

TEST REPORT

Applicant/Manufacturer: Marquardt GmbH
Address: Schloss-str. 16, 78604 Rietheim-Weilheim, Germany.
Report Number: 2501V37480E-RFB
FCC ID: IYZGK2A
IC: 2701A-GK2A

Test Standard (s)

FCC PART 15F; RSS-GEN ISSUE 5, FEBRUARY 2021 AMENDMENT 2;
RSS-220, ISSUE 1, AMENDMENT 1 July 2018

Sample Description

Product Type: Passive entry vehicle key
Model No.: GK2A
Multiple Model(s) No.: N/A
Trade Mark:



Marquardt GmbH

Date Received: 2025-07-07
Issue Date: 2025-10-22

Test Result:	Pass▲
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▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

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Wills Yu
RF Engineer

Approved By:

Nancy Wang

Nancy Wang
RF Supervisor

Note: The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	2501V37480E-RFB	Original Report	2025-10-22

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

HVIN	GK2A
FVIN	N/A
Product Category	Hand-held UWB Device
Frequency Range	Channel 5: 6489.6MHz, Channel 9: 7987.2 MHz
Modulation Technique	BPM-BPSK
Antenna Specification[#]	Channel 5: 3.3dBi, Channel 9: 3.2dBi (provided by the applicant)
Voltage Range	DC 3V from battery
Sample serial number	364I-5 for Radiated Emissions Test 364I-4 for RF Conducted Test (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	N/A

Objective

This report is prepared on behalf in accordance with Part 2-Subpart J, Part 15-Subparts A and F of the Federal Communication Commission's rules and RSS-GEN Issue 5, February 2021 Amendment 2 and RSS-220, Issue 1, Amendment 1 July 2018 of the Innovation, Science and Economic Development Canada rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2020 + Cor.1-2023 ▼, RSS-Gen and RSS-220.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		109.2kHz(k=2, 95% level of confidence)
RF output power, conducted		0.86dB(k=2, 95% level of confidence)
Power Spectral Density		0.90dB(k=2, 95% level of confidence)
AC Power Lines Conducted Emissions	9kHz~150 kHz	3.63dB(k=2, 95% level of confidence)
	150 kHz ~30MHz	3.66dB(k=2, 95% level of confidence)
Radiated Emissions	0.009MHz~30MHz	3.60dB(k=2, 95% level of confidence)
	30MHz~200MHz (Horizontal)	5.32dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	5.43dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	5.77dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.73dB(k=2, 95% level of confidence)
	1GHz - 6GHz	5.34dB(k=2, 95% level of confidence)
	6GHz - 18GHz	5.40dB(k=2, 95% level of confidence)
	18GHz - 40GHz	5.64dB(k=2, 95% level of confidence)
Temperature		±1°C
Humidity		±1%
Supply voltages		±0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 715558, the FCC Designation No. : CN5045.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0023.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing by manufacturer.

CH.	Frequency (MHz)	Bandwidth
5	6489.6	600MHz
9	7987.2	600MHz

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

“nRFConnect”[#] exercise software was used and the power level setting as below:

CH.	Frequency (MHz)	Power level [#]
5	6489.6	Default
9	7987.2	Default

The software and power level was provided by the manufacturer.

Support Equipment List and Details

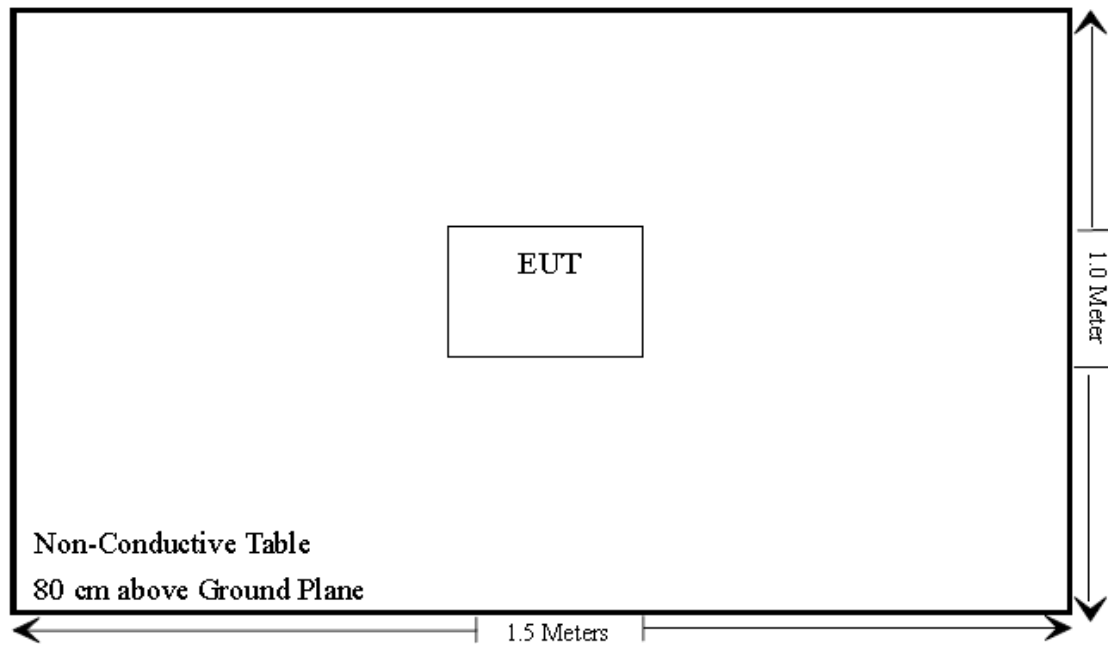
Manufacturer	Description	Model	Serial Number
Apple	Smartphone	iPhone11	FK1ZJ4A7N741
Apple	Smartphone	Phone14 plus	YQ4T7X2D71
Unknown	nRF board	HW-597	Unknown
Unknown	nRF board	HW-597	Unknown
DELL	PC	DESKTOP-1630AQ3	B0CB5M2

External I/O Cable

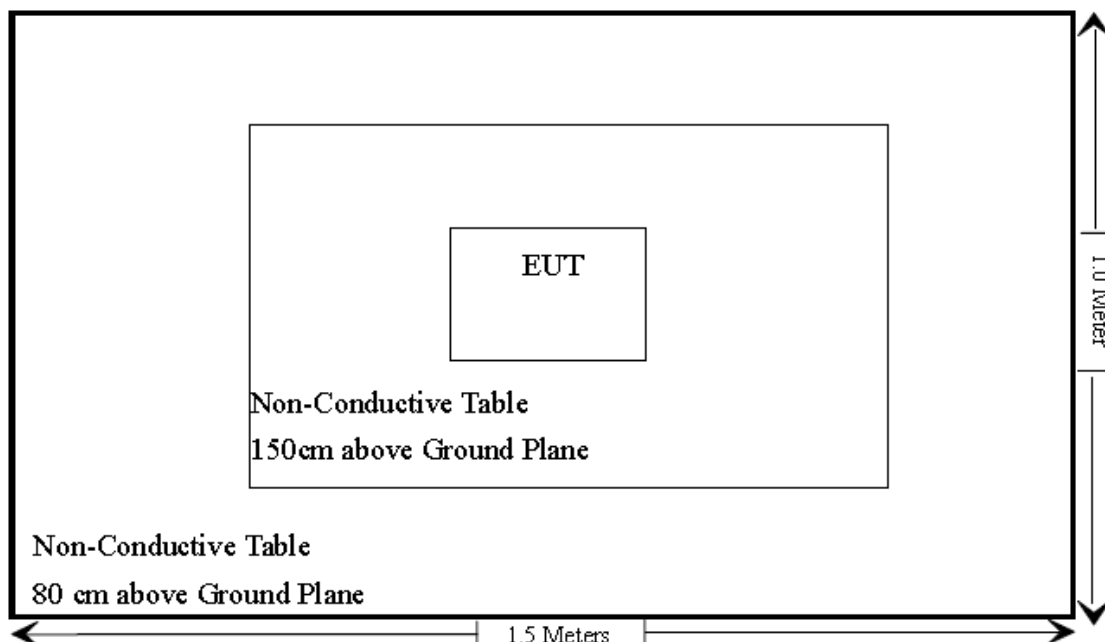
Cable Description	Length (m)	From/Port	To
/	/	/	/

Block Diagram of Test Setup

For Radiated Emissions: below 1G



For Radiated Emissions: above 1G



SUMMARY OF TEST RESULTS

FCC Rules	RSS Rules	Description of Test	Result
§2.1093 & §1.1307 & §1.1310	/	RF Exposure	Compliant
/	RSS-102 § 6.3	SAR Exemption Limits	Compliant
§15.203, §15.519(a)(2)	RSS-Gen §6.8, RSS-220 §5.1(b),5.3.1(a)	Antenna Requirement	Compliant
§15.207(a)	RSS-Gen §8.8	AC Line Conducted Emissions	Not Applicable
§15.519(a)(1)	RSS-220 §5.3.1(b)	Shutoff Timing Requirement	Compliant
§15.503 (a)(d), §15.519(b)	RSS-220 §2, §5.1(a)	UWB Operation bandwidth	Compliant
/	RSS-Gen §6.7	99% Occupied Bandwidth	Compliant
§15.209, §15.519(c)(d)	RSS-220 §3.4, §5.3.1(c)(d)(e)	Radiated Emissions	Compliant
§15.519(e)	RSS-220 §5.3.1(g), RSS-220 Annex §4 (c)	Maximum Peak Emission (Peak EIRP) and Average Emission (Average EIRP)	Compliant

Not Applicable: EUT only powered by battery.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emissions Test Below 960MHz					
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2024/12/04	2025/12/03
Sonoma instrument	Pre-amplifier	310 N	186238	2025/04/29	2026/04/28
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2026/07/19
Unknown	Cable	Chamber A Cable 1	N/A	2025/04/29	2026/04/28
Unknown	Cable	XH500C	J-10M-A	2025/04/29	2026/04/28
BACL	Active Loop Antenna	1313-1A	4031911	2024/05/14	2027/05/13
Unknown	Cable	2Y194	0735	2024/12/04	2025/12/03
Unknown	Cable	PNG214	1354	2024/12/04	2025/12/03
Audix	EMI Test software	E3	19821b(V9)	NCR	NCR
Radiated Emissions Test Above 960MHz					
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2025/03/26	2026/03/25
A.H.System	Preamplifier	PAM-0118P	489	2024/11/15	2025/11/14
Schwarzbeck	Horn Antenna	BBHA9120D(1201)	1143	2023/07/26	2026/07/25
Unknown	RF Cable	KMSE	735	2024/12/06	2025/12/05
JD	Filter Switch Unit	DT7220FSU	DS79906	2024/09/09	2025/09/08
JD	Filter Switch Unit	DT7220FSU	DS79906	2025/08/12	2026/08/11
JD	Multiplex Switch Test Control Set	DT7220SCU	DS79903	2024/09/09	2025/09/08
JD	Multiplex Switch Test Control Set	DT7220SCU	DS79903	2025/08/12	2026/08/11
A.H.System	Pre-amplifier	PAM-1840VH	190	2025/04/29	2026/04/28
Electro-Mechanics Co	Horn Antenna	3116	9510-2270	2023/09/18	2026/09/17
UTIFLEX	RF Cable	NO. 13	232308-001	2024/12/18	2025/12/17
Audix	EMI Test software	E3	191218(V9)	NCR	NCR
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSV40	101942	2024/09/20	2025/09/19
Unknown	10dB Attenuator	Unknown	F-03-EM190	2025/06/26	2026/06/25

* **Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1307 & §1.1310 & 2.1093 - RF EXPOSURE

Applicable Standard

According to FCC §2.1093, §1.1307(b) (3) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D04 Interim General RF Exposure Guidance V01.

SAR-Based Exemption:

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time averaged power or maximum time-averaged ERP, whichever is greater.

Per § 1.1307(b)(3)(i)(B), for single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

RF Exposure for devices that operate above 6 GHz (1.1310):

§2.1093 (d): Portable devices that transmit at frequencies above 6 GHz shall be evaluated in terms of the MPE limits specified in Table 1 to §1.1310(e)(1). A minimum separation distance applicable to the operating configurations and exposure conditions of the device shall be used for the evaluation.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm²)	Averaging Time (Minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For multiple RF sources: Multiple RF sources are exempt if:

in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

Test Result:

For worst case:

Mode	Frequency (MHz)	Tune up conducted power [#] (dBm)	Antenna Gain [#]		ERP		Evaluation Distance (mm)	P_{th} (mW)	Test Exemption
			(dBi)	(dBd)	(dBm)	(mW)			
BLE	2402-2480	0.3	2.2	0.05	0.35	1.08	5	2.72	Yes

Mode	Frequency (MHz)	Maximum Tune-up EIRP [#]		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBm)	(mW)			
UWB	6489.6	-4.0	0.40	0.5	0.13	1
UWB	7987.2	-4.0	0.40	0.5	0.13	1

Note: 1.The tune up power and antenna gain was declared by the applicant.
 2. 0dBd=2.15dBi
 3. The BLE and UWB can transmit at same time.

Simultaneous transmitting consideration (worst case):

The ratio= $P_{BLE} / P_{th} + MPE_{UWB} / MPE_{Limit} = 1.08/2.72 + 0.13/1 = 0.527 < 1.0$

So simultaneous exposure is compliant.

RSS-102 § 6.3 –SAR EXEMPTION LIMITS

Applicable Standard

According to RSS-102 Issue 6 § (6.3), Devices operating at or below the applicable output power levels (adjusted for tune-up tolerance) specified in table 11, based on the separation distance, are exempt from SAR evaluation. The separation distance, defined as the distance between the user and/or bystander and the antenna and/or radiating element of the device or the outer surface of the device, shall be less than or equal to 20 cm for these exemption limits to apply.

Table 11: Power limits for exemption from routine SAR evaluation based on the separation distance

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

The exemption limits in table 11 are based on measurements and simulations of half-wave dipole antennas at separation distances of 5 mm to 50 mm from a flat phantom, which provides a SAR value of approximately 0.4 W/kg for 1 g of tissue.

For limb-worn devices where the 10 gram of tissue applies, the exemption limits for routine evaluation in table 11 are multiplied by a factor of 2.5.

For controlled-use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in table 11 are multiplied by a factor of 5.

When the operating frequency of the device is between two frequencies located in table 11, linear interpolation shall be applied for the applicable separation distance. If the separation distance of the device is between two distances located in table 11, linear interpolation may be applied for the applicable frequency. Alternatively, the limit corresponding to the smaller distance may be employed. For example, in case of a 7 mm separation distance, either use the exception value for a 5 mm separation distance or interpolate between the limits corresponding to 5 mm and 10 mm separation distances.

For implanted medical devices, the exemption limit for routine SAR evaluation is set at an output power of 1 mW, regardless of frequency.

The SAR levels from exempted transmitters shall be included in the compliance assessment and the determination of the TER. Detailed guidance is included in sections 7.1.8 and 8.2.2.1.

Test Result:

Mode	Frequency	Gain [#]	Max tune-up conducted power [#]	Max tune-up EIRP [#]		Distance (mm)	Exemption Limit	SAR Evaluation Exemption
	(MHz)	(dBi)	(dBm)	(dBm)	(mW)		(mW)	
BLE	2402-2480	2.2	0.3	2.50	1.78	0.5	2.97	Yes

Mode	Frequency (MHz)	Maximum Tune-up EIRP [#]		Exemption Limit (mW)	Test Exemption
		(dBm)	(mW)		
UWB	6489.6	-4.0	0.40	1	Yes
UWB	7987.2	-4.0	0.40	1	Yes

Note: 1.The tune up power and antenna gain was declared by the applicant.
 2. $(2480-2450)/(3500-2450) = (3-P)/(3-2)$, the exemption limit of 2480MHz is $P = 2.97\text{mW}$
 3. The BLE and UWB can transmit at same time.

Simultaneous transmitting consideration (worst case):

The ratio= $\text{EIRP}_{\text{BLE}} / \text{Limit}_{\text{BLE}} + \text{EIRP}_{\text{UWB}} / \text{Limit}_{\text{UWB}} = 1.78/2.97 + 0.40/1 = 0.999 < 1.0$

So simultaneous exposure is compliant.

Result: So the stand-alone SAR test is not required.

FCC §15.203 & §15.519(A)(2) & RSS-GEN § 6.8&RSS-220 §5.1(B), §5.3.1(A)- ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 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.

According to FCC § 15.203, the applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

According to FCC § 15.519(a)(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.

According to RSS-Gen §6.8, the applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer. The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

According to RSS-220 §5.1(b), the antenna of the UWB device shall be factory-installed and shall not be made modifiable by users.

According to RSS-220 §5.3.1(a), the device shall be designed so as to prevent its connection to antennas mounted on outdoor structures, e.g., antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoor infrastructure.

Antenna Connector Construction

The EUT has one internal antenna which is permanently attached to the unit, fulfilling the requirement of this section. Please refer to the EUT photos.

Antenna Type	Antenna Gain#	Impedance	Frequency Range
PCB	3.3dBi	50Ω	6489.6MHz
PCB	3.2dBi	50Ω	7987.2MHz

Result: Compliant.

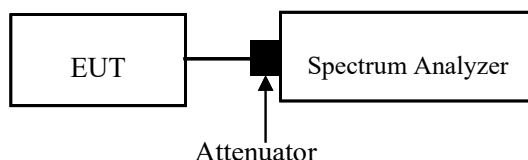
FCC §15.519(a) (1)& RSS-220§5.3.1(B)--SHUTOFF TIMING REQUIREMENT

According to FCC § 15. 519(a) (1), 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 RSS-220§5.3.1 (b), The device is to transmit only when it is sending information to an associated receiver. The device shall cease transmission of information 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 device at least every 10 seconds or the UWB device shall cease transmitting any information other than periodic signals used for the establishment or re-establishment of a communication link with an associated receiver.

Test Procedure

1. Set the EUT in normal operating mode.
2. RBW/VBW= 3MHz/3MHz.
3. SWT= 20s



Test Data

Environmental Conditions

Temperature:	24.1 °C
Relative Humidity:	53 %
ATM Pressure:	100.2kPa

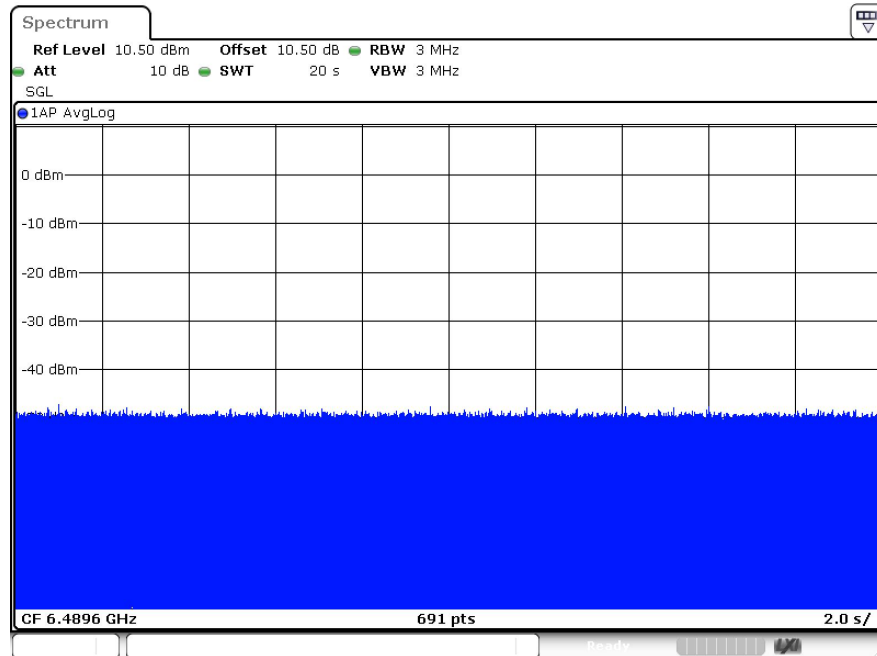
The testing was performed by Cheeb Huang on 2025-08-07.

Test Result: Pass.

EUT operation mode: Transmitting

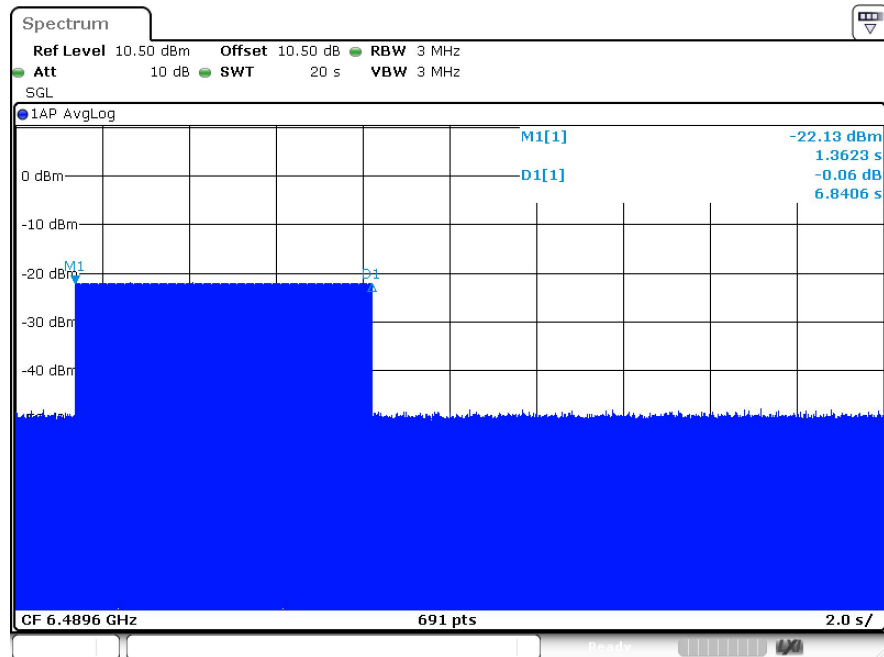
CH5:

Without associated receiver, EUT no transmit



ProjectNo.:2501V37480E-RF Tester:Cheeb Huang
Date: 7.AUG.2025 15:32:23

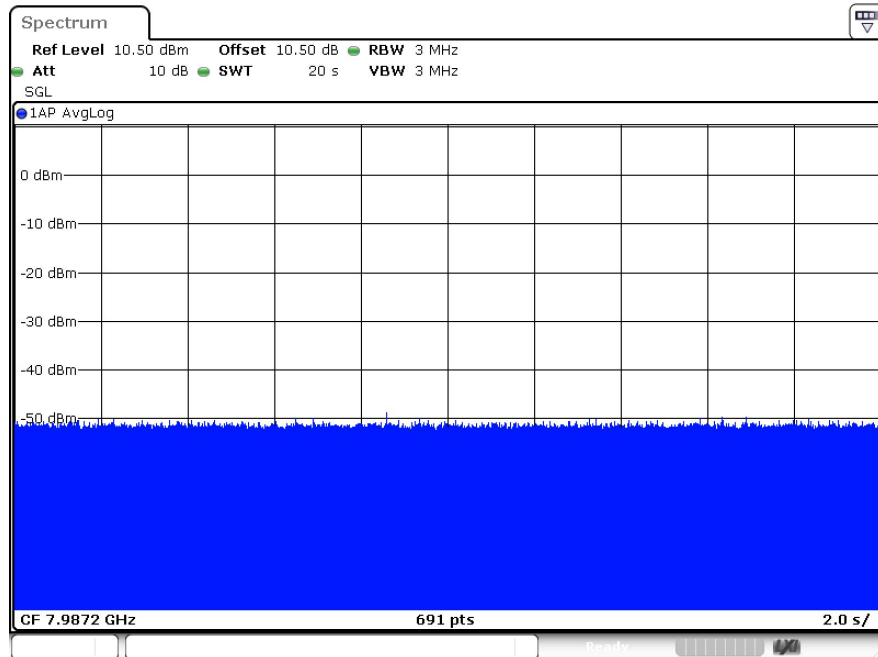
Communication with receiver, EUT start transmit, after approximate 7s, power off receiver, EUT cease transmit



ProjectNo.:2501V37480E-RF Tester:Cheeb Huang
Date: 7.AUG.2025 15:41:42

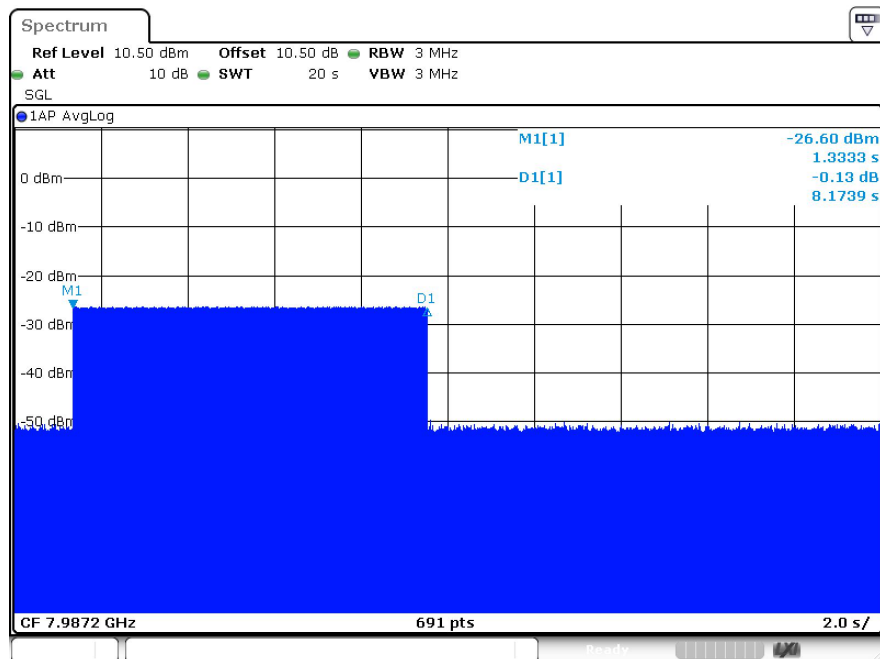
CH9

Without associated receiver, EUT no transmit



ProjectNo.:2501V37480E-RF Tester:Cheeb Huang
Date: 7.AUG.2025 15:34:17

Communication with receiver, EUT start transmit, after approximate 8s, power off receiver, EUT cease transmit



ProjectNo.:2501V37480E-RF Tester:Cheeb Huang
Date: 7.AUG.2025 15:38:13

FCC §15.503 (a)(d), §15.519(b) & RSS-220 §2, §5.1(A) –UWB OPEARTION BANDWIDTH

Applicable Standard

According to FCC § 15. 503 (a), UWB bandwidth. For the purpose of this subpart, 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. 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 .

According to FCC § 15. 503 (d), 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.

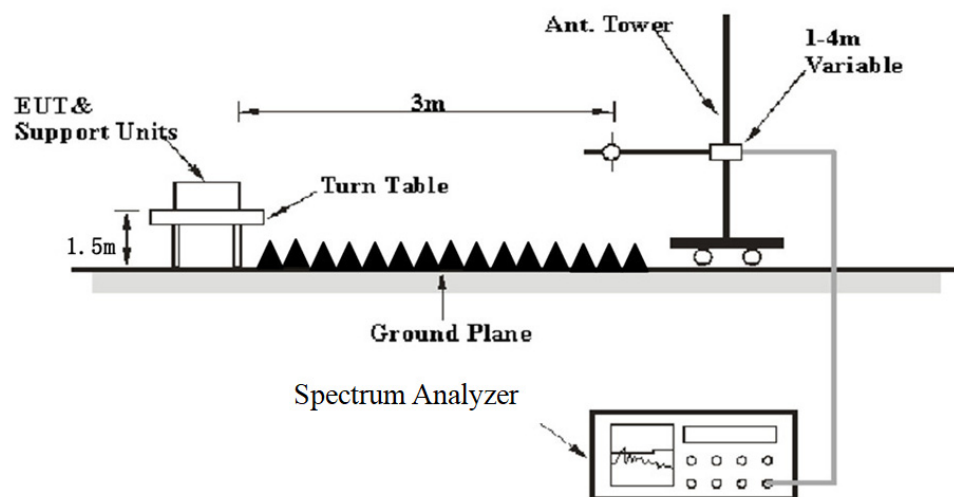
According to FCC § 15. 519 (b), The UWB bandwidth of a UWB system operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz.

According to RSS-220 §2, A UWB device is an intentional radiator that has either a -10 dB bandwidth of at least 500 MHz or a -10 dB fractional bandwidth greater than 0.2. There are eight distinct subclasses of UWB device.

According to RSS-220 §5.1 (a), The -10 dB bandwidth of the device shall be totally contained in the band 3.1-10.6 GHz.

Test Procedure

Refer to the ANSI C63.10-2020 Section 10.1 & RSS-220 ANNEX



Test Data**Environmental Conditions**

Temperature:	24.3℃
Relative Humidity:	49%
ATM Pressure:	100.2 kPa

The testing was performed by Wing K Ji on 2025-08-15.

Test Result: Pass.

EUT operation mode: Transmitting

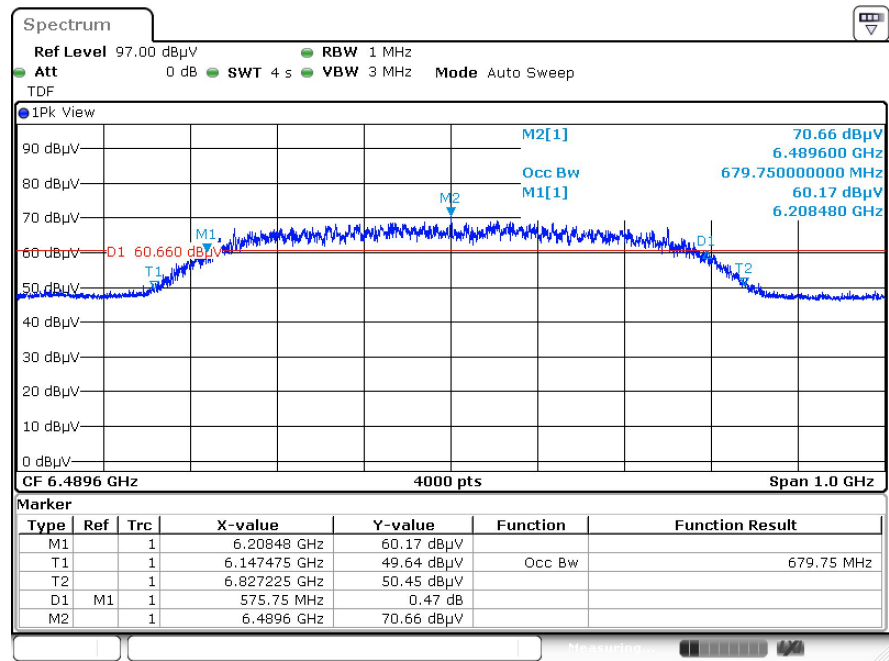
Please refer to the following table and plots.

Test distance is 3m.

CH5

Item		Result	Limit (MHz)
f_M (MHz)	The highest emission frequency	6489.60	/
f_L (MHz)	10dB below the highest emission	6208.48	>3100
f_H (MHz)	10dB above the highest emission	6784.23	<10600
f_C (MHz)	$(f_H + f_L)/2$	6496.356	/
10dB bandwidth(MHz)	$f_H - f_L$	575.75	≥ 500
Fractional bandwidth	$2(f_H - f_L) / (f_H + f_L)$	0.089	/

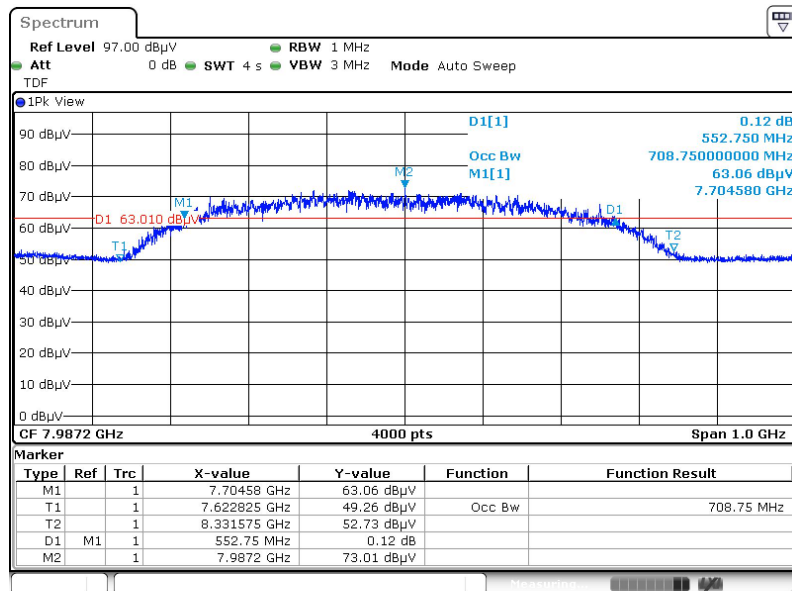
10dB Bandwidth



ProjectNo.:2501V37480E-RF Tester:Wing K Ji
Date: 15.AUG.2025 12:56:40

CH9:

Item		Result	Limit (MHz)
f_M (MHz)	The highest emission frequency	7987.2	/
f_L (MHz)	10dB below the highest emission	7704.58	>3100
f_H (MHz)	10dB above the highest emission	8257.33	<10600
f_C (MHz)	$(f_H + f_L)/2$	7980.96	/
10dB bandwidth(MHz)	$f_H - f_L$	552.75	≥ 500
Fractional bandwidth	$2(f_H - f_L) / (f_H + f_L)$	0.069	/

10dB Bandwidth

ProjectNo.:2501V37480E-RF Tester:Wing K Ji
Date: 15.AUG.2025 15:06:00

RSS-Gen §6.7 – 99% OCCUPIED BANDWIDTH

Applicable Standard

According to RSS-Gen §6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the “x dB bandwidth” is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:

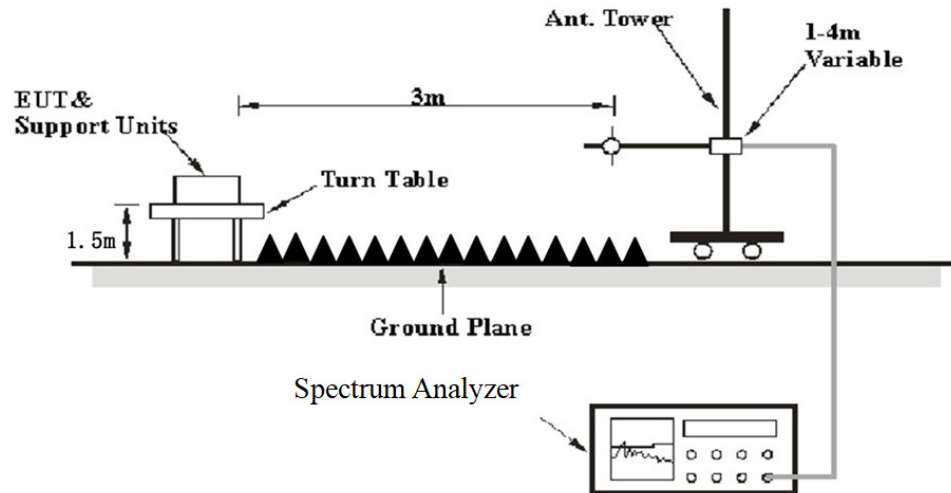
- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

Test Procedure

Refer to the ANSI C63.10-2020 Section 6.9.3



Test Data

Environmental Conditions

Temperature:	24.3 °C
Relative Humidity:	49%
ATM Pressure:	100.2 kPa

The testing was performed by Wing K Ji on 2025-10-22.

Test Result: Pass.

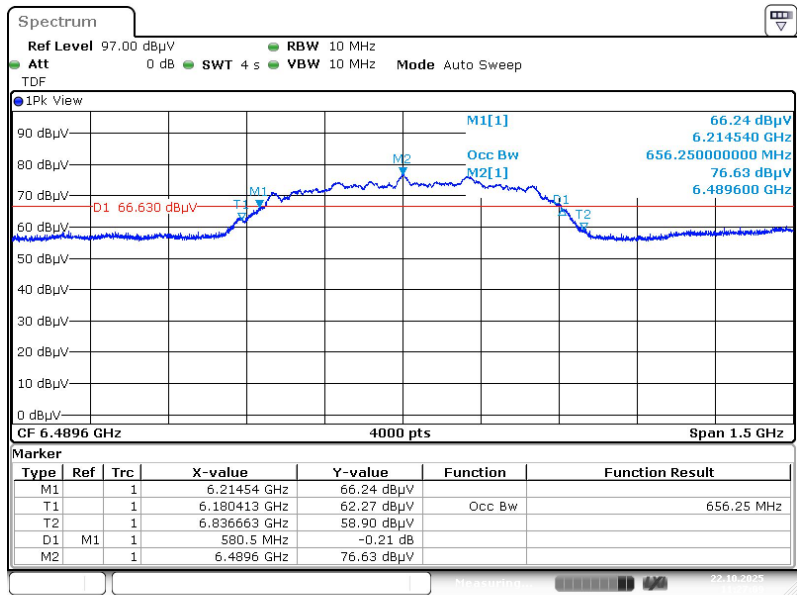
EUT operation mode: Transmitting

Please refer to the following table and plots.

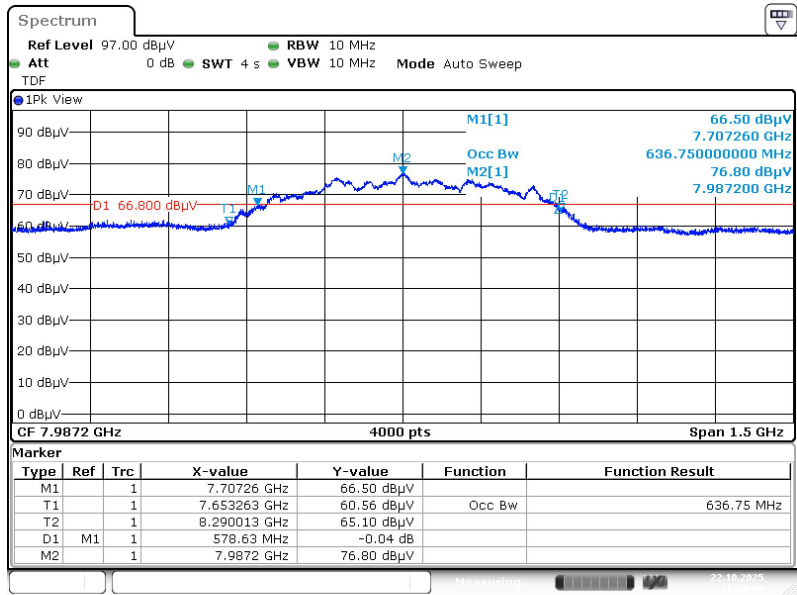
Test distance is 3m.

Channel	99% OBW (MHz)
CH5	656.25
CH9	636.75

CH5_99% Bandwidth



CH9_99% Bandwidth



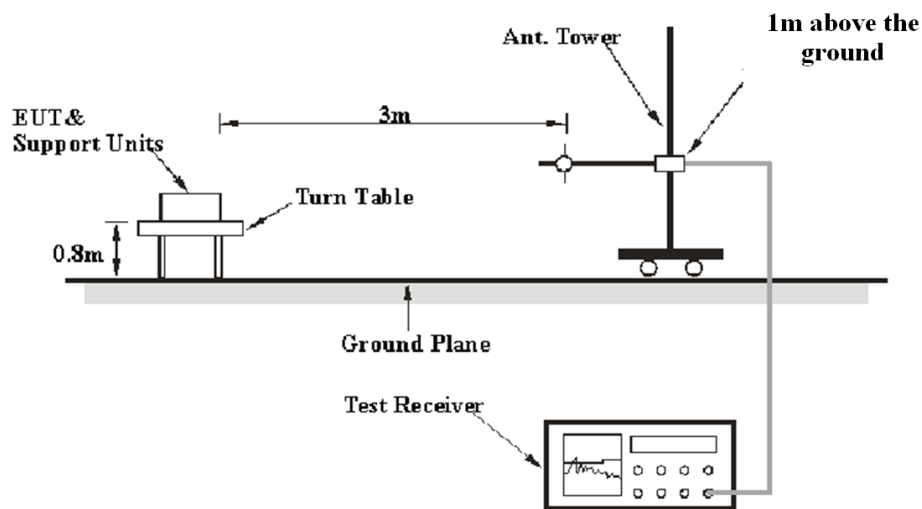
FCC §15.209, §15.519(c)(d)& RSS-220 §3.4, §5.3.1(C)(D)(E)- SPURIOUS EMISSIONS

Applicable Standard

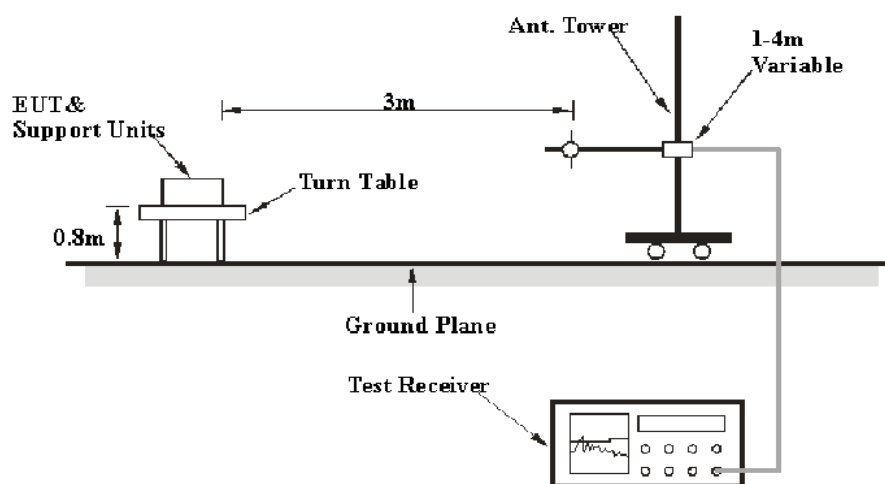
FCC §15.209, §15.519(c)(d), RSS-220 §3.4, §5.3.1(c)(d)(e)

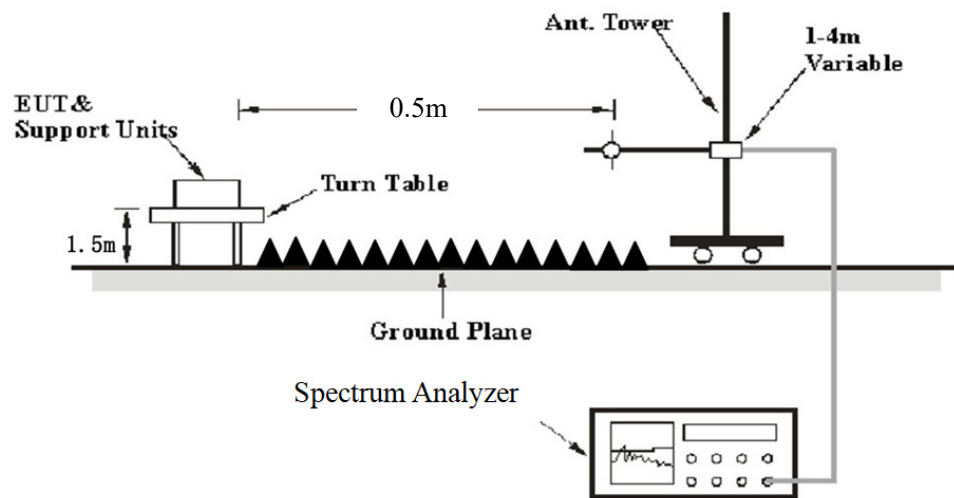
EUT Setup

9 kHz-30MHz:



30MHz-960MHz:



Above 960MHz:

The radiated emission tests were performed in the 3meters test site, using the setup accordance with the ANSI C63.10-2020. The specification used was the FCC 15.209, FCC 15.519, RSS-Gen and RSS-220 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz to 40 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector	Measurement
9 kHz – 150 kHz	/	/	200 Hz	QP	QP
	300 Hz	1 kHz	/	Peak	PK
150 kHz – 30 MHz	/	/	9 kHz	QP	QP
	10 kHz	30 kHz	/	Peak	PK
30 MHz – 960 MHz	/	/	120 kHz	QP	QP
	100 kHz	300 kHz	/	Peak	PK
Above 960 MHz	1MHz	3 MHz	/	RMS	Average
	1kHz	3 kHz	/	RMS	Average*

Note: * For the radiated spurious emission in the GPS band.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All final data was recorded in Quasi-peak detection mode except for the frequency bands 9–90 kHz, 110–490 kHz and above 960 MHz, average detection modes for frequency bands 9–90 kHz and 110–490 kHz, peak and average detection modes for frequencies above 960 MHz.

For 9 kHz-30MHz, the report shall list the six emissions with the smallest margin relative to the limit, for each of the three antenna orientations (parallel, perpendicular, and ground-parallel) unless the margin is greater than 20 dB.

All emissions under the average limit and under the noise floor have not recorded in the report.

Factor & Over Limit/Margin Calculation

The Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain. The basic equation is as follows:

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Over Limit/Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

$$\begin{aligned} \text{Over Limit/Margin} &= \text{Level} / \text{Corrected Amplitude} - \text{Limit} \\ \text{Level} / \text{Corrected Amplitude} &= \text{Read Level} + \text{Factor} \end{aligned}$$

Test Data

Environmental Conditions

Temperature:	24.5~23.6°C
Relative Humidity:	49~52%
ATM Pressure:	99.8~100.2kPa

The testing was performed by Alex Yan on 2025-07-16 for below 960MHz and Wing K Ji from 2025-08-14 to 2025-08-15 for above 960MHz.

EUT operation mode: Transmitting

Note:

1. The spurious emission from 9 kHz-30MHz of IC RSS-GEN standard, the unit of final result on the test plots are dBμV/m, so the limit should be added by 51,5 dB from dBμA/m to dBμV/m.

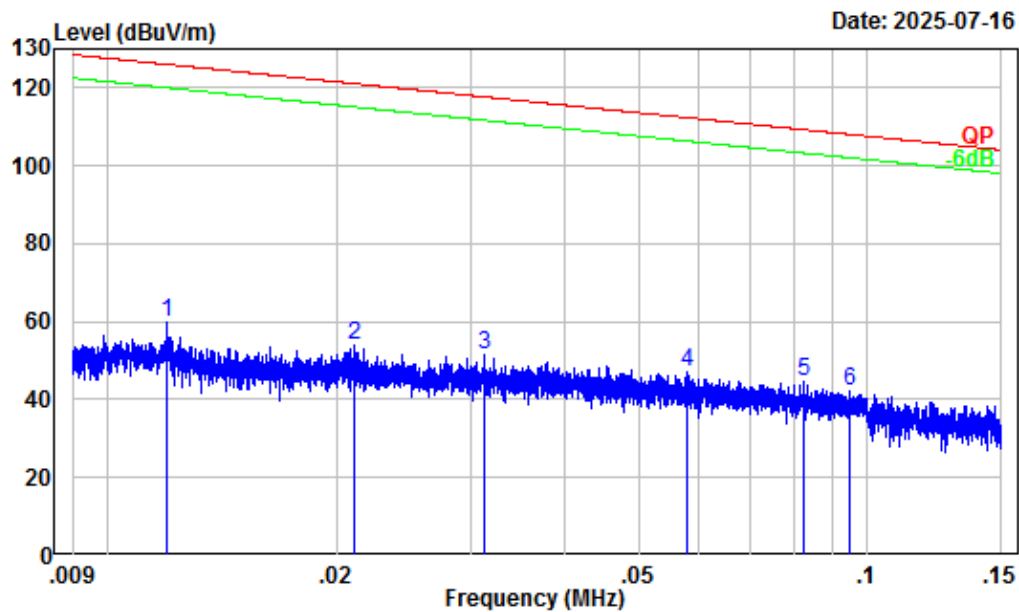
2. For the radiated spurious emission below 30MHz, only the worst case (parallel) was recorded.

3. For the radiated spurious emission below 960MHz, When the test result of peak was less than the limit of QP/Average more than 6dB, just peak value were recorded.

4. After pre-scan in the X, Y and Z axes of orientation, the worst case z-axis of orientation were recorded.

Below 960MHz:

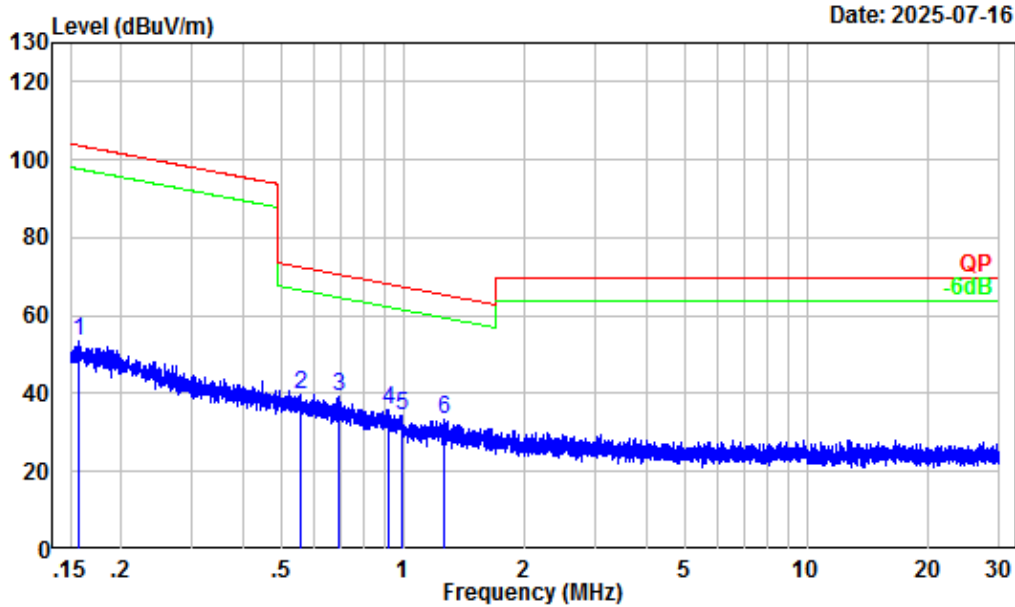
9kHz-150kHz



Site : Chamber A
Condition : 3m
Project Number : 2501V37480E-RF
Test Mode : UWB Transmitting
Detector: Peak RBW/VBW: 0.3/1kHz
Tester : Alex Yan

	Freq	Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.012	31.92	28.16	60.08	126.03	-65.95	Peak
2	0.021	30.19	23.53	53.72	121.11	-67.39	Peak
3	0.031	28.36	23.00	51.36	117.68	-66.32	Peak
4	0.058	25.62	21.56	47.18	112.37	-65.19	Peak
5	0.083	23.22	21.23	44.45	109.27	-64.82	Peak
6	0.095	22.36	19.68	42.04	108.07	-66.03	Peak

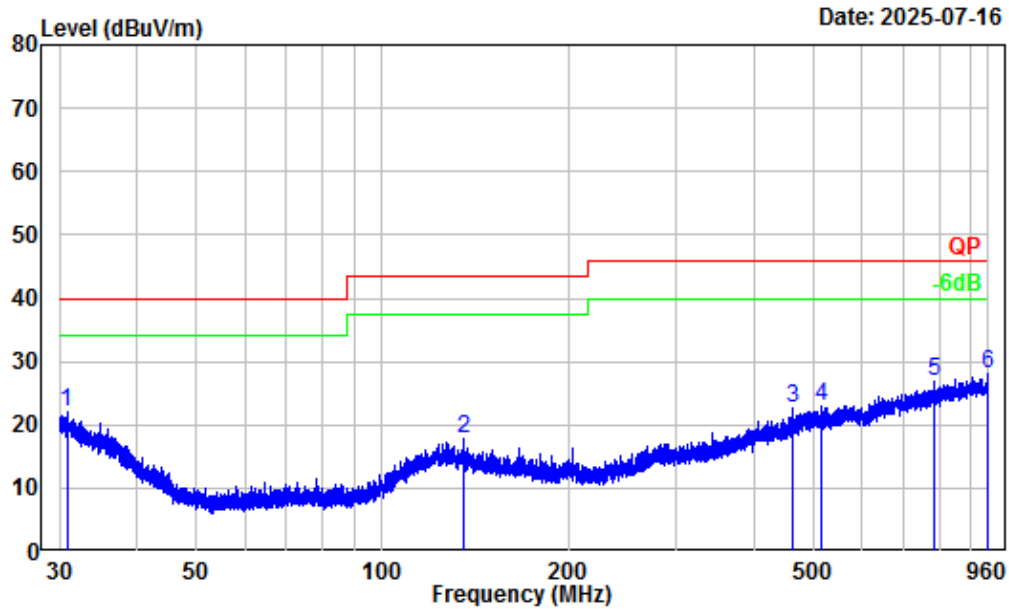
150kHz-30MHz



Site : Chamber A
 Condition : 3m
 Project Number : 2501V37480E-RF
 Test Mode : UWB Transmitting
 Detector: Peak RBW/VBW: 10/30kHz
 Tester : Alex Yan

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.156	18.67	34.64	53.31	103.71	-50.40	Peak
2	0.556	5.71	34.20	39.91	72.67	-32.76	Peak
3	0.695	3.99	35.04	39.03	70.69	-31.66	Peak
4	0.919	1.81	34.05	35.86	68.22	-32.36	Peak
5	0.995	1.24	33.18	34.42	67.52	-33.10	Peak
6	1.265	0.46	33.13	33.59	65.39	-31.80	Peak

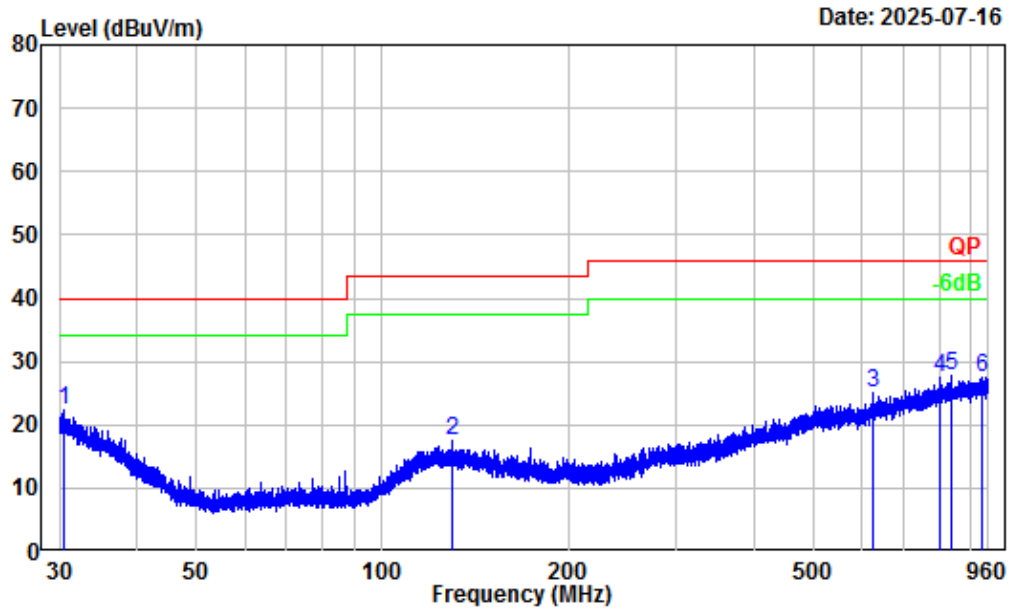
30MHz-960MHz_Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number : 2501V37480E-RF
Test Mode : UWB Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Alex Yan

	Freq Factor		Read	Limit	Over	Remark
	MHz	dB/m	Level	Line	Limit	
			dBuV	dBuV/m	dBuV/m	dB
1	30.83	-6.39	28.44	22.05	40.00	-17.95 Peak
2	135.24	-11.52	29.43	17.91	43.50	-25.59 Peak
3	461.45	-7.06	29.59	22.53	46.00	-23.47 Peak
4	514.01	-5.85	28.84	22.99	46.00	-23.01 Peak
5	786.55	-2.32	29.18	26.86	46.00	-19.14 Peak
6	957.51	-0.92	28.93	28.01	46.00	-17.99 Peak

30MHz-960MHz_Vertical



Site : Chamber A
 Condition : 3m Vertical
 Project Number : 2501V37480E-RF
 Test Mode : UWB Transmitting
 Detector: Peak RBW/VBW: 100/300kHz
 Tester : Alex Yan

	Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	30.50	-6.21	28.46	22.25	40.00	-17.75	Peak
2	129.62	-11.21	28.82	17.61	43.50	-25.89	Peak
3	625.46	-4.64	29.66	25.02	46.00	-20.98	Peak
4	803.77	-2.14	29.57	27.43	46.00	-18.57	Peak
5	838.99	-1.83	29.66	27.83	46.00	-18.17	Peak
6	935.37	-1.05	28.65	27.60	46.00	-18.40	Peak

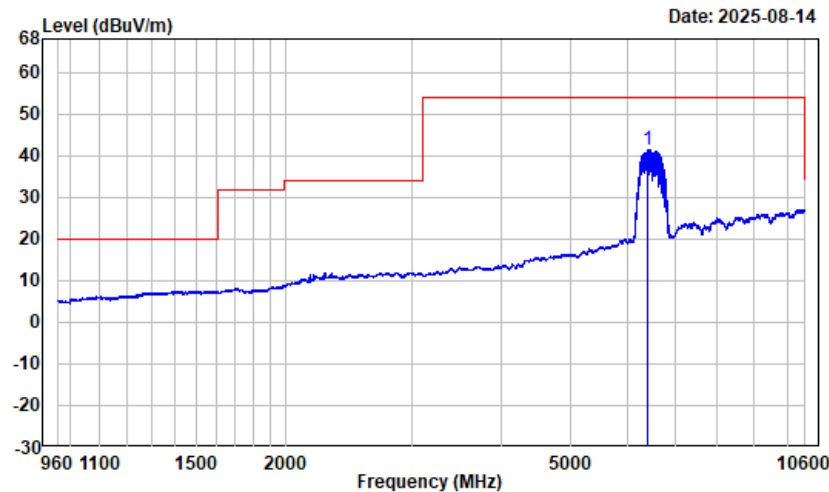
Spurious radiated emission above 960MHz in non GPS band:

- 1. The test distance is 0.5m, so the correct factor from 3m to 0.5m is $20\log(3/0.5)=15.56\text{dB}$ which was added into the offset on the spectrum analyzer.
- 2. $E[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm}] + 95.2$, for $d = 3$ meters. The unit of final result on the test plots are $\text{dB}\mu\text{V/m}$, so the limit should be added by 95.2 dB from dB m to $\text{dB}\mu\text{V/m}$.
- 3. The antenna factor, cable loss and preamplifier gain have been entered into the analyzer as the transducer factor.
- 4. For 10.6GHz-40GHz, the RBW Factor were added into the offset on the Spectrum Analyzer.
RBW Factor= $10\lg(1\text{MHz}/100\text{kHz})$

Channel 5:

For FCC:

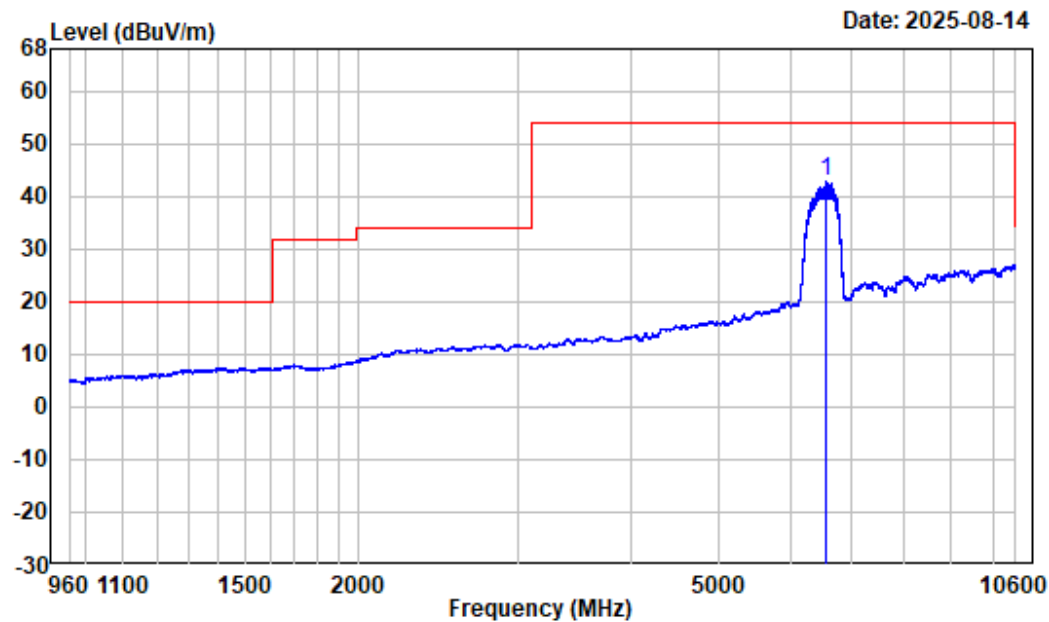
960MHz~10.6GHz_Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1MHz VBW:3MHz Detector:RMS
Note : UWB_6489.6MHz

	Freq	Factor	Read		Limit	Over	Remark
			Level	Level	Line	Limit	
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	6379.562	-3.09	44.53	41.44	53.90	-12.46	Peak

960MHz~10.6GHz _ Vertical

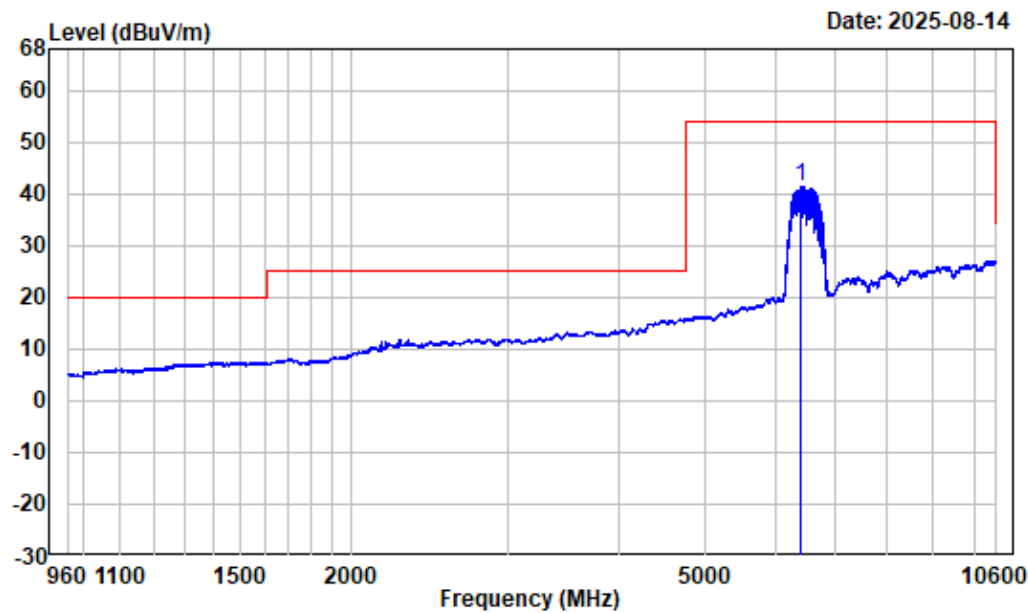


Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1MHz VBW:3MHz Detector:RMS
Note : UWB_6489.6MHz

Freq		Factor	Read Level	Level	Limit Line	Over Limit	Remark
MHz		dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	6555.581	-3.05	45.75	42.70	53.90	-11.20	Peak

For IC:

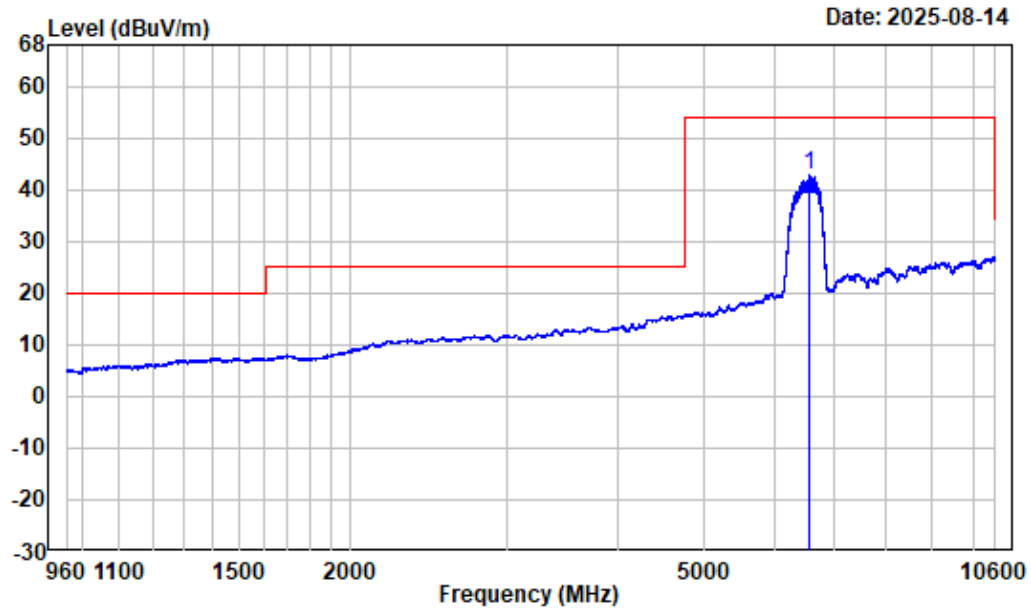
960MHz~10.6GHz_Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1MHz VBW:3MHz Detector:RMS
Note : UWB_6489.6MHz

	Freq Factor		Read Level		Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	6379.562	-3.09	44.53	41.44	53.90	-12.46	Peak

960MHz~10.6GHz _ Vertical

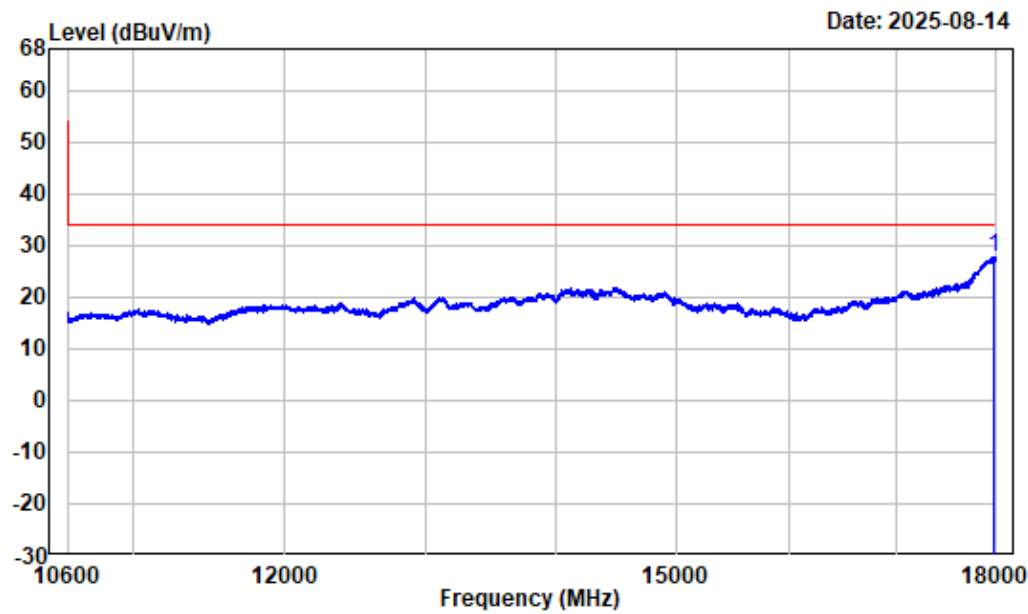


Condition : Vertical
 Project No. : 2501V37480E-RF
 Tester : Wing K Ji
 Spectrum setting: RBW:1MHz VBW:3MHz Detector:RMS
 Note : UWB_6489.6MHz

	Freq Factor		Read Level		Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	6555.581	-3.05	45.75	42.70	53.90	-11.20	Peak

For FCC/IC:

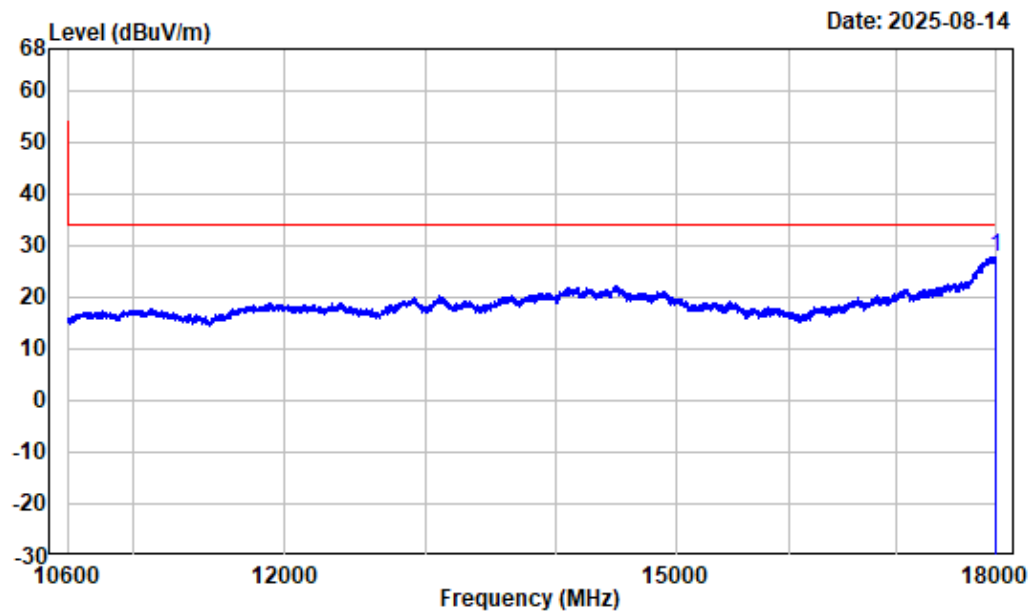
10.6-18GHz_Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:100kHz VBW:300kHz Detector:RMS
Note : UWB_6489.6MHz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	17977.000	13.09	14.70	27.79	33.90	-6.11	Peak

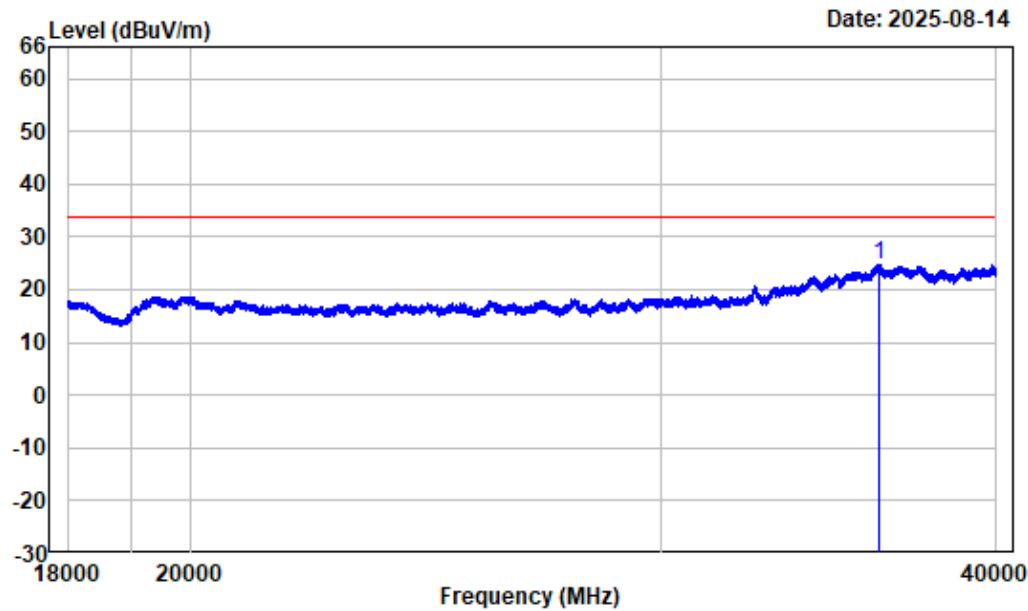
10.6-18GHz_ Vertical



Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:100kHz VBW:300kHz Detector:RMS
Note : UWB_6489.6MHz

Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 17990.000	13.16	14.56	27.72	33.90	-6.18	Peak

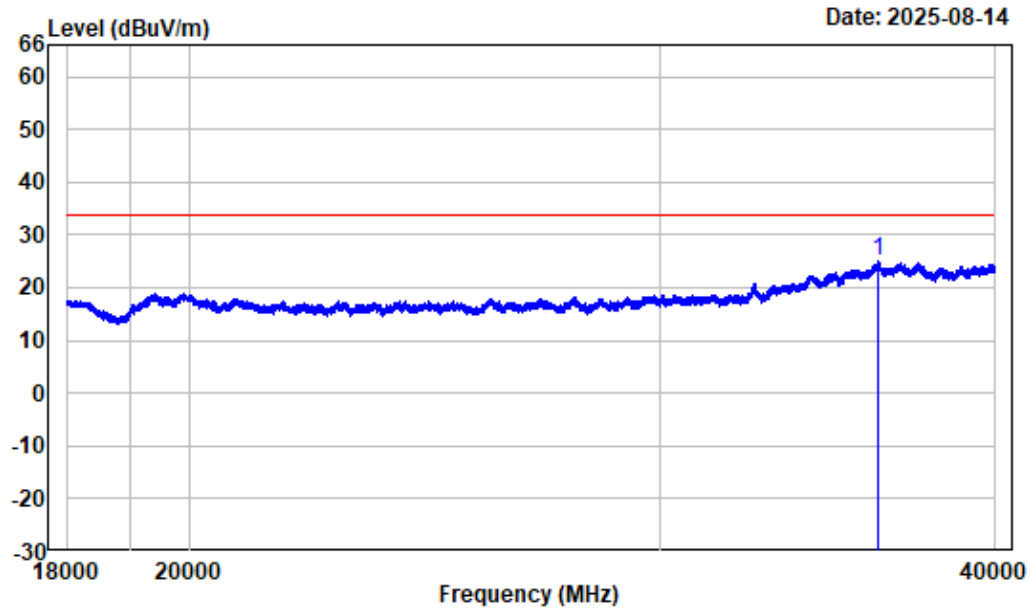
18-40GHz_Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:100kHz VBW:300kHz Detector:RMS
Note : UWB_6489.6MHz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	36149.820	23.44	1.40	24.84	33.90	-9.06	Peak

18-40GHz_Vertical



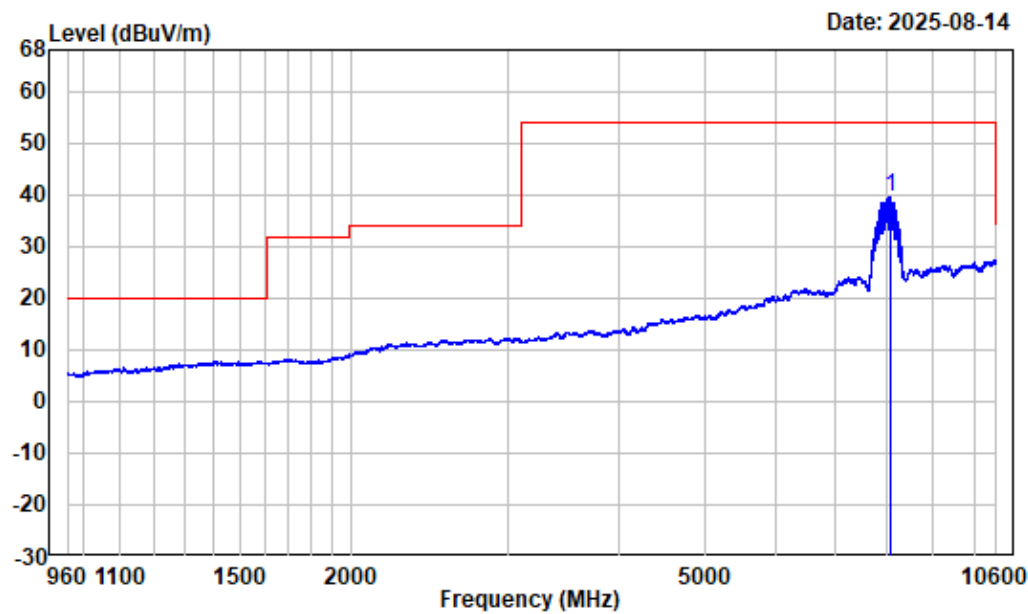
Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:100kHz VBW:300kHz Detector:RMS
Note : UWB_6489.6MHz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	36148.820	23.44	1.44	24.88	33.90	-9.02	Peak

Channel 9:

For FCC:

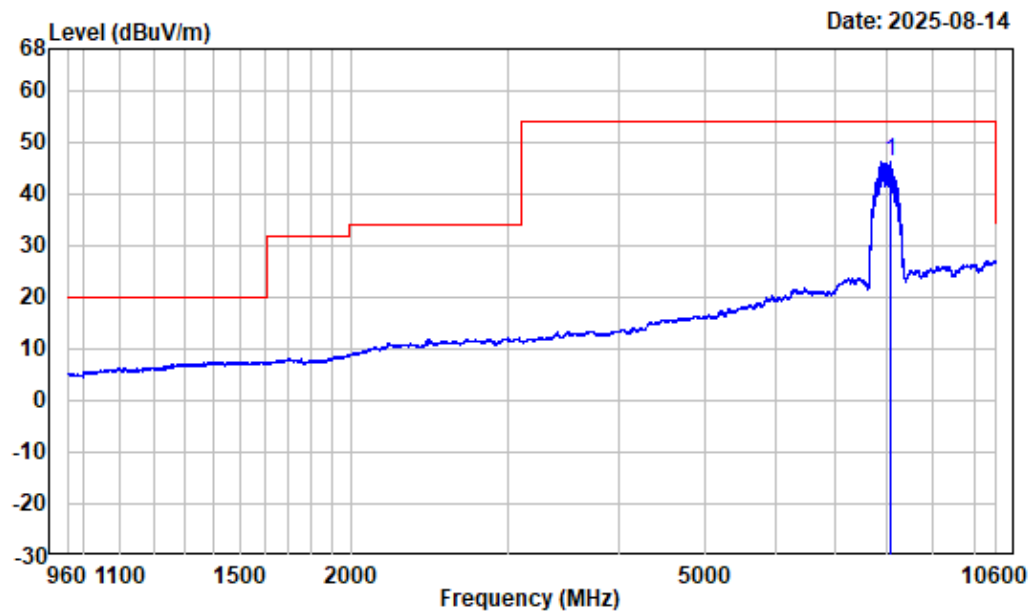
960MHz~10.6GHz_Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1MHz VBW:3MHz Detector:RMS
Note : UWB_7987.2MHz

Freq Factor		Read Level	Limit Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 8065.737	-0.96	40.67	39.71	53.90	-14.19	Peak

960MHz~10.6GHz _ Vertical

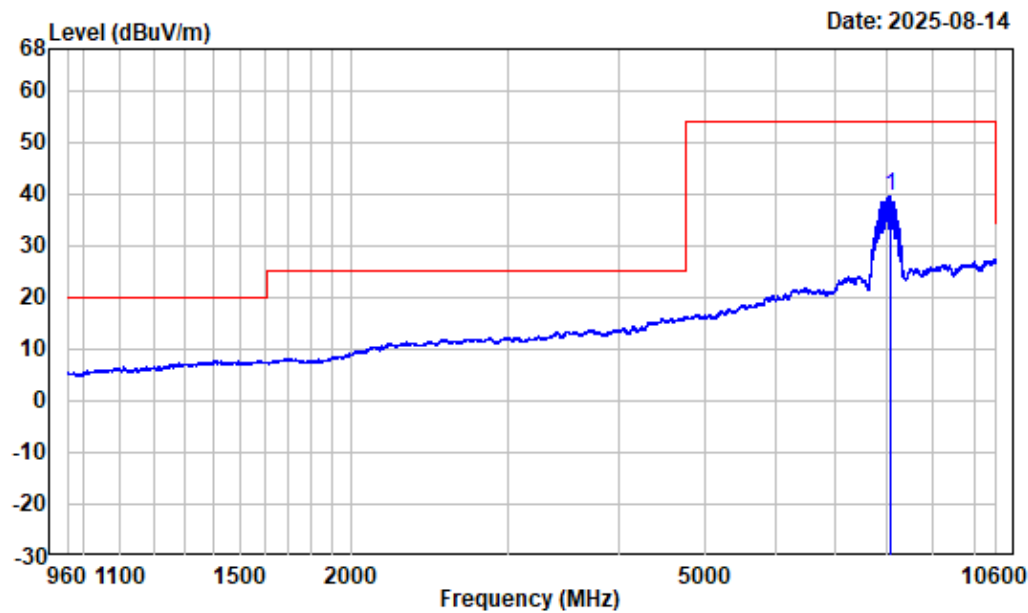


Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1MHz VBW:3MHz Detector:RMS
Note : UWB_7987.2MHz

	Freq Factor		Read Level		Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	8053.736	-0.97	47.10	46.13	53.90	-7.77	Peak

For IC:

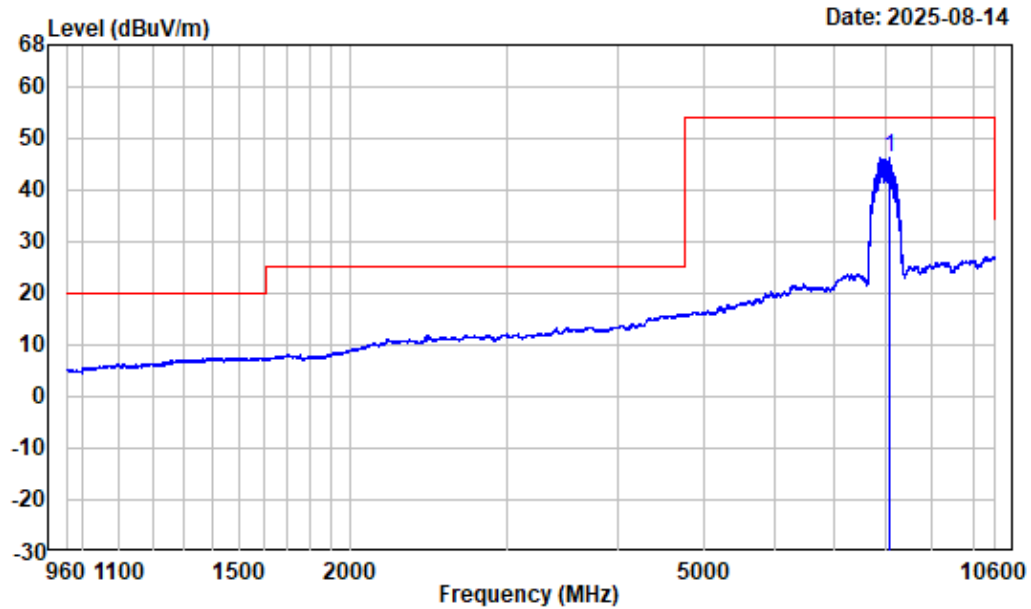
960MHz~10.6GHz_Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1MHz VBW:3MHz Detector:RMS
Note : UWB_7987.2MHz

	Freq Factor		Read Level		Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	8065.737	-0.96	40.67	39.71	53.90	-14.19	Peak

960MHz~10.6GHz _ Vertical

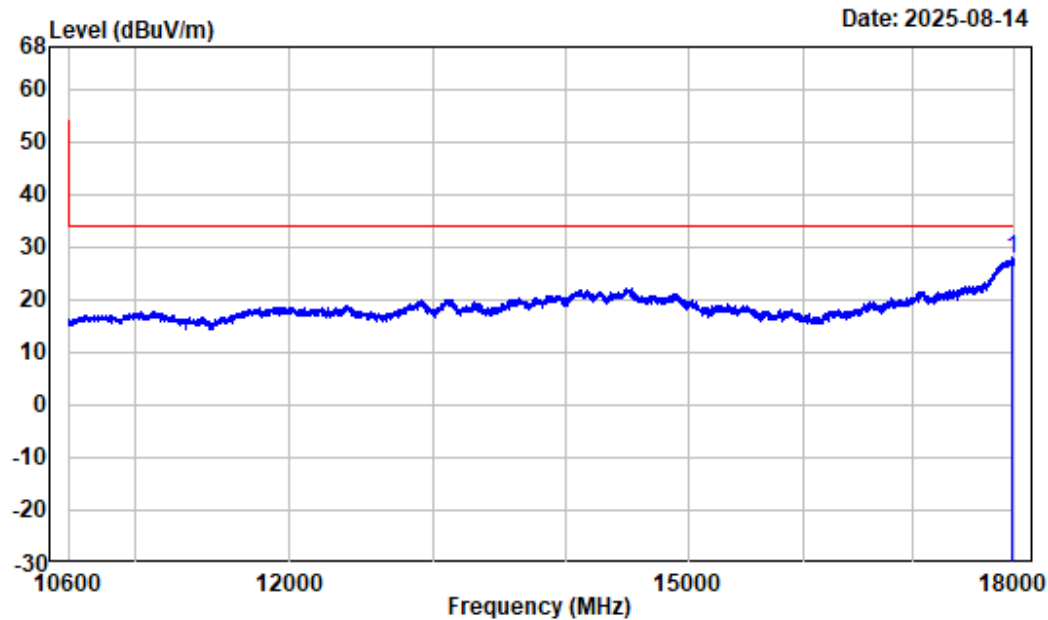


Condition : Vertical
 Project No. : 2501V37480E-RF
 Tester : Wing K Ji
 Spectrum setting: RBW:1MHz VBW:3MHz Detector:RMS
 Note : UWB_7987.2MHz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	8053.736	-0.97	47.10	46.13	53.90	-7.77	Peak

For FCC/IC:

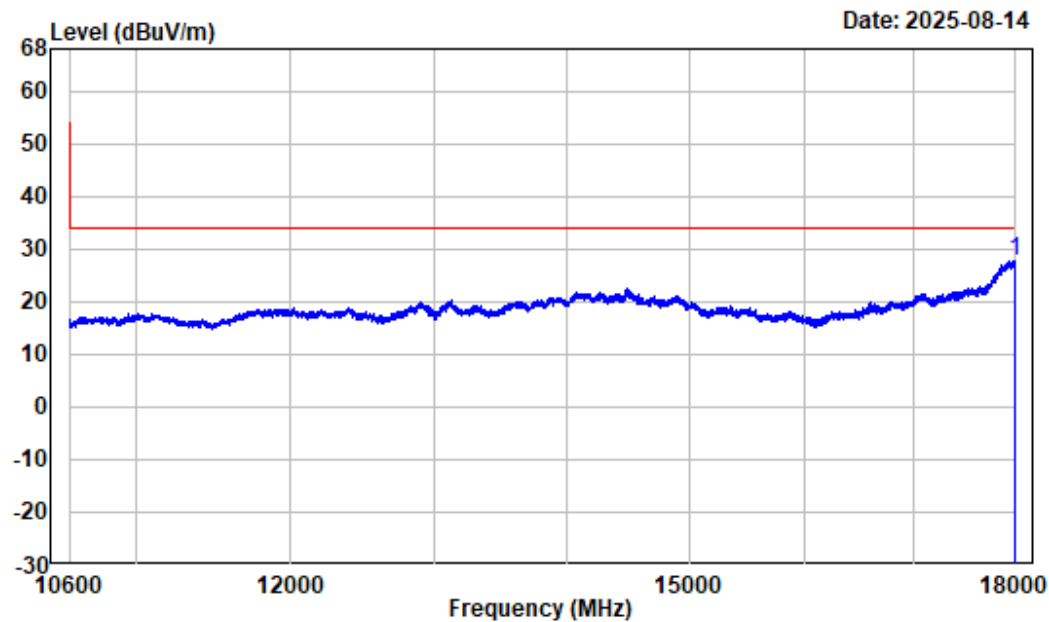
10.6-18GHz_Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:100kHz VBW:300kHz Detector:RMS
Note : UWB_7987.2MHz

Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 17980.000	13.10	14.68	27.78	33.90	-6.12	Peak

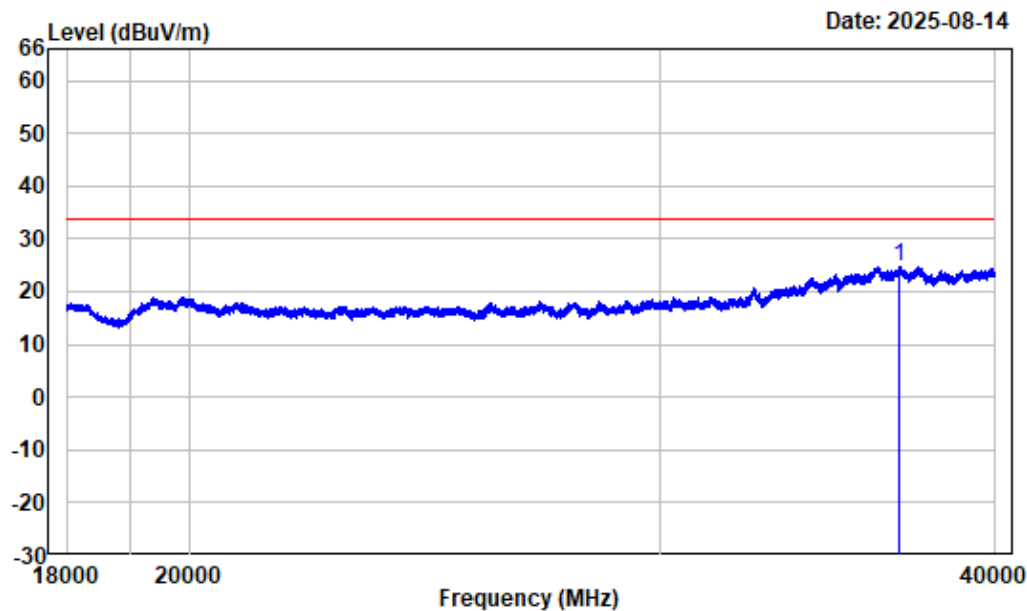
10.6-18GHz_ Vertical



Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:100kHz VBW:300kHz Detector:RMS
Note : UWB_7987.2MHz

Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 17990.000	13.16	14.68	27.84	33.90	-6.06	Peak

18-40GHz_Horizontal



Condition : Horizontal

Project No. : 2501V37480E-RF

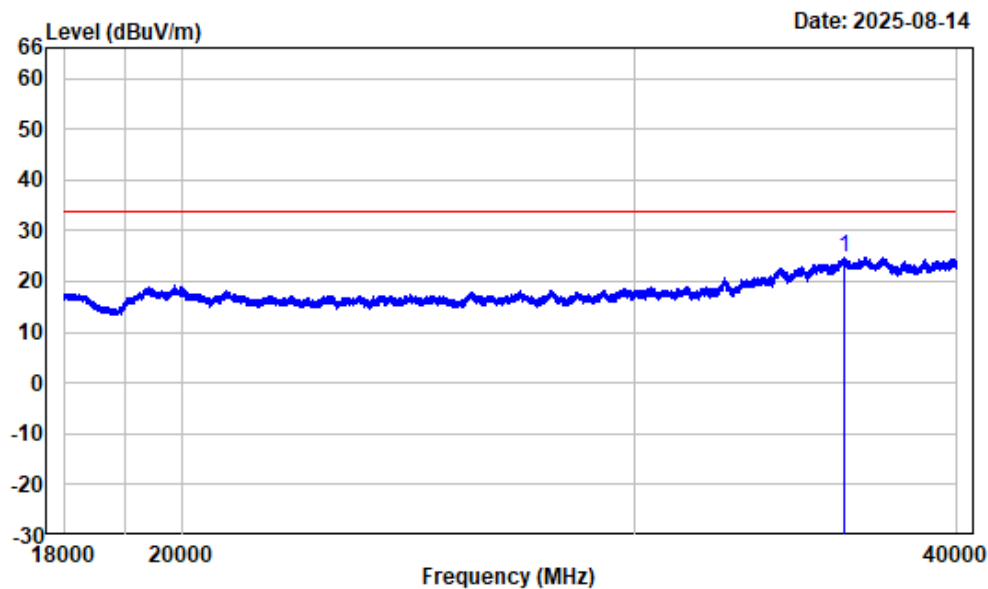
Tester : Wing K Ji

Spectrum setting: RBW:100kHz VBW:300kHz Detector:RMS

Note : UWB_7987.2MHz

Freq Factor		Read Level	Limit Level	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB
1 36836.860	22.90	1.95	24.85	33.90	-9.05 Peak

18-40GHz_Vertical



Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:100kHz VBW:300kHz Detector:RMS
Note : UWB_7987.2MHz

Freq		Factor	Read Level	Level	Limit Line	Over Limit	Remark
MHz		dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 36152.820		23.43	1.38	24.81	33.90	-9.09	Peak

Note:
Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Levle = Factor + Read Level
Over Limit = Level - Limit
The other spurious emission which is in the noise floor level was not recorded.

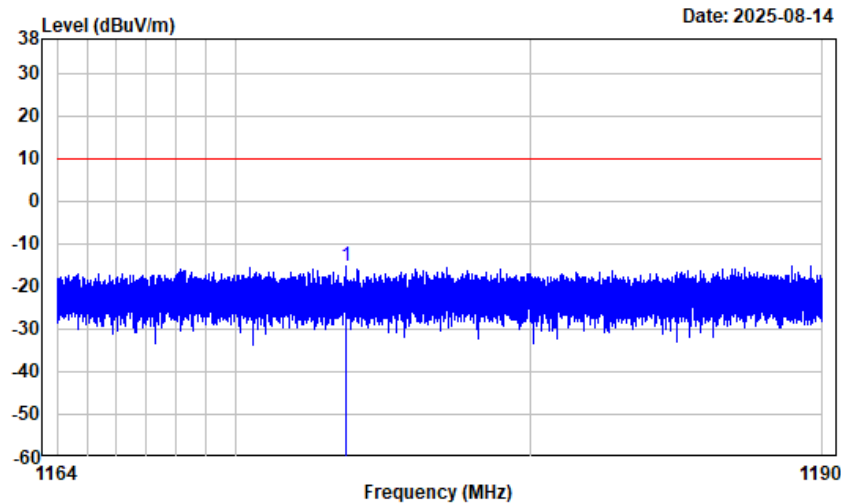
Spurious radiated emission above 960MHz in GPS band:

- 1. The test distance is 0.5m, so the correct factor from 3m to 0.5m is $20\log(3/0.5)=15.56\text{dB}$ which was added into the offset on the spectrum analyzer.
- 2. $E[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm}] + 95.2$, for $d = 3$ meters. The unit of final result on the test plots are $\text{dB}\mu\text{V/m}$, so the limit should be added by 95.2 dB from dB m to $\text{dB}\mu\text{V/m}$.
- 3. The antenna factor, cable loss and preamplifier gain have been entered into the analyzer as the transducer factor.

Channel 5:

1164MHz-1190MHz:

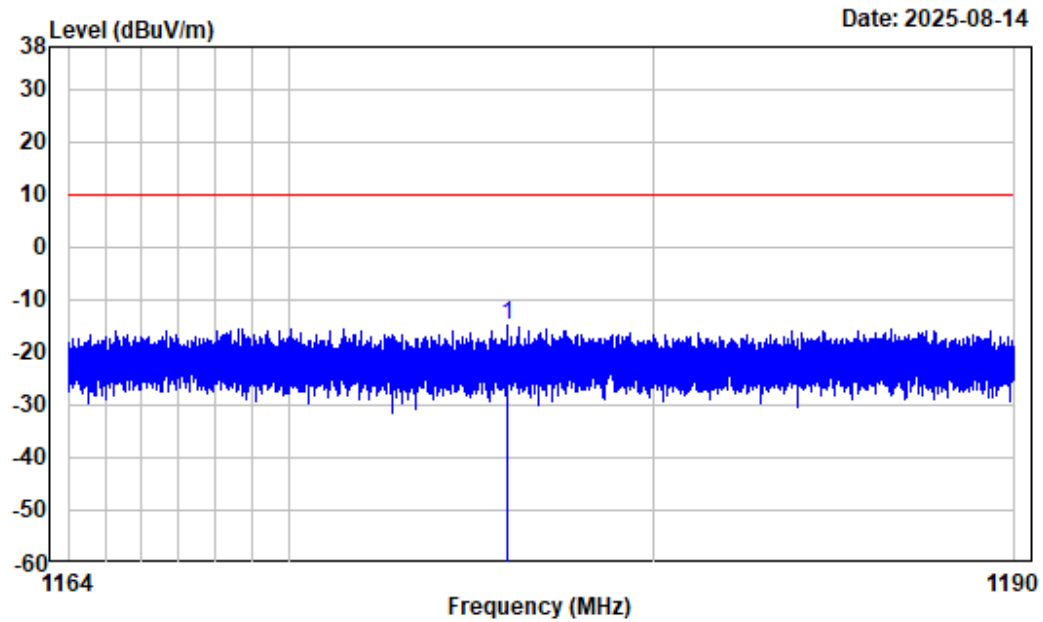
Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_6489.6MHz

Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1173.734	-15.22	0.13	-15.09	9.90	-24.99 Peak

Vertical

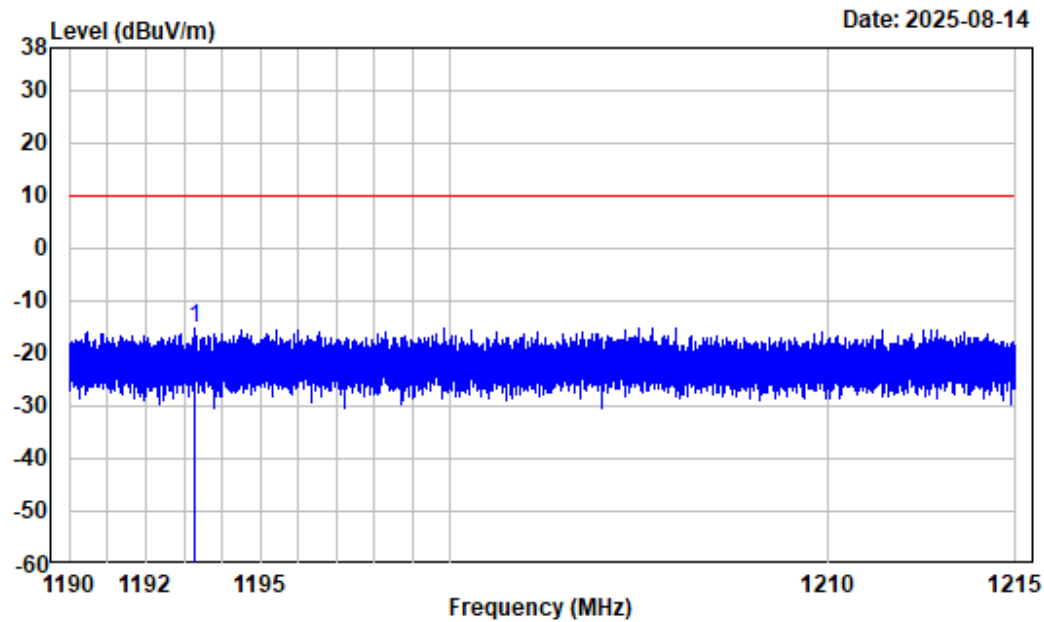


Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_6489.6MHz

		Read		Limit	Over	Remark
Freq Factor		Level	Level	Line	Limit	
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1176.003	-15.22	0.18 -15.04	9.90	-24.94	Peak

1190-1215MHz:

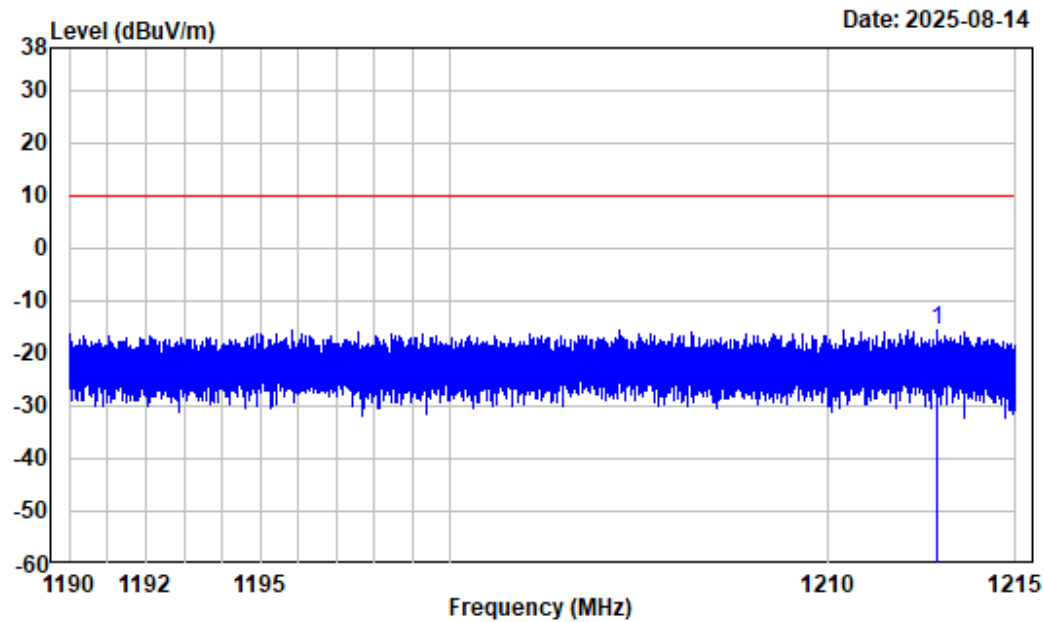
Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_6489.6MHz

		Read		Limit	Over	Remark
Freq Factor		Level	Level	Line	Limit	
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 1193.291	-15.15	-0.01	-15.16	9.90	-25.06	Peak

Vertical

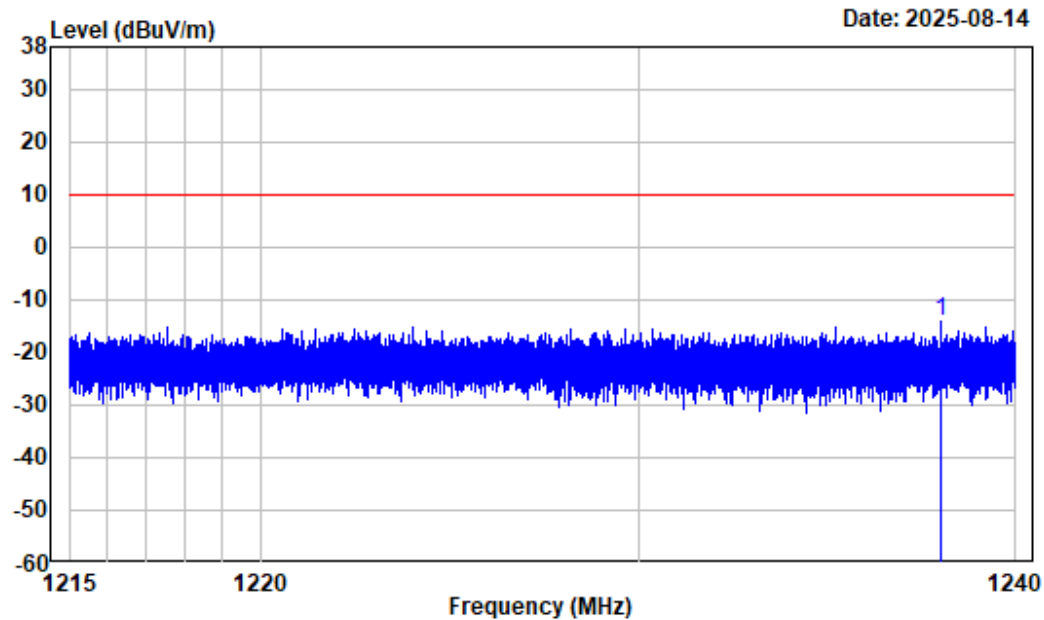


Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_6489.6MHz

Freq Factor		Read	Limit	Over	Remark
		Level	Level	Line	
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB
1 1212.895	-14.99	-0.50	-15.49	9.90	-25.39 Peak

1215-1240MHz:

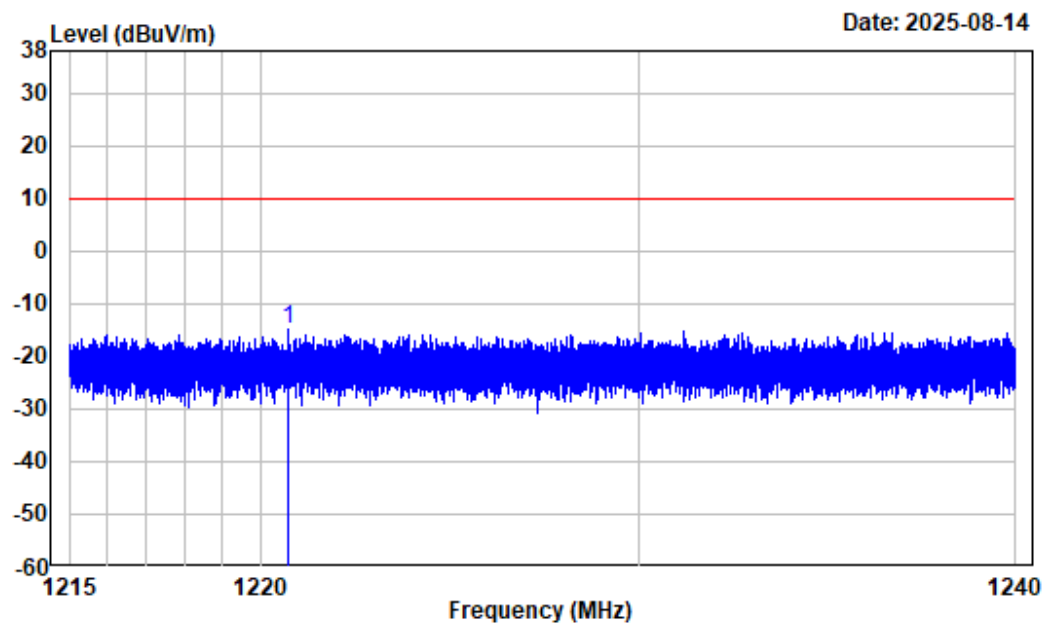
Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_6489.6MHz

Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 1238.021	-14.71	0.69	-14.02	9.90	-23.92	Peak

Vertical

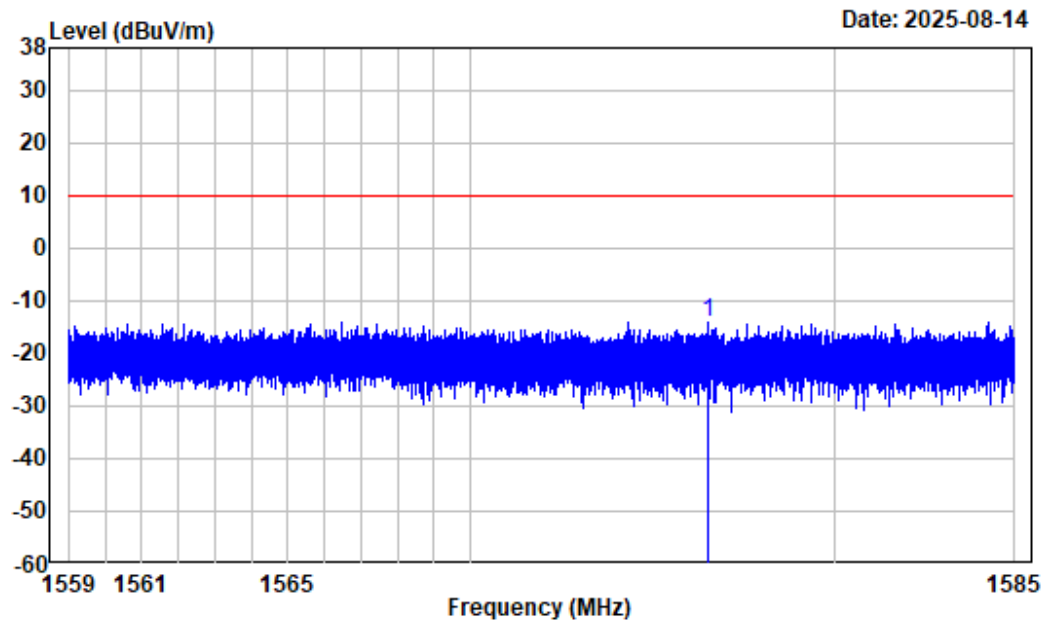


Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_6489.6MHz

Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 1220.751	-14.90	-0.11	-15.01	9.90	-24.91	Peak

1559-1585MHz:

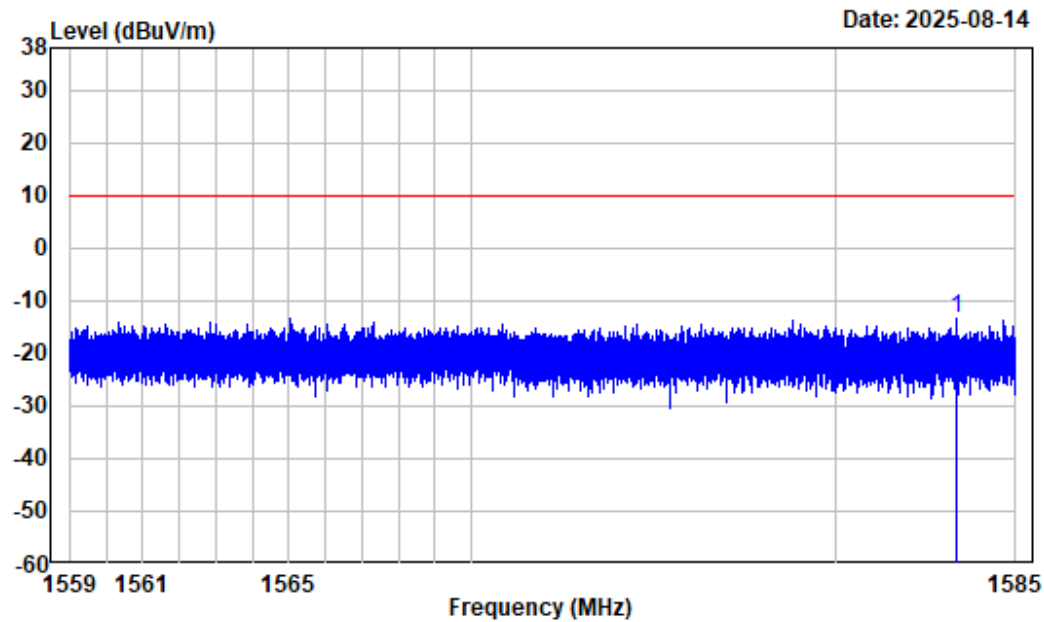
Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_6489.6MHz

Freq		Read		Limit	Over	Remark
Factor		Level	Level	Line	Limit	
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 1576.516	-14.22	0.25	-13.97	9.90	-23.87	Peak

Vertical

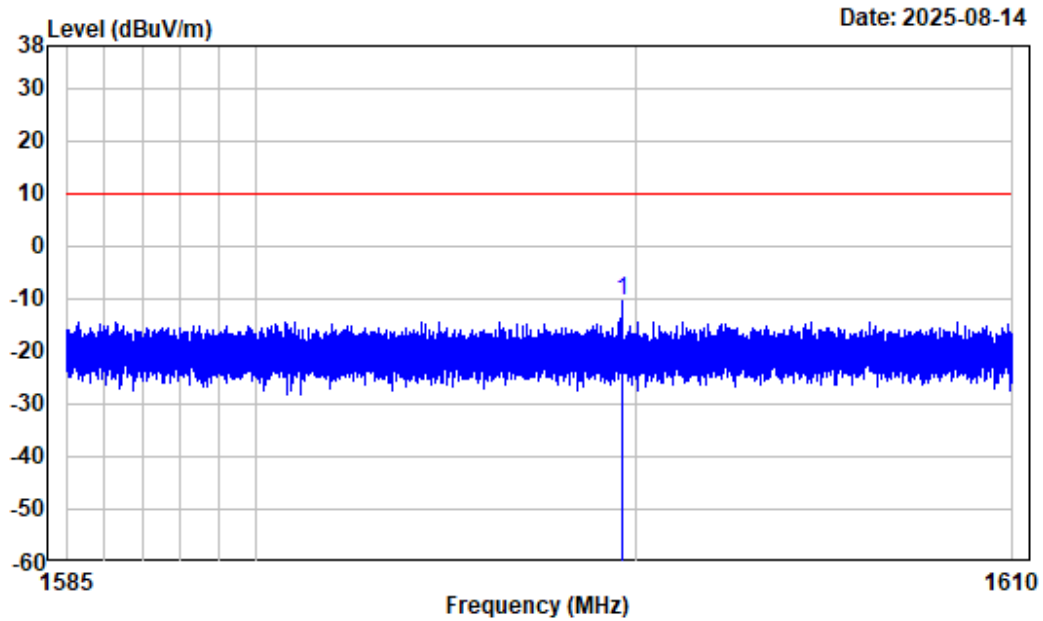


Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_6489.6MHz

Freq Factor		Read	Limit	Over	Remark
		Level	Level	Line	
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB
1 1583.356	-14.26	0.89	-13.37	9.90	-23.27 Peak

1585-1610MHz:

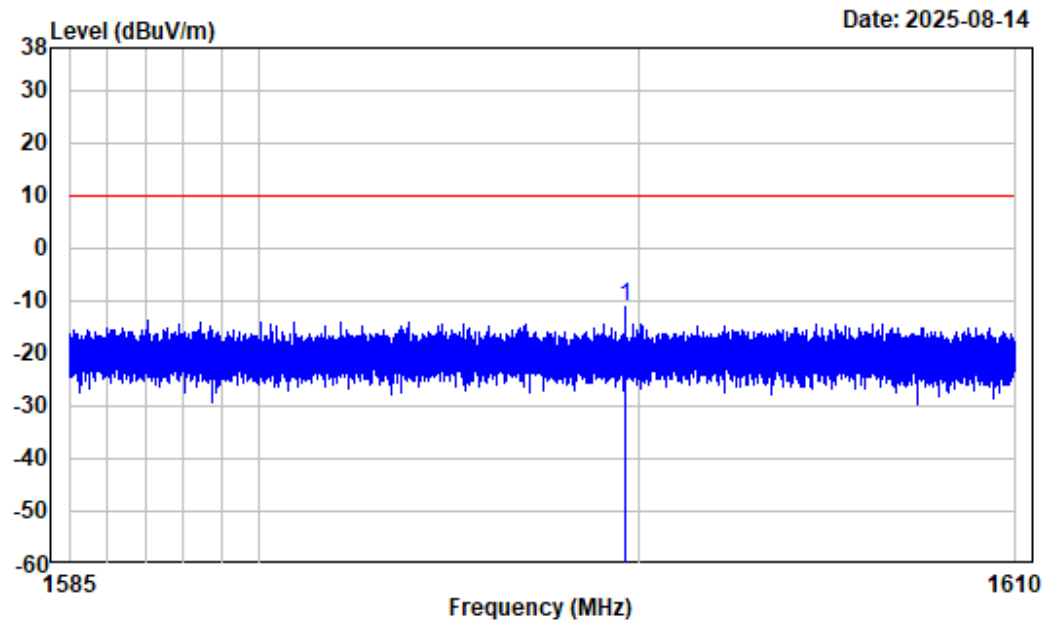
Horizontal



Condition : Horizontal
 Project No. : 2501V37480E-RF
 Tester : Wing K Ji
 Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
 Note : GPS_6489.6MHz

		Read		Limit	Over	Remark
Freq Factor		Level	Level	Line	Limit	
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 1599.635	-14.34	3.93	-10.41	9.90	-20.31	Peak

Vertical



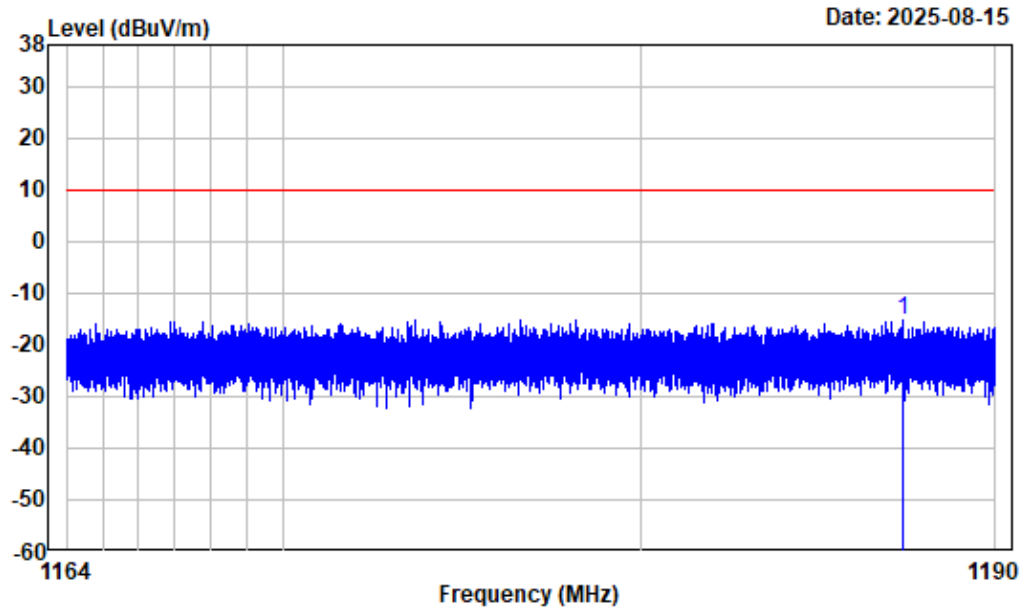
Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_6489.6MHz

Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 1599.637	-14.34	3.15	-11.19	9.90	-21.09	Peak

Channel 9:

1164MHz-1190MHz:

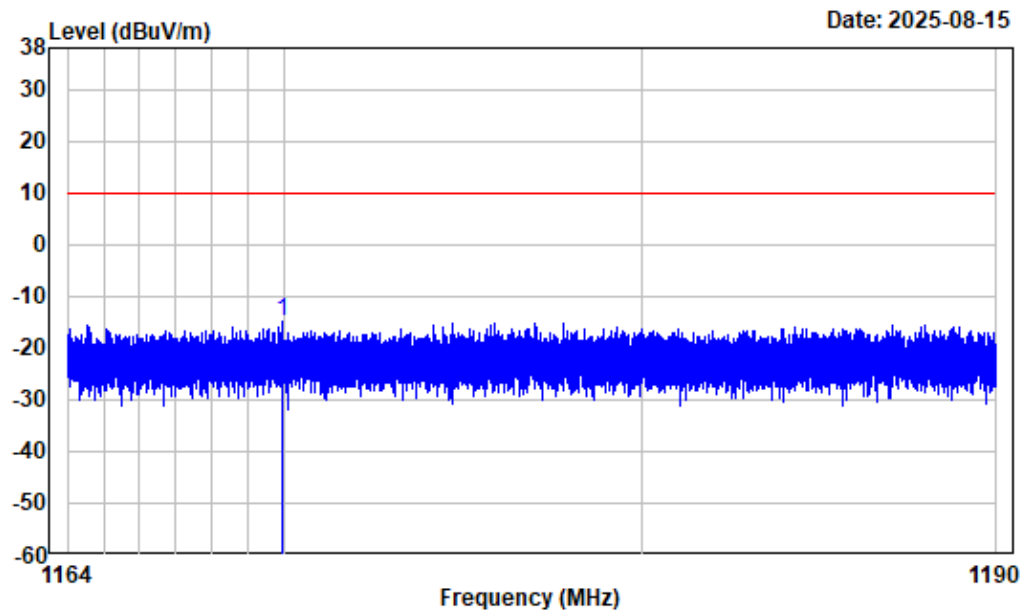
Horizontal



Condition : Horizontal
 Project No. : 2501V37480E-RF
 Tester : Wing K Ji
 Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
 Note : GPS_7987.2MHz

Freq Factor		Read Level	Limit Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 1187.384	-15.19	0.07	-15.12	9.90	-25.02	Peak

Vertical

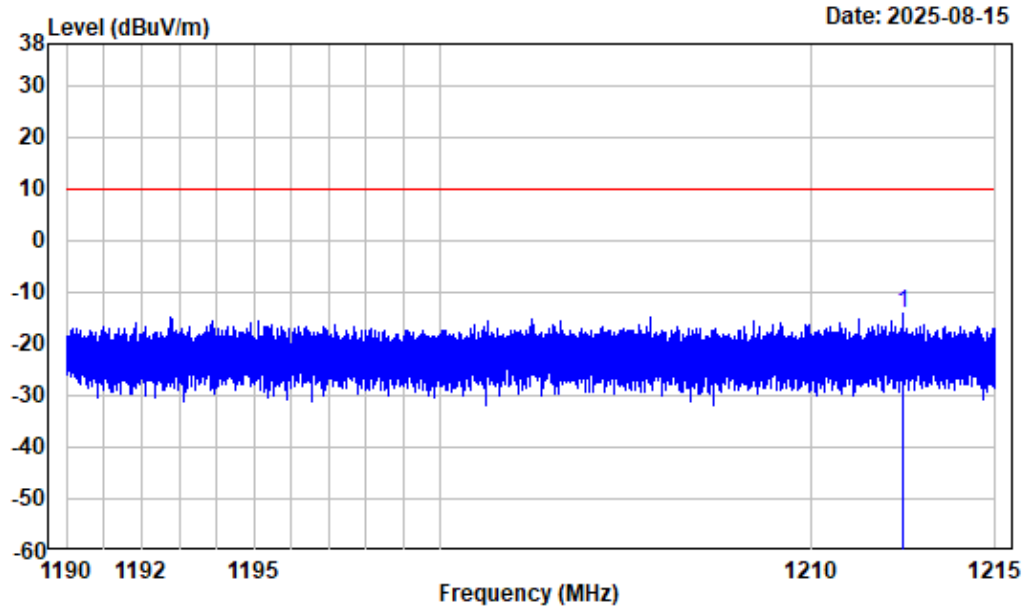


Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_7987.2MHz

Freq Factor		Read Level		Limit	Over	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1169.961	-15.25	0.23	-15.02	9.90	-24.92 Peak

1190-1215MHz:

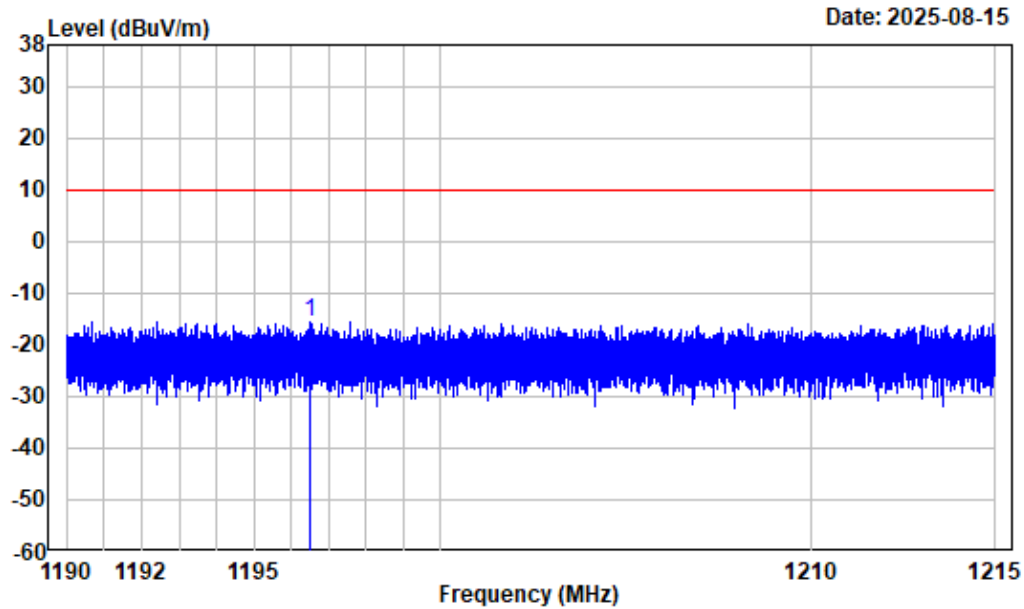
Horizontal



Condition : Horizontal
 Project No. : 2501V37480E-RF
 Tester : Wing K Ji
 Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
 Note : GPS_7987.2MHz

	Freq Factor		Read Level		Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1212.494	-15.01	0.69	-14.32	9.90	-24.22	Peak

Vertical

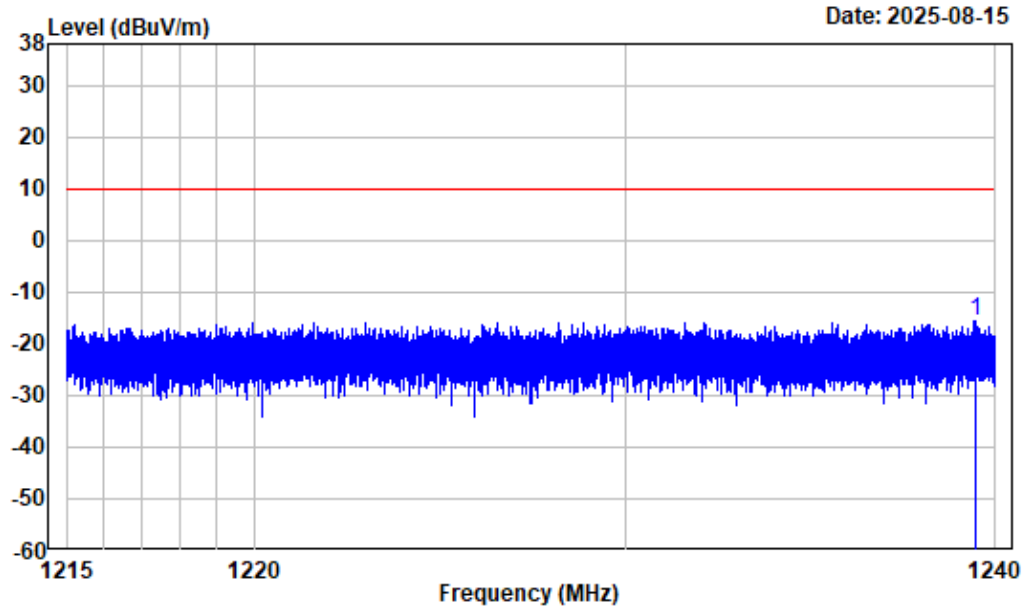


Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_7987.2MHz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1196.526	-15.16	-0.41	-15.57	9.90	-25.47	Peak

1215-1240MHz:

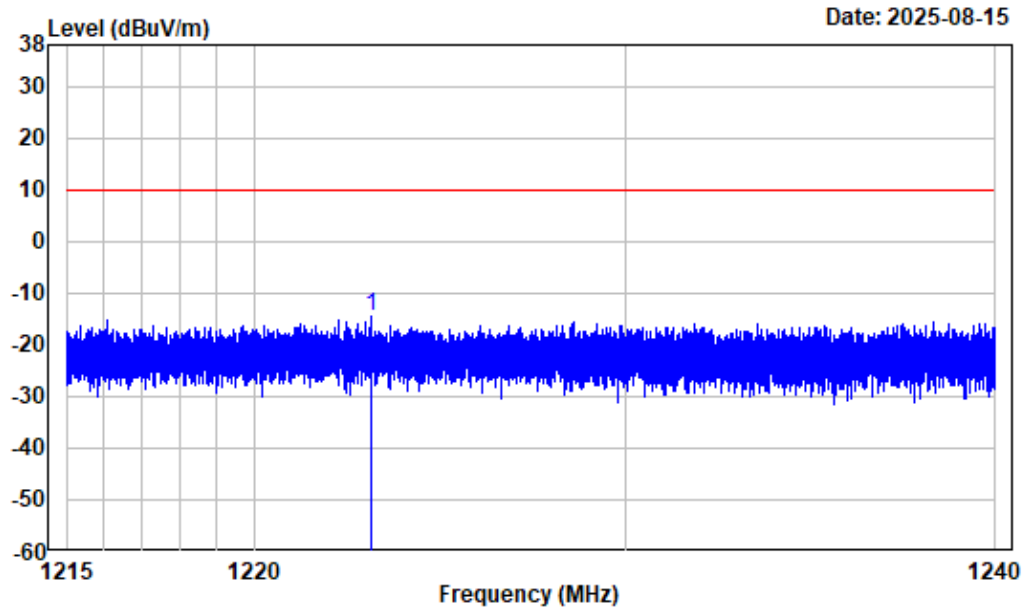
Horizontal



Condition : Horizontal
 Project No. : 2501V37480E-RF
 Tester : Wing K Ji
 Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
 Note : GPS_7987.2MHz

	Freq Factor		Read Level		Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1239.445	-14.71	-0.76	-15.47	9.90	-25.37	Peak

Vertical

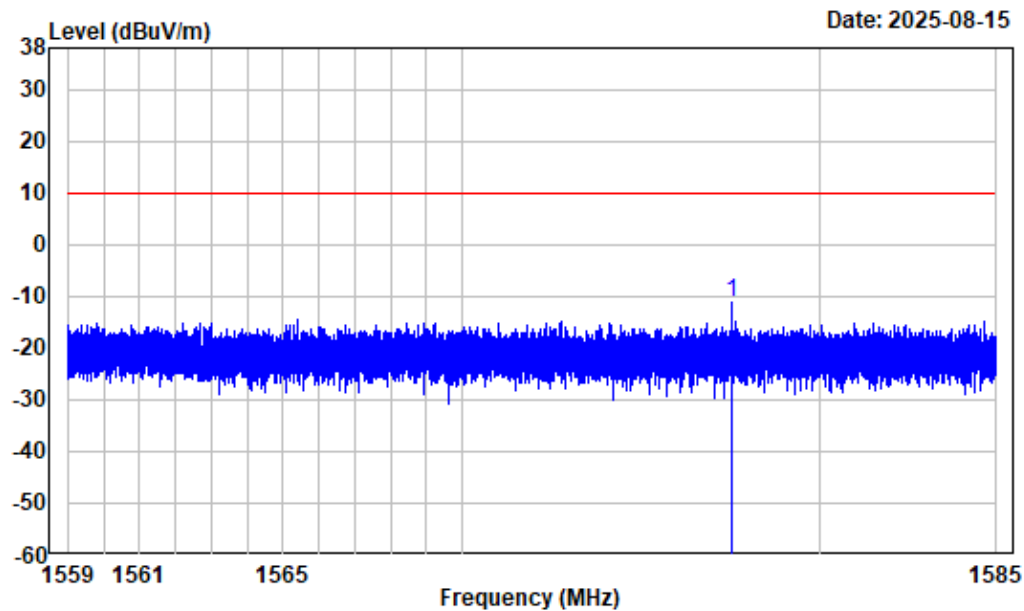


Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_7987.2MHz

Freq Factor		Read Level		Limit	Over	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1223.130	-14.89	0.28 -14.61	9.90	-24.51	Peak

1559-1585MHz:

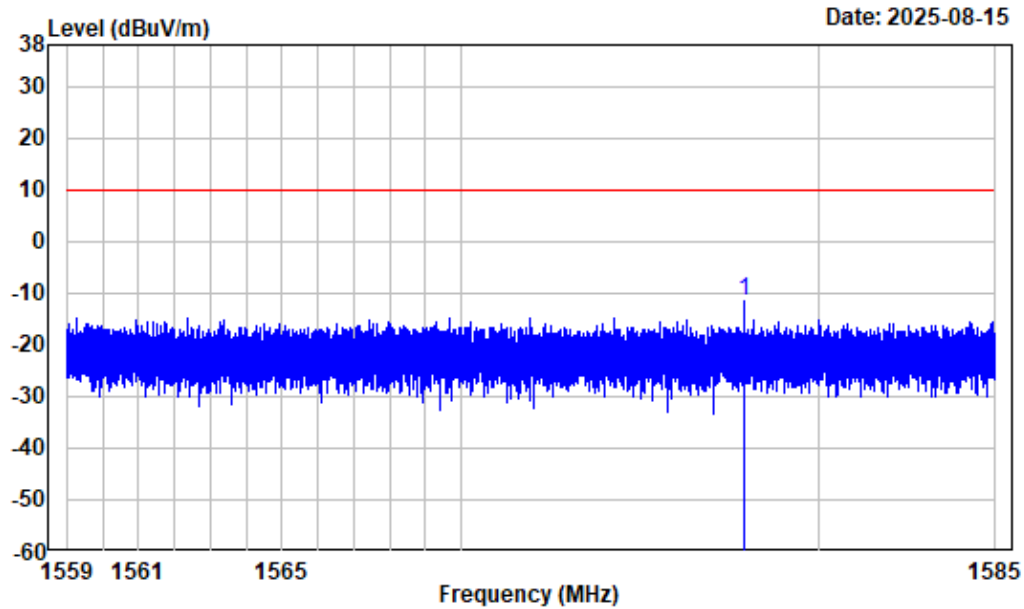
Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_7987.2MHz

Freq Factor		Read Level		Limit	Over	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1577.532	-14.23	2.95	-11.28	9.90	-21.18 Peak

Vertical

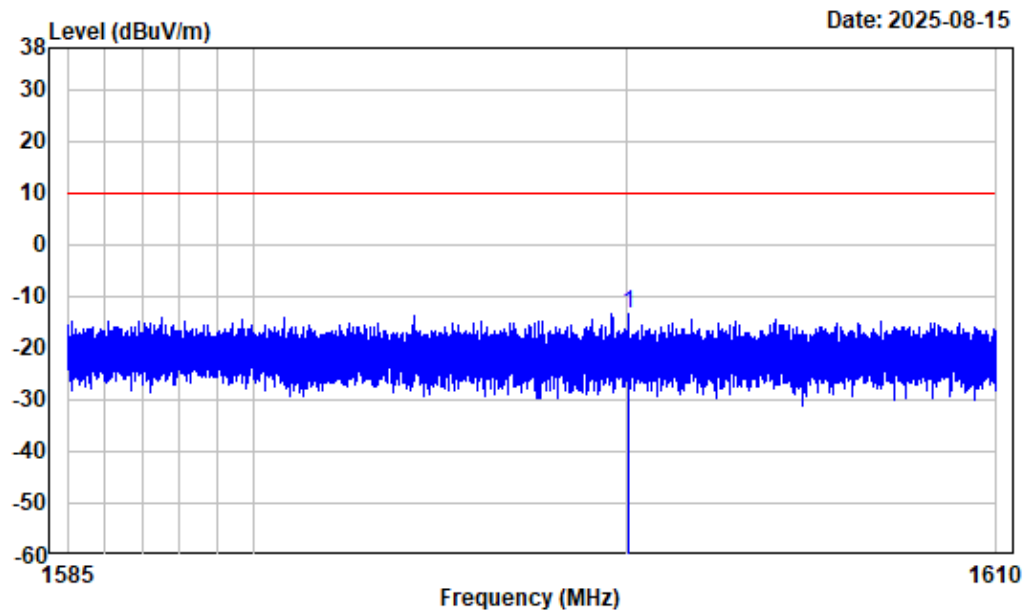


Condition : Vertical
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_7987.2MHz

Freq Factor		Read Level		Limit	Over	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1577.952	-14.23	2.80	-11.43	9.90	-21.33 Peak

1585-1610MHz:

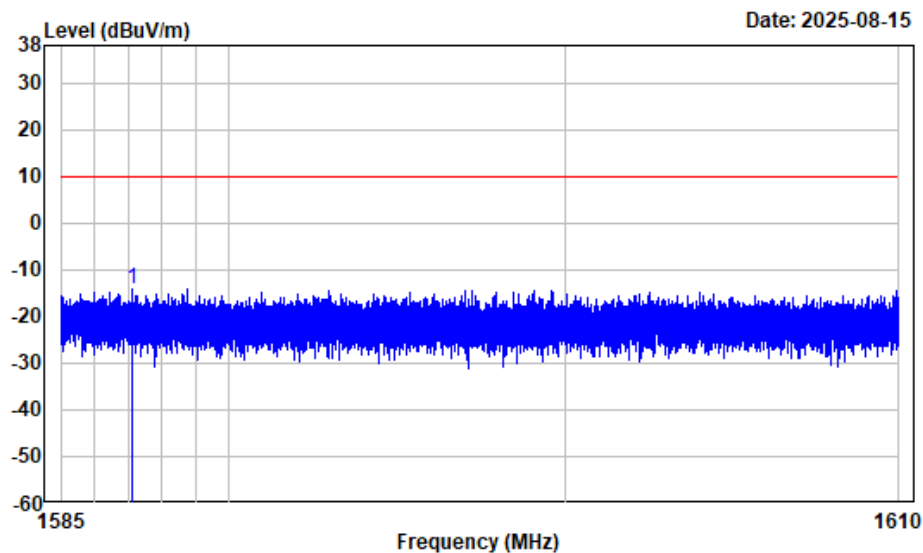
Horizontal



Condition : Horizontal
Project No. : 2501V37480E-RF
Tester : Wing K Ji
Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
Note : GPS_7987.2MHz

Freq Factor		Read Level		Limit	Over	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1600.050	-14.34	1.06 -13.28	9.90	-23.18	Peak

Vertical



Condition : Vertical
 Project No. : 2501V37480E-RF
 Tester : Wing K Ji
 Spectrum setting: RBW:1kHz VBW:3kHz Detector:RMS
 Note : GPS_7987.2MHz

	Freq	Factor	Read		Limit	Over	Remark
			Level	Level	Line	Limit	
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1587.108	-14.27	0.08	-14.19	9.90	-24.09	Peak

Note:

Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

Levle = Factor + Read Level

Over Limit = Level - Limit

The other spurious emission which is in the noise floor level was not recorded.

FCC §15.519(e), RSS-220 §5.3.1(G) & RSS-220 Annex §4 (c) - MAXIMUM PEAK EMISSION(PEAK EIRP) AND AVERAGE EMISSION(AVERAGE EIRP)

Applicable Standard

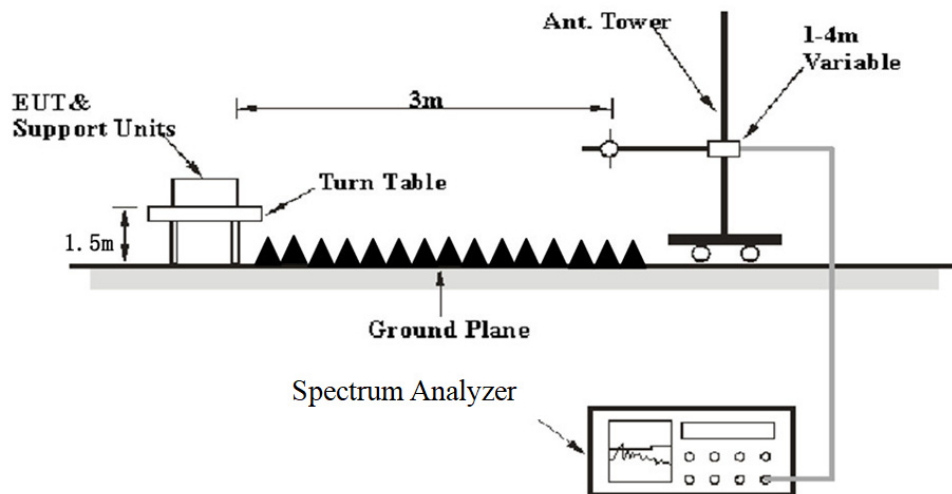
According to FCC § 15. 503 (e), There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, f_M . That limit is 0 dBm EIRP. It is acceptable to employ a different resolution bandwidth, and a correspondingly different peak emission limit, following the procedures described in §15.521.

According to RSS-220 §5.3.1 (g), The peak level of the transmissions shall not exceed the peak equivalent of the average limit contained within any 50 MHz bandwidth, as defined in section 4 of the Annex.

According to RSS-220 Annex §4 (c), Peak measurements shall be made in addition to average measurements. Transmissions shall not exceed 0 dBm e.i.r.p. in any 50 MHz bandwidth when the average limit is -41.3 dBm/MHz. This is the equivalent peak limit as calculated by combining the 6 dB peak-to-average conversion with a resolution bandwidth (RBW) scaling factor of $20 \log(1 \text{ MHz}/50 \text{ MHz})$. Only the 50 MHz bandwidth, centred on the frequency f_M where the highest power occurs, needs to be measured to satisfy the peak requirements for all frequencies. A different resolution bandwidth and a correspondingly different peak limit may also be used, in which case the RBW may be set anywhere between 1 MHz and 50 MHz. The peak e.i.r.p. limit is then calculated as $20 \log(\text{RBW}/50) \text{ dBm}$ where the RBW is in MHz. This may be converted to a peak field strength level at 3 metres using $E(\text{dBuV/m}) = P(\text{e.i.r.p.}(\text{dBm})) + 95.2$. If the RBW is greater than 3 MHz, the application for certification shall contain a detailed description of the test procedure, the calibration of the test set-up and the instrumentation used in the testing.

Test Procedure

Refer to the ANSI C63.10-2020 Section 10.3.5.



Test Data**Environmental Conditions**

Temperature:	24.3℃
Relative Humidity:	49 %
ATM Pressure:	100.2 kPa

The testing was performed by Wing K Ji on 2025-10-22.

EUT operation mode: Transmitting

Test result: Pass.

Please refer to follow tables and plots:

Peak:

Frequency (MHz)	Reading level (dBμV/m) RBW=10MHz	E (dBμV/m) RBW=50MHz	EIRP (dBm/50MHz)	Limit
				dBm/50MHz
CH5				
6489.6	76.94	90.83	-4.28	0
CH6				
7987.2	77.06	91.04	-4.16	0

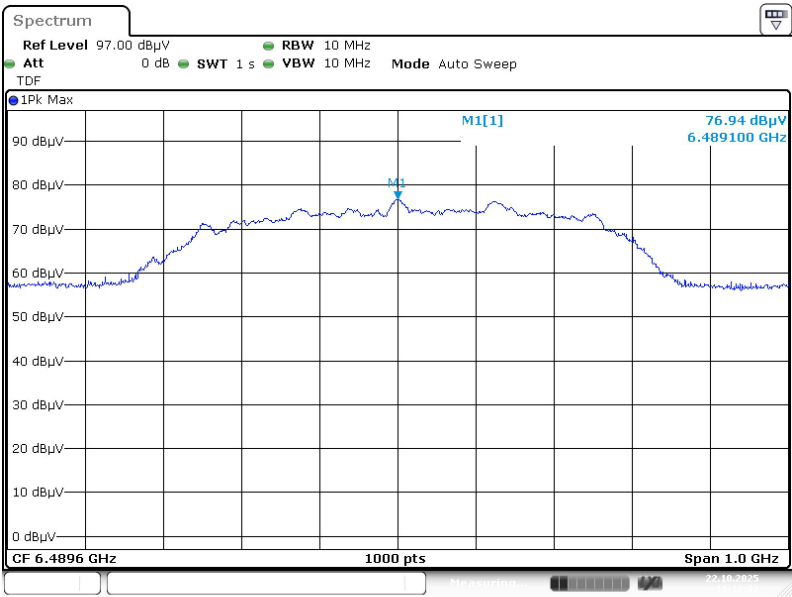
Note: 1. $E [dB\mu V/m] = EIRP [dBm] + 95.2$, for $d = 3$ meters.

2. The antenna factor, cable loss and preamplifier gain have been entered into the analyzer as the transducer factor.

3. The test distance is 3m

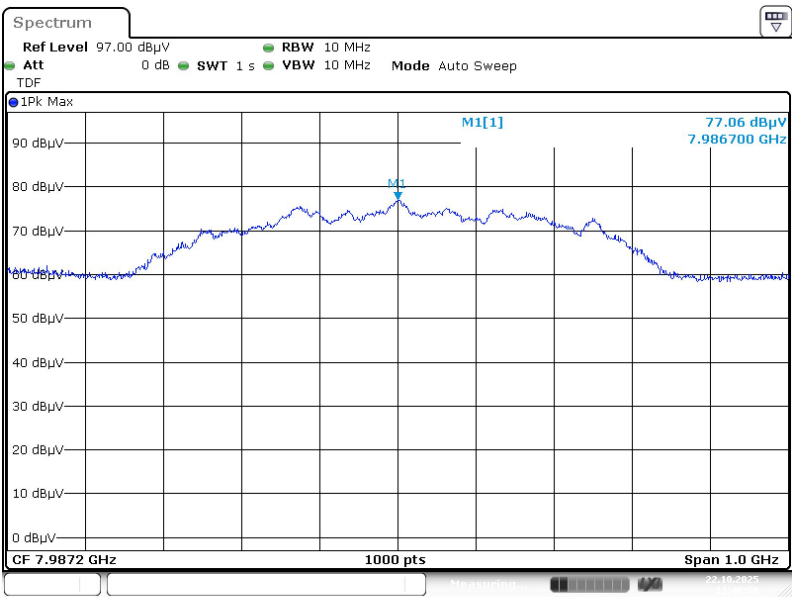
4. The correct factor of RBW 10MHz to 50MHz is $20 \log (50MHz/10MHz) = 13.98dB$.

CH5



ProjectNo.:2501V37480E-RF Tester:Wing K Ji
Date: 22.OCT.2025 11:12:32

CH9



ProjectNo.:2501V37480E-RF Tester:Wing K Ji
Date: 22.OCT.2025 11:46:08

Average:

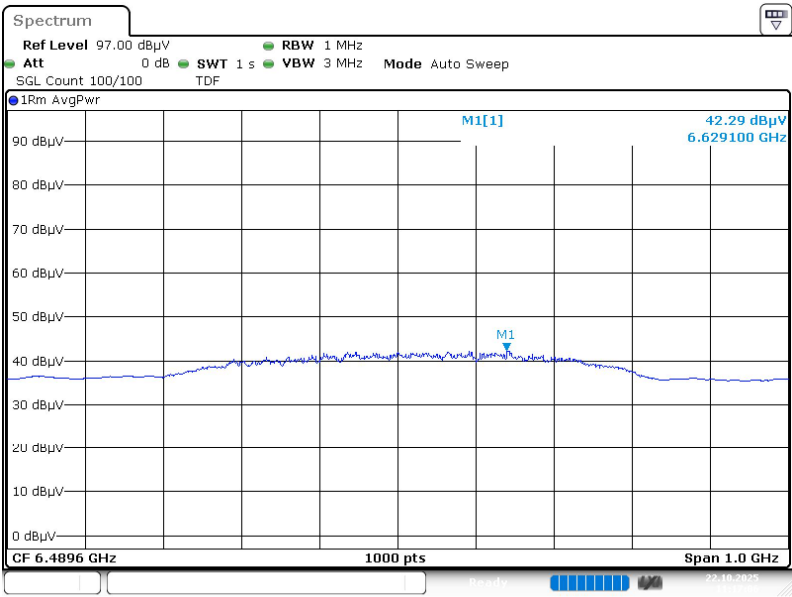
Frequency (MHz)	Reading level (dBμV/m)	EIRP (dBm/MHz)	Limit
			(dBm/MHz)
CH5			
6489.6	42.29	-52.91	-41.3
CH9			
7987.2	43.37	-51.83	-41.3

Note: 1. $E \text{ [dBμV/m]} = \text{EIRP [dBm]} + 95.2$, for $d = 3$ meters.

2. The antenna factor, cable loss and preamplifier gain have been entered into the analyzer as the transducer factor.

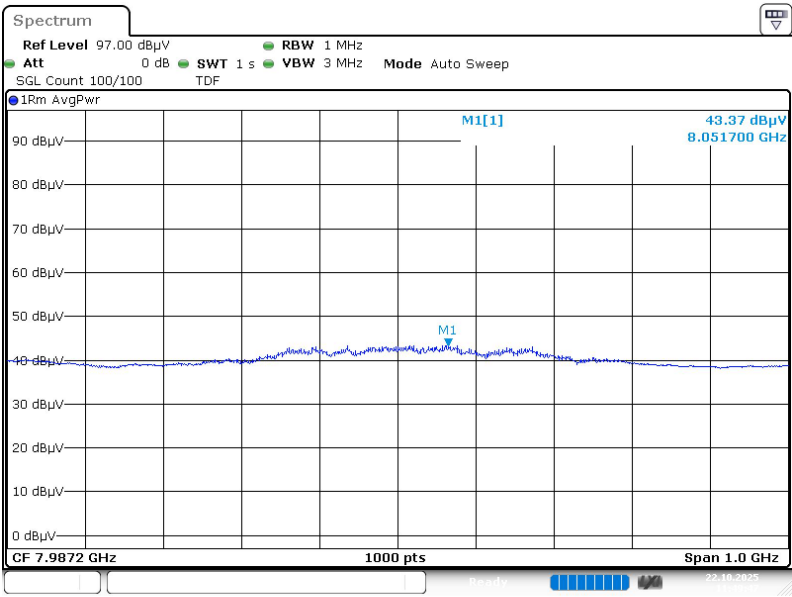
3. The test distance is 3m

CH5



ProjectNo.:2501V37480E-RF Tester:Wing K Ji
Date: 22.OCT.2025 11:17:06

CH9



ProjectNo.:2501V37480E-RF Tester:Wing K Ji
Date: 22.OCT.2025 11:49:48

EUT PHOTOGRAPHS

Please refer to the attachment 2501V37480E-RF-EXP External photo and 2501V37480E-RF-INP Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2501V37480E-RFB-TSP Test Setup photo.

******* END OF REPORT *******