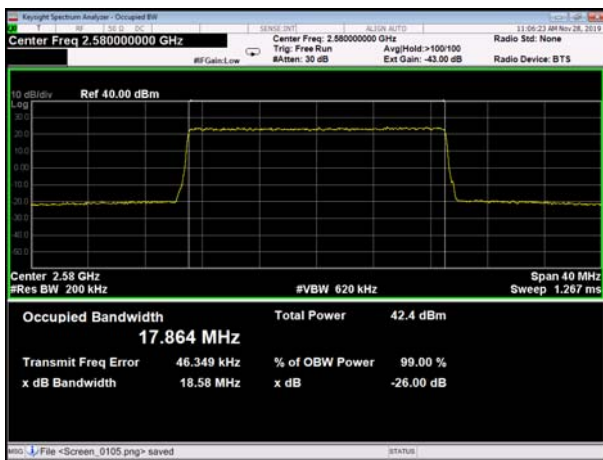




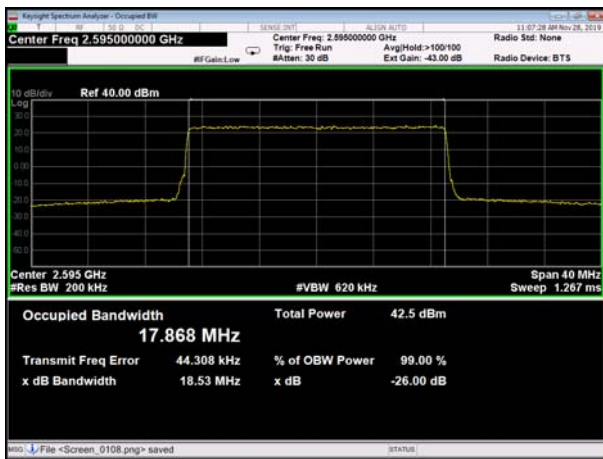
20MHz- Low CH E-TM1.1



20MHz- Low CH E-TM3.1



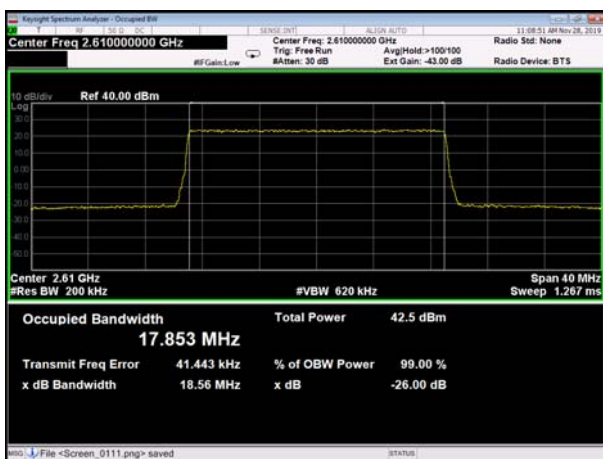
20MHz- Middle CH E-TM1.1



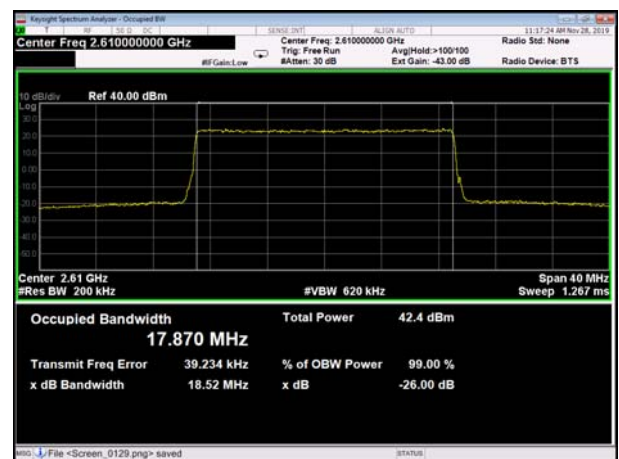
20MHz- Middle CH E-TM3.1



20MHz- High CH E-TM1.1



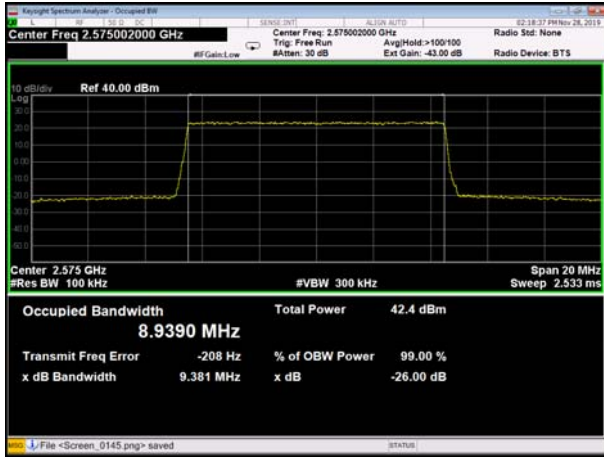
20MHz- High CH E-TM3.1



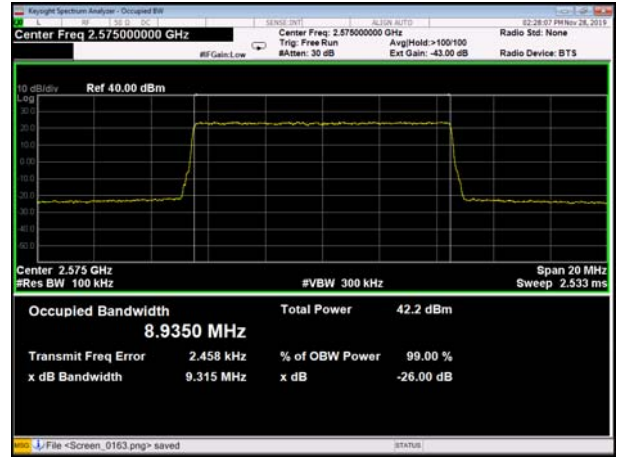


### IC Chain1

10MHz- Low CH E-TM1.1



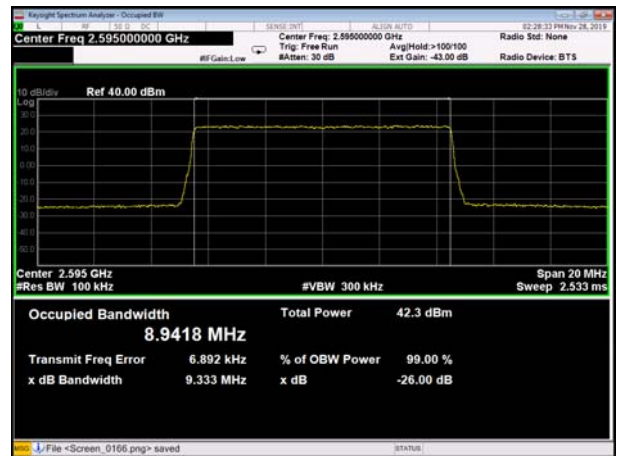
10MHz- Low CH E-TM3.1



10MHz- Middle CH E-TM1.1



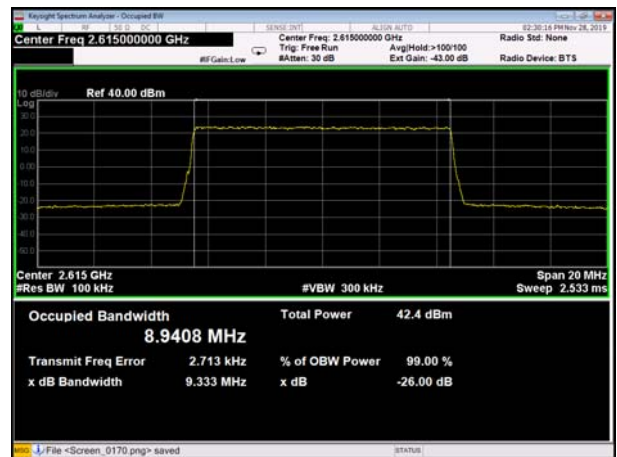
10MHz- Middle CH E-TM3.1



10MHz- High CH E-TM1.1

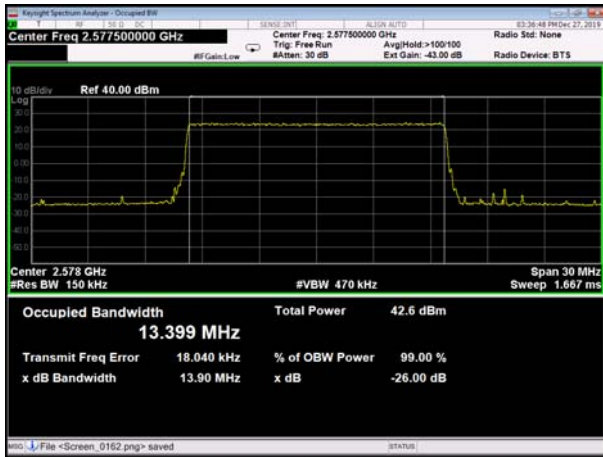


10MHz- High CH E-TM3.1

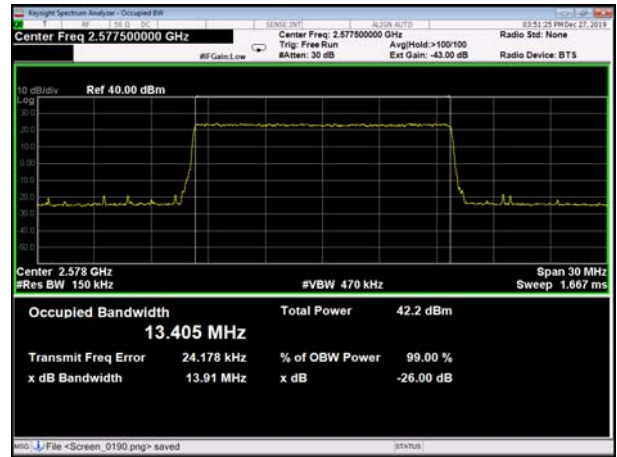




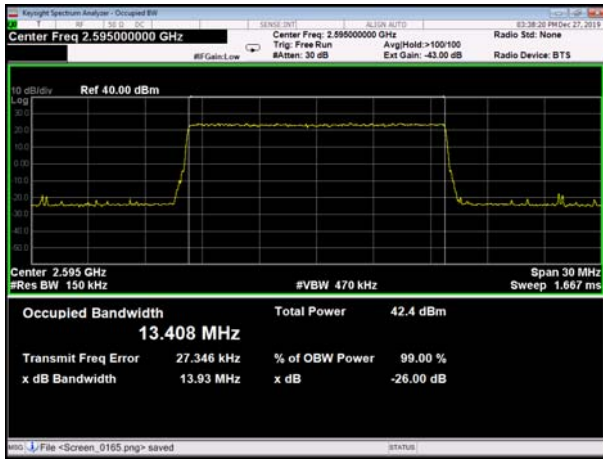
15MHz- Low CH E-TM1.1



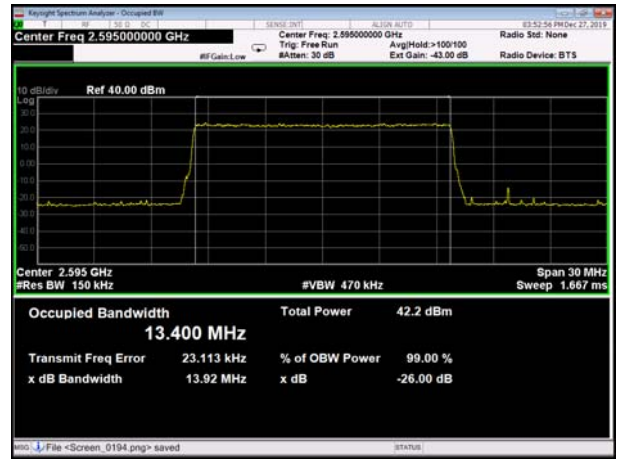
15MHz- Low CH E-TM3.1



15MHz- Middle CH E-TM1.1



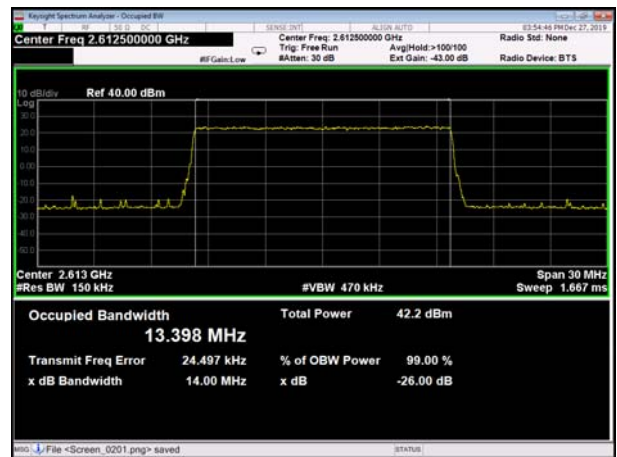
15MHz- Middle CH E-TM3.1



15MHz- High CH E-TM1.1

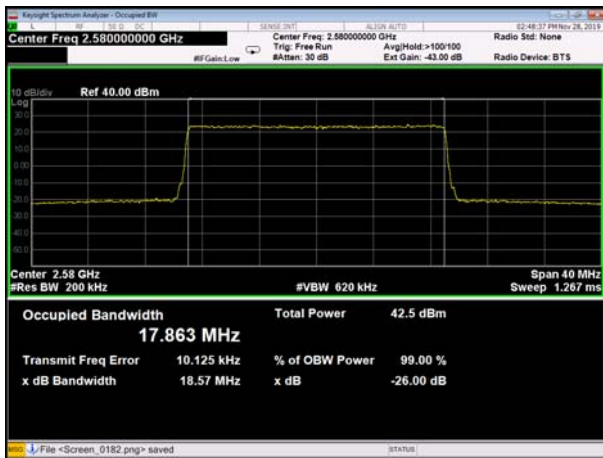


15MHz- High CH E-TM3.1

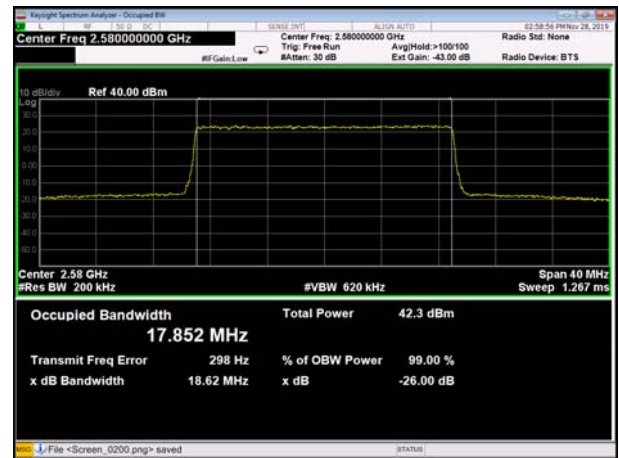




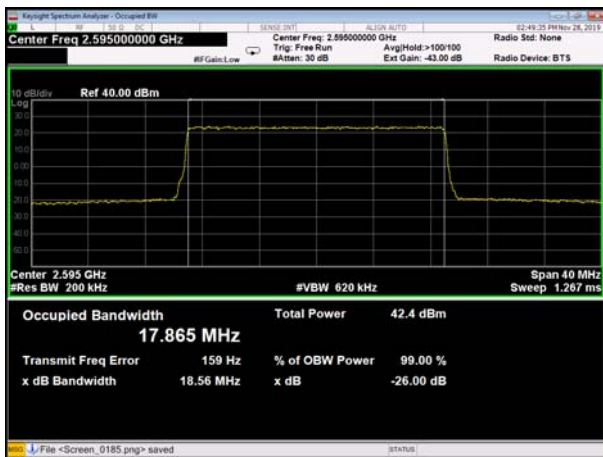
20MHz- Low CH E-TM1.1



20MHz- Low CH E-TM3.1



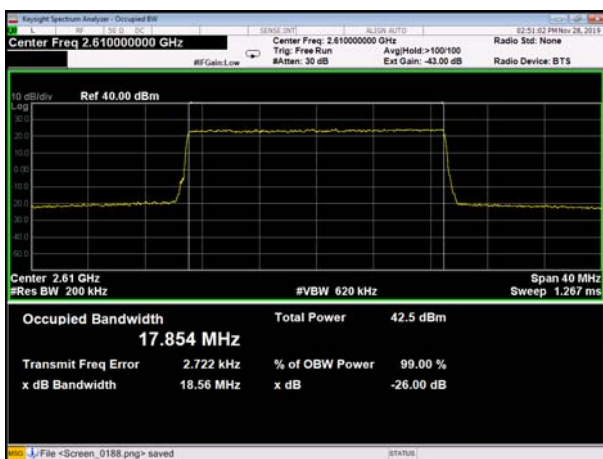
20MHz- Middle CH E-TM1.1



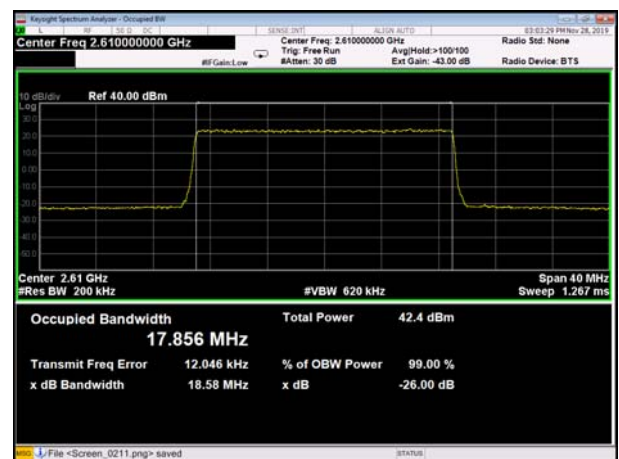
20MHz- Middle CH E-TM3.1



20MHz- High CH E-TM1.1



20MHz- High CH E-TM3.1



## **2.4 Frequency Stability**

### **2.4.1 Requirement**

FCC:

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

IC:

Using a resolution bandwidth equal to that permitted within the 1 MHz band immediately outside the channel edge, as found in section 4.5, reference points will be selected at the unwanted emission limits, which comply with the attenuation specified in section 4.5 for the type of device under test, on the emission mask of the lowest and highest channels. The frequency at these points shall be recorded as  $f_L$  and  $f_H$  respectively.

### **2.4.2 Measuring Instruments**

The measuring equipment is listed in the section 3 of this test report.

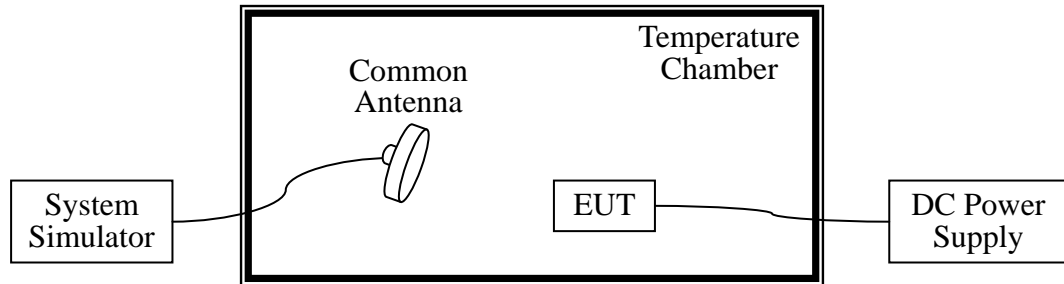
### **2.4.3 Test Procedures for Temperature Variation**

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached

### **2.4.4 Test Procedures for Voltage Variation**

1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage.
2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
3. Reduce the input voltage to specify extreme voltage variation (+/-15%) and endpoint, record the maximum frequency change.

### 2.4.5 Test Setup



### 2.4.6 Test Results of Frequency Stability

For FCC measurement data:

Chain 0

Test Frequency:2593MHz 10MHz				
Power (V <sub>DC</sub> )	Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Result
48	-40	56	0.022	PASS
	-30	65	0.025	
	-20	74	0.029	
	-10	39	0.015	
	0	52	0.020	
	+10	18	0.007	
	+20	88	0.034	
	+30	84	0.032	
	+40	56	0.022	
	+50	37	0.014	
+55	88	0.034		
42	+25	66	0.025	
55	+25	65	0.025	



Chain 1

Test Frequency:2593MHz 10MHz				
Power (V <sub>DC</sub> )	Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Result
48	-40	65	0.025	PASS
	-30	78	0.030	
	-20	84	0.032	
	-10	83	0.032	
	0	62	0.024	
	+10	28	0.011	
	+20	66	0.025	
	+30	71	0.027	
	+40	58	0.022	
	+50	38	0.015	
	+55	52	0.020	
42	+25	49	0.019	
55	+25	78	0.030	

For IC measurement data:

Chain 0

Test Frequency:2595MHz 10MHz				
Power (V <sub>DC</sub> )	Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Result
48	-40	78	0.030	PASS
	-30	75	0.029	
	-20	89	0.034	
	-10	81	0.031	
	0	120	0.046	
	+10	33	0.013	
	+20	59	0.023	
	+30	74	0.029	
	+40	65	0.025	
	+50	39	0.015	
	+55	33	0.013	
42	+25	48	0.018	
55	+25	70	0.027	



## Chain 1

Test Frequency:2595MHz 10MHz				
Power (V <sub>DC</sub> )	Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Result
48	-40	86	0.033	PASS
	-30	112	0.043	
	-20	101	0.039	
	-10	95	0.037	
	0	89	0.034	
	+10	88	0.034	
	+20	74	0.029	
	+30	86	0.033	
	+40	95	0.037	
	+50	77	0.030	
	+55	86	0.033	
42	+25	85	0.033	
55	+25	120	0.046	



## 2.5 Conducted Out of Band Emissions

### 2.5.1 Requirement

According to Part 27.53(m)(2) and RSS-199 Section 4.5(a)

### 2.5.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

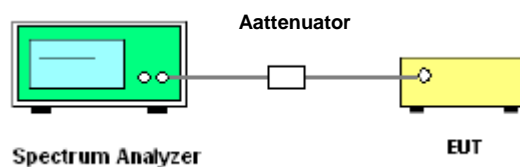
### 2.5.3 Limit

-13dBm

### 2.5.4 Test Procedures

- 1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
- 2 The resolution bandwidth of the spectrum analyzer was set at 100 kHz when below 1GHz, 1MHz when above 1 GHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
- 3 For the out of band: Set the RBW=100 kHz, VBW=300 kHz when below 1 GHz, RBW =1 MHz, VBW=3 MHz when above 1 GHz, Start=30MHz, Stop= 10th harmonic.
- 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

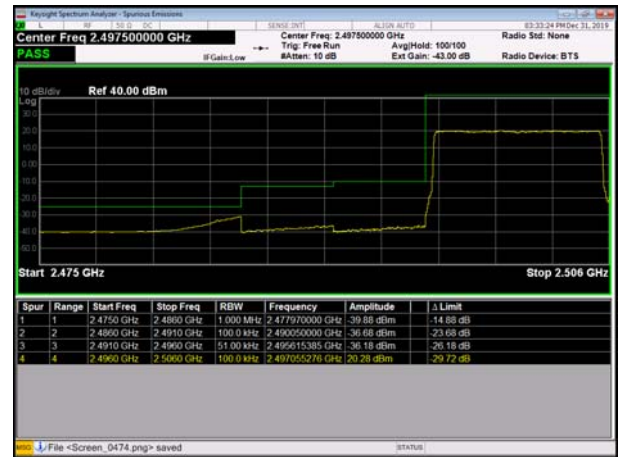
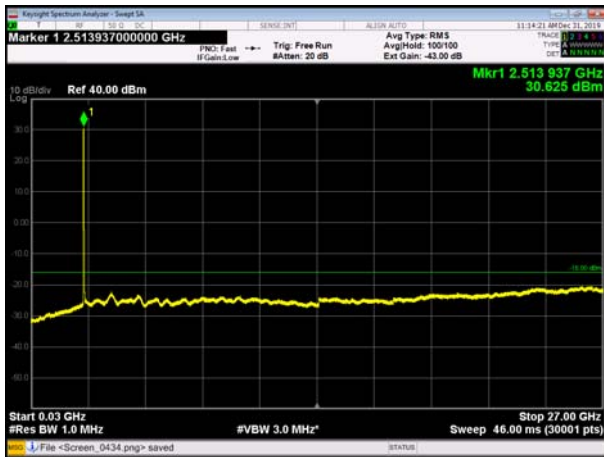
### 2.5.5 Test Setup



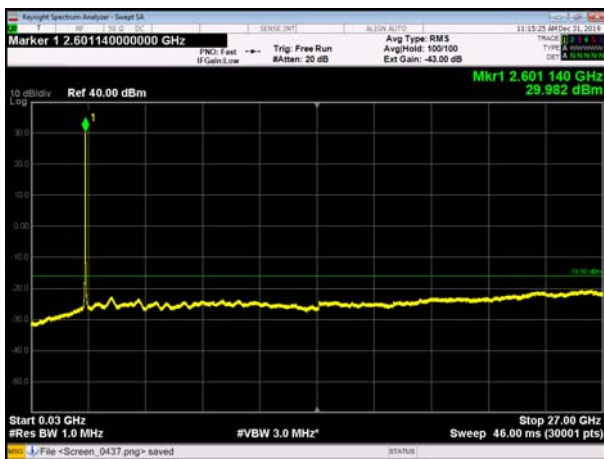
### 2.5.6 Test Result

Configuration MIMO-MC(C1+C2)  
For FCC measurement data:

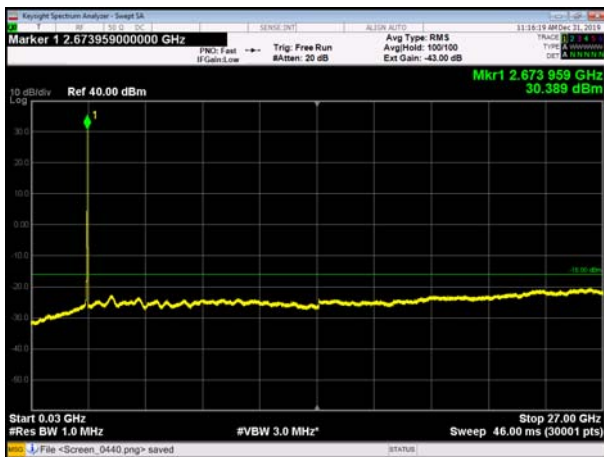
#### 10M-E-TM1.1-Low Chain0



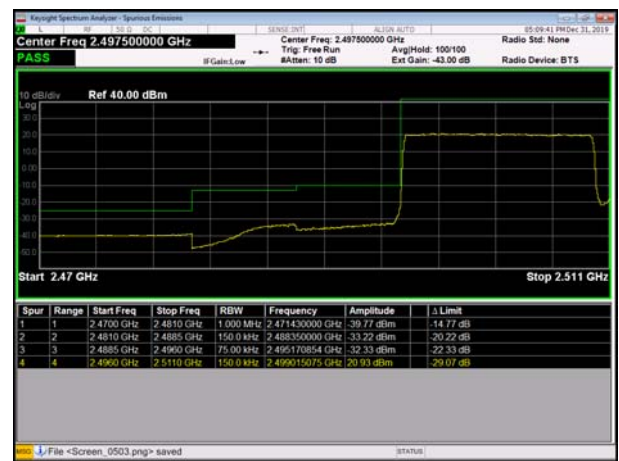
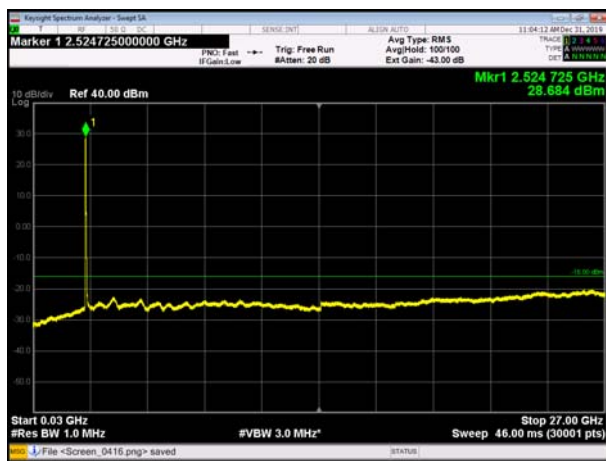
#### 10M-E-TM1.1-Middle Chain0



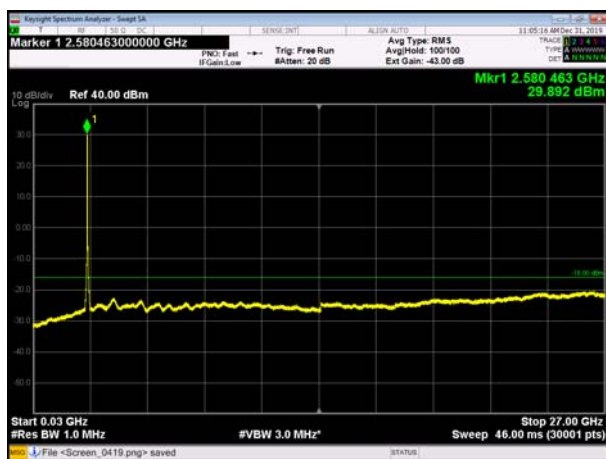
#### 10M-E-TM1.1-High Chain0



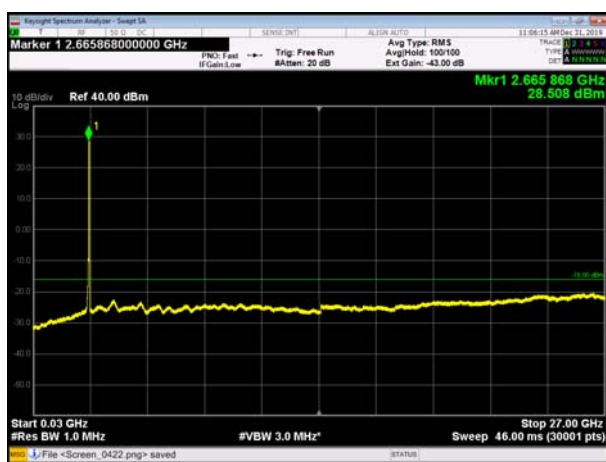
### 15M-E-TM1.1-Low Chain0



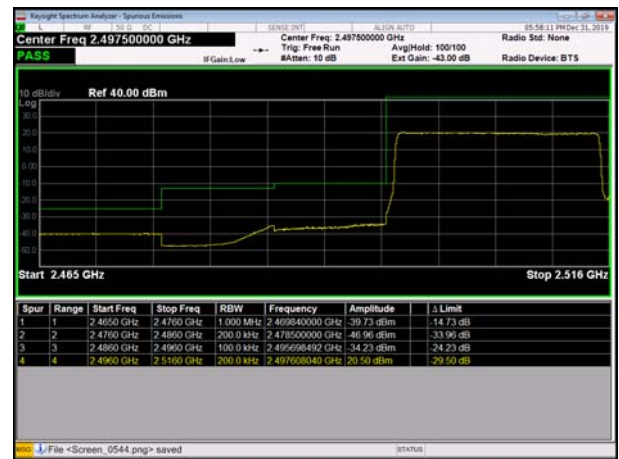
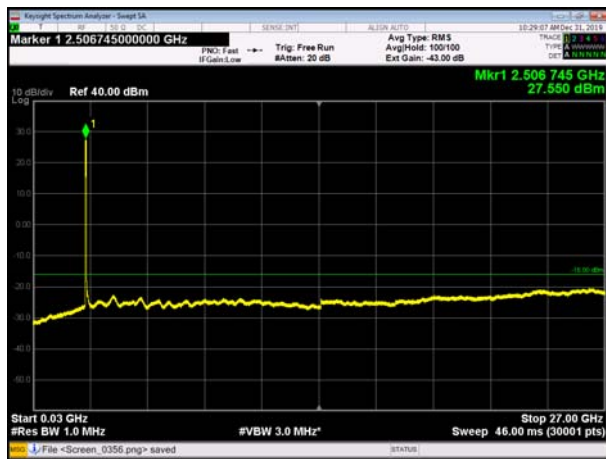
### 15M-E-TM1.1-Middle Chain0



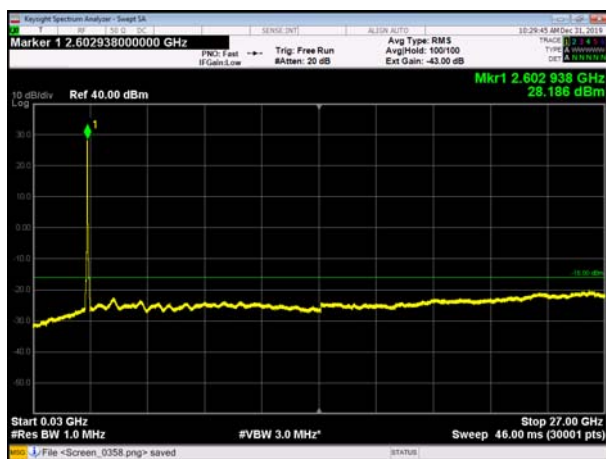
### 15M-E-TM1.1-High Chain0



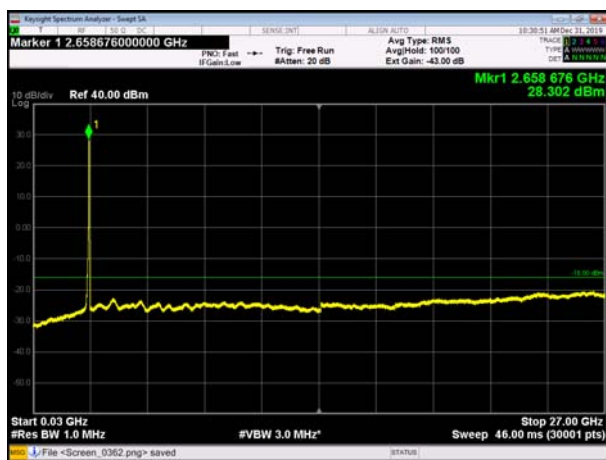
### 20M-E-TM1.1-Low Chain0



### 20M-E-TM1.1-Middle Chain0

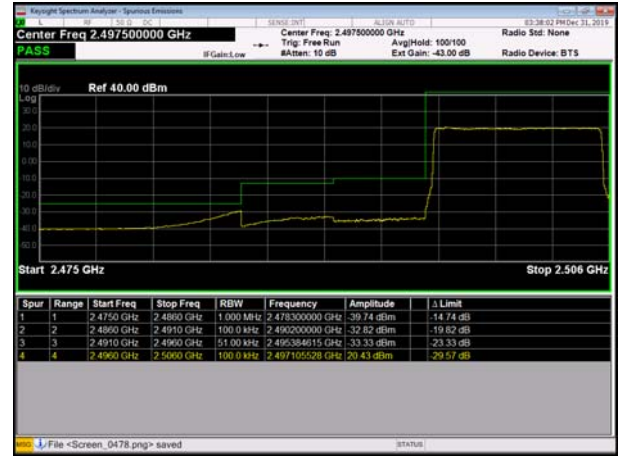
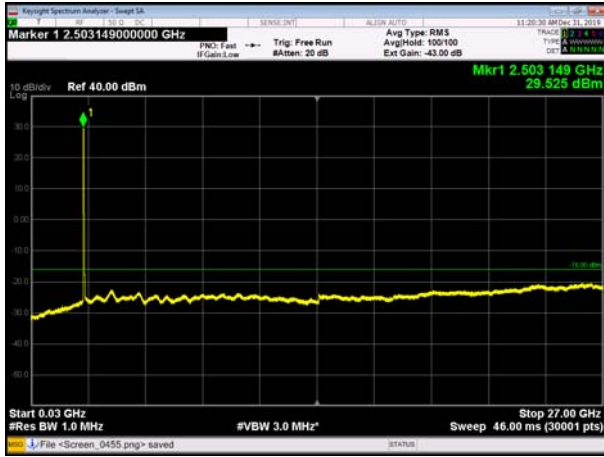


### 20M-E-TM1.1-High Chain0

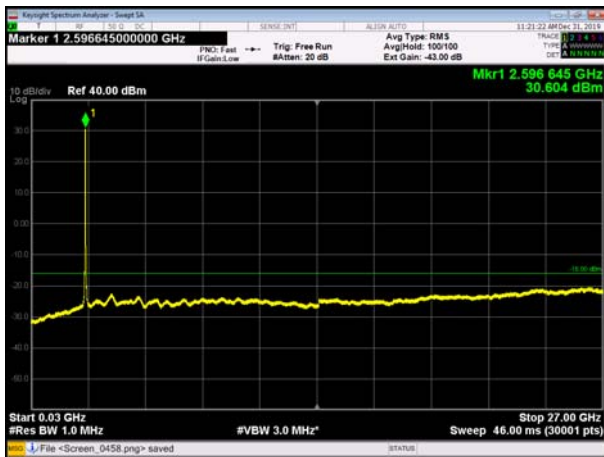




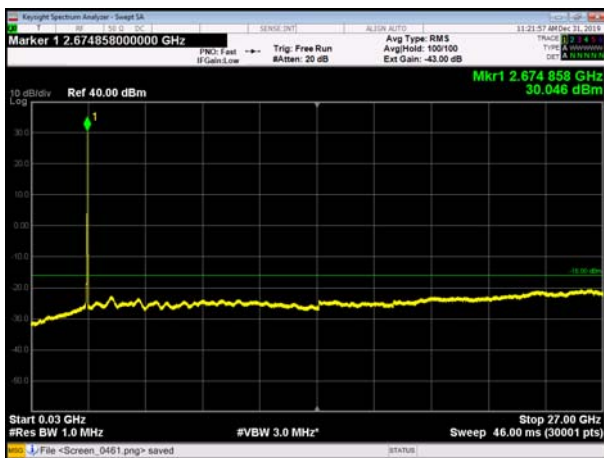
### 10M-E-TM1.1-Low Chain1



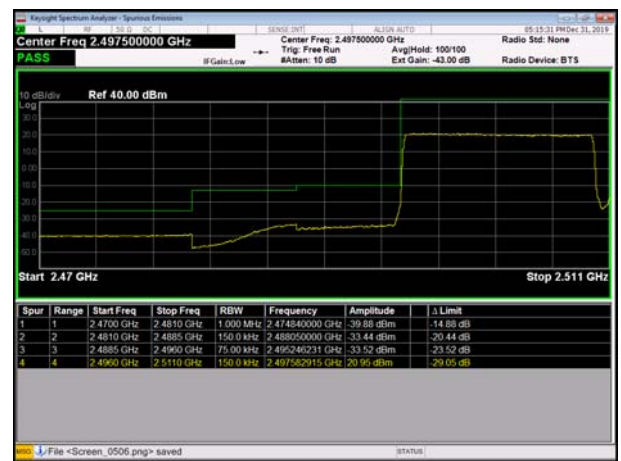
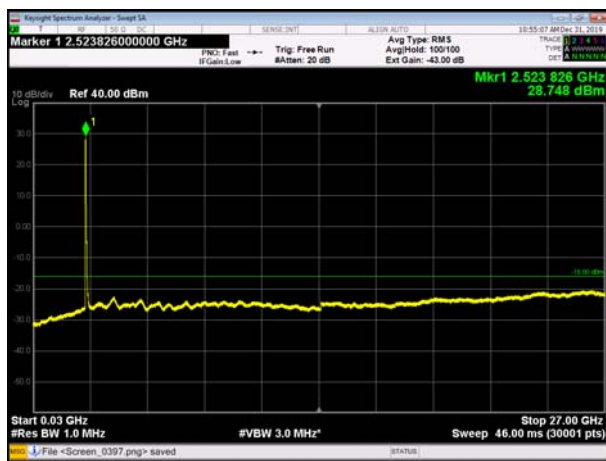
### 10M-E-TM1.1-Middle Chain1



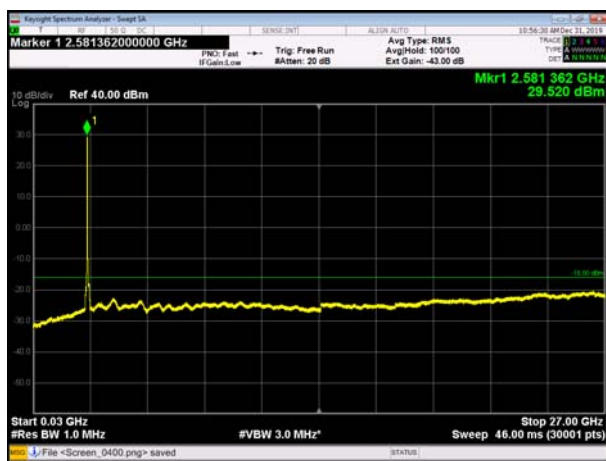
### 10M-E-TM1.1-High Chain1



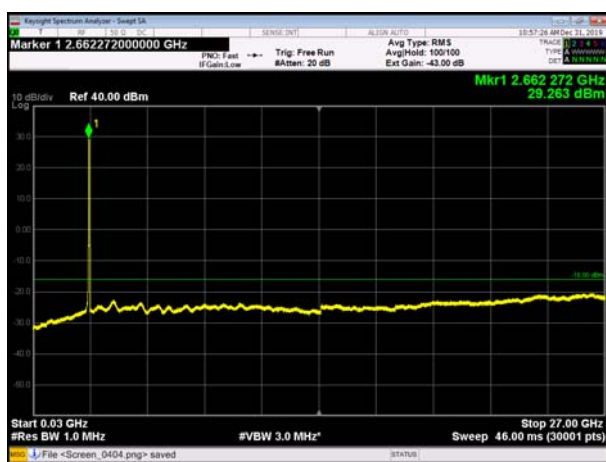
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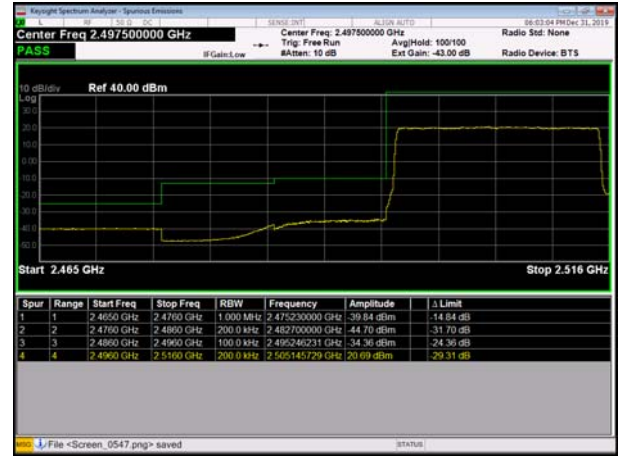
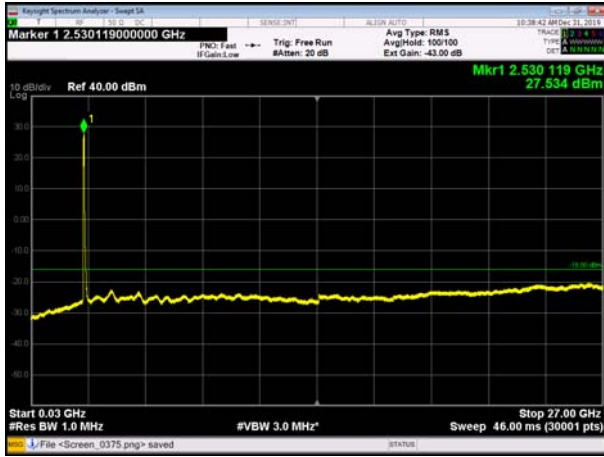
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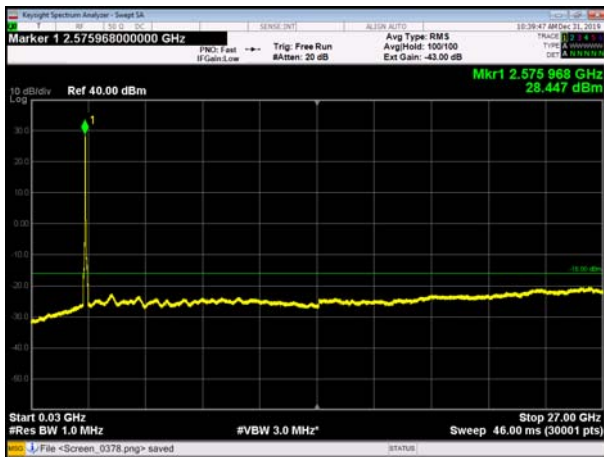
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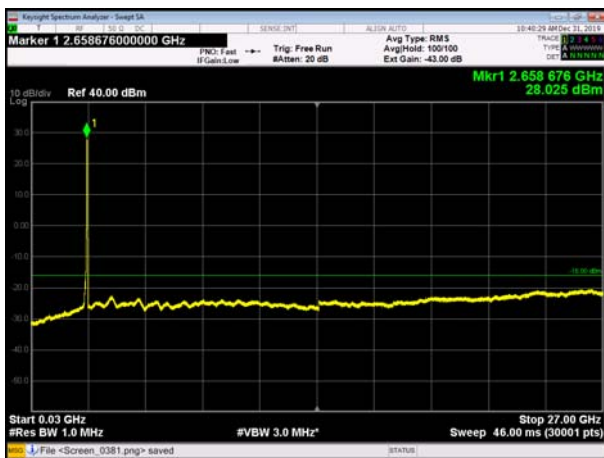
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### 20M-E-TM1.1-Middle Chain1

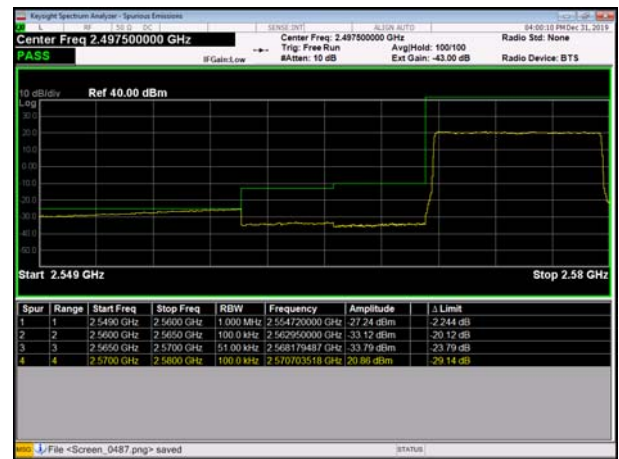
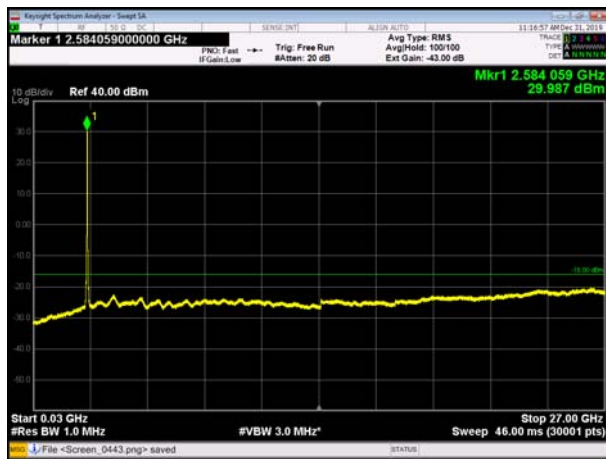


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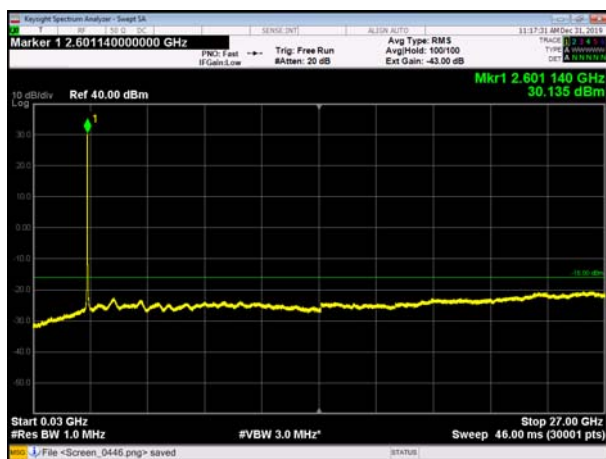


For IC measurement data:

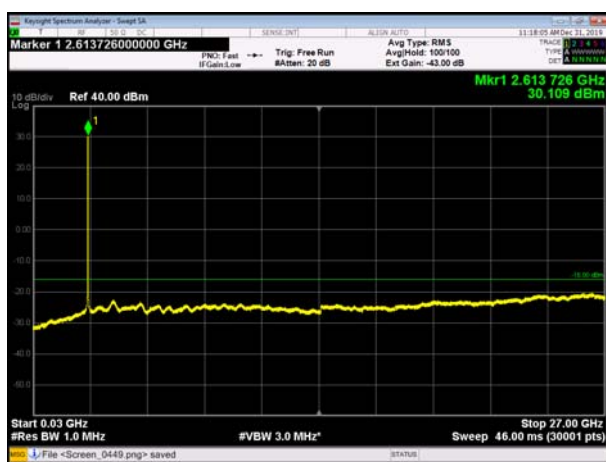
10M-E-TM1.1-Low Chain0



10M-E-TM1.1-Middle Chain0

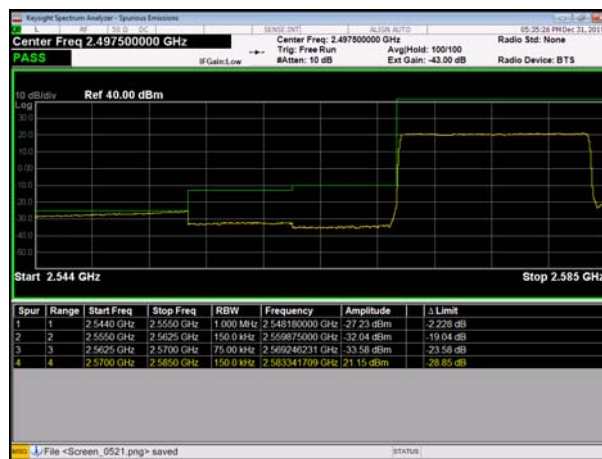
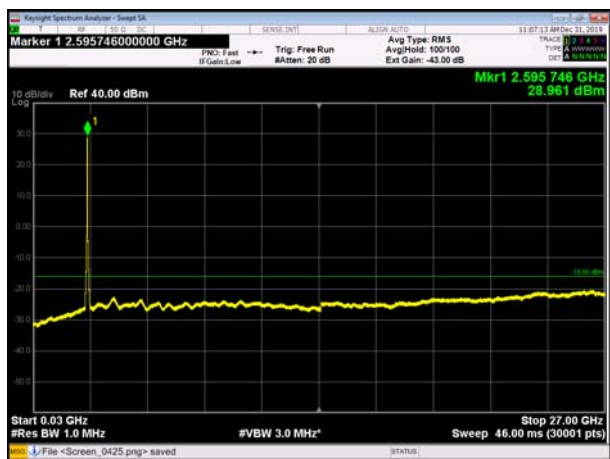


10M-E-TM1.1-High Chain0

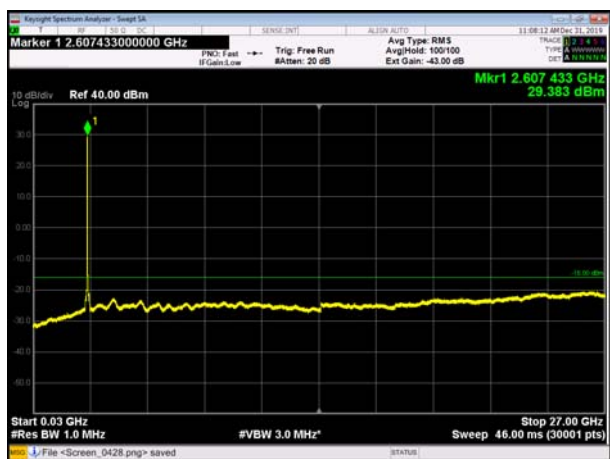




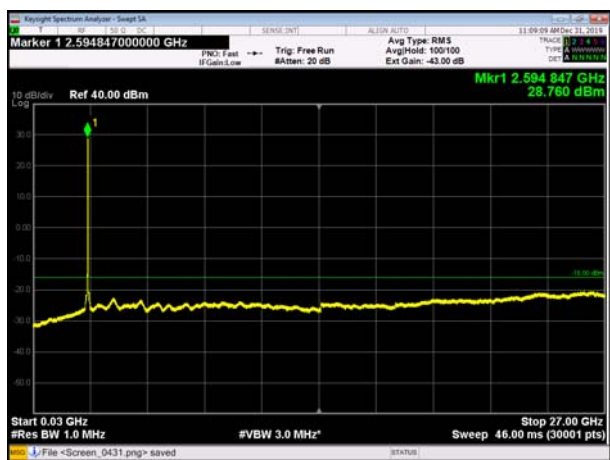
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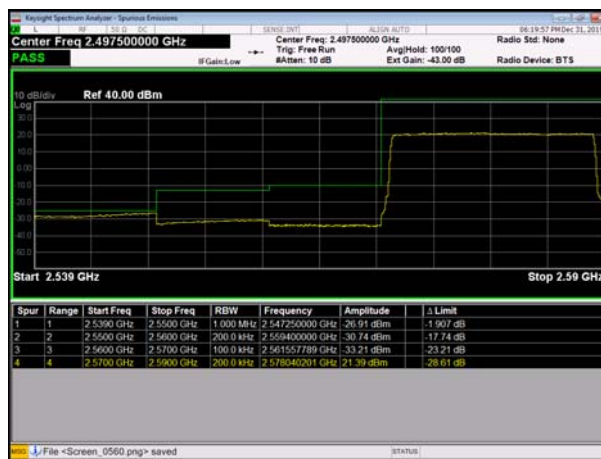
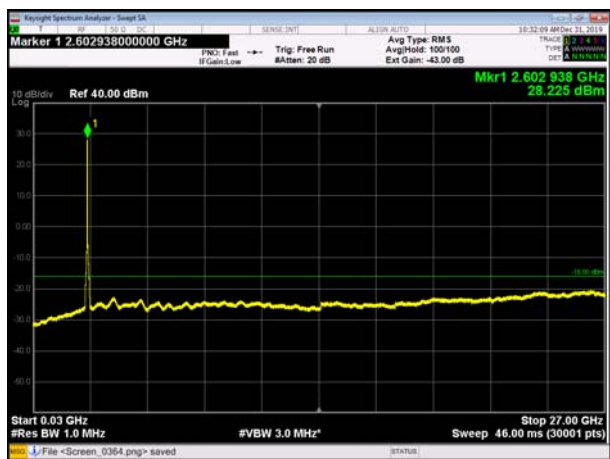
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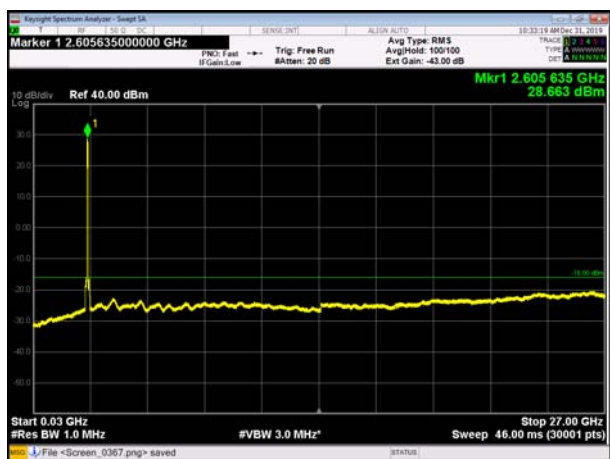
### 15M-E-TM1.1-High Chain0



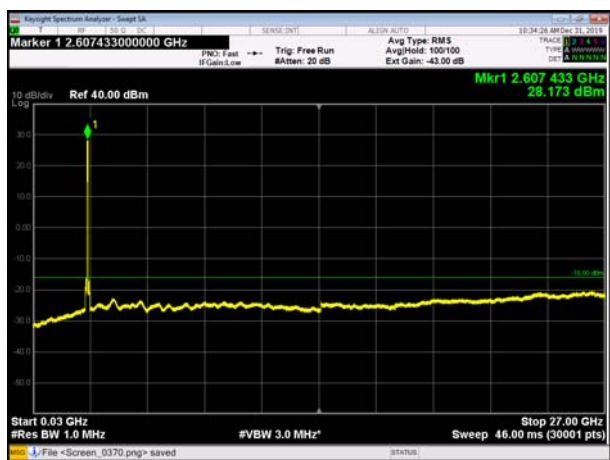
### 20M-E-TM1.1-Low Chain0



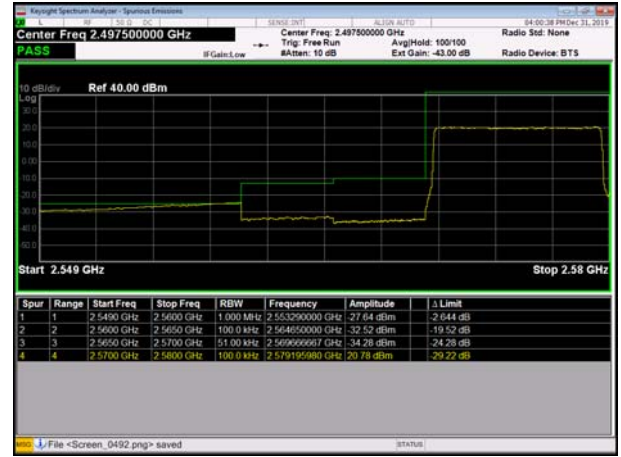
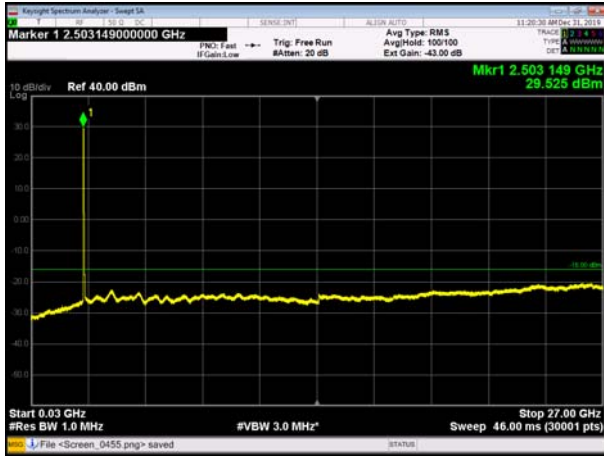
### 20M-E-TM1.1-Middle Chain0



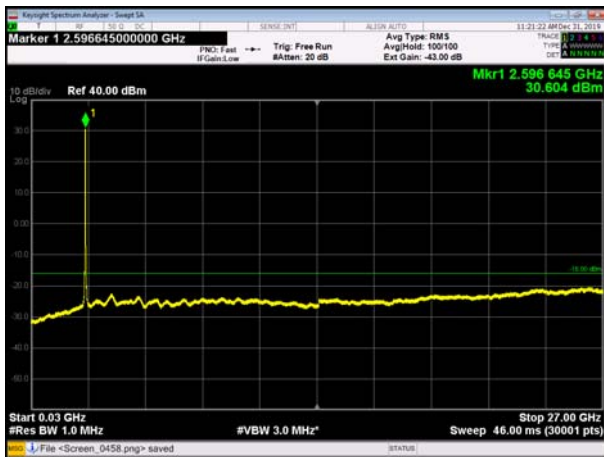
### 20M-E-TM1.1-High Chain0



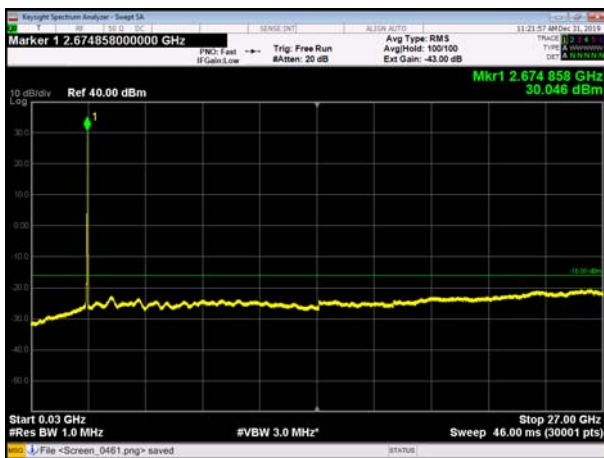
10M-E-TM1.1-Low Chain1



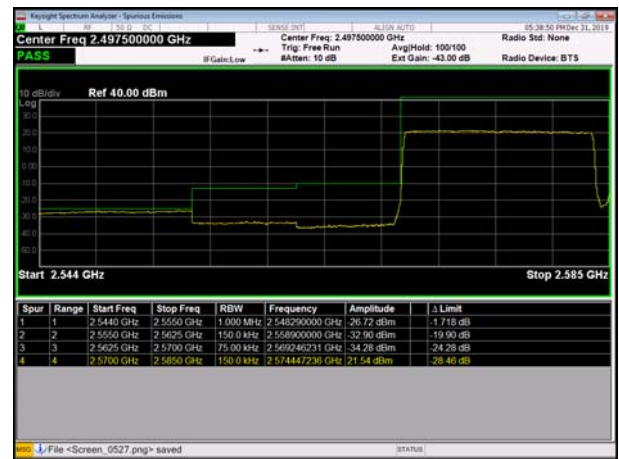
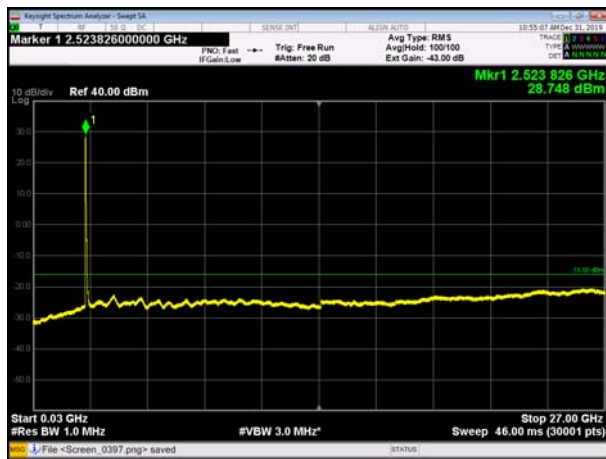
10M-E-TM1.1-Middle Chain1



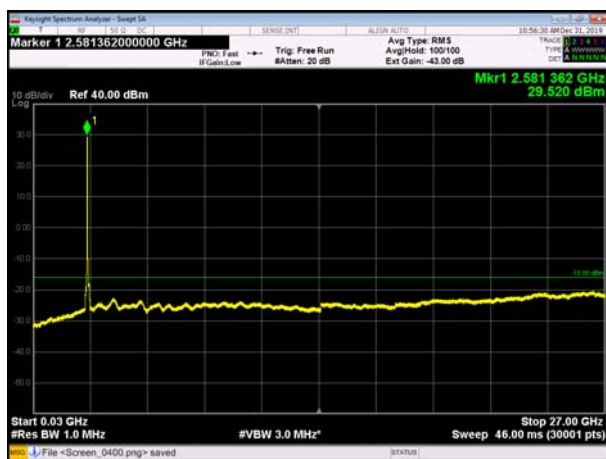
10M-E-TM1.1-High Chain1



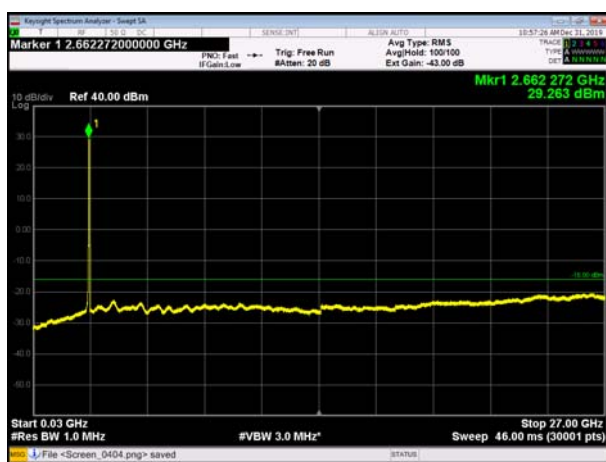
### 15M-E-TM1.1-Low Chain1



### 15M-E-TM1.1-Middle Chain1

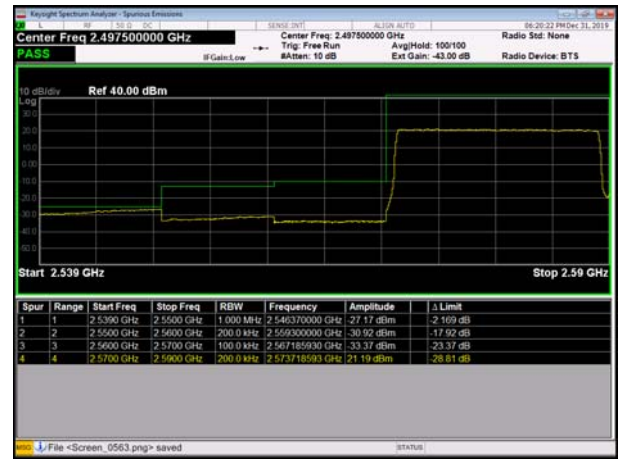
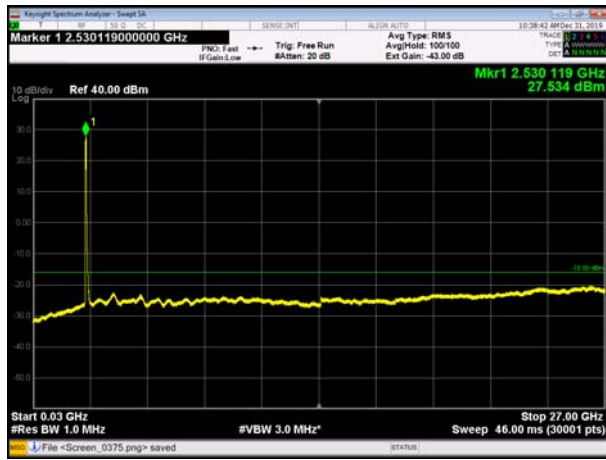


### 15M-E-TM1.1-High Chain1

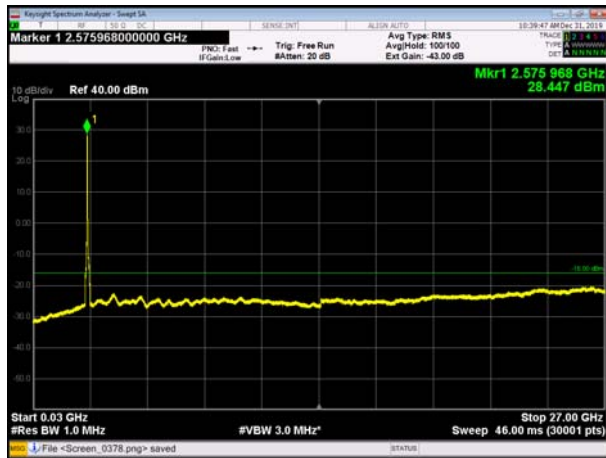




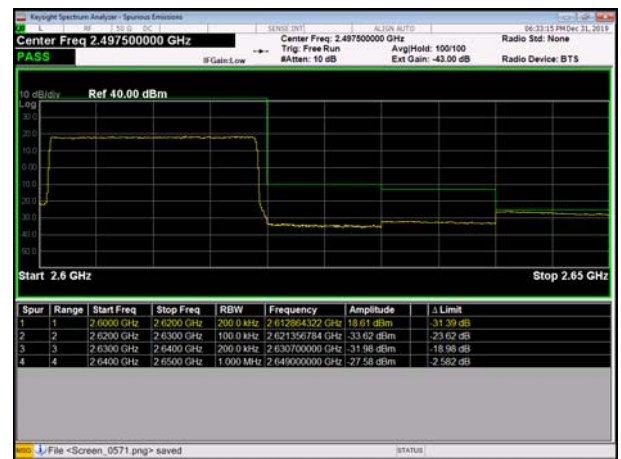
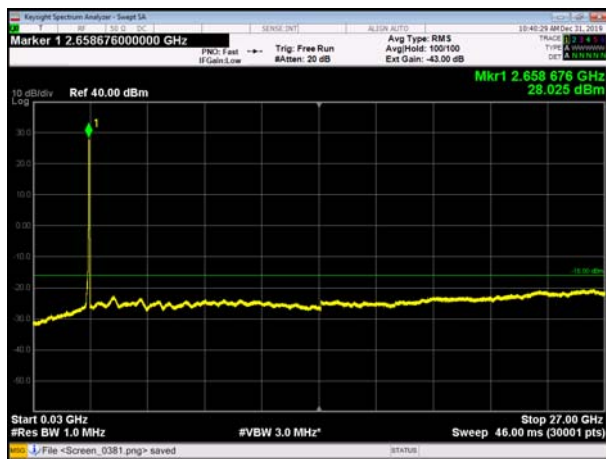
### 20M-E-TM1.1-Low Chain1



### 20M-E-TM1.1-Middle Chain1



### 20M-E-TM1.1-High Chain1



## 2.6 Radiated Spurious Emissions

### 2.6.1 Requirement

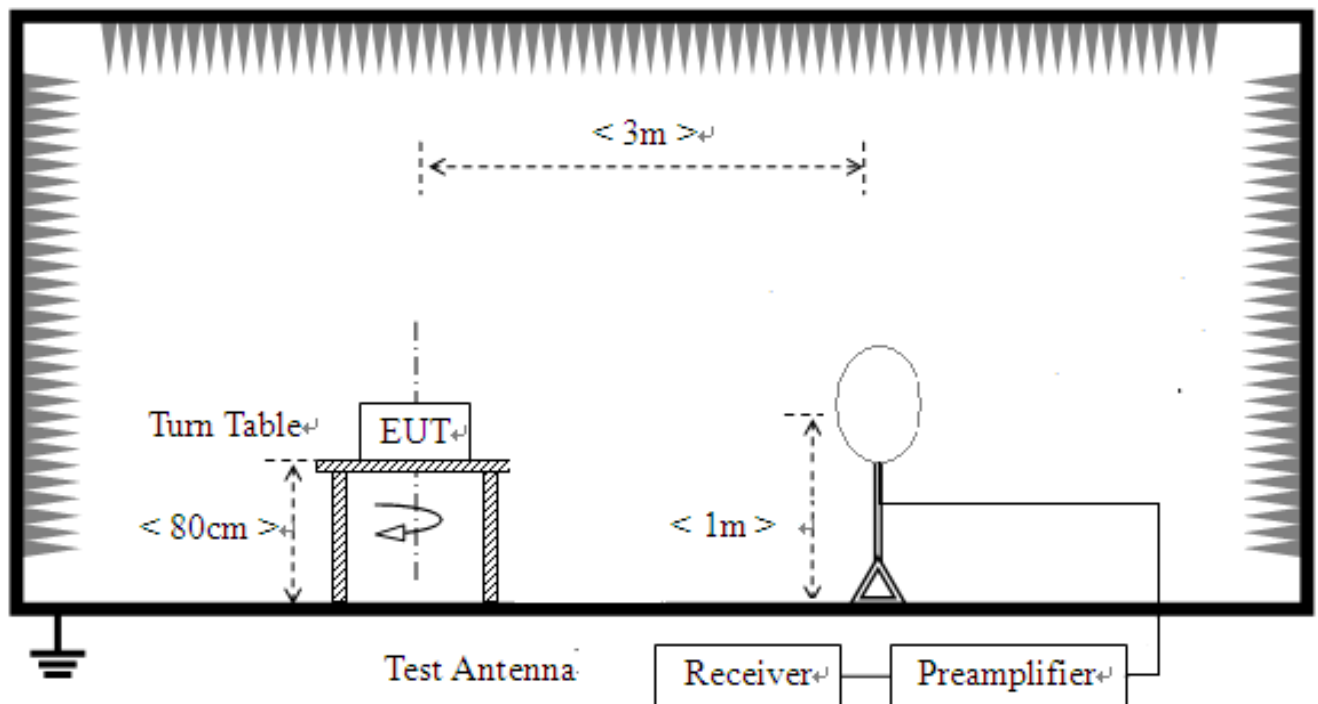
For digital base stations, the attenuation shall be not less than  $43 + 10 \log (P)$  dB

### 2.6.2 Measuring Instruments

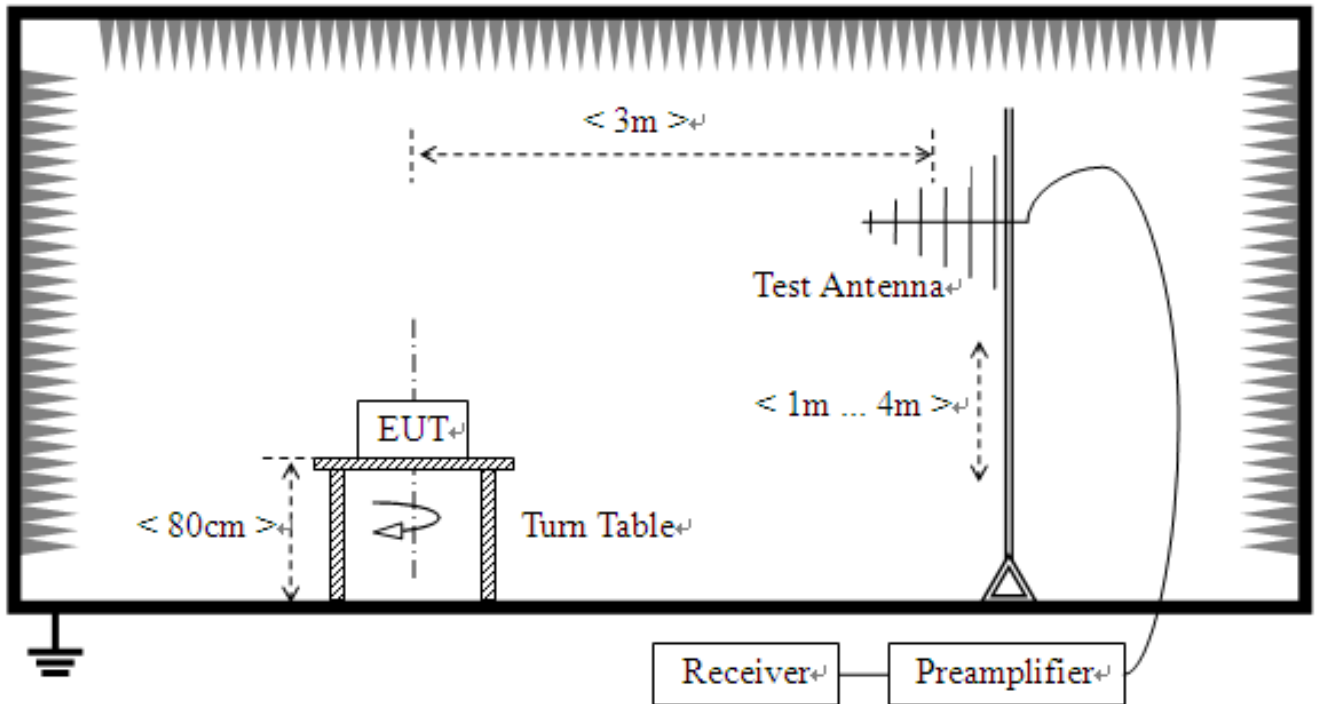
The measuring equipment is listed in the section 3 of this test report.

### 2.6.3 Test Setup

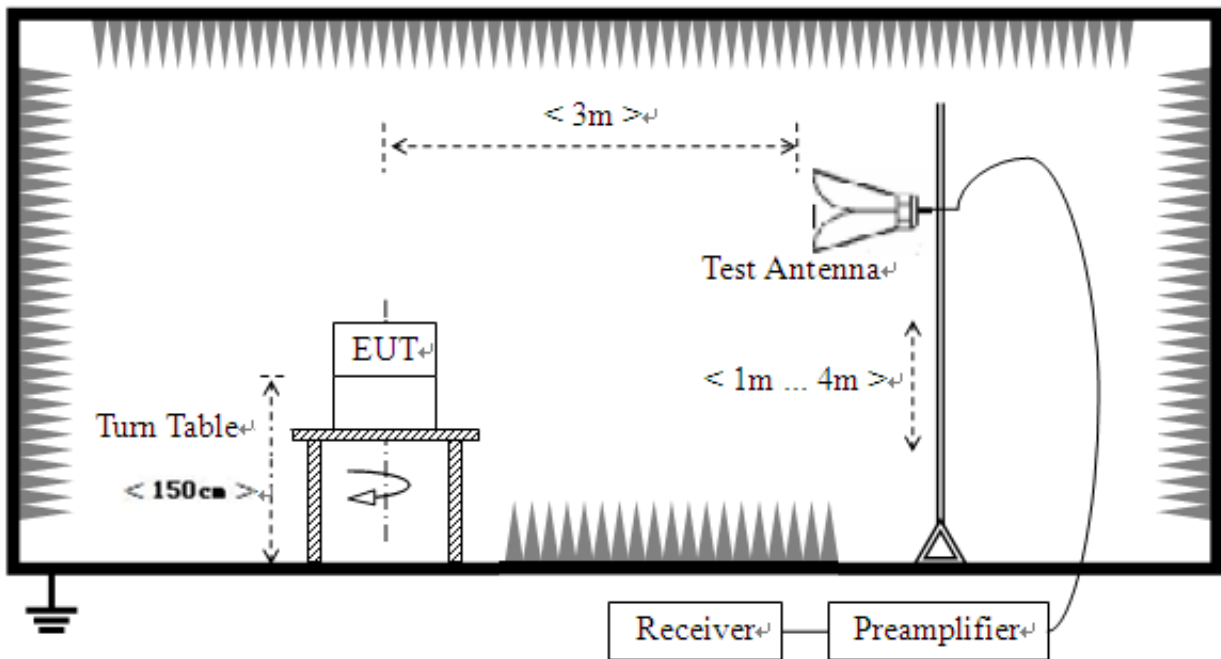
For radiated emissions from 9 kHz to 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



#### 2.6.4 Test Procedures

1. The testing follows ANSI C63.26:2015
2. The EUT was placed on a rotatable wooden table 0.8m(below 1G) or 1.5m(above 1G) above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
13. All Spurious Emission tests were performed in X, Y, Z axis direction and low, middle, high channel. And only the worst axis test condition was recorded in this test report.
14. The spectrum is measured from 9 KHz to the 10<sup>th</sup> harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. The worst case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
15. For 9KHz to 30MHz: the amplitude of spurious emissions are attenuated by more than 20dB below the permissible value has no need to be reported.





## 2.6.5 Test Results of Radiated Spurious Emissions

Worst-Case test data provide as below:

Note: 1. within 30MHz-1GHz were found more than 20dB below limit line

Note: 2. Absolute Level=Reading Level + Factor

30MHz~27GHz:

FCC Measurement data

Band 41 (Middle Channel BW:10MHz )

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	34.8549	-86.10	-61.29	-13.00	48.29	24.81	Horizontal
2	53.3033	-80.73	-59.47	-13.00	46.47	21.26	Horizontal
3	504.804	-104.17	-70.32	-13.00	57.32	33.85	Horizontal
4	1830.41	-55.83	-54.83	-13.00	41.83	1.00	Horizontal
5	3790.14	-58.03	-49.21	-13.00	36.21	8.82	Horizontal
6	10238.1	-60.62	-36.79	-13.00	23.79	23.83	Horizontal

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	34.8549	-86.61	-63.76	-13.00	50.76	22.85	Vertical
2	59.1291	-88.67	-66.74	-13.00	53.74	21.93	Vertical
3	85.3453	-95.47	-70.65	-13.00	57.65	24.82	Vertical
4	4955.85	-59.34	-46.23	-13.00	33.23	13.11	Vertical
5	7277.51	-58.84	-42.18	-13.00	29.18	16.66	Vertical
6	10574.6	-60.36	-36.16	-13.00	23.16	24.20	Vertical



## IC Measurement data

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	66.8969	-94.35	-75.76	-13.00	62.76	18.59	Horizontal
2	190.210	-98.66	-76.72	-13.00	63.72	21.94	Horizontal
3	3210.10	-53.54	-44.69	-13.00	31.69	8.85	Horizontal
4	4002.50	-54.51	-45.61	-13.00	32.61	8.90	Horizontal
5	6552.27	-54.84	-40.03	-13.00	27.03	14.81	Horizontal
6	13995.9	-58.19	-34.36	-13.00	21.36	23.83	Horizontal

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	63.9840	-94.07	-74.29	-13.00	61.29	19.78	Vertical
2	93.1131	-98.08	-75.08	-13.00	62.08	23.00	Vertical
3	1312.15	-52.71	-55.82	-13.00	42.82	-3.11	Vertical
4	3204.10	-55.48	-46.40	-13.00	33.40	9.08	Vertical
5	5791.39	-55.19	-43.87	-13.00	30.87	11.32	Vertical
6	12837.4	-56.04	-36.25	-13.00	23.25	19.79	Vertical



### 3. LIST OF MEASURING EQUIPMENT

Description	Manufacturer	Model	Serial No.	Cal. Date	Due Date	Remark
EMI Test Receiver	R&S	ESIB26	A0304218	2019.05.20	2020.05.19	Radiation
Loop Antenna	Schwarz beck	HFH2-Z2	100047	2019.04.26	2022.04.25	Radiation
Broadband antenna (30MHz~1GHz)	R&S	HL562	101341	2017.07.14	2020.07.13	Radiation
Broadband antenna (30MHz~1GHz)	R&S	HL562	101339	2017.07.14	2020.07.13	Radiation
Double ridge horn antenna (1GHz~18GHz)	R&S	HF906	100150	2019.04.27	2022.04.26	Radiation
Double ridge horn antenna (1GHz~18GHz)	R&S	HF906	100149	2019.04.17	2022.04.16	Radiation
Horn antenna (18GHz~26.5GHz)	AR	AT4002A	305753	2017.07.12	2020.07.11	Radiation
Horn antenna (18GHz~26.5GHz)	AR	AT4003A	0329293	2018.09.17	2020.09.16	Radiation
Amplifier 1GHz-18GHz	AR	25S1G4AM1	22018	2018.09.17	2020.09.16	Radiation
Amplifier 20M~3GHz	MILMEGA	80RF1000-250	1064573	2017.10.09	2020.10.08	Radiation
Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2019.06.05	2020.06.04	Conducted
LISN	ROHDE&SC HWARZ	ESH2-Z5	A0304221	2019.04.30	2020.04.29	Conducted
Test Receiver	R&S	ESCS30	A0304260	2019.05.25	2020.05.24	Conducted
Temperature chamber	Dongguan gaoda instrument CO.LTD	GD-7005-100	130130101	2019.04.22	2020.04.21	Conducted
Power Supply	R&S	NGMO1	101037	2019.08.03	2020.08.02	Conducted



#### 4. UNCERTAINTY OF EVALUATION

Measuring Uncertainty for a level of confidence of 95% ( $U=2U_c(y)$ )	2.6dB
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Uncertainty of Radiated Emission Measurement (30MHz~1GHz)

Measuring Uncertainty for a level of confidence of 95% ( $U=2U_c(y)$ )	2.4dB
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Uncertainty of Radiated Emission Measurement (1GHz~40GHz)

Measuring Uncertainty for a level of confidence of 95% ( $U=2U_c(y)$ )	2.8dB
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\*\* END OF REPORT \*\*