TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 96** **47 CFR FCC Part 2**
Report No.:	RFBEDW-WTW-P24070638-2
FCC ID:	GKRRXLN3
Product:	LGA Module
Brand:	COMPAL
Model No.:	RXL-N3
Received Date:	2024/7/29
Test Date:	2024/8/8 ~ 2024/9/26
Issued Date:	2024/11/22
Applicant:	Compal Electronics, Inc.
Address:	No.581 & 581-1, Ruiguang Rd., Neihu District, Taipei, (114) Taiwan
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(1):	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
Test Location(2):	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
FCC Registration /	788550 / TW0003 for Test Location(1)
Designation Number:	281270 / TW0032 for Test Location(2)

Approved by: Jeremy . Lin , **Date:** 2024/11/22

Jeremy Lin / Project Engineer

This test report consists of 43 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The test results in the report only apply to the tested sample. The test results in this report are traceable to the national or international standards.

Prepared by : Pettie Chen / Senior Specialist

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/ and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

Table of Contents

Release Control Record **4**

1 Certificate **5**

2 Summary of Test Results **6**

2.1 Measurement Uncertainty 7
2.2 Supplementary Information 7

3 General Information **8**

3.1 General Description of EUT 8
3.2 Antenna Description of EUT 9
3.3 Test Mode Applicability and Tested Channel Detail 10
3.4 Test Program Used and Operation Descriptions 11
3.5 Connection Diagram of EUT and Peripheral Devices 11
3.6 Configuration of Peripheral Devices and Cable Connections 11

4 Test Instruments **12**

4.1 Maximum EIRP 12
4.2 Peak to Average Ratio 12
4.3 Bandwidth 12
4.4 Conducted Spurious Emissions 12
4.5 Radiated Spurious Emissions below 1GHz 13
4.6 Radiated Spurious Emissions above 1GHz 14
4.7 Frequency Stability 14

5 Limits of Test Items **15**

5.1 Maximum EIRP 15
5.2 Peak to Average Ratio 15
5.3 Bandwidth 15
5.4 Conducted Spurious Emissions 15
5.5 Radiated Spurious Emissions below 1GHz 15
5.6 Radiated Spurious Emissions above 1GHz 16
5.7 Frequency Stability 16

6 Test Arrangements **17**

6.1 Maximum EIRP 17
6.1.1 Test Setup 17
6.1.2 Test Procedure 17
6.1.3 Test Procedure 18
6.2 Peak to Average Ratio 18
6.2.1 Test Setup 18
6.2.2 Test Procedure 18
6.3 Bandwidth 19
6.3.1 Test Setup 19
6.3.2 Test Procedure 19
6.4 Conducted Spurious Emissions 21
6.4.1 Test Setup 21
6.4.2 Test Procedure 21
6.5 Radiated Spurious Emissions below 1GHz 22
6.5.1 Test Setup 22
6.5.2 Test Procedure 22
6.6 Radiated Spurious Emissions above 1GHz 23
6.6.1 Test Setup 23
6.6.2 Test Procedure 23
6.7 Frequency Stability 24
6.7.1 Test Setup 24
6.7.2 Test Procedure 24

7 Test Results of Test Item **25**

7.1 Maximum EIRP 25

7.1.1 LTE Band 48 (CA 48C) 25
7.2 Peak to Average Ratio 28
7.2.1 LTE Band 48 (CA 48C) 28
7.3 Bandwidth 29
7.3.1 TE Band 48 (CA 48C) 29
7.4 Conducted Spurious Emissions 30
7.4.1 TE Band 48 (CA 48C) 30
7.5 Radiated Spurious Emissions below 1GHz 36
7.5.1 LTE Band 48 (CA 48C) 36
7.6 Radiated Spurious Emissions above 1GHz 38
7.6.1 LTE Band 48 (CA 48C) 38
7.7 Frequency Stability 41
7.7.1 LTE Band 48 (CA 48C) 41

8 Pictures of Test Arrangements 42

9 Information of the Testing Laboratories 43

Release Control Record

Issue No.	Description	Date Issued
RFBEDW-WTW-P24070638-2	Original release.	2024/11/22

1 Certificate

Product:	LGA Module
Brand:	COMPAL
Test Model:	RXL-N3
Sample Status:	Engineering sample
Applicant:	Compal Electronics, Inc.
Test Date:	2024/8/8 ~ 2024/9/26
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

47 CFR FCC Part 96 & Part 2			
Standard / Clause	Test Item	Result	Remark
FCC 47 CFR Part 2.1046 FCC 47 CFR Part 96.41(b)	Maximum EIRP	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1047	Modulation Characteristics	Pass	Refer to Note 2
FCC 47 CFR Part 96.41(g)	Peak to Average Ratio	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1049	Bandwidth	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1051 FCC 47 CFR Part 96.41(e)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1053 FCC 47 CFR Part 96.41(e)	Radiated Spurious Emissions below 1GHz	Pass	Minimum passing margin is -3.29 dB at 93.26 MHz
FCC 47 CFR Part 2.1053 FCC 47 CFR Part 96.41(e)	Radiated Spurious Emissions above 1GHz	Pass	Minimum passing margin is -2.14 dB at 14460.40 MHz
FCC 47 CFR Part 2.1055	Frequency Stability	Pass	Meet the requirement of limit.

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. LTE CA mode is similar to digital modulation in LTE single frequency band, so please refer to BV CPS report no.: RFBEDW-WTW-P24070638 for the modulation characteristics data of CA mode.

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	Specification	Expanded Uncertainty (k=2) (±)
Maximum Output Power / Peak to Average Ratio	-	1.371 dB
26dB Bandwidth / Occupied Bandwidth	-	453.93 Hz / 72 Hz
Conducted emission / Spectrum Emission Mask	-	2.120 dB / 1.899 dB
Frequency Stability	-	0.176 ppm
Radiated Spurious Emissions below 1GHz	9 kHz ~ 30 MHz	3.00 dB
	30 MHz ~ 1 GHz	2.93 dB
Radiated Spurious Emissions above 1GHz	1 GHz ~ 18 GHz	1.76 dB
	18 GHz ~ 40 GHz	1.77 dB

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	LGA Module
Brand	COMPAL
Test Model	RXL-N3
Status of EUT	Engineering sample
Power Supply Rating	3.8Vdc

Note:

1. EUT Overview

Band / Bandwidth	TX Frequency Range (MHz)	Max. EIRP Power			
		QPSK	16QAM	64QAM	256QAM
LTE Band 48C (Full Power) (20MHz+20MHz)	3560.0-3690.0	197.697mW (22.96dBm)	194.984mW (22.90dBm)	174.985mW (22.43dBm)	97.949mW (19.91dBm)
LTE Band 48C (Per 10M Power) (20MHz+20MHz)	3560.0-3690.0	184.077mW (22.65dBm)	181.134mW (22.58dBm)	162.930mW (22.12dBm)	90.782mW (19.58dBm)

Band / Bandwidth	TX Frequency Range (MHz)	Emission Designator			
		QPSK	16QAM	64QAM	256QAM
LTE Band 48C (Full Power) (20MHz+20MHz)	3560.0-3690.0	37M7D7W	37M7D7W	37M7D7W	37M7G7D

2. The EUT uses following accessories.

Item	Brand	Model
Ant	INPAQ	ANT0/1/2/3 GNSS

3. For CA mode configuration, please consult the manufacturer to declare the test mode.
4. The EUT support the following CA Configuration.

Band Configuration
48C

5. 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.

Type	External				
Brand	INPAQ				
Band	Freq. Range (MHz)	Peak Gain without cable loss (dBi)			
		Ant. 0 (Main)	Ant. 1 (DRx)	Ant. 2 (DRx)	Ant. 3 (Aux)
CA 48C (Ant 0)	3550 ~ 3700	0	0	0	0

Ant. No.	Cable Loss (dB)	Cable Length (mm)
Ant. 0	1.5	141.1
Ant. 1	1.3	120.3
Ant. 2	1	78.2
Ant. 3	1.3	121.2

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. The antenna of EUT can be used in the following ways: 0 degree/90 degrees. Pre-scan these ways and find the worst case as a representative test condition. 2. Pre-Scan has been conducted to determine the worst-case from all possible combinations of EUT configure mode (1TX or 2TX if available), channel, bandwidth, modulation and RB mode. See below table(s) for details.
Worst Case:	1. 0 degree/90 degrees Worst Condition: 90 degrees

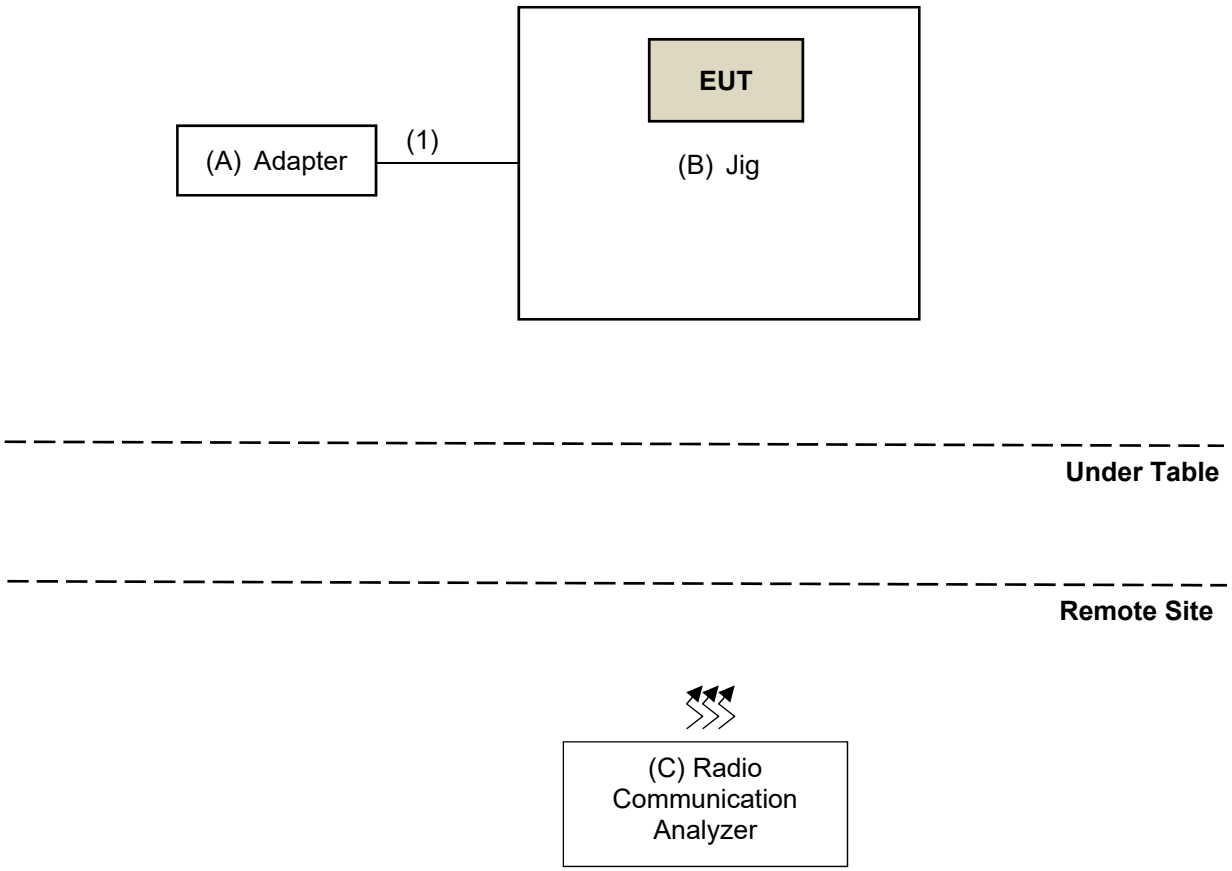
LTE Band 48 (CA 48C)

Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
EIRP	55340 (3560.0MHz)+55538 (3579.8MHz), 55891 (3615.1MHz)+56089 (3634.9MHz), 56642 (3670.2MHz)+56640 (3690.0MHz)	20MHz+20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB
Peak to Average Ratio	55340 (3560.0MHz)+55538 (3579.8MHz), 55891 (3615.1MHz)+56089 (3634.9MHz), 56642 (3670.2MHz)+56640 (3690.0MHz)	20MHz+20MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
Occupied Bandwidth	55340 (3560.0MHz)+55538 (3579.8MHz), 55891 (3615.1MHz)+56089 (3634.9MHz), 56642 (3670.2MHz)+56640 (3690.0MHz)	20MHz+20MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
Conducted Emission	55340 (3560.0MHz)+55538 (3579.8MHz), 55891 (3615.1MHz)+56089 (3634.9MHz), 56642 (3670.2MHz)+56640 (3690.0MHz)	20MHz+20MHz	QPSK	1 RB Full RB
Radiated Emission Below 1GHz	55891 (3615.1MHz)+56089 (3634.9MHz)	20MHz+20MHz	QPSK	1 RB
Radiated Emission Above 1GHz	55340 (3560.0MHz)+55538 (3579.8MHz), 55891 (3615.1MHz)+56089 (3634.9MHz), 56642 (3670.2MHz)+56640 (3690.0MHz)	20MHz+20MHz	QPSK	1 RB
Frequency Stability (3560MHz to 3690MHz)	55340 (3560MHz)+55538 (3579.8MHz) 56442 (3670.2MHz)+56640 (3690MHz)	20MHz + 20MHz	QPSK	Full RB

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 5G Wireless Test Platforms 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	ChenzhouFrecom Electronics Co. Ltd	F24L5-120200SOPAU	NA	NA	Supplied by applicant
B	Jig	Compal	ZYN1	NA	NA	Supplied by applicant
C	Radio Communication Analyzer	Anritsu	MT8821C	6201462755	NA	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	AC Cable	1	1	No	0	Supplied by applicant

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
PXA Signal Analyzer Keysight	N9030B	MY57140938	2024/3/20	2025/3/19
Radio Communication Analyzer Anritsu	MT8821C	6261806803	2024/2/15	2025/2/14
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: 2024/8/19 ~ 2024/9/26

4.2 Peak to Average Ratio

Refer to section 4.1 to get information of the instruments.

4.3 Bandwidth

Refer to section 4.1 to get information of the instruments.

4.4 Conducted Spurious Emissions

Refer to section 4.1 to get information of the instruments.

4.5 Radiated Spurious Emissions below 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-1213	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
MXA Signal Analyzer Keysight	N9020B	MY60110513	2023/12/22	2024/12/21
Preamplifier EMCI	EMC330N	980782	2024/1/15	2025/1/14
	EMC001340	980201	2023/9/27	2024/9/26
RF Coaxial Cable EMCI	EMCCFD400-NM-NM-500	201233	2024/1/15	2025/1/14
	EMCCFD400-NM-NM-3000	201235	2024/1/15	2025/1/14
	EMCCFD400-NM-NM-9000	201236(with PAD)	2024/1/15	2025/1/14
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MF-7802BS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208674	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2024/8/10

4.6 Radiated Spurious Emissions above 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
EMI Test Receiver R&S	ESR3	102782	2023/12/7	2024/12/6
Horn Antenna RFSPIN	DRH18-E	210103A18E	2023/11/12	2024/11/11
Horn Antenna Schwarzbeck	BBHA 9170	9170-1049	2023/11/12	2024/11/11
MXA Signal Analyzer Keysight	N9020B	MY60110513	2023/12/22	2024/12/21
Preamplifier EMCI	EMC118A45SE	980808	2023/12/28	2024/12/27
	EMC184045SE	980788	2024/1/15	2025/1/14
RF Coaxial Cable EMCI	EMC101G-KM-KM-2000	201254	2024/1/15	2025/1/14
	EMC101G-KM-KM-3000	201258	2024/1/15	2025/1/14
	EMC101G-KM-KM-5000	201261	2024/1/15	2025/1/14
	EMC104-SM-SM-1000	210102	2024/1/15	2025/1/14
	EMC104-SM-SM-3000	201231	2024/1/15	2025/1/14
	EMC104-SM-SM-9000	201243	2024/1/15	2025/1/14
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MF-7802BS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208674	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2024/8/8

4.7 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	8050A	4660081	2024/6/14	2025/6/13
PXA Signal Analyzer Keysight	N9030B	MY57140938	2024/3/20	2025/3/19
Radio Communication Analyzer Anritsu	MT8821C	6261806803	2024/2/15	2025/2/14
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

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2024/9/26

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 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.

5.3 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.

5.4 Conducted Spurious Emissions

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	

5.5 Radiated Spurious Emissions below 1GHz

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	

5.6 Radiated Spurious Emissions above 1GHz

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	

5.7 Frequency Stability

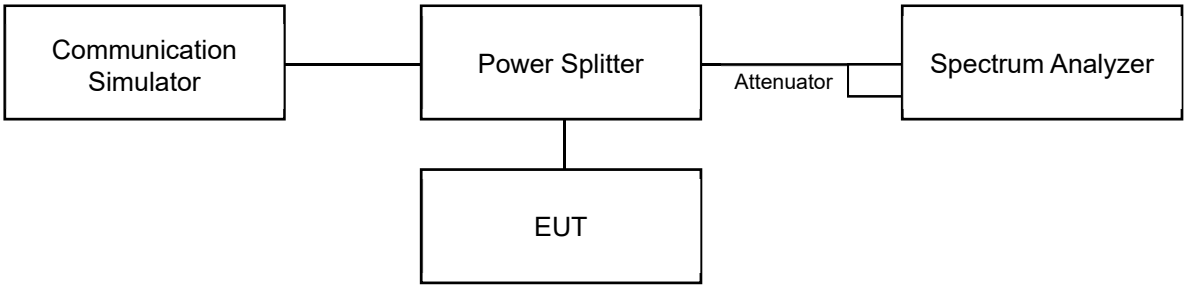
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation (authorized frequency block).

6 Test Arrangements

6.1 Maximum EIRP

6.1.1 Test Setup

Conducted Power Measurement:



6.1.2 Test Procedure

Conducted Power Measurement:

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. Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band or channel power measurement function with band/channel limits set equal to the OBW band edges.
j. If Duty cycle < 98%, Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission.
k. For per 10MHz method, channel power integrating bandwidth 10MHz is used for bandwidth 20M and 40M. For full power method, channel power integrating bandwidth 20MHz is used for bandwidth 20M, integrating bandwidth 40MHz is used for bandwidth 40M.

Maximum EIRP / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

$EIRP = P_{Meas} + G_T$

$ERP = P_{Meas} + G_T - 2.15$

where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

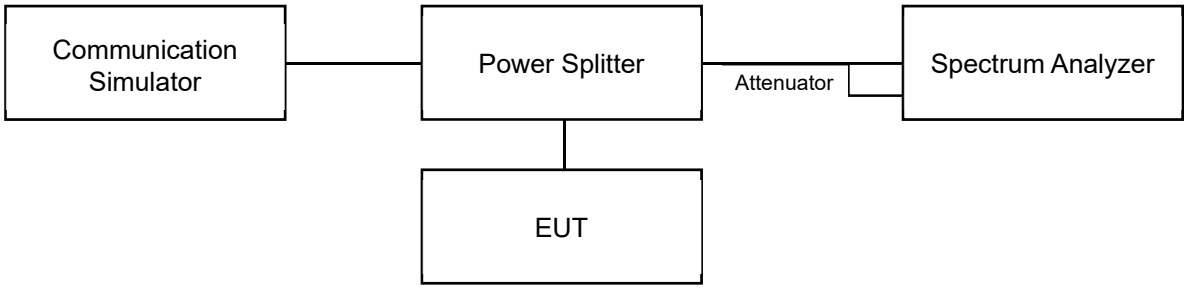
G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

6.1.3 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.

6.2 Peak to Average Ratio

6.2.1 Test Setup

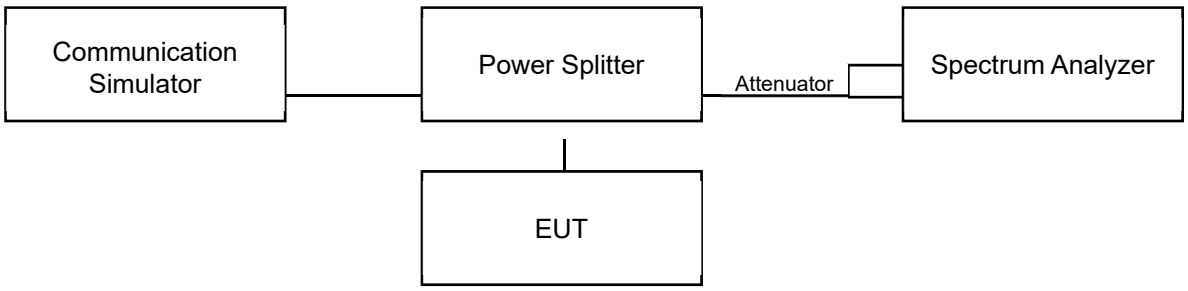


6.2.2 Test Procedure

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%.

6.3 Bandwidth

6.3.1 Test Setup



6.3.2 Test Procedure

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

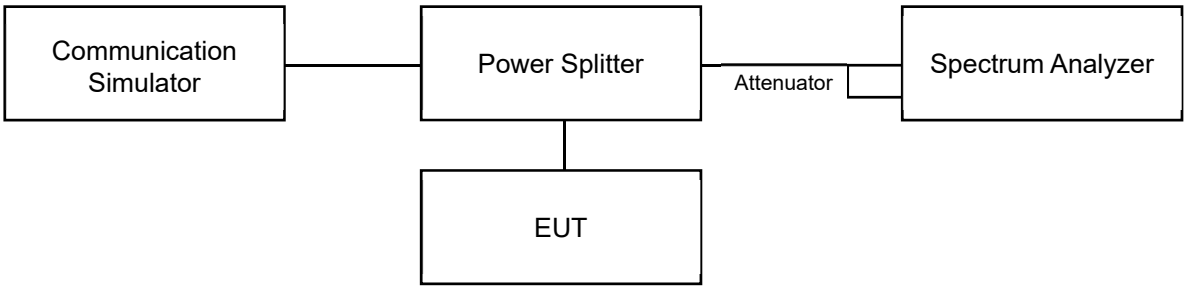
a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and 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).

6.4 Conducted Spurious Emissions

6.4.1 Test Setup



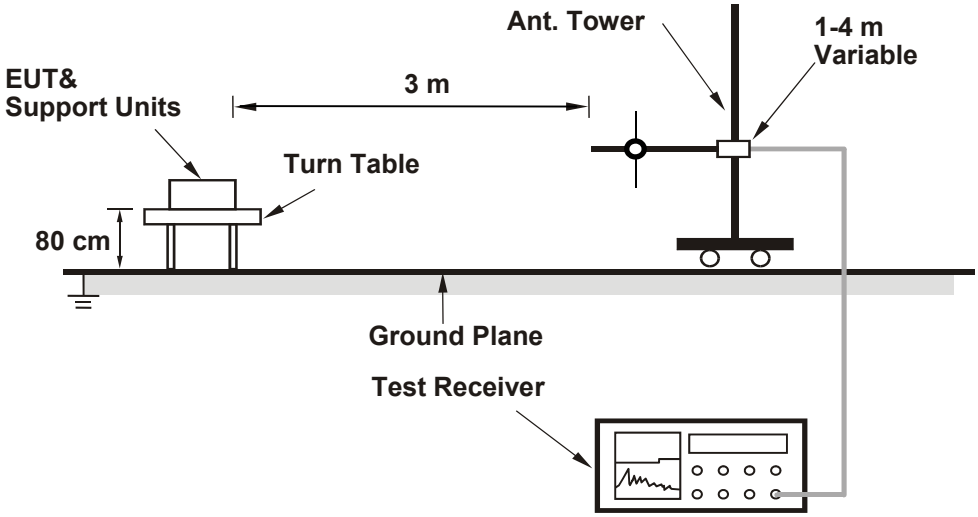
6.4.2 Test Procedure

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.

6.5 Radiated Spurious Emissions below 1GHz

6.5.1 Test Setup

For radiated emission 30 MHz to 1 GHz



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

6.5.2 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 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.

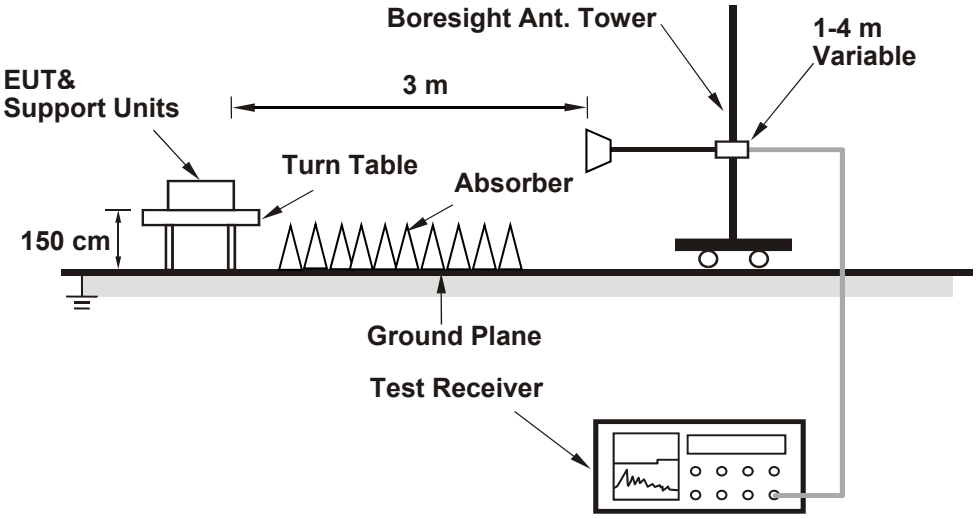
Note:

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

6.6 Radiated Spurious Emissions above 1GHz

6.6.1 Test Setup

For radiated emission above 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 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 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.

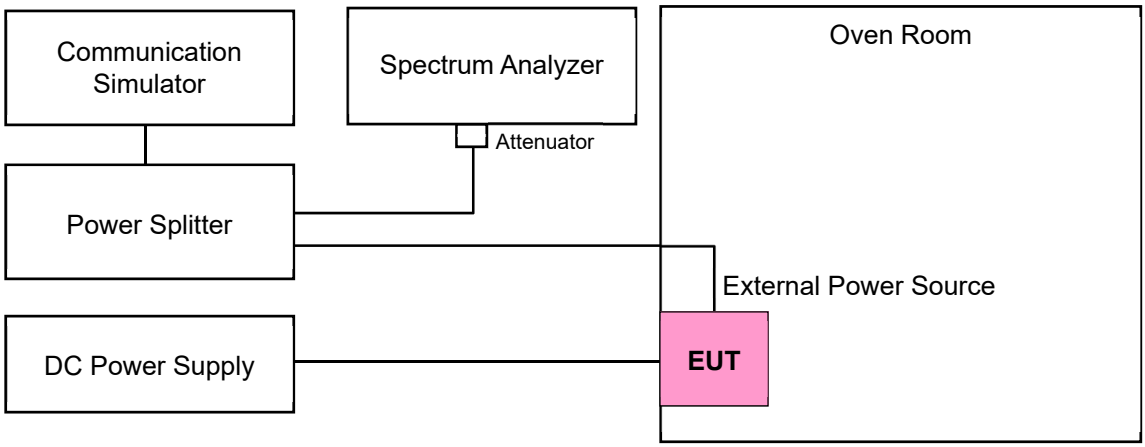
f. ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

Note:

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

6.7 Frequency Stability

6.7.1 Test Setup



6.7.2 Test Procedure

The EUT is configured by emulator 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

Input Power:	3.8 Vdc	Environmental Conditions:	22°C, 70% RH	Tested By:	Noah Chang

7.1.1 LTE Band 48 (CA 48C)

Conducted Output Power (dBm) Full Power

Con fugure	Com-bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm) Total
Intra Band Conti-guous	CA_48C	48	20	QPSK	1	0	55340	3560	48	20	QPSK	1	99	55538	3579.8	6.67
					1	99						1	0			20.43
		48	20	QPSK	1	0	55891	3615.1	48	20	QPSK	1	99	56089	3634.9	13.23
					1	99						1	0			22.96
		48	20	QPSK	1	0	56442	3670.2	48	20	QPSK	1	99	56640	3690	6.40
					1	99						1	0			19.29
Intra Band Conti-guous	CA_48C	48	20	16QAM	1	0	55340	3560	48	20	16QAM	1	99	55538	3579.8	6.61
					1	99						1	0			20.30
		48	20	16QAM	1	0	55891	3615.1	48	20	16QAM	1	99	56089	3634.9	13.12
					1	99						1	0			22.90
		48	20	16QAM	1	0	56442	3670.2	48	20	16QAM	1	99	56640	3690	6.35
					1	99						1	0			19.27
Intra Band Conti-guous	CA_48C	48	20	64QAM	1	0	55340	3560	48	20	64QAM	1	99	55538	3579.8	6.51
					1	99						1	0			20.18
		48	20	64QAM	1	0	55891	3615.1	48	20	64QAM	1	99	56089	3634.9	13.06
					1	99						1	0			22.43
		48	20	64QAM	1	0	56442	3670.2	48	20	64QAM	1	99	56640	3690	6.31
					1	99						1	0			19.19
Intra Band Conti-guous	CA_48C	48	20	256 QAM	1	0	55340	3560	48	20	256 QAM	1	99	55538	3579.8	6.42
					1	99						1	0			19.79
		48	20	256 QAM	1	0	55891	3615.1	48	20	256 QAM	1	99	56089	3634.9	12.99
					1	99						1	0			19.91
		48	20	256 QAM	1	0	56442	3670.2	48	20	256 QAM	1	99	56640	3690	6.25
					1	99						1	0			19.14

Output Power					
Modulation	Minimum Cond. Power (dBm)	Maximum Cond. Power (dBm)	Minimum EIRP (dBm)	Maximum EIRP (dBm)	EIRP Limit (dBm)
QPSK	6.40	22.96	6.40	22.96	23
16QAM	6.35	22.90	6.35	22.90	23
64QAM	6.31	22.43	6.31	22.43	23
256QAM	6.25	19.91	6.25	19.91	23

Note: EIRP (dBm) = Cond. Power (dBm) + Antenna Gain (dBi) + Array Gain (if applicable)

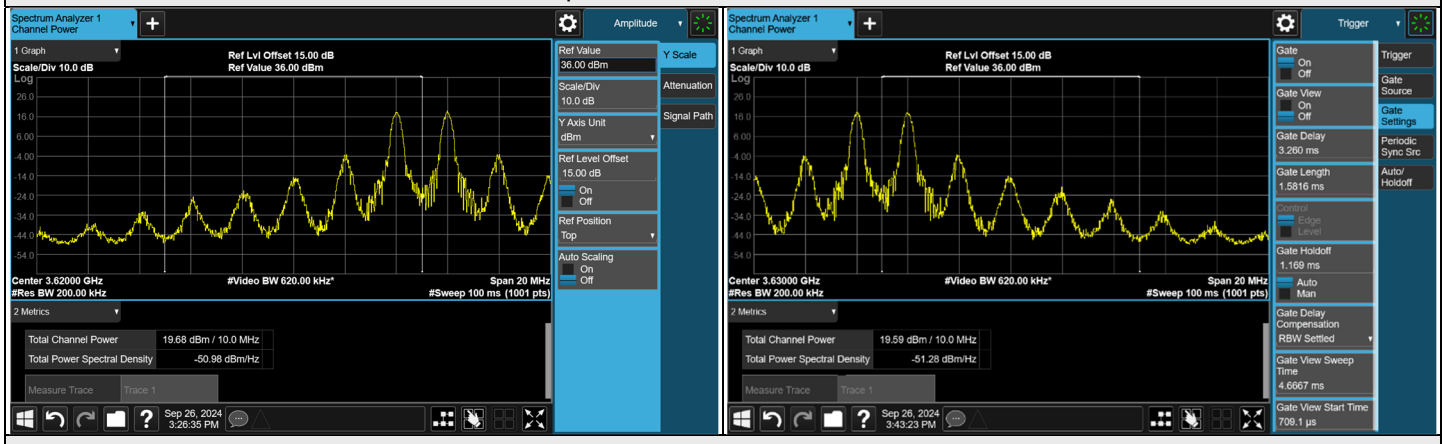
Conducted Output Power_Per 10M Power (dBm)

Con fugure	Com-bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm) Total
Intra Band Conti-guous	CA_48C	48	20	QPSK	1	0	55340	3560	48	20	QPSK	1	99	55538	3579.8	6.36
					1	99						1	0			20.10
		48	20	QPSK	1	0	55891	3615.1	48	20	QPSK	1	99	56089	3634.9	13.01
					1	99						1	0			22.65
		48	20	QPSK	1	0	56442	3670.2	48	20	QPSK	1	99	56640	3690	6.10
					1	99						1	0			18.97
Intra Band Conti-guous	CA_48C	48	20	16QAM	1	0	55340	3560	48	20	16QAM	1	99	55538	3579.8	6.29
					1	99						1	0			19.99
		48	20	16QAM	1	0	55891	3615.1	48	20	16QAM	1	99	56089	3634.9	12.82
					1	99						1	0			22.58
		48	20	16QAM	1	0	56442	3670.2	48	20	16QAM	1	99	56640	3690	6.02
					1	99						1	0			18.95
Intra Band Conti-guous	CA_48C	48	20	64QAM	1	0	55340	3560	48	20	64QAM	1	99	55538	3579.8	6.19
					1	99						1	0			19.84
		48	20	64QAM	1	0	55891	3615.1	48	20	64QAM	1	99	56089	3634.9	12.74
					1	99						1	0			22.12
		48	20	64QAM	1	0	56442	3670.2	48	20	64QAM	1	99	56640	3690	5.98
					1	99						1	0			18.88
Intra Band Conti-guous	CA_48C	48	20	256 QAM	1	0	55340	3560	48	20	256 QAM	1	99	55538	3579.8	6.09
					1	99						1	0			19.48
		48	20	256 QAM	1	0	55891	3615.1	48	20	256 QAM	1	99	56089	3634.9	12.68
					1	99						1	0			19.58
		48	20	256 QAM	1	0	56442	3670.2	48	20	256 QAM	1	99	56640	3690	5.93
					1	99						1	0			18.83

Output Power					
Modulation	Minimum Cond. Power (dBm)	Maximum Cond. Power (dBm)	Minimum EIRP (dBm)	Maximum EIRP (dBm)	EIRP Limit (dBm)
QPSK	6.10	22.65	6.10	22.65	23
16QAM	6.02	22.58	6.02	22.58	23
64QAM	5.98	22.12	5.98	22.12	23
256QAM	5.93	19.58	5.93	19.58	23

Note: EIRP (dBm) = Cond. Power (dBm) + Antenna Gain (dBi) + Array Gain (if applicable)

Spectrum Plot of Worst Value



QPSK CH 55891 (3615.1MHz)+CH 56089 (3634.9MHz)

7.2 Peak to Average Ratio

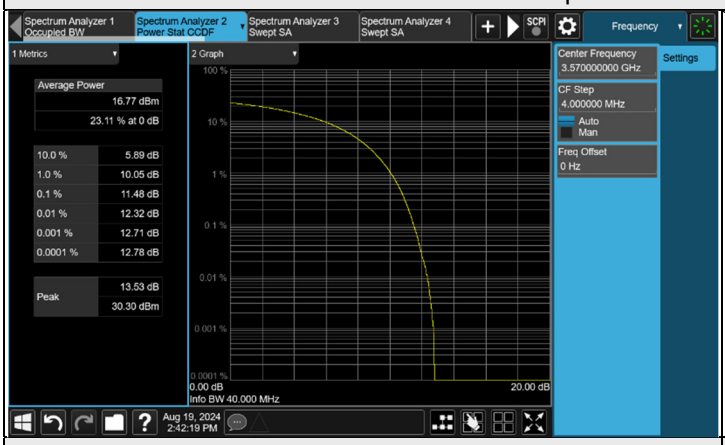
Input Power:	3.8 Vdc	Environmental Conditions:	22°C, 70% RH	Tested By:	Noah Chang

7.2.1 LTE Band 48 (CA 48C)

Channel Bandwidth: 20 MHz+20 MHz

Channel	Frequency (MHz)	Peak to Average Ratio (dB)				Limit
		QPSK	16QAM	64QAM	256QAM	
55340+55538	3560.0+3579.8	7.61	9.80	11.48	10.25	13.00
55891+56089	3615.1+3634.9	7.42	9.59	11.34	11.24	
56442+56640	3670.2+3690.0	7.75	9.48	10.49	10.54	

Spectrum Plot of Worst Value



64QAM CH 55340 (3560.0MHz)+CH 55538 (3579.8MHz)

7.3 Bandwidth

Input Power:	3.8 Vdc	Environmental Conditions:	22°C, 70% RH	Tested By:	Noah Chang

7.3.1 TE Band 48 (CA 48C)

Channel Bandwidth: 20 MHz+20 MHz

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				26 dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
55340+ 55538	3560.0+ 3579.8	37.68	37.65	37.67	37.69	39.72	39.69	39.71	39.70
55891+ 56089	3615.1+ 3634.9	37.72	37.67	37.65	37.67	39.77	39.75	39.69	39.69
56442+ 56640	3670.2+ 3690.0	37.72	37.68	37.67	37.71	39.78	39.71	39.70	39.65

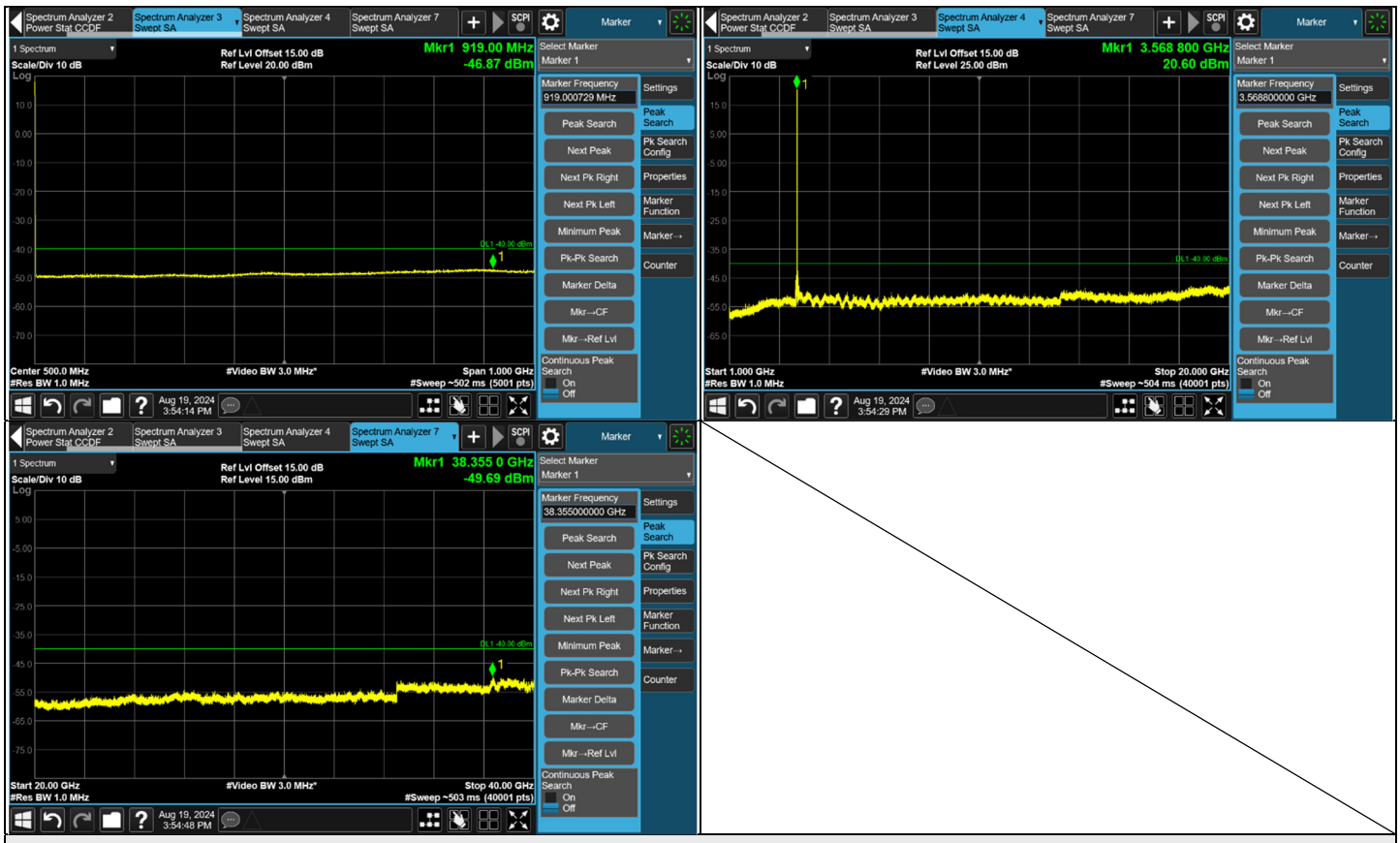
Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
QPSK CH 56442 (3670.2MHz)+CH 56640 (3690.0MHz)	QPSK CH 56442 (3670.2MHz)+CH 56640 (3690.0MHz)

7.4 Conducted Spurious Emissions

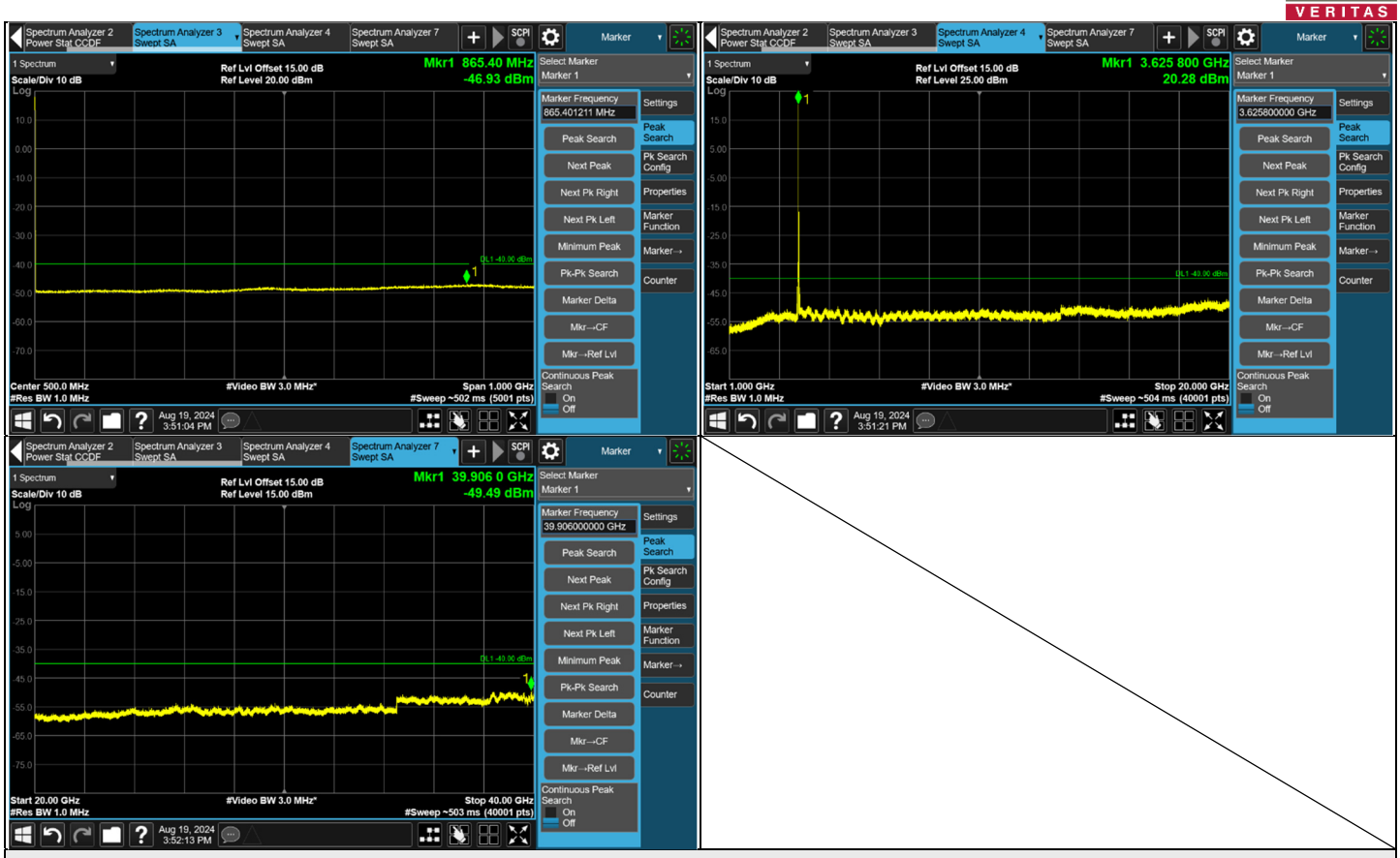
Input Power:	3.8 Vdc	Environmental Conditions:	22°C, 70% RH	Tested By:	Noah Chang

7.4.1 TE Band 48 (CA 48C)

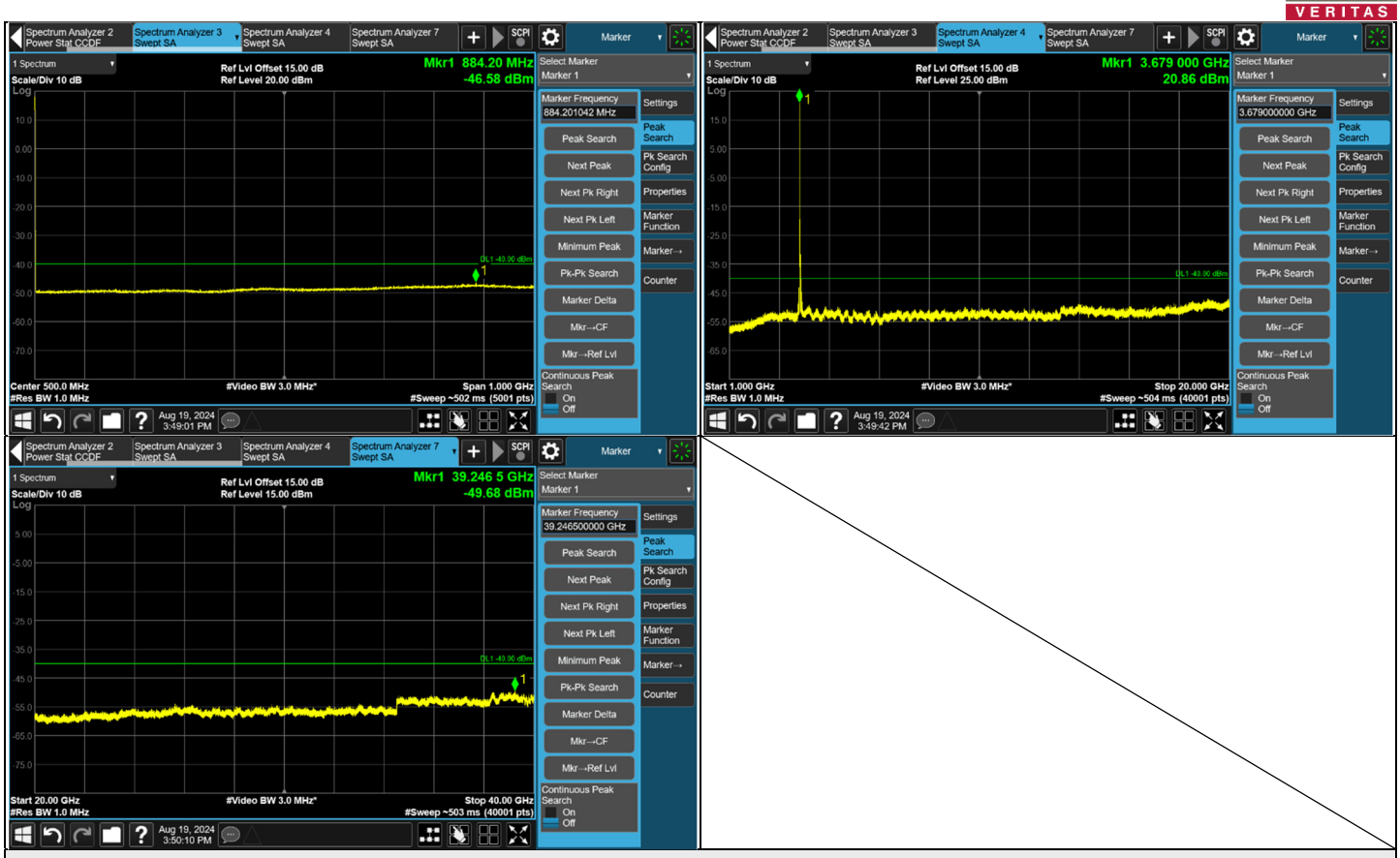
Channel Bandwidth: 20 MHz+20 MHz



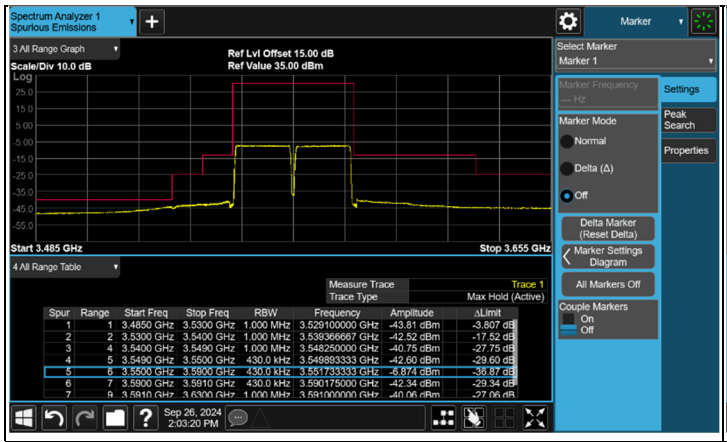
CH 55340 (3560.0MHz)+CH 55538 (3579.8MHz)



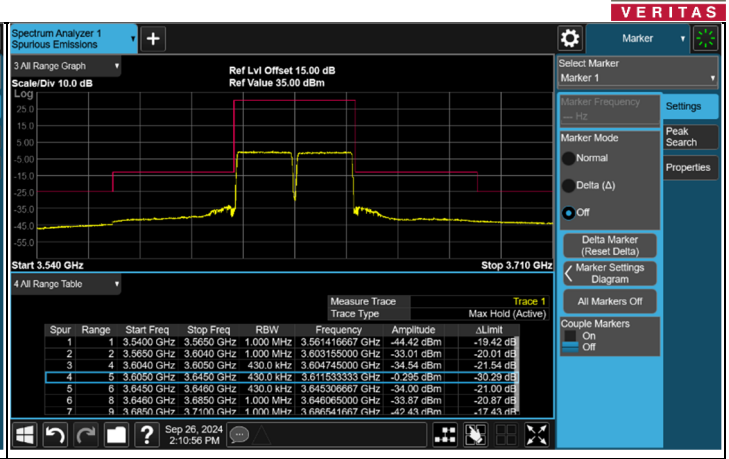
CH 55891 (3615.1MHz)+CH 56089 (3634.9MHz)



CH 56642 (3670.2MHz)+CH 56640 (3690.0MHz)

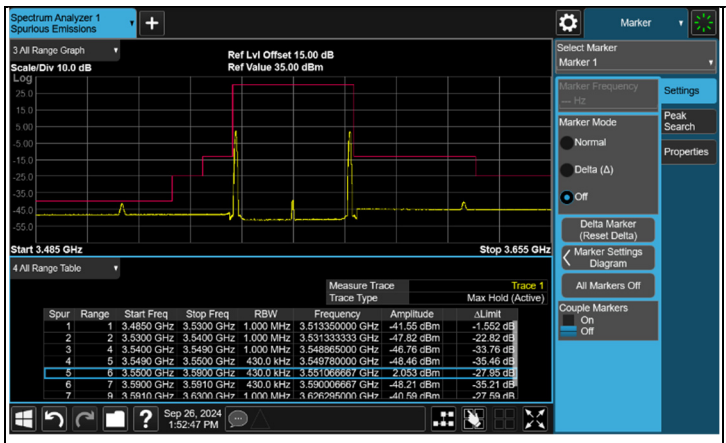


FULL
CH 55340 (3560.0MHz)+CH 55538 (3579.8MHz)

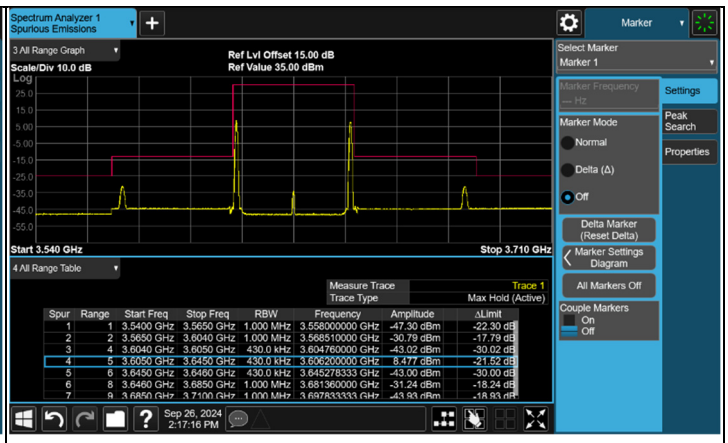


FULL
CH 55891 (3615.1MHz)+CH 56089 (3634.9MHz)

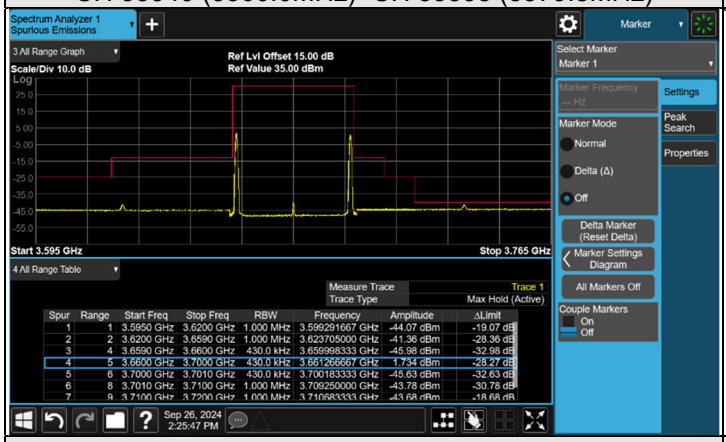
FULL
CH 56642 (3670.2MHz)+CH 56640 (3690.0MHz)



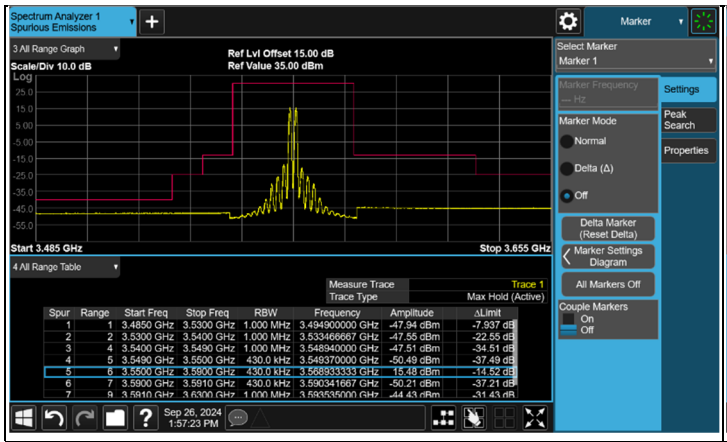
1RB / 0 RB Offset + 1 RB / 99 RB Offset
CH 55340 (3560.0MHz)+CH 55538 (3579.8MHz)



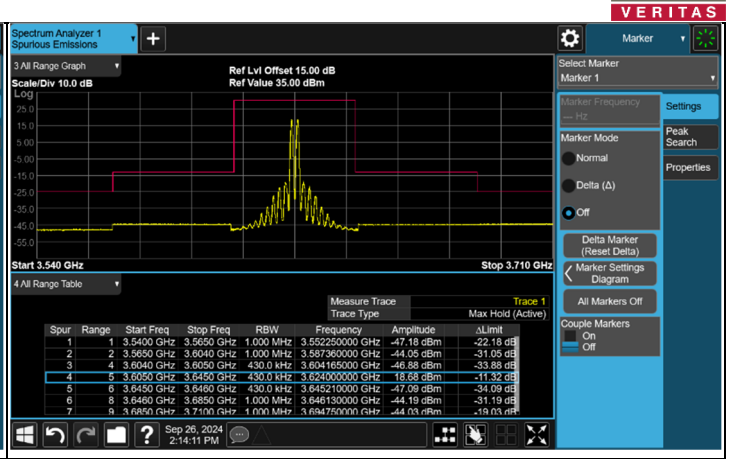
1RB / 0 RB Offset + 1 RB / 99 RB Offset
CH 55891 (3615.1MHz)+CH 56089 (3634.9MHz)



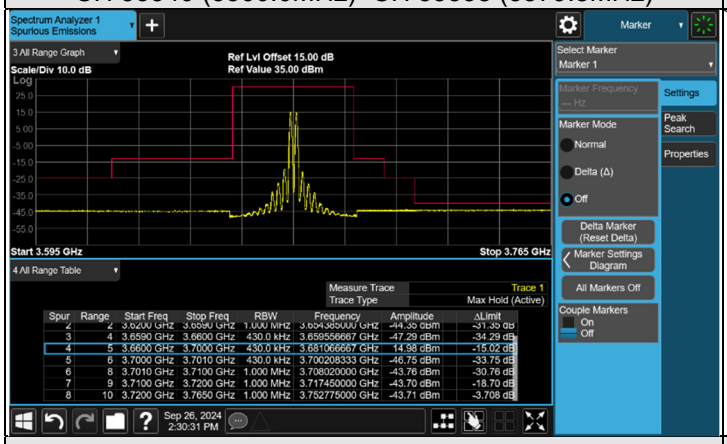
1RB / 0 RB Offset + 1 RB / 99 RB Offset
CH 56642 (3670.2MHz)+CH 56640 (3690.0MHz)



1RB / 99 RB Offset + 1 RB / 0 RB Offset
CH 55340 (3560.0MHz)+CH 55538 (3579.8MHz)



1RB / 99 RB Offset + 1 RB / 0 RB Offset
CH 55891 (3615.1MHz)+CH 56089 (3634.9MHz)



1RB / 99 RB Offset + 1 RB / 0 RB Offset
CH 56642 (3670.2MHz)+CH 56640 (3690.0MHz)

7.5 Radiated Spurious Emissions below 1GHz

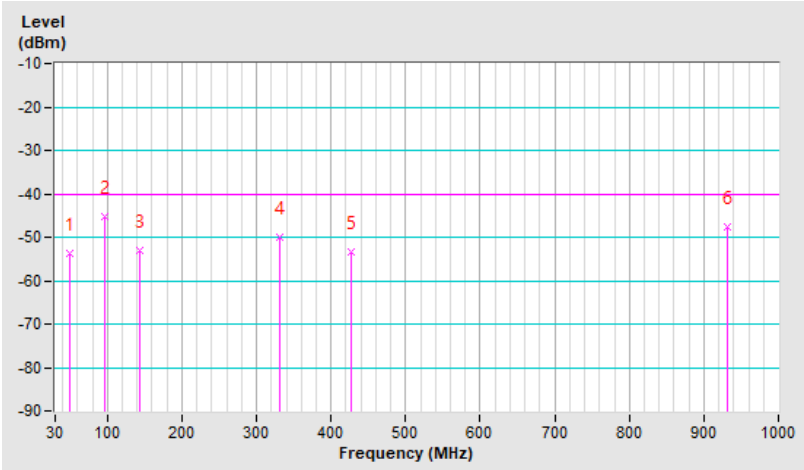
7.5.1 LTE Band 48 (CA 48C)

RF Mode	Channel Bandwidth: 20MHz+20MHz	**Channel**	CH 55891：3615.1MHz + CH 56089：3634.9MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	22°C, 68% RH
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	49.68	-53.73	-40.00	-13.73	1.00 H	2	50.40	-104.13
2	96.07	-45.40	-40.00	-5.40	1.25 H	288	64.09	-109.49
3	143.87	-53.13	-40.00	-13.13	2.00 H	267	51.04	-104.17
4	330.84	-49.86	-40.00	-9.86	1.50 H	289	51.98	-101.84
5	426.43	-53.31	-40.00	-13.31	1.00 H	165	46.85	-100.16
6	932.52	-47.46	-40.00	-7.46	1.25 H	30	42.35	-89.81

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The EIRP levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

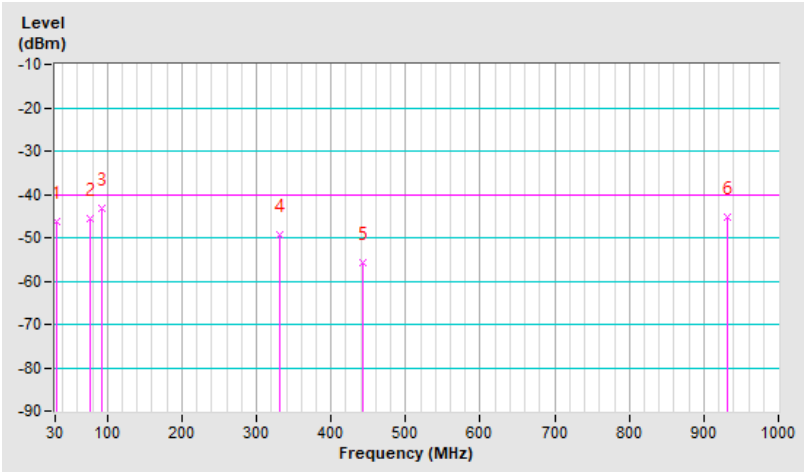


RF Mode	Channel Bandwidth: 20MHz+20MHz	**Channel**	CH 55891：3615.1MHz + CH 56089：3634.9MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	22°C, 68% RH
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	32.81	-46.34	-40.00	-6.34	1.50 V	7	59.46	-105.80
2	76.39	-45.65	-40.00	-5.65	1.50 V	6	61.84	-107.49
3	**93.26**	**-43.29**	**-40.00**	**-3.29**	**1.25 V**	**229**	**66.19**	**-109.48**
4	330.84	-49.27	-40.00	-9.27	1.00 V	285	52.57	-101.84
5	443.30	-55.78	-40.00	-15.78	1.00 V	313	43.98	-99.76
6	932.52	-45.25	-40.00	-5.25	1.25 V	279	44.56	-89.81

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The EIRP levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



7.6 Radiated Spurious Emissions above 1GHz

7.6.1 LTE Band 48 (CA 48C)

RF Mode	Channel Bandwidth: 20MHz+20MHz	**Channel**	CH 55340：3560.0MHz + CH 55538：3579.8MHz
Frequency Range	1 GHz ~ 40 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 67% RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7120.00	-50.68	-40.00	-10.68	1.84 H	232	37.00	-87.68
2	7159.60	-51.03	-40.00	-11.03	1.84 H	232	36.71	-87.74
3	10680.00	-49.36	-40.00	-9.36	1.69 H	253	38.23	-87.59
4	10739.40	-49.50	-40.00	-9.50	1.69 H	253	38.19	-87.69
5	14240.00	-45.65	-40.00	-5.65	1.51 H	28	40.41	-86.06
6	14319.20	-45.69	-40.00	-5.69	1.51 H	28	40.44	-86.13
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7120.00	-50.28	-40.00	-10.28	1.95 V	341	37.40	-87.68
2	7159.60	-51.58	-40.00	-11.58	1.95 V	341	36.16	-87.74
3	10680.00	-49.10	-40.00	-9.10	1.85 V	342	38.49	-87.59
4	10739.40	-49.26	-40.00	-9.26	1.85 V	342	38.43	-87.69
5	14240.00	-43.55	-40.00	-3.55	1.29 V	243	42.51	-86.06
6	14319.20	-45.51	-40.00	-5.51	1.29 V	243	40.62	-86.13

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

RF Mode	Channel Bandwidth: 20MHz+20MHz	**Channel**	CH 55891：3615.1MHz + CH 56089：3634.9MHz
Frequency Range	1 GHz ~ 40 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 67% RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7230.20	-50.91	-40.00	-10.91	2.24 H	195	36.81	-87.72
2	7269.80	-50.63	-40.00	-10.63	2.24 H	195	36.99	-87.62
3	10845.30	-49.38	-40.00	-9.38	1.75 H	341	38.07	-87.45
4	10904.70	-48.92	-40.00	-8.92	1.75 H	341	38.29	-87.21
5	14460.40	-45.13	-40.00	-5.13	1.46 H	181	40.72	-85.85
6	14539.60	-45.11	-40.00	-5.11	1.46 H	181	40.75	-85.86
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7230.20	-50.82	-40.00	-10.82	1.23 V	94	36.90	-87.72
2	7269.80	-50.85	-40.00	-10.85	1.23 V	94	36.77	-87.62
3	10845.30	-49.08	-40.00	-9.08	1.94 V	226	38.37	-87.45
4	10904.70	-48.92	-40.00	-8.92	1.94 V	226	38.29	-87.21
5	**14460.40**	**-42.14**	**-40.00**	**-2.14**	**2.03 V**	**288**	**43.71**	**-85.85**
6	14539.60	-44.99	-40.00	-4.99	2.03 V	288	40.87	-85.86

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

RF Mode	Channel Bandwidth: 20MHz+20MHz	**Channel**	CH 56642：3670.2MHz + CH 56640：3690.0MHz
Frequency Range	1 GHz ~ 40 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 67% RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7340.40	-50.60	-40.00	-10.60	1.81 H	62	36.94	-87.54
2	7380.00	-50.51	-40.00	-10.51	1.81 H	62	36.96	-87.47
3	11010.60	-49.04	-40.00	-9.04	2.94 H	160	37.58	-86.62
4	11070.00	-48.80	-40.00	-8.80	2.94 H	160	37.91	-86.71
5	14680.80	-45.65	-40.00	-5.65	1.56 H	104	40.37	-86.02
6	14760.00	-45.61	-40.00	-5.61	1.56 H	104	40.29	-85.90
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7340.40	-50.44	-40.00	-10.44	1.52 V	242	37.10	-87.54
2	7380.00	-50.62	-40.00	-10.62	1.52 V	242	36.85	-87.47
3	11010.60	-48.88	-40.00	-8.88	1.21 V	74	37.74	-86.62
4	11070.00	-48.89	-40.00	-8.89	1.21 V	74	37.82	-86.71
5	14680.80	-45.29	-40.00	-5.29	2.84 V	114	40.73	-86.02
6	14760.00	-45.60	-40.00	-5.60	2.84 V	114	40.30	-85.90

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

7.7 Frequency Stability

Environmental Conditions:	25°C, 60% RH	Tested By:	Ted Chang

7.7.1 LTE Band 48 (CA 48C)

Channel Bandwidth: 20 MHz+20 MHz

Frequency Stability Versus Voltage				
Voltage (Vdc)	CH 55340 (3560MHz) + 55538 (3579.8MHz)		CH 56442 (3670.2MHz) + 56640 (3690MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	3559.999998	-0.0006	3690.000002	0.0005
3.80	3560.000004	0.0011	3689.999996	-0.0011
4.40	3559.999996	-0.0011	3690.000003	0.0008

Note: The applicant defined the normal working voltage is from 3.23 to 4.40 Vdc.

Frequency Stability Versus Temperature				
Temperature (℃)	CH 55340 (3560MHz) + 55538 (3579.8MHz)		CH 56442 (3670.2MHz) + 56640 (3690MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3560.000002	0.0006	3689.999996	-0.0011
-20	3559.999997	-0.0008	3690.000001	0.0003
-10	3560.000001	0.0003	3690.000004	0.0011
0	3560.000001	0.0003	3689.999998	-0.0005
10	3560.000004	0.0011	3689.999999	-0.0003
20	3560.000001	0.0003	3689.999996	-0.0011
30	3559.999996	-0.0011	3689.999997	-0.0008
40	3559.999997	-0.0008	3689.999997	-0.0008
50	3559.999999	-0.0003	3690.000001	0.0003
60	3559.999995	-0.0014	3689.999997	-0.0008
70	3559.999996	-0.0011	3690.000002	0.0005
75	3560.000002	0.0006	3690.000001	0.0003

8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 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 FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@bureauveritas.com
Web Site: http://ee.bureauveritas.com.tw

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

--- END ---