

FCC Test Report

(PART 27)

Report No.: RF191008C34-4

FCC ID: 2AAFX-JDCGNUS3110

Test Model: ROBOTIC MOWER CONNECTIVITY MODULE

Received Date: Oct. 08, 2019

Test Date: Nov. 21, 2019 ~ Feb. 13, 2020

Issued Date: Feb. 24, 2020

Applicant: Deere & Company

Address: One John Deere Place, Moline, IL 61265

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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FCC Registration /
Designation Number: 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF191008C34-4	Original Release	Feb. 24, 2020

1 Certificate of Conformity

Product: Robotic Mower Connectivity Module

Brand: John Deere

Test Model: ROBOTIC MOWER CONNECTIVITY MODULE

Sample Status: Production Unit

Applicant: Deere & Company

Test Date: Nov. 21, 2019 ~ Feb. 13, 2020

Standards: FCC Part 27, Subpart C, H, L

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.

Prepared by :

Lena Wang

, **Date:** Feb. 24, 2020

Lena Wang / Specialist

Approved by :

Dylan Chiou

, **Date:** Feb. 24, 2020

Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2 (WCDMA)			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(d)(4)	Equivalent Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -24.2 dB at 35.82 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 4)			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(d)(4)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -22.5 dB at 325.85 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 12)			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(c)(10)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
---	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(g)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(g)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(g)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -21.5 dB at 63.95 MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 15, 2019	Apr. 14, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 12, 2019	Jun. 11, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 07, 2019	Nov. 06, 2020
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 19, 2019	Aug. 18, 2020
Radio Communication Analyzer Anritsu	MT8821C	6261806803	Jan. 22, 2019	Jan. 21, 2020
			Jan. 18, 2020	Jan. 17, 2021
MXG Vector signal generator Agilent	N5182B	MY53050162	Jan. 16, 2019	Jan. 15, 2020
			Jan. 14, 2020	Jan. 13, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Nov. 08, 2019	Nov. 09, 2020
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 25, 2018	Nov. 24, 2019
			Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 25, 2018	Nov. 24, 2019
			Nov. 24, 2019	Nov. 23, 2020
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2019	Sep. 15, 2020
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jul. 11, 2019	Jul. 10, 2020
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 19, 2019	Feb. 18, 2020
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 19, 2019	Jan. 18, 2020
			Jan. 18, 2020	Jan. 17, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9- (250795/4)	Jul. 11, 2019	Jul. 10, 2020
RF signal cable Woken	8D-FB	Cable-CH9-01	Jul. 30, 2019	Jul. 29, 2020
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 03, 2019	Jun. 02, 2020
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
True RMS Clamp Meter Fluke	325	31130711WS	May 21, 2019	May 20, 2020

DC power supply, low-cost. 30V/5A, 150 W Keysight	U8002A	MY56330015	NA	NA
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Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 9.

3 General Information

3.1 General Description of EUT

Product	Robotic Mower Connectivity Module		
Brand	John Deere		
Test Model	ROBOTIC MOWER CONNECTIVITY MODULE		
Status of EUT	Production Unit		
Power Supply Rating	18.5Vdc ~ 30 Vdc (DC Power Supply)		
Modulation Type	WCDMA	QPSK	
	LTE	QPSK, 16QAM	
Frequency Range	WCDMA	1712.4 ~ 1752.6 MHz	
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1710.7 ~ 1754.3 MHz	
	LTE Band 4 (Channel Bandwidth: 3 MHz)	1711.5 ~ 1753.5 MHz	
	LTE Band 4 (Channel Bandwidth: 5 MHz)	1712.5 ~ 1752.5 MHz	
	LTE Band 4 (Channel Bandwidth: 10 MHz)	1715.0 ~ 1750.0 MHz	
	LTE Band 4 (Channel Bandwidth: 15 MHz)	1717.5 ~ 1747.5 MHz	
	LTE Band 4 (Channel Bandwidth: 20 MHz)	1720.0 ~ 1745.0 MHz	
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	699.7 ~ 715.3 MHz	
	LTE Band 12 (Channel Bandwidth: 3 MHz)	700.5 ~ 714.5 MHz	
	LTE Band 12 (Channel Bandwidth: 5 MHz)	701.5 ~ 713.5 MHz	
	LTE Band 12 (Channel Bandwidth: 10MHz)	704.0 ~ 711.0 MHz	
Emission Designator	WCDMA	4M15F9W	
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1M09G7D	
	LTE Band 4 (Channel Bandwidth: 3 MHz)	2M70G7D	
	LTE Band 4 (Channel Bandwidth: 5 MHz)	4M49D7W	
	LTE Band 4 (Channel Bandwidth: 10 MHz)	8M96G7D	
	LTE Band 12 (Channel Bandwidth: 1.4 Hz)	1M09D7W	
	LTE Band 12 (Channel Bandwidth: 3 MHz)	2M70G7D	
	LTE Band 12 (Channel Bandwidth: 5 MHz)	4M50D7W	
	LTE Band 12 (Channel Bandwidth: 10 MHz)	8M99G7D	
Max. ERP Power		QPSK	16QAM
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	128.825 mW (21.10dBm)	95.499 mW (19.80dBm)
	LTE Band 12 (Channel Bandwidth: 3 MHz)	125.893 mW (21.00dBm)	91.201 mW (19.60dBm)
	LTE Band 12 (Channel Bandwidth: 5 MHz)	128.825 mW (21.10dBm)	89.125 mW (19.50dBm)
	LTE Band 12 (Channel Bandwidth: 10 MHz)	123.027 mW (20.90dBm)	--
Max. EIRP Power	WCDMA	630.957 mW (28.00dBm)	
		QPSK	16QAM
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	380.189 mW (25.80dBm)	301.995 mW (24.80dBm)
	LTE Band 4 (Channel Bandwidth: 3 MHz)	407.380 mW (26.10dBm)	301.995 mW (24.80dBm)
	LTE Band 4 (Channel Bandwidth: 5 MHz)	380.189 mW (25.80dBm)	301.995 mW (24.80dBm)
	LTE Band 4 (Channel Bandwidth: 10 MHz)	416.869 mW (26.20dBm)	--
Antenna Type	Metal stamp Antenna		
Antenna Gain	WCDMA	3.15 dBi	

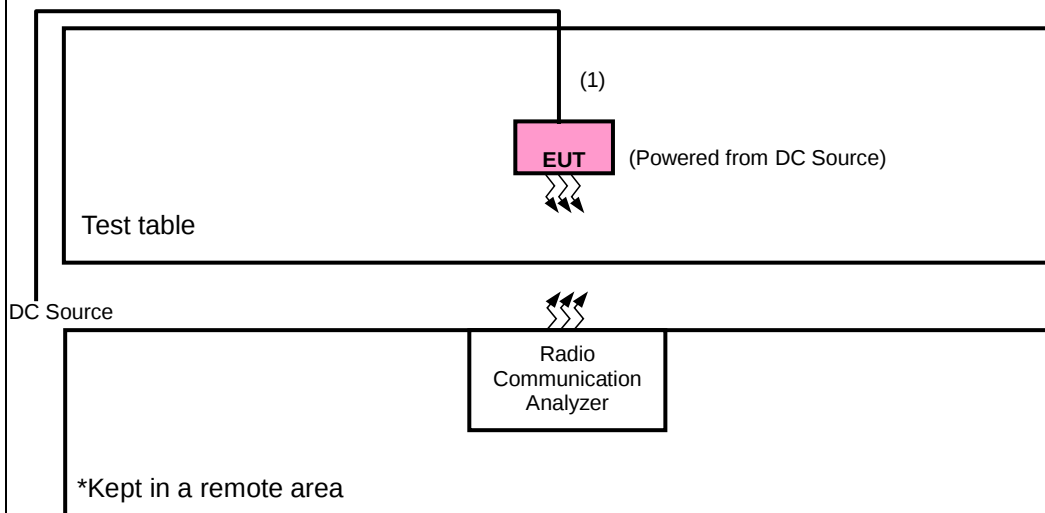
	LTE Band 4	3.15 dBi
	LTE Band 12	0.66 dBi
Accessory Device	N/A	
Data Cable Supplied	N/A	

Note:

1. 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 Configuration of System under Test

<Radiated Emission Test> & <E.R.P. / E.I.R.P. Test>



3.2.1 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.	DC power supply	Keysight	U8002A	MY56330015	--
2.	Radio Communication Analyzer	Anritsu	MT8821C	6261806803	--

No.	Signal Cable Description Of The Above Support Units
1.	Cable: 2.1m

Note:

1. All power cords of the above support units are non-shielded (1.8m).

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	ERP / EIRP	Radiated Emission
WCDMA	Y-plane	Y-plane
LTE Band 4	Y-plane	Y-plane
LTE Band 12	Y-plane	Y-plane

WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	1312 to 1513	1312, 1413, 1513	WCDMA
-	Modulation Characteristics	1312 to 1513	1413	WCDMA
-	Frequency Stability	1312 to 1513	1312, 1513	WCDMA
-	Occupied Bandwidth	1312 to 1513	1312, 1413, 1513	WCDMA
-	Band Edge	1312 to 1513	1312, 1513	WCDMA
-	Peak to Average Ratio	1312 to 1513	1312, 1413, 1513	WCDMA
-	Conducted Emission	1312 to 1513	1312, 1413, 1513	WCDMA
-	Radiated Emission	1312 to 1513	1312, 1413, 1513	WCDMA

Note: For radiated emission below 1 GHz, choose the maximum EIRP power worst one channel for final test

LTE Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK	1 RB / 0 RB Offset
-	Modulation Characteristics	19975 to 20375	20175	5 MHz	16QAM	25 RB / 0 RB Offset
		20000 to 20350		10 MHz	QPSK	50 RB / 0 RB Offset
-	Frequency Stability	19957 to 20393	19957, 20393	1.4 MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	19965, 20385	3 MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975, 20375	5 MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20000, 20350	10 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
-	Peak to Average Ratio	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK	1 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Band Edge	19957 to 20393	19957	1.4 MHz	QPSK	1 RB / 0 RB Offset
			20393	1.4 MHz	QPSK	6 RB / 0 RB Offset
		19965 to 20385	19965	3 MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
			20385	3 MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
		19975 to 20375	19975	5 MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
			20375	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
		20000 to 20350	20000	10 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
-	Conducted Emission	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK	1 RB / 0 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For radiated emission below 1 GHz, choose the maximum EIRP power worst one channel for final test

LTE Band 12

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	1 RB / 0 RB Offset
-	Modulation Characteristics	23035 to 23155	23095	5 MHz	16QAM	25 RB / 0 RB Offset
		23060 to 23130		10 MHz	QPSK	50 RB / 0 RB Offset
-	Frequency Stability	23017 to 23173	23017, 23173	1.4 MHz	QPSK	1 RB / 0 RB Offset
		23025 to 23165	23025, 23165	3 MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23035, 23155	5 MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23060, 23130	10 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	50 RB / 0 RB Offset
-	Peak to Average Ratio	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	1 RB / 0 RB Offset
-	Band Edge	23017 to 23173	23017	1.4 MHz	QPSK	1 RB / 0 RB Offset
			23173	1.4 MHz	QPSK	6 RB / 0 RB Offset
		23025 to 23165	23025	3 MHz	QPSK	1 RB / 5 RB Offset
			23165	3 MHz	QPSK	6 RB / 0 RB Offset
		23035 to 23155	23035	5 MHz	QPSK	1 RB / 0 RB Offset
			23155	5 MHz	QPSK	15 RB / 0 RB Offset
		23060 to 23130	23060	10 MHz	QPSK	1 RB / 14 RB Offset
			23130	10 MHz	QPSK	15 RB / 0 RB Offset
		23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK	1 RB / 0 RB Offset
			23025, 23095, 23165	3 MHz	QPSK	25 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK	1 RB / 24 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	25 RB / 0 RB Offset
-	Conducted Emission	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK	1 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	1 RB / 0 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For radiated emission below 1 GHz, choose the maximum ERP power worst one channel for final test

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP / EIRP	25 deg. C, 65 % RH	24 Vac	Han Wu
Modulation Characteristics	25 deg. C, 65 % RH	24 Vac	Vincent Huang
Frequency Stability	25 deg. C, 65 % RH	24 Vac	Vincent Huang
Occupied Bandwidth	25 deg. C, 65 % RH	24 Vac	Vincent Huang
Band Edge	25 deg. C, 65 % RH	24 Vac	Vincent Huang
Peak to Average Ratio	25 deg. C, 65 % RH	24 Vac	Vincent Huang
Conducted Emission	25 deg. C, 65 % RH	24 Vac	Vincent Huang
Radiated Emission	25 deg. C, 65 % RH	24 Vac	Greg Lin, Han Wu

3.4 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

3.5 General Description of Applied Standards and references

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

Test Standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 27

ANSI 63.26-2015

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

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI/TIA/EIA-603-E 2016

Note: All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

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.

Portable stations (hand-held device) operating in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

4.1.2 Test Procedures

EIRP / ERP Measurement:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 5 MHz for WCDMA and 10 MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 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.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step b. Record the power level of S.G.
- d. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$. E.R.P power can be calculated from E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$.

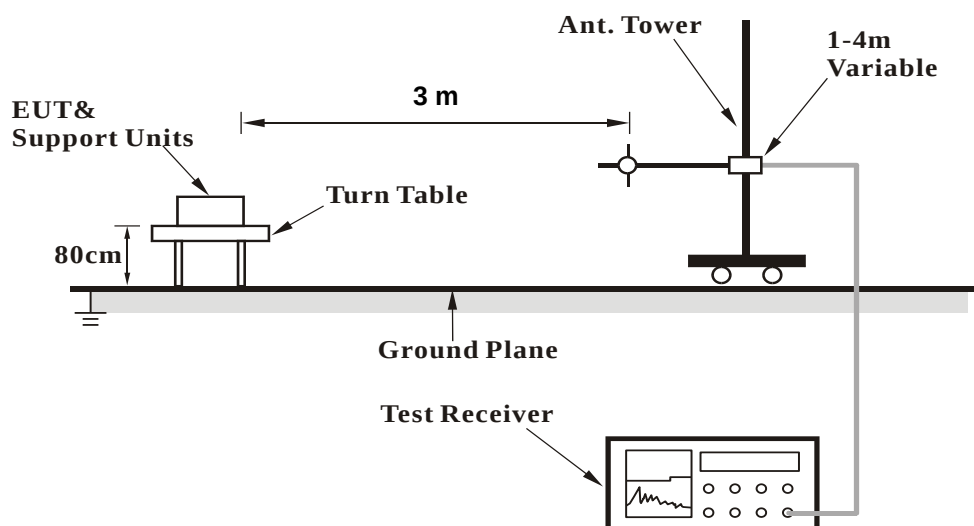
Conducted Power Measurement:

- a. The EUT was set up for the maximum power with WCDMA and LTE link data modulation and link up with simulator.
- b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

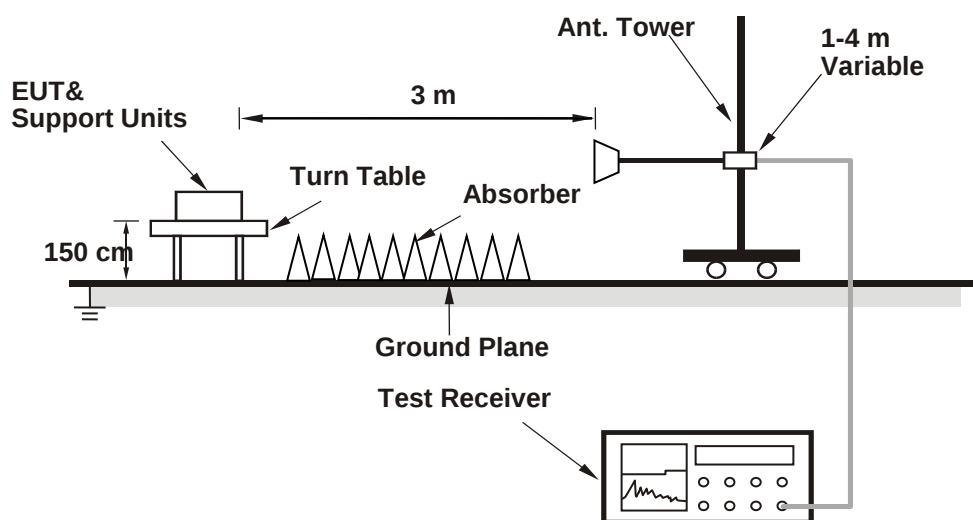
4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>

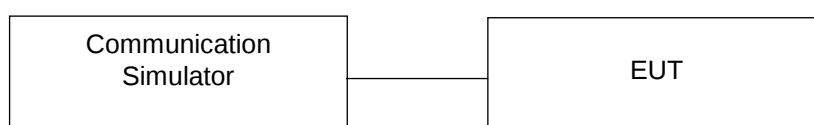


<Radiated Emission above 1 GHz>



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

Conducted Power Measurement:



4.1.4 Test Results

Conducted Output Power (dBm)

Band	WCDMA IV		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
RMC 12.2K	24.31	24.10	23.95
HSDPA Subtest-1	23.31	23.14	23.00
HSDPA Subtest-2	23.01	22.70	22.59
HSDPA Subtest-3	22.71	22.36	22.26
HSDPA Subtest-4	22.28	22.00	21.92
HSUPA Subtest-1	23.32	23.20	22.95
HSUPA Subtest-2	21.49	21.31	20.98
HSUPA Subtest-3	22.38	22.24	21.98
HSUPA Subtest-4	21.44	21.38	21.06
HSUPA Subtest-5	23.17	23.01	22.81

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 19957	Mid Ch 20175	High Ch 20393		Low Ch 19957	Mid Ch 20175	High Ch 20393	
			1710.7 MHz	1732.5 MHz	1754.3 MHz		1710.7 MHz	1732.5 MHz	1754.3 MHz	
4 / 1.4M	1	0	24.08	23.78	23.72	0	23.07	22.71	22.66	1
	1	2	24.00	23.73	23.66	0	22.94	22.71	22.58	1
	1	5	23.95	23.70	23.61	0	22.88	22.62	22.59	1
	3	0	23.87	23.67	23.55	0	22.81	22.64	22.46	1
	3	1	23.80	23.63	23.50	0	22.71	22.56	22.43	1
	3	3	23.72	23.55	23.44	0	22.64	22.54	22.40	1
	6	0	22.84	22.53	22.51	1	21.83	21.48	21.41	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 19965	Mid Ch 20175	High Ch 20385		Low Ch 19965	Mid Ch 20175	High Ch 20385	
			1711.5 MHz	1732.5 MHz	1753.5 MHz		1711.5 MHz	1732.5 MHz	1753.5 MHz	
4 / 3M	1	0	24.12	23.79	23.75	0	23.04	22.77	22.72	1
	1	7	23.97	23.79	23.70	0	22.92	22.71	22.69	1
	1	14	23.89	23.47	23.41	0	22.88	22.43	22.37	1
	8	0	23.02	22.68	22.58	1	21.80	21.55	21.45	2
	8	3	22.78	22.44	22.41	1	21.76	21.35	21.34	2
	8	7	22.75	22.35	22.30	1	21.69	21.34	21.26	2
	15	0	23.03	22.66	22.65	1	21.99	21.62	21.64	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 19975	Mid Ch 20175	High Ch 20375		Low CH 19975	Mid CH 20175	High CH 20375	
			1712.5 MHz	1732.5 MHz	1752.5 MHz		1712.5 MHz	1732.5 MHz	1752.5 MHz	
4 / 5M	1	0	24.18	23.90	23.80	0	23.10	22.87	22.76	1
	1	12	24.01	23.71	23.63	0	22.93	22.63	22.58	1
	1	24	23.92	23.61	23.51	0	22.85	22.59	22.47	1
	12	0	23.05	22.71	22.61	1	22.02	21.58	21.57	2
	12	6	22.86	22.57	22.51	1	21.77	21.48	21.45	2
	12	13	22.73	22.53	22.36	1	21.64	21.48	21.28	2
	25	0	22.94	22.67	22.66	1	21.91	21.58	21.65	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)
			Low Ch 20000	Mid Ch 20175	High Ch 20350	
			1715.0 MHz	1732.5 MHz	1750.0 MHz	
4 / 10M	1	0	24.25	23.87	23.89	0
	1	24	24.12	23.79	23.69	0
	1	49	23.94	23.72	23.54	0
	25	0	23.12	22.80	22.75	1
	25	12	22.92	22.64	22.55	1
	25	25	22.82	22.59	22.40	1
	50	0	23.15	22.73	22.70	1

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23017	Mid Ch 23095	High Ch 23173		Low Ch 23017	Mid Ch 23095	High Ch 23173	
			699.7 MHz	707.5 MHz	715.3 MHz		699.7 MHz	707.5 MHz	715.3 MHz	
12 / 1.4M	1	0	22.95	23.07	22.83	0	21.98	22.04	21.79	1
	1	2	22.88	22.92	22.70	0	21.82	21.94	21.66	1
	1	5	22.68	22.75	22.60	0	21.68	21.88	21.48	1
	3	0	21.94	21.89	21.72	0	20.75	20.88	20.53	1
	3	1	21.72	21.72	21.55	0	20.70	20.71	20.45	1
	3	3	21.70	21.65	21.45	0	20.46	20.52	20.42	1
	6	0	21.82	21.91	21.65	1	20.70	20.82	20.64	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23025	Mid Ch 23095	High Ch 23165		Low Ch 23025	Mid Ch 23095	High Ch 23165	
			700.5 MHz	707.5 MHz	714.5 MHz		700.5 MHz	707.5 MHz	714.5 MHz	
12 / 3M	1	0	23.08	23.18	22.91	0	22.02	22.10	21.84	1
	1	7	22.90	23.05	22.79	0	21.94	22.07	21.73	1
	1	14	22.69	22.83	22.61	0	21.75	21.72	21.68	1
	8	0	21.87	22.09	21.74	1	20.80	20.88	20.62	2
	8	3	21.68	21.84	21.56	1	20.66	20.79	20.50	2
	8	7	21.60	21.76	21.48	1	20.50	20.61	20.39	2
	15	0	21.94	22.06	21.77	1	20.84	20.84	20.78	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23035	Mid Ch 23095	High Ch 23155		Low Ch 23035	Mid Ch 23095	High Ch 23155	
			701.5 MHz	707.5 MHz	713.5 MHz		701.5 MHz	707.5 MHz	713.5 MHz	
12 / 5M	1	0	23.13	23.19	22.96	0	22.12	22.19	21.86	1
	1	12	23.04	23.07	22.86	0	21.94	21.96	21.79	1
	1	24	22.83	22.89	22.62	0	21.78	21.87	21.50	1
	12	0	21.96	22.12	21.83	1	20.95	21.02	20.65	2
	12	6	21.79	21.91	21.61	1	20.74	20.79	20.57	2
	12	13	21.62	21.76	21.50	1	20.62	20.79	20.55	2
	25	0	21.92	22.09	21.75	1	20.98	20.92	20.80	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)
			Low Ch 23060	Mid Ch 23095	High Ch 23130	
			704.0 MHz	707.5 MHz	711.0 MHz	
12 / 10M	1	0	23.18	23.26	23.00	0
	1	24	23.05	23.15	22.88	0
	1	49	22.80	22.88	22.64	0
	25	0	22.09	22.11	21.88	1
	25	12	21.90	21.92	21.69	1
	25	25	21.75	21.80	21.61	1
	50	0	22.04	22.10	21.84	1

ERP Power (dBm)
Modulation Type: QPSK

LTE Band 12, Channel Bandwidth 1.4MHz

MODE		TX Channel 23017					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	699.70	-7.20	17.30	3.50	20.80	34.80	-14.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	699.70	-16.10	11.40	3.50	14.90	34.80	-19.90

MODE		TX Channel 23095					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-7.40	17.40	3.50	20.90	34.80	-13.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-16.20	11.50	3.50	15.00	34.80	-19.80

MODE		TX Channel 23173					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	715.30	-7.40	17.60	3.50	21.10	34.80	-13.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	715.30	-15.80	11.80	3.50	15.30	34.80	-19.50

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 12, Channel Bandwidth 3MHz

MODE		TX Channel 23025					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	700.50	-7.30	17.20	3.50	20.70	34.80	-14.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	700.50	-15.90	11.70	3.50	15.20	34.80	-19.60

MODE		TX Channel 23095					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-7.40	17.40	3.50	20.90	34.80	-13.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-16.40	11.40	3.50	14.90	34.80	-19.90

MODE		TX Channel 23165					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	714.50	-7.50	17.50	3.50	21.00	34.80	-13.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	714.50	-15.90	11.70	3.50	15.20	34.80	-19.60

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 12, Channel Bandwidth 5MHz

MODE		TX Channel 23035					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	701.50	-6.90	17.70	3.40	21.10	34.80	-13.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	701.50	-16.20	11.50	3.40	14.90	34.80	-19.90

MODE		TX Channel 23095					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-7.40	17.40	3.50	20.90	34.80	-13.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-16.10	11.60	3.50	15.10	34.80	-19.70

MODE		TX Channel 23155					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	713.50	-7.80	17.20	3.50	20.70	34.80	-14.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	713.50	-15.80	11.90	3.50	15.40	34.80	-19.40

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 12, Channel Bandwidth 10MHz

MODE		TX Channel 23060					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	704.00	-7.60	17.10	3.50	20.60	34.80	-14.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	704.00	-15.70	11.90	3.50	15.40	34.80	-19.40

MODE		TX Channel 23095					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-7.40	17.40	3.50	20.90	34.80	-13.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-16.10	11.70	3.50	15.20	34.80	-19.60

MODE		TX Channel 23130					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	711.00	-7.70	17.30	3.50	20.80	34.80	-14.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	711.00	-15.60	12.00	3.50	15.50	34.80	-19.30

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

Modulation Type: 16QAM

LTE Band 12, Channel Bandwidth 1.4MHz

MODE		TX Channel 23017					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	699.70	-8.20	16.30	3.50	19.80	34.80	-15.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	699.70	-17.10	10.40	3.50	13.90	34.80	-20.90

MODE		TX Channel 23095					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-8.90	15.90	3.50	19.40	34.80	-15.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-16.90	10.80	3.50	14.30	34.80	-20.50

MODE		TX Channel 23173					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	715.30	-9.00	16.00	3.50	19.50	34.80	-15.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	715.30	-16.70	10.90	3.50	14.40	34.80	-20.40

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 12, Channel Bandwidth 3MHz

MODE		TX Channel 23025					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	700.50	-8.50	16.00	3.50	19.50	34.80	-15.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	700.50	-16.70	10.90	3.50	14.40	34.80	-20.40

MODE		TX Channel 23095					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-8.60	16.10	3.50	19.60	34.80	-15.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-17.40	10.40	3.50	13.90	34.80	-20.90

MODE		TX Channel 23165					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	714.50	-9.10	15.90	3.50	19.40	34.80	-15.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	714.50	-17.10	10.50	3.50	14.00	34.80	-20.80

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 12, Channel Bandwidth 5MHz

MODE		TX Channel 23035					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	701.50	-8.50	16.10	3.40	19.50	34.80	-15.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	701.50	-16.50	11.20	3.40	14.60	34.80	-20.20

MODE		TX Channel 23095					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-8.90	15.80	3.50	19.30	34.80	-15.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	707.50	-17.10	10.70	3.50	14.20	34.80	-20.60

MODE		TX Channel 23155					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	713.50	-9.50	15.50	3.50	19.00	34.80	-15.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	713.50	-17.10	10.60	3.50	14.10	34.80	-20.70

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

EIRP Power (dBm)
WCDMA Band 4

MODE		TX Channel 1312					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1712.40 (PK)	-10.90	27.10	0.70	27.80	30.00	-2.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1712.40 (PK)	-14.30	23.50	0.70	24.20	30.00	-5.80

MODE		TX Channel 1413					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.60 (PK)	-11.00	27.40	0.60	28.00	30.00	-2.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.60 (PK)	-12.90	25.50	0.60	26.10	30.00	-3.90

MODE		TX Channel 1513					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1752.60 (PK)	-11.80	27.00	0.50	27.50	30.00	-2.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1752.60 (PK)	-12.90	25.90	0.50	26.40	30.00	-3.60

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

Modulation Type: QPSK

LTE Band 4, Channel Bandwidth: 1.4MHz

MODE		TX Channel 19957					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1710.70 (PK)	-13.00	25.00	0.70	25.70	30.00	-4.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1710.70 (PK)	-16.70	21.10	0.70	21.80	30.00	-8.20

MODE		TX Channel 20175					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-13.40	25.00	0.60	25.60	30.00	-4.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-16.80	21.50	0.60	22.10	30.00	-7.90

MODE		TX Channel 20393					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1754.30 (PK)	-13.50	25.30	0.50	25.80	30.00	-4.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1754.30 (PK)	-17.60	21.30	0.50	21.80	30.00	-8.20

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 4, Channel Bandwidth: 3MHz

MODE		TX Channel 19965					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1711.50 (PK)	-12.80	25.20	0.70	25.90	30.00	-4.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1711.50 (PK)	-16.40	21.40	0.70	22.10	30.00	-7.90

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

MODE		TX Channel 20175					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-12.90	25.50	0.60	26.10	30.00	-3.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-17.20	21.10	0.60	21.70	30.00	-8.30

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

MODE		TX Channel 20385					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1753.50 (PK)	-13.70	25.10	0.50	25.60	30.00	-4.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1753.50 (PK)	-17.60	21.30	0.50	21.80	30.00	-8.20

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 4, Channel Bandwidth: 5MHz

MODE		TX Channel 19975					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1712.50 (PK)	-13.20	24.90	0.70	25.60	30.00	-4.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1712.50 (PK)	-16.60	21.30	0.70	22.00	30.00	-8.00

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

MODE		TX Channel 20175					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-13.30	25.10	0.60	25.70	30.00	-4.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-17.00	21.30	0.60	21.90	30.00	-8.10

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

MODE		TX Channel 20375					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1752.50 (PK)	-13.50	25.30	0.50	25.80	30.00	-4.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1752.50 (PK)	-17.60	21.20	0.50	21.70	30.00	-8.30

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 4, Channel Bandwidth: 10MHz

MODE		TX Channel 20000					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1715.00 (PK)	-12.90	25.20	0.70	25.90	30.00	-4.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1715.00 (PK)	-16.80	21.10	0.70	21.80	30.00	-8.20

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

MODE		TX Channel 20175					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-12.80	25.60	0.60	26.20	30.00	-3.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-16.70	21.60	0.60	22.20	30.00	-7.80

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

MODE		TX Channel 20350					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1750.00 (PK)	-13.60	25.20	0.50	25.70	30.00	-4.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1750.00 (PK)	-17.50	21.30	0.50	21.80	30.00	-8.20

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

Modulation Type: 16QAM

LTE Band 4, Channel Bandwidth: 1.4MHz

MODE		TX Channel 19957					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1710.70 (PK)	-13.90	24.10	0.70	24.80	30.00	-5.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1710.70 (PK)	-17.50	20.30	0.70	21.00	30.00	-9.00

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

MODE		TX Channel 20175					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-14.40	24.00	0.60	24.60	30.00	-5.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-17.60	20.70	0.60	21.30	30.00	-8.70

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

MODE		TX Channel 20393					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1754.30 (PK)	-14.80	24.00	0.50	24.50	30.00	-5.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1754.30 (PK)	-18.60	20.30	0.50	20.80	30.00	-9.20

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 4, Channel Bandwidth: 3MHz

MODE		TX Channel 19965					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1711.50 (PK)	-13.90	24.10	0.70	24.80	30.00	-5.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1711.50 (PK)	-17.60	20.20	0.70	20.90	30.00	-9.10

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

MODE		TX Channel 20175					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-14.70	23.70	0.60	24.30	30.00	-5.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-18.20	20.10	0.60	20.70	30.00	-9.30

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

MODE		TX Channel 20385					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1753.50 (PK)	-14.70	24.10	0.50	24.60	30.00	-5.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1753.50 (PK)	-18.50	20.40	0.50	20.90	30.00	-9.10

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 4, Channel Bandwidth: 5MHz

MODE		TX Channel 19975					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1712.50 (PK)	-14.20	23.90	0.70	24.60	30.00	-5.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1712.50 (PK)	-17.60	20.30	0.70	21.00	30.00	-9.00

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

MODE		TX Channel 20175					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-14.20	24.20	0.60	24.80	30.00	-5.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1732.50 (PK)	-18.30	20.00	0.60	20.60	30.00	-9.40

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

MODE		TX Channel 20375					
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1752.50 (PK)	-14.80	24.00	0.50	24.50	30.00	-5.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	EIRP (dBm)	LIMIT (dBm)	MARGIN (dB)
1	1752.50 (PK)	-18.40	20.40	0.50	20.90	30.00	-9.10

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

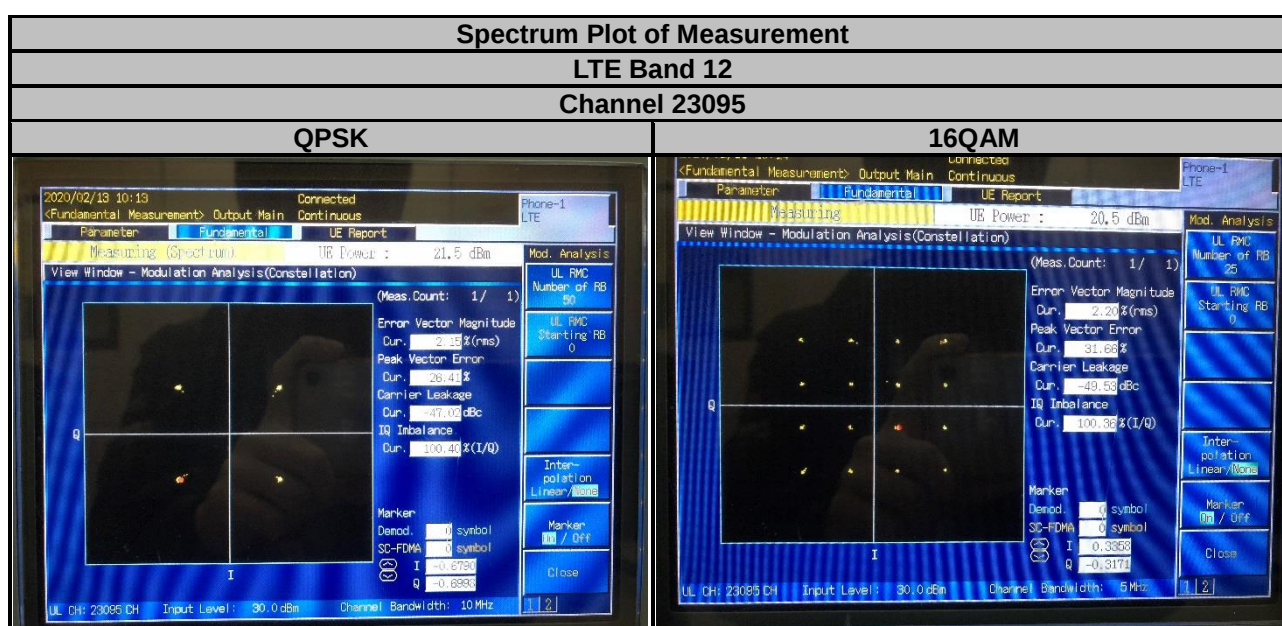
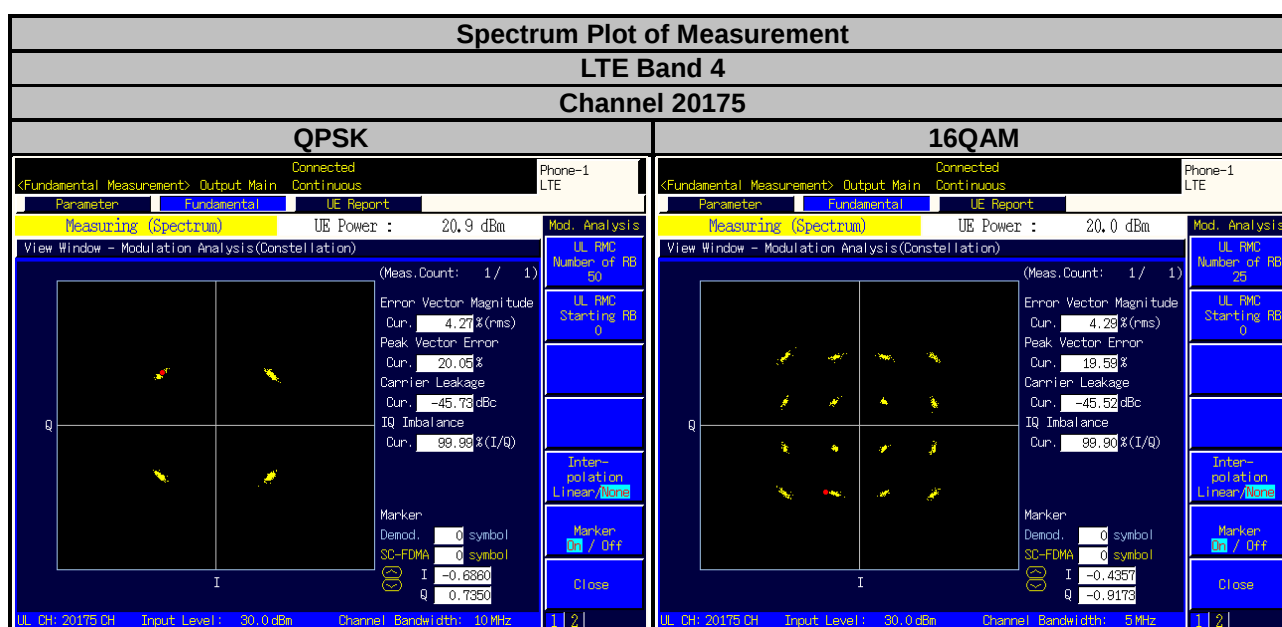
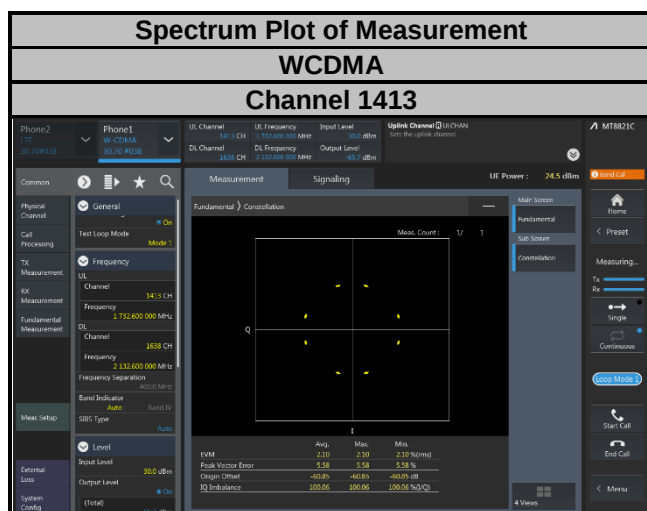
4.2.2 Test Setup



4.2.3 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector. The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.4 Test Results



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

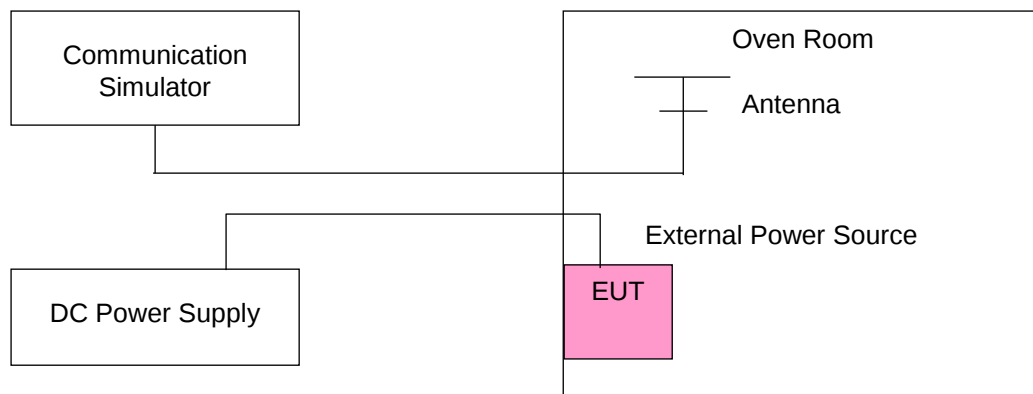
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

4.3.2 Test Procedure

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

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

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
27.6	1712.400003	0.002	1752.600003	0.002
24.0	1712.400003	0.002	1752.600003	0.002
20.4	1712.400003	0.002	1752.600001	0.001

Note: The applicant defined the normal working voltage of the power supply is from 27.6 Vdc to 20.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.400003	0.002	1752.600003	0.002
-20	1712.400002	0.001	1752.600002	0.001
-10	1712.400002	0.001	1752.600004	0.002
0	1712.400001	0.001	1752.600003	0.001
10	1712.400003	0.002	1752.600002	0.001
20	1712.400001	0.001	1752.600003	0.002
30	1712.399998	-0.001	1752.599996	-0.002
40	1712.399999	-0.001	1752.599997	-0.002
50	1712.399999	-0.001	1752.599996	-0.002
60	1712.399998	-0.001	1752.599997	-0.002
70	1712.399997	-0.002	1752.599997	-0.002

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -30°C to 70°C.
2. The EUT would shut down automatically as below -30°C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
27.6	1710.700002	0.001	1754.300003	0.002
24.0	1710.700004	0.002	1754.300002	0.001
20.4	1710.700001	0.001	1754.300002	0.001

Note: The applicant defined the normal working voltage of the power supply is from 27.6 Vdc to 20.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1710.700003	0.002	1754.300004	0.002
-20	1710.700004	0.002	1754.300003	0.002
-10	1710.700004	0.002	1754.300003	0.002
0	1710.700002	0.001	1754.300002	0.001
10	1710.700001	0.001	1754.300002	0.001
20	1710.700003	0.002	1754.300003	0.002
30	1710.699997	-0.002	1754.299997	-0.002
40	1710.699998	-0.001	1754.299998	-0.001
50	1710.699997	-0.002	1754.299997	-0.001
60	1710.699998	-0.001	1754.299996	-0.002
70	1710.699997	-0.002	1754.299998	-0.001

Note:

The applicant declared that the normal operating temperature of the EUT is from -30°C to 70°C. The EUT would shut down automatically as below -30°C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
27.6	1711.500002	0.001	1753.500003	0.002
24.0	1711.500003	0.002	1753.500002	0.001
20.4	1711.500004	0.002	1753.500002	0.001

Note: The applicant defined the normal working voltage of the power supply is from 27.6 Vdc to 20.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1711.500001	0.001	1753.500003	0.002
-20	1711.500001	0.001	1753.500003	0.002
-10	1711.500002	0.001	1753.500003	0.002
0	1711.500002	0.001	1753.500003	0.001
10	1711.500002	0.001	1753.500002	0.001
20	1711.500004	0.002	1753.500003	0.002
30	1711.499997	-0.002	1753.499997	-0.002
40	1711.499996	-0.002	1753.499997	-0.002
50	1711.499997	-0.002	1753.499997	-0.002
60	1711.499998	-0.001	1753.499998	-0.001
70	1711.499997	-0.002	1753.499996	-0.002

Note:

The applicant declared that the normal operating temperature of the EUT is from -30°C to 70°C. The EUT would shut down automatically as below -30°C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
27.6	1712.500002	0.001	1752.500003	0.002
24.0	1712.500004	0.002	1752.500003	0.002
20.4	1712.500003	0.002	1752.500002	0.001

Note: The applicant defined the normal working voltage of the power supply is from 27.6 Vdc to 20.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.500002	0.001	1752.500004	0.002
-20	1712.500001	0.001	1752.500002	0.001
-10	1712.500001	0.001	1752.500002	0.001
0	1712.500001	0.001	1752.500003	0.002
10	1712.500002	0.001	1752.500002	0.001
20	1712.500003	0.002	1752.500003	0.002
30	1712.499999	-0.001	1752.499997	-0.002
40	1712.499997	-0.002	1752.499996	-0.002
50	1712.499999	-0.001	1752.499999	-0.001
60	1712.499998	-0.001	1752.499999	-0.001
70	1712.499997	-0.002	1752.499998	-0.001

Note:

The applicant declared that the normal operating temperature of the EUT is from -30°C to 70°C.
The EUT would shut down automatically as below -30°C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
27.6	1715.000001	0.001	1750.000003	0.002
24.0	1715.000004	0.002	1750.000002	0.001
20.4	1715.000002	0.001	1750.000002	0.001

Note: The applicant defined the normal working voltage of the power supply is from 27.6 Vdc to 20.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1715.000003	0.001	1750.000001	0.001
-20	1715.000002	0.001	1750.000004	0.002
-10	1715.000002	0.001	1750.000003	0.002
0	1715.000003	0.002	1750.000001	0.001
10	1715.000003	0.001	1750.000002	0.001
20	1715.000003	0.002	1750.000002	0.001
30	1714.999996	-0.002	1749.999997	-0.002
40	1714.999997	-0.002	1749.999998	-0.001
50	1714.999997	-0.002	1749.999998	-0.001
60	1714.999998	-0.001	1749.999997	-0.002
70	1714.999997	-0.002	1749.999997	-0.002

Note:

The applicant declared that the normal operating temperature of the EUT is from -30°C to 70°C.
The EUT would shut down automatically as below -30°C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
27.6	699.700003	0.004	715.300002	0.003
24.0	699.700003	0.004	715.300002	0.003
20.4	699.700002	0.002	715.300004	0.005

Note: The applicant defined the normal working voltage of the power supply is from 27.6 Vdc to 20.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 12			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	699.700002	0.003	715.300002	0.002
-20	699.700002	0.002	715.300002	0.003
-10	699.700002	0.003	715.300003	0.005
0	699.700003	0.004	715.300003	0.003
10	699.700003	0.004	715.300004	0.005
20	699.700004	0.005	715.300001	0.001
30	699.699996	-0.005	715.299999	-0.001
40	699.699997	-0.004	715.299996	-0.005
50	699.699997	-0.004	715.299998	-0.003
60	699.699999	-0.002	715.299998	-0.003
70	699.699998	-0.002	715.299998	-0.003

Note:

The applicant declared that the normal operating temperature of the EUT is from -30°C to 70°C. The EUT would shut down automatically as below -30°C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
27.6	700.500004	0.006	714.500003	0.004
24.0	700.500002	0.002	714.500002	0.002
20.4	700.500004	0.005	714.500003	0.004

Note: The applicant defined the normal working voltage of the power supply is from 27.6 Vdc to 20.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 12			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	700.500004	0.006	714.500003	0.004
-20	700.500002	0.003	714.500001	0.002
-10	700.500002	0.003	714.500002	0.003
0	700.500002	0.003	714.500001	0.001
10	700.500003	0.004	714.500001	0.001
20	700.500003	0.004	714.500002	0.003
30	700.499997	-0.004	714.499998	-0.003
40	700.499998	-0.003	714.499997	-0.004
50	700.499996	-0.006	714.499998	-0.003
60	700.499998	-0.004	714.499997	-0.004
70	700.499997	-0.004	714.499999	-0.002

Note:

The applicant declared that the normal operating temperature of the EUT is from -30°C to 70°C. The EUT would shut down automatically as below -30°C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
27.6	701.500002	0.003	713.500001	0.002
24.0	701.500002	0.003	713.500002	0.003
20.4	701.500001	0.002	713.500001	0.002

Note: The applicant defined the normal working voltage of the power supply is from 27.6 Vdc to 20.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 12			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	701.500003	0.005	713.500004	0.005
-20	701.500002	0.002	713.500003	0.004
-10	701.500002	0.003	713.500003	0.005
0	701.500002	0.002	713.500002	0.002
10	701.500003	0.004	713.500002	0.002
20	701.500003	0.004	713.500002	0.002
30	701.499998	-0.003	713.499997	-0.005
40	701.499998	-0.002	713.499999	-0.002
50	701.499999	-0.002	713.499998	-0.002
60	701.499998	-0.002	713.499996	-0.005
70	701.499998	-0.004	713.499996	-0.005

Note:

The applicant declared that the normal operating temperature of the EUT is from -30°C to 70°C. The EUT would shut down automatically as below -30°C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
27.6	704.000004	0.006	711.000003	0.004
24.0	704.000001	0.002	711.000003	0.004
20.4	704.000004	0.006	711.000003	0.005

Note: The applicant defined the normal working voltage of the power supply is from 27.6 Vdc to 20.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 12			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	704.000001	0.002	711.000003	0.004
-20	704.000003	0.004	711.000001	0.002
-10	704.000001	0.002	711.000002	0.002
0	704.000002	0.003	711.000004	0.005
10	704.000004	0.005	711.000002	0.003
20	704.000001	0.002	711.000004	0.005
30	703.999996	-0.005	710.999998	-0.003
40	703.999998	-0.004	710.999999	-0.002
50	703.999997	-0.004	710.999997	-0.005
60	703.999998	-0.003	710.999999	-0.002
70	703.999999	-0.002	710.999997	-0.004

Note:

The applicant declared that the normal operating temperature of the EUT is from -30°C to 70°C. The EUT would shut down automatically as below -30°C.

4.4 Occupied Bandwidth Measurement

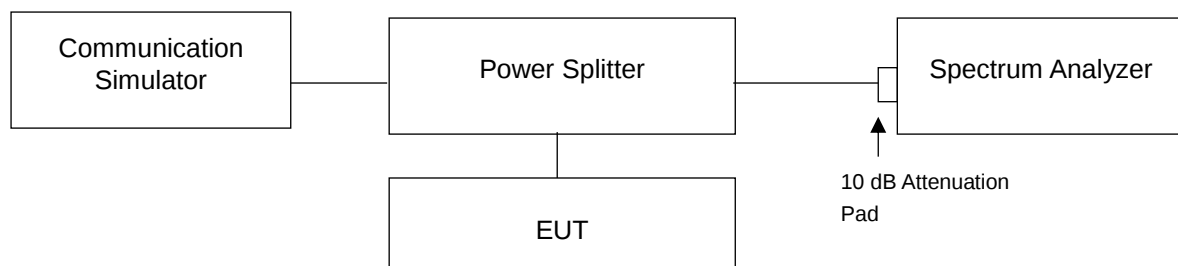
4.4.1 Limits of Occupied Bandwidth Measurement

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.2 Test Procedure

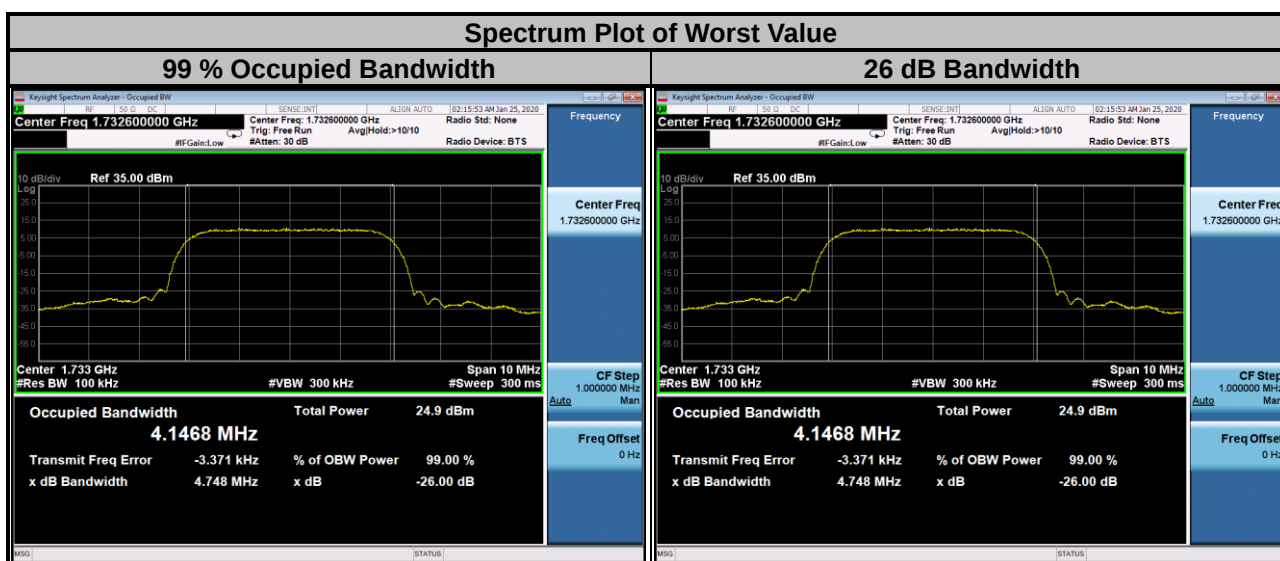
- The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.4.3 Test Setup



4.4.4 Test Result

WCDMA			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
1312	1712.4	4.1442	4.741
1413	1732.6	4.1468	4.748
1513	1752.6	4.1435	4.723



LTE Band 4					
Channel Bandwidth: 1.4 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19957	1710.7	1.0890	1.0901	1.254	1.262
20175	1732.5	1.0903	1.0901	1.250	1.255
20393	1754.3	1.0914	1.0908	1.261	1.251
Channel Bandwidth: 3 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19965	1711.5	2.7027	2.6982	2.927	2.930
20175	1732.5	2.7012	2.6980	2.924	2.933
20385	1753.5	2.7010	2.6960	2.927	2.930



LTE Band 4					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19975	1712.5	4.4925	4.4925	4.815	4.821
20175	1732.5	4.4923	4.4919	4.829	4.817
20375	1752.5	4.4868	4.4926	4.812	4.818
Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK		QPSK	
20000	1715.0	8.9550		9.516	
20175	1732.5	8.9479		9.512	
20350	1750.0	8.9468		9.512	



LTE Band 12					
Channel Bandwidth: 1.4 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23017	699.7	1.0885	1.0909	1.257	1.254
23095	707.5	1.0874	1.0909	1.245	1.253
23173	715.3	1.0874	1.0890	1.252	1.257
Channel Bandwidth: 3 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23025	700.5	2.7034	2.7004	2.924	2.928
23095	707.5	2.7006	2.6954	2.916	2.926
23165	714.5	2.6990	2.6951	2.910	2.913



LTE Band 12					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23035	701.5	4.4939	4.4969	4.823	4.811
23095	707.5	4.4794	4.4806	4.797	4.803
23155	713.5	4.4898	4.4886	4.799	4.803
Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK		QPSK	
23060	704.0	8.9161		9.470	
23095	707.5	8.9079		9.455	
23130	711.0	8.9880		9.519	



4.5 Band Edge Measurement

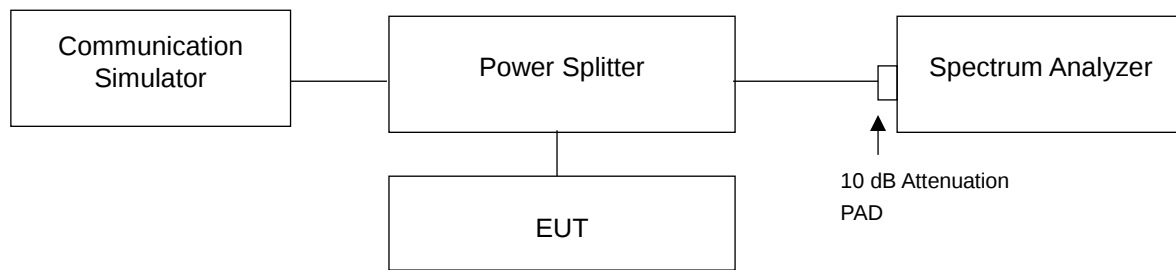
4.5.1 Limits of Band Edge Measurement

For operations in the 698-787 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

For operations in the 1710–1755 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB.

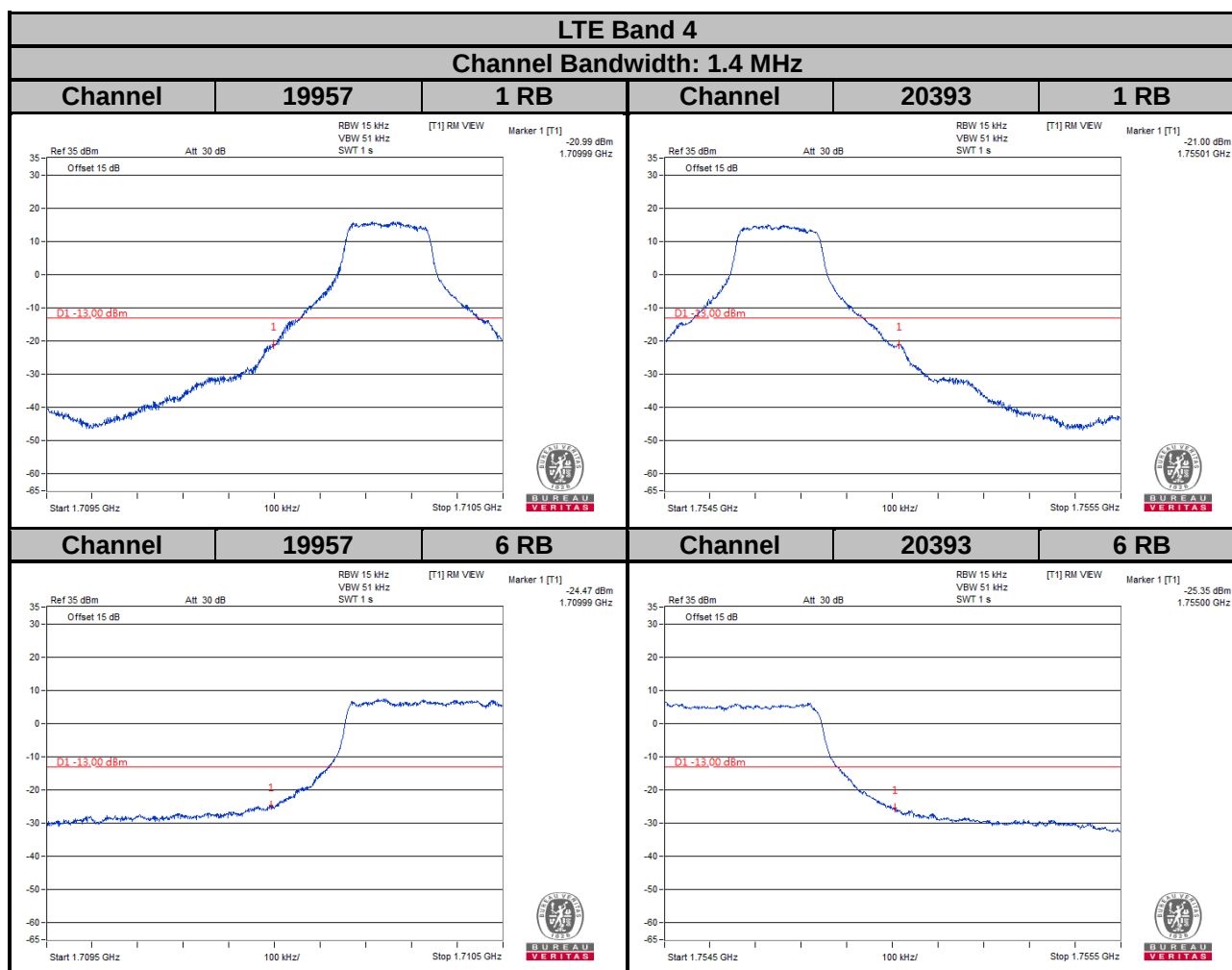
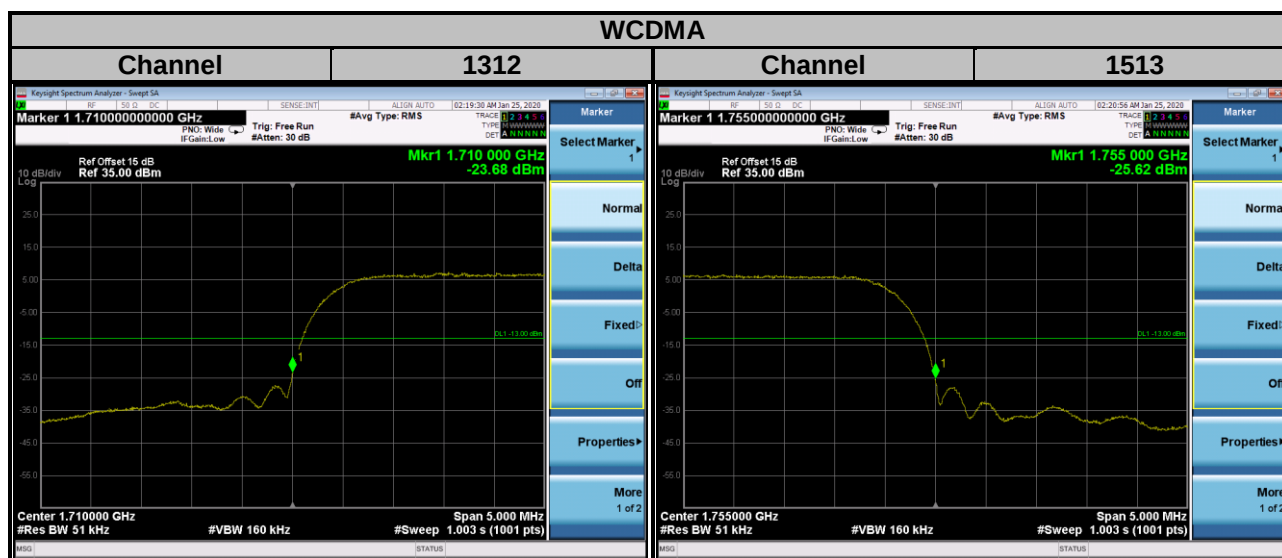
4.5.2 Test Setup

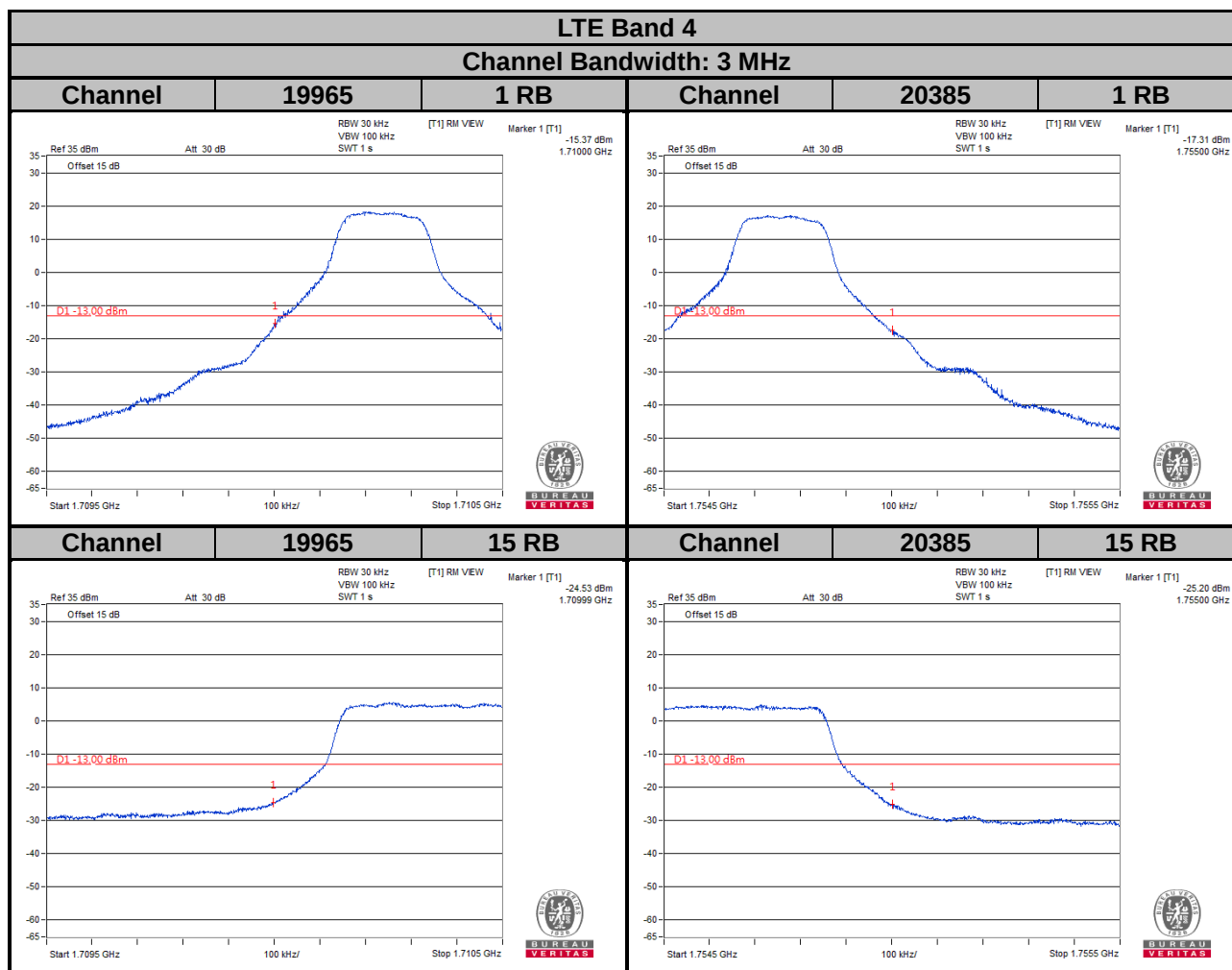


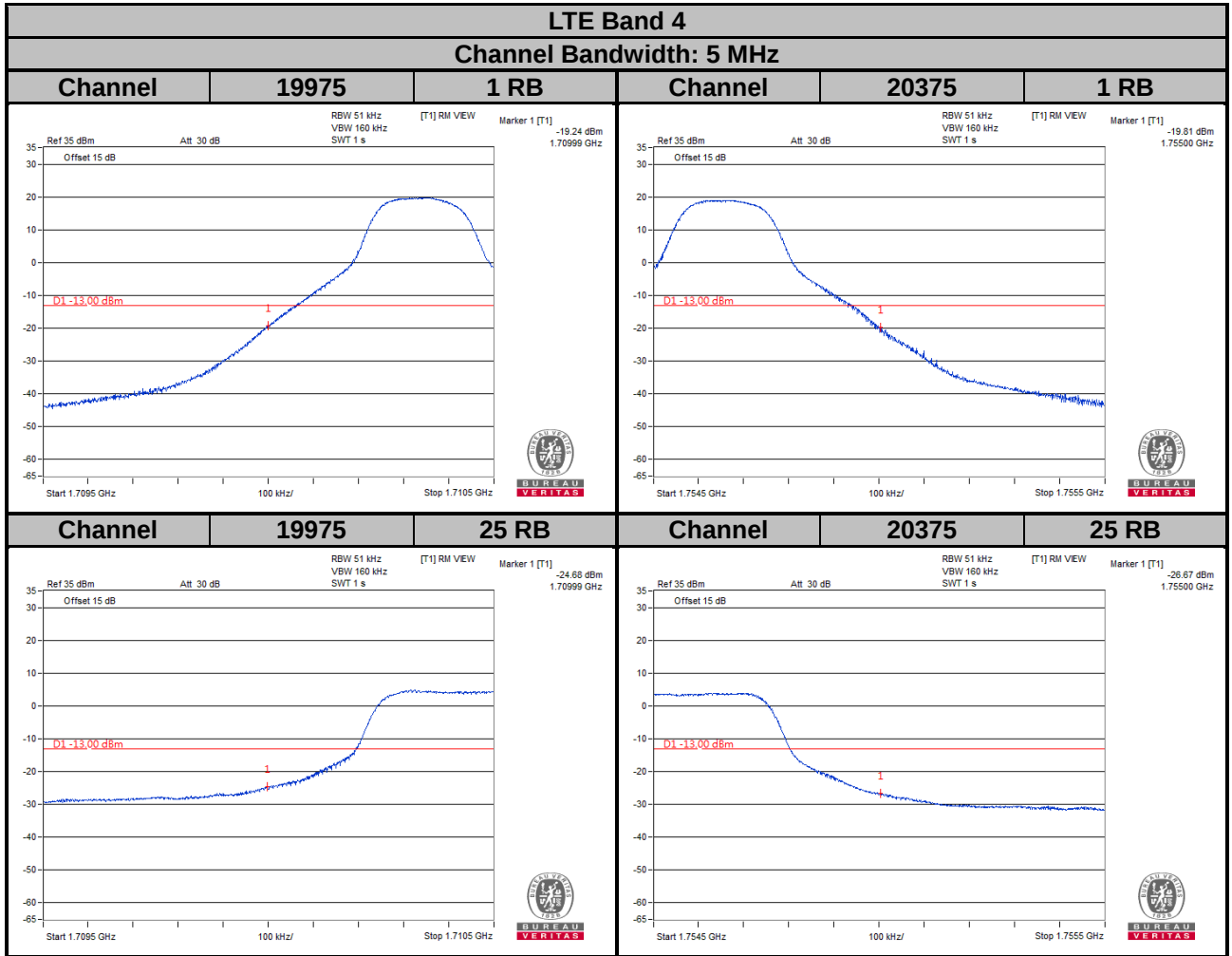
4.5.3 Test Procedures

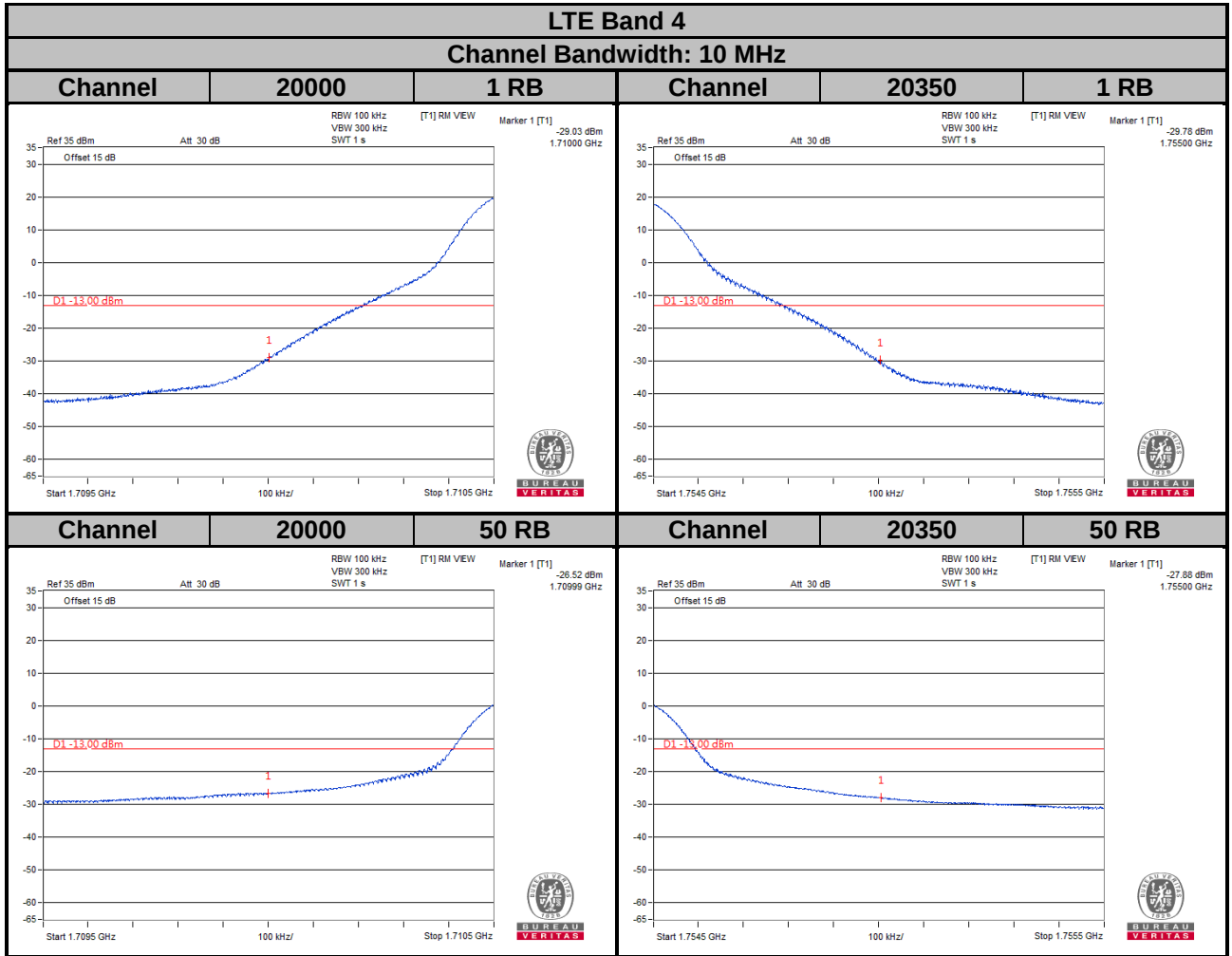
- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 51 kHz and VB of the spectrum is 160 kHz (WCDMA).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 15 kHz / 30 kHz and VB of the spectrum is 51 kHz / 100 kHz (LTE Bandwidth 1.4 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 3 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 51 kHz and VB of the spectrum is 160 kHz (LTE Bandwidth 5 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 10 MHz).
- Record the max. trace plot into the test report.

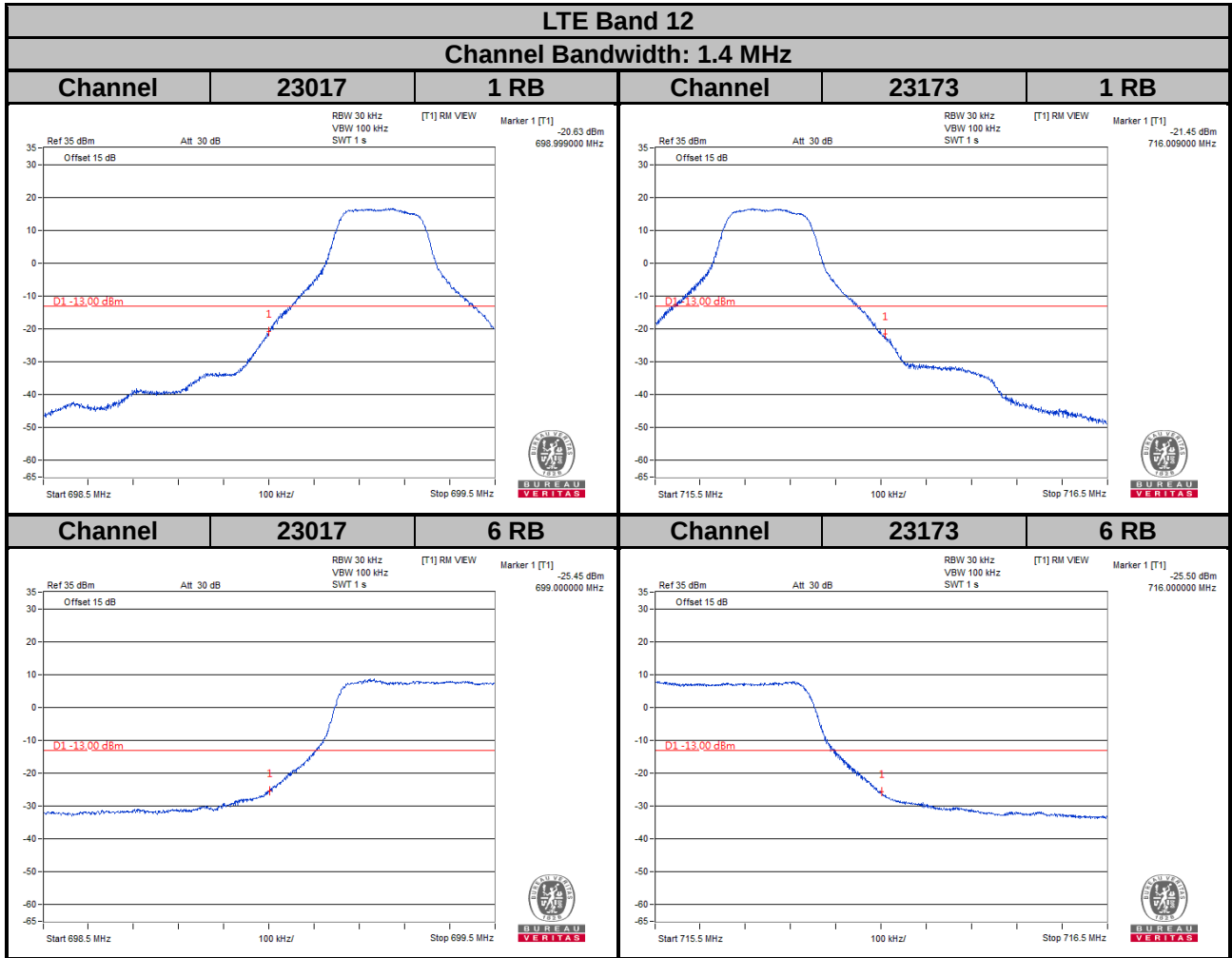
4.5.4 Test Results

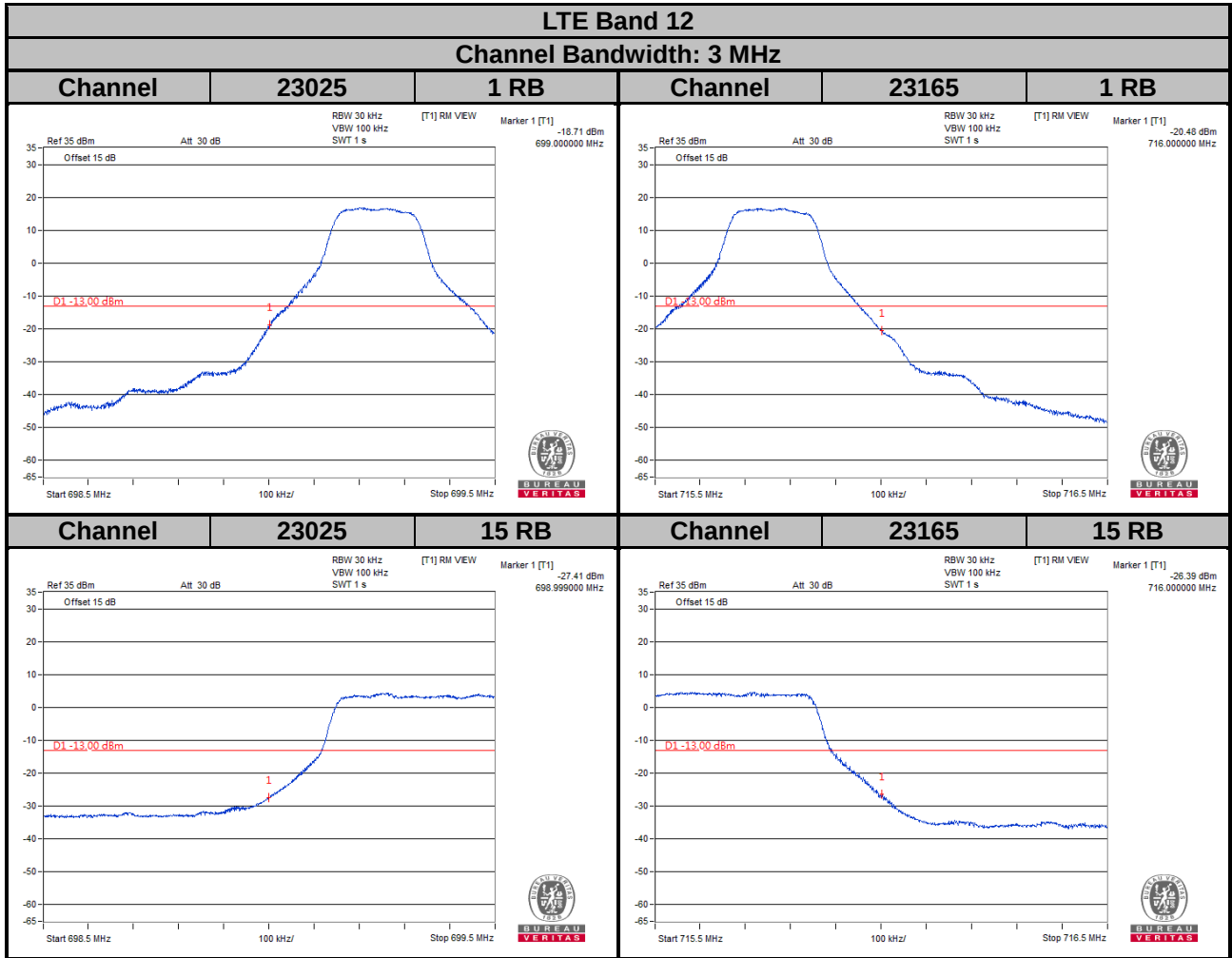


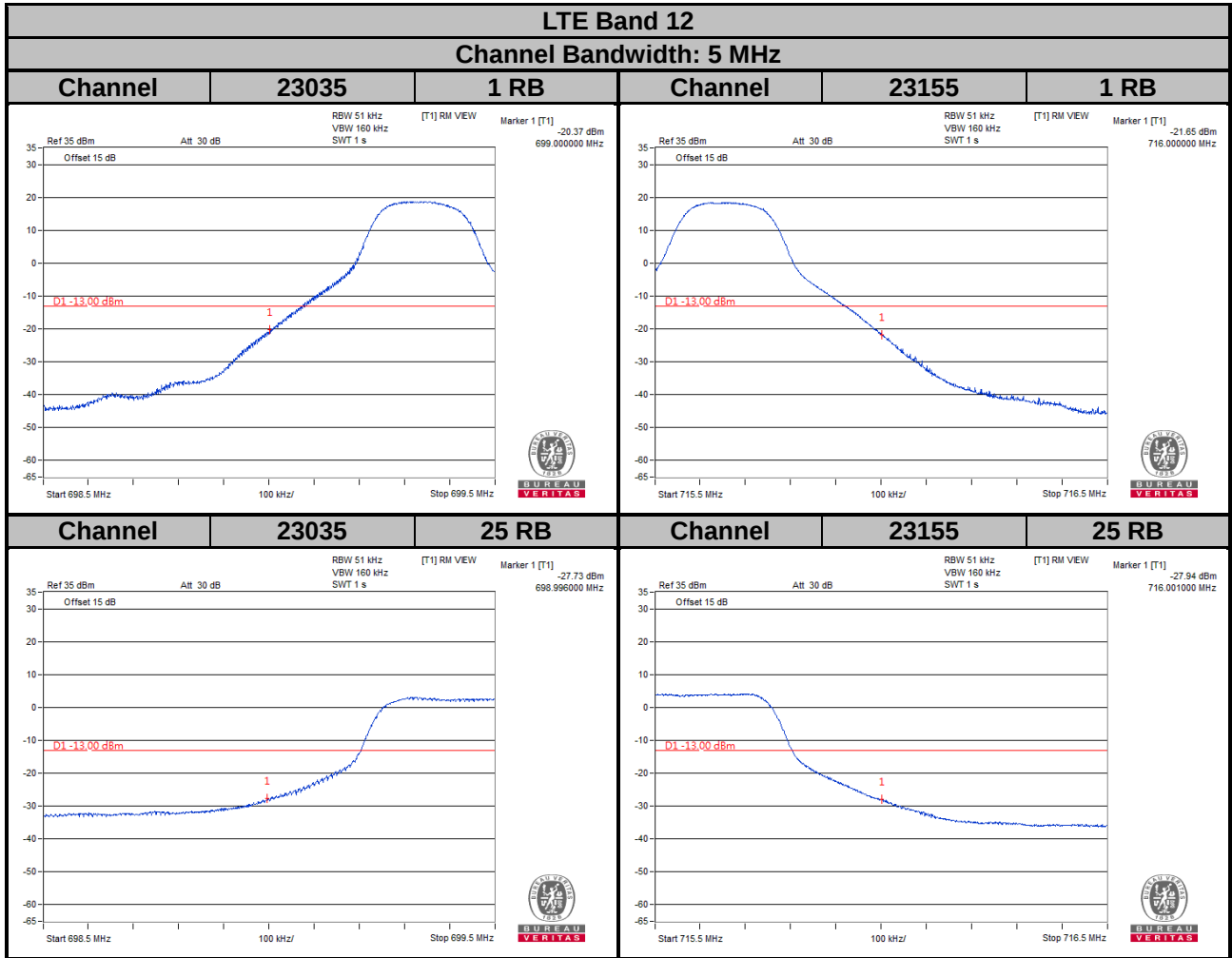


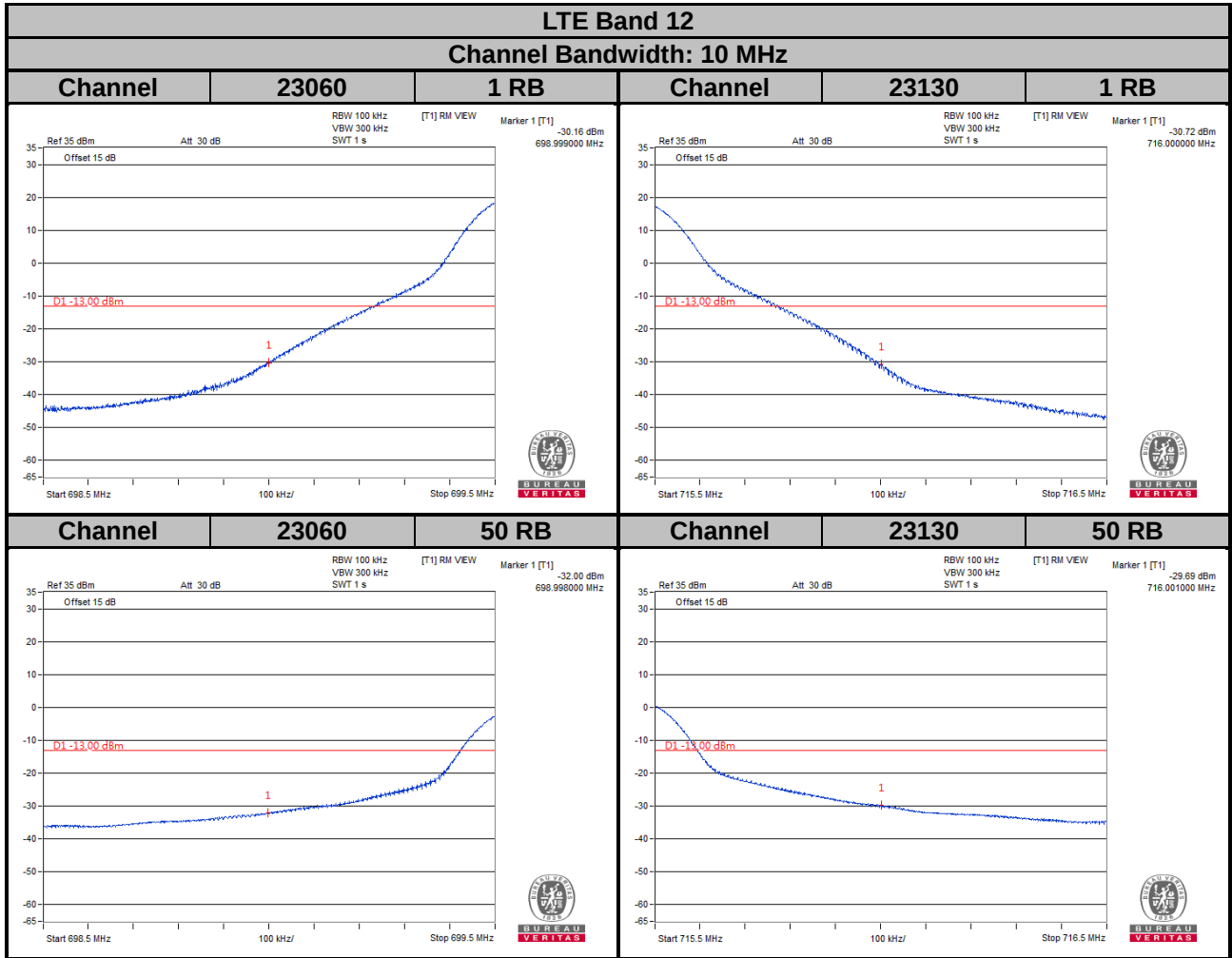










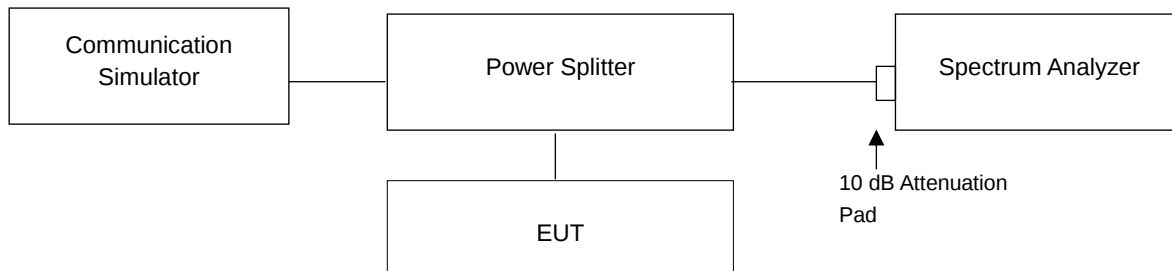


4.6 Peak to Average Ratio

4.6.1 Limits of Peak to Average Ratio Measurement

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.

4.6.2 Test Setup

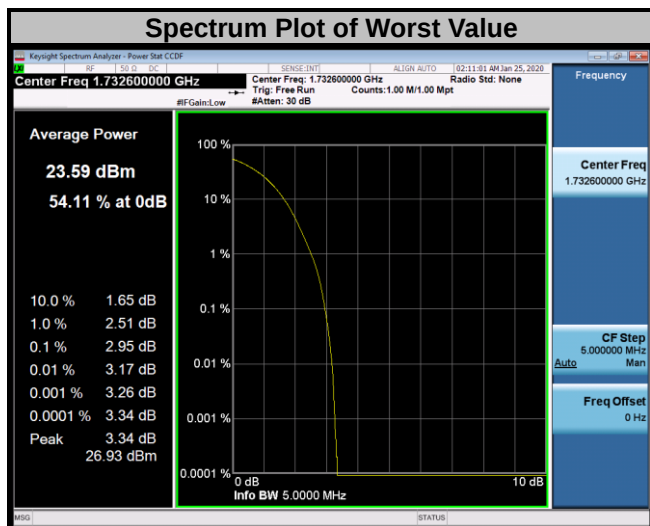


4.6.3 Test Procedures

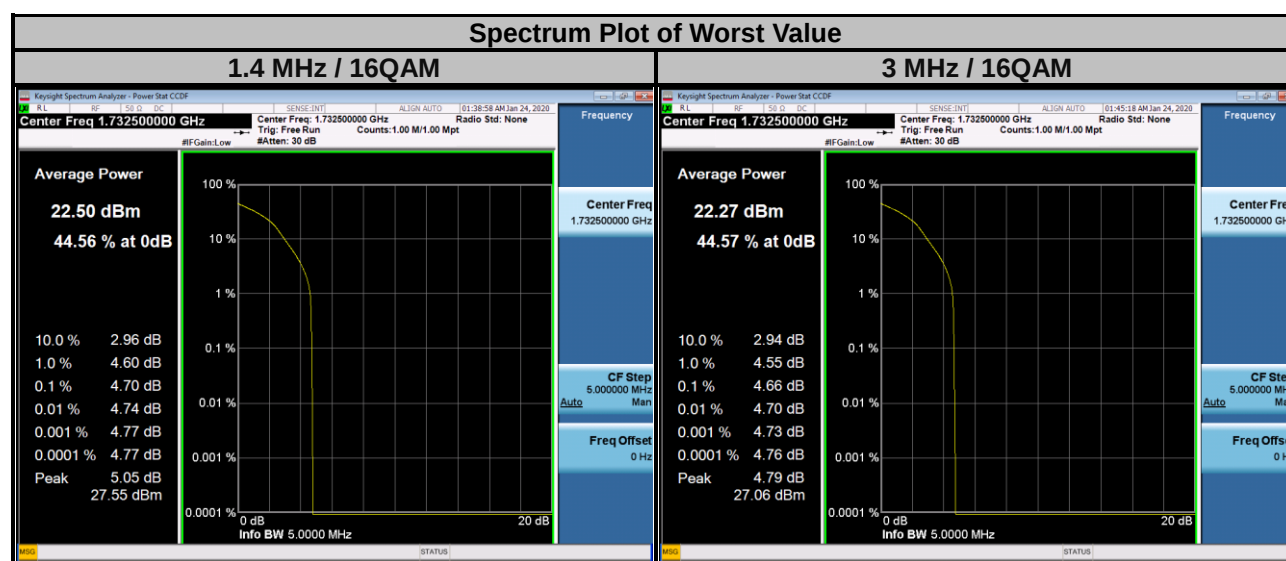
1. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.6.4 Test Results

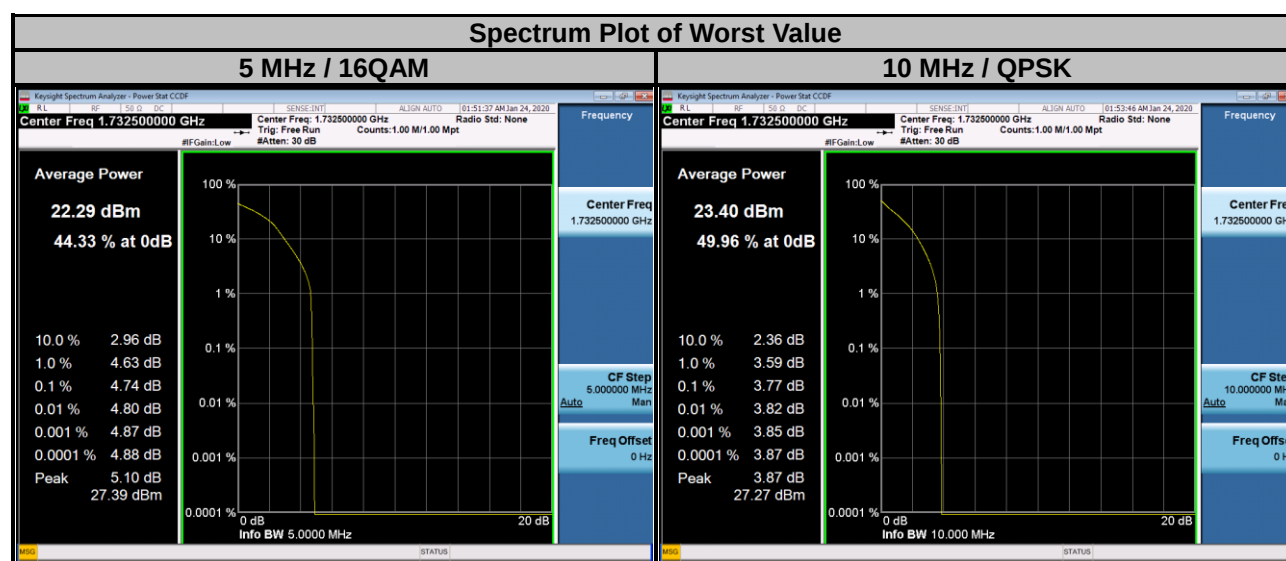
WCDMA		
Channel	Frequency (MHz)	Peak to Average Ratio (dB)
1312	1712.4	2.87
1413	1732.6	2.95
1513	1752.6	2.93



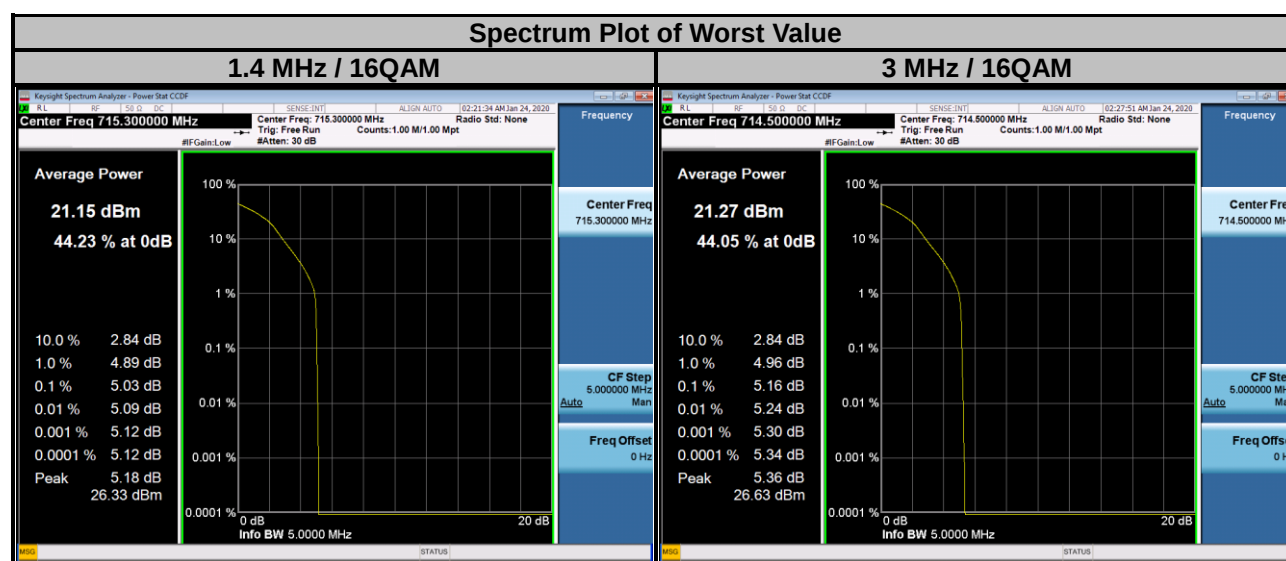
LTE Band 4							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	3.15	4.14	19965	1711.5	3.23	4.07
20175	1732.5	3.65	4.70	20175	1732.5	3.67	4.66
20393	1754.3	3.37	4.38	20385	1753.5	3.49	4.58



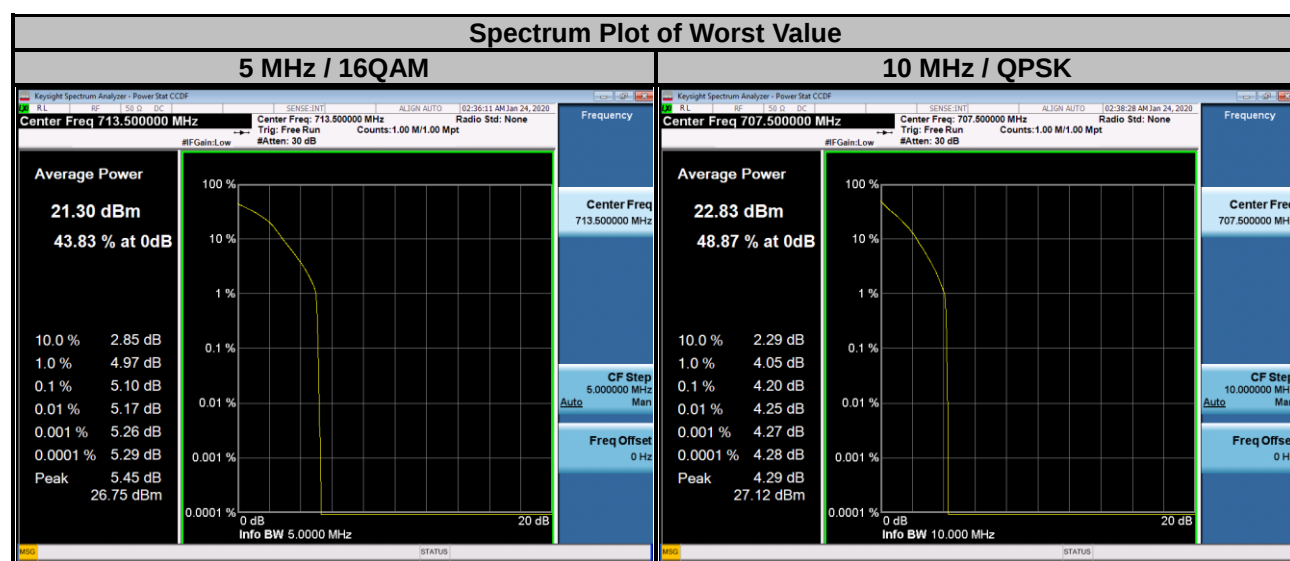
LTE Band 4						
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz		
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)
		QPSK	16QAM			QPSK
19975	1712.5	3.26	4.41	20000	1715.0	3.23
20175	1732.5	3.72	4.74	20175	1732.5	3.77
20375	1752.5	3.54	4.46	20350	1750.0	3.69



LTE Band 12							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
23017	699.7	4.13	4.98	23025	700.5	4.13	5.11
23095	707.5	4.07	4.96	23095	707.5	4.09	5.05
23173	715.3	4.14	5.03	23165	714.5	4.29	5.16



LTE Band 12						
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz		
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)
		QPSK	16QAM			QPSK
23035	701.5	4.16	5.02	23060	704.0	4.12
23095	707.5	4.19	5.07	23095	707.5	4.20
23155	713.5	4.29	5.10	23130	711.0	4.11

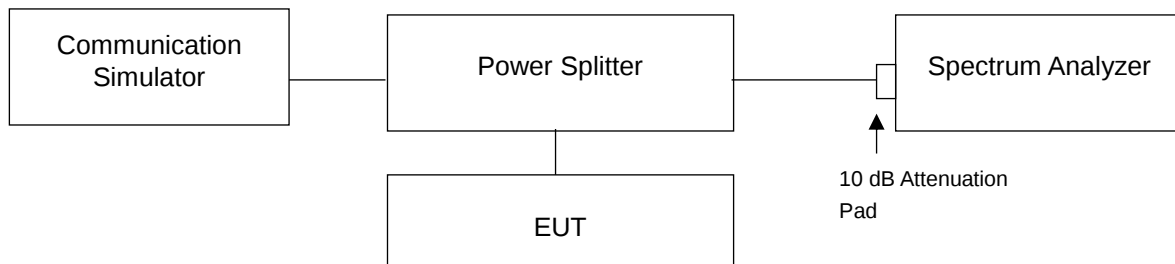


4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

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

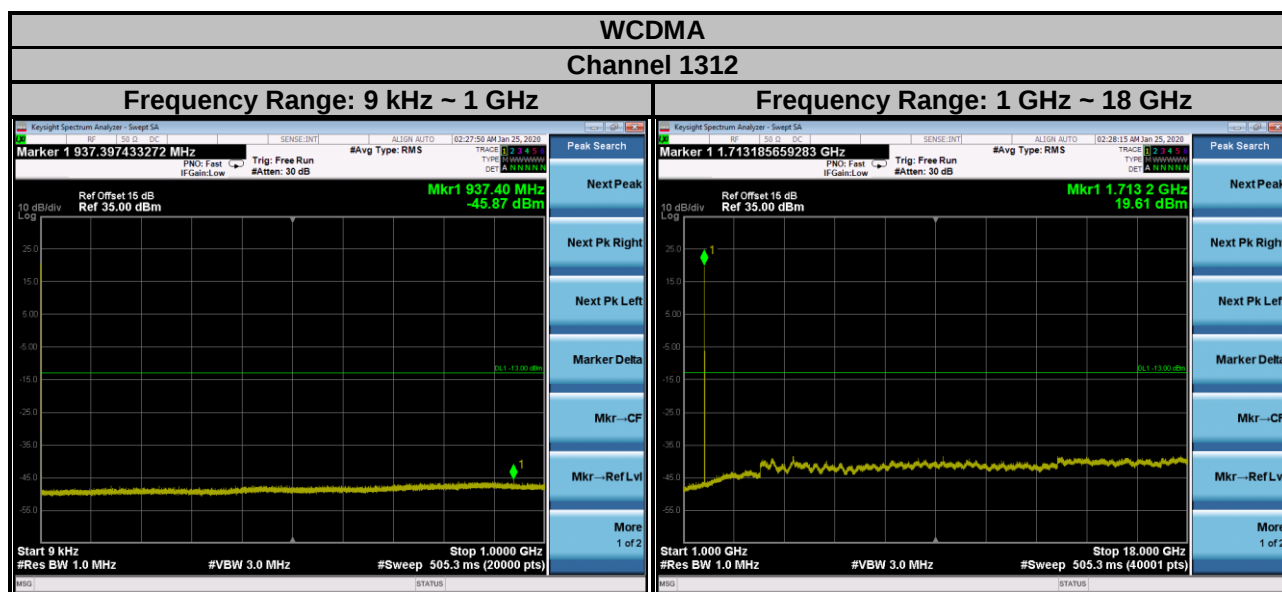
4.7.2 Test Setup



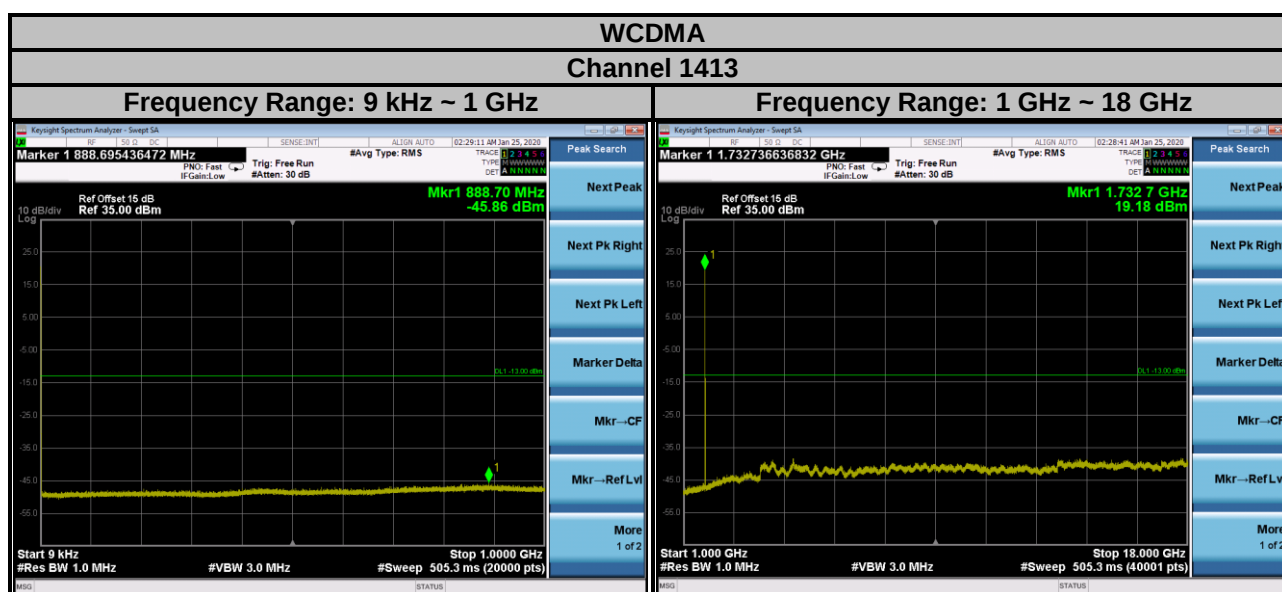
4.7.3 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 1 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 100 kHz and VBW = 300 kHz is used for LTE Band 12 conducted emission measurement.
- Measuring frequency range is from 9 kHz to 1 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for WCDMA, LTE Band 4 conducted emission measurement.
- Measuring frequency range is from 1 GHz to 8 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for conducted emission measurement.

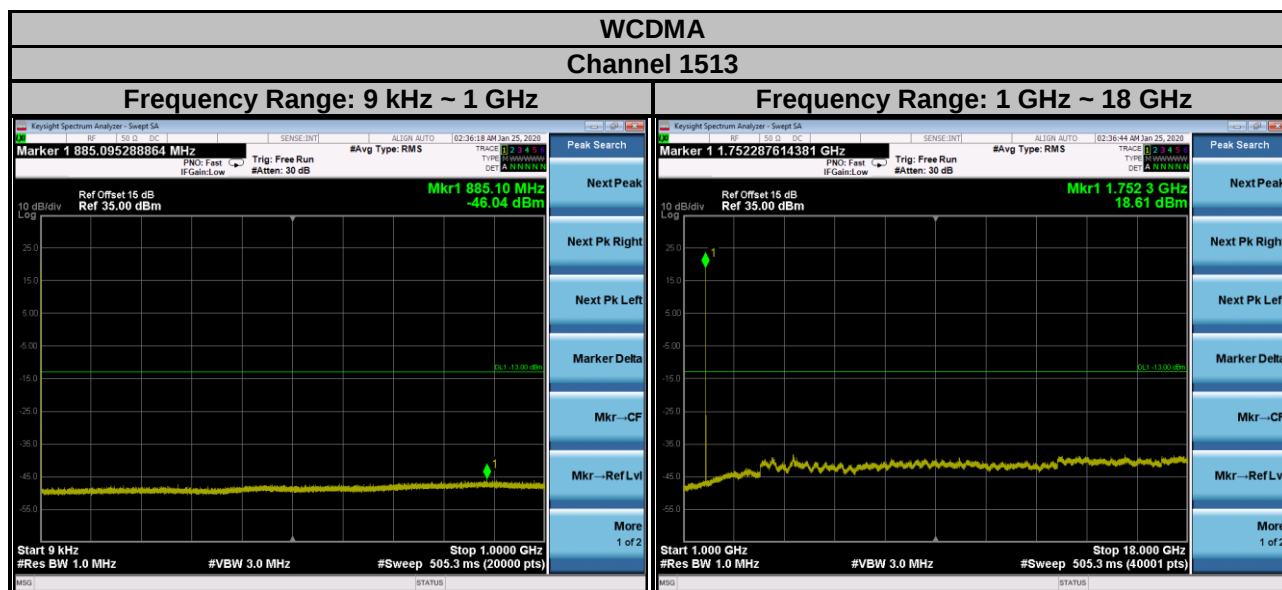
4.7.4 Test Results



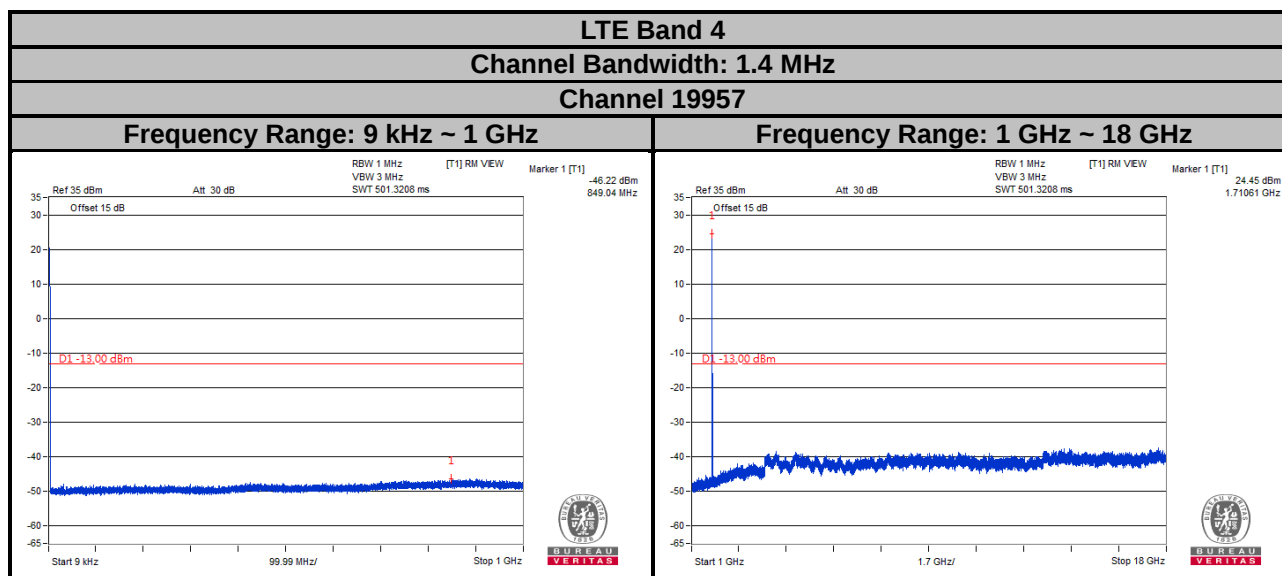
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



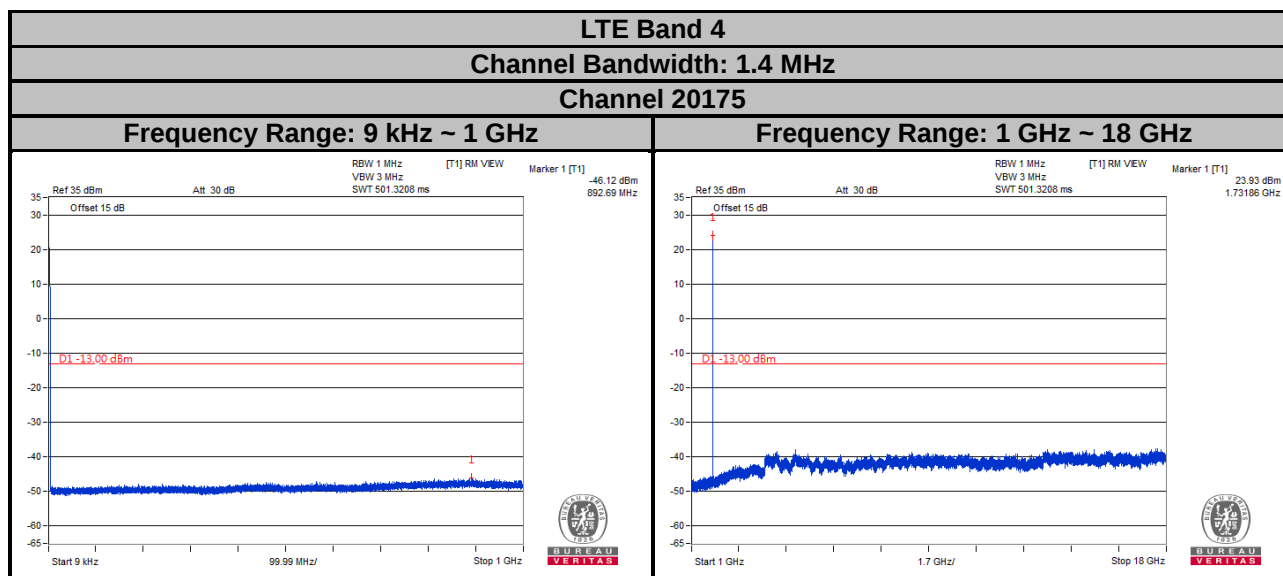
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



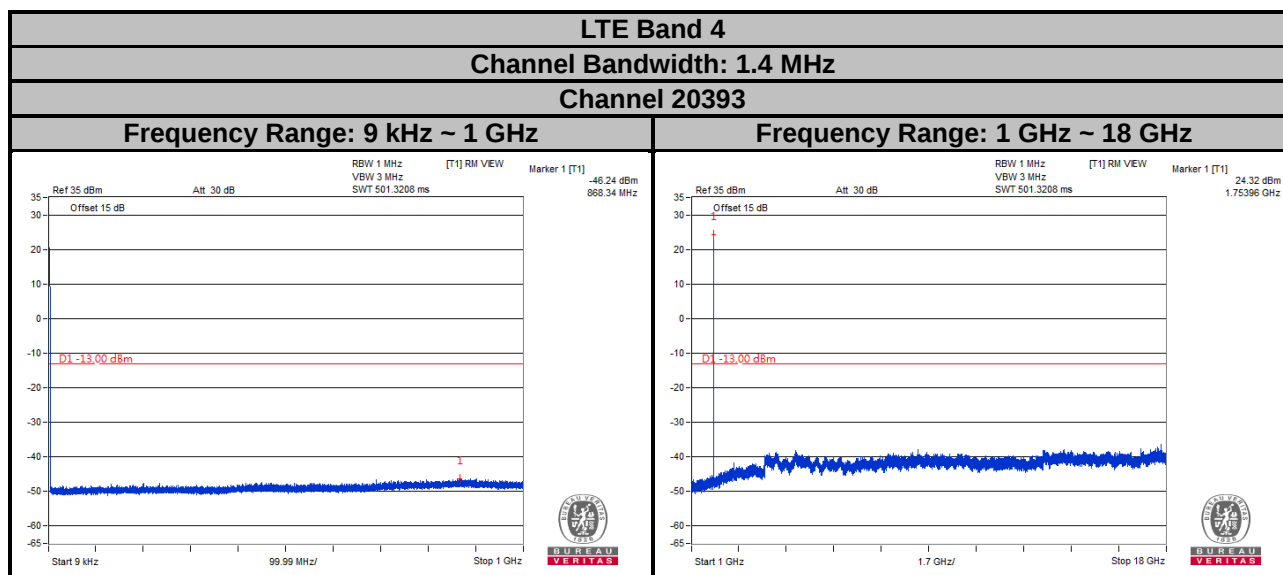
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



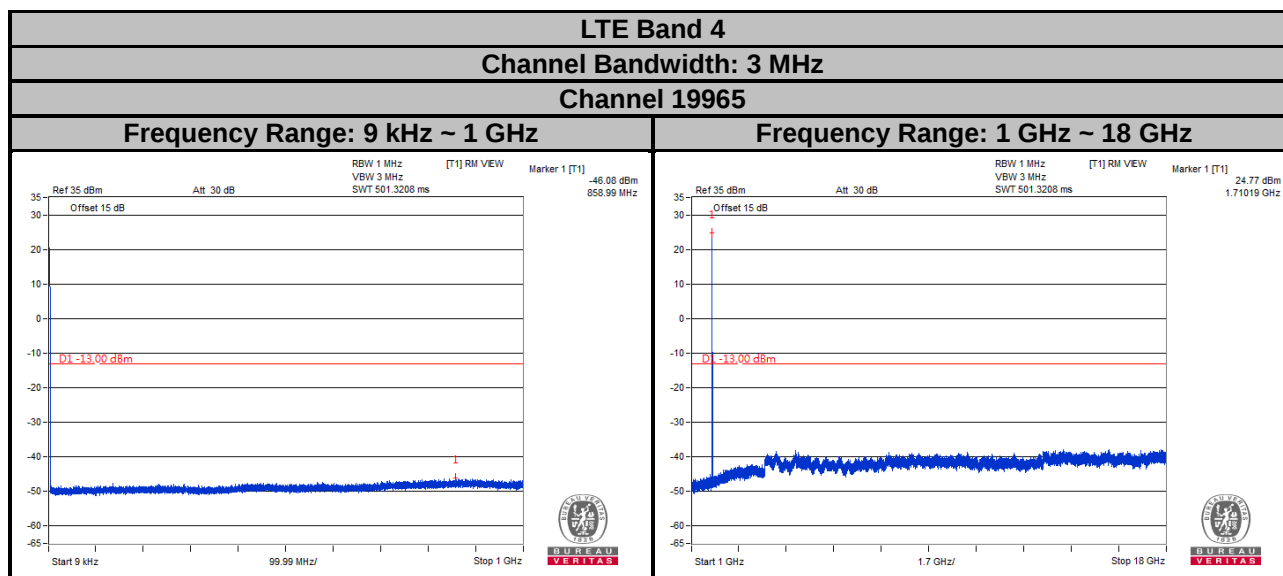
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



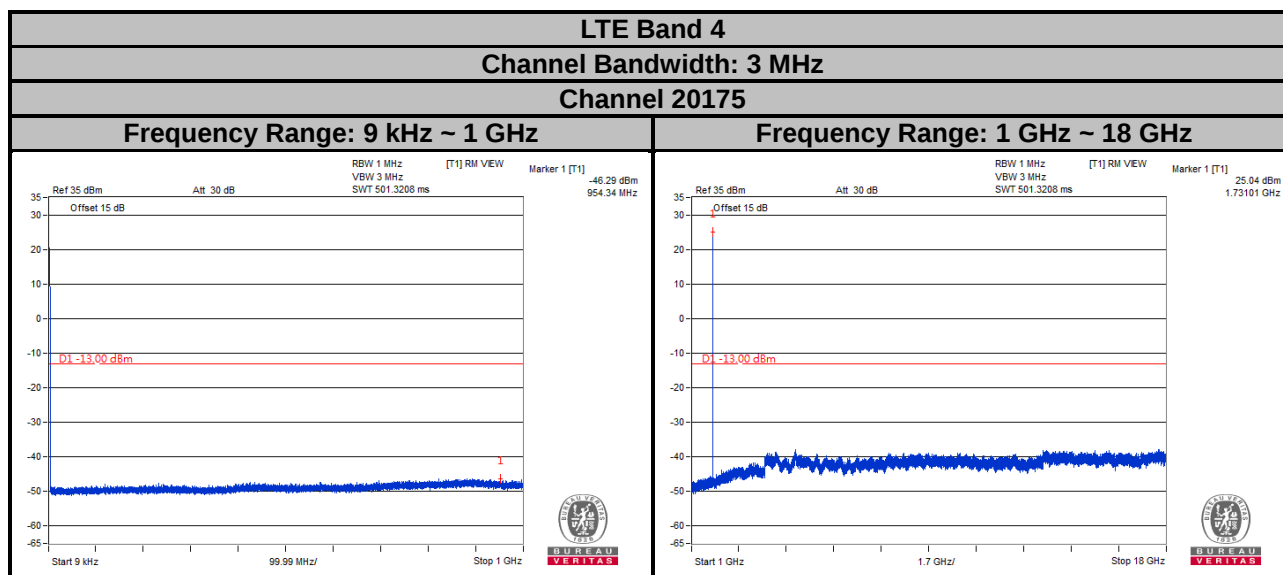
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



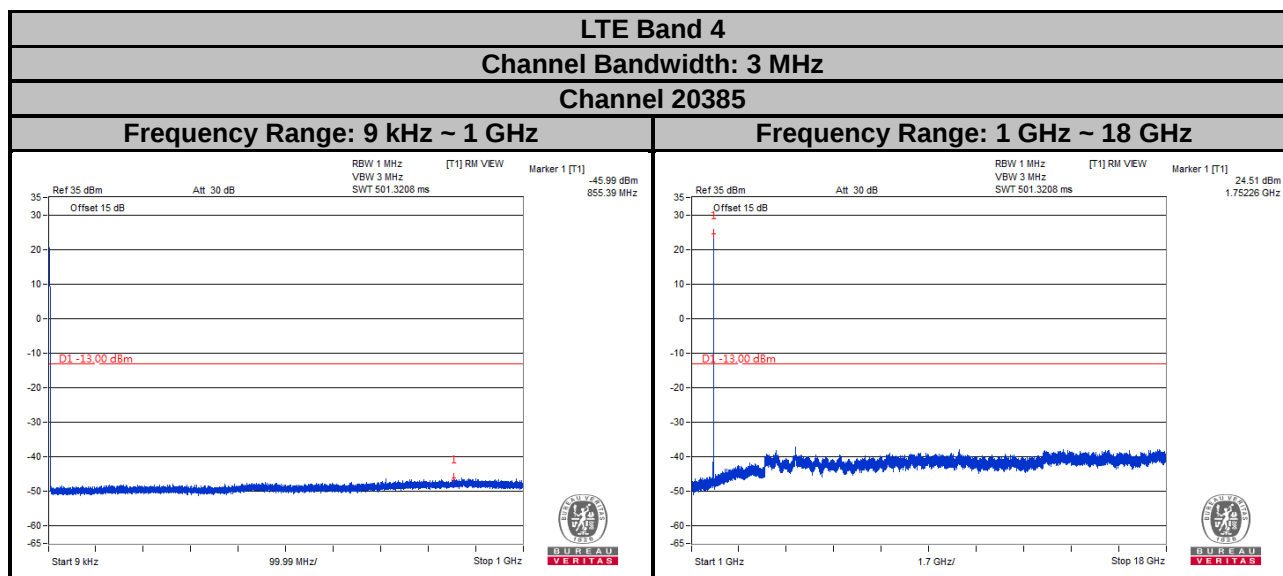
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



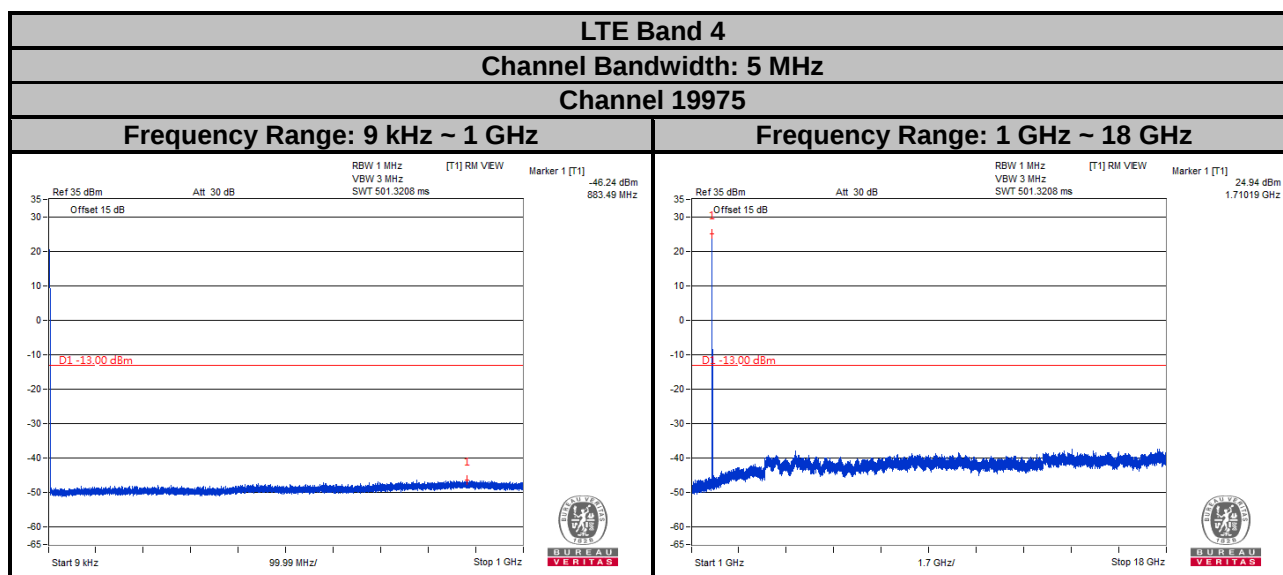
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



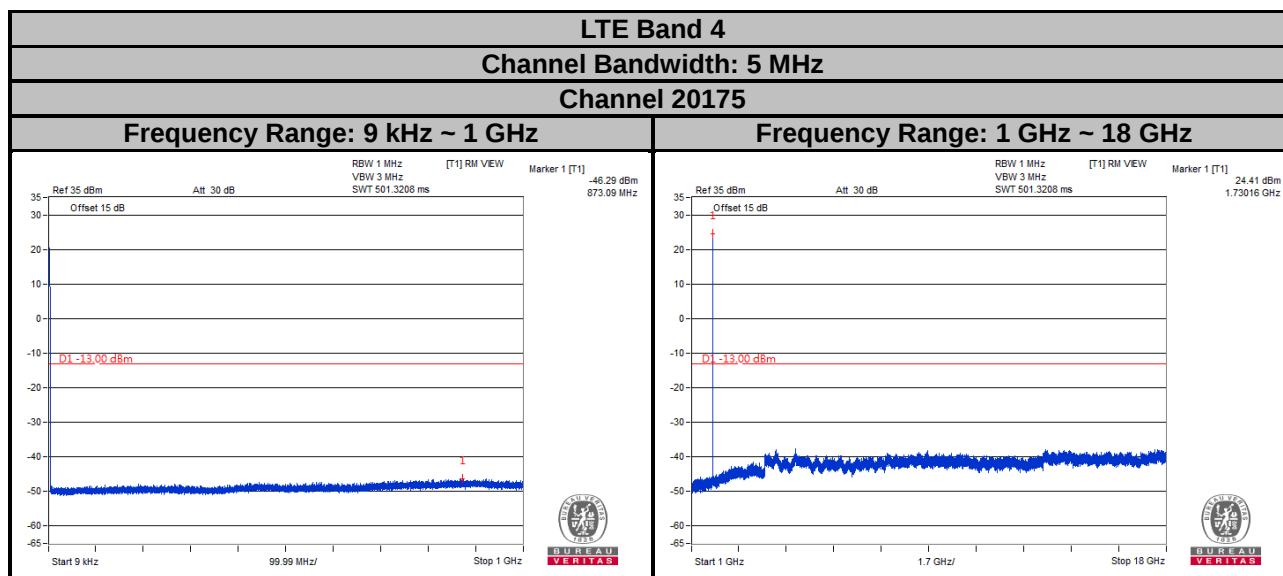
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



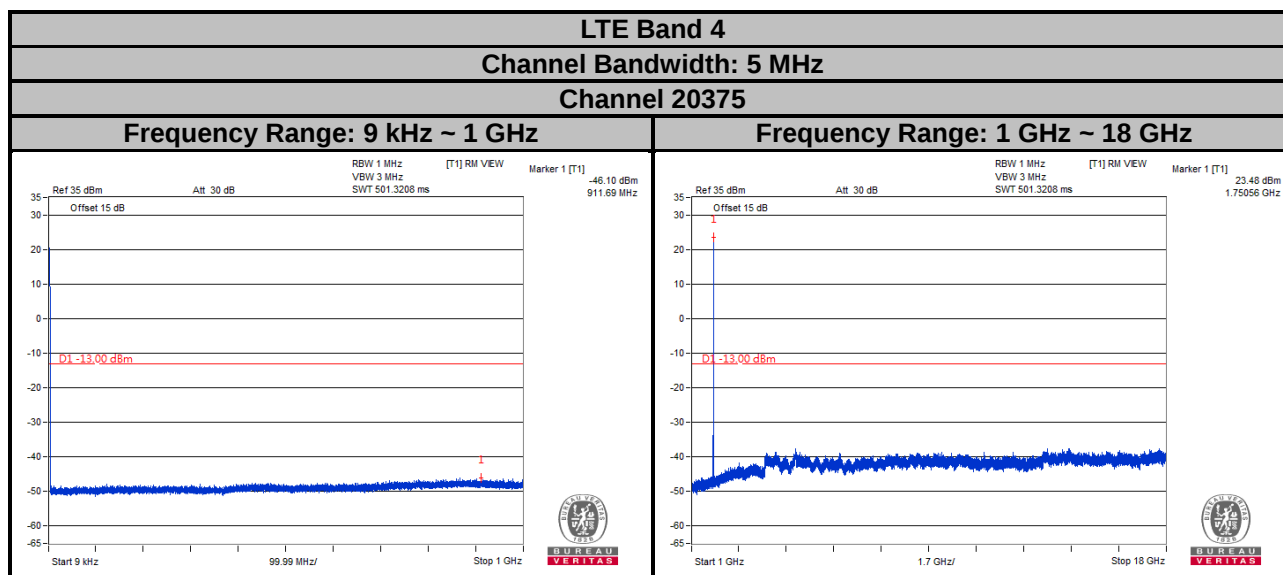
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



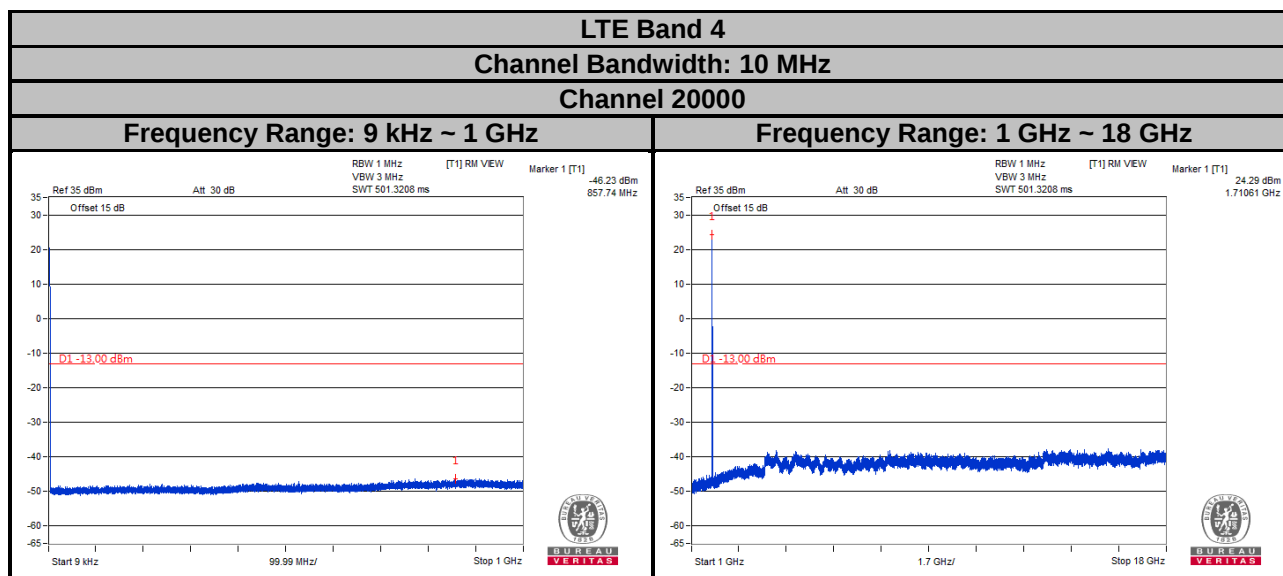
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



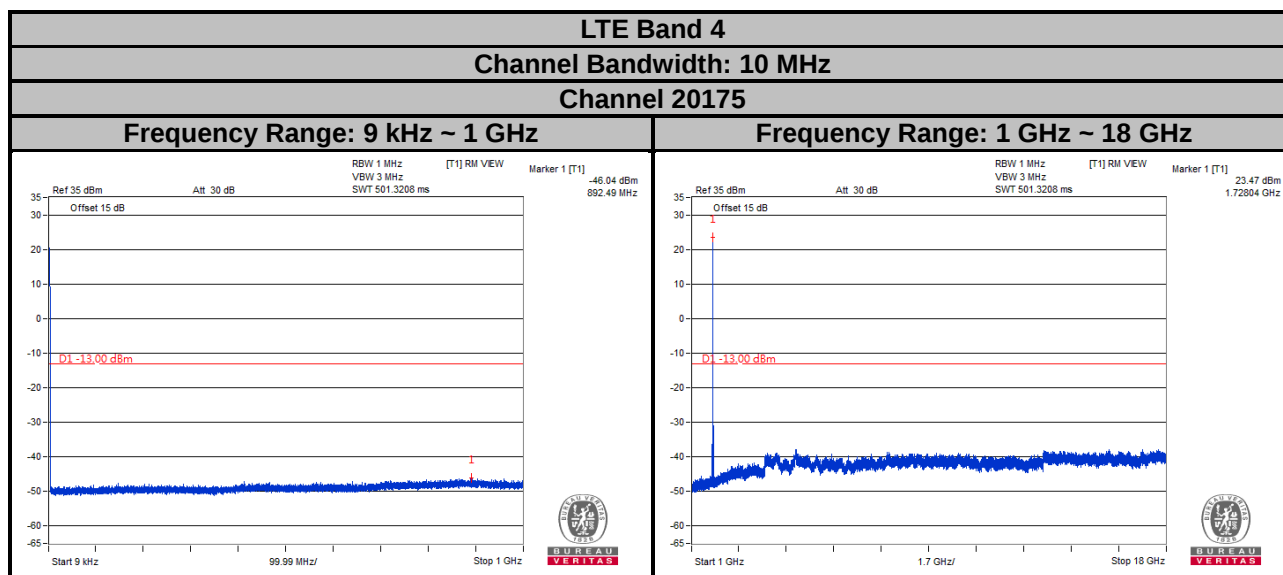
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.



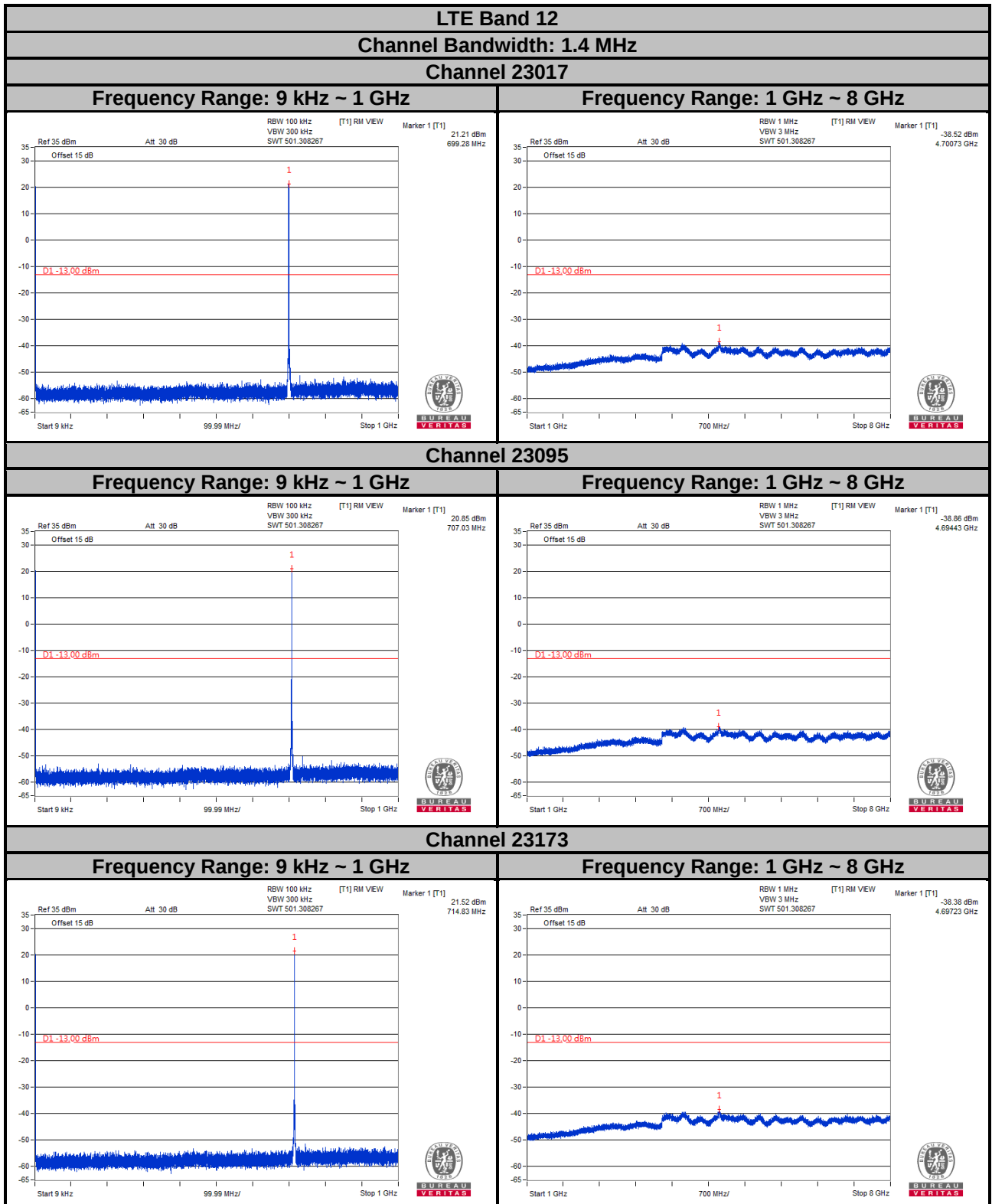
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



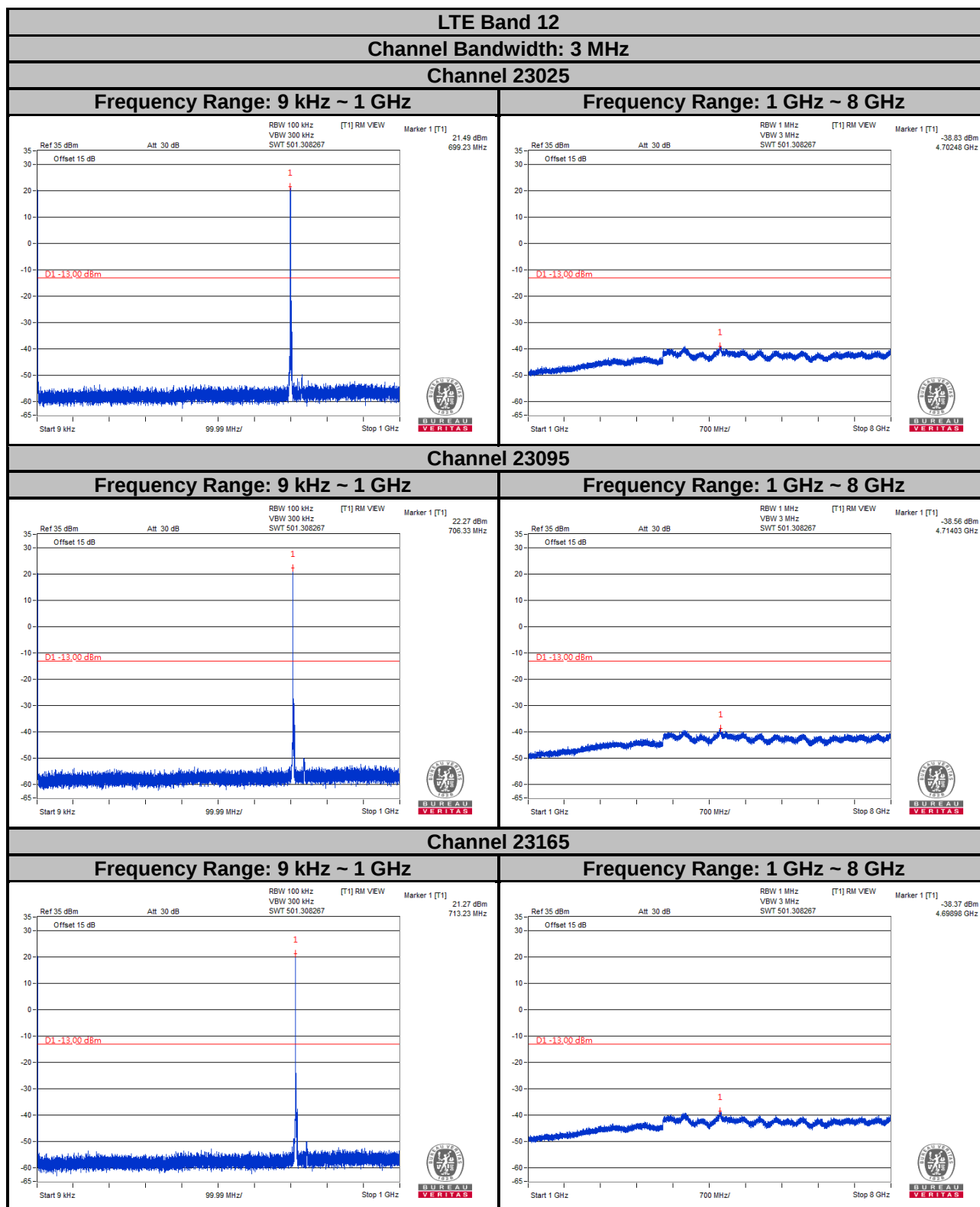
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



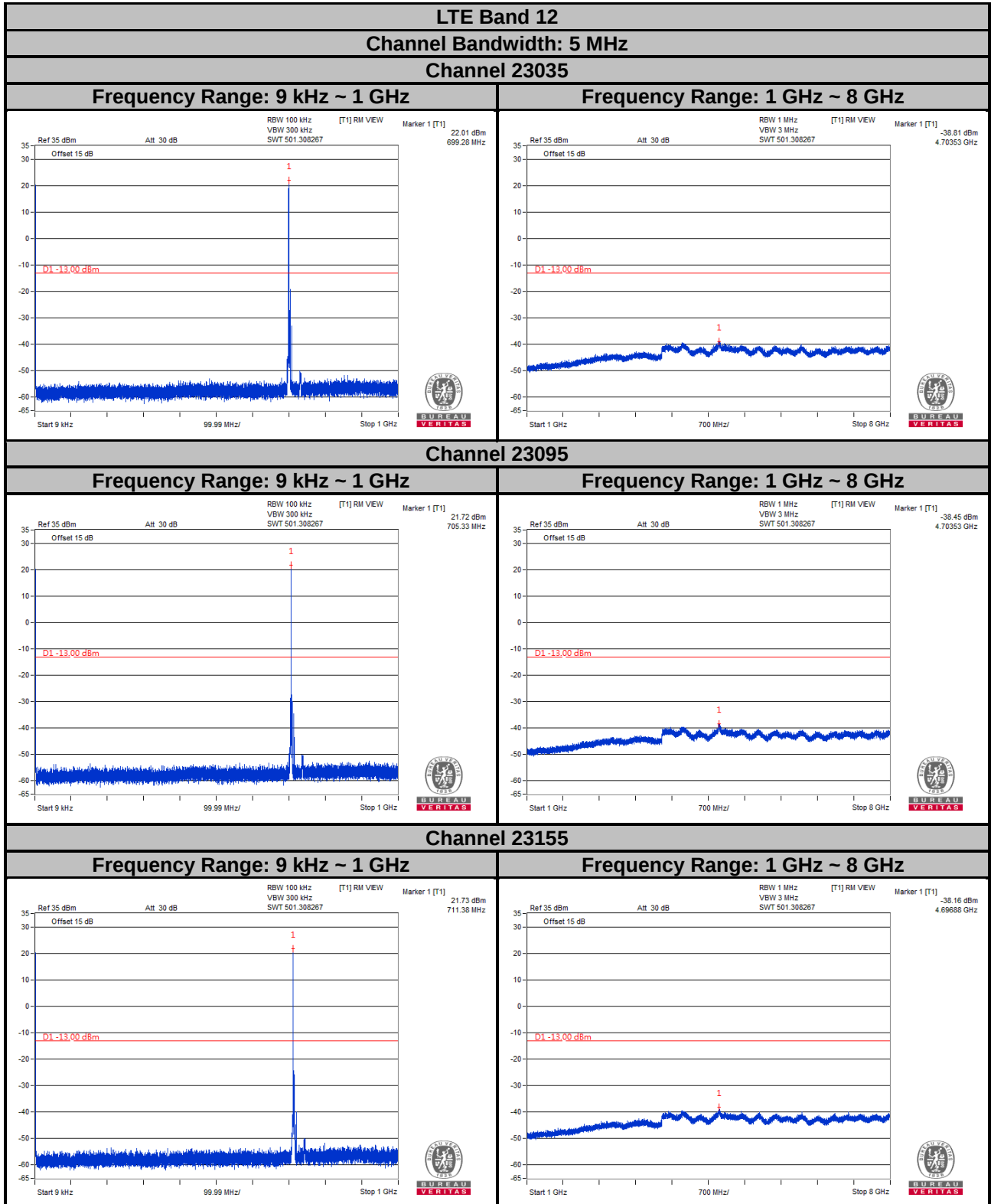
BUREAU
VERITAS



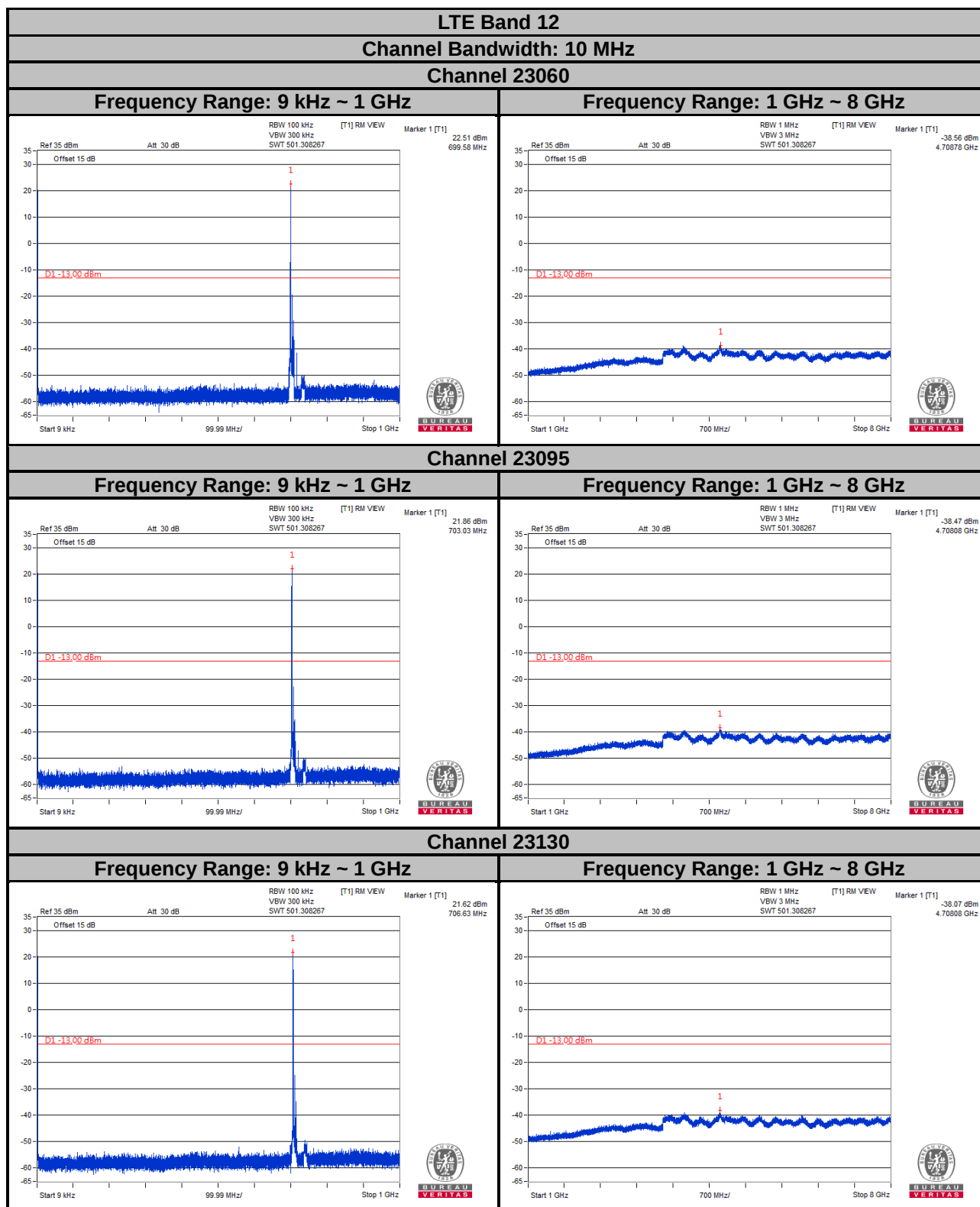
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.

4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

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

4.8.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 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 substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G.
- c. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$.

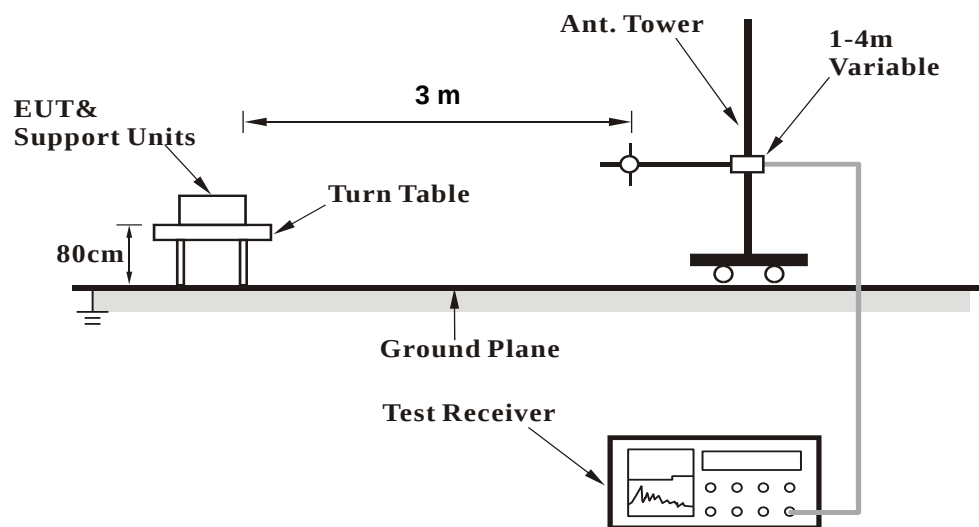
Note: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.8.3 Deviation from Test Standard

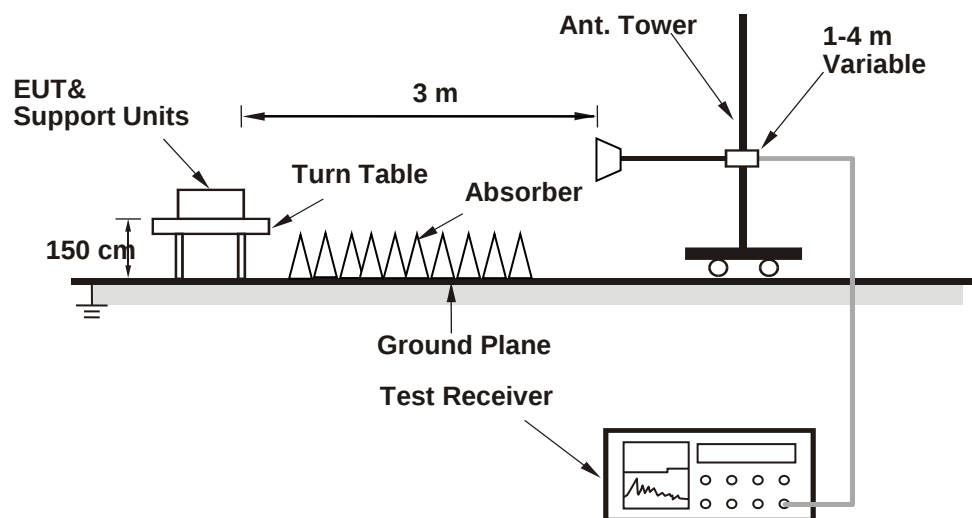
No deviation.

4.8.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



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

4.8.5 Test Results

Below 1GHz

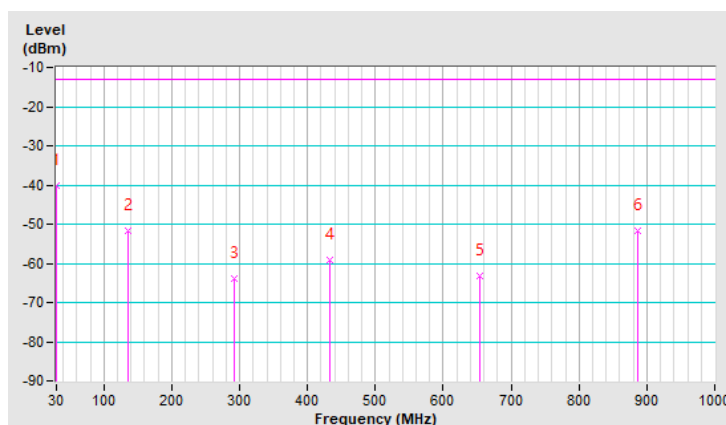
WCDMA Band 4:

Mode	TX channel 1413 (1732.6MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-44.0	-20.6	-19.4	-40.0	-13.0	-27.0
2	135.73	-45.7	-48.5	-3.2	-51.7	-13.0	-38.7
3	291.90	-60.1	-61.7	-2.1	-63.8	-13.0	-50.8
4	433.52	-58.8	-62.6	3.5	-59.1	-13.0	-46.1
5	654.68	-65.3	-66.7	3.6	-63.1	-13.0	-50.1
6	886.51	-58.8	-55.0	3.4	-51.6	-13.0	-38.6

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

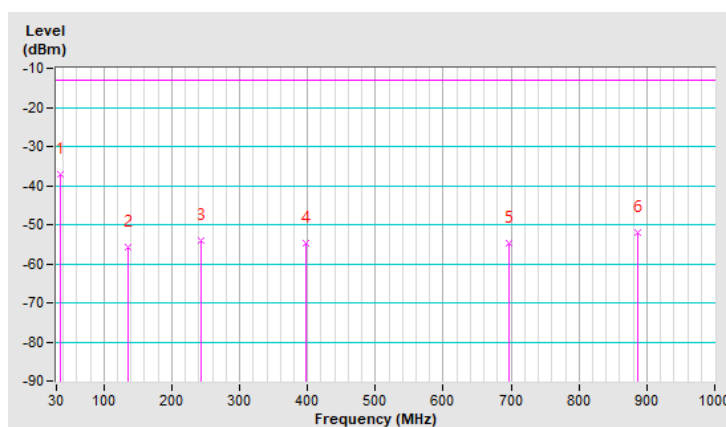


Mode	TX channel 1413 (1732.6MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	35.82	-27.5	-21.3	-15.9	-37.2	-13.0	-24.2
2	135.73	-52.5	-52.6	-3.2	-55.8	-13.0	-42.8
3	243.40	-52.5	-52.5	-1.4	-53.9	-13.0	-40.9
4	398.60	-54.0	-58.1	3.3	-54.8	-13.0	-41.8
5	696.39	-60.3	-58.0	3.4	-54.6	-13.0	-41.6
6	886.51	-60.1	-55.6	3.4	-52.2	-13.0	-39.2

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).



LTE Band 4

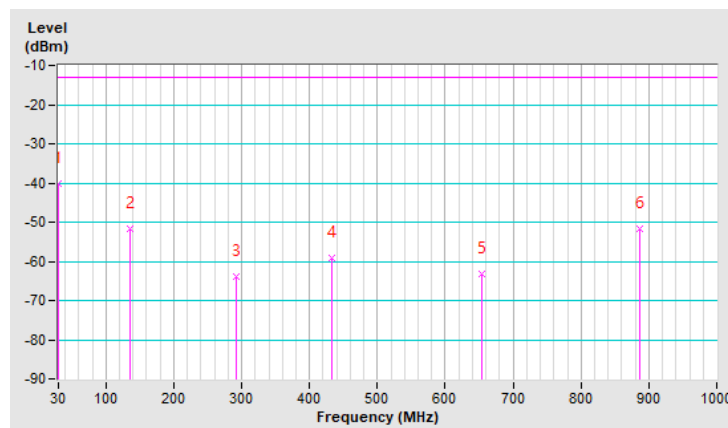
LTE Band 4, Channel Bandwidth: 1.4MHz

Mode	TX channel 20393 (1754.3MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-44.0	-20.6	-19.4	-40.0	-13.0	-27.0
2	135.73	-45.7	-48.5	-3.2	-51.7	-13.0	-38.7
3	291.90	-60.1	-61.7	-2.1	-63.8	-13.0	-50.8
4	433.52	-58.8	-62.6	3.5	-59.1	-13.0	-46.1
5	654.68	-65.3	-66.7	3.6	-63.1	-13.0	-50.1
6	886.51	-58.8	-55.0	3.4	-51.6	-13.0	-38.6

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

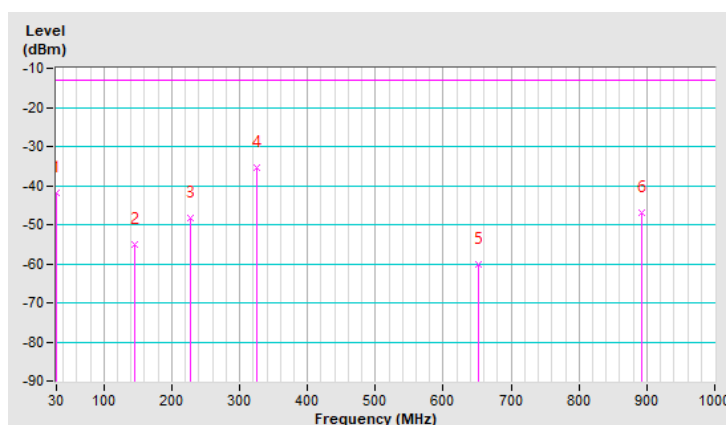


Mode	TX channel 20393 (1754.3MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	30.97	-31.5	-22.9	-18.8	-41.7	-13.0	-28.7
2	144.46	-52.9	-51.9	-3.2	-55.1	-13.0	-42.1
3	226.91	-44.5	-46.7	-1.7	-48.4	-13.0	-35.4
4	325.85	-35.3	-39.6	4.1	-35.5	-13.0	-22.5
5	652.74	-65.7	-63.7	3.6	-60.1	-13.0	-47.1
6	893.30	-55.3	-50.5	3.5	-47.0	-13.0	-34.0

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).



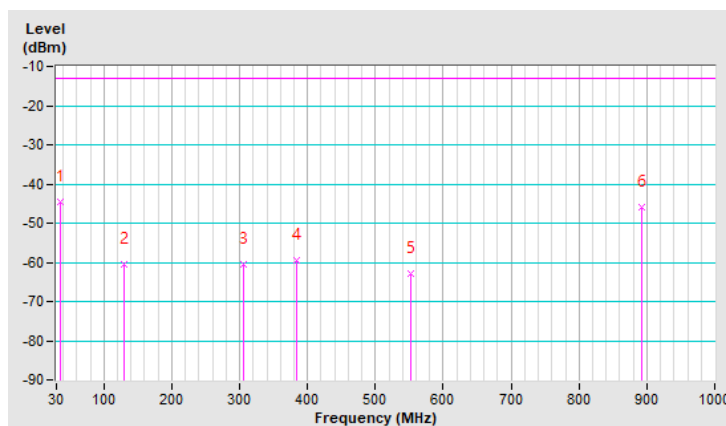
LTE Band 4, Channel Bandwidth: 5MHz

Mode	TX channel 20375 (1752.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	36.79	-48.0	-29.4	-15.2	-44.6	-13.0	-31.6
2	128.94	-54.4	-57.4	-3.2	-60.6	-13.0	-47.6
3	305.48	-56.1	-64.3	3.8	-60.5	-13.0	-47.5
4	384.05	-58.7	-63.1	3.5	-59.6	-13.0	-46.6
5	551.86	-63.3	-66.7	3.8	-62.9	-13.0	-49.9
6	893.30	-53.4	-49.6	3.5	-46.1	-13.0	-33.1

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

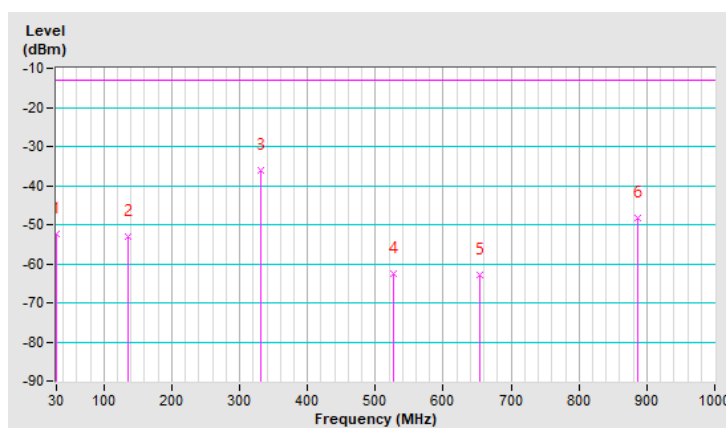


Mode	TX channel 20375 (1752.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-42.4	-32.9	-19.4	-52.3	-13.0	-39.3
2	135.73	-49.6	-49.7	-3.2	-52.9	-13.0	-39.9
3	330.70	-35.6	-40.1	4.0	-36.1	-13.0	-23.1
4	526.64	-63.2	-66.4	3.9	-62.5	-13.0	-49.5
5	653.71	-68.4	-66.4	3.6	-62.8	-13.0	-49.8
6	886.51	-56.1	-51.6	3.4	-48.2	-13.0	-35.2

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).



LTE Band 4, Channel Bandwidth: 10MHz

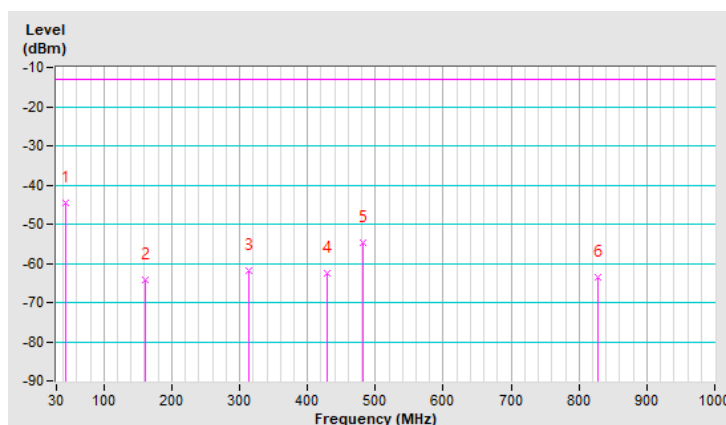
Mode	TX channel 20175 (1732.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	44.55	-45.9	-33.7	-10.9	-44.6	-13.0	-31.6
2	160.95	-58.9	-61.3	-3.0	-64.3	-13.0	-51.3
3	313.24	-57.8	-65.9	4.0	-61.9	-13.0	-48.9
4	428.67	-62.1	-66.0	3.5	-62.5	-13.0	-49.5
5	482.02	-54.7	-58.5	3.6	-54.9	-13.0	-41.9
6	828.31	-70.3	-67.3	3.9	-63.4	-13.0	-50.4

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

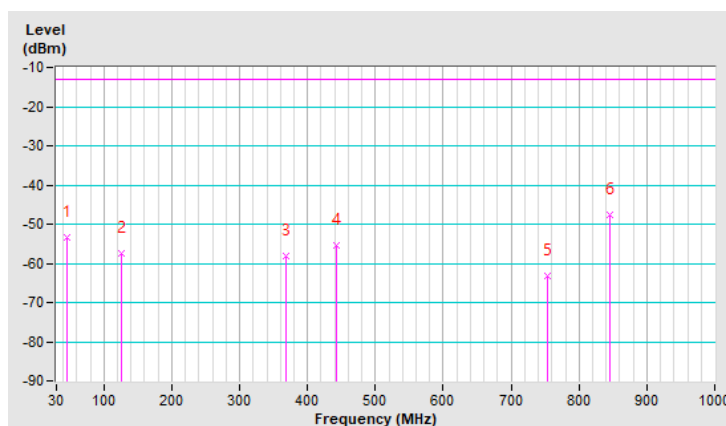


Mode	TX channel 20175 (1732.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	45.52	-45.0	-42.9	-10.4	-53.3	-13.0	-40.3
2	126.03	-51.3	-53.9	-3.4	-57.3	-13.0	-44.3
3	368.53	-57.9	-62.0	3.8	-58.2	-13.0	-45.2
4	443.22	-55.2	-58.9	3.5	-55.4	-13.0	-42.4
5	752.65	-70.2	-67.0	3.9	-63.1	-13.0	-50.1
6	844.80	-54.8	-51.2	3.6	-47.6	-13.0	-34.6

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).



LTE Band 12

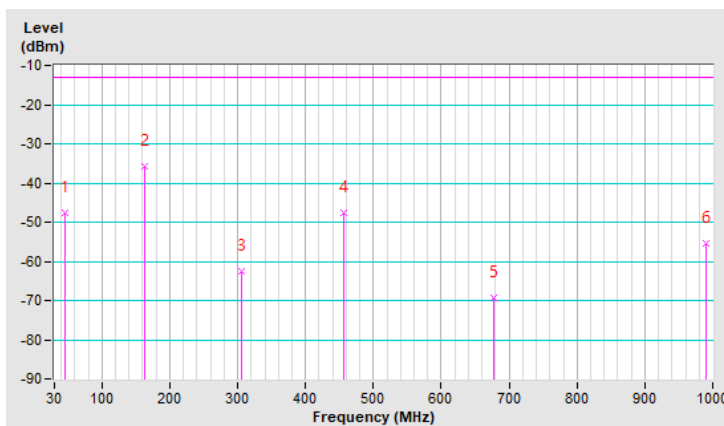
LTE Band 12, Channel Bandwidth: 1.4MHz

Mode	TX channel 23173 (715.30MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	45.52	-46.4	-37.3	-10.4	-47.7	-13.0	-34.7
2	162.89	-27.8	-32.8	-2.9	-35.7	-13.0	-22.7
3	306.45	-56.0	-66.3	3.9	-62.4	-13.0	-49.4
4	456.80	-45.4	-51.1	3.5	-47.6	-13.0	-34.6
5	676.99	-69.9	-73.0	3.6	-69.4	-13.0	-56.4
6	989.33	-61.9	-58.7	3.4	-55.3	-13.0	-42.3

Remarks:

1. $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} - \text{Cable Loss (dB)}$.

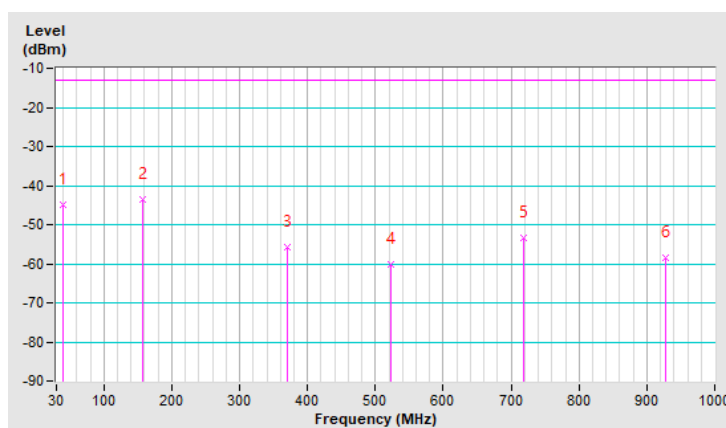


Mode	TX channel 23173 (715.30MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	39.70	-33.1	-31.2	-13.7	-44.9	-13.0	-31.9
2	158.04	-38.7	-41.0	-2.7	-43.7	-13.0	-30.7
3	370.47	-53.3	-59.7	3.9	-55.8	-13.0	-42.8
4	523.73	-58.6	-63.9	3.8	-60.1	-13.0	-47.1
5	718.70	-57.1	-56.8	3.5	-53.3	-13.0	-40.3
6	928.22	-65.2	-62.2	3.6	-58.6	-13.0	-45.6

Remarks:

1. $ERP\ (dBm) = S.G\ Value\ (dBm) + Correction\ Factor\ (dB)$.
2. $Correction\ Factor\ (dB) = Substitution\ Antenna\ Gain\ (dB) - Cable\ Loss\ (dB)$.



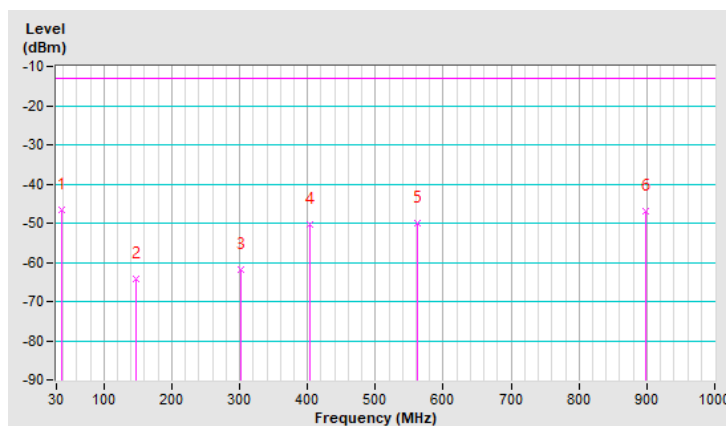
LTE Band 12, Channel Bandwidth: 5MHz

Mode	TX channel 23035 (701.50MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	37.76	-47.8	-31.9	-14.7	-46.6	-13.0	-33.6
2	146.40	-57.1	-61.1	-3.0	-64.1	-13.0	-51.1
3	302.57	-55.4	-65.7	3.7	-62.0	-13.0	-49.0
4	403.45	-47.6	-53.7	3.3	-50.4	-13.0	-37.4
5	562.53	-48.4	-53.6	3.7	-49.9	-13.0	-36.9
6	898.15	-52.2	-50.4	3.5	-46.9	-13.0	-33.9

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

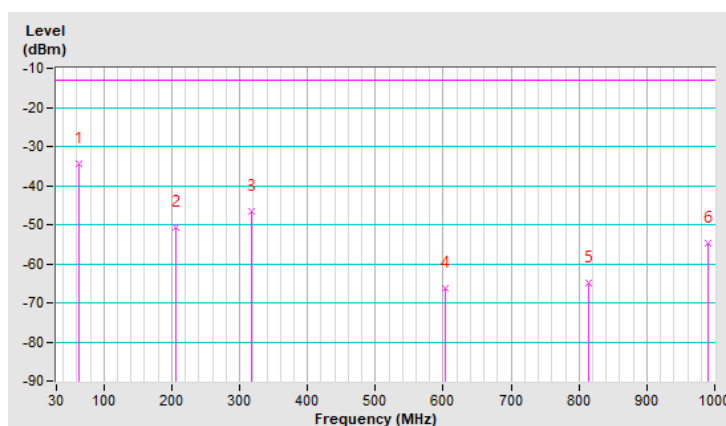


Mode	TX channel 23035 (701.50MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	63.95	-25.8	-32.5	-2.0	-34.5	-13.0	-21.5
2	206.54	-46.0	-48.6	-2.0	-50.6	-13.0	-37.6
3	318.09	-44.2	-50.5	4.0	-46.5	-13.0	-33.5
4	603.27	-68.0	-70.0	3.7	-66.3	-13.0	-53.3
5	814.73	-69.8	-68.9	3.9	-65.0	-13.0	-52.0
6	989.33	-62.2	-58.1	3.4	-54.7	-13.0	-41.7

Remarks:

1. $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} - \text{Cable Loss (dB)}$.



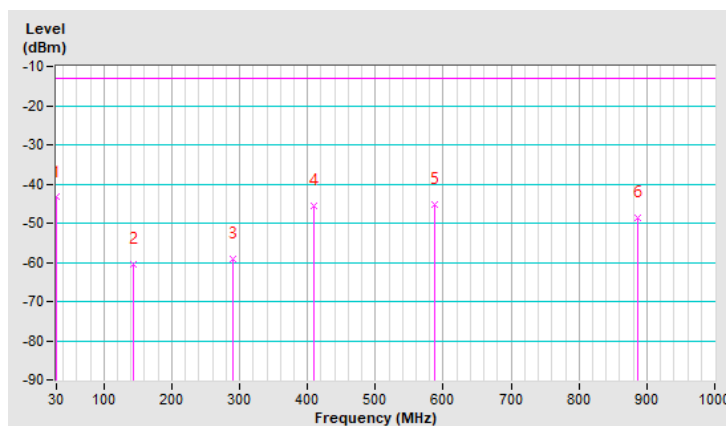
LTE Band 12, Channel Bandwidth: 10MHz

Mode	TX channel 23060 (704.00MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-45.2	-24.0	-19.4	-43.4	-13.0	-30.4
2	142.52	-53.0	-57.3	-3.1	-60.4	-13.0	-47.4
3	290.93	-53.5	-57.4	-1.9	-59.3	-13.0	-46.3
4	410.24	-43.4	-49.0	3.3	-45.7	-13.0	-32.7
5	586.78	-44.3	-49.1	3.8	-45.3	-13.0	-32.3
6	887.48	-53.8	-52.1	3.5	-48.6	-13.0	-35.6

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

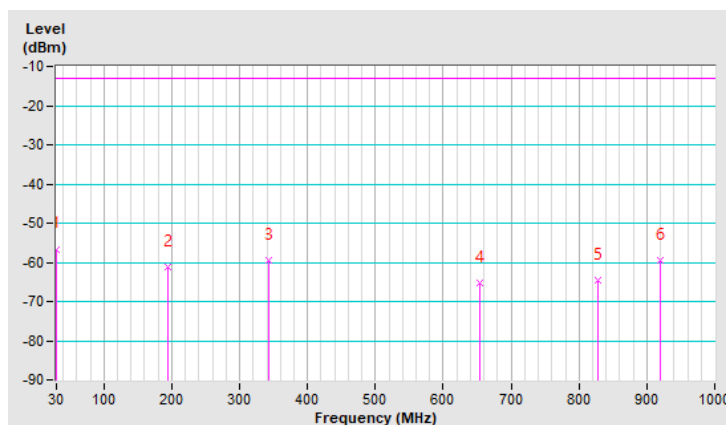


Mode	TX channel 23060 (704.00MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-44.5	-37.2	-19.4	-56.6	-13.0	-43.6
2	193.93	-57.6	-58.5	-2.6	-61.1	-13.0	-48.1
3	343.31	-56.9	-63.6	4.0	-59.6	-13.0	-46.6
4	653.71	-68.9	-69.0	3.6	-65.4	-13.0	-52.4
5	828.31	-70.0	-68.6	3.9	-64.7	-13.0	-51.7
6	919.49	-65.8	-63.2	3.6	-59.6	-13.0	-46.6

Remarks:

1. $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} - \text{Cable Loss (dB)}$.



Above 1GHz

WCDMA Band 4

Mode	TX channel 1312 (1712.4MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	24Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3424.80	-63.7	-55.1	1.3	-53.8	-13.0	-40.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3424.80	-64.0	-55.0	1.3	-54.6	-13.0	-41.6

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 1413 (1732.6MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	24Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3465.20	-63.7	-55.3	1.4	-53.9	-13.0	-40.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3465.20	-63.8	-56.0	1.4	-54.6	-13.0	-41.6

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 1513 (1752.6MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	24Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3505.20	-64.2	-56.0	1.5	-54.5	-13.0	-41.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3505.20	-64.3	-56.7	1.5	-55.2	-13.0	-42.2

Remarks:

1. $EIRP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} - \text{Cable Loss (dB)}$.

LTE Band 4, Channel Bandwidth: 1.4MHz

Mode	TX channel 19957 (1710.70MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3421.40	-63.8	-55.2	1.3	-53.9	-13.0	-40.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3421.40	-61.3	-53.2	1.3	-51.9	-13.0	-38.9

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 20175 (1732.50MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3465.00	-64.0	-55.6	1.4	-54.2	-13.0	-41.2
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3465.00	-61.4	-53.6	1.4	-52.2	-13.0	-39.2

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 20393 (1754.30MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3508.60	-64.2	-55.9	1.4	-54.5	-13.0	-41.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3508.60	-61.6	-53.9	1.4	-52.5	-13.0	-39.5

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

LTE Band 4, Channel Bandwidth: 5MHz

Mode	TX channel 19975 (1712.50MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3425.00	-63.7	-55.1	1.3	-53.8	-13.0	-40.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3425.00	-61.2	-53.1	1.3	-51.8	-13.0	-38.8

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 20175 (1732.50MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3465.00	-64.2	-55.8	1.4	-54.4	-13.0	-41.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3465.00	-60.7	-52.9	1.4	-51.5	-13.0	-38.5

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 20375 (1752.50MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3505.00	-64.3	-56.1	1.5	-54.6	-13.0	-41.6
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3505.00	-61	-53.4	1.5	-51.9	-13.0	-38.9

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

LTE Band 4, Channel Bandwidth: 10MHz

Mode	TX channel 20000 (1715.00MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3430.00	-64.3	-55.8	1.4	-54.4	-13.0	-41.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3430.00	-61.8	-53.8	1.4	-52.4	-13.0	-39.4

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 20175 (1732.50MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3465.00	-64.4	-56	1.4	-54.6	-13.0	-41.6
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3465.00	-61.8	-54	1.4	-52.6	-13.00	-39.6

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 20350 (1750.00MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3500.00	-64.6	-56.4	1.5	-54.9	-13.0	-41.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3500.00	-62.1	-54.5	1.5	-53.0	-13.0	-40.0

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

LTE Band 12, Channel Bandwidth: 1.4MHz

Mode	TX channel 23017 (699.70MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1430.60	-57.6	-48.7	1.0	-47.7	-13.0	-34.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1430.60	-58.6	-50.9	1.0	-49.9	-13.0	-36.9

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 23095 (707.50MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1415.00	-55.5	-49	0.9	-48.1	-13.0	-35.1
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1415.00	-56.2	-50.9	0.9	-50.0	-13.0	-37.0

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 23173 (715.30MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1430.60	-55.5	-48.7	1	-47.7	-13.0	-34.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1430.60	-56.4	-50.9	1	-49.9	-13.0	-36.9

Remarks:

1. $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} - \text{Cable Loss (dB)}$.

LTE Band 12, Channel Bandwidth: 5MHz

Mode	TX channel 23035 (701.50MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1403.00	-57.4	-48.9	0.9	-48.0	-13.0	-35.0

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1403.00	-58.2	-50.9	0.9	-50.0	-13.0	-37.0

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 23095 (707.50MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1415.00	-56	-49.4	0.9	-48.5	-13.0	-35.5

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1415.00	-56.5	-51.2	0.9	-50.3	-13.0	-37.3

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 23155 (713.50MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1427.00	-56.5	-49.9	1	-48.9	-13.0	-35.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1427.00	-57.2	-51.7	1	-50.7	-13.0	-37.7

Remarks:

1. $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} - \text{Cable Loss (dB)}$.

LTE Band 12, Channel Bandwidth: 10MHz

Mode	TX channel 23060 (704.00MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1408.00	-57.9	-49.3	0.9	-48.4	-13.0	-35.4

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1408.00	-59.1	-51.7	0.9	-50.8	-13.0	-37.8

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 23095 (707.50MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1415.00	-56.2	-49.7	0.9	-48.8	-13.0	-35.8

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1415.00	-57.2	-51.9	0.9	-51.0	-13.0	-38.0

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB).

Mode	TX channel 23130 (711.00MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	23deg. C, 66%RH	Input Power	24Vdc
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1422.00	-56.5	-50.0	1.0	-49.0	-13.0	-36.0
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1422.00	-57.8	-52.4	1.0	-51.4	-13.0	-38.4

Remarks:

1. $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} - \text{Cable Loss (dB)}$.

5 Pictures of Test Arrangements

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

Appendix – 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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