



## RF MEASUREMENT REPORT

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**FCC ID:** P27-SSH5R0

**Applicant:** Sercomm Corporation

**Product:** Premium Door/Window Sensor, Door/Window Sensor

**Model No.:** SSHX5R0-29xxxxx, SSH5R0-29xxxxx  
(the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, a to z, "blank" or "-", for the marketing purpose)

**Brand Name:** ADT

**FCC Classification:** Unlicensed PCS Base Station

**FCC Rule Part(s):** FCC Part 15, Subpart D

**Result:** Complies

**Test Date:** 2022-05-27 ~ 2022-06-07

**Reviewed By:**

\_\_\_\_\_

**Approved By:**

\_\_\_\_\_



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 C63.17. 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
2205RSU060-U1	Rev. 01	Initial Report	2022-06-21	Valid

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### 1.1. Applicant

8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.

Sercomm Corporation

8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.

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

#### 1.4. Product Information

Product Name	Premium Door/Window Sensor, Door/Window Sensor
Model No.	SSHX5R0-29xxxxx, SSH5R0-29xxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, a to z, "blank" or "-", for the marketing purpose)
Brand Name.	ADT
Radio Specification	DECT
EUT Identification No.	SSHX5R0-29: 20220526Sample#05; SSH5R0-29: 20220526Sample#02
Antenna Information	Refer to section 1.7
Working Voltage	Battery CR2 (3.0Vdc)
Accessories	
Battery	Model: CR2 Output: 900mAh
Remark: <ol style="list-style-type: none"><li>1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.</li><li>2. The difference of models just marketing requirement, all of hardware and software are the same. We chose the Model SSHX5R0-29 and SSH5R0-29 to do RF testing.</li><li>3. The difference between SSHX5R0-29 and SSH5R0-29 is that SSHX5R0-29 has one G-sensor and IO expander more than SSH5R0-29. We chose SSHX5R0-29 to do all RF testing and SSH5R0-29 to do power and spurious emission.</li></ol>	

### 1.5. Radio Specification

Frequency Range	1921.536 ~ 1928.448MHz
Channel Number	5
Type of Modulation	GFSK

### 1.6. Working Frequencies

UPCS Channel	Frequency (MHz)
Highest Band Edge	1930.000
0 (Highest)	1928.448
1	1926.720
2	1924.992
3	1923.264
4 (Lowest)	1921.536
Lowest Band Edge	1920.000

### 1.7. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	T <sub>x</sub> Paths	Max Antenna Gain (dBi)
Monopole	1920 ~ 1930	1	2.17



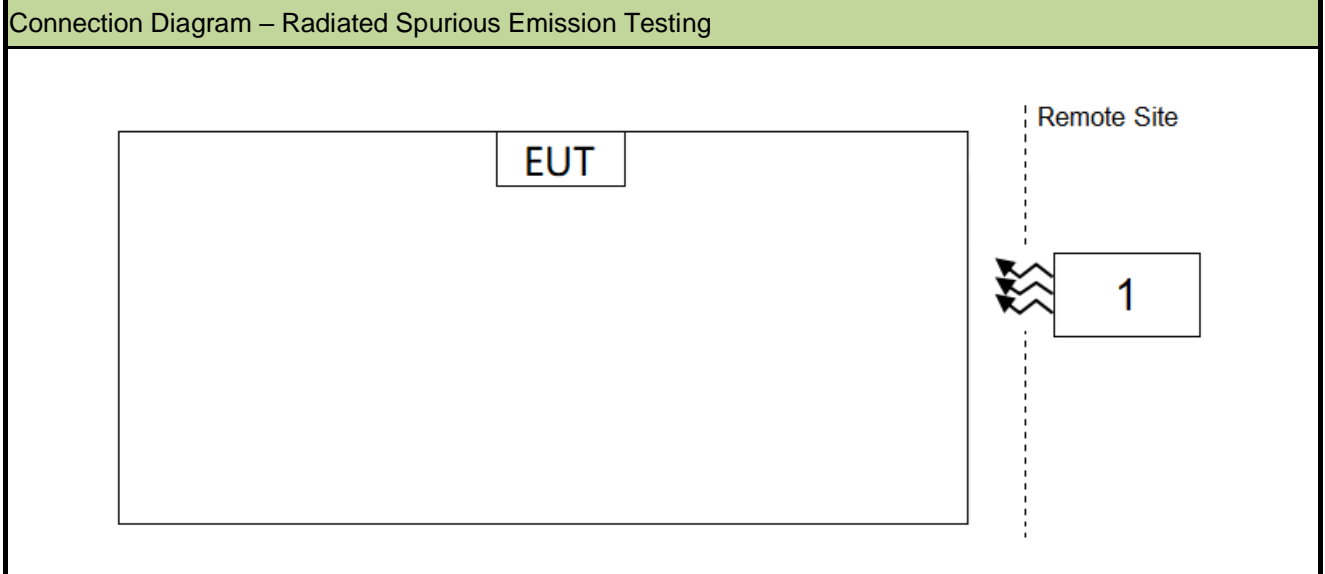
## 2. Test Configuration

### 2.1. Test Mode

Mode 1: SSHX5R0-29 transmit by DECT channel

Mode 2: SSH5R0-29 transmit by DECT channel

### 2.2. Test System Connection Diagram



### 2.3. Test System Details

Product		Manufacturer	Model No.
1	DECT Tester	RTX	RTX2012

### 2.4. Test Environment Condition

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

## 2.5. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

## 2.6. Automatic Discontinuation of Transmission

Does the EUT transmit Control and Signaling Information?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Does the EUT support Least Interfered Channel algorithm?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Type of EUT:	<input type="checkbox"/> Initiating Device	<input checked="" type="checkbox"/> Responding Device

The following tests simulate the reaction of the EUT in case of either absence of information to transmit or operational failure after a connection with the companion device is established.

Number	Test	EUT Reaction	Verdict
1	Power Removed from EUT	A	Pass
2	Switch off EUT	N/A	Pass
3	Power Removed from Companion Device	B	Pass
4	Switch off Companion Device	B	Pass

A - Connection breakdown, Cease of all transmissions

B - Connection breakdown, EUT transmits control and signaling information

C - Connection breakdown, Companion Device transmits control and signaling information

N/A - Not Applicable (EUT does not have on/off switch)

## Requirements, FCC 15.319(f)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude transmission of control and signaling information or use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

### 3. Antenna Requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antenna of the unit is **permanently attached**.
- There are no provisions for connection to an external antenna.

#### **Conclusion:**

The unit complies with the requirement of §15.203.

#### 4. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2023-05-20	WZ-AC2
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2022-06-24	WZ-AC2
Thermohygrometer	Mingle	ETH529	MRTSUE06170	1 year	2022-12-01	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2022-10-21	WZ-AC2
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2022-11-12	WZ-AC2
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2023-04-21	WZ-AC2
Thermohygrometer	testo	Testo 608-H1	MRTSUE11038	1 year	2022-11-11	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE06222	1 year	2022-10-10	WZ-SR4
Signal Generator	R&S	SMBV100A	MRTSUE06279	1 year	2023-04-06	WZ-SR4
DECT Tester	RTX	RTX2012	MRTSUE06408	1 year	2023-02-14	WZ-SR4
Signal Generator	Keysight	N5182B	MRTSUE06451	1 year	2022-06-24	WZ-SR4
Signal Generator	Keysight	N5182B	MRTSUE06993	1 year	2022-09-10	WZ-SR4
Signal Generator	R&S	SMU200A	MRTSUE06490	1 year	2023-02-14	WZ-SR4
Directional Coupler	narda	4226-10	MRTSUE06563	1 year	2022-10-28	WZ-SR4
Attenuator	MVE	MVE2213	MRTSUE11085	1 year	2023-06-09	WZ-SR4
Temperature Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2022-10-10	WZ-TR3
Thermohygrometer	testo	608-H1	MRTSUE06401	1 year	2022-06-28	WZ-TR3
Signal Analyzer	Keysight	N9010B	MRTSUE06457	1 year	2022-06-24	WZ-TR3

Software	Version	Function
EMI V3	V 3.0.0	EMI Test Software
Controller_MF 7802	1.02	RE Antenna&turntable
RTX2012	V 2.08.17	DECT

## 5. 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  $k = 2$ .

<b>AC Conducted Emission Measurement</b>
Measurement Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
<b>Radiated Disturbance</b>
Measurement Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): Horizontal: 30MHz~300MHz: 5.04dB 300MHz~1GHz: 4.95dB 1GHz~40GHz: 6.40dB Vertical: 30MHz~300MHz: 5.24dB 300MHz~1GHz: 6.03dB 1GHz~40GHz: 6.40dB
<b>Spurious Emissions, Conducted</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 0.78dB
<b>Output Power</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 1.13dB
<b>Power Spectrum Density</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 1.15dB
<b>Occupied Bandwidth</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 0.28%

## 6. Test Result

### 6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.319(b)	Digital Modulation Techniques	Declared	Pass
15.19(a)(3)	Labeling requirements		Pass
15.319(f)	Automatic discontinuation of transmission	Conducted	Pass
15.317, 15.203	Antenna Requirement	Declared	Pass
15.315	AC Power Line Conducted Emission	Line Conducted	N/A
15.323(a)	Emission Bandwidth	Conducted	Pass
15.319(c)	Peak Transmit Power		Pass
15.319(d)	Power Spectral Density		Pass
15.323(d)	In-band emissions		Pass
15.323(d)	Out-of-band emissions	Conducted & Radiated	Pass
15.323(e)	Frame Repetition Stability and period and Jitter	Conducted	Pass
15.323(f)	Carrier frequency stability		Pass
15.323(c1, c2, c3, c4)	Listen Before Transmit (LBT)		Pass
15.323(c5)	Least Interfered Channel (LIC)		Pass
15.323(c6)	Random Waiting		N/A
15.323(c7)	Monitoring Requirements		Pass
15.323(c8)	Monitoring Antenna	Declared	Pass
15.323(c9)	Monitoring Threshold Relaxation	Conducted	N/A
15.323(c10)	Duplex System LBT		N/A
15.323(c11)	Co-Located Device LBT		N/A
15.323(c12)	Fair Access	Declared	N/A
<p>Remark:</p> <ol style="list-style-type: none"> <li>“N/A” means that this item is not applicable, and the detail information refer to relevant section.</li> <li>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.</li> </ol>			

## 6.2. AC Power Line Conducted Measurement Emissions

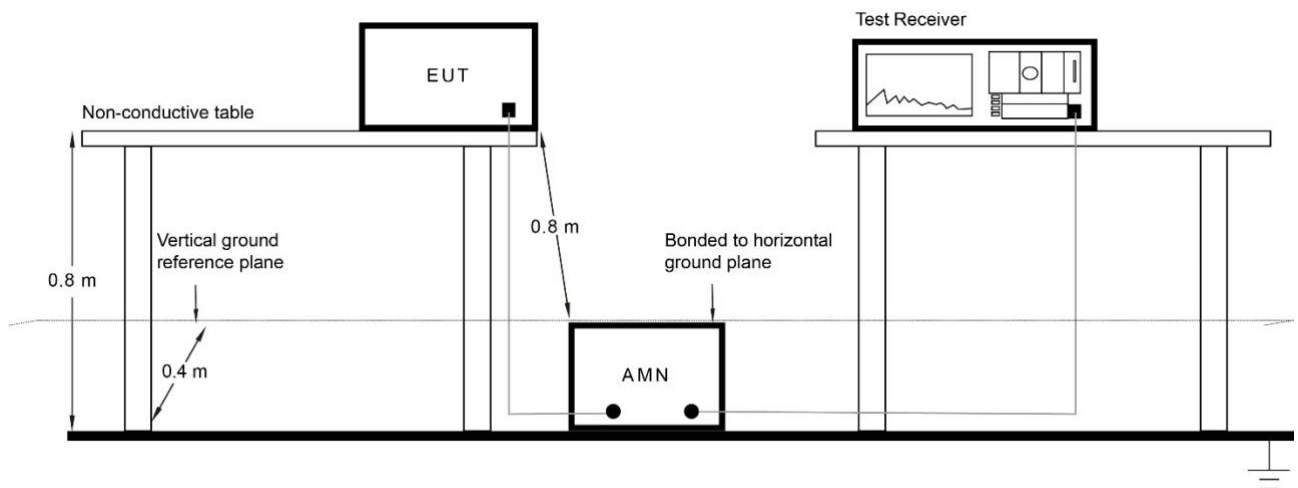
### 6.2.1. Test Limit

FCC Part 15.207 Limits		
Frequency (MHz)	QP (dB $\mu$ V)	AV (dB $\mu$ V)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

### 6.2.2. Test Setup



### 6.2.3. Test Result

This sample is powered by batteries, so this item is not applicable.

### 6.3. Emission Bandwidth Measurement

#### 6.3.1. Test Limit

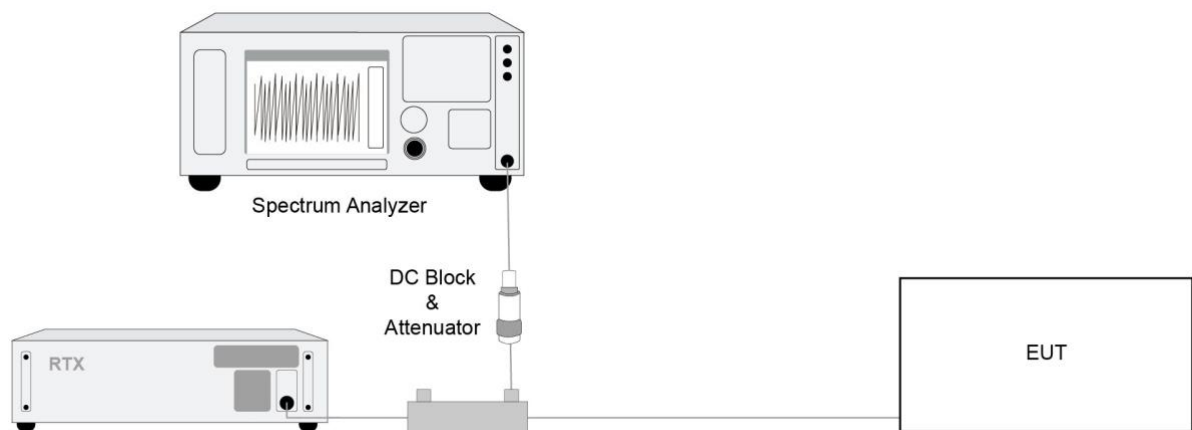
The 26 dB Bandwidth B shall be larger than 50 kHz and less than 2.5MHz.

No requirement for 6 dB and 12 dB Bandwidth. These values are only used for testing Monitoring Bandwidth if the Simple Compliance test fails (ANSI C63.17, clause 7.4).

#### 6.3.2. Test Procedure used

ANSI C63.17, Clause 6.1.3

#### 6.3.3. Test Setup





### 6.3.4. Test Result

Test Site	WZ-SR4	Test Engineer	Dandy Li
Test Date	2022/06/02	Test Mode	Mode 1

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Result
04	1921.536	1.400	Pass
02	1924.992	1.439	Pass
00	1928.448	1.433	Pass



## 6.4. Peak Power Output

### 6.4.1. Test Limit

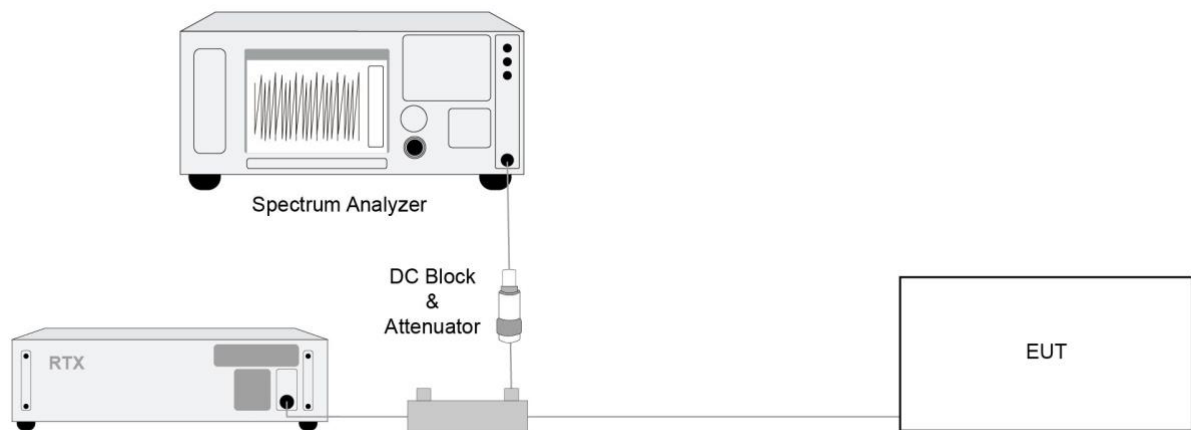
Peak transmit power shall not exceed 100 microwatts multiplied by the square root of the emission bandwidth in Hertz.

The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3dBi.

### 6.4.2. Test Procedure Used

ANSI C63.17, Clause 6.1.2

### 6.4.3. Test Setup



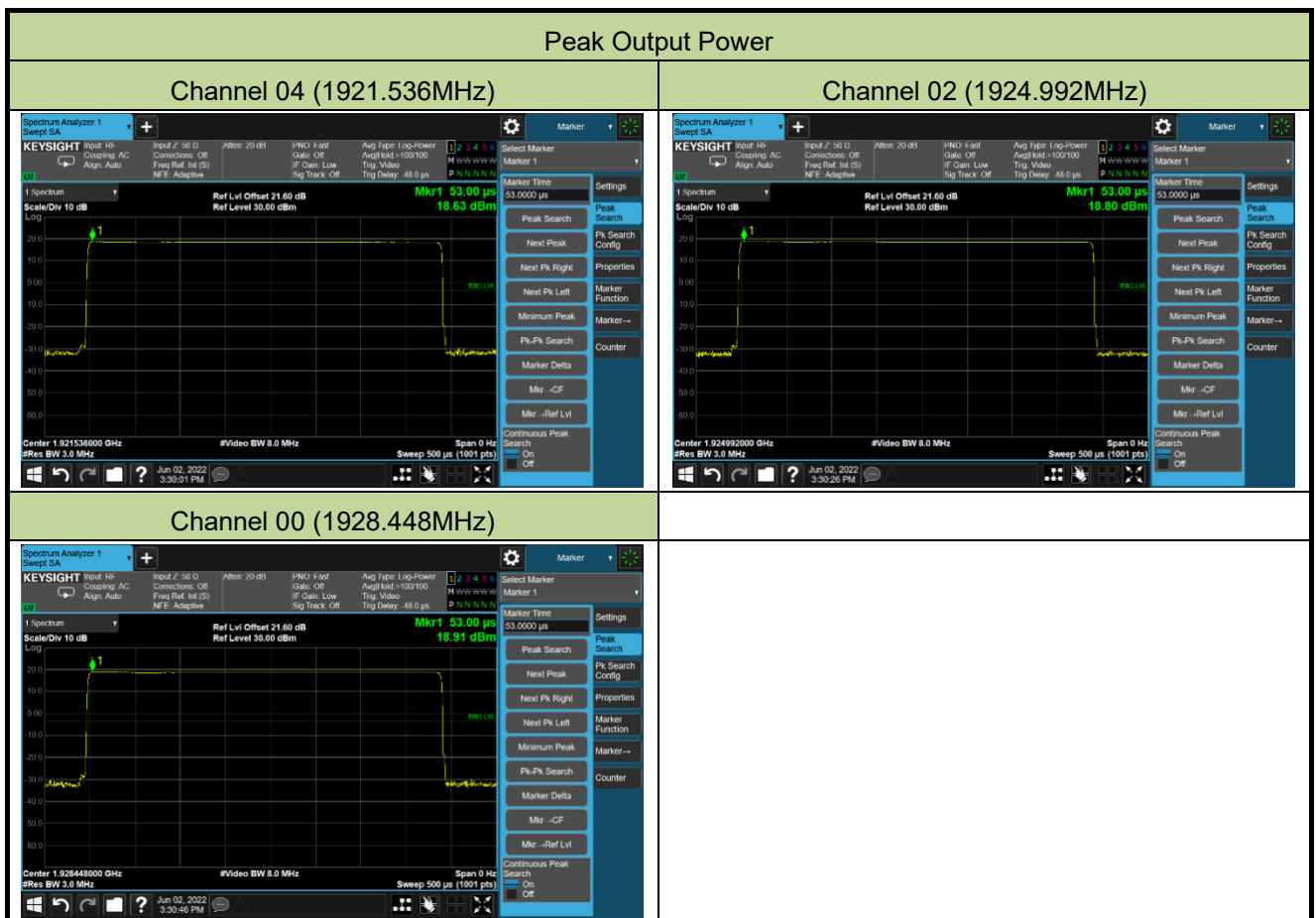
#### 6.4.4. Test Result

Test Site	WZ-SR4	Test Engineer	Dandy Li
Test Date	2022/06/02	Test Mode	Mode 1

Channel No.	Frequency (MHz)	Maximum Conducted Output Power (dBm)	Limit (dBm)	Result
04	1921.536	18.63	≤ 20.73	Pass
02	1924.992	18.80	≤ 20.73	Pass
00	1928.448	18.91	≤ 20.73	Pass

Note: The min EBW = 1400000Hz

Peak Transmit Power Limit =  $10 \cdot \log(100\mu\text{W} \times (\text{EBW})^{1/2} \div 1000) = 20.73\text{dBm}$ , Antenna Gain=2.17dBi < 3dBi

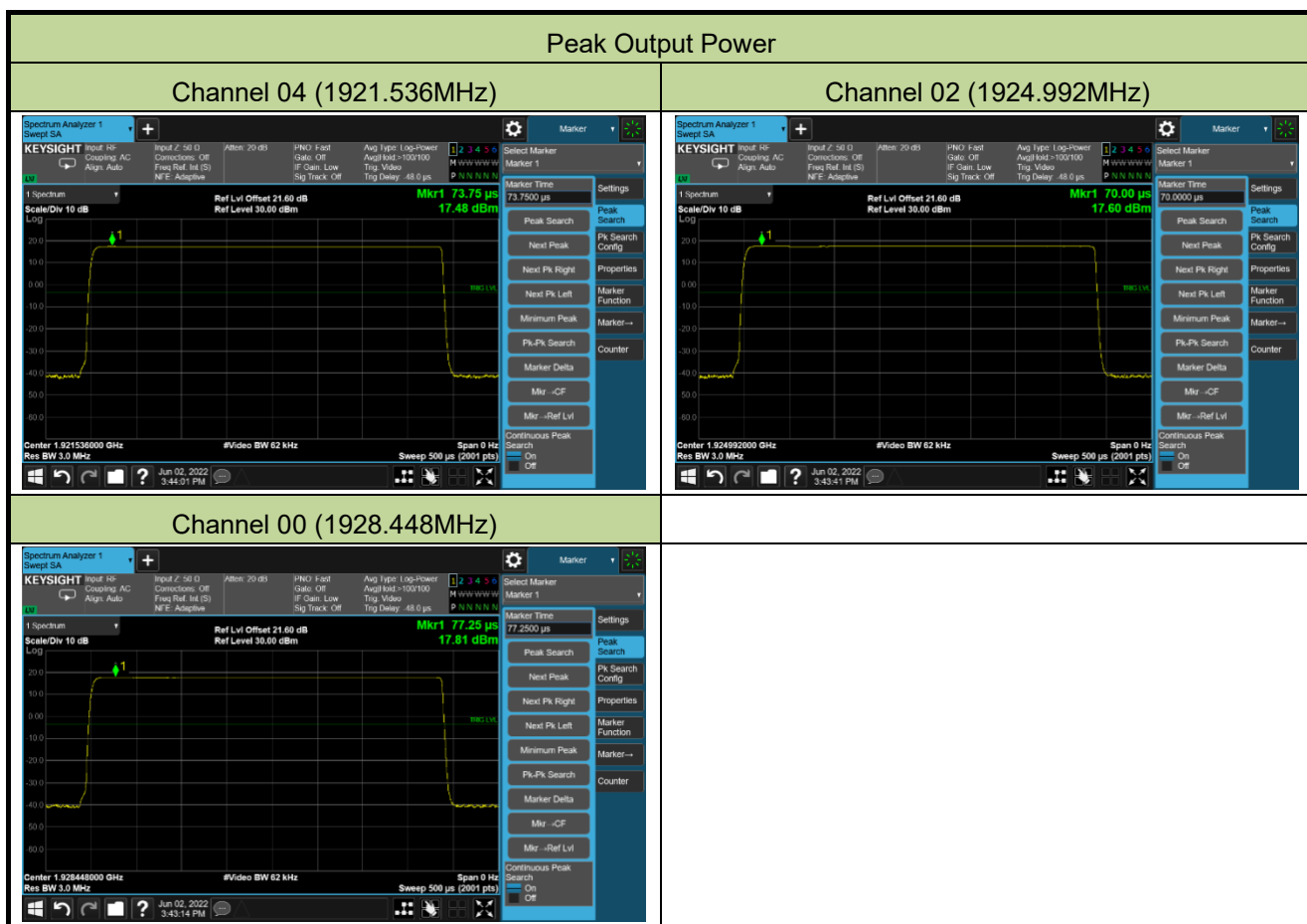


Test Site	WZ-SR4	Test Engineer	Dandy Li
Test Date	2022/06/02	Test Mode	Mode 2

Channel No.	Frequency (MHz)	Maximum Conducted Output Power (dBm)	Limit (dBm)	Result
04	1921.536	17.48	≤ 20.73	Pass
02	1924.992	17.60	≤ 20.73	Pass
00	1928.448	17.81	≤ 20.73	Pass

Note: The min EBW = 1400000Hz

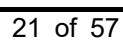
Peak Transmit Power Limit =  $10 \cdot \log(100\mu\text{W} \times (\text{EBW})^{1/2} \div 1000) = 20.73\text{dBm}$ , Antenna Gain=2.17dBi < 3dBi



### 6.5.1. Test Limit

### 6.5.2. Test Procedure Used

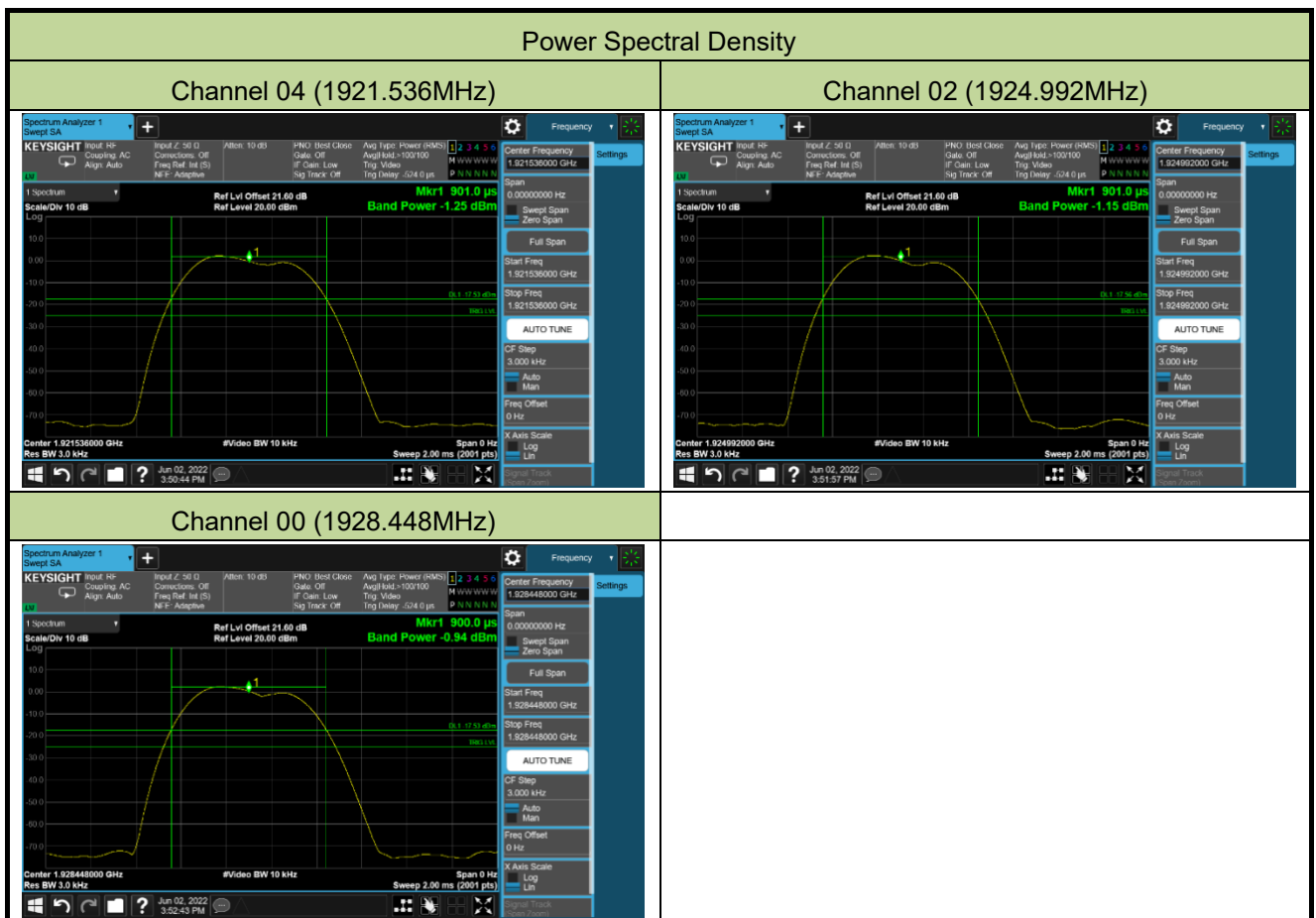
### 6.5.3. Test Setup



### 6.5.4. Test Result

Test Site	WZ-SR4	Test Engineer	Dandy Li
Test Date	2022/06/02	Test Mode	Mode 1

Channel No.	Frequency (MHz)	Measured PSD (dBm / 3kHz)	Measured PSD (mW / 3kHz)	Limit (mW / 3kHz)	Result
04	1921.536	-1.25	0.75	$\leq 3.00$	Pass
02	1924.992	-1.15	0.77	$\leq 3.00$	Pass
00	1928.448	-0.94	0.81	$\leq 3.00$	Pass



## 6.6. In-Band Unwanted Emissions

### 6.6.1. Test Limit

B < f2\_2B: less than or equal to 30 dB below maximum permitted peak power level

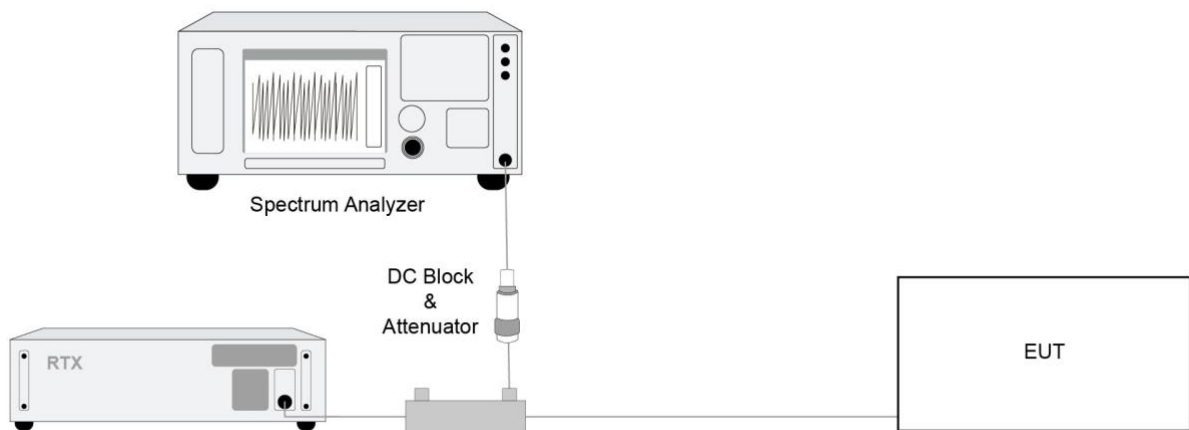
2B < f2\_3B: less than or equal to 50 dB below maximum permitted peak power level

3B < f2\_UCS Band Edge: less than or equal to 60 dB below maximum permitted peak power level.

### 6.6.2. Test Procedure Used

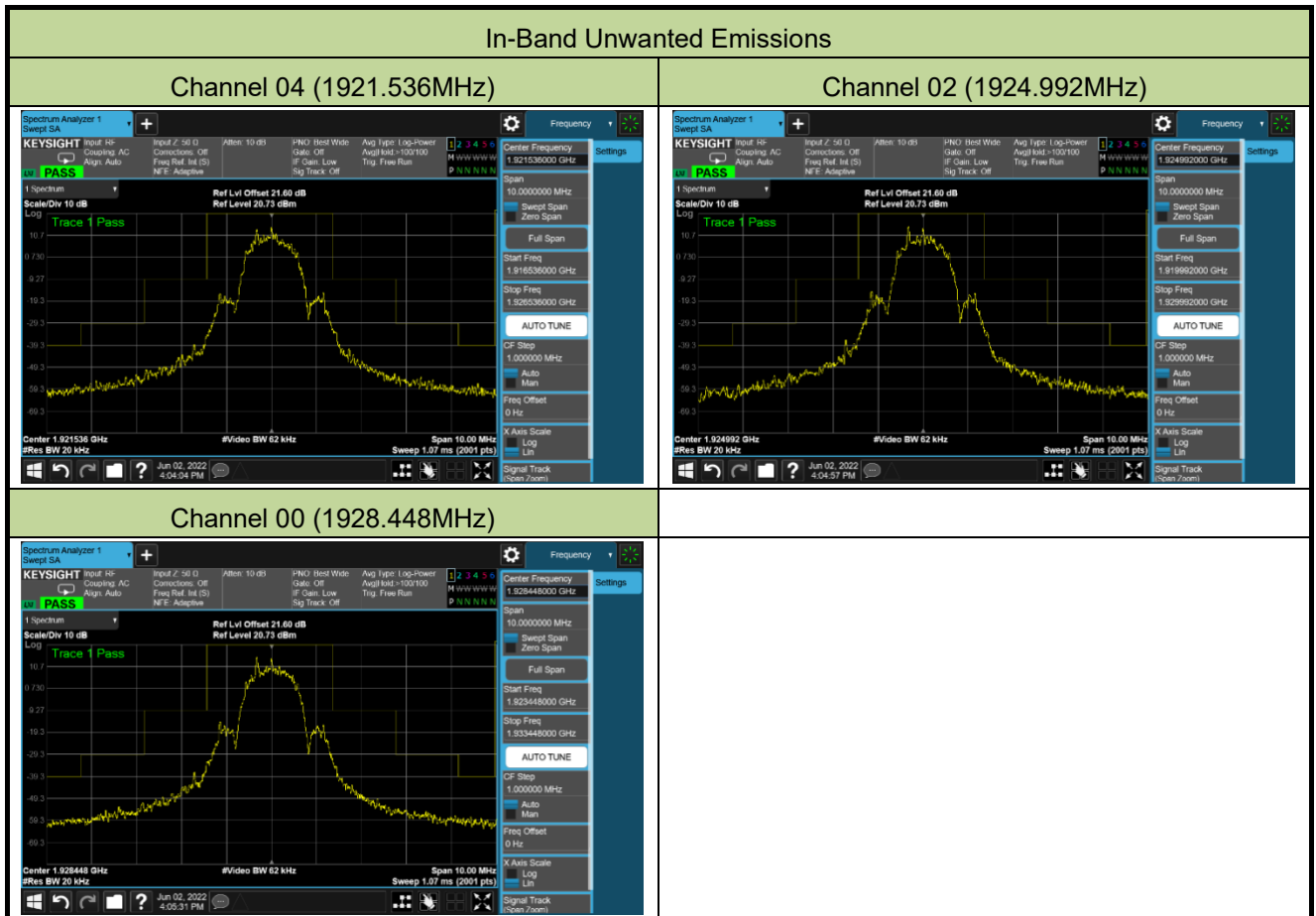
ANSI C63.17, Clause 6.1.6.1

### 6.6.3. Test Setup



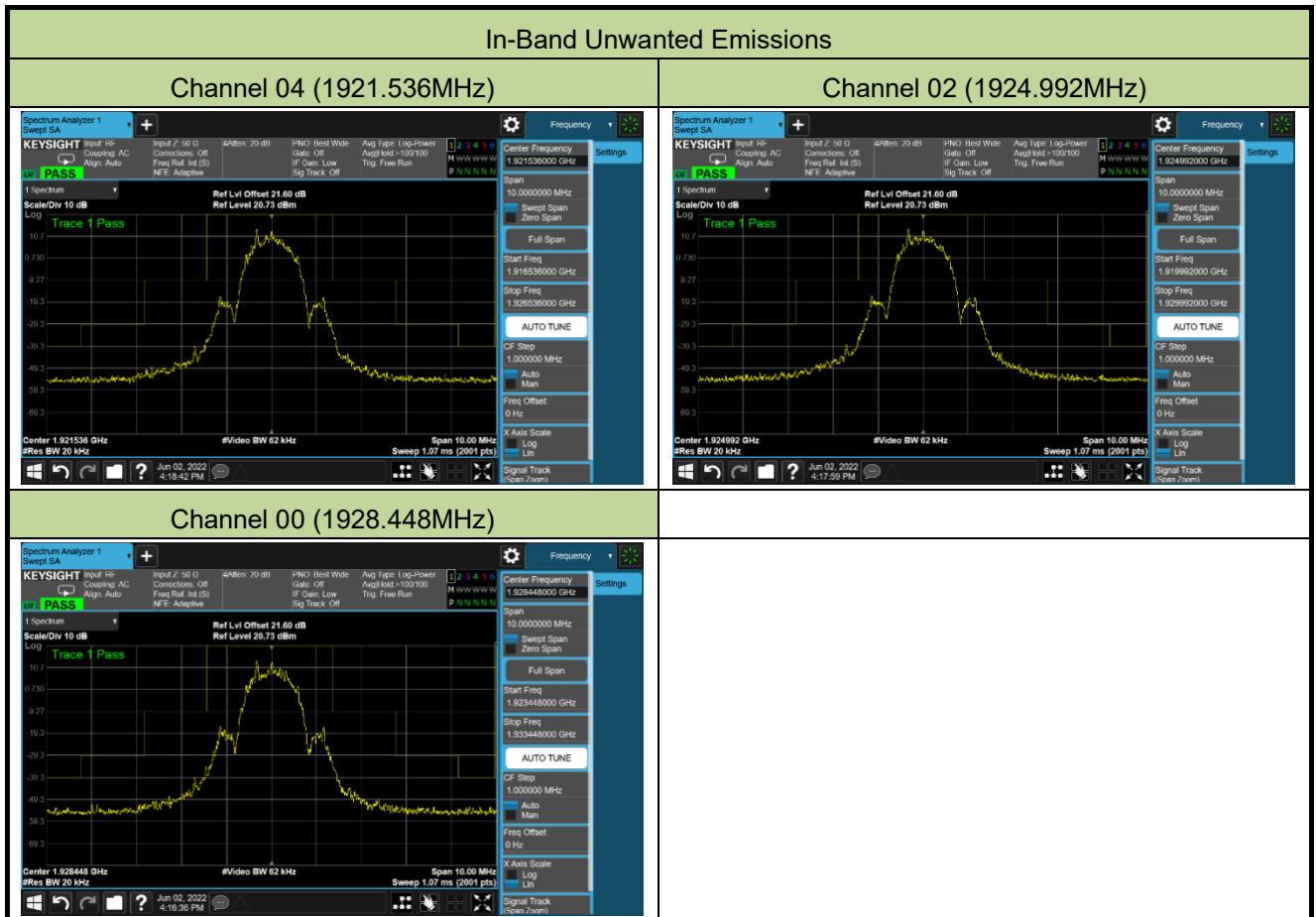
### 6.6.4. Test Result

Test Site	WZ-SR4	Test Engineer	Dandy Li
Test Date	2022/06/02	Test Mode	Mode 1





Test Site	WZ-SR4	Test Engineer	Dandy Li
Test Date	2022/06/02	Test Mode	Mode 2



## 6.7. Out-of-Band Emissions, Conducted

### 6.7.1. Test Limit

$f \leq 1.25$  MHz outside UPCS band:  $\leq -9.5$ dBm

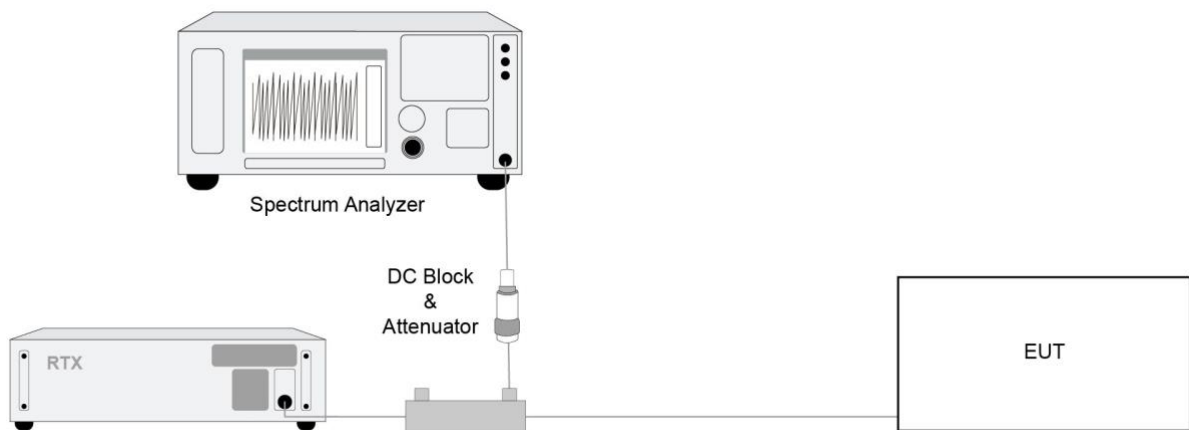
$1.25$  MHz  $\leq f \leq 2.5$  MHz outside UPCS band:  $\leq -29.5$ dBm

$f \geq 2.5$  MHz outside UPCS band:  $\leq -39.5$ dBm

### 6.7.2. Test Procedure Used

ANSI C63.17, Clause 6.1.6.2

### 6.7.3. Test Setup

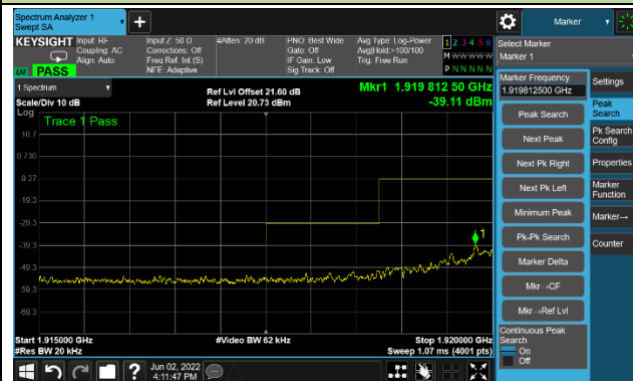


### 6.7.4. Test Result

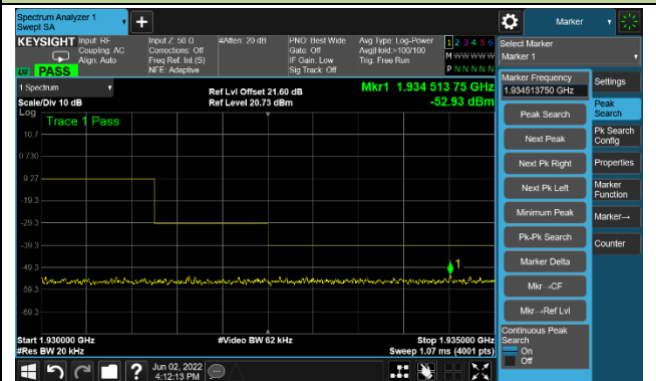
Test Site	WZ-SR4	Test Engineer	Dandy Li
Test Date	2022/06/02	Test Mode	Mode 1

#### Out-Band Unwanted Emissions – Channel 04

1.915GHz ~ 1.92GHz

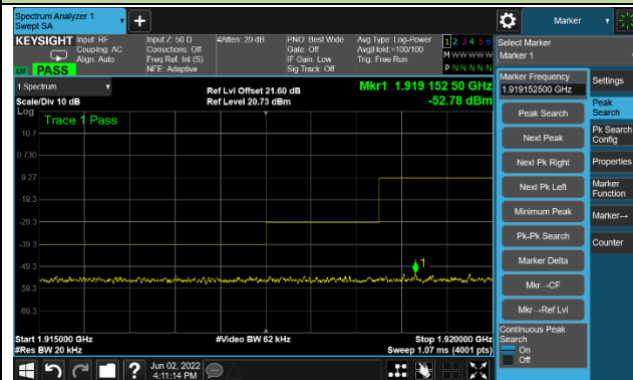


1.93GHz ~ 1.935GHz

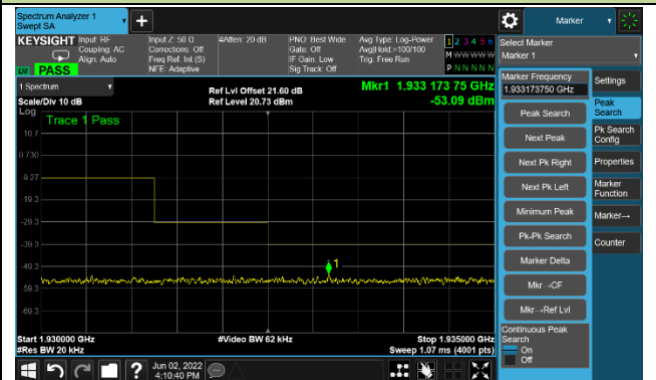


#### Out-Band Unwanted Emissions –Channel 02

1.915GHz ~ 1.92GHz

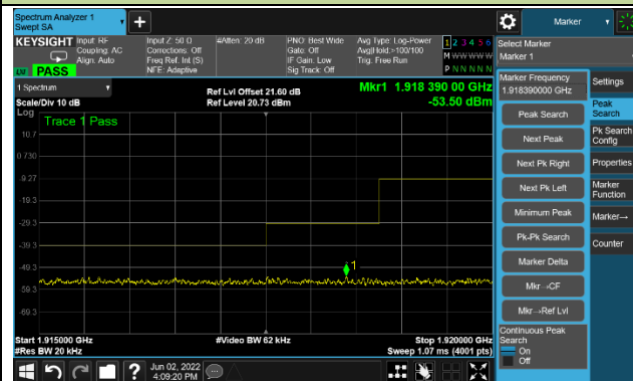


1.93GHz ~ 1.935GHz

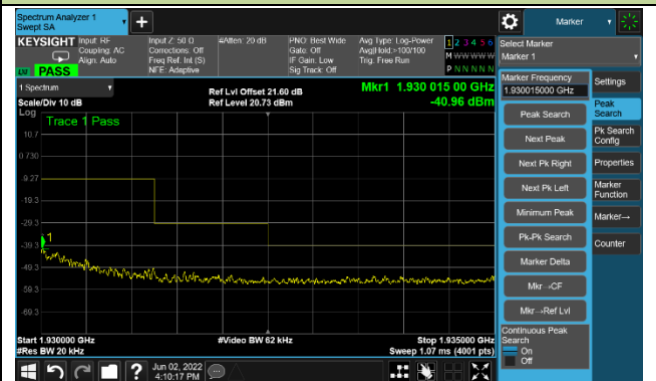


#### Out-Band Unwanted Emissions –Channel 00

1.915GHz ~ 1.92GHz



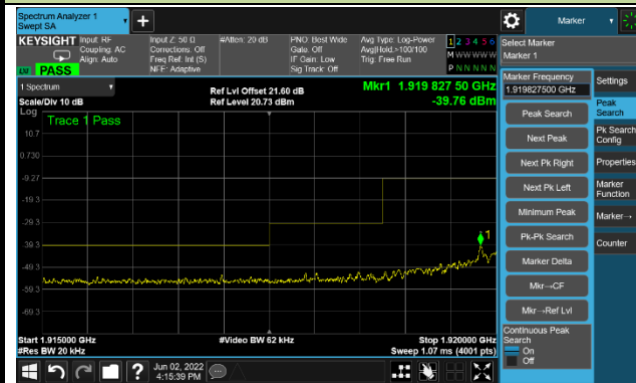
1.93GHz ~ 1.935GHz



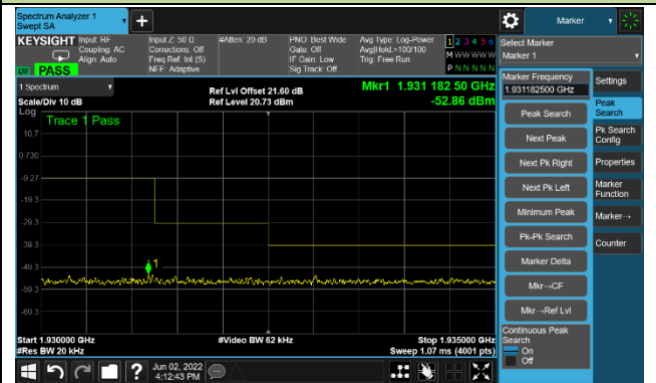
Test Site	WZ-SR4	Test Engineer	Dandy Li
Test Date	2022/06/02	Test Mode	Mode 2

### Out-Band Unwanted Emissions – Channel 04

1.915GHz ~ 1.92GHz

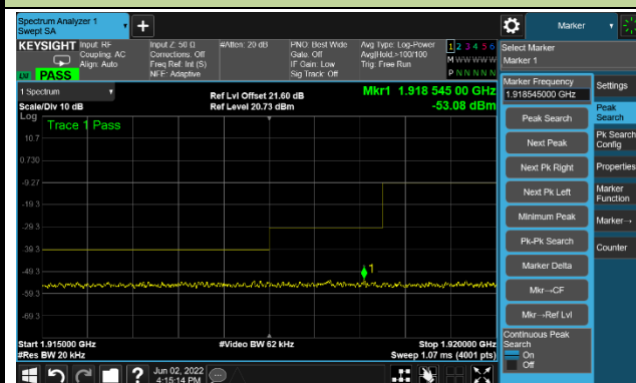


1.93GHz ~ 1.935GHz



### Out-Band Unwanted Emissions –Channel 02

1.915GHz ~ 1.92GHz

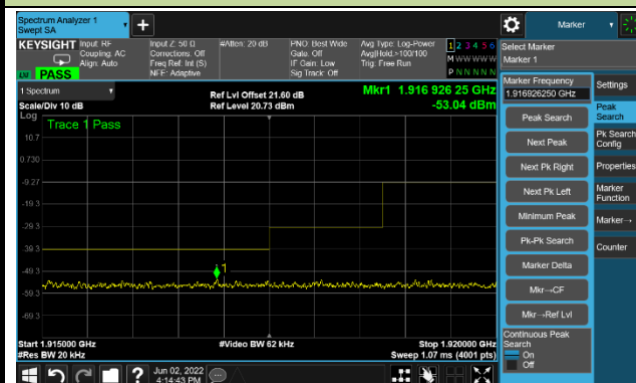


1.93GHz ~ 1.935GHz

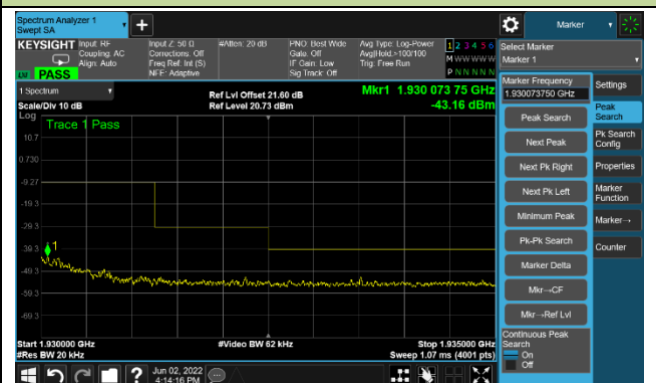


### Out-Band Unwanted Emissions –Channel 00

1.915GHz ~ 1.92GHz



1.93GHz ~ 1.935GHz



## 6.8. Radiated Spurious Emission Measurement

### 6.8.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

### 6.8.2. Test Procedure Used

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 Section 6.5 (Standard test method above 30MHz to 1GHz)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

### 6.8.3. Test Setting

**Table 1 - RBW as a function of frequency**

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

**Quasi-Peak Measurements below 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

**Peak Measurements above 1GHz**

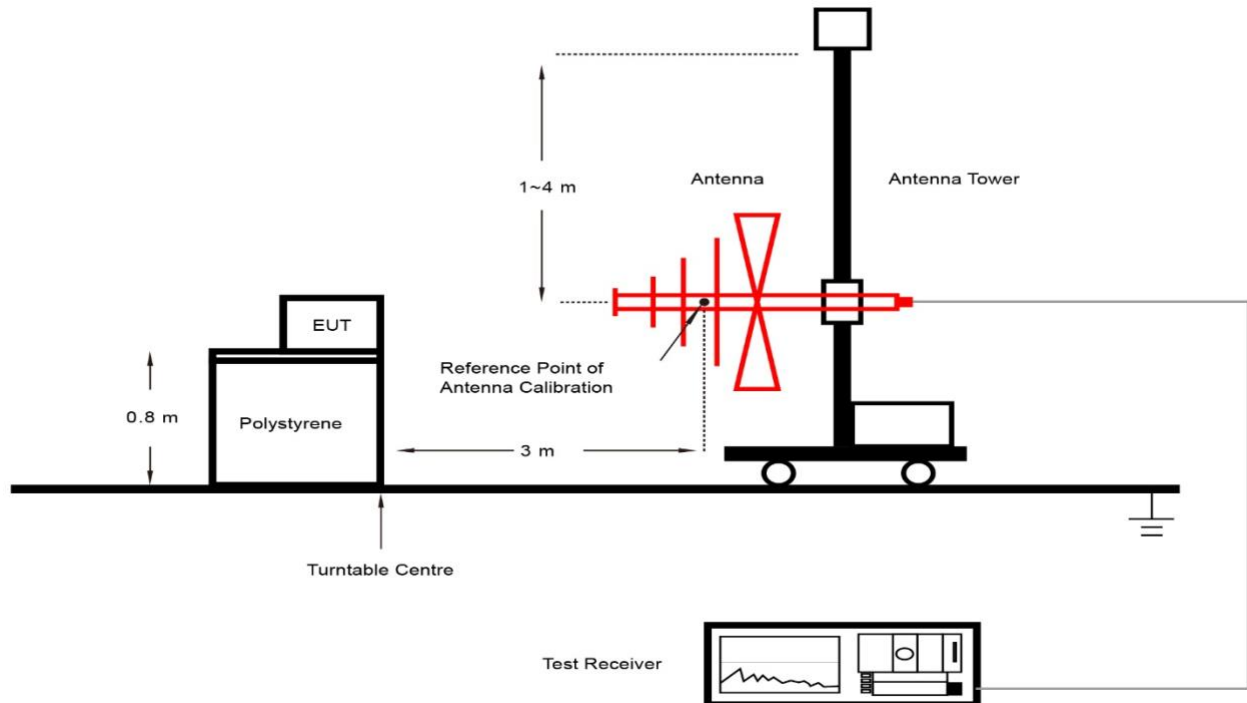
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

**Average Measurements above 1GHz (Method VB)**

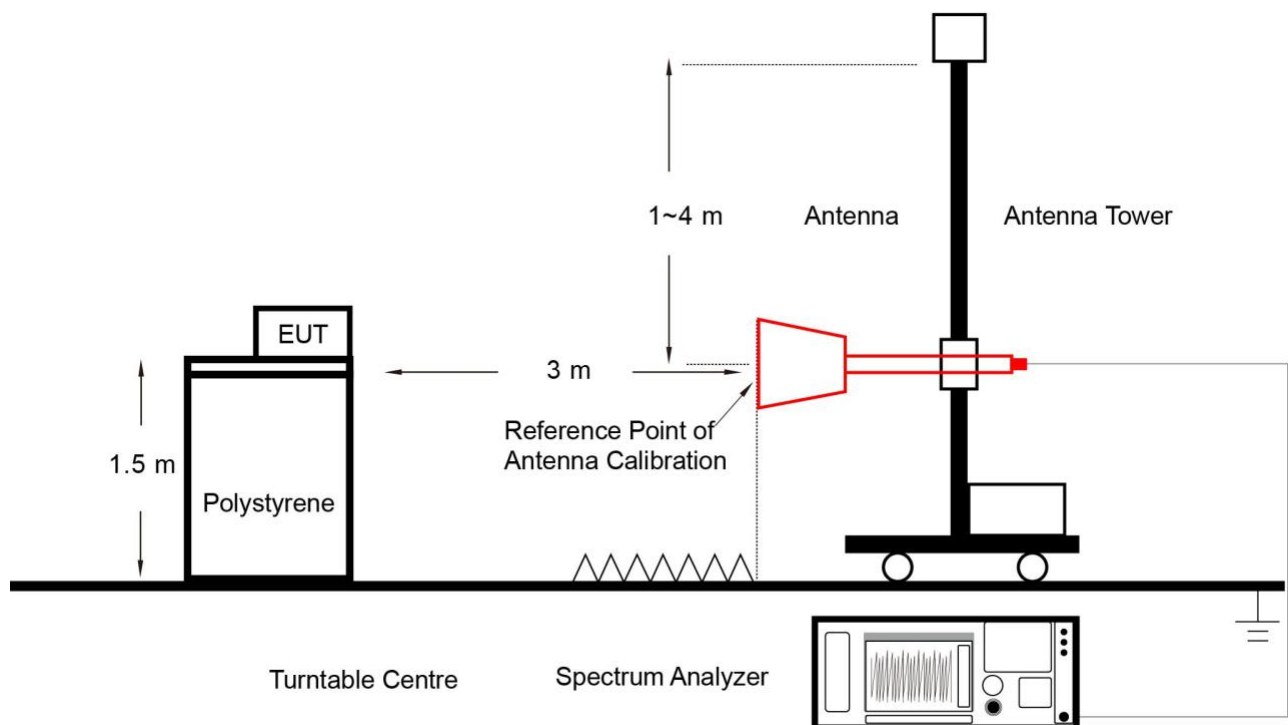
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle  $\geq 98\%$ , set VBW = 10 Hz.  
If the EUT duty cycle is  $< 98\%$ , set VBW  $\geq 1/T$ . T is the minimum transmission duration.
4. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Trace was allowed to stabilize

#### 6.8.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



### 6.8.5.Test Result

Test Site	WZ-AC2	Test Engineer	Hyde Yu
Test Date	2022/05/27	Test Mode	Mode 1
Remark	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	3856.000	62.1	0.0	62.0	74.0	-12.0	Peak	Horizontal
	3865.000	47.6	0.0	47.6	54.0	-6.4	Average	Horizontal
	7715.000	35.2	11.1	46.3	74.0	-27.7	Peak	Horizontal
	11574.000	36.8	17.5	54.4	74.0	-19.6	Peak	Horizontal
	11574.000	22.8	17.5	40.4	54.0	-13.6	Average	Horizontal
	3856.000	61.1	0.0	61.0	74.0	-13.0	Peak	Vertical
	3856.000	46.1	0.0	46.1	54.0	-7.9	Average	Vertical
	7715.000	36.6	11.1	47.7	74.0	-26.3	Peak	Vertical
	11574.000	34.5	17.5	52.0	74.0	-22.0	Peak	Vertical
	11574.000	20.4	17.5	38.0	54.0	-16.0	Average	Vertical
02	3847.500	63.0	-0.1	62.9	74.0	-11.1	Peak	Horizontal
	3847.500	48.6	-0.1	48.5	54.0	-5.5	Average	Horizontal
	8352.500	30.9	11.6	42.5	74.0	-31.5	Peak	Horizontal
	11548.500	37.1	17.2	54.2	74.0	-19.8	Peak	Horizontal
	11548.500	23.6	17.2	40.8	54.0	-13.2	Average	Horizontal
	3847.500	61.9	-0.1	61.8	74.0	-12.2	Peak	Vertical
	3847.500	46.8	-0.1	46.7	54.0	-7.3	Average	Vertical
	7698.000	37.9	10.9	48.8	74.0	-25.2	Peak	Vertical
	11548.500	32.4	17.2	49.6	74.0	-24.4	Peak	Vertical



Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
04	3843.500	60.2	-0.1	60.1	74.0	-13.9	Peak	Horizontal
	3843.500	44.7	-0.1	44.6	54.0	-9.4	Average	Horizontal
	7681.000	37.1	11.0	48.1	74.0	-25.9	Peak	Horizontal
	11531.500	33.3	17.6	51.0	74.0	-23.0	Peak	Horizontal
	3843.500	54.7	-0.1	54.6	74.0	-19.4	Peak	Vertical
	3843.500	40.1	-0.1	40.0	54.0	-14.0	Average	Vertical
	7689.500	36.5	11.0	47.5	74.0	-26.5	Peak	Vertical
	11531.500	31.9	17.6	49.5	74.0	-24.5	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)

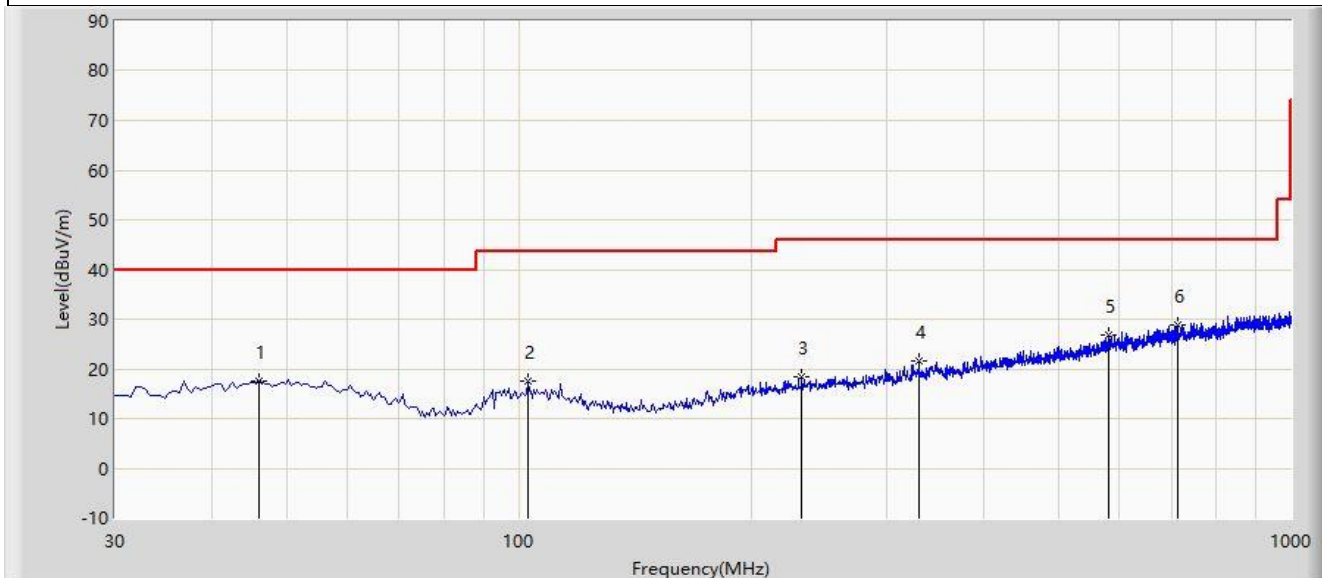
Test Site	WZ-AC2	Test Engineer	Hyde Yu
Test Date	2022/05/27	Test Mode	Mode 2
Remark	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	3856.000	61.0	0.0	61.0	74.0	-13.0	Peak	Horizontal
	3856.000	45.3	0.0	45.2	54.0	-8.8	Average	Horizontal
	7715.000	36.5	11.1	47.6	74.0	-26.4	Peak	Horizontal
	11565.500	34.7	17.6	52.3	74.0	-21.7	Peak	Horizontal
	11565.500	19.9	17.6	37.5	54.0	-16.5	Average	Horizontal
	3856.000	66.4	0.0	66.3	74.0	-7.7	Peak	Vertical
	3856.000	49.2	0.0	49.2	54.0	-4.8	Average	Vertical
	7715.000	39.7	11.1	50.8	74.0	-23.2	Peak	Vertical
	11574.000	33.1	17.5	50.7	74.0	-23.3	Peak	Vertical
02	3847.500	62.2	-0.1	62.1	74.0	-11.9	Peak	Horizontal
	3847.500	46.2	-0.1	46.1	54.0	-7.9	Average	Horizontal
	7698.000	36.3	10.9	47.2	74.0	-26.8	Peak	Horizontal
	11548.500	35.2	17.2	52.4	74.0	-21.6	Peak	Horizontal
	11548.500	21.2	17.2	38.4	54.0	-15.6	Average	Horizontal
	3847.500	63.1	-0.1	63.0	74.0	-11.0	Peak	Vertical
	3847.500	49.2	-0.1	49.1	54.0	-4.9	Average	Vertical
	7698.000	40.7	10.9	51.6	74.0	-22.4	Peak	Vertical
	7698.000	26.3	10.9	37.1	54.0	-16.9	Average	Vertical
	11548.500	35.0	17.2	52.2	74.0	-21.8	Peak	Vertical
	11548.500	21.3	17.2	38.5	54.0	-15.5	Average	Vertical

Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
04	3839.000	62.6	-0.1	62.4	74.0	-11.6	Peak	Horizontal
	3839.000	48.6	-0.1	48.5	54.0	-5.5	Average	Horizontal
	7681.000	37.9	11.0	49.0	74.0	-25.0	Peak	Horizontal
	11531.500	37.0	17.6	54.6	74.0	-19.4	Peak	Horizontal
	11531.500	23.1	17.6	40.8	54.0	-13.2	Average	Horizontal
	3839.000	66.1	-0.1	66.0	74.0	-8.0	Peak	Vertical
	3839.000	52.2	-0.1	52.1	54.0	-1.9	Average	Vertical
	7681.000	38.4	11.0	49.5	74.0	-24.5	Peak	Vertical
	11531.500	35.5	17.6	53.2	74.0	-20.8	Peak	Vertical
	11531.500	21.6	17.6	39.2	54.0	-14.8	Average	Vertical
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)								
Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)								

### The Worst Result of Radiated Emission below 1GHz:

Site: WZ-AC2	Time: 2022/05/27
Limit: FCC_Part15.209_RSE(3m)	Engineer: Hyde Yu
Probe: VULB9162_30-7000MHz	Polarity: Horizontal
EUT: Premium Door/Window Sensor	Power: By Battery
<b>Test Mode:</b> Transmit at channel 00	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1			46.005	17.649	-2.949	-22.351	40.000	20.598	PK
2			102.750	17.429	-1.256	-26.071	43.500	18.686	PK
3			232.730	18.351	-1.067	-27.649	46.000	19.418	PK
4			329.730	21.464	-0.547	-24.536	46.000	22.011	PK
5			580.475	26.936	0.084	-19.064	46.000	26.853	PK
6		*	712.395	28.926	0.336	-17.074	46.000	28.590	PK

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB/m)

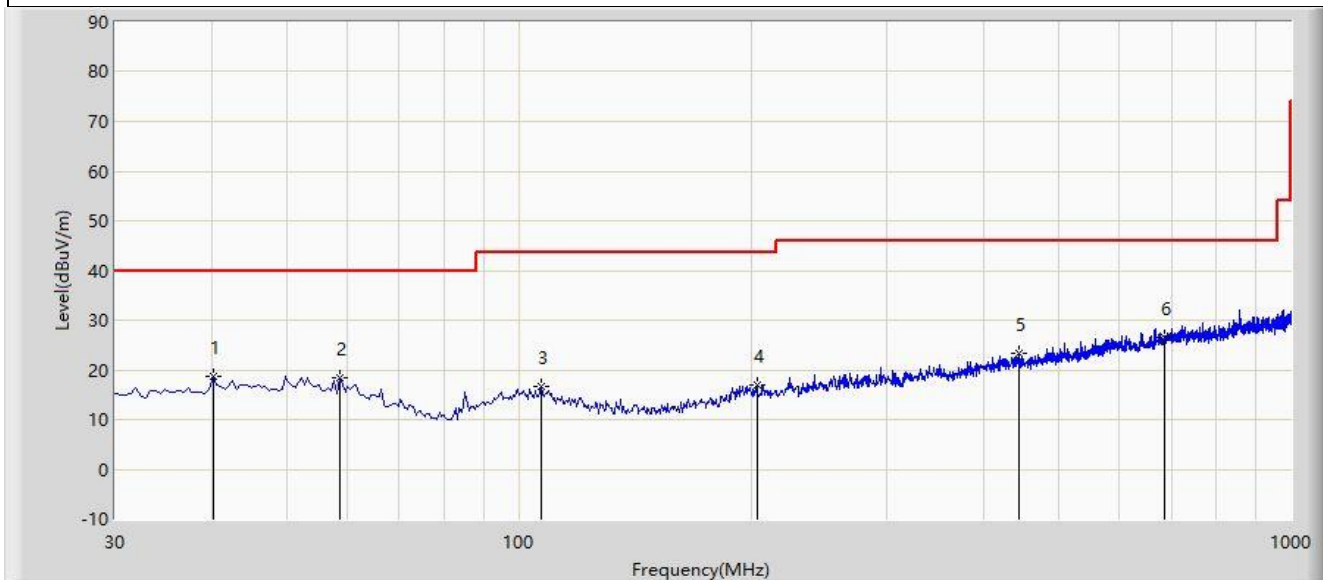
Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: QP measurement was not performed when peak measure level was lower than the QP limit.

Note 3: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 20GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value.

Therefore, the data is not presented in the report.

Site: WZ-AC2	Time: 2022/05/27
Limit: FCC_Part15.209_RSE(3m)	Engineer: Hyde Yu
Probe: VULB9162_30-7000MHz	Polarity: Vertical
EUT: Premium Door/Window Sensor	Power: By Battery
<b>Test Mode:</b> Transmit at channel 00	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1			40.185	18.734	-0.773	-21.266	40.000	19.508	PK
2			58.615	18.426	-1.341	-21.574	40.000	19.768	PK
3			107.115	16.707	-1.887	-26.793	43.500	18.595	PK
4			203.630	16.900	-1.666	-26.600	43.500	18.566	PK
5			443.705	23.397	-0.663	-22.603	46.000	24.060	PK
6		*	685.720	26.571	-1.864	-19.429	46.000	28.436	PK

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: QP measurement was not performed when peak measure level was lower than the QP limit.

Note 3: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 20GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value.

Therefore, the data is not presented in the report.

## 6.9. Frame Repetition Stability and Period and Jitter

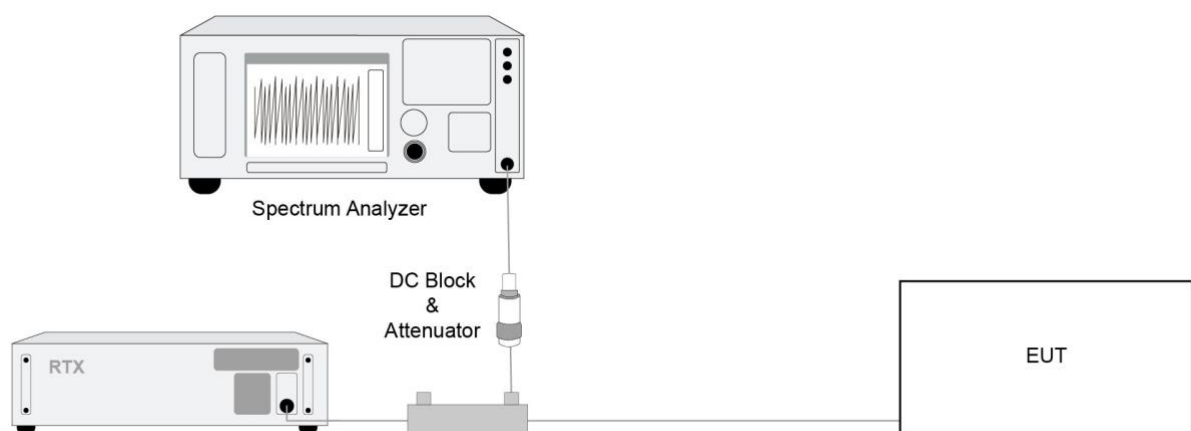
### 6.9.1. Test Limit

The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of an intentional radiator operating in this band shall be 20 milliseconds or 10 milliseconds/X where X is a positive whole number. Each device that implements time division for the purposes of maintaining a duplex connection on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 50 parts per million (ppm). Each device which further divides access in time in order to support multiple communication links on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 10 ppm. The jitter (time-related, abrupt, spurious variations in the duration of the frame interval) introduced at the two ends of such a communication link shall not exceed 25 microseconds for any two consecutive transmissions. Transmissions shall be continuous in every time and spectrum window during the frame period defined for the device.

### 6.9.2. Test Procedure Used

ANSI C63.17, Clause 6.2.2 & 6.2.3

### 6.9.3. Test Setup



#### 6.9.4. Test Result

Test Site	WZ-SR4	Test Engineer	Dandy Li
Test Date	2022/06/03	Test Mode	Mode 1

Carrier Frequency (MHz)	Frame Repetition Stability (ppm)					Limit (ppm)
	Standard deviation		Frame Repetition Stability			
1924.992	0.186		0.558			±10
Carrier Frequency (MHz)	Frame Jitter (us)					Limit (us)
	min	mean	max	△min	△max	
1924.992	-0.1	0	0.1	-0.1	0.1	±25

## 6.10. Carrier Frequency Stability

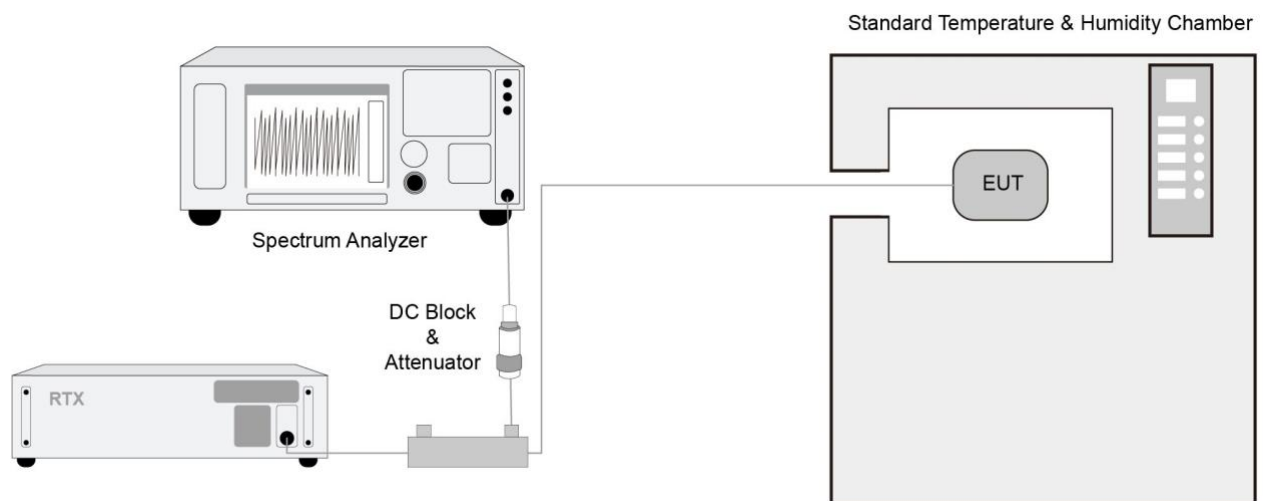
### 6.10.1. Test Limit

Per §15.323(f), the frequency stability of the carrier frequency of the intentional radiator shall be maintained within  $\pm 10$  ppm over 1 hour or the interval between channel access monitoring, whichever is shorter. The frequency stability shall be maintained over a temperature variation of  $-20^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of  $20^{\circ}\text{C}$ . For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage.

### 6.10.2. Test Procedure Used

ANSI C63.17, Clause 6.2.1

### 6.10.3. Test Setup





#### 6.10.4. Test Result

Test Site	WZ-TR3	Test Engineer	Dandy Li
Test Date	2022/06/03	Test Mode	Mode 1

#### Carrier Frequency Stability over Time at Nominal Temperature

Average Mean Carrier Frequency (MHz)	Max. Diff. (kHz)	Min. Diff. (kHz)	Max Dev. (ppm)	Limit (ppm)
1924.99388	8.4	1.5	3.39	±10

#### Carrier Frequency Stability over Temperature

Voltage	Average Mean Carrier Frequency (MHz)	Max. Diff (kHz)	Deviation (ppm)	Limit (ppm)
T = +20°C	1924.99388	Ref	Ref	±10
T = -20°C		8.6	3.49	
T = +50°C		8.9	3.65	

Note 1: Mean. Diff = Average Mean Carrier Frequency – Carrier Frequency

Deviation ppm = ((Max. Diff. - Mean. Diff.) / Mean Carrier Freq.) x 10<sup>6</sup>.

Note 2: This sample is powered by batteries, so the stability over power supply voltage is not applicable.

## 6.11. Listen Before Transmit (LBT)

### 6.11.1. Test Limit

#### Monitoring Time Requirements

Immediately prior to initiating transmission, devices must monitor the combined time and spectrum window in which they intend to transmit. For a period of at least 10 milliseconds for systems designed to use a 10 milliseconds or shorter frame period or at least 20 milliseconds for systems designed to use a 20 milliseconds frame period.

#### Monitoring Threshold

The monitoring threshold must not be more than 30 dB above the thermal noise power for a bandwidth equivalent to the emission bandwidth of the device.

Calculation of monitoring threshold limits for isochroous devices:

Monitoring threshold:  $T_L = -174 + 10 \log_{10} B + M_u + P_{MAX} - P_{EUT}$  (dBm)

Where: B=Emission bandwidth (Hz)

$M_u$ =dB the threshold may exceed thermal noise (30dB)

$P_{MAX} = 5 * \log_{10} B - 10$  (dBm)

$P_{EUT}$ =Transmitted power (dBm)

Monitor Threshold	B (MHz)	$M_u$ (dB)	$P_{MAX}$ (dBm)	$P_{EUT}$ (dBm)	Threshold (dBm)
$T_L$	1.400	30	20.73	18.91	-80.72

The EUT must not transmit until the interference level is less than or equal to:

Measured Threshold Level  $\leq T_L + U_m = -80.72 + 6 = -74.72$  dBm

#### Maximum Transmit Period

If no signal above the threshold level is detected, transmission may commence and continue with the same emission bandwidth in the monitored time and spectrum windows without further monitoring. However, occupation of the same combined time and spectrum windows by a device or group of cooperating devices continuously over a period of time longer than 8 h is not permitted without repeating the access criteria.

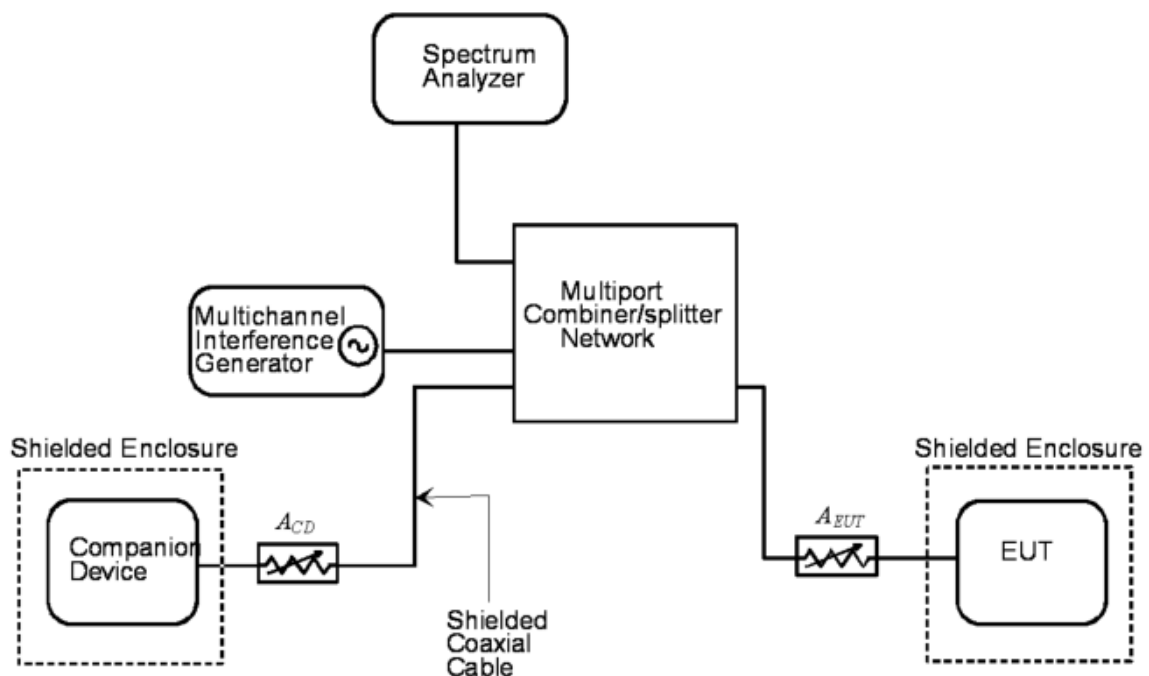
### System Acknowledgement

Once access to specific combined time and spectrum windows is obtained an acknowledgement from a system participant must be received by the initiating transmitter within one second or transmission must cease. Periodic acknowledgements must be received at least every 30 s or transmission must cease. Channels used exclusively for control and signaling information may transmit continuously for 30 s without receiving an acknowledgement, at which time the access criteria must be repeated.

#### 6.11.2. Test Procedure Used

ANSI C63.17, Clause 7.3 & 8.2.

#### 6.11.3. Test Setup



#### 6.11.4. Test Result

Test Site	WZ-SR4	Test Engineer	Dandy Li
Test Date	2022/06/04	Test Mode	Mode 1

#### Monitoring Time Requirements

Interference (Refer to ANSIC63.17 clause 7.3.3)	Reaction of EUT	Results
Apply the interference on f1 at level $T_L + U_M + 20$ , and no interference on f2. Initiate transmission and verify the transmission on f2.	EUT transmits on f2	Pass
Apply the interference on f2 at level $T_L + U_M + 20$ , at the same time, no interference on f1. After about 20ms, initiate transmission and verify the transmission on f1.	EUT transmits on f1	Pass

#### Monitoring Threshold Requirements

The test is not applicable, because the EUT supports at least of 20 duplex system access channels and implements Least Interfered Channel (LIC) algorithm.

#### Maximum Transmit Period

Test ref. to ANSI C63.17 clause 8.2.2	Observation	Verdict
Transmission duration on same time and frequency window	Only for initiating device that controls which time slot is used	N/A

#### System Acknowledgements

Test ref. to ANSI C63.17 clause 8.2.1	Observation	Verdict
Initial transmission without acknowledgements	Not applicable for EUT that transmits control and signaling information	N/A
Transmission time after loss of acknowledgements	5.0 sec	Pass

## **6.12. Least Interfered Channel (LIC) Requirements**

### **6.12.1. Test Limit**

#### **LIC Selection**

If access to spectrum is not available as determined by the above, and a minimum of 20 duplex system access channels are defined for the system, the time and spectrum windows with the lowest power level may be accessed.

#### **Least Interfered Channel Confirmation**

A device utilizing the provisions of this paragraph must have monitored all access channels defined for its system within the last 10 s and must verify, within the 20ms (40ms for devices designed to use a 20 ms frame period) immediately preceding actual channel access, that the detected power of the selected time and spectrum windows is no higher than the previously detected value.

#### **Power Measurement Resolution**

The power measurement resolution for this comparison must be accurate to within 6dB.

#### **Maximum Spectrum Occupancy**

No device or group of co-operating devices located within 1 m of each other shall, during any frame period, occupy more than 6 MHz of aggregate bandwidth, or alternatively, more than one third of the time and spectrum windows defined by the system.

### **6.12.2. Test Procedure Used**

ANSI C63.17, Clause 7.3.2 & 7.3.3

### 6.12.3. Test Result

Test Site	WZ-SR4	Test Engineer	Dandy Li
Test Date	2022/06/04	Test Mode	Mode 1

#### LIC Selection

The customer claims the product supports a minimum of 20 duplex system access channels.

#### Least Interfered Channel Confirmation

The test result is reported in section 6.11.

#### Power Measurement Resolution

Test ref. to ANSI C63.17 clause 7.3.2	Observation	Verdict
b) Apply interference to the EUT on $f_1$ at a level of $T_L + U_M + 7\text{dB}$ and on $f_2$ at a level of $T_L + U_M$ . Initiate transmission. The EUT should transmit on $f_2$ . Terminate the connection. Repeat five times.	EUT transmit on $f_2$	Pass
c) Apply interference to the EUT on $f_1$ at a level of $T_L + U_M$ and on $f_2$ at a level of $T_L + U_M + 7\text{dB}$ . Initiate transmission. The EUT should transmit on $f_1$ . Terminate the connection. Repeat five times.	EUT transmit on $f_1$	Pass
d) Apply interference to the EUT on $f_1$ at a level of $T_L + U_M + 1\text{dB}$ and on $f_2$ at a level of $T_L + U_M - 6\text{dB}$ . Initiate transmission. If the EUT transmits on $f_2$ , terminate the connection. Repeat five times.	EUT transmit on $f_2$	Pass
e) Apply interference to the EUT on $f_1$ at a level of $T_L + U_M + 1\text{dB}$ and on $f_2$ at a level of $T_L + U_M - 6\text{dB}$ . Initiate transmission. If the EUT transmits on $f_2$ , terminate the connection. Repeat five times.	EUT transmit on $f_1$	Pass

#### Maximum Spectrum Occupancy

According to the technical description provided, the total number of the time and spectrum windows defined by the system is more than 20.

During any frame period, the maximum number of different channels will be 5, which is less than one third of the time and spectrum windows defined by the system.

### **6.13. Random waiting Requirements**

#### **6.13.1. Test Limit**

If the selected combined time and spectrum windows are unavailable, the device may either monitor and select different windows or seek to use the same window after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 milliseconds, commencing when the channel becomes available.

#### **6.13.2. Test Procedure Used**

ANSI C63.17, Clause 8.1.3

#### **6.13.3. Test Result**

For systems that do implement the LIC algorithm and offer at least 20 duplex communications channels, the test is not applicable.

## **6.14. Monitoring Requirements**

### **6.14.1. Test Limit**

#### **Monitoring Bandwidth**

The monitoring system bandwidth must be equal to or greater than the emission bandwidth of the intended transmission

#### **Monitoring Reaction Time**

The monitoring system shall have a maximum reaction time less than  $50 \times \text{SQRT}(2.5/\text{emission bandwidth in MHz}) \mu\text{s}$  for signals at the applicable threshold level but shall not be required to be less than  $50 \mu\text{s}$ . If a signal is detected that is 6 dB or more above the applicable threshold level, the maximum reaction time shall be  $35 \times \text{SQRT}(2.5/\text{emission bandwidth in MHz}) \mu\text{s}$  but shall not be required to be less than  $35 \mu\text{s}$ . and have a maximum reaction time less than  $50 \times \text{SQRT}(1.25/\text{emission bandwidth in MHz})$  microseconds for signals at the applicable threshold level but shall not be required to be less than 50 microseconds

### **6.14.2. Test Procedure Used**

ANSI C63.17, Clause 7.4&7.5



### 6.14.3. Test Result

Test Site	WZ-SR4	Test Engineer	Dandy Li
Test Date	2022/06/04	Test Mode	Mode 1

#### Monitoring Bandwidth

Monitoring bandwidth of the EUT is equal to the occupied bandwidth of the intended transmission.

Monitoring is made through the radio receiver used by the EUT for communication.

#### Monitoring Reaction Time

Test Equation ( $\mu\text{s}$ )	B (MHz)	Pulse width( $\mu\text{s}$ )
$50 (1.25/B)^{1/2}$	1.400	47.26
$25 (1.25/B)^{1/2}$	1.400	23.62

Test ref. to ANSI C63.17 clause 7.5	Observation	Verdict
1) Additionally apply a CW signal on $f_2$ at the level $T_L$ and interference pulse on $f_1$ at level $T_L + U_M$ to the receive port of the EUT. Verify that the EUT establishes a connection only on $f_2$ when the width of the interference pulse exceeds $50\mu\text{s}$ .	EUT transmit on $f_2$	Pass
2) Change the time-synchronized, pulsed interference on $f_1$ to the level $T_L + U_M + 6\text{dB}$ . Verify that the EUT establishes a connection only on $f_2$ when the width of the interference pulse exceeds $35\mu\text{s}$ .	EUT transmit on $f_2$	Pass

## **6.15. Monitoring Antenna Requirements**

### **6.15.1. Test Limit**

The monitoring system shall use the same antenna used for transmission, or an antenna that yields equivalent reception at that location.

### **6.15.2. Test Procedure Used**

ANSI C63.17 paragraph 4

### **6.15.3. Test Result**

The antenna of the EUT used for transmission is the same interior antenna that used for monitoring.

## **6.16. Monitoring Threshold Relaxation Requirements**

### **6.16.1. Test Limit**

Devices that have a power output Lowest than the maximum permitted under the rules can increase their monitoring detection threshold by one decibel for each one decibel that the transmitter power is below the maximum permitted

### **6.16.2. Test Procedure Used**

ANSI C63.17 paragraph 4

### **6.16.3. Test Result**

The test is not applicable. Because the EUT supports at least of 20 duplex system access channels and implements Least Interfered Channel (LIC) algorithm, so the monitoring threshold is not applicable.

## **6.17. Duplex System LBT**

### **6.17.1. Test Limit**

An initiating device may attempt to establish a duplex connection by monitors both its intended transmit and receive time and spectrum windows. If both the intended transmit and receive time and spectrum windows meet the access criteria, then the initiating device can initiate a transmission in the intended transmit time and spectrum window. If the power detected by the responding device can be decoded as a duplex connection signal from the initiating device, then the responding device may immediately begin transmitting on the receive time and spectrum window monitored by the initiating device.

### **6.17.2. Test Procedure Used**

ANSI C63.17, Clause 8.3.1 & 8.3.2

### **6.17.3. Test Result**

The test is not applicable. Because the test is only applicable for EUT that can be initiating device.

## **6.18. Alternative monitoring interval for co-located devices Requirements**

### **6.18.1. Test Limit**

An initiating device that is prevented from monitoring during its intended transmit window due to monitoring system blocking from the transmissions of a co-located (within one meter) transmitter of the same system, may monitor the portions of the time and spectrum windows in which they intend to receive over a period of at least 10 milliseconds. The monitored time and spectrum window must total at least 50 percent of the 10 milliseconds frame interval and the monitored spectrum must be within 1.25 MHz of the center frequency of channel(s) already occupied by that device or co-located co-operating devices. If the access criteria is met for the intended receive time and spectrum window under the above conditions, then transmission in the intended transmit window by the initiating device may commence.

### **6.18.2. Test Procedure Used**

ANSI C63.17, Clause 8.4

### **6.18.3. Test Result**

The test is not applicable. Because the test is only applicable for EUT that can be initiating device.

## **6.19. Fair Access**

### **6.19.1. Test Limit**

The provisions of (c)(10) or (c)(11) shall not be used to extend the range of spectrum occupied over space or time for the purpose of denying fair access to spectrum to other devices.

### **6.19.2. Test Result**

The test is not applicable. Because the test is only applicable for EUT that can be initiating device.

## 7. CONCLUSION

The data collected relate only the item(s) tested and show that the unit is compliance with Part 15D of the FCC Rule.

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The End

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## **Appendix A - Test Setup Photograph**

Refer to “2205RSU060-UT” file.



## **Appendix B - EUT Photograph**

Refer to “2205RSU060-UE” file.