th>Function Result</th> </tr> </thead> <tbody> <tr> <td>M1</td> <td>1</td> <td></td> <td>13.55991 MHz</td> <td>-17.52 dBm</td> <td></td> <td></td> </tr> <tr> <td>T1</td> <td>1</td> <td></td> <td>13.5588112 MHz</td> <td>-32.02 dBm</td> <td>Occ Bw</td> <td>2.187812188 kHz</td> </tr> <tr> <td>T2</td> <td>1</td> <td></td> <td>13.560999 MHz</td> <td>-32.08 dBm</td> <td></td> <td></td> </tr> </tbody> </table>		Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		13.55991 MHz	-17.52 dBm			T1	1		13.5588112 MHz	-32.02 dBm	Occ Bw	2.187812188 kHz	T2	1		13.560999 MHz	-32.08 dBm		
Type	Ref	Trc	X-value	Y-value	Function	Function Result																																																					
M1	1		13.55991 MHz	-9.67 dBm	ndB down	2.577 kHz																																																					
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T2	1		13.560999 MHz	-32.08 dBm																																																							
<b>20dB Bandwidth (kHz)</b>	2.577	<b>99% OccupiedBW(kHz)</b>	2.188																																																								
<b>Frequency range (MHz)</b>	$f_L > 13.553$	13.55862	<b>Test Result</b>																																																								
	$f_H < 13.567$	13.56120	<b>Complies</b>																																																								

**Remark:** Because the measured signal is CW 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.



B2. Test Result of Frequency Stability

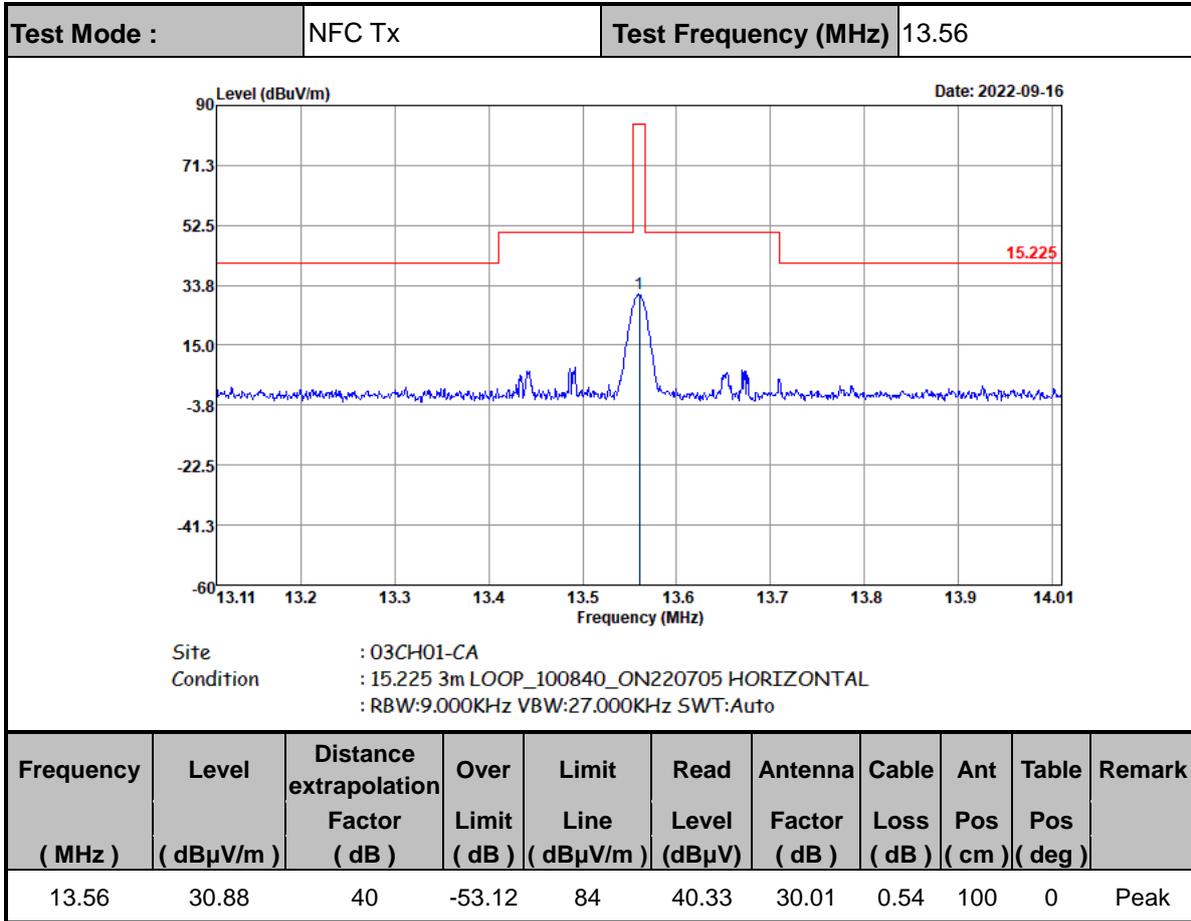
Voltage (Vdc)	Measured Frequency (MHz)	Deviation (MHz)	Deviation (ppm)
4.25	13.559884	-0.00012	-8.554572
4.75	13.559913	-0.00009	-6.415929
5	13.559899	-0.00010	-7.448378
5.75	13.559913	-0.00009	-6.415929

Temperature (°C)	Measured Frequency (MHz) at startup	at 2min	at 5min	at 10min	Deviation (MHz)	Deviation (ppm)
-20	13.559900	13.559870	13.559890	13.559890	-0.000130	-9.587021
-10	13.559958	13.559920	13.559920	13.559920	-0.000080	-5.899705
0	13.559958	13.559940	13.559940	13.559940	-0.000060	-4.424779
10	13.559916	13.559920	13.559920	13.559920	-0.000084	-6.194690
20	13.559899	13.559890	13.559880	13.559900	-0.000120	-8.849558
30	13.559880	13.559850	13.559850	13.559900	-0.000150	-11.061947
40	13.559850	13.559830	13.559830	13.559830	-0.000170	-12.536873
50	13.559850	13.559820	13.559830	13.559830	-0.000180	-13.27433628
<b>Limit</b>	<b>FS &lt; ±100 ppm</b>				<b>Limit</b>	<b>FS &lt; ±100 ppm</b>
<b>Test Result</b>	<b>PASS</b>				<b>Test Result</b>	<b>PASS</b>



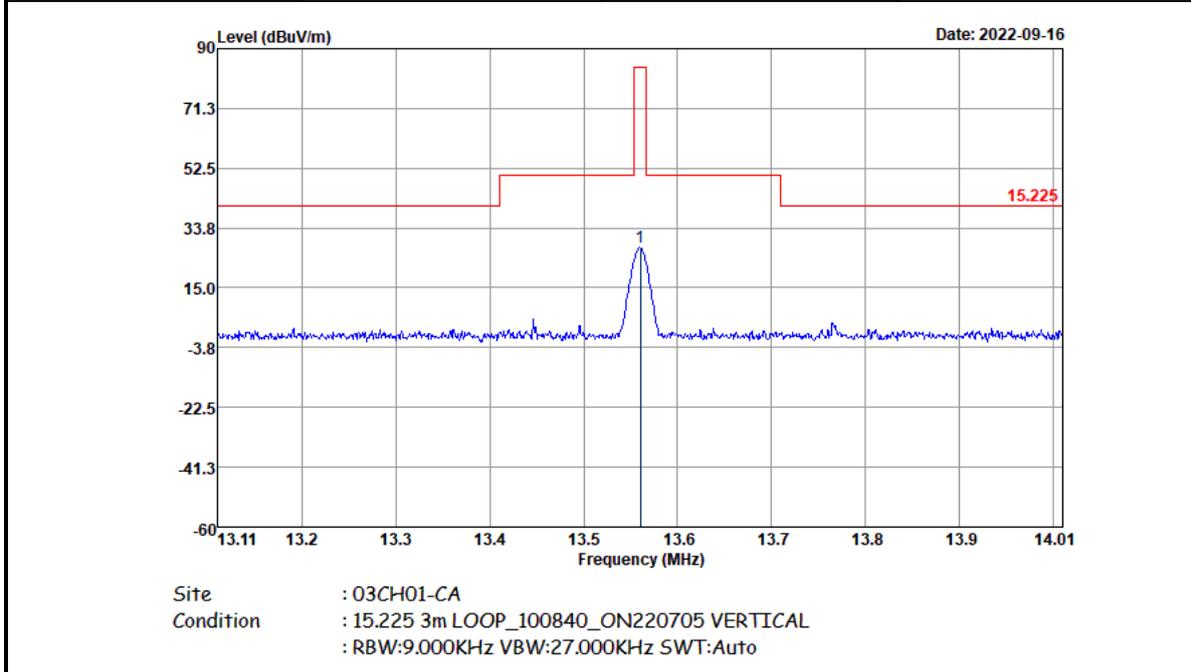
## Appendix C. Test Results of Radiated Test Items

### C1. Test Result of Field Strength of Fundamental Emissions





Test Mode :	NFC Tx	Test Frequency (MHz)	13.56
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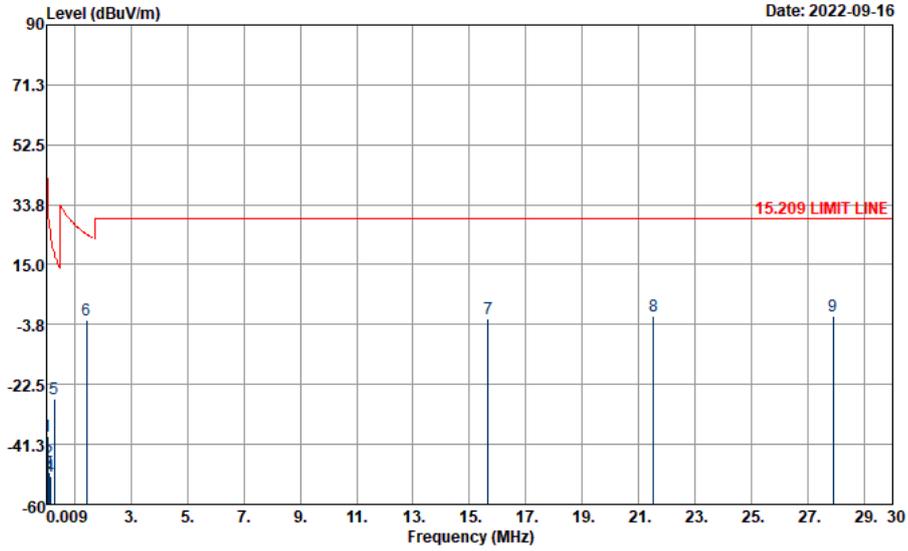
Frequency ( MHz )	Level ( dBμV/m )	Distance extrapolation Factor ( dB )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
13.56	27.6	40	-56.4	84	37.05	30.01	0.54	100	265	Peak

**Note :**

1. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
2. Level = Antenna Factor + Cable Loss + Read Level - Distance extrapolation factor.

**C2. Results of Radiated Spurious Emissions (9 kHz~30MHz)**

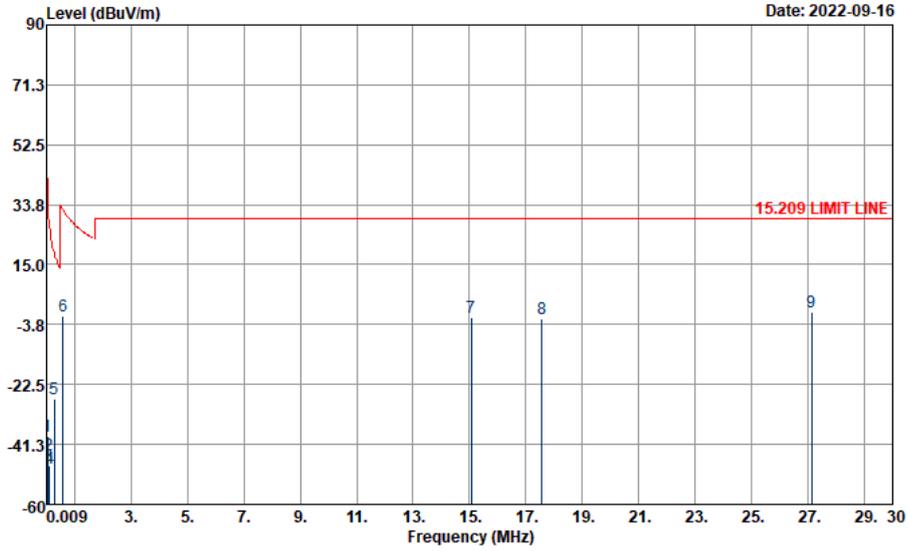
<b>Test Mode :</b>	NFC Tx	<b>Polarization :</b>	Horizontal
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Frequency ( MHz )	Level ( dBμV/m )	Distance extrapolation Factor ( dB )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
0.03506	-38.69	80	-75.4	36.71	10.34	30.93	0.04	-	-	Peak
0.07008	-46.63	80	-77.32	30.69	3	30.33	0.04	-	-	Peak
0.096	-50.17	80	-78.13	27.96	-0.62	30.41	0.04	-	-	Peak
0.13768	-51.33	80	-76.16	24.83	-1.49	30.12	0.04	-	-	Peak
0.28396	-26.93	80	-45.47	18.54	22.89	30.13	0.05	-	-	Peak
1.436	-2.21	40	-26.67	24.46	7.37	30.19	0.23	-	-	Peak
15.664	-2.12	40	-31.62	29.5	7.33	29.99	0.56	-	-	Peak
21.526	-1.27	40	-30.77	29.5	8.07	29.95	0.71	-	-	Peak
27.885	-1.04	40	-30.54	29.5	8.12	30.04	0.8	-	-	Peak



<b>Test Mode :</b>	NFC Tx	<b>Polarization :</b>	Vertical
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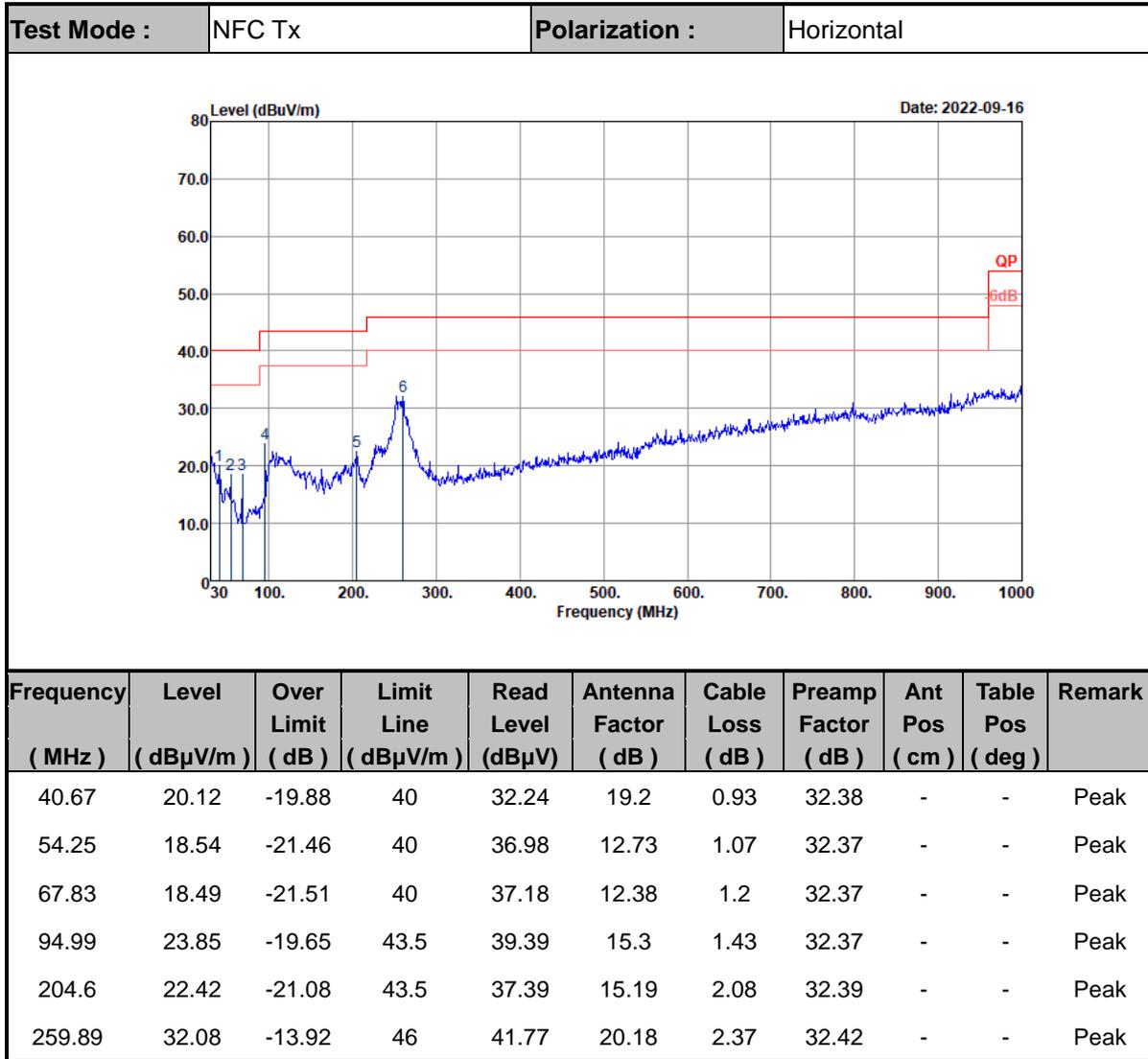


Frequency ( MHz )	Level ( dBμV/m )	Distance extrapolation Factor ( dB )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
0.03506	-38.61	80	-75.32	36.71	10.42	30.93	0.04	-	-	Peak
0.07008	-44.58	80	-75.27	30.69	5.05	30.33	0.04	-	-	Peak
0.09016	-47.89	80	-76.39	28.5	1.49	30.58	0.04	-	-	Peak
0.11188	-48.83	80	-75.46	26.63	0.93	30.2	0.04	-	-	Peak
0.28566	-26.86	80	-45.35	18.49	22.96	30.13	0.05	-	-	Peak
0.59514	-1.19	40	-33.3	32.11	8.48	30.23	0.1	-	-	Peak
15.064	-1.71	40	-31.21	29.5	7.77	29.98	0.54	-	-	Peak
17.566	-1.92	40	-31.42	29.5	7.5	29.97	0.61	-	-	Peak
27.12	0.26	40	-29.24	29.5	9.43	30.03	0.8	-	-	Peak

**Note :**

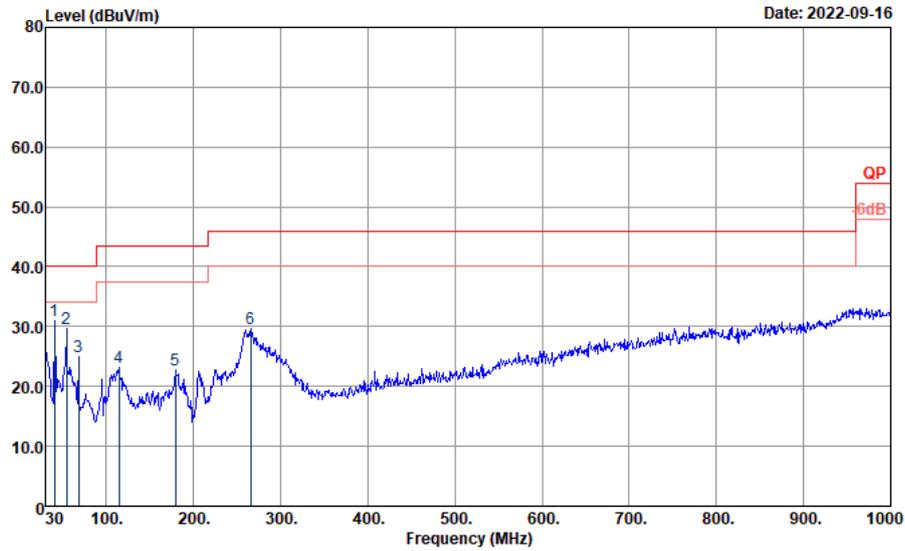
1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Distance extrapolation factor =  $40 \log(\text{specific distance} / \text{test distance})$  (dB)
3. Level = Antenna Factor + Cable Loss + Read Level - Distance extrapolation factor.

**C3. Results of Radiated Spurious Emissions (30MHz~1GHz)**





Test Mode :	NFC Tx	Polarization :	Vertical
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Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
40.67	30.87	-9.13	40	42.99	19.2	0.93	32.38	-	-	Peak
54.25	29.66	-10.34	40	48.1	12.73	1.07	32.37	-	-	Peak
67.83	24.97	-15.03	40	43.66	12.38	1.2	32.37	-	-	Peak
114.39	23.21	-20.29	43.5	36.5	17.4	1.55	32.36	-	-	Peak
179.38	22.72	-20.78	43.5	37.8	15.2	1.95	32.36	-	-	Peak
265.71	29.71	-16.29	46	39.5	20.06	2.39	32.42	-	-	Peak

**Note:**

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m).
3. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor= Level.
4. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

————THE END————