

Shanghai Medconn Medical Technology Co., Ltd.

RF TEST REPORT

Report Type:
FCC Part 15.225 RF report

Model:
MQ-3000, MQ-3000PT

REPORT NUMBER:
2407B2158SHA-001

ISSUE DATE:
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DOCUMENT CONTROL NUMBER:
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FCC ID: **2BHV20907**

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 15 (2023): Radio Frequency Devices (Subpart C)

ANSI C63.10 (2020): American National Standard of Procedures for Compliance Testing of Unlicensed
Wireless Devices

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Reviewer
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TEST REPORT**Revision History**

Report No.	Version	Description	Issued Date
2407B2158SHA-001	Rev. 01	Initial issue of report	August 20, 2024

TEST REPORT**Measurement result summary**

TEST ITEM	FCC REFERENCE	RESULT
Fundamental emission	15.225(a) (b) (c)	Pass
Spurious emission	15.225(d)	Pass
Frequency stability	15.225(e)	Pass
Conducted emissions	15.207	Pass
99% and 20dB Bandwidth	15.215(c)	Pass
Antenna requirement	15.203	Pass

Notes: 1: NA =Not Applicable

2: Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

3: Additions, Deviations and Exclusions from Standards: None.

TEST REPORT**1 GENERAL INFORMATION****1.1 Description of Equipment Under Test (EUT)**

Product name:	Glycated Hemoglobin Analyzer
Type/Model:	MQ-3000, MQ-3000PT
Description of EUT:	The EUT is a Glycated Hemoglobin Analyzer with NFC function, both models are identical except the appearance color. After review, model MQ-3000 was selected to perform all tests.
Rating:	100-240V~, 50/60Hz, 150VA
EUT type:	<input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing
Software Version:	/
Hardware Version:	/
Serial numbers:	A240621-02-002
Sample received date:	June 28, 2024
Date of test:	June 28, 2024 to August 5, 2024

1.2 Technical Specification

Frequency Range:	13.56 MHz ~ 13.56 MHz
Modulation:	ASK
Antenna:	PCB antenna

TEST REPORT**1.3 Description of Test Facility**

Name:	Intertek Testing Services (Shanghai FTZ) Co., Ltd.
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L21189
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0014
	VCCI Registration Lab Member No.: 3598 (Registration No.: R-14243, G-10845, C-14723, T-12252)
	A2LA Accreditation Lab Certificate Number: 3309.02

TEST REPORT**2 TEST SPECIFICATIONS****2.1 Standards or specification**

47CFR Part 15 (2023)
ANSI C63.10 (2020)

2.2 Mode of operation during the test

While testing, the internal modulation and continuously transmission was applied.

2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.4 Test peripherals list

Item No	Description	Band and Model	S/No
1	--	--	--

2.5 Test environment condition:

Test items	Temperature	Humidity
Radiated emission	25°C	53% RH
Power line conducted emission	24°C	53% RH

TEST REPORT
2.6 Instrument list

Conducted Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESR7	EC 6194	2025-02-27
<input checked="" type="checkbox"/>	A.M.N.	R&S	ESH2-Z5	EC 3119	2024-11-19
<input checked="" type="checkbox"/>	Attenuator	Hua Xiang	Ts5-10db-6g	EC 6194-1	2024-12-07
<input checked="" type="checkbox"/>	Shielded room	Zhongyu	-	EC 2838	2025-01-11
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESIB 26	EC 3045	2024-08-22
<input checked="" type="checkbox"/>	Active loop antenna	Schwarzbeck	FMZB1519	EC 5345	2024-09-24
<input checked="" type="checkbox"/>	Bilog Antenna	TESEQ	CBL 6112B	EC 6411	2024-09-12
<input checked="" type="checkbox"/>	Pre-amplifier	Tonscend	tap01018050	EC 6432-1	2024-12-07
<input checked="" type="checkbox"/>	Horn antenna	Tonscend	bha9120d	EC 6432-2	2025-02-15
<input checked="" type="checkbox"/>	Horn antenna	TOYO	HAP18-26W	EC 4792-3	2026-09-12
<input checked="" type="checkbox"/>	Semi-anechoic chamber	Albatross project	-	EC 3048	2025-01-11
RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input type="checkbox"/>	PXA Signal Analyzer	Keysight	N9030A	EC 5338	2025-03-07
<input type="checkbox"/>	Vector Signal Generator	Agilent	N5182B	EC 5175	2025-03-07
<input type="checkbox"/>	Universal Radio Communication Tester	R&S	CMW500	EC5944	2025-03-07
<input type="checkbox"/>	MXG Analog Signal Generator	Agilent	N5181A	EC 5338-2	2025-03-07
<input type="checkbox"/>	Mobile Test System	Litepoint	Iqxel	EC 5176	2025-01-11
<input type="checkbox"/>	Test Receiver	R&S	ESCI 7	EC 4501	2025-03-09
<input type="checkbox"/>	Climate chamber	GWS	MT3065	EC 6021	2025-03-06
<input checked="" type="checkbox"/>	Spectrum Analyzer	Keysight	N9030B	EC 6078	2025-06-15
<input type="checkbox"/>	Universal Radio Communication Tester	R&S	CMW500	EC 6209	2025-01-30
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Thermo-Hygrograph	Testo	175h1	EC 6640	2024-08-28
<input checked="" type="checkbox"/>	Thermo-Hygrograph	Testo	175h1	EC 6641	2024-08-28
<input checked="" type="checkbox"/>	Pressure meter	YM3	Shanghai Mengde	EC 4620	2024-08-16

TEST REPORT**2.7 Measurement uncertainty**

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Measurement uncertainty
Maximum peak output power	± 0.74dB
Power spectrum density	± 0.74dB
Radiated Emissions in restricted frequency bands below 1GHz	± 4.90dB
Radiated Emissions in restricted frequency bands above 1GHz	± 5.02dB
Emission outside the frequency band	± 2.89dB
Power line conducted emission	± 3.19dB
Occupied bandwidth	± 0.84 × 10 ⁻⁷

TEST REPORT**3 Fundamental Emission****Test result:** Pass**3.1 Limit**

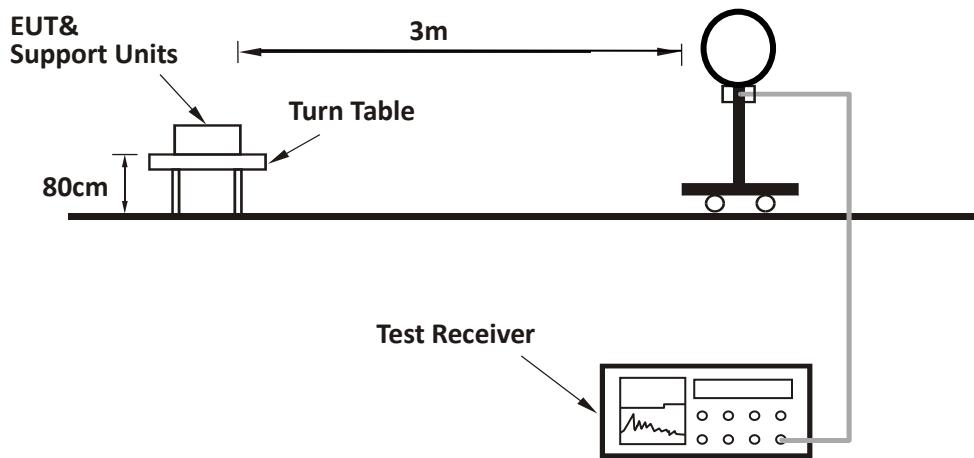
Frequencies (MHz)	Limit at 30m (dBuV/m)	Limit at 3m (dBuV/m)
13.110 – 13.410	40.50	80.50
13.410 – 13.553	50.50	90.50
13.553 – 13.567	84.00	124.00
13.567 – 13.710	50.50	90.50
13.710 – 14.010	40.50	80.50

3.2 Measurement Procedure

- a) The EUT was placed on a 0.8m plank above the ground at a 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) Both X and Y axes of the antenna are set to make the measurement.
- d) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e) The test-receiver system was set to PK Detect Function and Specified Bandwidth with Maximum Hold Mode.

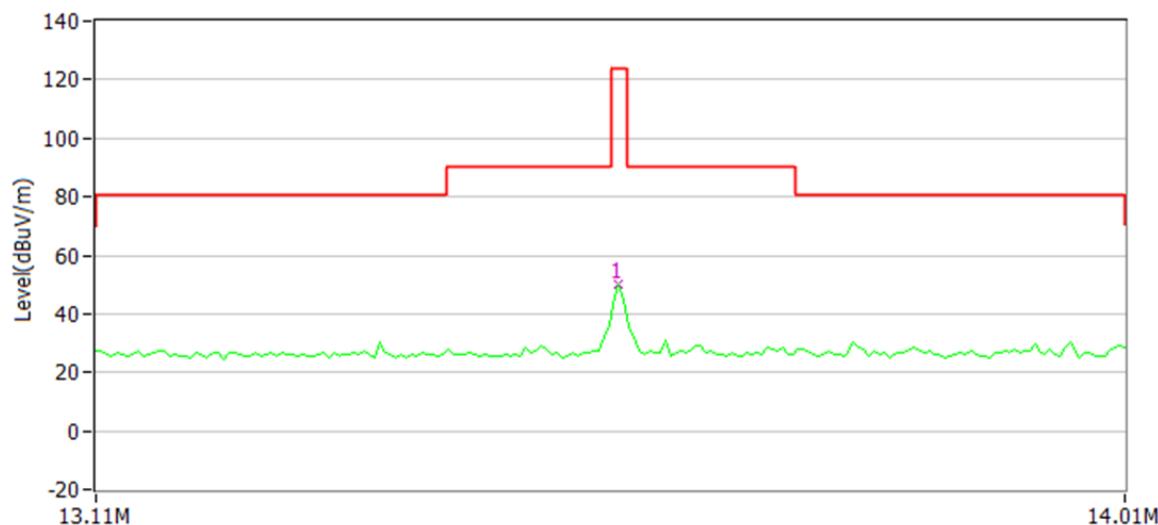
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

TEST REPORT**3.3 Test Configuration**

TEST REPORT
3.4 Test Results of Fundamental Emissions

Note: X axis as the worst case was recorded.



Antenna Polarization	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin	Detector
X	13.56	50.1	20.5	124.00	73.9	PK
Y	13.56	38.7	20.5	124.00	85.3	PK

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
 2. Corrected Reading = Original Receiver Reading + Correct Factor
 3. Margin = Limit - Corrected Reading

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
 Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,
 Limit = 40.00dBuV/m.
 Then Correct Factor = $30.20 + 2.00 - 32.00 = 0.20$ dB/m;
 Corrected Reading = $10\text{dBuV} + 0.20\text{dB/m} = 10.20\text{dBuV/m}$;
 Margin = $40.00\text{dBuV/m} - 10.20\text{dBuV/m} = 29.80\text{dB}$.

TEST REPORT**4 Spurious Emission****Test result:** Pass**4.1 Limit**

Frequencies (MHz)	Field Strength (microvolts/meter)	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

4.2 Measurement Procedure**For Radiated emission below 30MHz:**

- f) The EUT was placed on a 0.8m plank above the ground at a 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- g) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- h) Both X and Y axes of the antenna are set to make the measurement.
- i) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- j) The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz:

- a) The EUT was placed on a 0.8m plank above the ground at a 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

TEST REPORT

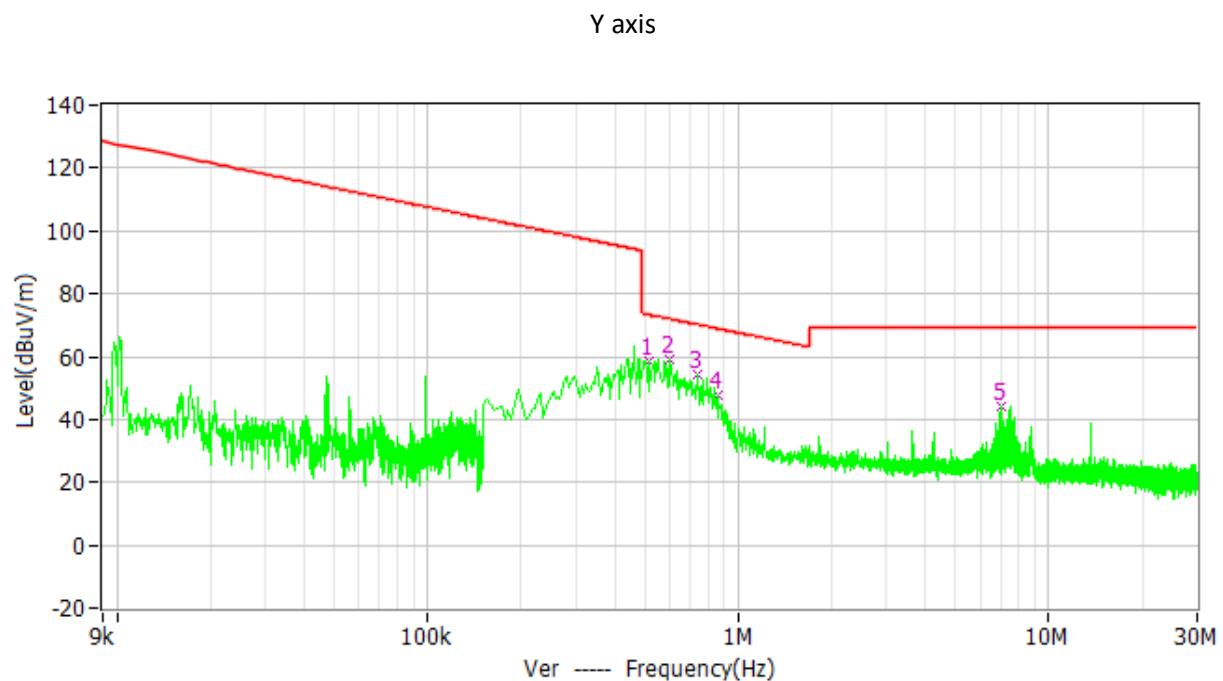
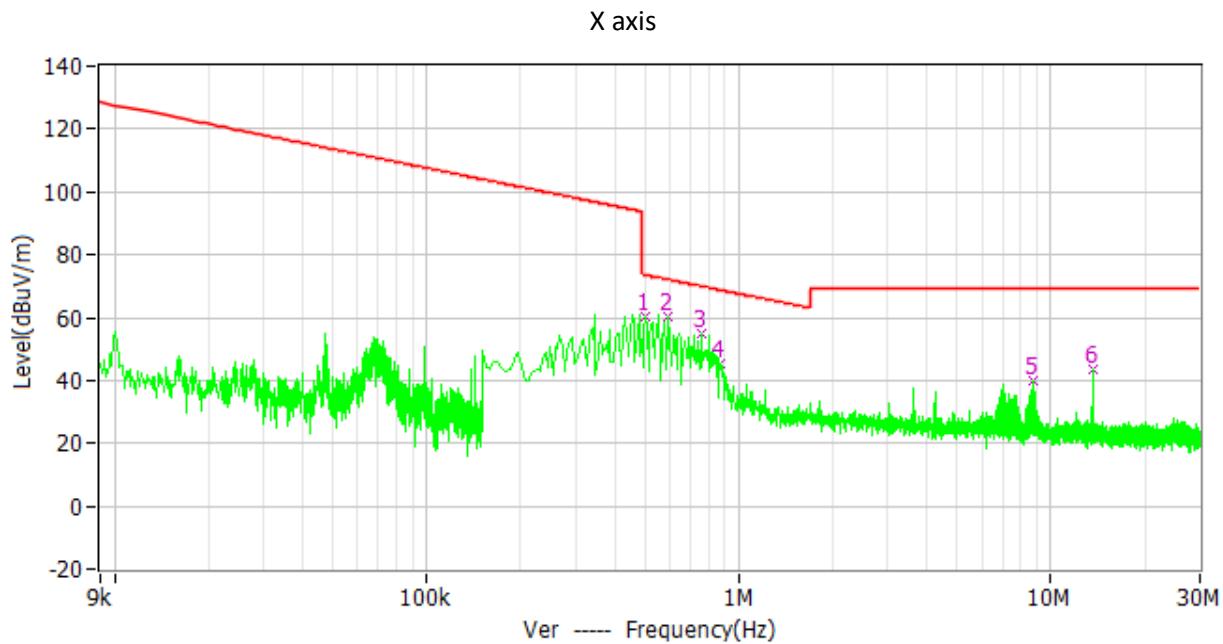
- d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. All modes of operation were evaluated and the worst-case emissions were reported

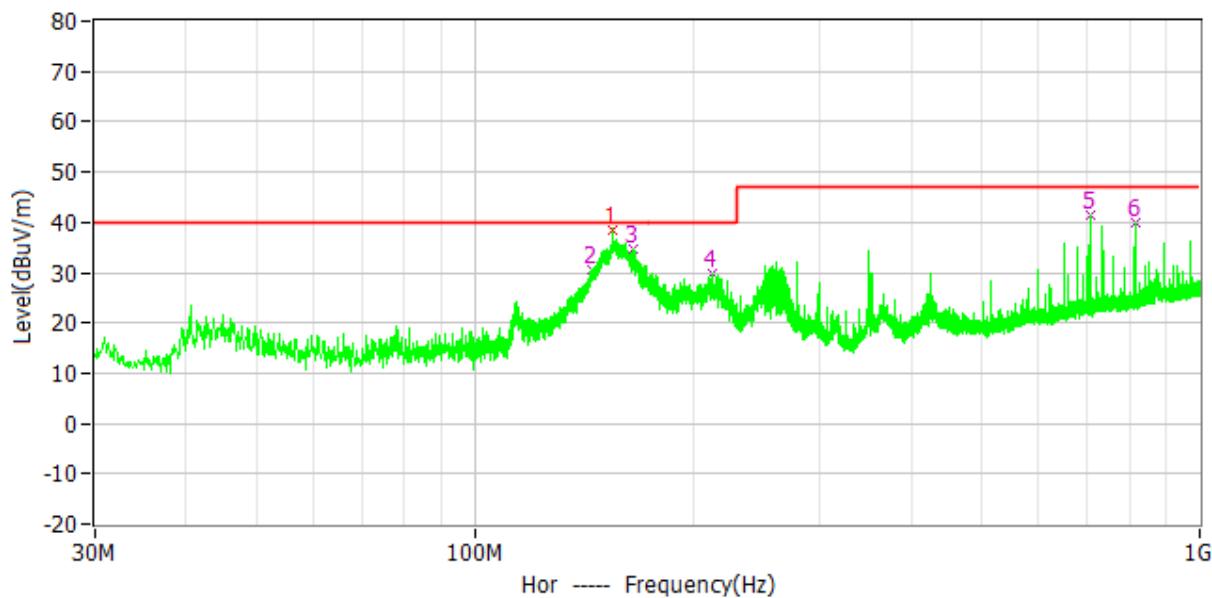
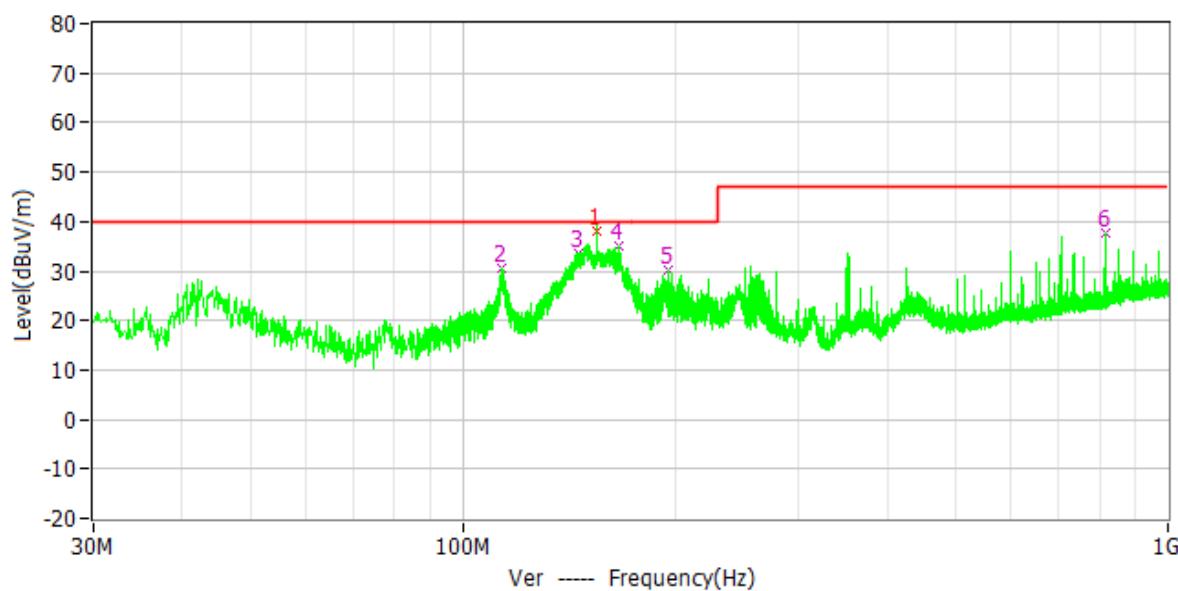
TEST REPORT**4.3 Test Results of Radiated Emissions**

The EUT has been tested in all two orthogonal planes, it has the worst case when it is in horizontal position for both below 30MHz & above 30MHz.

Test Curve:

TEST REPORT**Test data below 30MHz:**

Frequency	Limit (dBuV/m)	Corrected Reading (dBuV/m)	Margin	Detector	Polarity
501.000kHz	73.6	60.4	13.2	PK	X
595.500kHz	72.1	60.2	11.9	PK	X
757.500kHz	70.0	55.1	14.9	PK	X
874.500kHz	68.8	45.3	23.5	PK	X
8.817MHz	69.5	40.1	29.4	PK	X
514.500kHz	73.4	58.6	14.8	PK	Y
600.000kHz	72.0	58.9	13.1	PK	Y
739.500kHz	70.2	54.1	16.1	PK	Y
856.500kHz	69.0	47.6	21.3	PK	Y
7.049MHz	69.5	43.9	25.6	PK	Y
514.500kHz	73.4	58.6	14.8	PK	Y

TEST REPORT**H****V**

TEST REPORT
Test data from 30MHz to 1000MHz:

Antenna Polarization	Frequency	Limit (dBuV/m)	Corrected Reading (dBuV/m)	Margin	Detector
H	155.183MHz	40.0	38.6	1.4	QP
H	145.333MHz	40.0	30.7	9.3	PK
H	165.412MHz	40.0	34.8	5.2	PK
H	212.263MHz	40.0	29.9	10.1	PK
H	705.120MHz	47.0	41.3	5.7	PK
H	814.730MHz	47.0	40.0	7.0	PK
V	155.177MHz	40.0	38.1	1.9	QP
V	113.711MHz	40.0	30.6	9.4	PK
V	145.915MHz	40.0	33.5	6.5	PK
V	166.673MHz	40.0	35.0	5.0	PK
V	195.385MHz	40.0	30.1	9.9	PK
V	814.730MHz	47.0	37.6	9.4	PK

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
 2. Corrected Reading = Original Receiver Reading + Correct Factor
 3. Margin = Limit - Corrected Reading
 4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

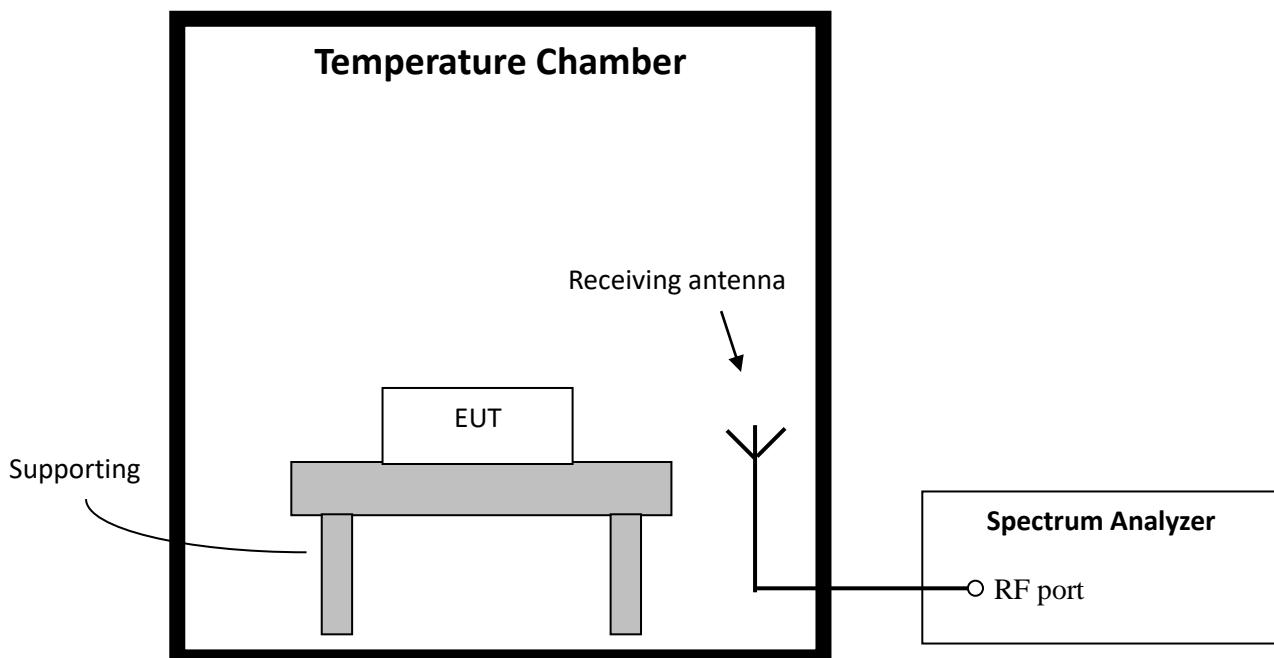
Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
 Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,
 Limit = 40.00dBuV/m.
 Then Correct Factor = $30.20 + 2.00 - 32.00 = 0.20$ dB/m;
 Corrected Reading = $10\text{dBuV} + 0.20\text{dB/m} = 10.20\text{dBuV/m}$;
 Margin = $40.00\text{dBuV/m} - 10.20\text{dBuV/m} = 29.80\text{dB}$.

TEST REPORT**5 Frequency Stability (Temperature Variation)**

Test result: **PASS**

5.1 Test limit

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage.

5.2 Test Configuration

TEST REPORT**5.3 Test procedure and test setup**

Test Procedure as per ANSI 63.10 clause 6.8.1.

5.4 Test protocol

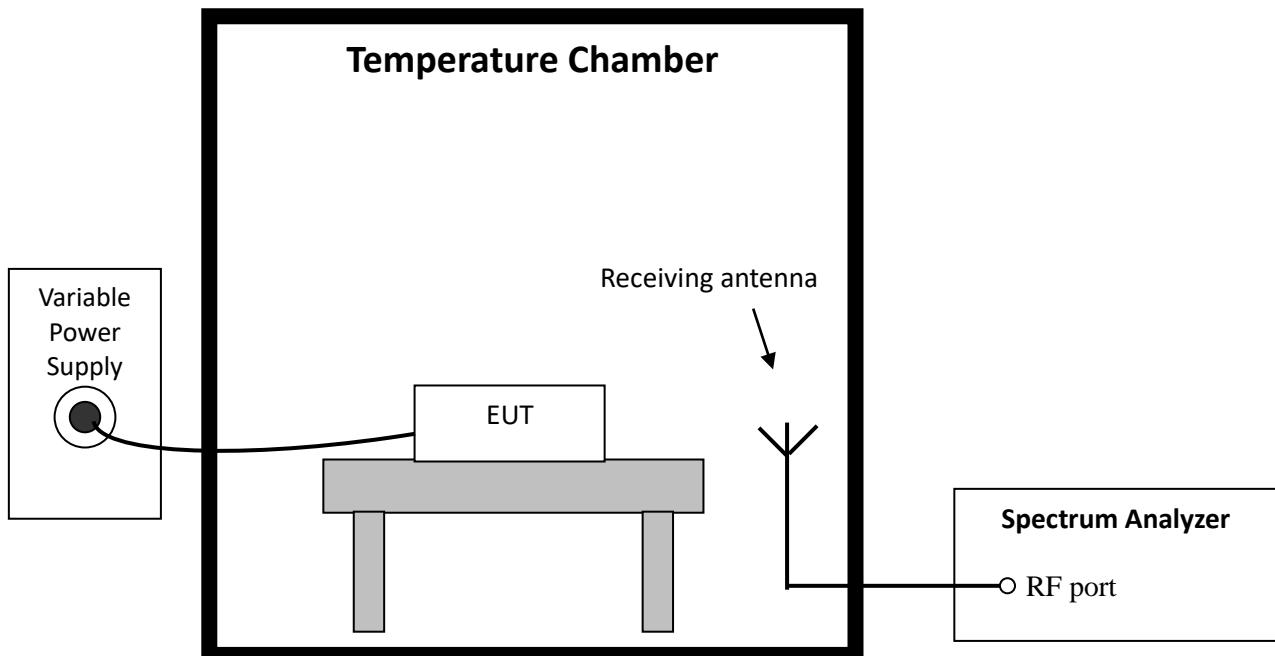
Voltage (V)	Temp (°C)	Freq measured (MHz)	Freq nominal (MHz)	Tolerance (%)	Limit (%)
120	-20	13.5595	13.56	-0.004	±0.01
	-10	13.5594		-0.004	
	0	13.5602		0.001	
	10	13.5601		0.001	
	20	13.56		0	
	30	13.5604		0.003	
	40	13.5597		-0.002	
	50	13.5594		-0.004	

TEST REPORT**6 Frequency Stability (Voltage Variation)**

Test result: PASS

6.1 Test limit

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ 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 using a new battery.

6.2 Test Configuration**6.3 Test procedure and test setup**

Test Procedure as per ANSI 63.10 clause 6.8.2.

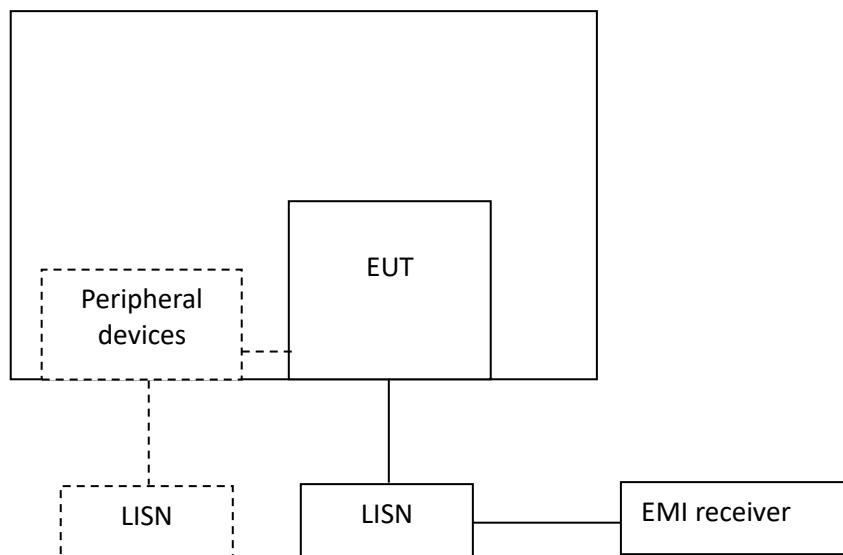
TEST REPORT**6.4 Test protocol**

Temp (°C)	Voltage (V)	Freq Measured (MHz)	Freq nominal (MHz)	Tolerance (%)	Limit (%)
20	102	13.5602	13.56	0.001	±0.01
	120	13.5601		0.001	
	138	13.5604		0.003	

TEST REPORT**7 Conducted emissions**Test result: **Pass****7.1 Limit**

Frequency of Emission (MHz)	Conducted Emissions Limit (dBuV)	
	QP	AV
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.

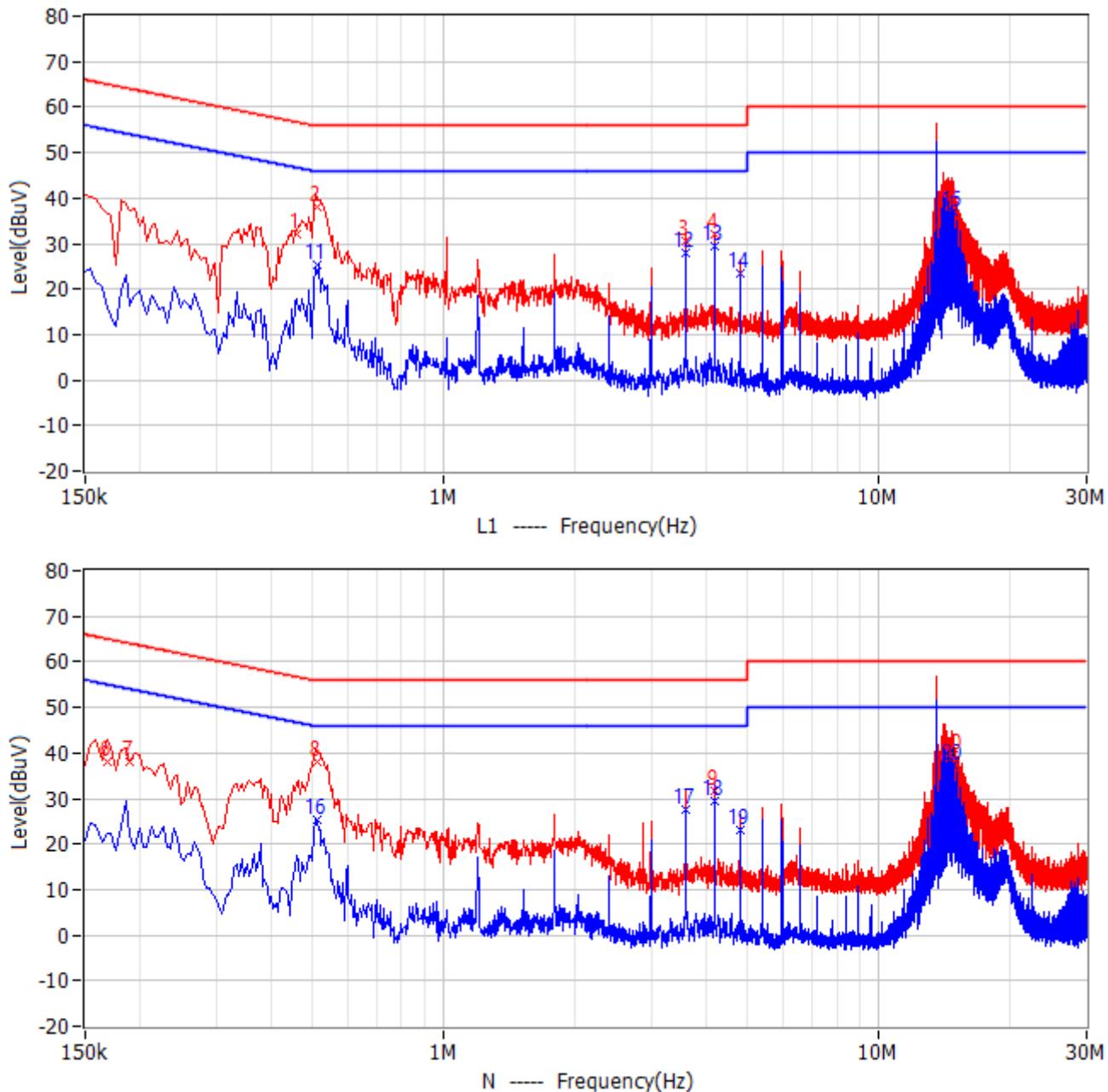
7.2 Test Configuration

TEST REPORT**7.3 Measurement Procedure**

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the $50\ \Omega$ LISN port (to which the EUT is connected), where permitted, terminated into a $50\ \Omega$ measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the $50\ \Omega$ measuring port is terminated by a measuring instrument having $50\ \Omega$ input impedance. All other ports are terminated in $50\ \Omega$ loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

TEST REPORT**7.4 Test Results of Conducted Emissions****Test Voltage: 120VAC/60Hz****Test Curve:**

TEST REPORT

No.	Frequency	Limit dBuV	Level dBuV	Delta dB	Reading dBuV	Factor dB	Detector	Phase
1	460.500kHz	56.7	32.0	-24.7	25.8	6.2	QP	L1
2	510.000kHz	56.0	38.1	-17.9	31.9	6.2	QP	L1
3	3.593MHz	56.0	30.6	-25.4	24.3	6.3	QP	L1
4	4.191MHz	56.0	32.0	-24.0	25.7	6.3	QP	L1
5	14.874MHz	60.0	39.2	-20.8	32.3	6.9	QP	L1
6	168.000kHz	65.1	37.9	-27.2	31.8	6.1	QP	N
7	190.500kHz	64.0	38.0	-26.0	31.9	6.1	QP	N
8	510.000kHz	56.0	38.1	-17.9	31.9	6.2	QP	N
9	4.191MHz	56.0	31.8	-24.2	25.5	6.3	QP	N
10	14.874MHz	60.0	39.7	-20.3	32.8	6.9	QP	N
11	510.000kHz	46.0	25.2	-20.8	19.0	6.2	CAV	L1
12	3.593MHz	46.0	27.8	-18.2	21.5	6.3	CAV	L1
13	4.191MHz	46.0	29.6	-16.4	23.3	6.3	CAV	L1
14	4.790MHz	46.0	23.3	-22.7	16.9	6.4	CAV	L1
15	14.879MHz	50.0	36.8	-13.2	29.9	6.9	CAV	L1
16	510.000kHz	46.0	25.3	-20.7	19.1	6.2	CAV	N
17	3.593MHz	46.0	27.7	-18.3	21.4	6.3	CAV	N
18	4.191MHz	46.0	29.5	-16.5	23.2	6.3	CAV	N
19	4.790MHz	46.0	23.2	-22.8	16.8	6.4	CAV	N
20	14.879MHz	50.0	37.3	-12.7	30.4	6.9	CAV	N

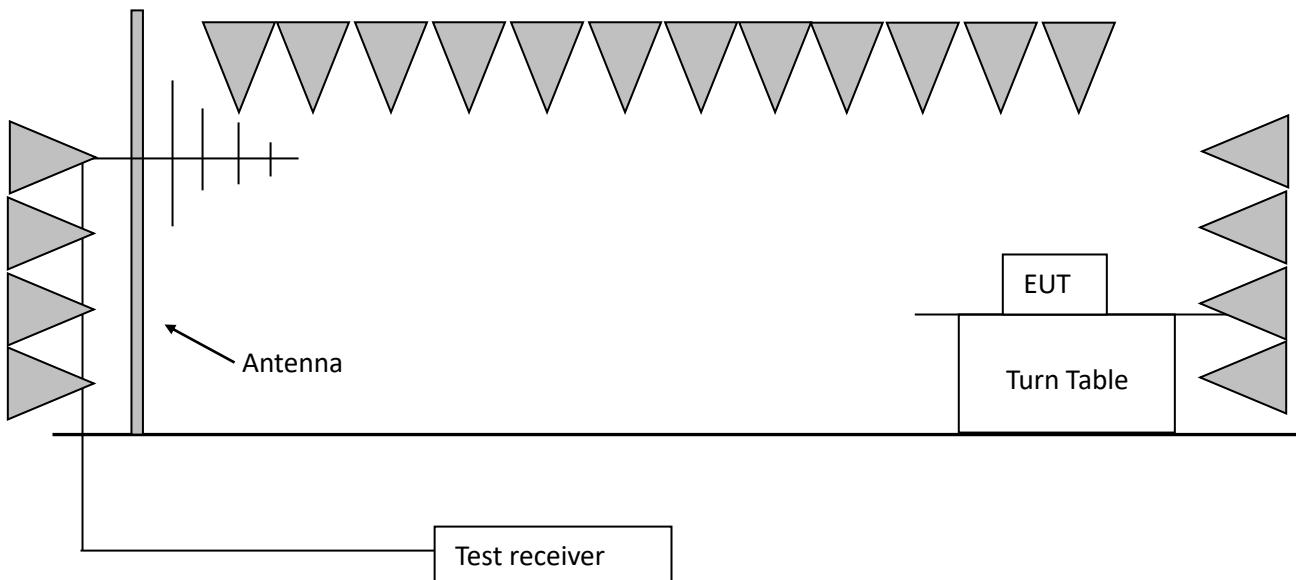
- Remark:*
1. *Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.*
 2. *Level = Original Receiver Reading + Correct Factor*
 3. *Delta = Level - Limit*
 4. *If the PK Level is lower than AV limit, the AV test can be elided.*
 5. *the emissions of 13.56MHz are the product's RF signal.*

TEST REPORT**8 20dB Bandwidth**

Test result: Pass

8.1 Limit

The 20dB bandwidth should be fallen in the allocated operating frequency range.
No limit for 99% bandwidth.

8.2 Test configuration

TEST REPORT**8.3 Test procedure and test set up**

The measurement was applied in a 3m semi-anechoic chamber.

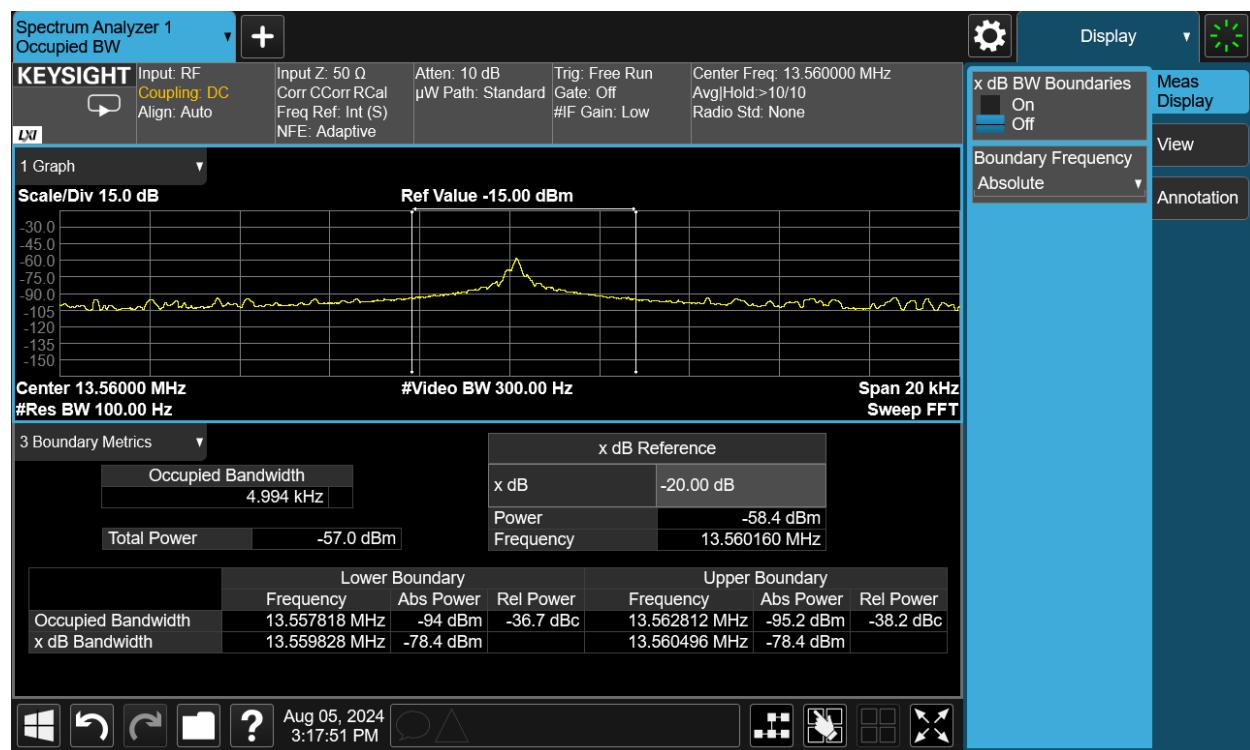
The center of the loop antenna shall be 1 m above the horizontal metal ground plane.

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set RBW = 1 % to 5 % of the OBW
3. Set VBW $\geq 3 \cdot \text{RBW}$
4. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
5. Use the 99 % power bandwidth function of the instrument (if available).
6. the 20dB bandwidth is also measured with the same setting.

TEST REPORT
8.4 Test protocol

	Lower point (MHz)	Higher point (MHz)	Bandwidth (kHz)	Allocated bandwidth (MHz)
20dB Bandwidth	13.559828	13.560496	0.668	13.553 ~ 13.567
Occupied bandwidth	13.557818	13.562812	4.994	13.553 ~ 13.567



TEST REPORT

9 Antenna requirement

Requirement:

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.

Result:

EUT uses permanently attached antenna to the intentional radiator, so it can comply with the provisions of this section.

***** END *****