

7.6 Band Edge Emissions

§2.1051 §30.203

Test Overview

All out of band emissions are measured in a radiated setup while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All modulations were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is -13dBm/1MHz. However, in the bands immediately outside and adjacent to the licensee's frequency block, having a bandwidth equal to 10 percent of the channel bandwidth, the conductive power or the total radiated power of any emission shall be -5 dBm/MHz or lower.

Test Procedure Used

ANSI C63.26-2015 Section 5.7.3

ANSI C63.26-2015 Section 6.4

Test Settings

1. Start and stop frequency were set such that both upper and lower band edges are measured.
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW = 1MHz
4. VBW $\geq 3 \times$ RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times$ Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Notes

- 1) The EUT was tested while positioned upright and mounted on a mast 1.5m height. The worst case emissions are reported with the EUT in this fixed position and with the modulations and active component carriers shown in the tables below.
- 2) All measurements in this section was performed in the radiated setup in the far field.
- 3) All appropriate Antenna Factor and Cable Loss have been applied in the spectrum analyzer for each measurement. Additionally, the conducted band edge emissions were measured by subtracting the EUT's antenna gain from the measured EIRP in the spectrum analyzer.
- 4) 1CC = 1 Component Carrier Active, and 8CC = 8 Component Carriers Active. Each component carrier's bandwidth is 100MHz.
- 5) For band edge measurement of EUT's Antenna A, the receive horn antenna was maximized on Antenna A and then the other antennas (B, C, and D) were individually energized and measured while maintaining maximized position on Antenna A. These measurements were saved into a spreadsheet and their spectra were summed to determine the total conducted power for the band edge emissions level shown starting in Section 7.6.5. The same procedure was repeated with the receive horn antenna maximized on Antennas B, C, and D.

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- 6) MIMO Band Edge values were summed in linear power units then converted back to dBm. All MIMO band edge data is located starting in Section 7.6.5 below.

MIMO Band Edge Sample Calculation

Conversion to linear value $= 10^{(\text{dBm}/10)} = 10^{(-31.13/10)} = 0.000771\text{mW}$

MIMO Band Edge [dBm] $= \text{Antenna A} + \text{Antenna B} + \text{Antenna C} + \text{Antenna D}$

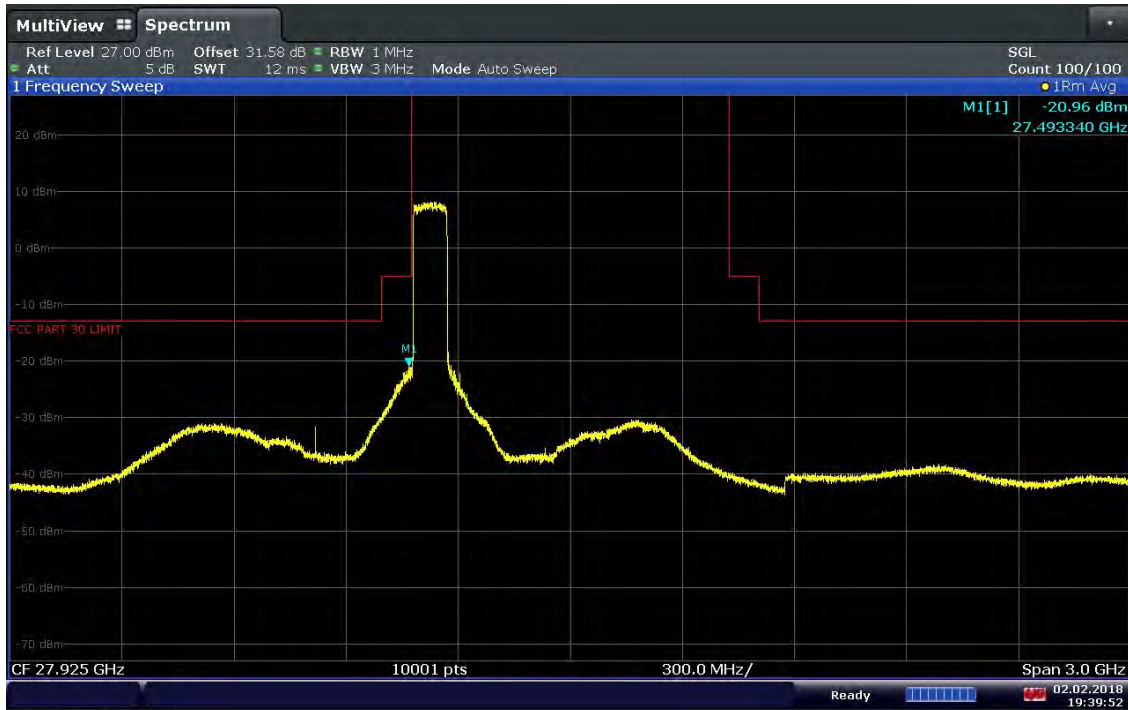
$= 0.000771\text{mW} + 0.0000685\text{mW} + 0.000476\text{mW} + 0.0000511\text{mW}$

$= 0.00137\text{mW}$

$= 10 \cdot \log(0.00137\text{mW}) = -28.65\text{dBm}$

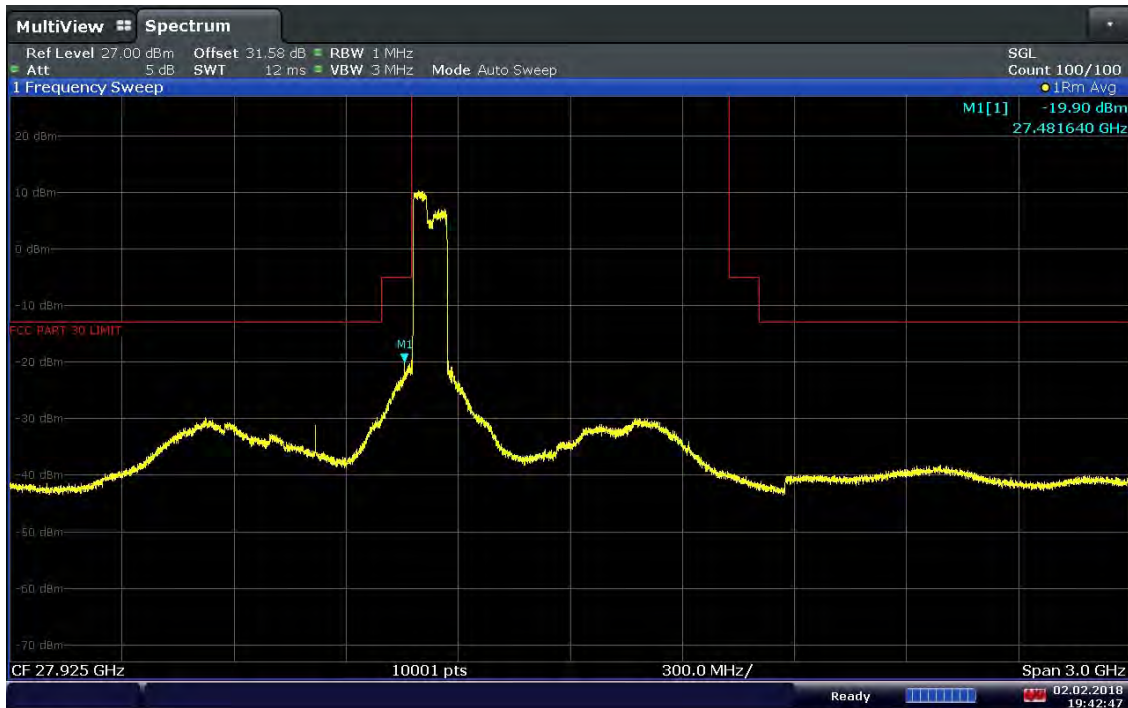
FCC ID: A3LSFG-AA100DC		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.6.1 Antenna A Conducted Band Edge Maximized on Antenna A



19:39:52 02.02.2018

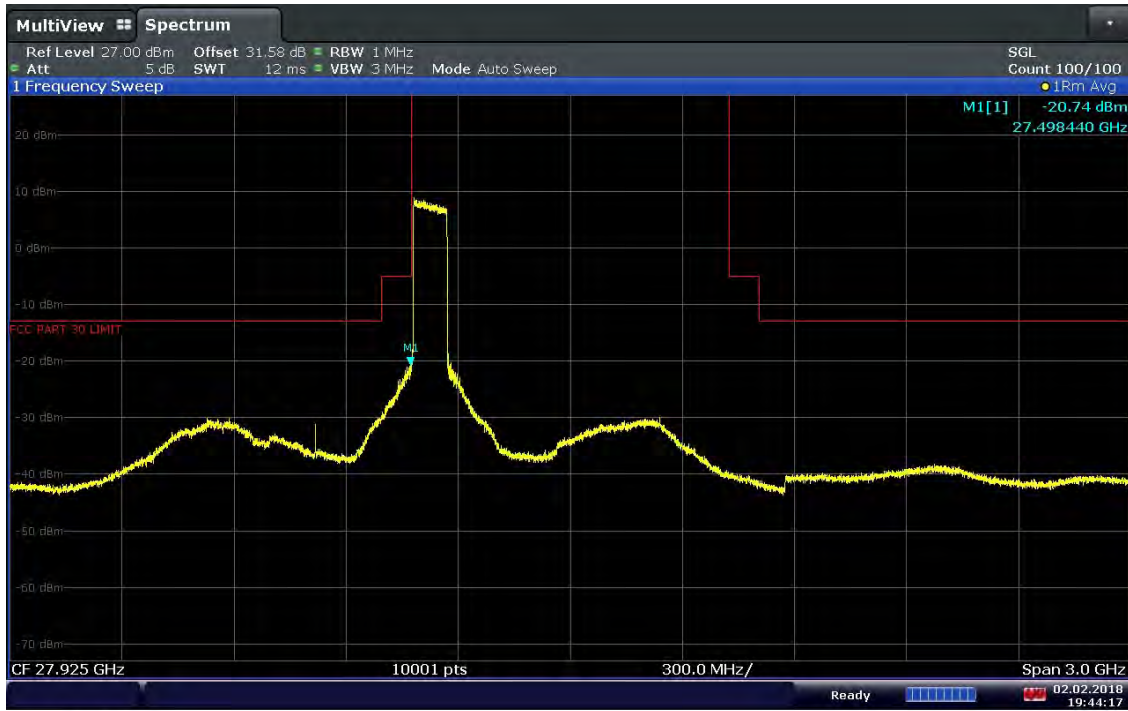
Plot 7-235. Band Edge Plot (1CC QPSK Low Channel)



19:42:48 02.02.2018

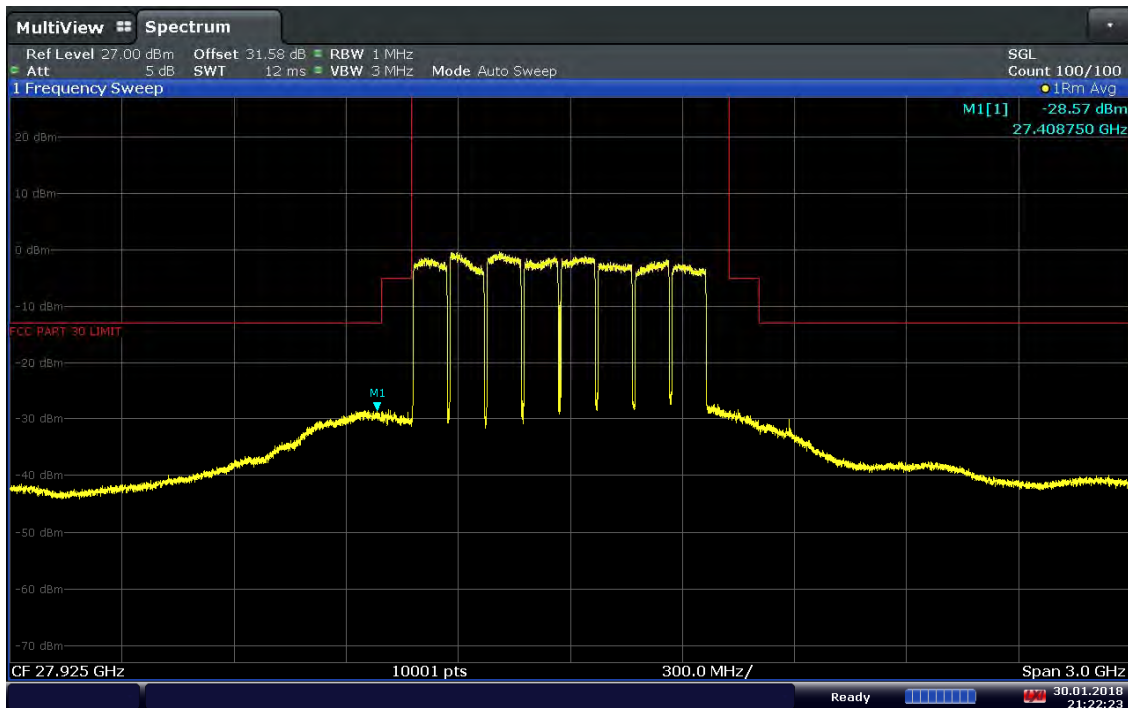
Plot 7-236. Band Edge Plot (1CC 16QAM Low Channel)

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19:44:17 02.02.2018

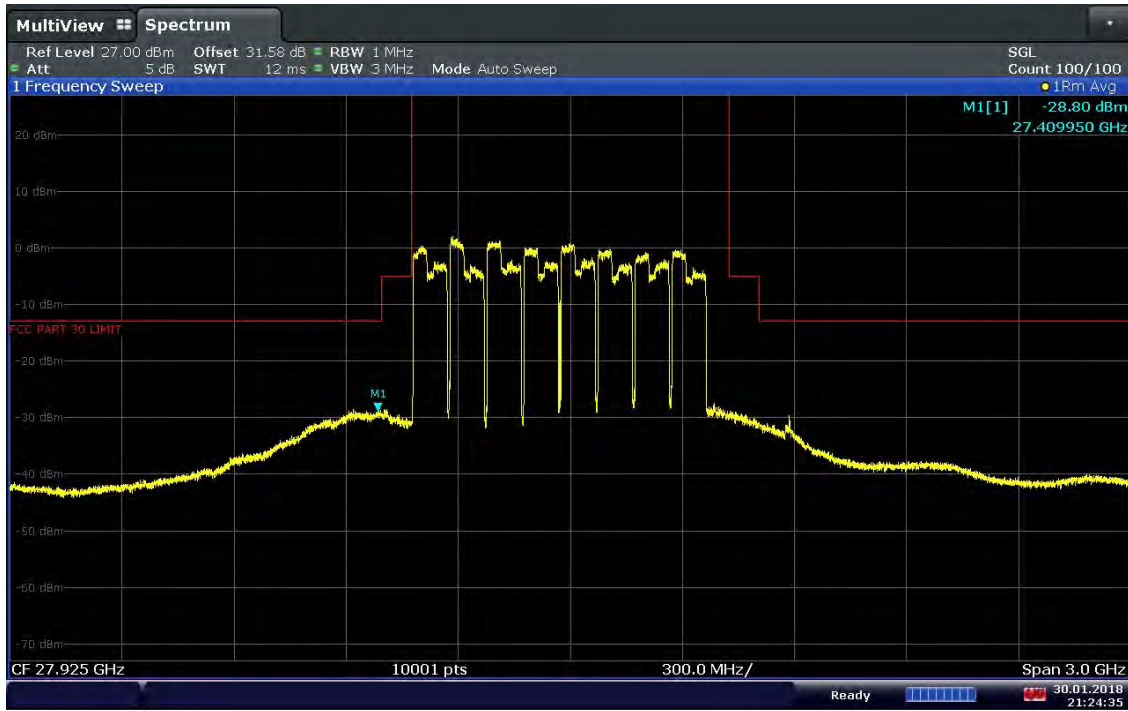
Plot 7-237. Band Edge Plot (1CC 64QAM Low Channel)



21:22:23 30.01.2018

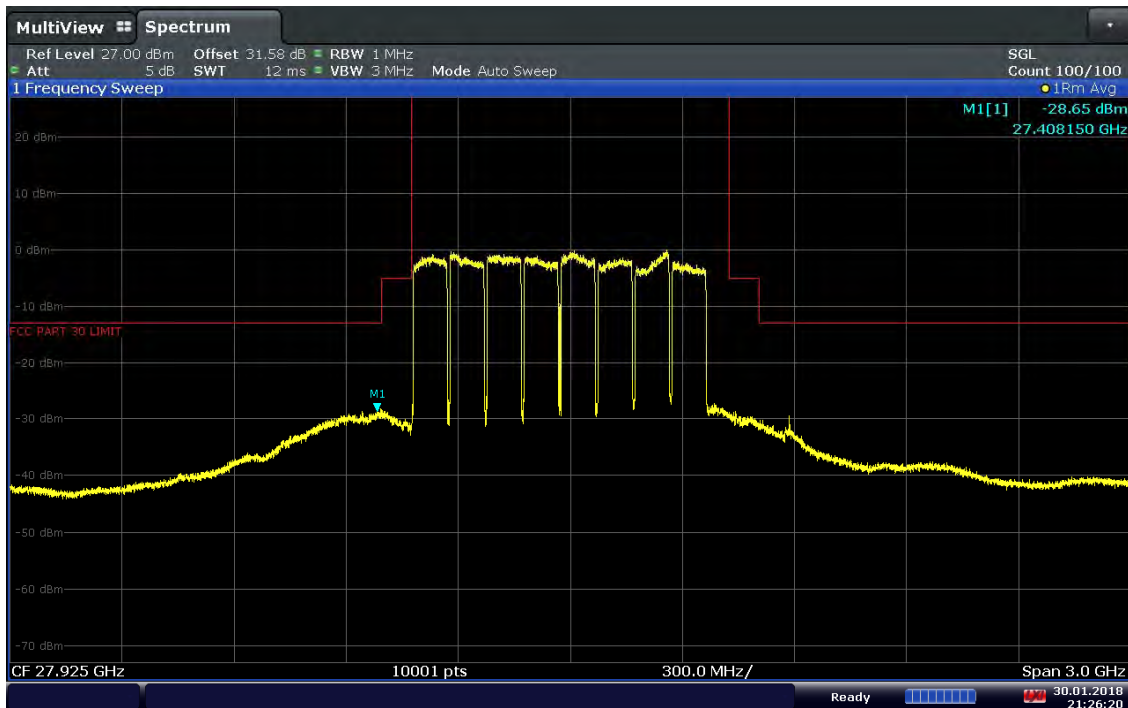
Plot 7-238. Band Edge Plot (8CC QPSK Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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21:24:35 30.01.2018

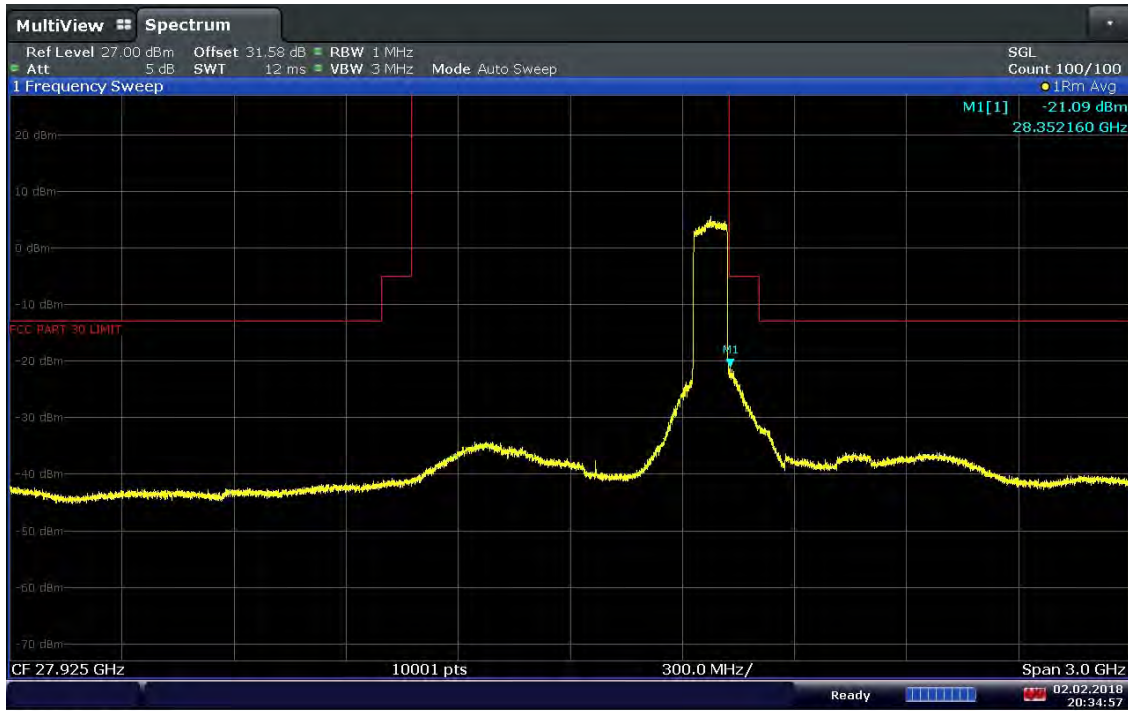
Plot 7-239. Band Edge Plot (8CC 16QAM Low Channel)



21:26:21 30.01.2018

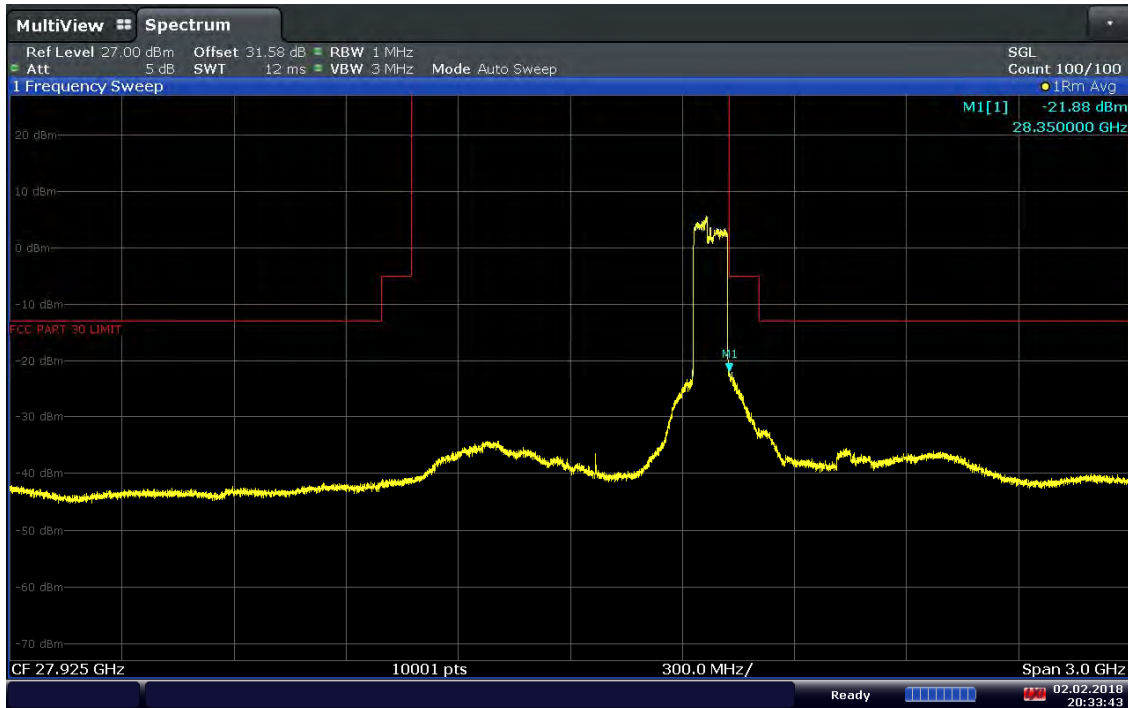
Plot 7-240. Band Edge Plot (8CC 64QAM Low Channel)

FCC ID: A3LSFG-AA100DC	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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20:34:57 02.02.2018

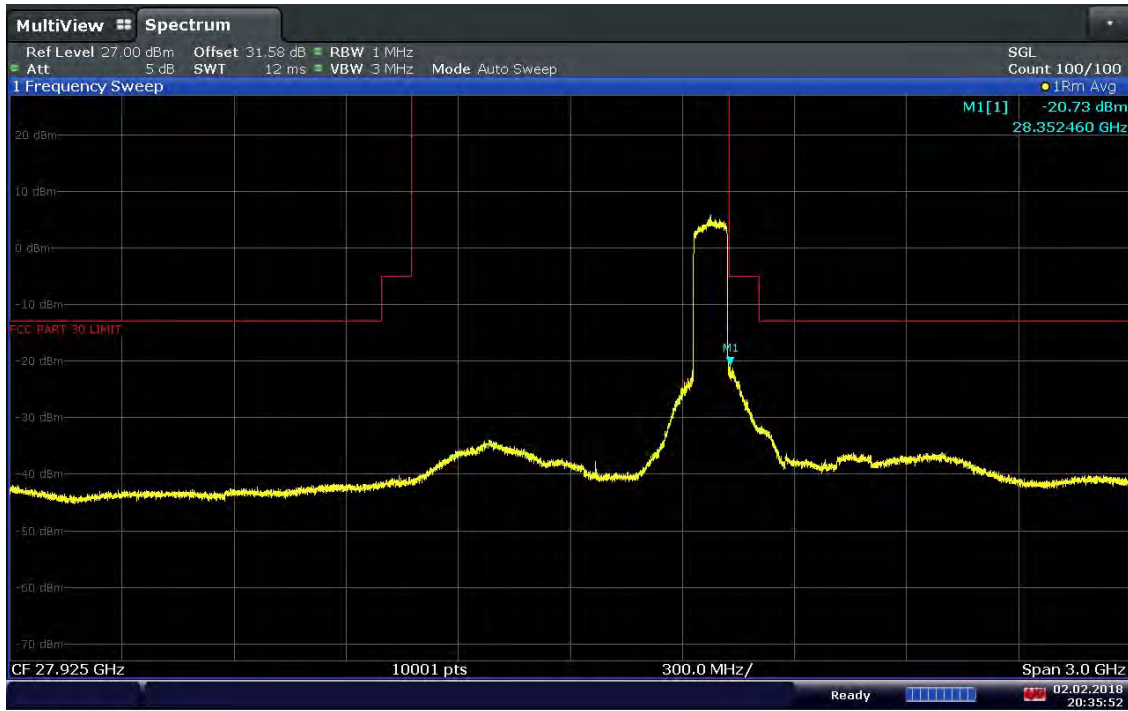
Plot 7-241. Band Edge Plot (1CC QPSK High Channel)



20:33:43 02.02.2018

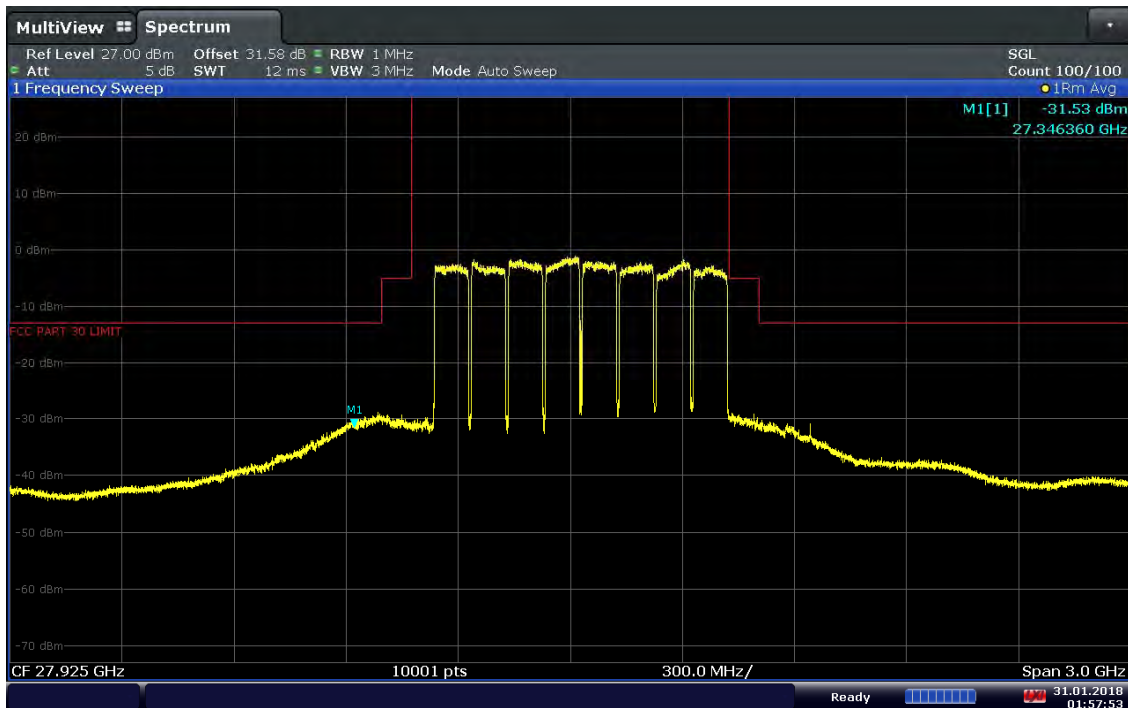
Plot 7-242. Band Edge Plot (1CC 16QAM High Channel)

FCC ID: A3LSFG-AA100DC	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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20:35:53 02.02.2018

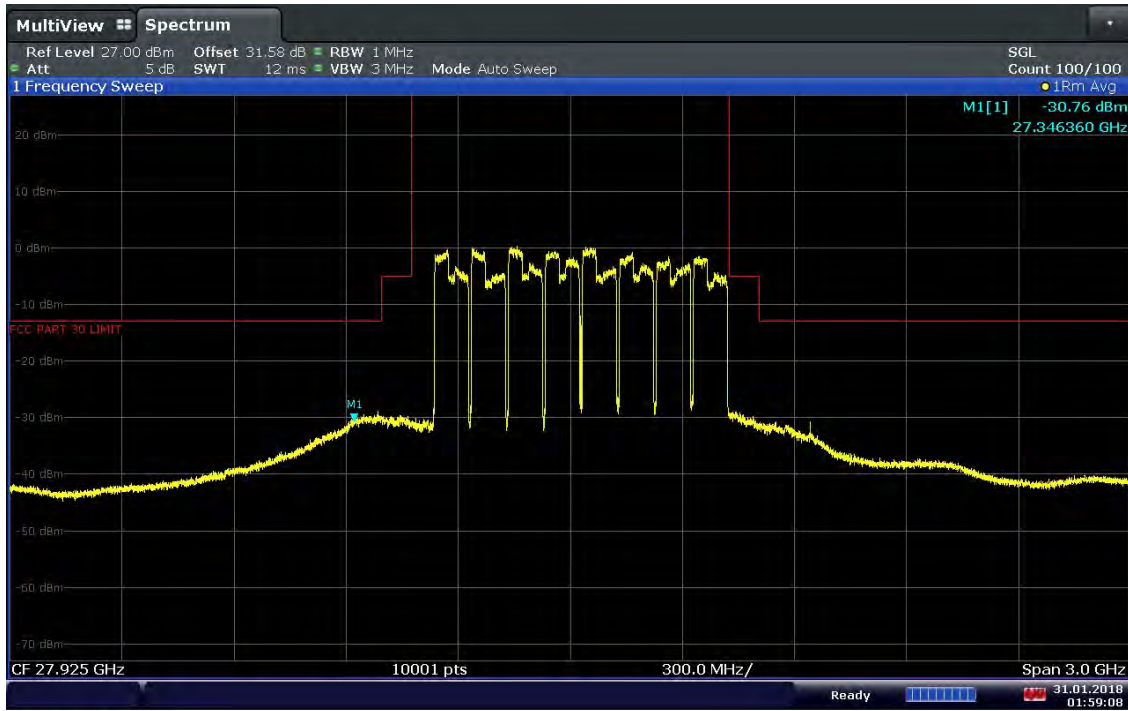
Plot 7-243. Band Edge Plot (1CC 64QAM High Channel)



01:57:54 31.01.2018

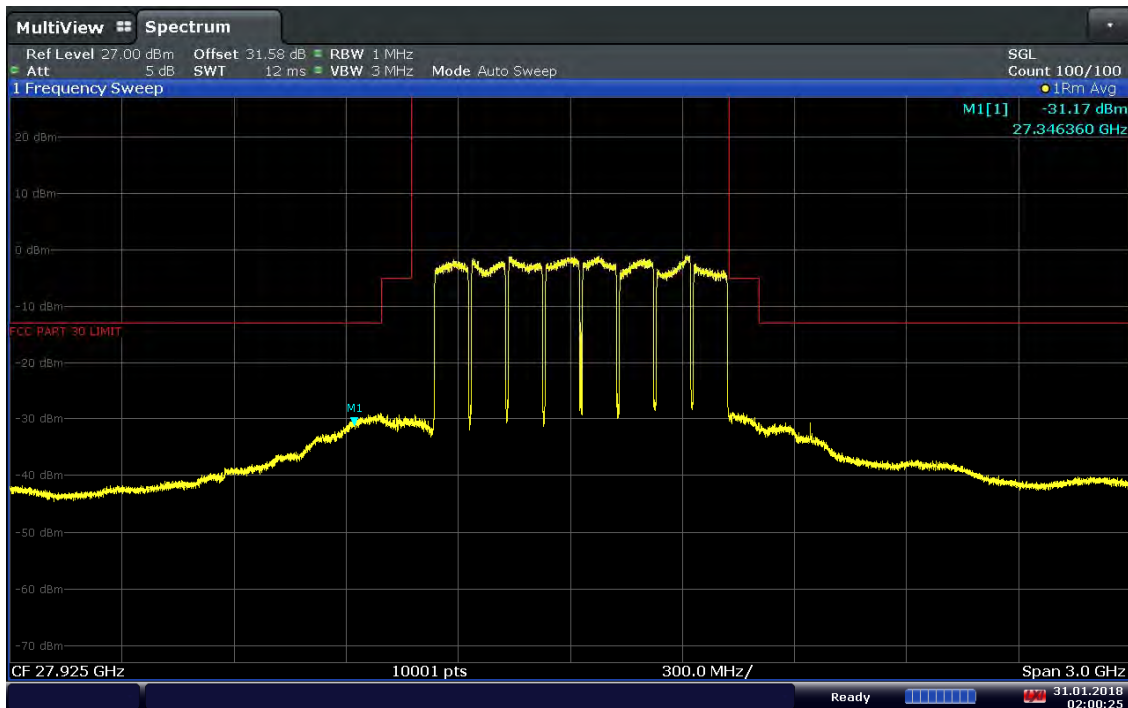
Plot 7-244. Band Edge Plot (8CC QPSK High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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01:59:09 31.01.2018

Plot 7-245. Band Edge Plot (8CC 16QAM High Channel)

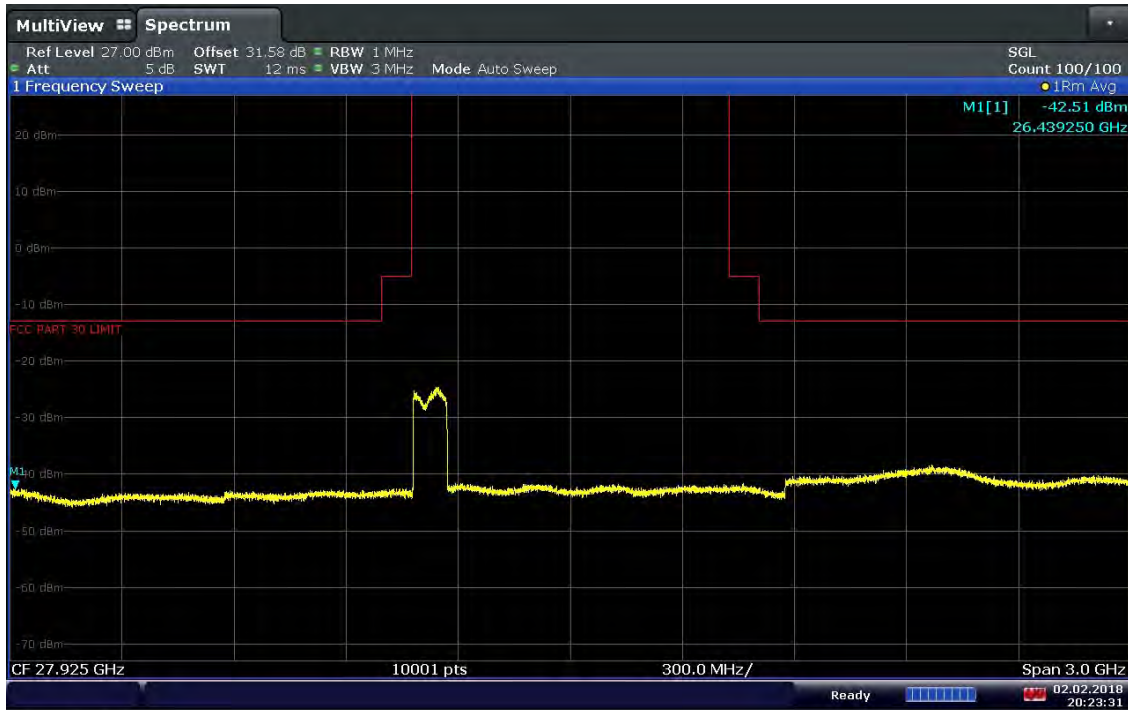


02:00:26 31.01.2018

Plot 7-246. Band Edge Plot (8CC 64QAM High Channel)

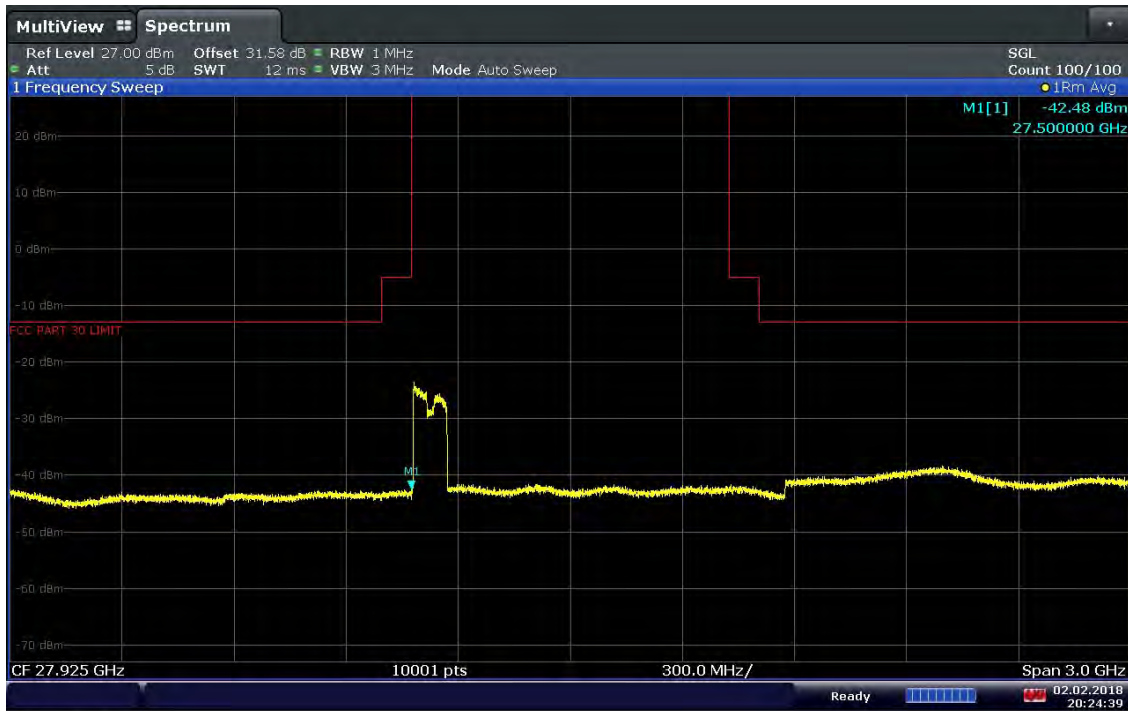
FCC ID: A3LSFG-AA100DC	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.6.2 Antenna B Conducted Band Edge Maximized on Antenna A



20:23:32 02.02.2018

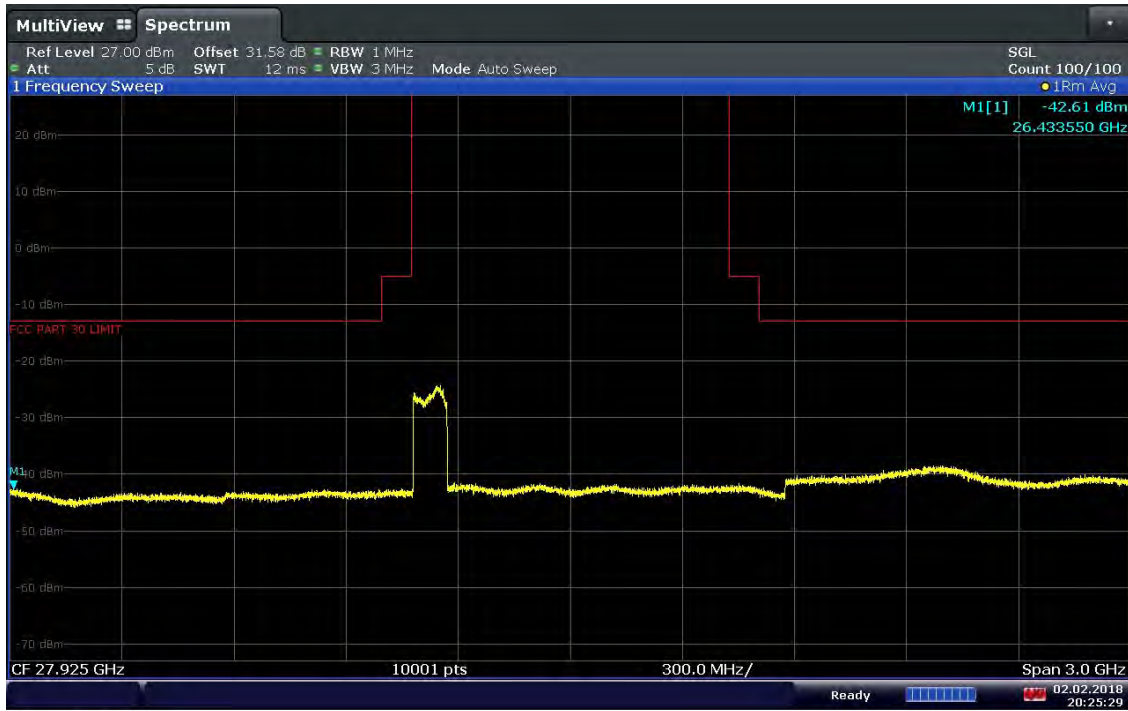
Plot 7-247. Band Edge Plot (1CC QPSK Low Channel)



20:24:40 02.02.2018

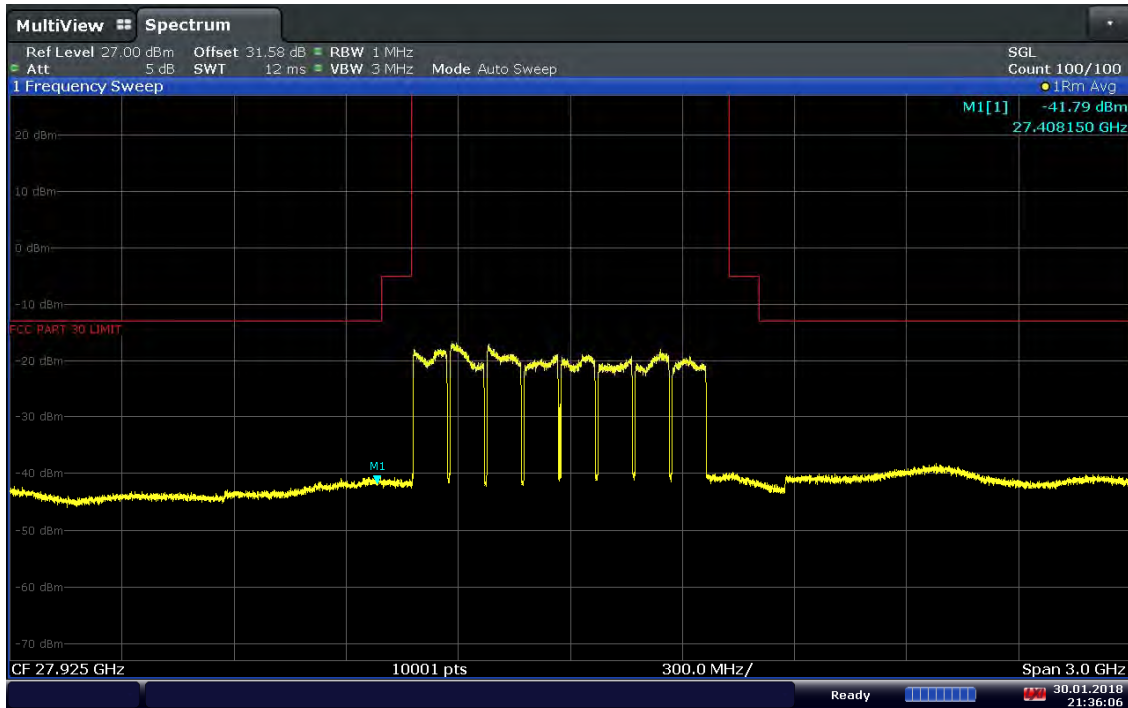
Plot 7-248. Band Edge Plot (1CC 16QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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20:25:30 02.02.2018

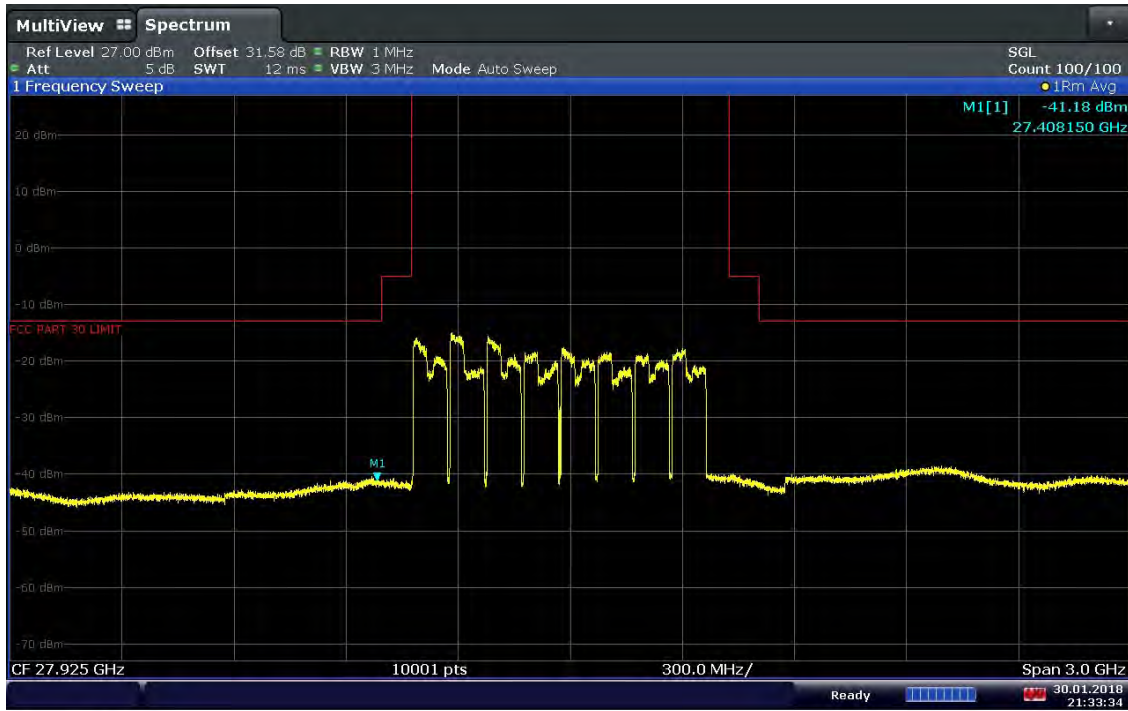
Plot 7-249. Band Edge Plot (1CC 64QAM Low Channel)



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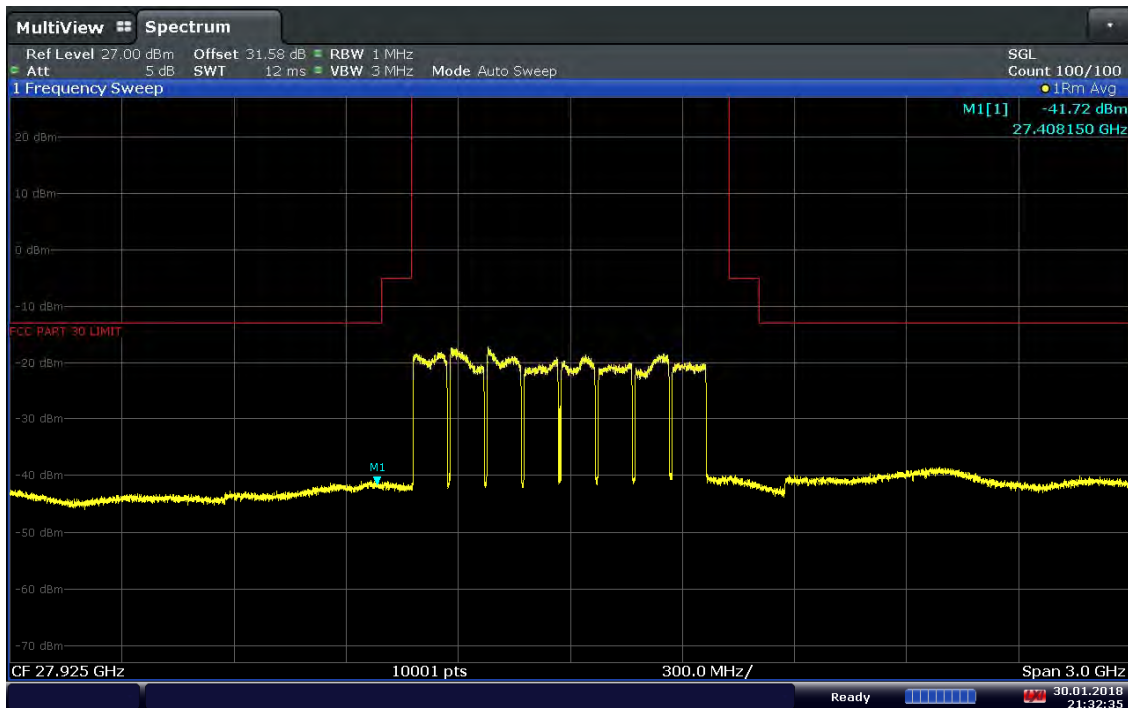
Plot 7-250. Band Edge Plot (8CC QPSK Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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21:33:34 30.01.2018

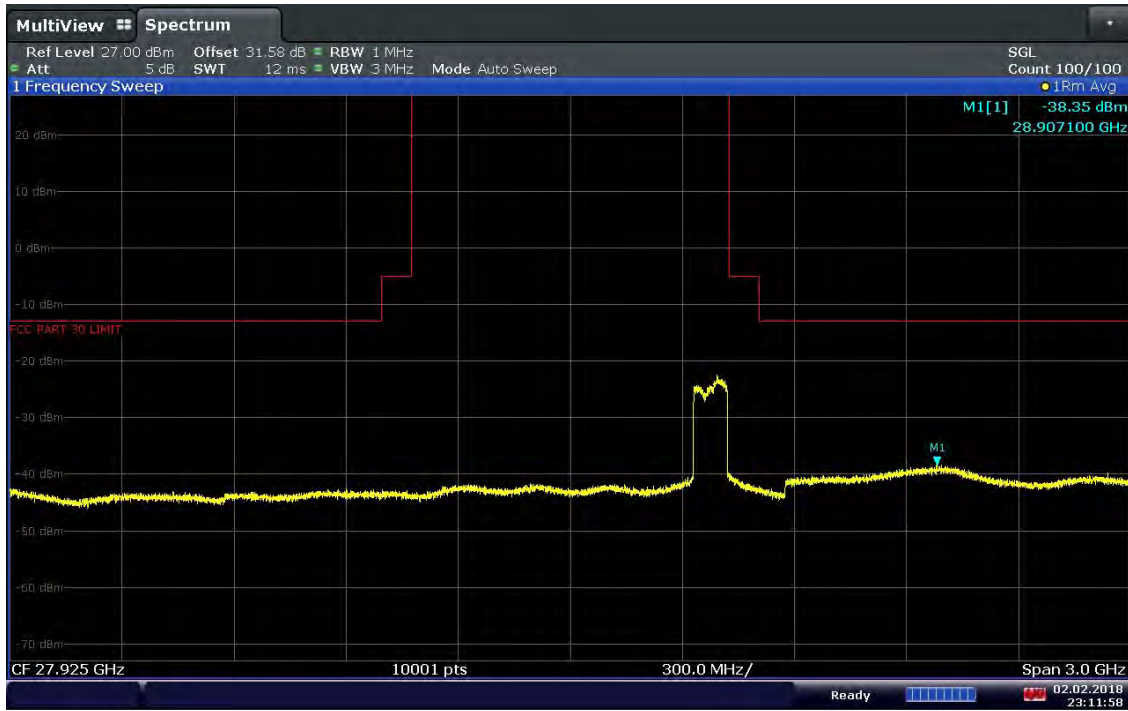
Plot 7-251. Band Edge Plot (8CC 16QAM Low Channel)



21:32:36 30.01.2018

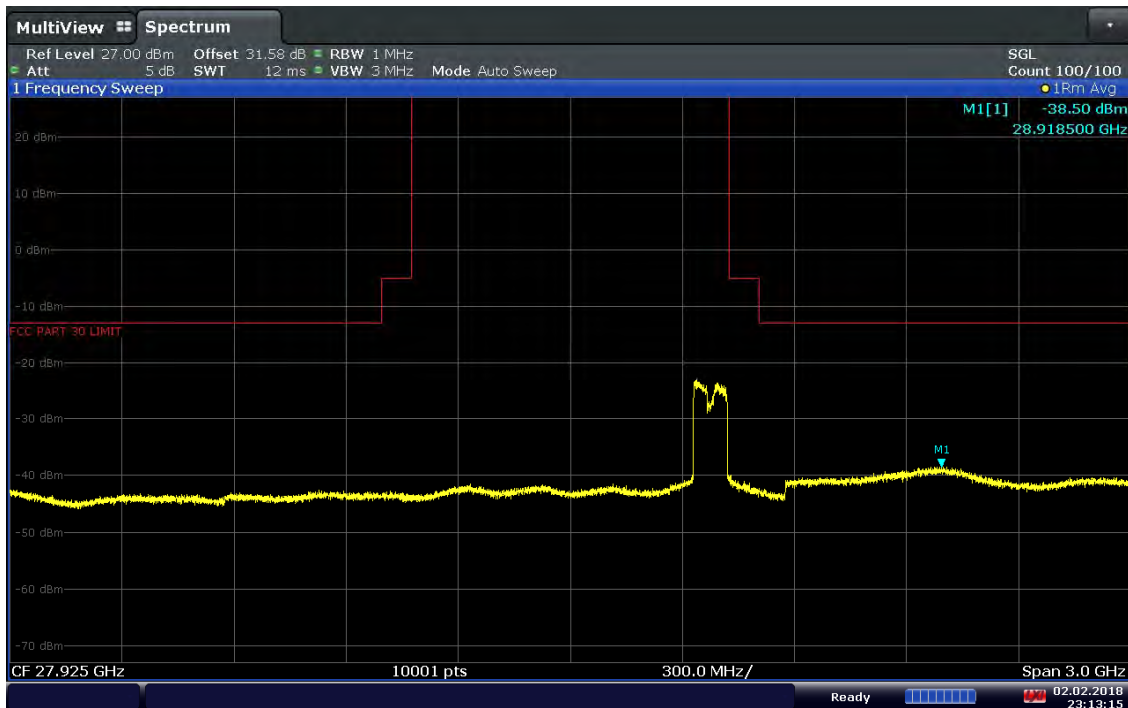
Plot 7-252. Band Edge Plot (8CC 64QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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23:11:58 02.02.2018

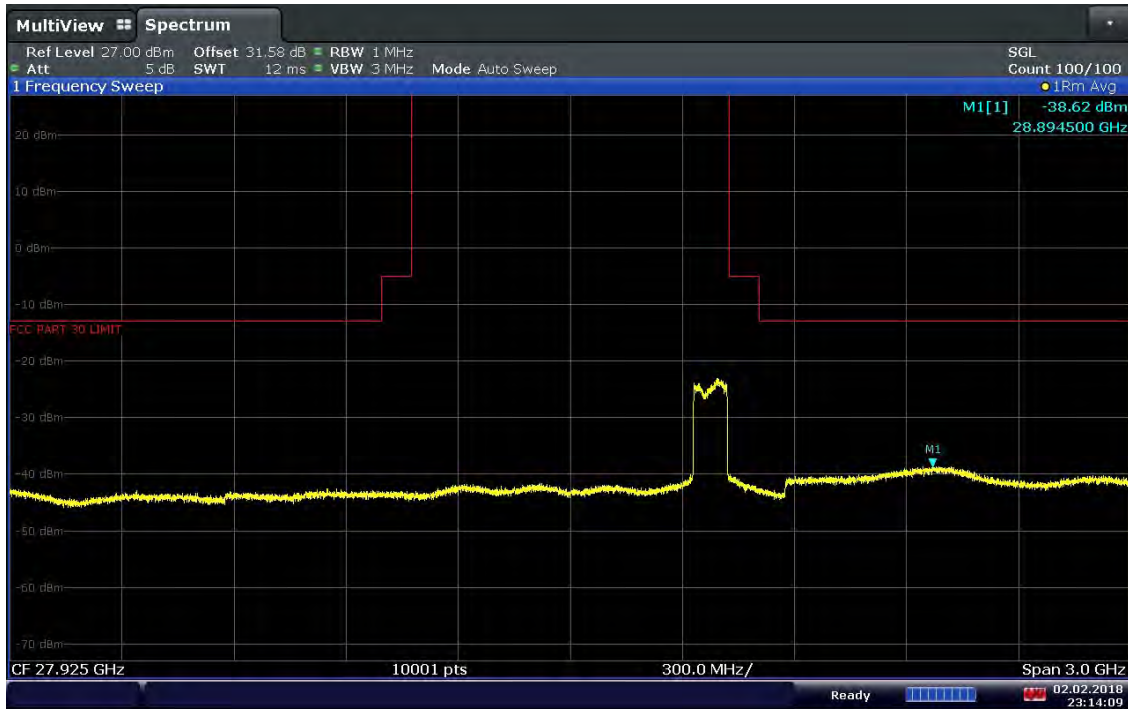
Plot 7-253. Band Edge Plot (1CC QPSK High Channel)



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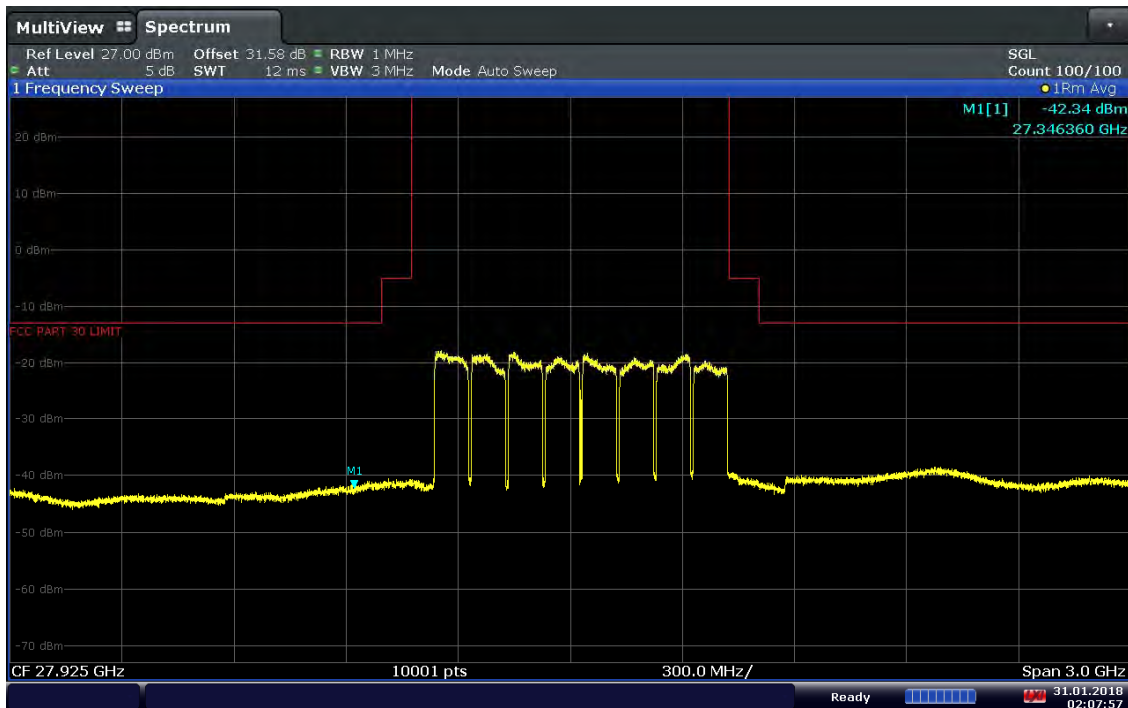
Plot 7-254. Band Edge Plot (1CC 16QAM High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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23:14:09 02.02.2018

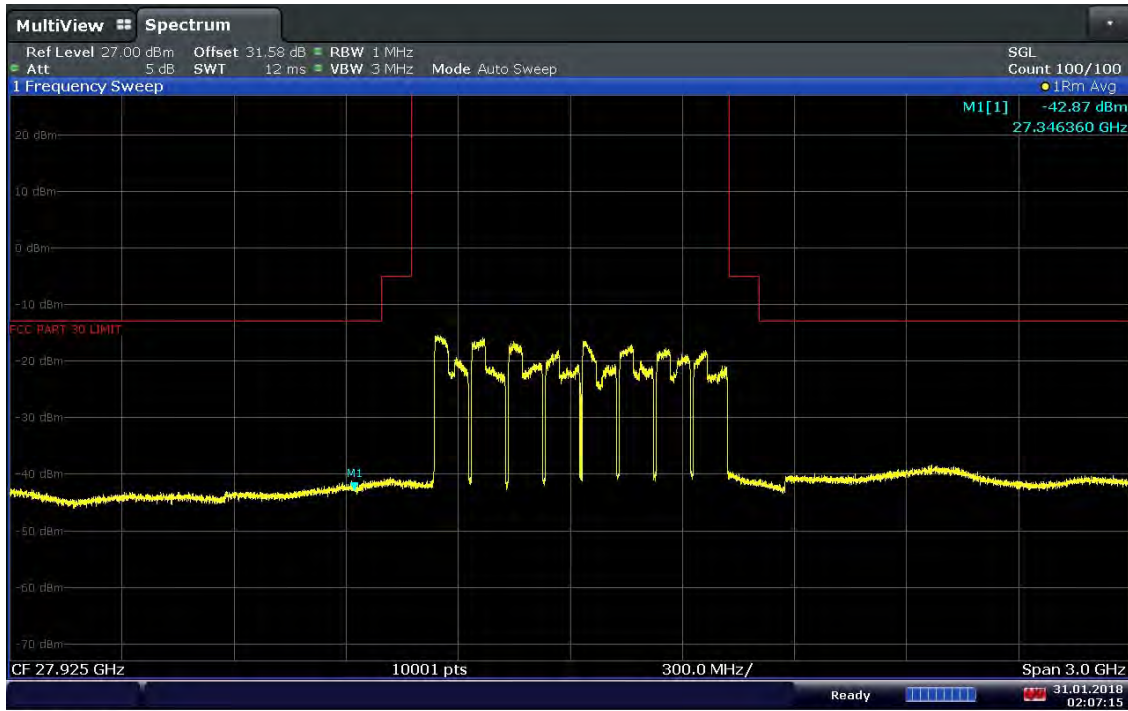
Plot 7-255. Band Edge Plot (1CC 64QAM High Channel)



02:07:58 31.01.2018

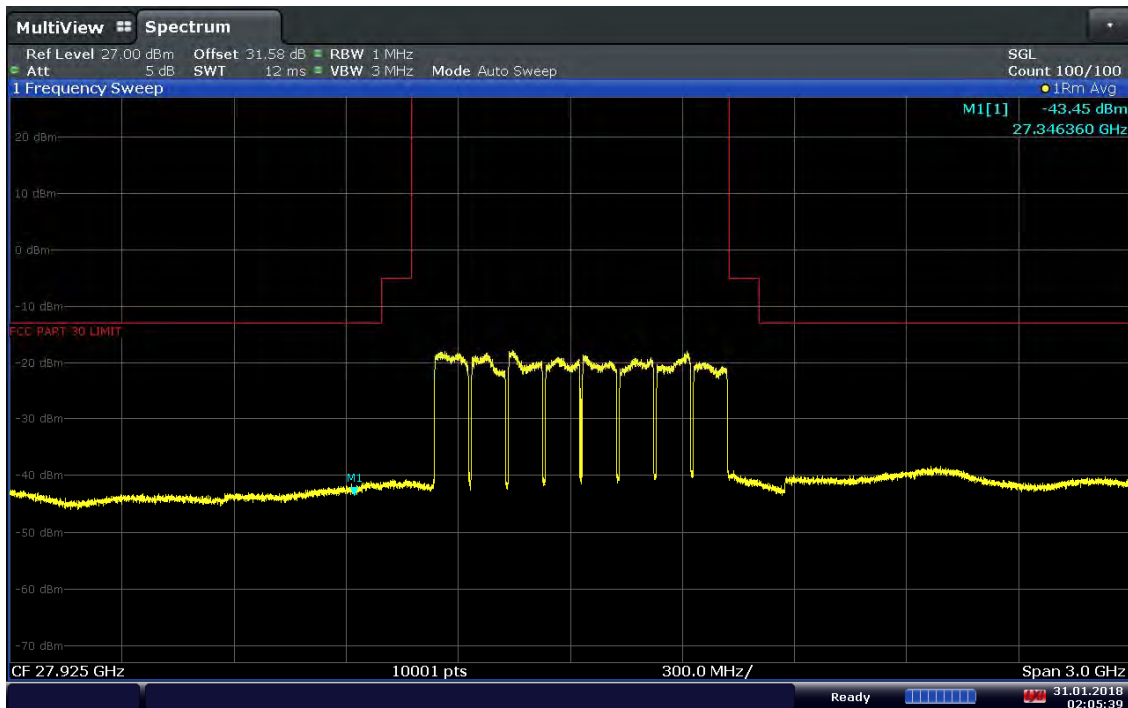
Plot 7-256. Band Edge Plot (8CC QPSK High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-257. Band Edge Plot (8CC 16QAM High Channel)

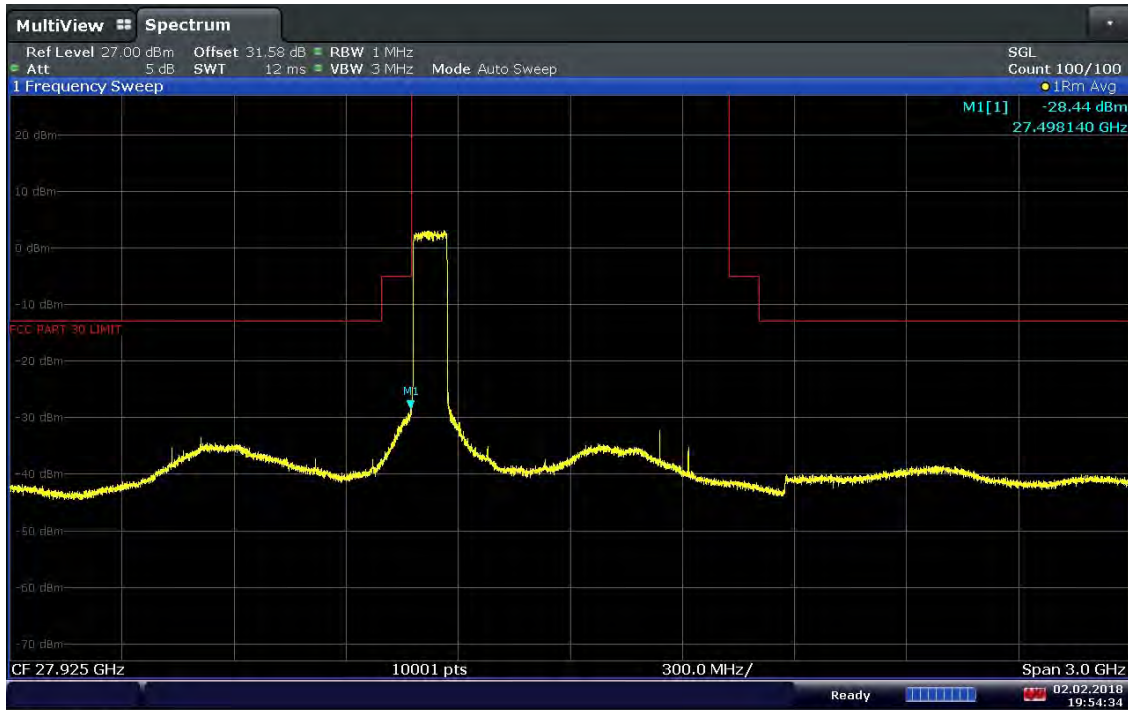


02:05:39 31.01.2018

Plot 7-258. Band Edge Plot (8CC 64QAM High Channel)

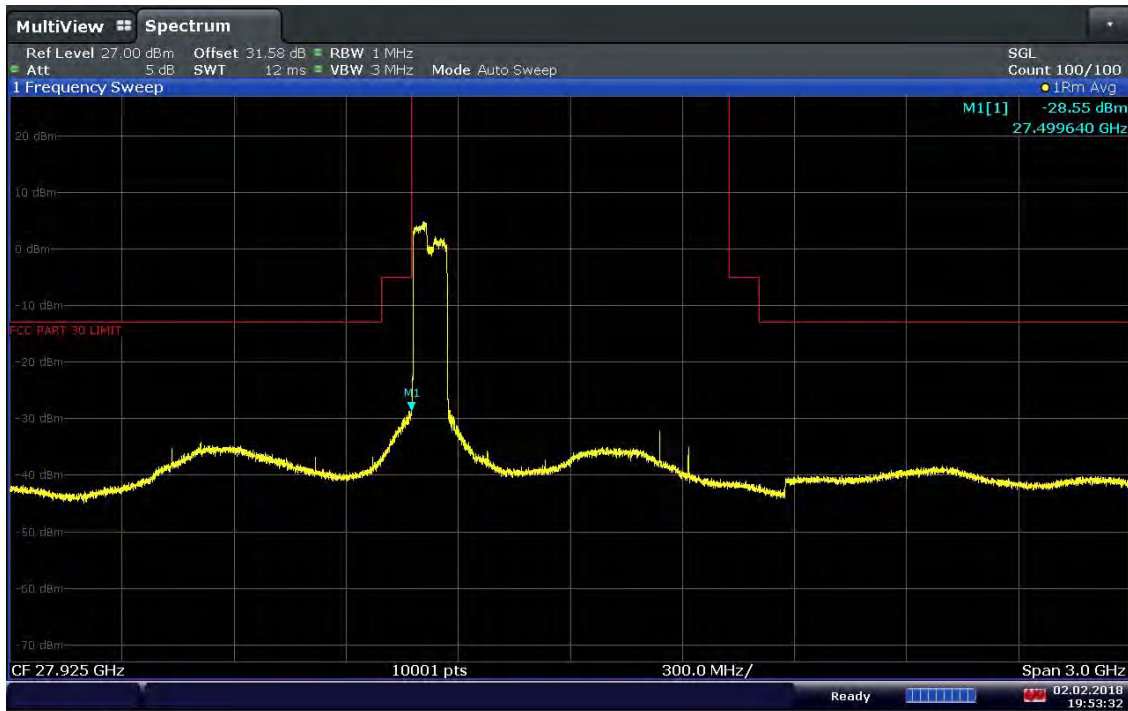
FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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7.6.3 Antenna C Conducted Band Edge Maximized on Antenna A



19:54:35 02.02.2018

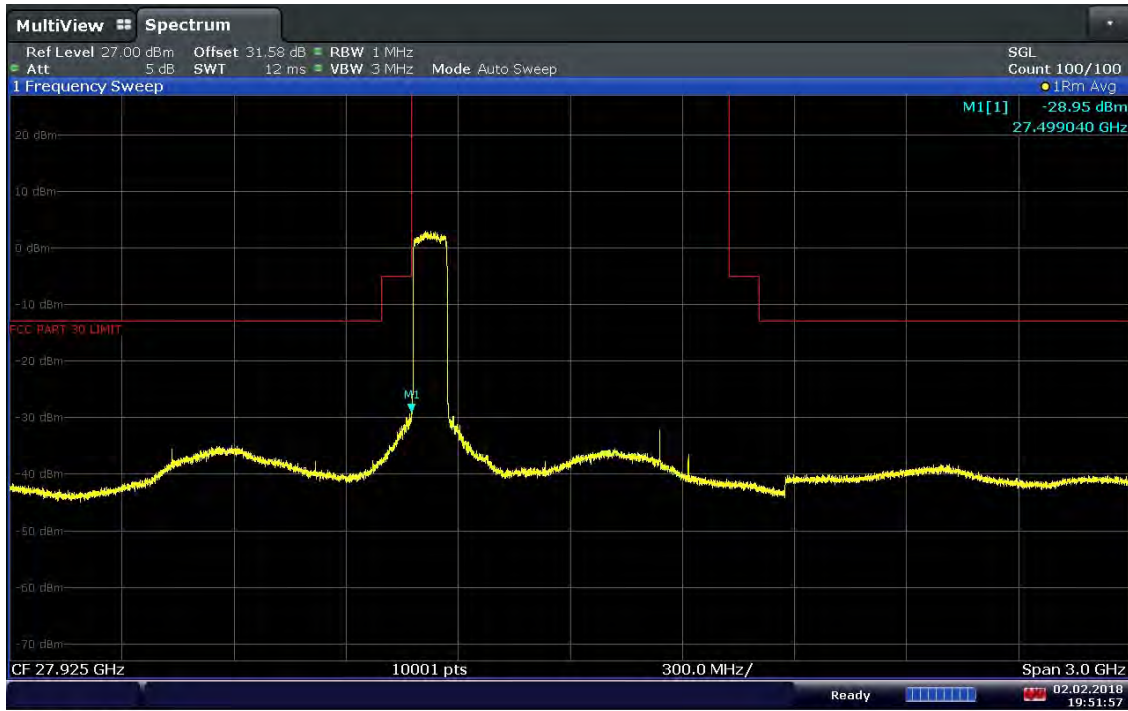
Plot 7-259. Band Edge Plot (1CC QPSK Low Channel)



19:53:32 02.02.2018

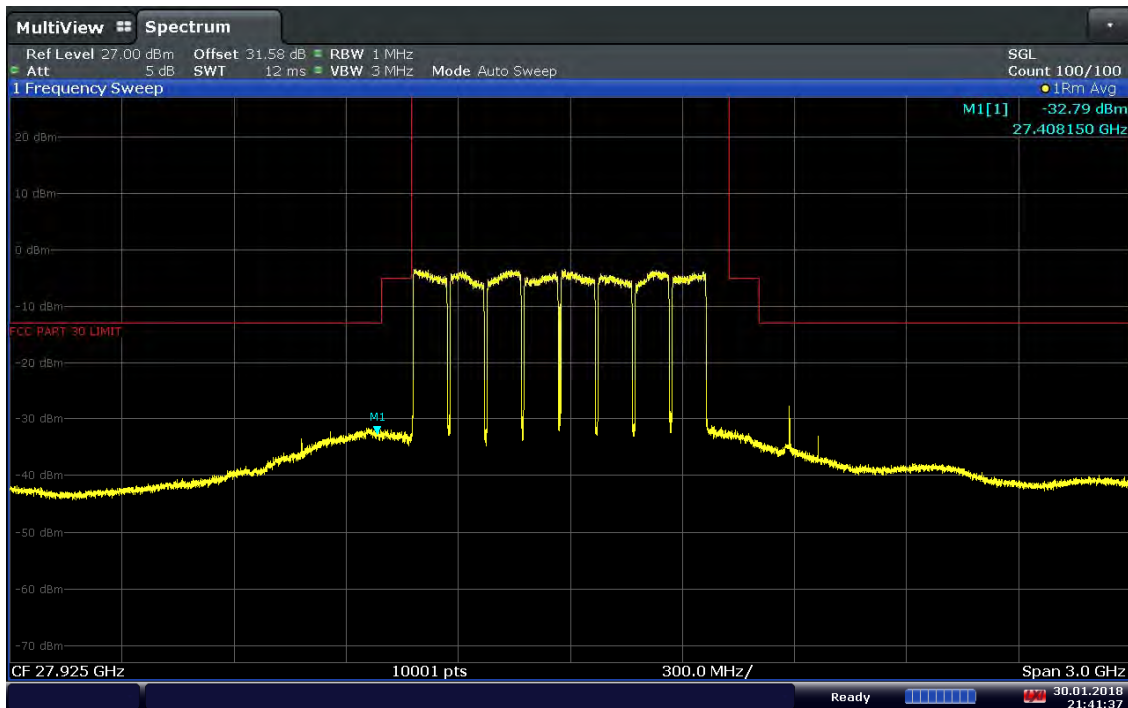
Plot 7-260. Band Edge Plot (1CC 16QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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19:51:58 02.02.2018

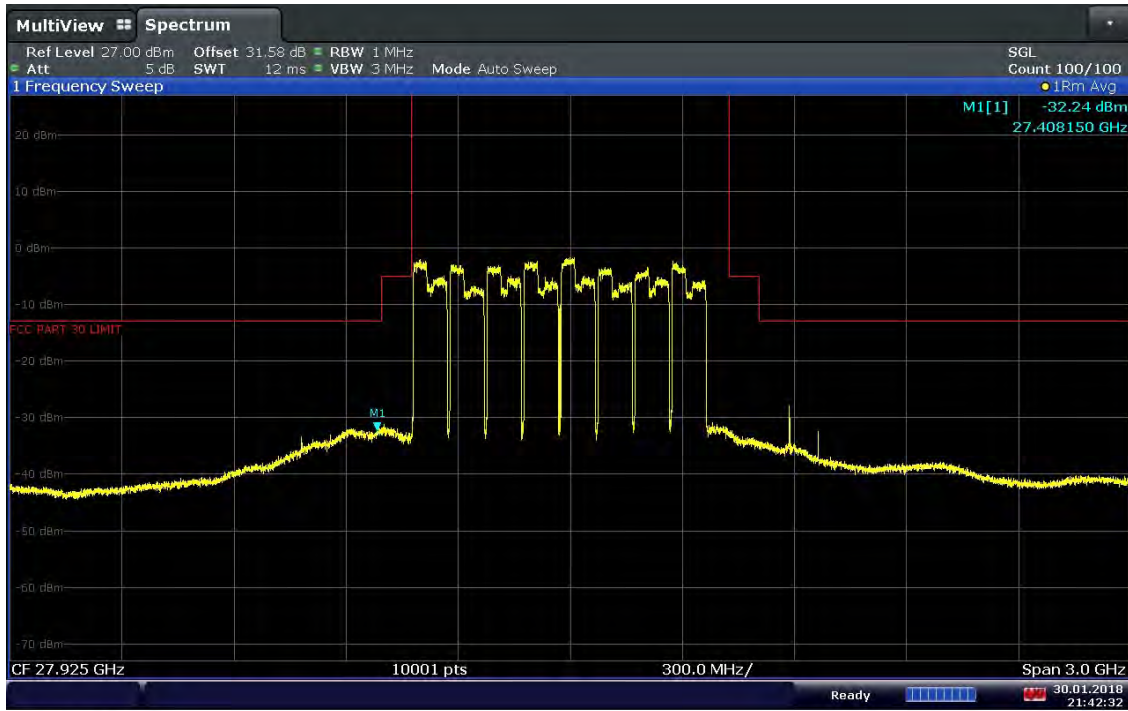
Plot 7-261. Band Edge Plot (1CC 64QAM Low Channel)



21:41:38 30.01.2018

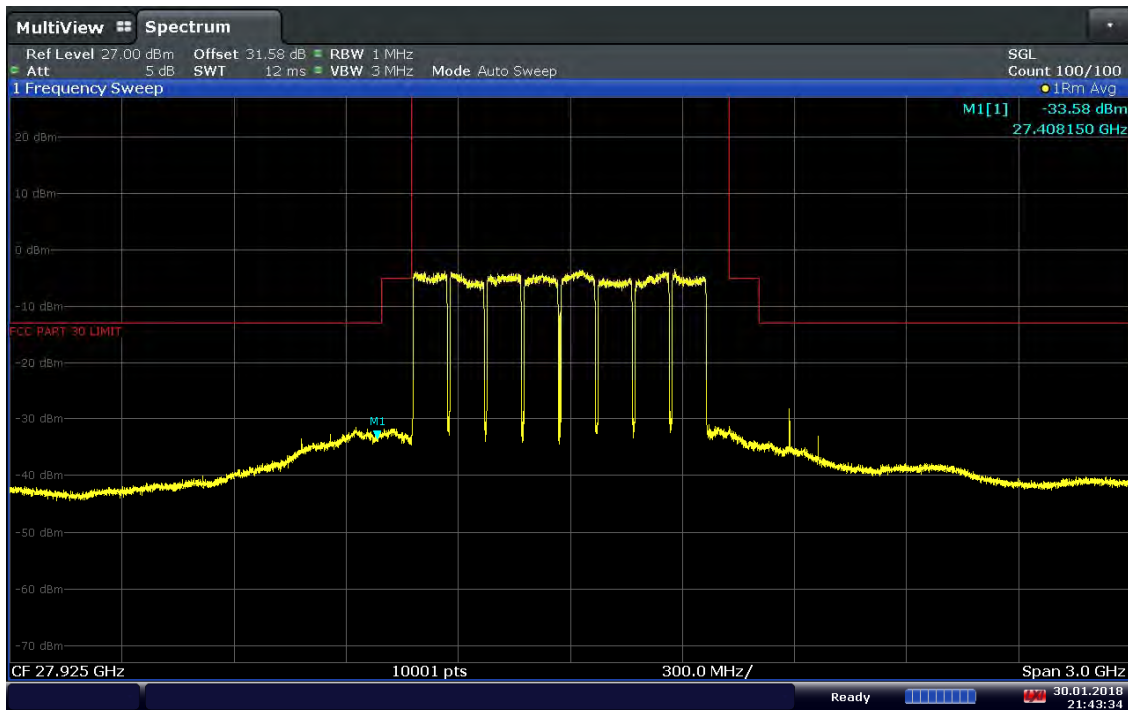
Plot 7-262. Band Edge Plot (8CC QPSK Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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21:42:32 30.01.2018

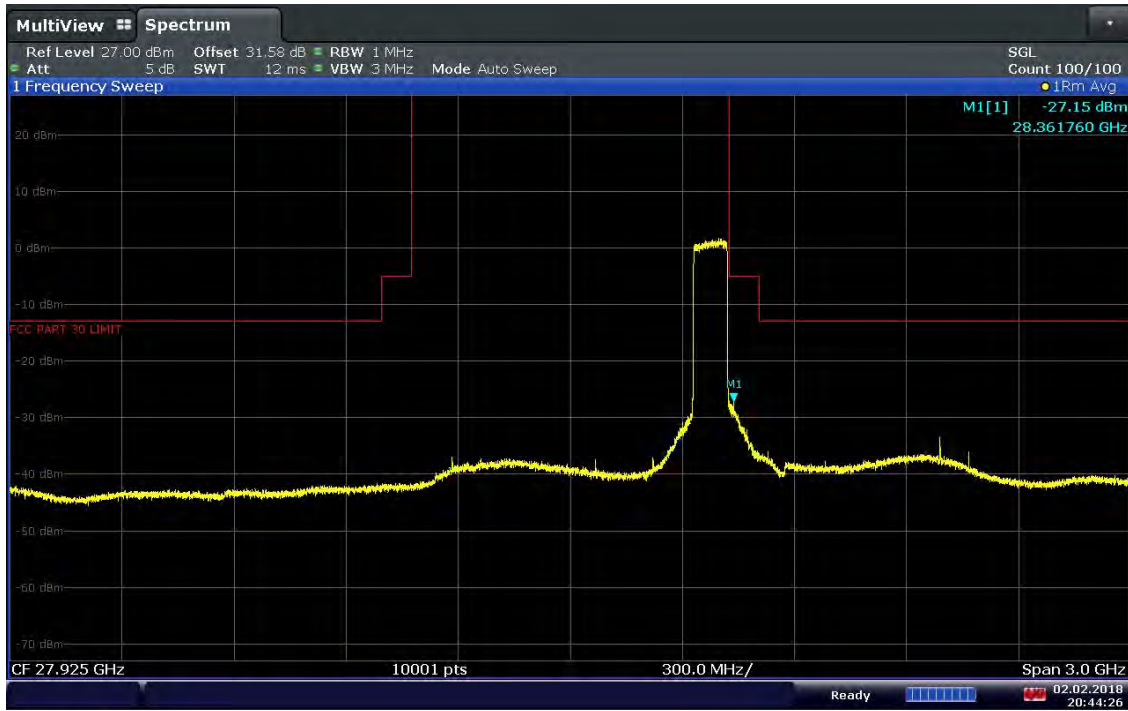
Plot 7-263. Band Edge Plot (8CC 16QAM Low Channel)



21:43:34 30.01.2018

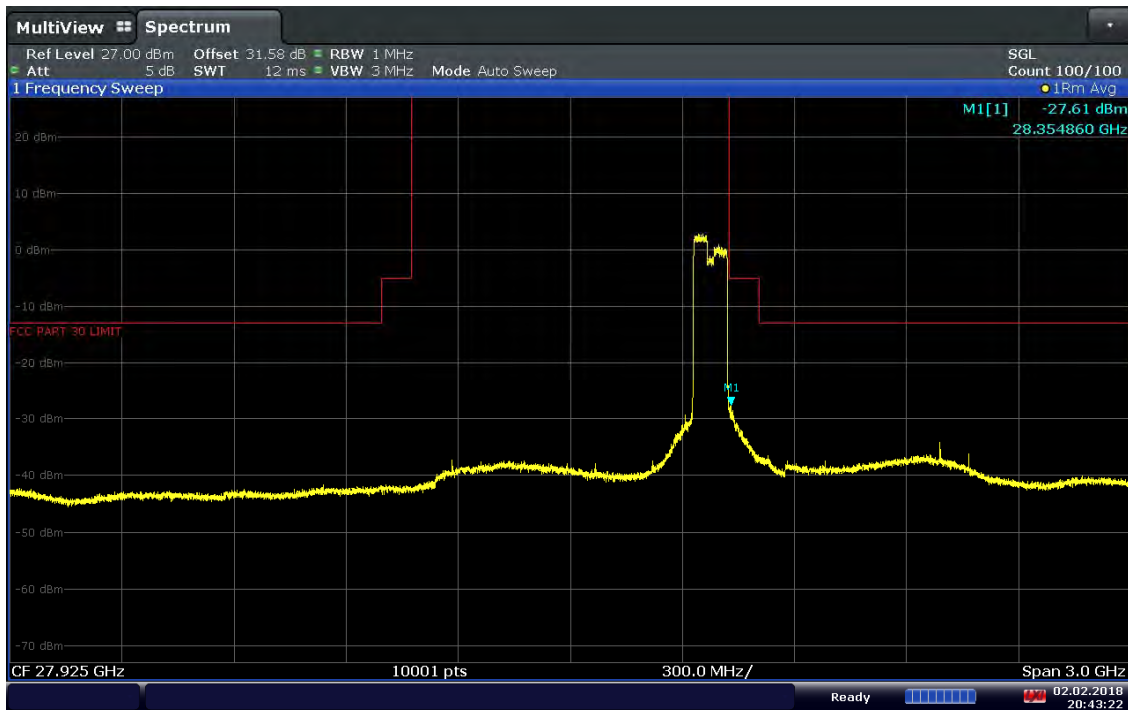
Plot 7-264. Band Edge Plot (8CC 64QAM Low Channel)

FCC ID: A3LSFG-AA100DC	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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20:44:27 02.02.2018

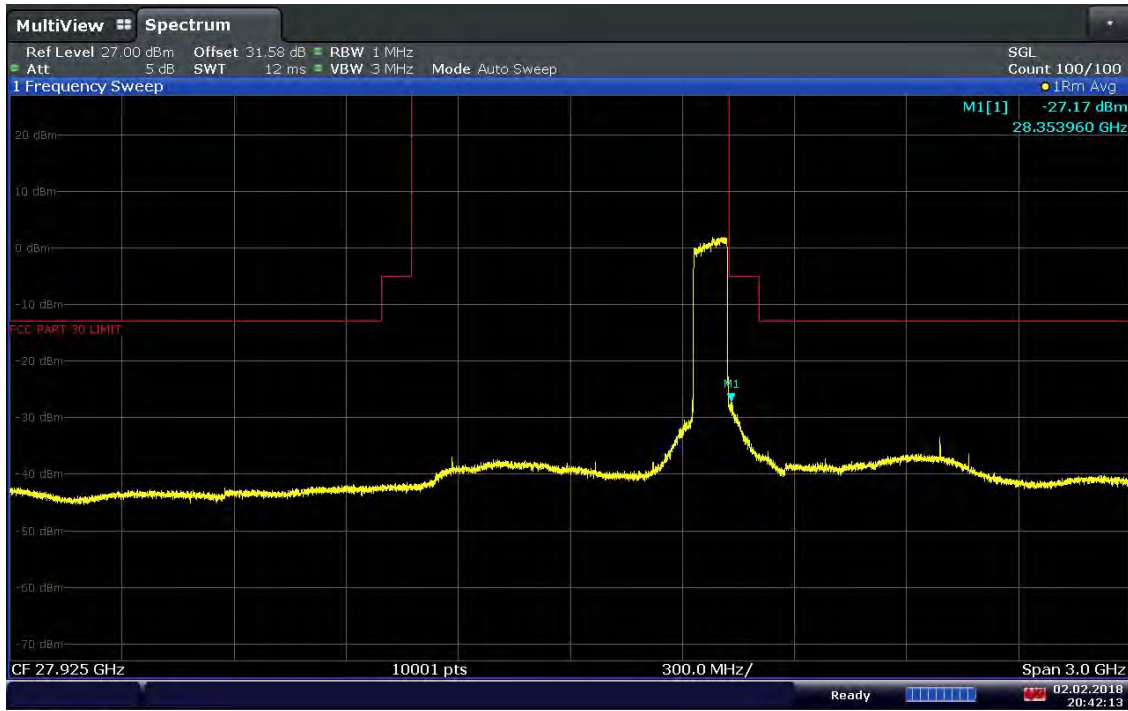
Plot 7-265. Band Edge Plot (1CC QPSK High Channel)



20:43:22 02.02.2018

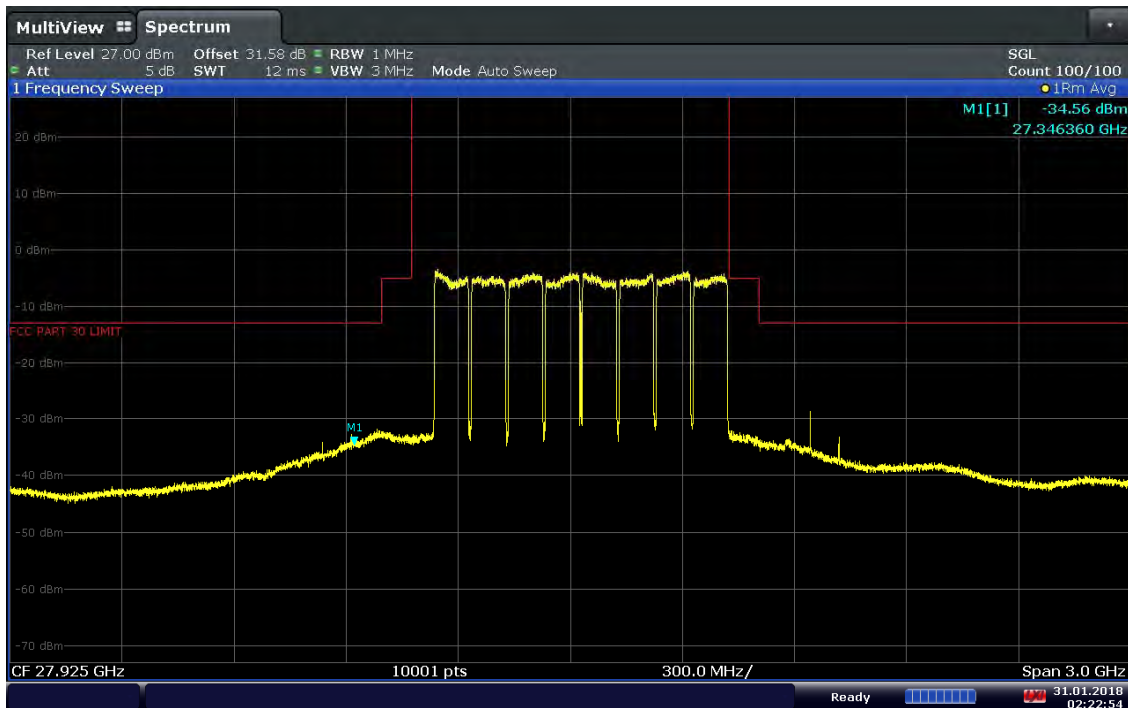
Plot 7-266. Band Edge Plot (1CC 16QAM High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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20:42:13 02.02.2018

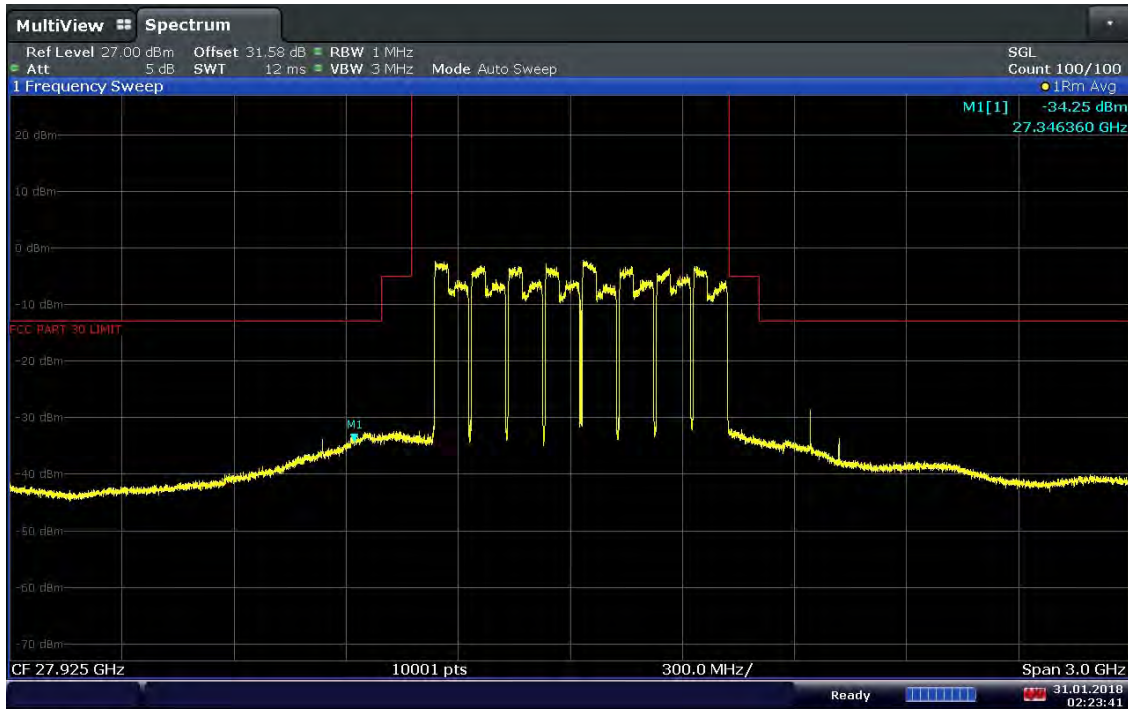
Plot 7-267. Band Edge Plot (1CC 64QAM High Channel)



02:22:54 31.01.2018

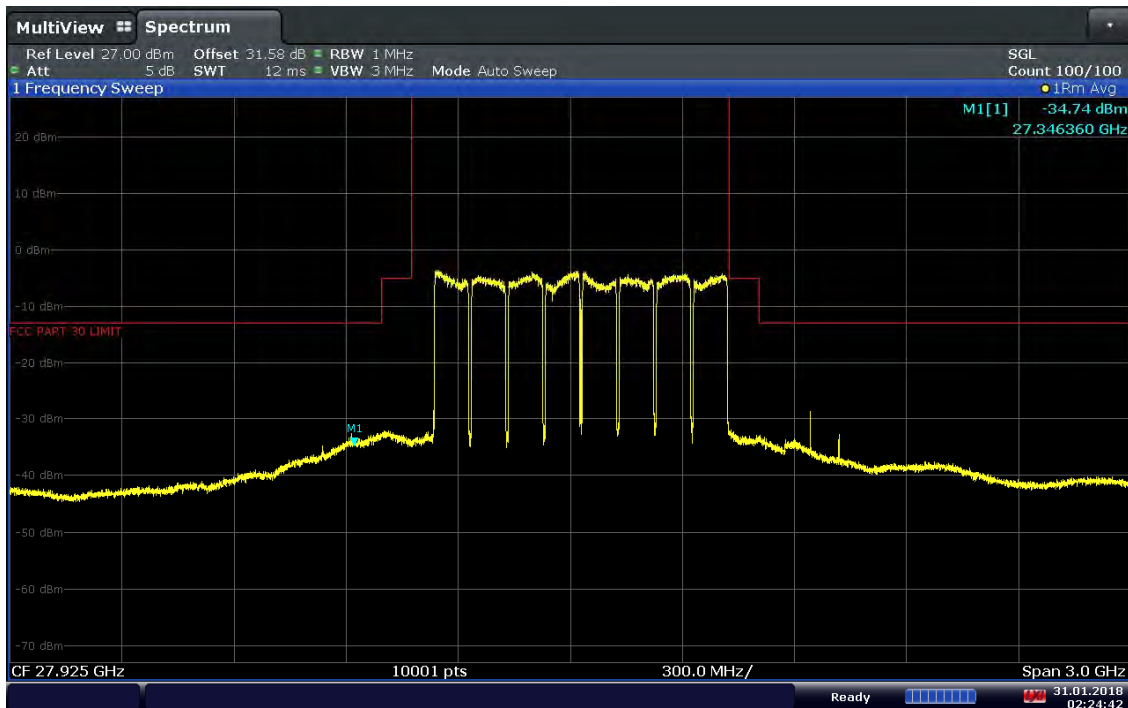
Plot 7-268. Band Edge Plot (8CC QPSK High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-269. Band Edge Plot (8CC 16QAM High Channel)

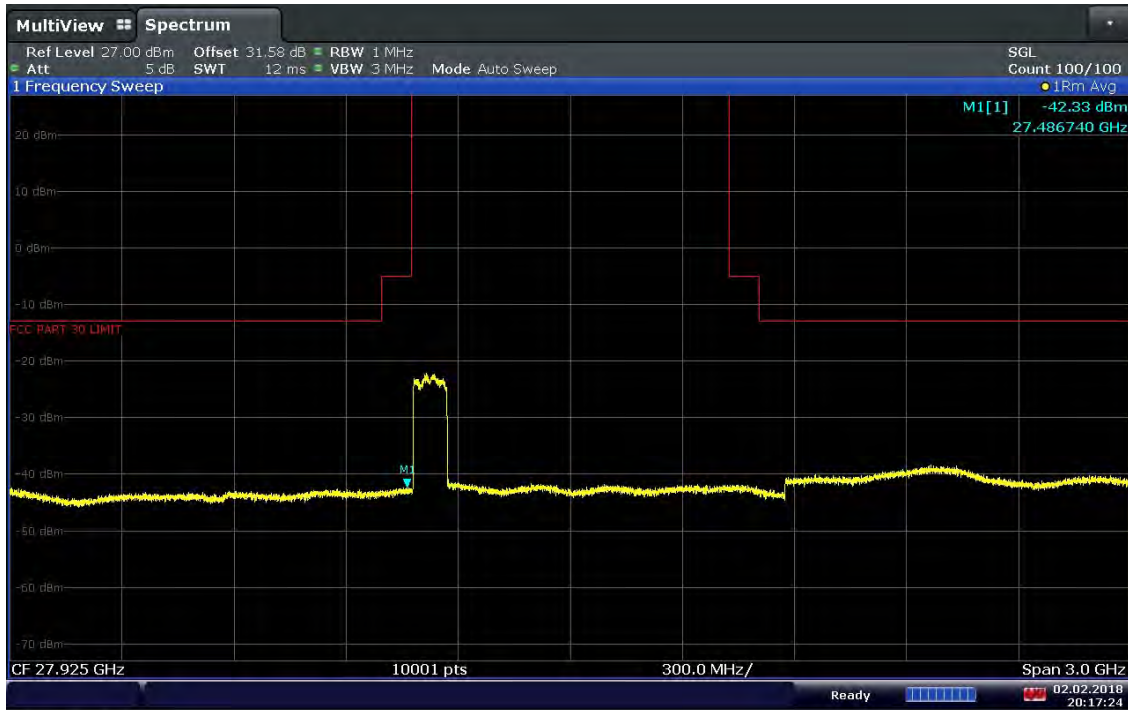


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Plot 7-270. Band Edge Plot (8CC 64QAM High Channel)

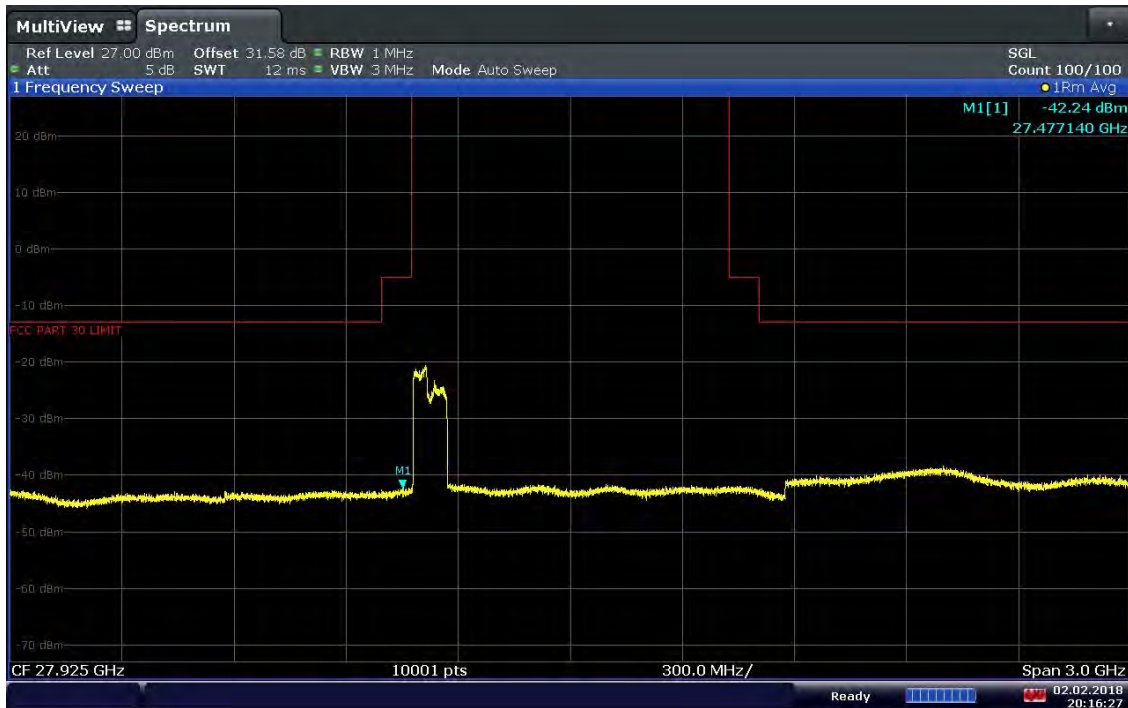
FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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7.6.4 Antenna D Conducted Band Edge Maximized on Antenna A



20:17:24 02.02.2018

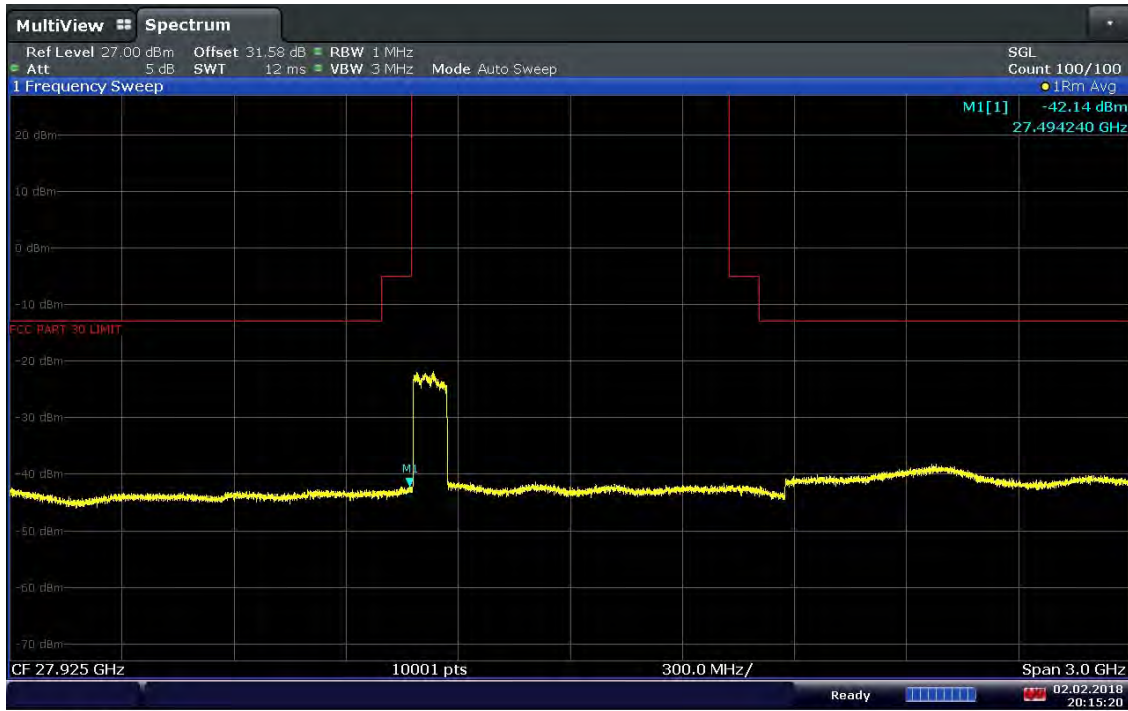
Plot 7-271. Band Edge Plot (1CC QPSK Low Channel)



20:16:28 02.02.2018

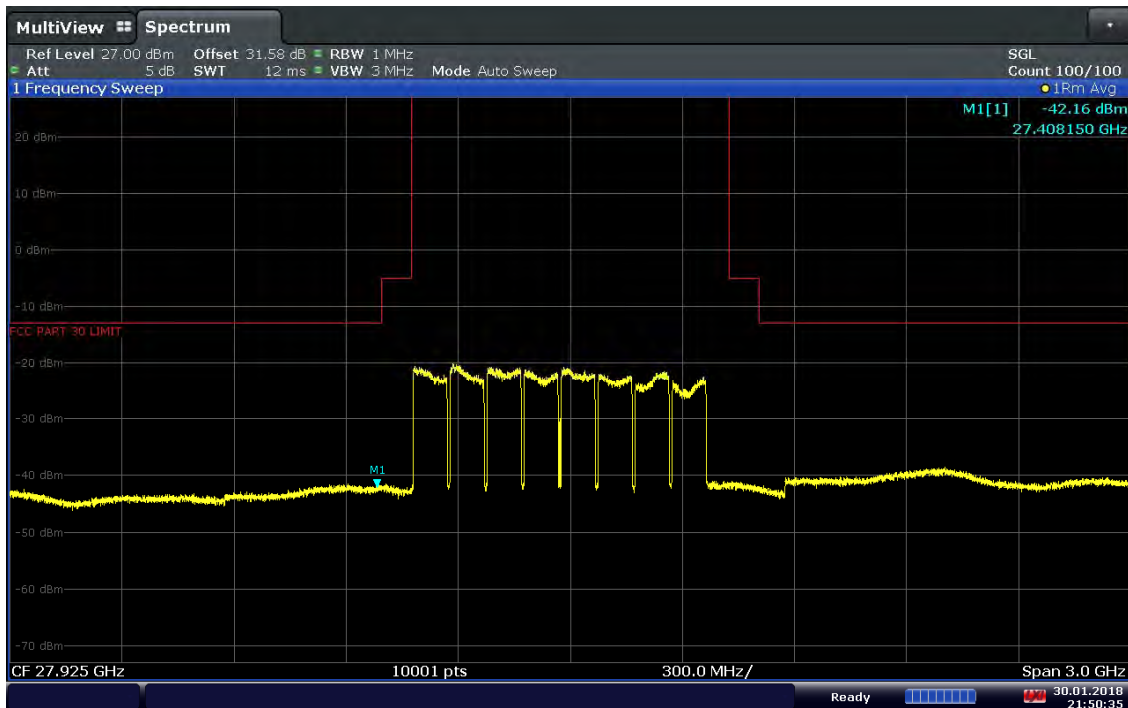
Plot 7-272. Band Edge Plot (1CC 16QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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20:15:20 02.02.2018

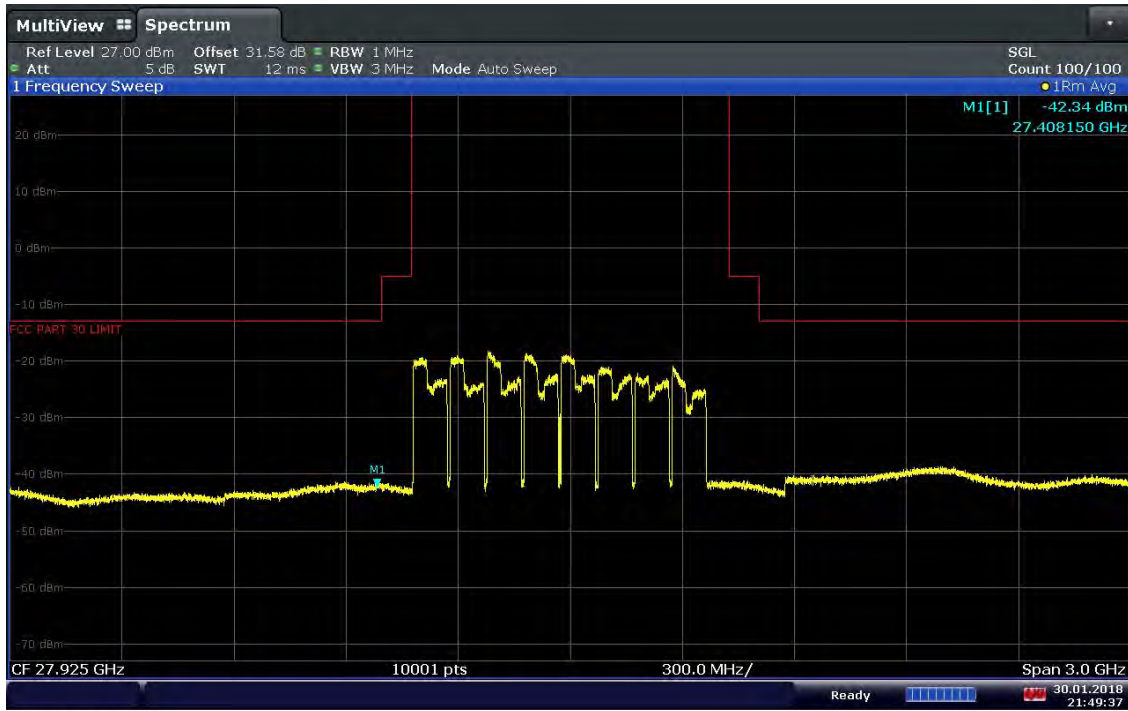
Plot 7-273. Band Edge Plot (1CC 64QAM Low Channel)



21:50:36 30.01.2018

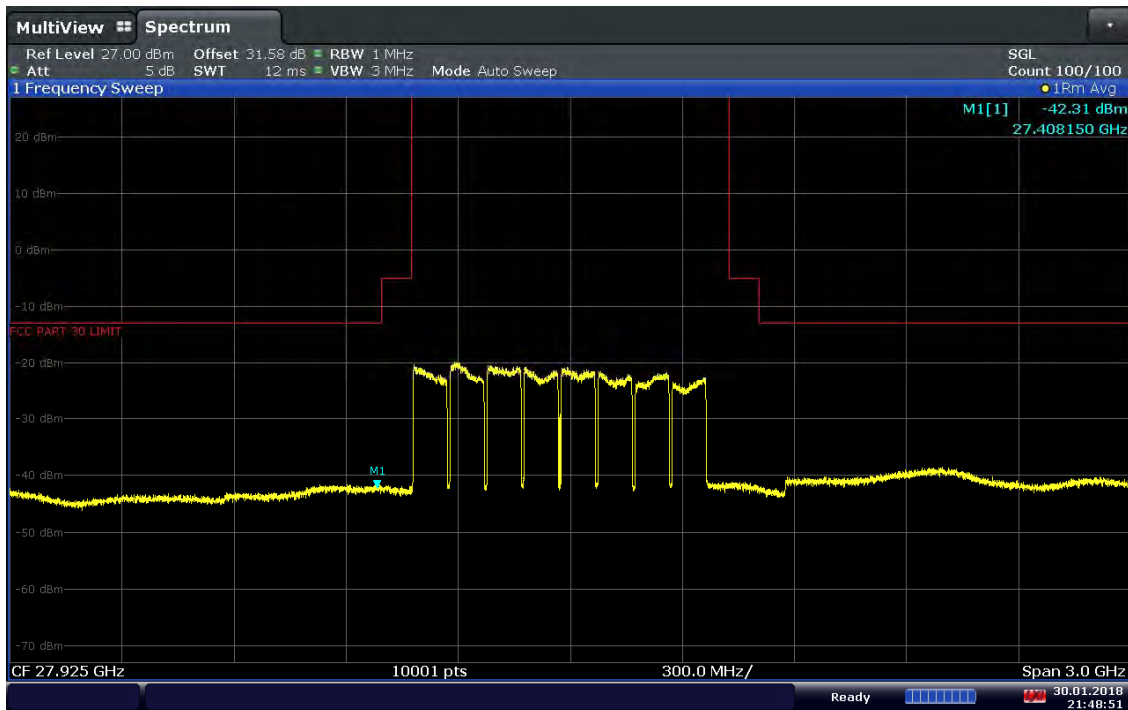
Plot 7-274. Band Edge Plot (8CC QPSK Low Channel)

FCC ID: A3LSFG-AA100DC	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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21:49:37 30.01.2018

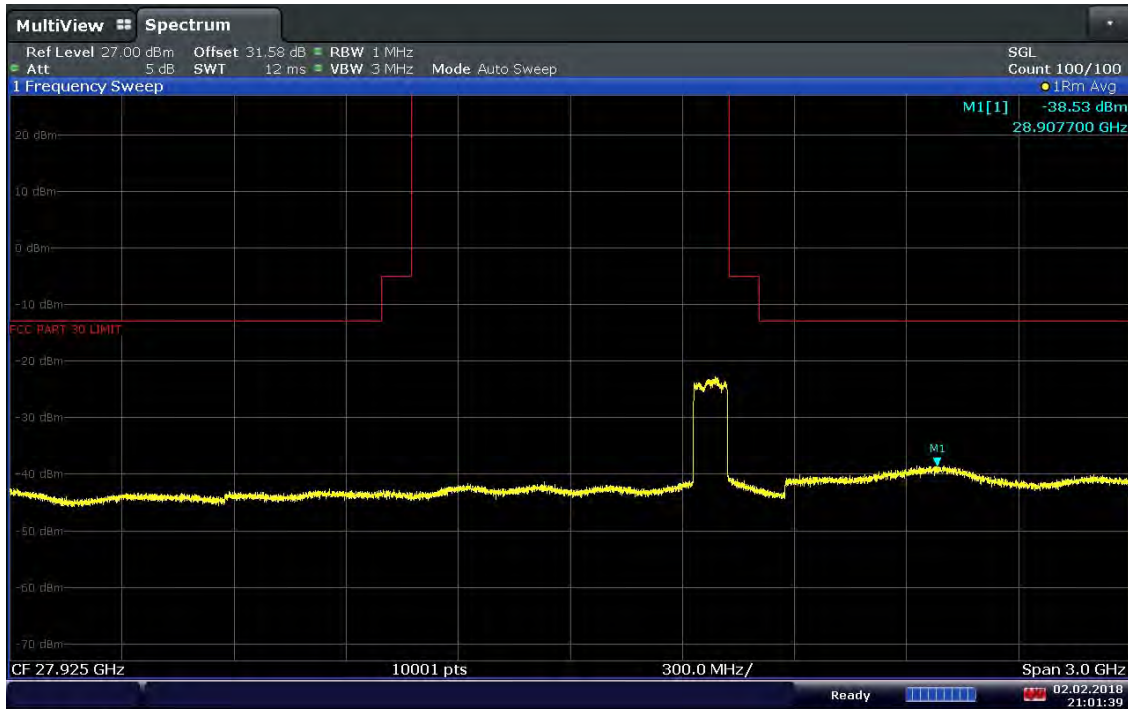
Plot 7-275. Band Edge Plot (8CC 16QAM Low Channel)



21:48:51 30.01.2018

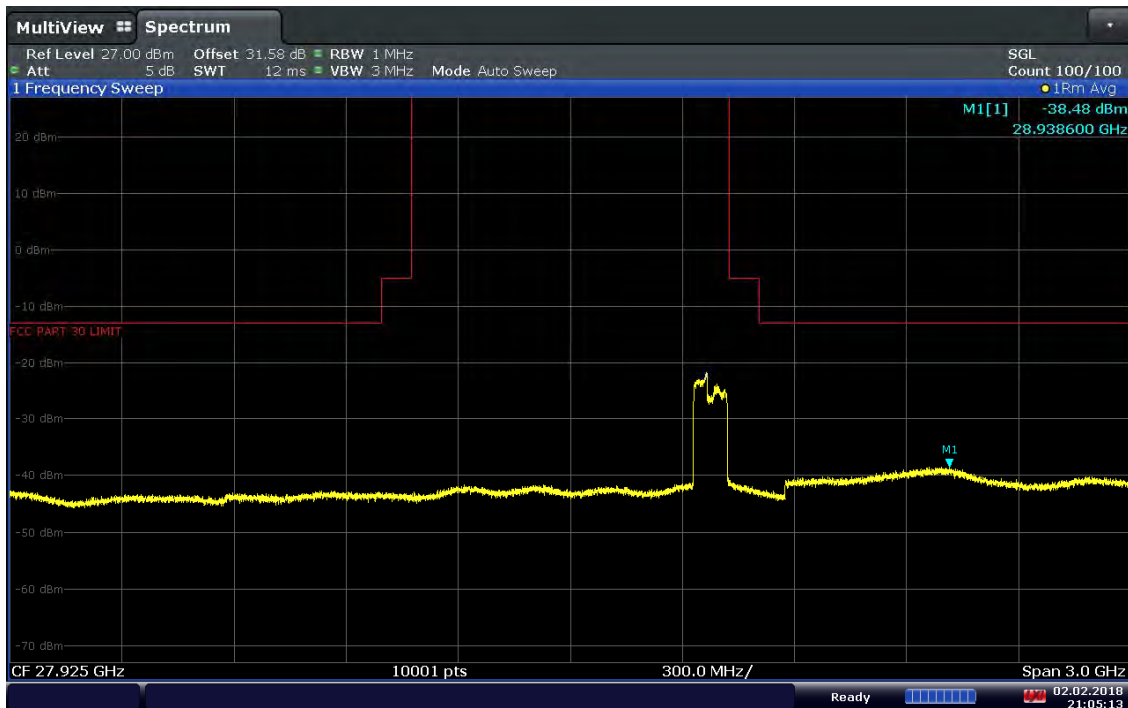
Plot 7-276. Band Edge Plot (8CC 64QAM Low Channel)

FCC ID: A3LSFG-AA100DC	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 176 of 222



21:01:39 02.02.2018

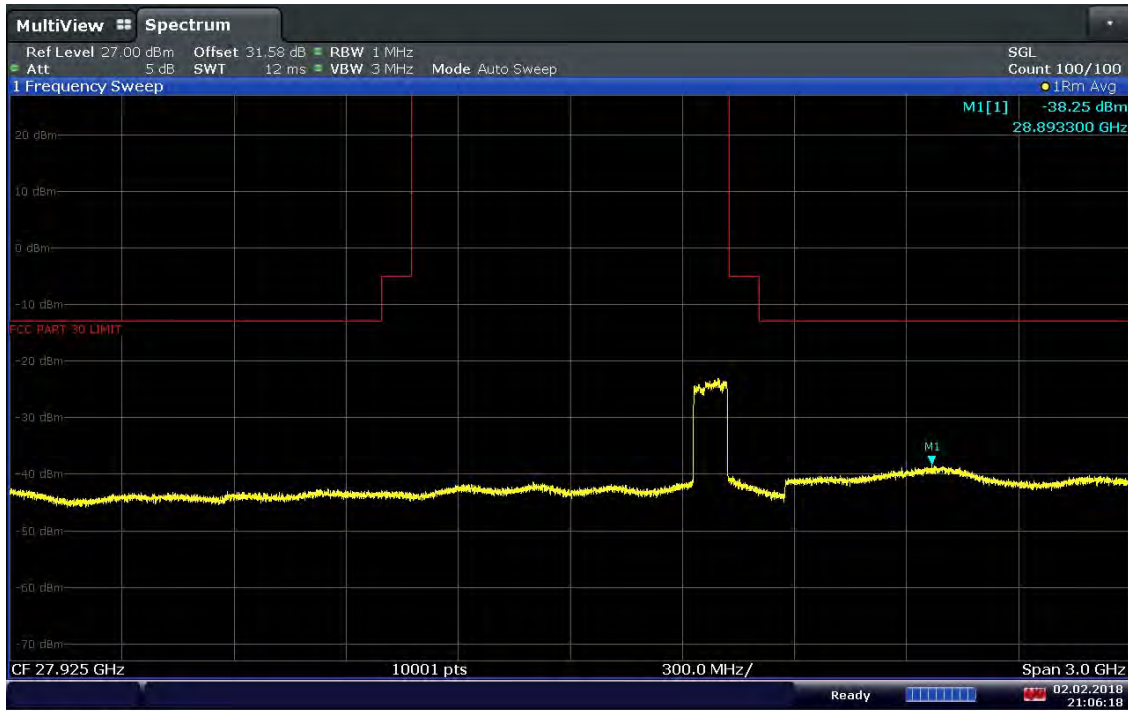
Plot 7-277. Band Edge Plot (1CC QPSK High Channel)



21:05:13 02.02.2018

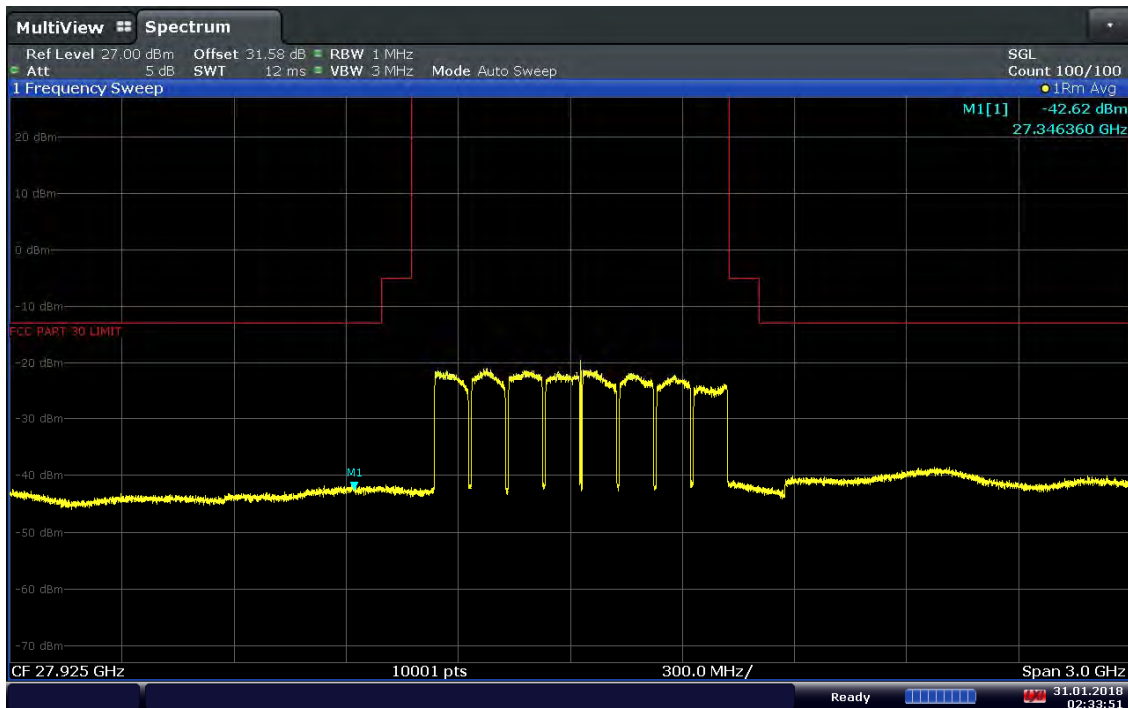
Plot 7-278. Band Edge Plot (1CC 16QAM High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 177 of 222



21:06:18 02.02.2018

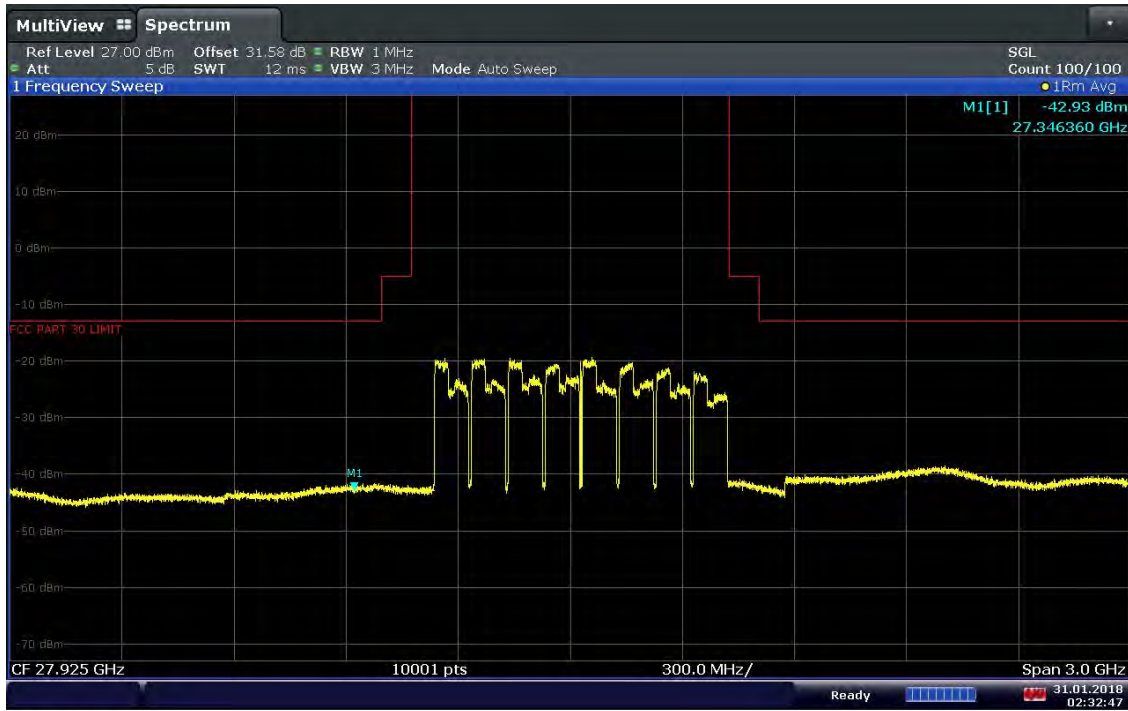
Plot 7-279. Band Edge Plot (1CC 64QAM High Channel)



02:33:52 31.01.2018

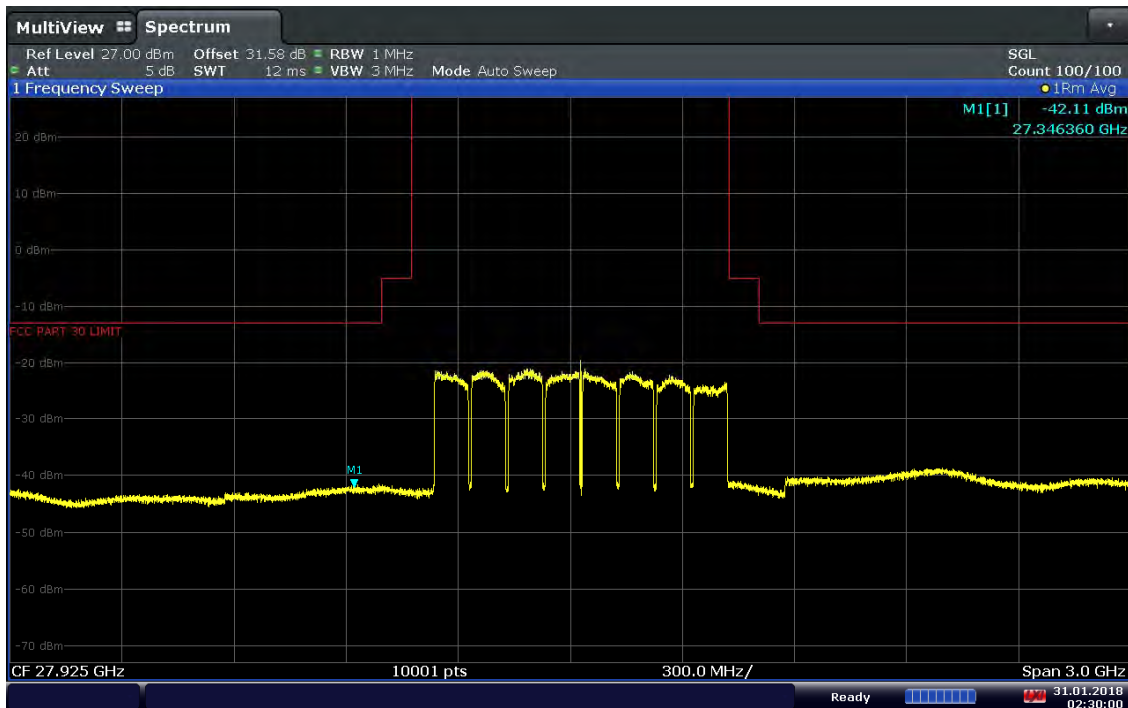
Plot 7-280. Band Edge Plot (8CC QPSK High Channel)

FCC ID: A3LSFG-AA100DC	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 178 of 222



02:32:48 31.01.2018

Plot 7-281. Band Edge Plot (8CC 16QAM High Channel)

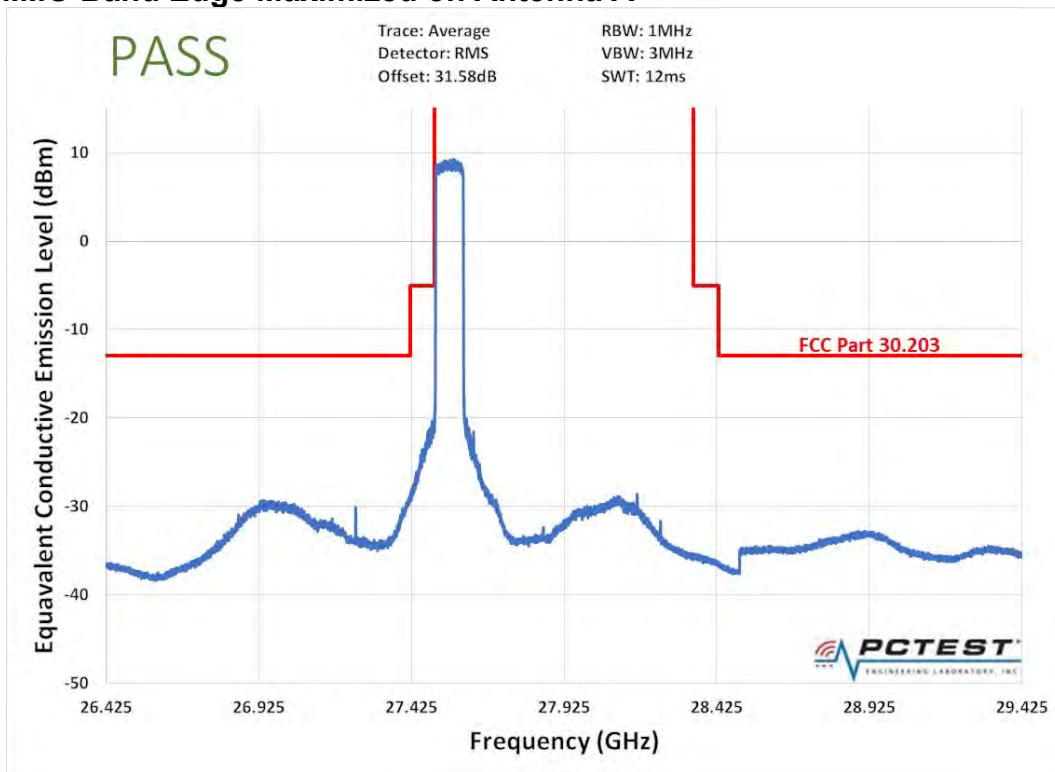


02:30:01 31.01.2018

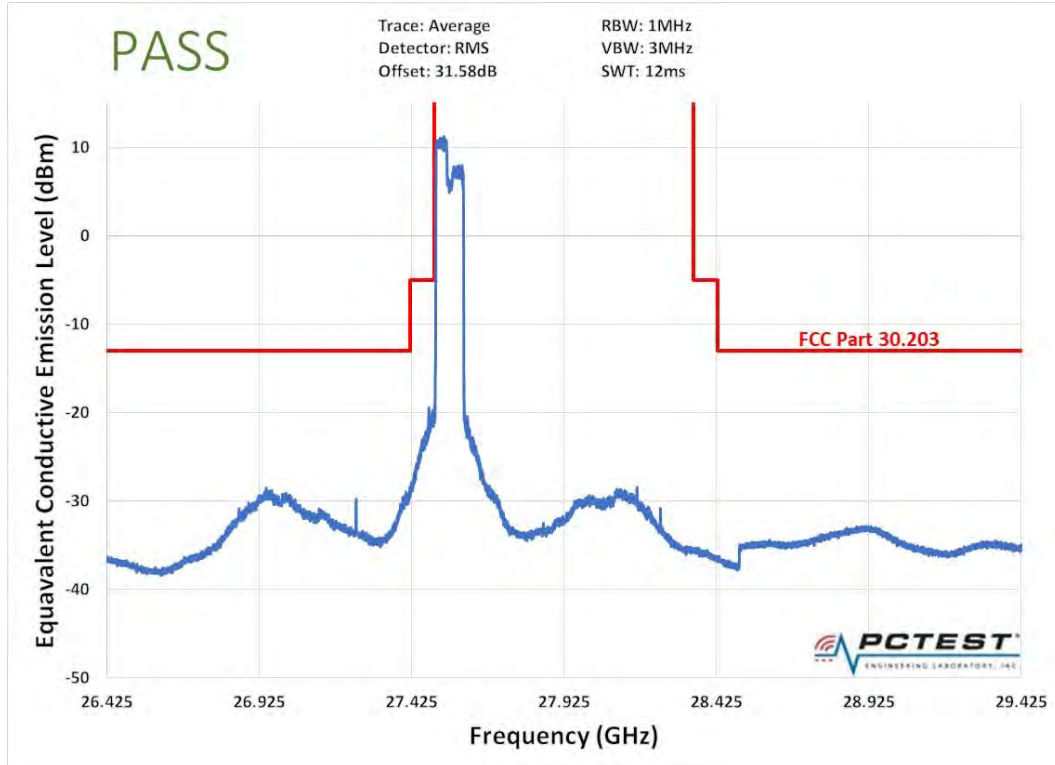
Plot 7-282. Band Edge Plot (8CC 64QAM High Channel)

FCC ID: A3LSFG-AA100DC	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 179 of 222

7.6.5 MIMO Band Edge Maximized on Antenna A

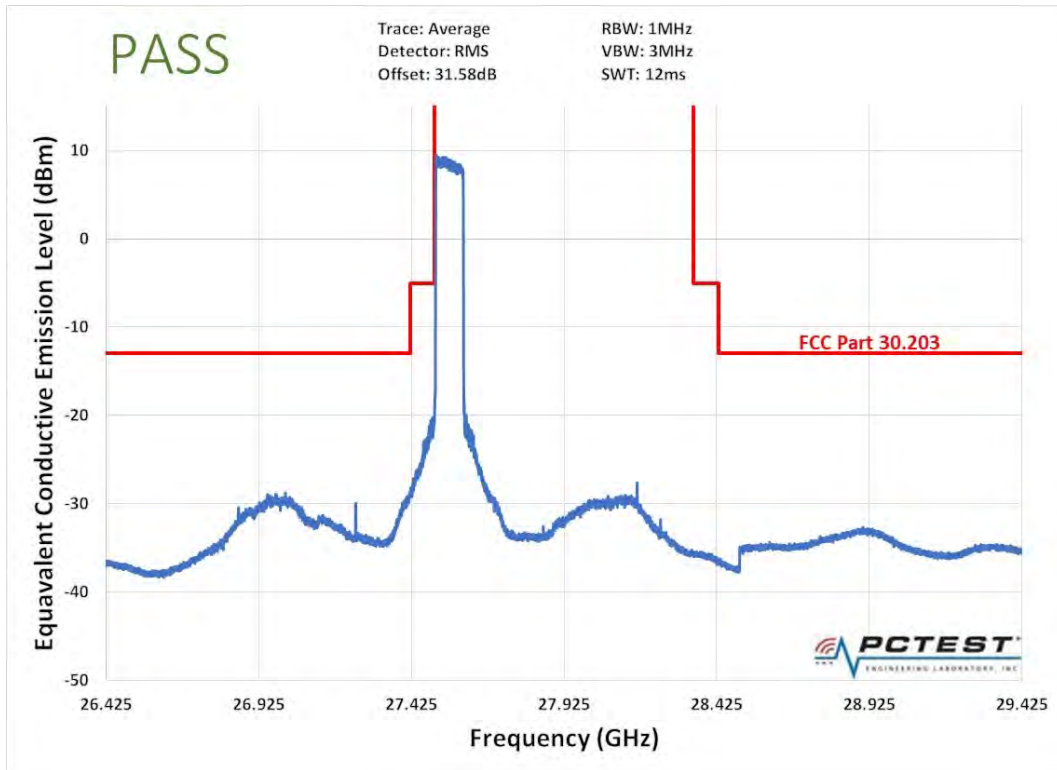


Plot 7-283. Band Edge Plot (1CC QPSK Low Channel)

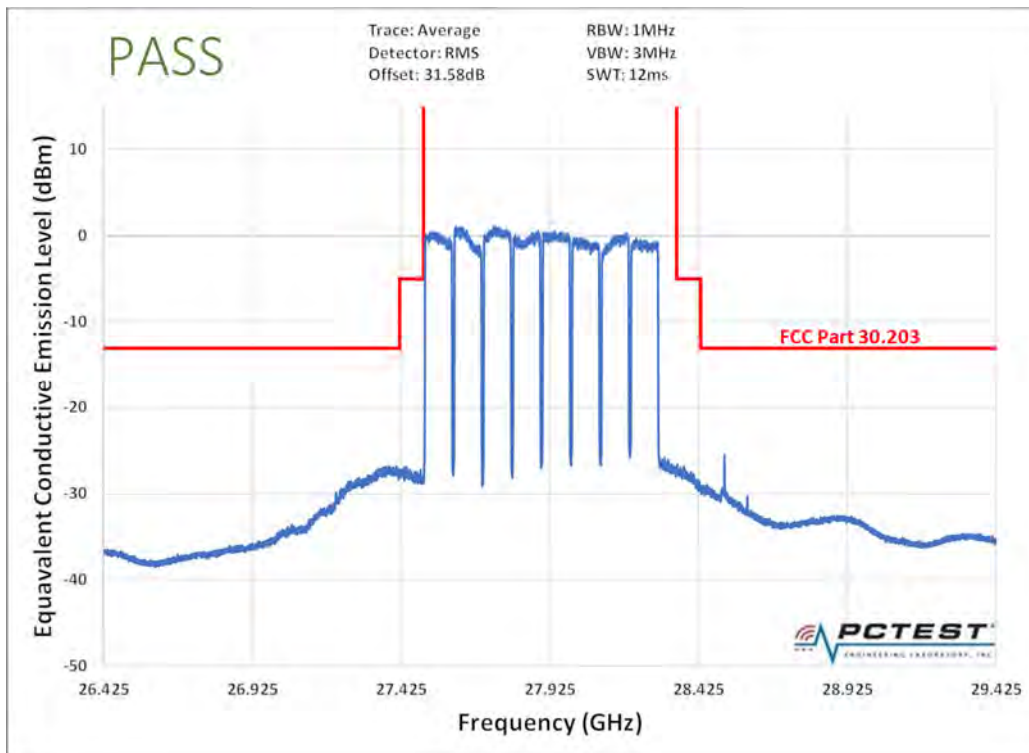


Plot 7-284. Band Edge Plot (1CC 16QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 180 of 222

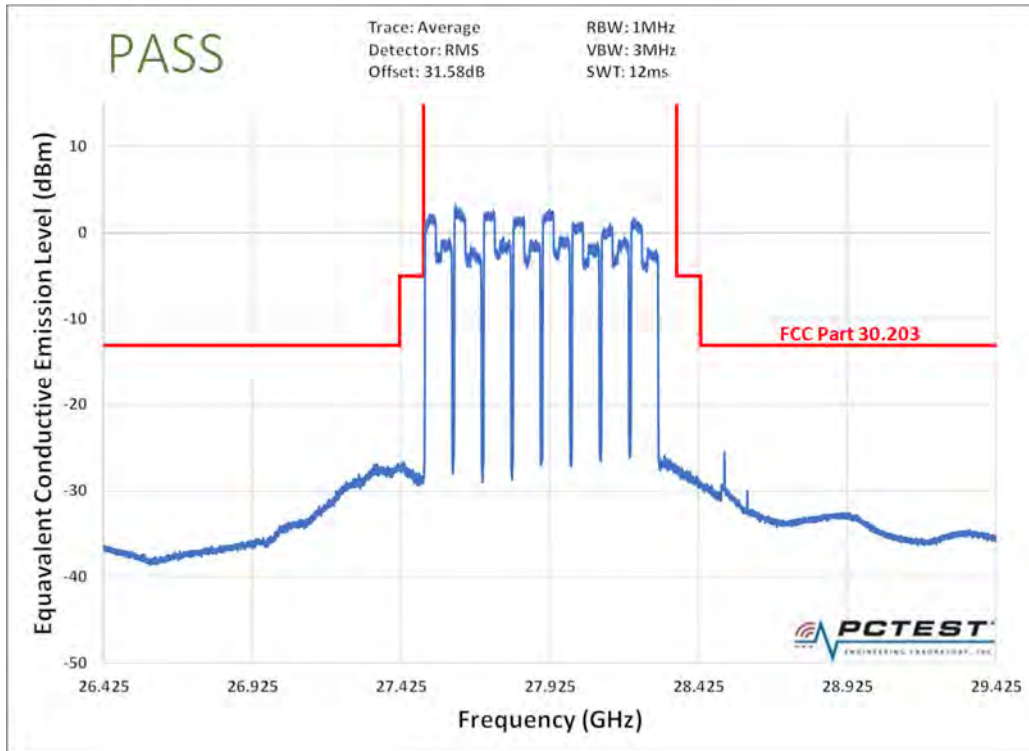


Plot 7-285. Band Edge Plot (1CC 64QAM Low Channel)

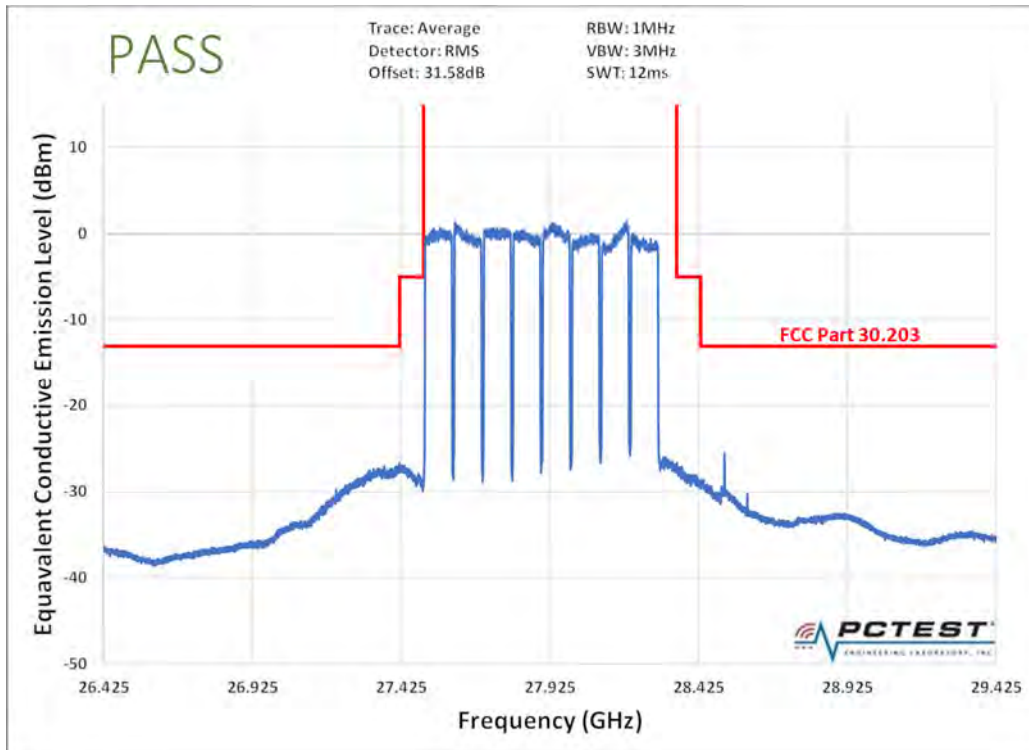


Plot 7-286. Band Edge Plot (8CC QPSK Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 181 of 222

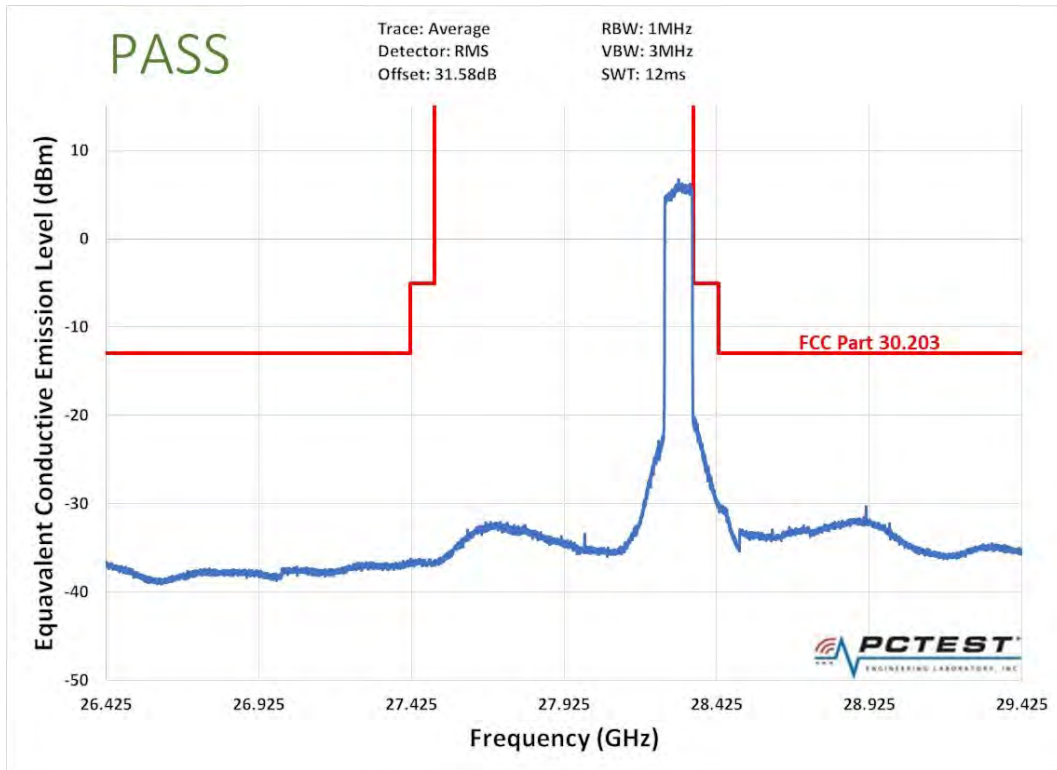


Plot 7-287. Band Edge Plot (8CC 16QAM Low Channel)

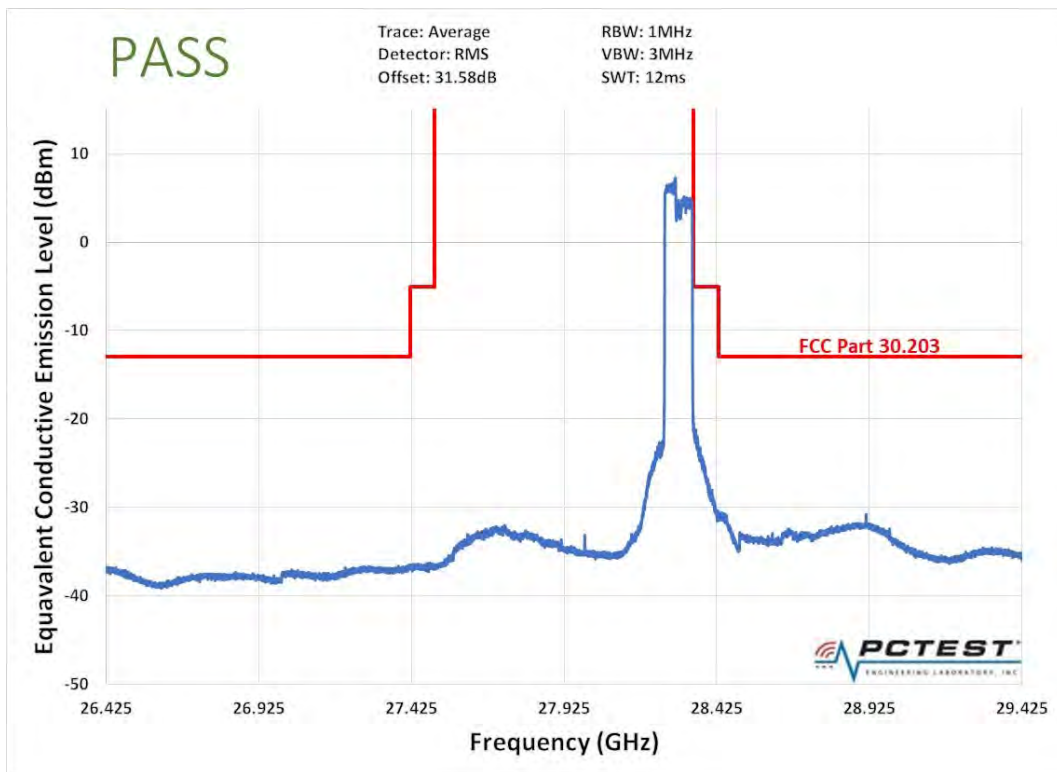


Plot 7-288. Band Edge Plot (8CC 64QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 182 of 222

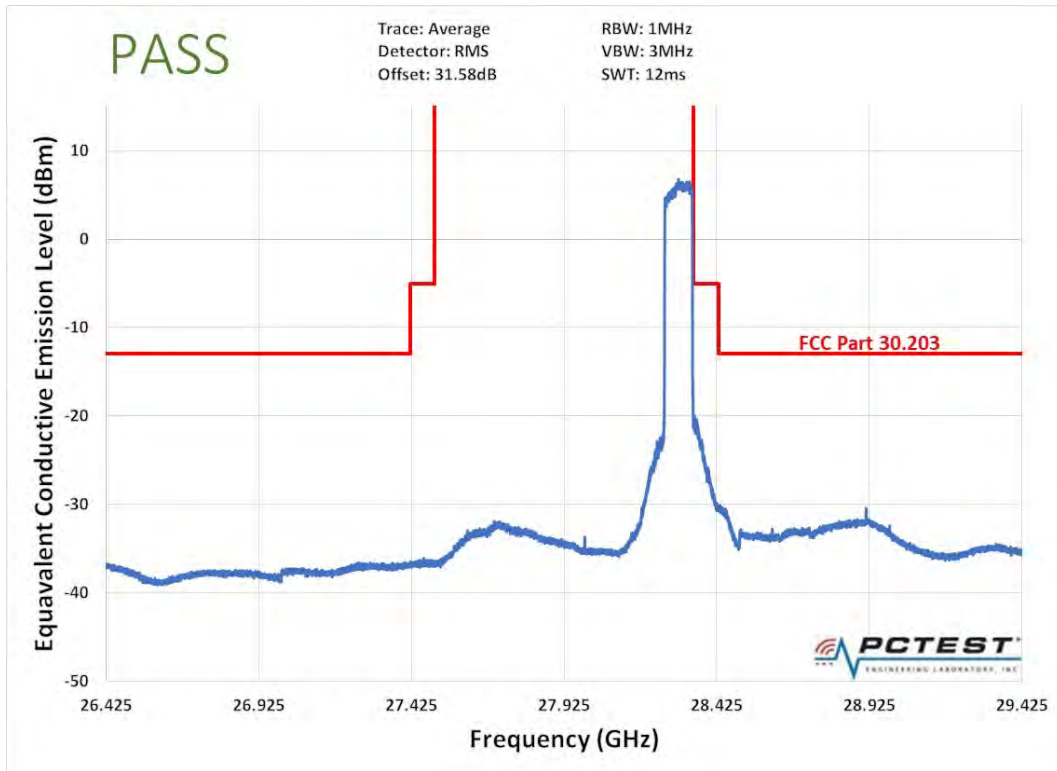


Plot 7-289. Band Edge Plot (1CC QPSK High Channel)

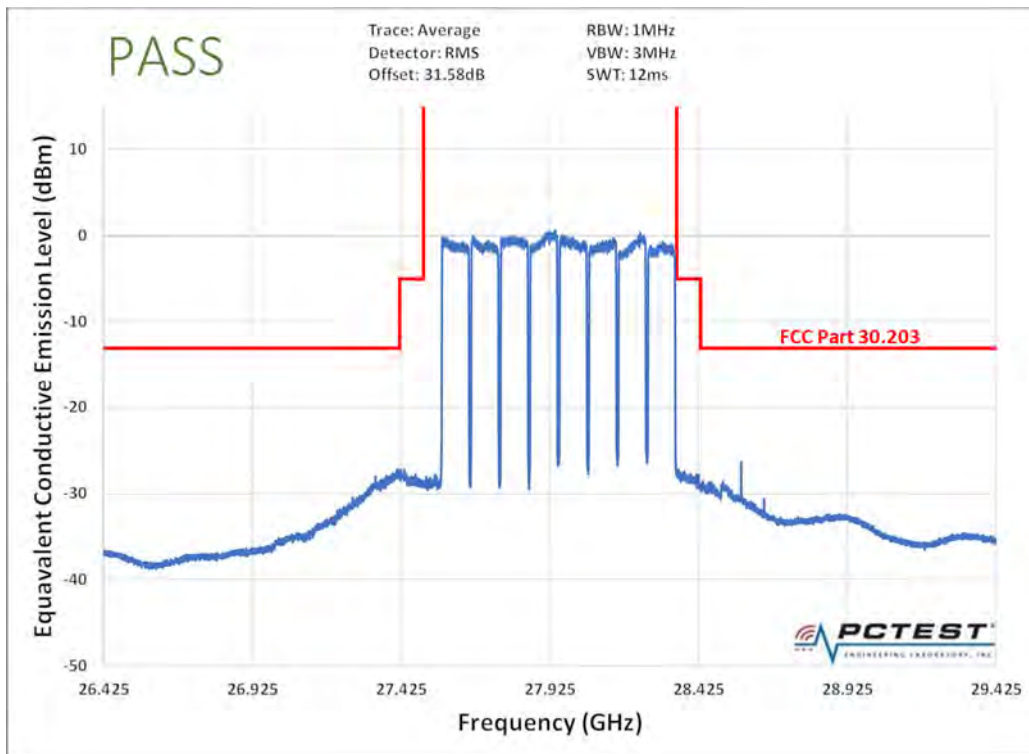


Plot 7-290. Band Edge Plot (1CC 16QAM High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 183 of 222

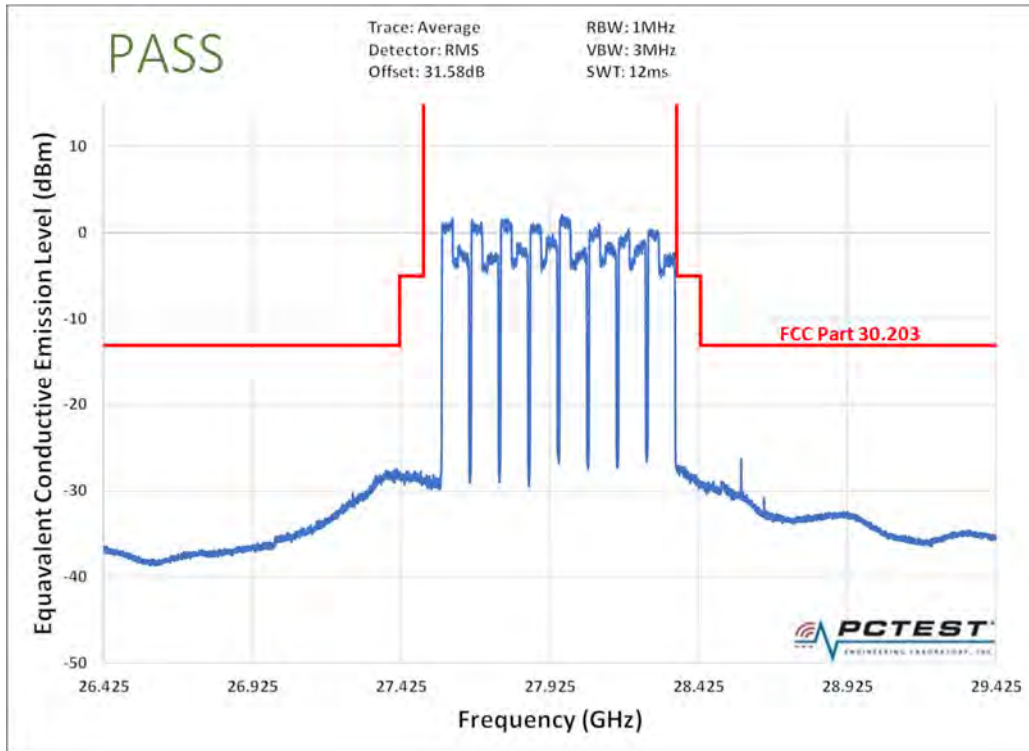


Plot 7-291. Band Edge Plot (1CC 64QAM High Channel)

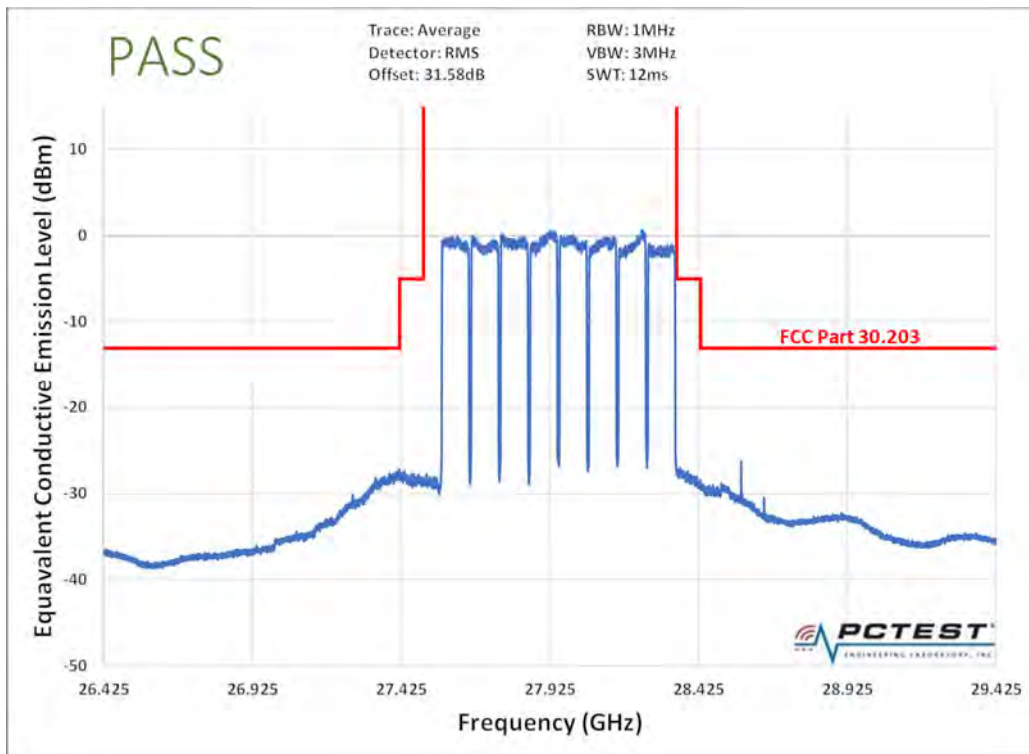


Plot 7-292. Band Edge Plot (8CC QPSK High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 184 of 222



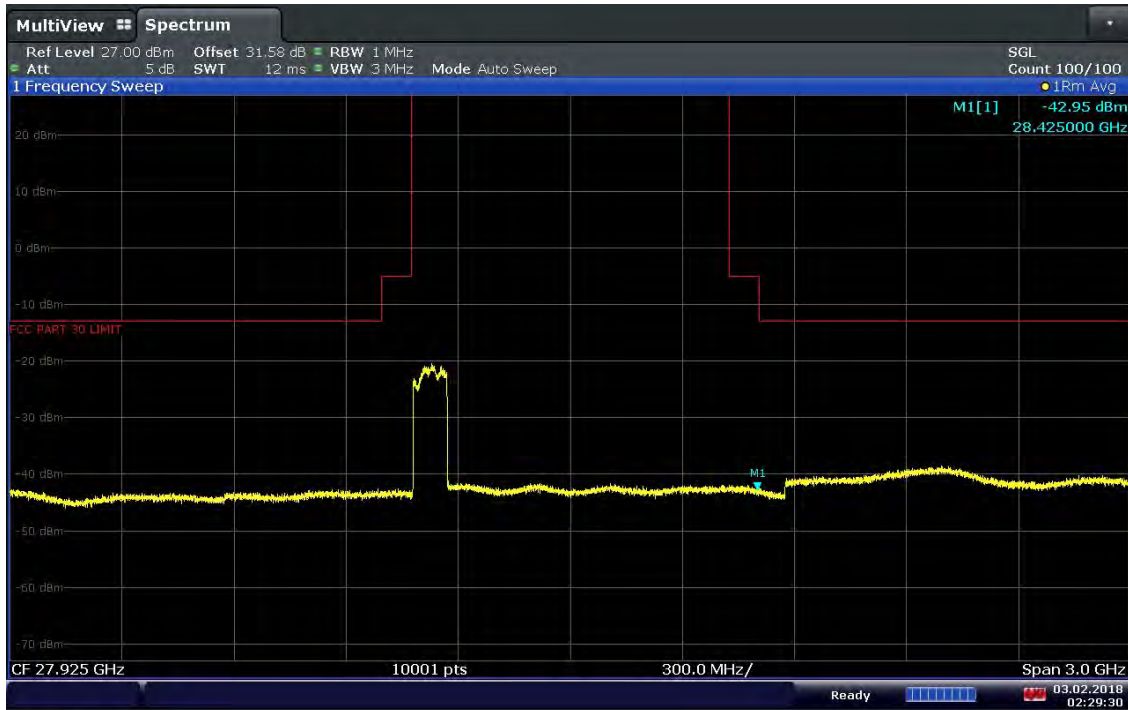
Plot 7-293. Band Edge Plot (8CC 16QAM High Channel)



Plot 7-294. Band Edge Plot (8CC 64QAM High Channel)

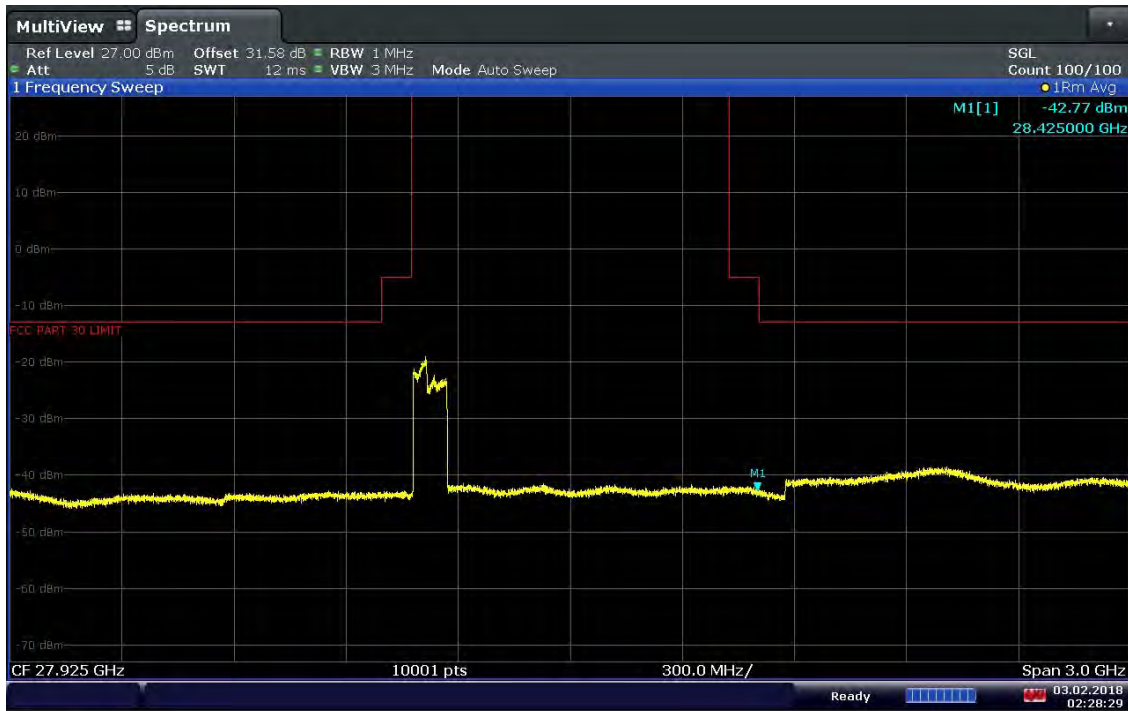
FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 185 of 222

7.6.6 Antenna A Conducted Band Edge Maximized on Antenna B



02:29:31 03.02.2018

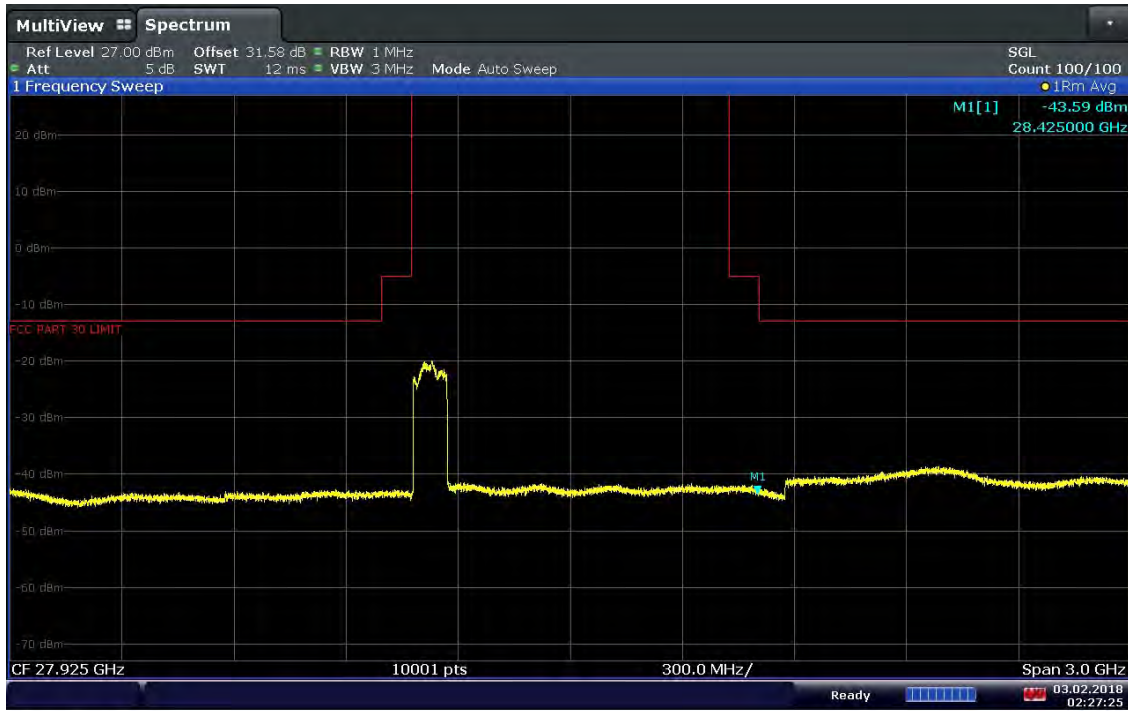
Plot 7-295. Band Edge Plot (1CC QPSK Low Channel)



02:28:29 03.02.2018

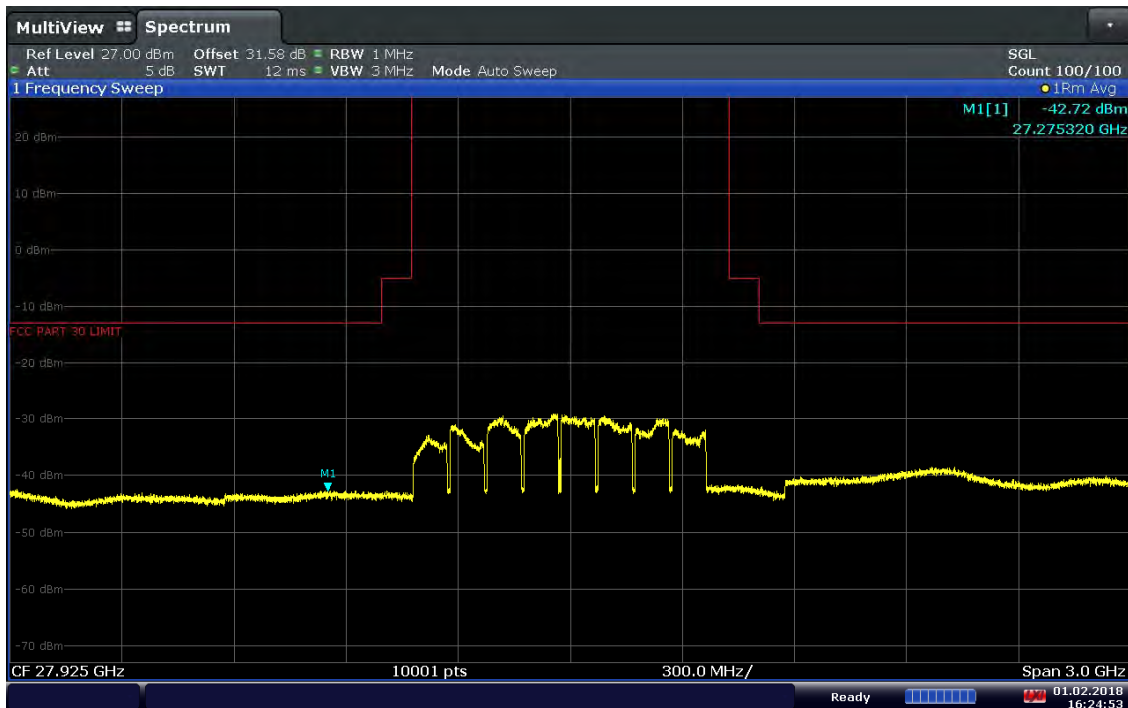
Plot 7-296. Band Edge Plot (1CC 16QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 186 of 222



02:27:25 03.02.2018

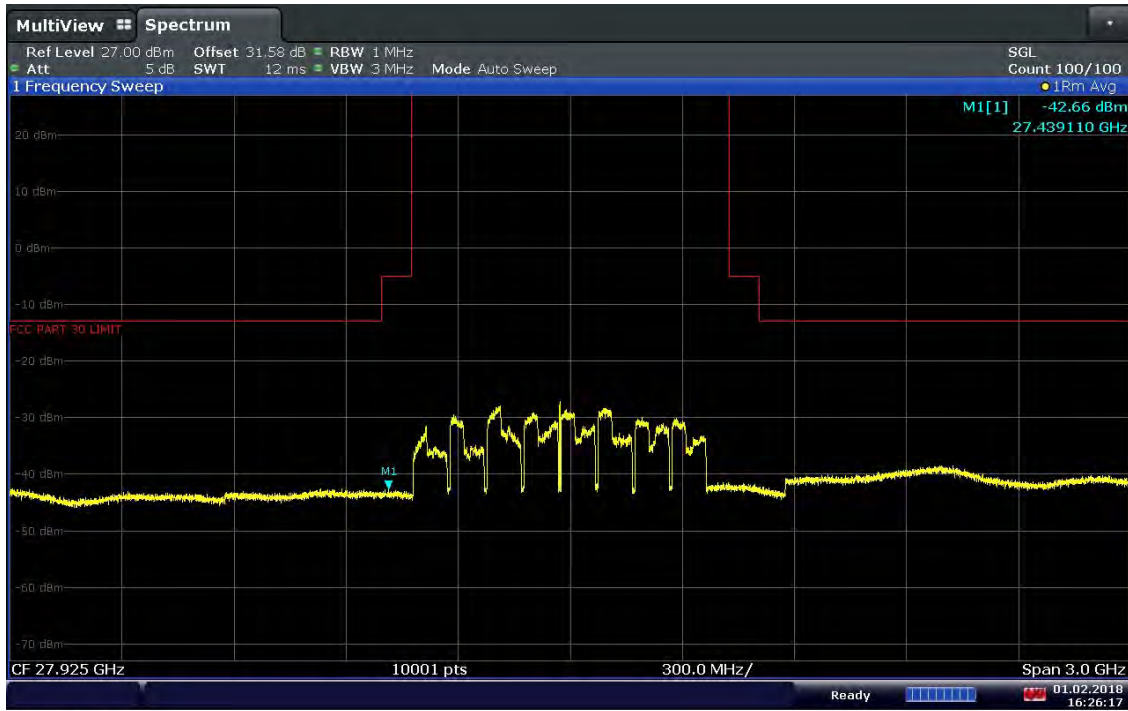
Plot 7-297. Band Edge Plot (1CC 64QAM Low Channel)



16:24:54 01.02.2018

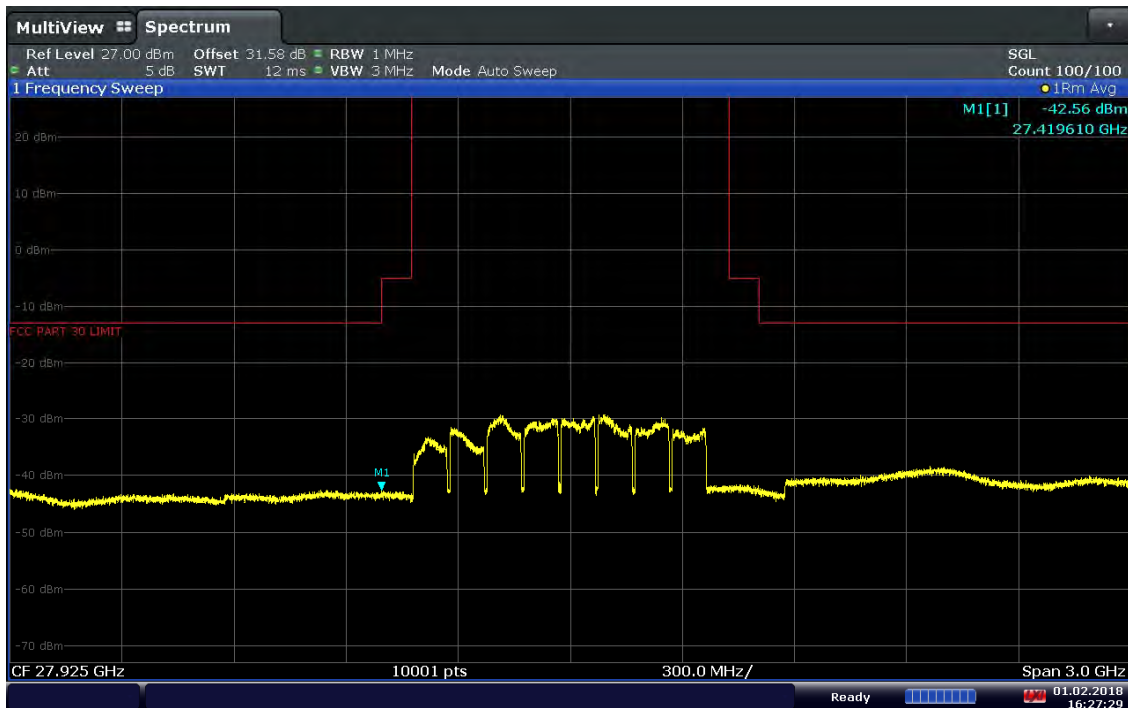
Plot 7-298. Band Edge Plot (8CC QPSK Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 187 of 222



16:26:17 01.02.2018

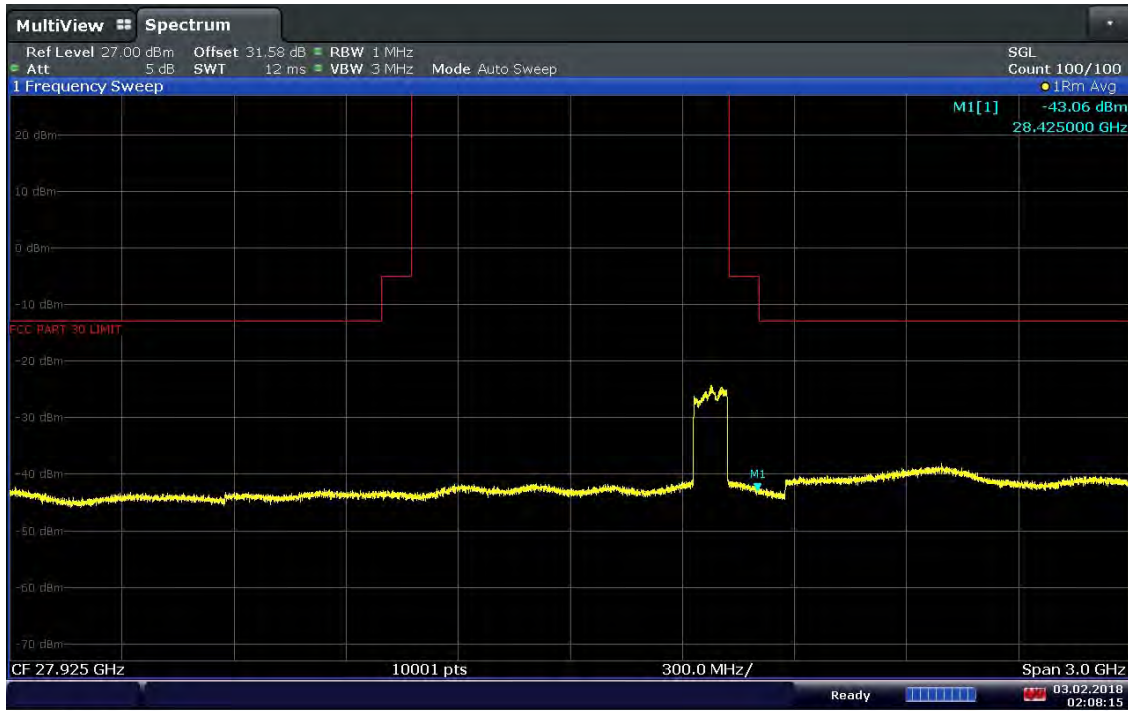
Plot 7-299. Band Edge Plot (8CC 16QAM Low Channel)



16:27:30 01.02.2018

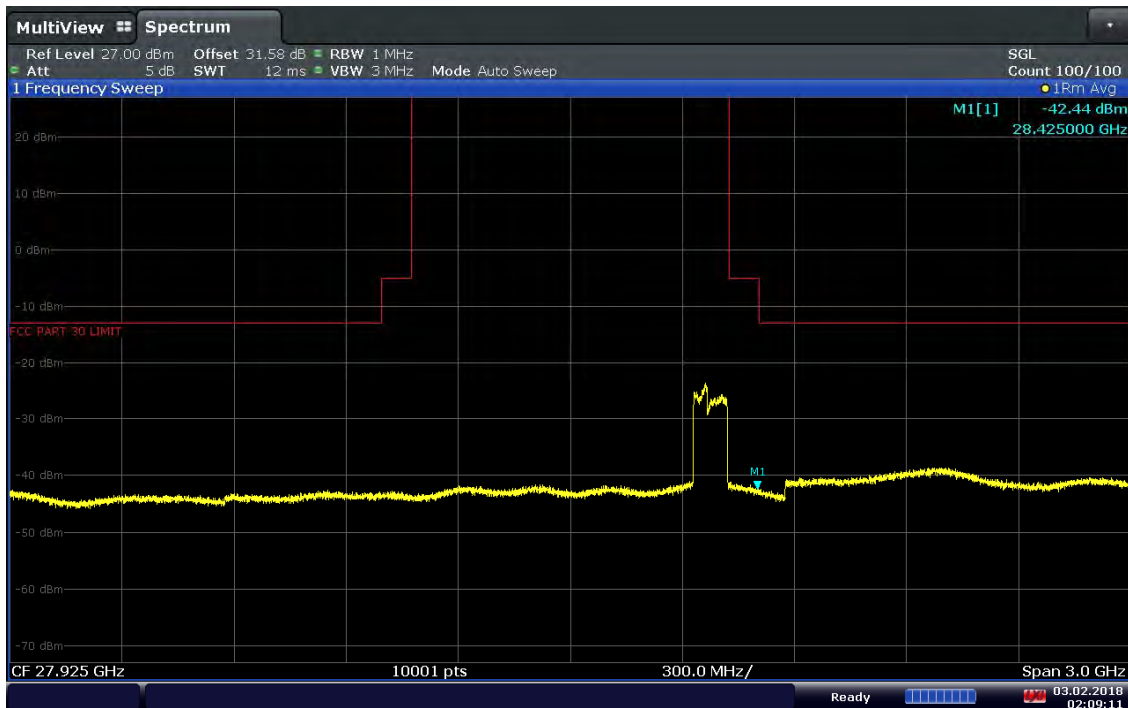
Plot 7-300. Band Edge Plot (8CC 64QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 188 of 222



02:08:15 03.02.2018

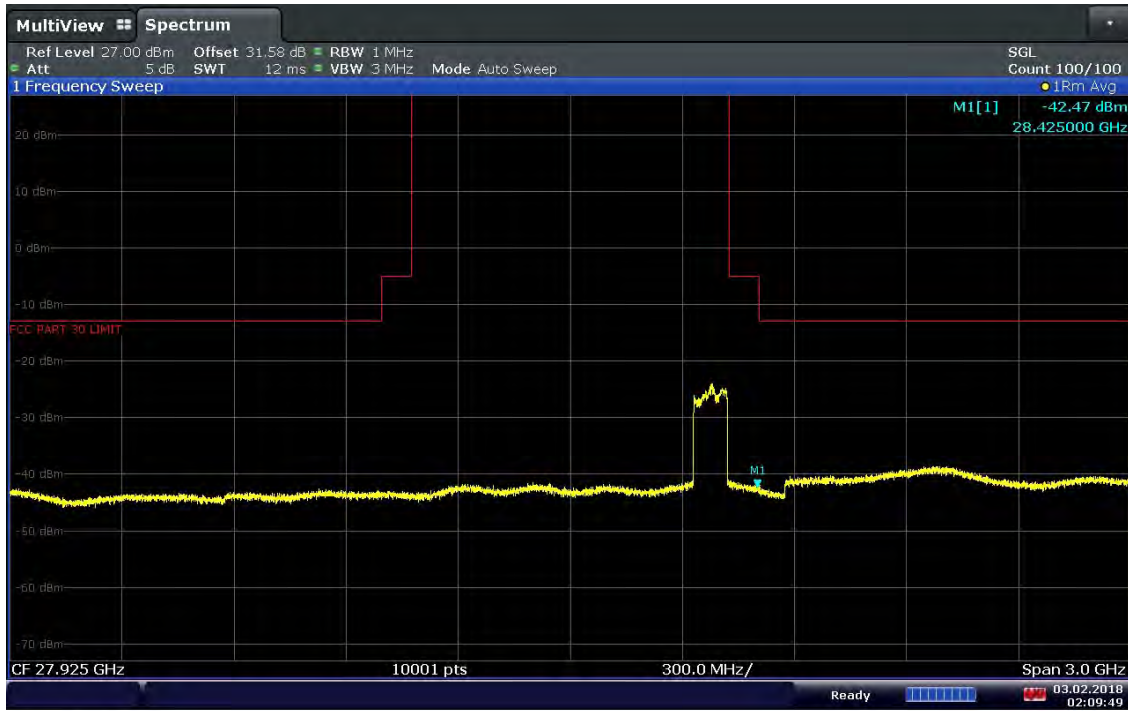
Plot 7-301. Band Edge Plot (1CC QPSK High Channel)



02:09:11 03.02.2018

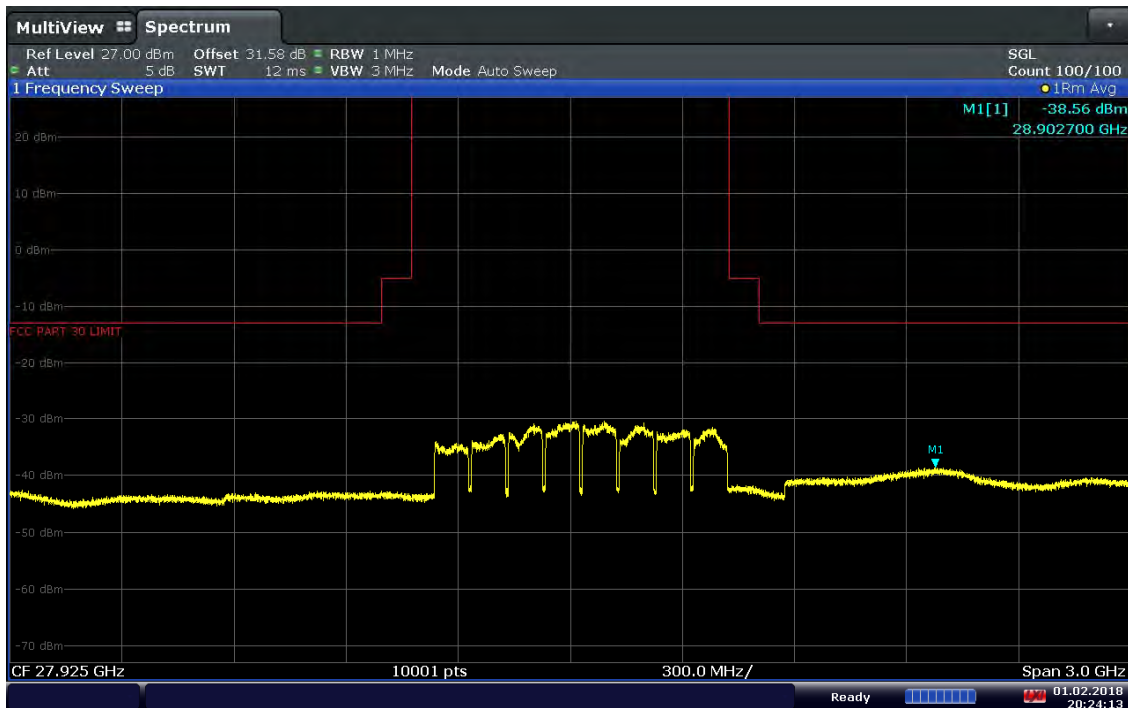
Plot 7-302. Band Edge Plot (1CC 16QAM High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 189 of 222



02:09:50 03.02.2018

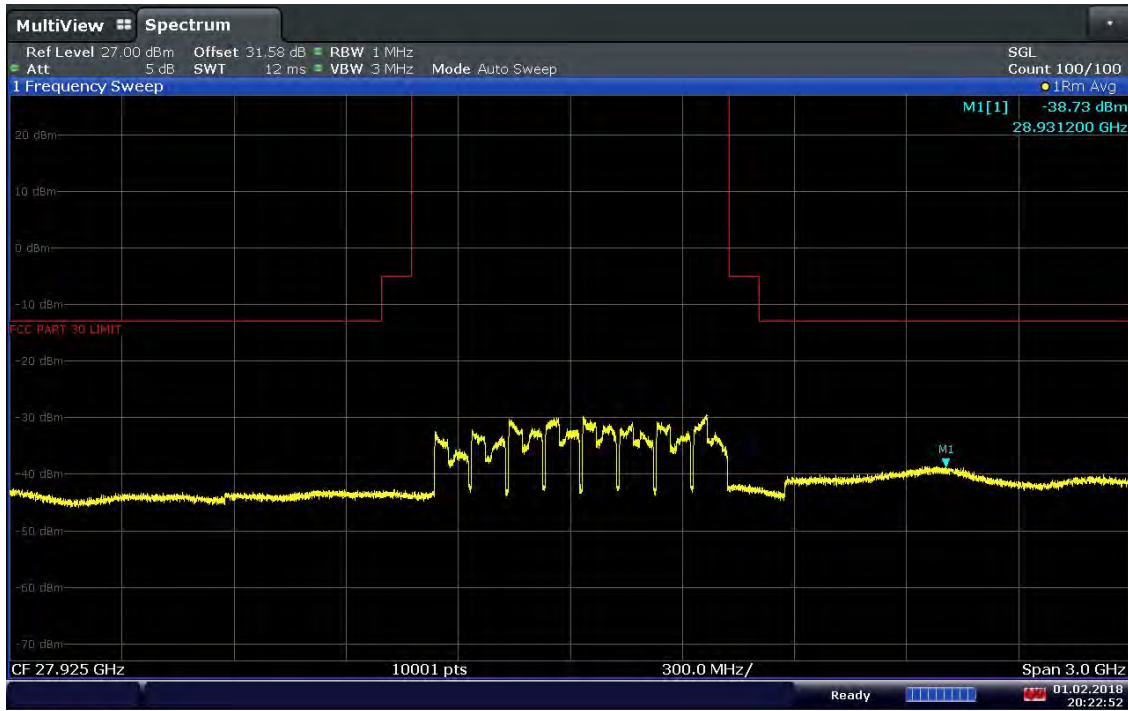
Plot 7-303. Band Edge Plot (1CC 64QAM High Channel)



20:24:14 01.02.2018

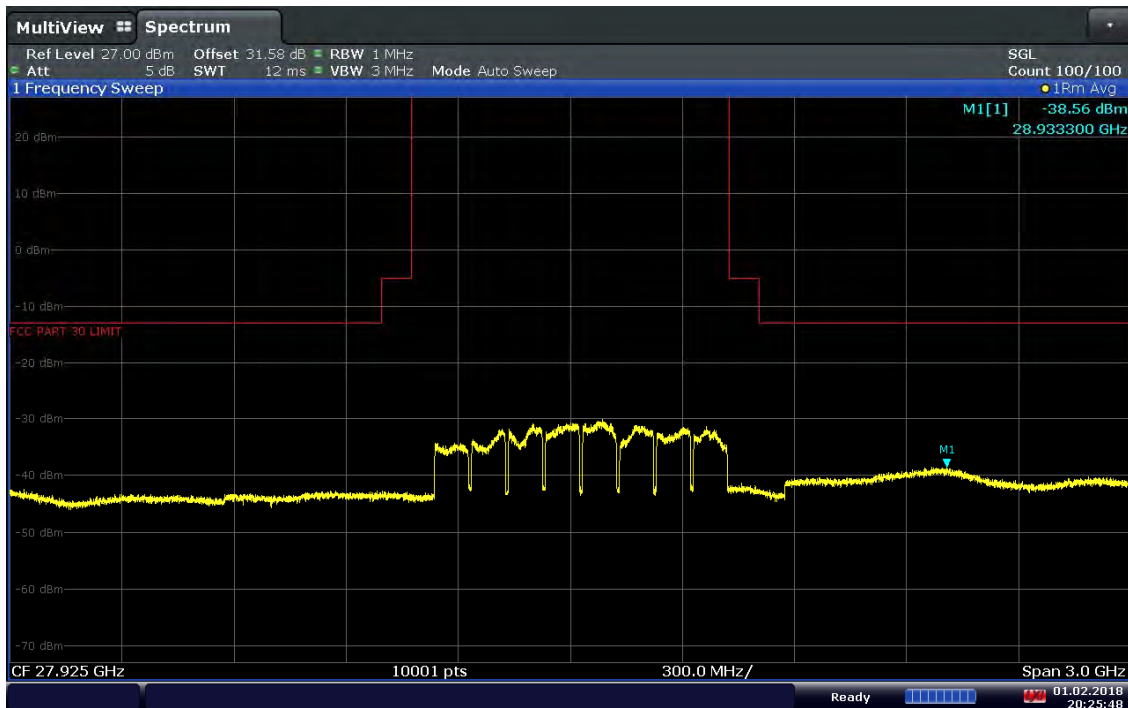
Plot 7-304. Band Edge Plot (8CC QPSK High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 190 of 222



20:22:53 01.02.2018

Plot 7-305. Band Edge Plot (8CC 16QAM High Channel)

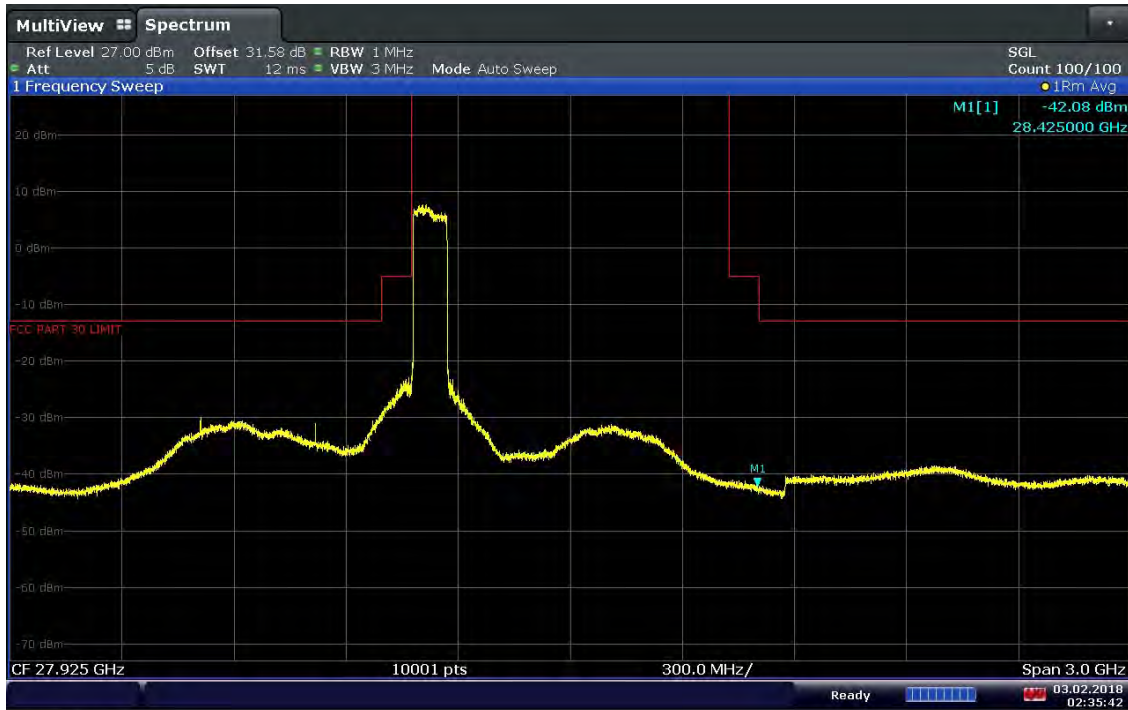


20:25:48 01.02.2018

Plot 7-306. Band Edge Plot (8CC 64QAM High Channel)

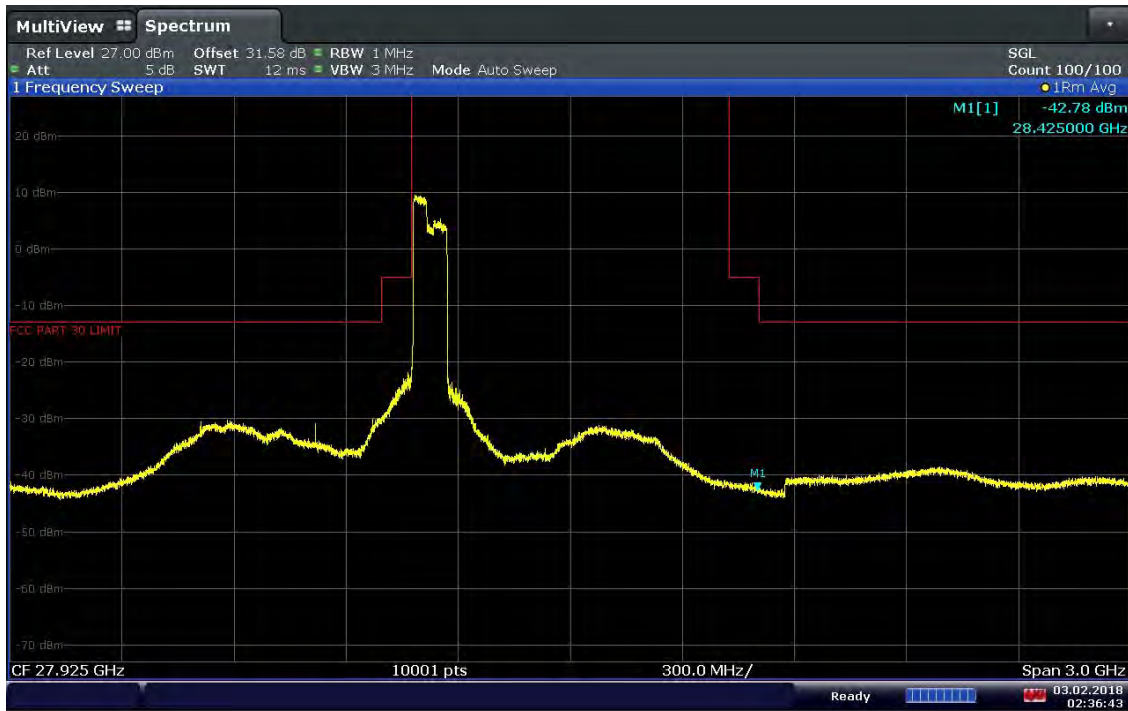
FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 191 of 222

7.6.7 Antenna B Conducted Band Edge Maximized on Antenna B



02:35:42 03.02.2018

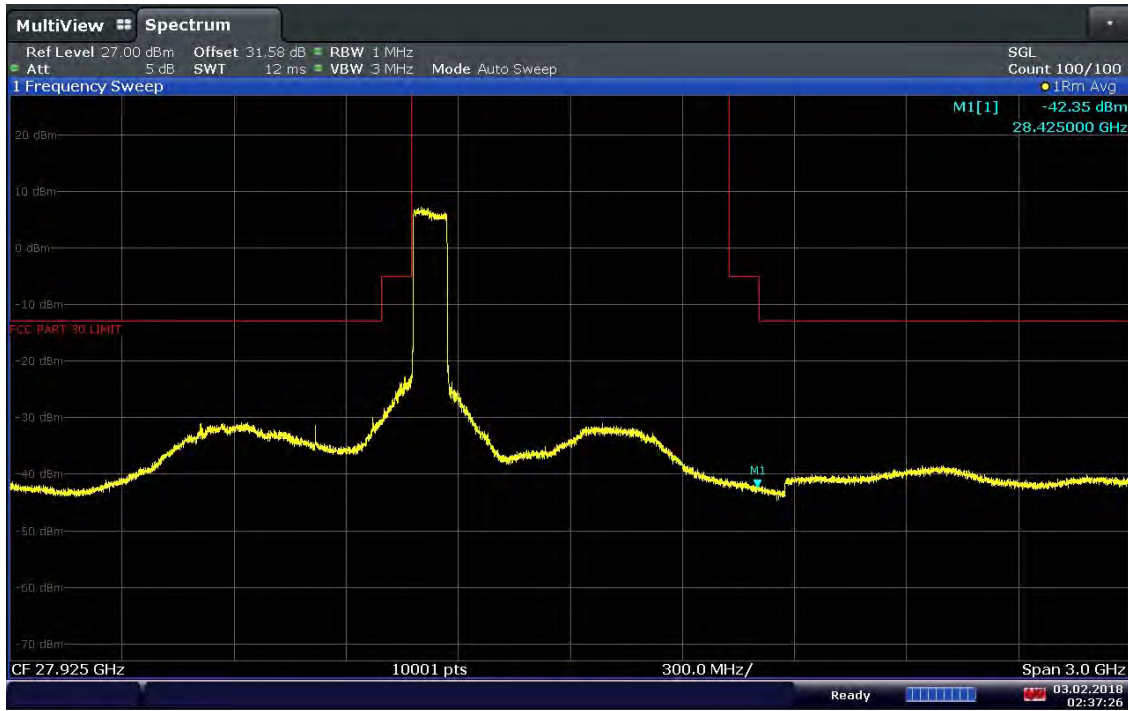
Plot 7-307. Band Edge Plot (1CC QPSK Low Channel)



02:36:44 03.02.2018

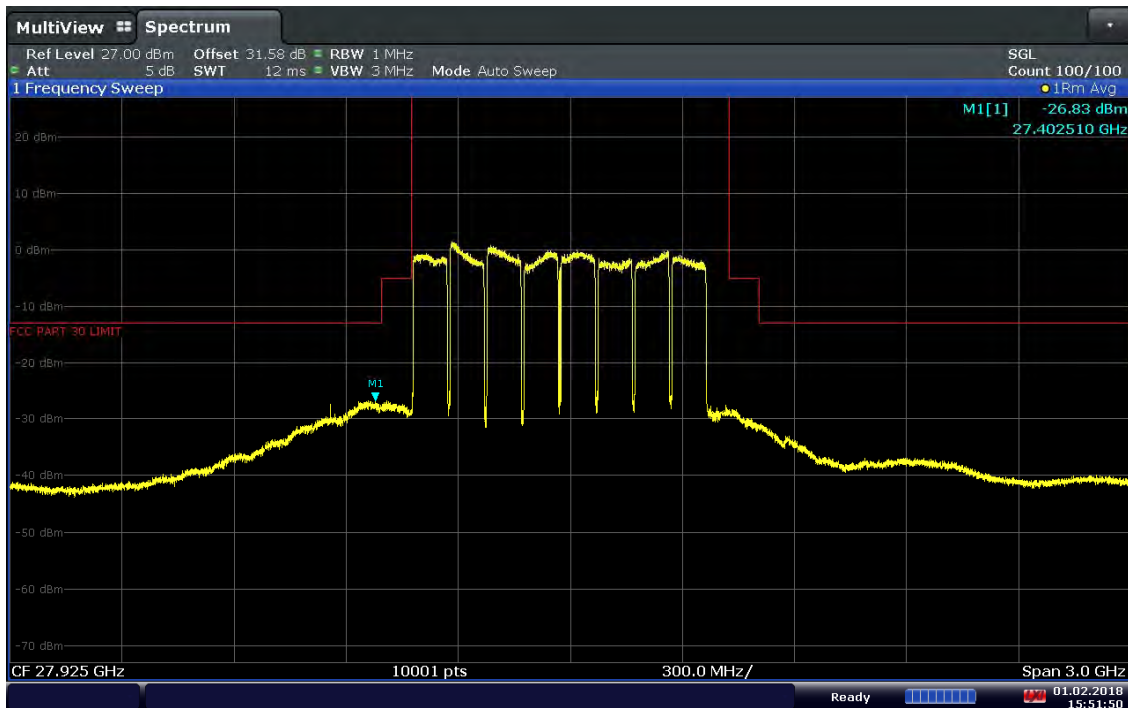
Plot 7-308. Band Edge Plot (1CC 16QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 192 of 222



02:37:26 03.02.2018

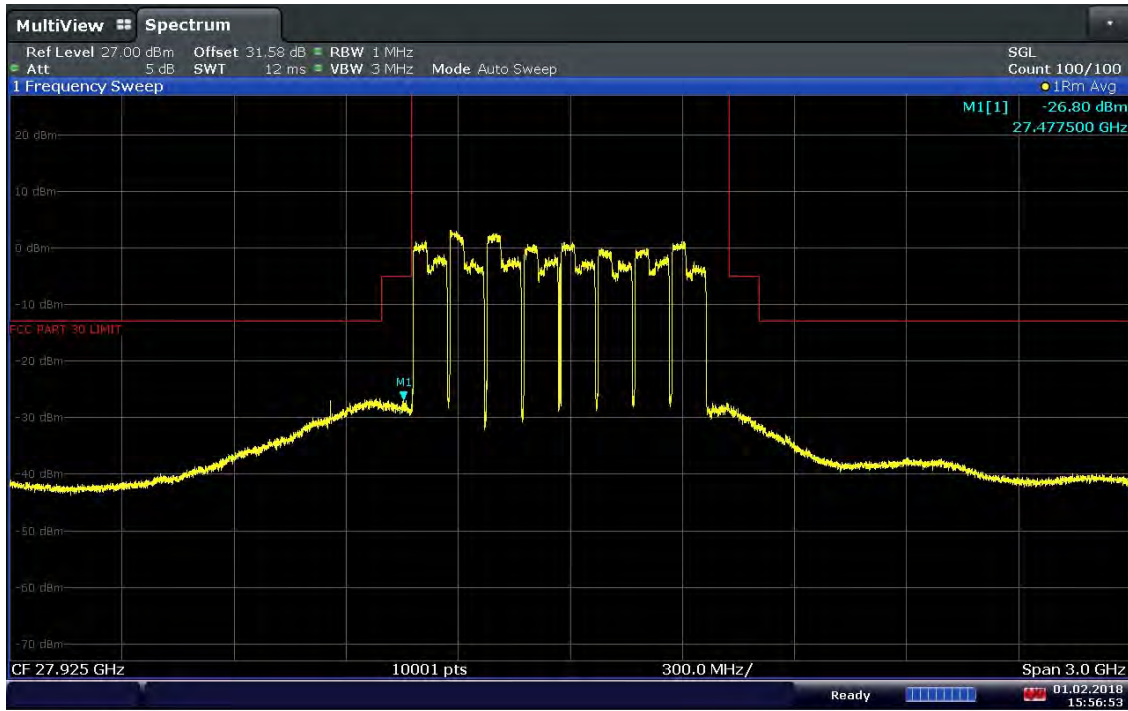
Plot 7-309. Band Edge Plot (1CC 64QAM Low Channel)



15:51:50 01.02.2018

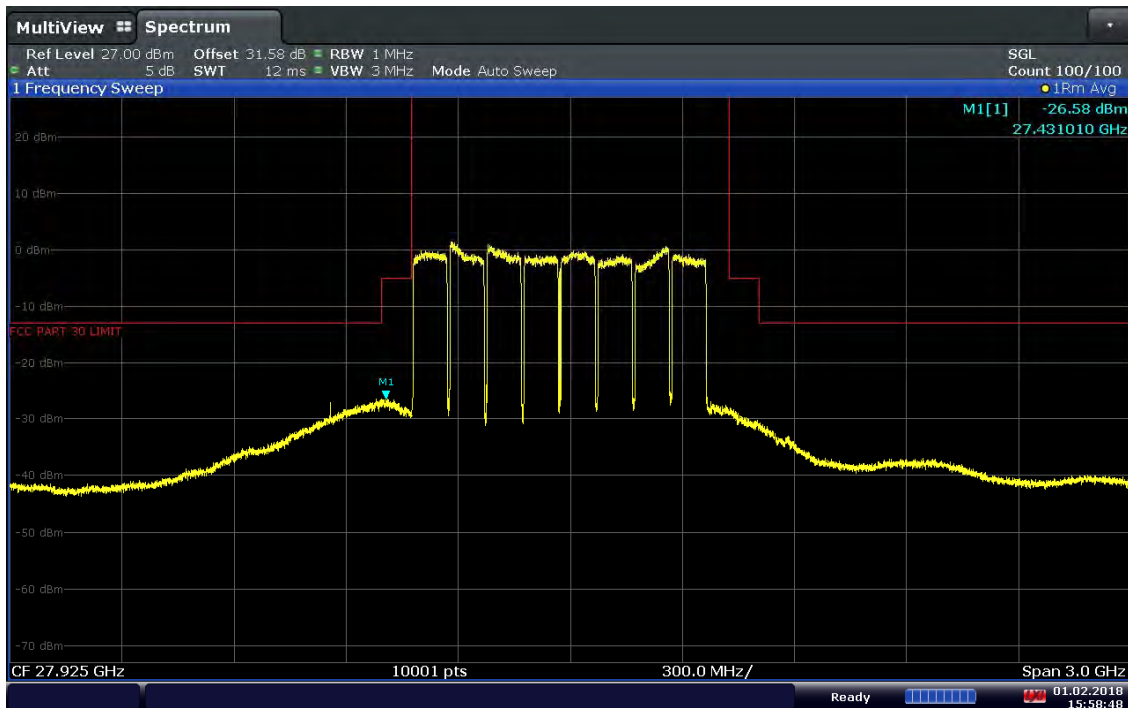
Plot 7-310. Band Edge Plot (8CC QPSK Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 193 of 222



15:56:53 01.02.2018

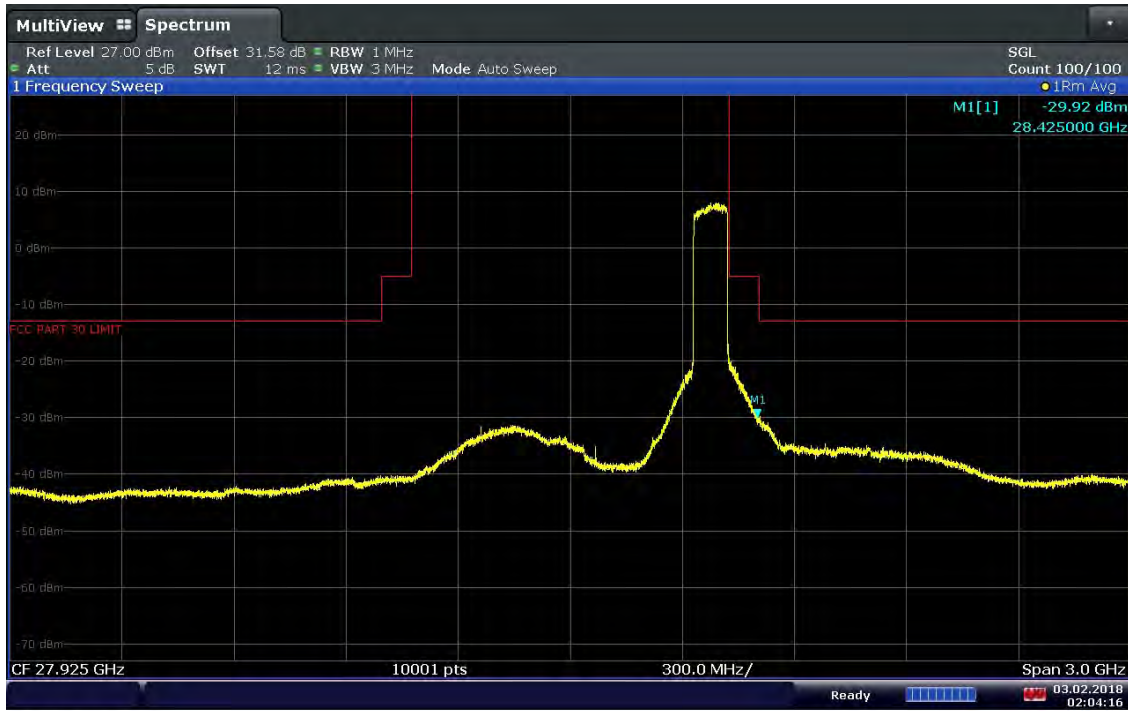
Plot 7-311. Band Edge Plot (8CC 16QAM Low Channel)



15:58:48 01.02.2018

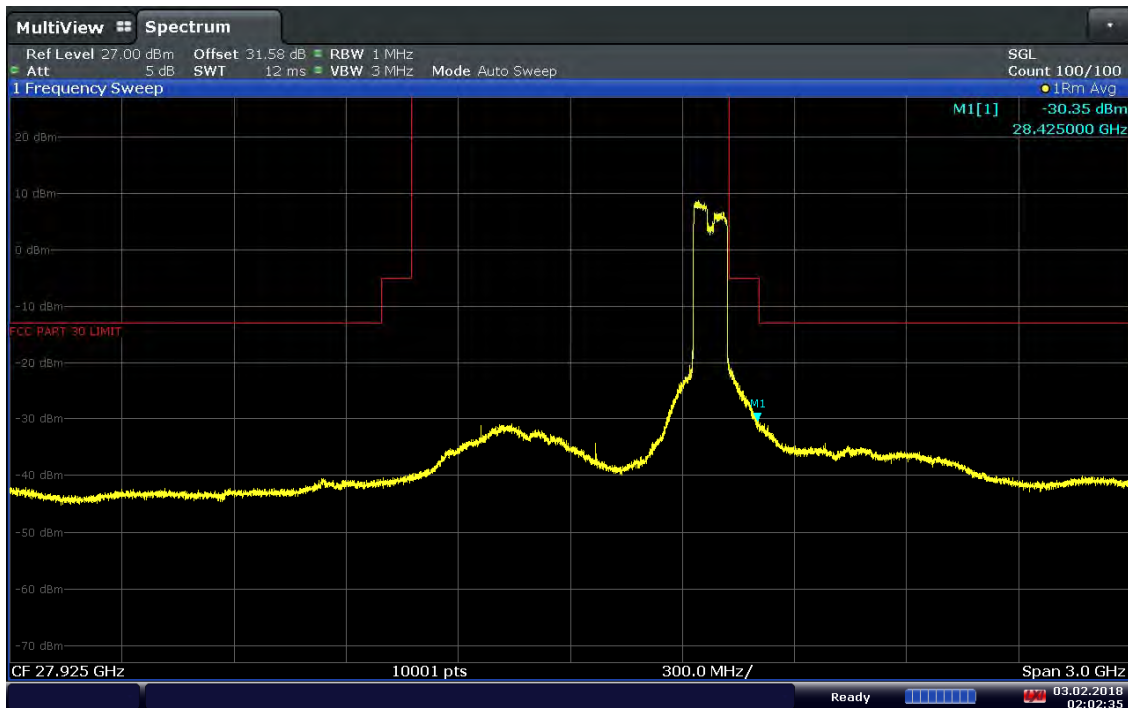
Plot 7-312. Band Edge Plot (8CC 64QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 194 of 222



02:04:17 03.02.2018

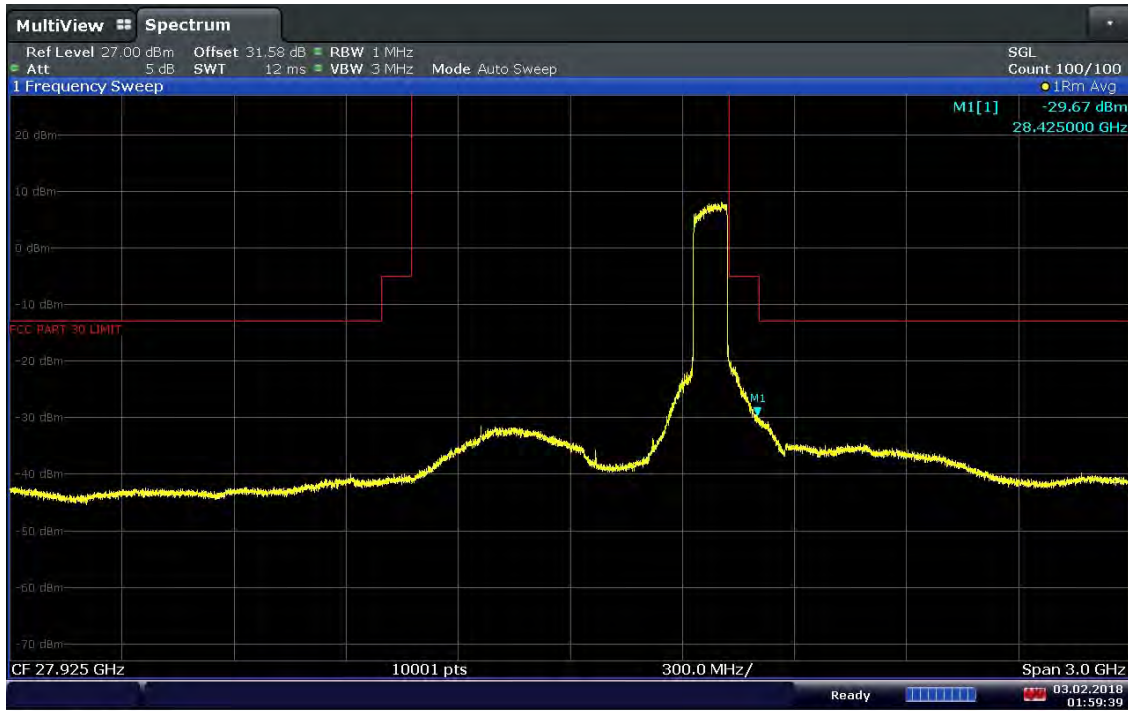
Plot 7-313. Band Edge Plot (1CC QPSK High Channel)



02:02:36 03.02.2018

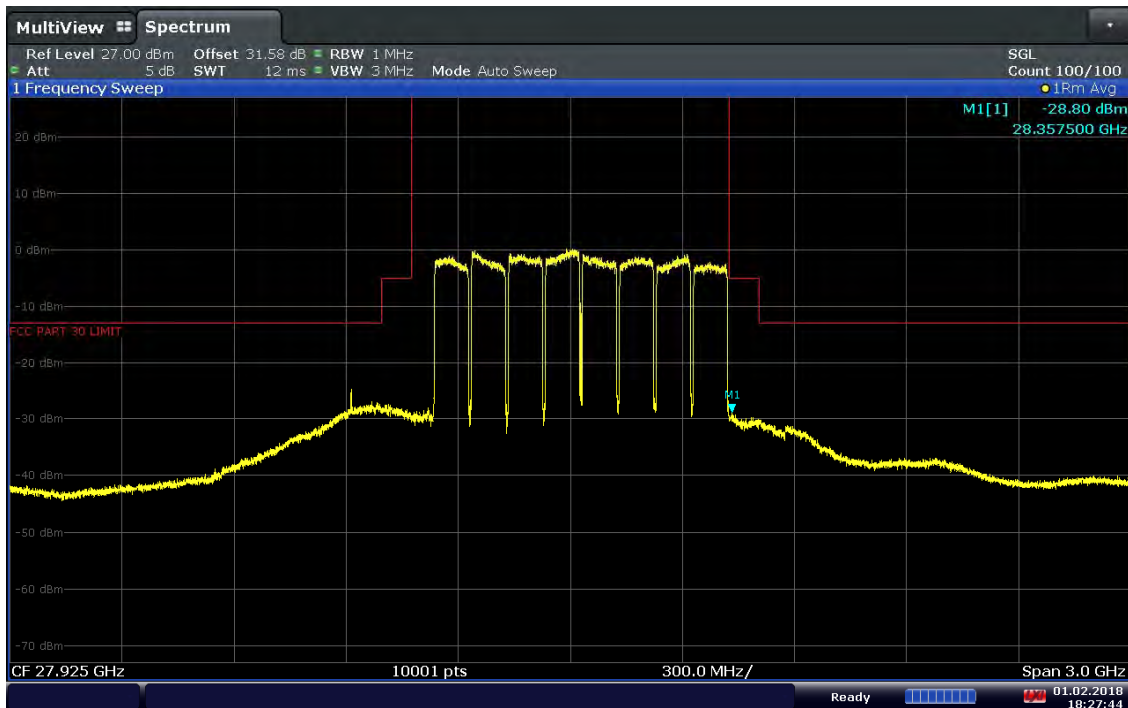
Plot 7-314. Band Edge Plot (1CC 16QAM High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 195 of 222



01:59:39 03.02.2018

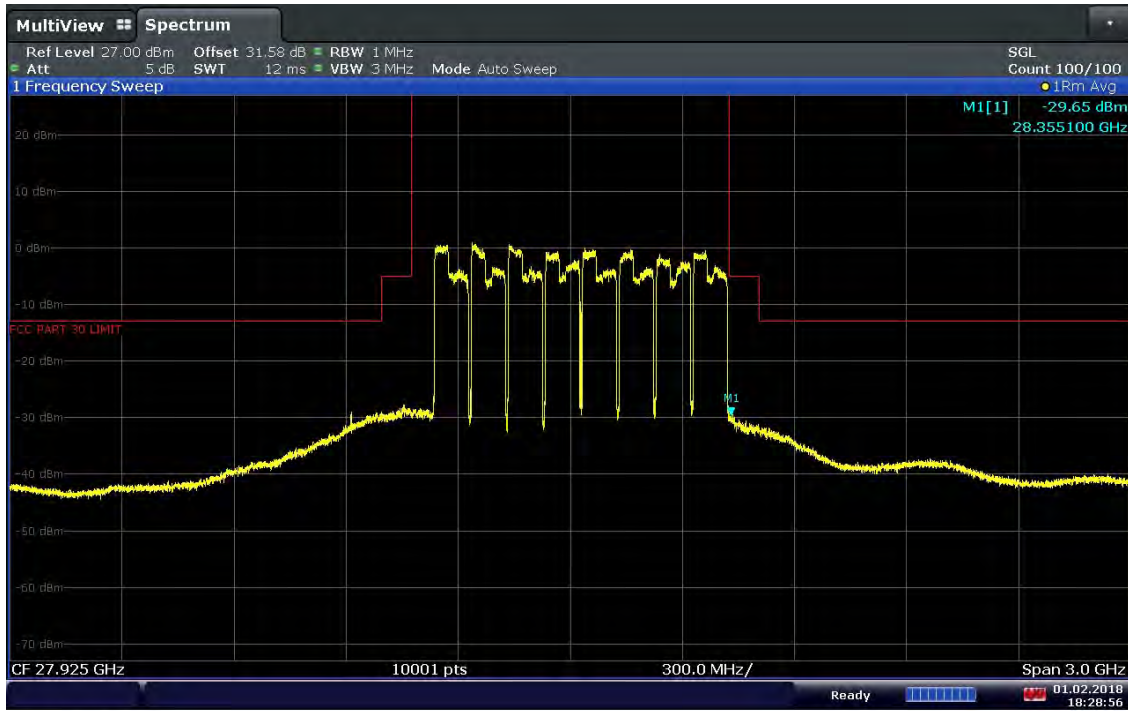
Plot 7-315. Band Edge Plot (1CC 64QAM High Channel)



18:27:45 01.02.2018

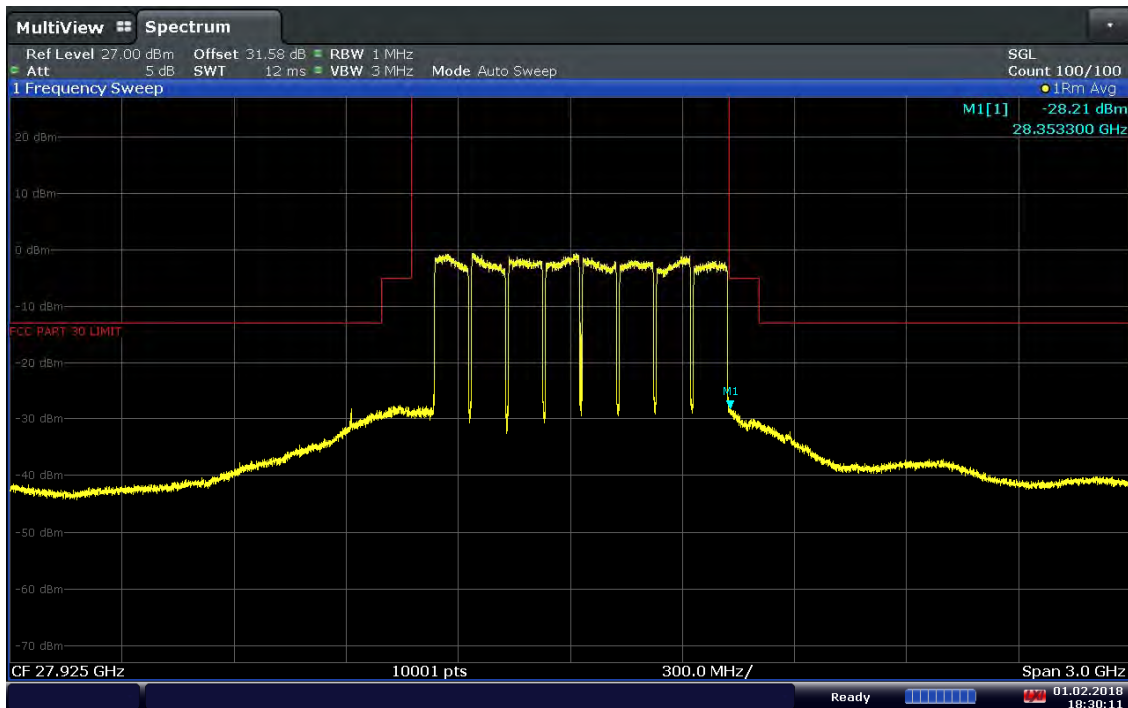
Plot 7-316. Band Edge Plot (8CC QPSK High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 196 of 222



18:28:56 01.02.2018

Plot 7-317. Band Edge Plot (8CC 16QAM High Channel)

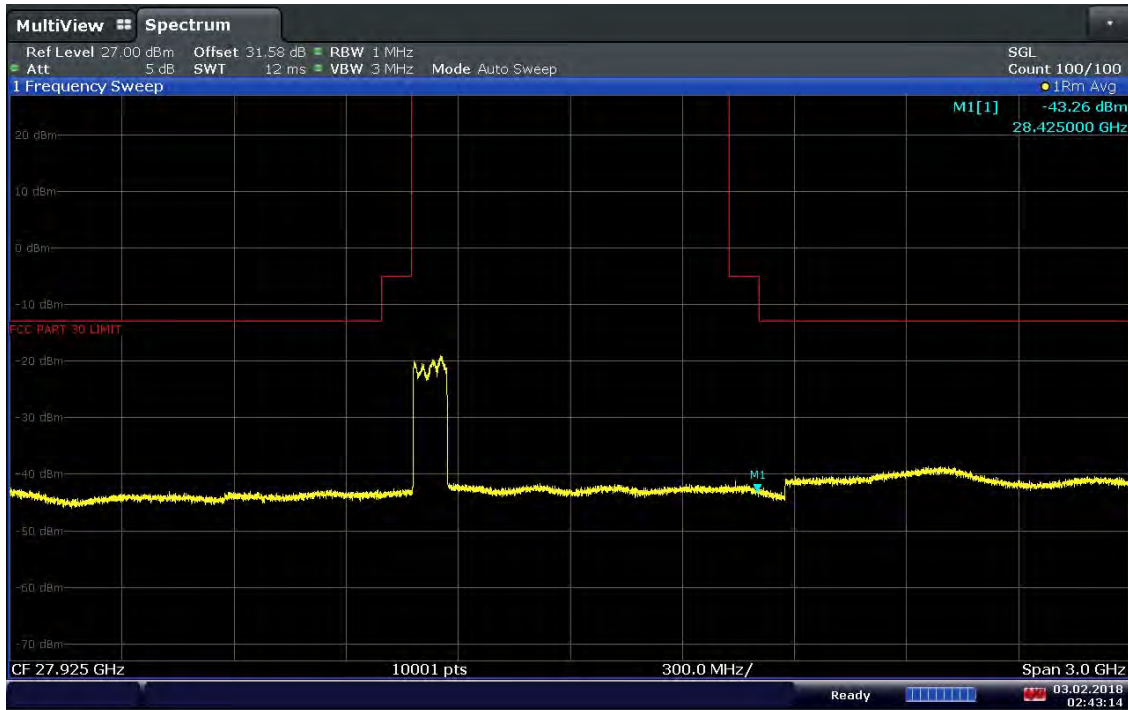


18:30:11 01.02.2018

Plot 7-318. Band Edge Plot (8CC 64QAM High Channel)

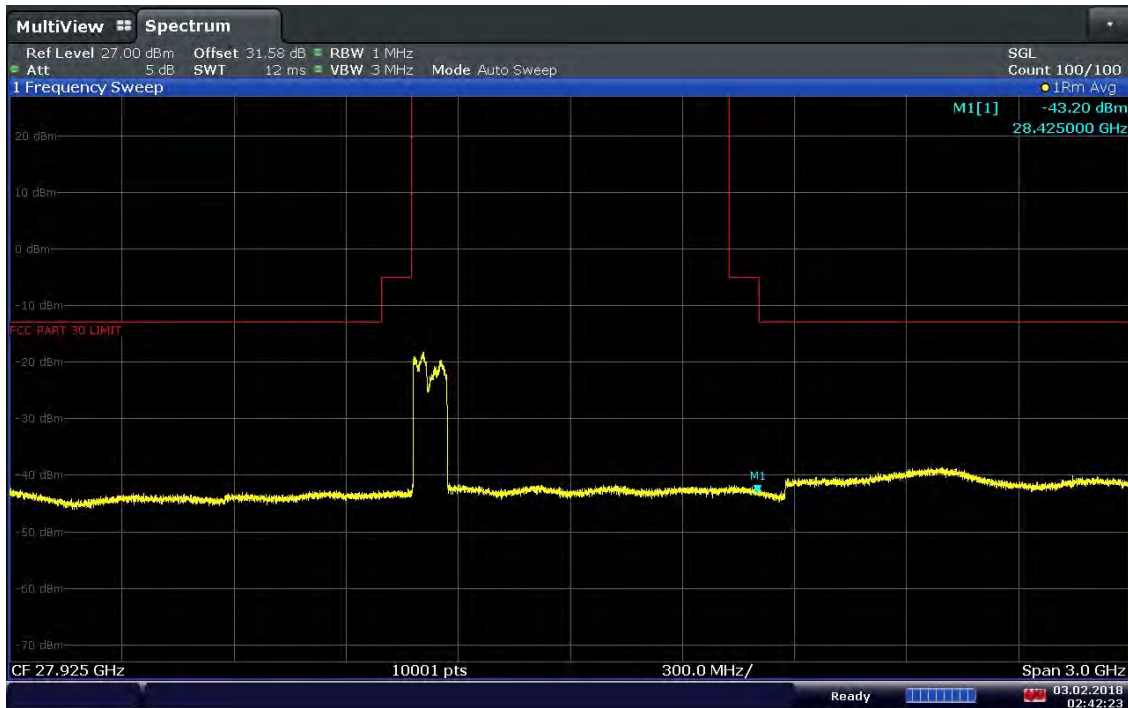
FCC ID: A3LSFG-AA100DC	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 197 of 222

7.6.8 Antenna C Conducted Band Edge Maximized on Antenna B



02:43:14 03.02.2018

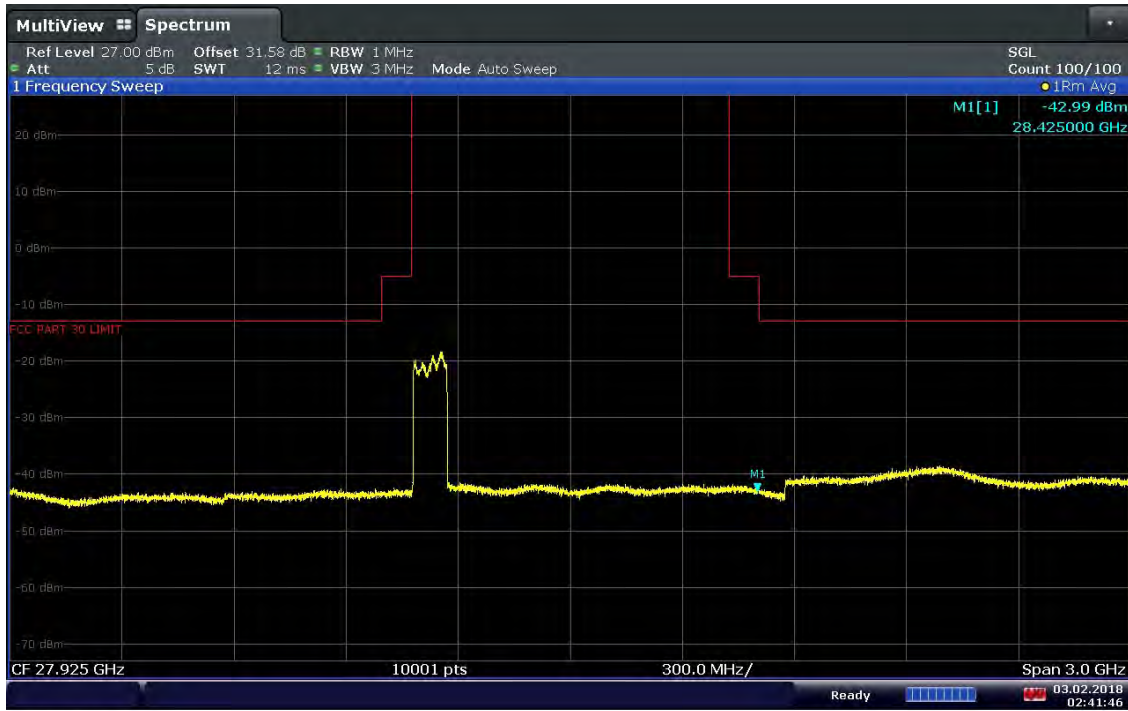
Plot 7-319. Band Edge Plot (1CC QPSK Low Channel)



02:42:24 03.02.2018

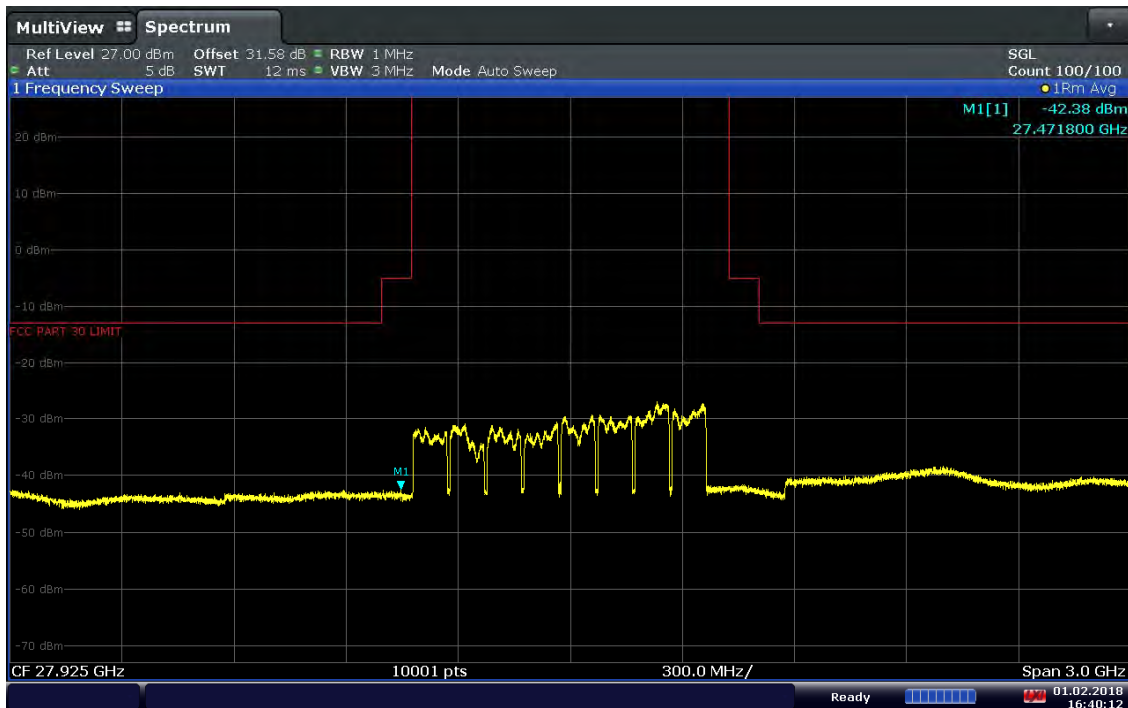
Plot 7-320. Band Edge Plot (1CC 16QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 198 of 222



02:41:46 03.02.2018

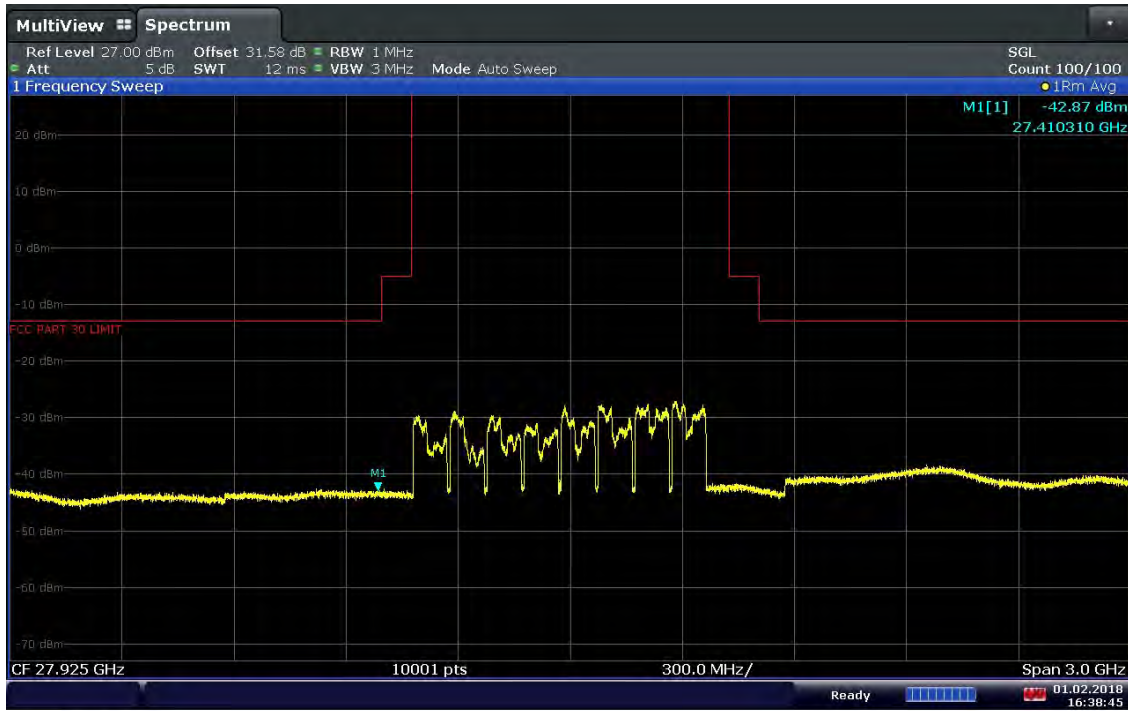
Plot 7-321. Band Edge Plot (1CC 64QAM Low Channel)



16:40:13 01.02.2018

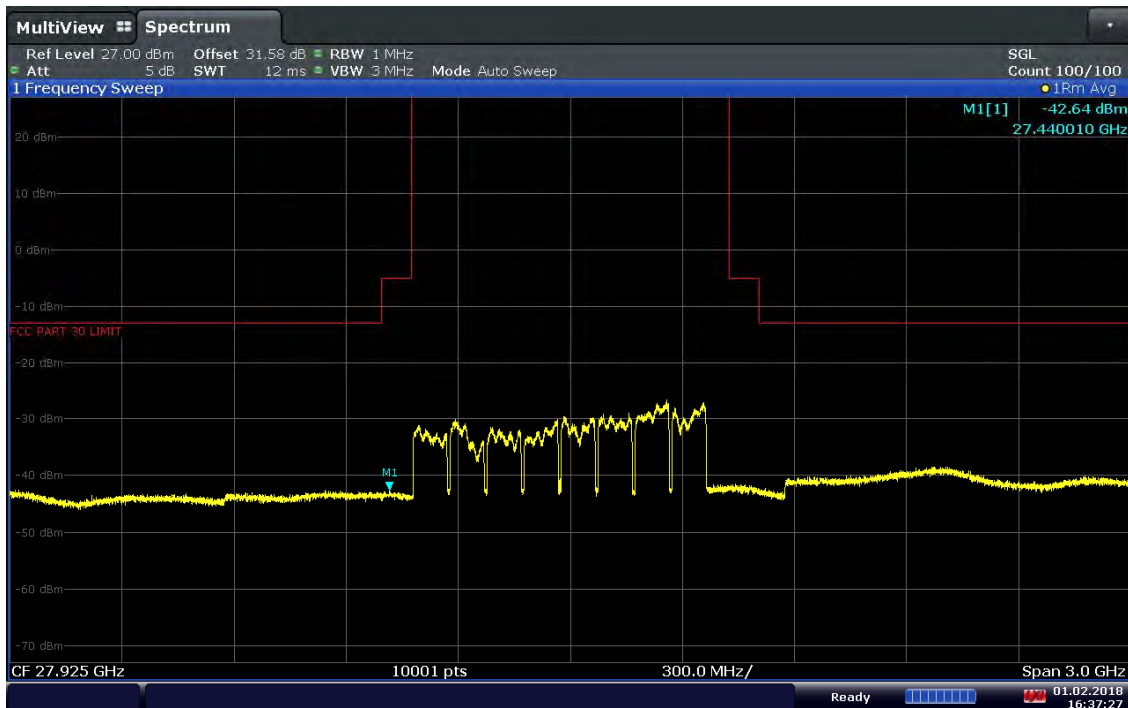
Plot 7-322. Band Edge Plot (8CC QPSK Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 199 of 222



16:38:45 01.02.2018

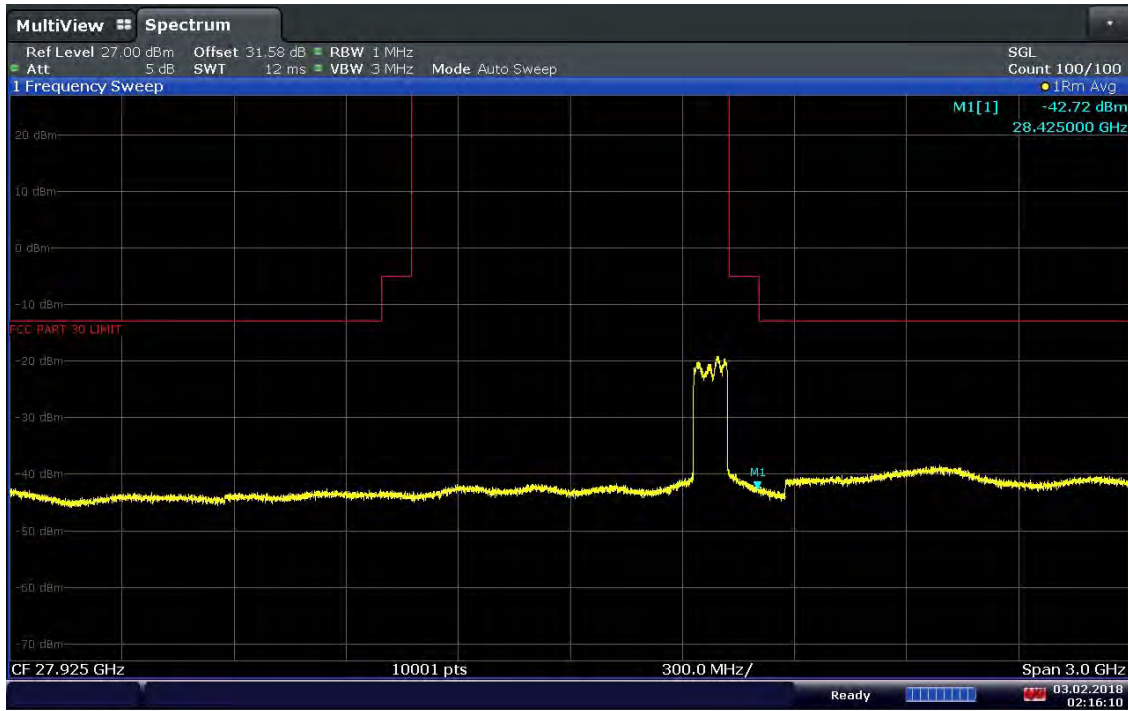
Plot 7-323. Band Edge Plot (8CC 16QAM Low Channel)



16:37:27 01.02.2018

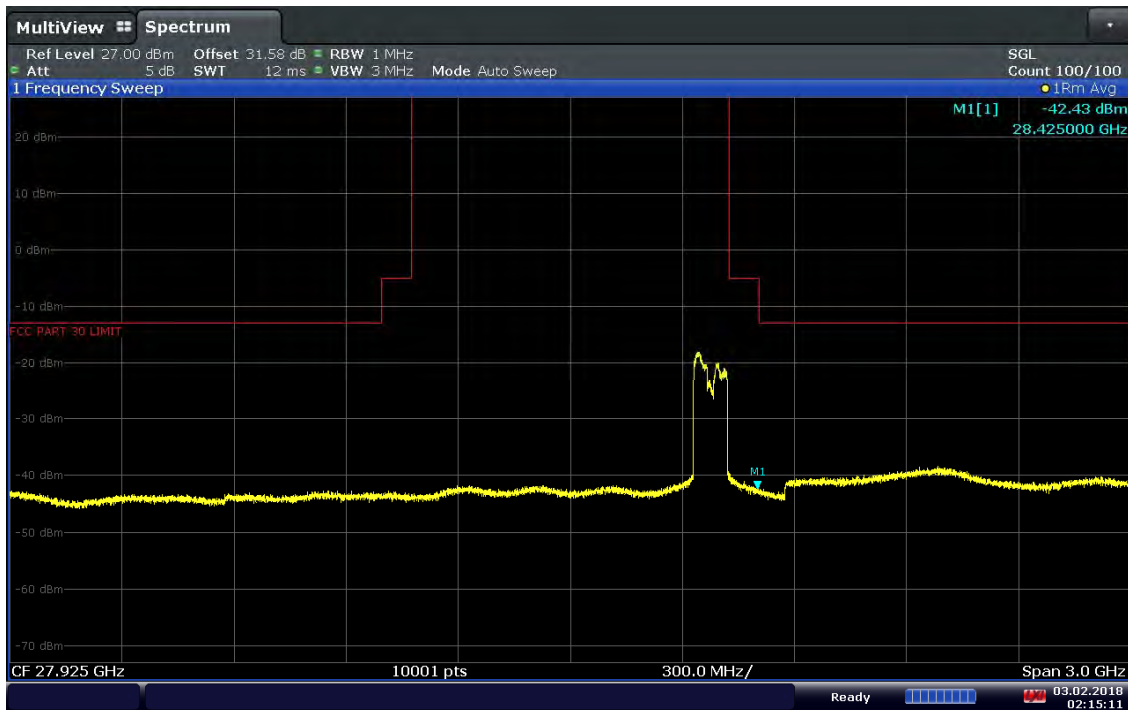
Plot 7-324. Band Edge Plot (8CC 64QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 200 of 222



02:16:11 03.02.2018

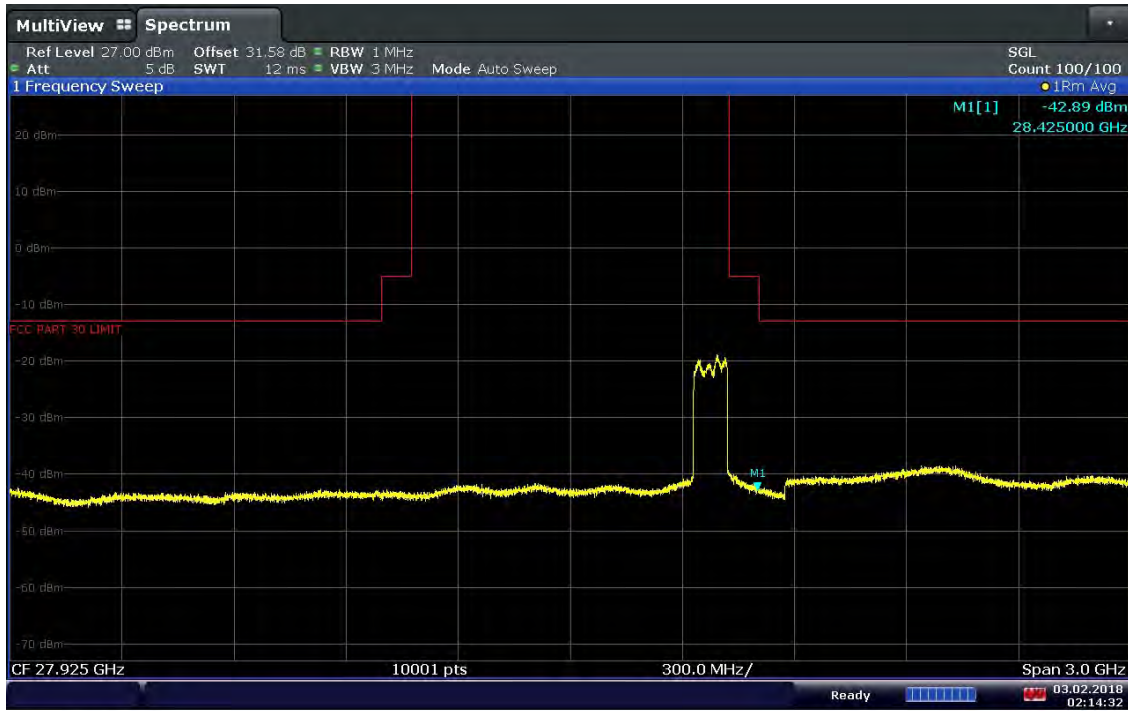
Plot 7-325. Band Edge Plot (1CC QPSK High Channel)



02:15:11 03.02.2018

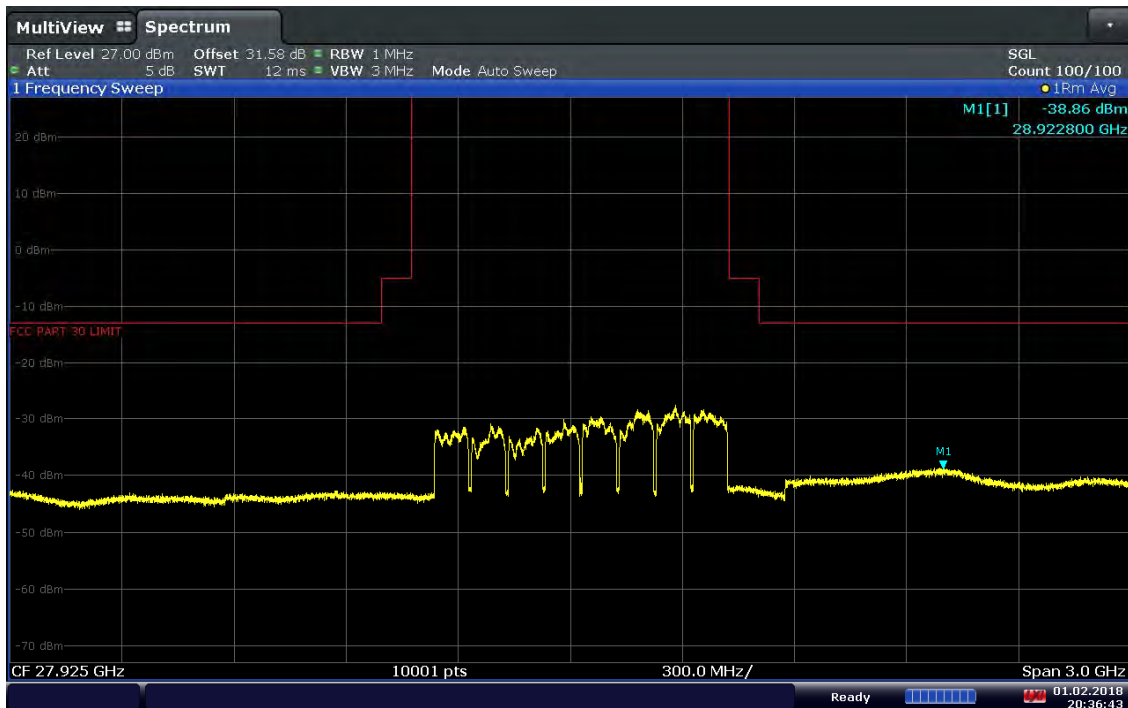
Plot 7-326. Band Edge Plot (1CC 16QAM High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 201 of 222



02:14:32 03.02.2018

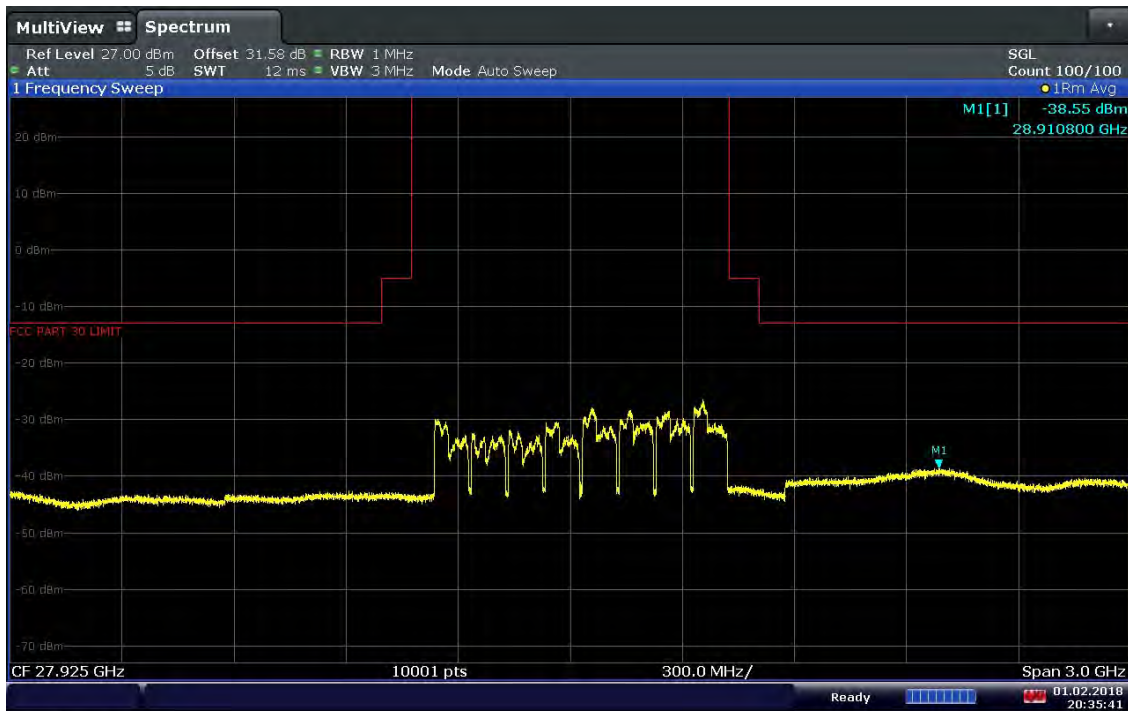
Plot 7-327. Band Edge Plot (1CC 64QAM High Channel)



20:36:43 01.02.2018

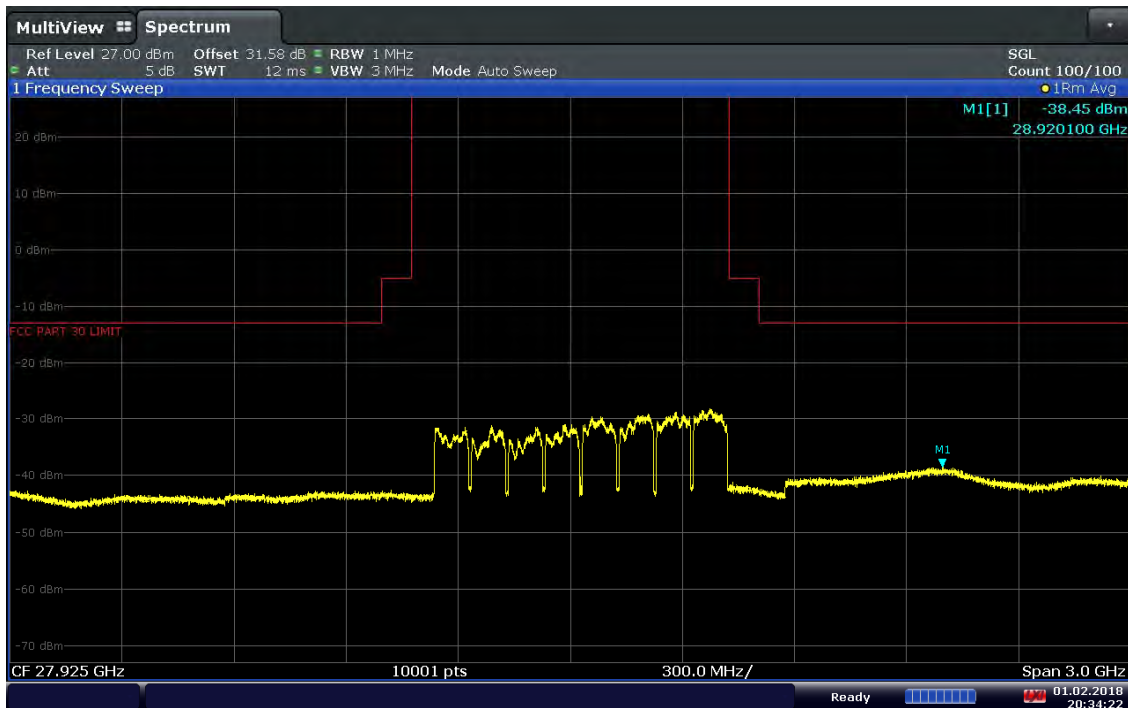
Plot 7-328. Band Edge Plot (8CC QPSK High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 202 of 222



20:35:41 01.02.2018

Plot 7-329. Band Edge Plot (8CC 16QAM High Channel)

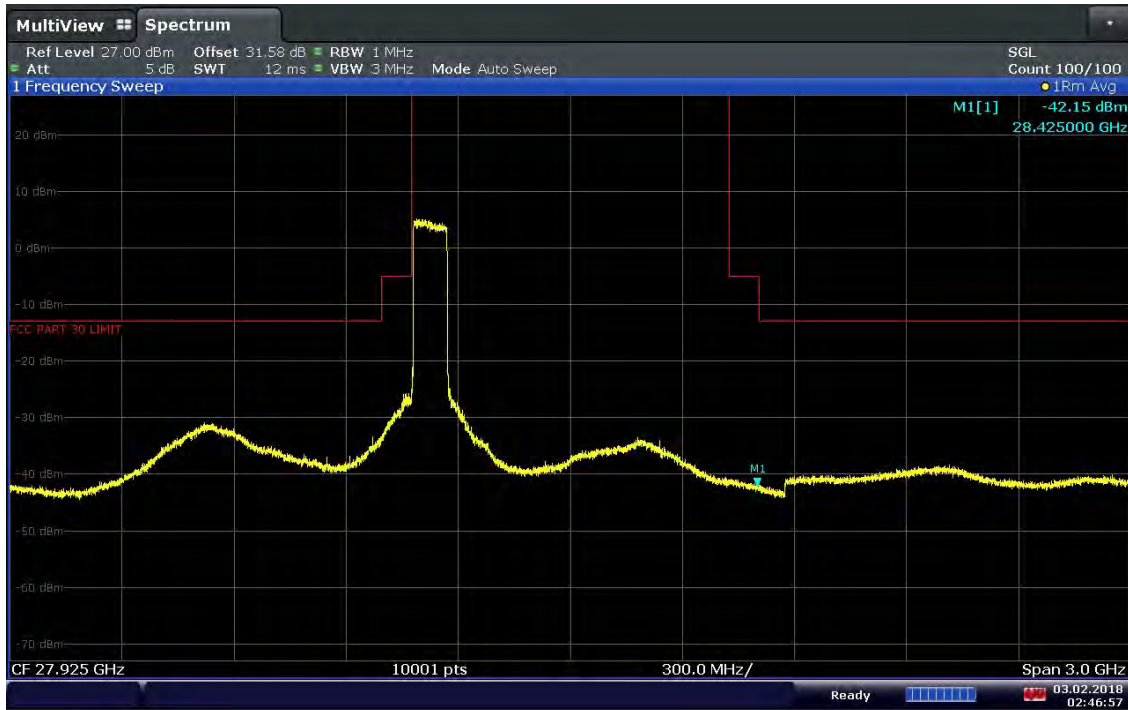


20:34:22 01.02.2018

Plot 7-330. Band Edge Plot (8CC 64QAM High Channel)

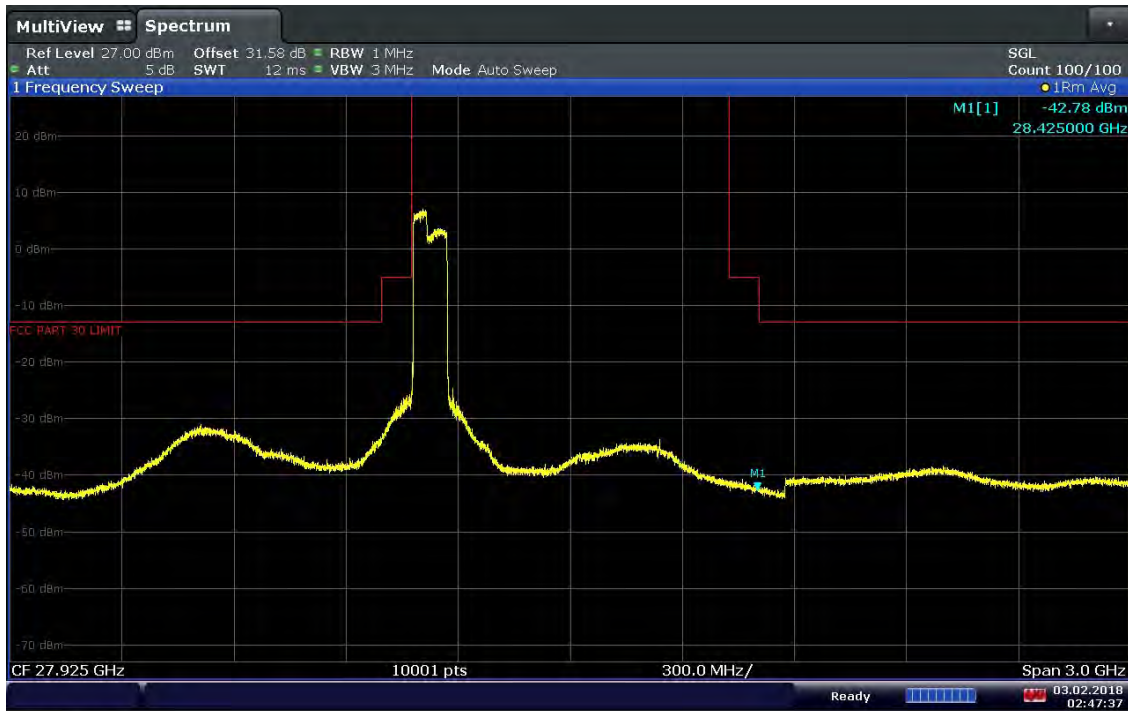
FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 203 of 222

7.6.9 Antenna D Conducted Band Edge Maximized on Antenna B



02:46:58 03.02.2018

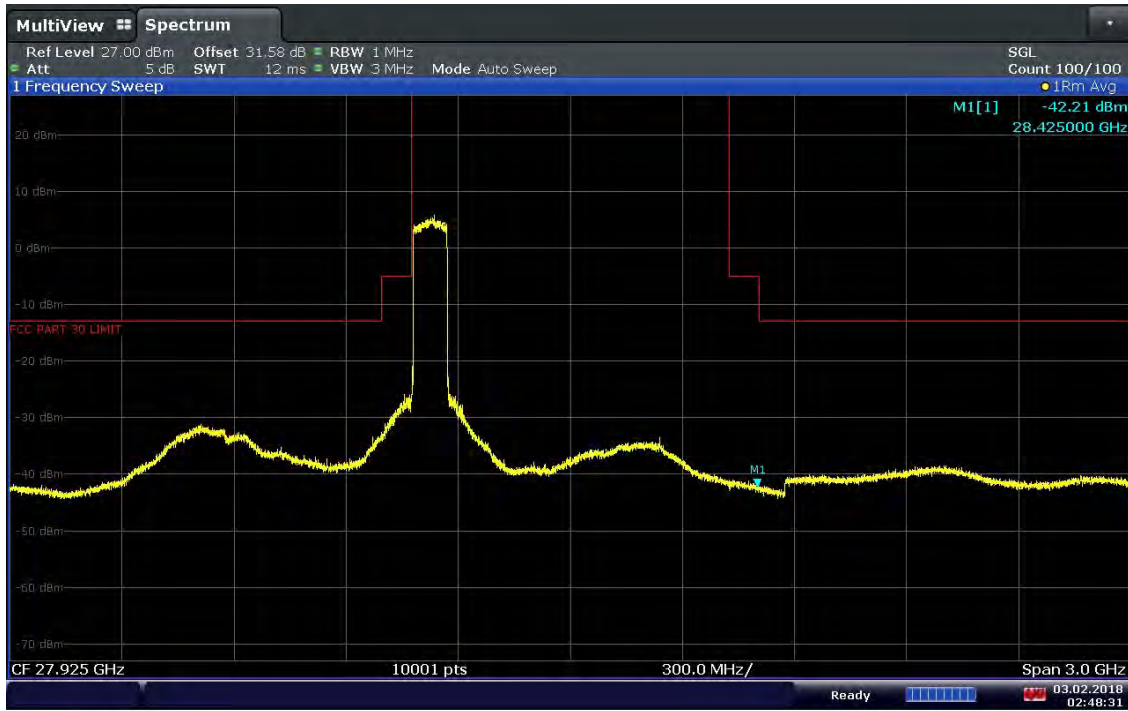
Plot 7-331. Band Edge Plot (1CC QPSK Low Channel)



02:47:38 03.02.2018

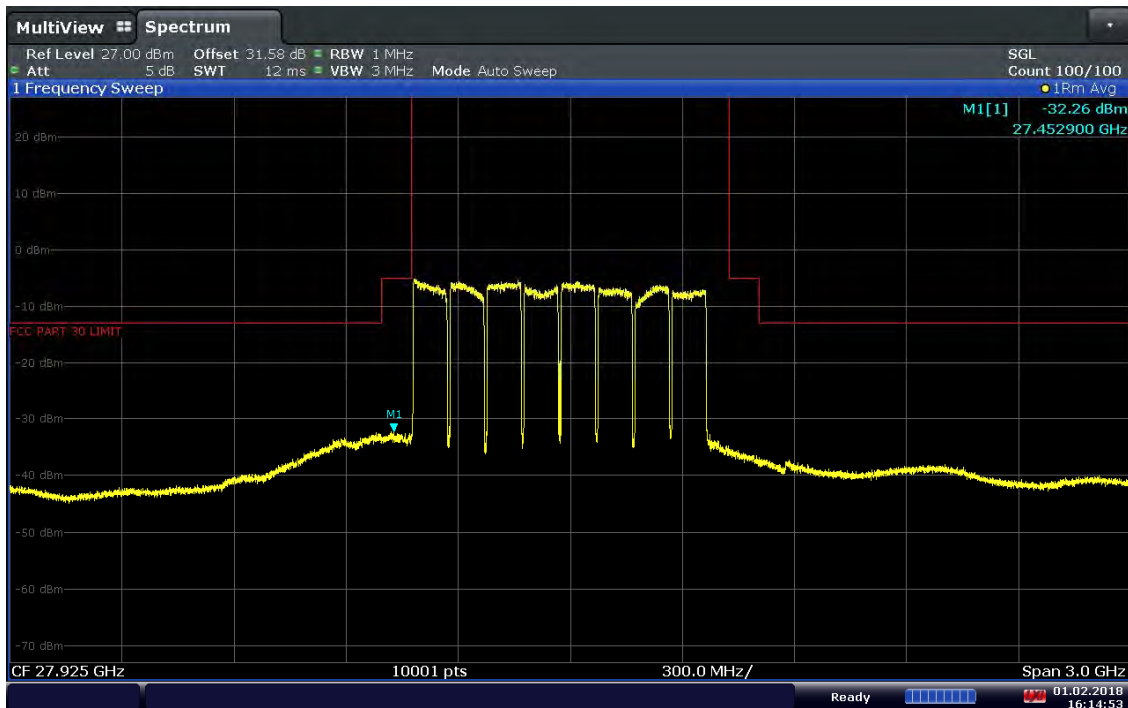
Plot 7-332. Band Edge Plot (1CC 16QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 204 of 222



02:48:32 03.02.2018

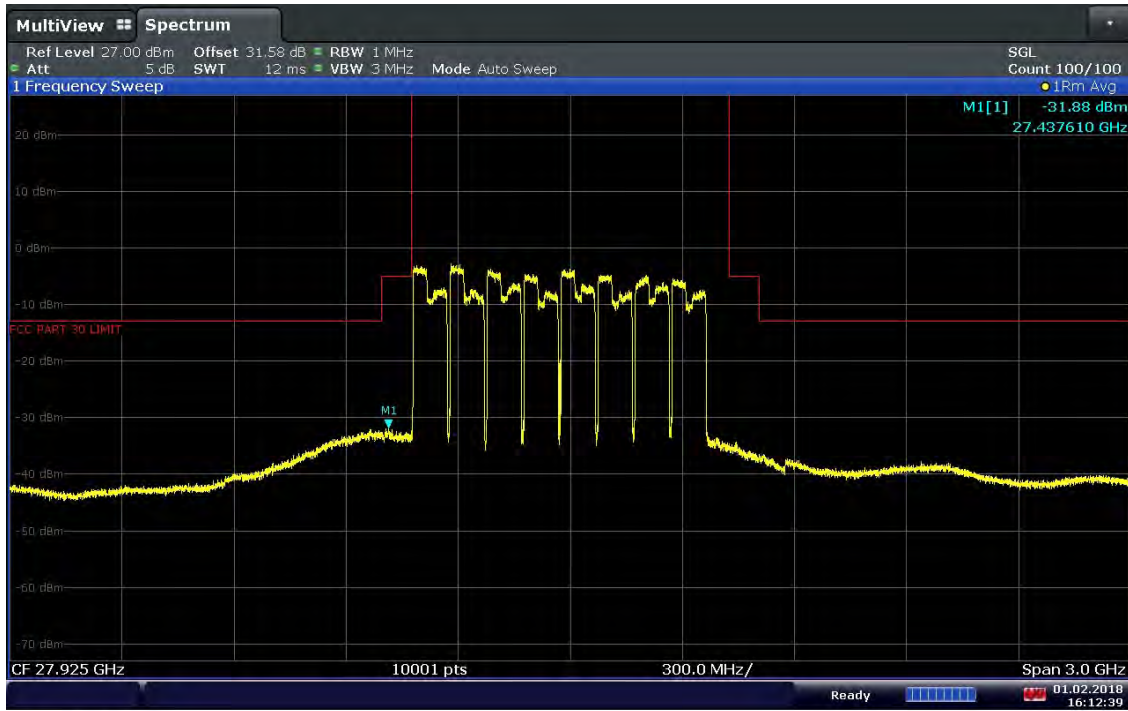
Plot 7-333. Band Edge Plot (1CC 64QAM Low Channel)



16:14:54 01.02.2018

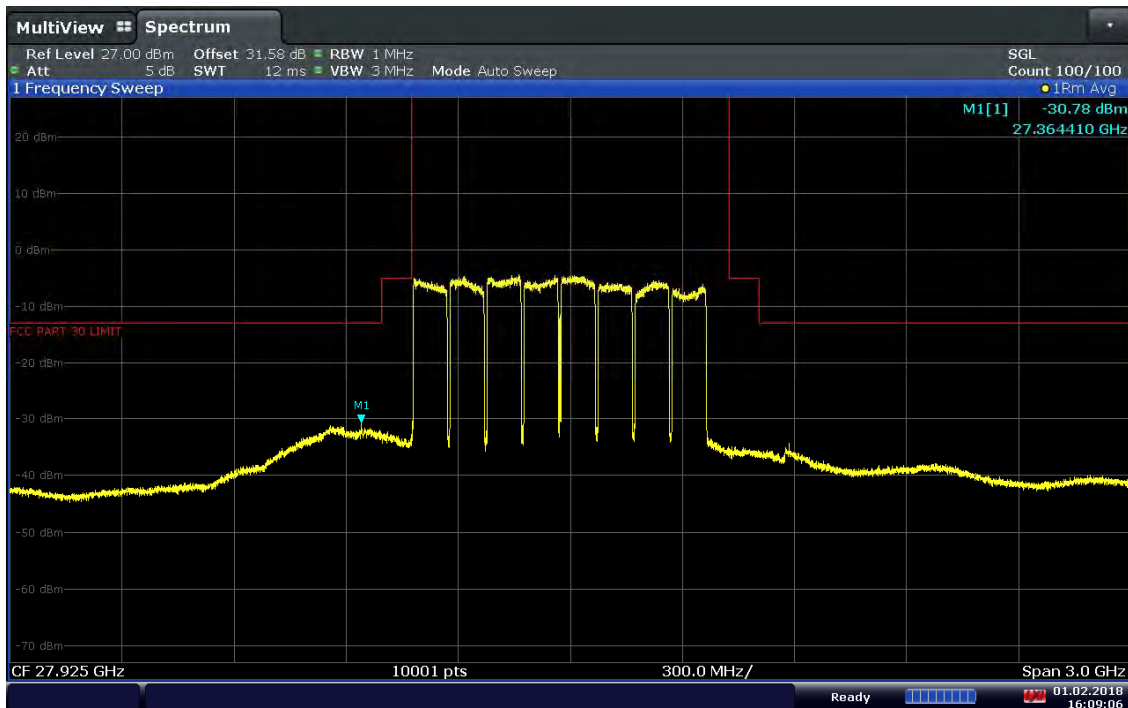
Plot 7-334. Band Edge Plot (8CC QPSK Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 205 of 222



16:12:40 01.02.2018

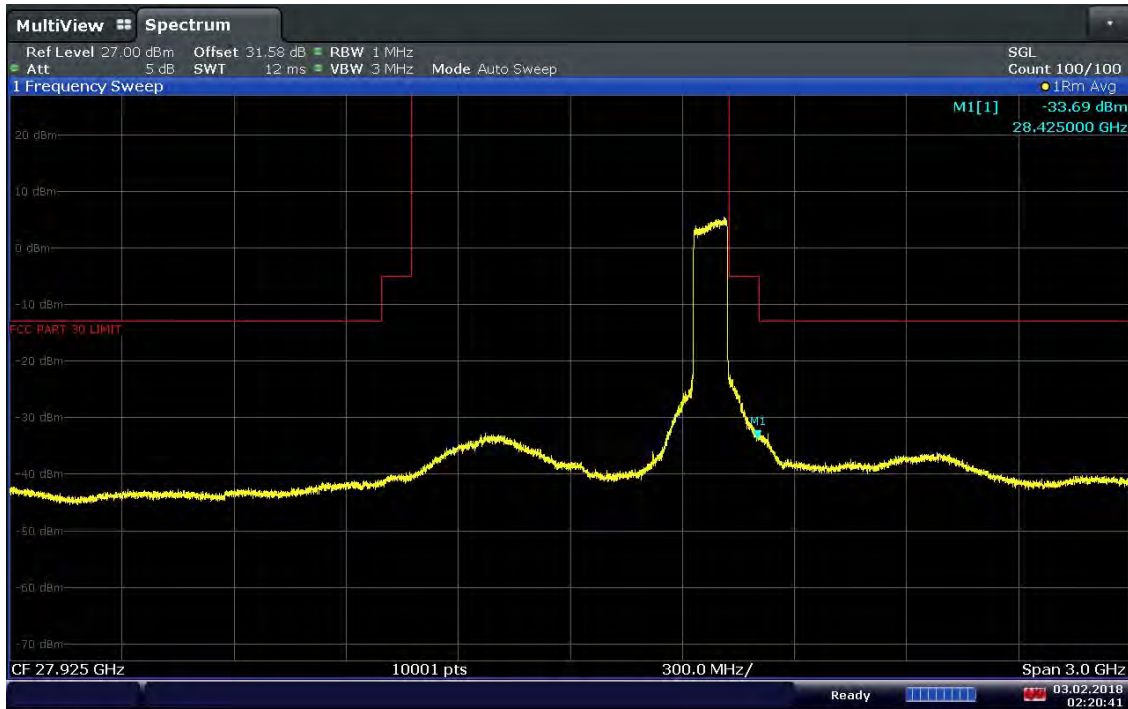
Plot 7-335. Band Edge Plot (8CC 16QAM Low Channel)



16:09:07 01.02.2018

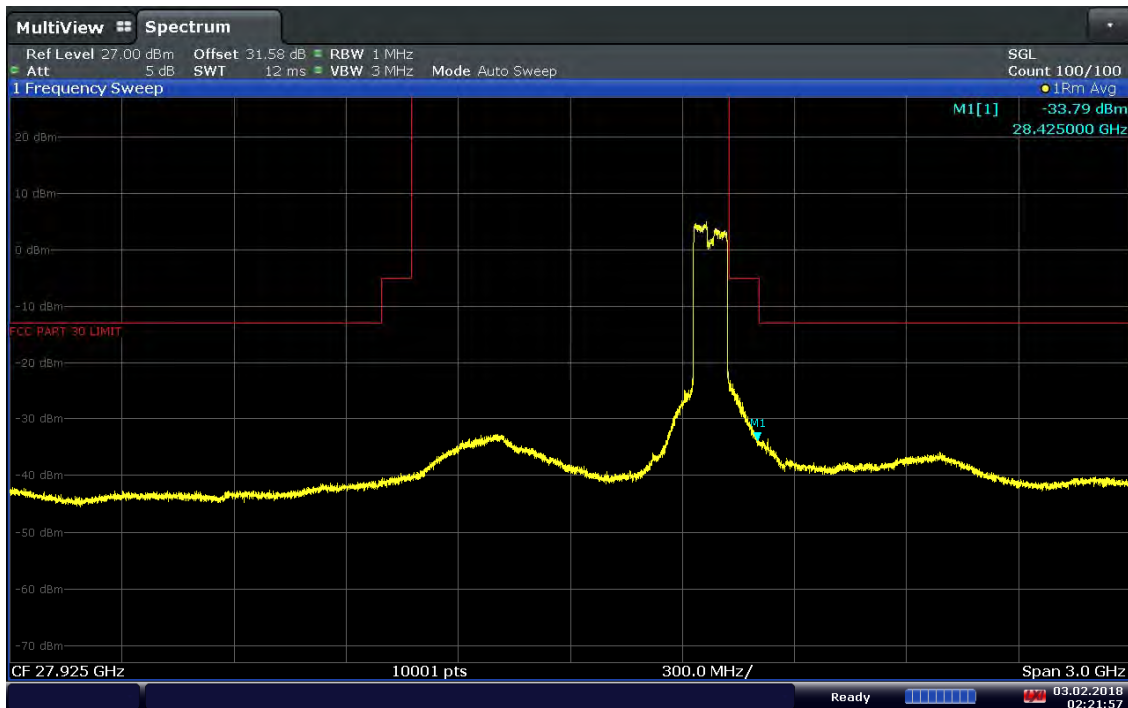
Plot 7-336. Band Edge Plot (8CC 64QAM Low Channel)

FCC ID: A3LSFG-AA100DC	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 206 of 222



02:20:42 03.02.2018

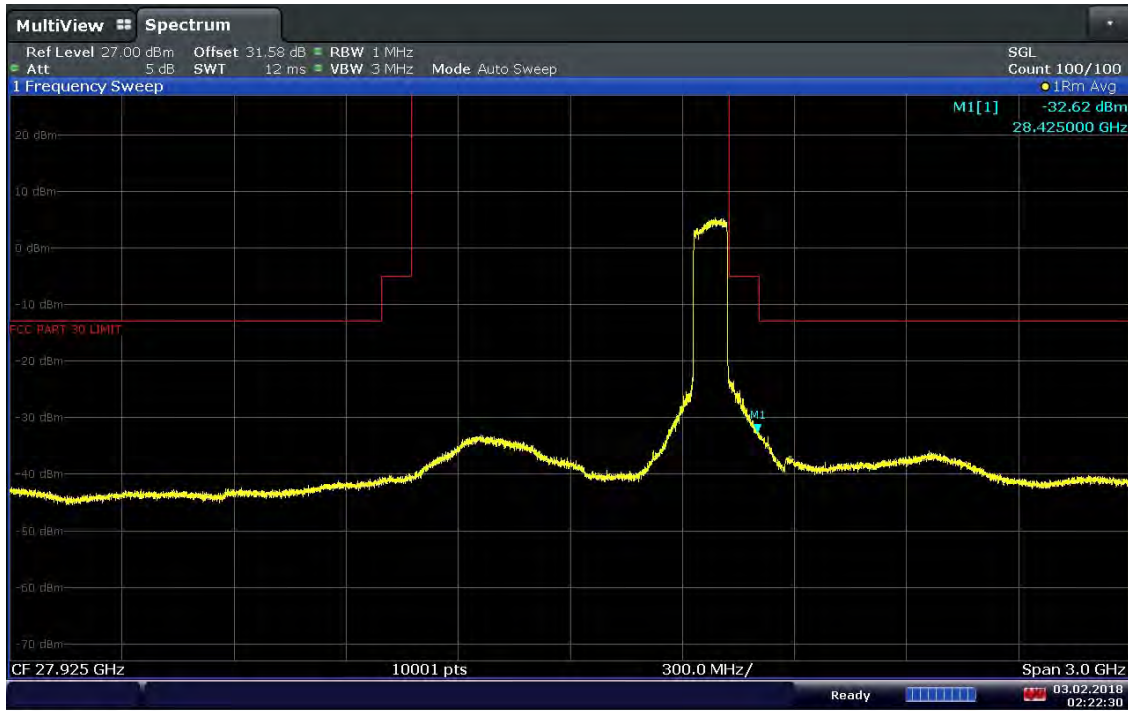
Plot 7-337. Band Edge Plot (1CC QPSK High Channel)



02:21:57 03.02.2018

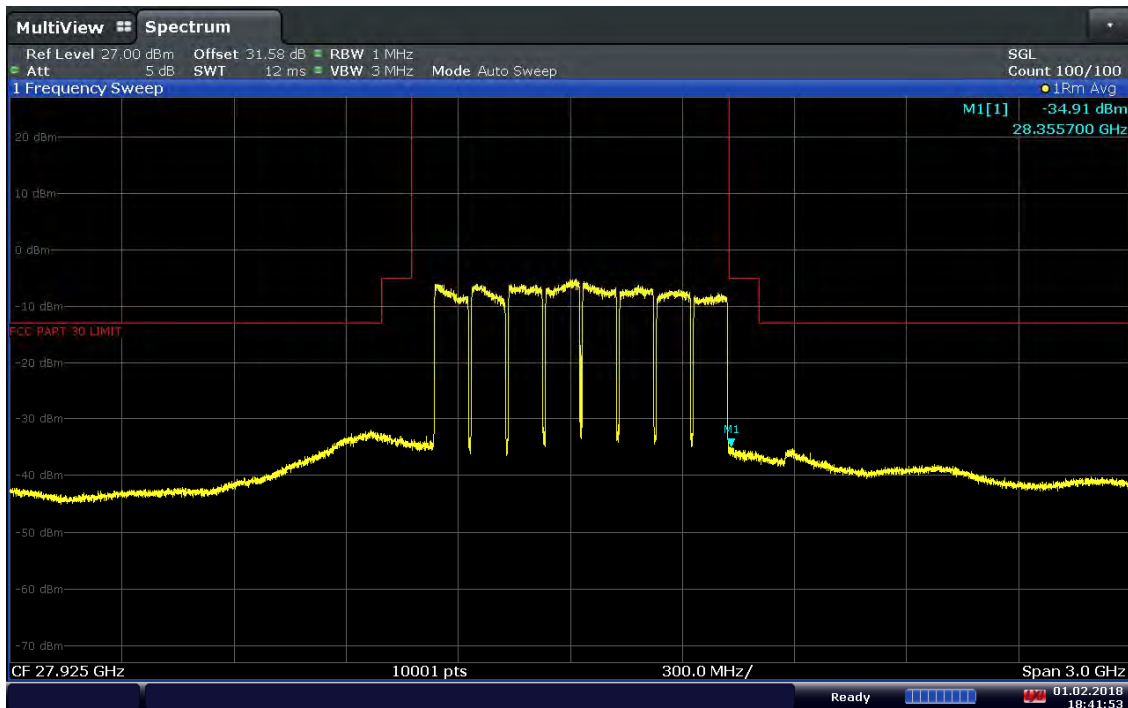
Plot 7-338. Band Edge Plot (1CC 16QAM High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 207 of 222



02:22:31 03.02.2018

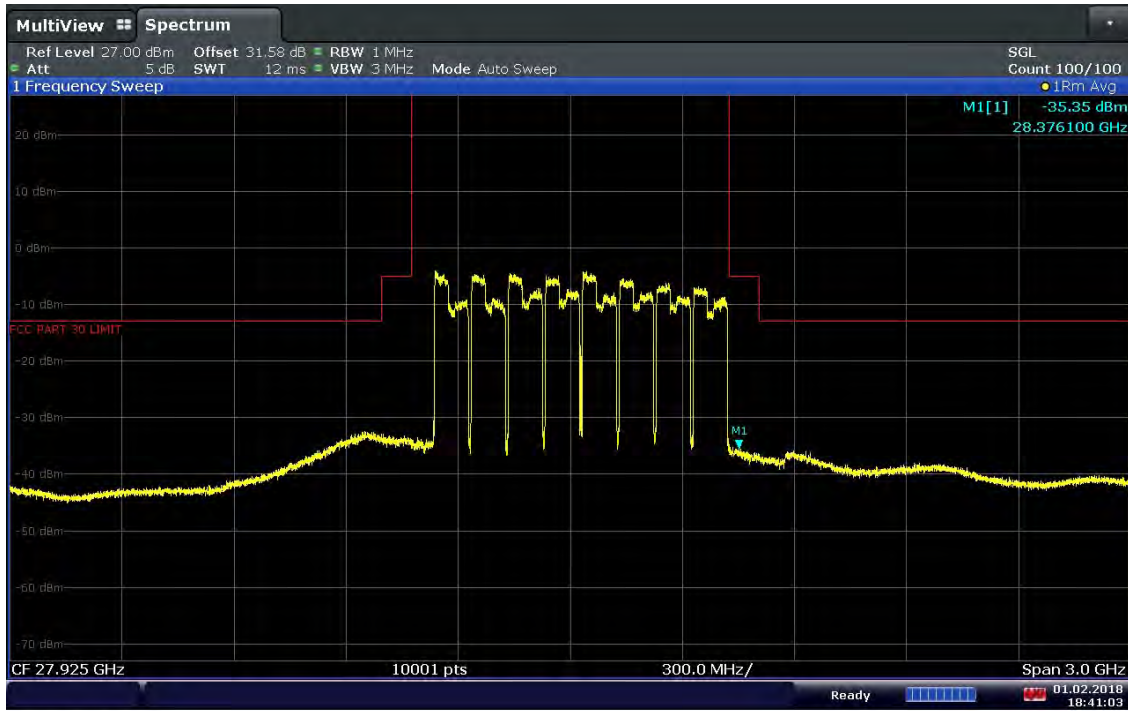
Plot 7-339. Band Edge Plot (1CC 64QAM High Channel)



18:41:54 01.02.2018

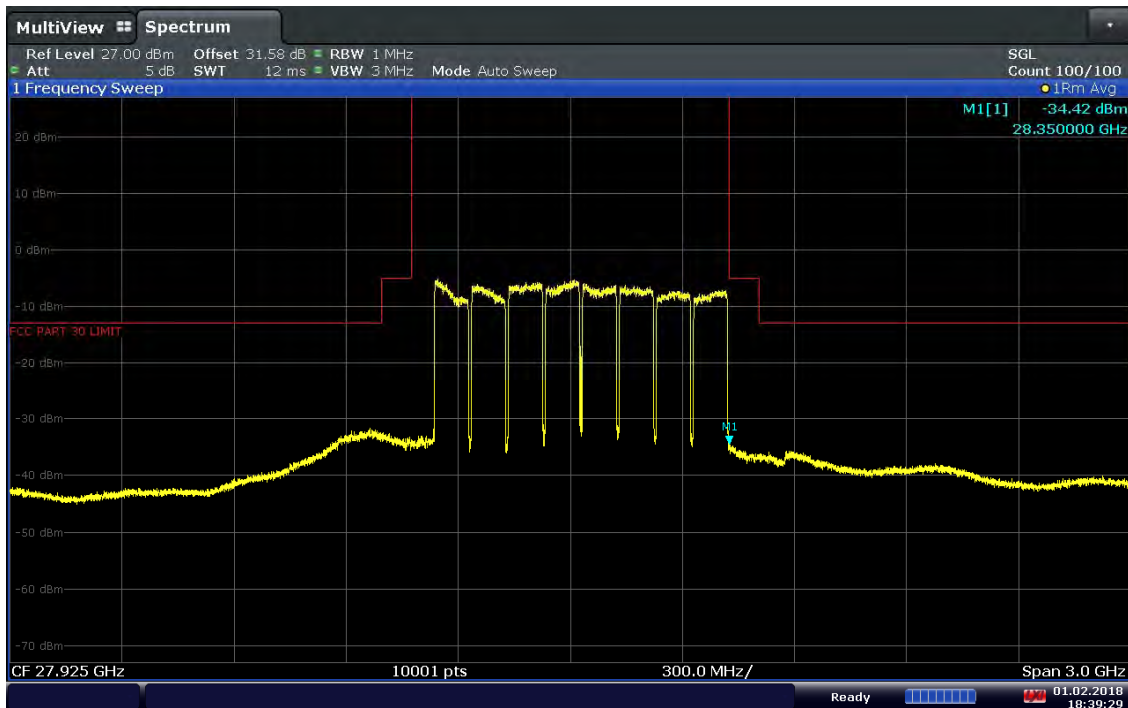
Plot 7-340. Band Edge Plot (8CC QPSK High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 208 of 222



18:41:03 01.02.2018

Plot 7-341. Band Edge Plot (8CC 16QAM High Channel)

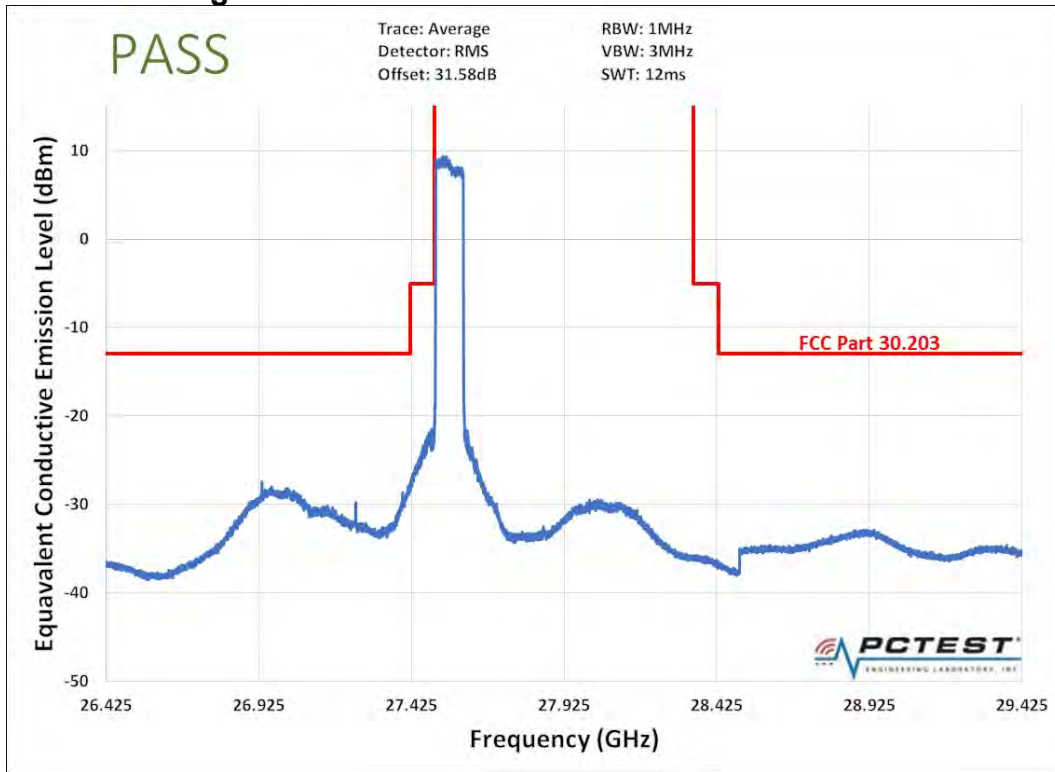


18:39:29 01.02.2018

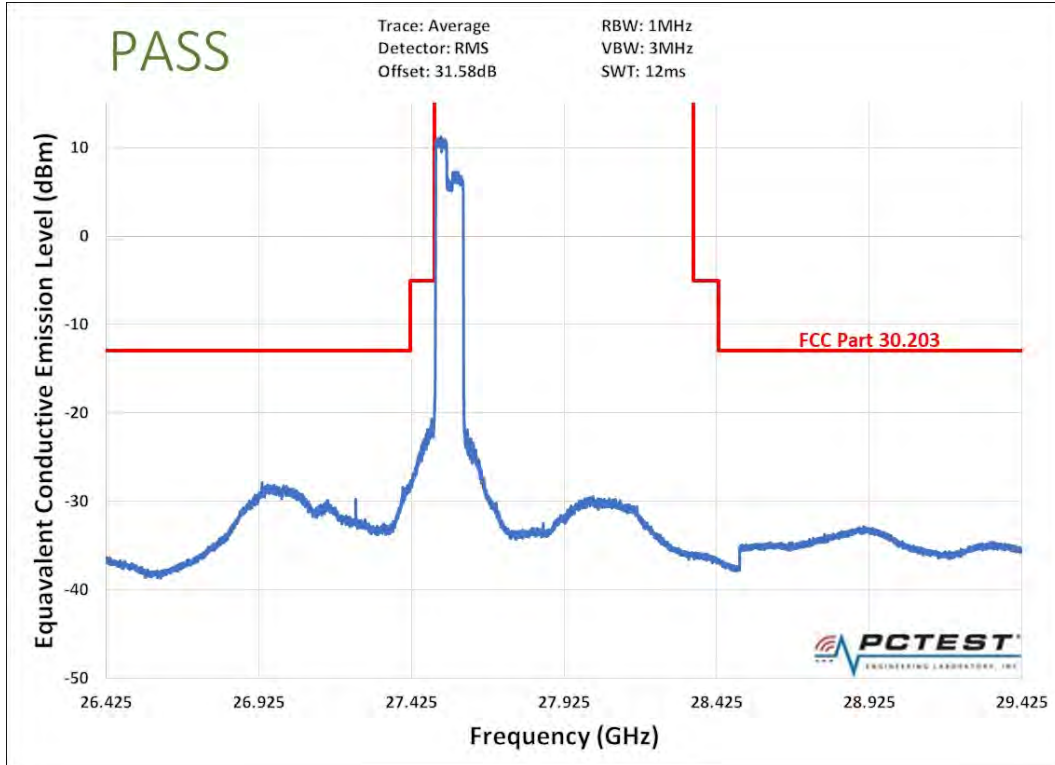
Plot 7-342. Band Edge Plot (8CC 64QAM High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 209 of 222

7.6.10 MIMO Band Edge Maximized on Antenna B

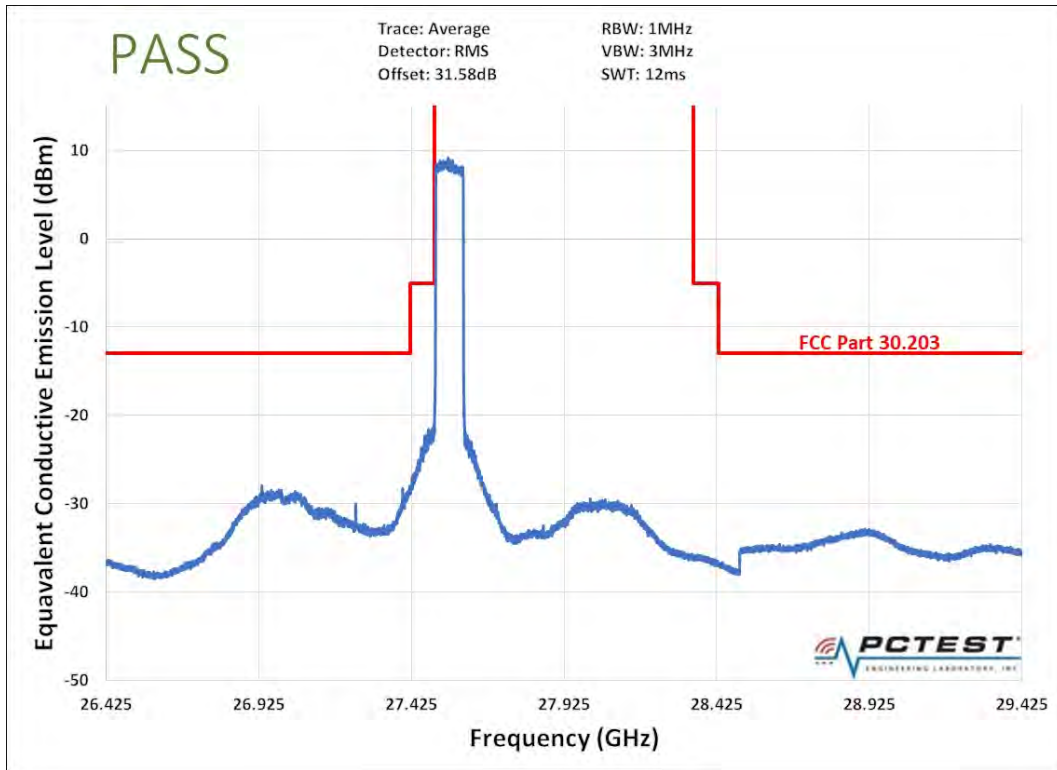


Plot 7-343. Band Edge Plot (1CC QPSK Low Channel)

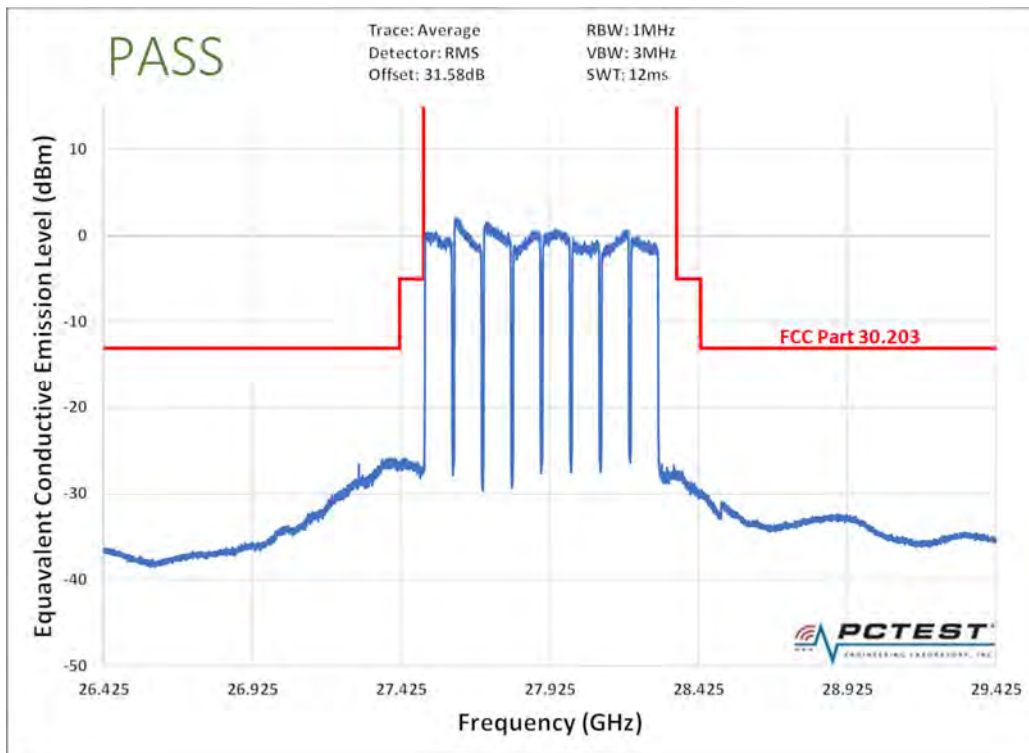


Plot 7-344. Band Edge Plot (1CC 16QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 210 of 222

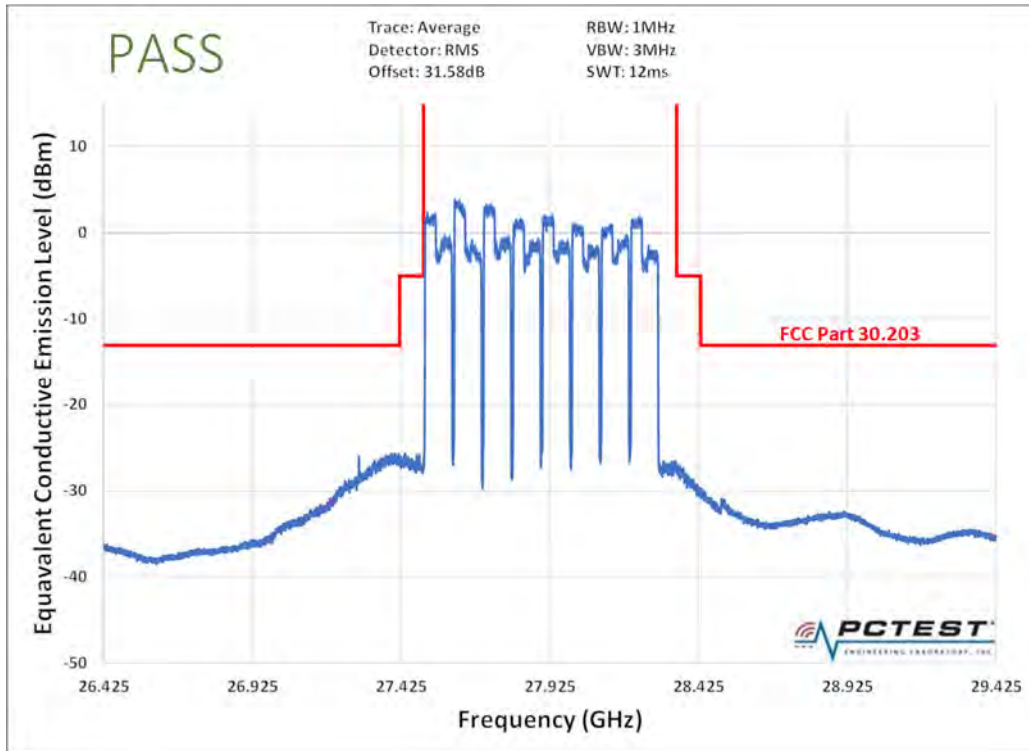


Plot 7-345. Band Edge Plot (1CC 64QAM Low Channel)

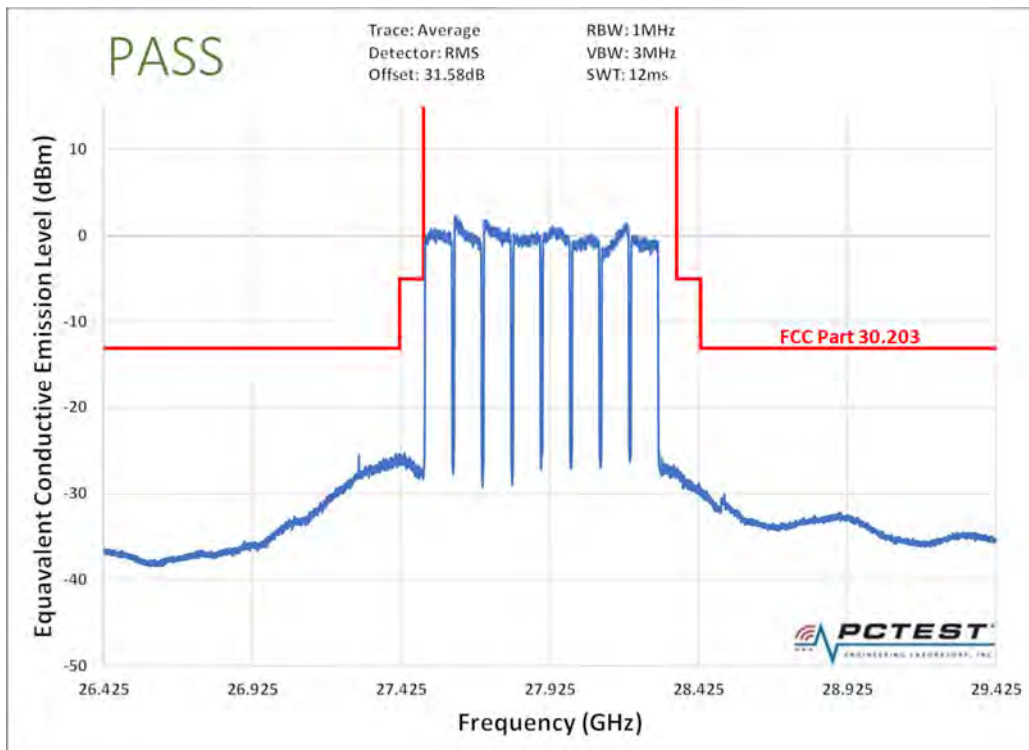


Plot 7-346. Band Edge Plot (8CC QPSK Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 211 of 222

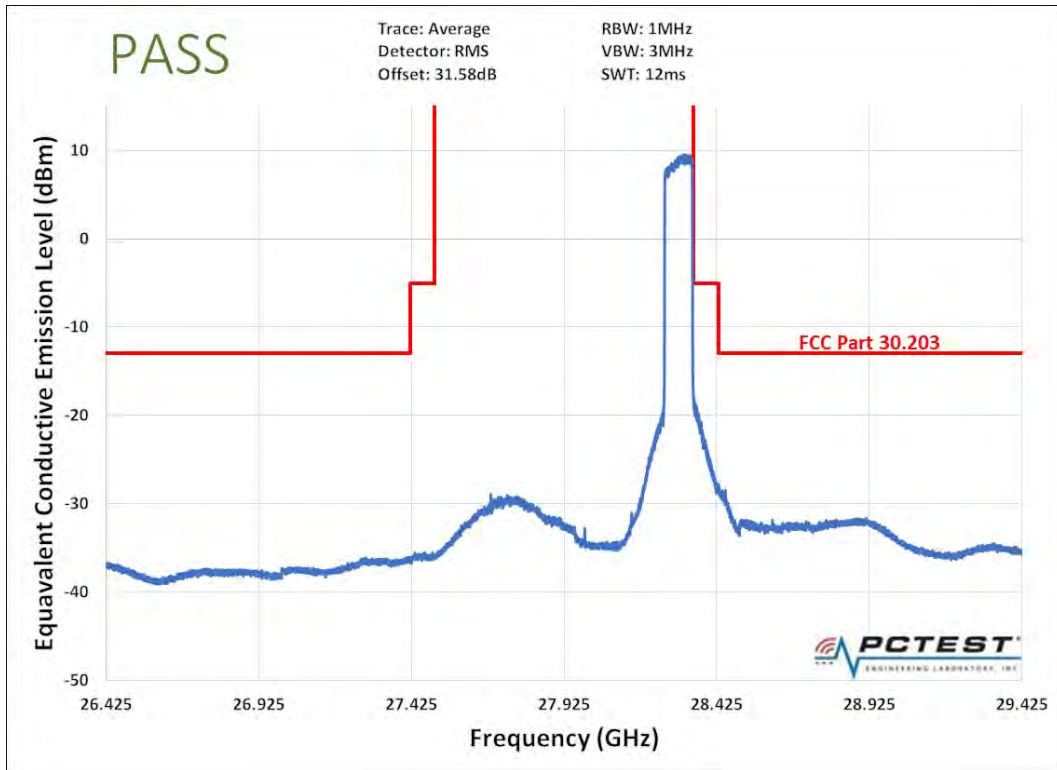


Plot 7-347. Band Edge Plot (8CC 16QAM Low Channel)

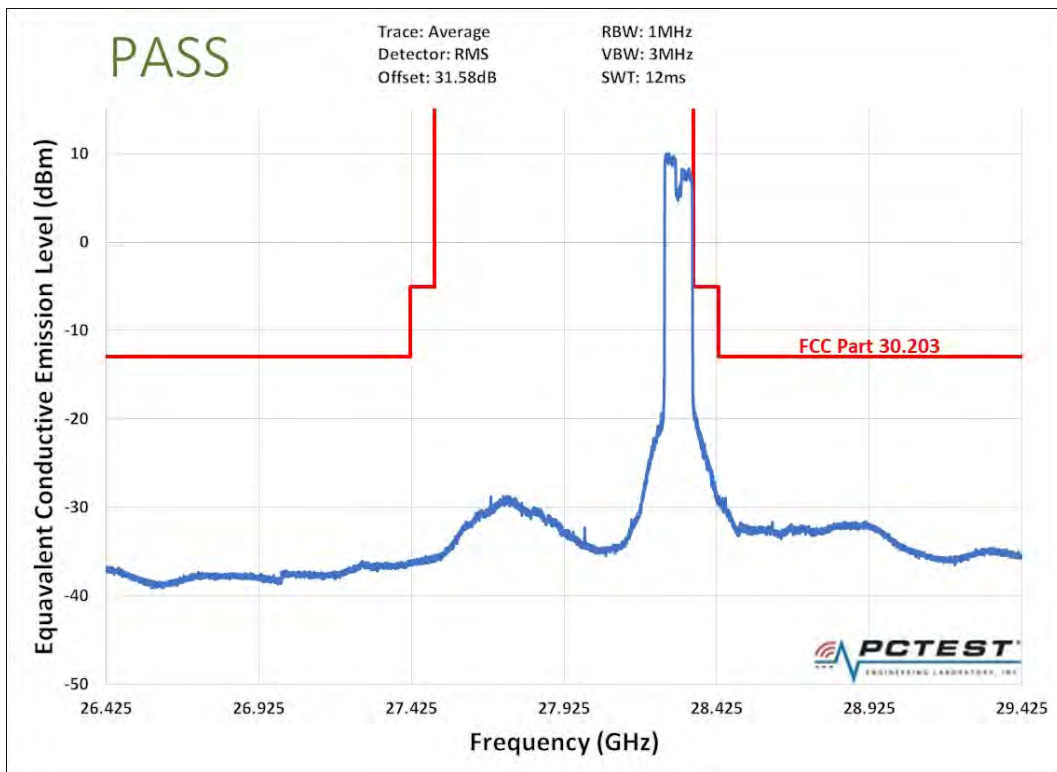


Plot 7-348. Band Edge Plot (8CC 64QAM Low Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 212 of 222

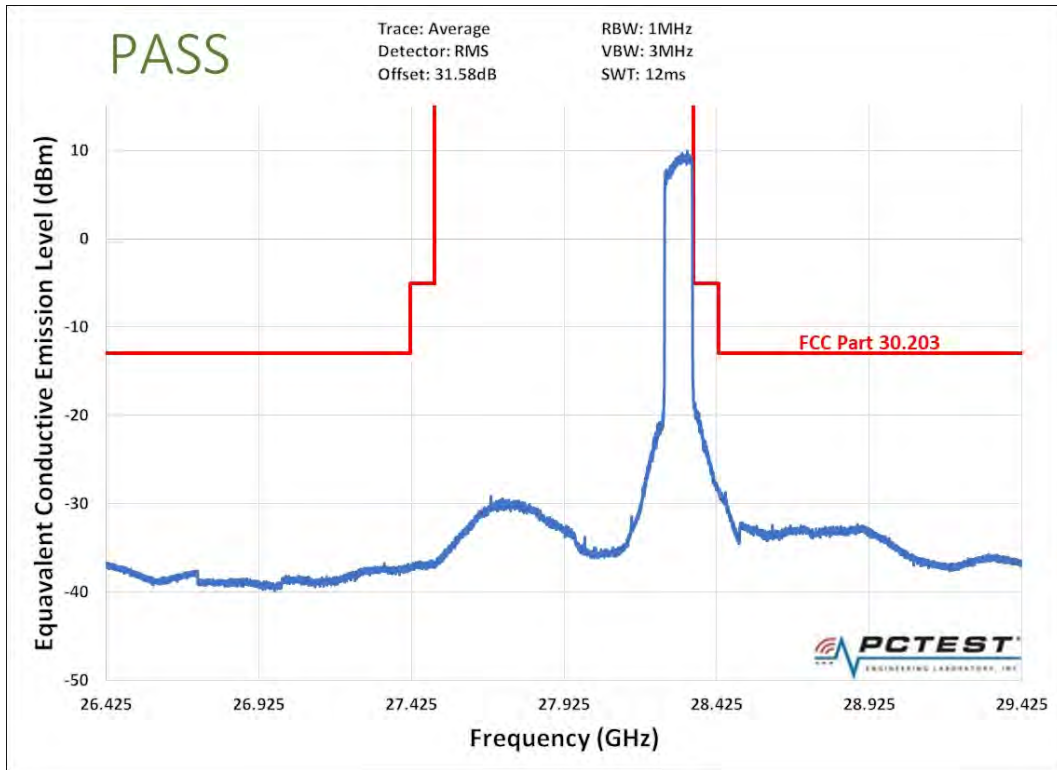


Plot 7-349. Band Edge Plot (1CC QPSK High Channel)

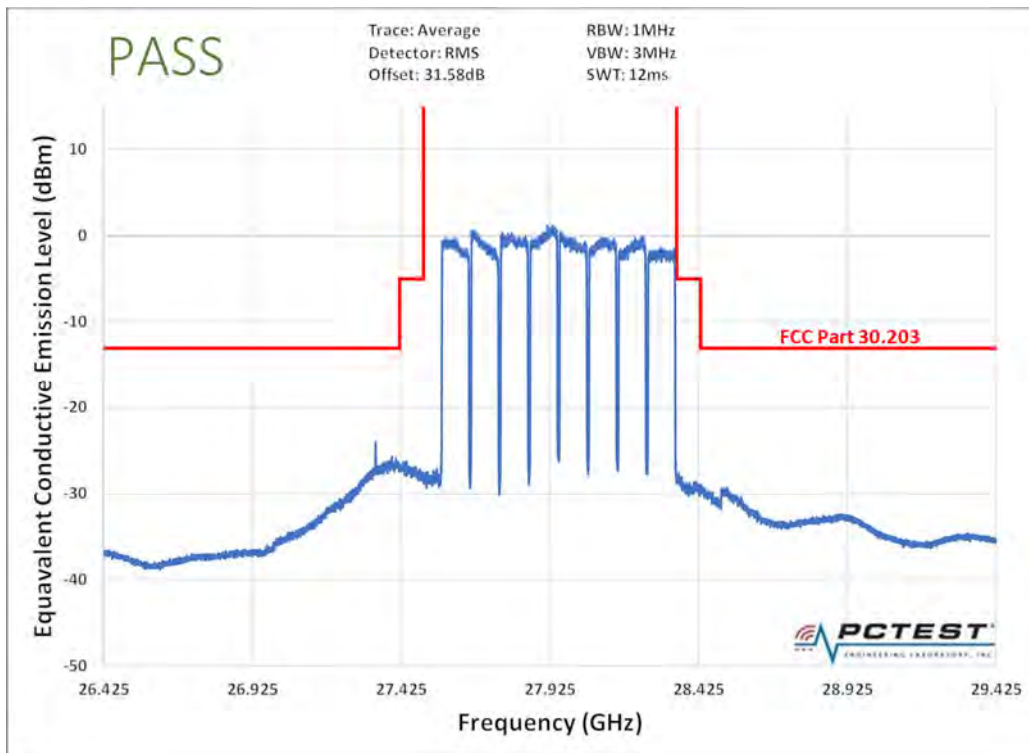


Plot 7-350. Band Edge Plot (1CC 16QAM High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 213 of 222

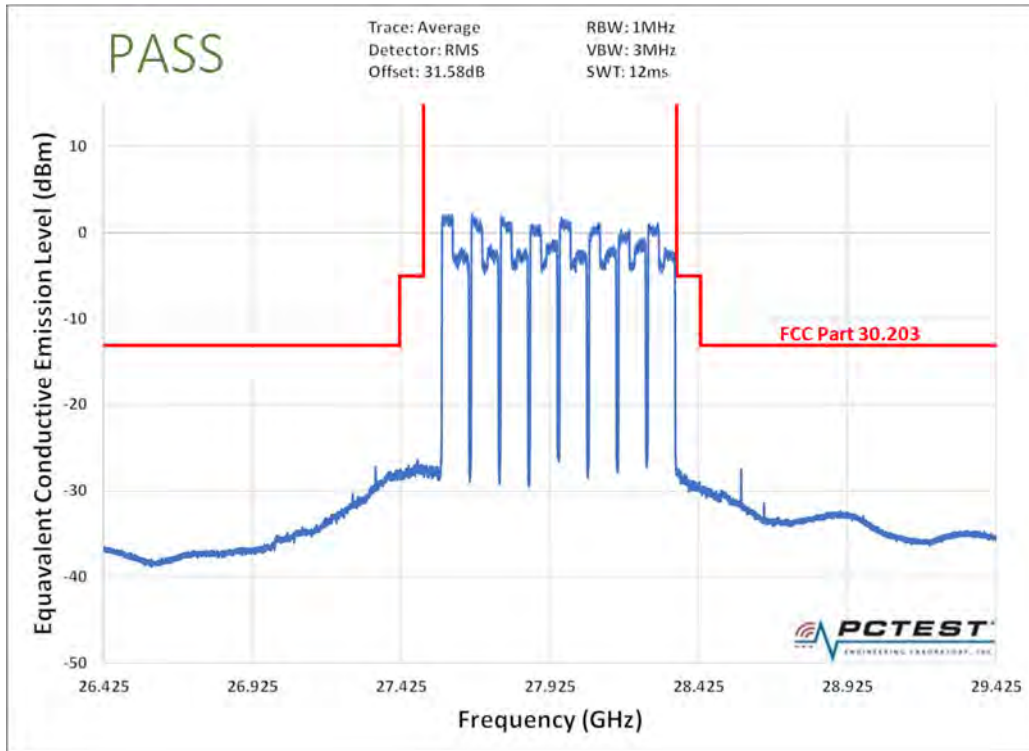


Plot 7-351. Band Edge Plot (1CC 64QAM High Channel)

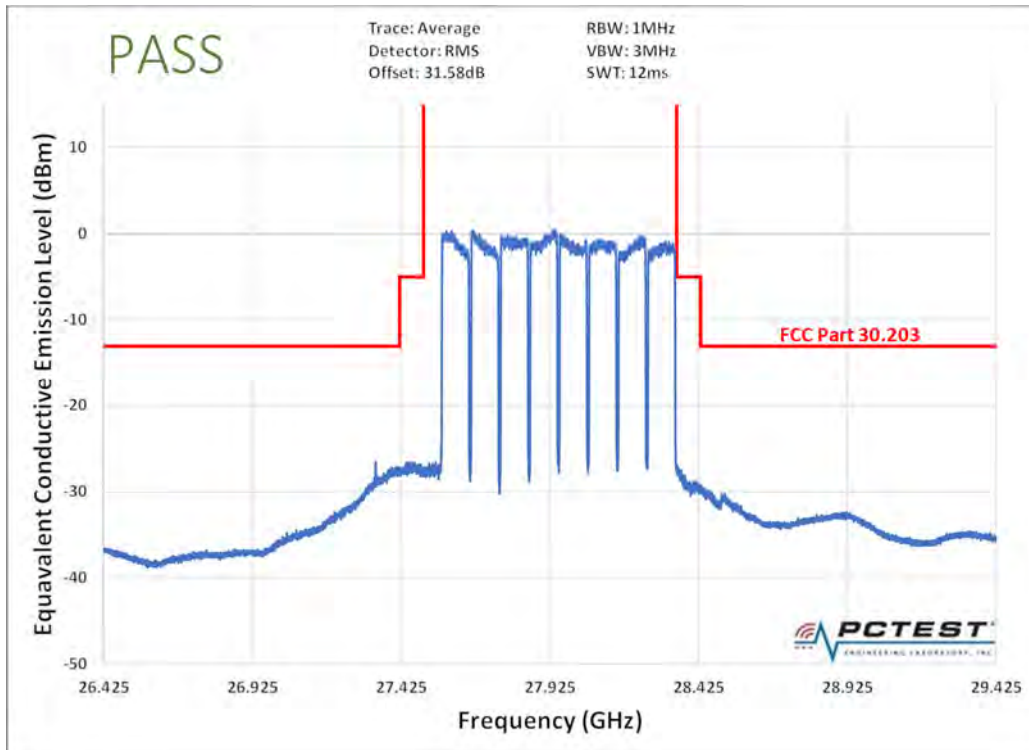


Plot 7-352. Band Edge Plot (8CC QPSK High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 214 of 222



Plot 7-353. Band Edge Plot (8CC 16QAM High Channel)



Plot 7-354. Band Edge Plot (8CC 64QAM High Channel)

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 215 of 222

7.7 Frequency Stability / Temperature Variation

§2.1055

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015. The frequency stability of the transmitter is measured by:

- Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Test Procedure Used

ANSI C63.26-2015 Section 5.6

Test Settings

- The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
- The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

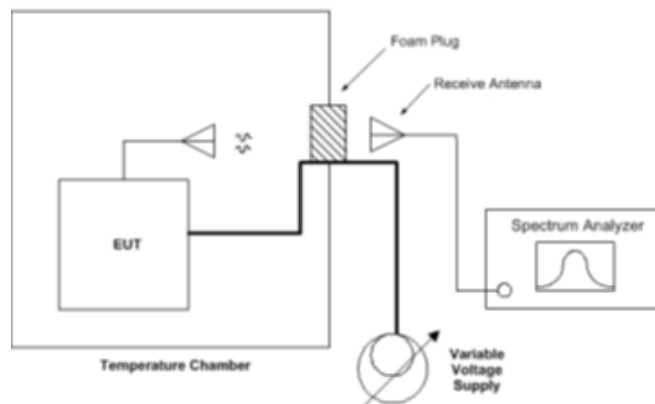


Figure 7-1. Test Instrument & Measurement Setup

The EUT was measured using horn antenna connected to a spectrum analyzer. The EUT was placed inside an environmental chamber.

Test Notes

None

FCC ID: A3LSFG-AA100DC	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 216 of 222

Frequency Stability Measurements

\$2.1055

OPERATING FREQUENCY: 27,925,000,000 Hz
 REFERENCE VOLTAGE: -48.00 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	-48.00	+ 20 (Ref)	27,925,001,386	1,386	0.0000050
100 %		- 30	27,925,002,298	2,298	0.0000082
100 %		- 20	27,924,998,589	-1,411	-0.0000051
100 %		- 10	27,924,997,689	-2,311	-0.0000083
100 %		0	27,925,000,759	759	0.0000027
100 %		+ 10	27,924,999,357	-643	-0.0000023
100 %		+ 20	27,924,999,150	-850	-0.0000030
100 %		+ 30	27,925,001,721	1,721	0.0000062
100 %		+ 40	27,925,001,344	1,344	0.0000048
100 %		+ 50	27,924,997,692	-2,308	-0.0000083
85 %	-40.80	+ 20	27,925,001,691	1,691	0.0000061
115 %	-55.20	+ 20	27,925,000,731	731	0.0000026

Table 7-24. Frequency Stability Data

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: A3LSFG-AA100DC		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 217 of 222

Frequency Stability Measurements

§2.1055

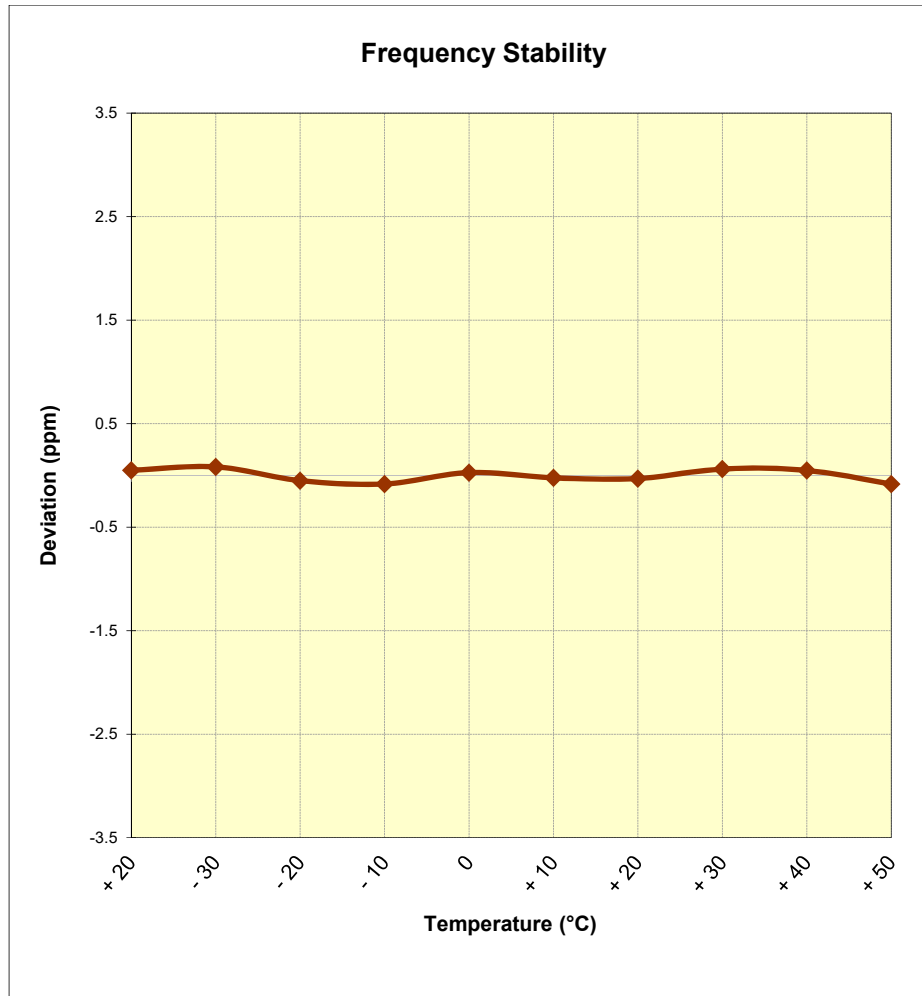


Figure 7-2. Frequency Stability Graph

FCC ID: A3LSFG-AA100DC		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 218 of 222

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung 5G Access Unit FCC ID: A3LSFG-AA100DC** complies with all the requirements of Part 30.

FCC ID: A3LSFG-AA100DC		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 219 of 222

9.0 APPENDIX A

9.1 OML Mixer Verification Certificate

Certificate of Compliance

Certificate No: 6201218D-F00228-1

Manufacturer: OML, Inc.

Model/Part No: HWDX08-VS (M08HWA Funct Verif) **Serial/ID No:** F00228-1

Description: WR-08 Mixer Functional Verification Service, Test Data, & USB Stick

Date of Test: January 16, 2018

Temperature: (23 +/- 5) deg C

Humidity: 20 to 65% RH

Procedure:

This certifies that the above product was tested in compliance with OML specifications using applicable OML's procedures.

As Received : Physical Condition: Good
Within Tolerance: Yes

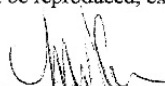
As Shipped: At the completion of the test, the product COMPLIED with the performance capability.

Remarks:

Traceability Information: Traceability is to national standards administered by U.S. NIST, NRC Canada, Euromet members (NPL, PTB, BNM, etc.) or other recognized standards laboratories. Some measurements are traceable to natural physical constants, consensus standards or ratio type measurements. Supporting documentation relative to traceability is available for review by appointment.

In the absence of power standards above 110 GHz, power measurements and conversion loss measurements above 110 GHz are to confirm operation functionality and traceable only to OML.

This certificate shall not be reproduced, except in full, without the written approval of OML.


Mitzi Chow, Material Manager

01/16/2018
Date

OML Inc.

300 Digital Drive, Morgan Hill, CA 95037 USA Tel. (408) 779 2698 Fax (408) 778 0491

FCC ID: A3LSFG-AA100DC		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 220 of 222

Certificate of Compliance

Certificate No: 6201218C-E00228-1

Manufacturer: OML, Inc.

Model/Part No: HWDX12-VS (M12HWA Funct Verif) **Serial/ID No:** E00228-1

Description: WR-12 Mixer Functional Verification Service, Test Data, & USB Stick

Date of Test: January 16, 2018

Temperature: (23 +/- 5) deg C

Humidity: 20 to 65% RH

Procedure:

This certifies that the above product was tested in compliance with OML specifications using applicable OML's procedures.

As Received : Physical Condition: Good
Within Tolerance: Yes

As Shipped: At the completion of the test, the product COMPLIED with the performance capability.

Remarks:

Traceability Information: Traceability is to national standards administered by U.S. NIST, NRC Canada, Euromet members (NPL, PTB, BNM, etc.) or other recognized standards laboratories. Some measurements are traceable to natural physical constants, consensus standards or ratio type measurements. Supporting documentation relative to traceability is available for review by appointment.

In the absence of power standards above 110 GHz, power measurements and conversion loss measurements above 110 GHz are to confirm operation functionality and traceable only to OML.

This certificate shall not be reproduced, except in full, without the written approval of OML.


Mitzi Chow, Material Manager

01/16/2018

Date

OML Inc.

300 Digital Drive, Morgan Hill, CA 95037 USA Tel. (408) 779 2698 Fax (408) 778 0491

FCC ID: A3LSFG-AA100DC		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit		Page 221 of 222

Certificate of Compliance

Certificate No: 6201218B-U00228-1

Manufacturer: OML, Inc.

Model/Part No: HWDX19-VS (M19HWA Funct Verif) **Serial/ID No:** U00228-1

Description: WR-19 Mixer Functional Verification Service, Test Data, & USB Stick

Date of Test: January 16, 2018

Temperature: (23 +/- 5) deg C

Humidity: 20 to 65% RH

Procedure:

This certifies that the above product was tested in compliance with OML specifications using applicable OML's procedures.

As Received : Physical Condition: Good
Within Tolerance: Yes

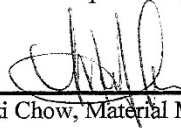
As Shipped: At the completion of the test, the product COMPLIED with the performance capability.

Remarks:

Traceability Information: Traceability is to national standards administered by U.S. NIST, NRC Canada, Euromet members (NPL, PTB, BNM, etc.) or other recognized standards laboratories. Some measurements are traceable to natural physical constants, consensus standards or ratio type measurements. Supporting documentation relative to traceability is available for review by appointment.

In the absence of power standards above 110 GHz, power measurements and conversion loss measurements above 110 GHz are to confirm operation functionality and traceable only to OML.

This certificate shall not be reproduced, except in full, without the written approval of OML.


Mitzi Chow, Material Manager

01/16/2018

Date

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FCC ID: A3LSFG-AA100DC	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1712270338-01-R1.A3L	Test Dates: 1/2-2/3/2018	EUT Type: 5G Access Unit	Page 222 of 222