TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 27** **47 CFR FCC Part 2**
Report No.:	RFBBQZ-WTW-P24030292-10
FCC ID:	PY324100618
Product:	Nighthawk 5G Mobile Router
Brand:	NETGEAR
Model No.:	MR7400
Received Date:	2024/3/18
Test Date:	2024/4/25 ~ 2024/4/26
Issued Date:	2024/7/1
Applicant and Manufacturer:	NETGEAR, INC.
Address:	350 East Plumeria Drive San Jose CA 95134
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kewi Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

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

Jeremy Lin / Project Engineer

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Prepared by : Pettie Chen / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBBQZ-WTW-P24030292-10	Original Release	2024/7/1

1 Certificate

Product:	Nighthawk 5G Mobile Router
Brand:	NETGEAR
Test Model:	MR7400
Sample Status:	Engineering sample
Applicant and Manufacturer:	NETGEAR, INC.
Test Date:	2024/4/25 ~ 2024/4/26
Standard:	47 CFR FCC Part 27 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 971168 D02 Misc Rev Approv License Devices v02r02

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 27 47 CFR FCC Part 2			
Standard / Clause	Test Item	Result	Remark
Part 2.1046 Part 27.50 (d)	Effective Radiated Power and Equivalent Isotropically Radiated Power	Pass	Meet the requirement of limit.
Part 2.1047	Modulation Characteristics	N/A	Refer to Note
Part 27.50 (d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
Part 2.1049	Bandwidth	Pass	Meet the requirement of limit.
Part 2.1051 Part 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
Part 2.1053 Part 27.53 (h)	Radiated Spurious Emissions below 1GHz	Pass	Minimum passing margin is -28.11 dB at 52.57 MHz
Part 2.1053 Part 27.53 (h)	Radiated Spurious Emissions above 1GHz	Pass	Minimum passing margin is -32.75 dB at 3540.00 MHz
Part 2.1055 Part 27.54	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.: RFBBQZ-WTW-P24030292-3 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 GHz ~ 40 GHz	2.29 dB
Peak to Average Ratio	-	0.920 dB
Bandwidth	-	960 Hz
Conducted Spurious Emissions	-	2.12 dB
Radiated Spurious Emissions below 1GHz	9 kHz ~ 30 MHz	3.59 dB
	30 MHz ~ 1 GHz	3.64 dB
Radiated Spurious Emissions above 1GHz	1 GHz ~ 18 GHz	2.29 dB
	18 GHz ~ 40 GHz	2.29 dB
Frequency Stability	-	0.176 ppm

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

2.2 Supplementary Information

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

3 General Information

3.1 General Description of EUT

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

Note:

1. EUT Overview

Mode	Bandwidth	Modulation	Max. EIRP (W)	Max. EIRP (dBm)	Emission Designator
CA 66B	10MHz + 10MHz	QPSK	0.460	26.63	18M9G7D
		16QAM	0.366	25.63	18M9D7W
		64QAM	0.288	24.59	18M9D7W
		256QAM	0.144	21.58	18M9D7W
CA 66C	20MHz + 20MHz	QPSK	0.476	26.78	37M7G7D
		16QAM	0.378	25.77	37M7D7W
		64QAM	0.299	24.75	37M7D7W
		256QAM	0.148	21.70	37M7D7W

2. The EUT uses following accessories.

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

3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.
4. For CA mode configuration, please consult the manufacturer to declare the test mode.

5. The EUT support the following CA Configuration.

Band Configuration
66B
66C

6. E-UTRA CA configuration / Bandwidth combination set.

E-UTRA CA configuration / Bandwidth combination set					
E-UTRA CA configuration	Uplink CA configurations	Component carriers in order of increasing carrier frequency		Maximum aggregated bandwidth [MHz]	Bandwidth combination set
		Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]		
CA_66B	CA_66B	5	5, 10, 15	20	0
		10	5, 10		
		15	5		
CA_66C	CA_66C	5	20	40	0
		10	15, 20		
		15	10, 15, 20		
		20	5, 10, 15, 20		

*66B is continuous CA and maximum combination is 10M+10M.
*66C is continuous CA and maximum combination is 20M+20M.

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

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna Type		Monopole	
LTE Band			
Band	Freq. Range (MHz)	Gain (dBi)	
		Ant. 1	Ant. 2
LTE B66	1710 ~ 1780	2.19	3.09

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

Antenna Type		External	
External Connector		TS9	
LTE Band			
Band	Freq. Range (MHz)	Gain (dBi)	
		Ant. 1	Ant. 2
LTE B66	1710 ~ 1780	0.67	0.54

Note:

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

3.3 Test Mode Applicability and Tested Channel Detail

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

For LTE Band 66B

Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
EIRP	132022(1715.0MHz)+132121(1724.9MHz), 132373(1750.1MHz)+132472(1760.0MHz), 132523(1765.1MHz)+132622(1775.0MHz)	10MHz + 10MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 49 RB Offset
Peak to Average Ratio	132022(1715.0MHz)+132121(1724.9MHz), 132373(1750.1MHz)+132472(1760.0MHz), 132523(1765.1MHz)+132622(1775.0MHz)	10MHz + 10MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 49 RB Offset
Bandwidth	132022(1715.0MHz)+132121(1724.9MHz), 132373(1750.1MHz)+132472(1760.0MHz), 132523(1765.1MHz)+132622(1775.0MHz)	10MHz + 10MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 49 RB Offset
Conducted Spurious Emissions	132022(1715.0MHz)+132121(1724.9MHz), 132373(1750.1MHz)+132472(1760.0MHz), 132523(1765.1MHz)+132622(1775.0MHz)	10MHz + 10MHz	QPSK	1 RB Full RB
Radiated Spurious Emissions below 1GHz	132373(1750.1MHz)+132472(1760.0MHz)	10MHz + 10MHz	QPSK	1 RB / 49 RB Offset + 1 RB / 0 RB Offset
Radiated Spurious Emissions above 1GHz	132022(1715.0MHz)+132121(1724.9MHz), 132373(1750.1MHz)+132472(1760.0MHz), 132523(1765.1MHz)+132622(1775.0MHz)	10MHz + 10MHz	QPSK	1 RB / 49 RB Offset + 1 RB / 0 RB Offset
Frequency Stability	132022(1715.0MHz)+132121(1724.9MHz), 132523(1765.1MHz)+132622(1775.0MHz)	10MHz + 10MHz	QPSK	Full RB

For LTE Band 66C

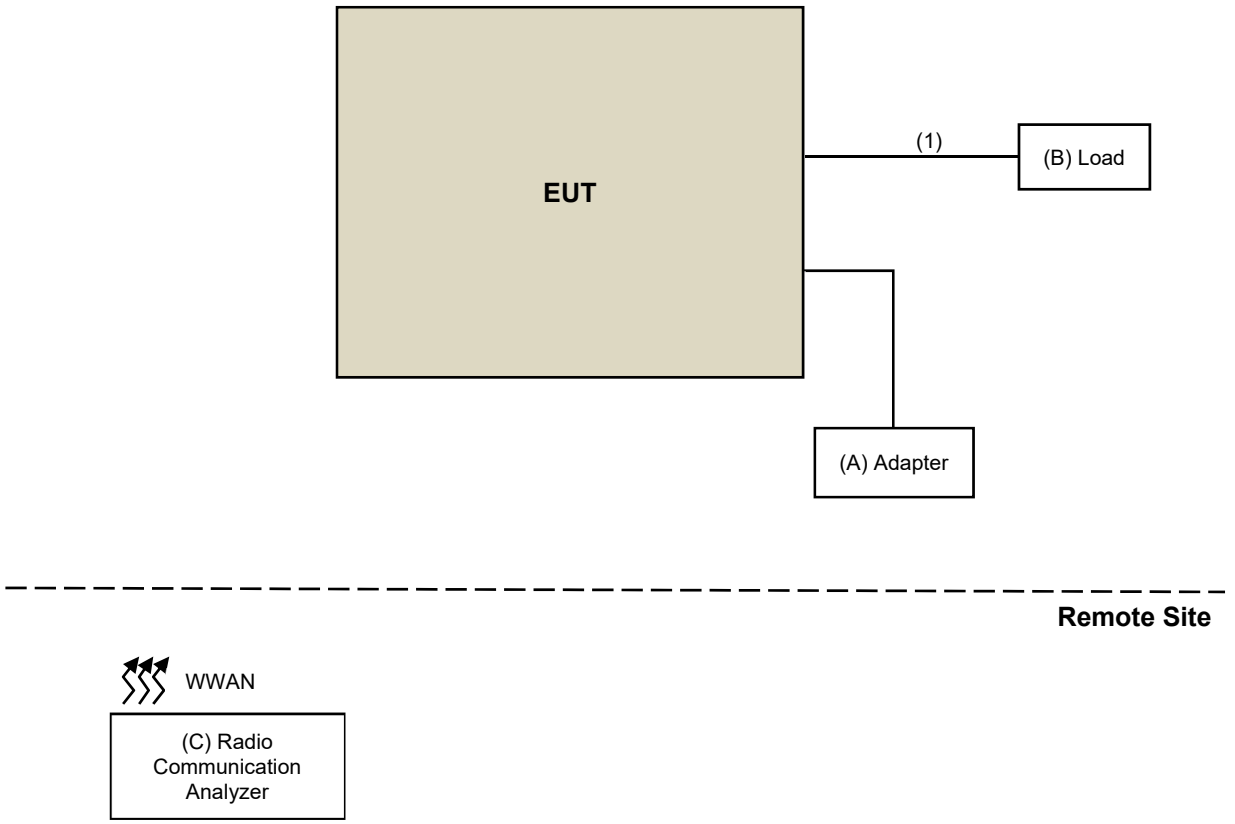
Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
EIRP	132072(1720.0MHz)+132270(1739.8MHz), 132323(1745.1MHz)+132521(1764.9MHz), 132374(1750.2MHz)+132572(1770.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
Peak to Average Ratio	132072(1720.0MHz)+132270(1739.8MHz), 132323(1745.1MHz)+132521(1764.9MHz), 132374(1750.2MHz)+132572(1770.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
Bandwidth	132072(1720.0MHz)+132270(1739.8MHz), 132323(1745.1MHz)+132521(1764.9MHz), 132374(1750.2MHz)+132572(1770.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
Conducted Spurious Emissions	132072(1720.0MHz)+132270(1739.8MHz), 132323(1745.1MHz)+132521(1764.9MHz), 132374(1750.2MHz)+132572(1770.0MHz)	20MHz + 20MHz	QPSK	1 RB Full RB
Radiated Spurious Emissions below 1GHz	132072(1720.0MHz)+132270(1739.8MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset
Radiated Spurious Emissions above 1GHz	132072(1720.0MHz)+132270(1739.8MHz), 132323(1745.1MHz)+132521(1764.9MHz), 132374(1750.2MHz)+132572(1770.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset
Frequency Stability	132072(1720.0MHz)+132270(1739.8MHz), 132374(1750.2MHz)+132572(1770.0MHz)	20MHz + 20MHz	QPSK	Full RB

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

3.4 Test Program Used and Operation Descriptions

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

3.5 Connection Diagram of EUT and Peripheral Devices



3.6 Configuration of Peripheral Devices and Cable Connections

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

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

4 Test Instruments

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

4.1 Effective Radiated Power and 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: 2024/4/25

4.2 Peak to Average Ratio

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
PXA Signal Analyzer Keysight	N9030B	MY57140938	2024/3/20	2025/3/19
Radio Communication Analyzer Anritsu	MT8821C	6201462755	2024/3/13	2025/3/12
		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: 2024/4/25

4.3 Bandwidth

Refer to section 4.2 to get information of the instruments.

4.4 Conducted Spurious Emissions

Refer to section 4.2 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 inn-co GmbH	MA 4000	010303	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-155	2023/10/13	2024/10/12
EMI Test Receiver R&S	ESR3	102782	2023/12/7	2024/12/6
Loop Antenna Electro-Metrics	EM-6879	269	2023/9/23	2024/9/22
Loop Antenna TESEQ	HLA 6121	45745	2023/8/8	2024/8/7
Preamplifier Agilent	8447D	2944A10631	2023/5/7	2024/5/6
Preamplifier EMCI	EMC001340	980201	2023/9/27	2024/9/26
RF Coaxial Cable Woken	8D-FB	Cable-CH4-01	2023/7/8	2024/7/7
Signal & Spectrum Analyzer R&S	FSW43	101582	2024/4/12	2025/4/11
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 3.
2. Tested Date: 2024/4/26

4.6 Radiated Spurious Emissions above 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower inn-co GmbH	MA 4000	010303	N/A	N/A
Boresight antenna tower fixture BV	BAF-02	5	N/A	N/A
EMI Test Receiver R&S	ESR3	102782	2023/12/7	2024/12/6
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-408	2023/11/12	2024/11/11
	BBHA 9170	9170-480	2023/11/12	2024/11/11
		BBHA9170241	2023/10/16	2024/10/15
		BBHA9170243	2023/11/12	2024/11/11
Preamplifier EMCI	EMC 184045	980116	2023/9/27	2024/9/26
Preamplifier Keysight	83017A	MY53270295	2023/5/7	2024/5/6
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2023/7/8	2024/7/7
	EMC102-KM-KM-3000	150929	2023/7/8	2024/7/7
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03(250724)	2023/5/7	2024/5/6
	Sucoflex 104	MY 13380+295012/04	2023/5/7	2024/5/6
Signal & Spectrum Analyzer R&S	FSW43	101582	2024/4/12	2025/4/11
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 3.
2. Tested Date: 2024/4/26

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	87III	70360742	2023/7/6	2024/7/5
PXA Signal Analyzer Keysight	N9030B	MY57140938	2024/3/20	2025/3/19
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A
Temperature & Humidity Chamber Terchy	HRM-120RF	931022	2023/12/19	2024/12/18
Radio Communication Analyzer Anritsu	MT8821C	6261806803	2024/2/15	2025/2/14

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2024/4/26

5 Limits of Test Items

5.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

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

According to FCC 47 CFR part 27.53(h), for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log (P) dB. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

5.5 Radiated Spurious Emissions below 1GHz

According to FCC 47 CFR part 27.53(h), for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log (P) dB. The limit of emission is equal to -13 dBm.

5.6 Radiated Spurious Emissions above 1GHz

According to FCC 47 CFR part 27.53(h), for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log (P) dB. The limit of emission is equal to -13 dBm.

5.7 Frequency Stability

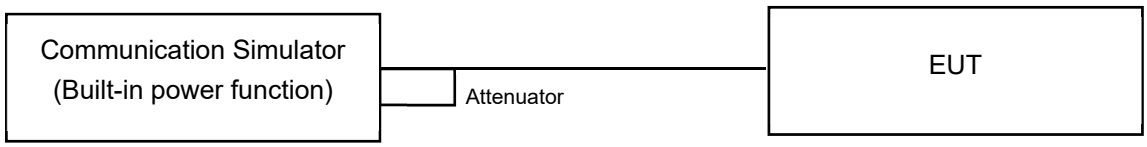
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation (authorized frequency block).

6 Test Arrangements

6.1 Effective Radiated Power and 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 average (rms) 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.
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).

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

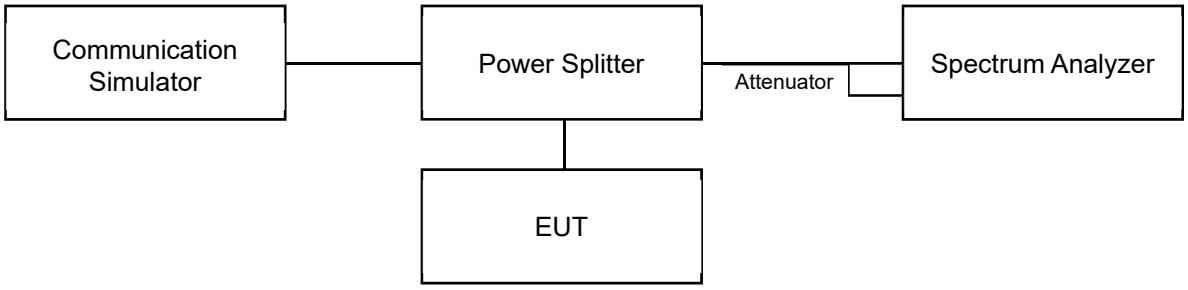
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P_{Meas}, e.g., dBm or dBW)

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

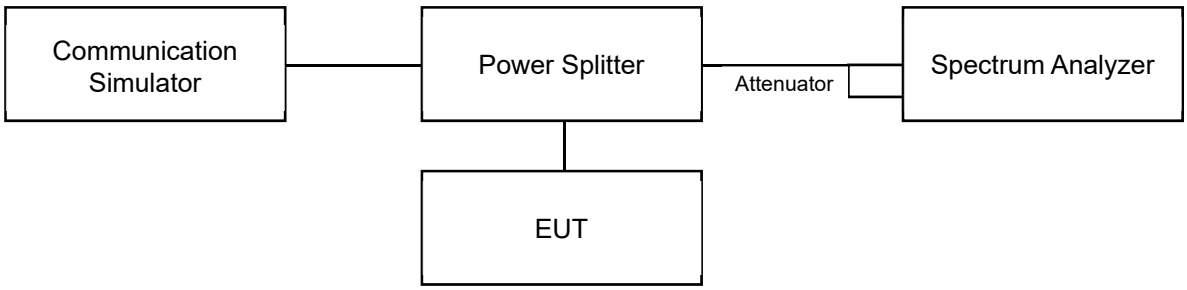


6.2.2 Test Procedure

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.

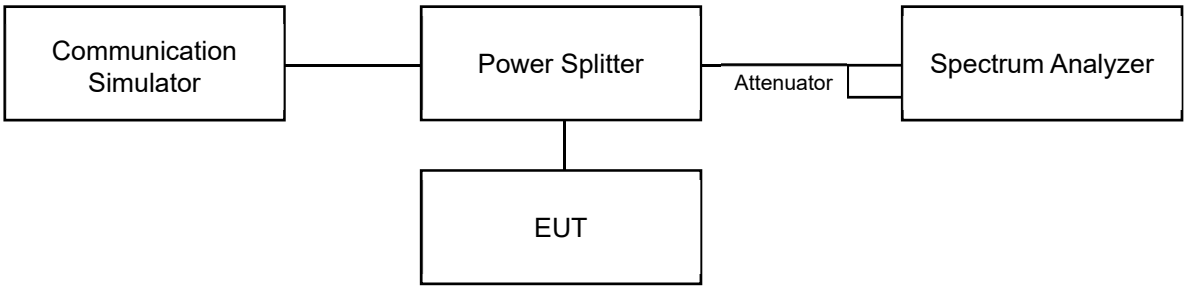
a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and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



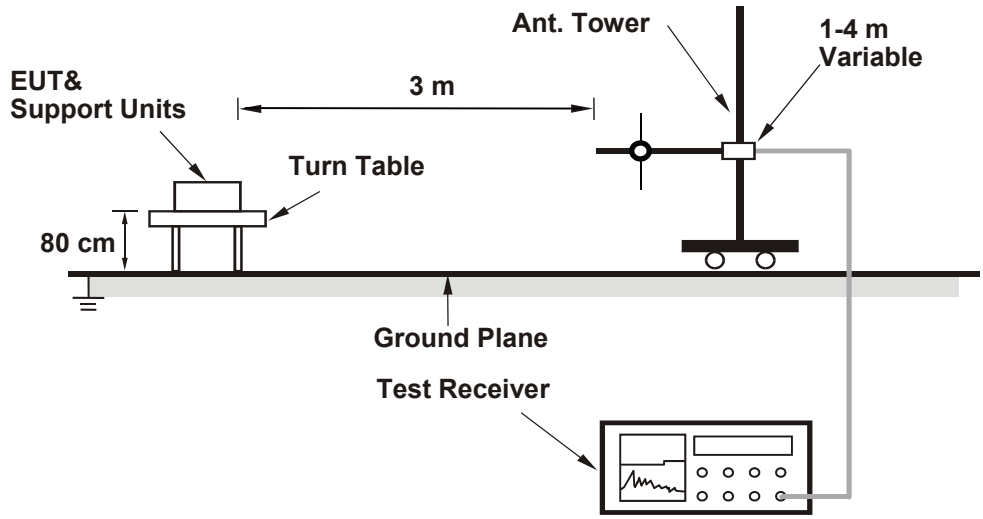
6.4.2 Test Procedure

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.
g. For the emissions measurement method, certain channel BW modes demonstrate compliance by integrating with the smaller RBW allowed by the rule.
h. e.g. Where Reference RBW = 1 MHz and a smaller RBW = 100 kHz is used, worst-case integrated BW power = [Max Measured Value (dBm) with RBW = 100 kHz] + 10* log(1000/100). To compensate for this integration before comparison to the limit, the limit line was reduced by 10 dB accordingly.
i. Record the maximum power value test plot.

6.5 Radiated Spurious Emissions below 1GHz

6.5.1 Test Setup

For radiated emission 30 MHz to 1 GHz



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

6.5.2 Test Procedure

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

a. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

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

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

d. Following C63.26 section 5.5 and 5.2.7

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

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

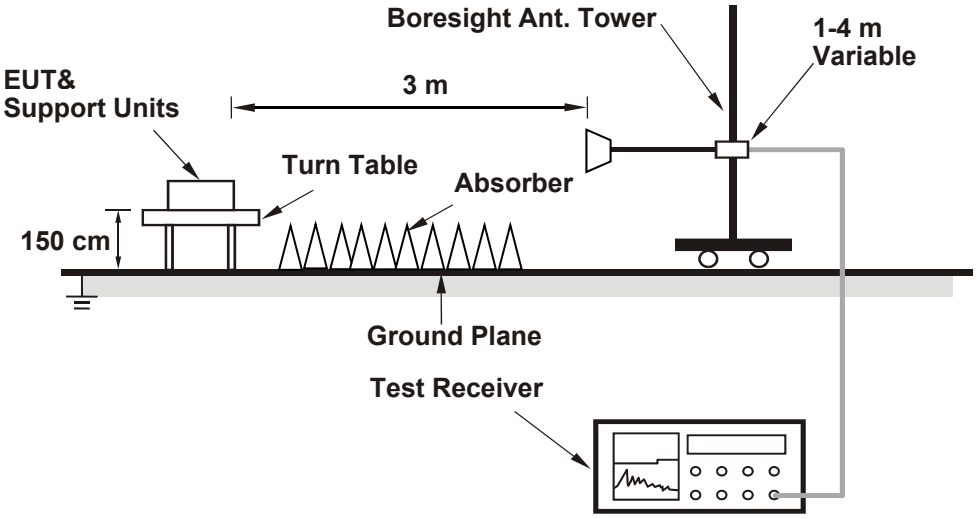
Note:

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

6.6 Radiated Spurious Emissions above 1GHz

6.6.1 Test Setup

For radiated emission above 1 GHz



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

6.6.2 Test Procedure

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

a. In the semi-anechoic chamber, EUT placed on the 1.5 m height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

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

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

d. Following ANSI C63.26 section 5.5 and 5.2.7

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

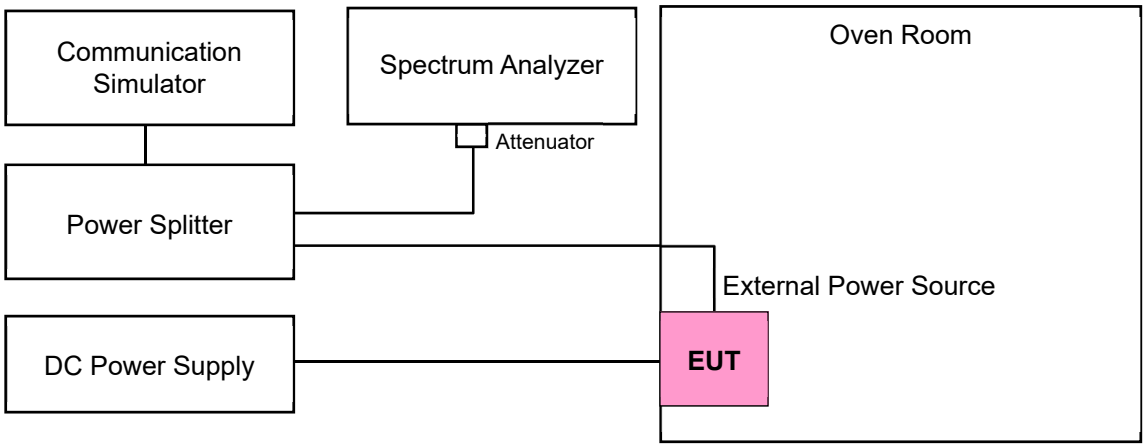
f. ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

Note:

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

6.7 Frequency Stability

6.7.1 Test Setup



6.7.2 Test Procedure

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

a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

7 Test Results of Test Item

7.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	22°C, 68% RH	Tested By:	Willy Cheng

7.1.1 LTE Band 66B

Con fugure	Com-bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Conti-guous	CA_66B	66	10	QPSK	1	0	132022	1715	66	10	QPSK	1	49	132121	1724.9	13.93
					1	49						1	0			23.52
		66	10	QPSK	1	0	132373	1750.1	66	10	QPSK	1	49	132472	1760	14.14
					1	49						1	0			**23.54**
		66	10	QPSK	1	0	132523	1765.1	66	10	QPSK	1	49	132622	1775	13.96
					1	49						1	0			22.51
Intra Band Conti-guous	CA_66B	66	10	16QAM	1	0	132022	1715	66	10	16QAM	1	49	132121	1724.9	12.89
					1	49						1	0			22.47
		66	10	16QAM	1	0	132373	1750.1	66	10	16QAM	1	49	132472	1760	13.13
					1	49						1	0			**22.54**
		66	10	16QAM	1	0	132523	1765.1	66	10	16QAM	1	49	132622	1775	12.94
					1	49						1	0			21.46
Intra Band Conti-guous	CA_66B	66	10	64QAM	1	0	132022	1715	66	10	64QAM	1	49	132121	1724.9	11.86
					1	49						1	0			21.46
		66	10	64QAM	1	0	132373	1750.1	66	10	64QAM	1	49	132472	1760	12.08
					1	49						1	0			**21.50**
		66	10	64QAM	1	0	132523	1765.1	66	10	64QAM	1	49	132622	1775	11.88
					1	49						1	0			20.42
Intra Band Conti-guous	CA_66B	66	10	256QAM	1	0	132022	1715	66	10	256QAM	1	49	132121	1724.9	18.44
					1	49						1	0			9.01
		66	10	256QAM	1	0	132373	1750.1	66	10	256QAM	1	49	132472	1760	**18.49**
					1	49						1	0			8.87
		66	10	256QAM	1	0	132523	1765.1	66	10	256QAM	1	49	132622	1775	17.40
					1	49						1	0			10.73

Maximum Output Power			
Modulation	Cond. Power (dBm)	EIRP (dBm)	EIRP Limit (dBm)
QPSK	23.54	26.63	30
16QAM	22.54	25.63	30
64QAM	21.50	24.59	30
256QAM	18.49	21.58	30

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

7.1.2 LTE Band 66C

Con fugure	Com-bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Conti-guous	CA_66C	66	20	QPSK	1	0	132072	1720	66	20	QPSK	1	99	132270	1739.8	15.84
					1	99						1	0			**23.69**
		66	20	QPSK	1	0	132323	1745.1	66	20	QPSK	1	99	132521	1764.9	13.87
					1	99						1	0			23.49
		66	20	QPSK	1	0	132374	1750.2	66	20	QPSK	1	99	132572	1770	14.09
					1	99						1	0			22.49
Intra Band Conti-guous	CA_66C	66	20	16QAM	1	0	132072	1720	66	20	16QAM	1	99	132270	1739.8	14.79
					1	99						1	0			**22.68**
		66	20	16QAM	1	0	132323	1745.1	66	20	16QAM	1	99	132521	1764.9	12.79
					1	99						1	0			22.41
		66	20	16QAM	1	0	132374	1750.2	66	20	16QAM	1	99	132572	1770	13.03
					1	99						1	0			21.45
Intra Band Conti-guous	CA_66C	66	20	64QAM	1	0	132072	1720	66	20	64QAM	1	99	132270	1739.8	13.75
					1	99						1	0			**21.66**
		66	20	64QAM	1	0	132323	1745.1	66	20	64QAM	1	99	132521	1764.9	11.77
					1	99						1	0			21.38
		66	20	64QAM	1	0	132374	1750.2	66	20	64QAM	1	99	132572	1770	11.96
					1	99						1	0			8.83
Intra Band Conti-guous	CA_66C	66	20	256QAM	1	0	132072	1720	66	20	256QAM	1	99	132270	1739.8	**18.61**
					1	99						1	0			8.74
		66	20	256QAM	1	0	132323	1745.1	66	20	256QAM	1	99	132521	1764.9	18.36
					1	99						1	0			8.92
		66	20	256QAM	1	0	132374	1750.2	66	20	256QAM	1	99	132572	1770	5.80
					1	99						1	0			15.39

Maximum Output Power			
Modulation	Cond. Power (dBm)	EIRP (dBm)	EIRP Limit (dBm)
QPSK	23.69	26.78	30
16QAM	22.68	25.77	30
64QAM	21.66	24.75	30
256QAM	18.61	21.70	30

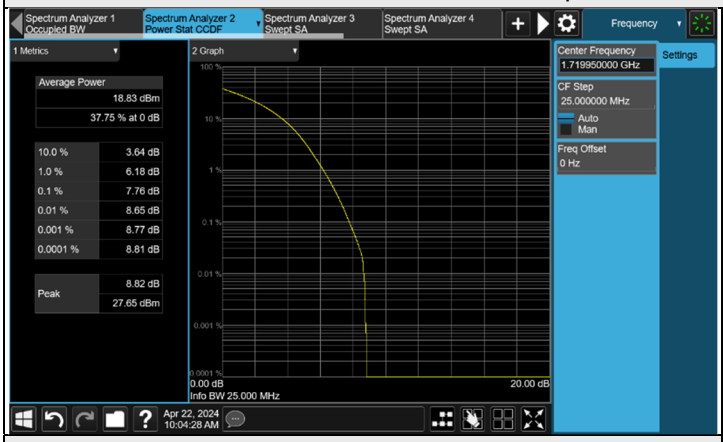
Note: EIRP (dBm) = Cond. Power (dBm) + Antenna Gain (dBi) + Array Gain (if applicable)

7.2 Peak to Average Ratio

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 69% RH	Tested By:	Noah Chang

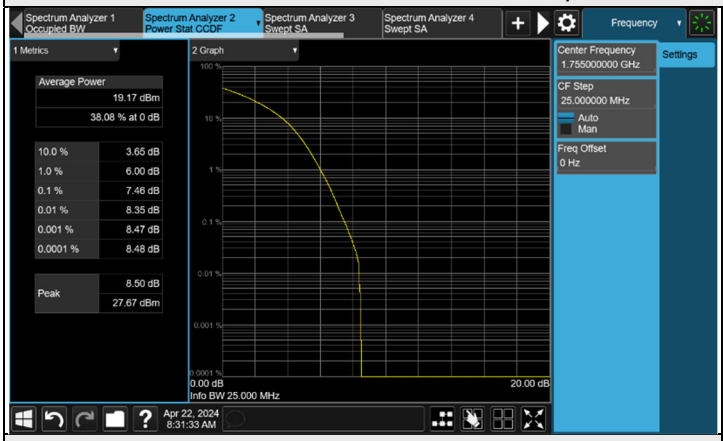
7.2.1 LTE Band 66B

Modulation	Channel (Frequency)	Measurement Value(dB)	Limit (dB)	Result
QPSK	132022(1715.0MHz)+132121(1724.9MHz)	3.93	13	PASS
QPSK	132373(1750.1MHz)+132472(1760.0MHz)	3.94	13	PASS
QPSK	132523(1765.1MHz)+132622(1775.0MHz)	3.76	13	PASS
16QAM	132022(1715.0MHz)+132121(1724.9MHz)	4.81	13	PASS
16QAM	132373(1750.1MHz)+132472(1760.0MHz)	4.75	13	PASS
16QAM	132523(1765.1MHz)+132622(1775.0MHz)	4.56	13	PASS
64QAM	132022(1715.0MHz)+132121(1724.9MHz)	7.52	13	PASS
64QAM	132373(1750.1MHz)+132472(1760.0MHz)	7.40	13	PASS
64QAM	132523(1765.1MHz)+132622(1775.0MHz)	7.15	13	PASS
256QAM	132022(1715.0MHz)+132121(1724.9MHz)	7.76	13	PASS
256QAM	132373(1750.1MHz)+132472(1760.0MHz)	7.55	13	PASS
256QAM	132523(1765.1MHz)+132622(1775.0MHz)	7.49	13	PASS

Spectrum Plot of Worst Value	
	
256QAM CH 132022(1715.0MHz)+CH 132121(1724.9MHz)	

7.2.2 LTE Band 66C

Modulation	Channel (Frequency)	Measurement Value(dB)	Limit (dB)	Result
QPSK	132072(1720.0MHz)+132270(1739.8MHz)	3.89	13	PASS
QPSK	132323(1745.1MHz)+132521(1764.9MHz)	3.90	13	PASS
QPSK	132374(1750.2MHz)+132572(1770.0MHz)	3.83	13	PASS
16QAM	132072(1720.0MHz)+132270(1739.8MHz)	4.55	13	PASS
16QAM	132323(1745.1MHz)+132521(1764.9MHz)	4.40	13	PASS
16QAM	132374(1750.2MHz)+132572(1770.0MHz)	4.33	13	PASS
64QAM	132072(1720.0MHz)+132270(1739.8MHz)	6.91	13	PASS
64QAM	132323(1745.1MHz)+132521(1764.9MHz)	7.04	13	PASS
64QAM	132374(1750.2MHz)+132572(1770.0MHz)	6.96	13	PASS
256QAM	132072(1720.0MHz)+132270(1739.8MHz)	7.37	13	PASS
256QAM	132323(1745.1MHz)+132521(1764.9MHz)	7.46	13	PASS
256QAM	132374(1750.2MHz)+132572(1770.0MHz)	7.24	13	PASS

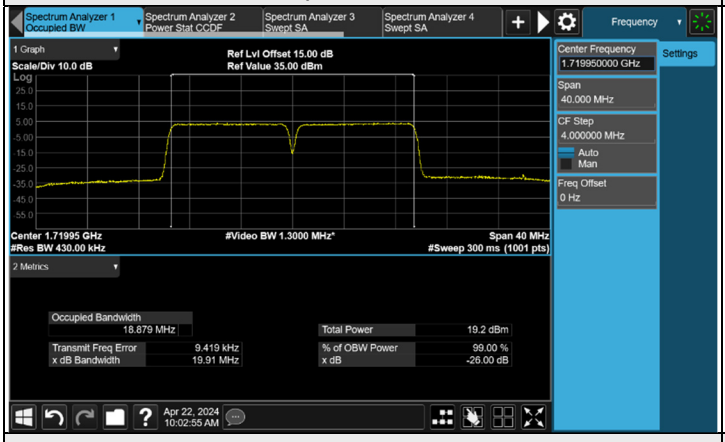
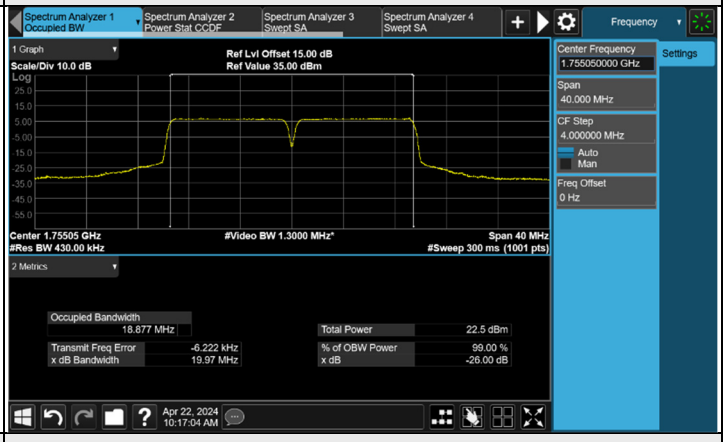
Spectrum Plot of Worst Value	
	
256QAM CH 132323(1745.1MHz)+CH 132521(1764.9MHz)	

7.3 Bandwidth

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 69% RH	Tested By:	Noah Chang

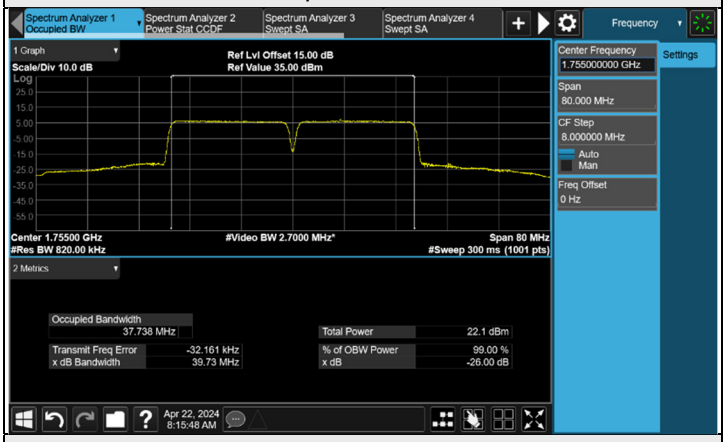
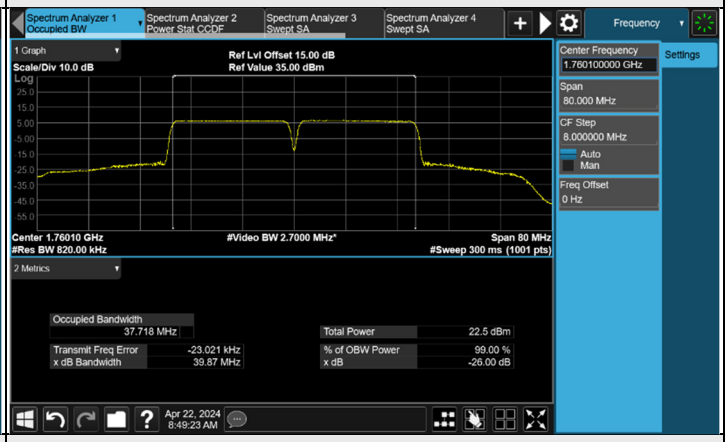
7.3.1 LTE Band 66B

Modulation	Channel (Frequency)	Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	132022(1715.0MHz)+132121(1724.9MHz)	18.867	19.92
QPSK	132373(1750.1MHz)+132472(1760.0MHz)	18.877	19.97
QPSK	132523(1765.1MHz)+132622(1775.0MHz)	18.873	19.96
16QAM	132022(1715.0MHz)+132121(1724.9MHz)	18.873	19.93
16QAM	132373(1750.1MHz)+132472(1760.0MHz)	18.869	19.93
16QAM	132523(1765.1MHz)+132622(1775.0MHz)	18.873	19.94
64QAM	132022(1715.0MHz)+132121(1724.9MHz)	18.866	19.90
64QAM	132373(1750.1MHz)+132472(1760.0MHz)	18.859	19.91
64QAM	132523(1765.1MHz)+132622(1775.0MHz)	18.863	19.91
256QAM	132022(1715.0MHz)+132121(1724.9MHz)	18.879	19.91
256QAM	132373(1750.1MHz)+132472(1760.0MHz)	18.856	19.91
256QAM	132523(1765.1MHz)+132622(1775.0MHz)	18.859	19.91

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
256QAM CH 132022(1715.0MHz)+CH 132121(1724.9MHz)	QPSK CH 132373(1750.1MHz)+CH132472(1760.0MHz)

7.3.2 LTE Band 66C

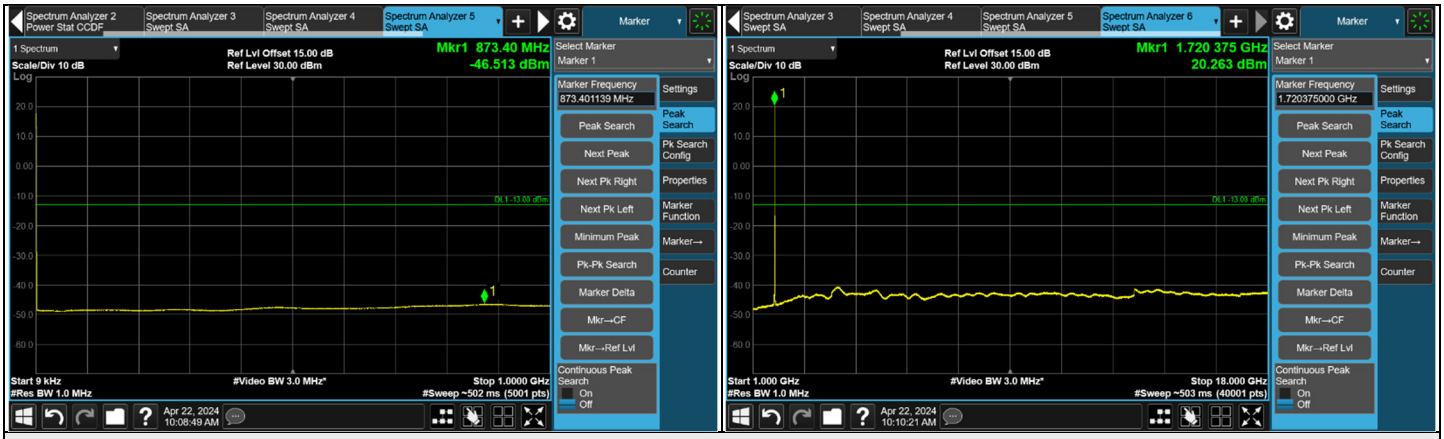
Modulation	Channel (Frequency)	Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	132072(1720.0MHz)+132270(1739.8MHz)	37.735	39.72
QPSK	132323(1745.1MHz)+132521(1764.9MHz)	37.738	39.73
QPSK	132374(1750.2MHz)+132572(1770.0MHz)	37.718	39.87
16QAM	132072(1720.0MHz)+132270(1739.8MHz)	37.683	39.72
16QAM	132323(1745.1MHz)+132521(1764.9MHz)	37.712	39.75
16QAM	132374(1750.2MHz)+132572(1770.0MHz)	37.700	39.74
64QAM	132072(1720.0MHz)+132270(1739.8MHz)	37.658	39.70
64QAM	132323(1745.1MHz)+132521(1764.9MHz)	37.689	39.69
64QAM	132374(1750.2MHz)+132572(1770.0MHz)	37.691	39.70
256QAM	132072(1720.0MHz)+132270(1739.8MHz)	37.662	39.70
256QAM	132323(1745.1MHz)+132521(1764.9MHz)	37.688	39.71
256QAM	132374(1750.2MHz)+132572(1770.0MHz)	37.680	39.69

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 132323(1745.1MHz)+CH 132521(1764.9MHz)	QPSK CH 132374(1750.2MHz)+CH 132572(1770.0MHz)

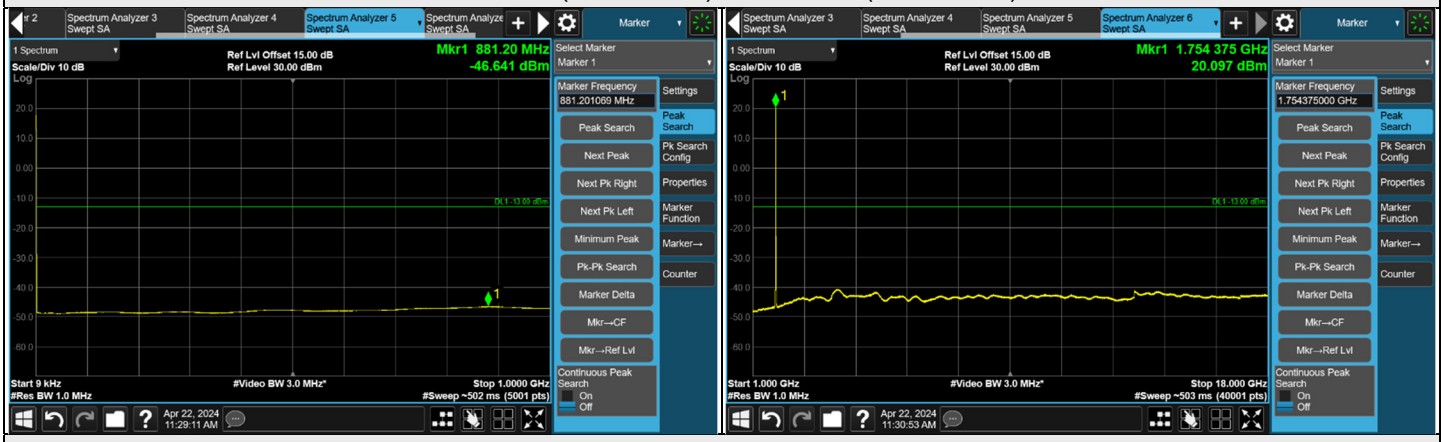
7.4 Conducted Spurious Emissions

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 69% RH	Tested By:	Noah Chang

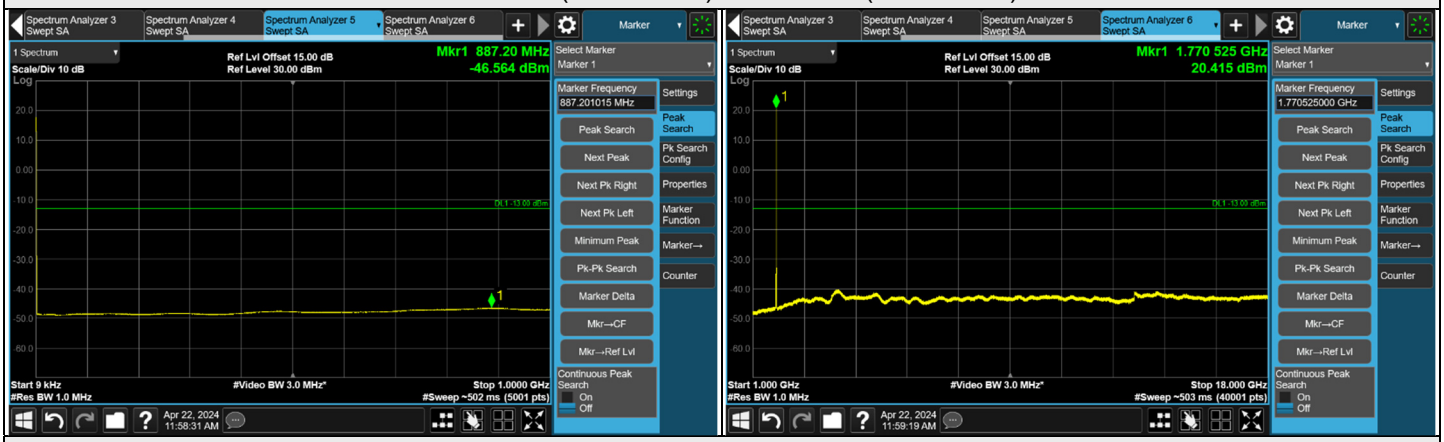
7.4.1 LTE Band 66B



CH 132022(1715.0MHz)+CH 132121(1724.9MHz)

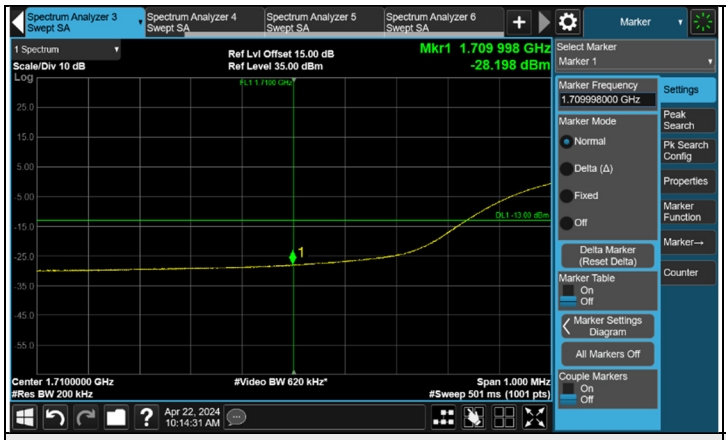


CH 132373(1750.1MHz)+CH 132472(1760.0MHz)

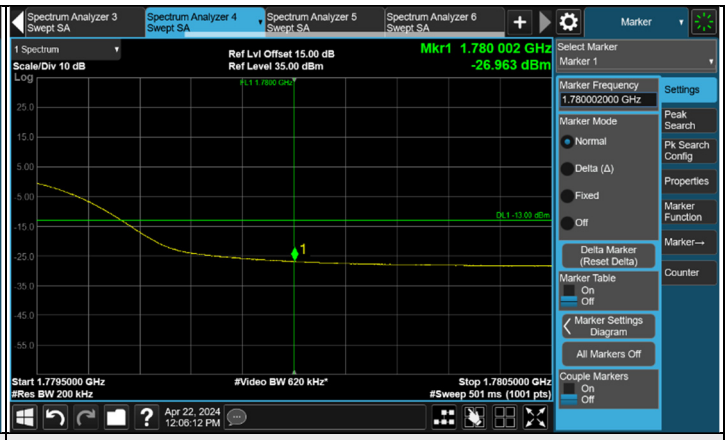


CH 132523(1765.1MHz)+CH 132622(1775.0MHz)

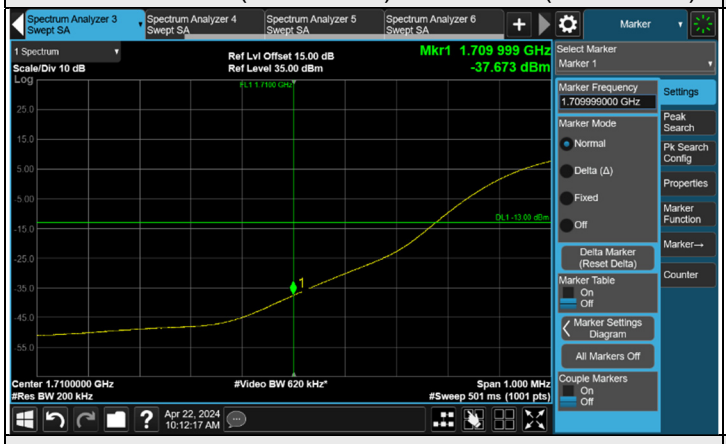
Note: The signal at 9 kHz is IF signal from spectrum analyzer.



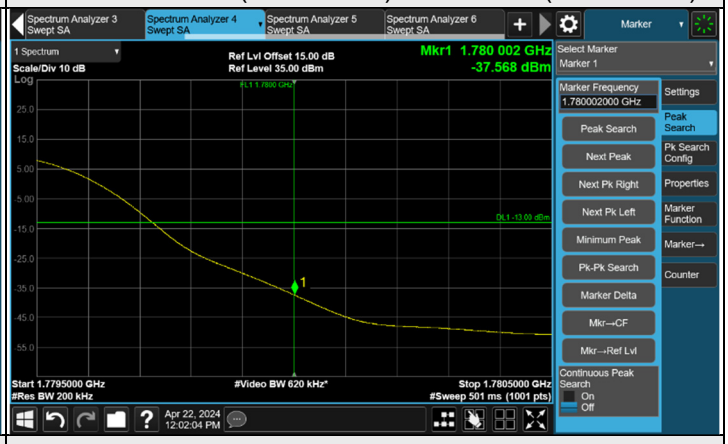
FULL CH 132022(1715.0MHz)+CH 132121(1724.9MHz)



FULL CH 132523(1765.1MHz)+CH 132622(1775.0MHz)

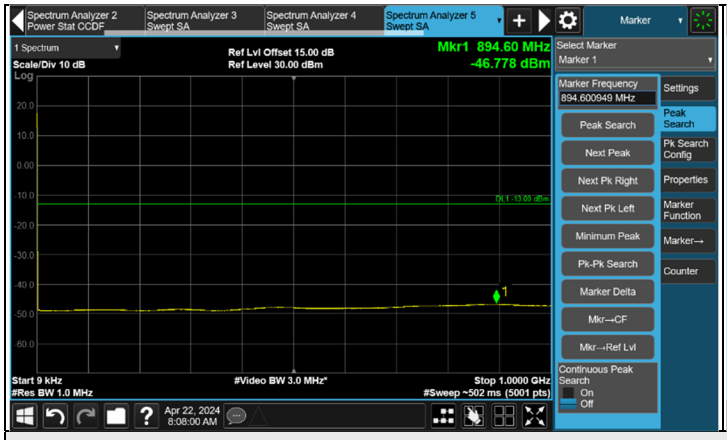


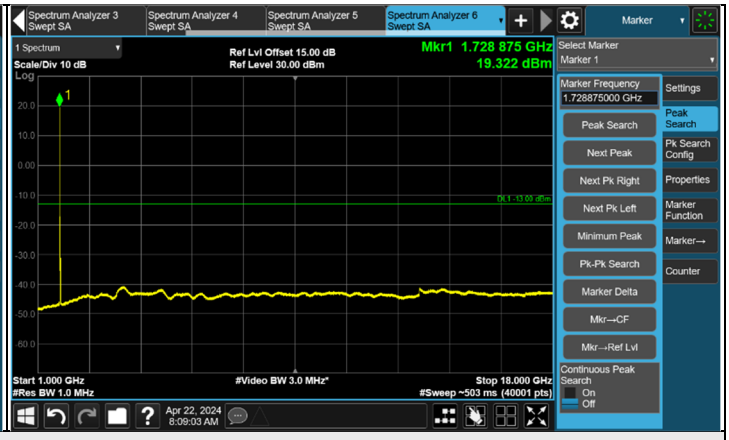
1RB CH 132022(1715.0MHz)+CH 132121(1724.9MHz)



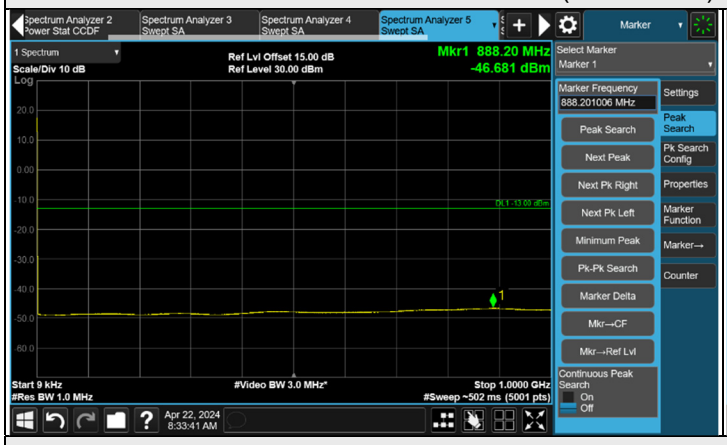
1RB CH 132523(1765.1MHz)+CH 132622(1775.0MHz)

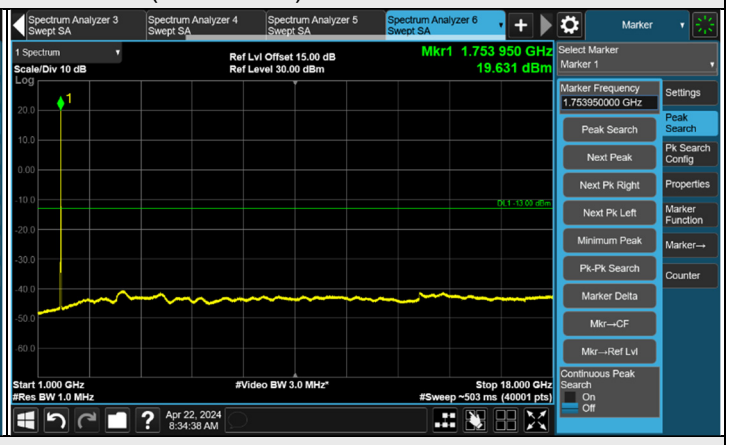
7.4.2 LTE Band 66C



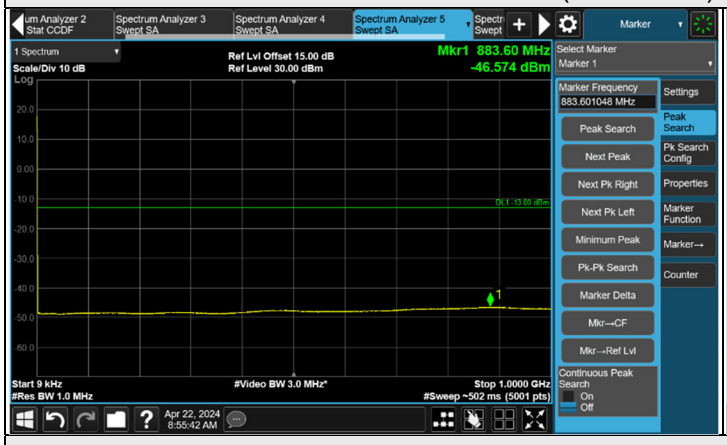


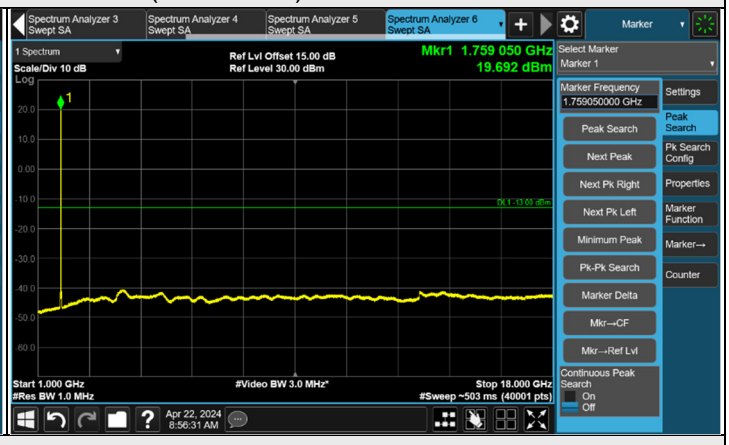
CH 132072(1720.0MHz)+CH 132270(1739.8MHz)





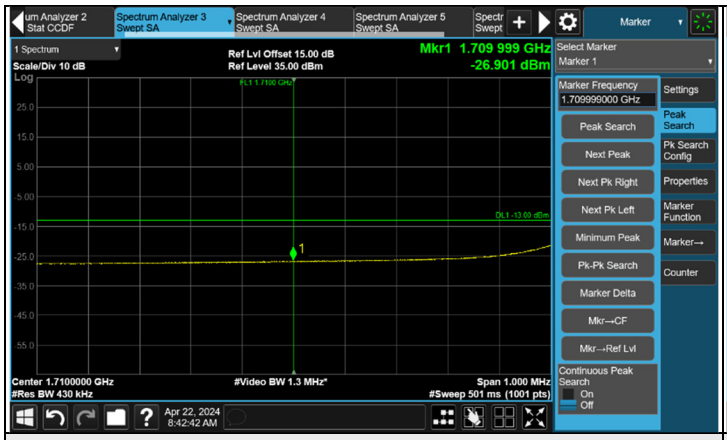
CH 132323(1745.1MHz)+CH 132521(1764.9MHz)



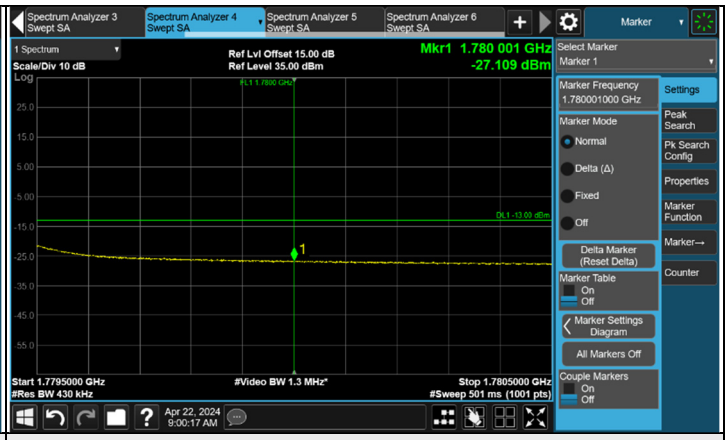


CH 132374(1750.2MHz)+CH 132572(1770.0MHz)

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

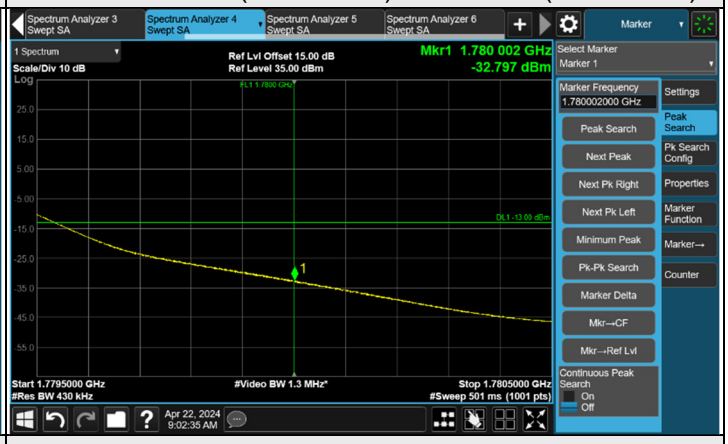


FULL CH 132072(1720.0MHz)+CH 132270(1739.8MHz)



FULL CH 132374(1750.2MHz)+CH 132572(1770.0MHz)

1RB CH 132072(1720.0MHz)+CH 132270(1739.8MHz)



1RB CH 132374(1750.2MHz)+CH 132572(1770.0MHz)

7.5 Radiated Spurious Emissions below 1GHz

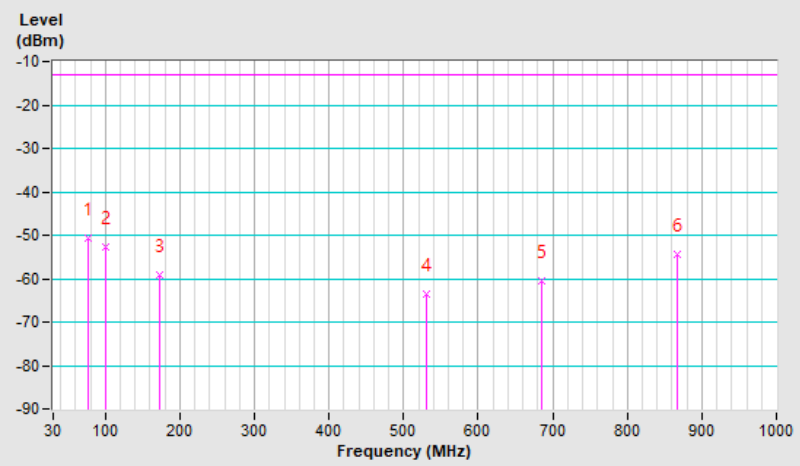
7.5.1 LTE Band 66B

RF Mode	LTE Band 66B Channel Bandwidth: 10MHz + 10MHz	Channel	CH 132373(1750.1MHz) + CH 132472(1760.0MHz)
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 67% RH
Tested By	Adair Peng		

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	77.88	-50.55	-13.00	-37.55	1.50 H	229	58.02	-108.57
2	99.97	-52.55	-13.00	-39.55	1.50 H	197	56.43	-108.98
3	173.56	-59.20	-13.00	-46.20	1.00 H	240	45.73	-104.93
4	531.49	-63.52	-13.00	-50.52	2.00 H	270	35.22	-98.74
5	685.72	-60.47	-13.00	-47.47	1.00 H	196	35.12	-95.59
6	867.11	-54.45	-13.00	-41.45	1.00 H	18	37.52	-91.97

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.

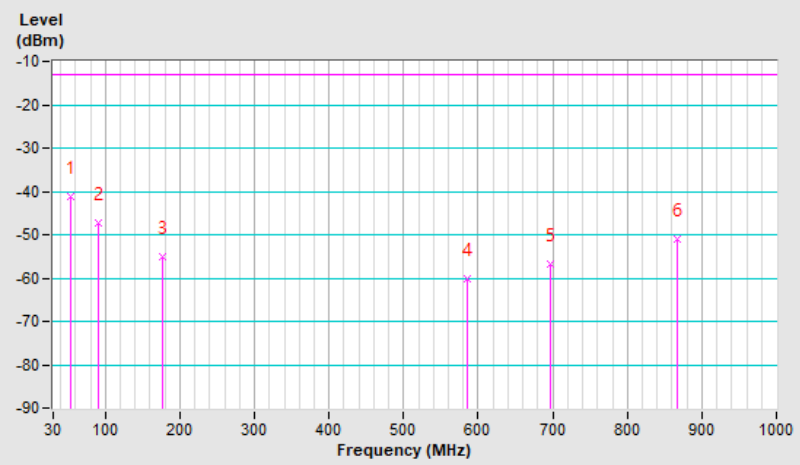


RF Mode	LTE Band 66B Channel Bandwidth: 10MHz + 10MHz	Channel	CH 132373(1750.1MHz) + CH 132472(1760.0MHz)
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 67% RH
Tested By	Adair Peng		

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	**52.57**	**-41.11**	**-13.00**	**-28.11**	**1.50 V**	**111**	**63.56**	**-104.67**
2	90.22	-47.33	-13.00	-34.33	1.50 V	177	62.89	-110.22
3	177.23	-55.25	-13.00	-42.25	1.50 V	111	50.09	-105.34
4	585.81	-60.13	-13.00	-47.13	1.00 V	2	37.31	-97.44
5	696.39	-56.92	-13.00	-43.92	2.00 V	218	38.45	-95.37
6	866.14	-50.85	-13.00	-37.85	1.00 V	110	41.15	-92.00

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.



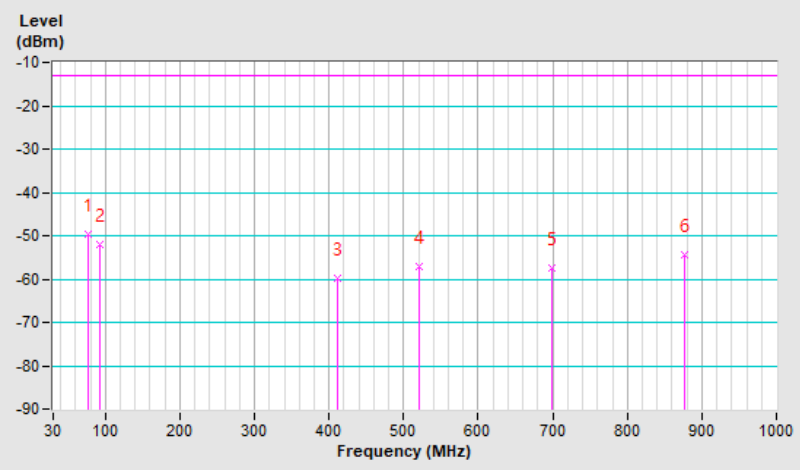
7.5.2 LTE Band 66C

RF Mode	LTE Band 66C Channel Bandwidth: 20MHz + 20MHz	Channel	CH 132072(1720.0MHz) + CH 132270(1739.8MHz)
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 67% RH
Tested By	Adair Peng		

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	77.23	-49.77	-13.00	-36.77	1.50 H	33	58.67	-108.44
2	92.99	-52.13	-13.00	-39.13	1.50 H	161	57.84	-109.97
3	411.23	-59.78	-13.00	-46.78	1.50 H	209	41.34	-101.12
4	520.82	-57.14	-13.00	-44.14	1.00 H	2	41.75	-98.89
5	699.30	-57.50	-13.00	-44.50	1.00 H	190	37.81	-95.31
6	877.22	-54.33	-13.00	-41.33	1.50 H	117	37.36	-91.69

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.

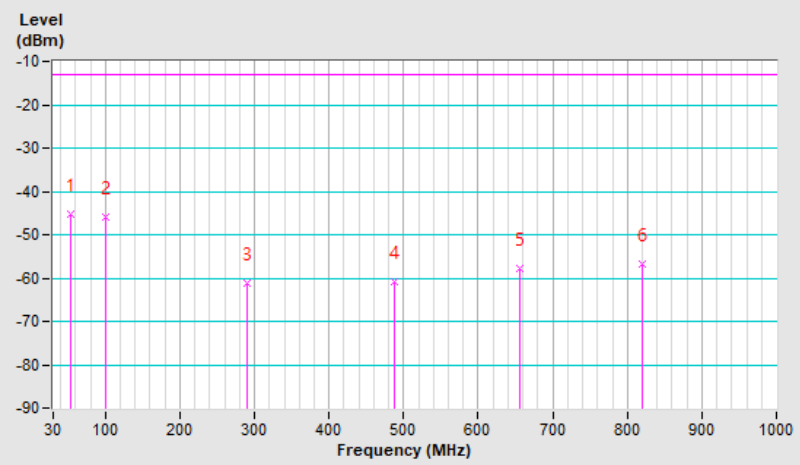


RF Mode	LTE Band 66C Channel Bandwidth: 20MHz + 20MHz	Channel	CH 132072(1720.0MHz) + CH 132270(1739.8MHz)
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 67% RH
Tested By	Adair Peng		

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	52.55	-45.33	-13.00	-32.33	1.50 V	102	59.34	-104.67
2	99.84	-45.77	-13.00	-32.77	1.50 V	177	63.24	-109.01
3	290.12	-61.33	-13.00	-48.33	1.50 V	77	41.94	-103.27
4	488.22	-60.77	-13.00	-47.77	1.50 V	113	38.75	-99.52
5	655.33	-57.88	-13.00	-44.88	1.50 V	113	38.12	-96.00
6	820.33	-56.77	-13.00	-43.77	1.00 V	258	35.97	-92.74

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 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 66B

RF Mode	LTE Band 66B Channel Bandwidth: 10MHz + 10MHz	**Channel**	CH 132022(1715.0MHz)+ CH 132121(1724.9MHz)
Frequency Range	1 GHz ~ 20 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 67% RH
Tested By	Adair Peng		

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	3430.00	-48.11	-13.00	-35.11	2.55 H	209	46.99	-95.10
2	3449.80	-48.23	-13.00	-35.23	2.61 H	193	46.76	-94.99
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	3430.00	-46.12	-13.00	-33.12	1.97 V	288	48.98	-95.10
2	3449.80	-46.09	-13.00	-33.09	1.91 V	279	48.90	-94.99

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	LTE Band 66B Channel Bandwidth: 10MHz + 10MHz	**Channel**	CH 132373(1750.1MHz)+ CH 132472(1760.0MHz)
Frequency Range	1 GHz ~ 20 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 67% RH
Tested By	Adair Peng		

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	3500.00	-47.87	-13.00	-34.87	2.52 H	191	46.58	-94.45
2	3520.00	-47.82	-13.00	-34.82	2.45 H	202	46.62	-94.44
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	3500.00	-45.97	-13.00	-32.97	1.97 V	293	48.48	-94.45
2	3520.00	-46.01	-13.00	-33.01	1.91 V	288	48.43	-94.44

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	LTE Band 66B Channel Bandwidth: 10MHz + 10MHz	**Channel**	CH 132523(1765.1MHz)+ CH 132622(1775.0MHz)
Frequency Range	1 GHz ~ 20 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 67% RH
Tested By	Adair Peng		

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	3530.00	-47.21	-13.00	-34.21	2.48 H	199	47.22	-94.43
2	3550.00	-47.13	-13.00	-34.13	2.37 H	208	47.28	-94.41
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	3530.00	-45.88	-13.00	-32.88	1.97 V	287	48.55	-94.43
2	3550.00	-46.03	-13.00	-33.03	1.81 V	266	48.38	-94.41

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.

7.6.2 LTE Band 66C

RF Mode	LTE Band 66C Channel Bandwidth: 20MHz + 20MHz	**Channel**	CH 132072(1720.0MHz)+ CH 132270(1739.8MHz)
Frequency Range	1 GHz ~ 20 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 67% RH
Tested By	Adair Peng		

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	3440.00	-47.98	-13.00	-34.98	2.58 H	209	47.06	-95.04
2	3479.60	-48.05	-13.00	-35.05	2.63 H	194	46.62	-94.67
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	3440.00	-47.39	-13.00	-34.39	1.93 V	285	47.65	-95.04
2	3479.60	-47.52	-13.00	-34.52	1.77 V	267	47.15	-94.67

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	LTE Band 66C Channel Bandwidth: 20MHz + 20MHz	**Channel**	CH 132323(1745.1MHz)+ CH 132521(1764.9MHz)
Frequency Range	1 GHz ~ 20 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 67% RH
Tested By	Adair Peng		

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	3490.00	-46.67	-13.00	-33.67	2.60 H	199	47.88	-94.55
2	3529.80	-46.65	-13.00	-33.65	2.38 H	208	47.78	-94.43
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	3490.00	-45.89	-13.00	-32.89	1.80 V	287	48.66	-94.55
2	3529.80	-46.03	-13.00	-33.03	1.93 V	290	48.40	-94.43

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	LTE Band 66C Channel Bandwidth: 20MHz + 20MHz	**Channel**	CH 132374(1750.2MHz)+ CH 132572(1770.0MHz)
Frequency Range	1 GHz ~ 20 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 67% RH
Tested By	Adair Peng		

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	3500.00	-47.39	-13.00	-34.39	2.63 H	200	47.06	-94.45
2	3540.00	-47.49	-13.00	-34.49	2.33 H	199	46.93	-94.42
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	3500.00	-45.78	-13.00	-32.78	1.80 V	288	48.67	-94.45
2	**3540.00**	**-45.75**	**-13.00**	**-32.75**	**1.93 V**	**263**	**48.67**	**-94.42**

Remarks:

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

7.7 Frequency Stability

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

7.7.1 LTE Band 66B

Frequency Stability Versus Voltage				
Voltage (Vdc)	CH 132022(1715.0MHz)+ CH 132121(1724.9MHz)		CH 132523(1765.1MHz)+ CH 132622(1775.0MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1715.000004	0.002	1775.000004	0.002
3.27	1715.000003	0.002	1774.999998	-0.001
4.43	1715.000004	0.002	1774.999998	-0.001

Note: The applicant defined the normal working voltage is from 3.27 to 4.43 Vdc.

Frequency Stability Versus Temperature				
Temperature (℃)	CH 132022(1715.0MHz)+ CH 132121(1724.9MHz)		CH 132523(1765.1MHz)+ CH 132622(1775.0MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1715.000003	0.002	1775.000002	0.001
-20	1715.000002	0.001	1775.000003	0.002
-10	1715.000004	0.002	1774.999997	-0.002
0	1714.999996	-0.002	1775.000002	0.001
10	1714.999998	-0.001	1775.000003	0.002
20	1715.000004	0.002	1775.000001	0.001
30	1715.000002	0.001	1774.999996	-0.002
40	1714.999996	-0.002	1775.000002	0.001
50	1715.000002	0.001	1775.000001	0.001
55	1714.999998	-0.001	1774.999998	-0.001

7.7.2 LTE Band 66C

Frequency Stability Versus Voltage				
Voltage (Vdc)	CH 132072(1720.0MHz)+ CH 132270(1739.8MHz)		CH 132374(1750.2MHz)+ CH 132572(1770.0MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1719.999996	-0.002	1770.000001	0.001
3.27	1720.000001	0.001	1770.000002	0.001
4.43	1720.000004	0.002	1769.999999	-0.001

Note: The applicant defined the normal working voltage is from 3.27 to 4.43 Vdc.

Frequency Stability Versus Temperature				
Temperature (℃)	CH 132072(1720.0MHz)+ CH 132270(1739.8MHz)		CH 132374(1750.2MHz)+ CH 132572(1770.0MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1720.000001	0.001	1770.000001	0.001
-20	1720.000002	0.001	1769.999999	-0.001
-10	1720.000003	0.002	1769.999997	-0.002
0	1720.000001	0.001	1770.000002	0.001
10	1719.999999	-0.001	1770.000001	0.001
20	1719.999996	-0.002	1770.000003	0.002
30	1719.999996	-0.002	1770.000002	0.001
40	1719.999999	-0.001	1769.999998	-0.001
50	1719.999996	-0.002	1770.000005	0.003
55	1719.999999	-0.001	1770.000004	0.002

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:

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

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