

TEST REPORT

Product Name: UWB device
Trade Mark: vtech
Model No.: X4M05V
Report Number: 181214024RFC-2
Test Standards: FCC 47 CFR Part 15 Subpart F
FCC ID: EW7X4M05V
Joh no: HK18120034
Test Result: PASS
Date of Issue: August 9, 2019

Prepared for:

VTech Telecommunications Ltd.
23/F, Tai Ping Industrial Centre, Block 1, 57 Ting Kok Road, Tai Po,
Hong Kong.

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
16/F, Block A, Building 6, Baoneng Science and Technology Park,
Qingxiang Road No.1, Longhua New District, Shenzhen, China
TEL: +86-755-2823 0888
FAX: +86-755-2823 0886

Tested by:



Henry Lu

Project Engineer

Reviewed by:



Kevin Liang

Assistant Manager

Approved by:



Billy Li
Technical Director

Date:

August 9, 2019

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

Version

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Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

[Http://www.uttlab.com](http://www.uttlab.com)

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	VTech Telecommunications Ltd.
Address of Applicant:	23/F, Tai Ping Industrial Centre, Block 1, 57 Ting Kok Road, Tai Po, Hong Kong.
Manufacturer:	VTech (Dongguan) Telecommunications Limited.
Address of Manufacturer:	VTech Science Park, Xia Ling Bei Management Zone, Liaobu, Dongguan, Guangdong, China.

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Breathing and Video Monitor	
Model No.:	VM5253 BU	
Add. Model No.:	VM5X53-ab BU	
FCC ID:	EW780-1501-00	
Module name:	UWB device	
Module No:	X4M05V	
Module FCC ID:	EW7X4M05V	
Trade Mark:	vtech	
DUT Stage:	Production Unit	
EUT Supports Function:	2405 -2475MHz:	General 2.4GHz FHSS
	3.1GHz -10.6GHz:	7.29GHz UWB
Sample Received Date:	December 7, 2018	
Sample Tested Date:	December 7, 2018 to August 9, 2019	
Note: The Model(s): VM5X53-ab BU is the same as the Model: VM5253 BU in electronics/electrical designs including software & firmware, PCB layout and construction design/physical design/enclosure as declared by client. The only differences between these models are color and model number to be sold for marketing purpose as declared by client. Suffix (“a,b,x”) indicates different number of baby unit, different color of enclosure, and different type packaging as declared by client.		

1.2.2 Description of Accessories

Adapter	
Model No.:	S006AKU0500100
Input:	100-240 V~50/60 Hz 200mA
Output:	5.0 V = 1000mA
DC Cable:	1.80 Meter, Unshielded without ferrite

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Frequency Band:	6 GHz to 8.5 GHz
Nominal Operating Frequency:	7.29 GHz
Number of Channels:	1
Antenna Type:	PCB Antenna
Normal Test Voltage:	120V~60Hz

1.4 OTHER INFORMATION

None

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Notebook	Lenovo	E450	SL10G10780	UnionTrust
Adapter	N/A	S006AKU0500100	N/A	Applicant
Breathing and Video Monitor- Parent Unit	VTech Telecommunications Ltd.	VM5253 PU	N/A	Applicant

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
-	-	-	-	-

1.6 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109

Telephone: +86 (0) 755 2823 0888

Fax: +86 (0) 755 2823 0886

1.7 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

IC-Registration No.: 21600-1

The 3m Semi-anechoic chamber of Shenzhen UnionTrust Quality and Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 21600-1.

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

1.8 DEVIATION FROM STANDARDS

None.

1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.11 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±5.2 dB

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart F Test Cases			
Test Item	Test Requirement	Test Method	Result
Antenna Requirement	FCC 47 CFR Part 15 Subpart F Section 15.203	N/A	N/A ^{Note1, 2}
AC Power Line Conducted Emission	FCC 47 CFR Part 15 Subpart F Section 15.207	ANSI C63.10-2013 Clause 6.2	PASS
Radiated Emission	FCC 47 CFR Part 15 Subpart F Section 15.209 FCC 47 CFR Part 15 Subpart F Section 15.519(c)	ANSI C63.10-2013 Section 6.5/ 6.6	PASS
Radiated Emission in GPS band	FCC 47 CFR Part 15 Subpart F Section 15.519(d)	ANSI C63.10-2013 Section 6.6	PASS
Operational Limitations	FCC 47 CFR Part 15 Subpart F Section 15.519(a)	N/A	PASS
10dB Bandwidth	FCC 47 CFR Part 15 Subpart F Section 15.503(a)	ANSI C63.10-2013 Section 10.1	N/A ^{Note1, 2}
EIRP	FCC 47 CFR Part 15 Subpart F Section 15.521(g)	ANSI C63.10-2013 Section 10.3	PASS
Note: 1) N/A: In this whole report not application. 2) After evaluation, the certification is C2PC, Please refer to the report number: 18C2028R-RF-US-P06V02, dated Apr. 19, 2019			

3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
☒	Receiver	R&S	ESIB26	100114	Nov. 24, 2018	Nov. 24, 2019
☒	Loop Antenna	ETS-LINDGREN	6502	00202525	Dec. 03, 2018	Dec. 03, 2019
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 08, 2018	Dec. 08, 2019
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec. 08, 2018	Dec. 08, 2019
☒	Preamplifier	HP	8447F	2805A02960	Nov. 24, 2018	Nov. 24, 2019
☒	Horn Antenna	ETS-LINDGREN	3117	00164202	Dec. 08, 2018	Dec. 08, 2019
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 22, 2018	May 22, 2019
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160333		

Conducted Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 24, 2018	Nov. 24, 2019
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 24, 2018	Nov. 24, 2019
☒	LISN	R&S	ESH2-Z5	860014/024	Nov. 24, 2018	Nov. 24, 2019
☒	Test Software	Audix	e3	Software Version: 9.160323		

RF Conducted Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 24, 2018	Nov. 24, 2019

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Record of Normal Environment

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Tested by
Radiated Emission	25.4	53	99.80	Fire Huo
Radiated Emission in GPS band	25.4	53	99.80	Fire Huo
Conducted Emission	25.2	59	99.80	Gemini Huang
EIRP	25.4	53	99.80	Fire Huo
Operational Limitations	23.6	51	99.80	Fire Huo

4.2 TEST CHANNELS

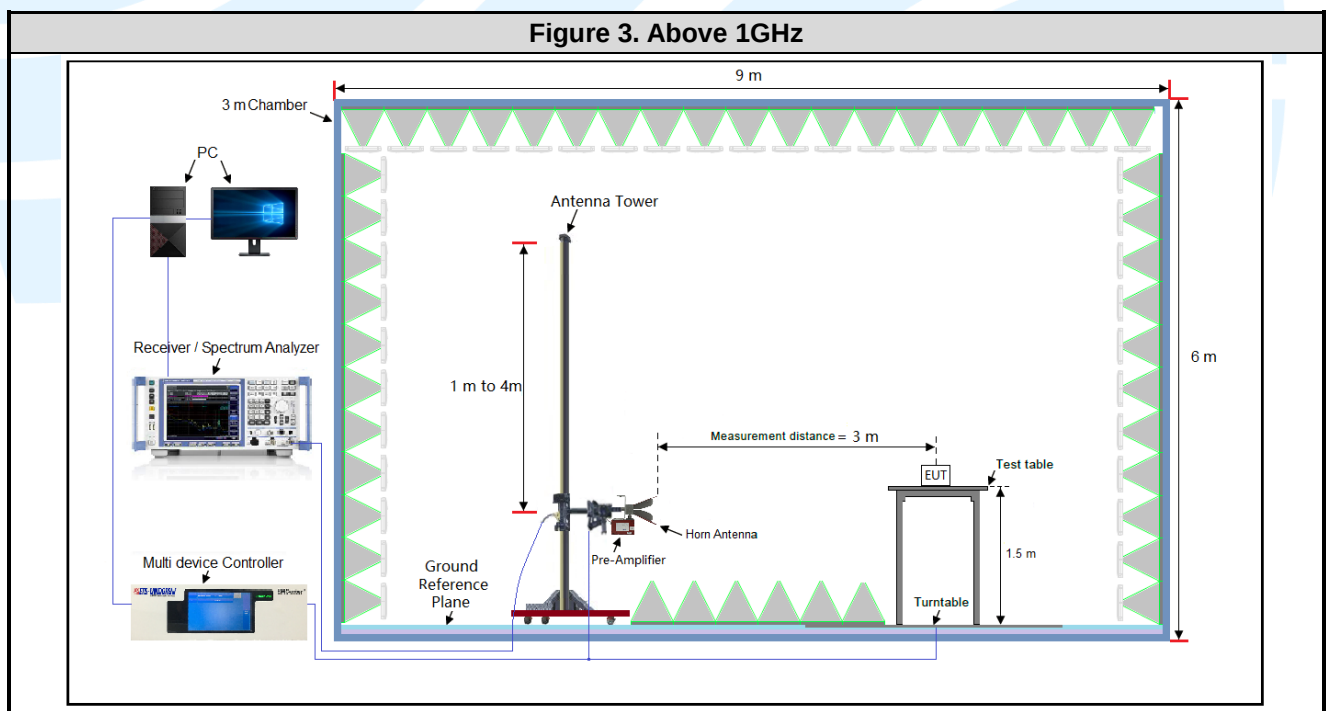
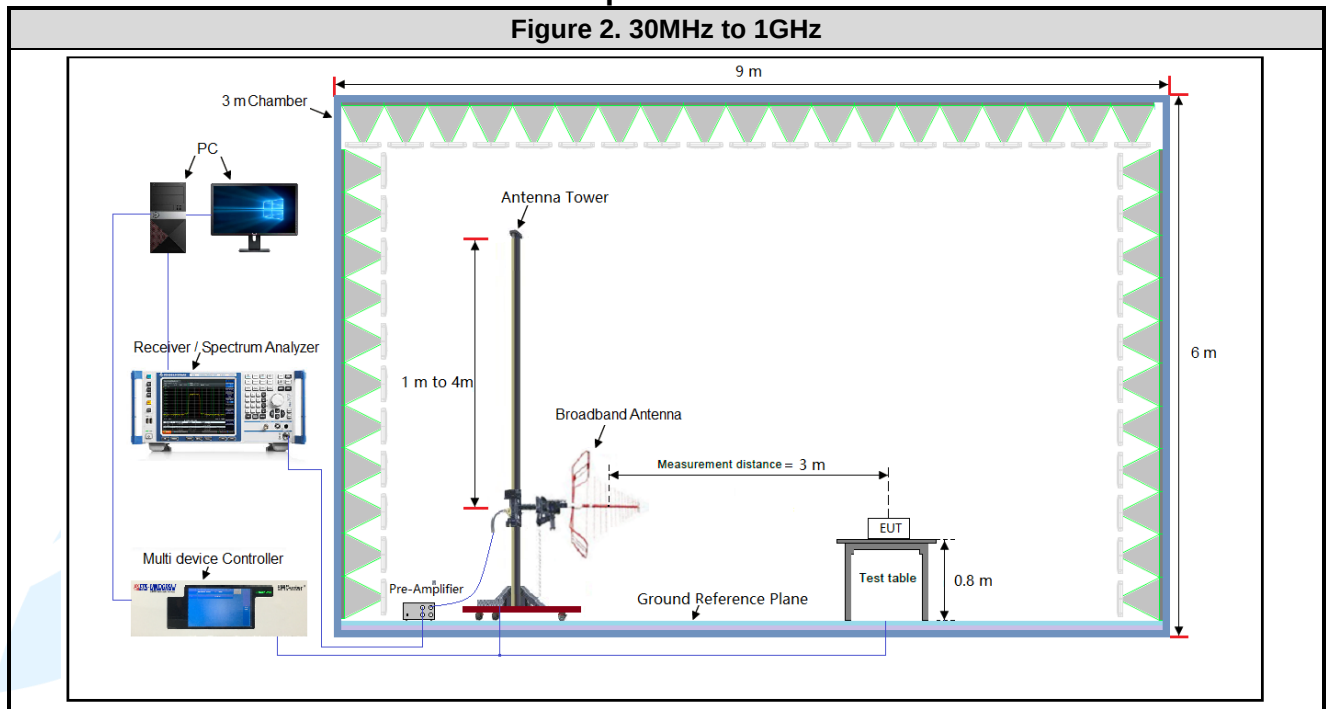
Frequency	Test RF Channel
7.29 GHz	Channel 1
	7.29 GHz

4.3 EUT TEST STATUS

Frequency	Tx Function	Description
7.29 GHz	1Tx	1. Keep the EUT in continuously transmitting (including 2.4GHz FHSS) during the test.

4.4 TEST SETUP

4.4.1 For Radiated Emissions test setup



The diagram illustrates the layout of a Shielding Room used for testing. On the left, a table holds a PC, a Receiver, and a Pulse Limiter. A Ground Reference Plane is indicated below the table. Two LISN (Line Impedance Stabilization Network) units, LISN 1 and LISN 2, are connected to the AC Mains. LISN 1 is connected to the Pulse Limiter and the Receiver. LISN 2 is connected to the AC Mains. The test setup includes a Test table with two EUT/AE (Equipment Under Test/Accessory Equipment) units and a PSU (Power Supply Unit). The EUT/AE units are spaced 10 cm apart, and the PSU is 10 cm from the second EUT/AE. The Test table is 80 cm high and 40 cm wide. The insulation between the Test table and the AC Mains is specified as ≤ 0.15 m. The entire setup is enclosed in a Shielding Room.

The diagram illustrates a shielding chamber setup for EMI testing. A spectrum analyzer is connected to a Non-Conducted Table, which is supported by two legs. The EUT (Equipment Under Test) is placed on the table, and a cable connects it to the spectrum analyzer. The entire setup is enclosed within a Shielding Chamber, indicated by a large rectangular box surrounding the equipment.

4.5 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by adapter. Only the worst case data were recorded in this test report.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION**5.1 REFERENCE DOCUMENTS FOR TESTING**

No.	Identity	Document Title
1	FCC 47 CFR Part 15	Radio Frequency Devices
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices



5.2 RADIATED EMISSION

Test Requirement: FCC 47 CFR Part 15 Subpart F Section 15.519
FCC 47 CFR Part 15 Subpart C Section 15.205/15.209

Test Method: ANSI C63.10-2013 Section 6.5/ 6.6

Receiver Setup:

Frequency	RBW
0.009 MHz-0.150 MHz	200/300 kHz
0.150 MHz -30 MHz	9/10 kHz
30 MHz-1 GHz	100/120 kHz
Above 1 GHz	1 MHz

Limits:

Spurious Emissions

Frequency	Field strength (microvolt/meter)	Limit (dB μ V/m)	Remark	Measurement distance (m)
30 MHz-88 MHz	100	40.0	Quasi-peak	3
88 MHz-216 MHz	150	43.5	Quasi-peak	3
216 MHz-960 MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1 GHz	500	54.0	Average	3

Frequency	EIRP in dBm
960 MHz-1610 MHz	-75.3
1610 MHz-1990 MHz	-63.3
1990 MHz-3100 MHz	-61.3
3100 MHz-10600 MHz	-41.3
Above 10600 MHz	-61.3

Test Setup: Refer to section 4.4.1 for details.

Test Procedures:

- From 30 MHz to 1GHz test procedure as below:
 - The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter 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.
 - The antenna 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table 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.
 - If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
 - Above 1GHz test procedure as below:
 - Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
 - Test the EUT in the lowest channel ,middle channel, the Highest channel
 - The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the Y positioning which it is worse case.
- Repeat above procedures until all frequencies measured was complete.

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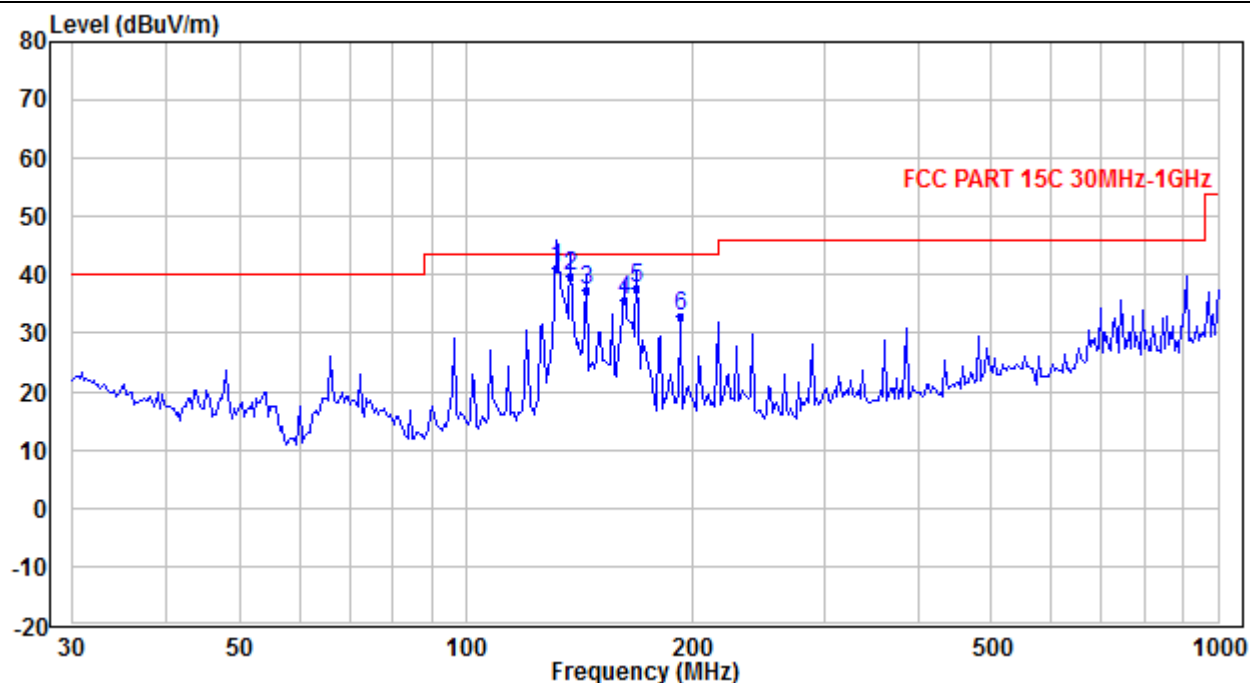
Equipment Used: Refer to section 3 for details.

Test Result: Pass

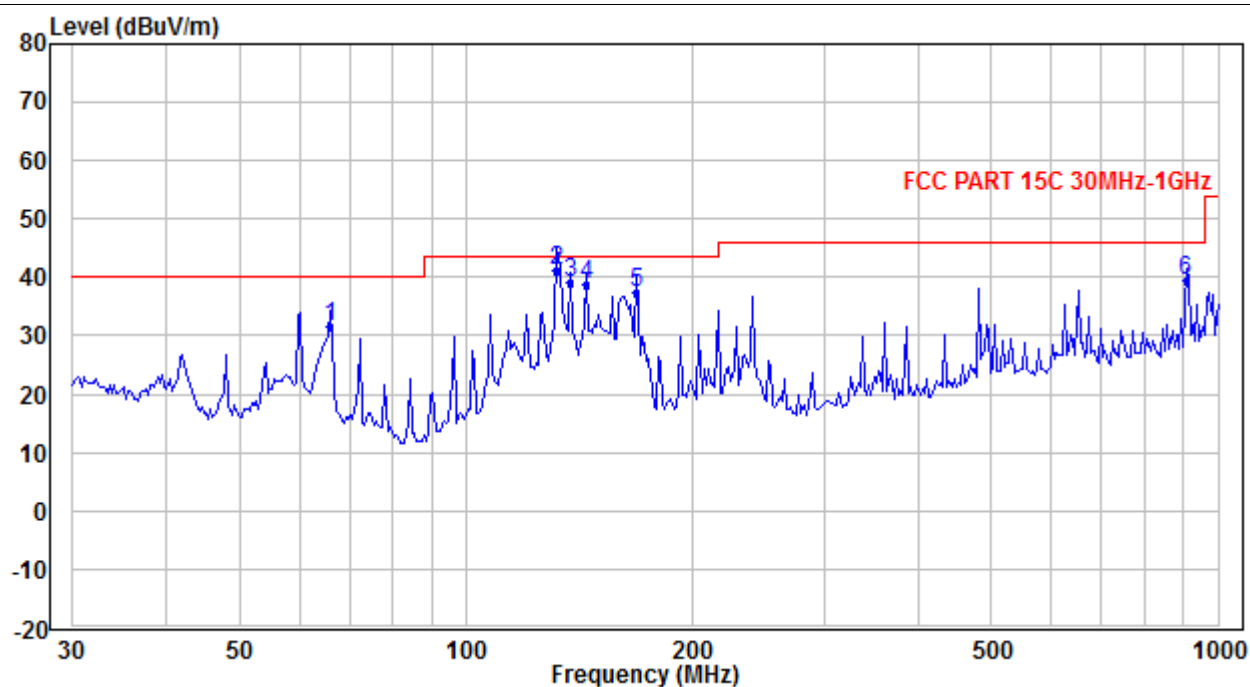
Radiated Emission Test Data (30 MHz ~ 1 GHz):

Test mode: VM5253 BU – UWB module Tx Transmission at 7.29GHz

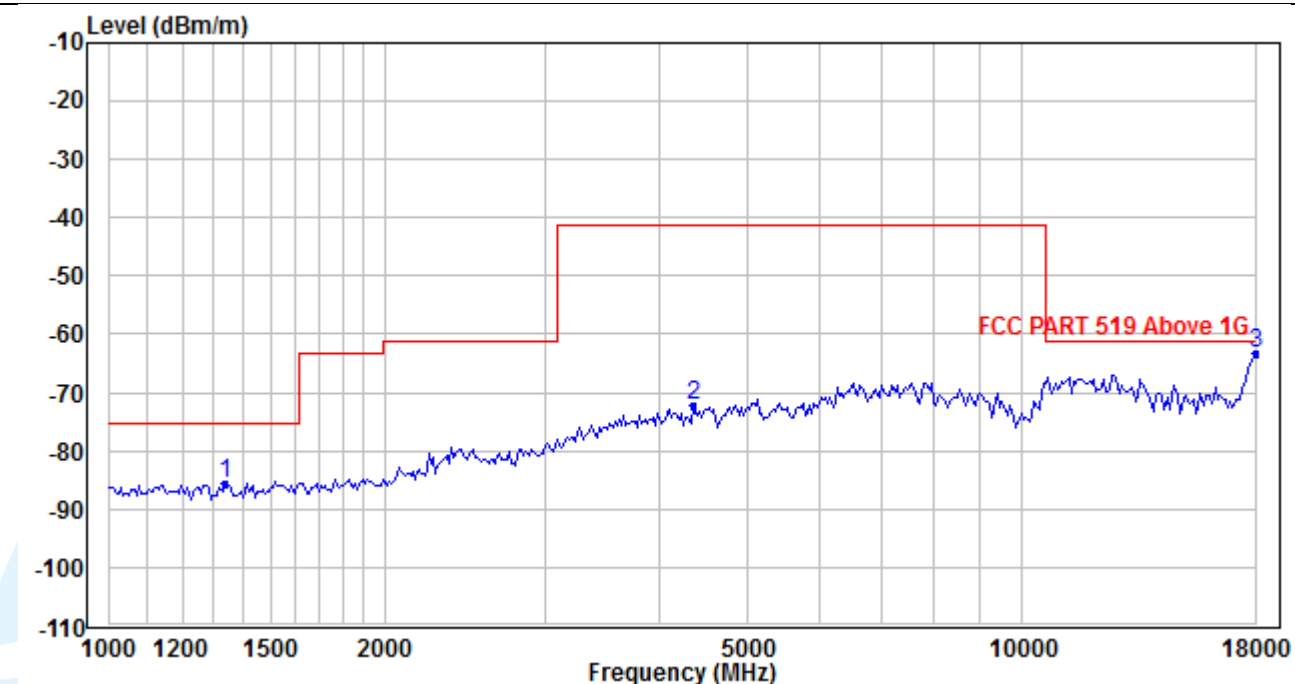
Horizontal



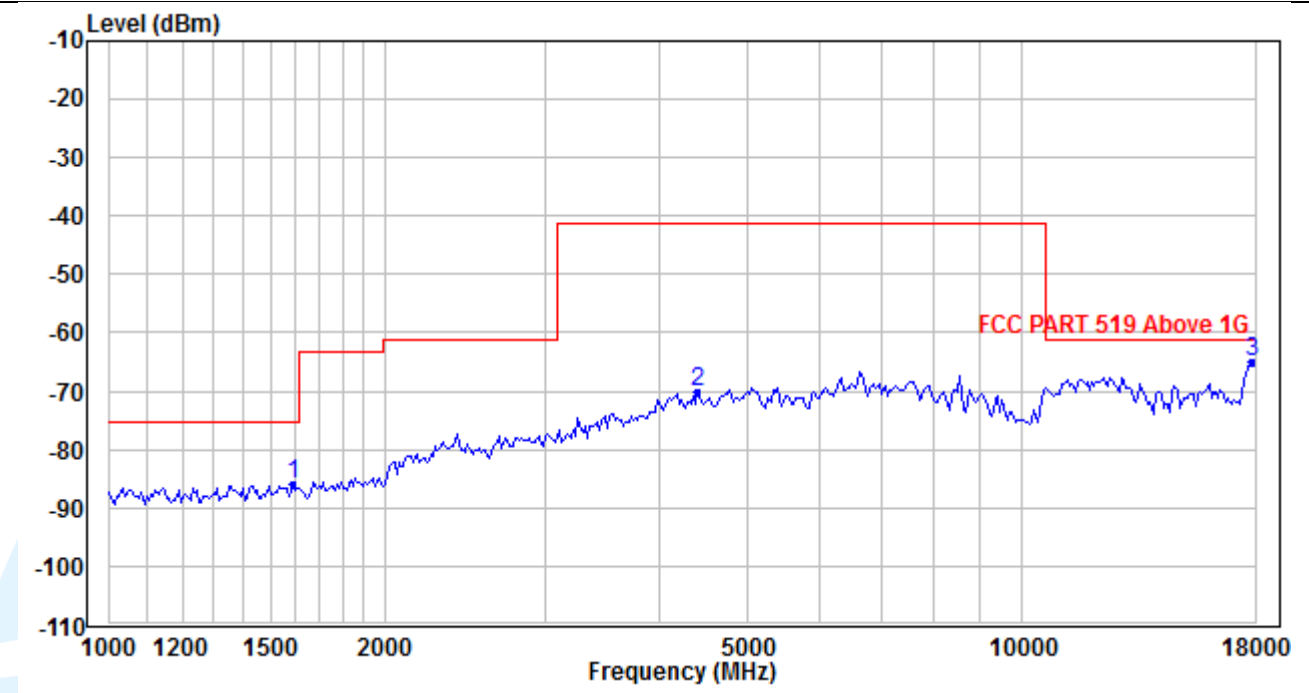
No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	131.527	52.78	-11.69	41.09	43.50	-2.41	QP
2	137.779	51.23	-11.39	39.84	43.50	-3.66	QP
3	144.588	48.30	-11.06	37.24	43.50	-6.26	QP
4	162.144	46.30	-10.47	35.83	43.50	-7.67	QP
5	168.877	48.17	-10.56	37.61	43.50	-5.89	QP
6	193.266	42.98	-10.09	32.89	43.50	-10.61	QP

Radiated Emission Test Data (30 MHz ~ 1 GHz):
Test mode: VM5253 BU – UWB module Tx Transmission at 7.29GHz
Vertical


No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	65.977	45.47	-14.08	31.39	40.00	-8.61	QP
2	132.228	52.87	-11.70	41.17	43.50	-2.33	QP
3	137.840	50.33	-11.38	38.95	43.50	-4.55	QP
4	144.739	49.69	-11.06	38.63	43.50	-4.87	QP
5	168.887	47.96	-10.56	37.40	43.50	-6.10	QP
6	906.304	36.02	3.38	39.40	46.00	-6.60	QP

Spurious emissions test data (1 GHz ~ 18 GHz):
Test mode: VM5253 BU - UWB module Tx Transmission at 7.29GHz
Horizontal


No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1335.915	-86.17	0.72	-85.45	-75.30	-10.15	Peak
2	4354.681	-87.19	14.99	-72.20	-41.30	-30.90	Peak
3	18000.000	-94.65	31.30	-63.35	-61.30	-2.05	Peak

Spurious emissions test data (1 GHz ~ 18 GHz):
Test mode: VM5253 BU - UWB module Tx Transmission at 7.29GHz
Vertical


No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1589.447	-89.29	3.37	-85.92	-75.30	-10.62	Peak
2	4405.422	-86.29	16.16	-70.13	-41.30	-28.83	Peak
3	17896.040	-93.60	28.50	-65.10	-61.30	-3.80	Peak

Remark:

1) The disturbance above 18GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

5.3 RADIATED EMISSION IN GPS BAND

Test Requirement: FCC 47 CFR Part 15 Subpart F Section 15.519

Test Method: ANSI C63.10-2013 Section 6.6

Receiver Setup:

Frequency	RBW
Above 1 GHz	1 MHz

Limits:

Spurious Emissions

Frequency	EIRP in dBm
1164 MHz-1240 MHz	-85.3
1559 MHz-1610 MHz	-85.3

Test Setup: Refer to section 4.4.1 for details.

Test Procedures:

1. Above 1GHz test procedure as below:

- 1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
- 2) Test the EUT in the lowest channel ,middle channel, the Highest channel
- 3) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the Y positioning which it is worse case.

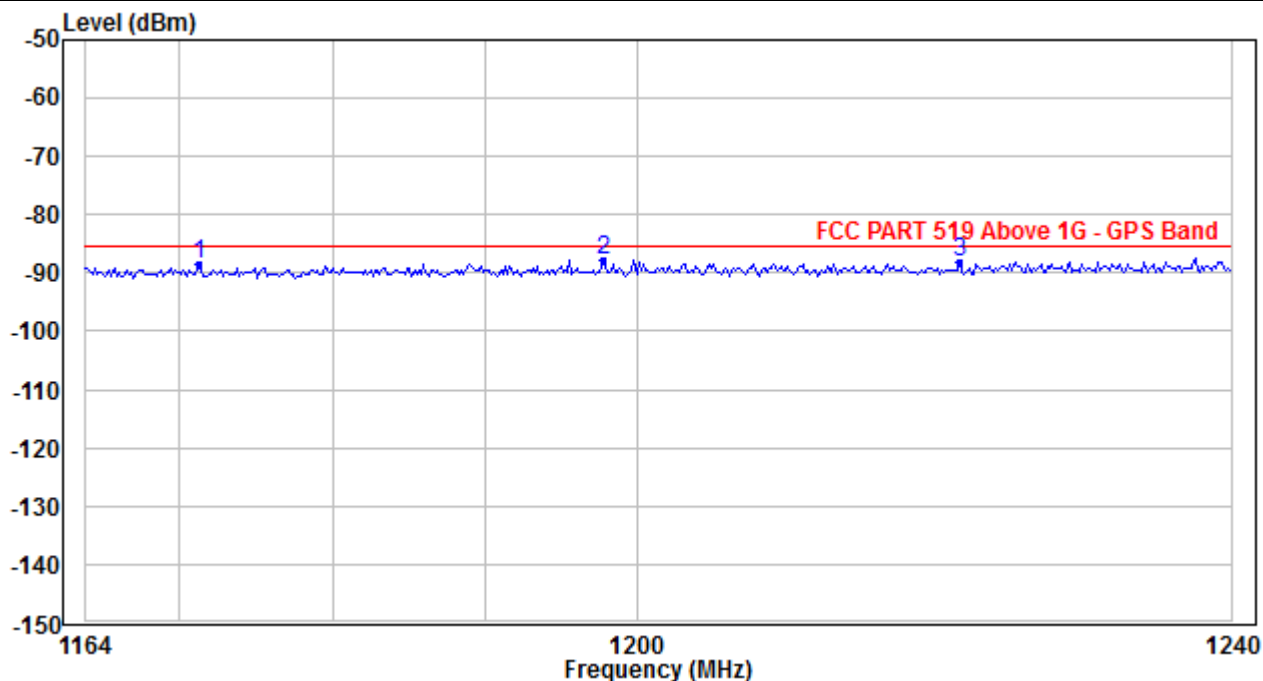
Repeat above procedures until all frequencies measured was complete.

Equipment Used: Refer to section 3 for details.

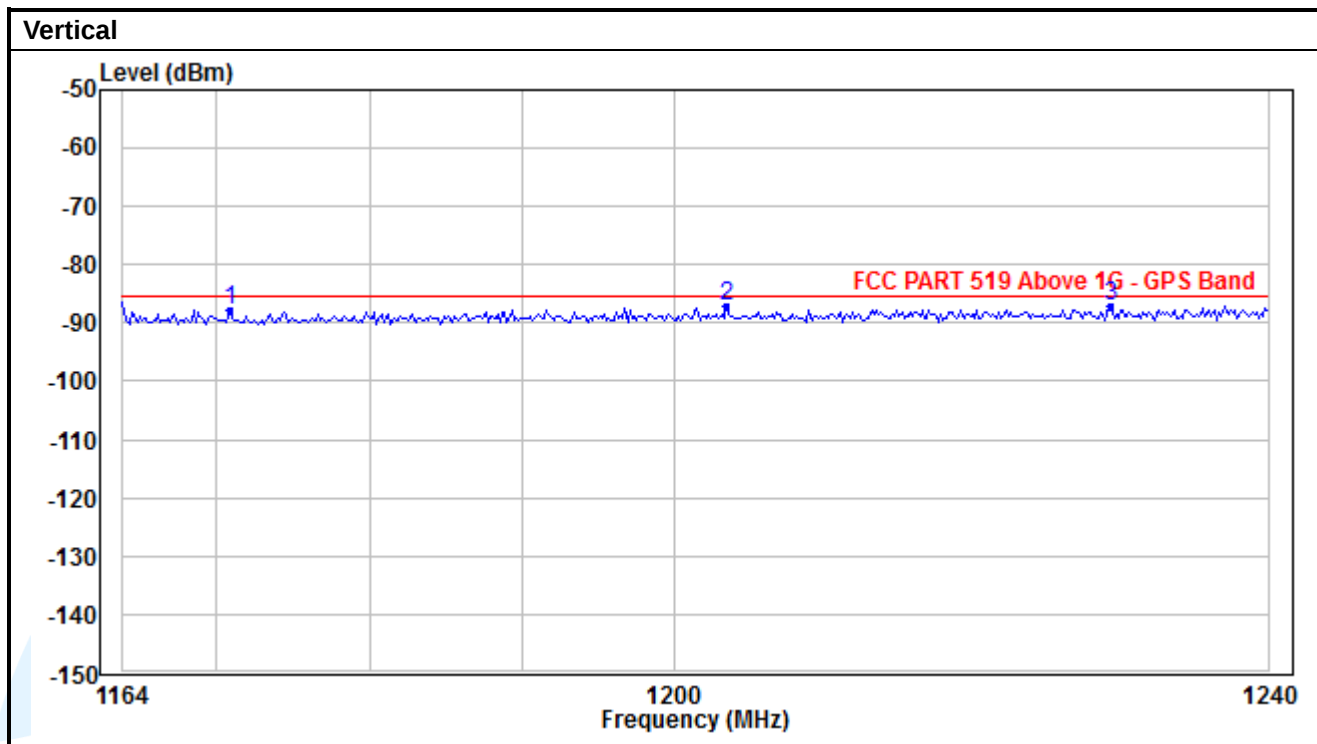
Test Result: Pass

Radiated Emission Test Data (1164 MHz-1240 MHz):

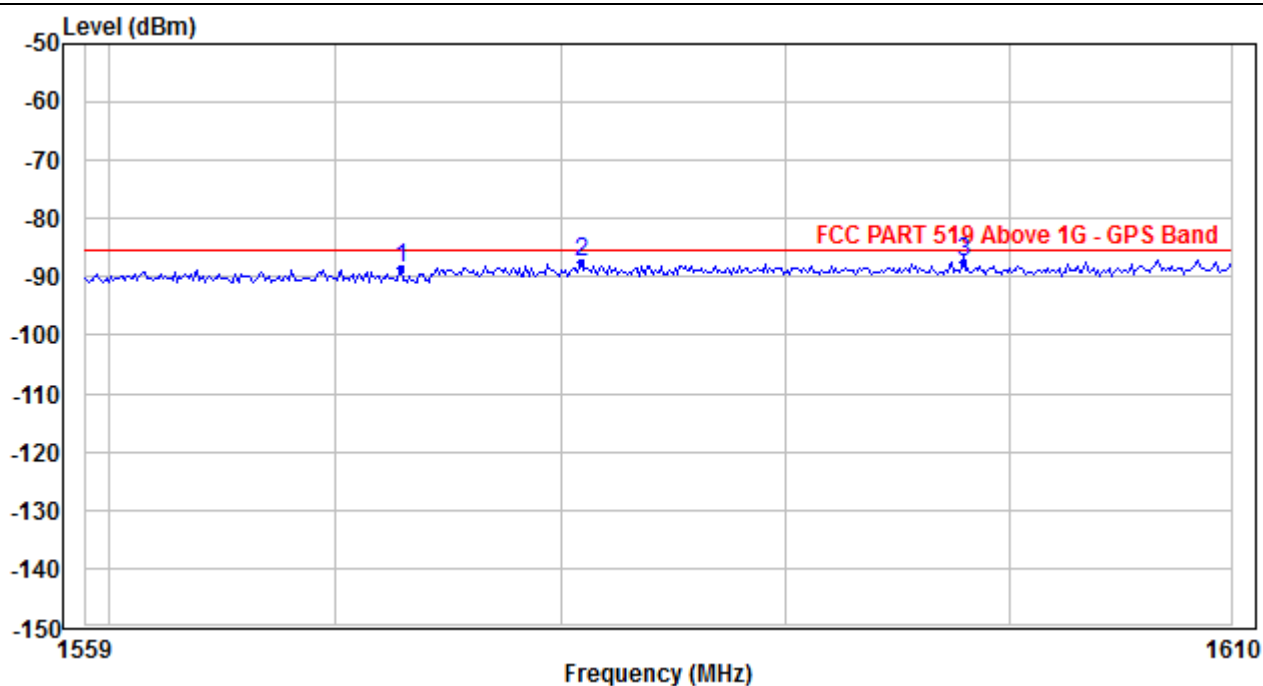
Horizontal



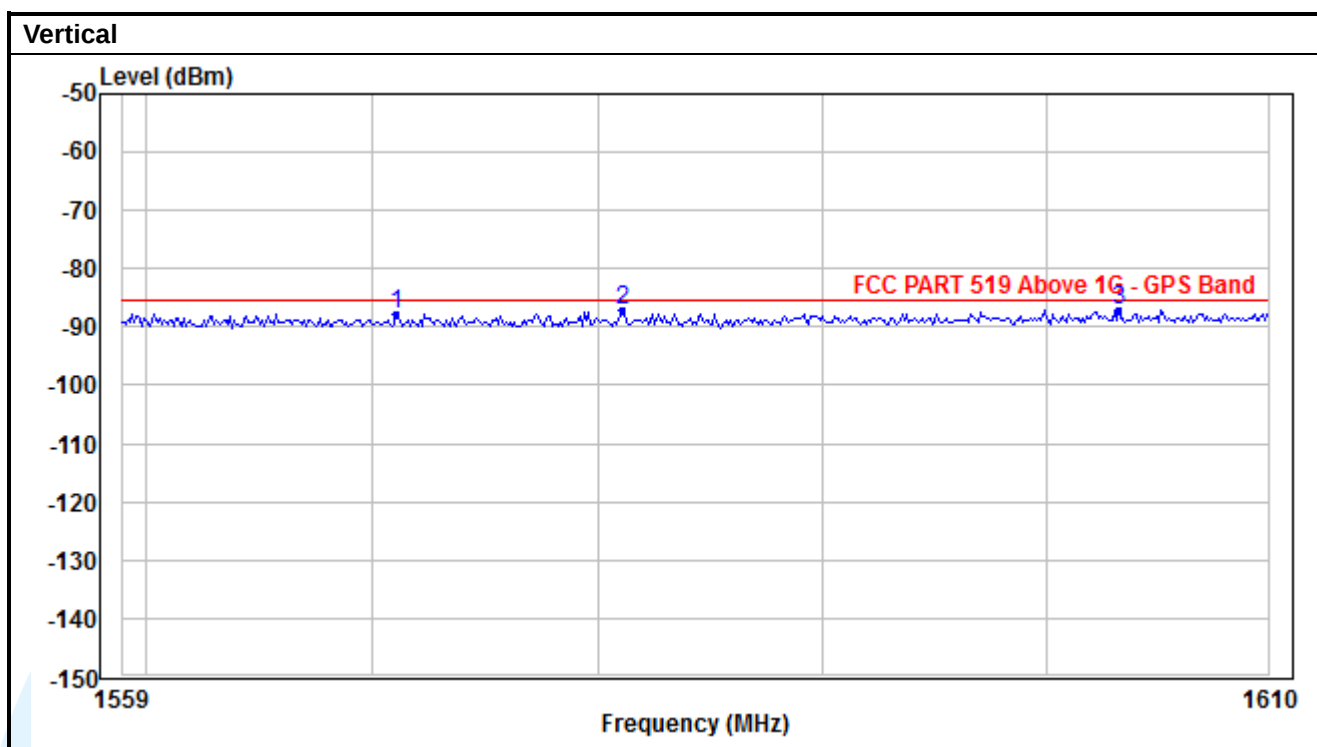
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1171.311	-88.76	0.23	-88.53	-85.30	-3.23	Peak
2	1197.812	-88.05	0.30	-87.75	-85.30	-2.45	Peak
3	1221.571	-88.62	0.38	-88.24	-85.30	-2.94	Peak



No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1170.854	-88.83	1.06	-87.77	-85.30	-2.47	Peak
2	1203.447	-88.32	1.18	-87.14	-85.30	-1.84	Peak
3	1229.339	-88.33	1.28	-87.05	-85.30	-1.75	Peak

Spurious emissions test data (1559 MHz-1610 MHz):
Horizontal


No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1572.900	-90.42	1.81	-88.61	-85.30	-3.31	Peak
2	1580.872	-89.24	1.86	-87.38	-85.30	-2.08	Peak
3	1597.940	-89.51	2.00	-87.51	-85.30	-2.21	Peak



No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1571.060	-90.81	3.15	-87.66	-85.30	-2.36	Peak
2	1581.076	-90.53	3.26	-87.27	-85.30	-1.97	Peak
3	1603.255	-90.52	3.51	-87.01	-85.30	-1.71	Peak

5.4 CONDUCTED EMISSION

Test Requirement: 47 CFR Part 15C Section 15.207

Test Method: ANSI C63.10-2013 Section 6.2

Limits:

Frequency range (MHz)	Limits (dB(μV))	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Remark:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup: Refer to section 4.4.2 for details.

Test Procedures:

Test frequency range :150KHz-30MHz

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Equipment Used: Refer to section 3 for details.

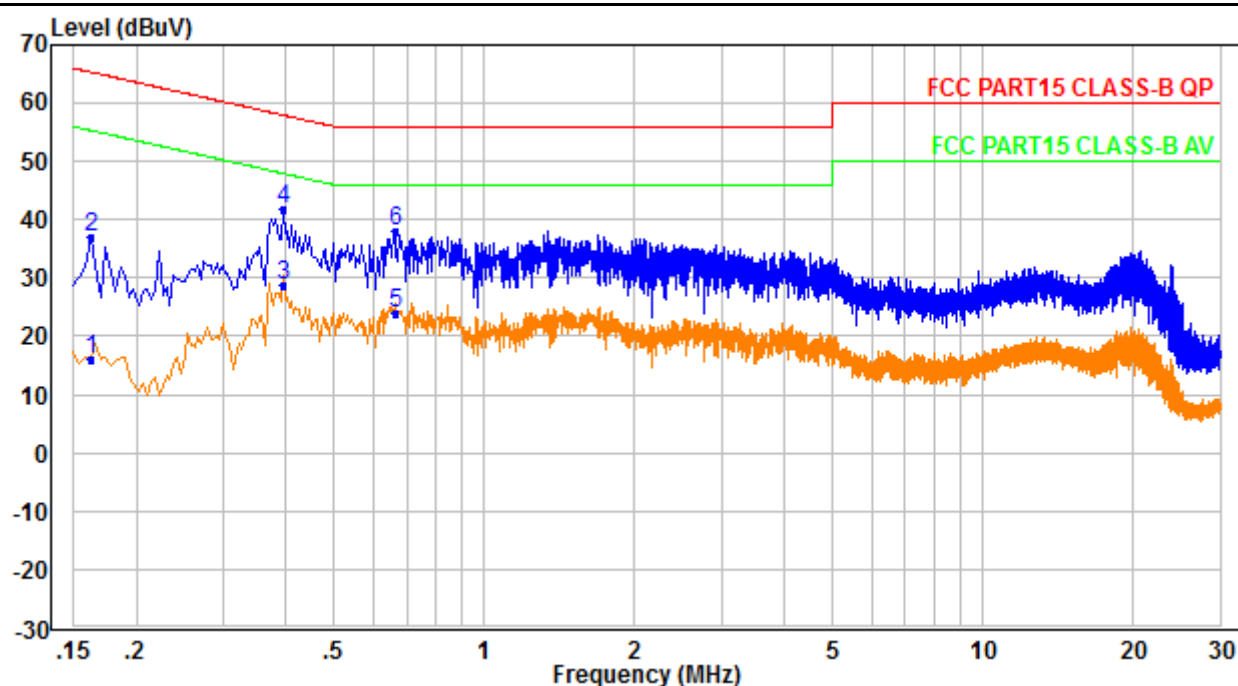
Test Result: Pass

The measurement data as follows:

Quasi Peak and Average:

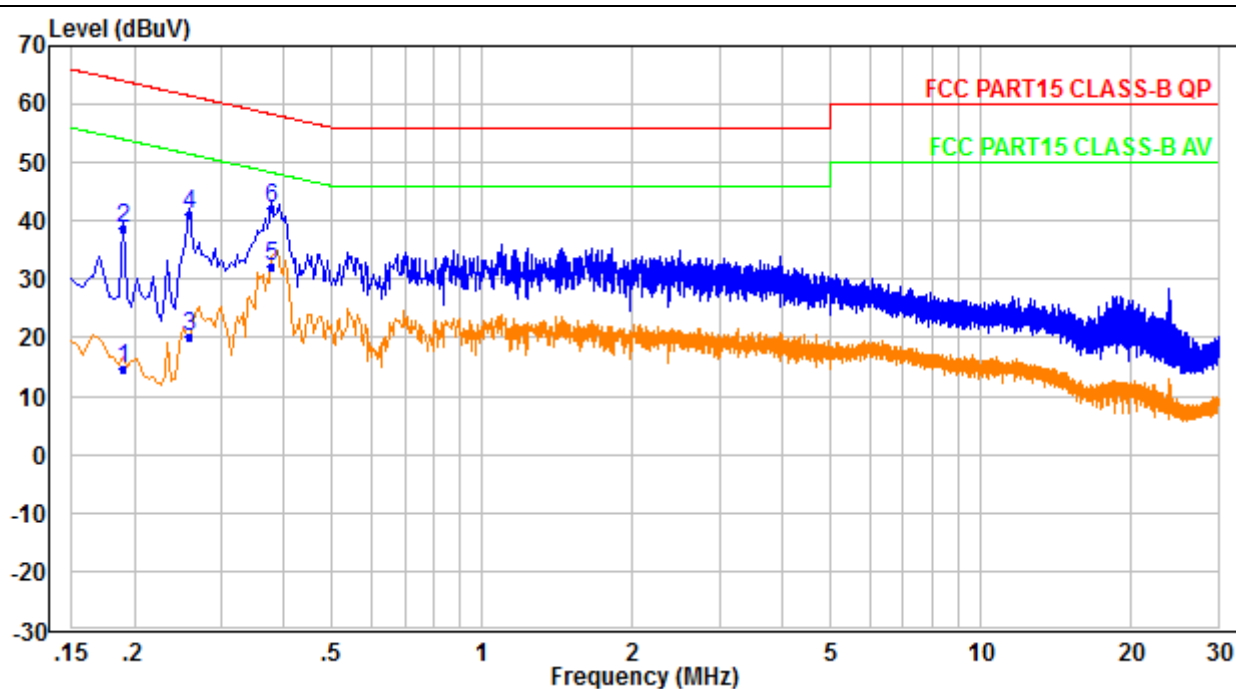
Mode: VM5253 BU - UWB module Tx Transmission at 7.29GHz

Live Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.162	6.80	9.26	16.06	55.36	-39.30	Average
2	0.162	27.85	9.26	37.11	65.36	-28.25	QP
3	0.394	18.91	9.90	28.81	47.98	-19.17	Average
4	0.394	31.96	9.90	41.86	57.98	-16.12	QP
5	0.662	14.88	9.14	24.02	46.00	-21.98	Average
6	0.662	28.83	9.14	37.97	56.00	-18.03	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBUV)	Correction factor (dB)	Result (dBUV)	Limit (dBUV)	Margin (dB)	Detector
1	0.190	5.31	9.37	14.68	54.04	-39.36	Average
2	0.190	29.30	9.37	38.67	64.04	-25.37	QP
3	0.258	10.71	9.33	20.04	51.50	-31.46	Average
4	0.258	31.72	9.33	41.05	61.50	-20.45	QP
5	0.378	22.90	9.30	32.20	48.32	-16.12	Average
6	0.378	32.91	9.30	42.21	58.32	-16.11	QP

Remark:

1. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

5.5 EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

Test Requirement: FCC 47 CFR Part 15 Subpart F Section 15.521(g)

Test Method: ANSI C63.10-2013 Section 10.3

Limit:

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 may be converted to a peak field strength level at 3 meters using $E(\text{dBuV/m}) = P(\text{dBm EIRP}) + 95.2$. If RBW is greater than 3 MHz, the application for certification filed with the Commission must contain a detailed description of the test procedure, calibration of the test setup, and the instrumentation employed in the testing.

Test Procedure:

Test procedure as below:

- 1) The EUT was powered ON and placed on a 0.8/1.5m high table at a 3 meter semi/fully Anechoic Chamber. The antenna of the transmitter was extended to its maximum length. Modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- 2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 3) The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 4) Steps 1) to 3) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 5) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 6) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 3) is obtained for this set of conditions.
- 7) The output power into the substitution antenna was then measured.
- 8) Steps 6) and 7) were repeated with both antennas polarized.
- 9) Calculate power in dBm by the following formula:

$$\text{ERP(dBm)} = P_g(\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

$$\text{EIRP(dBm)} = P_g(\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

$$\text{EIRP} = \text{ERP} + 2.15\text{dB}$$

where:

P_g is the generator output power into the substitution antenna.

- 10) Test the EUT in the lowest channel, the middle channel the Highest channel
- 11) The radiation measurements are performed in X, Y, Z axis positioning for EUT operation mode, and found the Z positioning which it is worse case.
- 12) Repeat above procedures until all frequencies measured was complete.

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
Above 1GHz	Peak	3MHz	3MHz	Peak

Test Setup: Refer to section 4.4.1 for details.

Instruments Used: Refer to section 3 for details

Test Results: Pass

Test Data: See table below

Maximum EIRP (dBm)			
Antenna	Result	Limit (dBm)	Result
H	-31.243	-24.437	Pass
V	-35.276	-24.437	Pass

5.6 OPERATIONAL LIMITATIONS

Test Requirement: FCC 47 CFR Part 15 Subpart F Section 15.519(a)

Test Method: N/A

Limit:

A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. 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.

Test Procedure:

Use the following spectrum analyzer settings:

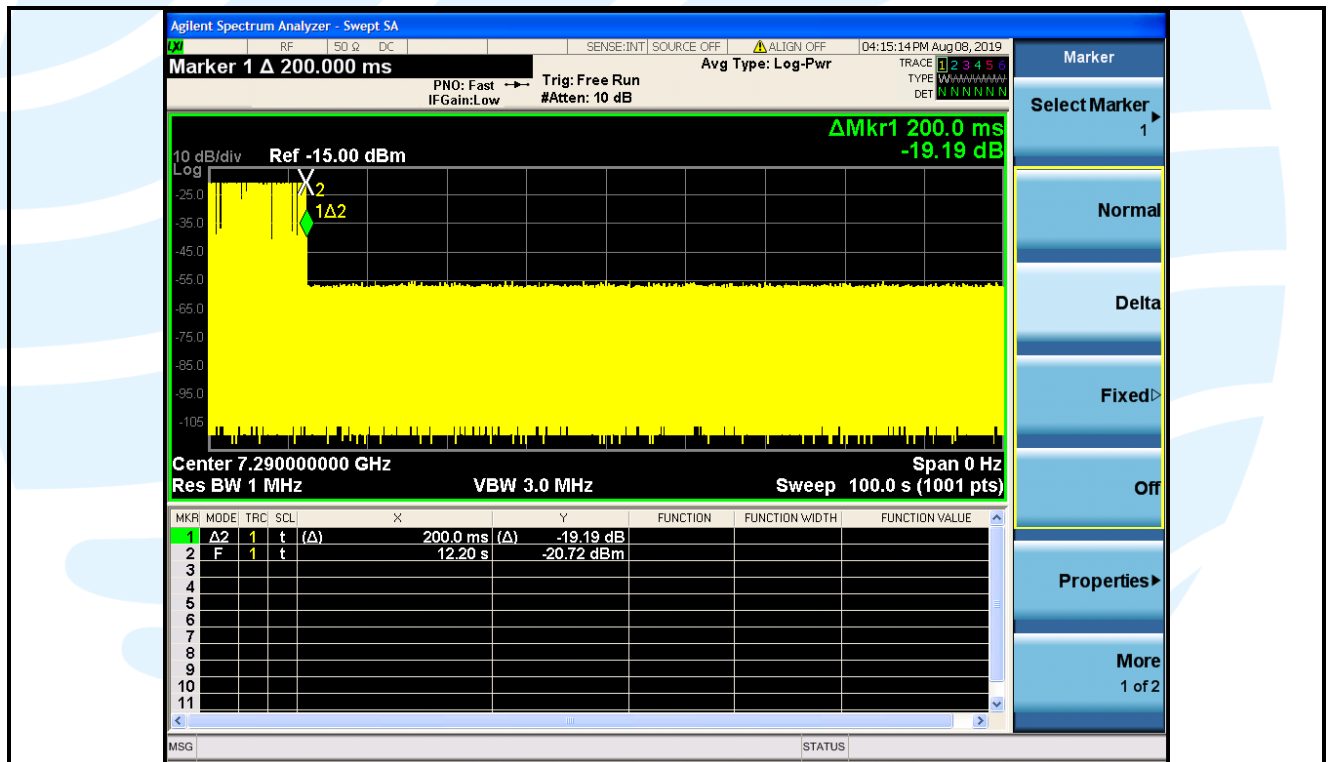
- Set RBW = 1 MHz.
- Set the video bandwidth (VBW) = 3 MHz
- Span = 0Hz
- Remove the acknowledgement from the associated receiver to test the result.

Test Setup: Refer to section 4.4.3 for details.

Instruments Used: Refer to section 3 for details

Test Results: Pass

Test Data: See table below



Note: the high emissions are belonging to the companion device, the lower emissions are spectrum noise.
X2: At the time of 12.2s the companion device was power off. After 200ms the EUT stopped transmissions.

APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.
