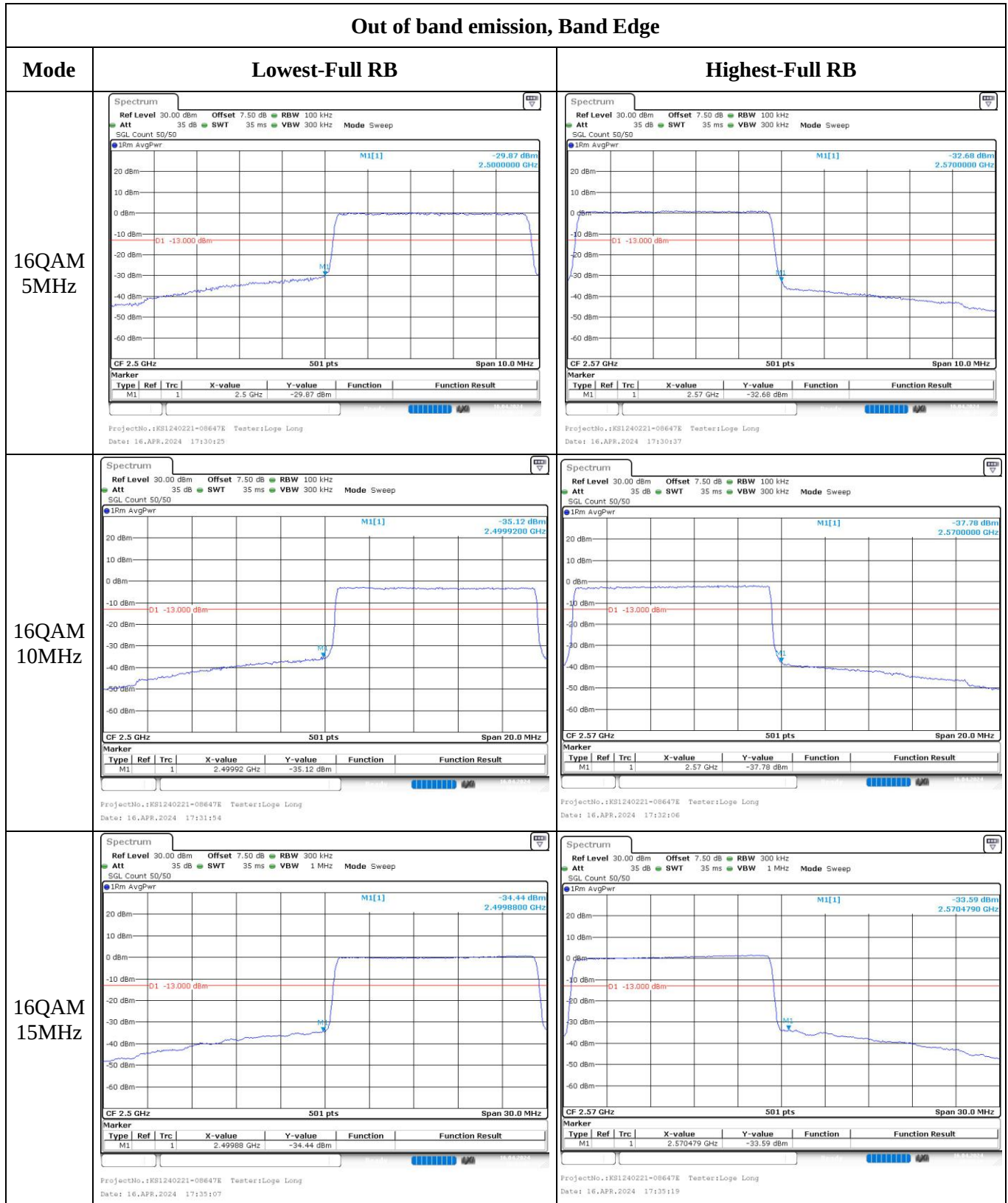
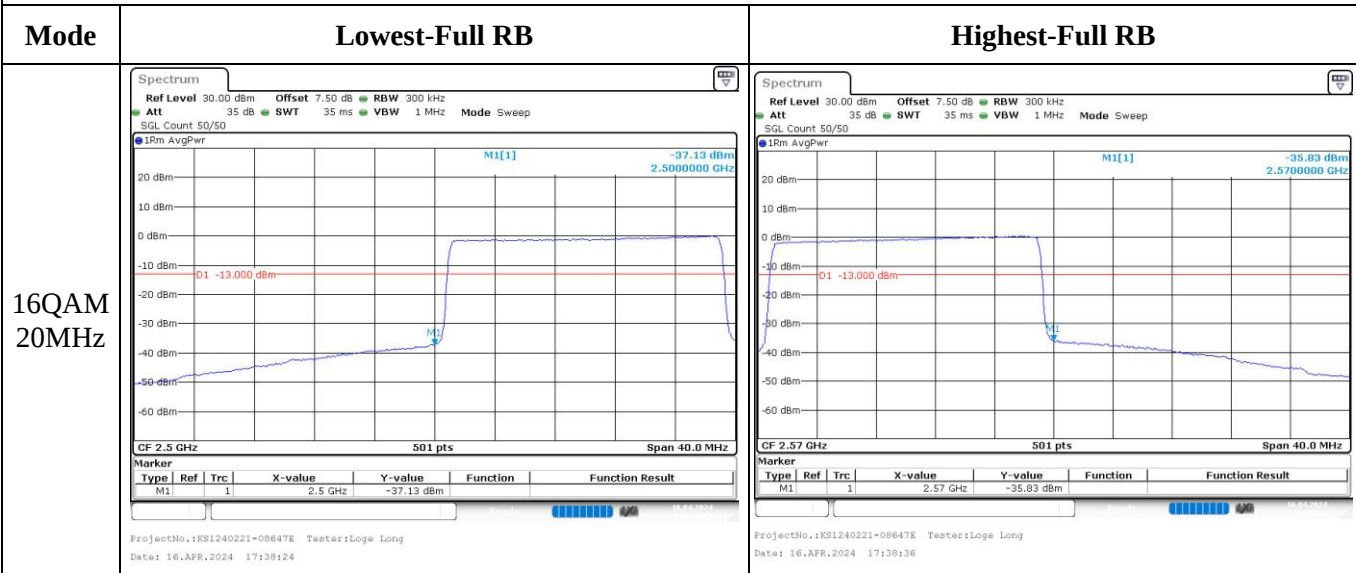


Out of band emission, Band Edge



Out of band emission, Band Edge



5.9 Antenna Port Test Data and Results for LTE Band 12

Serial Number:	2HV7-2	Test Date:	2024/4/16~2024/4/19
Test Site:	RF	Test Mode:	Transmitting
Tester:	Loge Long	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	26.4~28.1	Relative Humidity: (%)	46~61	ATM Pressure: (kPa)	100.1~100.5
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101461	2023/11/27	2024/11/26
Minl-Clrucits	Coaxial Power Splitters & Combiner	ZFRSC-183-S+	SF448201614	2024/2/25	2025/2/24
R&S	Wideband Radio Communication Tester	CMW500	110479	2023/10/18	2024/10/17
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30173	2023/10/18	2024/10/17
All-sun	Clamp Meter	EM305A	8348897	2023/8/3	2024/8/2
Micro-Coax	Coaxial Cable	UFB205A	323308-024	2024/1/2	2025/1/1
TDK-Lambda	DC Power Supply	Z+60-14	F-08-EM038-1	N/A	N/A

Test Frequency For Each Mode:

Operation Bandwidth	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)
1.4MHz	699.7	707.5	715.3
3MHz	700.5	707.5	714.5
5MHz	701.5	707.5	713.5
10MHz	704	707.5	711

Test Data:**FCC §2.1046; § 27.50(c) (10)****RF Output Power:**

Test Bandwidth & Modulation	Resource Block & RB offset	Conducted Average Output Power(dBm)			Maximum ERP (dBm)	ERP Limit (dBm)
		Lowest Channel	Middle Channel	Highest Channel		
1.4MHz QPSK	RB1#0	23.57	23.44	23.34	18.79	34.77
	RB1#3	23.74	23.67	23.52		
	RB1#5	23.58	23.49	23.39		
	RB3#0	23.64	23.54	23.41		
	RB3#3	23.64	23.59	23.40		
	RB6#0	22.66	22.58	22.48		
1.4MHz 16QAM	RB1#0	22.55	22.48	22.28	17.77	34.77
	RB1#3	22.72	22.67	22.46		
	RB1#5	22.49	22.53	22.29		
	RB3#0	22.58	22.60	22.42		
	RB3#3	22.54	22.66	22.52		
	RB6#0	21.48	21.52	21.43		
3MHz QPSK	RB1#0	23.64	23.34	23.40	18.69	34.77
	RB1#8	23.62	23.26	23.33		
	RB1#14	23.59	23.37	23.30		
	RB6#0	22.56	22.33	22.18		
	RB6#9	22.59	22.28	22.20		
	RB15#0	22.63	22.54	22.19		
3MHz 16QAM	RB1#0	22.59	22.48	22.27	17.65	34.77
	RB1#8	22.60	22.37	22.18		
	RB1#14	22.57	22.48	22.12		
	RB6#0	21.52	21.37	21.08		
	RB6#9	21.46	21.36	21.02		
	RB15#0	21.44	21.38	21.14		
5MHz QPSK	RB1#0	23.55	23.57	23.55	18.75	34.77
	RB1#13	23.66	23.70	23.68		
	RB1#24	23.56	23.61	23.57		
	RB15#0	22.67	22.73	22.71		
	RB15#10	22.75	22.65	22.77		
	RB25#0	22.67	22.66	22.69		
5MHz 16QAM	RB1#0	22.42	22.85	22.66	18	34.77
	RB1#13	22.56	22.95	22.78		
	RB1#24	22.50	22.91	22.58		
	RB15#0	21.69	21.71	21.75		
	RB15#10	21.74	21.60	21.78		
	RB25#0	21.71	21.67	21.75		
10MHz QPSK	RB1#0	23.63	23.63	23.66	18.86	34.77
	RB1#25	23.78	23.77	23.81		
	RB1#49	23.69	23.64	23.64		

10MHz 16QAM	RB25#0	22.64	22.72	22.82	18.37	34.77
	RB25#25	22.62	22.65	22.79		
	RB50#0	22.63	22.73	22.80		
	RB1#0	22.65	23.22	22.80		
	RB1#25	22.82	23.32	22.96		
	RB1#49	22.64	23.21	22.73		
	RB25#0	21.72	21.80	21.83		
	RB25#25	21.73	21.70	21.82		
	RB50#0	21.68	21.75	21.80		

Note:

ERP= Conducted Power(dBm) - L_c(dB) + G_T(dBd)G_T(dBd)=G_T(dBi)-2.15

Result:

Pass

Peak-to-average Ratio(PAR)

Test Bandwidth & Modulation	Resource Block & RB offset	Peak-to-average Ratio(dB)			Limit (dB)
		Lowest Channel	Middle Channel	Highest Channel	
10MHz QPSK	RB1#0	3.68	3.59	4.14	13
	RB50#0	4.67	4.81	4.81	13
10MHz 16QAM	RB1#0	4.55	4.49	5.10	13
	RB50#0	5.65	5.77	5.77	13
				Result:	Pass

FCC §2.1049, §27.53:Occupied Bandwidth

Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
1.4MHz QPSK	1.108	1.102	1.102	1.398	1.290	1.338
1.4MHz 16QAM	1.108	1.102	1.102	1.476	1.284	1.320
3MHz QPSK	2.695	2.683	2.695	2.880	2.880	2.868
3MHz 16QAM	2.683	2.683	2.683	2.880	2.892	2.928
5MHz QPSK	4.531	4.531	4.531	5.200	5.180	5.160
5MHz 16QAM	4.551	4.531	4.531	5.300	5.140	5.200
10MHz QPSK	8.942	8.942	9.022	9.880	9.880	10.040
10MHz 16QAM	8.942	8.982	8.982	9.880	9.880	9.800

Note: The test plots please refer to the Plots of Occupied Bandwidth

FCC §2.1051, §27.53:Spurious Emissions at Antenna Terminal

Result:	Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.
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FCC §2.1051, §27.53:Out of band emission, Band Edge

Result:	Pass, Please refer to the test plots of Out of band emission, Band Edge.
----------------	--

FCC §2.1055, §27.54: Frequency Stability

Test Mode:	10M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	699.523	699.00	715.501	716.00
	-20	3.8	699.505	699.00	715.489	716.00
	-10	3.8	699.505	699.00	715.504	716.00
	0	3.8	699.514	699.00	715.504	716.00
	10	3.8	699.502	699.00	715.507	716.00
	20	3.8	699.529	699.00	715.511	716.00
	30	3.8	699.553	699.00	715.537	716.00
	40	3.8	699.532	699.00	715.537	716.00
	50	3.8	699.553	699.00	715.513	716.00
Frequency Stability vs. Voltage	20	3.4	699.541	699.00	715.522	716.00
	20	4.35	699.544	699.00	715.519	716.00
					Result:	Pass

Test Mode:	10M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	699.505	699.00	715.483	716.00
	-20	3.8	699.520	699.00	715.498	716.00
	-10	3.8	699.523	699.00	715.489	716.00
	0	3.8	699.517	699.00	715.507	716.00
	10	3.8	699.508	699.00	715.501	716.00
	20	3.8	699.529	699.00	715.511	716.00
	30	3.8	699.535	699.00	715.525	716.00
	40	3.8	699.538	699.00	715.531	716.00
	50	3.8	699.535	699.00	715.534	716.00
Frequency Stability vs. Voltage	20	3.4	699.550	699.00	715.513	716.00
	20	4.35	699.532	699.00	715.519	716.00
					Result:	Pass

Test Plots:

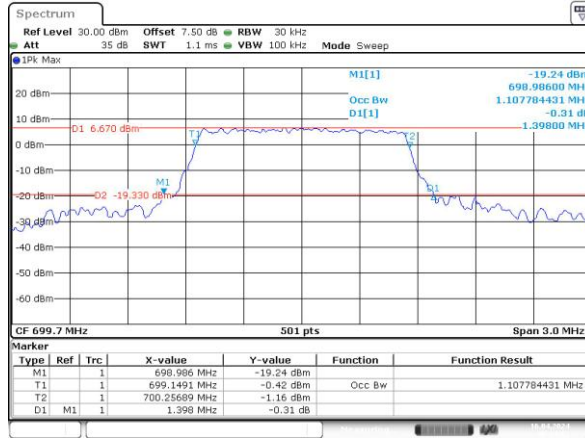
Occupied Bandwidth

Channel

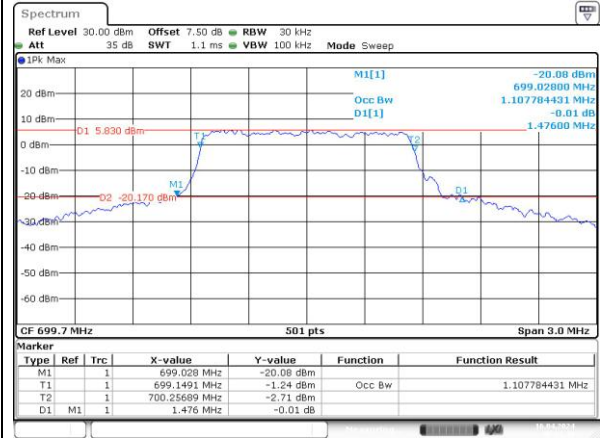
1.4MHz Bandwidth QPSK

1.4MHz Bandwidth 16QAM

Lowest

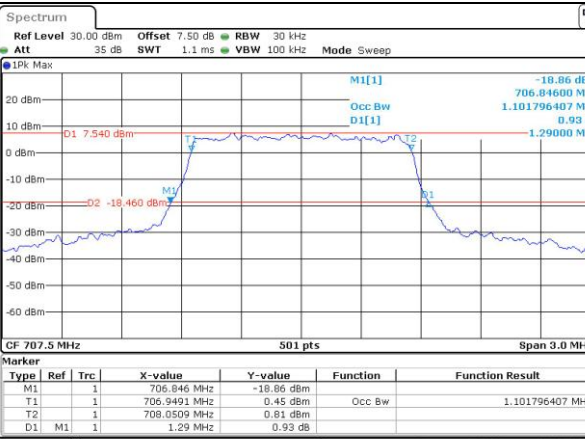


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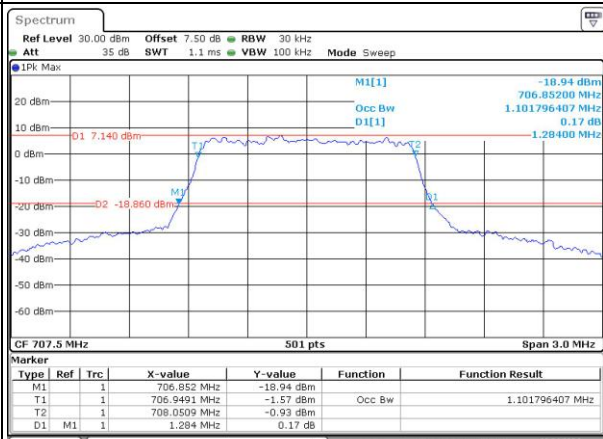


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Middle

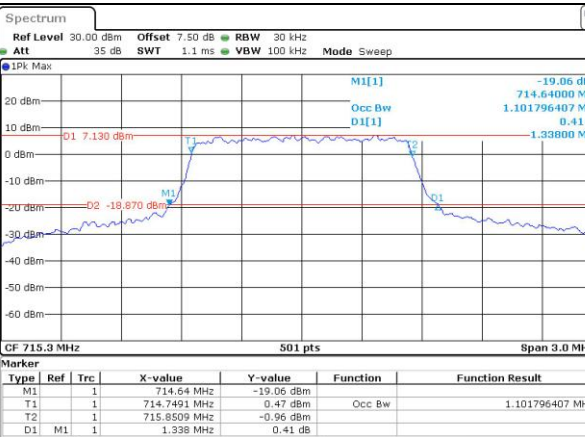


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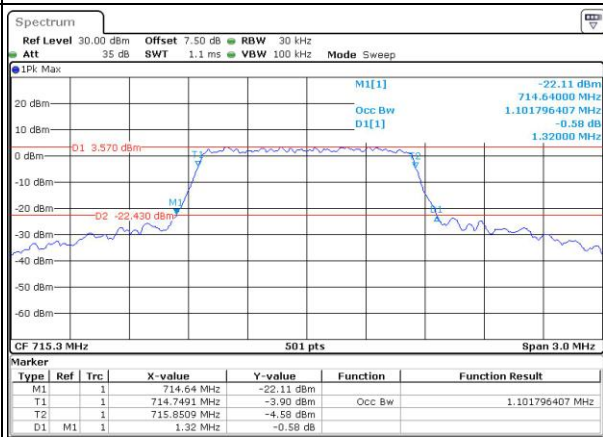


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Highest



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Date: 16.APR.2024 08:35:41



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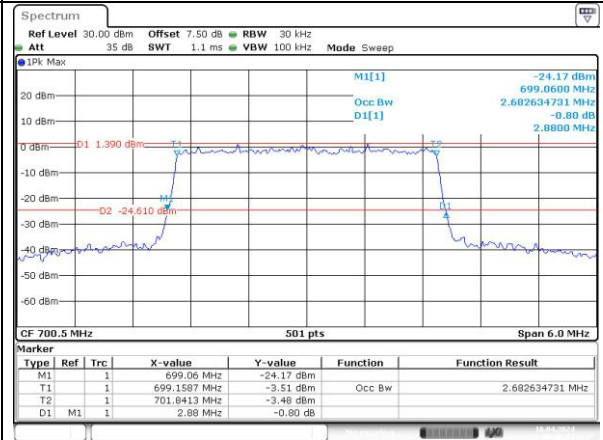
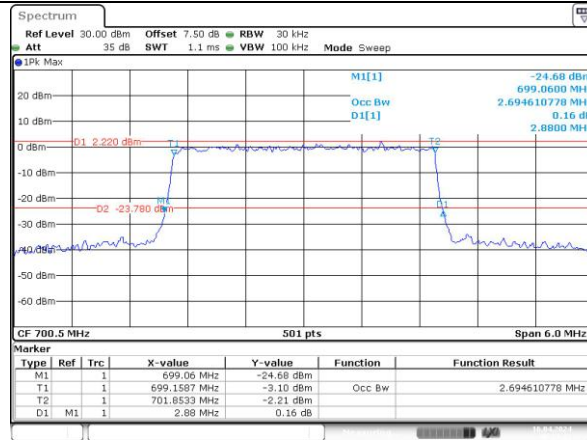
Occupied Bandwidth

Channel

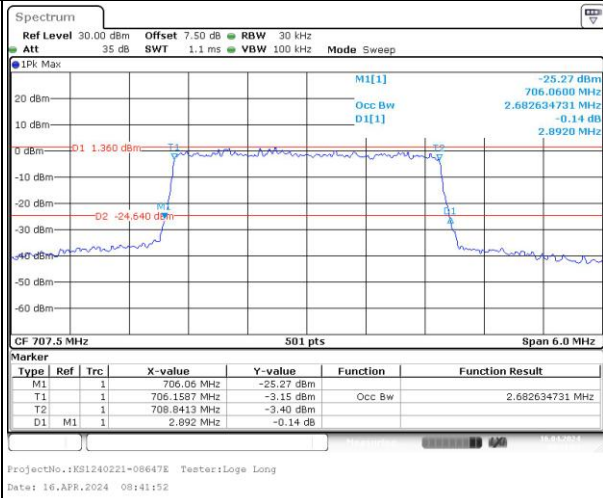
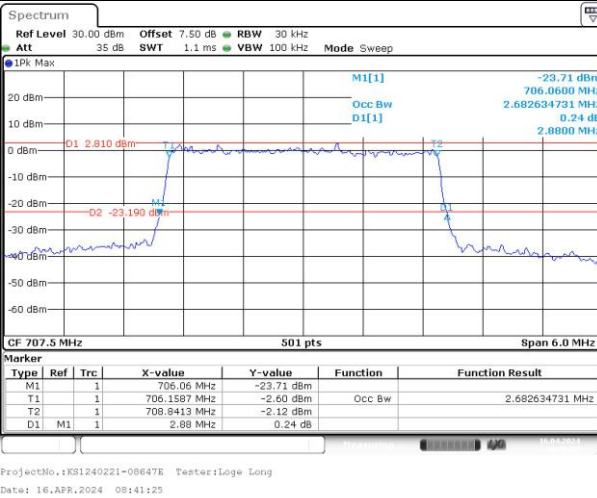
3MHz Bandwidth QPSK

3MHz Bandwidth 16QAM

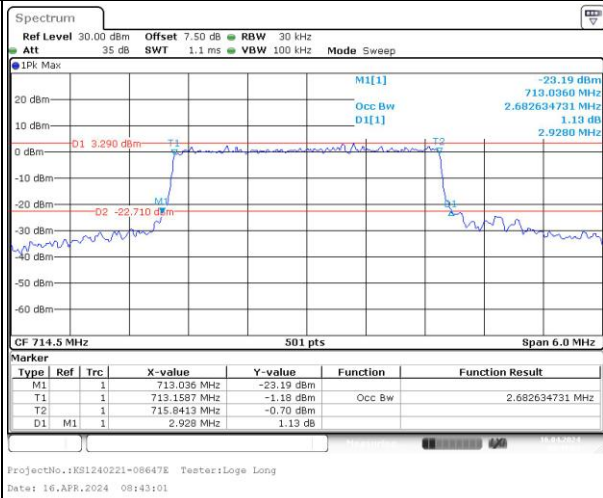
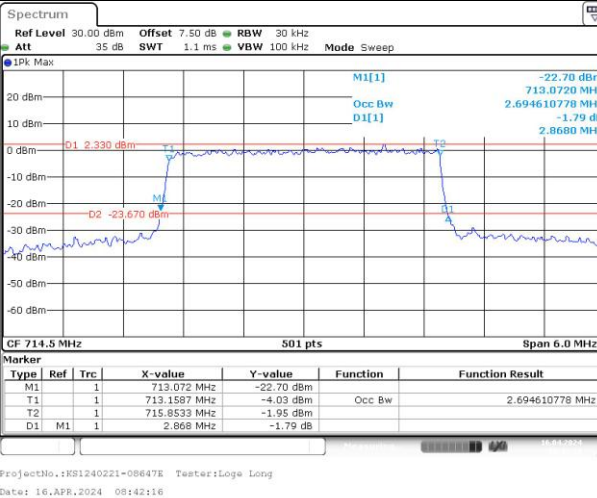
Lowest



Middle



Highest



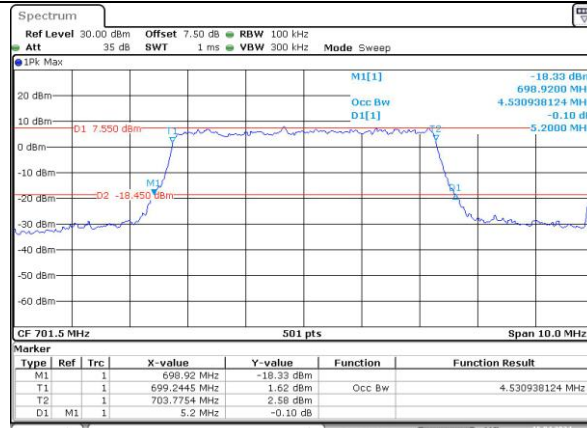
Occupied Bandwidth

Channel

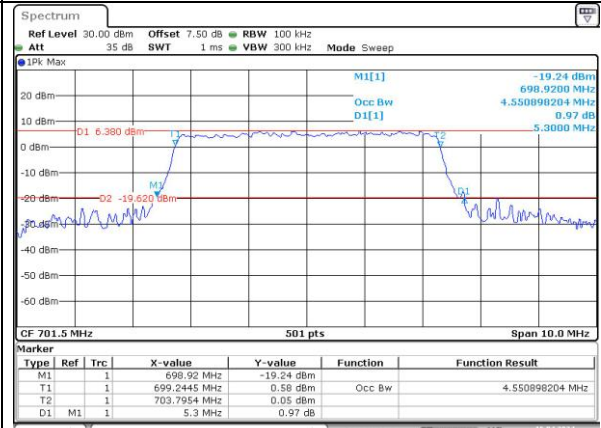
5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

Lowest

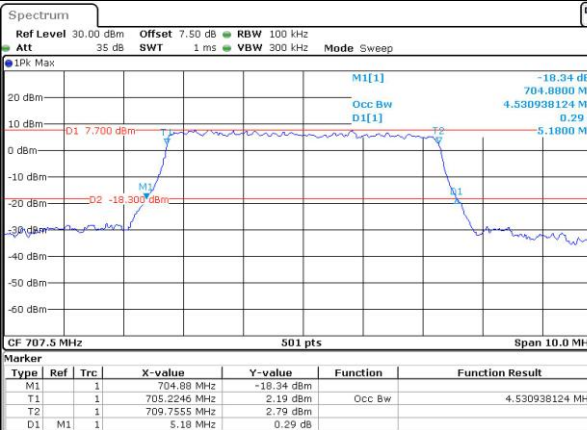


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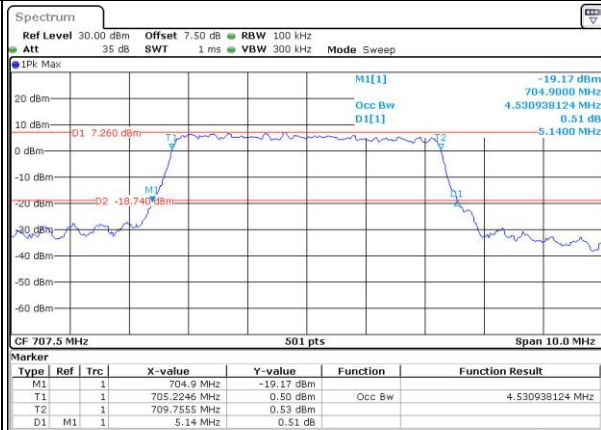


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Date: 16.APR.2024 08:58:52

Middle

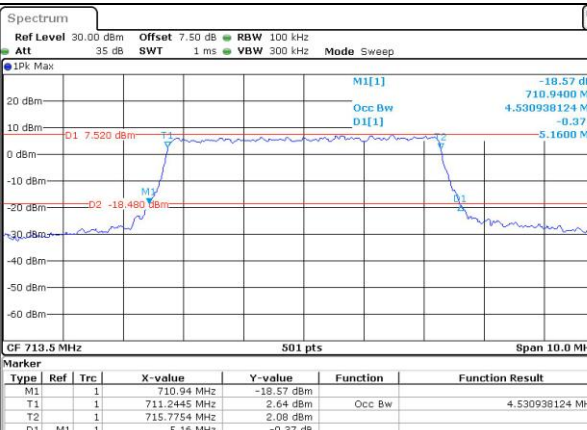


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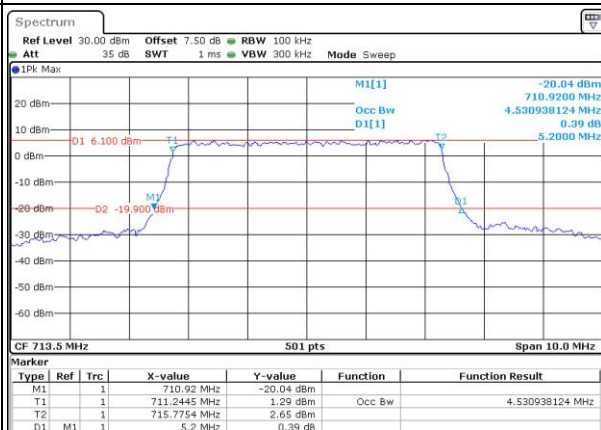


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Highest



ProjectNo.:KS1240221-08647E Tester:Loge Long
Date: 16.APR.2024 09:00:28



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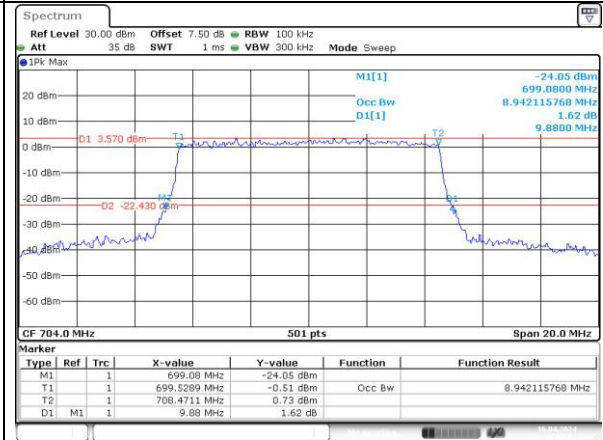
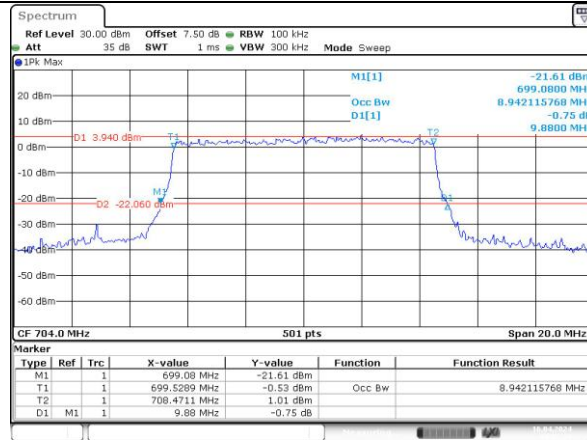
Occupied Bandwidth

Channel

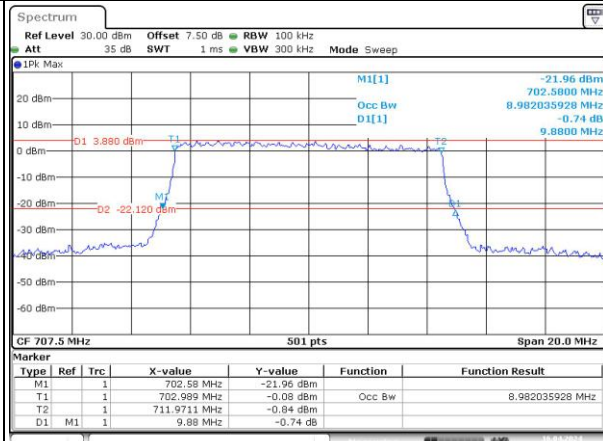
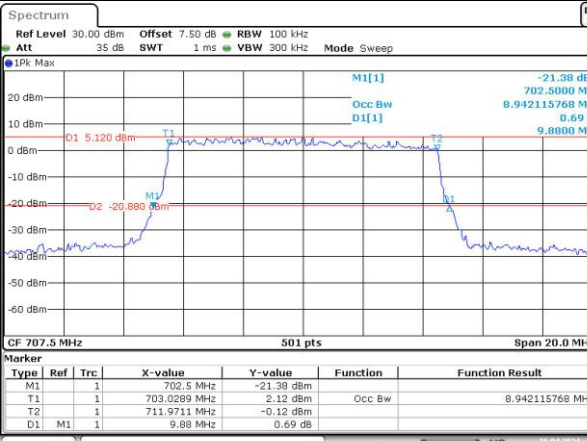
10MHz Bandwidth QPSK

10MHz Bandwidth 16QAM

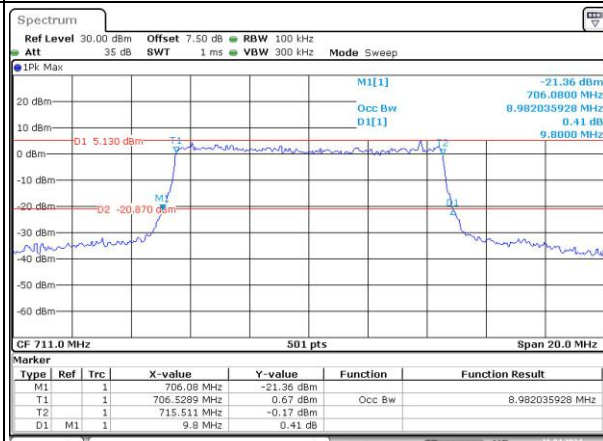
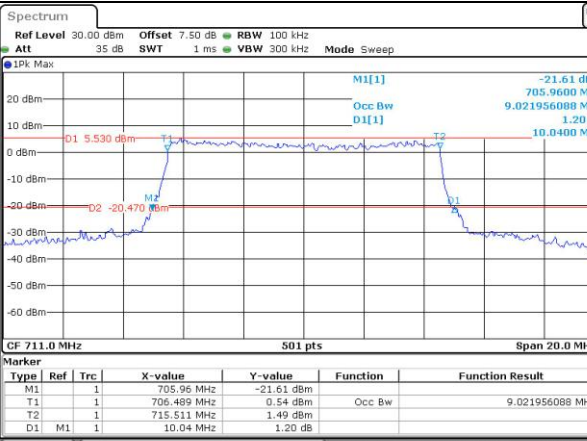
Lowest



Middle

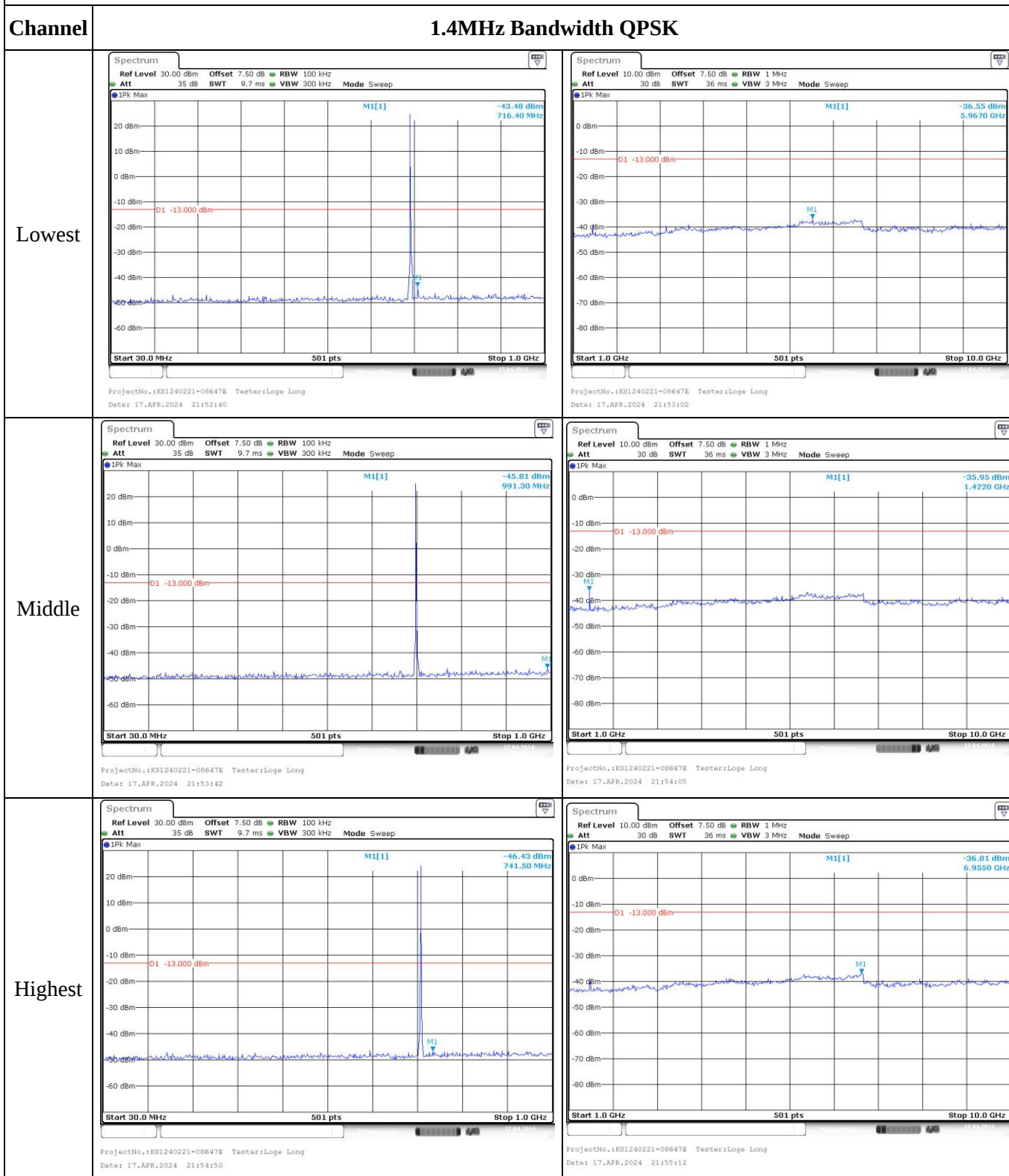


Highest



1RB:

Spurious Emissions at Antenna Terminal

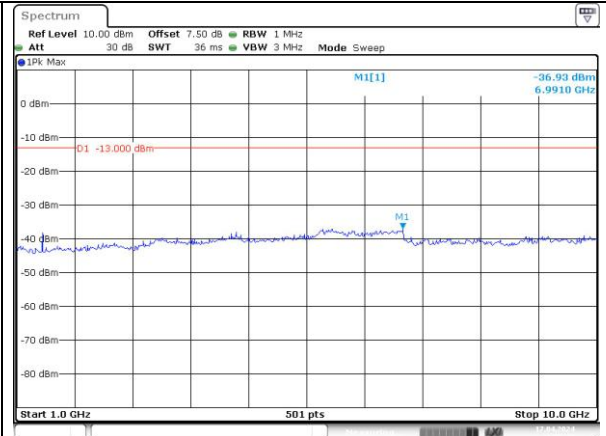
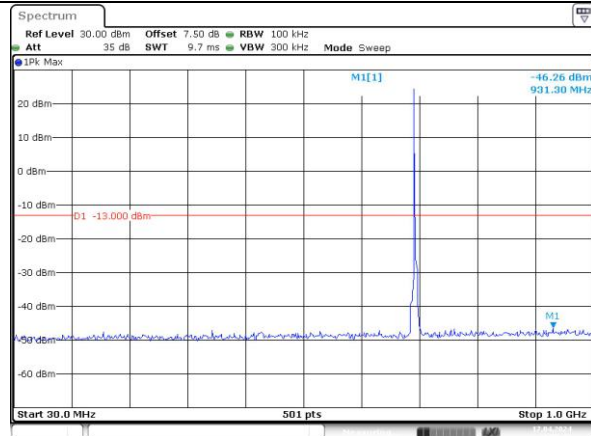


Spurious Emissions at Antenna Terminal

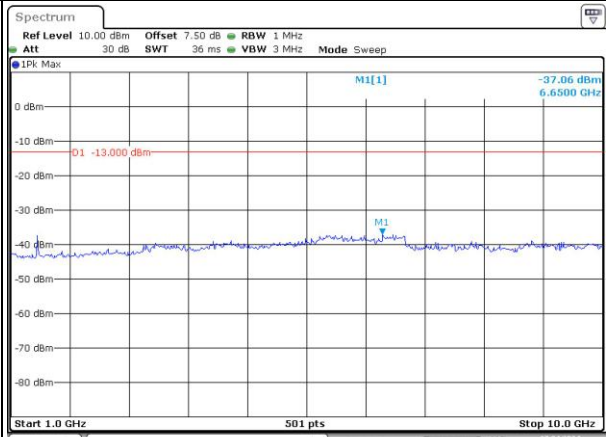
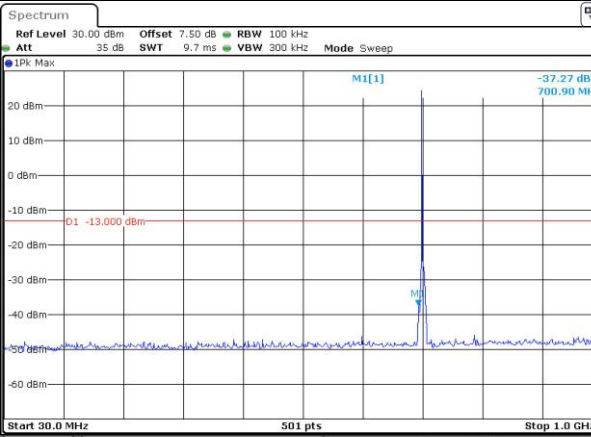
Channel

3MHz Bandwidth QPSK

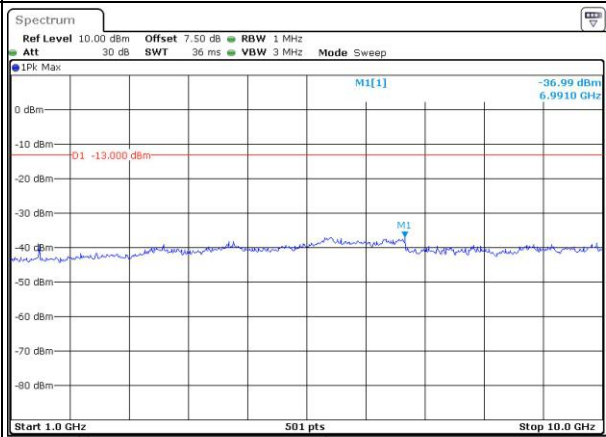
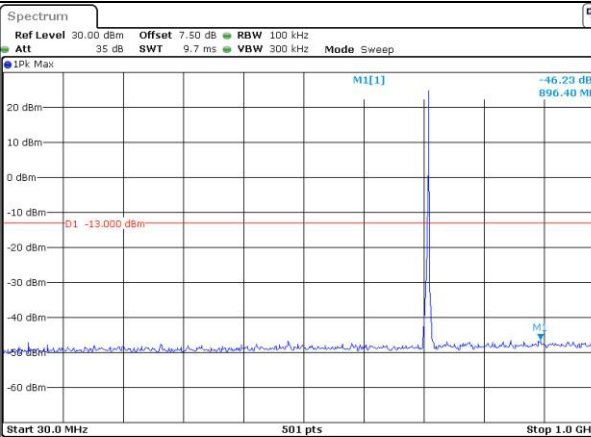
Lowest



Middle



Highest

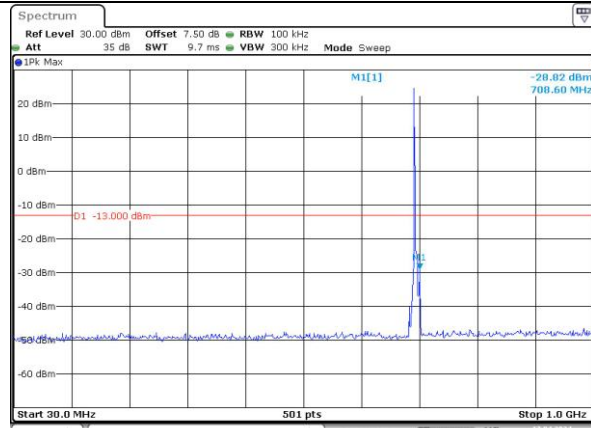


Spurious Emissions at Antenna Terminal

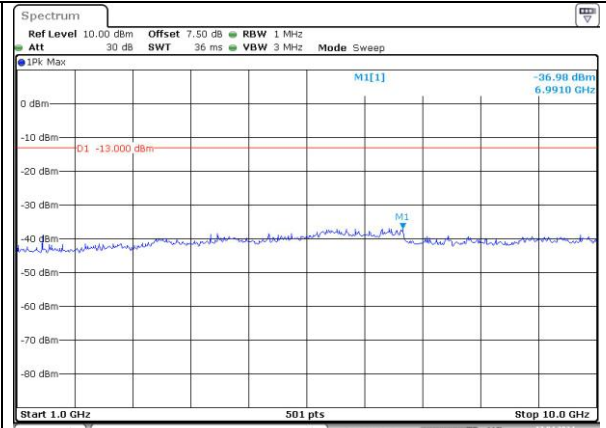
Channel

5MHz Bandwidth QPSK

Lowest

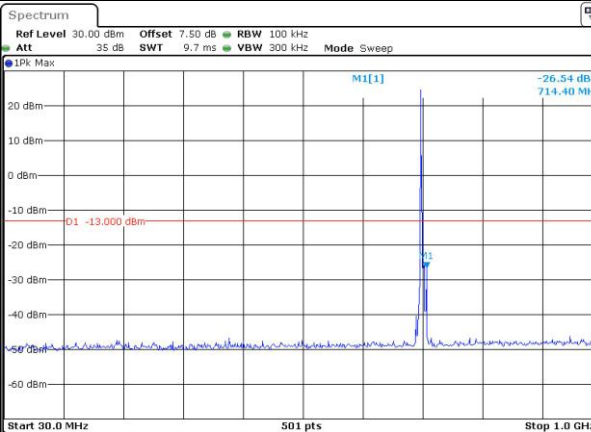


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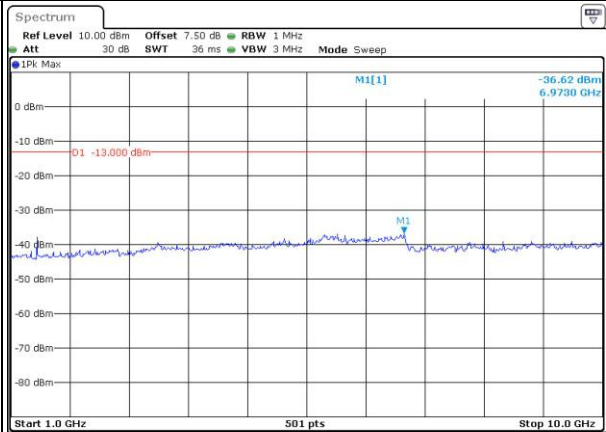


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Date: 17.APR.2024 22:00:21

Middle

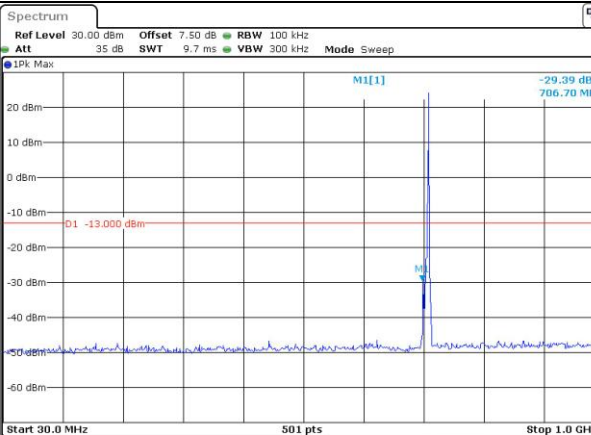


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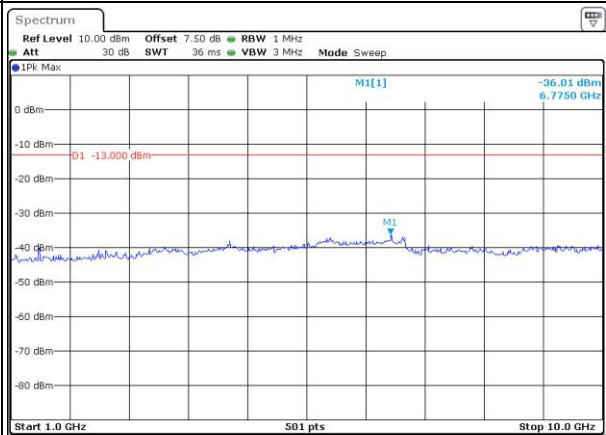


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Date: 17.APR.2024 22:01:22

Highest



ProjectNo.:KS1240221-08647E Tester:Loge Long
Date: 17.APR.2024 22:02:09



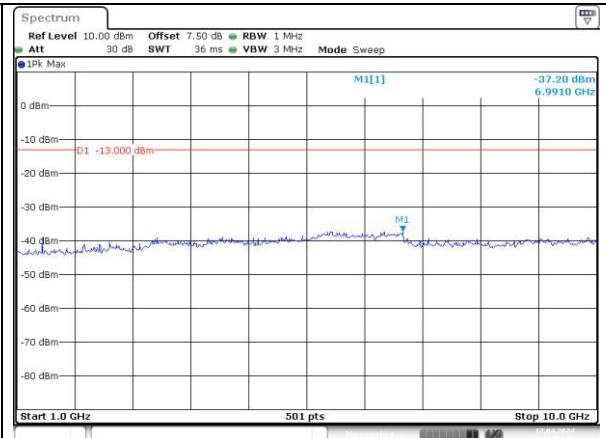
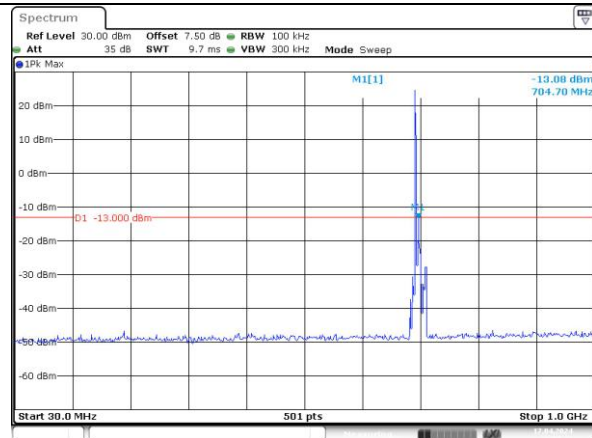
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Spurious Emissions at Antenna Terminal

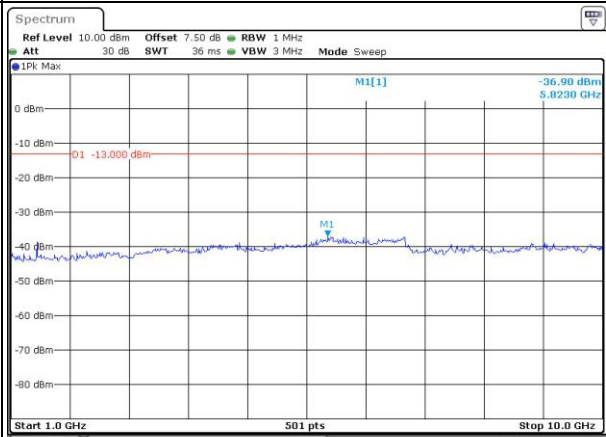
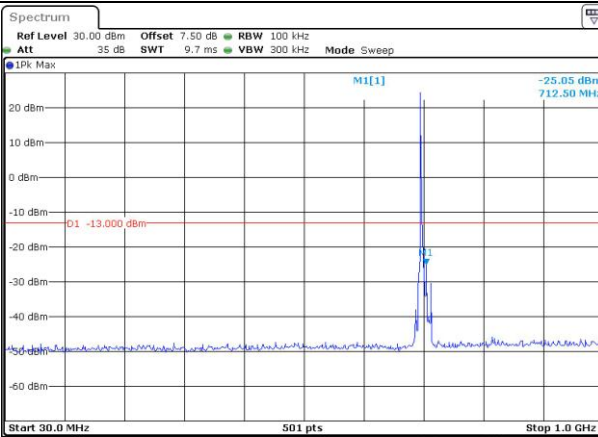
Channel

10MHz Bandwidth QPSK

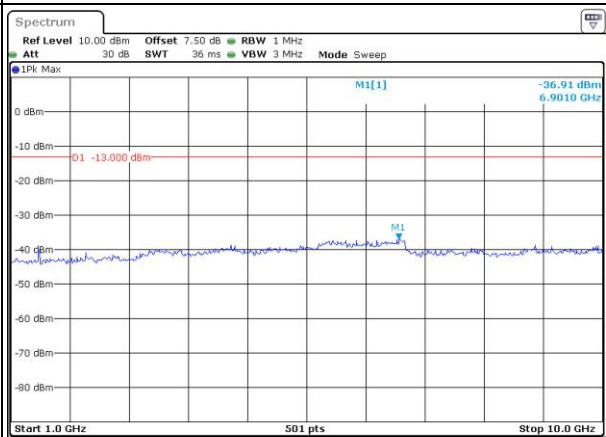
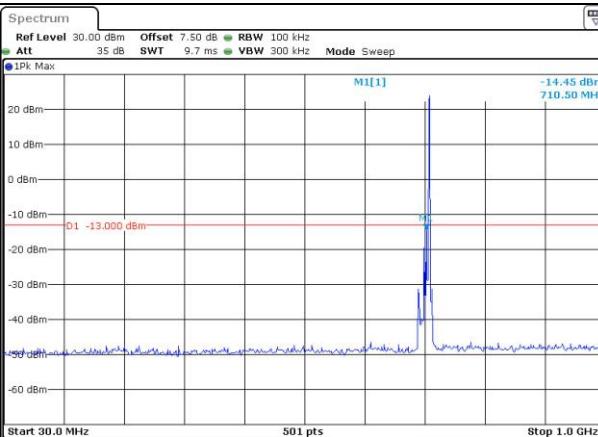
Lowest



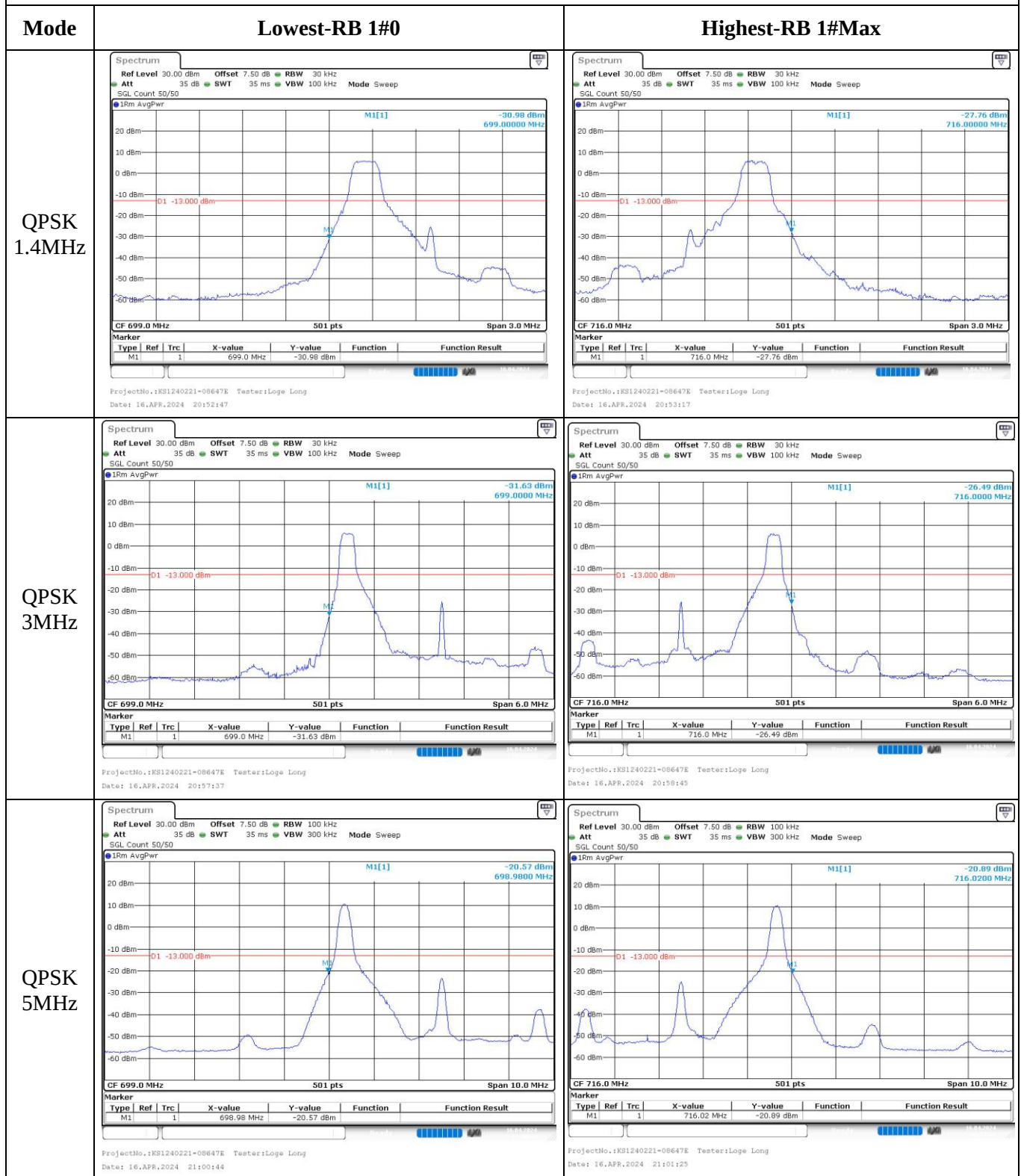
Middle



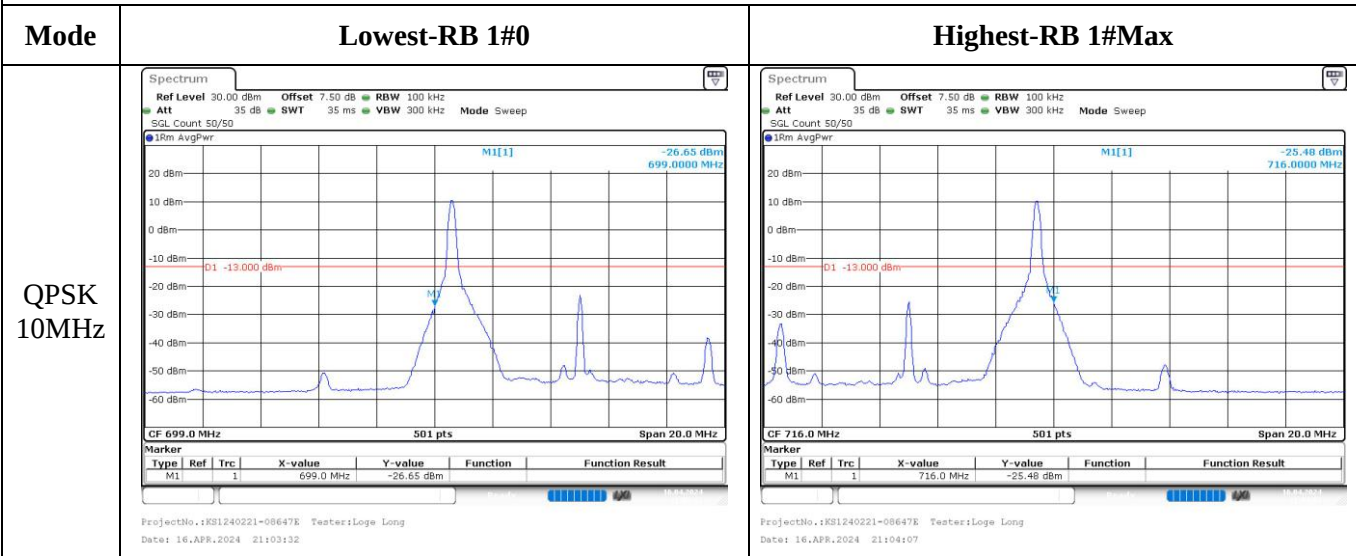
Highest



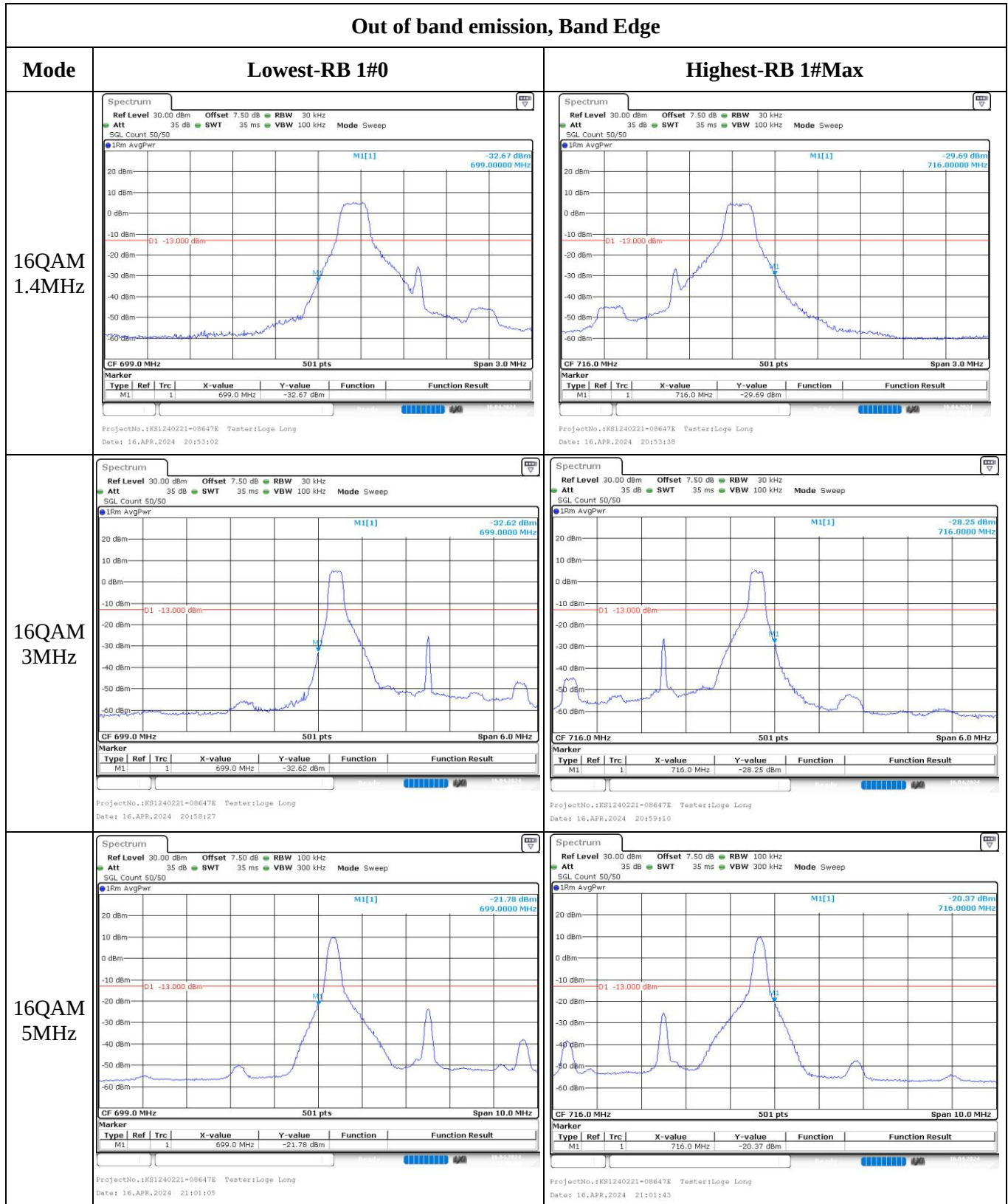
Out of band emission, Band Edge



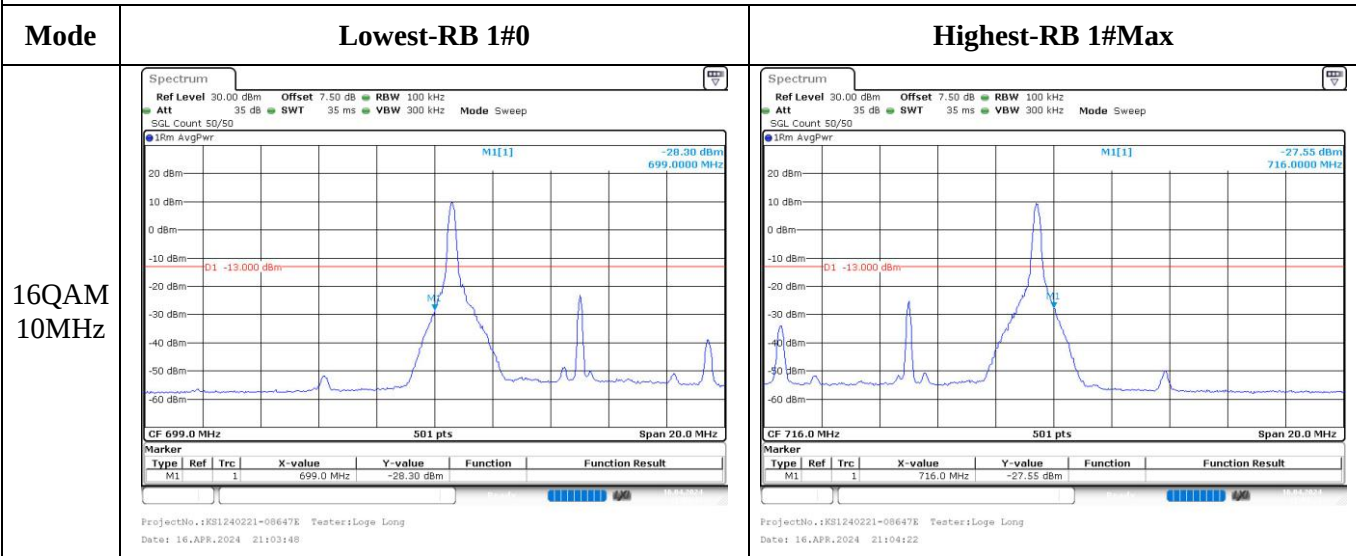
Out of band emission, Band Edge



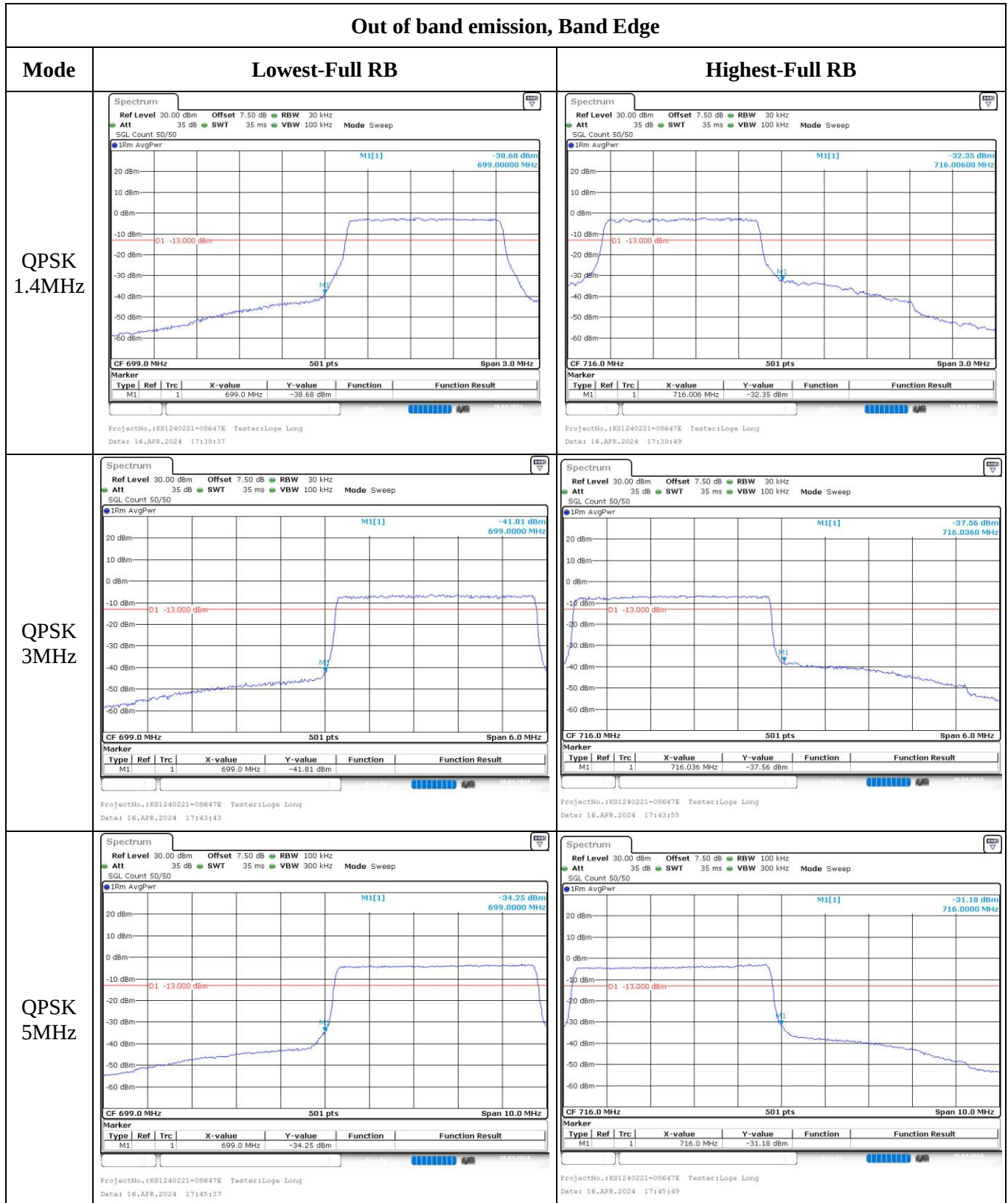
Out of band emission, Band Edge



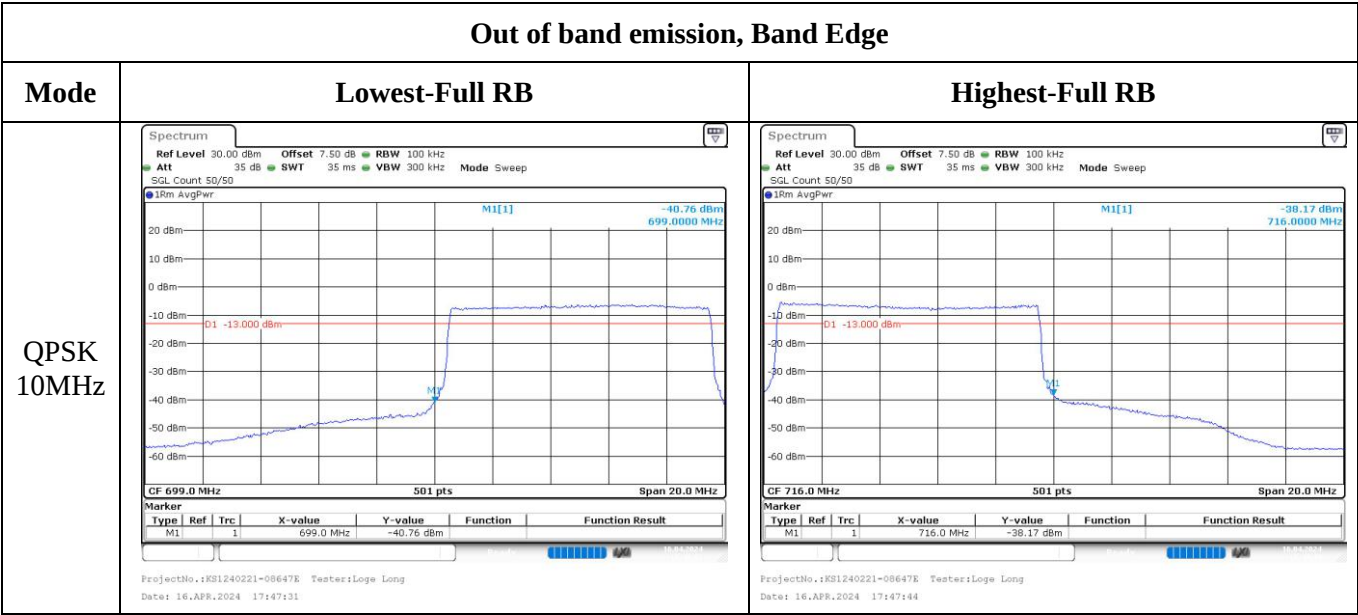
Out of band emission, Band Edge



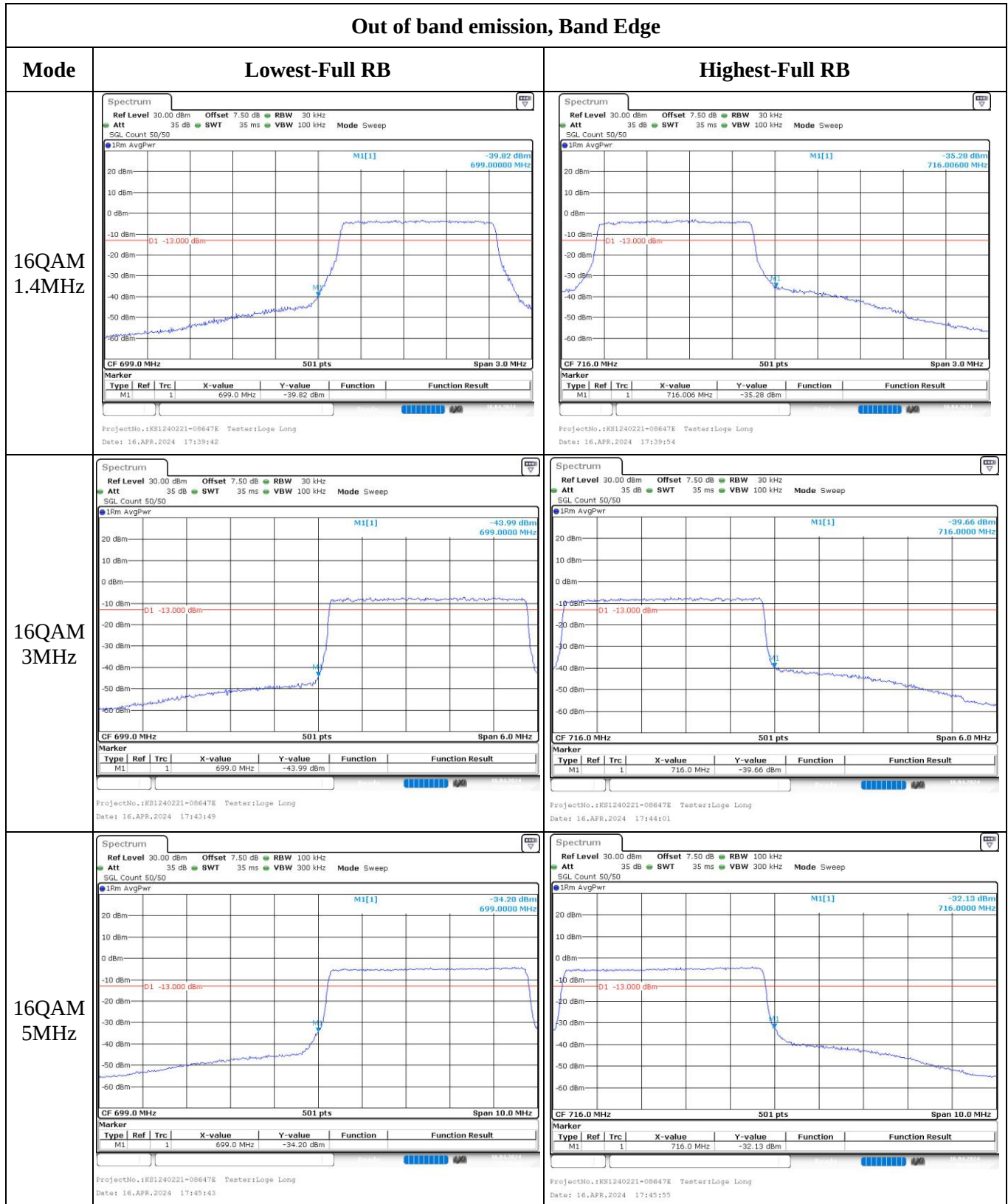
Out of band emission, Band Edge



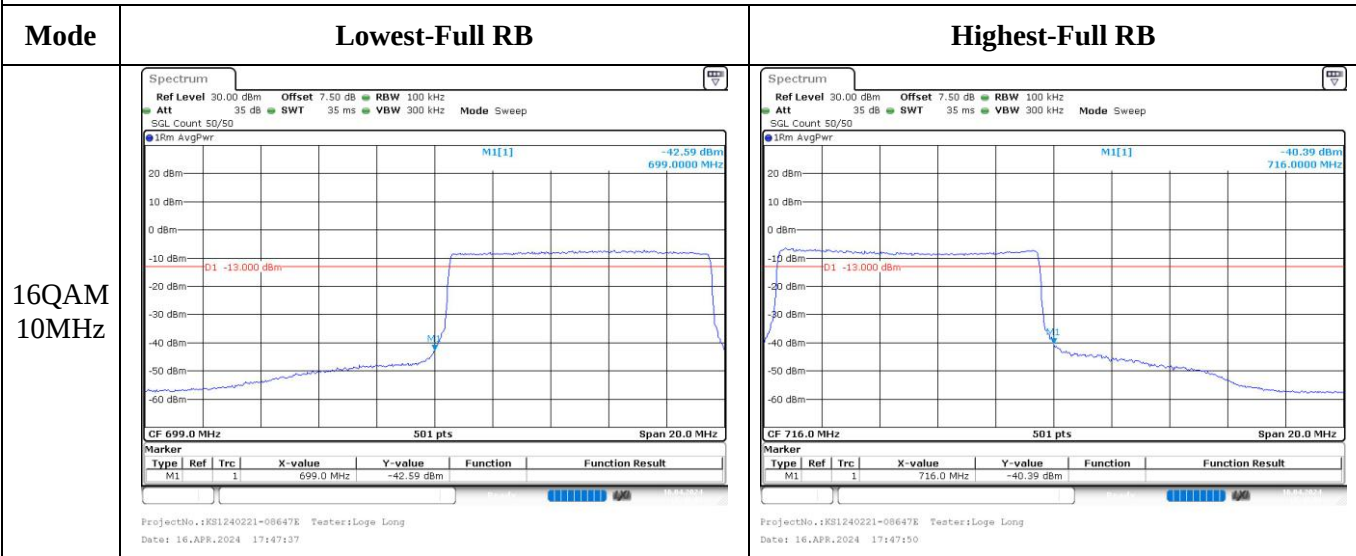
Out of band emission, Band Edge



Out of band emission, Band Edge



Out of band emission, Band Edge



5.10 Antenna Port Test Data and Results for LTE Band 13

Serial Number:	2HV7-2	Test Date:	2024/4/16~2024/4/19
Test Site:	RF	Test Mode:	Transmitting
Tester:	Loge Long	Test Result:	Pass

Environmental Conditions:					
Temperature: (°C)	26.4~28.1	Relative Humidity: (%)	46~61	ATM Pressure: (kPa)	100.1~100.5

Test Equipment List and Details:					
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101461	2023/11/27	2024/11/26
Minl-Clrucits	Coaxial Power Splitters & Combiner	ZFRSC-183-S+	SF448201614	2024/2/25	2025/2/24
R&S	Wideband Radio Communication Tester	CMW500	110479	2023/10/18	2024/10/17
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30173	2023/10/18	2024/10/17
All-sun	Clamp Meter	EM305A	8348897	2023/8/3	2024/8/2
Micro-Coax	Coaxial Cable	UFB205A	323308-024	2024/1/2	2025/1/1
TDK-Lambda	DC Power Supply	Z+60-14	F-08-EM038-1	N/A	N/A

Test Frequency For Each Mode:			
Operation Bandwidth	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)
5MHz	779.5	/	784.5
10MHz	/	782	/

Test Data:**FCC §2.1046; § 27.50(c) (10)****RF Output Power:**

Test Bandwidth & Modulation	Resource Block & RB offset	Conducted Average Output Power(dBm)			Maximum ERP (dBm)	ERP Limit (dBm)
		Lowest Channel	Middle Channel	Highest Channel		
5MHz QPSK	RB1#0	23.37	/	23.34	17.76	34.77
	RB1#13	23.49	/	23.45		
	RB1#24	23.34	/	23.31		
	RB15#0	22.48	/	22.43		
	RB15#10	22.54	/	22.36		
	RB25#0	22.52	/	22.38		
5MHz 16QAM	RB1#0	22.47	/	22.63	16.97	34.77
	RB1#13	22.58	/	22.70		
	RB1#24	22.40	/	22.63		
	RB15#0	21.59	/	21.45		
	RB15#10	21.61	/	21.39		
	RB25#0	21.56	/	21.43		
10MHz QPSK	RB1#0	/	23.48	/	17.86	34.77
	RB1#25	/	23.59	/		
	RB1#49	/	23.40	/		
	RB25#0	/	22.41	/		
	RB25#25	/	22.40	/		
	RB50#0	/	22.41	/		
10MHz 16QAM	RB1#0	/	22.46	/	16.83	34.77
	RB1#25	/	22.56	/		
	RB1#49	/	22.43	/		
	RB25#0	/	21.58	/		
	RB25#25	/	21.54	/		
	RB50#0	/	21.45	/		

Note:

ERP= Conducted Power(dBm) - Lc(dB) + G_T(dBd)G_T(dBd)=G_T(dBi)-2.15**Result:****Pass****Peak-to-average Ratio(PAR)**

Test Bandwidth & Modulation	Resource Block & RB offset	Peak-to-average Ratio(dB)			Limit (dB)
		Lowest Channel	Middle Channel	Highest Channel	
10MHz QPSK	RB1#0	/	4.87	/	13
	RB50#0	/	5.07	/	13
10MHz 16QAM	RB1#0	/	5.86	/	13
	RB50#0	/	6.00	/	13
Result:					Pass

FCC §2.1049, §27.53:Occupied Bandwidth

Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
5MHz QPSK	4.531	/	4.531	5.620	/	5.200
5MHz 16QAM	4.531	/	4.511	5.200	/	5.180
10MHz QPSK	/	8.942	/	/	9.880	/
10MHz 16QAM	/	8.942	/	/	9.920	/

Note: The test plots please refer to the Plots of Occupied Bandwidth

FCC §2.1051, §27.53:Spurious Emissions at Antenna Terminal

Result:	Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.
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FCC §2.1051, §27.53:Out of band emission, Band Edge

Result:	Pass, Please refer to the test plots of Out of band emission, Band Edge.
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FCC §2.1055, §27.54: Frequency Stability

Test Mode:	10M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	777.505	777.00	786.459	787.00
	-20	3.8	777.502	777.00	786.465	787.00
	-10	3.8	777.505	777.00	786.462	787.00
	0	3.8	777.508	777.00	786.456	787.00
	10	3.8	777.508	777.00	786.450	787.00
	20	3.8	777.529	777.00	786.471	787.00
	30	3.8	777.556	777.00	786.498	787.00
	40	3.8	777.532	777.00	786.498	787.00
	50	3.8	777.556	777.00	786.495	787.00
Frequency Stability vs. Voltage	20	3.4	777.532	777.00	786.498	787.00
	20	4.35	777.547	777.00	786.477	787.00
Result:					Pass	

Test Mode:	10M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	777.514	777.00	786.465	787.00
	-20	3.8	777.526	777.00	786.468	787.00
	-10	3.8	777.505	777.00	786.462	787.00
	0	3.8	777.511	777.00	786.450	787.00
	10	3.8	777.520	777.00	786.468	787.00
	20	3.8	777.529	777.00	786.471	787.00
	30	3.8	777.538	777.00	786.483	787.00
	40	3.8	777.544	777.00	786.486	787.00
	50	3.8	777.547	777.00	786.477	787.00
Frequency Stability vs. Voltage	20	3.4	777.553	777.00	786.495	787.00
	20	4.35	777.556	777.00	786.489	787.00
					Result:	Pass

Test Plots:

Occupied Bandwidth

