

FCC Test Report

Report No.: RFBGYQ-WTW-P25110657

FCC ID.: ZHK-M033

Model No.: M-033

Received Date: 2025/12/9

Test Date: 2026/2/24 ~ 2026/3/11

Issued Date: 2026/4/7

Applicant: GN Audio USA Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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33383, Taiwan

**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBGYQ-WTW-P25110657	Original Release	2026/4/7

1. Certificate of Conformity

Product: Wireless Mouse

Brand: steelseries

Test Model: M-033

Sample Status: Engineering sample

Applicant: GN Audio USA Inc.

Test Date: 2026/2/24 ~ 2026/3/11

Standards: 47 CFR FCC Part 15, Subpart F (Section 15.519)
ANSI C63.10-2020

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Lena Wang, **Date:** 2026/4/7
Lena Wang / Specialist

Approved by : Jeremy Lin, **Date:** 2026/4/7
Jeremy Lin / Project Engineer

2. Summary of Test Results

47 CFR FCC Part 15, Subpart F (Section 15.519)			
Standard Section	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	N/A	Without AC power port of the EUT
15.209	Radiated Emissions at or Below 960 MHz	Pass	Meet the requirement of limit. Minimum passing margin is -11.30 dB at 918.55 MHz.
15.519	Radiated emissions above 960 MHz	Pass	Meet the requirement of limit. Minimum passing margin is -0.49 dB at 7290.88 MHz.
15.519	UWB Bandwidth	Pass	Meet the requirement of limit.
15.519	Transmission Time	Pass	Meet the requirement of limit.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.59 dB
	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3. General Information

3.1 General Description of EUT

Product	Wireless Mouse
Brand	steelseries
Test Model	M-033
Sample Status	Engineering sample
Power Supply Rating	3.91 Vdc from battery
Modulation Type	OOK
Number of Channel	1
Operating Frequency Range	6.0 GHz ~ 8.5 GHz
Operating Frequency	7290.88 MHz
Output Power	-4.87 dBm (PK)
Antenna Type	Refer to Note for more details
Antenna Connector	Refer to Note for more details
Accessory Device	Refer to Note for more details
Cable Supplied	Refer to Note for more details
Device category	Handheld UWB systems(15.519)

Note:

1. The EUT uses following accessories.

Item	Brand	Model	Specification
Battery	steelseries	682020PN9 or M672020XV	Rating: 3.91Vdc

2. The antenna information is listed as below.

RF Port No.	Antenna Type	Brand	Model	Antenna Connector	Freq. (MHz)	Gain (dBi)
1	Vivaldi	SPARK Microsystems	SR1020	N/A	7290.88	2.22
2						2.29

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

3.2 Description of Test Modes

1 channel is provided to this EUT

Frequency (MHz)
7290.88

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to					Description
	BW	RE<1G	RE≥1G	TT	PLC	
-	√	√	√	√	-	-

Where BW: Occupied Bandwidth

RE<1G: Radiated Emission below 960 MHz

RE≥1G: Radiated Emission above 960 MHz & Bandedge Measurement

PLC: Power Line Conducted Emission

TT: Transmission Time

Note: The EUT is designed to be positioned on the X-plane only.

Radiated Emission Test (Above 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Operating Frequency	Modulation Type
-	1	7290.88MHz	OOK

Radiated Emission Test (Below 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Operating Frequency	Modulation Type
-	1	7290.88MHz	OOK

UBW Bandwidth Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Operating Frequency	Modulation Type
-	1	7290.88MHz	OOK

Transmission Time Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

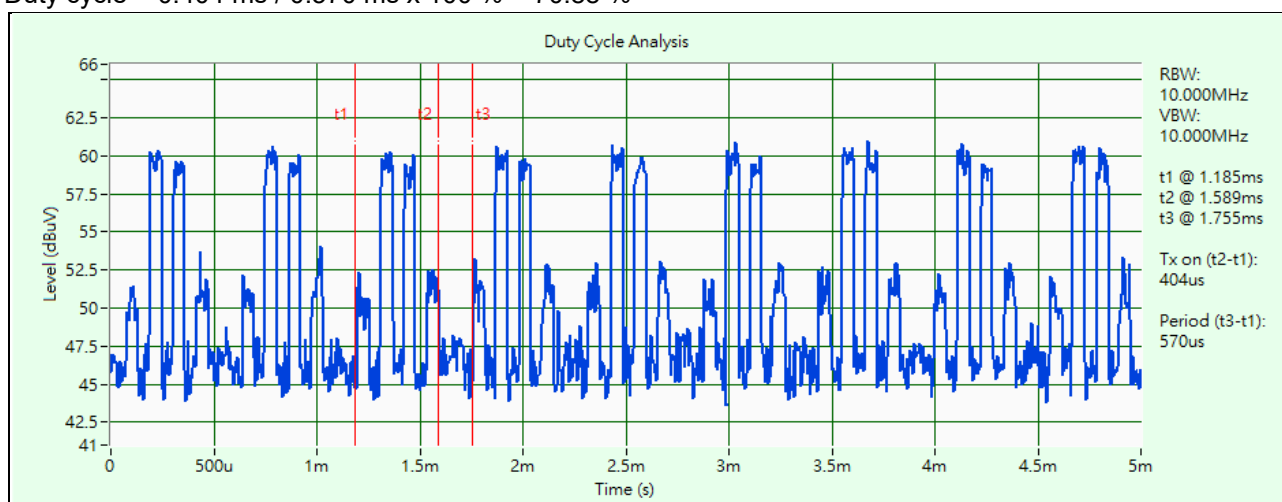
EUT Configure Mode	Available Channel	Tested Operating Frequency	Modulation Type
-	1	7290.88MHz	OOK

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	23 deg. C, 68% RH	3.91Vdc	Luis Lee
RE<1G	23 deg. C, 68% RH	3.91Vdc	Luis Lee
BW	23 deg. C, 68% RH	3.91Vdc	Luis Lee
TT	23 deg. C, 68% RH	3.91Vdc	Luis Lee

3.3 Duty cycle of test signal.

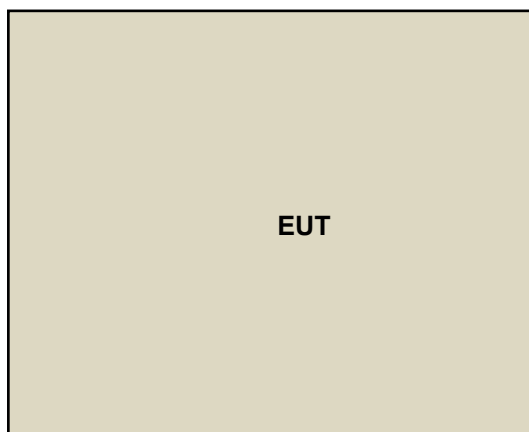
Duty cycle = $0.404 \text{ ms} / 0.570 \text{ ms} \times 100 \% = 70.88 \%$



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

47 CFR FCC Part 15, Subpart F

ANSI C63.10-2020

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

4. Test Types and Results

4.1 Radiated Emissions

4.1.1 Limits of Radiated Emission Measurement - at or Below 960 MHz

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

1. The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average emissions detector.
2. The lower limit shall apply at the transition frequencies.
3. Emission level (dBuV/m) = 20 log Emission level (uV/m).
4. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

4.1.2 Limits of Radiated Emission Measurement - Above 960 MHz

Ground penetrating radars and wall imaging systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-65.3
1610-1990	-53.3
1990-3100	-51.3
3100-10600	-41.3
Above 10600	-51.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-75.3
1559-1610	-75.3

D-wall imaging systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-65.3
1610-1990	-53.3
Above 1990	-51.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-75.3
1559-1610	-75.3

Surveillance systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-53.3
1610-1990	-51.3
1990-10600	-41.3
Above 10600	-51.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-63.3
1559-1610	-63.3

Medical imaging systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-65.3
1610-1990	-53.3
011990-3100	-51.3
3100-10600	-41.3
Above 10600	-51.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-75.3
1559-1610	-75.3

Vehicular radar systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-75.3
1610-22,000	-61.3
22,000-29,000	-41.3
29,000-31,000	-51.3
Above 31,000	-61.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-85.3
1559-1610	-85.3

Indoor UWB systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-75.3
1610-1990	-53.3
1990-3100	-51.3
3100-10600	-41.3
Above 10600	-51.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-85.3
1559-1610	-85.3

Hand held UWB systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-75.3
1610-1990	-63.3
1990-3100	-61.3
3100-10600	-41.3
Above 10600	-61.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-85.3
1559-1610	-85.3

Note:

1. Within the tables in §§15.509, 15.511, 15.513, 15.515, 15.517, and 15.519, the tighter emission limit applies at the band edges. Radiated emission levels at and below 960 MHz are based on measurements employing a CISPR quasi-peak detector. Radiated emission levels above 960 MHz are based on RMS average measurements over a 1 MHz resolution bandwidth. The RMS average measurement is based on the use of a spectrum analyzer with a resolution bandwidth of 1 MHz, an RMS detector, and a 1 millisecond or less averaging time. Unless otherwise stated, if pulse gating is employed where the transmitter is quiescent for intervals that are long compared to the nominal pulse repetition interval, measurements shall be made with the pulse train gated on. Alternative measurement procedures may be considered by the Commission.
2. 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.
3. For vehicular radar systems: Following proper installation, vehicular radar systems shall attenuate any emissions within the 23.6-24.0 GHz band that appear 38 degrees or greater above the horizontal plane by 25 dB below the limit specified in paragraph (d) of this section. For equipment authorized, manufactured or imported on or after January 1, 2005, this level of attenuation shall be 25 dB for any emissions within the 23.6-24.0 GHz band that appear 30 degrees or greater above the horizontal plane. For equipment authorized, manufactured or imported on or after January 1, 2010, this level of attenuation shall be 30 dB for any emissions within the 23.6-24.0 GHz band that appear 30 degrees or greater above the horizontal plane. For equipment authorized, manufactured or imported on or after January 1, 2014, this level of attenuation shall be 35 dB for any emissions within the 23.6-24.0 GHz band that appear 30 degrees or greater above the horizontal plane. This level of attenuation can be achieved through the antenna directivity, through a reduction in output power or any other means.

4.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver R&S	ESR3+	102782	2025/12/8	2026/12/7
Spectrum Analyzer R&S	FSW43	101582	2025/4/15	2026/4/14
Loop Antenna TESEQ	HLA 6121	63620	2025/10/20	2026/10/19
Pre-amplifier EMCI	EMC001340	980201	2025/9/21	2026/9/20
RF Coaxial Cable EMCI	5D-NM-BM	140901	2025/9/21	2026/9/20
Pre_Amplifier Agilent	8447D	2944A10631	2025/4/27	2026/4/26
Bi_Log Antenna Schwarzbeck	VULB9168	9168-155	2025/9/16	2026/9/15
RF Coaxial Cable WOKEN	8D-FB	Cable-CH4-01	2025/6/30	2026/6/29
Horn Antenna Schwarzbeck	9120D	9120D-408	2025/11/9	2026/11/8
Pre_Amplifier KEYSIGHT	83017A	MY53270295	2025/4/27	2026/4/26
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03(250724)	2025/4/27	2026/4/26
Pre-Amplifier EMCI	EMC 184045	980116	2025/9/21	2026/9/20
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170241	2025/10/28	2026/10/27
Horn Antenna Schwarzbeck	BBHA 9170	9170-480	2025/11/9	2026/11/8
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170243	2025/11/9	2026/11/8
RF Coaxial Cable EMCI	EMC102-KM-KM-3000	150929	2025/6/30	2026/6/29
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2025/6/30	2026/6/29
Pre-Amplifier EMCI	EMC 184045	980116	2025/9/21	2026/9/20
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight antenna tower fixture BV	BAF-02	5	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HY - 966 chamber 3.

4.2.1 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

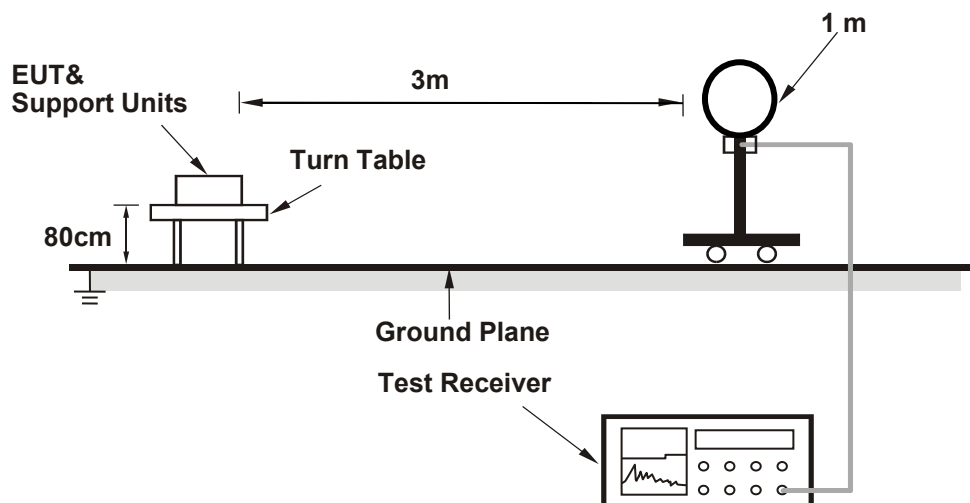
- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 960MHz) / 1.5 meters (for above 960MHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

4.2.2 Deviation from Test Standard

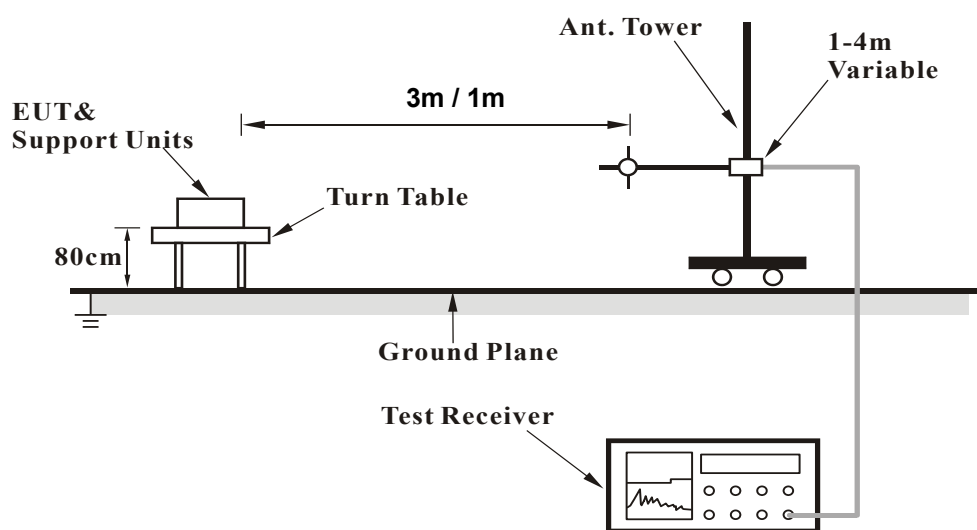
No deviation.

4.2.3 Test Setup

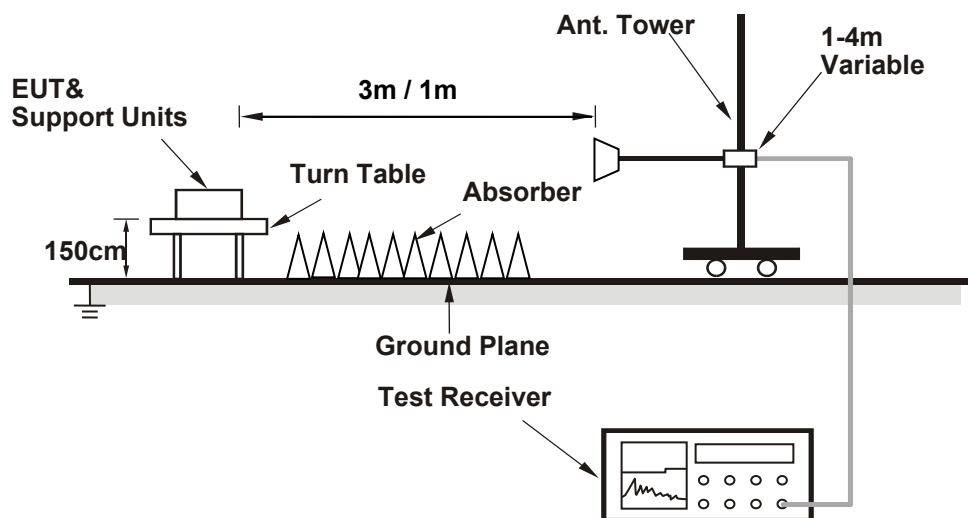
For Radiated emission below 30MHz



For Radiated emission 30MHz to 960MHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.4 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.

4.2.5 Test Results

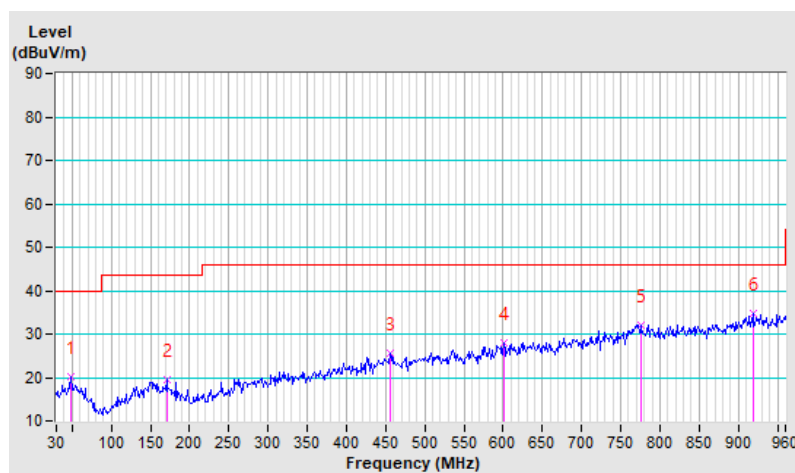
<960MHz

RF Mode	UWB	Operating Frequency	7290.88 MHz
Frequency Range	30 MHz ~ 960 MHz	Detector Function & Bandwidth	(QP), RB = VB = 120 kHz Sweep time = Auto

Antenna Polarity & Test Distance: Horizontal at 3 m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	48.18	20.08 QP	40.00	-19.92	1.50 H	240	28.74	-8.66
2	170.51	19.41 QP	43.50	-24.09	1.00 H	299	28.21	-8.80
3	455.94	25.66 QP	46.00	-20.34	1.00 H	27	29.78	-4.12
4	600.77	27.92 QP	46.00	-18.08	1.50 H	178	28.86	-0.94
5	775.13	32.18 QP	46.00	-13.82	1.00 H	233	29.14	3.04
6	918.55	34.70 QP	46.00	-11.30	1.50 H	24	28.91	5.79

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The frequency range 9kHz ~ 30MHz: all emissions are more than 20dB below the limit, therefore do not be recorded in this report.

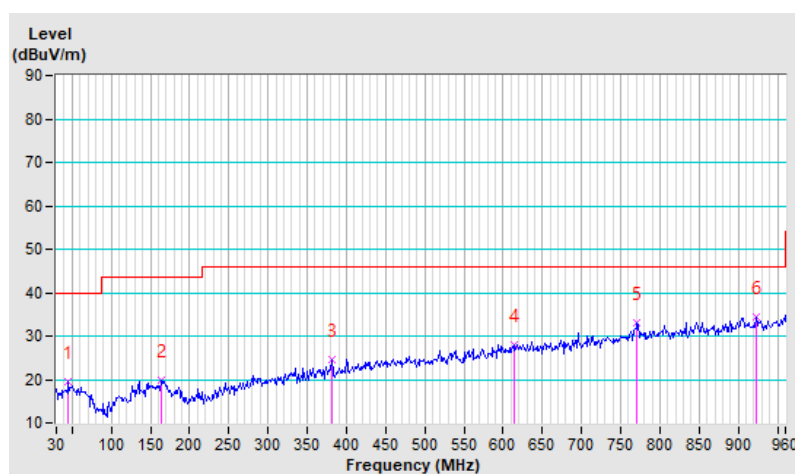


RF Mode	UWB	Operating Frequency	7290.88 MHz
Frequency Range	30 MHz ~ 960 MHz	Detector Function & Bandwidth	(QP), RB = VB = 120 kHz Sweep time = Auto

Antenna Polarity & Test Distance: Vertical at 3 m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	45.37	19.48 QP	40.00	-20.52	1.50 V	69	28.26	-8.78
2	163.48	19.75 QP	43.50	-23.75	1.00 V	79	28.26	-8.51
3	381.42	24.55 QP	46.00	-21.45	1.00 V	152	30.20	-5.65
4	614.83	28.11 QP	46.00	-17.89	1.50 V	77	28.51	-0.40
5	770.91	32.89 QP	46.00	-13.11	1.00 V	142	29.91	2.98
6	922.77	34.31 QP	46.00	-11.69	1.00 V	333	28.48	5.83

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The frequency range 9kHz ~ 30MHz: all emissions are more than 20dB below the limit, therefore do not be recorded in this report.



960 MHz – 10.6 GHz

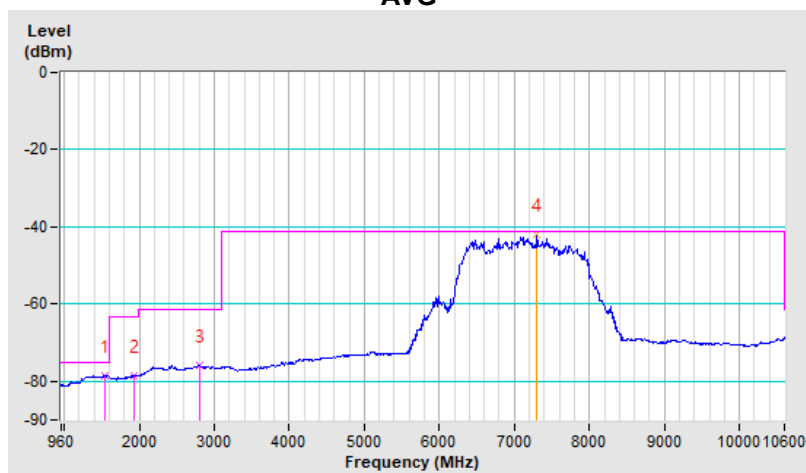
RF Mode	UWB	Operating Frequency	7290.88 MHz
Frequency Range	960 MHz ~ 10600 MHz	Detector Function & Bandwidth	(AV), RB = 1 MHz, VB = 3 MHz (RMS) (PK), RB = 50 MHz, VB = 50 MHz Sweep time = Auto

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1538.40(AV)	-78.53	-75.30	-3.23	3.80 H	344	30.91	-109.44
2	1933.64(AV)	-78.66	-63.30	-15.36	3.78 H	346	29.90	-108.56
3	2801.24(AV)	-75.81	-61.30	-14.51	3.88 H	341	28.99	-104.80
4	7290.88(AV)	-41.79	-41.30	-0.49	3.85 H	340	54.85	-96.64
5	7094.88(PK)	-4.87	0.00	-4.87	3.85 H	340	75.15	-80.02

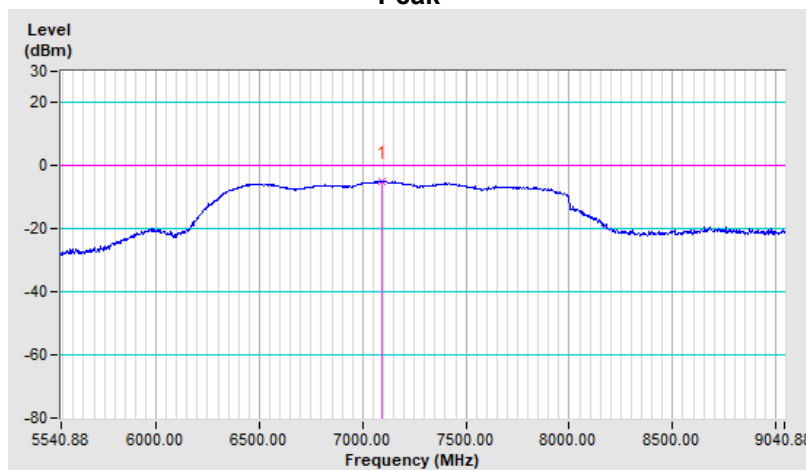
Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)+1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

AVG



Peak



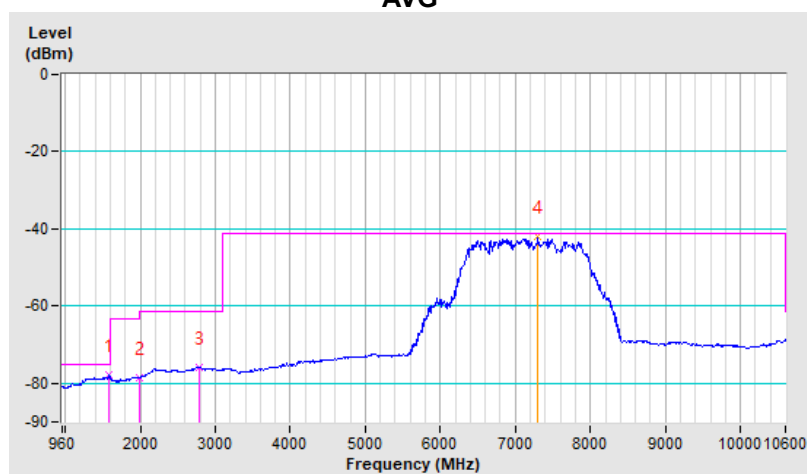
RF Mode	UWB	Operating Frequency	7290.88 MHz
Frequency Range	960 MHz ~ 10600 MHz	Detector Function & Bandwidth	(AV), RB = 1 MHz, VB = 3 MHz (RMS) (PK), RB = 50 MHz, VB = 50 MHz Sweep time = Auto

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1586.60(AV)	-77.72	-75.30	-2.42	3.77 V	315	31.81	-109.53
2	1981.84(AV)	-78.49	-63.30	-15.19	3.80 V	319	29.88	-108.37
3	2791.60(AV)	-75.79	-61.30	-14.49	3.74 V	320	29.07	-104.86
4	7290.88(AV)	-41.90	-41.30	-0.60	4.00 V	307	54.74	-96.64
5	7101.88(PK)	-7.95	0.00	-7.95	4.00 V	307	72.03	-79.98

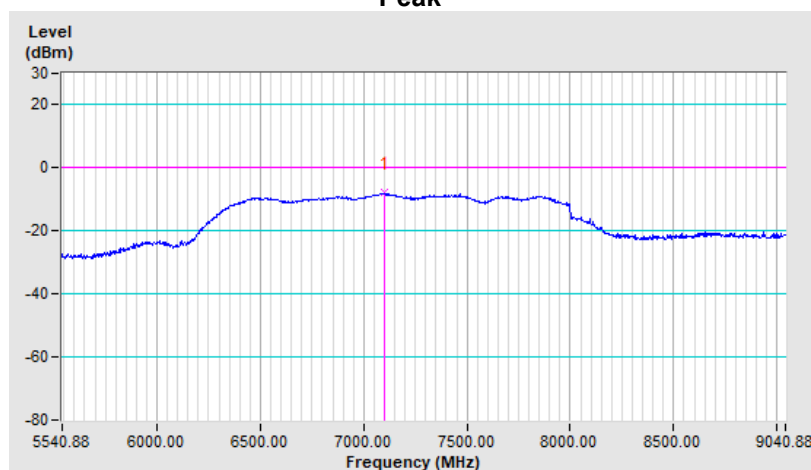
Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)+1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)=20*log(1/3)= -9.54dB
4. Margin value = Emission Level – Limit value.

AVG



Peak



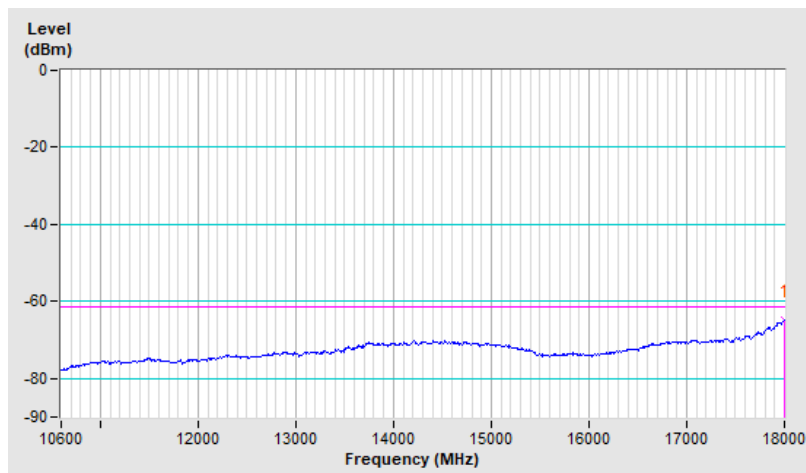
10.6 GHz - 18 GHz

RF Mode	UWB	Operating Frequency	7290.88 MHz
Frequency Range	10600 MHz ~ 18 GHz	Detector Function & Bandwidth	(AV), RB = 1 MHz, VB = 3 MHz (RMS) Sweep time = Auto

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	18000.00	-64.65	-61.30	-3.35	1.41 H	296	19.78	-84.43

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)+1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

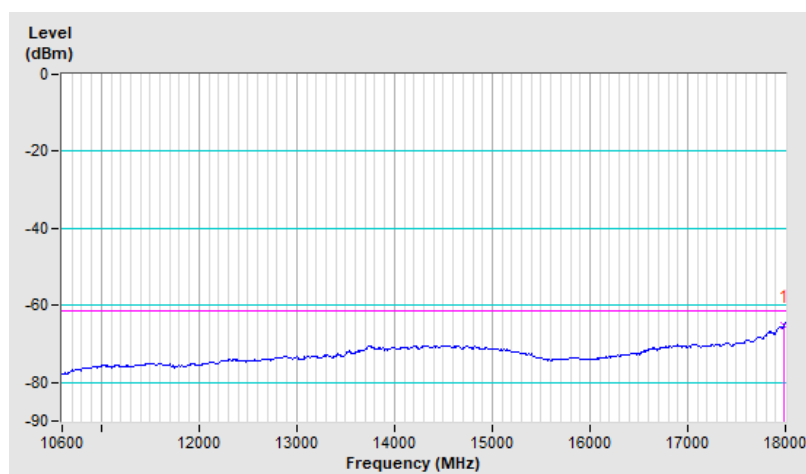


RF Mode	UWB	Operating Frequency	7290.88 MHz
Frequency Range	10600 MHz ~ 18 GHz	Detector Function & Bandwidth	(AV), RB = 1 MHz, VB = 3 MHz (RMS) Sweep time = Auto

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	17990.98	-65.27	-61.30	-3.97	1.85 V	230	19.33	-84.60

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)+1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.



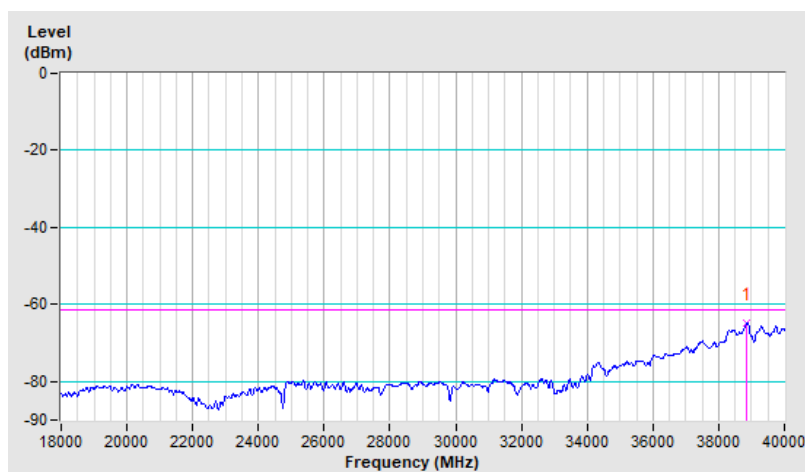
18 GHz – 40 GHz

RF Mode	UWB	Operating Frequency	7290.88 MHz
Frequency Range	18 GHz ~ 40 GHz	Detector Function & Bandwidth	(AV), RB = 1 MHz, VB = 3 MHz (RMS) Sweep time = Auto

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	38856.00	-64.76	-61.30	-3.46	1.69 H	225	35.59	-100.35

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)+1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

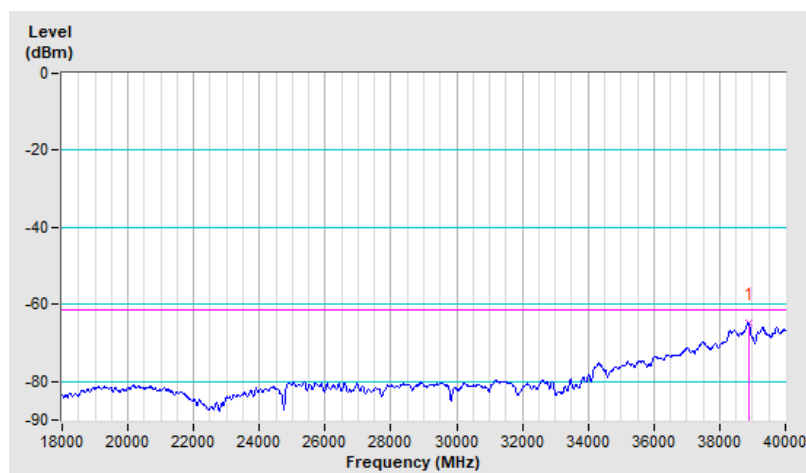


RF Mode	UWB	Operating Frequency	7290.88 MHz
Frequency Range	18 GHz ~ 40 GHz	Detector Function & Bandwidth	(AV), RB = 1 MHz, VB = 3 MHz (RMS) Sweep time = Auto

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	38878.00	-64.99	-61.30	-3.69	1.21 V	258	35.18	-100.17

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)+1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.



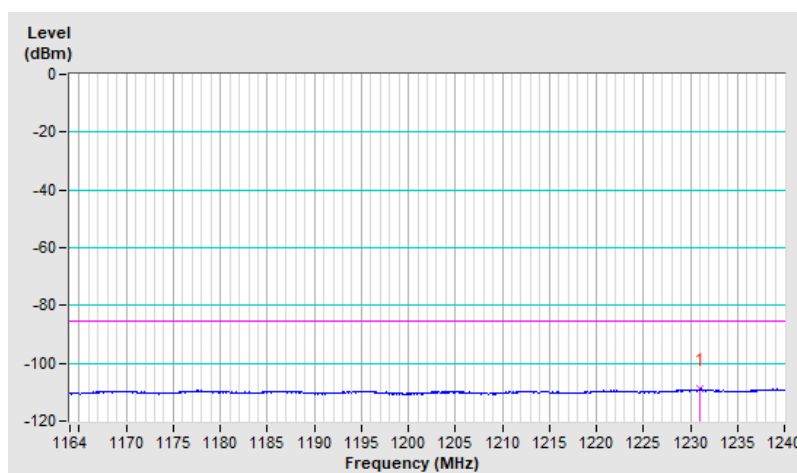
1.164 GHz – 1.24 GHz

RF Mode	UWB	Operating Frequency	7290.88 MHz
Frequency Range	1.164 GHz ~ 1.24 GHz	Detector Function & Bandwidth	(AV), RB = 1 kHz, VB = 3 kHz Sweep time = Auto

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1231.03	-109.01	-85.30	-23.71	1.62 H	301	2.23	-111.24

Remarks:

1. Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)+1m to 3m Test distance Fact(dB).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

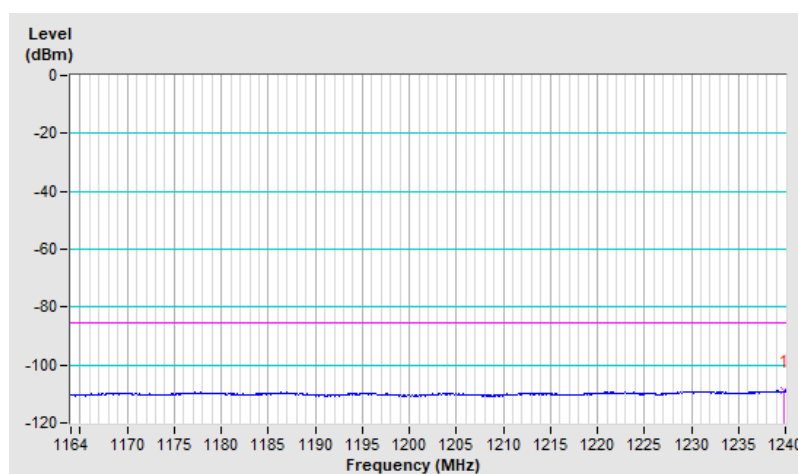


RF Mode	UWB	Operating Frequency	7290.88 MHz
Frequency Range	1.164 GHz ~ 1.24 GHz	Detector Function & Bandwidth	(AV), RB = 1 kHz, VB = 3 kHz Sweep time = Auto

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1239.92	-108.99	-85.30	-23.69	2.69 V	141	2.09	-111.08

Remarks:

1. Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)+1m to 3m Test distance Fact(dB).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.



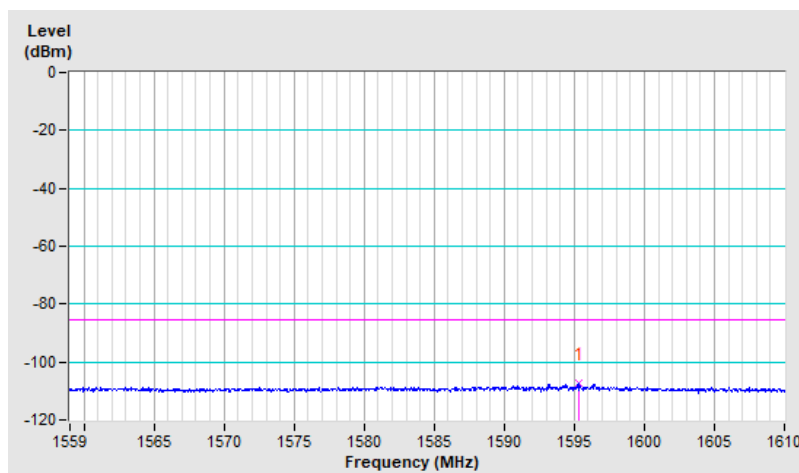
1.559 GHz – 1.61 GHz

RF Mode	UWB	Operating Frequency	7290.88 MHz
Frequency Range	1.599 GHz ~ 1.61 GHz	Detector Function & Bandwidth	(AV), RB = 1 kHz, VB = 3 kHz Sweep time = Auto

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1595.36	-107.45	-85.30	-22.15	2.16 H	180	2.10	-109.55

Remarks:

1. Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)+1m to 3m Test distance Fact(dB).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54\text{dB}$
4. Margin value = Emission Level – Limit value.

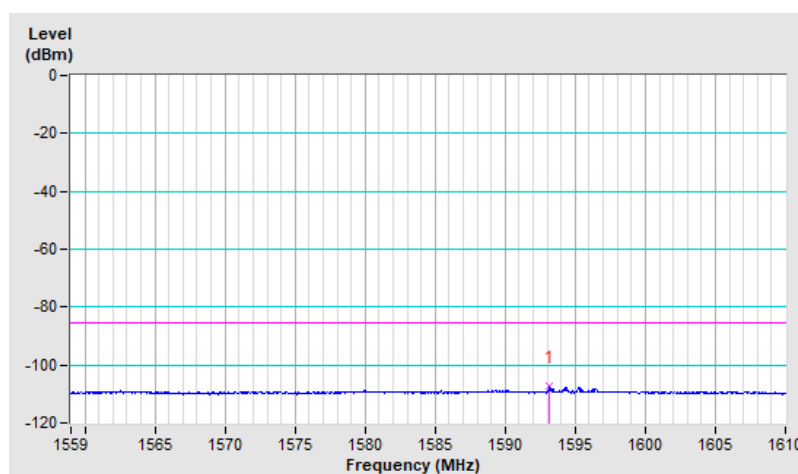


RF Mode	UWB	Operating Frequency	7290.88 MHz
Frequency Range	1.599 GHz ~ 1.61 GHz	Detector Function & Bandwidth	(AV), RB = 1 kHz, VB = 3 kHz Sweep time = Auto

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1593.17	-107.47	-85.30	-22.17	1.99 V	121	2.08	-109.55

Remarks:

1. Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)+1m to 3m Test distance Fact(dB).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.



4.3 UWB Bandwidth Measurement

4.3.1 Limits of Transmitter Power and Power Spectral Density Measurement

	EUT Description	Limit
☐	Ground penetrating radars and wall imaging systems	Must be below 10.6 GHz
☐	D-wall imaging systems	Must be below 960 MHz or the center frequency, f_C , and the frequency at which the highest radiated emission occurs, f_M , must be contained between 1990 MHz and 10600 MHz
☐	Surveillance systems	Must be contained between 1990 MHz and 10,600 MHz
☐	Medical imaging systems	Must be contained between 3100 MHz and 10,600 MHz
☐	Vehicular radar systems	Shall be contained between 22 GHz and 29 GHz. In addition, the center frequency, f_C , and the frequency at which the highest level emission occurs, f_M , must be greater than 24.075 GHz
☐	Indoor UWB systems	Must be contained between 3100 MHz and 10,600 MHz
☒	Hand held UWB systems	Must be contained between 3100 MHz and 10,600 MHz

4.3.2 Test Setup

Same as 4.2.3

4.3.3 Test Instruments

Refer to section 4.2 to get information of above instrument.

4.3.4 Test Procedure

The frequency at which the maximum power level is measured with the peak detector is designated f_M . The peak power measurements shall be made using a spectrum analyzer or EMI receiver with a 1 MHz resolution bandwidth and a video bandwidth of 1 MHz or greater. The instrument shall be set to peak detection using the maximum-hold trace mode. The outermost 1 MHz segments above and below f_M , where the peak power falls by 10 dB relative to the level at f_M , are designated as f_H and f_L , respectively:

4.3.5 Deviation from Test Standard

No deviation.

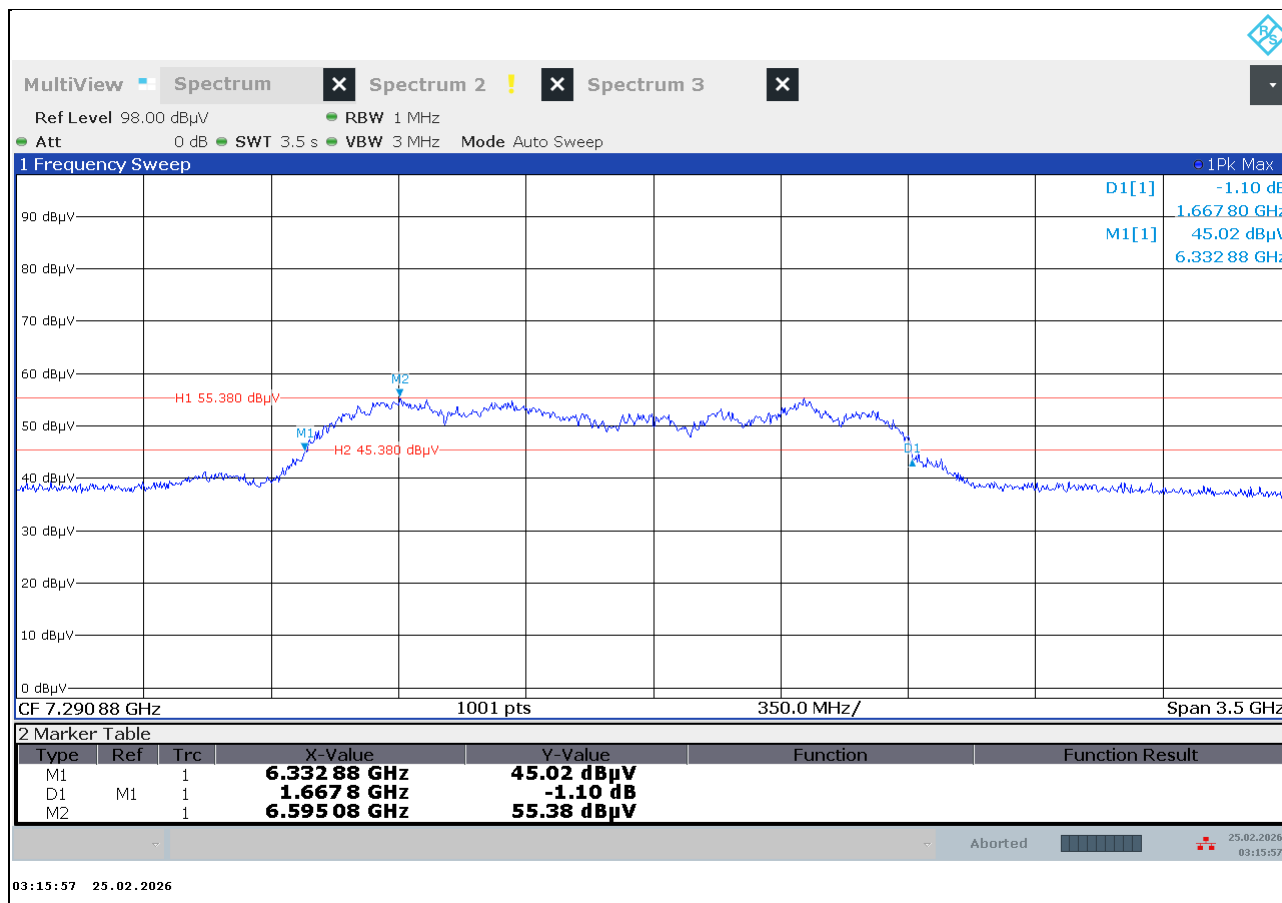
4.3.6 EUT Operating Conditions

Same as 4.2.4.

4.3.7 Test Results

10 dB Bandwidth

Frequency (MHz)	10dB Bandwidth (GHz)	Minimum Limit (MHz)	Pass / Fail
7290.88	1.6678	500	Pass



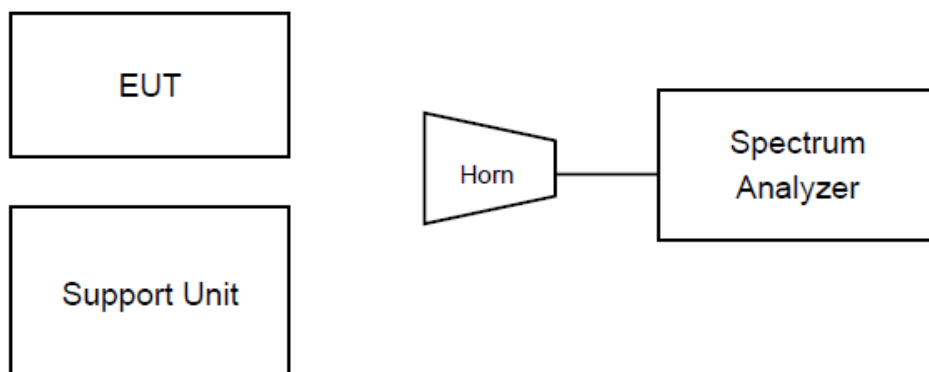
Note: f_L: 6.33288GHz, f_H: 8.00068GHz, f_c: 7.16678GHz, f_M: 6.59508GHz

4.4 Transmission Time Measurement

4.4.1 Limits of Transmitter Emission Measurement

	EUT Description	Limit
☐	Ground penetrating radars and wall imaging systems	Shall contain a manually operated switch that causes the transmitter to cease operation within 10 seconds of being released by the operator. In lieu of a switch located on the imaging system, it is permissible to operate an imaging system by remote control provided the imaging system ceases transmission within 10 seconds of the remote switch being released by the operator.
☐	D-wall imaging systems	Shall contain a manually operated switch that causes the transmitter to cease operation within 10 seconds of being released by the operator. In lieu of a switch located on the imaging system, it is permissible to operate an imaging system by remote control provided the imaging system ceases transmission within 10 seconds of the remote switch being released by the operator.
☐	Surveillance systems	N/A
☐	Medical imaging systems	Shall contain a manually operated switch that causes the transmitter to cease operation within 10 seconds of being released by the operator. In lieu of a switch located on the imaging system, it is permissible to operate an imaging system by remote control provided the imaging system ceases transmission within 10 seconds of the remote switch being released by the operator.
☐	Vehicular radar systems	N/A
☐	Indoor UWB systems	N/A
☒	Hand held UWB systems	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.

4.4.2 Test Setup



Use control software to configure the EUT to transmit or stop transmitting at a specific frequency.

4.4.3 Test Instruments

Refer to section 4.2 to get information of above instrument.

4.4.4 Test Procedure

1. Set the device under test (DUT) and test companion to transmission mode.
2. Configure the spectrum analyzer with a resolution bandwidth of 10MHz, video bandwidth of 10MHz, span of 0Hz, and sweep time of 30 seconds.
3. Observe whether the transmission stops within 10 seconds after the test companion stop.

4.4.5 Deviation from Test Standard

No deviation

4.4.6 EUT Operating Condition

Same as 4.2.4.

4.4.7 Test Results

Operating Frequency (MHz)	Transmission Time (s)	Limit (s)	Pass / Fail
7290.88	8.25	10	Pass



Note:

- M1 = The EUT begins transmitting information to companion receiver.
- M2 = Companion receiver disconnected.
- M3 = Point at which EUT stops transmission, within 10 seconds.

5. Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Email: service.adt@bureauveritas.com

Web Site: <http://ee.bureauveritas.com.tw>

The address and road map of all our labs can be found in our web site also.

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