



RF MEASUREMENT REPORT

FCC ID: 2APR4-X6
Application: Mercku Inc.
Product: Mercku 5G CPE X6
Model No.: X1NA0
Brand Name:  MERCKU
FCC Rule Part(s): Part 96.47 & 96.41
Result: Complies
Received Date: 2023-05-10
Test Date: 2023-05-12 ~ 2023-05-18

Reviewed By:

Jame Yuan

Approved By:

Robin Wu



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.26-2015. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2205RSU019-U1	V01	Initial Report	2023-05-29	Valid

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1.1. Applicant

3600 Steeles Avenue East, Suite C108B, Markham, Ontario, L3R 9Z7, Canada

Mercku Inc.

3600 Steeles Avenue East, Suite C108B, Markham, Ontario, L3R 9Z7, Canada

☒	Test Site - MRT Suzhou Laboratory
	Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
	Laboratory Location (Suzhou - SIP) 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China
	Laboratory Accreditations
	A2LA: 3628.01 CNAS: L10551 FCC: CN1166 ISED: CN0001
	VCCI: ☐ R-20025 ☐ G-20034 ☐ C-20020 ☐ T-20020 ☐ R-20141 ☐ G-20134 ☐ C-20103 ☐ T-20104
☐	Test Site - MRT Shenzhen Laboratory
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China
	Laboratory Accreditations
	A2LA: 3628.02 CNAS: L10551 FCC: CN1284 ISED: CN0105
☐	Test Site - MRT Taiwan Laboratory
	Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
	Laboratory Accreditations
	TAF: L3261-190725 FCC: 291082, TW3261 ISED: TW3261

1.4. Product Information

Product Name	Mercku 5G CPE X6
Model No.	X1NA0
E-UTRA Band	Band 48
IMEI	863109050054365
Accessory	
Adapter	Model No.: P120W2000U Input:100V - 240V~ 50/60Hz 0.6A Output: 12VDC 2.0A 24.0W
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Radio Specification under Test

TDD Tx Frequency Range	LTE Band 48: 3550 ~ 3700 MHz
TDD Rx Frequency Range	LTE Band 48: 3550 ~ 3700 MHz
Device Type	End User Device
Type of Modulation	QPSK, 16QAM, 64QAM, 256QAM
Antenna Type	Integrated Antenna
Antenna Gain	Ant1: 5.33dBi, Ant2: 5.33dBi

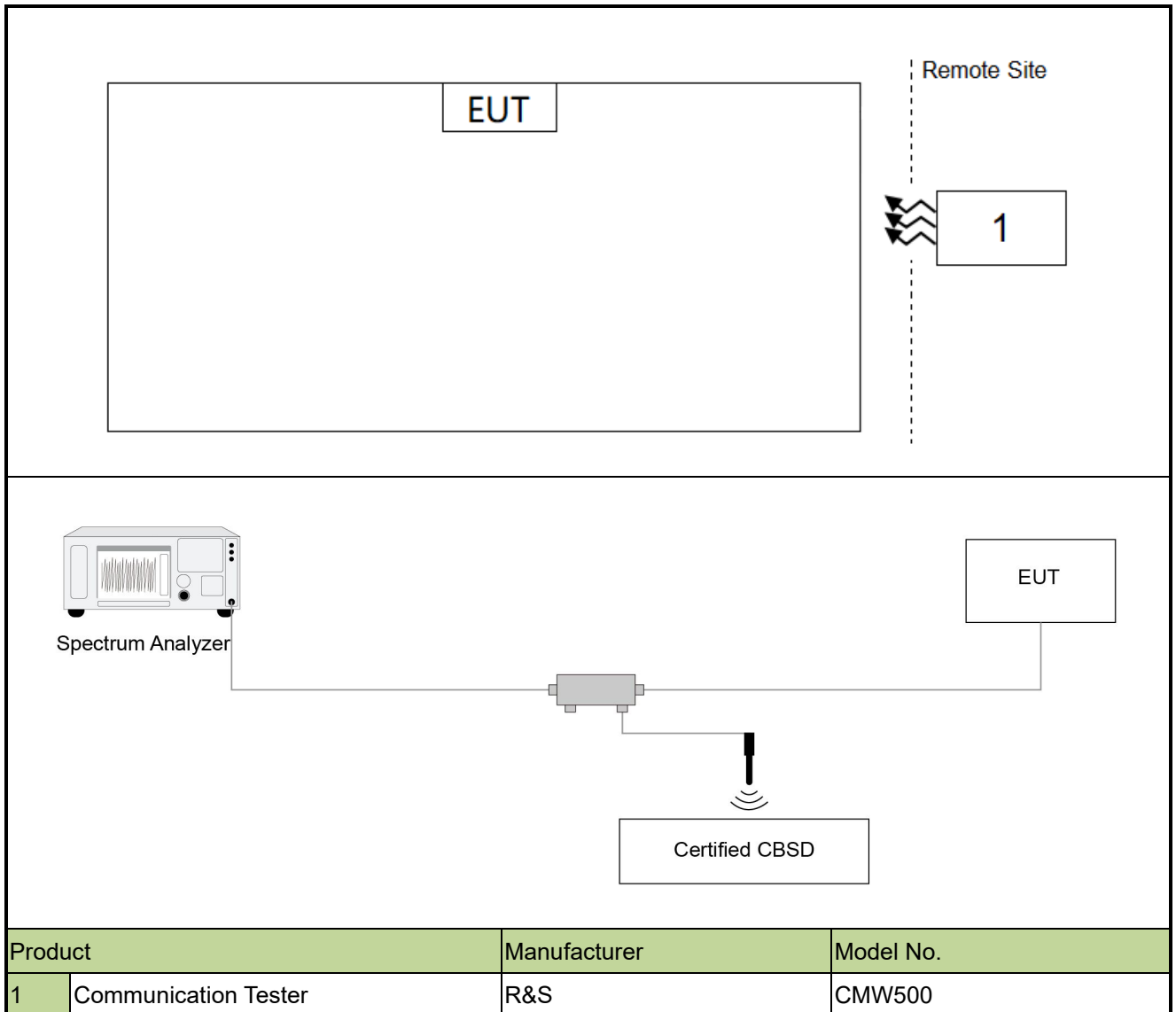
1.6. Test Methodology

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26:2015
- FCC 47 CFR Part 96
- FCC KDB 940660 D01 Part 96 CBRS Eqpt v02
- WINNF-TS-0122 V1.0.2: Test and Certification for Citizens Broadband Radio Service (CBRS);
Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT)

2. Test Configuration

2.1. Test System Connection Diagram



2.2. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20% ~ 75%RH

3. Measuring Instrument

Instrument Name	Manufacturer	Model No.	Asset No.	Cali. Interval	Cal. Due Date	Test Site
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2023-12-28	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2023-05-20	WZ-AC2
				1 year	2024-05-15	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2023-08-22	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2024-05-07	WZ-AC1
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2023-06-04	WZ-AC2
Thermohygrometer	Mingle	ETH529	MRTSUE06170	1 year	2023-11-27	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2023-10-13	WZ-AC2
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2023-06-21	WZ-AC1
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2024-05-07	WZ-AC2
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2024-04-20	WZ-AC1
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2024-04-20	WZ-AC2
Horn Antenna	ETS	3117	MRTSUE06257	1 year	2023-09-18	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE06403	1 year	2023-06-06	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2023-11-05	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2023-12-28	WZ-AC1
Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2024-01-12	WZ-AC1
Preamplifier	EMCI	EMC051845SE	MRTSUE06987	1 year	2023-09-08	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11038	1 year	2023-11-01	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2023-11-01	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE06362	1 year	2024-02-14	WZ-SR6
Shielding Room	HUAMING	WZ-SR6	MRTSUE06443	N/A	N/A	WZ-SR6
Signal Analyzer	Keysight	N9020B	MRTSUE06583	1 year	2023-10-08	WZ-SR6
Attenuator	MVE	MVE2213	MRTSUE11077	1 year	2023-06-09	WZ
Directional Coupler	MVE	MVE4816-10	MRTSUE11118	1 year	2023-08-24	WZ

Certified CBSD Information:

Instrument	Manufacturer	Type No.
Englewood	SERCOMM	SCE4255w
PC	HP	Vostro3888

Software	Version	Function
Controller_MF 7802	2.03C	RE Antenna & Turntable
Controller_MF 7802	1.02	RE Antenna & Turntable
EMI V3	V 3.0.0	EMI Test Software

4. Decision Rules and Measurement Uncertainty

4.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2.

(Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.2. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

Radiated Spurious Emissions
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): Horizontal: 9kHz ~ 300MHz: 5.04dB 300MHz ~ 1GHz: 4.95dB 1GHz ~ 40GHz: 6.40dB Vertical: 9kHz ~ 300MHz: 5.24dB 300MHz ~ 1GHz: 6.03dB 1GHz ~ 40GHz: 6.40dB
Conducted Spurious Emissions
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 0.78dB

5. Test Result

5.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result
2.1053, 96.41(e)	Spurious Emissions	Refer to section 5.2	Radiated	Pass
96.47	End User Device Additional Requirements (CBSD Protocol)	Refer to section 5.3	Conducted	Pass

Notes: The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.

5.2. Radiated Spurious Emissions Measurement

5.2.1. Test Limit

Out of band emissions: The power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

$E \text{ (dB}\mu\text{V/m)} = \text{EIRP (dBm)} - 20 \log D + 104.8$; where D is the measurement distance in meters. The emission limit equal to 55.3dB μ V/m.

5.2.2. Test Procedure

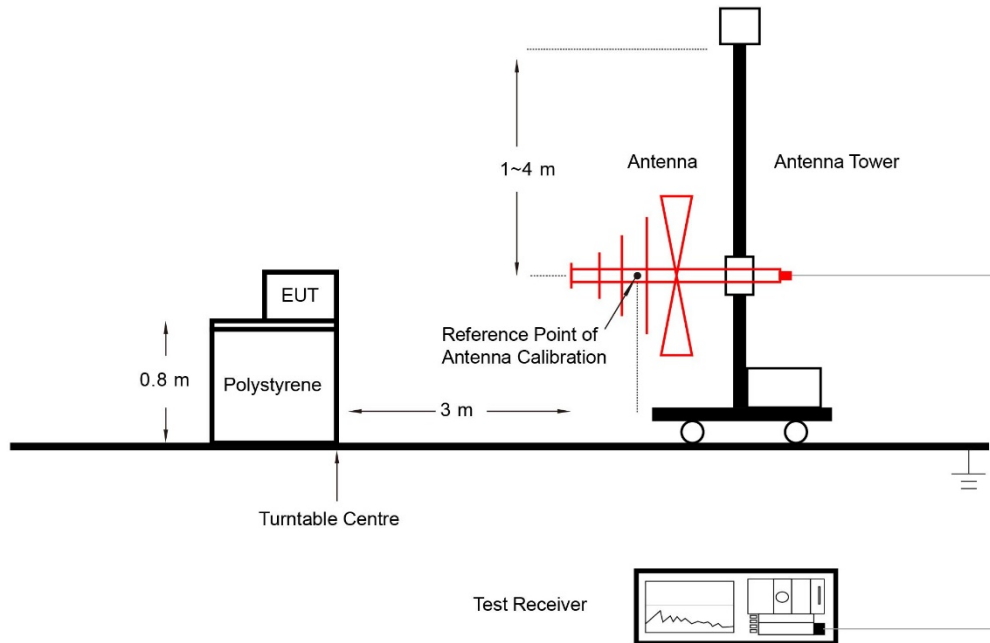
ANSI C63.26-2015 - Section 5.2.7 & 5.5

5.2.3. Test Setting

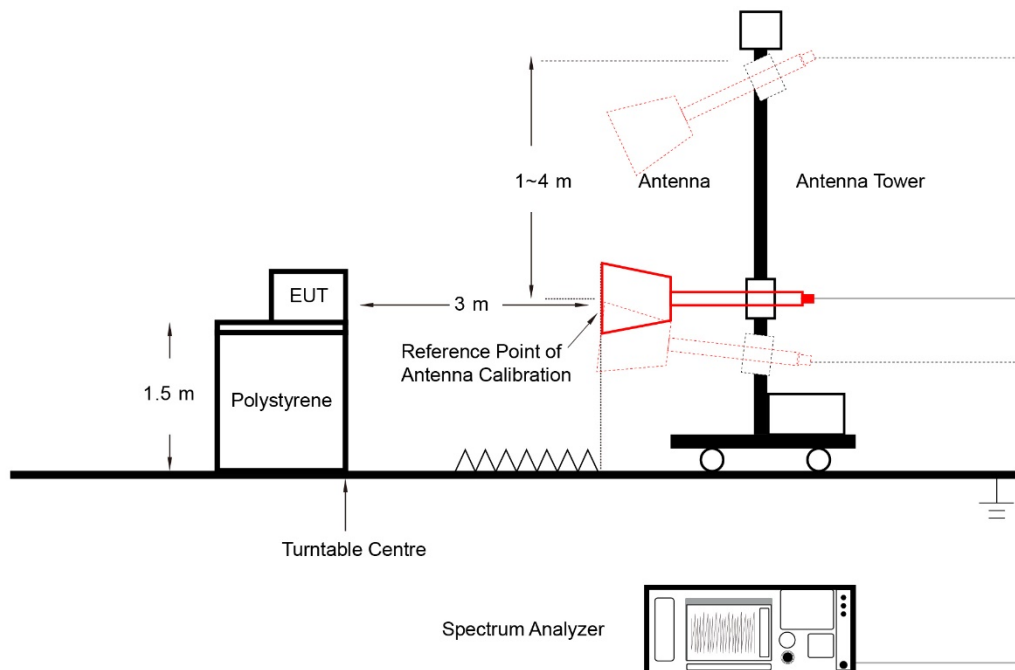
1. RBW = 1MHz
2. VBW $\geq 3 \times$ RBW
3. Sweep time $\geq 10 \times$ (number of points in sweep) $\times$ (transmission symbol period)
4. Detector = Peak
5. Trace mode = max hold
6. The trace was allowed to stabilize

5.2.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.2.5. Test Result

Refer to Appendix A.1.

5.3. End User Device Additional Requirement (CBSD Protocol) Measurement

5.3.1. Test Limit

End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by aCBSD, including the frequencies and power limits for their operation.

An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD

5.3.2. Test Procedure

KDB 940660 D01 v02, WINNF-TS-0122 V1.0.2

5.3.3. Test Setting

The EUT was connected via an RF cable to a certified CBSD (Sercomm Corp. FCC ID: P27-SCE4255W) and spectrum analyzer. The following procedure is performed by applying WINNF-TS-0122 CBRS CBSD Test Specification.

Step 1:

- a. Setup WINNF.PT.C.HBT.1 with 3570 ~ 3590MHz and power level at 6 dBm/MHz.
- b. Enable Smallcell service from EPC Manage Tool.
- c. Check EUT Tx frequency and power.
- d. Disable Smallcell service from EPC Manage Tool and check EUT stop transmission within 10s.

Step 2:

- a. Setup WINNF.PT.C.HBT.1 with 3670 ~ 3690MHz and power level at 11 dBm/MHz.
- b. Enable Smallcell service from EPC Manage Tool.
- c. Check EUT Tx frequency and power.
- d. Disable Smallcell service from EPC Manage Tool and check EUT stop transmission within 10s.

5.3.4. Test Result

Refer to Appendix A.2.

Appendix A - Test Result

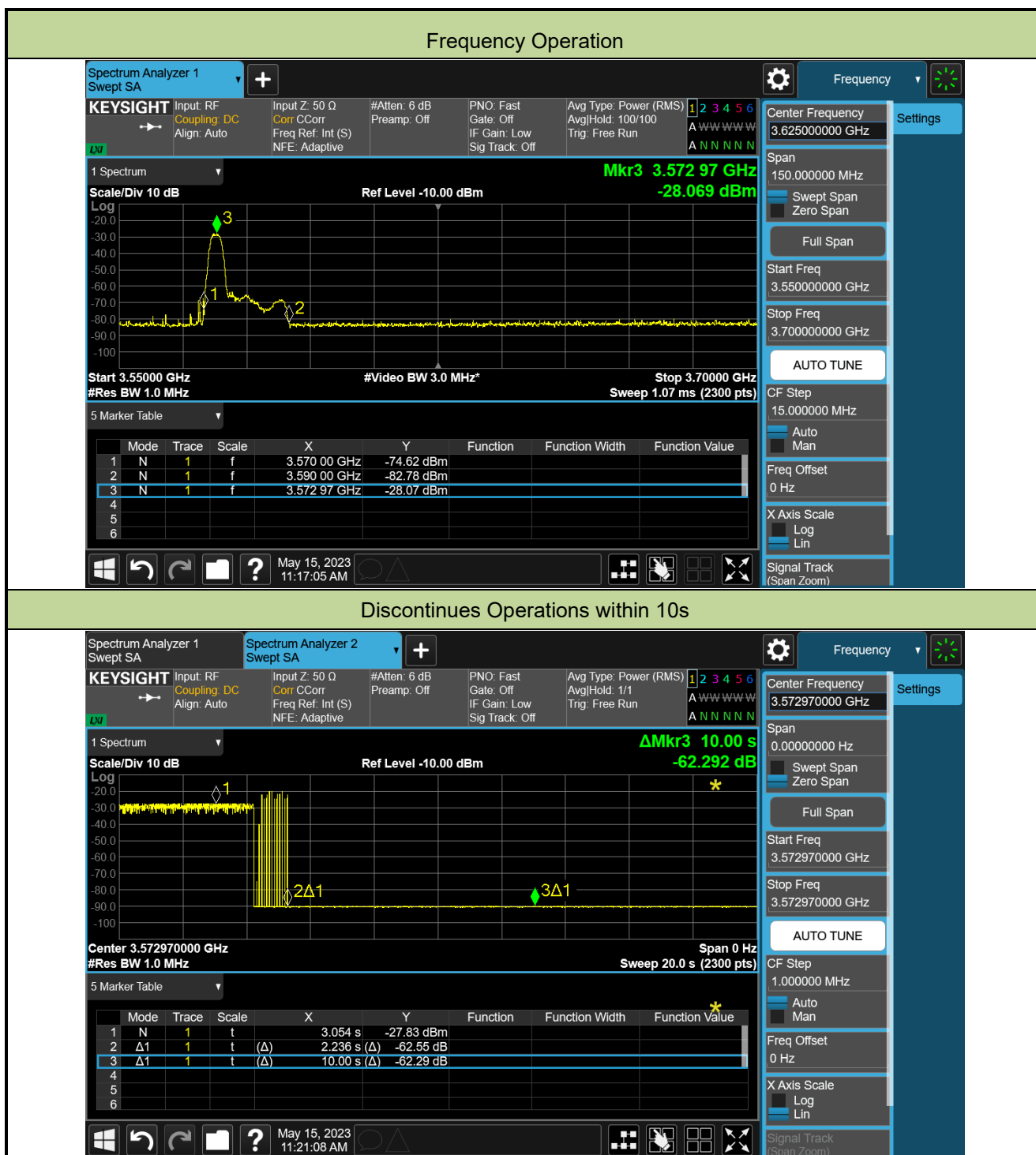
A.1 Radiated Spurious Emissions Test Result

Test Site	WZ-AC1	Test Engineer	Bob Zhang
Test Date	2023-05-12 ~ 2023-05-18	Test Band	LTE Band 48, 5MHz, 1RB

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Bottom Channel							
374.84	16.06	22.82	38.88	55.30	-16.42	Peak	Horizontal
526.64	16.50	25.36	41.86	55.30	-13.44	Peak	Horizontal
374.84	13.86	22.82	36.68	55.30	-18.62	Peak	Vertical
576.11	13.50	26.54	40.04	55.30	-15.26	Peak	Vertical
10163.00	33.48	13.85	47.33	55.30	-7.97	Peak	Horizontal
14302.50	31.52	19.22	50.74	55.30	-4.56	Peak	Horizontal
9296.00	31.05	13.80	44.85	55.30	-10.45	Peak	Vertical
14285.50	32.01	19.11	51.12	55.30	-4.18	Peak	Vertical
Middle Channel							
374.84	13.27	22.82	36.09	55.30	-19.21	Peak	Horizontal
526.64	16.66	25.36	42.02	55.30	-13.28	Peak	Horizontal
374.84	14.14	22.82	36.96	55.30	-18.34	Peak	Vertical
580.96	12.68	26.75	39.43	55.30	-15.87	Peak	Vertical
9126.00	32.25	13.05	45.30	55.30	-10.00	Peak	Horizontal
14030.50	32.65	19.10	51.75	55.30	-3.55	Peak	Horizontal
8633.00	33.07	12.25	45.32	55.30	-9.98	Peak	Vertical
12364.50	31.99	16.86	48.85	55.30	-6.45	Peak	Vertical
Top Channel							
374.84	12.93	22.82	35.75	55.30	-19.55	Peak	Horizontal
526.16	15.86	25.35	41.21	55.30	-14.09	Peak	Horizontal
374.84	16.56	22.82	39.38	55.30	-15.92	Peak	Vertical
523.25	18.78	25.29	44.07	55.30	-11.23	Peak	Vertical
9848.50	33.10	13.42	46.52	55.30	-8.78	Peak	Horizontal
14209.00	31.32	19.15	50.47	55.30	-4.83	Peak	Horizontal
10911.00	31.62	16.41	48.03	55.30	-7.27	Peak	Vertical
14362.00	31.19	19.61	50.80	55.30	-4.50	Peak	Vertical
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB).							

A.2 End User Device Additional Requirement (CBSD Protocol) Test Result

Test Site	WZ-SR6	Test Engineer	Larry Yan
Test Date	2023-05-15	Test Configuration	CBSD transmit at 3580MHz (20MHz BW), 6dBm/MHz

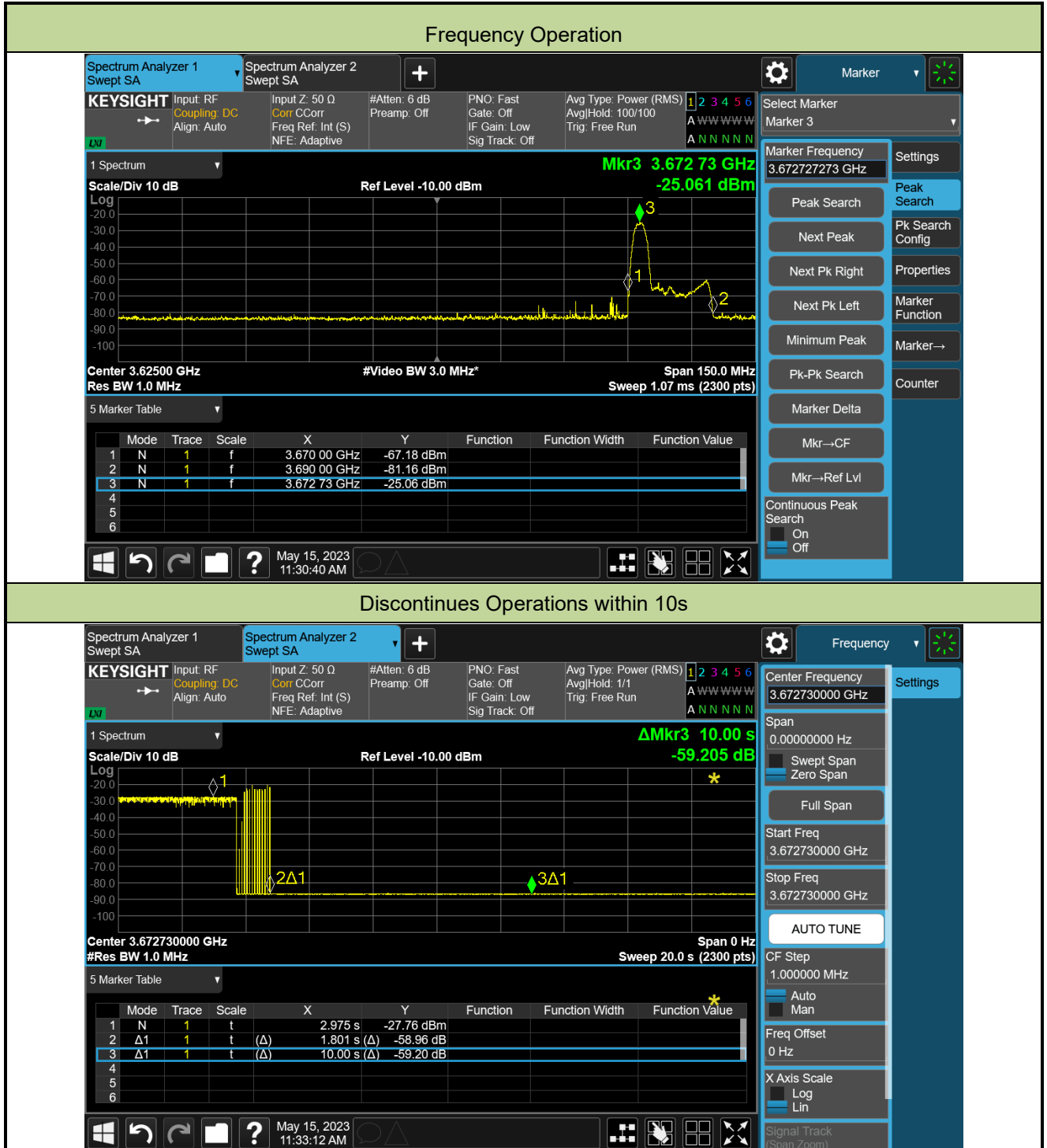


Marker 1: CBSD sends instructions to discontinue LTE operations.

Marker 2: EUT discontinues operation.

Marker 3: 10 seconds elapsed time from CBSD sending instructions to EUT.

Test Site	WZ-SR6	Test Engineer	Larry Yan
Test Date	2023-05-15	Test Configuration	CBSD transmit at 3680MHz (20MHz BW), 11dBm/MHz



Marker 1: CBSD sends instructions to discontinue LTE operations.

Marker 2: EUT discontinues operation.

Marker 3: 10 seconds elapsed time from CBSD sending instructions to EUT.

Appendix B - Test Setup Photograph

Refer to “2305RSU019-UT” file.

Appendix C - EUT Photograph

Refer to “2305RSU019-UE” file.

The End