



Test Report

FCC Part15 Subpart F

Product Name : UWB device
Model No. : X4M05V
FCC ID : EW7X4M05V

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

Date of Receipt : Dec. 04, 2018
Test Date : Dec. 05, 2018~ Apr. 19, 2019
Issued Date : Apr. 19, 2019
Report No. : 18C2028R-RF-US-P06V02
Report Version : V1.1

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

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Test Report Certification

Issued Date : Apr. 19, 2019

Report No. : 18C2028R-RF-US-P06V02



Product Name : UWB device

Applicant : VTech Telecommunications Ltd

Address : 23/F, Tai Ping Industrial Centre, Block 1, 57 Ting Kok Road,
Tai Po, Hong Kong

Manufacturer : VTech Telecommunications Ltd

Address : 23/F, Tai Ping Industrial Centre, Block 1, 57 Ting Kok Road,
Tai Po, Hong Kong

Model No. : X4M05V

Brand Name : VTech

FCC ID : EW7X4M05V

Test Voltage : DC 5V

EUT Voltage : DC 3V~5.5V

Applicable Standard : FCC CFR Title 47 Part 15 Subpart F: 2015
RSS-GEN Issue5; RSS-220 Issue1
ANSI C63.10: 2013; ANSI C63.4: 2014

Test Result : Complied

Performed Location : DEKRA Testing & Certification (Suzhou) Co., Ltd.
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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
18C2028R-RF-US-P06V02	V1.0	Initial Issued Report	Apr. 11, 2019
18C2028R-RF-US-P06V02	V1.1	Modify the Radiated Emission data	Apr. 19, 2019

1. General Information**1.1. EUT Description**

Product Name	UWB device
Model No.	X4M05V
Working Voltage	DC 3V~5.5V
Frequency Range	6~8.5GHz
Channel Number	1
Antenna Type	PCB Antenna

1.2. Mode of Operation

Test Mode
Mode 1: Transmit

Note:

1. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. For portable device, radiated spurious emission was verified over X, Y, Z Axis, and shown the worst case on this report.

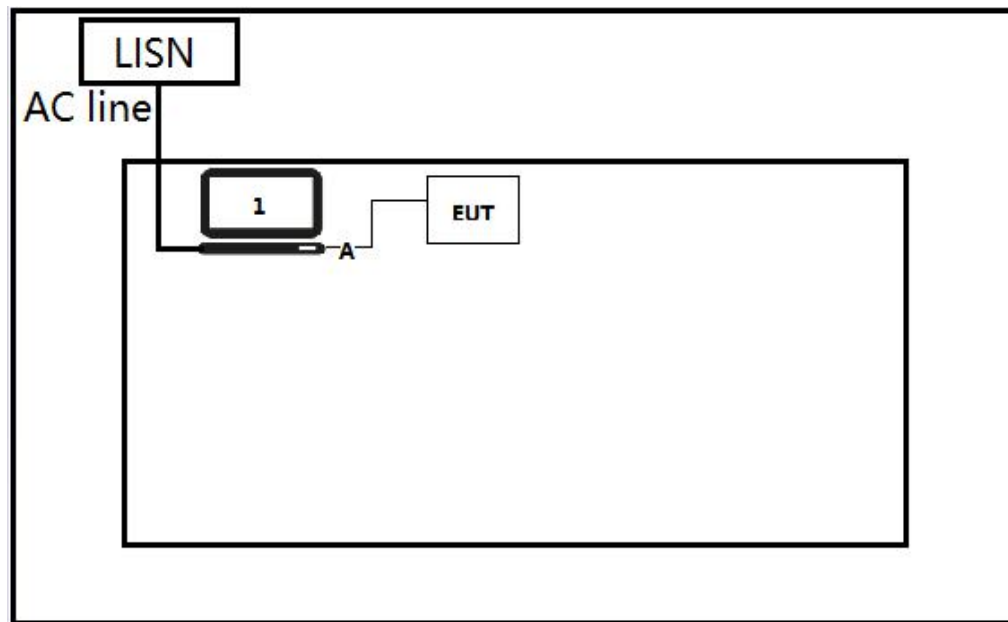
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

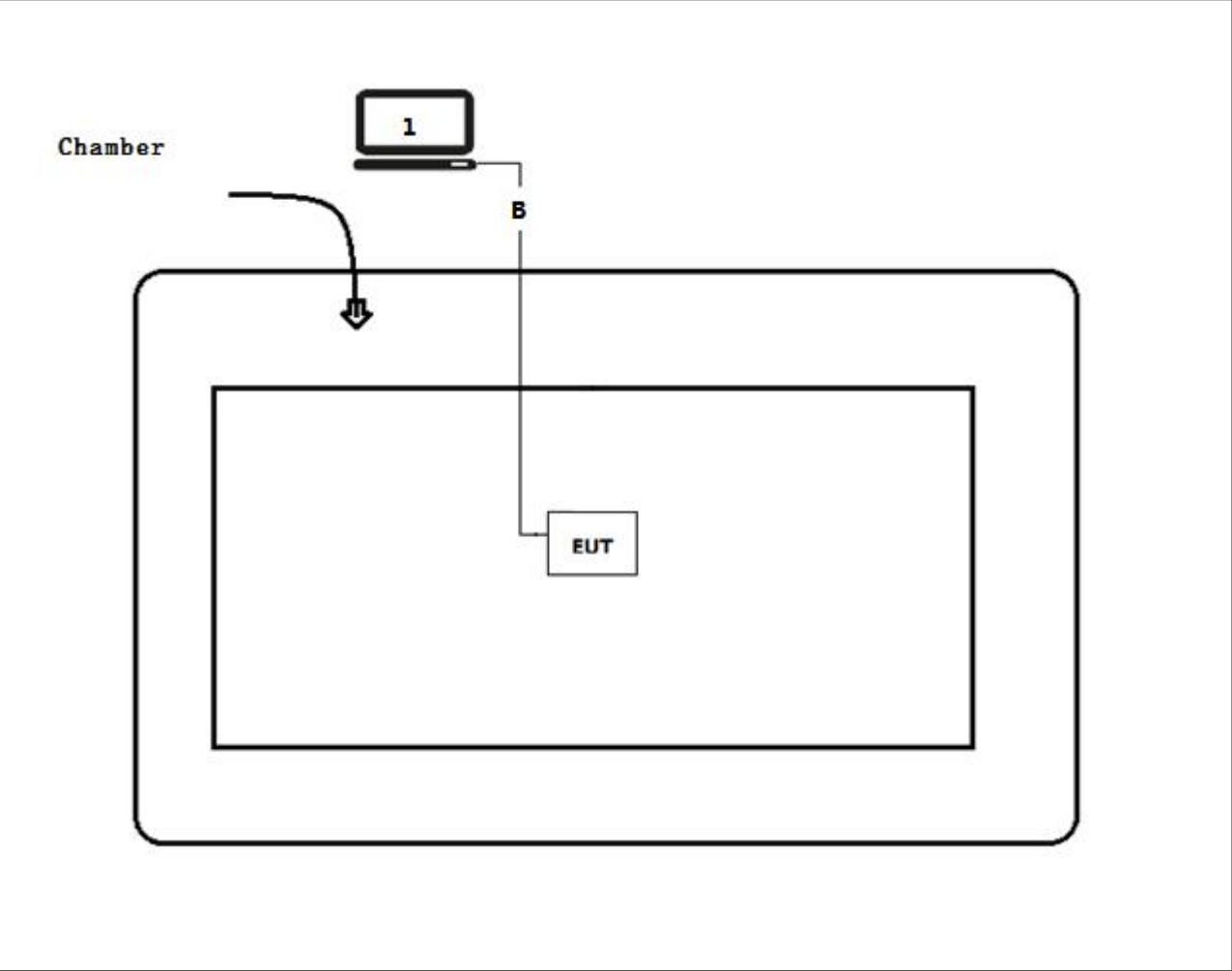
Product		Manufacturer	Model No.	Serial No.	Power Cord
1	N/A	N/A	N/A	N/A	N/A

1.4. Configuration of Tested System

Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Radiated Emission



Signal Cable Type		Signal Cable Description
A	USB cable	3m with shield
B	USB cable	3m with shield

1.5. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment. and start to test

2. Technical Test

2.1. Summary of Test Result

- ☒ No deviations from the test standards
- ☐ Deviations from the test standards as below description:

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.207	Yes	No
Radiated Emission	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.209; FCC CFR Title 47 Part 15 Subpart F: 2015 15.517(c)	Yes	No
Radiated Emission in GPS band	FCC CFR Title 47 Part 15 Subpart F: 2015 15.517(d)	Yes	No
Operational Limitations	FCC CFR Title 47 Part 15 Subpart F: 2015 15.519(a)	Yes	No
10dB Bandwidth	FCC CFR Title 47 Part 15 Subpart F: 2015 Section 15.503(a)	Yes	No
EIRP	FCC CFR Title 47 Part 15 Subpart F: 2015 Section 15.521(g)	Yes	No
Antenna Requirement	FCC CFR Title 47 Part 15 Subpart F: 2015 Section 15.203	Yes	No

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	RSS GEN Issue5 Clause 8.8	Yes	No
Radiated Emission	RSS GEN Issue5 Clause 8.9; RSS 220 Issue1 Clause 5.2(c) RSS 220 Issue1 Clause 5.2(d)	Yes	No
Radiated Emission in GPS band	RSS 220 Issue1 Clause 5.2(e)	Yes	No
Operational Limitations	RSS 220 Issue1 Clause 5.3(b)	Yes	No
10dB Bandwidth	RSS 220 Issue1 Clause 5.1(a)	Yes	No
EIRP	RSS 220 Issue1 Clause 5.2.1(g)	Yes	No
Antenna Requirement	RSS GEN Issue5 Clause 6.8	Yes	No

2.2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

3. Conducted Emission

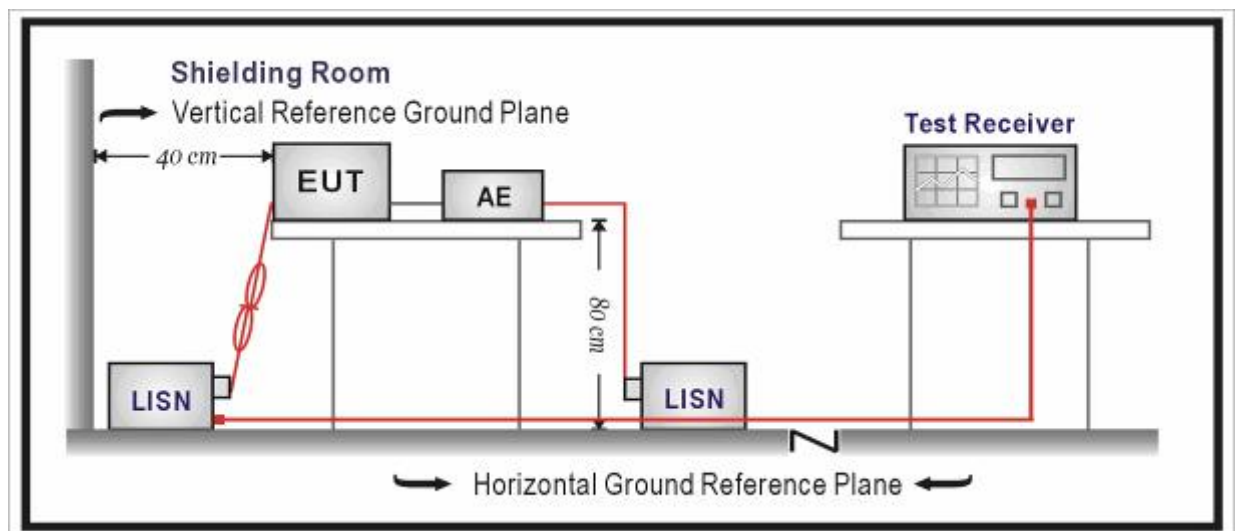
3.1. Test Equipment

Conducted Emission / TR-1

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100726	2019.09.16
Two-Line V-Network	R&S	ENV216	100043	2019.08.07
Two-Line V-Network	R&S	ENV216	100044	2019.09.16
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	N/A
50ohm Termination	SHX	TF2	07081401	2019.09.16
Temperature/Humidity Meter	zhicheng	ZC1-2	TR1-TH	2020.01.07

Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

3.2. Test Setup



3.3. Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 – 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

3.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2014, and tested according to FCC 47CFR 15.207 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

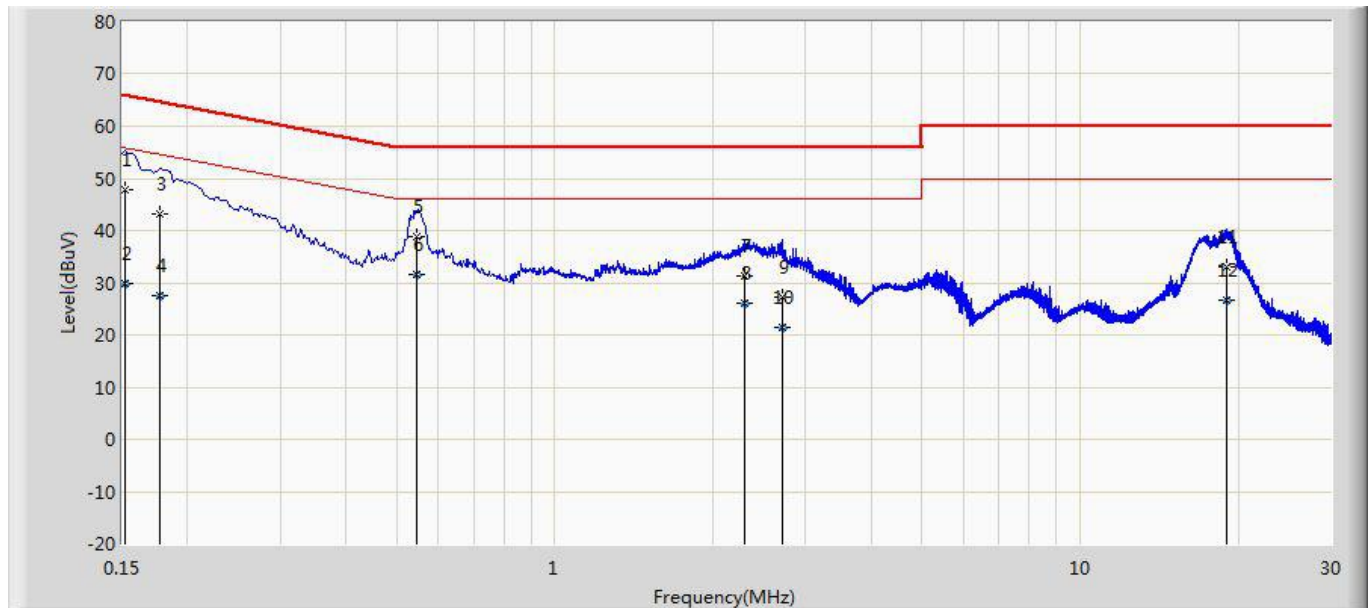
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

3.5. Uncertainty

The measurement uncertainty is defined as ± 2.02 dB

3.6. Test Result

Site: TR1	Time: 2019/02/01 - 13:50
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Line
EUT: UWB device	Power: AC 120V/60Hz
Note: Mdoe 1:Transmit at 7290MHz by UWB	



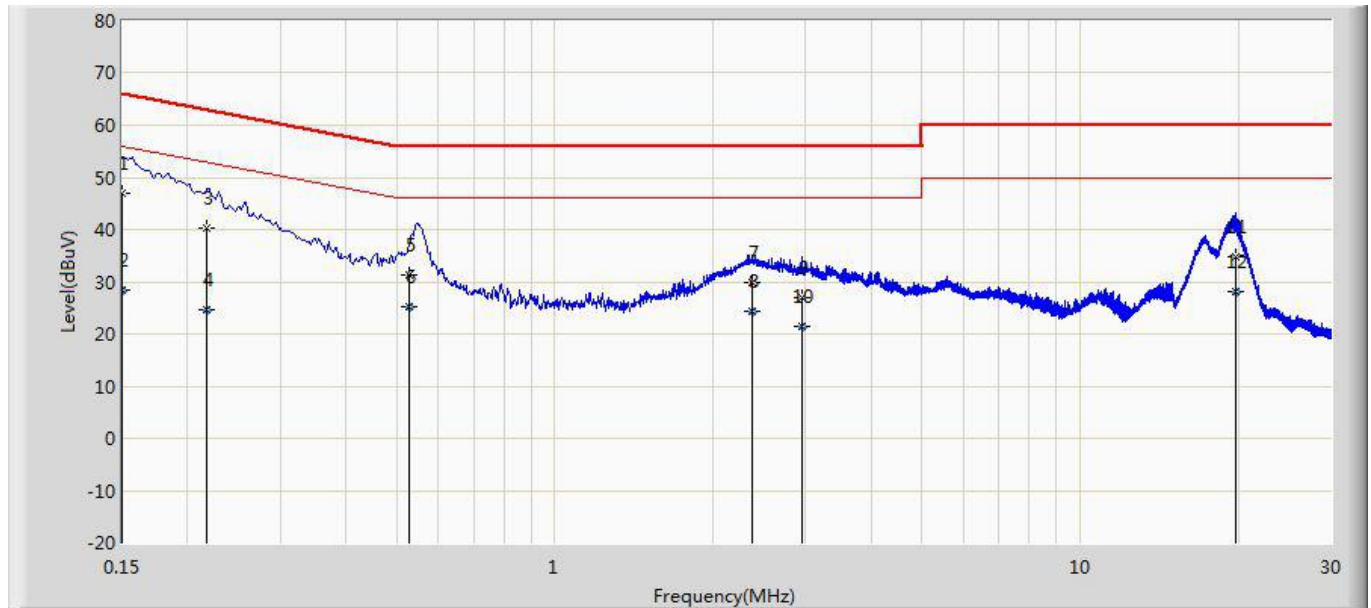
No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.152	47.782	38.143	-18.095	65.876	9.638	QP
2		0.152	29.954	20.315	-25.923	55.876	9.638	AV
3		0.177	43.058	33.425	-21.568	64.625	9.632	QP
4		0.177	27.408	17.775	-27.218	54.625	9.632	AV
5		0.546	38.704	29.060	-17.296	56.000	9.644	QP
6	*	0.546	31.608	21.964	-14.392	46.000	9.644	AV
7		2.301	31.405	21.696	-24.595	56.000	9.709	QP
8		2.301	26.058	16.348	-19.942	46.000	9.709	AV
9		2.713	27.375	17.650	-28.625	56.000	9.725	QP
10		2.713	21.419	11.694	-24.581	46.000	9.725	AV
11		18.958	33.112	22.741	-26.888	60.000	10.371	QP
12		18.958	26.715	16.344	-23.285	50.000	10.371	AV

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.

2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

Site: TR1	Time: 2019/02/01 - 13:54
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Neutral
EUT: UWB device	Power: AC 120V/60Hz
Note: Mdoe 1:Transmit at 7290MHz by UWB	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1	*	0.150	47.032	37.409	-18.968	66.000	9.623	QP
2		0.150	28.539	18.916	-27.461	56.000	9.623	AV
3		0.217	40.258	30.630	-22.656	62.914	9.628	QP
4		0.217	24.698	15.070	-28.216	52.914	9.628	AV
5		0.529	31.264	21.630	-24.736	56.000	9.634	QP
6		0.529	25.105	15.470	-20.895	46.000	9.634	AV
7		2.373	29.970	20.260	-26.030	56.000	9.710	QP
8		2.373	24.379	14.669	-21.621	46.000	9.710	AV
9		2.947	27.068	17.338	-28.932	56.000	9.730	QP
10		2.947	21.570	11.840	-24.430	46.000	9.730	AV
11		19.759	34.767	24.310	-25.233	60.000	10.457	QP
12		19.759	28.059	17.602	-21.941	50.000	10.457	AV

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.

3. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

4. Radiated Emission

4.1. Test Equipment

Radiated Emission / AC-2

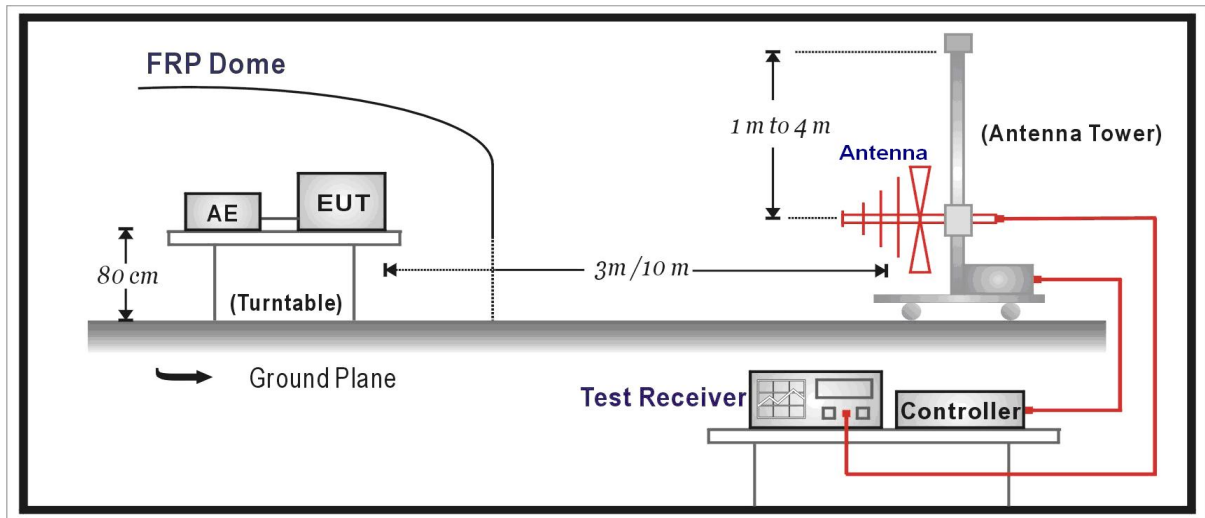
Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100573	2019.03.10
Loop Antenna	R&S	HFH2-Z2	833799/003	2019.11.25
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2019.10.10
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2019.02.28
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC2-TH	2019.01.07

Radiated Emission / AC-5

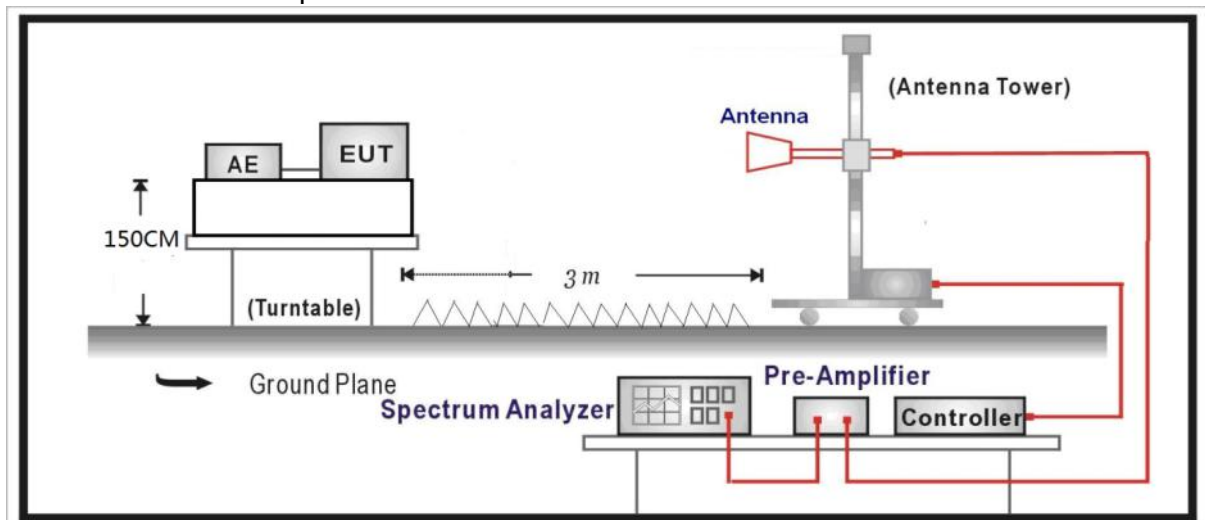
Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.05.12
Preamplifier	Miteq	NSP1800-25	1364185	2019.05.03
Preamplifier	QuieTek	AP-040G	CHM-0906001	2019.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2019.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	733	2019.02.26
DRG Horn	ETS-Lindgren	3117	00167055	2019.07.16
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2019.04.10
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2019.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2019.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2019.02.28
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2020.01.07

4.2. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Distance (m)	Level (dB μ V/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dB μ V/m) = 20 log E field strength (μ V/m)

Note 4: E field strength (dB μ V/m) = EIRP (dBm) + 95.2

Part 15.519:

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. 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:

Fundamental frequency (MHz)	EIRP in dBm
960-1610	-75.3
1610-1990	-63.3
1990-3100	-61.3
3100-10600	-41.3
Above 10600	-61.3

RSS-220:

Radiated emissions above 960 MHz from a device shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

Fundamental frequency (MHz)	EIRP in dBm
960-1610	-75.3
1610-4750	-70.0
4750-10600	-41.3
Above 10600	-51.3

4.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2014 & ANSI C63.10: 2013 for compliance to FCC 47CFR 15.517 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground for below 1GHz and 1.5 meter above ground for above 1GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2014 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz. The video bandwidth are normally three times of resolution bandwidth.

The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 10~60 degrees for H-plane and 10~90 degrees for E-plane.

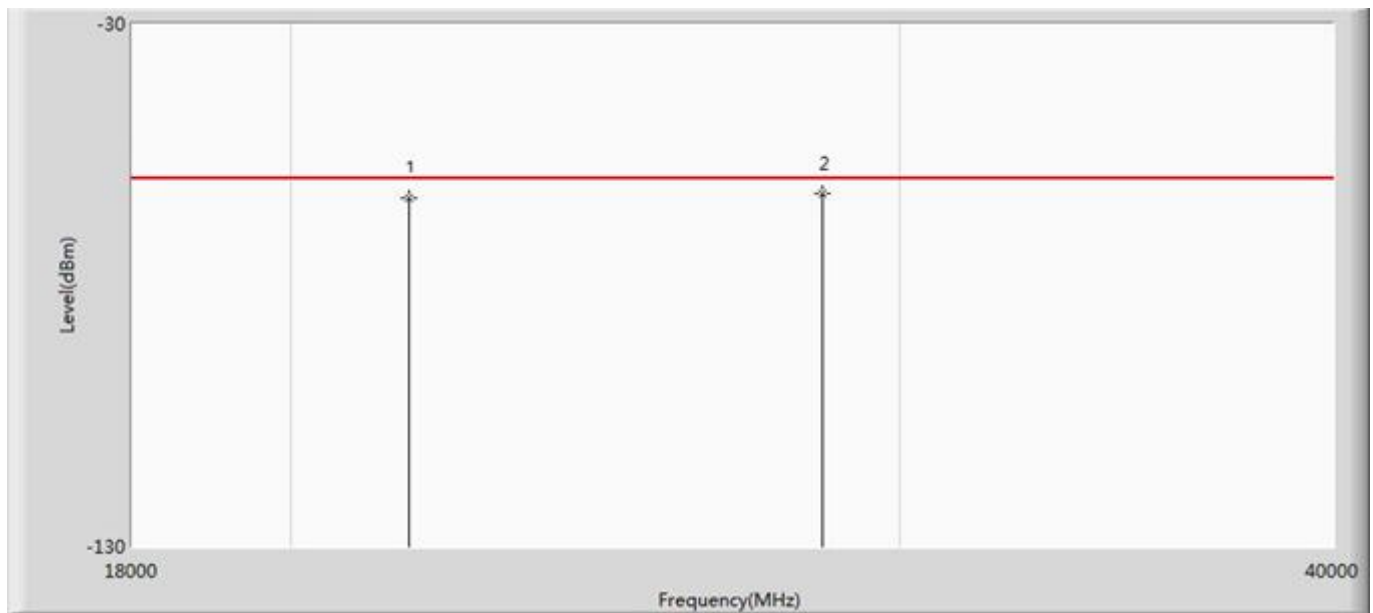
4.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB

below 1G is defined as ± 3.8 dB

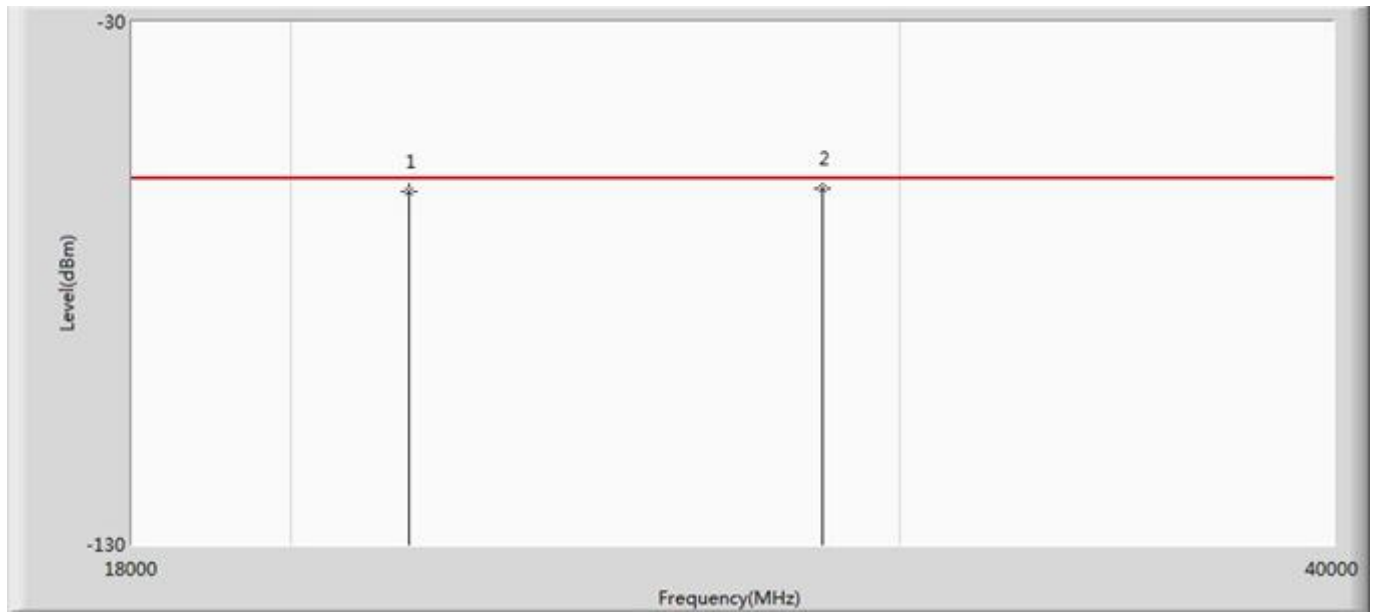
4.6. Test Result

Engineer: Tommie	
Site: AC5	Time: 2019/01/28 - 14:45
Limit: 15F 15.517	Margin: 0
Probe: BBHA 9170_294(18-40GHz)	Polarity: Horizontal
EUT: UWB device	Power: AC 120V/60Hz
Note: Mdoe 1:Transmit at 7290MHz by UWB	



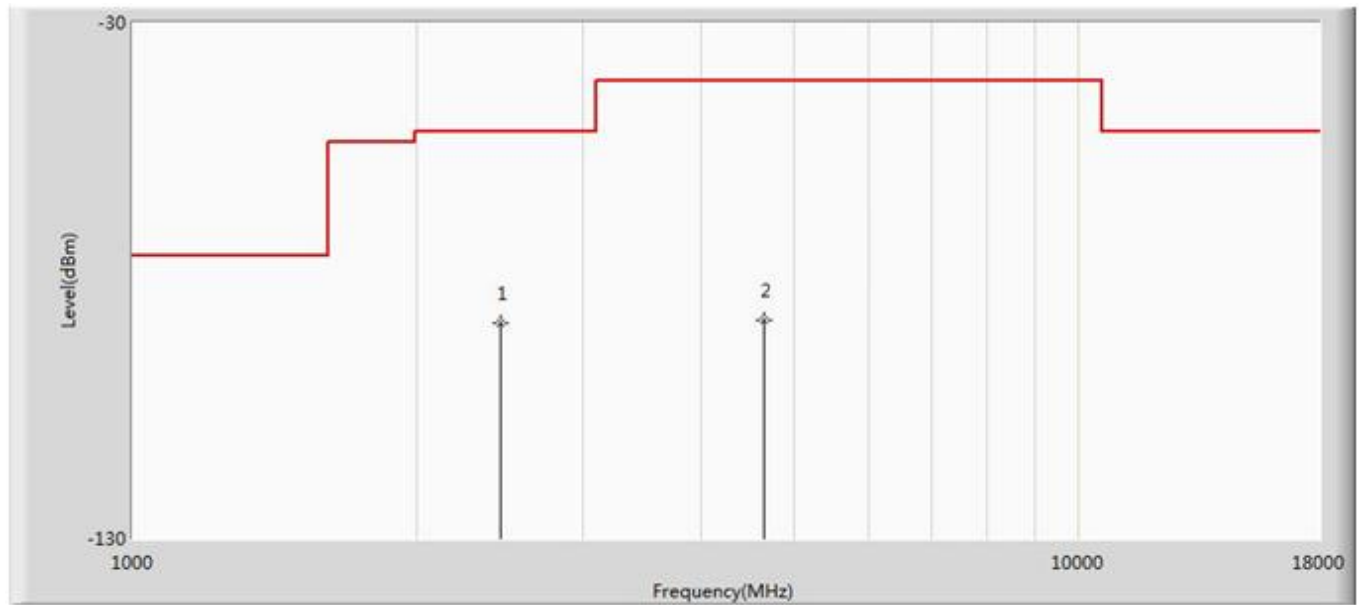
No	Mark	Frequency (MHz)	Measure Level (dBm)	Reading Level (dBm)	Over Limit (dB)	Limit (dBm)	Factor (dB)	Type
1		21650.000	-63.226	-58.198	-1.926	-61.300	-5.027	PK
2	*	28490.000	-62.361	-60.614	-1.061	-61.300	-1.748	PK

Engineer: Tommie	
Site: AC5	Time: 2019/01/28 - 14:46
Limit: 15F 15.517	Margin: 0
Probe: BBHA 9170_294(18-40GHz)	Polarity: Vertical
EUT: UWB device	Power: AC 120V/60Hz
Note: Mdoe 1:Transmit at 7290MHz by UWB	



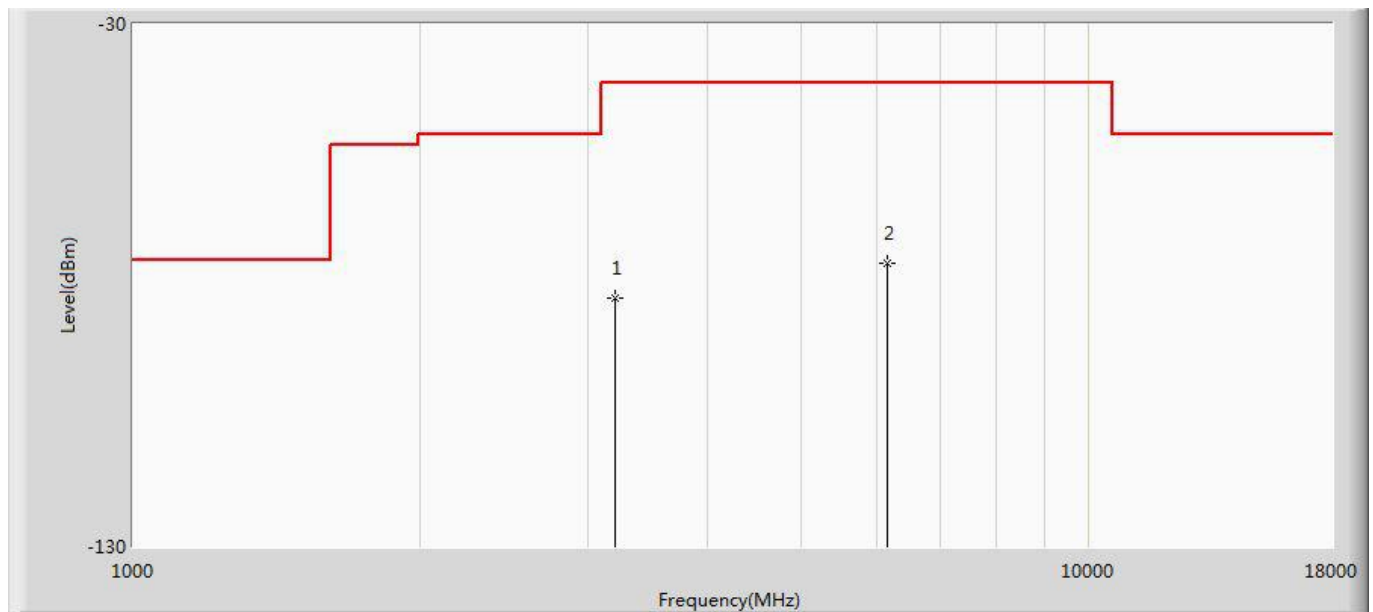
No	Mark	Frequency (MHz)	Measure Level (dBm)	Reading Level (dBm)	Over Limit (dB)	Limit (dBm)	Factor (dB)	Type
1		21650.000	-62.336	-57.308	-1.036	-61.300	-5.027	PK
2	*	28490.000	-61.855	-60.108	-0.555	-61.300	-1.748	PK

Engineer: Tommie	
Site: AC5	Time: 2019/02/01 - 14:18
Limit: UWB-1-18G	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: UWB	Power: AC 120V/60Hz
Note: Mdoe 1:Transmit at 7290MHz by UWB	



No	Mark	Frequency (MHz)	Measure Level (dBm)	Reading Level (dBm)	Over Limit (dB)	Limit (dBm)	Factor (dB)	Type
1		2453.500	-88.165	-81.794	-26.865	-61.3	-6.371	PK
2		4662.000	-87.651	-86.250	-46.351	-41.3	-1.402	PK

Engineer: Tommie	
Site: AC5	Time: 2019/01/28 - 14:46
Limit: 15F 15.517	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: UWB device	Power: AC 120V/60Hz
Note: Mdoe 1:Transmit at 7290MHz by UWB	



No	Mark	Frequency (MHz)	Measure Level (dBm)	Reading Level (dBm)	Over Limit (dB)	Limit (dBm)	Factor (dB)	Type
1		3193.000	-82.327	-78.131	-41.027	-41.300	-4.196	PK
2	*	6159.500	-75.919	-76.544	-34.619	-41.300	0.625	PK

Test Result	Pass
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5. Radiated Emission in GPS Band

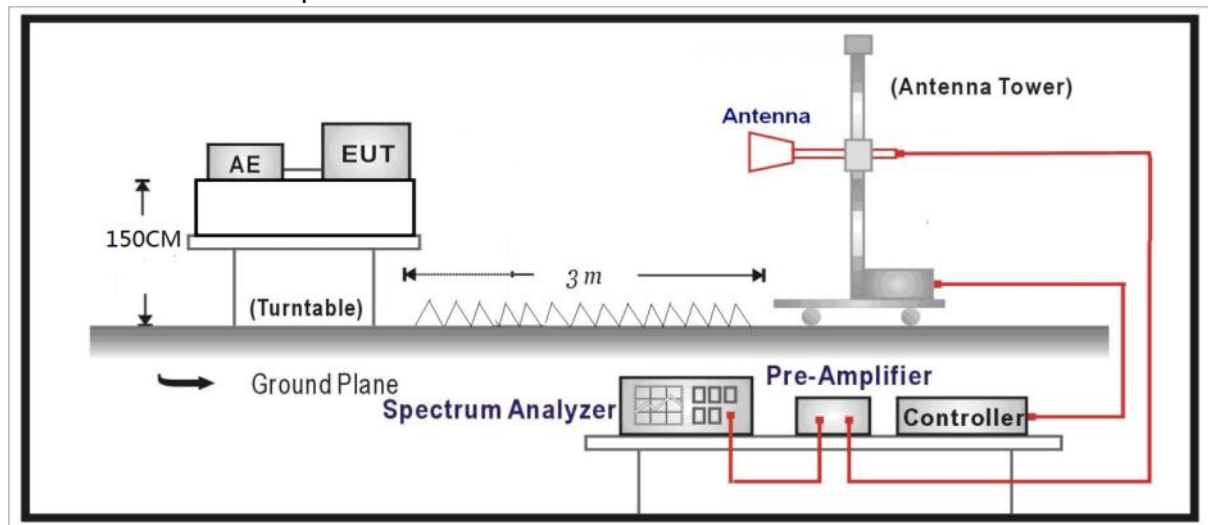
5.1. Test Equipment

Radiated Emission in GPS Band/ AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.05.12
Preamplifier	Miteq	NSP1800-25	1364185	2019.05.03
Preamplifier	QuieTek	AP-040G	CHM-0906001	2019.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2019.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	733	2019.02.26
DRG Horn	ETS-Lindgren	3117	00167055	2019.07.16
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2019.04.10
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2019.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2019.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2019.02.28
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2020.01.07

5.2. Test Setup

Above 1GHz Test Setup:



5.3. Limit

In addition to the radiated emission limits specified in the table in paragraph (c) 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:

Fundamental frequency (MHz)	EIRP in dBm
1164-1240	-85.3
1559-1610	-85.3

5.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2014 & ANSI C63.10: 2013 for compliance to FCC 47CFR 15.517 requirements.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2014 on radiated measurement.

The resolution bandwidth is 1kHz. The video bandwidth are normally three times of resolution bandwidth.

The frequency range from 1164-1240MHz & 1559-1610MHz is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 10~60 degrees for H-plane and 10~90 degrees for E-plane.

5.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB

5.6. Test Result

Mode 1: Transmitter

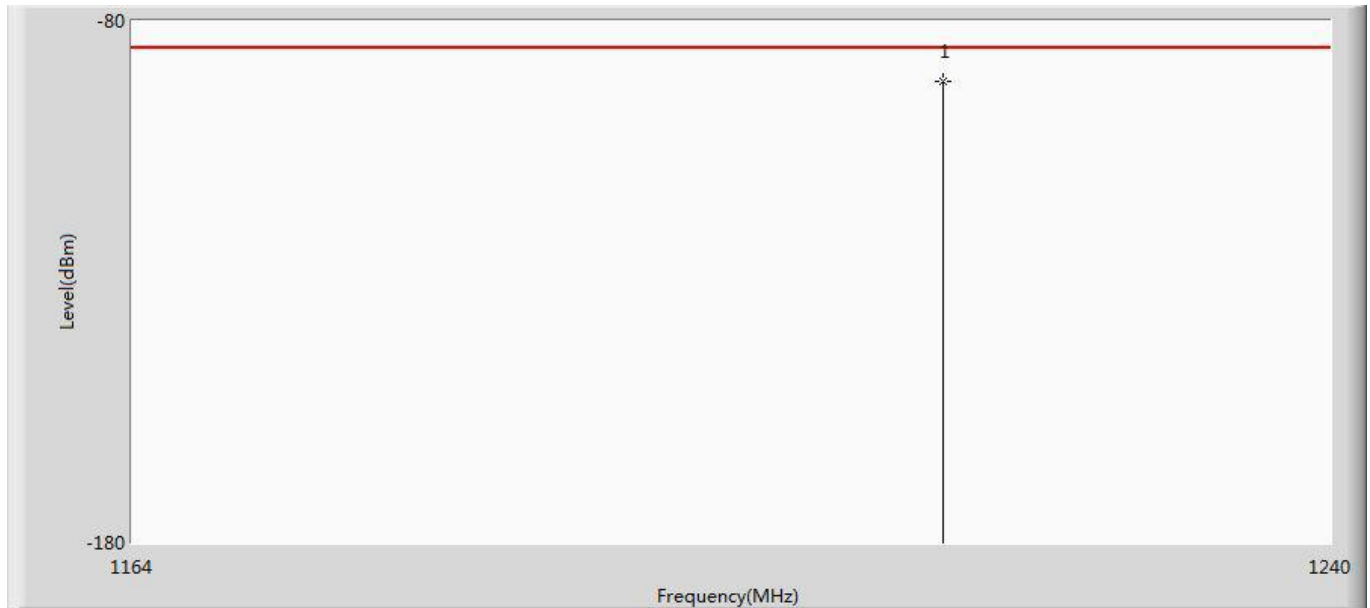
Chain	CH	Antenna	Frequency (MHz)	Reading Level (dBm)	Factor (dB)	Measure Level (dBm)	Limit (dBm)	Over Limit (dB)	Detector
Ant 0	1	H	1214.958	-80.775	-10.706	-91.481	-85.3(Note2)	-6.181	PK
		V	1185.356	-109.857	-10.586	-120.442	-85.3(Note2)	-35.142	PK
		H	1569.939	-87.917	-10.495	-98.412	-85.3(Note2)	-13.112	PK
		V	1604.747	-108.605	-10.275	-118.880	-85.3(Note2)	-33.580	PK

Note: 1. Measure Level = Reading Level + Factor.

Note: 2. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

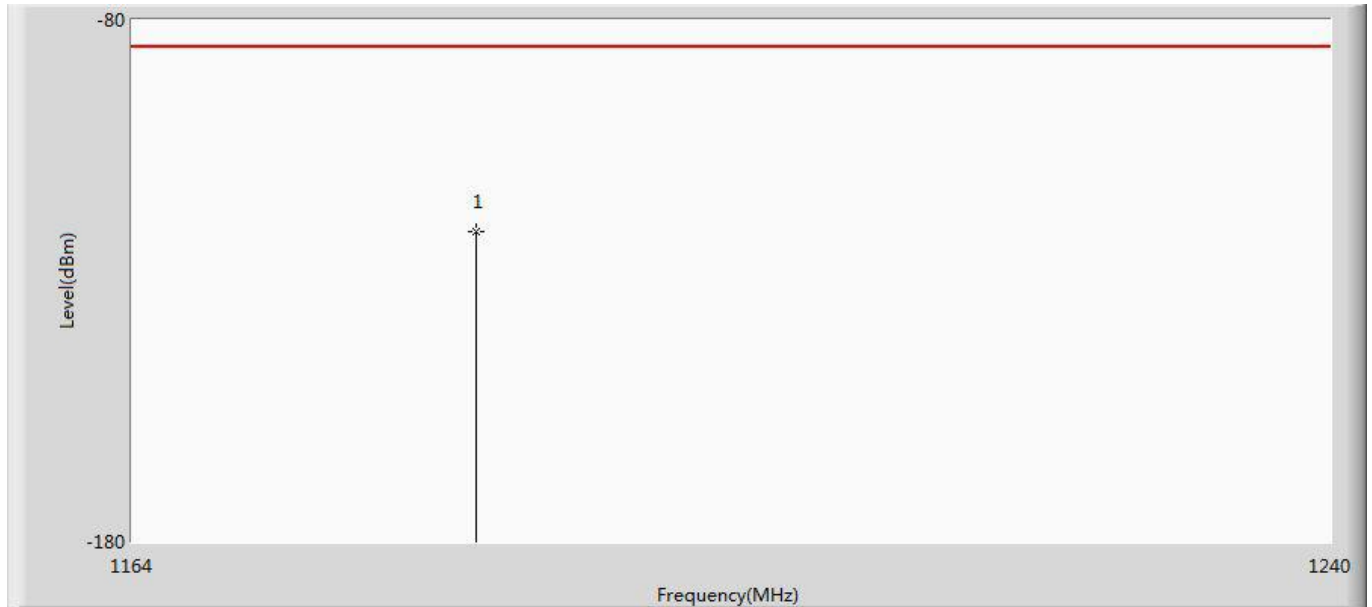
Note 3: E field strength (dB μ V/m) = EIRP (dBm) + 95.2

Engineer: Tommie	
Site: AC5	Time: 2019/01/15 - 03:22
Limit: UWB-1164-1240	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: UWB device	Power: AC 120V/60Hz
Note: Mdoe 1:Transmit at 7290MHz by UWB	



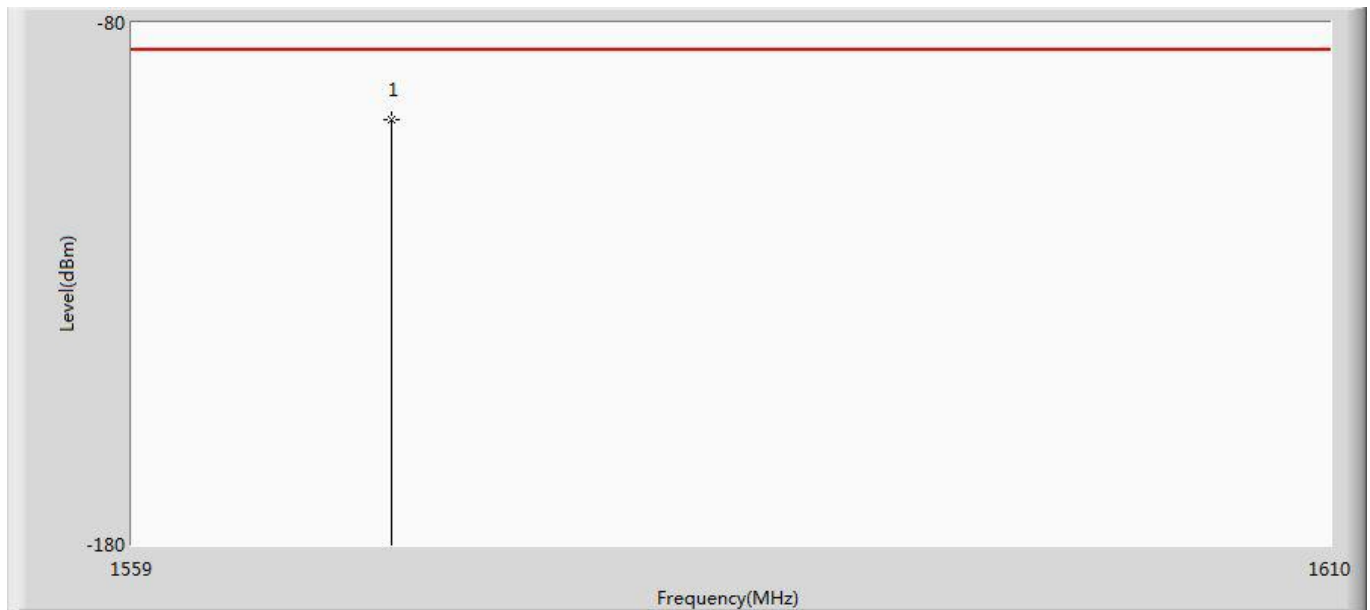
No	Mark	Frequency (MHz)	Measure Level (dBm)	Reading Level (dBm)	Over Limit (dB)	Limit (dBm)	Factor (dB)	Type
1	*	1214.958	-91.481	-80.775	-6.181	-85.300	-10.706	PK

Engineer: Tommie	
Site: AC5	Time: 2019/01/15 - 03:22
Limit: UWB-1164-1240	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: UWB device	Power: AC 120V/60Hz
Note: Mdoe 1:Transmit at 7290MHz by UWB	



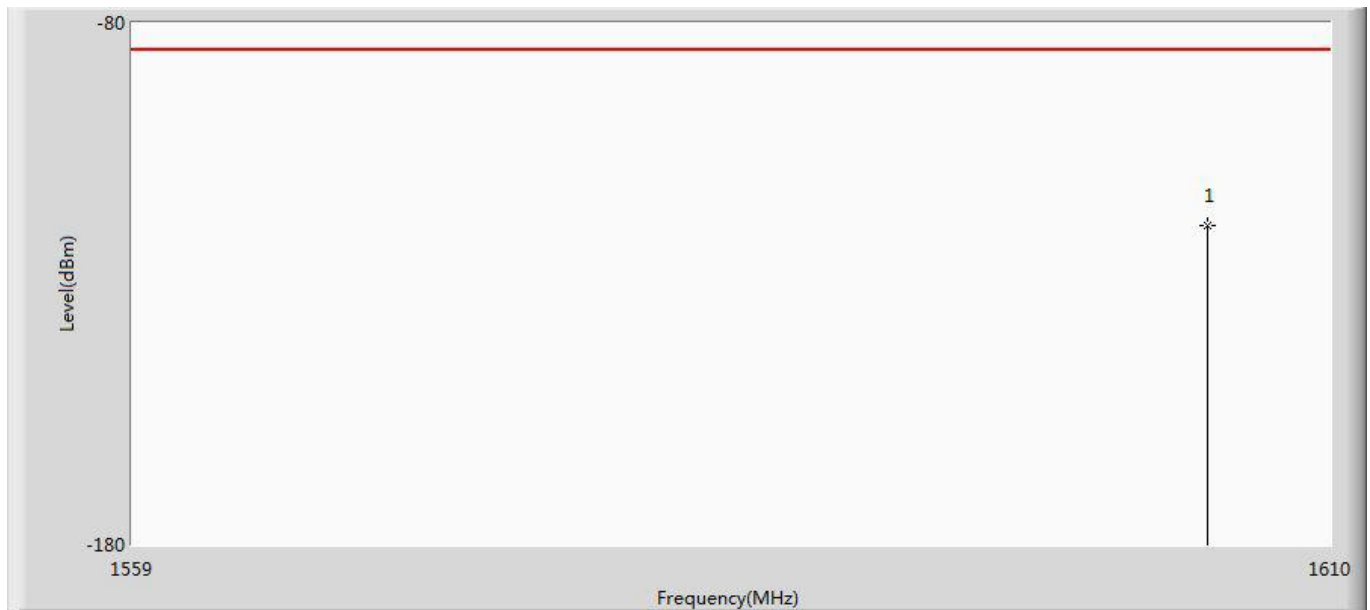
No	Mark	Frequency (MHz)	Measure Level (dBm)	Reading Level (dBm)	Over Limit (dB)	Limit (dBm)	Factor (dB)	Type
1	*	1185.356	-120.442	-109.857	-35.142	-85.300	-10.586	PK

Engineer: Tommie	
Site: AC5	Time: 2019/01/15 - 03:22
Limit: UWB-1559-1610	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: UWB device	Power: AC 120V/60Hz
Note: Mdoe 1:Transmit at 7290MHz by UWB	



No	Mark	Frequency (MHz)	Measure Level (dBm)	Reading Level (dBm)	Over Limit (dB)	Limit (dBm)	Factor (dB)	Type
1	*	1569.939	-98.412	-87.917	-13.112	-85.300	-10.495	PK

Engineer: Tommie	
Site: AC5	Time: 2019/01/15 - 03:22
Limit: UWB-1559-1610	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: UWB device	Power: AC 120V/60Hz
Note: Mdoe 1:Transmit at 7290MHz by UWB	



No	Mark	Frequency (MHz)	Measure Level (dBm)	Reading Level (dBm)	Over Limit (dB)	Limit (dBm)	Factor (dB)	Type
1	*	1604.747	-118.880	-108.605	-33.580	-85.300	-10.275	PK

Test Result	Pass
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6. Operational Limitations

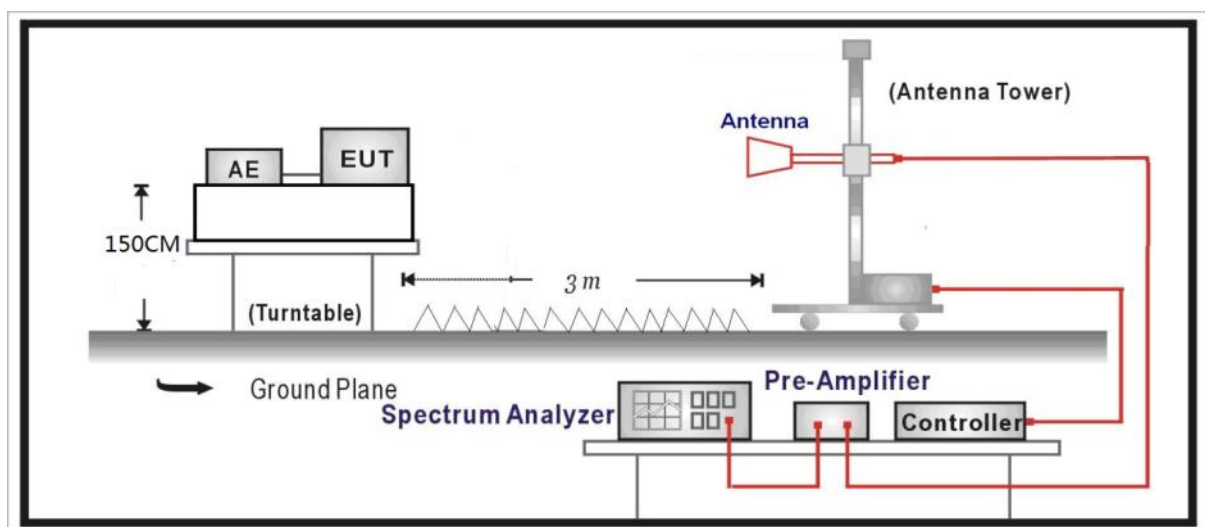
6.1. Test Equipment

Operational Limitations / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.05.12
Preamplifier	Miteq	NSP1800-25	1364185	2019.05.03
Preamplifier	QuieTek	AP-040G	CHM-0906001	2019.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2019.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	733	2019.02.26
DRG Horn	ETS-Lindgren	3117	00167055	2019.07.16
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2019.04.10
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2019.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2019.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2019.02.28
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2020.01.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

6.2. Test Setup



6.3. 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.

6.4. Test Procedure

The EUT was tested according to ANSI C63.10: 2013 for compliance to FCC 47CFR 15F requirements.

Set RBW = 1 MHz, VBW = 3 MHz, Span = 0 Hz, remove the acknowledgement from the associated receiver to test the result.

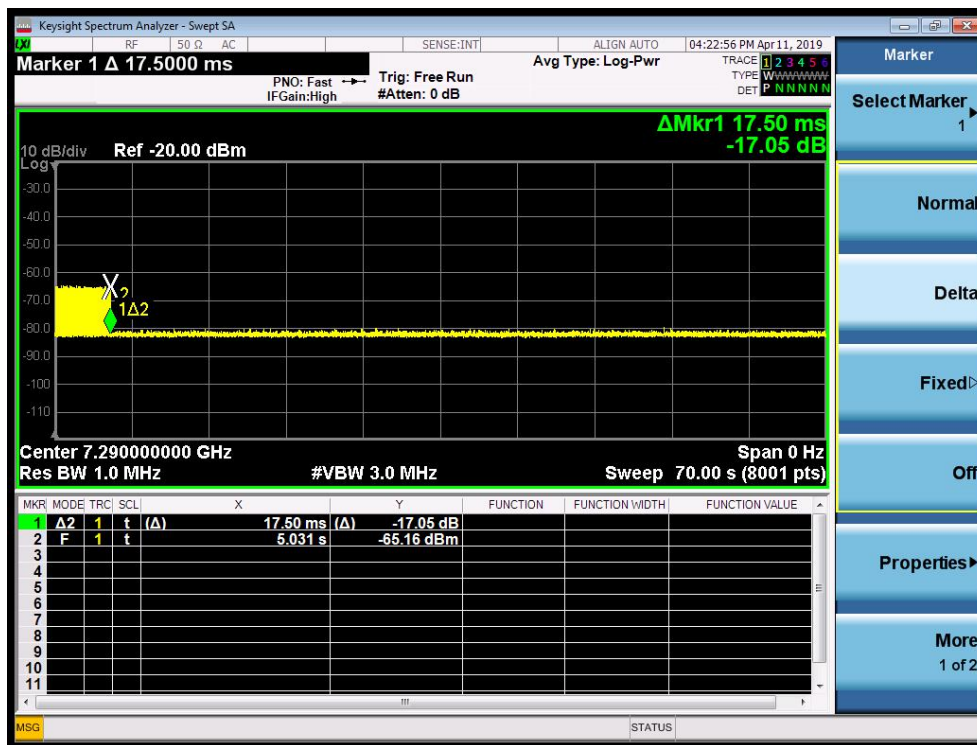
6.5. Uncertainty

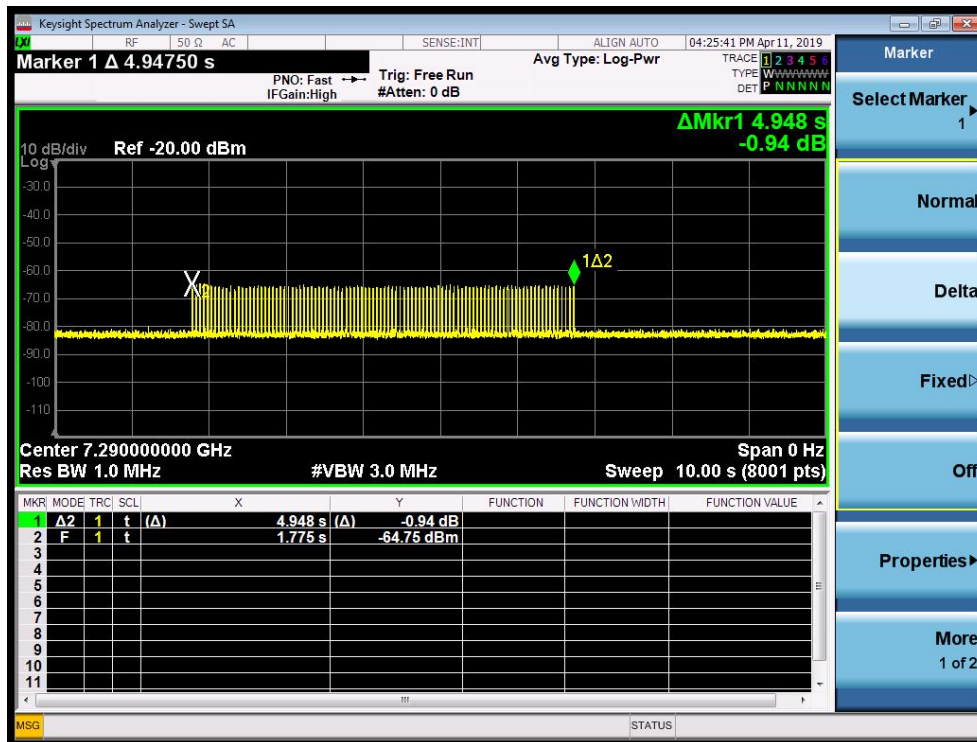
The measurement uncertainty is defined as $\pm 2\text{ms}$

6.6. Test Result

Product	: UWB device
Test Item	: Operational Limitations
Test Site	: AC-5
Test Mode	: Mode 1: Transmit

Frequency (MHz)	Duration from removing the acknowledgement from the associated receiver to stop transmission (s)	Limit (s)	Result
7290	4.948	10	Pass





Note: The device starts transmitting and it stops transmitting in 4.948s without ACK .

7. 10dB Bandwidth

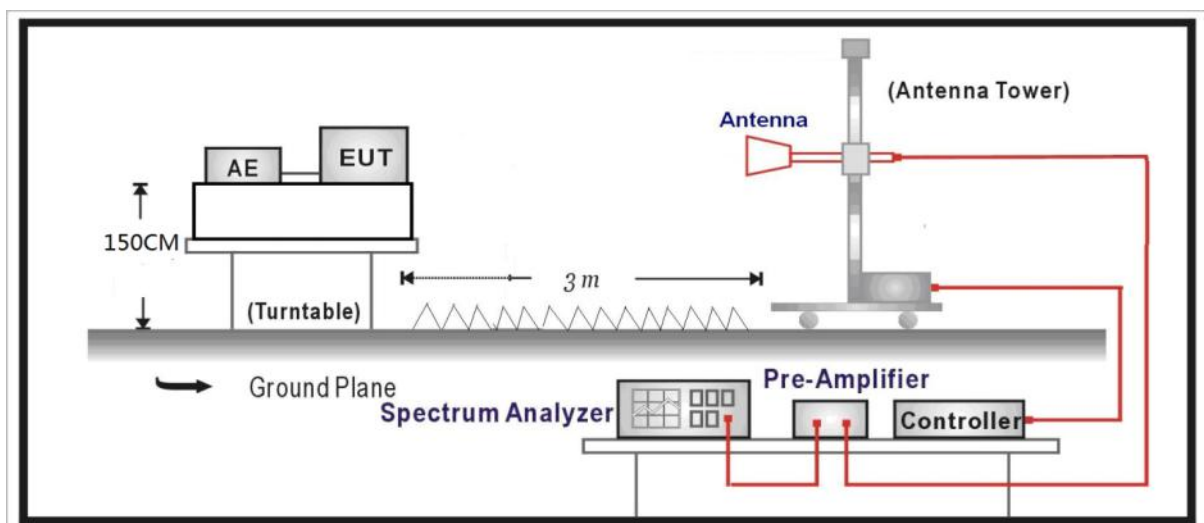
7.1. Test Equipment

10dB Bandwidth / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.05.12
Preamplifier	Miteq	NSP1800-25	1364185	2019.05.03
Preamplifier	QuieTek	AP-040G	CHM-090600 1	2019.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2019.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	733	2019.02.26
DRG Horn	ETS-Lindgren	3117	00167055	2019.07.16
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2019.04.10
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2019.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2019.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2019.02.28
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2020.01.07

Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

7.2. Test Setup



7.3. Limit

Ultra-wideband (UWB) transmitter. An intentional radiator that, at any point in time, 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.

The UWB bandwidth of a device operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz.

7.4. Test Procedure

The EUT was tested according to ANSI C63.10: 2013 for compliance to FCC 47CFR 15.503(a) requirements.

Set RBW = 1 MHz, VBW = 3 MHz, Span = 2.5 GHz, use 10dB bandwidth function to test the result.

7.5. Uncertainty

The measurement uncertainty is defined as ± 1 kHz

7.6. Test Result

Product	:	UWB device
Test Item	:	10dB Bandwidth
Test Site	:	AC-5
Test Mode	:	Mode 1: Transmit

Frequency (MHz)	10dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
7290	1368	2397.9	500	Pass



Frequency (MHz)	Lower Frequency (MHz)	Upper Frequency (MHz)	Limit (MHz)		Result
			Lower Frequency	Upper Frequency	
7290	6576	7867	3100	10600	Pass



8. EIRP

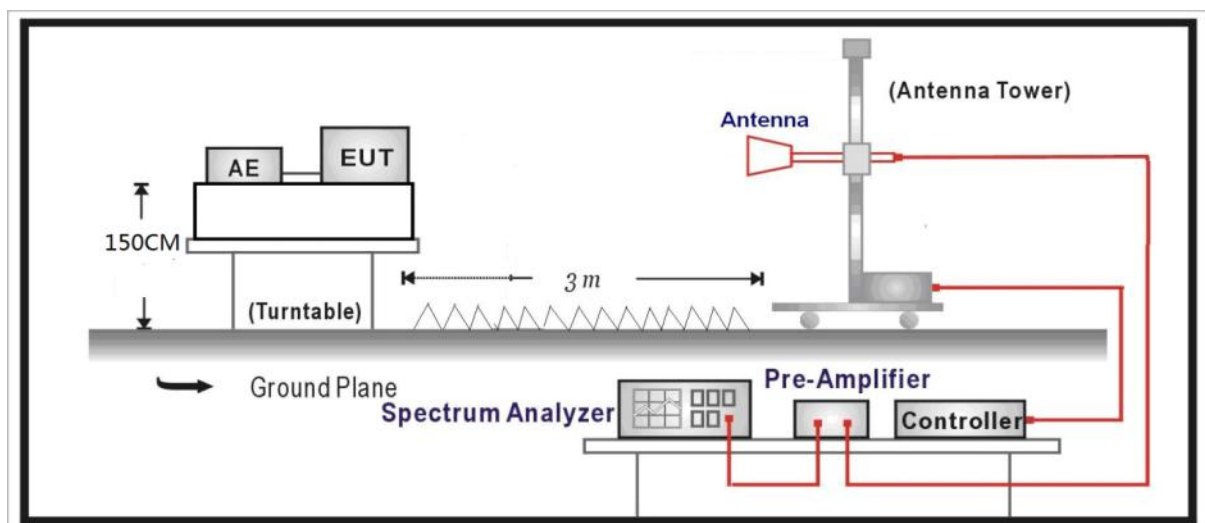
8.1. Test Equipment

EIRP / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.05.12
Preamplifier	Miteq	NSP1800-25	1364185	2019.05.03
Preamplifier	QuieTek	AP-040G	CHM-090600 1	2019.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2019.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	733	2019.02.26
DRG Horn	ETS-Lindgren	3117	00167055	2019.07.16
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2019.04.10
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2019.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2019.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2019.02.28
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2020.01.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

8.2. Test Setup



8.3. 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.

8.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2014 & ANSI C63.10: 2013 for compliance to FCC 47CFR 15.521(g) requirements.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2014 on radiated measurement.

Note: The RBW = 3MHz, VBW = 3MHz, so the EIRP limit is $20 \log (3/50) = -24.437$ dBm.

8.5. Uncertainty

The measurement uncertainty is defined as ± 3.9 dB

8.6. Test Result

Product	:	UWB device
Test Item	:	EIRP
Test Site	:	AC-5
Test Mode	:	Mode 1: Transmit

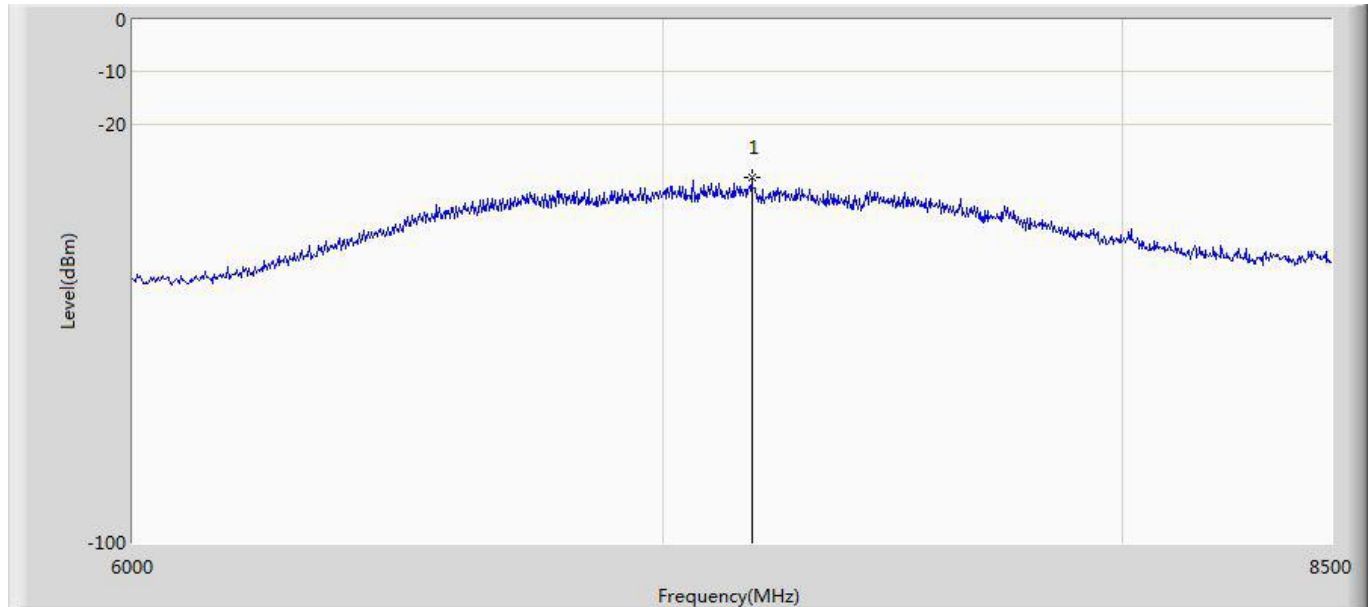
Chain	CH	Antenna	Frequency (MHz)	Reading Level (dBm)	Factor (dB)	Measure Level (dBm)	Limit (dBm)	Over Limit (dB)	Detector
Ant 0	1	H	7182.5	-31.916	1.785	-30.131	-24.437	-5.694	PK
		V	7115	-34.439	1.758	-32.681	-24.437	-8.244	PK

Note 1: Measure Level = Reading Level + Factor.

Note 2: E field strength (dB μ V/m) = EIRP (dBm) + 95.2

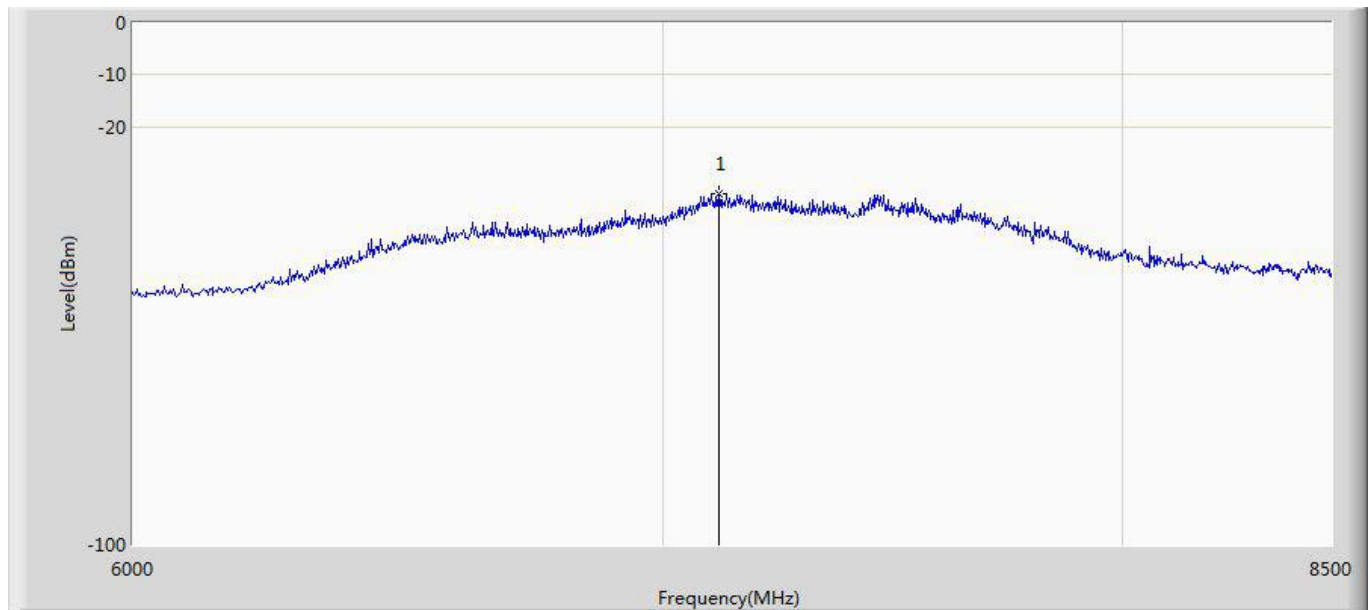
Note 3: The RBW = 3MHz, so the EIRP limit is $20 \log (3/50) = -24.437$ dBm.

Engineer: Tommie	
Site: AC5	Time: 2019/01/30 - 14:43
Limit:	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: UWB	Power: AC 120V/60Hz
Note: Mdoe 1:Transmit at 7290MHz by UWB	



No	Mark	Frequency (MHz)	Measure Level (dBm)	Reading Level (dBm)	Over Limit (dB)	Limit (dBm)	Factor (dB)	Type
1		7182.500	-30.131	-31.916	NaN	NaN	1.785	PK

Engineer: Tommie	
Site: AC5	Time: 2019/01/30 - 14:45
Limit:	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: UWB	Power: AC 120V/60Hz
Note: Mdoe 1:Transmit at 7290MHz by UWB	



No	Mark	Frequency (MHz)	Measure Level (dBm)	Reading Level (dBm)	Over Limit (dB)	Limit (dBm)	Factor (dB)	Type
1		7115.000	-32.681	-34.439	NaN	NaN	1.758	PK

9. Antenna Requirement

9.1. Limit

Antenna Requirement Limit
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

9.2. Result

The EUT use permanently attached antennas and comply with FCC 15.203.

_____ The End _____