8.7.18 Test data: GFSK modulation :DTS (BLE) (Mode - used for 4.2 in BLE) – Band Edge

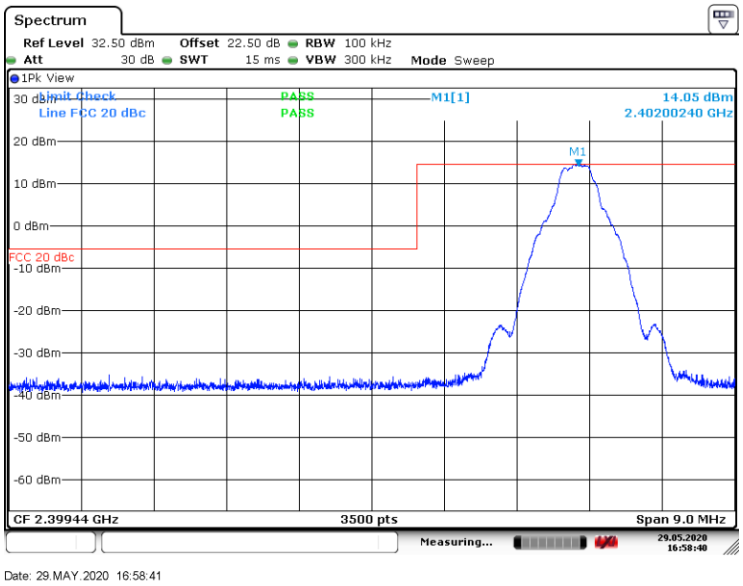


Figure 8.7-31: *Band Edge emissions for low channel*

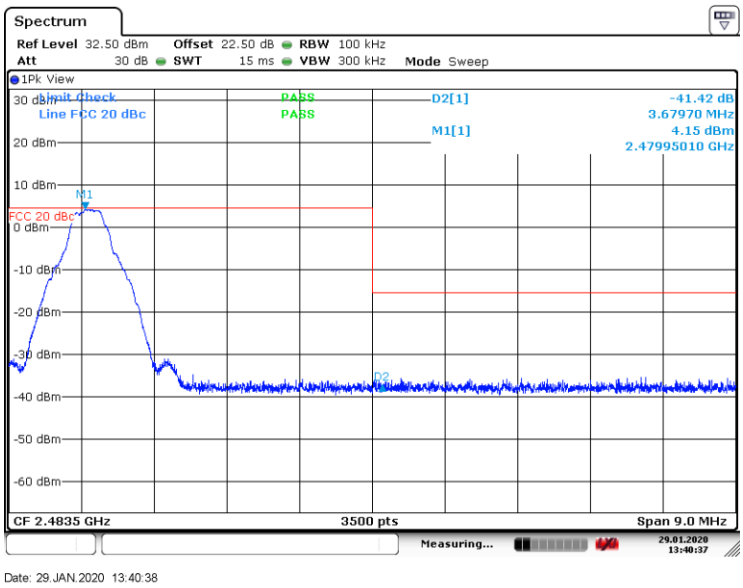


Figure 8.7-32: *Band Edge emissions for high channel*

8.7.19 Test data: GFSK modulation - 1Mbps (Mode - used for 2.1, 3.0 and 4.2 classic when communication is at 1Mbps (BRD) – Restricted Band Edge

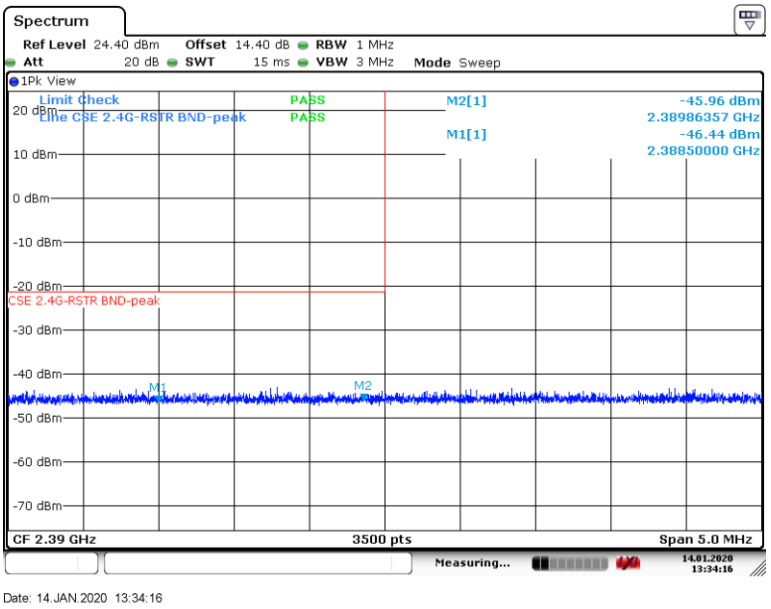


Figure 8.7-33: *Restricted Band Edge emissions for low channel, Peak*

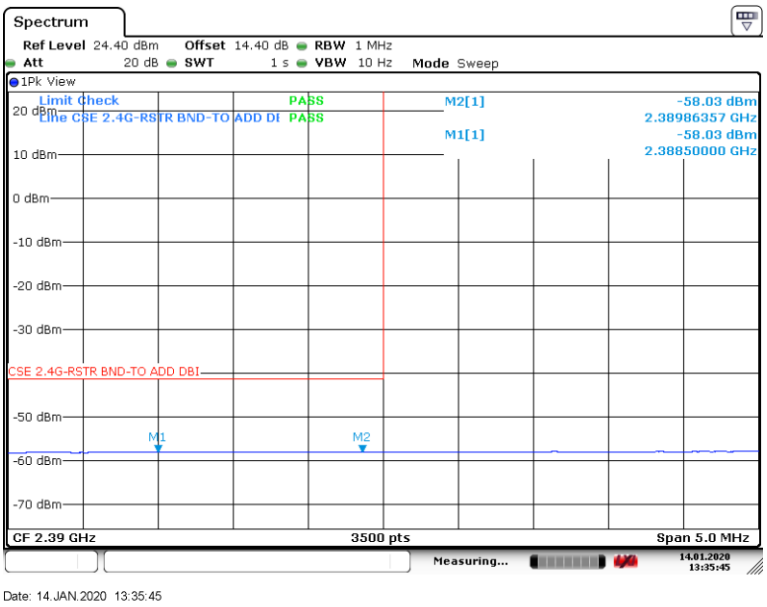


Figure 8.7-34: *Restricted Band Edge emissions for low channel, Average*

8.7.20 Test data: pi/4-DPSK modulation - 2 Mbps (Mode - used for 2.1, 3.0 and dual mode 4.2 classic when communication is at 2Mbps (EDR) – Restricted Band Edge

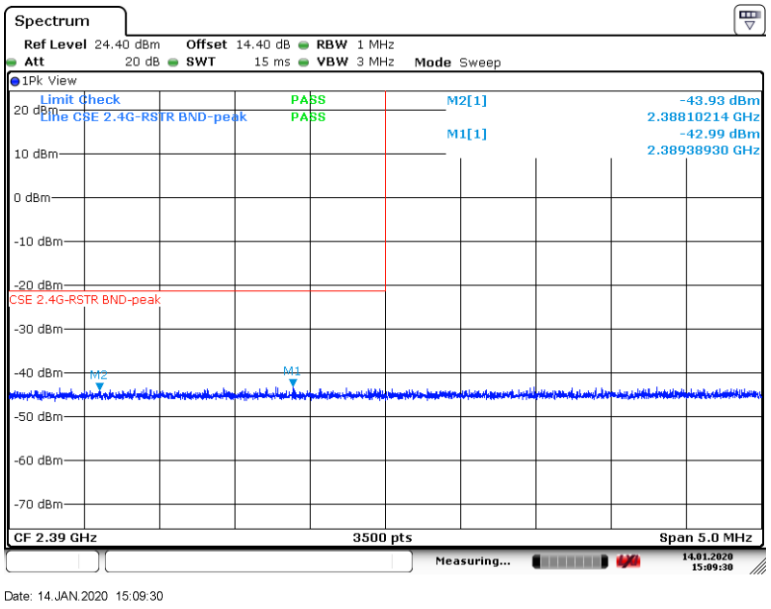


Figure 8.7-35: *Restricted Band Edge emissions for low channel, Peak*

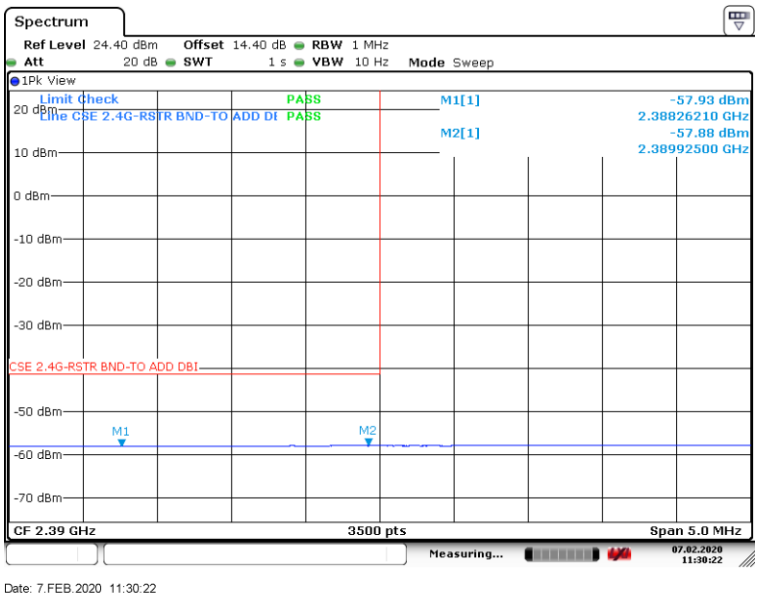


Figure 8.7-36: *Restricted Band Edge emissions for low channel, Average*

8.7.21 Test data: 8DPSK modulation - 3 Mbps (Mode - used for 2.1, 3.0 and dual mode 4.2 classic when communication is at 3 Mbps (EDR)– Restricted Band Edge

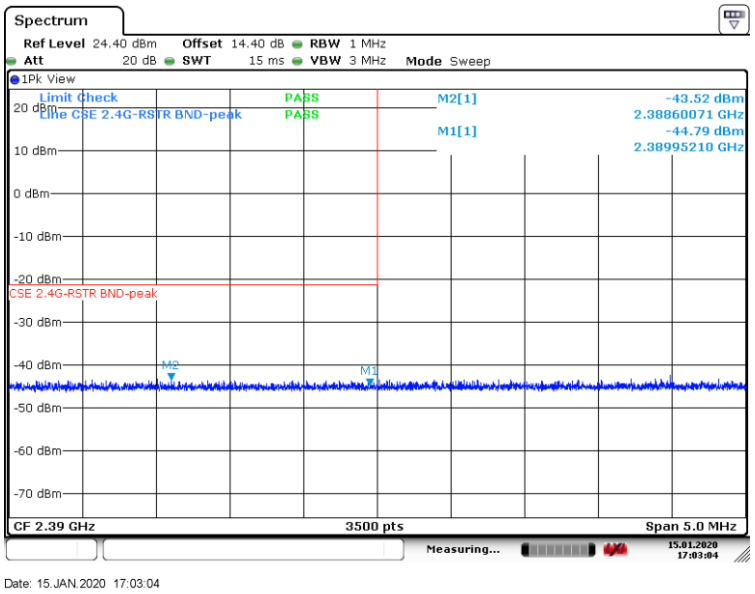


Figure 8.7-37: *Restricted Band Edge emissions for low channel, Peak*

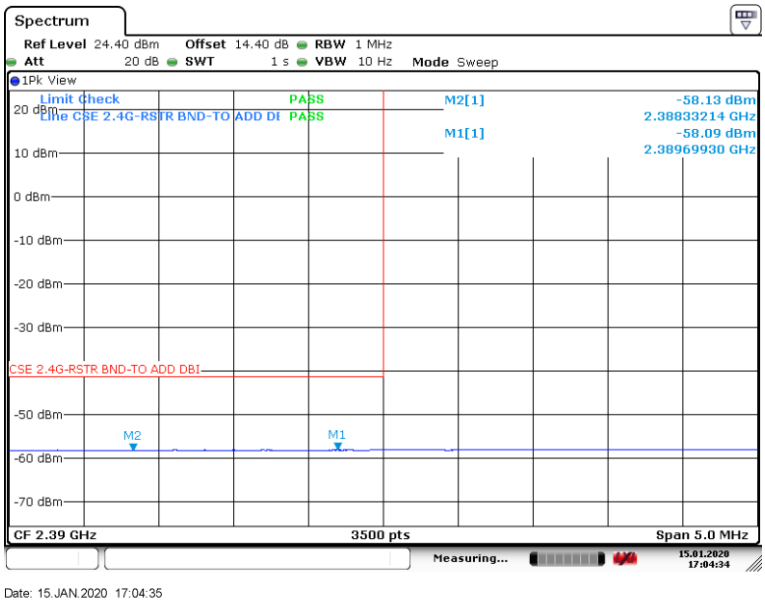


Figure 8.7-38: *Restricted Band Edge emissions for low channel, Average*

8.7.22 Test data: GFSK modulation :DTS (BLE) (Mode - used for 4.2 in BLE)– Restricted Band Edge

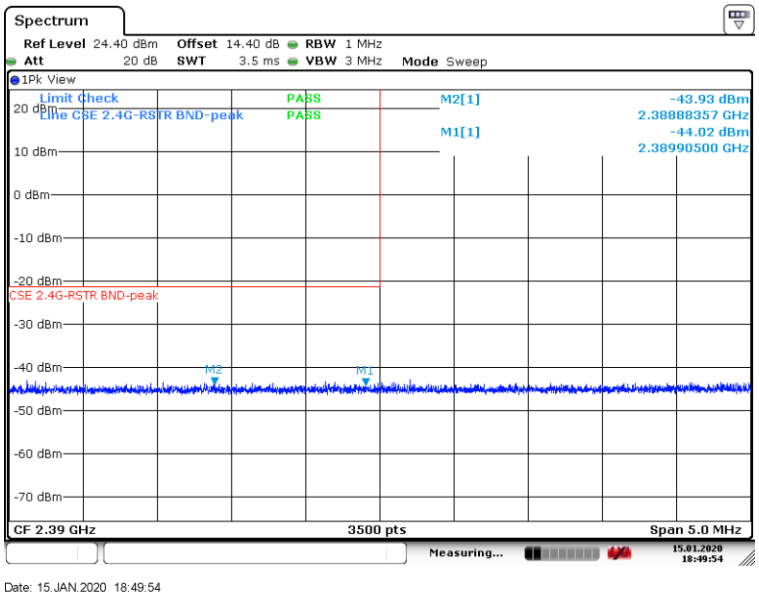


Figure 8.7-39: *Restricted Band Edge emissions for low channel, Peak*

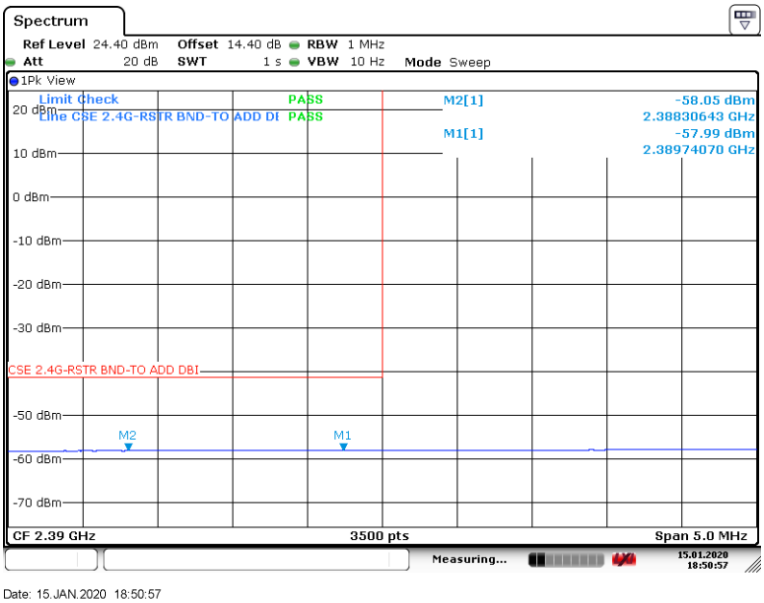


Figure 8.7-40: *Restricted Band Edge emissions for low channel, Average*

8.7.23 Test data: GFSK Modulation – 1Mbps (Mode – used for 2.1, 3.0 and 4.2 classic when communication is at 1Mbps (BRD))

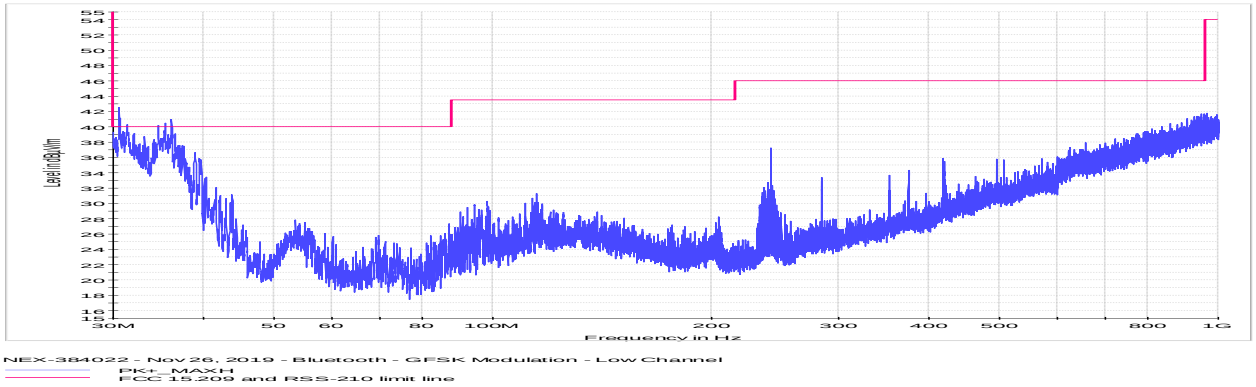


Figure 8.7-41: *Radiated spurious emissions for low channel 30 MHz to 1 GHz*

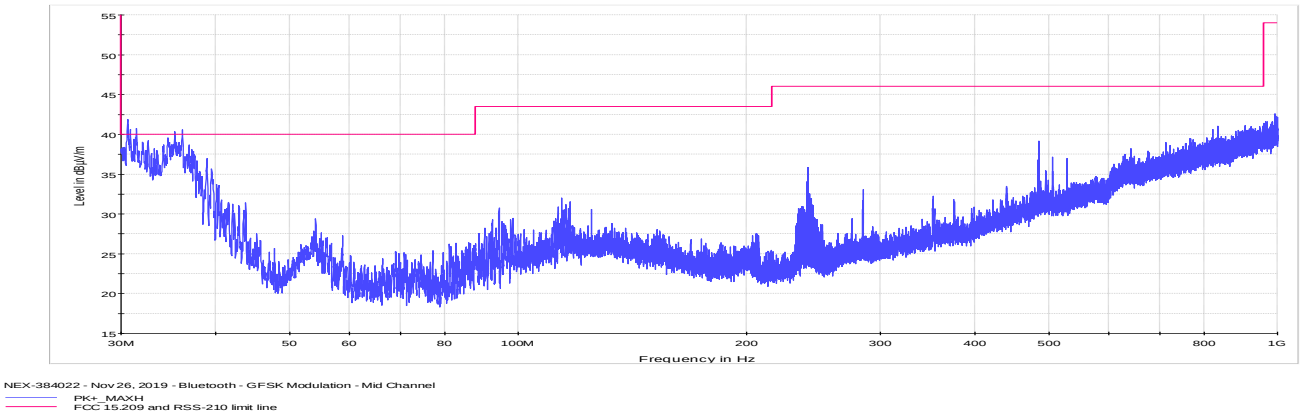


Figure 8.7-42: *Radiated spurious emissions for mid channel 30 MHz to 1 GHz*

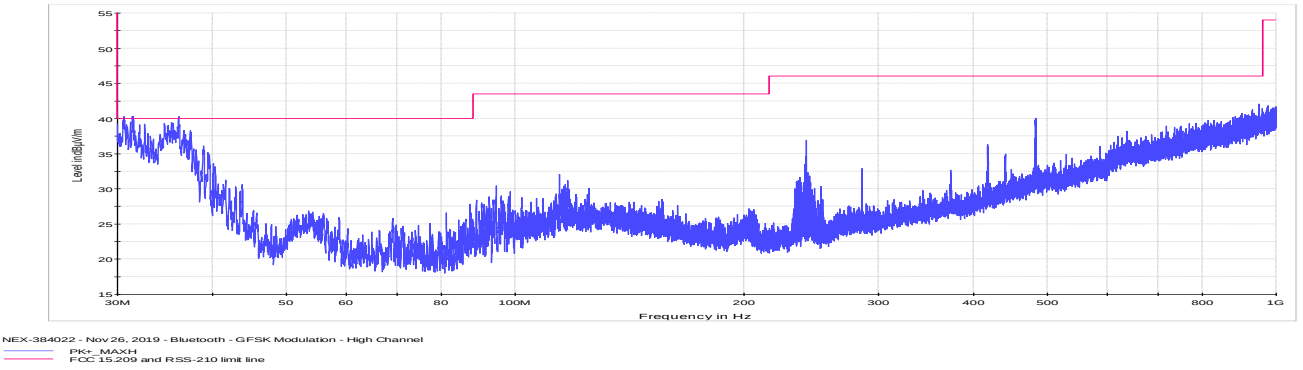


Figure 8.7-43: *Radiated spurious emissions for high channel 30 MHz to 1 GHz*

Note : For radiated Emission (30 MHz – 1 GHz), emissions above the limit line were verified to be digital noise, which are not related to RF portion.

8.7.24 Test data: pi/4-DPSK modulation – 2Mbps (Mode – used for 2.1, 3.0 and dual mode 4.2 classic when communication is at 2Mbps (EDR))

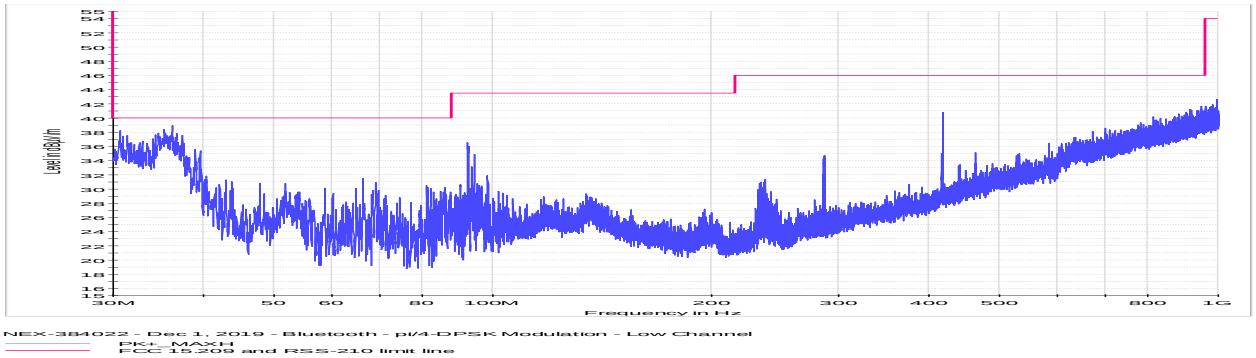


Figure 8.7-44: *Radiated spurious emissions for low channel 30 MHz to 1 GHz*

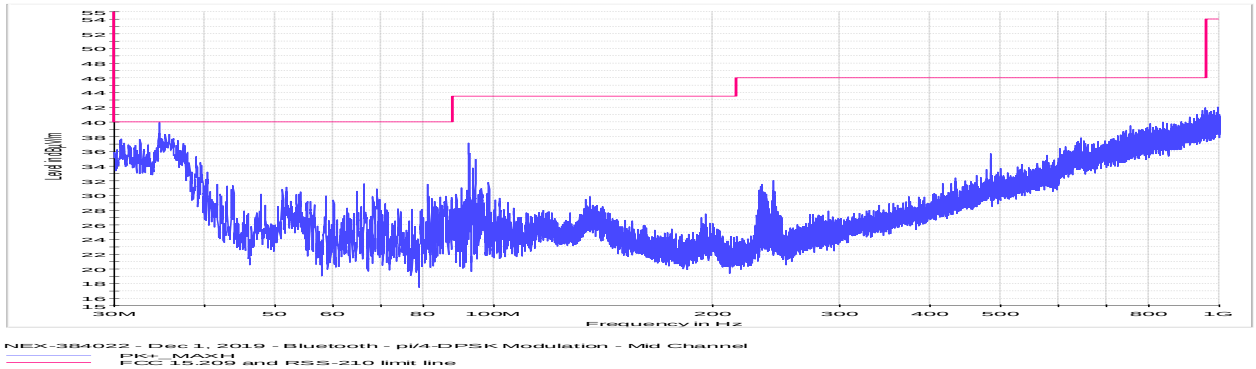


Figure 8.7-45: *Radiated spurious emissions for mid channel 30 MHz to 1 GHz*

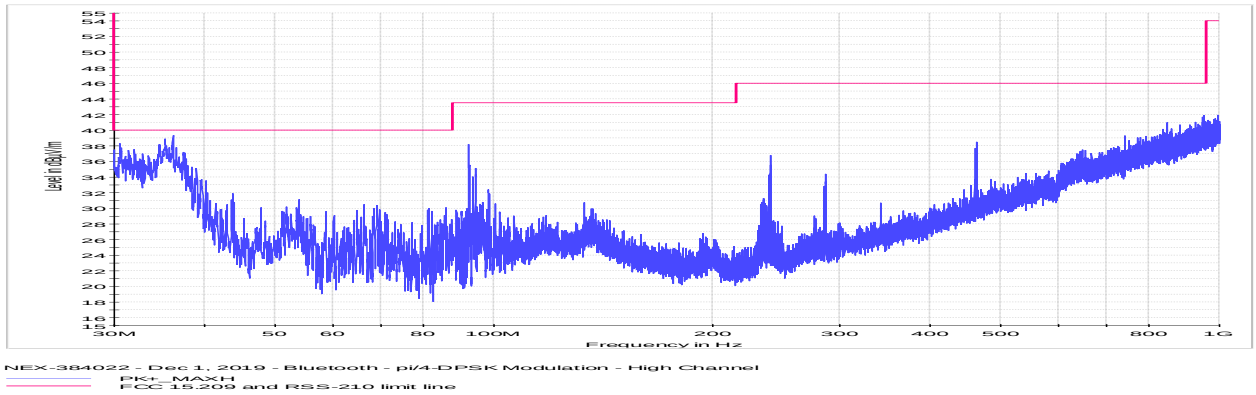


Figure 8.7-46: *Radiated spurious emissions for high channel 30 MHz to 1 GHz*

Note : For radiated Emission (30 MHz – 1 GHz), emissions above the limit line were verified to be digital noise, which are not related to RF portion.

8.7.25 Test data: 8DPSK modulation – 3Mbps (Mode – used for 2.1, 3.0 and dual mode 4.2 classic when communication is at 3Mbps (EDR))

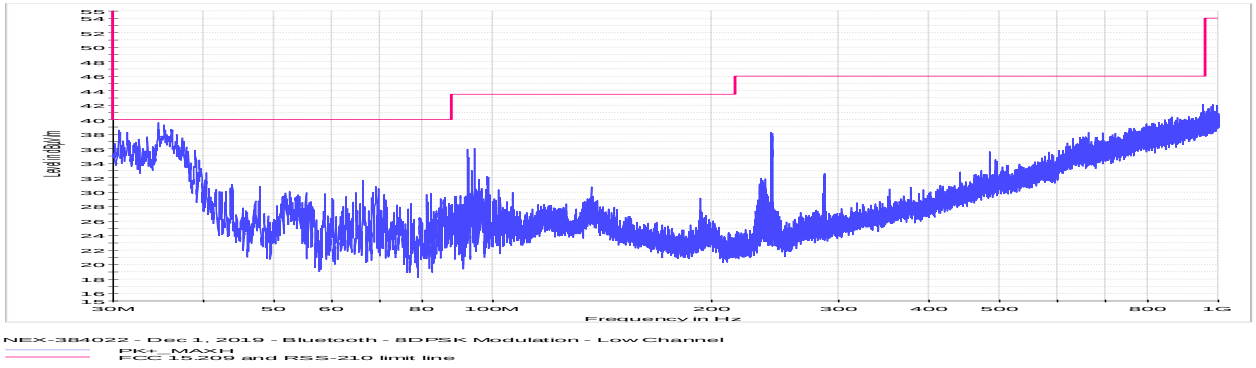


Figure 8.7-47: *Radiated spurious emissions for low channel 30 MHz to 1 GHz*

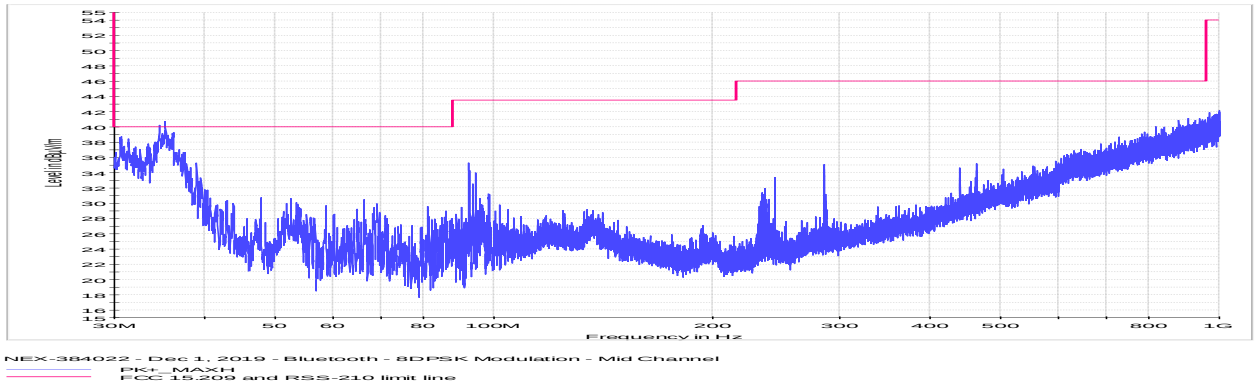


Figure 8.7-48: *Radiated spurious emissions for mid channel 30 MHz to 1 GHz*

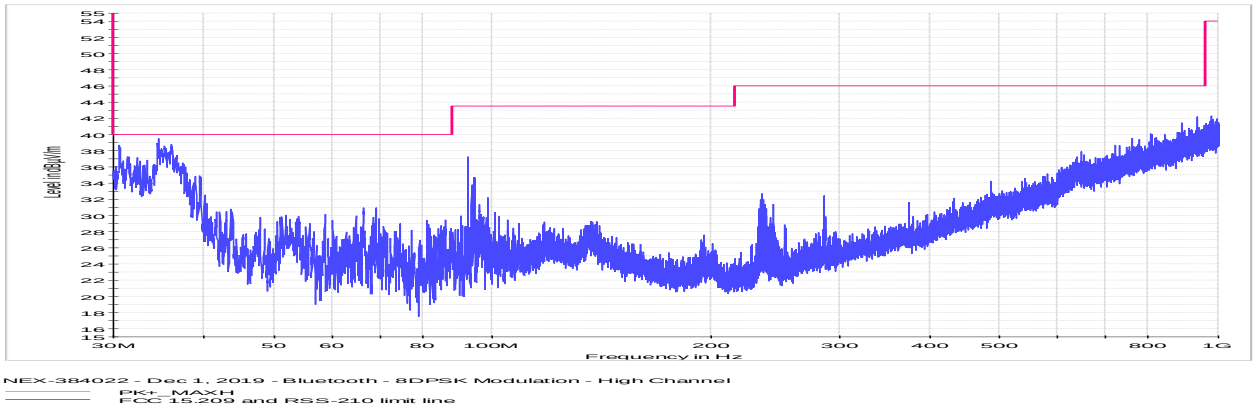


Figure 8.7-49: *Radiated spurious emissions for high channel 30 MHz to 1 GHz*

Note : For radiated Emission (30 MHz – 1 GHz), emissions above the limit line were verified to be digital noise, which are not related to RF portion.

8.7.26 Test data : GFSK modulation – DTS (BLE) (Mode: used for 4.2 in BLE)

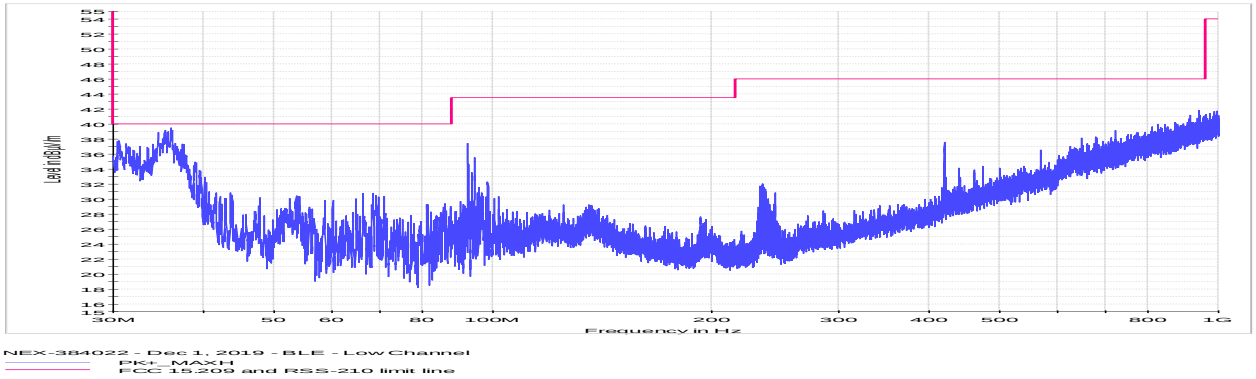


Figure 8.7-50: *Radiated spurious emissions for low channel 30 MHz to 1 GHz*

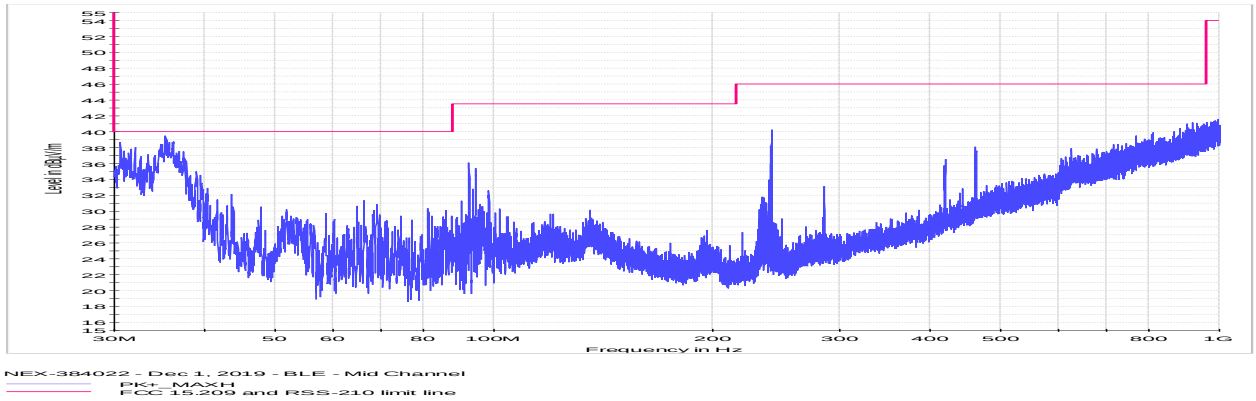


Figure 8.7-51: *Radiated spurious emissions for mid channel 30 MHz to 1 GHz*

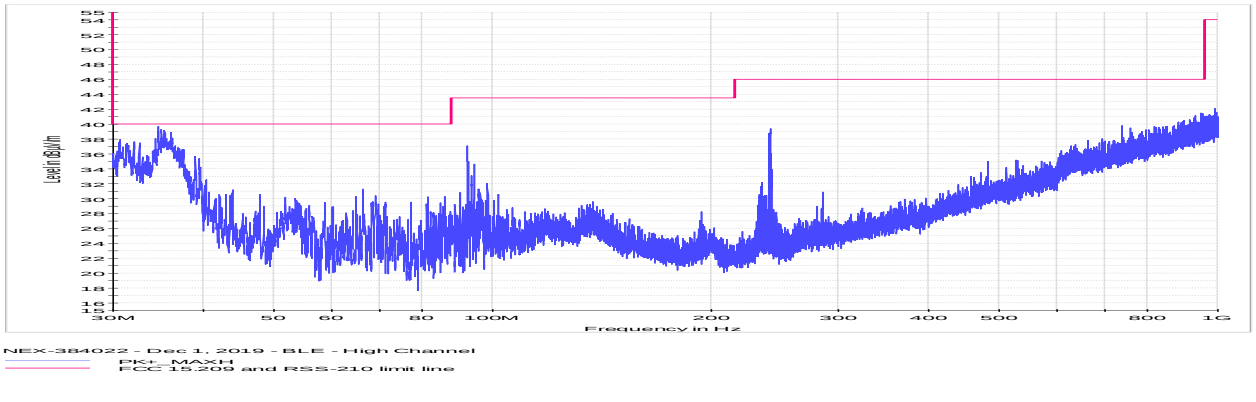


Figure 8.7-52: *Radiated spurious emissions for high channel 30 MHz to 1 GHz*

Note : For radiated Emission (30 MHz – 1 GHz), emissions above the limit line were verified to be digital noise, which are not related to RF portion.

8.7.27 Test data: GFSK Modulation – 1Mbps (Mode – used for 2.1, 3.0 and 4.2 classic when communication is at 1Mbps (BRD))

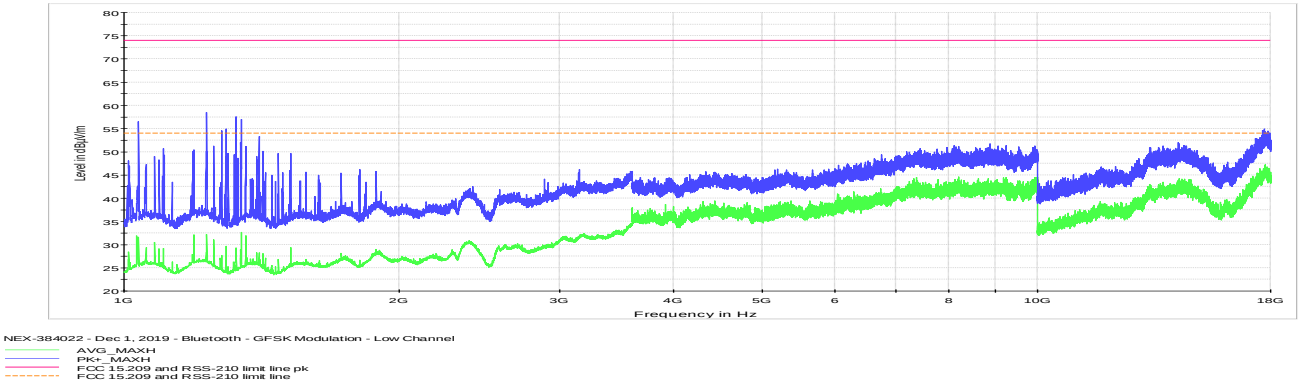


Figure 8.7-53: *Radiated spurious emissions for low channel 1 GHz to 18 GHz*

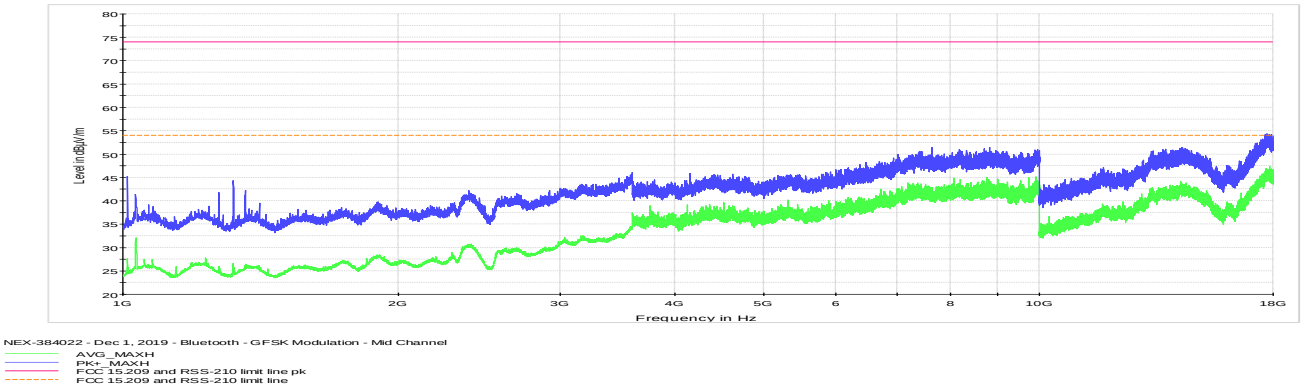


Figure 8.1 1: *Radiated spurious emissions for mid channel 1 GHz to 18 GHz*

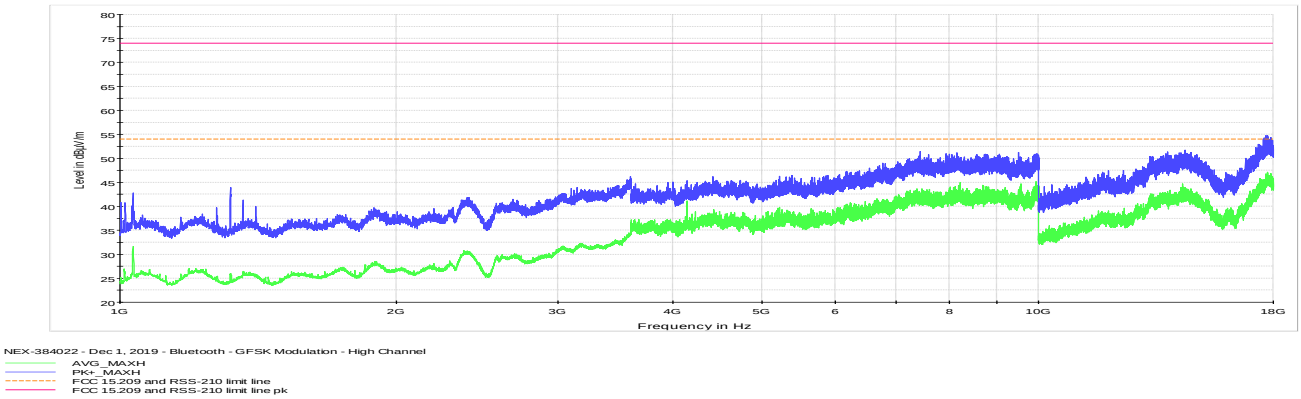


Figure 8.1 1: *Radiated spurious emissions for high channel 1 GHz to 18 GHz*

8.7.28 Test data: pi/4-DPSK modulation – 2Mbps (Mode – used for 2.1, 3.0 and dual mode 4.2 classic when communication is at 2Mbps (EDR))

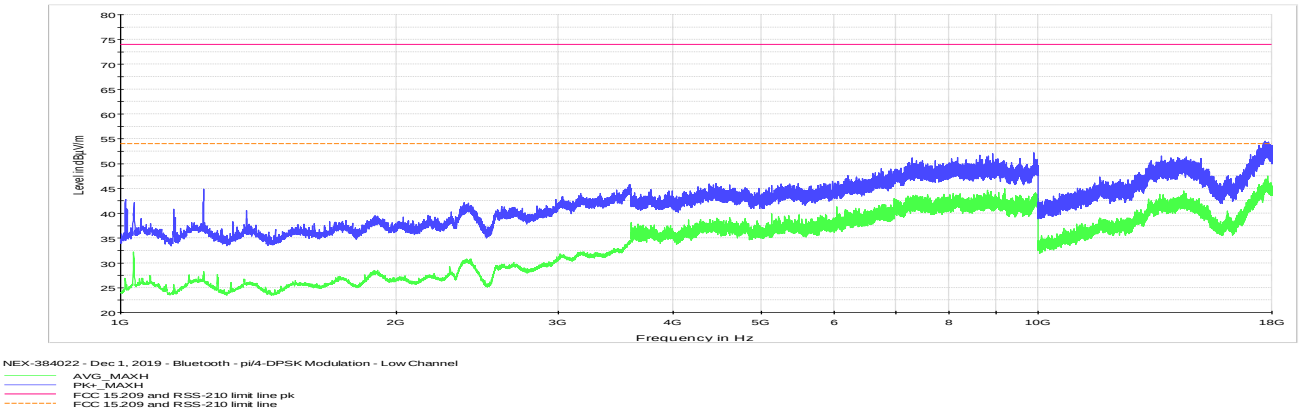


Figure 8.7-54: *Radiated spurious emissions for low channel 1 GHz to 18 GHz*

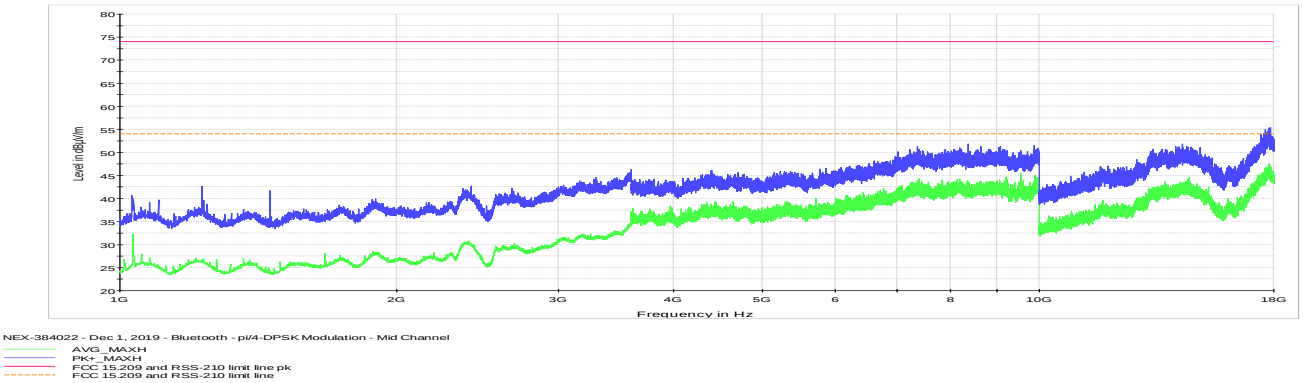


Figure 8.1 1: *Radiated spurious emissions for mid channel 1 GHz to 18 GHz*

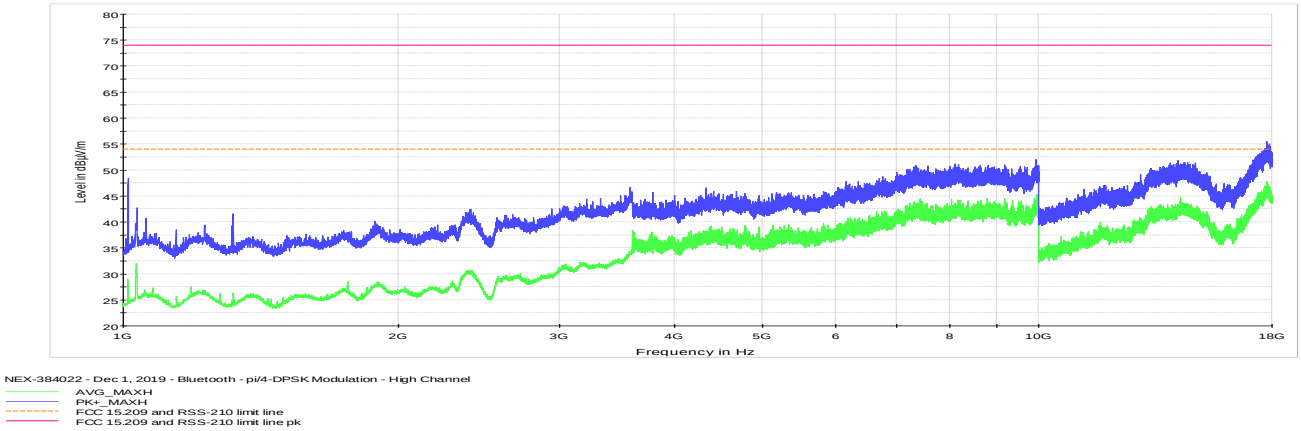


Figure 8.1 1: *Radiated spurious emissions for high channel 1 GHz to 18 GHz*

8.7.29 Test data: 8DPSK modulation – 3Mbps (Mode – used for 2.1, 3.0 and dual mode 4.2 classic when communication is at 3Mbps (EDR))

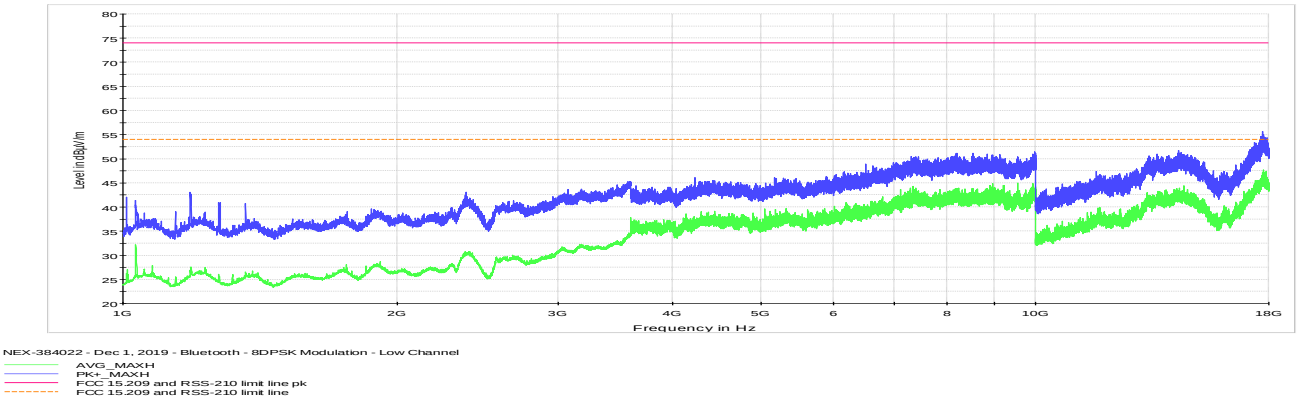


Figure 8.7-55: *Radiated spurious emissions for low channel 1 GHz to 18 GHz*

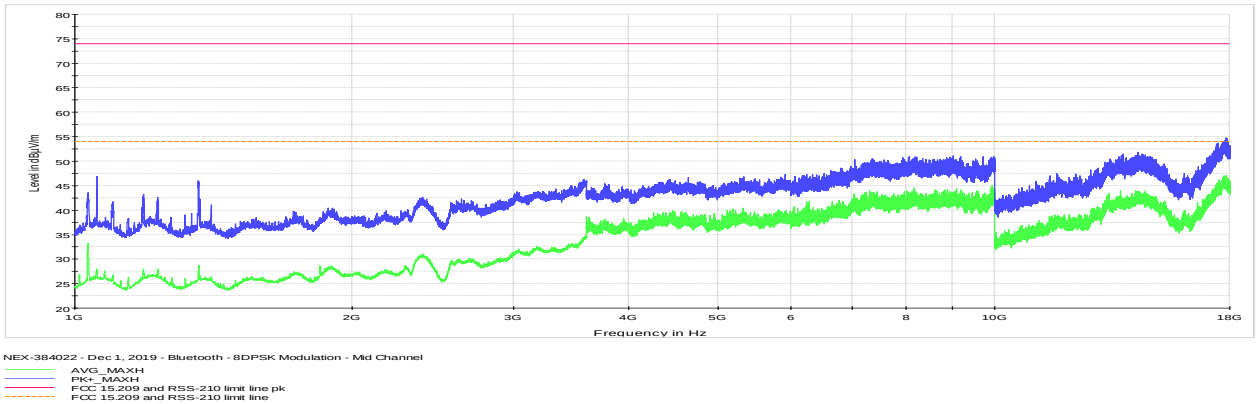


Figure 8.1 1: *Radiated spurious emissions for high channel 1 GHz to 18 GHz*

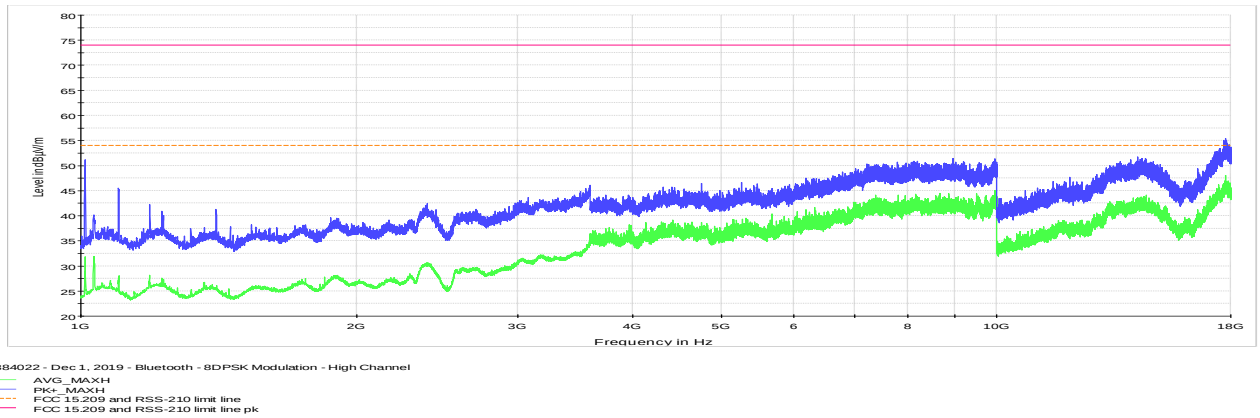


Figure 8.1 1: *Radiated spurious emissions for high channel 1 GHz to 18 GHz*

8.7.30 Test data: GFSK modulation – DTS (BLE) (Mode: used for 4.2 in BLE), continued

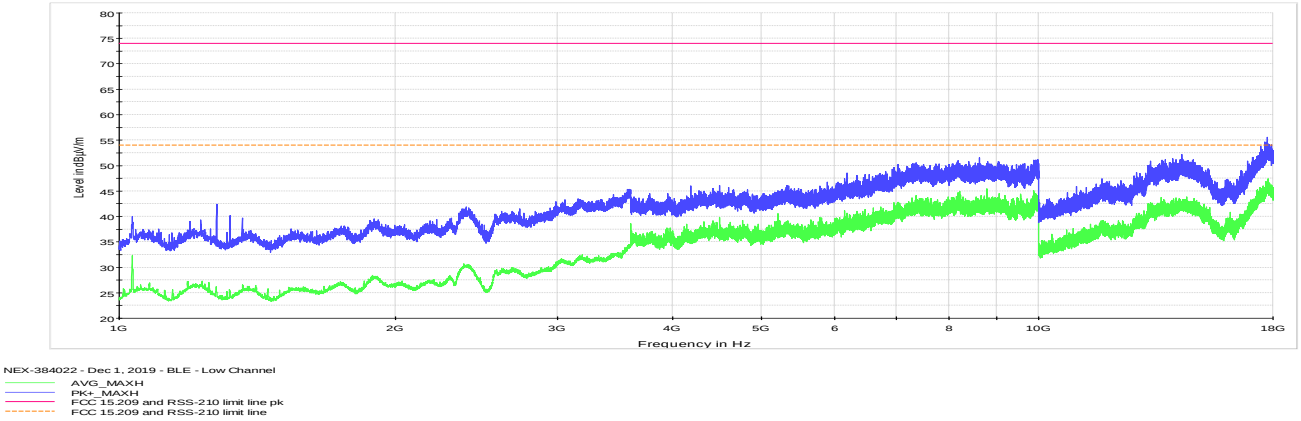


Figure 8.7-56: *Radiated spurious emissions for low channel 1 GHz to 18 GHz*

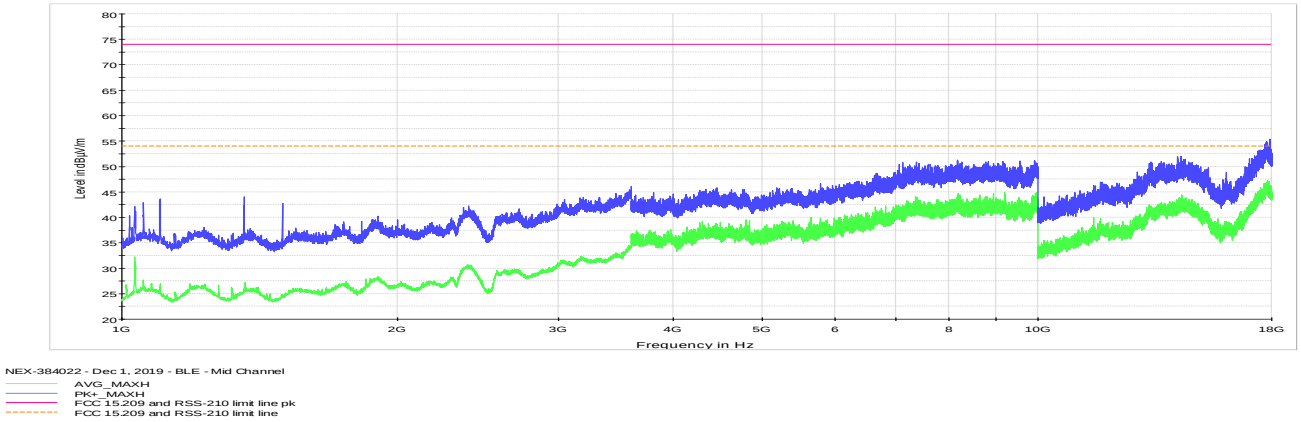


Figure 8.1 1: *Radiated spurious emissions for mid channel 1 GHz to 18 GHz*

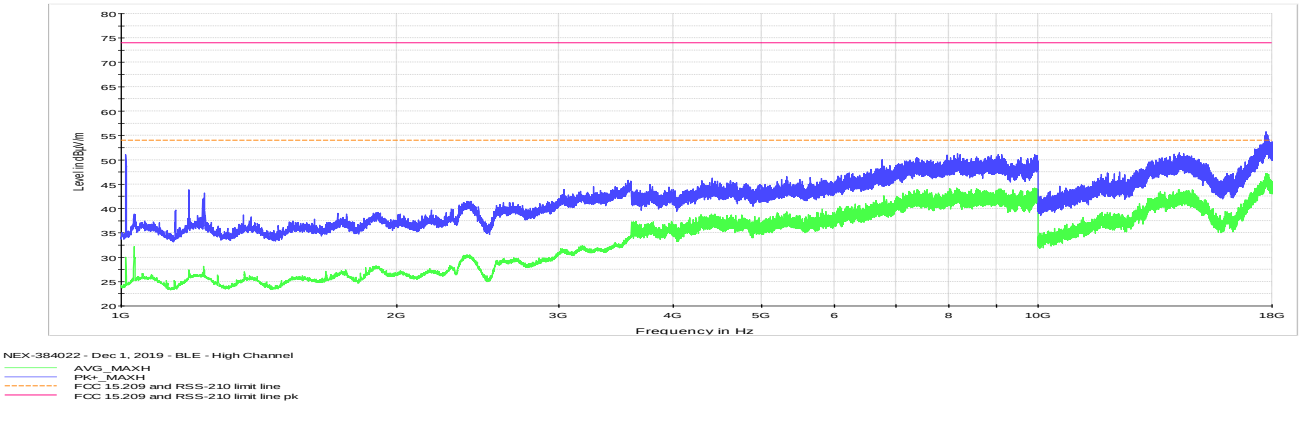


Figure 8.1 1: *Radiated spurious emissions for high channel 1 GHz to 18 GH*

8.7.24 Test data: GFSK Modulation – 1Mbps (Mode – used for 2.1, 3.0 and 4.2 classic when communication is at 1Mbps (BRD))

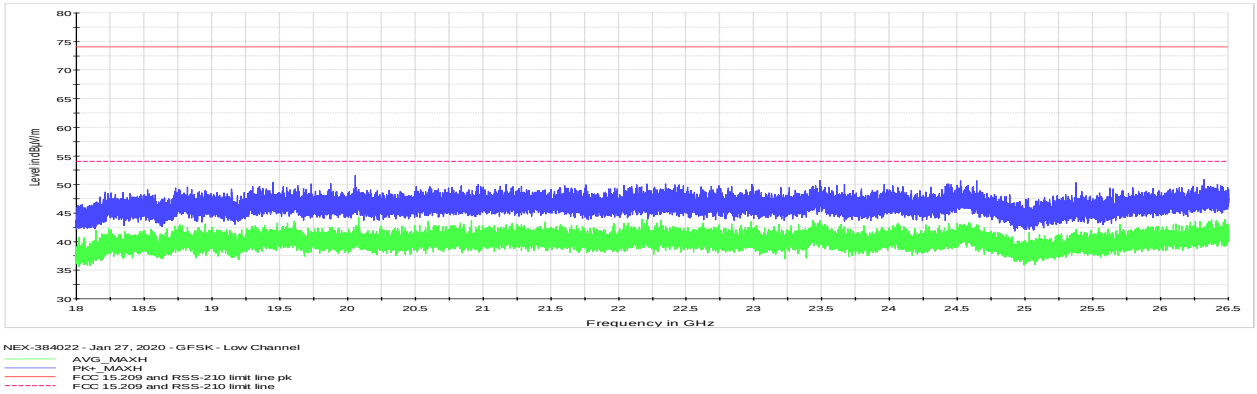


Figure 8.7-57: *Radiated spurious emissions for low channel 18 GHz to 26.5 GHz*

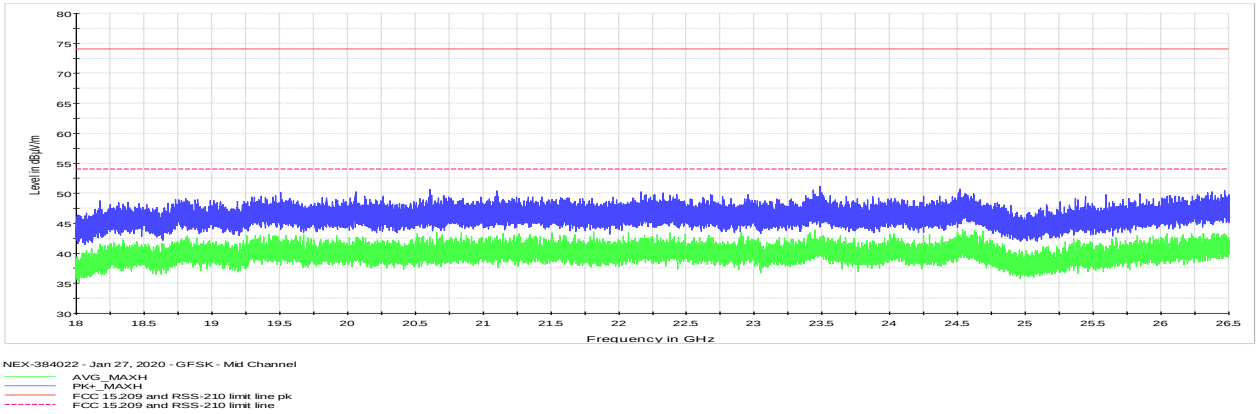


Figure 8.1 1: *Radiated spurious emissions for mid channel 18 GHz to 26.5 GHz*

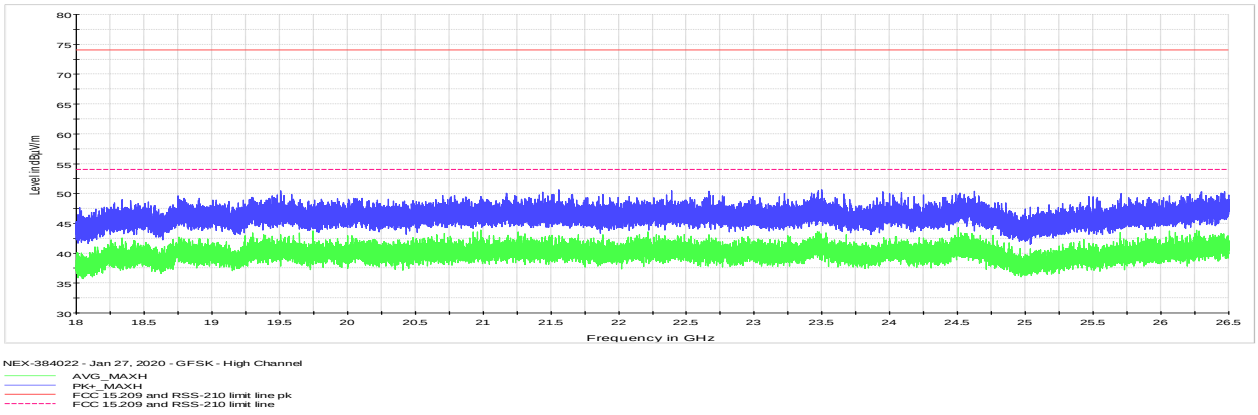


Figure 8.1 1: *Radiated spurious emissions for high channel 18 GHz to 26.5 GHz*

8.7.25 Test data: pi/4-DPSK modulation – 2Mbps (Mode – used for 2.1, 3.0 and dual mode 4.2 classic when communication is at 2Mbps (EDR))

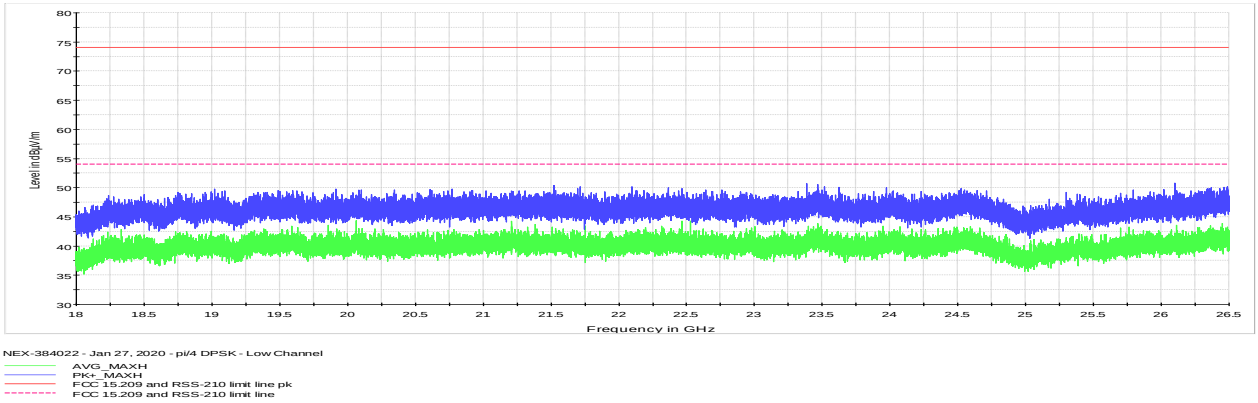


Figure 8.7-58: *Radiated spurious emissions for low channel 18 GHz to 26.5 GHz*

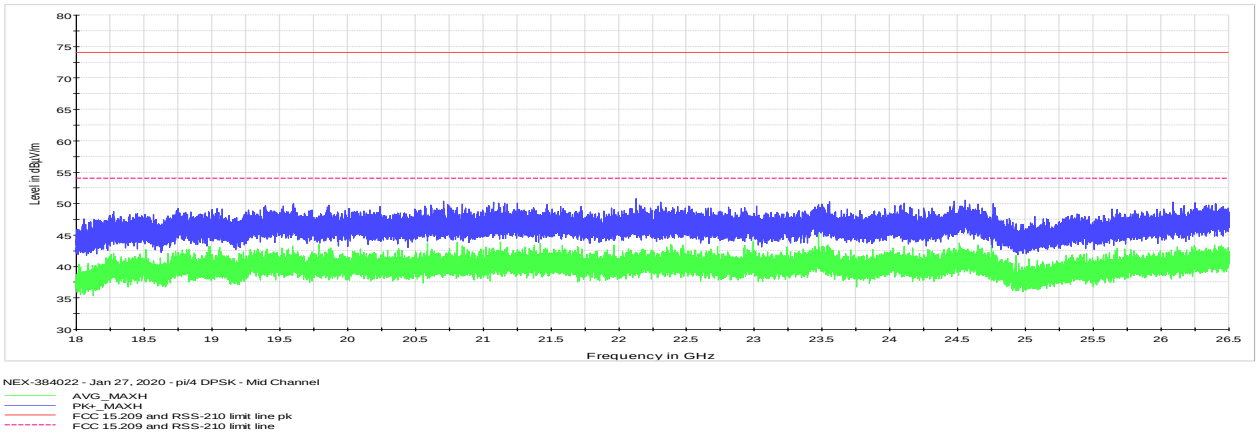


Figure 8.1 1: *Radiated spurious emissions for mid channel 18 GHz to 26.5 GHz*

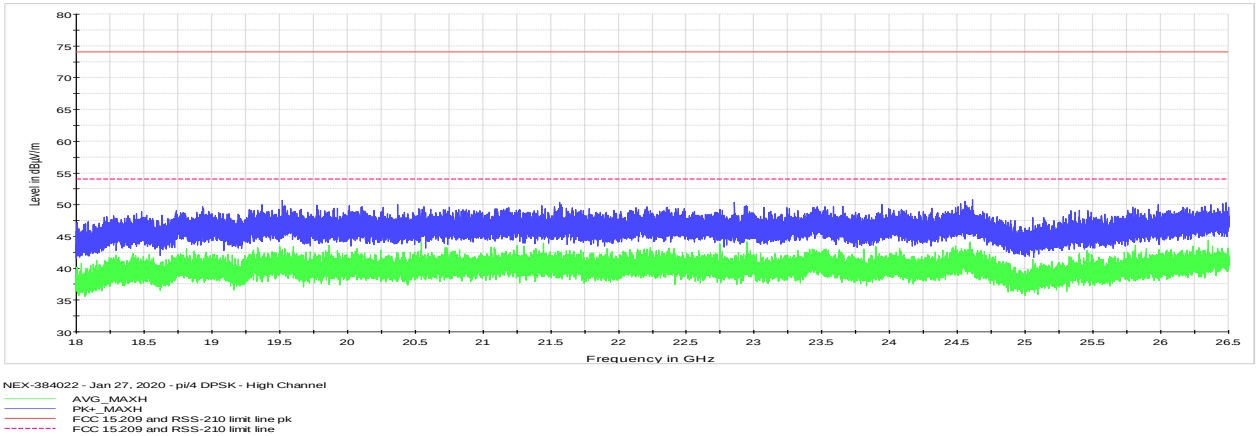


Figure 8.1 1: *Radiated spurious emissions for high channel 18 GHz to 26.5 GHz*

8.7.26 Test data: 8DPSK modulation – 3Mbps (Mode – used for 2.1, 3.0 and dual mode 4.2 classic when communication is at 3Mbps (EDR))

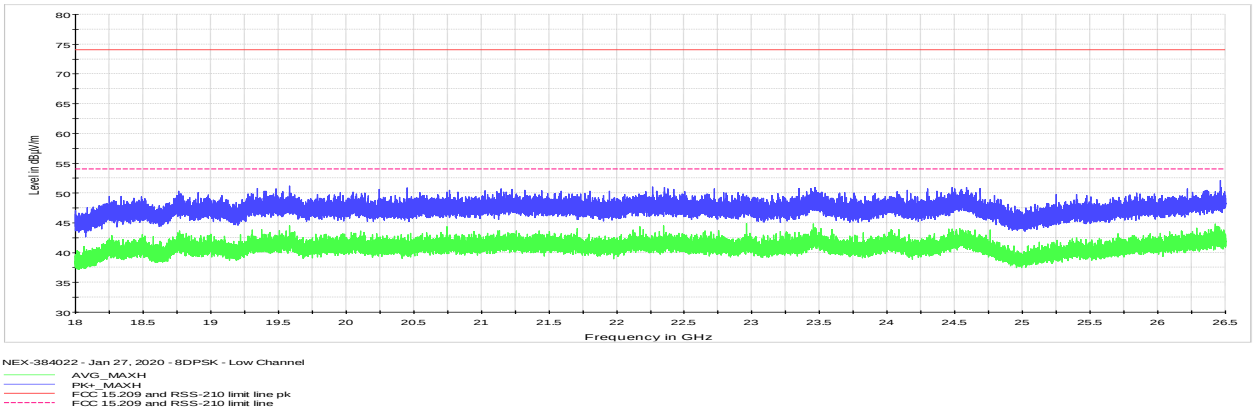


Figure 8.7-59: *Radiated spurious emissions for low channel 18 GHz to 26.5 GHz*

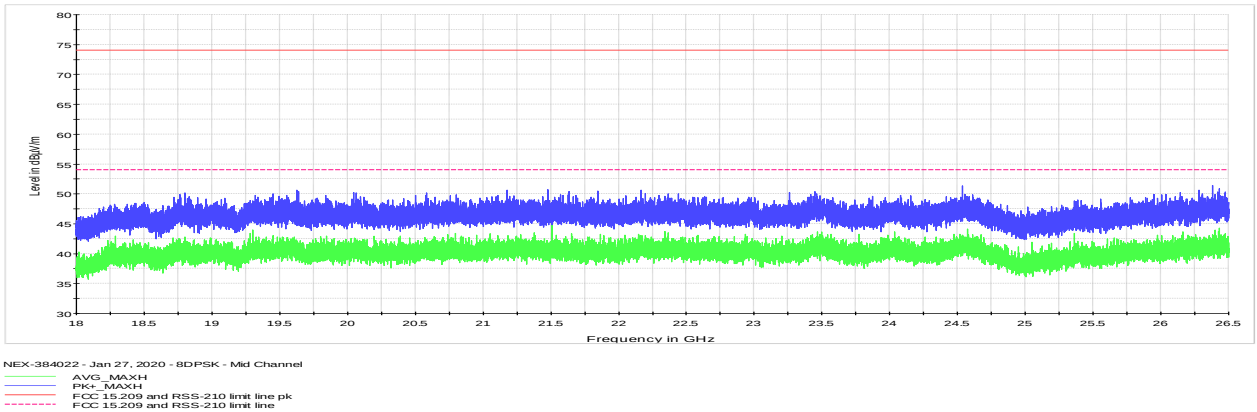


Figure 8.1 1: *Radiated spurious emissions for mid channel 18 GHz to 26.5 GHz*

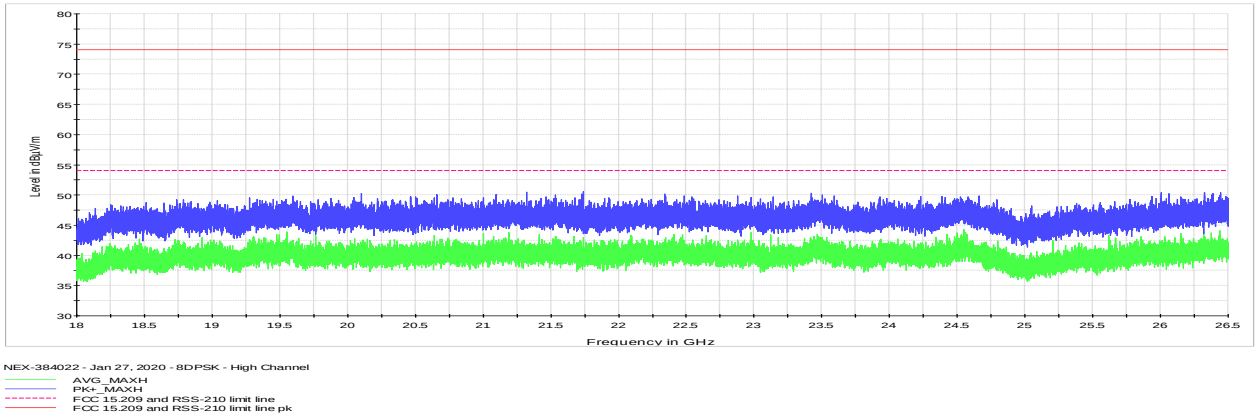


Figure 8.1 1: *Radiated spurious emissions for high channel 18 GHz to 26.5 GHz*

8.7.27 Test data: GFSK modulation – DTS (BLE) (Mode: used for 4.2 in BLE), continued

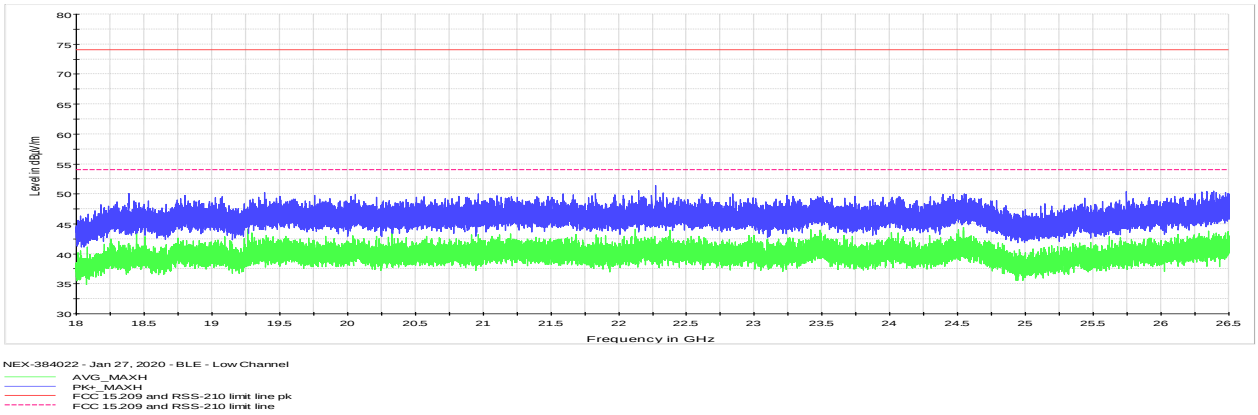


Figure 8.7-60: *Radiated spurious emissions for low channel 18 GHz to 26.5 GHz*

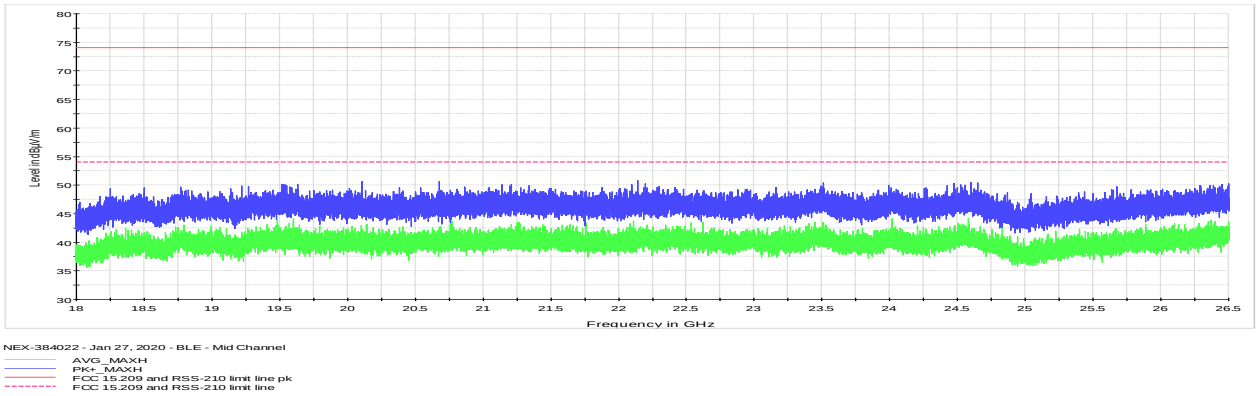


Figure 8.1 1: *Radiated spurious emissions for mid channel 18 GHz to 26.5 GHz*

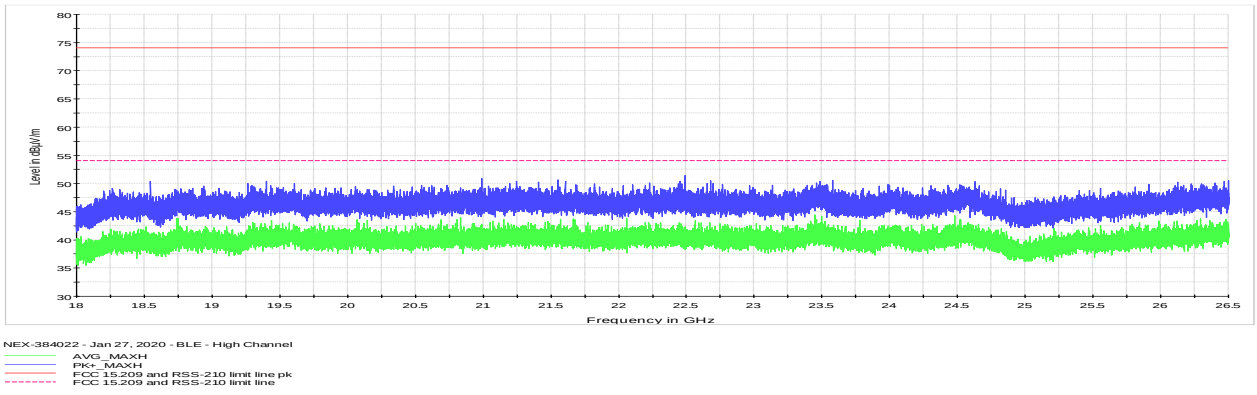


Figure 8.1 1: *Radiated spurious emissions for high channel 18 GHz to 26.5 GH*

8.8 FCC 15.247(e) and RSS-247 5.2(b) Power spectral density for digitally modulated devices

8.8.1 Definitions and limits

FCC:
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

(f) For the purposes of this section, hybrid systems are those that employ a combination of both frequency hopping and digital modulation techniques. The frequency hopping operation of the hybrid system, with the direct sequence or digital modulation operation turned-off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4. The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

ISED:
The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

5.3 Hybrid systems
Hybrid systems employ a combination of both frequency hopping and digital transmission techniques and shall comply with the following:

a. With the frequency hopping turned off, the digital transmission operation shall comply with the power spectral density requirements for digital modulation systems set out in of section 5.2(b) or section 6.2.4 for hybrid devices operating in the band 5725–5850 MHz.

8.8.1 Test date

Start date	January 15, 2020

8.8.2 Observations, settings and special notes

Power spectral density test was performed as per KDB 558074, section 8.4 with reference to ANSI C63.10 subclause 11.10.
The test was performed using method PKPSD (peak PSD).
Spectrum analyser settings:

Resolution bandwidth:	3 kHz ≤ RBW ≤ 100 kHz
Video bandwidth:	≥3 × RBW
Frequency span:	3 MHz
Detector mode:	Peak
Trace mode:	Max Hold
Averaging sweeps number:	100

8.8.3 Test data: GFSK modulation - 1Mbps (Mode - used for 2.1, 3.0 and 4.2 classic when communication is at 1Mbps (BRD)

Table 8.8-1: *PSD measurements results*

Channel	PSD, dBm/50 kHz	PSD limit, dBm/3 kHz	Margin, dB
Low	3.15	8.00	4.85
Mid	5.10	8.00	2.90
High	4.61	8.00	3.39

8.8.4 Test data: GFSK modulation - 1Mbps (Mode - used for 2.1, 3.0 and 4.2 classic when communication is at 1Mbps (BRD), Continued

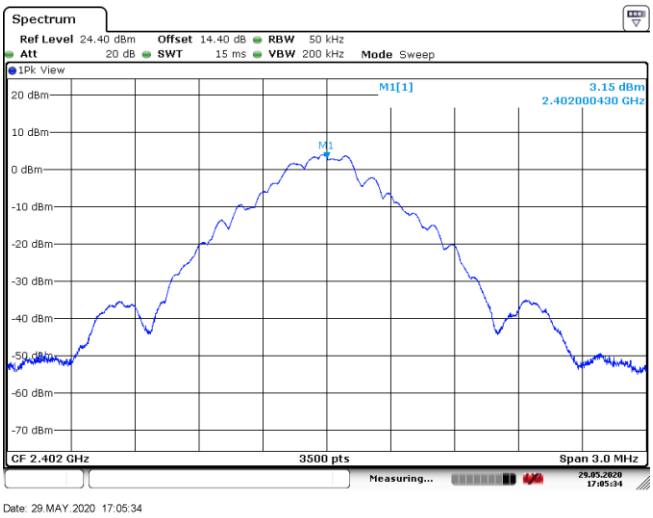


Figure 8.8-1: *PSD sample plot on low channel*

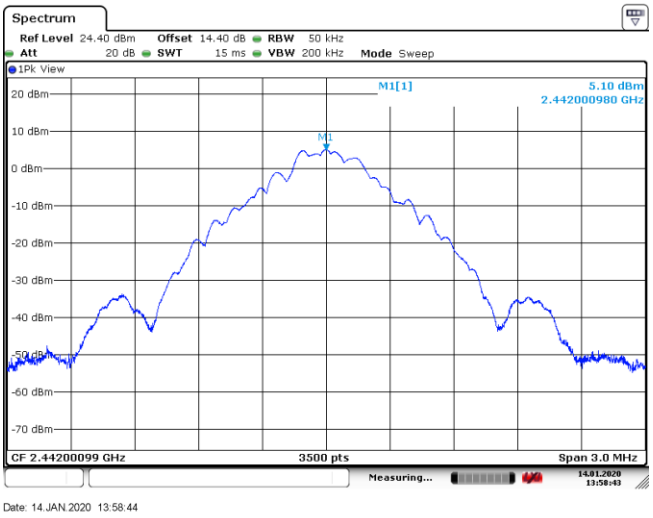


Figure 8.8-2: *PSD sample plot on mid channel*

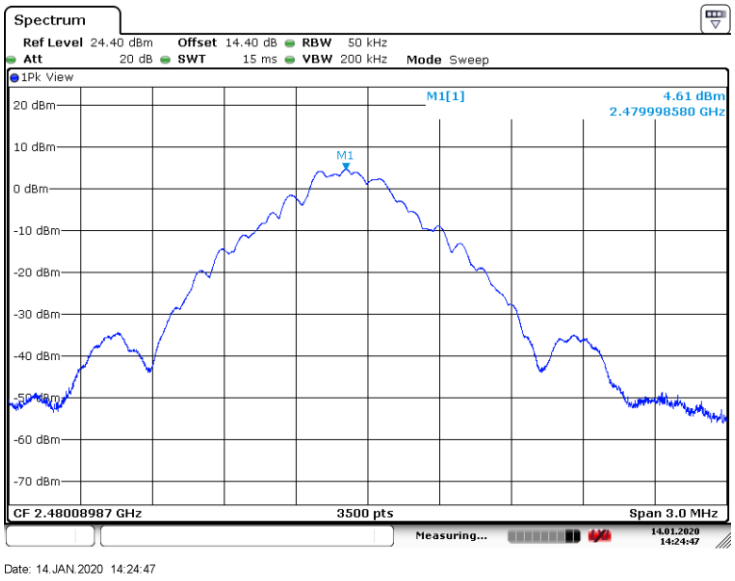


Figure 8.8-3: *PSD sample plot on high channel*

8.8.5 Test data: pi/4-DPSK modulation - 2 Mbps (Mode - used for 2.1, 3.0 and dual mode 4.2 classic when communication is at 2Mbps (EDR)

Table 8.8-2: *PSD measurements results*

Channel	PSD, dBm/50 kHz	PSD limit, dBm/3 kHz	Margin, dB
Low	1.59	8.00	6.41
Mid	1.74	8.00	6.26
High	0.42	8.00	7.58

8.8.6 Test data: pi/4-DPSK modulation - 2 Mbps (Mode - used for 2.1, 3.0 and dual mode 4.2 classic when communication is at 2Mbps (EDR), Continued

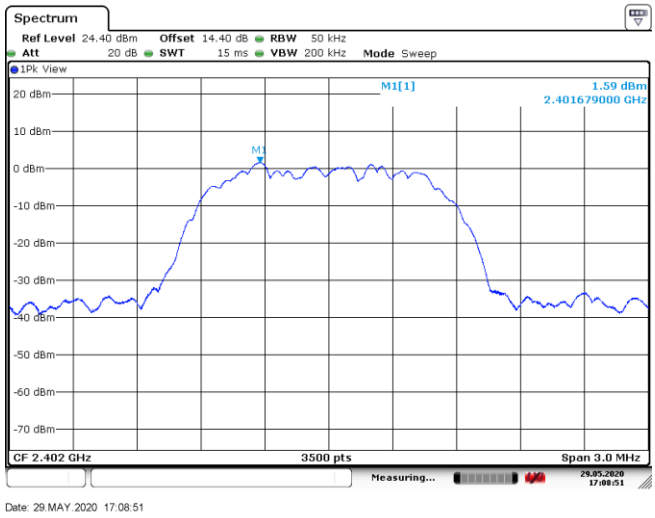


Figure 8.8-4: *PSD sample plot on low channel*

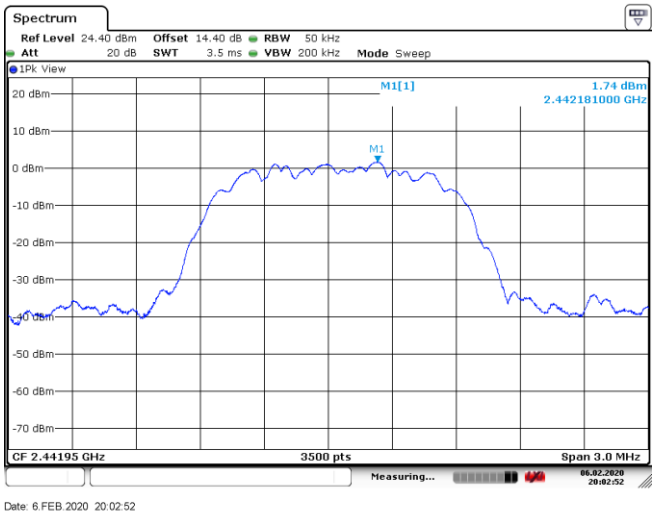


Figure 8.8-5: *PSD sample plot on mid channel*

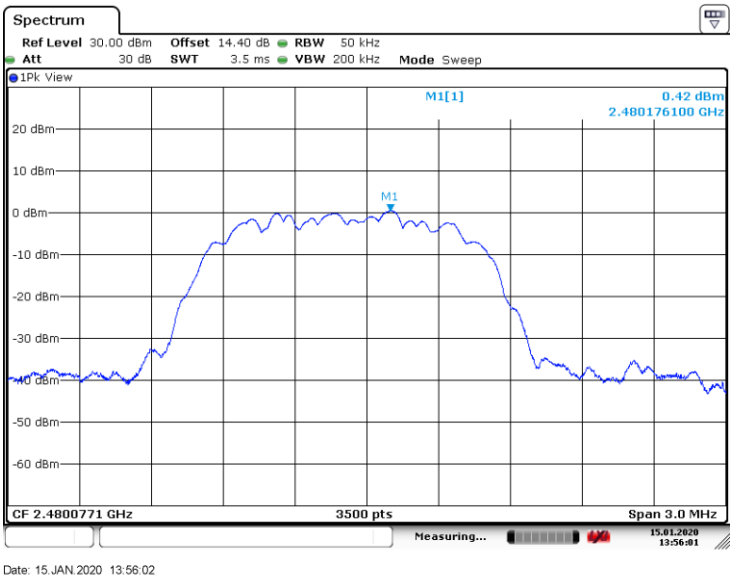


Figure 8.8-6: *PSD sample plot on high channel*

8.8.7 Test data: 8DPSK modulation - 3 Mbps (Mode - used for 2.1, 3.0 and dual mode 4.2 classic when communication is at 3 Mbps (EDR)

Table 8.8-3: *PSD measurements results*

Channel	PSD, dBm/50 kHz	PSD limit, dBm/3 kHz	Margin, dB
Low	2.24	8.00	5.76
Mid	2.74	8.00	5.26
High	1.43	8.00	6.57

8.8.8 Test data: 8DPSK modulation - 3 Mbps (Mode - used for 2.1, 3.0 and dual mode 4.2 classic when communication is at 3 Mbps (EDR), Continued

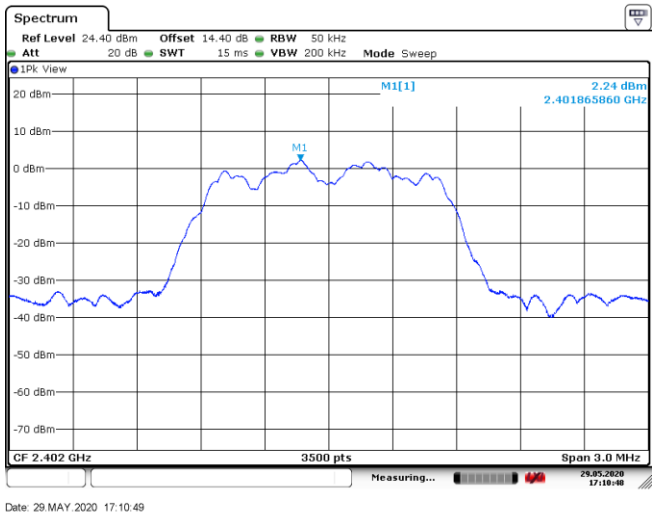


Figure 8.8-7: *PSD sample plot on low channel*

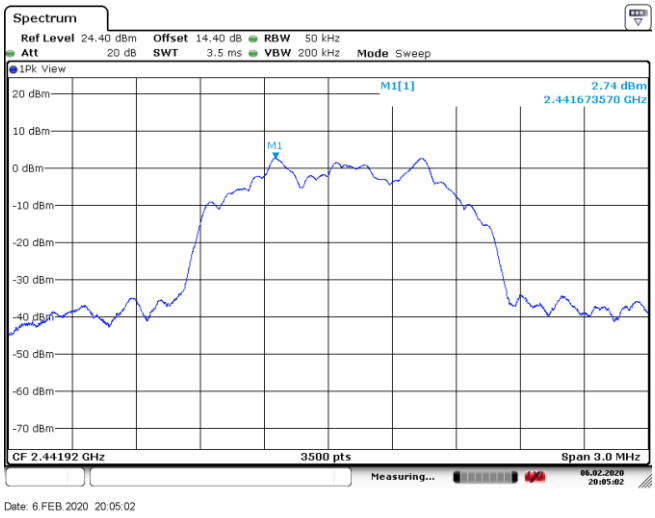


Figure 8.8-8: *PSD sample plot on mid channel*

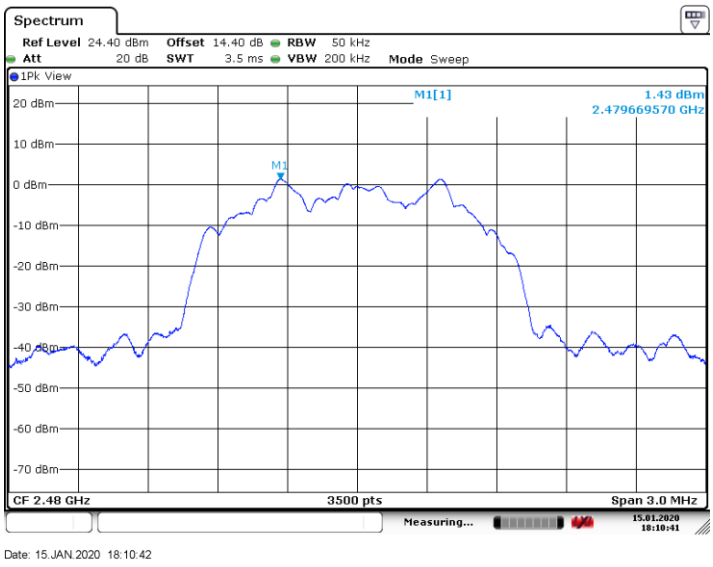


Figure 8.8-9: *PSD sample plot on high channel*

8.8.9 Test data: GFSK modulation :DTS (BLE) (Mode - used for 4.2 in BLE)

Table 8.8-4: *PSD measurements results*

Channel	PSD, dBm/50 kHz	PSD limit, dBm/3 kHz	Margin, dB
Low	4.97	8.00	3.03
Mid	5.19	8.00	2.81
High	4.72	8.00	3.28

8.8.10 Test data: GFSK modulation :DTS (BLE) (Mode - used for 4.2 in BLE), Continued

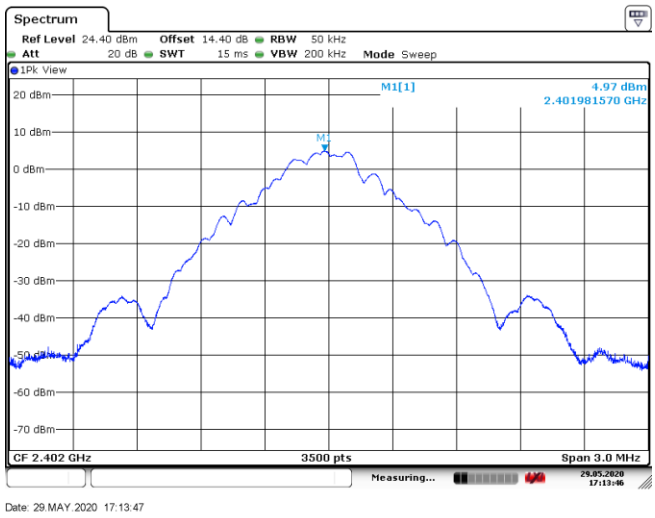


Figure 8.8-10: *PSD sample plot on low channel*

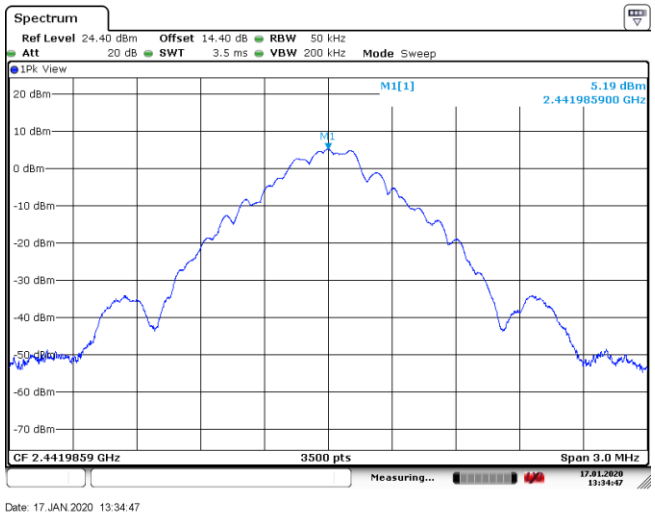


Figure 8.8-11: *PSD sample plot on mid channel*

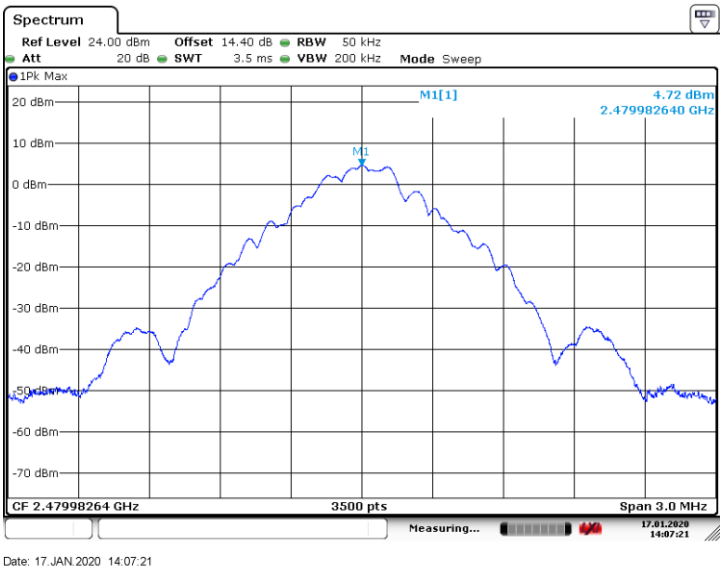
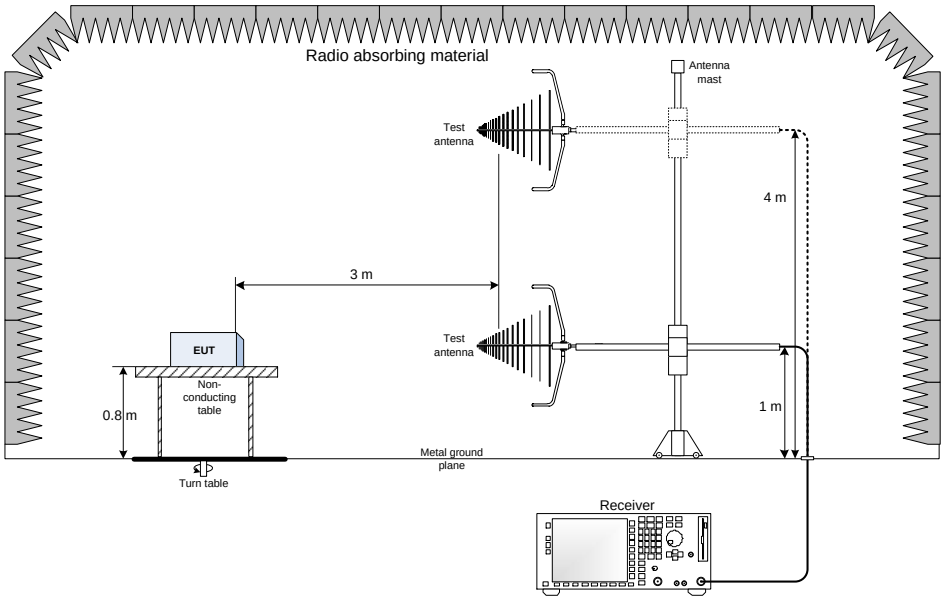


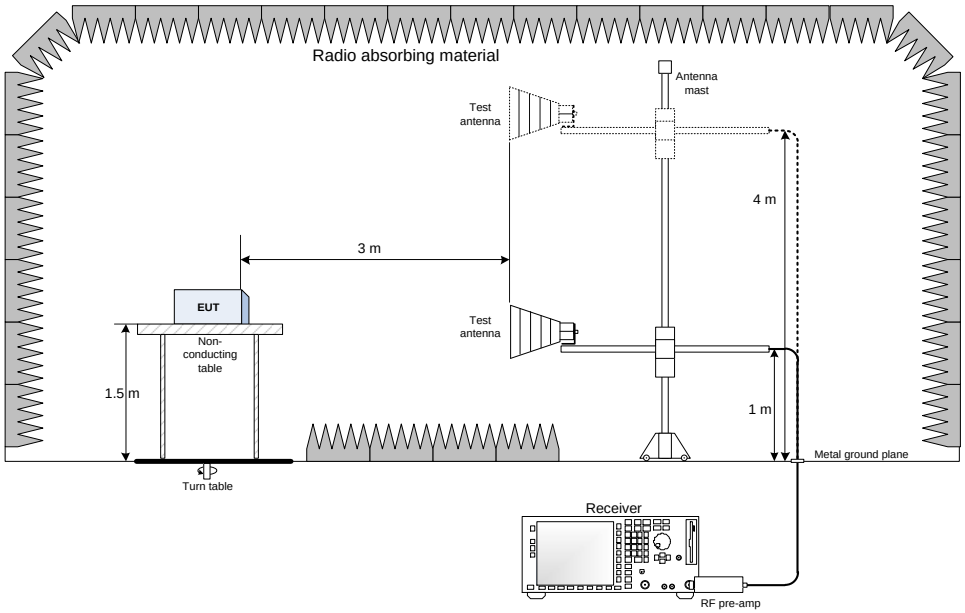
Figure 8.8-12: *PSD sample plot on high channel*

Section 9. Block diagrams of test set-ups

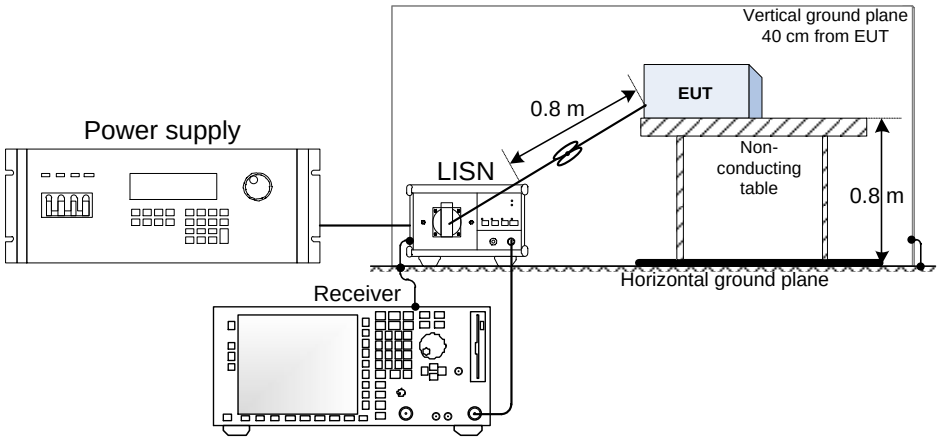
9.1 Radiated emissions set-up for frequencies below 1 GHz



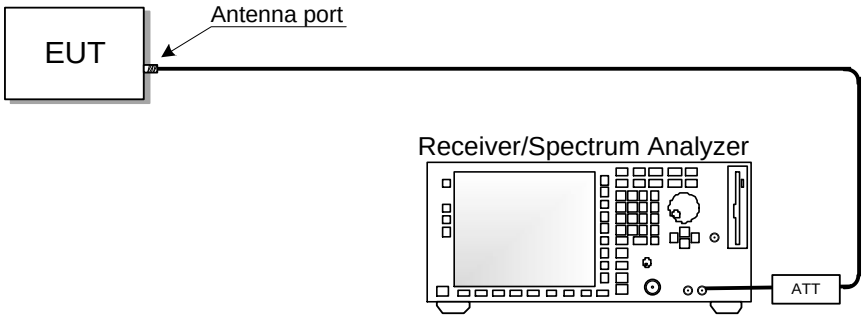
9.2 Radiated emissions set-up for frequencies above 1 GHz



9.3 Conducted emissions set-up



9.4 Antenna port set-up



(End of Report)