TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 96** **47 CFR FCC Part 2**
Report No.:	RFBBQZ-WTW-P24030292-4
FCC ID:	PY324100618
Product:	Nighthawk 5G Mobile Router
Brand:	NETGEAR
Model No.:	MR7400
Received Date:	2024/3/18
Test Date:	2024/3/25 ~ 2024/6/14
Issued Date:	2024/7/1
Applicant and Manufacturer:	NETGEAR, INC.
Address:	350 East Plumeria Drive San Jose CA 95134
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kewi Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Approved by: Jeremy Lin , **Date:** **2024/7/1**

Jeremy Lin / Project Engineer

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Prepared by : Pettie Chen / Senior Specialist

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RFBBQZ-WTW-P24030292-4	Original release.	2024/7/1

1 Certificate

Product:	Nighthawk 5G Mobile Router
Brand:	NETGEAR
Test Model:	MR7400
Sample Status:	Engineering sample
Applicant and Manufacturer:	NETGEAR, INC.
Test Date:	2024/3/25 ~ 2024/6/14
Standard:	47 CFR FCC Part 96 47 CFR FCC Part 2
Measurement procedure:	ANSI/TIA/EIA-603-E 2016 ANSI C63.26-2015 KDB 971168 D01 Power Meas License Digital Systems v03r01 KDB 940660 D01 Part 96 CBRS Eqpt v03

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.

2 Summary of Test Results

Standard / Clause	Test Item	Result	Remark
Part 2.1046 Part 96.41(b)	Maximum EIRP	Pass	Meet the requirement of limit.
Part 2.1047	Modulation Characteristics	Pass	Meet the requirement of limit.
Part 2.1046 Part 96.41(b)	Maximum Power Spectral Density	N/A	This device is End User Device.
Part 96.41(g)	Peak to Average Ratio	Pass	Meet the requirement of limit.
Part 2.1049	Bandwidth	Pass	Meet the requirement of limit.
Part 2.1051 Part 96.41(e)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
Part 2.1053 Part 96.41(e)	Radiated Spurious Emissions below 1GHz	Pass	Minimum passing margin is -6.26 dB at 99.84 MHz
Part 2.1053 Part 96.41(e)	Radiated Spurious Emissions above 1GHz	Pass	Minimum passing margin is -1.15 dB at 7250.00 MHz
Part 2.1055	Frequency Stability	Pass	Meet the requirement of limit.

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:

Parameter	Specification	Uncertainty (±)
Effective Radiated Power and Equivalent Isotropically Radiated Power	18 GHz ~ 40 GHz	2.29 dB
	1 GHz ~ 18 GHz	2.29 dB
Peak to Average Ratio	-	0.920 dB
Bandwidth	-	960 Hz
Conducted Spurious Emissions	-	2.12 dB
Radiated Spurious Emissions below 1GHz	9 kHz ~ 30 MHz	3.59 dB
	30 MHz ~ 1 GHz	3.64 dB
Radiated Spurious Emissions above 1GHz	1 GHz ~ 18 GHz	2.29 dB
	18 GHz ~ 40 GHz	2.29 dB
Frequency Stability	-	0.176 ppm

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Nighthawk 5G Mobile Router
Brand	NETGEAR
Test Model	MR7400
Status of EUT	Engineering sample
Power Supply Rating	3.85Vdc from battery 5Vdc or 9Vdc or 12Vdc from adapter

Note:

1. EUT Overview

Mode	Bandwidth	TX Frequency Range (MHz)	Modulation	Max. EIRP (W)	Max. EIRP (dBm)	Emission Designator
LTE Band 48	5 MHz	3552.5 ~ 3697.5	QPSK	0.188	22.74	4M49G7D
			16QAM	0.15	21.76	4M50D7W
			64QAM	0.118	20.73	4M49D7W
			256QAM	0.095	19.76	4M49D7W
	10 MHz	3555 ~ 3695	QPSK	0.189	22.77	8M98G7D
			16QAM	0.15	21.76	8M98D7W
			64QAM	0.119	20.77	8M98D7W
			256QAM	0.095	19.76	8M98D7W
	15 MHz	3557.5 ~ 3692.5	QPSK	0.166	22.2	13M5G7D
			16QAM	0.132	21.2	13M5D7W
			64QAM	0.104	20.19	13M5D7W
			256QAM	0.083	19.17	13M5D7W
	20 MHz	3560 ~ 3690	QPSK	0.191	22.8	18M0G7D
			16QAM	0.151	21.8	18M0D7W
			64QAM	0.121	20.82	18M0D7W
			256QAM	0.095	19.78	18M0D7W

2. The EUT uses following accessories.

AC Adapter 1			
Brand	Model	Part Number	Specification
NETGEAR	2AFH0183AA	332-11642-01	AC Input : 100-240Vac, 50/60Hz, 0.5A DC Output : 5.0V, 3.0A, 15.0W 9.0V, 2.0A, 18.0W 12.0V, 1.5A, 18.0W DC Output Cable : N/A Plug : US Manufacturer : CWT
AC Adapter 2			
Brand	Model	Part Number	Specification
NETGEAR	AD2122F20	332-11106-03	AC Input : 100-240V, 50/60Hz, 0.5A DC Output : 5V, 2.0A 9V, 1.8A DC Output Cable : N/A Plug : US Manufacturer : PIE
Battery			
Brand	Model	Part Number	Specification
NETGEAR	W-20b	308-10100-01	Power Rating : 3.85Vdc, 19.96Wh
USB Cable 1			
Brand		Model	Specification
HORTON		D0017100R37HR	Signal Line : 1m
USB Cable 2			
Brand		Model	Specification
LUXSHARE PRECISION INDUSTRY		LZZUC052-CS-H	Signal Line : 1m

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

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna Type		Monopole	
LTE Band			
Band	Freq. Range (MHz)	Gain (dBi)	
		Ant. 1	Ant. 2
LTE B48	3550 ~ 3700	2.31	1.91

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

Antenna Type		External	
External Connector		TS9	
LTE Band			
Band	Freq. Range (MHz)	Gain (dBi)	
		Ant. 1	Ant. 2
LTE B48	3550 ~ 3700	0.17	1.66

Note:

1. TS9 connector is for the external antennas, while the external antennas are connected, RF outputs are switch from internal 1/2 to the external one.
2. The maximum antenna gain allowed for the external antenna is limited by the internal antenna gain, also illustrated in the user manual.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. For Unwanted Emission (below 1GHz) items: Battery/AC Adapter/USB Cable. Pre-scan these modes and find the worst case as a representative test condition. 2. EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition.
Worst Case:	1. AC Adapter 1 + USB Cable 1 2. Z-Axis

Following channel(s) was (were) selected for the final test as listed below:

For LTE Band 48

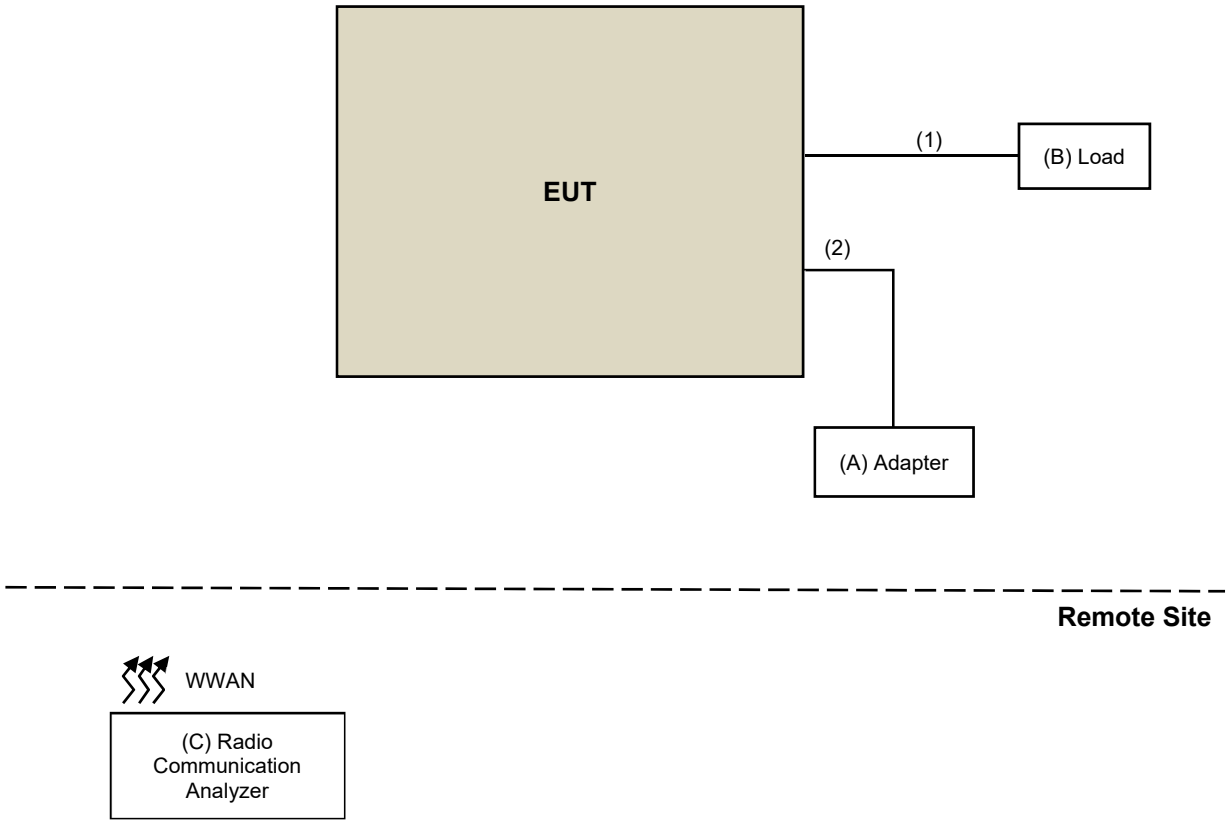
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation
Maximum Output Power	55265 to 56715	55265 (3552.50MHz), 55990 (3625.00MHz), 56715 (3697.50MHz)	5MHz	QPSK / 16QAM / 64QAM / 256QAM
	55290 to 56690	55290 (3555.00MHz), 55990 (3625.00MHz), 56690 (3695.00MHz)	10MHz	QPSK / 16QAM / 64QAM / 256QAM
	55315 to 56665	55315 (3557.50MHz), 55990 (3625.00MHz), 56665 (3692.50MHz)	15MHz	QPSK / 16QAM / 64QAM / 256QAM
	55340 to 56640	55340 (3560.00MHz), 55990 (3625.00MHz), 56640 (3690.00MHz)	20MHz	QPSK / 16QAM / 64QAM / 256QAM
Modulation Characteristics	55340 to 56640	55990 (3625.00MHz)	20MHz	QPSK / 16QAM / 64QAM / 256QAM
Peak to Average Ratio	55265 to 56715	55265 (3552.50MHz), 55990 (3625.00MHz), 56715 (3697.50MHz)	5MHz	QPSK / 16QAM / 64QAM / 256QAM
	55290 to 56690	55290 (3555.00MHz), 55990 (3625.00MHz), 56690 (3695.00MHz)	10MHz	QPSK / 16QAM / 64QAM / 256QAM
	55315 to 56665	55315 (3557.50MHz), 55990 (3625.00MHz), 56665 (3692.50MHz)	15MHz	QPSK / 16QAM / 64QAM / 256QAM
	55340 to 56640	55340 (3560.00MHz), 55990 (3625.00MHz), 56640 (3690.00MHz)	20MHz	QPSK / 16QAM / 64QAM / 256QAM

Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation
Occupied Bandwidth	55265 to 56715	55265 (3552.50MHz), 55990 (3625.00MHz), 56715 (3697.50MHz)	5MHz	QPSK / 16QAM / 64QAM / 256QAM
	55290 to 56690	55290 (3555.00MHz), 55990 (3625.00MHz), 56690 (3695.00MHz)	10MHz	QPSK / 16QAM / 64QAM / 256QAM
	55315 to 56665	55315 (3557.50MHz), 55990 (3625.00MHz), 56665 (3692.50MHz)	15MHz	QPSK / 16QAM / 64QAM / 256QAM
	55340 to 56640	55340 (3560.00MHz), 55990 (3625.00MHz), 56640 (3690.00MHz)	20MHz	QPSK / 16QAM / 64QAM / 256QAM
Conducted Emission	55265 to 56715	55265 (3552.50MHz), 55990 (3625.00MHz), 56715 (3697.50MHz)	5MHz	QPSK
	55290 to 56690	55290 (3555.00MHz), 55990 (3625.00MHz), 56690 (3695.00MHz)	10MHz	QPSK
	55315 to 56665	55315 (3557.50MHz), 55990 (3625.00MHz), 56665 (3692.50MHz)	15MHz	QPSK
	55340 to 56640	55340 (3560.00MHz), 55990 (3625.00MHz), 56640 (3690.00MHz)	20MHz	QPSK
Radiated Emission Below 1GHz	55340 to 56640	56640 (3690.00MHz)	20MHz	QPSK
Radiated Emission Above 1GHz	55265 to 56715	55265 (3552.50MHz), 55990 (3625.00MHz), 56715 (3697.50MHz)	5MHz	QPSK
	55340 to 56640	55340 (3560.00MHz), 55990 (3625.00MHz), 56640 (3690.00MHz)	20MHz	QPSK
Frequency Stability	55265 to 56715	55265 (3552.50MHz), 56715 (3697.50MHz)	5MHz	QPSK
	55290 to 56690	55290 (3555.00MHz), 56690 (3695.00MHz)	10MHz	QPSK
	55315 to 56665	55315 (3557.50MHz), 56665 (3692.50MHz)	15MHz	QPSK
	55340 to 56640	55340 (3560.00MHz), 56640 (3690.00MHz)	20MHz	QPSK
EUT Configure Mode:	Adapter 1+USB Cable 1			

3.4 Test Program Used and Operation Descriptions

There is no need to controlling software during the test, and the EUT can be paired with the Radio Communication Analyzer to test the connection when it is powered on.

3.5 Connection Diagram of EUT and Peripheral Devices



3.6 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Adapter	NETGEAR	2AFH0183AA	NA	NA	Accessory of EUT
B.	Load	NA	NA	NA	NA	Provided by Lab
C.	Radio Communication Analyzer	Anritsu	MT8821C	6201462755	N/A	Provided by Lab

No.	Cable Descriptions	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Qty.)	Remark
1.	RJ45 Cable	1	1.5	No	0	Provided by Lab
2.	USB Cable	1	1	Yes	0	Accessory of EUT

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Maximum EIRP

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower &Turn BV ADT	AT100	AT93021705	N/A	N/A
Boresight antenna tower fixture BV	BAF-02	5	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-1169	2023/11/12	2024/11/11
	BBHA 9170	9170-480	2023/11/12	2024/11/11
		BBHA9170243	2023/11/12	2024/11/11
MXE EMI Receiver Keysight	N9038B	MY60180018	2024/3/13	2025/3/12
Preamplifier Agilent	8449B	3008A02367	2024/1/6	2025/1/5
Preamplifier EMCI	EMC 184045	980116	2023/9/27	2024/9/26
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2023/7/8	2024/7/7
	EMC102-KM-KM-3000	150929	2023/7/8	2024/7/7
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	2024/1/6	2025/1/5
RF Coaxial Cable HUBER+SUHNER&EMCI	SUCOFLEX 104& EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	2024/1/6	2025/1/5
Signal & Spectrum Analyzer R&S	FSW43	101867	2023/12/29	2024/12/28
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 4.
2. Tested Date: 2024/4/30

4.2 Modulation Characteristics

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
PXA Signal Analyzer Keysight	N9030B	MY57140938	2024/3/20	2025/3/19
Radio Communication Analyzer Anritsu	MT8821C	6201462755	2024/3/13	2025/3/12
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2024/4/11

4.3 Peak to Average Ratio

Refer to section 4.2 to get information of the instruments.

4.4 Bandwidth

Refer to section 4.2 to get information of the instruments.

4.5 Conducted Spurious Emissions

Refer to section 4.2 to get information of the instruments.

4.6 Radiated Spurious Emissions below 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower inn-co GmbH	MA 4000	010303	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-155	2023/10/13	2024/10/12
EMI Test Receiver R&S	ESR3	102782	2023/12/7	2024/12/6
Loop Antenna Electro-Metrics	EM-6879	269	2023/9/23	2024/9/22
Loop Antenna TESEQ	HLA 6121	45745	2023/8/8	2024/8/7
Preamplifier Agilent	8447D	2944A10631	2023/5/7	2024/5/6
Preamplifier EMCI	EMC001340	980201	2023/9/27	2024/9/26
RF Coaxial Cable Woken	8D-FB	Cable-CH4-01	2023/7/8	2024/7/7
Signal & Spectrum Analyzer R&S	FSW43	101582	2023/4/13	2024/4/12
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 3.
2. Tested Date: 2024/3/27

4.7 Radiated Spurious Emissions above 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower inn-co GmbH	MA 4000	010303	N/A	N/A
Boresight antenna tower fixture BV	BAF-02	5	N/A	N/A
EMI Test Receiver R&S	ESR3	102782	2023/12/7	2024/12/6
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-408	2023/11/12	2024/11/11
	BBHA 9170	9170-480	2023/11/12	2024/11/11
		BBHA9170241	2023/10/16	2024/10/15
		BBHA9170243	2023/11/12	2024/11/11
Preamplifier EMCI	EMC 184045	980116	2023/9/27	2024/9/26
Preamplifier Keysight	83017A	MY53270295	2023/5/7	2024/5/6
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2023/7/8	2024/7/7
	EMC102-KM-KM-3000	150929	2023/7/8	2024/7/7
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03(250724)	2023/5/7	2024/5/6
	Sucoflex 104	MY 13380+295012/04	2023/5/7	2024/5/6
Signal & Spectrum Analyzer R&S	FSW43	101582	2023/4/13	2024/4/12
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 3.
2. Tested Date: 2024/3/25

4.8 Frequency Stability

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
3-channel DC power supply JIN YIH Technology	ODP3033	ODP30332128138	N/A	N/A
Digital Multimeter Fluke	87III	70360742	2023/7/6	2024/7/5
PXA Signal Analyzer Keysight	N9030B	MY57140938	2024/3/20	2025/3/19
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A
Temperature & Humidity Chamber Terchy	HRM-120RF	931022	2023/12/19	2024/12/18
UXM 5G Wireless Test Platform Keysight	E7515B	MY59321376	2024/3/18	2025/3/17

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2024/6/14

5 Limits of Test Items

5.1 Maximum EIRP

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

5.2 Modulation Characteristics

A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

5.3 Peak to Average Ratio

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

5.4 Bandwidth

According to FCC 47 CFR part 2.1049, the occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.

5.5 Conducted Spurious Emissions

The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed −13 dBm/MHz within 0 to B MHz (where B is the bandwidth in MHz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B MHz below the lower CBSD-assigned channel edge. At all frequencies greater than B MHz above the upper CBSD assigned channel edge and less than B MHz below the lower CBSD-assigned channel edge, the conducted power of any end user device emission shall not exceed −25 dBm/MHz.
Additional protection levels: The conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

5.6 Radiated Spurious Emissions below 1GHz

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

5.7 Radiated Spurious Emissions above 1GHz

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

5.8 Frequency Stability

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation (authorized frequency block).

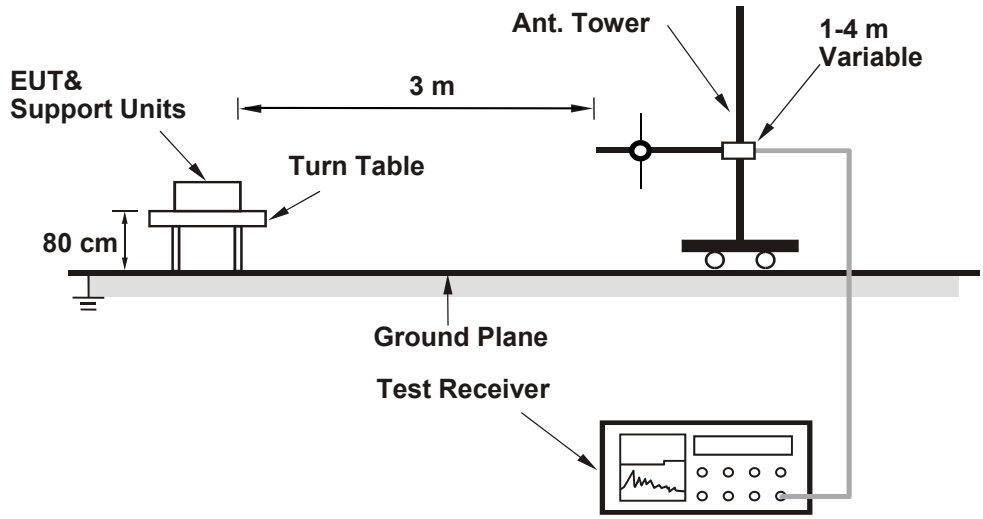
6 Test Arrangements

6.1 Maximum EIRP

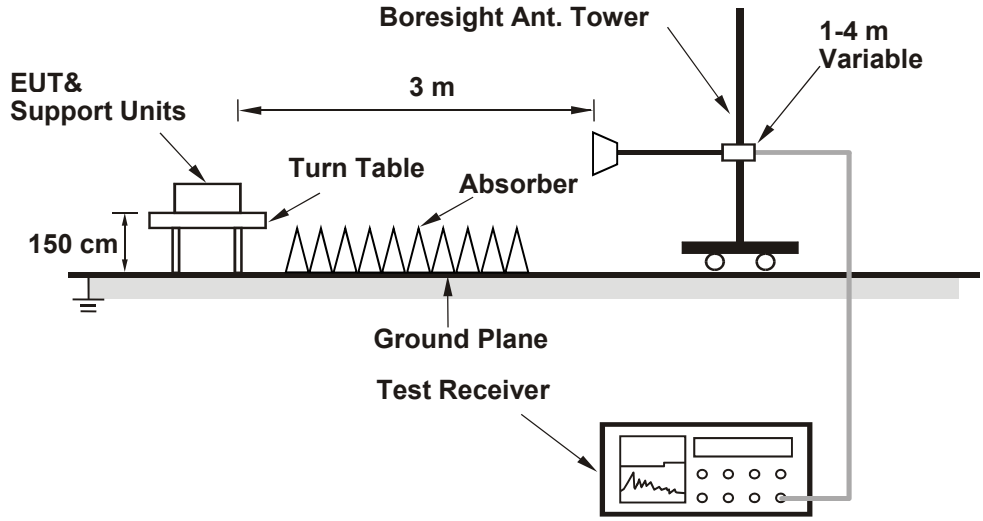
6.1.1 Test Setup

Radiated Power EIRP / ERP Measurement:

For Radiated Emission below or equal 1 GHz



For Radiated Emission above 1 GHz



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

6.1.2 Test Procedure

Radiated Power EIRP / ERP Measurement:

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology.

Set the EUT to transmit under low, middle and high channel and record the power level shown on spectrum analyzer.

a. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) 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 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
d. Following C63.26 section 5.5 and 5.2.7. Set the detector to power averaging (rms) detector.

- EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.
- ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

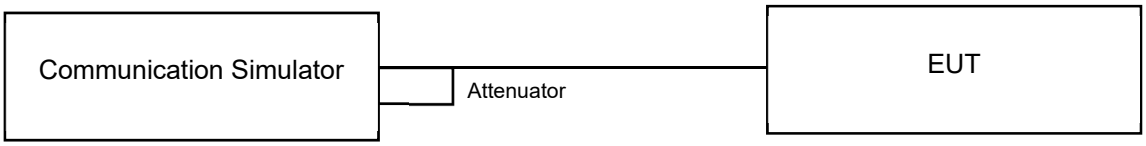
Spectrum analyzer setting as below:

Measurement method refers to ANSI C63.26 section 5.2.4.4.

a. Set span to 2 × to 3 × the OBW.
b. Set RBW = 1% to 5% of the OBW.
c. Set VBW ≥ 3 × RBW.
d. Set number of measurement points in sweep ≥ 2 × span / RBW.
e. Set Sweep time = auto-couple.
f. Detector = power averaging (rms).
g. Set sweep trigger to “free run.”
h. Trace average at least 100 traces in power averaging (rms) mode.
i. Use the Band/Channel Power function to determine the integrated power per 10 MHz bandwidth and full bandwidth, according to the 47 CFR FCC Part 96 standard.
j. If Duty cycle < 98%, Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission.

6.2 Modulation Characteristics

6.2.1 Test Setup

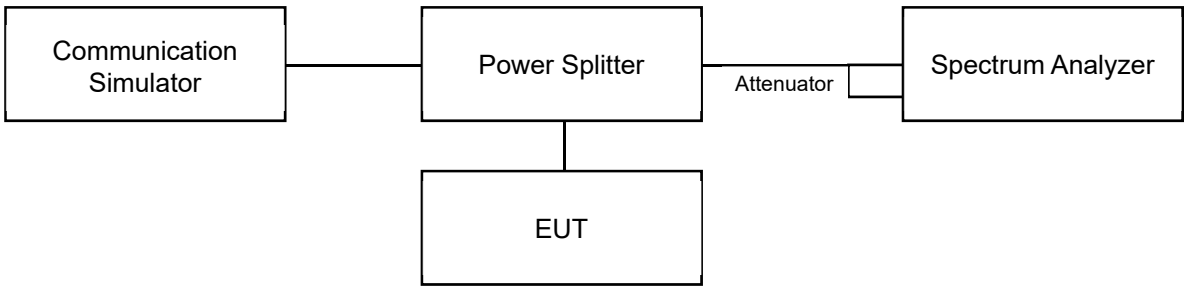


6.2.2 Test Procedure

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.

6.3 Peak to Average Ratio

6.3.1 Test Setup

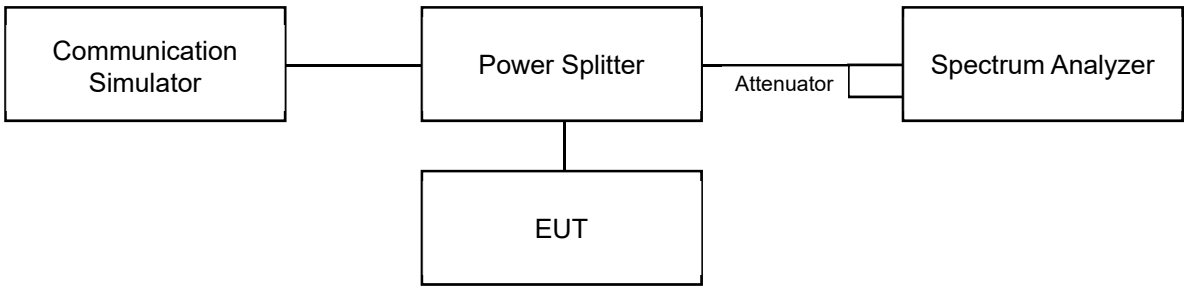


6.3.2 Test Procedure

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

6.4 Bandwidth

6.4.1 Test Setup



6.4.2 Test Procedure

For the 26 dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

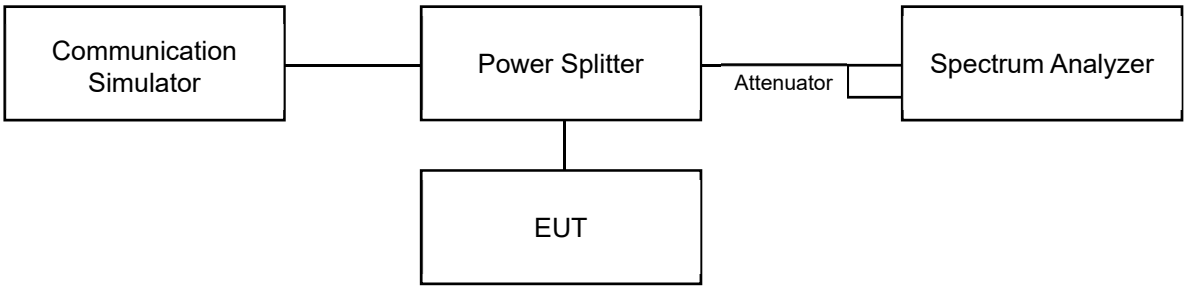
a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c. Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
d. The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
e. Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
f. Determine the following reference values: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
g. Determine the "−X dB amplitude" as equal to (Reference Value − X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
h. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the "−X dB amplitude" determined in step f). If a marker is below this "−X dB amplitude" value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.
i. The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

For the occupied bandwidth measurement method, please refer to section 5.4.4 of ANSI C63.26.

a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c. Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
d. The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
e. Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
f. Determine the reference value by either of the following:
g. 1) Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
h. 2) Set the EUT to transmit an unmodulated carrier. Set the spectrum analyzer marker to the level of the carrier.
i. Determine the "−X dB amplitude" as equal to (Reference Value − X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
j. If the reference value was determined using an unmodulated carrier, turn the EUT modulation on, then either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise the trace from step f) shall be used for step i).
k. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the "−X dB amplitude" determined in step f). If a marker is below this "−X dB amplitude" value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers. The spectral envelope can cross the "−X dB amplitude" at multiple points. The lowest or highest frequency shall be selected as the frequencies that are the farthest away from the center frequency at which the spectral envelope crosses the "−X dB amplitude."
l. The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

6.5 Conducted Spurious Emissions

6.5.1 Test Setup



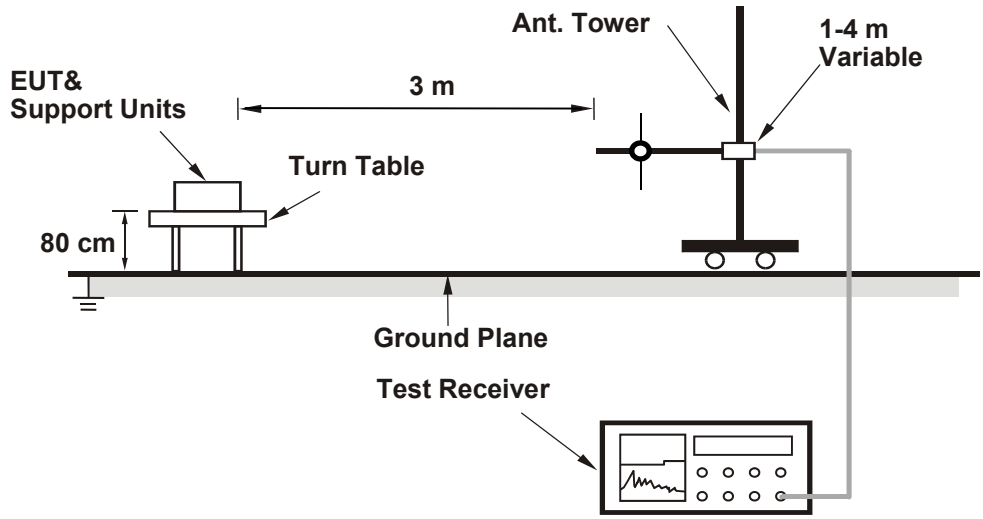
6.5.2 Test Procedure

a. Measurement refer to ANSI C63.26 section 5.7.
b. All measurements were done at 3 channels: low, middle and high operational frequency range.
c. Measuring frequency range is from 9 kHz up to the tenth harmonic of the hightest fundamental frequency or to 40 GHz, whichever is lower. 20 dB attenuation pad is connected with spectrum.
d. The fundamental frequency above 1 GHz, the spectrum set RBW = 1 MHz, VBW = 3 MHz, Detector = Average.
e. The fundamental frequency below 1 GHz, the spectrum set RBW ≥ 100 kHz, VBW ≥ 3 x RBW, Detector = Average.
f. Measuring frequency band edge, narrow RBW (no less than 1% of the OBW) is used for conducted emission measurement.
g. For the emissions measurement method, certain channel BW modes demonstrate compliance by integrating with the smaller RBW allowed by the rule.
h. e.g. Where Reference RBW = 1 MHz and a smaller RBW = 100 kHz is used, worst-case integrated BW power = [Max Measured Value (dBm) with RBW = 100 kHz] + 10* log(1000/100). To compensate for this integration before comparison to the limit, the limit line was reduced by 10 dB accordingly.
i. Record the maximum power value test plot.

6.6 Radiated Spurious Emissions below 1GHz

6.6.1 Test Setup

For radiated emission 30 MHz to 1 GHz



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

6.6.2 Test Procedure

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology.

a. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) 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 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.

d. Following ANSI C63.26 section 5.5 and 5.2.7

e. EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.

f. ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

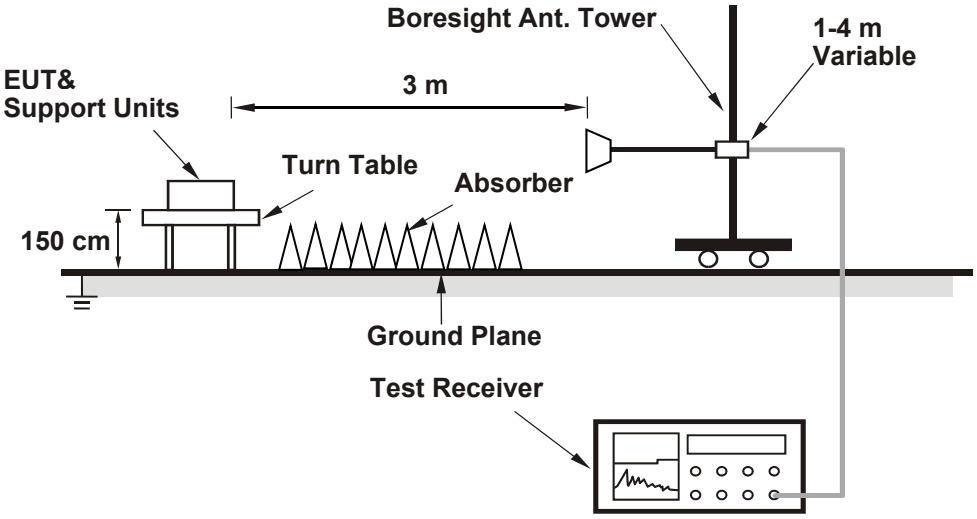
Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz. Set detector = average.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
   The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

6.7 Radiated Spurious Emissions above 1GHz

6.7.1 Test Setup

For radiated emission above 1 GHz



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

6.7.2 Test Procedure

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology.

a. In the semi-anechoic chamber, EUT placed on the 1.5 m 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 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.

d. Following ANSI C63.26 section 5.5 and 5.2.7

e. EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.

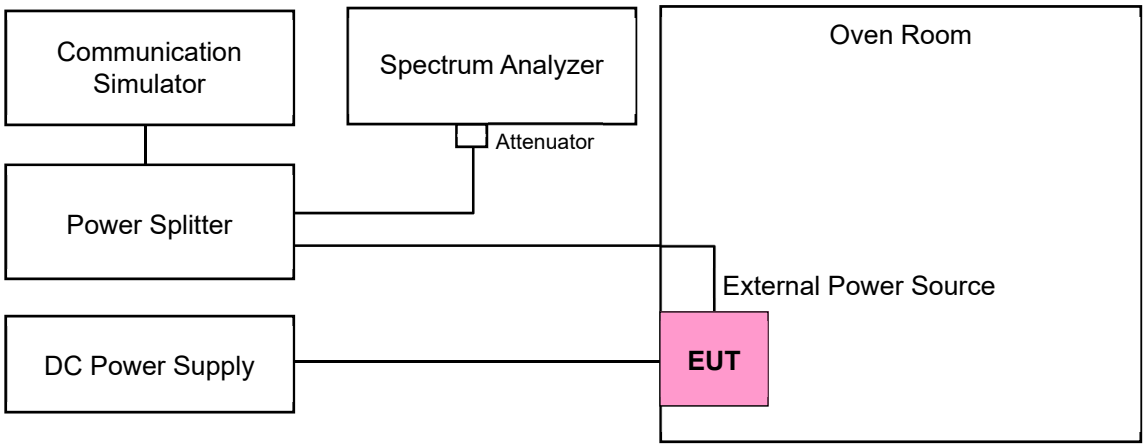
f. ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz. Set detector = average.

6.8 Frequency Stability

6.8.1 Test Setup



6.8.2 Test Procedure

The EUT is configured by test software or key-in commands to set data modulation and maximum power using WWAN technology.

a. 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.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ 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.

7 Test Results of Test Item

7.1 Maximum EIRP

Environmental Conditions:	25°C, 60% RH	Tested By:	Adair Peng

7.1.1 LTE Band 48

LTE Band 48, Channel Bandwidth: 5 MHz

Modulation	Channel	Channel Frequency (MHz)	Field Strength (dBμV/m)	Correction Factor (dB)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)
QPSK	55265	3552.5	117.52	-95.26	168.267	22.26	23
	55990	3625	117.75	-95.26	177.419	22.49	23
	56715	3697.5	118	-95.26	187.932	22.74	23
16QAM	55265	3552.5	116.54	-95.26	134.276	21.28	23
	55990	3625	116.74	-95.26	140.605	21.48	23
	56715	3697.5	117.02	-95.26	149.968	21.76	23
64QAM	55265	3552.5	115.52	-95.26	106.17	20.26	23
	55990	3625	115.73	-95.26	111.429	20.47	23
	56715	3697.5	115.99	-95.26	118.304	20.73	23
256QAM	55265	3552.5	114.54	-95.26	84.723	19.28	23
	55990	3625	114.74	-95.26	88.716	19.48	23
	56715	3697.5	115.02	-95.26	94.624	19.76	23

Notes:

1. EIRP (dBm) = Field Strength (dBμV/m) + Correction Factor (dB)
2. Correction Factor (dB) = 20log(D) – 104.8; where D is the measurement distance at 3 meters.

LTE Band 48, Channel Bandwidth: 10 MHz

Modulation	Channel	Channel Frequency (MHz)	Field Strength (dBμV/m)	Correction Factor (dB)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)
QPSK	55290	3555	117.35	-95.26	161.808	22.09	23
	55990	3625	117.3	-95.26	159.956	22.04	23
	56690	3695	118.03	-95.26	189.234	22.77	23
16QAM	55290	3555	116.35	-95.26	128.529	21.09	23
	55990	3625	116.32	-95.26	127.644	21.06	23
	56690	3695	117.02	-95.26	149.968	21.76	23
64QAM	55290	3555	115.37	-95.26	102.565	20.11	23
	55990	3625	115.32	-95.26	101.391	20.06	23
	56690	3695	116.03	-95.26	119.399	20.77	23
256QAM	55290	3555	114.37	-95.26	81.47	19.11	23
	55990	3625	114.34	-95.26	80.91	19.08	23
	56690	3695	115.02	-95.26	94.624	19.76	23

Notes:

1. EIRP (dBm) = Field Strength (dBμV/m) + Correction Factor (dB)
2. Correction Factor (dB) = 20log(D) – 104.8; where D is the measurement distance at 3 meters.

LTE Band 48, Channel Bandwidth: 15 MHz, Output Power: Full Power

Modulation	Channel	Channel Frequency (MHz)	Field Strength (dBµV/m)	Correction Factor (dB)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)
QPSK	55315	3557.5	117.36	-95.26	162.181	22.1	23
	55990	3625	117.24	-95.26	157.761	21.98	23
	56665	3692.5	117.46	-95.26	165.959	22.2	23
16QAM	55315	3557.5	116.34	-95.26	128.233	21.08	23
	55990	3625	116.22	-95.26	124.738	20.96	23
	56665	3692.5	116.46	-95.26	131.826	21.2	23
64QAM	55315	3557.5	115.35	-95.26	102.094	20.09	23
	55990	3625	115.22	-95.26	99.083	19.96	23
	56665	3692.5	115.45	-95.26	104.472	20.19	23
256QAM	55315	3557.5	114.35	-95.26	81.096	19.09	23
	55990	3625	114.24	-95.26	79.068	18.98	23
	56665	3692.5	114.43	-95.26	82.604	19.17	23

Notes:

1. EIRP (dBm) = Field Strength (dBµV/m) + Correction Factor (dB)
2. Correction Factor (dB) = 20log(D) – 104.8; where D is the measurement distance at 3 meters.

LTE Band 48, Channel Bandwidth: 20 MHz, Output Power: Full Power

Modulation	Channel	Channel Frequency (MHz)	Field Strength (dBµV/m)	Correction Factor (dB)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)
QPSK	55340	3560	116.97	-95.26	148.252	21.71	23
	55990	3625	117.2	-95.26	156.315	21.94	23
	56640	3690	118.06	-95.26	190.546	22.8	23
16QAM	55340	3560	115.97	-95.26	117.761	20.71	23
	55990	3625	116.18	-95.26	123.595	20.92	23
	56640	3690	117.06	-95.26	151.356	21.8	23
64QAM	55340	3560	114.96	-95.26	93.325	19.7	23
	55990	3625	115.17	-95.26	97.949	19.91	23
	56640	3690	116.08	-95.26	120.781	20.82	23
256QAM	55340	3560	113.96	-95.26	74.131	18.7	23
	55990	3625	114.22	-95.26	78.705	18.96	23
	56640	3690	115.04	-95.26	95.06	19.78	23

Notes:

1. EIRP (dBm) = Field Strength (dBµV/m) + Correction Factor (dB)
2. Correction Factor (dB) = 20log(D) – 104.8; where D is the measurement distance at 3 meters.

LTE Band 48, Channel Bandwidth: 15 MHz, Output Power: dBm/10 MHz

Modulation	Channel	Channel Frequency (MHz)	Field Strength (dBµV/m)	Correction Factor (dB)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)
QPSK	55315	3557.5	117.3	-95.26	159.956	22.04	23
	55990	3625	117.17	-95.26	155.239	21.91	23
	56665	3692.5	117.38	-95.26	162.93	22.12	23
16QAM	55315	3557.5	116.25	-95.26	125.603	20.99	23
	55990	3625	116.11	-95.26	121.619	20.85	23
	56665	3692.5	116.37	-95.26	129.122	21.11	23
64QAM	55315	3557.5	115.25	-95.26	99.77	19.99	23
	55990	3625	115.13	-95.26	97.051	19.87	23
	56665	3692.5	115.35	-95.26	102.094	20.09	23
256QAM	55315	3557.5	114.26	-95.26	79.433	19	23
	55990	3625	114.14	-95.26	77.268	18.88	23
	56665	3692.5	114.34	-95.26	80.91	19.08	23

Notes:

1. EIRP (dBm) = Field Strength (dBµV/m) + Correction Factor (dB)
2. Correction Factor (dB) = 20log(D) – 104.8; where D is the measurement distance at 3 meters.

LTE Band 48, Channel Bandwidth: 20 MHz, Output Power: dBm/10 MHz

Modulation	Channel	Channel Frequency (MHz)	Field Strength (dBµV/m)	Correction Factor (dB)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)
QPSK	55340	3560	116.85	-95.26	144.212	21.59	23
	55990	3625	117.08	-95.26	152.055	21.82	23
	56640	3690	118.04	-95.26	189.671	22.78	23
16QAM	55340	3560	115.85	-95.26	114.551	20.59	23
	55990	3625	116.06	-95.26	120.226	20.8	23
	56640	3690	117.02	-95.26	149.968	21.76	23
64QAM	55340	3560	114.83	-95.26	90.573	19.57	23
	55990	3625	115.06	-95.26	95.499	19.8	23
	56640	3690	116.03	-95.26	119.399	20.77	23
256QAM	55340	3560	113.84	-95.26	72.111	18.58	23
	55990	3625	114.11	-95.26	76.736	18.85	23
	56640	3690	115.02	-95.26	94.624	19.76	23

Notes:

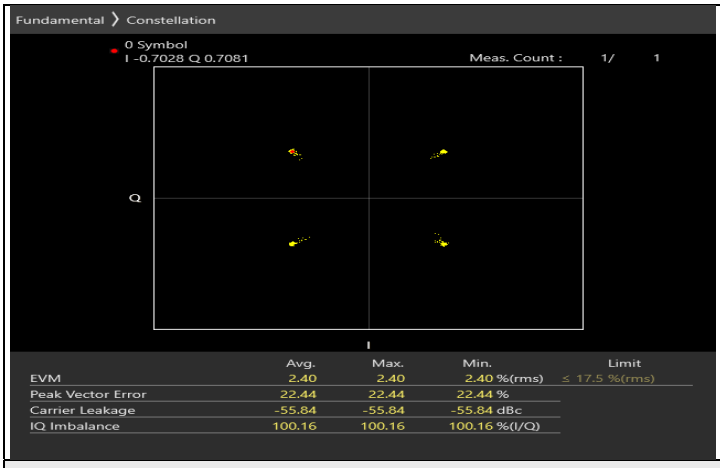
1. EIRP (dBm) = Field Strength (dBµV/m) + Correction Factor (dB)
2. Correction Factor (dB) = 20log(D) – 104.8; where D is the measurement distance at 3 meters.

7.2 Modulation Characteristics

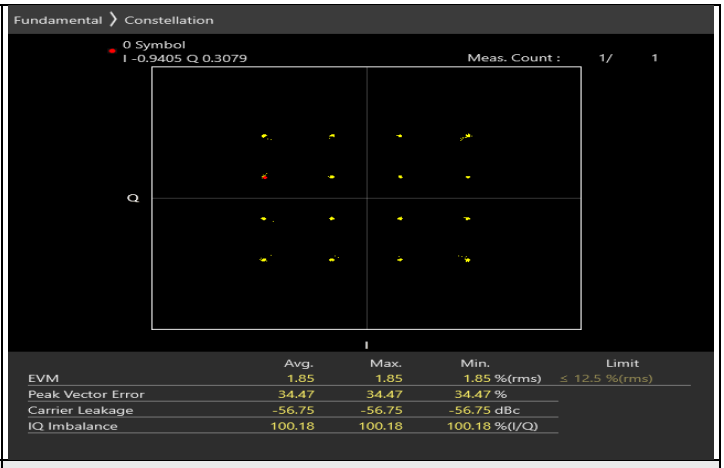
Input Power:	3.85 Vdc	Environmental Conditions:	25°C, 68% RH	Tested By:	Noah Chang

7.2.1 LTE Band 48

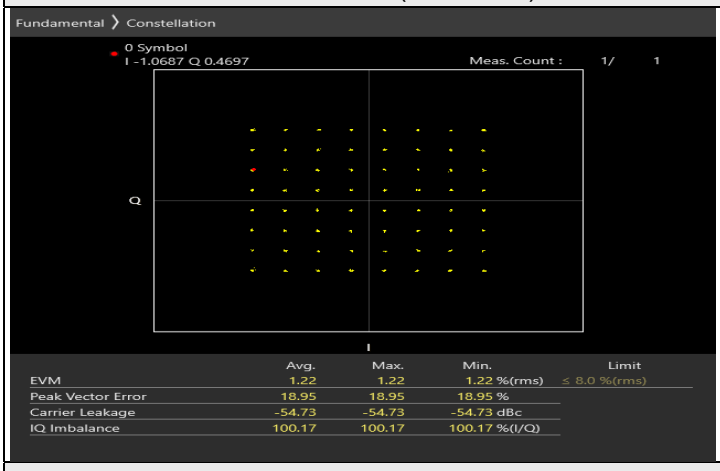
LTE Band 48, Channel Bandwidth: 20 MHz



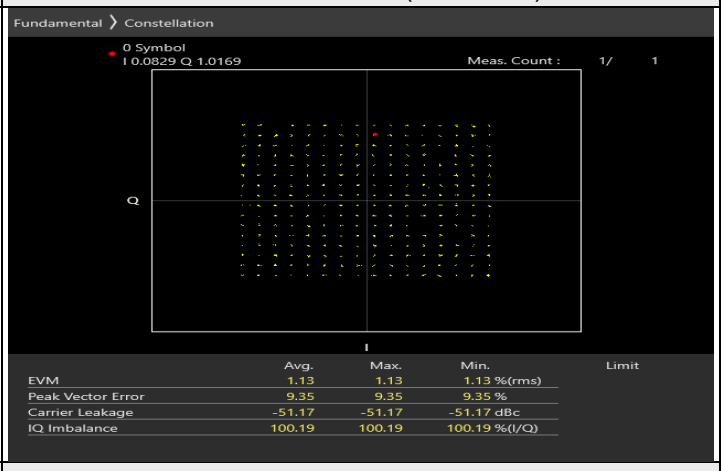
QPSK CH 55990 (3625 MHz)



16QAM CH 55990 (3625 MHz)



64QAM CH 55990 (3625 MHz)



256QAM CH 55990 (3625 MHz)

7.3 Peak to Average Ratio

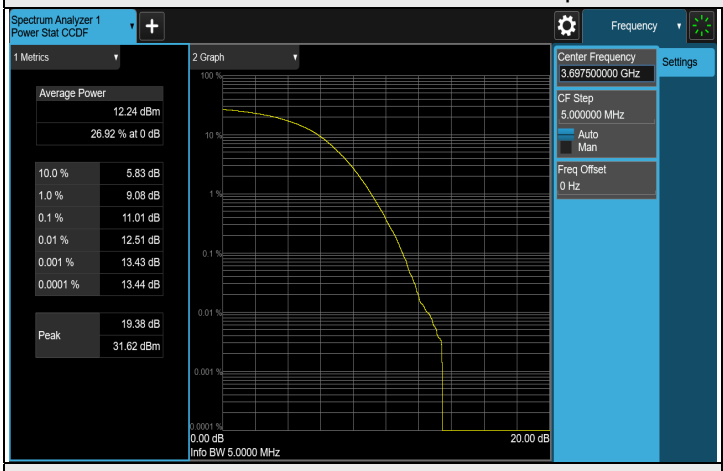
Input Power:	3.85 Vdc	Environmental Conditions:	25°C, 68% RH	Tested By:	Noah Chang

7.3.1 LTE Band 48

LTE Band 48, Channel Bandwidth: 5 MHz

Modulation	Channel	Frequency (MHz)	Measurement Value(dB)	Limit (dB)	Result
QPSK	55265	3552.5	7.11	13	PASS
QPSK	55990	3625	6.88	13	PASS
QPSK	56715	3697.5	9.37	13	PASS
16QAM	55265	3552.5	8.56	13	PASS
16QAM	55990	3625	8.82	13	PASS
16QAM	56715	3697.5	9.51	13	PASS
64QAM	55265	3552.5	9.18	13	PASS
64QAM	55990	3625	8.77	13	PASS
64QAM	56715	3697.5	9.37	13	PASS
256QAM	55265	3552.5	9.71	13	PASS
256QAM	55990	3625	10.57	13	PASS
256QAM	56715	3697.5	11.01	13	PASS

Spectrum Plot of Worst Value

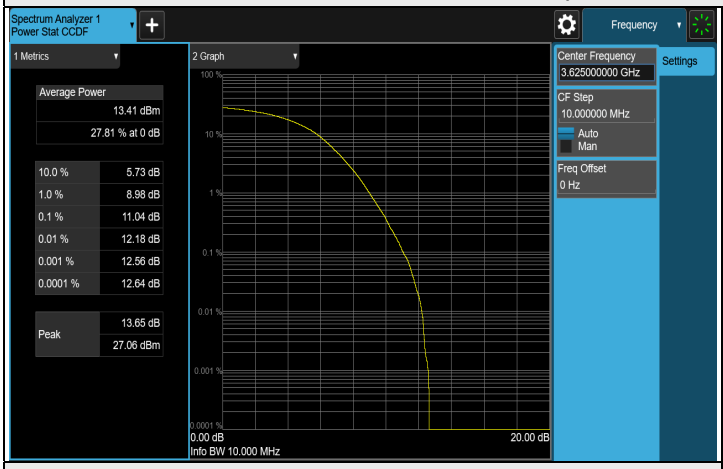


256QAM CH 56715 (3697.5 MHz)

LTE Band 48, Channel Bandwidth: 10 MHz

Modulation	Channel	Frequency (MHz)	Measurement Value(dB)	Limit (dB)	Result
QPSK	55290	3555	7.39	13	PASS
QPSK	55990	3625	8.11	13	PASS
QPSK	56690	3695	8.31	13	PASS
16QAM	55290	3555	9.24	13	PASS
16QAM	55990	3625	7.44	13	PASS
16QAM	56690	3695	9.04	13	PASS
64QAM	55290	3555	8.59	13	PASS
64QAM	55990	3625	9.75	13	PASS
64QAM	56690	3695	9.51	13	PASS
256QAM	55290	3555	9.79	13	PASS
256QAM	55990	3625	11.04	13	PASS
256QAM	56690	3695	9.98	13	PASS

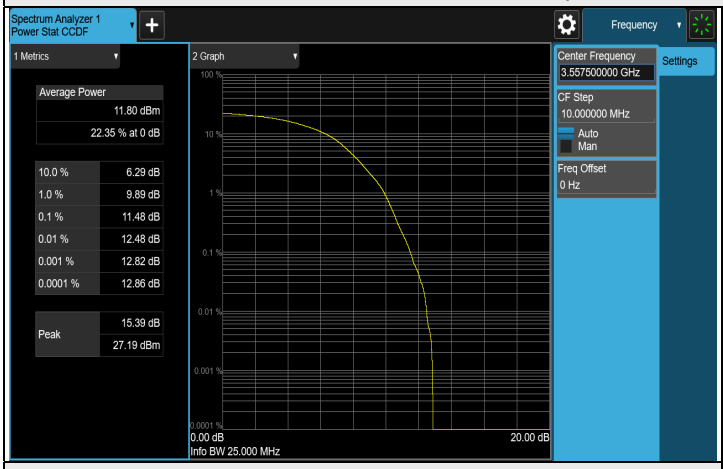
Spectrum Plot of Worst Value



256QAM CH 55990 (3625 MHz)

LTE Band 48, Channel Bandwidth: 15 MHz

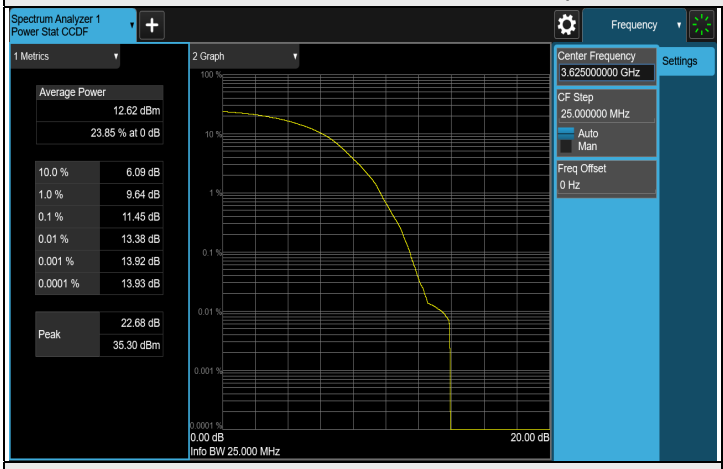
Modulation	Channel	Frequency (MHz)	Measurement Value(dB)	Limit (dB)	Result
QPSK	55315	3557.5	8.28	13	PASS
QPSK	55990	3625	6.95	13	PASS
QPSK	56665	3692.5	8.72	13	PASS
16QAM	55315	3557.5	9.34	13	PASS
16QAM	55990	3625	8.86	13	PASS
16QAM	56665	3692.5	9.20	13	PASS
64QAM	55315	3557.5	8.45	13	PASS
64QAM	55990	3625	10.01	13	PASS
64QAM	56665	3692.5	9.18	13	PASS
256QAM	55315	3557.5	11.48	13	PASS
256QAM	55990	3625	9.43	13	PASS
256QAM	56665	3692.5	10.44	13	PASS

Spectrum Plot of Worst Value	
	
256QAM CH 55315 (3557.5 MHz)	

LTE Band 48, Channel Bandwidth: 20 MHz

Modulation	Channel	Frequency (MHz)	Measurement Value(dB)	Limit (dB)	Result
QPSK	55340	3560	7.18	13	PASS
QPSK	55990	3625	7.44	13	PASS
QPSK	56640	3690	9.91	13	PASS
16QAM	55340	3560	9.30	13	PASS
16QAM	55990	3625	9.06	13	PASS
16QAM	56640	3690	7.88	13	PASS
64QAM	55340	3560	8.80	13	PASS
64QAM	55990	3625	9.30	13	PASS
64QAM	56640	3690	8.61	13	PASS
256QAM	55340	3560	11.37	13	PASS
256QAM	55990	3625	11.45	13	PASS
256QAM	56640	3690	10.55	13	PASS

Spectrum Plot of Worst Value



256QAM CH 55990 (3625 MHz)

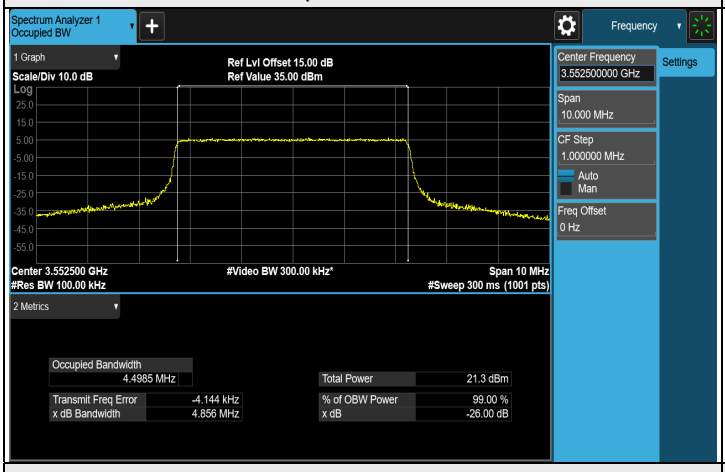
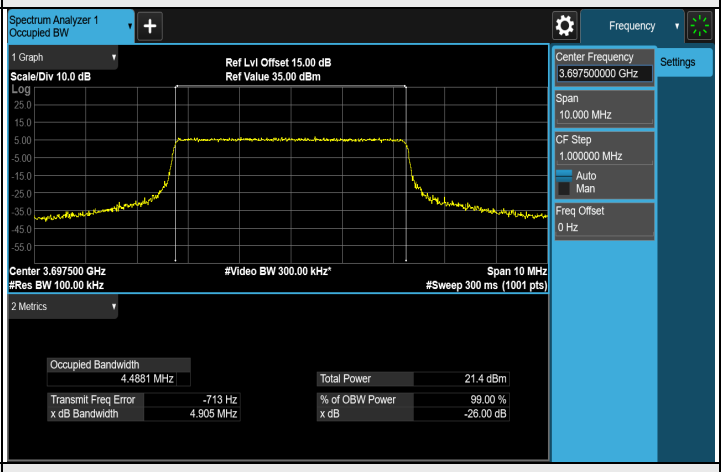
7.4 Bandwidth

Input Power:	3.85 Vdc	Environmental Conditions:	25°C, 68% RH	Tested By:	Noah Chang

7.4.1 LTE Band 48

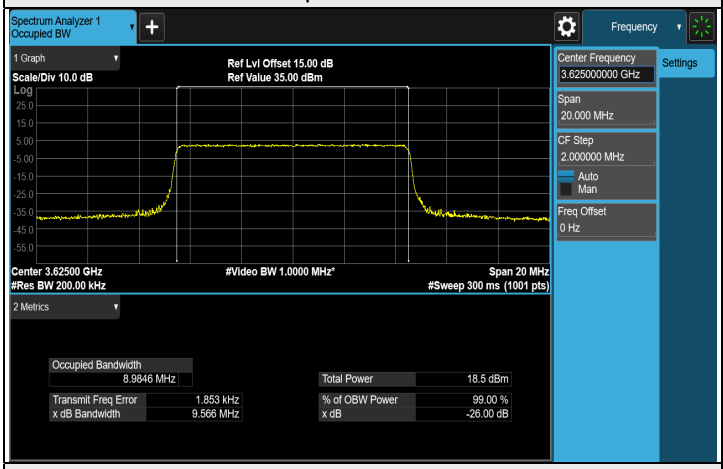
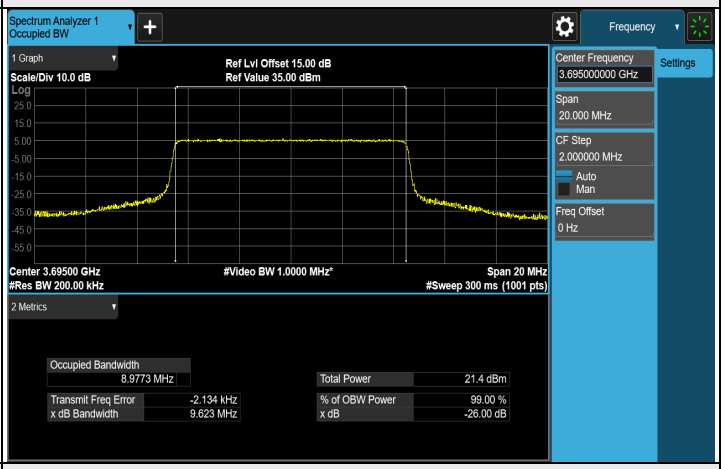
LTE Band 48, Channel Bandwidth: 5 MHz

Modulation	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	55265	3552.5	4.4896	4.862
QPSK	55990	3625	4.4891	4.852
QPSK	56715	3697.5	4.4881	4.905
16QAM	55265	3552.5	4.4985	4.856
16QAM	55990	3625	4.4884	4.836
16QAM	56715	3697.5	4.4958	4.874
64QAM	55265	3552.5	4.4899	4.835
64QAM	55990	3625	4.4890	4.877
64QAM	56715	3697.5	4.4842	4.857
256QAM	55265	3552.5	4.4923	4.853
256QAM	55990	3625	4.4945	4.852
256QAM	56715	3697.5	4.4845	4.839

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
16QAM CH 55265 (3552.5 MHz)	QPSK CH 56715 (3697.5 MHz)

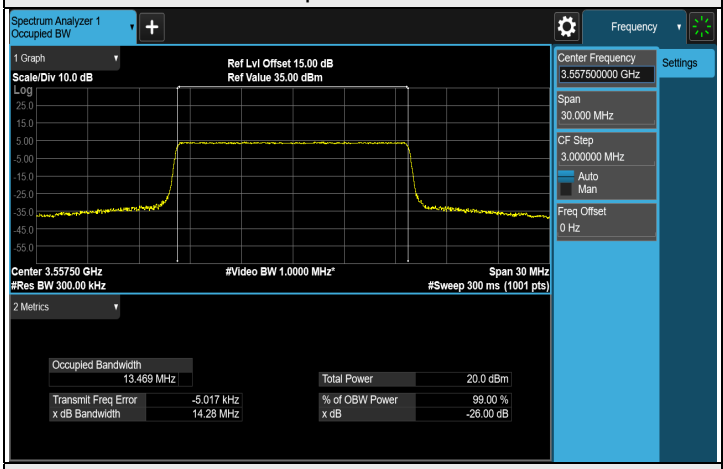
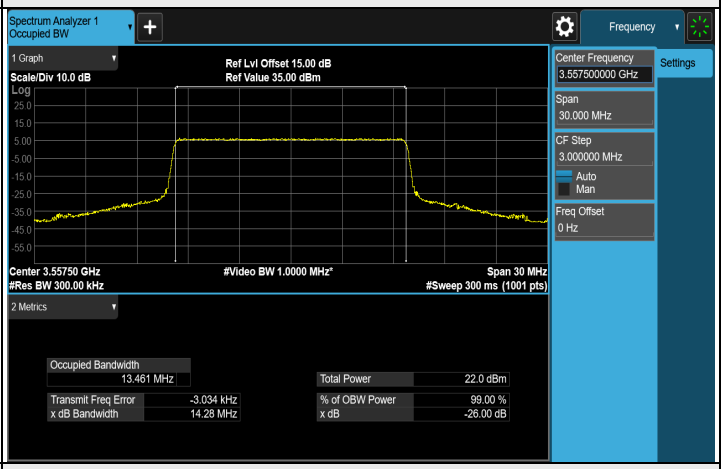
LTE Band 48, Channel Bandwidth: 10 MHz

Modulation	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	55290	3555	8.9749	9.547
QPSK	55990	3625	8.9662	9.542
QPSK	56690	3695	8.9773	9.623
16QAM	55290	3555	8.9812	9.529
16QAM	55990	3625	8.9754	9.559
16QAM	56690	3695	8.9711	9.501
64QAM	55290	3555	8.9756	9.596
64QAM	55990	3625	8.9695	9.532
64QAM	56690	3695	8.9738	9.545
256QAM	55290	3555	8.9810	9.505
256QAM	55990	3625	8.9846	9.566
256QAM	56690	3695	8.9738	9.508

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
256QAM CH 55990 (3625 MHz)	QPSK CH 56690 (3695 MHz)

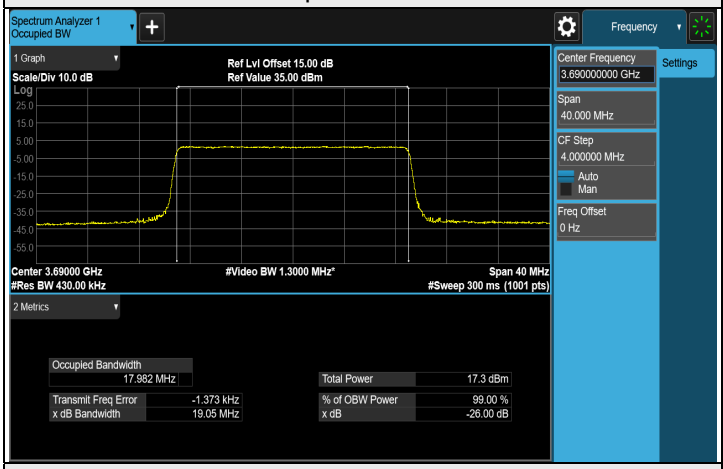
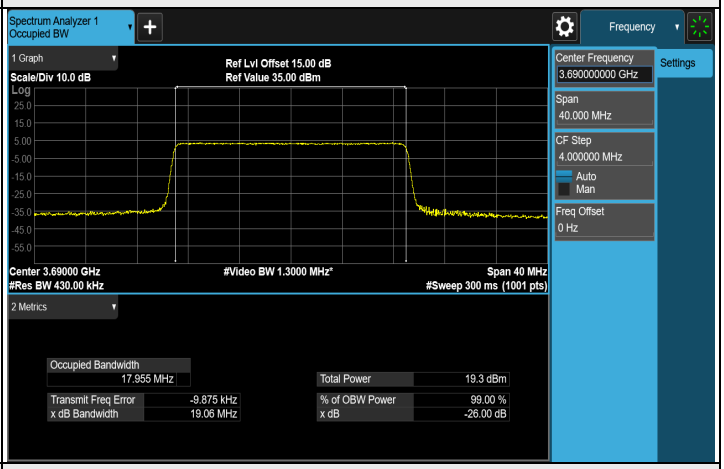
LTE Band 48, Channel Bandwidth: 15 MHz

Modulation	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	55315	3557.5	13.4607	14.280
QPSK	55990	3625	13.4582	14.231
QPSK	56665	3692.5	13.4599	14.223
16QAM	55315	3557.5	13.4588	14.262
16QAM	55990	3625	13.4586	14.254
16QAM	56665	3692.5	13.4601	14.251
64QAM	55315	3557.5	13.4692	14.279
64QAM	55990	3625	13.4615	14.245
64QAM	56665	3692.5	13.4634	14.252
256QAM	55315	3557.5	13.4597	14.273
256QAM	55990	3625	13.4669	14.260
256QAM	56665	3692.5	13.4601	14.230

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
64QAM CH 55315 (3557.5 MHz)	QPSK CH 55315 (3557.5 MHz)

LTE Band 48, Channel Bandwidth: 20 MHz

Modulation	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	55340	3560	17.9596	19.044
QPSK	55990	3625	17.9542	19.028
QPSK	56640	3690	17.9670	19.025
16QAM	55340	3560	17.9648	19.037
16QAM	55990	3625	17.9529	19.049
16QAM	56640	3690	17.9621	19.044
64QAM	55340	3560	17.9485	19.036
64QAM	55990	3625	17.9628	19.032
64QAM	56640	3690	17.9547	19.055
256QAM	55340	3560	17.9583	19.026
256QAM	55990	3625	17.9555	19.029
256QAM	56640	3690	17.9820	19.055

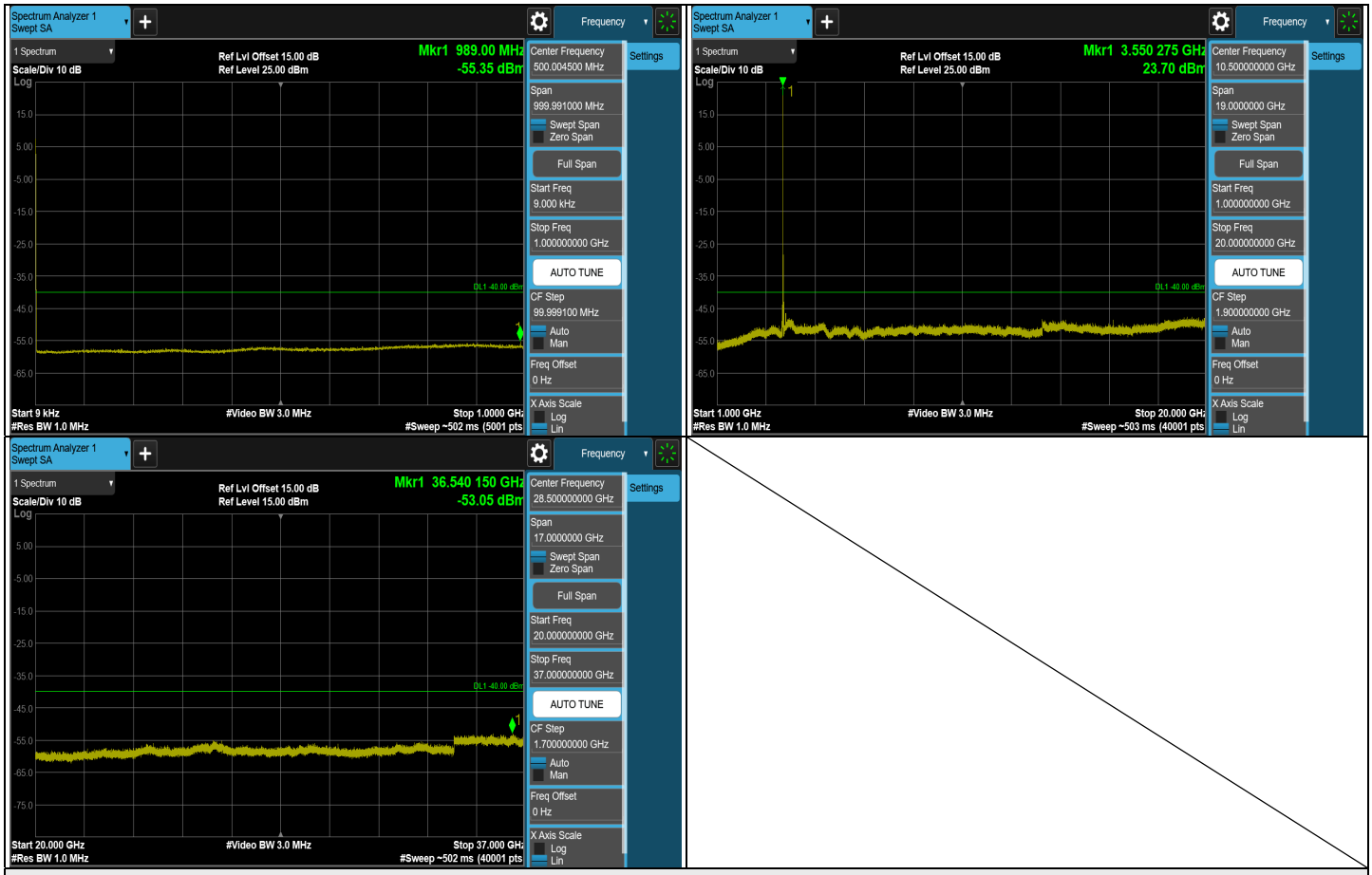
Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
256QAM CH 56640 (3690 MHz)	64QAM CH 56640 (3690 MHz)

7.5 Conducted Spurious Emissions

Input Power:	3.85 Vdc	Environmental Conditions:	25°C, 68% RH	Tested By:	Noah Chang

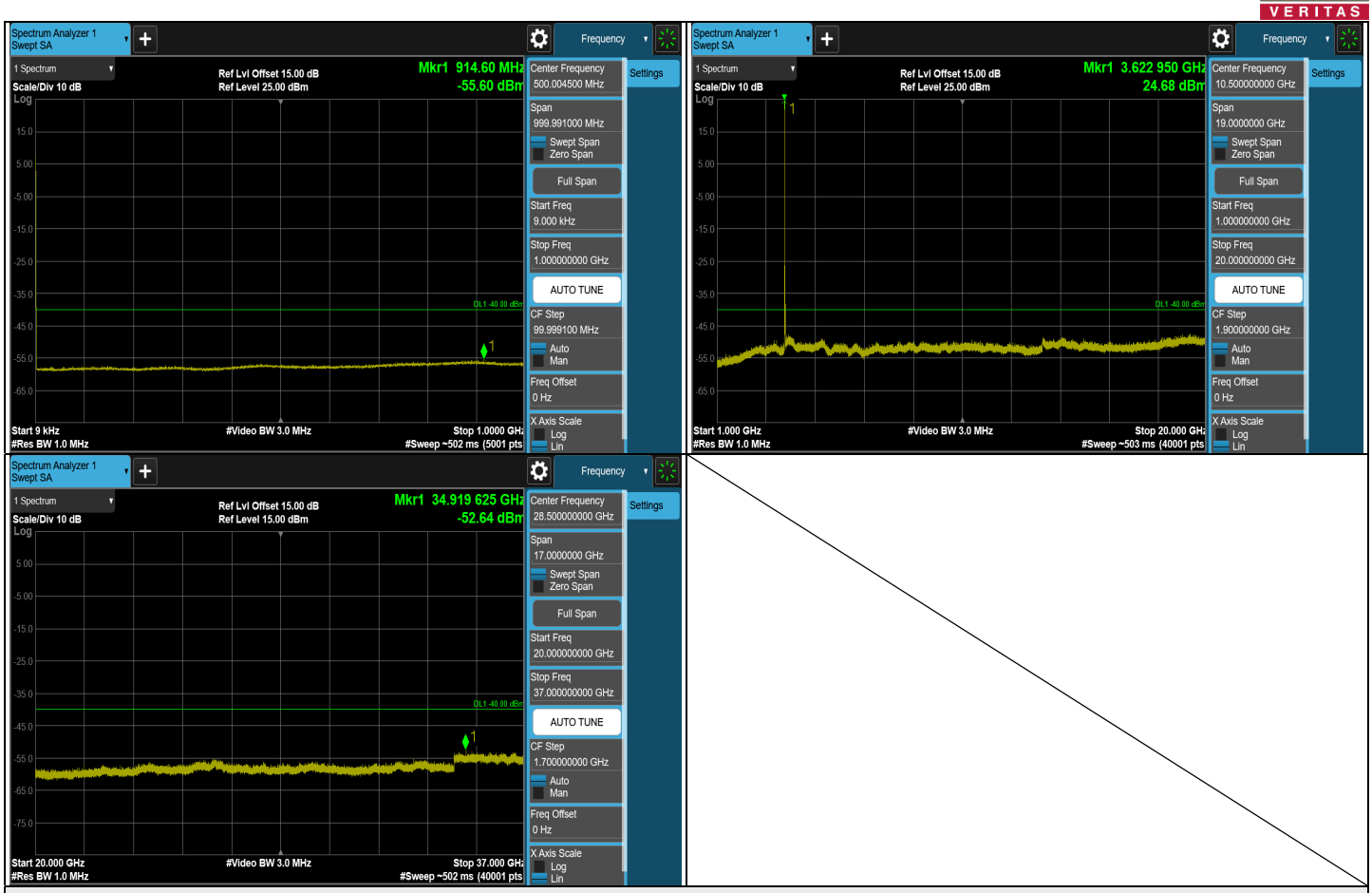
7.5.1 LTE Band 48

LTE Band 48, Channel Bandwidth: 5 MHz



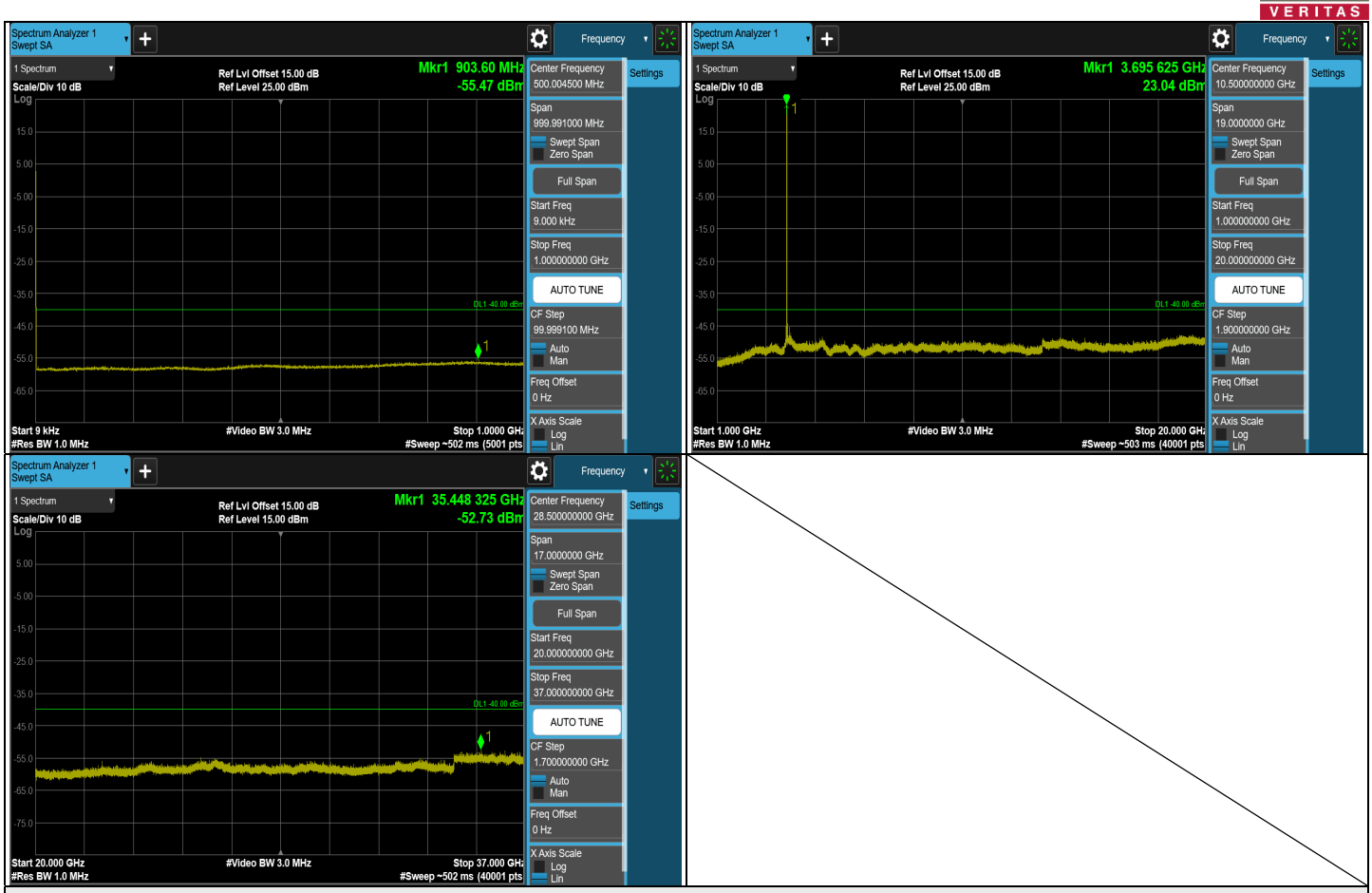
CH 55265 (3552.5 MHz)

Note: The signal at 9 kHz is IF signal from spectrum analyzer.



CH 55990 (3625 MHz)

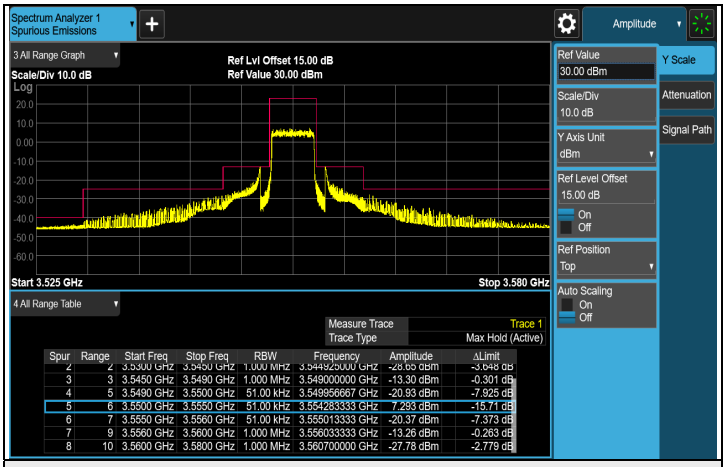
Note: The signal at 9 kHz is IF signal from spectrum analyzer.



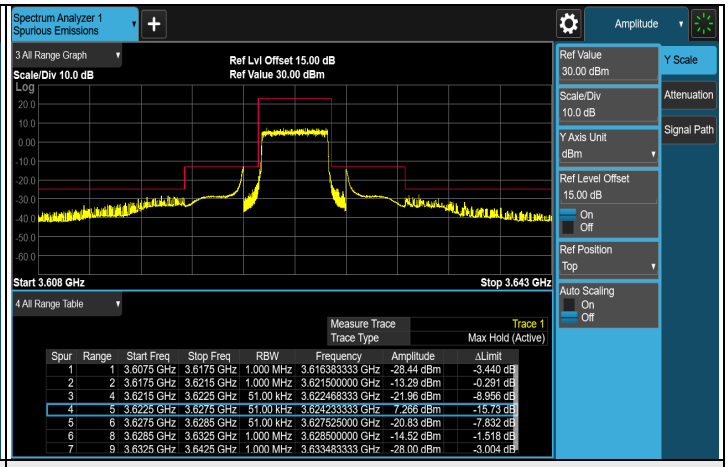
CH 56715 (3697.5 MHz)

Note: The signal at 9 kHz is IF signal from spectrum analyzer.

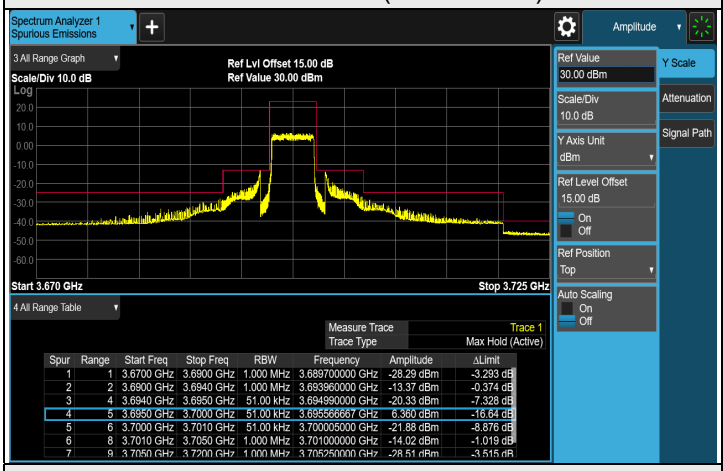
LTE Band 48, Channel Bandwidth: 5 MHz



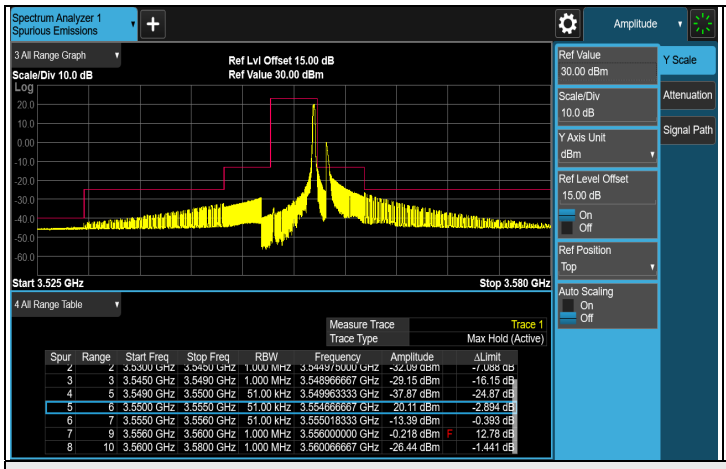
FULL CH 55265 (3552.5 MHz)



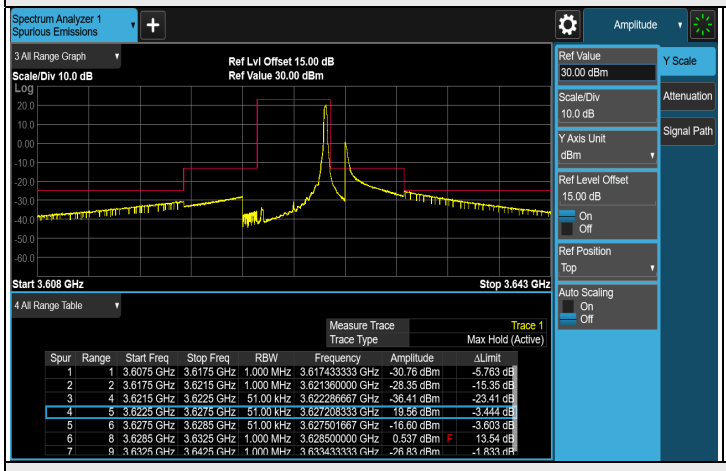
FULL CH 55990 (3625 MHz)



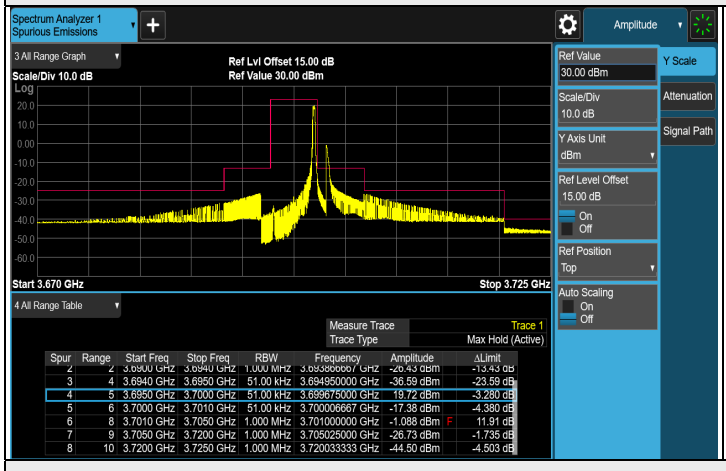
FULL CH 56715 (3697.5 MHz)



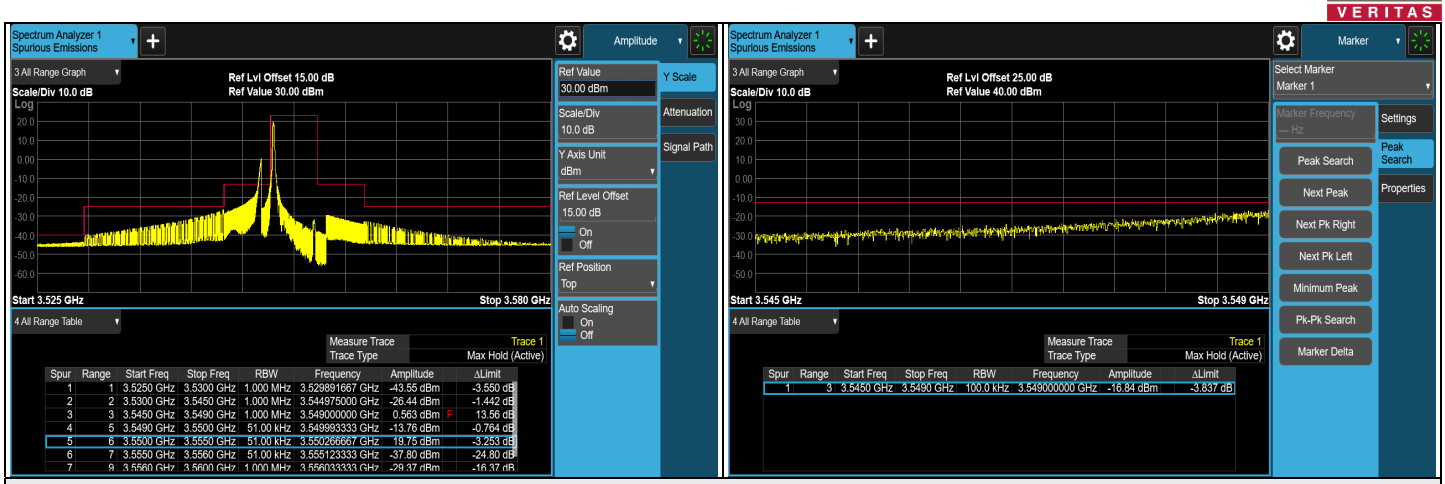
1RB#MAX CH 55265 (3552.5 MHz)



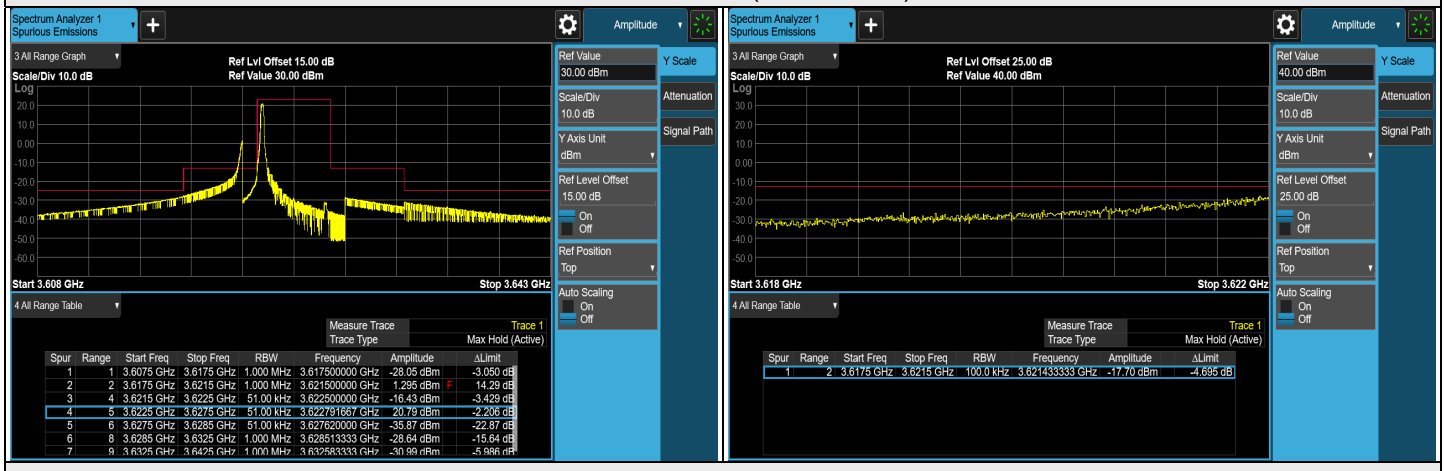
1RB#MAX CH 55990 (3625 MHz)



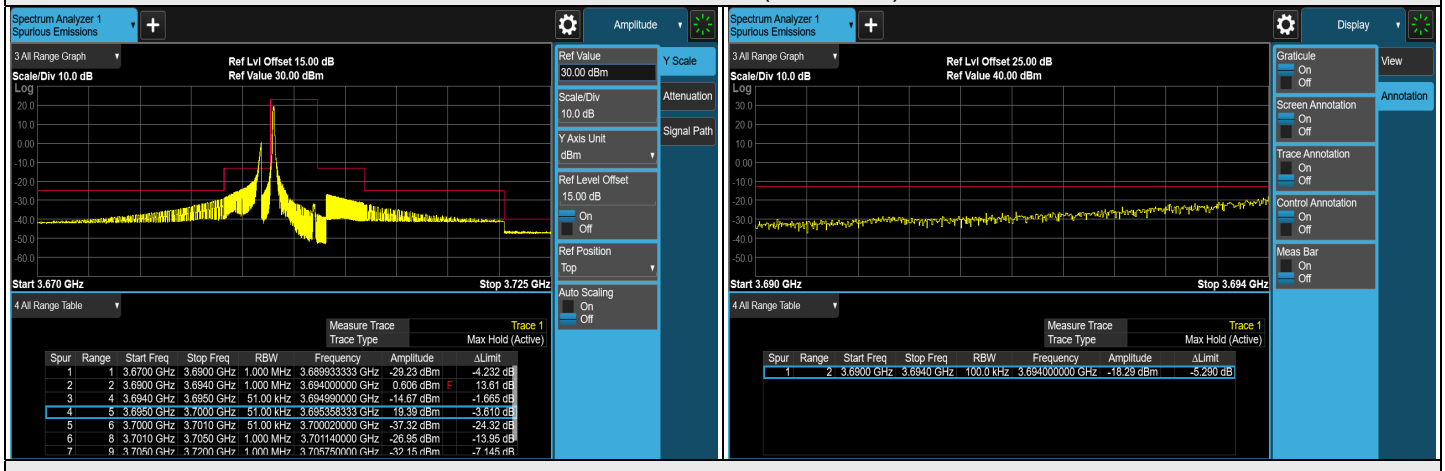
1RB#MAX CH 56715 (3697.5 MHz)



1RB#0 CH 55265 (3552.5 MHz)

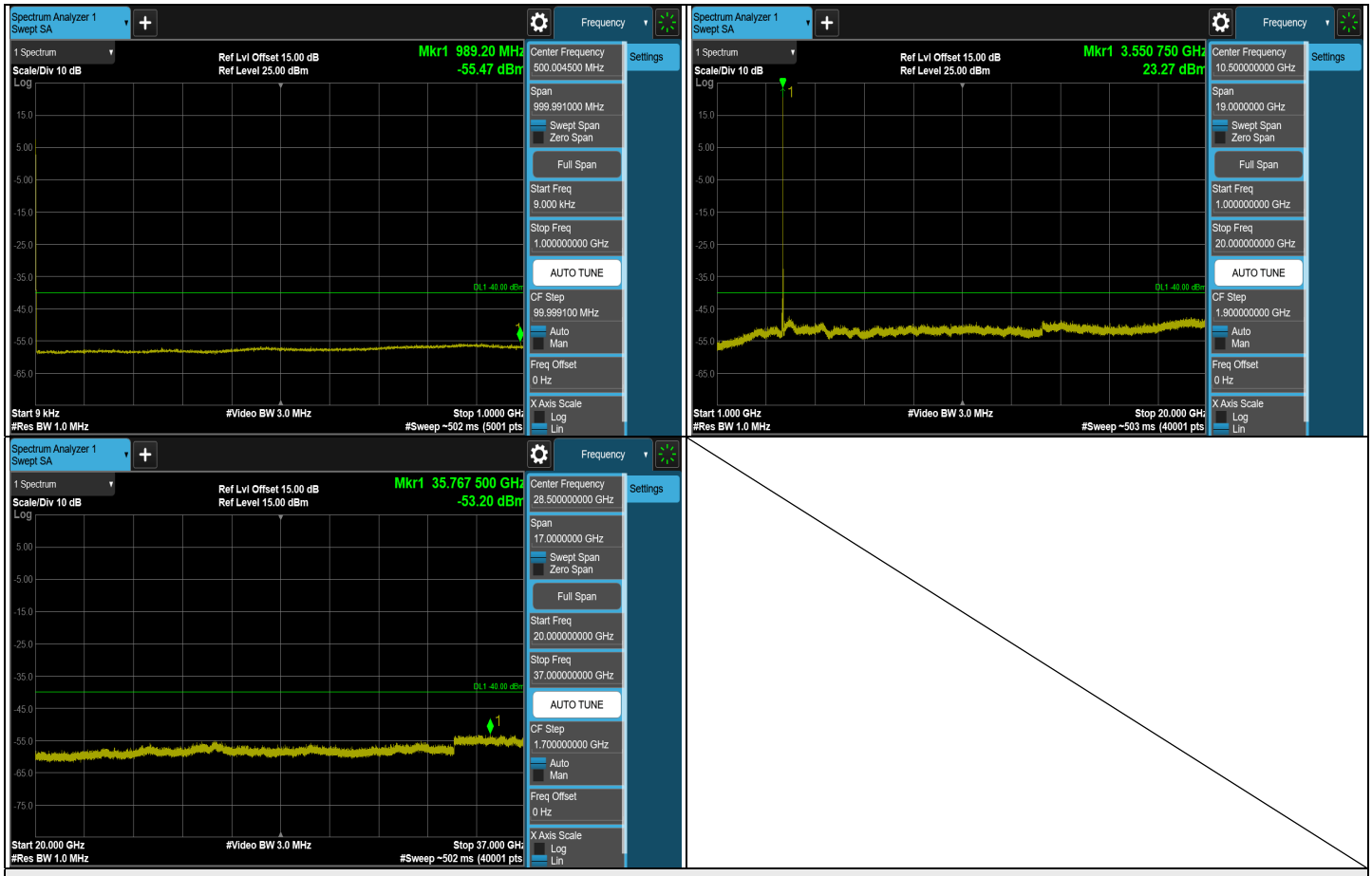


1RB#0 CH 55990 (3625 MHz)



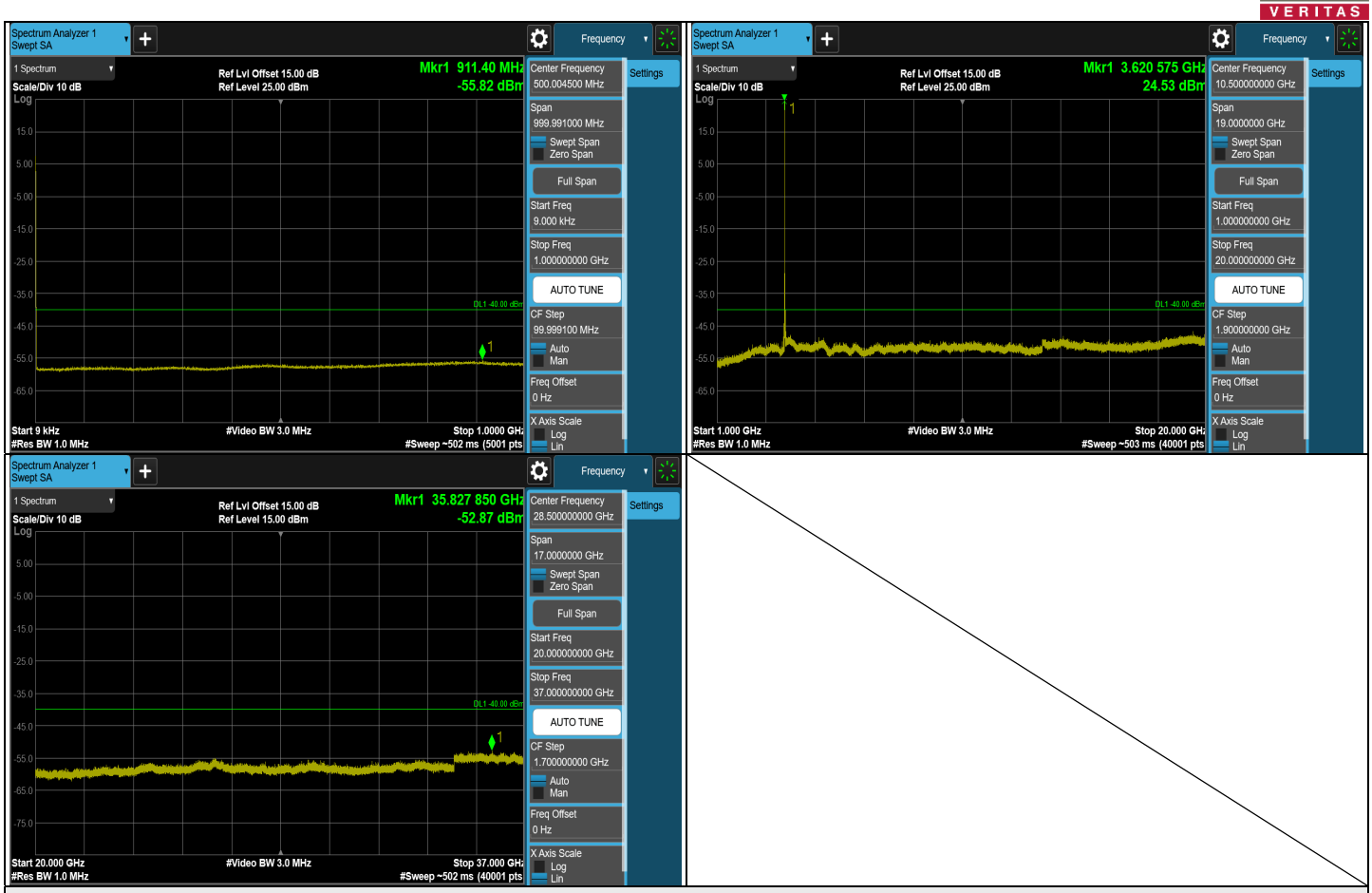
1RB#0 CH 56715 (3697.5 MHz)

LTE Band 48, Channel Bandwidth: 10 MHz



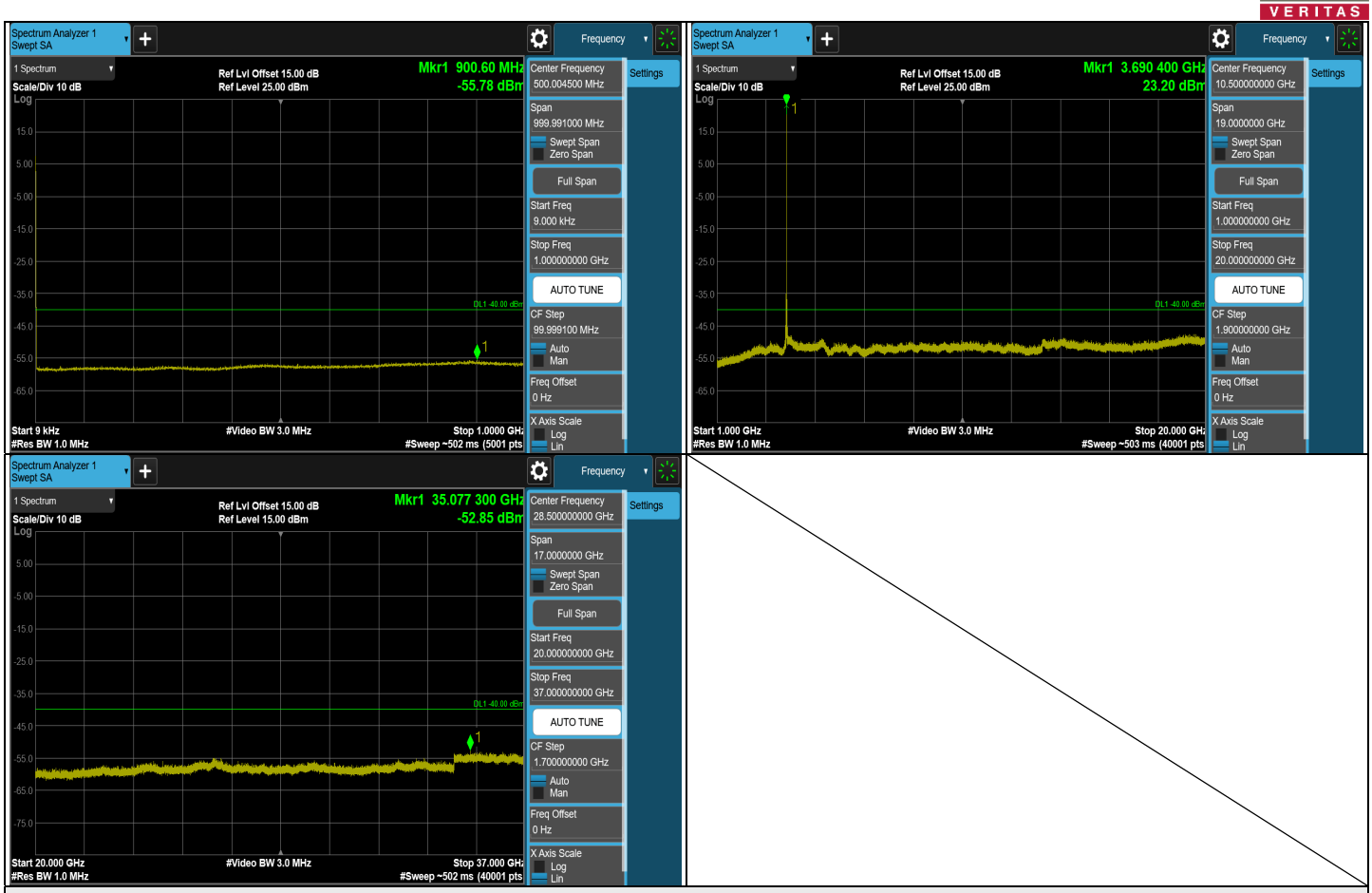
CH 55290 (3555 MHz)

Note: The signal at 9 kHz is IF signal from spectrum analyzer.



CH 55990 (3625 MHz)

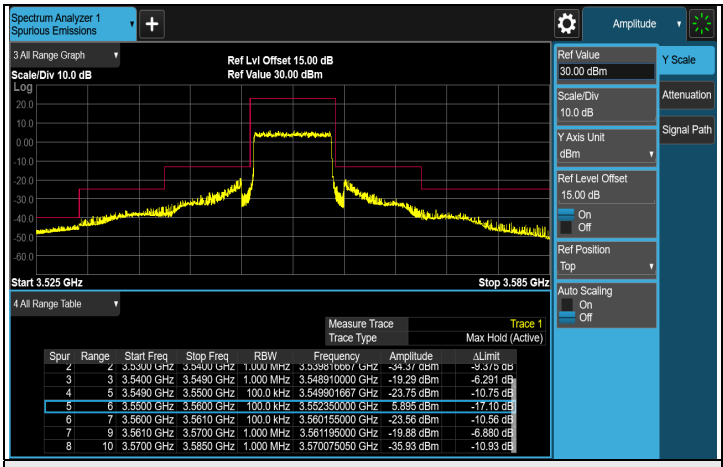
Note: The signal at 9 kHz is IF signal from spectrum analyzer.



CH 56690 (3695 MHz)

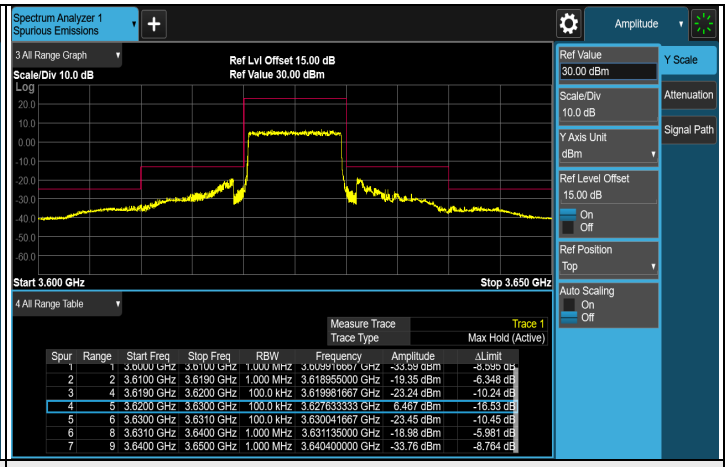
Note: The signal at 9 kHz is IF signal from spectrum analyzer.

LTE Band 48, Channel Bandwidth: 10 MHz



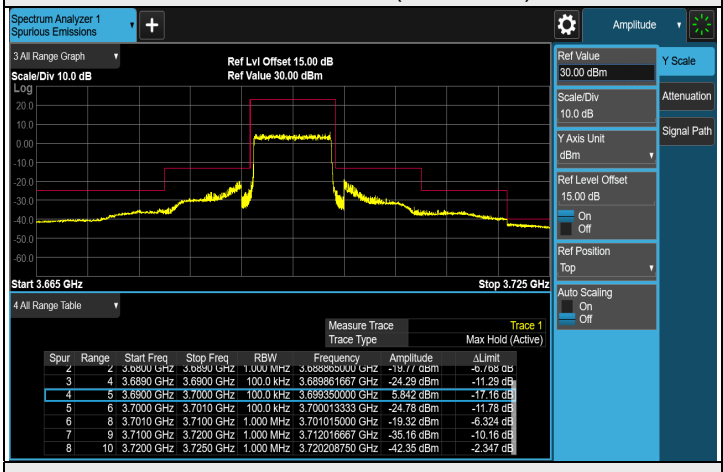
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	ΔLimit
2	2	3.5400 GHz	3.5490 GHz	1.000 MHz	3.548910000 GHz	-19.29 dBm	-6.291 dB
3	3	3.5490 GHz	3.5500 GHz	100.0 kHz	3.549901667 GHz	-23.75 dBm	-10.75 dB
4	5	3.5500 GHz	3.5600 GHz	100.0 kHz	3.552350000 GHz	5.895 dBm	-17.10 dB
5	6	3.5600 GHz	3.5610 GHz	100.0 kHz	3.560155000 GHz	-23.56 dBm	-10.56 dB
6	7	3.5610 GHz	3.5700 GHz	1.000 MHz	3.561195000 GHz	-19.88 dBm	-6.880 dB
7	9	3.5700 GHz	3.5850 GHz	1.000 MHz	3.570075050 GHz	-35.93 dBm	-10.93 dB

FULL CH 55290 (3555 MHz)



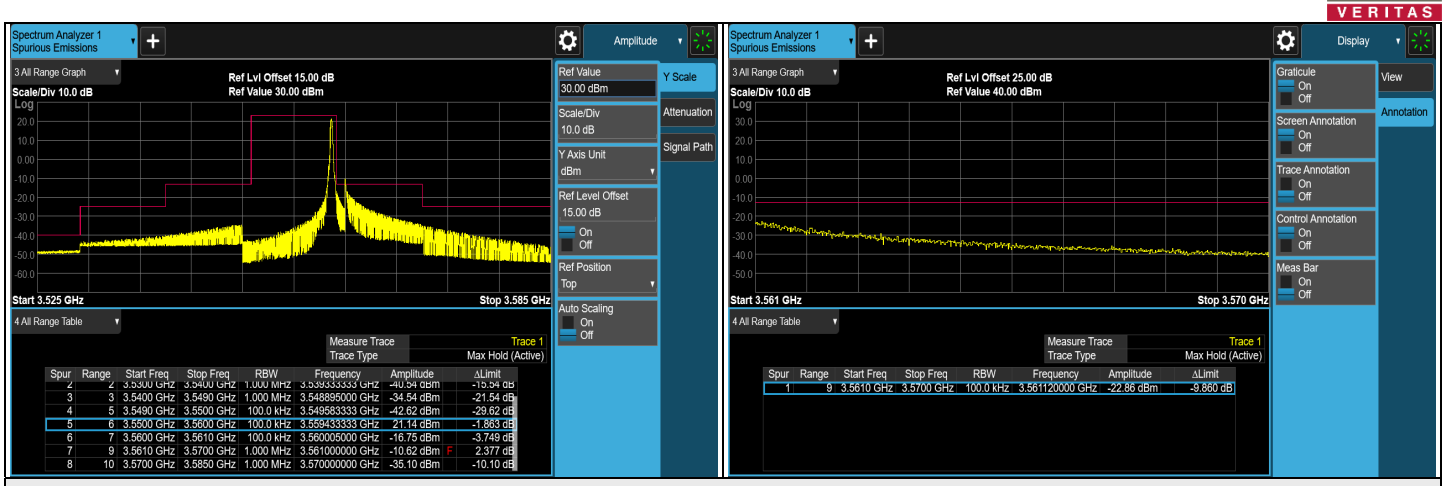
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	ΔLimit
2	2	3.6100 GHz	3.6190 GHz	1.000 MHz	3.618955000 GHz	-19.35 dBm	-6.348 dB
3	4	3.6190 GHz	3.6200 GHz	100.0 kHz	3.619981667 GHz	-23.24 dBm	-10.24 dB
4	5	3.6200 GHz	3.6300 GHz	100.0 kHz	3.627633333 GHz	6.467 dBm	-16.53 dB
5	6	3.6300 GHz	3.6310 GHz	100.0 kHz	3.630041667 GHz	-23.45 dBm	-10.45 dB
6	8	3.6310 GHz	3.6400 GHz	1.000 MHz	3.631135000 GHz	-18.98 dBm	-5.981 dB
7	9	3.6400 GHz	3.6500 GHz	1.000 MHz	3.640400000 GHz	-33.76 dBm	-8.764 dB

FULL CH 55990 (3625 MHz)

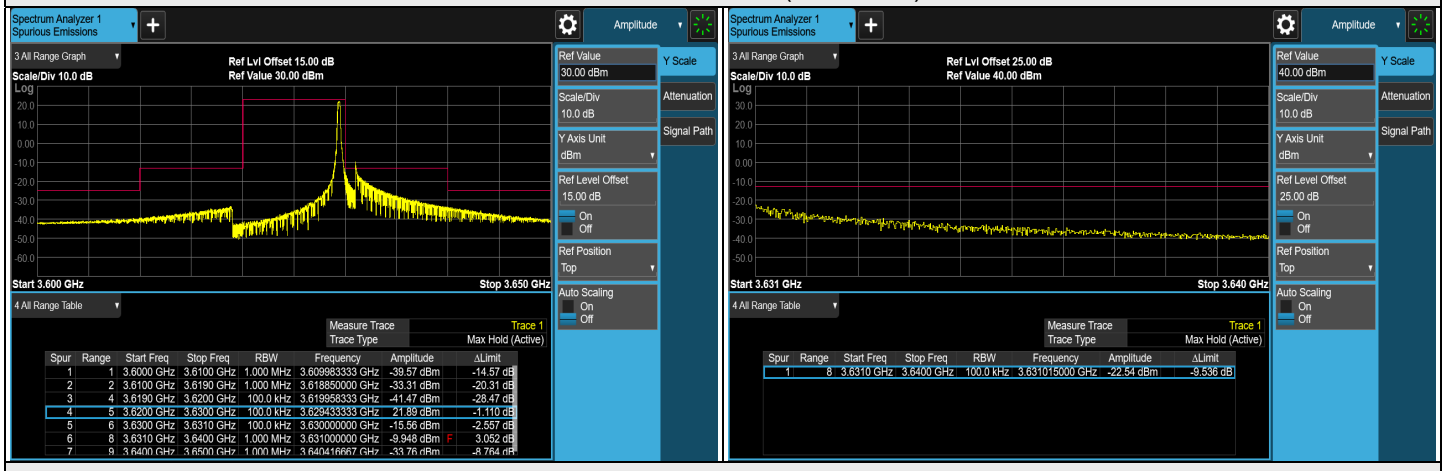


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	ΔLimit
3	4	3.6890 GHz	3.6900 GHz	100.0 kHz	3.689861667 GHz	-24.29 dBm	-11.29 dB
4	5	3.6900 GHz	3.7000 GHz	100.0 kHz	3.699350000 GHz	5.842 dBm	-17.16 dB
5	6	3.7000 GHz	3.7010 GHz	100.0 kHz	3.700013333 GHz	-24.78 dBm	-11.78 dB
6	8	3.7010 GHz	3.7100 GHz	1.000 MHz	3.701015000 GHz	-19.32 dBm	-6.324 dB
7	9	3.7100 GHz	3.7200 GHz	1.000 MHz	3.712016667 GHz	-35.16 dBm	-10.16 dB
8	10	3.7200 GHz	3.7250 GHz	1.000 MHz	3.720208750 GHz	-42.35 dBm	-2.347 dB

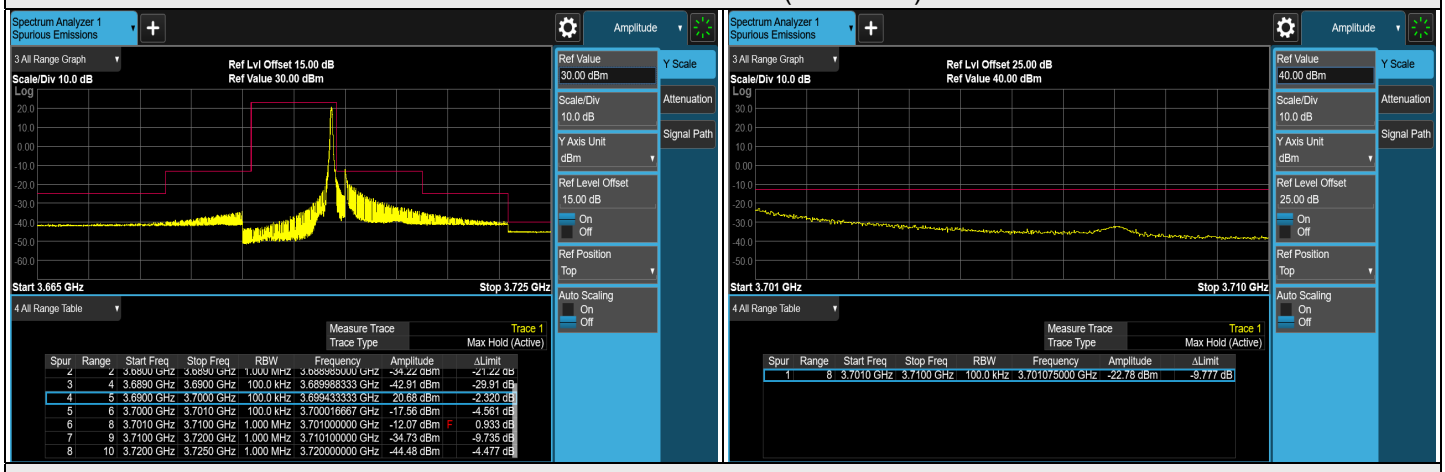
FULL CH 56690 (3695 MHz)



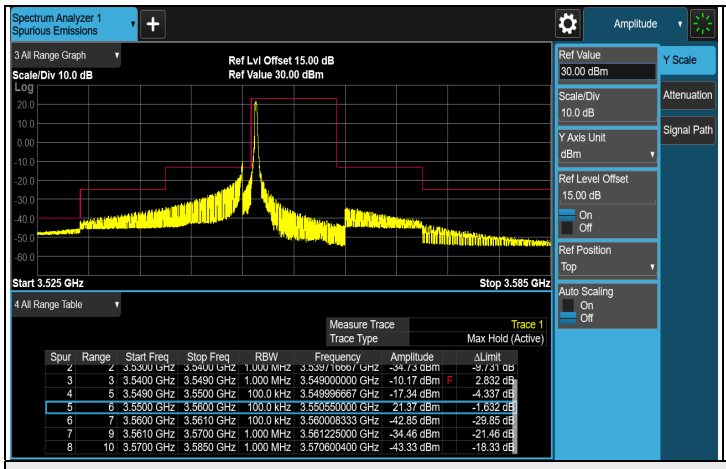
1RB#MAX CH 55290 (3555 MHz)



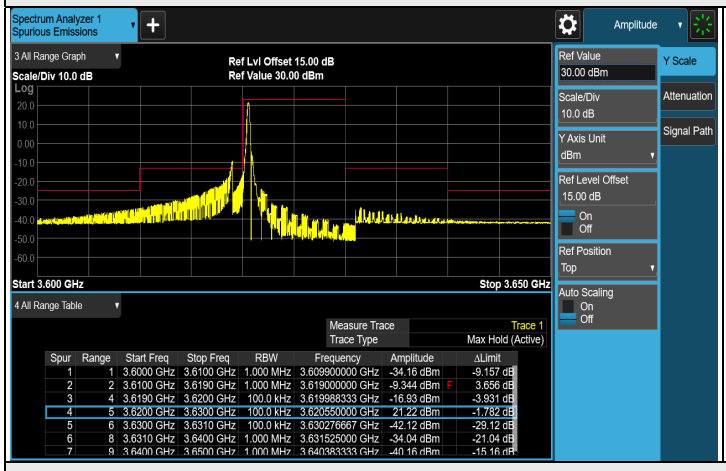
1RB#MAX CH 55990 (3625 MHz)



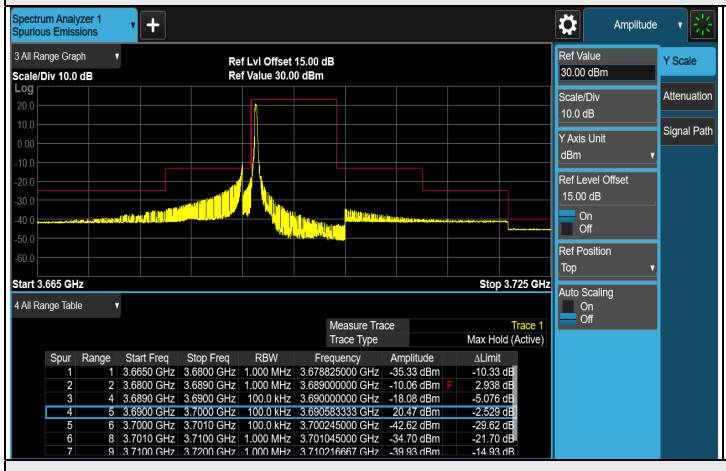
1RB#MAX CH 56690 (3695 MHz)



1RB#0 CH 55290 (3555 MHz)

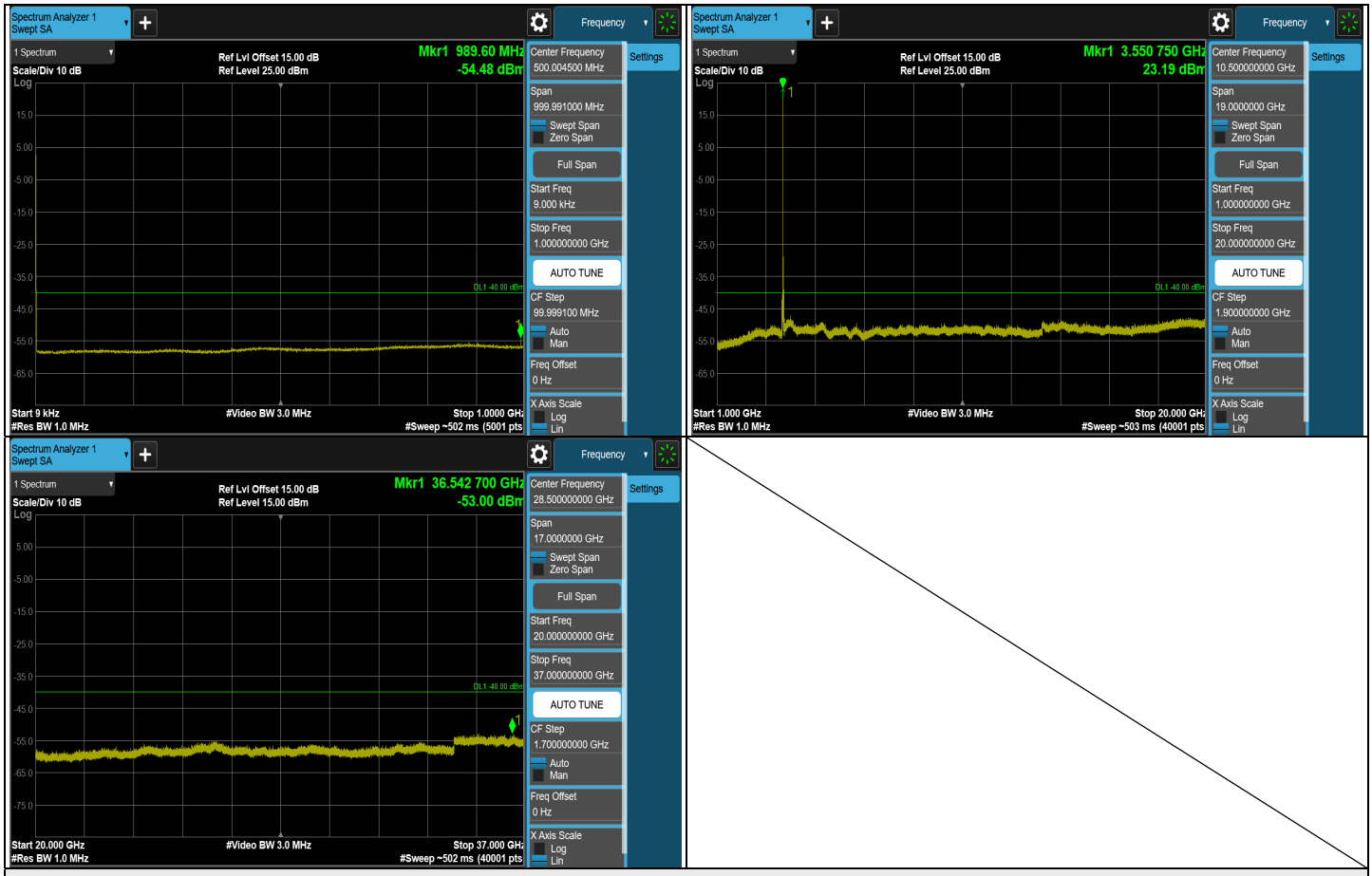


1RB#0 CH 55990 (3625 MHz)



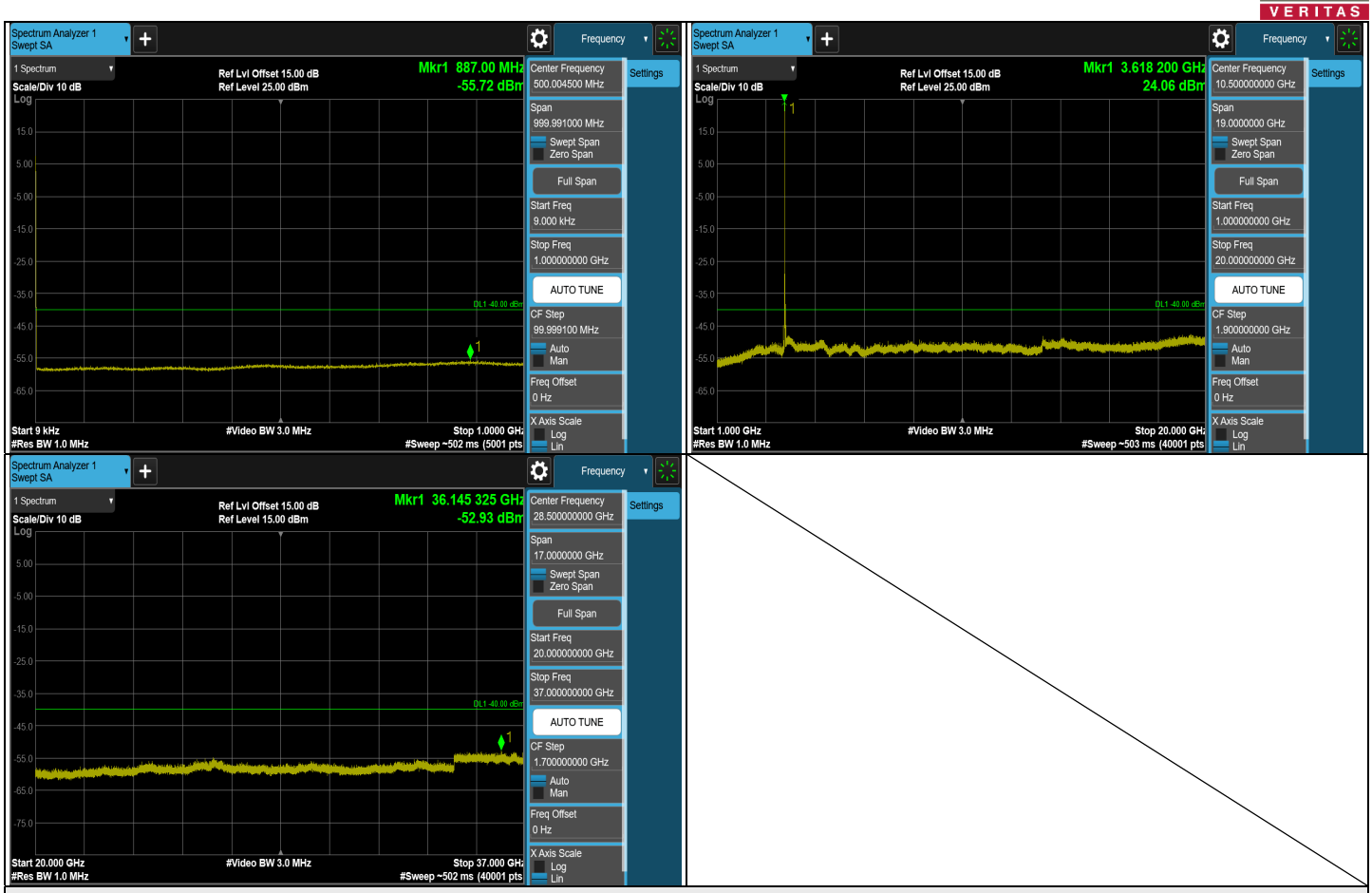
1RB#0 CH 56690 (3695 MHz)

LTE Band 48, Channel Bandwidth: 15 MHz



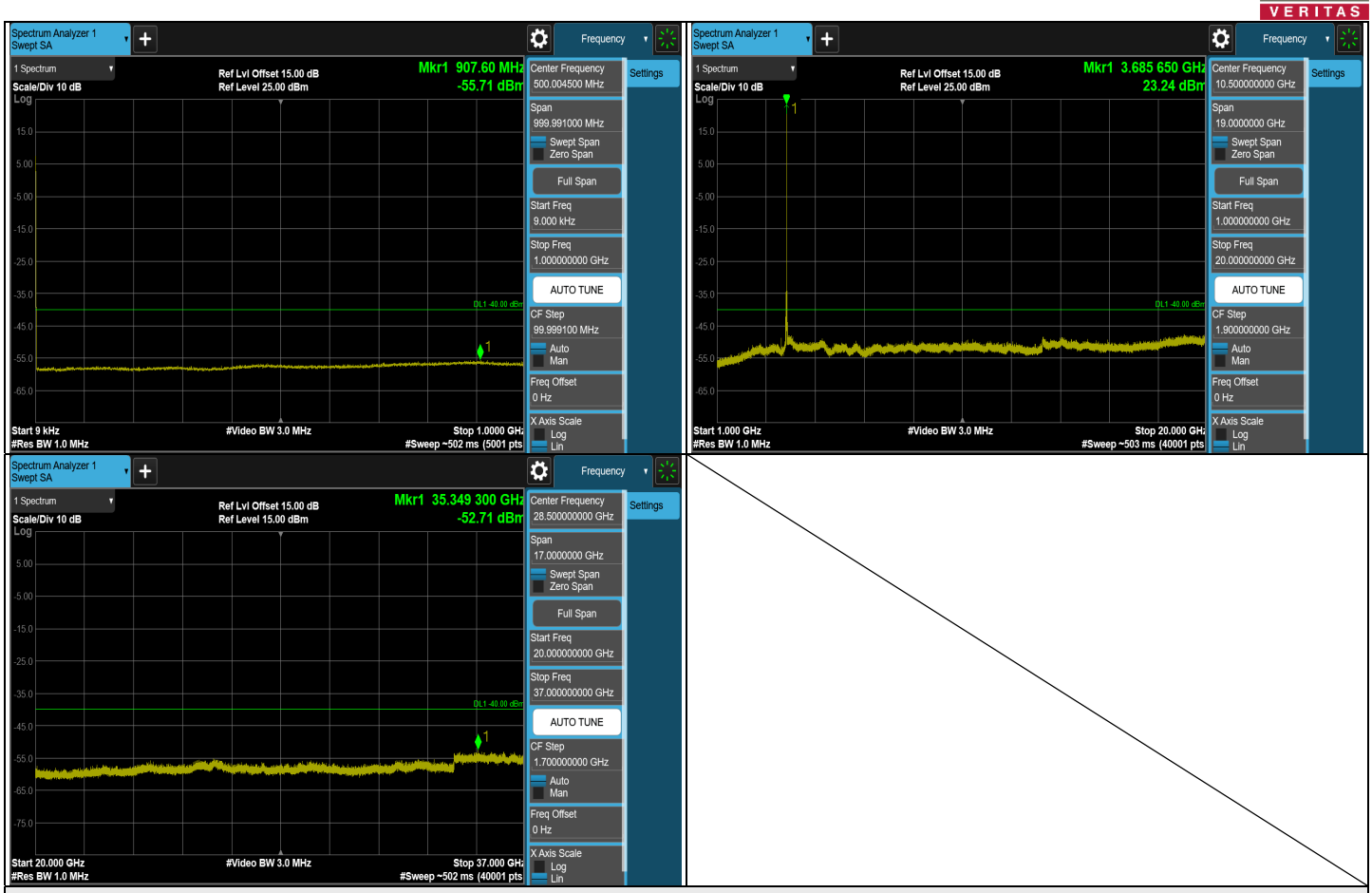
CH 55315 (3557.5 MHz)

Note: The signal at 9 kHz is IF signal from spectrum analyzer.



CH 55990 (3625 MHz)

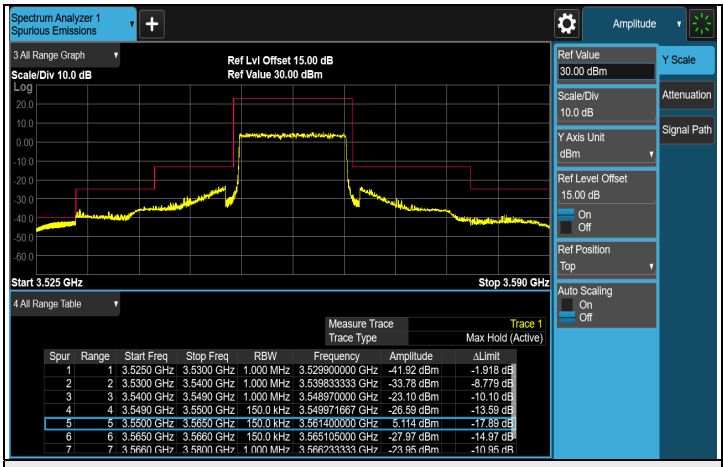
Note: The signal at 9 kHz is IF signal from spectrum analyzer.



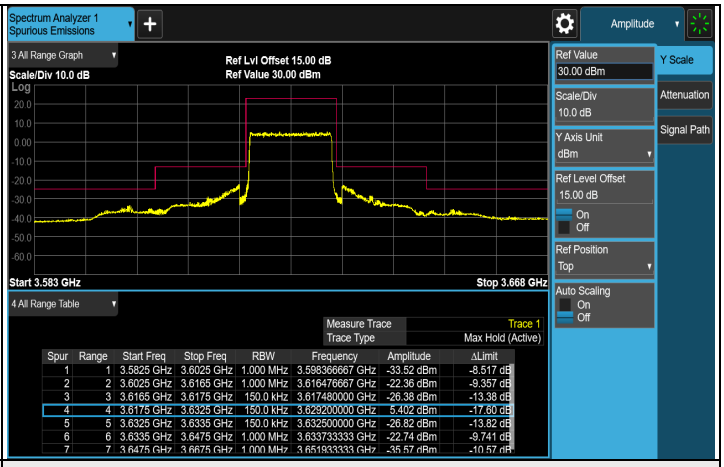
CH 56665 (3692.5 MHz)

Note: The signal at 9 kHz is IF signal from spectrum analyzer.

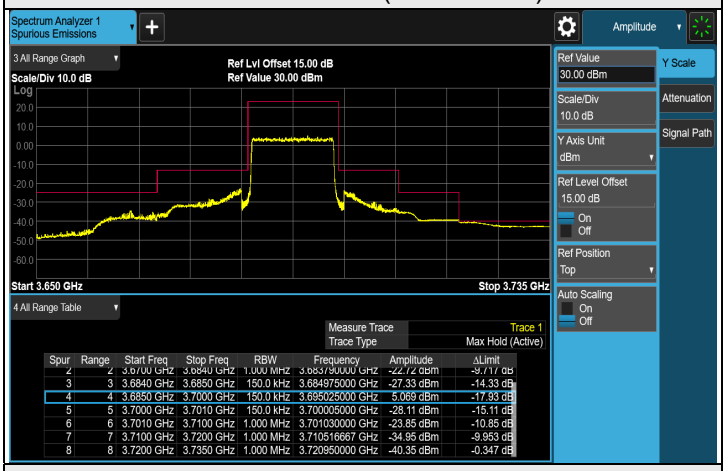
LTE Band 48, Channel Bandwidth: 15 MHz



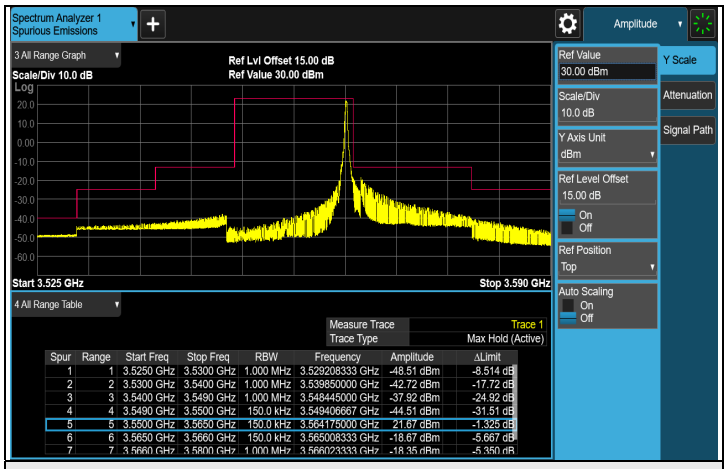
FULL CH 55315 (3557.5 MHz)



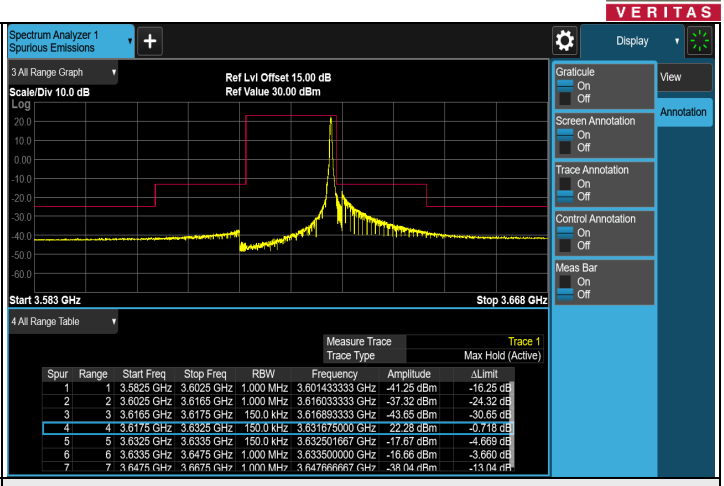
FULL CH 55990 (3625 MHz)



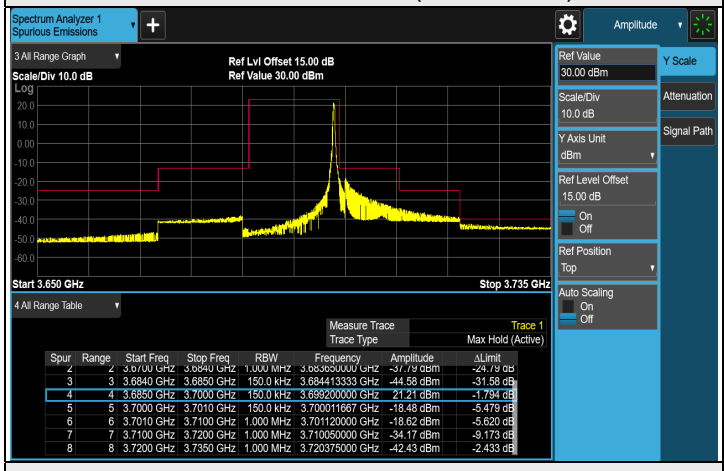
FULL CH 56665 (3692.5 MHz)



1RB#MAX CH 55315 (3557.5 MHz)



1RB#MAX CH 55990 (3625 MHz)



1RB#MAX CH 56665 (3692.5 MHz)