

## FCC IC Test Report

**Report No.:** FCC\_IC\_SL19041701-SEV-040\_LTE WCDMA\_Rev1.0

**FCC ID:** AFJ382500

**IC:** 202D-382500

**Test Model:** IP501M

**Received Date:** 06/21/2019

**Test Date:** 06/27/2019 – 07/08/2019

**Issued Date:** 08/15/2019

### FCC

**Applicant:** ICOM Incorporated

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**Manufacturer:** ICOM Incorporated

**Address:** 1-1-32 Kamiminami Hirano-ku Osaka 547-0003 Japan

### IC

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**Manufacturer:** ICOM CANADA

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**Issued By:** Bureau Veritas Consumer Products Services, Inc.

**Lab Address:** 775 Montague Expressway, Milpitas, CA 95035

**FCC Registration /** 540430

**Designation Number:**

**ISED# / CAB identifier:** 4842D



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### Release Control Record

Issue No.	Description	Date Issued
FCC_IC_SL19041701-SEV-040_LTE WCDMA	Original Release	07/19/2019
FCC_IC_SL19041701-SEV-040_LTE WCDMA_Rev1.0	Original Release	08/15/2019

## 1 Certificate of Conformity

**Product:** IP Advanced Radio System

**Brand:** Icom

**Test Model:** IP501M

**Sample Status:** ENGINEERING SAMPLE

**FCC Applicant:** ICOM Incorporated

**IC Applicant:** ICOM CANADA

**Test Date:** 06/27/2019 – 07/08/2019

**Standards:** 47CFR Part 22/24/27

RSS-Gen Issue 5, RSS-130 Issue 2, RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 3

The above equipment has been tested by **Bureau Veritas Consumer Products Services, Inc., Milpitas 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 EMC characteristics under the conditions specified in this report.

**Prepared by :** , **Date:** 08/15/2019  
Rachana Khanduri / Test Engineer

**Approved by :** , **Date:** 08/15/2019  
Chen Ge / Engineer Reviewer

## 2 Summary of Test Results

Applied Standard: FCC Part 22/24/27			
RSS-Gen Issue 5, RSS-130 Issue 2, RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 3			
FCC IC Clause	Test Item	Result	Remarks
2.1046, 22.913 (a) RSS-130 (4.6), RSS-132 (5.4), RSS-133 (6.4), RSS-139 (6.5)	Effective radiated power	PASS	Meet the requirement of limit.
47CFR24.232(d), 27.50(d)(5) RSS-130 (4.6), RSS-132 (5.4), RSS-133 (6.4), RSS-139 (6.5)	Peak To Average Ratio	PASS	Pass*
47CFR2.1051, 22.917(a), 24.238(a), 27.53(h) RSS-130 (4.7), RSS-132 (5.5), RSS-133 (6.5), RSS-139 (6.6)	Spurious and harmonic Emission at antenna port	PASS	Pass*
47CFR2.1053, 22.355, 24.135, 27.54 RSS-130 (4.5), RSS-132 (5.3), RSS-133(6.3), RSS-139 (6.4)	Frequency Stability	PASS	Pass*
2.1049 RSS-Gen (6.7), RSS-133 (2.3)	Occupied Bandwidth	PASS	Pass*
47CFR2.1051, 22.917(a), 24.238(a), 27.53(h) RSS-130 (4.7), RSS-132 (5.5), RSS-133 (6.5), RSS-139 (6.6)	Band Edge Measurements	PASS	Pass*
47CFR2.1053, 22.917(a), 24.238(a), 27.53(h) RSS-130 (4.7), RSS-132 (5.5), RSS-133 (6.5), RSS-139 (6.6)	Radiated Spurious and harmonic Emissions	PASS	Meet the requirement of limit.

### Note:

- Note: Pass\*: Only radiated spurious emission is tested in this report, for other test items please refer to the RF reports for module SIM7500A.FCC ID: UDV-201606 (FCC Report No: I16D00113-RFA, I16Z41276-GTE01, BL-SZ1690342-501) IC: 23761-8PYA003 (IC Report No: I18D00227-SRD01, I18D00227-D02).

### Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
Radiated Emission	22deg. C, 71%RH	13.8VDC	Rachana Khanduri

### 2.1 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

## 2.2 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	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	3.51dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	3.73dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.64dB
	6GHz ~ 18GHz	4.82dB
	18GHz ~ 40GHz	4.91dB

## 2.3 Modification Record

There were no modifications required for compliance.

## 2.4 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
EMI Test Receiver ROHDE & SCHWARZ	ESIB 40	100179	08/28/2018	08/28/2019
Spectrum Analyzer KEYSIGHT	N9030B	MY57140374	07/22/2018	07/22/2019
Hybrid Antenna SUNAR	JB6	A111717	03/09/2019	03/09/2020
DRG Horn Antenna ETS LINDGREN	3117	214309	11/22/2018	11/22/2019
Horn Antenna EMCO	3115	100059	01/26/2018	01/26/2020
Tuned Dipole Antenna COM-POWER	AD-100	40133	01/23/2018	01/23/2020
Preamplifier RF-LAMBDA	RAMP00M50GA	17032300047	09/19/2018	09/19/2019
Preamplifier RF-BAY	LPA-6-30	11170601	07/24/2018	07/24/2019
Signal Generator KEYSIGHT	N5182A	MY47071065	08/10/2018	08/10/2019

### 3 General Information

#### 3.1 General Description of EUT

Product	IP Advanced Radio System	
Brand	Icom	
Test Model	IP501M	
Serial No.	000000000301	
Serial Mode	N/A	
Model Difference	N/A	
HVIN	382500-01	
Status of EUT	ENGINEERING SAMPLE	
Power Supply Rating	13.8VDC	
Equipment Class/ Category	PCB	
Modulation Type	WCDMA	QPSK
	LTE	QPSK, 16QAM, 64QAM
Frequency Range	WCDMA- Band 2	TX: 1850 MHz to 1910 MHz RX: 1930 MHz to 1990 MHz
	WCDMA- Band 5	TX: 824 MHz to 849 MHz RX: 869 MHz to 894 MHz
	LTE Band 2	TX: 1850 MHz to 1910 MHz RX: 1930 MHz to 1990 MHz
	LTE Band 4	TX: 1710 MHz to 1755 MHz RX: 2110 MHz to 2155 MHz
	LTE Band 12	TX: 699 MHz to 716 MHz RX: 729 MHz to 746 MHz
Bandwidth	WCDMA- Band 2	5MHz
	WCDMA- Band 5	5 MHz
	LTE Band 2	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
	LTE Band 4	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
	LTE Band 12	1.4MHz, 3MHz, 5MHz, 10MHz
Hardware Version	N/A	
Software Version	N/A	
Antenna Type	LTE/GSM Passive Antenna	
Antenna Gain	0dBi	
Antenna Connector	Reverse SMA	
Accessory Device	N/A	

Note:

- The EUT consumes power from the DC power supply

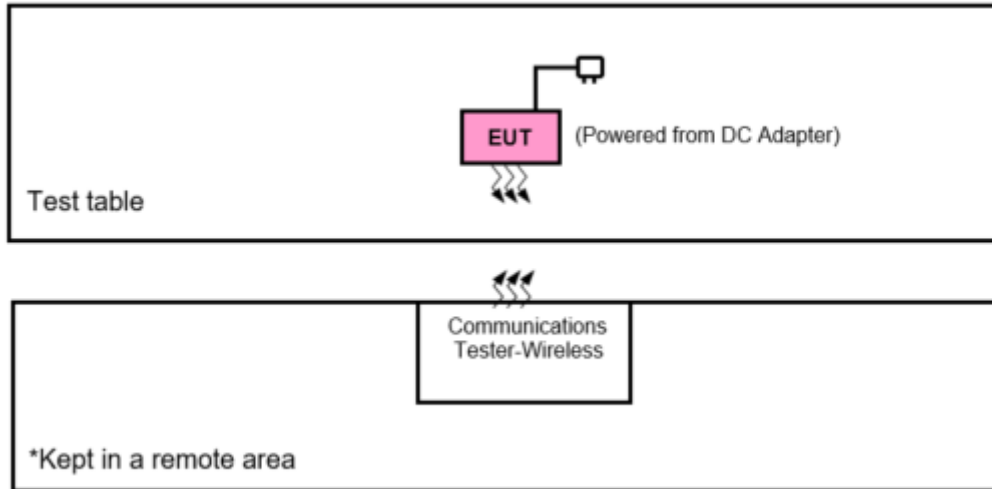
MODEL	RIGOL DP712
RATING	13.8Vdc

- The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3.2 Configuration of System under Test

For WCDMA and LTE:

<Radiated Emission Test>



### 3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	Wideband Radio Communicator	Rohde & Schwarz	CMW500	108852	NA
2	DC Power Supply	RIGOL	DP712	DP7B182100095	NA

### 3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**47CFR Part 22/24/27**

**RSS-Gen Issue 5, RSS-130 Issue 2, RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 3**

Note: All test items have been performed and recorded as per the above standards.



## 4 Test Types and Results

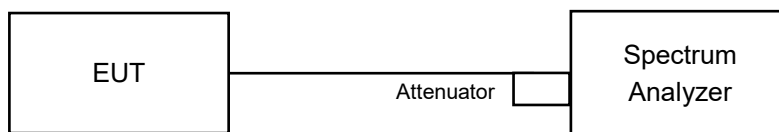
### 4.1 E.R.P./E.I.R.P.

#### 4.1.1 Limits of E.R.P./E.I.R.P

Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

The maximum effective radiated power (ERP) of fixed and base station must not exceed 1000 Watts.

#### 4.1.2 Test Setup



#### 4.1.3 Test Instruments

Refer to section 2.3 to get information of above instrument.

#### 4.1.4 Test Procedure

- EUT was set for low, mid, high channel with modulated mode and highest RF output power.
- The spectrum analyzer was connected to the antenna terminal.

#### 4.1.5 Deviation from Test Standard

No deviation.

#### 4.1.6 Test Results

##### FCC-Maximum ERP/EIRP

Type	Conducted Power (dBm)	Antenna Gain (dBi)	ERP/EIRP (dBm)	Limit (dBm)
WCDMA Band 2	24.74	0	24.74	40.61
WCDMA Band 5	24.82	0	22.67	40.61

Type	Conducted Power (dBm)	Antenna Gain (dBi)	ERP/EIRP (dBm)	Limit (dBm)
LTE Band 2	22.98	0	22.98	33.01
LTE Band 4	23.32	0	23.32	30.00
LTE Band 12	21.91	0	19.76	36.99

##### IC-Maximum ERP/EIRP

Type	Conducted Power (dBm)	Antenna Gain (dBi)	ERP/EIRP (dBm)	Limit (dBm)
WCDMA Band 2	23.49	0	23.49	40.61
WCDMA Band 5	24.84	0	24.84	40.61

Type	Conducted Power (dBm)	Antenna Gain (dBi)	ERP/EIRP (dBm)	Limit (dBm)
LTE Band 2	24.03	0	24.03	33.01
LTE Band 4	23.60	0	23.60	30.00
LTE Band 12	24.88	0	22.73	36.99

Note: ERP/EIRP is calculated as per below:

$$\text{ERP} = P_{\text{conducted}} + G_{\text{ant}} - 2.15$$

$$\text{EIRP} = P_{\text{conducted}} + G_{\text{ant}}$$

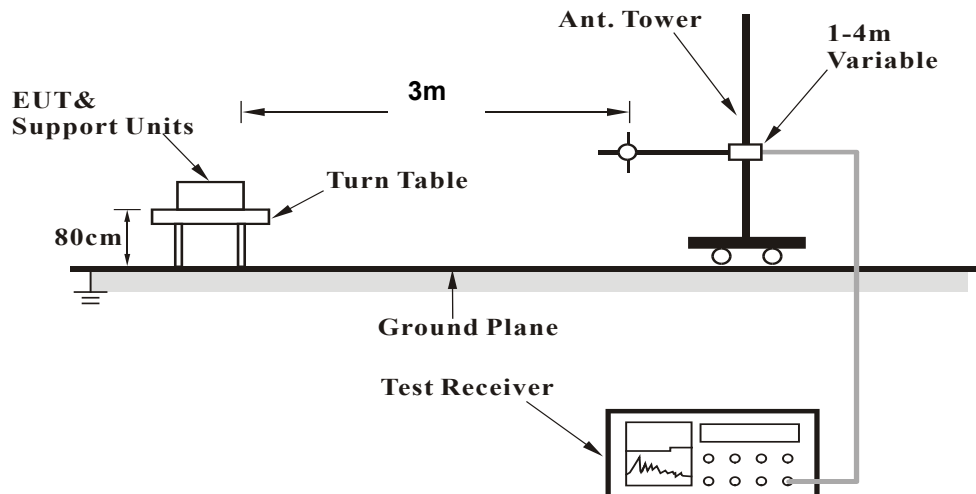
## 4.2 Radiated Emission Measurement

### 4.2.1 Limits of Radiated Emission Measurement

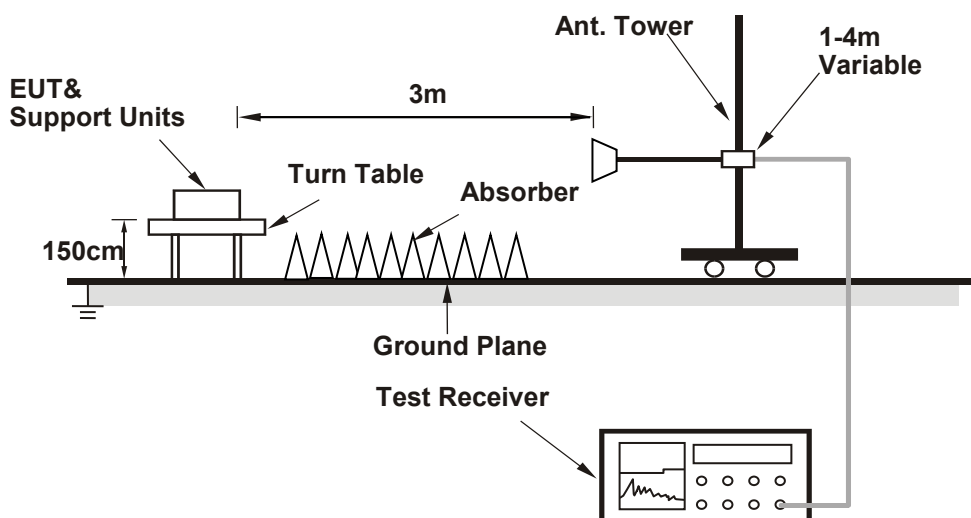
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB. The limit of emission equals to -13dBm.

### 4.2.2 Test Setup

#### For Radiated emission 30MHz to 1GHz



#### For Radiated emission above 1GHz



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

### 4.2.3 Test Instruments

Refer to section 2.3 to get information of above instrument.

#### 4.2.4 Test Procedure

##### Substitution method:

- a. The EUT was switched on and allowed to warm up to its normal operating condition.
- b. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
  - Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
  - The EUT was then rotated to the direction that gave the maximum emission.
  - Finally, the antenna height was adjusted to the height that gave the maximum emission.
- c. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The centre of the substitution antenna should be approximately at the same location as the centre of the transmitter.
- d. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained.
- e. Steps 4 were repeated for the next frequency point, until all selected frequency points were measured.

#### 4.2.5 Deviation from Test Standard

No deviation.

#### 4.2.6 Test Results

Radiated Emission Test Results (Below 1GHz) (Worst case only)

WCDMA band 2

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
70.01	-63.45	315	186	V	70.01	-58.82	0.47	0	-58.35	-13	-45.35
70.01	-67.74	293	133	H	70.01	-61.9	0.47	0	-61.43	-13	-48.43
165.19	-61.23	224	159	V	165.19	-57.5	1.24	0	-56.26	-13	-43.26
165.19	-63.51	344	284	H	165.19	-59.63	1.24	0	-58.39	-13	-45.39

LTE band 2

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
70.01	-64.21	315	186	V	70.01	-59.06	0.47	0	-58.59	-13	-45.59
70.01	-67.21	293	133	H	70.01	-61.7	0.47	0	-61.23	-13	-48.23
165.19	-61.51	224	159	V	165.19	-57.7	1.24	0	-56.46	-13	-43.46
165.19	-63.27	344	284	H	165.19	-60.08	1.24	0	-58.84	-13	-45.84

#### REMARKS:

1. Absolute level (dBm) = Level (dBm) + Ant Gain(dBi) – Cable Loss(dB)
2. Margin value = Absolute level – Limit value.

## Radiated Emission Test Results (Above 1GHz)

## WCDMA band 2 Low Channel

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
3704.8	-55.71	228	208	V	3704.8	-51.91	10.29	1.95	-43.57	-13	-30.57
3704.8	-54.46	216	152	H	3704.8	-50.66	10.29	1.95	-42.32	-13	-29.32
7483	-57.47	30	175	V	7483	-51.61	10.66	2.42	-43.37	-13	-30.37
7483	-64.18	60	193	H	7483	-58.32	10.66	2.42	-50.08	-13	-37.08

## WCDMA band 2 Mid Channel

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
3760	-56.65	219	158	V	3760	-52.77	9.98	1.95	-44.74	-13	-31.74
3760	-55.96	44	162	H	3760	-52.08	9.98	1.95	-44.05	-13	-31.05
7524	-61.02	77	159	V	7524	-55.17	10.76	2.43	-46.84	-13	-33.84
7524	-64.92	31	205	H	7524	-59.07	10.76	2.43	-50.74	-13	-37.74

## WCDMA band 2 High Channel

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
3815.2	-57.32	100	205	V	3815.2	-53.35	9.72	1.95	-45.58	-13	-32.58
3815.2	-59	326	173	H	3815.2	-55.03	9.72	1.95	-47.26	-13	-34.26
7333	-57.99	204	174	V	7333	-51.9	10.46	2.85	-44.29	-13	-31.29
7333	-56.53	123	174	H	7333	-50.44	10.46	2.85	-42.83	-13	-29.83

## WCDMA band 5 Low Channel

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1652.8	-60.81	203	187	V	1652.8	-56.51	9.32	1.27	-48.46	-13	-35.46
1652.8	-61.58	112	180	H	1652.8	-57.28	9.32	1.27	-49.23	-13	-36.23
6202	-61.16	281	212	V	6202	-56.21	10.31	2.6	-48.5	-13	-35.5
6202	-61.75	305	209	H	6202	-56.8	10.31	2.6	-49.09	-13	-36.09

## WCDMA band 5 Mid Channel

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1670	-66.21	247	178	V	1670	-62.04	9.29	1.29	-54.04	-13	-41.04
1670	-61.01	249	214	H	1670	-56.84	9.29	1.29	-48.84	-13	-35.84
6772	-57.02	73	219	V	6772	-51.45	10.7	2.79	-43.54	-13	-30.54
6772	-64.9	164	207	H	6772	-59.33	10.7	2.79	-51.42	-13	-38.42

## WCDMA band 5 High Channel

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1693.2	-61.54	314	219	V	1693.2	-57.47	9.25	1.3	-49.52	-13	-36.52
1693.2	-61.02	73	205	H	1693.2	-56.95	9.25	1.3	-49	-13	-36
6885	-64.15	3	219	V	6885	-58.46	10.72	2.82	-50.56	-13	-37.56
6885	-57.74	99	164	H	6885	-52.05	10.72	2.82	-44.15	-13	-31.15

## LTE band 2 Low Channel, 10MHz BW, QPSK

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
3720	-57.16	256	216	V	3720	-53.34	10.21	1.95	-45.08	-13	-32.08
3720	-53.02	122	152	H	3720	-49.2	10.21	1.95	-40.94	-13	-27.94
7093	-57.39	175	214	V	7093	-51.47	10.42	2.89	-43.94	-13	-30.94
7093	-55.22	117	151	H	7093	-49.3	10.42	2.89	-41.77	-13	-28.77

## LTE band 2 Mid Channel, 10MHz BW, QPSK

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
3760	-53.05	110	193	V	3760	-49.17	9.98	1.95	-41.14	-13	-28.14
3760	-52.29	316	185	H	3760	-48.41	9.98	1.95	-40.38	-13	-27.38
7970	-61.83	142	153	V	7970	-56.1	10.75	2.55	-47.9	-13	-34.9
7970	-59.26	102	190	H	7970	-53.53	10.75	2.55	-45.33	-13	-32.33

## LTE band 2 High Channel, 10MHz BW, QPSK

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
3800	-56.67	19	193	V	3800	-52.72	9.76	1.95	-44.91	-13	-31.91
3800	-56.03	301	153	H	3800	-52.08	9.76	1.95	-44.27	-13	-31.27
7455	-64.83	193	206	V	7455	-58.96	10.63	2.41	-50.74	-13	-37.74
7455	-65.78	283	166	H	7455	-59.91	10.63	2.41	-51.69	-13	-38.69



## LTE band 4 Low Channel, 10MHz BW, QPSK

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
3440	-61.54	131	177	V	3440	-57.85	9.69	1.7	-49.86	-13	-36.86
3440	-55.66	164	161	H	3440	-51.97	9.69	1.7	-43.98	-13	-30.98
7966	-64.65	245	207	V	7966	-58.92	10.76	2.55	-50.71	-13	-37.71
7966	-64.02	265	179	H	7966	-58.29	10.76	2.55	-50.08	-13	-37.08

## LTE band 4 Mid Channel, 10MHz BW, QPSK

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
3465	-54.7	176	158	V	3465	-50.96	9.79	1.72	-42.89	-13	-29.89
3465	-54.59	187	208	H	3465	-50.85	9.79	1.72	-42.78	-13	-29.78
7989	-54.55	71	195	V	7989	-48.83	10.72	2.56	-40.67	-13	-27.67
7989	-63.65	268	180	H	7989	-57.93	10.72	2.56	-49.77	-13	-36.77

## LTE band 4 High Channel, 10MHz BW, QPSK

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
3490	-54.33	108	170	V	3490	-50.54	9.88	1.73	-42.39	-13	-29.39
3490	-57.1	275	196	H	3490	-53.31	9.88	1.73	-45.16	-13	-32.16
7408	-57.54	342	218	V	7408	-51.6	10.57	2.54	-43.57	-13	-30.57
7408	-56.64	233	192	H	7408	-50.7	10.57	2.54	-42.67	-13	-29.67

## LTE band 12 Low Channel, 5MHz BW, QPSK

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
2112	-61.86	137	202	V	2112	-57.42	9.32	1.41	-49.51	-13	-36.51
2112	-63.59	62	171	H	2112	-59.15	9.32	1.41	-51.24	-13	-38.24
7532	-64.07	64	212	V	7532	-58.22	10.79	2.43	-49.86	-13	-36.86
7532	-62.2	31	196	H	7532	-56.35	10.79	2.43	-47.99	-13	-34.99

## LTE band 12 Mid Channel, 5MHz BW, QPSK

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
2122.5	-61.88	350	164	V	2122.5	-57.43	9.34	1.41	-49.5	-13	-36.5
2122.5	-63.25	272	151	H	2122.5	-58.8	9.34	1.41	-50.87	-13	-37.87
7481	-55.07	60	196	V	7481	-49.21	10.66	2.42	-40.97	-13	-27.97
7481	-61.31	261	201	H	7481	-55.45	10.66	2.42	-47.21	-13	-34.21

## LTE band 12 High Channel, 5MHz BW, QPSK

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
2133	-60.69	326	185	V	2133	-56.23	9.36	1.41	-48.28	-13	-35.28
2133	-60.35	175	181	H	2133	-55.89	9.36	1.41	-47.94	-13	-34.94
7205	-57.77	97	210	V	7205	-51.73	10.32	2.93	-44.34	-13	-31.34
7205	-58.81	47	190	H	7205	-52.77	10.32	2.93	-45.38	-13	-32.38

**REMARKS:**

1. Absolute level (dBm) = Level (dBm) + Ant Gain(dBi) – Cable Loss(dB)
2. Margin value = Absolute level – Limit value.

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information of the Testing Laboratories

Bureau Veritas is a global leader in testing, inspection and certification (TIC) services. We help businesses improve safety, sustainability and productivity; and our clients include the majority of leading brands in retail, manufacturing and other industries. With a presence in every major country around the world, our quality assurance and compliance solutions are vital in helping our customers enhance product quality and concept-to-consumer journeys. We also assist with increasing speed to market, profitability and brand equity throughout the supply chain. Bureau Veritas is a leading wireless/IoT testing, inspection, audit and certification provider, with a global network of test laboratories to support the IoT industry in areas of connectivity, security, interoperability as well as quality, health & safety, and environmental/chemical requirements.

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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