



Product Service

FCC ID:
VBNFZHN-01

Test Report No:
D547351042

QPSK-Modulation ANT6			
	2690	-30.89	compliant
QPSK-Modulation ANT7			
	2691	-28.83	compliant
QPSK-Modulation ANT8			
	2690	-30.64	compliant
64QAM-Modulation ANT1			
	2690	-31.95	compliant
64QAM-Modulation ANT2			
	2690	-30.07	compliant
64QAM-Modulation ANT3			
	2690	-30.81	compliant
64QAM-Modulation ANT4			
	2690	-29.11	compliant
64QAM-Modulation ANT5			
	2690	-29.47	compliant
64QAM-Modulation ANT6			
	2691	-30.75	compliant
64QAM-Modulation ANT7			
	2691	-30.63	compliant
64QAM-Modulation ANT8			
	2691	-27.51	compliant
16QAM-Modulation ANT1			
	2690	-29.89	compliant
16QAM-Modulation ANT2			
	2690	-36.11	compliant
16QAM-Modulation ANT3			
	2690	-29.58	compliant
16QAM-Modulation ANT4			
	2690	-26.94	compliant
16QAM-Modulation ANT5			
	2690	-31.41	compliant
16QAM-Modulation ANT6			
	2691	-30.69	compliant
16QAM-Modulation ANT7			

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	2690	-28.88	compliant
16QAM-Modulation ANT8			
	2690	-30.71	compliant
Measurement Uncertainty:	$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$		



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Table 20 Configuration C, Spurious emissions

Carrier Frequency: 2573/2593/2613 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
0.009 - 26900	5181	-28.8	compliant
QPSK-ModulationANT2			
0.009 - 26900	5181	-28.64	compliant
QPSK-Modulation ANT3			
0.009 - 26900	5193	-28.52	compliant
QPSK-Modulation ANT4			
0.009 - 26900	5181	-29.24	compliant
QPSK-Modulation ANT5			
0.009 - 26900	5205	-30.81	compliant
QPSK-Modulation ANT6			
0.009 - 26900	5181	-28.71	compliant
QPSK-Modulation ANT7			
0.009 - 26900	2989	-28.88	compliant
QPSK-Modulation ANT8			
0.009 - 26900	5181	-28.41	compliant
64QAM-Modulation ANT1			
0.009 - 26900	2993	-28.89	compliant
64QAM-ModulationANT2			
0.009 - 26900	5193	-30.29	compliant
64QAM-Modulation ANT3			
0.009 - 26900	5193	-29.36	compliant
64QAM-Modulation ANT4			
0.009 - 26900	5181	-29.46	compliant
64QAM-Modulation ANT5			
0.009 - 26900	5193	-30.5	compliant
64QAM-Modulation ANT6			
0.009 - 26900	5181	-29.08	compliant
64QAM-Modulation ANT7			
0.009 - 26900	5181	-28.73	compliant
64QAM-Modulation ANT8			
0.009 - 26900	5193	-28.64	compliant
16QAM-Modulation ANT1			
0.009 - 26900	2984	-30.99	compliant
16QAM-ModulationANT2			
0.009 - 26900	5193	-29.27	compliant

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16QAM-Modulation ANT3			
0.009 - 26900	5181	-30.78	compliant
16QAM-Modulation ANT4			
0.009 - 26900	5193	-31.57	compliant
16QAM-Modulation ANT5			
0.009 - 26900	5181	-30.53	compliant
16QAM-Modulation ANT6			
0.009 - 26900	5193	-29.82	compliant
16QAM-Modulation ANT7			
0.009 - 26900	5205	-30.13	compliant
16QAM-Modulation ANT8			
0.009 - 26900	5205	-29.69	compliant
Measurement Uncertainty:		f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f < 3.6GHz: ±1.2dB, 3.6GHz ≤ f < 8.0GHz: ±1.6dB,	

The measured conducted emission levels were found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.



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4.5 Test No. 5: Field Strength of Spurious Radiation (§ 2.1053, § 2.1057, § 27.53)

4.5.1 Limits

Para. No. 27.53(m). For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts.

(m)(2) For digital base stations, the attenuation shall be not less than $43 + 10 \log (P)$ dB (P = transmitter power in Watts).

4.5.2 Test Configuration

The measurements were performed in an anechoic chamber. The radiated test site complies with the site attenuation requirements listed in ANSI C63.4 2014 and is listed with the FCC.

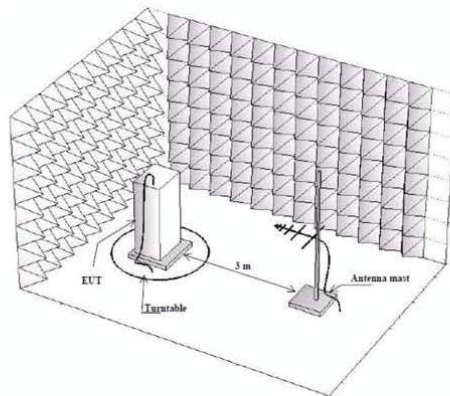


Figure 2 Test Configuration

Photographs of the EUT in the anechoic chamber are shown on page 255 of this measurement report.

4.5.3 Test Procedure and Results

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TIA/EIA-603-C-2004, Section 2.2.12

The test was performed in a semi-anechoic shielded room. The EUT was placed on a non-conductive 0.8 m high table standing on the turntable. During the test in the frequency range 30 - 26500 MHz the distance from the EUT to the measuring antenna was 3 m. In order to find the maximum levels of the disturbance radiation the angle of the turntable, the height of the measuring antenna were varied during the tests. The test was performed with the measuring antenna being both in horizontal and vertical polarizations.

Vertical and horizontal polarizations in the frequency range 30 - 26500 MHz was first measured by using the peak detector. During the peak detector scan the turntable was rotated from 0° to 360° with 30° step with the antenna heights 1.0 m and 2.5 m.

The limit of -13 dBm has been calculated to correspond 84.4 dB (μV/m). Spurious emissions closer than 20 dB to the limit was measured with average detector.

According to § 2.1057, all emissions from the lowest radio frequency generated in the equipment, without going below 9 kHz, up to the 10th harmonic were investigated.

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The EUT was replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator $G_{Antenna[dBi]}$. This antenna was fed with a signal at the spurious frequency $P_{Gen[dBm]}$. The level of the signal was adjusted to repeat the previously measured level. The resulting

EIRP is the signal level fed to the reference antenna corrected for gain referenced to an isotropic.

The formula below was used to calculate the EIRP of the EUT.

$$P_{EIRP[dBm]} = P_{Gen[dBm]} - L_{Cable[dB]} + G_{Antenna[dBi]}$$



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Worst case detected emission levels are reported in the following table (refer to spectral plots included on pages 100 for details). The antenna factor and cable loss is according to the manufacturer's specification.

Config A, B:

Table 21

Carrier Frequency: 2506.0 MHz, 2593.0 MHz and 2680.0 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation TX1			
30 - 26500	26454.2428	-25.63	compliant
Measurement Uncertainty:			±5.4dB

Table 2 Field Strength of Spurious Radiation (20 MHz Channel BW)

The measured emission levels were found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

4.6 Test No. 6: Frequency Stability (§ 2.1055, § 27.54)

4.6.1 Purpose

Frequency stability measurements were performed to verify that the frequency deviation of the emission stays within the licensee's frequency block under extreme temperature

4.6.2 Limits

Para. No. 27.54. (-30 °C to +50 °C) and supply voltage conditions according to § 2.1055.



4.6.3 Test Configuration

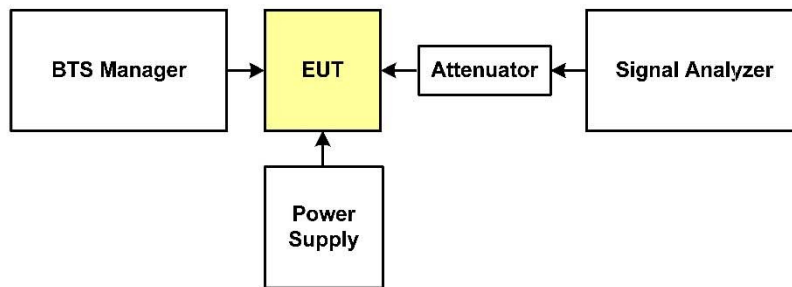


Figure 3 Test Configuration for frequency stability with voltage variation

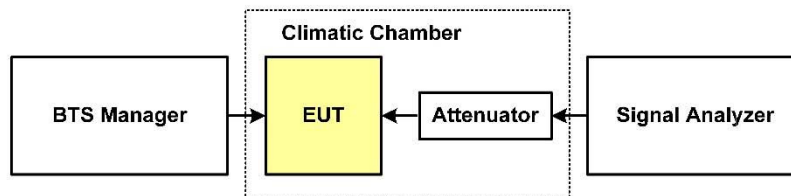


Figure 4 Test Configuration for frequency stability with temperature variation

A complete list of the measurement equipment is included on page 655 of this measurement report.

4.6.4 Frequency Stability with Temperature Variation

The supply voltage of the EUT was set to the nominal value and the temperature of the environmental chamber was varied in 10 degree steps



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from -30 degrees Celsius to +50 degrees Celsius. The EUT was allowed to stabilize 60 min. at each temperature and the frequency error was measured.

Table 22 Configuration A

Carrier Frequency: 2593.0 MHz						
Supply Voltage (DC) [V]	Ambient Temperature [°C]	Frequency Deviation		Manufacturer's Specification		Result
		[Hz]	[ppm]	[Hz]	[ppm]	
QPSK Modulation ANT1						
-48.0	-30	9.37057	0.004	129	0.05	compliant
-48.0	-20	-7.08583	-0.003	129	0.05	compliant
-48.0	-10	-7.42660	-0.003	129	0.05	compliant
-48.0	0	-6.21340	-0.002	129	0.05	compliant
-48.0	10	-7.46899	-0.003	129	0.05	compliant
-48.0	30	14.20290	0.005	129	0.05	compliant
-48.0	40	-11.89826	-0.005	129	0.05	compliant
-48.0	50	8.74520	0.003	129	0.05	compliant
QPSK Modulation ANT2						
-48.0	-30	-4.48031	-0.002	129	0.05	compliant
-48.0	-20	6.58758	0.003	129	0.05	compliant
-48.0	-10	8.72114	0.003	129	0.05	compliant
-48.0	0	8.99286	0.003	129	0.05	compliant
-48.0	10	10.49806	0.004	129	0.05	compliant
-48.0	30	-8.09760	-0.003	129	0.05	compliant
-48.0	40	6.30435	0.002	129	0.05	compliant
-48.0	50	15.44000	0.006	129	0.05	compliant
QPSK Modulation ANT3						
-48.0	-30	-10.65810	-0.004	129	0.05	compliant
-48.0	-20	6.13170	0.002	129	0.05	compliant
-48.0	-10	-10.41440	-0.004	129	0.05	compliant
-48.0	0	11.68549	0.005	129	0.05	compliant
-48.0	10	7.77830	0.003	129	0.05	compliant
-48.0	30	-7.31818	-0.003	129	0.05	compliant
-48.0	40	-9.54090	-0.004	129	0.05	compliant
-48.0	50	14.10072	0.005	129	0.05	compliant
QPSK Modulation ANT4						
-48.0	-30	10.08964	0.004	129	0.05	compliant



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-48.0	-20	6.34539	0.002	129	0.05	compliant
-48.0	-10	-12.00230	-0.005	129	0.05	compliant
-48.0	0	-10.14579	-0.004	129	0.05	compliant
-48.0	10	12.81030	0.005	129	0.05	compliant
-48.0	30	-7.04518	-0.003	129	0.05	compliant
-48.0	40	-4.05026	-0.002	129	0.05	compliant
-48.0	50	-7.95022	-0.003	129	0.05	compliant
QPSK Modulation ANT5						
-48.0	-30	-8.50065	-0.003	129	0.05	compliant
-48.0	-20	6.97807	0.003	129	0.05	compliant
-48.0	-10	-12.88930	-0.005	129	0.05	compliant
-48.0	0	7.35424	0.003	129	0.05	compliant
-48.0	10	-10.98320	-0.004	129	0.05	compliant
-48.0	30	8.00552	0.003	129	0.05	compliant
-48.0	40	8.40388	0.003	129	0.05	compliant
-48.0	50	-12.56320	-0.005	129	0.05	compliant
QPSK Modulation ANT6						
-48.0	-30	11.74618	0.005	129	0.05	compliant
-48.0	-20	-5.67850	-0.002	129	0.05	compliant
-48.0	-10	4.61870	0.002	129	0.05	compliant
-48.0	0	-6.04608	-0.002	129	0.05	compliant
-48.0	10	-4.67700	-0.002	129	0.05	compliant
-48.0	30	-7.62216	-0.003	129	0.05	compliant
-48.0	40	14.48345	0.006	129	0.05	compliant
-48.0	50	12.59158	0.005	129	0.05	compliant
QPSK Modulation ANT7						
-48.0	-30	-10.31441	-0.004	129	0.05	compliant
-48.0	-20	-5.55450	-0.002	129	0.05	compliant
-48.0	-10	12.85040	0.005	129	0.05	compliant
-48.0	0	8.49558	0.003	129	0.05	compliant
-48.0	10	-14.45230	-0.006	129	0.05	compliant
-48.0	30	-8.11829	-0.003	129	0.05	compliant
-48.0	40	7.99624	0.003	129	0.05	compliant
-48.0	50	-8.62737	-0.003	129	0.05	compliant
QPSK Modulation ANT8						
-48.0	-30	5.26110	0.002	129	0.05	compliant
-48.0	-20	-5.76940	-0.002	129	0.05	compliant
-48.0	-10	8.94110	0.003	129	0.05	compliant
-48.0	0	-13.50233	-0.005	129	0.05	compliant



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-48.0	10	-11.62670	-0.004	129	0.05	compliant
-48.0	30	-9.39488	-0.004	129	0.05	compliant
-48.0	40	6.66969	0.003	129	0.05	compliant
-48.0	50	-11.04705	-0.004	129	0.05	compliant
64QAM Modulation ANT1						
-48.0	-30	-8.71126	-0.003	129	0.05	compliant
-48.0	-20	6.84758	0.003	129	0.05	compliant
-48.0	-10	-11.52460	-0.004	129	0.05	compliant
-48.0	0	10.73705	0.004	129	0.05	compliant
-48.0	10	-8.71755	-0.003	129	0.05	compliant
-48.0	30	-7.82830	-0.003	129	0.05	compliant
-48.0	40	-6.01263	-0.002	129	0.05	compliant
-48.0	50	-10.79900	-0.004	129	0.05	compliant
64QAM Modulation ANT2						
-48.0	-30	-10.38693	-0.004	129	0.05	compliant
-48.0	-20	-5.50460	-0.002	129	0.05	compliant
-48.0	-10	10.33570	0.004	129	0.05	compliant
-48.0	0	-7.57960	-0.003	129	0.05	compliant
-48.0	10	-5.88020	-0.002	129	0.05	compliant
-48.0	30	7.74467	0.003	129	0.05	compliant
-48.0	40	8.70790	0.003	129	0.05	compliant
-48.0	50	-15.41739	-0.006	129	0.05	compliant
64QAM Modulation ANT3						
-48.0	-30	-7.13587	-0.003	129	0.05	compliant
-48.0	-20	6.88490	0.003	129	0.05	compliant
-48.0	-10	-6.40000	-0.002	129	0.05	compliant
-48.0	0	8.45855	0.003	129	0.05	compliant
-48.0	10	-8.01860	-0.003	129	0.05	compliant
-48.0	30	5.82890	0.002	129	0.05	compliant
-48.0	40	-8.73338	-0.003	129	0.05	compliant
-48.0	50	-8.28580	-0.003	129	0.05	compliant
64QAM Modulation ANT4						
-48.0	-30	8.26198	0.003	129	0.05	compliant
-48.0	-20	-7.05183	-0.003	129	0.05	compliant
-48.0	-10	-9.38580	-0.004	129	0.05	compliant
-48.0	0	7.56787	0.003	129	0.05	compliant
-48.0	10	-10.10820	-0.004	129	0.05	compliant
-48.0	30	-8.18985	-0.003	129	0.05	compliant
-48.0	40	-7.35573	-0.003	129	0.05	compliant



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-48.0	50	10.22090	0.004	129	0.05	compliant
64QAM Modulation ANT5						
-48.0	-30	-11.46868	-0.004	129	0.05	compliant
-48.0	-20	3.07498	0.001	129	0.05	compliant
-48.0	-10	9.38290	0.004	129	0.05	compliant
-48.0	0	-8.98450	-0.003	129	0.05	compliant
-48.0	10	8.17964	0.003	129	0.05	compliant
-48.0	30	10.91179	0.004	129	0.05	compliant
-48.0	40	-7.38445	-0.003	129	0.05	compliant
-48.0	50	-7.86326	-0.003	129	0.05	compliant
64QAM Modulation ANT6						
-48.0	-30	-12.11630	-0.005	129	0.05	compliant
-48.0	-20	-10.78222	-0.004	129	0.05	compliant
-48.0	-10	-7.06590	-0.003	129	0.05	compliant
-48.0	0	-9.14620	-0.004	129	0.05	compliant
-48.0	10	7.57737	0.003	129	0.05	compliant
-48.0	30	10.95283	0.004	129	0.05	compliant
-48.0	40	11.50494	0.004	129	0.05	compliant
-48.0	50	-16.22767	-0.006	129	0.05	compliant
64QAM Modulation ANT7						
-48.0	-30	-7.51136	-0.003	129	0.05	compliant
-48.0	-20	-6.82940	-0.003	129	0.05	compliant
-48.0	-10	9.94400	0.004	129	0.05	compliant
-48.0	0	-8.15670	-0.003	129	0.05	compliant
-48.0	10	-6.72918	-0.003	129	0.05	compliant
-48.0	30	10.41730	0.004	129	0.05	compliant
-48.0	40	7.82012	0.003	129	0.05	compliant
-48.0	50	-5.23008	-0.002	129	0.05	compliant
64QAM Modulation ANT8						
-48.0	-30	10.24463	0.004	129	0.05	compliant
-48.0	-20	-8.17460	-0.003	129	0.05	compliant
-48.0	-10	11.33796	0.004	129	0.05	compliant
-48.0	0	9.86166	0.004	129	0.05	compliant
-48.0	10	6.64024	0.003	129	0.05	compliant
-48.0	30	-9.96647	-0.004	129	0.05	compliant
-48.0	40	-6.03543	-0.002	129	0.05	compliant
-48.0	50	-9.53034	-0.004	129	0.05	compliant
16QAM Modulation ANT1						
-48.0	-30	-11.61860	-0.004	129	0.05	compliant

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-48.0	-20	-7.44375	-0.003	129	0.05	compliant
-48.0	-10	-9.08367	-0.004	129	0.05	compliant
-48.0	0	7.36390	0.003	129	0.05	compliant
-48.0	10	9.32267	0.004	129	0.05	compliant
-48.0	30	7.43594	0.003	129	0.05	compliant
-48.0	40	-8.77569	-0.003	129	0.05	compliant
-48.0	50	-7.54240	-0.003	129	0.05	compliant
16QAM Modulation ANT2						
-48.0	-30	-7.09925	-0.003	129	0.05	compliant
-48.0	-20	-5.95820	-0.002	129	0.05	compliant
-48.0	-10	3.58520	0.001	129	0.05	compliant
-48.0	0	11.65160	0.004	129	0.05	compliant
-48.0	10	-5.35622	-0.002	129	0.05	compliant
-48.0	30	6.83360	0.003	129	0.05	compliant
-48.0	40	-12.73026	-0.005	129	0.05	compliant
-48.0	50	11.64700	0.004	129	0.05	compliant
16QAM Modulation ANT3						
-48.0	-30	-10.10838	-0.004	129	0.05	compliant
-48.0	-20	5.81390	0.002	129	0.05	compliant
-48.0	-10	6.14660	0.002	129	0.05	compliant
-48.0	0	13.61330	0.005	129	0.05	compliant
-48.0	10	-13.26700	-0.005	129	0.05	compliant
-48.0	30	13.15169	0.005	129	0.05	compliant
-48.0	40	13.27909	0.005	129	0.05	compliant
-48.0	50	6.92554	0.003	129	0.05	compliant
16QAM Modulation ANT4						
-48.0	-30	-6.64871	-0.003	129	0.05	compliant
-48.0	-20	-4.84090	-0.002	129	0.05	compliant
-48.0	-10	8.33280	0.003	129	0.05	compliant
-48.0	0	-5.91888	-0.002	129	0.05	compliant
-48.0	10	-8.02284	-0.003	129	0.05	compliant
-48.0	30	13.99700	0.005	129	0.05	compliant
-48.0	40	9.86575	0.004	129	0.05	compliant
-48.0	50	-17.17300	-0.007	129	0.05	compliant
16QAM Modulation ANT5						
-48.0	-30	-10.46098	-0.004	129	0.05	compliant
-48.0	-20	5.90280	0.002	129	0.05	compliant
-48.0	-10	-6.07420	-0.002	129	0.05	compliant
-48.0	0	9.33280	0.004	129	0.05	compliant



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-48.0	10	-4.90954	-0.002	129	0.05	compliant
-48.0	30	-9.71551	-0.004	129	0.05	compliant
-48.0	40	9.40117	0.004	129	0.05	compliant
-48.0	50	-12.72560	-0.005	129	0.05	compliant
16QAM Modulation ANT6						
-48.0	-30	-8.00980	-0.003	129	0.05	compliant
-48.0	-20	-7.04656	-0.003	129	0.05	compliant
-48.0	-10	-5.00140	-0.002	129	0.05	compliant
-48.0	0	-12.30947	-0.005	129	0.05	compliant
-48.0	10	-15.66673	-0.006	129	0.05	compliant
-48.0	30	10.39756	0.004	129	0.05	compliant
-48.0	40	-10.37236	-0.004	129	0.05	compliant
-48.0	50	-12.37664	-0.005	129	0.05	compliant
16QAM Modulation ANT7						
-48.0	-30	8.80673	0.003	129	0.05	compliant
-48.0	-20	-5.07970	-0.002	129	0.05	compliant
-48.0	-10	-12.35810	-0.005	129	0.05	compliant
-48.0	0	-8.28780	-0.003	129	0.05	compliant
-48.0	10	6.83660	0.003	129	0.05	compliant
-48.0	30	-15.34974	-0.006	129	0.05	compliant
-48.0	40	9.28730	0.004	129	0.05	compliant
-48.0	50	9.52111	0.004	129	0.05	compliant
16QAM Modulation ANT8						
-48.0	-30	-12.39590	-0.005	129	0.05	compliant
-48.0	-20	10.42850	0.004	129	0.05	compliant
-48.0	-10	-5.75888	-0.002	129	0.05	compliant
-48.0	0	-8.69777	-0.003	129	0.05	compliant
-48.0	10	-5.78780	-0.002	129	0.05	compliant
-48.0	30	-15.21686	-0.006	129	0.05	compliant
-48.0	40	-7.72008	-0.003	129	0.05	compliant
-48.0	50	-6.95958	-0.003	129	0.05	compliant
Measurement Uncertainty:					±1.0 Hz	

4.6.5 Frequency Stability with Voltage Variation:



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The EUT was placed in a climatic chamber and allowed to stabilize at +20 degrees Celsius for at least 60 minutes. With the supply voltage of the EUT set to 85% of the nominal value, the frequency error was measure. This procedure was repeated at 100% and 115% of the nominal supply voltage value.

Table 23 Configuration A

Carrier Frequency: 2593 MHz						
Supply Voltage (DC) [V]	Ambient Temperature [°C]	Frequency Deviation		Manufacturer's Specification		Result
		[Hz]	[ppm]	[Hz]	[ppm]	
QPSK Modulation ANT1						
-40.8	20.0	10.82500	0.004	36	0.05	compliant
-48.0	20.0	-8.71000	-0.003	36	0.05	compliant
-55.2	20.0	9.64330	0.004	36	0.05	compliant
QPSK Modulation ANT2						
-40.8	20.0	-7.33150	-0.003	36	0.05	compliant
-48.0	20.0	-13.21834	-0.005	36	0.05	compliant
-55.2	20.0	-7.12420	-0.003	36	0.05	compliant
QPSK Modulation ANT3						
-40.8	20.0	8.92740	0.003	36	0.05	compliant
-48.0	20.0	9.50769	0.004	36	0.05	compliant
-55.2	20.0	10.50300	0.004	36	0.05	compliant
QPSK Modulation ANT4						
-40.8	20.0	11.85269	0.005	36	0.05	compliant
-48.0	20.0	-9.52308	-0.004	36	0.05	compliant
-55.2	20.0	-16.60177	-0.006	36	0.05	compliant
QPSK Modulation ANT5						
-40.8	20.0	-5.87710	-0.002	36	0.05	compliant
-48.0	20.0	10.79037	0.004	36	0.05	compliant
-55.2	20.0	-12.02341	-0.005	36	0.05	compliant
QPSK Modulation ANT6						
-40.8	20.0	13.33477	0.005	36	0.05	compliant
-48.0	20.0	-9.30316	-0.004	36	0.05	compliant
-55.2	20.0	-4.67040	-0.002	36	0.05	compliant
QPSK Modulation ANT7						
-40.8	20.0	-9.06268	-0.003	36	0.05	compliant



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-48.0	20.0	11.61770	0.004	36	0.05	compliant
-55.2	20.0	-7.78924	-0.003	36	0.05	compliant
QPSK Modulation ANT8						
-40.8	20.0	-8.55584	-0.003	36	0.05	compliant
-48.0	20.0	-8.75945	-0.003	36	0.05	compliant
-55.2	20.0	8.99490	0.003	36	0.05	compliant
64QAM Modulation ANT1						
-40.8	20.0	6.30740	0.002	36	0.05	compliant
-48.0	20.0	-12.02580	-0.005	36	0.05	compliant
-55.2	20.0	-17.00100	-0.007	36	0.05	compliant
64QAM Modulation ANT2						
-40.8	20.0	16.78690	0.006	36	0.05	compliant
-48.0	20.0	-8.70439	-0.003	36	0.05	compliant
-55.2	20.0	8.60660	0.003	36	0.05	compliant
64QAM Modulation ANT3						
-40.8	20.0	6.75720	0.003	36	0.05	compliant
-48.0	20.0	-6.05662	-0.002	36	0.05	compliant
-55.2	20.0	-9.34540	-0.004	36	0.05	compliant
64QAM Modulation ANT4						
-40.8	20.0	-10.11518	-0.004	36	0.05	compliant
-48	20.0	-10.06690	-0.004	36	0.05	compliant
-55.2	20.0	-8.63770	-0.003	36	0.05	compliant
64QAM Modulation ANT5						
-40.8	20.0	8.02528	0.003	36	0.05	compliant
-48.0	20.0	-6.07240	-0.002	36	0.05	compliant
-55.2	20.0	9.19828	0.004	36	0.05	compliant
64QAM Modulation ANT6						
-40.8	20.0	7.74691	0.003	36	0.05	compliant
-48.0	20.0	-6.35204	-0.002	36	0.05	compliant
-55.2	20.0	8.05338	0.003	36	0.05	compliant
64QAM Modulation ANT7						
-40.8	20.0	-10.16885	-0.004	36	0.05	compliant
-48.0	20.0	4.61462	0.002	36	0.05	compliant
-55.2	20.0	-6.43149	-0.002	36	0.05	compliant
64QAM Modulation ANT8						
-40.8	20.0	-9.69580	-0.004	36	0.05	compliant
-48.0	20.0	11.08767	0.004	36	0.05	compliant
-55.2	20.0	-10.88198	-0.004	36	0.05	compliant
16QAM Modulation ANT1						

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-40.8	20.0	-9.61510	-0.004	36	0.05	compliant
-48.0	20.0	13.09369	0.005	36	0.05	compliant
-55.2	20.0	-9.88590	-0.004	36	0.05	compliant
16QAM Modulation ANT2						
-40.8	20.0	-9.00460	-0.003	36	0.05	compliant
-48.0	20.0	-5.44770	-0.002	36	0.05	compliant
-55.2	20	-5.51070	-0.002	36	0.05	compliant
16QAM Modulation ANT3						
-40.8	20.0	-11.79968	-0.005	36	0.05	compliant
-48.0	20.0	-8.03089	-0.003	36	0.05	compliant
-55.2	20.0	9.44000	0.004	36	0.05	compliant
16QAM Modulation ANT4						
-40.8	20.0	-5.76850	-0.002	36	0.05	compliant
-48.0	20.0	12.56310	0.005	36	0.05	compliant
-55.2	20.0	8.62586	0.003	36	0.05	compliant
16QAM Modulation ANT5						
-40.8	20.0	-6.84870	-0.003	36	0.05	compliant
-48.0	20.0	-7.20872	-0.003	36	0.05	compliant
-55.2	20.0	10.28750	0.004	36	0.05	compliant
16QAM Modulation ANT6						
-40.8	20.0	6.13649	0.002	36	0.05	compliant
-48.0	20.0	-6.46080	-0.002	36	0.05	compliant
-55.2	20.0	-8.36470	-0.003	36	0.05	compliant
16QAM Modulation ANT7						
-40.8	20.0	-14.96670	-0.006	36	0.05	compliant
-48.0	20.0	-12.58420	-0.005	36	0.05	compliant
-55.2	20.0	-8.26085	-0.003	36	0.05	compliant
16QAM Modulation ANT8						
-40.8	20.0	7.24860	0.003	36	0.05	compliant
-48.0	20.0	4.92283	0.002	36	0.05	compliant
-55.2	20.0	-13.62854	-0.005	36	0.05	compliant
Measurement Uncertainty:					±1.0 Hz	

The measured frequency stability was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.



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5 TEST DATA AND SCREENSHOTS

5.1 Part List of the RF Measurement Test Equipment

Table 24 Part List of the RF Measurement Test Equipment

No.	Test Equipment	Manufacturer & Type	Serial Number	Calibration date	Calibration due	Test No.
1	Signal Analyzer	Rohde & Schwarz: FSV 30	100781	06/2016	06/2017	1, 2, 3, 4, 6
2	Vector Network Analyzer	Rohde & Schwarz: ZVA40	100146	01/2016	01/2017	4
3	Vector Network Analyzer	Rohde & Schwarz: ZVL13	101177	07/2016	07/2017	4
4	Calibration Unit	Rohde & Schwarz: ZV-Z54	100125	06/2016	06/2017	4
5	Calibration Kit	Hewlett-Packard: HP85032B	2919A04843	07/2016	07/2017	4
6	Multimeter	Fluke 83	65870302	01/2016	01/2017	1, 2, 3, 4, 6
7	Humidity and Temperature Indicator	Vaisala: HMI 31	P3730008	07/2016	07/2017	1, 2, 3, 4, 6
8	DC Power Supply	Agilent 6674A	MY41001083	cnn	-	1, 2, 3, 4, 6
9	Attenuator	Aeroflex/Weinschel: 66-20-33	BV3345	cnn	-	1,2,3,4,6
10	Attenuator	Aeroflex/Weinschel: 48-10-39	BC2566	cnn	-	1,2,3,4,6
11	EMI Test Receiver	R&S ESU40	100262	05/2016	05/2017	5
12	Horn Antenna	ETS LINDGREN 3115	92148	06/2016	06/2017	5



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13	Bilog Antenna	Chase CBL6112	2003	06/2016	06/2017	5
14	Log Periodic Antenna	R&S 1-26.5GHz	356749/012	04/2016	04/2017	5
15	Amplifier	Miteq AFSX4	902638	cnn	-	5
16	Amplifier	HP 83017A	-	cnn	-	5
17	Antenna Mast	MATURO TAM4.0-E	086/17210915	cnn	-	5
18	Controller	NCD/180_2	17210416	cnn	-	5



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5.2 Spectral Plots

5.2.1 Test No. 2: Modulation Characteristics

No additional measurements are required for the modulation characteristics. Please refer to test no. 3, occupied bandwidth on page 23.

Screenshots below shows information about the modulations I/Q constellation form and modulation information table, displaying error to ideal modulation symbols.

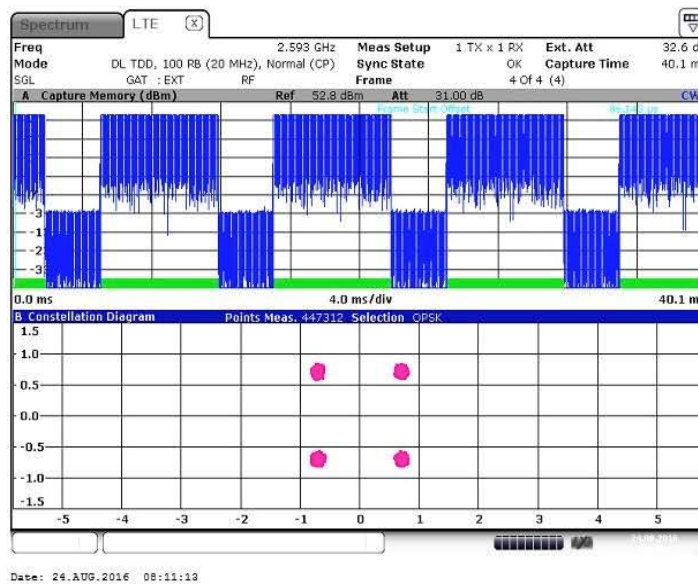


Figure 5 I/Q constellation diagram with capture buffer – QPSK (2593.0 MHz) (20MHz Channel BW)



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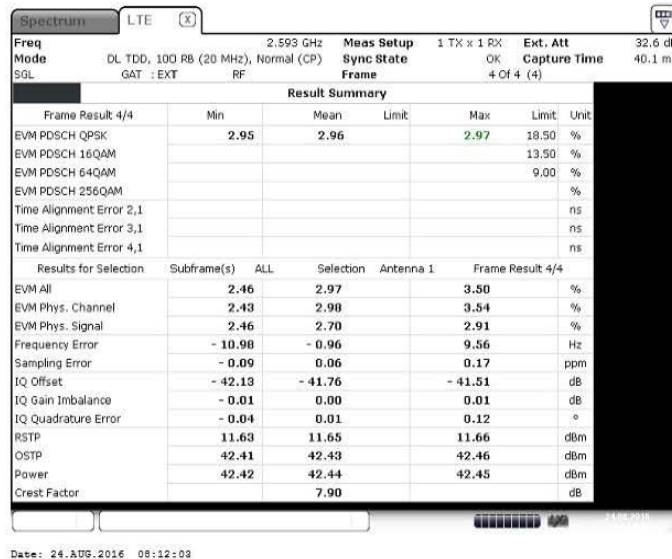


Figure 6 I/Q constellation table with I/Q error – QPSK (2593.0 MHz) (20MHz Channel BW)

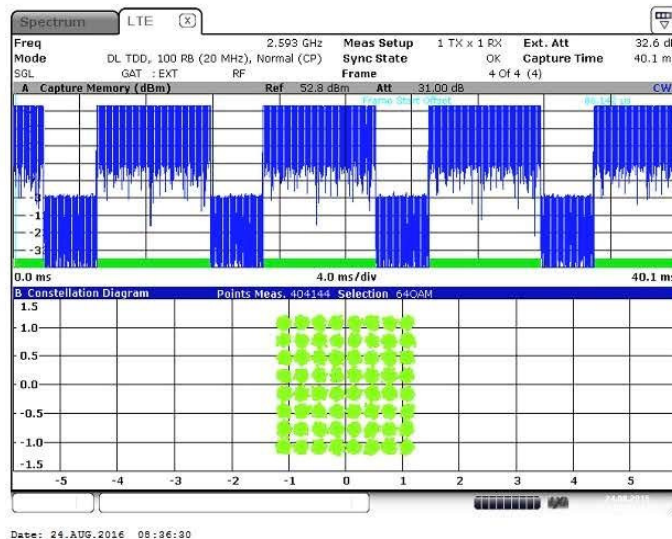


Figure 7 I/Q constellation diagram with capture buffer – 64QAM (2593.0 MHz) (20MHz Channel BW)



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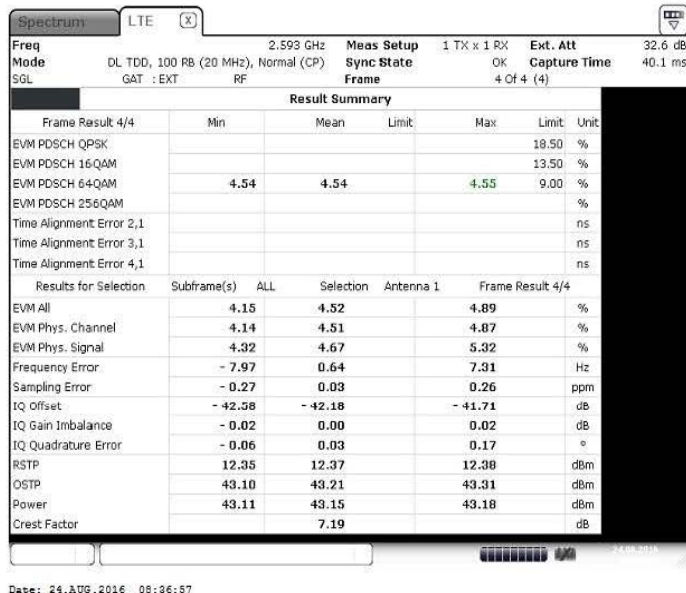


Figure 8 I/Q constellation table with I/Q error – 64QAM (2593.0 MHz) (20MHz Channel BW)



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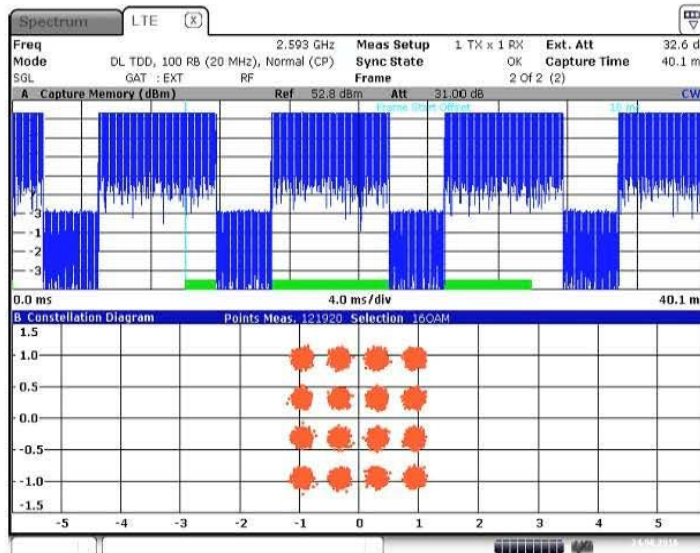


Figure 9 I/Q constellation diagram with capture buffer – 16QAM (2593.0 MHz) (20MHz Channel BW)

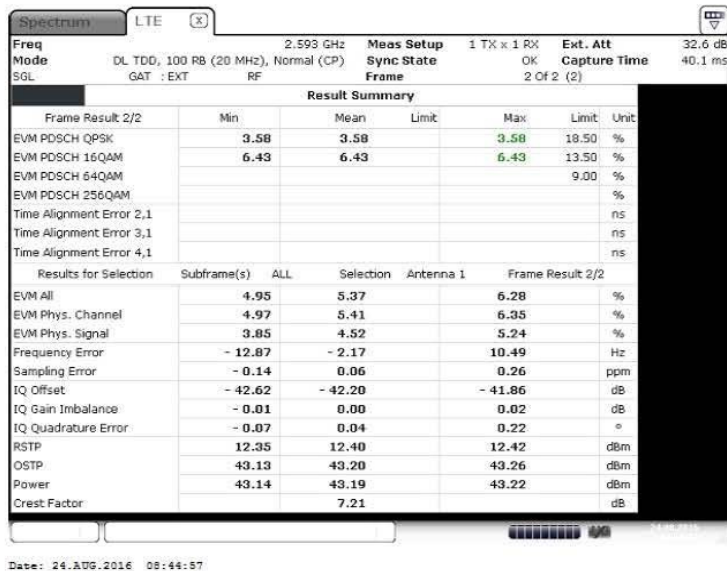


Figure 10 I/Q constellation table with I/Q error – 16QAM (2593.0 MHz) (20MHz Channel BW)



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5.2.2 Test No. 3: Occupied Bandwidth

The value 'Occ Bw' is the measured occupied bandwidth.

Configuration A Antenna 1:

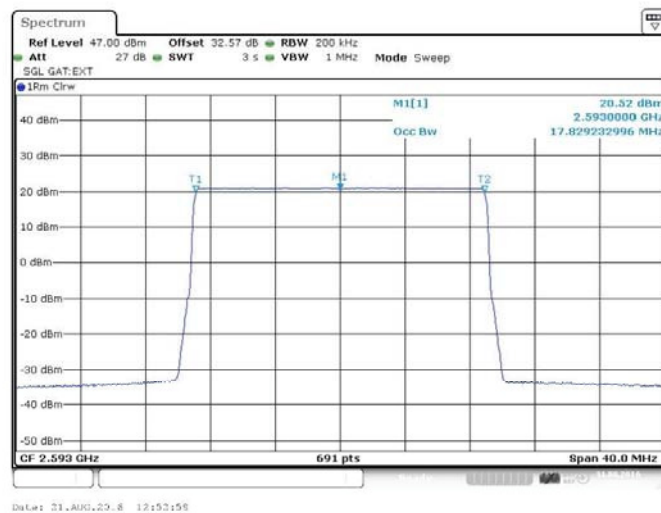


Figure 11 Occupied Bandwidth – QPSK (2593.0 MHz) (20MHz Channel BW)



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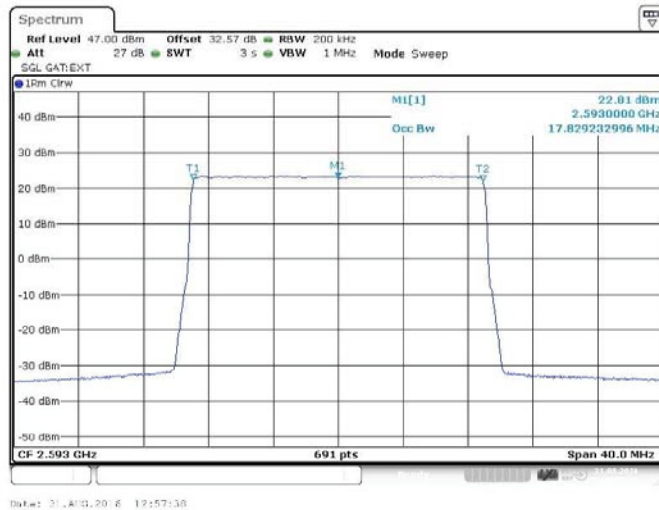


Figure 12 Occupied Bandwidth – 64QAM (2593.0 MHz) (20MHz Channel BW)

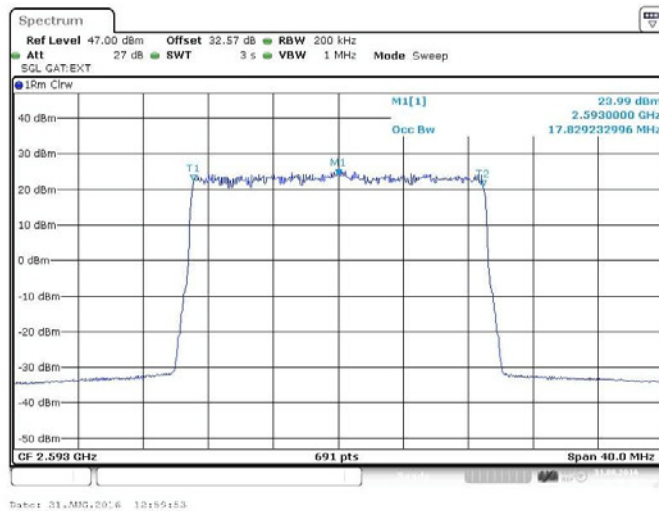


Figure 13 Occupied Bandwidth – 16QAM (2593.0 MHz) (20MHz Channel BW)



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Configuration A Antenna 2:

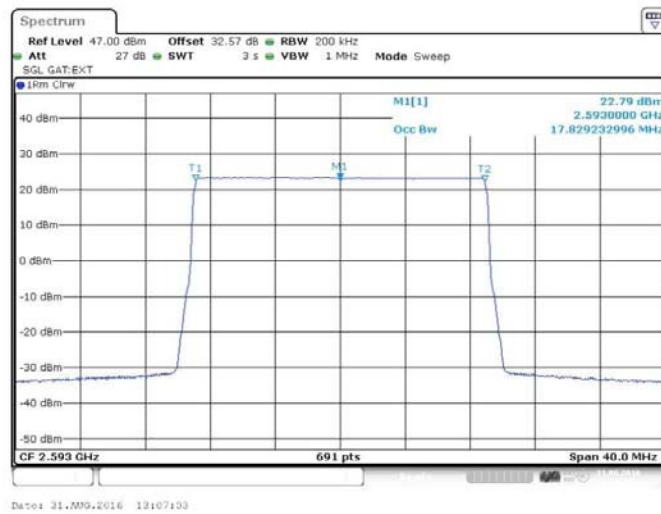


Figure 14 Occupied Bandwidth – QPSK (2593.0 MHz) (20MHz Channel BW)

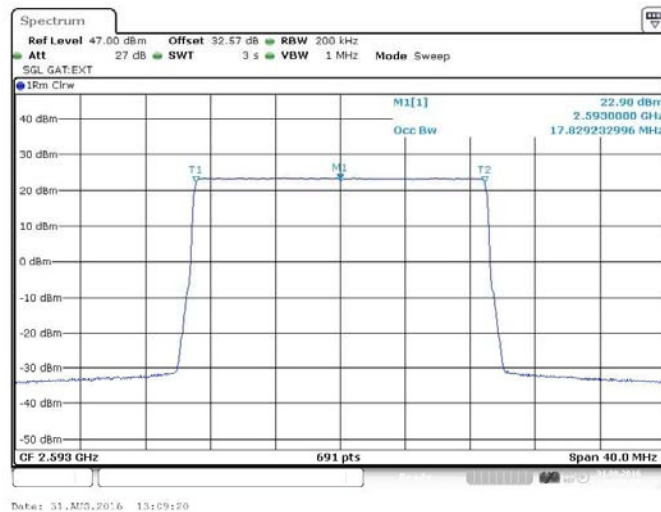


Figure 15 Occupied Bandwidth – 64QAM (2593.0 MHz) (20MHz Channel BW)



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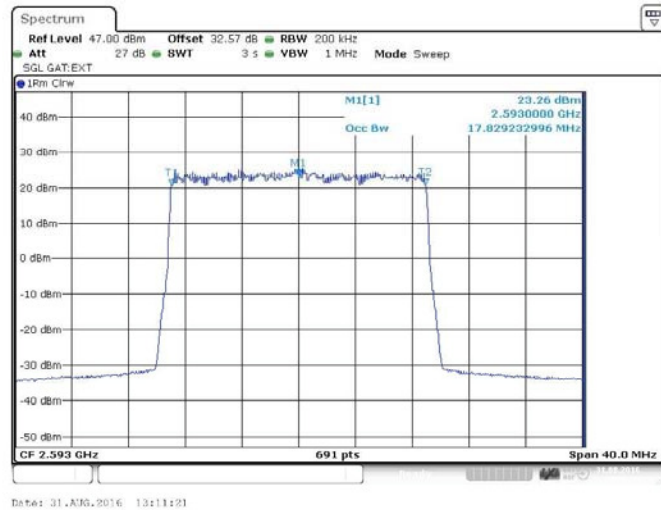


Figure 16 Occupied Bandwidth – 16QAM (2593.0 MHz) (20MHz Channel BW)



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Configuration A Antenna 3:

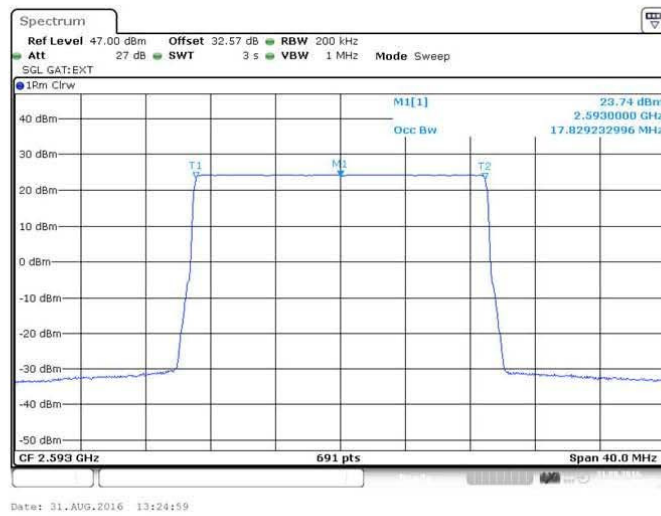


Figure 17 Occupied Bandwidth – QPSK (2593.0 MHz) (20MHz Channel BW)

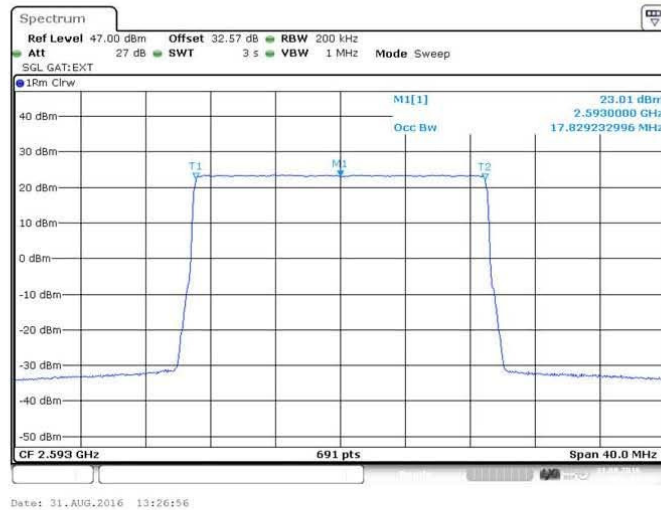


Figure 18 Occupied Bandwidth – 64QAM (2593.0 MHz) (20MHz Channel BW)



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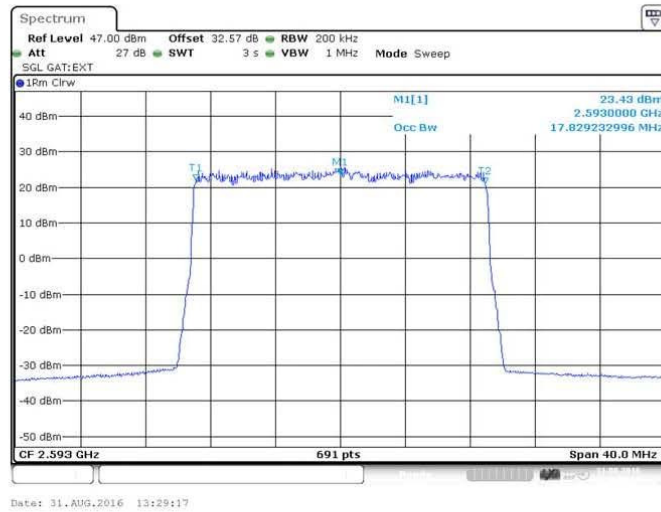


Figure 19 Occupied Bandwidth – 16QAM (2593.0 MHz) (20MHz Channel BW)



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Configuration A Antenna 4:



Figure 20 Occupied Bandwidth – QPSK (2593.0 MHz) (20MHz Channel BW)

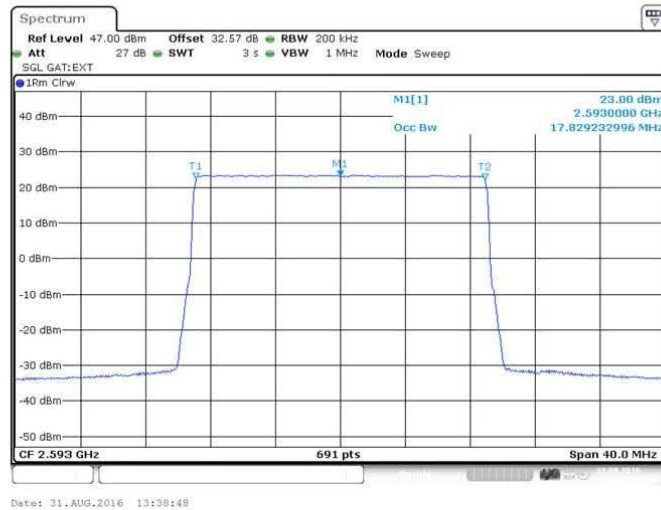


Figure 21 Occupied Bandwidth – 64QAM (2593.0 MHz) (20MHz Channel BW)



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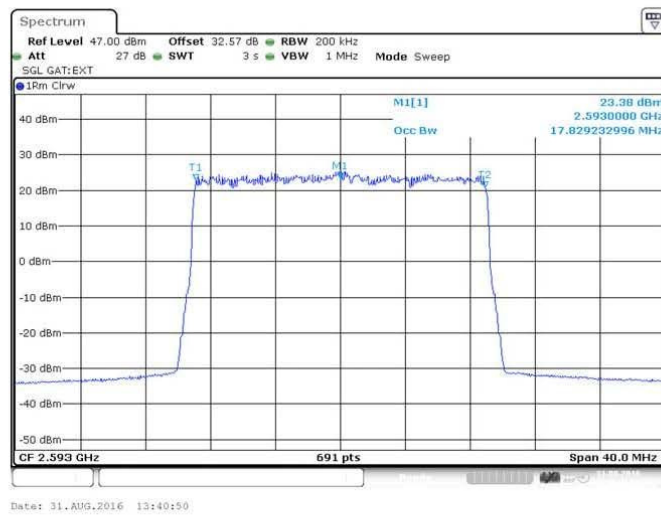


Figure 22 Occupied Bandwidth – 16QAM (2593.0 MHz) (20MHz Channel BW)



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Configuration A Antenna 5:

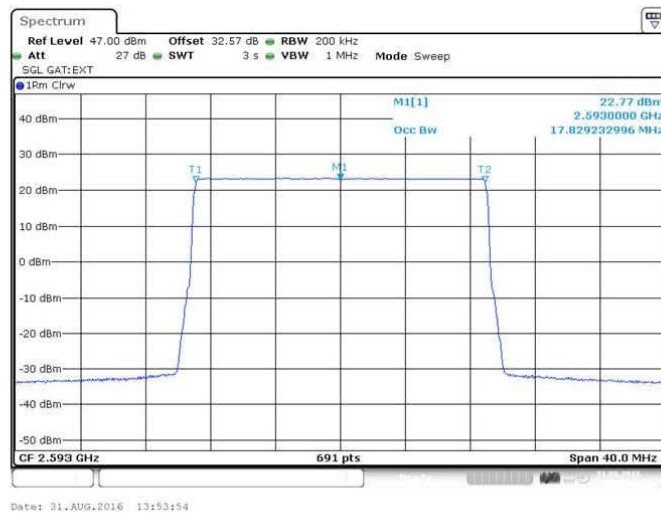


Figure 23 Occupied Bandwidth – QPSK (2593.0 MHz) (20MHz Channel BW)

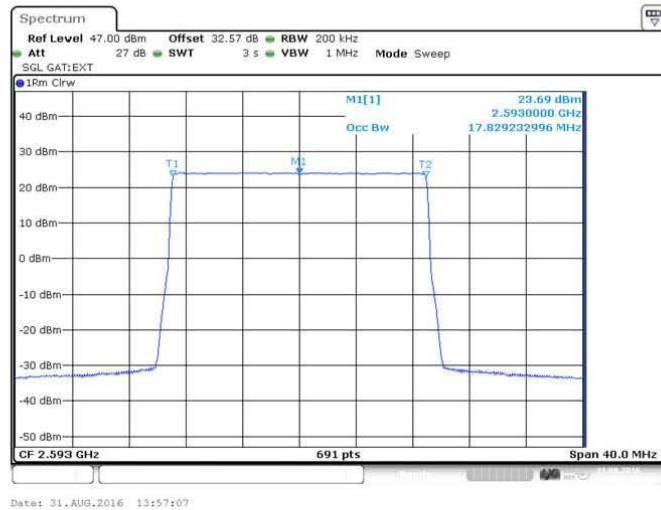


Figure 24 Occupied Bandwidth – 64QAM (2593.0 MHz) (20MHz Channel BW)



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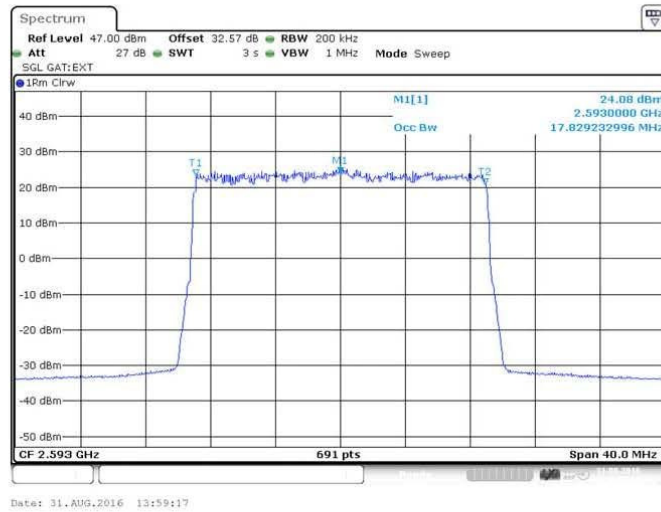


Figure 25 Occupied Bandwidth – 16QAM (2593.0 MHz) (20MHz Channel BW)



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Configuration A Antenna 6:

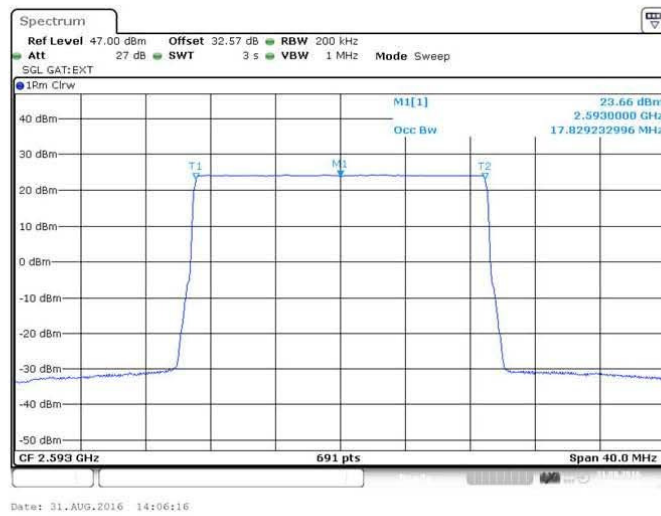


Figure 26 Occupied Bandwidth – QPSK (2593.0 MHz) (20MHz Channel BW)

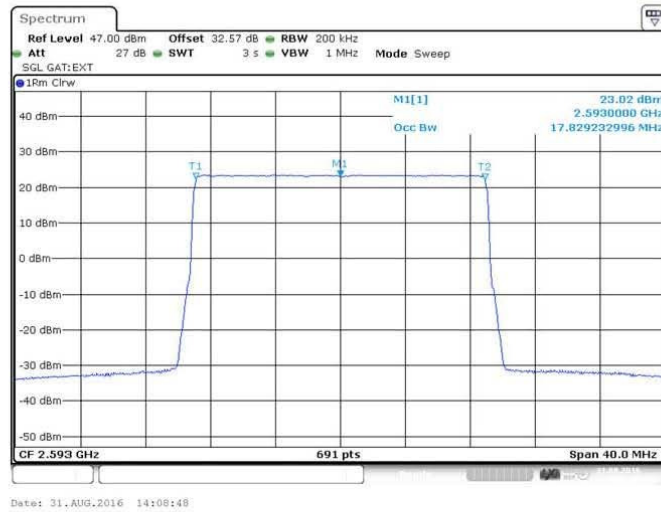


Figure 27 Occupied Bandwidth – 64QAM (2593.0 MHz) (20MHz Channel BW)



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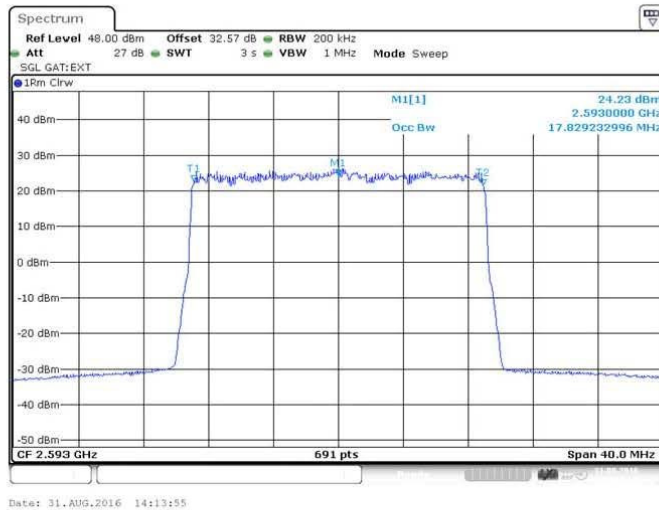


Figure 28 Occupied Bandwidth – 16QAM (2593.0 MHz) (20MHz Channel BW)



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Configuration A Antenna 7:

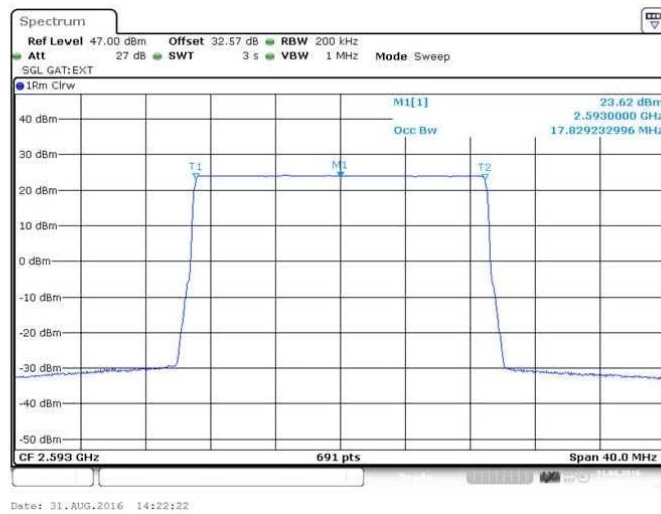


Figure 29 Occupied Bandwidth – QPSK (2593.0 MHz) (20MHz Channel BW)

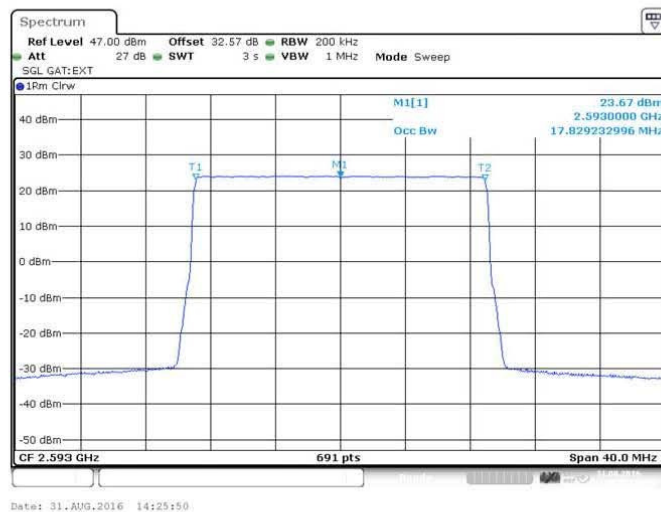


Figure 30 Occupied Bandwidth – 64QAM (2593.0 MHz) (20MHz Channel BW)



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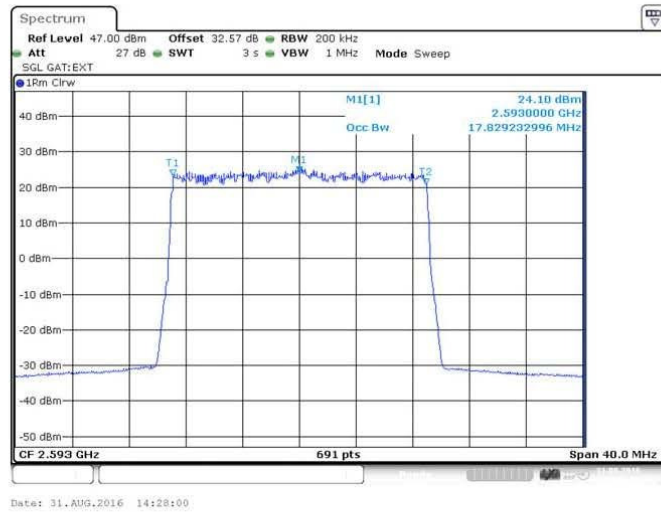


Figure 31 Occupied Bandwidth – 16QAM (2593.0 MHz) (20MHz Channel BW)



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Configuration A Antenna 8:

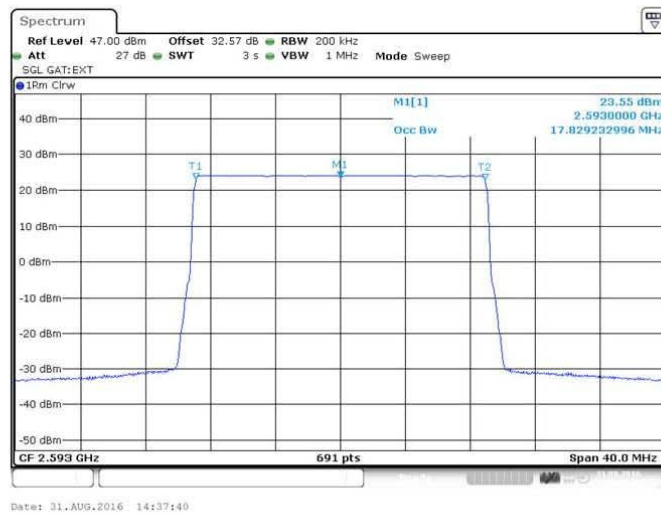


Figure 32 Occupied Bandwidth – QPSK (2593.0 MHz) (20MHz Channel BW)

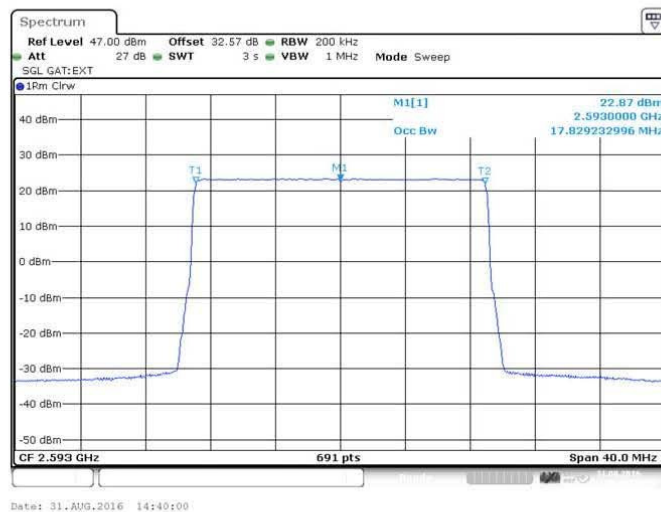


Figure 33 Occupied Bandwidth – 16QAM (2593.0 MHz) (20MHz Channel BW)



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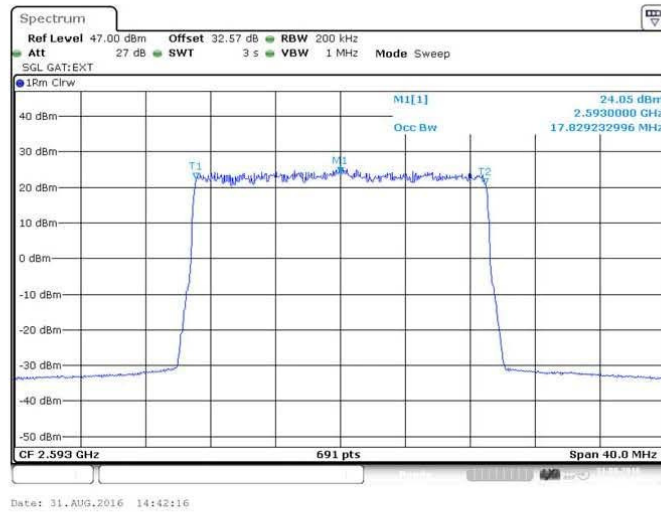


Figure 34 Occupied Bandwidth – 64QAM (2593.0 MHz) (20MHz Channel BW)



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D547351042

Configuration B Antenna 1:

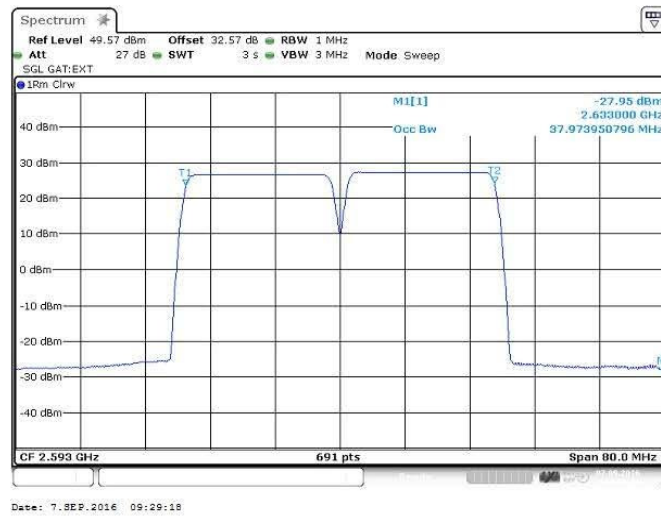


Figure 35 Occupied Bandwidth – QPSK (2583/ 2603 MHz) (2 X 20MHz Channel BW)

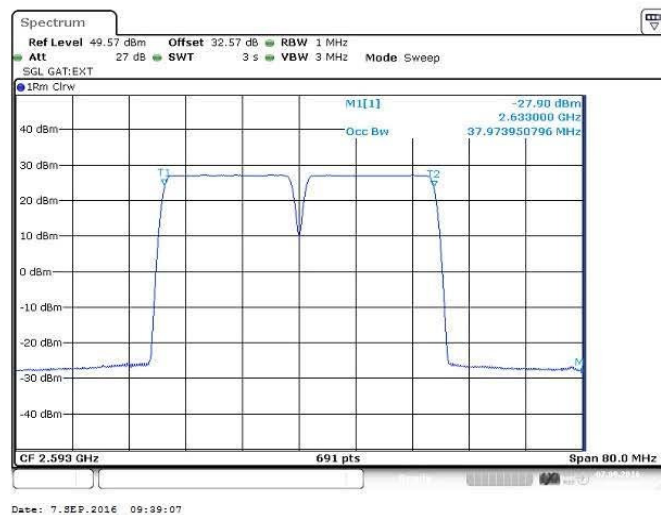


Figure 36 Occupied Bandwidth – 64QAM (2583/ 2603 MHz) (2 X 20MHz Channel BW)



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Figure 37 Occupied Bandwidth –16QAM (2583/ 2603 MHz) (2 X 20MHz Channel BW)



FCC ID:
VBNFZHN-01

Test Report No:
D547351042

Configuration B Antenna 2:



Figure 38 Occupied Bandwidth –QPSK (2583/ 2603 MHz) (2 X 20MHz Channel BW)

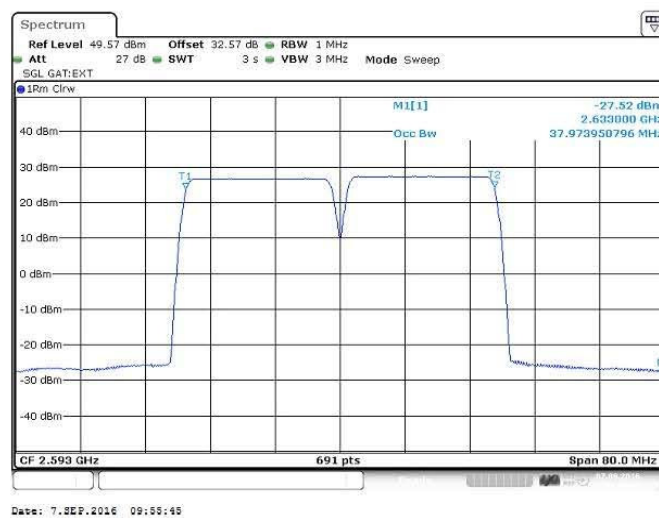


Figure 39 Occupied Bandwidth –64QAM (2583/ 2603 MHz) (2 X 20MHz Channel BW)



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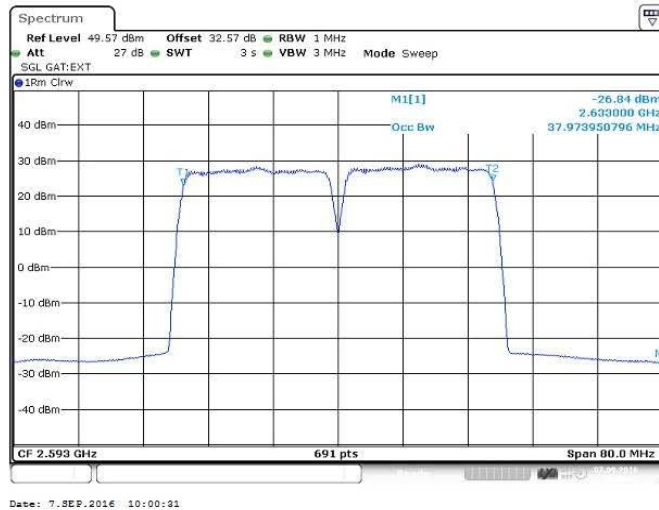


Figure 40 Occupied Bandwidth –16QAM (2583/ 2603 MHz) (2 X 20MHz Channel BW)



FCC ID:
VBNFZHN-01

Test Report No:
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Configuration B Antenna 3:



Figure 41 Occupied Bandwidth–QPSK (2583/ 2603 MHz) (2 X 20MHz Channel BW)

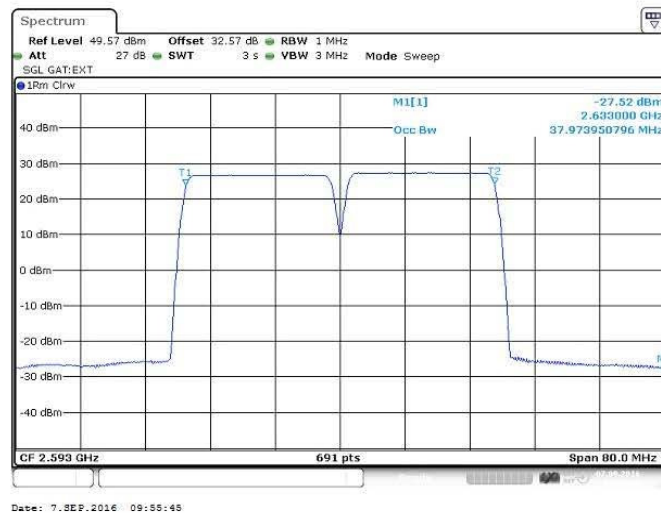


Figure 42 Occupied Bandwidth–64QAM (2583/ 2603 MHz) (2 X 20MHz Channel BW)



Product Service

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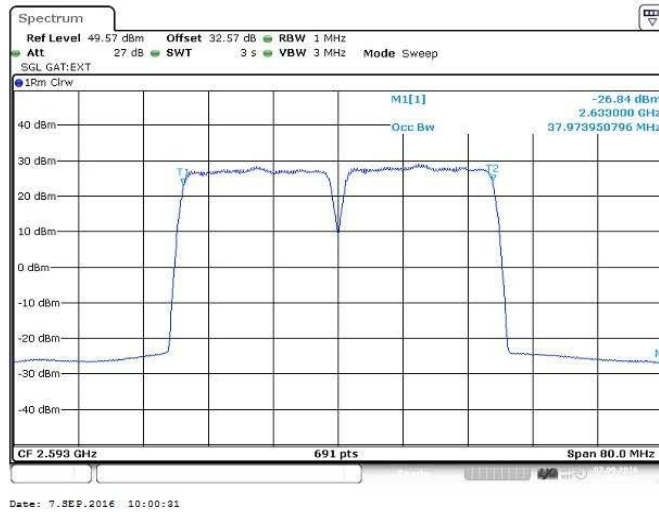


Figure 43 Occupied Bandwidth –16QAM (2583/ 2603 MHz) (2 X 20MHz Channel BW)