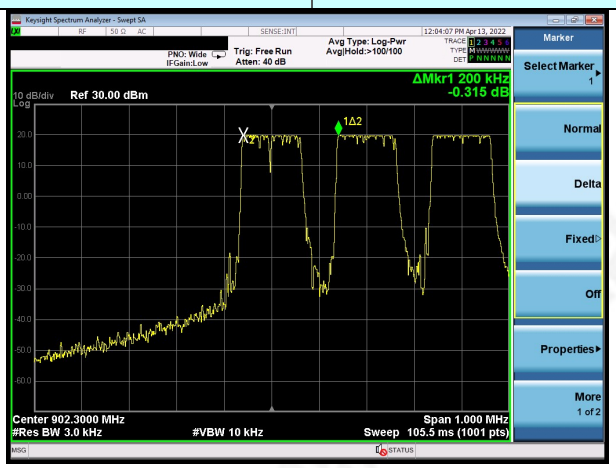
Test plot as follows:

Modulation mode:	125KHz Bandwidth



Lowest channel

Middle channel

Highest channel

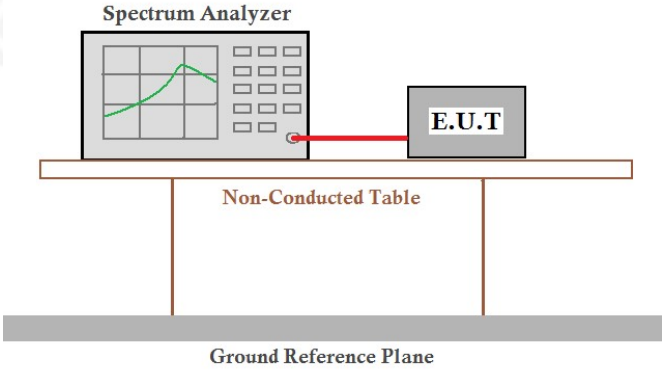
Test mode:	250KHz Bandwidth

Lowest channel

Middle channel

Highest channel

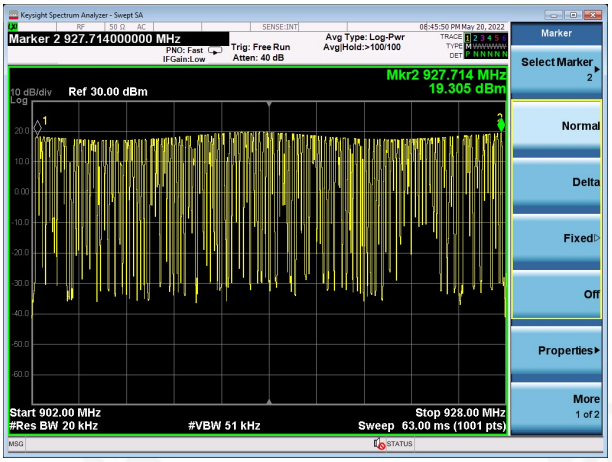
4.5 Hopping Channel Number

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

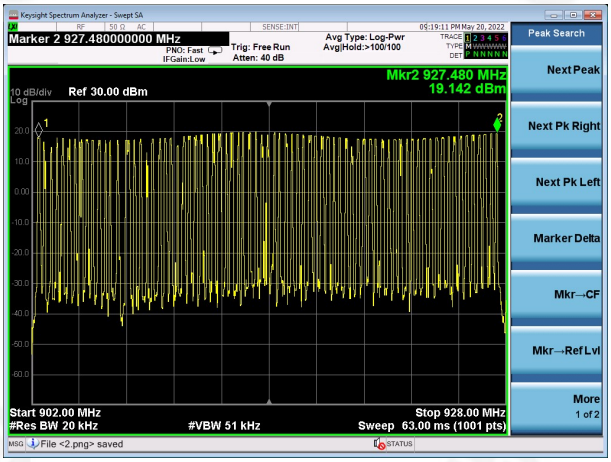
Measurement Data:

Mode	Hopping channel numbers	Limit	Result
125KHz Bandwidth	128	50	Pass
250KHz Bandwidth	77	25	Pass

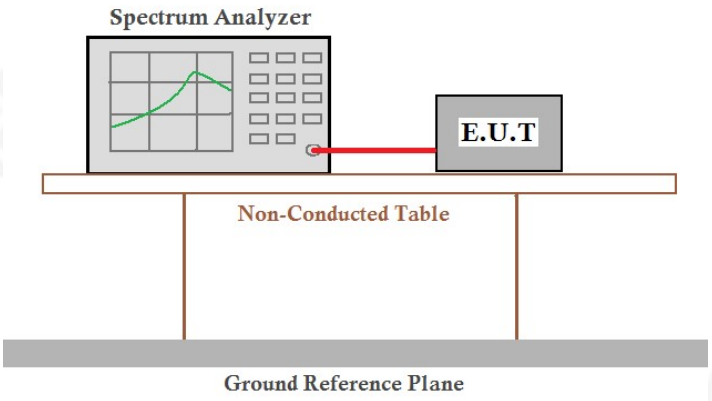
125KHz



250KHz



4.6 Dwell Time

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=10kHz, VBW=30KHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

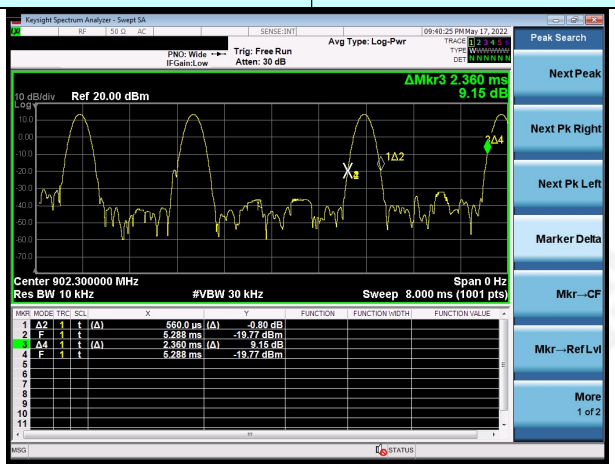
Measurement Data

Mode	Ton(ms)	Tcycle(ms)	Dwell time(ms)	Limit(ms)	Result
125KHz Bandwidth	0.560	2.360	90.169	400	Pass
250KHz Bandwidth	0.210	1.680	15.00	400	Pass

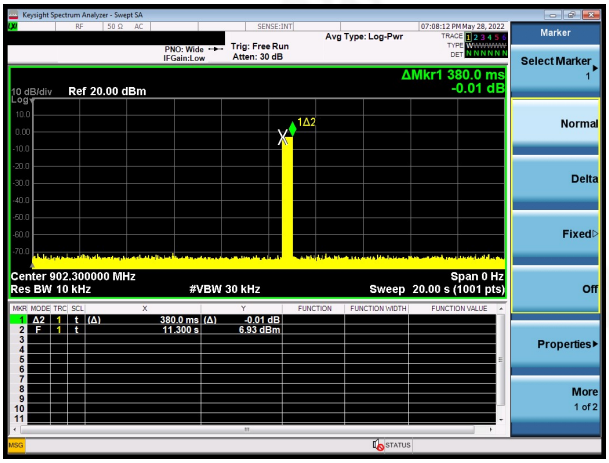
Note: Transmit numbers= Continue TX Time/Tcycle
Dwell time=Transmit numbers*Ton

Test plot as follows:

Test Mode:	125KHz Bandwidth

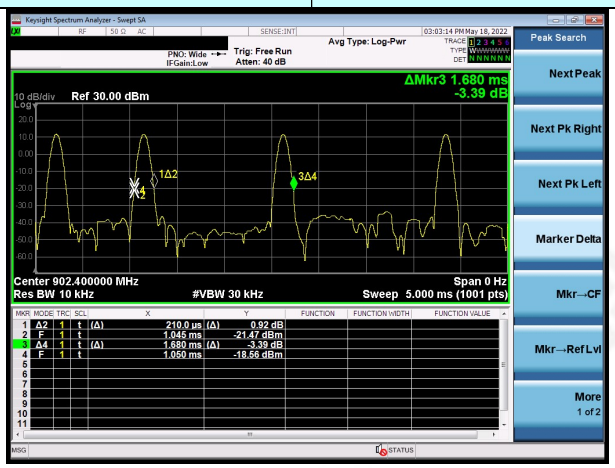


Ton&Tcycle

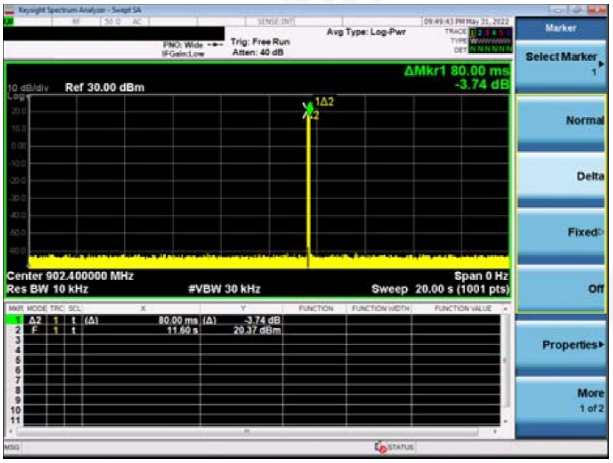


Continue TX Time

Test Mode:	250KHz Bandwidth

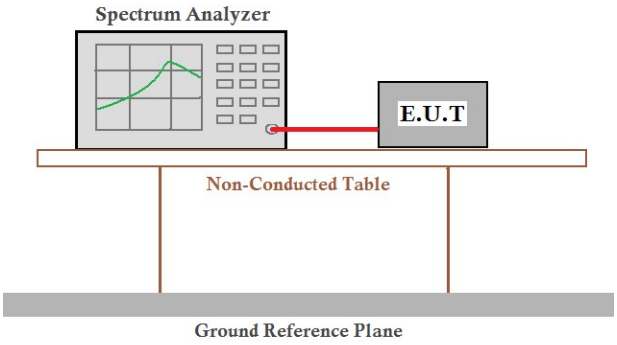


Ton&Tcycle



Continue TX Time

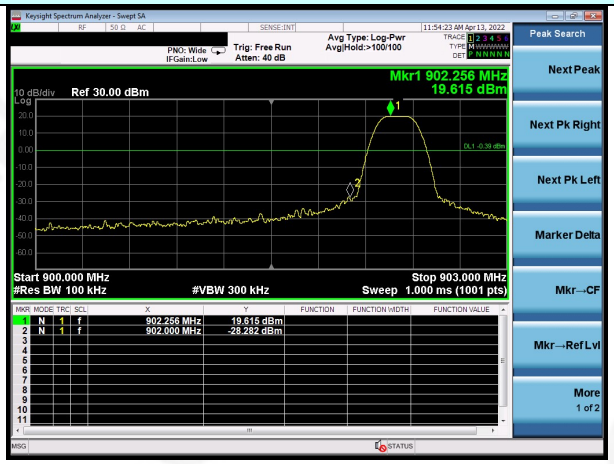
4.7 Band Edge

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Detector=Peak
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

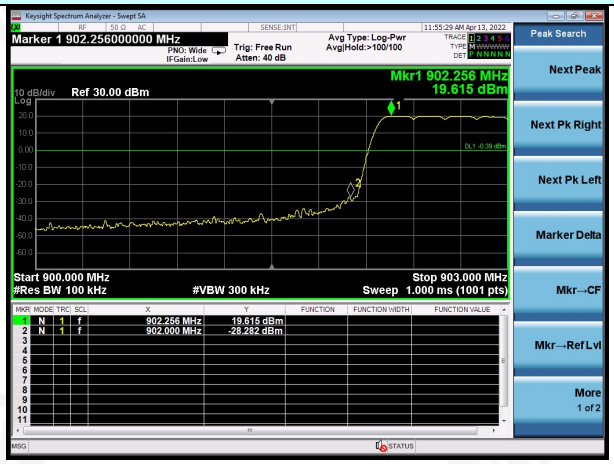
Test plot as follows:

125KHz Bandwidth:

Test channel:	Lowest channel

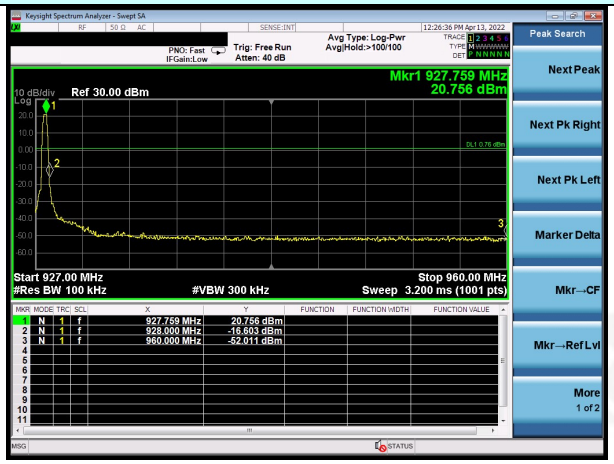


No-hopping mode

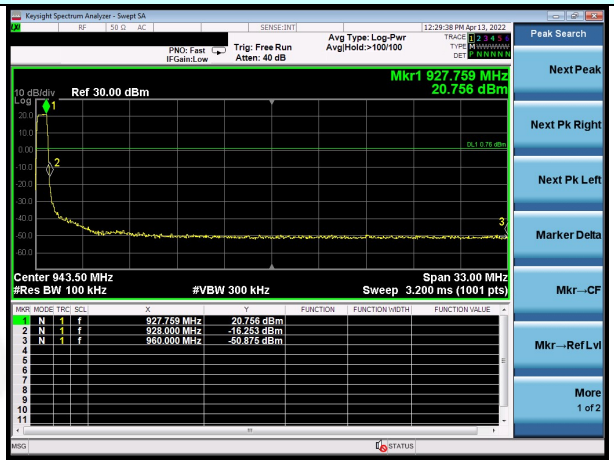


Hopping mode

Test channel:	Highest channel



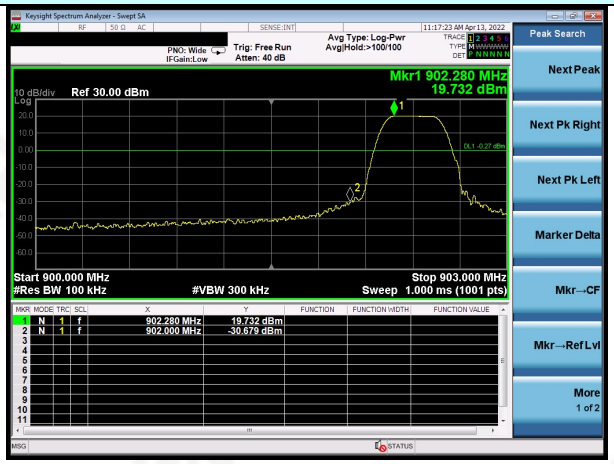
No-hopping mode



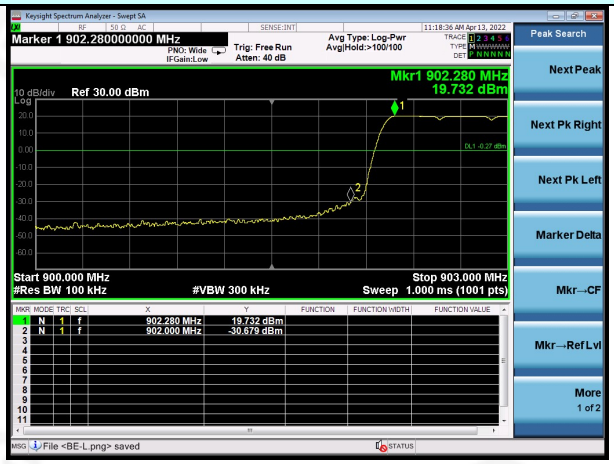
Hopping mode

250KHz Bandwidth:

Test channel:	Lowest channel

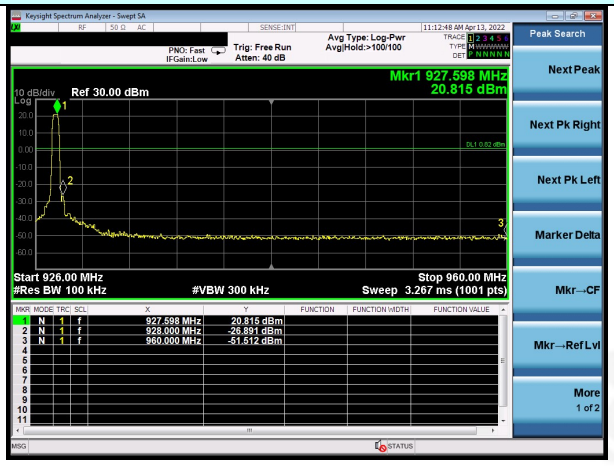


No-hopping mode

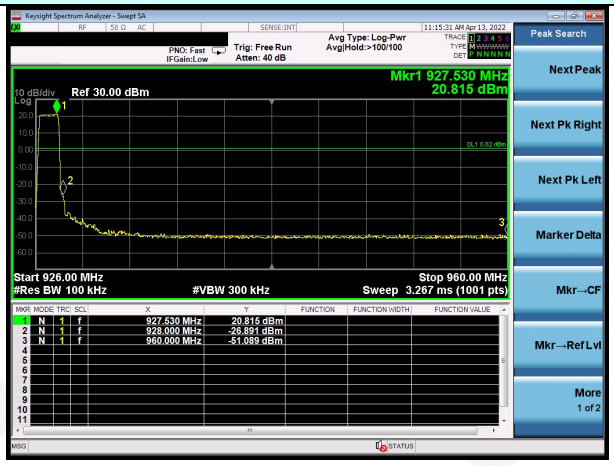


Hopping mode

Test channel:	Highest channel



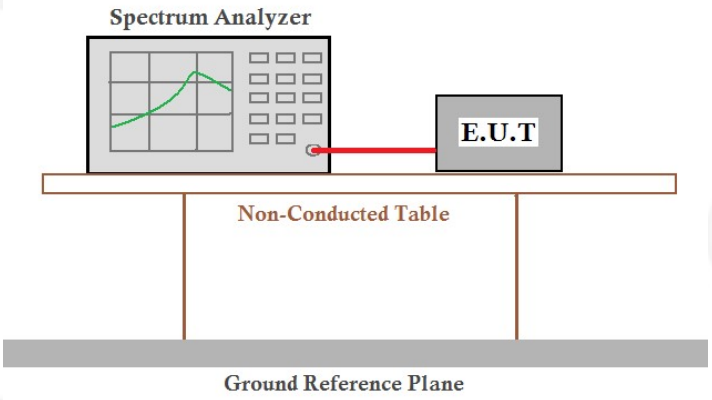
No-hopping mode



Hopping mode

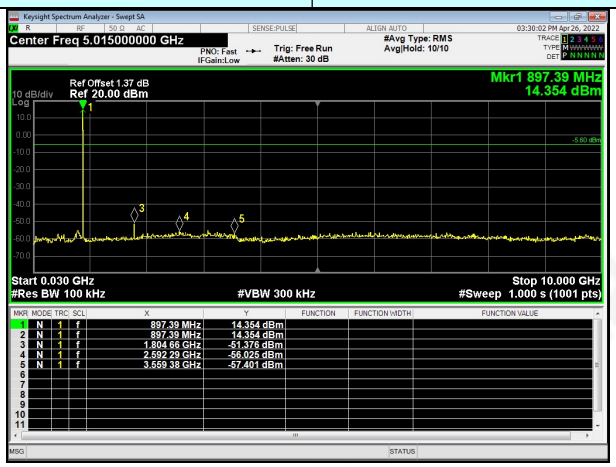
4.8 Spurious Emission

Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

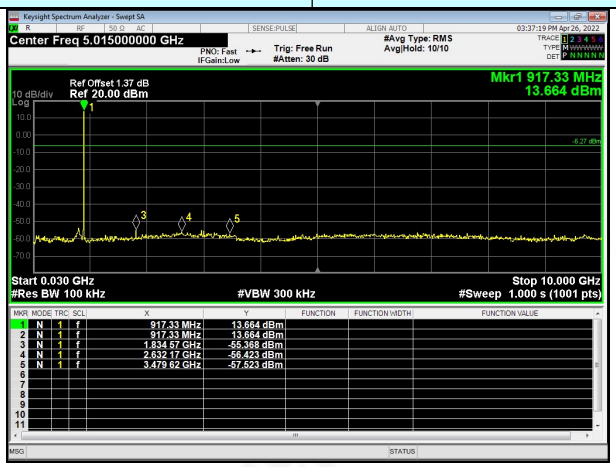
125KHz Bandwidth:

Test channel:	Lowest channel



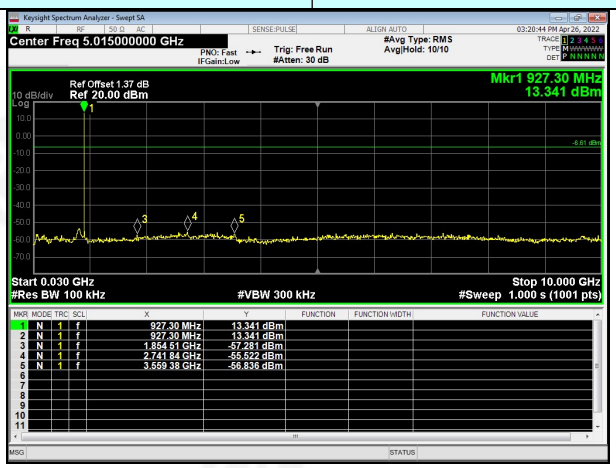
30MHz~10GHz

Test channel:	Middle channel



30MHz~10GHz

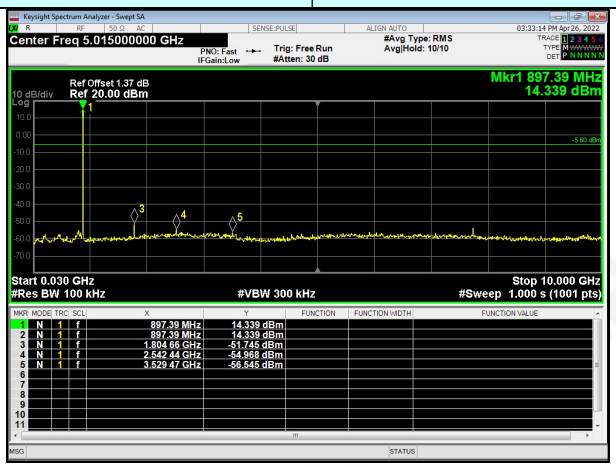
Test channel:	Highest channel



30MHz~10GHz

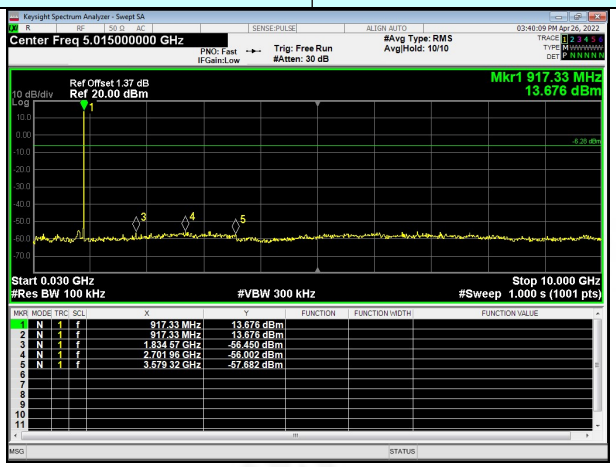
250KHz Bandwidth:

Test channel:	Lowest channel



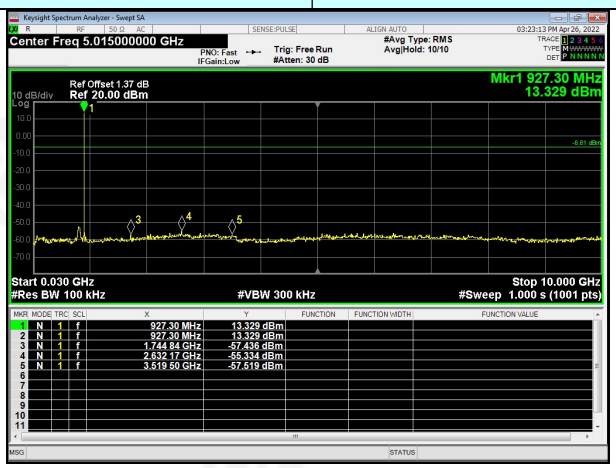
30MHz~10GHz

Test channel:	Middle channel



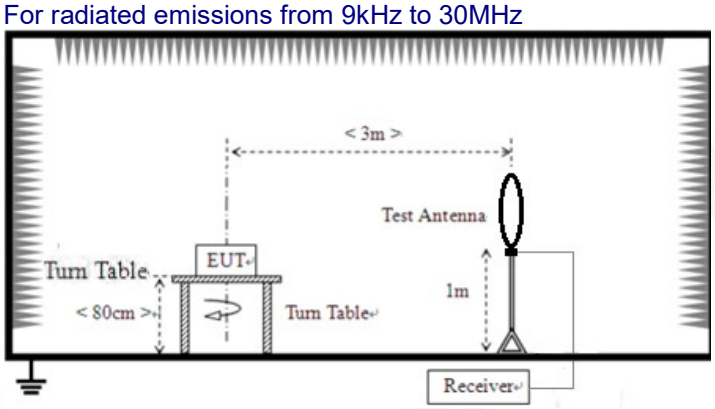
30MHz~10GHz

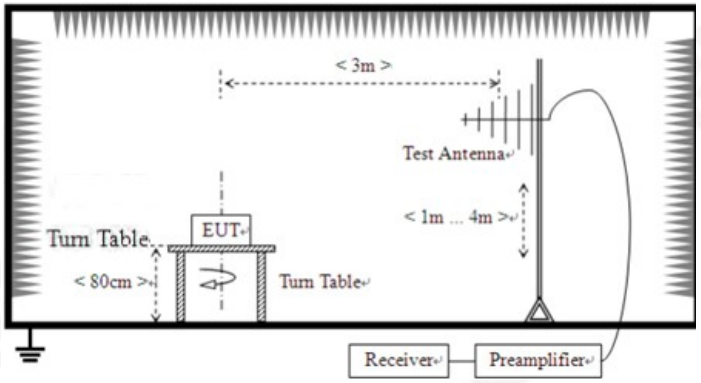
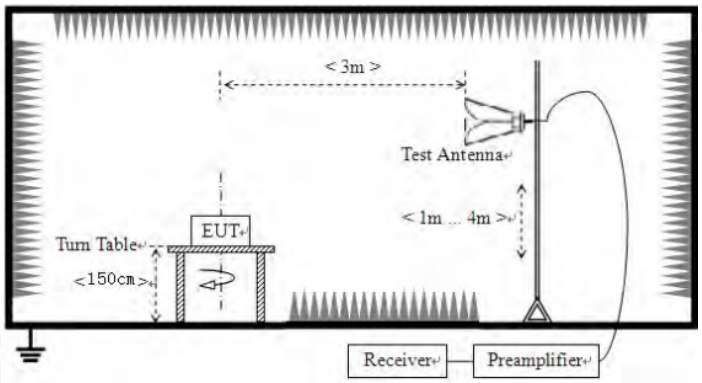
Test channel:	Highest channel



30MHz~10GHz

4.9 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 25GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9KHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>600Hz</td><td>Quasi-peak</td></tr>
<tr><td>150KHz-30MHz</td><td>Quasi-peak</td><td>9KHz</td><td>30KHz</td><td>Quasi-peak</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (uV/m)</th><th>Value</th><th>Measurement Distance</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(KHz)</td><td>QP</td><td>30m</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>QP</td><td>30m</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>QP</td><td rowspan="6">3m</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>QP</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>QP</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>QP</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>500</td><td>Average</td></tr>
<tr><td>5000</td><td>Peak</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions from 9kHz to 30MHz
 
</td></tr>
</table>

	For radiated emissions from 30MHz to1GHz  For radiated emissions above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details

Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Measurement data:

Remarks:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

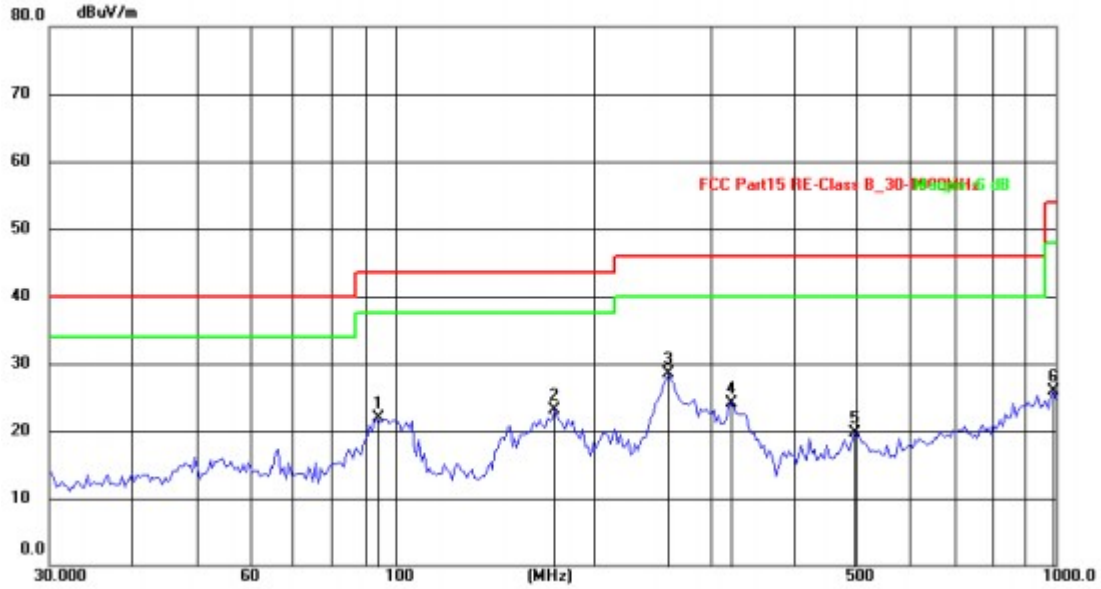
■ **9kHz~30MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

■ Below 1GHz

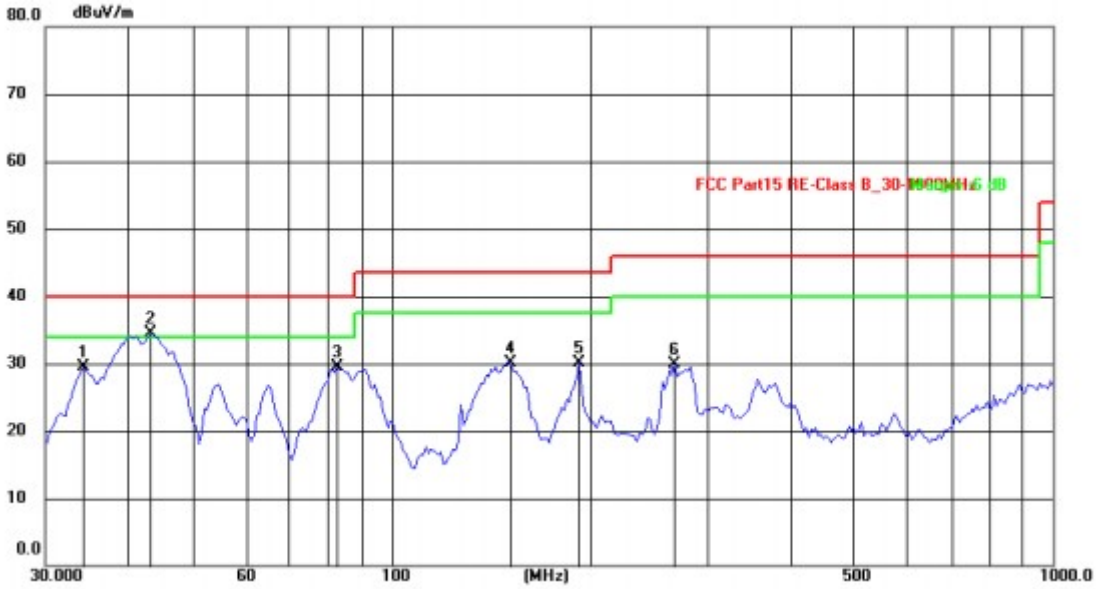
Pre-scan all test modes, found worst case at lowest channel of 125KHz bandwidth, so only show the worst case on the report.

Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	93.7685	41.99	-20.06	21.93	43.50	-21.57	QP
2	174.7300	41.22	-18.15	23.07	43.50	-20.43	QP
3	259.2338	45.63	-17.18	28.45	46.00	-17.55	QP
4	322.7538	43.09	-18.89	24.20	46.00	-21.80	QP
5	495.9343	33.51	-13.83	19.68	46.00	-26.32	QP
6	991.2718	32.99	-7.05	25.94	54.00	-28.06	QP

Vertical:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	34.2159	47.18	-17.74	29.44	40.00	-10.56	QP
2	43.3534	51.49	-17.01	34.48	40.00	-5.52	QP
3	82.9384	51.18	-21.76	29.42	40.00	-10.58	QP
4	150.5378	51.25	-21.05	30.20	43.50	-13.30	QP
5	192.4185	51.40	-21.31	30.09	43.50	-13.41	QP
6	268.4852	50.88	-21.04	29.84	46.00	-16.16	QP

■ **Above 1GHz**

Test channel:	Lowest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1804.60	41.19	25.35	4.67	34.04	37.17	74.00	-36.83	Vertical
2706.90	34.94	28.26	5.43	33.25	35.38	74.00	-38.62	Vertical
3609.20	33.71	29.18	7.11	37.34	32.66	74.00	-41.34	Vertical
4511.50	*					74.00		Vertical
5413.80	*					74.00		Vertical
6316.10	*					74.00		Vertical
1804.60	39.78	25.35	4.67	34.04	35.76	74.00	-38.24	Horizontal
2706.90	34.99	28.26	5.43	33.25	35.43	74.00	-38.57	Horizontal
3609.20	32.67	29.18	7.11	37.34	31.62	74.00	-42.38	Horizontal
4511.50	*					74.00		Horizontal
5413.80	*					74.00		Horizontal
6316.10	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1804.60	30.27	25.35	4.67	34.04	26.25	54.00	-27.75	Vertical
2706.90	23.81	28.26	5.43	33.25	24.25	54.00	-29.75	Vertical
3609.20	24.06	29.18	7.11	37.34	23.01	54.00	-30.99	Vertical
4511.50	*					54.00		Vertical
5413.80	*					54.00		Vertical
6316.10	*					54.00		Vertical
1804.60	29.31	25.35	4.67	34.04	25.29	54.00	-28.71	Horizontal
2706.90	23.57	28.26	5.43	33.25	24.01	54.00	-29.99	Horizontal
3609.20	22.42	29.18	7.11	37.34	21.37	54.00	-32.63	Horizontal
4511.50	*					54.00		Horizontal
5413.80	*					54.00		Horizontal
6316.10	*					54.00		Horizontal

Test channel:	Middle channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1830.20	40.23	25.43	4.89	34.12	36.43	74.00	-37.57	Vertical
2745.30	35.00	28.34	5.68	33.57	35.45	74.00	-38.55	Vertical
3660.40	34.73	29.42	7.29	37.66	33.78	74.00	-40.22	Vertical
4575.50	*					74.00		Vertical
5490.60	*					74.00		Vertical
6405.70	*					74.00		Vertical
1830.20	40.63	25.43	4.89	34.12	36.83	74.00	-37.17	Horizontal
2745.30	33.95	28.34	5.68	33.57	34.40	74.00	-39.60	Horizontal
3660.40	33.99	29.42	7.29	37.66	33.04	74.00	-40.96	Horizontal
4575.50	*					74.00		Horizontal
5490.60	*					74.00		Horizontal
6405.70	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1830.20	31.08	25.43	4.89	34.12	27.28	54.00	-26.72	Vertical
2745.30	23.32	28.34	5.68	33.57	23.77	54.00	-30.23	Vertical
3660.40	23.98	29.42	7.29	37.66	23.03	54.00	-30.97	Vertical
4575.50	*					54.00		Vertical
5490.60	*					54.00		Vertical
6405.70	*					54.00		Vertical
1830.20	30.74	25.43	4.89	34.12	26.94	54.00	-27.06	Horizontal
2745.30	23.04	28.34	5.68	33.57	23.49	54.00	-30.51	Horizontal
3660.40	23.71	29.42	7.29	37.66	22.76	54.00	-31.24	Horizontal
4575.50	*					54.00		Horizontal
5490.60	*					54.00		Horizontal
6405.70	*					54.00		Horizontal

Test channel:	Highest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1855.40	45.81	25.64	4.75	34.67	41.53	74.00	-32.47	Vertical
2783.10	35.7	28.46	5.87	33.83	36.2	74.00	-37.8	Vertical
3710.80	38.44	29.75	7.59	37.76	38.02	74.00	-35.98	Vertical
4638.50	*					74.00		Vertical
5566.20	*					74.00		Vertical
6493.90	*					74.00		Vertical
1855.40	45.62	25.64	4.75	34.67	41.34	74.00	-32.66	Horizontal
2783.10	34.98	28.46	5.87	33.83	35.48	74.00	-38.52	Horizontal
3710.80	33.79	29.75	7.59	37.76	33.37	74.00	-40.63	Horizontal
4638.50	*					74.00		Horizontal
5566.20	*					74.00		Horizontal
6493.90	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1855.40	36.77	25.64	4.75	34.67	32.49	54.00	-21.51	Vertical
2783.10	25.69	28.46	5.87	33.83	26.19	54.00	-27.81	Vertical
3710.80	26.53	29.75	7.59	37.76	26.11	54.00	-27.89	Vertical
4638.50	*					54.00		Vertical
5566.20	*					54.00		Vertical
6493.90	*					54.00		Vertical
1855.40	35.48	25.64	4.75	34.67	31.2	54.00	-22.8	Horizontal
2783.10	24.25	28.46	5.87	33.83	24.75	54.00	-29.25	Horizontal
3710.80	22.15	29.75	7.59	37.76	21.73	54.00	-32.27	Horizontal
4638.50	*					54.00		Horizontal
5566.20	*					54.00		Horizontal
6493.90	*					54.00		Horizontal

Remarks:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means this data is the too weak instrument of signal is unable to test.*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
4. *The test data shows only the worst case 125KHz bandwidth mode.*

5. Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
EUT Antenna:	
The antenna is External antenna, the best case gain of the antennas is 5dBi, reference to the appendix II for details	

6. Test Setup Photo

Reference to the appendix I for details.

7. EUT Constructional Details

Reference to the appendix II for details.

※※※※※ END OF REPORT ※※※※※