TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 96** **47 CFR FCC Part 2**
Report No.:	RFBCMN-WTW-P23100614-9
FCC ID:	Q3N-RS38
Product:	Mobile Computer
Brand:	CIPHERLAB
Model No.:	RS38
Received Date:	2023/11/12
Test Date:	2024/2/23 ~ 2024/7/19
Issued Date:	2024/8/14
Applicant:	Cipherlab Co., Ltd.
Address:	12F, 333 Dunhua S. Rd., Sec. 2, Taipei, Taiwan 10669
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., Kewi Shan Dist., Taoyuan City 33383, Taiwan
Test Location(2):	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
FCC Registration / Designation Number:	788550 / TW0003 for Test Location(1) 281270 / TW0032 for Test Location(2)

Approved by: Jeremy Lin , **Date:** 2024/8/14

Jeremy Lin / Project Engineer

This test report consists of 41 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

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

4 Test Instruments **11**

4.1 Equivalent Isotropically Radiated Power 11
4.2 Peak to Average Ratio 11
4.3 Bandwidth 11
4.4 Conducted Spurious Emissions 11
4.5 Radiated Spurious Emissions below 1GHz 12
4.6 Radiated Spurious Emissions above 1GHz 13
4.7 Frequency Stability 14

5 Limits of Test Items **15**

5.1 Equivalent Isotropically Radiated Power 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 Equivalent Isotropically Radiated Power 17
6.1.1 Test Setup 17
6.1.2 Test Procedure 17
6.2 Peak to Average Ratio 17
6.2.1 Test Setup 17
6.2.2 Test Procedure 17
6.3 Bandwidth 18
6.3.1 Test Setup 18
6.3.2 Test Procedure 18
6.4 Conducted Spurious Emissions 20
6.4.1 Test Setup 20
6.4.2 Test Procedure 20
6.5 Radiated Spurious Emissions below 1GHz 21
6.5.1 Test Setup 21
6.5.2 Test Procedure 21
6.6 Radiated Spurious Emissions above 1GHz 22
6.6.1 Test Setup 22
6.6.2 Test Procedure 22
6.7 Frequency Stability 23
6.7.1 Test Setup 23
6.7.2 Test Procedure 23

7 Test Results of Test Item **24**

7.1 Equivalent Isotropically Radiated Power 24
7.1.1 LTE Band 48 (CA 48C) 24

7.2 Peak to Average Ratio 26
7.2.1 LTE Band 48 (CA 48C) 26
7.3 Bandwidth 27
7.3.1 LTE Band 48 (CA 48C) 27
7.4 Conducted Spurious Emissions 28
7.4.1 TE Band 48 (CA 48C) 28
7.5 Radiated Spurious Emissions below 1GHz 34
7.5.1 LTE Band 48 (CA 48C) 34
7.6 Radiated Spurious Emissions above 1GHz 36
7.6.1 LTE Band 48 (CA 48C) 36
7.7 Frequency Stability 39
7.7.1 LTE Band 48 (CA 48C) 39
8 Pictures of Test Arrangements 40
9 Information of the Testing Laboratories 41

Release Control Record

Issue No.	Description	Date Issued
RFBCMN-WTW-P23100614-9	Original release.	2024/8/14

1 Certificate

Product:	Mobile Computer
Brand:	CIPHERLAB
Test Model:	RS38
Sample Status:	Engineering sample
Applicant:	Cipherlab Co., Ltd.
Test Date:	2024/2/23 ~ 2024/7/19
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 -5.40 dB at 31.94 MHz
FCC 47 CFR Part 2.1053 FCC 47 CFR Part 96.41(e)	Radiated Spurious Emissions above 1GHz	Pass	Minimum passing margin is -0.36 dB at 7380.00 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.: RFBCMN-WTW-P23100614-12 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	Mobile Computer
Brand	CIPHERLAB
Test Model	RS38
Status of EUT	Engineering sample
Power Supply Rating	3.87 Vdc (from battery) 5 Vdc (from adapter or host equipment)

Note:
1. EUT Overview

Full Maximum EIRP (dBm/channel bandwidth)

Band / Bandwidth	TX Frequency Range (MHz)	Max. EIRP Power			
		QPSK	16QAM	64QAM	256QAM
LTE Band 48 (CA 48C) (20MHz + 20MHz)	3560.0-3690.0	2.032mW (3.08dBm/channel bandwidth)	1.667mW (2.22dBm/channel bandwidth)	1.368mW (1.36dBm/channel bandwidth)	0.690mW (-1.61dBm/channel bandwidth)

Maximum EIRP (dBm/10MHz)

Band / Bandwidth	TX Frequency Range (MHz)	Max. EIRP Power			
		QPSK	16QAM	64QAM	256QAM
LTE Band 48 (CA 48C) (20MHz + 20MHz)	3560.0-3690.0	2.000mW (3.01dBm/10MHz)	1.656mW (2.19dBm/10MHz)	1.361mW (1.34dBm/10MHz)	0.682mW (-1.66dBm/10MHz)

Band / Bandwidth	TX Frequency Range (MHz)	Emission Designator			
		QPSK	16QAM	64QAM	256QAM
LTE Band 48 (CA 48C) (20MHz + 20MHz)	3560.0-3590.0	37M5G7D	37M5D7W	37M5D7W	37M5D7W

2. The EUT uses following accessories.

Item	Brand	Model	Specification
Adapter	Channel WELL Technology	2AEA010BC3D	AC Input: 100-240 Vac, 50/60 Hz, 0.35 A DC Output: 5.0 Vdc, 2.0 A, 10.0 W
Reader 1	Zebra	SE4770	-
Reader 2	Zebra	SE4100	-
Reader 3	Zebra	SE5500	-
1st Battery	CIPHERLAB	BA-0174A5	3.87 Vdc, 4500 mAh, 17.42 Wh
2nd Battery	Chongqing VDL Electronics Co., Ltd	341322PM4	3.85 Vdc, 90 mAh
USB To Type C Cable	SUNCA CO., LTD	1Q11512211-XJ	0.9 m

* After pretesting, Reader 1 and 1st Battery were the worst case and chosen for final test.

3. For CA mode configuration, please consult the manufacturer to declare the test mode.

4. The EUT support the following CA Configuration.

Band Configuration
2C
7C
41C
48C
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 Type	LDS					
Antenna Connector	spring					
Item	Band	Freq. Range (MHz)	Gain (dBi)			
			Ant. 0	Ant. 5	Ant. 6	Ant. 7
LTE	LTE Band 48	3550 ~ 3700		-1		-2.5

* 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:	EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition.
Worst Case:	X-axis/ Y-axis/ Z-axis Worst Condition: Z-axis

For LTE Band 48 (CA 48C)

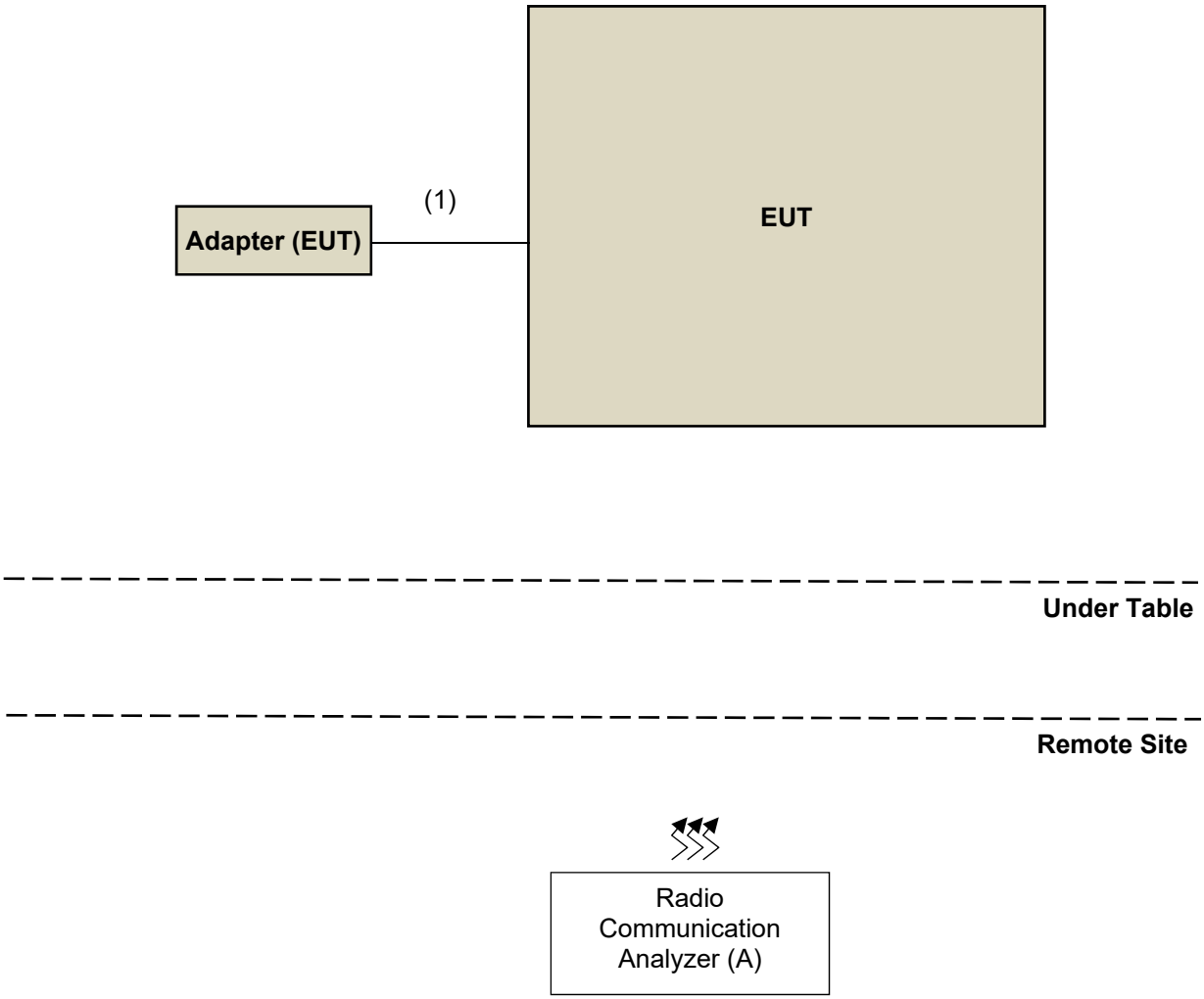
Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
EIRP	55340 (3560MHz) + 55538 (3579.8MHz) 55891 (3615.1MHz) + 56089 (3634.9MHz) 56442 (3670.2MHz) + 56640 (3690MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB Half RB Full RB
Frequency Stability	55340 (3560MHz) + 55538 (3579.8MHz) 56442 (3670.2MHz) + 56640 (3690MHz)	20MHz + 20MHz	QPSK	Full RB
Occupied Bandwidth	55340 (3560MHz) + 55538 (3579.8MHz) 55891 (3615.1MHz) + 56089 (3634.9MHz) 56442 (3670.2MHz) + 56640 (3690MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
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
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	56442 (3670.2MHz) + 56640 (3690MHz)	20MHz + 20MHz	QPSK	1 RB
RE Above 1GHz	55340 (3560MHz) + 55538 (3579.8MHz) 55891 (3615.1MHz) + 56089 (3634.9MHz) 56442 (3670.2MHz) + 56640 (3690MHz)	20MHz + 20MHz	QPSK	1 RB

Note: Max. power and max gian were chosne 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	Radio Communication Analyzer	Anritsu	MT8821C	6201462755	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	USB To Type C Cable	1	0.9	Y	0	Accessory of EUT

4 Test Instruments

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

4.1 Equivalent Isotropically Radiated Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
N9030B - PXA Signal Analyzer KEYSIGHT	N9030B	MY57140488	2024/3/6	2025/3/5
Radio Communication Analyzer Anritsu	MT8821C	6201462755	2024/3/13	2025/3/12
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2024/7/19

4.2 Peak to Average Ratio

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
N9030B - PXA Signal Analyzer KEYSIGHT	N9030B	MY57140938	2024/3/20	2025/3/19
Radio Communication Analyzer Anritsu	MT8821C	6201462755	2024/3/13	2025/3/12
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2024/3/29

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
Loop Antenna TESEQ	HLA 6121	45745	2023/8/8	2024/8/7
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
Radio Communication Analyzer Anritsu	MT8821C	6201462755	2023/3/3	2024/3/2

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2024/2/26

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
MXA Signal Analyzer Keysight	N9020B	MY60110513	2023/12/22	2024/12/21
Preamplifier EMCI	EMC118A45SE	980808	2023/12/28	2024/12/27
RF Coaxial Cable EMCI	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
Radio Communication Analyzer Anritsu	MT8821C	6201462755	2023/3/3	2024/3/2

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2024/2/23

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	87-III	70360742	2023/7/6	2024/7/5
Signal and spectrum analyzer R&S	FSV3044	101105	2024/2/27	2025/2/26
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	2023/12/19	2024/12/18
Radio Communication Analyzer Anritsu	MT8821C	6201462755	2024/3/13	2025/3/12

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2024/4/8

5 Limits of Test Items

5.1 Equivalent Isotropically Radiated Power

For 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

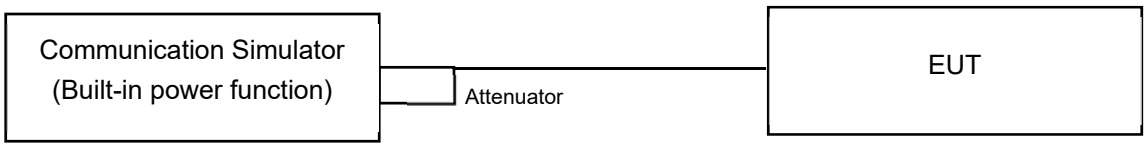
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation (authorized frequency block).

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. The power measurement was performed on emulator and power value was measured from power function on emulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

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

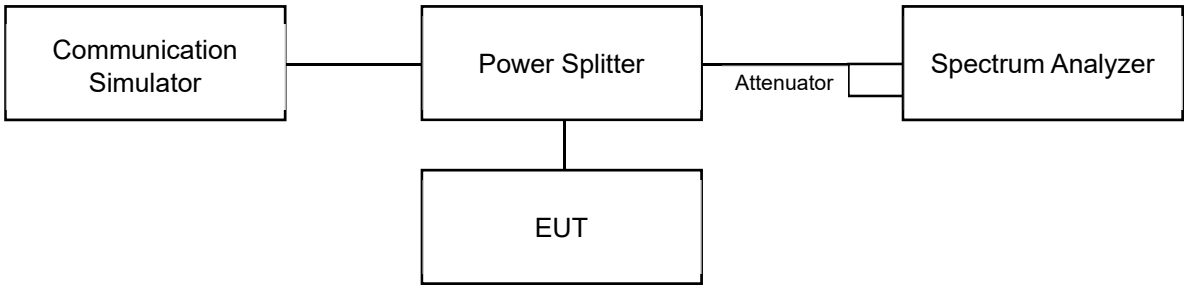
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)

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)

6.2 Peak to Average Ratio

6.2.1 Test Setup

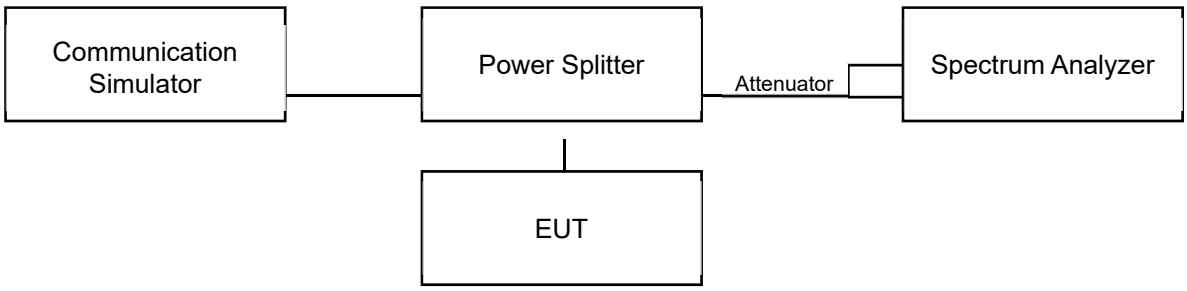


6.2.2 Test Procedure

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.

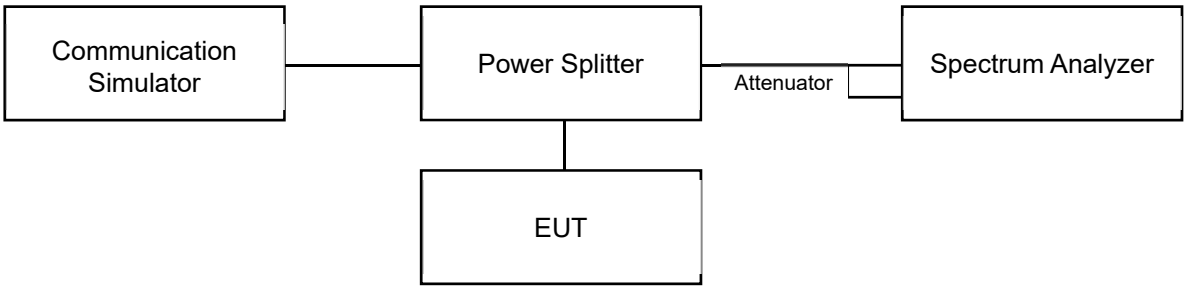
a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and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



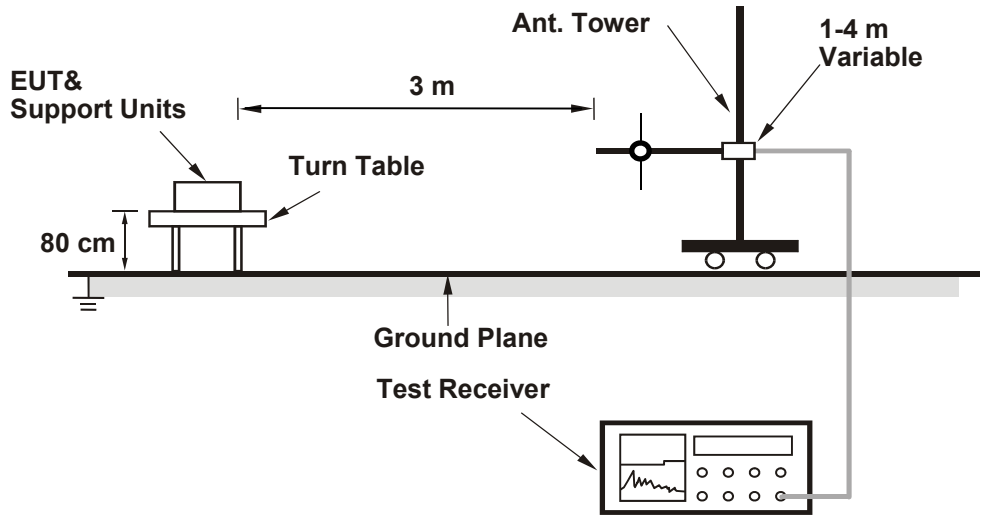
6.4.2 Test Procedure

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.

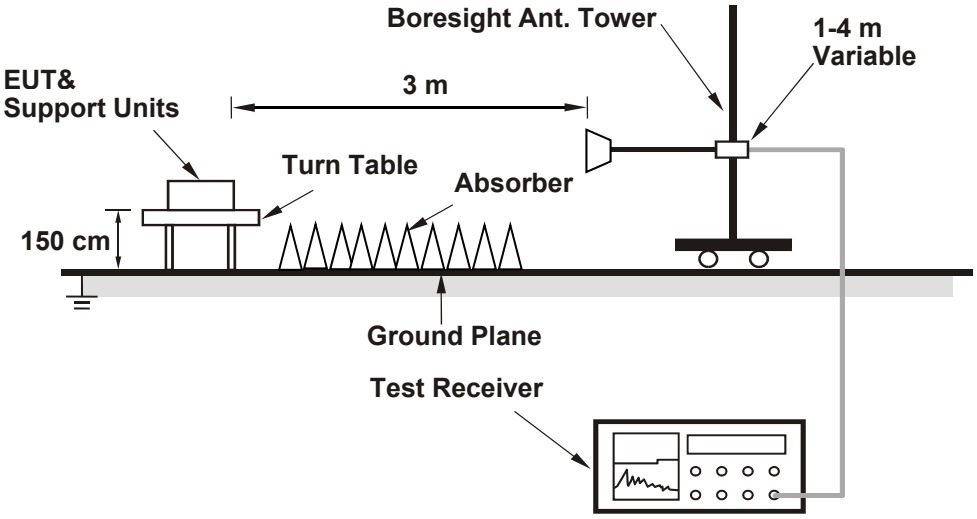
Note:

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

6.6 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.

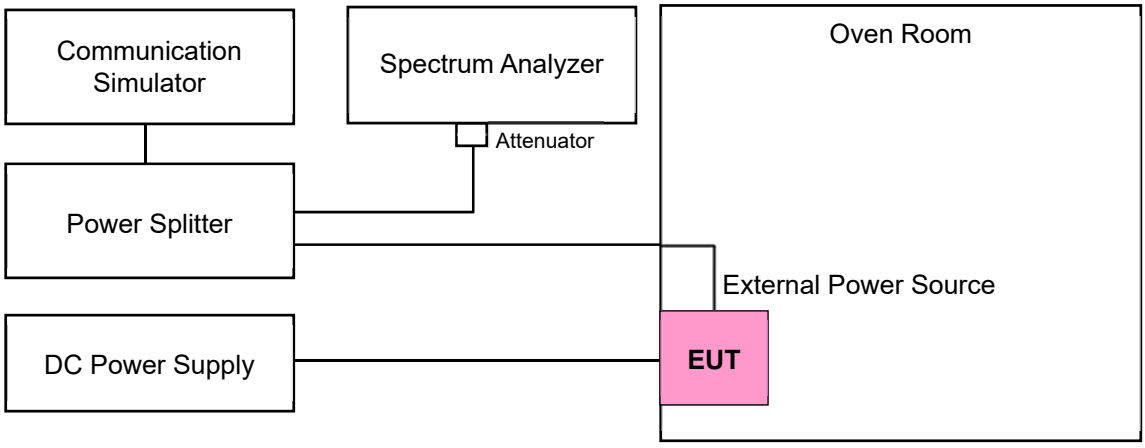
f. ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

Note:

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

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 Equivalent Isotropically Radiated Power

Input Power:	3.87 Vdc	Environmental Conditions:	21°C, 69% RH	Tested By:	Willy Cheng

7.1.1 LTE Band 48 (CA 48C)

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

Confugure	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	3.87
					1	99						1	0			4.08
		48	20	QPSK	1	0	55891	3615.1	48	20	QPSK	1	99	56089	3634.9	3.63
					1	99						1	0			3.74
		48	20	QPSK	1	0	56442	3670.2	48	20	QPSK	1	99	56640	3690	3.38
					1	99						1	0			3.57
	CA_48C	48	20	16QAM	1	0	55340	3560	48	20	16QAM	1	99	55538	3579.8	3.01
					1	99						1	0			3.22
		48	20	16QAM	1	0	55891	3615.1	48	20	16QAM	1	99	56089	3634.9	2.81
					1	99						1	0			2.86
		48	20	16QAM	1	0	56442	3670.2	48	20	16QAM	1	99	56640	3690	2.52
					1	99						1	0			2.73
	CA_48C	48	20	64QAM	1	0	55340	3560	48	20	64QAM	1	99	55538	3579.8	2.14
					1	99						1	0			2.36
		48	20	64QAM	1	0	55891	3615.1	48	20	64QAM	1	99	56089	3634.9	1.98
					1	99						1	0			2.04
		48	20	64QAM	1	0	56442	3670.2	48	20	64QAM	1	99	56640	3690	1.69
					1	99						1	0			1.88
	CA_48C	48	20	256QAM	1	0	55340	3560	48	20	256QAM	1	99	55538	3579.8	-0.84
					1	99						1	0			-0.61
		48	20	256QAM	1	0	55891	3615.1	48	20	256QAM	1	99	56089	3634.9	-0.98
					1	99						1	0			-0.90
		48	20	256QAM	1	0	56442	3670.2	48	20	256QAM	1	99	56640	3690	-1.28
					1	99						1	0			-1.05

EIRP Power (dBm)

Maximum Output Power		
Modulation	Cond. Power (dBm)	Max. EIRP (dBm)
QPSK	4.08	3.08
16QAM	3.22	2.22
64QAM	2.36	1.36
256QAM	-0.61	-1.61

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

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

Confugure	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	3.83
					1	99						1	0			4.01
		48	20	QPSK	1	0	55891	3615.1	48	20	QPSK	1	99	56089	3634.9	3.57
					1	99						1	0			3.70
		48	20	QPSK	1	0	56442	3670.2	48	20	QPSK	1	99	56640	3690	3.37
					1	99						1	0			3.56
	CA_48C	48	20	16QAM	1	0	55340	3560	48	20	16QAM	1	99	55538	3579.8	2.98
					1	99						1	0			3.19
		48	20	16QAM	1	0	55891	3615.1	48	20	16QAM	1	99	56089	3634.9	2.75
					1	99						1	0			2.81
		48	20	16QAM	1	0	56442	3670.2	48	20	16QAM	1	99	56640	3690	2.48
					1	99						1	0			2.68
	CA_48C	48	20	64QAM	1	0	55340	3560	48	20	64QAM	1	99	55538	3579.8	2.08
					1	99						1	0			2.34
		48	20	64QAM	1	0	55891	3615.1	48	20	64QAM	1	99	56089	3634.9	1.94
					1	99						1	0			2.01
		48	20	64QAM	1	0	56442	3670.2	48	20	64QAM	1	99	56640	3690	1.62
					1	99						1	0			1.83
	CA_48C	48	20	256QAM	1	0	55340	3560	48	20	256QAM	1	99	55538	3579.8	-0.89
					1	99						1	0			-0.66
		48	20	256QAM	1	0	55891	3615.1	48	20	256QAM	1	99	56089	3634.9	-1.01
					1	99						1	0			-0.93
		48	20	256QAM	1	0	56442	3670.2	48	20	256QAM	1	99	56640	3690	-1.33
					1	99						1	0			-1.11

EIRP Power (dBm)

Maximum Output Power		
Modulation	Cond. Power (dBm)	Max. EIRP (dBm)
QPSK	4.01	3.01
16QAM	3.19	2.19
64QAM	2.34	1.34
256QAM	-0.66	-1.66

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

7.2 Peak to Average Ratio

Input Power:	3.87 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	7.15	7.44	7.49	7.49	13.00
55891 + 56089	3615.1	3634.9	7.08	7.46	7.36	7.47	
56442 + 56640	3670.2	3690	7.23	7.21	7.39	7.50	

Spectrum Plot of Worst Value	
	
256QAM CH 56442 (3670.2MHz) + 56640 (3690MHz)	

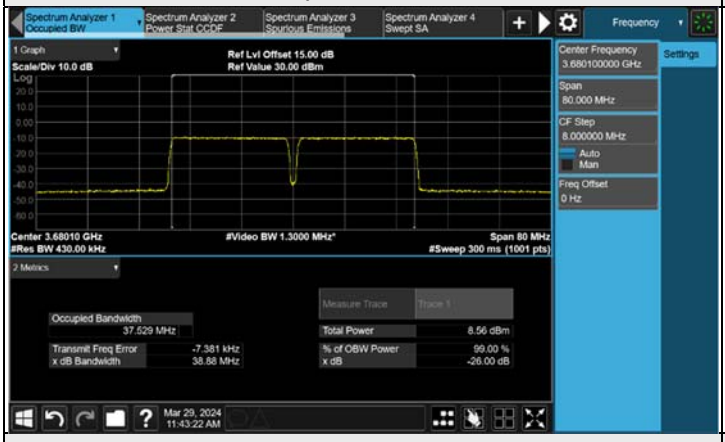
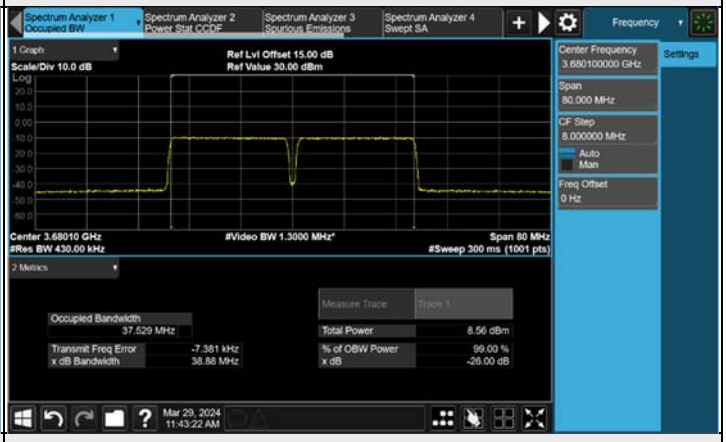
7.3 Bandwidth

Input Power:	3.87 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	37.52	37.52	37.51	37.52	38.86	38.87	38.85	38.87
55891 + 56089	3615.1	3634.9	37.50	37.47	37.49	37.50	38.88	38.86	38.85	38.85
56442 + 56640	3670.2	3690	37.53	37.53	37.51	37.53	38.87	38.87	38.85	38.88

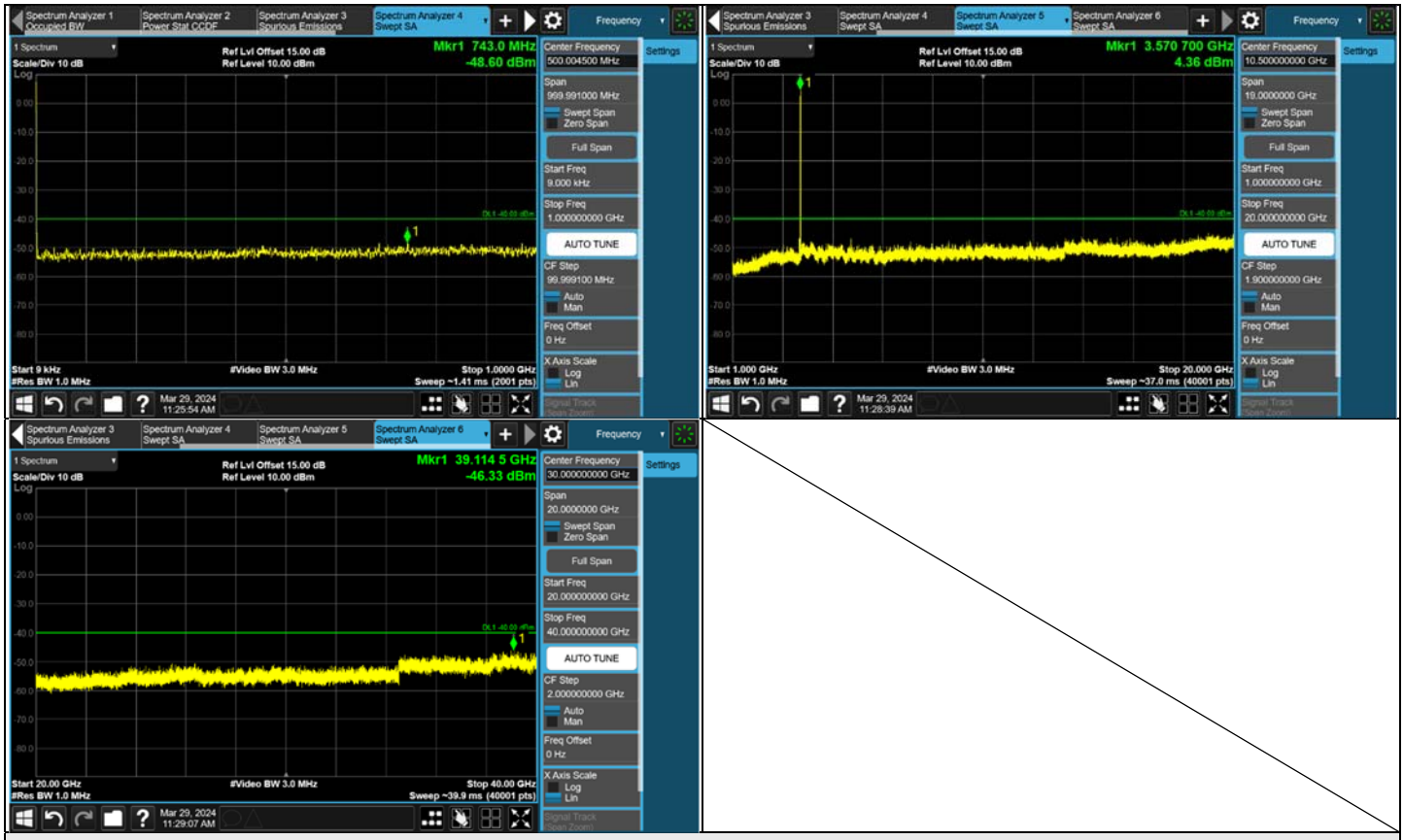
Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
256QAM CH 56442 (3670.2MHz) + 56640 (3690MHz)	256QAM CH 56442 (3670.2MHz) + 56640 (3690MHz)

7.4 Conducted Spurious Emissions

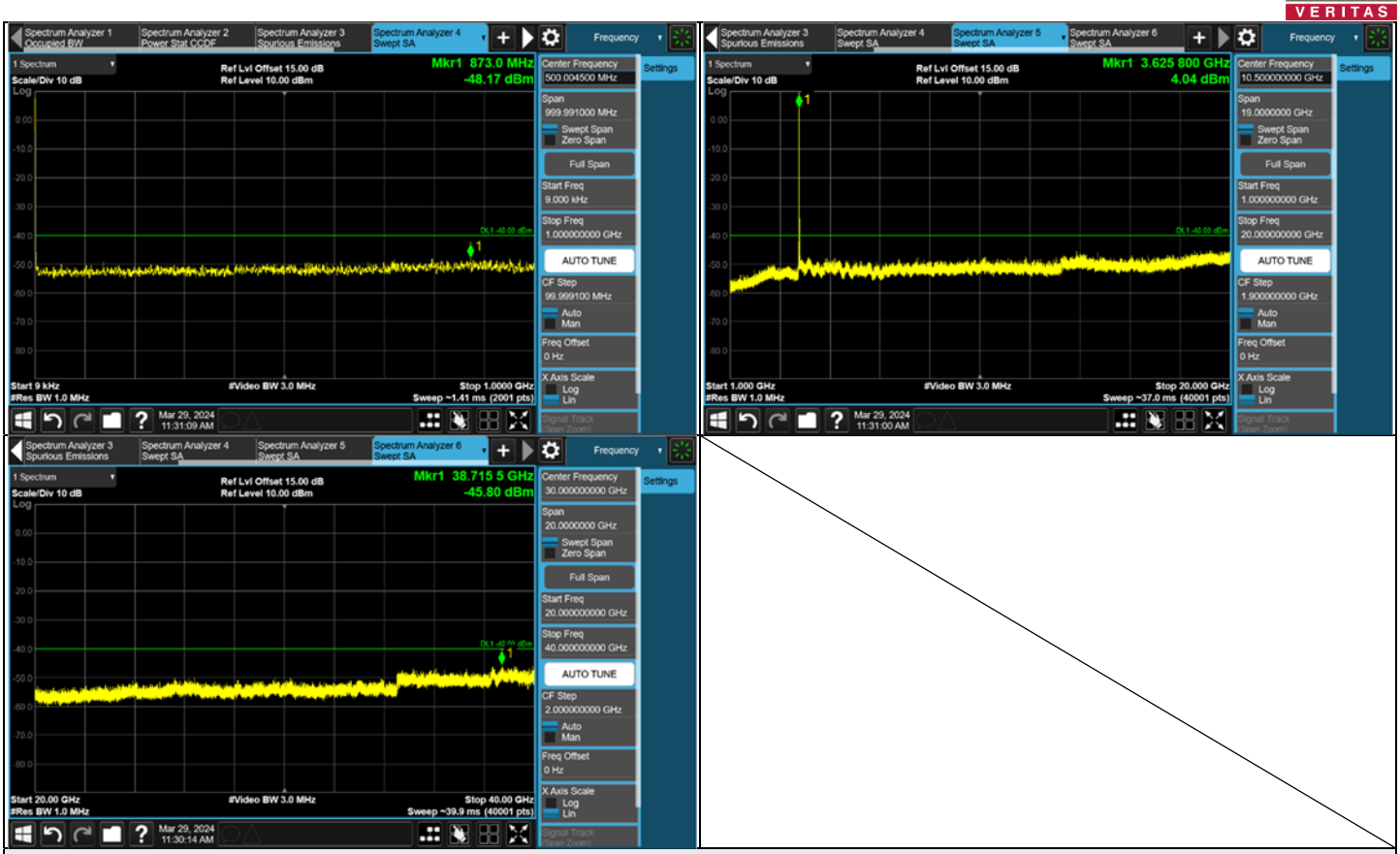
Input Power:	3.87 Vdc	Environmental Conditions:	25°C, 66% RH	Tested By:	Noah Chang

7.4.1 TE Band 48 (CA 48C)

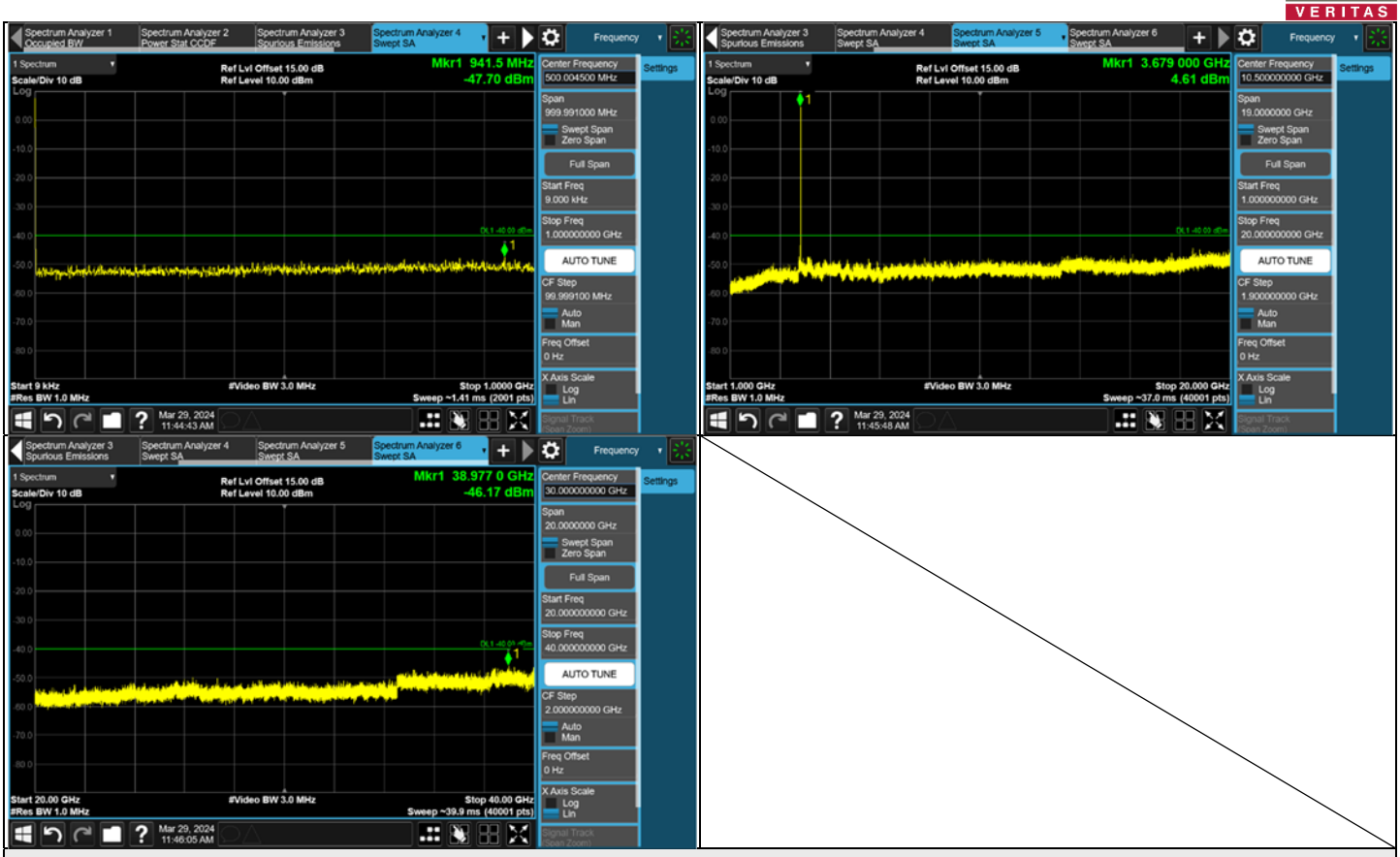
Channel Bandwidth: 20 MHz+20 MHz



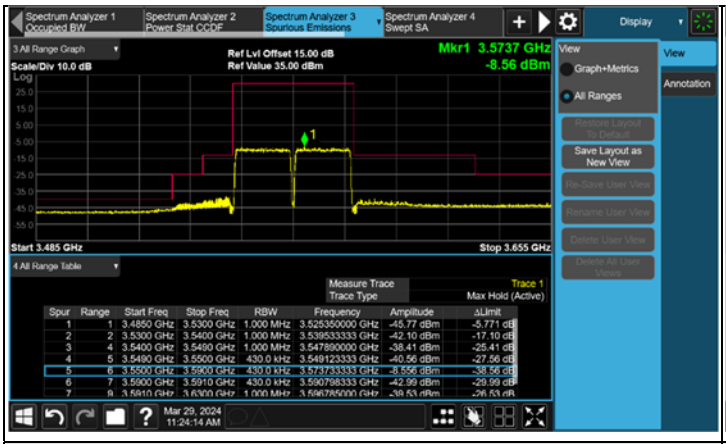
CH 55340 (3560MHz) + 55538 (3579.8MHz)



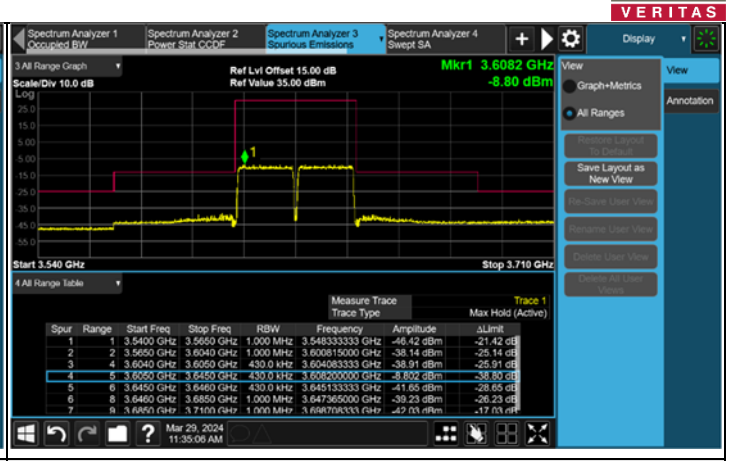
CH 55891 (3615.1MHz) + 56089 (3634.9MHz)



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



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



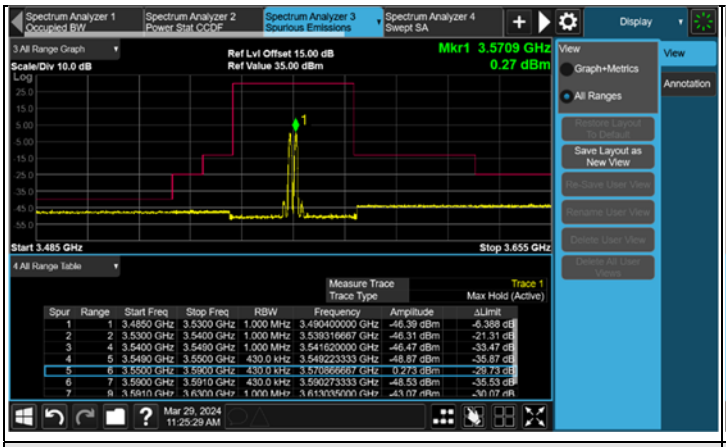
FULL
CH 55891 (3615.1MHz) + 56089 (3634.9MHz)

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

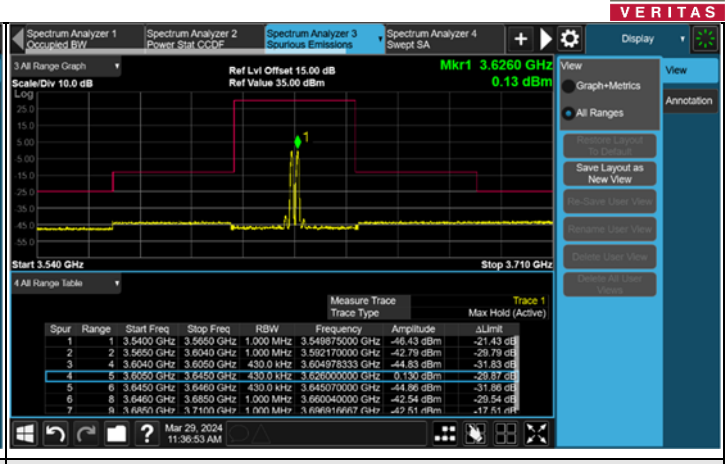
1RB / 0 RB Offset + 1 RB / 99 RB Offset
CH 55340 (3560.0MHz) + 55538 (3579.8MHz)

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

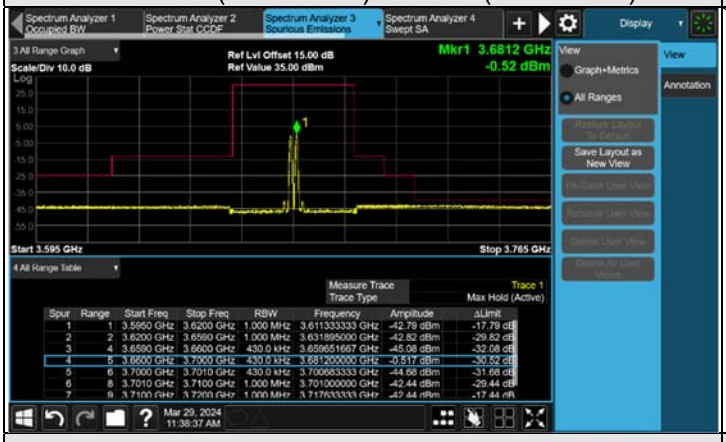
1RB / 0 RB Offset + 1 RB / 99 RB Offset
CH 56642 (3670.2MHz) + 56640 (3690.0MHz)



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

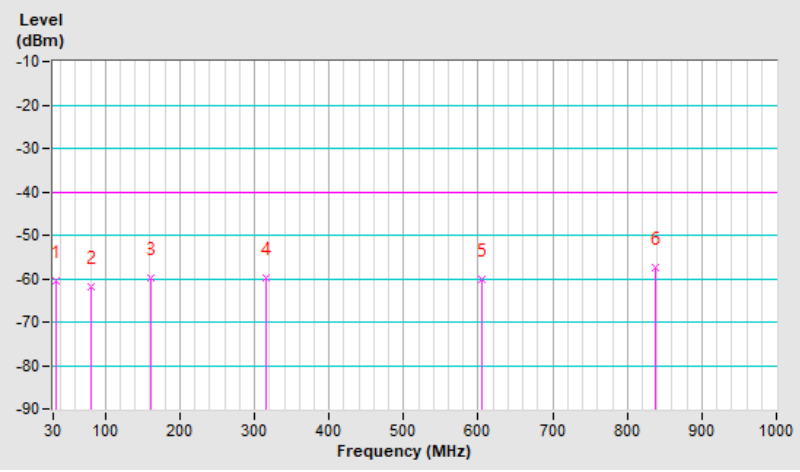
7.5.1 LTE Band 48 (CA 48C)

RF Mode	Channel Bandwidth: 20MHz+20MHz	**Channel**	CH 56442：3670.2 MHz + CH 56640：3690 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	21°C, 69% 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	34.85	-60.34	-40.00	-20.34	1.25 H	89	49.04	-109.38
2	80.44	-61.94	-40.00	-21.94	1.50 H	277	51.34	-113.28
3	160.95	-59.72	-40.00	-19.72	1.00 H	2	48.29	-108.01
4	315.18	-59.77	-40.00	-19.77	1.50 H	260	47.36	-107.13
5	605.21	-60.13	-40.00	-20.13	2.00 H	2	39.98	-100.11
6	838.01	-57.39	-40.00	-17.39	1.50 H	2	39.62	-97.01

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 frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

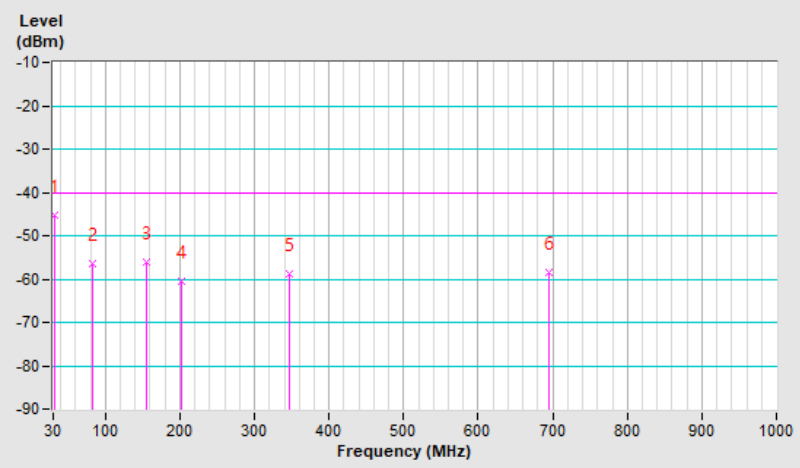


RF Mode	Channel Bandwidth: 20MHz+20MHz	**Channel**	CH 56442：3670.2 MHz + CH 56640：3690 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	21°C, 69% RH
Tested By	Greg Lin		

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	**31.94**	**-45.40**	**-40.00**	**-5.40**	**1.25 V**	**358**	**64.16**	**-109.56**
2	83.35	-56.59	-40.00	-16.59	1.50 V	278	57.15	-113.74
3	156.10	-56.05	-40.00	-16.05	1.00 V	18	51.89	-107.94
4	202.66	-60.61	-40.00	-20.61	1.50 V	301	51.24	-111.85
5	347.19	-58.75	-40.00	-18.75	1.00 V	163	47.85	-106.60
6	694.45	-58.56	-40.00	-18.56	1.25 V	84	40.35	-98.91

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 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**	21°C, 69% 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	7120.00	-40.62	-40.00	-0.62	2.05 H	242	47.06	-87.68
2	7159.60	-40.70	-40.00	-0.70	2.05 H	242	47.04	-87.74
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	-41.75	-40.00	-1.75	1.96 V	230	45.93	-87.68
2	7159.60	-41.60	-40.00	-1.60	1.96 V	230	46.14	-87.74

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 55891：3615.1 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**	21°C, 69% 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	7230.20	-40.53	-40.00	-0.53	2.02 H	243	47.19	-87.72
2	7269.80	-40.49	-40.00	-0.49	2.02 H	243	47.13	-87.62
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	-41.56	-40.00	-1.56	1.89 V	229	46.16	-87.72
2	7269.80	-41.49	-40.00	-1.49	1.89 V	229	46.13	-87.62

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 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**	21°C, 69% 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	7340.40	-40.37	-40.00	-0.37	2.01 H	242	47.17	-87.54
2	**7380.00**	**-40.36**	**-40.00**	**-0.36**	**2.01 H**	**242**	**47.11**	**-87.47**
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	-41.47	-40.00	-1.47	1.94 V	223	46.07	-87.54
2	7380.00	-41.61	-40.00	-1.61	1.94 V	223	45.86	-87.47

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, 66% 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)
4.40	3560.000003	0.001	3690.000003	0.001
3.87	3560.000002	0.000	3690.000004	0.001
3.60	3560.000001	0.000	3690.000004	0.001

Note: The applicant defined the normal working voltage is from 3.60 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	3560.000001	0.000	3690.000003	0.001
-20	3560.000002	0.001	3690.000003	0.001
-10	3560.000004	0.001	3690.000001	0.000
0	3560.000003	0.001	3690.000003	0.001
10	3559.999998	-0.001	3689.999997	-0.001
20	3559.999997	-0.001	3689.999999	0.000
30	3559.999999	0.000	3689.999997	-0.001
40	3559.999998	-0.001	3689.999998	-0.001
50	3559.999997	-0.001	3689.999997	-0.001

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 ---