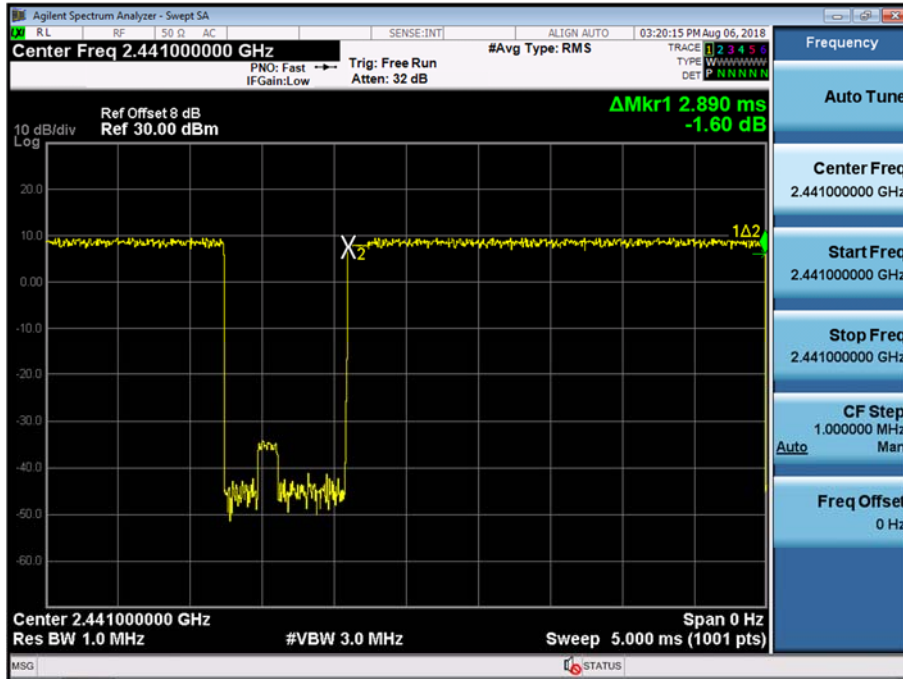
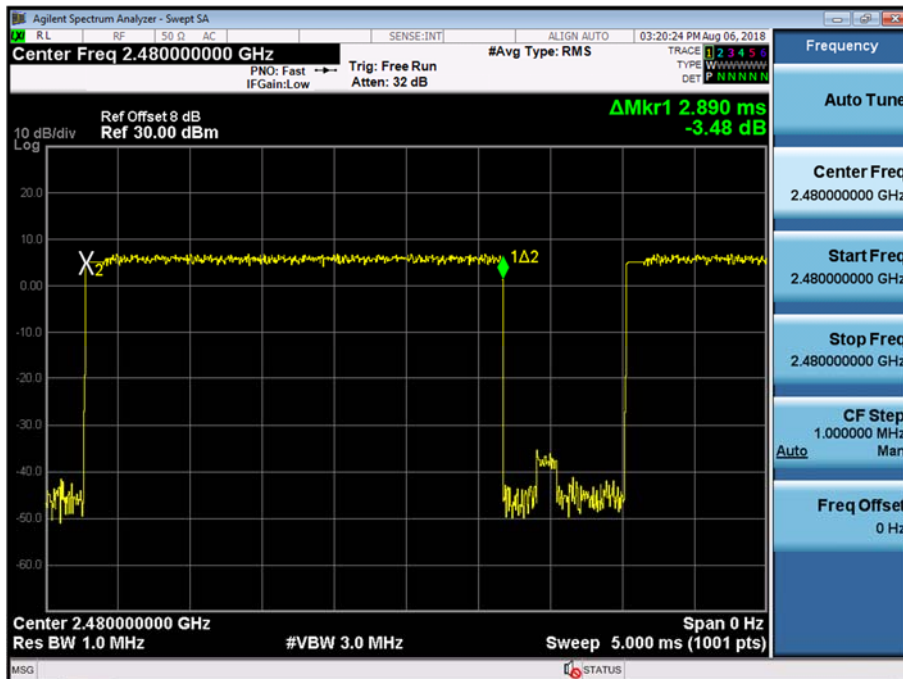


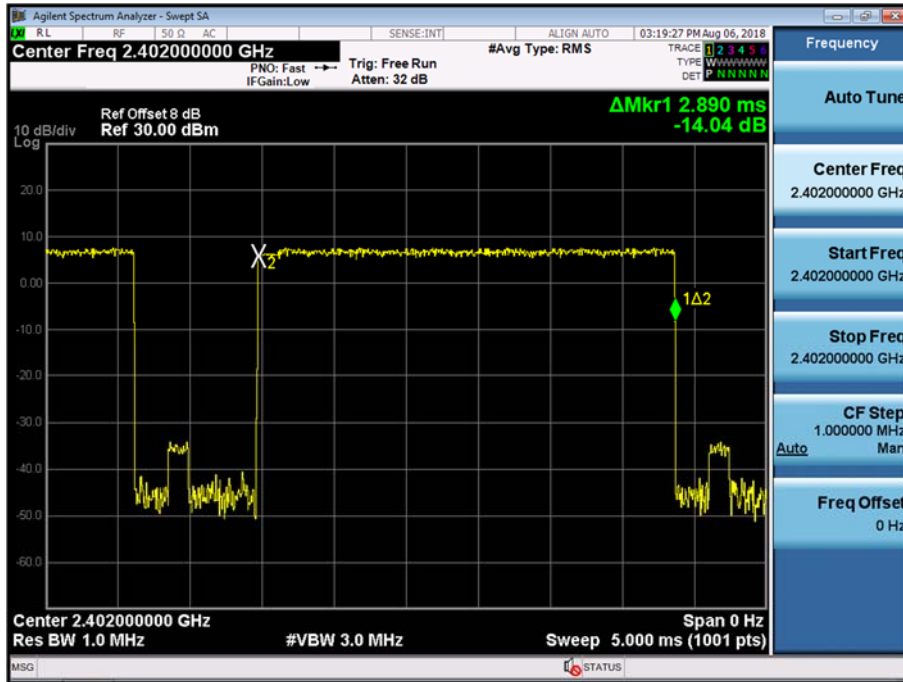
Test Plots (8DPSK)
Dwell Time (CH.39)



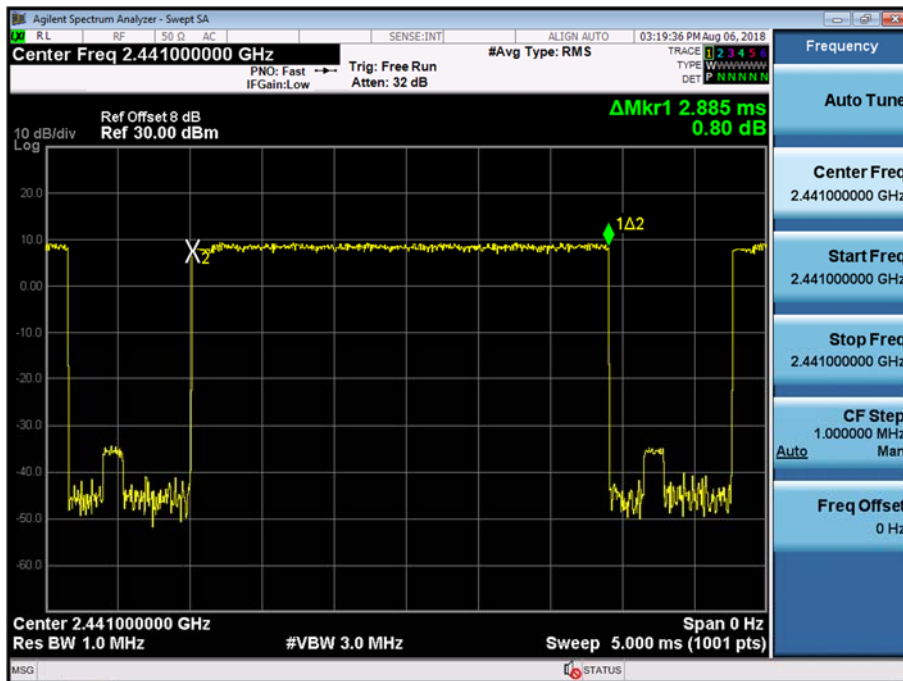
Test Plots (8DPSK)
Dwell Time (CH.78)



Test Plots ($\pi/4$ DQPSK)
Dwell Time (CH.0)



Test Plots ($\pi/4$ DQPSK)
Dwell Time (CH.39)



9.6 SPURIOUS EMISSIONS

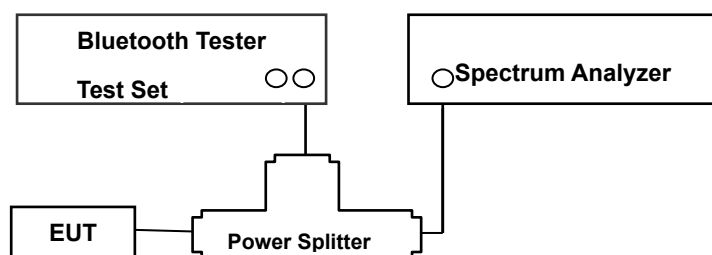
9.6.1 CONDUCTED SPURIOUS EMISSIONS

Test Requirements and limit, §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit : 20 dBc

Test Configuration



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer.

The Spectrum Analyzer is set to (7.8.8 in ANSI 63.10-2013)

- 1) Span: 30 MHz to 10 times the operating frequency in GHz.
- 2) RBW: 100 kHz
- 3) VBW: 300 kHz
- 4) Sweep: Coupled
- 5) Detector: Peak

Measurements are made over the 30 MHz to 26 GHz range with the transmitter set to the lowest, middle, and highest channels.

This test is performed with hopping off.

TEST RESULTS

No non-compliance noted.

Note : In order to simplify the report, attached plots were only the worst case channel and data rate.

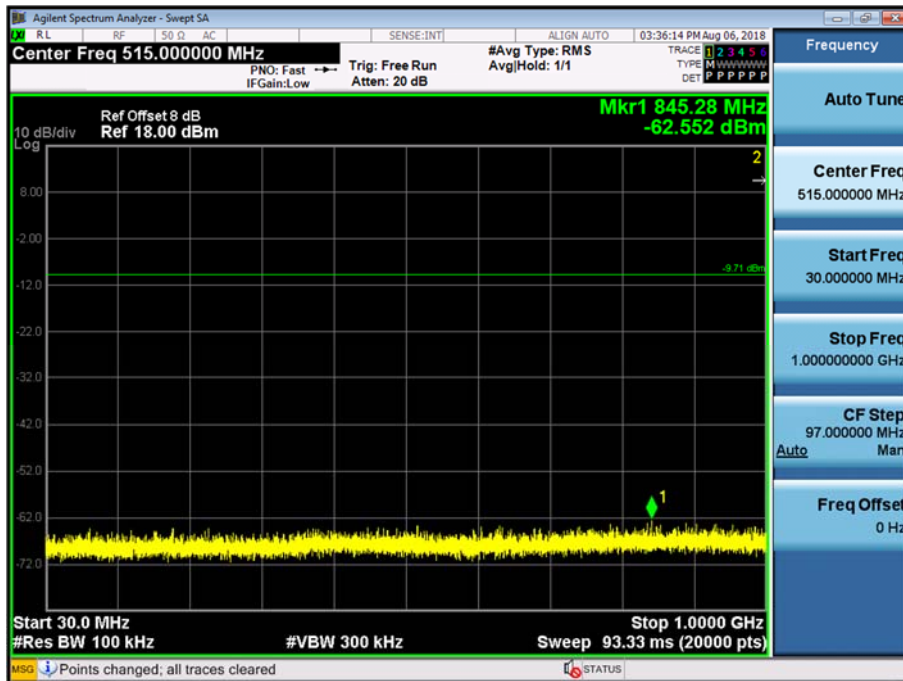
FACTORS FOR FREQUENCY

| Freq(MHz) | Factor(dB) |
|-----------|------------|
| 30 | 7.18 |
| 100 | 6.35 |
| 200 | 7.04 |
| 300 | 6.58 |
| 400 | 6.26 |
| 500 | 5.95 |
| 600 | 6.17 |
| 700 | 6.34 |
| 800 | 6.72 |
| 900 | 7.08 |
| 1000 | 7.38 |
| 2000 | 7.78 |
| 2400* | 7.36 |
| 2500* | 7.44 |
| 3000 | 7.88 |
| 4000 | 8.95 |
| 5000 | 9.57 |
| 6000 | 6.68 |
| 7000 | 9.99 |
| 8000 | 8.34 |
| 9000 | 9.61 |
| 10000 | 10.47 |
| 11000 | 8.96 |
| 12000 | 9.73 |
| 13000 | 8.84 |
| 14000 | 9.50 |
| 15000 | 11.54 |
| 16000 | 8.14 |
| 17000 | 11.73 |
| 18000 | 9.71 |
| 19000 | 10.40 |
| 20000 | 11.69 |
| 21000 | 10.72 |
| 22000 | 12.31 |
| 23000 | 9.85 |
| 24000 | 12.52 |
| 25000 | 11.07 |
| 26000 | 10.50 |

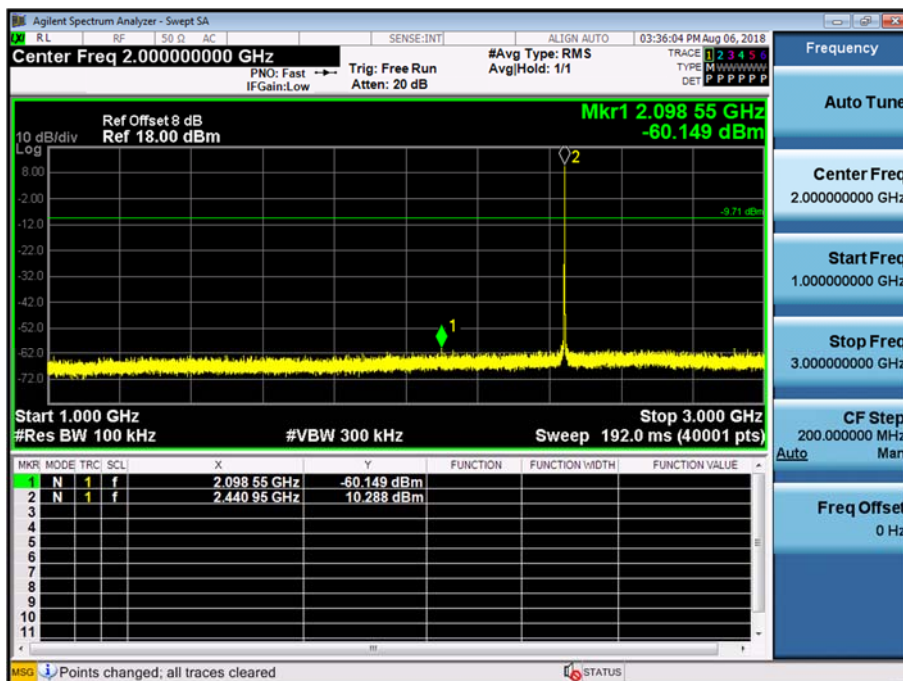
Note : 1. ** is fundamental frequency range.

2. Factor = Cable loss + Splitter loss + eut cable loss (0.6dB)

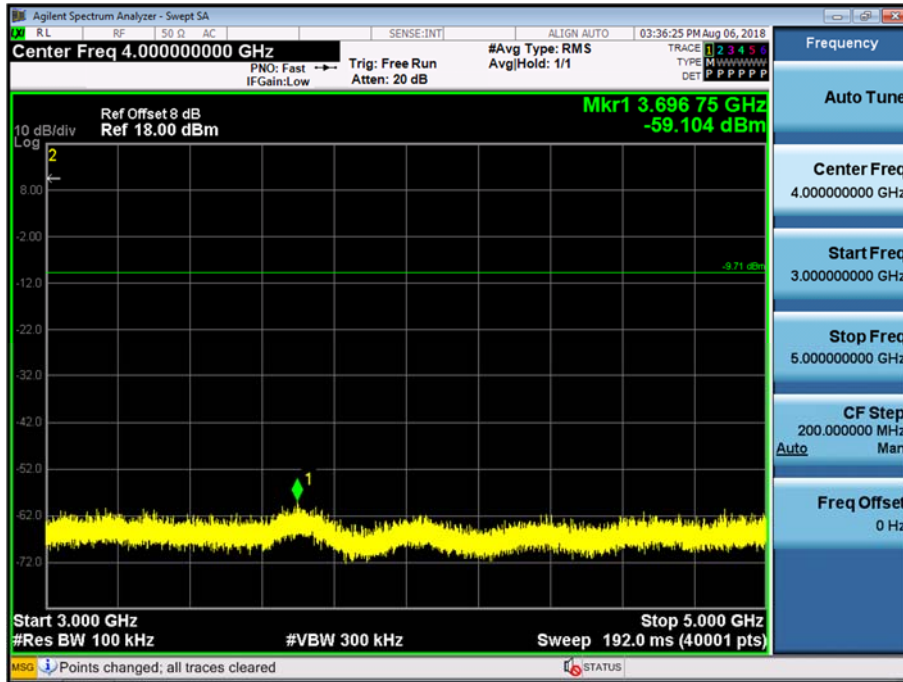
Test Plots (GFSK)- 30 MHz - 1 GHz
Spurious Emission (CH.0)



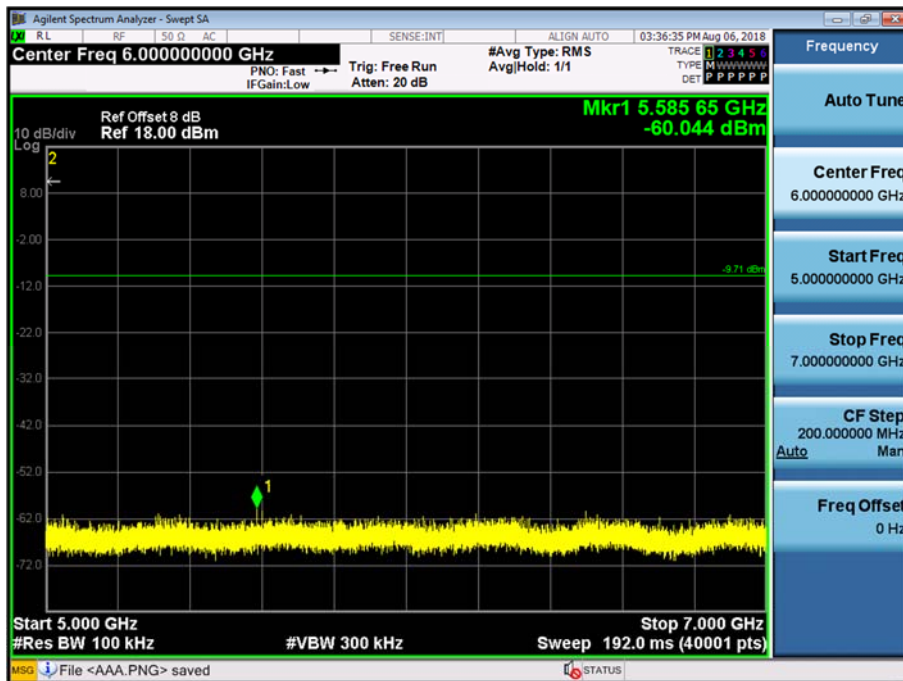
Test Plots (GFSK)- 1 GHz – 3 GHz
Spurious Emission (CH.0)



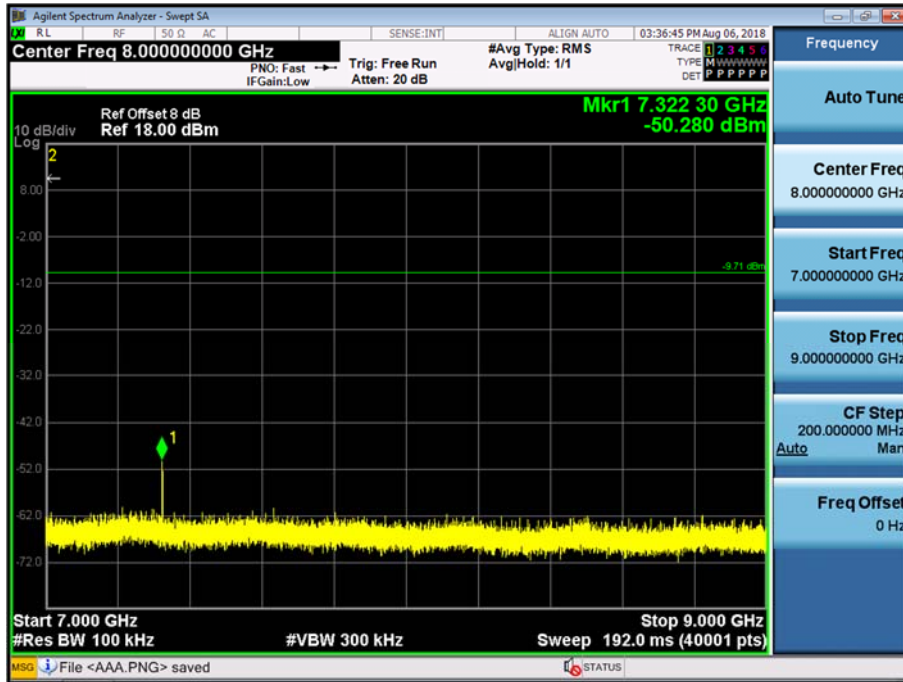
Test Plots(GFSK)- 3 GHz - 5 GHz
Spurious Emission (CH.0)



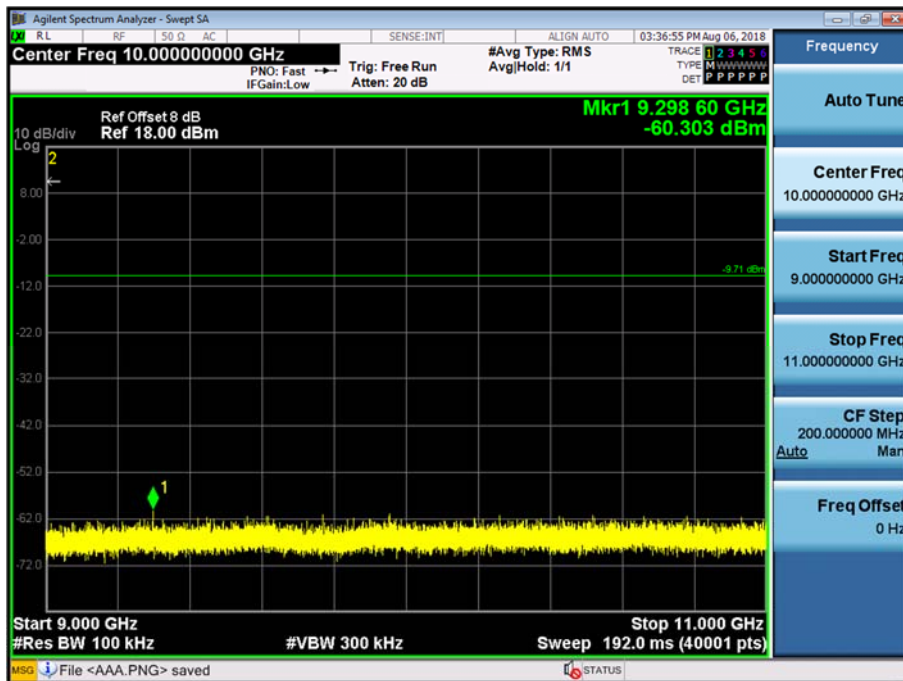
Test Plots (GFSK)- 5 GHz - 7 GHz
Spurious Emission (CH.0)



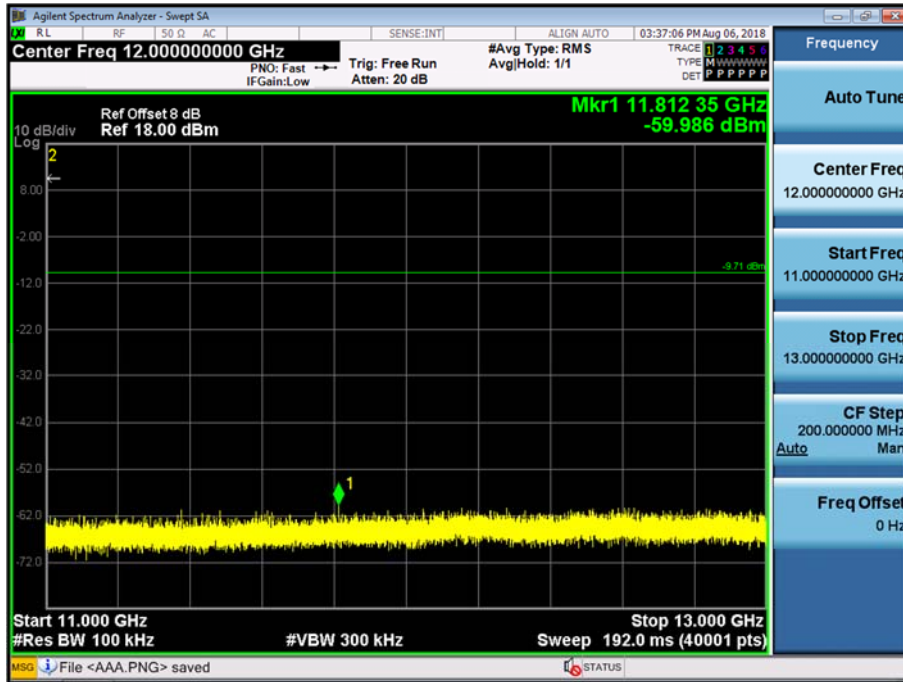
Test Plots(GFSK)- 7 GHz - 9 GHz
Spurious Emission (CH.0)



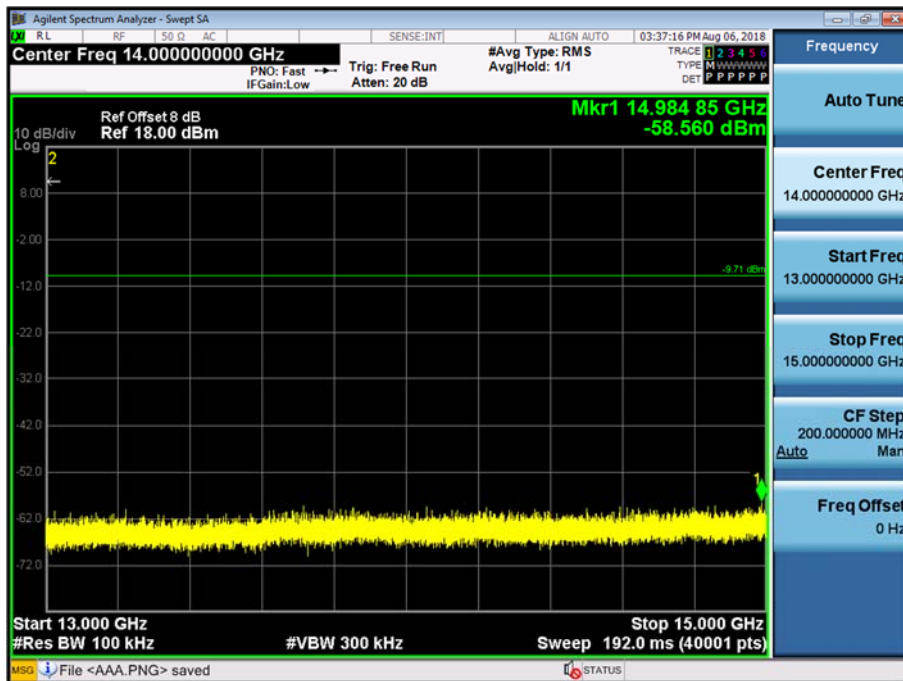
Test Plots(GFSK)- 9 GHz - 11 GHz
Spurious Emission (CH.0)



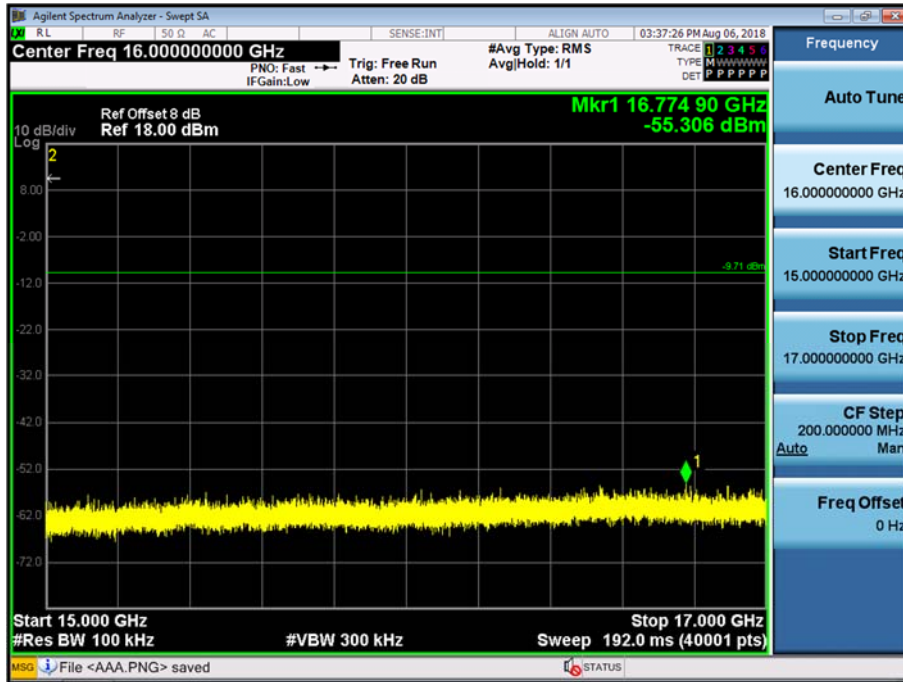
Test Plots(GFSK) 11 GHz - 13 GHz
Spurious Emission (CH.0)



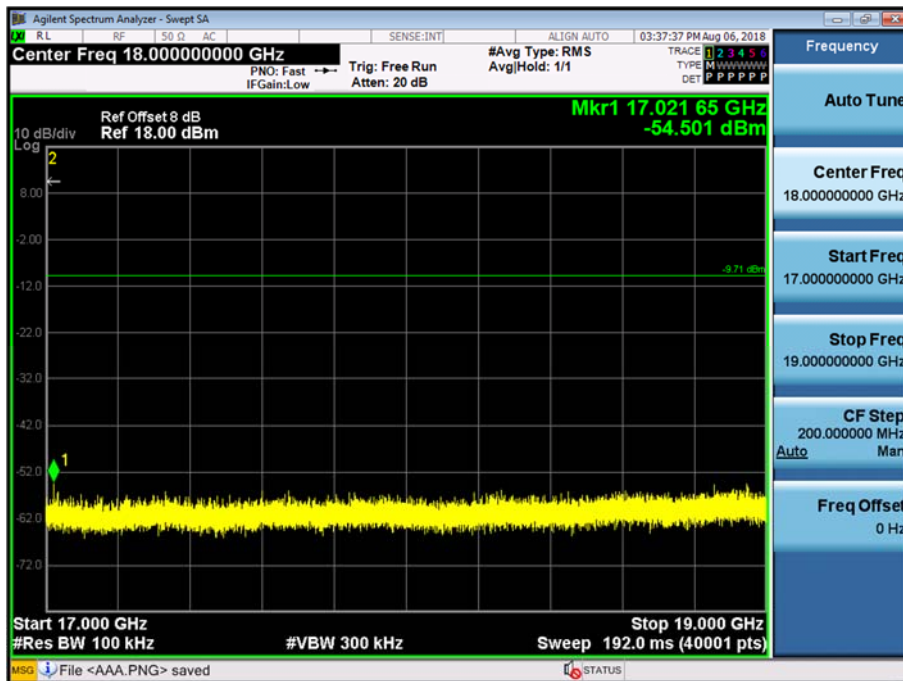
Test Plots (GFSK)- 13 GHz – 15 GHz
Spurious Emission (CH.0)



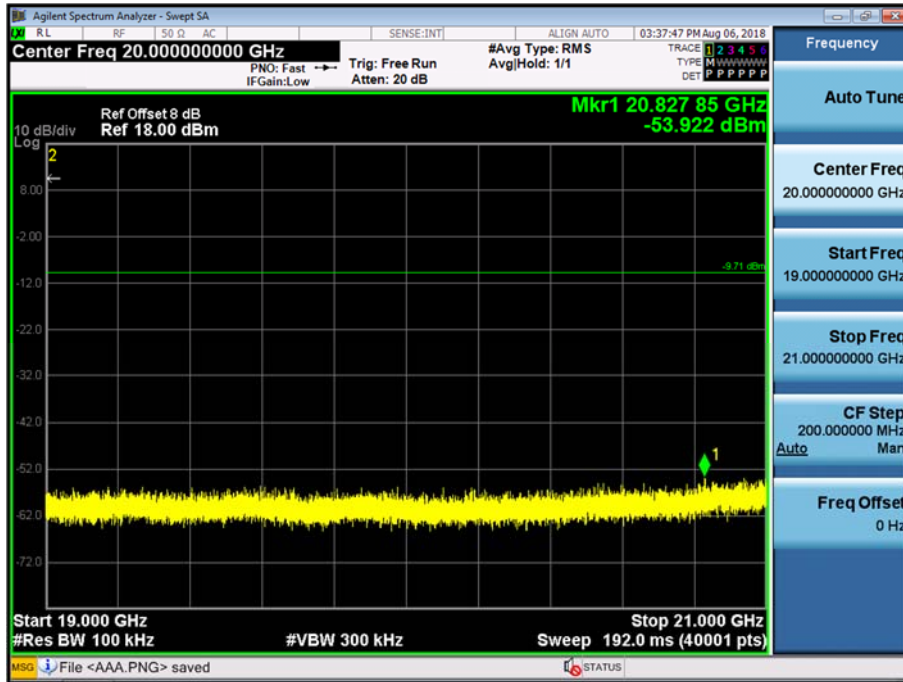
Test Plots(GFSK)- 15 GHz - 17 GHz
Spurious Emission (CH.0)



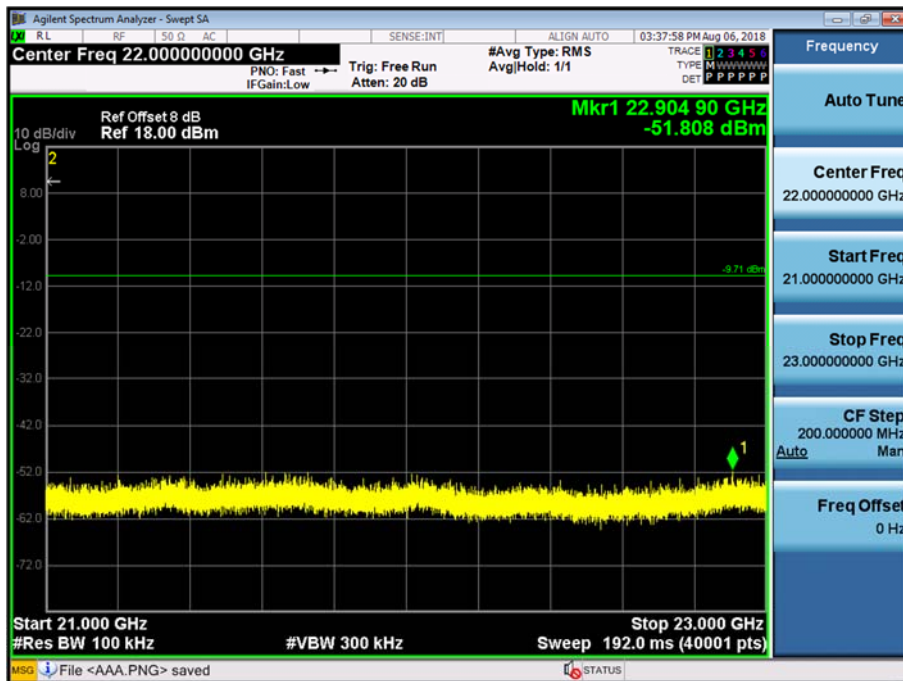
Test Plots(GFSK)- 17 GHz - 19 GHz
Spurious Emission (CH.0)



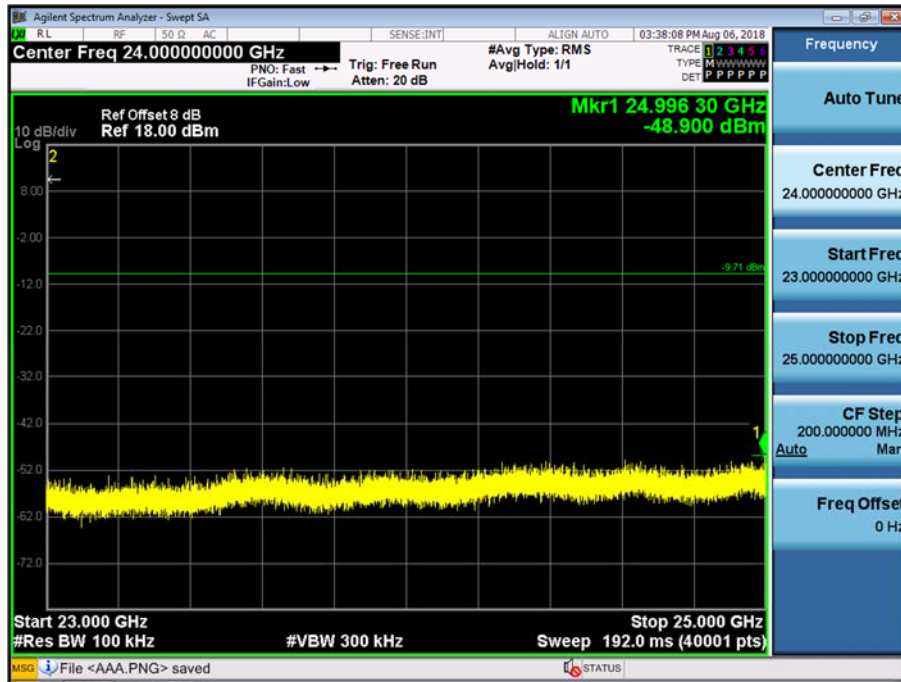
Test Plots (GFSK)- 19 GHz - 21 GHz
Spurious Emission (CH.0)



Test Plots (GFSK)- 21 GHz - 23 GHz
Spurious Emission (CH.0)



Test Plots (GFSK)- 23 GHz - 25 GHz
Spurious Emission (CH.0)



9.6.2 RADIATED SPURIOUS EMISSIONS

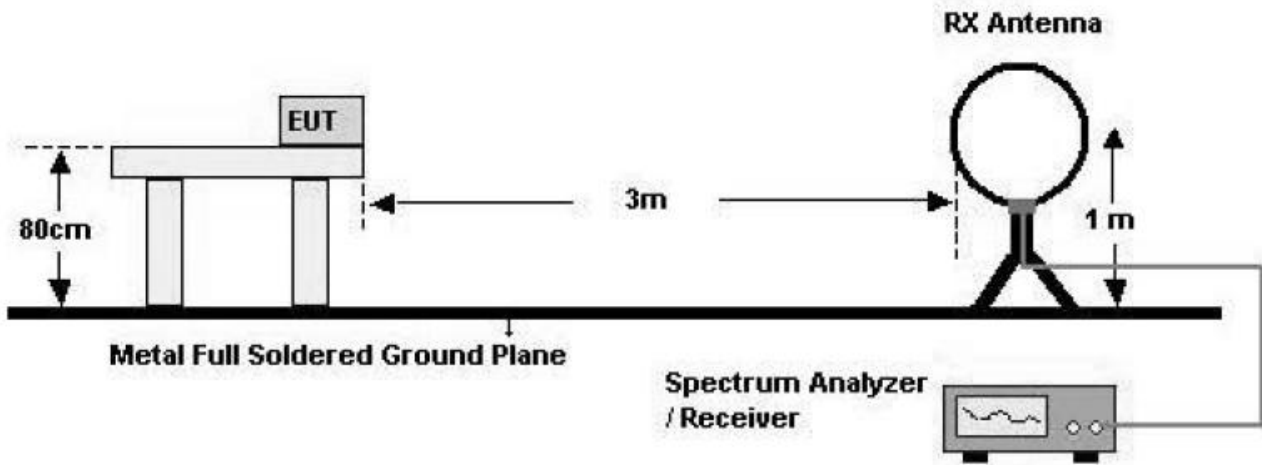
LIMIT : §15.247(d), §15.205, §15.209

1. 20dBc in any 100kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

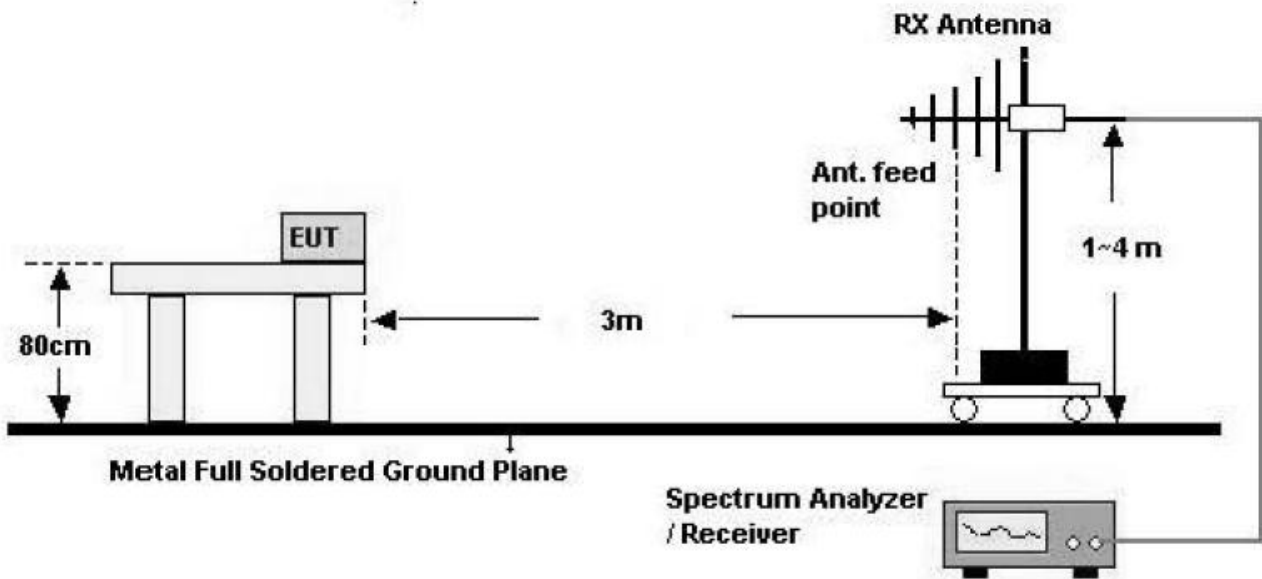
| Frequency (MHz) | Field Strength (uV/m) | Measurement Distance (m) |
|-----------------|-----------------------|--------------------------|
| 0.009 – 0.490 | 2400/F(kHz) | 300 |
| 0.490 – 1.705 | 24000/F(kHz) | 30 |
| 1.705 – 30 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

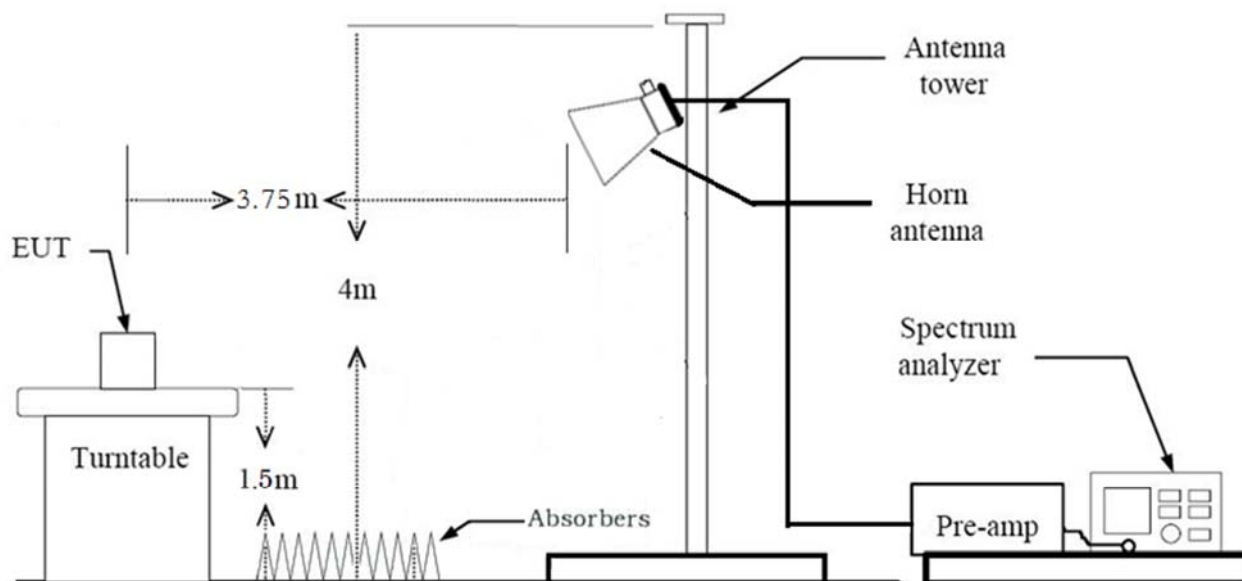
Test Configuration

Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz**TEST PROCEDURE**

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. Spectrum Setting
 - a. Peak: 1 GHz – 25 GHz, RBW = 1 MHz, VBW $\geq 3 \times$ RBW
 - b. Average: 1 GHz – 25 GHz, RBW = 1 MHz, VBW $\geq 1/\tau$ Hz, where τ = pulse width in seconds.

Note :

1. We are performed the RSE and radiated band edge using standard radiated method.
2. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
3. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)
4. The duty cycle factor for BT mode.

| BT Mode | T_{on} (ms) | VBW(1/T) (Hz) | The actual setting value of VBW (Hz) |
|--------------------------------|-------------------------------|-------------------------|--|
| GFSK | 2.885 | 347 | 1000 |
| $\pi/4$DQPSK | 2.890 | 346 | 1000 |
| 8DPSK | 2.885 | 347 | 1000 |

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

| Frequency | Reading | Ant. factor | Cable loss | Ant. POL | Total | Limit | Margin |
|-------------------------|---------|-------------|------------|----------|--------|--------|--------|
| MHz | dBuV/m | dBm/m | dBm | (H/V) | dBuV/m | dBuV/m | dB |
| No Critical peaks found | | | | | | | |

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor
5. This test is performed with hopping off.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

| Frequency | Reading | Ant. factor | Cable loss | Ant. POL | Total | Limit | Margin |
|-------------------------|---------|-------------|------------|----------|--------|--------|--------|
| MHz | dBuV/m | dBm/m | dBm | (H/V) | dBuV/m | dBuV/m | dB |
| No Critical peaks found | | | | | | | |

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. This test is performed with hopping off.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Above 1 GHz

Operation Mode: CH Low(GFSK)

| Frequency [MHz] | Reading [dBuV] | *A.F.+C.L.- A.G.+D.F. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|----------------|-------------------------------|----------------|----------------|----------------|-------------|------------------|
| 4804 | 51.68 | -0.42 | V | 51.26 | 73.98 | 22.72 | PK |
| 4804 | 38.12 | -0.42 | V | 37.7 | 53.98 | 16.28 | AV |
| 7206 | 51.00 | 5.40 | V | 56.395 | 73.98 | 17.59 | PK |
| 7206 | 37.90 | 5.40 | V | 43.295 | 53.98 | 10.69 | AV |
| 4804 | 52.17 | -0.42 | H | 51.75 | 73.98 | 22.23 | PK |
| 4804 | 38.41 | -0.42 | H | 37.99 | 53.98 | 15.99 | AV |
| 7206 | 51.42 | 5.40 | H | 56.815 | 73.98 | 17.17 | PK |
| 7206 | 38.19 | 5.40 | H | 43.585 | 53.98 | 10.40 | AV |

Operation Mode: CH Low(8DPSK)

| Frequency [MHz] | Reading [dBuV] | *A.F.+C.L.- A.G.+D.F. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|----------------|-------------------------------|----------------|----------------|----------------|-------------|------------------|
| 4804 | 51.79 | -0.42 | V | 51.37 | 73.98 | 22.61 | PK |
| 4804 | 38.05 | -0.42 | V | 37.63 | 53.98 | 16.35 | AV |
| 7206 | 51.46 | 5.40 | V | 56.855 | 73.98 | 17.13 | PK |
| 7206 | 37.88 | 5.40 | V | 43.275 | 53.98 | 10.71 | AV |
| 4804 | 52.21 | -0.42 | H | 51.79 | 73.98 | 22.19 | PK |
| 4804 | 38.29 | -0.42 | H | 37.87 | 53.98 | 16.11 | AV |
| 7206 | 51.81 | 5.40 | H | 57.205 | 73.98 | 16.78 | PK |
| 7206 | 38.08 | 5.40 | H | 43.475 | 53.98 | 10.51 | AV |

Operation Mode: CH Low($\pi/4$ DQPSK)

| Frequency [MHz] | Reading [dBuV] | *A.F.+C.L.-A.G.+D.F. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|----------------|---------------------------|----------------|----------------|----------------|-------------|------------------|
| 4804 | 51.17 | -0.42 | V | 50.75 | 73.98 | 23.23 | PK |
| 4804 | 38.11 | -0.42 | V | 37.69 | 53.98 | 16.29 | AV |
| 7206 | 51.38 | 5.40 | V | 56.775 | 73.98 | 17.21 | PK |
| 7206 | 37.85 | 5.40 | V | 43.245 | 53.98 | 10.74 | AV |
| 4804 | 51.46 | -0.42 | H | 51.04 | 73.98 | 22.94 | PK |
| 4804 | 38.50 | -0.42 | H | 38.08 | 53.98 | 15.90 | AV |
| 7206 | 51.62 | 5.40 | H | 57.015 | 73.98 | 16.97 | PK |
| 7206 | 38.05 | 5.40 | H | 43.445 | 53.98 | 10.54 | AV |

*A.F. : Antenna Factor / C.L. : Cable Loss / AMP.G. : Amplifier Gain / D.F. : Distance Factor

Notes:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
- Distance extrapolation factor = $20 \log(\text{test distance} / \text{specific distance})$ (dB)
- Spectrum setting:
 - Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
We performed using a reduced video BW method was done with the analyzer in linear mode.
- FYI : Duty Cycle Correction Factor (79 channel hopping)
 - Time to cycle through all channels= $\Delta t = \tau$ [ms] x 79 channels = 229.100 ms, where τ = pulse width
 - $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 1$
 - Worst Case Dwell Time = τ [ms] x $H' = 2.900$ ms
 - Duty Cycle Correction = $20 \log(\text{Worst Case Dwell Time} / 100\text{ms})$ dB = -30.752 dB
- Duty Cycle Correction Factor(AFH mode – minimum channel number case - 20 channels)
 - Time to cycle through all channels= $\Delta t = \tau$ [ms] x 20 channels = 58.00 ms, where τ = pulse width
 - $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 2$
 - Worst Case Dwell Time = τ [ms] x $H' = 5.800$ ms
 - Duty Cycle Correction(AFH) = $20 \log(\text{Worst Case Dwell Time} / 100\text{ms})$ dB = -24.7314 dB

- e. We applied DCCF in the test result which hopping channel number is 20.
- 9. We have done Normal Mode and EDR Mode test.
- 10. This test is performed with hopping off.
- 11. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: CH Mid(GFSK)

| Frequency [MHz] | Reading [dBuV] | *A.F.+C.L.- A.G.+D.F. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|--------------------|-------------------|----------------------------------|-------------------|-------------------|-------------------|----------------|---------------------|
| 4882 | 52.68 | -0.27 | V | 52.415 | 73.98 | 21.57 | PK |
| 4882 | 40.25 | -0.27 | V | 39.985 | 53.98 | 14.00 | AV |
| 7323 | 50.97 | 5.42 | V | 56.39 | 73.98 | 17.59 | PK |
| 7323 | 37.01 | 5.42 | V | 42.43 | 53.98 | 11.55 | AV |
| 4882 | 53.88 | -0.27 | H | 53.615 | 73.98 | 20.37 | PK |
| 4882 | 40.68 | -0.27 | H | 40.415 | 53.98 | 13.57 | AV |
| 7323 | 51.10 | 5.42 | H | 56.52 | 73.98 | 17.46 | PK |
| 7323 | 37.26 | 5.42 | H | 42.68 | 53.98 | 11.30 | AV |

Operation Mode: CH Mid(8DPSK)

| Frequency [MHz] | Reading [dBuV] | *A.F.+C.L.- A.G.+D.F. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|--------------------|-------------------|----------------------------------|-------------------|-------------------|-------------------|----------------|---------------------|
| 4882 | 51.43 | -0.27 | V | 51.165 | 73.98 | 22.82 | PK |
| 4882 | 37.81 | -0.27 | V | 37.545 | 53.98 | 16.44 | AV |
| 7323 | 50.07 | 5.42 | V | 55.49 | 73.98 | 18.49 | PK |
| 7323 | 36.89 | 5.42 | V | 42.31 | 53.98 | 11.67 | AV |
| 4882 | 51.72 | -0.27 | H | 51.455 | 73.98 | 22.53 | PK |
| 4882 | 38.32 | -0.27 | H | 38.055 | 53.98 | 15.93 | AV |
| 7323 | 50.36 | 5.42 | H | 55.78 | 73.98 | 18.20 | PK |
| 7323 | 37.09 | 5.42 | H | 42.51 | 53.98 | 11.47 | AV |

Operation Mode: CH Mid($\pi/4$ DQPSK)

| Frequency [MHz] | Reading [dBuV] | ※A.F.+C.L.- A.G.+D.F. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|----------------|-------------------------------|----------------|----------------|----------------|-------------|------------------|
| 4882 | 51.69 | -0.27 | V | 51.425 | 73.98 | 22.56 | PK |
| 4882 | 37.84 | -0.27 | V | 37.575 | 53.98 | 16.41 | AV |
| 7323 | 50.47 | 5.42 | V | 55.89 | 73.98 | 18.09 | PK |
| 7323 | 36.94 | 5.42 | V | 42.36 | 53.98 | 11.62 | AV |
| 4882 | 52.43 | -0.27 | H | 52.165 | 73.98 | 21.82 | PK |
| 4882 | 38.27 | -0.27 | H | 38.005 | 53.98 | 15.98 | AV |
| 7323 | 51.28 | 5.42 | H | 56.7 | 73.98 | 17.28 | PK |
| 7323 | 37.07 | 5.42 | H | 42.49 | 53.98 | 11.49 | AV |

*A.F. : Antenna Factor / C.L. : Cable Loss / AMP.G. : Amplifier Gain / D.F. : Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. Distance extrapolation factor = $20 \log(\text{test distance} / \text{specific distance})$ (dB)
6. Spectrum setting:
 - a. Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - b. Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
We performed using a reduced video BW method was done with the analyzer in linear mode.
7. FYI : Duty Cycle Correction Factor (79 channel hopping)
 - a. Time to cycle through all channels= $\Delta t = \tau$ [ms] x 79 channels = 229.100 ms, where τ = pulse width
 - b. $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 1$
 - c. Worst Case Dwell Time = τ [ms] x $H' = 2.900$ ms
 - d. Duty Cycle Correction = $20 \log(\text{Worst Case Dwell Time} / 100\text{ms})$ dB = -30.752 dB
8. Duty Cycle Correction Factor(AFH mode – minimum channel number case - 20 channels)
 - a. Time to cycle through all channels= $\Delta t = \tau$ [ms] x 20 channels = 58.00 ms, where τ = pulse width
 - b. $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 2$
 - c. Worst Case Dwell Time = τ [ms] x $H' = 5.800$ ms
 - d. Duty Cycle Correction(AFH) = $20 \log(\text{Worst Case Dwell Time} / 100\text{ms})$ dB = -24.7314 dB

- e. We applied DCCF in the test result which hopping channel number is 20.
- 9. We have done Normal Mode and EDR Mode test.
- 10. This test is performed with hopping off.
- 11. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: CH High(GFSK)

| Frequency [MHz] | Reading [dBuV] | *A.F.+C.L.- A.G.+D.F. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|----------------|-------------------------------|----------------|----------------|----------------|-------------|------------------|
| 4960 | 51.44 | -0.67 | V | 50.77 | 73.98 | 23.21 | PK |
| 4960 | 38.12 | -0.67 | V | 37.45 | 53.98 | 16.53 | AV |
| 7440 | 50.29 | 5.70 | V | 55.99 | 73.98 | 17.99 | PK |
| 7440 | 36.99 | 5.70 | V | 42.69 | 53.98 | 11.29 | AV |
| 4960 | 51.74 | -0.67 | H | 51.07 | 73.98 | 22.91 | PK |
| 4960 | 38.22 | -0.67 | H | 37.55 | 53.98 | 16.43 | AV |
| 7440 | 50.64 | 5.70 | H | 56.34 | 73.98 | 17.64 | PK |
| 7440 | 37.07 | 5.70 | H | 42.77 | 53.98 | 11.21 | AV |

Operation Mode: CH High(8DPSK)

| Frequency [MHz] | Reading [dBuV] | *A.F.+C.L.- A.G.+D.F. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|----------------|-------------------------------|----------------|----------------|----------------|-------------|------------------|
| 4960 | 51.10 | -0.67 | V | 50.43 | 73.98 | 23.55 | PK |
| 4960 | 37.84 | -0.67 | V | 37.17 | 53.98 | 16.81 | AV |
| 7440 | 50.13 | 5.70 | V | 55.83 | 73.98 | 18.15 | PK |
| 7440 | 36.95 | 5.70 | V | 42.65 | 53.98 | 11.33 | AV |
| 4960 | 51.52 | -0.67 | H | 50.85 | 73.98 | 23.13 | PK |
| 4960 | 38.30 | -0.67 | H | 37.63 | 53.98 | 16.35 | AV |
| 7440 | 50.38 | 5.70 | H | 56.08 | 73.98 | 17.90 | PK |
| 7440 | 37.07 | 5.70 | H | 42.77 | 53.98 | 11.21 | AV |

Operation Mode: CH High ($\pi/4$ DQPSK)

| Frequency [MHz] | Reading [dBuV] | *A.F.+C.L.- A.G.+D.F. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|----------------|-------------------------------|----------------|----------------|----------------|-------------|------------------|
| 4960 | 51.31 | -0.67 | V | 50.64 | 73.98 | 23.34 | PK |
| 4960 | 38.10 | -0.67 | V | 37.43 | 53.98 | 16.55 | AV |
| 7440 | 51.44 | 5.70 | V | 57.14 | 73.98 | 16.84 | PK |
| 7440 | 37.00 | 5.70 | V | 42.7 | 53.98 | 11.28 | AV |
| 4960 | 51.64 | -0.67 | H | 50.97 | 73.98 | 23.01 | PK |
| 4960 | 38.26 | -0.67 | H | 37.59 | 53.98 | 16.39 | AV |
| 7440 | 52.00 | 5.70 | H | 57.7 | 73.98 | 16.28 | PK |
| 7440 | 37.05 | 5.70 | H | 42.75 | 53.98 | 11.23 | AV |

*A.F. : Antenna Factor / C.L. : Cable Loss / AMP.G. : Amplifier Gain / D.F. : Distance Factor

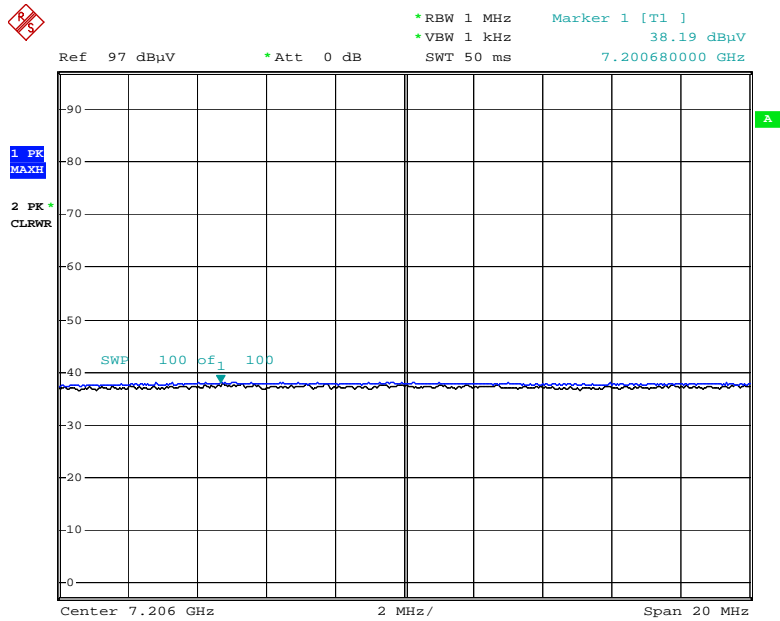
Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. Distance extrapolation factor = $20 \log(\text{test distance} / \text{specific distance})$ (dB)
6. Spectrum setting:
 - a. Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - b. Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
We performed using a reduced video BW method was done with the analyzer in linear mode.
7. FYI : Duty Cycle Correction Factor (79 channel hopping)
 - a. Time to cycle through all channels= $\Delta t = \tau$ [ms] x 79 channels = 229.100 ms, where τ = pulse width
 - b. $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 1$
 - c. Worst Case Dwell Time = τ [ms] x $H' = 2.900$ ms
 - d. Duty Cycle Correction = $20 \log(\text{Worst Case Dwell Time} / 100\text{ms})$ dB = -30.752 dB
8. Duty Cycle Correction Factor(AFH mode – minimum channel number case - 20 channels)
 - a. Time to cycle through all channels= $\Delta t = \tau$ [ms] x 20 channels = 58.00 ms, where τ = pulse width
 - b. $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 2$
 - c. Worst Case Dwell Time = τ [ms] x $H' = 5.800$ ms
 - d. Duty Cycle Correction(AFH) = $20 \log(\text{Worst Case Dwell Time} / 100\text{ms})$ dB = -24.7314 dB

- e. We applied DCCF in the test result which hopping channel number is 20.
- 9. We have done Normal Mode and EDR Mode test.
- 10. This test is performed with hopping off.
- 11. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

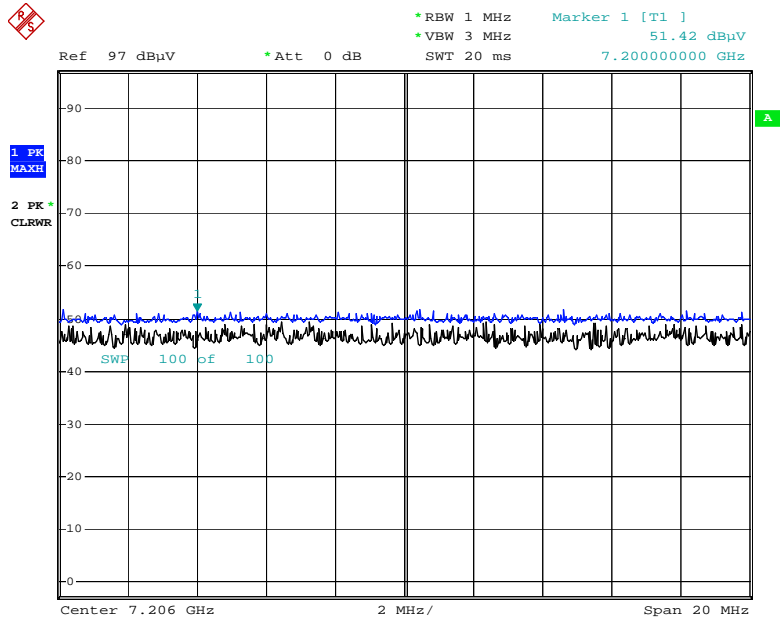
■ RESULT PLOTS (Worst case : X-H)

Radiated Spurious Emissions plot – Average Reading (GFSK, Ch.0 3rd Harmonic)



Date: 3.AUG.2018 10:26:04

Radiated Spurious Emissions plot – Peak Reading (GFSK, Ch.0 3rd Harmonic)



Date: 3.AUG.2018 10:27:01

9.6.3 RADIATED RESTRICTED BAND EDGES

Test Requirements and limit, §15.247(d), §15.205, §15.209

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

| | |
|---------------------|--------------------|
| Operation Mode | Normal(GFSK) |
| Operating Frequency | 2402 MHz, 2480 MHz |
| Channel No | CH 0, CH 78 |

| Frequency [MHz] | Reading dBuV | * A.F.+C.L.+D.F. [dB] | Ant. Pol. [H/V] | Duty Cycle Correction [dB] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|--------------------|-----------------|--------------------------|--------------------|-------------------------------|-------------------|-------------------|----------------|---------------------|
| 2390.0 | 53.59 | 1.34 | H | 0 | 54.93 | 73.98 | 19.05 | PK |
| 2390.0 | 40.13 | 1.34 | H | -24.73 | 16.74 | 53.98 | 37.24 | AV |
| 2390.0 | 52.46 | 1.34 | V | 0 | 53.80 | 73.98 | 20.18 | PK |
| 2390.0 | 39.84 | 1.34 | V | -24.73 | 16.45 | 53.98 | 37.53 | AV |
| 2483.5 | 61.44 | 0.37 | H | 0 | 61.81 | 73.98 | 12.17 | PK |
| 2483.5 | 62.04 | 0.37 | H | -24.73 | 37.68 | 53.98 | 16.30 | AV |
| 2483.5 | 60.99 | 0.37 | V | 0 | 61.36 | 73.98 | 12.62 | PK |
| 2483.5 | 61.53 | 0.37 | V | -24.73 | 37.17 | 53.98 | 16.81 | AV |

Operation Mode EDR(8DPSK)
 Operating Frequency 2402 MHz, 2480 MHz
 Channel No CH 0, CH 78

| Frequency [MHz] | Reading dBuV | * A.F.+C.L.+D.F. [dB] | Ant. Pol. [H/V] | Duty Cycle Correction [dB] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|--------------|-----------------------|-----------------|----------------------------|----------------|----------------|-------------|------------------|
| 2390.0 | 53.58 | 1.34 | H | 0 | 54.92 | 73.98 | 19.06 | PK |
| 2390.0 | 40.48 | 1.34 | H | -24.73 | 17.09 | 53.98 | 36.89 | AV |
| 2390.0 | 52.84 | 1.34 | V | 0 | 54.18 | 73.98 | 19.80 | PK |
| 2390.0 | 39.46 | 1.34 | V | -24.73 | 16.07 | 53.98 | 37.91 | AV |
| 2483.5 | 63.24 | 0.37 | H | 0 | 63.61 | 73.98 | 10.37 | PK |
| 2483.5 | 59.69 | 0.37 | H | -24.73 | 35.33 | 53.98 | 18.65 | AV |
| 2483.5 | 62.37 | 0.37 | V | 0 | 62.74 | 73.98 | 11.24 | PK |
| 2483.5 | 58.49 | 0.37 | V | -24.73 | 34.13 | 53.98 | 19.85 | AV |

Operation Mode EDR(π /4DQPSK)
 Operating Frequency 2402 MHz, 2480 MHz
 Channel No CH 0, CH 78

| Frequency [MHz] | Reading dBuV | * A.F.+C.L.+D.F. [dB] | Ant. Pol. [H/V] | Duty Cycle Correction [dB] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|--------------|-----------------------|-----------------|----------------------------|----------------|----------------|-------------|------------------|
| 2390.0 | 53.84 | 1.34 | H | 0 | 55.18 | 73.98 | 18.80 | PK |
| 2390.0 | 40.36 | 1.34 | H | -24.73 | 16.97 | 53.98 | 37.01 | AV |
| 2390.0 | 53.10 | 1.34 | V | 0 | 54.44 | 73.98 | 19.54 | PK |
| 2390.0 | 39.55 | 1.34 | V | -24.73 | 16.16 | 53.98 | 37.82 | AV |
| 2483.5 | 63.87 | 0.37 | H | 0 | 64.24 | 73.98 | 9.74 | PK |
| 2483.5 | 59.63 | 0.37 | H | -24.73 | 35.27 | 53.98 | 18.71 | AV |
| 2483.5 | 62.57 | 0.37 | V | 0 | 62.94 | 73.98 | 11.04 | PK |
| 2483.5 | 59.12 | 0.37 | V | -24.73 | 34.76 | 53.98 | 19.22 | AV |

Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss + Distance Factor + Duty Cycle Correction Factor
2. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)
3. Spectrum setting:
 - a. Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - b. Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW $\geq 1/\tau$ Hz, where τ = pulse width in seconds.

We performed using a reduced video BW method was done with the analyzer in linear mode.

4. FYI : Duty Cycle Correction Factor (79 channel hopping)

a. Time to cycle through all channels= $\Delta t = \tau$ [ms] x 79 channels = 229.100 ms, where τ = pulse width

b. $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 1$

c. Worst Case Dwell Time = τ [ms] x $H' = 2.900$ ms

d. Duty Cycle Correction = $20\log$ (Worst Case Dwell Time/ 100ms) dB = -30.752 dB

6. Duty Cycle Correction Factor(AFH mode – minimum channel number case - 20 channels)

a. Time to cycle through all channels= $\Delta t = \tau$ [ms] x 20 channels = 58.00 ms, where τ = pulse width

b. $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 2$

c. Worst Case Dwell Time = τ [ms] x $H' = 5.800$ ms

d. Duty Cycle Correction(AFH) = $20\log$ (Worst Case Dwell Time/ 100ms) dB = -24.7314 dB

e. We applied DCCF in the test result which hopping channel number is 20.

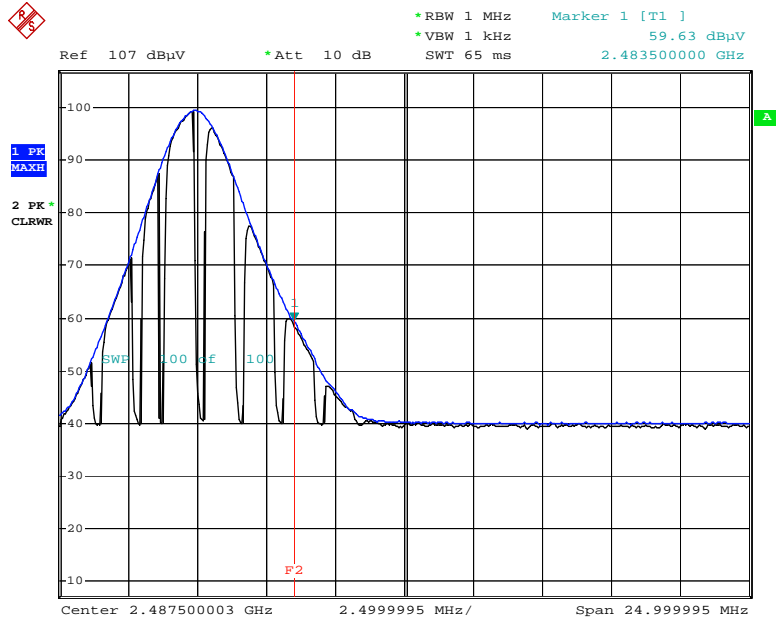
6. We have done Normal Mode, EDR Mode.

7. This test is performed with hopping off.

8. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

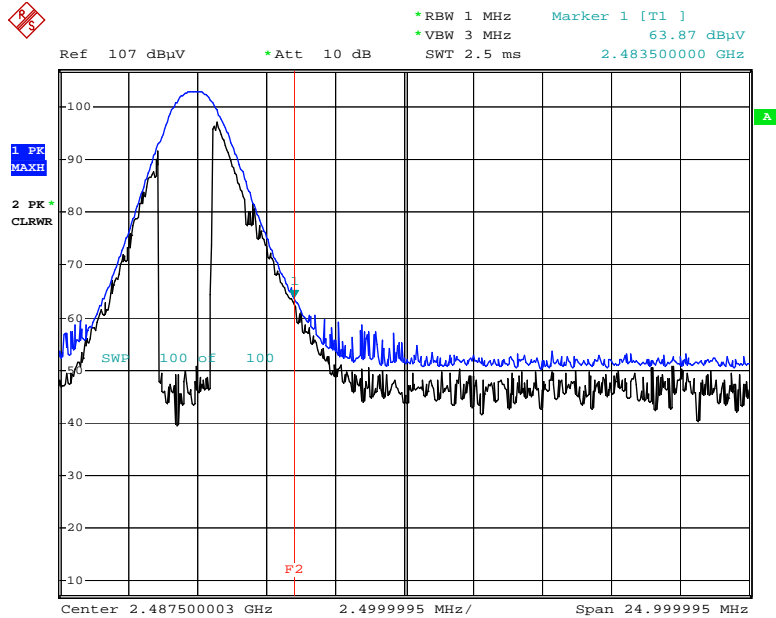
RESULT PLOTS (Worst case : X-H)

Radiated Restricted Band Edges plot – Average Reading ($\pi/4$ DQPSK, Ch.78)



Date: 3.AUG.2018 10:07:46

Radiated Restricted Band Edges plot – Peak Reading ($\pi/4$ DQPSK, Ch.78)



Date: 3.AUG.2018 10:08:45

Note : Only the worst case plots for Radiated Restricted Band Edges.

9. LIST OF TEST EQUIPMENT

9.1 LIST OF TEST EQUIPMENT(Conducted Test)

| Manufacturer | Model / Equipment | Calibration Date | Calibration Interval | Serial No. |
|-----------------|--|------------------|----------------------|------------|
| Rohde & Schwarz | ENV216 / LISN | 12/20/2017 | Annual | 102245 |
| Rohde & Schwarz | ESCI / Test Receiver | 06/27/2018 | Annual | 100033 |
| ESPAC | SU-642 /Temperature Chamber | 03/30/2018 | Annual | 0093008124 |
| Agilent | N9020A / Signal Analyzer | 06/08/2018 | Annual | MY51110085 |
| Agilent | N9030A / Signal Analyzer | 11/22/2017 | Annual | MY49431210 |
| Agilent | N1911A / Power Meter | 04/16/2018 | Annual | MY45100523 |
| Agilent | N1921A / Power Sensor | 04/16/2018 | Annual | MY52260025 |
| Agilent | 87300B / Directional Coupler | 11/20/2017 | Annual | 3116A03621 |
| Hewlett Packard | 11667B / Power Splitter | 06/07/2018 | Annual | 05001 |
| Hewlett Packard | E3632A / DC Power Supply | 06/26/2018 | Annual | KR75303960 |
| Agilent | 8493C / Attenuator(10 dB) | 07/10/2018 | Annual | 07560 |
| Rohde & Schwarz | EMC32 / Software | N/A | N/A | N/A |
| HCT CO., LTD. | FCC WLAN&BT&BLE Conducted Test Software v3.0 | N/A | N/A | N/A |
| Rohde & Schwarz | CBT / Bluetooth Tester | 05/17/2018 | Annual | 100422 |

9.2 LIST OF TEST EQUIPMENT(Radiated Test)

| Manufacturer | Model / Equipment | Calibration Date | Calibration Interval | Serial No. |
|------------------------|--|------------------|----------------------|-------------|
| Innco system | CO3000 / Controller(Antenna mast) | N/A | N/A | CO3000-4p |
| Innco system | MA4640/800-XP-EP / Antenna Position Tower | N/A | N/A | N/A |
| Emco | 2090 / Controller | N/A | N/A | 060520 |
| Ets | Turn Table | N/A | N/A | N/A |
| Rohde & Schwarz | Loop Antenna | 04/19/2017 | Biennial | 1513-175 |
| Schwarzbeck | VULB 9168 / Hybrid Antenna | 04/06/2017 | Biennial | 760 |
| Schwarzbeck | BBHA 9120D / Horn Antenna | 11/21/2017 | Biennial | 9120D-1191 |
| Schwarzbeck | BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz) | 12/04/2017 | Biennial | BBHA9170541 |
| Rohde & Schwarz | FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer | 09/21/2017 | Annual | 836650/016 |
| Rohde & Schwarz | FSV40-N / Spectrum Analyzer | 09/27/2017 | Annual | 101068-SZ |
| Wainwright Instruments | WHKX10-2700-3000-18000-40SS / High Pass Filter | 07/16/2018 | Annual | 4 |
| Wainwright Instruments | WHKX8-6090-7000-18000-40SS / High Pass Filter | 07/10/2018 | Annual | 5 |
| Wainwright Instruments | WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter | 01/03/2018 | Annual | 2 |
| Wainwright Instruments | WRCJV5100/5850-40/50-8EEK / Band Reject Filter | 01/03/2018 | Annual | 2 |
| Api tech. | 18B-03 / Attenuator (3 dB) | 06/07/2018 | Annual | 2 |
| WEINSCHL | 56-10 / Attenuator(10 dB) | 10/13/2017 | Annual | 72316 |
| CERNEX | CBLU1183540 / Broadband Low Noise Amplifier | 01/03/2018 | Annual | 24613 |
| CERNEX | CBL06185030 / Broadband Low Noise Amplifier | 01/03/2018 | Annual | 24615 |
| CERNEX | CBL18265035 / Power Amplifier | 01/10/2018 | Annual | 22966 |
| CERNEX | CBL26405040 / Power Amplifier | 06/29/2018 | Annual | 25956 |
| TESCOM | TC-3000C / Bluetooth Tester | 03/27/2018 | Annual | 3000C000276 |

10. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

| No. | Description |
|-----|---------------------|
| 1 | HCT-RF-1808-FC010-P |