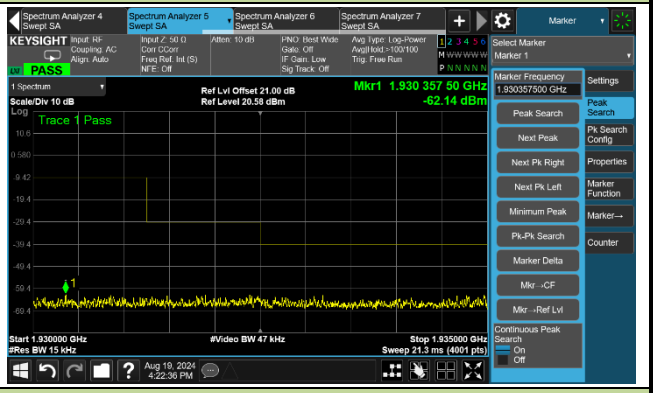
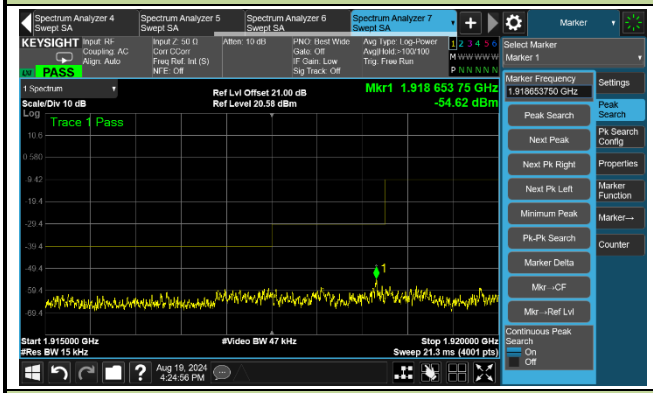
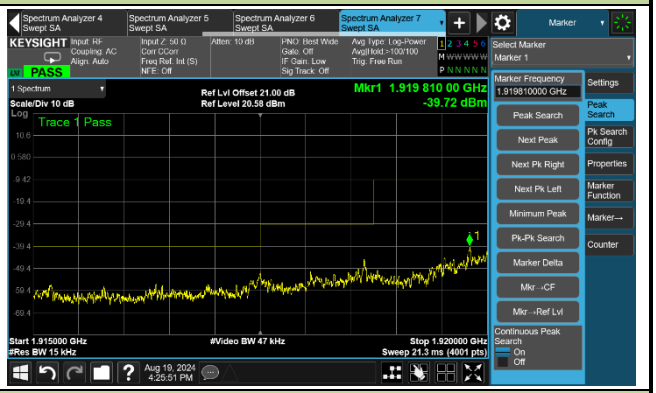
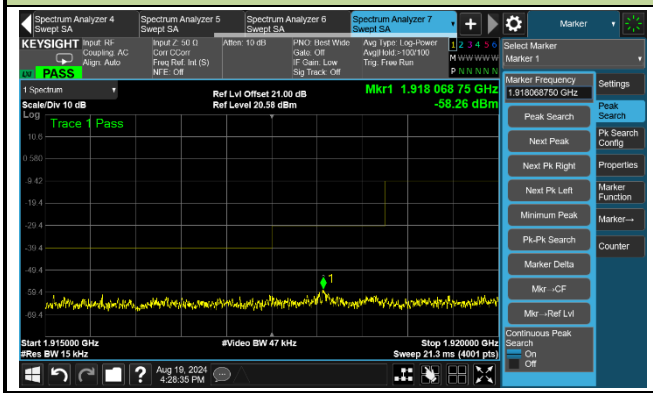
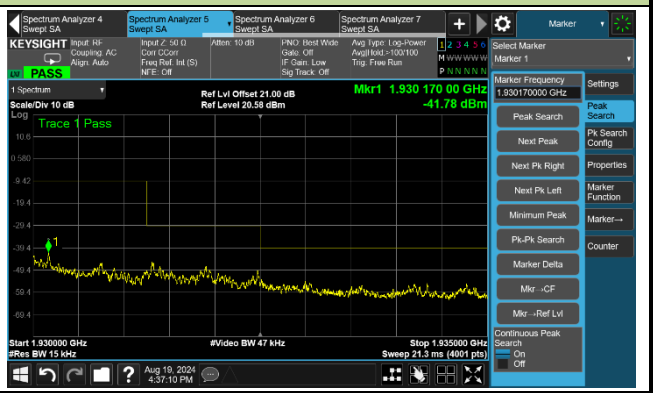
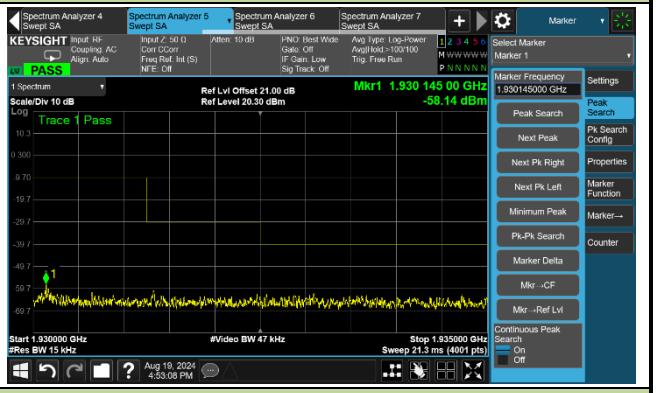
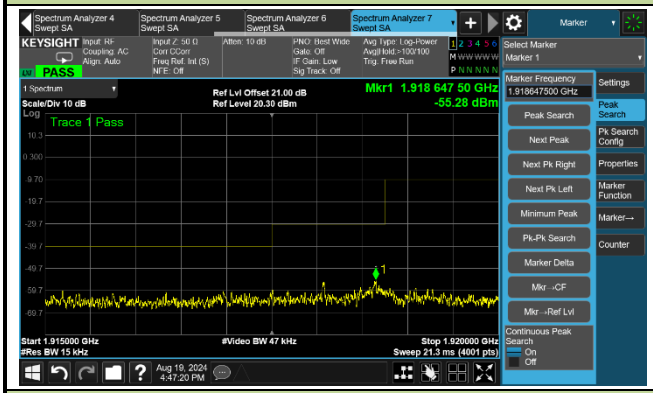
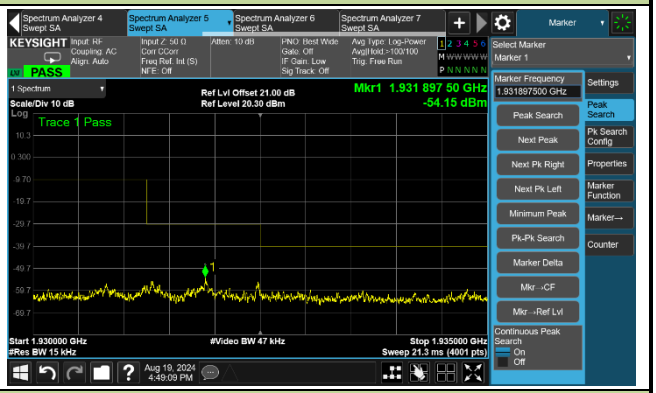
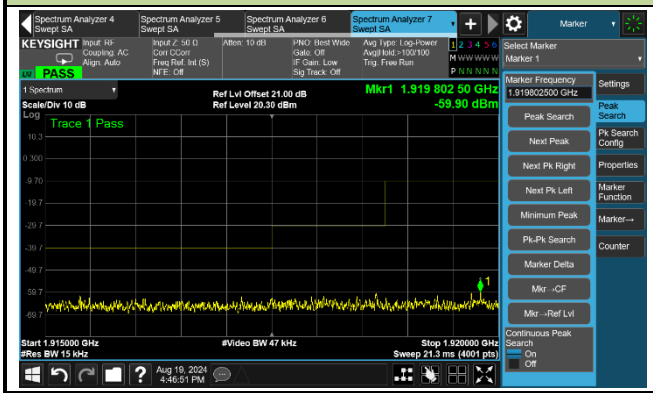
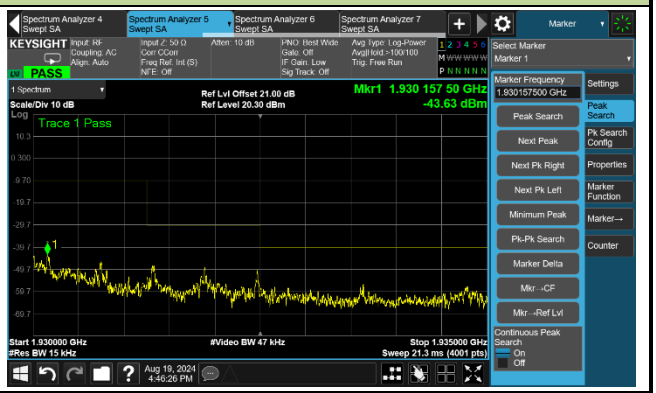
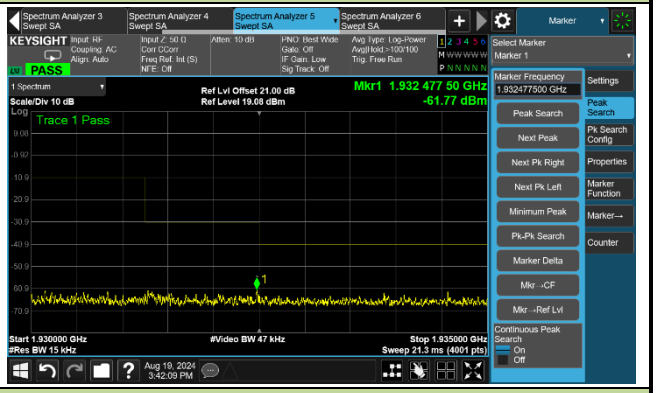
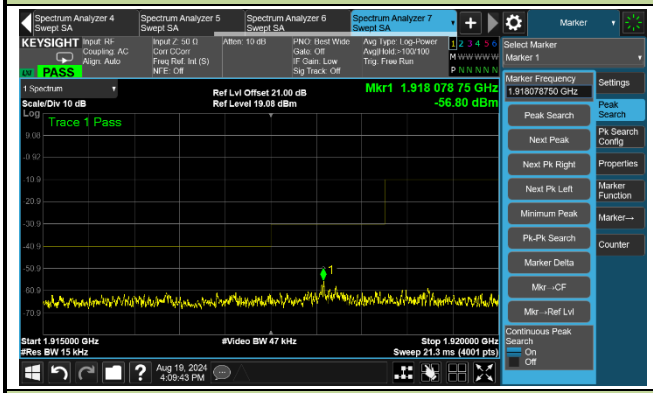
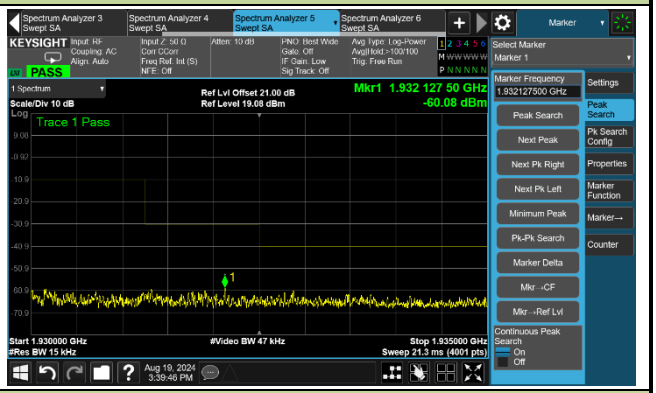
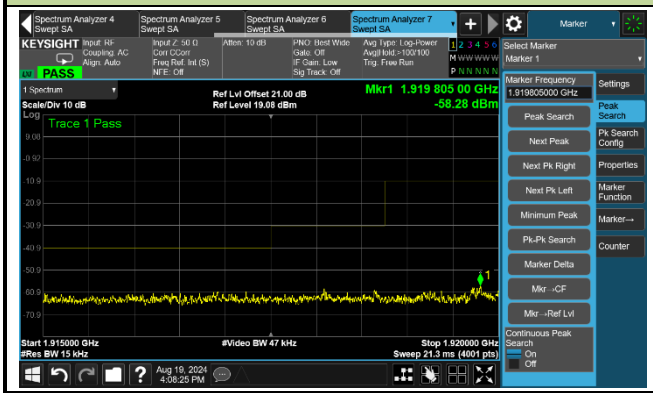
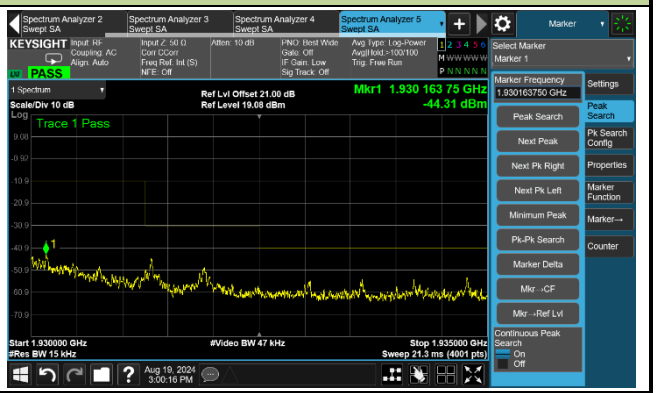
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-08-19	Test Mode	Mode 2

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
	

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-08-19	Test Mode	Mode 3

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-SR5	Test Engineer	Lynn Yang
Test Date	2024-08-19	Test Mode	Mode 4

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

For section 15.323(d): Emission outside the band shall be attenuation below a reference power of 112 milliwatts: 60 dB at 2.5 MHz or greater above or below the band

For section 15.319(g): Notwithstanding other technical requirements specified in this subpart, attenuation of emissions below the general emission limits in 15.209 is not required.

Where the limit is more stringent than 15.209, the limits of 15.209 take precedence as indicated in 15.319(g).

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

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 ≥ 98%, set VBW = 10 Hz.

If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.

4. Detector = Peak

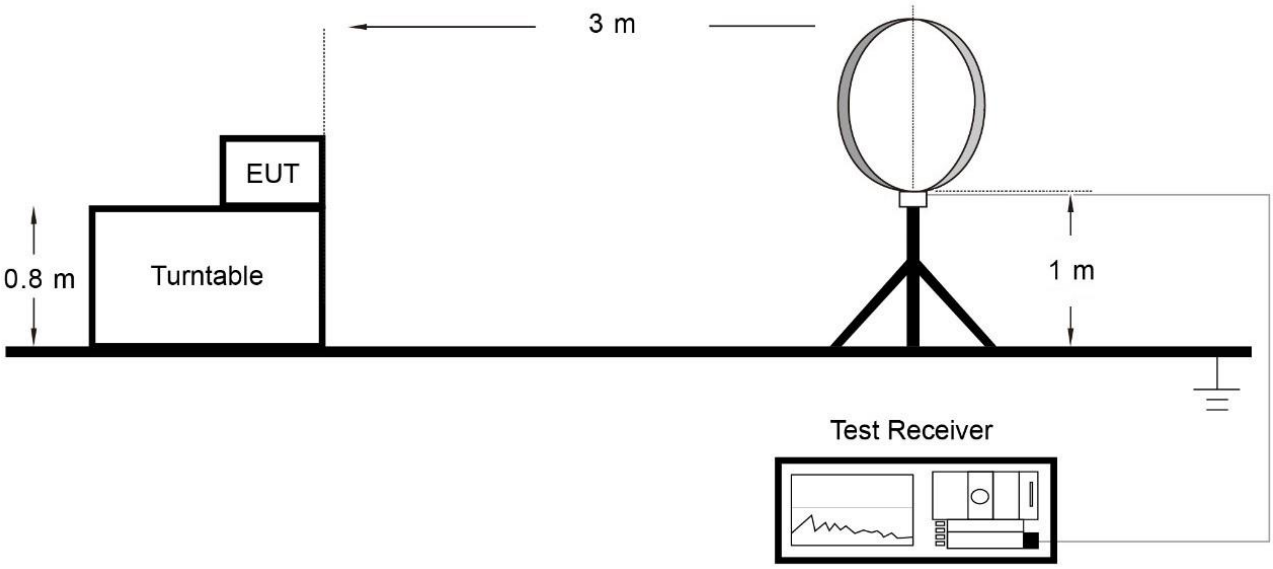
5. Sweep time = auto

6. Trace mode = max hold

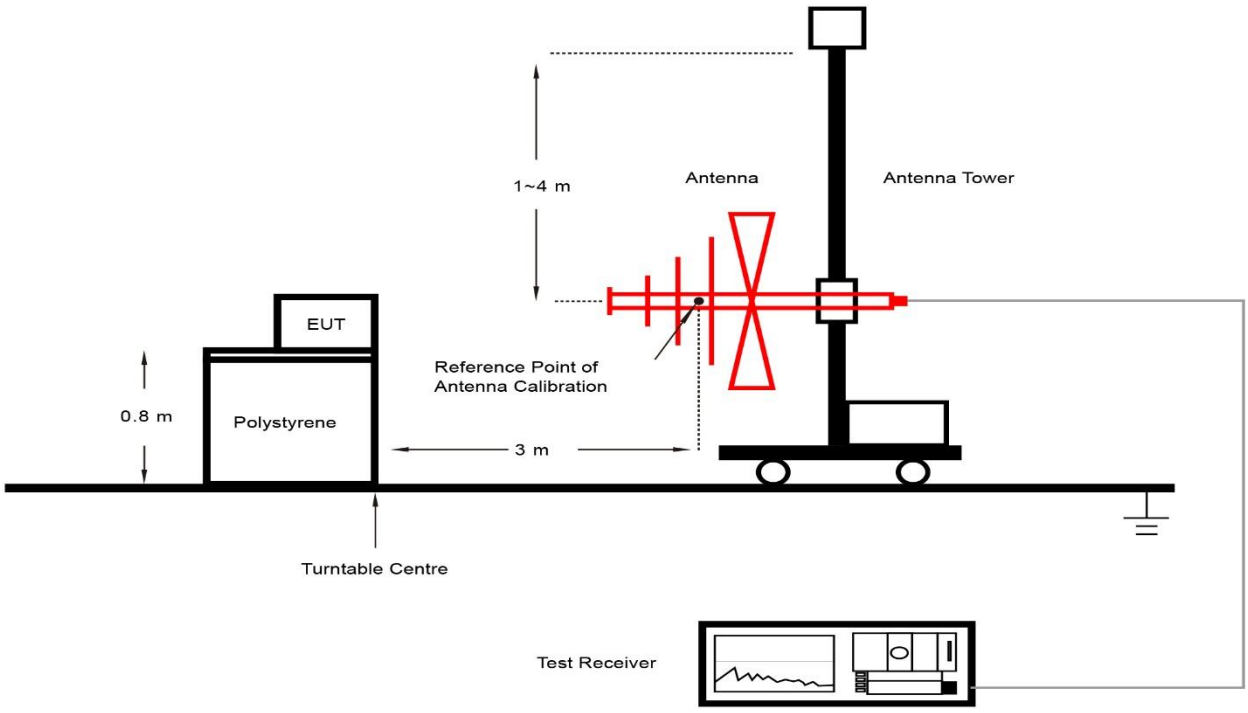
7. Trace was allowed to stabilize

6.8.4. Test Setup

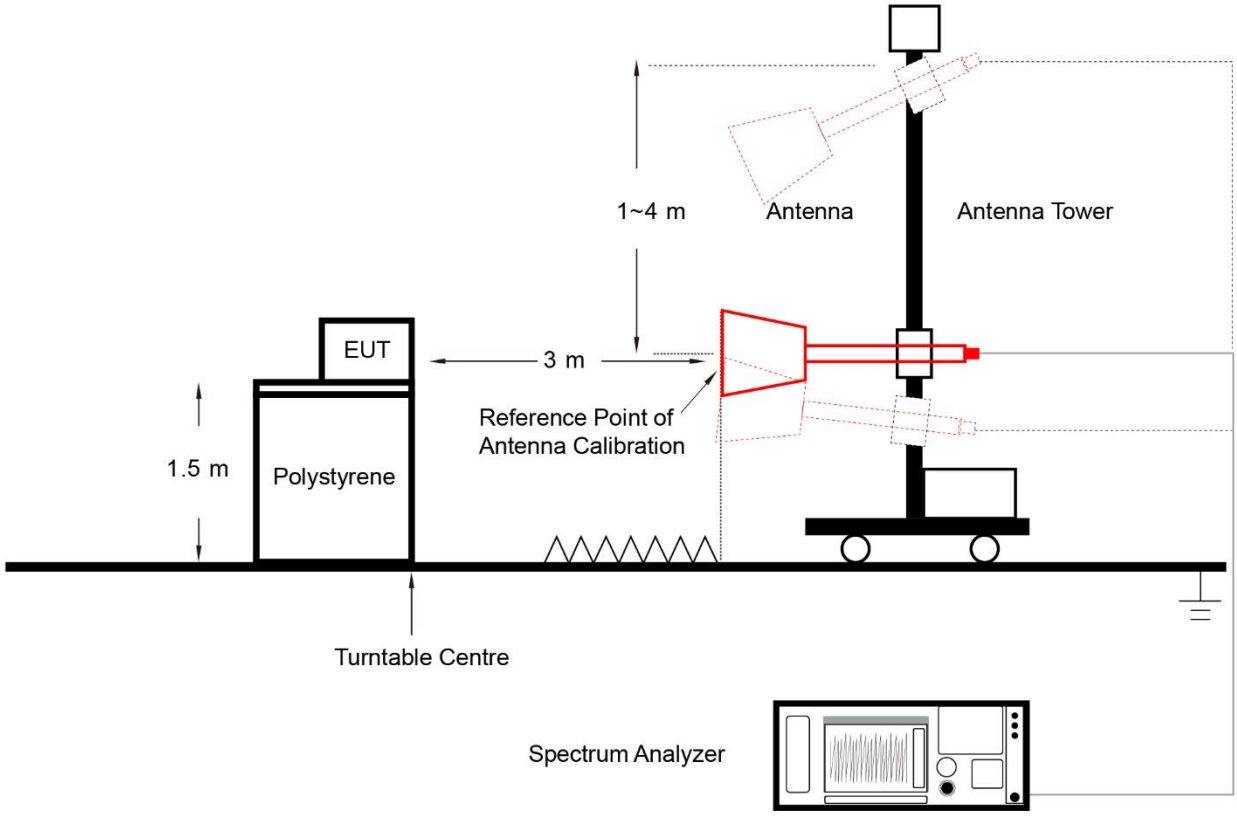
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.8.5. Test Result

Test Site	WZ-AC2	Test Engineer	Bob Zhang
Test Date	2024-08-30	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	3842.400	43.7	0.2	43.9	74.0	-30.1	Peak	Horizontal
	5765.100	43.4	5.1	48.5	74.0	-25.5	Peak	Horizontal
	12087.400	31.5	17.0	48.5	74.0	-25.5	Peak	Horizontal
	3844.100	49.9	0.2	50.1	74.0	-23.9	Peak	Vertical
	5763.400	45.1	5.1	50.2	54.0	-3.8	Average	Vertical
	5763.400	46.0	5.1	51.1	74.0	-22.9	Peak	Vertical
	11092.900	32.4	16.7	49.1	74.0	-24.9	Peak	Vertical
02	3850.900	45.1	0.2	45.3	74.0	-28.7	Peak	Horizontal
	5775.300	42.7	5.2	47.9	74.0	-26.1	Peak	Horizontal
	10424.800	32.2	15.0	47.2	74.0	-26.8	Peak	Horizontal
	3849.200	50.0	0.2	50.2	54.0	-3.8	Average	Vertical
	3849.200	51.7	0.2	51.9	74.0	-22.1	Peak	Vertical
	5773.600	46.7	5.2	51.9	54.0	-2.1	Average	Vertical
	5773.600	47.5	5.2	52.7	74.0	-21.3	Peak	Vertical
	11543.400	30.9	17.3	48.2	74.0	-25.8	Peak	Vertical
04	3856.000	45.1	0.2	45.3	74.0	-28.7	Peak	Horizontal
	5783.800	45.8	5.3	51.1	74.0	-22.9	Peak	Horizontal
	10525.100	32.3	15.1	47.4	74.0	-26.6	Peak	Horizontal
	3856.000	52.1	0.2	52.3	54.0	-1.7	Average	Vertical
	3856.000	52.9	0.2	53.1	74.0	-20.9	Peak	Vertical
	5783.800	48.0	5.3	53.3	54.0	-0.7	Average	Vertical
	5783.800	48.4	5.3	53.7	74.0	-20.3	Peak	Vertical
	9642.800	34.4	13.0	47.4	74.0	-26.6	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	Dick Shen
Test Date	2024-08-30	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	3844.100	44.4	0.2	44.6	74.0	-29.4	Peak	Horizontal
	5763.400	36.7	5.1	41.8	74.0	-32.2	Peak	Horizontal
	10572.700	32.3	15.2	47.5	74.0	-26.5	Peak	Horizontal
	3844.100	51.1	0.2	51.3	54.0	-2.7	Peak	Vertical
	3844.100	53.7	0.2	53.9	74.0	-20.1	Peak	Vertical
	5763.400	46.2	5.1	51.3	54.0	-2.7	Average	Vertical
	5763.400	47.9	5.1	53.0	74.0	-21.0	Peak	Vertical
	14639.100	29.2	19.0	48.2	54.0	-5.8	Average	Vertical
	14639.100	32.4	19.0	51.4	74.0	-22.6	Peak	Vertical
02	3849.200	43.7	0.2	43.9	74.0	-30.1	Peak	Horizontal
	5773.600	43.5	5.2	48.7	74.0	-25.3	Peak	Horizontal
	10530.200	32.5	15.0	47.5	74.0	-26.5	Peak	Horizontal
	3850.900	49.7	0.2	49.9	74.0	-24.1	Peak	Vertical
	5777.000	46.5	5.3	51.8	54.0	-2.2	Average	Vertical
	5777.000	47.5	5.3	52.8	74.0	-21.2	Peak	Vertical
	9627.500	35.0	12.9	47.9	74.0	-26.1	Peak	Vertical
04	3857.700	44.6	0.2	44.8	74.0	-29.2	Peak	Horizontal
	5785.500	42.1	5.3	47.4	74.0	-26.6	Peak	Horizontal
	14384.100	29.1	19.8	48.9	54.0	-5.1	Average	Horizontal
	14384.100	32.0	19.8	51.8	74.0	-22.2	Peak	Vertical
	3857.700	50.0	0.2	50.2	54.0	-3.8	Average	Vertical
	3857.700	51.8	0.2	52.0	74.0	-22.0	Peak	Vertical
	5787.200	45.8	5.4	51.2	74.0	-22.8	Peak	Vertical
	9644.500	34.1	13.0	47.1	74.0	-26.9	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	Dick Shen
Test Date	2024-08-30	Test Mode	Mode 3
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	3844.100	42.5	0.2	42.7	74.0	-31.3	Peak	Horizontal
	5765.100	39.8	5.1	44.9	74.0	-29.1	Peak	Horizontal
	11541.700	31.4	17.3	48.7	74.0	-25.3	Peak	Horizontal
	3844.100	50.1	0.2	50.3	54.0	-3.7	Average	Vertical
	3844.100	51.8	0.2	52.0	74.0	-22.0	Peak	Vertical
	5765.100	45.3	5.1	50.4	74.0	-23.6	Peak	Vertical
	11626.700	30.8	17.4	48.2	74.0	-25.8	Peak	Vertical
02	3849.200	43.7	0.2	43.9	74.0	-30.1	Peak	Horizontal
	5773.600	44.0	5.2	49.2	68.2	-19.0	Peak	Horizontal
	11477.100	31.5	17.4	48.9	74.0	-25.1	Peak	Horizontal
	3849.200	45.1	0.2	45.3	74.0	-28.7	Peak	Vertical
	5773.600	47.0	5.2	52.2	54.0	-1.8	Average	Vertical
	5773.600	47.5	5.2	52.7	74.0	-21.3	Peak	Vertical
	7698.000	34.9	10.8	45.7	74.0	-28.3	Peak	Vertical
04	3857.700	40.1	0.2	40.3	74.0	-33.7	Peak	Horizontal
	7351.200	32.6	10.9	43.5	74.0	-30.5	Peak	Horizontal
	11489.000	30.2	17.5	47.7	74.0	-26.3	Peak	Horizontal
	3857.700	48.0	0.2	48.2	74.0	-25.8	Peak	Vertical
	5783.800	46.0	5.3	51.3	54.0	-2.7	Average	Vertical
	5783.800	46.4	5.3	51.7	68.2	-16.5	Peak	Vertical
	7715.000	36.1	10.7	46.8	74.0	-27.2	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	Dick Shen
Test Date	2024-08-30	Test Mode	Mode 4
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	3842.400	44.2	0.2	44.4	74.0	-29.6	Peak	Horizontal
	5765.100	44.1	5.1	49.2	74.0	-24.8	Peak	Horizontal
	11388.700	31.8	17.2	49.0	74.0	-25.0	Peak	Horizontal
	3842.400	51.7	0.2	51.9	54.0	-2.1	Average	Vertical
	3842.400	52.2	0.2	52.4	74.0	-21.6	Peak	Vertical
	5765.100	48.4	5.1	53.5	54.0	-0.5	Average	Vertical
	5765.100	49.2	5.1	54.3	74.0	-19.7	Peak	Vertical
	11660.700	31.2	17.6	48.8	74.0	-25.2	Peak	Vertical
02	3850.900	44.9	0.2	45.1	74.0	-28.9	Peak	Horizontal
	5775.300	44.4	5.2	49.6	74.0	-24.4	Peak	Horizontal
	11647.100	31.6	17.6	49.2	74.0	-24.8	Peak	Horizontal
	3850.900	52.1	0.2	52.3	54.0	-1.7	Average	Vertical
	3850.900	53.0	0.2	53.2	74.0	-20.8	Peak	Horizontal
	5775.300	48.2	5.2	53.4	54.0	-0.6	Average	Vertical
	5775.300	49.5	5.2	54.7	74.0	-19.3	Peak	Horizontal
	9306.200	31.9	13.7	45.6	74.0	-28.4	Peak	Vertical
04	3857.700	43.5	0.2	43.7	74.0	-30.3	Peak	Horizontal
	5783.800	44.2	5.3	49.5	74.0	-24.5	Peak	Horizontal
	11482.200	31.3	17.4	48.7	74.0	-25.3	Peak	Horizontal
	3857.700	51.1	0.2	51.3	54.0	-2.7	Average	Vertical
	3857.700	52.7	0.2	52.9	74.0	-21.1	Peak	Vertical
	5783.800	48.1	5.3	53.4	54.0	-0.6	Average	Vertical
	5783.800	49.1	5.3	54.4	74.0	-19.6	Peak	Vertical
	14137.600	29.2	19.8	49.0	54.0	-5.0	Average	Vertical
	14137.600	31.6	19.8	51.4	74.0	-22.6	Peak	Vertical

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

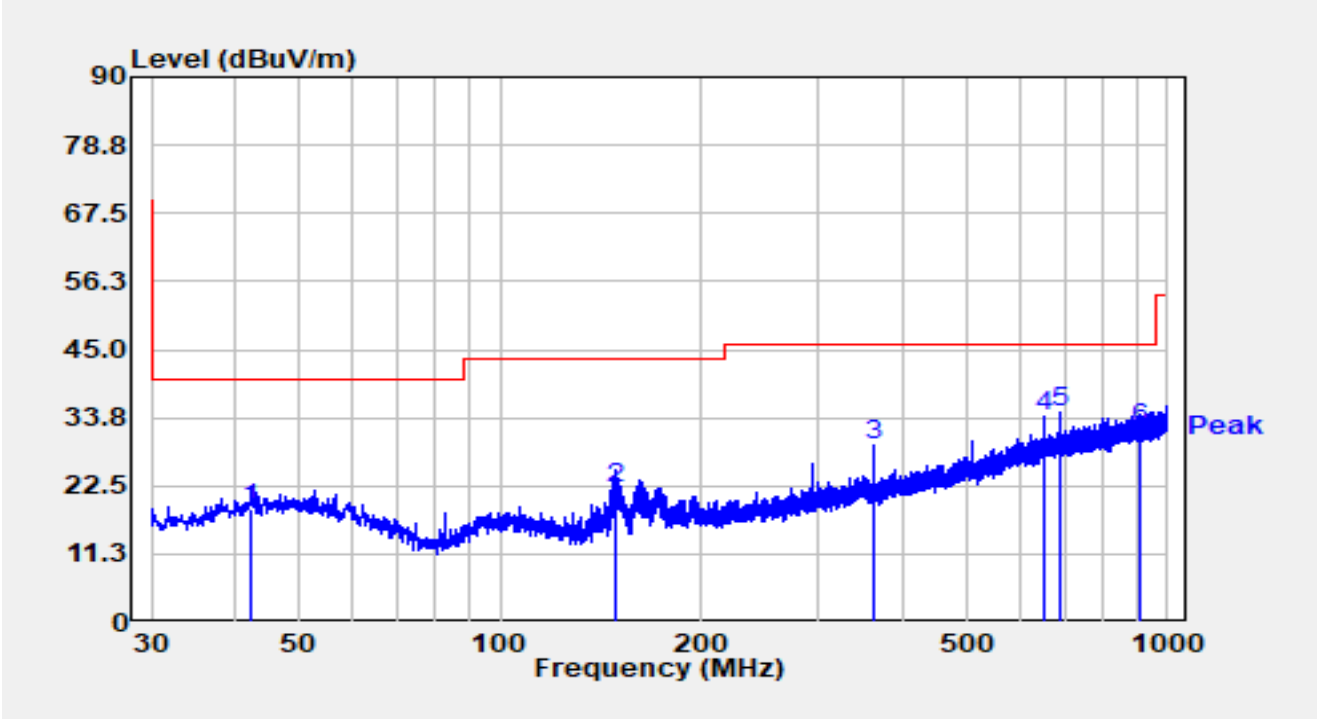
Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Site	WZ-AC2	Test Engineer	Dick Shen
Test Date	2024-08-30	Test Mode	Mode 5
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
04 + 02	3849.200	38.1	0.2	38.3	74.0	-35.7	Peak	Horizontal
	5787.200	36.7	5.4	42.1	74.0	-31.9	Peak	Horizontal
	11103.100	31.5	16.6	48.1	74.0	-25.9	Peak	Horizontal
	3850.900	43.9	0.2	44.1	74.0	-29.9	Peak	Vertical
	5777.000	41.8	5.3	47.1	74.0	-26.9	Peak	Vertical
	13391.300	31.8	18.3	50.1	74.0	-23.9	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)								

The Worst Result of Radiated Emission below 1GHz:

Site	WZ-AC2	Test Date	2024-09-10
Test Engineer	Dick Shen	Temp./Humidity	20.3°C /45.4%
Factor	VULB 9162_30-7000MHz	Polarity	Horizontal
EUT	Access Point Transceiver	Test Voltage	Powered by PoE Switch
Test Mode	Test Mode 5		



No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1		42.222	-1.17	19.79	18.62	-21.38	40.00	QP
2		148.243	6.81	15.15	21.96	-21.54	43.50	QP
3		362.904	7.10	22.12	29.22	-16.78	46.00	QP
4		653.225	5.73	28.13	33.86	-12.14	46.00	QP
5	*	688.145	6.02	28.57	34.59	-11.41	46.00	QP
6		909.014	0.24	31.56	31.80	-14.20	46.00	QP

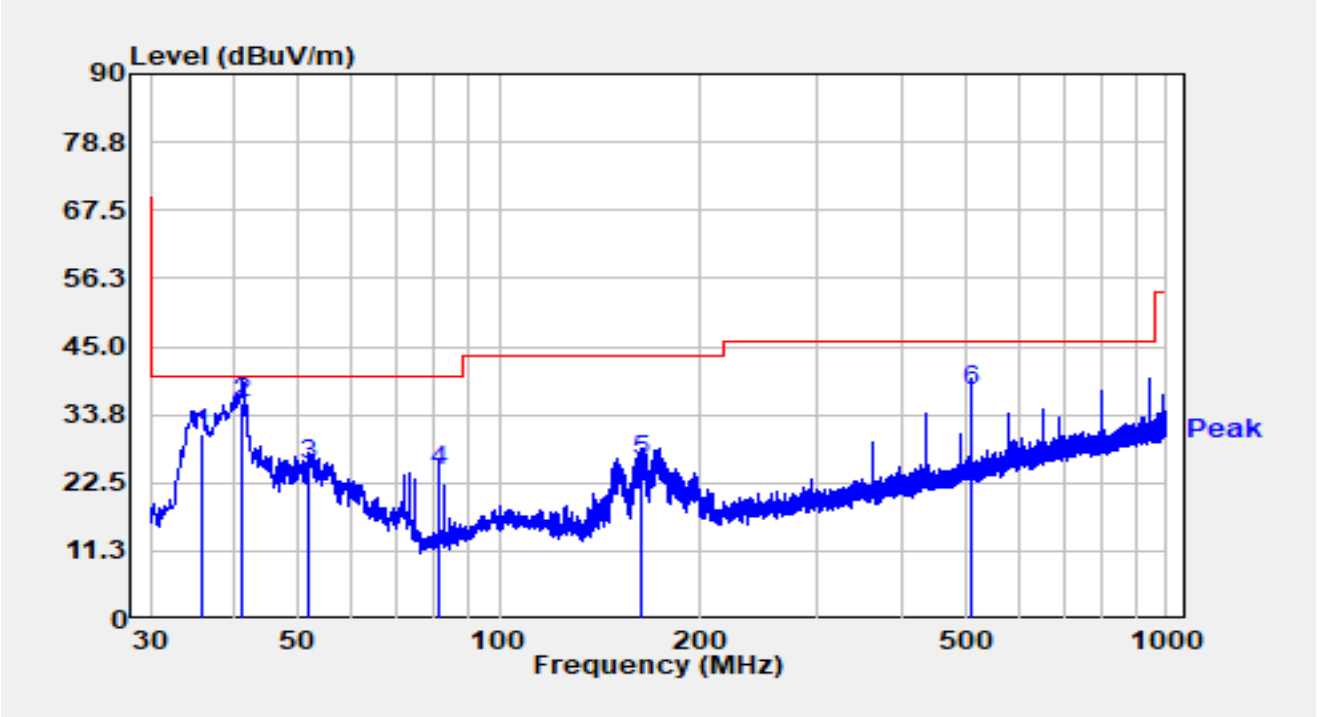
Notes:

1. " *", means this data is the worst emission level.

2. C.F (dB/m) = Antenna Factor (dB/m)+ Cable Loss (dB).

3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

Site	WZ-AC2	Test Date	2024-09-10
Test Engineer	Dick Shen	Temp./Humidity	20.3°C /45.4%
Factor	VULB 9162_30-7000MHz	Polarity	Vertical
EUT	Access Point Transceiver	Test Voltage	Powered by PoE Switch
Test Mode	Test Mode 5		



No	Mark	Frequency (MHz)	Reading (dBµV)	C.F (dB/m)	Measurement (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector
1		35.723	12.64	17.81	30.45	-9.55	40.00	QP
2	*	41.200	16.10	19.55	35.65	-4.35	40.00	QP
3		51.728	4.91	20.43	25.34	-14.66	40.00	QP
4		81.313	10.45	14.05	24.50	-15.50	40.00	QP
5		163.763	10.37	15.95	26.32	-17.18	43.50	QP
6		508.016	12.37	25.38	37.75	-8.25	46.00	QP

Notes:

1. " *", means this data is the worst emission level.

2. C.F (dB/m) = Antenna Factor (dB/m)+ Cable Loss (dB).

3. Measurement (dBµV/m) = Reading (dBµV) + C.F (dB/m).

6.9. Frame Repetition Stability and Period and Jitter

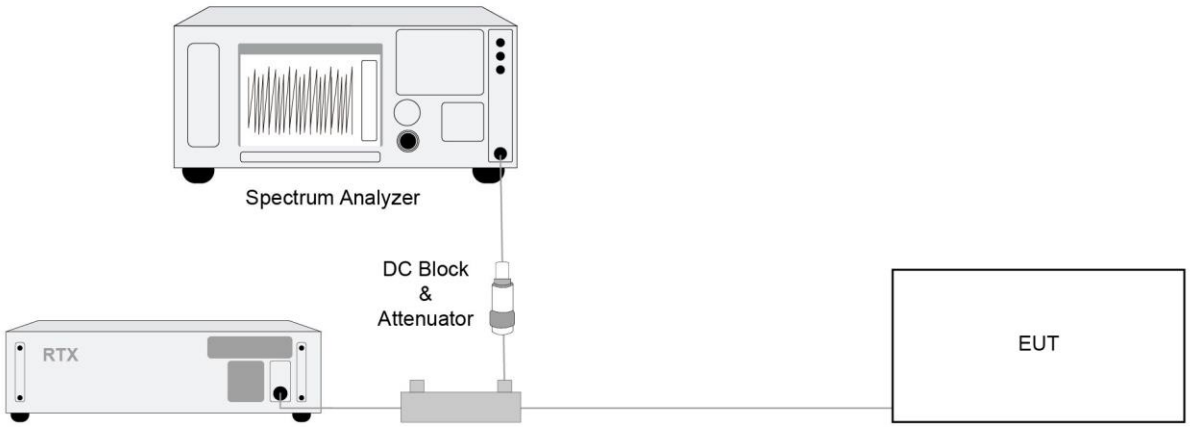
6.9.1. Test Limit

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

ANSI C63.17, Clause 6.2.2 & 6.2.3

6.9.3. Test Setup



6.9.4. Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-08-20	Test Mode	Mode 1

Carrier Frequency (MHz)	Frame Repetition Stability (ppm)					Limit (ppm)
	Standard deviation		Frame Repetition Stability			
1924.992	0.155		0.465			±10
Carrier Frequency (MHz)	Frame Jitter (us)					Limit (us)
	min	mean	max	△min	△max	
1924.992	-0.1	0	0.1	-0.8	0.8	±25

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-08-20	Test Mode	Mode 3

Carrier Frequency (MHz)	Frame Repetition Stability (ppm)					Limit (ppm)
	Standard deviation		Frame Repetition Stability			
1924.992	0.150		0.450			±10
Carrier Frequency (MHz)	Frame Jitter (us)					Limit (us)
	min	mean	max	△min	△max	
1924.992	-0.1	0	0.1	-0.8	0.8	±25

6.10. Carrier Frequency Stability

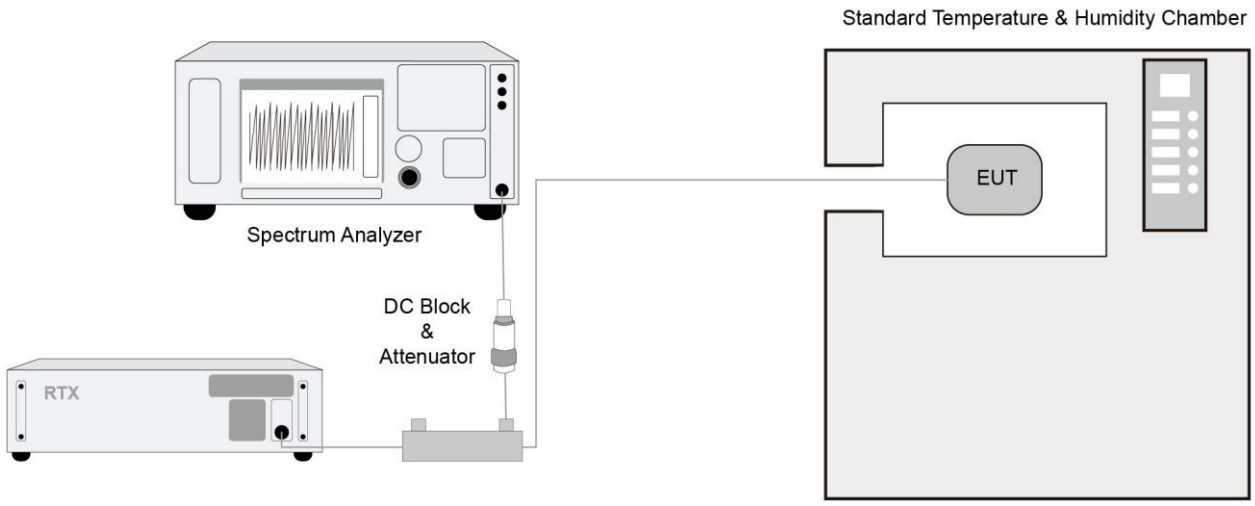
6.10.1. Test Limit

Per §15.323(f), the frequency stability of the carrier frequency of the intentional radiator shall be maintained within ±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°C to +50°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 °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

ANSI C63.17, Clause 6.2.1

6.10.3. Test Setup



6.10.4. Test Result

Test Site	WZ-TR3	Test Engineer	Lynn Yang
Test Date	2024-08-25	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)
1924.99350	7.0	0.3	2.88	±10

Carrier Frequency Stability over Temperature

Voltage	Average Mean Carrier Frequency (MHz)	Max. Diff (kHz)	Deviation (ppm)	Limit (ppm)
T = +20°C	1924.99350	Ref	Ref	±10
T = 0°C		6.8	2.75	
T = +40°C		4.7	1.66	

Carrier Frequency Stability over Voltage

Voltage	Average Mean Carrier Frequency (MHz)	Max. Diff (kHz)	Deviation (ppm)	Limit (ppm)
V = 120V	1924.99350	Ref	Ref	±10
V = 102V		6.7	2.70	
V = 138V		6.5	2.59	

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

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

Test Site	WZ-TR3	Test Engineer	Lynn Yang
Test Date	2024-08-25	Test Mode	Mode 3

Carrier Frequency Stability over Time at Nominal Temperature

Average Mean Carrier Frequency (MHz)	Max. Diff. (kHz)	Min. Diff. (kHz)	Max Dev. (ppm)	Limit (ppm)
1924.99355	7.1	0.4	2.88	±10

Carrier Frequency Stability over Temperature

Voltage	Average Mean Carrier Frequency (MHz)	Max. Diff (kHz)	Deviation (ppm)	Limit (ppm)
T = +20°C	1924.99355	Ref	Ref	±10
T = 0°C		6.9	2.78	
T = +40°C		5.2	1.90	

Carrier Frequency Stability over Voltage

Voltage	Average Mean Carrier Frequency (MHz)	Max. Diff (kHz)	Deviation (ppm)	Limit (ppm)
V = 120V	1924.99355	Ref	Ref	±10
V = 102V		6.8	2.73	
V = 138V		6.3	2.47	

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

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

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: $T_L = -174+10Log_{10}B + M_u + P_{MAX} - P_{EUT}$ (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)

For Radio A

Monitor Threshold	B (MHz)	M_U (dB)	P_{MAX} (dBm)	P_{EUT} (dBm)	Threshold (dBm)
T_L	1.390	30	20.58	18.40	-80.39

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

Measured Threshold Level $\leq T_L + U_m$ = -80.39 + 6 = -74.39dBm

For Radio B

Monitor Threshold	B (MHz)	M_U (dB)	P_{MAX} (dBm)	P_{EUT} (dBm)	Threshold (dBm)
T_L	1.385	30	20.30	18.00	-80.41

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

Measured Threshold Level $\leq T_L + U_m$ = -80.41 + 6 = -74.41dBm

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.

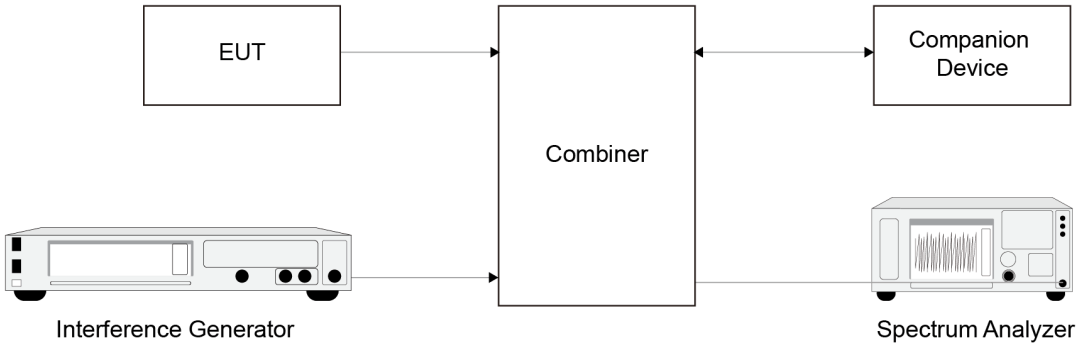
System Acknowledgement

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

ANSI C63.17, Clause 7.3 & 8.2.

6.11.3. Test Setup



6.11.4. Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-08-20	Test Mode	Mode 2

Monitoring Time Requirements

Interference ref. to ANSI C63.17 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	5.1 sec	Pass

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-08-20	Test Mode	Mode 3

Monitoring Time Requirements

Interference ref. to ANSI C63.17 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	5.1 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

ANSI C63.17, Clause 7.3.2 & 7.3.3

6.12.3. Test Result

Test Site	WZ-SR5	Test Engineer	Dandy Li
Test Date	2024-08-24	Test Mode	Mode 2

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 + 7dB 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 + 7dB. 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 + 1dB and on f_2 at a level of T_L + U_M − 6dB. 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 + 1dB and on f_2 at a level of T_L + U_M − 6dB. 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.

Test Site	WZ-SR5	Test Engineer	Dandy Li
Test Date	2024-08-24	Test Mode	Mode 3

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 + 7dB 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 + 7dB. 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 + 1dB and on f_2 at a level of T_L + U_M − 6dB. 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 + 1dB and on f_2 at a level of T_L + U_M − 6dB. 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

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

Threshold and LIC Monitoring Bandwidth

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

Reaction Time and Monitoring Interval

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

ANSI C63.17, Clause 7.4 & 7.5

6.14.3. Test Result

Test Site	WZ-SR5	Test Engineer	Dandy Li
Test Date	2024-08-24	Test Mode	Mode 2

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 (μs)	B (MHz)	Pulse width(μs)
50 $(1.25/B)^{1/2}$	1.390	47.42
25 $(1.25/B)^{1/2}$	1.390	23.71

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 50μs.	EUT transmit on f_2	Pass
2) Change the time-synchronized, pulsed interference on f_1 to the level $T_L + U_M$ + 6dB. Verify that the EUT establishes a connection only on f_2 when the width of the interference pulse exceeds 35μs.	EUT transmit on f_2	Pass

Test Site	WZ-SR5	Test Engineer	Dandy Li
Test Date	2024-08-24	Test Mode	Mode 3

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 (μs)	B (MHz)	Pulse width(μs)
50 $(1.25/B)^{1/2}$	1.385	47.50
25 $(1.25/B)^{1/2}$	1.385	23.75

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 50μs.	EUT transmit on f_2	Pass
2) Change the time-synchronized, pulsed interference on f_1 to the level $T_L + U_M$ + 6dB. Verify that the EUT establishes a connection only on f_2 when the width of the interference pulse exceeds 35μs.	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

ANSI C63.17 Clause 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

ANSI C63.17 Clause 4

6.16.3. Test Result

This requirement is covered by the results of Least Interfered Channel (LIC).

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

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

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.

6.20. Automatic Discontinuation of Transmission

Does the EUT transmit Control and Signaling Information?	☒Yes	☐No
Does the EUT support Least Interfered Channel algorithm?	☒Yes	☐No
Type of EUT	☐Initiating Device	☒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.

Appendix A - Test Setup Photograph

Refer to “2407RSU009-UT” file.

Appendix B - EUT Photograph

Refer to “2407RSU009-UE” file.

The End