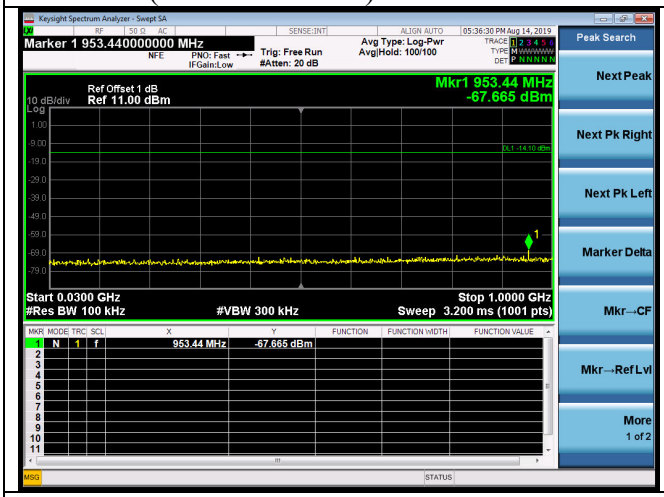
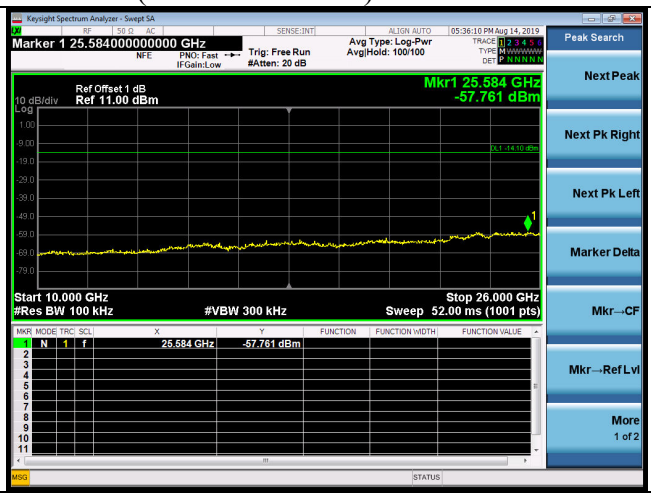
2480MHz(30MHz – 1GHz)

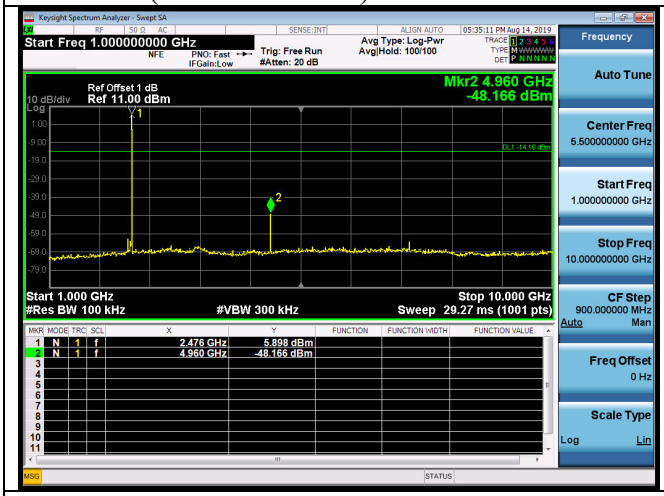


2480MHz(10GHz – 26GHz)

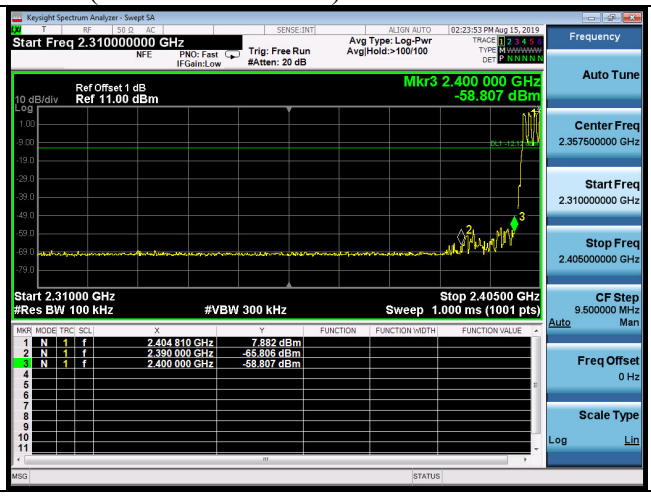


Hopping on

2480MHz(1GHz – 10GHz)

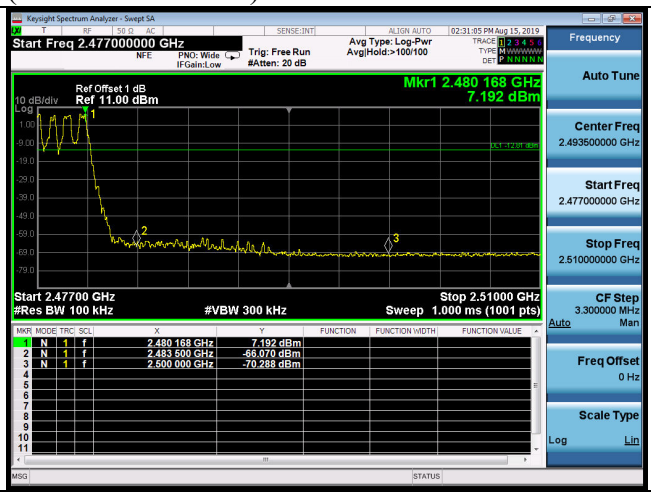


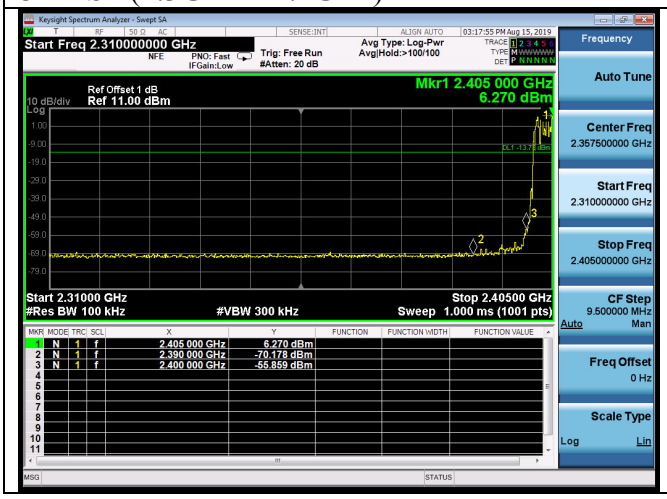
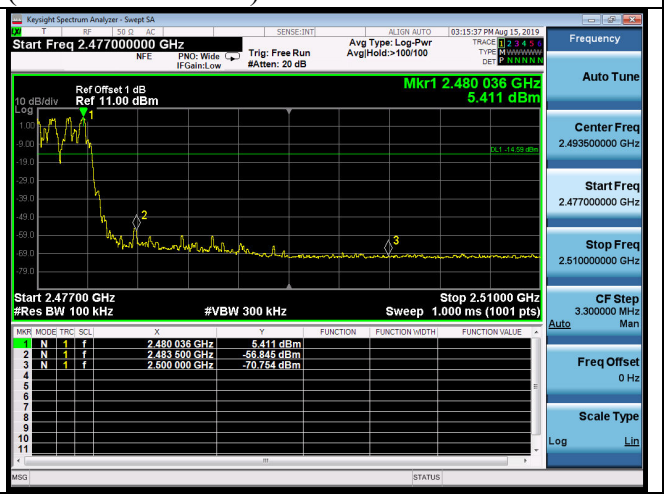
GFSK(2.3GHz – 2.4GHz)



2480MHz(2.4GHz – 2.5GHz)

(2.4GHz – 2.5GHz)



8-DPSK(2.3GHz – 2.4GHz)	(2.4GHz – 2.5GHz)
	

6. 20 DB BANDWIDTH TEST

6.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Jun.30,19	1 Year
2.	Attenuator	Agilent	8491B	MY39262165	Oct.14,18	1 Year
3.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	May.13,19	1 Year

6.2.Block Diagram of Test Setup

6.3.Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

6.4.Test Procedure

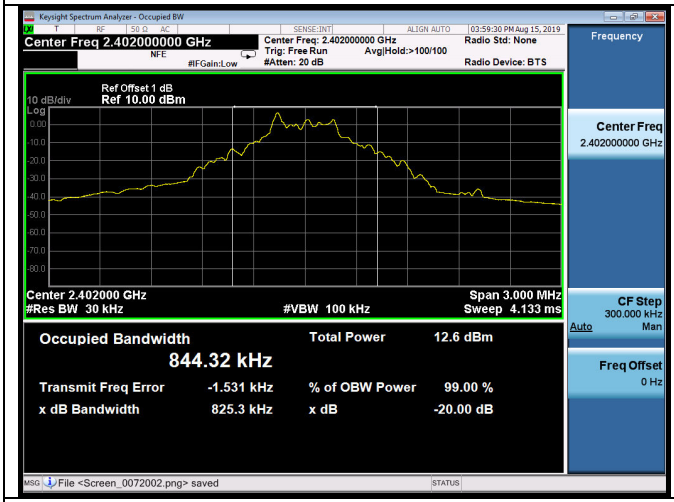
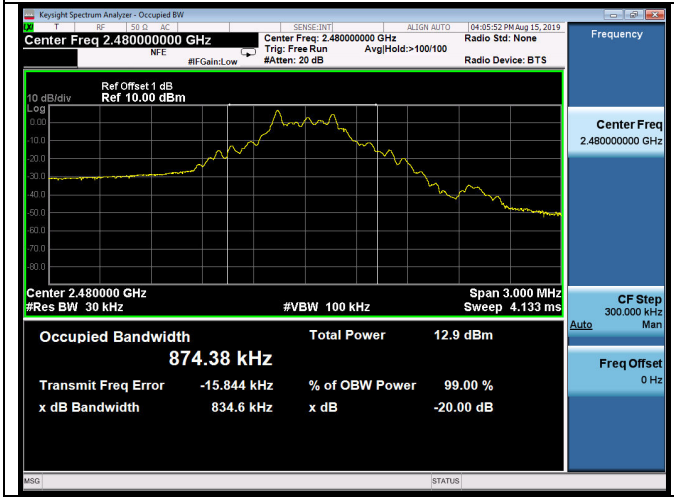
Use the test method descried in ANSI C63.10 clause 7.8.7:

1. Connect the antenna port of the EUT to the spectrum analyzer.
2. Let the EUT transmit at Low/ Mid/ High channel with test software.
3. Setting of SA is following as: RBW: 30kHz / VBW: 100kHz
   Sweep Mode: Continuous sweep
   Detect mode: Positive peak
   Trace mode: Max hold.
4. Use the occupied bandwidth function of the SA measure the 20dB bandwidth directly.

6.5.Test Results

EUT: COSMO		
M/N: COSMO COMMUNICATOR VE		
Test date: 2019-08-15	Pressure: 102.3±1.0 kpa	Humidity: 53.6±3.0%
Tested by: Garry	Test site: RF site	Temperature: 25.5±0.6℃

Test Mode	Frequency (MHz)	20dB bandwidth (KHz)	Limit (KHz)
GFSK	2402	825.3	N/A
	2441	832.9	N/A
	2480	834.6	N/A
8-DPSK	2402	1153	N/A
	2441	1151	N/A
	2480	1150	N/A
Conclusion：PASS			

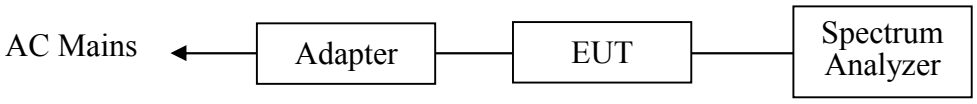
GFSK	8-DPSK
2402MHz	2402MHz
	
2441MHz	2441MHz
2480MHz	2480MHz
	

7. CARRIER FREQUENCY SEPARATION TEST

7.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Jun.30,19	1 Year
2.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	May.13,19	1 Year

7.2.Block Diagram of Test Setup



7.3.Limit

Frequency hopping systems shall have hopping channel carrier frequency separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

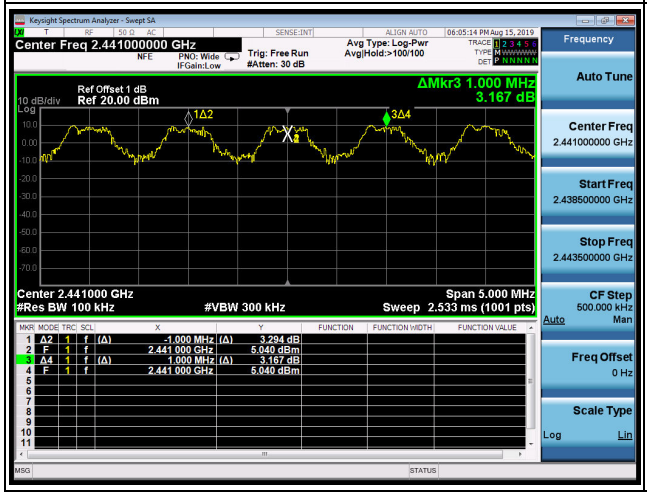
7.4.Test Procedure

Use the test method descried in ANSI C63.10 clause 7.8.2:
1. Connect the antenna port of the EUT to the Spectrum analyzer.
2. Let the EUT transmit at Low/ Mid/ High channel.
3. Setting of SA is following as: RBW: 100kHz / VBW: 300kHz.Span: 3MHz
4. Use the mark Delta function of the SA measure out the channel separation.

7.5.Test Results.

EUT: COSMO		
M/N: COSMO COMMUNICATOR VE		
Test date: 2019-08-15	Pressure: 102.1±1.0 kpa	Humidity: 51.1±3.0%
Tested by: Garry	Test site: RF site	Temperature:22.8±0.6 ℃

Test Mode	Channel separation	Limit(KHz)	Conclusion
GFSK	1.0MHz	556.400	PASS
8-DPSK	1.0MHz	768.667	PASS

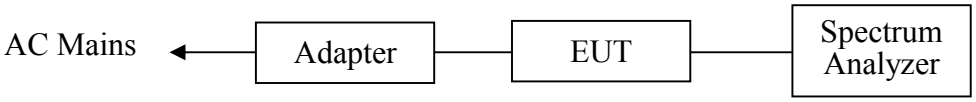
GFSK	8-DPSK
	

8. NUMBER OF HOPPING FREQUENCY TEST

8.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Jun.30,19	1 Year
2.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	May.13,19	1 Year

8.2.Block Diagram of Test Setup



8.3.Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

8.4.Test Procedure

Use the test method descried in ANSI C63.10 clause 7.8.3:

1. Connect the antenna of the EUT to Spectrum analyzer and let the EUT working at hopping mode.
2. Setting of SA is following as: RBW: 100kHz / VBW: 300kHz ,
   Start frequency: 2390MHz
   Stop frequency: 2483.5MHz

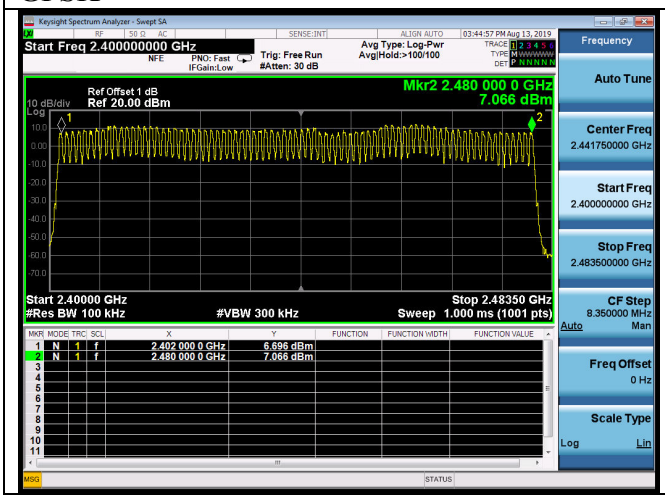
And waiting for the hopping trace until stability, count out the number of the hopping.

8.5.Test Results

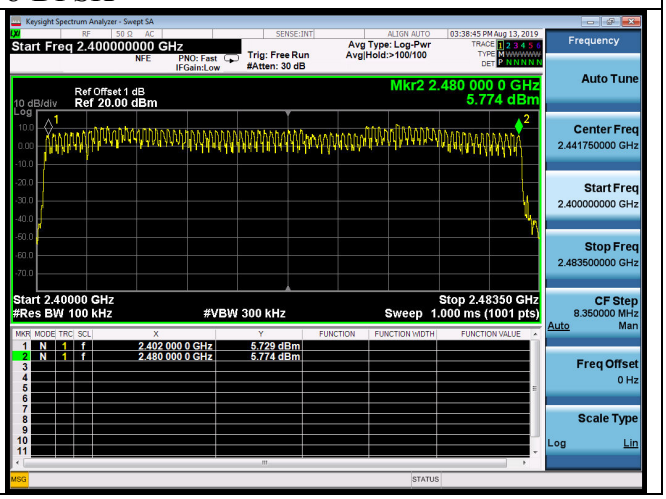
EUT: COSMO		
M/N: COSMO COMMUNICATOR VE		
Test date: 2019-08-13	Pressure: 102.1±1.0 kpa	Humidity: 51.1±3.0%
Tested by: Garry	Test site: RF site	Temperature:22.8±0.6 ℃

Test Mode	Number of channel	Limit	Conclusion
GFSK	79	>=15	PASS
8-DPSK	79	>=15	PASS

GFSK



8-DPSK

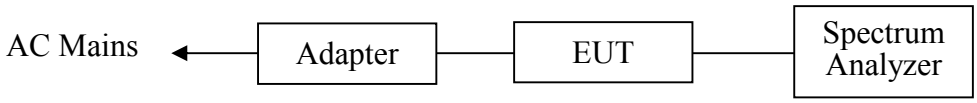


9. DWELL TIME

9.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Jun.30,19	1 Year
2.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	May.13,19	1 Year

9.2.Block Diagram of Test Setup



9.3.Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

9.4.Test Procedure

Use the test method descried in ANSI C63.10 clause 7.8.4:

1. Connect the antenna of the EUT to Spectrum analyzer and let the EUT working at hopping mode.
2. Setting of SA is following as:
   RBW: 100kHz / VBW: 300kHz
   Sweep Mode: Single
   Detect mode: Positive peak
   Trace mode: Auto
   Span: 0Hz
   Sweep time: 5s and big enough to measure one hopping signal
3. Use below formula calculate the Dwell time
   Dwell time=Hopping number per second*0.4*channel number*Pulse bandwidth per hopping.

9.5.Test Results

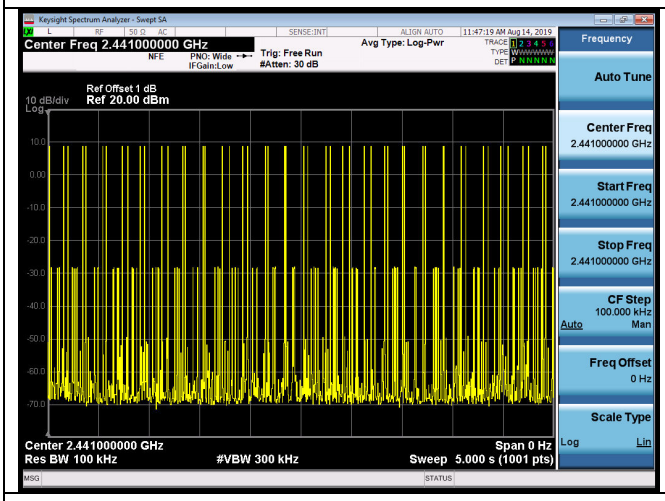
EUT: COSMO		
M/N: COSMO COMMUNICATOR VE		
Test date: 2019-08-14	Pressure: 102.1±1.0 kpa	Humidity: 51.1±3.0%
Tested by: Garry	Test site: RF site	Temperature:22.8±0.6 ℃

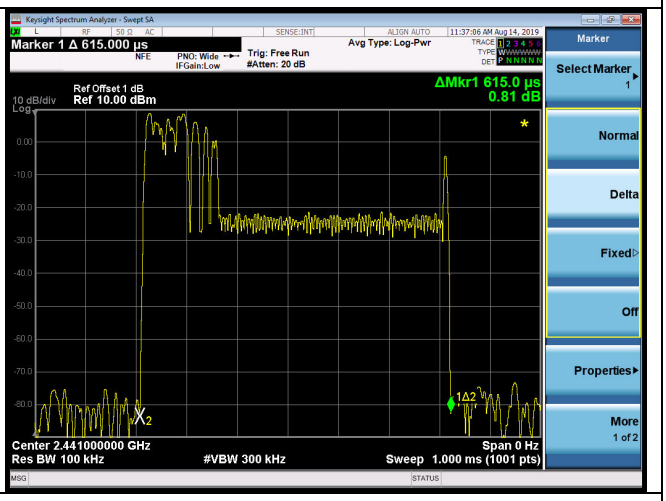
Mode		dwell time	Limit	Conclusion
GFSK	DH1	49 hops/5s*0.4*79chanels* 0.615 ms =190.453ms	≦400ms	PASS
	DH3	24 hops/5s*0.4*79chanels* 1.893 ms =287.130ms	≦400ms	PASS
	DH5	18 hops/5s*0.4*79chanels* 2.945 ms =335.023ms	≦400ms	PASS
8-DPSK	3-DH1	49 hops/5s*0.4*79chanels* 0.623 ms =192.931ms	≦400ms	PASS
	3-DH3	22 hops/5s*0.4*79chanels* 1.875 ms =260.700ms	≦400ms	PASS
	3-DH5	15 hops/5s*0.4*79chanels* 2.865 ms =271.602ms	≦400ms	PASS

Note: All the lower levels were signaled from receiver and should not be considered in here.

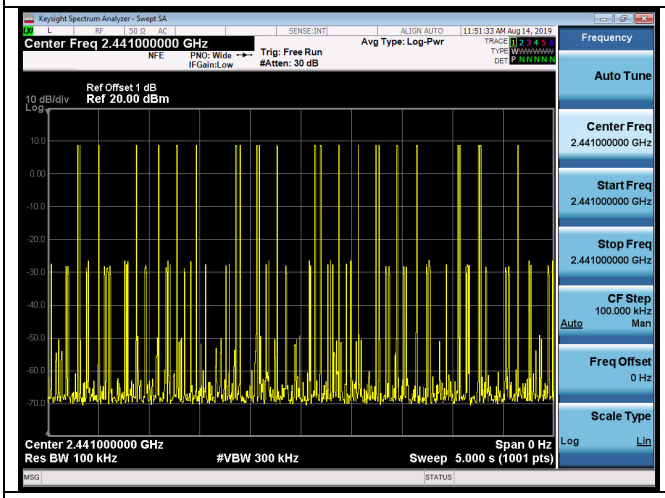
GFSK

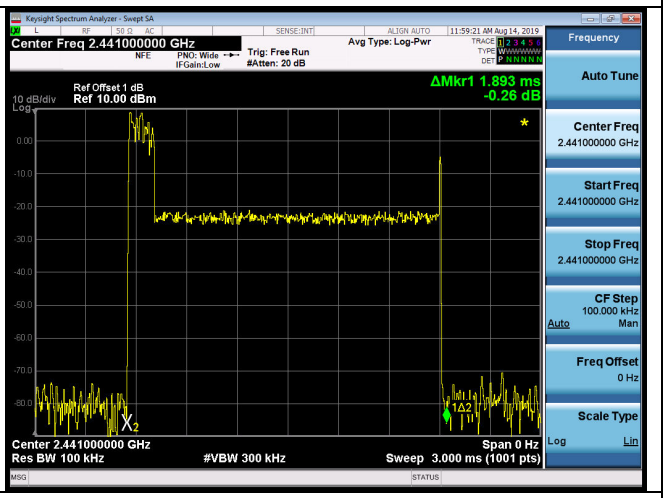
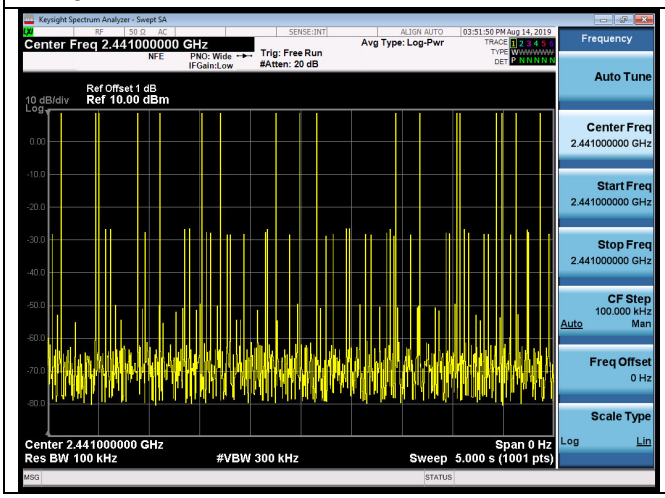
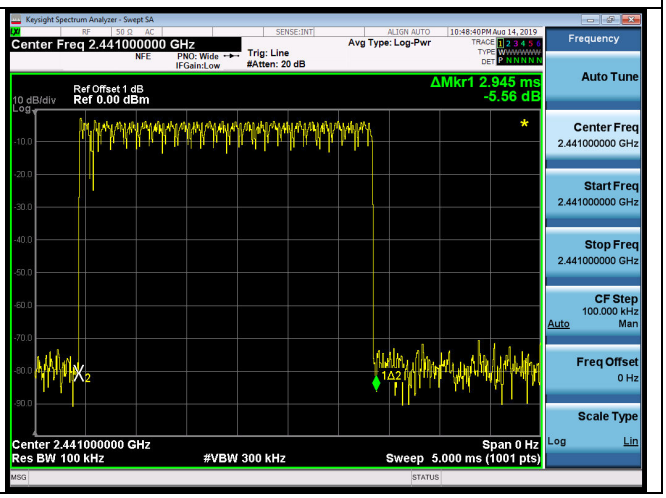
DH 1





DH 3





DH 5