



## RF MEASUREMENT REPORT

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**FCC ID:** 2A4JS80203900  
**Application:** Xtel Wireless ApS  
**Product:** XT2039  
**Model No.:** XT2039  
**Brand Name:** Xtellio Gateway  
**FCC Rule Part(s):** Part 24 (E), 27  
**Test Date:** March 15 ~ 27, 2022

**Reviewed By:**

\_\_\_\_\_  
Sunny Sun

**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
2203RSU035-U2	Rev. 01	Initial Report	2022-10-20	Valid

## CONTENTS

Description	Page
<b>1. General Information</b> .....	<b>4</b>
1.1. Applicant.....	4
1.2. Manufacture.....	4
1.3. Testing Facility.....	4
1.4. Product Information.....	5
1.5. Product Specification under Test.....	5
1.6. EIRP and Emission Designator.....	6
1.7. Test Methodology.....	6
1.8. Device Capabilities.....	6
1.9. Configuration of Tested System.....	7
1.10. Test Environment Condition.....	7
<b>2. Test Equipment Calibration Data</b> .....	<b>8</b>
<b>3. Measurement Uncertainty</b> .....	<b>9</b>
3.1. Decision Rules.....	9
3.2. Measurement Uncertainty.....	9
<b>4. Test Result</b> .....	<b>10</b>
4.1. Summary.....	10
4.2. Radiated Spurious Emissions Measurement.....	11
4.2.1. Test Limit.....	11
4.2.2. Test Procedure.....	11
4.2.3. Test Setting.....	11
4.2.4. Test Setup.....	12
4.2.5. Test Result.....	12
<b>Appendix A - Test Result</b> .....	<b>13</b>
A.1 Radiated Spurious Emissions Test Result.....	13
<b>Appendix B - Test Setup Photograph</b> .....	<b>19</b>
<b>Appendix C - EUT Photograph</b> .....	<b>20</b>

## 1. General Information

### 1.1. Applicant

Xtel Wireless ApS  
 Gasvaerksvej 32E, 9000, Aalborg, Denmark.

### 1.2. Manufacture

Xtel Wireless ApS  
 Gasvaerksvej 32E, 9000, Aalborg, Denmark.

### 1.3. Testing Facility

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

#### 1.4. Product Information

Product Name	XT2039
Model No.	XT2039
Brand Name	Xtellio Gateway
Bluetooth Version	V4.2 single mode, BLE only
Cat-M Single Band	Band 2, 4, 12, 66
NB-IoT Single Band	Band 2, 4, 12, 66
Operating Temperature	-30 ~ 85 °C
Supply Voltage:	By Battery
Integrated Modular Information (Cellular Module)	
Model No.	BG77
FCC ID	XMR201912BG77
Brand Name	Quectel
Accessories	
Lithium Battery	Model: CR17500EP Output: 3.0V
Remark:	
<ol style="list-style-type: none"> <li>1. This device is based on Quectel "BG77" module to assessing the radiated spurious emission.</li> <li>2. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.</li> </ol>	

#### 1.5. Product Specification under Test

3GPP Specification	
FDD Tx Frequency Range	Band 2: 1850 ~ 1910 MHz; Band 4: 1710 ~ 1755 MHz Band 12: 699 ~ 716 MHz; Band 66: 1710 ~ 1780 MHz
FDD Rx Frequency Range	Band 2: 1930 ~ 1990 MHz; Band 4: 2110 ~ 2155 MHz Band 12: 729 ~ 746 MHz; Band 66: 2110 ~ 2180 MHz
Modulation	NB-IoT: BPSK, QPSK Cat-M: QPSK, 16QAM
Antenna Information	PCB Antenna Band 2: 4.4dBi; Band 4: 4.4dBi; Band 12: 1.3dBi; Band 66: 4.4dBi

### 1.6. EIRP and Emission Designator

Technology	Frequency Band (MHz)	Max Conducted Power (W)	Antenna Gain (dBi)	Max EIRP (W)	Emission Designator
Cat-M Band 2	1850 ~ 1910	0.142	4.4	0.3911	1M13G7D
		0.141	4.4	0.3883	961KW7D
Cat-M Band 4	1710 ~ 1755	0.145	4.4	0.3994	1M13G7D
		0.142	4.4	0.3911	962KW7D
Cat-M Band 66	1710 ~ 1780	0.135	4.4	0.3718	1M13G7D
		0.133	4.4	0.3663	959KW7D
Cat-M Band 12	699 ~ 716	0.137	1.3	0.1848	1M12G7D
		0.137	1.3	0.1848	953KW7D
NB-IoT Band 2	1850 ~ 1910	0.138	4.4	0.3801	185KG7D
NB-IoT Band 4	1710 ~ 1755	0.145	4.4	0.3994	185KG7D
NB-IoT Band 66	1710 ~ 1780	0.146	4.4	0.4021	184KG7D
NB-IoT Band 12	699 ~ 716	0.143	1.3	0.1929	185KG7D

Remark: The Max conducted power and emission designator extracted from FCC ID "XMR201912BG77" grant

### 1.7. 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 CFR 47 Part 24, Part 27
- FCC KDB 412172 D01 v01r01: Determining ERP and EIRP

### 1.8. Device Capabilities

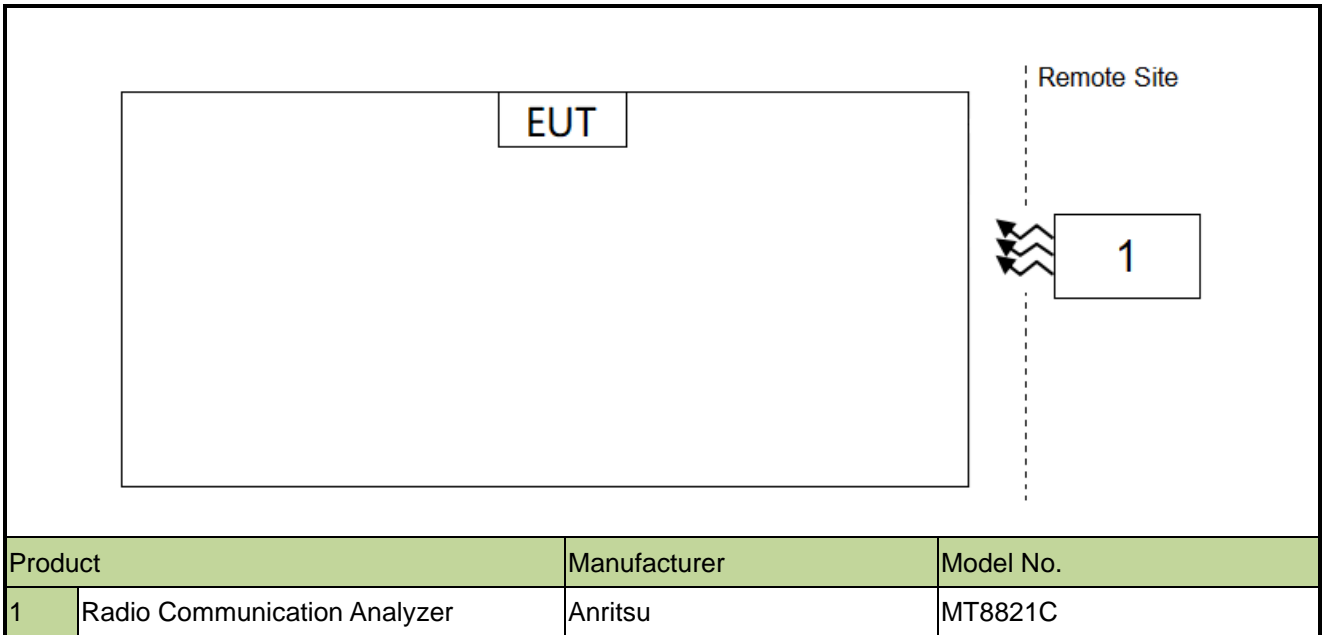
This device contains the following capabilities:

Working on LTE Band 2, 4, 12, 66; Moviot NB-IoT/LTE-M gateway.

LTE Band 66 (1710 ~ 1780 MHz) overlaps the entire frequency range of LTE Band 4 (1710 ~ 1755 MHz).

Therefore, test data provided in this report covers Band 4 as well as Band 66.

### 1.9. Configuration of Tested System



### 1.10. Test Environment Condition

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

## 2. Test Equipment Calibration Dtae

### Radiated Emission (WZ-AC2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2022/5/24
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2022/10/28
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2022/6/24
Thermohygrometer	Mingle	ETH529	MRTSUE06170	1 year	2022/12/1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2022/10/21
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2022/11/12
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2022/4/29
Horn Antenna	ETS	3117	MRTSUE06257	1 year	2022/9/25
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2022/12/1
Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2023/1/13
Preamplifier	EMCI	EMC051845SE	MRTSUE06987	1 year	2022/9/9
Thermohygrometer	testo	Testo 608-H1	MRTSUE11038	1 year	2022/11/11

Software	Version	Function
EMI Software	V3.0.0	EMI Test Software



### 3. Measurement Uncertainty

#### 3.1. 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.)

#### 3.2. 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% ( $U=2Uc(y)$ ):

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

## 4. Test Result

### 4.1. Summary

FCC Part Section(s)	Test Description	Test Condition	Verdict
2.1053, 24.238(a), 27.53 (h)(g)	Spurious Emissions (Band 2, 4/66, 12)	Radiated	Pass

**Notes:**

- 1) 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.
- 2) For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.

## **4.2. Radiated Spurious Emissions Measurement**

### **4.2.1. Test Limit**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to -13dBm.

$E$  (dB $\mu$ V/m) = EIRP (dBm) - 20 log D + 104.8; where D is the measurement distance in meters. The emission limit equal to 82.3dB $\mu$ V/m.

### **4.2.2. Test Procedure**

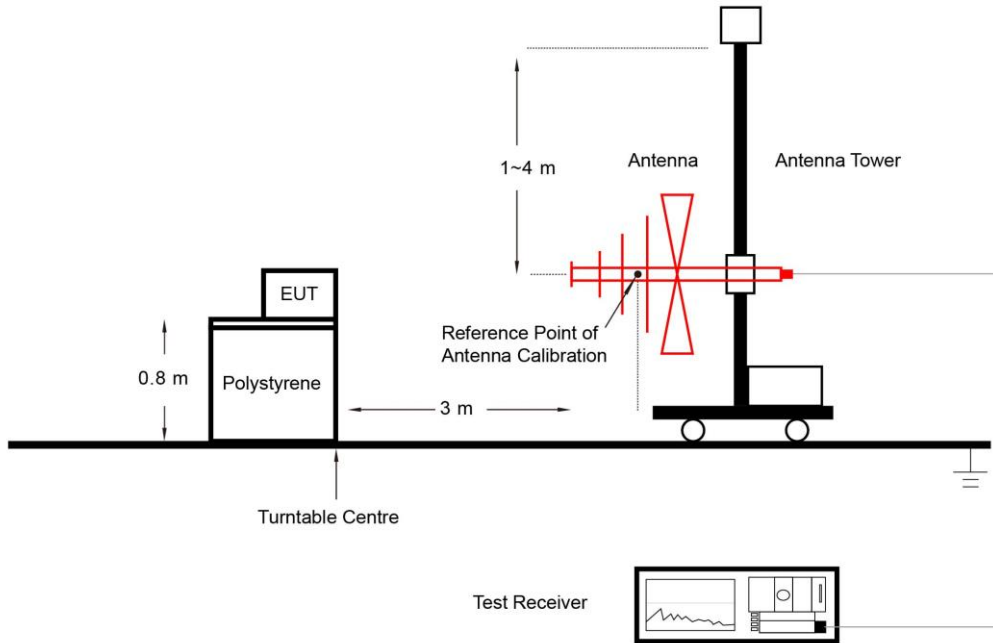
ANSI C63.26-2015 - Section 5.2.7 & 5.5

### **4.2.3. Test Setting**

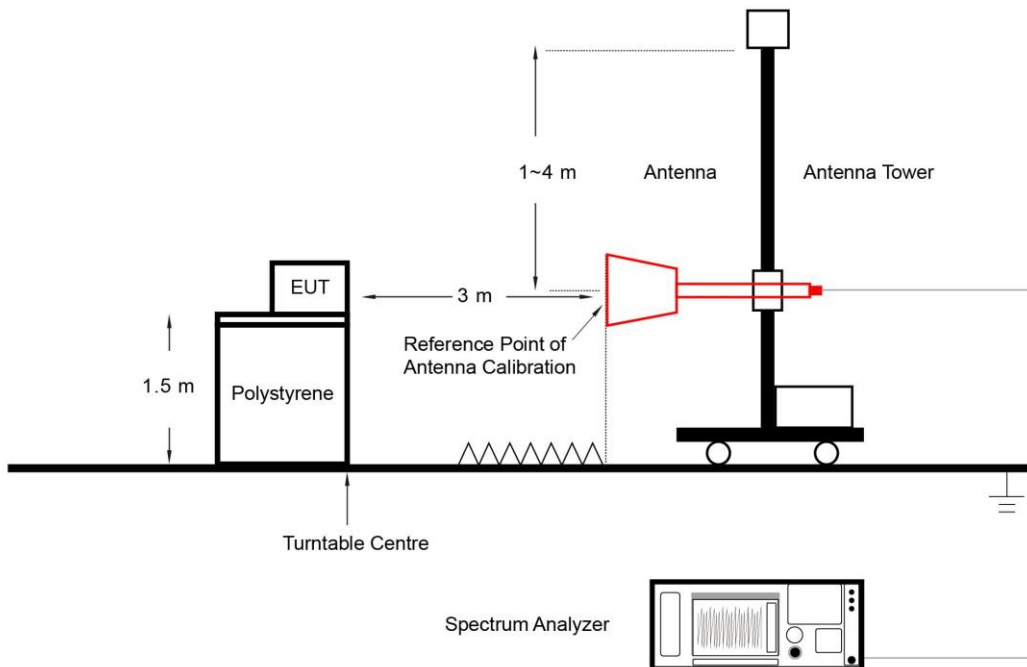
1. RBW = 1MHz
2. VBW  $\geq$  3\*RBW
3. Sweep time  $\geq$  10  $\times$  (number of points in sweep)  $\times$  (transmission symbol period)
4. Detector = Peak
5. Trace mode = max hold
6. The trace was allowed to stabilize

### 4.2.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



### 4.2.5. Test Result

Refer to Appendix A.1.

## Appendix A - Test Result

### A.1 Radiated Spurious Emissions Test Result

Test Site	WZ-AC2	Test Engineer	Cloud Guo
Test Date	2022/03/19 ~ 2022/03/30	Test Band	NB-IoT Band 2 1RB, QPSK

Frequency (MHz)	Reading Level (dB $\mu$ V)	Factor (dB/m)	Measure Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Polarization
Low Channel							
46.49	6.06	20.45	26.51	82.30	-55.79	Peak	Horizontal
617.34	4.53	27.42	31.95	82.30	-50.35	Peak	Horizontal
44.07	17.77	20.35	38.12	82.30	-44.18	Peak	Vertical
58.13	12.14	19.70	31.84	82.30	-50.46	Peak	Vertical
3703.00	42.87	-0.10	42.77	82.30	-39.53	Peak	Horizontal
5369.00	36.88	4.22	41.10	82.30	-41.20	Peak	Horizontal
3703.00	44.71	-0.10	44.61	82.30	-37.69	Peak	Vertical
8641.50	34.83	13.10	47.93	82.30	-34.37	Peak	Vertical

Note: Measure Level (dB $\mu$ V/m) = Reading Level (dB $\mu$ V) + Factor (dB/m).

Test Site	WZ-AC2	Test Engineer	Cloud Guo
Test Date	2022/03/19 ~ 2022/03/30	Test Band	NB-IoT Band 4/66, 1RB, QPSK

Frequency (MHz)	Reading Level (dB $\mu$ V)	Factor (dB/m)	Measure Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Polarization
Low Channel							
46.98	4.73	20.47	25.20	82.30	-57.10	Peak	Horizontal
861.29	5.07	31.22	36.29	82.30	-46.01	Peak	Horizontal
44.07	16.45	20.35	36.80	82.30	-45.50	Peak	Vertical
57.65	12.57	19.79	32.36	82.30	-49.94	Peak	Vertical
5012.00	36.82	3.82	40.64	82.30	-41.66	Peak	Horizontal
9015.50	33.87	14.03	47.90	82.30	-34.40	Peak	Horizontal
7783.00	34.82	11.52	46.34	82.30	-35.96	Peak	Vertical
11514.50	33.47	17.93	51.40	82.30	-30.90	Peak	Vertical

Note: Measure Level (dB $\mu$ V/m) = Reading Level (dB $\mu$ V) + Factor (dB/m).

Test Site	WZ-AC2	Test Engineer	Cloud Guo
Test Date	2022/03/19 ~ 2022/03/30	Test Band	NB-IoT Band 12, 1RB, QPSK

Frequency (MHz)	Reading Level (dB $\mu$ V)	Factor (dB/m)	Measure Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Polarization
Low Channel							
46.98	8.24	20.47	28.71	82.30	-53.59	Peak	Horizontal
242.43	3.41	19.70	23.11	82.30	-59.19	Peak	Horizontal
46.01	15.39	20.43	35.82	82.30	-46.48	Peak	Vertical
57.65	11.18	19.79	30.97	82.30	-51.33	Peak	Vertical
1399.50	52.40	-4.54	47.86	82.30	-34.44	Peak	Horizontal
2096.50	45.56	-2.60	42.96	82.30	-39.34	Peak	Horizontal
1399.50	52.78	-4.54	48.24	82.30	-34.06	Peak	Vertical
2096.50	49.53	-2.60	46.93	82.30	-35.37	Peak	Vertical

Note: Measure Level (dB $\mu$ V/m) = Reading Level (dB $\mu$ V) + Factor (dB/m).

Test Site	WZ-AC2	Test Engineer	Cloud Guo
Test Date	2022/03/19 ~ 2022/03/30	Test Band	Cat M Band 2 1RB, QPSK

Frequency (MHz)	Reading Level (dB $\mu$ V)	Factor (dB/m)	Measure Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Polarization
Low Channel							
46.98	5.46	20.47	25.93	82.30	-56.37	Peak	Horizontal
107.60	2.91	18.32	21.23	82.30	-61.07	Peak	Horizontal
44.07	16.74	20.35	37.09	82.30	-45.21	Peak	Vertical
54.25	11.95	20.22	32.17	82.30	-50.13	Peak	Vertical
3703.00	48.48	-0.10	48.38	82.30	-33.92	Peak	Horizontal
5547.50	46.78	4.23	51.01	82.30	-31.29	Peak	Horizontal
3703.00	50.29	-0.10	50.19	82.30	-32.11	Peak	Vertical
5547.50	45.39	4.23	49.62	82.30	-32.68	Peak	Vertical

Note: Measure Level (dB $\mu$ V/m) = Reading Level (dB $\mu$ V) + Factor (dB/m).



Test Site	WZ-AC2	Test Engineer	Cloud Guo
Test Date	2022/03/19 ~ 2022/03/30	Test Band	Cat M Band 4/66, 1RB, QPSK

Frequency (MHz)	Reading Level (dB $\mu$ V)	Factor (dB/m)	Measure Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Polarization
Low Channel							
46.49	4.50	20.45	24.95	82.30	-57.35	Peak	Horizontal
102.27	2.28	18.51	20.79	82.30	-61.51	Peak	Horizontal
43.58	17.70	20.25	37.95	82.30	-44.35	Peak	Vertical
54.25	12.05	20.22	32.27	82.30	-50.03	Peak	Vertical
3422.50	60.71	-1.19	59.52	82.30	-22.78	Peak	Horizontal
6559.00	34.79	8.31	43.10	82.30	-39.20	Peak	Horizontal
3422.50	57.78	-1.19	56.59	82.30	-25.71	Peak	Vertical
7222.00	32.62	11.65	44.27	82.30	-38.03	Peak	Vertical

Note: Measure Level (dB $\mu$ V/m) = Reading Level (dB $\mu$ V) + Factor (dB/m).

Test Site	WZ-AC2	Test Engineer	Cloud Guo
Test Date	2022/03/19 ~ 2022/03/30	Test Band	Cat M Band 12, 1RB, QPSK

Frequency (MHz)	Reading Level (dB $\mu$ V)	Factor (dB/m)	Measure Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Polarization
Low Channel							
54.74	6.29	20.16	26.45	82.30	-55.85	Peak	Horizontal
929.68	11.32	31.43	42.75	82.30	-39.55	Peak	Horizontal
46.49	14.19	20.45	34.64	82.30	-47.66	Peak	Vertical
54.74	14.91	20.16	35.07	82.30	-47.23	Peak	Vertical
1399.50	68.02	-4.54	63.48	82.30	-18.82	Peak	Horizontal
2096.50	44.47	-2.60	41.87	82.30	-40.43	Peak	Horizontal
1399.50	67.64	-4.54	63.10	82.30	-19.20	Peak	Vertical
2096.50	43.20	-2.60	40.60	82.30	-41.70	Peak	Vertical

Note: Measure Level (dB $\mu$ V/m) = Reading Level (dB $\mu$ V) + Factor (dB/m).

## **Appendix B - Test Setup Photograph**

Refer to "2203RSU035-UT" file.

## Appendix C - EUT Photograph

Refer to "2203RSU035-UE" file.