

Test Report

Applicant : Jiuling (Wenzhou) Electronic Technology Co., Ltd
Address : 8F, Wenzhou World Trade Center, Danan Road, Lucheng District,
Wenzhou, Zhejiang, China
Product Name : UWB Radio Frequency Module
Brand Mark : 
Model No. : UWB-X5-AOA-T
Series model : UWB-U2-CA (PRO MAX)
FCC ID : 2BXGOUWB-X5-AOA-T
Report Number : BLA-EMC-202606-A54-01
Date of Receipt : Jun. 16, 2026
Date of Test : Jun. 16, 2026 to Jul. 13, 2026
Test Standard : 47 CFR Part 15 Subpart F
KDB 393764 D01 UWB FAQ v02r01
Test Result : Pass

Compiled by: Mark Chen

Review by: Xavier

Approved by:

Issued Date: Sep. 02, 2026



BlueAsia Technical Services(Shenzhen) Co.,Ltd.

Address: No.41, South of Beihuan Road, Shangwu Community, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China



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Revise Record

Version No.	Date	Description
01	Sep. 02, 2026	Original

1 General information

1.1 General information

Applicant	Jiuling (Wenzhou) Electronic Technology Co., Ltd
Address	8F, Wenzhou World Trade Center, Danan Road, Lucheng District, Wenzhou, Zhejiang, China
Manufacturer	Jiuling (Wenzhou) Electronic Technology Co., Ltd
Address	8F, Wenzhou World Trade Center, Danan Road, Lucheng District, Wenzhou, Zhejiang, China
Factory	Jiuling (Wenzhou) Electronic Technology Co., Ltd
Address	8F, Wenzhou World Trade Center, Danan Road, Lucheng District, Wenzhou, Zhejiang, China

1.2 General description of EUT

Product Name	UWB Radio Frequency Module
Model No.	UWB-X5-AOA-T
Series model	UWB-U2-CA (PRO MAX)
Differences of Series model	Their electrical circuit design layout, components used and internal wiring are identical, only the model name are different. The sole minor mechanical difference is that the dimensions of the metal shielding can (shield cover) used on the PCB are slightly different between the two versions.
Operation Frequency	Channel 09: 7987.2MHz
Modulation Type	BPM-BPSK
Application Category	Hand held UWB systems
Number of Channels	1
Antenna Type	FPC antenna & Chip antenna
Antenna Gain	Chip Antenna: 5.3dBi (Provided by customer) FPC Antenna: 4.9dBi (Provided by customer)
Power supply	DC 3.3V
Hardware Version	N/A

Software Version	N/A
<i>Note: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.</i>	

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2 Test summary

No.	Test item	Test Requirement	Test Method	Result
1	Antenna requirement	47 CFR Part 15F Section 15.517(a3), 15.519(a2), 15.521(b), 15.203	N/A	Pass
2	AC Power Line Conducted Emissions	47 CFR Part 15F Section 15.207	ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024+Errata to C63.10a-2024 Clause 6.2	Pass
3	UWB Bandwidth	47 CFR Part 15F Section 15.503(a)	ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024+Errata to C63.10a-2024 Clause 10.1	Pass
4	Average and Peak Power Spectral Density	47 CFR Part 15F Section 15.519 (c)(e), 15.521(d), 15.521(g)	ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024+Errata to C63.10a-2024 Clause 10.3	Pass
5	Radiated emissions below 1GHz	47 CFR Part 15F Section 15.519 (c)(d),15.209	ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024+Errata to C63.10a-2024 Clause 10.2&10.3	Pass
6	Radiated emissions above 1GHz	47 CFR Part 15F Section 15.519 (c)(d),15.209	ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024+Errata to C63.10a-2024 Clause 10.3	Pass
7	Cease Transmission Time	47 CFR Part 15F Section 15.519(a)(1)	N/A	Pass

Remark:

N/A: Not Applicable

3 Test Configuration

3.1 Test mode

Test Mode ^{Note 1}	Description
TX	Keep the EUT in continuously transmitting with modulation mode.
RX	Keep the EUT in receiving mode

Note 1: The EUT was configured to measure its highest possible emission and/or immunity level. The test modes were adapted according to the operation manual for use.

Power level setup in software			
Test Software Name	JL Assistant(v3.6.2)		
Mode	Channel	Frequency (MHz)	Soft Set
UWB-TX	CH09	7987.2	TX level : Default

3.2 Operation Frequency each of channel

Channel	Frequency	Channel	Frequency
09	7987.2MHz	/	/

3.3 Test channel

Channel	Frequency
09	7987.2MHz

3.4 Auxiliary equipment

Device Type	Manufacturer	Model Name	Serial No.	Remark
PC	HP	14s-cr2010TX	/	/
Test board	DevEBox	CH340G	/	/

Note:

“--” mean no any auxiliary device during testing.

3.5 Test environment

Environment	Temperature	Voltage
Normal	25°C	DC 3.3V

4 Laboratory information

4.1 Laboratory and accreditations

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

Company name:	BlueAsia Technical Services (Shenzhen) Co.,Ltd.
Address:	No.41, South of Beihuan Road, Shangwu Community, Shiyao Subdistrict, Bao'an District, Shenzhen, Guangdong, China
CNAS accredited No.:	L9788
A2LA Cert. No.:	5071.01
FCC Designation No.:	CN1252
Test Firm Registration No.:	923526
ISED CAB identifier No.:	CN0028
Registration No.:	24243
Telephone:	+86-755-28682673
FAX:	+86-755-28682673

4.2 Measurement uncertainty

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

Parameter	Expanded Uncertainty
Radiated Emission(9kHz-30MHz)	$\pm 4.34\text{dB}$
Radiated Emission(30MHz-1000MHz)	$\pm 4.24\text{dB}$
Radiated Emission(1GHz-18GHz)	$\pm 4.68\text{dB}$
Radiated Emission(18GHz-40GHz)	$\pm 4.78\text{dB}$
AC Power Line Conducted Emission(150kHz-30MHz)	$\pm 3.45\text{dB}$
Occupied Channel Bandwidth	$\pm 5\%$
RF output power, conducted	$\pm 1.5\text{dB}$
Power Spectral Density, conducted	$\pm 3.0\text{dB}$
Unwanted Emissions, conducted	$\pm 3.0\text{dB}$
Temperature	$\pm 3\text{ }^{\circ}\text{C}$
Supply voltages	$\pm 3\%$

Time	±5 %
------	------

5 Test equipment

Radiated Spurious Emissions (Below 1GHz)

Equipment	Name	Model	Manufacture	S/N	Cal. Date	Due. Date
BLA-EMC-002-01	Anechoic chamber	9*6*6 chamber	SKET	N/A	2024/3/27	2027/3/26
BLA-EMC-002-02	Control room	966 control room	SKET	N/A	2024/3/27	2027/3/26
BLA-EMC-009	EMI receiver	ESR7	R&S	101199	2025/08/05	2026/08/04
BLA-EMC-043	Loop antenna	FMZB1519B	Schwarzbeck	00102	2026/05/31	2027/05/30
BLA-EMC-065	Broadband antenna	VULB9168	Schwarzbeck	01065P	2026/05/31	2027/05/30
BLA-XC-01	Coaxial Cable	N/A	BlueAsia	V01	N/A	N/A
BLA-XC-02	Coaxial Cable	N/A	BlueAsia	V02	N/A	N/A

Radiated Spurious Emissions (Above 1GHz)

Equipment	Name	Model	Manufacture	S/N	Cal. Date	Due. Date
BLA-EMC-001-01	Anechoic chamber	9*6*6 chamber	SKET	N/A	2023/11/16	2026/11/15
BLA-EMC-001-02	Control Room	966 control room	SKET	N/A	2025/11/12	2026/11/11
BLA-EMC-008	Spectrum	FSP40	R&S	100817	2025/08/05	2026/08/04
BLA-EMC-013	Horn Antenna	BBHA9120D	Schwarzbeck	01892	2026/05/31	2027/05/30
BLA-EMC-014	Amplifier	PA_000318G-45	SKET	PA2018043003	2025/08/05	2026/08/04
BLA-EMC-046	Filter bank	2.4G/5G Filter bank	SKET	N/A	2026/05/25	2027/05/24
BLA-EMC-061	Receiver	ESPI7	R&S	101477	2026/05/25	2027/05/24
BLA-EMC-066	Amplifier	LNPA_30M01G-30	SKET	SK2021060801	2026/05/25	2027/05/24
BLA-EMC-086	Amplifier	LNPA_18G40G-50dB	SKET	SK2022071301	2026/05/25	2027/05/24
BLA-EMC-087	Horn Antenna	BBHA 9170	Schwarzbeck	1106	2026/05/31	2027/05/30

BLA-XC-03	Coaxial Cable	N/A	BlueAsia	V03	N/A	N/A
BLA-XC-04	Coaxial Cable	N/A	BlueAsia	V04	N/A	N/A

Conducted Emissions

Equipment	Name	Model	Manufacture	S/N	Cal. Date	Due. Date
BLA-EMC-003-001	Shield room	8*3*3	SKET	N/A	2025/11/12	2026/11/11
BLA-EMC-009	EMI receiver	ESR7	R&S	101199	2025/08/05	2026/08/04
BLA-EMC-011	LISN	ENV216	R&S	101372	2025/08/05	2026/08/04
BLA-EMC-033	Impedance transformer	DC-2GHz	DFXP	N/A	2026/05/25	2027/05/24
BLA-EMC-041	LISN	AT166-2	ATTEN	AKK180600 0003	2025/08/05	2026/08/04
BLA-EMC-045	Impedance stable network	ISNT8-cat 6	TESEQ	53580	2025/08/05	2026/08/04
BLA-EMC-095	Single-channel vehicle artificial power network	NNBM 8124	Schwarzbeck	01045	2026/05/25	2027/05/24
BLA-EMC-096	Single-channel vehicle artificial power network	NNBM 8124	Schwarzbeck	01075	2026/05/25	2027/05/24
BLA-XC-05	Coaxial Cable	N/A	BlueAsia	V05	N/A	N/A

RF conducted

Equipment	Name	Model	Manufacture	S/N	Cal. Date	Due. Date
BLA-EMC-003-003	Shield room	5*3*3	SKET	N/A	2025/11/12	2026/11/11
BLA-EMC-016	Signal Generator	N5182A	Agilent	MY524205 67	2026/05/25	2027/05/24
BLA-EMC-038	Spectrum	N9020A	Agilent	MY491000 60	2025/08/05	2026/08/04
BLA-EMC-042	Power sensor	RPR3006W	DARE	14I00889S N042	2025/08/05	2026/08/04
BLA-EMC-044	Radio communication	CMW500	R&S	132429	2025/08/05	2026/08/04

	tester					
BLA-EMC-064	Signal Generator	N5182B	KEYSIGHT	MY581088 92	2026/05/25	2027/05/24
BLA-EMC-079	Spectrum	N9020A	Agilent	MY544201 61	2026/05/25	2027/05/24
BLA-EMC-088	Audio Analyzer	ATS-1	Audio Precision	ATS14109 4	2026/05/25	2027/05/24

Test Software Record:

Software No.	Software Name	Manufacture	Software version	Test site
BLA-EMC-S001	EZ-EMC	EZ	EEMC-3A1+	RE
BLA-EMC-S002	EZ-EMC	EZ	EEMC-3A1+	RE
BLA-EMC-S003	EZ-EMC	EZ	EEMC-3A1+	CE
BLA-EMC-S010	MTS 8310	MW	2.0.0.0	RF

6 Test result

6.1 Antenna requirement

Test Requirement	47 CFR Part 15F Section 15.517(a3), 15.519(a2), 15.521(b), 15.203
Test Method	N/A

6.1.1 Requirement

§ 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. 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, 15.221, or § 15.236. 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.

§ 15.519a(2)

The use of antennas mounted on outdoor structures, e.g., antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is prohibited. Antennas may be mounted only on the hand held UWB device.

15.521(a) UWB devices may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a satellite is prohibited.

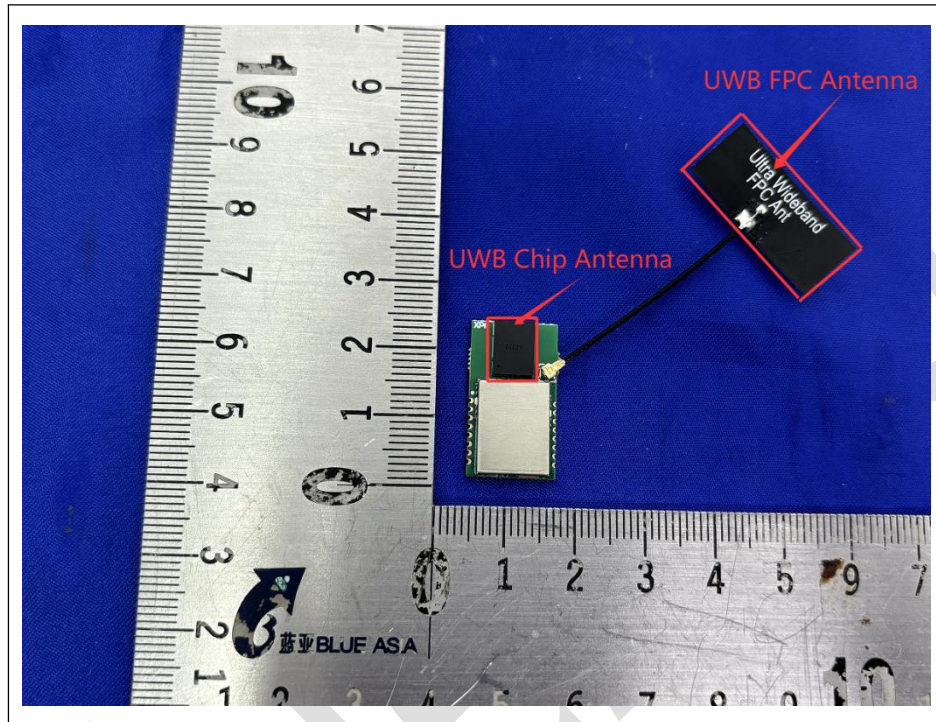
15.521(b)

Manufacturers and users are reminded of the provisions of § 15.203.

EUT antenna:

The antenna is FPC antenna. The best case gain of the antenna is 4.9dBi.

The antenna is Chip antenna. The best case gain of the antenna is 5.3dBi.



6.2 Conducted emissions at AC power line (150 kHz-30 MHz)

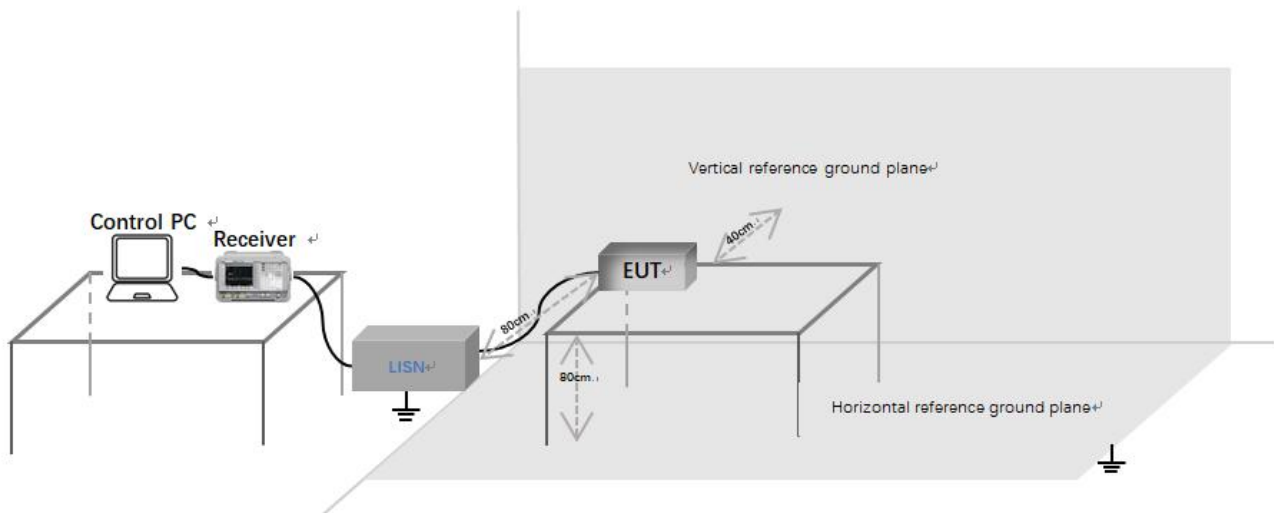
Test Requirement	47 CFR Part 15F Section 15.207
Test Method	ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024+Errata to C63.10a-2024 Clause 6.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.2.1 Limit

Frequency of emission(MHz)	Conducted limit(dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

6.2.2 Test setup



Description of test setup connection:

- Connect the control PC to the receiver through a USB to GPIB cable;
- The receiver is connected to the LISN through a coaxial line;
- Connect the power port of LISN to the EUT.

6.2.3 Procedure

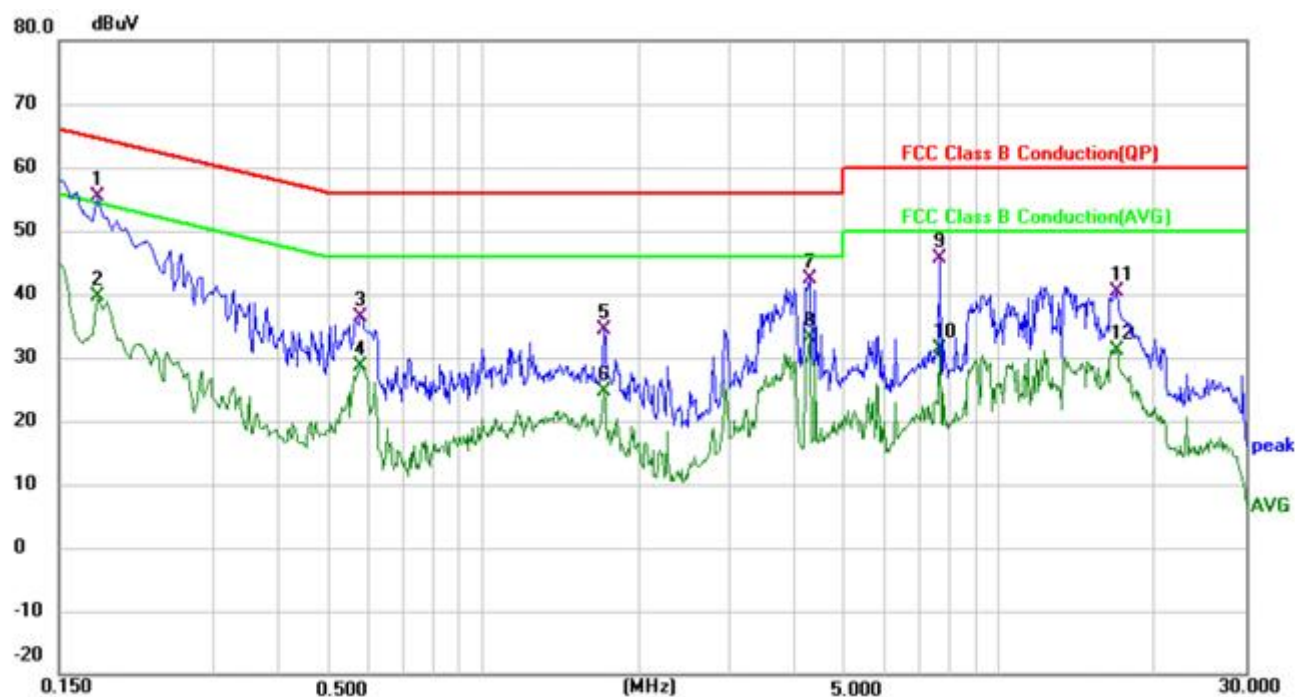
- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to 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.

LISN=Read Level+ Cable Loss+ LISN Factor

6.2.4 Test data

Chip Antenna

[Test Mode: 7987.2MHz-TX]; [Line: Line];[Voltage: AC120V/60Hz]



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1780	45.39	10.00	55.39	64.58	-9.19	QP
2		0.1780	29.69	10.00	39.69	54.58	-14.89	AVG
3		0.5780	26.54	9.73	36.27	56.00	-19.73	QP
4		0.5780	18.89	9.73	28.62	46.00	-17.38	AVG
5		1.7140	24.64	9.83	34.47	56.00	-21.53	QP
6		1.7140	14.81	9.83	24.64	46.00	-21.36	AVG
7		4.2780	32.34	10.03	42.37	56.00	-13.63	QP
8		4.2780	23.04	10.03	33.07	46.00	-12.93	AVG
9		7.6500	35.16	10.41	45.57	60.00	-14.43	QP
10		7.6500	20.86	10.41	31.27	50.00	-18.73	AVG
11		16.9260	28.46	11.99	40.45	60.00	-19.55	QP
12		16.9260	19.09	11.99	31.08	50.00	-18.92	AVG

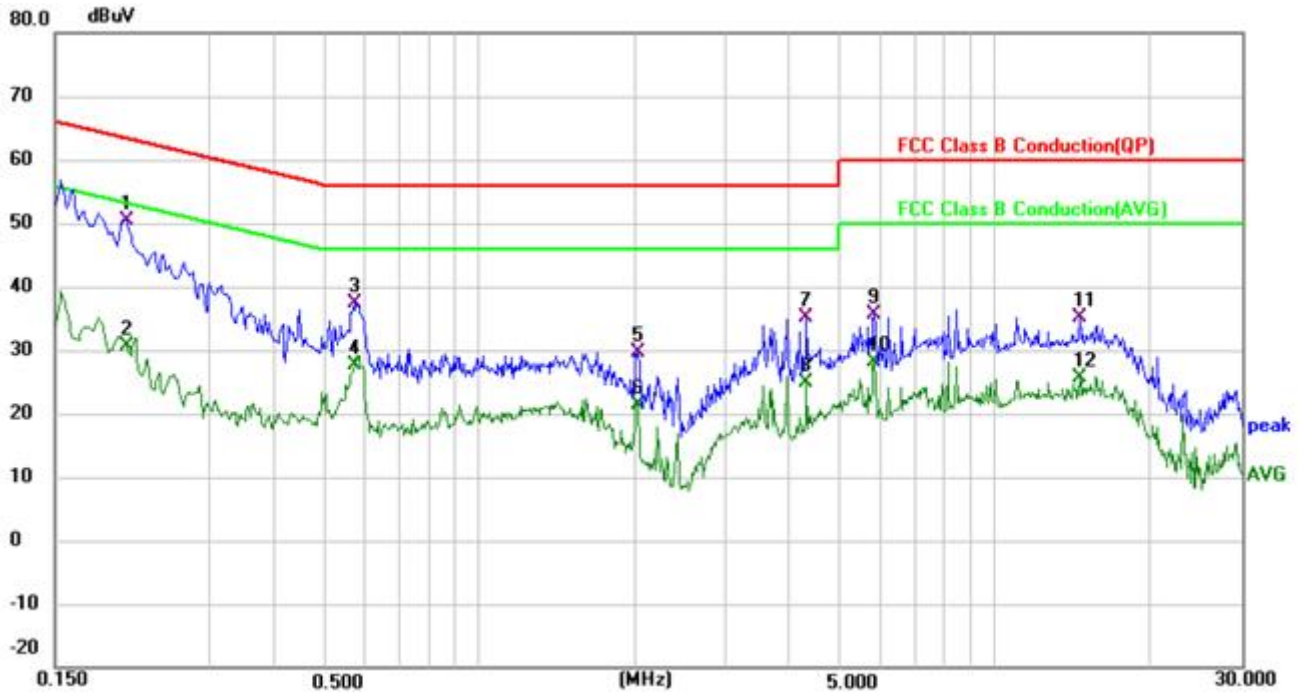
Test Result: Pass*BlueAsia of Technical Services (Shenzhen) Co., Ltd.*

Tel: +86-755-23059481

Email: marketing@cblueasia.com www.cblueasia.com

Version: v1.3

[Test Mode: 7987.2MHz-TX]; [Line: Neutral] ;[Voltage: AC120V/60Hz]

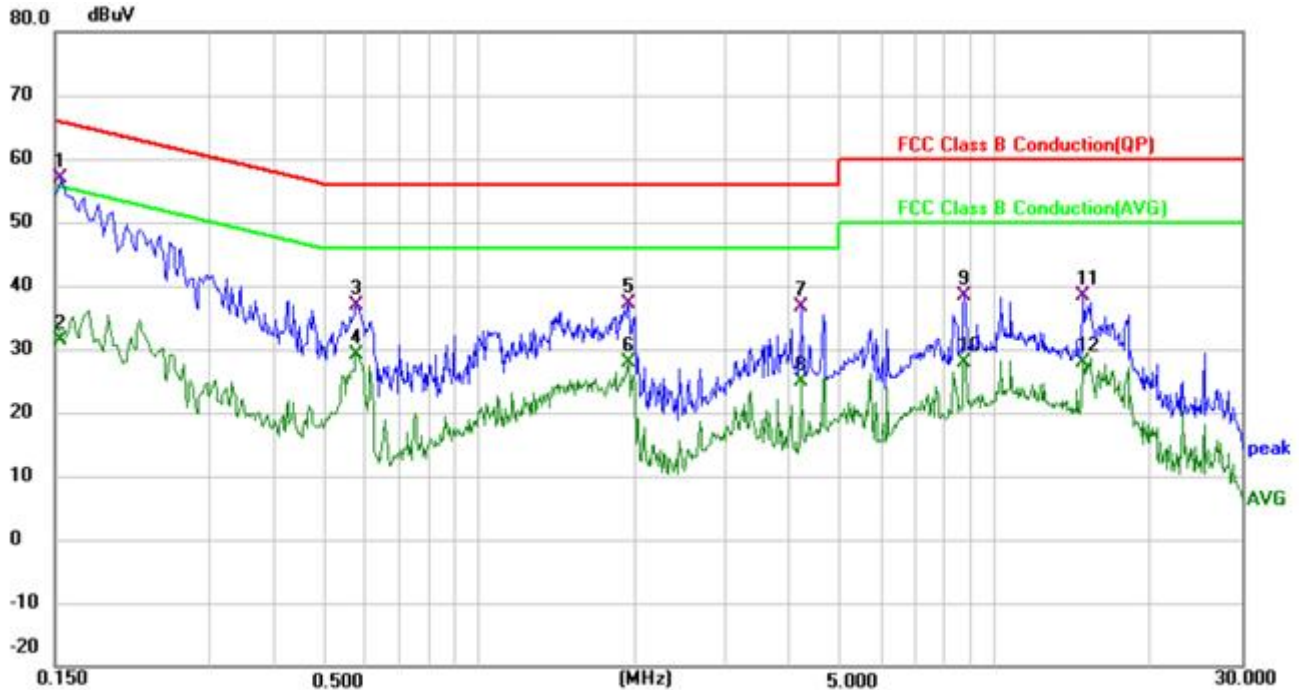


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.2060	40.45	10.05	50.50	63.37	-12.87	QP
2		0.2060	20.66	10.05	30.71	53.37	-22.66	AVG
3		0.5700	27.76	9.72	37.48	56.00	-18.52	QP
4		0.5700	18.01	9.72	27.73	46.00	-18.27	AVG
5		2.0260	19.84	9.84	29.68	56.00	-26.32	QP
6		2.0260	11.51	9.84	21.35	46.00	-24.65	AVG
7		4.2980	25.08	10.04	35.12	56.00	-20.88	QP
8		4.2980	14.77	10.04	24.81	46.00	-21.19	AVG
9		5.8340	25.52	10.20	35.72	60.00	-24.28	QP
10		5.8340	17.86	10.20	28.06	50.00	-21.94	AVG
11		14.5780	23.65	11.54	35.19	60.00	-24.81	QP
12		14.5780	14.17	11.54	25.71	50.00	-24.29	AVG

Test Result: Pass

FPC Antenna

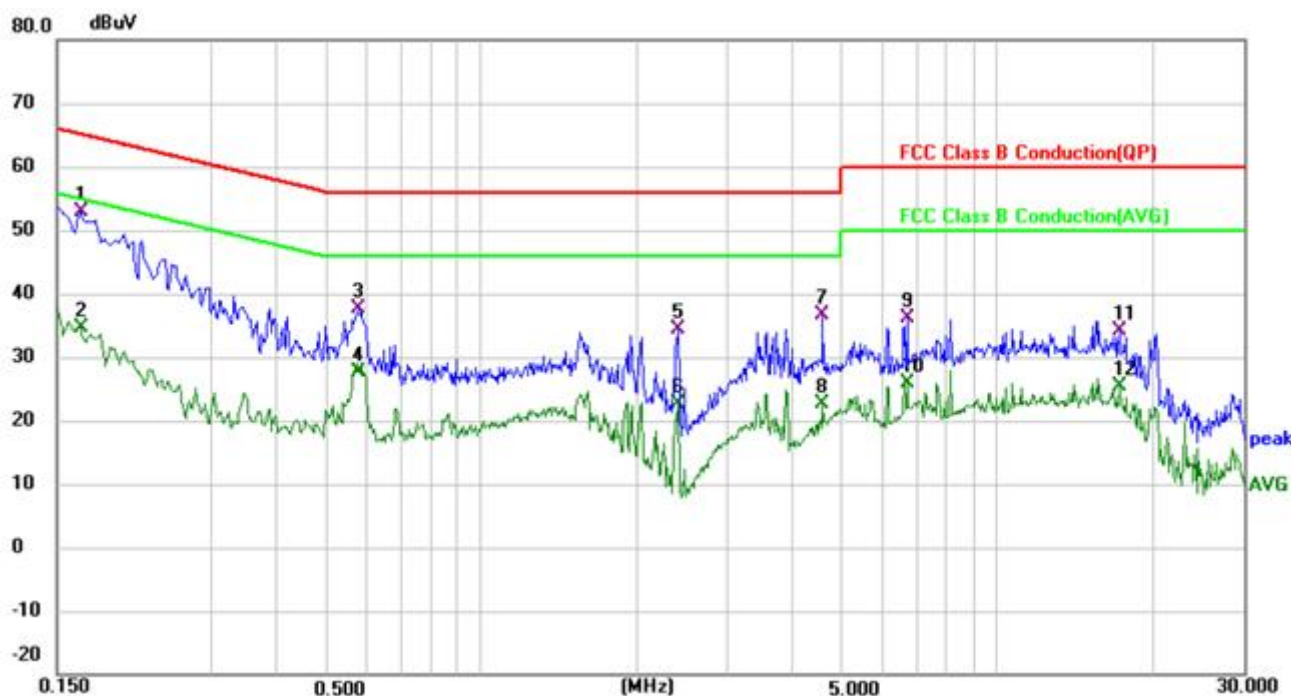
[Test Mode: 7987.2MHz-TX]; [Line: Line];[Voltage: AC120V/60Hz]



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1539	46.94	9.92	56.86	65.79	-8.93	QP
2		0.1539	21.52	9.92	31.44	55.79	-24.35	AVG
3		0.5780	27.18	9.73	36.91	56.00	-19.09	QP
4		0.5780	19.41	9.73	29.14	46.00	-16.86	AVG
5		1.9460	27.17	9.84	37.01	56.00	-18.99	QP
6		1.9460	17.93	9.84	27.77	46.00	-18.23	AVG
7		4.2020	26.70	10.02	36.72	56.00	-19.28	QP
8		4.2020	14.82	10.02	24.84	46.00	-21.16	AVG
9		8.7260	27.85	10.57	38.42	60.00	-21.58	QP
10		8.7260	17.38	10.57	27.95	50.00	-22.05	AVG
11		14.7980	41.57	-3.21	38.36	60.00	-21.64	QP
12		14.7980	30.98	-3.21	27.77	50.00	-22.23	AVG

Test Result: Pass

[Test Mode: 7987.2MHz-TX]; [Line: Neutral] ;[Voltage: AC120V/60Hz]



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1660	42.88	9.97	52.85	65.16	-12.31	QP
2		0.1660	24.76	9.97	34.73	55.16	-20.43	AVG
3		0.5780	27.98	9.72	37.70	56.00	-18.30	QP
4		0.5780	18.00	9.72	27.72	46.00	-18.28	AVG
5		2.3980	24.46	9.86	34.32	56.00	-21.68	QP
6		2.3980	12.66	9.86	22.52	46.00	-23.48	AVG
7		4.5860	26.50	10.07	36.57	56.00	-19.43	QP
8		4.5860	12.45	10.07	22.52	46.00	-23.48	AVG
9		6.6740	25.85	10.30	36.15	60.00	-23.85	QP
10		6.6740	15.55	10.30	25.85	50.00	-24.15	AVG
11		17.2220	22.10	12.01	34.11	60.00	-25.89	QP
12		17.2220	13.48	12.01	25.49	50.00	-24.51	AVG

Test Result: Pass

6.3 UWB Bandwidth

6.3.1 Description

§ 15.503

The UWB bandwidth is the frequency band bounded by the points that are 10 dB below the highest radiated emission, as based on the complete transmission system including the antenna.

6.3.2 Limit

≥500MHz

6.3.3 Test procedure

15.503:

(a) The upper boundary is designated f_H and the lower boundary is designated f_L . The frequency at which the highest radiated emission occurs is designated f_M .

(b) Center frequency. The center frequency, f_C , equals $(f_H + f_L)/2$.

(c) Fractional bandwidth. The fractional bandwidth equals $2(f_H - f_L) / (f_H + f_L)$.

15.519:

The UWB bandwidth of a device operating under the provisions of this section must be contained between 3100MHz and 10600MHz.

Use the following spectrum analyzer settings:

RBW = 1 MHz

VBW ≥ 3 MHz

Sweep = auto

Detector function = Peak

Trace = max hold



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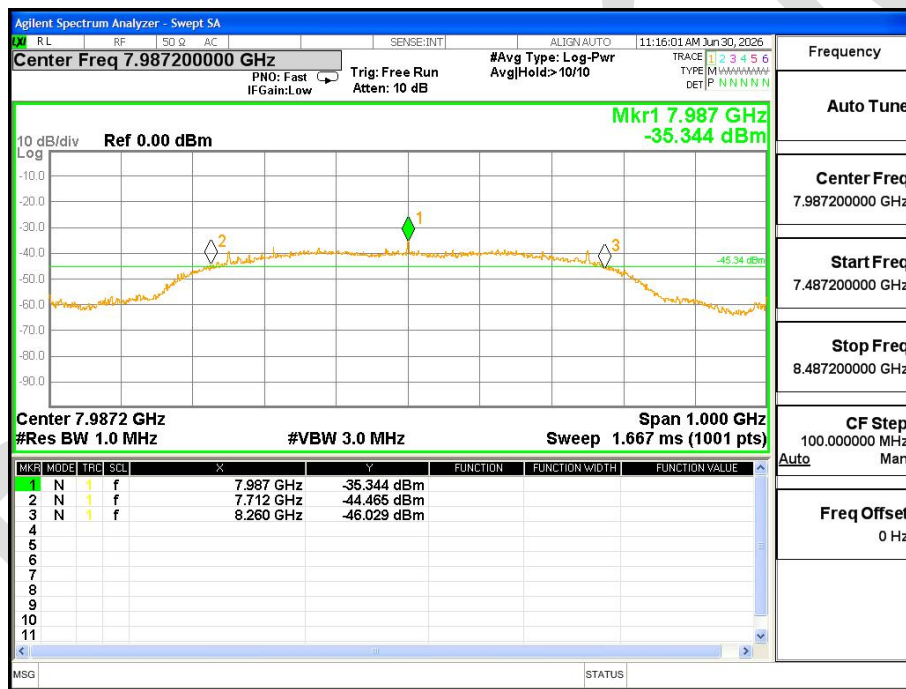
6.3.4 Results

Channel	F _L (MHz)	F _M (MHz)	F _H (MHz)	UWB Bandwidth (MHz)	Limit (MHz)	Verdict
CH09	7712	7987	8260	548	≥ 500 MHz	Pass

Channel	F _L (MHz)	F _M (MHz)	F _H (MHz)	Fractional Bandwidth (MHz)	Limit
CH09	7712	7987	8260	0.069	≥ 0.2

CH09:

-10 dB Bandwidth@7987.2MHz



Note1: The 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.

6.4 Average and Peak Power Spectral Density

6.4.1 Description

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, f_M .

6.4.2 Limit

That limit is 0 dBm EIRP. It is acceptable to employ a different resolution bandwidth, and a correspondingly different peak emission limit, following the procedures described in FCC15.521.

6.4.3 Test procedure

Bandwidth conversion of peak power measurements:

It is acceptable to employ an RBW of less than 50 MHz (but no less than 1 MHz) when performing the required peak power measurements. When this approach is employed, the peak emissions EIRP limit (0 dBm / 50 MHz) is converted to a limit commensurate with the RBW by employing a $[20 \log (RBW/50 \text{ MHz})]$ relationship. For example, the peak power limit could be expressed in a 1 MHz bandwidth as follows in Equation

$$EIRP_{1\text{MHz}} = EIRP_{50\text{MHz}} + 20 \log (1 \text{ MHz} / 50 \text{ MHz}) = 0 \text{ dBm} + (-34 \text{ dB}) = -34 \text{ dBm}$$

When a resolution bandwidth of less than 50 MHz is used, this measurement shall be performed over a 50 MHz span centered on the frequency associated with the highest detected average emission level.

Use the following spectrum analyzer settings:

RBW = 5 MHz

VBW = 8 MHz

Sweep = auto

Detector function = Peak

Trace = max hold

6.4.4 Results

FPC Antenna

Peak Field Strength for fundamental @ RBW=5MHz				
Channel	EIRP Emission Level within 5MHz (dBm)	Limit (dBm)		Verdict
		50MHz BW Centered on F _M	RBW=5MHz ($\leq 20 \cdot \log(\text{RBW}/50)$)	
CH09	-29.887	0	-20	Pass

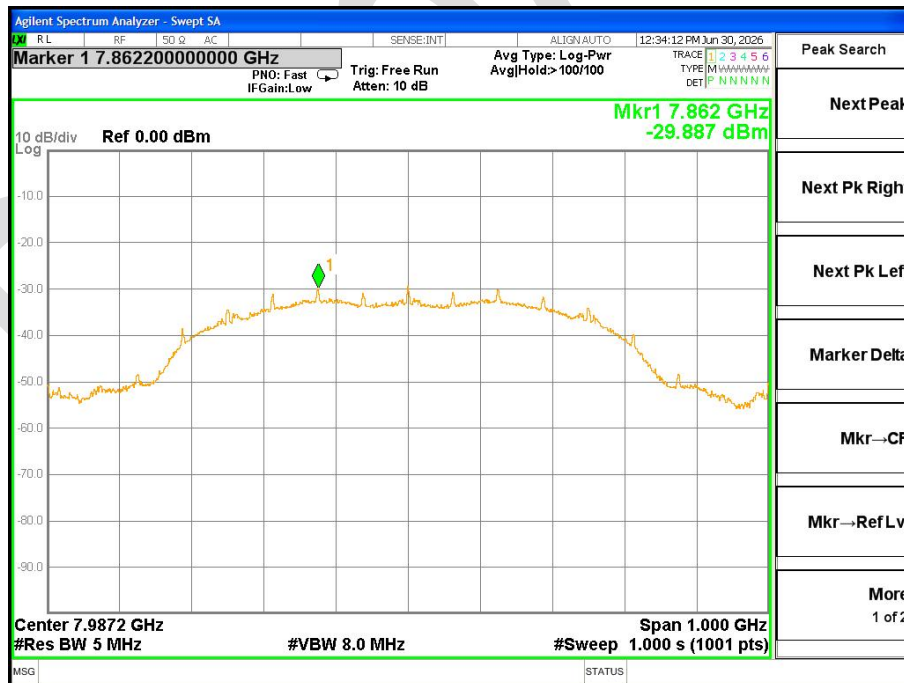
Remark:

Note 1: Measurement Value(dBm/50MHz)= -29.887+20= -9.887dBm < 0dBm.

Note 2: RBW_{used} [MHz] =5MHz

CH09:

RBW: 5MHz@7987.2MHz



Chip Antenna

Peak Field Strength for fundamental @ RBW=5MHz				
Channel	EIRP Emission Level within 5MHz (dBm)	Limit (dBm)		Verdict
		50MHz BW Centered on F _M	RBW=5MHz (<=20*log(RBW/50))	
CH09	-29.304	0	-20	Pass

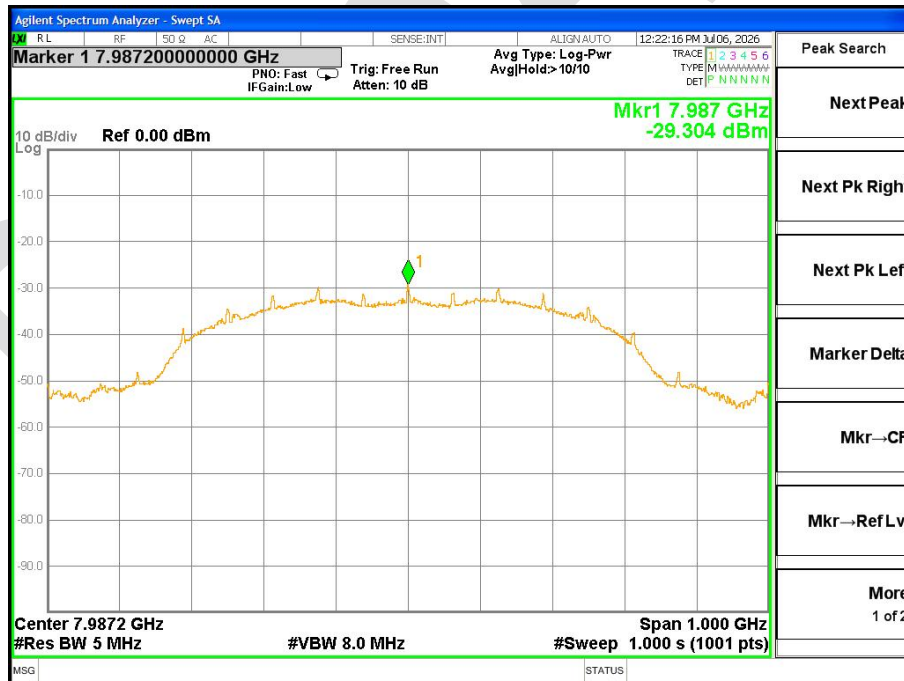
Remark:

Note 1: Measurement Value(dBm/50MHz)= -29.304+20= -9.304dBm< 0dBm.

Note 2: RBW_{used} [MHz] =5MHz

CH09:

RBW: 5MHz@7987.2MHz



FPC Antenna

Average Field Strength for fundamental @ RBW=1MHz						
Test Frequency (MHz)	Reading Level (dBm)	Correct Factor (dB)	Measurement (dBm/MHz)	Limit (dBm/MHz)	Polarization	Result
7987.2	-63.597	14.20	-49.397	-41.3	Horizontal	PASS
7987.2	-63.603	14.20	-49.403	-41.3	Vertical	PASS

Note1:

UWB EIRP (dBm) = Power Spectral Density (dBm/MHz) + 10*log (-10dB Bandwidth)
 = -49.397+10*log(548)= -22.01dBm

Chip Antenna

Average Field Strength for fundamental @ RBW=1MHz						
Test Frequency (MHz)	Reading Level (dBm)	Correct Factor (dB)	Measurement (dBm/MHz)	Limit (dBm/MHz)	Polarization	Result
7987.2	-63.505	14.20	-49.305	-41.3	Horizontal	PASS
7987.2	-63.526	14.20	-49.326	-41.3	Vertical	PASS

Note2:

UWB EIRP (dBm) = Power Spectral Density (dBm/MHz) + 10*log (-10dB Bandwidth)
 = -49.305+10*log(548)= -21.92dBm

6.5 Radiated emissions below 1GHz

6.5.1 Description

FCC 15.519 (c) 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 FCC 15.209.

6.5.2 Limit

15.209 (a)

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:

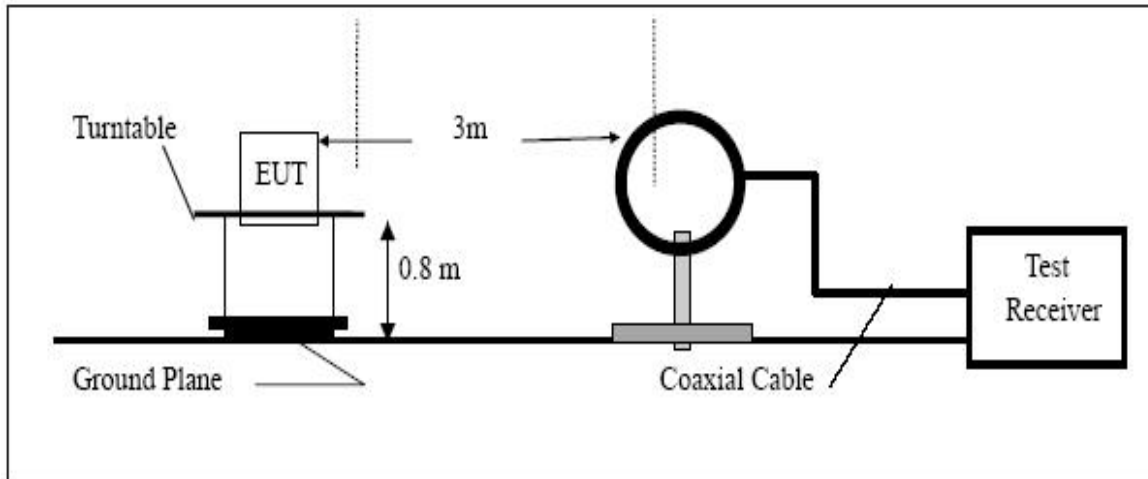
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., 15.231 and 15.241.

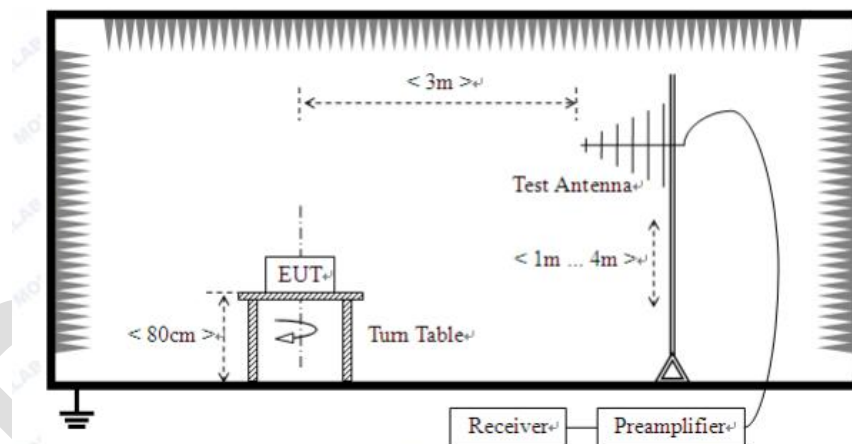
6.5.3 Test procedure

Measurements are made with the antenna feeding a spectrum analyzer via a preamplifier and cables, at a maximum distance of 3m from the EUT.

Below 30MHz



Below 1GHz



1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
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 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.

4. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. 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.
7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Note: For below 30 MHz and 18-40GHz testing, when the EUT was pre-scanned and the result which was 20 dB lower than the limit line, so that the test result was not showed in this reported.

6.5.4 Test data

Below 1GHz

FPC Antenna:

[Test mode: TX-7987.2MHz]; [Polarity: Horizontal]



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	41.2765	41.17	-16.76	24.41	40.00	-15.59	QP
2	71.3300	37.38	-16.69	20.69	40.00	-19.31	QP
3	89.5899	39.92	-21.07	18.85	43.50	-24.65	QP
4	155.3643	35.42	-15.53	19.89	43.50	-23.61	QP
5	237.4759	42.17	-17.75	24.42	46.00	-21.58	QP
6	768.7481	25.04	-5.79	19.25	46.00	-26.75	QP

Test Result: Pass

[Test mode: TX-7987.2MHz]; [Polarity: Vertical]

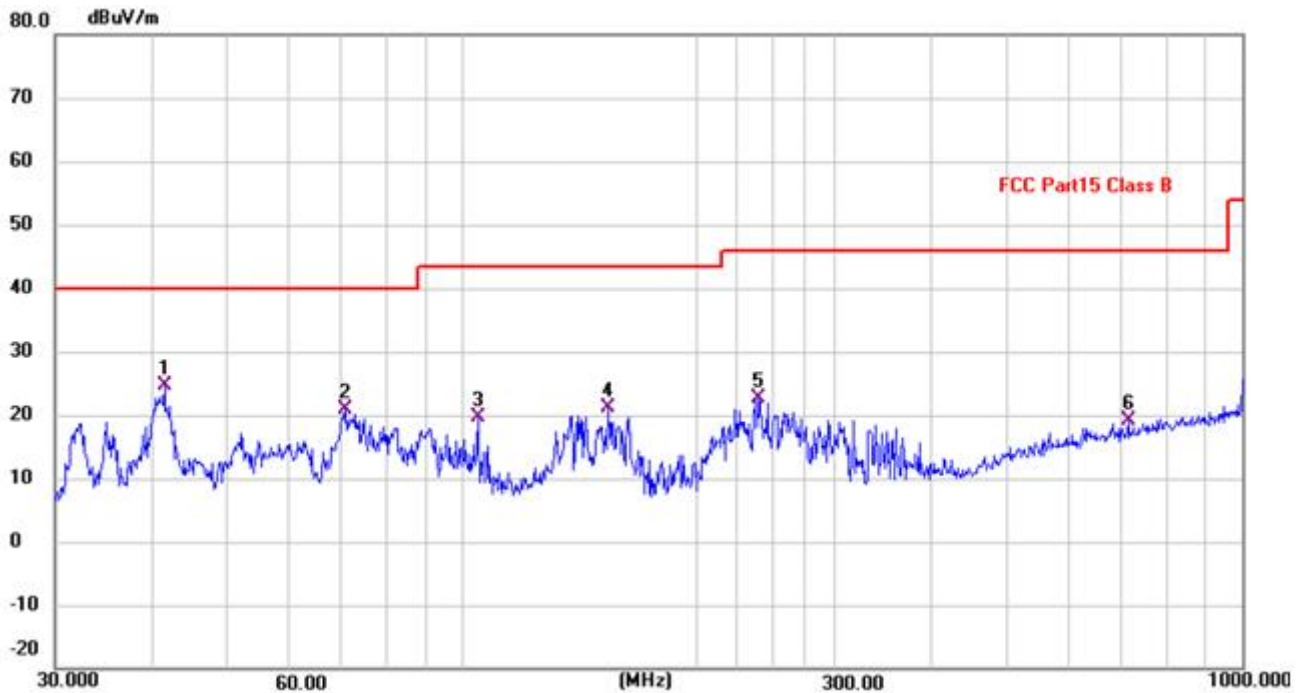


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	41.1320	52.48	-16.76	35.72	40.00	-4.28	QP
2	78.6888	45.87	-18.95	26.92	40.00	-13.08	QP
3	97.4560	43.56	-21.09	22.47	43.50	-21.03	QP
4	151.0666	33.50	-15.69	17.81	43.50	-25.69	QP
5	241.6763	36.93	-17.55	19.38	46.00	-26.62	QP
6	810.2654	25.61	-5.09	20.52	46.00	-25.48	QP

Test Result: Pass

Chip Antenna:

[Test mode: TX-7987.2MHz]; [Polarity: Horizontal]



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	41.4215	41.28	-16.75	24.53	40.00	-15.47	QP
2	70.8315	37.42	-16.55	20.87	40.00	-19.13	QP
3	104.5360	40.58	-20.89	19.69	43.50	-23.81	QP
4	153.7385	36.81	-15.59	21.22	43.50	-22.28	QP
5	239.9873	40.29	-17.60	22.69	46.00	-23.31	QP
6	714.1733	25.77	-6.74	19.03	46.00	-26.97	QP

Test Result: Pass

[Test mode: TX-7987.2MHz]; [Polarity: Vertical]



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	41.1320	52.55	-16.76	35.79	40.00	-4.21	QP
2	63.5356	43.34	-15.72	27.62	40.00	-12.38	QP
3	109.4116	42.81	-20.67	22.14	43.50	-21.36	QP
4	144.3348	32.63	-16.10	16.53	43.50	-26.97	QP
5	239.1473	35.16	-17.65	17.51	46.00	-28.49	QP
6	694.4174	25.61	-7.11	18.50	46.00	-27.50	QP

Test Result: Pass

6.6 Radiated emissions above 1GHz

6.6.1 Limit

15.519 (c)

Frequency in MHz	EIRP in dBm	Field Strength (dBuV/m)	Detector	Measurement distance (m)
960-1610	-75.3	20	AV	3
1610-1990	-63.3	32	AV	3
1990-3100	-61.3	34	AV	3
3100-10600	-41.3	54	AV	3
Above 10600	-61.3	34	AV	3
Fundamental	0 dBm (EIRP, RBW=50MHz)	95.3	Peak	3

Remark: Due to some spectrum analyzer does not support 50MHz RBW setting, RBW set to the maximum value, and add a correction factor is allowed for Max Peak EIRP measurement.

According to ANSI 63.10 Clause 10.3.9, the EIRP to field strength at a specified measurement distance of 3 m is below:

$$E \text{ (dBuV/m)} = \text{EIRP(dBm)} + 95.3$$

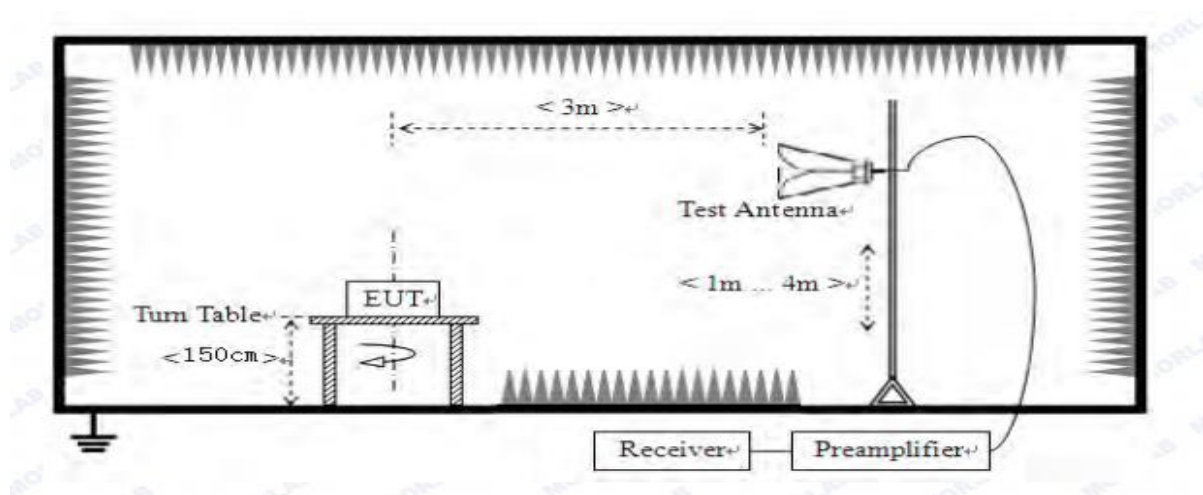
For peak power test, the spectrum analyzer was set to RBW=5MHz, VBW=8MHz, and add a conversion factor of $20 \cdot \log(50\text{MHz}/5\text{MHz})=20\text{dB}$.

FCC 15.519 (d) 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:

Frequency in MHz	EIRP in dBm	Field Strength (dBuV/m)	Detector	Measurement distance (m)
1164-1240	-85.3	10	AV	3
1559-1610	-85.3	10	AV	3

6.6.2 Test procedure

Measurements are made with the antenna feeding a spectrum analyzer via a preamplifier and cables, at a maximum distance of 3m from the EUT.



1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
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 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.
4. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. 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.

7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Note: Exploratory measurements for all frequency ranges are performed with the measurement antenna at close distances to the EUT as described in ANSI C63.10 6.6.4.2. Where emissions are observed the measurement antenna is then positioned at a height of 1.5m and a distance of 0.5m from the EUT and final measurements are made at the frequencies observed in the exploratory scans using the alternative measurement procedures detailed in ANSI C63.10 section 6.6.5. If no emissions are observed, a plot is made at a test distance of 0.5m from the EUT to show the measurement system noise floor.

6.6.3 Test data

Above (1GHz – 18GHz)

CH09:

[Test Mode: TX-7987.2MHz]; [Polarity: Horizontal] Chip Antenna @ RBW=1MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		11132.88	18.36	8.77	27.13	34.00	-6.87	AVG
2		12053.04	18.04	9.04	27.08	34.00	-6.92	AVG
3	*	14012.64	18.23	10.14	28.37	34.00	-5.63	AVG
4		14592.00	19.06	9.17	28.23	34.00	-5.77	AVG
5		16773.12	19.24	8.19	27.43	34.00	-6.57	AVG
6		17642.16	17.72	10.41	28.13	34.00	-5.87	AVG

Test Result: Pass

[Test Mode: TX-7987.2MHz];; [Polarity: Vertical] Chip Antenna @ RBW=1MHz



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV/m	dBuV/m	dB	
1		9548.160	33.40	7.63	41.03	54.00	-12.97	AVG
2		11644.08	18.26	9.38	27.64	34.00	-6.36	AVG
3		13484.40	14.59	12.85	27.44	34.00	-6.56	AVG
4		15154.32	20.69	8.29	28.98	34.00	-5.02	AVG
5		16551.60	18.09	9.56	27.65	34.00	-6.35	AVG
6	*	18000.00	16.34	13.01	29.35	34.00	-4.65	AVG

Test Result: Pass

Note 1: Level (dBuV) = Reading (dBuV) + Factor (dB/m)

[Test Mode: TX-7987.2MHz]; [Polarity: Horizontal] FPC Antenna @ RBW=1MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		9360.720	34.16	7.63	41.79	54.00	-12.21	AVG
2		12939.12	16.69	9.66	26.35	34.00	-7.65	AVG
3		13603.68	18.23	9.52	27.75	34.00	-6.25	AVG
4		14285.28	18.22	10.06	28.28	34.00	-5.72	AVG
5		15699.60	18.74	8.41	27.15	34.00	-6.85	AVG
6	*	17880.72	18.30	11.47	29.77	34.00	-4.23	AVG

Test Result: Pass

[Test Mode: TX-7987.2MHz];; [Polarity: Vertical] FPC Antenna @ RBW=1MHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		9326.640	33.40	7.62	41.02	54.00	-12.98	AVG
2		11695.20	18.59	8.68	27.27	34.00	-6.73	AVG
3		14097.84	17.84	9.68	27.52	34.00	-6.48	AVG
4		15000.96	19.66	8.46	28.12	34.00	-5.88	AVG
5		17267.28	19.95	9.04	28.99	34.00	-5.01	AVG
6	*	17982.96	17.31	12.76	30.07	34.00	-3.93	AVG

Test Result: Pass

Note 1: Level (dBuV) = Reading (dBuV) + Factor (dB/m)

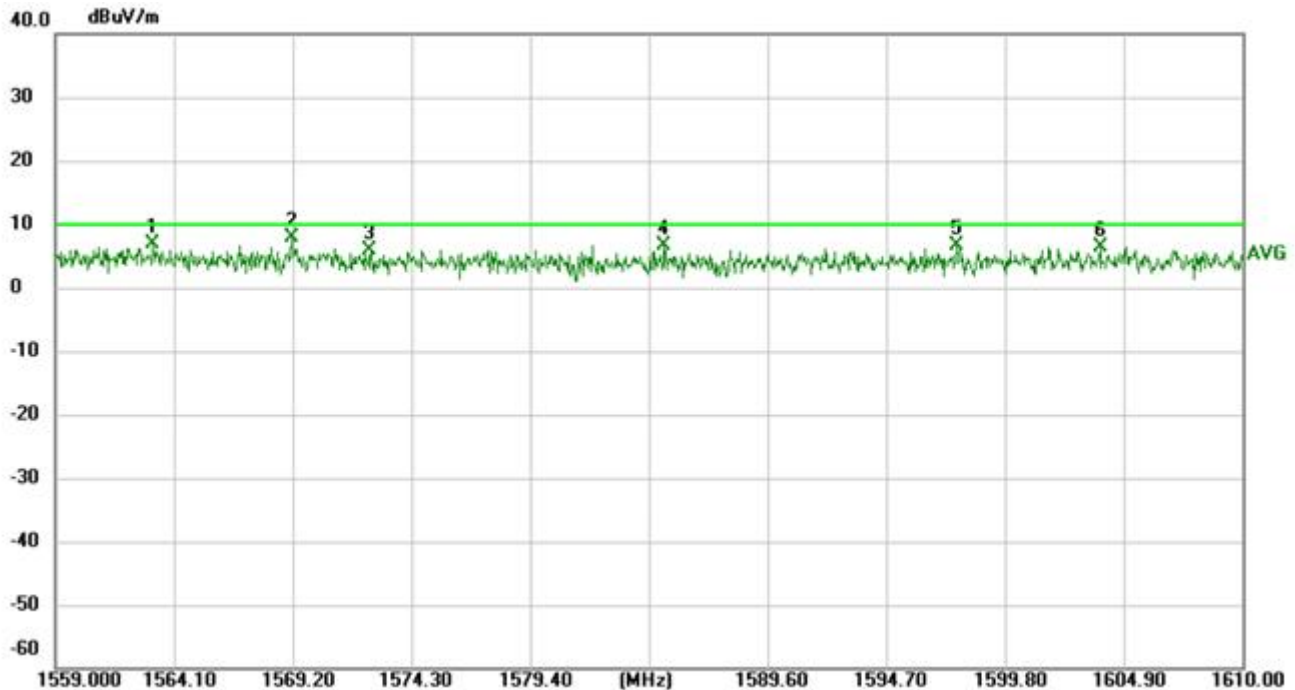
6.6.3.1 Emission (1164-1240 MHz and 1559-1610 MHz)

Test data:

CH09:

1559-1610 MHz

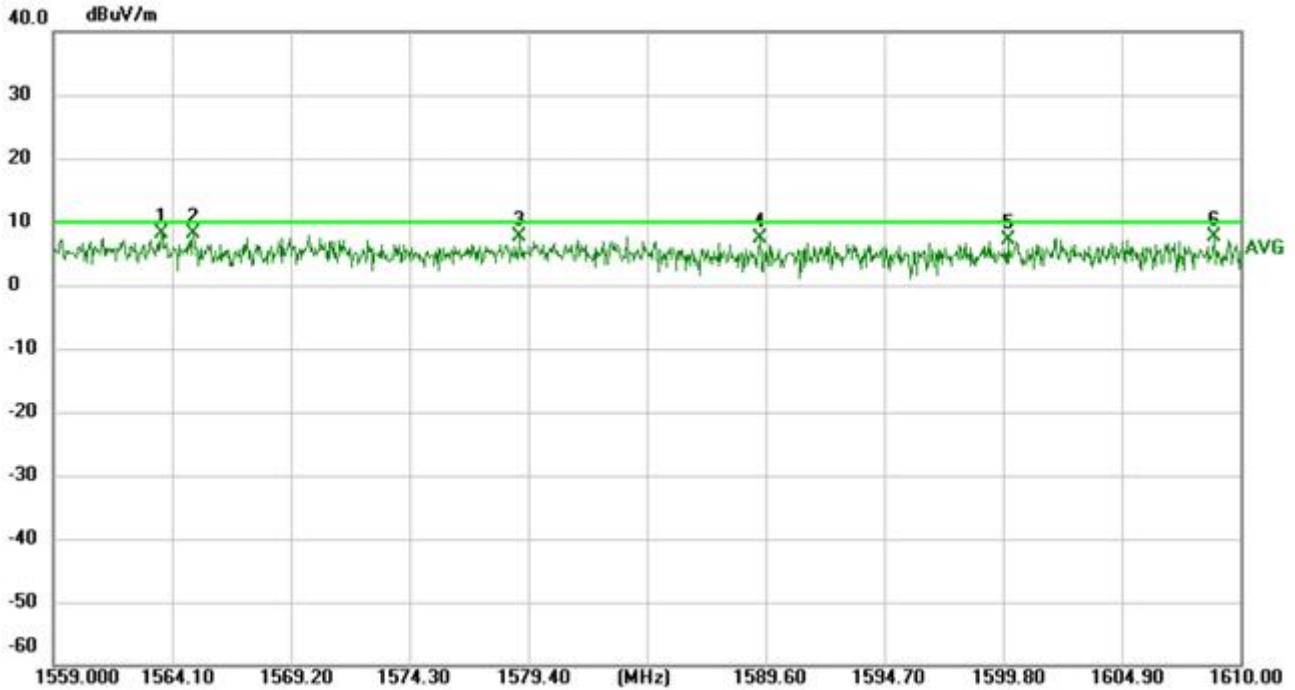
[Test Mode: TX-7987.2MHz]; [Polarity: Horizontal] Chip Antenna @ RBW=1kHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		1563.182	23.97	-17.20	6.77	10.00	-3.23	AVG
2	*	1569.149	25.18	-17.29	7.89	10.00	-2.11	AVG
3		1572.566	23.25	-17.34	5.91	10.00	-4.09	AVG
4		1585.163	24.22	-17.55	6.67	10.00	-3.33	AVG
5		1597.709	24.45	-17.75	6.70	10.00	-3.30	AVG
6		1603.880	24.25	-17.76	6.49	10.00	-3.51	AVG

Test Result: Pass

[Test Mode: TX-7987.2MHz];; [Polarity: Vertical] Chip Antenna @ RBW=1kHz



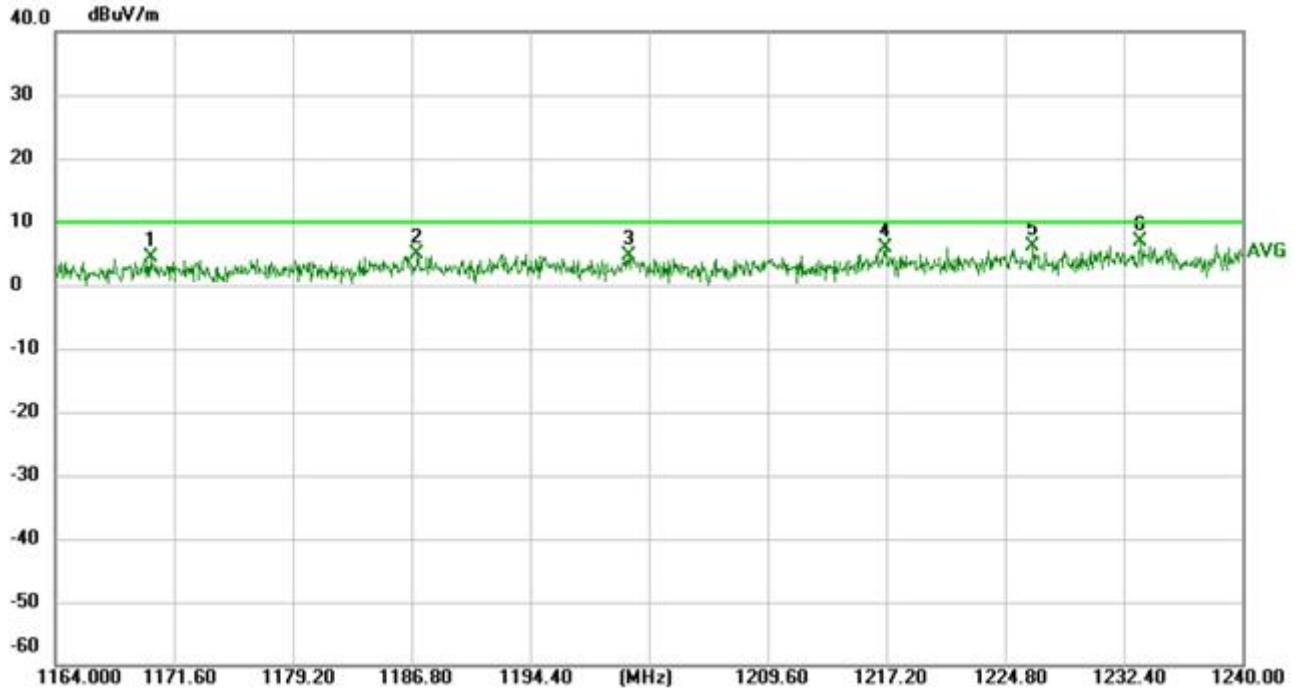
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	1563.641	24.19	-15.96	8.23	10.00	-1.77	AVG
2		1565.018	24.02	-15.99	8.03	10.00	-1.97	AVG
3		1579.043	23.90	-16.21	7.69	10.00	-2.31	AVG
4		1589.345	23.75	-16.36	7.39	10.00	-2.61	AVG
5		1600.004	23.60	-16.54	7.06	10.00	-2.94	AVG
6		1608.878	24.25	-16.50	7.75	10.00	-2.25	AVG

Test Result: Pass

Note 1: Level (dBuV) = Reading (dBuV) + Factor (dB/m)

1164-1240 MHz:

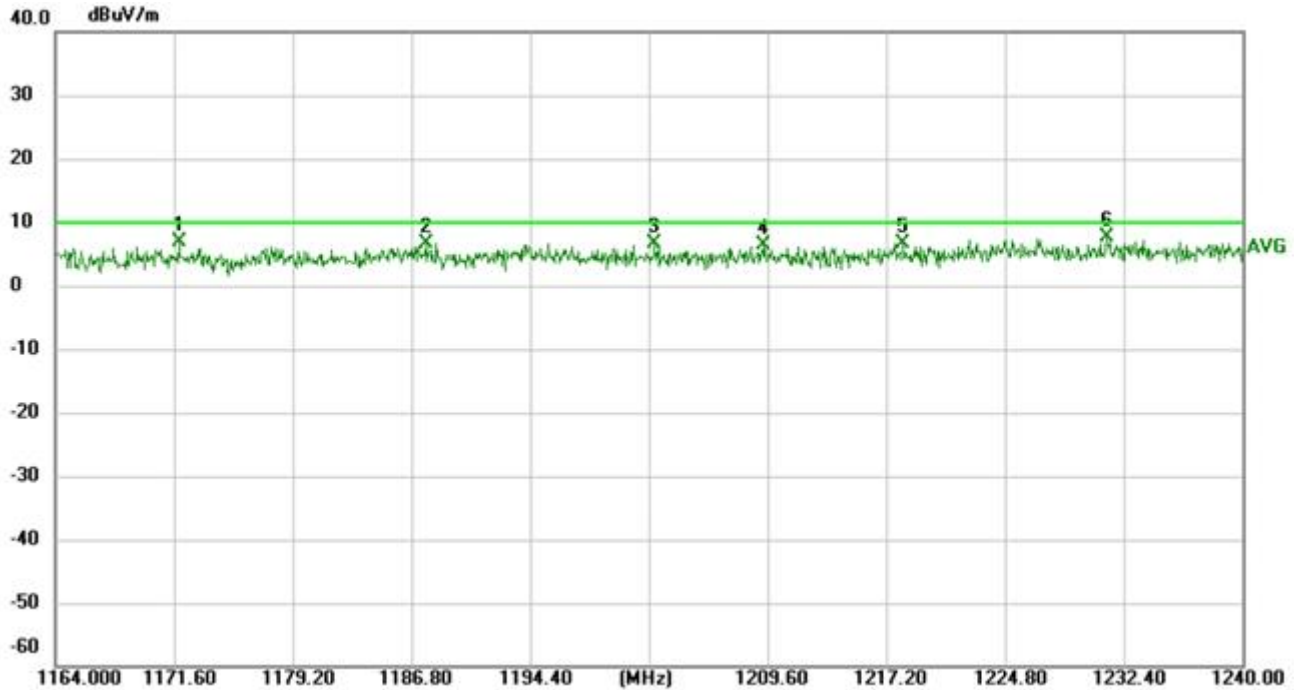
[Test Mode: TX-7987.2MHz]; [Polarity: Horizontal] Chip Antenna @ RBW=1kHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		1170.080	23.67	-19.22	4.45	10.00	-5.55	AVG
2		1187.180	23.93	-19.08	4.85	10.00	-5.15	AVG
3		1200.708	23.49	-18.94	4.55	10.00	-5.45	AVG
4		1217.124	24.07	-18.29	5.78	10.00	-4.22	AVG
5		1226.548	24.14	-17.93	6.21	10.00	-3.79	AVG
6	*	1233.464	24.52	-17.65	6.87	10.00	-3.13	AVG

Test Result: Pass

[Test Mode: TX-7987.2MHz];; [Polarity: Vertical] Chip Antenna @ RBW=1kHz



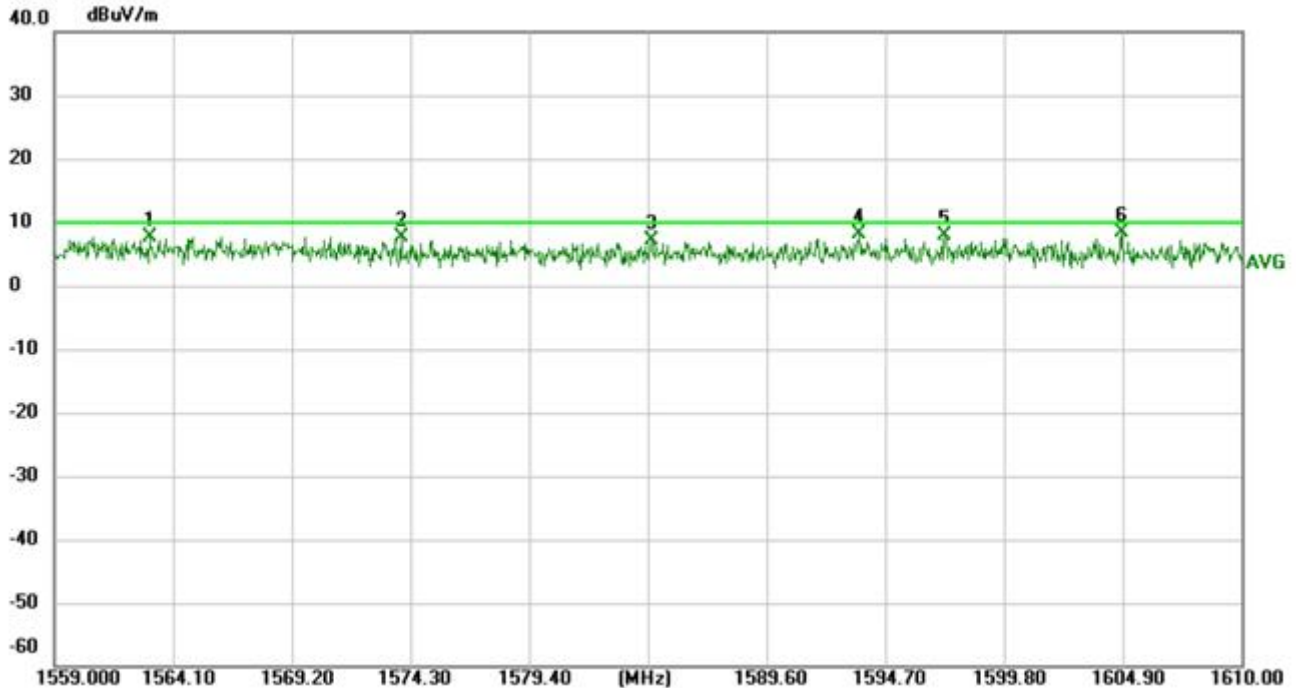
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		1171.904	24.46	-17.51	6.95	10.00	-3.05	AVG
2		1187.712	24.11	-17.45	6.66	10.00	-3.34	AVG
3		1202.380	23.89	-17.35	6.54	10.00	-3.46	AVG
4		1209.372	23.60	-17.17	6.43	10.00	-3.57	AVG
5		1218.264	23.61	-16.94	6.67	10.00	-3.33	AVG
6	*	1231.336	24.32	-16.62	7.70	10.00	-2.30	AVG

Test Result: Pass

Note 1: Level (dBuV) = Reading (dBuV) + Factor (dB/m)

1559-1610 MHz

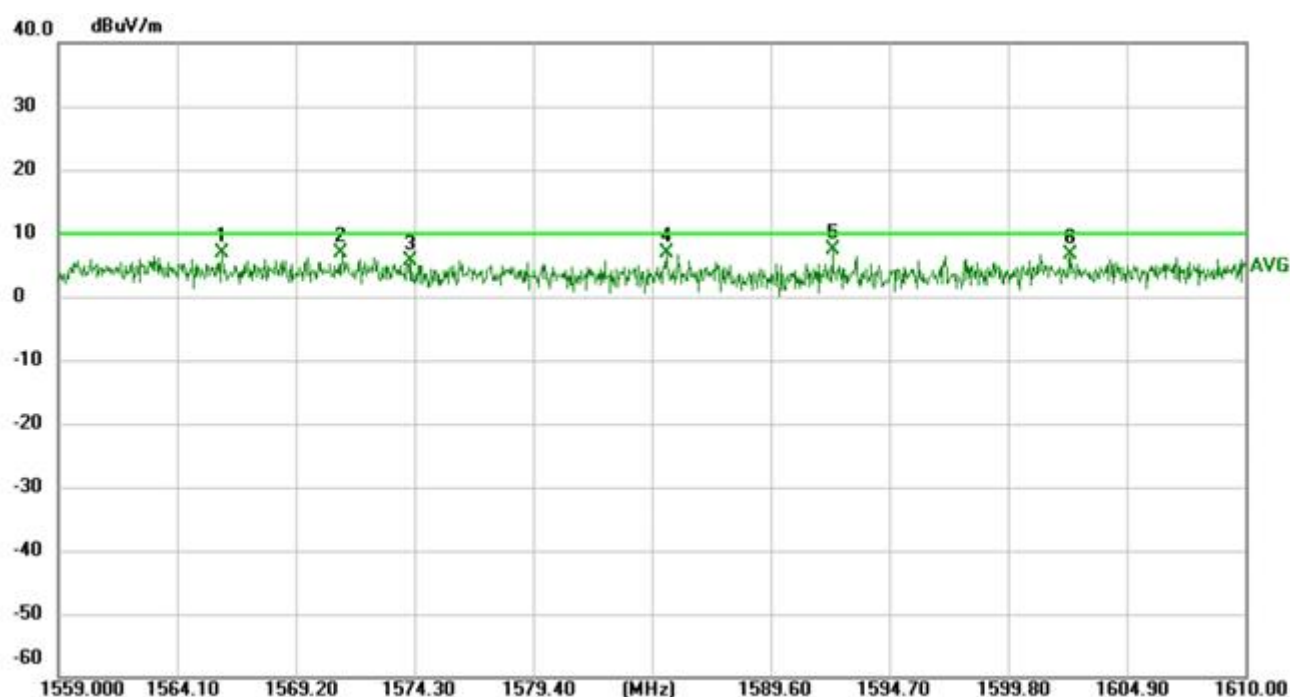
[Test Mode: TX-7987.2MHz]; [Polarity: Horizontal] FPC Antenna @ RBW=1kHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		1563.080	23.59	-15.95	7.64	10.00	-2.36	AVG
2		1573.892	23.68	-16.13	7.55	10.00	-2.45	AVG
3		1584.653	23.45	-16.30	7.15	10.00	-2.85	AVG
4		1593.578	24.49	-16.43	8.06	10.00	-1.94	AVG
5		1597.250	24.29	-16.49	7.80	10.00	-2.20	AVG
6	*	1604.849	24.82	-16.52	8.30	10.00	-1.70	AVG

Test Result: Pass

[Test Mode: TX-7987.2MHz];; [Polarity: Vertical] FPC Antenna @ RBW=1kHz



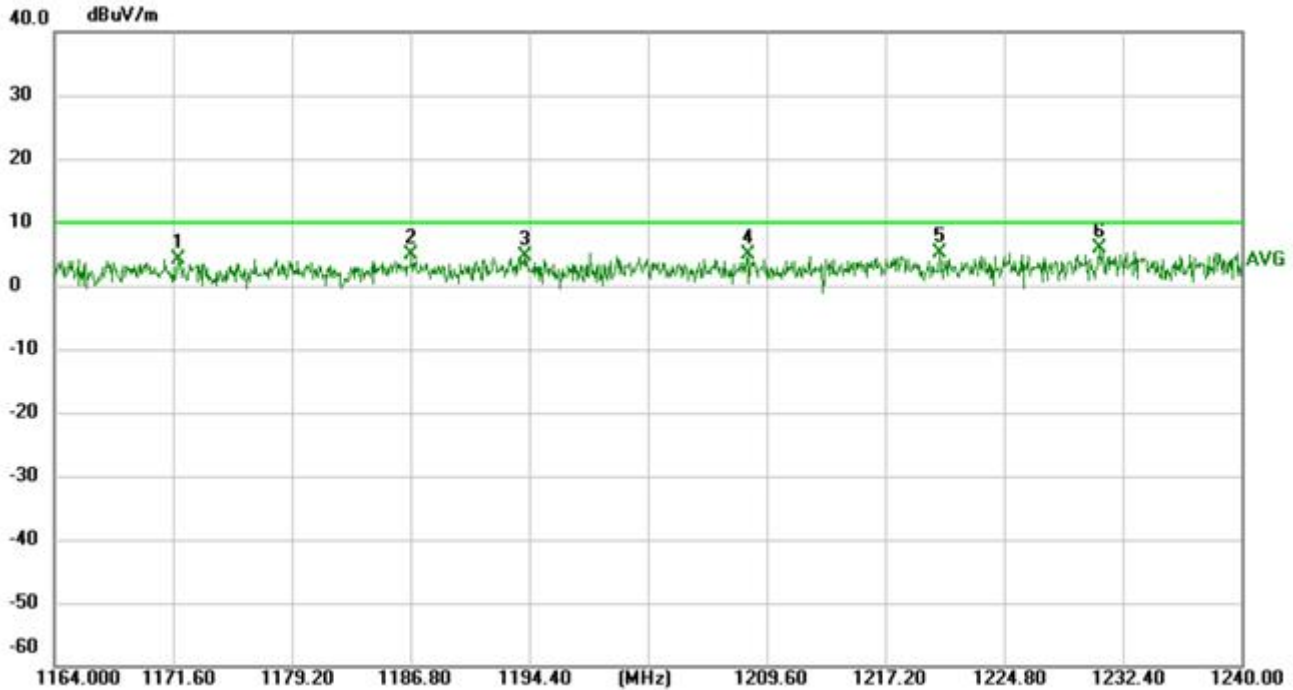
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		1566.038	24.19	-17.24	6.95	10.00	-3.05	AVG
2		1571.189	24.18	-17.33	6.85	10.00	-3.15	AVG
3		1574.147	22.99	-17.37	5.62	10.00	-4.38	AVG
4		1585.112	24.35	-17.55	6.80	10.00	-3.20	AVG
5	*	1592.252	24.92	-17.66	7.26	10.00	-2.74	AVG
6		1602.452	24.32	-17.77	6.55	10.00	-3.45	AVG

Test Result: Pass

Note 1: Level (dBuV) = Reading (dBuV) + Factor (dB/m)

1164-1240 MHz:

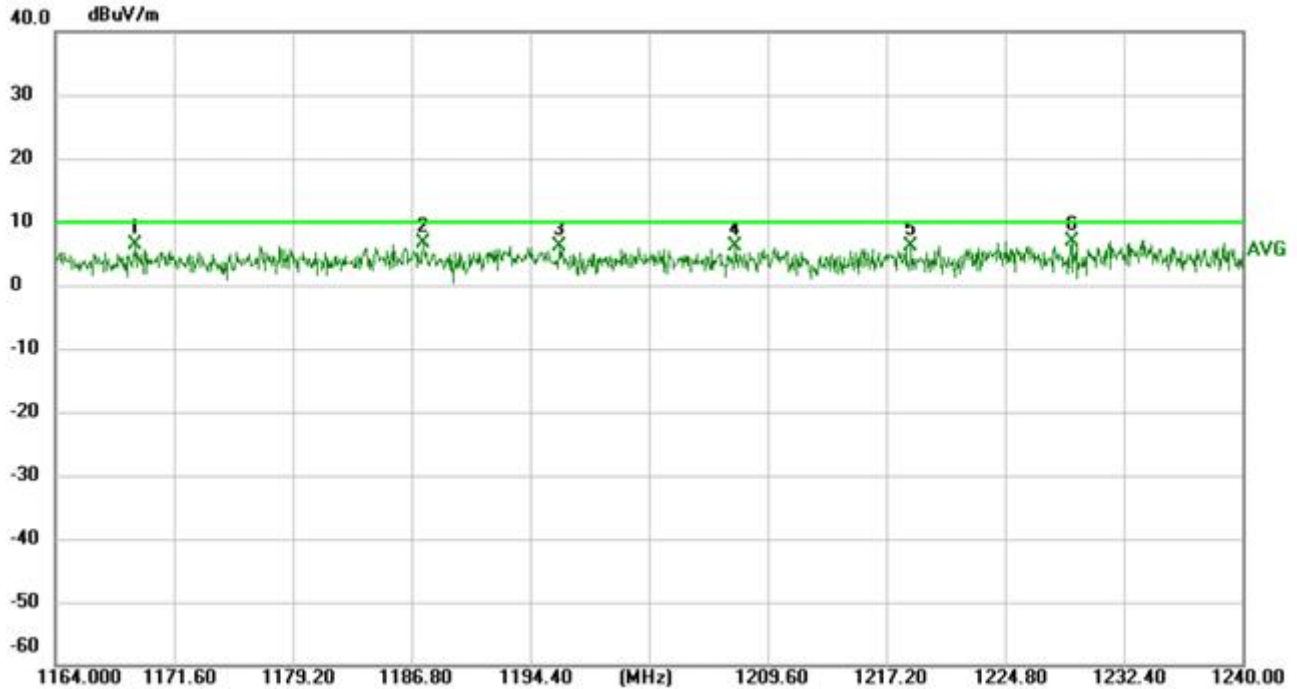
[Test Mode: TX-7987.2MHz]; [Polarity: Horizontal] FPC Antenna @ RBW=1kHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		1171.904	23.40	-19.20	4.20	10.00	-5.80	AVG
2		1186.876	24.01	-19.09	4.92	10.00	-5.08	AVG
3		1194.096	23.64	-19.03	4.61	10.00	-5.39	AVG
4		1208.384	23.40	-18.64	4.76	10.00	-5.24	AVG
5		1220.696	23.33	-18.15	5.18	10.00	-4.82	AVG
6	*	1230.880	23.73	-17.75	5.98	10.00	-4.02	AVG

Test Result: Pass

[Test Mode: TX-7987.2MHz];; [Polarity: Vertical] FPC Antenna @ RBW=1kHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		1169.092	24.02	-17.52	6.50	10.00	-3.50	AVG
2		1187.560	24.14	-17.45	6.69	10.00	-3.31	AVG
3		1196.300	23.67	-17.42	6.25	10.00	-3.75	AVG
4		1207.548	23.39	-17.22	6.17	10.00	-3.83	AVG
5		1218.796	23.12	-16.93	6.19	10.00	-3.81	AVG
6	*	1229.056	23.57	-16.67	6.90	10.00	-3.10	AVG

Test Result: Pass

Note 1: Level (dBuV) = Reading (dBuV) + Factor (dB/m)

6.7 Cease Transmission Time

6.7.1 Limit

For FCC 15.519 Technical requirements for hand held UWB systems:

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.

According to KDB 393764 D01 UWB FAQ v02 section 4:

An acknowledgement of reception must continue to be received by the UWB device at least once every 10 seconds, or else the device shall cease transmission of any information other than periodic signals for use in the establishment or re-establishment of a communications link with an associated receiver.

6.7.2 Test procedure

RBW: 8 MHz, VBW: 8 MHz

Detector: peak

Span: 0Hz

6.7.3 Results

Frequency (MHz)	Transmission time (s)	Limit (s)	Remark
7987.2	1.815	<10	PASS

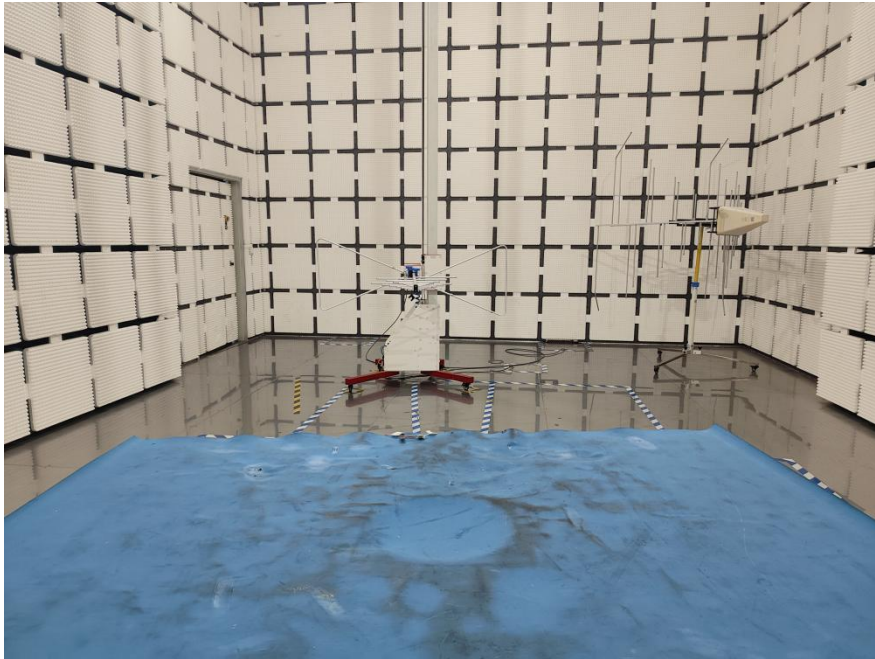
Test Plot:

CH 09:

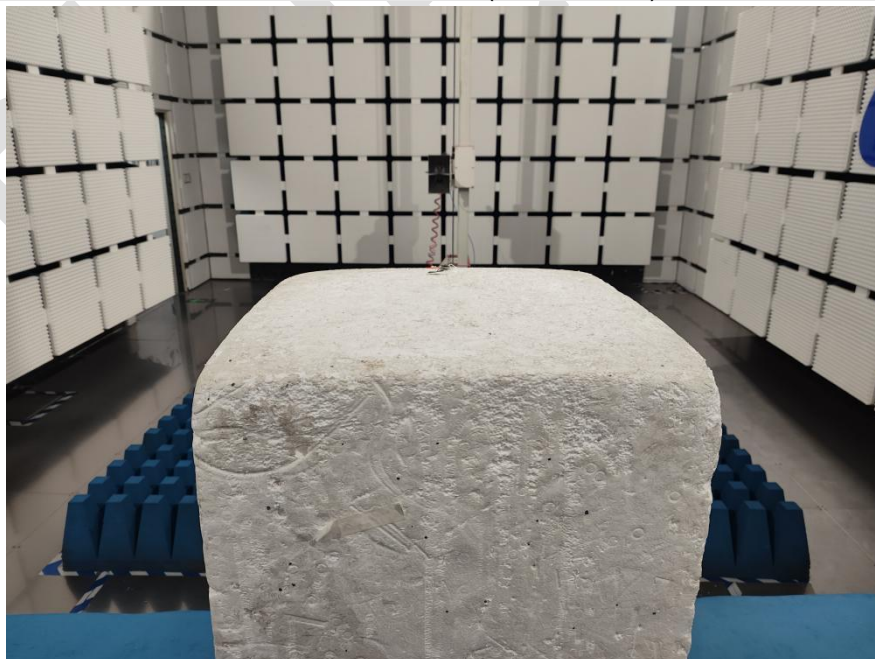


Appendix B: photographs of test setup

Radiated Emissions (30MHz-1GHz)



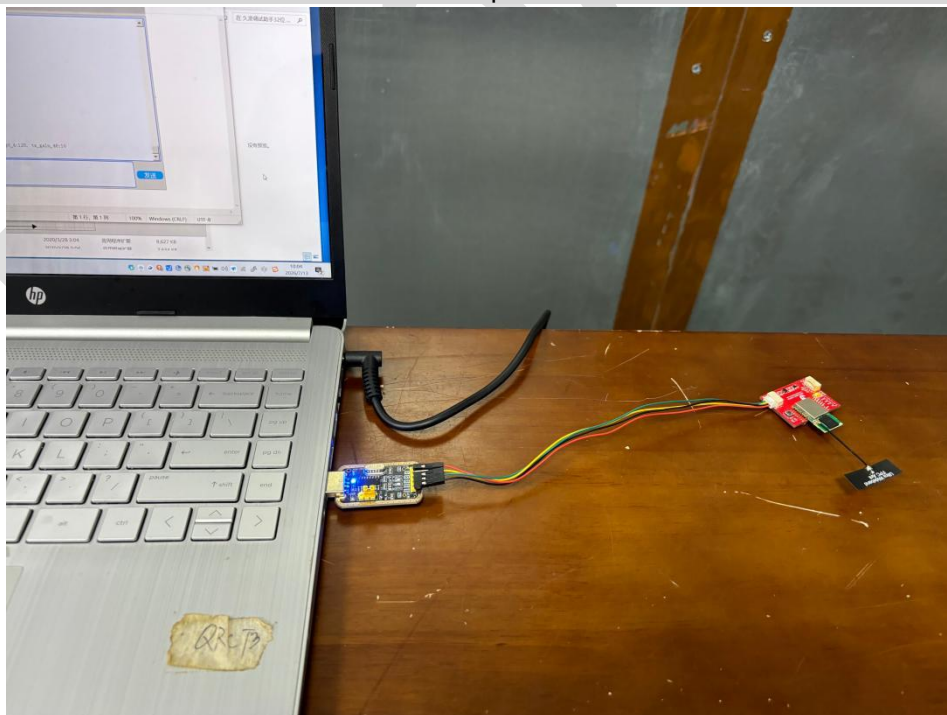
Radiated Emissions (above 1GHz)



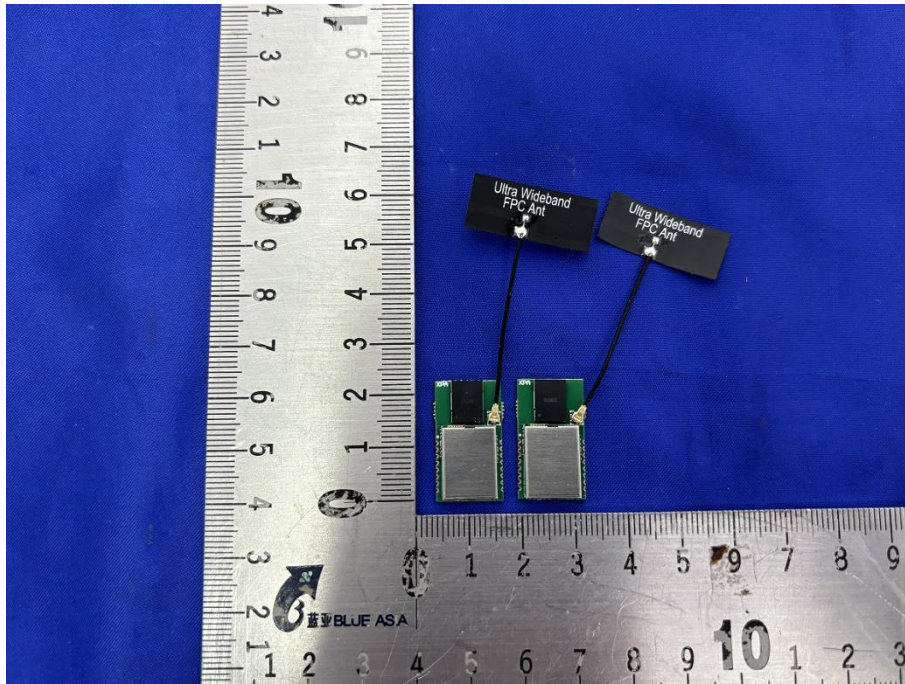
Conducted Emissions at Mains Terminals (150 kHz-30MHz)



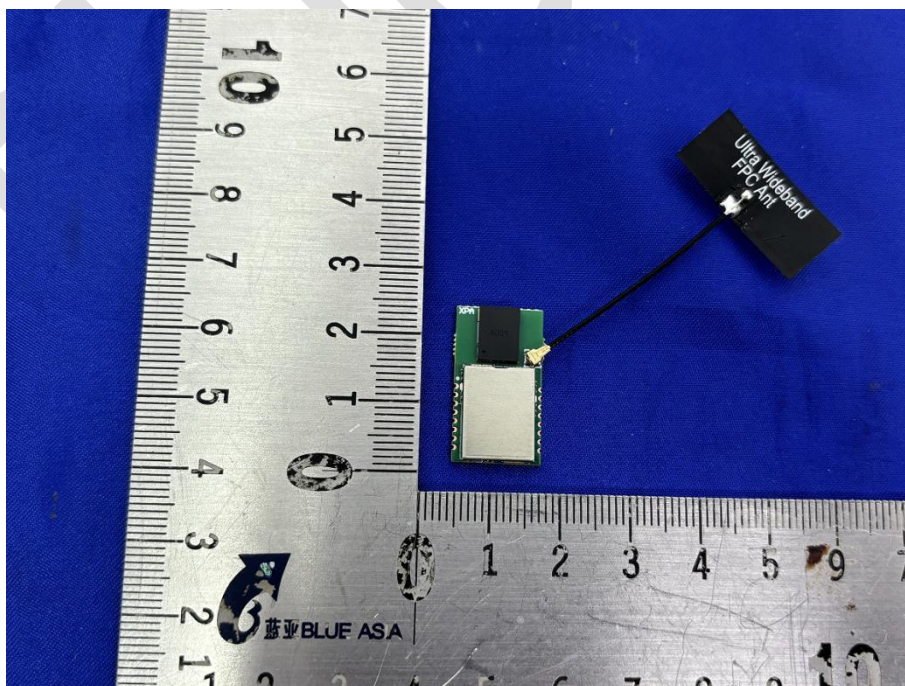
Close-up view



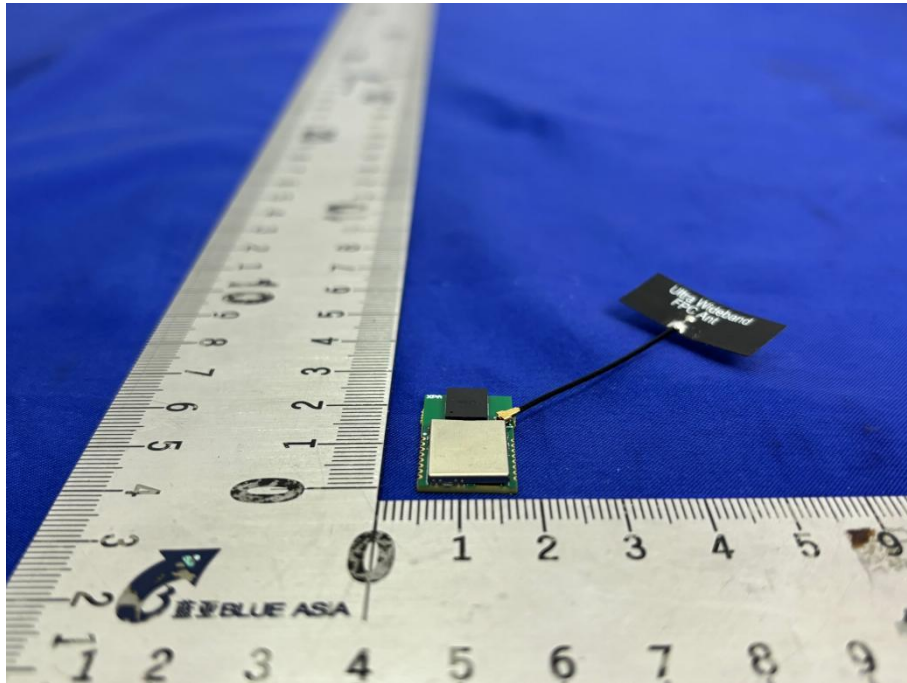
Appendix C: photographs of EUT



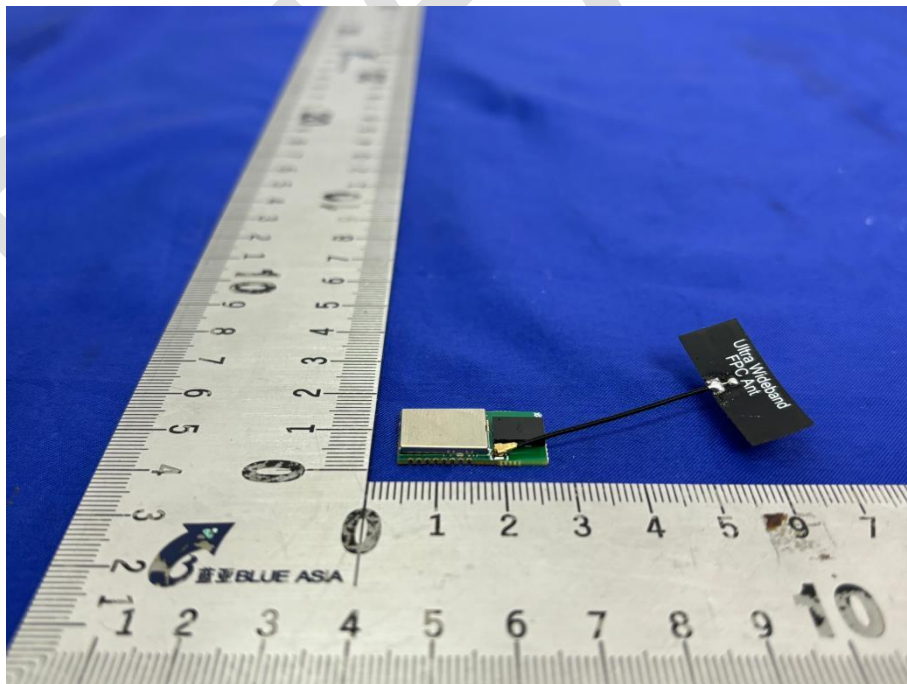
View of Product-1



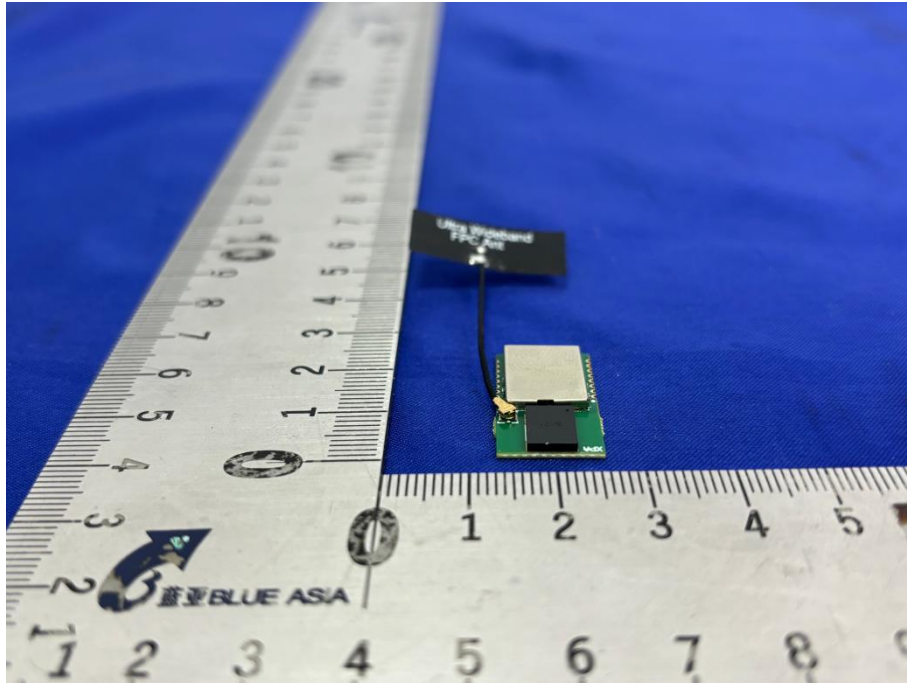
View of Product-2



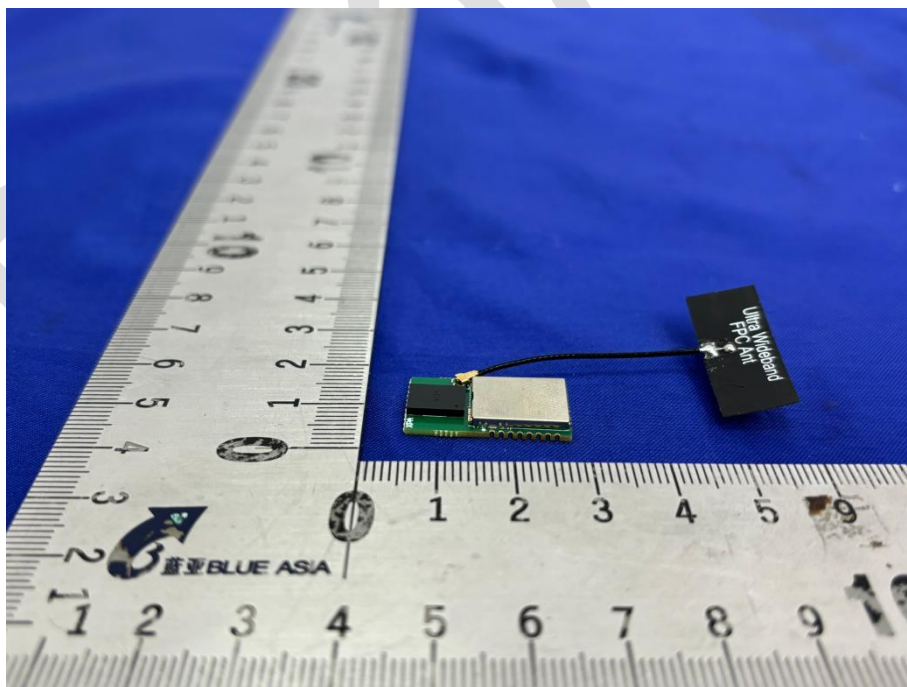
View of Product-3



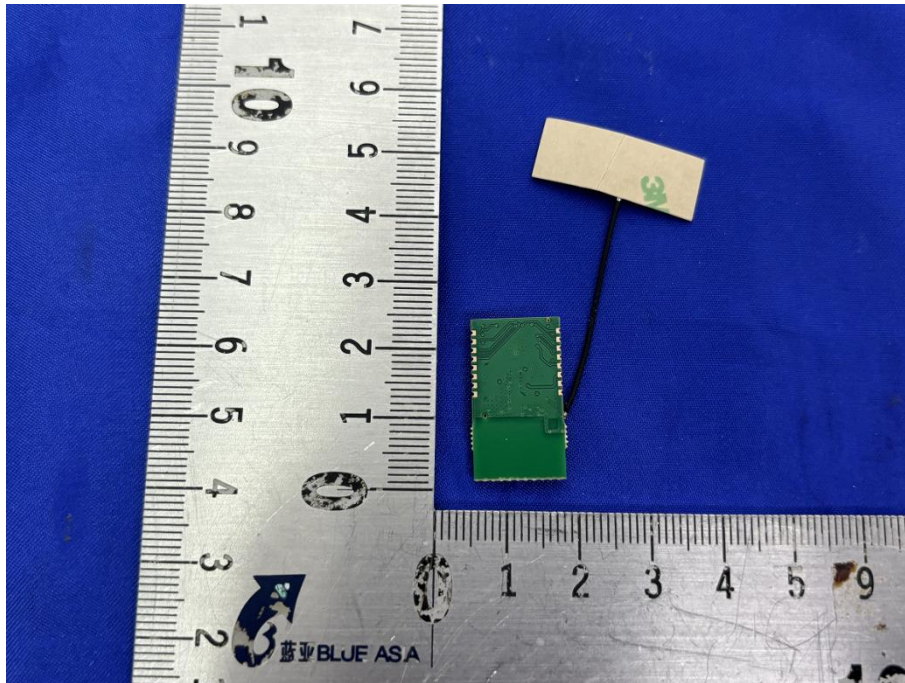
View of Product-4



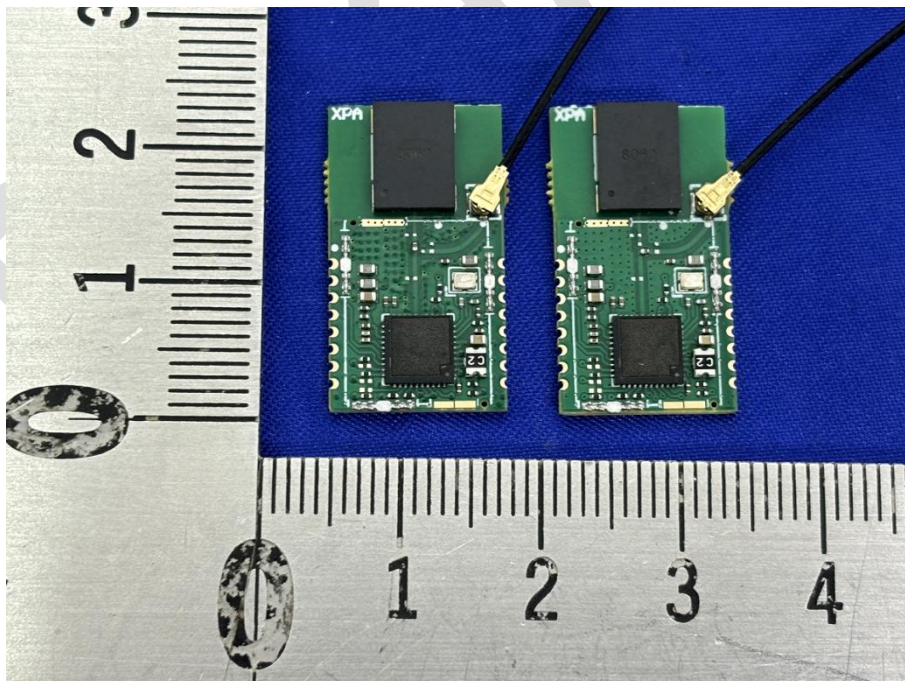
View of Product-5



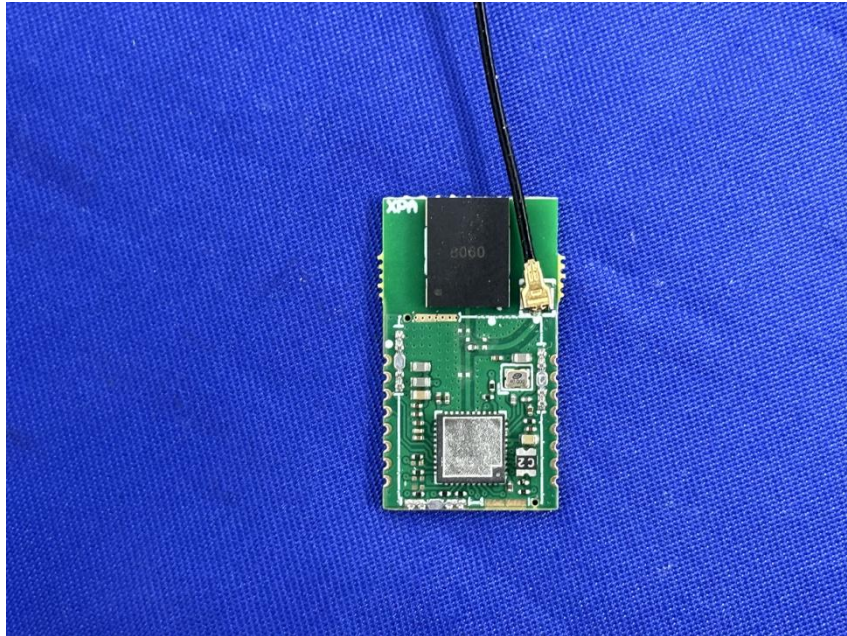
View of Product-6



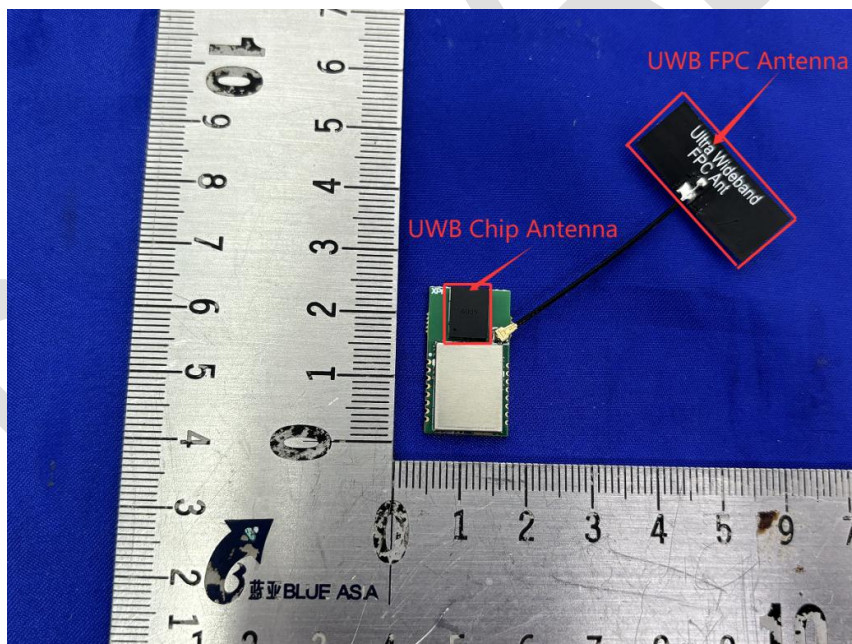
View of Product-7



View of Product-8



View of Product-9



View of Product-10

----END OF REPORT----

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