TESTREPORT

Applicant Name :	WIZZILAB SAS
Address :	29 Boulevard Romain Rolland Montrouge 92120 France
ReportNumber:	SZNS211102-56246E-RF-00
FCC ID:	2ARZVUM-1

Test Standard (s)

FCC PART 15F

Sample Description

Product Type:	UWB Module
Model No.:	UM-1
Multiple Model(s) No.:	N/A
Trade Mark:	WIZZILAB
Date Received:	2021/11/02
Report Date:	2022/04/11

Test Result:	Pass*

* In the configuration tested, the EUT complied with the standards above.

Prepared andChecked By:

Ting Lv

EMC Engineer

Approved By:

Robert Li

EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★ ".
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	4493MHz to 6490MHz
Antenna Specification*	0.8dBi(It is provided by the applicant)
Voltage Range	DC 2.8-3.6V(Typical DC 3.3V)
Sample serial number	SZNS211102-56246E-RF-S1(Assigned by ATC)
Sample/EUT Status	Good condition

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.

Test Methodology

All tests and measurements indicated in this document were performed in accordance ANSI C63.10-2013.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		$0.082*10^{-7}$
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
	18GHz -26.5GHz	5.06dB
	26.5GHz -40GHz	4.72dB
Temperature		1℃
Humidity		6%
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 Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358,the FCC Designation No.: CN1189.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing by manufacturer.

EUT support two channels:
Channel 3: 4493MHz, channel 5: 6490MHz

EUT support two option Pulse Repetition Frequency (PRF): 16MHz and 64MHz (be marked as PRF16, PRF64 in report), and two option data rates: 110kbps and 850kbps (marked as 110K, 850K in report).
So EUT can set at below four configurations:
PRF16-110K; PRF16-850K; PRF64-110K; PRF64-850K

EUT was tested on both channels with the four configurations.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

“rubyinstaller-devkit-2.7.4-1-x64.exe”*software was used during test and power level is default* which was provided by manufacturer

Support Equipment List and Details

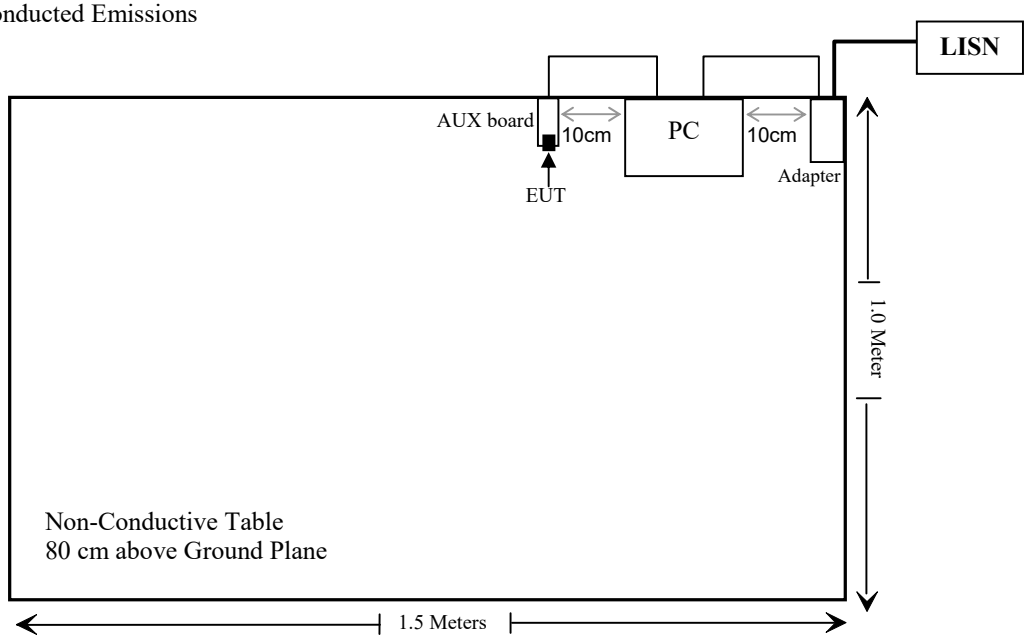
Manufacturer	Description	Model	Serial Number
DELL	PC	Latitude	11429208685
DELL	Adapter	DA130PE1-00	CN-0JU012-68219-18B-JEYY-A04
WIZZILAB SAS	AUX board	Umlab-v1-21.09	Unknown

External I/O Cable

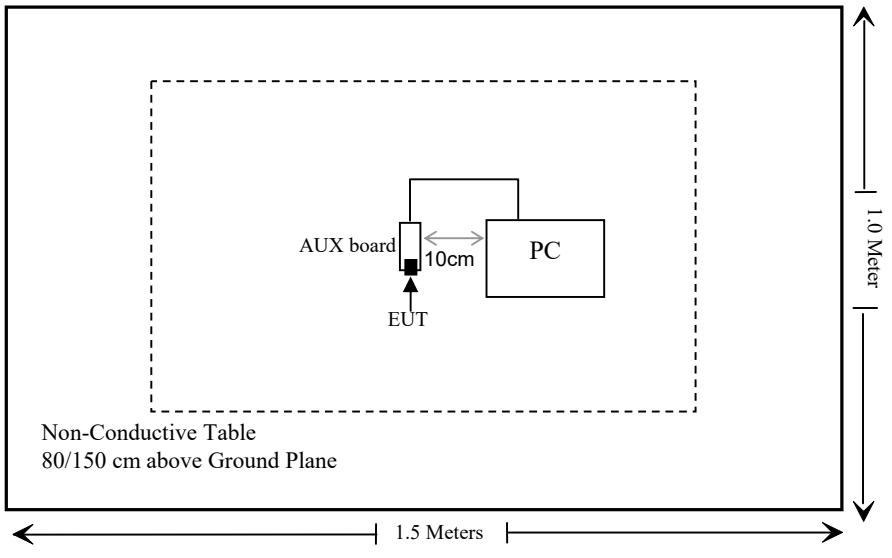
Cable Description	Length (m)	From/Port	To
Un-shielding Detachable AC Cable	1.5	Adapter	LISN
Un-shielding Detachable DC Cable	1.5	Adapter	PC
Un-shielding Detachable DC Cable	1.3	AUX board	PC

Block Diagram of Test Setup

For Conducted Emissions



For Spurious Emissions



SUMMARY OF TEST RESULTS

Items	Description of Test	Result
§1.1310&§2.1093	RF Exposure	Compliant
§15.203, §15.519(a)(2)	Antenna Requirement	Compliant
§15.207(a)	AC Line Conducted Emissions	Compliant
§15.519(a)(1)	Shutoff Timing Requirement	Compliant
§15.503 (a)(d), §15.519(b)	UWB Operation bandwidth	Compliant
§15.209,§15.519(c)(d)	Radiated Emissions	Compliant
§15.519(e)	Peak Emission in a 50 MHz bandwidth	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde& Schwarz	EMI Test Receiver	ESCI	100784	2021/12/13	2022/12/12
Rohde & Schwarz	L.I.S.N.	ENV216	101314	2021/12/13	2022/12/12
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2021/12/13	2022/12/12
Unknown	RF Coaxial Cable	No.17	N0350	2021/12/14	2022/12/13
Conducted Emission Test Software: e3 19821b (V9)					
Radiated Emissions Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2021/12/13	2022/12/12
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2021/12/13	2022/12/12
SONOMA INSTRUMENT	Amplifier	310 N	186131	2021/11/09	2022/11/08
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2021/11/09	2022/11/08
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2021/11/11	2022/11/10
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04
Unknown	RF Coaxial Cable	No.10	N050	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.11	N1000	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.12	N040	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.13	N300	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.14	N800	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.15	N600	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.16	N650	2021/12/14	2022/12/13

*** 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§1.1310&§2.1093- RF EXPOSURE

Applicable Standard

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

According to subpart 2.1093(d): Portable devices that transmit at frequencies above 6GHz shall be evaluated in terms of the MPE limits specified in table 1 to 47 CFR 1.1310. A minimum separation distance applicable to the operating configurations and exposure conditions of the device shall be used for the evaluation. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for device operating above 6GHz should be made at a minimum distance of 0.5cm from the radiating source.

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/cm^2)**	**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

Result

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/cm^2)
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)

Frequency (MHz)	**Tune up EIRP**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBm)	**(mW)**			
4493-6490	0	1	0.5	0.32	1

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliance

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has one internalantenna which permanently attached to the unit, fulfill the requirement of this section. The antenna gain is 0.8dBi. Please refer to the EUT photos.

Antenna	Type	Antenna Gain	Impedance
	PCB	0.8dBi	50 Ω

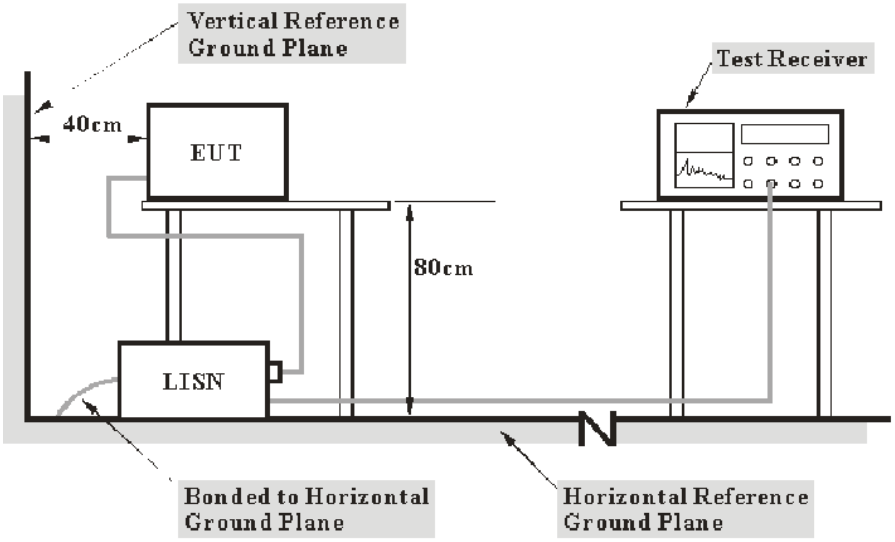
Result: Compliant.

FCC §15.207 (a) -AC Power Line Conducted Emissions

Applicable Standard

FCC§15.207(a)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits and RSS-Gen limits.

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

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30MHz	9 kHz

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Test Results Summary

According to the EUT complied with theFCC 15.207.

Transd Factor & Margin Calculation

The Transd factor is calculated by addingLISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

Transd Factor = LISN VDF + Cable Loss

The "**Over limit**" column of the following data tables indicates the degree of compliance with the applicablelimit. For example, a over limit of -7dB means the emission is 7 dB below the limit. The equation for over limitcalculation is as follows:

Over limit = Level - Limit
Level= Reading level+Transd Factor

Test Data

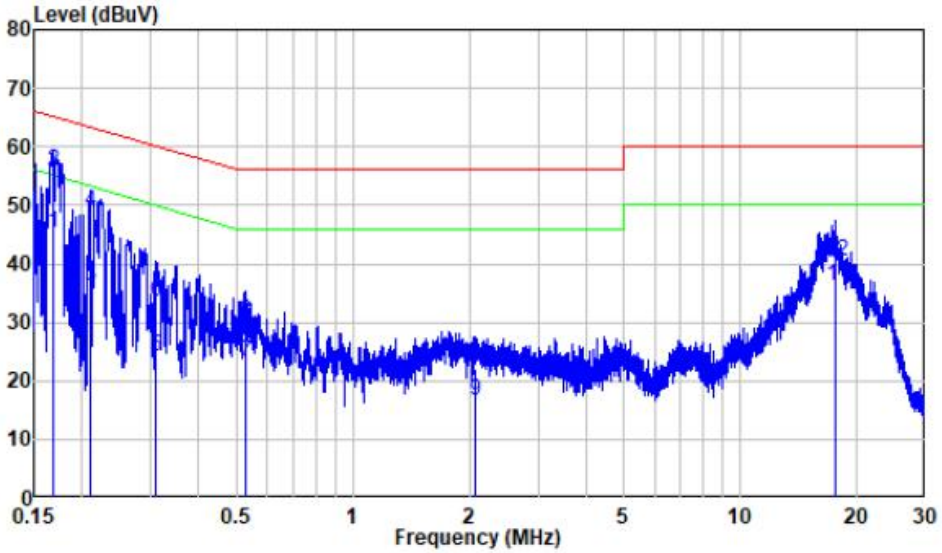
Environmental Conditions

Temperature:	22℃
Relative Humidity:	47%
ATM Pressure:	101.0 kPa

The testing was performed by Black Duan on 2022-01-12.

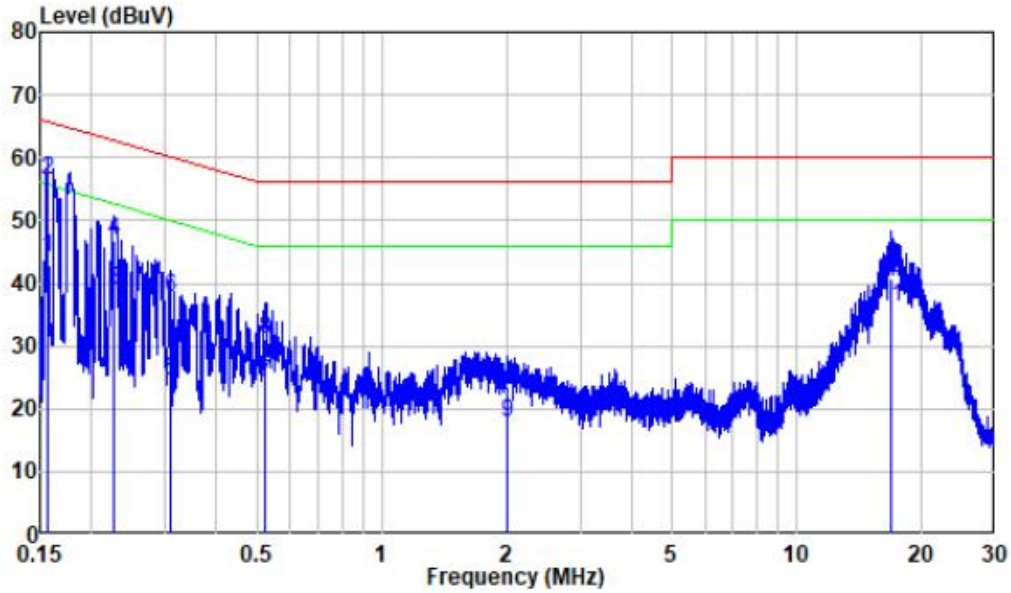
EUT operation mode: Transmitting (worst case isCH5-PRF16-110K)

AC 120V/60 Hz,Line



	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.168	9.80	35.35	45.15	55.08	-9.93	Average
2	0.168	9.80	46.16	55.96	65.08	-9.12	QP
3	0.210	9.80	26.35	36.15	53.19	-17.04	Average
4	0.210	9.80	39.06	48.86	63.19	-14.33	QP
5	0.311	9.80	14.27	24.07	49.95	-25.88	Average
6	0.311	9.80	23.70	33.50	59.95	-26.45	QP
7	0.526	9.81	13.47	23.28	46.00	-22.72	Average
8	0.526	9.81	20.23	30.04	56.00	-25.96	QP
9	2.075	9.82	6.77	16.59	46.00	-29.41	Average
10	2.075	9.82	12.35	22.17	56.00	-33.83	QP
11	17.649	9.98	26.12	36.10	50.00	-13.90	Average
12	17.649	9.98	30.36	40.34	60.00	-19.66	QP

AC 120V/60 Hz,Neutral



	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.156	9.80	34.37	44.17	55.68	-11.51	Average
2	0.156	9.80	46.61	56.41	65.68	-9.27	QP
3	0.226	9.80	29.17	38.97	52.61	-13.64	Average
4	0.226	9.80	37.00	46.80	62.61	-15.81	QP
5	0.309	9.80	14.61	24.41	49.99	-25.58	Average
6	0.309	9.80	27.89	37.69	59.99	-22.30	QP
7	0.523	9.81	14.46	24.27	46.00	-21.73	Average
8	0.523	9.81	21.27	31.08	56.00	-24.92	QP
9	2.000	9.82	7.98	17.80	46.00	-28.20	Average
10	2.000	9.82	13.66	23.48	56.00	-32.52	QP
11	16.772	10.07	26.04	36.11	50.00	-13.89	Average
12	16.772	10.07	30.67	40.74	60.00	-19.26	QP

§15.519(a) (1)-Shutoff Timing Requirement

(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.

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

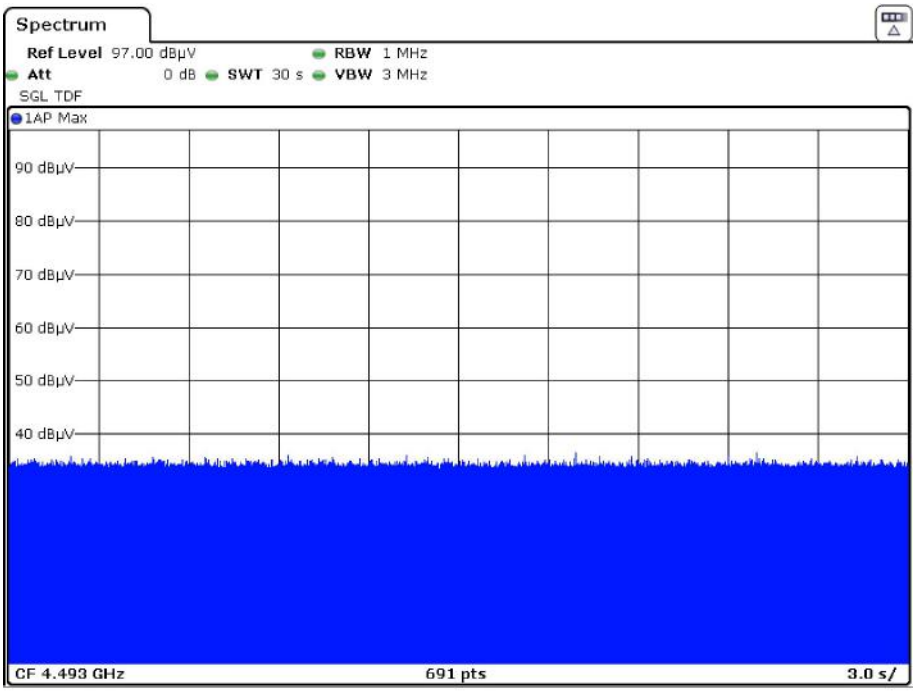
The testing was performed by Ting Lv on 2022-03-03.

Test Result: Pass.

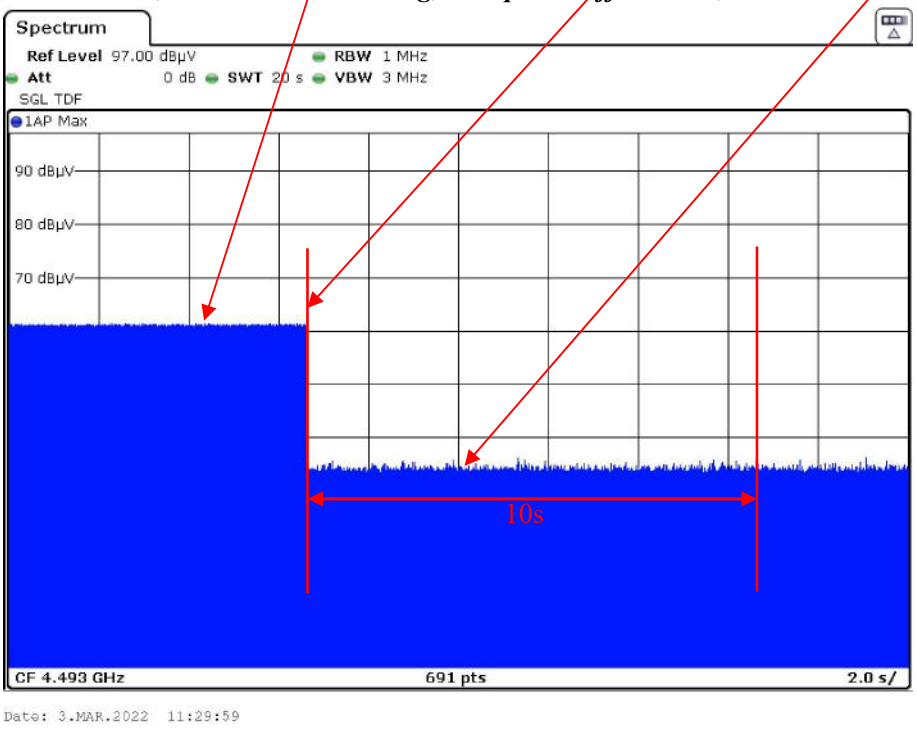
EUT operation mode: Transmitting

CH3-PRF16-110K

Without associated receiver, EUT no transmit

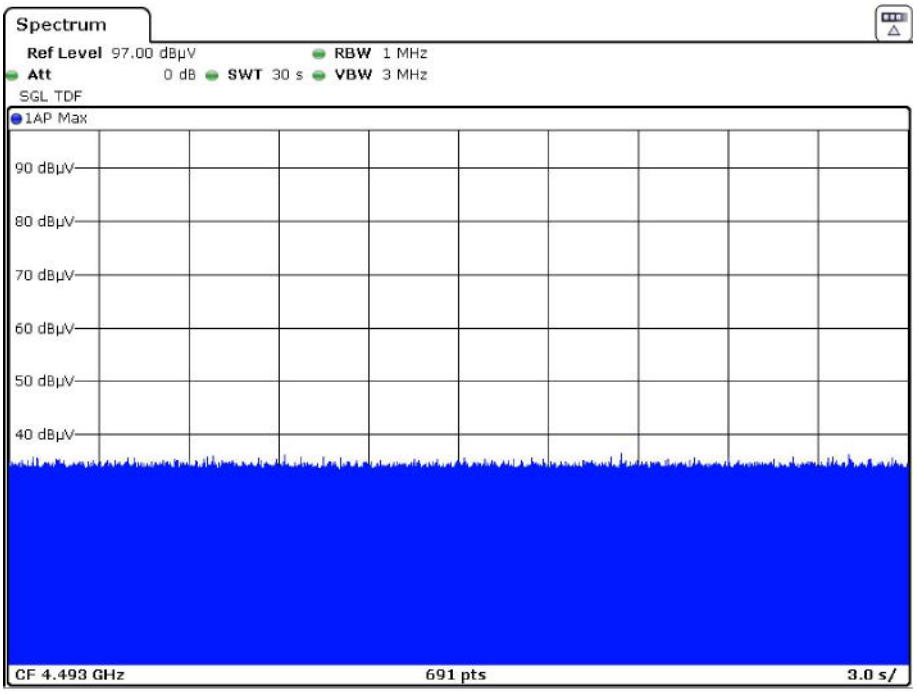


Communication with receiver, EUT was transmitting, then power off receiver, EUT cease transmit within 10s

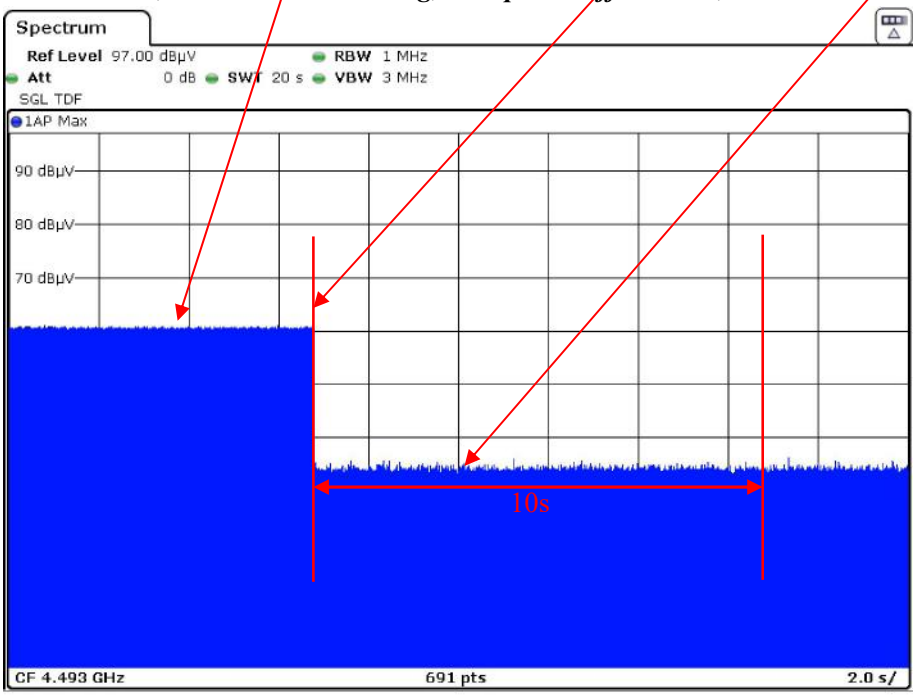


CH3-PRF16-850K

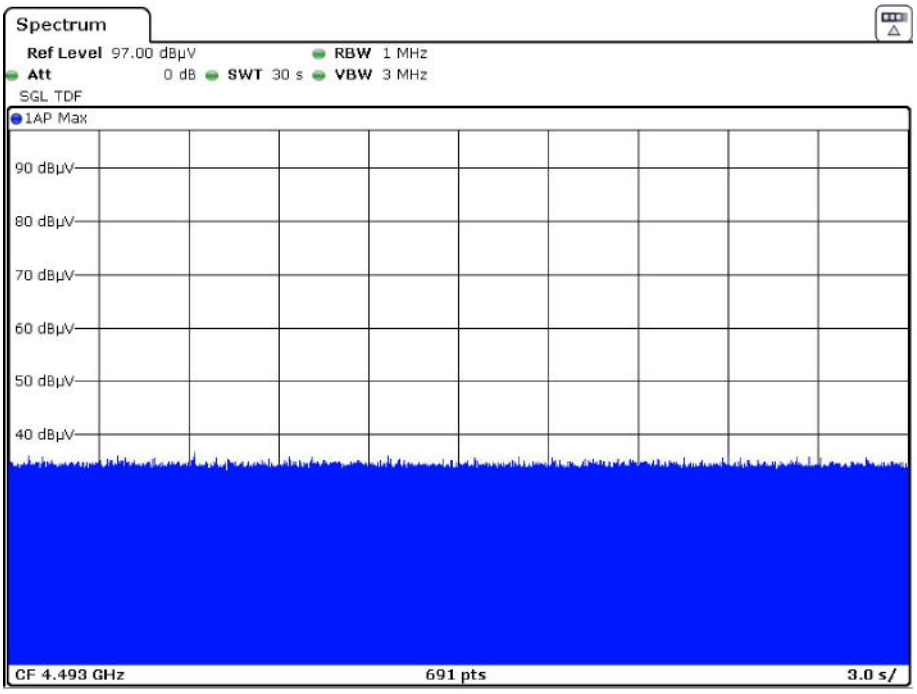
Without associated receiver, EUT no transmit



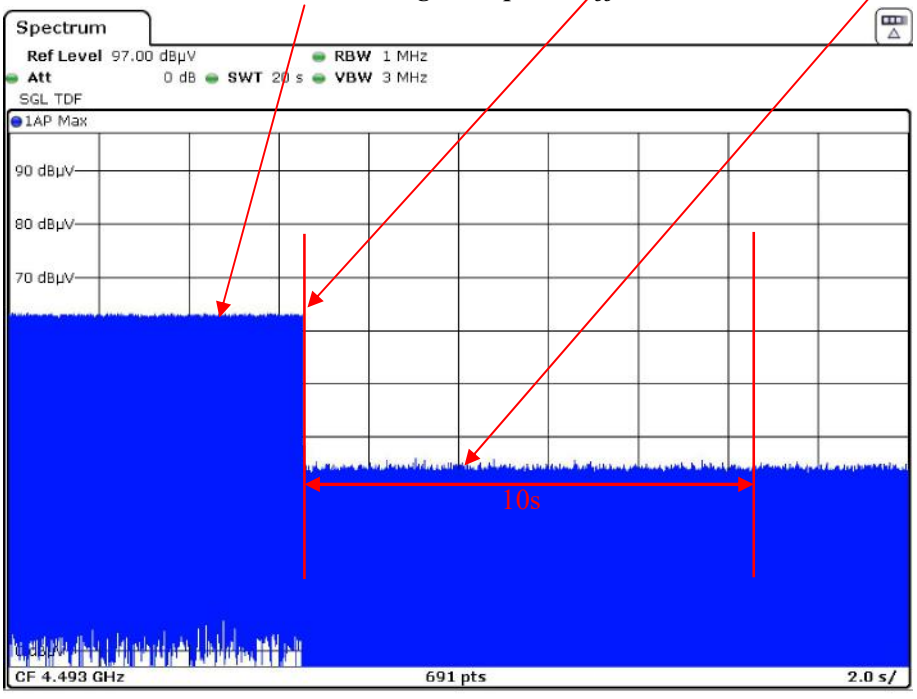
Communication with receiver, EUT was transmitting, then power off receiver, EUT cease transmit within 10s



CH3-PRF64-110K
Without associated receiver, EUT no transmit

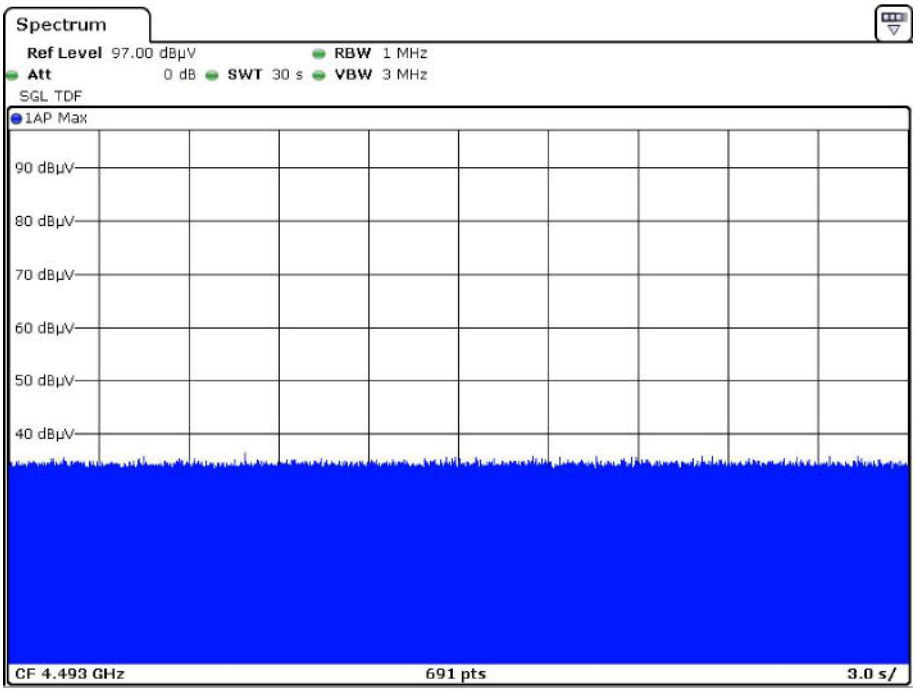


Communication with receiver, EUT was transmitting, then power off receiver, EUT cease transmit within 10s

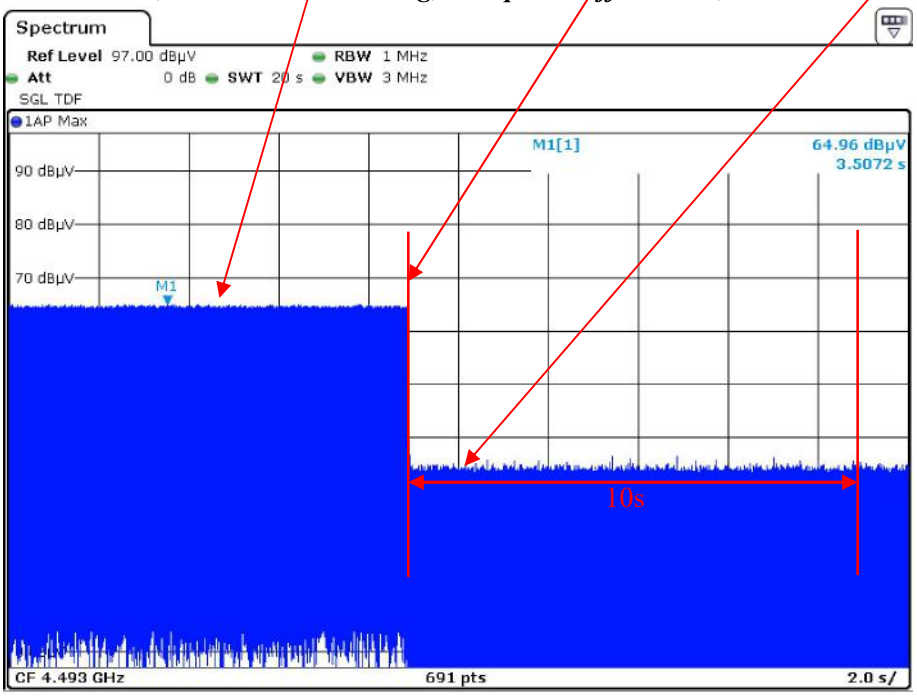


CH3-PRF64-850K

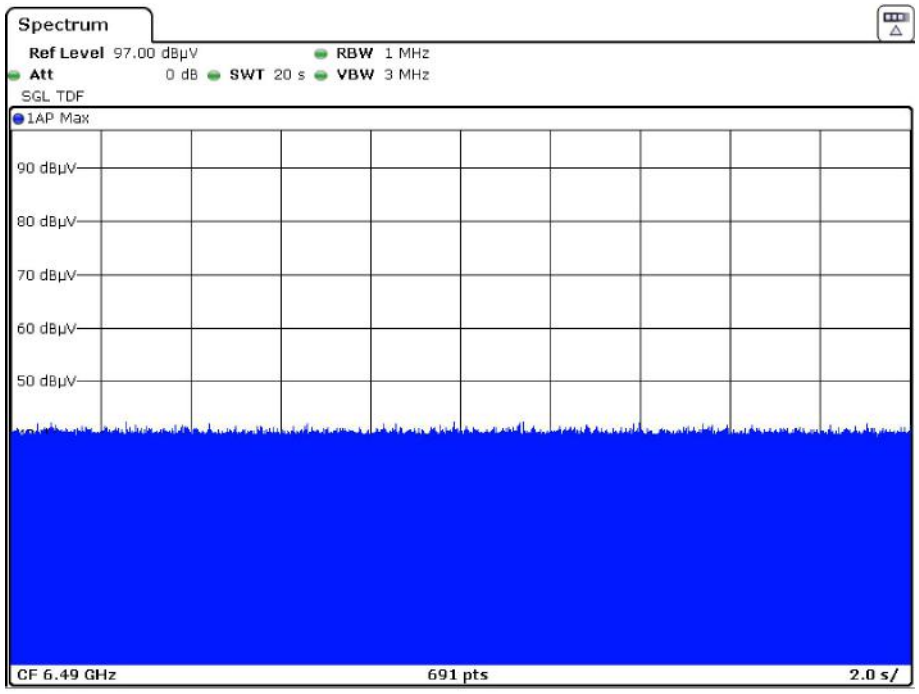
Without associated receiver, EUT no transmit



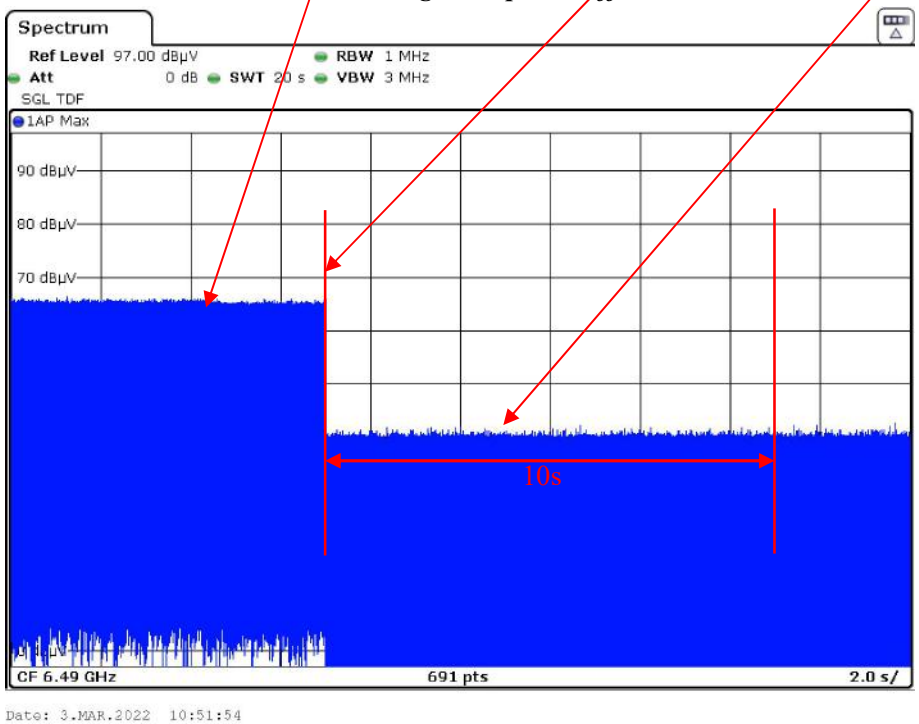
Communication with receiver, EUT was transmitting, then power off receiver, EUT cease transmit within 10s



CH5-PRF16-110K
Without associated receiver, EUT no transmit

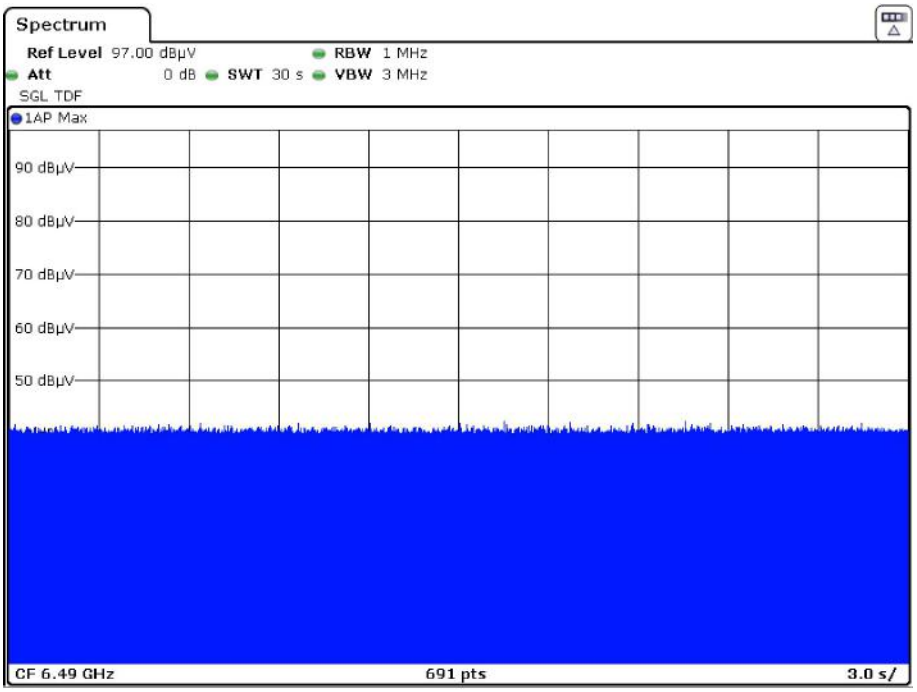


Communication with receiver, EUT was transmitting, then power off receiver, EUT cease transmit within 10s

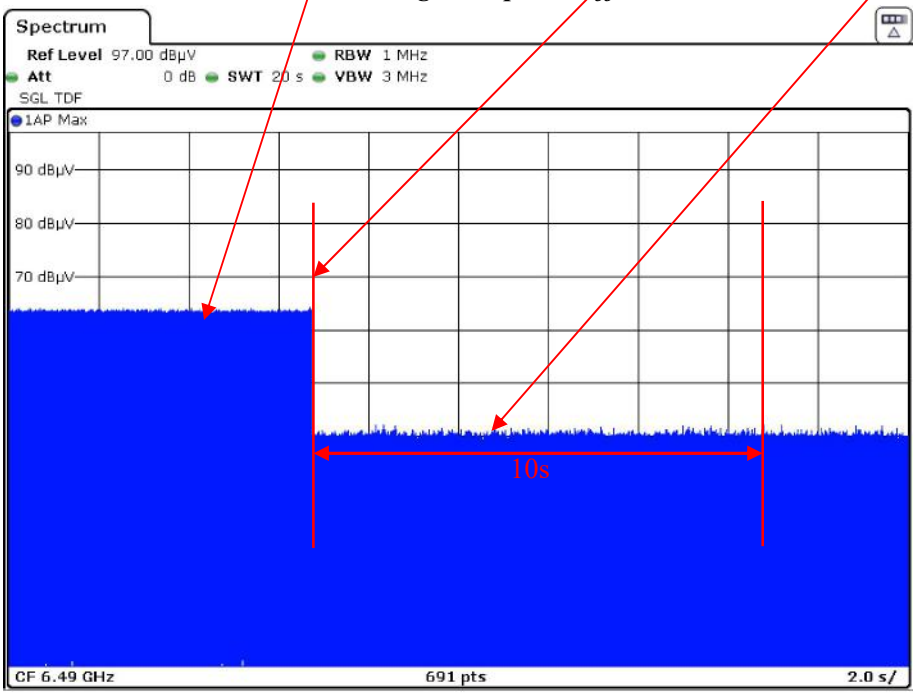


CH5-PRF16-850K

Without associated receiver, EUT no transmit

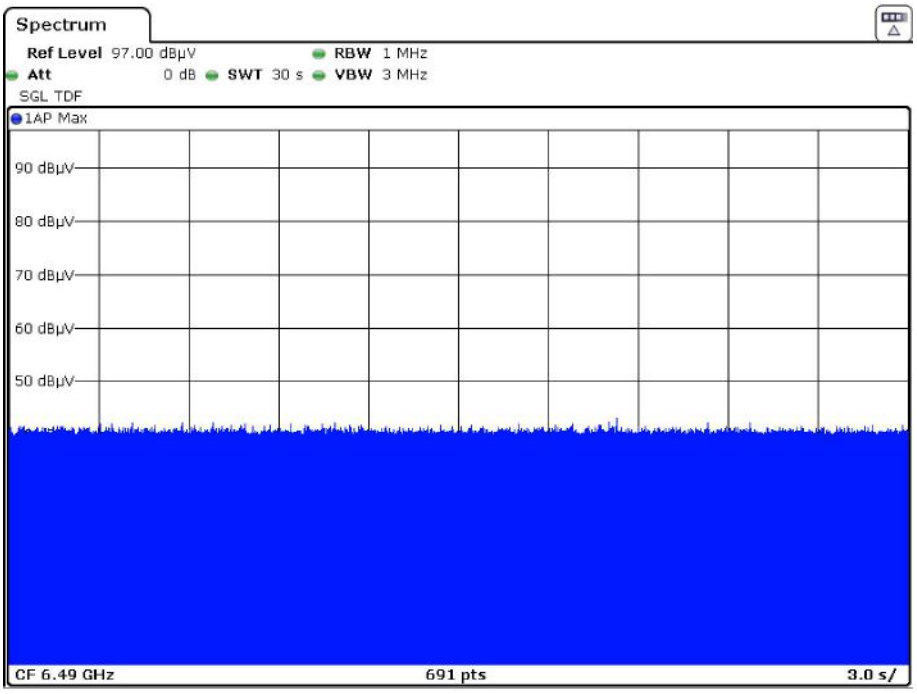


Communication with receiver, EUT was transmitting, then power off receiver, EUT cease transmit within 10s



CH5-PRF64-110K

Without associated receiver, EUT no transmit



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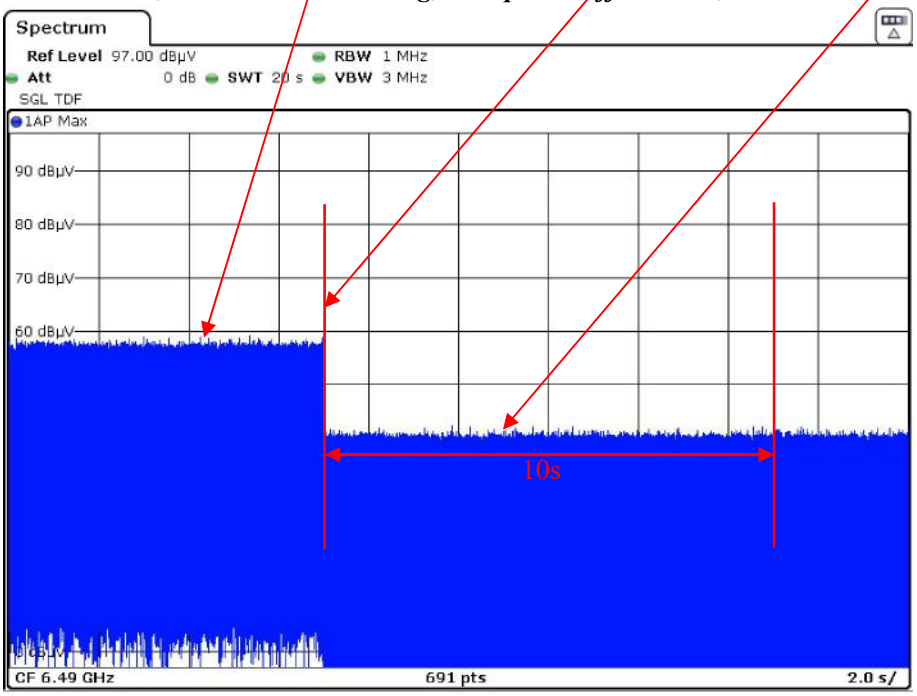
Communication with receiver, EUT was transmitting, then power off receiver, EUT cease transmit within 10s



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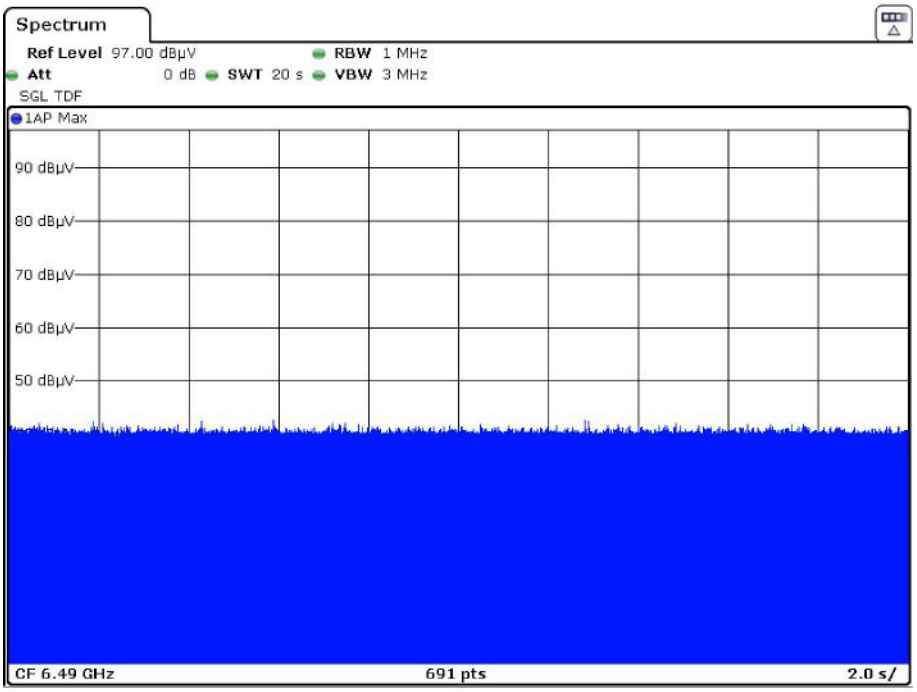
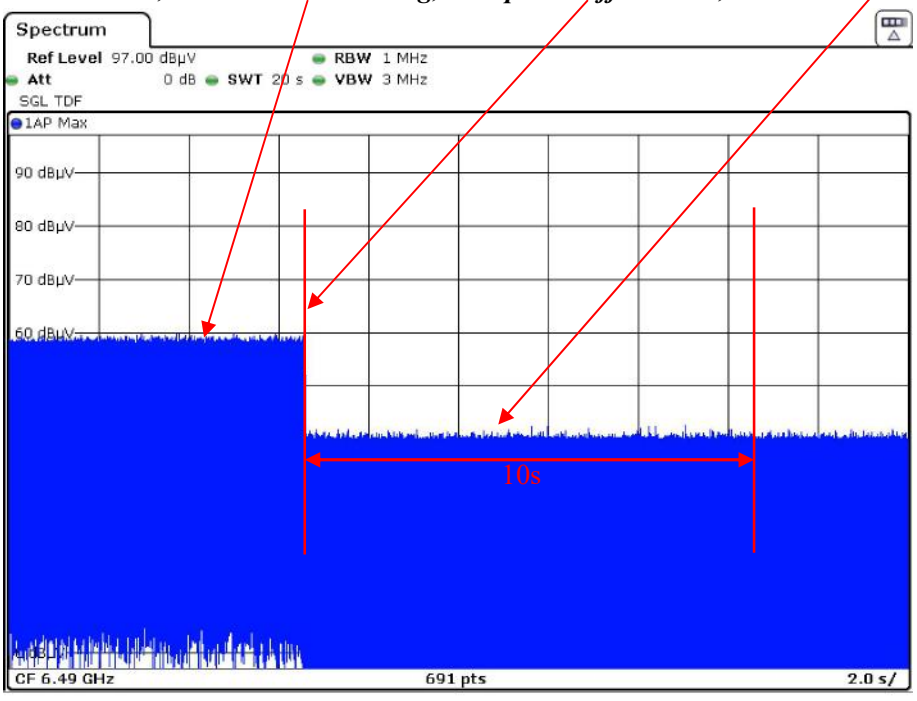
CH5-PRF64-850K

Without associated receiver, EUT no transmit



Communication with receiver, EUT was transmitting, then power off receiver, EUT cease transmit within 10s



§15.503 (a)(d), §15.519(b) –UWB OPEARTION BANDWIDTH

Applicable Standard

(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 fH and the lower boundary is designated fL. The frequency at which the highest radiated emission occurs is designated fM.

(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.

(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.

Test Procedure

Refer to the C63.10 -2013 Section 10.1

Test Data

Environmental Conditions

Temperature:	24.7 ℃
Relative Humidity:	58%
ATM Pressure:	100.9 kPa

The testing was performed by Ting Lv from 2021-12-24 to 2022-02-22.

Test Result: Pass.

EUT operation mode: Transmitting

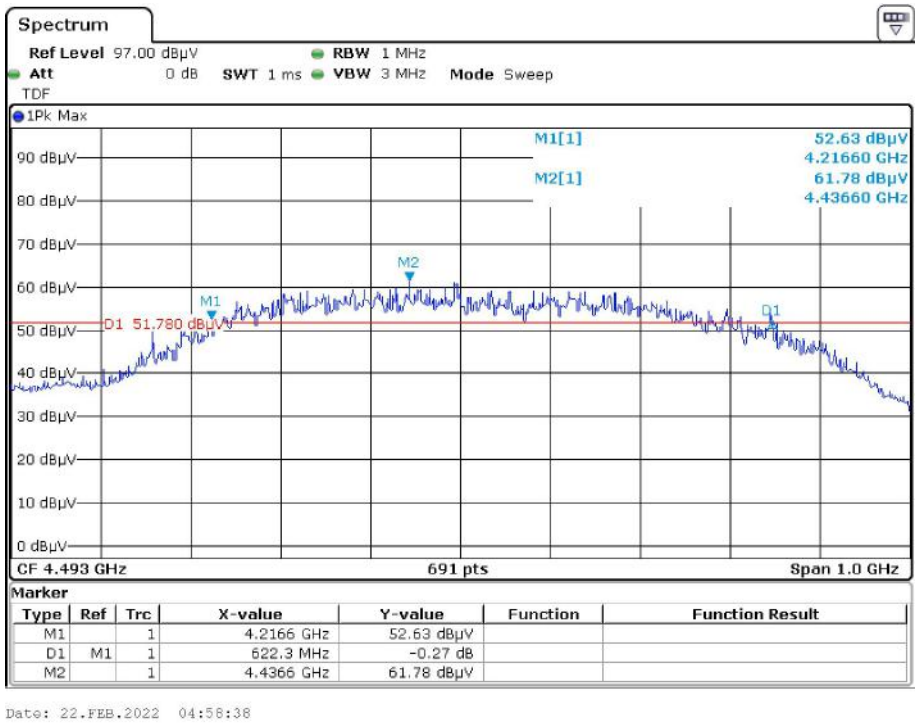
Please refer to the following table and plots.

Test distance is 3m.

CH3 4493MHZ-PRF16-110K:

Item		Result	Limit (MHz)
f_M(MHz)	The highest emission frequency	4436.6	/
f_L(MHz)	10dB below the lowest emission	4216.6	>3100
f_H(MHz)	10dB above the highest emission	4838.9	<10600
f_C(MHz)	$(f_H + f_L)/2$	4527.75	/
10dB bandwidth(MHz)	$f_H - f_L$	622.3	⩾500
Fractional bandwidth	$2(f_H - f_L)/(f_H + f_L)$	0.137	/

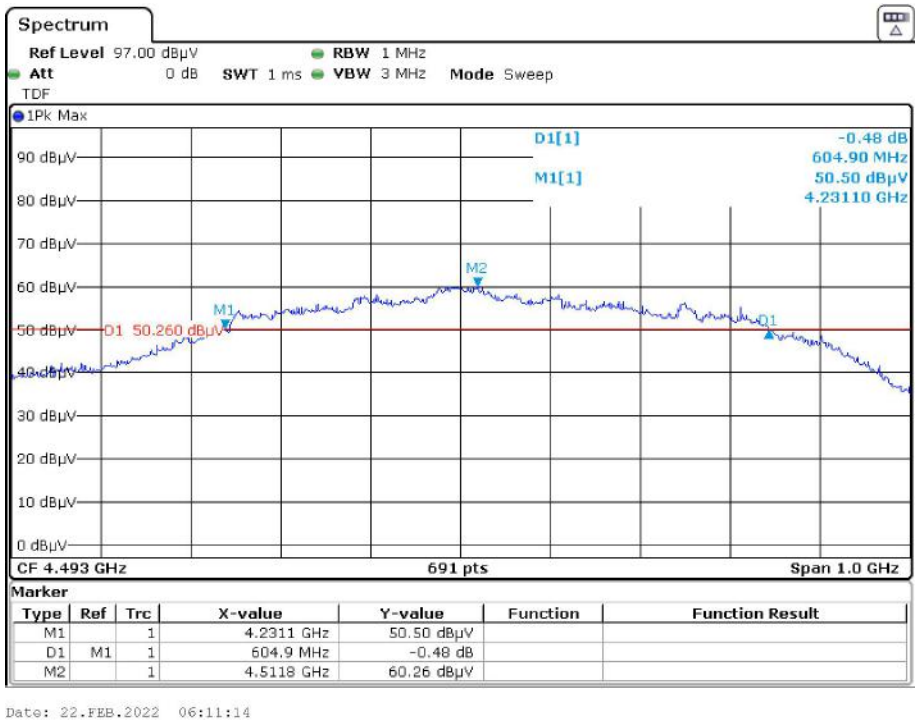
10dB Bandwidth



CH3 4493MHZ-PRF16-850K:

Item		Result	Limit (MHz)
f_M(MHz)	The highest emission frequency	4511.8	/
f_L(MHz)	10dB below the lowest emission	4231.1	>3100
f_H(MHz)	10dB above the highest emission	4836.0	<10600
f_C(MHz)	$(f_H + f_L)/2$	4533.6	/
10dB bandwidth(MHz)	$f_H - f_L$	604.9	⩾500
Fractional bandwidth	$2(f_H-f_L)/(f_H + f_L)$	0.133	/

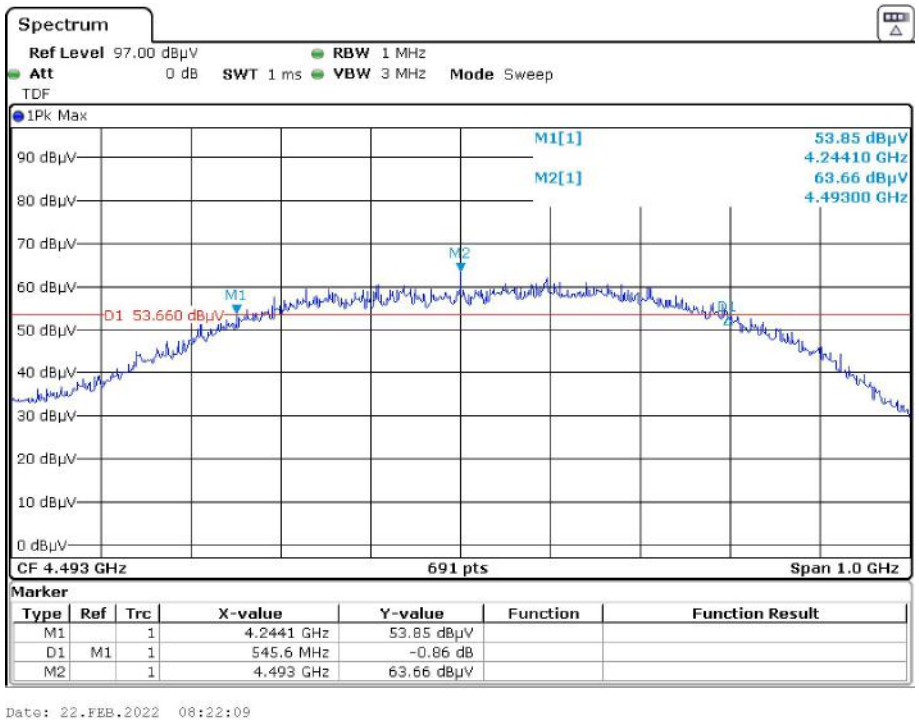
10dB Bandwidth



CH3 4493MHZ-PRF64-110K:

Item		Result	Limit (MHz)
f_M(MHz)	The highest emission frequency	4493.0	/
f_L(MHz)	10dB below the lowest emission	4244.1	>3100
f_H(MHz)	10dB above the highest emission	4789.7	<10600
f_C(MHz)	$(f_H + f_L)/2$	4516.9	/
10dB bandwidth(MHz)	$f_H - f_L$	545.6	≥500
Fractional bandwidth	$2(f_H - f_L)/ (f_H + f_L)$	0.121	/

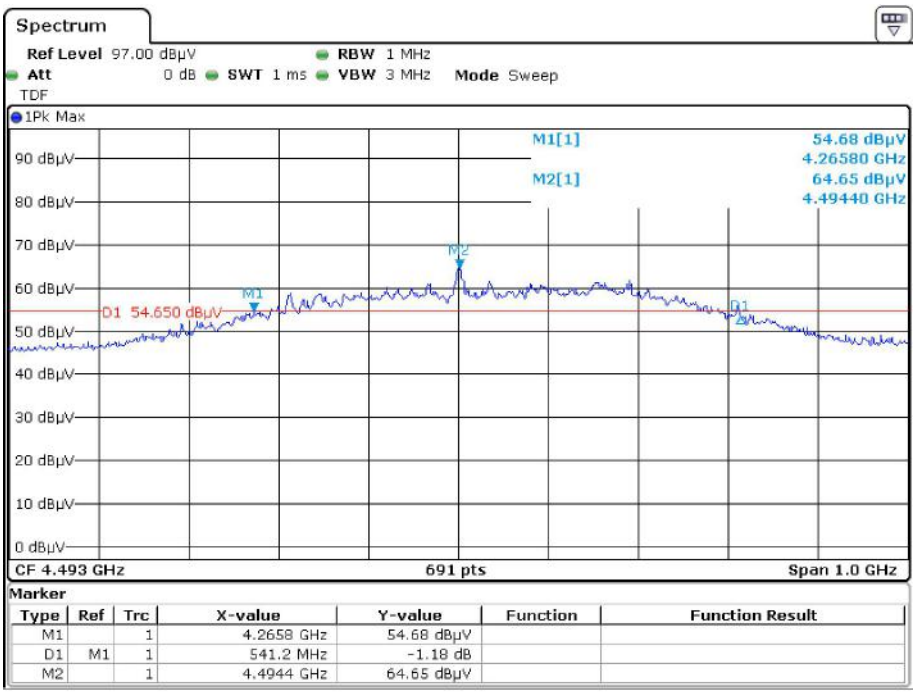
10dB Bandwidth



CH3 4493MHZ-PRF64-850K:

Item		Result	Limit (MHz)
f_M(MHz)	The highest emission frequency	4494.4	/
f_L(MHz)	10dB below the lowest emission	4265.8	>3100
f_H(MHz)	10dB above the highest emission	4807.0	<10600
f_C(MHz)	$(f_H + f_L)/2$	4536.4	/
10dB bandwidth(MHz)	$f_H - f_L$	541.2	⩾500
Fractional bandwidth	$2(f_H-f_L)/(f_H + f_L)$	0.119	/

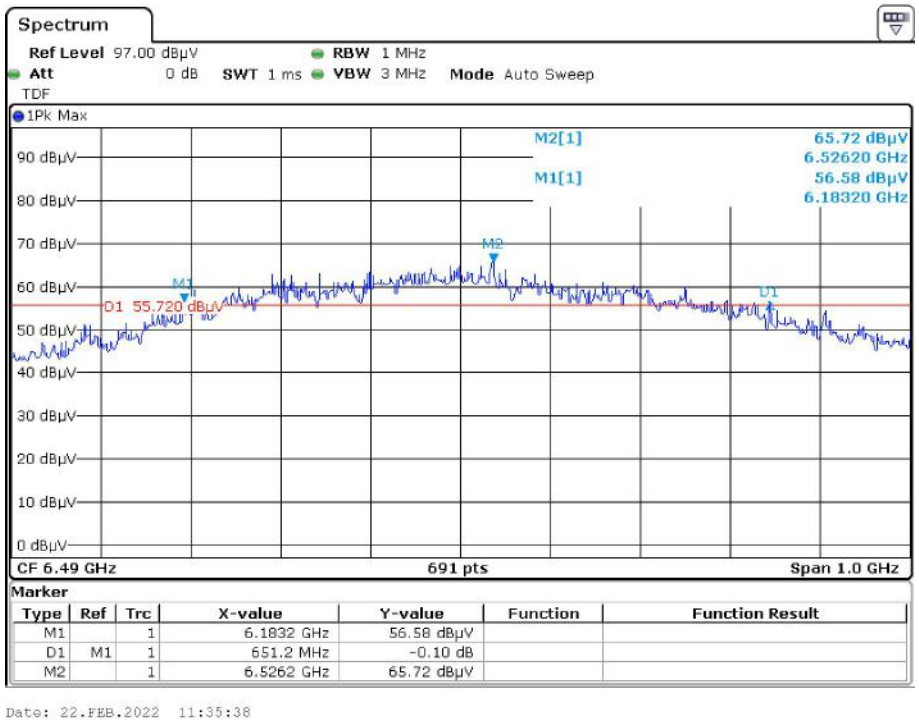
10dB Bandwidth



CH5 -6490MHZ PRF16-110K:

Item		Result	Limit (MHz)
f_M(MHz)	The highest emission frequency	6526.2	/
f_L(MHz)	10dB below the lowest emission	6183.2	>3100
f_H(MHz)	10dB above the highest emission	6834.4	<10600
f_C(MHz)	$(f_H + f_L)/2$	6508.8	/
10dB bandwidth(MHz)	$f_H - f_L$	651.2	⩾500
Fractional bandwidth	$2(f_H - f_L)/(f_H + f_L)$	0.100	/

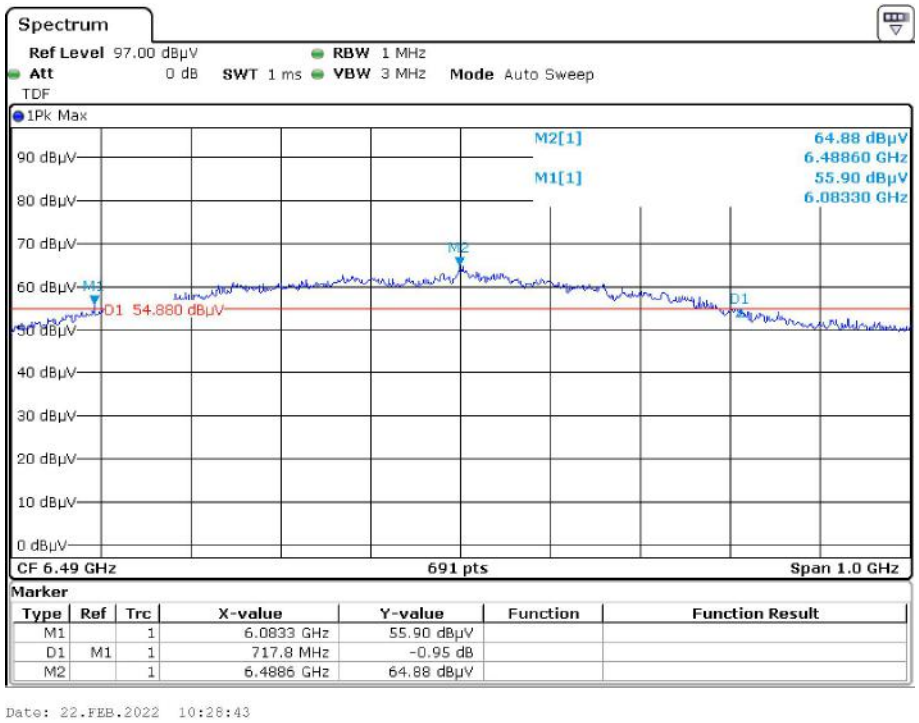
10dB Bandwidth



CH5 6490MHZ-PRF16-850K:

Item		Result	Limit (MHz)
f_M(MHz)	The highest emission frequency	6488.6	/
f_L(MHz)	10dB below the lowest emission	6083.3	>3100
f_H(MHz)	10dB above the highest emission	6801.1	<10600
f_C(MHz)	$(f_H + f_L)/2$	6442.2	/
10dB bandwidth(MHz)	$f_H - f_L$	717.8	≥500
Fractional bandwidth	$2(f_H - f_L)/(f_H + f_L)$	0.111	/

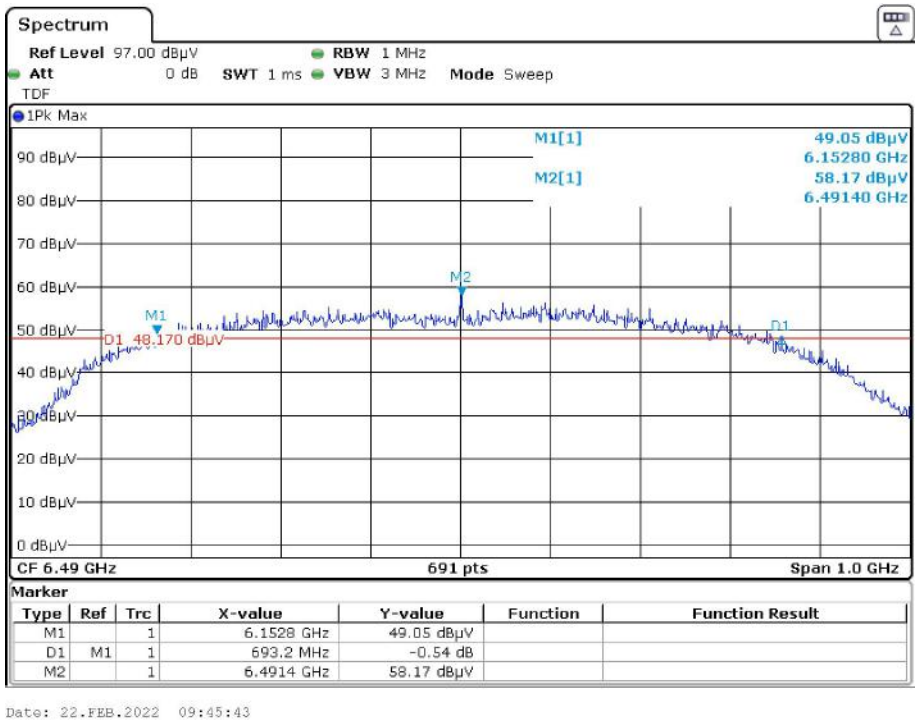
10dB Bandwidth



CH5 6490MHZ-PRF64-110K:

Item		Result	Limit (MHz)
f_M(MHz)	The highest emission frequency	6491.4	/
f_L(MHz)	10dB below the lowest emission	6152.8	>3100
f_H(MHz)	10dB above the highest emission	6846.0	<10600
f_C(MHz)	$(f_H + f_L)/2$	6499.4	/
10dB bandwidth(MHz)	$f_H - f_L$	693.2	≥500
Fractional bandwidth	$2(f_H - f_L)/(f_H + f_L)$	0.107	/

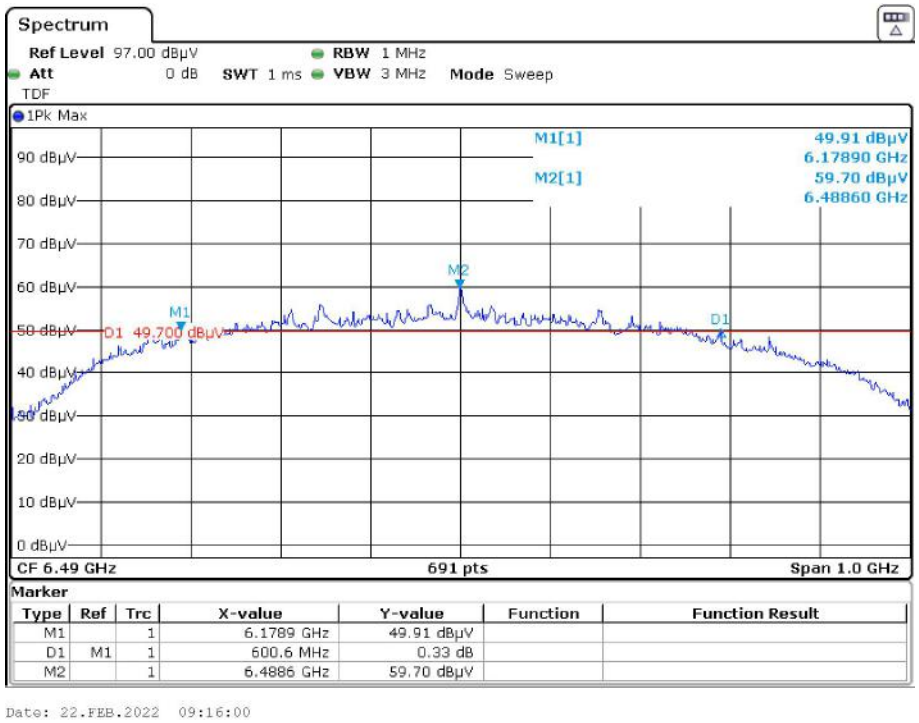
10dB Bandwidth



CH5 6490MHZ-PRF64-850K:

Item		Result	Limit (MHz)
f_M(MHz)	The highest emission frequency	6488.6	/
f_L(MHz)	10dB below the lowest emission	6178.9	>3100
f_H(MHz)	10dB above the highest emission	6779.5	<10600
f_C(MHz)	$(f_H + f_L)/2$	6479.2	/
10dB bandwidth(MHz)	$f_H - f_L$	600.6	≥500
Fractional bandwidth	$2(f_H - f_L)/(f_H + f_L)$	0.093	/

10dB Bandwidth



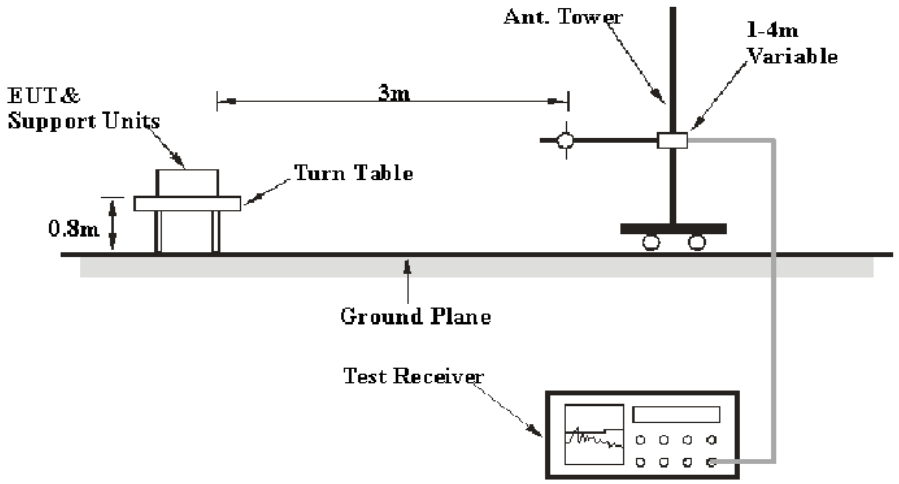
FCC §15.209, §15.519(c)(d)- SPURIOUS EMISSIONS

Applicable Standard

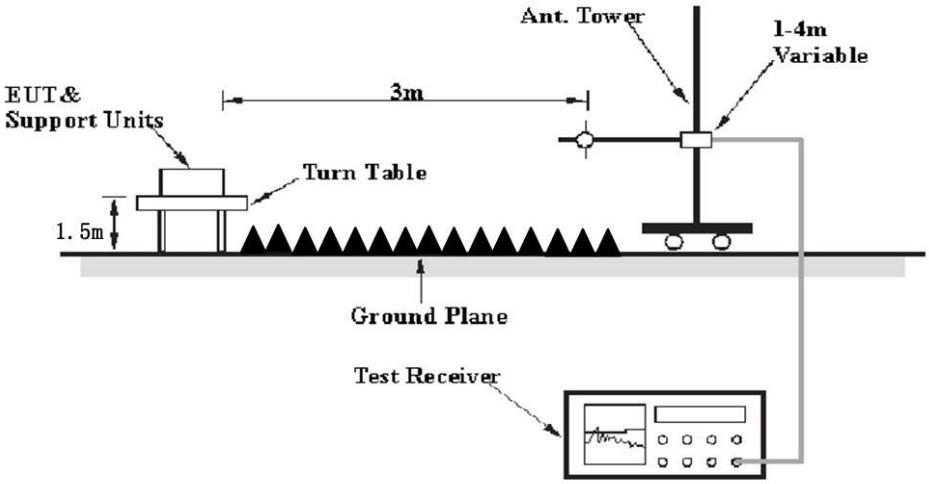
FCC §15.247 (d); §15.209;§15.205;

EUT Setup

Below 960MHz:



Above 960MHz:



The radiated emission tests were performed in the 3meters chamber, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.519 limits.

EMI Test Receiver& Spectrum Analyzer Setup

The system was investigated from 30 MHz 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	Measurement
30MHz – 960 MHz	100 kHz	300 kHz	120kHz	QP
Above 960 MHz	1MHz	3 MHz	/	Average
	1kHz	3kHz	/	Average*

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

Test Procedure

Refer to the C63.10 -2013 Section 10.2 & 10.3

Corrected Factor& Margin Calculation

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

Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain

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

Over Limit = Level - Limit
Level = Meter Reading + Corrected Factor

Test Data

Environmental Conditions

Temperature:	21℃
Relative Humidity:	62%
ATM Pressure:	101.0 kPa

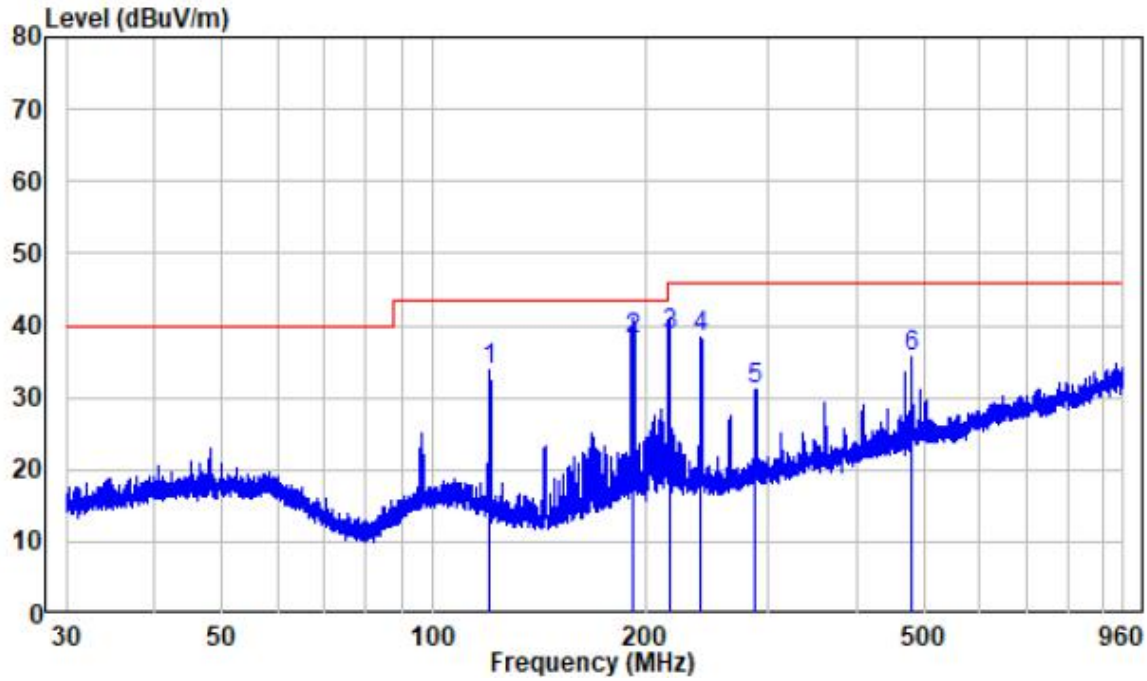
The testing was performed byBin Deng on 2022-01-12 for below 1GHz and Caro Hu 2022-02-16~2022-03-31 for above 1GHz.

EUT operation mode: Transmitting *(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)*

30 MHz~960MHz: *(worst case isCH5-PRF16-110K)*

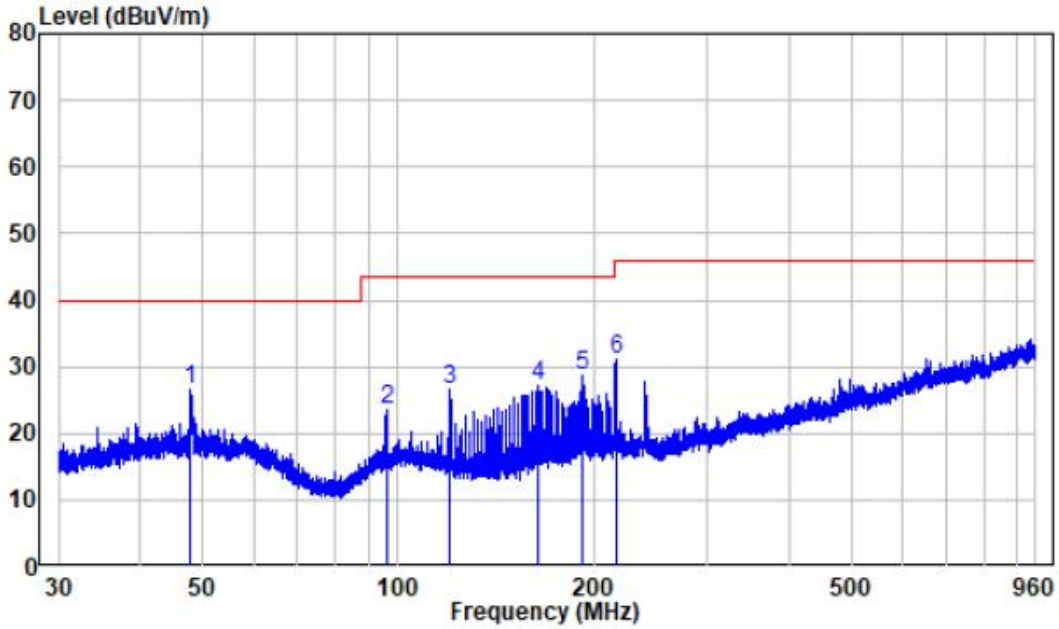
Note: When the result of peak less than the limit of QP more than 6dB, just peak value was recorded.

Horizontal



	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	119.961	-13.52	47.18	33.66	43.50	-9.84	Peak
2	192.587	-11.27	49.30	38.03	43.50	-5.47	QP
3	217.068	-11.57	50.12	38.55	46.00	-7.45	QP
4	240.514	-10.88	49.23	38.35	46.00	-7.65	Peak
5	287.486	-9.37	40.57	31.20	46.00	-14.80	Peak
6	480.107	-5.00	40.63	35.63	46.00	-10.37	Peak

Vertical



	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	47.910	-10.00	36.57	26.57	40.00	-13.43	Peak
2	96.225	-12.29	35.83	23.54	43.50	-19.96	Peak
3	120.171	-13.56	40.26	26.70	43.50	-16.80	Peak
4	164.908	-14.15	41.28	27.13	43.50	-16.37	Peak
5	192.082	-11.25	40.07	28.82	43.50	-14.68	Peak
6	216.593	-11.60	42.59	30.99	46.00	-15.01	Peak

Above 960MHz:

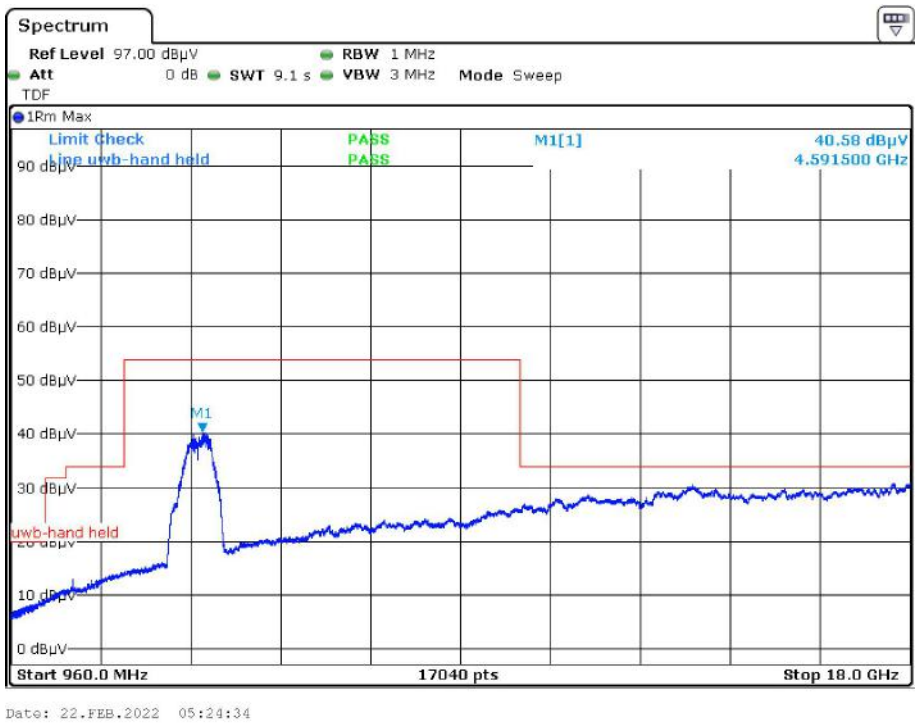
CH34493MHZ-PRF16-110K

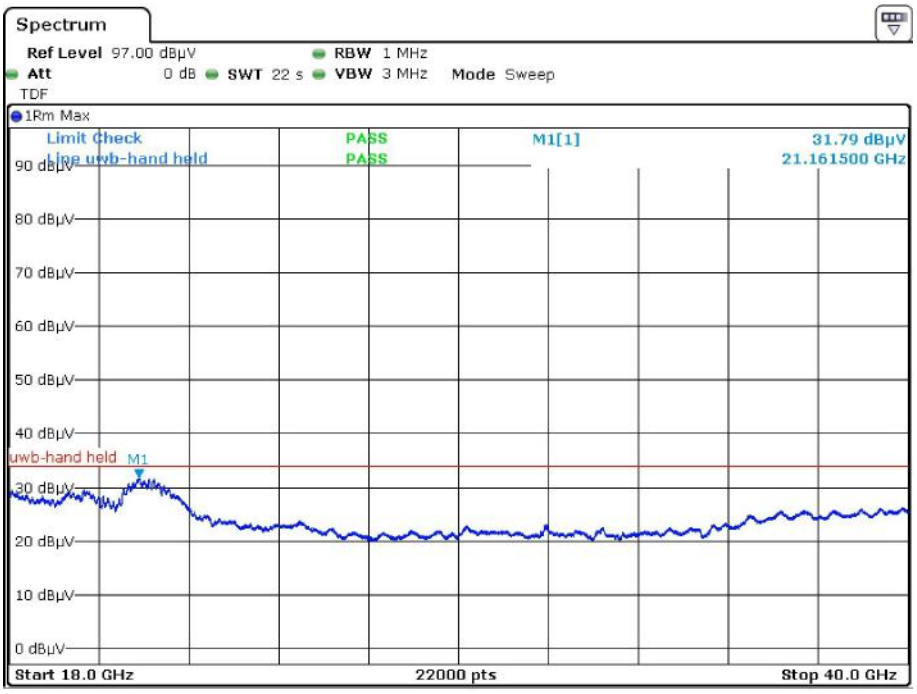
Spurious radiated emission above 960MHz in non GPS band:

1. The test distance is 3m
2. E[dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters.
3. The antenna factor, cable loss and preamplifier gain have been entered into the analyzer as the transducer factor.

Frequency (MHz)	Corrected Amplitude (dBμV/m)	EIRP (dBm)	Detector	Turntable Degree	Rx Antenna Height (m)	Rx Antenna Polar (H / V)	Part15.519 EIRP Limit (dBm)	Part15.519 Margin (dB)
4591.5	40.58	-54.62	RMS	327	2.1	H	-41.3	-13.32
4511.5	36.29	-58.91	RMS	333	1.9	V	-41.3	-17.61
21161.5	31.79	-63.41	RMS	247	2.2	H	-61.3	-2.11
21171.5	31.77	-63.43	RMS	163	1.6	V	-61.3	-2.13

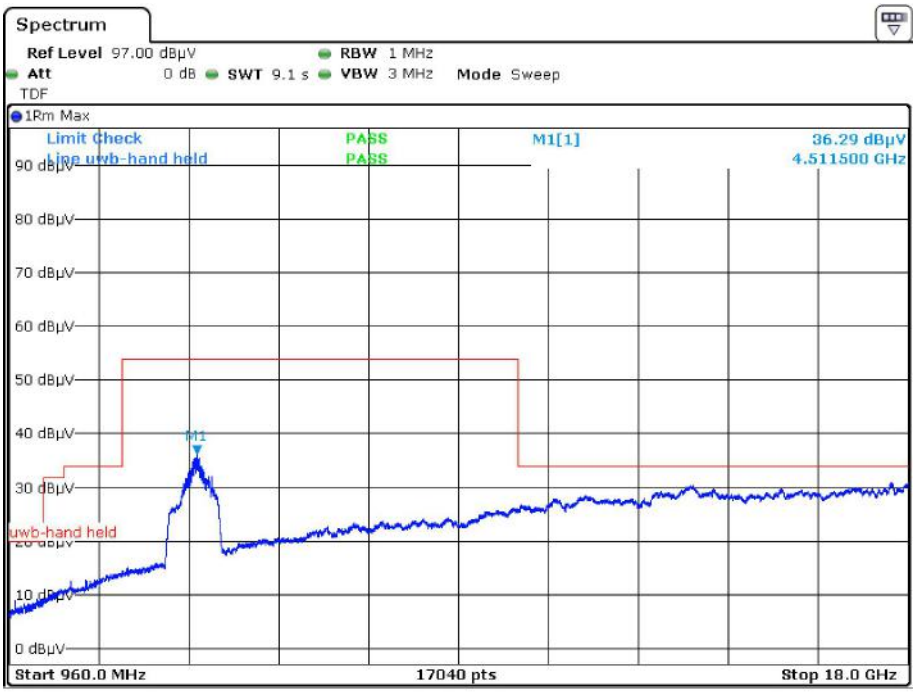
Horizontal



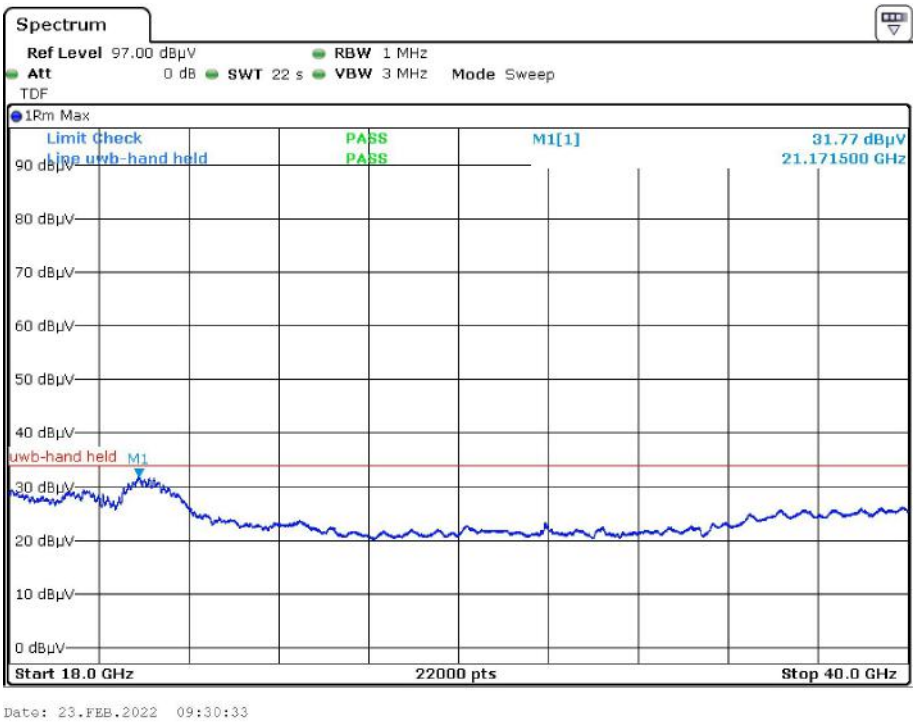


Date: 23.FEB.2022 09:27:05

Vertical



Date: 22.FEB.2022 05:32:56



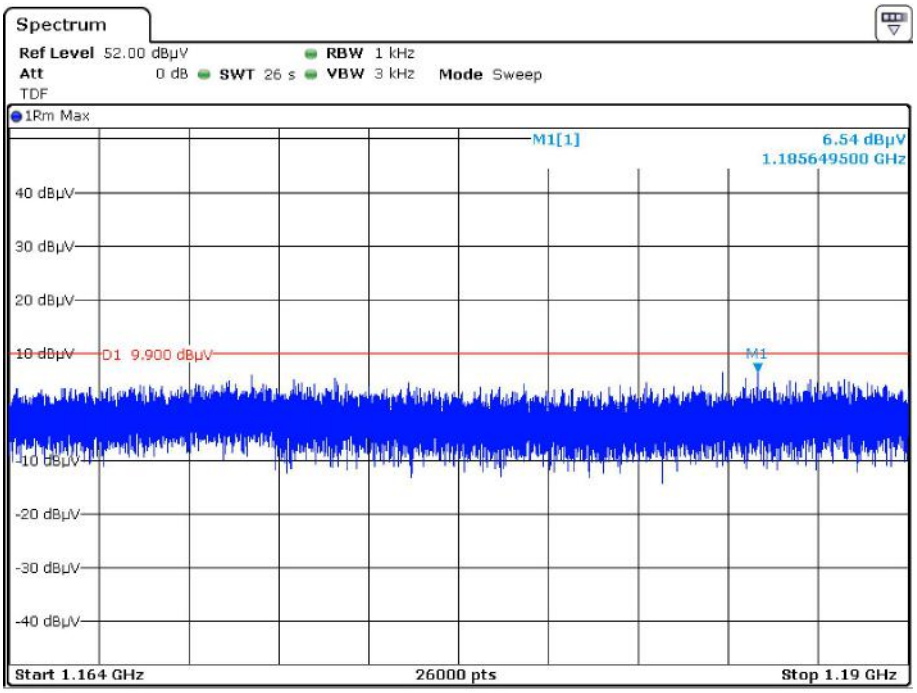
Spurious radiated emission above 960MHz in GPS band:

1. The test distance is 3m
2. E[dBµV/m] = EIRP[dBm] + 95.2, for d = 3 meters.
3. The antenna factor, cable loss and preamplifier gain have been entered into the analyzer as the transducer factor.

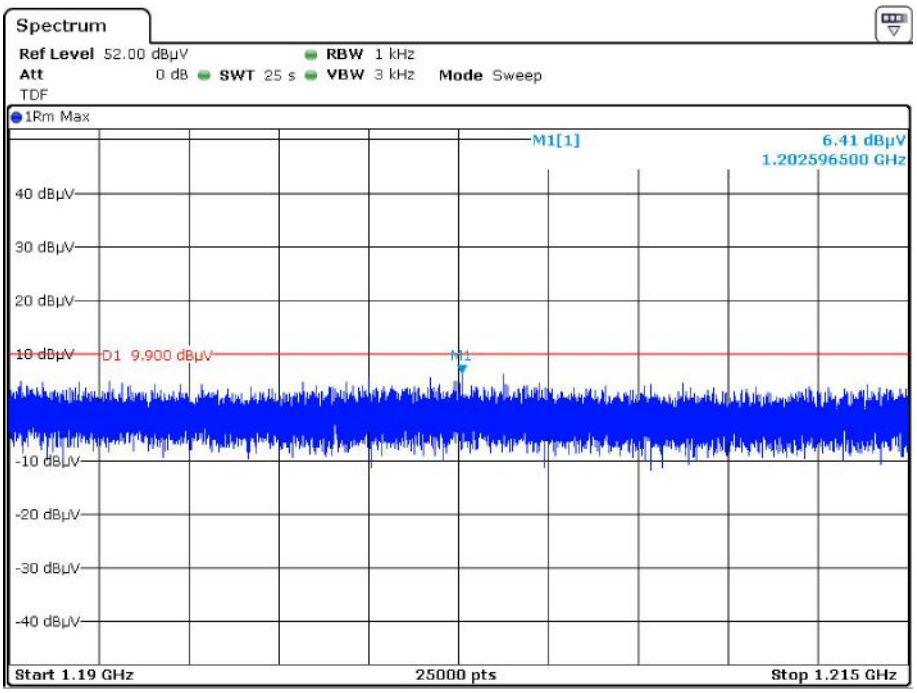
Frequency (MHz)	Corrected Amplitude (dBµV/m)	EIRP (dBm)	Detector	Turntable Degree	Rx Antenna Height (m)	Rx Antenna Polar (H / V)	Part 15.519 EIRP Limit (dBm)	Part 15.519 Margin (dB)
1185.65	6.54	-88.66	RMS	170	1.1	H	-85.3	-3.36
1172.02	5.58	-89.62	RMS	263	2.0	V	-85.3	-4.32
1202.60	6.41	-88.79	RMS	301	1.6	H	-85.3	-3.49
1210.56	5.70	-89.50	RMS	18	1.4	V	-85.3	-4.20
1217.40	5.78	-89.42	RMS	28	1.4	H	-85.3	-4.12
1215.58	6.84	-88.36	RMS	270	1.8	V	-85.3	-3.06
1572.30	7.50	-87.70	RMS	32	2.1	H	-85.3	-2.40
1583.34	6.69	-88.51	RMS	303	1.0	V	-85.3	-3.21
1601.56	7.59	-87.61	RMS	81	1.7	H	-85.3	-2.31
1605.77	7.45	-87.75	RMS	229	2.1	V	-85.3	-2.45

1164MHz-1240MHz:

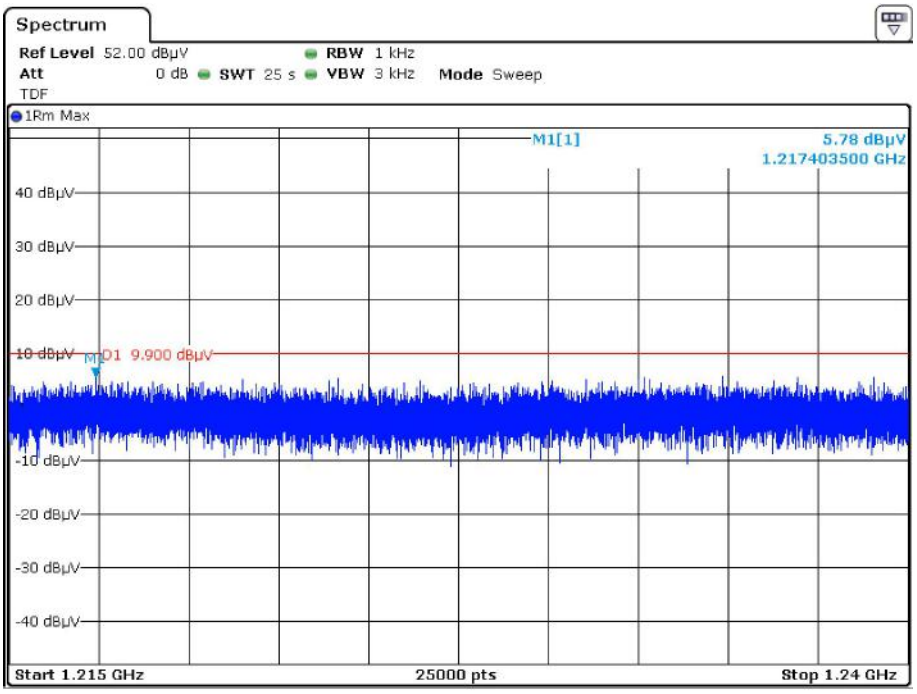
Horizontal



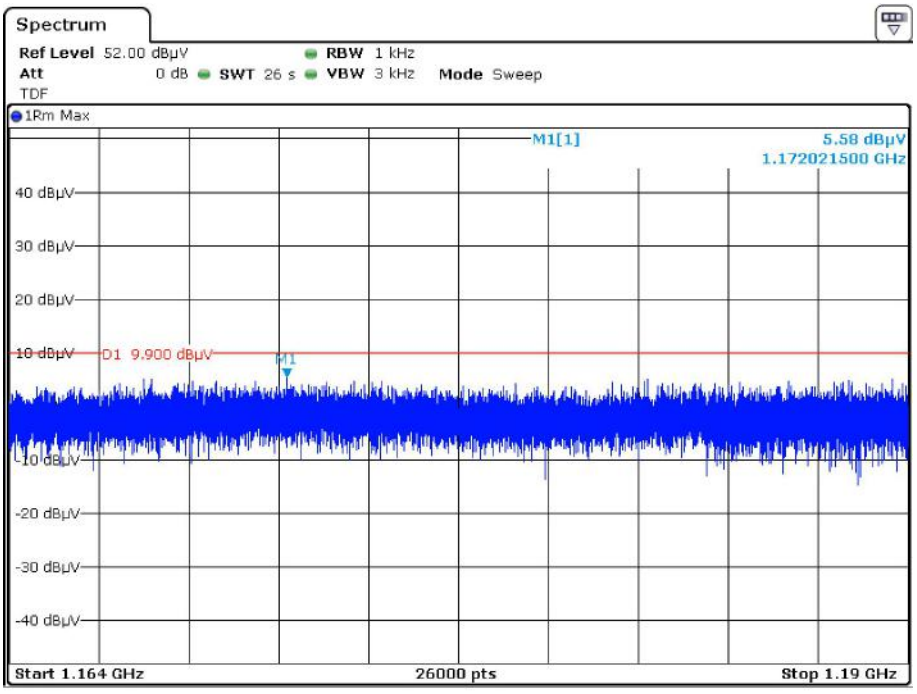
Date: 31.MAR.2022 11:37:25

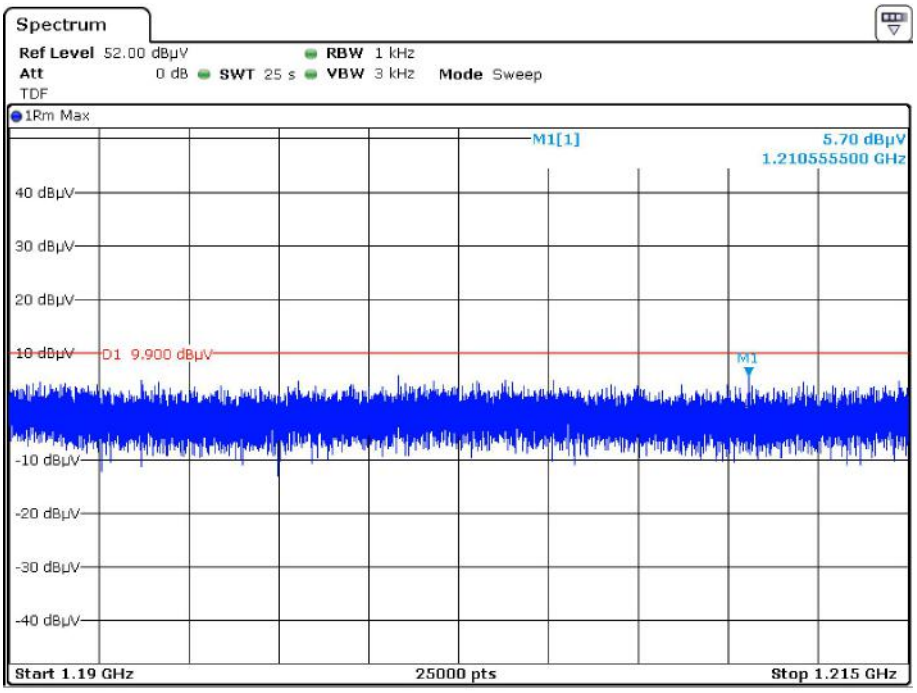


Date: 31.MAR.2022 11:39:29

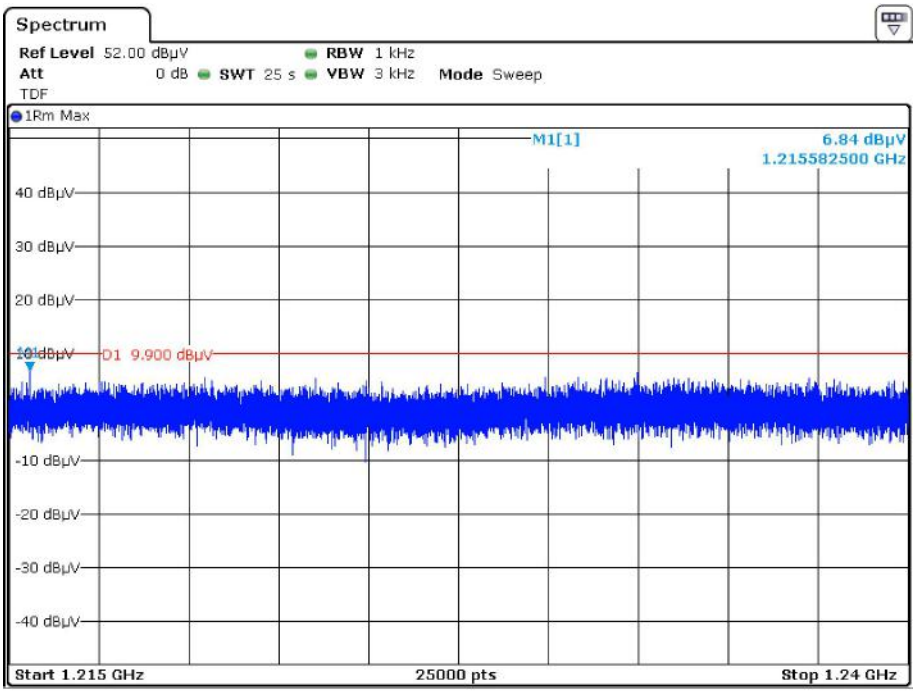

Spectrum
Ref Level 52.00 dBµV
RBW 1 kHz
Att 0 dB SWT 25 s VBW 3 kHz Mode Sweep
TDF
1Rm Max
M1[1] 5.78 dBµV
1.217403500 GHz
40 dBµV
30 dBµV
20 dBµV
10 dBµV
D1 9.900 dBµV
-10 dBµV
-20 dBµV
-30 dBµV
-40 dBµV
Start 1.215 GHz
25000 pts
Stop 1.24 GHz
Date: 31.MAR.2022 11:41:07

Vertical


Spectrum
Ref Level 52.00 dBµV
RBW 1 kHz
Att 0 dB SWT 26 s VBW 3 kHz Mode Sweep
TDF
1Rm Max
M1[1] 5.58 dBµV
1.172021500 GHz
40 dBµV
30 dBµV
20 dBµV
10 dBµV
D1 9.900 dBµV
-10 dBµV
-20 dBµV
-30 dBµV
-40 dBµV
Start 1.164 GHz
26000 pts
Stop 1.19 GHz
Date: 31.MAR.2022 11:42:58



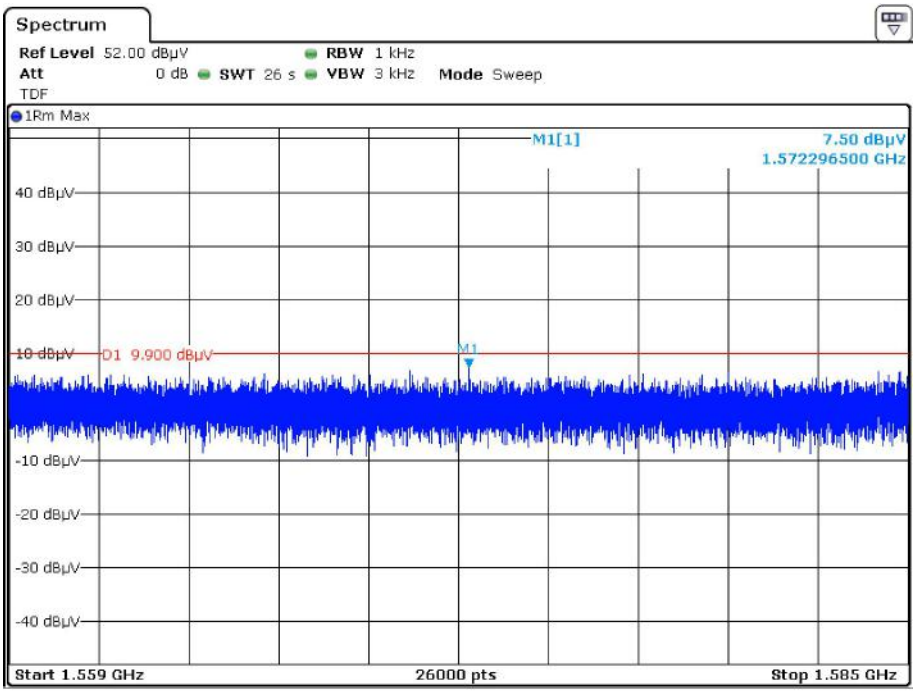
Date: 31.MAR.2022 11:44:39



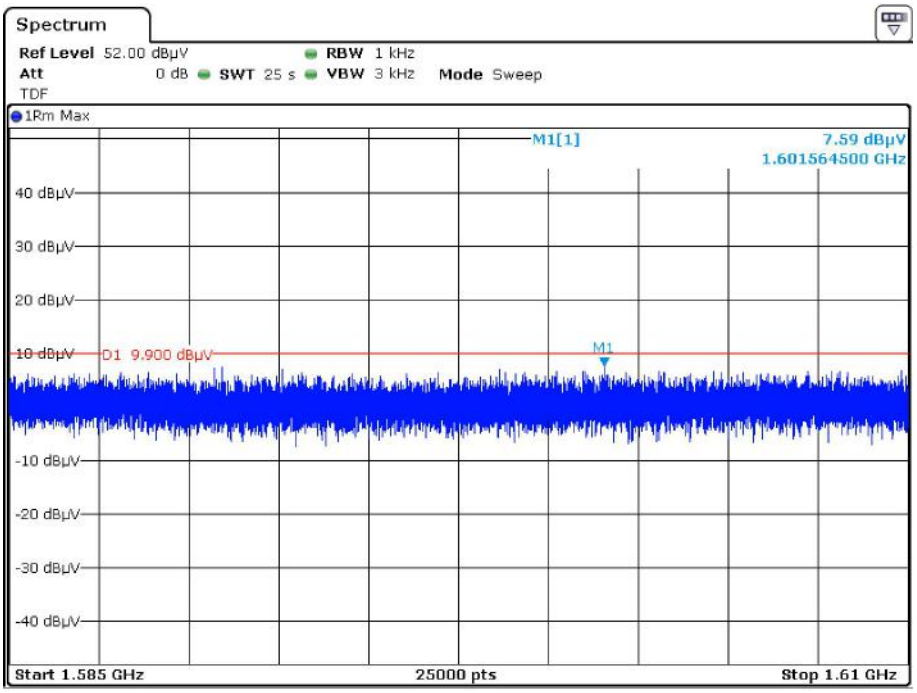
Date: 31.MAR.2022 11:47:06

1559MHz-1610MHz:

Horizontal

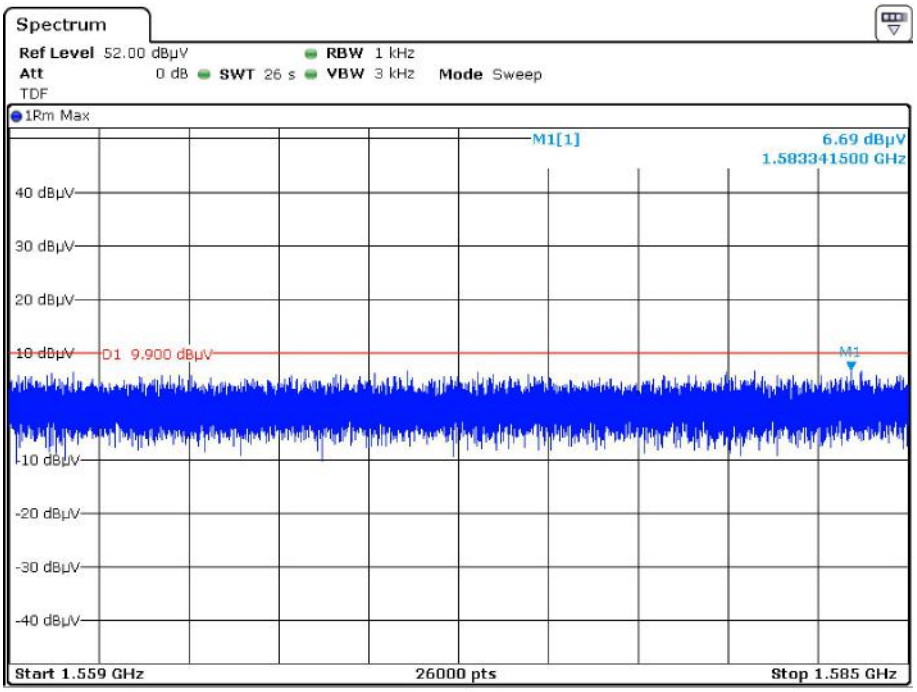


Date: 31.MAR.2022 11:49:09

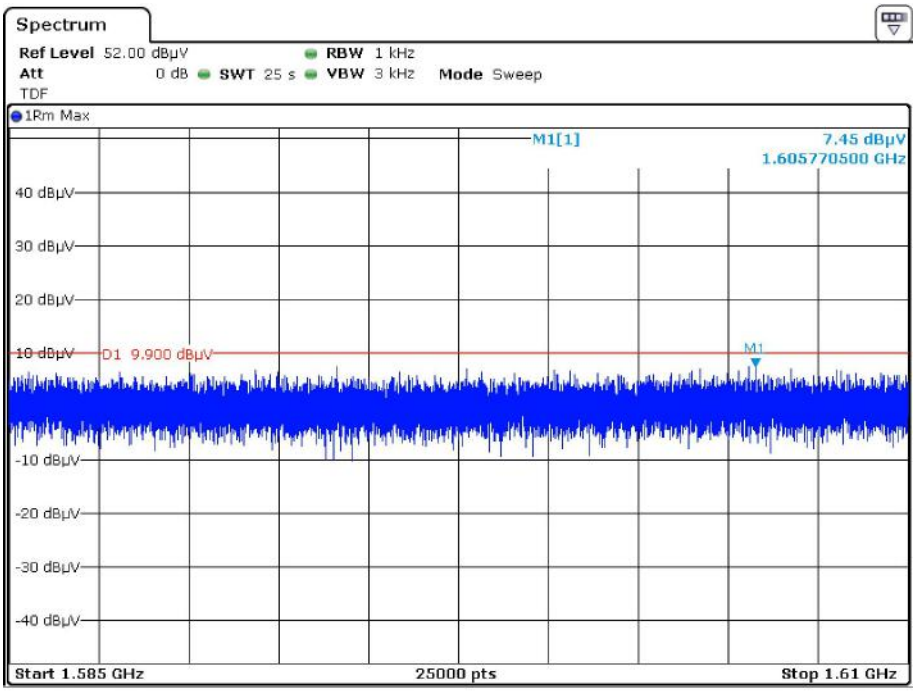


Date: 31.MAR.2022 11:51:20

Vertical



Date: 31.MAR.2022 11:53:20



Date: 31.MAR.2022 11:55:03

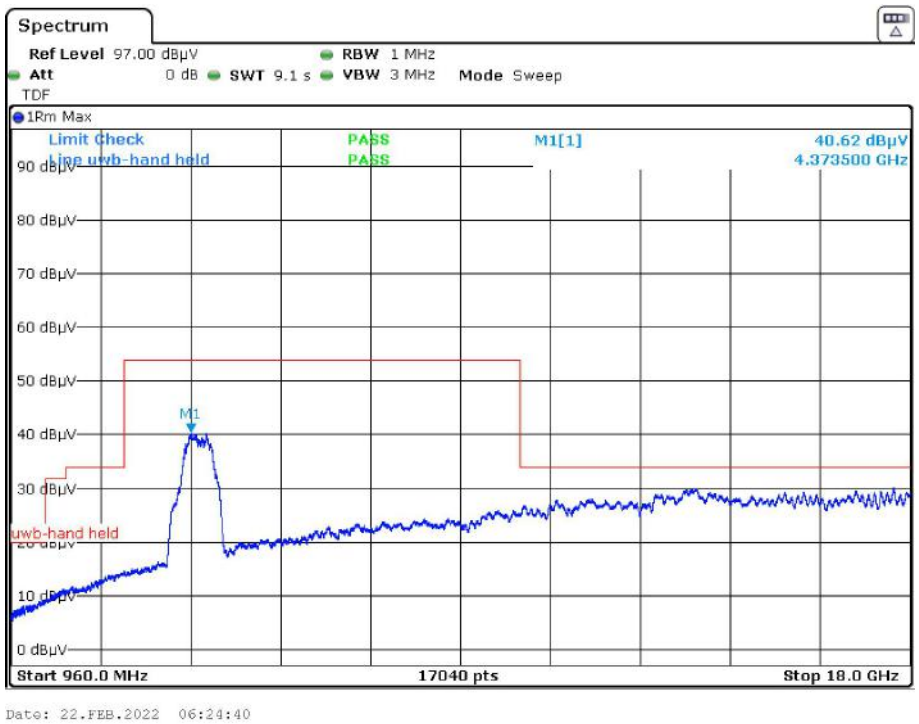
CH34493MHZ-PRF16-850K

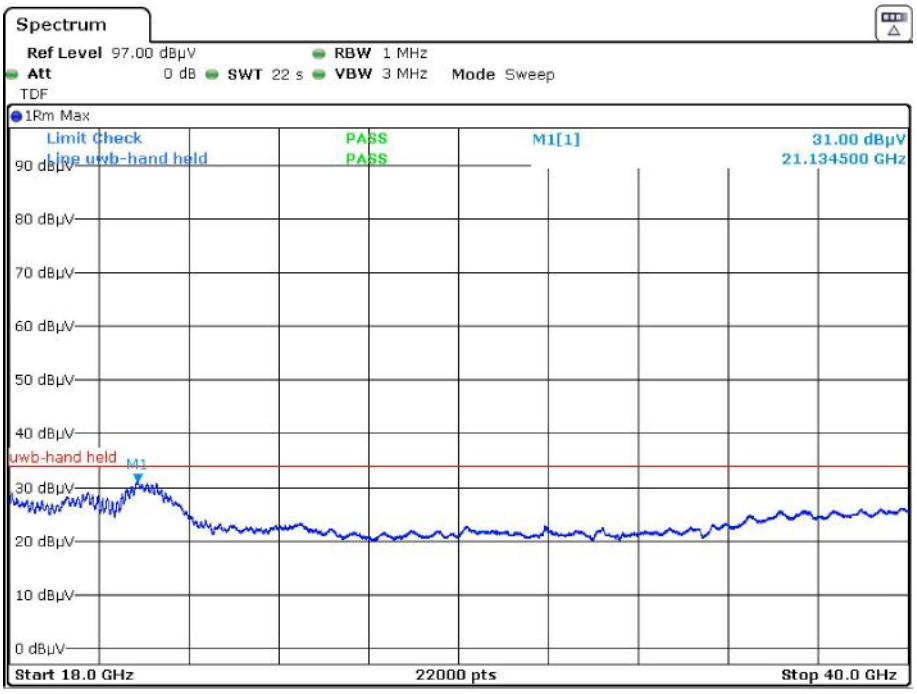
Spurious radiated emission above 960MHz in non GPS band:

1. The test distance is 3m.
2. E[dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters.
3. The antenna factor, cable loss and preamplifier gain have been entered into the analyzer as the transducer factor.

Frequency	Corrected Amplitude (dBμV/m)	EIRP (dBm)	Detector	Turntable	Rx Antenna		Part15.519	
(MHz)				Degree	Height (m)	Polar (H / V)	EIRP Limit (dBm)	Margin (dB)
4373.5	40.62	-54.58	RMS	226	1.8	H	-41.3	-13.28
4430.5	35.61	-59.59	RMS	190	1.5	V	-41.3	-18.29
21134.5	31.00	-64.20	RMS	137	2.1	H	-61.3	-2.90
21124.5	31.01	-64.19	RMS	96	2.3	V	-61.3	-2.89

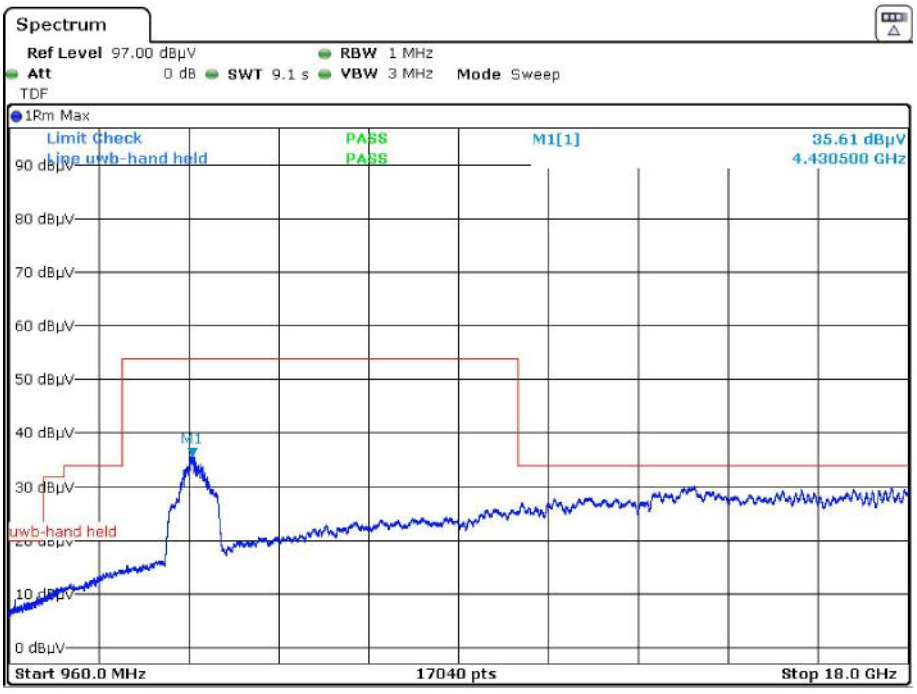
Horizontal



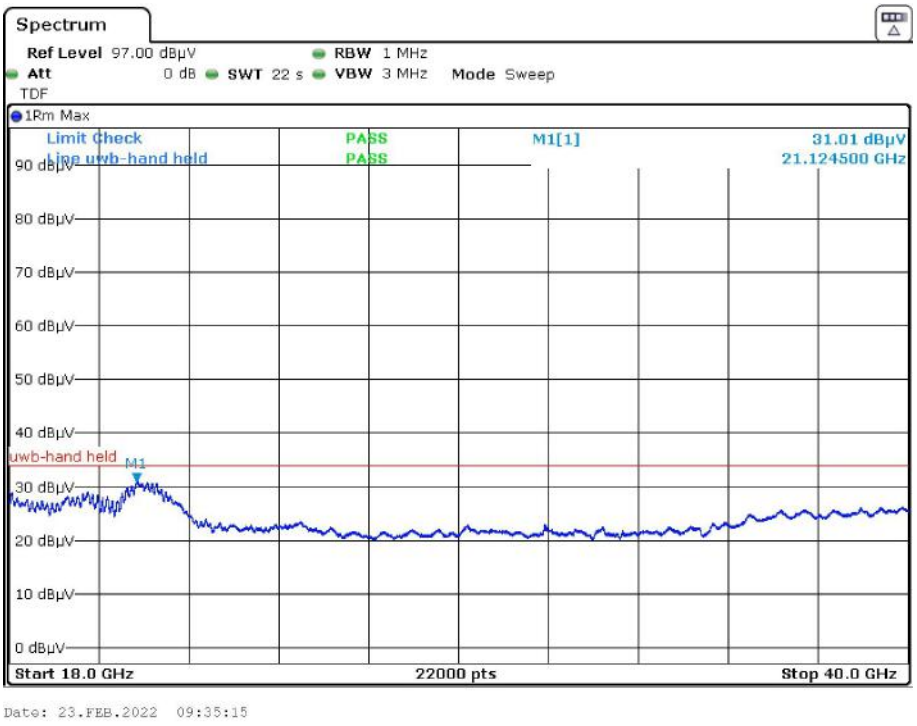


Date: 23.FEB.2022 09:32:22

Vertical



Date: 22.FEB.2022 06:28:48



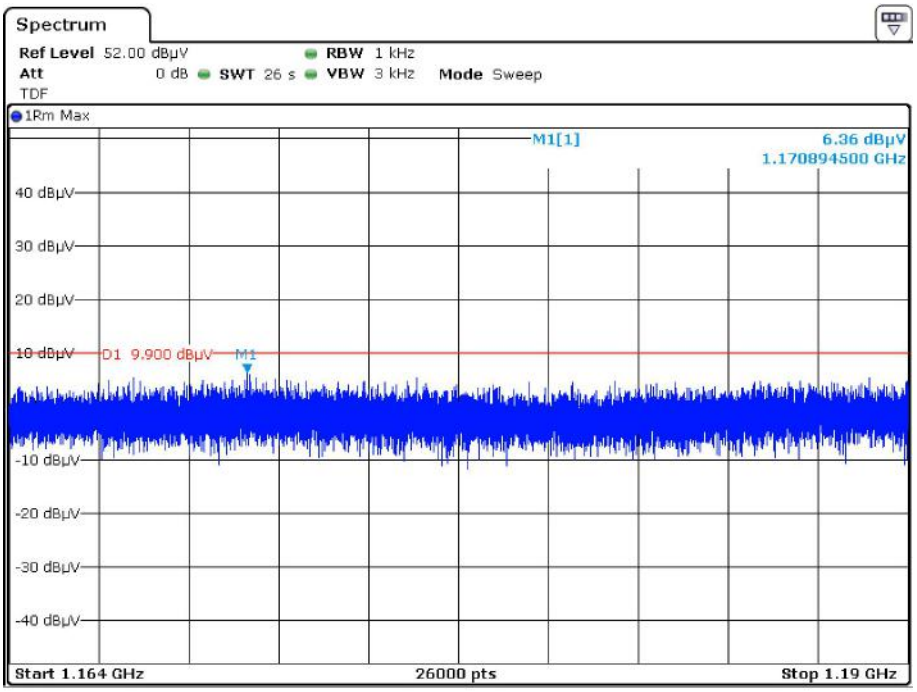
Spurious radiated emission above 960MHz in GPS band:

1. The test distance is 3m.
2. E[dBµV/m] = EIRP[dBm] + 95.2, for d = 3 meters.
3. The antenna factor, cable loss and preamplifier gain have been entered into the analyzer as the transducer factor.

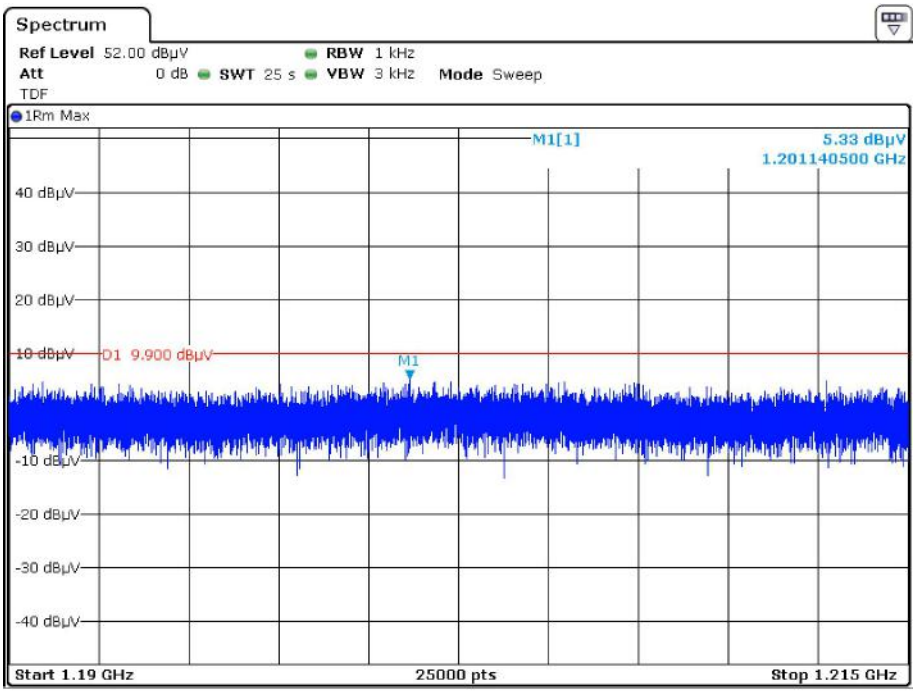
Frequency (MHz)	Corrected Amplitude (dBµV/m)	EIRP (dBm)	Detector	Turntable Degree	Rx Antenna Height (m)	Rx Antenna Polar (H / V)	Part 15.519 EIRP Limit (dBm)	Part 15.519 Margin (dB)
1170.89	6.36	-88.84	RMS	150	2.5	H	-85.3	-3.54
1188.37	6.25	-88.95	RMS	306	2.4	V	-85.3	-3.65
1201.14	5.33	-89.87	RMS	3	2.4	H	-85.3	-4.57
1199.02	5.64	-89.56	RMS	288	1.9	V	-85.3	-4.26
1232.15	6.01	-89.19	RMS	249	1.0	H	-85.3	-3.89
1236.93	6.63	-88.57	RMS	202	1.0	V	-85.3	-3.27
1576.16	8.79	-86.41	RMS	172	1.7	H	-85.3	-1.11
1567.04	7.84	-87.36	RMS	119	1.3	V	-85.3	-2.06
1607.39	8.83	-86.37	RMS	325	1.5	H	-85.3	-1.07
1587.20	8.02	-87.18	RMS	329	1.1	V	-85.3	-1.88

1164-1240MHz:

Horizontal



Date: 31.MAR.2022 11:57:34



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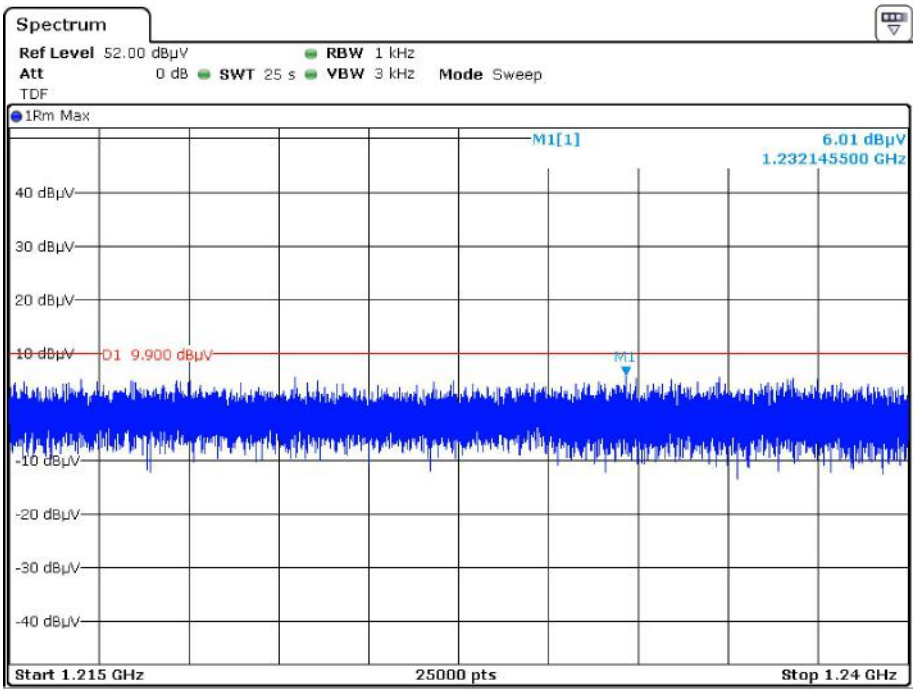
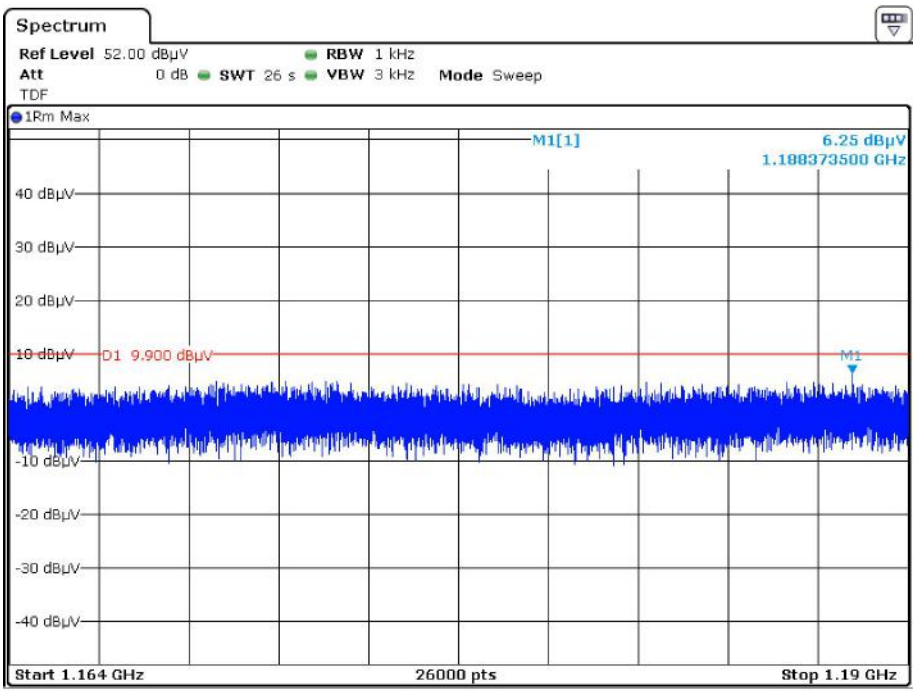


Date: 31.MAR.2022 12:00:47

Vertical



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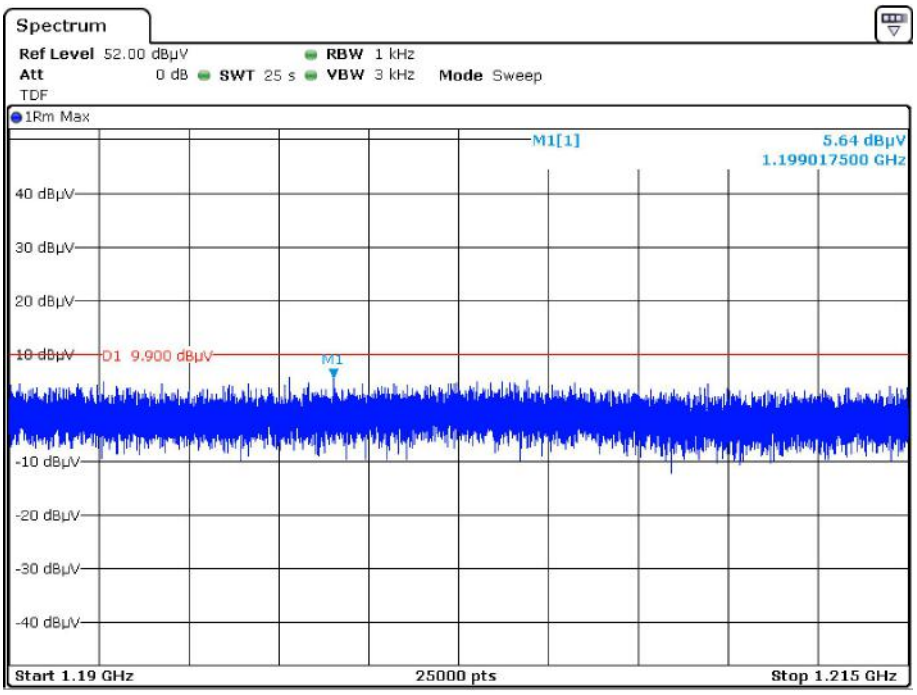

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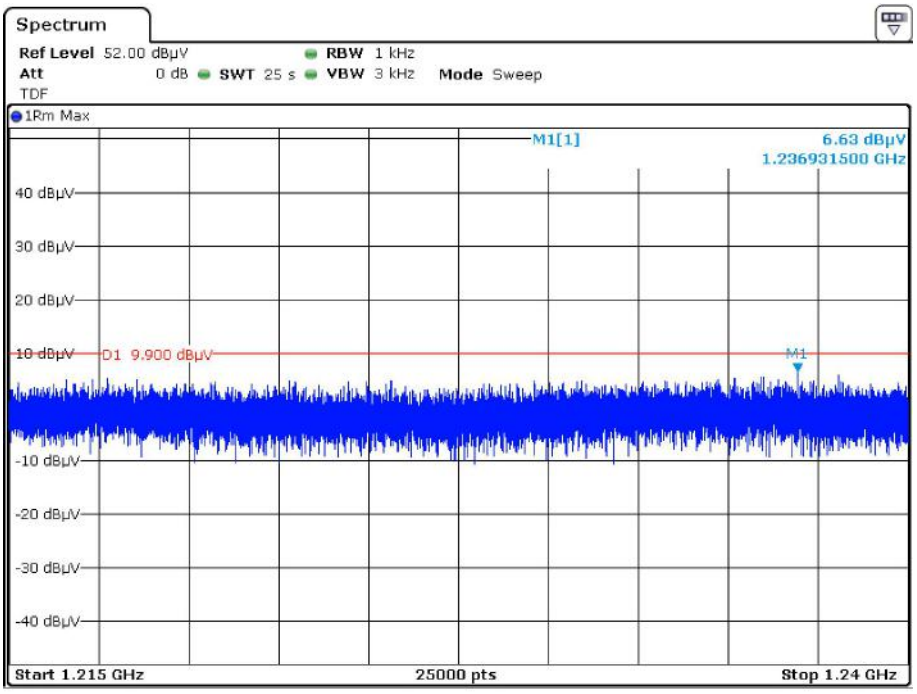
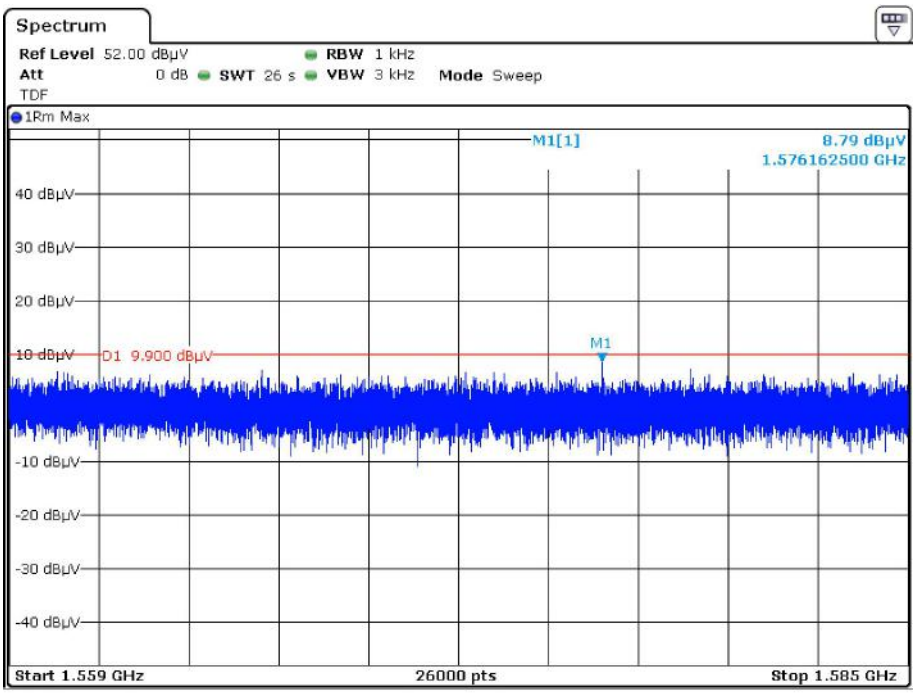


Date: 31.MAR.2022 12:06:25

1559-1610MHz:

Horizontal



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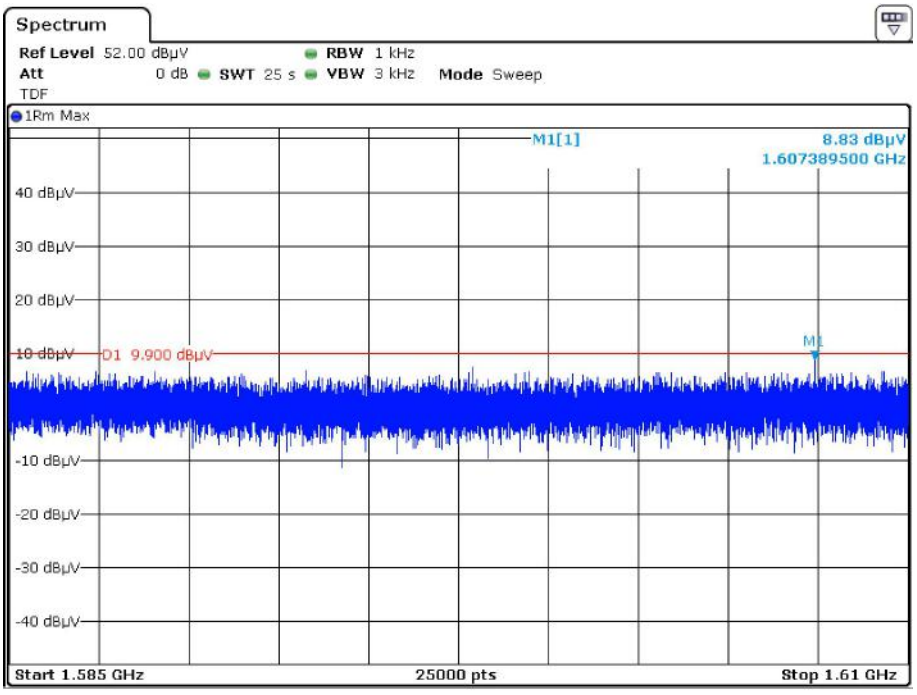

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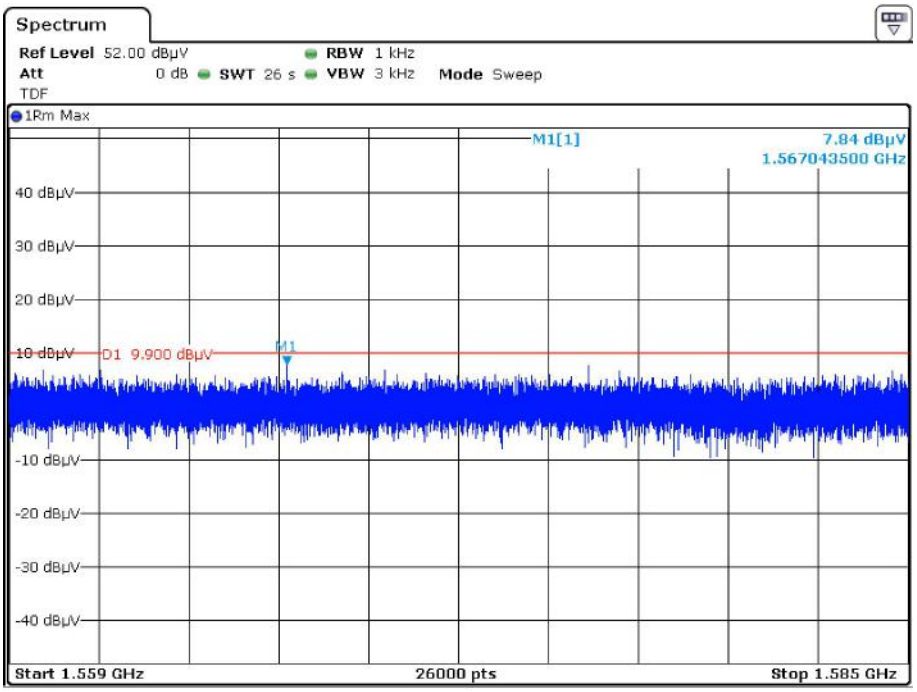
Vertical



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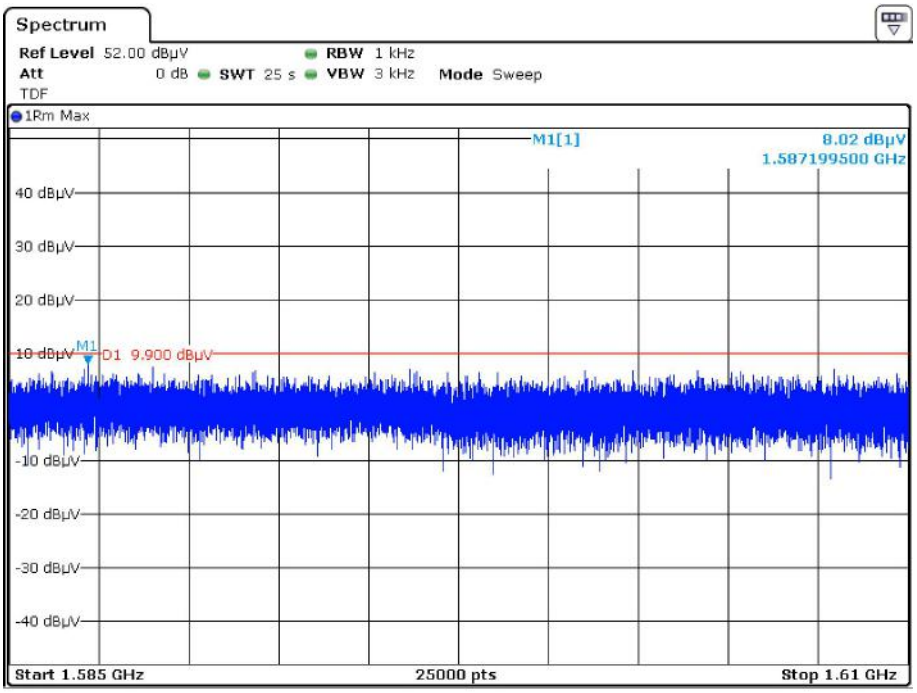


Date: 31.MAR.2022 12:14:07

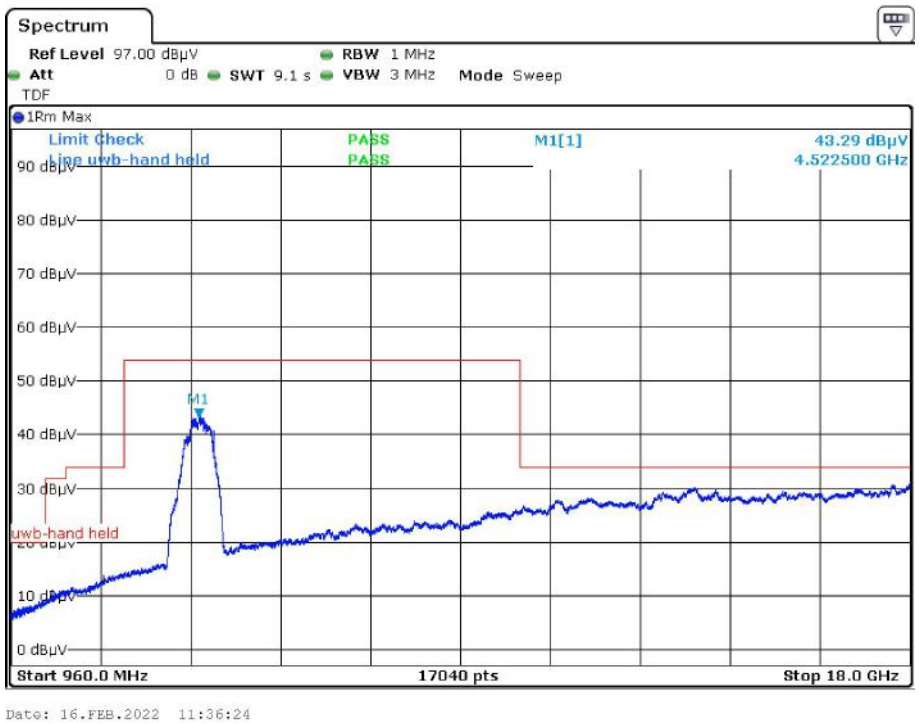
CH34493MHZ-PRF64-110K

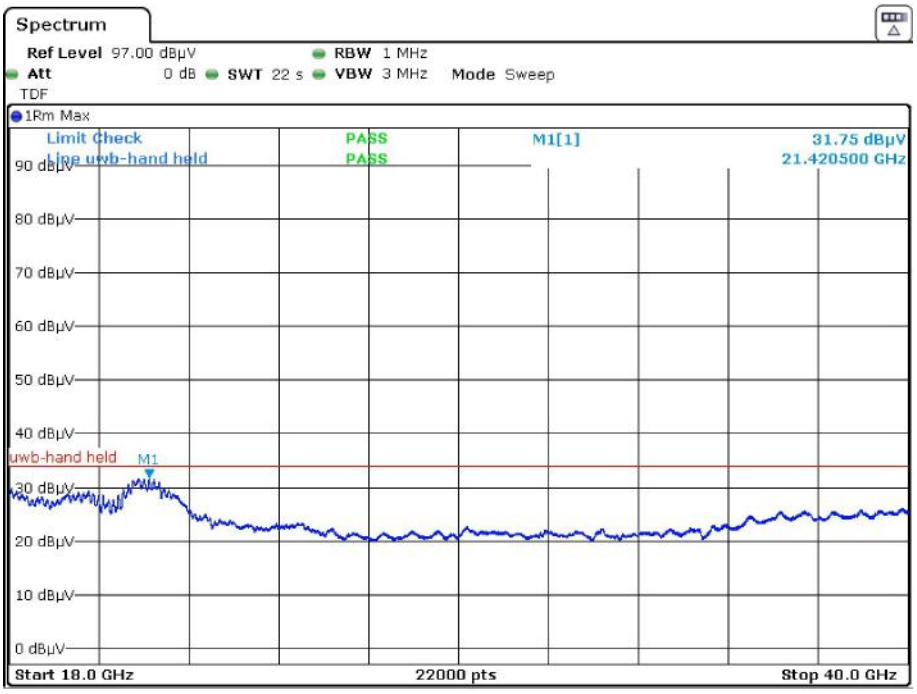
Spurious radiated emission above 960MHz in non GPS band:

1. The test distance is 3m.
2. E[dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters.
3. The antenna factor, cable loss and preamplifier gain have been entered into the analyzer as the transducer factor.

Frequency	Corrected Amplitude (dBμV/m)	EIRP (dBm)	Detector	Turntable	Rx Antenna		Part15.519	
(MHz)				Degree	Height (m)	Polar (H / V)	EIRP Limit (dBm)	Margin (dB)
4522.5	43.29	-51.91	RMS	107	1.9	H	-41.3	-10.61
4391.6	38.12	-57.08	RMS	193	2	V	-41.3	-15.78
21420.5	31.75	-63.45	RMS	195	2.5	H	-61.3	-2.15
21174.5	31.71	-63.49	RMS	11	1.9	V	-61.3	-2.19

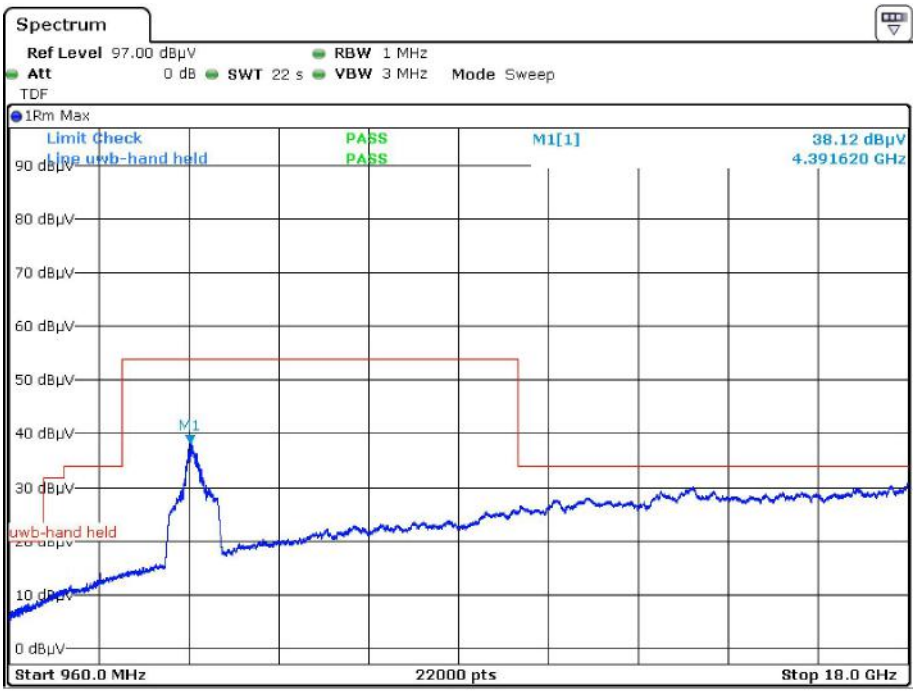
Horizontal



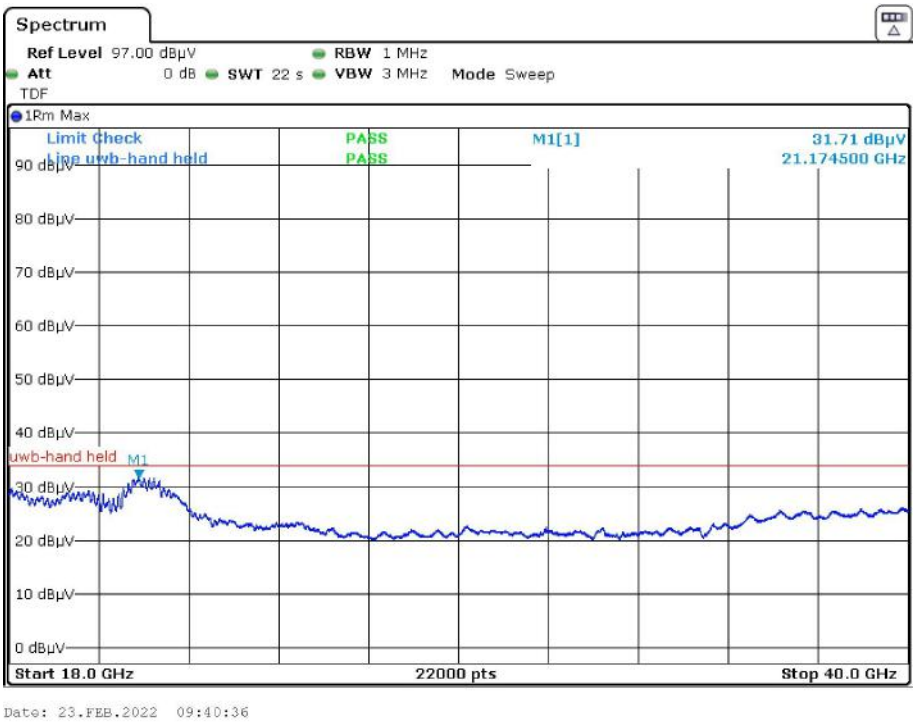


Date: 23.FEB.2022 09:37:27

Vertical



Date: 16.FEB.2022 11:43:10



Spurious radiated emission above 960MHz in GPS band:

1. The test distance is 3m.
2. E[dBµV/m] = EIRP[dBm] + 95.2, for d = 3 meters.
3. The antenna factor, cable loss and preamplifier gain have been entered into the analyzer as the transducer factor.

Frequency (MHz)	Corrected Amplitude (dBµV/m)	EIRP (dBm)	Detector	Turntable Degree	Rx Antenna Height (m)	Rx Antenna Polar (H / V)	Part 15.519 EIRP Limit (dBm)	Part 15.519 Margin (dB)
1172.72	5.86	-89.34	RMS	245	2.0	H	-85.3	-4.04
1189.18	5.83	-89.37	RMS	305	2.0	V	-85.3	-4.07
1202.14	5.87	-89.33	RMS	341	2.0	H	-85.3	-4.03
1213.08	6.49	-88.71	RMS	315	1.3	V	-85.3	-3.41
1234.00	6.47	-88.73	RMS	258	2.1	H	-85.3	-3.43
1232.41	5.17	-90.03	RMS	74	1.2	V	-85.3	-4.73
1565.90	6.67	-88.53	RMS	314	1.8	H	-85.3	-3.23
1581.41	7.63	-87.57	RMS	239	1.1	V	-85.3	-2.27
1609.12	7.71	-87.49	RMS	166	1.9	H	-85.3	-2.19
1596.25	7.06	-88.14	RMS	193	1.2	V	-85.3	-2.84