

TEST REPORT

Application No.: SZCR2305001544AT
Applicant: Pozyx NV
Address of Applicant: Vrijdagmarkt 10/ 201, 9000, Gent, Belgium
Manufacturer: Pozyx NV
Address of Manufacturer: Vrijdagmarkt 10/ 201, 9000, Gent, Belgium
Factory: Page Electronica NV
Address of Factory: Frankrijklaan 22, 8970, Poperinge, Belgium
Equipment Under Test (EUT):
EUT Name: Industrial tag V1.2
Model No.: 250010001
FCC ID: 2AYPJ-250101-2
Trade Mark: POZYX
Standard(s) : 47 CFR Part 15 Subpart F
Date of Receipt: 2023-05-22
Date of Test: 2023-06-29 to 2023-07-26
Date of Issue: 2023-07-27

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

Keny Xu

Keny Xu
EMC Laboratory Manager



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch EMC Laboratory

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2023-07-27		Original

Authorized for issue by:				
		Calvin Weng		
		Calvin Weng/Project Engineer		
		Eric Fu		
		Eric Fu/Reviewer		



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2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15 Subpart F	N/A	47 CFR Part 15F Section 15.519(a2), 15.521(b), 15.203	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Dwell Time	47 CFR Part 15 Subpart F	/	47 CFR Part 15F Section 15.519(a)(1)	Pass
EIRP		ANSI C63.10: 2013 section 10.3	47 CFR Part 15, Subpart F Section 15.519 (c)(e) 15.521(g)	Pass
Spurious Emissions Below 1GHz		ANSI C63.10: 2013 section 10.2	47 CFR Part 15, Subpart F Section 15.519 (c)(d),15.209, 15.521(c)(d) (h)	Pass
Spurious Emissions Above 1GHz		ANSI C63.10: 2013 section 10.3	47 CFR Part 15, Subpart F Section 15.519 (c)(d),15.209, 15.521(c)(d) (h)	Pass
UWB Bandwidth		ANSI C63.10:2013 section 10.1	47 CFR Part 15F Section 15.503, 15.521(e)	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)		ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart F 15.207, 15.505, 15.521(j)	N/A

Remark: This device is battery powered.

Remark: for 47 CFR Part 15.521 General Requirement, Section15.521(f)(i), is not applicable for this product, so it's not evaluated in the report.



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC3V by CR2477 type battery(1000mAh)
Operating Frequency:	Channel2:3993.6MHz, Channel3:4492.8MHz, Channel5:6489.6MHz
Modulation Type:	PM
Number of Channels:	3
Sample Type:	Portable
Antenna Type:	Chip antenna
Antenna Gain:	Channel2:2.73dBi; Channel3:2.73dBi, Channel5:4.16dBi

Remark:The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
--	--	--	--

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Dwell Time	$\pm 0.37\%$
EIRP	$\pm 4.8\text{dB}$
Spurious Emissions Below 1GHz	$\pm 6.0\text{dB}$ for 3m; $\pm 5.0\text{dB}$ for 10M
Spurious Emissions Above 1GHz	$\pm 4.6\text{dB}(1-18\text{GHz})$; $\pm 4.8\text{dB}(18-40\text{GHz})$
UWB Bandwidth	$\pm 3\%$

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4.4 Test Location

All tests were performed at:

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No tests were sub-contracted.

4.5 Test Facility

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

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI (Member No. 1937)

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Dwell Time					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-19	2023-03-21	2024-03-20
Coaxial Cable	SGS	N/A	SEM031-01	2022-07-08	2023-07-07
				2023-07-07	2024-07-06

EIRP					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2022-04-02	2025-04-01
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2023-03-20	2024-03-19
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2022-07-24	2024-07-23
Microwave system amplifier	Agilent	83017A	SEM005-25	2022-09-21	2023-09-20
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2022-07-08	2023-07-07
				2023-07-07	2024-07-06

Spurious Emissions Below 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2020-07-19	2023-07-18
				2023-07-18	2026-07-17
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2022-10-20	2023-10-19
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2021-09-17	2023-09-16
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2023-03-20	2024-03-19
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2021-11-30	2023-11-29
Coaxial Cable	SGS	N/A	SEM025-01	2022-07-08	2023-07-07
				2023-07-07	2024-07-06

Spurious Emissions Above 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2022-04-02	2025-04-01
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2023-03-20	2024-03-19
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2022-07-24	2024-07-23
Microwave system	Agilent	83017A	SEM005-25	2022-09-21	2023-09-20

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amplifier					
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2022-07-08 2023-07-07	2023-07-07 2024-07-06
Coaxial Cable	SGS	N/A	SEM026-06	2022-07-08 2023-07-07	2023-07-07 2024-07-06
Coaxial Cable	SGS	N/A	SEM023-02	2022-07-08 2023-07-07	2023-07-07 2024-07-06

UWB Bandwidth

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
DC Power Supply	Chroma	62012P-80-60	SEM011-11	2022-10-20	2023-10-19
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-19	2023-03-21	2024-03-20
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2022-07-08 2023-07-07	2023-07-07 2024-07-06
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2023-03-31	2024-03-30

General used equipment

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2022-09-04	2023-09-03
Humidity/ Temperature Indicator	Anymetre	TH101B	SEM002-09	2022-09-04	2023-09-03
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2023-03-23	2024-03-22



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15F Section 15.519(a2), 15.521(b), 15.203

6.1.2 Conclusion

15.203 Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of 15.211, 15.213, 15.217, 15.219, 15.221, or 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

15.519 requirement:

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.



7 Radio Spectrum Matter Test Results

7.1 Dwell Time

Test Requirement	47 CFR Part 15F Section 15.519(a)(1)
Test Method:	ANSI C63.10:2013 section 7.8.4
Limit	<p>A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver.</p> <p>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.</p>

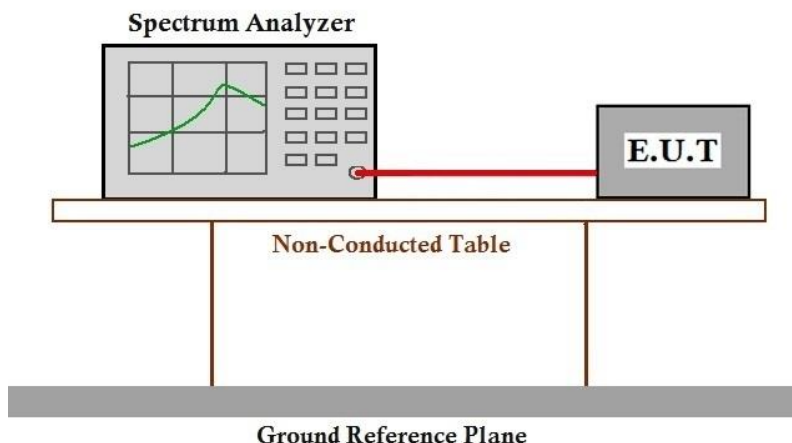
7.1.1 E.U.T. Operation

Operating Environment:			
Temperature:	25.1 °C	Humidity:	49.9 % RH
		Atmospheric Pressure:	1005 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	Normal Operating Mode: Keep the EUT Paring with Other Device and Operating Normally

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

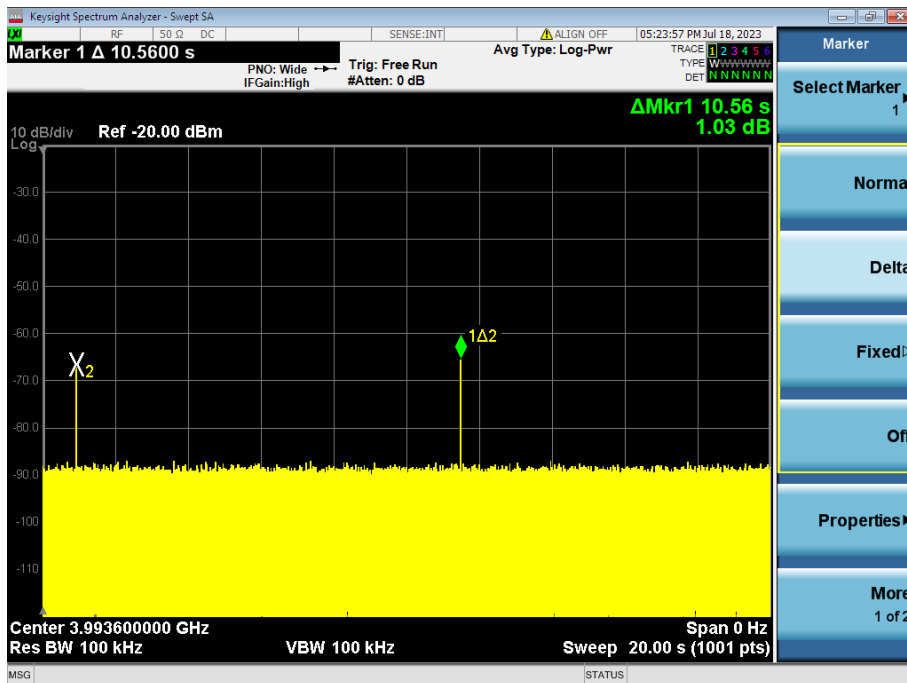
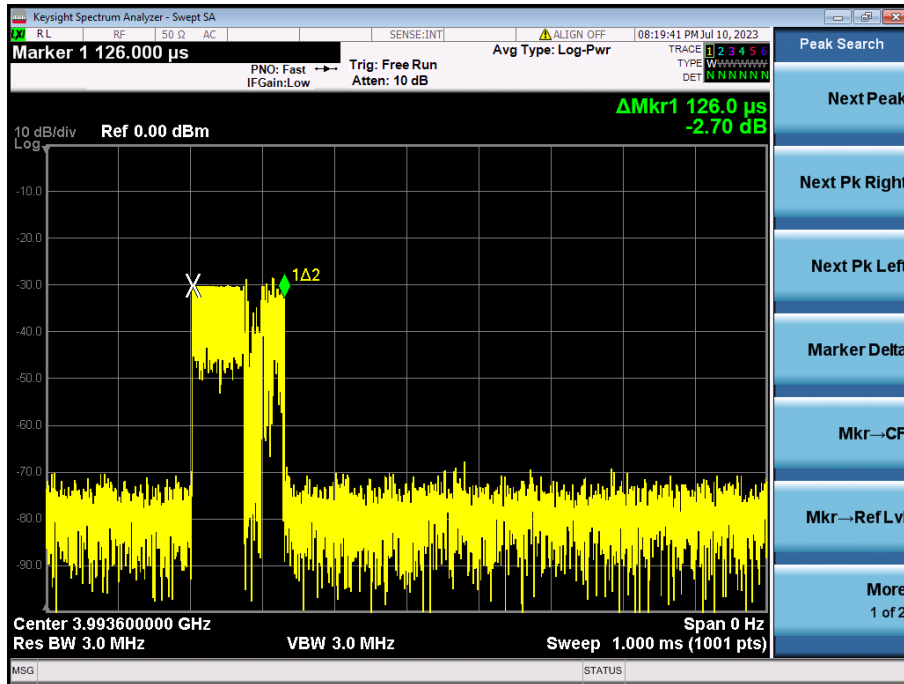


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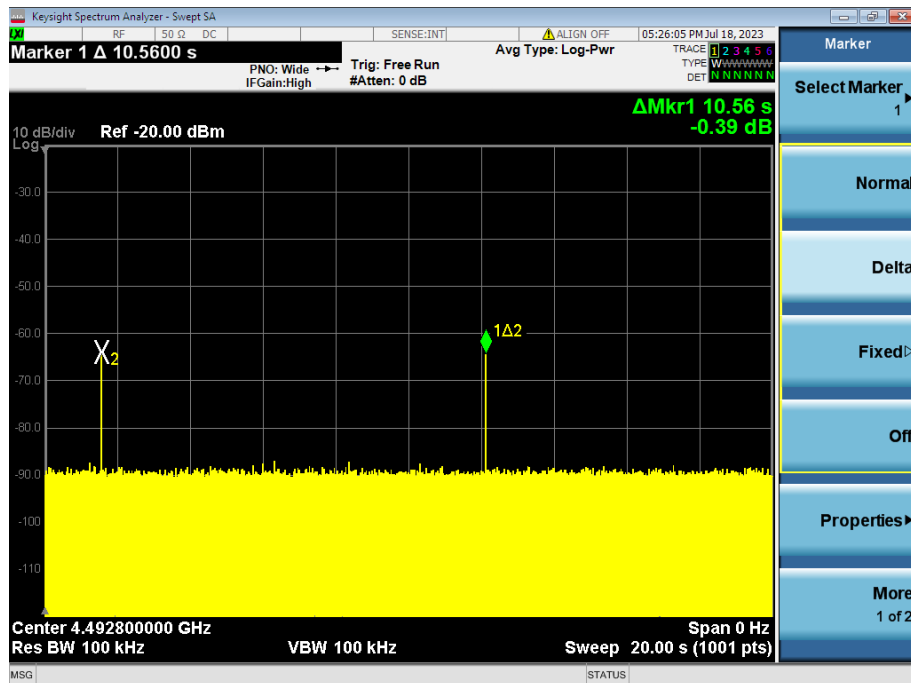
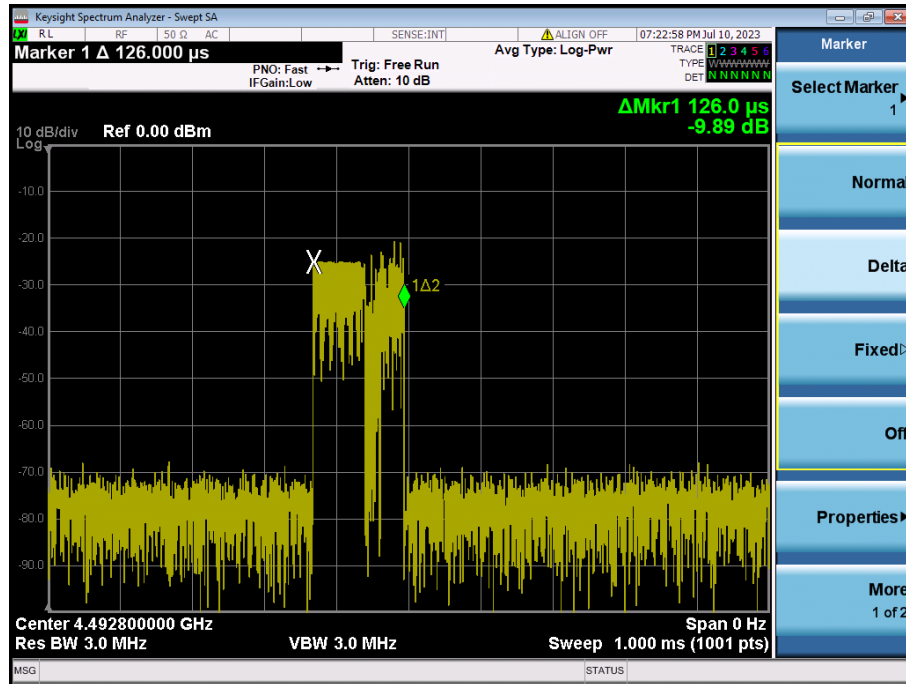
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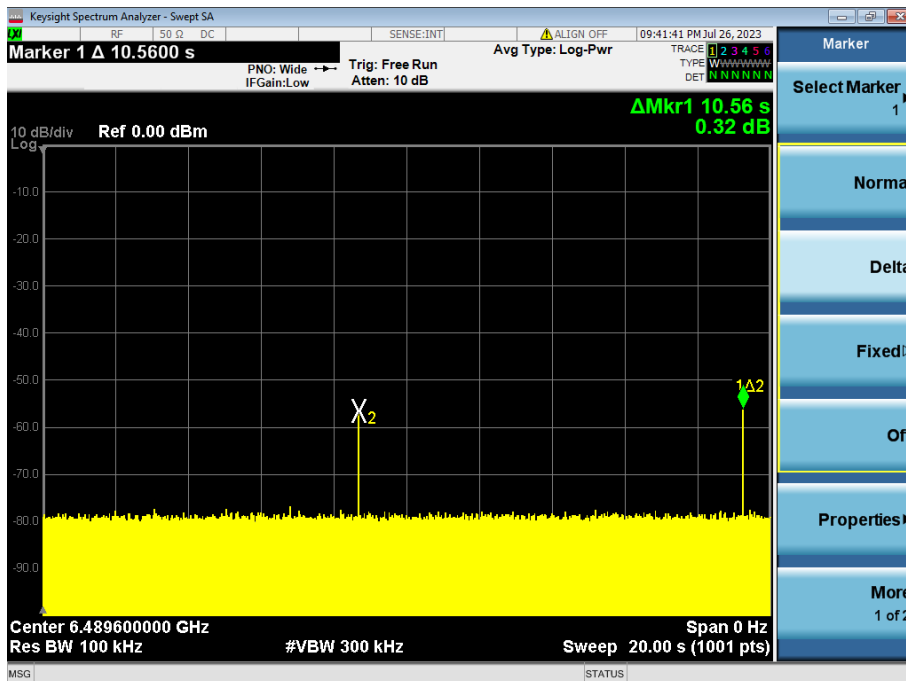
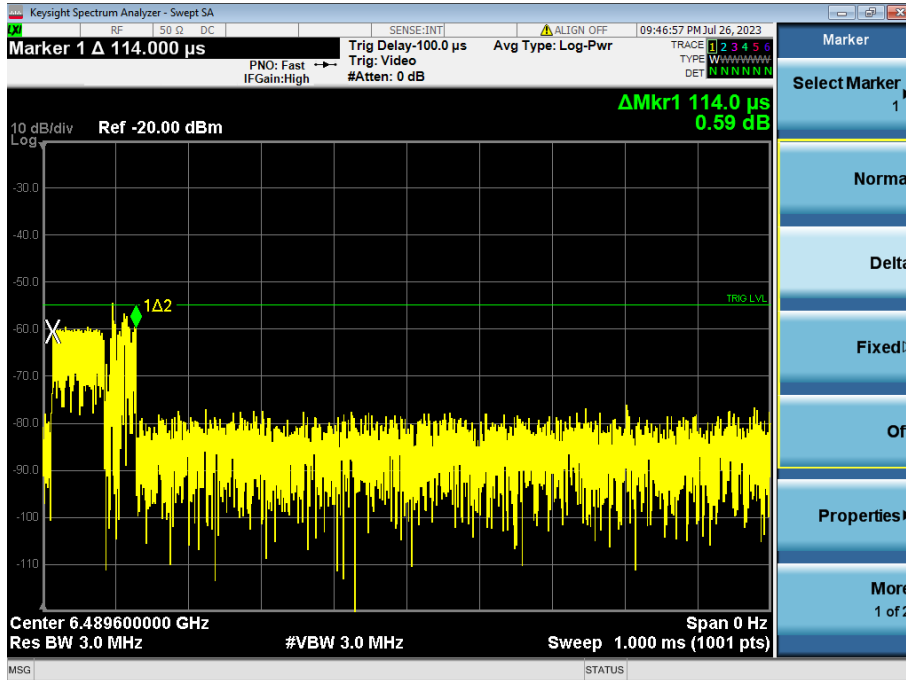
3993.6MHz: (the EUT transmit every 10.56s, each transmit pulse is 126us.)



4492.8MHz: (the EUT transmit every 10.56s, each transmit pulse is 126us.)



6489.6MHz: (the EUT transmit every 10.56s, each transmit pulse is 114us.)



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7.2 EIRP

Test Requirement 47 CFR Part 15, Subpart F Section 15.519 (c)(e)

Test Method: ANSI C63.10: 2013 section 10.3

Limit:

Frequency	Limit	Detector	Measurement distance (m)
960MHz-1610MHz	-75.3 dBm (EIRP, RBW=1MHz)	AV	3
1610MHz-1990MHz	-63.3 dBm (EIRP, RBW=1MHz)	AV	3
1990MHz-3100MHz	-61.3 dBm (EIRP, RBW=1MHz)	AV	3
3100MHz-10600MHz	-41.3 dBm (EIRP, RBW=1MHz)	AV	3
Above 10600MHz	-61.3 dBm (EIRP, RBW=1MHz)	AV	3
Fundamental	0 dBm (EIRP, RBW=50MHz)	Peak	3

Remark: Due to some spectrum analyzer does not support 50MHz RBW setting, RBW set to the maximum value, and add a correction factor is allowed for Max Peak EIRP measurement. According to ANSI 63.10 Clause 10.3.9, the EIRP to field strength at a specified measurement distance of 3 m is below:

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

For peak power test, the spectrum analyzer was set to RBW=10MHz, VBW=10MHz, and add a conversion factor of $20 \cdot \log(50\text{MHz}/10\text{MHz})=13.98\text{dB}$.

Thus, the field strength limit for the test above 1GHz is below:

Frequency	Limit	Detector	Measurement Distance
	Field Strength (dBuV/m)		
960MHz-1610MHz	20.00	AV	3
1610MHz-1990MHz	32.00	AV	3
1990MHz-3100MHz	34.00	AV	3
3100MHz-10600MHz	54.00	AV	3
Above 10600MHz	34.00	AV	3
Fundamental	95.30	Peak	3

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.0 °C Humidity: 57.6 % RH Atmospheric Pressure: 1005 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Continuous Tx Mode: Keep the EUT Transmitting with Modulation



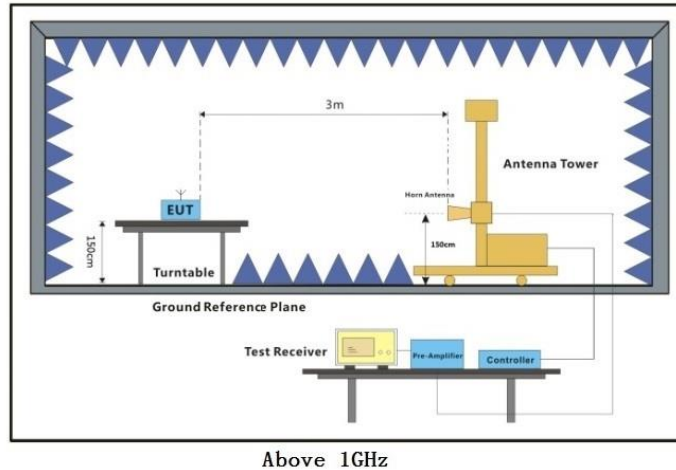
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7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

- 1) The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 3) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5) The test-receiver system was set to Peak detector with Maximum Hold Mode for Max Peak EIRP measurement and RMS/AV detector for Average EIRP measurement.
- 6) Test the EUT in the lowest channel, the middle channel, the Highest channel
- 7) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.
- 8) Repeat above procedures until all frequencies measured was complete.

Remark: For peak power measurement, the test plot below were not include a correction factor, final result need to add a correction factor of $20 \cdot \log(50/10) \text{dB} = 13.98 \text{dB}$.

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Test frequency: 3993.6MHz

Peak Field Strength for fundamental @ RBW=10MHz										
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Test Level (dBuV/m)	Correction factor (dBuV/m)	Final Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Polarization
4070.344	32.94	6.35	34.38	68.66	73.57	13.98	87.55	95.30	7.75	Horizontal
4069.320	32.94	6.35	34.38	75.98	80.89	13.98	94.87	95.30	0.43	Vertical

Average Field Strength for fundamental @ RBW=1MHz									
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Polarization	
3950.226	32.60	6.22	34.38	37.47	41.91	54.00	12.09	Horizontal	
4023.485	32.79	6.30	34.35	48.04	52.78	54.00	1.22	Vertical	

Test frequency: 4492.8MHz

Peak Field Strength for fundamental @ RBW=10MHz										
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Test Level (dBuV/m)	Correction factor (dBuV/m)	Final Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Polarization
4492.920	33.50	6.76	34.67	68.22	73.81	13.98	87.79	95.30	7.51	Horizontal
4492.920	33.50	6.76	34.67	74.99	80.58	13.98	94.56	95.30	0.74	Vertical

Average Field Strength for fundamental @ RBW=1MHz									
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Polarization	
4496.939	33.50	6.77	34.67	38.85	44.45	54.00	9.55	Horizontal	
4525.169	33.45	6.79	34.69	46.89	52.44	54.00	1.56	Vertical	



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Test frequency: 6489.6MHz

Peak Field Strength for fundamental @ RBW=10MHz										
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Test Level (dBuV/m)	Correction factor (dBuV/m)	Final Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Polarization
6490.321	35.48	8.24	35.48	65.64	73.88	13.98	87.86	95.30	7.44	Horizontal
6488.317	35.48	8.24	35.48	72.6	80.84	13.98	94.82	95.30	0.48	Vertical

Average Field Strength for fundamental @ RBW=1MHz								
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Polarization
6495.333	35.49	8.24	35.49	37.33	45.57	54.00	8.43	Horizontal
6465.317	35.43	8.24	35.46	44.34	52.55	54.00	1.45	Vertical



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7.3 Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart F Section 15.519 (c)(d),15.209

Test Method: ANSI C63.10: 2013 section 10.2 & 10.3

Measurement Distance: 3m

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1000MHz	-	20	AV	3

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22.1 °C

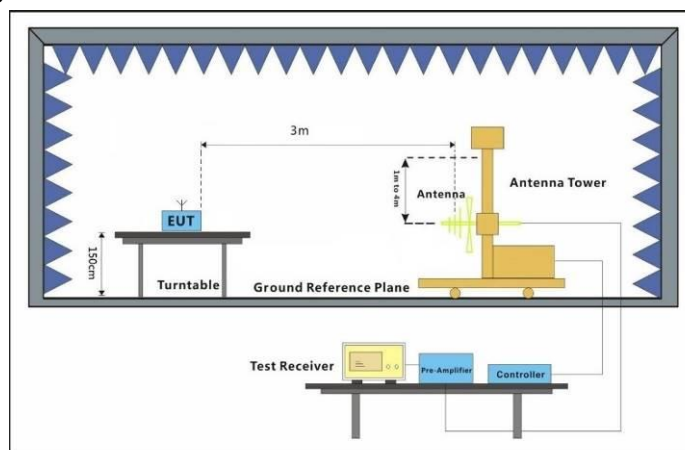
Humidity: 41.2 % RH

Atmospheric Pressure: 1005 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Continuous Tx Mode: Keep the EUT Transmitting with Modulation

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

- 1) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 3) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5) The test-receiver system was set to Peak detector with Maximum Hold Mode. And use Quasi-Peak to measure the six highest frequencies.
- 6) Test the EUT in the lowest channel,the middle channel,the Highest channel and only recorded worst channel--Lowest channel in the test report.
- 7) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case.
- 8) Repeat above procedures until all frequencies measured was complete



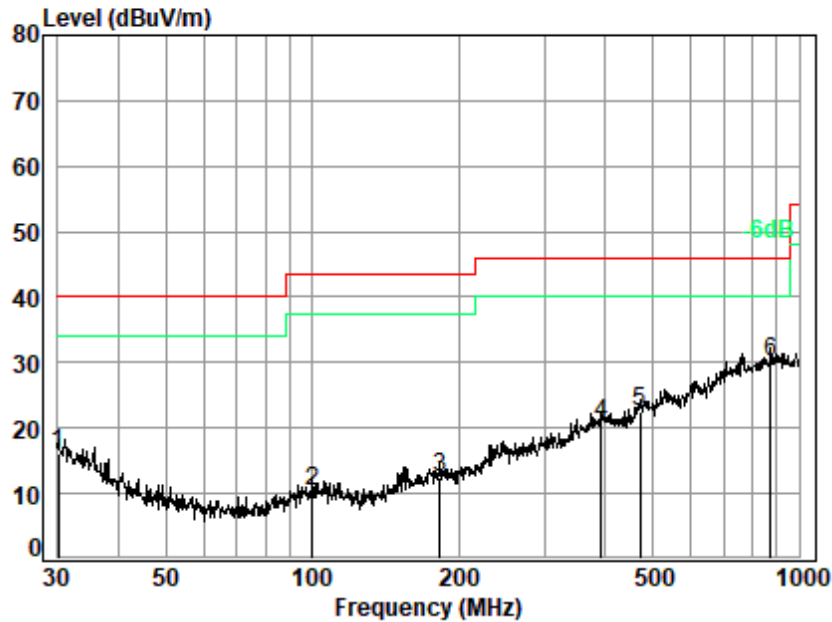
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Test Mode: 00; Polarity: Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : 01544AT
Test Mode: 00

	Ant	Cable	Preamp	Read		Limit	Over	
	Freq	Factor	Loss	Factor	Level	Level	Line	Limit Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.11	21.40	0.63	27.23	21.46	16.26	40.00	-23.74 QP
2	100.23	13.03	1.14	27.00	23.25	10.42	43.50	-33.08 QP
3	182.56	14.67	1.59	26.67	23.02	12.61	43.50	-30.89 QP
4	392.10	21.51	2.45	26.48	23.13	20.61	46.00	-25.39 QP
5	470.52	22.84	2.71	26.71	23.59	22.43	46.00	-23.57 QP
6 q	875.25	28.20	3.94	26.00	24.09	30.23	46.00	-15.77 QP



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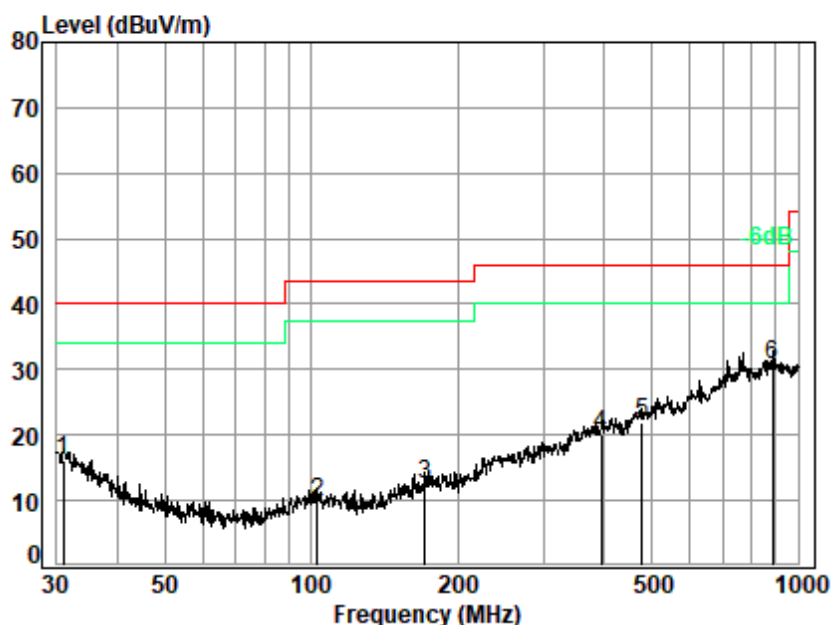
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Test Mode: 00; Polarity: Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : 01544AT
Test Mode: 00

	Ant	Cable	Preamp	Read		Limit	Over	
Freq	Factor	Loss	Factor	Level	Level	Line	Limit	Remark
MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1	30.96	20.86	0.63	27.23	21.76	16.02	40.00	-23.98 QP
2	102.72	12.98	1.15	26.99	22.69	9.83	43.50	-33.67 QP
3	171.39	14.25	1.53	26.71	23.35	12.42	43.50	-31.08 QP
4	394.85	21.62	2.46	26.48	22.53	20.13	46.00	-25.87 QP
5	477.17	23.14	2.73	26.73	22.84	21.98	46.00	-24.02 QP
6 q	887.61	28.86	3.98	25.95	23.81	30.70	46.00	-15.30 QP



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7.4 Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart F Section 15.519 (c)(d),15.209

Test Method: ANSI C63.10: 2013 section 10.3

Limit:

Frequency	Limit (dBuV/m)	RBW	Detector	Measurement distance (m)
1000MHz-1610MHz	20.0	1MHz	AV	0.5
1610MHz-1990MHz	32.0	1MHz	AV	0.5
1990MHz-3100MHz	34.0	1MHz	AV	0.5
3100MHz-10600MHz	54.0	1MHz	AV	0.5
Above 10600MHz	34.0	1MHz	AV	0.5
1164MHz-1240MHz	10.0	1KHz	AV	3
1559MHz-1610MHz	10.0	1KHz	AV	3

Remark: The limit is based on measurement distance at 3m, for this case, spurious emission other than GPS band is measured at 0.5m distance.

7.4.1 E.U.T. Operation

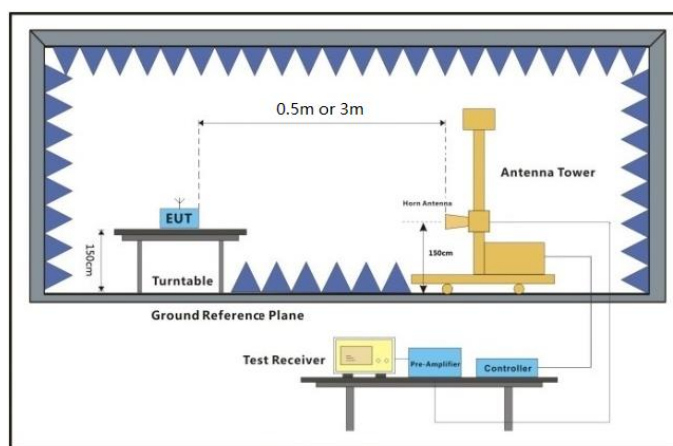
Operating Environment:

Temperature: 22.1 °C Humidity: 57.8 % RH Atmospheric Pressure: 1005 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Continuous Tx Mode: Keep the EUT Transmitting with Modulation

7.4.3 Test Setup Diagram



Above 1GHz



7.4.4 Measurement Procedure and Data

- 1) The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 3) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5) The test-receiver system was set to Peak detector with Maximum Hold Mode.
- 6) Test the EUT in the lowest channel, the middle channel, the Highest channel
- 7) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.
- 8) Repeat above procedures until all frequencies measured was complete

Remark: 1. For emission out of GPS band, measuring distance is 0.5meters, so the distance correction factor is $20 \cdot \log(3/0.5) = 15.56\text{dB}$

2. For emission of GPS band, measuring distance is 3meters

3. For emission above 18GHz, no spurious emission was found, so it's not recorded.



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Test frequency: 3993.6MHz

Average Field Strength within 1164-1240MHz & 1559-1610MHz @ RBW=1KHz								
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV)	Polarization
1182.178	24.33	1	37.77	10.48	-1.96	10	-11.96	Horizontal
1196.924	24.39	1	37.72	13.73	1.4	10	-8.6	Horizontal
1233.663	24.47	1.02	37.61	11.24	-0.88	10	-10.88	Horizontal
1590.426	26.39	1.15	36.65	6.77	-2.34	10	-12.34	Horizontal
1595.914	26.45	1.15	36.64	10.09	1.05	10	-8.95	Horizontal
1604.258	26.52	1.16	36.62	7.39	-1.55	10	-11.55	Horizontal
1184.198	24.34	1	37.76	12.11	-0.31	10	-10.31	Vertical
1195.789	24.38	1	37.73	12.38	0.03	10	-9.97	Vertical
1236.241	24.47	1.02	37.6	12.36	0.25	10	-9.75	Vertical
1587.46	26.35	1.15	36.66	7.24	-1.92	10	-11.92	Vertical
1597.507	26.47	1.15	36.64	10.76	1.74	10	-8.26	Vertical
1606.893	26.53	1.16	36.61	8.02	-0.9	10	-10.9	Vertical

Average Field Strength out of 1164-1240MHz & 1559-1610MHz @ RBW=1MHz									
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Read Level (dBuV)	Distance factor (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV)	Polarization
1071.832	24.22	0.95	38.14	39.28	-15.56	10.75	20	-9.25	Horizontal
1426.916	25.11	1.09	37.06	37.12	-15.56	10.7	20	-9.3	Horizontal
1872.381	27.35	1.24	36.04	34.74	-15.56	11.73	32	-20.27	Horizontal
2543.625	29.49	1.44	35.59	33.69	-15.56	13.47	34	-20.53	Horizontal
6974.982	35.75	2.45	35.89	34.41	-15.56	21.16	54	-32.84	Horizontal
16600.64	42.5	1.97	37.55	35.65	-15.56	27.01	34	-6.99	Horizontal
1109.66	24.04	0.96	38.01	39.69	-15.56	11.12	20	-8.88	Vertical
1278.492	24.61	1.04	37.47	37.91	-15.56	10.53	20	-9.47	Vertical
1762.112	26.85	1.2	36.27	35.85	-15.56	12.07	32	-19.93	Vertical
2543.625	29.49	1.44	35.59	33.42	-15.56	13.2	34	-20.8	Vertical
9502.925	37.19	3.02	35.54	33.62	-15.56	22.73	54	-31.27	Vertical
17487.18	43.59	1.85	37.44	35.97	-15.56	28.41	34	-5.59	Vertical



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Test frequency: 4492.8MHz

Average Field Strength within 1164-1240MHz & 1559-1610MHz @ RBW=1KHz								
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV)	Polarization
1196.319	24.39	1	37.73	13.38	1.04	10	-8.96	Horizontal
1210.782	24.42	1.01	37.68	11.91	-0.34	10	-10.34	Horizontal
1236.241	24.47	1.02	37.6	10.68	-1.43	10	-11.43	Horizontal
1589.045	26.37	1.15	36.66	7.51	-1.63	10	-11.63	Horizontal
1597.713	26.47	1.15	36.64	10.4	1.38	10	-8.62	Horizontal
1606.945	26.53	1.16	36.61	8.68	-0.24	10	-10.24	Horizontal
1187.949	24.35	1	37.75	11.73	-0.67	10	-10.67	Vertical
1199.956	24.4	1	37.71	12.46	0.15	10	-9.85	Vertical
1236.241	24.47	1.02	37.6	10.95	-1.16	10	-11.16	Vertical
1589.147	26.37	1.15	36.66	7.42	-1.72	10	-11.72	Vertical
1596.684	26.46	1.15	36.64	10.47	1.44	10	-8.56	Vertical
1607.256	26.53	1.16	36.61	8.86	-0.06	10	-10.06	Vertical

Average Field Strength out of 1164-1240MHz & 1559-1610MHz @ RBW=1MHz									
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Distance factor (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV)	Polarization
1053.404	24.37	0.94	38.2	37.4	-15.56	8.95	20	-11.05	Horizontal
1398.336	25	1.08	37.14	35.56	-15.56	8.94	20	-11.06	Horizontal
1921.727	27.53	1.25	35.94	37.07	-15.56	14.35	32	-17.65	Horizontal
2603.126	29.6	1.45	35.57	34.3	-15.56	14.22	34	-19.78	Horizontal
6640.542	35.6	2.41	35.61	33.71	-15.56	20.55	54	-33.45	Horizontal
16362.46	42.09	2.03	37.59	35.95	-15.56	26.92	34	-7.08	Horizontal
1041.295	24.5	0.93	38.25	40.15	-15.56	11.77	20	-8.23	Vertical
1426.916	25.11	1.09	37.06	37.5	-15.56	11.08	20	-8.92	Vertical
1921.727	27.53	1.25	35.94	34.42	-15.56	11.7	32	-20.3	Vertical
2618.218	29.6	1.46	35.56	33.41	-15.56	13.35	34	-20.65	Vertical
8153.195	36.4	2.47	35.99	33.69	-15.56	21.01	54	-32.99	Vertical
15942.3	41.54	2.14	37.63	35.86	-15.56	26.35	34	-7.65	Vertical



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Test frequency: 6489.6MHz

Average Field Strength within 1164-1240MHz & 1559-1610MHz @ RBW=1KHz								
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV)	Polarization
1165.621	24.26	0.99	37.82	10.92	-1.65	10	-11.65	Horizontal
1182.552	24.33	1	37.77	10.53	-1.91	10	-11.91	Horizontal
1199.956	24.4	1	37.71	11.64	-0.67	10	-10.67	Horizontal
1572.305	26.17	1.15	36.7	8.64	-0.74	10	-10.74	Horizontal
1597.507	26.47	1.15	36.64	9.9	0.88	10	-9.12	Horizontal
1607.256	26.53	1.16	36.61	8.14	-0.78	10	-10.78	Horizontal
1172.127	24.29	0.99	37.8	11.05	-1.47	10	-11.47	Vertical
1180.982	24.32	1	37.77	11.67	-0.78	10	-10.78	Vertical
1199.956	24.4	1	37.71	12.79	0.48	10	-9.52	Vertical
1592.527	26.41	1.15	36.65	8.61	-0.48	10	-10.48	Vertical
1604.206	26.52	1.16	36.62	7.46	-1.48	10	-11.48	Vertical
1606.945	26.53	1.16	36.61	8.12	-0.8	10	-10.8	Vertical

Average Field Strength out of 1164-1240MHz & 1559-1610MHz @ RBW=1MHz									
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Read Level (dBuV)	Distance factor (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV)	Polarization
1087.434	24.1	0.95	38.08	41.4	-15.56	12.81	20	-7.19	Horizontal
1426.916	25.11	1.09	37.06	37.99	-15.56	11.57	20	-8.43	Horizontal
1840.189	27.24	1.23	36.1	34.73	-15.56	11.54	32	-20.46	Horizontal
2442.751	29.06	1.41	35.62	33.69	-15.56	12.98	34	-21.02	Horizontal
4329.354	33.6	1.96	34.56	33.69	-15.56	19.13	54	-34.87	Horizontal
16409.82	42.22	2.02	37.58	36.13	-15.56	27.23	34	-6.77	Horizontal
1056.453	24.35	0.94	38.19	37.91	-15.56	9.45	20	-10.55	Vertical
1342.882	24.87	1.06	37.29	36.6	-15.56	9.68	20	-10.32	Vertical
1798.127	26.99	1.21	36.19	36.28	-15.56	12.73	32	-19.27	Vertical
2471.157	29.23	1.42	35.61	37.41	-15.56	16.89	34	-17.11	Vertical
4859.975	34.02	2.14	34.9	33.11	-15.56	18.81	54	-35.19	Vertical
16409.82	42.22	2.02	37.58	36.06	-15.56	27.16	34	-6.84	Vertical



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7.5 UWB Bandwidth

Test Requirement 47 CFR Part 15F Section 15.503,15.519(3)(b)
Test Method: ANSI C63.10:2013 section 10.1

7.5.1 E.U.T. Operation

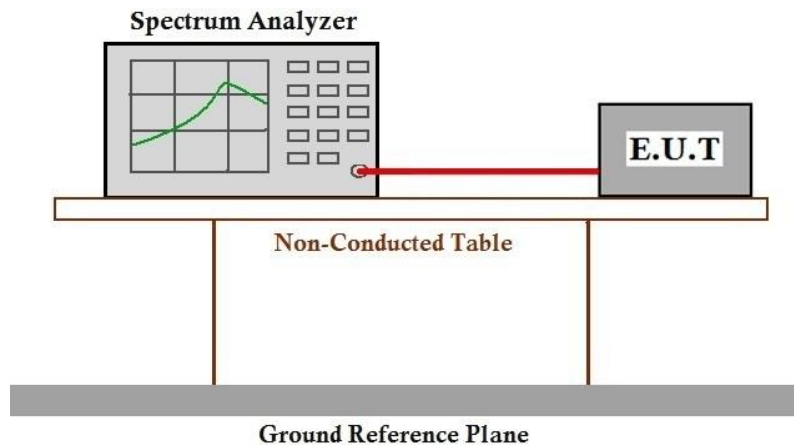
Operating Environment:

Temperature: 25.1 °C Humidity: 49.9 % RH Atmospheric Pressure: 1005 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Continuous Tx Mode: Keep the EUT Transmitting with Modulation

7.5.3 Test Setup Diagram



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7.5.4 Measurement Procedure and Data

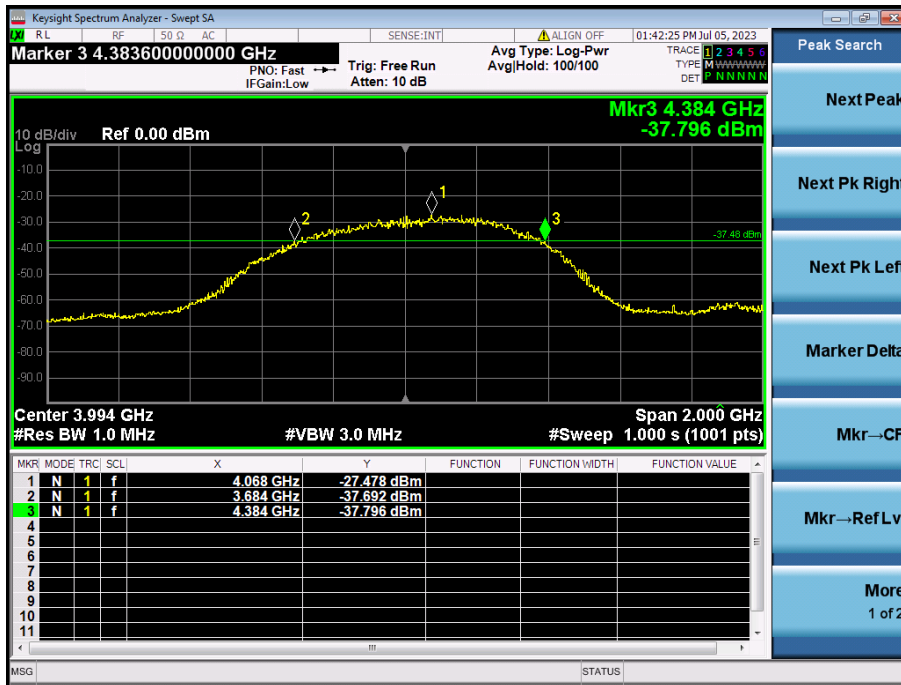
The frequency at which the maximum power level is measured with the peak detector is designated fM. The peak power measurements shall be made using a spectrum analyzer or EMI receiver with a 1 MHz resolution bandwidth and a video bandwidth of 1 MHz or greater. The instrument shall be set to peak detection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

- a) For the lowest frequency bound fL, the emission is searched from a frequency lower than fM that has, by inspection, a peak power much lower than 10 dB less than the power at fM and increased toward fM until the peak power indicates 10 dB less than the power at fM. The frequency of that segment is recorded.
- b) This process is repeated for the highest frequency bound fH, beginning at a frequency higher than fM that has, by inspection, a peak power much lower than 10 dB below the power at fM. The frequency of that segment is recorded.
- c) The two recorded frequencies represent the highest fH and lowest fL bounds of the UWB transmission, and the 10 dB bandwidth (B - 10) is defined as (fH - fL). The center frequency (fc) is mathematically determined from (fH - fL) / 2.
- d) The fractional bandwidth is defined as 2(fH - fL) / (fH + fL).
- e) Determine whether the -10 dB bandwidth (fH - fL) is ≥ 500 MHz, or whether the fractional bandwidth 2(fH - fL) / (fH + fL) is ≥ 0.2 .



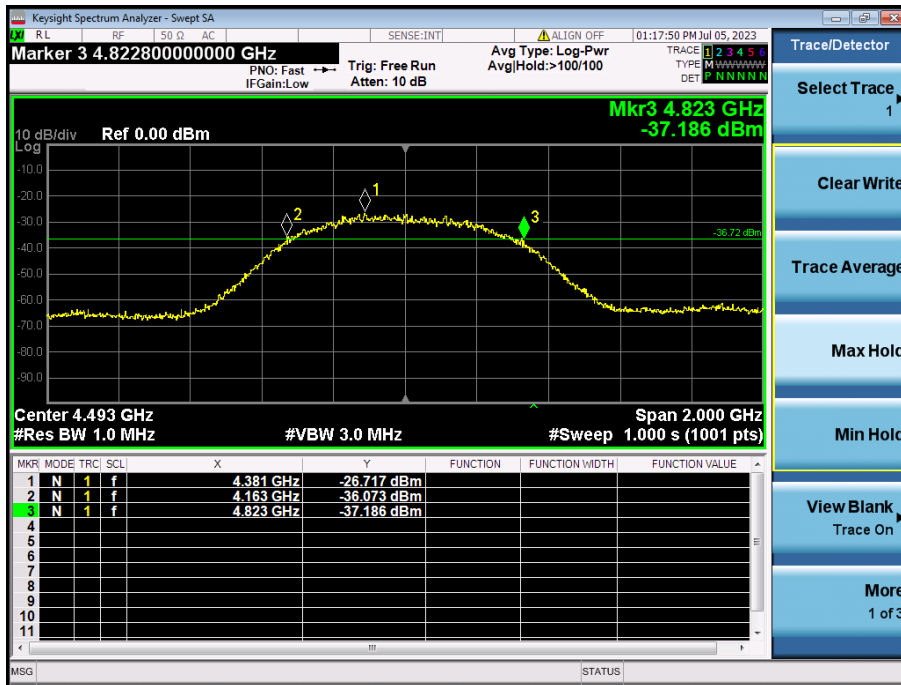
Test Frequency (MHz)	FM(MHz)	FL (MHz)	FH (MHz)	10dB bandwidth (MHz)	Limit (MHz)	FL Limit (MHz)	FH Limit (MHz)	Results
3993.6	4068	3684	4384	700	≥500	>3100	<10600	Pass

10dBc bandwidth



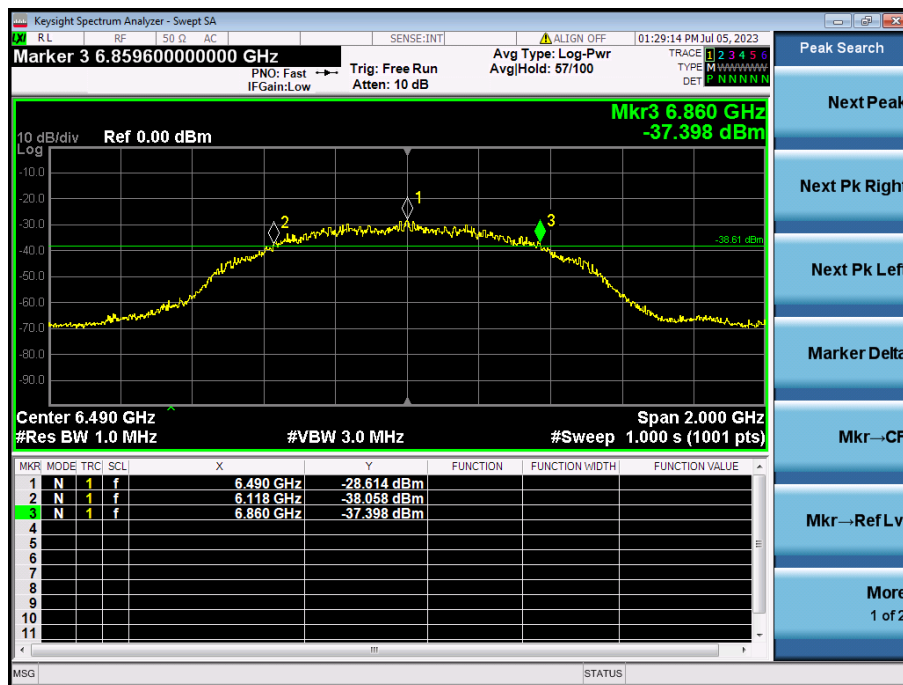
Test Frequency (MHz)	FM(MHz)	FL (MHz)	FH (MHz)	10dB bandwidth (MHz)	Limit (MHz)	FL Limit (MHz)	FH Limit (MHz)	Results
4492.8	4381	4163	4823	660	≥500	>3100	<10600	Pass

10dBc bandwidth



Test Frequency (MHz)	FM(MHz)	FL (MHz)	FH (MHz)	10dB bandwidth (MHz)	Limit (MHz)	FL Limit (MHz)	FH Limit (MHz)	Results
6489.6	6490	6118	6860	742	≥ 500	>3100	<10600	Pass

10dBc bandwidth



8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SZCR2305001544AT.

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - External & Internal Photographs for SZCR2305001544AT.

- End of the Report -

