

FCC Test Report

(PART 27)

Report No.: RFBEIH-WTW-P21090617-2

FCC ID: 2AK5B-HB2

Test Model: HB2LW1NA1

Received Date: Sep. 15, 2021

Test Date: Oct. 04, ~ Oct. 15, 2021

Issued Date: Nov. 24, 2021

Applicant: Latch Systems, Inc.

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

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Test Location: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
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**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBEIH-WTW-P21090617-2	Original Release	Nov. 24, 2021

1 Certificate of Conformity

Product: Hub
Brand: LATCH
Test Model: HB2LW1NA1
Sample Status: Engineering Sample
Applicant: Latch Systems, Inc.
Test Date: Oct. 04, ~ Oct. 15, 2021
Standards: FCC Part 27, Subpart C, H, F, 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:** Nov. 24, 2021
Lena Wang / Specialist

Approved by : Jeremy Lin, **Date:** Nov. 24, 2021
Jeremy Lin / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2 (LTE 4)			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(d)	Equivalent Isotropically 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	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Out of Band Emission Measurements	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak To Average Ratio	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 -13.26 dB at 6880.00 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 12)			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(c)	Effective 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	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53(g)	Out of Band Emission Measurements	Pass	Meet the requirement of limit.
--	Peak To Average Ratio	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 -16.91 dB at 41.64 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 13)			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(b)	Effective 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	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53(c)	Out of Band Emission Measurements	Pass	Meet the requirement of limit.
--	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1051 27.53(c)(f)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(c)(f)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -2.19 dB at 1569.00 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. 09, 2021	Apr. 08, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 10, 2021	Jun. 09, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 06, 2020	Nov. 05, 2021
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 22, 2020	Nov. 21, 2021
Loop Antenna TESEQ	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 05, 2021	Jun. 04, 2022
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 17, 2021	Feb. 16, 2022
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM- SM8000	CABLE-CH9-02 (248780+171006)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9- (250795/4)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	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
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
True RMS Clamp Meter Fluke	325	31130711WS	Jun. 02, 2021	Jun. 01, 2022
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 26, 2021	Aug. 25, 2023
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 10, 2021	Sep. 09, 2022
AC Power Source EEC	6905S	1991553	NA	NA

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	Hub		
Brand	LATCH		
Test Model	HB2LW1NA1		
Status of EUT	Engineering Sample		
Power Supply Rating	12.0 Vdc (adapter)		
Modulation Type	LTE	QPSK, 16QAM	
Frequency Range	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: 10 MHz)	704.0 ~ 711.0 MHz	
	LTE Band 13 (Channel Bandwidth: 5 MHz)	779.5 ~ 784.5 MHz	
	LTE Band 13 (Channel Bandwidth: 10 MHz)	782.0 MHz	
Emission Designator	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1M09D7W	
	LTE Band 4 (Channel Bandwidth: 3 MHz)	2M70G7D	
	LTE Band 4 (Channel Bandwidth: 5 MHz)	4M49D7W	
	LTE Band 4 (Channel Bandwidth: 10 MHz)	8M97D7W	
	LTE Band 4 (Channel Bandwidth: 15 MHz)	13M5G7D	
	LTE Band 4 (Channel Bandwidth: 20 MHz)	18M0D7W	
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	1M09D7W	
	LTE Band 12 (Channel Bandwidth: 3 MHz)	2M70G7D	
	LTE Band 12 (Channel Bandwidth: 5 MHz)	4M49D7W	
	LTE Band 12 (Channel Bandwidth: 10 MHz)	8M98D7W	
	LTE Band 13 (Channel Bandwidth: 5 MHz)	4M49D7W	
	LTE Band 13 (Channel Bandwidth: 10 MHz)	8M95G7D	
Max. ERP Power		QPSK	16QAM
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	164.059 mW (22.15 dBm)	128.529 mW (21.09 dBm)
	LTE Band 12 (Channel Bandwidth: 3 MHz)	163.305 mW (22.13 dBm)	130.317 mW (21.15 dBm)
	LTE Band 12 (Channel Bandwidth: 5 MHz)	164.059 mW (22.15 dBm)	130.317 mW (21.15 dBm)
	LTE Band 12 (Channel Bandwidth: 10 MHz)	164.059 mW (22.15 dBm)	130.317 mW (21.15 dBm)
	LTE Band 13 (Channel Bandwidth: 5 MHz)	162.930 mW (22.12 dBm)	130.017 mW (21.14 dBm)
	LTE Band 13 (Channel Bandwidth: 10 MHz)	164.059 mW (22.15 dBm)	129.420 mW (21.12 dBm)
Max. EIRP Power	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	377.572 mW (25.77 dBm)	299.226 mW (24.76 dBm)
	LTE Band 4 (Channel Bandwidth: 3 MHz)	377.572 mW (25.77 dBm)	297.167 mW (24.73 dBm)

	LTE Band 4 (Channel Bandwidth: 5 MHz)	379.315 mW (25.79 dBm)	301.995 mW (24.80 dBm)
	LTE Band 4 (Channel Bandwidth: 10 MHz)	378.443 mW (25.78 dBm)	297.852 mW (24.74 dBm)
	LTE Band 4 (Channel Bandwidth: 15 MHz)	377.572 mW (25.77 dBm)	297.852 mW (24.74 dBm)
	LTE Band 4 (Channel Bandwidth: 20 MHz)	378.443 mW (25.78 dBm)	292.415 mW (24.66 dBm)
Antenna Type	Refer to Note as below		
Antenna Gain	Refer to Note as below		
Accessory Device	Refer to Note as below		
Data Cable Supplied	N/A		

Note:

- The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	APD	WB-24J12FU	I/P: 100-240 Vac, 50/60 Hz, 0.7 A O/P: 12 Vdc, 2 A 1.5m non shielded, without core

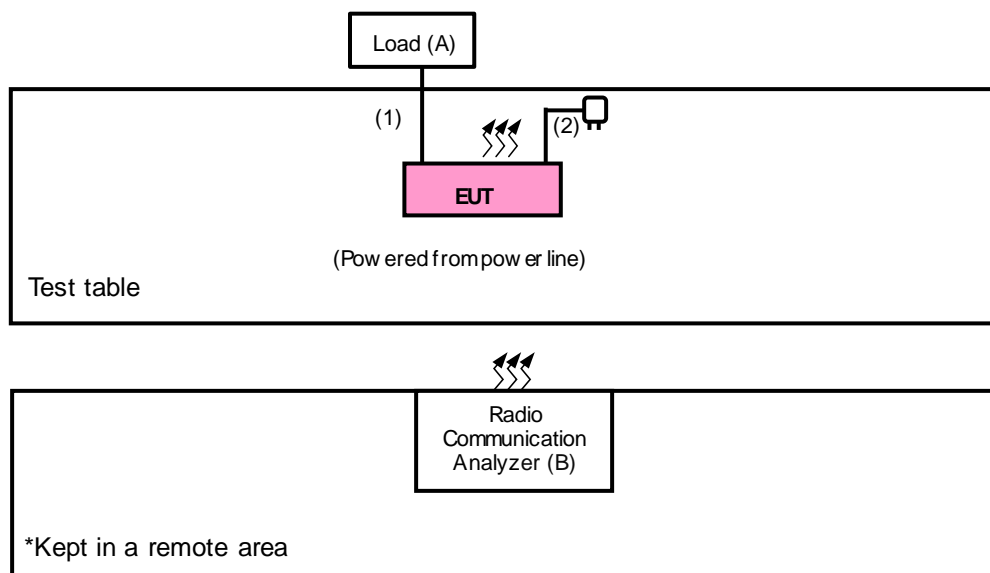
- The antenna information is listed as below.

Antenna Type		PIFA						
Band		WCDMA		LTE				
		2	5	2	4	5	12	13
Gain	Ant. 1 (Main)	2.3	1.3	2.3	2.8	1.3	1.1	1.1
	Ant. 2 (Div, Rx only)	2.6	2.5	2.6	2.8	2.5	2.8	2.8

- The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
- 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
A	Load	N/A	N/A	N/A	N/A
B	Radio Communication Analyzer	Anritsu	MT8820C	6201300640	N/A

No.	Signal Cable Description Of The Above Support Units
1.	LAN Cable: 3m
2.	DC Output Cable: 1.5m

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	Radiated Emission
LTE Band 4	X-plane
LTE Band 12	X-plane
LTE Band 13	X-plane

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 1 RB / 2 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 7 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	1 RB / 49 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	1 RB / 37 RB Offset 1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	1 RB / 50 RB Offset
-	Modulation Characteristics	20050 to 20300	20175	20 MHz	QPSK, 16QAM	100 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
		20025 to 20325	20025, 20325	15 MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050, 20300	20 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
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 2 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 7 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	1 RB / 49 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	1 RB / 37 RB Offset 1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	1 RB / 50 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 6 RB / 0 RB Offset		
			20393	1.4 MHz	QPSK	1 RB / 5 RB Offset 6 RB / 0 RB Offset		
		19965 to 20385	19965	3 MHz	QPSK	1 RB / 0 RB Offset 15 RB / 0 RB Offset		
			20385	3 MHz	QPSK	1 RB / 14 RB Offset 15 RB / 0 RB Offset		
		19975 to 20375	19975	5 MHz	QPSK	1 RB / 0 RB Offset 25 RB / 0 RB Offset		
			20375	5 MHz	QPSK	1 RB / 24 RB Offset 25 RB / 0 RB Offset		
		20000 to 20350	20000	10 MHz	QPSK	1 RB / 0 RB Offset 50 RB / 0 RB Offset		
			20350	10 MHz	QPSK	1 RB / 49 RB Offset 50 RB / 0 RB Offset		
		20025 to 20325	20025	15 MHz	QPSK	1 RB / 0 RB Offset 75 RB / 0 RB Offset		
			20325	15 MHz	QPSK	1 RB / 74 RB Offset 75 RB / 0 RB Offset		
		20050 to 20300	20050	20 MHz	QPSK	1 RB / 0 RB Offset 100 RB / 0 RB Offset		
			20300	20 MHz	QPSK	1 RB / 99 RB Offset 100 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 / 49 RB Offset
				20025 to 20325	20025, 20175, 20325	15 MHz	QPSK	1 RB / 37 RB Offset
				20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1 RB / 50 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		
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1 RB / 50 RB Offset		

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation. Therefore, only ERP, modulation characteristics, occupied bandwidth and peak to average ratio items had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
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 emissions below 1 GHz, select the worst radiated emission channel for final testing.

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	3 RB / 3 RB Offset 3 RB / 1 RB Offset		
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	8 RB / 7 RB Offset 1 RB / 14 RB Offset		
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset		
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 25 RB / 0 RB Offset		
-	Modulation Characteristics	23060 to 23130	23095	10 MHz	QPSK, 16QAM	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, 16QAM	50 RB / 0 RB Offset		
-	Peak to Average Ratio	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	3 RB / 3 RB Offset 3 RB / 1 RB Offset		
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	8 RB / 7 RB Offset 1 RB / 14 RB Offset		
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset		
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 25 RB / 0 RB Offset		
-	Band Edge	23017 to 23173	23017	1.4 MHz	QPSK	1 RB / 0 RB Offset 6 RB / 0 RB Offset		
			23173	1.4 MHz	QPSK	1 RB / 5 RB Offset 6 RB / 0 RB Offset		
		23025 to 23165	23025	3 MHz	QPSK	1 RB / 0 RB Offset 15 RB / 0 RB Offset		
			23165	3 MHz	QPSK	1 RB / 14 RB Offset 15 RB / 0 RB Offset		
		23035 to 23155	23035	5 MHz	QPSK	1 RB / 0 RB Offset 25 RB / 0 RB Offset		
			23155	5 MHz	QPSK	1 RB / 24 RB Offset 25 RB / 0 RB Offset		
		23060 to 23130	23060	10 MHz	QPSK	1 RB / 0 RB Offset 50 RB / 0 RB Offset		
			23130	10 MHz	QPSK	1 RB / 49 RB Offset 50 RB / 0 RB Offset		
		-	Conducted Emission	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK	3 RB / 3 RB Offset
				23025 to 23165	23025, 23095, 23165	3 MHz	QPSK	8 RB / 7 RB Offset
				23035 to 23155	23035, 23095, 23155	5 MHz	QPSK	1 RB / 12 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	3 RB / 3 RB Offset		
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK	1 RB / 12 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. Therefore, only ERP, modulation characteristics, occupied bandwidth and peak to average ratio items had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
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 emissions below 1 GHz, select the worst radiated emission channel for final testing.

LTE Band 13

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23230	23230	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 25 RB / 12 RB Offset
-	Modulation Characteristics	23230	23230	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
-	Frequency Stability	23205 to 23255	23205, 23255	5 MHz	QPSK	1 RB / 0 RB Offset
		23230	23230	10 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23230	23230	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
-	Peak to Average Ratio	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23230	23230	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 25 RB / 12 RB Offset
-	Band Edge	23205 to 23255	23205	5 MHz	QPSK	1 RB / 0 RB Offset 25 RB / 0 RB Offset
			23255	5 MHz	QPSK	1 RB / 24 RB Offset 25 RB / 0 RB Offset
		23230	23230	10 MHz	QPSK	1 RB / 0 RB Offset 50 RB / 0 RB Offset
			23230	10 MHz	QPSK	1 RB / 49 RB Offset 50 RB / 0 RB Offset
			23230	10 MHz	QPSK	1 RB / 0 RB Offset 50 RB / 0 RB Offset
			23230	10 MHz	QPSK	1 RB / 0 RB Offset 50 RB / 0 RB Offset
-	Conducted Emission	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK	25 RB / 0 RB Offset
		23230	23230	10 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK	25 RB / 0 RB Offset
		23230	23230	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. Therefore, only ERP, modulation characteristics, occupied bandwidth and peak to average ratio items had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
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 emissions below 1 GHz, select the worst radiated emission channel for final testing.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP / EIRP	25 deg. C, 65 % RH	120 Vac, 60 Hz	Greg Lin
Modulation Characteristics	25 deg. C, 65 % RH	120 Vac, 60 Hz	James Yang
Frequency Stability	25 deg. C, 65 % RH	120 Vac, 60 Hz	James Yang
Occupied Bandwidth	25 deg. C, 65 % RH	120 Vac, 60 Hz	James Yang
Band Edge	25 deg. C, 65 % RH	120 Vac, 60 Hz	James Yang
Peak to Average Ratio	25 deg. C, 65 % RH	120 Vac, 60 Hz	James Yang
Conducted Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	James Yang
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Greg Lin

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

For LTE Band 13

Control stations and mobile stations in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands and fixed stations transmitting in the 787-788 MHz and 805-806 MHz bands are limited to 30 watts ERP.

Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

For LTE Band 12

Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.

Portable stations (hand-held devices) 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.

For LTE Band 4

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.

4.1.2 Test Procedures

Conducted Power Measurement:

- a. The EUT was set up for the maximum power with 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.

Maximum EIRP / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

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

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

where

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

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

4.1.3 Test Setup

EIRP / ERP Measurement:

Conducted Power Measurement:



4.1.4 Test Results

Conducted Output Power (dBm)

LTE Band 4						
BW	MCS Index	Channel		19957	20175	20393
		Frequency (MHz)		1710.7	1732.5	1754.3
1.4M	QPSK	1	0	22.97	22.95	22.70
		1	2	22.89	22.95	22.71
		1	5	22.94	22.82	22.73
		3	0	21.70	21.76	21.70
		3	1	21.74	21.54	21.75
		3	3	21.56	21.57	21.54
		6	0	21.71	21.73	21.55
	16QAM	1	0	21.87	21.90	21.70
		1	2	21.94	21.76	21.96
		1	5	21.96	21.90	21.84
		3	0	20.60	20.56	20.52
		3	1	20.51	20.71	20.55
		3	3	20.68	20.57	20.75
		6	0	20.51	20.62	20.53
BW	MCS Index	Channel		19965	20175	20385
		Frequency (MHz)		1711.5	1732.5	1753.5
3M	QPSK	1	0	22.97	22.80	22.75
		1	7	22.80	22.73	22.72
		1	14	22.73	22.74	22.97
		8	0	21.73	21.51	21.53
		8	3	21.71	21.74	21.76
		8	7	21.54	21.69	21.79
		15	0	21.74	21.54	21.69
	16QAM	1	0	21.80	21.77	21.75
		1	7	21.93	21.70	21.74
		1	14	21.79	21.73	21.78
		8	0	20.75	20.71	20.53
		8	3	20.70	20.73	20.67
		8	7	20.69	20.60	20.55
		15	0	20.62	20.54	20.66

LTE Band 4						
BW	MCS Index	Channel		19975	20175	20375
		Frequency (MHz)		1712.5	1732.5	1752.5
5M	QPSK	1	0	22.99	22.86	22.97
		1	12	22.82	22.75	22.97
		1	24	22.83	22.75	22.90
		12	0	21.65	21.67	21.66
		12	6	21.67	21.73	21.61
		12	13	21.52	21.62	21.55
		25	0	21.80	21.79	21.62
	16QAM	1	0	21.73	21.99	21.86
		1	12	21.80	21.80	21.71
		1	24	22.00	21.79	21.85
		12	0	20.58	20.63	20.68
		12	6	20.80	20.66	20.60
		12	13	20.55	20.72	20.63
		25	0	20.69	20.79	20.71
BW	MCS Index	Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	22.77	22.89	22.88
		1	24	22.80	22.75	22.70
		1	49	22.98	22.72	22.81
		25	0	21.80	21.57	21.65
		25	12	21.74	21.54	21.57
		25	25	21.72	21.71	21.54
		50	0	21.76	21.53	21.51
	16QAM	1	0	21.87	21.89	21.74
		1	24	21.81	21.85	21.86
		1	49	21.77	21.94	21.76
		25	0	20.59	20.60	20.62
		25	12	20.57	20.54	20.64
		25	25	20.57	20.65	20.78
		50	0	20.69	20.59	20.64

LTE Band 4						
BW	MCS Index	Channel		20025	20175	20325
		Frequency (MHz)		1717.5	1732.5	1747.5
15M	QPSK	1	0	22.87	22.76	22.71
		1	37	22.97	22.80	22.83
		1	74	22.77	22.85	22.96
		36	0	21.66	21.58	21.79
		36	19	21.51	21.62	21.57
		36	39	21.66	21.66	21.54
		75	0	21.80	21.63	21.53
	16QAM	1	0	21.80	21.84	21.94
		1	37	21.84	21.90	21.80
		1	74	21.88	21.93	21.86
		36	0	20.70	20.64	20.50
		36	19	20.74	20.72	20.54
		36	39	20.63	20.62	20.57
		75	0	20.66	20.70	20.79
BW	MCS Index	Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	22.74	22.86	22.81
		1	50	22.73	22.91	22.98
		1	99	22.90	22.79	22.93
		50	0	21.80	21.65	21.75
		50	25	21.64	21.68	21.58
		50	50	21.54	21.61	21.79
		100	0	21.57	21.50	21.50
	16QAM	1	0	21.71	21.72	21.76
		1	50	21.86	21.74	21.77
		1	99	21.70	21.76	21.77
		50	0	20.67	20.79	20.76
		50	25	20.53	20.67	20.79
		50	50	20.65	20.51	20.66
		100	0	20.51	20.70	20.74

LTE Band 12						
BW	MCS Index	Channel		23017	23095	23173
		Frequency (MHz)		699.7	707.5	715.3
1.4M	QPSK	1	0	23.14	22.99	23.16
		1	2	22.94	22.95	23.12
		1	5	23.12	23.05	22.99
		3	0	23.06	23.19	22.92
		3	1	22.99	22.98	22.93
		3	3	23.20	22.91	23.20
		6	0	22.99	23.17	23.08
	16QAM	1	0	22.13	21.93	21.92
		1	2	22.13	22.10	21.97
		1	5	22.13	22.01	22.09
		3	0	22.04	22.10	22.10
		3	1	22.11	22.14	22.14
		3	3	21.92	22.07	22.02
		6	0	22.07	21.98	21.93
BW	MCS Index	Channel		23025	23095	23165
		Frequency (MHz)		700.5	707.5	714.5
3M	QPSK	1	0	23.03	23.14	23.15
		1	7	23.06	22.98	22.91
		1	14	23.06	23.11	22.94
		8	0	23.06	22.98	23.16
		8	3	23.10	23.07	23.14
		8	7	23.18	22.92	23.03
		15	0	23.01	23.16	22.98
	16QAM	1	0	21.97	21.99	22.08
		1	7	22.12	21.96	21.99
		1	14	22.13	21.99	22.20
		8	0	22.00	22.16	22.19
		8	3	22.12	21.94	22.12
		8	7	22.02	22.19	21.91
		15	0	22.01	22.18	21.94

LTE Band 12						
BW	MCS Index	Channel		23035	23095	23155
		Frequency (MHz)		701.5	707.5	713.5
5M	QPSK	1	0	23.10	23.00	23.07
		1	12	22.91	23.05	23.20
		1	24	22.90	23.16	23.14
		12	0	22.91	23.10	23.18
		12	6	22.97	22.98	23.11
		12	13	23.12	22.91	23.01
		25	0	23.14	23.08	22.93
	16QAM	1	0	22.03	22.11	21.97
		1	12	21.95	22.08	22.20
		1	24	22.09	22.07	21.96
		12	0	22.20	22.09	21.94
		12	6	22.15	22.09	22.06
		12	13	22.04	22.17	22.08
		25	0	22.20	22.04	22.13
BW	MCS Index	Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	22.94	22.94	23.20
		1	24	22.90	23.10	23.15
		1	49	23.18	23.13	22.94
		25	0	23.01	23.10	22.93
		25	12	23.04	22.90	23.16
		25	25	22.95	23.05	23.17
		50	0	23.07	23.10	23.16
	16QAM	1	0	22.13	21.95	22.16
		1	24	21.95	21.91	22.07
		1	49	22.15	21.95	21.97
		25	0	22.06	22.11	22.20
		25	12	22.04	22.04	21.94
		25	25	22.01	22.05	22.18
		50	0	22.06	22.01	21.91

LTE Band 13						
BW	MCS Index	Channel		23205	23230	23255
		Frequency (MHz)		779.5	782	784.5
5M	QPSK	1	0	23.15	22.91	23.12
		1	12	23.15	22.99	23.06
		1	24	23.11	22.91	22.93
		12	0	23.14	22.91	23.14
		12	6	23.08	23.12	23.09
		12	13	23.13	23.03	23.06
		25	0	23.13	23.17	23.08
	16QAM	1	0	21.97	22.16	21.92
		1	12	21.90	22.10	22.03
		1	24	22.12	22.18	22.10
		12	0	21.91	22.06	22.13
		12	6	22.09	22.13	22.07
		12	13	22.09	22.09	22.01
		25	0	22.19	21.96	22.17
BW	MCS Index	Channel		23230		
		Frequency (MHz)		782		
10M	QPSK	1	0	23.20		
		1	24	22.97		
		1	49	22.90		
		25	0	23.07		
		25	12	23.06		
		25	25	23.08		
		50	0	23.11		
	16QAM	1	0	22.15		
		1	24	22.04		
		1	49	22.10		
		25	0	22.12		
		25	12	22.17		
		25	25	22.04		
		50	0	21.92		

EIRP Power(dBm)

LTE Band 4						
BW	MCS Index	Channel		19957	20175	20393
		Frequency (MHz)		1710.7	1732.5	1754.3
1.4M	QPSK	1	0	25.77	25.75	25.50
		1	2	25.69	25.75	25.51
		1	5	25.74	25.62	25.53
		3	0	24.50	24.56	24.50
		3	1	24.54	24.34	24.55
		3	3	24.36	24.37	24.34
		6	0	24.51	24.53	24.35
	16QAM	1	0	24.67	24.70	24.50
		1	2	24.74	24.56	24.76
		1	5	24.76	24.70	24.64
		3	0	23.40	23.36	23.32
		3	1	23.31	23.51	23.35
		3	3	23.48	23.37	23.55
		6	0	23.31	23.42	23.33
BW	MCS Index	Channel		19965	20175	20385
		Frequency (MHz)		1711.5	1732.5	1753.5
3M	QPSK	1	0	25.77	25.60	25.55
		1	7	25.60	25.53	25.52
		1	14	25.53	25.54	25.77
		8	0	24.53	24.31	24.33
		8	3	24.51	24.54	24.56
		8	7	24.34	24.49	24.59
		15	0	24.54	24.34	24.49
	16QAM	1	0	24.60	24.57	24.55
		1	7	24.73	24.50	24.54
		1	14	24.59	24.53	24.58
		8	0	23.55	23.51	23.33
		8	3	23.50	23.53	23.47
		8	7	23.49	23.40	23.35
		15	0	23.42	23.34	23.46

*EIRP = Conducted + antenna gain (2.8dBi)

LTE Band 4						
BW	MCS Index	Channel		19975	20175	20375
		Frequency (MHz)		1712.5	1732.5	1752.5
5M	QPSK	1	0	25.79	25.66	25.77
		1	12	25.62	25.55	25.77
		1	24	25.63	25.55	25.70
		12	0	24.45	24.47	24.46
		12	6	24.47	24.53	24.41
		12	13	24.32	24.42	24.35
		25	0	24.60	24.59	24.42
	16QAM	1	0	24.53	24.79	24.66
		1	12	24.60	24.60	24.51
		1	24	24.80	24.59	24.65
		12	0	23.38	23.43	23.48
		12	6	23.60	23.46	23.40
		12	13	23.35	23.52	23.43
		25	0	23.49	23.59	23.51
BW	MCS Index	Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	25.57	25.69	25.68
		1	24	25.60	25.55	25.50
		1	49	25.78	25.52	25.61
		25	0	24.60	24.37	24.45
		25	12	24.54	24.34	24.37
		25	25	24.52	24.51	24.34
		50	0	24.56	24.33	24.31
	16QAM	1	0	24.67	24.69	24.54
		1	24	24.61	24.65	24.66
		1	49	24.57	24.74	24.56
		25	0	23.39	23.40	23.42
		25	12	23.37	23.34	23.44
		25	25	23.37	23.45	23.58
		50	0	23.49	23.39	23.44

*EIRP = Conducted + antenna gain (2.8dBi)

LTE Band 4						
BW	MCS Index	Channel		20025	20175	20325
		Frequency (MHz)		1717.5	1732.5	1747.5
15M	QPSK	1	0	25.67	25.56	25.51
		1	37	25.77	25.60	25.63
		1	74	25.57	25.65	25.76
		36	0	24.46	24.38	24.59
		36	19	24.31	24.42	24.37
		36	39	24.46	24.46	24.34
		75	0	24.60	24.43	24.33
	16QAM	1	0	24.60	24.64	24.74
		1	37	24.64	24.70	24.60
		1	74	24.68	24.73	24.66
		36	0	23.50	23.44	23.30
		36	19	23.54	23.52	23.34
		36	39	23.43	23.42	23.37
		75	0	23.46	23.50	23.59
BW	MCS Index	Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	25.54	25.66	25.61
		1	50	25.53	25.71	25.78
		1	99	25.70	25.59	25.73
		50	0	24.60	24.45	24.55
		50	25	24.44	24.48	24.38
		50	50	24.34	24.41	24.59
		100	0	24.37	24.30	24.30
	16QAM	1	0	24.51	24.52	24.56
		1	50	24.66	24.54	24.57
		1	99	24.50	24.56	24.57
		50	0	23.47	23.59	23.56
		50	25	23.33	23.47	23.59
		50	50	23.45	23.31	23.46
		100	0	23.31	23.50	23.54

*EIRP = Conducted + antenna gain (2.8dBi)

ERP Power (dBm)

LTE Band 12						
BW	MCS Index	Channel		23017	23095	23173
		Frequency (MHz)		699.7	707.5	715.3
1.4M	QPSK	1	0	22.09	21.94	22.11
		1	2	21.89	21.90	22.07
		1	5	22.07	22.00	21.94
		3	0	22.01	22.14	21.87
		3	1	21.94	21.93	21.88
		3	3	22.15	21.86	22.15
		6	0	21.94	22.12	22.03
	16QAM	1	0	21.08	20.88	20.87
		1	2	21.08	21.05	20.92
		1	5	21.08	20.96	21.04
		3	0	20.99	21.05	21.05
		3	1	21.06	21.09	21.09
		3	3	20.87	21.02	20.97
		6	0	21.02	20.93	20.88
BW	MCS Index	Channel		23025	23095	23165
		Frequency (MHz)		700.5	707.5	714.5
3M	QPSK	1	0	21.98	22.09	22.10
		1	7	22.01	21.93	21.86
		1	14	22.01	22.06	21.89
		8	0	22.01	21.93	22.11
		8	3	22.05	22.02	22.09
		8	7	22.13	21.87	21.98
		15	0	21.96	22.11	21.93
	16QAM	1	0	20.92	20.94	21.03
		1	7	21.07	20.91	20.94
		1	14	21.08	20.94	21.15
		8	0	20.95	21.11	21.14
		8	3	21.07	20.89	21.07
		8	7	20.97	21.14	20.86
		15	0	20.96	21.13	20.89

*ERP = Conducted + antenna gain (1.1dBi)-2.15

LTE Band 12						
BW	MCS Index	Channel		23035	23095	23155
		Frequency (MHz)		701.5	707.5	713.5
5M	QPSK	1	0	22.05	21.95	22.02
		1	12	21.86	22.00	22.15
		1	24	21.85	22.11	22.09
		12	0	21.86	22.05	22.13
		12	6	21.92	21.93	22.06
		12	13	22.07	21.86	21.96
		25	0	22.09	22.03	21.88
	16QAM	1	0	20.98	21.06	20.92
		1	12	20.90	21.03	21.15
		1	24	21.04	21.02	20.91
		12	0	21.15	21.04	20.89
		12	6	21.10	21.04	21.01
		12	13	20.99	21.12	21.03
		25	0	21.15	20.99	21.08
BW	MCS Index	Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	21.89	21.89	22.15
		1	24	21.85	22.05	22.10
		1	49	22.13	22.08	21.89
		25	0	21.96	22.05	21.88
		25	12	21.99	21.85	22.11
		25	25	21.90	22.00	22.12
		50	0	22.02	22.05	22.11
	16QAM	1	0	21.08	20.90	21.11
		1	24	20.90	20.86	21.02
		1	49	21.10	20.90	20.92
		25	0	21.01	21.06	21.15
		25	12	20.99	20.99	20.89
		25	25	20.96	21.00	21.13
		50	0	21.01	20.96	20.86

*ERP = Conducted + antenna gain (1.1dBi)-2.15

LTE Band 13						
BW	MCS Index	Channel		23205	23230	23255
		Frequency (MHz)		779.5	782	784.5
5M	QPSK	1	0	22.10	21.86	22.07
		1	12	22.10	21.94	22.01
		1	24	22.06	21.86	21.88
		12	0	22.09	21.86	22.09
		12	6	22.03	22.07	22.04
		12	13	22.08	21.98	22.01
		25	0	22.08	22.12	22.03
	16QAM	1	0	20.92	21.11	20.87
		1	12	20.85	21.05	20.98
		1	24	21.07	21.13	21.05
		12	0	20.86	21.01	21.08
		12	6	21.04	21.08	21.02
		12	13	21.04	21.04	20.96
		25	0	21.14	20.91	21.12
BW	MCS Index	Channel		23230		
		Frequency (MHz)		782		
10M	QPSK	1	0	22.15		
		1	24	21.92		
		1	49	21.85		
		25	0	22.02		
		25	12	22.01		
		25	25	22.03		
		50	0	22.06		
	16QAM	1	0	21.10		
		1	24	20.99		
		1	49	21.05		
		25	0	21.07		
		25	12	21.12		
		25	25	20.99		
		50	0	20.87		

*ERP = Conducted + antenna gain (1.1dBi)-2.15

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

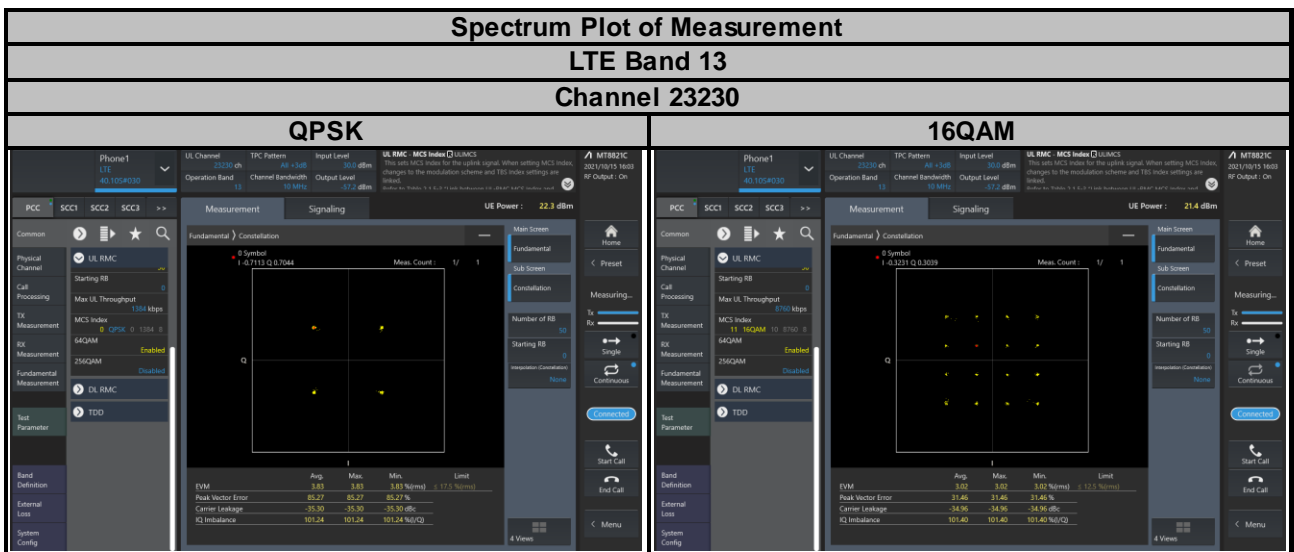
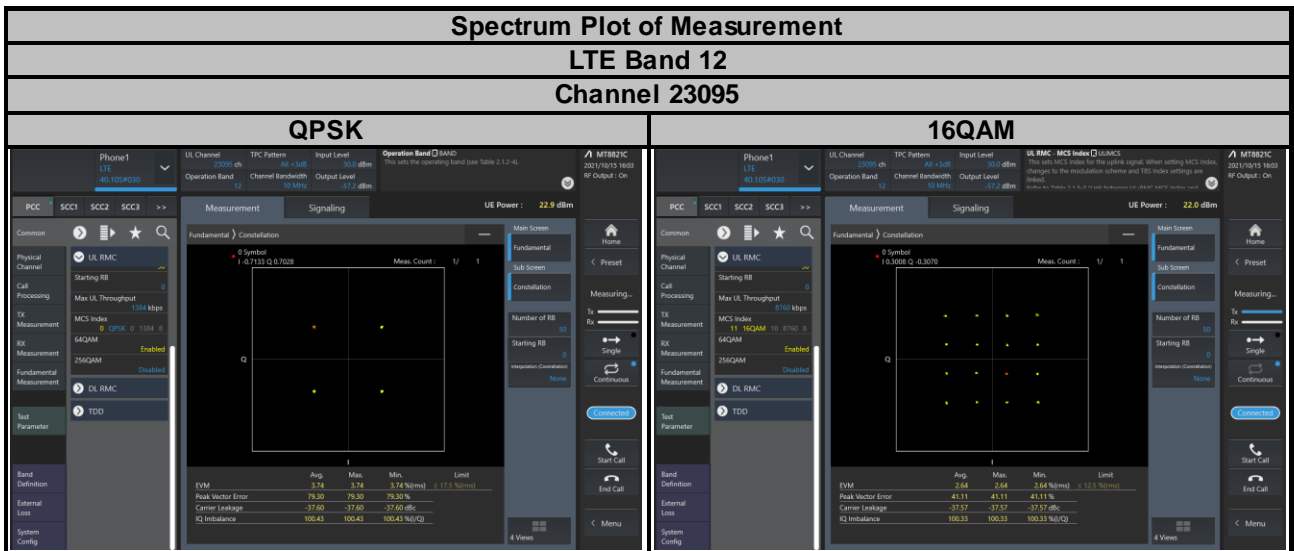
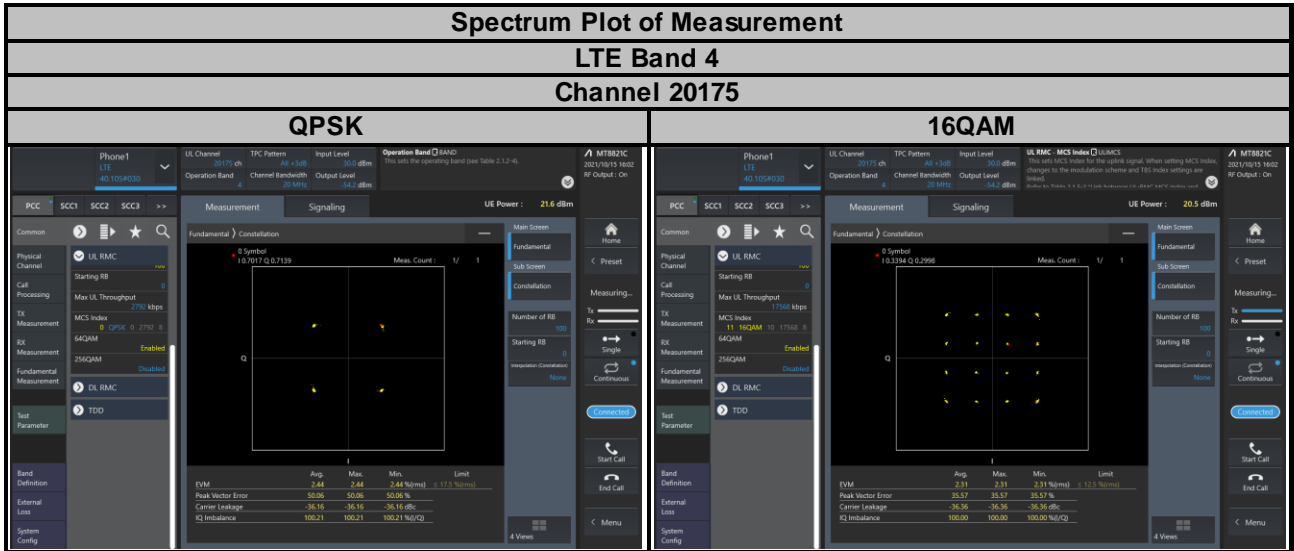
4.2.2 Test Setup



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

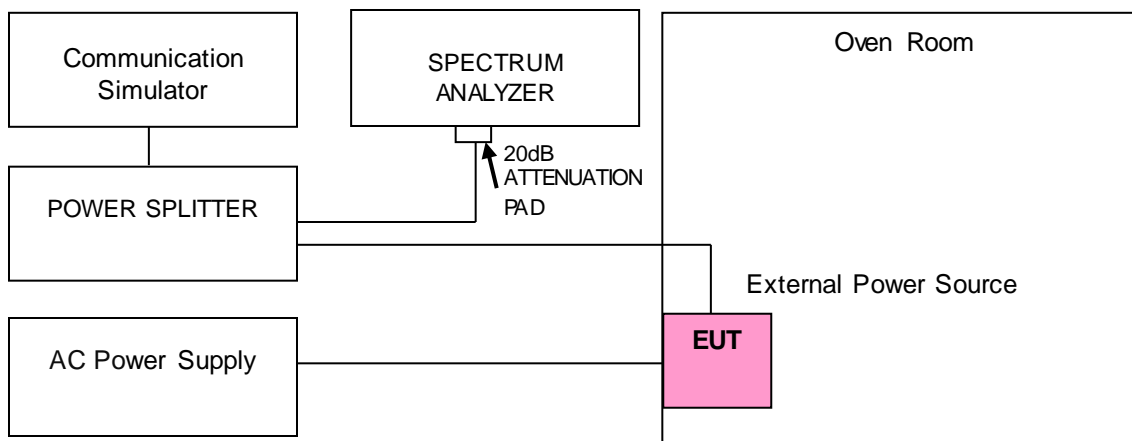
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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 AC 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)	LTE Band 4			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
110	1710.700014	0.008	1754.300035	0.020
93.5	1710.700012	0.007	1754.300012	0.007
126.5	1710.700023	0.013	1754.300030	0.017

Note: The applicant defined the normal working voltage of the battery is from 93.5 Vac to 126.5 Vac.

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	1710.700023	0.013	1754.300022	0.013
-20	1710.700038	0.022	1754.300033	0.019
-10	1710.700012	0.007	1754.300020	0.011
0	1710.700025	0.015	1754.300032	0.018
10	1710.700034	0.020	1754.300024	0.014
20	1710.699982	-0.011	1754.299980	-0.011
30	1710.699976	-0.014	1754.299986	-0.008
40	1710.699983	-0.010	1754.299968	-0.018
50	1710.699987	-0.008	1754.299966	-0.019

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)
110	1711.500025	0.015	1753.500018	0.010
93.5	1711.500023	0.013	1753.500016	0.009
126.5	1711.500021	0.012	1753.500018	0.010

Note: The applicant defined the normal working voltage of the battery is from 93.5 Vac to 126.5 Vac.

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	1711.500025	0.015	1753.500035	0.020
-20	1711.500012	0.007	1753.500028	0.016
-10	1711.500019	0.011	1753.500032	0.018
0	1711.500039	0.023	1753.500037	0.021
10	1711.500018	0.011	1753.500010	0.006
20	1711.499960	-0.023	1753.499980	-0.011
30	1711.499966	-0.020	1753.499984	-0.009
40	1711.499987	-0.008	1753.499968	-0.018
50	1711.499985	-0.009	1753.499976	-0.014

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)
110	1712.500026	0.015	1752.500028	0.016
93.5	1712.500035	0.020	1752.500033	0.019
126.5	1712.500029	0.017	1752.500011	0.006

Note: The applicant defined the normal working voltage of the battery is from 93.5 Vac to 126.5 Vac.

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	1712.500021	0.012	1752.500023	0.013
-20	1712.500010	0.006	1752.500023	0.013
-10	1712.500035	0.020	1752.500016	0.009
0	1712.500019	0.011	1752.500016	0.009
10	1712.500021	0.012	1752.500020	0.011
20	1712.499964	-0.021	1752.499961	-0.022
30	1712.499987	-0.008	1752.499965	-0.020
40	1712.499987	-0.008	1752.499987	-0.007
50	1712.499967	-0.019	1752.499978	-0.013

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)
110	1715.000023	0.013	1750.000032	0.018
93.5	1715.000016	0.009	1750.000023	0.013
126.5	1715.000016	0.009	1750.000021	0.012

Note: The applicant defined the normal working voltage of the battery is from 93.5 Vac to 126.5 Vac.

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	1715.000039	0.023	1750.000029	0.017
-20	1715.000030	0.017	1750.000017	0.010
-10	1715.000020	0.012	1750.000024	0.014
0	1715.000022	0.013	1750.000015	0.009
10	1715.000031	0.018	1750.000024	0.014
20	1714.999964	-0.021	1749.999961	-0.022
30	1714.999981	-0.011	1749.999989	-0.006
40	1714.999967	-0.019	1749.999982	-0.010
50	1714.999983	-0.010	1749.999979	-0.012

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
110	1717.500039	0.023	1747.500032	0.018
93.5	1717.500037	0.022	1747.500013	0.007
126.5	1717.500032	0.019	1747.500033	0.019

Note: The applicant defined the normal working voltage of the battery is from 93.5 Vac to 126.5 Vac.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1717.500021	0.012	1747.500027	0.015
-20	1717.500015	0.009	1747.500012	0.007
-10	1717.500018	0.010	1747.500012	0.007
0	1717.500020	0.012	1747.500017	0.010
10	1717.500024	0.014	1747.500028	0.016
20	1717.499983	-0.010	1747.499987	-0.007
30	1717.499984	-0.009	1747.499972	-0.016
40	1717.499975	-0.015	1747.499965	-0.020
50	1717.499967	-0.019	1747.499966	-0.019

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
110	1720.000022	0.013	1745.000030	0.017
93.5	1720.000014	0.008	1745.000022	0.013
126.5	1720.000039	0.023	1745.000035	0.020

Note: The applicant defined the normal working voltage of the battery is from 93.5 Vac to 126.5 Vac.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1720.000025	0.015	1745.000020	0.011
-20	1720.000027	0.016	1745.000033	0.019
-10	1720.000037	0.022	1745.000016	0.009
0	1720.000012	0.007	1745.000039	0.022
10	1720.000027	0.016	1745.000018	0.010
20	1719.999962	-0.022	1744.999969	-0.018
30	1719.999964	-0.021	1744.999980	-0.011
40	1719.999988	-0.007	1744.999973	-0.015
50	1719.999971	-0.017	1744.999962	-0.022

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)
110	699.700026	0.037	715.300036	0.050
93.5	699.700030	0.043	715.300024	0.034
126.5	699.700026	0.037	715.300026	0.036

Note: The applicant defined the normal working voltage of the battery is from 93.5 Vac to 126.5 Vac.

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	699.700015	0.021	715.300027	0.038
-20	699.700030	0.043	715.300025	0.035
-10	699.700025	0.036	715.300025	0.035
0	699.700038	0.054	715.300031	0.043
10	699.700026	0.037	715.300018	0.025
20	699.699962	-0.054	715.299970	-0.042
30	699.699990	-0.014	715.299985	-0.021
40	699.699968	-0.046	715.299972	-0.039
50	699.699989	-0.016	715.299970	-0.042

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)
110	700.500013	0.019	714.500010	0.014
93.5	700.500020	0.029	714.500017	0.024
126.5	700.500031	0.044	714.500032	0.045

Note: The applicant defined the normal working voltage of the battery is from 93.5 Vac to 126.5 Vac.

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	700.500019	0.027	714.500017	0.024
-20	700.500010	0.014	714.500028	0.039
-10	700.500032	0.046	714.500037	0.052
0	700.500013	0.019	714.500021	0.029
10	700.500019	0.027	714.500037	0.052
20	700.499984	-0.023	714.499973	-0.038
30	700.499965	-0.050	714.499990	-0.014
40	700.499979	-0.030	714.499985	-0.021
50	700.499975	-0.036	714.499989	-0.015

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)
110	701.500031	0.044	713.500026	0.036
93.5	701.500015	0.021	713.500027	0.038
126.5	701.500025	0.036	713.500036	0.050

Note: The applicant defined the normal working voltage of the battery is from 93.5 Vac to 126.5 Vac.

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	701.500014	0.020	713.500011	0.015
-20	701.500031	0.044	713.500023	0.032
-10	701.500017	0.024	713.500037	0.052
0	701.500037	0.053	713.500025	0.035
10	701.500021	0.030	713.500016	0.022
20	701.499975	-0.036	713.499967	-0.046
30	701.499987	-0.019	713.499989	-0.015
40	701.499978	-0.031	713.499988	-0.017
50	701.499981	-0.027	713.499972	-0.039

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)
110	704.000032	0.045	711.000021	0.030
93.5	704.000014	0.020	711.000034	0.048
126.5	704.000035	0.050	711.000013	0.018

Note: The applicant defined the normal working voltage of the battery is from 93.5 Vac to 126.5 Vac.

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	704.000039	0.055	711.000039	0.055
-20	704.000022	0.031	711.000039	0.055
-10	704.000015	0.021	711.000039	0.055
0	704.000035	0.050	711.000024	0.034
10	704.000017	0.024	711.000019	0.027
20	703.999969	-0.044	710.999967	-0.046
30	703.999987	-0.018	710.999972	-0.039
40	703.999975	-0.036	710.999976	-0.034
50	703.999965	-0.050	710.999972	-0.039

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 13			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
110	779.500012	0.015	784.500014	0.018
93.5	779.500010	0.013	784.500027	0.034
126.5	779.500038	0.049	784.500014	0.018

Note: The applicant defined the normal working voltage of the battery is from 93.5 Vac to 126.5 Vac.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 13			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	779.500034	0.044	784.500021	0.027
-20	779.500024	0.031	784.500032	0.041
-10	779.500018	0.023	784.500012	0.015
0	779.500014	0.018	784.500019	0.024
10	779.500030	0.038	784.500021	0.027
20	779.499965	-0.045	784.499967	-0.042
30	779.499976	-0.031	784.499977	-0.029
40	779.499965	-0.045	784.499976	-0.031
50	779.499978	-0.028	784.499967	-0.042

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 13	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
110	782.000033	0.042
93.5	782.000013	0.017
126.5	782.000038	0.049

Note: The applicant defined the normal working voltage of the battery is from 93.5 Vac to 126.5 Vac.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 13	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
-30	782.000018	0.023
-20	782.000029	0.037
-10	782.000017	0.022
0	782.000031	0.040
10	782.000030	0.038
20	781.999963	-0.047
30	781.999974	-0.033
40	781.999969	-0.040
50	781.999973	-0.035

4.4 Occupied Bandwidth Measurement

4.4.1 Limits of Occupied Bandwidth Measurement

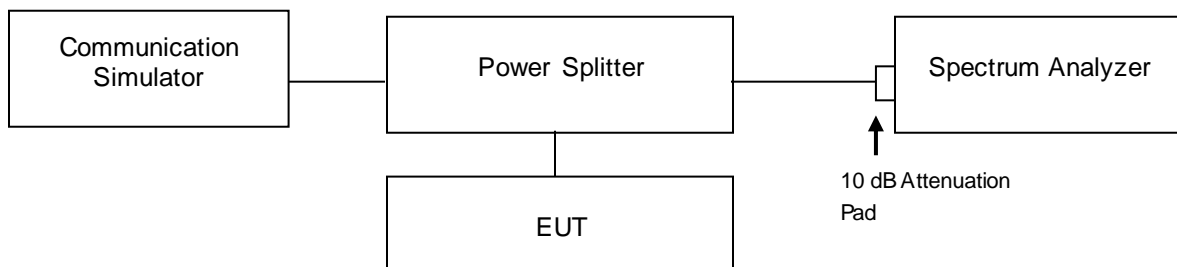
The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

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. Measurement method, please refer to section 5.4.4 of ANSI C63.26.

For the 26dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

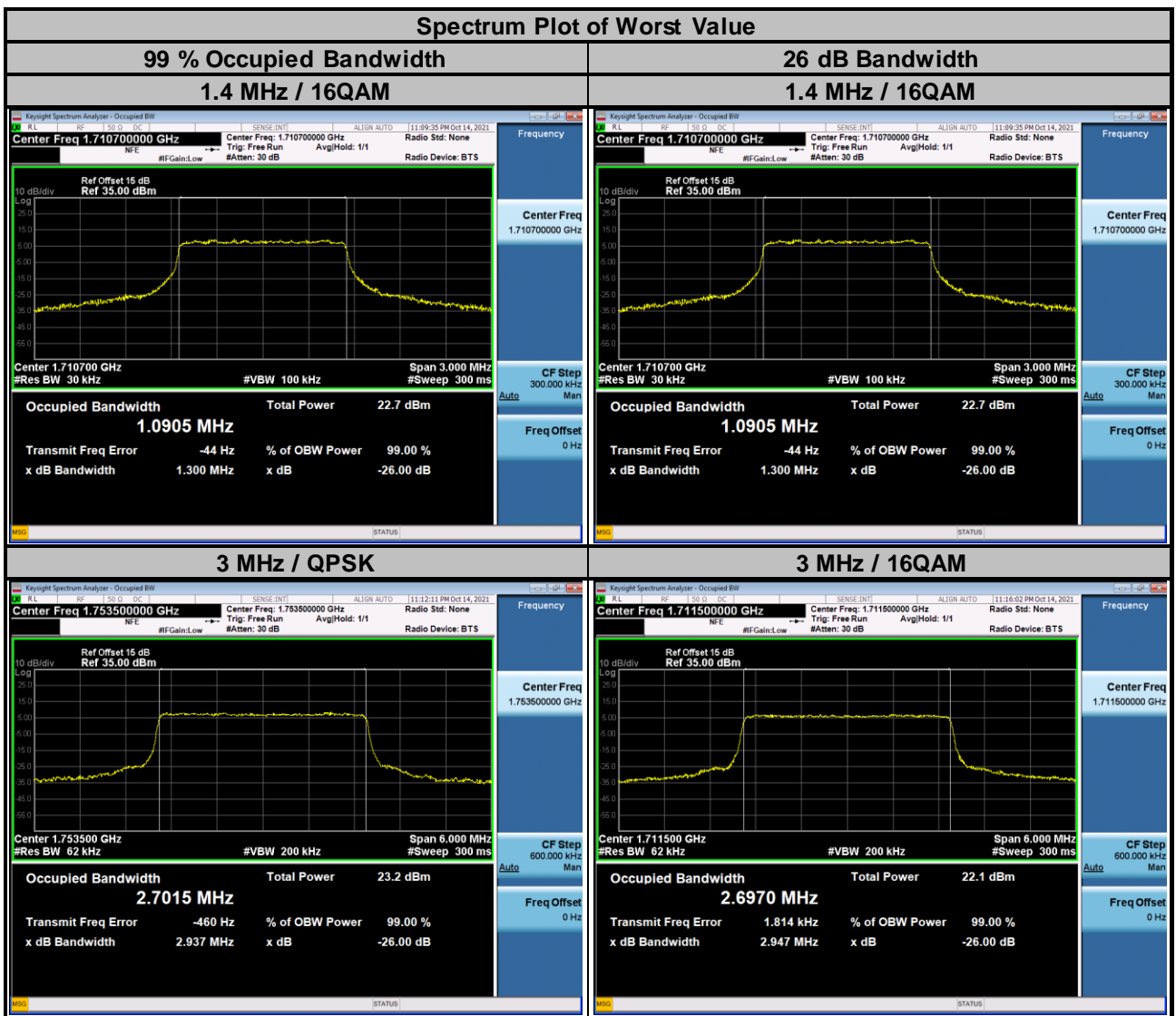
4.4.3 Test Setup



4.4.4 Test Result

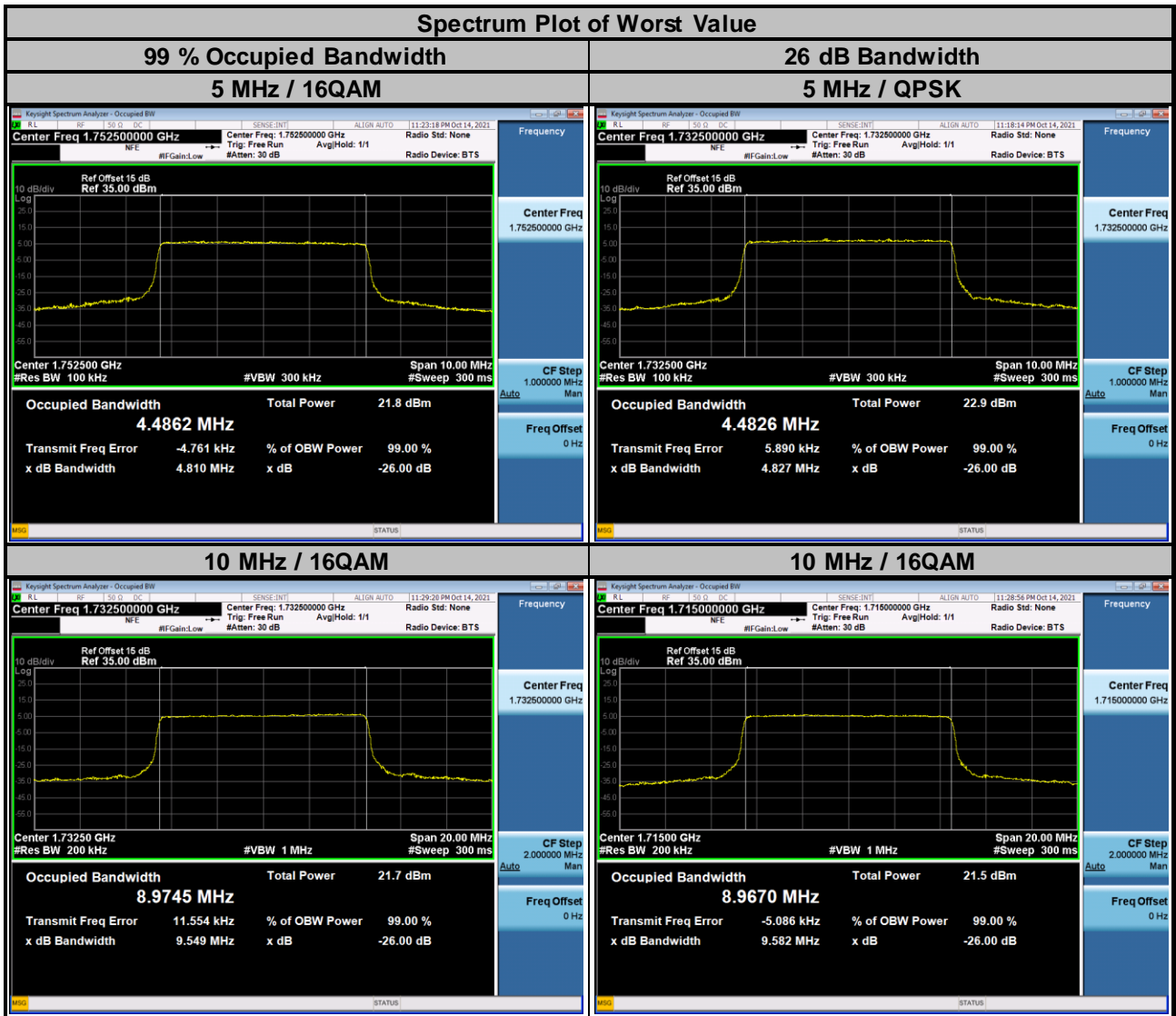
LTE Band 4					
Channel Bandwidth: 1.4 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19957	1710.7	1.09	1.09	1.30	1.30
20175	1732.5	1.09	1.09	1.27	1.29
20393	1754.3	1.09	1.09	1.29	1.27

Channel Bandwidth: 3 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19965	1711.5	2.70	2.70	2.92	2.95
20175	1732.5	2.70	2.70	2.93	2.94
20385	1753.5	2.70	2.70	2.94	2.92



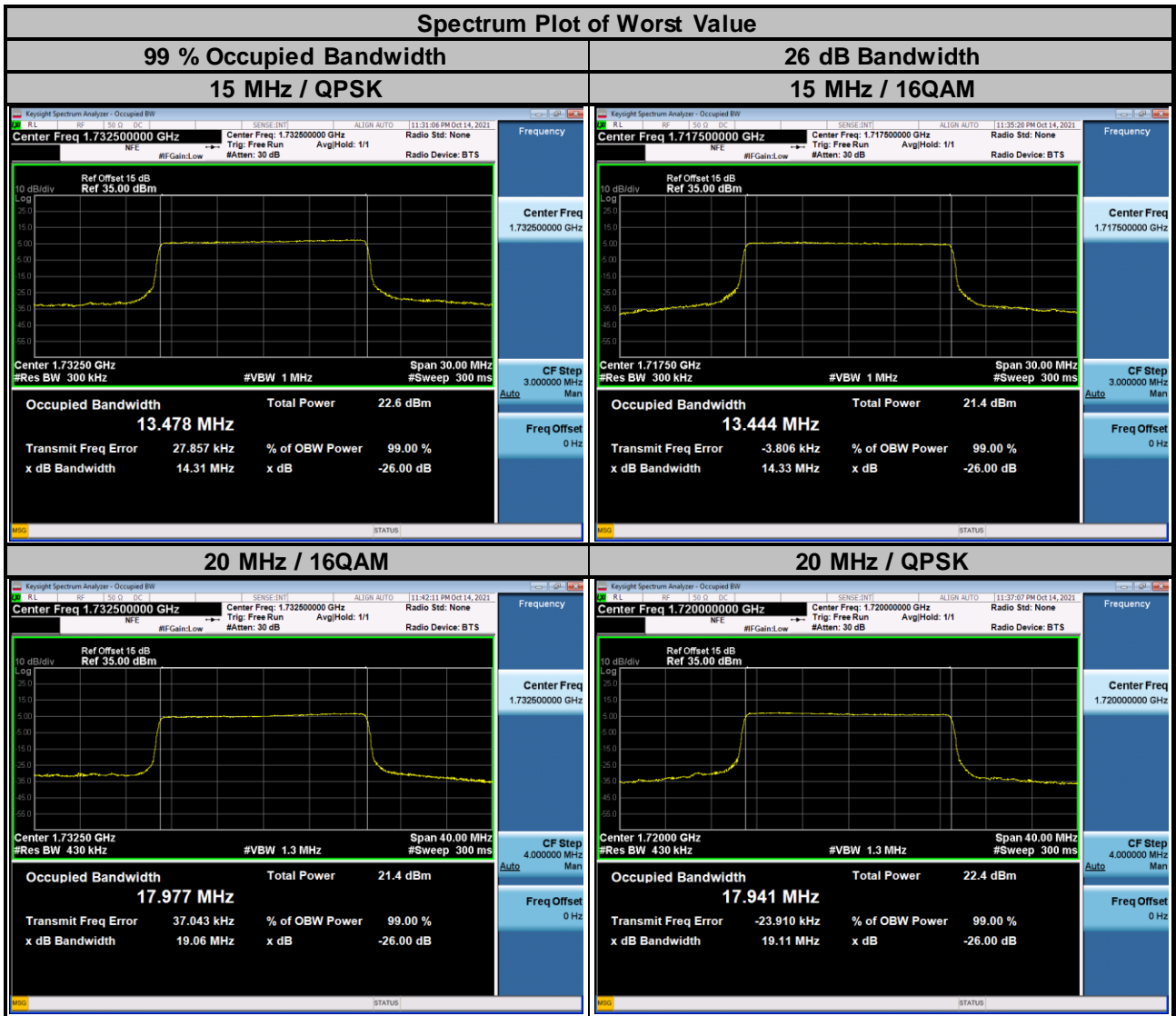
LTE Band 4					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19975	1712.5	4.48	4.49	4.79	4.82
20175	1732.5	4.48	4.49	4.83	4.82
20375	1752.5	4.48	4.49	4.80	4.81

Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20000	1715.0	8.96	8.97	9.53	9.58
20175	1732.5	8.97	8.97	9.55	9.55
20350	1750.0	8.97	8.97	9.53	9.54



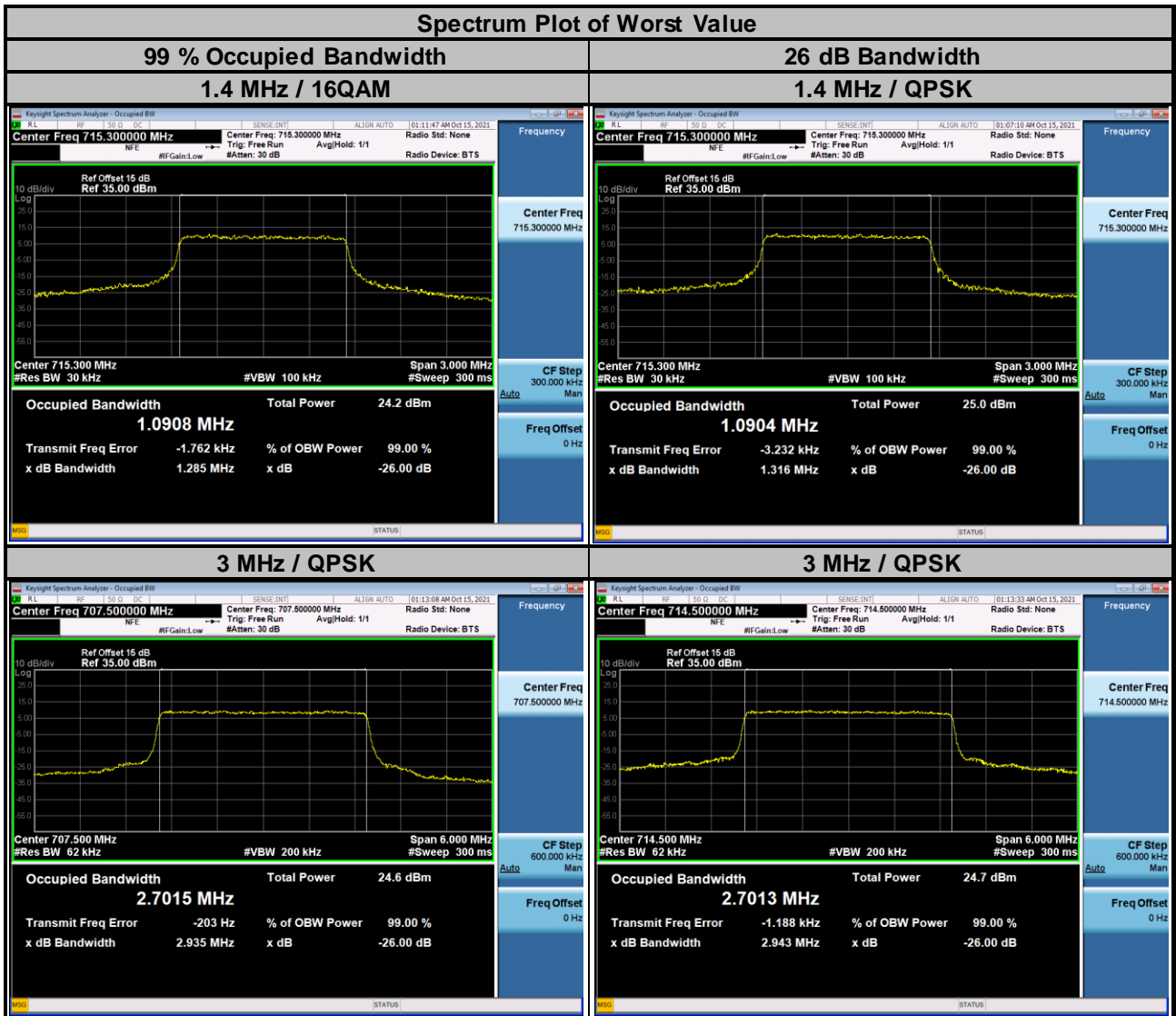
LTE Band 4					
Channel Bandwidth: 15 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20025	1717.5	13.45	13.44	14.31	14.33
20175	1732.5	13.48	13.46	14.31	14.31
20325	1747.5	13.44	13.43	14.25	14.30

Channel Bandwidth: 20 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20050	1720.0	17.94	17.96	19.11	19.04
20175	1732.5	17.96	17.98	19.07	19.06
20300	1745.0	17.87	17.89	19.06	19.03



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	1.09	1.09	1.29	1.29
23095	707.5	1.09	1.09	1.28	1.28
23173	715.3	1.09	1.09	1.32	1.29

Channel Bandwidth: 3 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23025	700.5	2.70	2.70	2.93	2.94
23095	707.5	2.70	2.70	2.94	2.93
23165	714.5	2.70	2.69	2.94	2.94



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	4.48	4.49	4.82	4.81
23095	707.5	4.49	4.49	4.82	4.83
23155	713.5	4.47	4.48	4.79	4.80

Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23060	704.0	8.96	8.95	9.54	9.55
23095	707.5	8.98	8.98	9.55	9.57
23130	711.0	8.97	8.97	9.54	9.53



LTE Band 13					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23205	779.5	4.49	4.49	4.84	4.86
23230	782.0	4.48	4.47	4.80	4.81
23255	784.5	4.48	4.48	4.78	4.80

Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23230	782.0	8.95	8.95	9.52	9.53



4.5 Band Edge Measurement

4.5.1 Limits of Band Edge Measurement

For LTE Band 4:

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

For LTE Band 12:

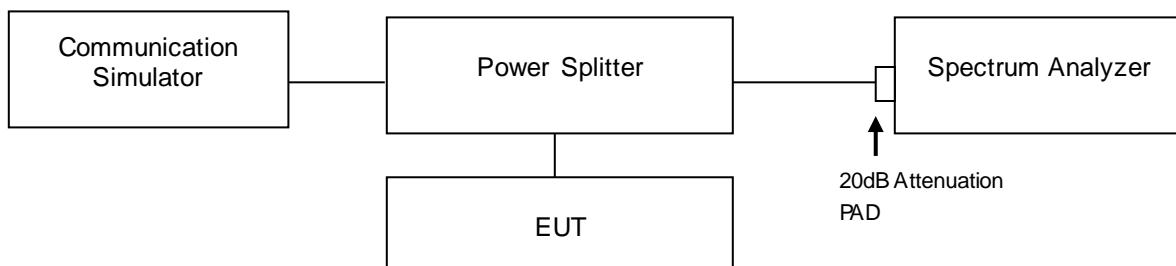
According to FCC 27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ 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 LTE Band 13:

According to FCC 27.53(c)(2), for on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) 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.

According to 27.53(c)(4), on all frequencies between 763-775MHz and 793-805MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations

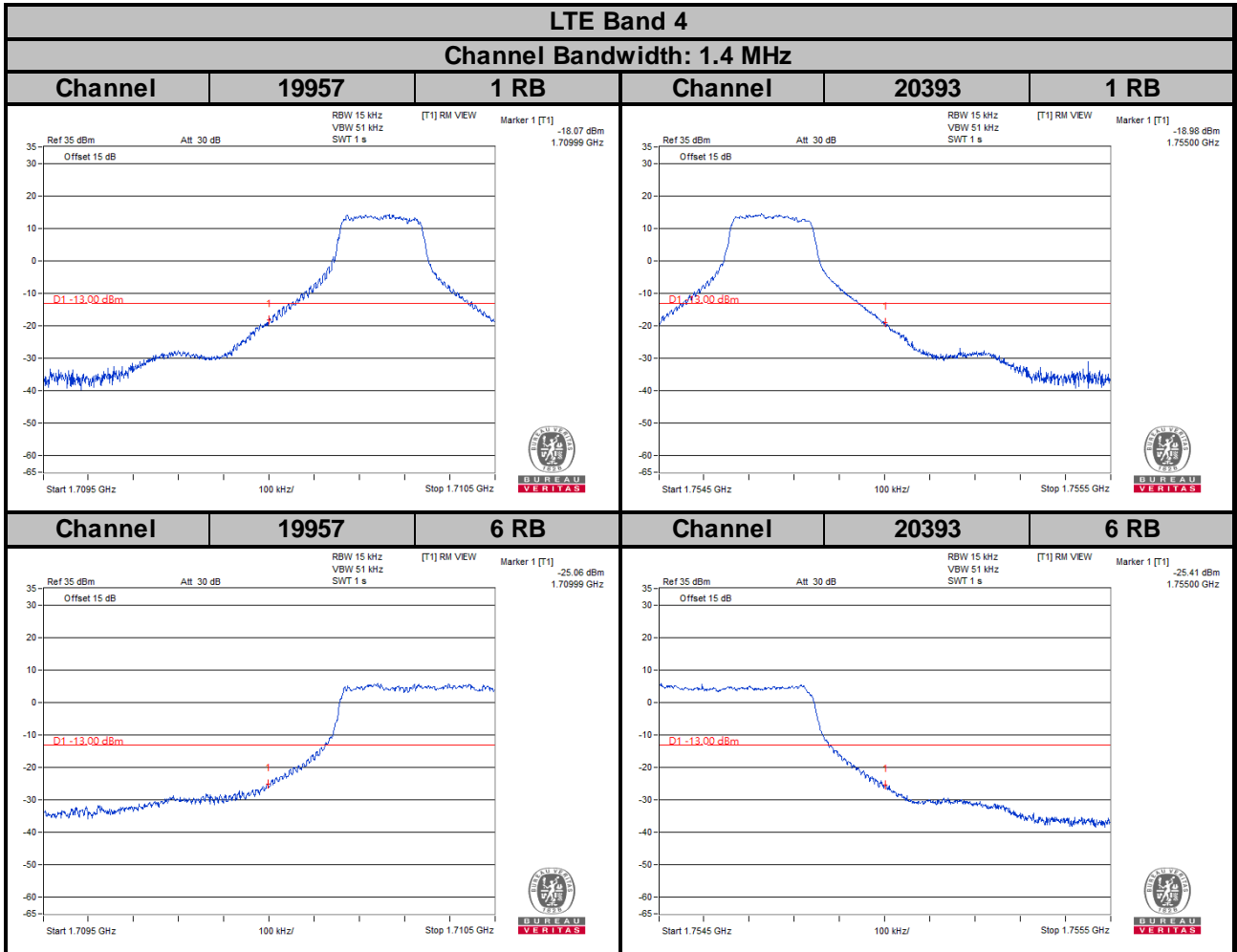
4.5.2 Test Setup



4.5.3 Test Procedures

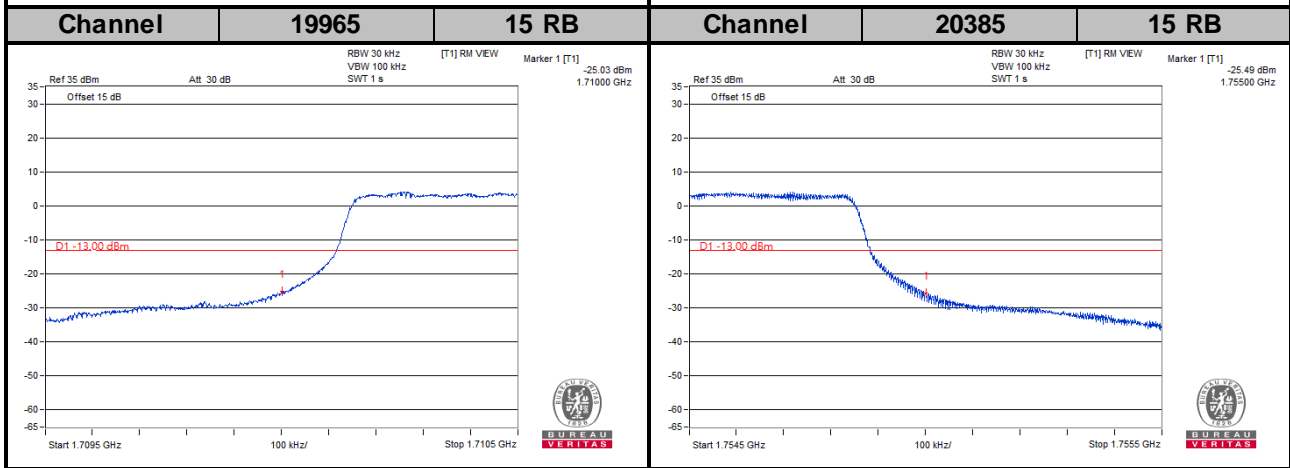
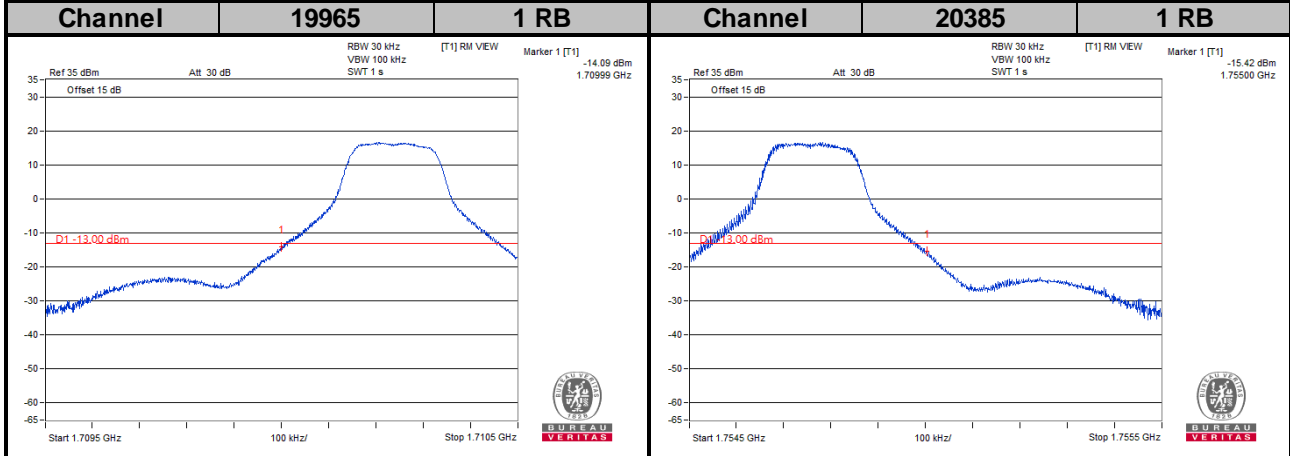
- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 1 MHz. For LTE Band 12: RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz. For other LTE Band 4: RB of the spectrum is 15 kHz and VB of the spectrum is 51 kHz (LTE Bandwidth 1.4 MHz).
- c. 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).
- d. 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).
- e. 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).
- f. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 150 kHz and VB of the spectrum is 470 kHz (LTE Bandwidth 15 MHz).
- g. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 200 kHz and VB of the spectrum is 1 MHz (LTE Bandwidth 20 MHz).
- h. Record the max. trace plot into the test report.

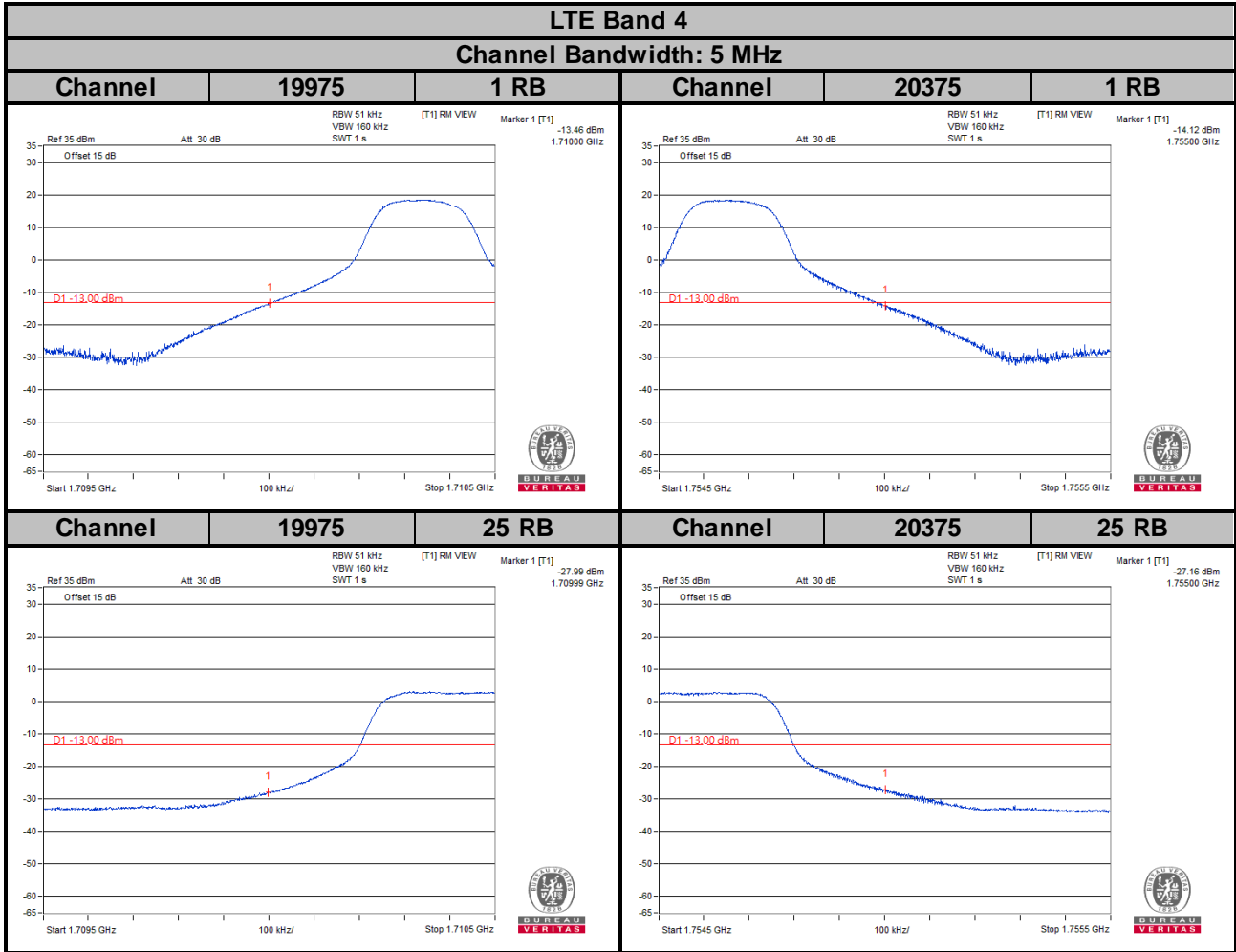
4.5.4 Test Results



LTE Band 4

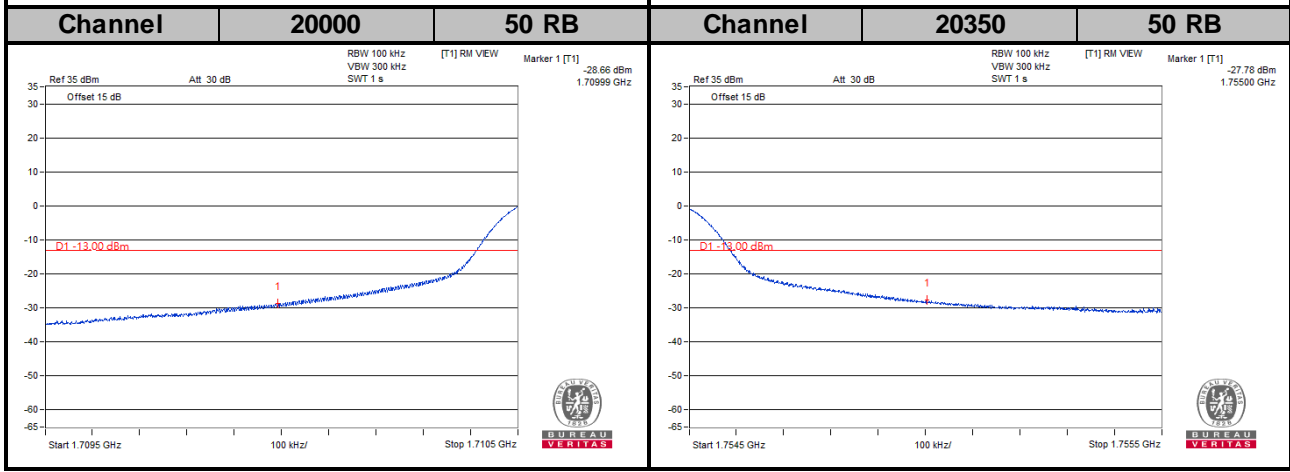
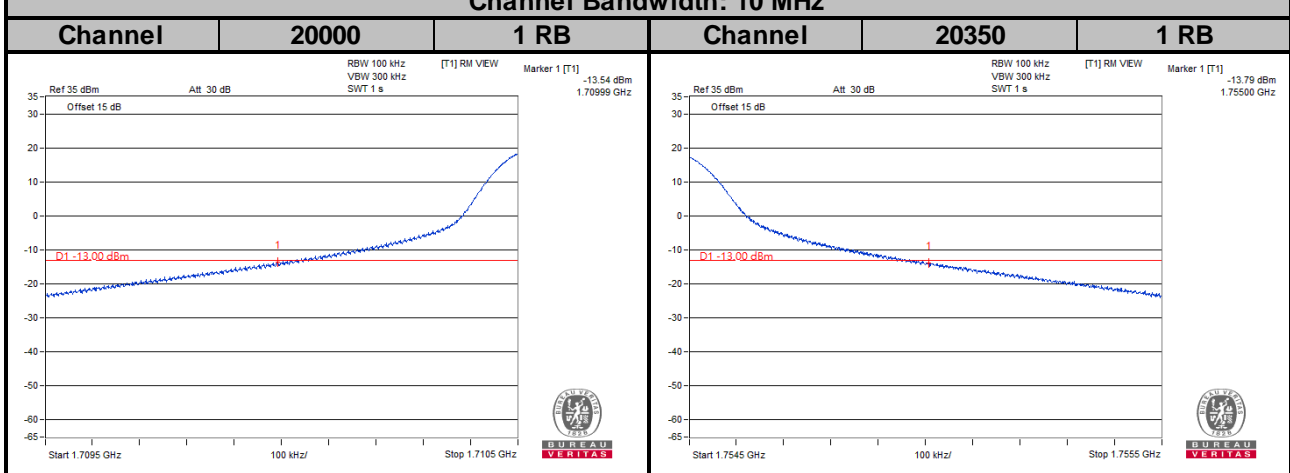
Channel Bandwidth: 3 MHz

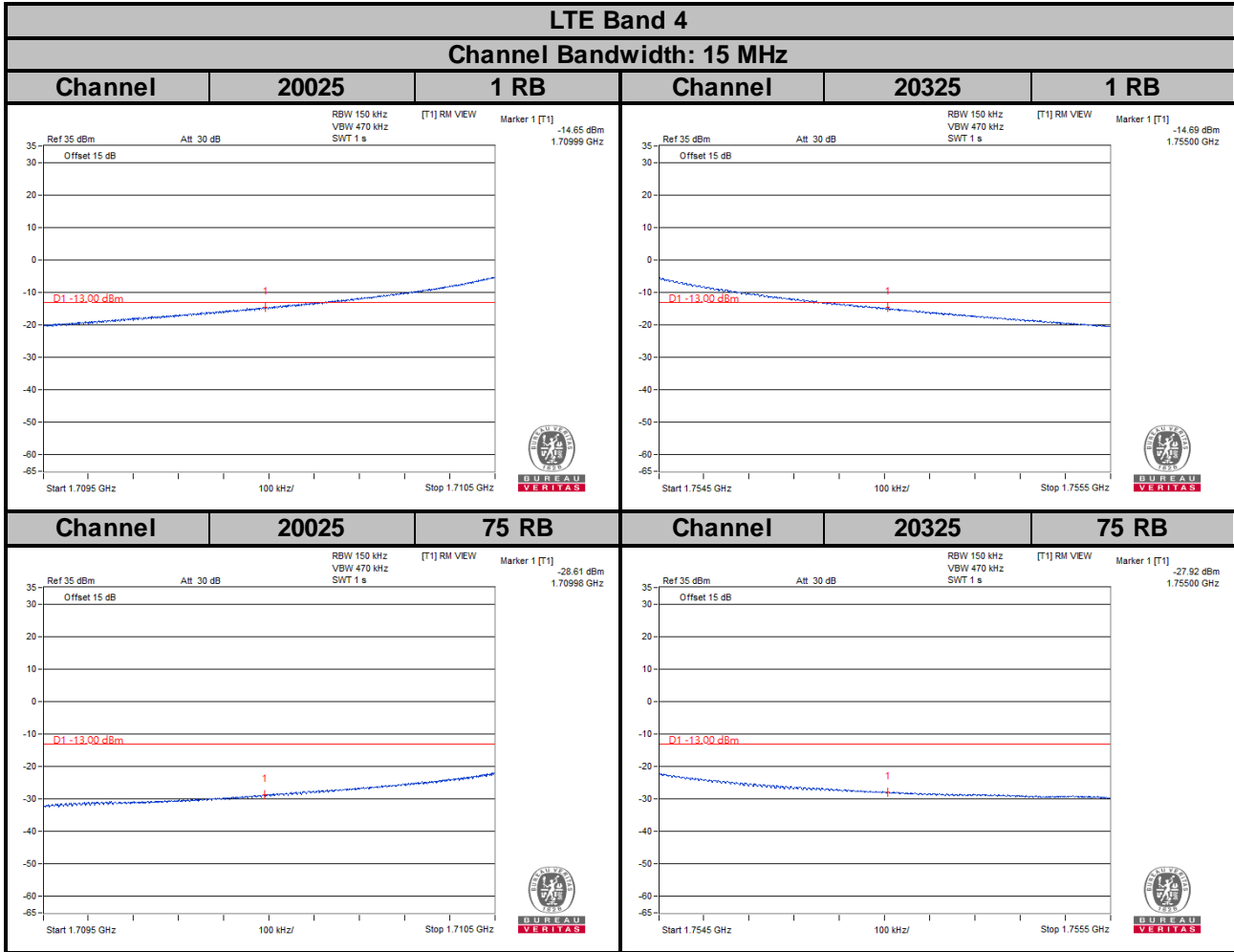




LTE Band 4

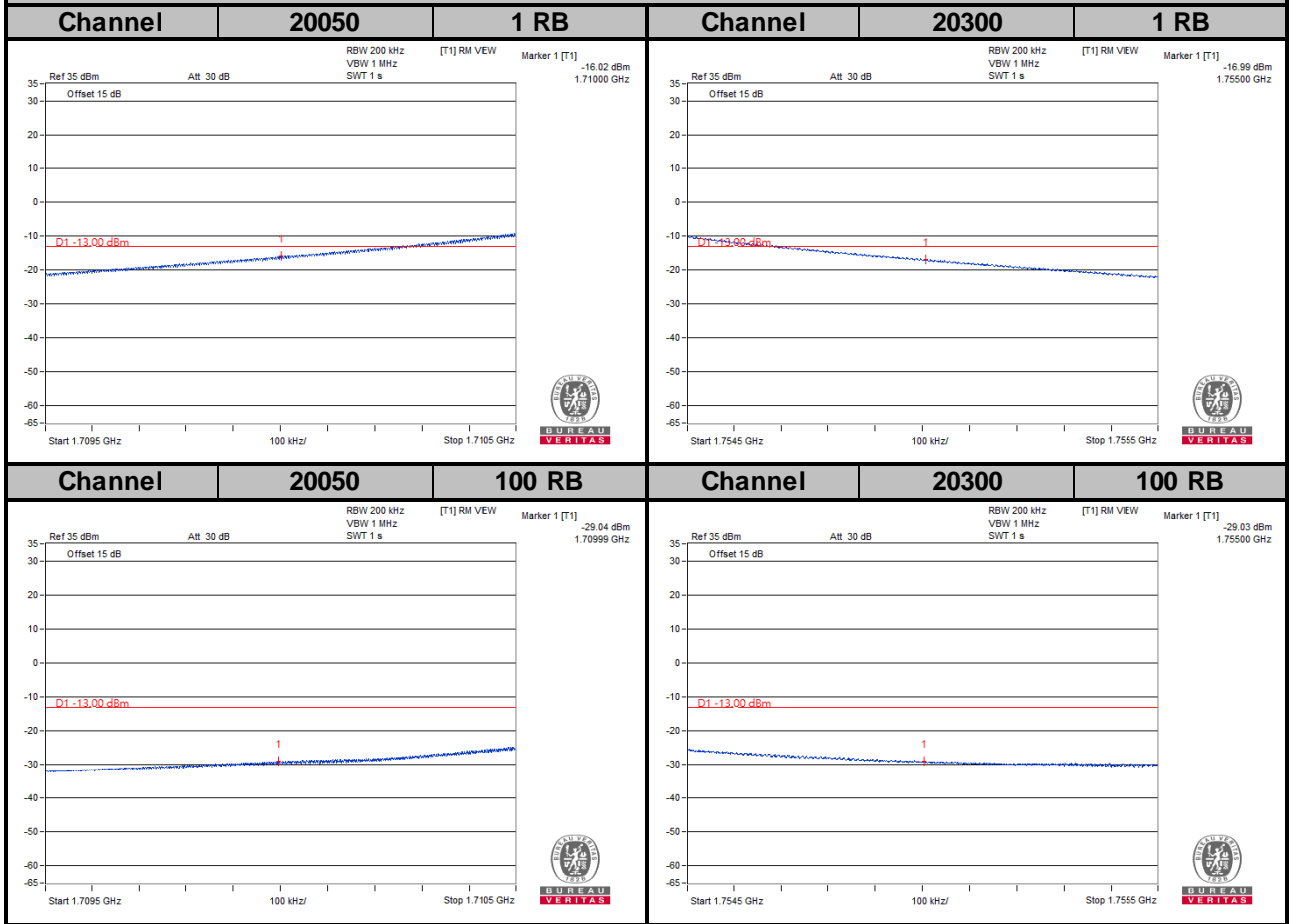
Channel Bandwidth: 10 MHz





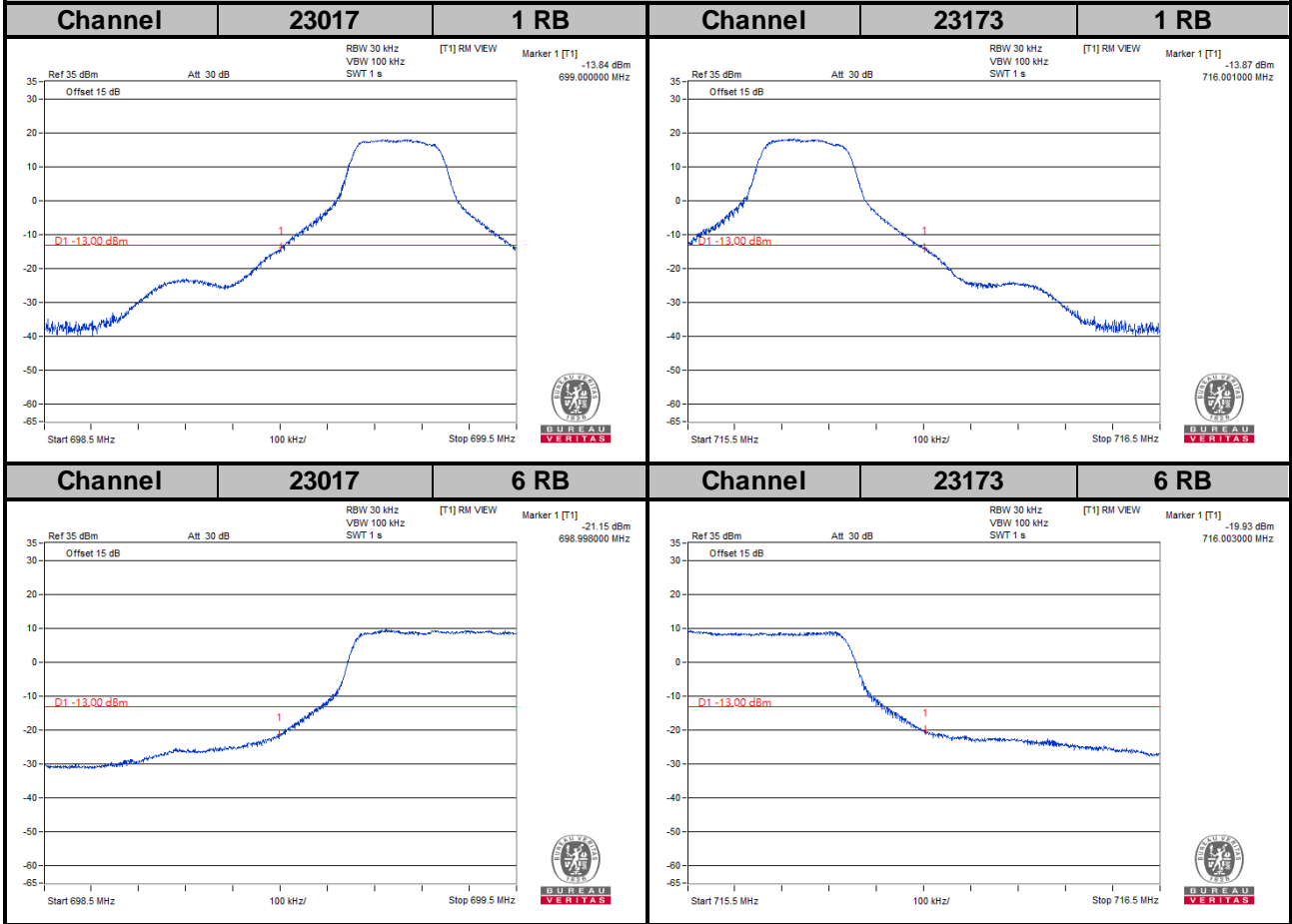
LTE Band 4

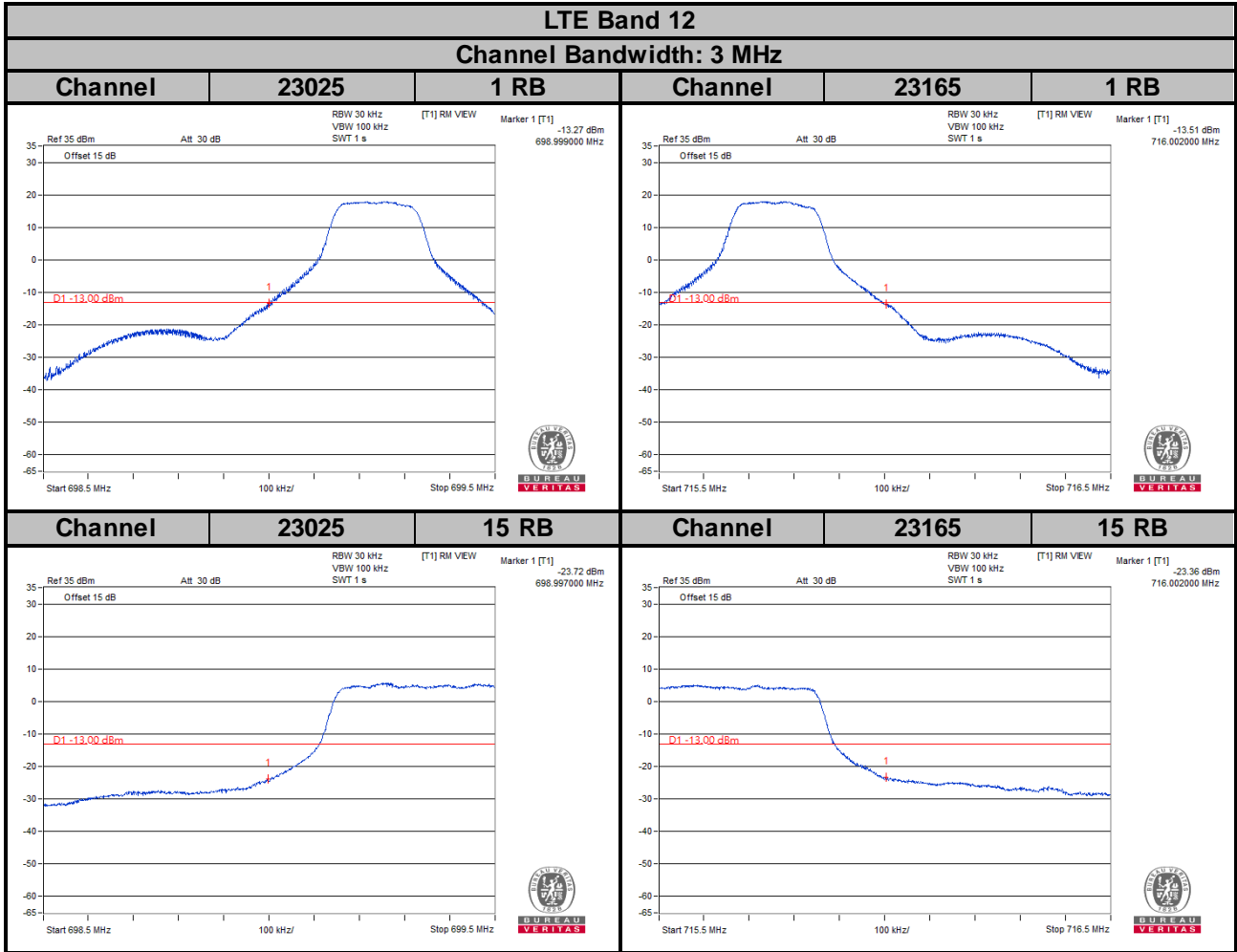
Channel Bandwidth: 20 MHz

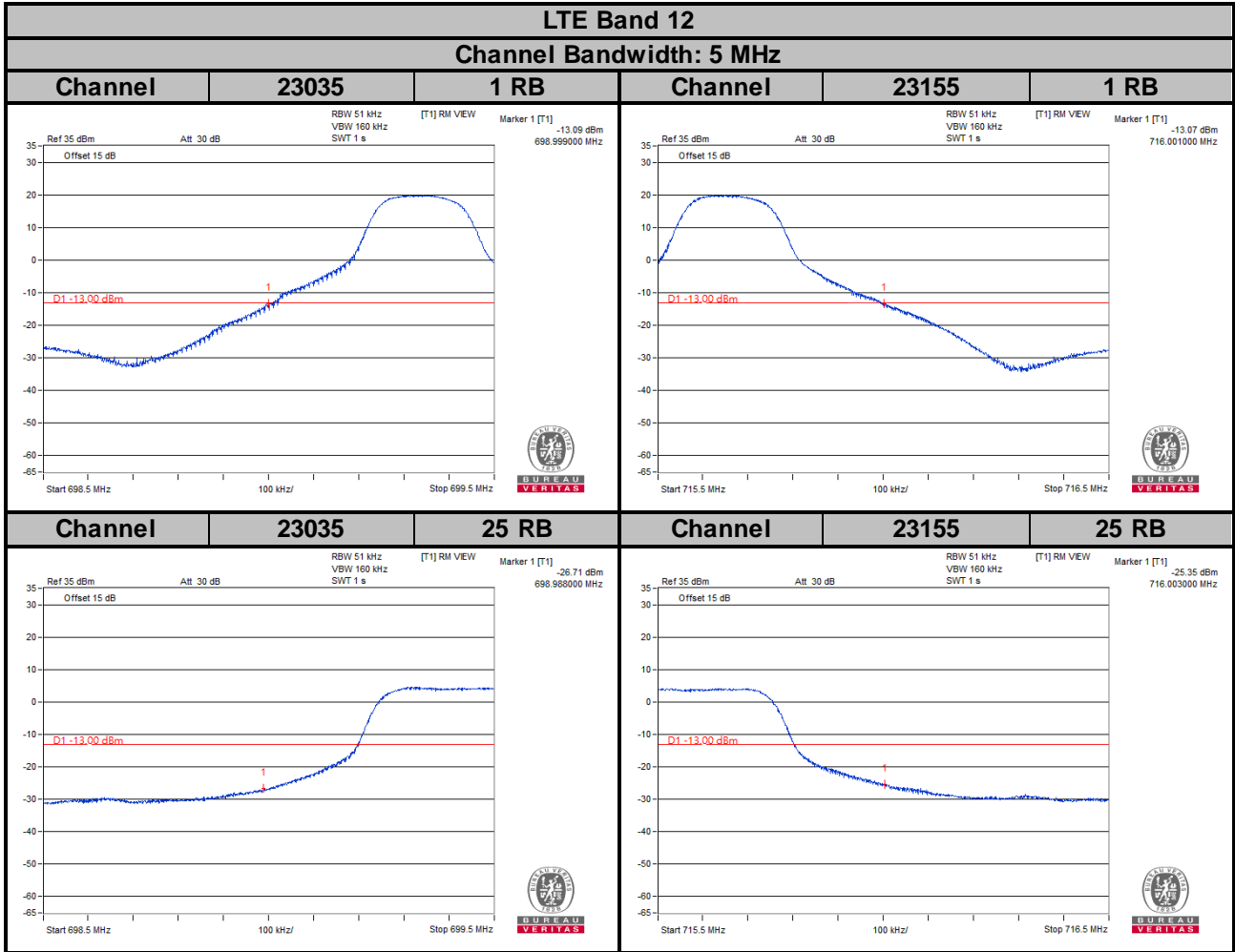


LTE Band 12

Channel Bandwidth: 1.4 MHz

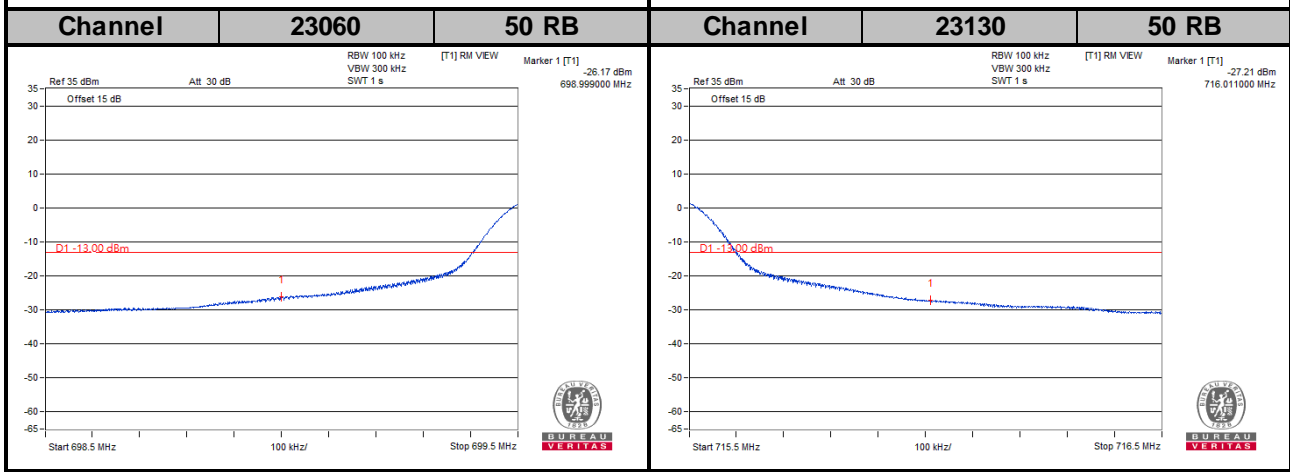
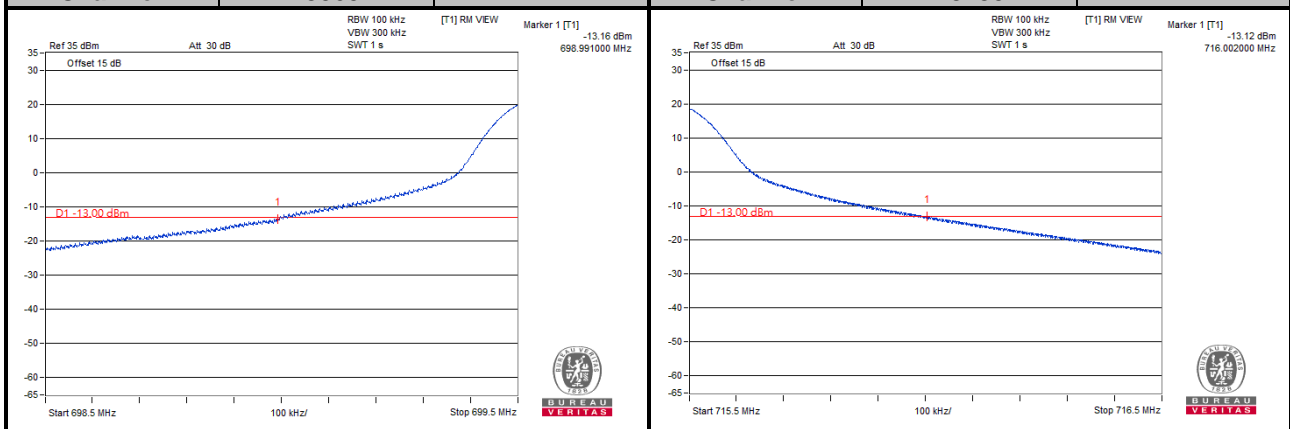




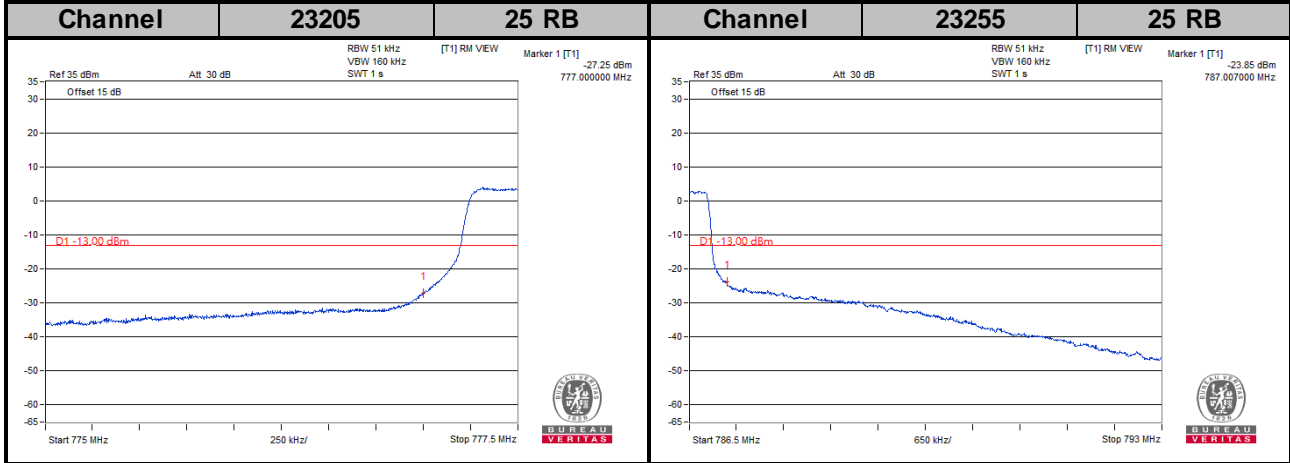
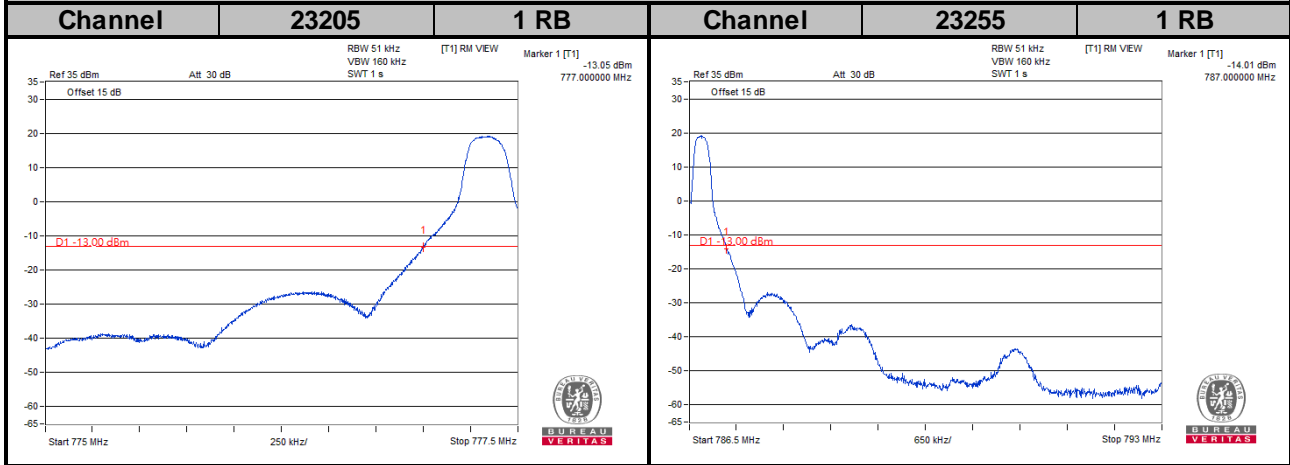


LTE Band 12

Channel Bandwidth: 10 MHz

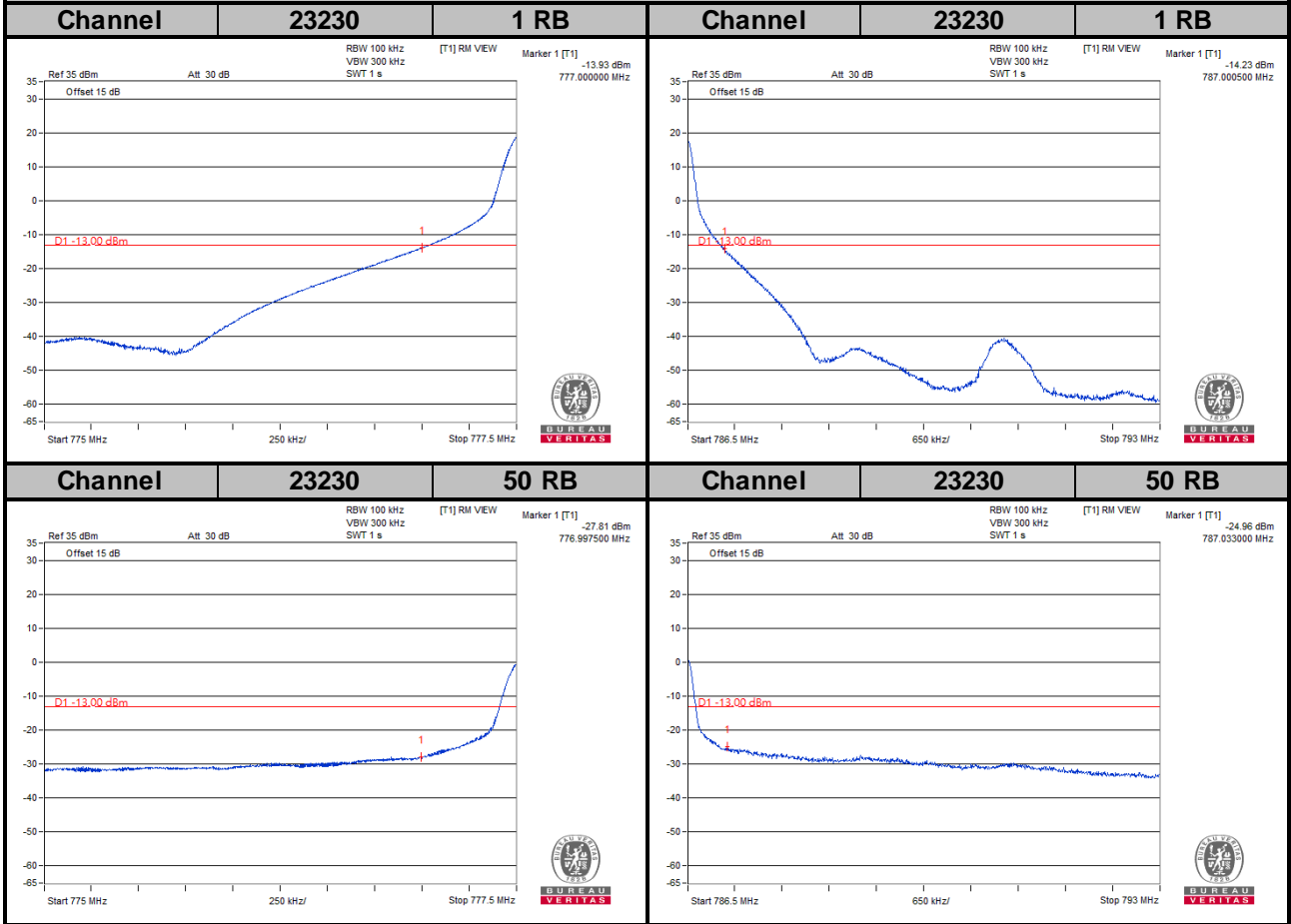


LTE Band 13
Channel Bandwidth: 5 MHz

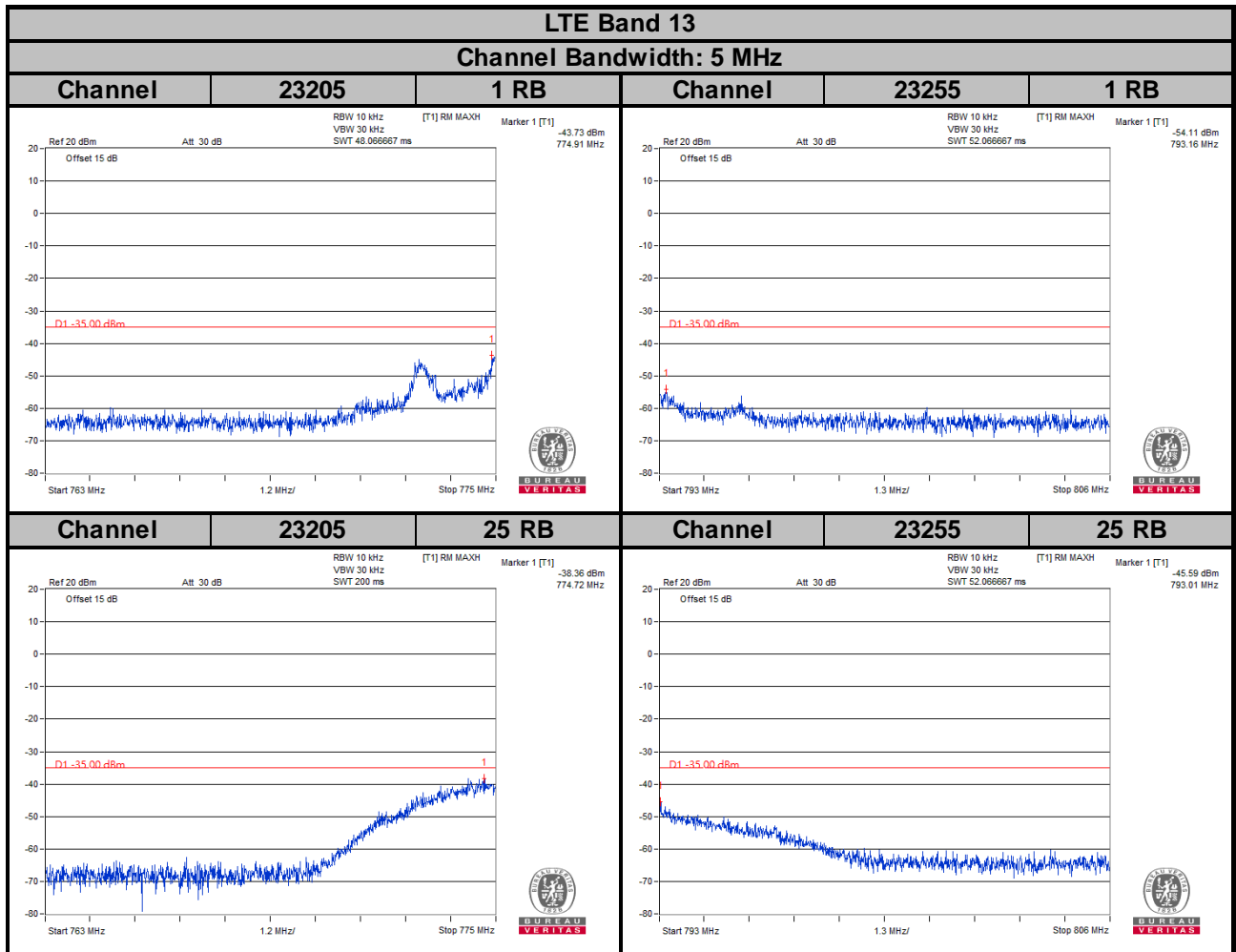


LTE Band 13

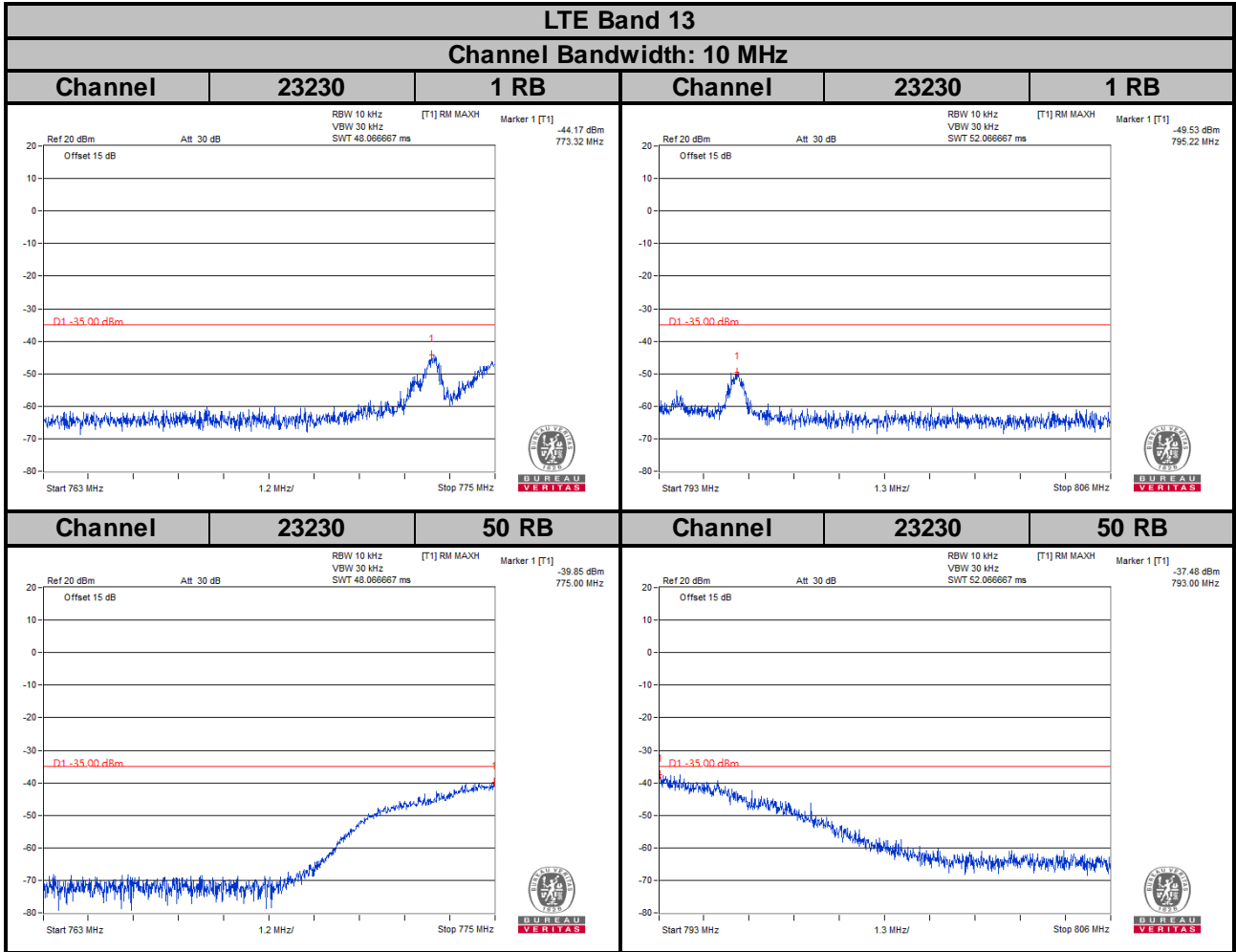
Channel Bandwidth: 10 MHz



Emission Mask



For the 763 - 775 MHz and 793 - 805 MHz band, the FCC limit is $65 + 10 \log(P[\text{watt}])$ in a 6.25 kHz bandwidth. Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 10 kHz was used instead to show compliance, and the correction factor is compensated at the spectrum. By using a 10 kHz bandwidth on the spectrum analyzer.



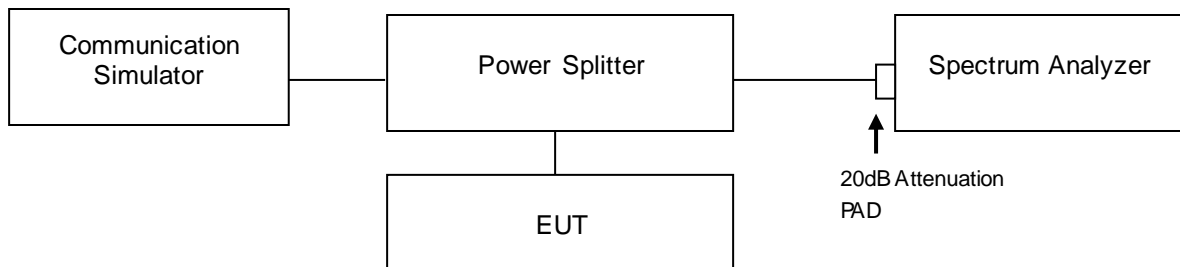
For the 763 - 775 MHz and 793 - 805 MHz band, the FCC limit is $65+10\log(P[\text{watt}])$ in a 6.25 kHz bandwidth. Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 10 kHz was used instead to show compliance, and the correction factor is compensated at the spectrum. By using a 10 kHz bandwidth on the spectrum analyzer.

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

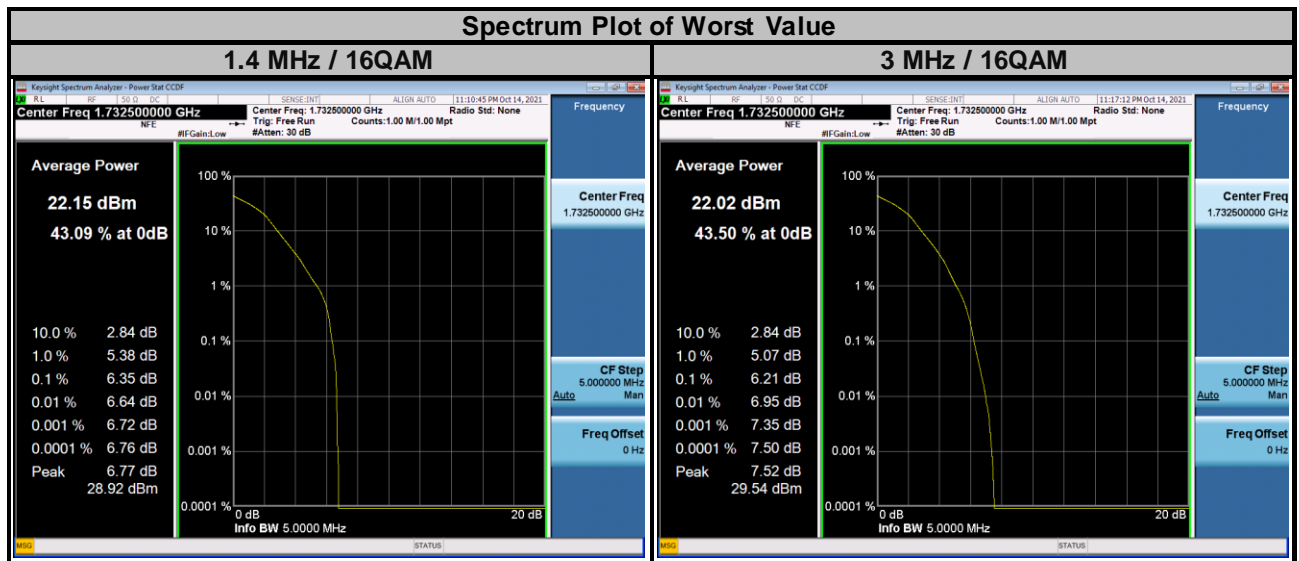


4.6.3 Test Procedures

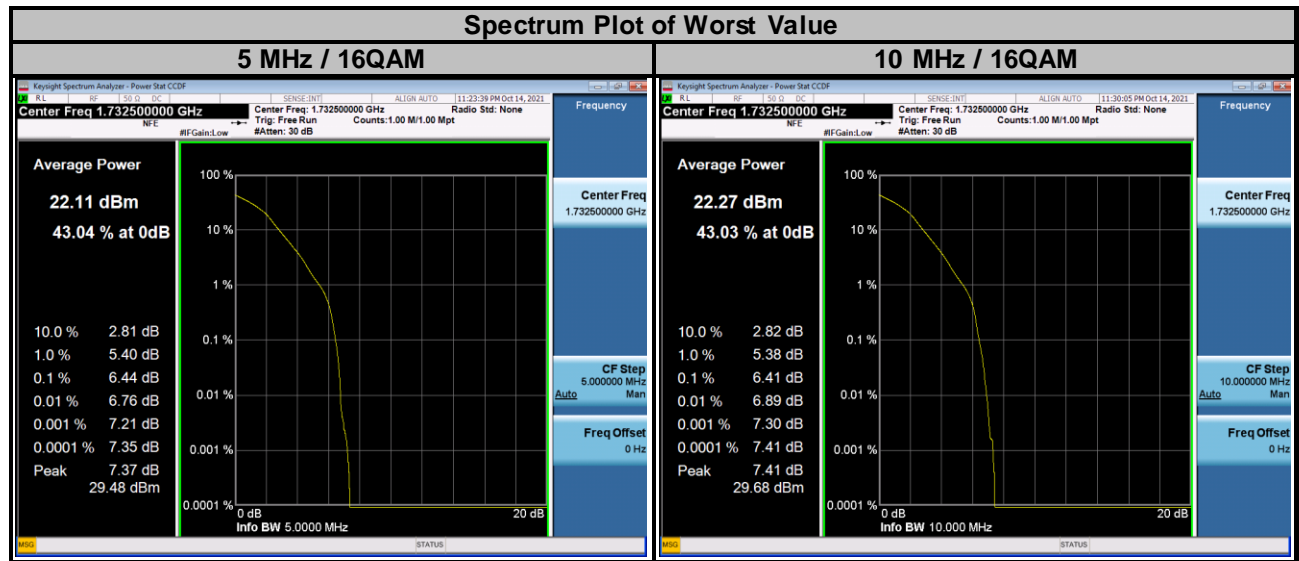
1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.6.4 Test Results

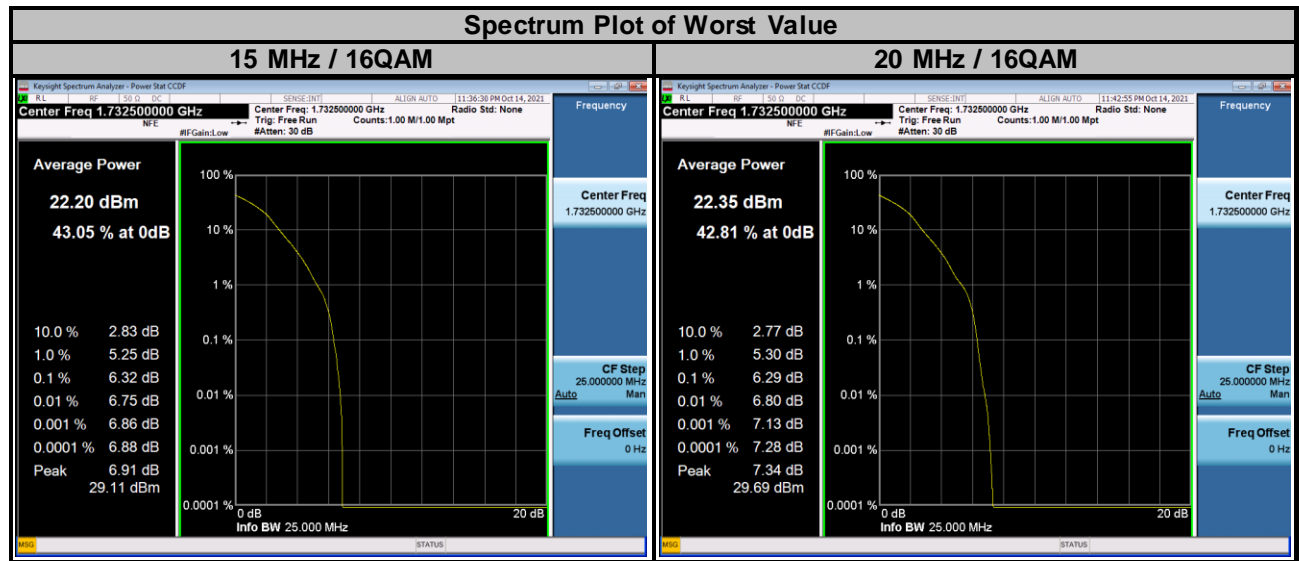
LTE Band 4							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	4.76	5.68	19965	1711.5	4.67	5.57
20175	1732.5	5.40	6.35	20175	1732.5	5.36	6.21
20393	1754.3	5.01	5.93	20385	1753.5	4.81	5.61



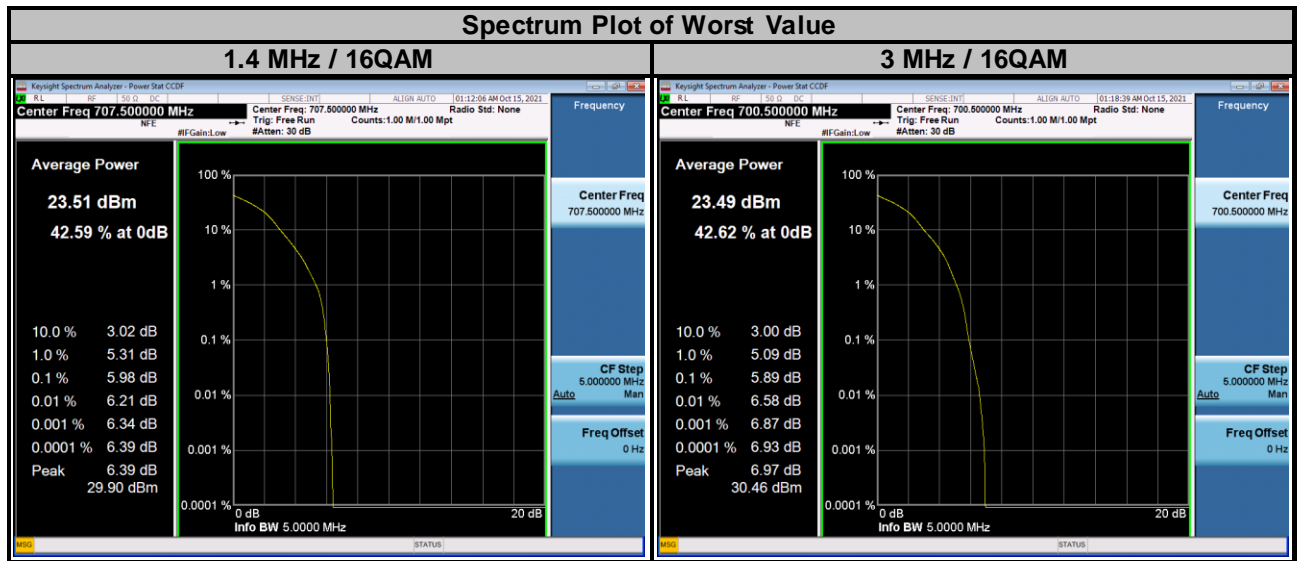
LTE Band 4							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	4.76	5.68	20000	1715.0	4.64	5.52
20175	1732.5	5.55	6.44	20175	1732.5	5.50	6.41
20375	1752.5	4.63	5.45	20350	1750.0	4.11	4.96



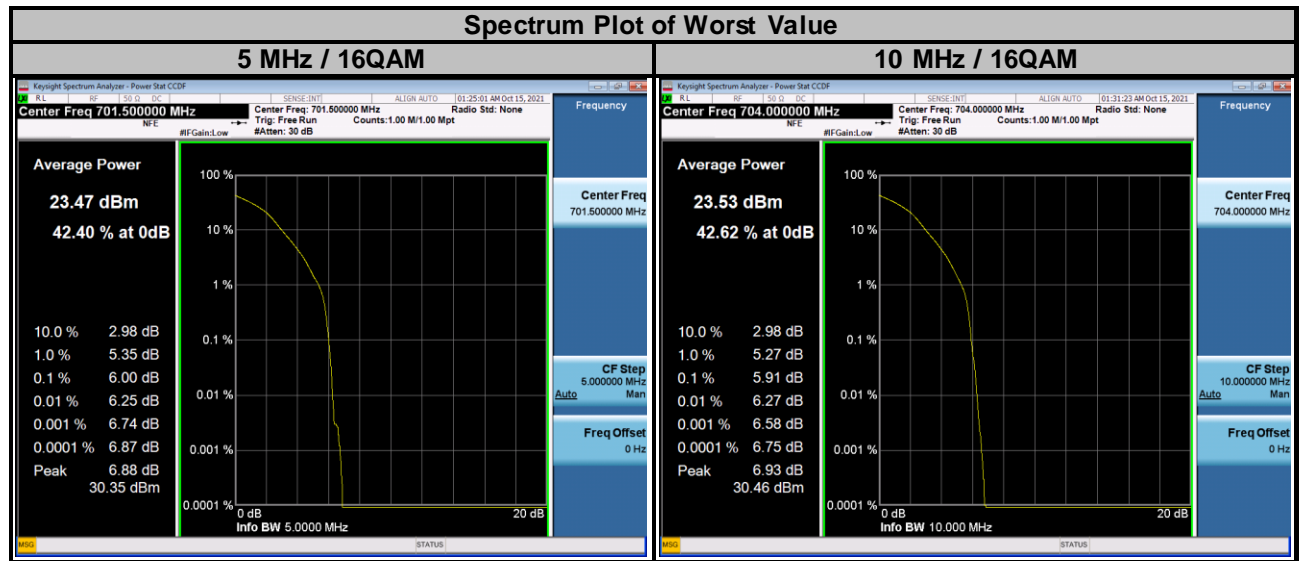
LTE Band 4							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	4.53	5.35	20050	1720.0	4.69	5.36
20175	1732.5	5.42	6.32	20175	1732.5	5.51	6.29
20325	1747.5	4.20	5.08	20300	1745.0	4.83	5.62



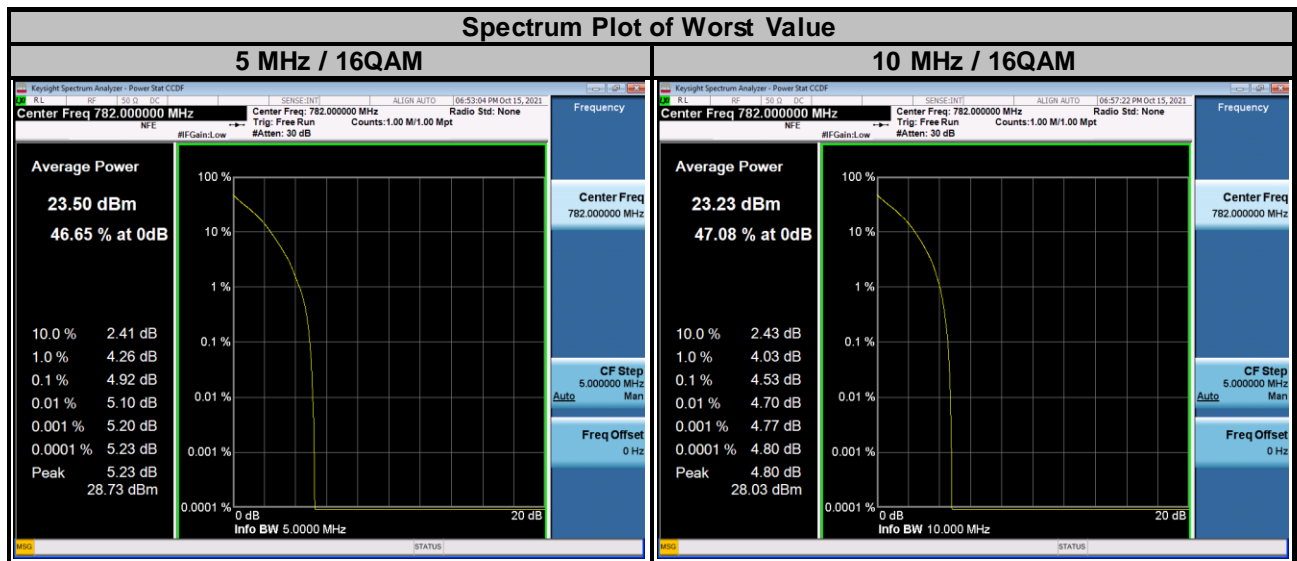
LTE Band 12							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
23017	699.7	5.14	5.95	23025	700.5	5.07	5.89
23095	707.5	5.19	5.98	23095	707.5	4.92	5.76
23173	715.3	3.50	4.30	23165	714.5	3.92	4.87



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	16QAM
23035	701.5	5.14	6.00	23060	704.0	5.07	5.91
23095	707.5	4.80	5.61	23095	707.5	4.52	5.31
23155	713.5	4.91	5.76	23130	711.0	5.06	5.82



LTE Band 13							
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	16QAM
23205	779.5	4.28	4.26	23230	782.0	4.52	4.53
23230	782.0	4.91	4.92				
23255	784.5	4.16	4.17				



4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

For LTE Band 4:

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

For LTE Band 12:

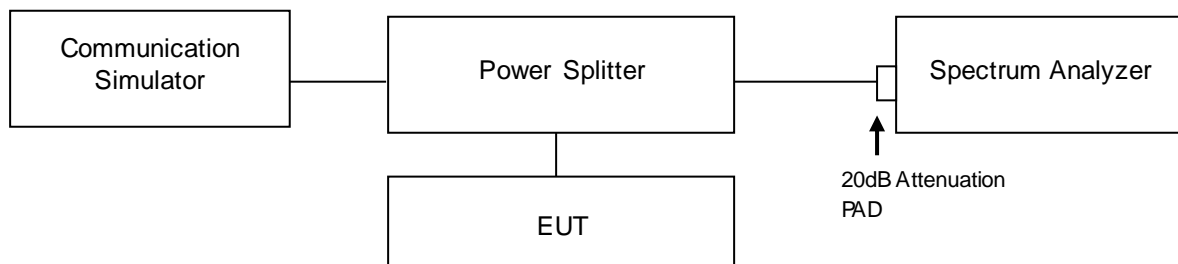
According to FCC 27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. The limit of emissions is equal to -13 dBm.

For LTE Band 13:

According to FCC 27.53(c)(2), for on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. The limit of emissions is equal to -13 dBm.

According to FCC 27.53(f), for operations in the 775-788 MHz, emissions in the band 1559-1610MHz shall be limited to -70 dBW/MHz (EIRP). The limit of emissions is equal to -40 dBm.

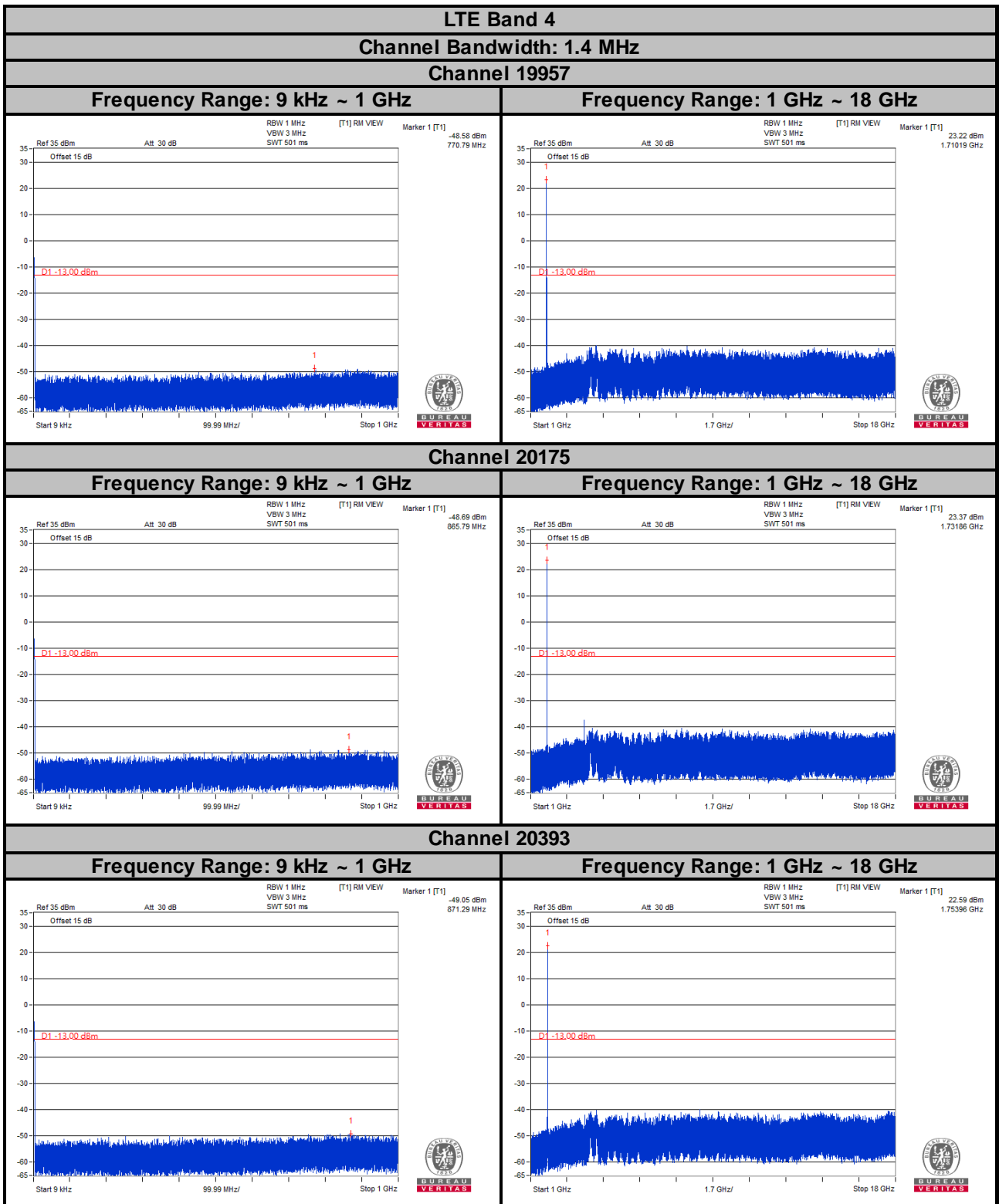
4.7.2 Test Setup



4.7.3 Test Procedure

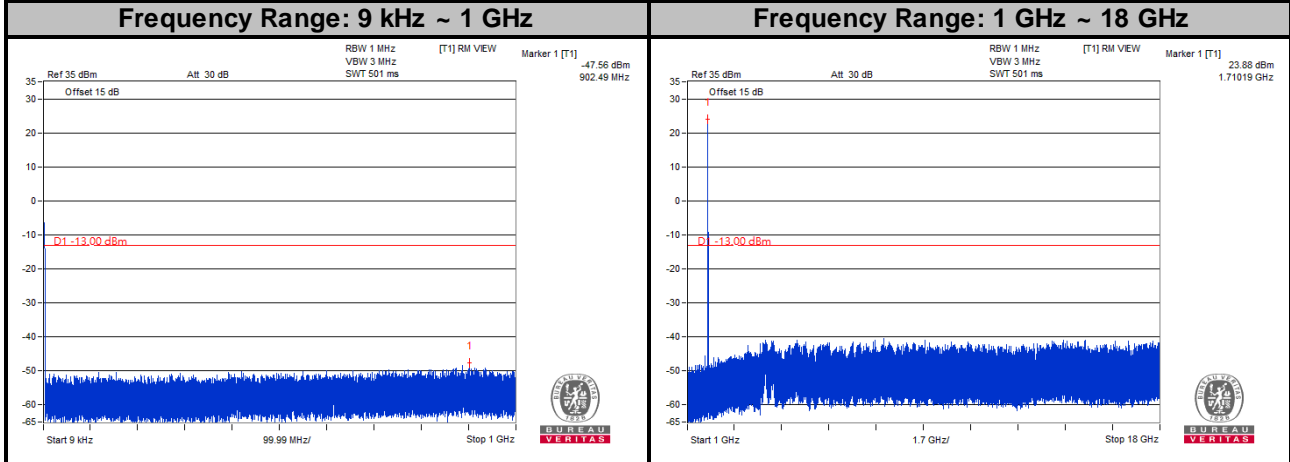
- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 1 GHz. 10 dB attenuation pad is connected with spectrum. For Band 12 & 13: RBW = 100 kHz and VBW = 300 kHz, For Band 4: RBW = 1MHz and VBW = 3MHz is used for conducted emission measurement.
- Measuring frequency range is from 1 GHz to 8 GHz / 18 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

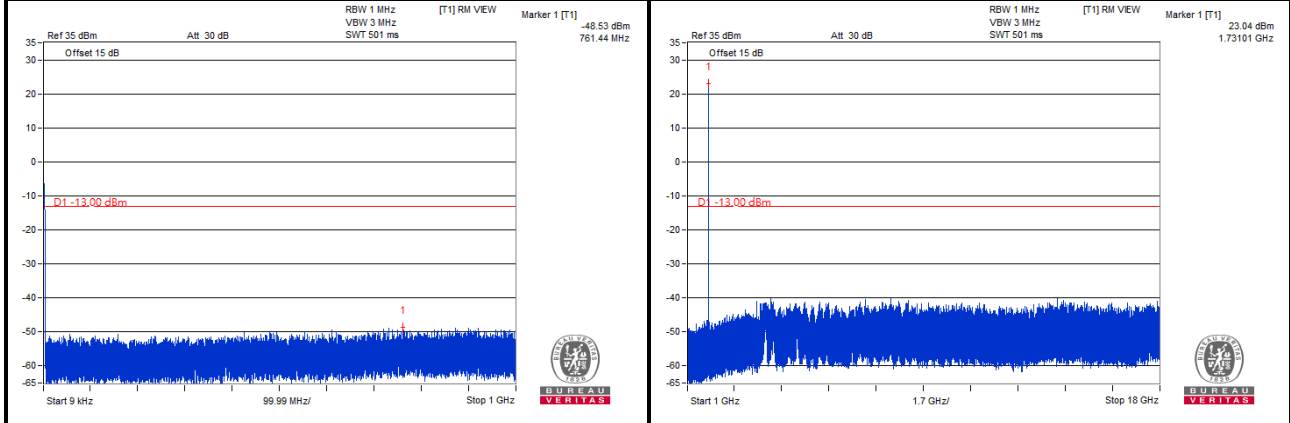


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

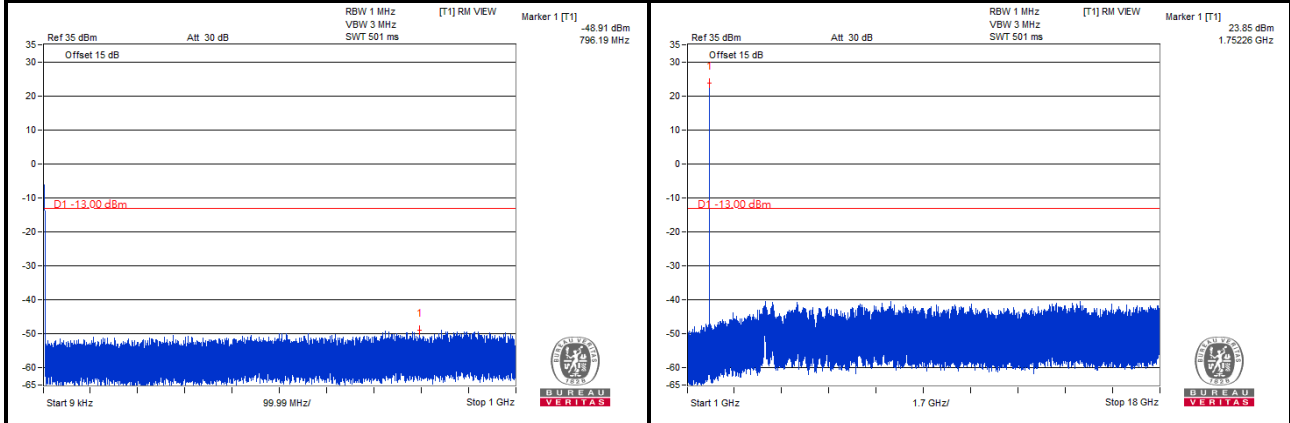
LTE Band 4
Channel Bandwidth: 3 MHz
Channel 19965



Channel 20175

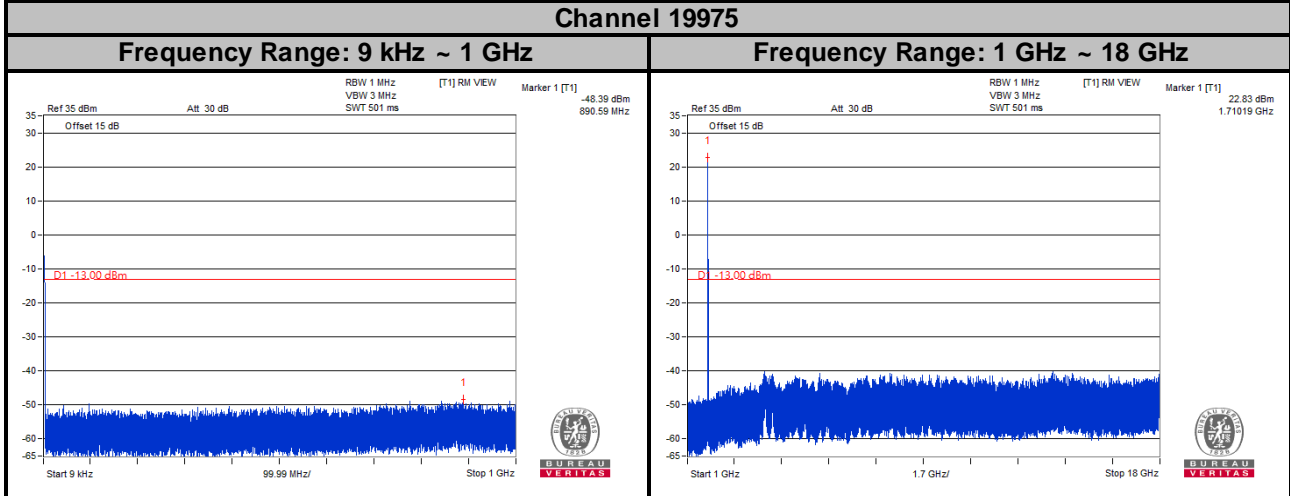


Channel 20385

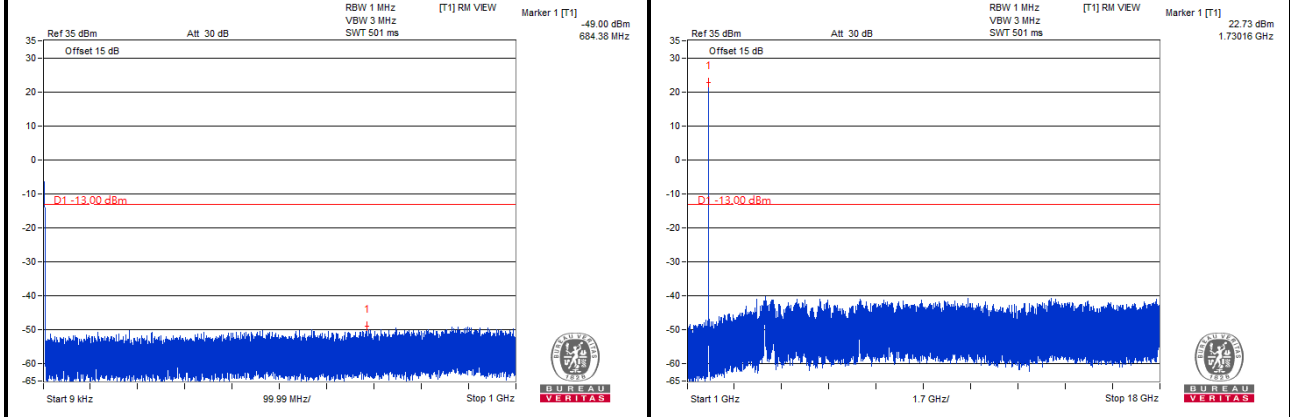


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

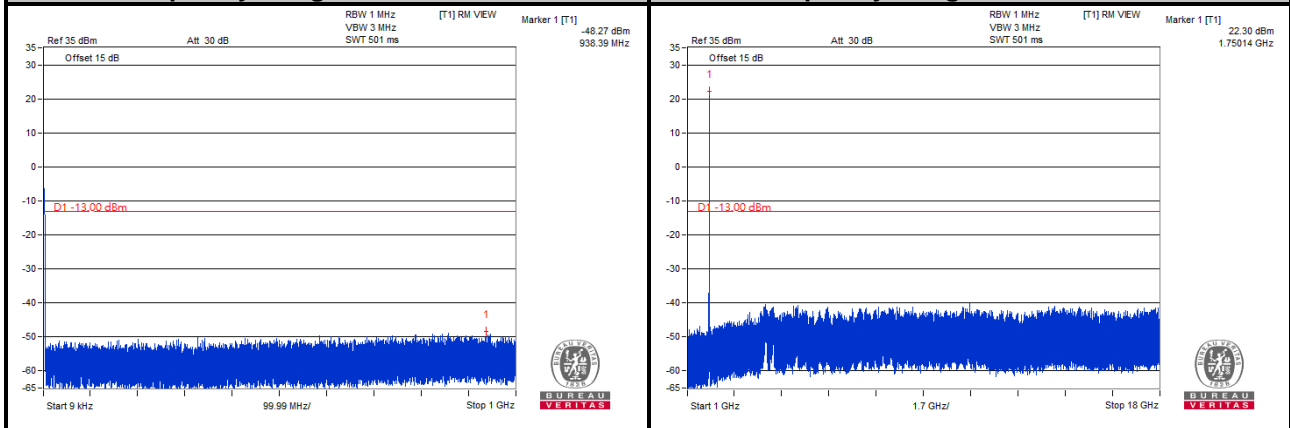
LTE Band 4
Channel Bandwidth: 5 MHz
Channel 19975



Channel 20175

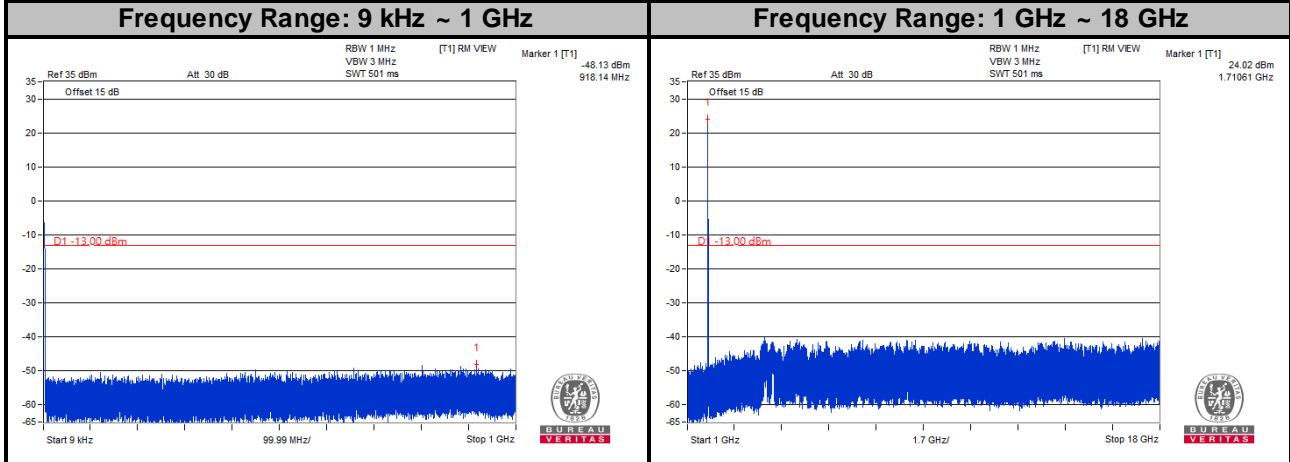


Channel 20375

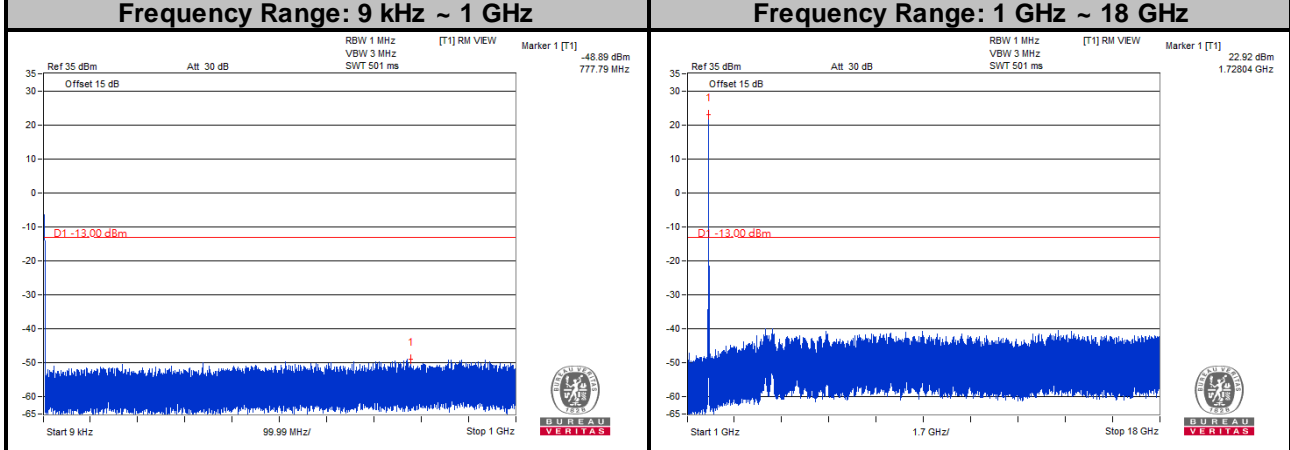


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

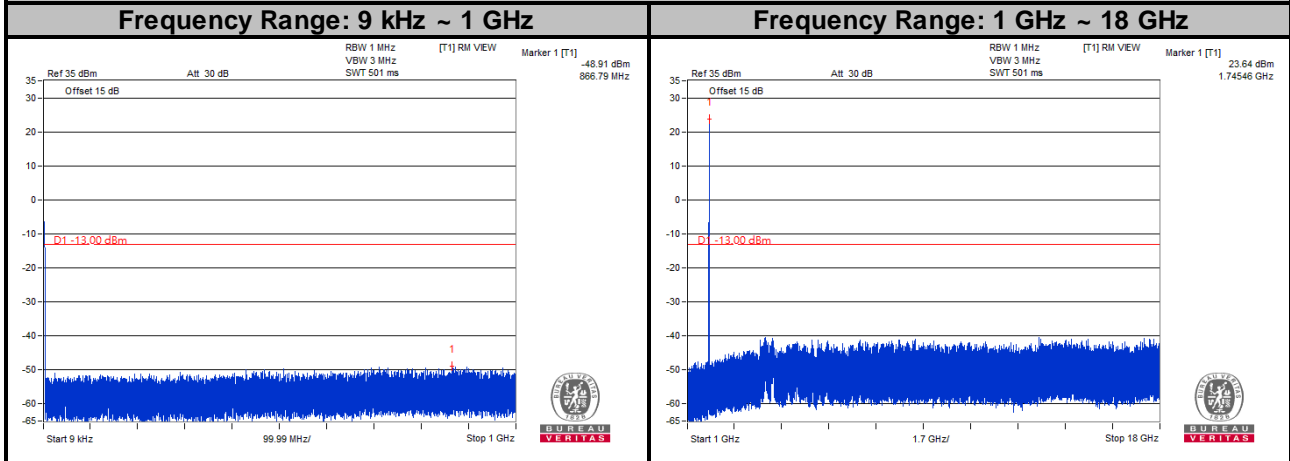
LTE Band 4
Channel Bandwidth: 10 MHz
Channel 20000



Channel 20175

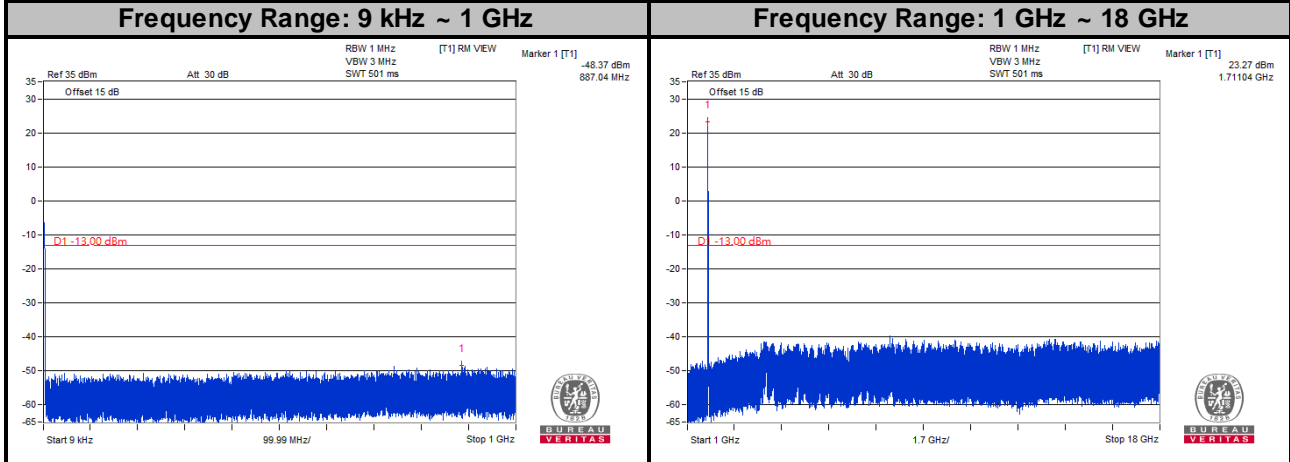


Channel 20350

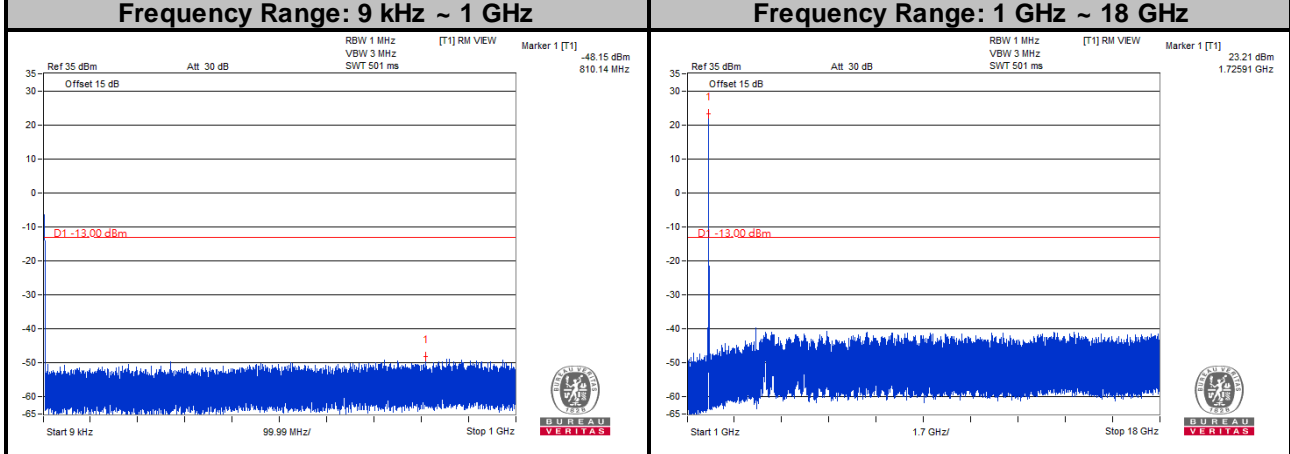


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

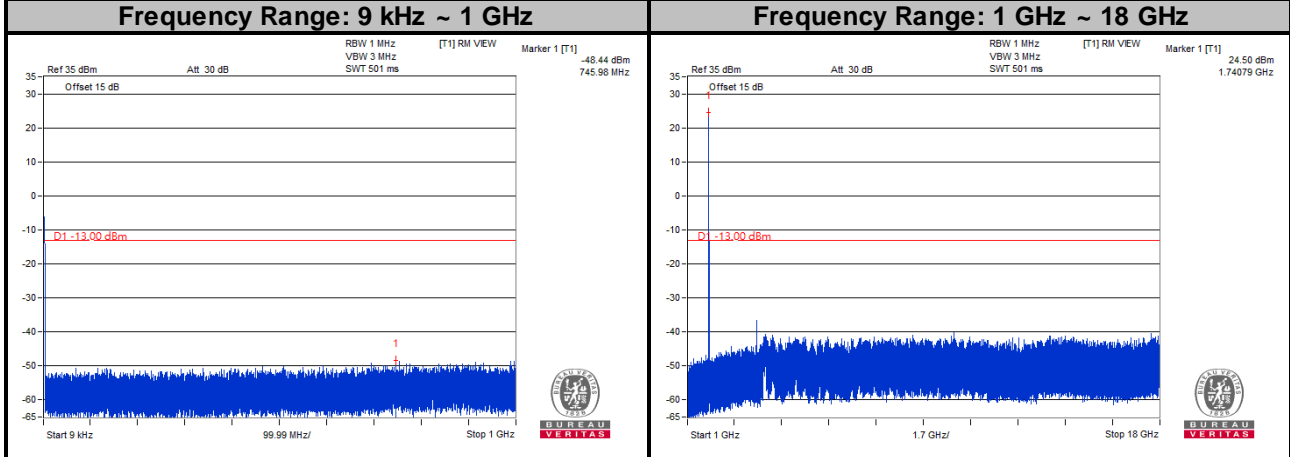
LTE Band 4
Channel Bandwidth: 15 MHz
Channel 20025



Channel 20175

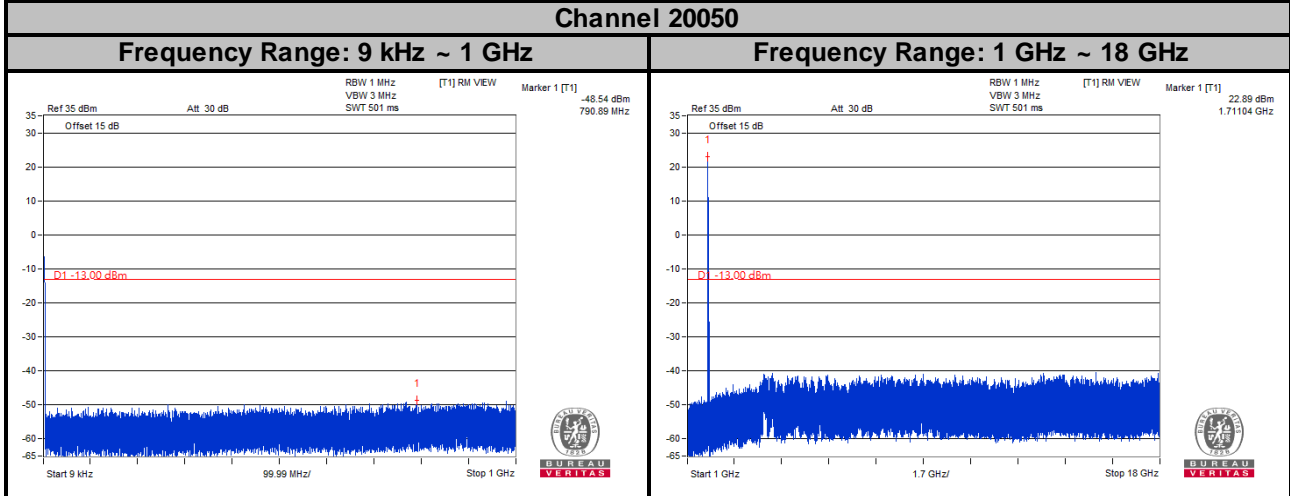


Channel 20325

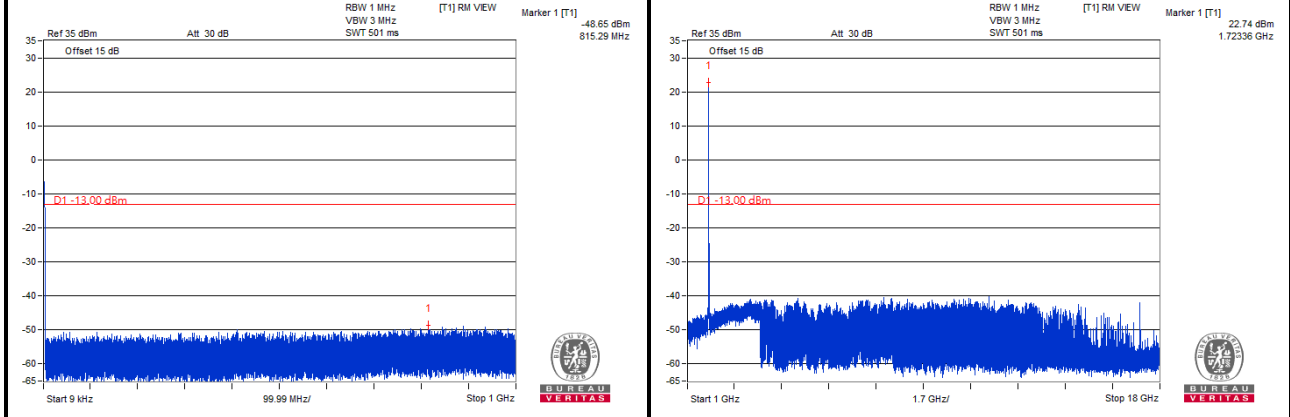


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

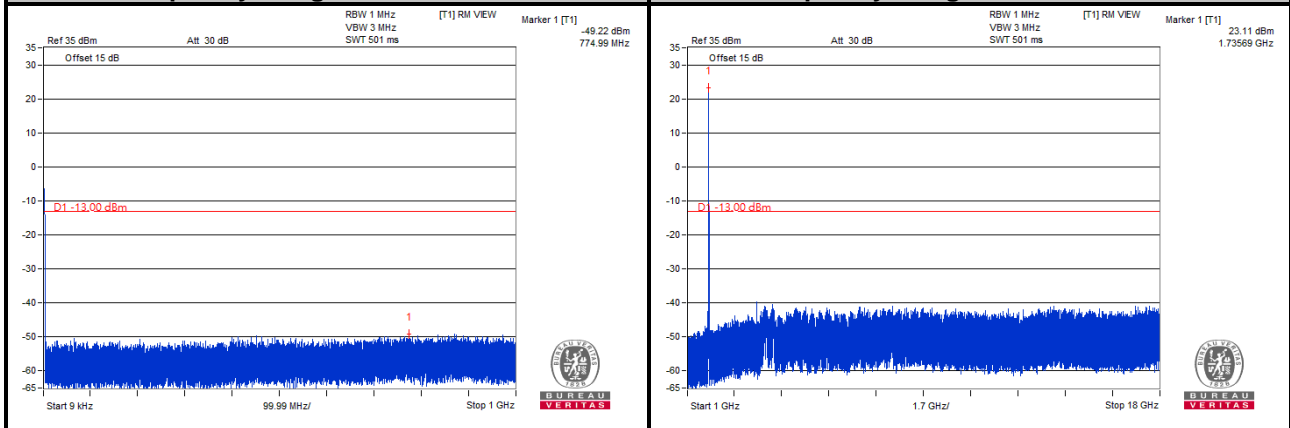
LTE Band 4
Channel Bandwidth: 20 MHz
Channel 20050



Channel 20175

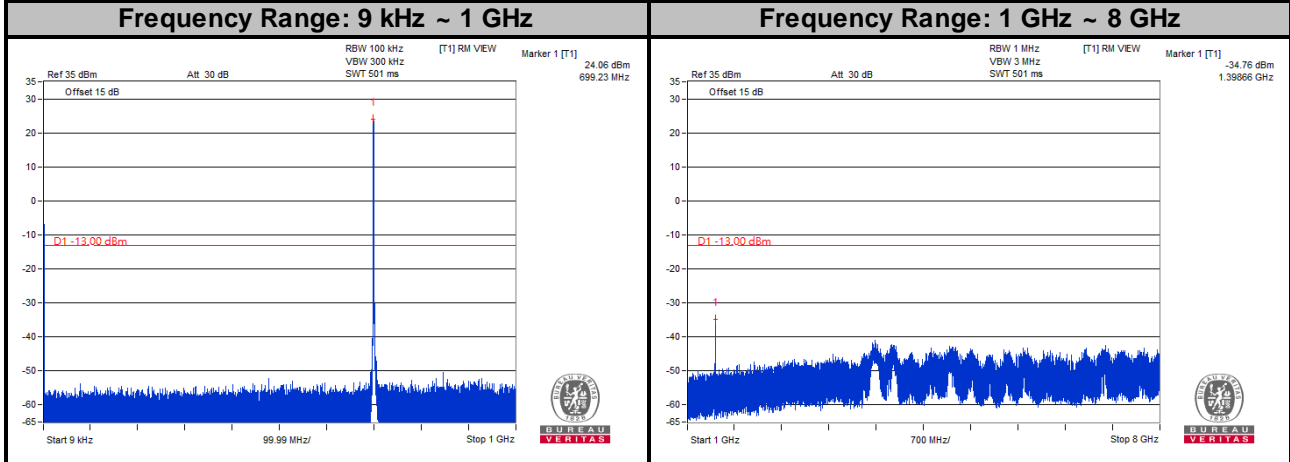


Channel 20300

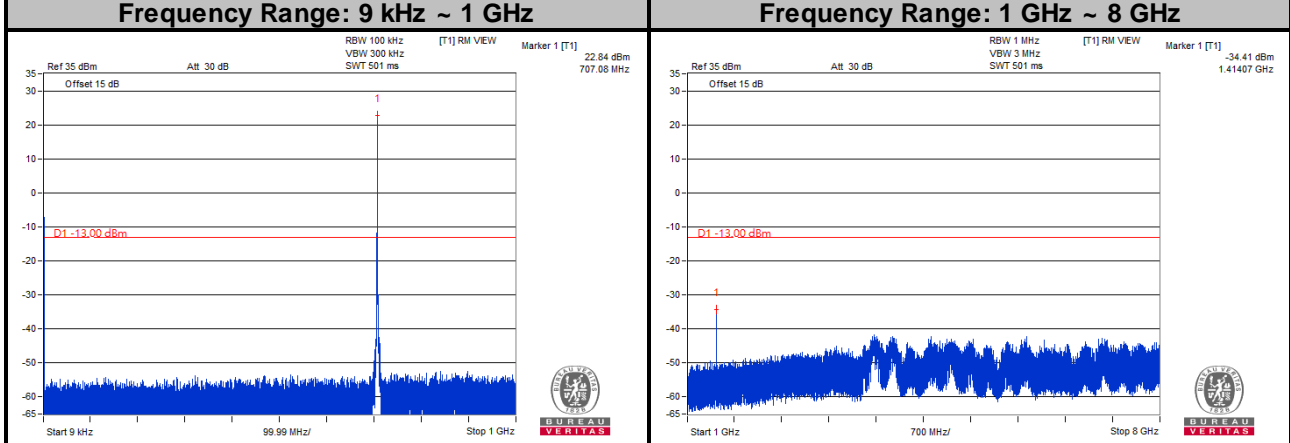


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

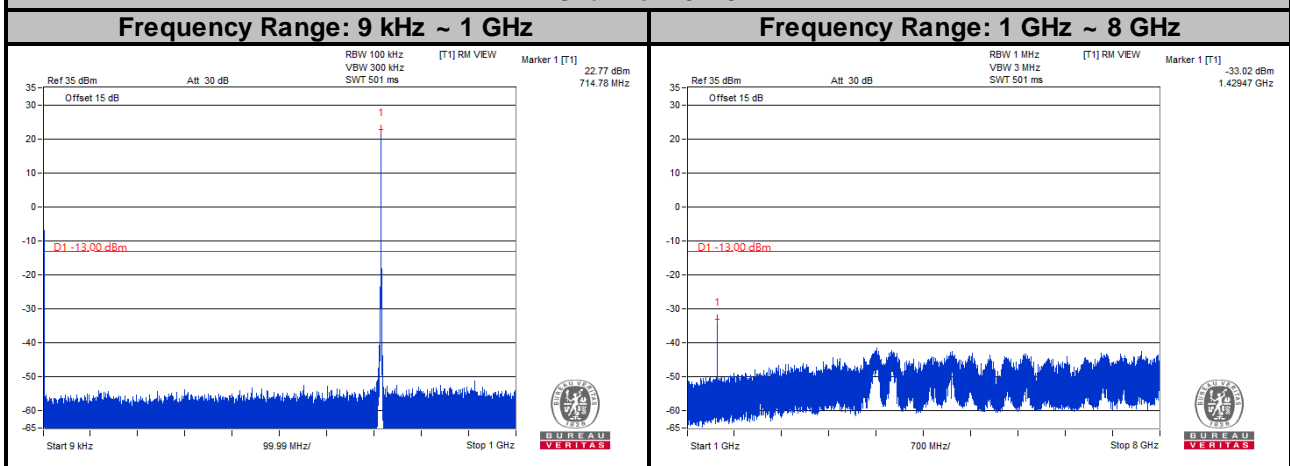
LTE Band 12
Channel Bandwidth: 1.4 MHz
Channel 23017



Channel 23095

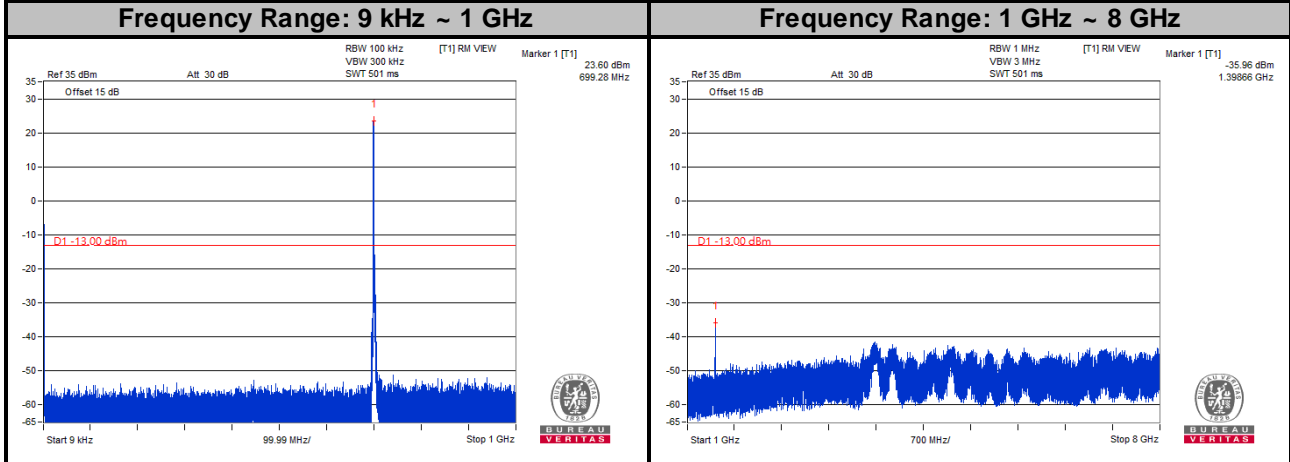


Channel 23173

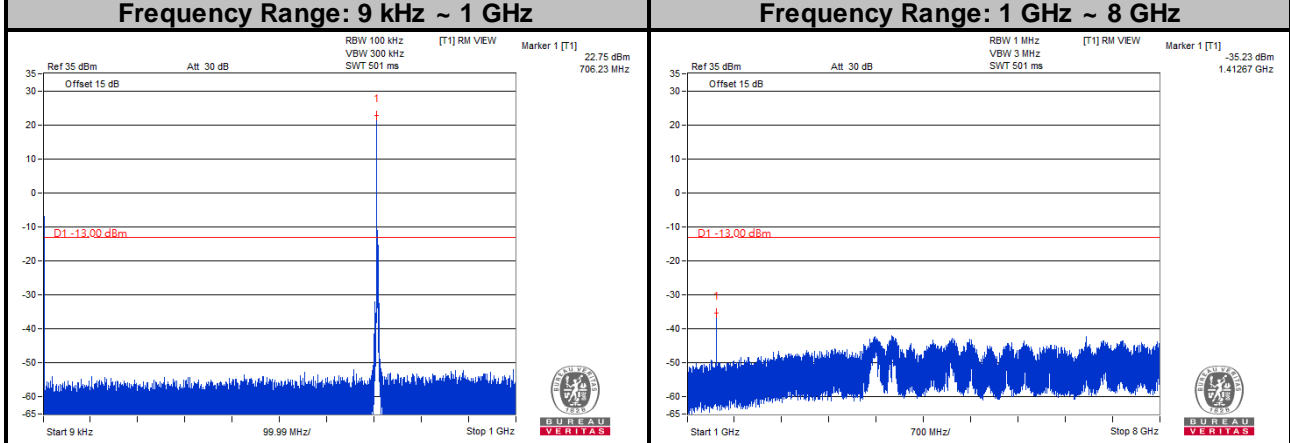


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

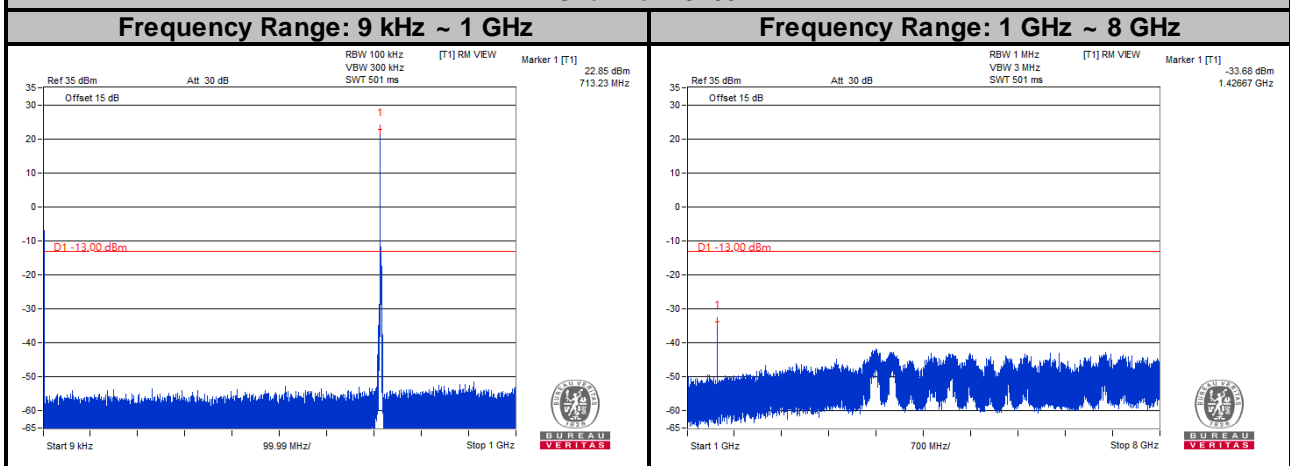
LTE Band 12
Channel Bandwidth: 3 MHz
Channel 23025



Channel 23095

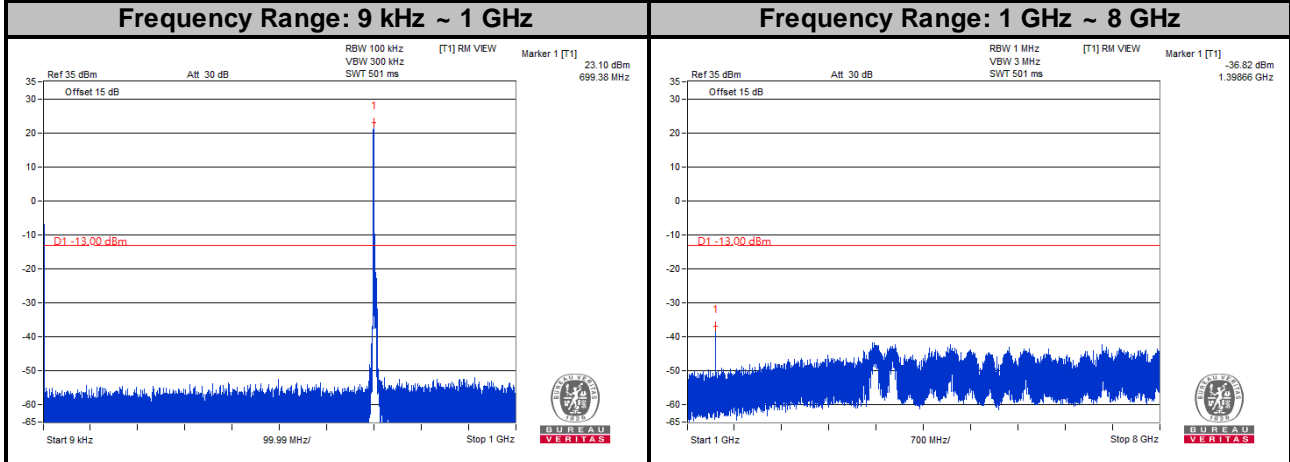


Channel 23165

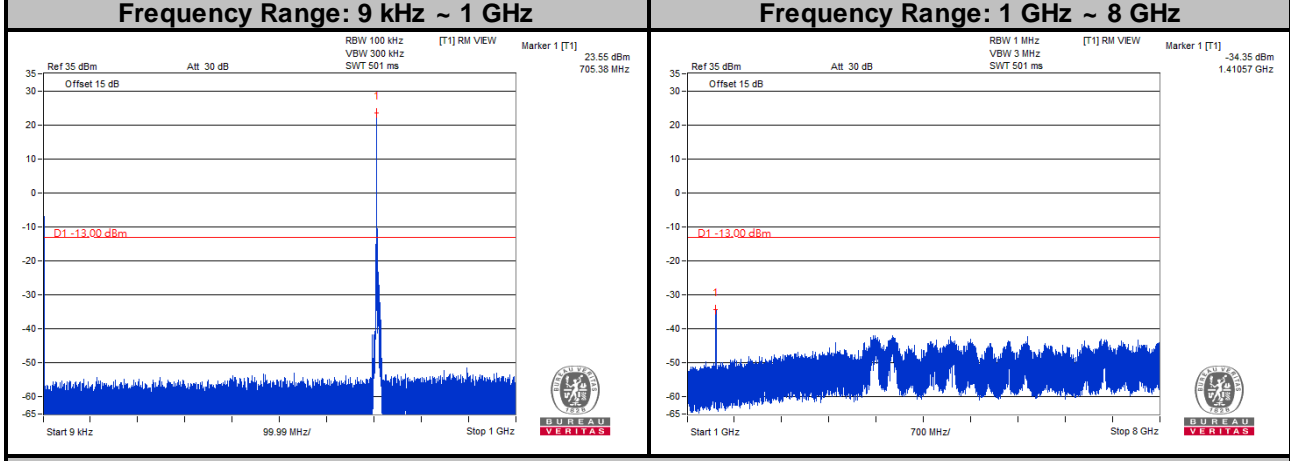


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

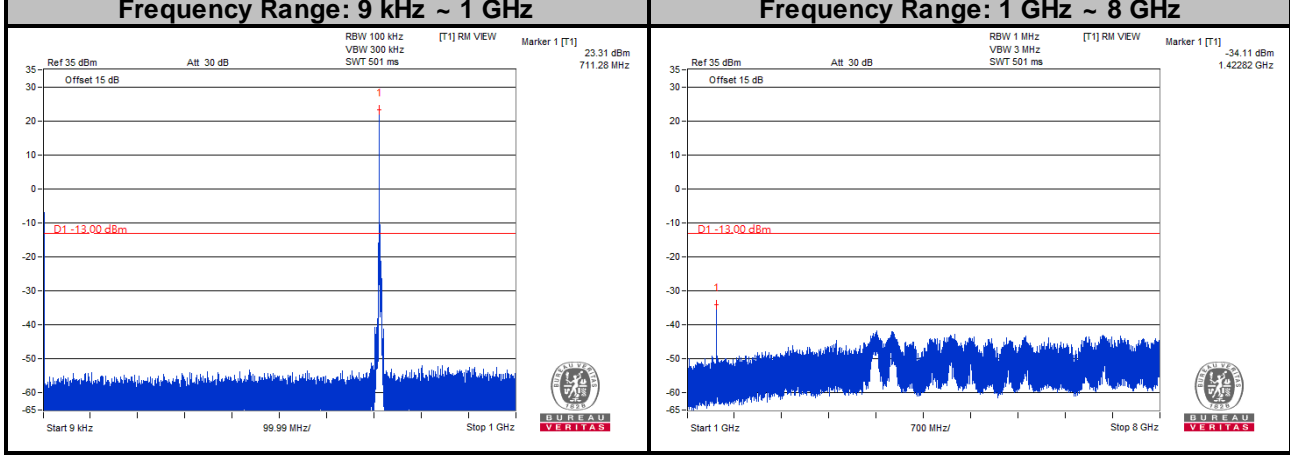
LTE Band 12
Channel Bandwidth: 5 MHz
Channel 23035



Channel 23095

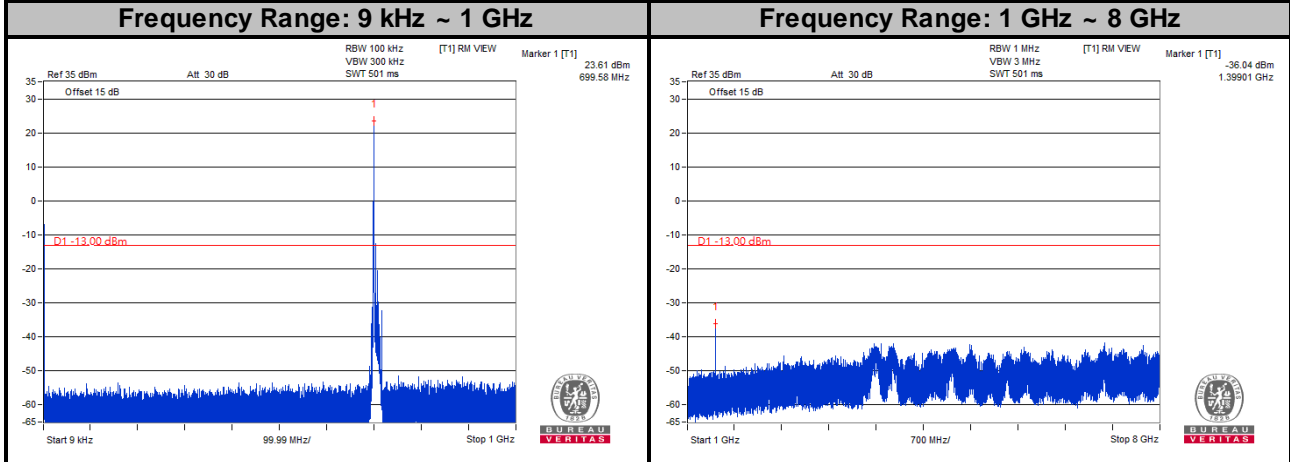


Channel 23155

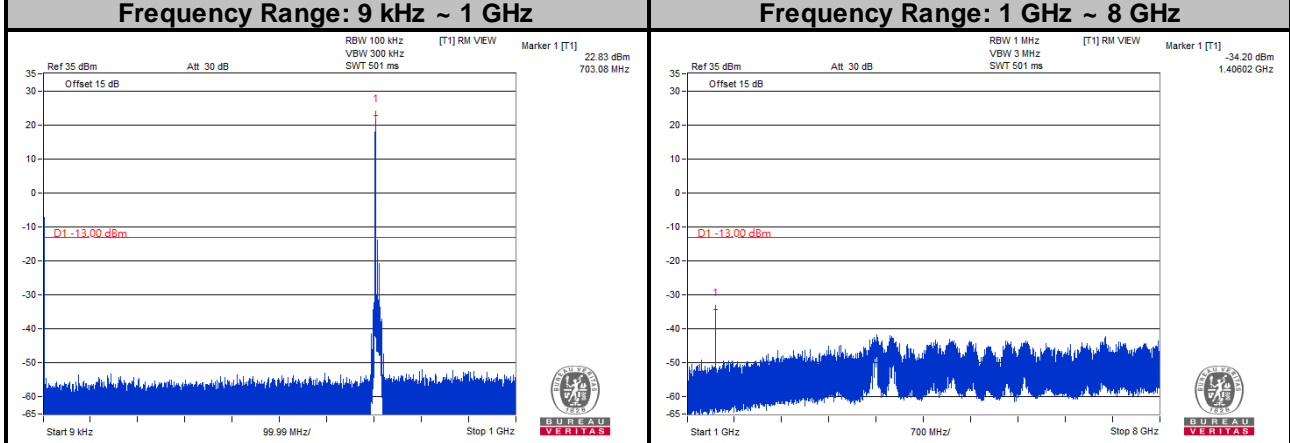


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

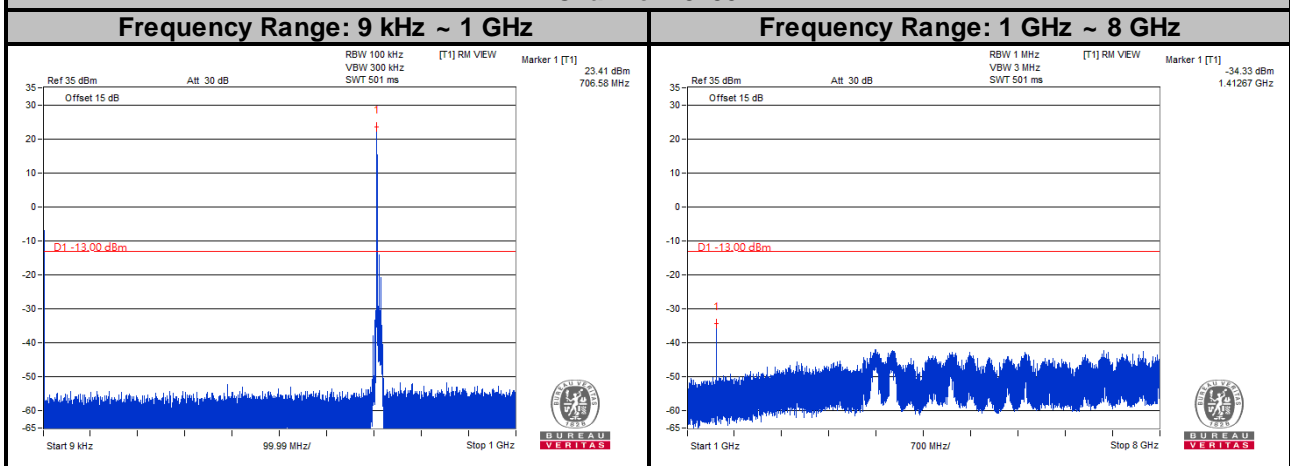
LTE Band 12
Channel Bandwidth: 10 MHz
Channel 23060



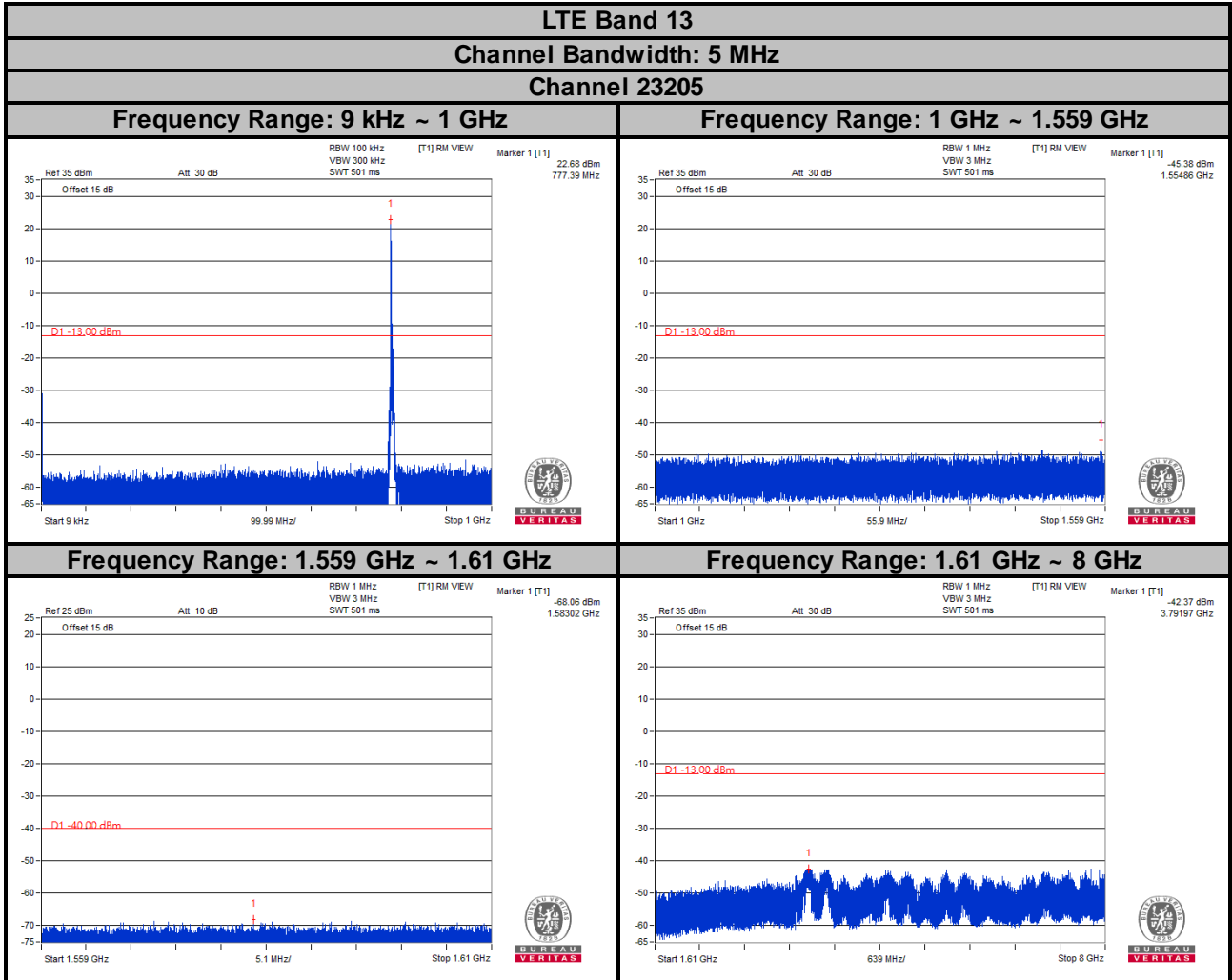
Channel 23095



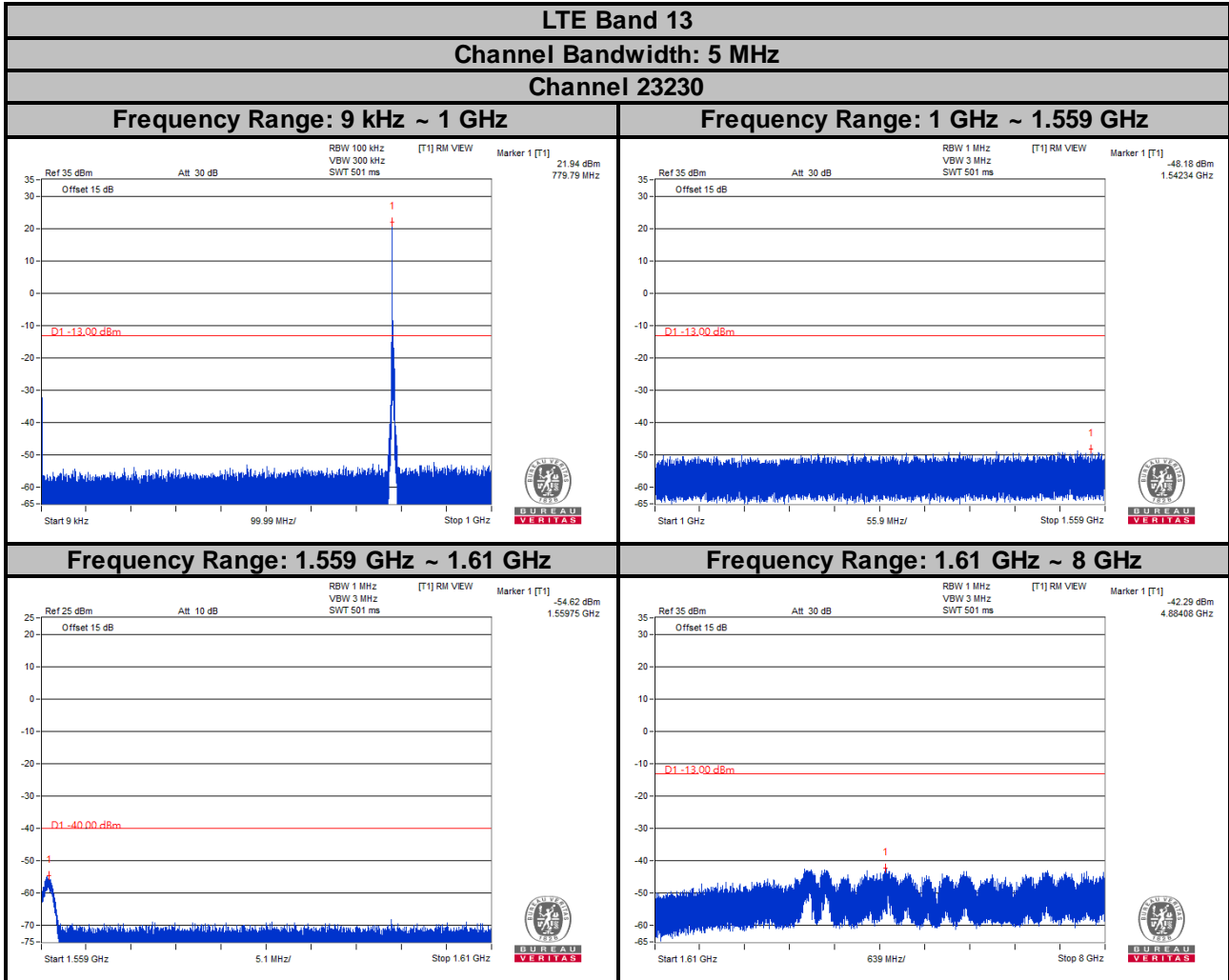
Channel 23130



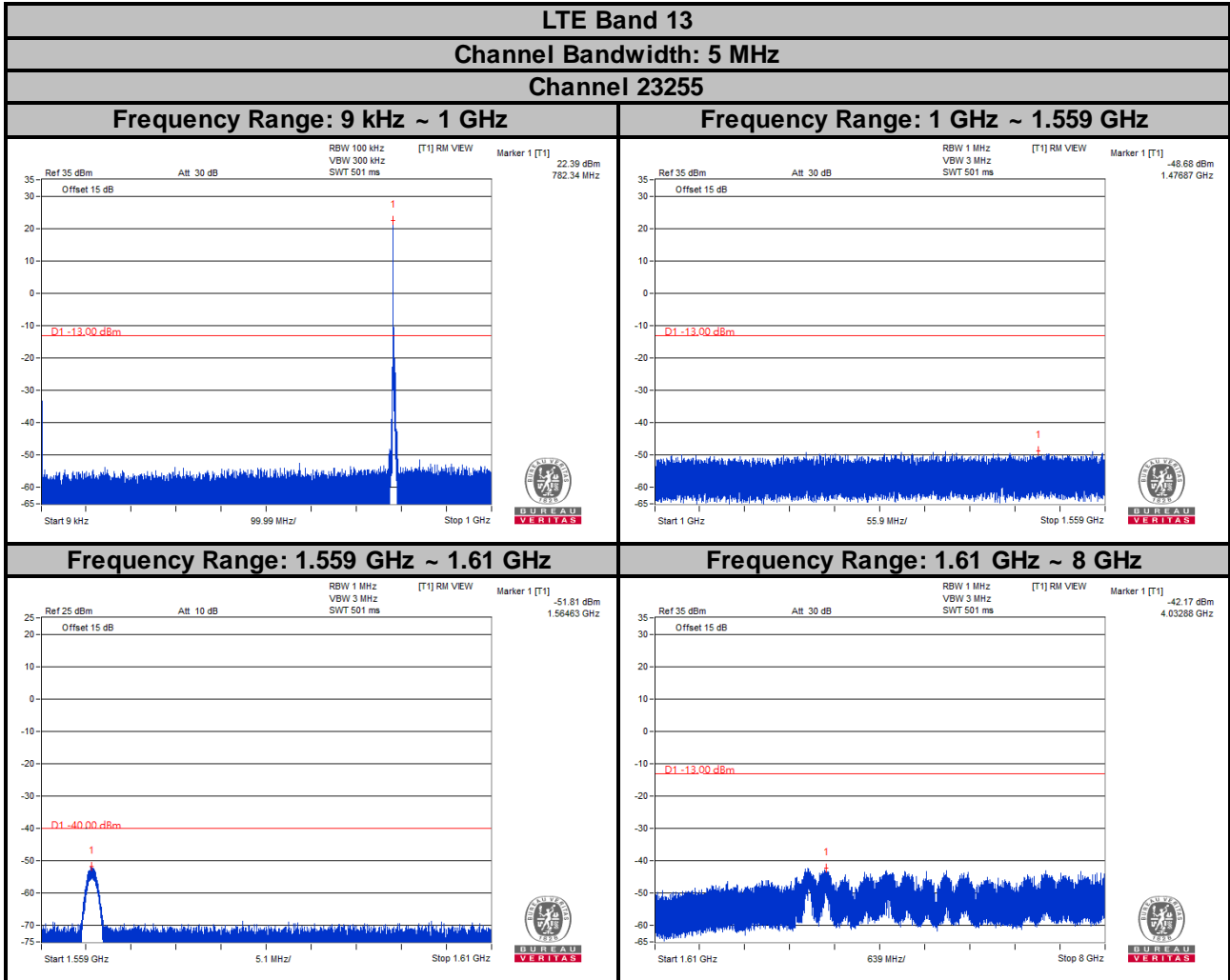
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



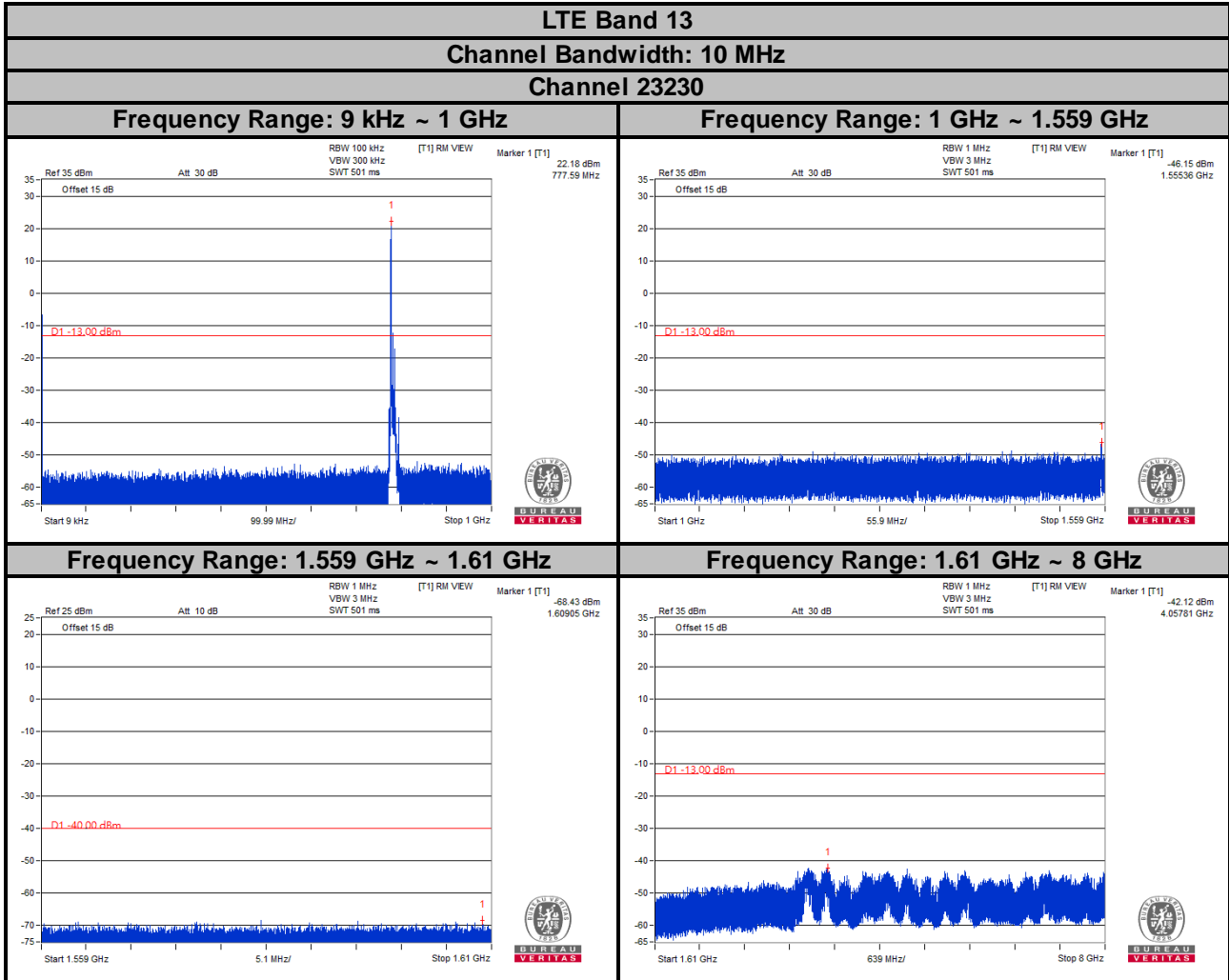
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



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.

4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

For LTE Band 4:

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

For LTE Band 12:

According to FCC 27.53(g), for operations in the 600 MHz band and the 698-746 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. The limit of emissions is equal to -13 dBm.

For LTE Band 13:

According to FCC 27.53(c)(2), for on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. The limit of emissions is equal to -13 dBm.

According to FCC 27.53(f), for operations in the 775-788 MHz, emissions in the band 1559-1610MHz shall be limited to -70 dBW/MHz (EIRP). The limit of emissions is equal to -40 dBm.

4.8.2 Test Procedure

- In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) 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 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
- Following C63.26 section 5.5 and 5.2.7
 $EIRP \text{ (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
 $ERP \text{ (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

Note:

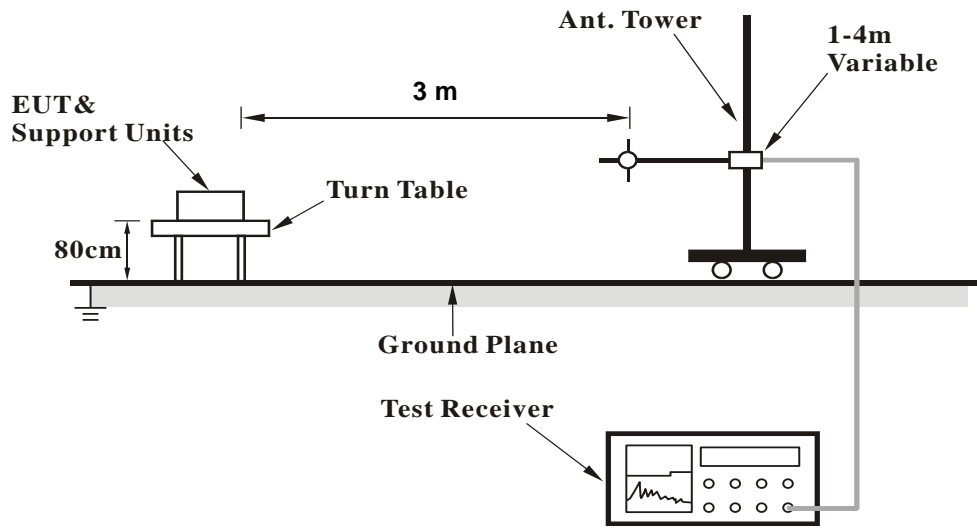
- The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.
- The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.8.3 Deviation from Test Standard

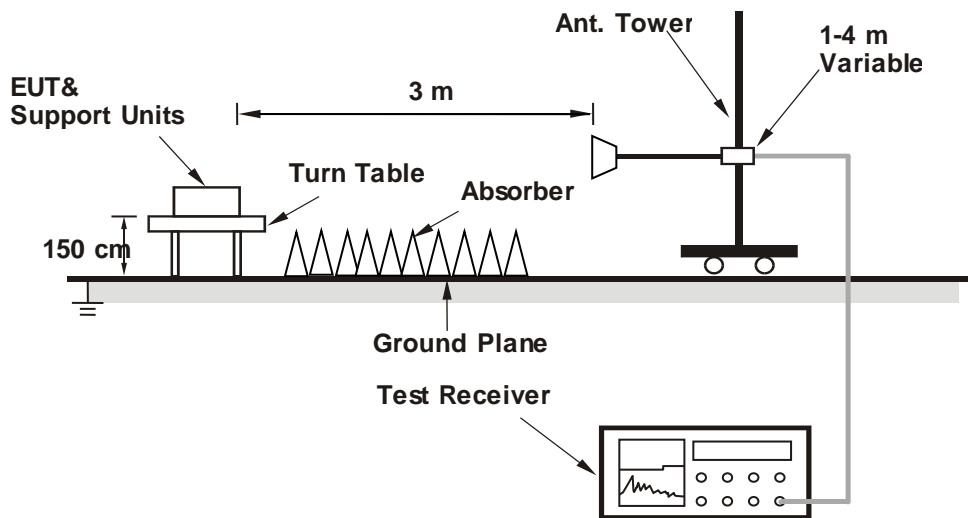
No deviation.

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

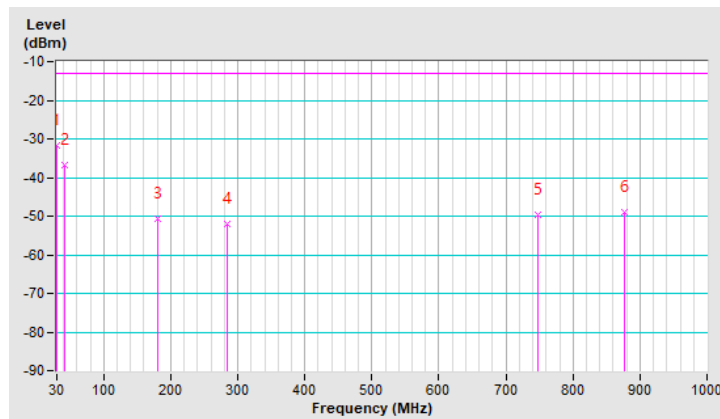
LTE Band 4, Channel Bandwidth: 20MHz

RF Mode	TX LTE Band IV-20MHz	Channel	CH 20050 : 1720 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.00	-31.74	-13.00	-18.74	1.63 H	82	73.74	-105.48
2	41.64	-36.75	-13.00	-23.75	1.15 H	328	67.80	-104.55
3	181.32	-50.71	-13.00	-37.71	1.79 H	218	54.77	-105.48
4	285.11	-51.94	-13.00	-38.94	2.31 H	260	50.45	-102.39
5	747.80	-49.50	-13.00	-36.50	1.18 H	91	43.49	-92.99
6	875.84	-48.99	-13.00	-35.99	2.05 H	79	41.36	-90.35

Remarks:

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

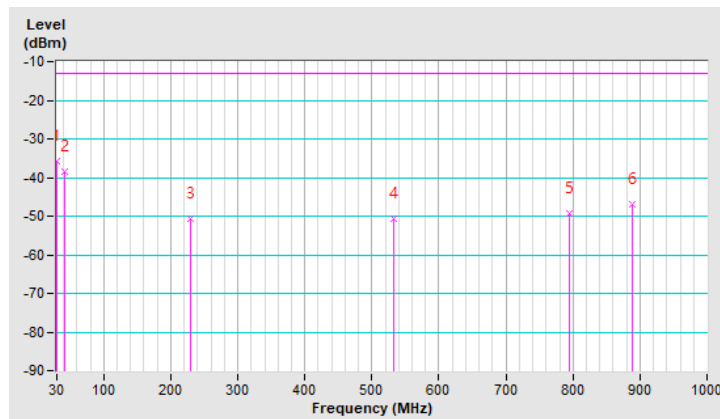


RF Mode	TX LTE Band IV-20MHz	Channel	CH 20050 : 1720 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.00	-35.87	-13.00	-22.87	1.08 V	358	69.61	-105.48
2	42.61	-38.62	-13.00	-25.62	1.65 V	322	65.92	-104.54
3	228.85	-50.67	-13.00	-37.67	1.87 V	279	55.22	-105.89
4	532.46	-50.66	-13.00	-37.66	2.25 V	305	46.32	-96.98
5	795.33	-49.43	-13.00	-36.43	1.64 V	276	42.39	-91.82
6	888.45	-46.91	-13.00	-33.91	1.09 V	30	43.21	-90.12

Remarks:

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



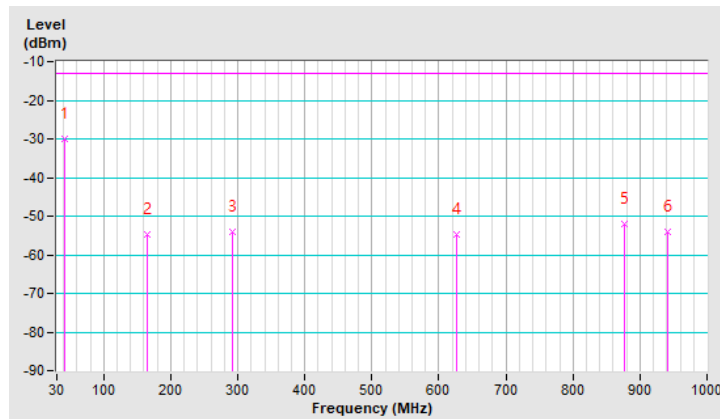
LTE Band 12, Channel Bandwidth: 1.4 MHz

RF Mode	TX LTE Band XII-1.4MHz	Channel	CH 23095 : 707.5 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	41.64	-29.91	-13.00	-16.91	1.43 H	265	76.79	-106.70
2	165.80	-54.75	-13.00	-41.75	1.26 H	1	51.37	-106.12
3	292.87	-54.12	-13.00	-41.12	1.78 H	259	50.21	-104.33
4	625.58	-54.86	-13.00	-41.86	2.25 H	222	42.27	-97.13
5	875.84	-52.10	-13.00	-39.10	1.63 H	85	40.40	-92.50
6	940.83	-53.99	-13.00	-40.99	1.47 H	15	37.12	-91.11

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit.

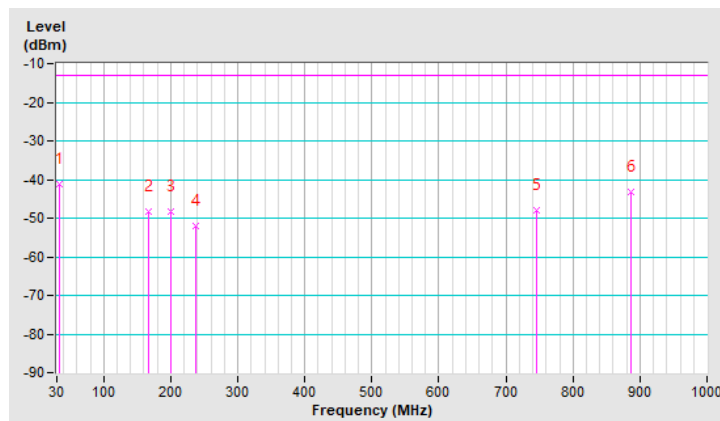


RF Mode	TX LTE Band XII- 1.4MHz	Channel	CH 23095 : 707.5 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	33.88	-41.20	-13.00	-28.20	1.02 V	236	66.25	-107.45
2	166.77	-48.43	-13.00	-35.43	1.14 V	236	57.67	-106.10
3	199.75	-48.45	-13.00	-35.45	1.98 V	236	60.36	-108.81
4	237.58	-52.15	-13.00	-39.15	2.35 V	285	54.70	-106.85
5	745.86	-47.91	-13.00	-34.91	2.20 V	89	47.28	-95.19
6	886.51	-43.18	-13.00	-30.18	1.42 V	15	49.17	-92.35

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



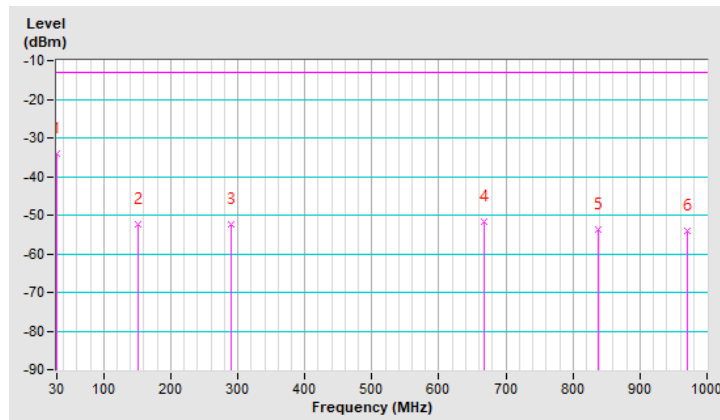
LTE Band 13, Channel Bandwidth: 5 MHz

RF Mode	TX LTE Band XIII-5MHz	Channel	CH 23255 : 784.5 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.00	-34.22	-13.00	-21.22	1.64 H	88	73.41	-107.63
2	150.28	-52.36	-13.00	-39.36	2.24 H	199	53.67	-106.03
3	290.93	-52.37	-13.00	-39.37	3.05 H	272	52.01	-104.38
4	667.29	-51.74	-13.00	-38.74	1.71 H	295	44.93	-96.67
5	837.04	-53.85	-13.00	-40.85	2.63 H	91	39.47	-93.32
6	969.93	-54.05	-13.00	-41.05	1.05 H	130	36.75	-90.80

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

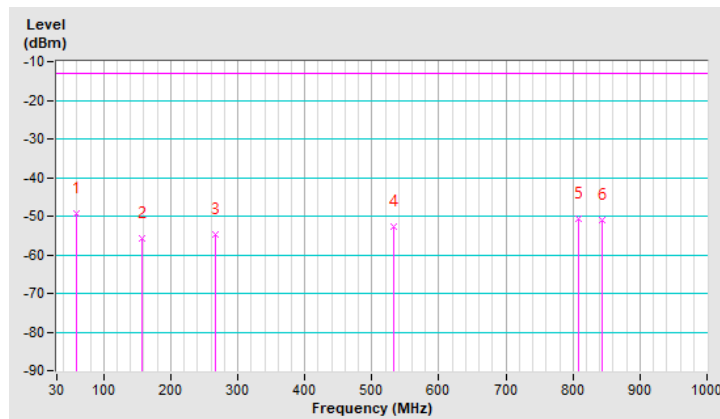


RF Mode	TX LTE Band XIII-5MHz	Channel	CH 23255 : 784.5 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	59.10	-49.34	-13.00	-36.34	1.13 V	350	57.45	-106.79
2	158.04	-55.84	-13.00	-42.84	2.45 V	209	50.09	-105.93
3	265.71	-54.90	-13.00	-41.90	1.87 V	314	50.51	-105.41
4	532.46	-52.74	-13.00	-39.74	1.93 V	314	46.39	-99.13
5	807.94	-50.69	-13.00	-37.69	2.46 V	258	43.24	-93.93
6	843.83	-50.99	-13.00	-37.99	3.33 V	268	42.19	-93.18

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



Above 1GHz

LTE Band 4, Channel Bandwidth: 1.4 MHz

RF Mode	TX LTE Band IV-1.4MHz	Channel	CH 19957 : 1710.7 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3421.40	-31.84	-13.00	-18.84	1.50 H	22	61.36	-93.20
2	6742.80	-28.82	-13.00	-15.82	1.34 H	79	55.92	-84.74
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3421.40	-31.72	-13.00	-18.72	1.52 V	340	61.48	-93.20
2	6842.80	-26.82	-13.00	-13.82	1.53 V	360	57.64	-84.46

Remarks:

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

RF Mode	TX LTE Band IV-1.4MHz	Channel	CH 20175 : 1732.5 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3465.00	-30.44	-13.00	-17.44	1.44 H	7	62.43	-92.87
2	6930.00	-32.66	-13.00	-19.66	1.27 H	80	51.69	-84.35
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3465.00	-31.04	-13.00	-18.04	1.25 V	41	61.83	-92.87
2	6930.00	-31.52	-13.00	-18.52	1.23 V	8	52.83	-84.35

Remarks:

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

RF Mode	TX LTE Band IV-1.4MHz	Channel	CH 20393 : 1754.3 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3508.60	-31.22	-13.00	-18.22	1.34 H	23	61.29	-92.51
2	7017.20	-32.31	-13.00	-19.31	1.29 H	95	51.38	-83.69
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3508.60	-31.71	-13.00	-18.71	1.17 V	44	60.80	-92.51
2	7017.20	-32.00	-13.00	-19.00	1.46 V	8	51.69	-83.69

Remarks:

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

LTE Band 4, Channel Bandwidth: 5 MHz

RF Mode	TX LTE Band IV-5MHz	Channel	CH 19975 : 1712.5 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3425.00	-30.43	-13.00	-17.43	1.09 H	1	62.74	-93.17
2	6850.00	-29.84	-13.00	-16.84	1.18 H	16	54.60	-84.44
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3425.00	-31.02	-13.00	-18.02	1.37 V	43	62.15	-93.17
2	6850.00	-27.71	-13.00	-14.71	1.38 V	47	56.73	-84.44

Remarks:

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

RF Mode	TX LTE Band IV-5MHz	Channel	CH 20175 : 1732.5 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3465.00	-30.94	-13.00	-17.94	1.02 H	5	61.93	-92.87
2	6930.00	-32.16	-13.00	-19.16	1.24 H	82	52.19	-84.35
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3465.00	-31.63	-13.00	-18.63	1.10 V	51	61.24	-92.87
2	6930.00	-31.39	-13.00	-18.39	1.43 V	10	52.96	-84.35

Remarks:

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

RF Mode	TX LTE Band IV-5MHz	Channel	CH 20375 : 1752.5 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3505.00	-32.00	-13.00	-19.00	1.06 H	12	60.54	-92.54
2	7010.00	-32.51	-13.00	-19.51	1.21 H	81	51.23	-83.74
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3505.00	-32.90	-13.00	-19.90	1.36 V	56	59.64	-92.54
2	7010.00	-34.16	-13.00	-21.16	1.26 V	33	49.58	-83.74

Remarks:

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

LTE Band 4, Channel Bandwidth: 20 MHz

RF Mode	TX LTE Band IV-20MHz	Channel	CH 20050 : 1720 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3440.00	-31.54	-13.00	-18.54	1.06 H	9	61.54	-93.08
2	6880.00	-29.94	-13.00	-16.94	1.42 H	4	54.45	-84.39
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3440.00	-31.70	-13.00	-18.70	1.53 V	29	61.38	-93.08
2	6880.00	-26.26	-13.00	-13.26	1.64 V	10	58.13	-84.39

Remarks:

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

RF Mode	TX LTE Band IV-20MHz	Channel	CH 20175 : 1732.5 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3465.00	-31.28	-13.00	-18.28	1.03 H	5	61.59	-92.87
2	6930.00	-30.12	-13.00	-17.12	1.22 H	81	54.23	-84.35
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3465.00	-31.24	-13.00	-18.24	1.77 V	26	61.63	-92.87
2	6930.00	-28.77	-13.00	-15.77	1.49 V	9	55.58	-84.35

Remarks:

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

RF Mode	TX LTE Band IV-20MHz	Channel	CH 20300 : 1745 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3490.00	-30.99	-13.00	-17.99	1.02 H	3	61.67	-92.66
2	6980.00	-34.31	-13.00	-21.31	1.21 H	79	49.71	-84.02
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3490.00	-30.98	-13.00	-17.98	1.23 V	43	61.68	-92.66
2	6980.00	-33.62	-13.00	-20.62	1.21 V	7	50.40	-84.02

Remarks:

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

LTE Band 12, Channel Bandwidth: 1.4 MHz

RF Mode	TX LTE Band XII-1.4MHz	Channel	CH 23017 : 699.7 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1399.40	-35.98	-13.00	-22.98	1.96 H	359	65.62	-101.60
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1399.40	-41.10	-13.00	-28.10	1.05 V	329	60.50	-101.60

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

RF Mode	TX LTE Band XII- 1.4MHz	Channel	CH 23095 : 707.5 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1415.00	-35.56	-13.00	-22.56	2.44 H	356	66.07	-101.63
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1415.00	-40.66	-13.00	-27.66	1.13 V	330	60.97	-101.63

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

RF Mode	TX LTE Band XII- 1.4MHz	Channel	CH 23173 : 715.3 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1430.60	-38.24	-13.00	-25.24	1.87 H	353	63.43	-101.67
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1430.60	-43.40	-13.00	-30.40	1.08 V	315	58.27	-101.67

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

LTE Band 12, Channel Bandwidth: 5 MHz

RF Mode	TX LTE Band XII-5MHz	Channel	CH 23035 : 701.5 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1403.00	-37.29	-13.00	-24.29	1.93 H	358	64.32	-101.61
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1403.00	-42.08	-13.00	-29.08	1.30 V	219	59.53	-101.61

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

RF Mode	TX LTE Band XII-5MHz	Channel	CH 23095 : 707.5 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1415.00	-36.78	-13.00	-23.78	1.91 H	349	64.85	-101.63
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1415.00	-40.29	-13.00	-27.29	1.46 V	216	61.34	-101.63

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

RF Mode	TX LTE Band XII-5MHz	Channel	CH 23155 : 713.5 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1427.00	-36.74	-13.00	-23.74	2.03 H	334	64.91	-101.65
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1427.00	-40.24	-13.00	-27.24	1.55 V	212	61.41	-101.65

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

LTE Band 12, Channel Bandwidth: 10 MHz

RF Mode	TX LTE Band XII-10MHz	Channel	CH 23060 : 704 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1408.00	-36.79	-13.00	-23.79	1.92 H	341	64.82	-101.61
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1408.00	-40.44	-13.00	-27.44	1.62 V	214	61.17	-101.61

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

RF Mode	TX LTE Band XII-10MHz	Channel	CH 23095 : 707.5 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1415.00	-37.06	-13.00	-24.06	1.96 H	357	64.57	-101.63
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1415.00	-40.40	-13.00	-27.40	1.60 V	221	61.23	-101.63

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

RF Mode	TX LTE Band XII-10MHz	Channel	CH 23130 : 711 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1422.00	-37.18	-13.00	-24.18	1.86 H	355	64.46	-101.64
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1422.00	-41.30	-13.00	-28.30	1.61 V	215	60.34	-101.64

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

LTE Band 13, Channel Bandwidth: 5 MHz

RF Mode	TX LTE Band XIII-5MHz	Channel	CH 23205 : 779.5 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1559.00	-42.95	-40.00	-2.95	1.27 H	172	56.87	-99.82
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1559.00	-43.96	-40.00	-3.96	1.35 V	15	55.86	-99.82

Remarks:

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

RF Mode	TX LTE Band XIII-5MHz	Channel	CH 23230 : 782 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1564.00	-42.20	-40.00	-2.20	1.18 H	159	57.64	-99.84
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1564.00	-43.06	-40.00	-3.06	1.40 V	9	56.78	-99.84

Remarks:

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

RF Mode	TX LTE Band XIII-5MHz	Channel	CH 23255 : 784.5 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1569.00	-42.19	-40.00	-2.19	1.23 H	146	57.66	-99.85
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1569.00	-43.84	-40.00	-3.84	1.41 V	12	56.01	-99.85

Remarks:

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

LTE Band 13, Channel Bandwidth: 10 MHz

RF Mode	TX LTE Band XIII-10MHz	Channel	CH 23230 : 782 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1564.00	-42.22	-40.00	-2.22	1.35 H	164	57.62	-99.84
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1564.00	-43.57	-40.00	-3.57	1.37 V	21	56.27	-99.84

Remarks:

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

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.

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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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