

FCC Test Report (Part 96)

Report No.: RF181220E07-1

FCC ID: I88LTE7480-S905

Test Model: LTE7480-S905

Received Date: Dec. 20, 2018

Test Date: Jan. 31 to Feb. 26, 2019

Issued Date: Mar. 27, 2019

Applicant: Zyxel Communications Corporation

Address: No.2 Industry East RD. IX, Hsinchu Science Park, Hsinchu 30075, Taiwan

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan R.O.C.

Test Location : E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan R.O.C.

**FCC Registration /
Designation Number:** 723255 / TW2022

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Release Control Record

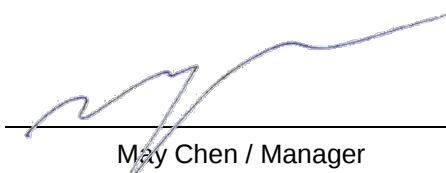
Issue No.	Description	Date Issued
RF181220E07-1	Original release.	Mar. 27, 2019

1 Certificate of Conformity

Product: LTE-A Pro Outdoor Router
Brand: ZYXEL
Test Model: LTE7480-S905
Sample Status: ENGINEERING SAMPLE
Applicant: Zyxel Communications Corporation
Test Date: Jan. 31 to Feb. 26, 2019
Standards: 47 CFR FCC Part 96, Subpart E

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Mar. 27, 2019
Claire Kuan / Specialist

Approved by :  , **Date:** Mar. 27, 2019
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 96			
FCC Clause	Test Item	Result	Remarks
2.1046 96.41(b)	Maximum Peak Output Power and Maximum EIRP	Pass	Meet the requirement of limit.
2.1046 96.41(b)	Maximum Power Spectral Density	NA	Not Applicable.
2.1047 96.41(a)	Modulation characteristics	Pass	Meet the requirement.
96.41(g)	Peak to Average Ration	Pass	Meet the requirement of limit.
2.1049	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1055	Frequency Stability	Pass	Meet the requirement of limit.
2.1051 96.41(e)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 96.41(e)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -7.26dB at 14790.00MHz.

Note:

Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	LTE-A Pro Outdoor Router	
Brand	ZYNEL	
Test Model	LTE7480-S905	
CPU Model No.	MT7621AT	
WiFi Chip Model No.	MT7603E	
LTE chip Model No.	SDX20	
FW version	LTE7480-S905 V2.00(ABQT.0)C0	
Status of EUT	ENGINEERING SAMPLE	
Power Supply Rating	DC 48V from adapter (POE)	
Modulation Type	QPSK, 16QAM, 64QAM	
Operating Frequency	Channel Bandwidth 5MHz	TX: 3552.5 ~ 3697.5 MHz RX: 3552.5 ~ 3697.5 MHz
	Channel Bandwidth 10MHz	TX: 3555 ~ 3695 MHz RX: 3555 ~ 3695 MHz
	Channel Bandwidth 15MHz	TX: 3557.5 ~ 3692.5 MHz RX: 3557.5 ~ 3692.5 MHz
	Channel Bandwidth 20MHz	TX: 3560 ~ 3690 MHz RX: 3560 ~ 3690 MHz
	5MHz, 10MHz, 15MHz & 20MHz	
	Channel Bandwidth 5MHz	22.77 dBm
	Channel Bandwidth 10MHz	22.66 dBm
	Channel Bandwidth 15MHz	22.75 dBm
Emission Designator	Channel Bandwidth 5MHz	QPSK: 4M47G7D 16QAM: 4M47D7W 64QAM: 4M47D7W
	Channel Bandwidth 10MHz	QPSK: 8M92G7D 16QAM: 8M94D7W 64QAM: 8M92D7W
	Channel Bandwidth 15MHz	QPSK: 13M5G7D 16QAM: 13M4D7W 64QAM: 13M4D7W
	Channel Bandwidth 20MHz	QPSK: 17M9G7D 16QAM: 17M8D7W 64QAM: 17M8D7W
	Antenna Type	
	Refer to note as below	
	Antenna Connector	
	Refer to note as below	
	Accessory Device	
	Adapter (POE) x 1	
	Data Cable Supplied	
	RJ45 cable (Unshielded, 1.8m)	

Note:

1. There are WLAN and WWAN technology used for the EUT. The EUT has below radios as following table:

Radio 1	Radio 2
WLAN (2.4GHz)	WWAN (LTE) / 3G

2. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	WWAN (LTE) / 3G

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

3. The EUT must be supplied with a adapter (POE) as following table:

Brand	Model No.	Spec.
SHENZHEN	TPT24S48A-MC	Input: 100-240Vac, 0.5A, 50/60Hz AC input cable: Unshielded 1.8m Output: 48Vdc

4. The antennas provided to the EUT, please refer to the following table:

Chain No.	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type
WLAN-ANT0	6	2.4 ~ 2.4835GHz	PIFA	iPEX
WLAN-ANT1	5	2.4 ~ 2.4835GHz	PIFA	iPEX
WWAN_0 (TX & RX)	9.85	3550 ~ 3700 MHz	Dipole	iPEX
WWAN_1 (RX only)	9.85	3550 ~ 3700 MHz	Dipole	iPEX
WWAN_2 (RX only)	9.85	3550 ~ 3700 MHz	Dipole	iPEX
WWAN_3 (RX only)	9.85	3550 ~ 3700 MHz	Dipole	iPEX

5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

Channel Bandwidth (MHz)	Channel
5	Low
	Middle
	High
10	Low
	Middle
	High
15	Low
	Middle
	High
20	Low
	Middle
	High

3.2.1 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, 0 degree, Vertical +30 degree, Vertical -30 degree, 0 degree clockwise 45 degree and 0 degree counterclockwise 45 degree antenna ports and RB configs

The worst case was found when positioned on 0 degree and RB configs worst case is 1RB. Following channel(s) was (were) selected for the final test as listed below:

Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation
EIRP	3552.5 to 3697.5	3552.5, 3625, 3697.5	5MHz	QPSK, 16QAM, 64QAM
	3555 to 3695	3555, 3625, 3695	10MHz	QPSK, 16QAM, 64QAM
	3557.5 to 3692.5	3557.5, 3625, 3692.5	15MHz	QPSK, 16QAM, 64QAM
	3560 to 3690	3560, 3625, 3690	20MHz	QPSK, 16QAM, 64QAM
Modulation Characteristics	3552.5 to 3697.5	3625	5MHz	QPSK, 16QAM, 64QAM
Frequency Stability	3552.5 to 3697.5	3625	5MHz	QPSK
	3555 to 3695	3625	10MHz	QPSK
	3557.5 to 3692.5	3625	15MHz	QPSK
	3560 to 3690	3625	20MHz	QPSK
Occupied Bandwidth	3552.5 to 3697.5	3552.5, 3625, 3697.5	5MHz	QPSK, 16QAM, 64QAM
	3555 to 3695	3555, 3625, 3695	10MHz	QPSK, 16QAM, 64QAM
	3557.5 to 3692.5	3557.5, 3625, 3692.5	15MHz	QPSK, 16QAM, 64QAM
	3560 to 3690	3560, 3625, 3690	20MHz	QPSK, 16QAM, 64QAM
Peak to Average Ratio	3552.5 to 3697.5	3552.5, 3625, 3697.5	5MHz	QPSK
	3555 to 3695	3555, 3625, 3695	10MHz	QPSK
	3557.5 to 3692.5	3557.5, 3625, 3692.5	15MHz	QPSK
	3560 to 3690	3560, 3625, 3690	20MHz	QPSK
Radiated Emission	3552.5 to 3697.5	3552.5, 3625, 3697.5	5MHz	QPSK
	3555 to 3695	3555, 3625, 3695	10MHz	QPSK
	3557.5 to 3692.5	3557.5, 3625, 3692.5	15MHz	QPSK
	3560 to 3690	3560, 3625, 3690	20MHz	QPSK
Conducted Emission	3552.5 to 3697.5	3552.5, 3625, 3697.5	5MHz	QPSK
	3555 to 3695	3555, 3625, 3695	10MHz	QPSK
	3557.5 to 3692.5	3557.5, 3625, 3692.5	15MHz	QPSK
	3560 to 3690	3560, 3625, 3690	20MHz	QPSK

NOTE: All supported modulation types were evaluated. The Worst case of QPSK was selected. Therefore, the EIRP, Frequency Stability, Peak to Average Ratio, Conducted Emission and Radiated Emission were presented under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	24deg. C, 58%RH	120Vac, 60Hz	Allen Chuang
Modulation Characteristics	20deg. C, 76%RH	120Vac, 60Hz	Allen Chuang
Frequency Stability	20deg. C, 76%RH	120Vac, 60Hz	Allen Chuang
Occupied Bandwidth	20deg. C, 76%RH	120Vac, 60Hz	Allen Chuang
Peak to Average Ratio	20deg. C, 76%RH	120Vac, 60Hz	Allen Chuang
Conducted Emission	20deg. C, 76%RH	120Vac, 60Hz	Allen Chuang
Radiated Emission	22deg. C, 64%RH	120Vac, 60Hz	Robert Cheng

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

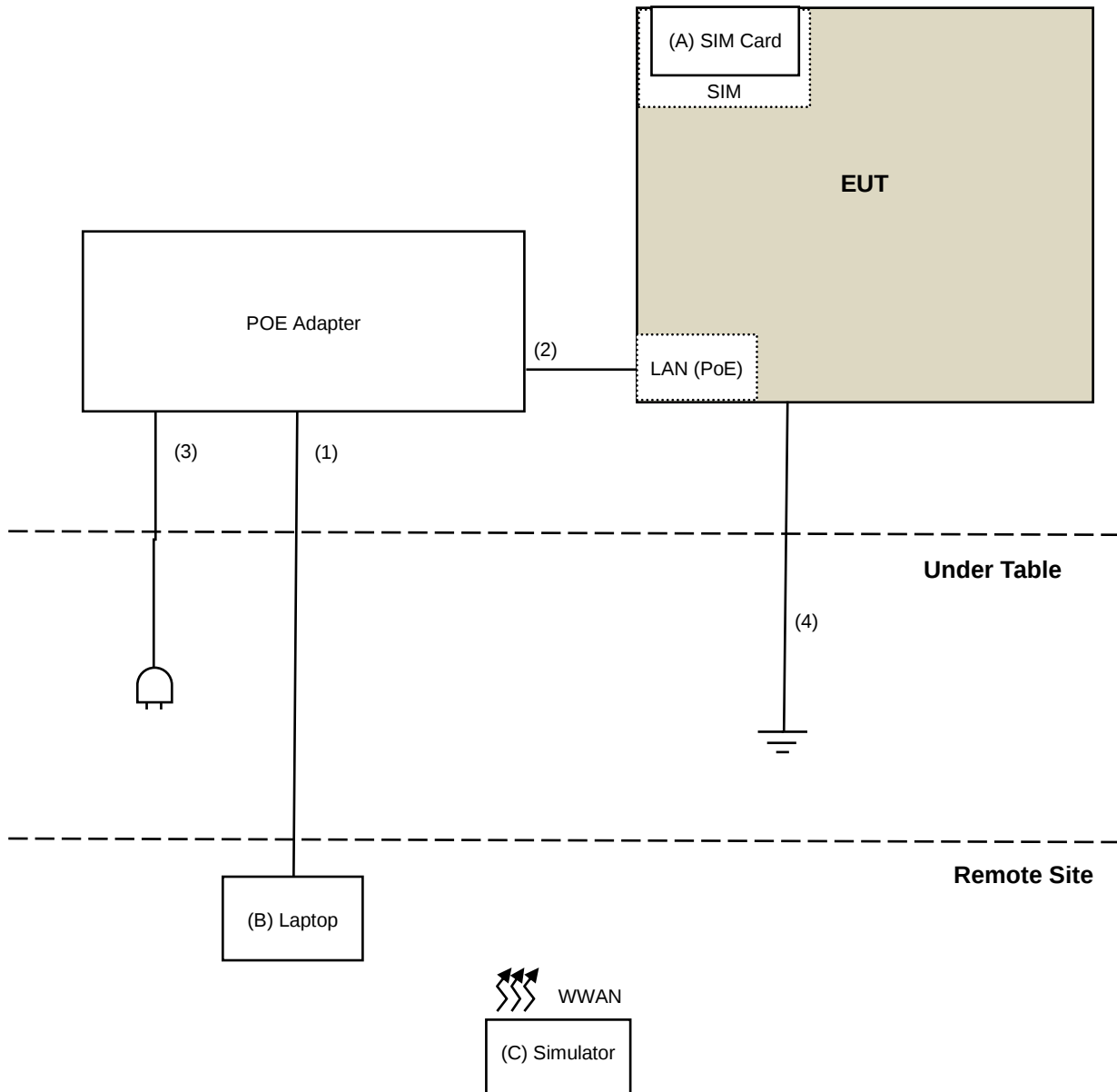
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	SIM Card	R&S	NA	NA	NA	Provided by Lab
B.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	1.8	No	0	Supplied by client
3.	AC Cable	1	1.8	No	0	Supplied by client
4.	GND Cable	1	2.8	No	0	Provided by Lab

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

47 CFR FCC Part 96, Subpart E

KDB 971168 D01 Power Meas License Digital Systems v03r01

KDB 940660 D01 Part 96 CBRS Equipment v01

ANSI/TIA/EIA-603-D-2010

All test items have been performed and recorded as per the above standards.

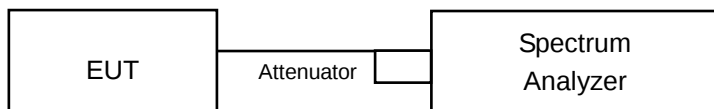
4 Test Types and Results

4.1 Maximum EIRP Measurement

4.1.1 Limits of Maximum EIRP Measurement

Device		Maximum EIRP (dBm/10 MHz)
☒	End User Device	23
☐	Category A CBSD	30
☐	Category B CBSD	47

4.1.2 Test Setup



4.1.3 Test Instruments

For radiated emissions above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 16, 2018	Aug. 15, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 28, 2019	Jan. 27, 2020
RF Cable	104 RF cable	131215	Jan. 10, 2019	Jan. 09, 2020
RF Cable	EMC104-SM-SM-6000	180418	May 07, 2018	May 06, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. The CANADA Site Registration No. is 20331-2
4. Loop antenna was used for all emissions below 30 MHz.
5. Tested Date: Jan. 31, 2019

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Pre-Amplifier EMCI	EMC001340	980142	Jan. 25, 2019	Jan. 24, 2020
Loop Antenna Electro-Metrics	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 30, 2018	Oct. 29, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-4-1	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-2	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-3	Mar. 21, 2018	Mar. 20, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 27, 2018	Sep. 26, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. The CANADA Site Registration No. is 20331-2
4. Loop antenna was used for all emissions below 30 MHz.
5. Tested Date: Feb. 11 to 26, 2019

4.1.4 Test Procedures

1. Connect the DUT transmitter output to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.
2. Set span to at least 1.5 times the OBW.
3. Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
4. Set VBW $\geq 3 \times$ RBW.
5. Set number of points in sweep $\geq 2 \times$ span / RBW.
6. Sweep time = auto-couple.
7. Detector = RMS (power averaging).
8. If the EUT can be configured to transmit continuously (i.e., burst duty cycle $\geq 98\%$), then set the trigger to free run.
9. If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle $< 98\%$), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Ensure that the sweep time is less than or equal to the transmission burst duration.
10. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
11. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

4.1.5 Deviation from Test Standard

No deviation.

4.1.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.1.7 Test Results

Channel	Freq. (MHz)	5MHz			Limit (dBm/10MHz)	Pass /Fail
		QPSK				
		Conducted Average Power (dBm/10MHz)	Gain(dBi)	9.85		
			EIRP		Maximum	
Low	3552.5	12.15	22.00		23.0	Pass
Middle	3625	12.39	22.24		23.0	Pass
High	3697.5	12.04	21.89		23.0	Pass

Channel	Freq. (MHz)	10MHz			Limit (dBm/10MHz)	Pass /Fail
		QPSK				
		Conducted Average Power (dBm/10MHz)	Gain(dBi)	9.85		
			EIRP		Maximum	
Low	3555	12.06	21.91		23.0	Pass
Middle	3625	12.48	22.33		23.0	Pass
High	3695	12.51	22.36		23.0	Pass

Channel	Freq. (MHz)	15MHz			Limit (dBm/10MHz)	Pass /Fail
		QPSK				
		Conducted Average Power (dBm/10MHz)	Gain(dBi)	9.85		
			EIRP		Maximum	
Low	3557.5	12.03	21.88		23.0	Pass
Middle	3625	12.31	22.16		23.0	Pass
High	3692.5	12.03	21.88		23.0	Pass

Channel	Freq. (MHz)	20MHz			Limit (dBm/10MHz)	Pass /Fail
		QPSK				
		Conducted Average Power (dBm/10MHz)	Gain(dBi)	9.85		
			EIRP		Maximum	
Low	3560	12.07	21.92		23.0	Pass
Middle	3625	12.40	22.25		23.0	Pass
High	3690	12.09	21.94		23.0	Pass

Channel	Freq. (MHz)	5MHz			Limit (dBm/10MHz)	Pass /Fail
		16QAM				
		Conducted Average Power (dBm/10MHz)	Gain(dBi)	9.85		
			EIRP		Maximum	
Low	3552.5	12.40	22.25		23.0	Pass
Middle	3625	12.92	22.77		23.0	Pass
High	3697.5	12.43	22.28		23.0	Pass

Channel	Freq. (MHz)	10MHz			Limit (dBm/10MHz)	Pass /Fail
		16QAM				
		Conducted Average Power (dBm/10MHz)	Gain(dBi)	9.85		
			EIRP		Maximum	
Low	3555	12.45	22.30		23.0	Pass
Middle	3625	12.81	22.66		23.0	Pass
High	3695	12.29	22.14		23.0	Pass

Channel	Freq. (MHz)	15MHz			Limit (dBm/10MHz)	Pass /Fail
		16QAM				
		Conducted Average Power (dBm/10MHz)	Gain(dBi)	9.85		
			EIRP		Maximum	
Low	3557.5	12.55	22.40		23.0	Pass
Middle	3625	12.90	22.75		23.0	Pass
High	3692.5	12.59	22.44		23.0	Pass

Channel	Freq. (MHz)	20MHz			Limit (dBm/10MHz)	Pass /Fail
		16QAM				
		Conducted Average Power (dBm/10MHz)	Gain(dBi)	9.85		
			EIRP		Maximum	
Low	3560	12.56	22.41		23.0	Pass
Middle	3625	12.84	22.69		23.0	Pass
High	3690	12.49	22.34		23.0	Pass

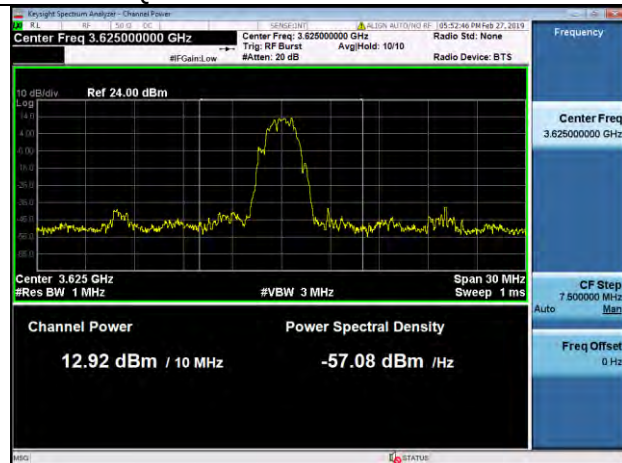
Channel	Freq. (MHz)	5MHz			Limit (dBm/10MHz)	Pass /Fail
		64QAM				
		Conducted Average Power (dBm/10MHz)	Gain(dBi)	9.85		
			EIRP		Maximum	
Low	3552.5	12.31	22.16		23.0	Pass
Middle	3625	12.44	22.29		23.0	Pass
High	3697.5	12.17	22.02		23.0	Pass

Channel	Freq. (MHz)	10MHz			Limit (dBm/10MHz)	Pass /Fail
		64QAM				
		Conducted Average Power (dBm/10MHz)	Gain(dBi)	9.85		
			EIRP		Maximum	
Low	3555	12.39	22.24		23.0	Pass
Middle	3625	12.52	22.37		23.0	Pass
High	3695	12.30	22.15		23.0	Pass

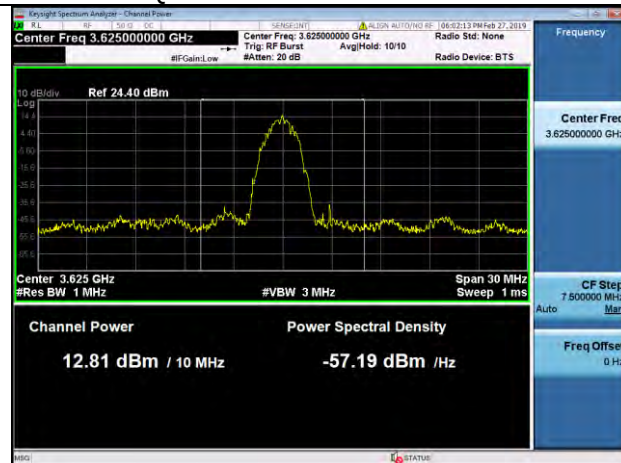
Channel	Freq. (MHz)	15MHz			Limit (dBm/10MHz)	Pass /Fail
		64QAM				
		Conducted Average Power (dBm/10MHz)	Gain(dBi)	9.85		
			EIRP		Maximum	
Low	3557.5	12.30	22.15		23.0	Pass
Middle	3625	12.61	22.46		23.0	Pass
High	3692.5	12.41	22.26		23.0	Pass

Channel	Freq. (MHz)	20MHz			Limit (dBm/10MHz)	Pass /Fail
		64QAM				
		Conducted Average Power (dBm/10MHz)	Gain(dBi)	9.85		
			EIRP		Maximum	
Low	3560	12.18	22.03		23.0	Pass
Middle	3625	12.38	22.23		23.0	Pass
High	3690	12.24	22.09		23.0	Pass

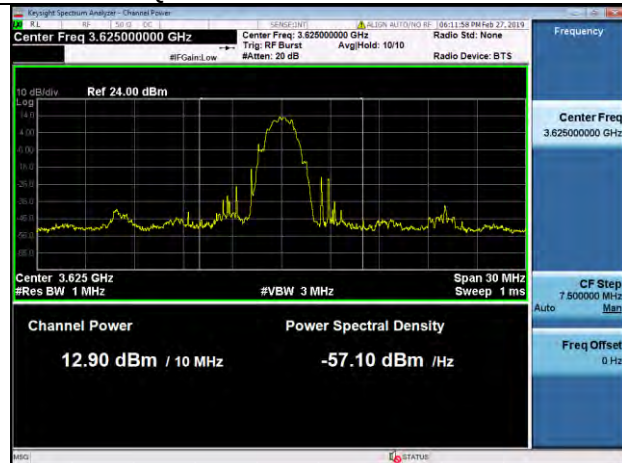
5MHz / 16QAM



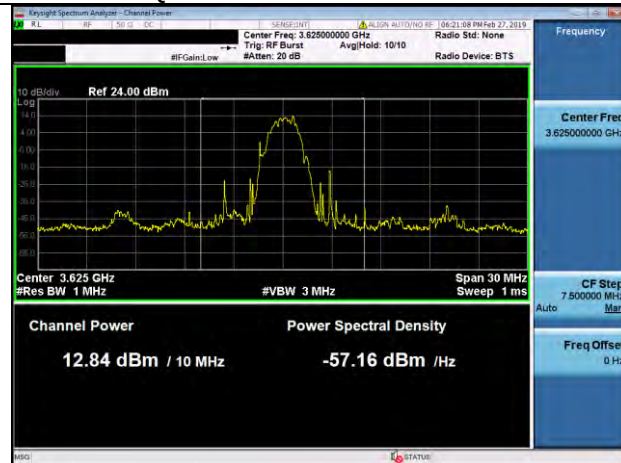
10MHz / 16QAM



15MHz / 16QAM



20MHz / 16QAM



4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

4.2.2 Test Procedure

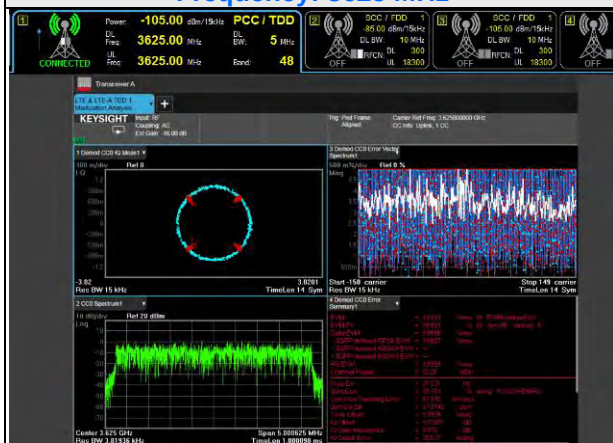
Connect the EUT to Communication Simulator via the antenna connector, the frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.3 Test Setup



4.2.4 Test Results

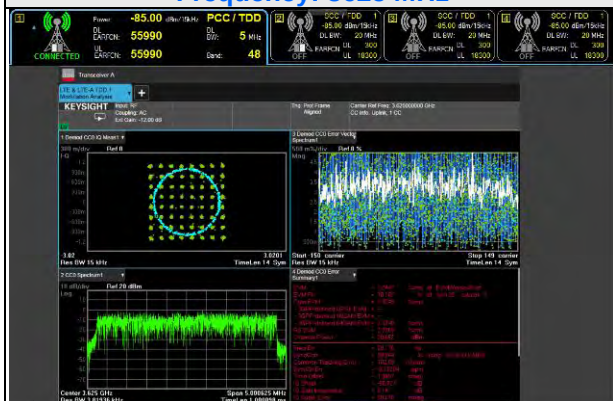
LTE QPSK / Channel Bandwidth: 5MHz / Frequency: 3625 MHz



LTE 16QAM / Channel Bandwidth: 5MHz / Frequency: 3625 MHz



LTE 64QAM / Channel Bandwidth: 5MHz / Frequency: 3625 MHz



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency band.

4.3.2 Test Procedure

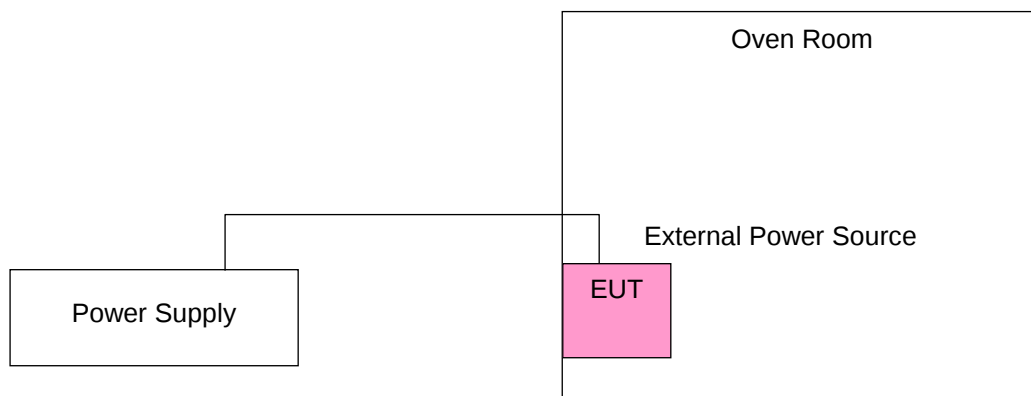
- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the AC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

4.3.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.3.4 Test Setup



4.3.5 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (MHz)				Pass/Fail
	5MHz	10MHz	15MHz	20MHz	
102	3625.000043	3625.000038	3625.000042	3625.000038	Pass
120	3625.000042	3625.000044	3625.000035	3625.000041	Pass
138	3625.000038	3625.000034	3625.000038	3625.000041	Pass

Frequency Error vs. Temperature.

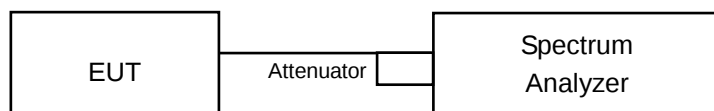
TEMP. (°C)	Frequency Error (MHz)				Pass/Fail
	5MHz	10MHz	15MHz	20MHz	
75	3625.000035	3625.000041	3625.000040	3625.000044	Pass
70	3625.000041	3625.000037	3625.000039	3625.000042	Pass
60	3625.000044	3625.000035	3625.000038	3625.000043	Pass
50	3625.000042	3625.000035	3625.000043	3625.000034	Pass
40	3625.000042	3625.000040	3625.000043	3625.000040	Pass
30	3625.000041	3625.000039	3625.000042	3625.000040	Pass
20	3625.000037	3625.000041	3625.000043	3625.000041	Pass
10	3625.000036	3625.000037	3625.000037	3625.000035	Pass
0	3625.000037	3625.000041	3625.000044	3625.000034	Pass
-10	3625.000043	3625.000036	3625.000037	3625.000039	Pass
-20	3625.000041	3625.000043	3625.000039	3625.000042	Pass
-30	3625.000036	3625.000043	3625.000034	3625.000035	Pass

4.4 Emission Bandwidth Measurement

4.4.1 Limit of Emission Bandwidth Measurement

Reference only

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.4.4 Test Procedure

Occupied Bandwidth:

All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

26dBc Bandwidth:

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW = 51 kHz (5 MHz bandwidth), RBW = 100 kHz (10 MHz bandwidth), RBW = 150 kHz (15 MHz bandwidth), RBW = 200 kHz (20 MHz bandwidth). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.4.7 Test Result (-26dB Bandwidth)

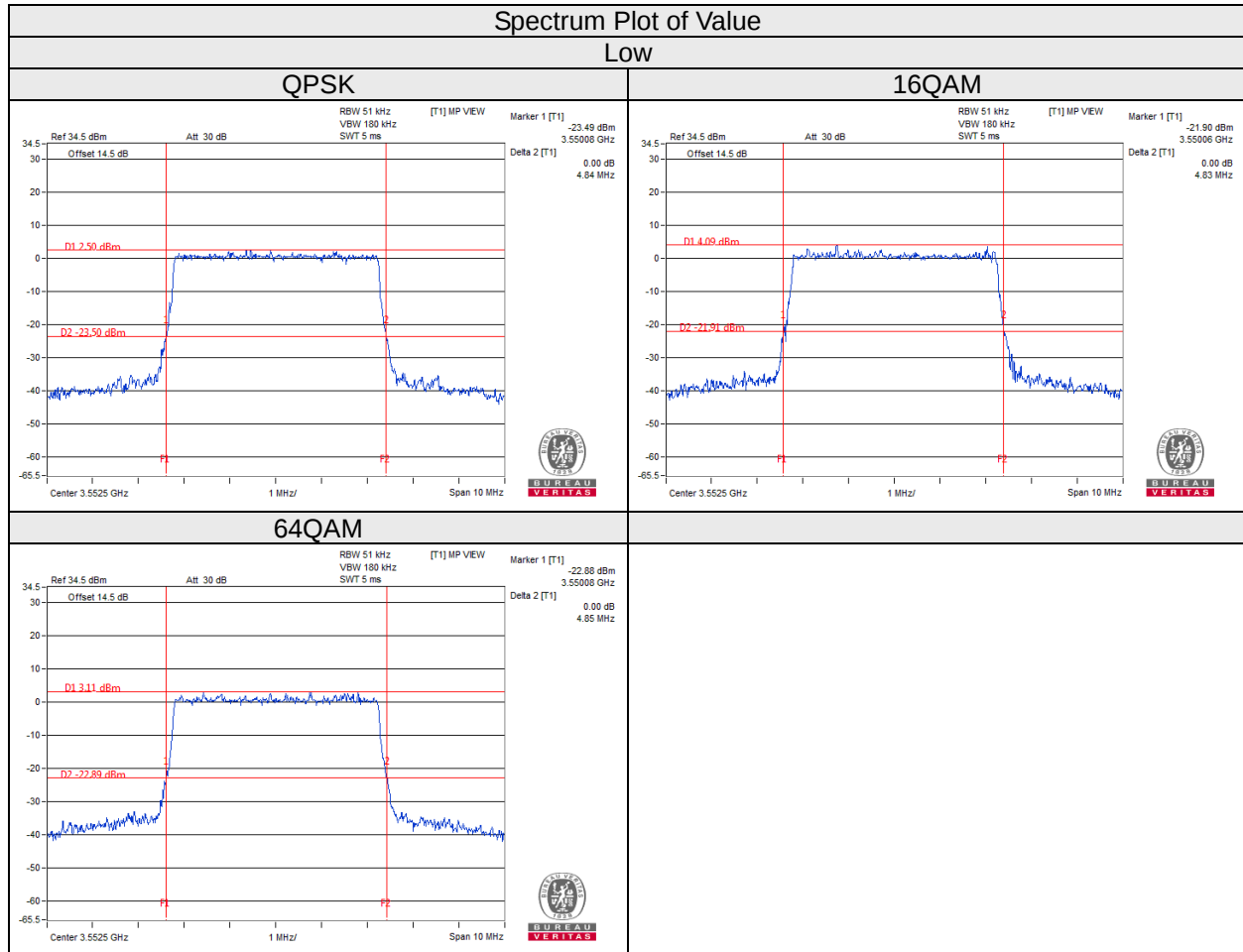
Channel	Freq. (MHz)	26dB Down Bandwidth (MHz)		
		5MHz		
		QPSK	16QAM	64QAM
Low	3552.5	4.84	4.83	4.85
Middle	3625	4.84	4.81	4.82
High	3697.5	4.81	4.82	4.77

Channel	Freq. (MHz)	26dB Down Bandwidth (MHz)		
		10MHz		
		QPSK	16QAM	64QAM
Low	3555	9.61	9.73	9.69
Middle	3625	9.43	9.45	9.37
High	3695	9.42	9.51	9.47

Channel	Freq. (MHz)	26dB Down Bandwidth (MHz)		
		15MHz		
		QPSK	16QAM	64QAM
Low	3557.5	14.46	14.51	14.45
Middle	3625	14.30	14.03	14.24
High	3692.5	14.30	14.30	14.08

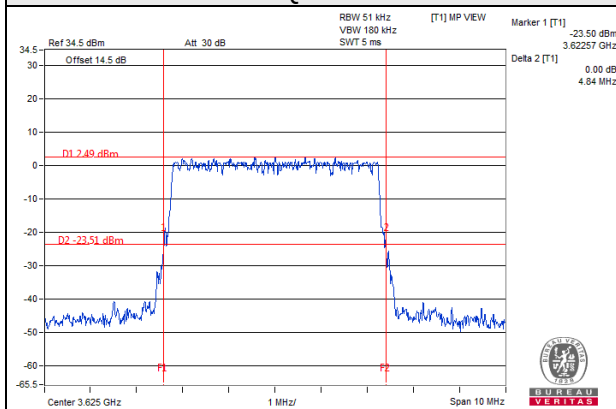
Channel	Freq. (MHz)	26dB Down Bandwidth (MHz)		
		20MHz		
		QPSK	16QAM	64QAM
Low	3560	19.14	19.09	19.31
Middle	3625	18.65	18.75	18.66
High	3690	18.76	18.94	18.68

5MHz:

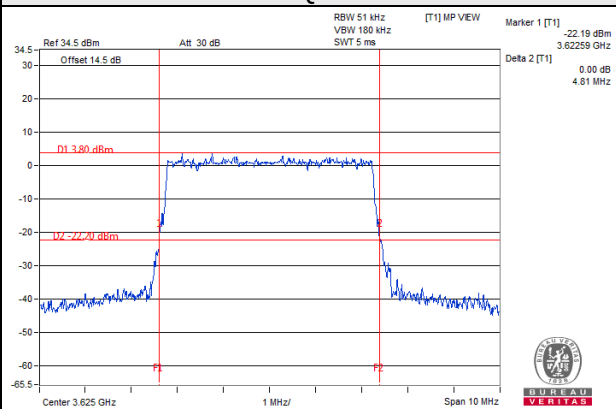


Spectrum Plot of Value Middle

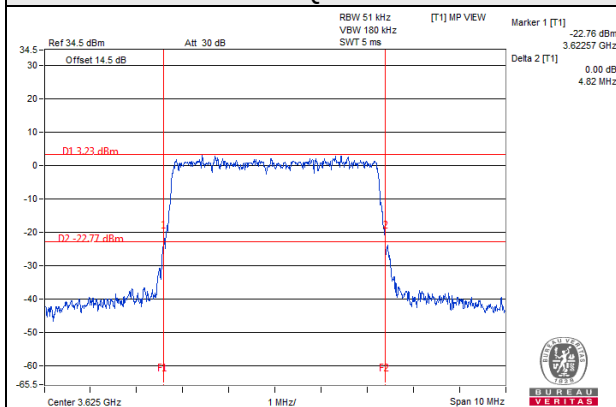
QPSK



16QAM



64QAM

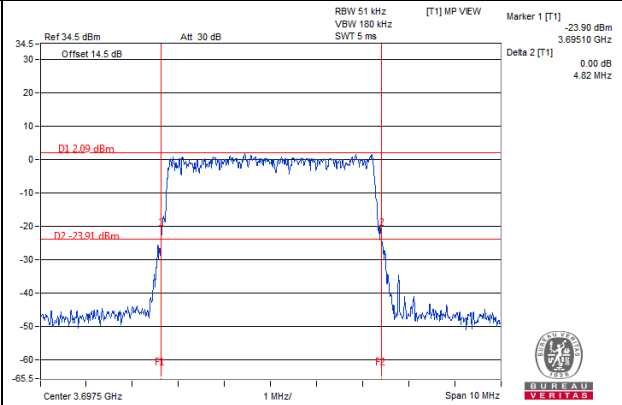
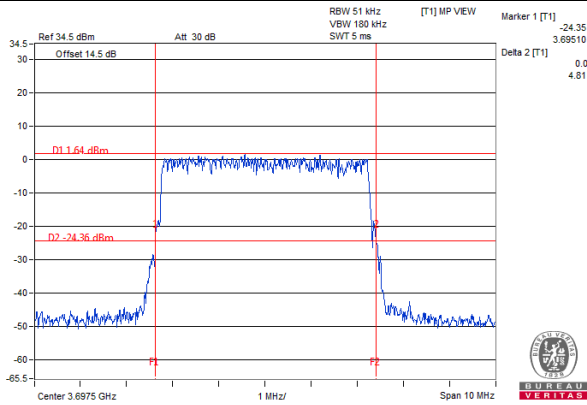


Spectrum Plot of Value

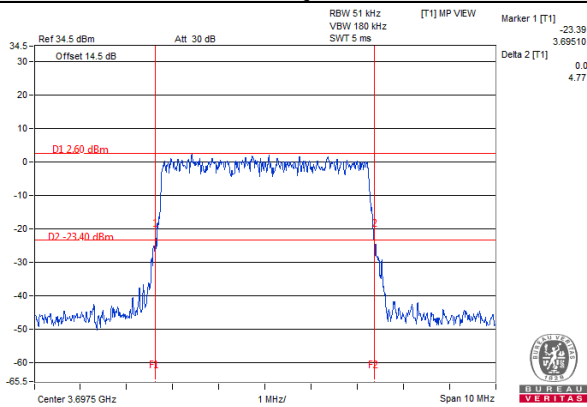
High

QPSK

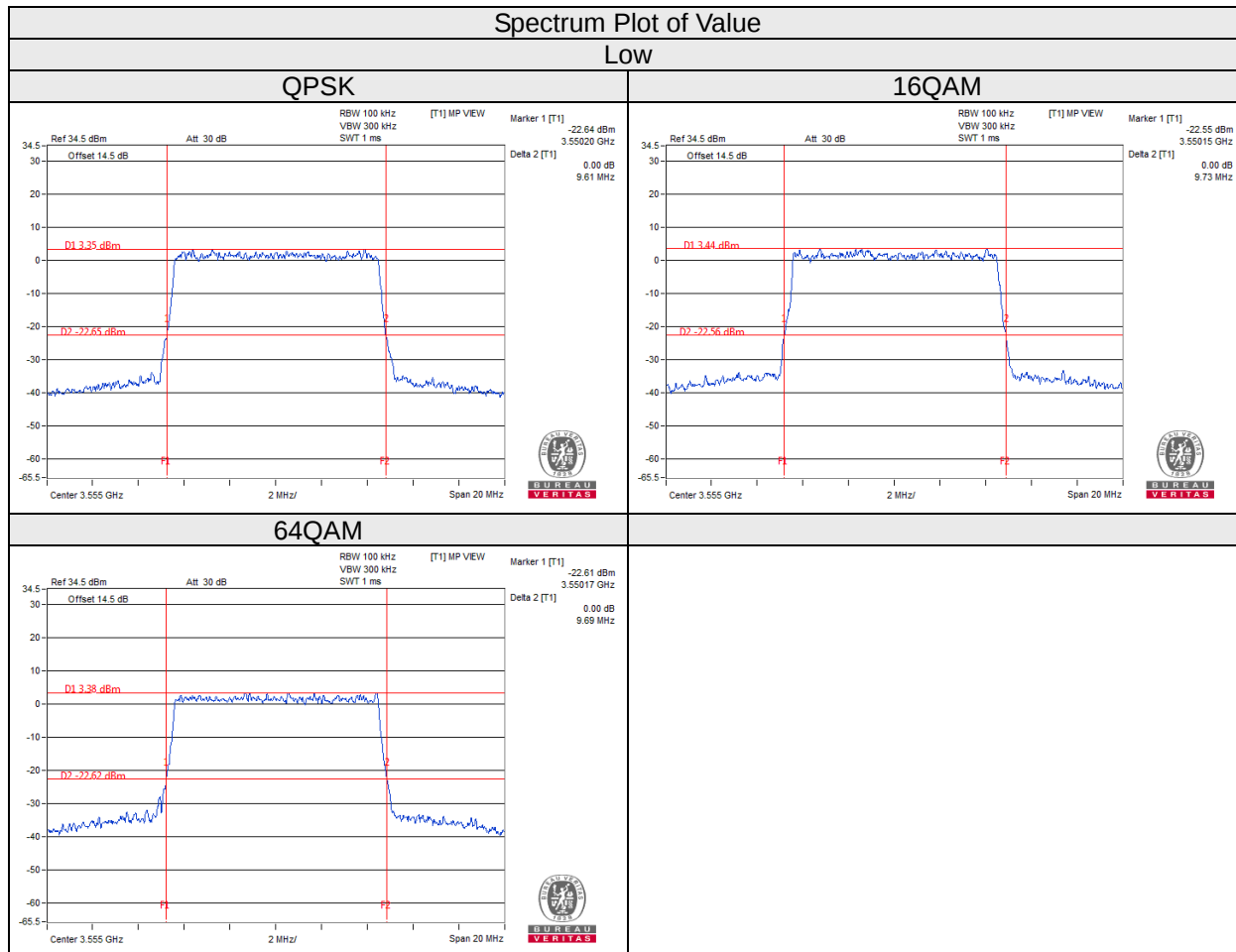
16QAM



64QAM

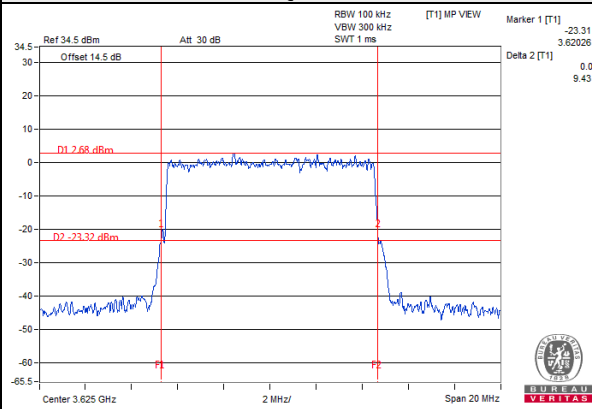


10MHz:

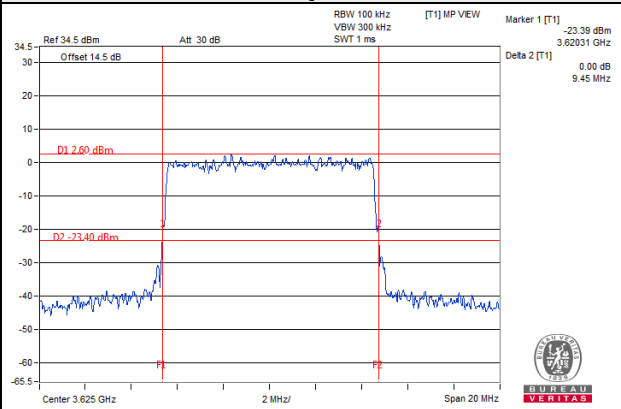


Spectrum Plot of Value Middle

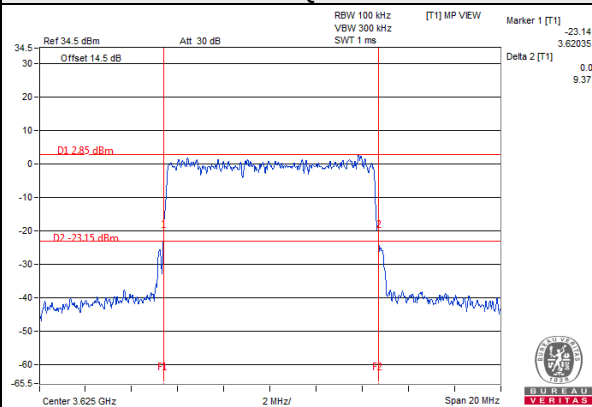
QPSK



16QAM



64QAM

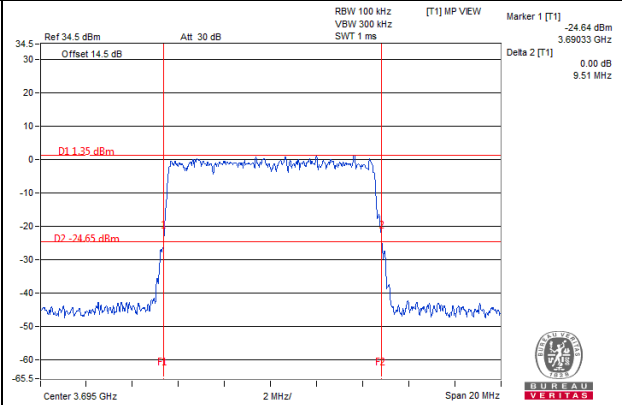
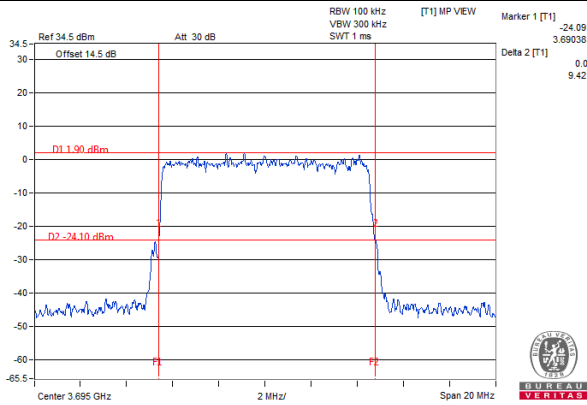


Spectrum Plot of Value

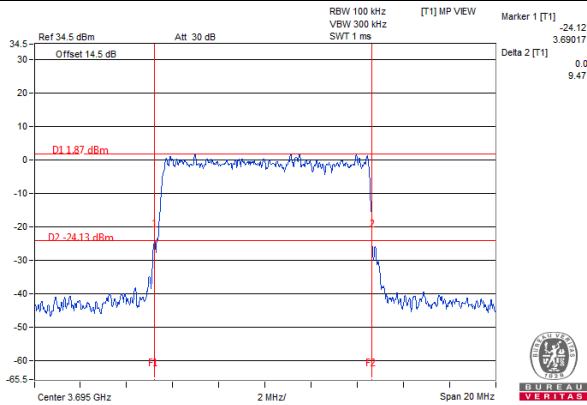
High

QPSK

16QAM



64QAM

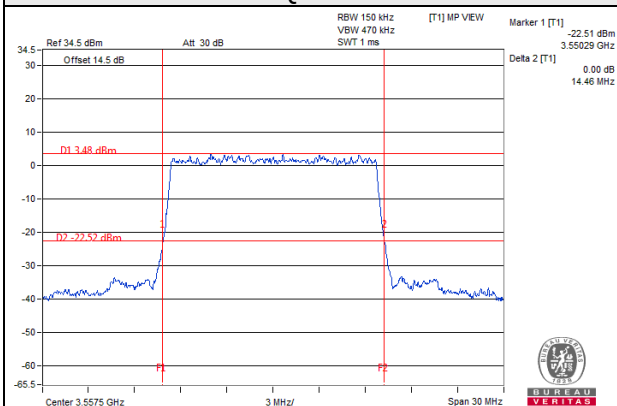


15MHz:

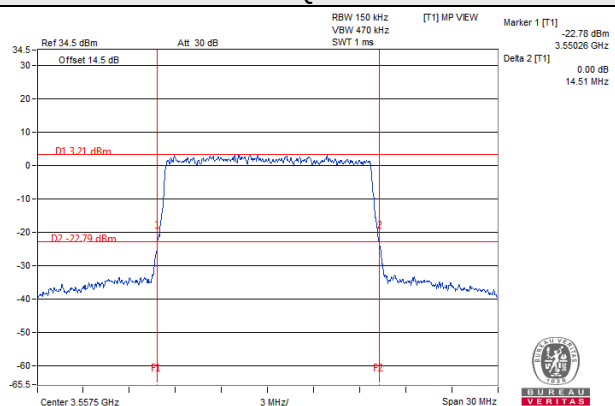
Spectrum Plot of Value

Low

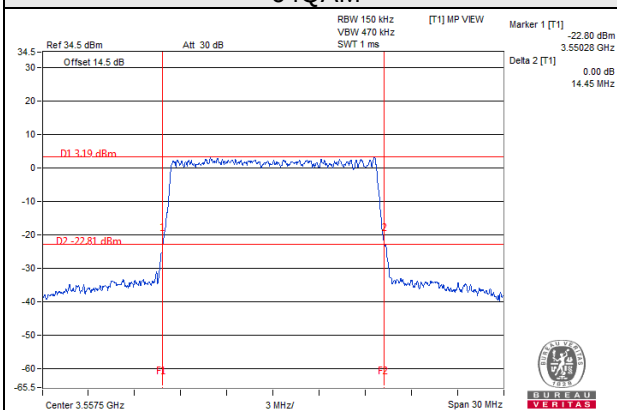
QPSK



16QAM

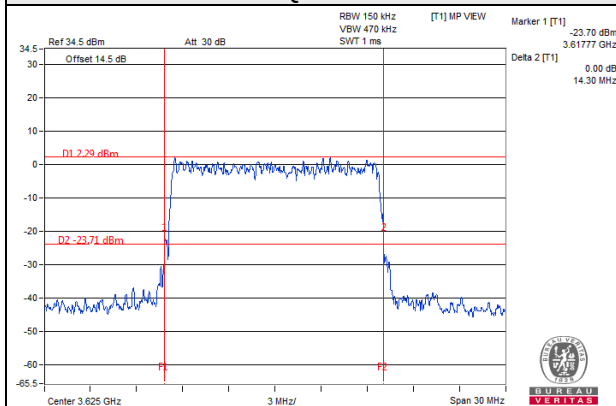


64QAM

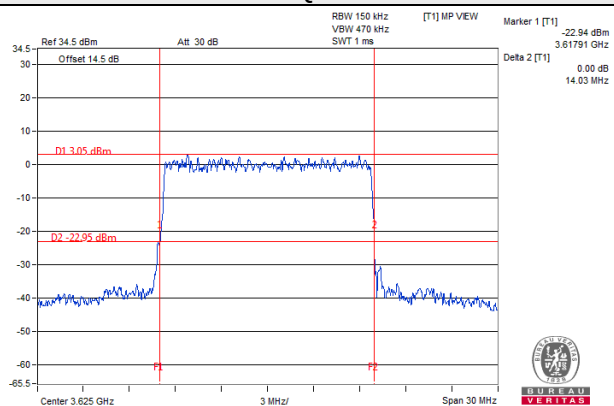


Spectrum Plot of Value Middle

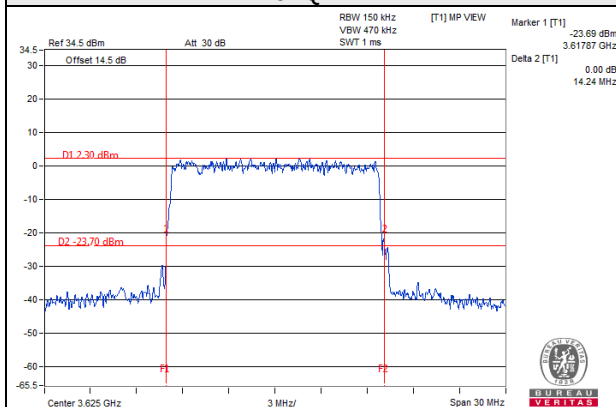
QPSK



16QAM



64QAM

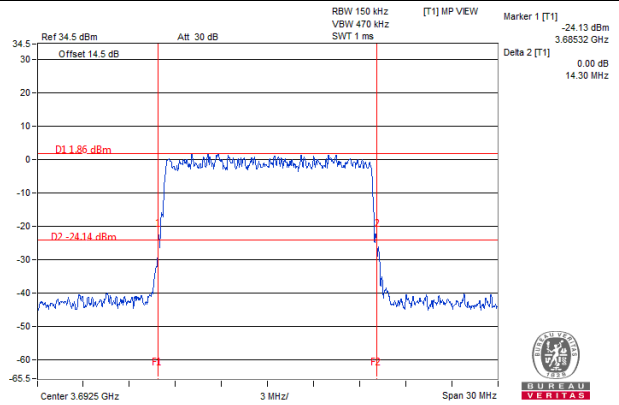
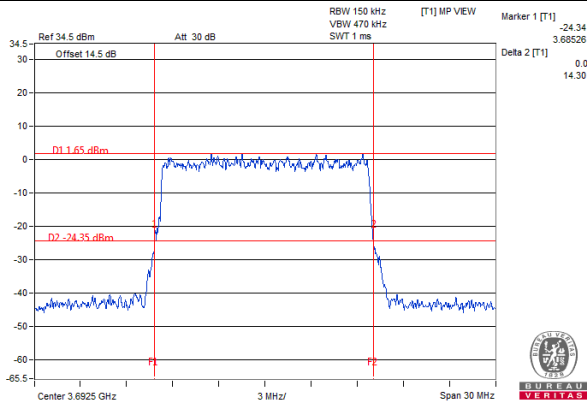


Spectrum Plot of Value

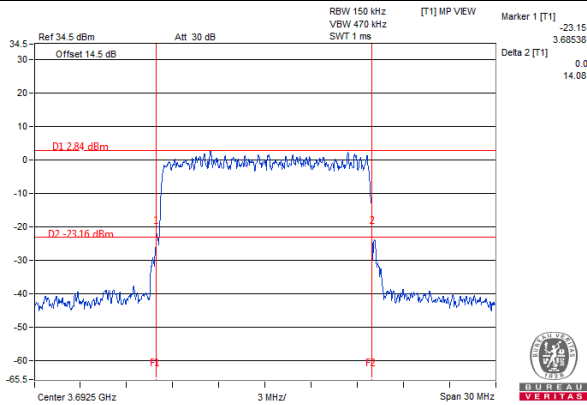
High

QPSK

16QAM



64QAM



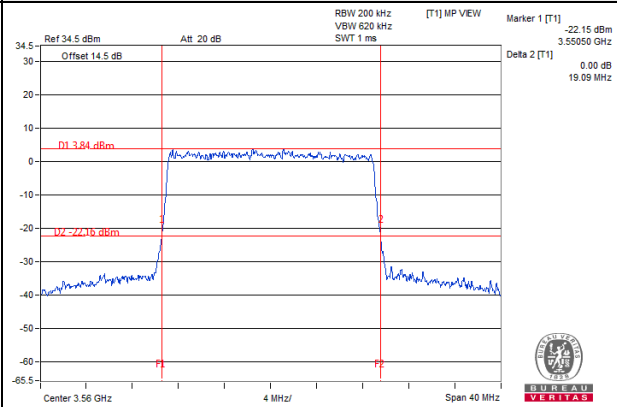
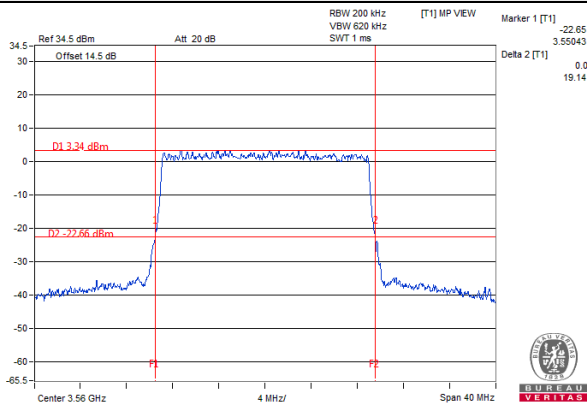
20MHz:

Spectrum Plot of Value

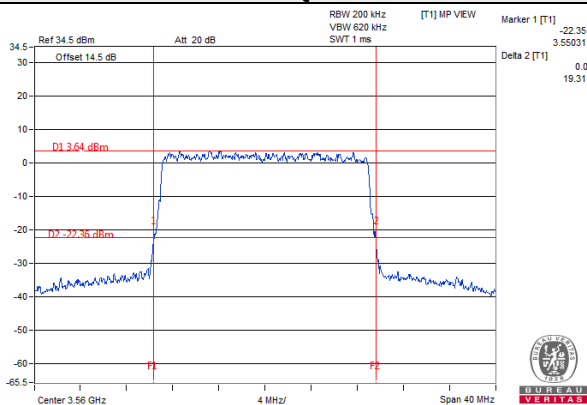
Low

QPSK

16QAM

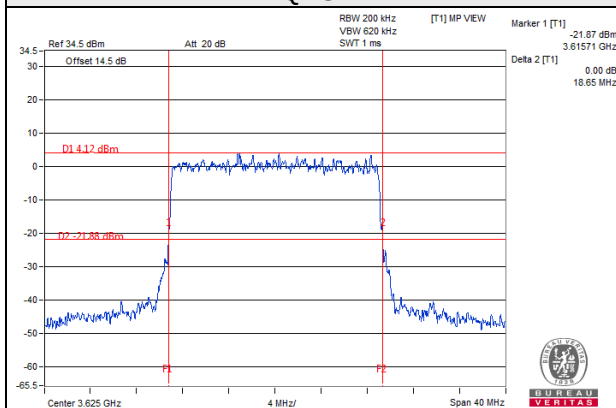


64QAM

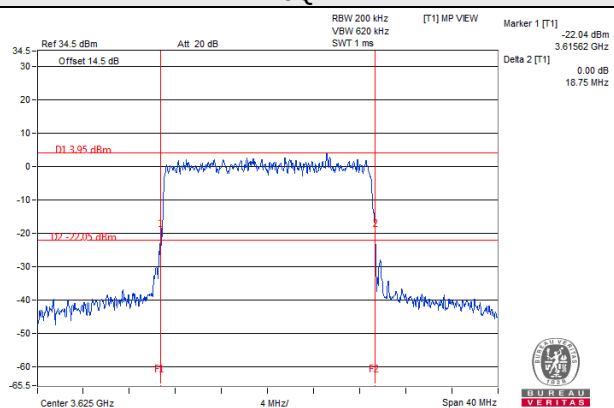


Spectrum Plot of Value Middle

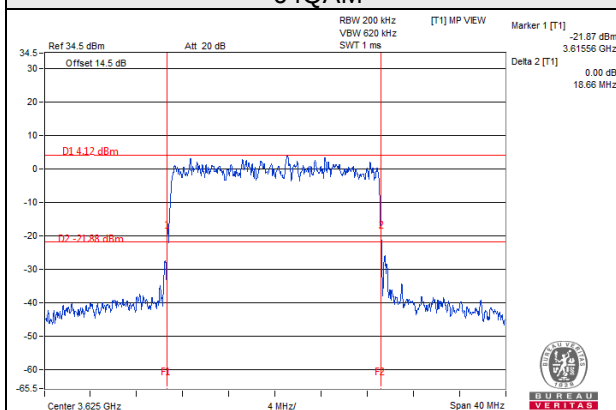
QPSK



16QAM



64QAM

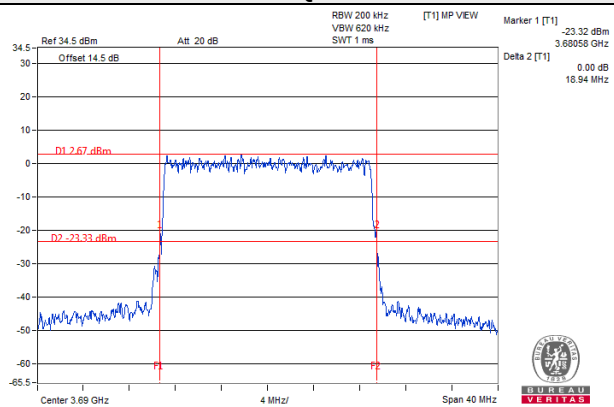
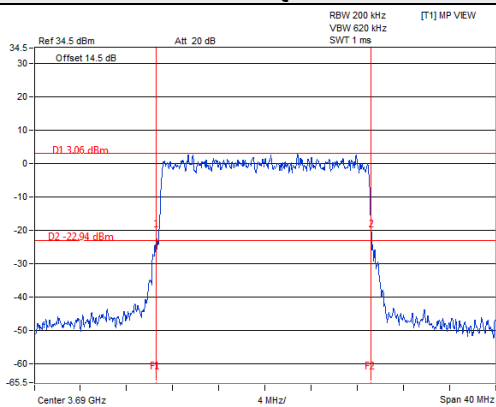


Spectrum Plot of Value

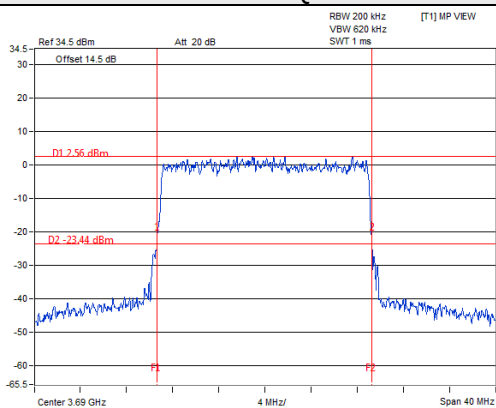
High

QPSK

16QAM



64QAM



4.4.8 Test Result (Occupied Bandwidth)

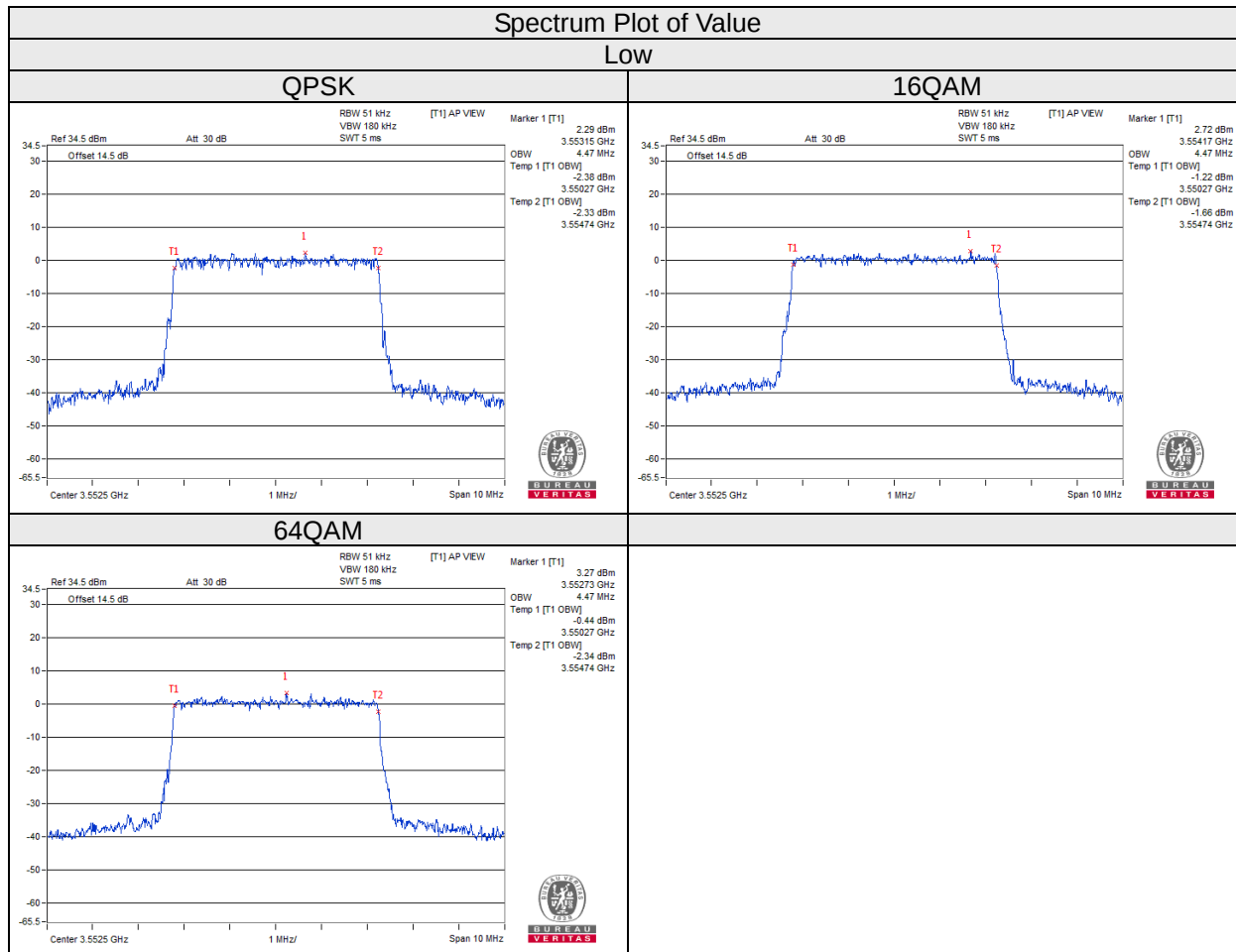
Channel	Freq. (MHz)	OCP 99 Band Width (MHz)		
		5MHz		
		QPSK	16QAM	64QAM
Low	3552.5	4.47	4.47	4.47
Middle	3625	4.46	4.47	4.47
High	3697.5	4.46	4.46	4.45

Channel	Freq. (MHz)	OCP 99 Band Width (MHz)		
		10MHz		
		QPSK	16QAM	64QAM
Low	3555	8.92	8.94	8.92
Middle	3625	8.90	8.94	8.92
High	3695	8.92	8.92	8.92

Channel	Freq. (MHz)	OCP 99 Band Width (MHz)		
		15MHz		
		QPSK	16QAM	64QAM
Low	3557.5	13.38	13.38	13.41
Middle	3625	13.47	13.38	13.38
High	3692.5	13.38	13.38	13.35

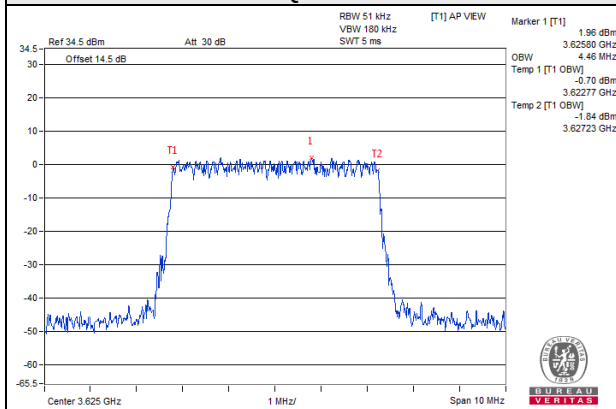
Channel	Freq. (MHz)	OCP 99 Band Width (MHz)		
		20MHz		
		QPSK	16QAM	64QAM
Low	3560	17.92	17.84	17.84
Middle	3625	17.84	17.84	17.84
High	3690	17.92	17.84	17.84

5MHz:

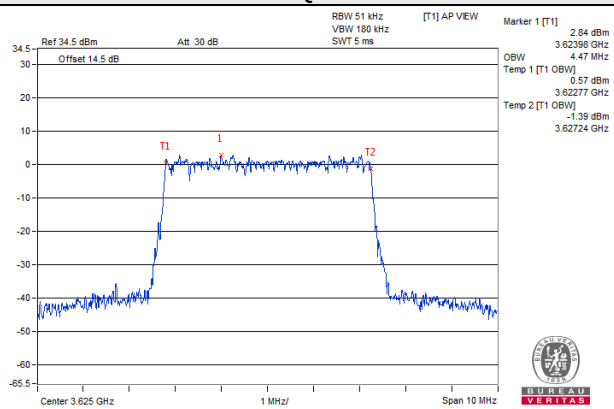


Spectrum Plot of Value Middle

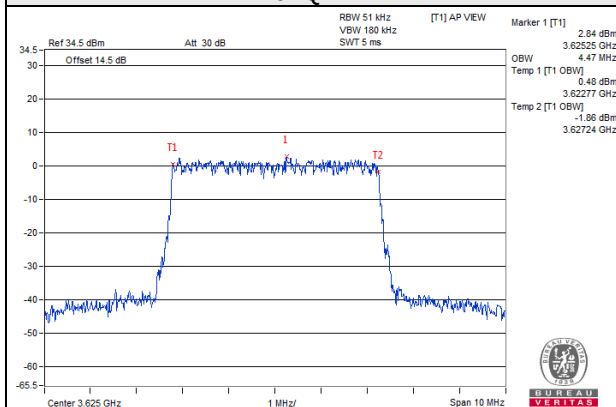
QPSK



16QAM



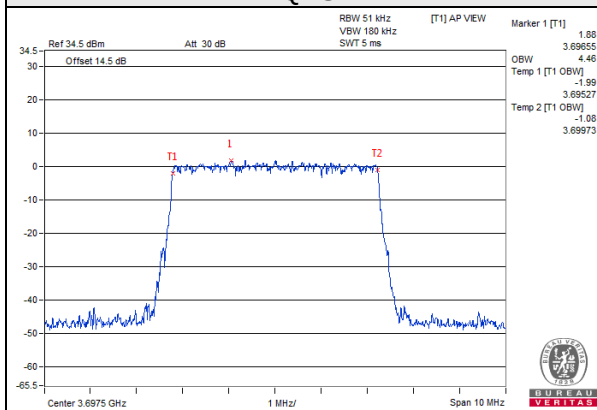
64QAM



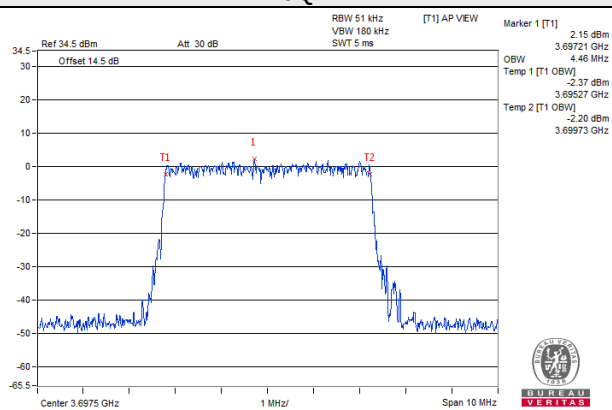
Spectrum Plot of Value

High

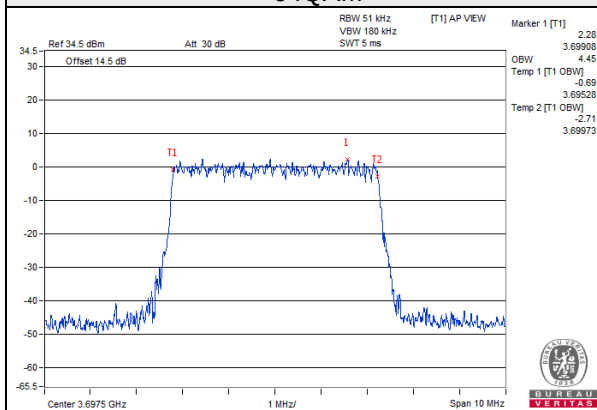
QPSK



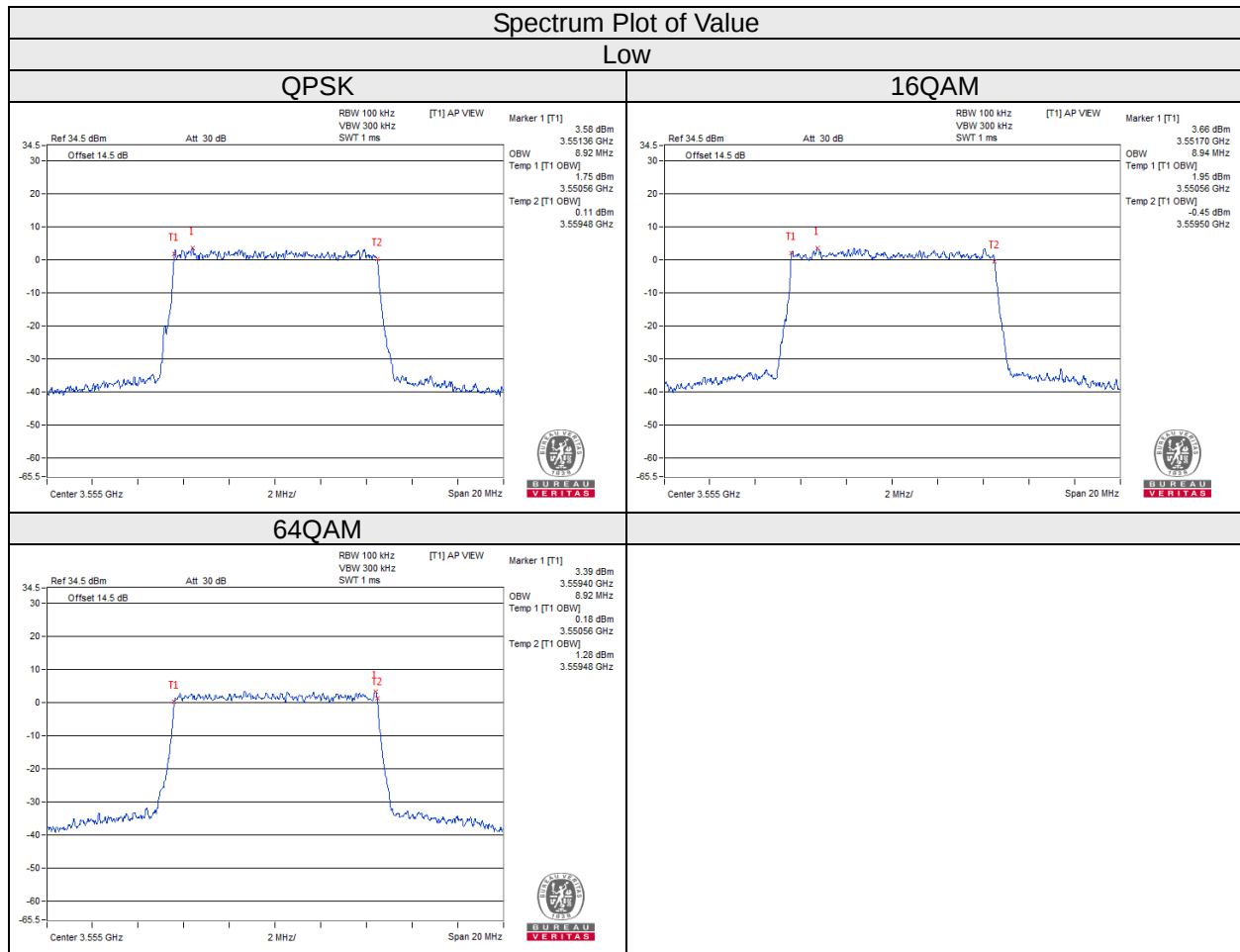
16QAM



64QAM

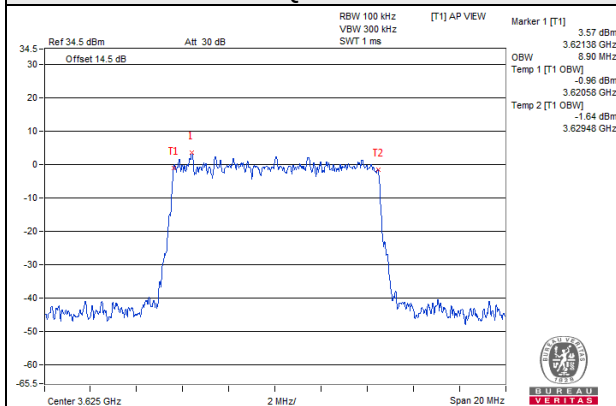


10MHz:

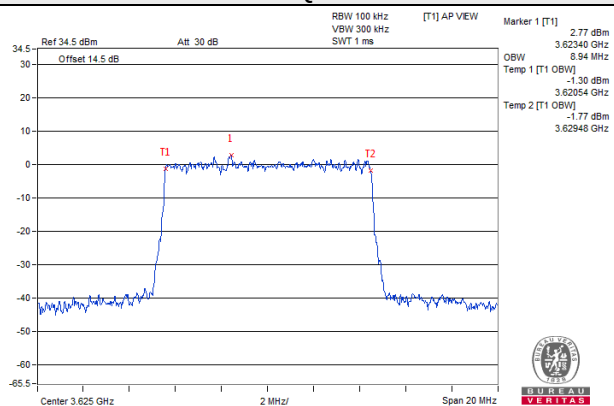


Spectrum Plot of Value Middle

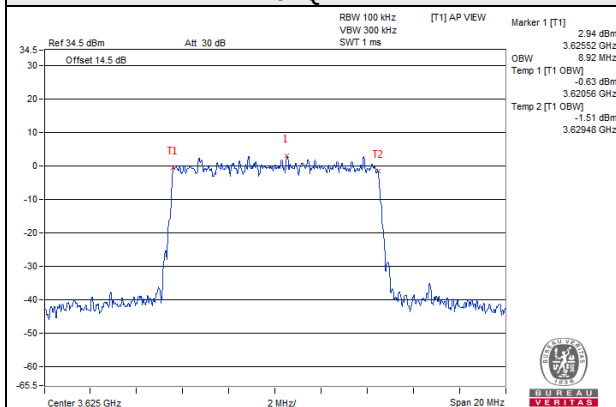
QPSK



16QAM



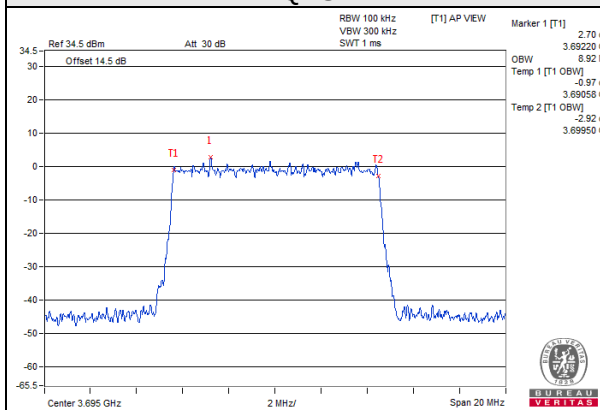
64QAM



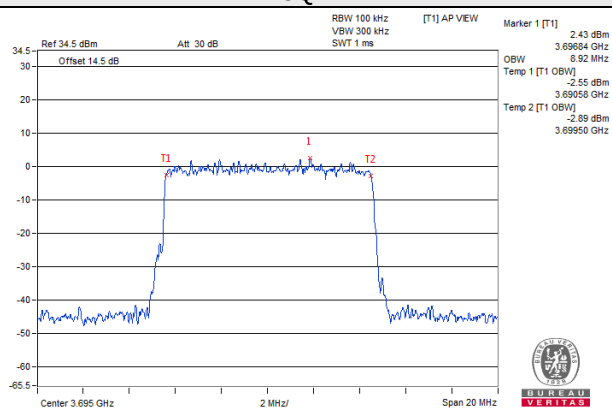
Spectrum Plot of Value

High

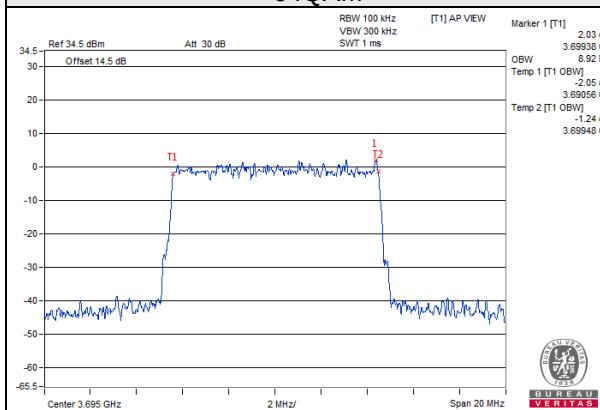
QPSK



16QAM



64QAM



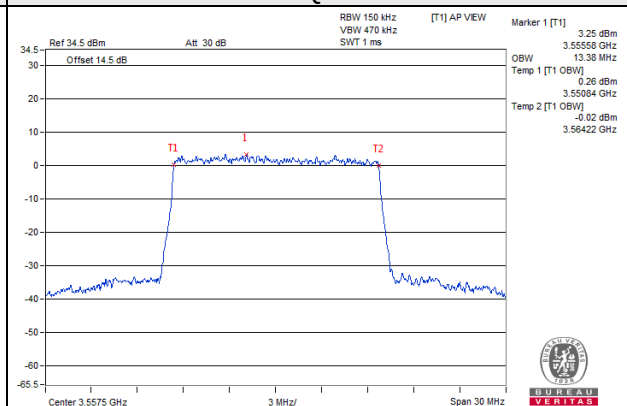
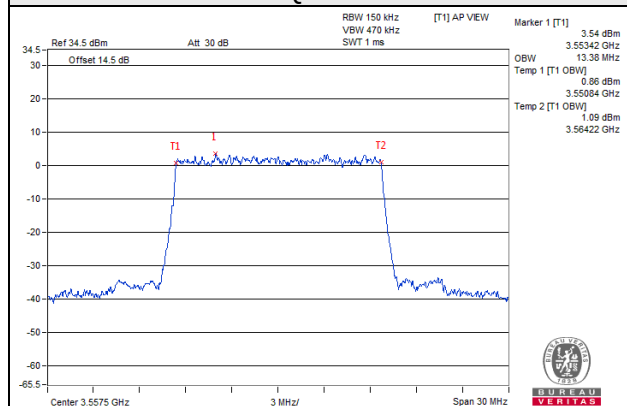
15MHz:

Spectrum Plot of Value

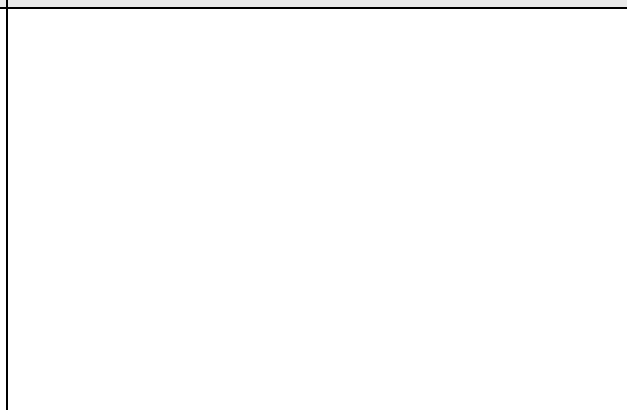
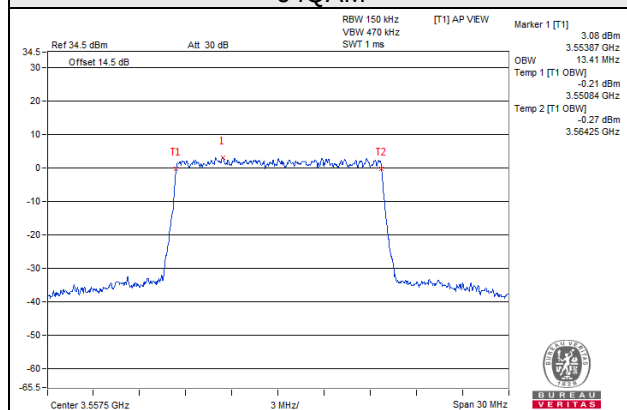
Low

QPSK

16QAM

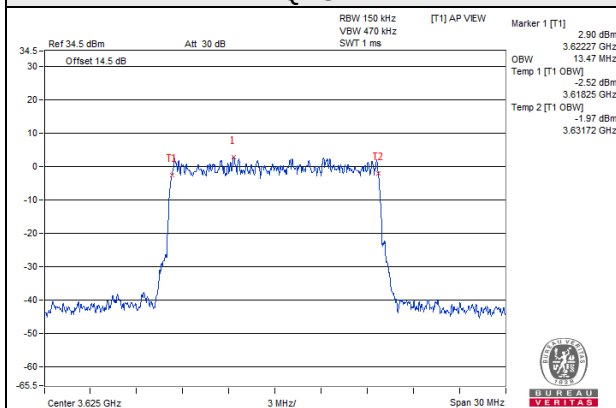


64QAM

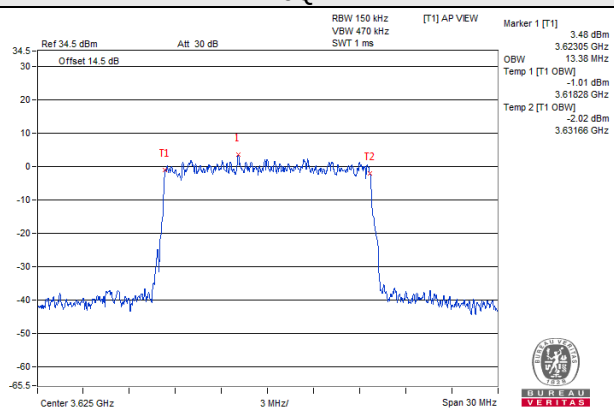


Spectrum Plot of Value Middle

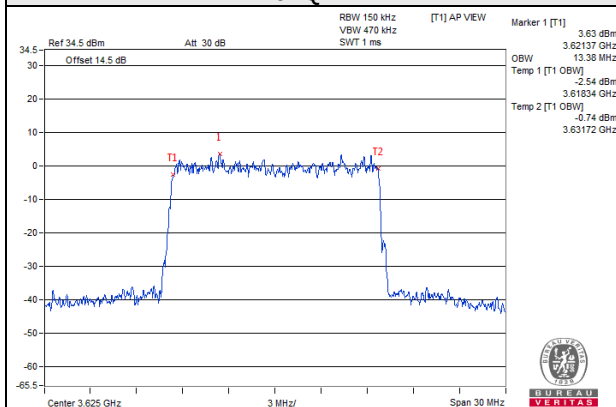
QPSK



16QAM



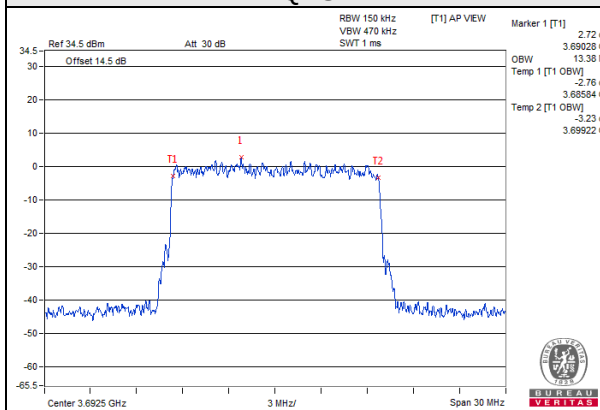
64QAM



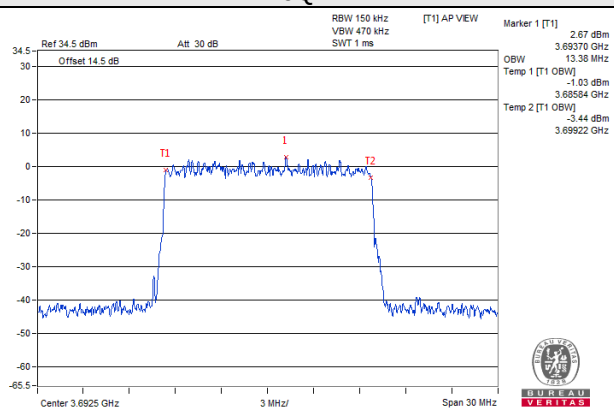
Spectrum Plot of Value

High

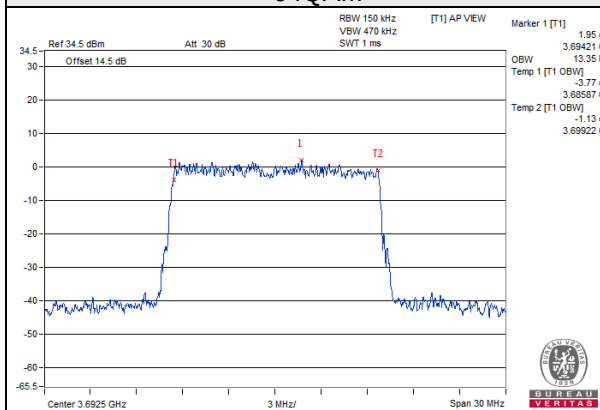
QPSK



16QAM



64QAM



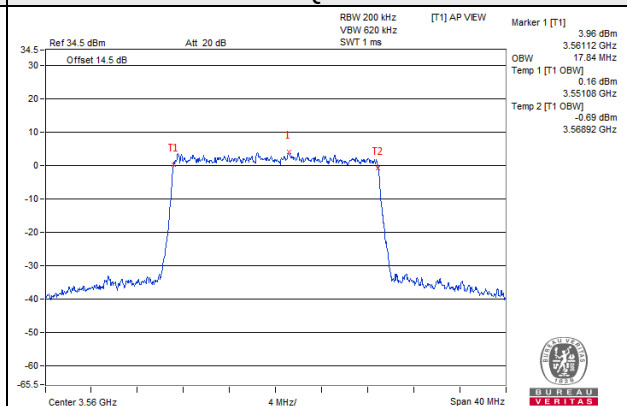
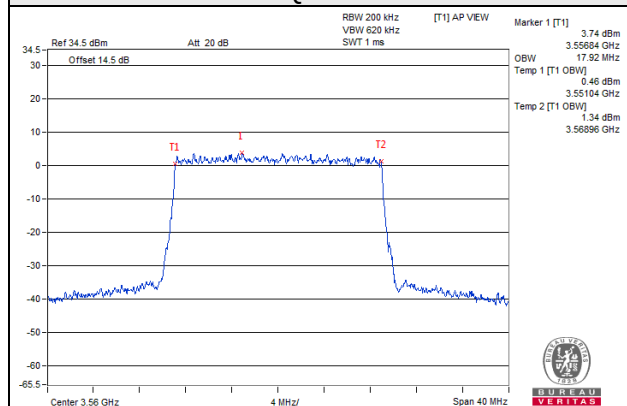
20MHz:

Spectrum Plot of Value

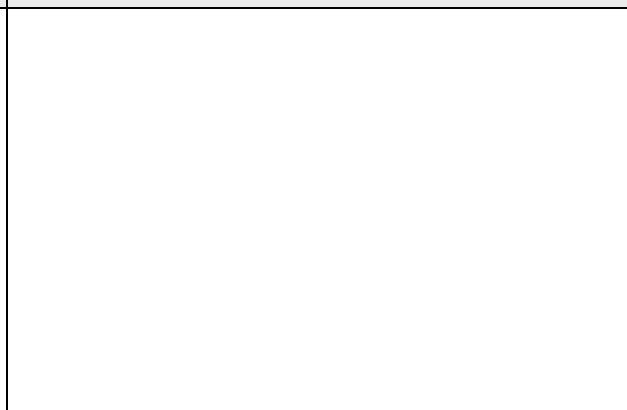
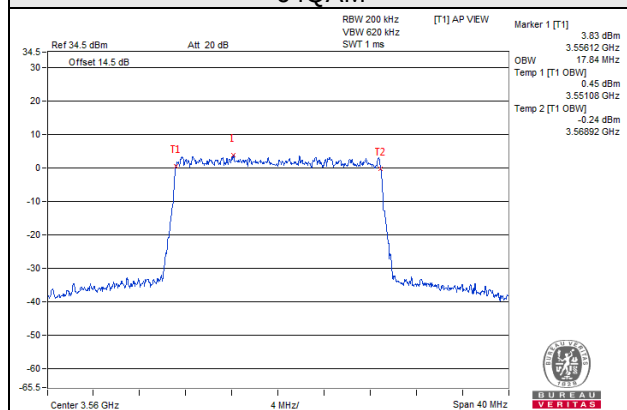
Low

QPSK

16QAM

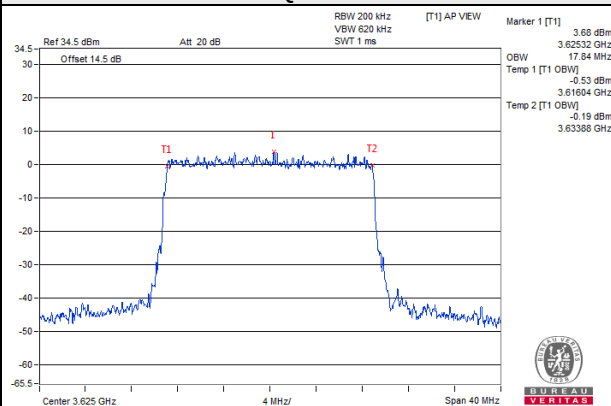


64QAM

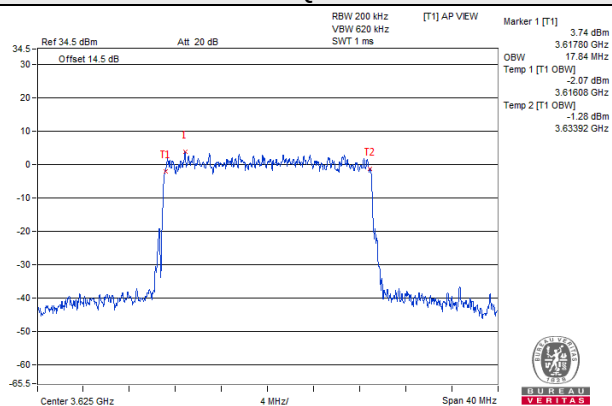


Spectrum Plot of Value Middle

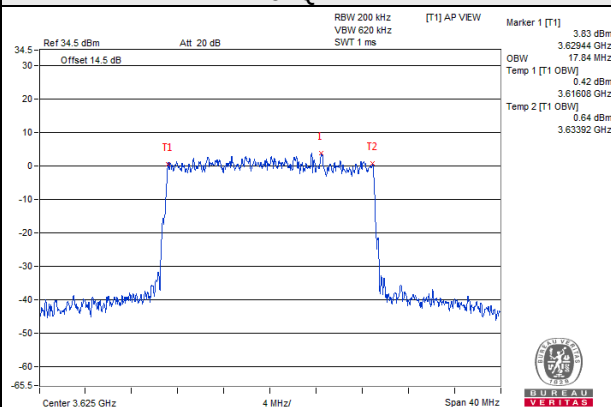
QPSK



16QAM



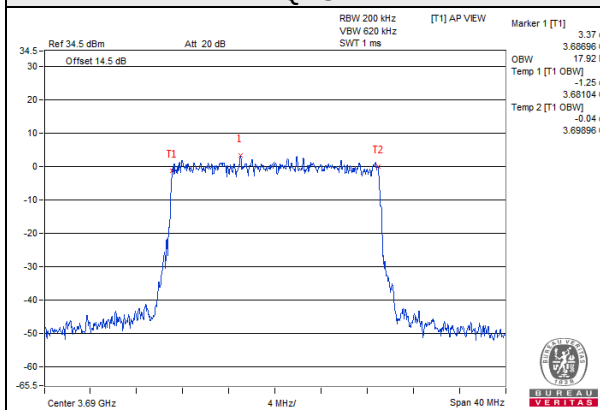
64QAM



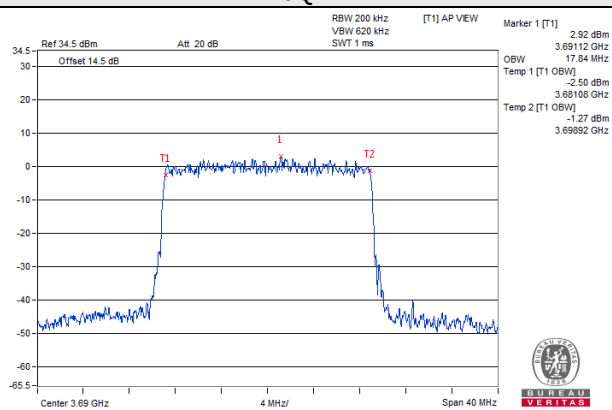
Spectrum Plot of Value

High

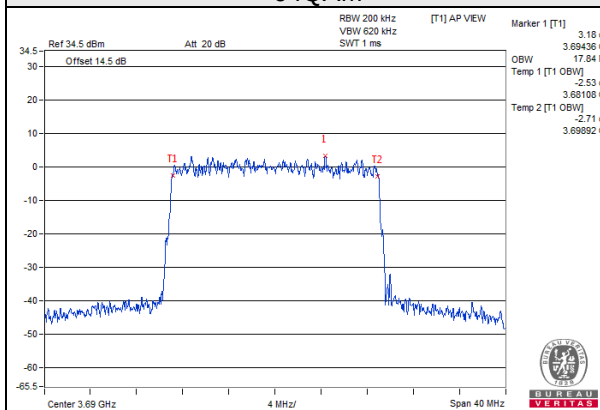
QPSK



16QAM



64QAM

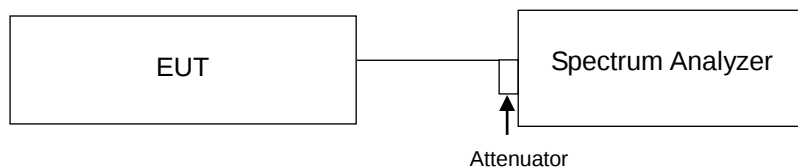


4.5 Peak to Average Ratio

4.5.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

4.5.2 Test Setup



4.5.3 Test Procedures

- Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Record the maximum PAPR level associated with a probability of 0.1%.

4.5.4 Test Results

Channel	Freq. (MHz)	Peak to Average Ratio (dB)			Limit(dB)	Pass /Fail
		5MHz				
		QPSK	16QAM	64QAM		
Low	3552.5	4.98	6.24	7.05	13	Pass
Middle	3625	4.85	6.21	7.13	13	Pass
High	3697.5	4.87	6.03	6.69	13	Pass

Channel	Freq. (MHz)	Peak to Average Ratio (dB)			Limit(dB)	Pass /Fail
		10MHz				
		QPSK	16QAM	64QAM		
Low	3555	4.98	6.36	6.96	13	Pass
Middle	3625	4.87	6.26	6.78	13	Pass
High	3695	4.84	6.08	6.78	13	Pass

Channel	Freq. (MHz)	Peak to Average Ratio (dB)			Limit(dB)	Pass /Fail
		15MHz				
		QPSK	16QAM	64QAM		
Low	3557.5	5.19	6.45	6.98	13	Pass
Middle	3625	4.98	6.25	6.81	13	Pass
High	3692.5	4.93	6.11	6.67	13	Pass

Channel	Freq. (MHz)	Peak to Average Ratio (dB)			Limit(dB)	Pass /Fail
		20MHz				
		QPSK	16QAM	64QAM		
Low	3560	4.96	6.22	6.90	13	Pass
Middle	3625	4.81	6.12	6.74	13	Pass
High	3690	4.82	6.03	6.73	13	Pass

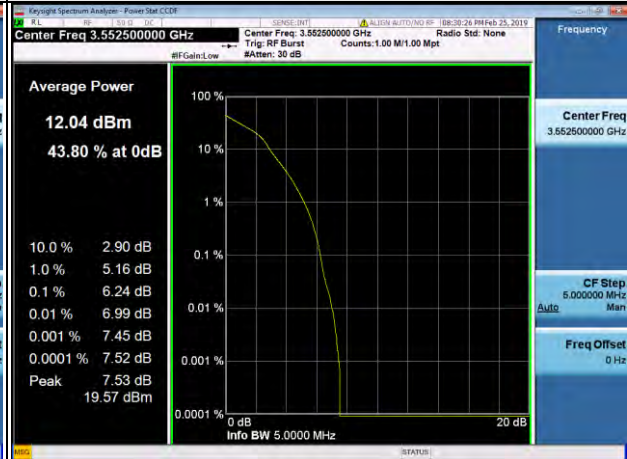
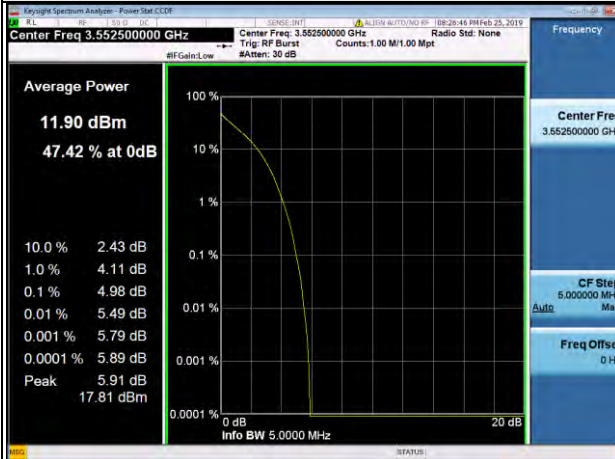
5MHz:

Spectrum Plot of Value

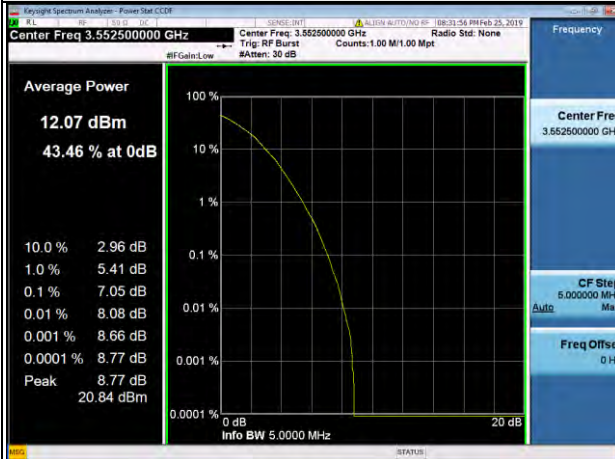
Low

QPSK

16QAM

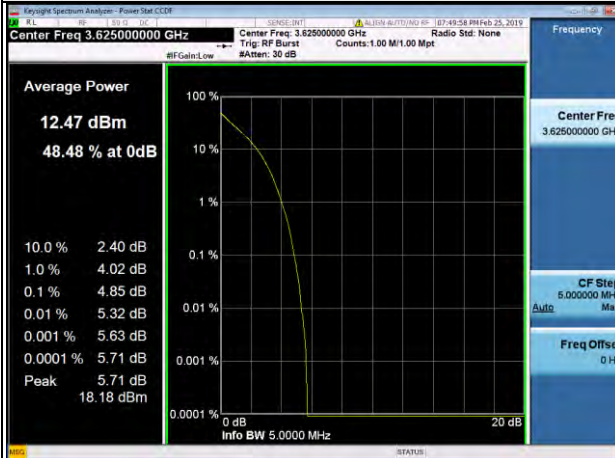


64QAM

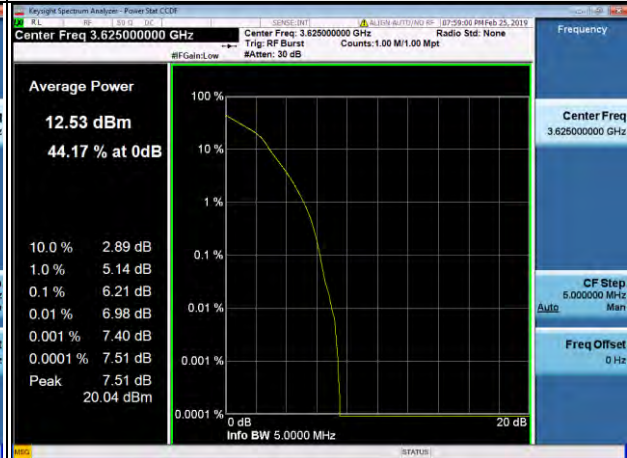


Middle

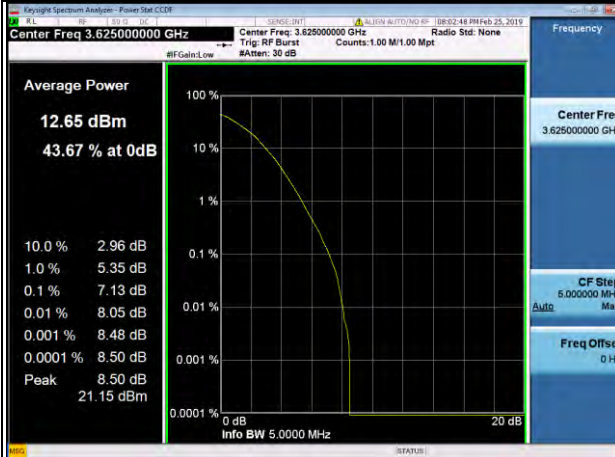
QPSK



16QAM

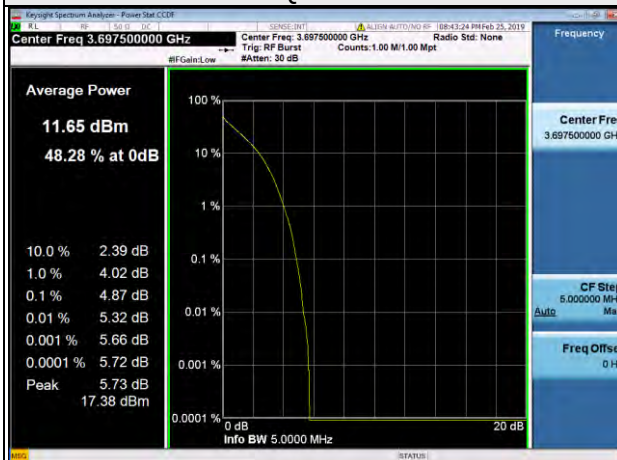


64QAM



High

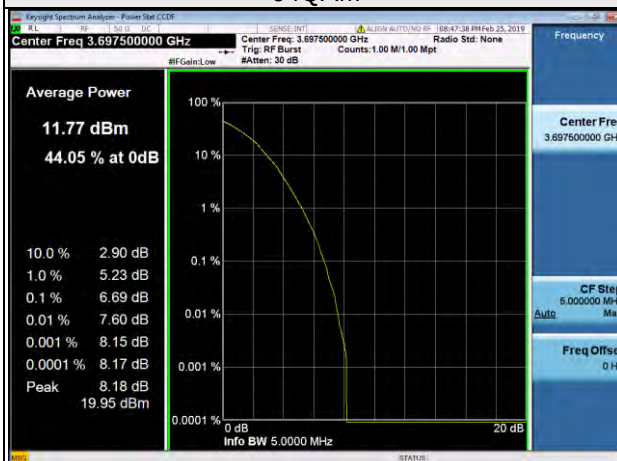
QPSK



16QAM



64QAM

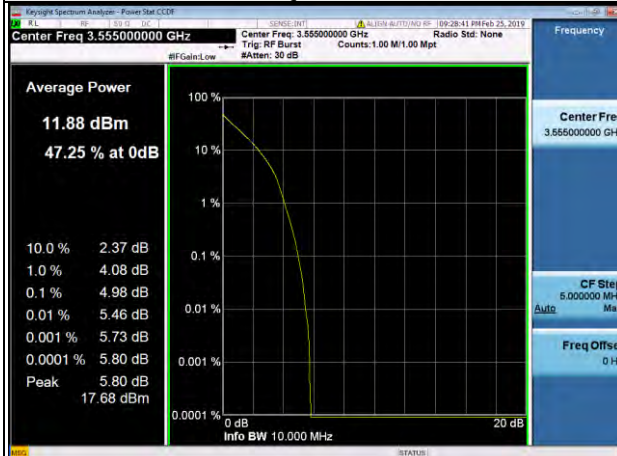


10MHz:

Spectrum Plot of Value

Low

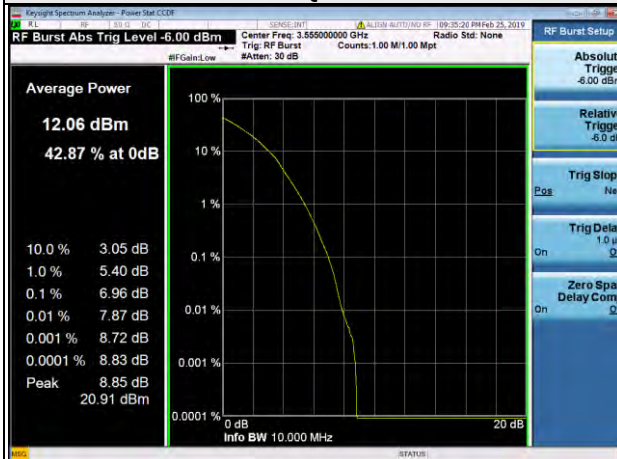
QPSK



16QAM

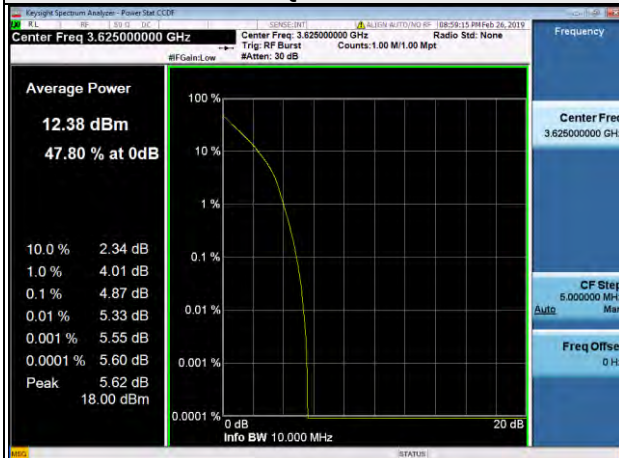


64QAM

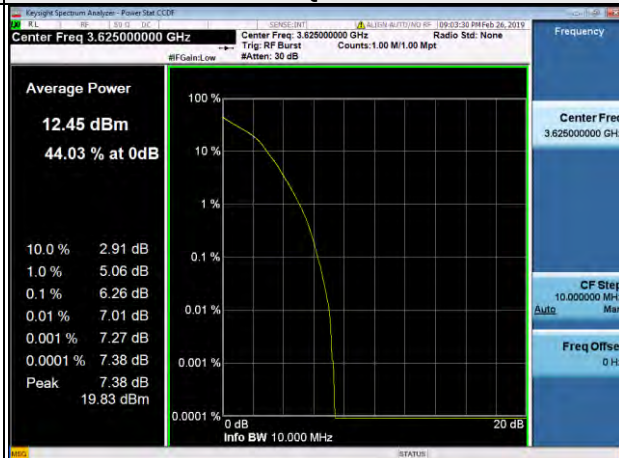


Middle

QPSK



16QAM

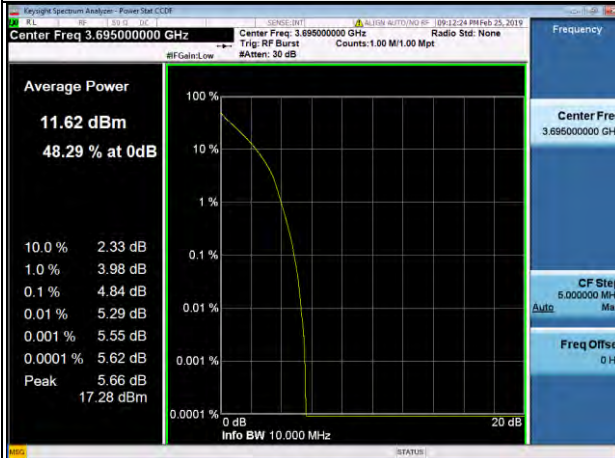


64QAM

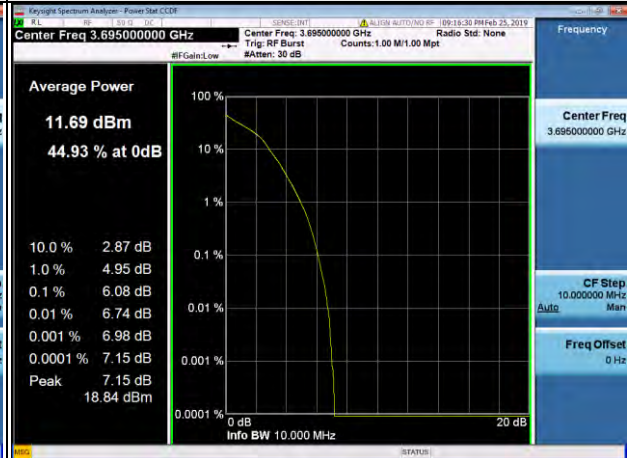


High

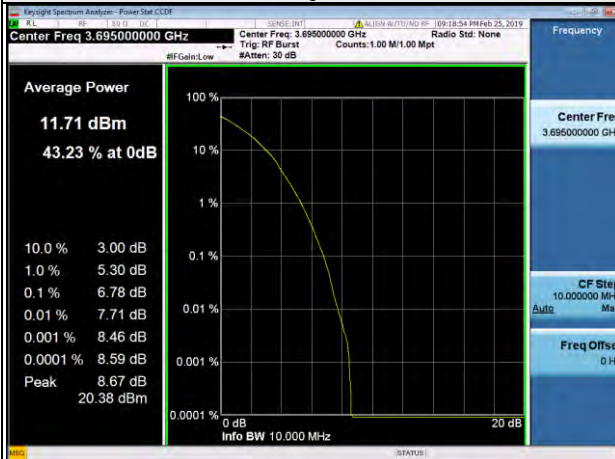
QPSK



16QAM



64QAM

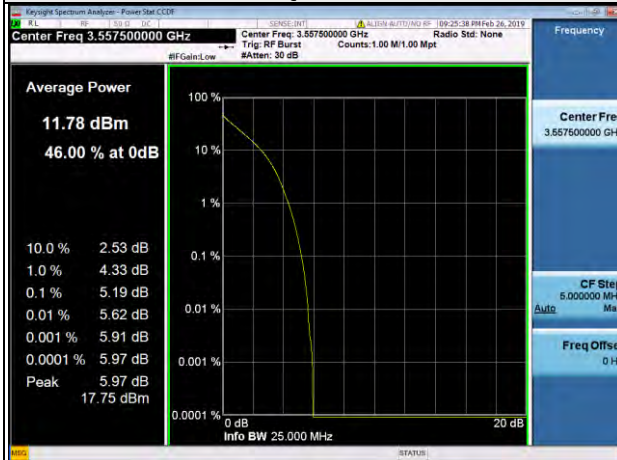


15MHz:

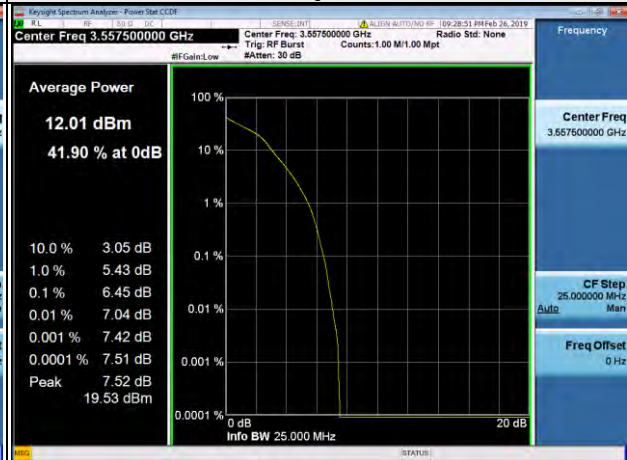
Spectrum Plot of Value

Low

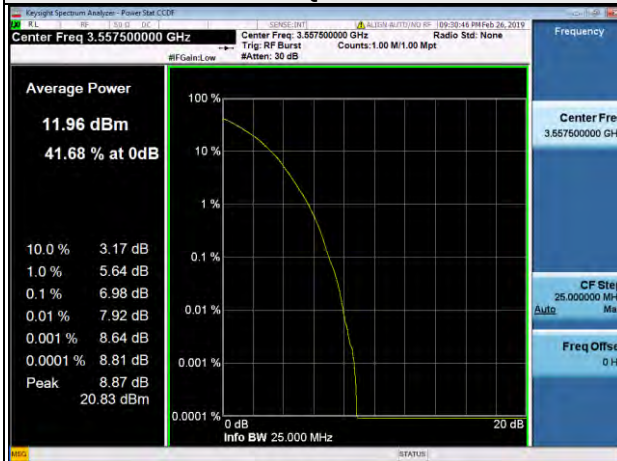
QPSK



16QAM

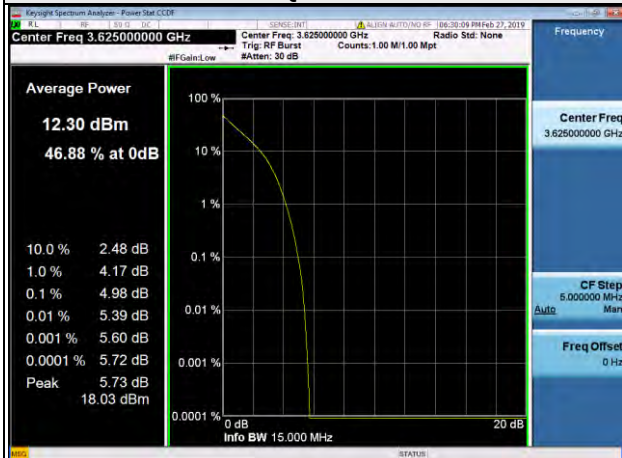


64QAM

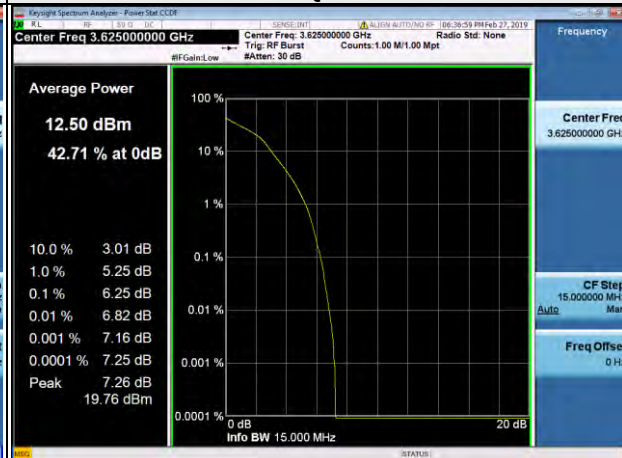


Middle

QPSK



16QAM

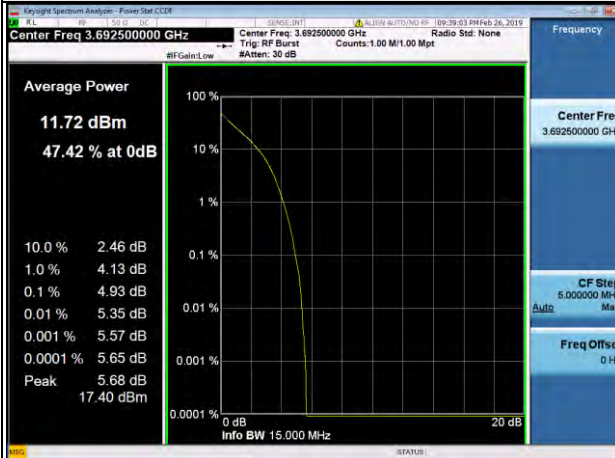


64QAM

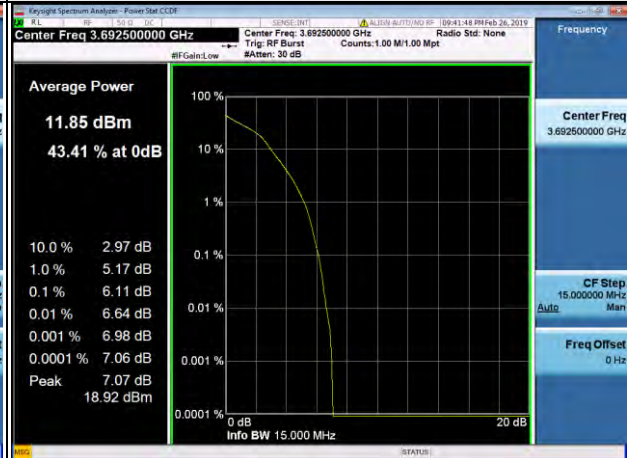


High

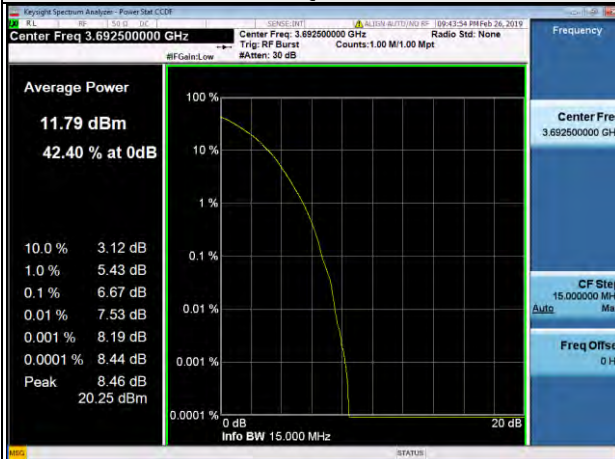
QPSK



16QAM



64QAM

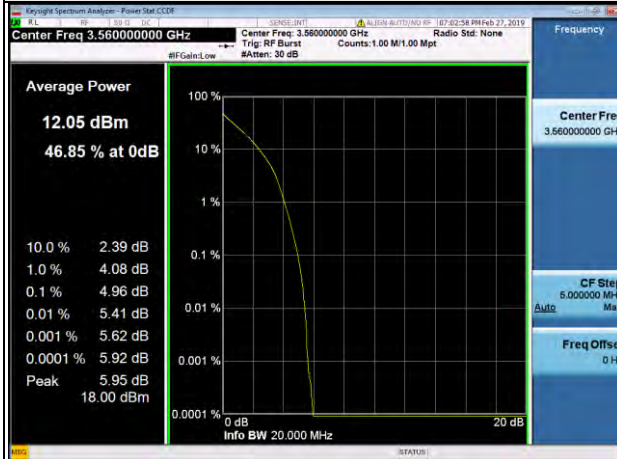


20MHz:

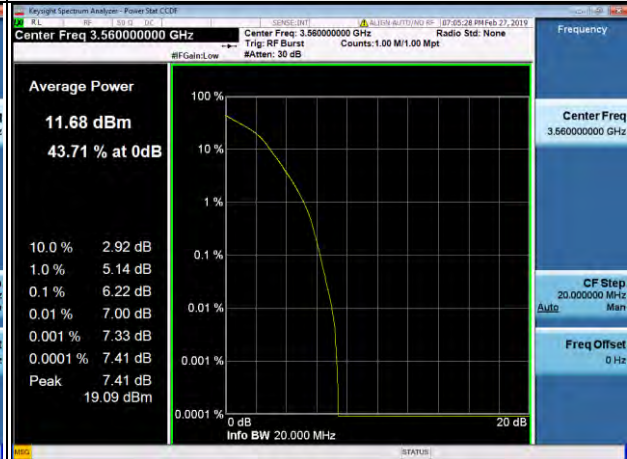
Spectrum Plot of Value

Low

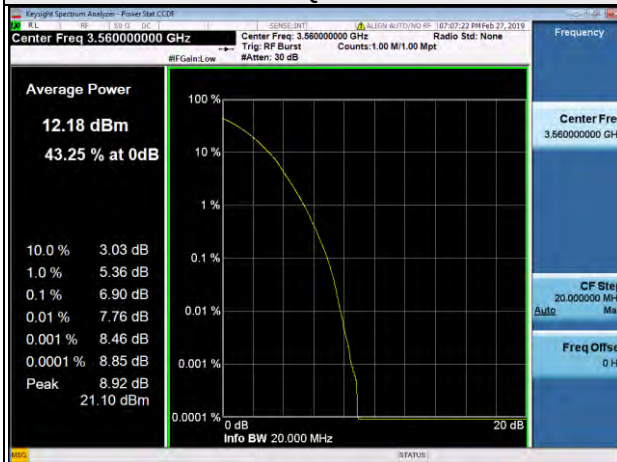
QPSK



16QAM

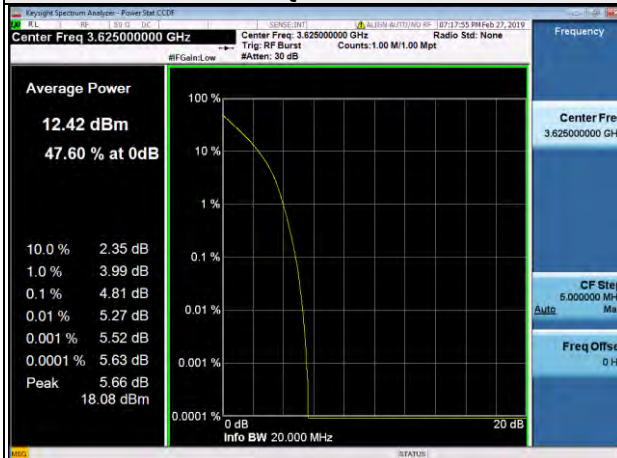


64QAM

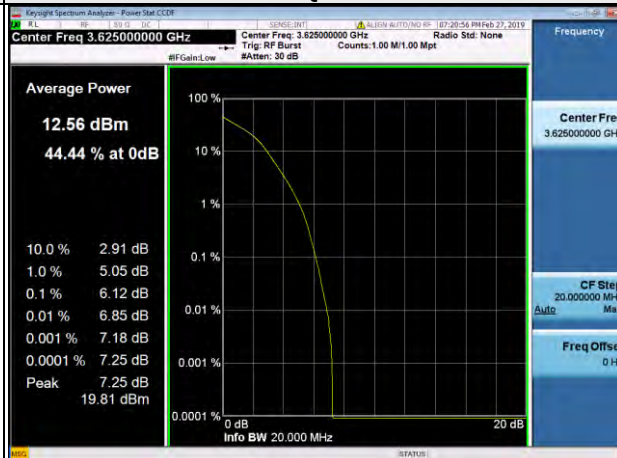


Middle

QPSK



16QAM

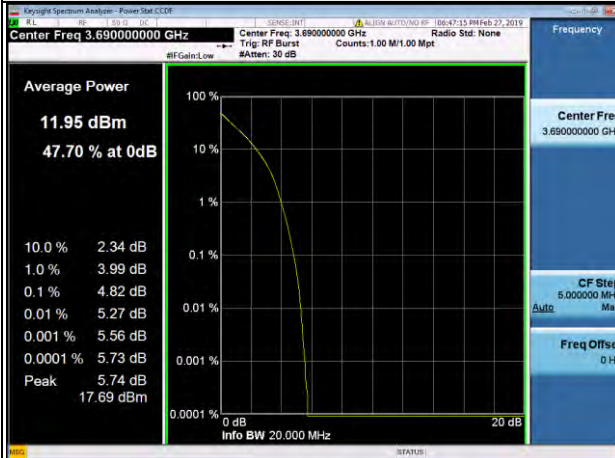


64QAM

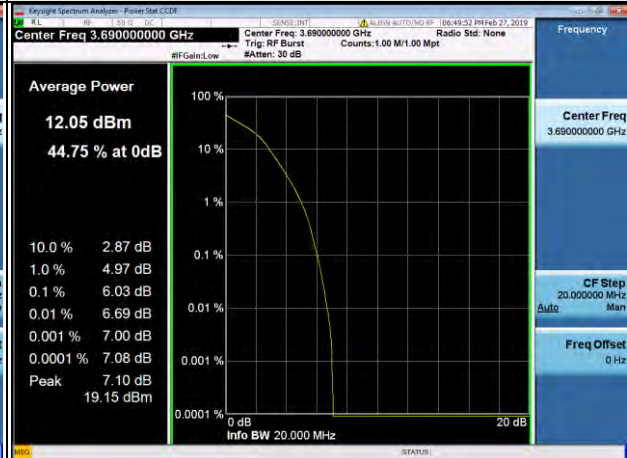


High

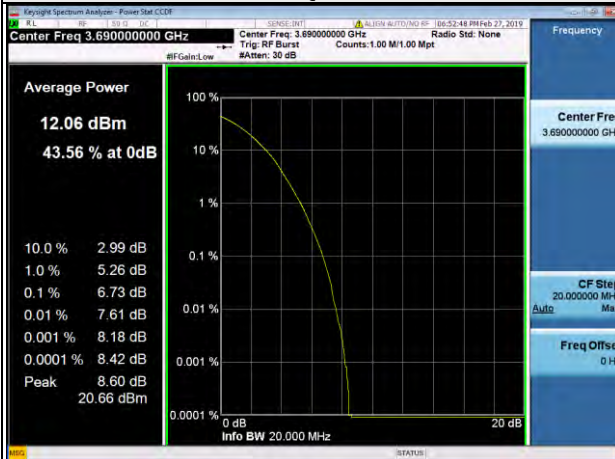
QPSK



16QAM



64QAM

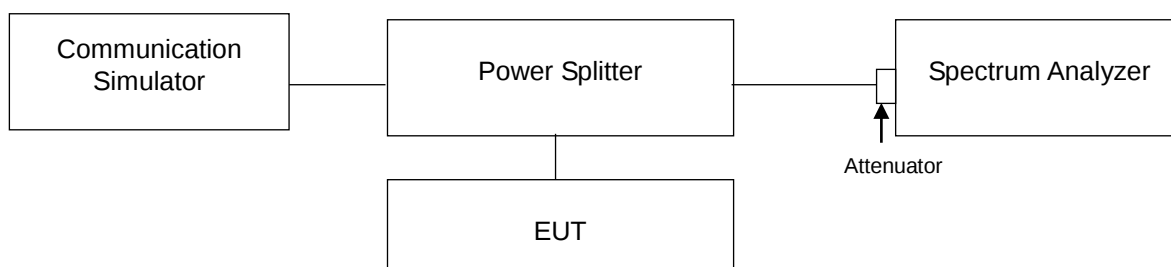


4.6 Conducted Spurious Emissions

4.6.1 Limits of Conducted Spurious Emissions Measurement

Power of any emissions outside the Fundamental	Limit
Within 0-10MHz above the Assigned Channel	-13 dBm/MHz
Within 0-10MHz below the Assigned Channel	
Greater than 10MHz above the Assigned Channel	-25 dBm/MHz
Greater than 10MHz below the Assigned Channel	
Power of any emission below 3530MHz	-40 dBm/MHz
Power of any emission above 3720MHz	

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.6.4 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 37.5 GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

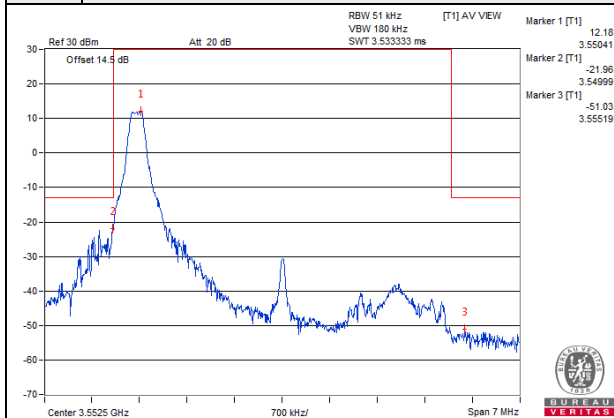
4.6.5 Test Results

LTE Band 48

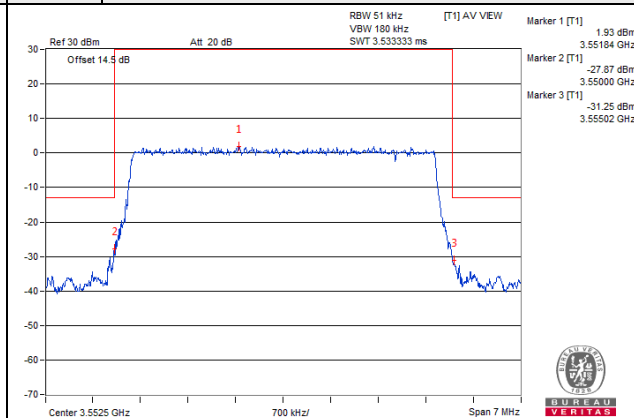
Channel Bandwidth 5MHz QPSK

Low Channel 3552.5MHz

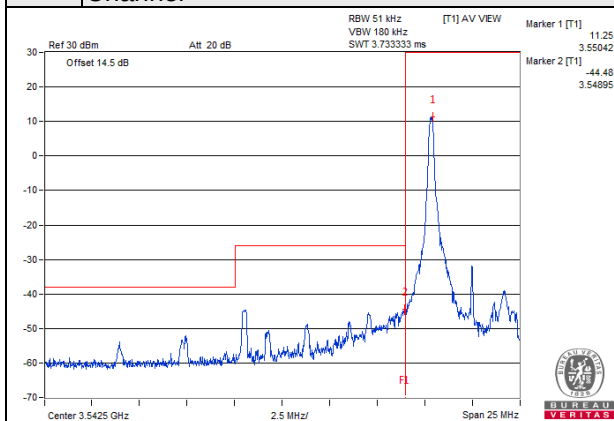
1 RB Within 1MHz outside the designated channel



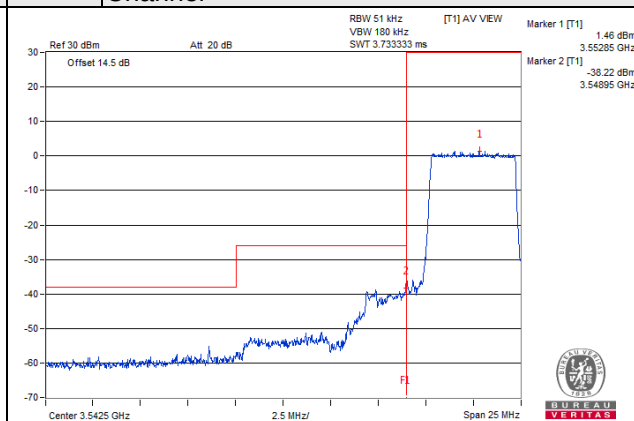
Full RB Within 1MHz outside the designated channel



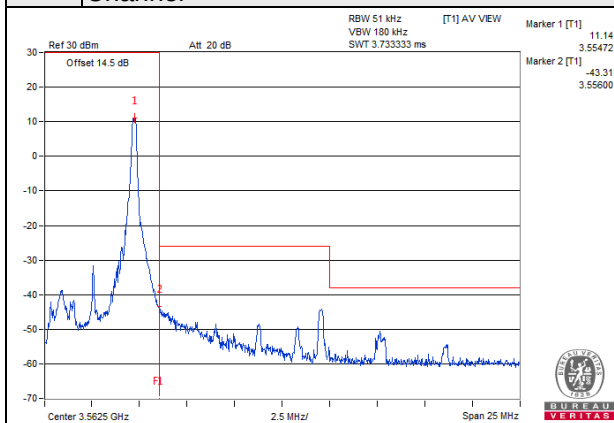
1 RB Greater than 1MHz below the Assigned Channel



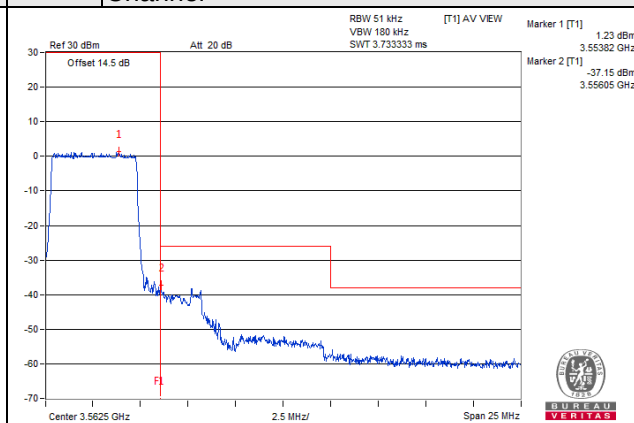
Full RB Greater than 1MHz below the Assigned Channel



1 RB Greater than 1MHz above the Assigned Channel



Full RB Greater than 1MHz above the Assigned Channel



NOTE:

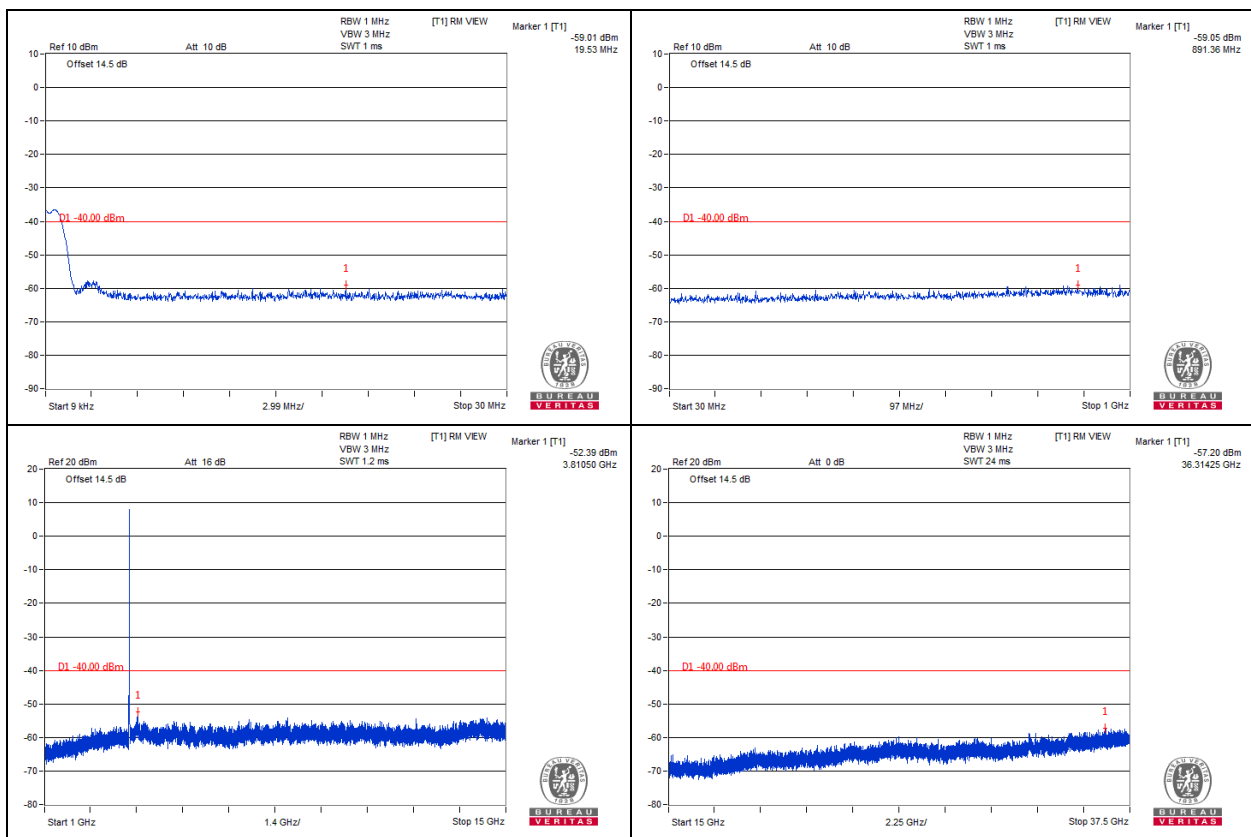
1MHz outside of designated channel needs to reduce the limit, When measured RBW less than 1MHz.

Within 1-10MHz above the Assigned channel Limit is $-13+10*\text{Log}(51\text{kHz}/1\text{MHz}) = -25.92 \text{ dBm}$

Within 1-10MHz below the Assigned channel Limit is $-13+10*\text{Log}(51\text{kHz}/1\text{MHz}) = -25.92 \text{ dBm}$

10MHz above the Assigned channel Limit is $-25+10*\text{Log}(51\text{kHz}/1\text{MHz}) = -37.92 \text{ dBm}$

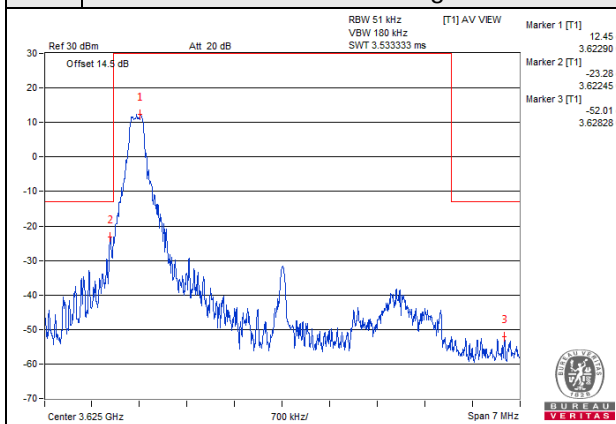
10MHz below the Assigned channel Limit is $-25+10*\text{Log}(51\text{kHz}/1\text{MHz}) = -37.92 \text{ dBm}$



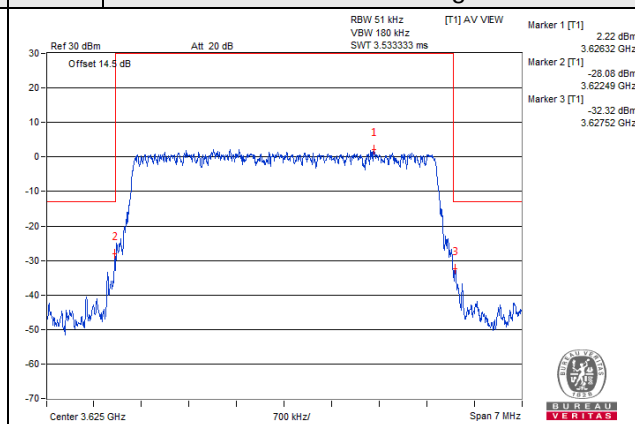
Channel Bandwidth 5MHz QPSK

Middle Channel 3625MHz

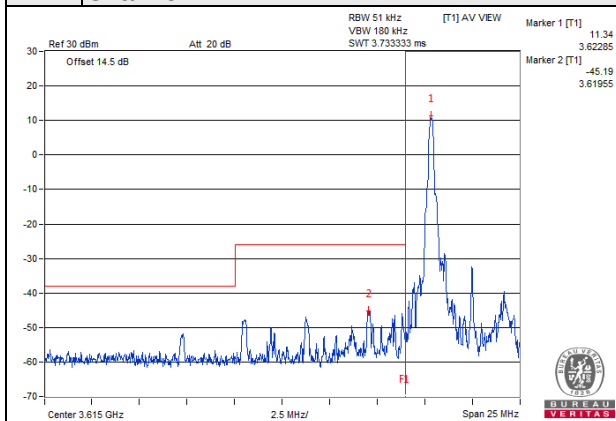
1 RB Within 1MHz outside the designated channel



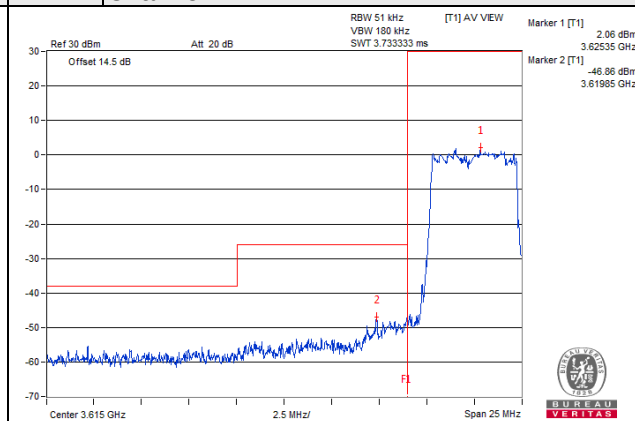
Full RB Within 1MHz outside the designated channel



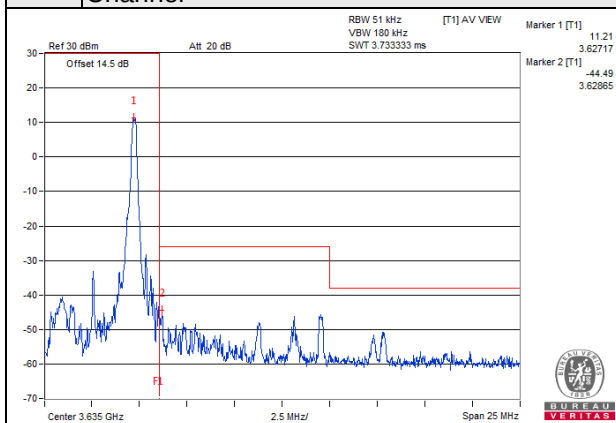
1 RB Greater than 1MHz below the Assigned Channel



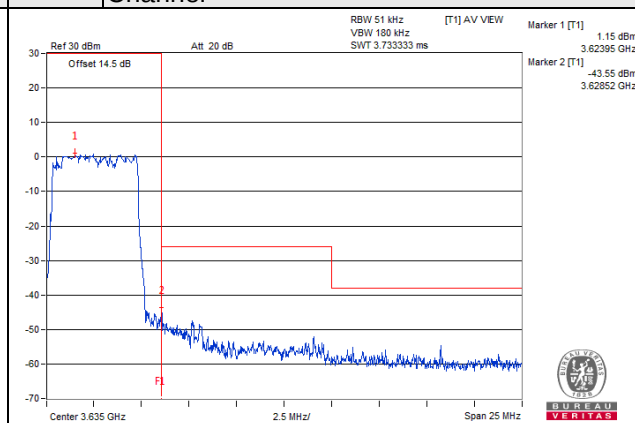
Full RB Greater than 1MHz below the Assigned Channel



1 RB Greater than 1MHz above the Assigned Channel



Full RB Greater than 1MHz above the Assigned Channel



NOTE:

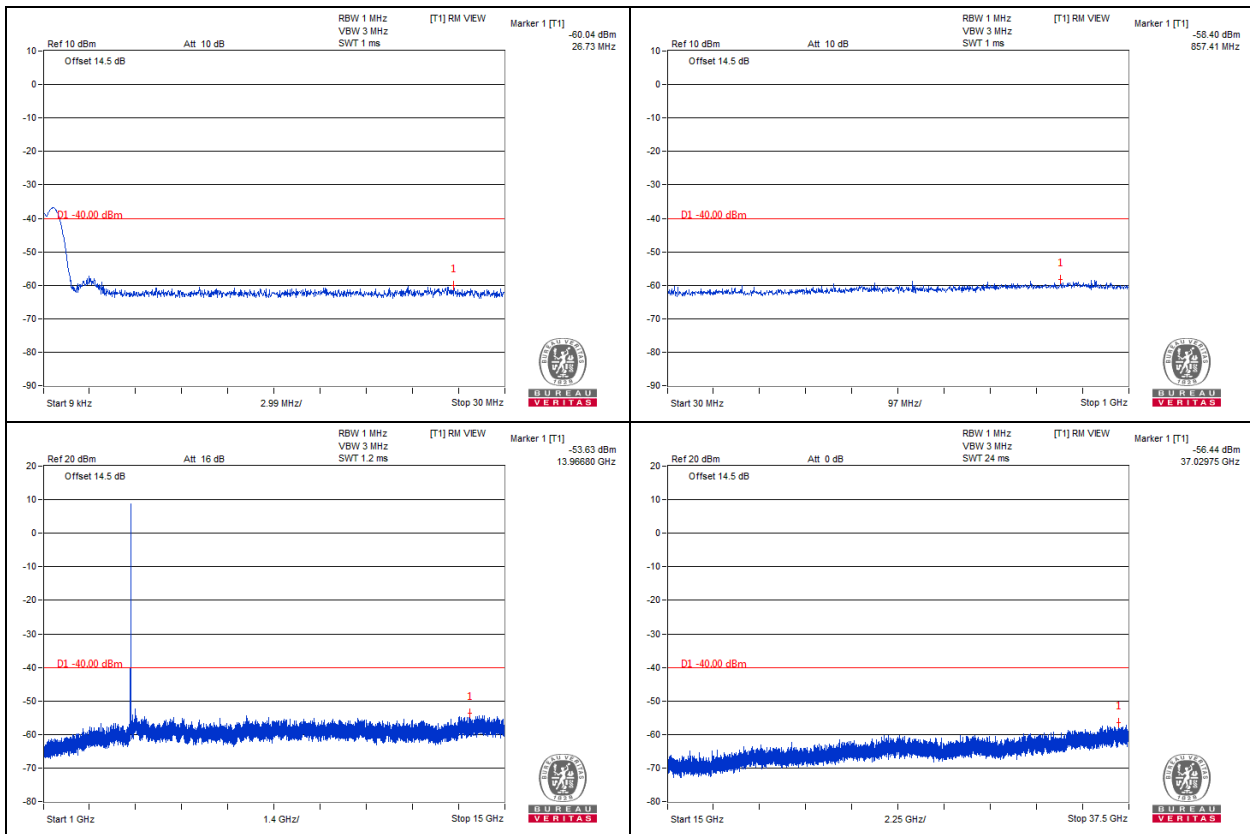
1MHz outside of designated channel needs to reduce the limit, When measured RBW less than 1MHz.

Withn 1-10MHz above the Assigned channel Limit is $-13+10*\text{Log}(51\text{kHz}/1\text{MHz}) = -25.92 \text{ dBm}$

Withn 1-10MHz below the Assigned channel Limit is $-13+10*\text{Log}(51\text{kHz}/1\text{MHz}) = -25.92 \text{ dBm}$

10MHz above the Assigned channel Limit is $-25+10*\text{Log}(51\text{kHz}/1\text{MHz}) = -37.92 \text{ dBm}$

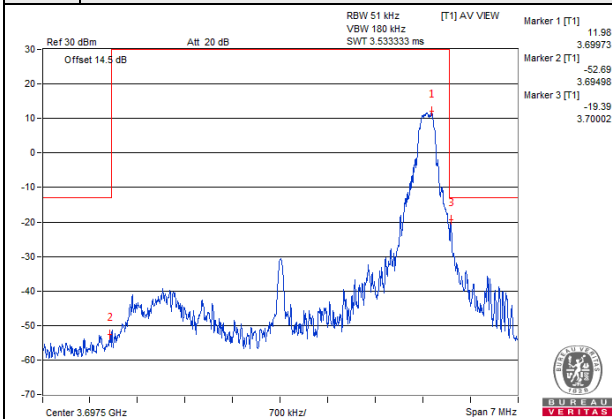
10MHz below the Assigned channel Limit is $-25+10*\text{Log}(51\text{kHz}/1\text{MHz}) = -37.92 \text{ dBm}$



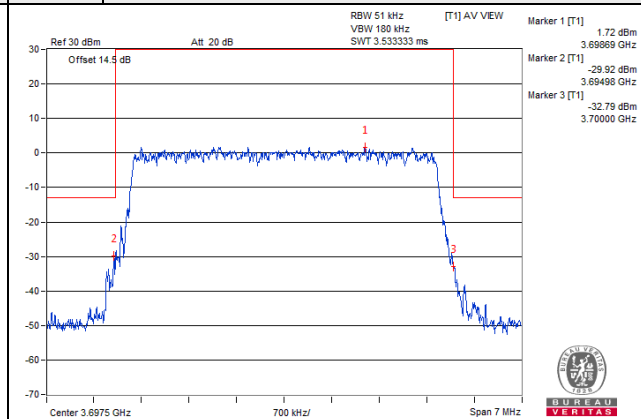
Channel Bandwidth 5MHz QPSK

High Channel 3697.5MHz

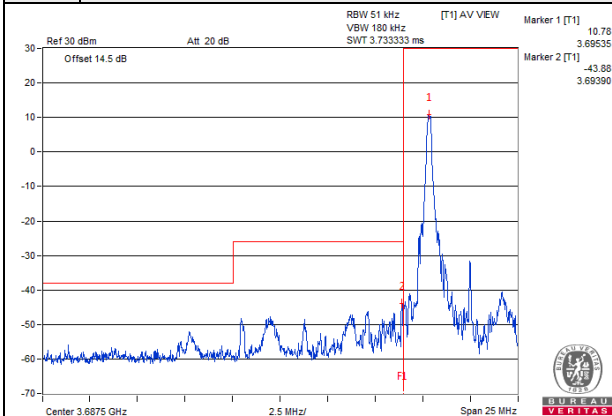
1 RB Within 1MHz outside the designated channel



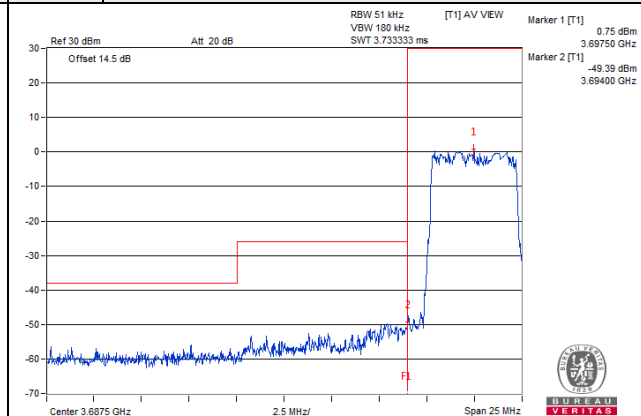
Full RB Within 1MHz outside the designated channel



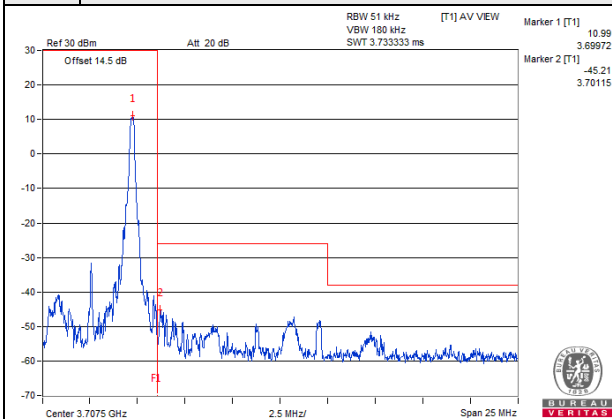
1 RB Greater than 1MHz below the Assigned Channel



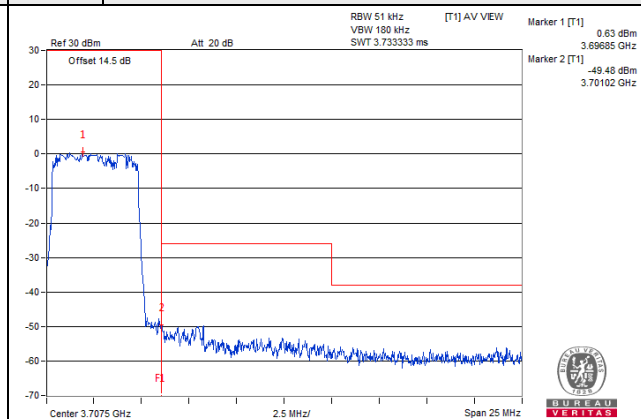
Full RB Greater than 1MHz below the Assigned Channel



1 RB Greater than 1MHz above the Assigned Channel



Full RB Greater than 1MHz above the Assigned Channel



NOTE:

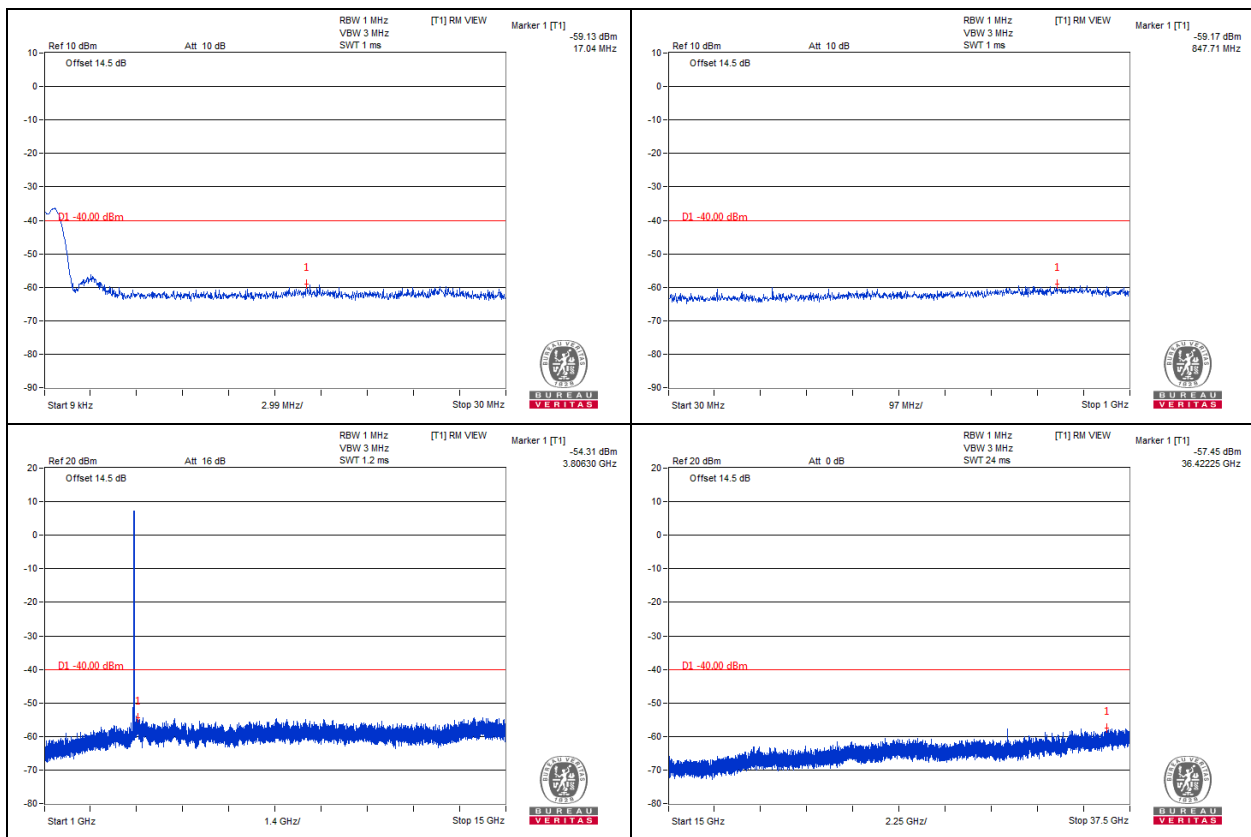
1MHz outside of designated channel needs to reduce the limit, When measured RBW less than 1MHz.

Within 1-10MHz above the Assigned channel Limit is $-13+10*\text{Log}(51\text{kHz}/1\text{MHz}) = -25.92 \text{ dBm}$

Within 1-10MHz below the Assigned channel Limit is $-13+10*\text{Log}(51\text{kHz}/1\text{MHz}) = -25.92 \text{ dBm}$

10MHz above the Assigned channel Limit is $-25+10*\text{Log}(51\text{kHz}/1\text{MHz}) = -37.92 \text{ dBm}$

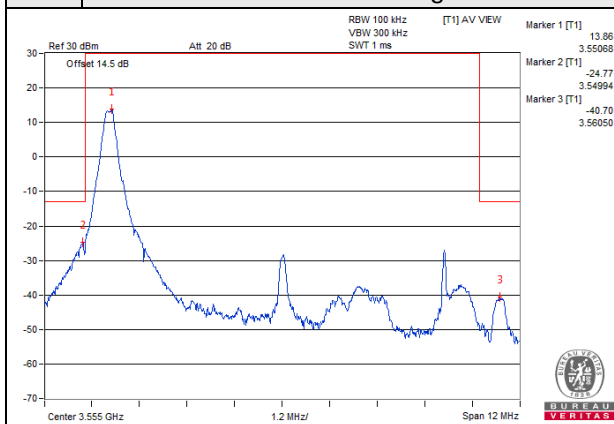
10MHz below the Assigned channel Limit is $-25+10*\text{Log}(51\text{kHz}/1\text{MHz}) = -37.92 \text{ dBm}$



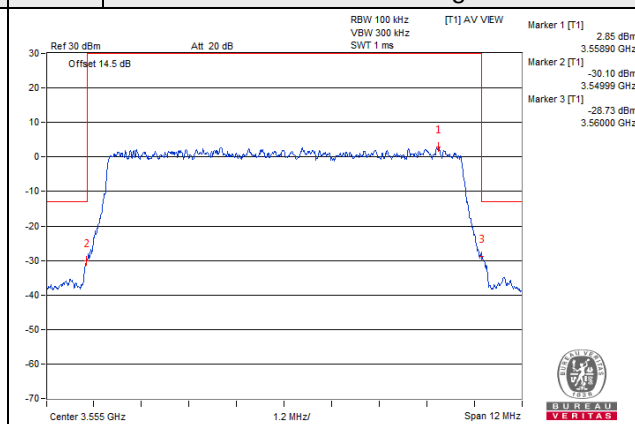
Channel Bandwidth 10MHz QPSK

Low Channel 3555MHz

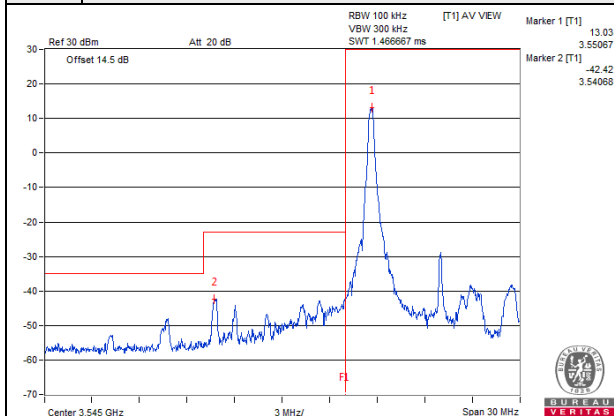
1 RB Within 1MHz outside the designated channel



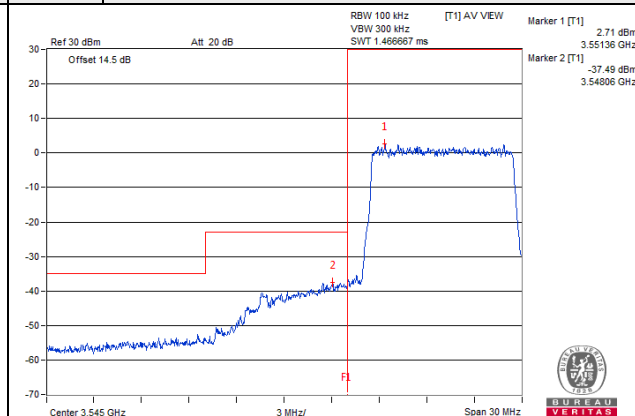
Full RB Within 1MHz outside the designated channel



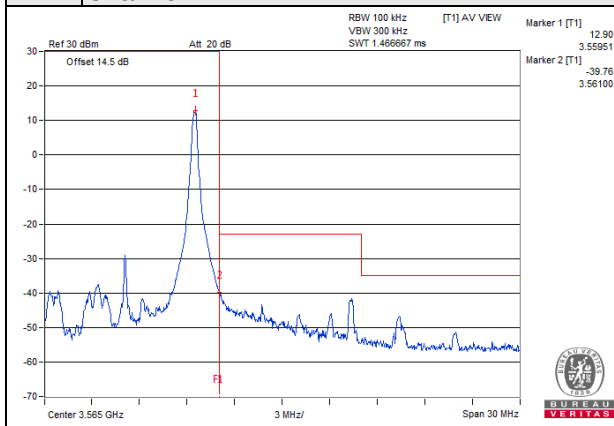
1 RB Greater than 1MHz below the Assigned Channel



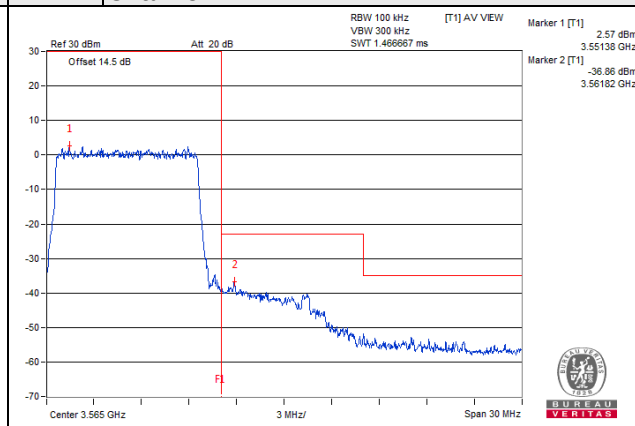
Full RB Greater than 1MHz below the Assigned Channel



1 RB Greater than 1MHz above the Assigned Channel



Full RB Greater than 1MHz above the Assigned Channel



NOTE:

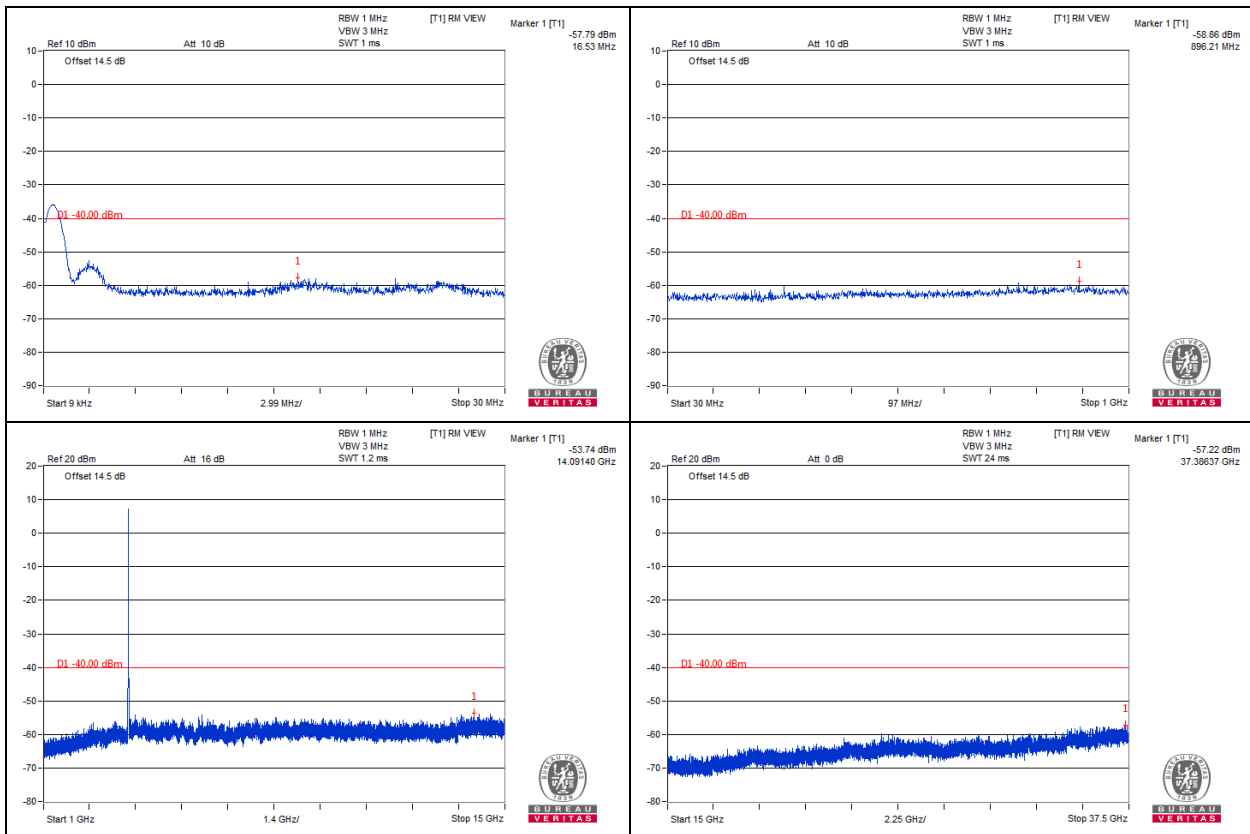
1MHz outside of designated channel needs to reduce the limit, When measured RBW less than 1MHz.

Withn 1-10MHz above the Assigned channel Limit is $-13+10*\text{Log}(100\text{kHz}/1\text{MHz}) = -23 \text{ dBm}$

Withn 1-10MHz below the Assigned channel Limit is $-13+10*\text{Log}(100\text{kHz}/1\text{MHz}) = -23 \text{ dBm}$

10MHz above the Assigned channel Limit is $-25+10*\text{Log}(100\text{kHz}/1\text{MHz}) = -35 \text{ dBm}$

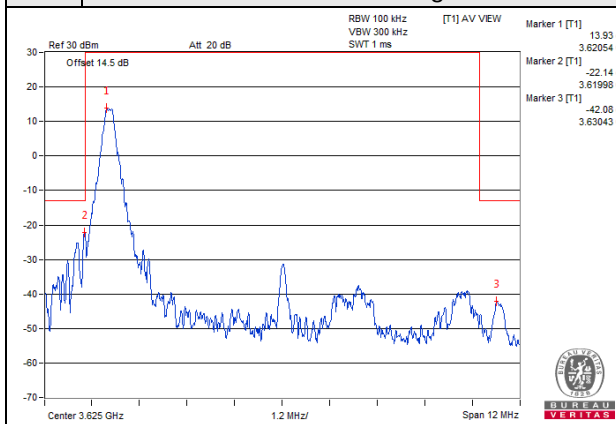
10MHz below the Assigned channel Limit is $-25+10*\text{Log}(100\text{kHz}/1\text{MHz}) = -35 \text{ dBm}$



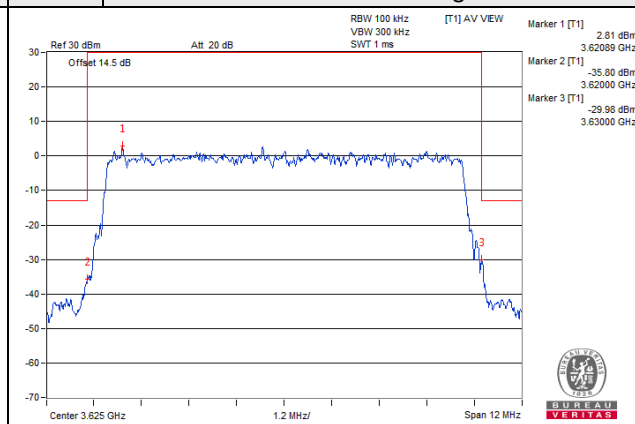
Channel Bandwidth 10MHz QPSK

Middle Channel 3625MHz

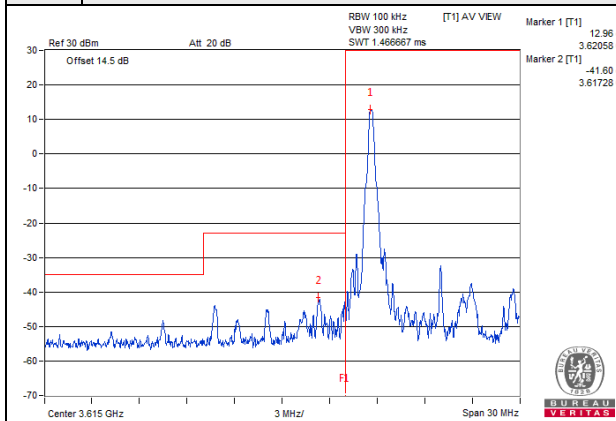
1 RB Within 1MHz outside the designated channel



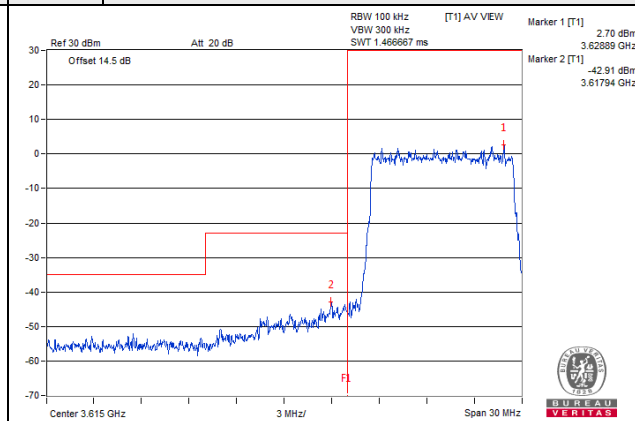
Full RB Within 1MHz outside the designated channel



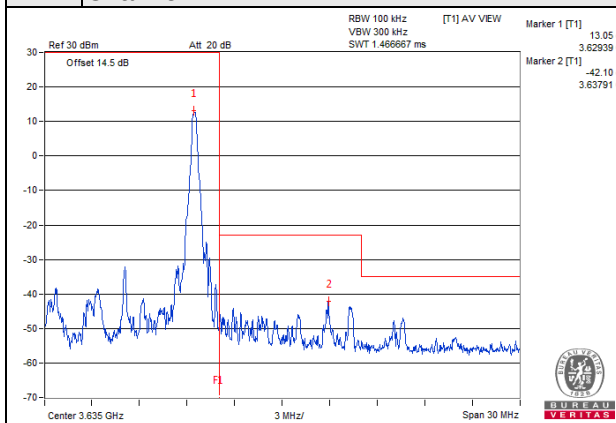
1 RB Greater than 1MHz below the Assigned Channel



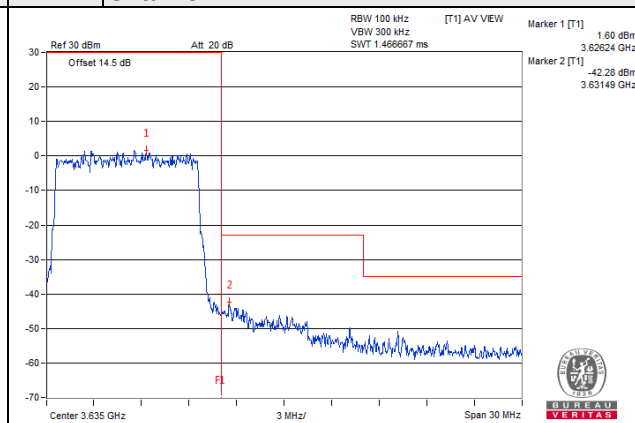
Full RB Greater than 1MHz below the Assigned Channel



1 RB Greater than 1MHz above the Assigned Channel



Full RB Greater than 1MHz above the Assigned Channel



NOTE:

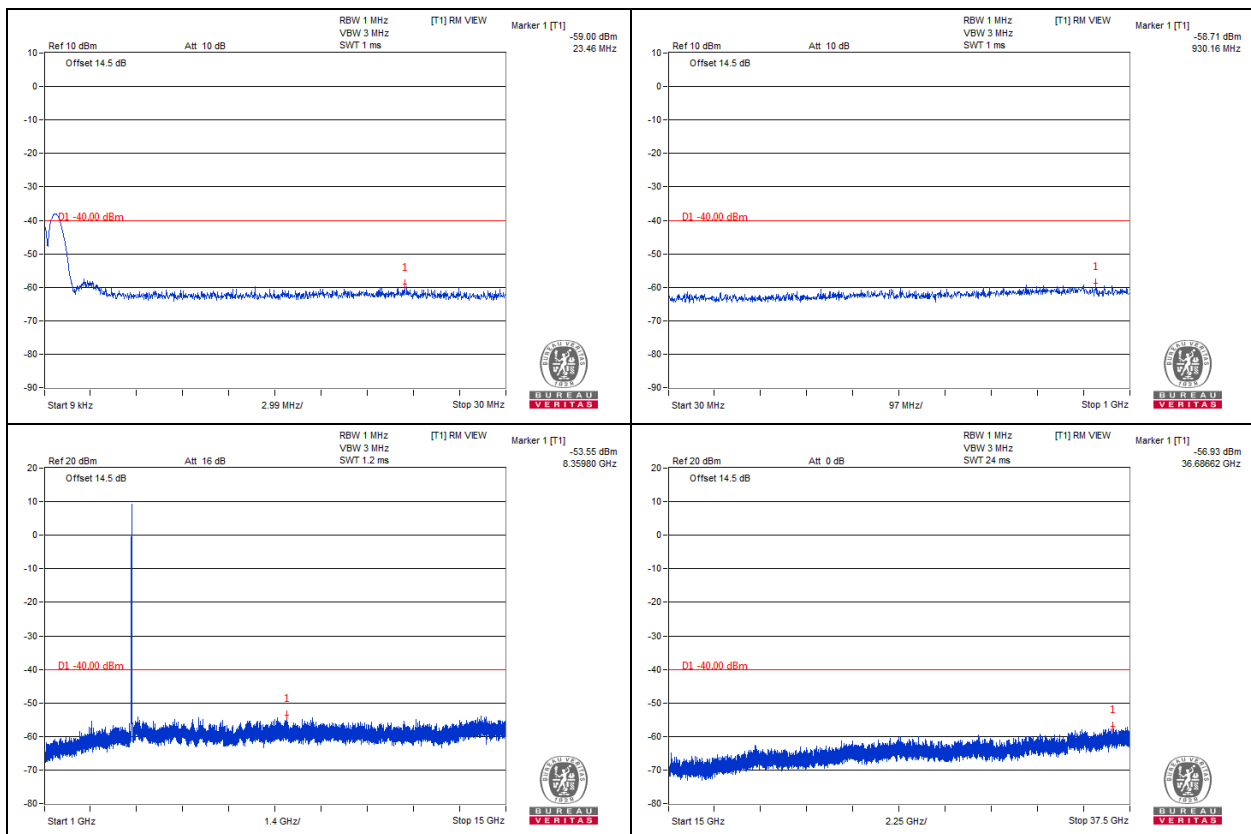
1MHz outside of designated channel needs to reduce the limit, When measured RBW less than 1MHz.

Within 1-10MHz above the Assigned channel Limit is $-13+10*\text{Log}(100\text{kHz}/1\text{MHz}) = -23 \text{ dBm}$

Within 1-10MHz below the Assigned channel Limit is $-13+10*\text{Log}(100\text{kHz}/1\text{MHz}) = -23 \text{ dBm}$

10MHz above the Assigned channel Limit is $-25+10*\text{Log}(100\text{kHz}/1\text{MHz}) = -35 \text{ dBm}$

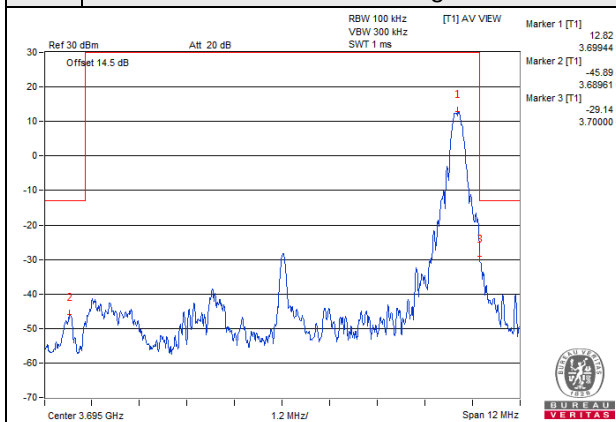
10MHz below the Assigned channel Limit is $-25+10*\text{Log}(100\text{kHz}/1\text{MHz}) = -35 \text{ dBm}$



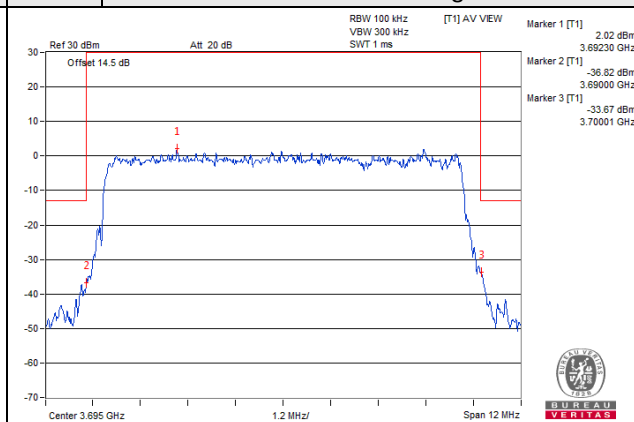
Channel Bandwidth 10MHz QPSK

High Channel 3695MHz

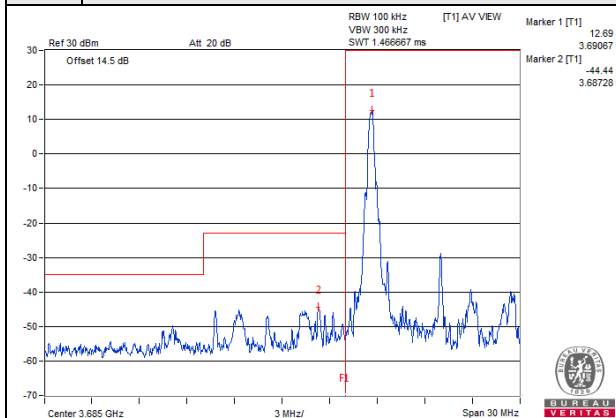
1 RB Within 1MHz outside the designated channel



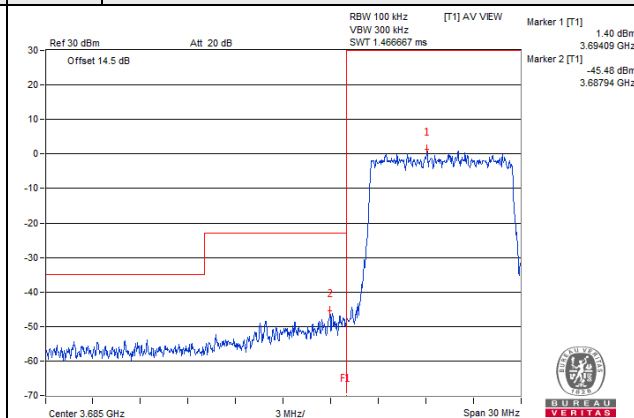
Full RB Within 1MHz outside the designated channel



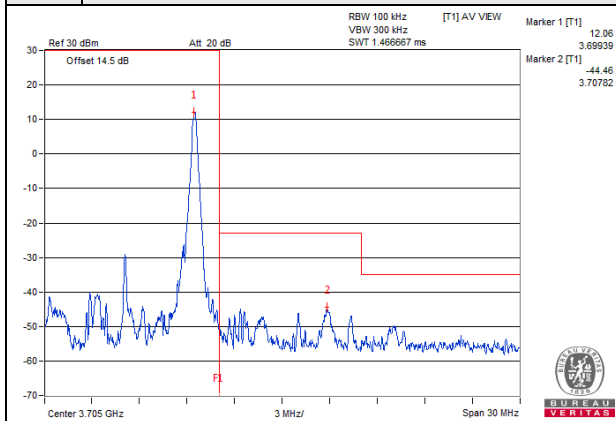
1 RB Greater than 1MHz below the Assigned Channel



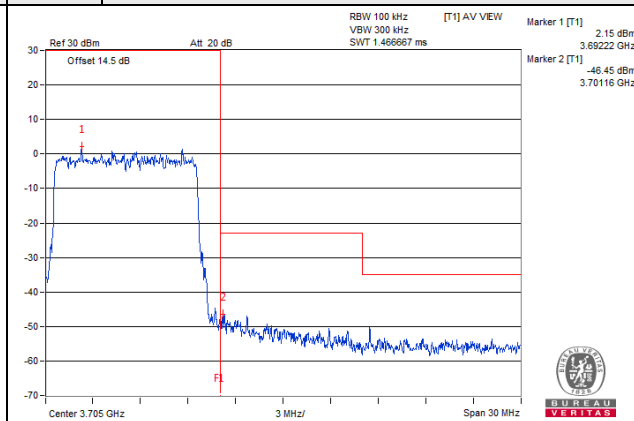
Full RB Greater than 1MHz below the Assigned Channel



1 RB Greater than 1MHz above the Assigned Channel



Full RB Greater than 1MHz above the Assigned Channel



NOTE:

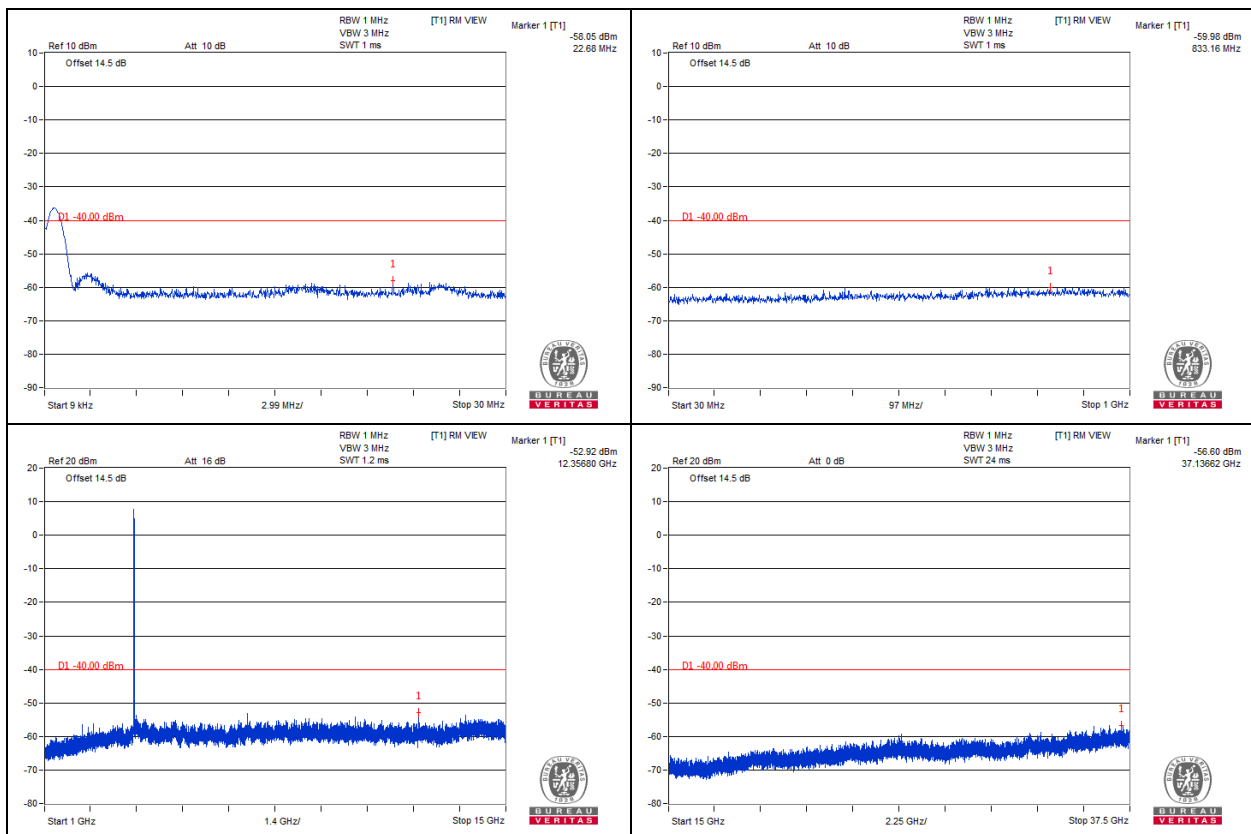
1MHz outside of designated channel needs to reduce the limit, When measured RBW less than 1MHz.

Withn 1-10MHz above the Assigned channel Limit is $-13+10*\text{Log}(100\text{kHz}/1\text{MHz}) = -23 \text{ dBm}$

Withn 1-10MHz below the Assigned channel Limit is $-13+10*\text{Log}(100\text{kHz}/1\text{MHz}) = -23 \text{ dBm}$

10MHz above the Assigned channel Limit is $-25+10*\text{Log}(100\text{kHz}/1\text{MHz}) = -35 \text{ dBm}$

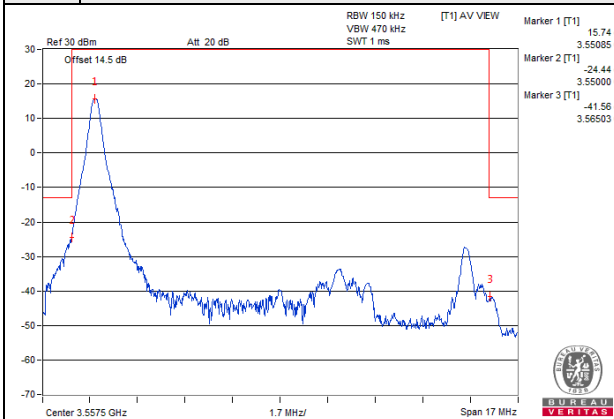
10MHz below the Assigned channel Limit is $-25+10*\text{Log}(100\text{kHz}/1\text{MHz}) = -35 \text{ dBm}$



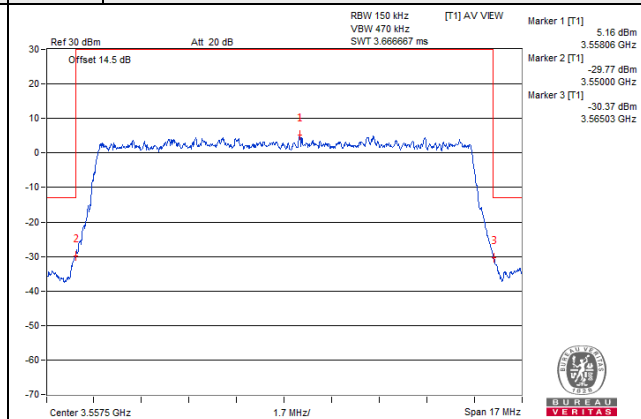
Channel Bandwidth 15MHz QPSK

Low Channel 3557.5MHz

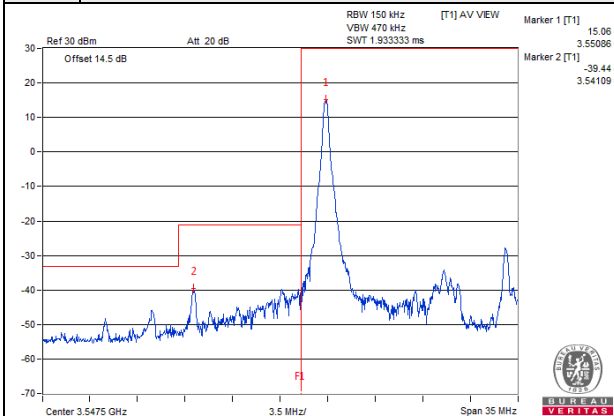
1 RB Within 1MHz outside the designated channel



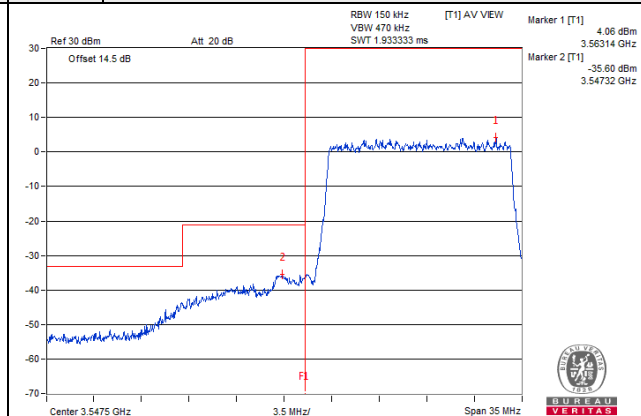
Full RB Within 1MHz outside the designated channel



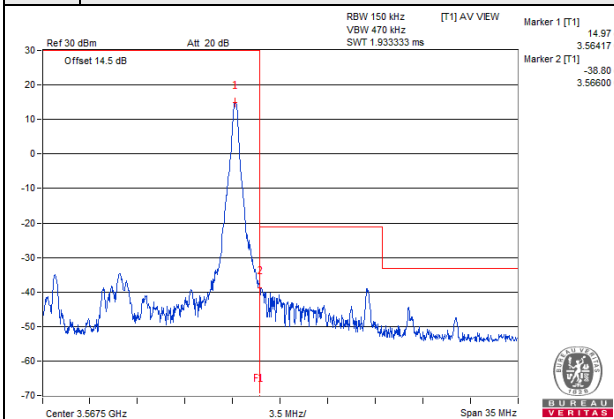
1 RB Greater than 1MHz below the Assigned Channel



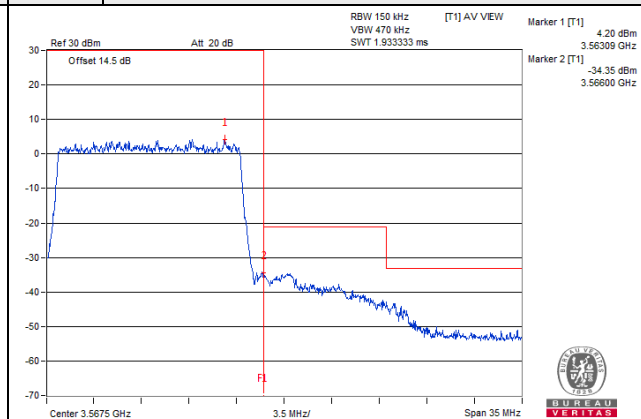
Full RB Greater than 1MHz below the Assigned Channel



1 RB Greater than 1MHz above the Assigned Channel



Full RB Greater than 1MHz above the Assigned Channel



NOTE:

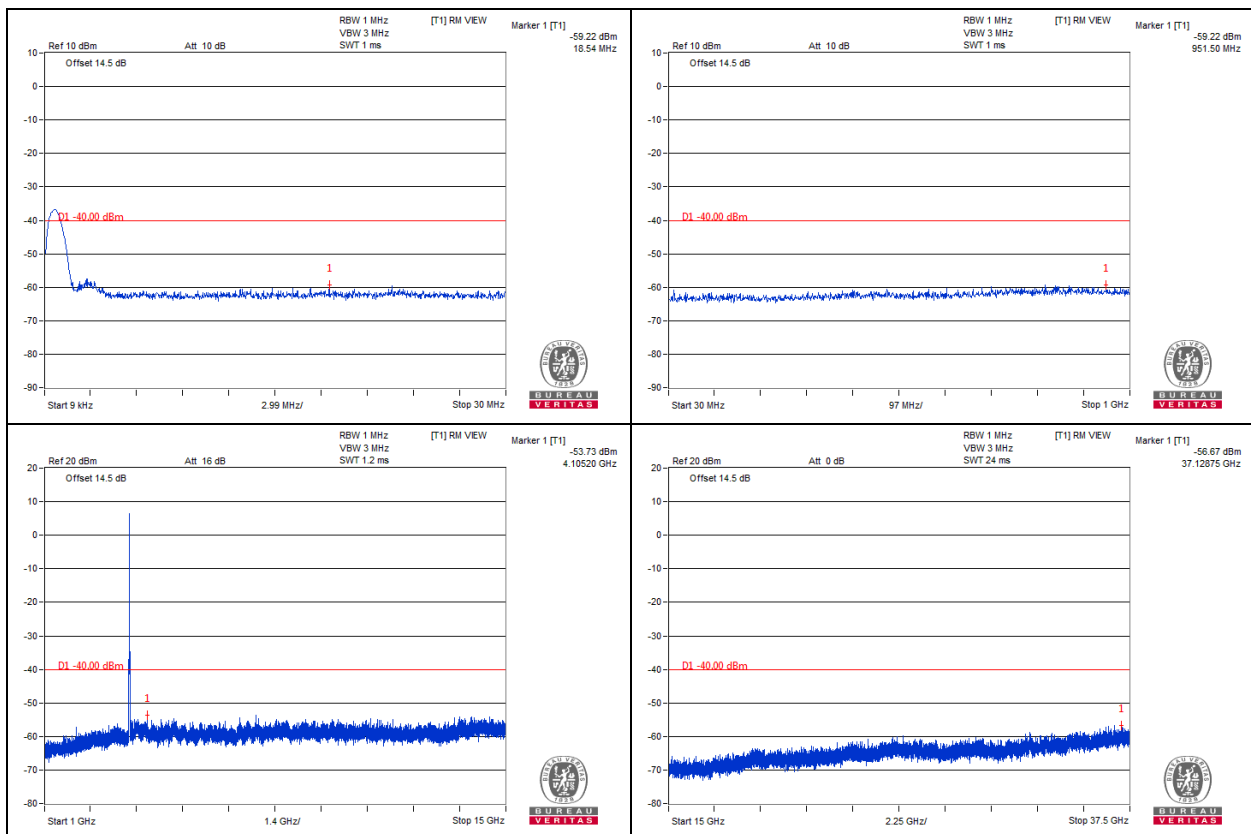
1MHz outside of designated channel needs to reduce the limit, When measured RBW less than 1MHz.

Withn 1-10MHz above the Assigned channel Limit is $-13+10*\text{Log}(150\text{kHz}/1\text{MHz}) = -21.24 \text{ dBm}$

Withn 1-10MHz below the Assigned channel Limit is $-13+10*\text{Log}(150\text{kHz}/1\text{MHz}) = -21.24 \text{ dBm}$

10MHz above the Assigned channel Limit is $-25+10*\text{Log}(150\text{kHz}/1\text{MHz}) = -33.24 \text{ dBm}$

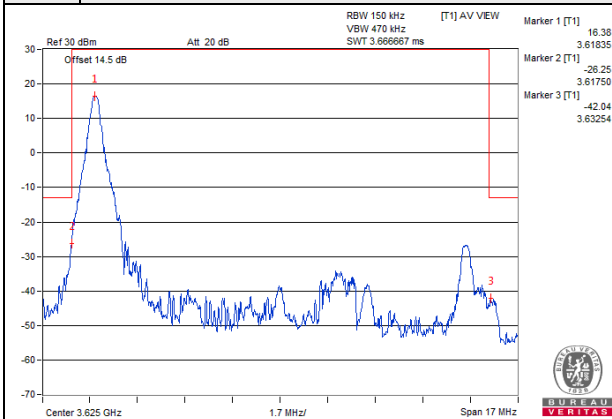
10MHz below the Assigned channel Limit is $-25+10*\text{Log}(150\text{kHz}/1\text{MHz}) = -33.24 \text{ dBm}$



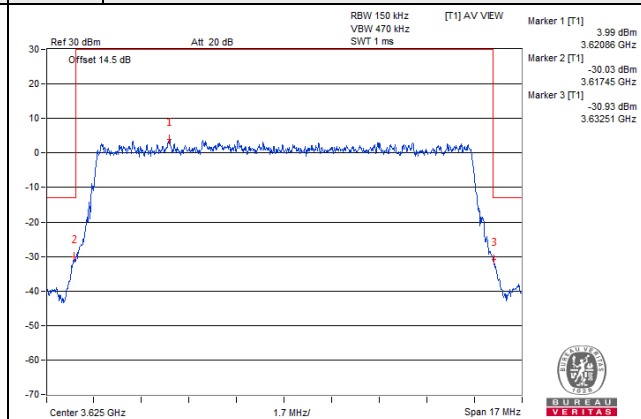
Channel Bandwidth 15MHz QPSK

Middle Channel 3625MHz

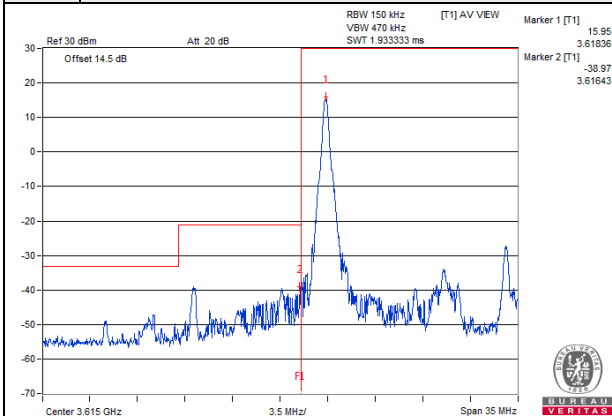
1 RB Within 1MHz outside the designated channel



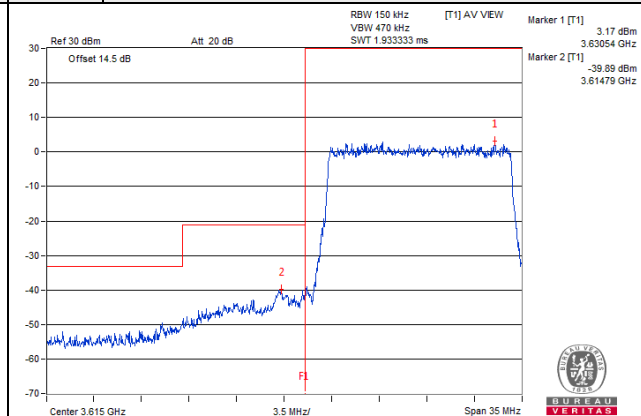
Full RB Within 1MHz outside the designated channel



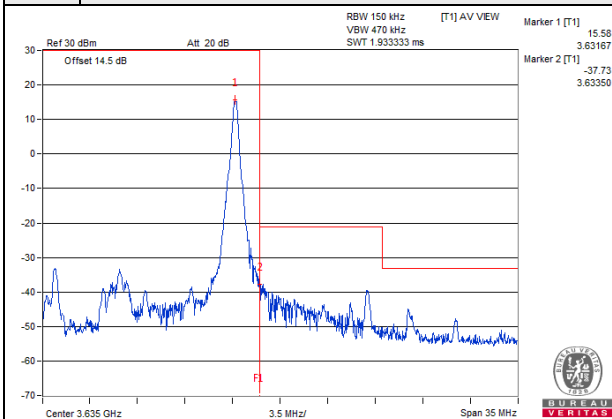
1 RB Greater than 1MHz below the Assigned Channel



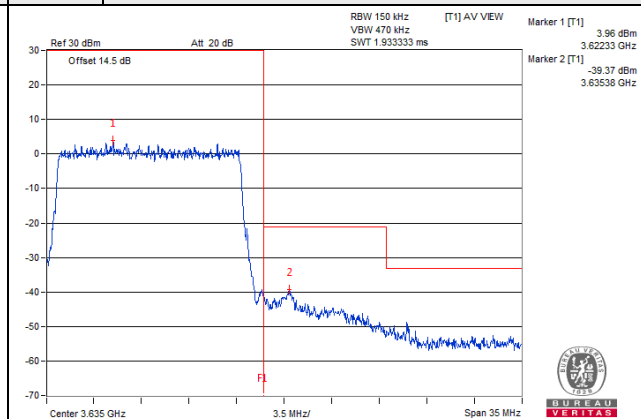
Full RB Greater than 1MHz below the Assigned Channel



1 RB Greater than 1MHz above the Assigned Channel



Full RB Greater than 1MHz above the Assigned Channel



NOTE:

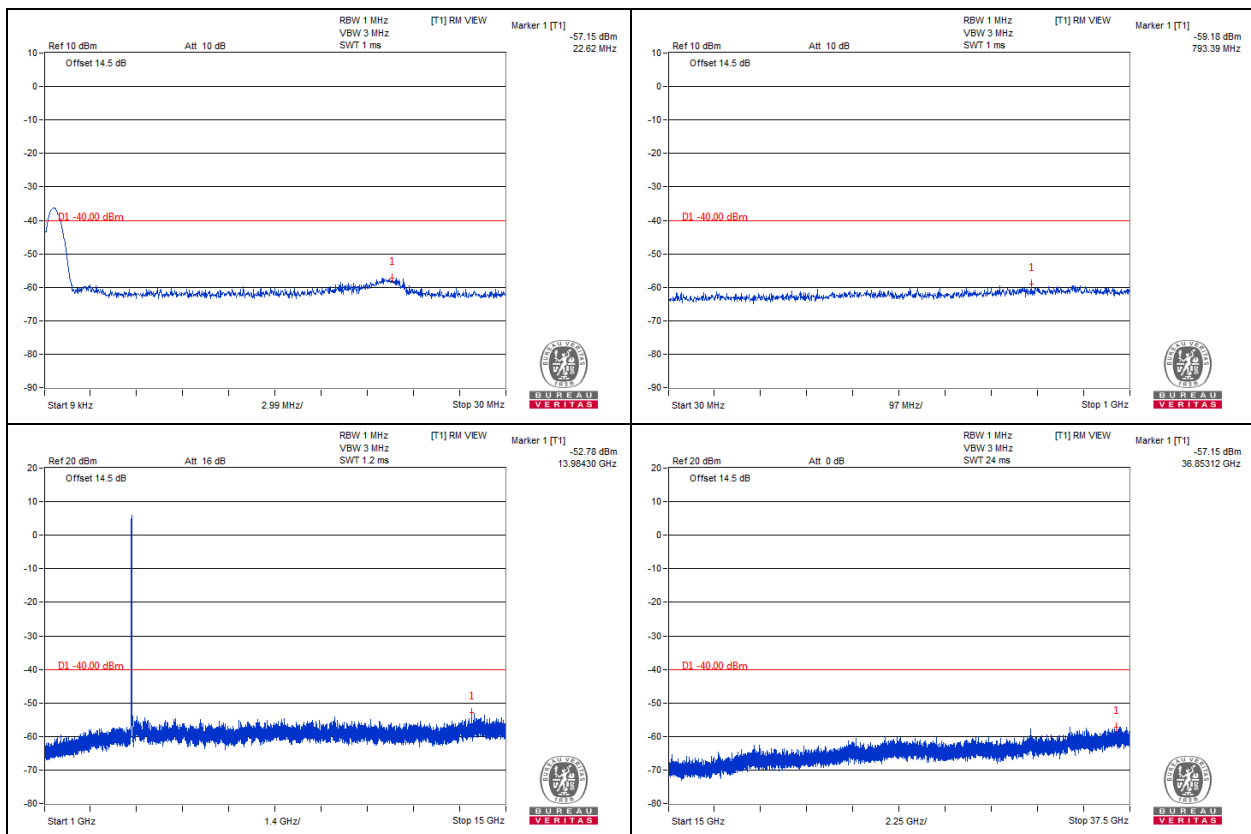
1MHz outside of designated channel needs to reduce the limit, When measured RBW less than 1MHz.

Within 1-10MHz above the Assigned channel Limit is $-13+10*\text{Log}(150\text{kHz}/1\text{MHz}) = -21.24 \text{ dBm}$

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10MHz above the Assigned channel Limit is $-25+10*\text{Log}(150\text{kHz}/1\text{MHz}) = -33.24 \text{ dBm}$

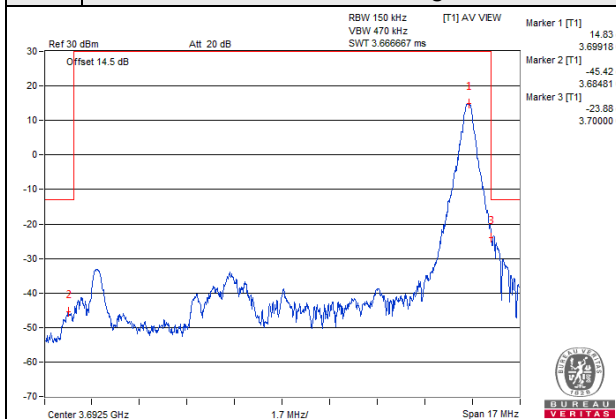
10MHz below the Assigned channel Limit is $-25+10*\text{Log}(150\text{kHz}/1\text{MHz}) = -33.24 \text{ dBm}$



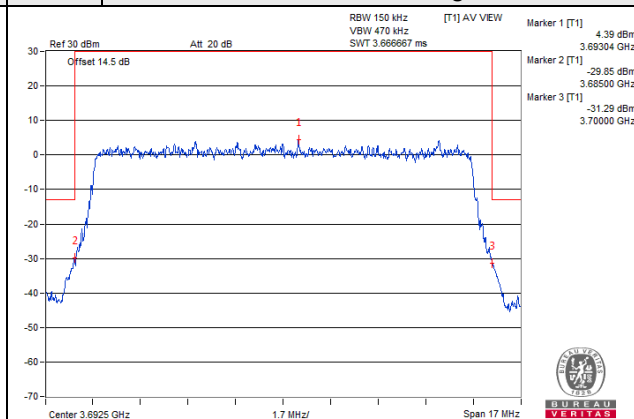
Channel Bandwidth 15MHz QPSK

High Channel 3692.5MHz

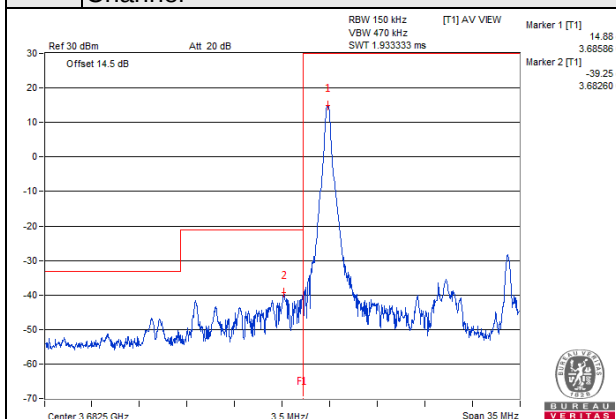
1 RB Within 1MHz outside the designated channel



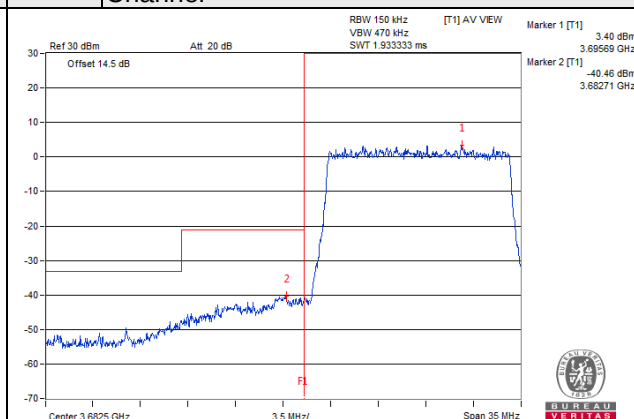
Full RB Within 1MHz outside the designated channel



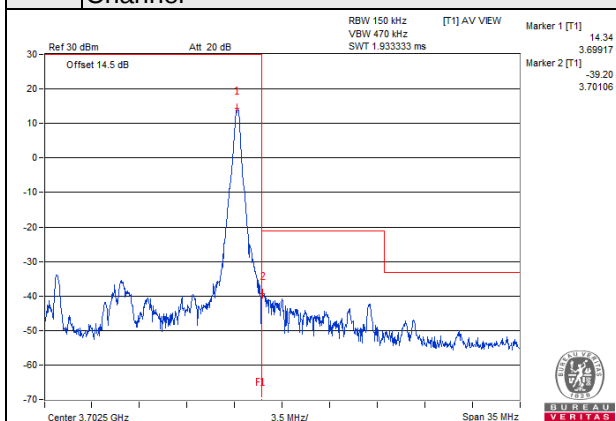
1 RB Greater than 1MHz below the Assigned Channel



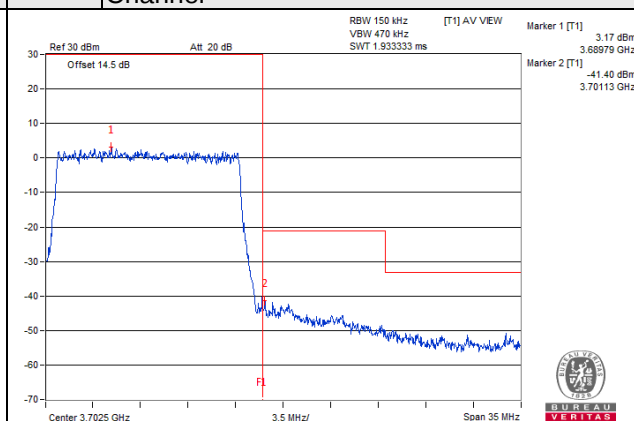
Full RB Greater than 1MHz below the Assigned Channel



1 RB Greater than 1MHz above the Assigned Channel



Full RB Greater than 1MHz above the Assigned Channel



NOTE:

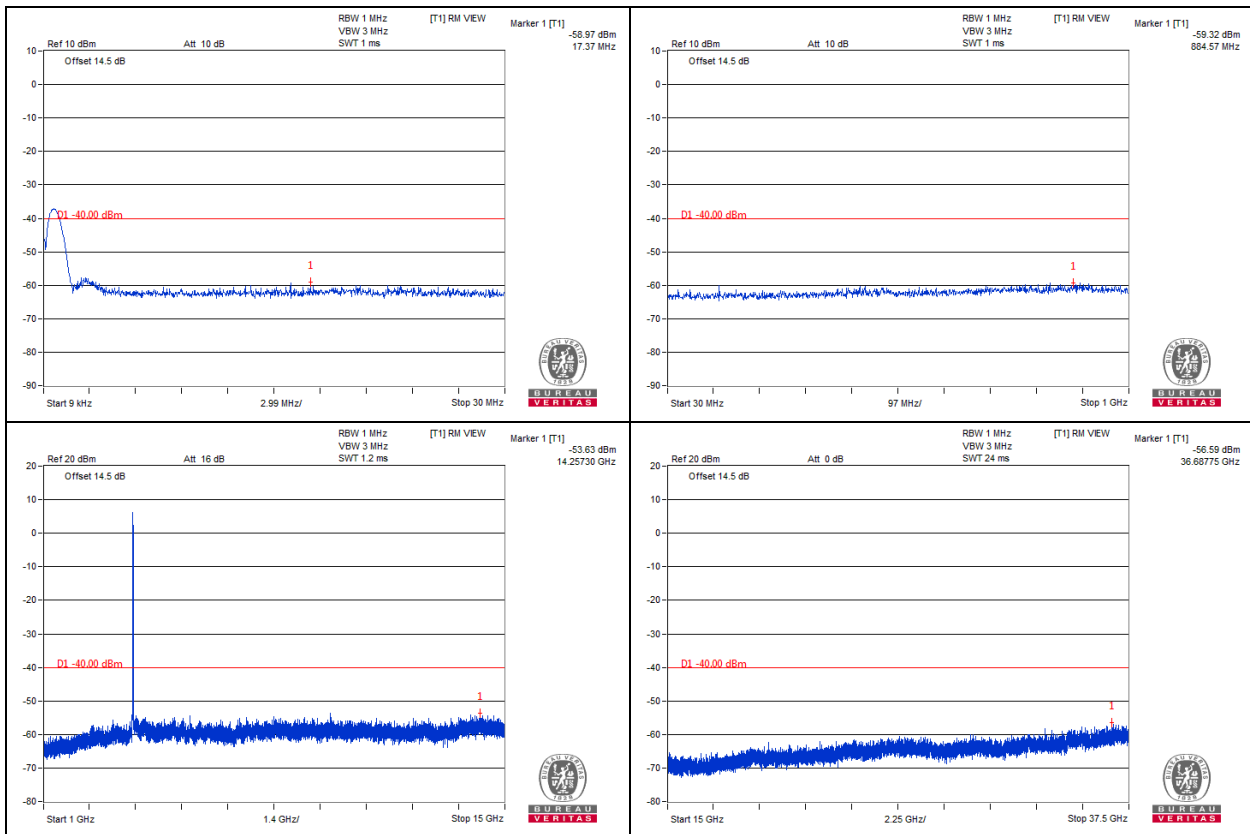
1MHz outside of designated channel needs to reduce the limit, When measured RBW less than 1MHz.

Withn 1-10MHz above the Assigned channel Limit is $-13+10*\text{Log}(150\text{kHz}/1\text{MHz}) = -21.24 \text{ dBm}$

Withn 1-10MHz below the Assigned channel Limit is $-13+10*\text{Log}(150\text{kHz}/1\text{MHz}) = -21.24 \text{ dBm}$

10MHz above the Assigned channel Limit is $-25+10*\text{Log}(150\text{kHz}/1\text{MHz}) = -33.24 \text{ dBm}$

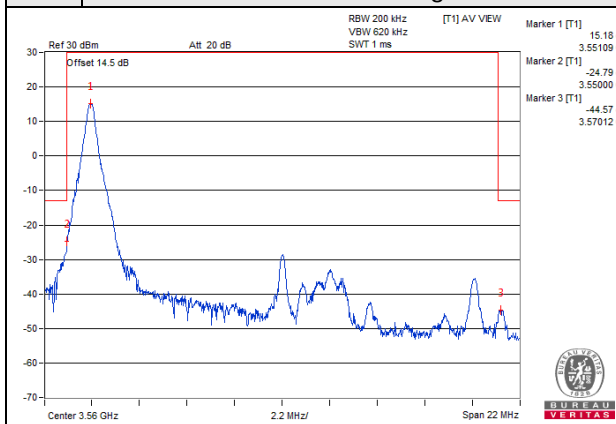
10MHz below the Assigned channel Limit is $-25+10*\text{Log}(150\text{kHz}/1\text{MHz}) = -33.24 \text{ dBm}$



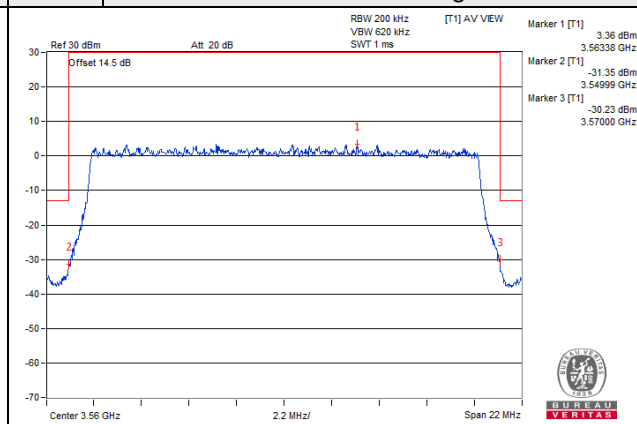
Channel Bandwidth 20MHz QPSK

Low Channel 3560MHz

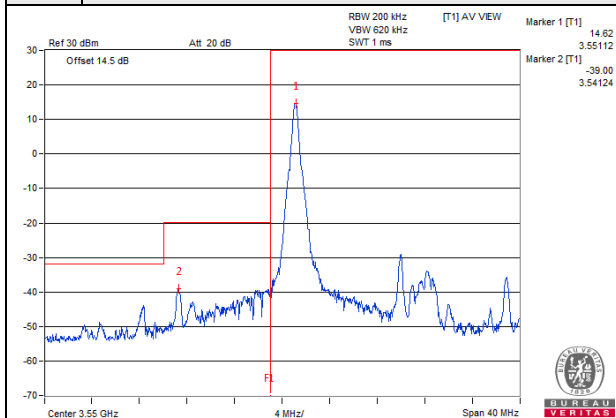
1 RB Within 1MHz outside the designated channel



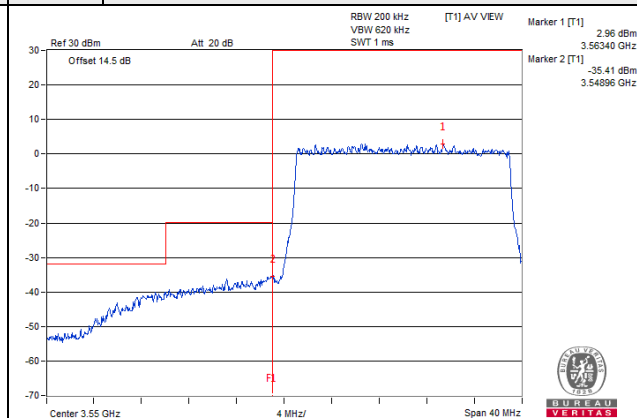
Full RB Within 1MHz outside the designated channel



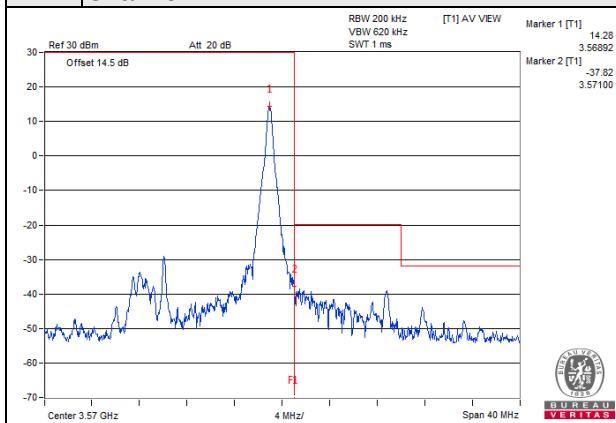
1 RB Greater than 1MHz below the Assigned Channel



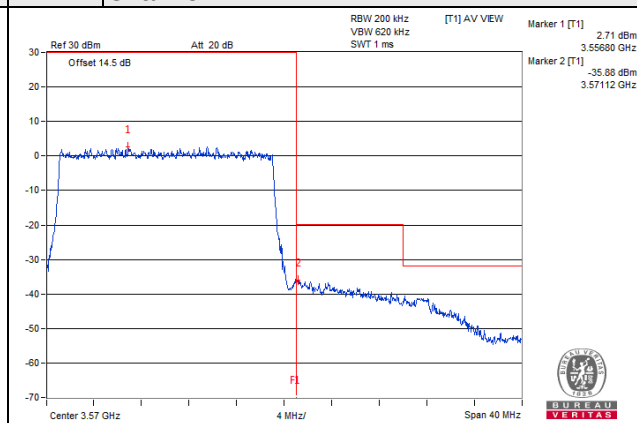
Full RB Greater than 1MHz below the Assigned Channel



1 RB Greater than 1MHz above the Assigned Channel



Full RB Greater than 1MHz above the Assigned Channel



NOTE:

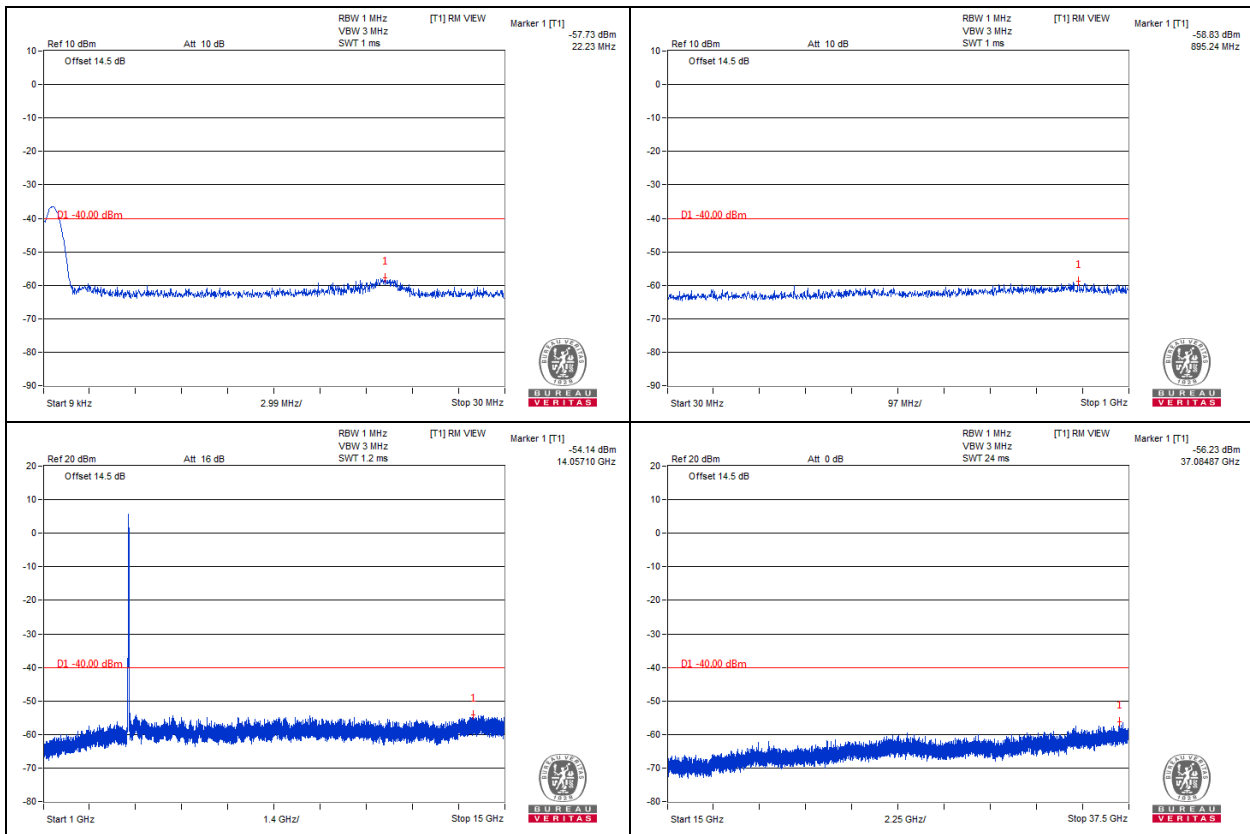
1MHz outside of designated channel needs to reduce the limit, When measured RBW less than 1MHz.

Within 1-10MHz above the Assigned channel Limit is $-13+10*\text{Log}(200\text{kHz}/1\text{MHz}) = -19.99 \text{ dBm}$

Within 1-10MHz below the Assigned channel Limit is $-13+10*\text{Log}(200\text{kHz}/1\text{MHz}) = -19.99 \text{ dBm}$

10MHz above the Assigned channel Limit is $-25+10*\text{Log}(200\text{kHz}/1\text{MHz}) = -31.99 \text{ dBm}$

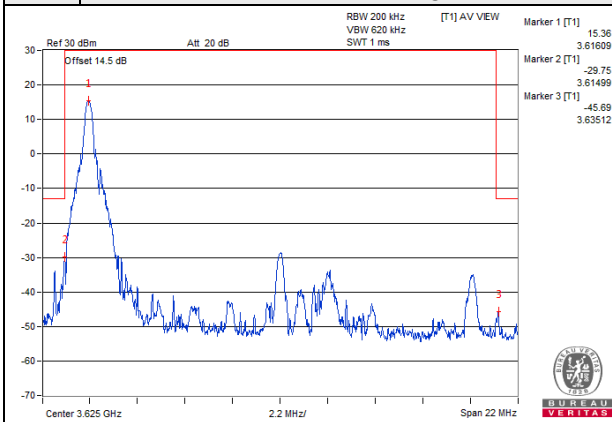
10MHz below the Assigned channel Limit is $-25+10*\text{Log}(200\text{kHz}/1\text{MHz}) = -31.99 \text{ dBm}$



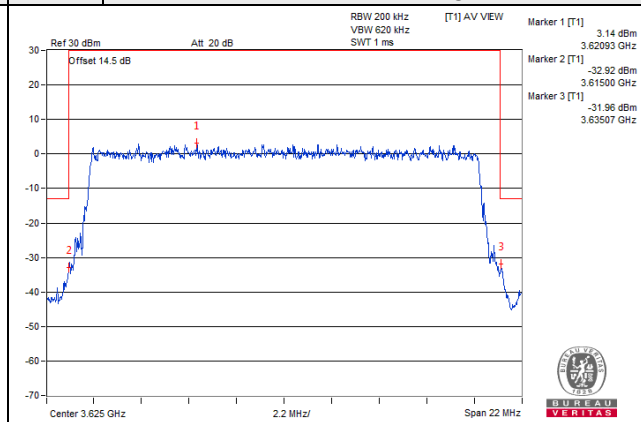
Channel Bandwidth 20MHz QPSK

Middle Channel 3625MHz

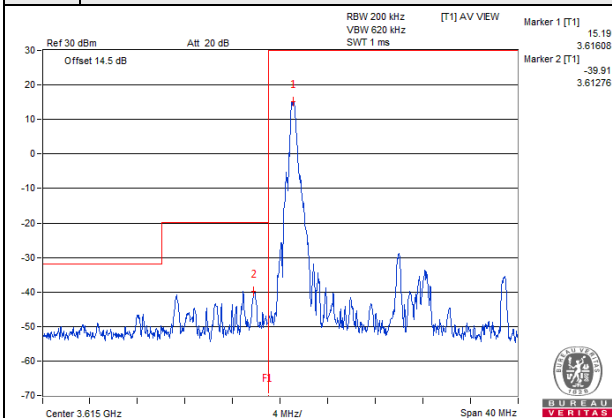
1 RB Within 1MHz outside the designated channel



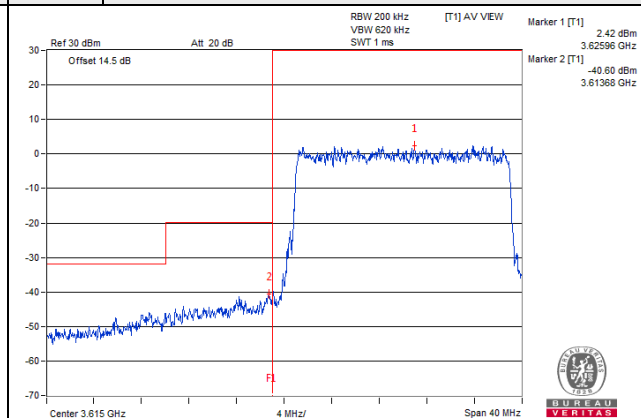
Full RB Within 1MHz outside the designated channel



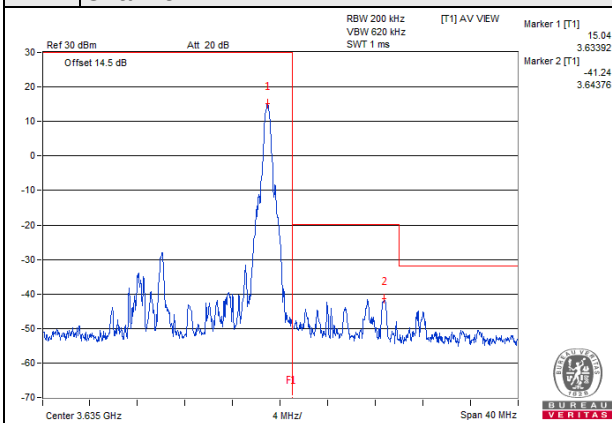
1 RB Greater than 1MHz below the Assigned Channel



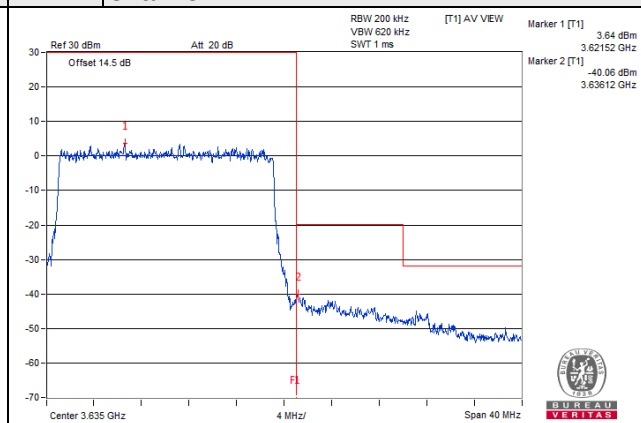
Full RB Greater than 1MHz below the Assigned Channel



1 RB Greater than 1MHz above the Assigned Channel



Full RB Greater than 1MHz above the Assigned Channel



NOTE:

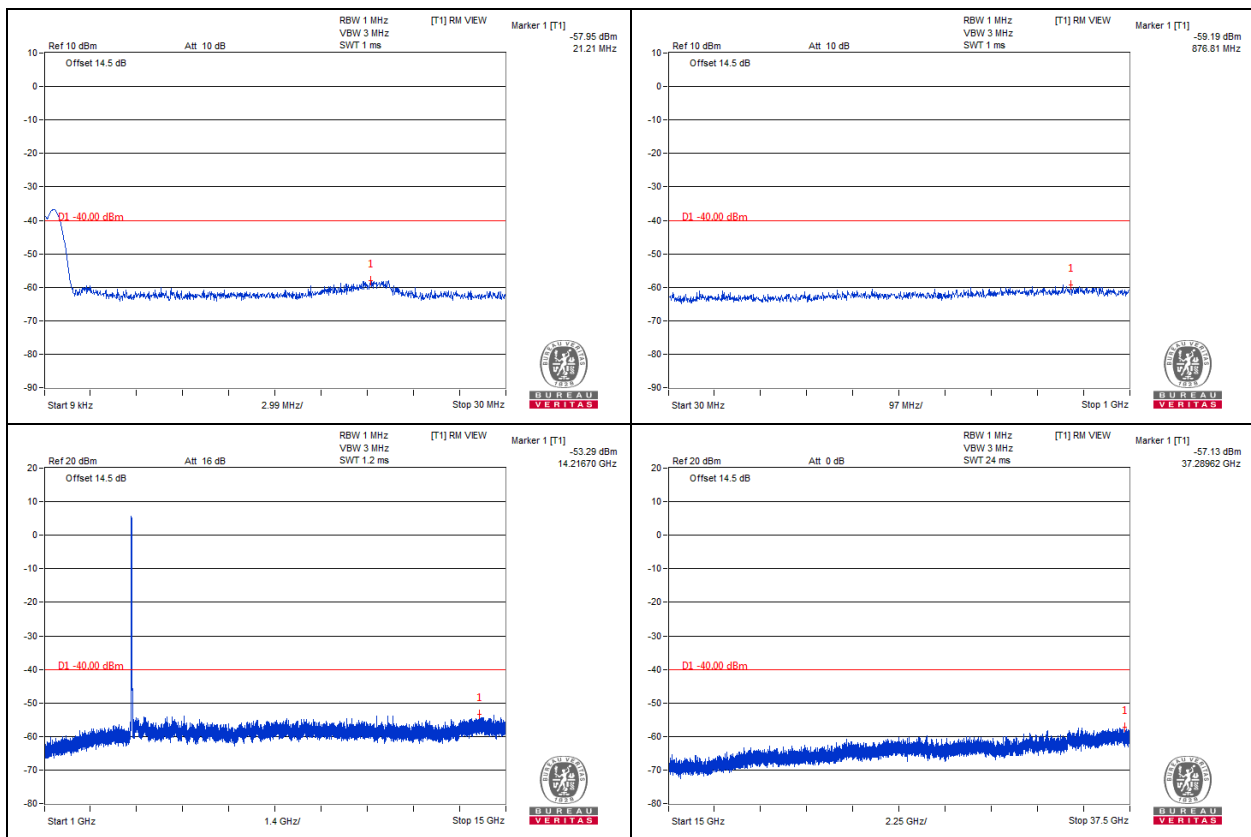
1MHz outside of designated channel needs to reduce the limit, When measured RBW less than 1MHz.

Within 1-10MHz above the Assigned channel Limit is $-13+10*\text{Log}(200\text{kHz}/1\text{MHz}) = -19.99 \text{ dBm}$

Within 1-10MHz below the Assigned channel Limit is $-13+10*\text{Log}(200\text{kHz}/1\text{MHz}) = -19.99 \text{ dBm}$

10MHz above the Assigned channel Limit is $-25+10*\text{Log}(200\text{kHz}/1\text{MHz}) = -31.99 \text{ dBm}$

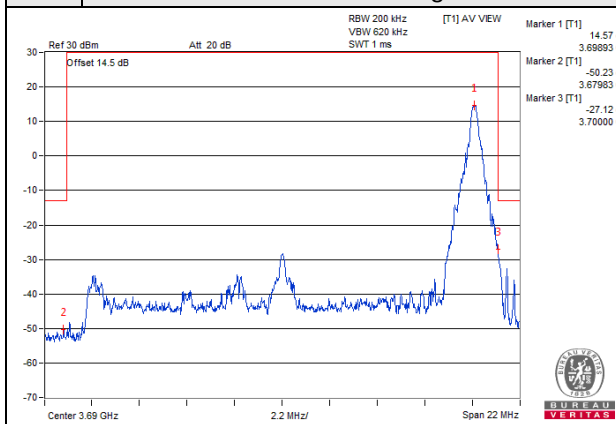
10MHz below the Assigned channel Limit is $-25+10*\text{Log}(200\text{kHz}/1\text{MHz}) = -31.99 \text{ dBm}$



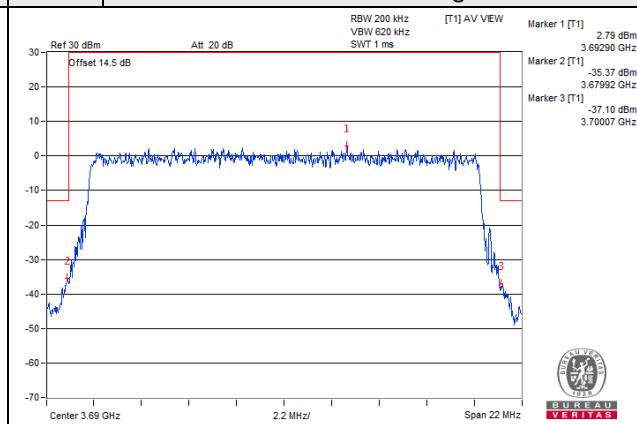
Channel Bandwidth 20MHz QPSK

High Channel 3690MHz

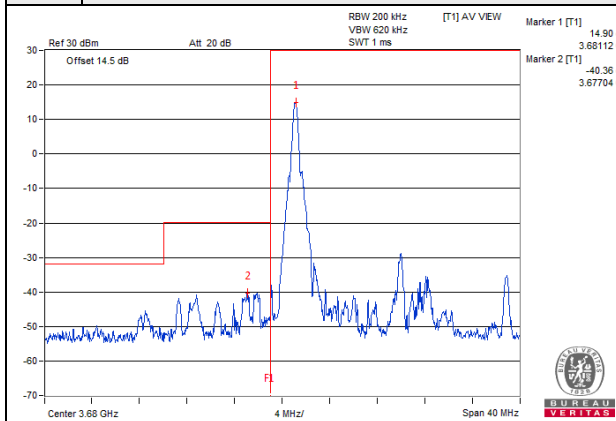
1 RB Within 1MHz outside the designated channel



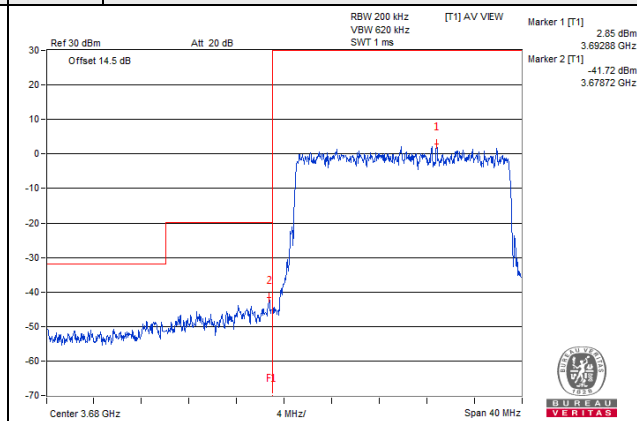
Full RB Within 1MHz outside the designated channel



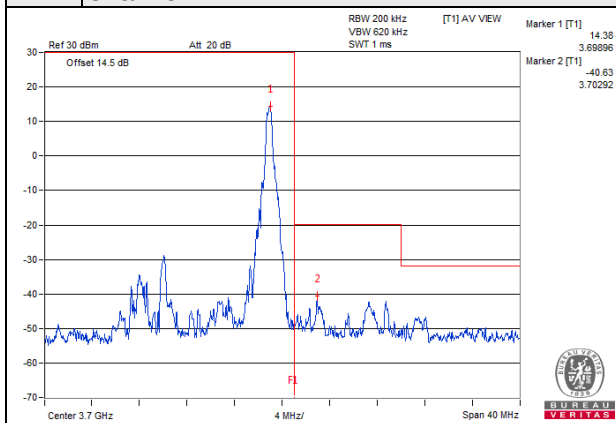
1 RB Greater than 1MHz below the Assigned Channel



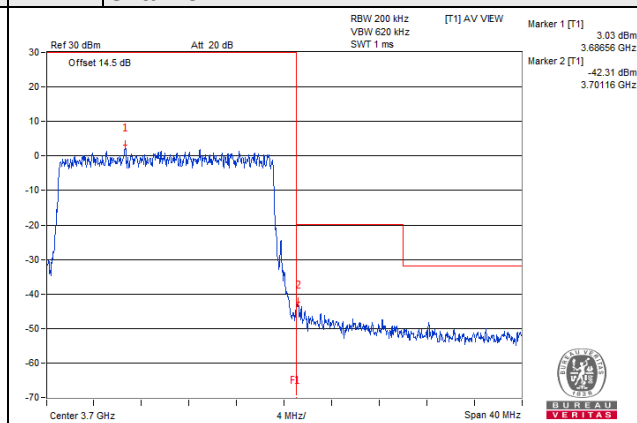
Full RB Greater than 1MHz below the Assigned Channel



1 RB Greater than 1MHz above the Assigned Channel



Full RB Greater than 1MHz above the Assigned Channel



NOTE:

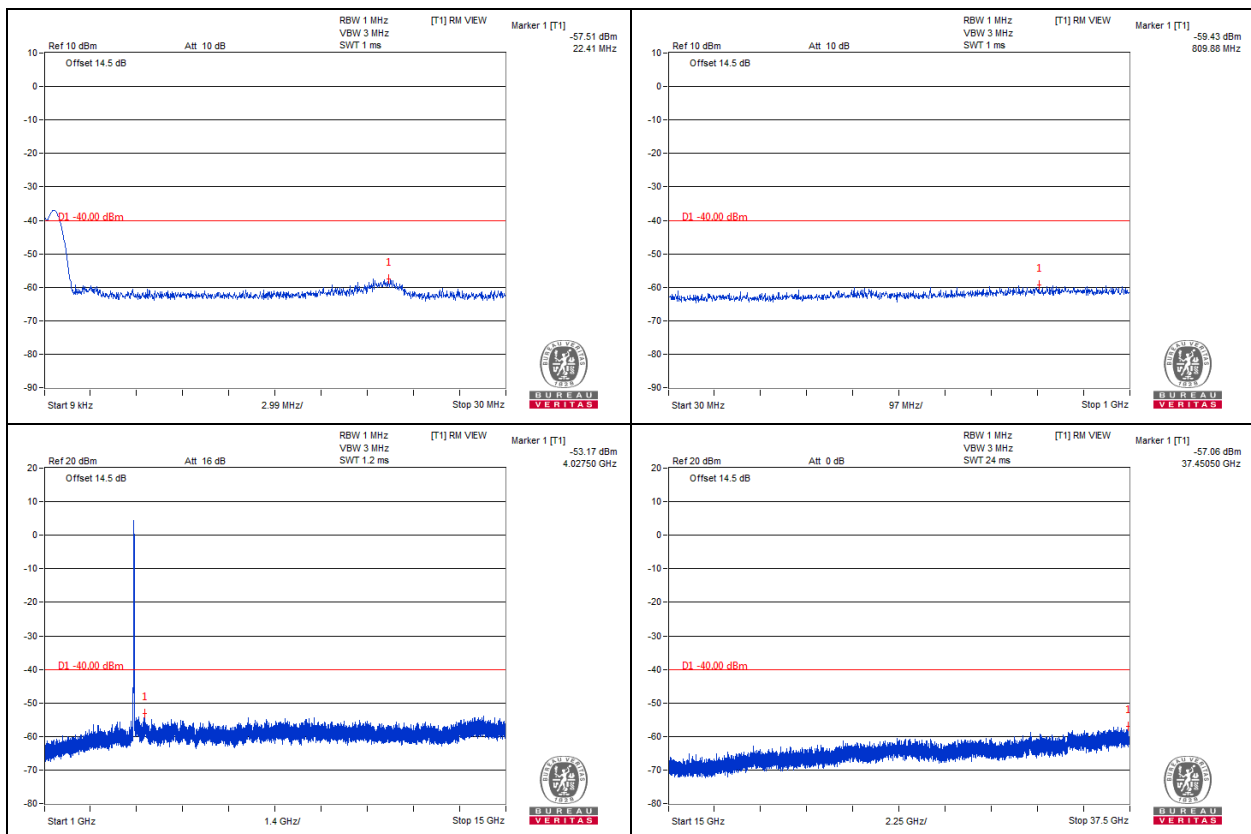
1MHz outside of designated channel needs to reduce the limit, When measured RBW less than 1MHz.

Within 1-10MHz above the Assigned channel Limit is $-13+10*\text{Log}(200\text{kHz}/1\text{MHz}) = -19.99 \text{ dBm}$

Within 1-10MHz below the Assigned channel Limit is $-13+10*\text{Log}(200\text{kHz}/1\text{MHz}) = -19.99 \text{ dBm}$

10MHz above the Assigned channel Limit is $-25+10*\text{Log}(200\text{kHz}/1\text{MHz}) = -31.99 \text{ dBm}$

10MHz below the Assigned channel Limit is $-25+10*\text{Log}(200\text{kHz}/1\text{MHz}) = -31.99 \text{ dBm}$



4.7 Radiated Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

The power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

4.7.2 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.7.3 Test Procedures

- a. Substitution method is used for EIRP measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- c. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$
- d. ERP power can be calculated form EIRP power by subtracting the gain of dipole, $ERP \text{ power} = EIPR \text{ power} - 2.15dBi.$

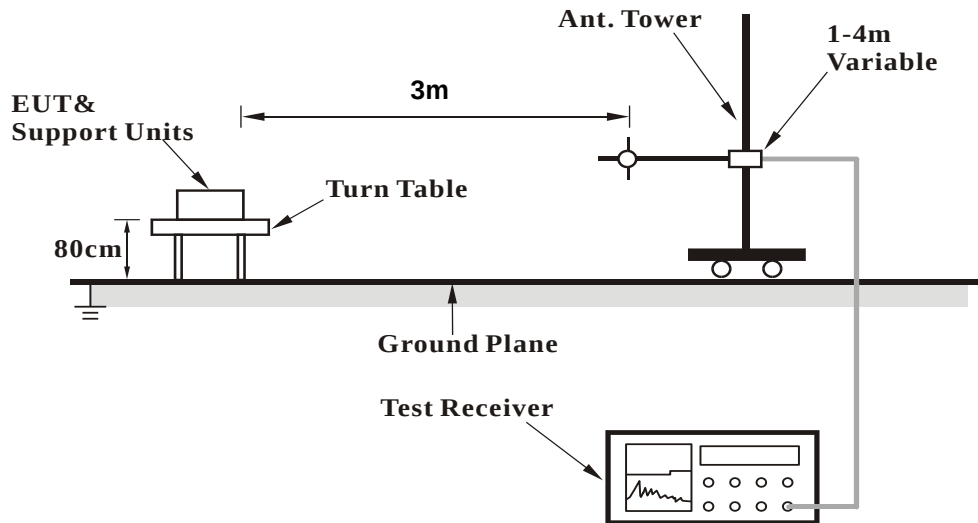
Note: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.7.4 Deviation from Test Standard

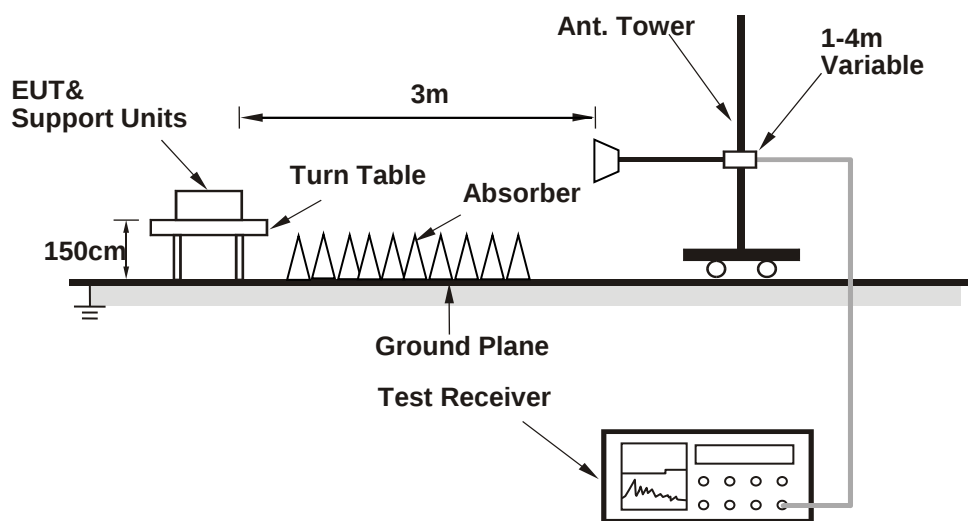
No deviation.

4.7.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.6 Test Results

Test was done with 50ohm terminator on antenna port.

Below 1GHz Data :

5MHz

Mode	TX Low	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	158.15	31.38	-56.31	-0.96	-57.27	-40	-17.27
2	243.62	28.36	-66.85	3.84	-63.01	-40	-23.01
3	336.07	29.65	-68.22	3.67	-64.55	-40	-24.55
4	526.6	28.60	-66.61	2.69	-63.91	-40	-23.91
5	703.66	27.28	-69.06	1.56	-67.50	-40	-27.50
6	802.7	30.98	-67.52	1.52	-66.00	-40	-26.00
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	82.94	31.40	-62.21	-1.61	-63.82	-40	-23.82
2	161.45	30.16	-58.45	-0.49	-58.94	-40	-18.94
3	244.46	32.95	-62.23	3.85	-58.38	-40	-18.38
4	337.92	33.54	-64.33	3.66	-60.67	-40	-20.67
5	430.59	34.50	-63.60	3.01	-60.59	-40	-20.59
6	524.34	31.97	-63.26	2.71	-60.55	-40	-20.55

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX Middle	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	158.88	30.58	-57.31	-0.86	-58.17	-40	-18.17
2	242.81	26.93	-68.32	3.84	-64.48	-40	-24.48
3	337.02	28.97	-68.90	3.66	-65.24	-40	-25.24
4	527.32	28.24	-66.96	2.69	-64.27	-40	-24.27
5	702.82	26.40	-69.94	1.57	-68.37	-40	-28.37
6	802.6	30.27	-68.24	1.53	-66.72	-40	-26.72

Antenna Polarity & Test Distance: Vertical at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	82.65	30.10	-63.56	-1.63	-65.18	-40	-25.18
2	161.26	30.03	-58.53	-0.52	-59.04	-40	-19.04
3	243.91	31.85	-63.35	3.85	-59.51	-40	-19.51
4	337.66	32.44	-65.43	3.66	-61.77	-40	-21.77
5	429.78	34.11	-63.98	3.02	-60.96	-40	-20.96
6	524.99	30.73	-64.49	2.70	-61.79	-40	-21.79

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX High	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	158.64	31.18	-56.64	-0.89	-57.54	-40	-17.54
2	242.86	27.54	-67.70	3.84	-63.87	-40	-23.87
3	335.59	29.05	-68.82	3.67	-65.15	-40	-25.15
4	526.84	27.58	-67.62	2.69	-64.93	-40	-24.93
5	704.24	27.09	-69.25	1.55	-67.70	-40	-27.70
6	801.74	30.93	-67.65	1.53	-66.12	-40	-26.12

Antenna Polarity & Test Distance: Vertical at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	83.02	30.75	-62.84	-1.61	-64.45	-40	-24.45
2	160.61	29.23	-59.14	-0.61	-59.75	-40	-19.75
3	244.72	32.09	-63.08	3.85	-59.23	-40	-19.23
4	337.67	32.65	-65.22	3.66	-61.56	-40	-21.56
5	431.54	33.97	-64.13	3.00	-61.13	-40	-21.13
6	523.53	31.16	-64.08	2.71	-61.37	-40	-21.37

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

10MHz

Mode	TX Low	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	158.94	31.19	-56.72	-0.85	-57.57	-40	-17.57
2	243.96	28.27	-66.93	3.85	-63.08	-40	-23.08
3	335.28	29.44	-68.43	3.67	-64.76	-40	-24.76
4	526.59	27.39	-67.82	2.69	-65.12	-40	-25.12
5	702.81	25.85	-70.49	1.57	-68.92	-40	-28.92
6	803.38	30.41	-68.04	1.52	-66.52	-40	-26.52
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	82.34	30.88	-62.83	-1.64	-64.47	-40	-24.47
2	161.76	29.80	-58.90	-0.44	-59.34	-40	-19.34
3	244.95	32.23	-62.93	3.85	-59.08	-40	-19.08
4	338.92	32.08	-65.79	3.65	-62.14	-40	-22.14
5	429.92	33.91	-64.18	3.02	-61.16	-40	-21.16
6	523.81	31.36	-63.88	2.71	-61.17	-40	-21.17

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX Middle	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	159.05	30.68	-57.26	-0.83	-58.09	-40	-18.09
2	242.86	28.18	-67.06	3.84	-63.23	-40	-23.23
3	335.18	29.12	-68.75	3.67	-65.08	-40	-25.08
4	527.02	28.38	-66.82	2.69	-64.13	-40	-24.13
5	703.38	27.13	-69.21	1.56	-67.65	-40	-27.65
6	802.6	29.90	-68.61	1.53	-67.09	-40	-27.09
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	83.42	30.02	-63.50	-1.58	-65.09	-40	-25.09
2	162.37	29.85	-59.02	-0.36	-59.37	-40	-19.37
3	245.29	32.23	-62.92	3.86	-59.06	-40	-19.06
4	337.62	32.74	-65.13	3.66	-61.47	-40	-21.47
5	431.58	34.29	-63.81	3.00	-60.81	-40	-20.81
6	524.91	31.64	-63.59	2.70	-60.88	-40	-20.88

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX High	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	158.03	30.69	-56.96	-0.98	-57.94	-40	-17.94
2	242.92	28.33	-66.91	3.84	-63.07	-40	-23.07
3	336.63	28.89	-68.98	3.67	-65.32	-40	-25.32
4	527.54	27.47	-67.72	2.69	-65.04	-40	-25.04
5	703.63	26.20	-70.14	1.56	-68.58	-40	-28.58
6	803.58	30.27	-68.16	1.52	-66.65	-40	-26.65

Antenna Polarity & Test Distance: Vertical at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	83.26	31.10	-62.45	-1.59	-64.04	-40	-24.04
2	160.46	29.36	-58.97	-0.63	-59.60	-40	-19.60
3	244.56	31.66	-63.52	3.85	-59.67	-40	-19.67
4	337.47	33.01	-64.86	3.66	-61.20	-40	-21.20
5	431.4	33.03	-65.07	3.00	-62.07	-40	-22.07
6	524.38	30.72	-64.51	2.71	-61.80	-40	-21.80

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

15MHz

Mode	TX Low	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	157.99	29.94	-57.70	-0.99	-58.69	-40	-18.69
2	243.53	26.90	-68.32	3.84	-64.47	-40	-24.47
3	336.94	28.30	-69.57	3.66	-65.91	-40	-25.91
4	527.42	28.39	-66.81	2.69	-64.12	-40	-24.12
5	702.76	26.48	-69.86	1.57	-68.29	-40	-28.29
6	802.08	29.88	-68.67	1.53	-67.14	-40	-27.14
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	83.72	31.26	-62.21	-1.56	-63.78	-40	-23.78
2	161.45	29.61	-59.00	-0.49	-59.49	-40	-19.49
3	244.58	32.60	-62.58	3.85	-58.72	-40	-18.72
4	338.26	32.82	-65.05	3.66	-61.39	-40	-21.39
5	430.67	33.88	-64.22	3.01	-61.21	-40	-21.21
6	523.9	31.42	-63.82	2.71	-61.10	-40	-21.10

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX Middle	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	158.03	31.01	-56.64	-0.98	-57.62	-40	-17.62
2	242.91	28.15	-67.09	3.84	-63.25	-40	-23.25
3	336.68	29.35	-68.52	3.66	-64.86	-40	-24.86
4	525.88	28.59	-66.62	2.70	-63.93	-40	-23.93
5	702.95	27.15	-69.19	1.57	-67.62	-40	-27.62
6	802.57	30.16	-68.35	1.53	-66.83	-40	-26.83

Antenna Polarity & Test Distance: Vertical at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	83.19	30.27	-63.29	-1.60	-64.89	-40	-24.89
2	161.47	29.52	-59.09	-0.49	-59.58	-40	-19.58
3	244.81	31.49	-63.68	3.85	-59.82	-40	-19.82
4	337.21	33.40	-64.47	3.66	-60.81	-40	-20.81
5	430.01	33.40	-64.69	3.02	-61.67	-40	-21.67
6	523.62	30.67	-64.57	2.71	-61.86	-40	-21.86

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX High	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	157.34	31.27	-56.19	-1.08	-57.27	-40	-17.27
2	243.71	27.94	-67.27	3.84	-63.43	-40	-23.43
3	336.16	29.59	-68.28	3.67	-64.61	-40	-24.61
4	527.38	27.20	-68.00	2.69	-65.31	-40	-25.31
5	703.67	27.08	-69.26	1.56	-67.70	-40	-27.70
6	803.51	29.49	-68.95	1.52	-67.43	-40	-27.43
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	82.99	30.23	-63.37	-1.61	-64.97	-40	-24.97
2	162.18	29.39	-59.42	-0.38	-59.81	-40	-19.81
3	244.3	32.35	-62.84	3.85	-58.99	-40	-18.99
4	337.53	32.67	-65.20	3.66	-61.54	-40	-21.54
5	430.88	33.48	-64.62	3.01	-61.61	-40	-21.61
6	524.47	31.46	-63.77	2.71	-61.06	-40	-21.06

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

20MHz

Mode	TX Low	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	157.64	30.67	-56.87	-1.04	-57.91	-40	-17.91
2	244.52	27.24	-67.94	3.85	-64.09	-40	-24.09
3	336.17	28.67	-69.20	3.67	-65.53	-40	-25.53
4	526.93	27.45	-67.75	2.69	-65.06	-40	-25.06
5	704.56	27.20	-69.14	1.54	-67.60	-40	-27.60
6	802.12	30.20	-68.35	1.53	-66.82	-40	-26.82
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	82.05	31.32	-62.44	-1.66	-64.10	-40	-24.10
2	160.7	28.74	-59.66	-0.60	-60.25	-40	-20.25
3	244.62	32.63	-62.54	3.85	-58.69	-40	-18.69
4	338.05	32.63	-65.24	3.66	-61.58	-40	-21.58
5	429.76	34.01	-64.08	3.02	-61.06	-40	-21.06
6	525.03	31.55	-63.67	2.70	-60.97	-40	-20.97

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX Middle	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	158.16	30.81	-56.88	-0.96	-57.84	-40	-17.84
2	244.06	28.24	-66.96	3.85	-63.11	-40	-23.11
3	336.83	28.29	-69.58	3.66	-65.92	-40	-25.92
4	525.82	28.32	-66.89	2.70	-64.20	-40	-24.20
5	704.32	25.83	-70.51	1.55	-68.96	-40	-28.96
6	802.45	30.87	-67.65	1.53	-66.13	-40	-26.13

Antenna Polarity & Test Distance: Vertical at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	82.37	30.93	-62.77	-1.64	-64.42	-40	-24.42
2	161.2	30.08	-58.46	-0.52	-58.98	-40	-18.98
3	244.25	31.83	-63.36	3.85	-59.51	-40	-19.51
4	337.37	32.11	-65.76	3.66	-62.10	-40	-22.10
5	431.18	33.62	-64.48	3.00	-61.48	-40	-21.48
6	524.56	30.87	-64.36	2.71	-61.65	-40	-21.65

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX High	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	158.29	30.60	-57.12	-0.94	-58.07	-40	-18.07
2	244.07	27.98	-67.22	3.85	-63.37	-40	-23.37
3	335.42	29.49	-68.38	3.67	-64.71	-40	-24.71
4	526.01	27.94	-67.27	2.70	-64.58	-40	-24.58
5	704.5	26.77	-69.57	1.55	-68.03	-40	-28.03
6	803.34	30.33	-68.12	1.52	-66.60	-40	-26.60

Antenna Polarity & Test Distance: Vertical at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	82.33	30.98	-62.73	-1.64	-64.38	-40	-24.38
2	160.87	28.78	-59.67	-0.57	-60.24	-40	-20.24
3	244.06	32.61	-62.59	3.85	-58.74	-40	-18.74
4	337.59	33.39	-64.48	3.66	-60.82	-40	-20.82
5	431.33	33.66	-64.44	3.00	-61.44	-40	-21.44
6	525.12	30.48	-64.74	2.70	-62.04	-40	-22.04

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Above 1GHz Data :

5MHz

Mode	TX Low	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7105.00	44.30	-57.85	4.88	-52.96	-40	-12.96
2	10657.50	44.00	-57.94	3.42	-54.52	-40	-14.52
3	14210.00	46.10	-52.80	2.50	-50.30	-40	-10.30
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7105.00	43.40	-58.75	4.88	-53.86	-40	-13.86
2	10657.50	43.30	-58.64	3.42	-55.22	-40	-15.22
3	14210.00	44.60	-54.30	2.50	-51.80	-40	-11.80

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX Middle	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7250.00	44.19	-58.13	4.76	-53.37	-40	-13.37
2	10875.00	44.02	-57.67	3.21	-54.46	-40	-14.46
3	14500.00	45.59	-52.53	2.97	-49.56	-40	-9.56
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7250.00	43.37	-58.95	4.76	-54.19	-40	-14.19
2	10875.00	42.97	-58.72	3.21	-55.51	-40	-15.51
3	14500.00	44.31	-53.81	2.97	-50.84	-40	-10.84

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX High	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7395.00	43.84	-58.65	4.63	-54.02	-40	-14.02
2	11092.50	44.00	-57.44	3.00	-54.44	-40	-14.44
3	14790.00	46.64	-50.70	3.44	-47.26	-40	-7.26
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7395.00	43.96	-58.53	4.63	-53.90	-40	-13.90
2	11092.50	43.82	-57.62	3.00	-54.62	-40	-14.62
3	14790.00	44.85	-52.49	3.44	-49.05	-40	-9.05

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

10MHz

Mode	TX Low	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7110.00	44.35	-57.80	4.88	-52.92	-40	-12.92
2	10665.00	43.97	-57.96	3.41	-54.55	-40	-14.55
3	14220.00	45.88	-53.00	2.52	-50.48	-40	-10.48
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7110.00	43.53	-58.62	4.88	-53.74	-40	-13.74
2	10665.00	43.24	-58.69	3.41	-55.28	-40	-15.28
3	14220.00	45.47	-53.41	2.52	-50.89	-40	-10.89

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX Middle	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7250.00	44.19	-58.13	4.76	-53.37	-40	-13.37
2	10875.00	44.51	-57.18	3.21	-53.97	-40	-13.97
3	14500.00	46.48	-51.64	2.97	-48.67	-40	-8.67
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7250.00	44.33	-57.99	4.76	-53.23	-40	-13.23
2	10875.00	44.03	-57.66	3.21	-54.45	-40	-14.45
3	14500.00	44.32	-53.80	2.97	-50.83	-40	-10.83

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX High	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7390.00	43.57	-58.92	4.64	-54.28	-40	-14.28
2	11085.00	44.41	-57.04	3.01	-54.03	-40	-14.03
3	14780.00	46.44	-50.92	3.42	-47.50	-40	-7.50
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7390.00	42.69	-59.80	4.64	-55.16	-40	-15.16
2	11085.00	43.07	-58.38	3.01	-55.37	-40	-15.37
3	14780.00	44.05	-53.31	3.42	-49.89	-40	-9.89

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

15MHz

Mode	TX Low	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7115.00	44.00	-58.16	4.87	-53.29	-40	-13.29
2	10672.50	44.88	-57.04	3.41	-53.64	-40	-13.64
3	14230.00	46.53	-52.32	2.53	-49.79	-40	-9.79
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7115.00	42.49	-59.67	4.87	-54.80	-40	-14.80
2	10672.50	42.36	-59.56	3.41	-56.16	-40	-16.16
3	14230.00	45.16	-53.69	2.53	-51.16	-40	-11.16

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX Middle	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7250.00	45.11	-57.21	4.76	-52.45	-40	-12.45
2	10875.00	43.65	-58.04	3.21	-54.83	-40	-14.83
3	14500.00	46.71	-51.41	2.97	-48.44	-40	-8.44
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7250.00	42.70	-59.62	4.76	-54.86	-40	-14.86
2	10875.00	44.21	-57.48	3.21	-54.27	-40	-14.27
3	14500.00	44.18	-53.94	2.97	-50.97	-40	-10.97

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX High	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7385.00	43.78	-58.70	4.64	-54.06	-40	-14.06
2	11077.50	44.65	-56.81	3.02	-53.80	-40	-13.80
3	14770.00	45.78	-51.61	3.40	-48.21	-40	-8.21

Antenna Polarity & Test Distance: Vertical at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7385.00	42.68	-59.80	4.64	-55.16	-40	-15.16
2	11077.50	43.29	-58.17	3.02	-55.16	-40	-15.16
3	14770.00	45.33	-52.06	3.40	-48.66	-40	-8.66

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

20MHz

Mode	TX Low	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7120.00	44.16	-58.00	4.87	-53.14	-40	-13.14
2	10680.00	43.04	-58.87	3.40	-55.48	-40	-15.48
3	14240.00	46.92	-51.90	2.55	-49.35	-40	-9.35
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7120.00	42.42	-59.74	4.87	-54.88	-40	-14.88
2	10680.00	42.40	-59.51	3.40	-56.12	-40	-16.12
3	14240.00	44.05	-54.77	2.55	-52.22	-40	-12.22

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX Middle	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7250.00	43.33	-58.99	4.76	-54.23	-40	-14.23
2	10875.00	44.79	-56.90	3.21	-53.69	-40	-13.69
3	14500.00	46.41	-51.71	2.97	-48.74	-40	-8.74
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7250.00	43.07	-59.25	4.76	-54.49	-40	-14.49
2	10875.00	42.32	-59.37	3.21	-56.16	-40	-16.16
3	14500.00	43.89	-54.23	2.97	-51.26	-40	-11.26

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX High	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7380.00	43.65	-58.83	4.65	-54.18	-40	-14.18
2	11070.00	43.25	-58.22	3.02	-55.20	-40	-15.20
3	14760.00	45.49	-51.93	3.39	-48.54	-40	-8.54
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	7380.00	44.06	-58.42	4.65	-53.77	-40	-13.77
2	11070.00	43.11	-58.36	3.02	-55.34	-40	-15.34
3	14760.00	44.04	-53.38	3.39	-49.99	-40	-9.99

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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The address and road map of all our labs can be found in our web site also.

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