

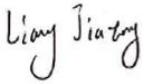
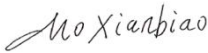



Test Report No.:
FCCSZ2024-0072-RF

RF Test Report

FCC ID : 2BLON-MAX3220
EUT : Ultra-Wideband Transceiver Modules
MODEL : MAX3220
BRAND NAME : YCHIOT
APPLICANT : Wenzhou Yanchuang Internet of Things
Technology Co., Ltd.
Classification of Test : N/A

CVC Testing Technology (Shenzhen) Co., Ltd.

Applicant		Name: Wenzhou Yanchuang Internet of Things Technology Co., Ltd.	
		Address: 2nd Floor, Smart Cube Student Workstation, No. 165, Gaoke Road, Chashan Street, Ouhai District, Wenzhou City, Zhejiang Province	
Manufacturer		Name: Wenzhou Yanchuang Internet of Things Technology Co., Ltd.	
		Address: 2nd Floor, Smart Cube Student Workstation, No. 165, Gaoke Road, Chashan Street, Ouhai District, Wenzhou City, Zhejiang Province	
Equipment Under Test		Name: Ultra-Wideband Transceiver Modules	
		Model/Type: MAX3220	
		Additional Model/Type: N/A	
		Brand: YCHIOT	
		Serial No.: N/A	
		Sample No.: 3-1	
Date of Receipt.	2024.09.14	Date of Testing	2024.09.14~2024.10.28
Test Specification		Test Result	
FCC Part 15, Subpart F, Section 15.519		PASS	
Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied.		
	Issue Date: 2024.10.28		
Compiled by:  <u>Liang Jiatong</u> Name Signature	Reviewed by:  <u>Mo Xianbiao</u> Name Signature	Approved by:  <u>Dong Sanbi</u> Name Signature	
Other Aspects: NONE.			
Abbreviations: OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested			

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2024-0072-RF	Original release	2024.10.28

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart F (Section 15.519)			
FCC STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	N/A	DC supply,not applicable
15.519(a)(1)	Cease Transmission Time	PASS	Meet the requirement of limit.
15.503 15.521(e)	10dB bandwidth	PASS	Meet the requirement of limit.
-	99 % Bandwidth	PASS	Meet the requirement of limit.
15.209(a) 15.519(c) 15.519(d)	Radiated Emissions	PASS	Meet the requirement of limit.
15.519(e) 15.519(c) 15.521(a) 15.521(b) 15.521(g)	Maximum Peak Power and Average Emissions	PASS	Meet the requirement of limit.
15.519(a2) 15.521(b) 15.203	Antenna Requirement	PASS	Meet the requirement of limit.

1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial Number	Cal. interval	Cal. Due
Antenna Port Conducted Test					
Signal&Spectrum Analyzer	Rohde&Schwarz	FSV 30	104408	1 year	2025.5.22
#4Shielding room	MORI	443	N/A	3 year	2026.5.16
Wideband radio communication tester	Rohde&Schwarz	CMW 500	168588	1 year	2025.5.24
Analog signal Generator(100kHz~12.75GHz)	Rohde&Schwarz	SMB 100A	181882	1 year	2025.4.27
Vector signal Generator(8kHz~6GHz)	Rohde&Schwarz	SMBV 100B	101846	1 year	2025.4.28
DC power supply	Rohde&Schwarz	HMC8041-G	101203	1 year	2025.4.29
RF control unit(2/3/4/5G)	Tonscend	JS0806-1	CS0300027	1 year	2025.4.28
Automatic filter bank(2/3/4G)	Tonscend	JS0806-F	CS0300028	1 year	2025.4.28
Automatic filter bank(5G)	Tonscend	JS0806-F-5G NR	N/A	1 year	2025.4.28
Temperature and humidity meter	UNI-T	A10T	C193561464	1 year	2025.4.27
Radio Communication Analyzer	Anritsu	MT8821C	6272374548	1 year	2025.1.09
Constant temperature humidity chamber	TEELONG	TL-HW-225B	20220518-01	1 year	2025.5.24
Radio Communication Test Station	Anritsu	MT8000A	6272354169	1 year	2025.1.09
Radiation Spurious					
Signal&Spectrum Analyzer	Rohde&Schwarz	FSV 40	101898	1 year	2025.4.28
EMI Test Receiver	Rohde&Schwarz	ESR3	102693	1 year	2025.5.24
Antenna(30MHz~1001MHz)	SCHWARZBECK	VULB 9168	1133	1 year	2025.2.21
Horn antenna(1GHz-18GHz)	ETS	3117	227611	1 year	2025.3.24
Horn antenna(18GHz-40GHz)	QMS	QMS-00880	22051	1 year	2025.3.24
3m anechoic chamber	MORI	966	CS0300011	3 year	2026.5.18
Filter group(RSE-BT/WiFi)	Rohde&Schwarz	WiFi /BT Variant 1	100820	1 year	2025.4.28
Filter group(RSE-Cellular)	Rohde&Schwarz	Cellular Variant 1	100768	1 year	2025.4.28
Preamplifier(1GHz-18GHz)	Rohde&Schwarz	SCU-18F	100799	1 year	2025.4.28
Preamplifier(1GHz-18GHz)	Rohde&Schwarz	SCU-18F	100801	1 year	2025.4.28
Preamplifier(18Gz-40GHz)	Rohde&Schwarz	SCU-40A	101209	1 year	2025.4.28
#2 control room	MORI	433	CS0200059	3 year	2026.5.16
Temperature and humidity meter	/	C193561517	C193561517	1 year	2025.4.27
RE Test - 3M Chamber					
EMI Test Receiver	Rohde&Schwarz	ESR 26	101718	1 year	2025.5.24
Loop antenna (8.3k~30MHz)	Rohde&Schwarz	HFH2-Z2E	100951	1 year	2025/6/03
Antenna(30MHz~1000MHz)	SCHWARZBECK	VULB 9168	01132	1 year	2025.4.25
Horn antenna(1GHz-18GHz)	ETS	3117	227634	1 year	2025.3.24
Horn antenna(18GHz-40GHz)	SCHWARZBECK	BBHA 9170	01003	1 year	2025.3.25
3m anechoic chamber	MORI	966	CS0200019	3 year	2026.5.18
Preamplifier(1GHz-18GHz)	Tonscend	TAP-051845	AP22G806257	1 year	2025.4.28
Attenuator	/	SJ-5dB	607684	1 year	2025.2.21
#1 control room	MORI	433	CS0300028	3 year	2026.5.16
Temperature and humidity meter	UNI-T	A10T	C193561473	1 year	2025.4.27

1.2 MEASUREMENT UNCERTAINTY

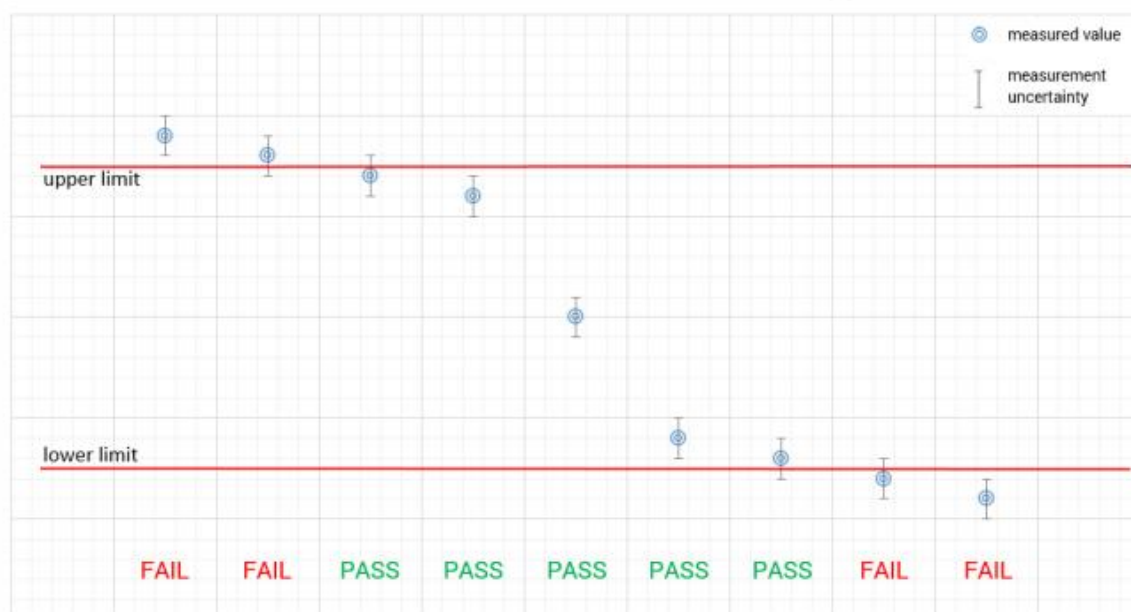
Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	Item	Measurement Uncertainty
1	Occupied Channel Bandwidth	± 1.86 %
2	RF output power, conducted	± 0.9 dB
3	Power Spectral Density, conducted	± 0.8 dB
4	Conducted emission test	± 2.7 dB
5	Radiated emission 9kHz-30MHz	± 5.6 dB
	Radiated emission 30MHz-1GHz	± 4.6 dB
	Radiated emission 1GHz-18GHz	± 4.4 dB
	Radiated emission 18GHz-40GHz	± 5.1 dB
6	Temperature	± 0.73 °C
7	Humidity	± 3.90 %
8	Supply voltages	± 0.37 %
9	Time	± 0.27 %
Remark: 95% Confidence Levels, k=2.		

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed.

The measurement uncertainty is mentioned in this test report, but is not taken into account - neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong.

measured value, measurement uncertainty, verdict



1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology (Shenzhen) Co., Ltd.

Lab Address: No. 1301-14&16, Guanguang Road, Xinlan Community, Guanlan Subdistrict, Longhua District, Shenzhen, Guangdong, China

Post Code: 518110 Tel: 0755-23763060-8805

Fax: 0755-23763060 E-mail: sz-kf@cvc.org.cn

FCC(Test firm designation number: CN1363)

IC(Test firm CAB identifier number: CN0137)

CNAS(Test firm designation number: L16091)

2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT	Ultra-Wideband Transceiver Modules
BRAND	YCHIOT
TEST MODEL	MAX3220
ADDITIONAL MODEL	N/A
POWER SUPPLY	DC 3.0 V – 3.6 V
MODULATION TYPE	BPM/BPSK
OPERATING FREQUENCY	See section 2.2
NUMBER OF CHANNEL	2
ANTENNA TYPE	Double copper tube Antenna with 2.72dBm gain
I/O PORTS	Refer to user's manual
<p>Note:</p> <ol style="list-style-type: none">For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, CVC is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusionEUT photo refer to the report (Report NO.: FCCSZ2024-0072-EUT).According to 15.519(a), antennas mounted on outdoor structures such,. as antennas mounted on the outside of a building or on a telephone pole or any fixed outdoors infrastructure are prohibited for use with this device.According to 15.521(a), UWB devices may not be employed for the operation of toys. Operation onboard aircraft, a ship or a satellite is prohibited.	

2.2 OTHER INFORMATION

The EUT only have two channels.

CHANNEL	FREQUENCY (MHz)	CHANNEL	FREQUENCY (MHz)
5	6489.6	9	7987.2

2.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports

The worst case was found when positioned on X axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

TEST MODE			
MODE	UWB ANT	FREQUENCY (MHz)	PREAM_LEN
CH5	1	6489.6	128
CH9	1	7987.2	128

EUT CONFIGURE MODE	APPLICABLE TO						DESCRIPTION
	RE ≥ 1G	RE < 1G	PLC	BW	MP	CTT	
CH5,CH9	√	√	√	√	√	√	3.6V power supply

Where **RE ≥ 1G**: Radiated Emission above 1GHz **RE < 1G**: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

BW: 10dB Bandwidth measurement

MP: Maximum Peak Power and Average Emissions

CTT: Cease Transmission Time

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	23deg. C, 53%RH	DC 3.6V	Liu Yuan
RE≥1G	23deg. C, 53%RH	DC 3.6V	Liu Yuan
PLC	23deg. C, 53%RH	DC 3.6V	Liu Yuan
BW	20deg. C, 55%RH	DC 3.6V	Liu Yuan
MP	23deg. C, 53%RH	DC 3.6V	Liu Yuan
CTT	23deg. C, 53%RH	DC 3.6V	Liu Yuan

2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC PART 15, SUBPART F, SECTION 15.519

ANSI C63.10:2020

All test items have been performed and recorded as per the above standards

2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Training and tests.

Support Equipment							
NO	Description	Brand	Model No.	Serial Number	Supplied by		
1	Power bank	N/A	TKM5000	N/A	Client		
Support Cable							
NO	Description	Quantity (Number)	Length (m)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
1	Power supply cord	1	1	Yes	No	N/A	Client

3 TEST TYPES AND RESULTS

3.1 RADIATED EMISSIONS

3.1.1 Limits

- (a) The radiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in §15.209:

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

NOTE:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).

- (b) The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

Frequency in MHz	EIRP in dBm	dBuV/m
960-1610	-75.3	19.93
1610-1990	-63.3	31.93
1990-3100	-61.3	33.93
3100-10600	-41.3	53.93
Above 10600	-61.3	33.93

NOTE: (dBuV/m) =EIRP(dBm)+95.23,E(dBuV/m)=-75.3+95.23=19.93dBuV/m

- (c) In addition to the radiated emission limits specified in the table in paragraph (a)(b) of this section, UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz:

Frequency in MHz	EIRP in dBm	dBuV/m
1164-1240	-85.3	9.93
1559-1610	-85.3	9.93

NOTE: (dBuV/m) =EIRP(dBm)+95.23,E(dBuV/m)=-85.3+95.23=9.93dBuV/m



3.1.2 Measurement procedure

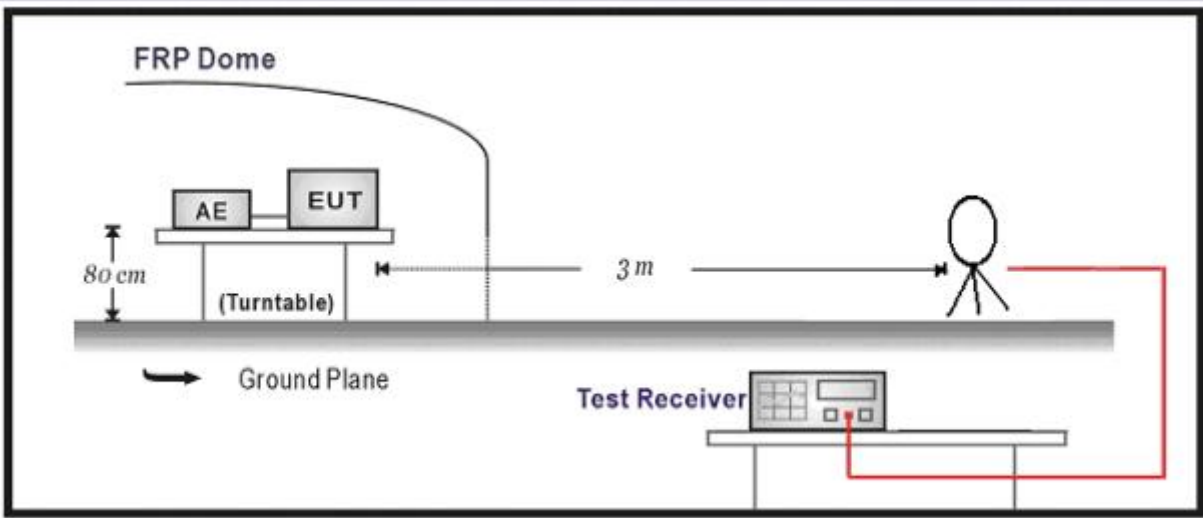
- a. The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its height 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.
- 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- g. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

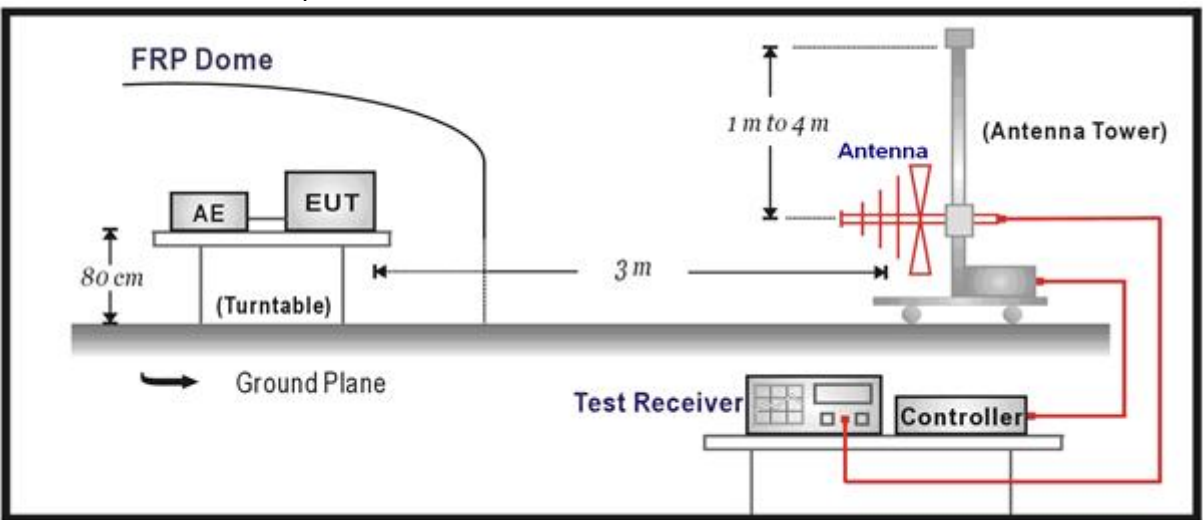
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

3.1.3 Test setup

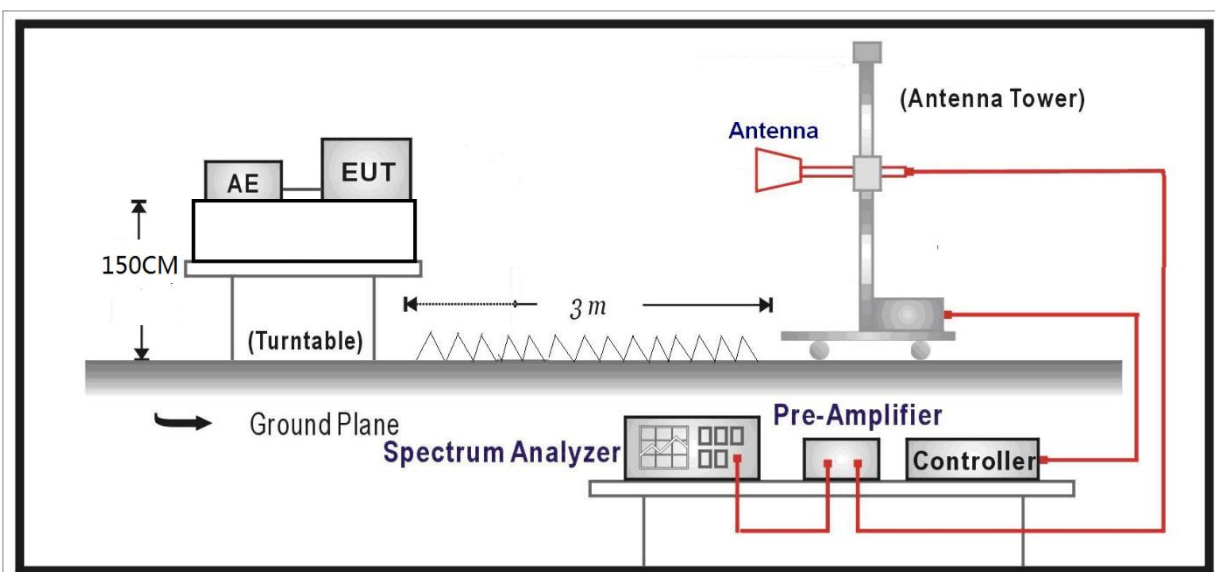
Below 30MHz Test Setup:



Below 960MHz Test Setup:

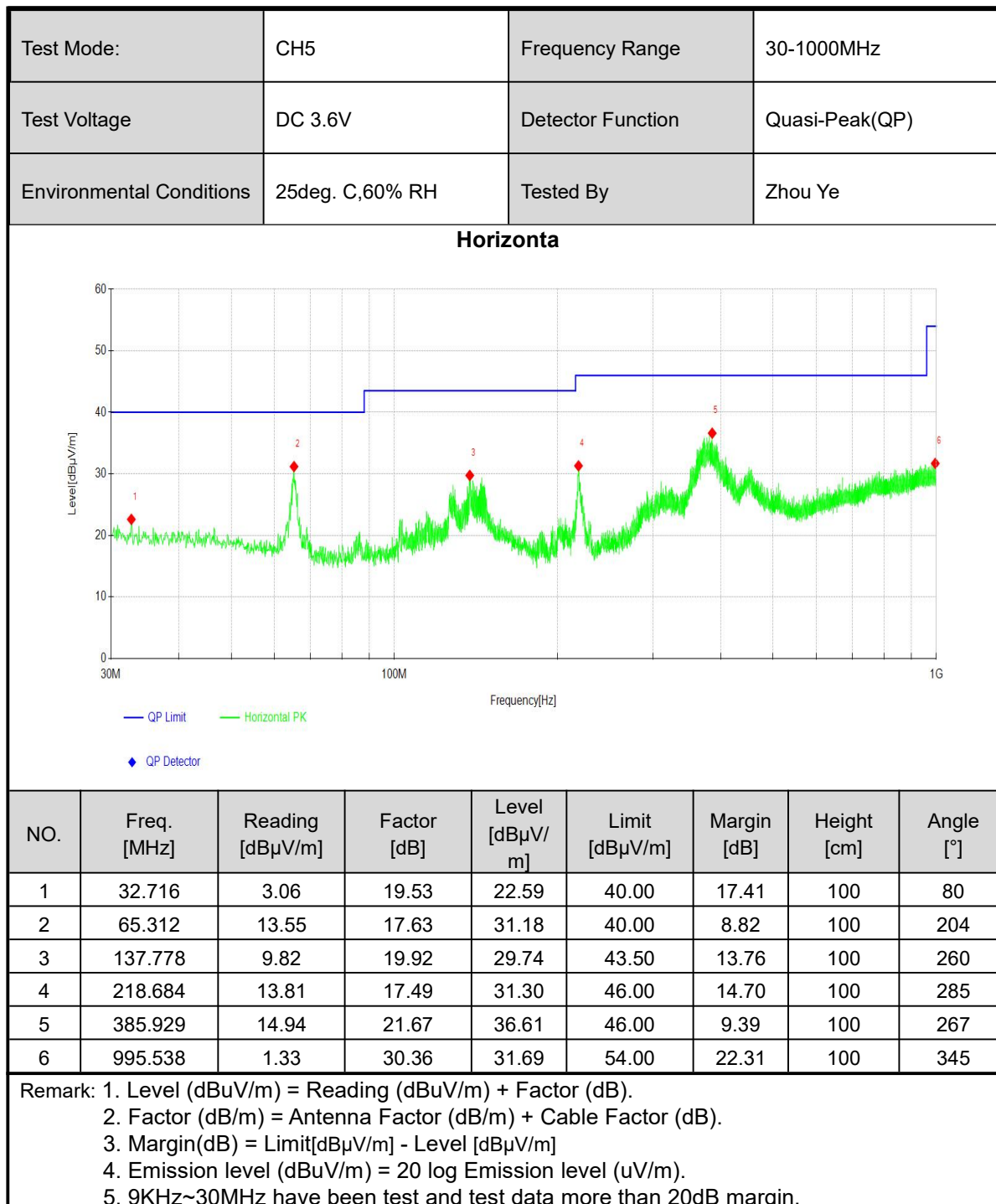


Above 960MHz Test Setup:

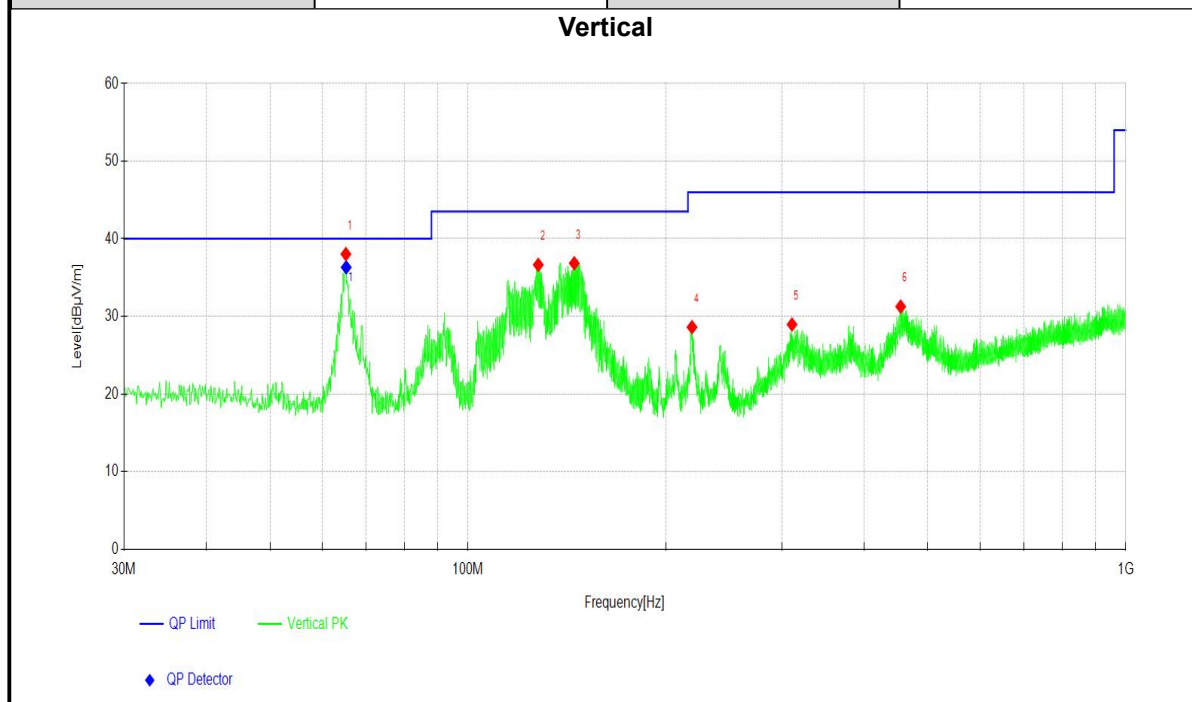


3.1.4 Test results

BELOW 1GHz WORST-CASE DATA:



Test Mode:	CH5	Frequency Range	30-1000MHz
Test Voltage	DC 3.6V	Detector Function	Quasi-Peak(QP)
Environmental Conditions	25deg. C,60% RH	Tested By	Zhou Ye



NO.	Freq. [MHz]	Reading [dBuV/m]	Factor [dB]	Level [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [°]
1	65.215	20.38	17.65	38.03	40.00	1.97	100	245
2	127.883	17.35	19.30	36.65	43.50	6.85	100	22
3	145.054	16.51	20.33	36.84	43.50	6.66	100	248
4	219.072	11.09	17.52	28.61	46.00	17.39	100	118
5	310.843	8.88	20.07	28.95	46.00	17.05	100	93
6	454.708	7.86	23.40	31.26	46.00	14.74	100	357

Remark: 1. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]
4. Emission level (dBuV/m) = 20 log Emission level (uV/m).
5. 9KHz~30MHz have been test and test data more than 20dB margin.

Radiated Emissions above 960 MHz:

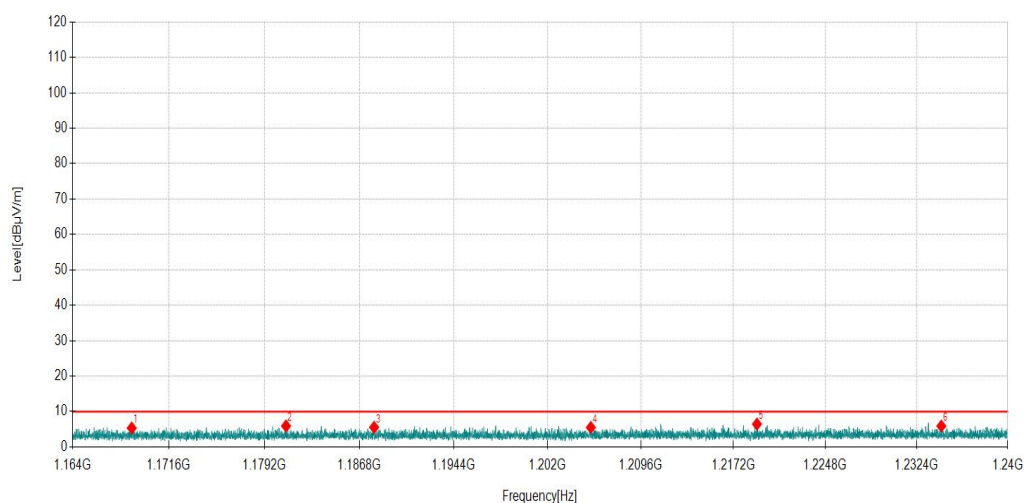
Channel	CH 5	Frequency		6489.6MHz			
Frequency Range	Above 1G						
Horizontal							
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	985.56	50.72	-37.81	12.91	19.93	7.02	Horizontal
2	1713.24	50.69	-36.19	14.50	31.93	17.43	Horizontal
3	3035.68	51.44	-34.27	17.17	33.93	16.76	Horizontal
4	6444.02	57.48	-30.11	27.37	53.93	26.56	Horizontal
5	11544.60	51.83	-24.92	26.91	33.93	7.02	Horizontal
6	17008.17	51.73	-21.44	30.29	33.93	3.64	Horizontal
7	18880.09	28.08	-5.66	22.42	33.93	11.51	Horizontal
8	21203.52	26.05	-4.91	21.14	33.93	12.79	Horizontal
9	23190.32	23.13	-5.15	17.98	33.93	15.95	Horizontal
10	27188.12	23.05	-3.40	19.65	33.93	14.28	Horizontal
11	33218.92	23.28	-1.12	22.16	33.93	11.77	Horizontal
12	37005.50	27.16	1.17	28.33	33.93	5.60	Horizontal
Vertical							
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	1121.90	50.10	-37.56	12.54	19.93	7.39	Vertical
2	1735.40	50.61	-36.14	14.47	31.93	17.46	Vertical
3	3417.41	53.79	-34.02	19.77	53.93	34.16	Vertical
4	6490.03	64.81	-30.06	34.75	53.93	19.18	Vertical
5	10735.12	51.89	-26.25	25.64	33.93	8.29	Vertical
6	16815.60	50.85	-21.70	29.15	33.93	4.78	Vertical
7	19269.53	27.80	-5.48	22.32	33.93	11.61	Vertical
8	21392.74	25.44	-4.87	20.57	33.93	13.36	Vertical
9	25914.19	20.81	-3.64	17.17	33.93	16.76	Vertical
10	27672.17	23.21	-3.05	20.16	33.93	13.77	Vertical
11	33324.53	22.95	-1.12	21.83	33.93	12.10	Vertical
12	36948.29	26.77	1.03	27.80	33.93	6.13	Vertical
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]							

Channel	CH 9	Frequency		7987.2MHz			
Frequency Range	Above 1G						
Horizontal							
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	1208.81	49.89	-37.39	12.50	19.93	7.43	Horizontal
2	1962.05	50.52	-35.53	14.99	31.93	16.94	Horizontal
3	2519.32	52.10	-34.71	17.39	33.93	16.54	Horizontal
4	5165.89	51.12	-31.90	19.22	53.93	34.71	Horizontal
5	8030.60	59.29	-29.15	30.14	53.93	23.79	Horizontal
6	13052.79	52.12	-23.44	28.68	33.93	5.25	Horizontal
7	20041.80	26.85	-5.31	21.54	33.93	12.39	Horizontal
8	23168.32	23.23	-5.16	18.07	33.93	15.86	Horizontal
9	25898.79	21.47	-3.66	17.81	33.93	16.12	Horizontal
10	27711.77	22.40	-3.16	19.24	33.93	14.69	Horizontal
11	32072.61	24.09	-1.97	22.12	33.93	11.81	Horizontal
12	37045.10	26.85	1.06	27.91	33.93	6.02	Horizontal
Vertical							
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	1094.63	50.23	-37.62	12.61	19.93	7.32	Vertical
2	1919.45	51.25	-35.65	15.60	31.93	16.33	Vertical
3	3035.68	51.41	-34.27	17.14	33.93	16.79	Vertical
4	4370.05	51.37	-32.54	18.83	53.93	35.10	Vertical
5	8115.81	60.44	-29.04	31.40	53.93	22.53	Vertical
6	13025.53	51.75	-23.42	28.33	33.93	5.60	Vertical
7	18644.66	27.98	-5.65	22.33	33.93	11.60	Vertical
8	22182.62	24.91	-5.06	19.85	33.93	14.08	Vertical
9	26613.86	23.62	-3.40	20.22	33.93	13.71	Vertical
10	29612.76	20.92	-2.01	18.91	33.93	15.02	Vertical
11	34842.68	26.67	-1.23	25.44	33.93	8.49	Vertical
12	39625.96	24.57	1.81	26.38	33.93	7.55	Vertical
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]							

Radiated Emissions in GPS band:

Test Mode:	CH 5	Frequency Range	GPS-1164-1240MHz
Test Voltage	DC 3.6V	Detector Function	Quasi-Peak(QP)
Environmental Conditions	25deg. C,60% RH	Tested By	Zhou Ye

Horizontal

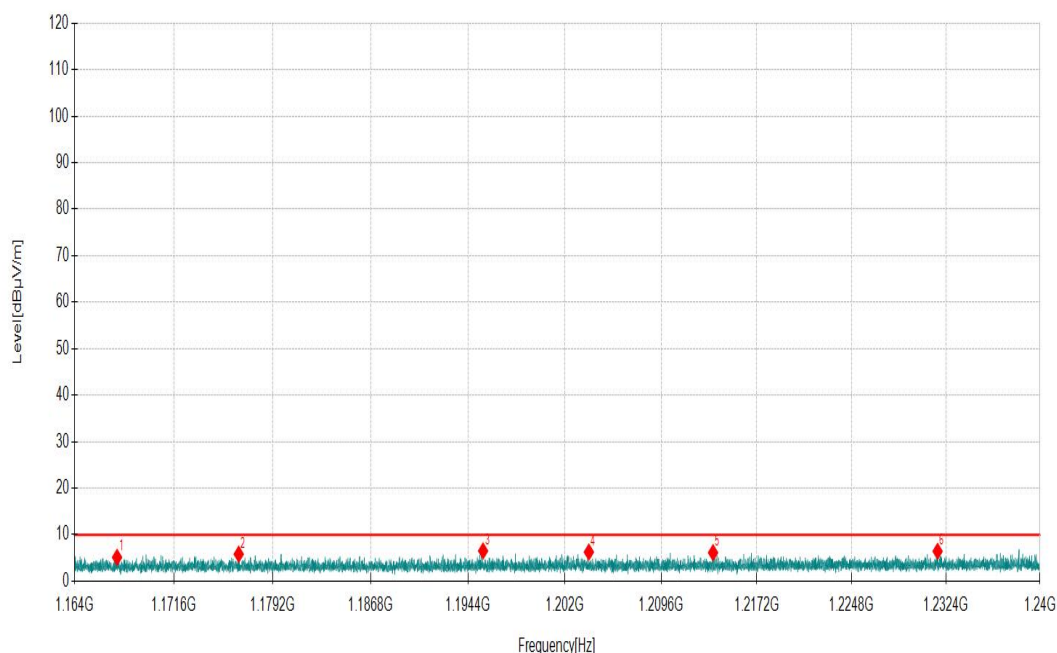


NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	1168.67	42.79	-37.46	5.33	9.93	4.60	Horizontal
2	1180.93	43.35	-37.44	5.91	9.93	4.02	Horizontal
3	1187.99	42.96	-37.43	5.53	9.93	4.40	Horizontal
4	1205.53	42.90	-37.39	5.51	9.93	4.42	Horizontal
5	1219.15	43.82	-37.37	6.45	9.93	3.48	Horizontal
6	1234.45	43.23	-37.34	5.89	9.93	4.04	Horizontal

Remark: 1. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
 2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]
 4. Emission level (dBuV/m) = 20 log Emission level (uV/m).
 5. 9KHz~30MHz have been test and test data more than 20dB margin.

Test Mode:	CH 5	Frequency Range	GPS-1164-1240MHz
Test Voltage	DC 3.6V	Detector Function	Quasi-Peak(QP)
Environmental Conditions	25deg. C,60% RH	Tested By	Zhou Ye

Vertical

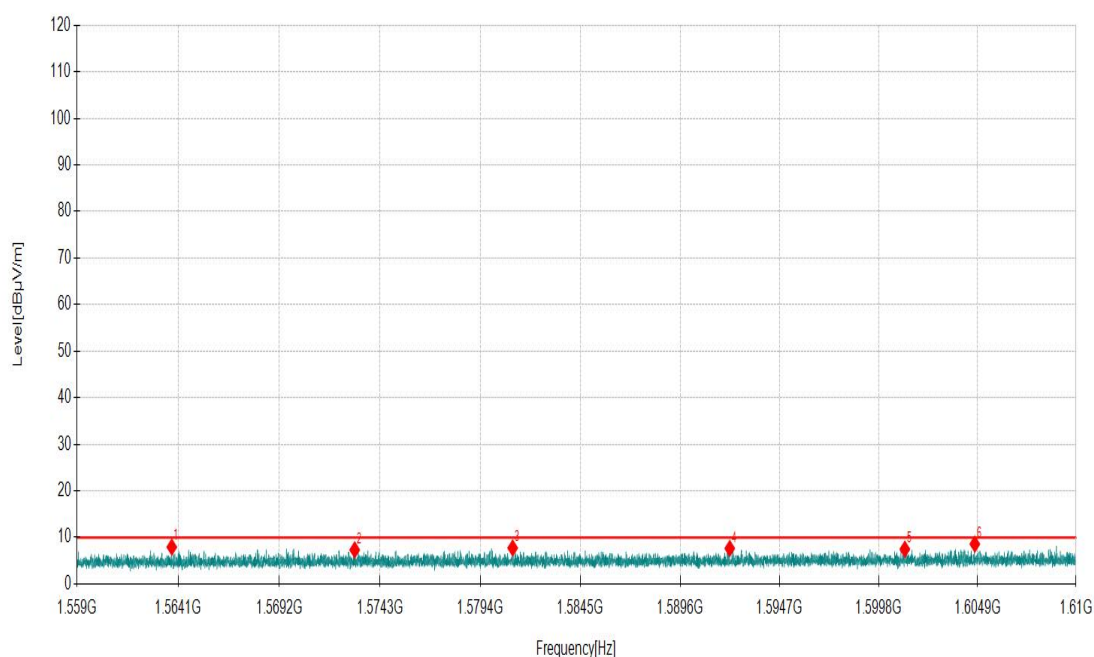


NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	1167.25	42.60	-37.47	5.13	9.93	4.80	Vertical
2	1176.59	43.26	-37.45	5.81	9.93	4.12	Vertical
3	1195.58	43.93	-37.41	6.52	9.93	3.41	Vertical
4	1203.90	43.66	-37.39	6.27	9.93	3.66	Vertical
5	1213.73	43.50	-37.37	6.13	9.93	3.80	Vertical
6	1231.72	43.79	-37.35	6.44	9.93	3.49	Vertical

Remark: 1. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
 2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]
 4. Emission level (dBuV/m) = 20 log Emission level (uV/m).
 5. 9KHz~30MHz have been test and test data more than 20dB margin.

Test Mode:	CH 9	Frequency Range	GPS-1559-1610MHz
Test Voltage	DC 3.6V	Detector Function	Quasi-Peak(QP)
Environmental Conditions	25deg. C,60% RH	Tested By	Zhou Ye

Horizontala

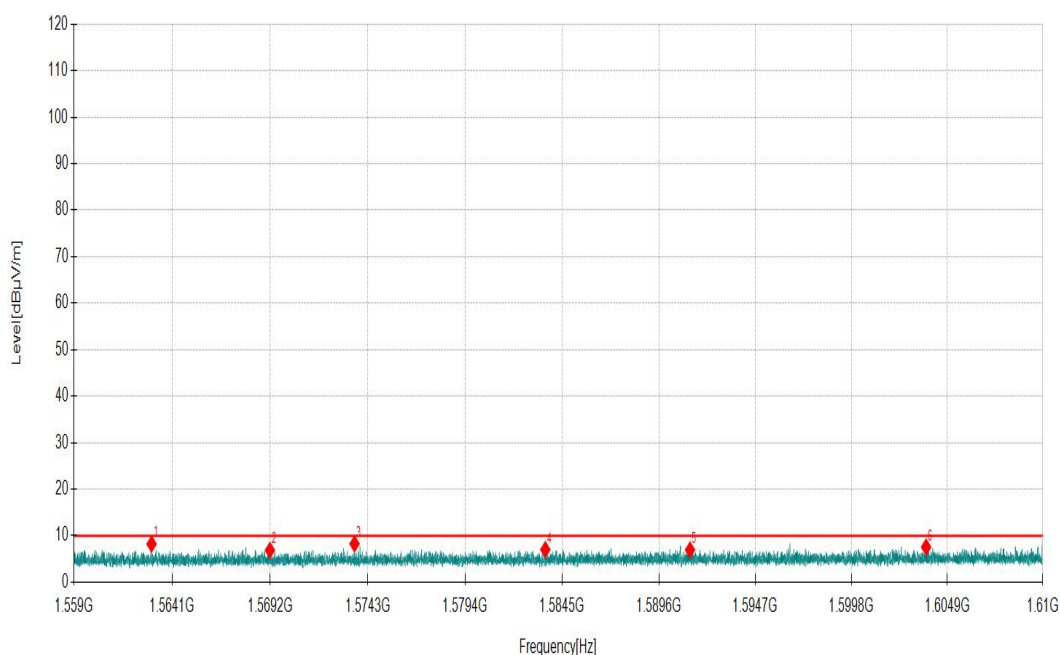


NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	1563.78	44.55	-36.63	7.92	9.93	2.01	Horizontal
2	1573.02	43.93	-36.61	7.32	9.93	2.61	Horizontal
3	1581.05	44.31	-36.58	7.73	9.93	2.20	Horizontal
4	1592.14	44.19	-36.56	7.63	9.93	2.30	Horizontal
5	1601.15	44.00	-36.53	7.47	9.93	2.46	Horizontal
6	1604.76	45.08	-36.51	8.57	9.93	1.36	Horizontal

Remark: 1. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
 2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]
 4. Emission level (dBuV/m) = 20 log Emission level (uV/m).
 5. 9KHz~30MHz have been test and test data more than 20dB margin.

Test Mode:	CH 9	Frequency Range	GPS-1559-1610MHz
Test Voltage	DC 3.6V	Detector Function	Quasi-Peak(QP)
Environmental Conditions	25deg. C,60% RH	Tested By	Zhou Ye

Vertical



NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	1563.03	44.86	-36.64	8.22	9.93	1.71	Vertical
2	1569.19	43.49	-36.62	6.87	9.93	3.06	Vertical
3	1573.61	44.86	-36.61	8.25	9.93	1.68	Vertical
4	1583.62	43.60	-36.59	7.01	9.93	2.92	Vertical
5	1591.25	43.50	-36.56	6.94	9.93	2.99	Vertical
6	1603.78	44.07	-36.52	7.55	9.93	2.38	Vertical

Remark: 1. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]
4. Emission level (dBuV/m) = 20 log Emission level (uV/m).
5. 9KHz~30MHz have been test and test data more than 20dB margin.

3.2 10DB BANDWIDTH

3.2.1 LIMIT

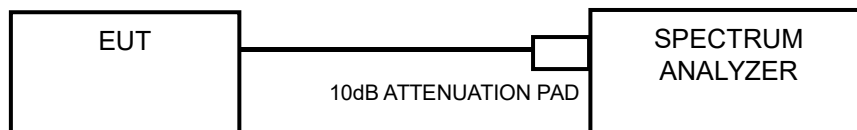
FCC 15.503(d) Has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.

FCC 15.519(3)(b) The UWB bandwidth of a device operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz.

3.2.2 TEST PROCEDURES

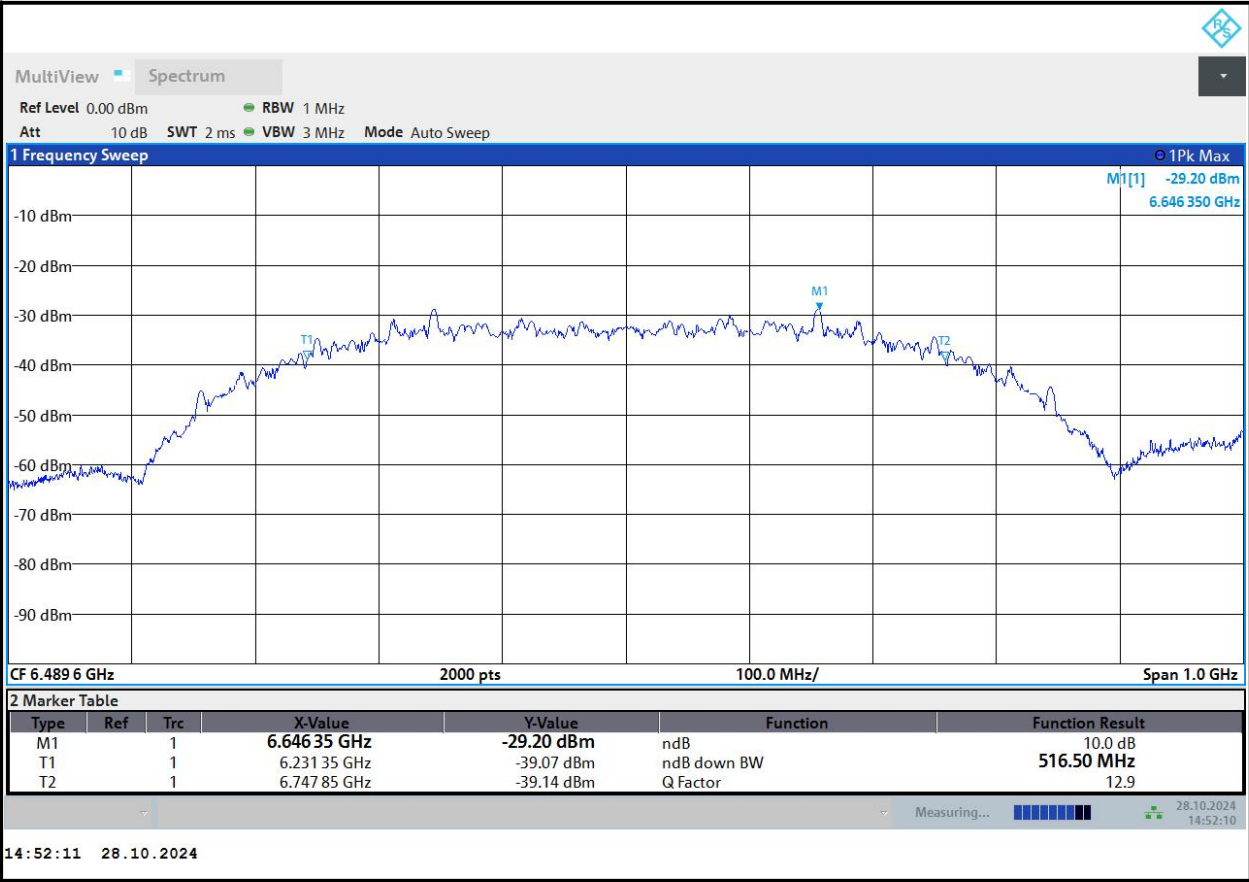
1. Set the centre frequency of the channel under test
2. Set resolution bandwidth (RBW) = 1MHz
3. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 10 dB relative to the maximum level measured in the fundamental emission.

3.2.3 TEST SETUP

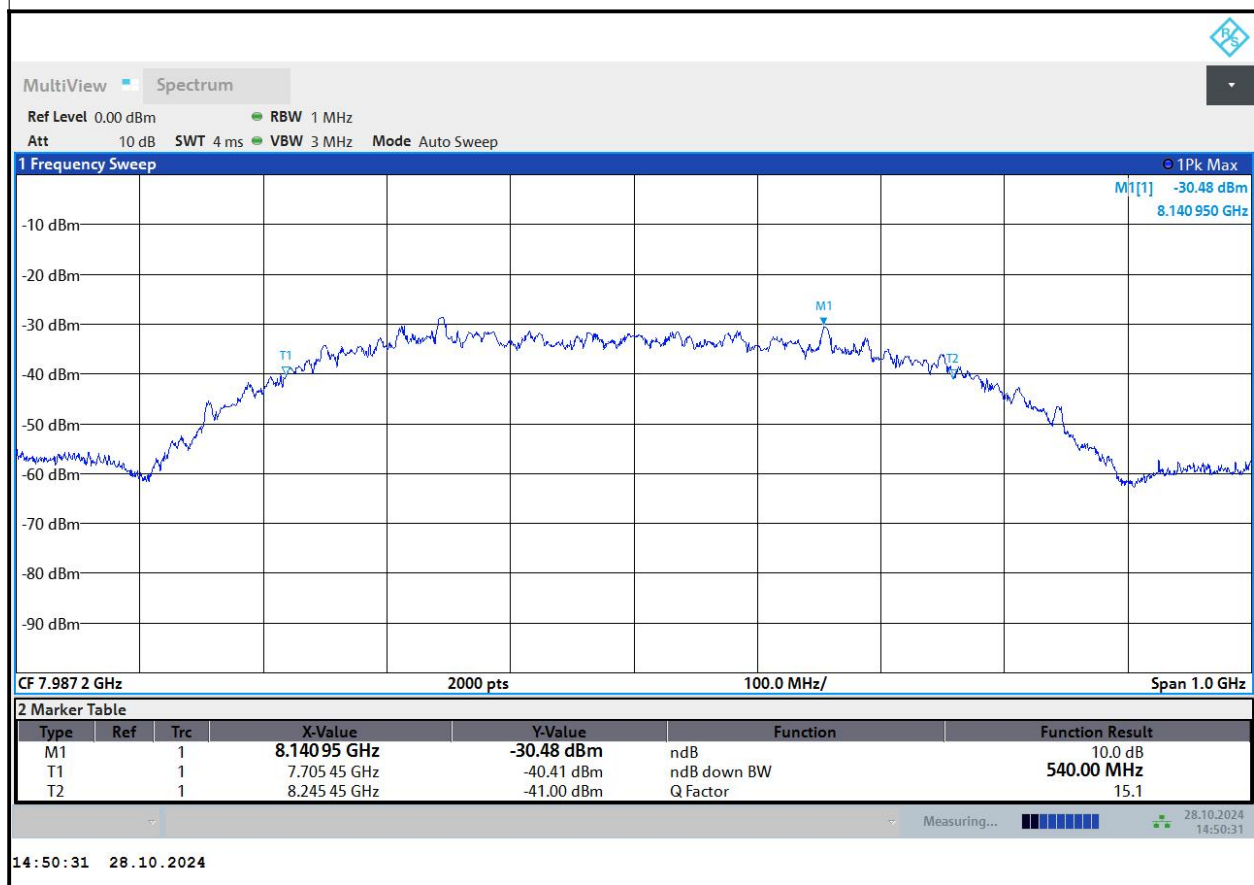


3.2.4 TEST RESULTS

Mode	Measured Frequencies		10dB Bandwidth (MHz)	Operating Limit (MHz)	OBW Limit (MHz)	Pass/Fail
	FL (MHz)	FH (MHz)				
CH5	6231.35	6747.85	516.5	FL > 3100 and FH < 10600	500	Pass



Mode	Measured Frequencies		10dB Bandwidth (MHz)	Operating Limit (MHz)	OBW Limit (MHz)	Pass/Fail
	FL (MHz)	FH (MHz)				
CH9	7705.45	8245.45	540	FL > 3100 and FH < 10600	500	Pass



3.3 99% OCCUPIED BANDWIDTH

3.3.1 LIMIT

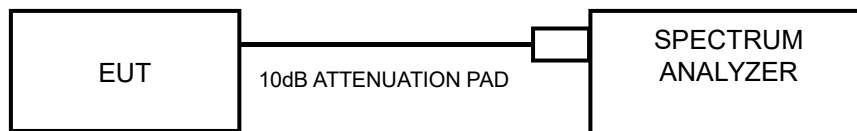
Only report

3.3.2 Measurement procedure

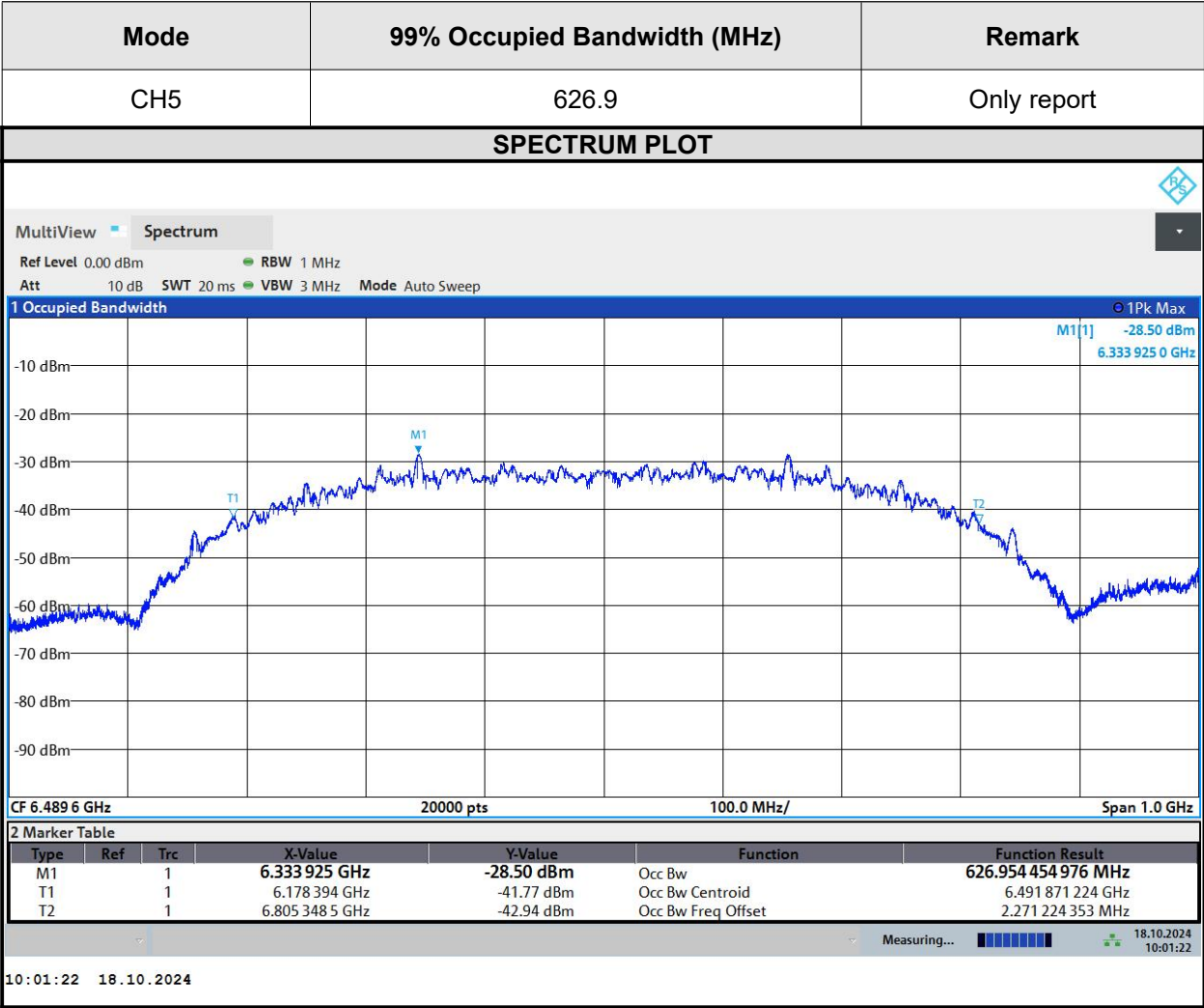
The transmitter antenna output was connected to the spectrum analyzer through an attenuator. The resolution bandwidth shall be set to the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.

below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

3.3.3 TEST SETUP

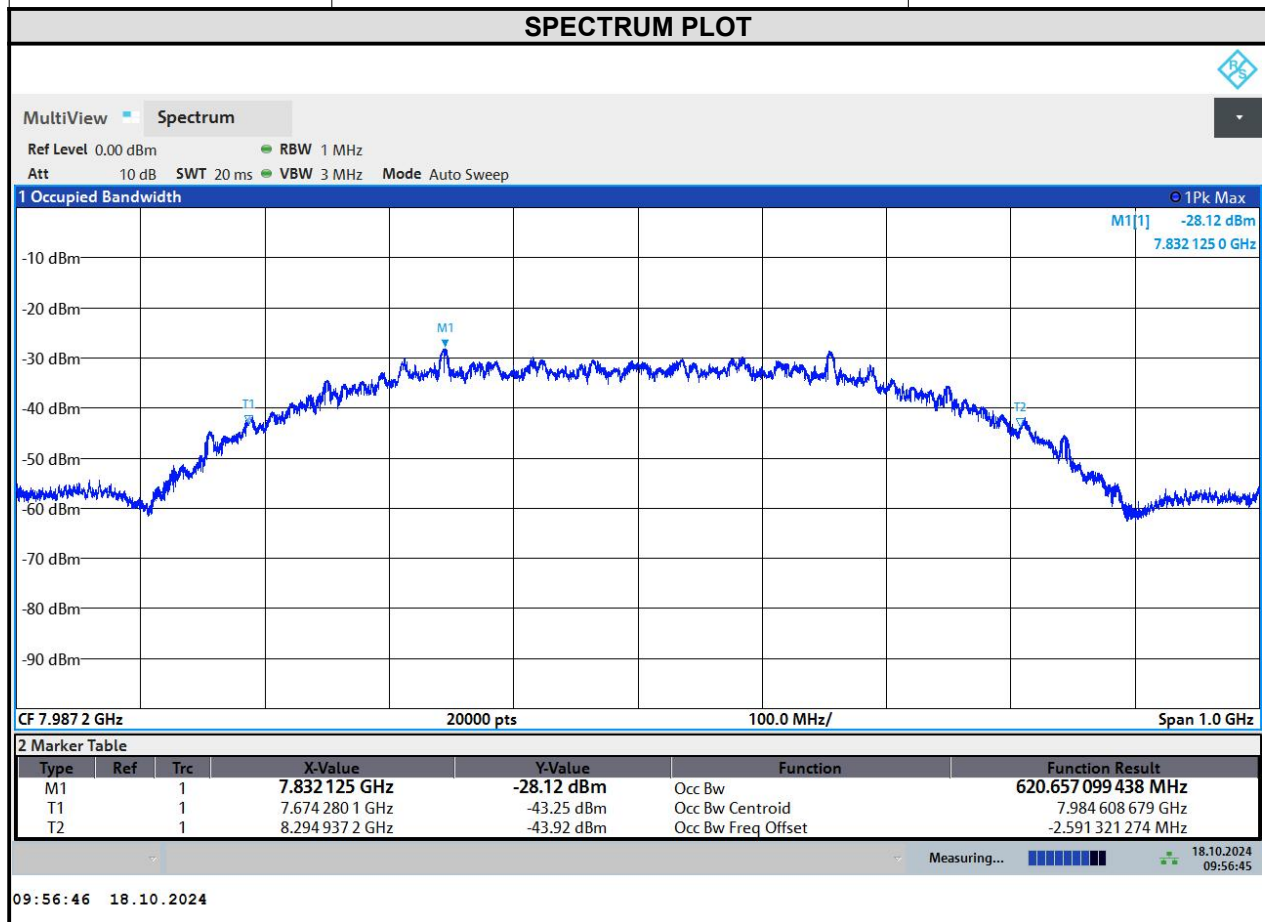


3.3.4 TEST RESULTS





Mode	99% Occupied Bandwidth (MHz)	Remark
CH9	620.6	Only report



3.4 MAXIMUM PEAK POWER AND AVERAGE EMISSIONS

3.4.1 LIMITS

There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, fM. That limit is 0 dBm EIRP.

When a peak measurement is required, it is acceptable to use a resolution bandwidth other than the 50 MHz specified in this subpart. This resolution bandwidth shall not be lower than 1 MHz or greater than 50 MHz, and the measurement shall be centered on the frequency at which the highest radiated emission occurs, fM. If a resolution bandwidth other than 50 MHz is employed, the peak EIRP limit shall be $20 \log (RBW/50)$ dBm where RBW is the resolution bandwidth in megahertz that is employed. This converted to a peak field strength level at 3 meters using $E(dBuV/m) = P(dBm \text{ EIRP}) + 95.2$.

ITEM	LIMIT
AVERAGE EMISSIONS	-41.3dBm/MHz
MAXIMUM PEAK POWER	0 dBm/50MHz

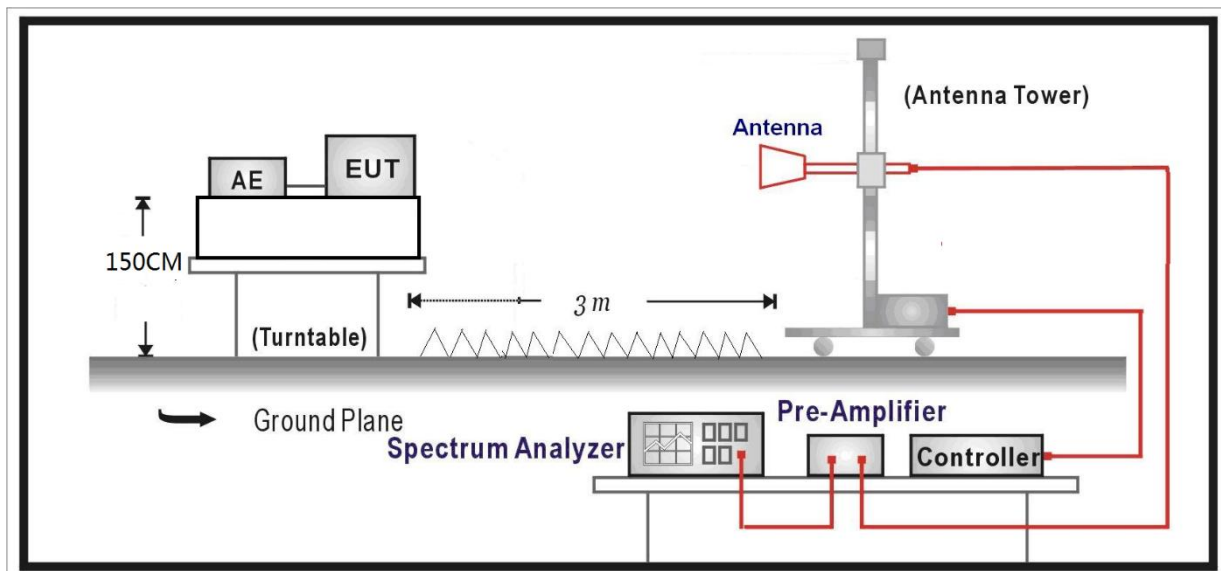
3.4.2 TEST PROCEDURE

- The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its height 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

3.4.3 TEST SETUP



3.4.4 TEST RESULTS

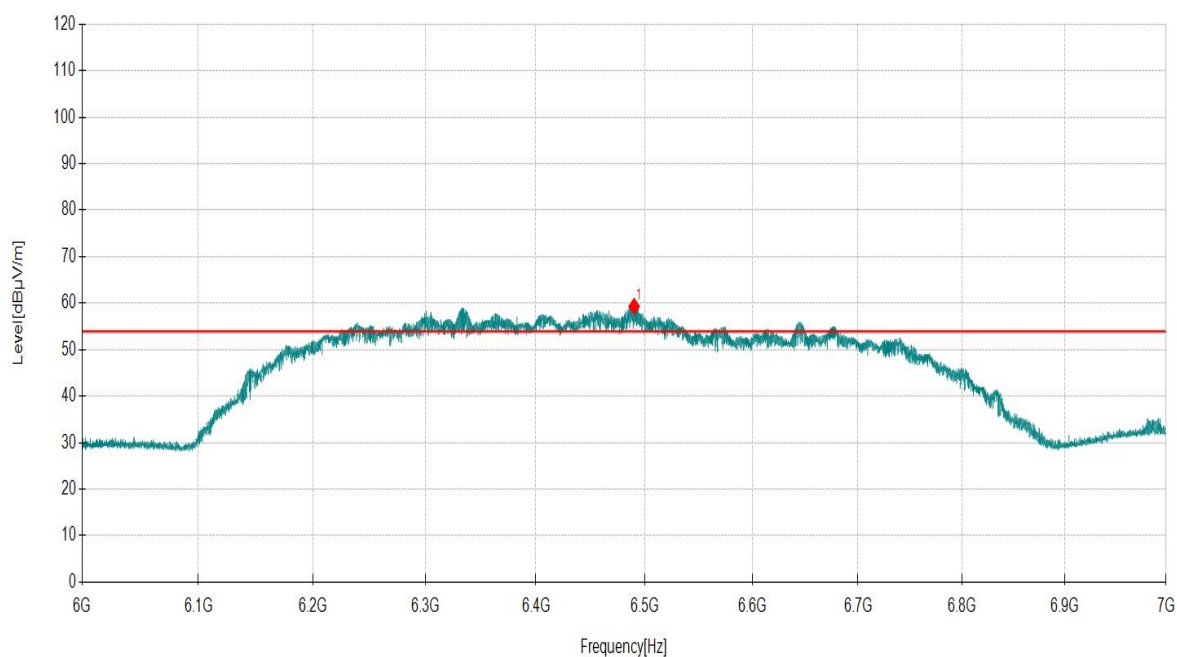
Mode	Pol(H/V)	Frequency (MHz)	Maximum Peak Power (dBuV/10MHz)	Maximum Peak Power (dBuV/50MHz)	Maximum Peak Power (dBm/50MHz)	(dBm/50MHz)	Pass/Fail
1	V	6489.05	46.30	60.28	-34.92	0	Pass
1	H	6490.05	59.30*	73.28	-21.92	0	Pass
2	V	7832.63	48.54	62.52	-32.68	0	Pass
2	H	7986.55	57.98	71.96	-23.24	0	Pass

Bandwidth correction factor (BWCF)= $20\log(50\text{MHz}/10\text{MHz}) = 13.98$

Maximum Peak Power (dBuV/50MHz) = Maximum Peak Power (dBuV/10MHz) + BWCF

Maximum Peak Power (dBm/50MHz) = Maximum Peak Power (dBuV/50MHz) - 95.2

*Note: Only the worst test plot

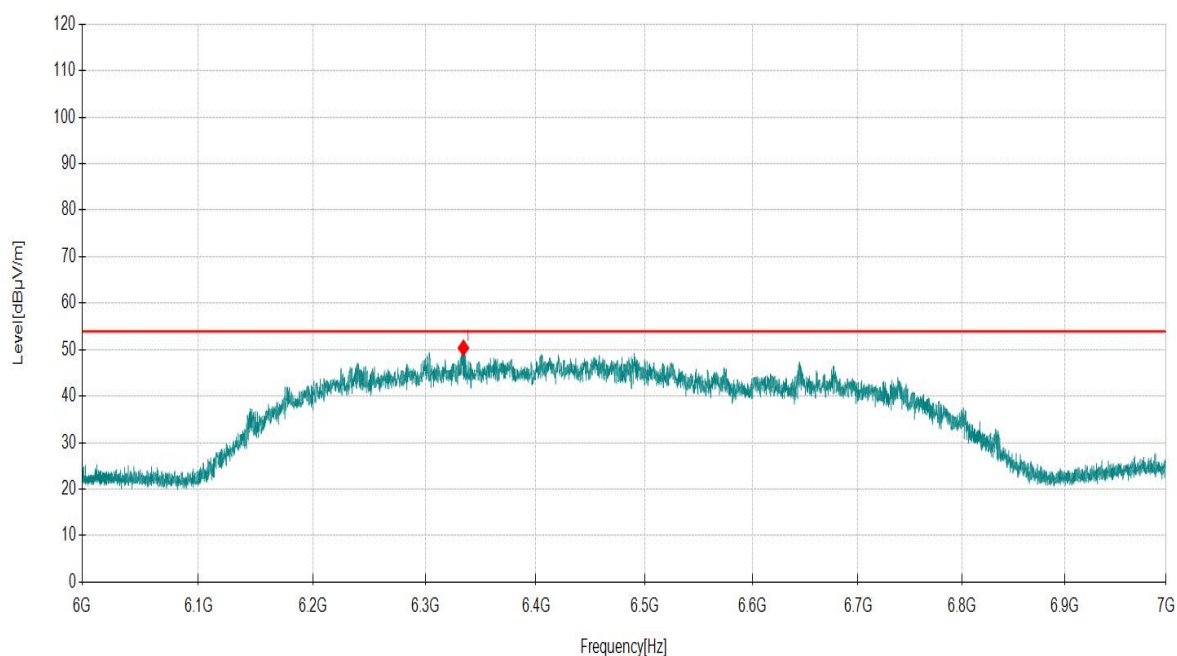


NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	6490.05	89.36	-30.06	59.30	/	/	RMS	Vertical

Mode	Frequency (MHz)	Average Emissions (dBuV/MHz)	Average Emissions (dBm/MHz)	Limit(dBm/MHz)	Pass/Fail
1	H	34.38	-60.82	-41.3	Pass
1	V	50.36*	-44.84	-41.3	Pass
2	H	48.58	-46.62	-41.3	Pass
2	V	38.20	-57.00	-41.3	Pass

Average Emissions (dBm/MHz) = Average Emissions (dBuV/MHz) -95.2

*Note: Only the worst test plot



NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	6334.33	80.61	-30.25	50.36	53.93	3.57	RMS	Vertical

3.5 CEASE TRANSMISSION TIME

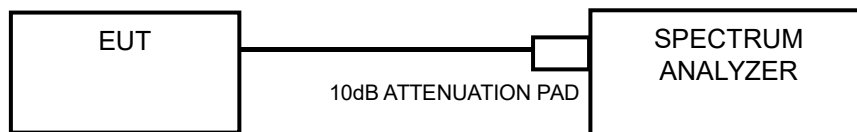
3.5.1 LIMIT

The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.

3.5.2 TEST PROCEDURES

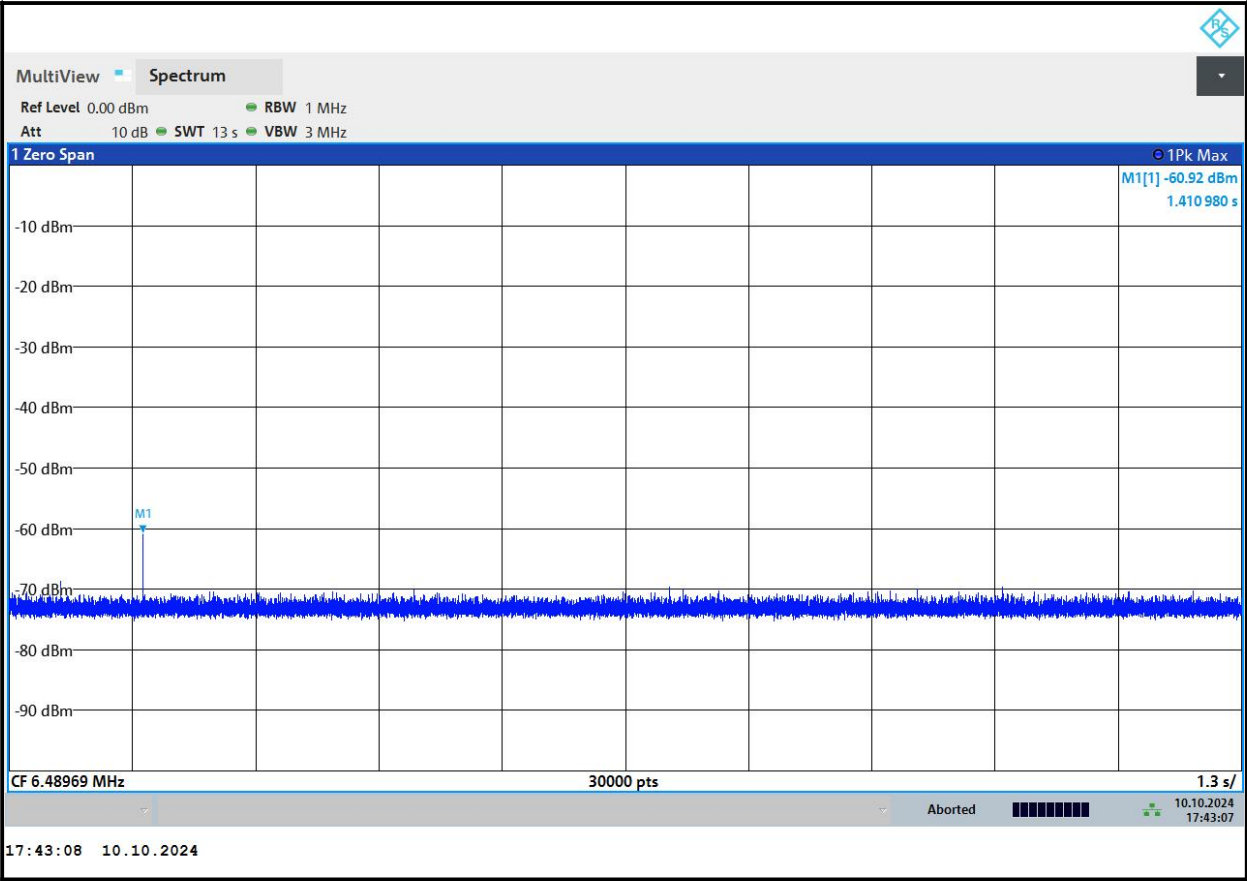
With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer set the center frequency, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the transmission duration was measured and recorded.

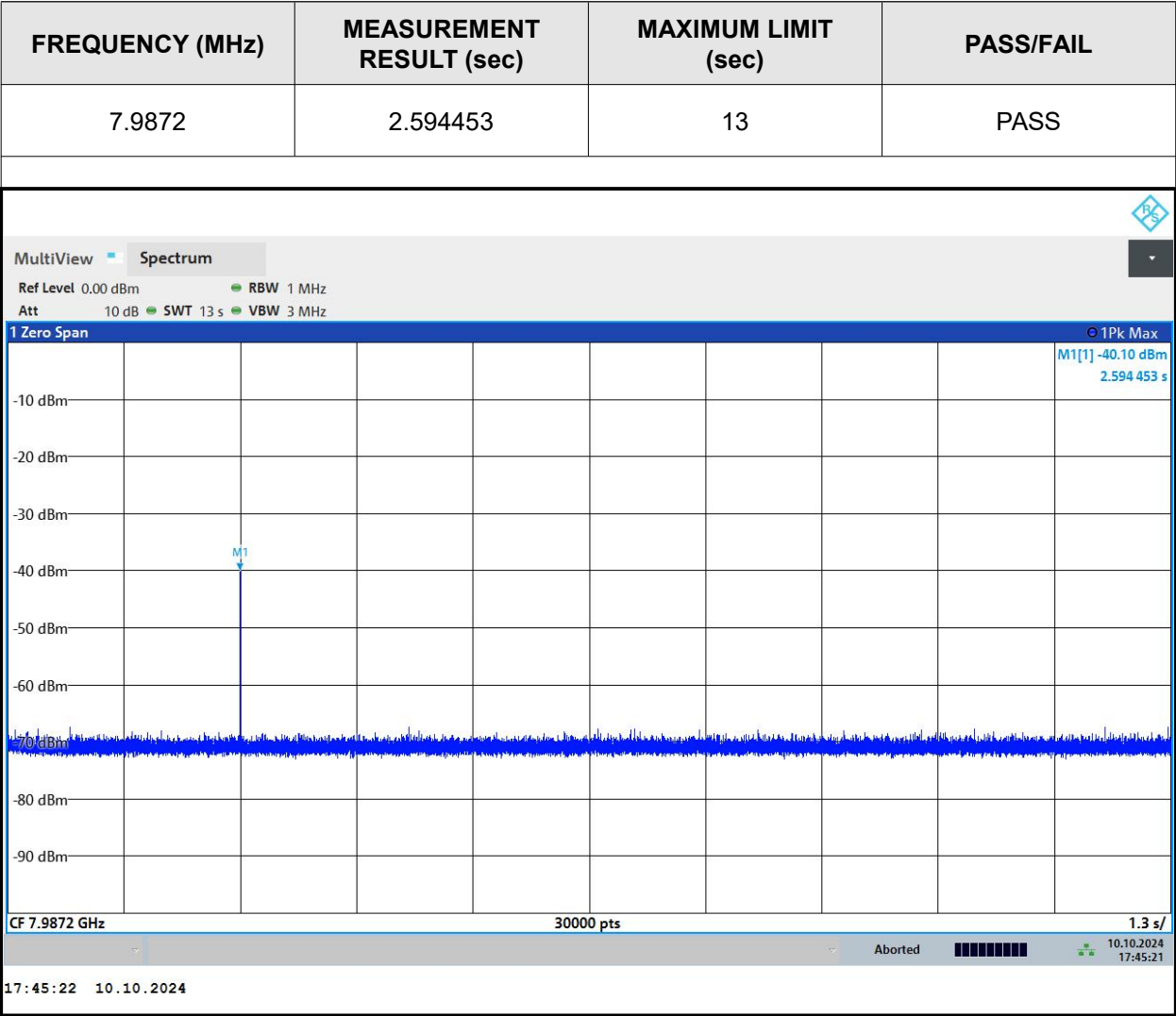
3.5.3 TEST SETUP





FREQUENCY (MHz)	MEASUREMENT RESULT (sec)	MAXIMUM LIMIT (sec)	PASS/FAIL
6489.6	1.41098	13	PASS





3.6 ANTENNA REQUIREMENT

3.6.1 LIMITS OFFREQUENCY STABILITY

For intentional device, according to FCC 47 CFR Section 15.203, 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. And according to FCC 47 CFR Section 15.247 (b) , if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.6.2 ANTENNA ANTI-REPLACEMENT CONSTRUCTION

The antenna used for this product is Double copper tube Antenna and that no antenna other than that furnished by the responsible party shall be used with the device

3.6.3 ANTENNA GAIN

UWB share a single antenna maximum peak value is 2.72dBm



4 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Photos).

5 PHOTOGRAPHS OF THE EUT

Please refer to the attached file (External Photos report and Internal Photos).

Important

- (1) The test report is invalid without the official stamp of CVC;
- (2) Any part photocopies of the test report are forbidden without the written permission from CVC;
- (3) The test report is invalid without the signatures of Approval and Reviewer;
- (4) The test report is invalid if altered;
- (5) Objections to the test report must be submitted to CVC within 15 days.
- (6) Generally, commission test is responsible for the tested samples only.
- (7) As for the test result “-” or “N” means “not applicable”, “/” means “not test”, “P” means “pass” and “F” means “fail”

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