

FCC TEST REPORT

Test report No.: EMC- FCC- R0207
FCC ID: TQ8-AT241E6AN
Type of equipment: DIGITAL CAR AVN SYSTEM
Basic Model Name: AT241E6AN
Applicant: Hyundai Mobis Co., Ltd.
FCC Rule Part(s): FCC Part 27
Frequency Range: LTE Band 13 (779.5 MHz ~ 784.5 MHz)
LTE Band 4 (1 710.7 MHz ~ 1 754.3 MHz)
Test result: Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.

The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of receipt: 2014. 10. 17

Date of test: 2014. 12. 02 ~ 12. 22

Issued date: 2015. 01. 15

Tested by: 

KIM, SUNG SIN

Approved by: 

YU, SANG HOON

[Contents]

1. Client information	3
2. Laboratory information	4
3. Description of E.U.T.	5
3.1 Basic description	5
3.2 General description	5
3.3 Test frequency Test mode	6
3.4 Test Voltage	6
4. Summary of test results	7
4.1 Standards & results	7
4.2 Uncertainty	7
5. Test results	8
5.1 Conducted Output Power	8
5.2 Occupied Bandwidth	17
5.3 Peak to Average Ratio	35
5.4 Undesirable emissions (conducted)	44
5.5 Frequency Stability	189
5.6 Effective Radiated Power	192
5.7 Undesirable emissions (Radiated)	196
6. Test equipment used for test	200

1. Client information

Applicant: Hyundai Mobis Co., Ltd.
Address: 203, Teheran-ro, Gangnam-gu, Seoul, Korea (135-977)
Telephone number: +82-31-260-0098
Facsimile number: +82-31-899-1788
Contact person: Seung-Hoon Choe / csh@mobis.co.kr

Manufacturer: Hyundai Mobis Co., Ltd.
Address: 95, Sayang 2-Gil, Munbaek-Myeon, Jincheon-Gun,
Chungcheongbuk-Do 365-862 Korea

2. Laboratory information

Address

EMC compliance Ltd.

480-5, Sin-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea

Telephone Number: 82-31-336-9919 Facsimile Number: 82-505-299-8311

Certificate

KOLAS No.: 231

FCC Site Designation No.: KR0040

FCC Site Registration No.: 687132

VCCI Site Registration No.: R-3327, G-198, C-3706, T-1849

IC Site Registration No.:8035A-2

SITE MAP



EMC compliance Ltd.

480-5, Sin-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea

82-31-336-9919 (Main) 82-505-299-8311 (Fax)

3. Description of E.U.T.

3.1 Basic description

Applicant	Hyundai Mobis Co., Ltd.
Address of Applicant	203, Teheran-ro, Gangnam-gu, Seoul, 135-977, Korea
Manufacturer	Hyundai Mobis Co., Ltd.
Address of Manufacturer	95, Sayang 2-Gil, MunBaek-Myeon, Jinchun-Gun, Chungcheongbuk-Do 365-862 Korea
Type of equipment	DIGITAL CAR AVN SYSTEM
Basic Model	AT241E6AN
Serial number	N/A

3.2 General description

Frequency Range	824.70 MHz ~ 848.31 MHz (CDMA800) 1 851.25 MHz ~ 1 908.75 MHz (CDMA1 900) 779.5 MHz ~ 784.5 MHz (LTE Band 13) 1 710.7 MHz ~ 1 754.3 MHz (LTE Band 4) 2 402 MHz ~ 2 480 MHz (Bluetooth) 2 412 MHz ~ 2 462 MHz (802.11b/g/n_HT20)
Type of Modulation	1xRTT, 1xEV-DO (CDMA800, CDMA1 900) QPSK, 16QAM (LTE Band 13, LTE Band 4) IEEE 802.11b/g/n_HT20 (WiFi) GFSK, $\pi/4$ DQPSK, 8DPSK (Bluetooth)
Type of Antenna	Metal Plate
Antenna Gain	4.27 dBi (CDMA800) 2.30 dBi (CDMA1 900) 2.64 dBi (LTE Band 13) 1.87 dBi (LTE Band 4) 4.12 dBi (WiFi) -3.26 dBi (Bluetooth)
Transmit Power	20.7 dBm (CDMA800) 17.9 dBm (CDMA1 900) 23.65 dBm (LTE Band 13) 24.04 dBm (LTE Band 4) 23.36 dBm (WiFi) 5.36 dBm (Bluetooth)
Power supply	DC 12 V*

* Declared by the applicant

3.3 Test frequency Test mode

The transmitter has a maximum average output power as follows:

Mode	Tx Frequency (MHz)	Rx Frequency (MHz)	Modulation	Conducted Power	
				Max power (dBm)	Max power (W)
LTE Band 13	779.5 ~ 784.5	748.5 ~ 753.5	QPSK	23.77	0.24
LTE Band 13	779.5 ~ 784.5	748.5 ~ 753.5	16QAM	22.65	0.18
LTE Band 13	782	751	QPSK	23.65	0.23
LTE Band 13	782	751	16QAM	22.58	0.18
LTE Band 4	1 710.7 ~ 1 754.3	2 110.7 ~ 2 154.3	QPSK	23.90	0.25
LTE Band 4	1 710.7 ~ 1 754.3	2 110.7 ~ 2 154.3	16QAM	22.91	0.20
LTE Band 4	1 711.5 ~ 1 753.5	2 111.5 ~ 2 153.5	QPSK	23.98	0.25
LTE Band 4	1 711.5 ~ 1 753.5	2 111.5 ~ 2 153.5	16QAM	22.92	0.20
LTE Band 4	1 712.5 ~ 1 752.5	2 112.5 ~ 2 152.5	QPSK	24.04	0.25
LTE Band 4	1 712.5 ~ 1 752.5	2 112.5 ~ 2 152.5	16QAM	22.81	0.19
LTE Band 4	1 715 ~ 1 750	2 115 ~ 2 150	QPSK	24.03	0.25
LTE Band 4	1 715 ~ 1 750	2 115 ~ 2 150	16QAM	23.01	0.20
LTE Band 4	1 717.5 ~ 1 747.5	2 117.5 ~ 2 147.5	QPSK	24.00	0.25
LTE Band 4	1 717.5 ~ 1 747.5	2 117.5 ~ 2 147.5	16QAM	23.00	0.20
LTE Band 4	1 720 ~ 1 745	2 120 ~ 2 145	QPSK	24.03	0.25
LTE Band 4	1 720 ~ 1 745	2 120 ~ 2 145	16QAM	22.99	0.20

3.4 Test Voltage

mode	Voltage
Norminal voltage	DC 12 V

4. Summary of test results

4.1 Standards & results

FCC Part 27			
FCC Rule Reference	Parameter	Report Section	Test Result
§2.1046	Conducted Output Power	5.1	C
§2.1049	Occupied Bandwidth	5.2	C
§24.232(d)	Peak to Average Ratio	5.3	C
§2.1051 §27.53(c.2) §27.53(h)	Undesirable Emissions at band edge and for all out-of-band emissions (Conducted)	5.4	C
§2.1055 §27.54	Frequency Stability	5.5	C
§27.50(b.10)	Effective Radiated Power	5.6	C
§27.50(d.4)	Equivalent Isotropic Radiated Power		C
§2.1051 §27.53(c.2) §27.53(h)	Undesirable Emissions (Radiated)	5.7	C
§27.53(f)	Undesirable Emissions in 1 559 ~ 1 610 MHz		C
§27.53(c.4)	Undesirable Emissions in 763 ~ 775 MHz & 793 ~ 805 MHz		C
§15.207(a)	Conducted Emissions	-	N/A ₁₎
Note: C = complies NC = Not complies NT = Not tested NA = Not Applicable N/A ₁₎ : The test is not applicable since the EUT is not the device that is designed to be connected to the public utility(AC) power line(This EUT is automotive device)			

4.2 Uncertainty

Measurement Item	Expanded Uncertainty $U = KU_c$ ($K = 2$)	
Conducted RF power	± 1.36 dB	
Occupied Bandwidth	± 2.54 kHz	
Conducted Spurious Emissions	± 1.52 dB	
Radiated Spurious Emissions	30 MHz ~ 300 MHz:	+ 4.94 dB, - 5.06 dB
		+ 4.93 dB, - 5.05 dB
	300 MHz ~ 1 000 MHz:	+ 4.97 dB, - 5.08 dB
		+ 4.84 dB, - 4.96 dB
	1 GHz ~ 6 GHz:	+ 6.03 dB, - 6.05 dB
	6 GHz ~ 25 GHz:	+ 6.41 dB, - 6.53 dB

5. Test results

5.1 Conducted Output Power

5.1.1 Measurement Procedure

1. The RF output of the transmitter was connected to the input of the Mobile Communication Test Unit through sufficient attenuation.
2. The EUT was set up for the max. output power with pseudo random data modulation.
3. The power was measured with Mobile Communication Test unit.

5.1.2 Limit

Requirements: CFR 47, Section §2.1046

5.1.3 Test Result

OUTPUT POWER FOR LTE BAND 13 (5.0 MHz)

Bandwidth (MHz)	UL Channel (MHz)	Frequency (MHz)	Modulation	RB		Peak Power (dBm)	Average (dBm)
				Size	Offset		
5.0	23205	779.5	QPSK	1	0	27.69	23.75
				1	12	27.87	23.51
				1	24	28.32	23.56
				12	0	27.66	22.46
				12	6	27.80	22.50
				12	13	28.12	22.44
				25	0	28.04	22.48
			16QAM	1	0	27.78	22.60
				1	12	27.98	22.42
				1	24	28.46	22.46
				12	0	27.72	21.53
				12	6	27.81	21.54
				12	13	28.08	21.54
				25	0	28.02	21.43
5.0	23230	782.0	QPSK	1	0	27.91	23.53
				1	12	28.26	23.64
				1	24	28.21	23.44
				12	0	28.07	22.55
				12	6	28.27	22.55
				12	13	28.39	22.45
				25	0	28.15	22.39
			16QAM	1	0	28.06	22.49
				1	12	28.56	22.65
				1	24	28.45	22.33
				12	0	28.10	21.59
				12	6	28.33	21.67
				12	13	28.38	21.58
				25	0	28.15	21.40
5.0	23255	784.5	QPSK	1	0	28.35	23.77
				1	12	28.33	23.68
				1	24	27.98	23.53
				12	0	28.32	22.47
				12	6	28.33	22.49
				12	13	28.26	22.44
				25	0	28.23	22.44
			16QAM	1	0	28.56	22.65
				1	12	28.62	22.60
				1	24	28.16	22.42
				12	0	28.34	21.53
				12	6	28.35	21.59
				12	13	28.31	21.55
				25	0	28.22	21.35

OUTPUT POWER FOR LTE BAND 13 (10.0 MHz)

Bandwidth (MHz)	UL Channel (MHz)	Frequency (MHz)	Modulation	RB		Peak Power (dBm)	Average (dBm)
				Size	Offset		
10.0	23230	782	QPSK	1	0	27.62	23.65
				1	24	28.24	23.64
				1	49	28.00	23.49
				25	0	27.98	22.45
				25	12	28.15	22.44
				25	25	28.26	22.43
				50	0	28.18	22.14
			16QAM	1	0	27.76	22.58
				1	24	28.54	22.52
				1	49	28.20	22.35
				25	0	27.99	21.54
				25	12	28.22	21.34
				25	25	28.33	21.41
				50	0	28.29	21.19

OUTPUT POWER FOR LTE BAND 4 (1.4 MHz)

Bandwidth (MHz)	UL Channel (MHz)	Frequency (MHz)	Modulation	RB		Peak Power (dBm)	Average (dBm)
				Size	Offset		
1.4	19957	1710.7	QPSK	1	0	28.75	23.42
				1	3	28.78	23.41
				1	5	28.89	23.43
				3	0	29.08	23.33
				3	3	29.17	23.48
				6	0	28.73	22.47
			16QAM	1	0	29.04	22.47
				1	3	29.16	22.49
				1	5	29.18	22.44
				3	0	29.11	22.44
				3	3	29.25	22.52
				6	0	28.80	21.47
1.4	20175	1732.5	QPSK	1	0	28.70	23.89
				1	3	28.64	23.87
				1	5	28.84	23.87
				3	0	28.94	23.82
				3	3	28.93	23.85
				6	0	28.66	22.84
			16QAM	1	0	28.92	22.78
				1	3	28.94	22.77
				1	5	28.91	22.78
				3	0	29.02	22.84
				3	3	29.00	22.81
				6	0	28.56	21.86
1.4	20393	1754.3	QPSK	1	0	29.46	23.78
				1	3	29.42	23.86
				1	5	29.48	23.87
				3	0	29.74	23.86
				3	3	29.74	23.90
				6	0	29.49	22.81
			16QAM	1	0	29.90	22.75
				1	3	30.02	22.82
				1	5	29.97	22.82
				3	0	30.06	22.89
				3	3	30.11	22.91
				6	0	29.36	21.85

OUTPUT POWER FOR LTE BAND 4 (3.0 MHz)

Bandwidth (MHz)	UL Channel (MHz)	Frequency (MHz)	Modulation	RB		Peak Power (dBm)	Average (dBm)
				Size	Offset		
3.0	19965	1711.5	QPSK	1	0	28.88	23.54
				1	7	28.94	23.47
				1	14	29.12	23.48
				8	0	28.97	22.44
				8	4	29.11	22.38
				8	7	28.93	22.37
				15	0	28.95	22.33
			16QAM	1	0	29.06	22.45
				1	7	29.36	22.44
				1	14	29.41	22.35
				8	0	28.54	21.41
				8	4	28.52	21.30
				8	7	28.62	21.34
				15	0	28.79	21.36
3.0	20175	1732.5	QPSK	1	0	28.71	23.98
				1	7	28.50	23.77
				1	14	28.50	23.75
				8	0	28.64	22.77
				8	4	28.63	22.73
				8	7	28.49	22.74
				15	0	28.56	22.76
			16QAM	1	0	28.94	22.92
				1	7	28.91	22.82
				1	14	28.76	22.70
				8	0	28.27	21.79
				8	4	28.24	21.77
				8	7	28.22	21.75
				15	0	28.51	21.78
3.0	20385	1753.5	QPSK	1	0	29.41	23.86
				1	7	29.37	23.78
				1	14	29.58	23.88
				8	0	29.49	22.84
				8	4	29.58	22.74
				8	7	29.49	22.75
				15	0	29.52	22.70
			16QAM	1	0	29.81	22.76
				1	7	29.92	22.75
				1	14	30.00	22.82
				8	0	28.93	21.80
				8	4	28.96	21.74
				8	7	28.96	21.69
				15	0	29.28	21.68

OUTPUT POWER FOR LTE BAND 4 (5.0 MHz)

Bandwidth (MHz)	UL Channel (MHz)	Frequency (MHz)	Modulation	RB		Peak Power (dBm)	Average (dBm)
				Size	Offset		
5.0	19975	1712.5	QPSK	1	0	29.30	23.49
				1	12	29.34	23.51
				1	24	29.59	23.74
				12	0	28.92	22.37
				12	6	29.08	22.48
				12	13	29.29	22.50
				25	0	28.93	22.42
			16QAM	1	0	29.13	22.43
				1	12	29.50	22.49
				1	24	29.59	22.73
				12	0	28.89	21.46
				12	6	28.91	21.50
				12	13	29.24	21.57
				25	0	28.86	21.39
5.0	20175	1732.5	QPSK	1	0	28.87	24.04
				1	12	28.69	23.88
				1	24	28.50	23.71
				12	0	28.80	22.96
				12	6	28.75	22.87
				12	13	28.70	22.79
				25	0	28.60	22.00
			16QAM	1	0	29.13	22.81
				1	12	29.07	22.79
				1	24	28.70	22.65
				12	0	28.82	22.02
				12	6	28.71	21.96
				12	13	28.69	21.89
				25	0	28.57	21.84
5.0	20375	1752.5	QPSK	1	0	29.30	23.79
				1	12	29.42	23.78
				1	24	29.52	23.72
				12	0	29.33	22.69
				12	6	29.43	22.65
				12	13	29.60	22.64
				25	0	29.26	22.65
			16QAM	1	0	29.56	22.80
				1	12	29.92	22.71
				1	24	29.89	22.68
				12	0	29.40	21.76
				12	6	29.50	21.77
				12	13	29.49	21.70
				25	0	29.17	21.66

OUTPUT POWER FOR LTE BAND 4 (10.0 MHz)

Bandwidth (MHz)	UL Channel (MHz)	Frequency (MHz)	Modulation	RB		Peak Power (dBm)	Average (dBm)
				Size	Offset		
10.0	20000	1715.0	QPSK	1	0	28.94	23.48
				1	24	29.43	23.81
				1	49	29.61	23.96
				25	0	28.96	22.47
				25	12	29.19	22.55
				25	25	29.30	22.80
				50	0	29.06	22.43
			16QAM	1	0	29.17	22.46
				1	24	29.82	22.80
				1	49	29.65	22.89
				25	0	28.88	21.43
				25	12	29.16	21.59
				25	25	29.23	21.80
				50	0	29.16	21.47
10.0	20175	1732.5	QPSK	1	0	29.11	24.03
				1	24	28.72	23.85
				1	49	28.69	23.94
				25	0	28.75	22.92
				25	12	28.65	22.85
				25	25	28.42	22.77
				50	0	28.52	22.64
			16QAM	1	0	29.42	23.01
				1	24	29.08	22.85
				1	49	28.88	22.90
				25	0	28.72	21.86
				25	12	28.59	21.77
				25	25	28.60	21.70
				50	0	28.55	21.57
10.0	20350	1750.0	QPSK	1	0	28.99	23.80
				1	24	29.32	23.84
				1	49	29.62	23.75
				25	0	29.03	22.79
				25	12	29.25	22.79
				25	25	29.23	22.64
				50	0	29.05	22.59
			16QAM	1	0	29.32	22.81
				1	24	29.77	22.90
				1	49	29.73	22.72
				25	0	28.95	21.78
				25	12	29.15	21.82
				25	25	29.13	21.64
				50	0	29.13	21.49

OUTPUT POWER FOR LTE BAND 4 (15.0 MHz)

Bandwidth (MHz)	UL Channel (MHz)	Frequency (MHz)	Modulation	RB		Peak Power (dBm)	Average (dBm)
				Size	Offset		
15.0	20025	1717.5	QPSK	1	0	28.93	23.50
				1	37	29.53	23.89
				1	74	29.37	23.86
				36	0	29.25	22.54
				36	16	29.45	22.64
				36	39	29.43	22.82
				75	0	29.03	22.50
			16QAM	1	0	29.24	22.49
				1	37	29.93	23.00
				1	74	29.63	22.90
				36	0	29.16	21.42
				36	16	29.32	21.68
				36	39	29.38	21.85
				75	0	28.96	21.48
15.0	20175	1732.5	QPSK	1	0	29.11	23.86
				1	37	28.60	23.88
				1	74	28.63	24.00
				36	0	28.80	22.79
				36	16	28.58	22.68
				36	39	28.36	22.58
				75	0	28.50	22.60
			16QAM	1	0	29.43	22.84
				1	37	28.93	22.83
				1	74	28.80	22.92
				36	0	28.74	21.77
				36	16	28.58	21.64
				36	39	28.37	21.61
				75	0	28.48	21.59
15.0	20325	1747.5	QPSK	1	0	28.42	23.65
				1	37	29.09	23.93
				1	74	29.52	23.83
				36	0	28.67	22.71
				36	16	29.02	22.84
				36	39	29.21	22.81
				75	0	28.88	22.69
			16QAM	1	0	28.61	22.63
				1	37	29.45	22.99
				1	74	29.98	22.86
				36	0	28.64	21.71
				36	16	28.99	21.71
				36	35	29.28	21.71
				75	0	28.87	21.61

OUTPUT POWER FOR LTE BAND 4 (20.0 MHz)

Bandwidth (MHz)	UL Channel (MHz)	Frequency (MHz)	Modulation	RB		Peak Power (dBm)	Average (dBm)
				Size	Offset		
20.0	20050	1720.0	QPSK	1	0	29.05	23.48
				1	49	29.42	23.96
				1	99	28.92	24.03
				50	0	29.27	22.54
				50	25	29.35	22.60
				50	50	29.04	22.64
				100	0	29.04	22.65
			16QAM	1	0	29.17	22.51
				1	49	29.94	22.99
				1	99	29.07	22.97
				50	0	29.22	21.51
				50	25	29.21	21.59
				50	50	28.99	21.59
				100	0	29.12	21.53
20.0	20175	1732.5	QPSK	1	0	29.41	23.89
				1	49	28.52	23.84
				1	99	28.58	23.81
				50	0	28.80	22.63
				50	25	28.49	22.53
				50	50	28.33	22.48
				100	0	28.51	22.56
			16QAM	1	0	29.48	22.92
				1	49	28.91	22.82
				1	99	28.84	22.76
				50	0	28.77	21.46
				50	25	28.49	21.45
				50	50	28.30	21.46
				100	0	28.49	21.50
20.0	20300	1745.0	QPSK	1	0	28.48	23.83
				1	49	28.82	23.94
				1	99	29.49	23.79
				50	0	28.48	22.56
				50	25	28.78	22.68
				50	50	29.10	22.56
				100	0	28.74	22.71
			16QAM	1	0	28.72	22.72
				1	49	29.17	22.87
				1	99	29.83	22.77
				50	0	28.44	21.58
				50	25	28.76	21.70
				50	50	29.08	21.52
				100	0	28.82	21.63

5.2 Occupied Bandwidth

5.2.1 Measurement Procedure

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26 dB bandwidth was also measured and recorded.

5.2.2 Limit

For reporting purposes only.

5.2.3 Test Result

LTE BAND 13

Band	MODE	RB		Frequency (MHz)	Occupied Bandwidth(MHz)	26dB Bandwidth(MHz)
		Size	Offset			
LTE BAND 13	5.0 MHz BAND QPSK	25	0	782.0	4.49	5.11
	5.0 MHz BAND 16QAM	25	0	782.0	4.50	5.02
	10.0 MHz BAND QPSK	50	0	782.0	9.00	9.95
	10.0 MHz BAND 16QAM	50	0	782.0	8.95	9.89

LTE BAND 4

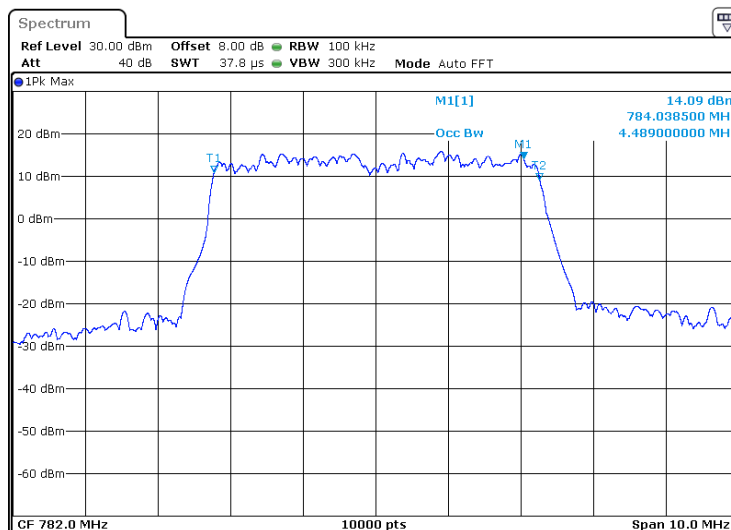
Band	MODE	RB		Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth(MHz)
		Size	Offset			
LTE BAND 4	1.4 MHz BAND QPSK	6	0	1732.5	1.09	1.28
	1.4 MHz BAND 16QAM	6	0	1732.5	1.08	1.29
	3.0 MHz BAND QPSK	15	0	1732.5	2.69	3.00
	3.0 MHz BAND 16QAM	15	0	1732.5	2.69	3.05
	5.0 MHz BAND QPSK	25	0	1732.5	4.49	5.13
	5.0 MHz BAND 16QAM	25	0	1732.5	4.49	5.00
	10.0 MHz BAND QPSK	50	0	1732.5	8.98	9.86
	10.0 MHz BAND 16QAM	50	0	1732.5	8.95	9.85
	15.0 MHz BAND QPSK	75	0	1732.5	13.40	14.59
	15.0 MHz BAND 16QAM	75	0	1732.5	13.41	14.64
	20.0 MHz BAND QPSK	100	0	1732.5	17.87	19.26
	20.0 MHz BAND 16QAM	100	0	1732.5	17.92	19.54

5.2.4 Test Plot

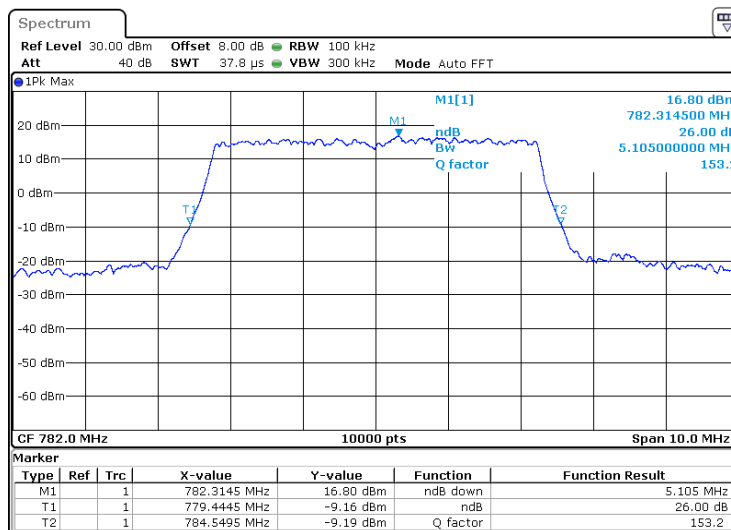
Band 13

QPSK (5 MHz Bandwidth)

Occupied Bandwidth

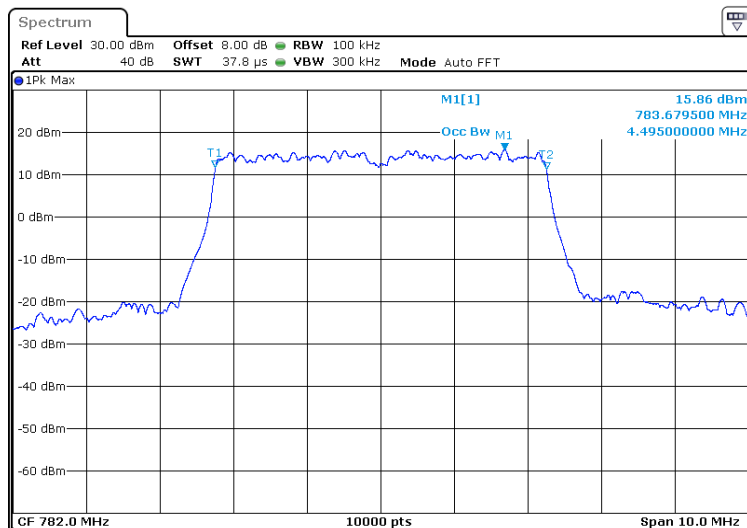


26 dB Bandwidth

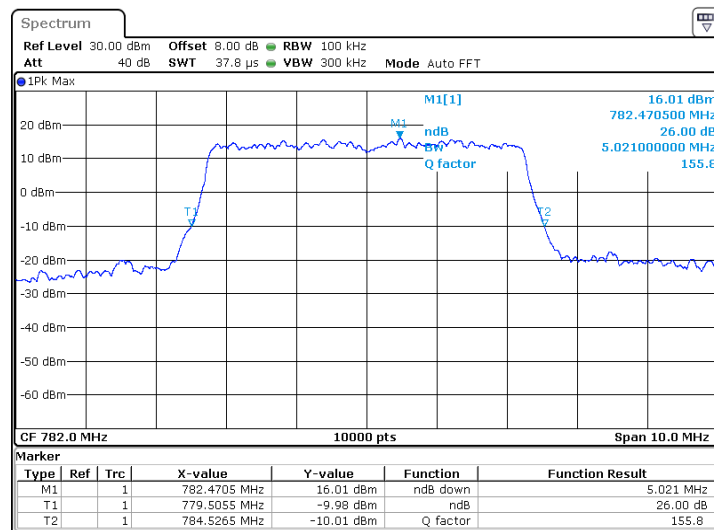


16QAM (5 MHz Bandwidth)

Occupied Bandwidth

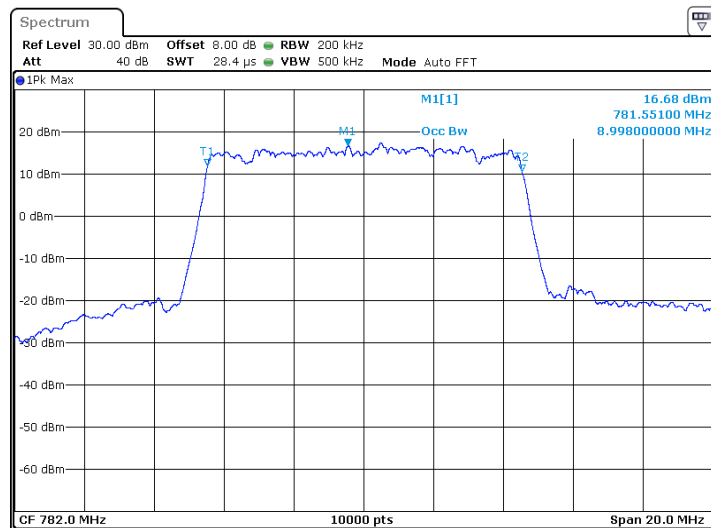


26 dB Bandwidth

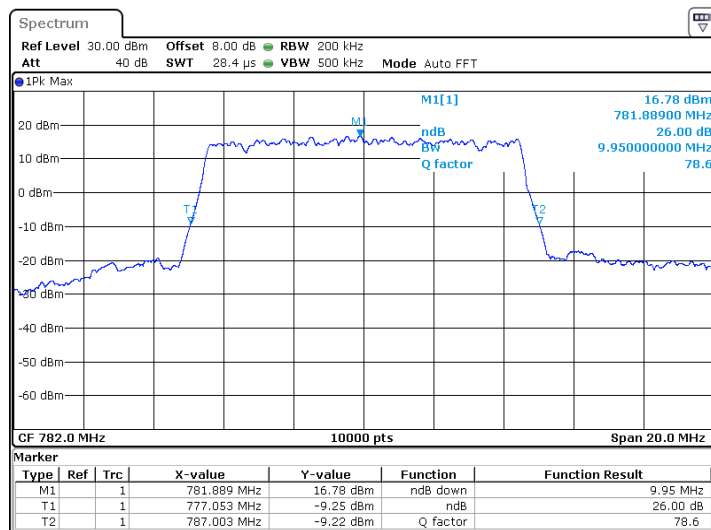


QPSK (10 MHz Bandwidth)

Occupied Bandwidth

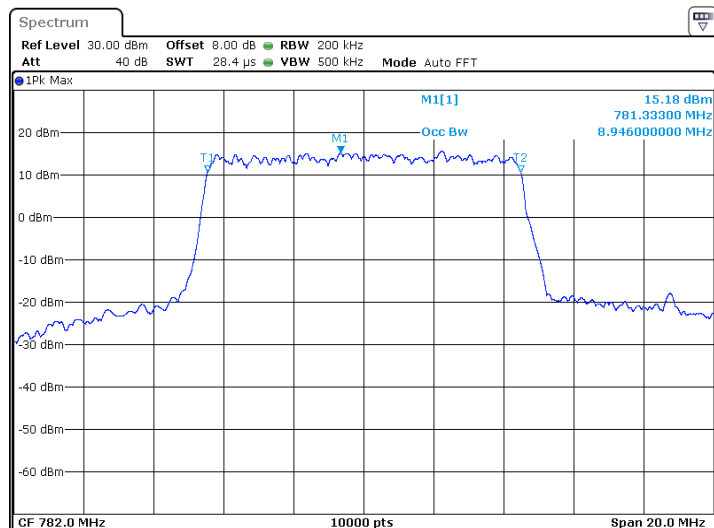


26 dB Bandwidth

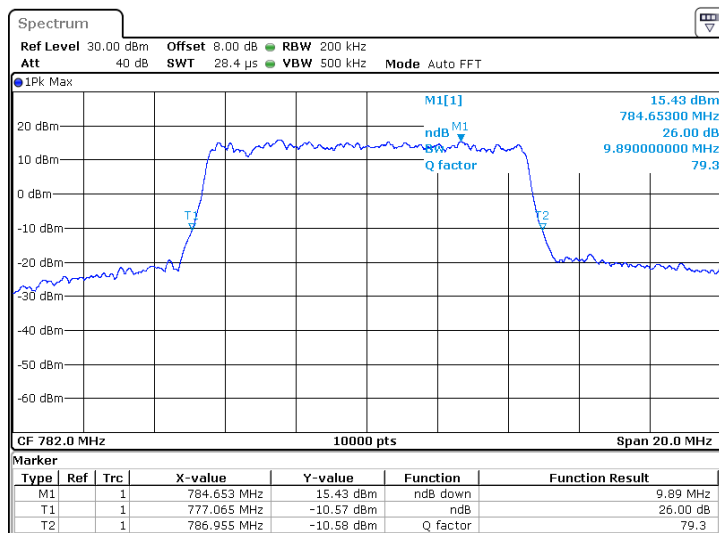


16QAM (10 MHz Bandwidth)

Occupied Bandwidth



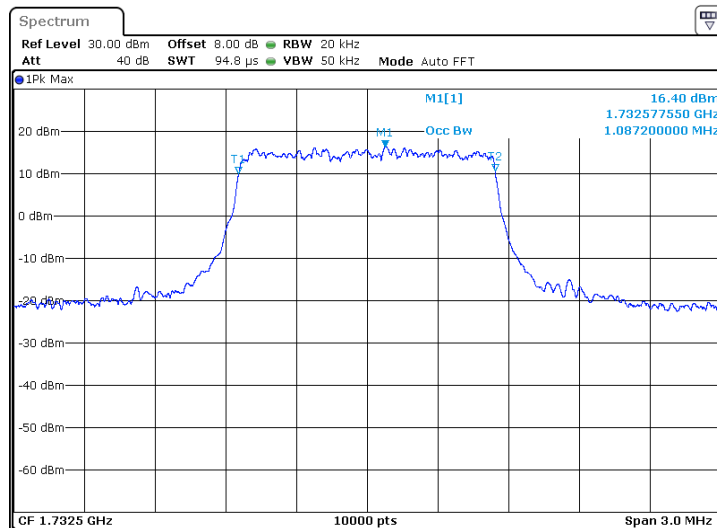
26 dB Bandwidth



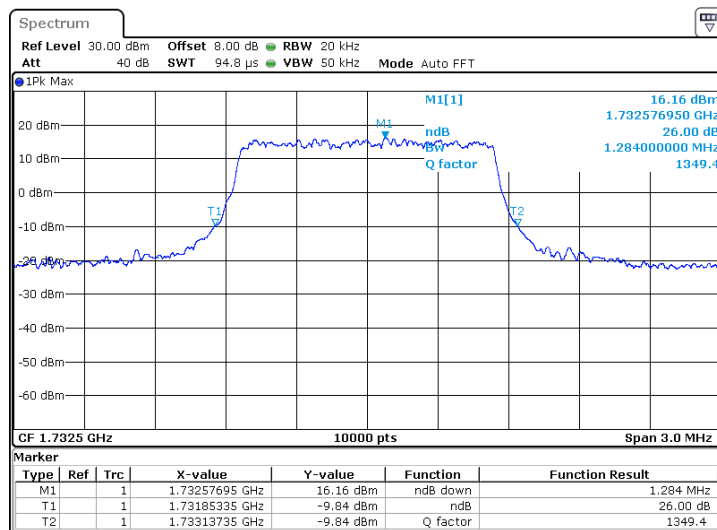
Band 4

QPSK (1.4 MHz Bandwidth)

Occupied Bandwidth

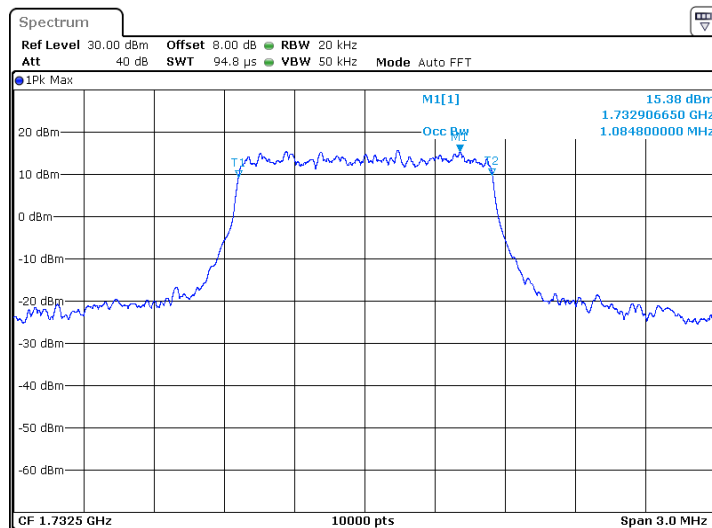


26 dB Bandwidth

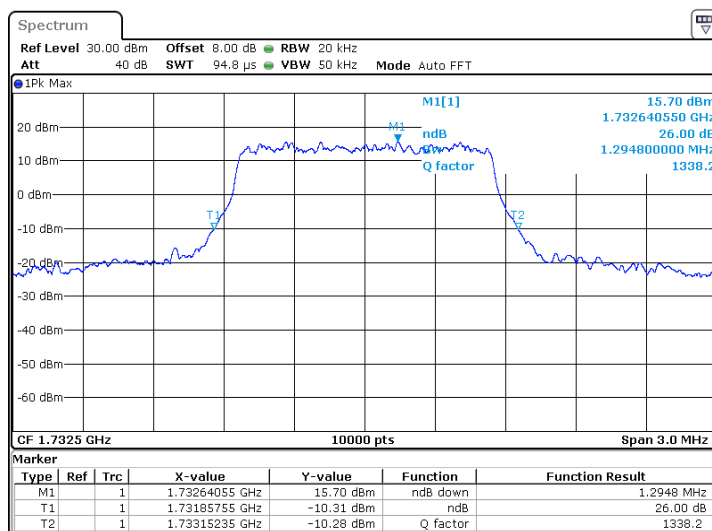


16QAM (1.4 MHz Bandwidth)

Occupied Bandwidth

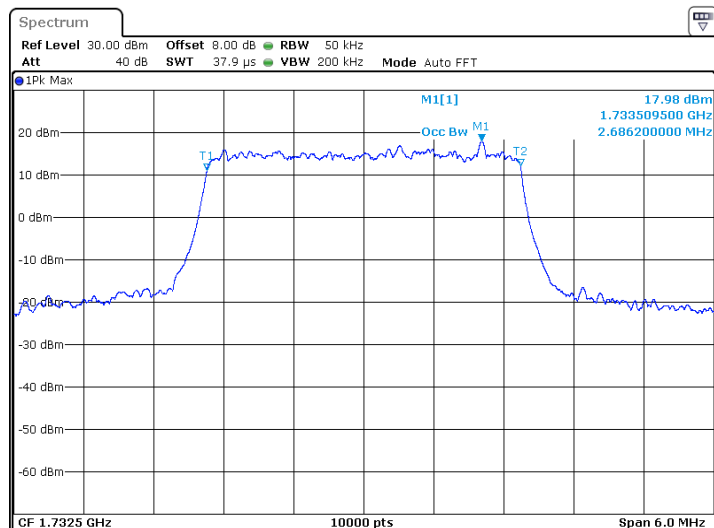


26 dB Bandwidth

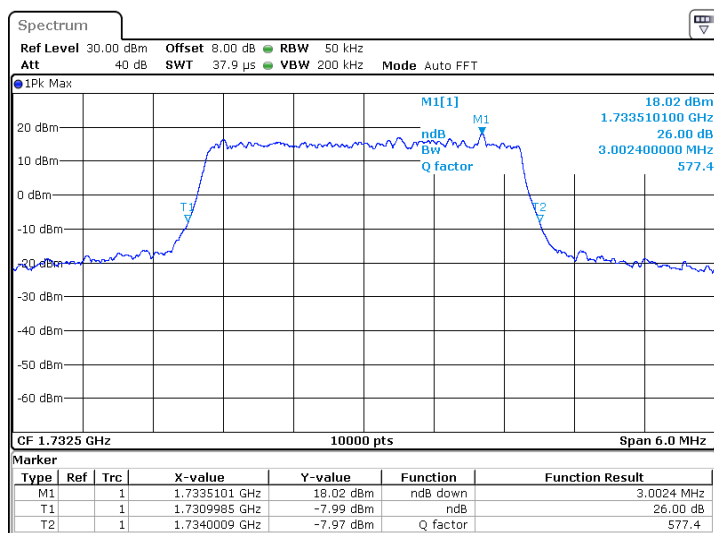


QPSK (3 MHz Bandwidth)

Occupied Bandwidth

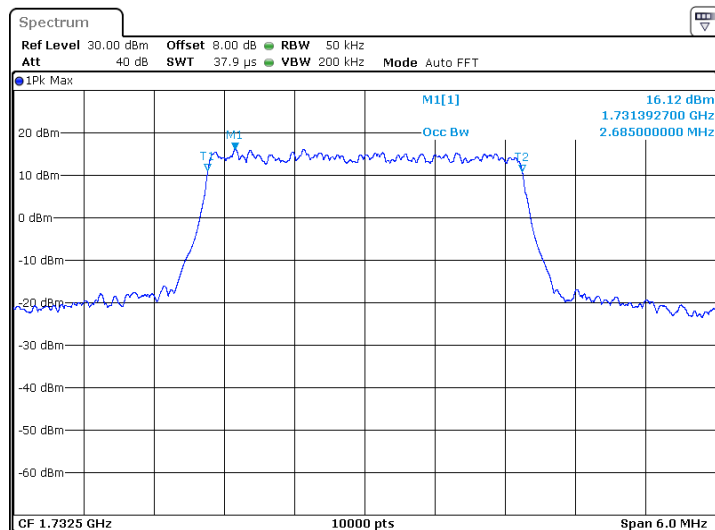


26 dB Bandwidth

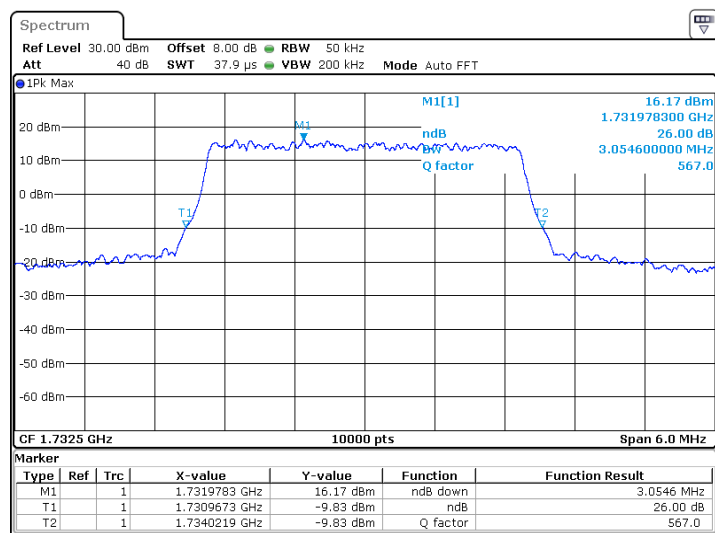


16QAM (3 MHz Bandwidth)

Occupied Bandwidth

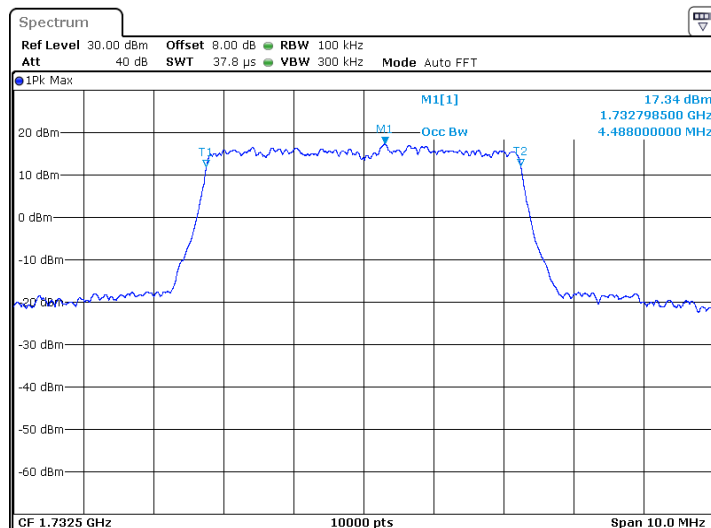


26 dB Bandwidth

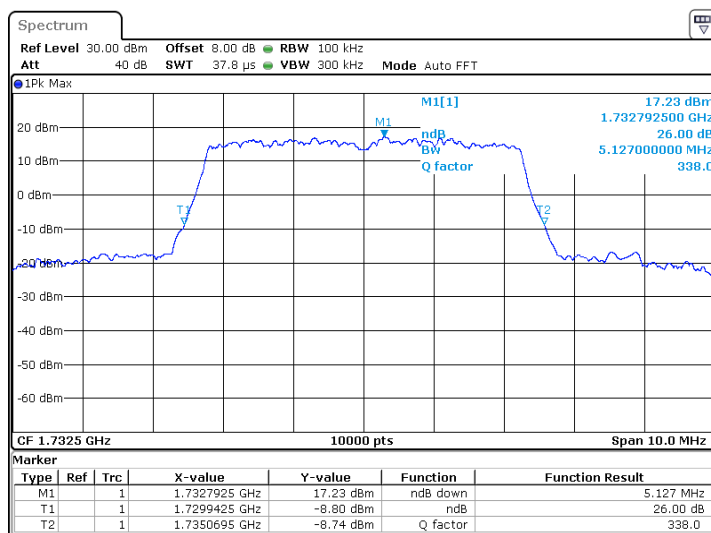


QPSK (5 MHz Bandwidth)

Occupied Bandwidth

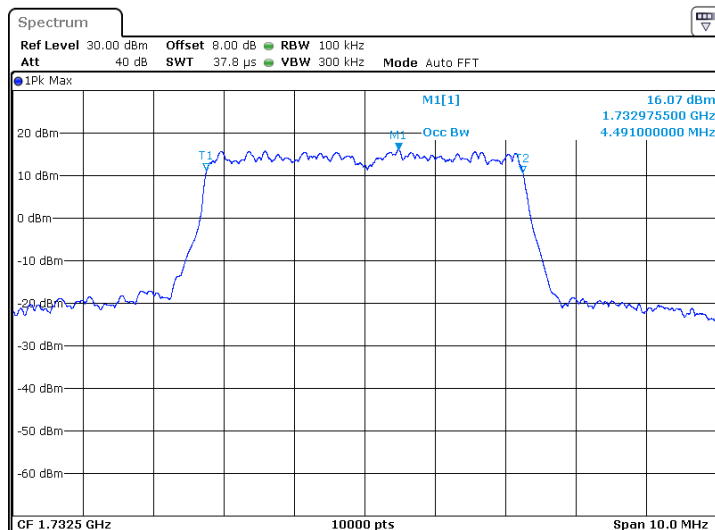


26 dB Bandwidth

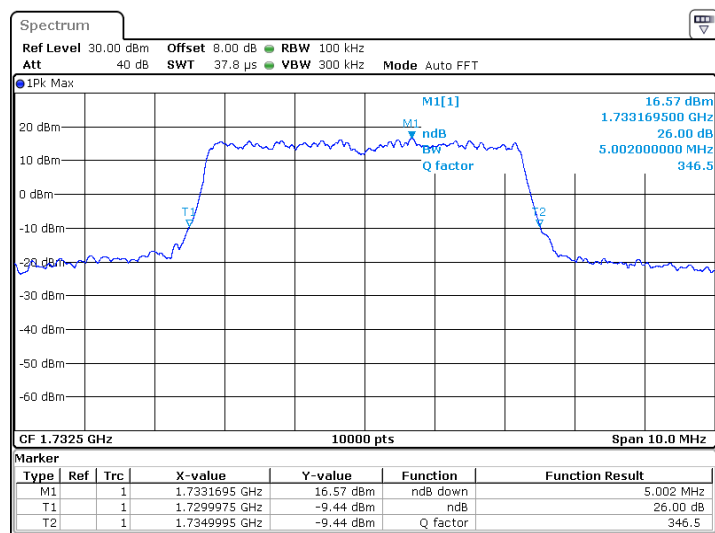


16QAM (5 MHz Bandwidth)

Occupied Bandwidth

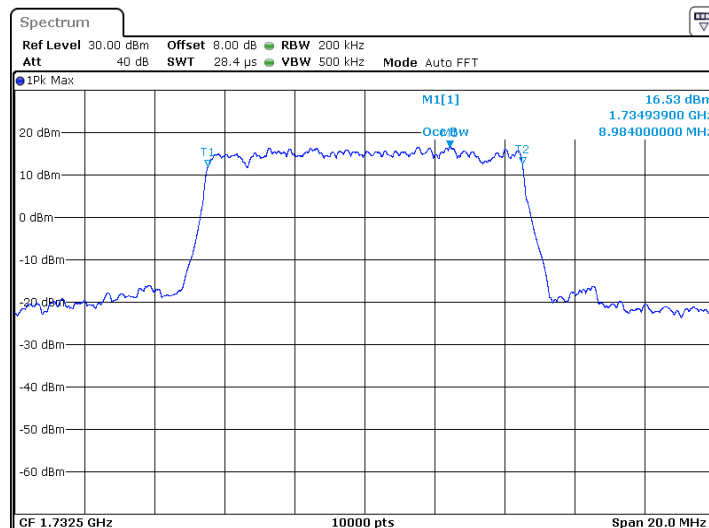


26 dB Bandwidth

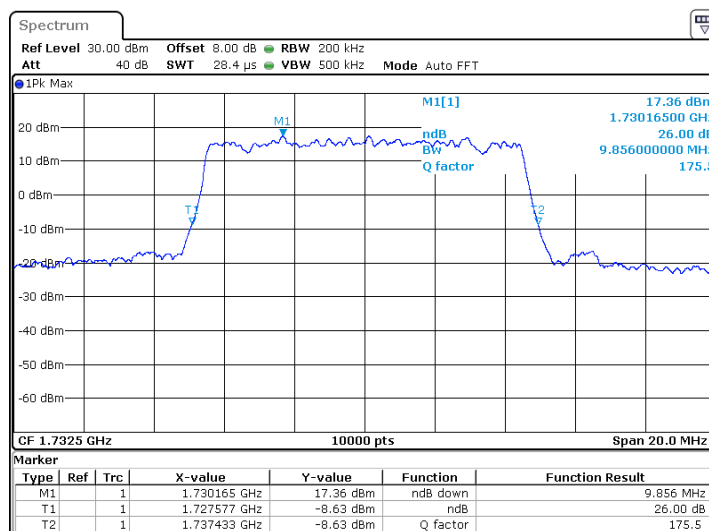


QPSK (10 MHz Bandwidth)

Occupied Bandwidth

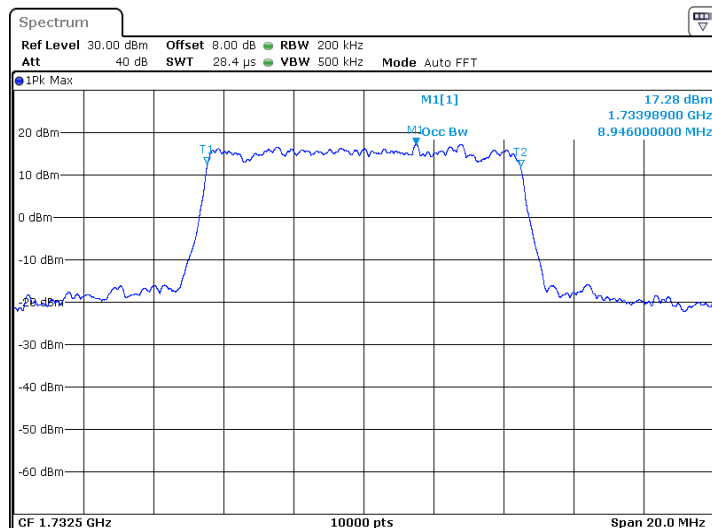


26 dB Bandwidth

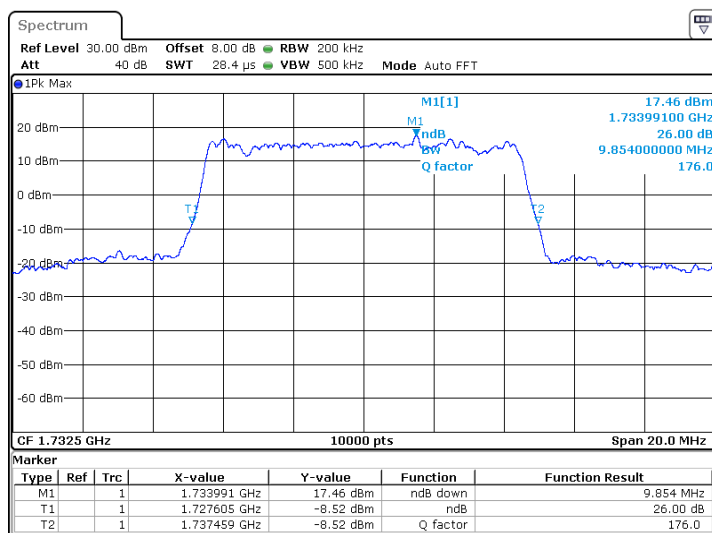


16QAM (10 MHz Bandwidth)

Occupied Bandwidth

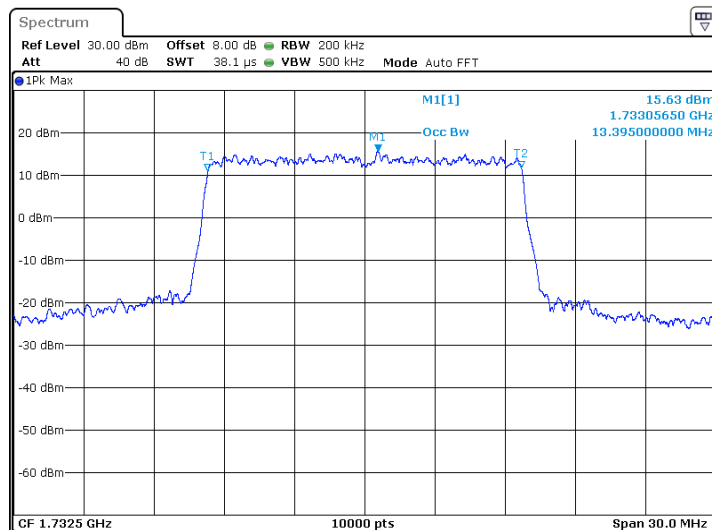


26 dB Bandwidth

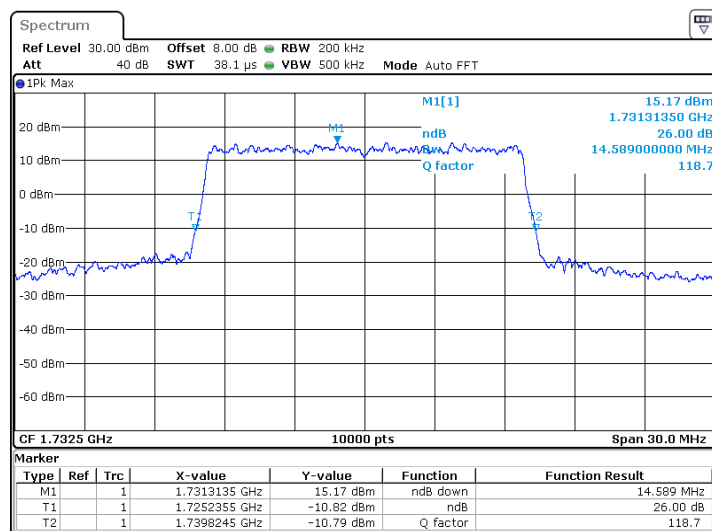


QPSK (15 MHz Bandwidth)

Occupied Bandwidth

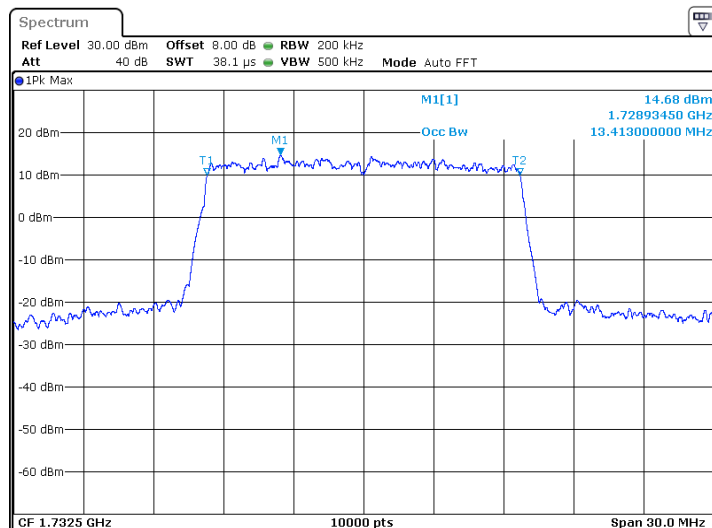


26 dB Bandwidth

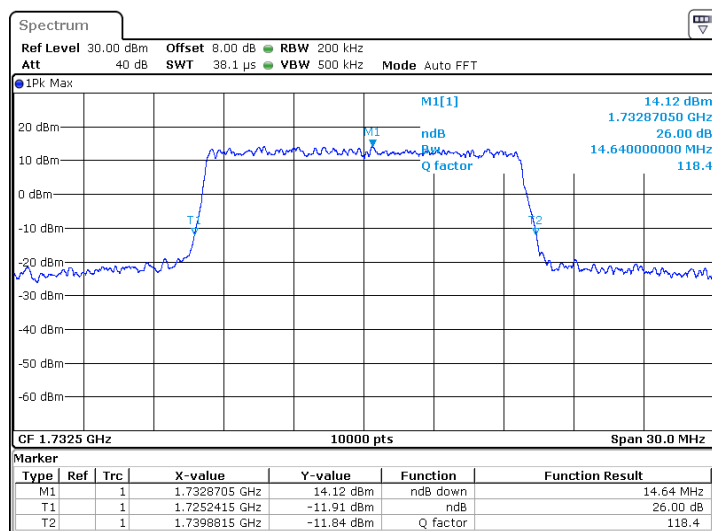


16QAM (15 MHz Bandwidth)

Occupied Bandwidth

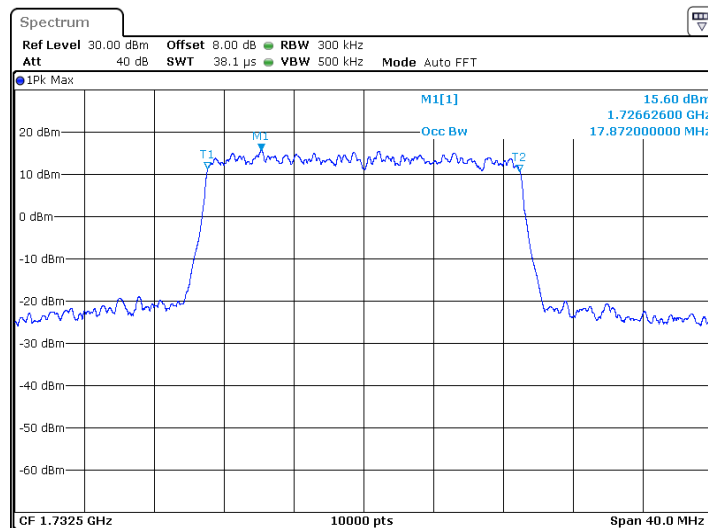


26 dB Bandwidth

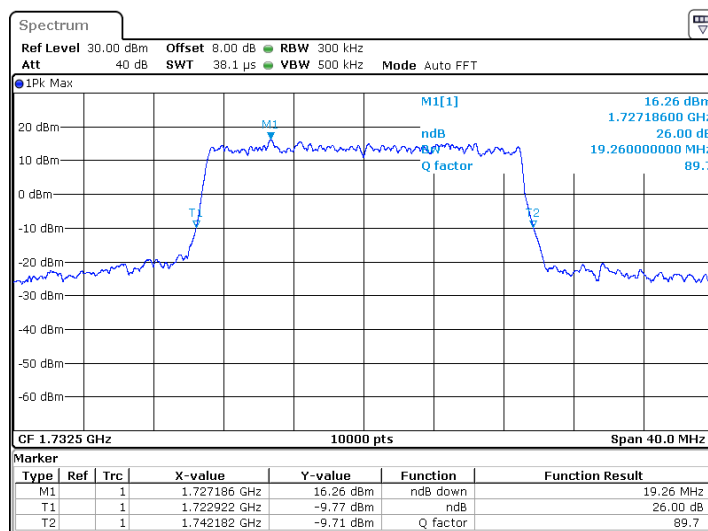


QPSK (20 MHz Bandwidth)

Occupied Bandwidth

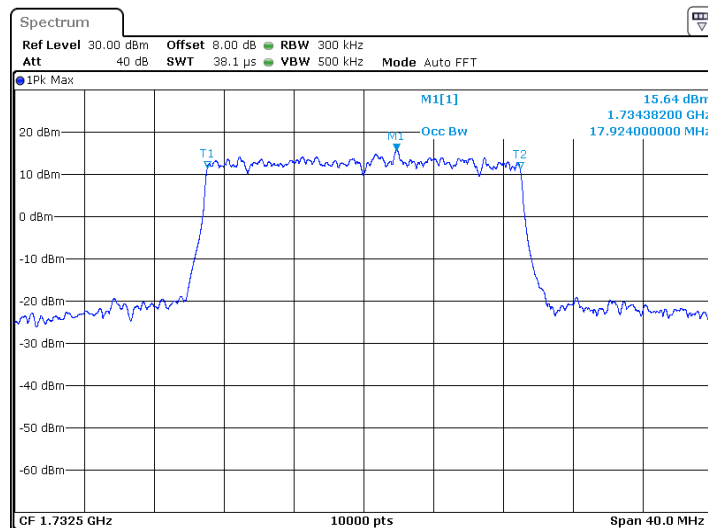


26 dB Bandwidth

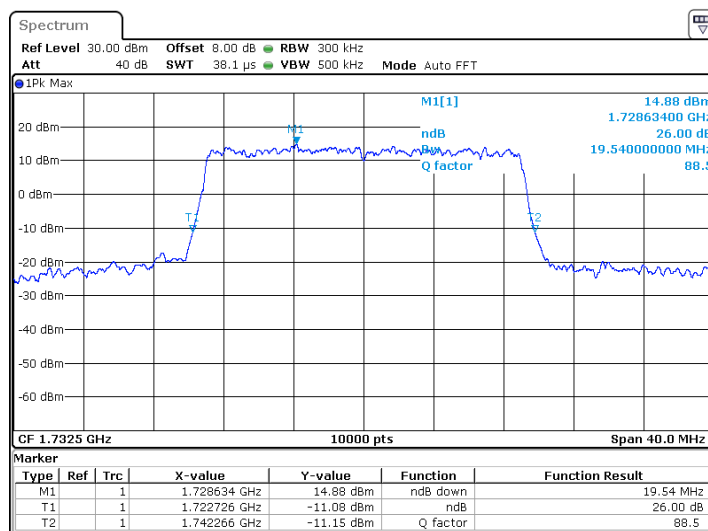


16QAM (20 MHz Bandwidth)

Occupied Bandwidth



26 dB Bandwidth



5.3 Peak to Average Ratio

5.3.1 Measurement Procedure

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through Sufficient attenuation.
2. The CCDF function of the spectrum analyzer was set.
3. PAR was measured with spectrum analyzer for each channel.

5.3.2 Limit

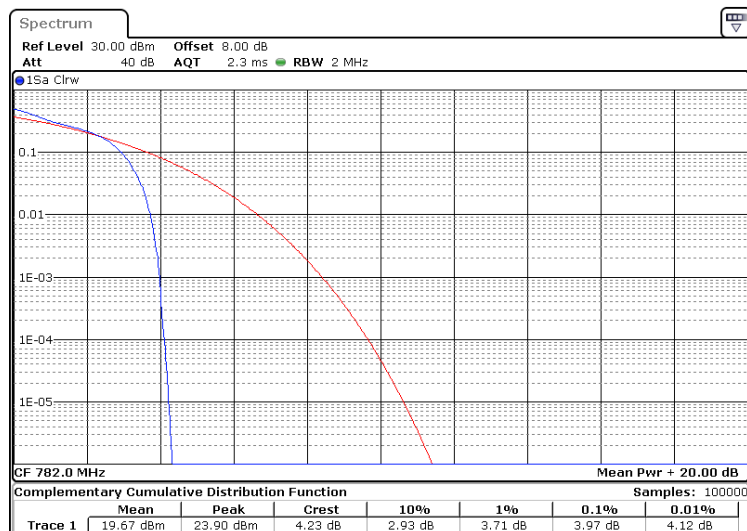
§24.232(d) Power measurements for transmissions by stations authorized under this section may be Made either in accordance with a Commission-approved average power technique or in compliance with Paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

5.3.3 Test Result

BAND13

QPSK (5 MHz Bandwidth)

1732.5 MHz RB 25/0



16QAM (5 MHz Bandwidth)

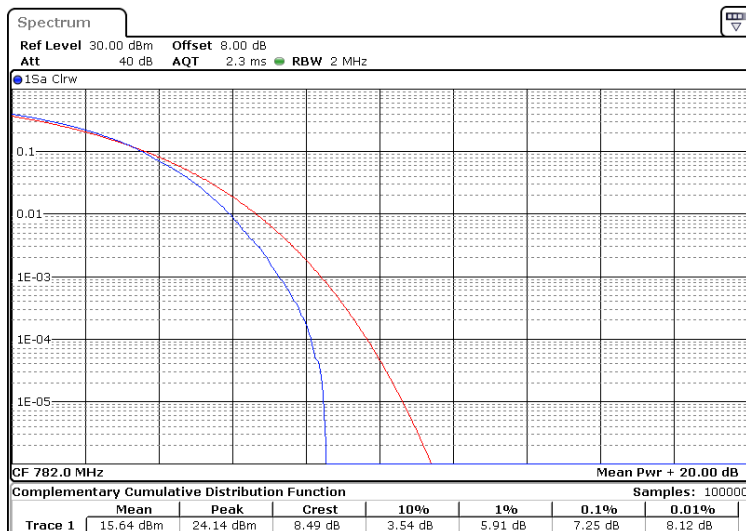
1732.5 MHz RB 25/0



QPSK (10 MHz Bandwidth)
1732.5 MHz RB 50/0



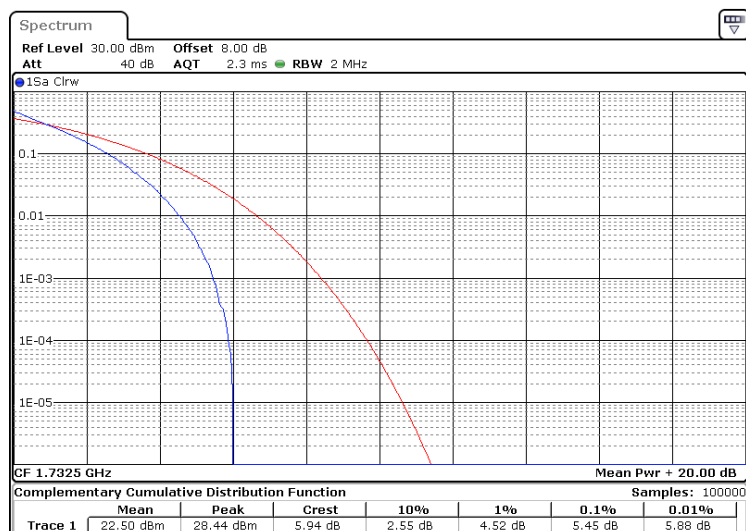
16QAM (10 MHz Bandwidth)
1732.5 MHz RB 50/0



BAND4

QPSK (1.4 MHz Bandwidth)

1732.5 MHz RB 6/0



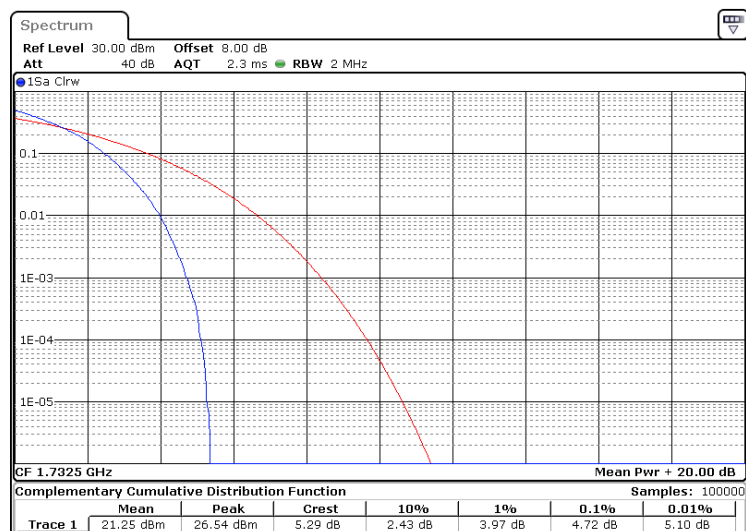
16QAM (1.4MHz Bandwidth)

1732.5MHz RB 6/0



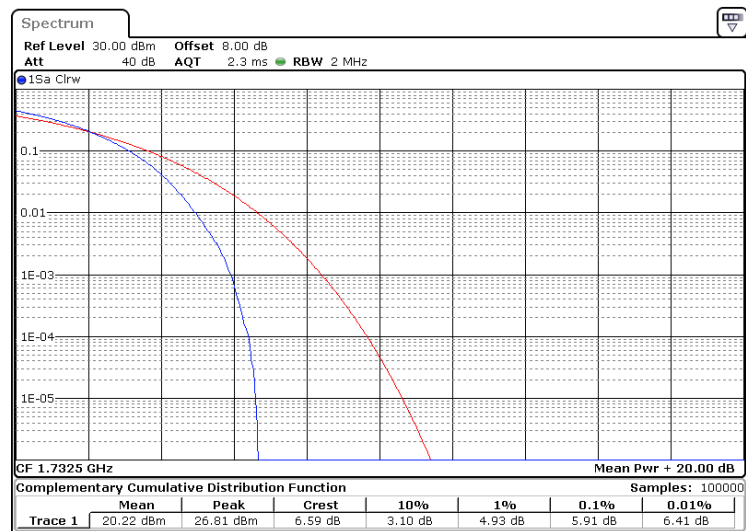
QPSK (3.0 MHz Bandwidth)

1732.5 MHz RB 15/0

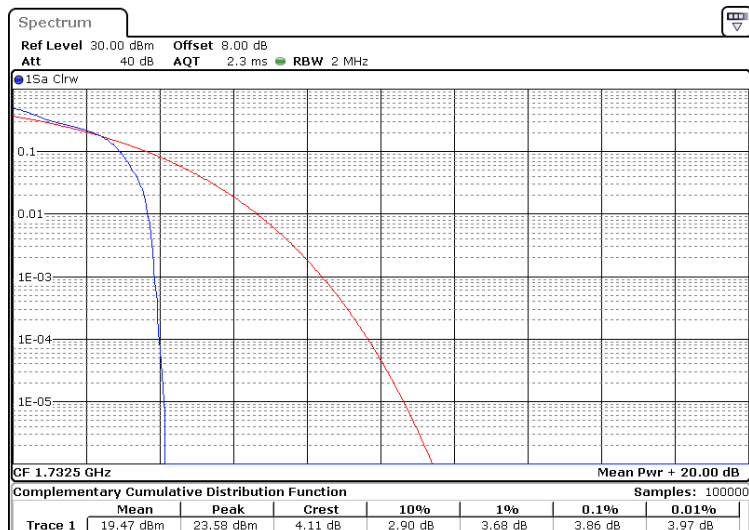


16QAM (3.0MHz Bandwidth)

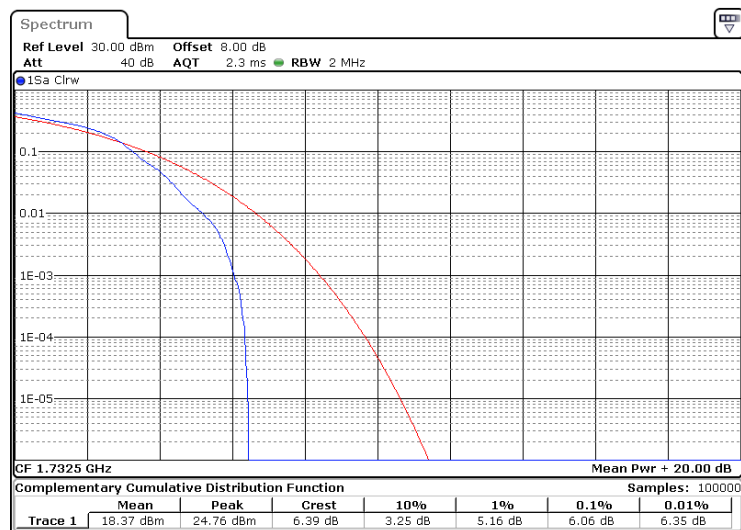
1732.5MHz RB 15/0



QPSK (5.0 MHz Bandwidth)
1732.5 MHz RB 25/0



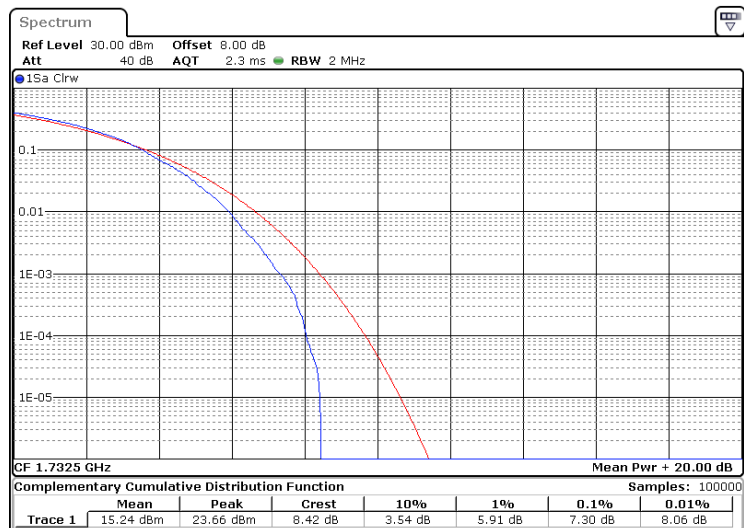
16QAM (5.0 MHz Bandwidth)
1732.5 MHz RB 25/0



QPSK (10.0 MHz Bandwidth)
1732.5 MHz RB 50/0



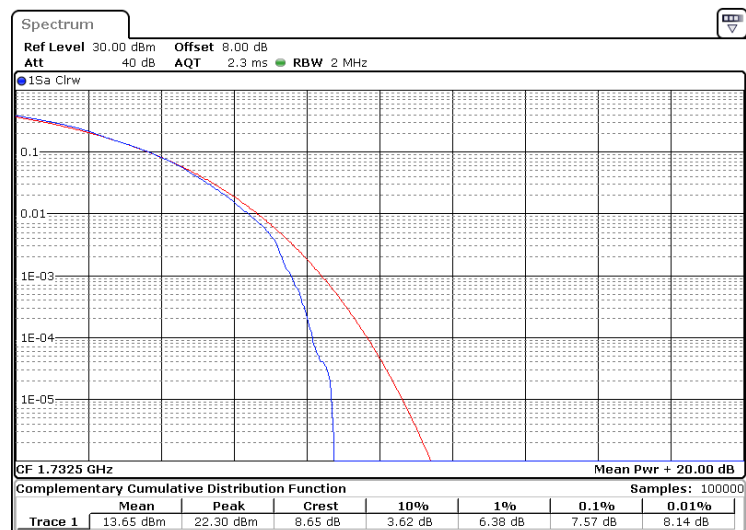
16QAM (10.0 MHz Bandwidth)
1732.5 MHz RB 50/0



QPSK (15.0 MHz Bandwidth)
1732.5 MHz RB 75/0



16QAM (15.0 MHz Bandwidth)
1732.5 MHz RB 75/0



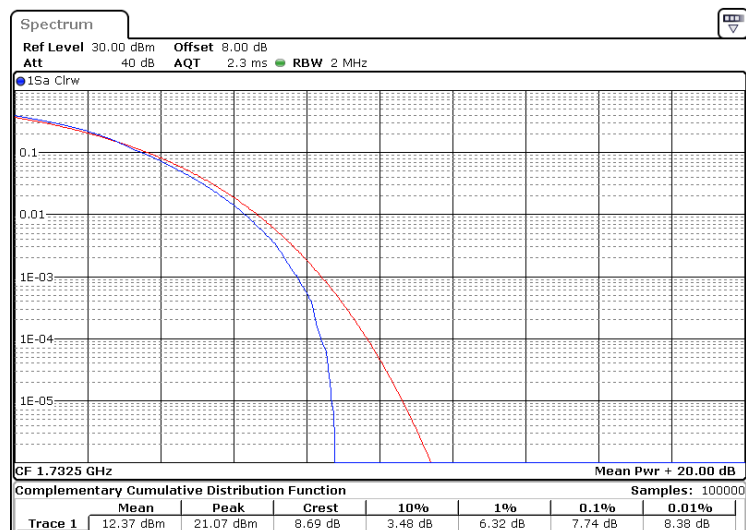
QPSK (20.0 MHz Bandwidth)

1732.5 MHz RB 100/0



16QAM (20.0 MHz Bandwidth)

1732.5 MHz RB 100/0



5.4 Undesirable emissions (conducted)

5.4.1 Bandedge

5.4.1.1 Measurement Procedure

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

5.4.1.2 Limit

- (c) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;
- (6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

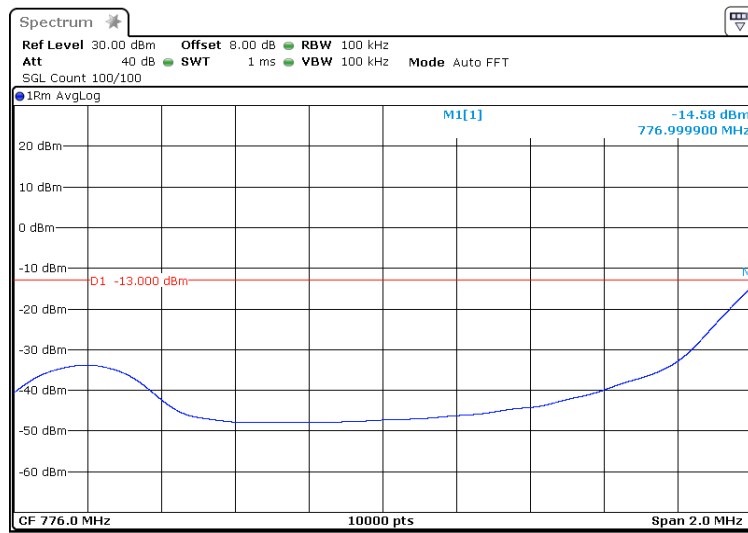
5.4.1.3 Test Result

Band 13

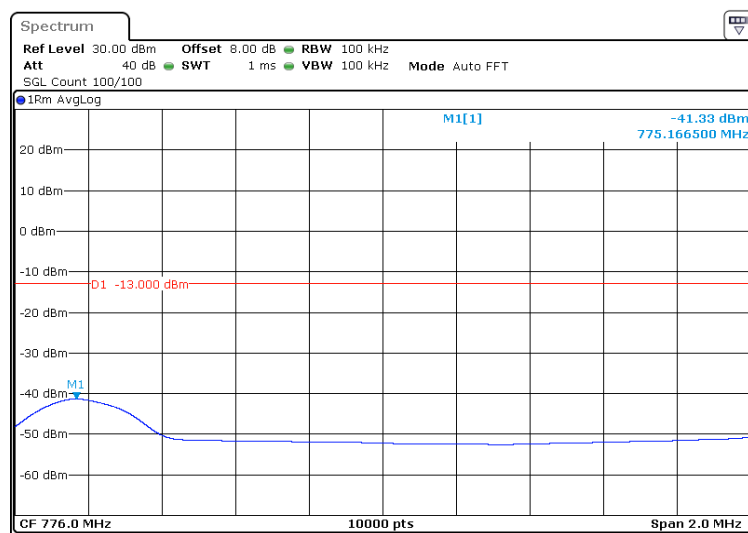
QPSK 775 – 777 MHz (5 MHz Bandwidth)

LOW

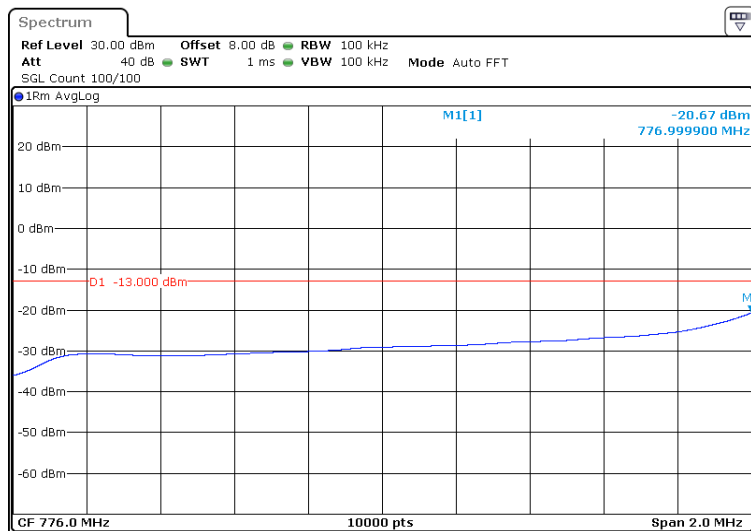
RB 1/0



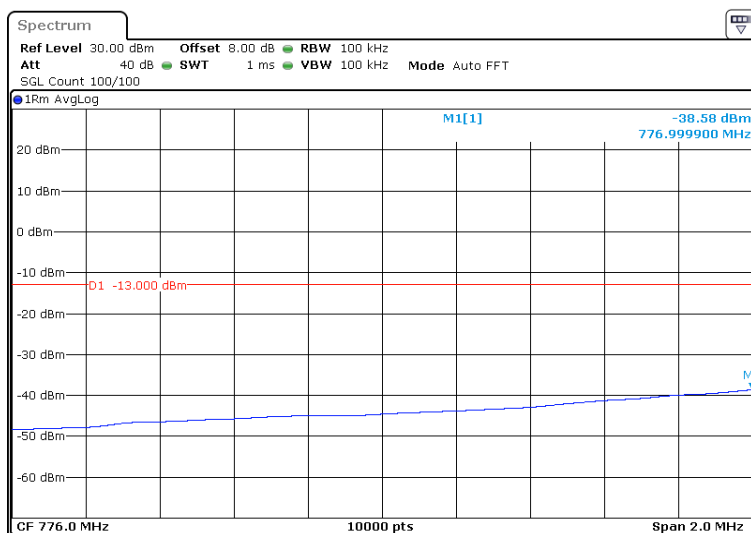
RB 1/24



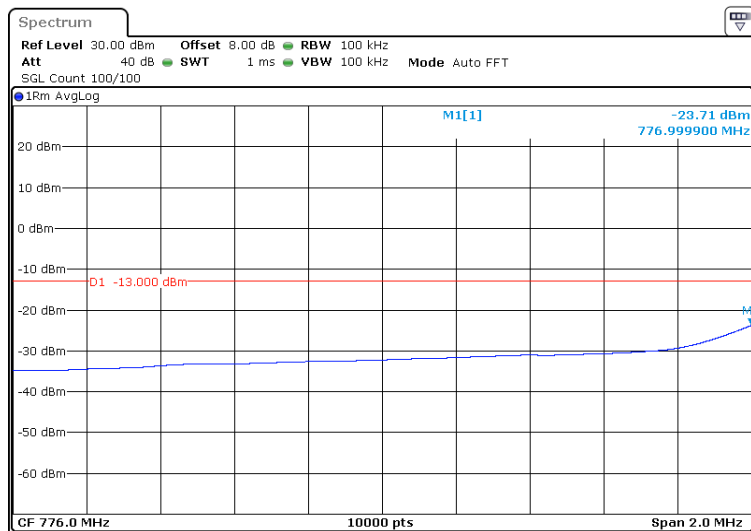
RB 12/0



RB 12/13



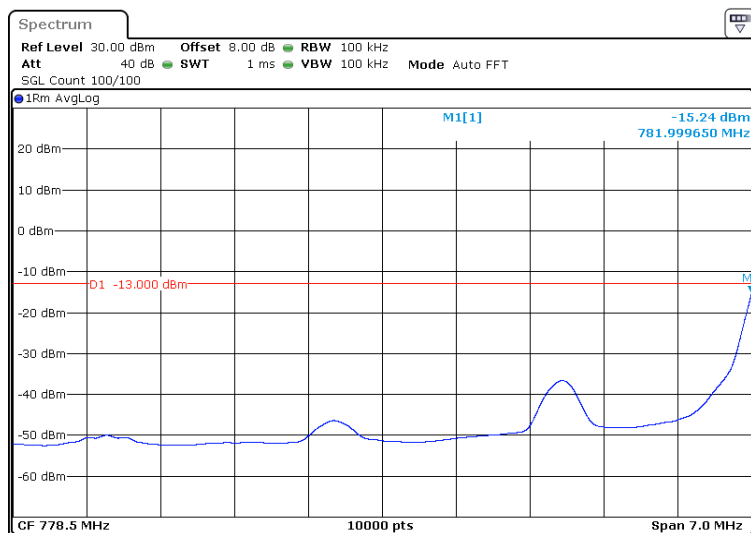
RB 25/0



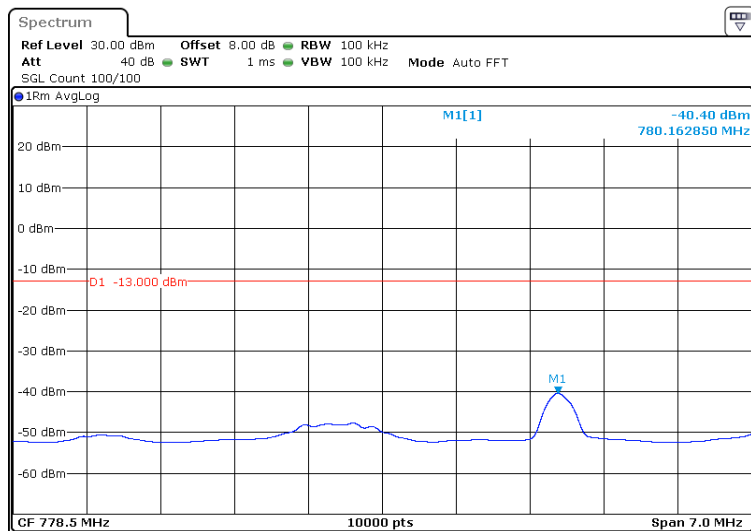
QPSK 775 – 782 MHz (5 MHz Bandwidth)

HIGH

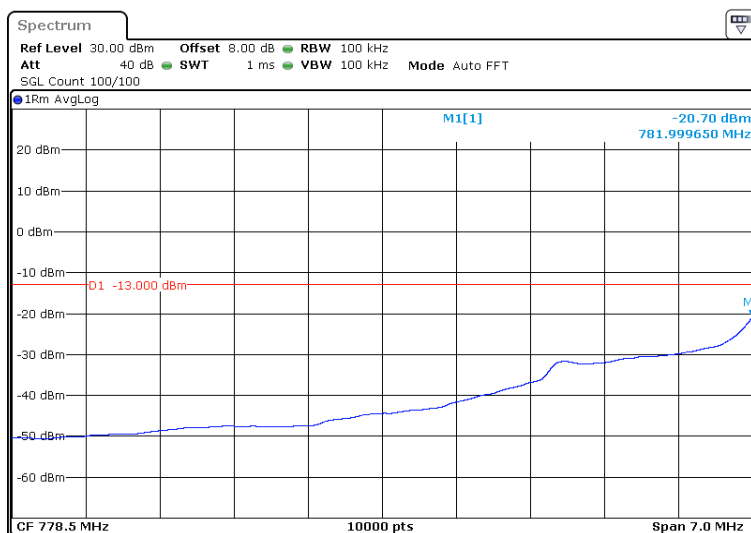
RB 1/0



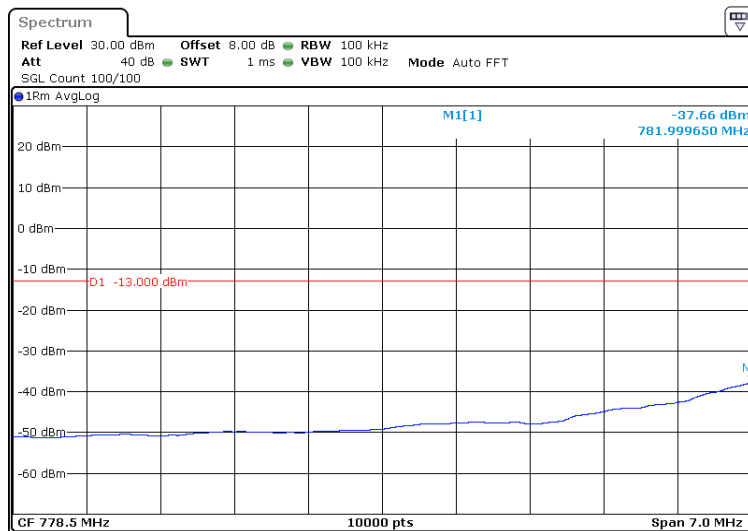
RB 1/24



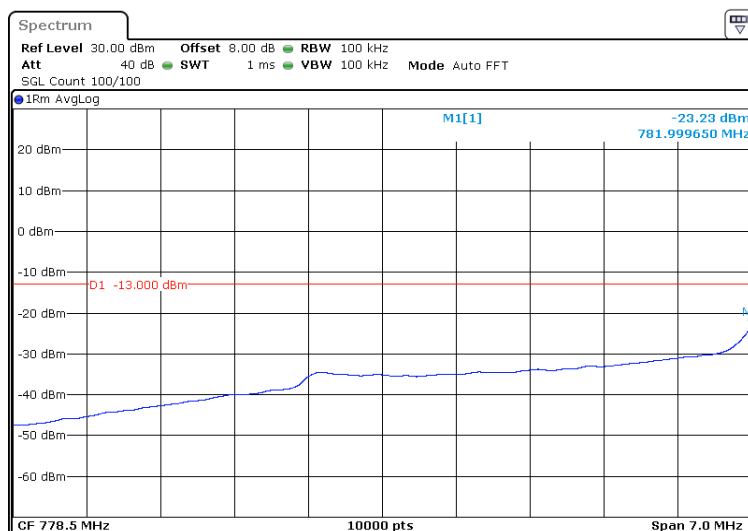
RB 12/0



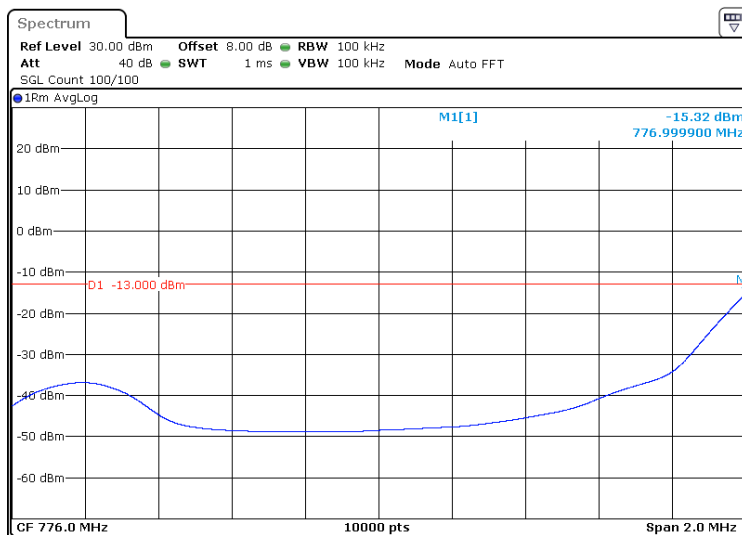
RB 12/13



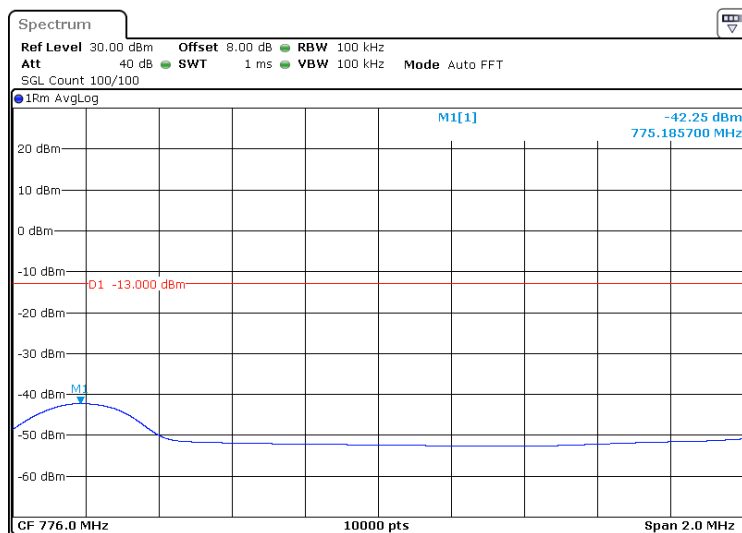
RB 25/0



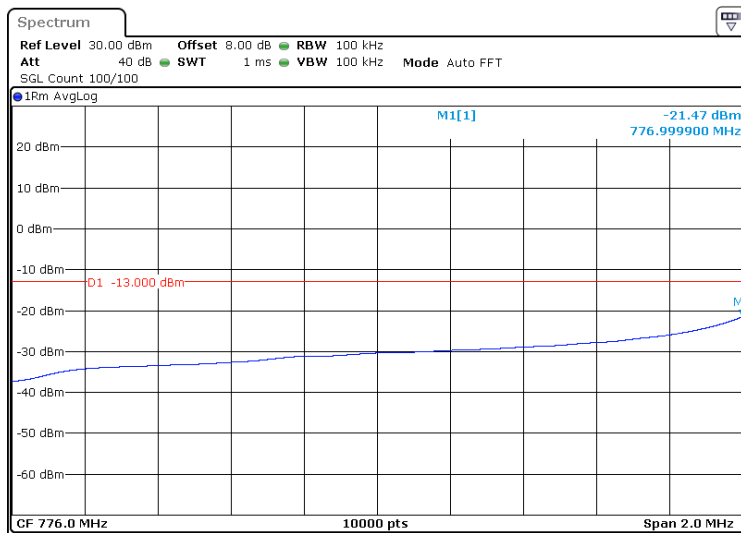
16QAM, 775 – 777 MHz (5 MHz Bandwidth)
LOW
RB 1/0



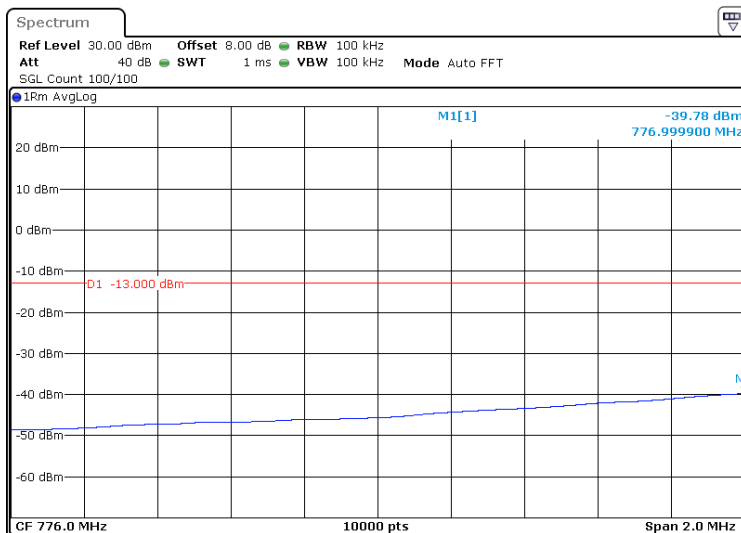
RB 1/24



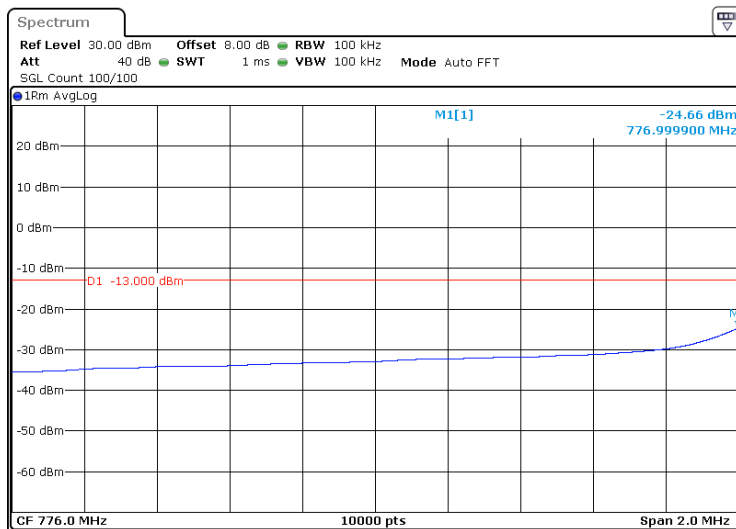
RB 12/0



RB 12/13



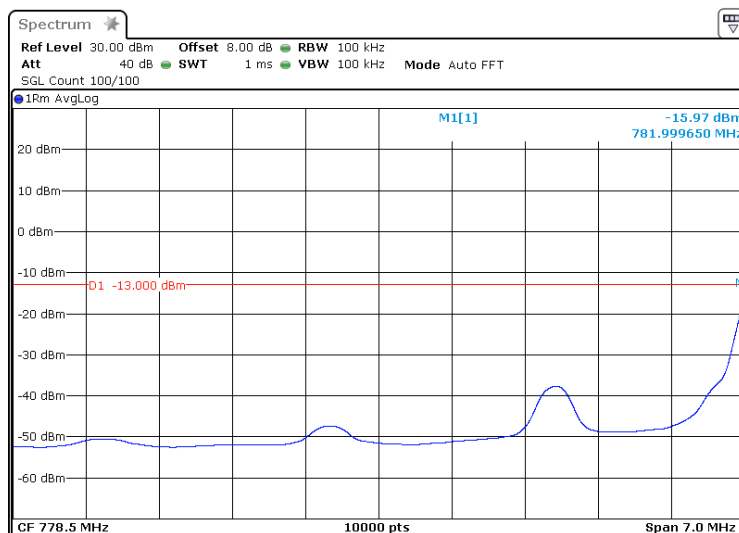
RB 25/0



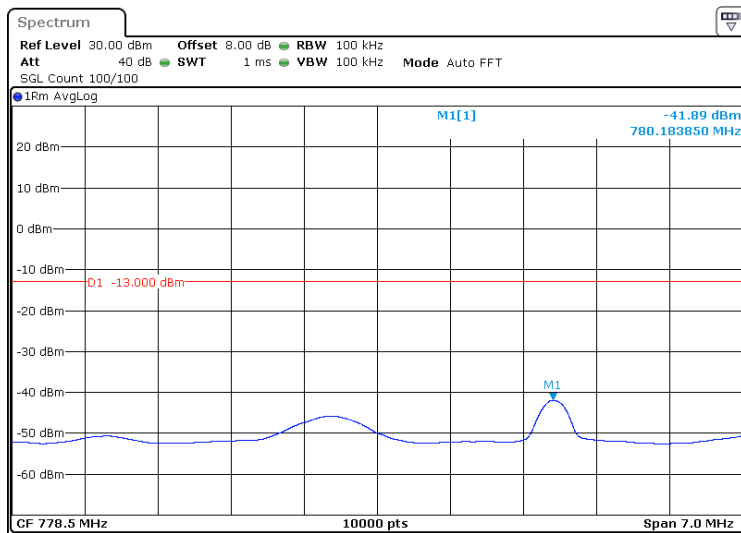
16QAM 775 – 782 MHz (5 MHz Bandwidth)

HIGH

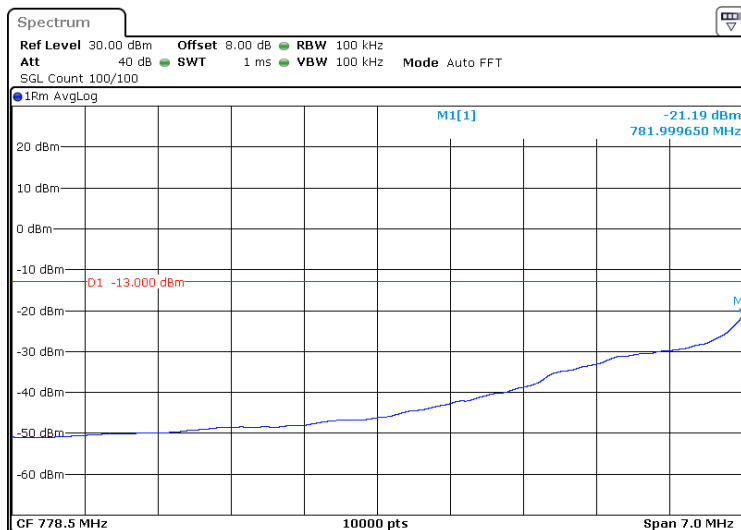
RB 1/0



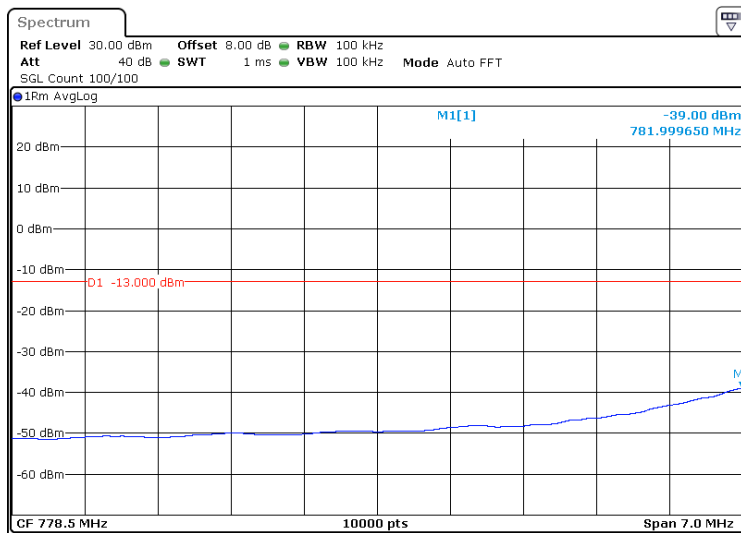
RB 1/24



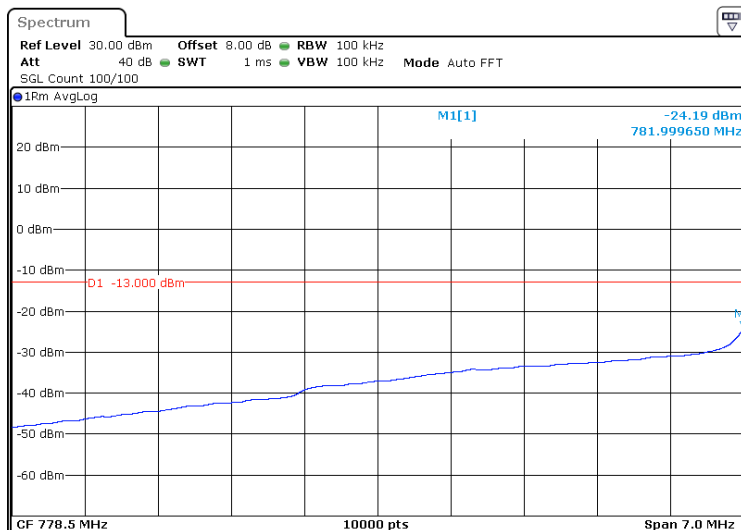
RB 12/0



RB 12/13



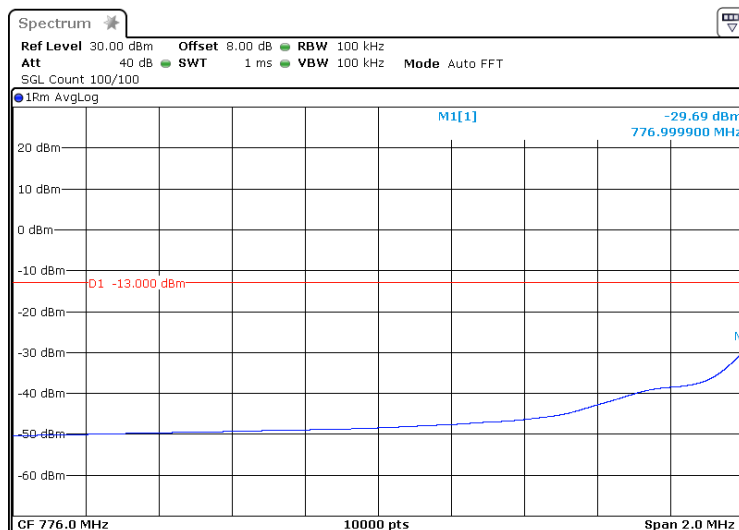
RB 25/0



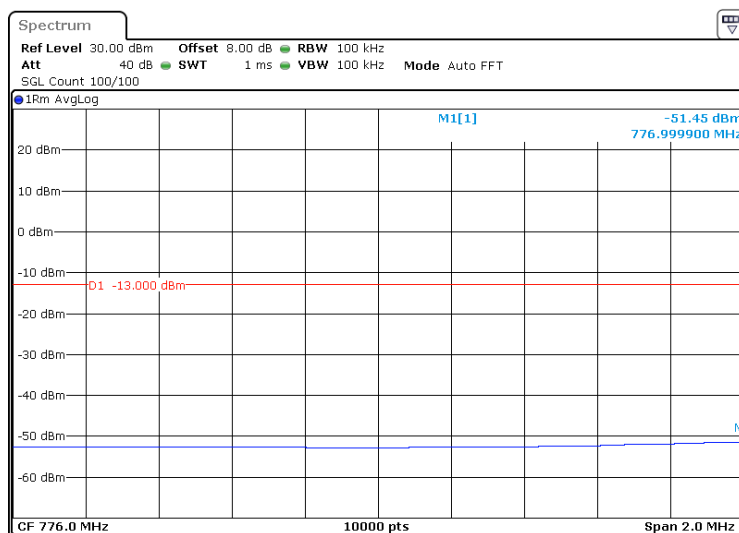
QPSK 775 – 777 MHz (10 MHz Bandwidth)

782 MHz

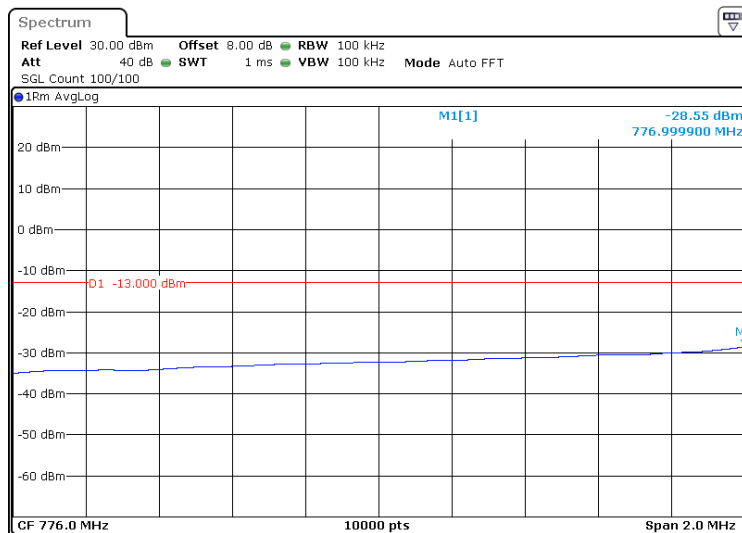
RB 1/0



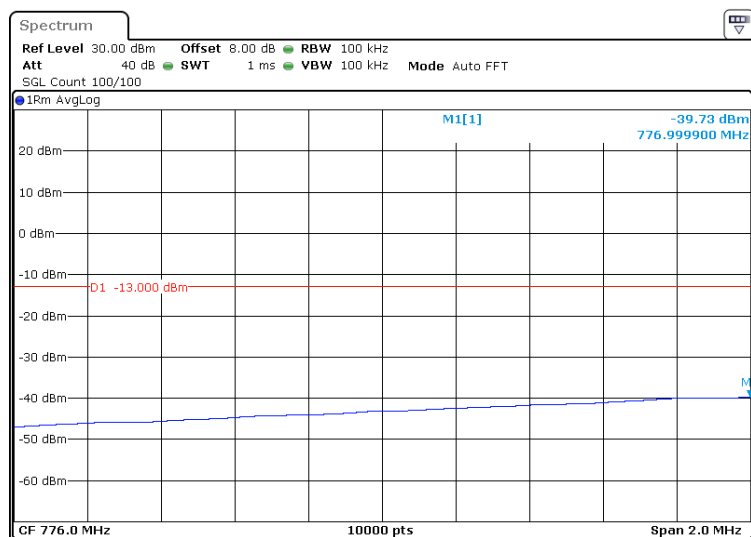
RB 1/49



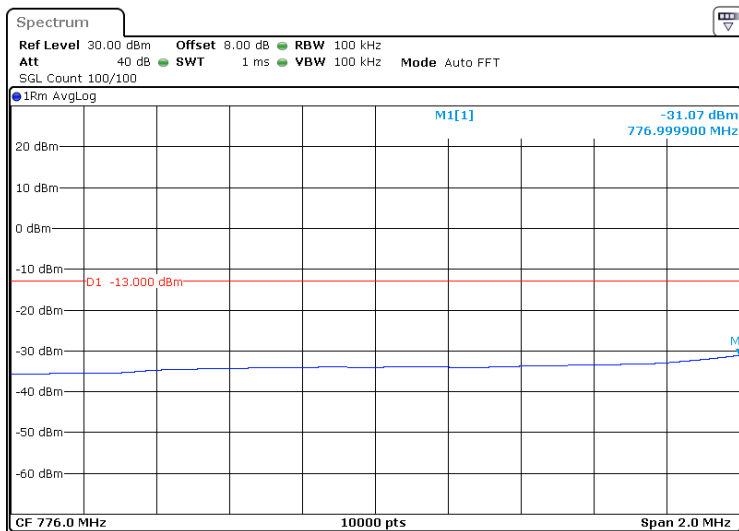
RB 25/0



RB 25/25



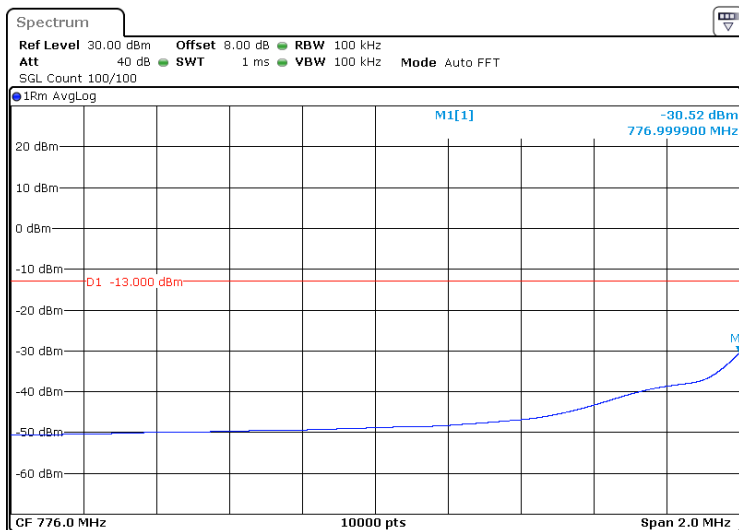
RB 50/0



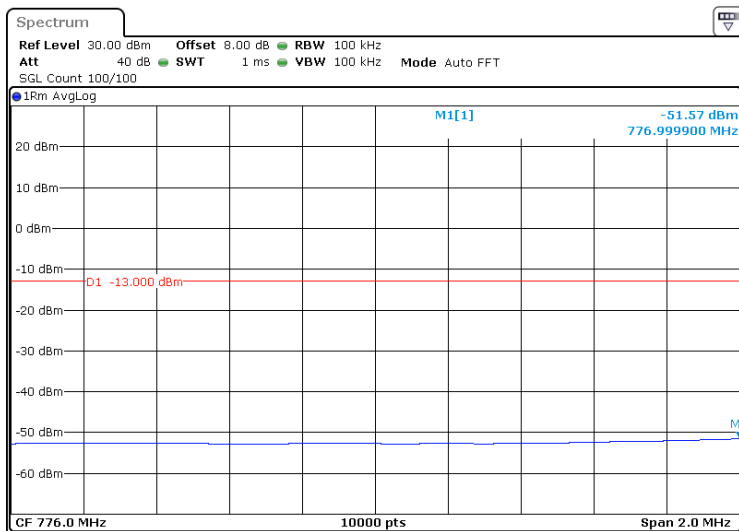
16QAM, 775 – 777 MHz (10 MHz Bandwidth)

782 MHz

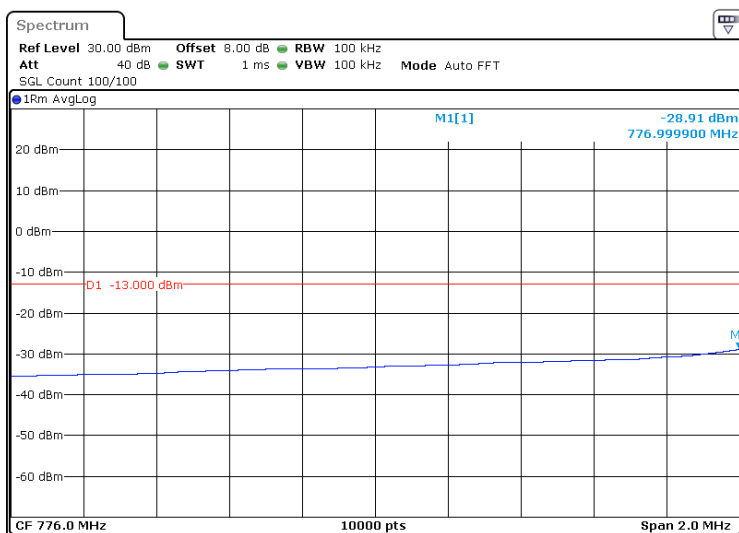
RB 1/0



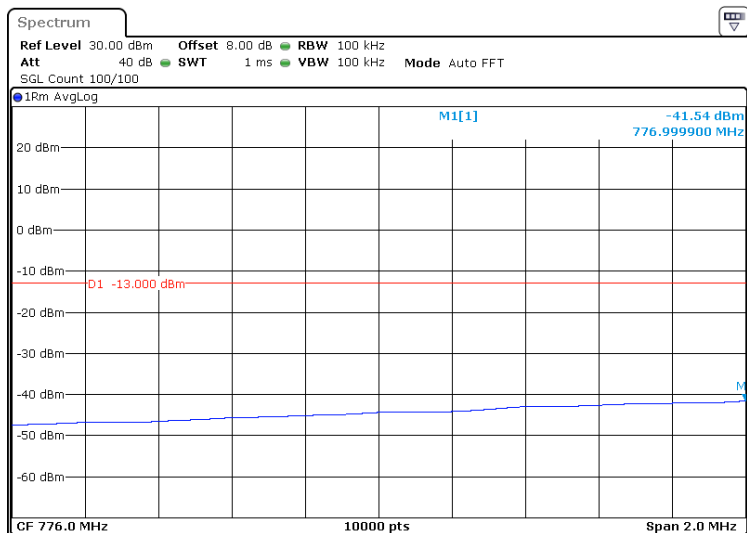
RB 1/49



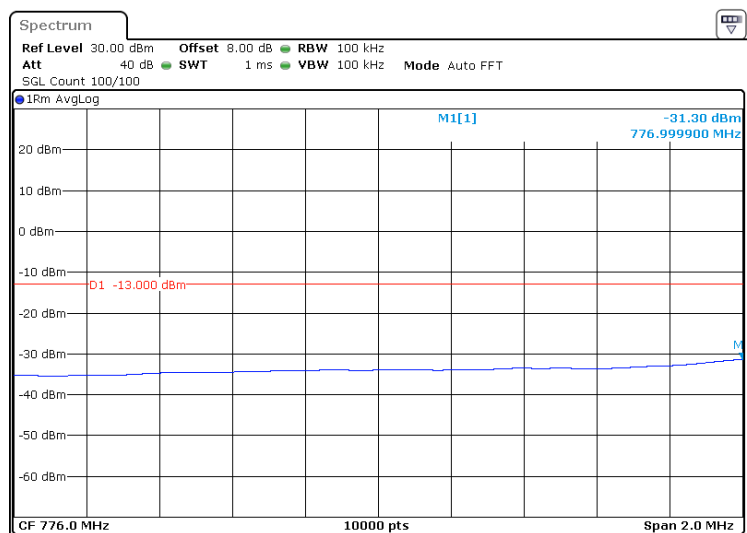
RB 25/0



RB 25/25



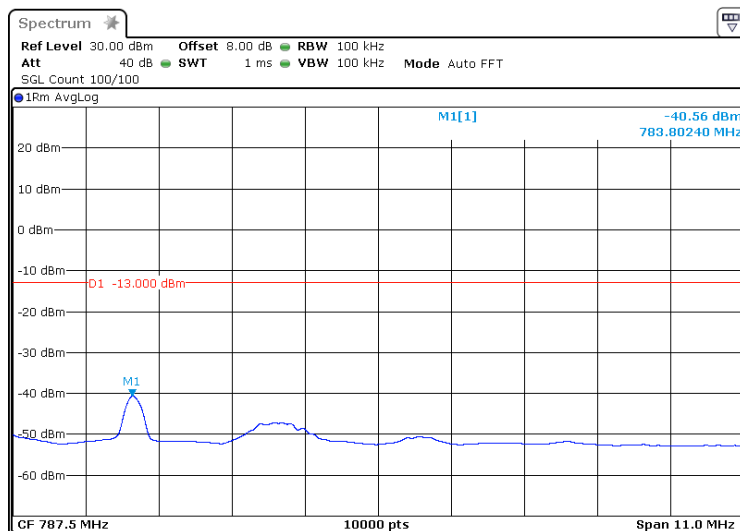
RB 50/0



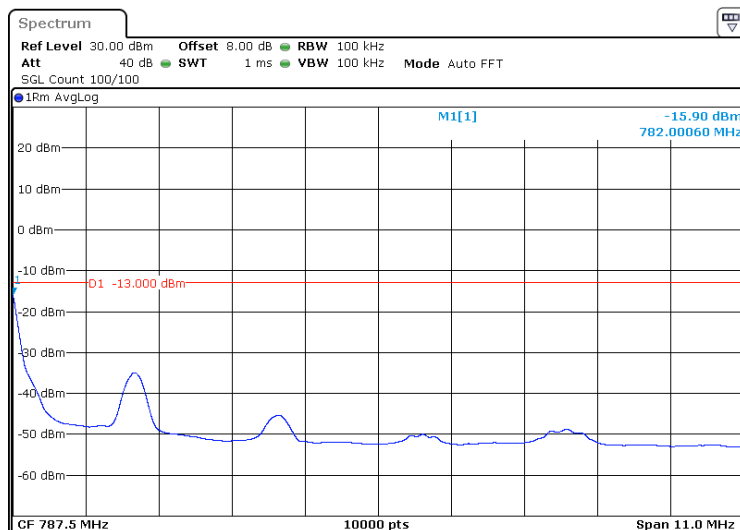
QPSK, 782 – 793 MHz (5 MHz Bandwidth)

LOW

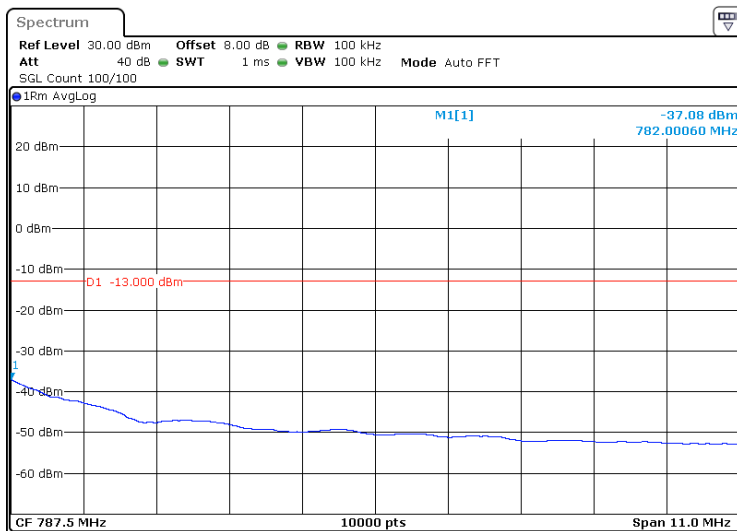
RB 1/0



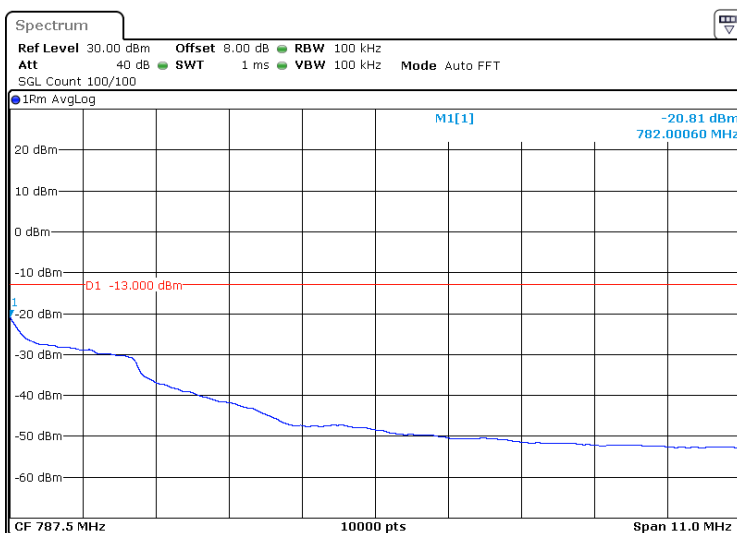
RB 1/24



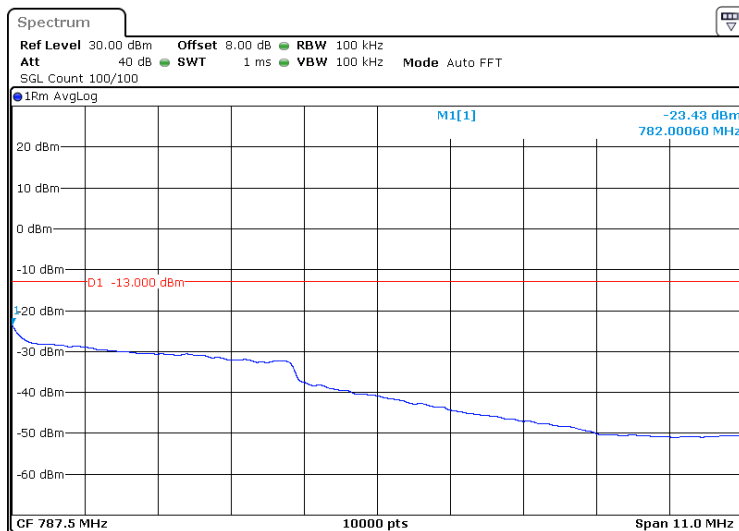
RB 12/0



RB 12/13



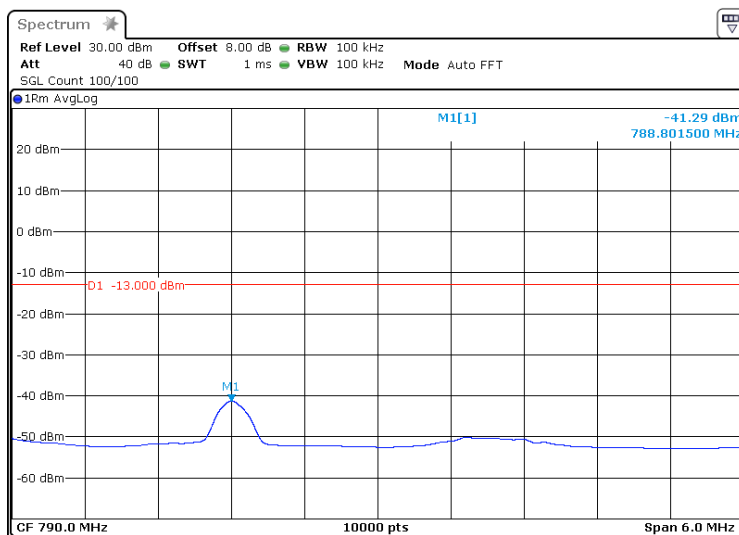
RB 25/0



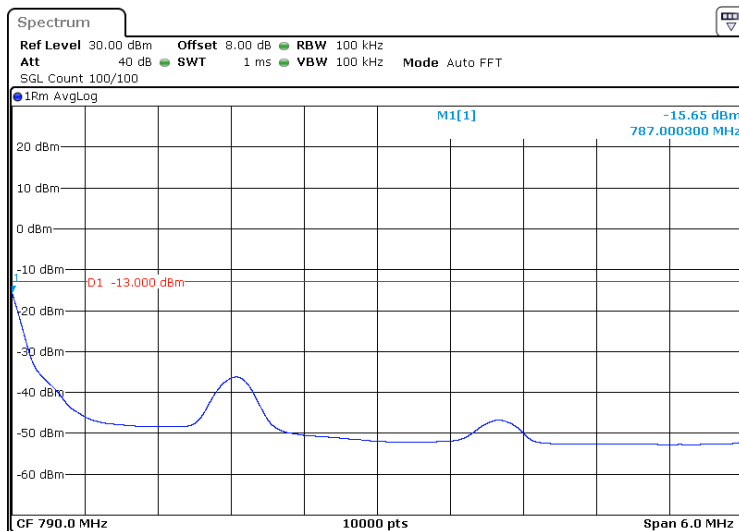
QPSK, 787 – 793 MHz (5 MHz Bandwidth)

HIGH

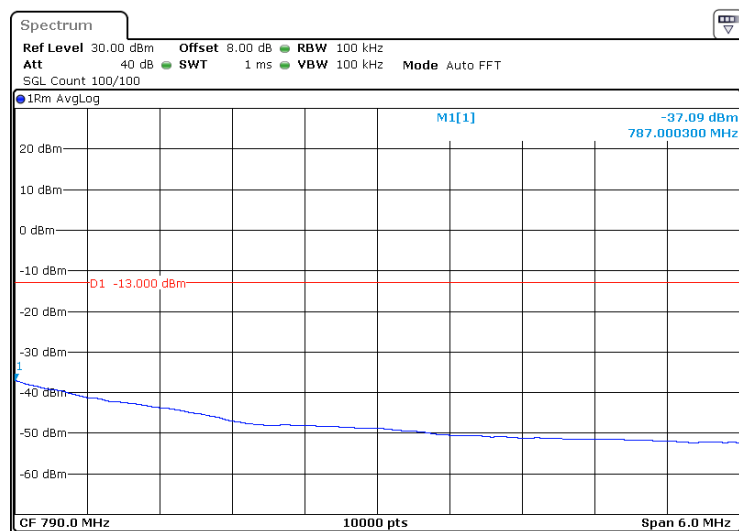
RB 1/0



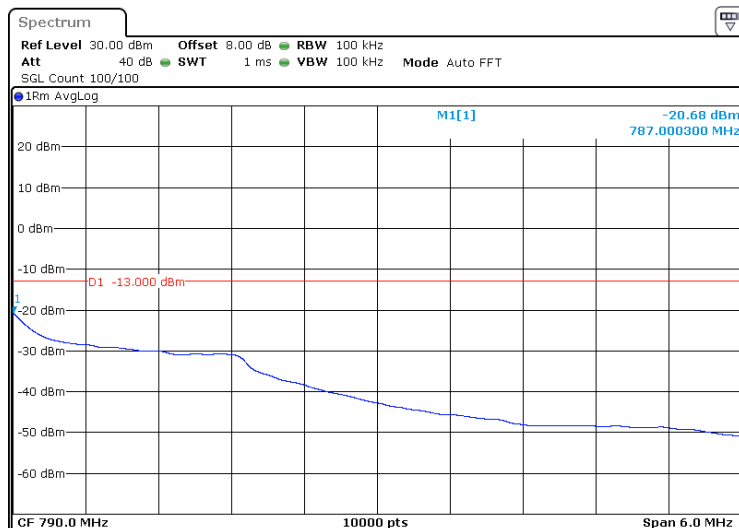
RB 1/24



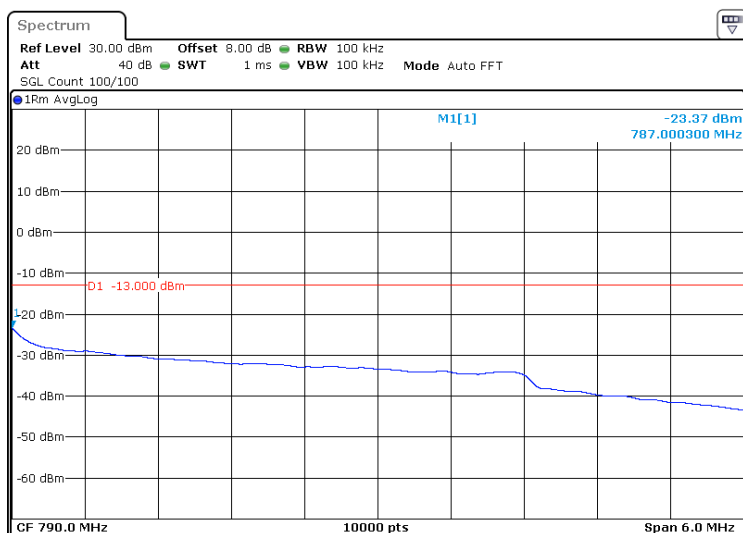
RB 12/0



RB 12/13



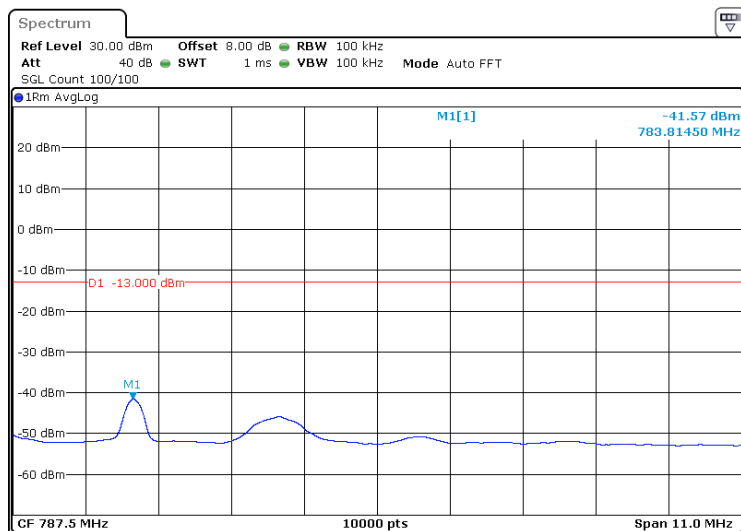
RB 25/0



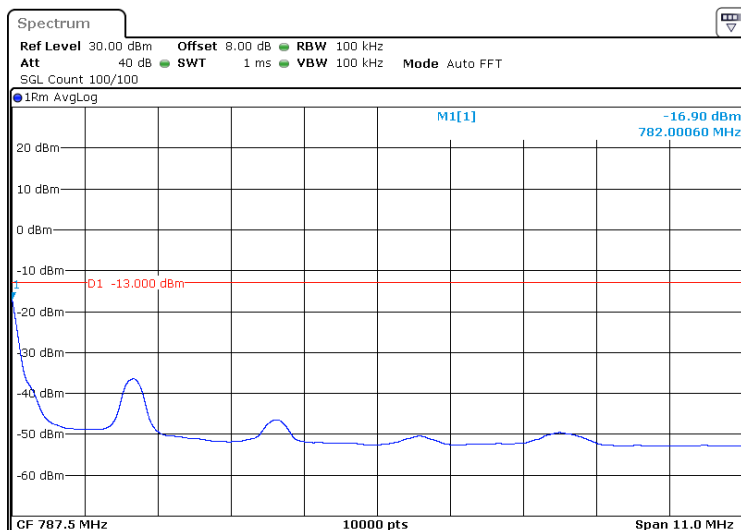
16QAM 782 – 793 MHz (5 MHz Bandwidth)

LOW

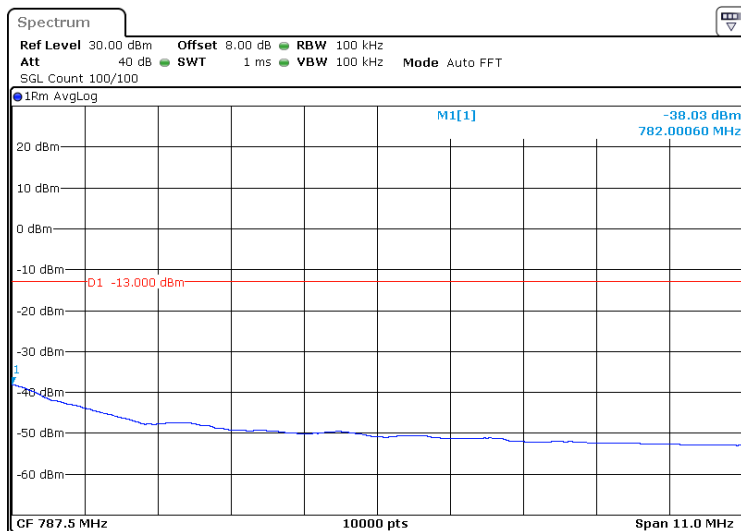
RB 1/0



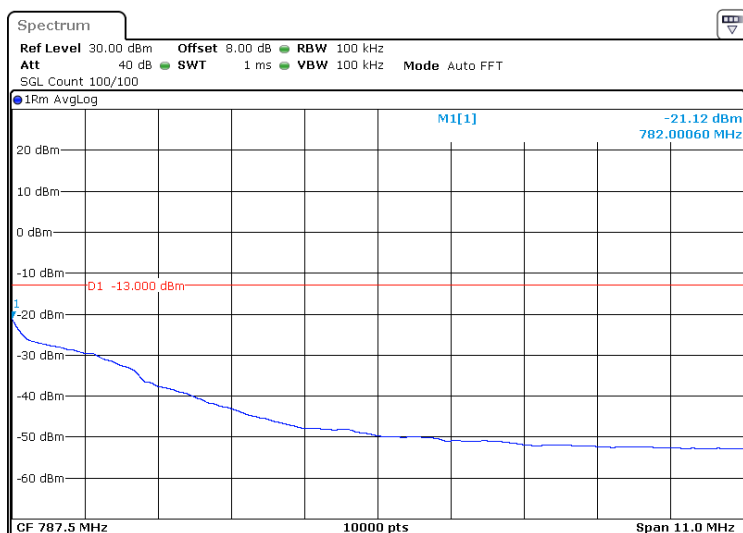
RB 1/24



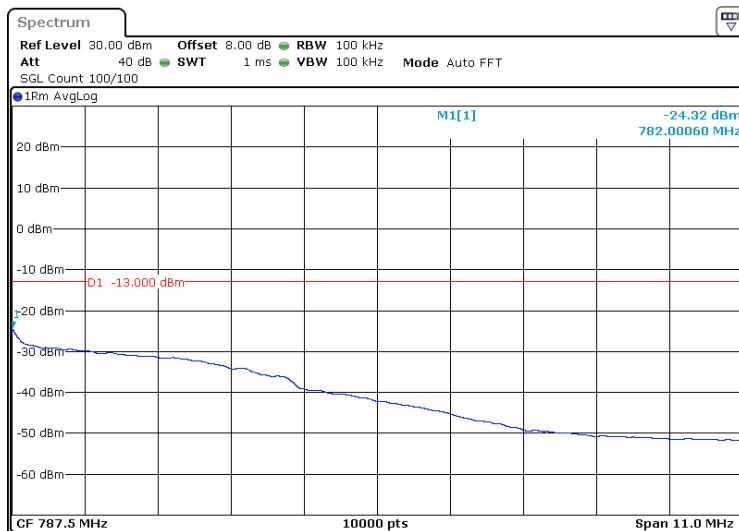
RB 12/0



RB 12/13



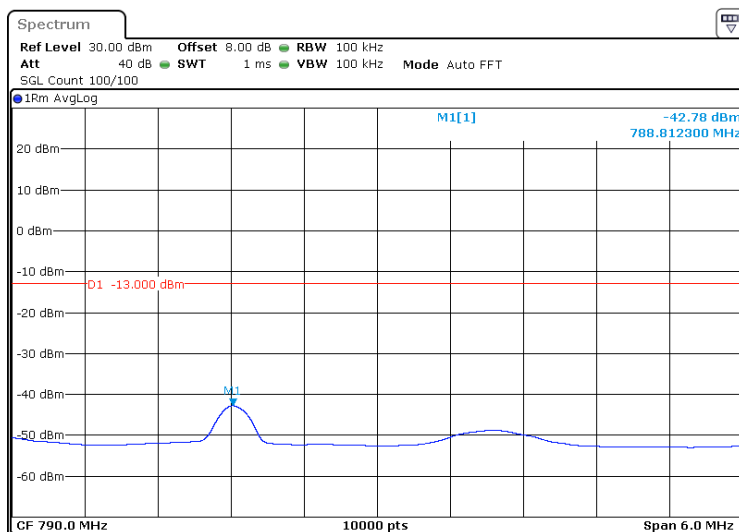
RB 25/0



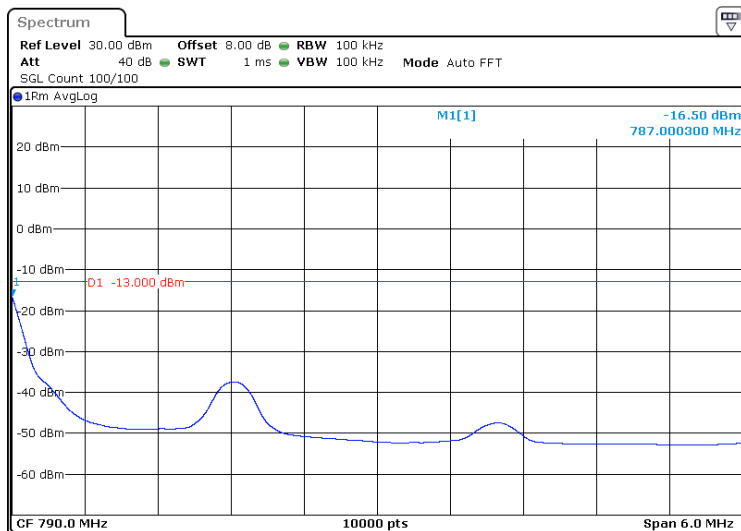
16QAM 787 – 793 MHz (5 MHz Bandwidth)

HIGH

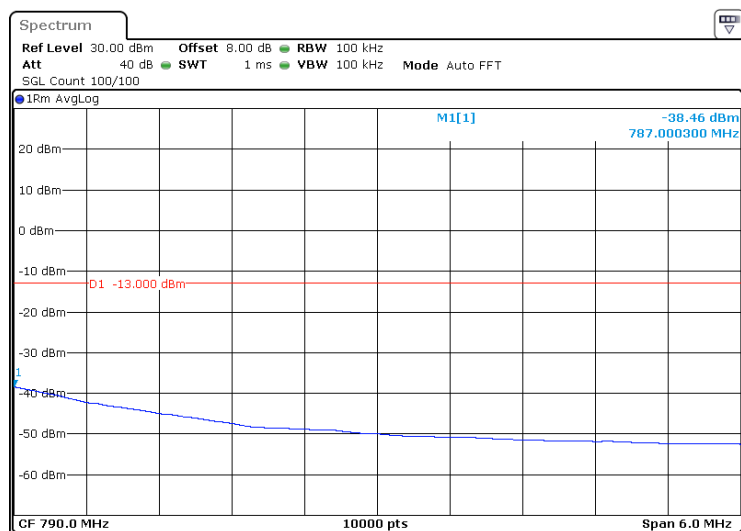
RB 1/0



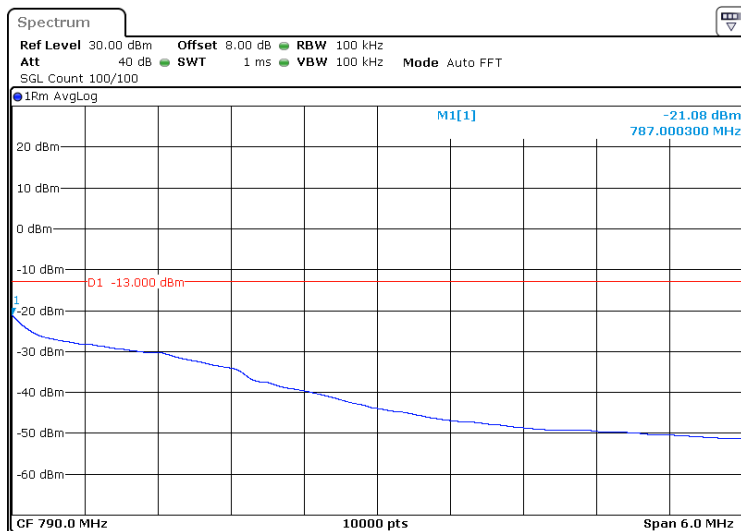
RB 1/24



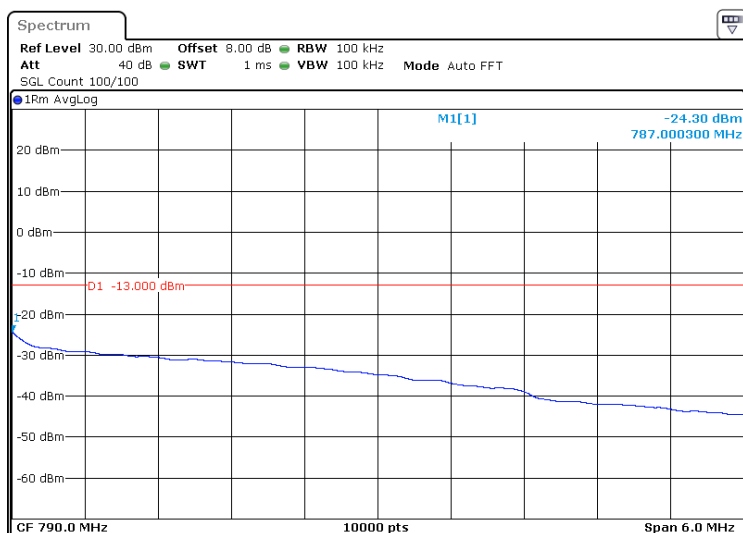
RB 12/0



RB 12/13



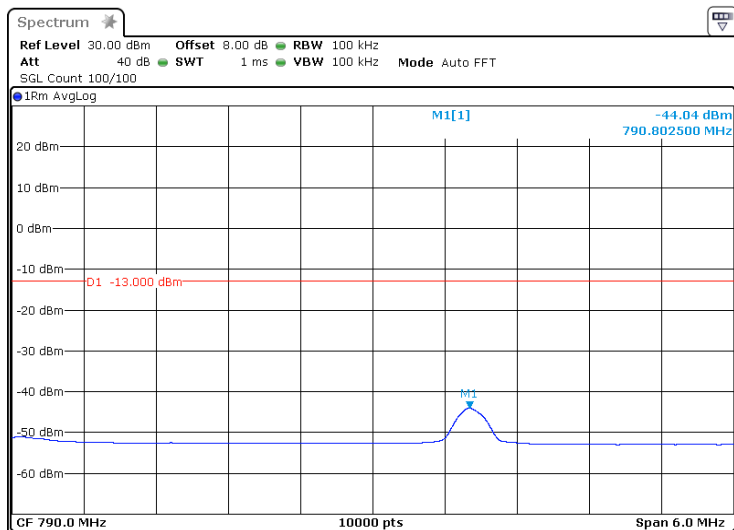
RB 25/0



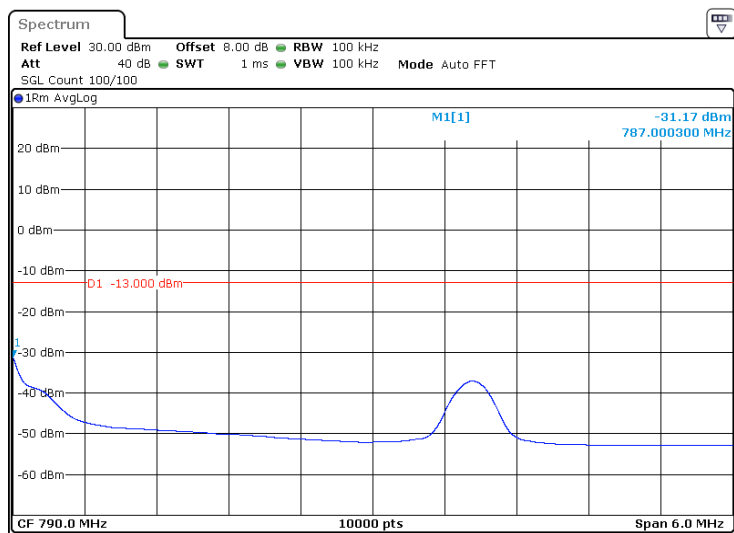
QPSK, 787 – 793 MHz (10 MHz Bandwidth)

782 MHz

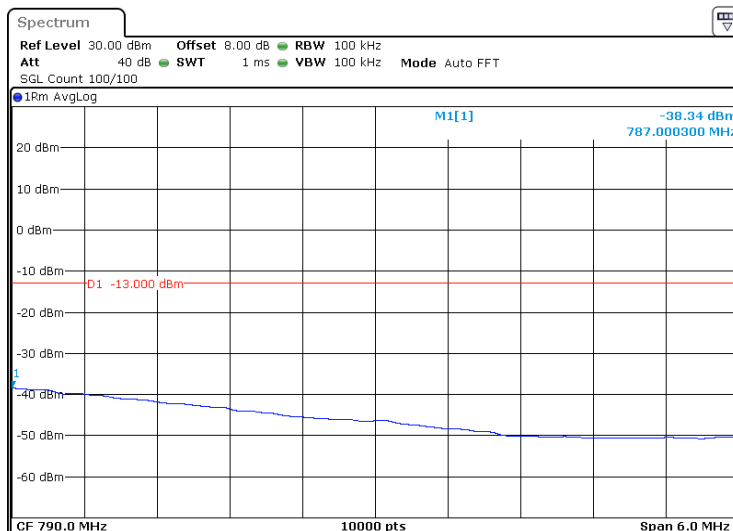
RB 1/0



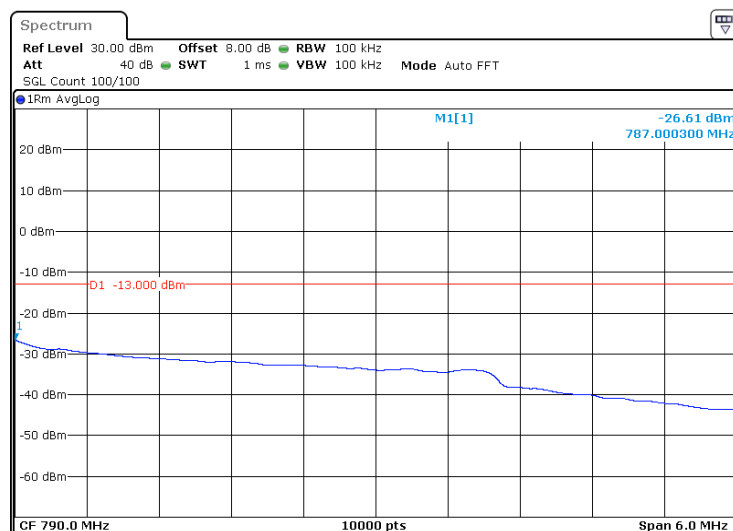
RB 1/49



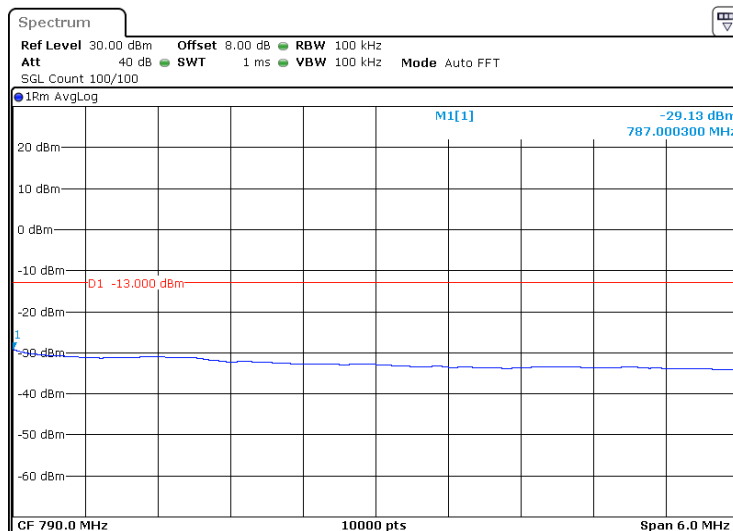
RB 25/0



RB 25/25



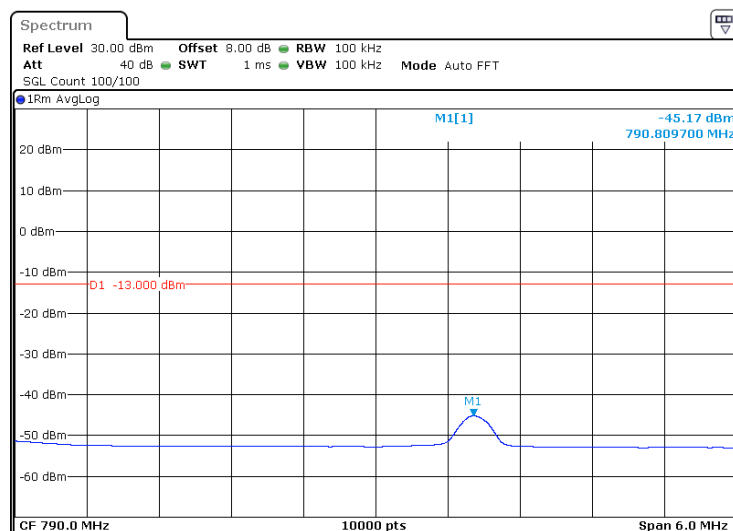
RB 50/0



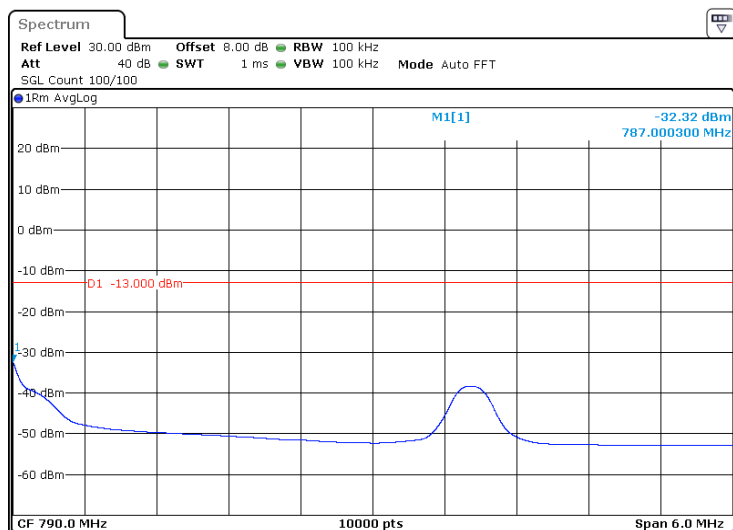
16QAM 787 – 793 MHz (10 MHz Bandwidth)

782 MHz

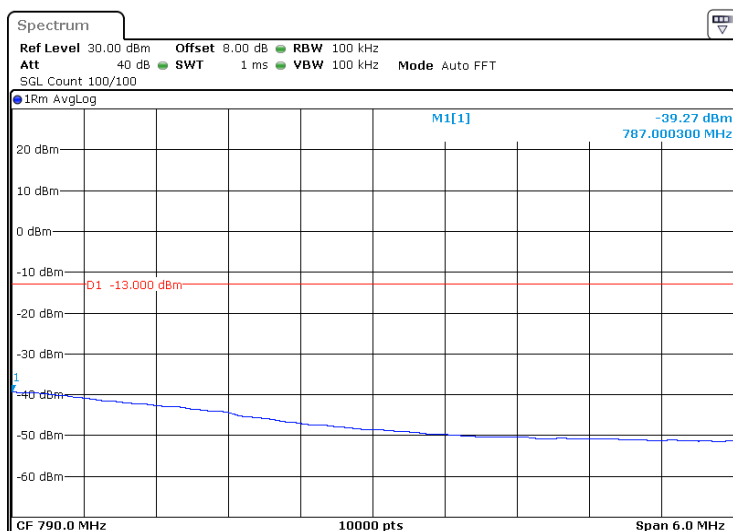
RB 1/0



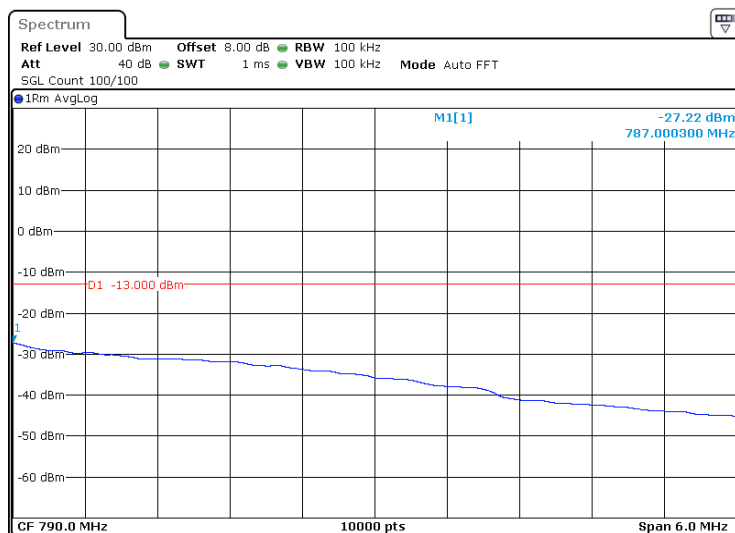
RB 1/49



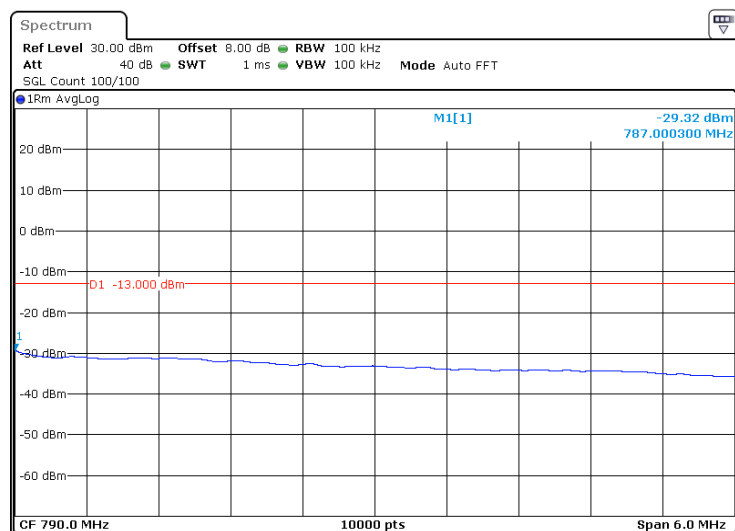
RB 25/0



RB 25/25



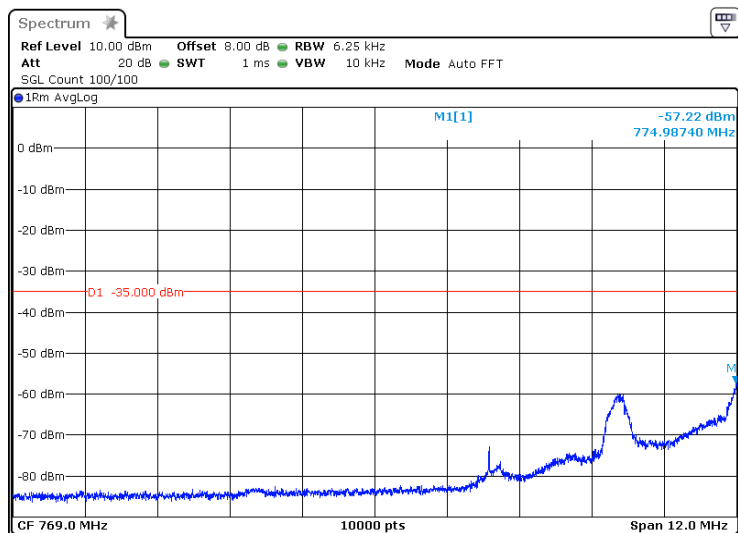
RB 50/0



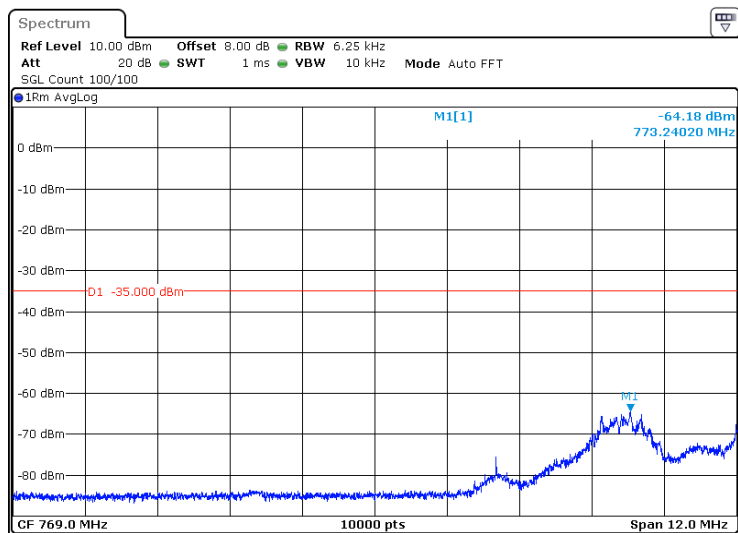
QPSK, 763 – 775 MHz (5 MHz Bandwidth)

LOW

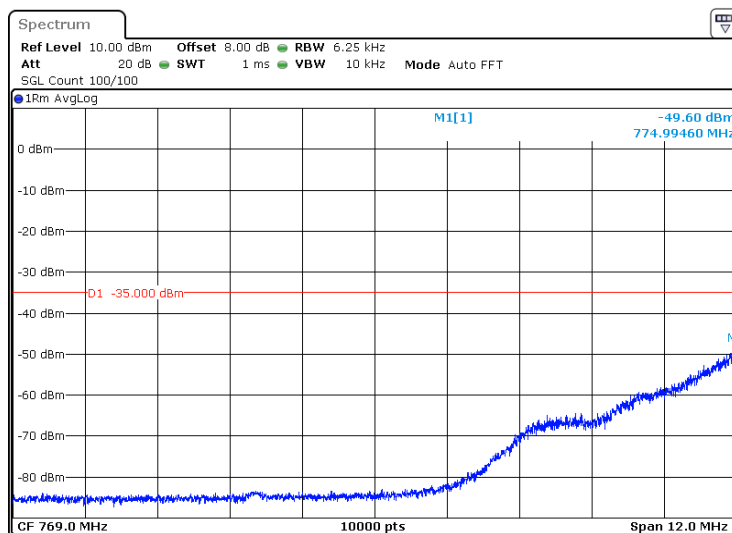
RB 1/0



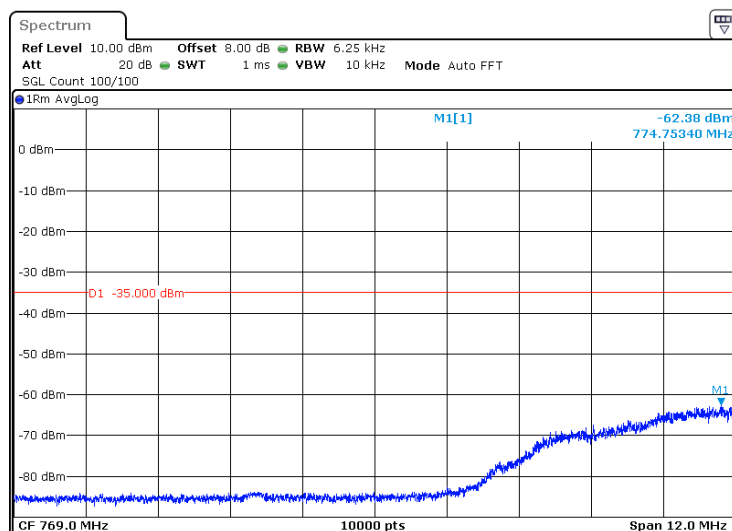
RB 1/24



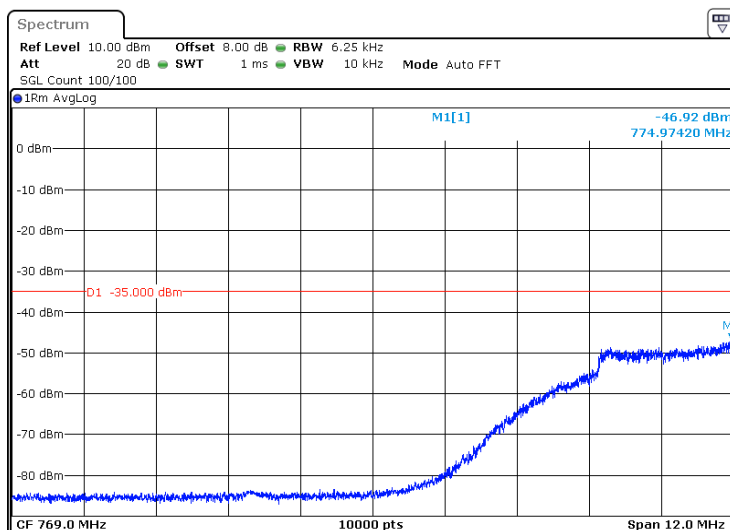
RB 12/0



RB 12/13



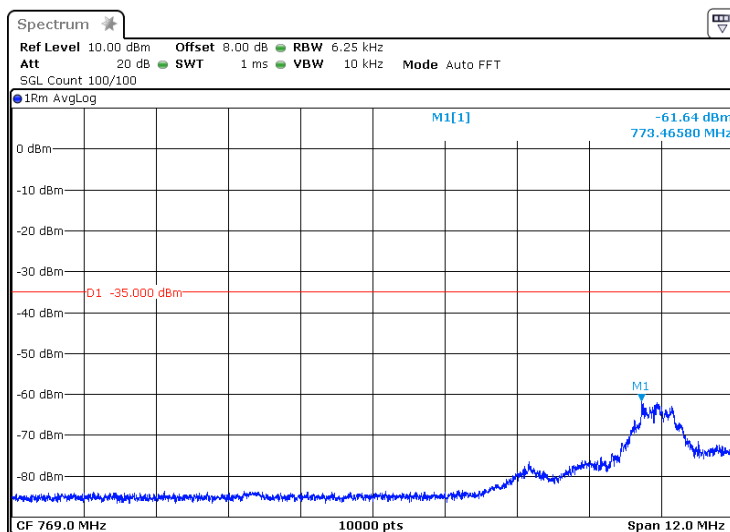
RB 25/0



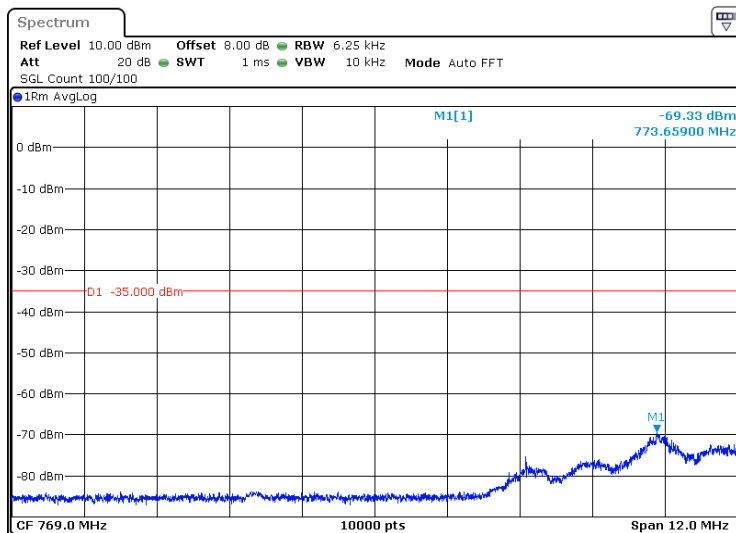
QPSK, 763 – 775 MHz (5 MHz Bandwidth)

HIGH

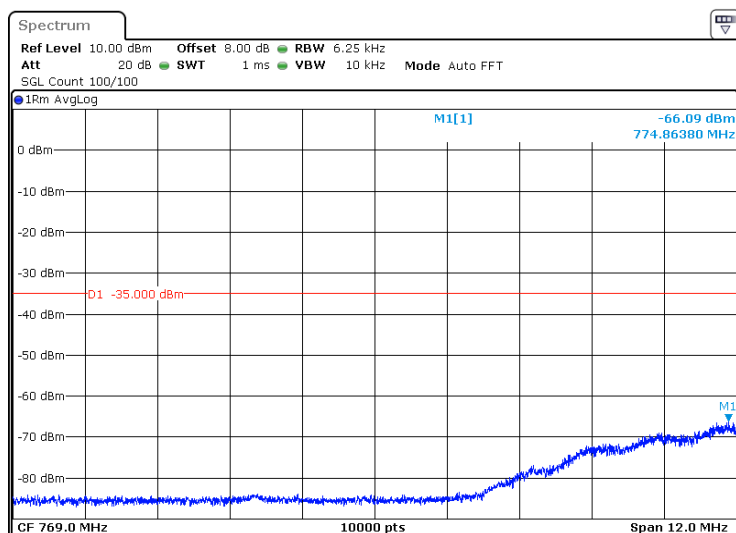
RB 1/0



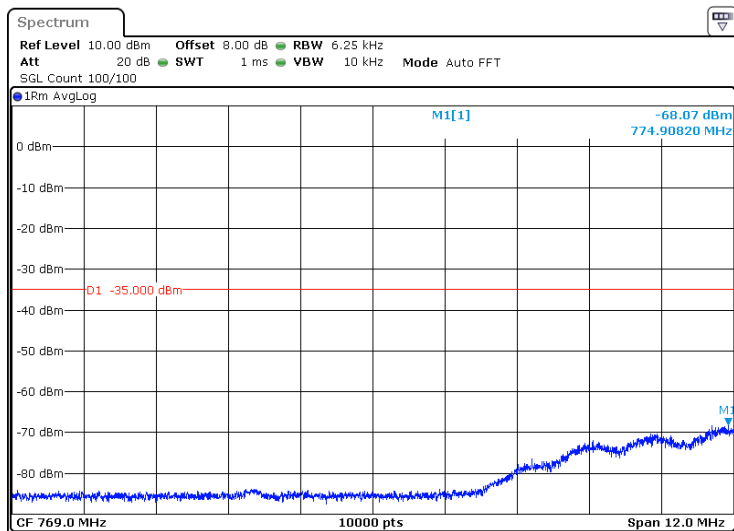
RB 1/24



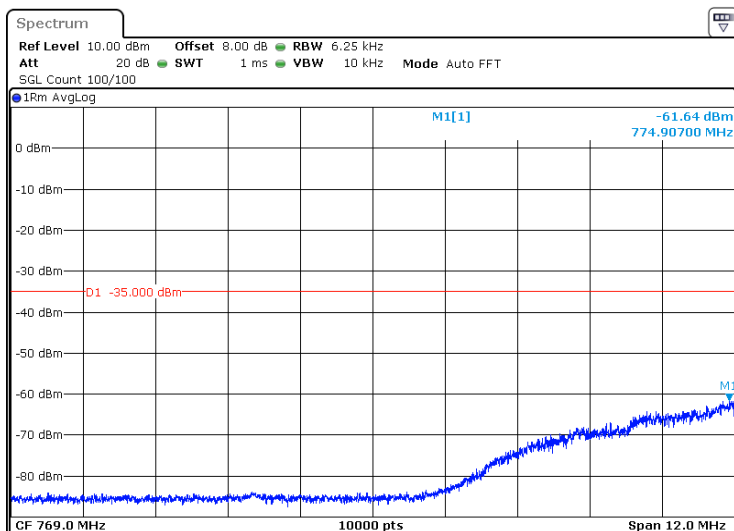
RB 12/0



RB 12/13



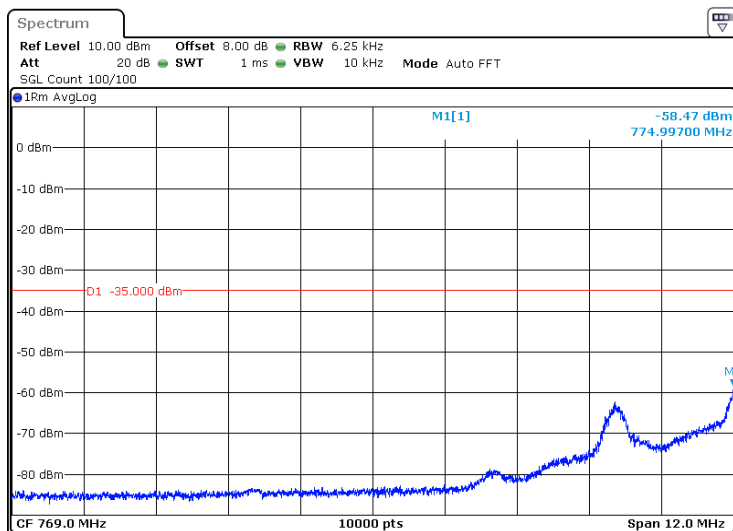
RB 25/0



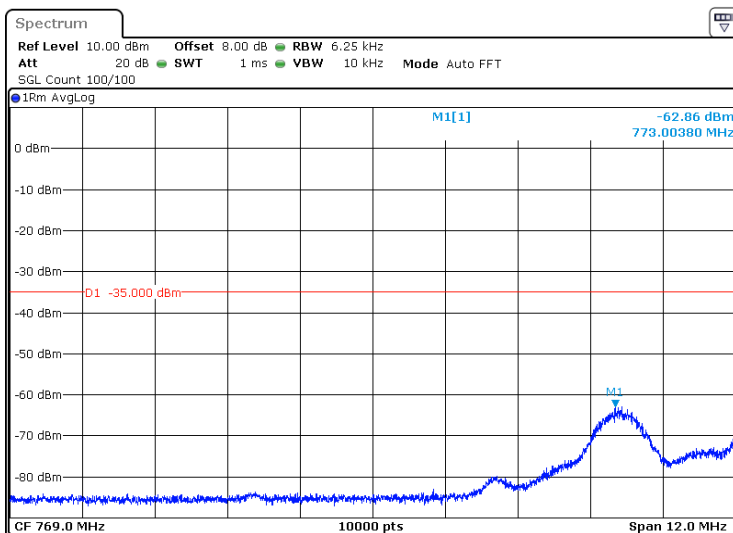
16QAM 763 – 775 MHz (5 MHz Bandwidth)

LOW

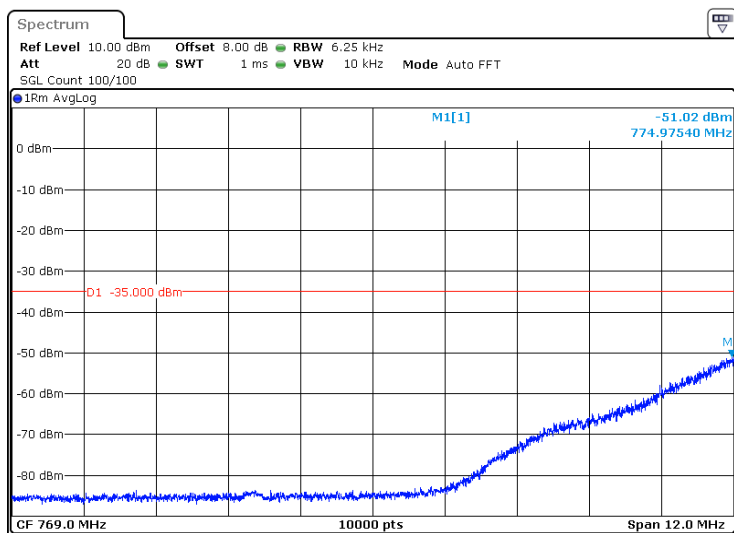
RB 1/0



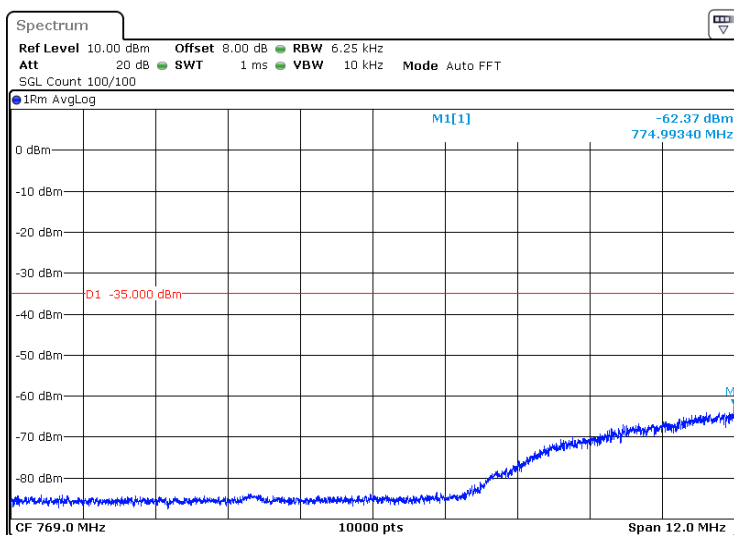
RB 1/24



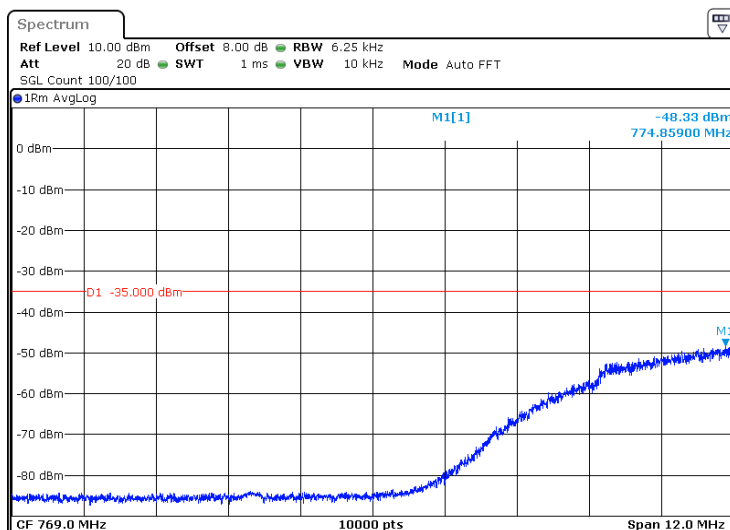
RB 12/0



RB 12/13



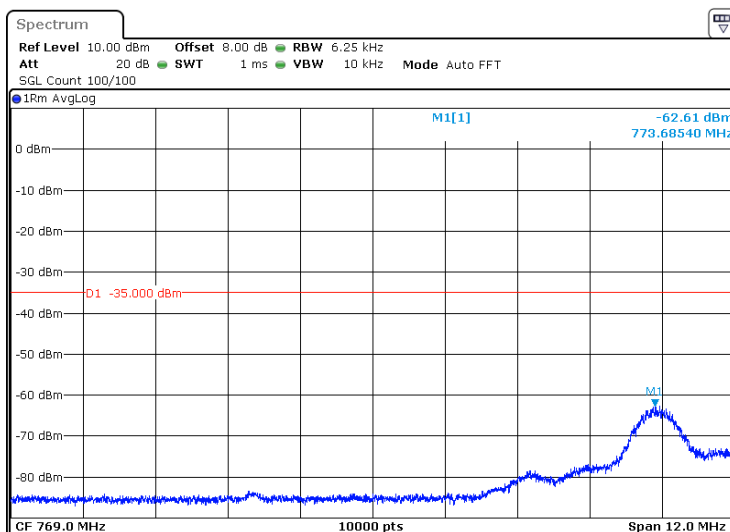
RB 25/0



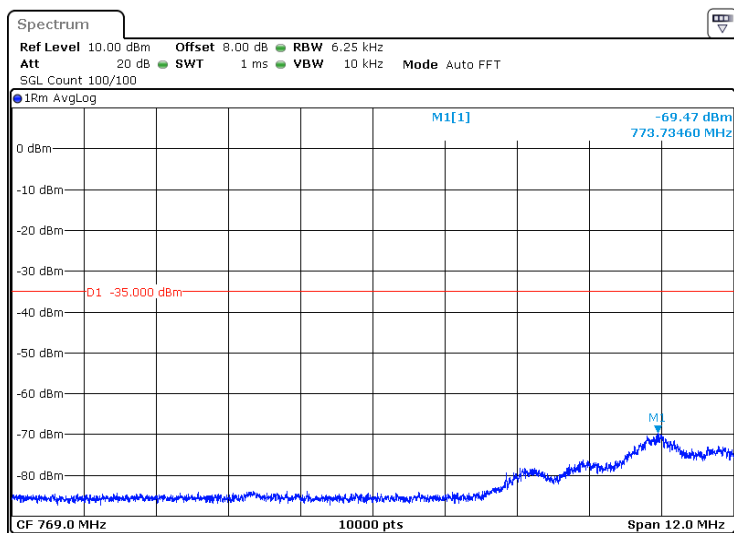
16QAM 763 – 775 MHz (5 MHz Bandwidth)

HIGH

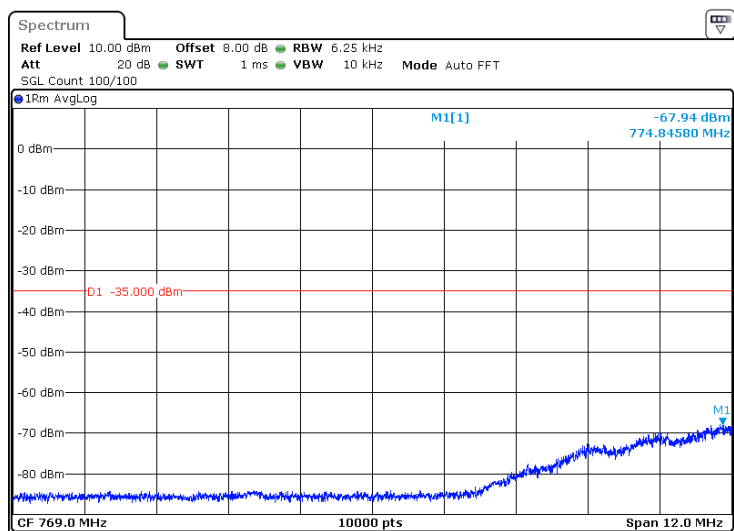
RB 1/0



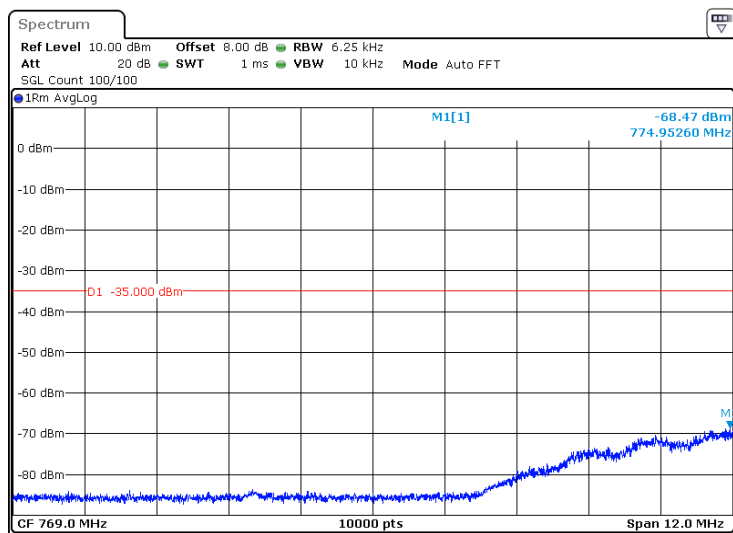
RB 1/24



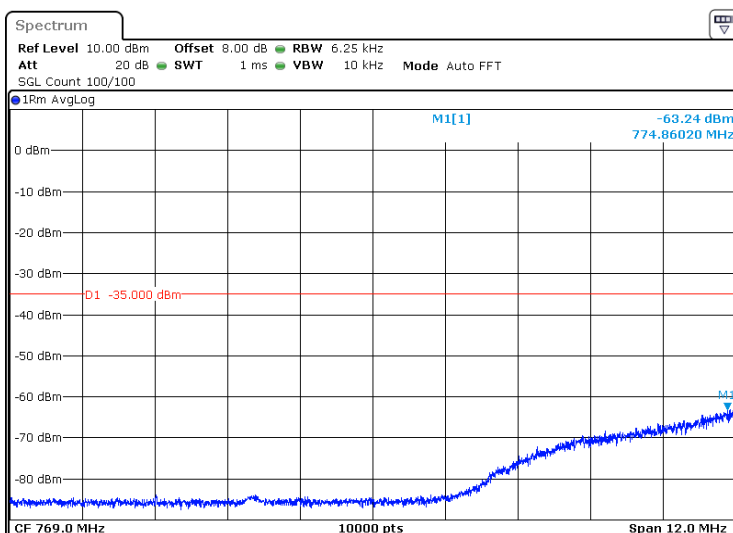
RB 12/0



RB 12/13



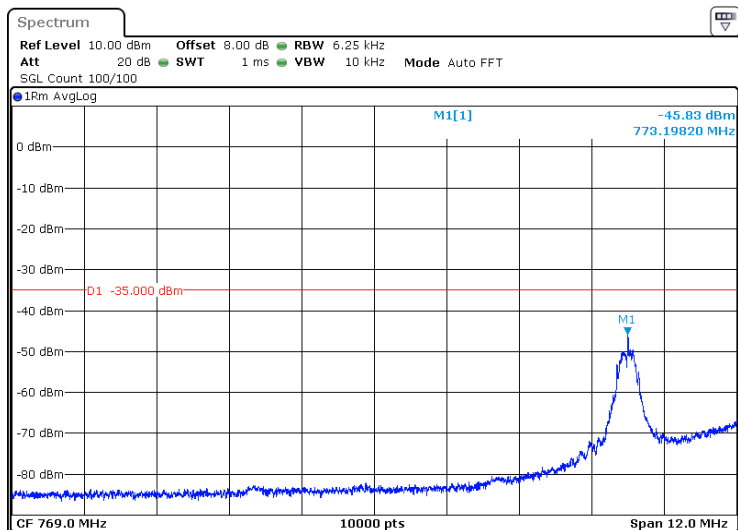
RB 25/0



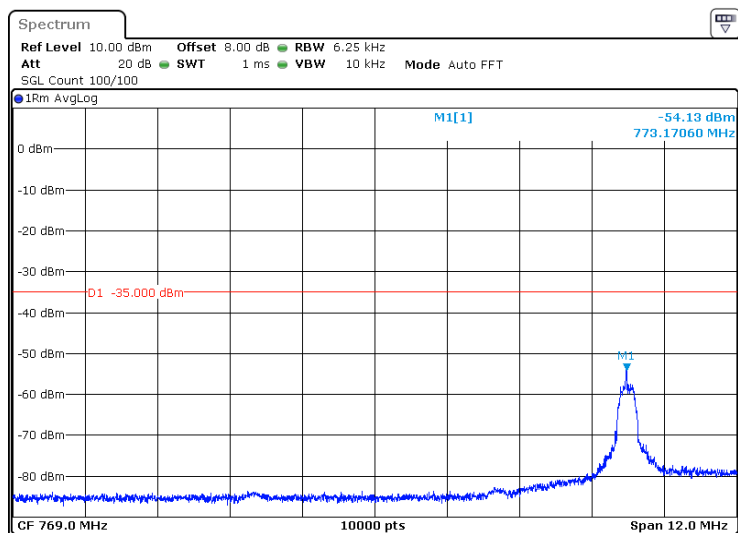
QPSK, 763 – 775 MHz (10 MHz Bandwidth)

782 MHz

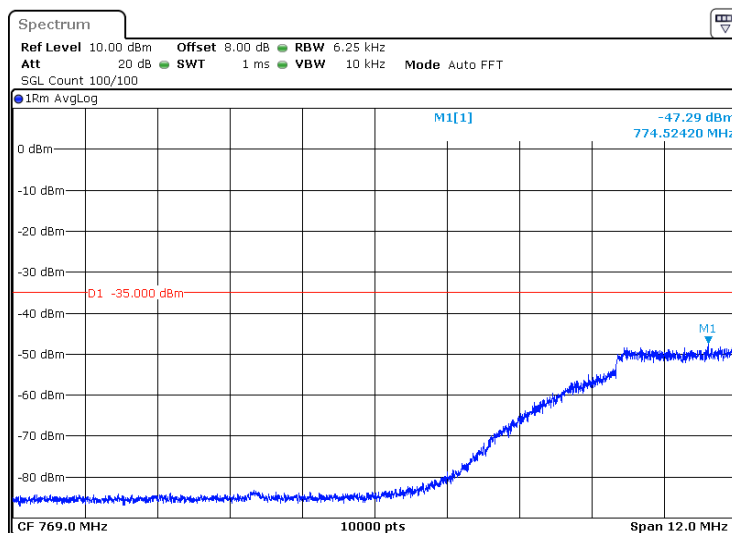
RB 1/0



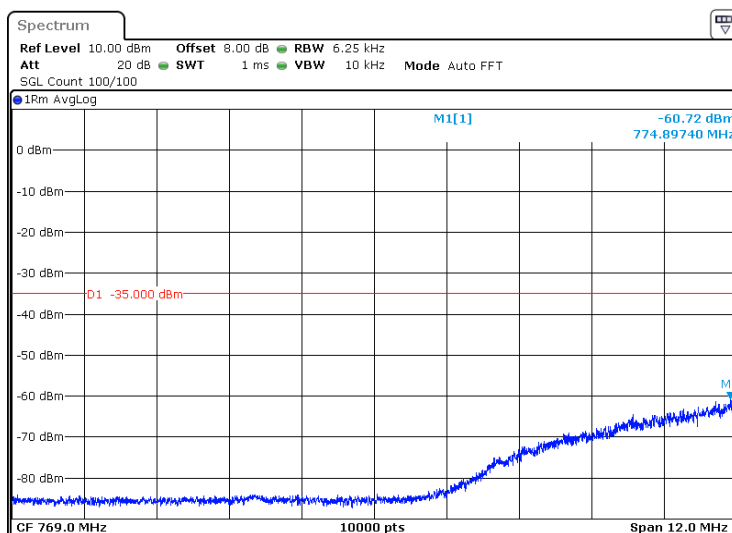
RB 1/49



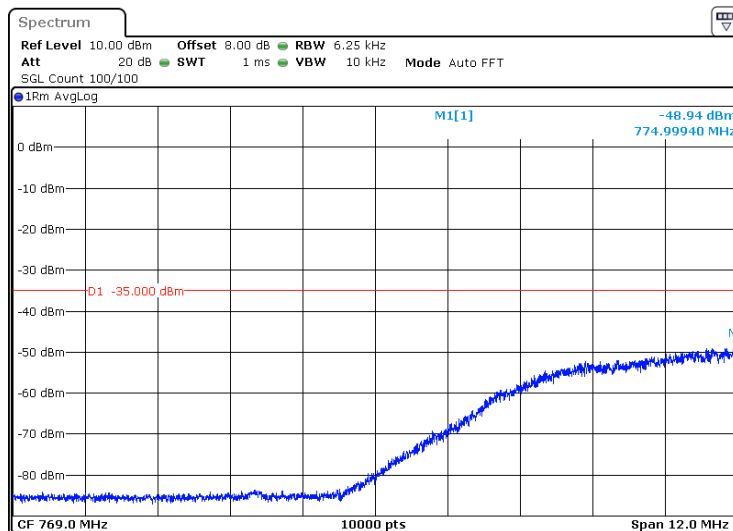
RB 25/0



RB 25/25



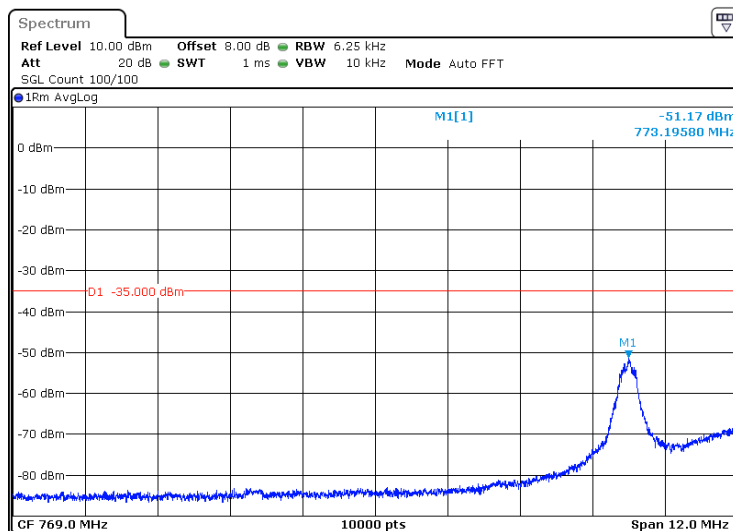
RB 50/0



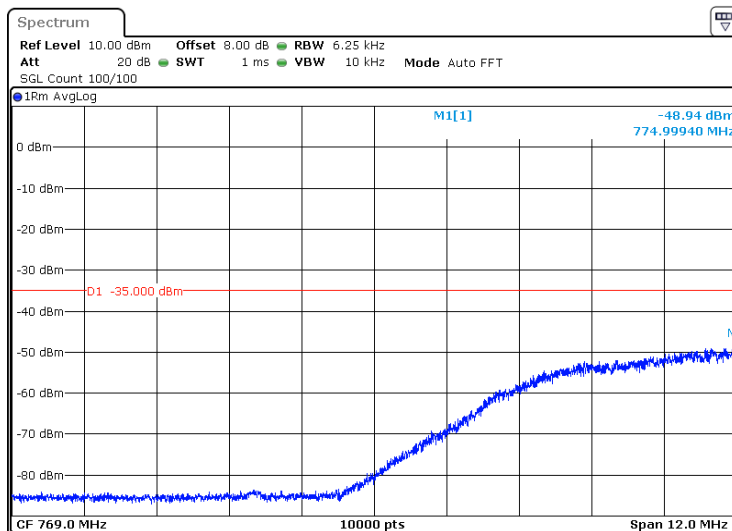
16QAM 763 – 775 MHz (10 MHz Bandwidth)

782 MHz

RB 1/0



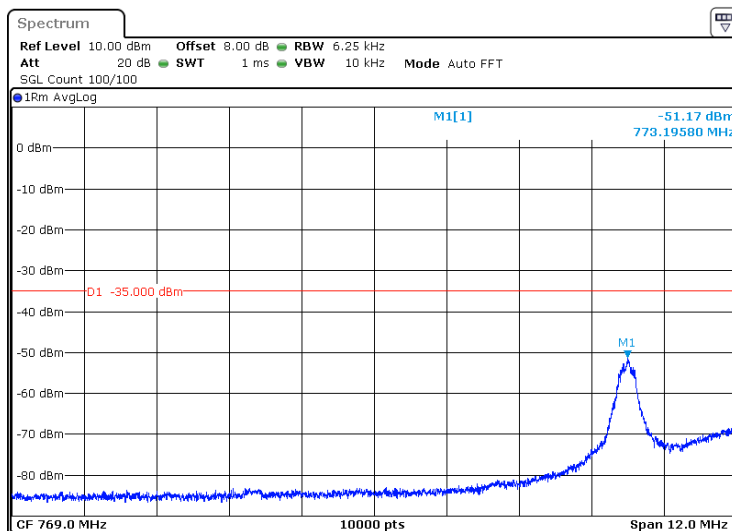
RB 50/0



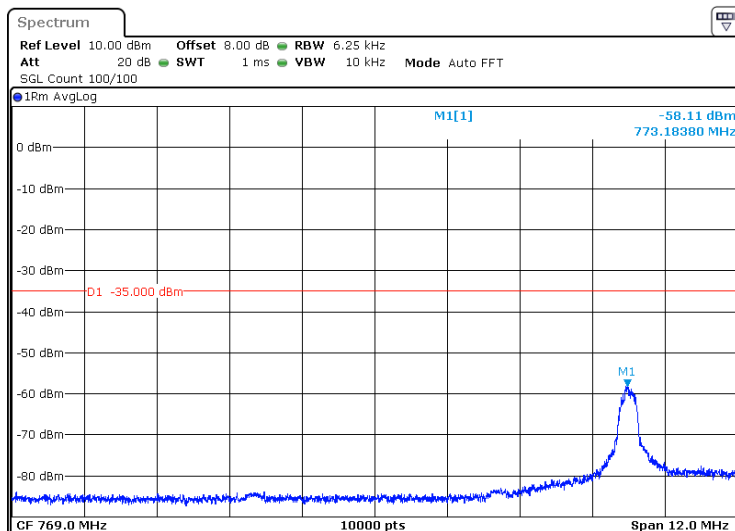
16QAM 763 – 775 MHz (10 MHz Bandwidth)

782 MHz

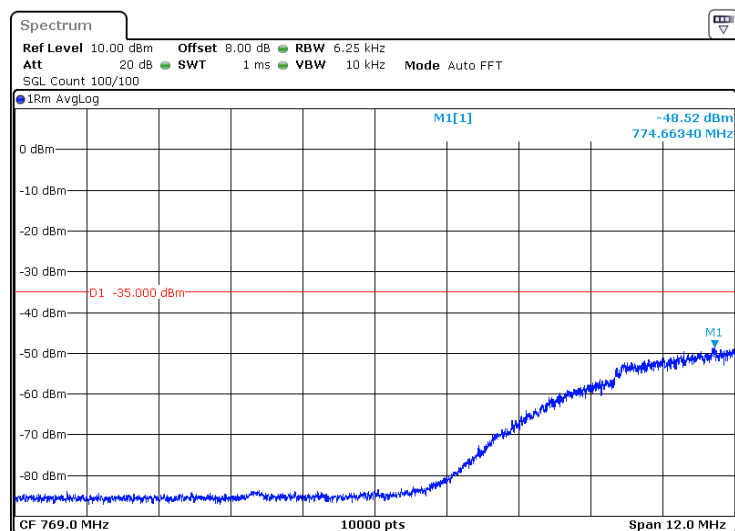
RB 1/0



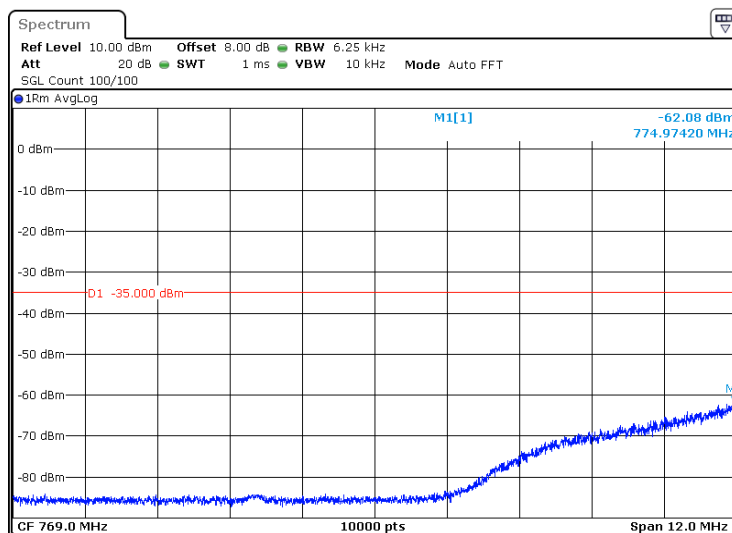
RB 1/49



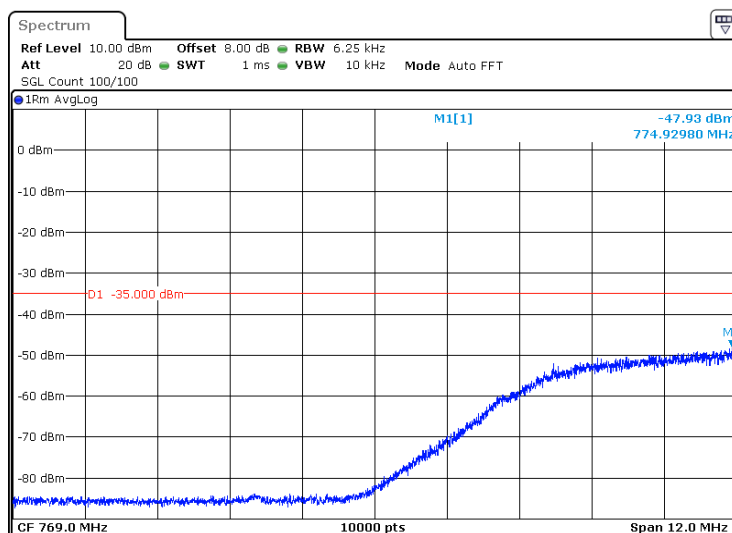
RB 25/0



RB 25/25



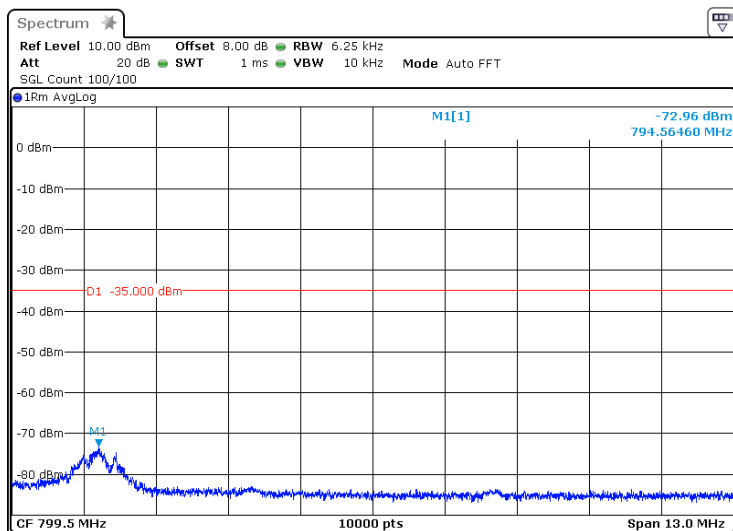
RB 50/0



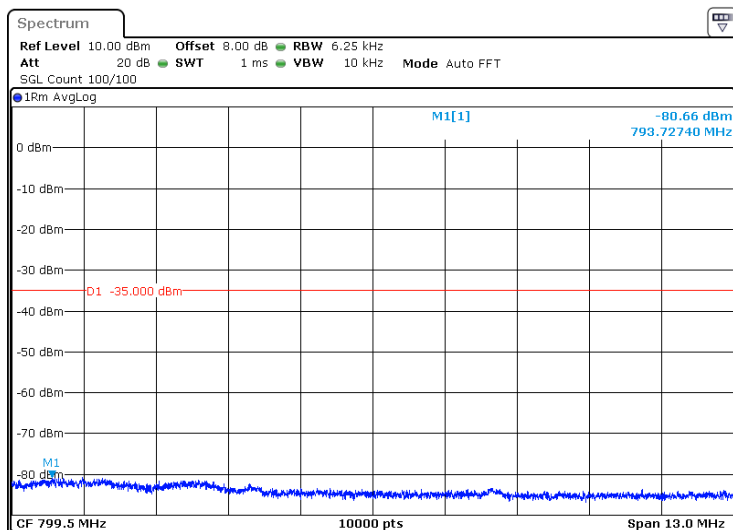
QPSK, 793 – 806 MHz (5 MHz Bandwidth)

LOW

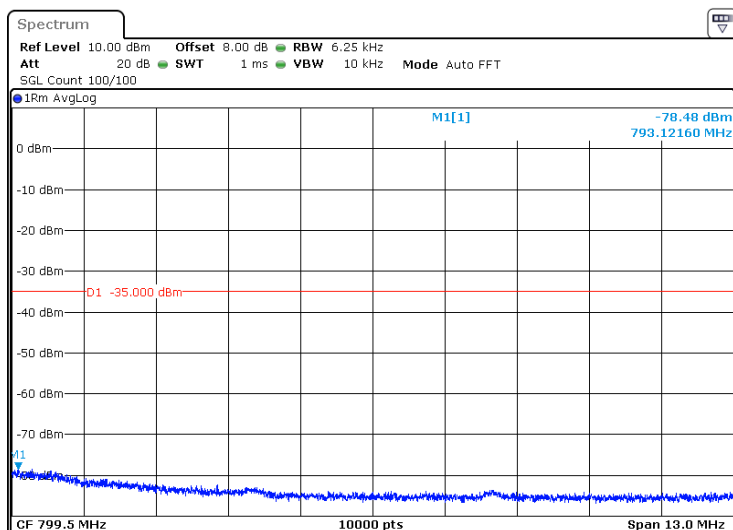
RB 1/0



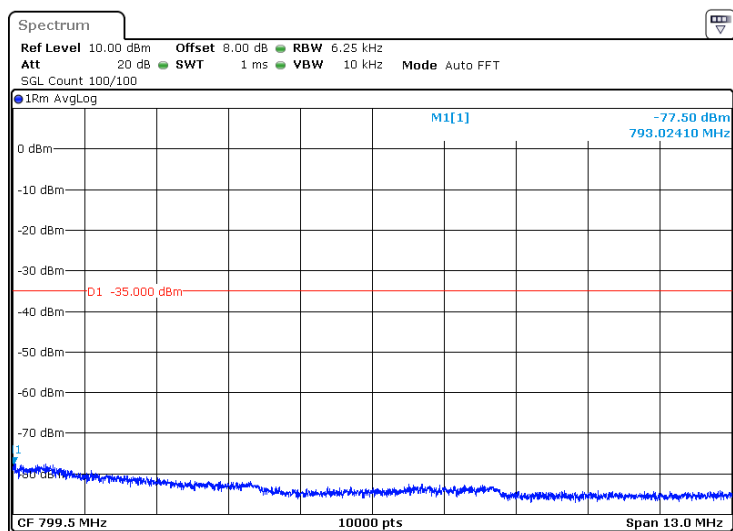
RB 1/24



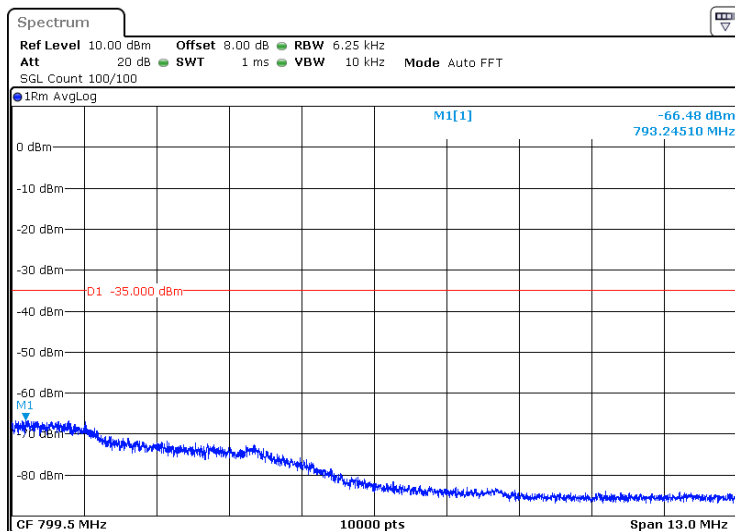
RB 12/0



RB 12/13



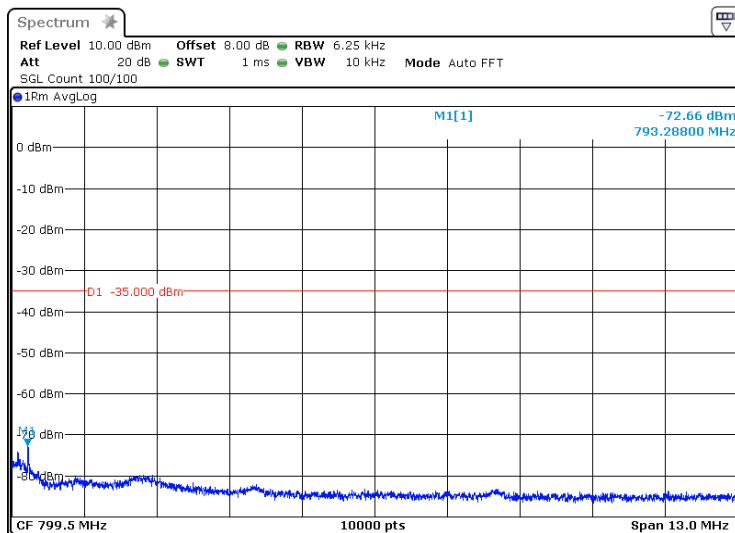
RB 25/0



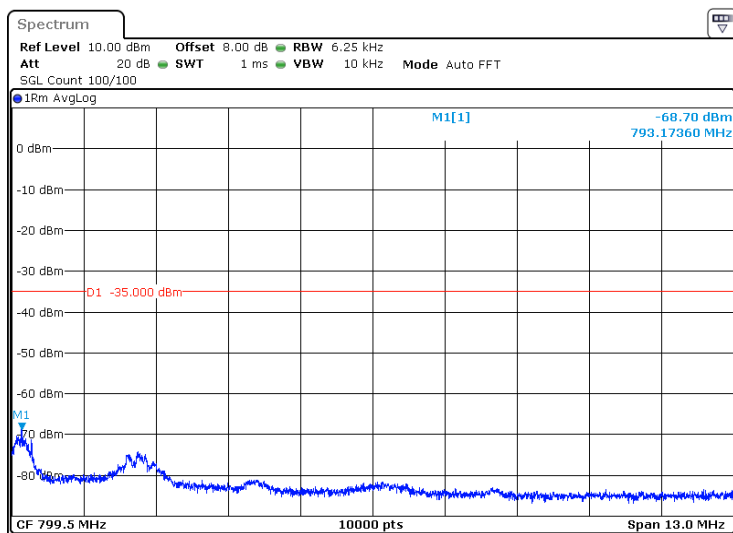
PSK, 793 – 806 MHz (5 MHz Bandwidth)

HIGH

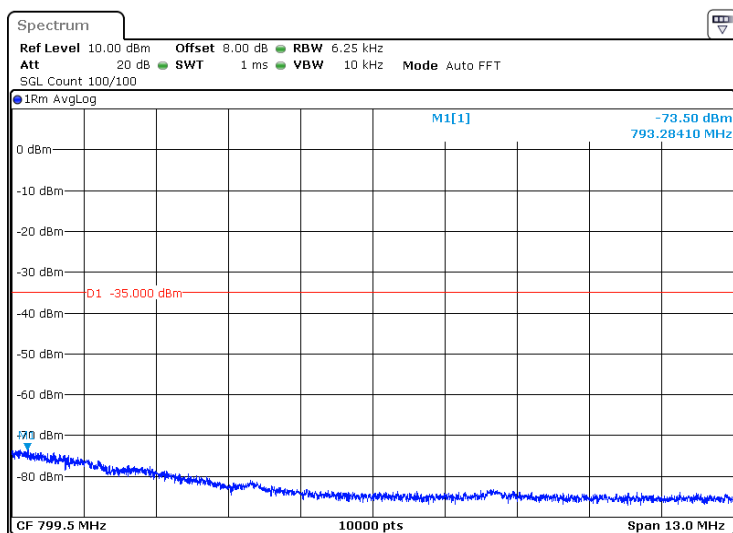
RB 1/0



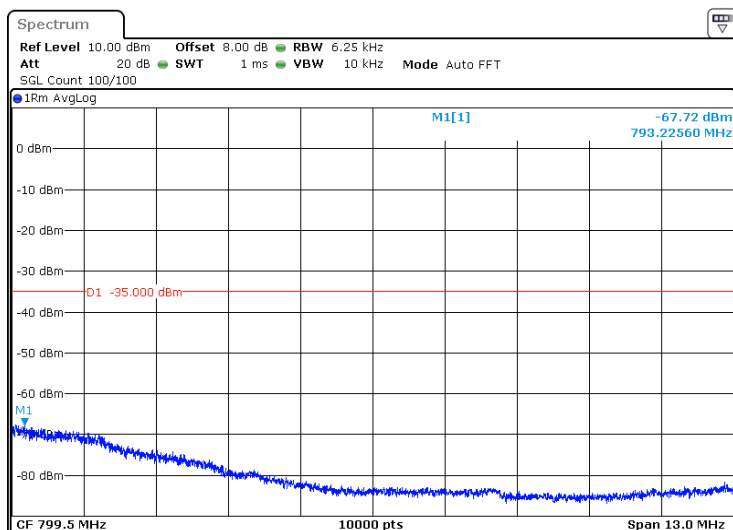
RB 1/24



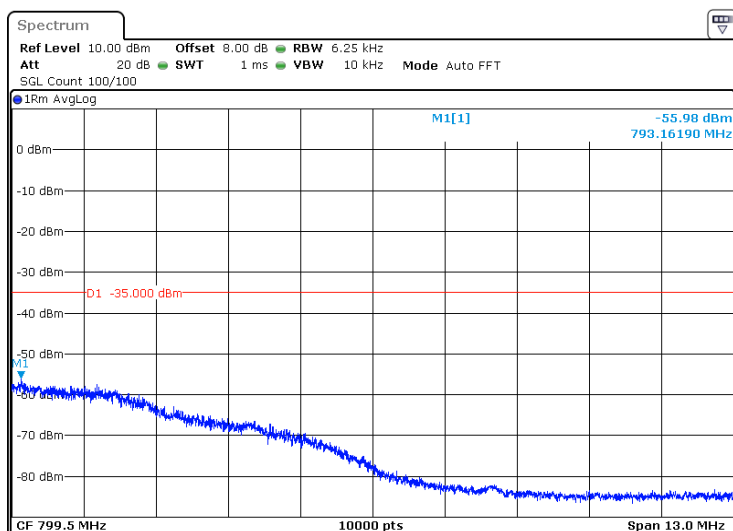
RB 12/0



RB 12/13



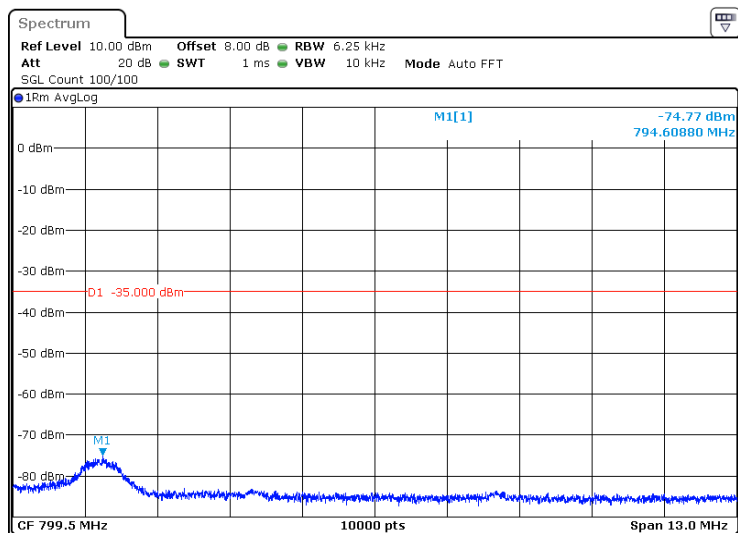
RB 25/0



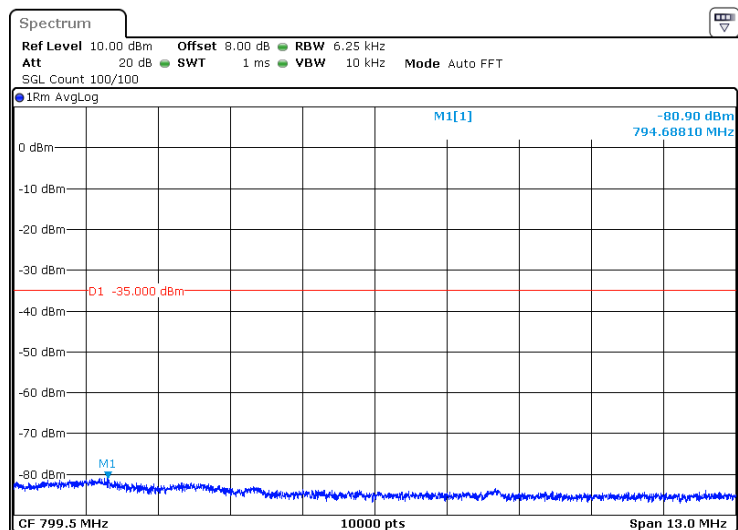
16QAM 793 – 806 MHz (5 MHz Bandwidth)

LOW

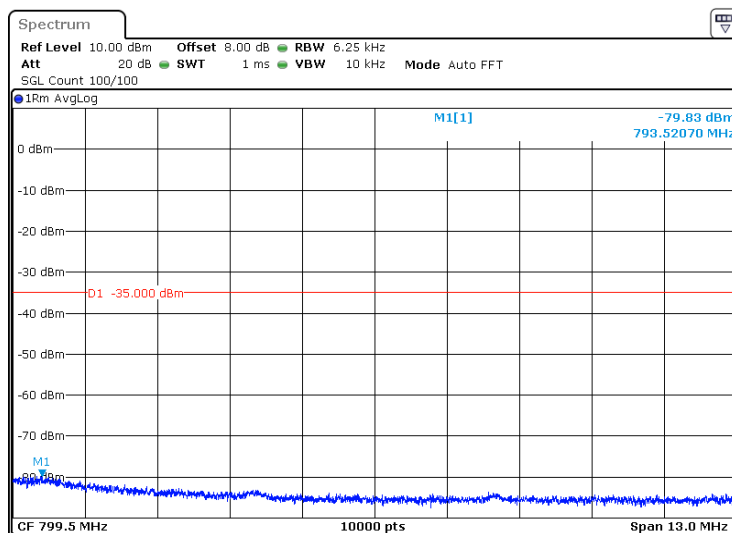
RB 1/0



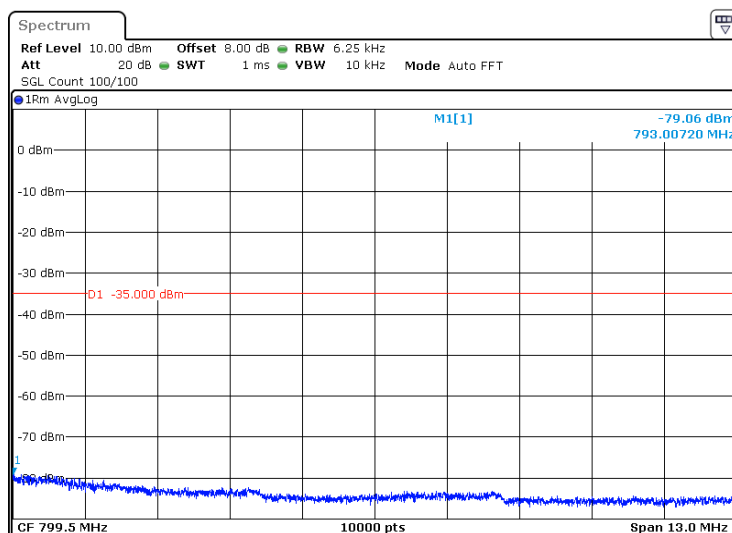
RB 1/24



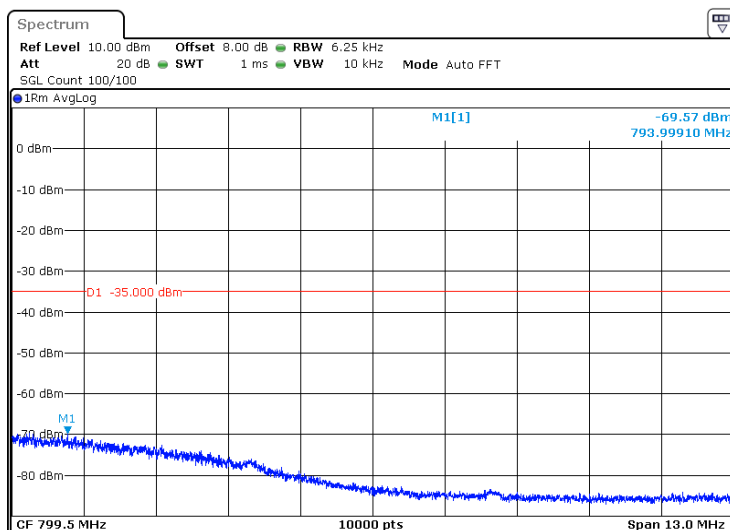
RB 12/0



RB 12/13



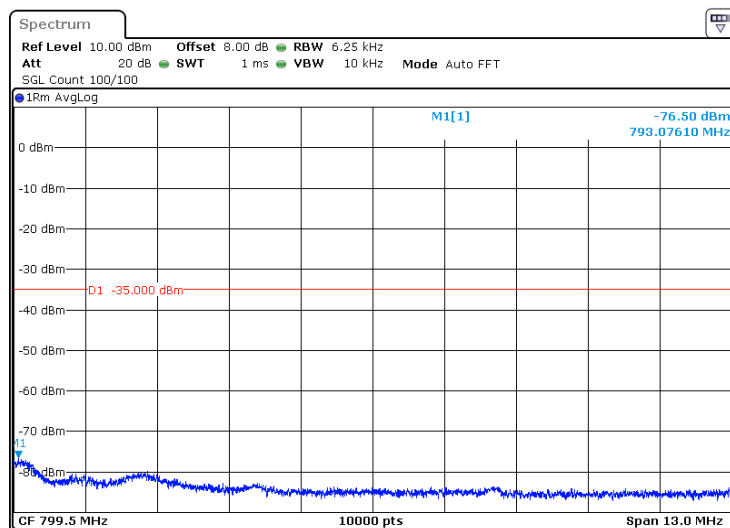
RB 25/0



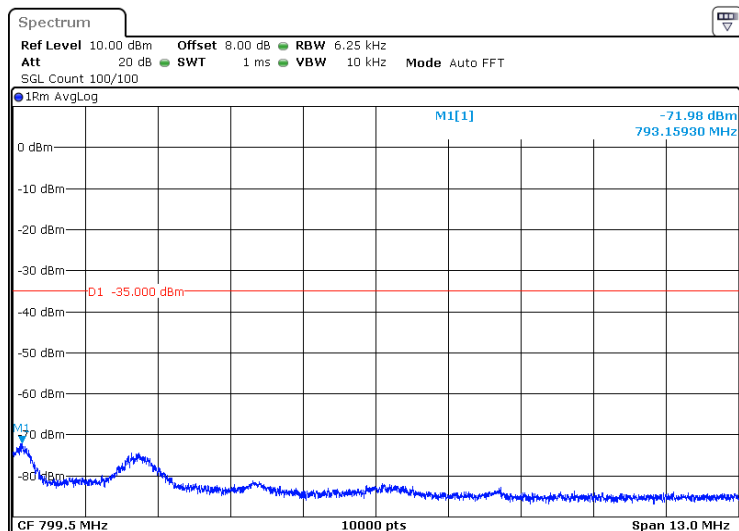
16QAM 793 – 806 MHz (5 MHz Bandwidth)

HIGH

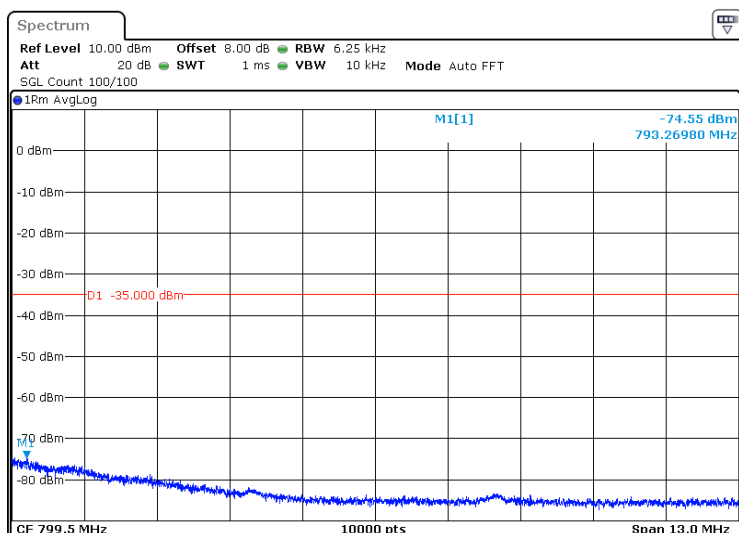
RB 1/0



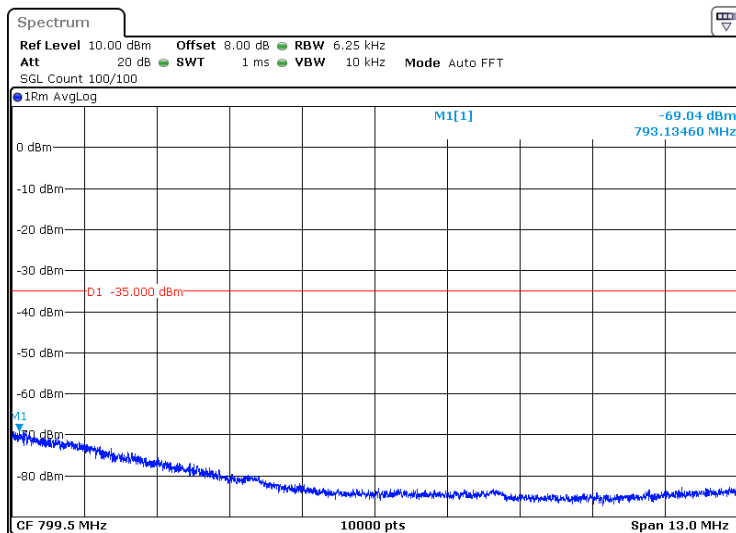
RB 1/24



RB 12/0



RB 12/13



RB 25/0

