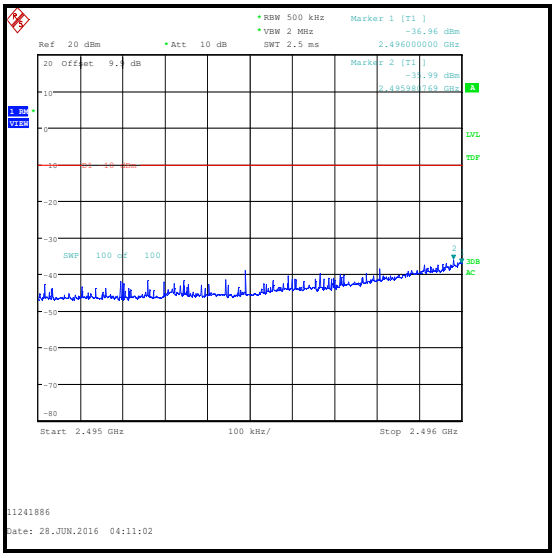
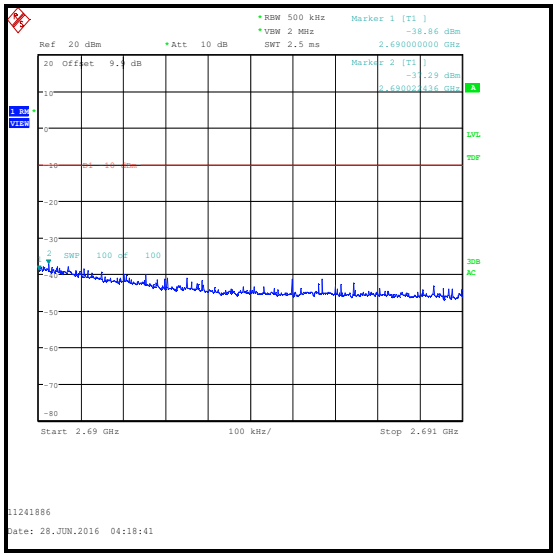
Transmitter Radiated Emissions at Band Edges (continued) - UAT

Results: 20 MHz Channel Bandwidth / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495.981	100	0	-36.0	-13.0	23.0	Complied
2496	100	0	-37.0	-13.0	24.0	Complied
2690	100	0	-38.9	-10.0	28.9	Complied
2690.022	100	0	-37.3	-10.0	27.3	Complied



QPSK / Lower Band Edge



QPSK / Upper Band Edge

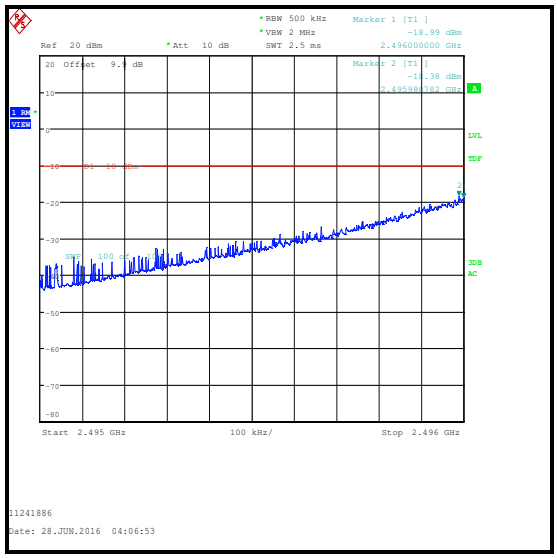
Transmitter Radiated Emissions at Band Edges (continued) - UAT

Results: 20 MHz Channel Bandwidth / QPSK

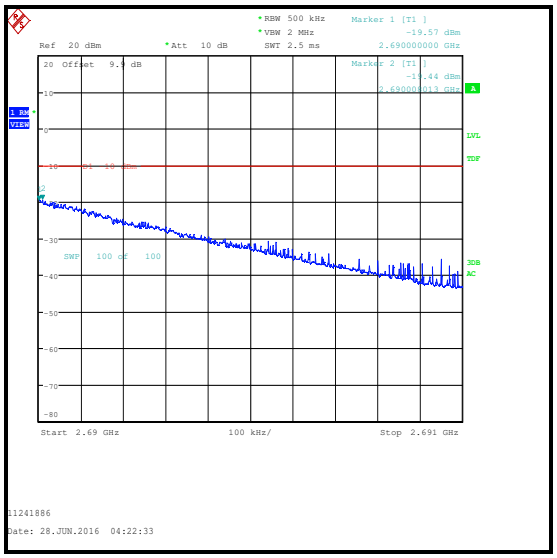
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495.989	1	0	-18.4	-13.0	5.4	Complied
2496	1	0	-19.0	-13.0	6.0	Complied
2690	1	99	-19.6	-10.0	9.6	Complied
2690.008	1	99	-19.4	-10.0	9.4	Complied
2496	1	99	-56.9	-13.0	43.9	Complied
2690	1	0	-56.5	-10.0	46.5	Complied

Transmitter Radiated Emissions at Band Edges (continued) - UAT

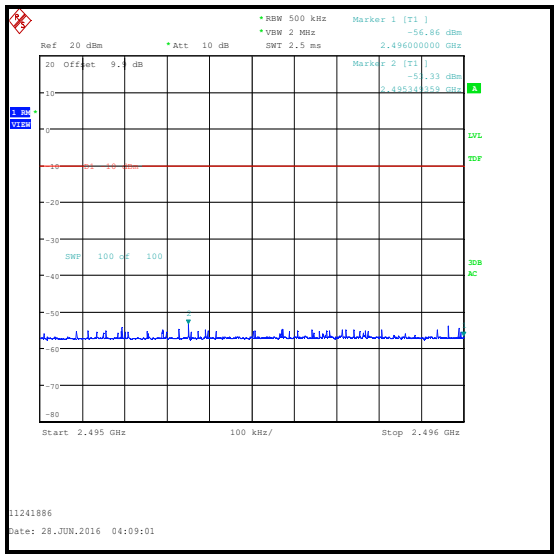
Results: 20 MHz Channel Bandwidth / QPSK



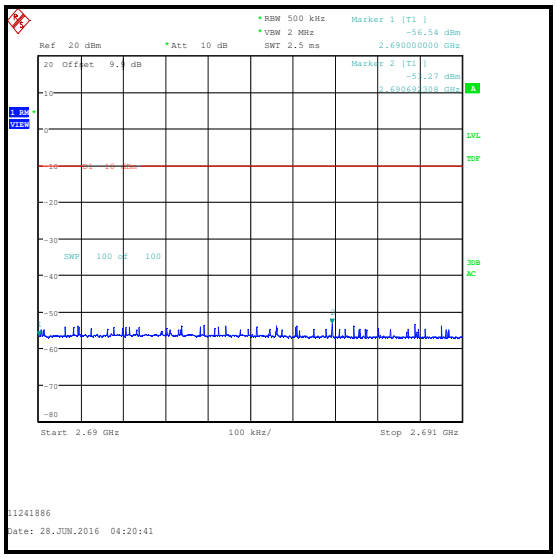
QPSK / 1 RB 0 Offset / Lower Band Edge



QPSK / 1 RB 99 Offset / Lower Band Edge



QPSK / 1 RB 99 Offset / Upper Band Edge

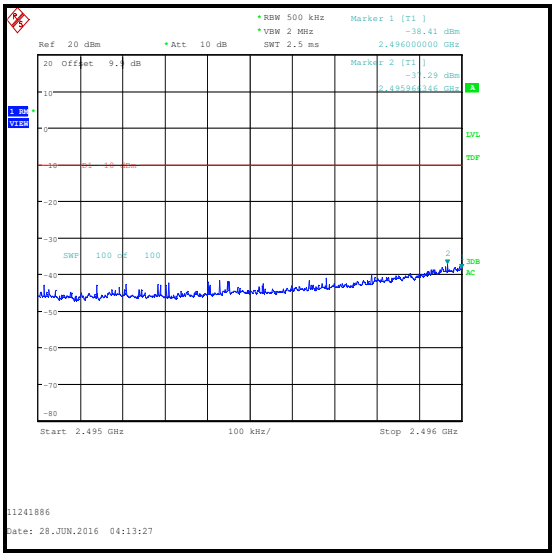


QPSK / 1 RB 0 Offset / Upper Band Edge

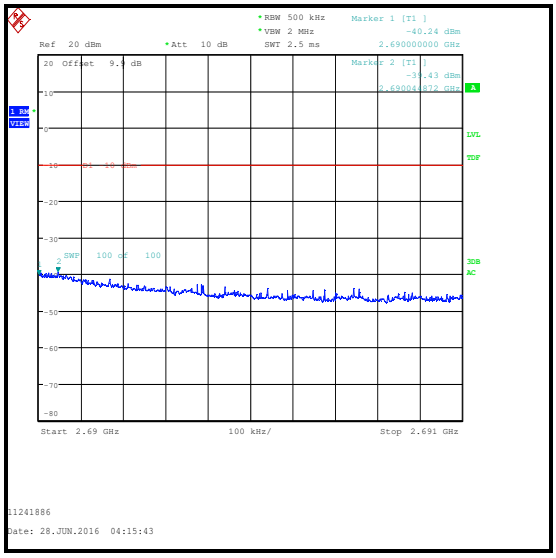
Transmitter Radiated Emissions at Band Edges (continued) - UAT

Results: 20 MHz Channel Bandwidth / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495.966	100	0	-37.3	-13.0	24.3	Complied
2496	100	0	-38.4	-13.0	25.4	Complied
2690	100	0	-40.2	-10.0	30.2	Complied
2690.045	100	0	-39.4	-10.0	29.4	Complied



16QAM / Lower Band Edge

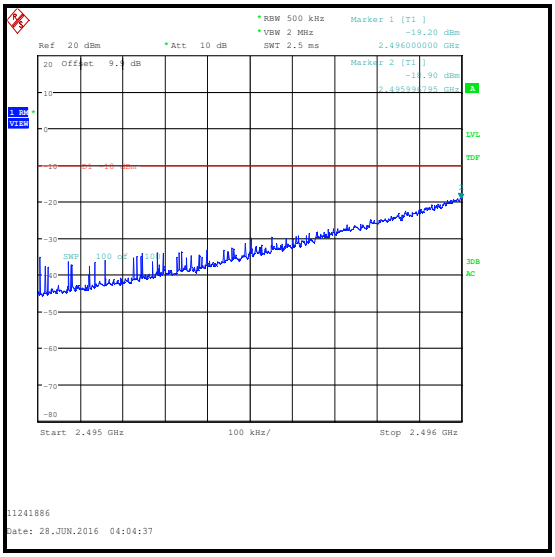


16QAM / Upper Band Edge

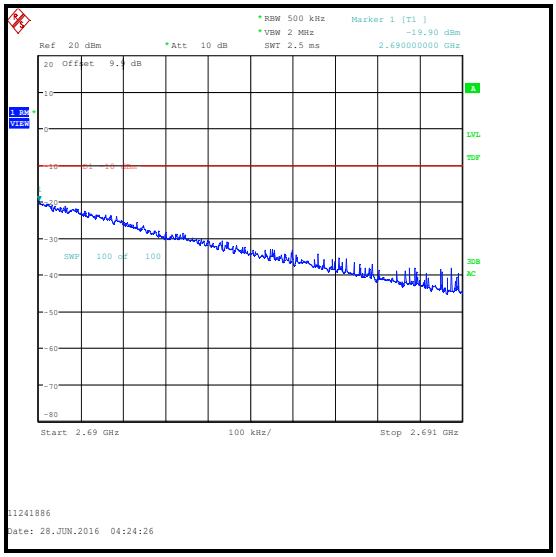
Transmitter Radiated Emissions at Band Edges (continued) - UAT

Results: 20 MHz Channel Bandwidth / 16QAM

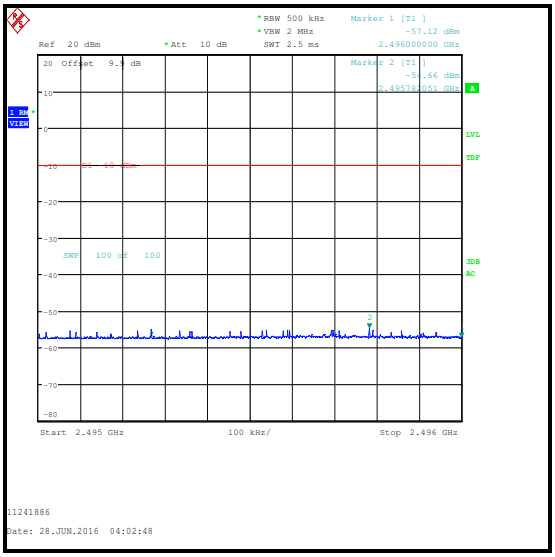
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495.997	1	0	-18.9	-13.0	5.9	Complied
2496	1	0	-19.2	-13.0	6.2	Complied
2690	1	99	-19.9	-10.0	9.9	Complied
2496	1	99	-57.1	-13.0	44.1	Complied
2690	1	0	-56.5	-10.0	46.5	Complied



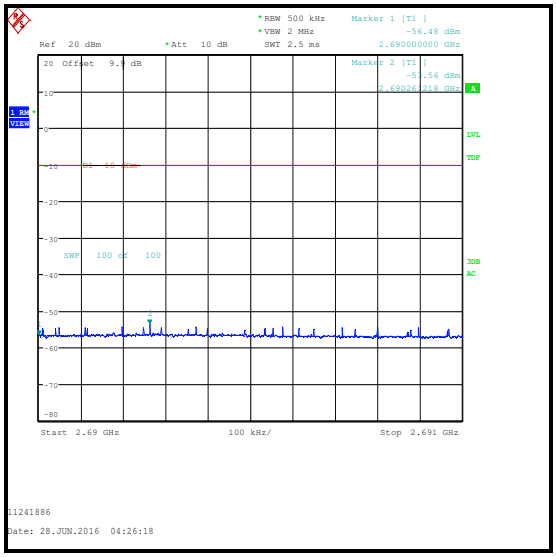
16QAM / 1 RB 0 Offset / Lower Band Edge



16QAM / 1 RB 99 Offset / Lower Band Edge



16QAM / 1 RB 99 Offset / Upper Band Edge



16QAM / 1 RB 0 Offset / Upper Band Edge

Transmitter Radiated Emissions at Band Edges (continued) - UAT

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	22 Apr 2017	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	17 May 2017	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	21 Mar 2017	12
A2863	Pre-Amplifier	Agilent	8449B	3008A02100	07 Jan 2017	12
A2889	Antenna	Schwarzbeck	BBHA 9120 B	BBHA 9120 B	07 Apr 2017	12
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#1	19 May 2017	12

5.2.9. Transmitter Radiated Emissions at Band Edges ± X MHz - LAT

Test Summary:

Test Engineers:	Andrew Edwards & Georgios Vrezas	**Test Dates:**	05 July 2016 & 09 July 2016
Test Sample IMEIs:	358640070087480 & 358640070063996		

FCC Reference:	Parts 2.1053 & 27.53(m)(4)
Test Method Used:	KDB 971168 Section 6 referencing FCC Part 27.53 & note 2 below

Environmental Conditions:

Temperature (°C):	24 to 25
Relative Humidity (%):	40 to 41

Note(s):

1. Measurements were performed with the EUT transmitting QPSK and 16QAM modulation schemes, with resource block settings stated in section 4.3.
2. Sweep time was set to auto and an RMS detector with trace averaging of 300 sweeps was used.
3. In accordance with 27.53(m)(4), the following limits were calculated:

5 MHz Channel Bandwidth		10 MHz Channel Bandwidth	
Frequency (MHz)	**Limit (dBm)**	**Frequency (MHz)**	**Limit (dBm)**
30 – 2490.5	-25	30 – 2490.5	-25
2490.5 – 2496	-13	2490.5 – 2496	-13
2690 – 2695	-10	2690 – 2695	-10
2695 – 2696	-13	2695 – 2698.987	-13
2696 – 26000	-25	2698.987 – 26000	-25

15 MHz Channel Bandwidth		20 MHz Channel Bandwidth	
Frequency (MHz)	**Limit (dBm)**	**Frequency (MHz)**	**Limit (dBm)**
30 – 2490.5	-25	30 – 2490.5	-25
2490.5 – 2496	-13	2490.5 – 2496	-13
2690 – 2695	-10	2690 – 2695	-10
2695 – 2703.480	-13	2695 – 2708.039	-13
2703.480 – 26000	-25	2708.039 – 26000	-25

Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

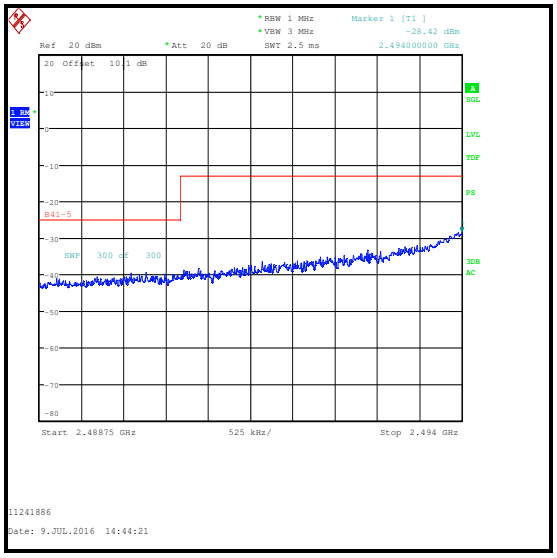
Note(s):

4. For given channel bandwidth, the minimum value of the emission bandwidth was used to calculate the above limits. The choice of the minimum emission bandwidth, regardless of modulation schemes, gives a worst case scenario for the applicable limit lines.
5. The plots of this section illustrate the conducted emissions at band edges, at frequencies below 2495 MHz and above 2691 MHz. Compliance in the frequency ranges 2495 – 2496 MHz and 2690 – 2691 MHz are shown in section 5.2.7 of this report.
6. In accordance with 27.53(m)(6), a narrower resolution bandwidth is allowed to be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz. The channel power function of the spectrum analyser was used where necessary.
7. * Integrated level (dBm).
8. ** Compliance has been shown against the stricter limit of -25.0 dBm.

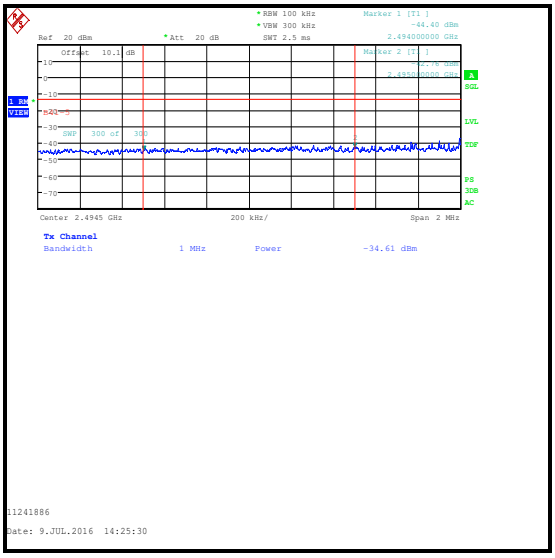
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 5 MHz Channel Bandwidth / 2488.75 to 2495 MHz & 2691 to 2697.25 MHz / QPSK

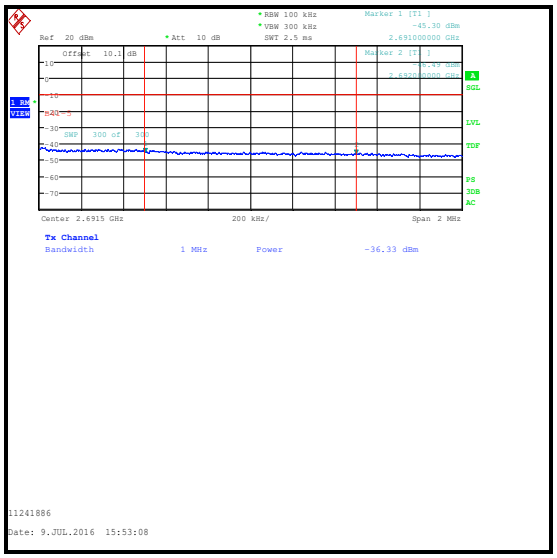
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	25	0	-28.4	-13.0	15.4	Complied
2494 to 2495	25	0	-34.6*	-13.0	21.6	Complied
2691 to 2692	25	0	-36.3*	-10.0	26.3	Complied
2692	25	0	-28.6	-10.0	18.6	Complied



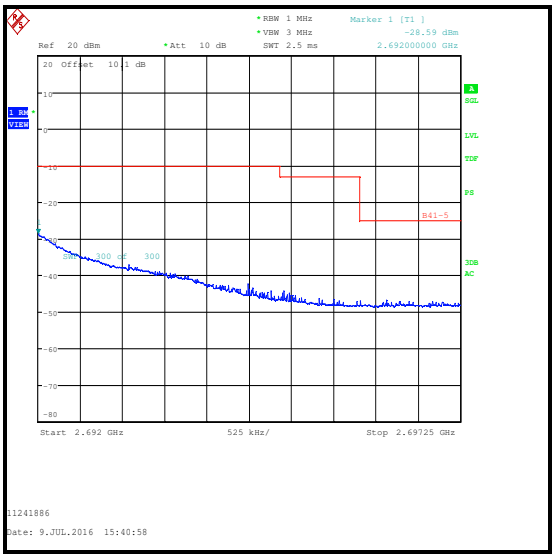
QPSK / 25 RB 0 Offset / 2488.75 to 2494 MHz



QPSK / 25 RB 0 Offset / 2494 to 2495 MHz / Integrated level



QPSK / 25 RB 0 Offset / 2691 to 2692 MHz / Integrated level

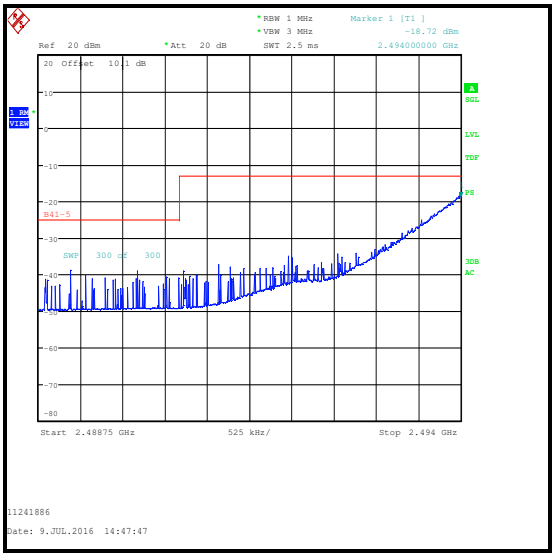


QPSK / 25 RB 0 Offset / 2692 to 2697.25 MHz

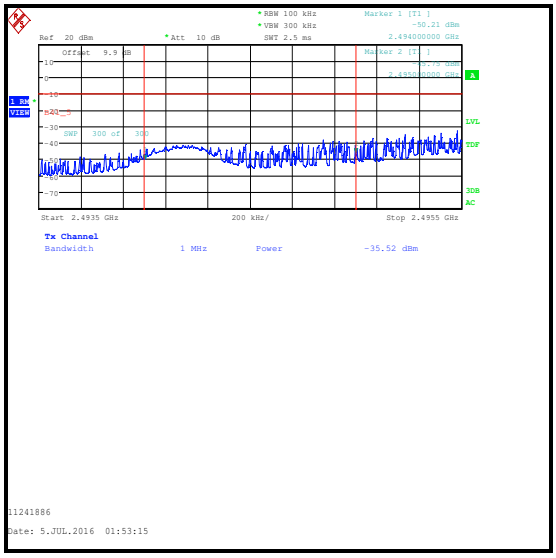
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 5 MHz Channel Bandwidth / 2488.75 to 2495 MHz & 2691 to 2697.25 MHz / QPSK

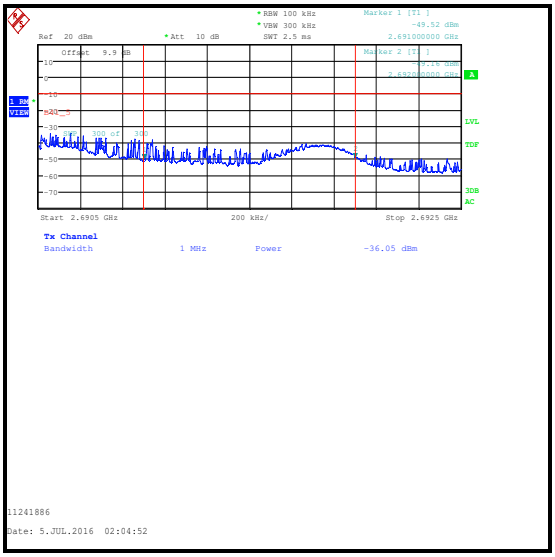
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-18.7	-13.0	5.7	Complied
2494 to 2495	1	0	-35.5*	-13.0	22.5	Complied
2691 to 2692	1	24	-36.1*	-10.0	26.1	Complied
2692	1	24	-15.6	-10.0	5.6	Complied



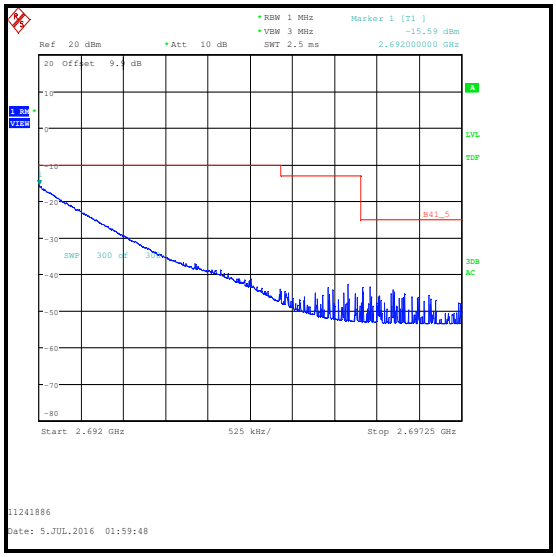
QPSK / 1 RB 0 Offset / 2488.75 to 2494 MHz



QPSK / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



QPSK / 1 RB 24 Offset / 2691 to 2692 MHz / Integrated level

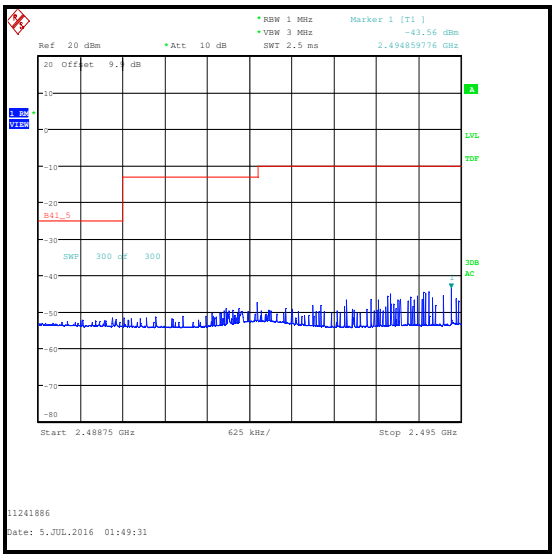


QPSK / 1 RB 24 Offset / 2692 to 2697.25 MHz

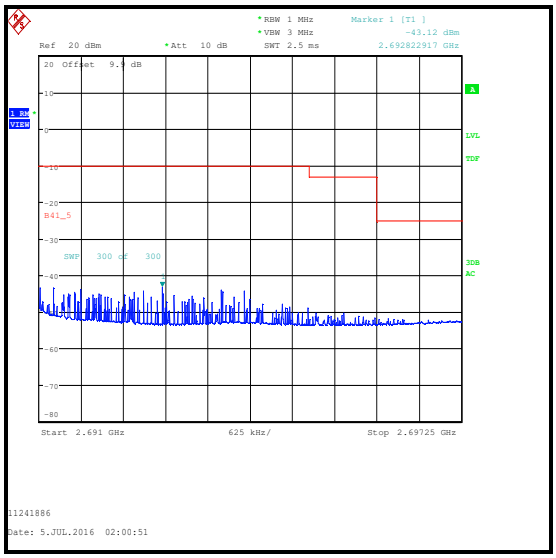
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 5 MHz Channel Bandwidth / 2488.75 to 2495 MHz & 2691 to 2697.25 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.860	1	24	-43.6	-25.0	18.6	Complied
2692.823	1	0	-43.1	-10.0	33.1	Complied



QPSK / 1 RB 24 Offset / 2488.75 to 2495 MHz
See note 8

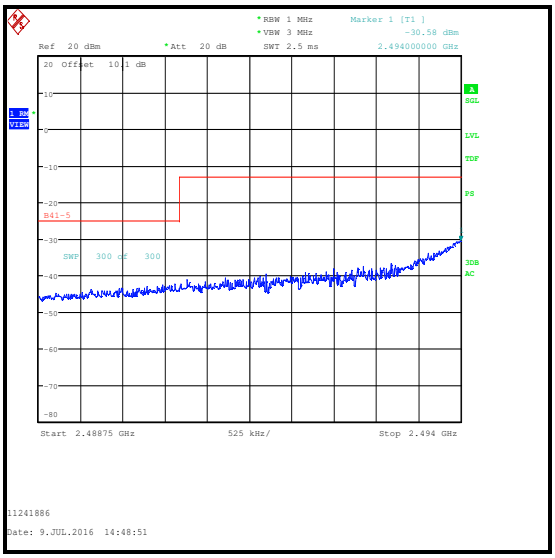


QPSK / 1 RB 0 Offset / 2691 to 2697.25 MHz

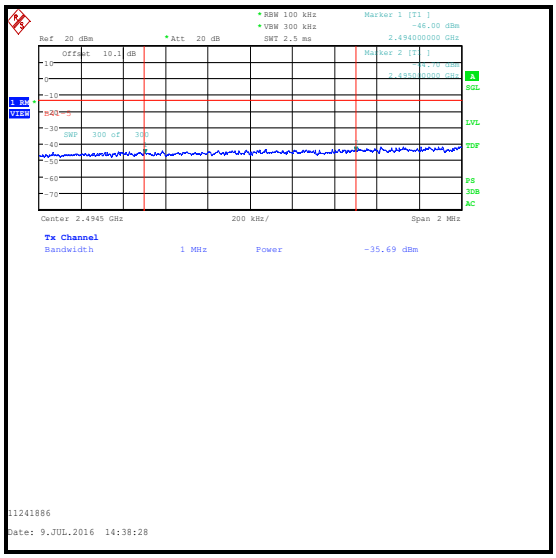
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 5 MHz Channel Bandwidth / 2488.75 to 2495 MHz & 2691 to 2697.25 MHz / 16QAM

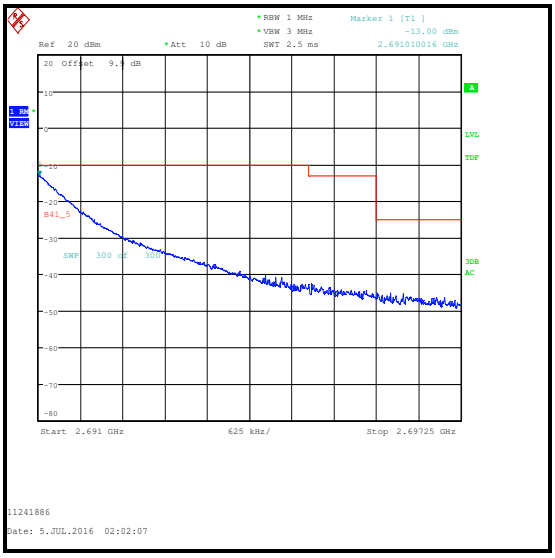
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	25	0	-30.6	-13.0	17.6	Complied
2494 to 2495	25	0	-35.7*	-13.0	22.7	Complied
2691.010	25	0	-13.0	-10.0	3.0	Complied



16QAM / 25 RB 0 Offset / 2488.75 to 2494 MHz



QPSK / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level

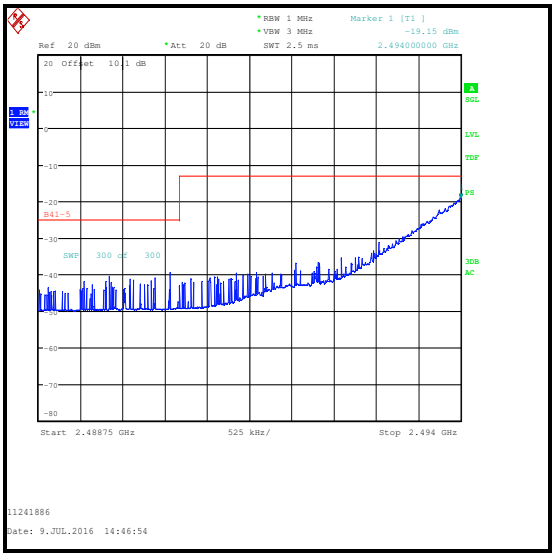


16QAM / 25 RB 0 Offset / 2691 to 2697.25 MHz

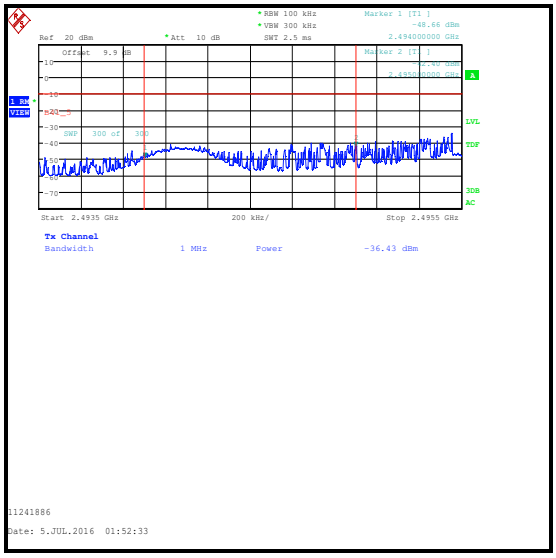
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 5 MHz Channel Bandwidth / 2488.75 to 2495 MHz & 2691 to 2697.25MHz / 16QAM

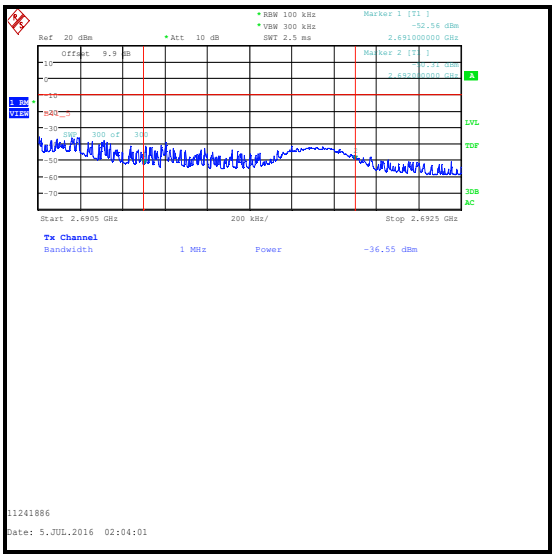
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-19.1	-13.0	6.1	Complied
2494 to 2495	1	0	-36.4*	-10.0	26.4	Complied
2691 to 2692	1	24	-36.6*	-10.0	26.6	Complied
2692.008	1	24	-16.1	-10.0	6.1	Complied



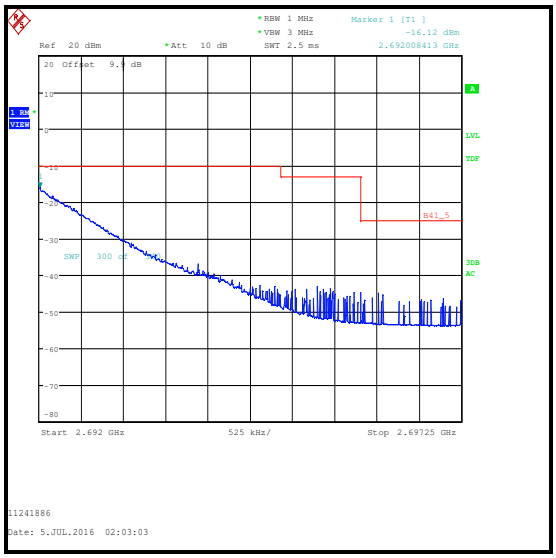
16QAM / 1 RB 0 Offset / 2488.75 to 2494 MHz



16QAM / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



16QAM / 1 RB 24 Offset / 2691 to 2692 MHz / Integrated level

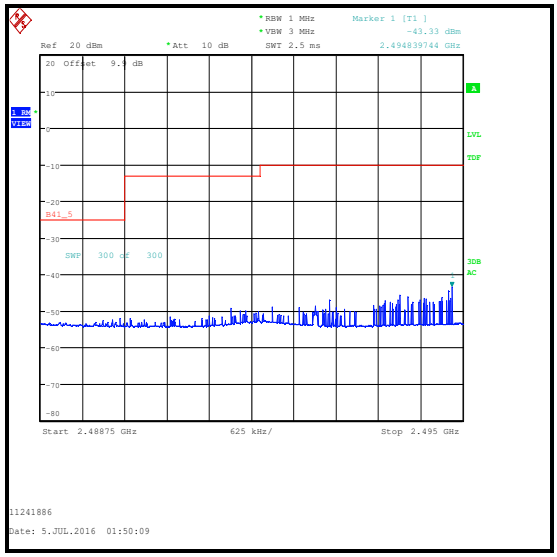


16QAM / 1 RB 24 Offset / 2692 to 2697.25 MHz

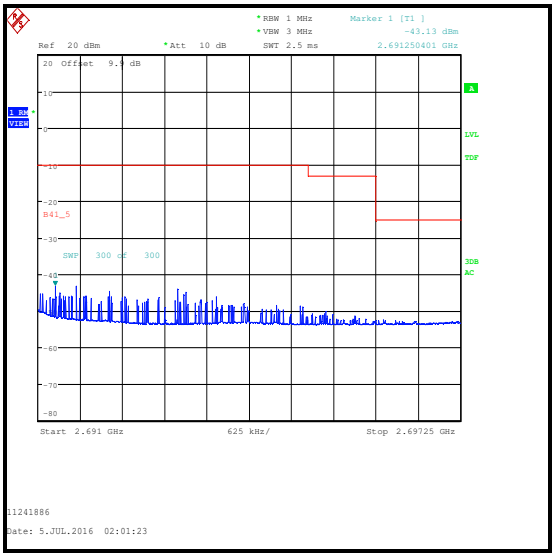
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 5 MHz Channel Bandwidth / 2488.75 to 2495 MHz & 2691 to 2697.25 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.840	1	24	-43.3	-25.0	18.3	Complied
2691.250	1	0	-43.1	-10.0	33.1	Complied



16QAM / 1 RB 24 Offset / 2488.75 to 2495 MHz
See note 8

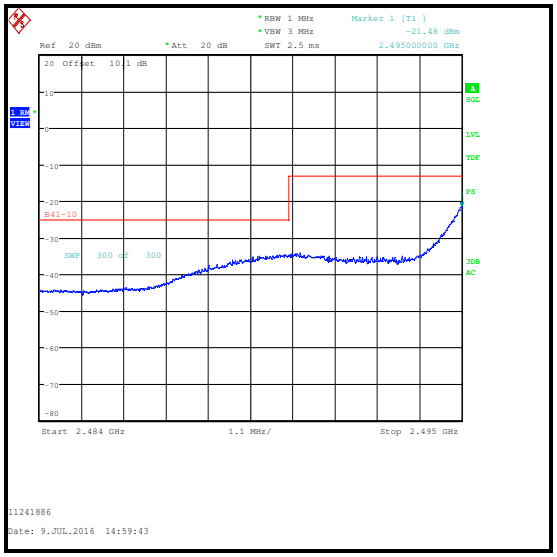


16QAM / 1 RB 0 Offset / 2691 to 2697.25 MHz

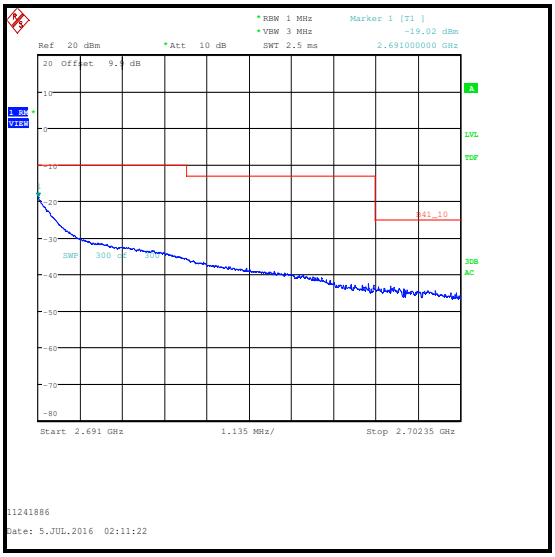
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 10 MHz Channel Bandwidth / 2484 to 2495 MHz & 2691 to 2702.35 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495	50	0	-21.5	-13.0	8.5	Complied
2691	50	0	-19.0	-10.0	9.0	Complied



QPSK / 50 RB 0 Offset / 2484 to 2495 MHz

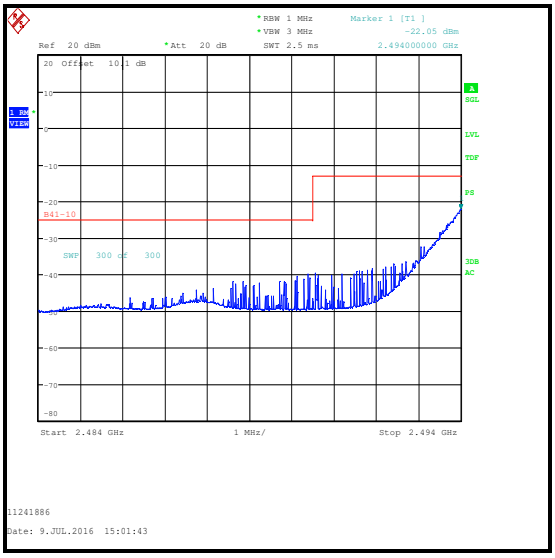


QPSK / 50 RB 0 Offset / 2692 to 2702.35 MHz

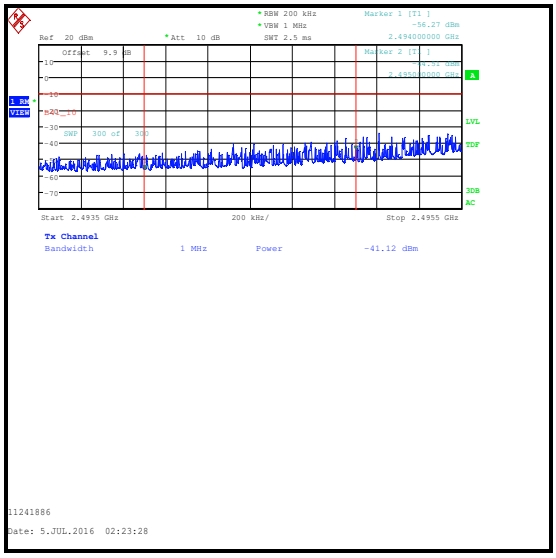
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 10 MHz Channel Bandwidth / 2484 to 2495 MHz & 2691 to 2702.35 MHz / QPSK

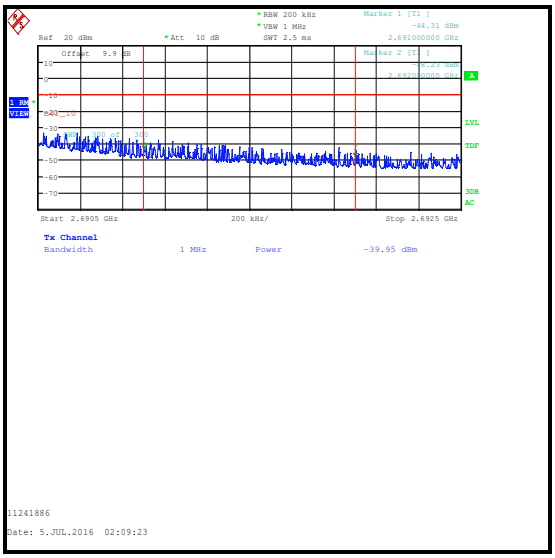
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-22.0	-13.0	9.0	Complied
2494 to 2495	1	0	-41.1*	-13.0	28.1	Complied
2691 to 2692	1	49	-40.0*	-10.0	30.0	Complied
2692	1	49	-19.5	-10.0	9.5	Complied



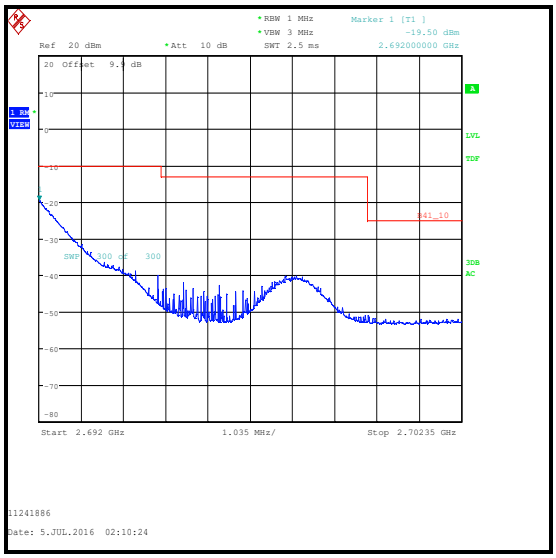
QPSK / 1 RB 0 Offset / 2484 to 2494 MHz



QPSK / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



QPSK / 1 RB 49 Offset / 2691 to 2692 MHz / Integrated level

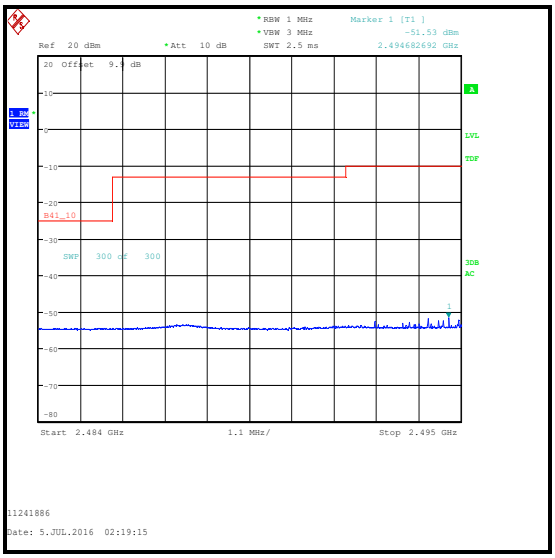


QPSK / 1 RB 49 Offset / 2692 to 2702.35 MHz

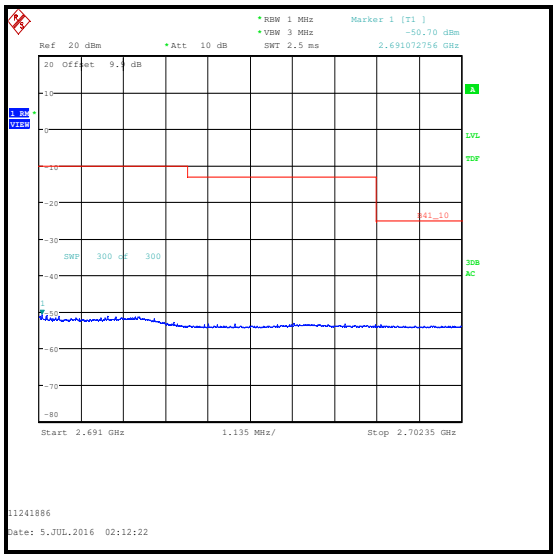
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 10 MHz Channel Bandwidth / 2484 to 2495 MHz & 2691 to 2702.35 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.682	1	49	-51.5	-25.0	26.5	Complied
2691.073	1	0	-50.7	-10.0	40.7	Complied



QPSK / 1 RB 49 Offset / 2484 to 2495 MHz
See note 8

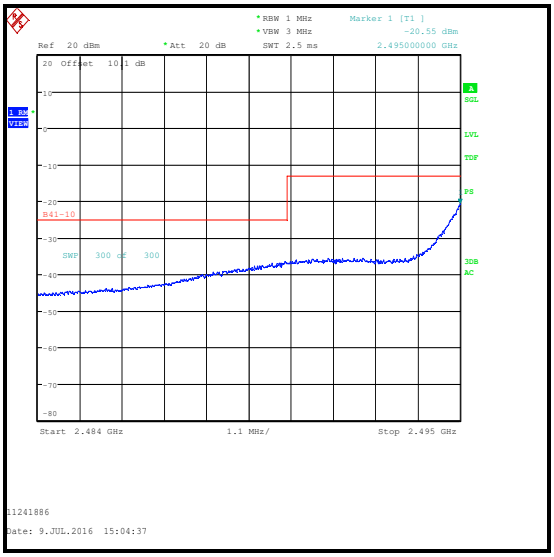


QPSK / 1 RB 0 Offset / 2691 to 2702.35 MHz

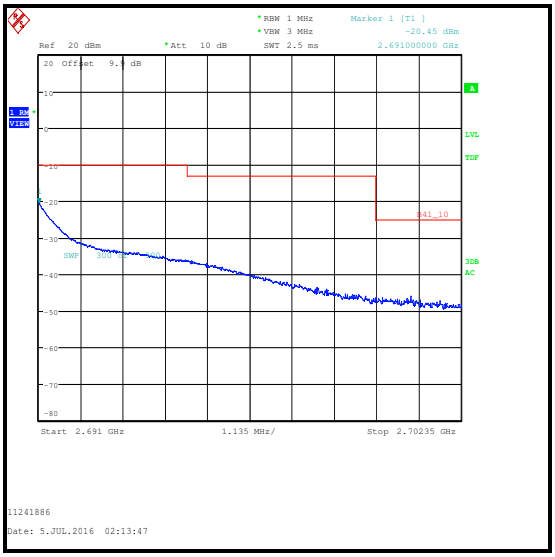
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 10 MHz Channel Bandwidth / 2484 to 2495 MHz & 2691 to 2702.35 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495	50	0	-20.5	-13.0	7.5	Complied
2691	50	0	-20.5	-10.0	10.5	Complied



16QAM / 50 RB 0 Offset / 2484 to 2495 MHz

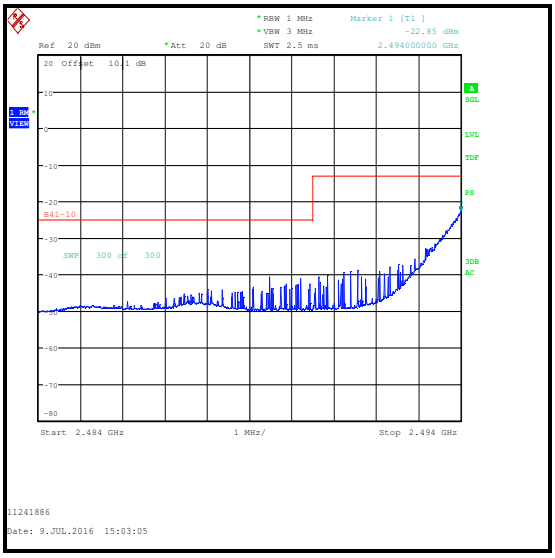


16QAM / 50 RB 0 Offset / 2691 to 2702.35 MHz

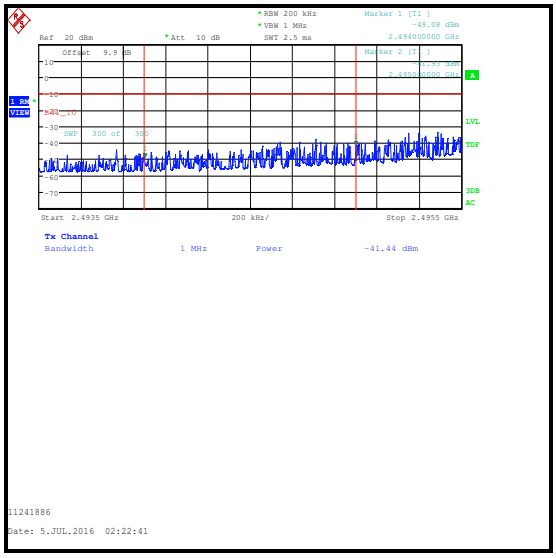
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 10 MHz Channel Bandwidth / 2484 to 2495 MHz & 2691 to 2702.35 MHz / 16QAM

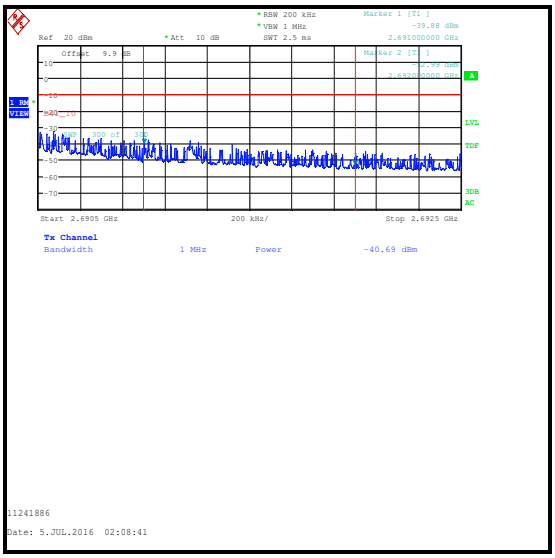
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-22.8	-13.0	9.8	Complied
2494 to 2495	1	0	-41.4*	-13.0	28.4	Complied
2691 to 2692	1	49	-40.7*	-10.0	30.7	Complied
2692.017	1	49	-20.3	-10.0	10.3	Complied



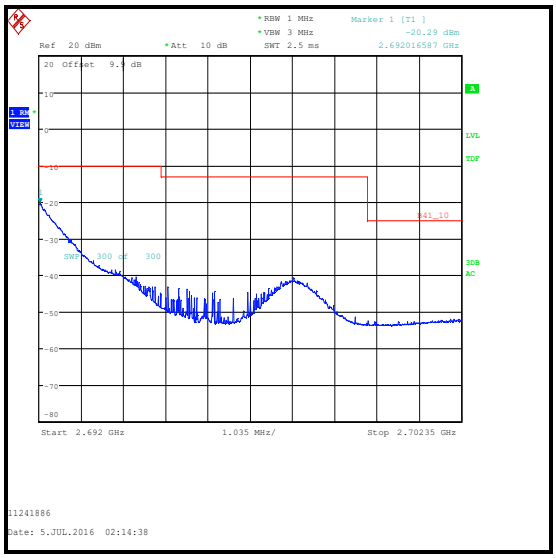
16QAM / 1 RB 0 Offset / 2484 to 2494 MHz



16QAM / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



16QAM / 1 RB 49 Offset / 2691 to 2692 MHz / Integrated level

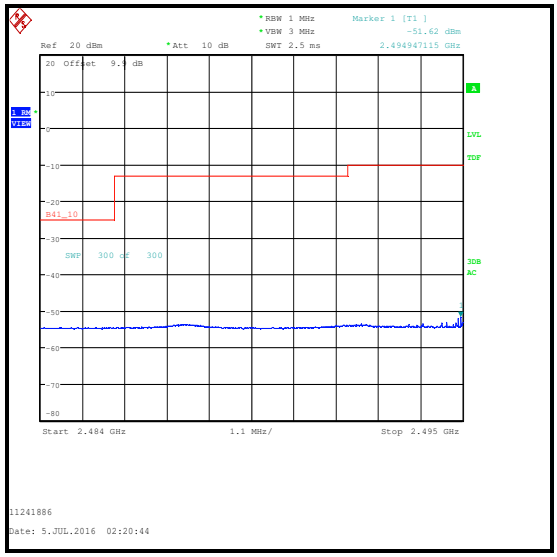


16QAM / 1 RB 49 Offset / 2692 to 2702.35 MHz

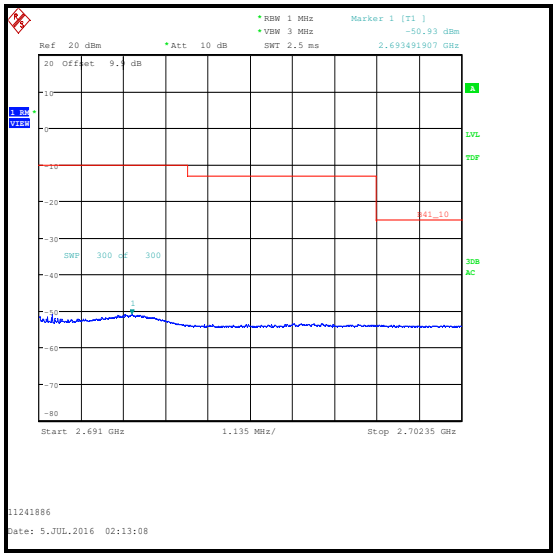
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 10 MHz Channel Bandwidth / 2484 to 2495 MHz & 2691 to 2702.35 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.947	1	49	-51.6	-25.0	26.6	Complied
2693.492	1	0	-50.9	-10.0	40.9	Complied



16QAM / 1 RB 49 Offset / 2484 to 2495 MHz
See note 8

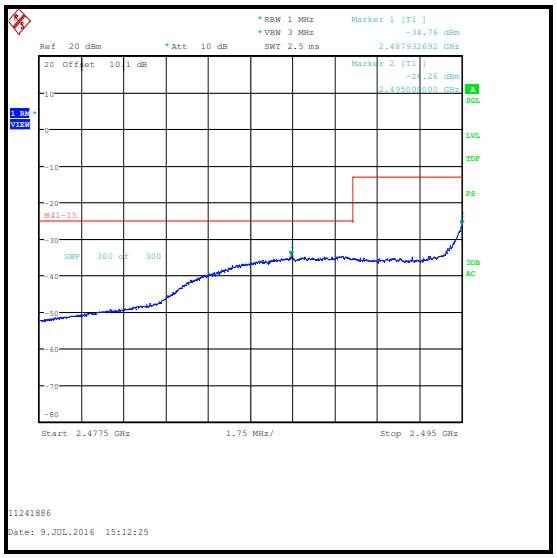


16QAM / 1 RB 0 Offset / 2691 to 2702.35 MHz

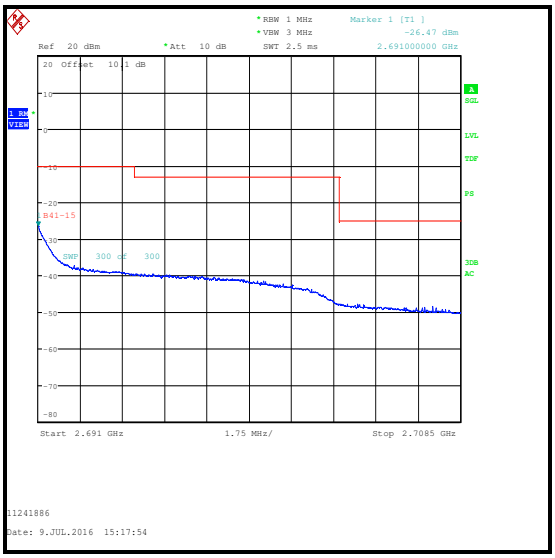
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 15 MHz Channel Bandwidth / 2477.5 to 2495 MHz & 2691 to 2708.5 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2487.933	75	0	-34.8	-25.0	9.8	Complied
2495	75	0	-26.3	-13.0	13.3	Complied
2691	75	0	-26.5	-10.0	16.5	Complied



QPSK / 75 RB 0 Offset / 2477.5 to 2495 MHz

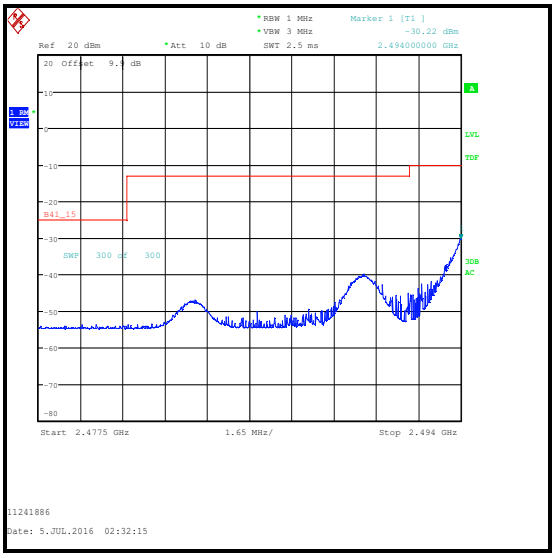


QPSK / 75 RB 0 Offset / 2691 to 2708.5 MHz

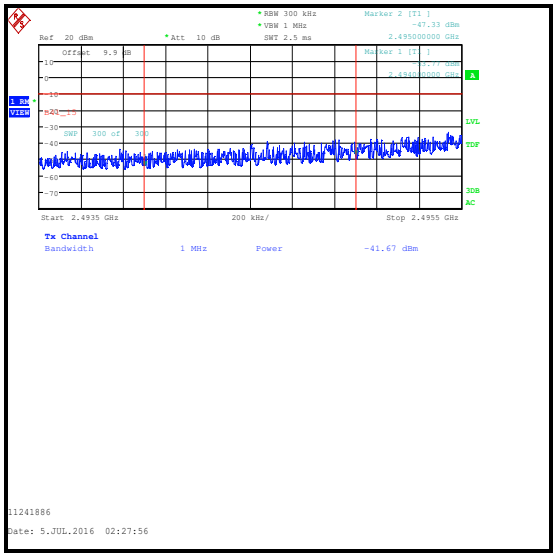
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 15 MHz Channel Bandwidth / 2477.5 to 2495 MHz & 2691 to 2708.5 MHz / QPSK

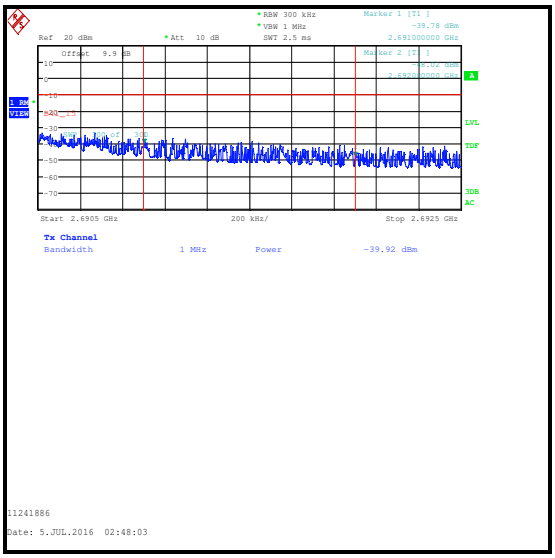
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-30.2	-25.0	5.2	Complied
2494 to 2495	1	0	-41.7*	-13.0	28.7	Complied
2691 to 2692	1	74	-39.9*	-10.0	29.9	Complied
2692	1	74	-24.5	-10.0	14.5	Complied



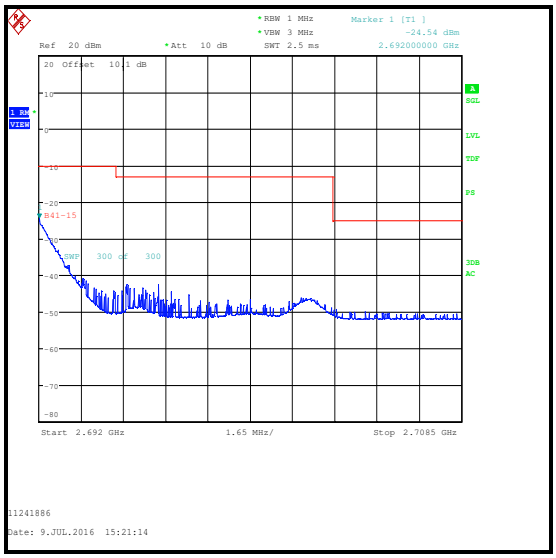
QPSK / 1 RB 0 Offset / 2477.5 to 2494 MHz
See note 8



QPSK / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



QPSK / 1 RB 74 Offset / 2691 to 2692 MHz / Integrated level

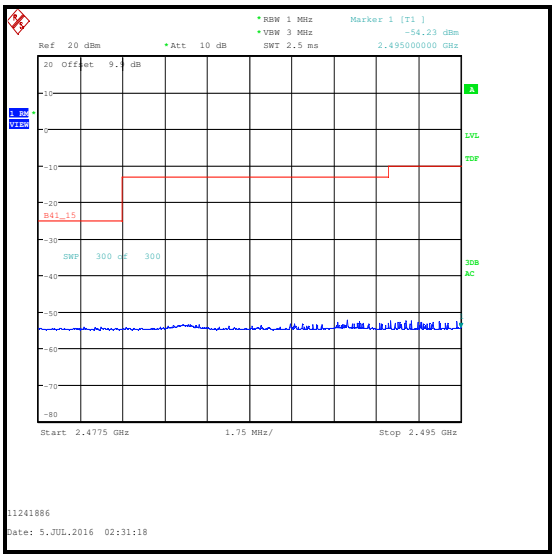


QPSK / 1 RB 74 Offset / 2692 to 2708.5 MHz

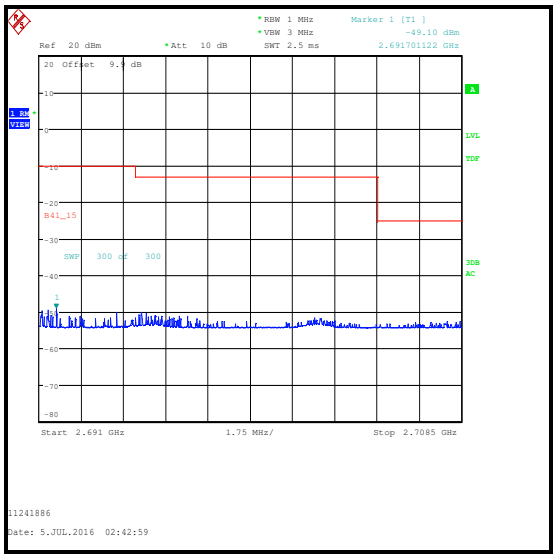
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 15 MHz Channel Bandwidth / 2477.5 to 2495 MHz & 2691 to 2708.5 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495	1	74	-54.2	-25.0	29.2	Complied
2691.701	1	0	-49.1	-25.0	24.1	Complied



QPSK / 1 RB 74 Offset / 2477.5 to 2495 MHz
See note 8

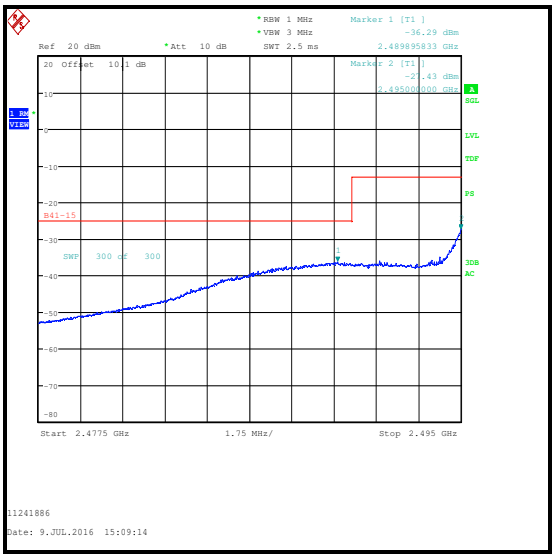


QPSK / 1 RB 0 Offset / 2691 to 2708.5 MHz
See note 8

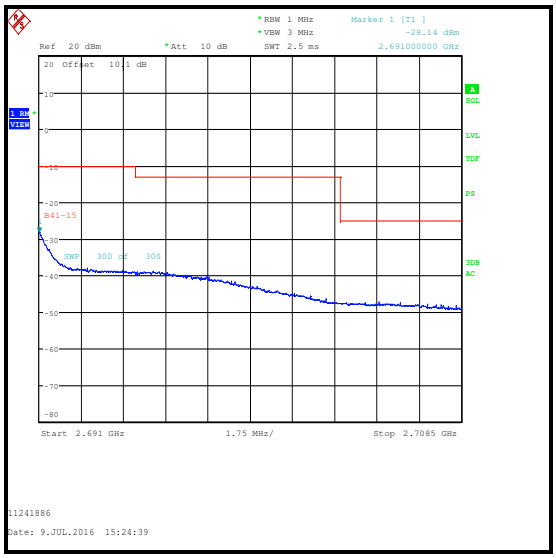
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 15 MHz Channel Bandwidth / 2477.5 to 2495 MHz & 2691 to 2708.5 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2489.896	75	0	-36.3	-25.0	11.3	Complied
2495	75	0	-27.4	-13.0	14.4	Complied
2691	75	0	-28.1	-10.0	18.1	Complied



16QAM / 75 RB 0 Offset / 2477.5 to 2495 MHz

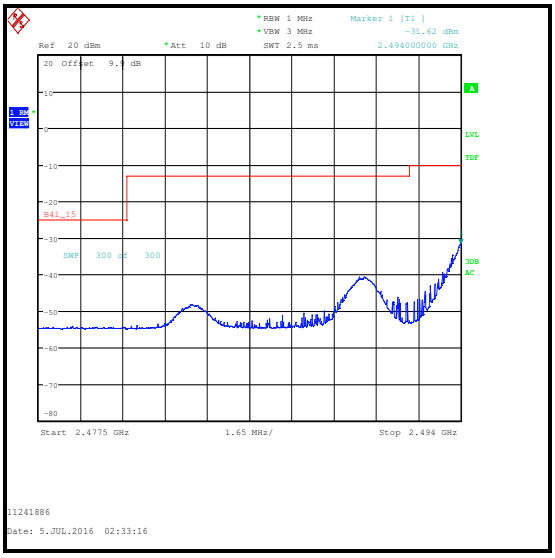


16QAM / 75 RB 0 Offset / 2691 to 2708.5 MHz

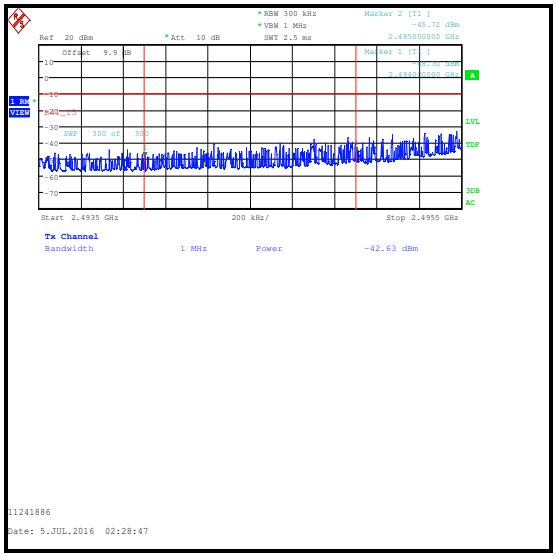
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 15 MHz Channel Bandwidth / 2477.5 to 2495 MHz & 2691 to 2708.5 MHz / 16QAM

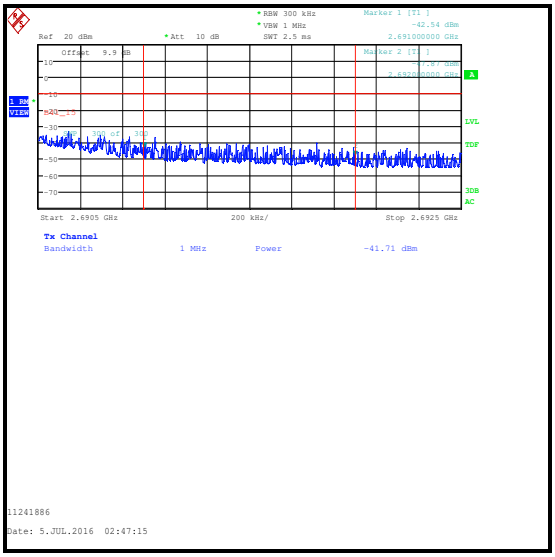
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-31.6	-25.0	6.6	Complied
2494 to 2495	1	0	-42.6*	-13.0	29.6	Complied
2691 to 2692	1	74	-41.7*	-10.0	31.7	Complied
2692	1	74	-25.7	-10.0	15.7	Complied



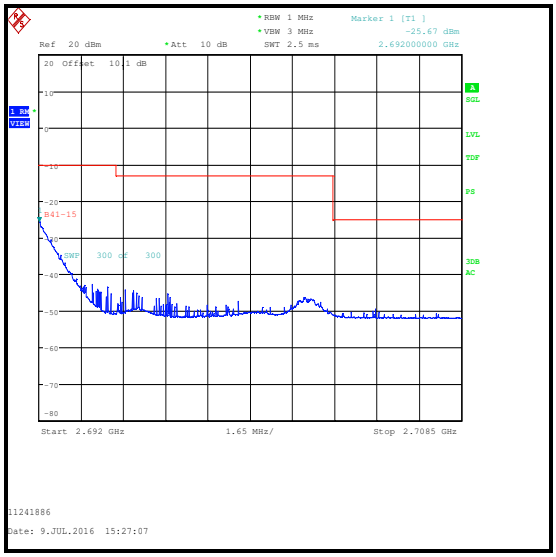
16QAM / 1 RB 0 Offset / 2477.5 to 2494 MHz
See note 8



16QAM / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



16QAM / 1 RB 74 Offset / 2691 to 2692 MHz / Integrated level

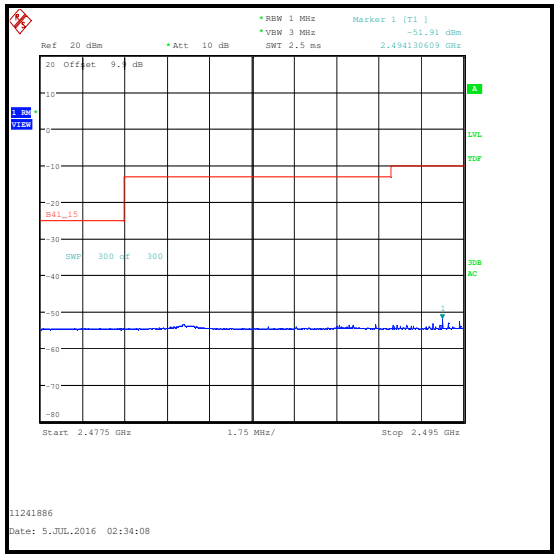


16QAM / 1 RB 74 Offset / 2692 to 2708.5 MHz

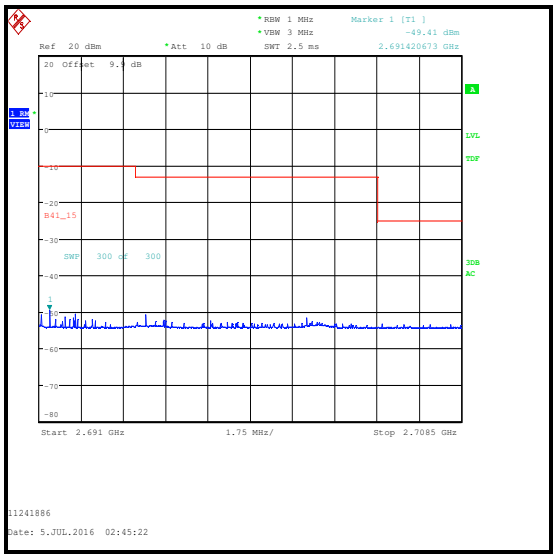
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 15 MHz Channel Bandwidth / 2477.5 to 2495 MHz & 2691 to 2708.5 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.130	1	74	-51.9	-25.0	26.9	Complied
2691.420	1	0	-49.4	-25.0	24.4	Complied



16QAM / 1 RB 74 Offset / 2477.5 to 2495 MHz
See note 8

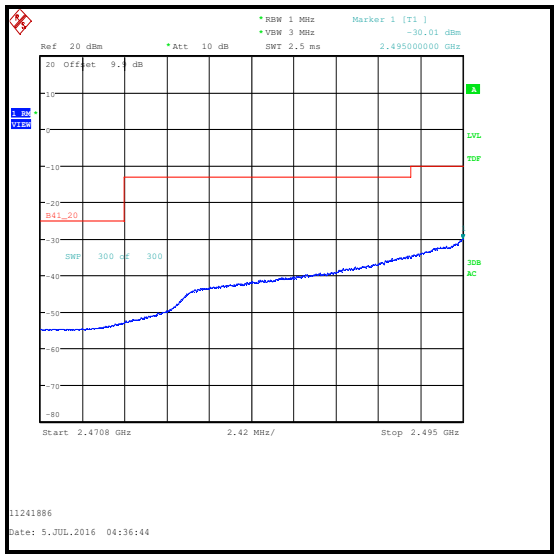


16QAM / 1 RB 0 Offset / 2691 to 2708.5 MHz
See note 8

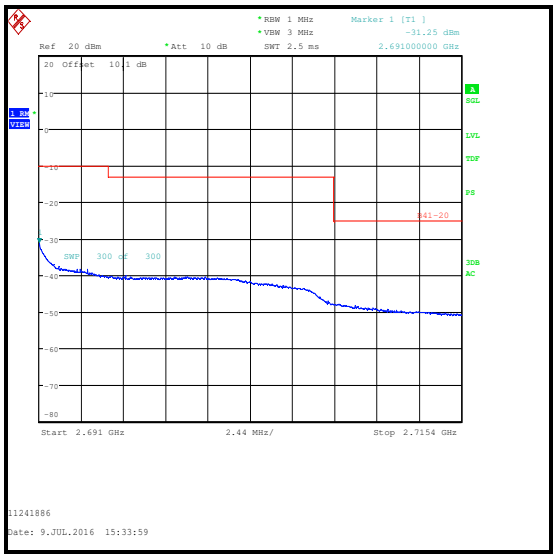
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 20 MHz Channel Bandwidth / 2470.8 to 2495 MHz & 2691 to 2715.4 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495	100	0	-30.0	-25.0	5.0	Complied
2691	100	0	-31.2	-10.0	21.2	Complied



QPSK / 100 RB 0 Offset / 2470.8 to 2495 MHz
See note 8

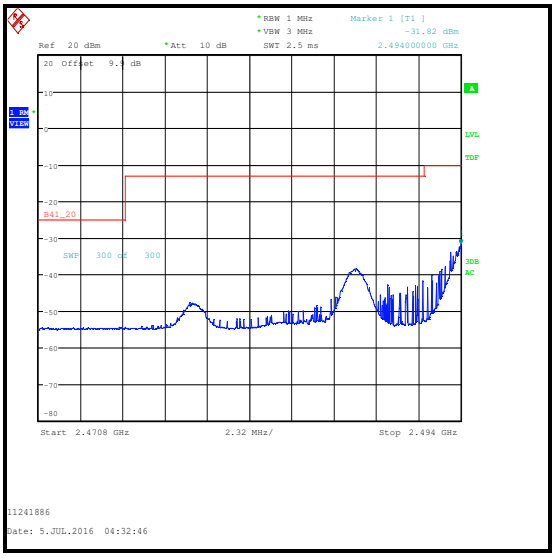


QPSK / 100 RB 0 Offset / 2691 to 2715.4 MHz

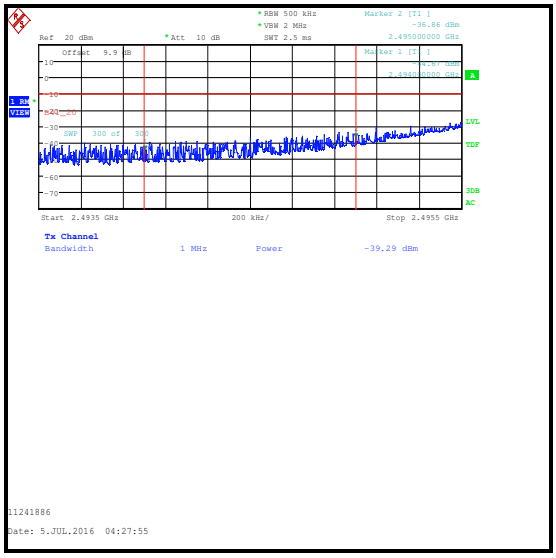
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 20 MHz Channel Bandwidth / 2470.8 to 2495 MHz & 2691 to 2715.4 MHz / QPSK

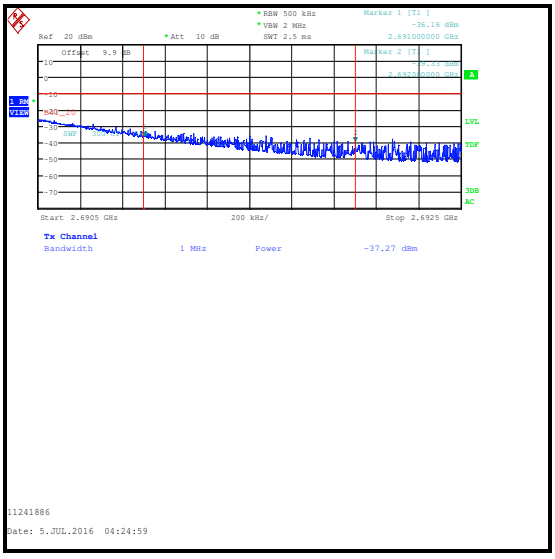
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-31.8	-25.0	6.8	Complied
2494 to 2495	1	0	-40.7*	-13.0	27.7	Complied
2691 to 2692	1	99	-38.7*	-10.0	28.7	Complied
2692	1	99	-27.7	-10.0	17.7	Complied



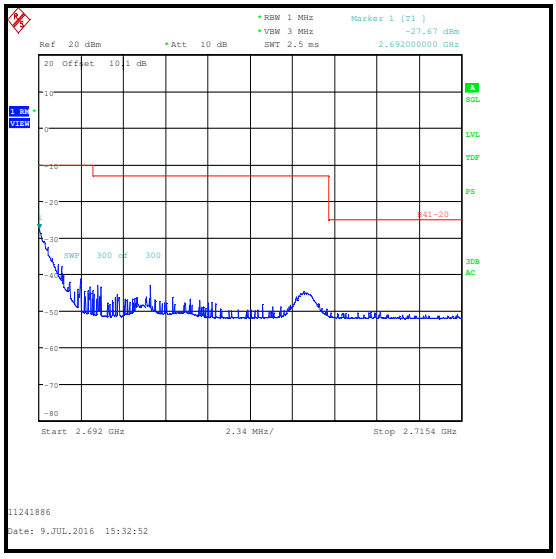
QPSK / 1 RB 0 Offset / 2470.8 to 2494 MHz
See note 8



QPSK / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



QPSK / 1 RB 99 Offset / 2691 to 2692 MHz / Integrated level

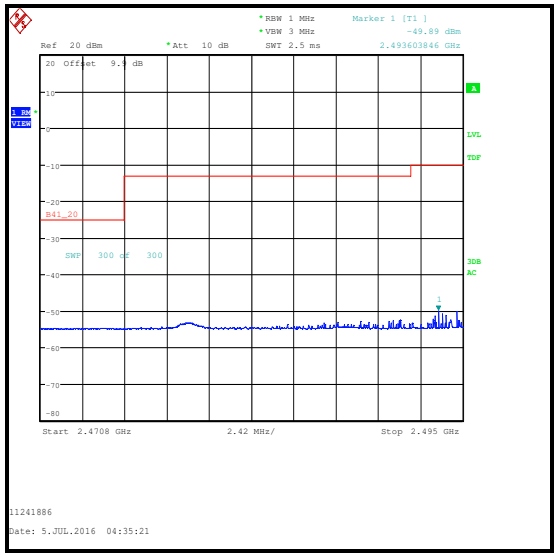


QPSK / 1 RB 99 Offset / 2692 to 2715.4 MHz

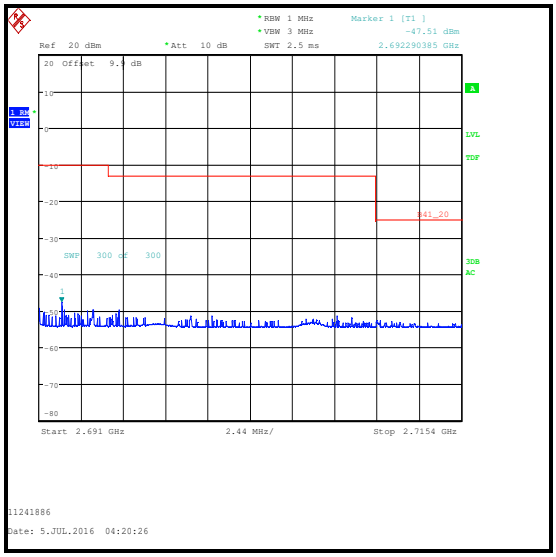
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 20 MHz Channel Bandwidth / 2470.8 to 2495 MHz & 2691 to 2715.4 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2493.604	1	99	-49.9	-25.0	24.9	Complied
2692.290	1	0	-47.5	-25.0	22.5	Complied



QPSK / 1 RB 99 Offset / 2470.8 to 2495 MHz
See note 8

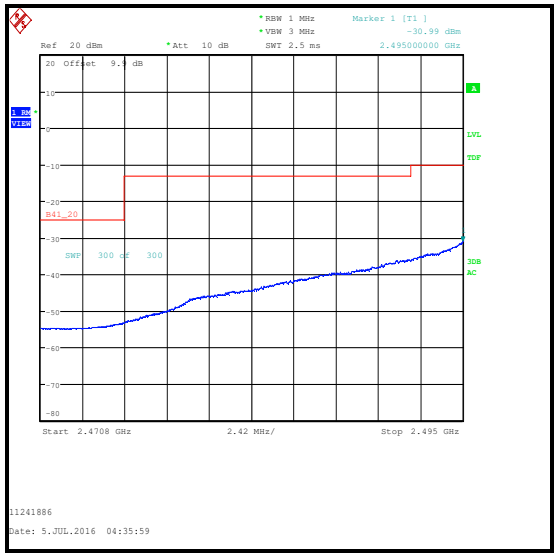


QPSK / 1 RB 0 Offset / 2691 to 2715.4 MHz
See note 8

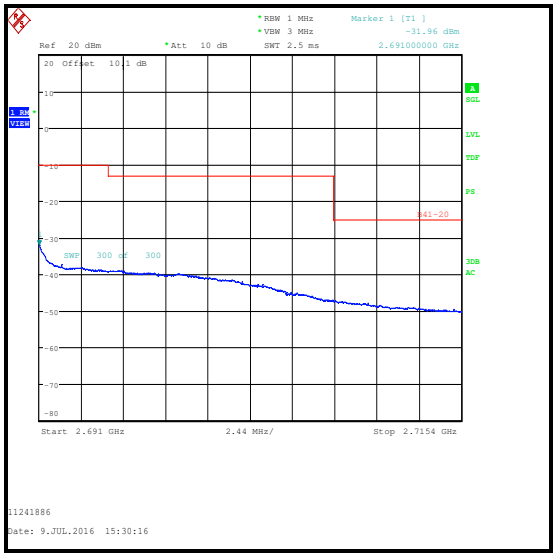
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 20 MHz Channel Bandwidth / 2470.8 to 2495 MHz & 2691 to 2715.4 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495	100	0	-31.0	-25.0	6.0	Complied
2691	100	0	-32.0	-10.0	22.0	Complied



16QAM / 100 RB 0 Offset / 2470.8 to 2495 MHz
See note 8

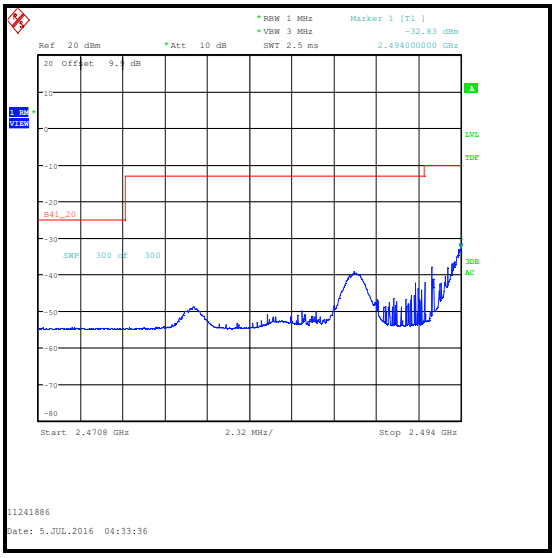


16QAM / 100 RB 0 Offset / 2691 to 2715.4 MHz

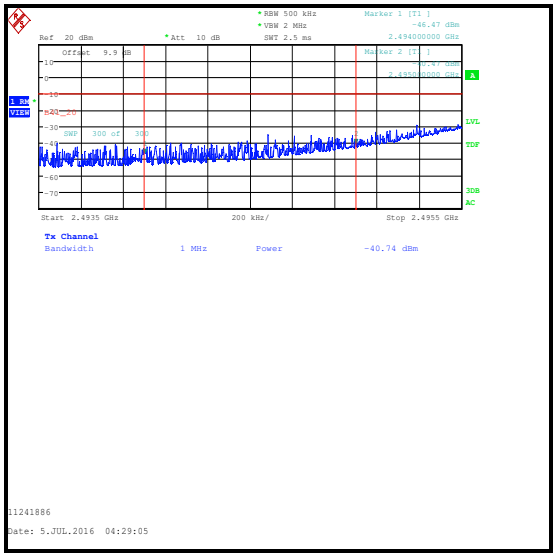
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 20 MHz Channel Bandwidth / 2470.8 to 2495 MHz & 2691 to 2715.4 MHz / 16QAM

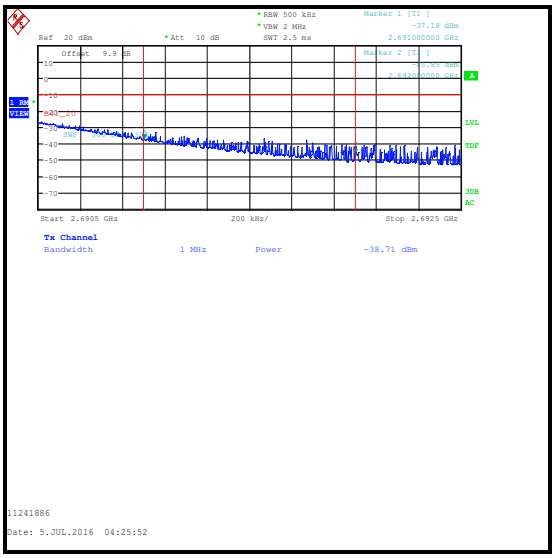
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-32.8	-25.0	7.8	Complied
2494 to 2495	1	0	-39.3*	-13.0	26.3	Complied
2691 to 2692	1	99	-37.3*	-10.0	27.3	Complied
2692	1	99	-28.5	-10.0	18.5	Complied



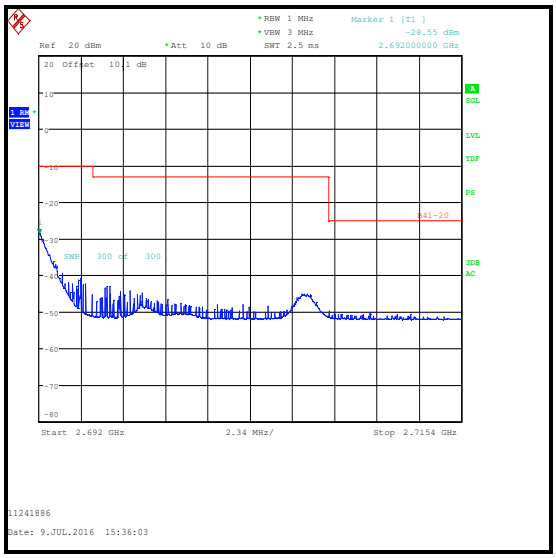
16QAM / 1 RB 0 Offset / 2470.8 to 2494 MHz
See note 8



16QAM / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



16QAM / 1 RB 99 Offset / 2691 to 2692 MHz / Integrated level

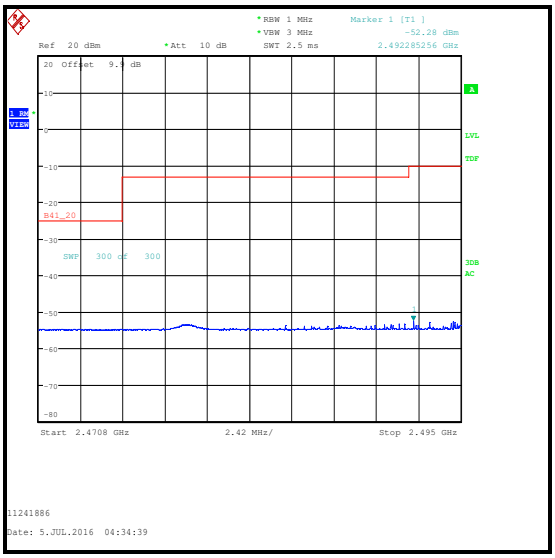


16QAM / 1 RB 99 Offset / 2692 to 2715.4 MHz

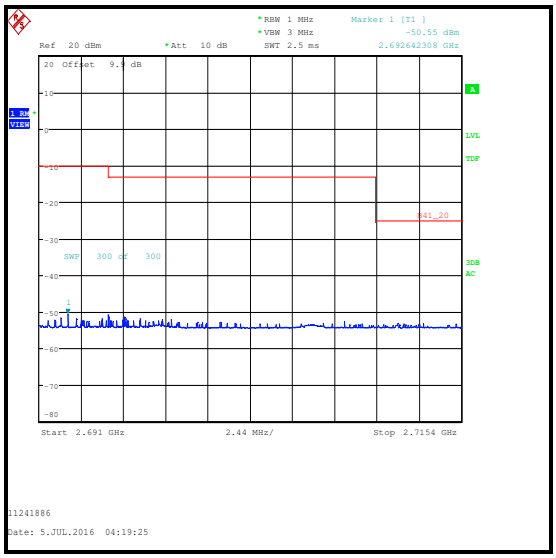
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 20 MHz Channel Bandwidth / 2470.8 to 2495 MHz & 2691 to 2715.4 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2492.285	1	99	-52.3	-25.0	27.3	Complied
2692.642	1	0	-50.6	-25.0	25.6	Complied



16QAM / 1 RB 24 Offset / 2470.8 to 2495 MHz
See note 8



16QAM / 1 RB 0 Offset / 2691 to 2715.4 MHz
See note 8

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	22 Apr 2017	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	17 May 2017	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	21 Mar 2017	12
A2863	Pre-Amplifier	Agilent	8449B	3008A02100	07 Jan 2017	12
A2889	Antenna	Schwarzbeck	BBHA 9120 B	BBHA 9120 B	07 Apr 2017	12
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#1	19 May 2017	12
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	02 Apr 2017	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	21 May 2016	12
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	21 Mar 2017	12
A1534	Pre-Amplifier	Hewlett Packard	8449B	3008A00405	19 Dec 2016	12
A1818	Antenna	EMCO	3115	00075692	17 Dec 2016	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	26 Apr 2017	12

5.2.10. Transmitter Radiated Emissions at Band Edges ± X MHz - UAT

Test Summary:

Test Engineers:	Andrew Edwards & Georgios Vrezas	**Test Dates:**	05 July 2016 & 09 July 2016
Test Sample IMEIs:	358640070022890 & 358640070066106		

FCC Reference:	Parts 2.1053 & 27.53(m)(4)
Test Method Used:	KDB 971168 Section 6 referencing FCC Part 27.53 & note 2 below

Environmental Conditions:

Temperature (°C):	24 to 25
Relative Humidity (%):	40 to 41

Note(s):

1. Measurements were performed with the EUT transmitting QPSK and 16QAM modulation schemes, with resource block settings stated in section 4.3.
2. Sweep time was set to auto and an RMS detector with trace averaging of 300 sweeps was used.
3. In accordance with 27.53(m)(4), the following limits were calculated:

5 MHz Channel Bandwidth		10 MHz Channel Bandwidth	
Frequency (MHz)	**Limit (dBm)**	**Frequency (MHz)**	**Limit (dBm)**
30 – 2490.5	-25	30 – 2490.5	-25
2490.5 – 2496	-13	2490.5 – 2496	-13
2690 – 2695	-10	2690 – 2695	-10
2695 – 2696	-13	2695 – 2698.987	-13
2696 – 26000	-25	2698.987 – 26000	-25

15 MHz Channel Bandwidth		20 MHz Channel Bandwidth	
Frequency (MHz)	**Limit (dBm)**	**Frequency (MHz)**	**Limit (dBm)**
30 – 2490.5	-25	30 – 2490.5	-25
2490.5 – 2496	-13	2490.5 – 2496	-13
2690 – 2695	-10	2690 – 2695	-10
2695 – 2703.480	-13	2695 – 2708.039	-13
2703.480 – 26000	-25	2708.039 – 26000	-25

Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

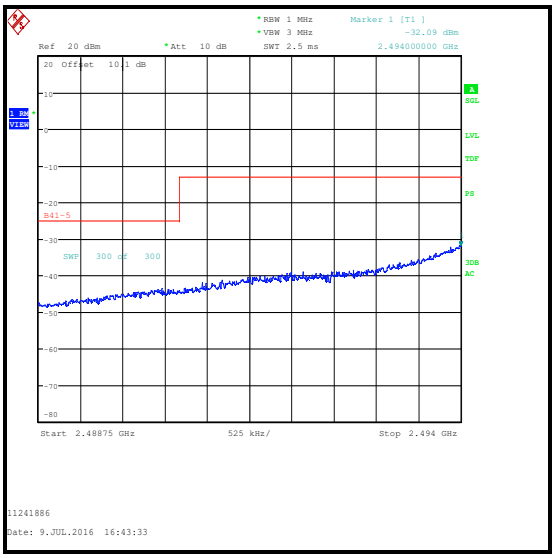
Note(s):

4. For given channel bandwidth, the minimum value of the emission bandwidth was used to calculate the above limits. The choice of the minimum emission bandwidth, regardless of modulation schemes, gives a worst case scenario for the applicable limit lines.
5. The plots of this section illustrate the conducted emissions at band edges, at frequencies below 2495 MHz and above 2691 MHz. Compliance in the frequency ranges 2495 – 2496 MHz and 2690 – 2691 MHz are shown in section 5.2.8 of this report.
6. In accordance with 27.53(m)(6), a narrower resolution bandwidth is allowed to be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz. The channel power function of the spectrum analyser was used where necessary.
7. * Integrated level (dBm).
8. ** Compliance has been shown against the stricter limit of -25.0 dBm.

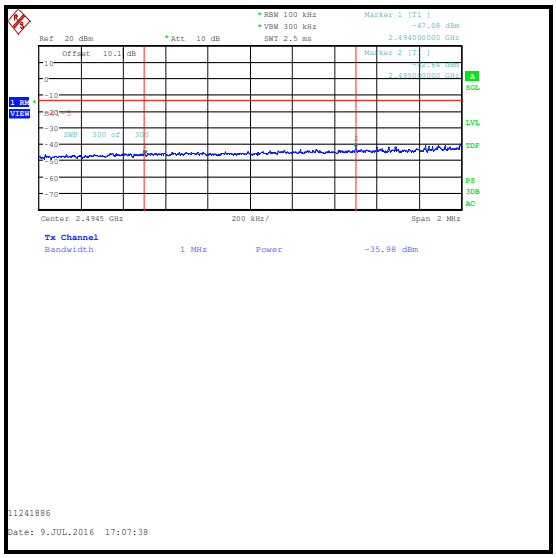
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 5 MHz Channel Bandwidth / 2488.75 to 2495 MHz & 2691 to 2697.25 MHz / QPSK

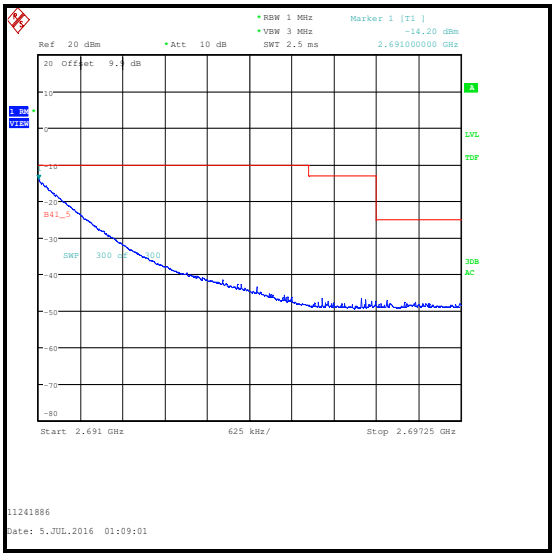
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	25	0	-32.1	-13.0	19.1	Complied
2494 to 2495	25	0	-36.0*	-13.0	23.0	Complied
2691	25	0	-14.2	-10.0	4.2	Complied



QPSK / 25 RB 0 Offset / 2488.75 to 2494 MHz



QPSK / 25 RB 0 Offset / 2494 to 2495 MHz / Integrated level

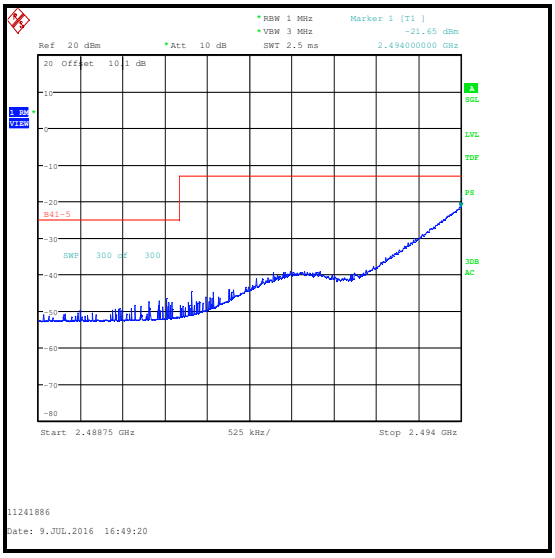


QPSK / 25 RB 0 Offset / 2691 to 2697.25 MHz

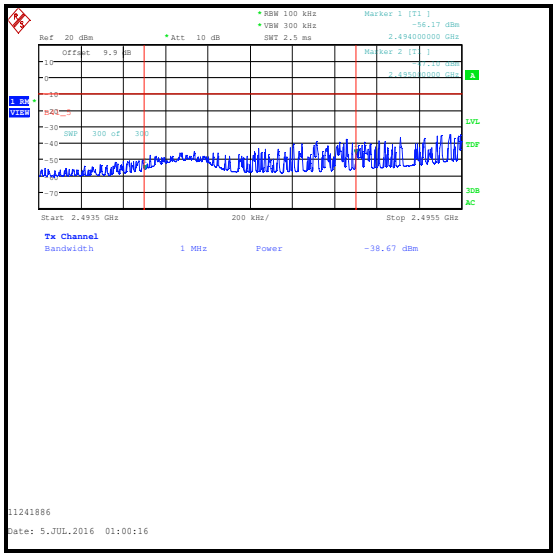
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 5 MHz Channel Bandwidth / 2488.75 to 2495 MHz & 2691 to 2697.25 MHz / QPSK

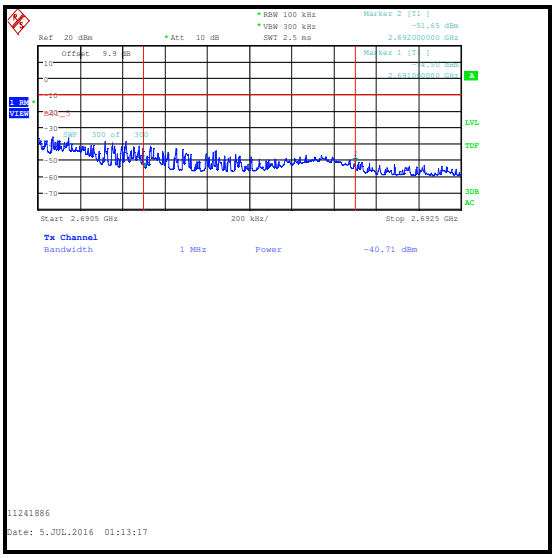
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-21.6	-13.0	8.6	Complied
2494 to 2495	1	0	-38.7*	-13.0	25.7	Complied
2691 to 2692	1	24	-40.7*	-10.0	30.7	Complied
2692.008	1	24	-17.9	-10.0	7.9	Complied



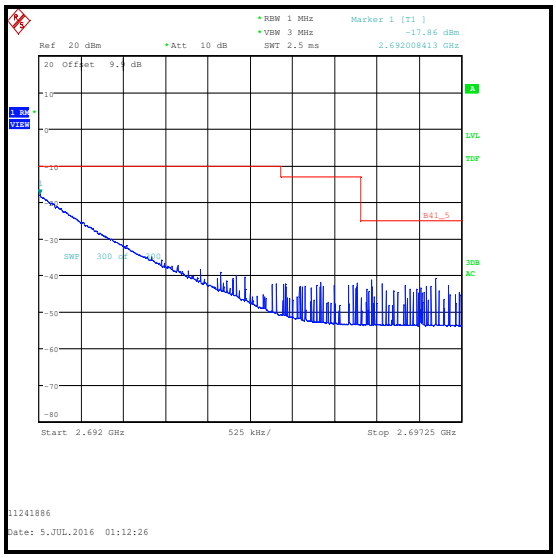
QPSK / 1 RB 0 Offset / 2488.75 to 2494 MHz



QPSK / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



QPSK / 1 RB 24 Offset / 2691 to 2692 MHz / Integrated level

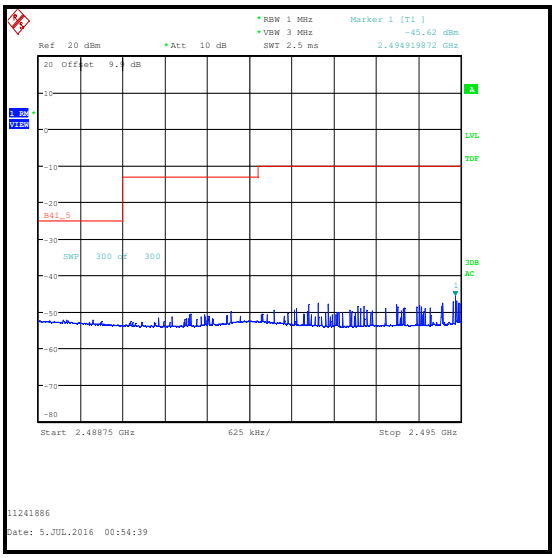


QPSK / 1 RB 24 Offset / 2692 to 2697.25 MHz

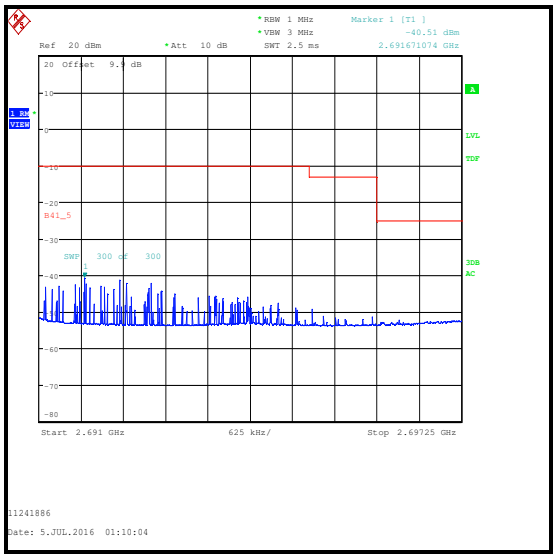
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 5 MHz Channel Bandwidth / 2488.75 to 2495 MHz & 2691 to 2697.25 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.920	1	24	-45.6	-25.0	20.6	Complied
2691.671	1	0	-40.5	-10.0	30.5	Complied



QPSK / 1 RB 24 Offset / 2488.75 to 2495 MHz
See note 8

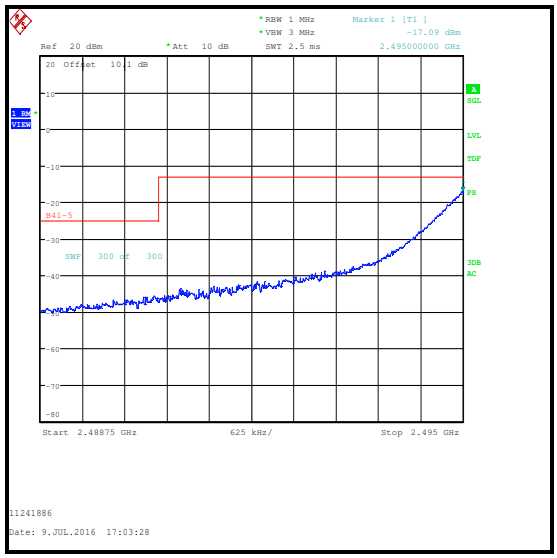


QPSK / 1 RB 0 Offset / 2691 to 2697.25 MHz

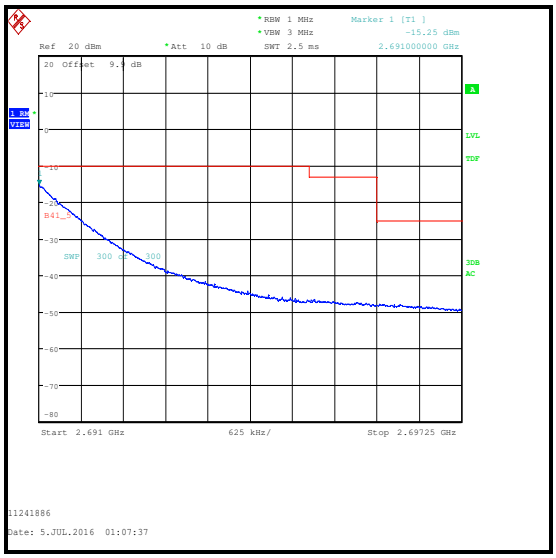
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 5 MHz Channel Bandwidth / 2488.75 to 2495 MHz & 2691 to 2697.25 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495	25	0	-17.1	-13.0	4.1	Complied
2691	25	0	-15.3	-10.0	5.3	Complied



16QAM / 25 RB 0 Offset / 2488.75 to 2495 MHz

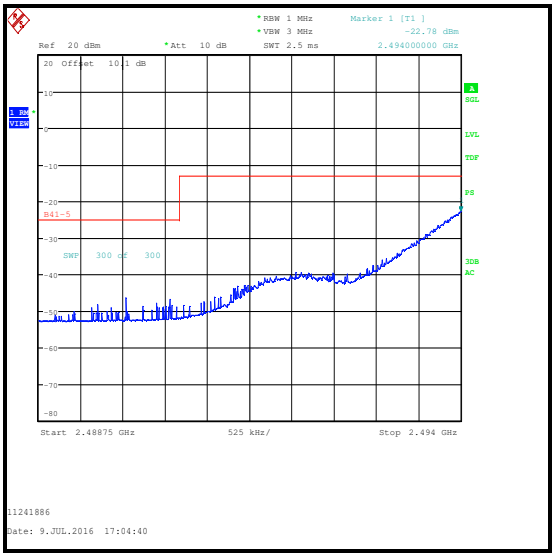


16QAM / 25 RB 0 Offset / 2691 to 2697.25 MHz

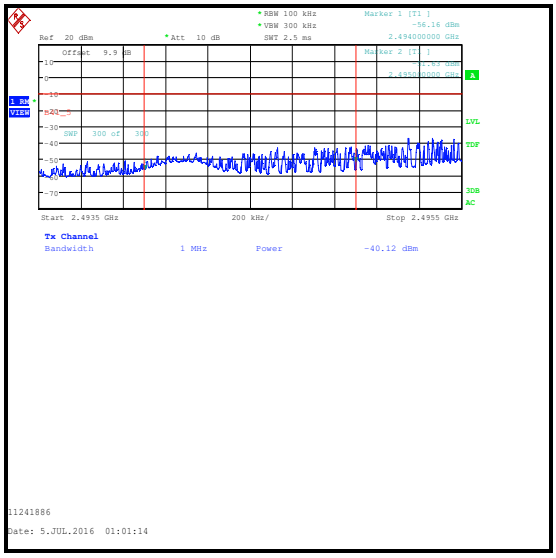
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 5 MHz Channel Bandwidth / 2488.75 to 2495 MHz & 2691 to 2697.25MHz / 16QAM

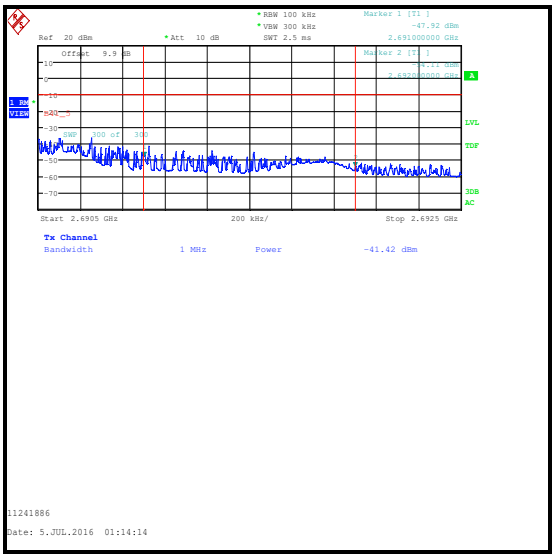
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-22.8	-13.0	9.8	Complied
2494 to 2495	1	0	-40.1*	-13.0	27.1	Complied
2691 to 2692	1	24	-41.4*	-10.0	31.4	Complied
2692.034	1	24	-18.8	-10.0	8.8	Complied



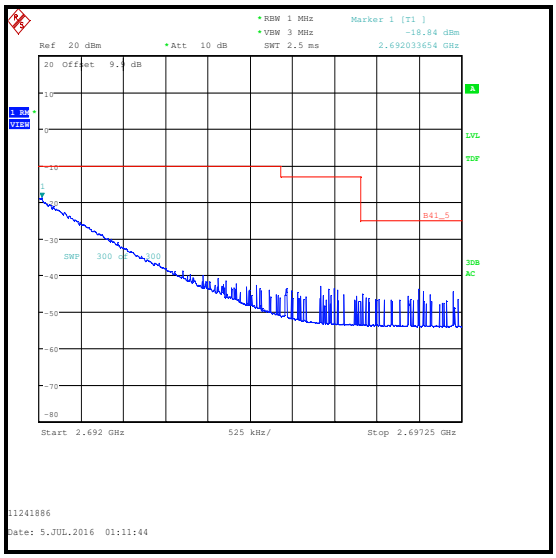
16QAM / 1 RB 0 Offset / 2488.75to 2494 MHz



16QAM / 1 RB 0 Offset / 2494to 2495 MHz / Integrated level



16QAM / 1 RB 24 Offset / 2691 to 2692 MHz / Integrated level

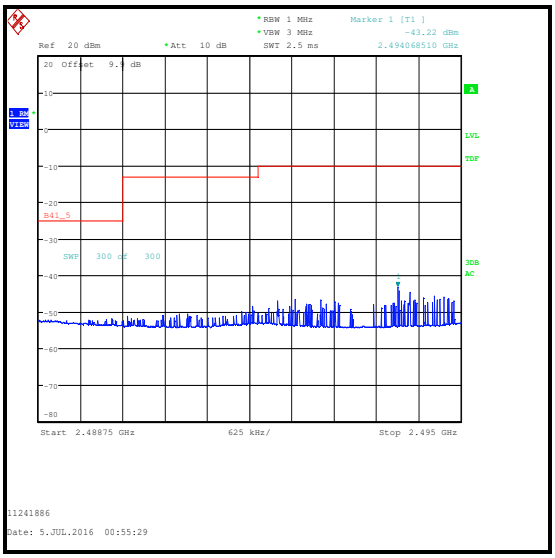


16QAM / 1 RB 24 Offset / 2692 to 2697.25 MHz

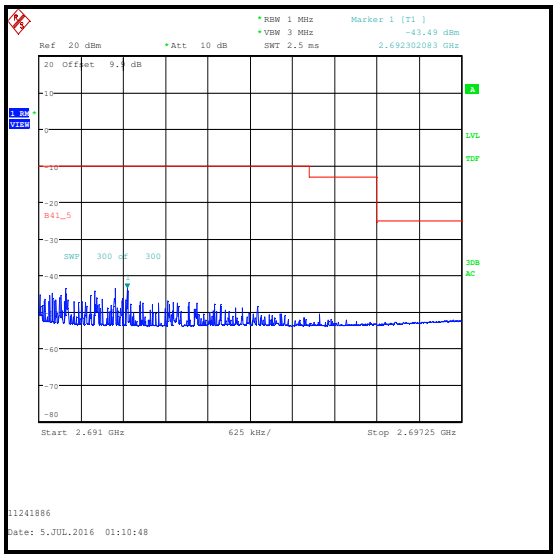
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 5 MHz Channel Bandwidth / 2488.75 to 2495 MHz & 2691 to 2697.25 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.069	1	24	-43.2	-25.0	18.2	Complied
2692.302	1	0	-43.5	-10.0	33.5	Complied



16QAM / 1 RB 24 Offset / 2488.75 to 2495 MHz
See note 8

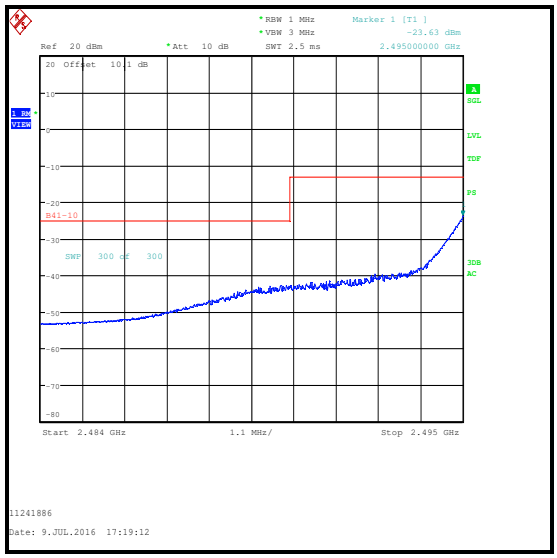


16QAM / 1 RB 0 Offset / 2691 to 2697.25 MHz

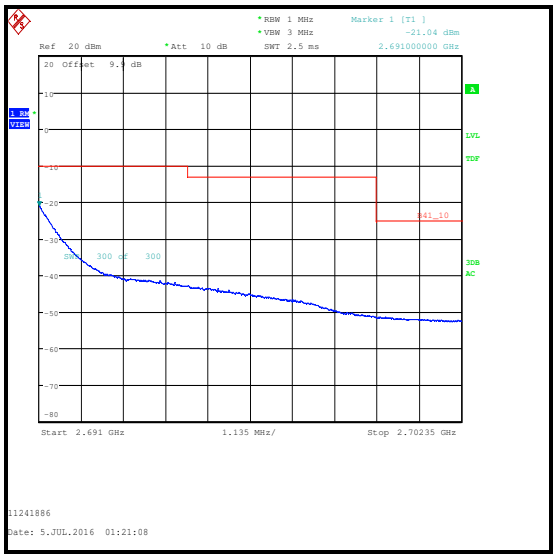
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 10 MHz Channel Bandwidth / 2484 to 2495 MHz & 2691 to 2702.35 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495	50	0	-23.6	-13.0	10.6	Complied
2691	50	0	-21.0	-10.0	11.0	Complied



QPSK / 50 RB 0 Offset / 2484 to 2494 MHz

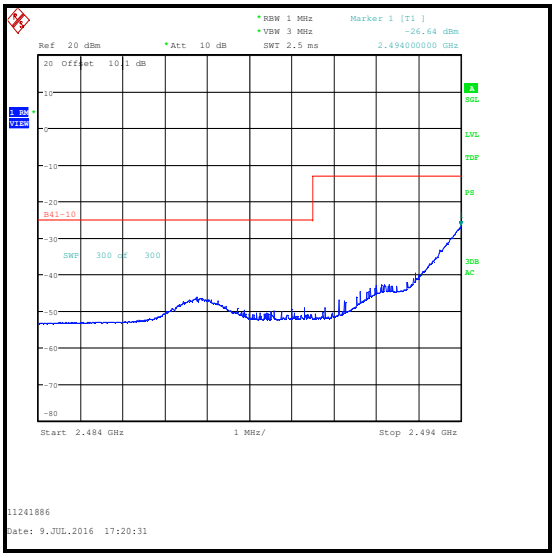


QPSK / 50 RB 0 Offset / 2691 to 2702.35 MHz

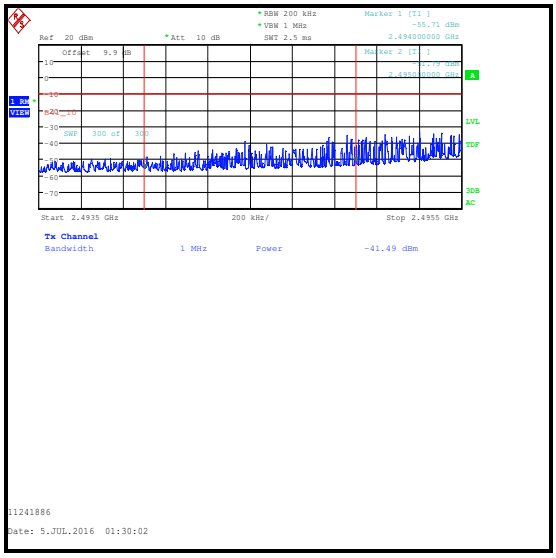
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 10 MHz Channel Bandwidth / 2484 to 2495 MHz & 2691 to 2702.35 MHz / QPSK

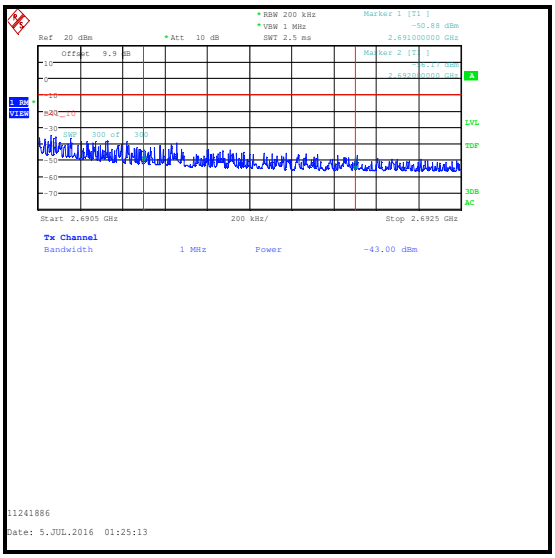
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2493.984	1	0	-26.6	-13.0	13.6	Complied
2494 to 2495	1	0	-41.5*	-13.0	28.5	Complied
2691 to 2692	1	49	-43.0*	-10.0	33.0	Complied
2692	1	49	-21.4	-10.0	11.4	Complied



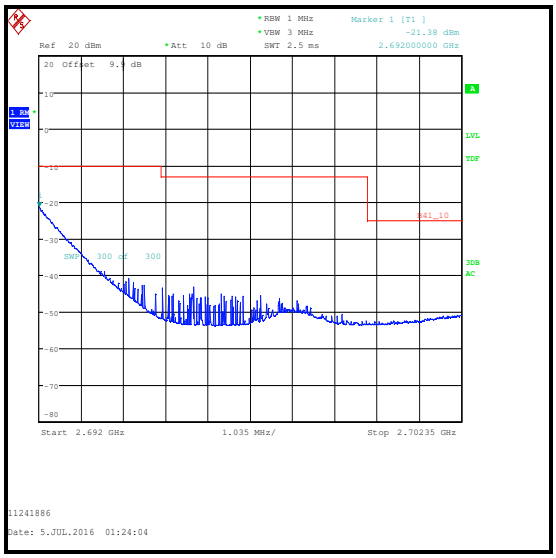
QPSK / 1 RB 0 Offset / 2484 to 2494 MHz



QPSK / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



QPSK / 1 RB 49 Offset / 2691 to 2692 MHz / Integrated level

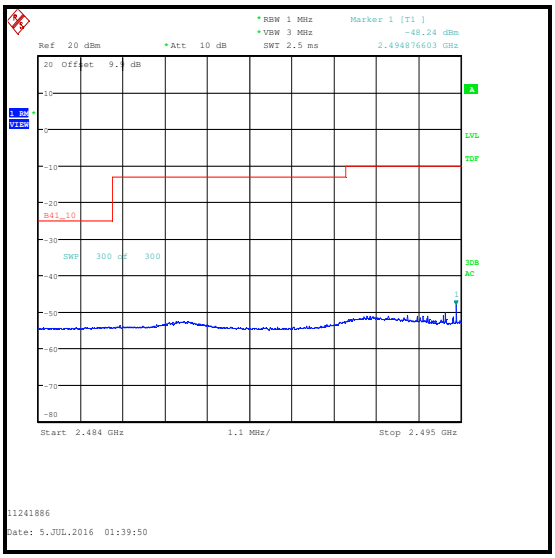


QPSK / 1 RB 49 Offset / 2692 to 2702.35 MHz

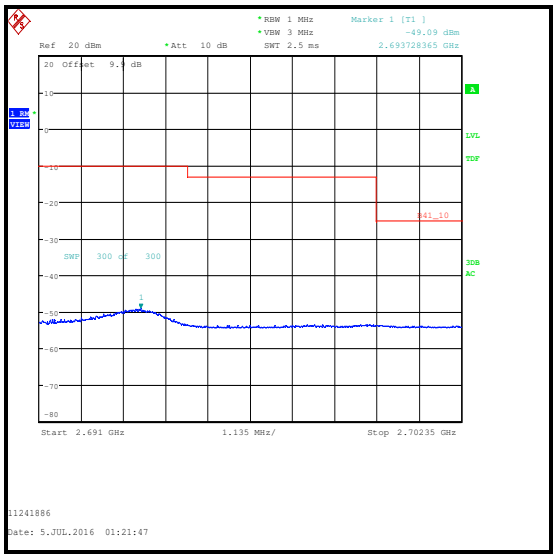
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 10 MHz Channel Bandwidth / 2484 to 2495 MHz & 2691 to 2702.35 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.878	1	49	-48.2	-25.0	23.2	Complied
2693.728	1	0	-49.1	-10.0	39.1	Complied



QPSK / 1 RB 49 Offset / 2484 to 2495 MHz
See note 8

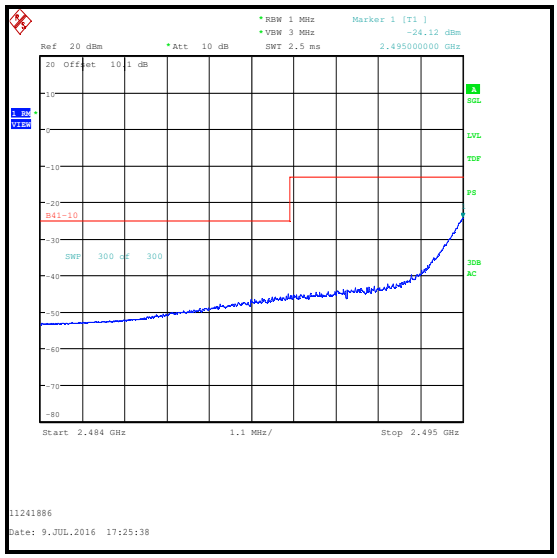


QPSK / 1 RB 0 Offset / 2691 to 2702.35 MHz

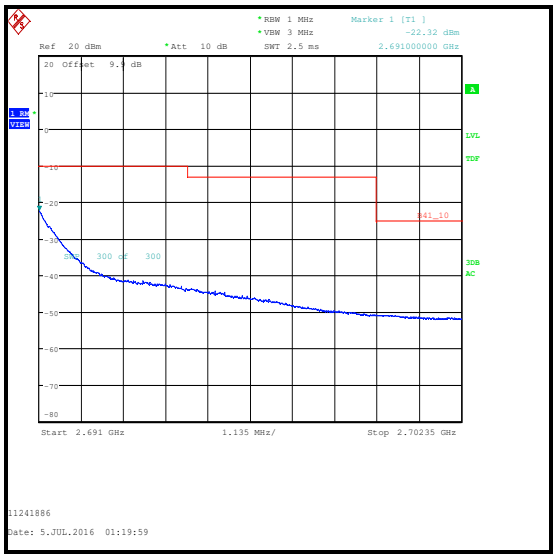
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 10 MHz Channel Bandwidth / 2484 to 2495 MHz & 2691 to 2702.35 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495	50	0	-24.1	-13.0	11.1	Complied
2691	50	0	-22.3	-10.0	12.3	Complied



16QAM / 50 RB 0 Offset / 2484 to 2495 MHz

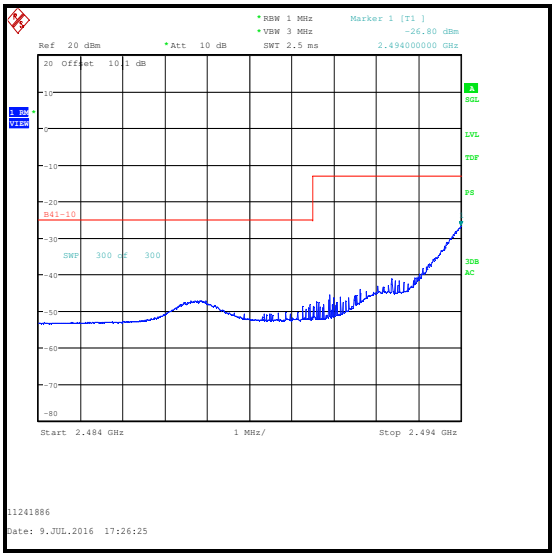


16QAM / 50 RB 0 Offset / 2691 to 2702.35 MHz

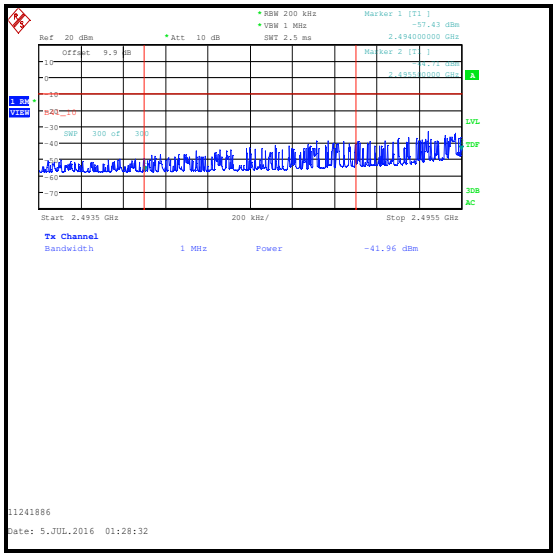
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 10 MHz Channel Bandwidth / 2484 to 2495 MHz & 2691 to 2702.35 MHz / 16QAM

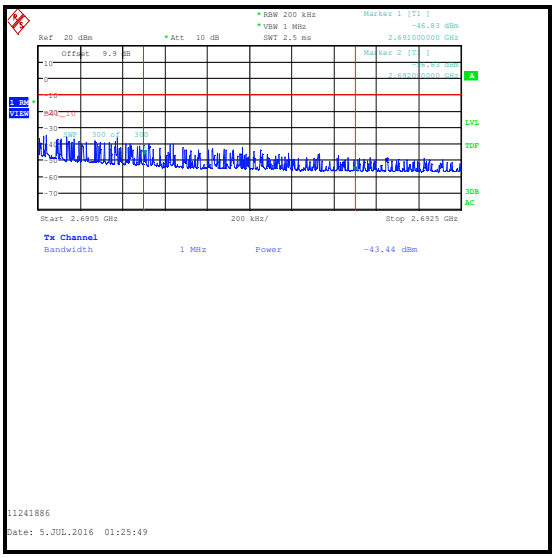
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-26.8	-13.0	13.8	Complied
2494 to 2495	1	0	-42.0*	-13.0	29.0	Complied
2691 to 2692	1	49	-43.4*	-10.0	33.4	Complied
2692	1	49	-22.4	-10.0	12.4	Complied



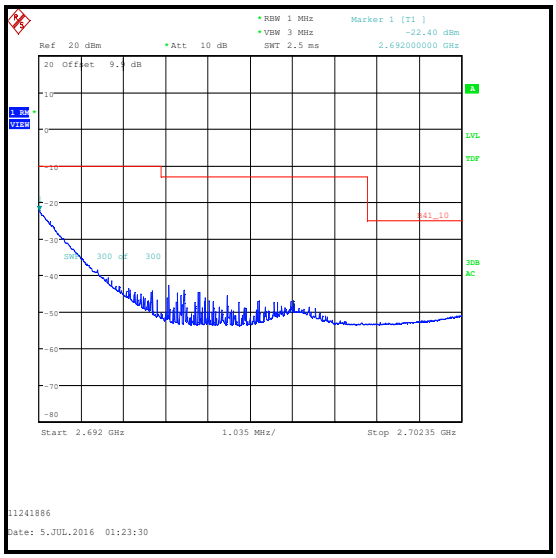
16QAM / 1 RB 0 Offset / 2484 to 2494 MHz



16QAM / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



16QAM / 1 RB 49 Offset / 2691 to 2692 MHz / Integrated level

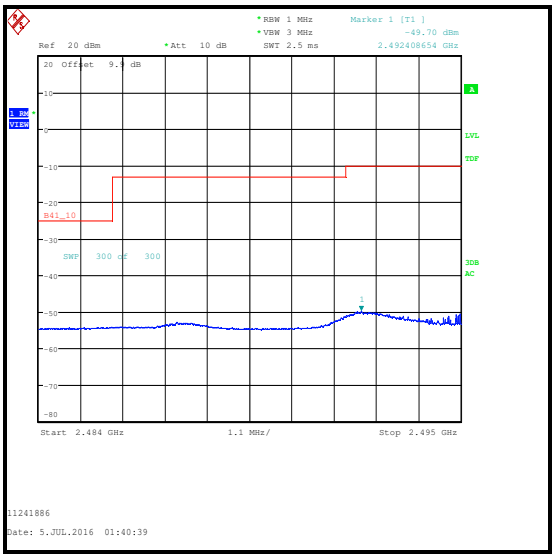


16QAM / 1 RB 49 Offset / 2692 to 2702.35 MHz

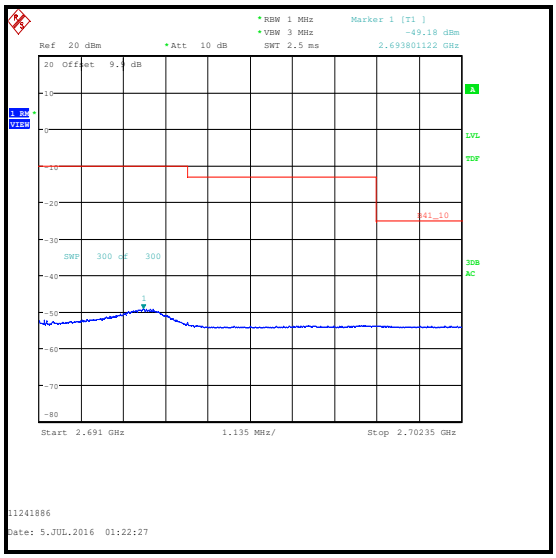
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 10 MHz Channel Bandwidth / 2484 to 2495 MHz & 2691 to 2702.35 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2492.409	1	49	-49.7	-25.0	24.7	Complied
2693.801	1	0	-49.2	-10.0	39.2	Complied



16QAM / 1 RB 49 Offset / 2484 to 2495 MHz
See note 8

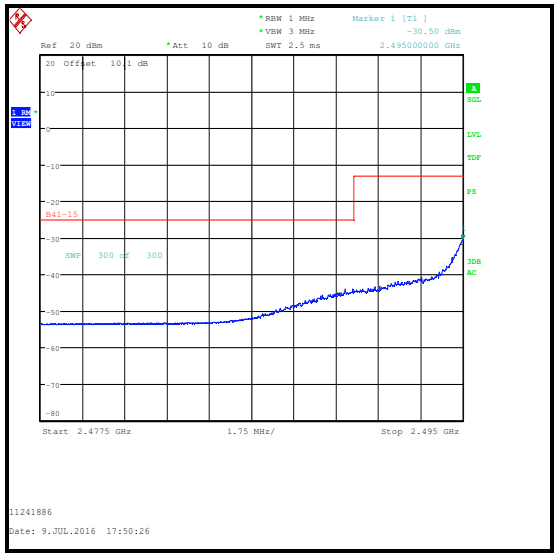


16QAM / 1 RB 0 Offset / 2691 to 2702.35 MHz

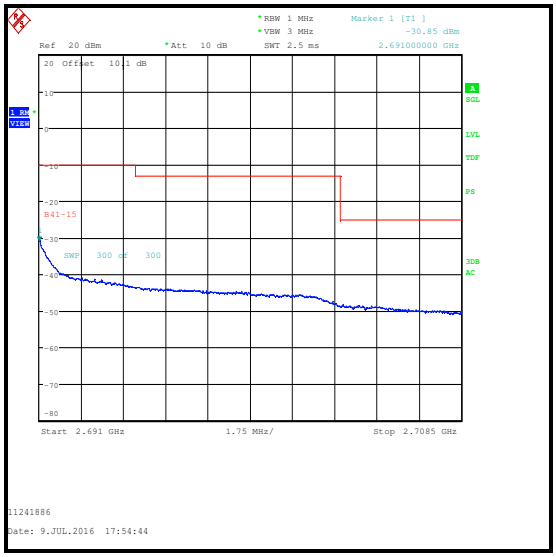
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 15 MHz Channel Bandwidth / 2477.5 to 2495 MHz & 2691 to 2708.5 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495	75	0	-30.5	-13.0	17.5	Complied
2691	75	0	-30.8	-10.0	20.8	Complied



QPSK / 75 RB 0 Offset / 2477.5 to 2495 MHz

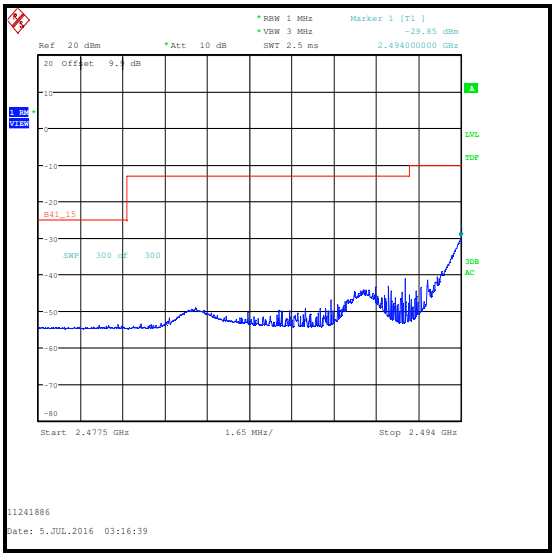


QPSK / 75 RB 0 Offset / 2691 to 2708.5 MHz

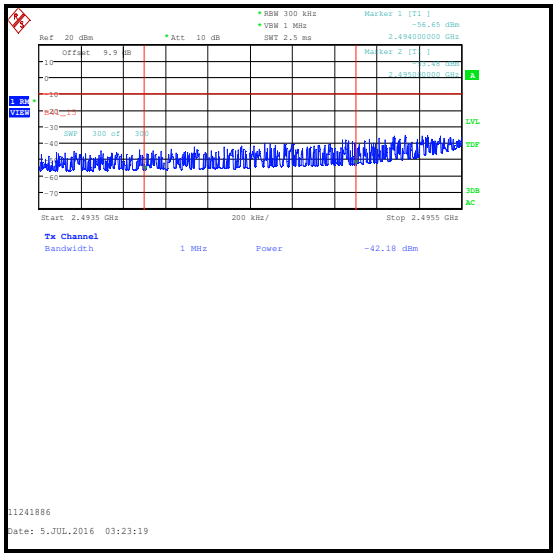
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 15 MHz Channel Bandwidth / 2477.5 to 2495 MHz & 2691 to 2708.5 MHz / QPSK

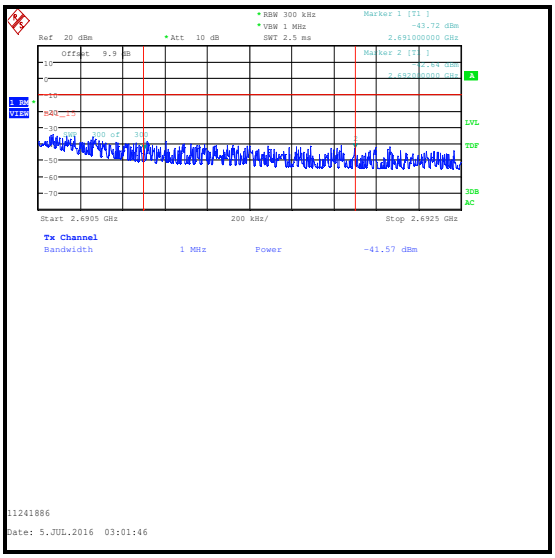
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-29.9	-25.0	4.9	Complied
2494 to 2495	1	0	-42.1*	-13.0	29.1	Complied
2691 to 2692	1	74	-41.6*	-10.0	31.6	Complied
2692	1	74	-28.9	-10.0	18.9	Complied



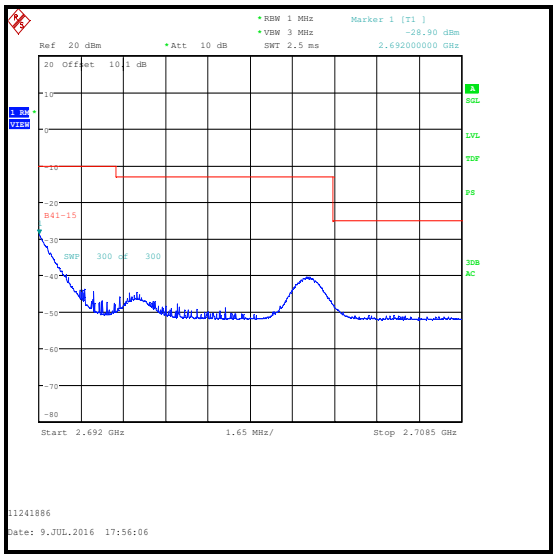
QPSK / 1 RB 0 Offset / 2477.5 to 2494 MHz
See note 8



QPSK / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



QPSK / 1 RB 74 Offset / 2691 to 2692 MHz / Integrated level

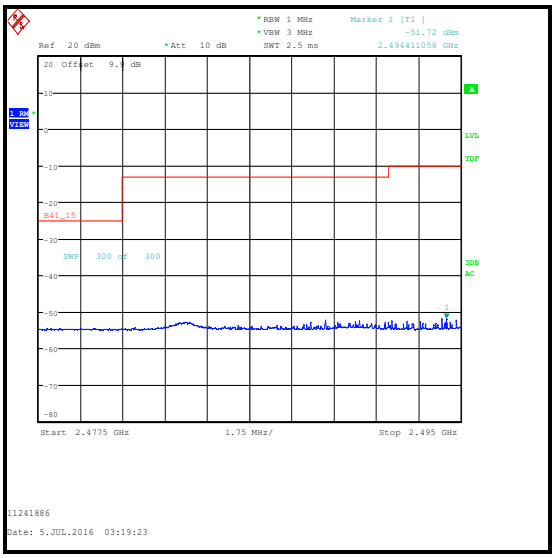


QPSK / 1 RB 74 Offset / 2692 to 2708.5 MHz

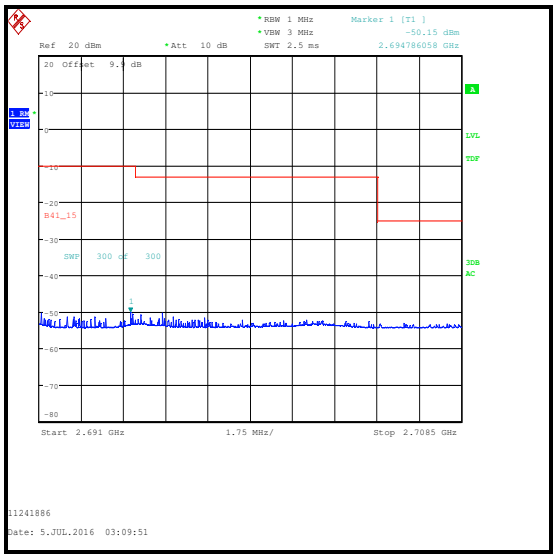
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 15 MHz Channel Bandwidth / 2477.5 to 2495 MHz & 2691 to 2708.5 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.411	1	74	-51.7	-25.0	26.7	Complied
2694.786	1	0	-50.2	-25.0	25.2	Complied



QPSK / 1 RB 74 Offset / 2477.5 to 2495 MHz
See note 8

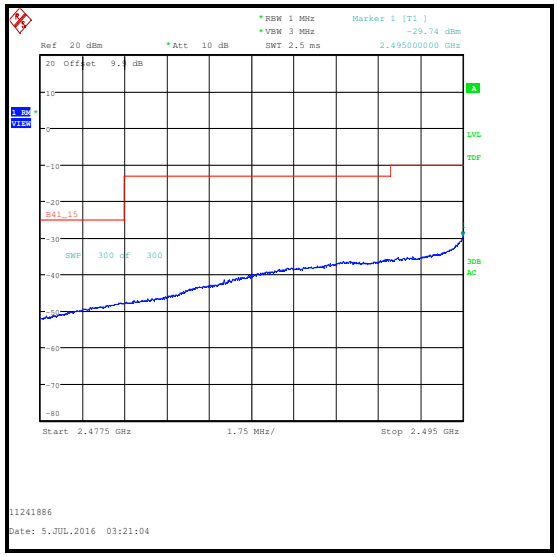


QPSK / 1 RB 0 Offset / 2691 to 2708.5 MHz
See note 8

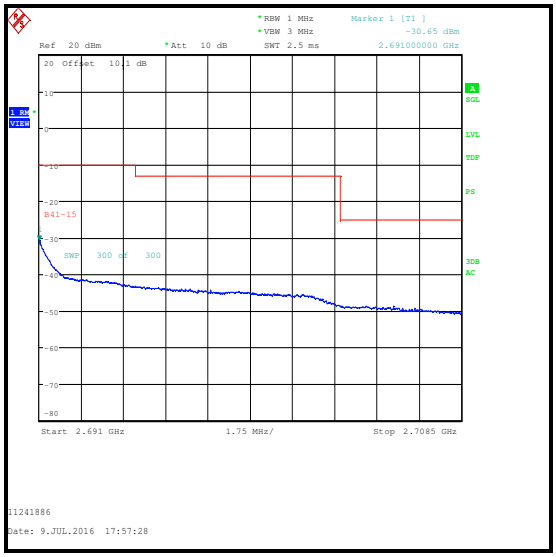
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 15 MHz Channel Bandwidth / 2477.5 to 2495 MHz & 2691 to 2708.5 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495	75	0	-29.7	-25.0	4.7	Complied
2691	75	0	-30.6	-10.0	20.6	Complied



16QAM / 75 RB 0 Offset / 2477.5 to 2495 MHz
See note 8

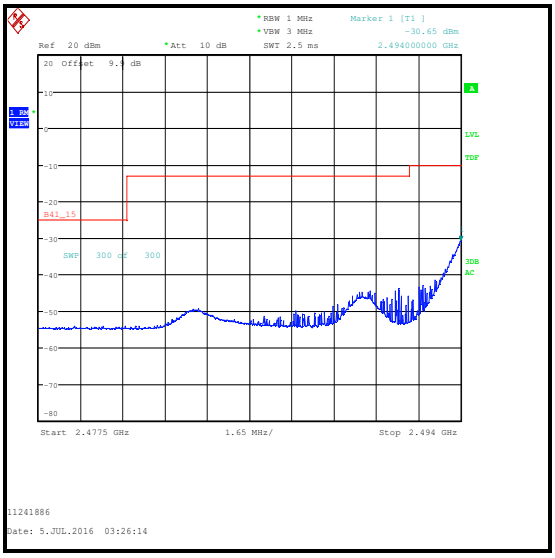


16QAM / 75 RB 0 Offset / 2691 to 2708.5 MHz

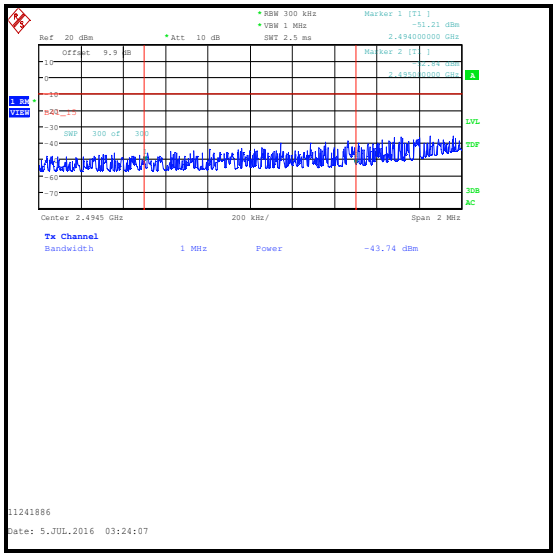
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 15 MHz Channel Bandwidth / 2477.5 to 2495 MHz & 2691 to 2708.5 MHz / 16QAM

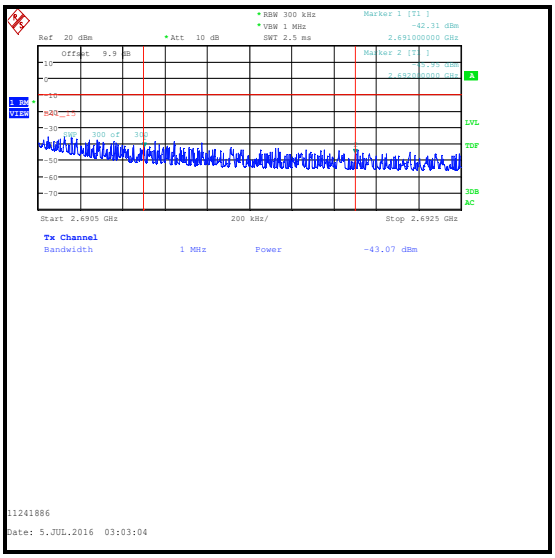
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-30.6	-25.0	5.6	Complied
2494 to 2495	1	0	-43.7*	-13.0	30.7	Complied
2691 to 2692	1	74	-43.1*	-10.0	33.1	Complied
2692	1	74	-28.5	-10.0	18.5	Complied



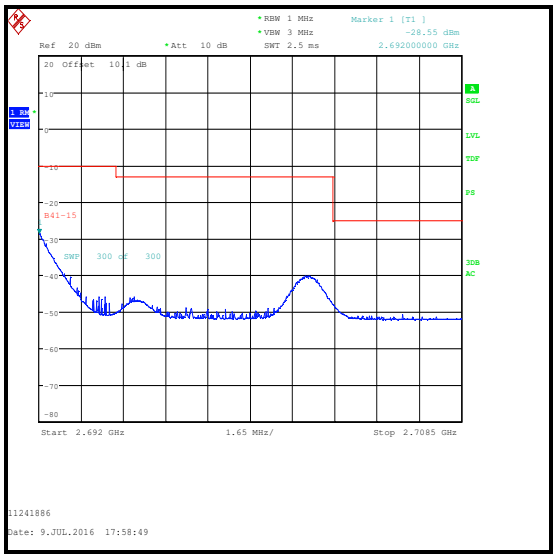
16QAM / 1 RB 0 Offset / 2477.5 to 2494 MHz
See note 8



16QAM / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



16QAM / 1 RB 74 Offset / 2691 to 2692 MHz / Integrated level

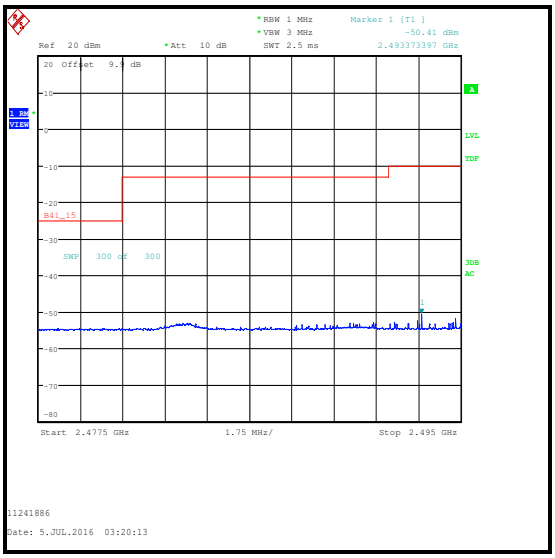


16QAM / 1 RB 74 Offset / 2692 to 2708.5 MHz

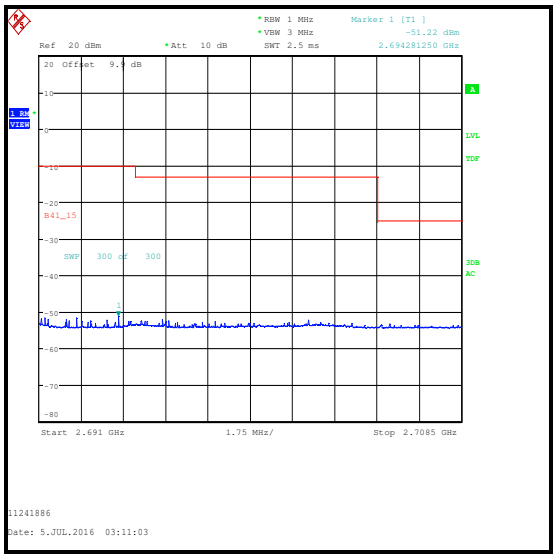
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 15 MHz Channel Bandwidth / 2477.5 to 2495 MHz & 2691 to 2708.5 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.130	1	74	-50.4	-25.0	25.4	Complied
2694.281	1	0	-51.2	-25.0	26.1	Complied



16QAM / 1 RB 24 Offset / 2477.5to 2495 MHz
See note 8

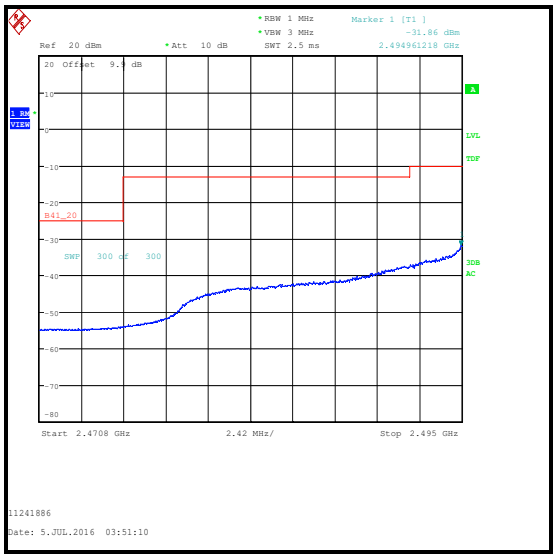


16QAM / 1 RB 0 Offset / 2691 to 2708.5 MHz
See note 8

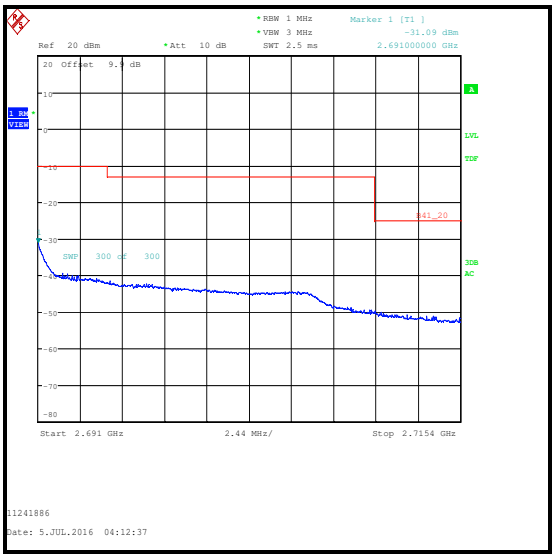
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 20 MHz Channel Bandwidth / 2470.8 to 2495 MHz & 2691 to 2715.4 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.961	100	0	-31.9	-25.0	6.9	Complied
2691	100	0	-31.1	-25.0	6.1	Complied



QPSK / 100 RB 0 Offset / 2470.8 to 2495 MHz
See note 8

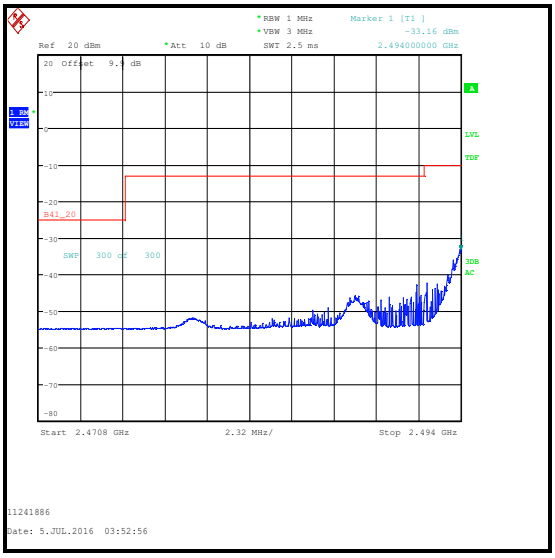


QPSK / 100 RB 0 Offset / 2691 to 2715.4 MHz
See note 8

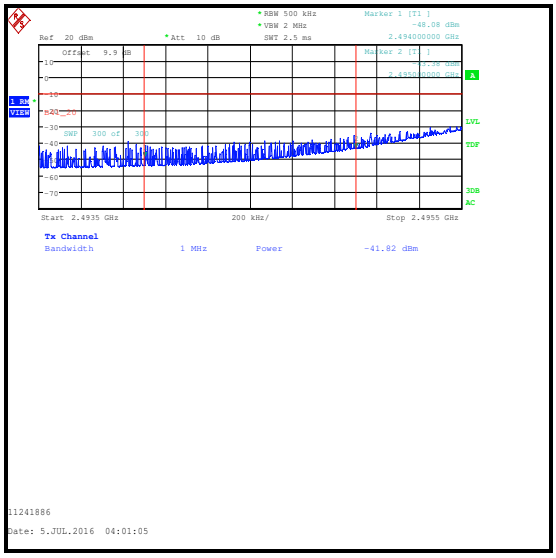
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 20 MHz Channel Bandwidth / 2470.8 to 2495 MHz & 2691 to 2715.4 MHz / QPSK

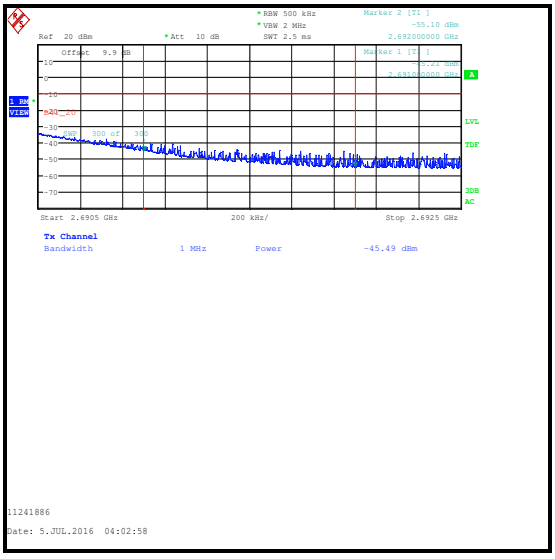
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-33.2	-25.0	8.2	Complied
2494 to 2495	1	0	-41.8*	-13.0	28.8	Complied
2691 to 2692	1	99	-45.5*	-10.0	35.5	Complied
2692	1	99	-28.9	-25.0	3.9	Complied



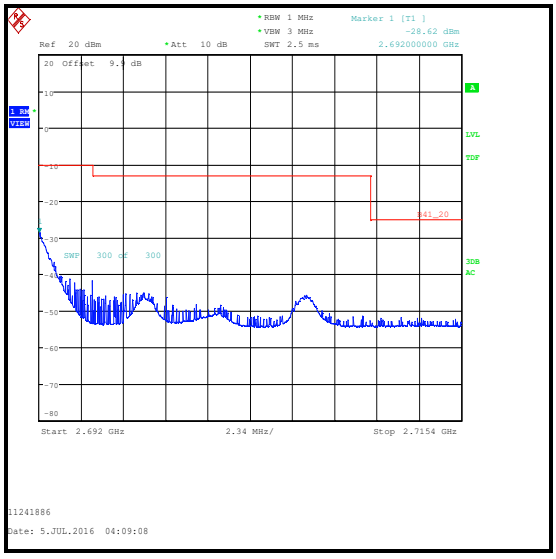
QPSK / 1 RB 0 Offset / 2470.8 to 2494 MHz
See note 8



QPSK / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



QPSK / 1 RB 99 Offset / 2691 to 2692 MHz / Integrated level

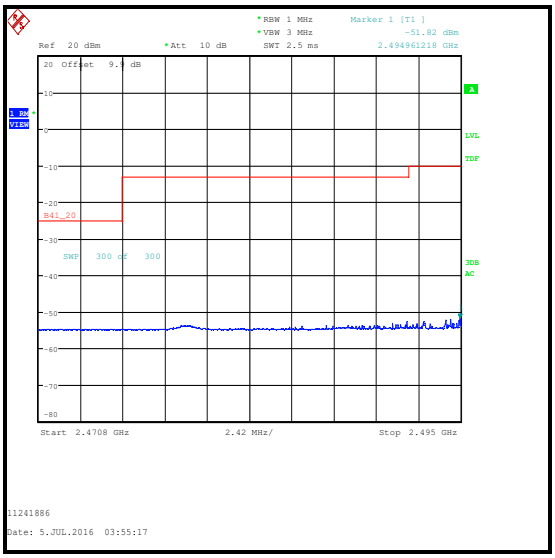


QPSK / 1 RB 99 Offset / 2692 to 2715.4 MHz
See note 8

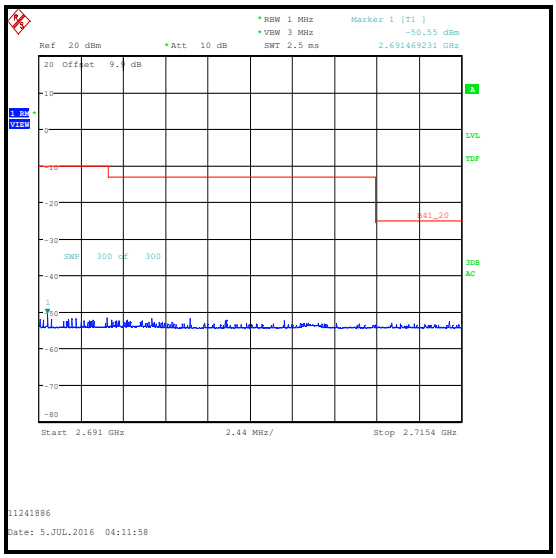
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 20 MHz Channel Bandwidth / 2470.8 to 2495 MHz & 2691 to 2715.4 MHz / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.961	1	99	-51.8	-25.0	26.8	Complied
2691.469	1	0	-50.6	-25.0	25.6	Complied



QPSK / 1 RB 99 Offset / 2470.8 to 2495 MHz
See note 8

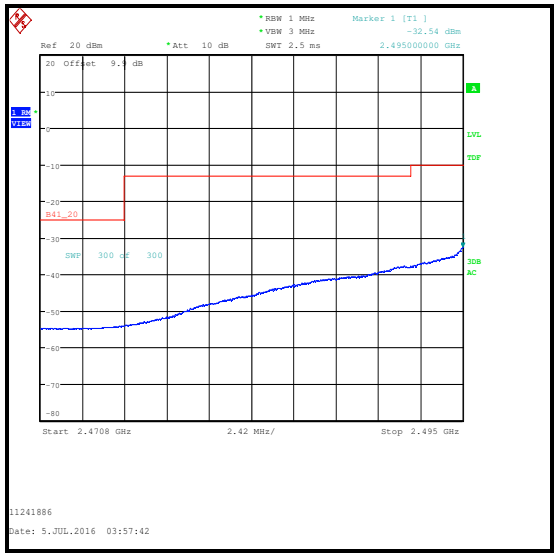


QPSK / 1 RB 0 Offset / 2691 to 2715.4 MHz
See note 8

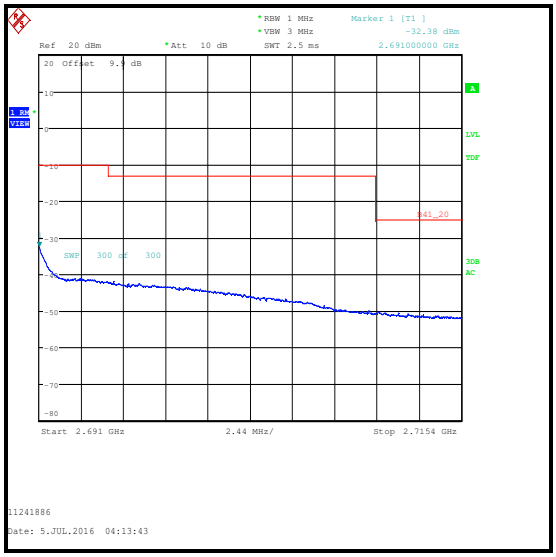
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 20 MHz Channel Bandwidth / 2470.8 to 2495 MHz & 2691 to 2715.4 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2495	100	0	-32.5	-25.0	7.5	Complied
2691	100	0	-32.4	-25.0	7.4	Complied



16QAM / 100 RB 0 Offset / 2470.8 to 2495 MHz
See note 8

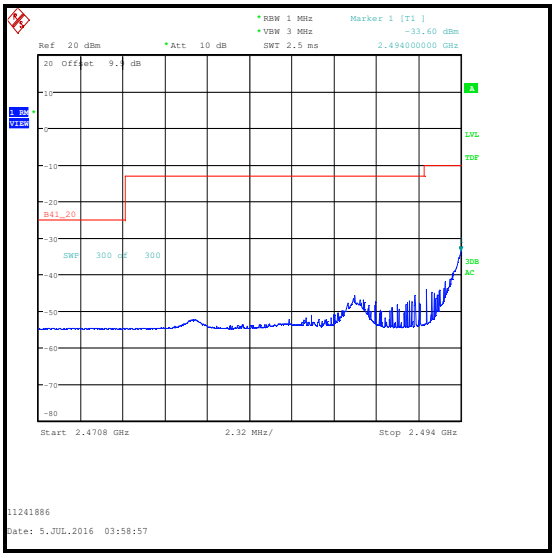


16QAM / 100 RB 0 Offset / 2691 to 2715.4 MHz
See note 8

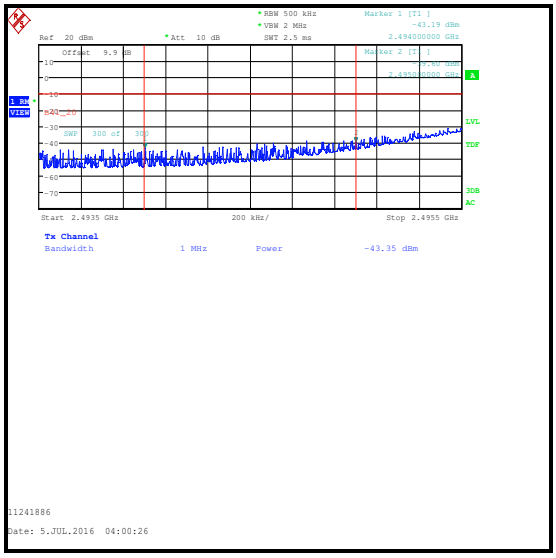
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 20 MHz Channel Bandwidth / 2470.8 to 2495 MHz & 2691 to 2715.4 MHz / 16QAM

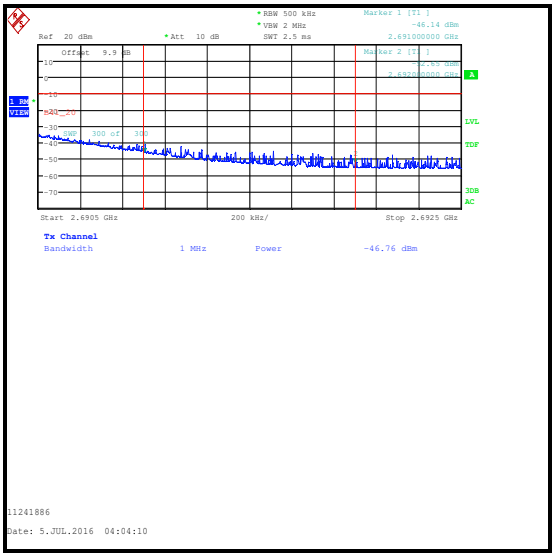
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494	1	0	-33.6	-25.0	8.6	Complied
2494 to 2495	1	0	-43.4*	-13.0	30.4	Complied
2691 to 2692	1	99	-46.8*	-10.0	36.8	Complied
2692	1	99	-29.6	-25.0	4.6	Complied



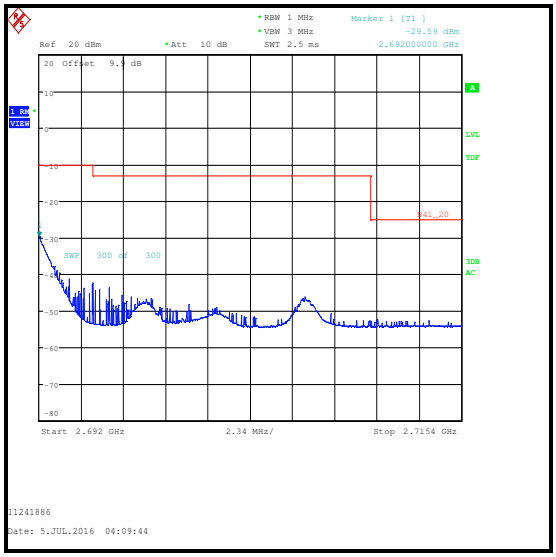
16QAM / 1 RB 0 Offset / 2470.8 to 2494 MHz
See note 8



16QAM / 1 RB 0 Offset / 2494 to 2495 MHz / Integrated level



16QAM / 1 RB 99 Offset / 2691 to 2692 MHz / Integrated level

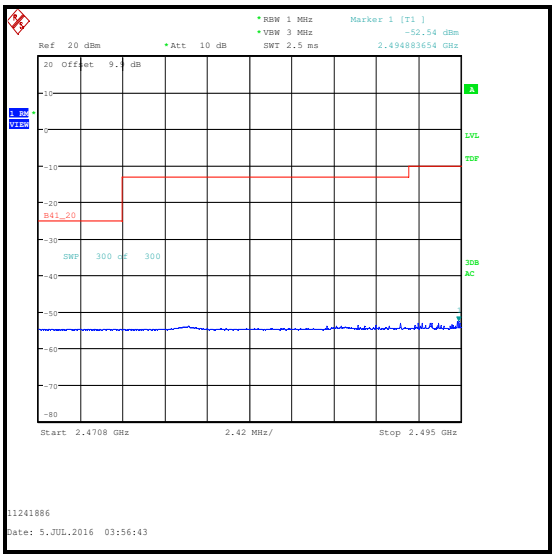


16QAM / 1 RB 99 Offset / 2692 to 2715.4 Hz
See note 8

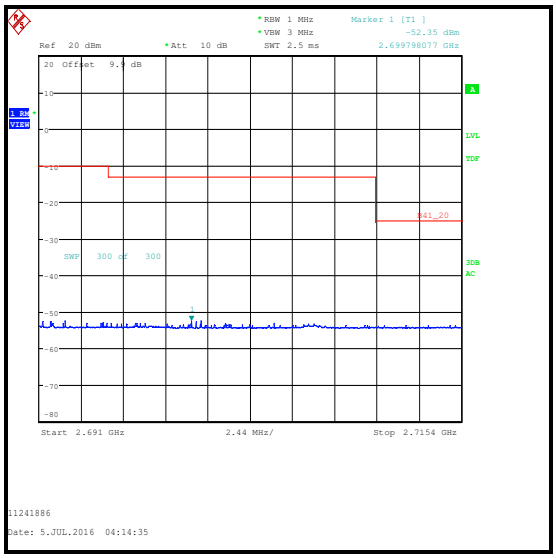
Transmitter Radiated Emissions at Band Edges ± X MHz (continued)

Results: 20 MHz Channel Bandwidth / 2470.8 to 2495 MHz & 2691 to 2715.4 MHz / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2494.884	1	99	-52.5	-25.0	27.5	Complied
2699.798	1	0	-52.4	-25.0	27.4	Complied



16QAM / 1 RB 24 Offset / 2470.8 to 2495 MHz
See note 8



16QAM / 1 RB 0 Offset / 2691 to 2715.4 MHz
See note 8

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	22 Apr 2017	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	17 May 2017	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	21 Mar 2017	12
A2863	Pre-Amplifier	Agilent	8449B	3008A02100	07 Jan 2017	12
A2889	Antenna	Schwarzbeck	BBHA 9120 B	BBHA 9120 B	07 Apr 2017	12
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#1	19 May 2017	12
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	02 Apr 2017	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	21 May 2016	12
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	21 Mar 2017	12
A1534	Pre-Amplifier	Hewlett Packard	8449B	3008A00405	19 Dec 2016	12
A1818	Antenna	EMCO	3115	00075692	17 Dec 2016	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	26 Apr 2017	12

5.2.11. Transmitter Frequency Stability (Temperature Variation)

Test Summary:

Test Engineer:	Stefan Ho	**Test Date:**	17 May 2016
Test Sample Serial Number:	C7CRG02QH6DH		

FCC Reference:	Parts 2.1055 & 27.54
Test Method Used:	KDB 971168 Section 9.0 referencing ANSI TIA-603-D-2010 Section 2.2.2 and FCC Part 2.1055

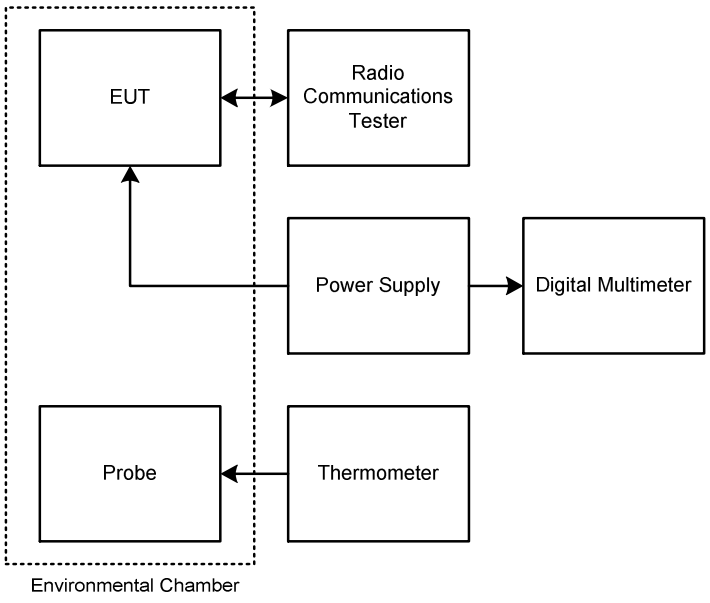
Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	42

Note(s):

1. Flying leads were connected internally to the EUT in place of the battery. These leads extended and connected to a bench power supply at the nominal voltage of 3.8 V.
2. Frequency error was measured using a calibrated Rohde and Schwarz CMW 500 Universal Radio Communications Tester in accordance with current Rohde and Schwarz application notes. The EUT was connected by suitable RF cables to the CMW 500. A bi-directional communications link was established between the EUT and CMW 500. The frequency meter value was recorded.
3. Temperature was monitored throughout the test with a calibrated digital thermometer.

Test setup:



Transmitter Frequency Stability (Temperature Variation) (continued)

Results: Bottom Channel (2498.5 MHz)

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
-30	9	2498.500009	2496	2.500009	Complied
-20	11	2498.500011	2496	2.500011	Complied
-10	9	2498.499991	2496	2.499991	Complied
0	17	2498.500017	2496	2.500017	Complied
10	16	2498.500016	2496	2.500016	Complied
20	20	2498.500020	2496	2.500020	Complied
30	29	2498.500029	2496	2.500029	Complied
40	23	2498.500023	2496	2.500023	Complied
50	23	2498.500023	2496	2.500023	Complied

Results: Top Channel (2687.5 MHz)

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
-30	11	2687.499989	2690	2.500011	Complied
-20	21	2687.500021	2690	2.499979	Complied
-10	12	2687.499988	2690	2.500012	Complied
0	9	2687.499991	2690	2.500009	Complied
10	18	2687.500018	2690	2.499982	Complied
20	19	2687.500019	2690	2.499981	Complied
30	19	2687.500019	2690	2.499981	Complied
40	10	2687.499990	2690	2.500010	Complied
50	11	2687.500011	2690	2.499989	Complied

Transmitter Frequency Stability (Temperature Variation) (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	02 Apr 2017	12
M1869	Wideband Radio Comms Tester	Rohde & Schwarz	CMW 500	145923	05 Apr 2017	12
M1674	Environmental Chamber	Espec Corporation	SU-241	90213139	Calibrated before use	-
M1642	Thermometer	Fluke	52II	18890119	25 Apr 2017	12
S021	DC power supply	TTI	CPX200	061034	Calibrated before use	-
M122	Multimeter	Fluke	77	64910017	21 Apr 2017	12

5.2.12. Transmitter Frequency Stability (Voltage Variation)

Test Summary:

Test Engineer:	Stefan Ho	**Test Date:**	17 May 2016
Test Sample Serial Number:	C7CRG02QH6DH		

FCC Reference:	Parts 2.1055 & 27.54
Test Method Used:	KDB 971168 Section 9.0 referencing ANSI TIA-603-D-2010 Section 2.2.2 and FCC Part 2.1055

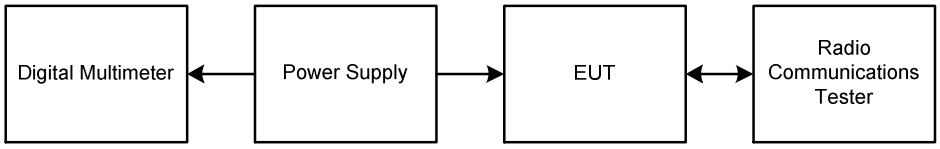
Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	42

Note(s):

1. Flying leads were connected internally to the EUT in place of the battery. These leads extended and connected to a bench power supply.
2. Frequency error was measured using a calibrated Rohde and Schwarz CMW 500 Universal Radio Communications Tester in accordance with current Rohde and Schwarz application notes. The EUT was connected by suitable RF cables to the CMW 500. A bi-directional communications link was established between the EUT and CMW 500. The frequency meter value was recorded.
3. Voltage was monitored throughout the test with a calibrated digital voltmeter.

Test setup:



Transmitter Frequency Stability (Voltage Variation) (continued)

Results: Bottom Channel (2498.5 MHz)

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
3.4	25	2498.500025	2496	2.500025	Complied
4.2	10	2498.500010	2496	2.500010	Complied

Results: Top Channel (2687.5 MHz)

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
3.4	22	2687.500022	2690	2.499978	Complied
4.2	23	2687.500023	2690	2.499977	Complied

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	02 Apr 2017	12
M1869	Wideband Radio Comms Tester	Rohde & Schwarz	CMW 500	145923	05 Apr 2017	12
S0576	DC power supply	TTI	PL330QMD	066701	Calibrated before use	-
M122	Multimeter	Fluke	77	64910017	21 Apr 2017	12

6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Conducted Output Power	2500 to 2570 MHz	95%	±1.36 dB
Frequency Stability	2500 to 2570 MHz	95%	±23 Hz
Occupied Bandwidth	2500 to 2570 MHz	95%	±3.92 %
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 26 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

7. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	-	-	Amended Transmitter output powers
3.0	-	-	Updates as requested by the TCB
4.0	-	-	Updates as requested by the TCB
5.0	-	-	Updates as requested by the TCB

--- END OF REPORT ---