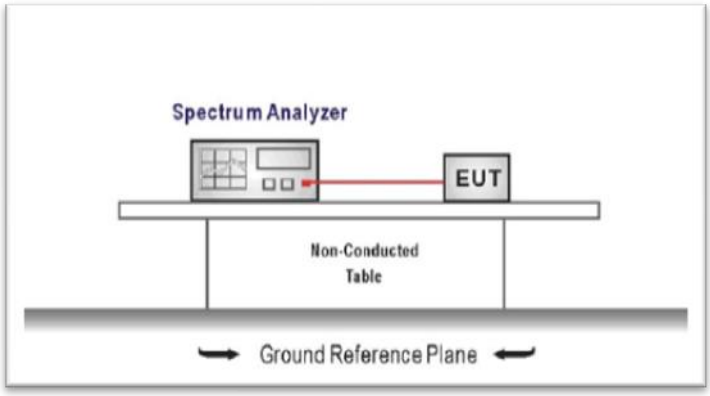
5.10. Band edge and Spurious Emissions (conducted)

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):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 CONFIGURATION



TEST PROCEDURE

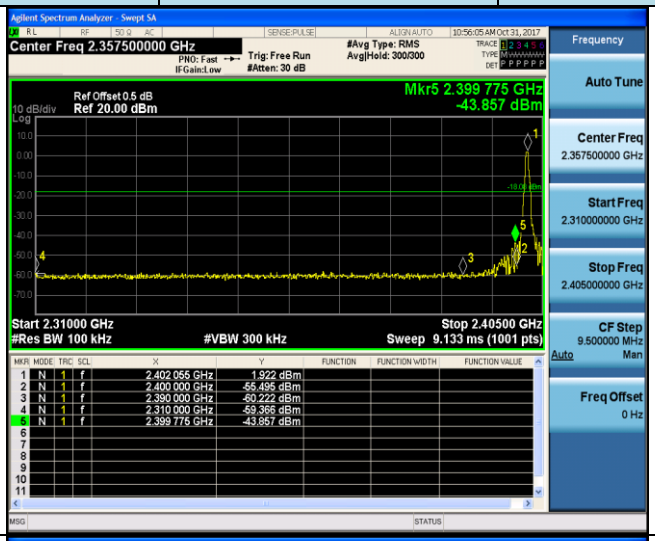
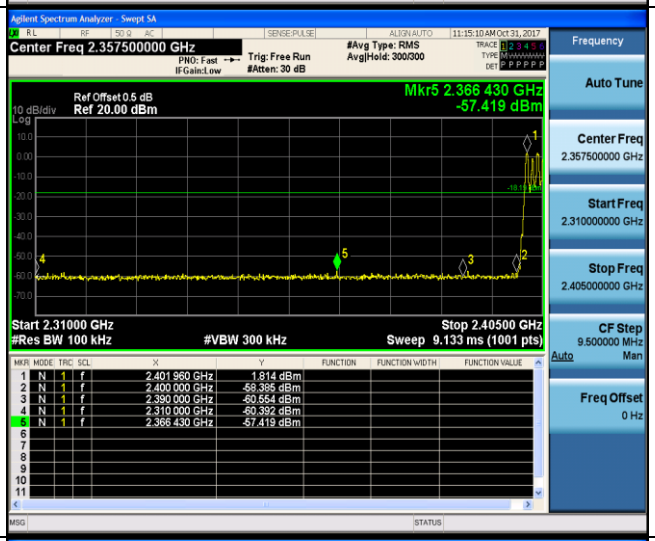
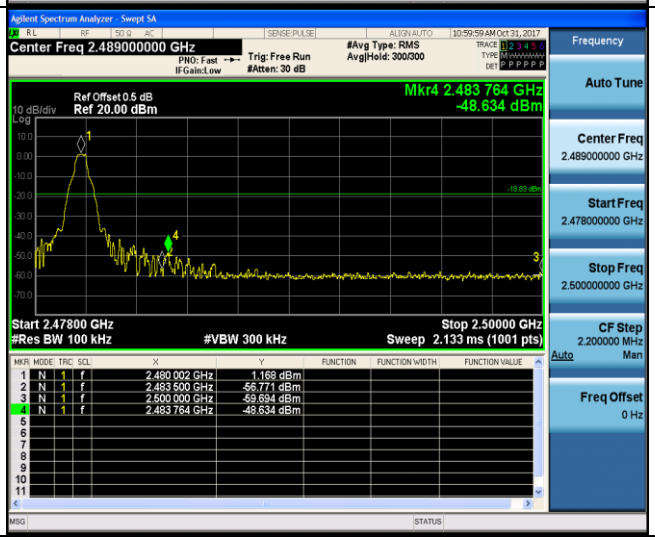
1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
   RBW = 100 kHz, VBW ≥ RBW
   Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

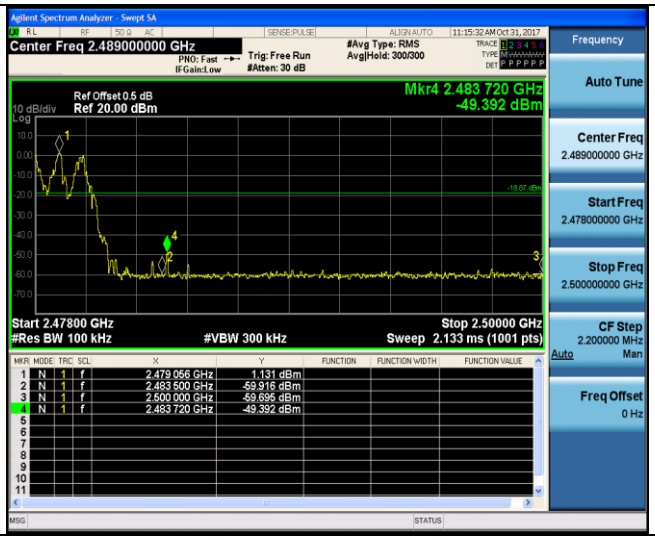
TEST MODE:

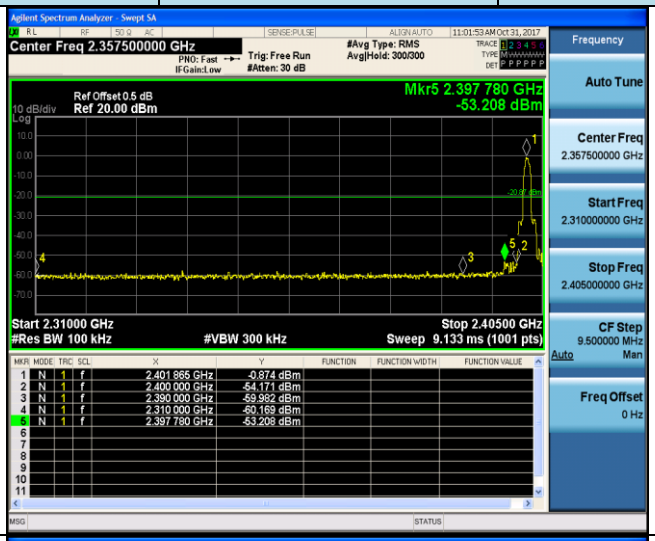
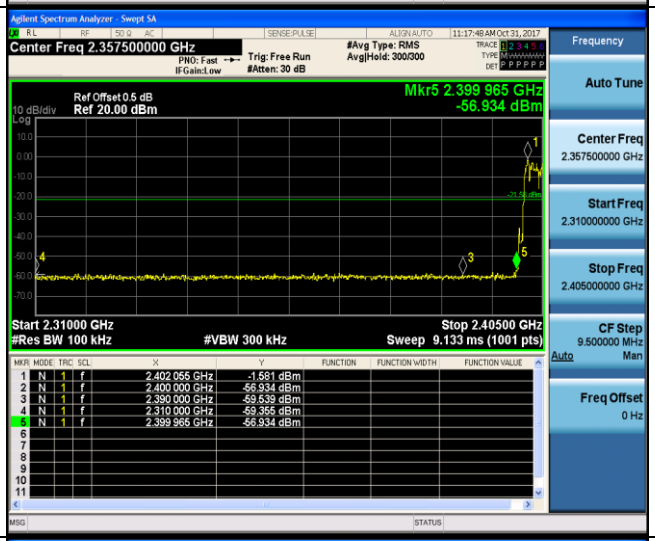
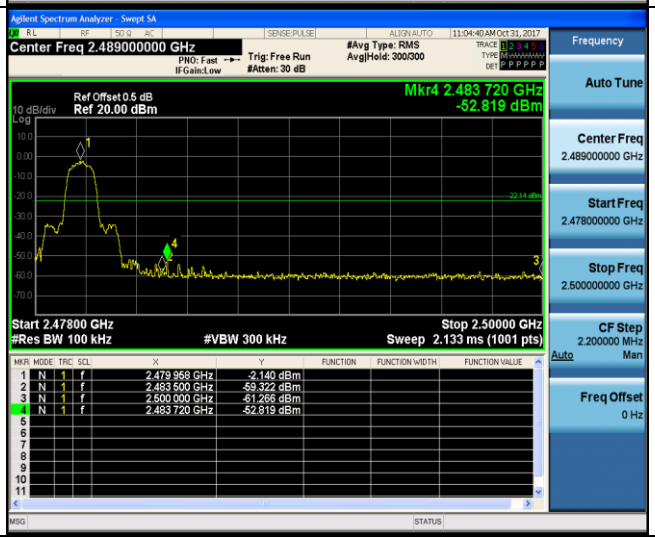
Please refer to the clause 3.3

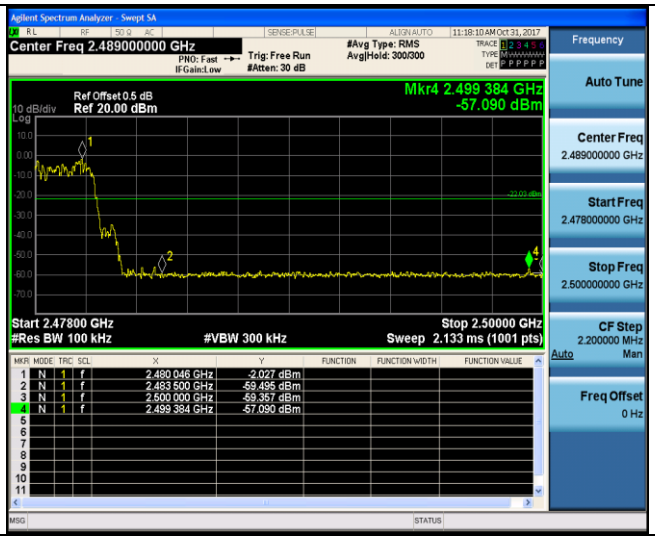
TEST RESULTS

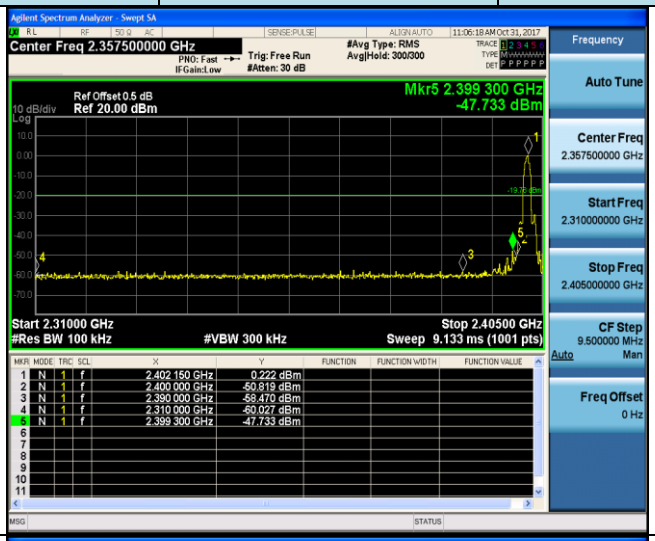
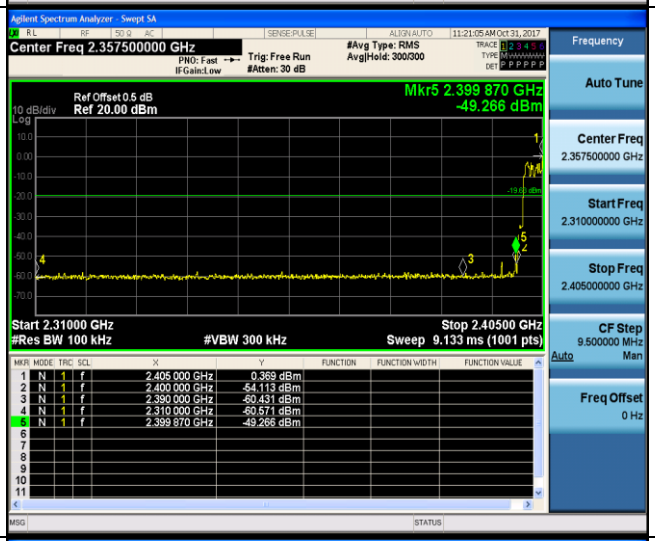
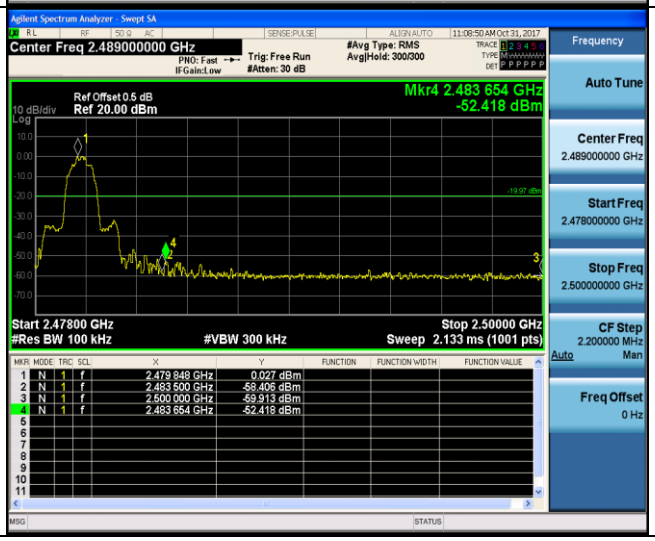
☒ **Passed** ☐ **Not Applicable**

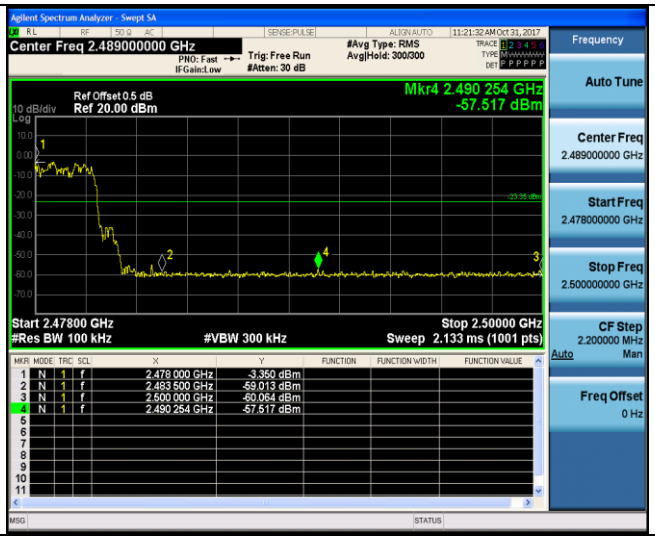
Test Item:	Band edge	Modulation type:	GFSK
CH00 No hopping mode			
CH00 Hopping mode			
CH78 No hopping mode			

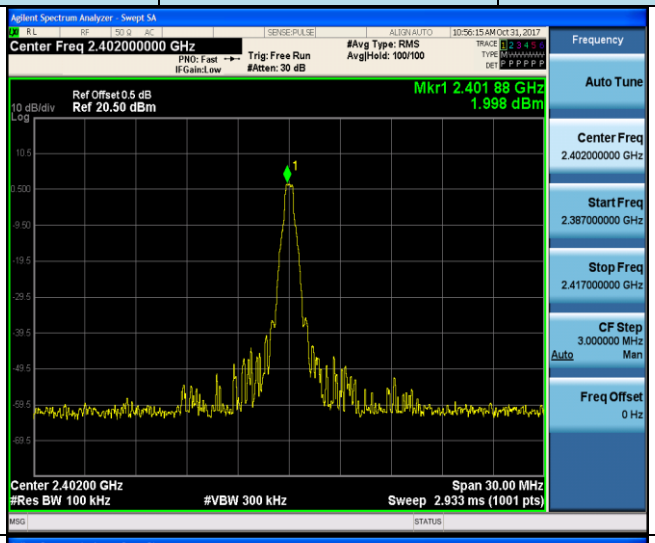
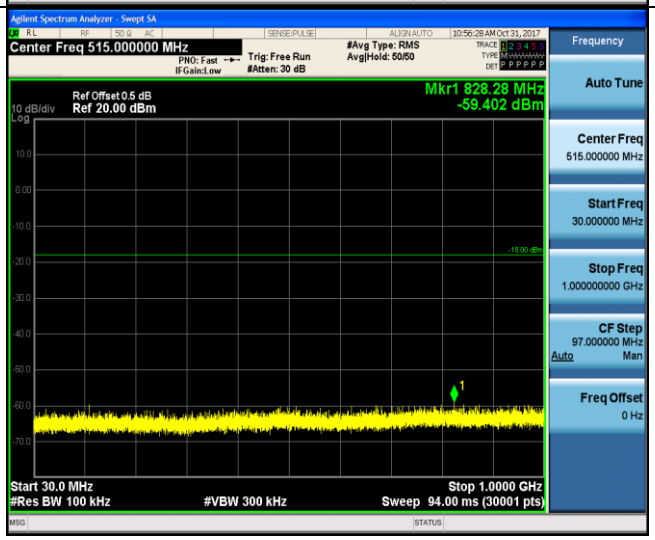
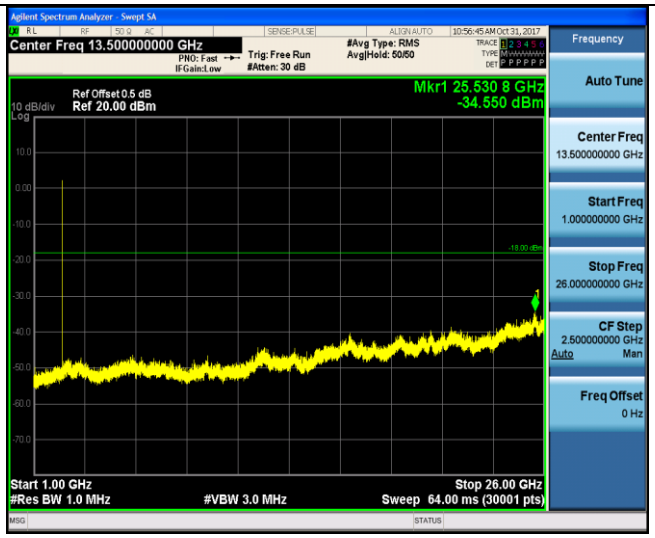
CH78 Hopping mode			

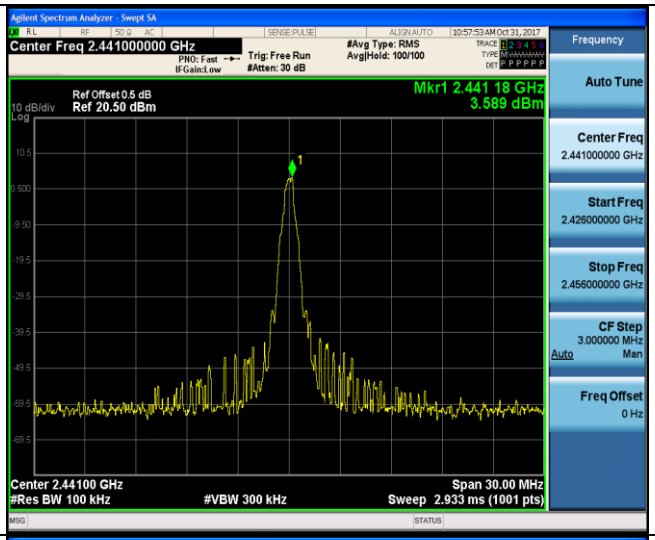
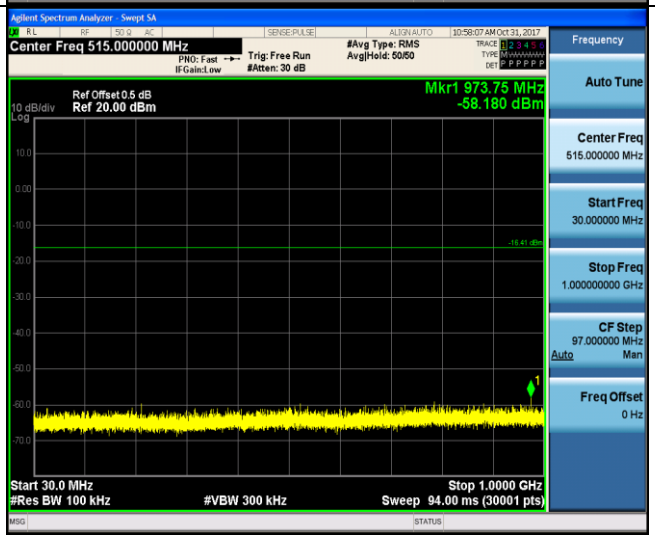
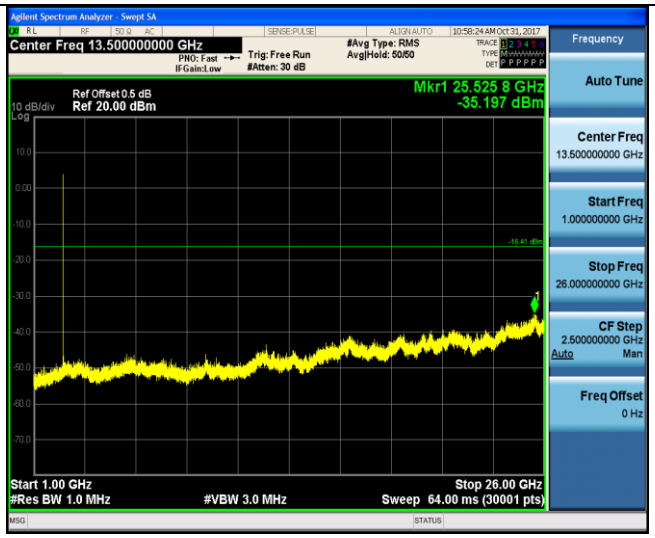
Test Item:	Band edge	Modulation type:	π/4DQPSK
CH00 No hopping mode	
CH00 Hopping mode	
CH78 No hopping mode	

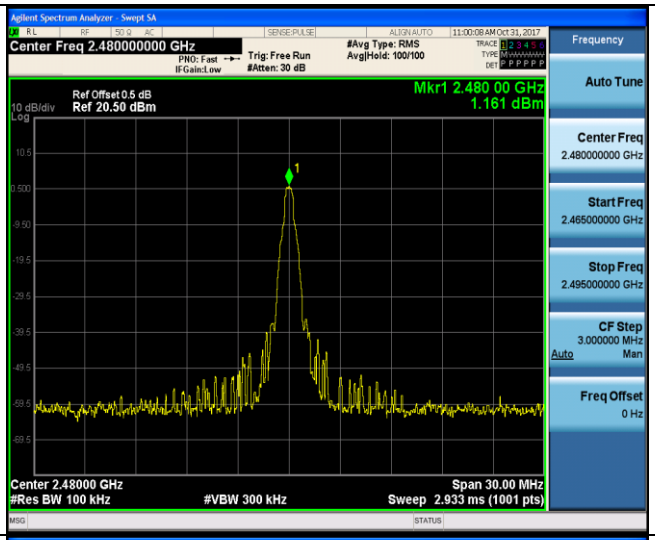
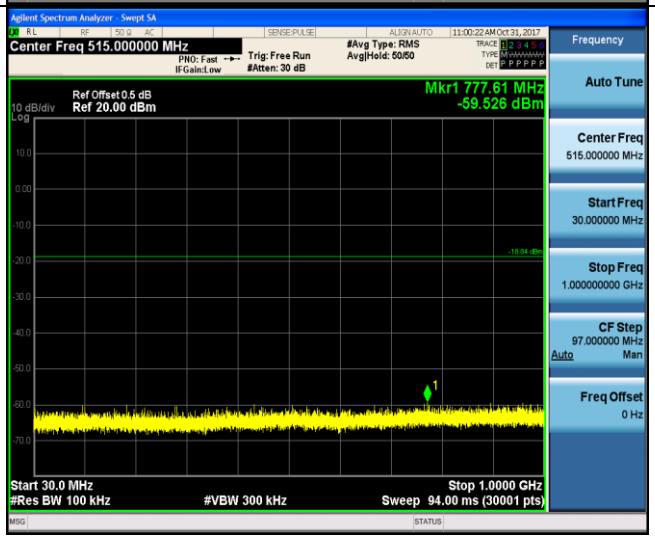
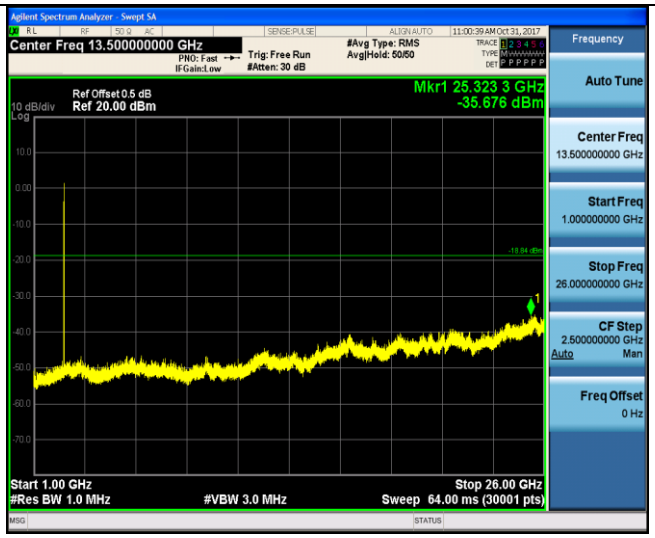
CH78 Hopping mode			

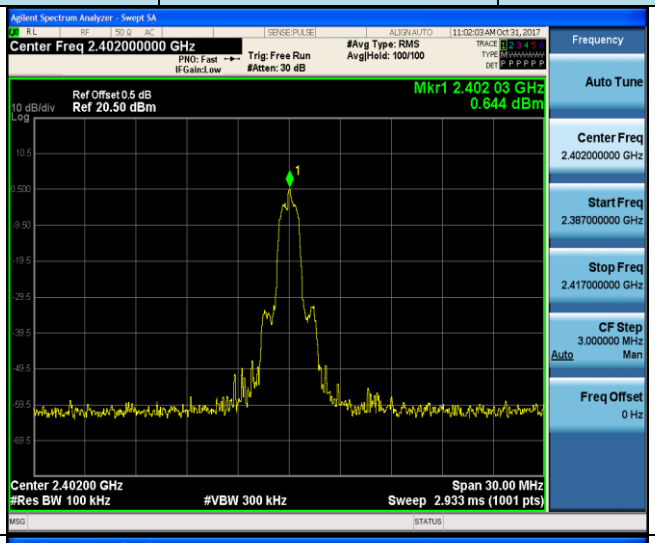
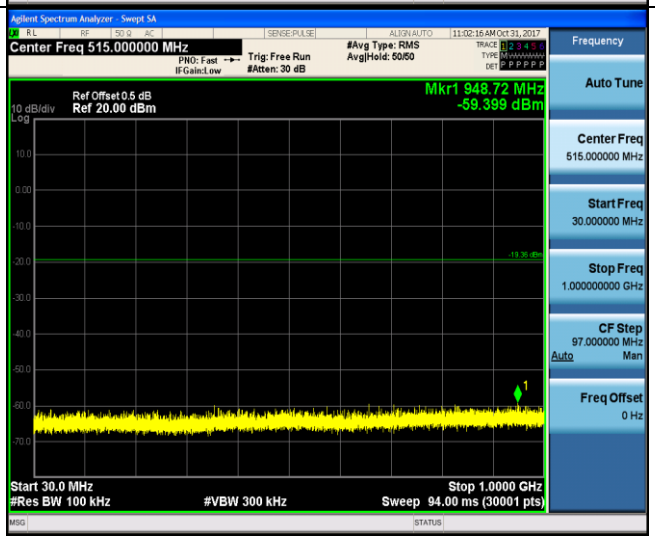
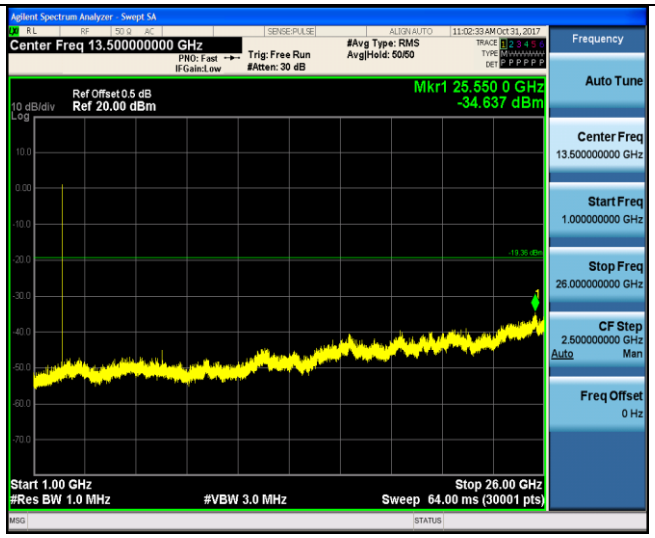
Test Item:	Band edge	Modulation type:	8DPSK
CH00 No hopping mode			
CH00 Hopping mode			
CH78 No hopping mode			

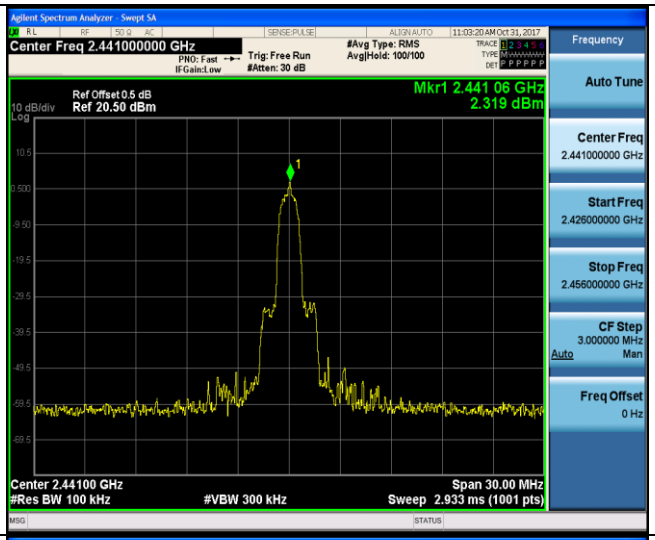
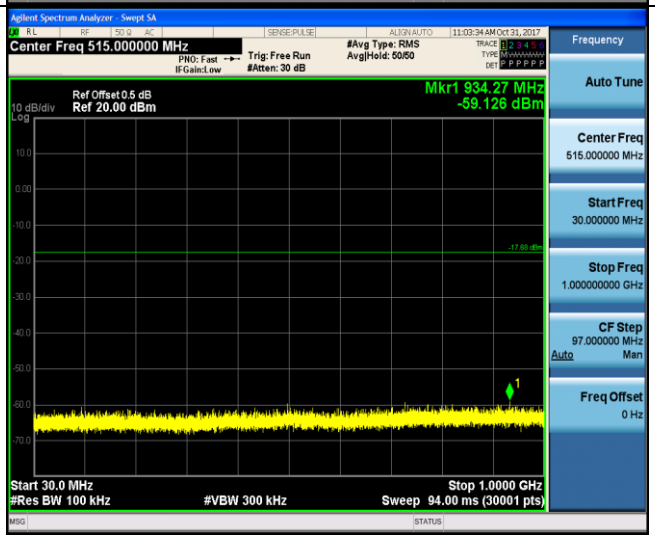
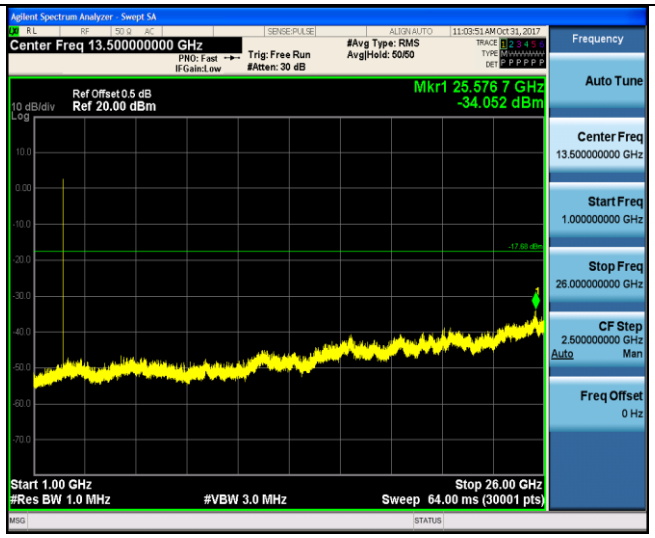
CH78 Hoppig mode			

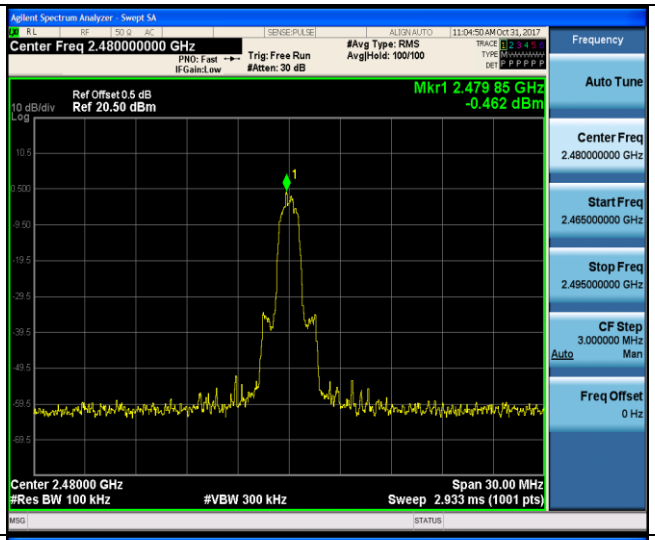
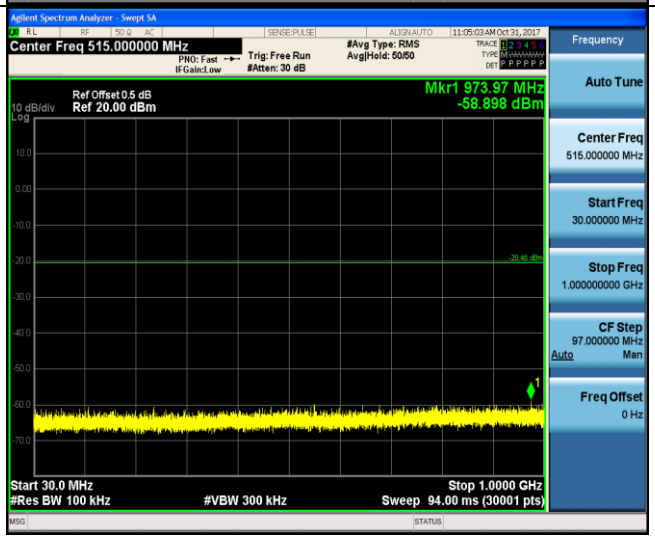
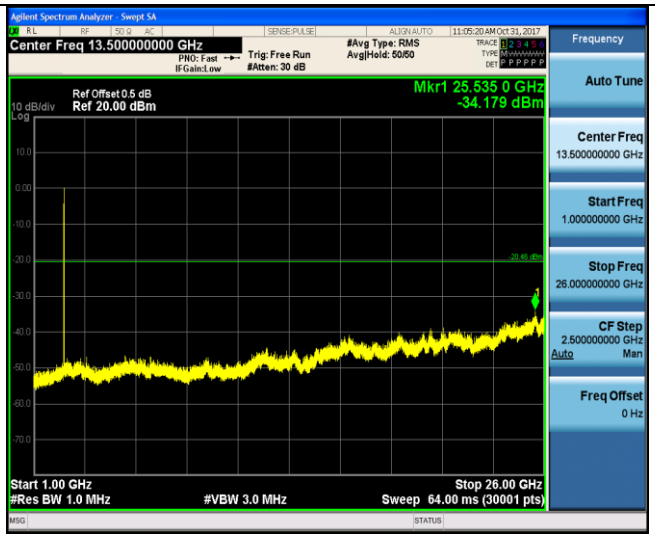
Test Item:	SE	Modulation type:	GFSK
reference level CH00			
CH00			
			

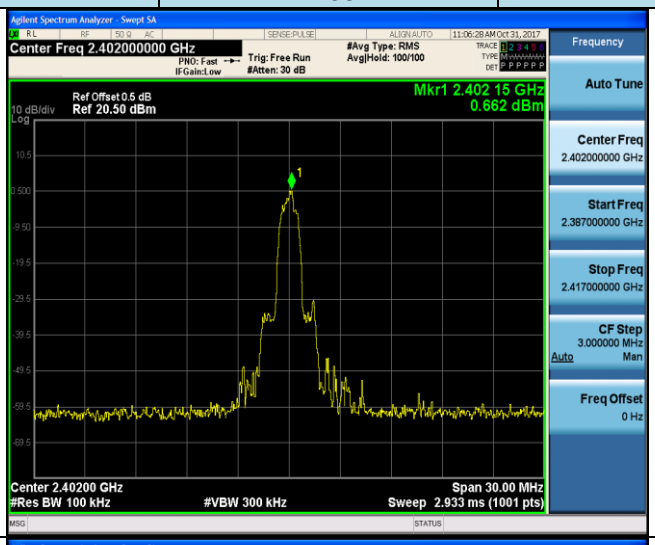
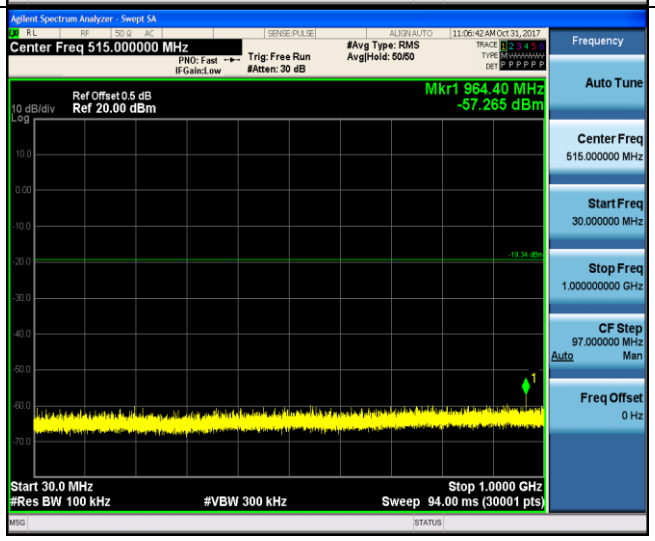
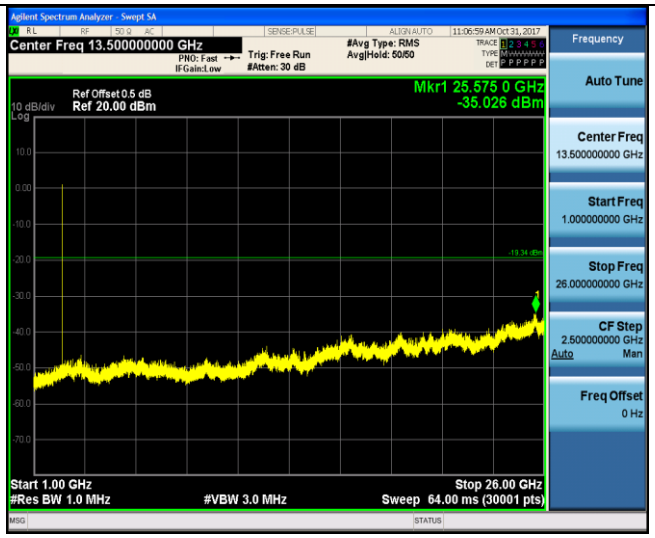
reference level CH39		
CH39		
		

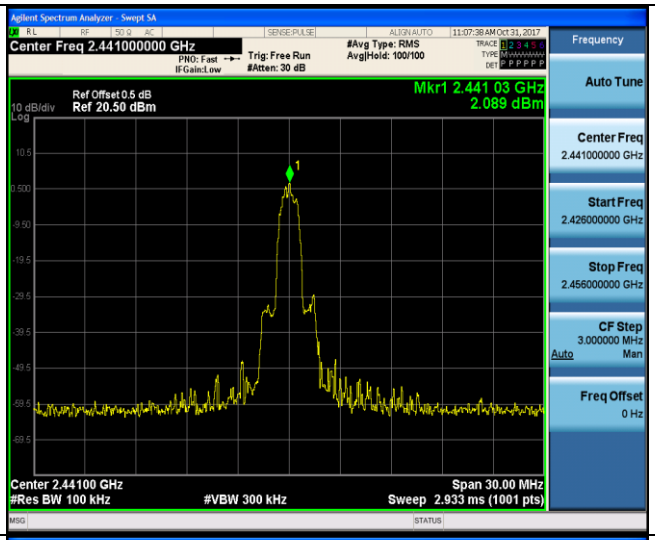
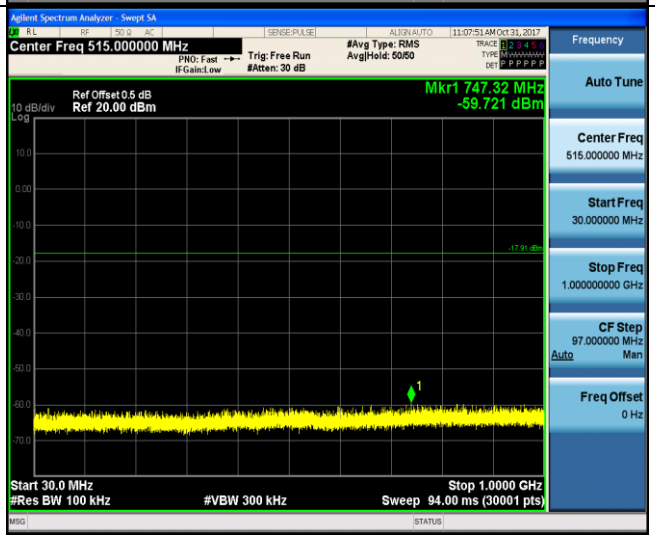
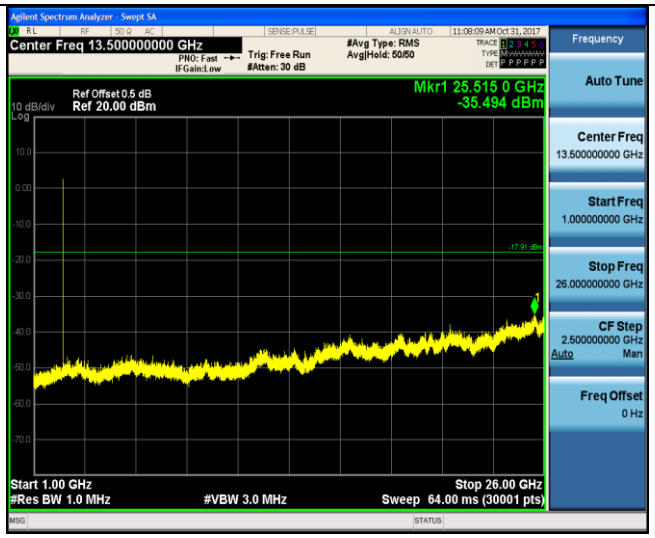
reference level CH78		
CH78		
		

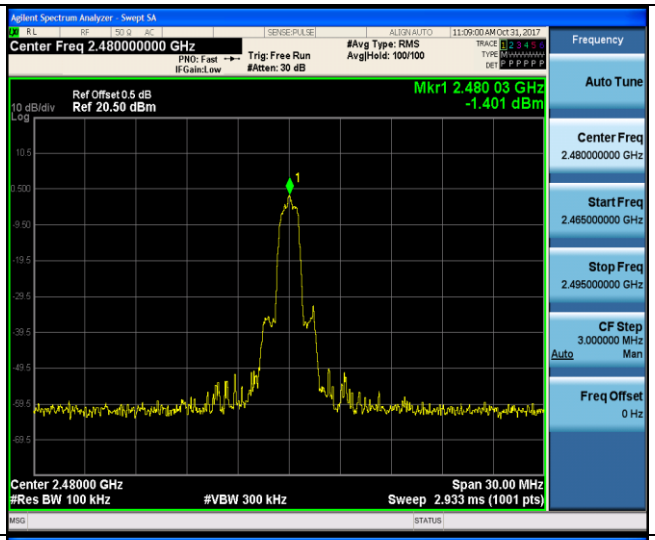
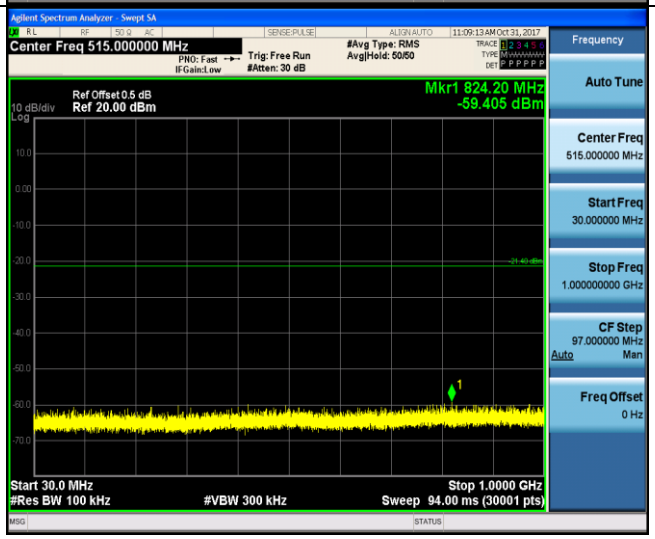
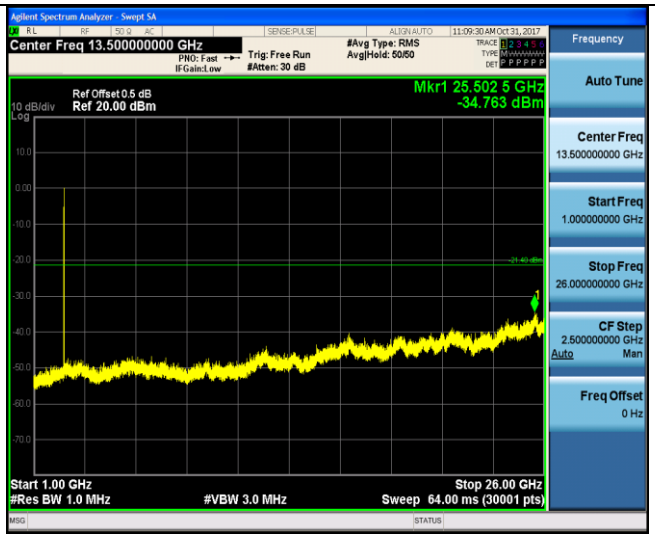
Test Item:	SE	Modulation type:	π/4DQPSK
reference level CH00			
CH00			
			

reference level CH39		
CH39		
		

reference level CH78		
CH78		
		

Test Item:	SE	Modulation type:	8DPSK
reference level CH00			
CH00			
			

reference level CH39		
CH39		
		

reference level CH78		
CH78		
		

5.11. Spurious Emissions (radiated)

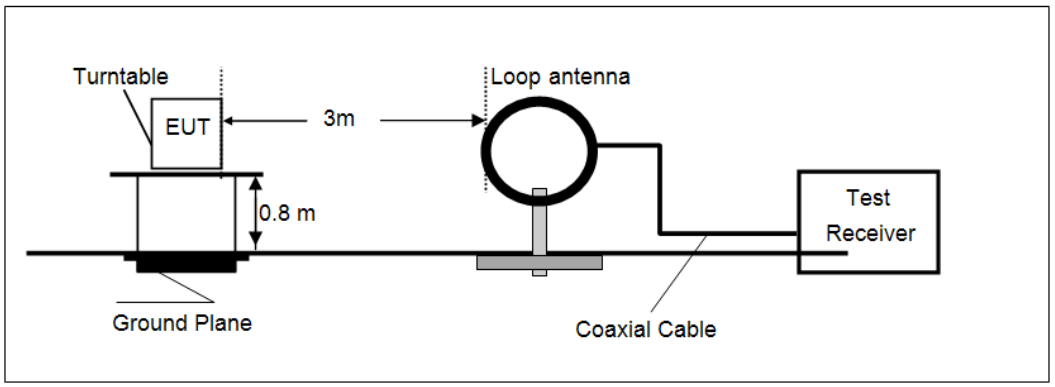
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

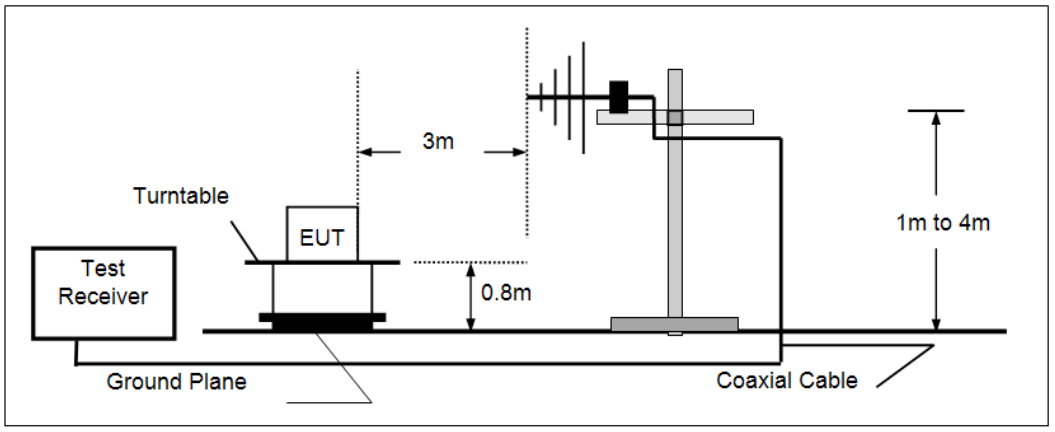
Frequency	Limit (dBuV/m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
Above 1 GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

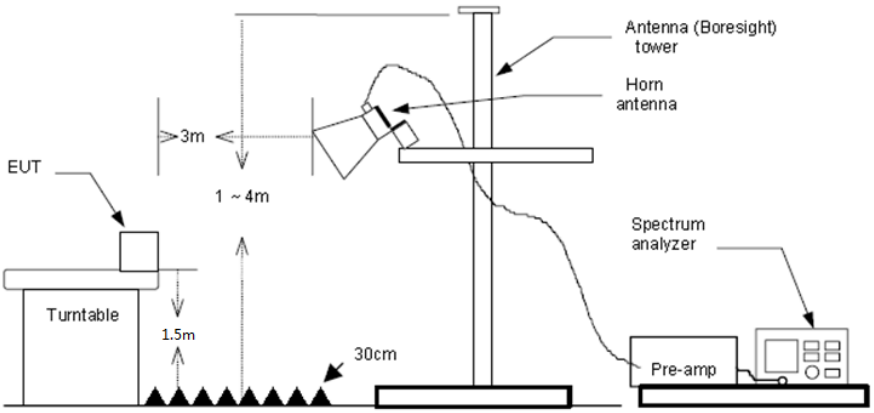
- Below 30 MHz



- 30 MHz ~1000 MHz



- Above 1 GHz



TEST PROCEDURE

1. The EUT was tested according to ANSI C63.10:2013.
2. The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna.
5. Use the following spectrum analyzer settings
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Below 1 GHz, RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold; If the emission level of the EUT measured by the peak detectoris 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
   (3) Above 1 GHz, RBW=1 MHz, VBW=3 MHz Peak detector for Peak value
   RBW=1 MHz, VBW=10 Hz Peak detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Note:

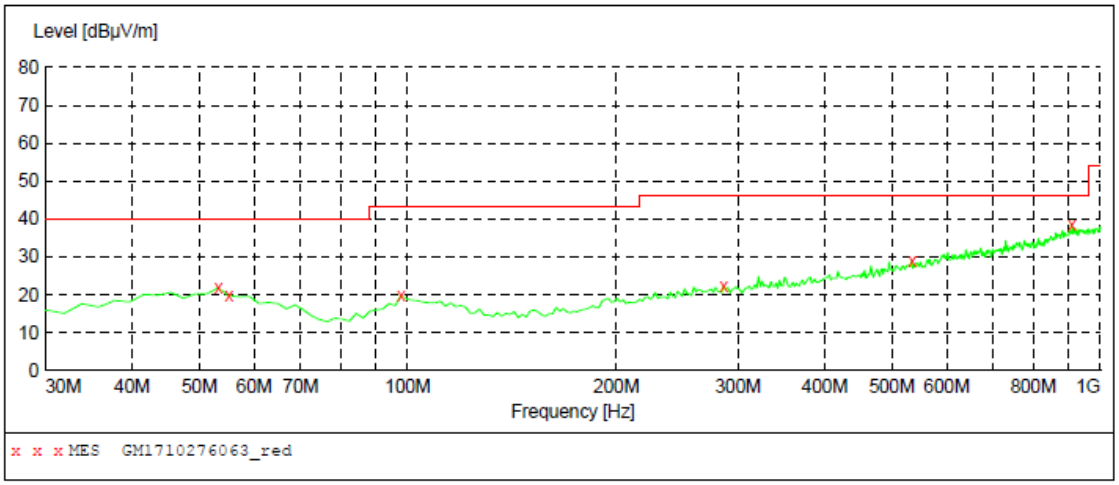
1) Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2) The emission levels of other frequencies are very lower than the limit and not show in test report.
3) Below 1 GHz,Have pre-scan all modulation mode, found the GFSK modulation High channel which it was worst case, so only the worst case's data on the test report.
4) Above 1 GHz,Have pre-scan all modulation mode, found the GFSK modulation which it was worst case, so only the worst case's data on the test report
5) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.

➢ **9 kHz ~ 30 MHz**

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.

➢ **30 MHz ~ 1 GHz**

Polarization:	Vertical

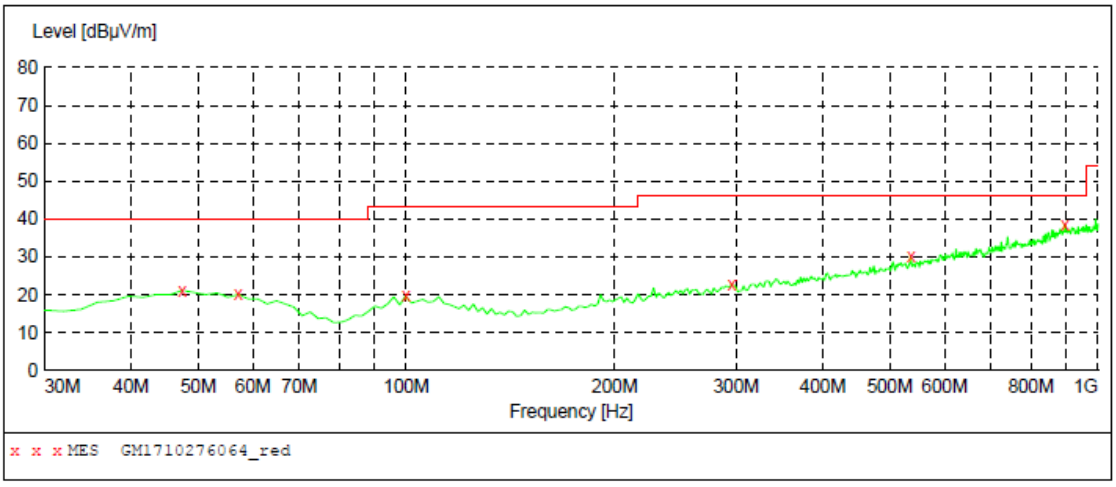


MEASUREMENT RESULT: "GM1710276063_red"

10/27/2017 5:52PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
53.280000	21.90	-9.0	40.0	18.1	QP	100.0	7.00	VERTICAL
55.220000	19.80	-9.2	40.0	20.2	QP	100.0	195.00	VERTICAL
97.900000	19.90	-10.8	43.5	23.6	QP	100.0	298.00	VERTICAL
286.080000	22.20	-7.5	46.0	23.8	QP	100.0	275.00	VERTICAL
534.400000	28.90	-1.1	46.0	17.1	QP	100.0	33.00	VERTICAL
908.820000	38.70	6.9	46.0	7.3	QP	100.0	0.00	VERTICAL

Polarization:	Horizontal



MEASUREMENT RESULT: "GM1710276064_red"

10/27/2017 5:55PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	21.20	-8.8	40.0	18.8	QP	300.0	142.00	HORIZONTAL
57.160000	20.10	-9.4	40.0	19.9	QP	300.0	337.00	HORIZONTAL
99.840000	19.70	-10.6	43.5	23.8	QP	100.0	27.00	HORIZONTAL
295.780000	22.90	-7.3	46.0	23.1	QP	100.0	27.00	HORIZONTAL
536.340000	30.10	-1.0	46.0	15.9	QP	100.0	292.00	HORIZONTAL
895.240000	38.50	6.6	46.0	7.5	QP	300.0	154.00	HORIZONTAL

➢ **1 GHz ~ 25 GHz**

CH00									
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	Test value
1668.04	37.43	25.11	5.70	36.86	31.38	74.00	-42.62	Vertical	Peak
3350.56	43.27	28.20	7.90	38.46	40.91	74.00	-33.09	Vertical	Peak
4809.50	41.25	31.58	9.55	36.93	45.45	74.00	-28.55	Vertical	Peak
7063.69	32.60	35.49	11.85	34.88	45.06	74.00	-28.94	Vertical	Peak
1715.41	36.77	25.23	5.80	36.96	30.84	74.00	-43.16	Horizontal	Peak
3570.71	36.09	29.21	8.22	38.31	35.21	74.00	-38.79	Horizontal	Peak
5099.49	33.32	31.90	9.75	36.30	38.67	74.00	-35.33	Horizontal	Peak
7027.82	32.83	35.38	11.85	34.83	45.23	74.00	-28.77	Horizontal	Peak

CH39									
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	Test value
1746.25	53.88	25.29	5.86	37.03	48.00	74.00	-26.00	Vertical	Peak
4045.06	36.31	29.79	8.82	38.01	36.91	74.00	-37.09	Vertical	Peak
4883.52	35.36	31.43	9.59	36.73	39.65	74.00	-34.35	Vertical	Peak
7921.00	32.68	36.78	12.68	34.74	47.40	74.00	-26.60	Vertical	Peak
1884.83	37.93	25.31	6.09	37.21	32.12	74.00	-41.88	Horizontal	Peak
3472.12	36.44	28.78	8.07	38.45	34.84	74.00	-39.16	Horizontal	Peak
4883.52	35.06	31.43	9.59	36.73	39.35	74.00	-34.65	Horizontal	Peak
7413.73	32.11	36.27	12.11	34.83	45.66	74.00	-28.34	Horizontal	Peak

CH78									
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	Test value
1764.12	40.59	25.33	5.89	37.06	34.75	74.00	-39.25	Vertical	Peak
3552.58	35.98	29.16	8.20	38.34	35.00	74.00	-39.00	Vertical	Peak
5776.92	32.95	31.99	10.55	35.38	40.11	74.00	-33.89	Vertical	Peak
7063.69	32.90	35.49	11.85	34.88	45.36	74.00	-28.64	Vertical	Peak
1773.13	37.07	25.35	5.91	37.08	31.25	74.00	-42.75	Horizontal	Peak
3472.12	35.84	28.78	8.07	38.45	34.24	74.00	-39.76	Horizontal	Peak
4958.68	36.10	31.46	9.64	36.52	40.68	74.00	-33.32	Horizontal	Peak
6903.71	32.47	34.72	11.73	34.89	44.03	74.00	-29.97	Horizontal	Peak

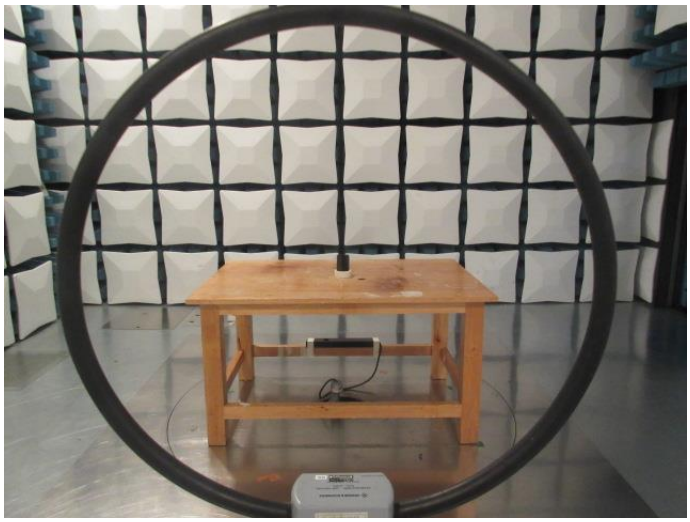
Remark:

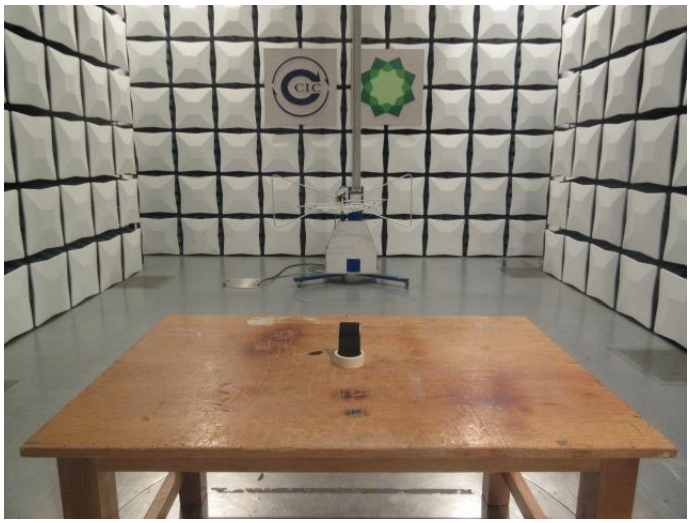
1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies(test frequency band is 1GHz to 25GHz) are very lower than the limit and not show in test report.

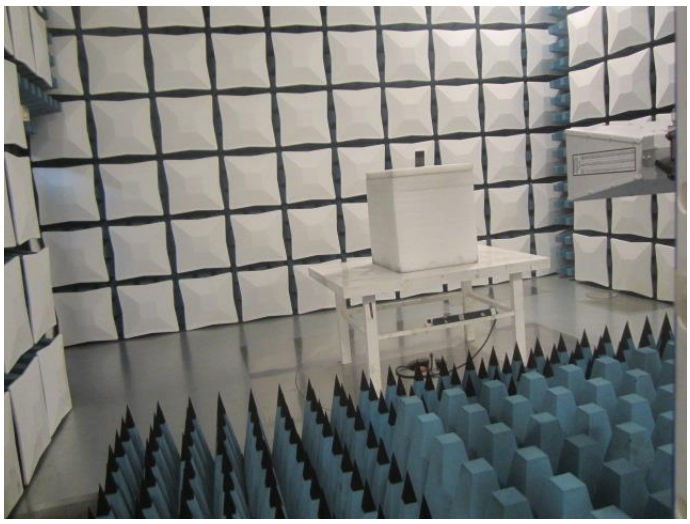
6. TEST SETUP PHOTOS

Conducted Emissions

Radiated Emissions







7. EXTERANAL AND INTERNAL PHOTOS

Reference to the test report No.: TRE1710011201.

.....End of Report.....