

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 96
47 CFR FCC Part 2

Report No.: RFBCMA-WTW-P24070713-11

FCC ID: RAXXC46BE

Product: Dragon

Brand: Verizon

Model No.: XC46BE

Received Date: 2024/9/27

Test Date: 2024/10/28 ~ 2024/11/3

Issued Date: 2024/11/19

Applicant: Arcadyan Technology Corporation

Address: No.8, Sec.2, Guangfu Rd., Hsinchu City 30071, Taiwan, R.O.C.

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:** 2024/11/19
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 : Polly Chien / 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	6
2.2 Supplementary Information	6
3 General Information	7
3.1 General Description of EUT	7
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 Equivalent Isotropically Radiated Power	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	15
5 Limits of Test Items.....	16
5.1 Equivalent Isotropically Radiated Power	16
5.2 Peak to Average Ratio	16
5.3 Bandwidth.....	16
5.4 Conducted Spurious Emissions	16
5.5 Radiated Spurious Emissions below 1GHz.....	16
5.6 Radiated Spurious Emissions above 1GHz	17
5.7 Frequency Stability	17
6 Test Arrangements.....	18
6.1 Equivalent Isotropically Radiated Power	18
6.1.1 Test Setup	18
6.1.2 Test Procedure	18
6.2 Peak to Average Ratio	19
6.2.1 Test Setup	19
6.2.2 Test Procedure	19
6.3 Bandwidth.....	20
6.3.1 Test Setup	20
6.3.2 Test Procedure	20
6.4 Conducted Spurious Emissions	22
6.4.1 Test Setup	22
6.4.2 Test Procedure	22
6.5 Radiated Spurious Emissions below 1GHz.....	23
6.5.1 Test Setup	23
6.5.2 Test Procedure	23
6.6 Radiated Spurious Emissions above 1GHz	24
6.6.1 Test Setup	24
6.6.2 Test Procedure	24
6.7 Frequency Stability	25
6.7.1 Test Setup	25
6.7.2 Test Procedure	25
7 Test Results of Test Item	26
7.1 Equivalent Isotropically Radiated Power	26
7.1.1 LTE Band 48 (CA 48C)	26

7.2	Peak to Average Ratio	28
7.2.1	LTE Band 48 (CA 48C)	28
7.3	Bandwidth	29
7.3.1	LTE 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
RFBCMA-WTW-P24070713-11	Original release.	2024/11/19

1 Certificate

Product: Dragon

Brand: Verizon

Test Model: XC46BE

Sample Status: Engineering sample

Applicant: Arcadyan Technology Corporation

Test Date: 2024/10/28 ~ 2024/11/3

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 -1.31 dB at 174.53 MHz
FCC 47 CFR Part 2.1053 FCC 47 CFR Part 96.41(e)	Radiated Spurious Emissions above 1GHz	Pass	Minimum passing margin is -1.00 dB at 7340.40 MHz
FCC 47 CFR 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.
- LTE CA mode is similar to digital modulation in LTE single frequency band, so please refer to BV CPS report no.: RFBCMA-WTW-P24070713-3 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:

Parameter	Specification	Uncertainty (±)
Effective Radiated Power and Equivalent Isotropically Radiated Power	-	1.371 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 dB
	30 MHz ~ 1 GHz	2.92 dB
Radiated Spurious Emissions above 1GHz	1 GHz ~ 18 GHz	1.76 dB
	18 GHz ~ 40 GHz	1.77 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	Dragon
Brand	Verizon
Test Model	XC46BE
Status of EUT	Engineering sample
Power Supply Rating	12.0Vdc from adapter 7.2 Vdc from battery

Note:

1. EUT Overview

Full Maximum EIRP (dBm/channel bandwidth)

Band / Bandwidth	TX Frequency Range (MHz)	Modulation	Max. EIRP (W)	Max. EIRP (dBm/channel bandwidth)
LTE Band 48 (CA 48C) (20MHz + 20MHz)	3560.0-3690.0	QPSK	0.163	22.11
		16QAM	0.131	21.18
		64QAM	0.093	19.70
		256QAM	0.053	17.28

Maximum EIRP (dBm/10MHz)

Band / Bandwidth	TX Frequency Range (MHz)	Modulation	Max. EIRP (W)	Max. EIRP (dBm/10MHz)
LTE Band 48 (CA 48C) (20MHz + 20MHz)	3560.0-3690.0	QPSK	0.160	22.03
		16QAM	0.129	21.11
		64QAM	0.092	19.62
		256QAM	0.052	17.20

Band / Bandwidth	TX Frequency Range (MHz)	Emission Designator			
		QPSK	16QAM	64QAM	256QAM
LTE Band 48 (CA 48C) (20MHz + 20MHz)	3560.0-3690.0	37M6G7D	37M6D7W	37M6D7W	37M6D7W

2. The EUT uses following accessories.

Adapter	
Brand	verizon
Model	1A105-1235
Input Power	105-125 Vac, 60Hz, 1.2A
Output Power	12.0Vdc, 3.5A, 42.0W
DC Output Cable	1.8meter unshielded cable, w/o ferrite core

Battery	
Brand	Atemitech
Model	XC46BE224T-F100
Power Rating	7.2Vdc, 9800mAh (70.56Wh)

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
66B
66C

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.

Antenna NO.	TX/RX	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type
Ant.1	TX1/RX	2.86	FDD B2/n2: 1850 -1910 MHz	Dipole	SMA
	TX1/RX	2.77	FDD B5/n5: 824-849 MHz		
	TX0/RX	3.35	FDD B13: 777-787 MHz		
	TX0/RX	0.57	TDD B48/n48: 3550-3700 MHz		
	TX1/RX	2.54	FDD B66/n66: 1710-1780 MHz		
	TX0/RX	0.57	TDD n77: 3300-4200 MHz		
Ant.2	RX	2.82	FDD B2/n2: 1850 -1910 MHz	Dipole	SMA
		1.84	FDD B5/n5: 824-849 MHz		
		2.59	FDD B13: 777-787 MHz		
		0.91	TDD B48/n48: 3550-3700 MHz		
		2.83	FDD B66/n66: 1710-1780 MHz		
		0.91	TDD n77: 3300-4200 MHz		
Ant.3	RX	2.93	FDD B2/n2: 1850 -1910 MHz	Dipole	SMA
		2.7	FDD B5/n5: 824-849 MHz		
		2.18	FDD B13: 777-787 MHz		
		-0.13	TDD B48/n48: 3550-3700 MHz		
		3.08	FDD B66/n66: 1710-1780 MHz		
		0.78	TDD n77: 3300-4200 MHz		
Ant.4	TX0/RX	3.52	FDD B2/n2: 1850 -1910 MHz	Dipole	SMA
	TX0/RX	3.92	FDD B5/n5: 824-849 MHz		
	RX	4.23	FDD B13: 777-787 MHz		
	TX1/RX	0.33	TDD B48/n48: 3550-3700 MHz		
	TX0/RX	2.9	FDD B66/n66: 1710-1780 MHz		
	TX1/RX	0.74	TDD n77: 3300-4200 MHz		

*During SISO mode, FDD Band2/n2, FDD Band5/n5 & FDD Band66/n66 were fixed on Ant.4 and FDD Band13, TDD Band48/n48 & TDD n77 were fixed on Ant.1.

*For MIMO mode:

1. FDD:n2/n66 & TDD: n48/n77 were fixed on Ant.1 + Ant.4.
2. The MIMO mode signal was uncorrelated signal.
3. Regarding EIRP calculation that we will use the maximum antenna gain/frequency band as calculation parameters.
Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10})/2]$ dBi.

*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:	- For Unwanted Emission (below 1GHz) items: Battery/ POE/ AC Adapter. Pre-scan these modes and find the worst case as a representative test condition. - Pre-Scan has been conducted to determine the worst-case from all possible combinations of TX/RX condition, channel, bandwidth, modulation and RB mode. See below table(s) for details.
Worst Case:	- For Unwanted Emission (below 1GHz) items worst condition: AC Adapter, frequency stability items worst condition: Battery and others test item the worst condition: AC Adapter. - EUT only operate on the specific X-axis for tested.

For LTE Band 48 (CA 48C)

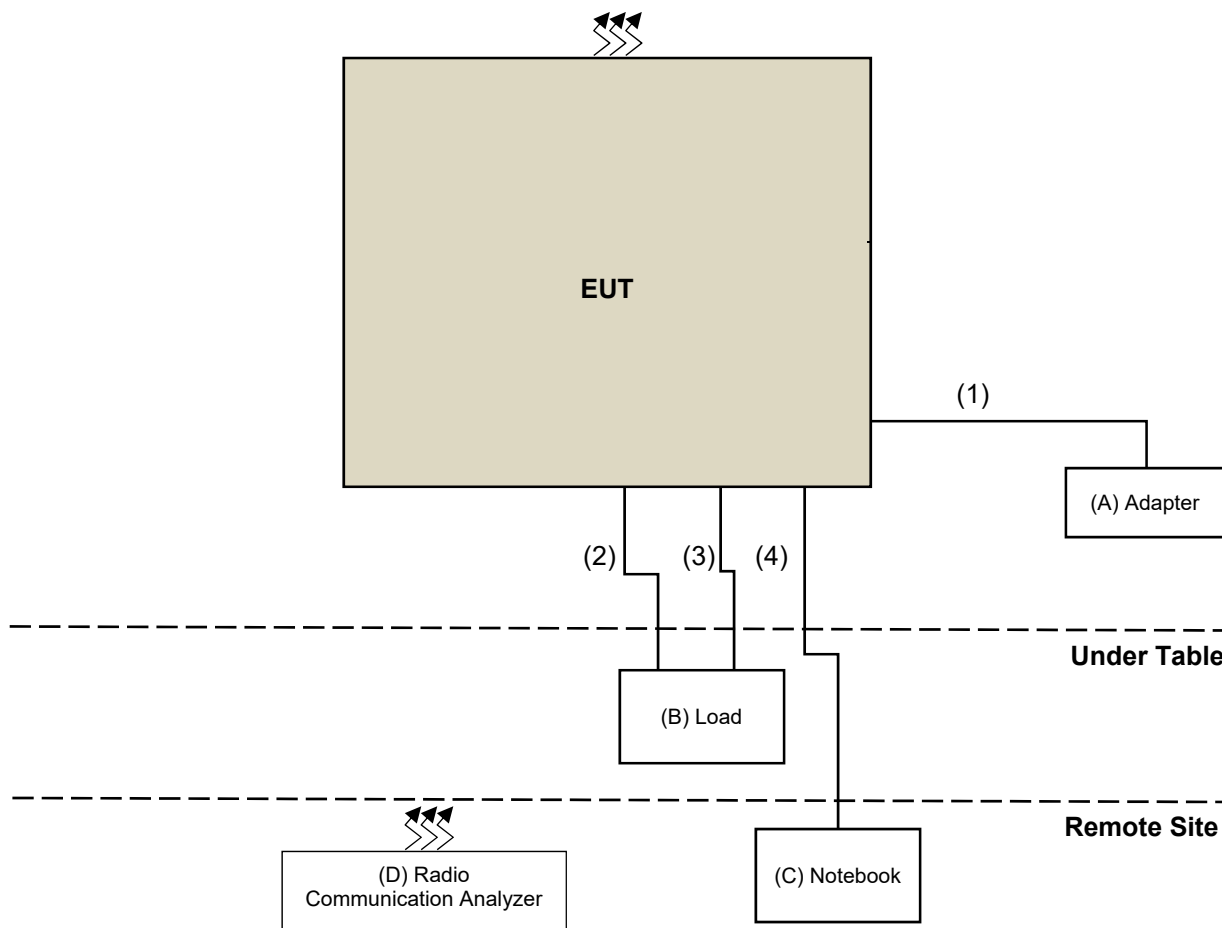
Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
EIRP	55340 (3560MHz) + 55538 (3579.8MHz) 55891 (3615.1MHz) + 56089 (3634.9MHz) 56442 (3670.2MHz) + 56640 (3690MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
Peak to Average Ratio	55340 (3560MHz) + 55538 (3579.8MHz) 55891 (3615.1MHz) + 56089 (3634.9MHz) 56442 (3670.2MHz) + 56640 (3690MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
Occupied Bandwidth	55340 (3560MHz) + 55538 (3579.8MHz) 55891 (3615.1MHz) + 56089 (3634.9MHz) 56442 (3670.2MHz) + 56640 (3690MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
Conducted Emission	55340 (3560MHz) + 55538 (3579.8MHz) 55891 (3615.1MHz) + 56089 (3634.9MHz) 56442 (3670.2MHz) + 56640 (3690MHz)	20MHz + 20MHz	QPSK	1 RB Full RB
RE Below 1GHz	55891 (3615.1MHz) + 56089 (3634.9MHz)	20MHz + 20MHz	QPSK	1 RB / 99 RB Offset 1 RB / 0 RB Offset
RE Above 1GHz	55340 (3560MHz) + 55538 (3579.8MHz) 55891 (3615.1MHz) + 56089 (3634.9MHz) 56442 (3670.2MHz) + 56640 (3690MHz)	20MHz + 20MHz	QPSK	1 RB / 99 RB Offset 1 RB / 0 RB Offset
Frequency Stability (Frequency range: 3550 MHz to 3700 MHz)	55340 (3560MHz) + 55538 (3579.8MHz) 56442 (3670.2MHz) + 56640 (3690MHz)	20MHz + 20MHz	QPSK	Full RB

Note: Max. power and max gain were chosen for final test.

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	verizon	1A105-1235	N/A	N/A	Supplied by applicant
B	Load	NA	NA	N/A	N/A	Provided by Lab
C	Notebook	Lenovo	20J4 MD A003TW	N/A	N/A	Provided by Lab
D	Radio Communication Analyzer	Anritsu	MT8821C	6201462755	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Output Cable	1	1.8	No	0	Supplied by applicant
2	LAN cable	1	1.5	No	0	Provided by Lab
3	LAN cable	1	1.5	No	0	Provided by Lab
4	LAN cable	1	10	No	0	Provided by Lab

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 Equivalent Isotropically Radiated Power

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: 2024/10/28 ~ 2024/11/1

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 KaiTuo	N/A	N/A	N/A	N/A
Antenna Tower Controller KaiTuo	KT-2000	N/A	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-995	2024/10/9	2025/10/8
Loop Antenna TESEQ	HLA 6121	45745	2024/8/21	2025/8/20
MXE EMI Receiver Agilent	N9038A	MY52260177	2024/9/19	2025/9/18
Preamplifier EMCI	EMC330N	980783	2024/1/15	2025/1/14
	EMC001340	980201	2024/9/24	2025/9/23
PXA Signal Analyzer Keysight	N9030B	MY57140488	2024/3/6	2025/3/5
RF Coaxial Cable EMCI	EMCCFD400-NM-NM-500	201245	2024/1/15	2025/1/14
	EMCCFD400-NM-NM-3000	201250	2024/1/15	2025/1/14
	EMCCFD400-NM-NM-9000	201252(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	MFT-151SS-0.5T	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208675	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 7.
2. Tested Date: 2024/11/3

4.6 Radiated Spurious Emissions above 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower KaiTuo	N/A	N/A	N/A	N/A
Antenna Tower Controller KaiTuo	KT-2000	N/A	N/A	N/A
Horn Antenna RFSPIN	DRH18-E	210104A18E	2023/11/12	2024/11/11
Horn Antenna Schwarzbeck	BBHA 9170	9170-1048	2023/11/12	2024/11/11
MXE EMI Receiver Agilent	N9038A	MY52260177	2024/9/19	2025/9/18
Preamplifier EMCI	EMC118A45SE	980810	2023/12/28	2024/12/27
	EMC184045SE	980787	2024/1/15	2025/1/14
PXA Signal Analyzer Keysight	N9030B	MY57140488	2024/3/6	2025/3/5
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	210101	2024/1/15	2025/1/14
	EMC104-SM-SM-3000	201242	2024/1/15	2025/1/14
	EMC104-SM-SM-9000	201230	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	MFT-151SS-0.5T	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208675	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 7.
2. Tested Date: 2024/11/1

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: 2024/11/1

5 Limits of Test Items

5.1 Equivalent Isotropically Radiated Power

For LTE Band 48:

Device Category	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

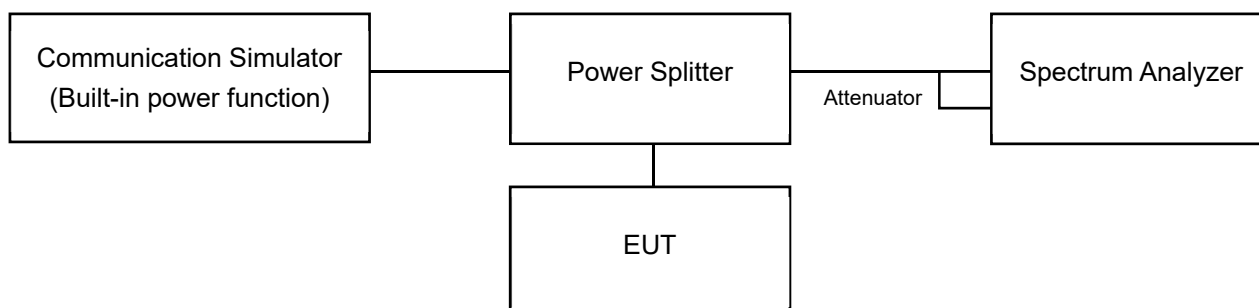
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation (authorized frequency block).

6 Test Arrangements

6.1 Equivalent Isotropically Radiated Power

6.1.1 Test Setup

Conducted Power Measurement:



6.1.2 Test Procedure

Conducted Power Measurement:

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology and link to spectrum analyzer measurements. Set the EUT to transmit under low, middle and high channel and record the power level shown on spectrum analyzer. Power measurements use detector average (rms).

Measurement method refers to ANSI C63.26 section 5.2.4.4.

- Set span to 2 × to 3 × the OBW.
- Set RBW = 1% to 5% of the OBW.
- Set VBW ≥ 3 × RBW.
- Set number of measurement points in sweep ≥ 2 × span / RBW.
- Set Sweep time = auto-couple.
- Detector = power averaging (rms).
- Set sweep trigger to “free run.”
- Trace average at least 100 traces in power averaging (rms) mode.
- 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.
- If Duty cycle < 98%, Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission.

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:

$$\text{EIRP} = P_{\text{Meas}} + G_T$$

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

where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively

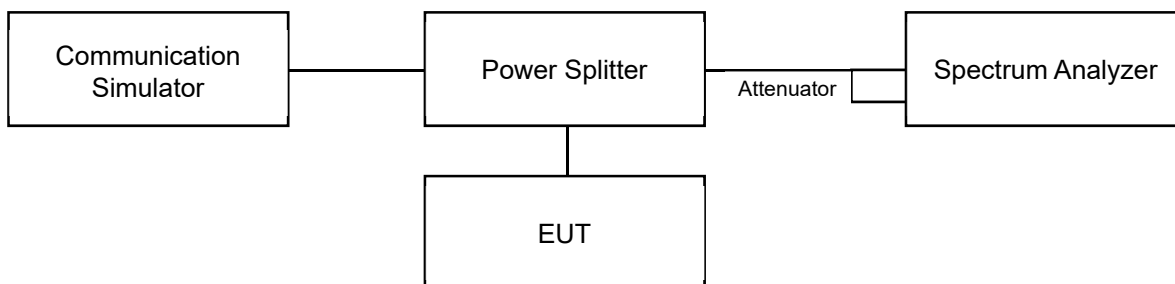
(expressed in the same units as P_{Meas} , e.g., dBm or dBW)

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)

6.2 Peak to Average Ratio

6.2.1 Test Setup

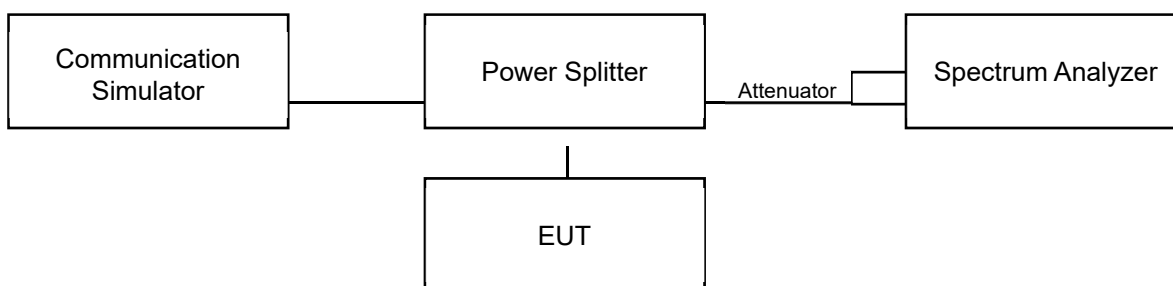


6.2.2 Test Procedure

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

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.

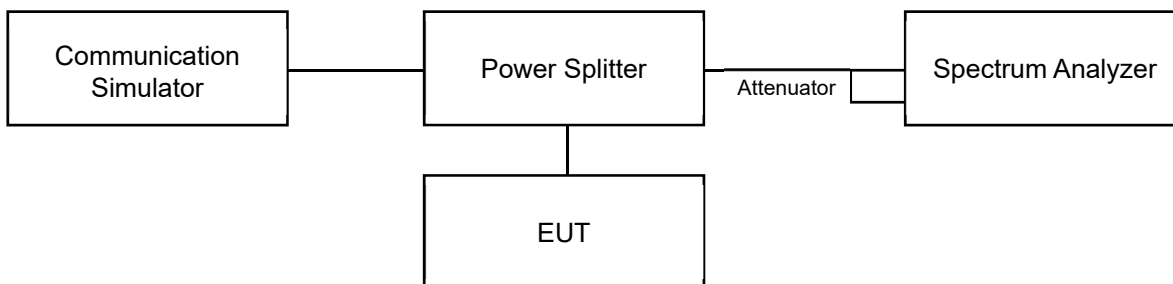
- a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- b. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times$ 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 $\geq 3 \times$ 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



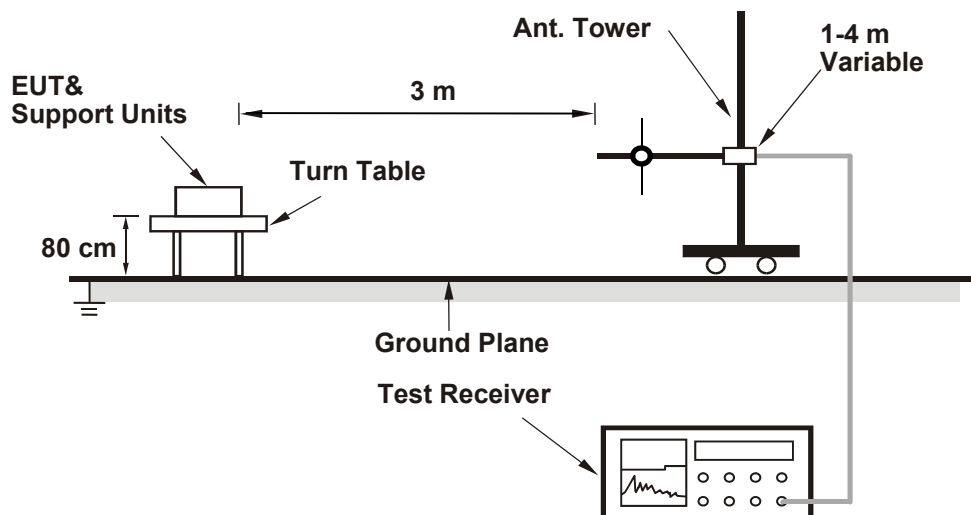
6.4.2 Test Procedure

- Measurement refer to ANSI C63.26 section 5.7.
- All measurements were done at 3 channels: low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. 20 dB attenuation pad is connected with spectrum.
- The fundamental frequency above 1 GHz, the spectrum set RBW = 1 MHz, VBW = 3 MHz, Detector = Average.
- The fundamental frequency below 1 GHz, the spectrum set RBW $\geq$ 100 kHz, VBW $\geq$ 3 x RBW, Detector = Average.
- 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.

- 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.
- 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.
- 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.
- Following C63.26 section 5.5 and 5.2.7
- $EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
- $ERP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

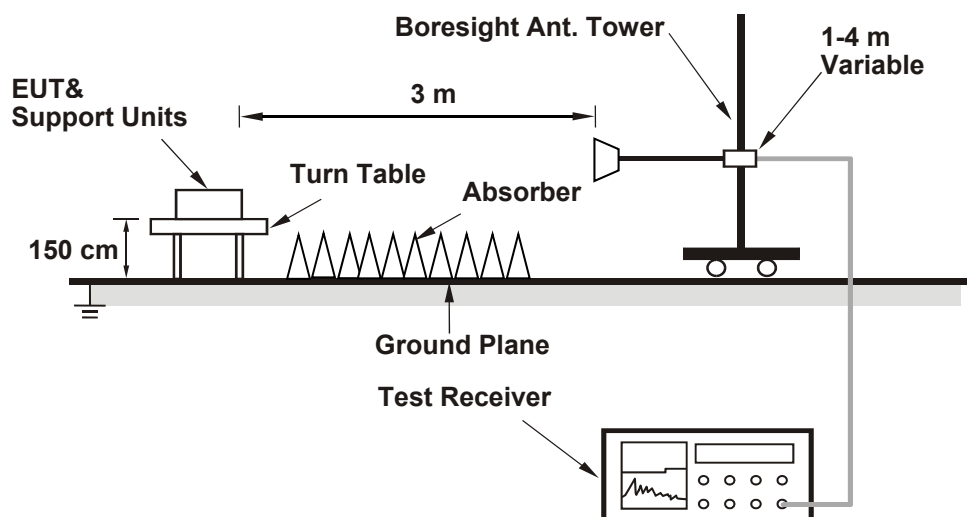
Note:

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

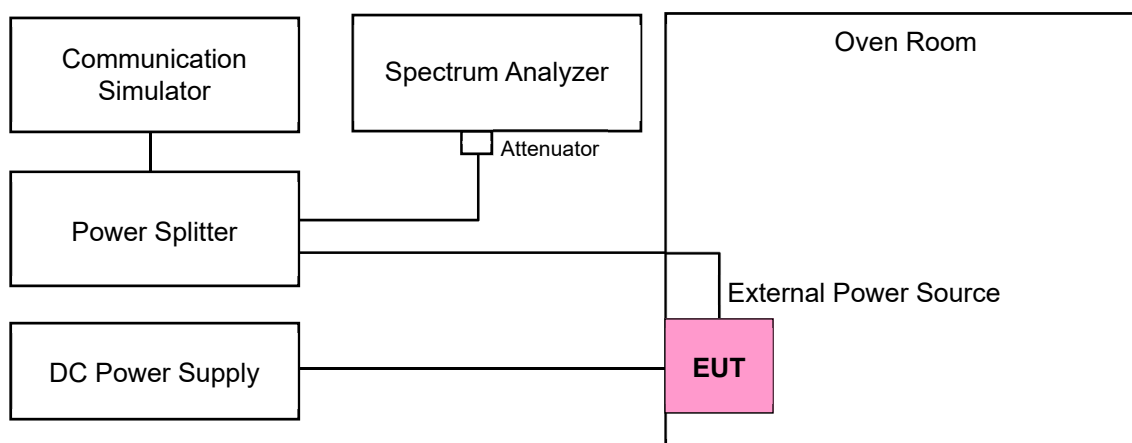
- In the semi-anechoic chamber, EUT placed on the 1.5 m height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- 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.
- 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.
- Following C63.26 section 5.5 and 5.2.7
- $EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
- $ERP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

Note:

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

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.

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

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

7 Test Results of Test Item

7.1 Equivalent Isotropically Radiated Power

Input Power:	7.2 Vdc	Environmental Conditions:	22°C, 68% RH	Tested By:	Noah Chang
--------------	---------	---------------------------	--------------	------------	------------

7.1.1 LTE Band 48 (CA 48C)

Conducted Output Power (dBm) (dBm/channel bandwidth)

Configure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Channel	UL Frequency (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Channel	UL Frequency (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_48C	48	20	QPSK	1	0	55340	3560	48	20	QPSK	1	99	55538	3579.8	12.89
					1	99						1	0			21.26
		48	20	QPSK	1	0	55891	3615.1	48	20	QPSK	1	99	56089	3634.9	13.05
					1	99						1	0			21.54
		48	20	QPSK	1	0	56442	3670.2	48	20	QPSK	1	99	56640	3690	12.87
					1	99						1	0			21.18
	CA_48C	48	20	16QAM	1	0	55340	3560	48	20	16QAM	1	99	55538	3579.8	12.83
					1	99						1	0			20.35
		48	20	16QAM	1	0	55891	3615.1	48	20	16QAM	1	99	56089	3634.9	13.02
					1	99						1	0			20.61
		48	20	16QAM	1	0	56442	3670.2	48	20	16QAM	1	99	56640	3690	12.83
					1	99						1	0			20.24
	CA_48C	48	20	64QAM	1	0	55340	3560	48	20	64QAM	1	99	55538	3579.8	12.80
					1	99						1	0			18.99
		48	20	64QAM	1	0	55891	3615.1	48	20	64QAM	1	99	56089	3634.9	12.96
					1	99						1	0			19.13
		48	20	64QAM	1	0	56442	3670.2	48	20	64QAM	1	99	56640	3690	12.78
					1	99						1	0			18.85
	CA_48C	48	20	256QAM	1	0	55340	3560	48	20	256QAM	1	99	55538	3579.8	12.74
					1	99						1	0			16.59
		48	20	256QAM	1	0	55891	3615.1	48	20	256QAM	1	99	56089	3634.9	12.92
					1	99						1	0			16.71
		48	20	256QAM	1	0	56442	3670.2	48	20	256QAM	1	99	56640	3690	12.73
					1	99						1	0			16.41

Output Power					
Modulation	Minimum Cond. Power (dBm)	Maximum Cond. Power (dBm)	Minimum EIRP (dBm)	Maximum EIRP (dBm)	EIRP Limit (dBm)
QPSK	12.87	21.54	15.07	22.11	23.00
16QAM	12.83	20.61	15.03	21.18	23.00
64QAM	12.78	19.13	14.98	19.70	23.00
256QAM	12.73	16.71	14.93	17.28	23.00

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

Conducted Output Power (dBm) (dBm/10MHz)

Configure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Channel	UL Frequency (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Channel	UL Frequency (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_48C	48	20	QPSK	1	0	55340	3560	48	20	QPSK	1	99	55538	3579.8	12.82
					1	99						1	0			21.18
		48	20	QPSK	1	0	55891	3615.1	48	20	QPSK	1	99	56089	3634.9	12.97
					1	99						1	0			21.46
		48	20	QPSK	1	0	56442	3670.2	48	20	QPSK	1	99	56640	3690	12.79
					1	99						1	0			21.11
	CA_48C	48	20	16QAM	1	0	55340	3560	48	20	16QAM	1	99	55538	3579.8	12.76
					1	99						1	0			20.27
		48	20	16QAM	1	0	55891	3615.1	48	20	16QAM	1	99	56089	3634.9	12.94
					1	99						1	0			20.54
		48	20	16QAM	1	0	56442	3670.2	48	20	16QAM	1	99	56640	3690	12.75
					1	99						1	0			20.16
	CA_48C	48	20	64QAM	1	0	55340	3560	48	20	64QAM	1	99	55538	3579.8	12.72
					1	99						1	0			18.91
		48	20	64QAM	1	0	55891	3615.1	48	20	64QAM	1	99	56089	3634.9	12.89
					1	99						1	0			19.05
		48	20	64QAM	1	0	56442	3670.2	48	20	64QAM	1	99	56640	3690	12.71
					1	99						1	0			18.78
	CA_48C	48	20	256QAM	1	0	55340	3560	48	20	256QAM	1	99	55538	3579.8	12.67
					1	99						1	0			16.52
		48	20	256QAM	1	0	55891	3615.1	48	20	256QAM	1	99	56089	3634.9	12.85
					1	99						1	0			16.63
		48	20	256QAM	1	0	56442	3670.2	48	20	256QAM	1	99	56640	3690	12.65
					1	99						1	0			16.33

Output Power					
Modulation	Minimum Cond. Power (dBm)	Maximum Cond. Power (dBm)	Minimum EIRP (dBm)	Maximum EIRP (dBm)	EIRP Limit (dBm)
QPSK	12.79	21.46	14.99	22.03	23.00
16QAM	12.75	20.54	14.95	21.11	23.00
64QAM	12.71	19.05	14.91	19.62	23.00
256QAM	12.65	16.63	14.85	17.20	23.00

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

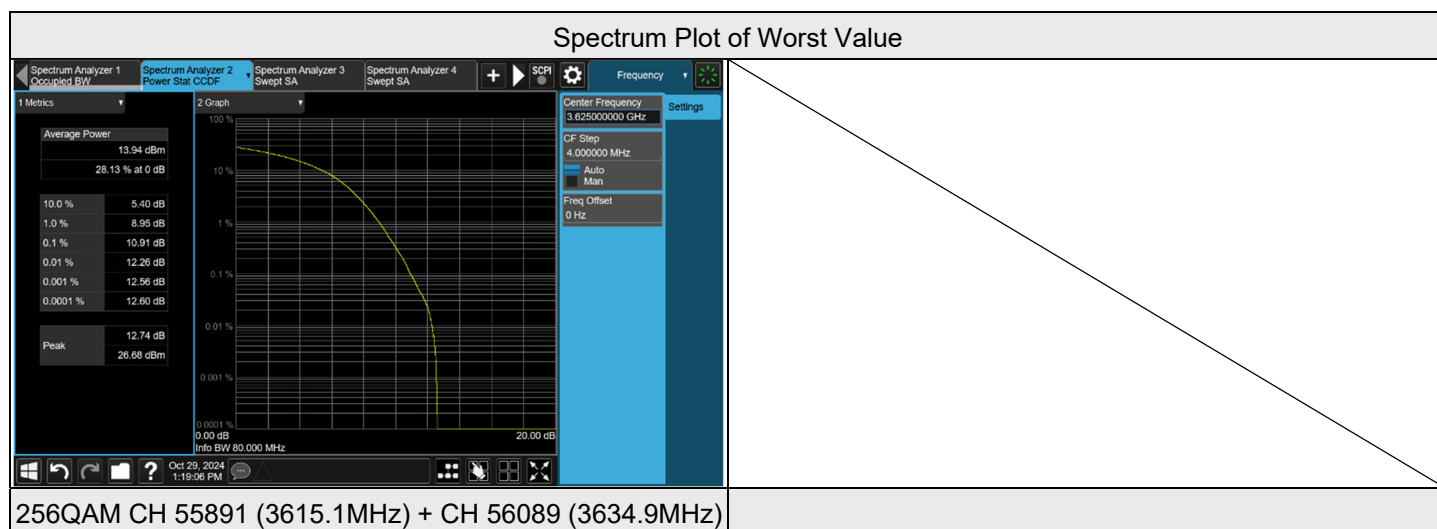
7.2 Peak to Average Ratio

Input Power:	7.2 Vdc	Environmental Conditions:	25°C, 66% 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	3579.8	7.50	7.81	9.76	8.77	13.00
55891 + 56089	3615.1	3634.9	8.14	9.24	10.22	10.91	
56442 + 56640	3670.2	3690	7.82	9.46	9.63	9.59	



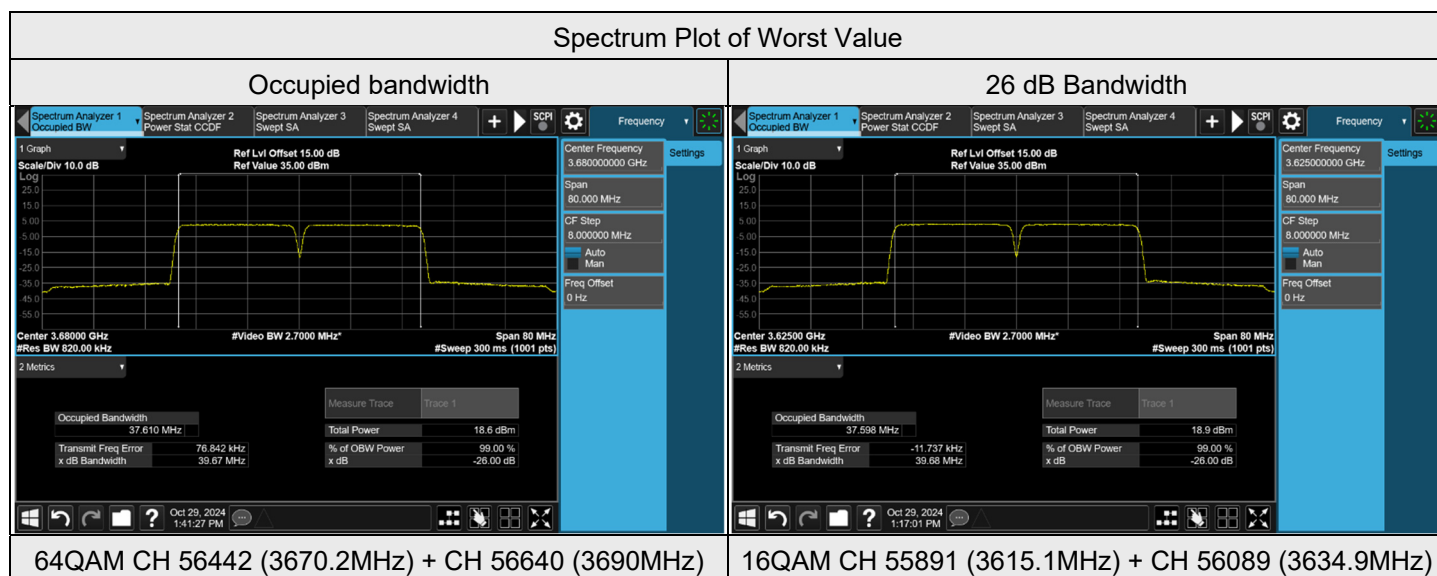
7.3 Bandwidth

Input Power:	7.2 Vdc	Environmental Conditions:	25°C, 66% RH	Tested By:	Noah Chang
--------------	---------	---------------------------	--------------	------------	------------

7.3.1 LTE 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	3579.8	37.60	37.58	37.58	37.59	39.68	39.65	39.64	39.64
55891 + 56089	3615.1	3634.9	37.59	37.60	37.59	37.57	39.68	39.68	39.66	39.65
56442 + 56640	3670.2	3690	37.59	37.60	37.61	37.58	39.67	39.66	39.67	39.65

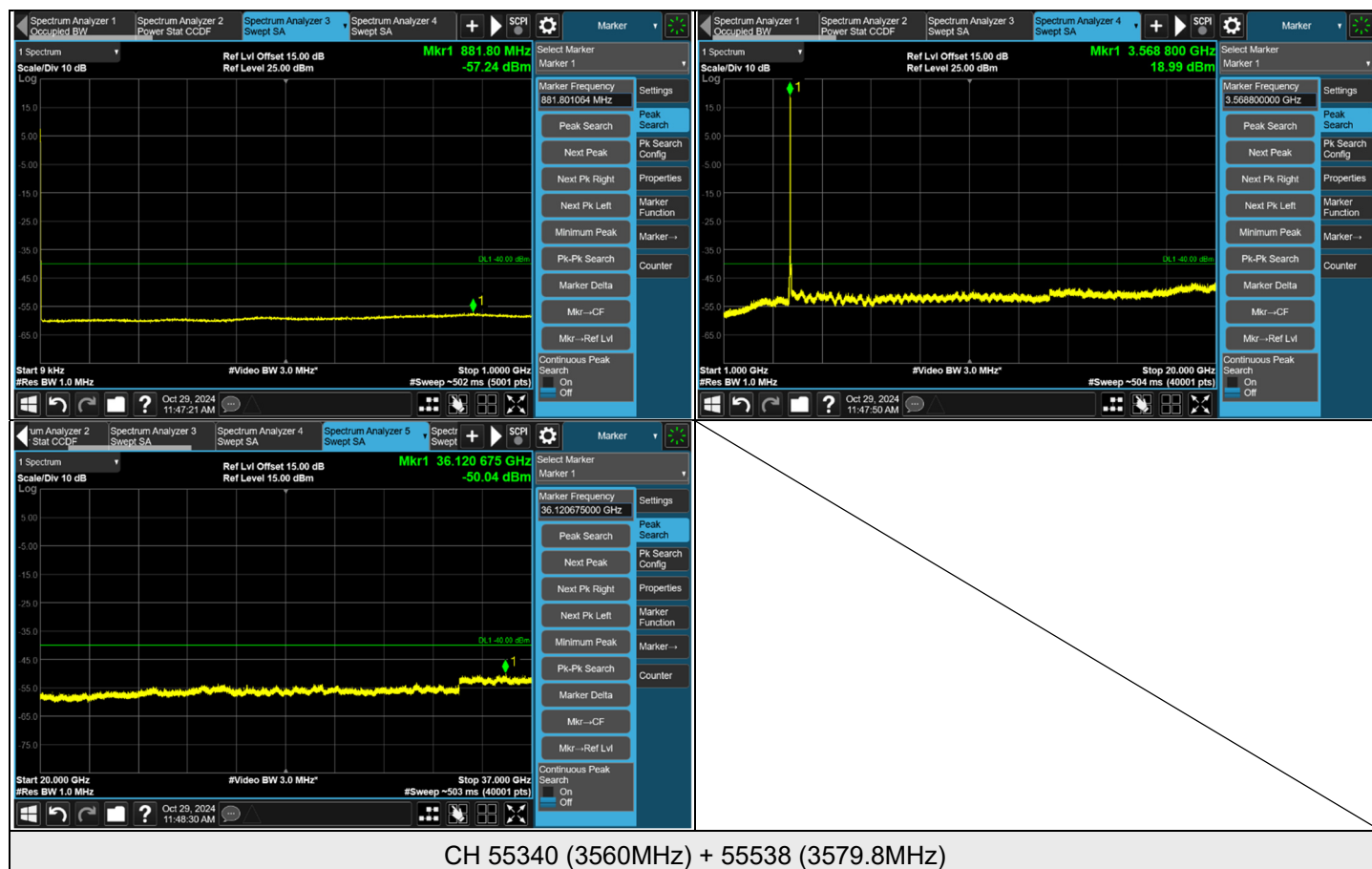


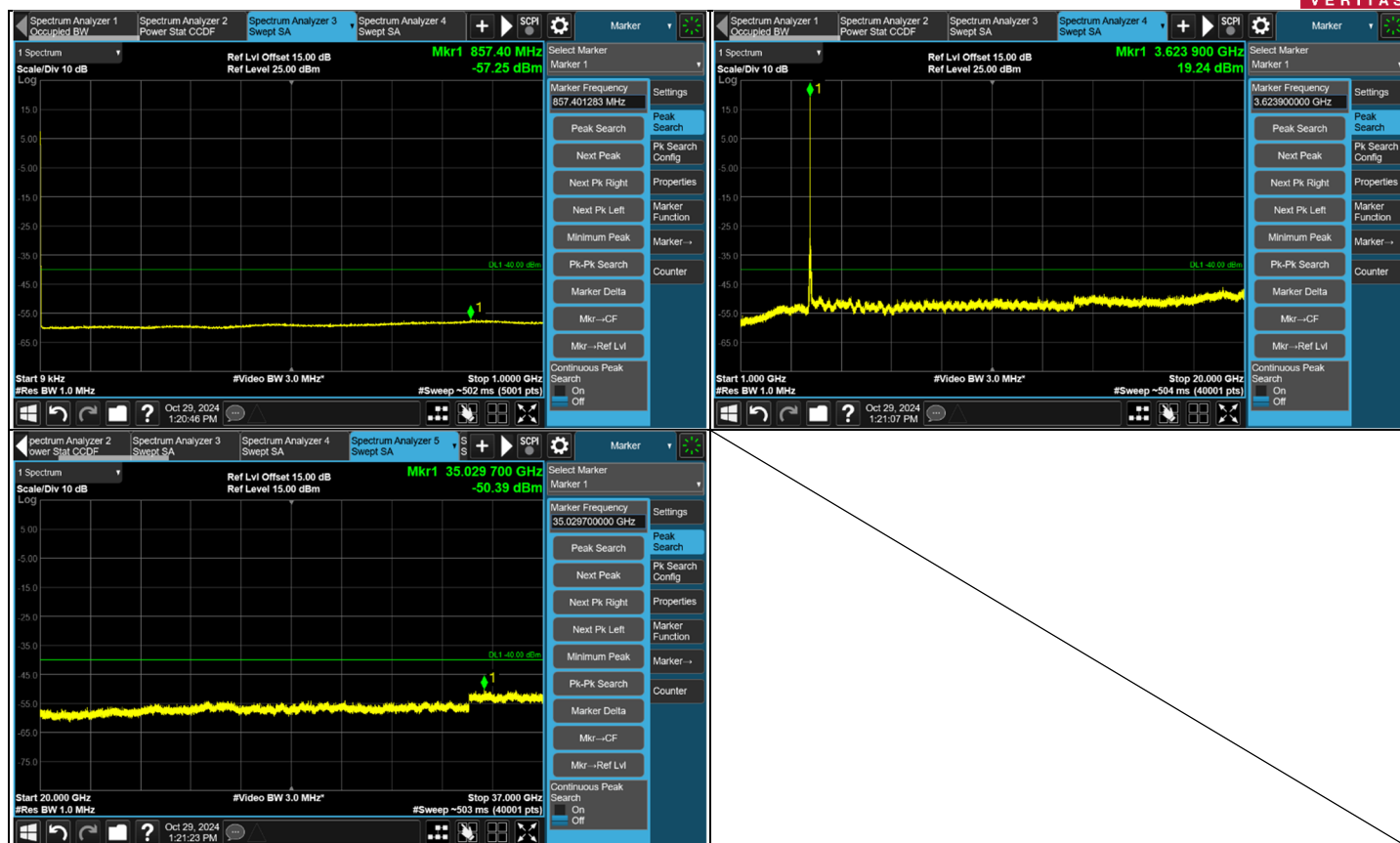
7.4 Conducted Spurious Emissions

Input Power:	7.2 Vdc	Environmental Conditions:	25°C, 66% RH	Tested By:	Noah Chang
--------------	---------	---------------------------	--------------	------------	------------

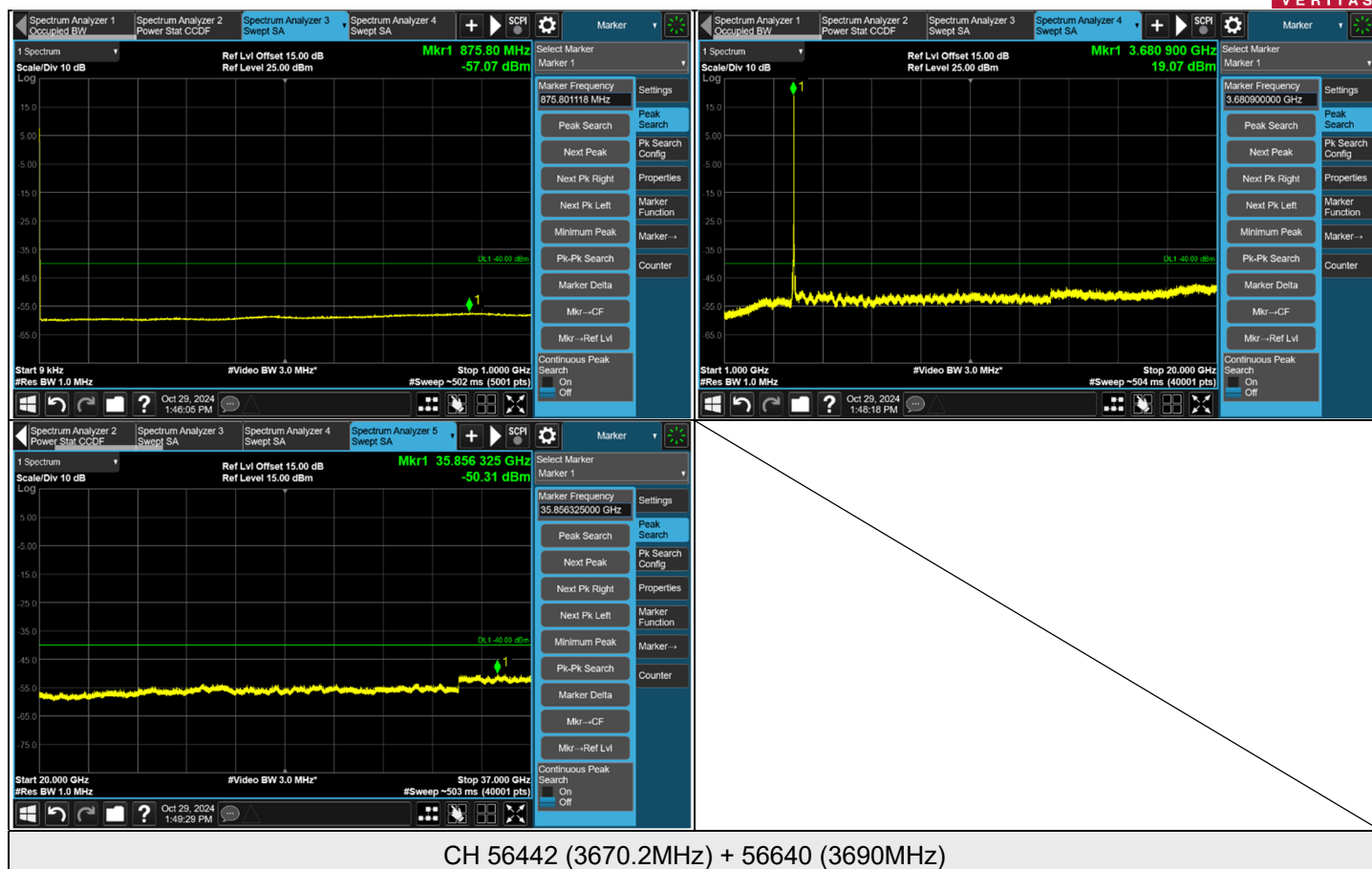
7.4.1 TE Band 48 (CA 48C)

Channel Bandwidth: 20 MHz+20 MHz





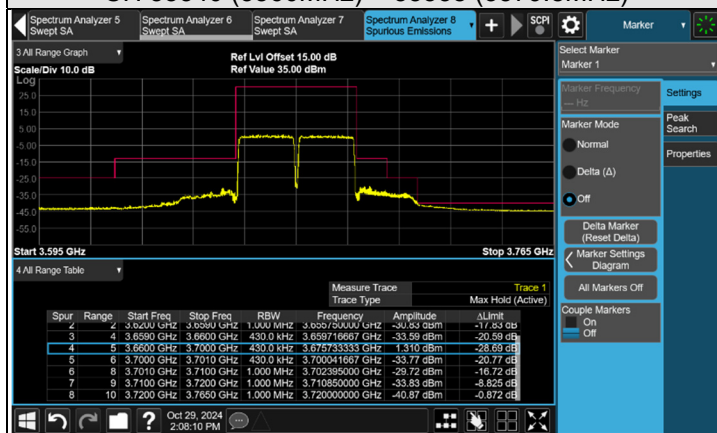
CH 55891 (3615.1MHz) + 56089 (3634.9MHz)





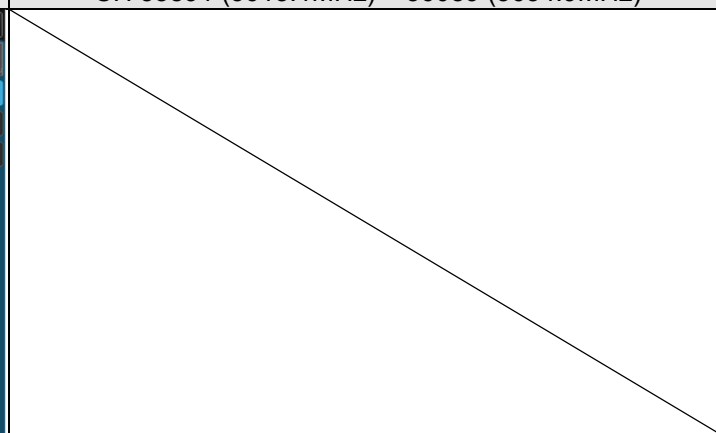
FULL

CH 55340 (3560MHz) + 55538 (3579.8MHz)



FULL

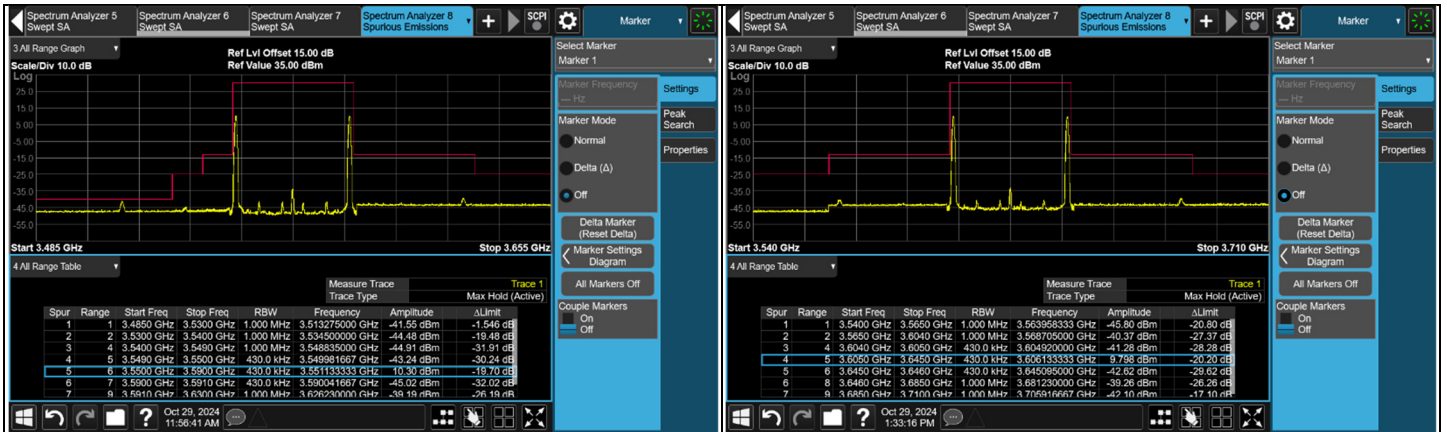
CH 55891 (3615.1MHz) + 56089 (3634.9MHz)



FULL

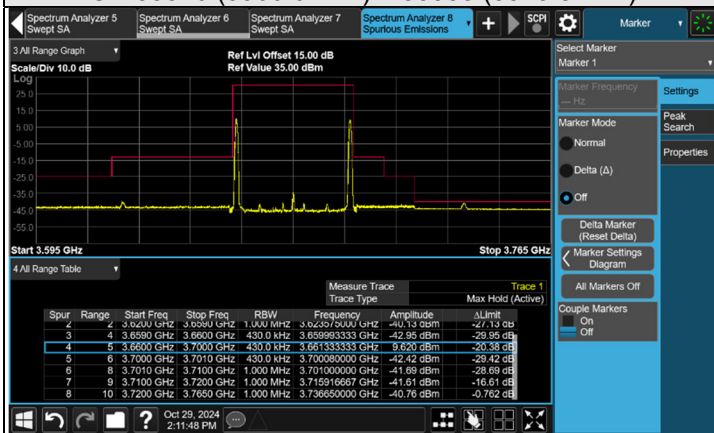
CH 56442 (3670.2MHz) + 56640 (3690MHz)



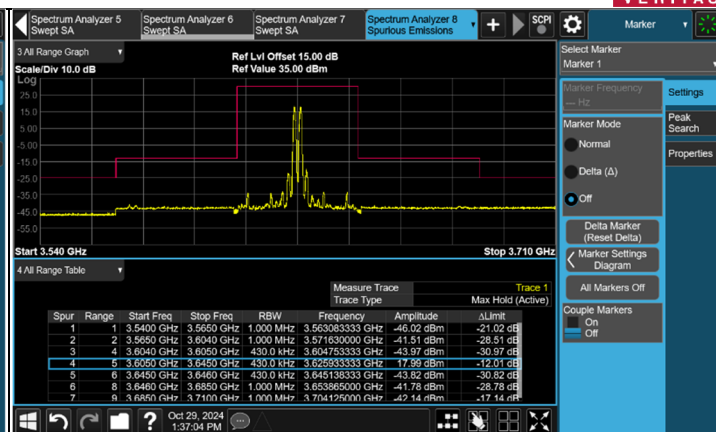
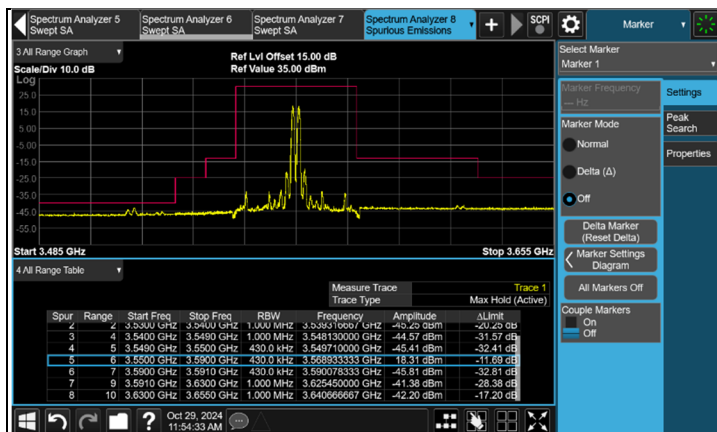


1RB / 0 RB Offset + 1 RB / 99 RB Offset
CH 55340 (3560.0MHz) + 55538 (3579.8MHz)

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

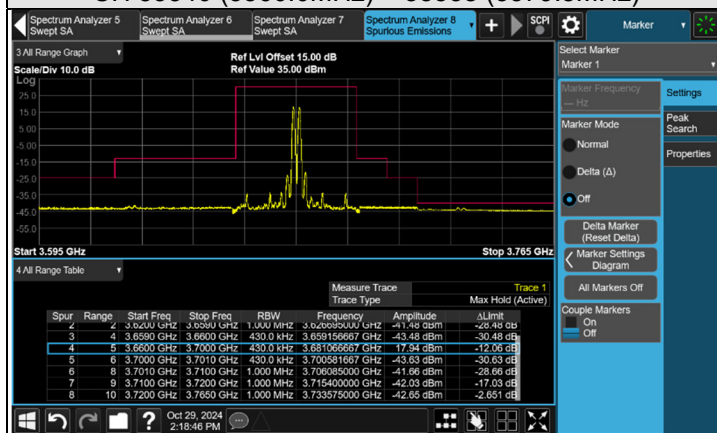


1RB / 0 RB Offset + 1 RB / 99 RB Offset
CH 56642 (3670.2MHz) + 56640 (3690.0MHz)

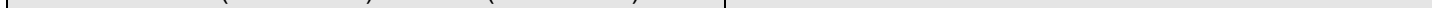


1RB / 99 RB Offset + 1 RB / 0 RB Offset
CH 55340 (3560.0MHz) + 55538 (3579.8MHz)

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



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



7.5 Radiated Spurious Emissions below 1GHz

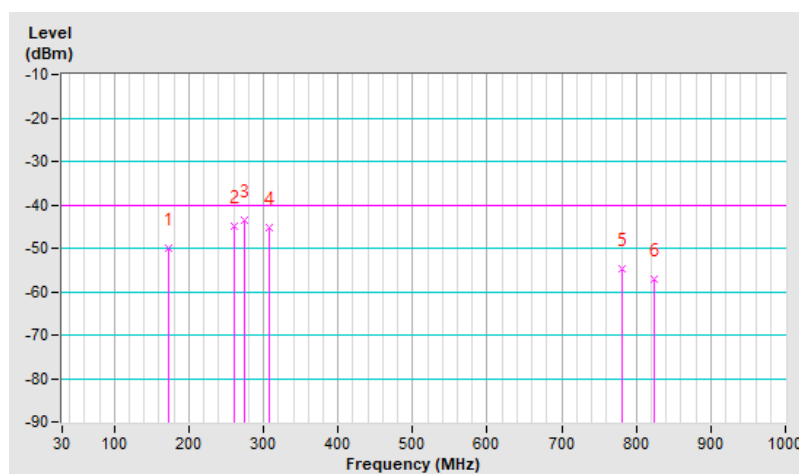
7.5.1 LTE Band 48 (CA 48C)

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	25°C, 66% RH
Tested By	Charles Hsiao		

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	173.56	-50.10	-40.00	-10.10	1.73 H	331	58.70	-108.80
2	260.86	-44.93	-40.00	-4.93	1.57 H	187	64.17	-109.10
3	275.41	-43.61	-40.00	-3.61	1.25 H	5	64.74	-108.35
4	308.39	-45.29	-40.00	-5.29	1.97 H	190	62.16	-107.45
5	781.75	-54.84	-40.00	-14.84	1.15 H	153	42.47	-97.31
6	823.46	-57.05	-40.00	-17.05	1.05 H	2	40.19	-97.24

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
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 frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

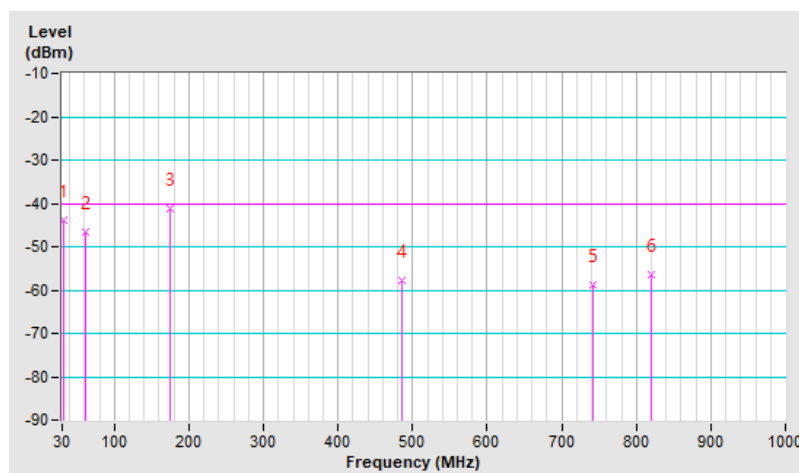


RF Mode	Channel Bandwidth: 20MHz+20MHz	Channel	CH 55891 (3615.1MHz) + CH 56089 (3634.9MHz)
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 66% RH
Tested By	Charles Hsiao		

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	32.91	-43.76	-40.00	-3.76	1.65 V	156	65.82	-109.58
2	62.01	-46.61	-40.00	-6.61	1.24 V	151	62.84	-109.45
3	174.53	-41.31	-40.00	-1.31	1.05 V	211	67.57	-108.88
4	484.93	-57.70	-40.00	-17.70	1.15 V	24	45.33	-103.03
5	741.98	-58.65	-40.00	-18.65	1.18 V	8	39.32	-97.97
6	819.58	-56.47	-40.00	-16.47	1.14 V	157	40.81	-97.28

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
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 frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this 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 MHz + CH 55538 : 3579.8 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 65% RH
Tested By	Charles Hsiao		

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	-45.84	-40.00	-5.84	1.53 H	359	37.15	-82.99
2	7159.60	-46.12	-40.00	-6.12	1.53 H	359	36.99	-83.11
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	-49.63	-40.00	-9.63	1.85 V	340	33.36	-82.99
2	7159.60	-50.12	-40.00	-10.12	1.85 V	340	32.99	-83.11

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
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 : 3615.1 MHz + CH 56089 : 3634.9 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 65% RH
Tested By	Charles Hsiao		

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	-43.29	-40.00	-3.29	1.53 H	0	39.65	-82.94
2	7269.80	-43.60	-40.00	-3.60	1.53 H	0	39.32	-82.92
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	-50.37	-40.00	-10.37	1.85 V	340	32.57	-82.94
2	7269.80	-49.48	-40.00	-9.48	1.85 V	340	33.44	-82.92

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
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 56442 : 3670.2 MHz + CH 56640 : 3690 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 65% RH
Tested By	Charles Hsiao		

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	-41.00	-40.00	-1.00	1.53 H	0	42.19	-83.19
2	7380.00	-41.03	-40.00	-1.03	1.53 H	0	42.33	-83.36
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	-49.55	-40.00	-9.55	1.84 V	344	33.64	-83.19
2	7380.00	-49.85	-40.00	-9.85	1.84 V	344	33.51	-83.36

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
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, 67% RH	Tested By:	Noah 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)
8.28	3560.000002	0.0006	3690.000001	0.0003
7.20	3560.000002	0.0006	3690.000004	0.0011
6.12	3560.000001	0.0003	3690.000004	0.0011

Note: The applicant defined the normal working voltage is from 6.12 to 8.28 Vdc.

Frequency Stability Versus Temperature				
Temperature (°C)	CH 55340 (3560MHz) + 55538 (3579.8MHz)		CH 56442 (3670.2MHz) + 56640 (3690MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3560.000001	0.0003	3690.000003	0.0008
-20	3560.000002	0.0006	3690.000002	0.0005
-10	3560.000003	0.0008	3690.000001	0.0003
0	3560.000003	0.0008	3690.000003	0.0008
10	3560.000002	0.0006	3690.000002	0.0005
20	3559.999997	-0.0008	3689.999999	-0.0003
30	3559.999999	-0.0003	3689.999997	-0.0008
40	3559.999999	-0.0003	3689.999996	-0.0011
50	3559.999997	-0.0008	3689.999998	-0.0005

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 ---