

TEST REPORT

Reference No...... : WTD23D05117054W002 V1
FCC ID..... : 2A8WB-6406
Applicant : Shenzhen Mindray Animal Medical Technology Co., Ltd.
Address : Room 702, Tower 4, YESUN Intelligent Community III, No.1301-88
Guangang Road, Shenzhen, China
Manufacturer : Shenzhen Mindray Animal Medical Technology Co., Ltd.
Address : Room 702, Tower 4, YESUN Intelligent Community III, No.1301-88
Guangang Road, Shenzhen, China
Product : Veterinary Telemetry System
Model(s)..... : TMS30 Vet
Brand Name..... :  (mindray animal care)
Standards : FCC CFR47 Part 95 Subpart H
Date of Receipt sample : 2023-05-31
Date of Test : 2023-05-31 to 2023-07-05
Date of Issue : 2023-09-27
Test Result : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

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3 Revision History

Test Report No.	Date of Receipt Sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTD23D05117054W002	2023-05-31	2023-05-31 to 2023-07-05	2023-08-01	Original	-	Replaced
WTD23D05117054W002 V1	2023-05-31	2023-05-31 to 2023-07-05	2023-09-27	Version 1	Update	Valid

4 General Information

4.1 General Description of E.U.T.

Product Name: Veterinary Telemetry System
Model No.: TMS30 Vet
Hardware Version: 2.0
Software Version: 09.01.00.01

4.2 Details of E.U.T.

Frequency Range: 608 MHz to 614 MHz
Max. RF output power: 101.51dBuV/m
Type of Modulation: 2GFSK
Antenna installation: PCB Printed Antenna
Antenna Gain: -4.07dBi

Note:

#: The antenna gain is provided by the applicant, and the applicant should be responsible for its authenticity, WALTEK lab has not verified the authenticity of its information.

Ratings: DC 3.8V 3600mA from lithium battery
or DC 1.5V *3 from carbon battery

4.3 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode	Channel
Transmitting	608.66MHz
Transmitting	609.66MHz
Transmitting	610.66MHz
Transmitting	611.66MHz
Transmitting	612.66MHz

5 Equipment Used during Test

5.1 Equipments List

3m Semi-anechoic Chamber for Radiation Emissions 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP30	100091	2023-04-24	2024-04-23
2	Amplifier	Agilent	8447D	2944A10178	2022-08-01	2023-07-31
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2022-08-07	2023-08-06
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2023-04-24	2024-04-23
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2023-02-02	2024-02-01
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2022-07-29	2023-07-28
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2022-08-08	2023-08-07
8	Coaxial Cable (above 1GHz)	ZT26-NJ-NJ-8M/FA	1GHz-18GHz	NA	2023-02-02	2024-02-01
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	2023-04-24	2024-04-23
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2022-10-31	2023-10-30
3	Active Loop Antenna	Com-Power Corp.	AL-130R	10160007	2023-05-07	2024-05-06
4	Amplifier	ANRITSU	MH648A	M43381	2023-04-24	2024-04-23
5	Cable	HUBER+SUHNER	CBL2	525178	2023-04-24	2024-04-23
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	Spectrum Analyzer	Agilent	N9020A	MY49100060	2022-08-01	2023-07-31
2	Spectrum Analyzer	R&S	FSP30	100091	2023-04-24	2024-04-23
3	Humidity Chamber	GF	GTH-225-40-1P	IAA061213	2022-08-01	2023-07-31
4	EXA Signal Analyzer	Keysight	N9010A	MY50520207	2023-04-24	2024-04-23

5.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Confidence interval:95%. Confidence factor: k=2	

5.3 Test Facility

The test facility has a test site registered with the following organizations:

ISED CAB identifier: CN0013. Test Firm Registration No.: 7760A.

Waltek Testing Group Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files.

Registration number 7760A, October 15, 2016.

FCC Designation No.: CN1201. Test Firm Registration No.: 523476.

Waltek Testing Group Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration number 523476, September 10, 2019.

5.4 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

6 Test Summary

Test Items	Test Requirement	Result
FIELD STRENGTH OF FUNDAMENTAL	95.2369(a)(b)	PASS
FIELD STRENGTH OF SPURIOUS EMISSIONS	95.2379(a)(b)	PASS
OCCUPIED BANDWIDTH	2.1049	PASS
FREQUENCY STABILITY	95.2365	PASS
Note: Pass=Compliance, NC=Not Compliance, NT=Not Tested, N/A=Not Applicable		

7 Field Strength of Fundamental

Test Requirement: 95.2369(a)(b)
Test Method: ANSI/TIA-603-E-2016
Test Mode: TX transmitting

7.1 EUT Operation

Operating Environment :

Temperature: 25.5 °C
Humidity: 54.1 % RH
Atmospheric Pressure: 101.2kPa

7.2 Test Procedure

Radiated method:

1. The setup of EUT is according with per TIA/EIA/EIA Standard 603-C.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

7.3 Test limits

(a) For WMTS transmitter types operating in the 608-614 MHz band, the field strength of the transmitted signal must not exceed 200 mV/m, measured at a distance of 3 meters, using instrumentation with a CISPR quasi-peak detector.

(b) For WMTS transmitter types operating in the 1395-1400 MHz and 1427-1432 MHz bands, the field strength of the transmitted signal must not exceed 740 mV/m, measured at 3 meters, using instrumentation with an averaging detector and a 1MHz reference bandwidth.

7.4 Test Result

Test channels(MHz)	Field Strength(dBuv/m)	limits(dBuv/m)	Result
608.66 MHz	101.01	106	PASS
610.66 MHz	101.51	106	PASS
612.66 MHz	101.34	106	PASS

8 Field Strength of Spurious Emissions

Test Requirement: 95.2379(a)(b)
Test Method: ANSI/TIA-603-E-2016
Test Mode: TX transmitting

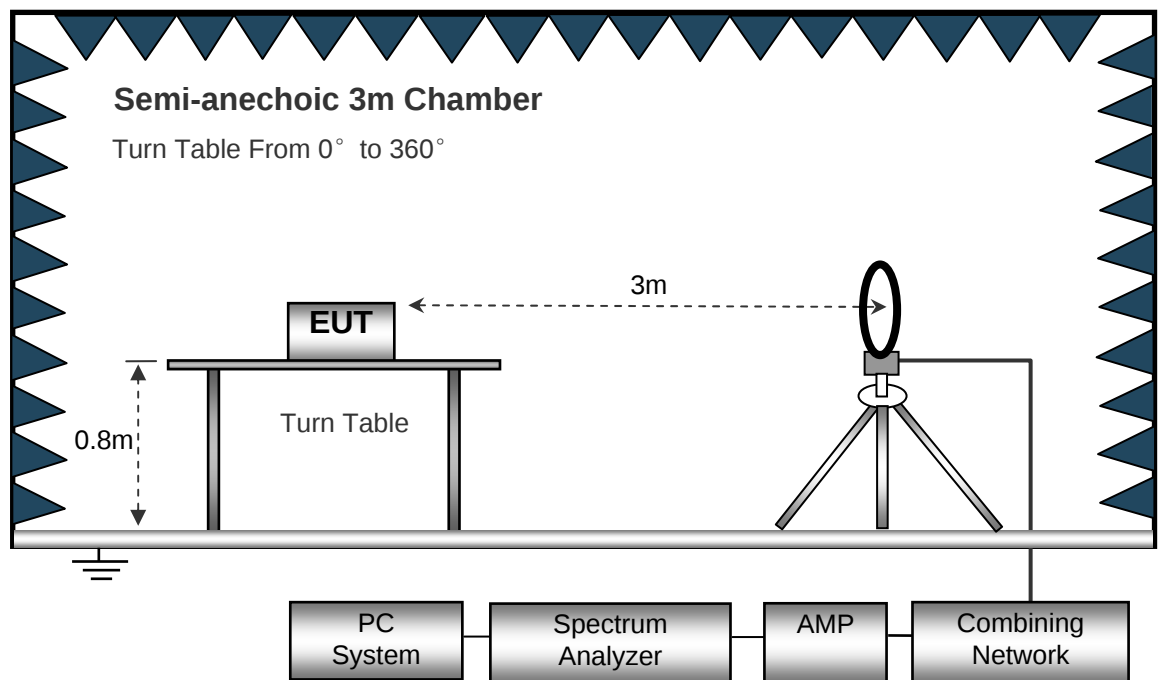
8.1 EUT Operation

Operating Environment :

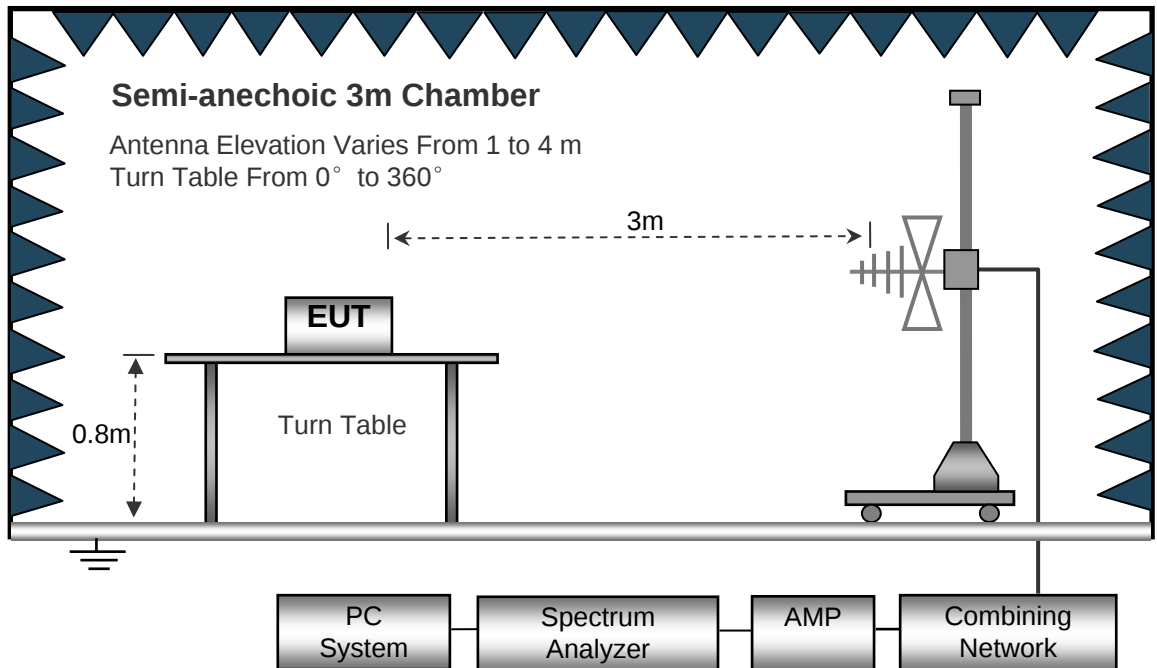
Temperature: 26.5 °C
Humidity: 53.9 % RH
Atmospheric Pressure: 101.2kPa

8.2 Test Setup

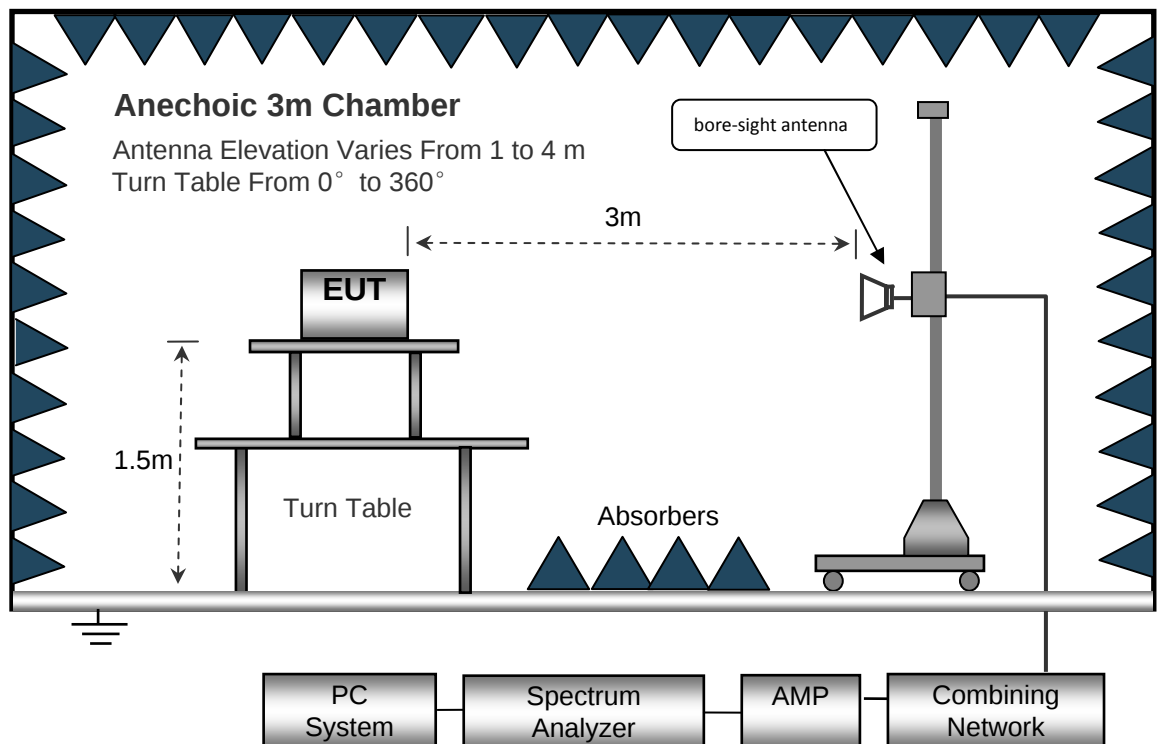
The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site.
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



8.3 Spectrum Analyzer Setup

30MHz ~ 1GHz

Sweep Speed Auto
 Detector PK
 Resolution Bandwidth..... 100kHz
 Video Bandwidth..... 300kHz
 Detector QP.
 Resolution Bandwidth..... 100kHz
 Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed Auto
 Detector PK
 Resolution Bandwidth..... 1MHz
 Video Bandwidth..... 3MHz
 Detector Ave.
 Resolution Bandwidth..... 1MHz
 Video Bandwidth..... 3MHz

8.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m for below 1GHz and 1.5m for above 1GHz above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from 30MHz up to the tenth harmonic of the highest fundamental frequency.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the Z position. So the data shown was the Z position only.
7. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

$$\text{Spurious emissions in dB} = 10 \lg (\text{TXpwr in Watts}/0.001) - \text{the absolute level}$$

$$\text{Spurious attenuation limit in dB} = 43 + 10 \text{ Log}_{10} (\text{power out in Watts})$$
8. Repeat above procedures until the measurements for all frequencies are completed.

8.5 Summary of Test Results

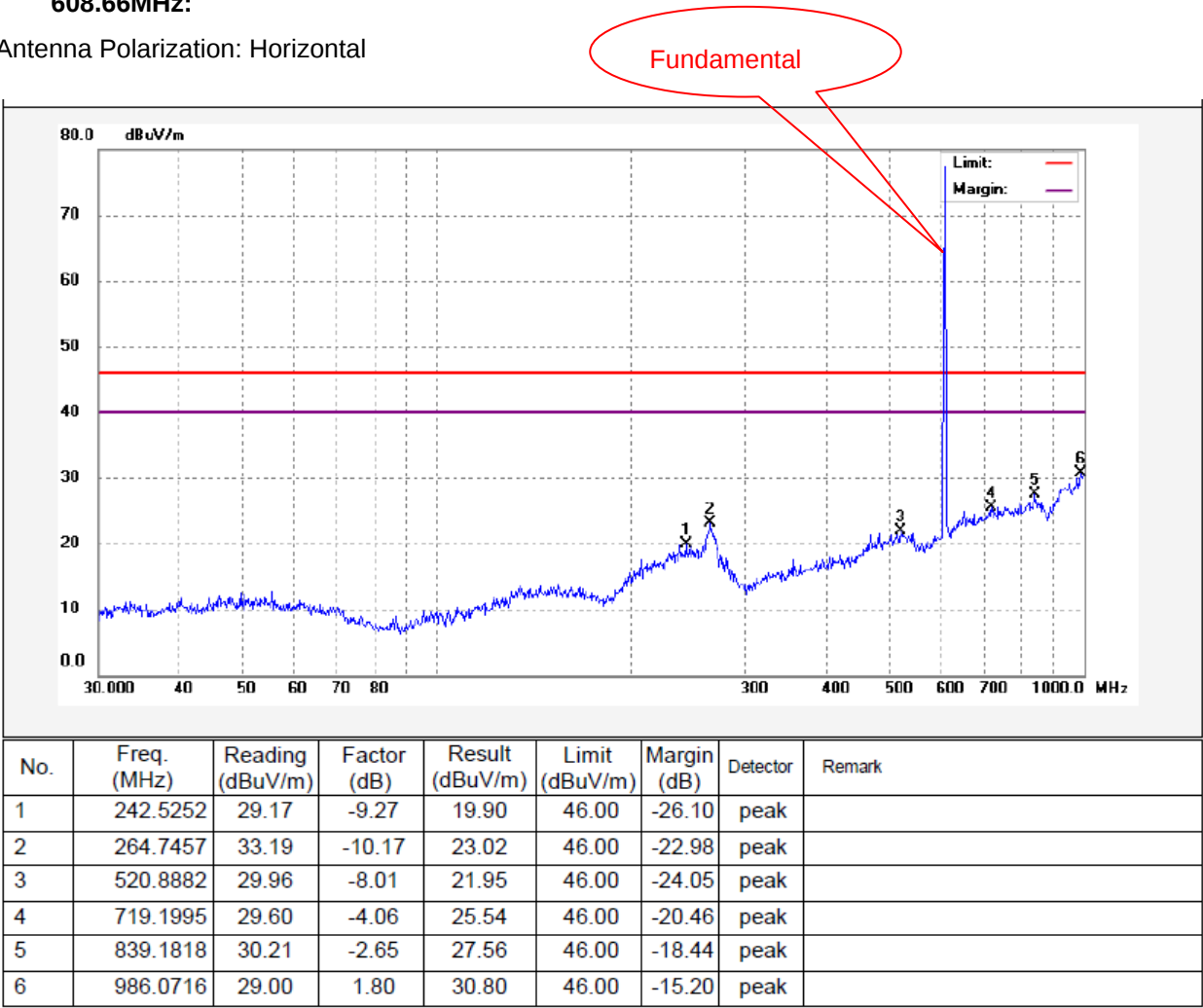
For 26MHz~30MHz

The measurements were more than 20 dB below the limit and not reported.

For 30MHz~1000MHz

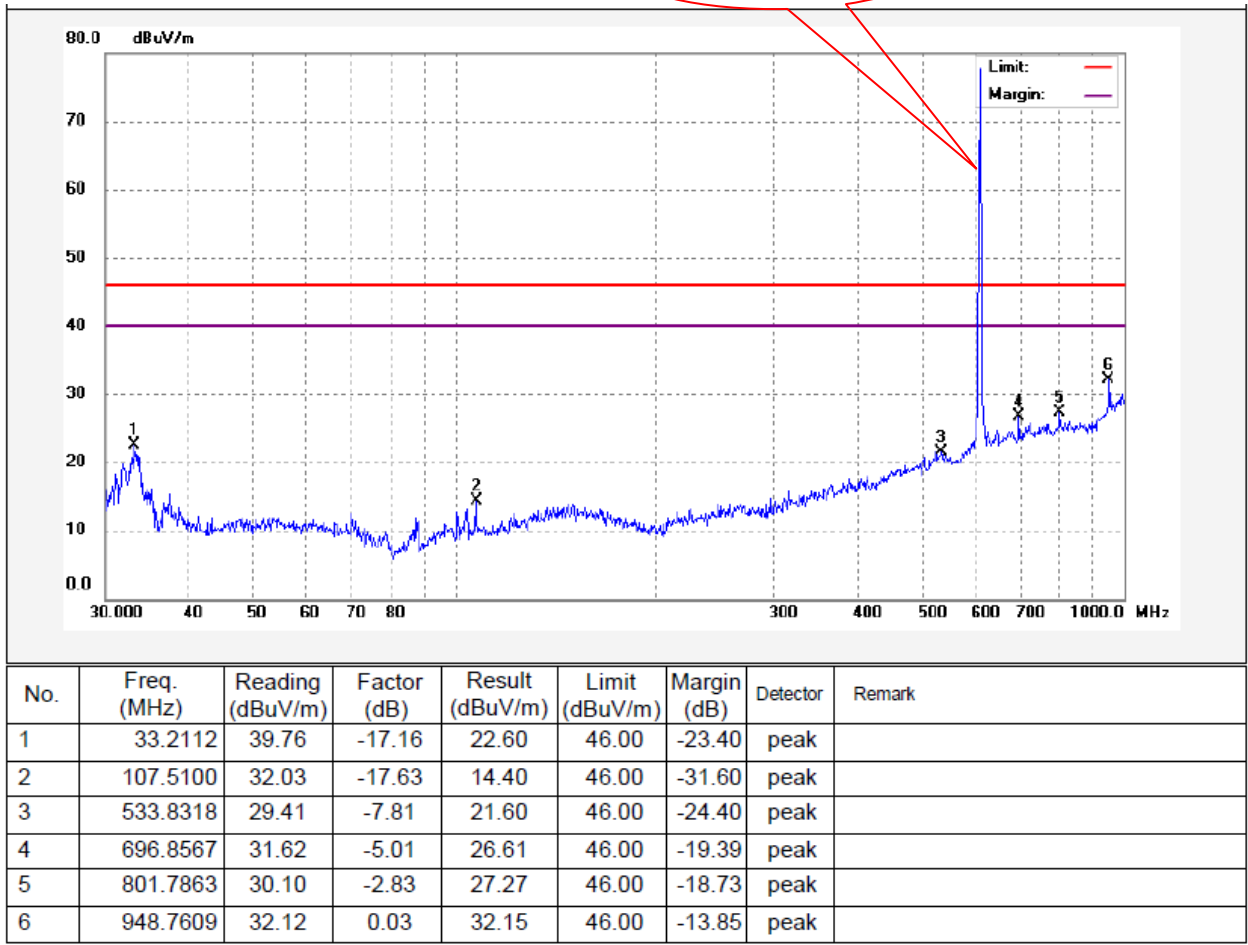
608.66MHz:

Antenna Polarization: Horizontal



Antenna Polarization: Vertical

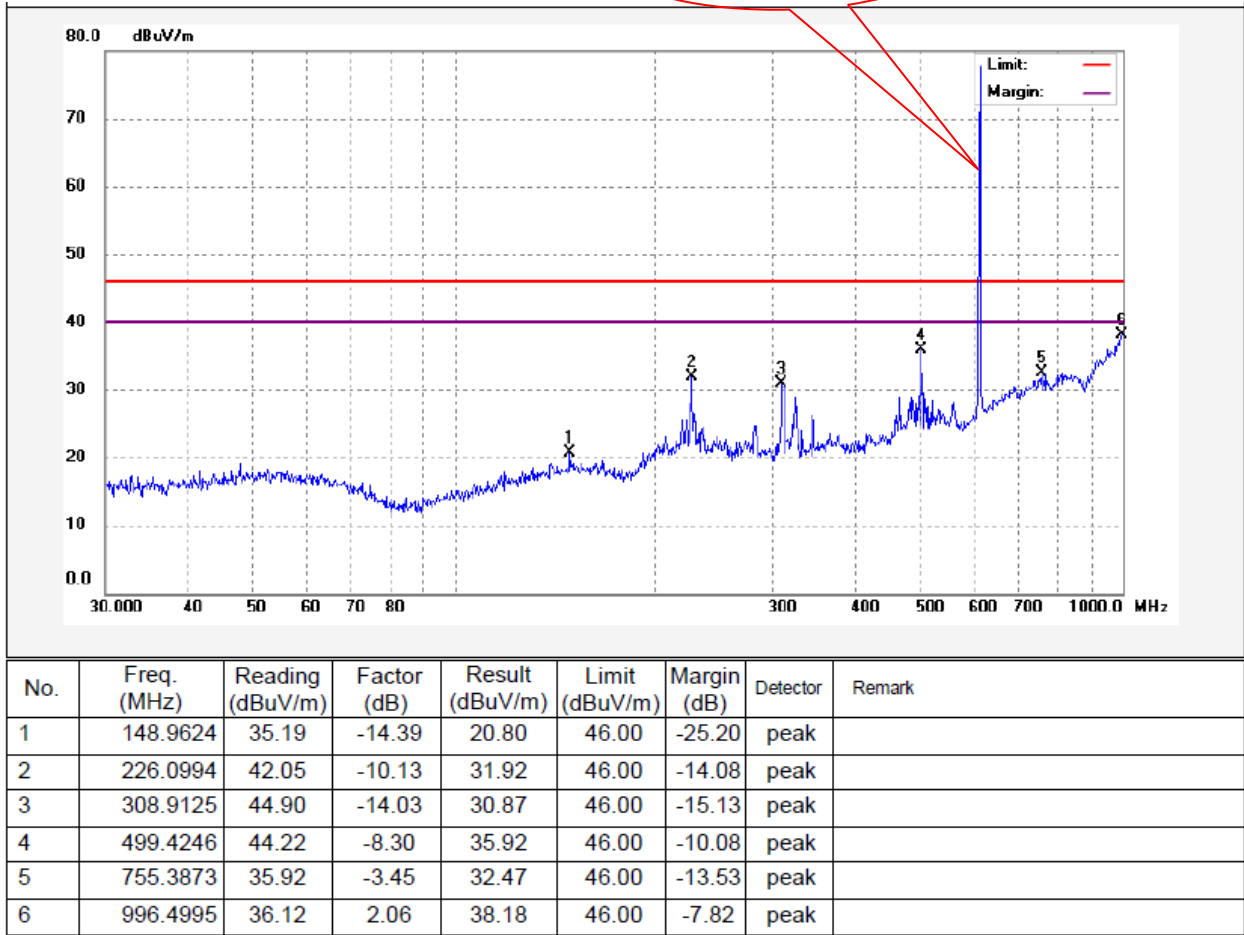
Fundamental



610.66MHz:

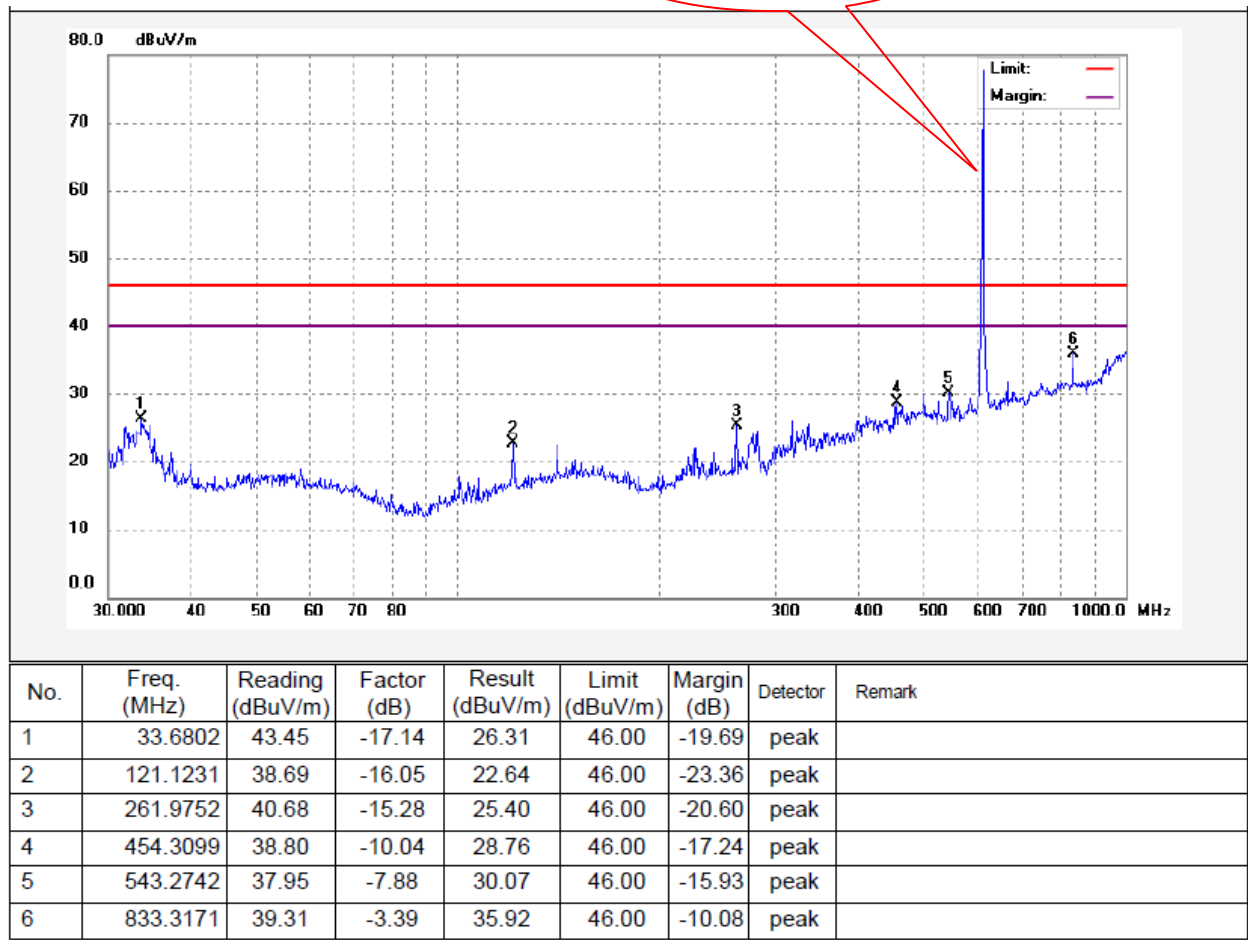
Antenna Polarization: Horizontal

Fundamental



Antenna Polarization: Vertical

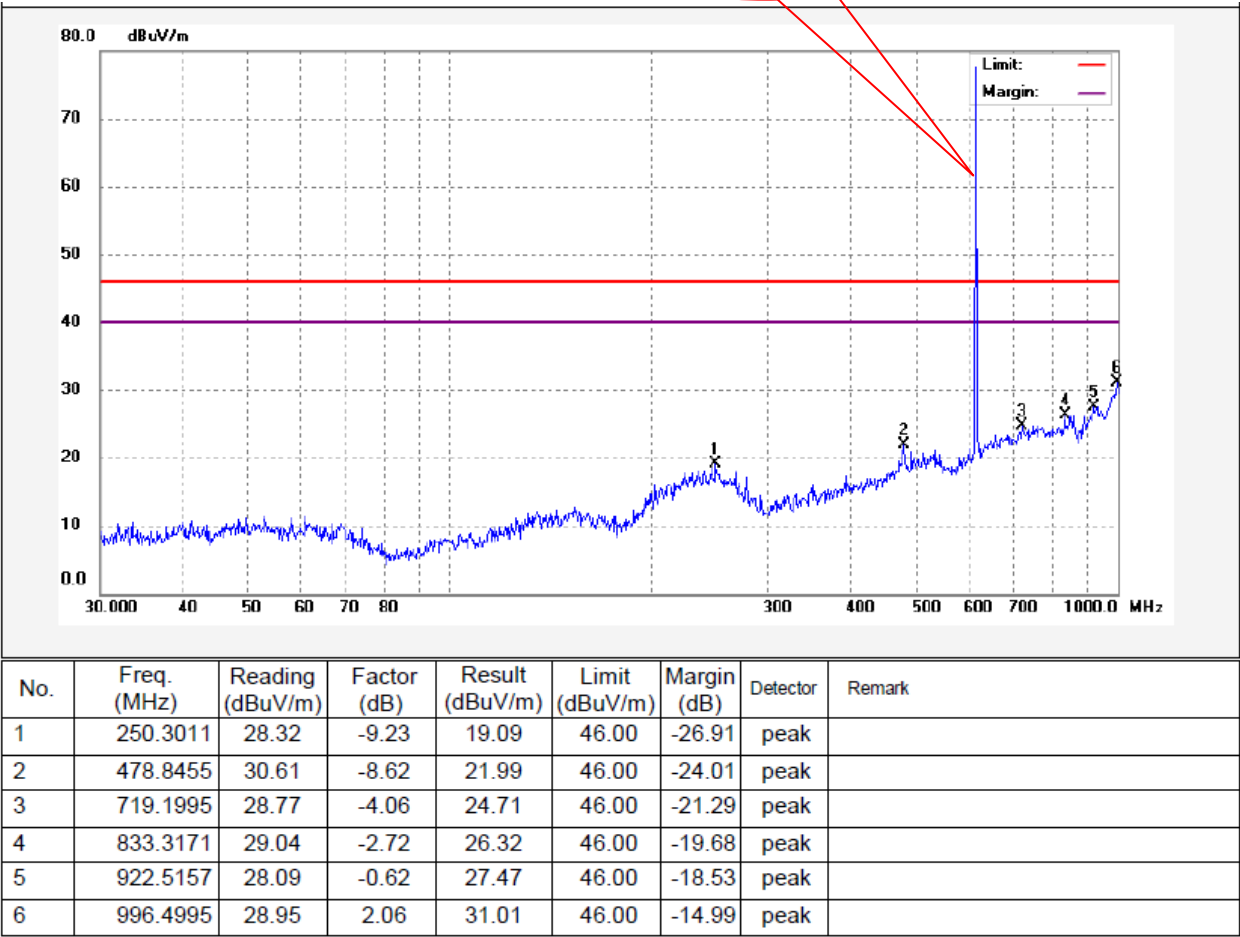
Fundamental



612.66MHz:

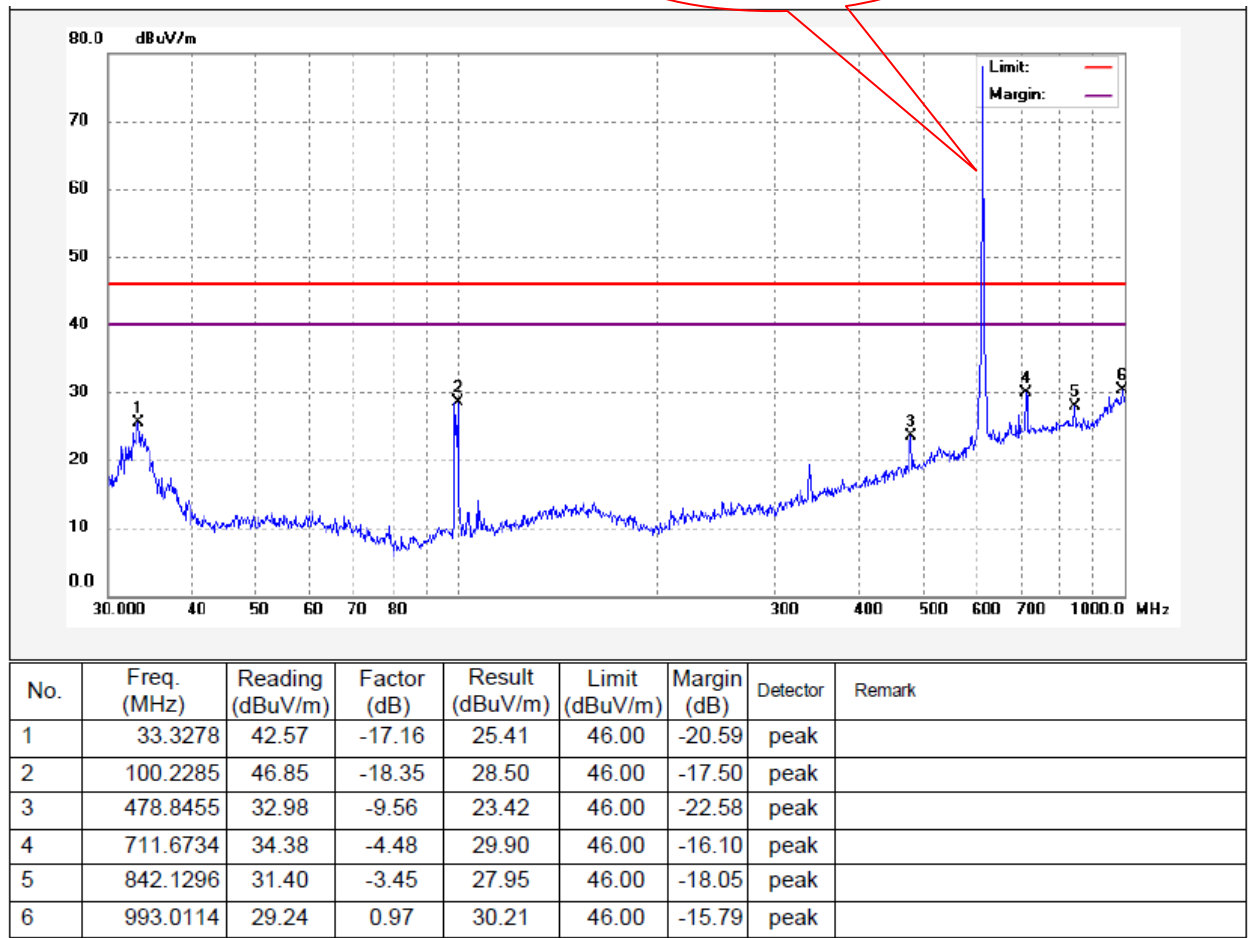
Antenna Polarization: Horizontal

Fundamental



Antenna Polarization: Vertical

Fundamental

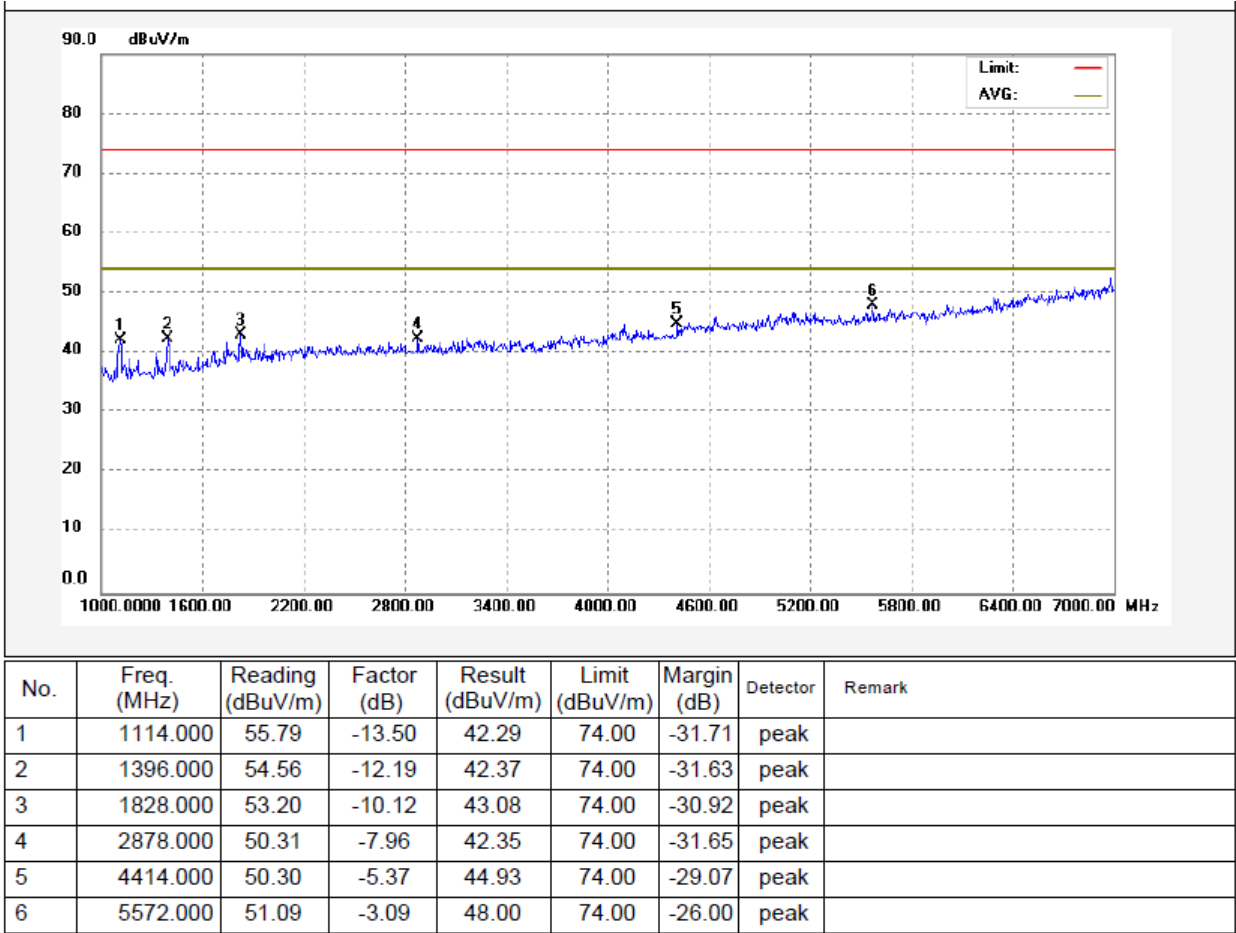


Note: The above peak value is lower than the quasi-peak limit, so the quasi-peak value is not read.

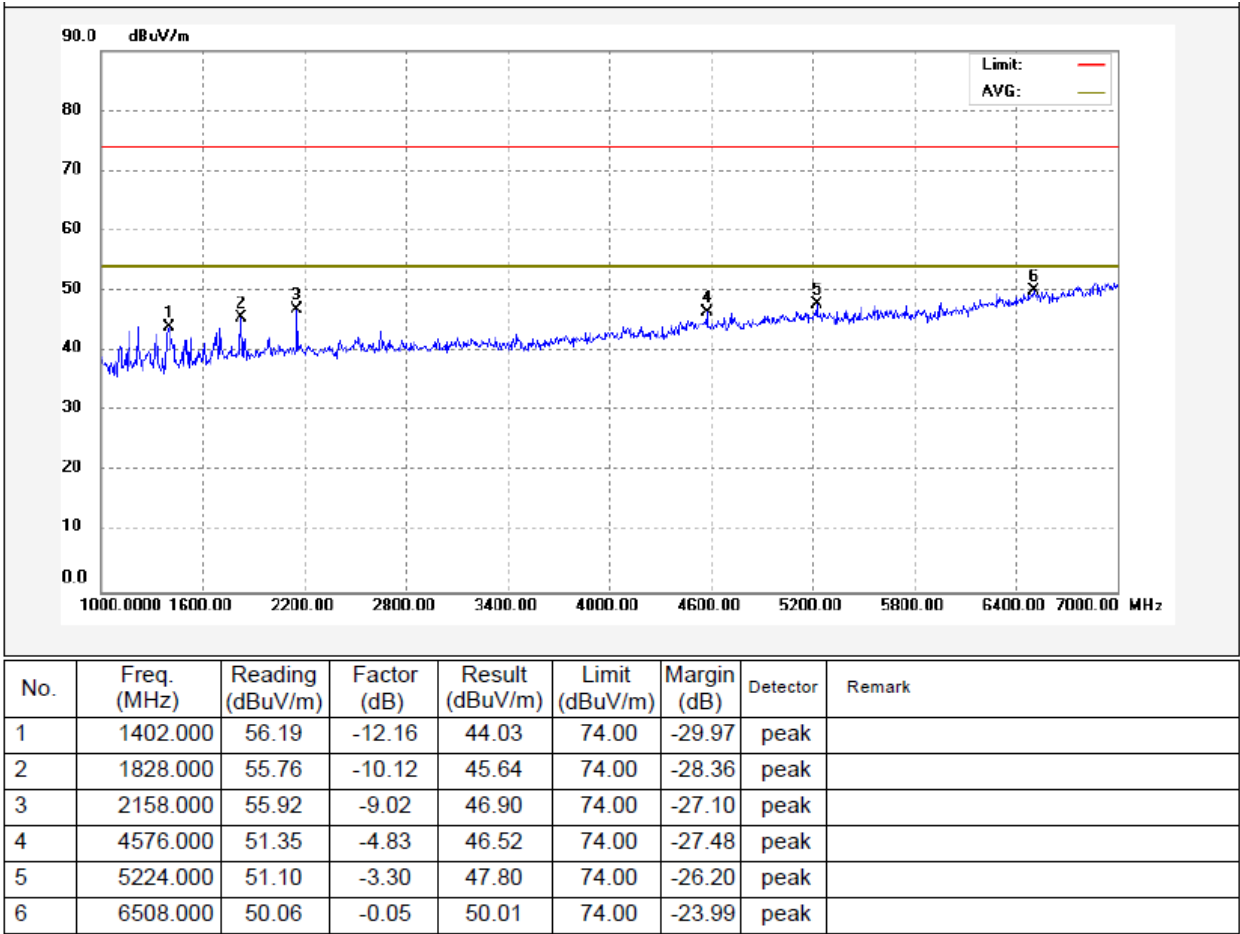
For 1000MHz~7000MHz

608.66MHz:

Antenna Polarization: Horizontal

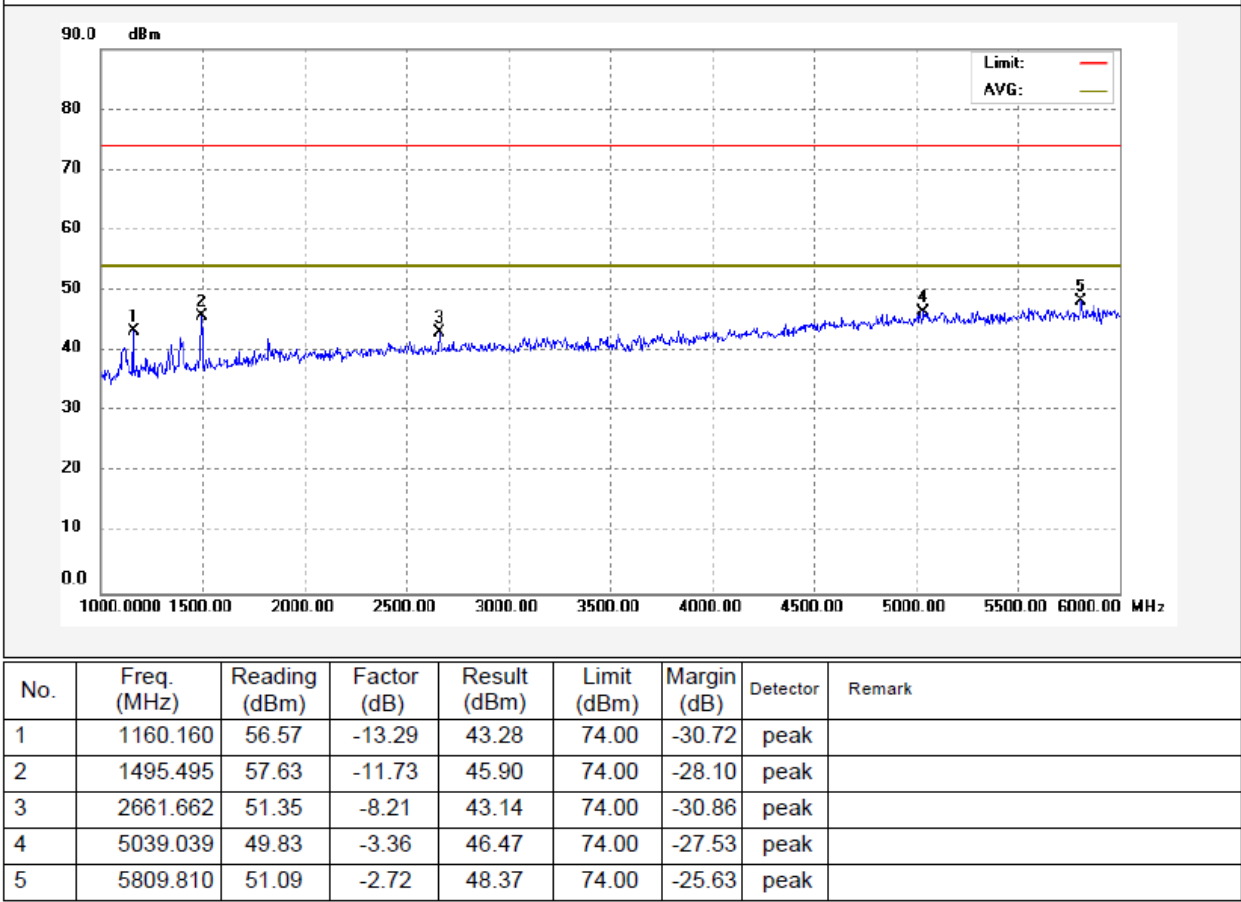


Antenna Polarization: Vertical

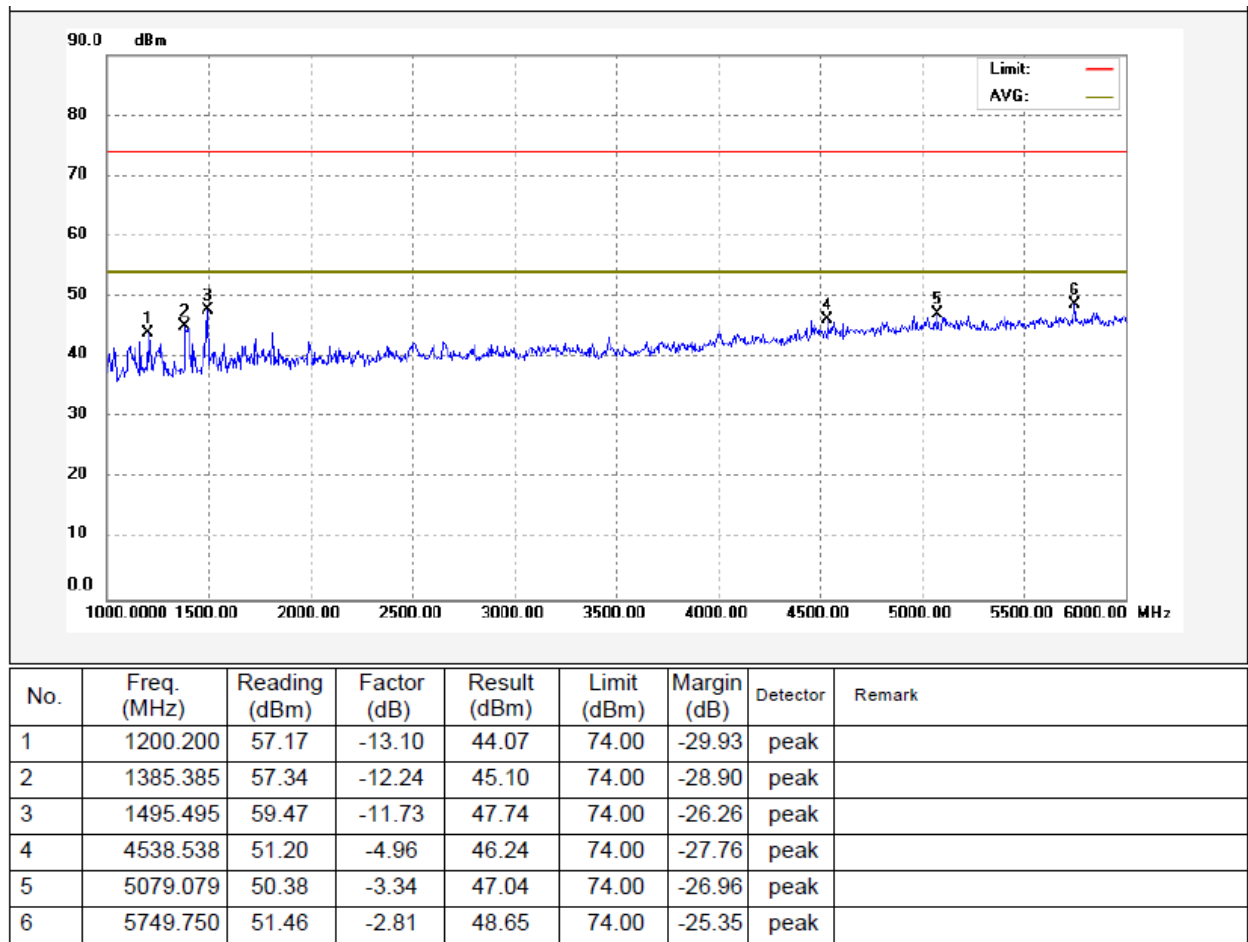


610.66MHz:

Antenna Polarization: Horizontal

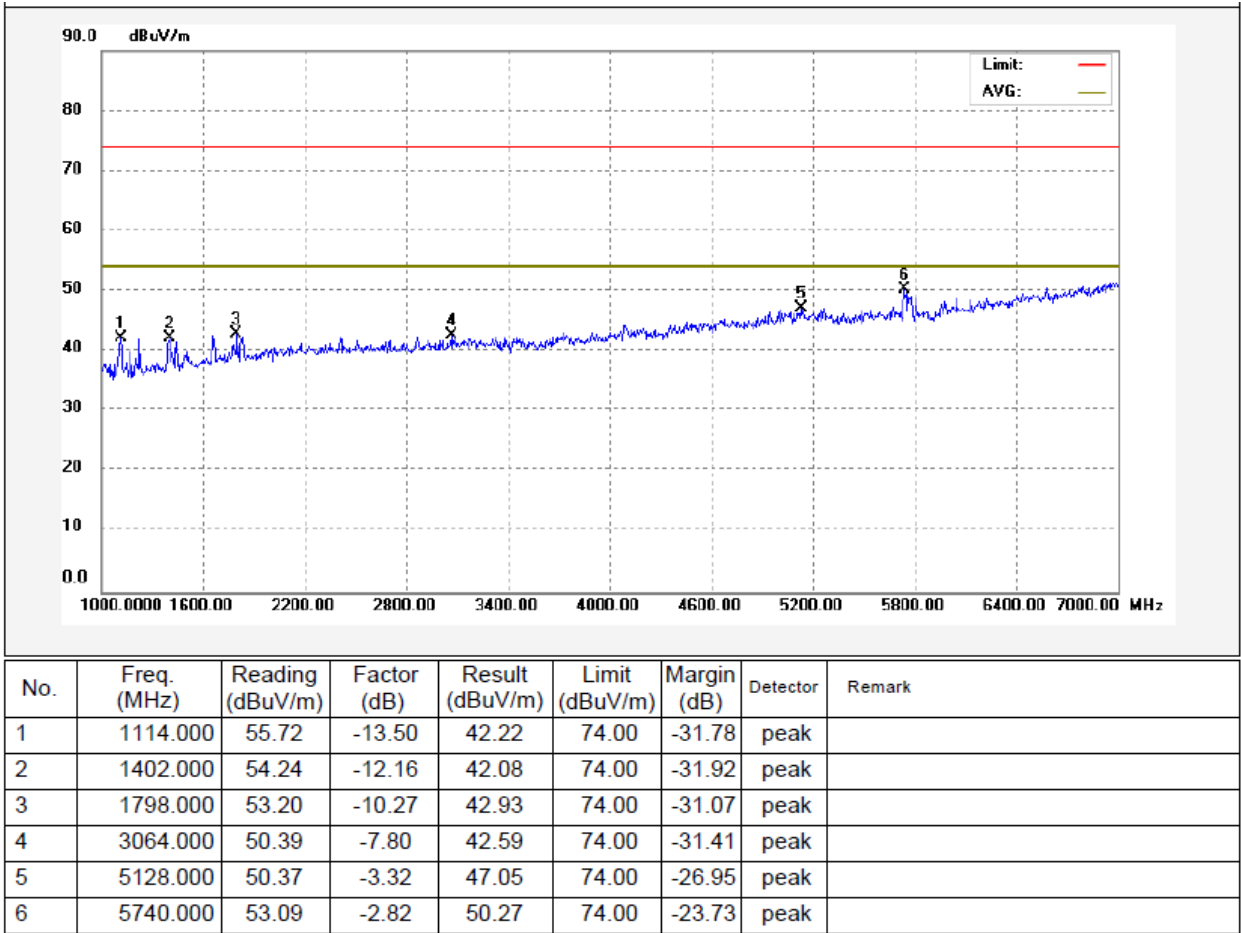


Antenna Polarization: Vertical

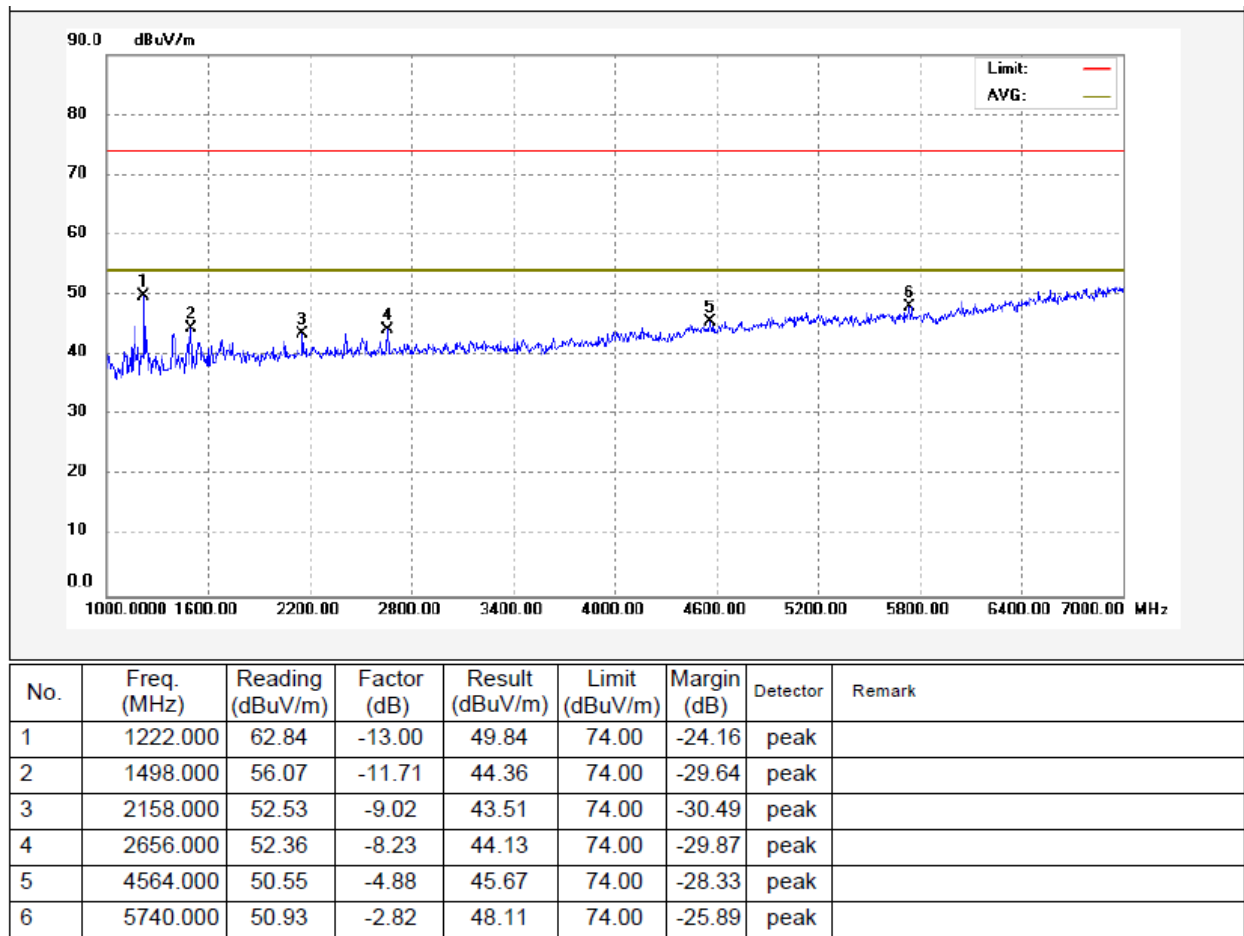


612.66MHz:

Antenna Polarization: Horizontal



Antenna Polarization: Vertical



Note: The above averaging value is lower than the quasi-peak limit, so the quasi-peak value is not read.

9 Occupied Bandwidth

Test Requirement: 2.1049
Test Method: ANSI/TIA-603-E-2016
Test Mode: TX transmitting

9.1 EUT Operation

Operating Environment :
Temperature: 25.3 °C
Humidity: 56.8 % RH
Atmospheric Pressure: 101.3kPa

9.2 Test Procedure

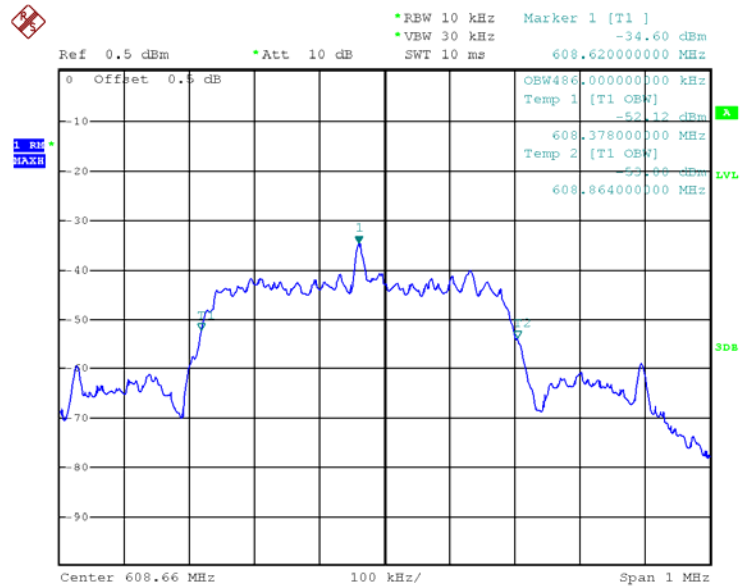
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 10kHz, VBW = 30kHz

9.3 Test Result

Test Channel	Bandwidth(kHz)
608.66 MHz	486
610.66 MHz	484
612.66 MHz	486

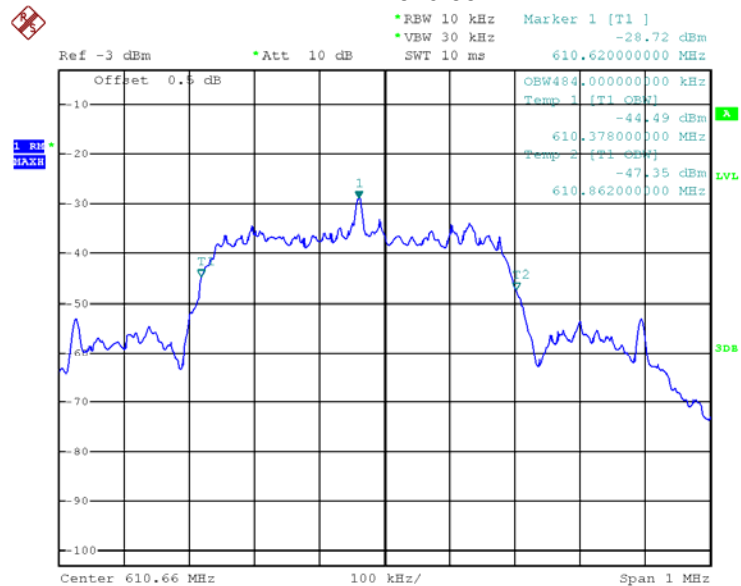
Test plots

608.66 MHz

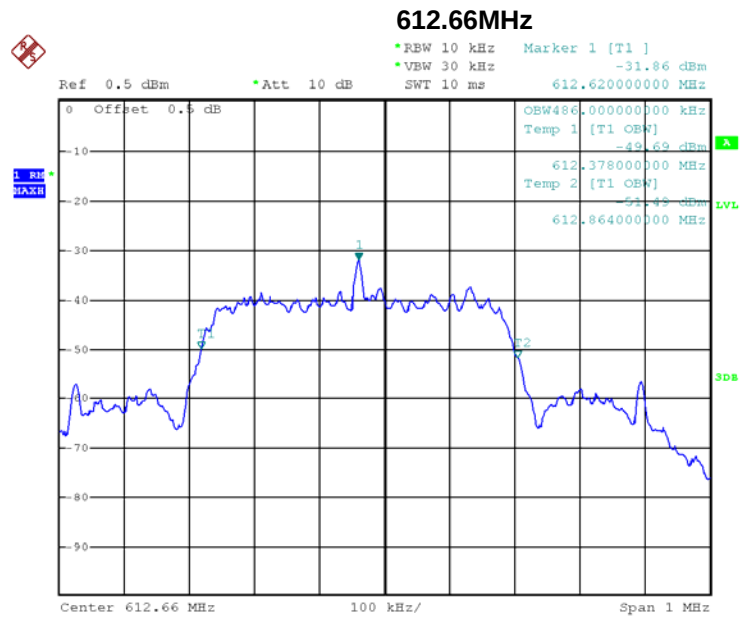


Date: 20.JUN.2023 11:00:22

610.66MHz



Date: 5.JUL.2023 10:13:16



Date: 20.JUN.2023 11:09:04

10 Frequency Stability

Test Requirement:	FCC Part 2.1055
Test Method:	ANSI/TIA-603-E-2016 ANSI C63.26:2015
Test Mode:	TX transmitting
Note:	N/A

10.1 EUT Operation

Operating Environment :

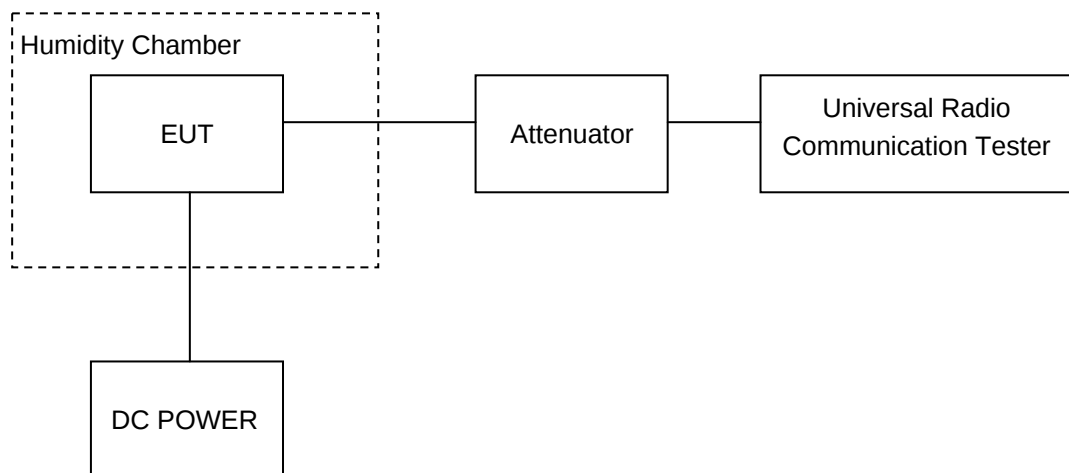
Temperature:	25.0°C
Humidity:	53.6 % RH
Atmospheric Pressure:	101.3kPa

10.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



10.3 Test Result

Test Frequency:608.66MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (MHz)	Frequency Error (ppm)	Limit (ppm)
50	4.5	0.0401	65.87	100
40		0.0348	57.11	100
30		0.0346	56.89	100
20		0.0400	65.72	100
10		0.0460	75.66	100
0		0.0404	66.38	100
-10		0.0472	77.48	100
-20		0.0430	70.63	100
-30		0.0432	70.94	100
25	4.05	0.0466	76.52	100
25	4.95	0.0404	66.39	100

Test Frequency:610.66MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (MHz)	Frequency Error (ppm)	Limit (ppm)
50	4.5	0.0396	64.91	100
40		0.0436	71.43	100
30		0.0375	61.47	100
20		0.0400	65.50	100
10		0.0394	64.59	100
0		0.0337	55.25	100
-10		0.0398	65.14	100
-20		0.0325	53.24	100
-30		0.0332	54.40	100
25	4.05	0.0421	68.97	100
25	4.95	0.0414	67.85	100

Test Frequency:612.66MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (MHz)	Frequency Error (ppm)	Limit (ppm)
50	4.5	0.0347	56.56	100
40		0.0486	79.39	100
30		0.0398	65.00	100
20		0.0400	65.29	100
10		0.0370	60.45	100
0		0.0353	57.67	100
-10		0.0427	69.76	100
-20		0.0378	61.63	100
-30		0.0405	66.05	100
25	4.05	0.0418	68.15	100
25	4.95	0.0450	73.38	100

11 RF Exposure

Remark: Please refer to MPE test report: WTD23D05117054W003.

12 Photographs –Test Setup and EUT

Note: Please refer to appendix: Appendix-TMS30 Vet -Photos.

=====End of Report=====