

Variant FCC Test Report

(PART 27)

Report No.: RF170817C03A

FCC ID: NKR-LMA12Q7

Test Model: UMC-A12Q7-R

Received Date: Apr. 22, 2019

Test Date: Apr. 29, 2019 ~ Apr. 30, 2019

Issued Date: May 09, 2019

Applicant: Wistron Neweb Corporation

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

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(R.O.C)

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33383, Taiwan (R.O.C)

**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF170817C03A	Original Release	May 09, 2019

1 Certificate of Conformity

Product: LTE CAT M1 module

Brand: WNC

Test Model: UMC-A12Q7-R

Sample Status: Identical Prototype

Applicant: Wistron Neweb Corporation

Test Date: Apr. 29, 2019 ~ Apr. 30, 2019

Standards: FCC Part 27, Subpart 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 : Rona Chen, **Date:** May 09, 2019
Rona Chen / Specialist

Approved by : Dylan Chiou, **Date:** May 09, 2019
Dylan Chiou / 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)(4)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -32.19 dB at 3440.00 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 Agilent	N9038A	MY51210203	Mar. 18, 2019	Mar. 17, 2020
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 13, 2018	Dec. 12, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	100115	Jan. 21, 2019	Jan. 20, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSW26	102023	Oct. 11, 2018	Oct. 10, 2019
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 25, 2018	Nov. 24, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Nov. 23, 2018	Nov. 22, 2019
Horn Antenna SCHWARZBECK	BBHA 9170	148	Nov. 25, 2018	Nov. 24, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 19, 2018	Nov. 18, 2019
Preamplifier EMCI	EMC 012645	980115	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 184045	980116	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 330H	980112	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-800 0&3000	140811+170717	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM- 1000(140807)	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 12, 2018	Oct. 11, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Radio Communication Analyzer ANRITSU	MT8821C	6261786083	Dec. 11, 2018	Dec. 10, 2019
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 05, 2018	Sep. 04, 2019
DC Power Supply Topward	33010D	807748	NA	NA

- Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 10.
 3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
 4. The IC Site Registration No. is 7450F-10.

3 General Information

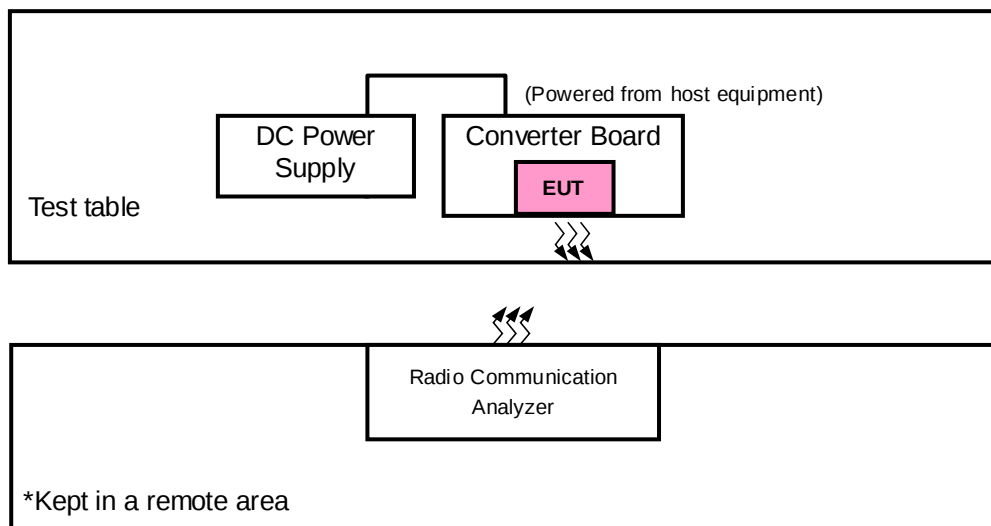
3.1 General Description of EUT

Product	LTE CAT M1 module	
Brand	WNC	
Test Model	UMC-A12Q7-R	
Status of EUT	Identical Prototype	
Power Supply Rating	3.8 Vdc (host equipment)	
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
Emission Designator	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1M09G7D
	LTE Band 4 (Channel Bandwidth: 3 MHz)	1M09G7D
	LTE Band 4 (Channel Bandwidth: 5 MHz)	1M10G7D
	LTE Band 4 (Channel Bandwidth: 10 MHz)	1M09G7D
	LTE Band 4 (Channel Bandwidth: 15 MHz)	1M10G7D
	LTE Band 4 (Channel Bandwidth: 20 MHz)	1M09G7D
Max. EIRP Power	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	202.77 mW
	LTE Band 4 (Channel Bandwidth: 3 MHz)	214.29 mW
	LTE Band 4 (Channel Bandwidth: 5 MHz)	224.91 mW
	LTE Band 4 (Channel Bandwidth: 10 MHz)	241.55 mW
	LTE Band 4 (Channel Bandwidth: 15 MHz)	260.62 mW
	LTE Band 4 (Channel Bandwidth: 20 MHz)	277.33 mW
Antenna Type	Fixed External Antenna with 2 dBi gain	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

1. This report is issued as a supplementary report to BV CPS report no. RF170817C03. The difference compared with original report is enabling LTE Band 4. Therefore, the EUT is re-tested in this report.
2. 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



3.2.1 Description of Support Units

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

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Power Supply	N/A	N/A	N/A	N/A
2.	Converter Board	N/A	N/A	N/A	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A
2.	N/A

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, XZ axis, and antenna ports

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

Band	ERP / EIRP	Radiated Emission
LTE Band 4	Z-plane	Z-axis

LTE Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Modulation Characteristics	20050 to 20300	20175	20 MHz	QPSK	6 RB / 0 RB Offset
					16QAM	5 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
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Band Edge	19957 to 20393	19957	1.4 MHz	QPSK	1 RB / 0 RB Offset
			20393	1.4 MHz	QPSK	6 RB / 0 RB Offset
		19965 to 20385	19965	3 MHz	QPSK	1 RB / 5 RB Offset
			20385	3 MHz	QPSK	6 RB / 0 RB Offset
		19975 to 20375	19975	5 MHz	QPSK	1 RB / 0 RB Offset
			20375	5 MHz	QPSK	15 RB / 0 RB Offset
		20000 to 20350	20000	10 MHz	QPSK	1 RB / 14 RB Offset
			20350	10 MHz	QPSK	15 RB / 0 RB Offset
		20025 to 20325	20025	15 MHz	QPSK	1 RB / 0 RB Offset
			20325	15 MHz	QPSK	25 RB / 0 RB Offset
		20050 to 20300	20050	20 MHz	QPSK	1 RB / 24 RB Offset
			20300	20 MHz	QPSK	25 RB / 0 RB Offset
		19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK	1 RB / 0 RB Offset
			19965, 20175, 20385	3 MHz	QPSK	50 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK	1 RB / 49 RB Offset
			19975, 20175, 20375	5 MHz	QPSK	50 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK	1 RB / 0 RB Offset
			20000, 20175, 20350	10 MHz	QPSK	75 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK	1 RB / 74 RB Offset
			20025, 20175, 20325	15 MHz	QPSK	75 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK	1 RB / 0 RB Offset
			20050, 20175, 20300	20 MHz	QPSK	100 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1 RB / 99 RB Offset
			20050, 20175, 20300	20 MHz	QPSK	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
-	Radiated Emission	20000 to 20350	20000, 20175, 20350	10 MHz	QPSK	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1 RB / 0 RB Offset

Note:

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

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP / EIRP	25 deg. C, 65 % RH	3.8 Vdc	Thomas Wei
Modulation Characteristics	25 deg. C, 65 % RH	3.8 Vdc	Getaz Yang
Frequency Stability	25 deg. C, 65 % RH	3.8 Vdc	Getaz Yang
Occupied Bandwidth	25 deg. C, 65 % RH	3.8 Vdc	Getaz Yang
Band Edge	25 deg. C, 65 % RH	3.8 Vdc	Getaz Yang
Peak to Average Ratio	25 deg. C, 65 % RH	3.8 Vdc	Getaz Yang
Conducted Emission	25 deg. C, 65 % RH	3.8 Vdc	Getaz Yang
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Thomas Wei

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

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

FCC 47 CFR Part 2

FCC 47 CFR Part 27

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

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

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

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

4.1.2 Test Procedures

EIRP / ERP Measurement:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 10 MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step b. Record the power level of S.G.
- d. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$.

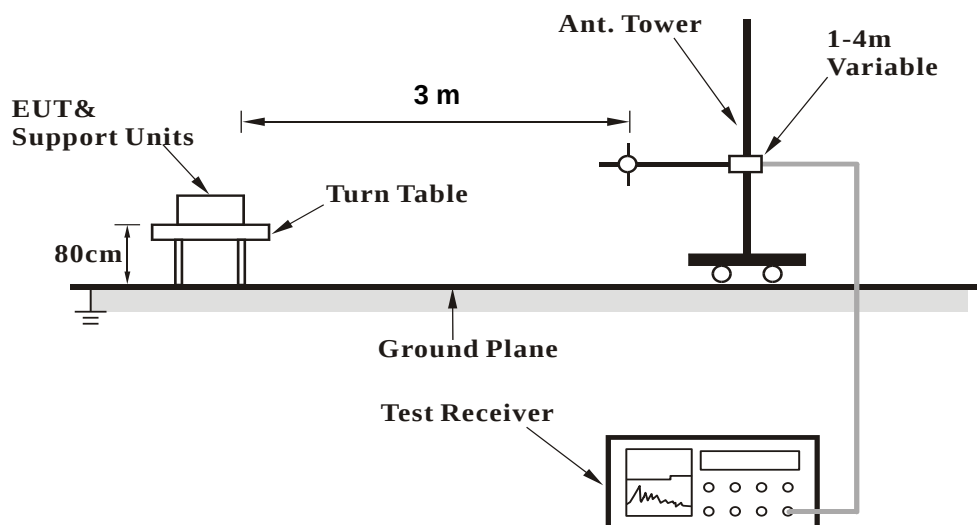
Conducted Power Measurement:

- 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.

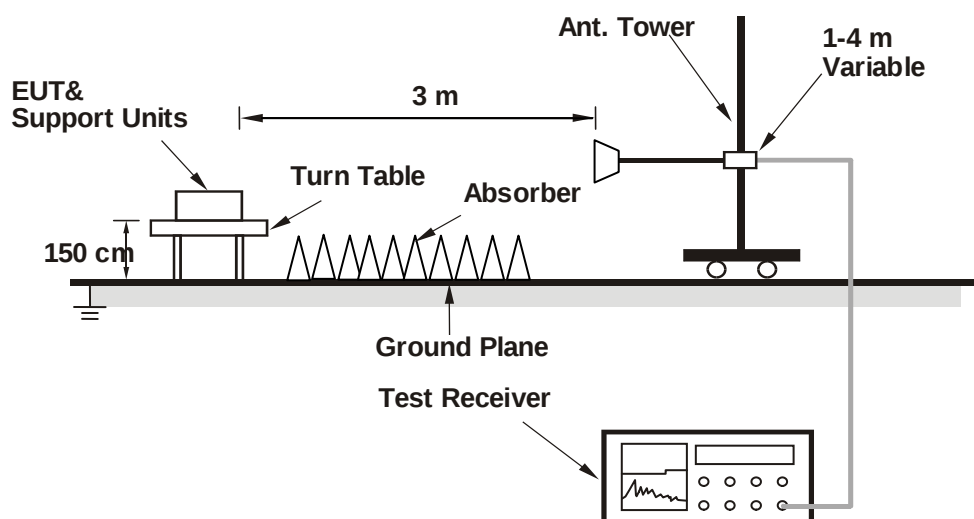
4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



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

Conducted Power Measurement:



4.1.4 Test Results

Conducted Output Power (dBm)

LTE Band 4

BW (MHz): 1.4

Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	19957	1710.7	1957	2110.7	QPSK	1	0	0	-85	22.69
					QPSK	1	5	0	-85	21.67
					QPSK	3	3	0	-85	21.82
					QPSK	6	0	0	-85	21.77
					16QAM	1	0	0	-85	21.89
					16QAM	1	5	0	-85	21.87
					16QAM	3	0	0	-85	21.62
					16QAM	5	0	0	-85	22.33
Mid Range	20175	1732.5	2175	2132.5	QPSK	1	0	0	-85	21.74
					QPSK	1	5	0	-85	21.83
					QPSK	3	3	0	-85	21.78
					QPSK	6	0	0	-85	21.55
					16QAM	1	0	0	-85	21.99
					16QAM	1	5	0	-85	21.94
					16QAM	3	0	0	-85	22.24
					16QAM	5	0	0	-85	22.17
High Range	20393	1754.3	2393	2154.3	QPSK	1	0	0	-85	22.43
					QPSK	1	5	0	-85	21.94
					QPSK	3	3	0	-85	22.24
					QPSK	6	0	0	-85	21.91
					16QAM	1	0	0	-85	21.78
					16QAM	1	5	0	-85	21.90
					16QAM	3	0	0	-85	21.80
					16QAM	5	0	0	-85	21.70

BW (MHz): 3

Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	19965	1711.5	1965	2111.5	QPSK	1	0	0	-85	22.77
					QPSK	1	5	0	-85	21.78
					QPSK	1	0	1	-85	21.97
					QPSK	1	5	1	-85	22.05
					QPSK	3	3	0	-85	21.94
					QPSK	3	3	1	-85	21.99
					QPSK	6	0	0	-85	21.75
					QPSK	6	0	1	-85	22.29
					16QAM	1	0	0	-85	21.83
					16QAM	1	5	0	-85	21.97
					16QAM	1	0	1	-85	22.03
					16QAM	1	5	1	-85	21.66
					16QAM	3	0	0	-85	22.08
					16QAM	3	3	1	-85	22.12
					16QAM	5	0	0	-85	22.36
					16QAM	5	0	1	-85	22.39
Mid Range	20175	1732.5	2175	2132.5	QPSK	1	0	0	-85	22.00
					QPSK	1	5	0	-85	22.55
					QPSK	1	0	1	-85	22.09
					QPSK	1	5	1	-85	22.31
					QPSK	3	3	0	-85	22.11
					QPSK	3	3	1	-85	21.91
					QPSK	6	0	0	-85	22.03
					QPSK	6	0	1	-85	22.00
					16QAM	1	0	0	-85	21.85
					16QAM	1	5	0	-85	21.84
					16QAM	1	0	1	-85	21.97
					16QAM	1	5	1	-85	21.78
					16QAM	3	0	0	-85	22.01
					16QAM	3	3	1	-85	21.96
					16QAM	5	0	0	-85	22.17
					16QAM	5	0	1	-85	22.23
High Range	20385	1753.5	2385	2153.5	QPSK	1	0	0	-85	21.99
					QPSK	1	5	0	-85	22.02
					QPSK	1	0	1	-85	21.98
					QPSK	1	5	1	-85	22.47
					QPSK	3	3	0	-85	22.13
					QPSK	3	3	1	-85	22.16
					QPSK	6	0	0	-85	22.09
					QPSK	6	0	1	-85	22.12
					16QAM	1	0	0	-85	22.13
					16QAM	1	5	0	-85	21.96
					16QAM	1	0	1	-85	21.86
					16QAM	1	5	1	-85	21.75
					16QAM	3	0	0	-85	21.77
					16QAM	3	3	1	-85	21.62
					16QAM	5	0	0	-85	22.21
					16QAM	5	0	1	-85	21.69

BW (MHz): 5

Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	19975	1712.5	1975	2112.5	QPSK	1	0	0	-85	22.87
					QPSK	1	5	0	-85	21.95
					QPSK	1	0	1	-85	22.09
					QPSK	1	5	1	-85	22.08
					QPSK	1	0	3	-85	22.14
					QPSK	1	5	3	-85	22.14
					QPSK	3	0	0	-85	21.78
					QPSK	3	3	3	-85	22.41
					QPSK	6	0	0	-85	21.98
					QPSK	6	0	1	-85	22.09
					QPSK	6	0	3	-85	22.04
					16QAM	1	0	0	-85	21.83
					16QAM	1	5	0	-85	22.23
					16QAM	1	0	1	-85	22.17
					16QAM	1	5	1	-85	22.49
					16QAM	1	0	3	-85	22.41
					16QAM	1	5	3	-85	22.06
					16QAM	3	0	0	-85	22.74
					16QAM	3	3	3	-85	22.22
					16QAM	5	0	0	-85	22.44
					16QAM	5	0	1	-85	22.21
					16QAM	5	0	3	-85	22.09
Mid Range	20175	1732.5	2175	2132.5	QPSK	1	0	0	-85	22.13
					QPSK	1	5	0	-85	22.17
					QPSK	1	0	1	-85	21.90
					QPSK	1	5	1	-85	22.01
					QPSK	1	0	3	-85	22.12
					QPSK	1	5	3	-85	21.93
					QPSK	3	0	0	-85	22.08
					QPSK	3	3	3	-85	22.05
					QPSK	6	0	0	-85	22.25
					QPSK	6	0	1	-85	22.44
					QPSK	6	0	3	-85	22.21
					16QAM	1	0	0	-85	22.19
					16QAM	1	5	0	-85	22.02
					16QAM	1	0	1	-85	22.14
					16QAM	1	5	1	-85	22.70
					16QAM	1	0	3	-85	22.28
					16QAM	1	5	3	-85	22.33
					16QAM	3	0	0	-85	22.17
					16QAM	3	3	3	-85	22.33
					16QAM	5	0	0	-85	22.26
					16QAM	5	0	1	-85	22.16
					16QAM	5	0	3	-85	22.02

Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
High Range	20375	1752.5	2375	2152.5	QPSK	1	0	0	-85	21.76
					QPSK	1	5	0	-85	21.74
					QPSK	1	0	1	-85	22.26
					QPSK	1	5	1	-85	21.73
					QPSK	1	0	3	-85	22.18
					QPSK	1	5	3	-85	21.77
					QPSK	3	0	0	-85	22.16
					QPSK	3	3	3	-85	22.16
					QPSK	6	0	0	-85	22.18
					QPSK	6	0	1	-85	22.14
					QPSK	6	0	3	-85	21.98
					16QAM	1	0	0	-85	21.85
					16QAM	1	5	0	-85	22.34
					16QAM	1	0	1	-85	21.91
					16QAM	1	5	1	-85	22.41
					16QAM	1	0	3	-85	21.93
					16QAM	1	5	3	-85	22.17
					16QAM	3	0	0	-85	22.31
					16QAM	3	3	3	-85	22.41
					16QAM	5	0	0	-85	22.21
					16QAM	5	0	1	-85	22.10
					16QAM	5	0	3	-85	22.03

BW (MHz): 10

Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	20000	1715	2000	2115	QPSK	1	0	0	-85	22.99
					QPSK	1	5	0	-85	22.05
					QPSK	1	0	3	-85	22.20
					QPSK	1	5	3	-85	22.29
					QPSK	1	0	7	-85	22.23
					QPSK	1	5	7	-85	22.14
					QPSK	4	0	0	-85	21.98
					QPSK	4	2	7	-85	22.57
					QPSK	6	0	0	-85	22.10
					QPSK	6	0	7	-85	22.24
					16QAM	1	0	0	-85	22.23
					16QAM	1	5	0	-85	21.90
					16QAM	1	0	3	-85	22.36
					16QAM	1	5	3	-85	22.27
					16QAM	1	0	7	-85	22.52
					16QAM	1	5	7	-85	22.61
					16QAM	4	2	0	-85	22.20
					16QAM	4	2	7	-85	22.84
					16QAM	5	0	0	-85	22.31
					16QAM	5	0	7	-85	22.62
Mid Range	20175	1732.5	2175	2132.5	QPSK	1	0	0	-85	22.33
					QPSK	1	5	0	-85	22.19
					QPSK	1	0	3	-85	22.30
					QPSK	1	5	3	-85	22.21
					QPSK	1	0	7	-85	22.08
					QPSK	1	5	7	-85	22.11
					QPSK	4	0	0	-85	22.30
					QPSK	4	2	7	-85	21.95
					QPSK	6	0	0	-85	22.18
					QPSK	6	0	7	-85	22.17
					16QAM	1	0	0	-85	22.49
					16QAM	1	5	0	-85	22.51
					16QAM	1	0	3	-85	22.33
					16QAM	1	5	3	-85	22.36
					16QAM	1	0	7	-85	22.21
					16QAM	1	5	7	-85	22.22
					16QAM	4	2	0	-85	22.82
					16QAM	4	2	7	-85	22.48
					16QAM	5	0	0	-85	22.51
					16QAM	5	0	7	-85	22.29
High Range	20350	1750	2350	2150	QPSK	1	0	0	-85	22.45
					QPSK	1	5	0	-85	22.25
					QPSK	1	5	7	-85	22.14
					QPSK	1	0	3	-85	22.12
					QPSK	1	5	3	-85	21.90
					QPSK	1	0	7	-85	21.86
					QPSK	4	0	0	-85	22.48
					QPSK	4	2	7	-85	21.87
					QPSK	6	0	0	-85	22.35
					QPSK	6	0	7	-85	21.84
					16QAM	1	0	0	-85	22.30
					16QAM	1	5	0	-85	22.19
					16QAM	1	0	3	-85	22.27
					16QAM	1	5	3	-85	22.29
					16QAM	1	0	7	-85	22.01
					16QAM	1	5	7	-85	21.86
					16QAM	4	2	0	-85	22.42
					16QAM	4	2	7	-85	21.98
					16QAM	5	0	0	-85	22.48
					16QAM	5	0	7	-85	22.11

BW (MHz): 15

Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	20025	1717.5	2025	2117.5	QPSK	1	0	0	-85	23.01
					QPSK	1	5	0	-85	22.19
					QPSK	1	0	5	-85	22.29
					QPSK	1	5	5	-85	22.36
					QPSK	1	0	11	-85	22.38
					QPSK	1	5	11	-85	22.36
					QPSK	3	0	0	-85	22.07
					QPSK	3	3	11	-85	22.68
					QPSK	6	0	0	-85	22.24
					QPSK	6	0	11	-85	22.40
					16QAM	1	0	0	-85	22.31
					16QAM	1	5	0	-85	22.03
					16QAM	1	0	5	-85	22.45
					16QAM	1	5	5	-85	22.43
					16QAM	1	0	11	-85	22.64
					16QAM	1	5	11	-85	22.69
					16QAM	3	0	0	-85	22.30
					16QAM	3	3	11	-85	23.00
					16QAM	5	0	0	-85	22.45
					16QAM	5	0	11	-85	22.70
Mid Range	20175	1732.5	2175	2132.5	QPSK	1	0	0	-85	22.48
					QPSK	1	5	0	-85	22.30
					QPSK	1	0	5	-85	22.41
					QPSK	1	5	5	-85	22.36
					QPSK	1	0	11	-85	22.16
					QPSK	1	5	11	-85	22.27
					QPSK	3	0	0	-85	22.42
					QPSK	3	3	11	-85	22.11
					QPSK	6	0	0	-85	22.31
					QPSK	6	0	11	-85	22.26
					16QAM	1	0	0	-85	22.58
					16QAM	1	5	0	-85	22.64
					16QAM	1	0	5	-85	22.45
					16QAM	1	5	5	-85	22.45
					16QAM	1	0	11	-85	22.34
					16QAM	1	5	11	-85	22.40
					16QAM	3	0	0	-85	22.92
					16QAM	3	3	11	-85	22.56
					16QAM	5	0	0	-85	22.61
					16QAM	5	0	11	-85	22.41
High Range	20325	1747.5	2325	2147.5	QPSK	1	0	0	-85	22.53
					QPSK	1	5	11	-85	22.38
					QPSK	1	0	5	-85	22.23
					QPSK	1	5	5	-85	22.22
					QPSK	1	0	11	-85	22.00
					QPSK	1	5	11	-85	21.98
					QPSK	3	0	0	-85	22.58
					QPSK	3	3	11	-85	22.04
					QPSK	6	0	0	-85	22.42
					QPSK	6	0	11	-85	22.01
					16QAM	1	0	0	-85	22.43
					16QAM	1	5	0	-85	22.38
					16QAM	1	0	5	-85	22.41
					16QAM	1	5	5	-85	22.36
					16QAM	1	0	11	-85	22.18
					16QAM	1	5	11	-85	22.00
					16QAM	3	0	0	-85	22.58
					16QAM	3	3	11	-85	22.14
					16QAM	5	0	0	-85	22.66
					16QAM	5	0	11	-85	22.25

BW (MHz): 20

Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset t	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	20050	1720	2050	2120	QPSK	1	0	0	-85	23.21
					QPSK	1	5	0	-85	22.31
					QPSK	1	0	7	-85	22.44
					QPSK	1	5	7	-85	22.51
					QPSK	1	0	15	-85	22.47
					QPSK	1	5	15	-85	22.45
					QPSK	3	0	0	-85	22.18
					QPSK	3	3	15	-85	22.84
					QPSK	6	0	0	-85	22.37
					QPSK	6	0	15	-85	22.51
					16QAM	1	0	0	-85	22.45
					16QAM	1	5	0	-85	22.15
					16QAM	1	0	7	-85	22.61
					16QAM	1	5	7	-85	22.57
					16QAM	1	0	15	-85	22.78
					16QAM	1	5	15	-85	22.80
					16QAM	3	0	0	-85	22.42
					16QAM	3	3	15	-85	23.11
					16QAM	5	0	0	-85	22.56
					16QAM	5	0	15	-85	22.83
Mid Range	20175	1732.5	2175	2132.5	QPSK	1	0	0	-85	22.59
					QPSK	1	5	0	-85	22.44
					QPSK	1	0	7	-85	22.55
					QPSK	1	5	7	-85	22.51
					QPSK	1	0	15	-85	22.31
					QPSK	1	5	15	-85	22.37
					QPSK	3	0	0	-85	22.51
					QPSK	3	3	15	-85	22.27
					QPSK	6	0	0	-85	22.47
					QPSK	6	0	15	-85	22.42
					16QAM	1	0	0	-85	22.71
					16QAM	1	5	0	-85	22.75
					16QAM	1	0	7	-85	22.58
					16QAM	1	5	7	-85	22.60
					16QAM	1	0	15	-85	22.47
					16QAM	1	5	15	-85	22.52
					16QAM	3	0	0	-85	23.01
					16QAM	3	3	15	-85	22.69
					16QAM	5	0	0	-85	22.72
					16QAM	5	0	15	-85	22.53
High Range	20300	1745	2300	2145	QPSK	1	0	0	-85	22.66
					QPSK	1	5	0	-85	22.51
					QPSK	1	0	7	-85	22.39
					QPSK	1	5	7	-85	22.32
					QPSK	1	0	15	-85	22.15
					QPSK	1	5	15	-85	22.12
					QPSK	3	0	0	-85	22.67
					QPSK	3	3	15	-85	22.14
					QPSK	6	0	0	-85	22.58
					QPSK	6	0	15	-85	22.13
					16QAM	1	0	0	-85	22.52
					16QAM	1	5	0	-85	22.51
					16QAM	1	0	7	-85	22.54
					16QAM	1	5	7	-85	22.51
					16QAM	1	0	15	-85	22.31
					16QAM	1	5	15	-85	22.15
					16QAM	3	0	0	-85	22.68
					16QAM	3	3	15	-85	22.26
					16QAM	5	0	0	-85	22.77
					16QAM	5	0	15	-85	22.36

EIRP Power (dBm)

LTE Band 4							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	19957	1710.7	-13.74	36.45	22.71	186.64	H
	20175	1732.5	-13.73	36.80	23.07	202.77	
	20393	1754.3	-14.08	36.94	22.86	193.20	
	19957	1710.7	-18.71	37.28	18.57	71.94	V
	20175	1732.5	-18.24	37.63	19.39	86.90	
	20393	1754.3	-18.84	37.64	18.80	75.86	
Channel Bandwidth: 1.4 MHz / 16QAM							
Z	19957	1710.7	-14.66	36.45	21.79	151.01	H
	20175	1732.5	-14.60	36.80	22.20	165.96	
	20393	1754.3	-14.86	36.94	22.08	161.44	
	19957	1710.7	-19.86	37.28	17.42	55.21	V
	20175	1732.5	-19.39	37.63	18.24	66.68	
	20393	1754.3	-19.79	37.64	17.85	60.95	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	19965	1711.5	-13.54	36.45	22.91	195.43	H
	20175	1732.5	-13.49	36.80	23.31	214.29	
	20385	1753.5	-13.87	36.94	23.07	202.77	
	19965	1711.5	-18.43	37.28	18.85	76.74	V
	20175	1732.5	-18.00	37.63	19.63	91.83	
	20385	1753.5	-18.51	37.64	19.13	81.85	
Channel Bandwidth: 3 MHz / 16QAM							
Z	19965	1711.5	-14.46	36.45	21.99	158.12	H
	20175	1732.5	-14.38	36.80	22.42	174.58	
	20385	1753.5	-14.61	36.94	22.33	171.00	
	19965	1711.5	-19.55	37.28	17.73	59.29	V
	20175	1732.5	-19.19	37.63	18.44	69.82	
	20385	1753.5	-19.49	37.64	18.15	65.31	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	19975	1712.5	-13.19	36.45	23.26	211.84	H
	20175	1732.5	-13.28	36.80	23.52	224.91	
	20375	1752.5	-13.53	36.94	23.41	219.28	
	19975	1712.5	-18.16	37.28	19.12	81.66	V
	20175	1732.5	-17.68	37.63	19.95	98.86	
	20375	1752.5	-18.26	37.64	19.38	86.70	
Channel Bandwidth: 5 MHz / 16QAM							
Z	19975	1712.5	-14.24	36.45	22.21	166.34	H
	20175	1732.5	-14.12	36.80	22.68	185.35	
	20375	1752.5	-14.32	36.94	22.62	182.81	
	19975	1712.5	-19.33	37.28	17.95	62.37	V
	20175	1732.5	-18.89	37.63	18.74	74.82	
	20375	1752.5	-19.22	37.64	18.42	69.50	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	20000	1715.0	-13.03	36.64	23.61	229.61	H
	20175	1732.5	-12.97	36.80	23.83	241.55	
	20350	1750.0	-13.18	36.80	23.62	230.14	
	20000	1715.0	-18.00	37.44	19.44	87.90	V
	20175	1732.5	-17.47	37.63	20.16	103.75	
	20350	1750.0	-17.96	37.64	19.68	92.90	
Channel Bandwidth: 10 MHz / 16QAM							
Z	20000	1715.0	-14.17	36.64	22.47	176.60	H
	20175	1732.5	-13.86	36.80	22.94	196.79	
	20350	1750.0	-13.93	36.80	22.87	193.64	
	20000	1715.0	-19.18	37.44	18.26	66.99	V
	20175	1732.5	-18.57	37.63	19.06	80.54	
	20350	1750.0	-18.91	37.64	18.73	74.64	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	20025	1717.5	-12.63	36.45	23.82	240.99	H
	20175	1732.5	-12.64	36.80	24.16	260.62	
	20325	1747.5	-13.07	36.94	23.87	243.78	
	20025	1717.5	-17.56	37.28	19.72	93.76	V
	20175	1732.5	-17.23	37.63	20.40	109.65	
	20325	1747.5	-17.69	37.64	19.95	98.86	
Channel Bandwidth: 15 MHz / 16QAM							
Z	20025	1717.5	-13.70	36.45	22.75	188.36	H
	20175	1732.5	-13.61	36.80	23.19	208.45	
	20325	1747.5	-13.87	36.94	23.07	202.77	
	20025	1717.5	-18.72	37.28	18.56	71.78	V
	20175	1732.5	-18.37	37.63	19.26	84.33	
	20325	1747.5	-18.59	37.64	19.05	80.35	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 20 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	20050	1720.0	-12.34	36.45	24.11	257.63	H
	20175	1732.5	-12.37	36.80	24.43	277.33	
	20300	1745.0	-12.74	36.94	24.20	263.03	
	20050	1720.0	-17.23	37.28	20.05	101.16	V
	20175	1732.5	-17.02	37.63	20.61	115.08	
	20300	1745.0	-17.42	37.64	20.22	105.20	
Channel Bandwidth: 20 MHz / 16QAM							
Z	20050	1720.0	-13.48	36.45	22.97	198.15	H
	20175	1732.5	-13.36	36.80	23.44	220.80	
	20300	1745.0	-13.66	36.94	23.28	212.81	
	20050	1720.0	-18.40	37.28	18.88	77.27	V
	20175	1732.5	-18.05	37.63	19.58	90.78	
	20300	1745.0	-18.39	37.64	19.25	84.14	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

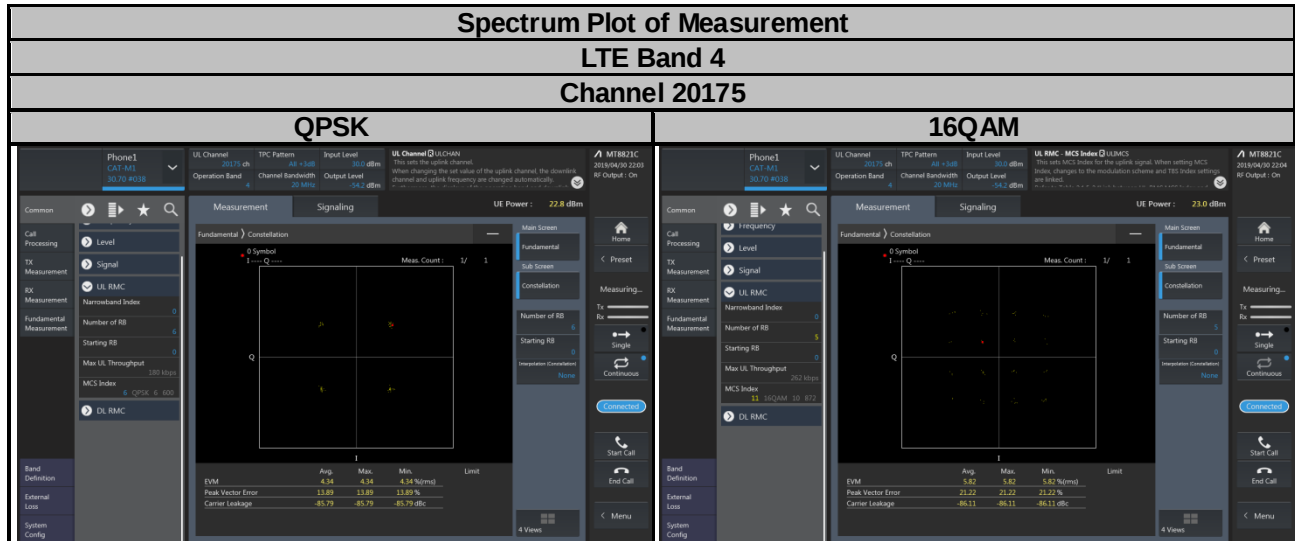
4.2.2 Test Setup



4.2.3 Test Procedure

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

4.2.4 Test Results



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

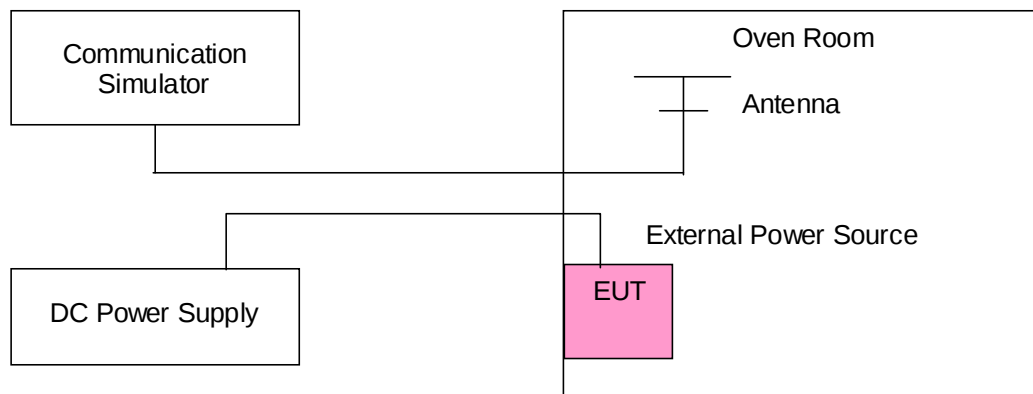
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

4.3.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 0.5 °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)
3.8	1710.700002	0.001	1754.300001	0.001
3.4	1710.700003	0.002	1754.300002	0.001
4.2	1710.700004	0.002	1754.300002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.4 Vdc to 4.2 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1710.700002	0.001	1754.300001	0.001
-30	1710.700004	0.002	1754.300003	0.002
-20	1710.700003	0.002	1754.300003	0.002
-10	1710.700004	0.002	1754.300002	0.001
0	1710.700002	0.001	1754.300002	0.001
10	1710.699998	-0.001	1754.299998	-0.001
20	1710.699997	-0.002	1754.299997	-0.002
30	1710.699997	-0.002	1754.299998	-0.001
40	1710.699999	-0.001	1754.299997	-0.002
50	1710.699999	-0.001	1754.299999	-0.001
60	1710.700002	0.001	1754.300004	0.002
70	1710.700004	0.002	1754.300004	0.002
80	1710.700003	0.002	1754.300004	0.002
85	1710.700004	0.002	1754.300003	0.002

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)
3.8	1710.700001	0.001	1754.300001	0.001
3.4	1710.700004	0.002	1754.300002	0.001
4.2	1710.700003	0.002	1754.300001	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.4 Vdc to 4.2 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1710.700002	0.001	1754.300001	0.001
-30	1710.700003	0.002	1754.300001	0.001
-20	1710.700001	0.001	1754.300004	0.002
-10	1710.700003	0.002	1754.300004	0.002
0	1710.700002	0.001	1754.300002	0.001
10	1710.699997	-0.002	1754.299997	-0.002
20	1710.699997	-0.002	1754.299997	-0.002
30	1710.699996	-0.002	1754.299998	-0.001
40	1710.699998	-0.001	1754.299998	-0.001
50	1710.699996	-0.002	1754.299998	-0.001
60	1710.700004	0.002	1754.300002	0.001
70	1710.700002	0.001	1754.300002	0.001
80	1710.700003	0.002	1754.300002	0.001
85	1710.700004	0.002	1754.300001	0.001

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)
3.8	1710.700001	0.001	1754.300002	0.001
3.4	1710.700002	0.001	1754.300003	0.002
4.2	1710.700003	0.002	1754.300003	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.4 Vdc to 4.2 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1710.700004	0.002	1754.300004	0.002
-30	1710.700002	0.001	1754.300003	0.002
-20	1710.700004	0.002	1754.300002	0.001
-10	1710.700001	0.001	1754.300002	0.001
0	1710.700002	0.001	1754.300003	0.001
10	1710.699998	-0.001	1754.299997	-0.002
20	1710.699996	-0.002	1754.299997	-0.002
30	1710.699998	-0.001	1754.299997	-0.002
40	1710.699998	-0.001	1754.299999	-0.001
50	1710.699998	-0.001	1754.299997	-0.002
60	1710.700002	0.001	1754.300002	0.001
70	1710.700002	0.001	1754.300002	0.001
80	1710.700003	0.001	1754.300003	0.002
85	1710.700003	0.002	1754.300001	0.001

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)
3.8	1710.700001	0.001	1754.300002	0.001
3.4	1710.700003	0.002	1754.300003	0.002
4.2	1710.700003	0.002	1754.300003	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.4 Vdc to 4.2 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1710.700003	0.002	1754.300003	0.002
-30	1710.700001	0.001	1754.300003	0.002
-20	1710.700002	0.001	1754.300001	0.001
-10	1710.700002	0.001	1754.300002	0.001
0	1710.700004	0.002	1754.300003	0.002
10	1710.699998	-0.001	1754.299997	-0.002
20	1710.699997	-0.002	1754.299999	-0.001
30	1710.699997	-0.002	1754.299999	-0.001
40	1710.699997	-0.002	1754.299997	-0.002
50	1710.699997	-0.002	1754.299998	-0.001
60	1710.700002	0.001	1754.300002	0.001
70	1710.700002	0.001	1754.300002	0.001
80	1710.700001	0.001	1754.300001	0.001
85	1710.700002	0.001	1754.300004	0.002

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)
3.8	1710.700003	0.001	1754.300004	0.002
3.4	1710.700003	0.002	1754.300003	0.002
4.2	1710.700003	0.002	1754.300002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.4 Vdc to 4.2 Vdc.

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)
-40	1710.700003	0.001	1754.300004	0.002
-30	1710.700002	0.001	1754.300004	0.002
-20	1710.700002	0.001	1754.300002	0.001
-10	1710.700001	0.001	1754.300004	0.002
0	1710.700003	0.002	1754.300003	0.002
10	1710.699997	-0.002	1754.299997	-0.002
20	1710.699998	-0.001	1754.299999	-0.001
30	1710.699996	-0.002	1754.299997	-0.002
40	1710.699998	-0.001	1754.299998	-0.001
50	1710.699998	-0.001	1754.299999	-0.001
60	1710.700002	0.001	1754.300001	0.001
70	1710.700003	0.002	1754.300002	0.001
80	1710.700002	0.001	1754.300003	0.002
85	1710.700003	0.002	1754.300002	0.001

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)
3.8	1710.700004	0.002	1754.300002	0.001
3.4	1710.700001	0.001	1754.300001	0.001
4.2	1710.700003	0.002	1754.300001	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.4 Vdc to 4.2 Vdc.

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)
-40	1710.700003	0.002	1754.300002	0.001
-30	1710.700002	0.001	1754.300002	0.001
-20	1710.700002	0.001	1754.300002	0.001
-10	1710.700004	0.002	1754.300004	0.002
0	1710.700004	0.002	1754.300001	0.001
10	1710.699999	-0.001	1754.299998	-0.001
20	1710.699996	-0.002	1754.299998	-0.001
30	1710.699997	-0.002	1754.299998	-0.001
40	1710.699998	-0.001	1754.299996	-0.002
50	1710.699997	-0.002	1754.299999	-0.001
60	1710.700002	0.001	1754.300001	0.001
70	1710.700004	0.002	1754.300002	0.001
80	1710.700003	0.001	1754.300003	0.002
85	1710.700003	0.002	1754.300003	0.002

4.4 Occupied Bandwidth Measurement

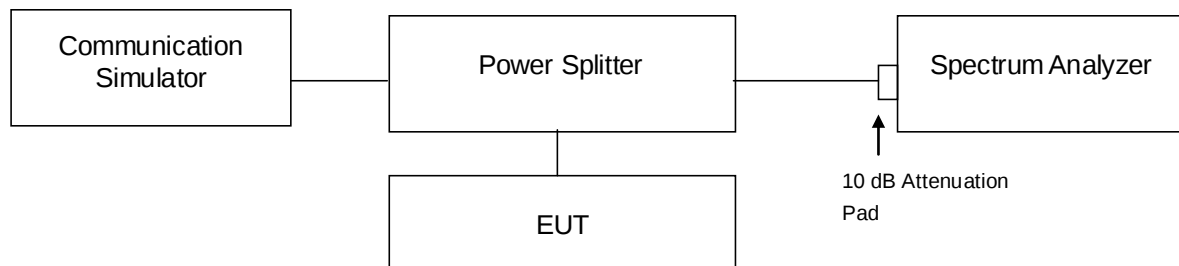
4.4.1 Limits of Occupied Bandwidth Measurement

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

4.4.2 Test Procedure

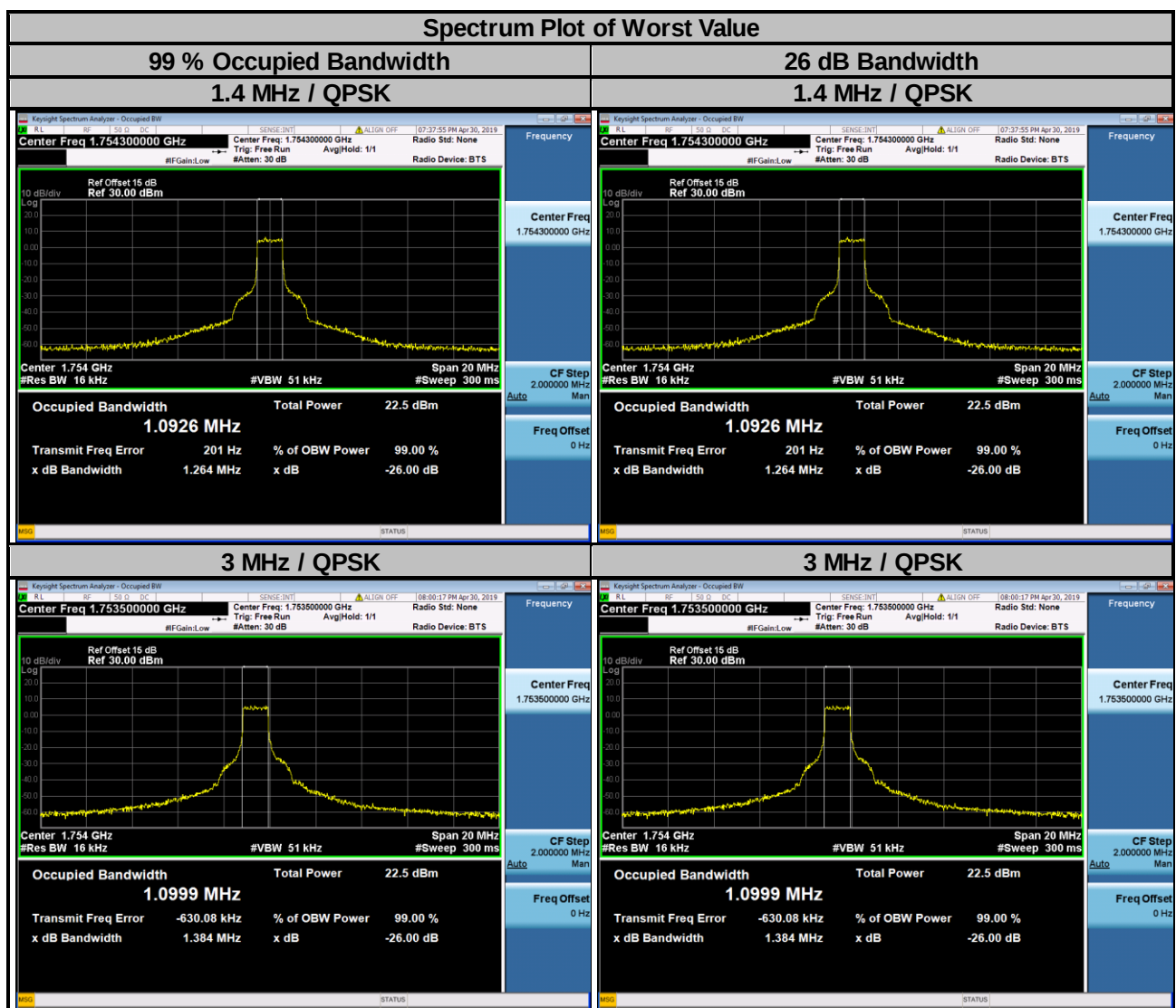
- The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.4.3 Test Setup

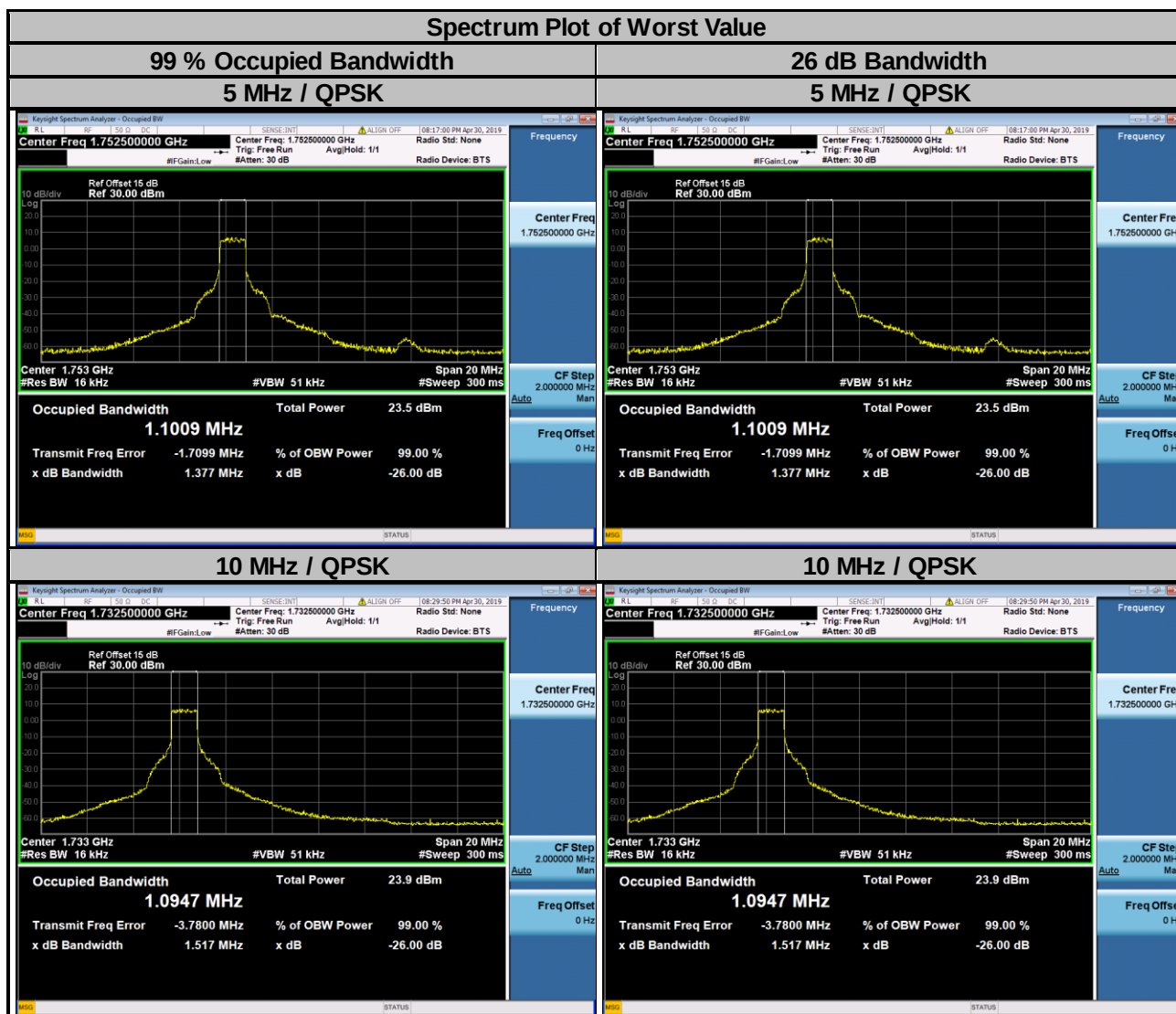


4.4.4 Test Result

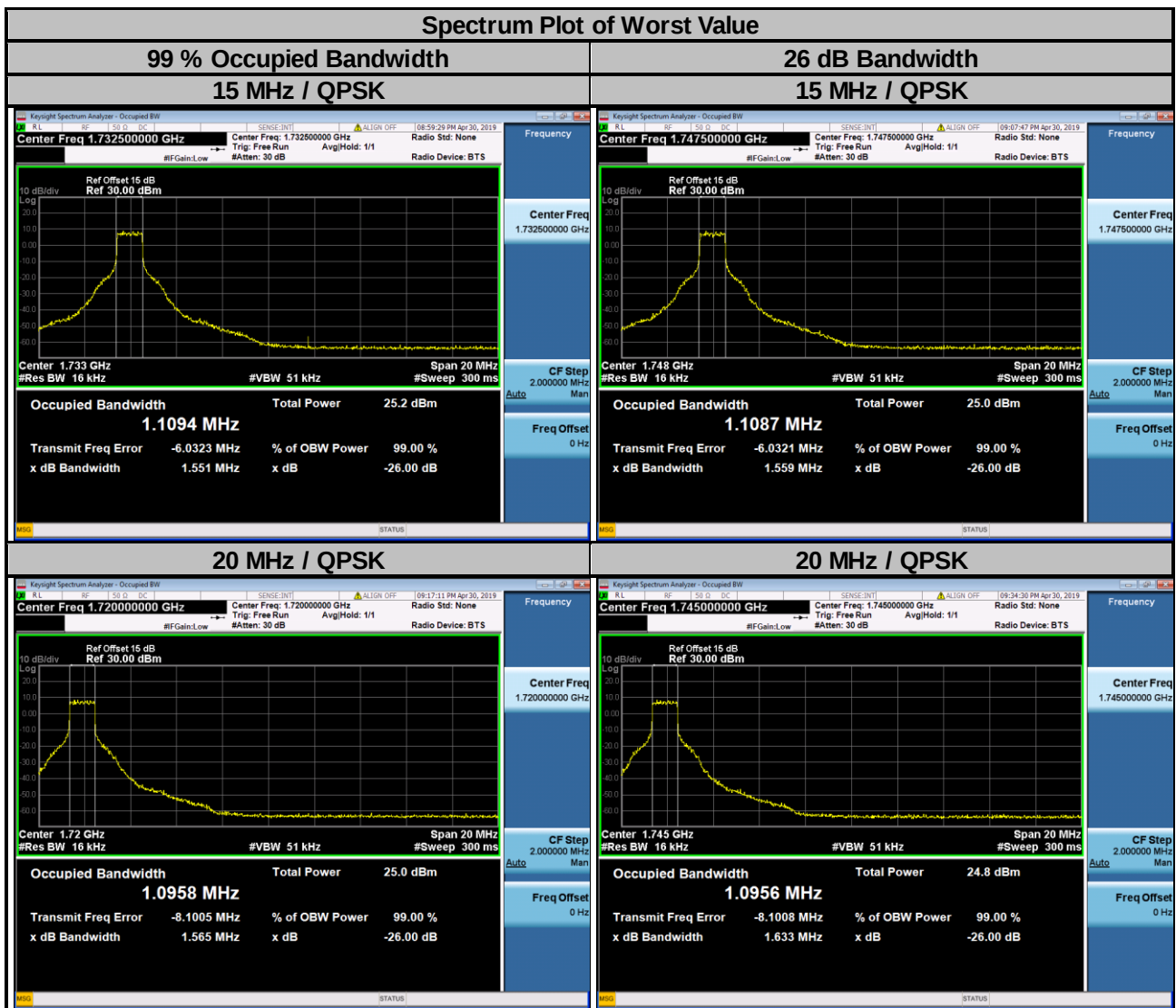
LTE Band 4					
Channel Bandwidth: 1.4 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19957	1710.7	1.0917	0.9135	1.261	1.098
20175	1732.5	1.0905	0.9130	1.261	1.124
20393	1754.3	1.0926	0.9130	1.264	1.139
Channel Bandwidth: 3 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19965	1711.5	1.0910	0.9212	1.371	1.177
20175	1732.5	1.0988	0.9216	1.376	1.183
20385	1753.5	1.0999	0.9174	1.384	1.202



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	1.0963	0.9110	1.338	1.171
20175	1732.5	1.0896	0.9212	1.369	1.182
20375	1752.5	1.1009	0.9119	1.377	1.196
Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20000	1715.0	1.0904	0.9152	1.471	1.305
20175	1732.5	1.0947	0.9174	1.517	1.283
20350	1750.0	1.0942	0.9178	1.485	1.372



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	1.1088	0.9234	1.532	1.403
20175	1732.5	1.1094	0.9306	1.551	1.440
20325	1747.5	1.1087	0.9321	1.559	1.448
Channel Bandwidth: 20 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20050	1720.0	1.0958	0.9187	1.565	1.454
20175	1732.5	1.0958	0.9237	1.612	1.526
20300	1745.0	1.0956	0.9265	1.633	1.594

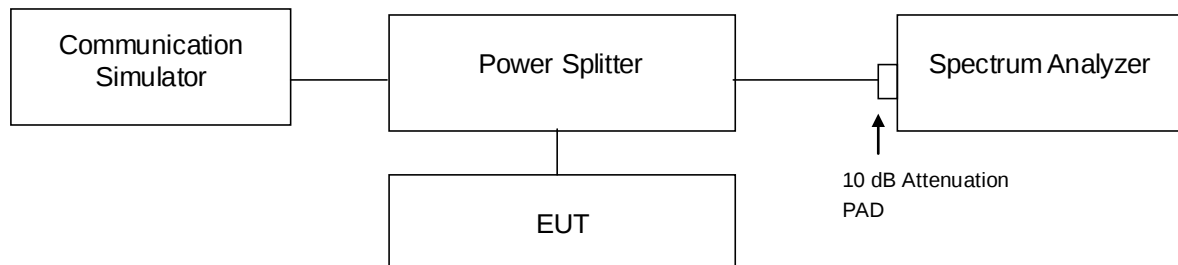


4.5 Band Edge Measurement

4.5.1 Limits of Band Edge Measurement

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

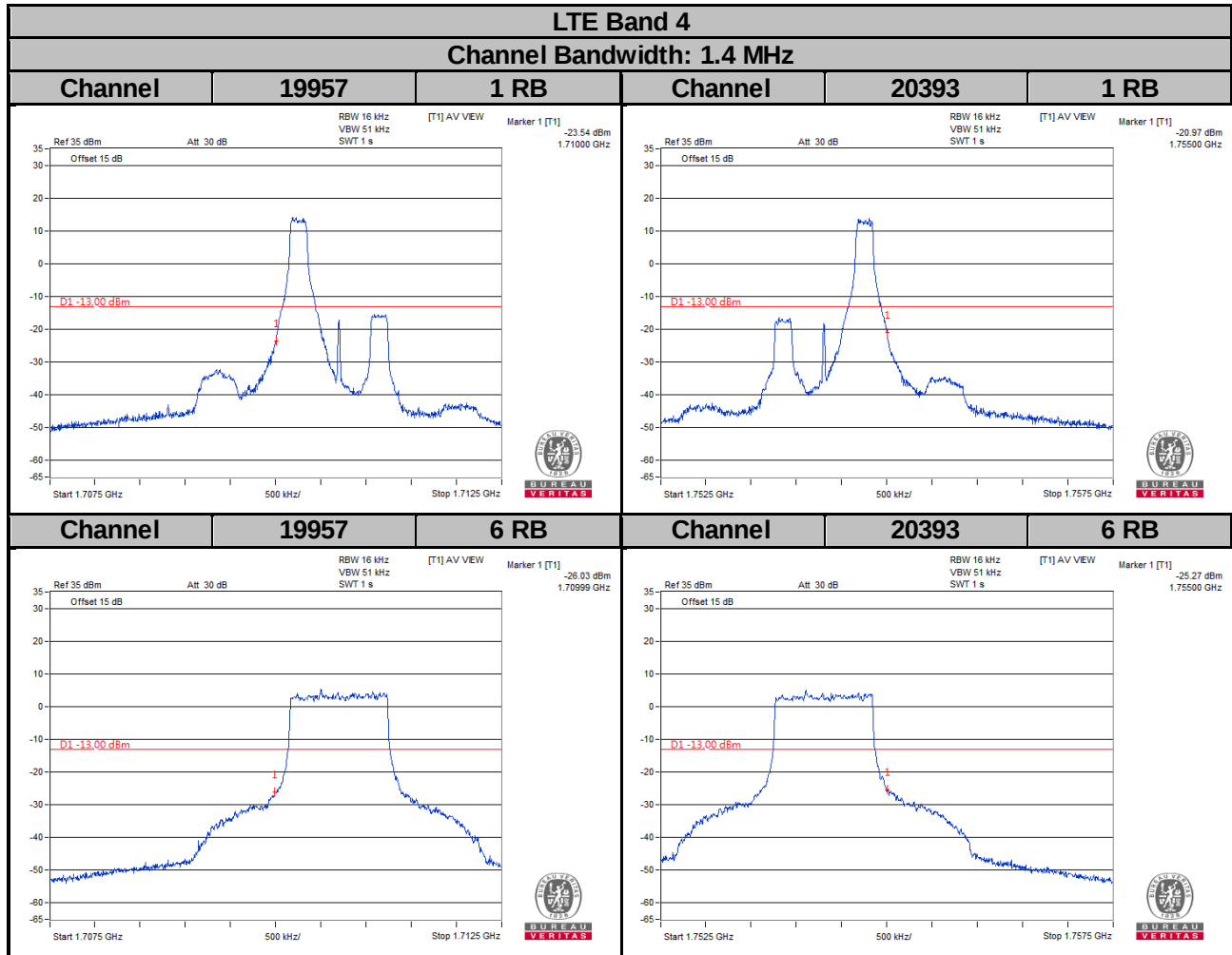
4.5.2 Test Setup



4.5.3 Test Procedures

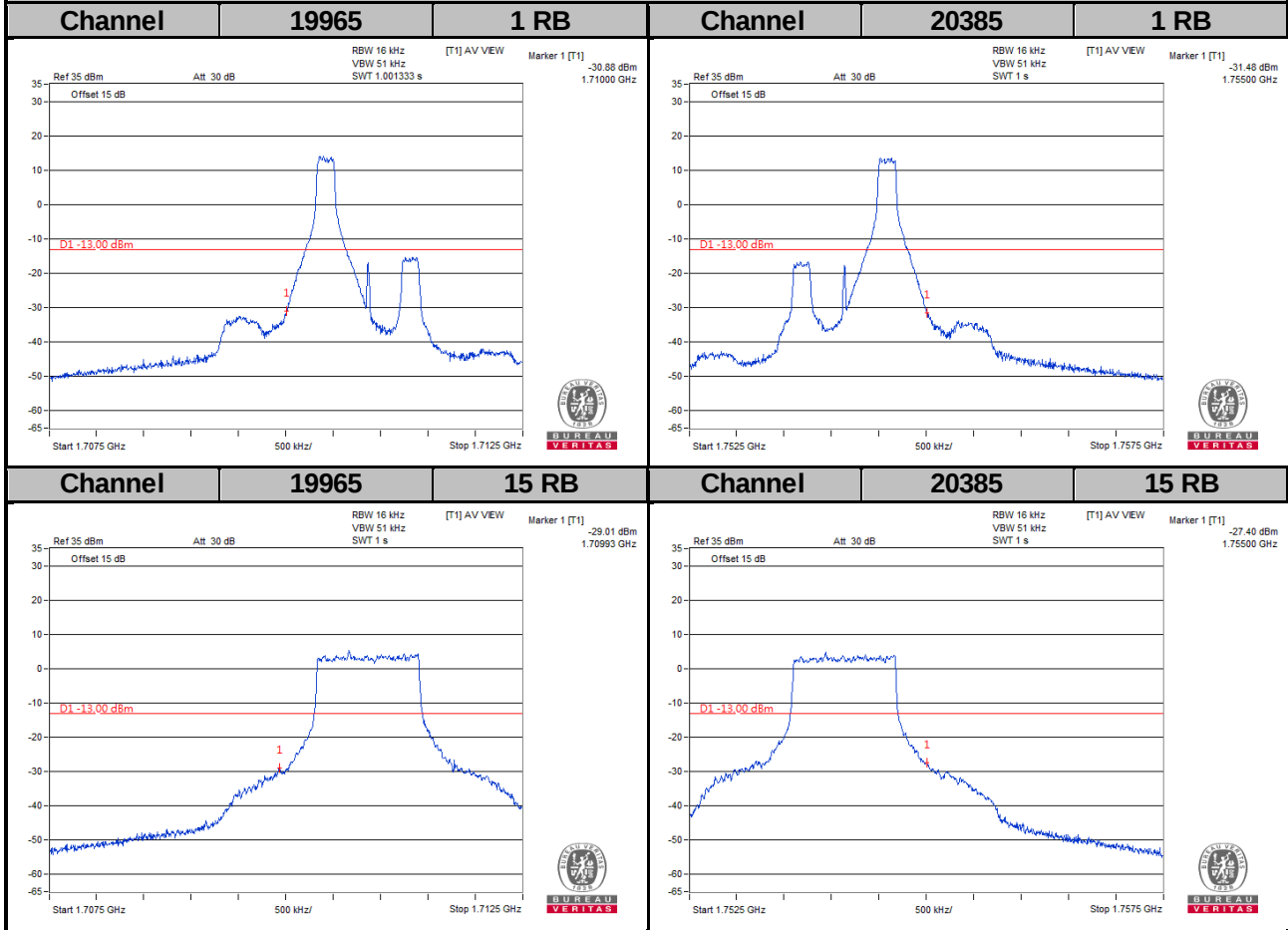
- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 15 kHz and VB of the spectrum is 51 kHz (LTE Bandwidth 1.4 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 3 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 62 kHz and VB of the spectrum is 200 kHz (LTE Bandwidth 5 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 10 MHz).
- 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).
- 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).
- Record the max. trace plot into the test report.

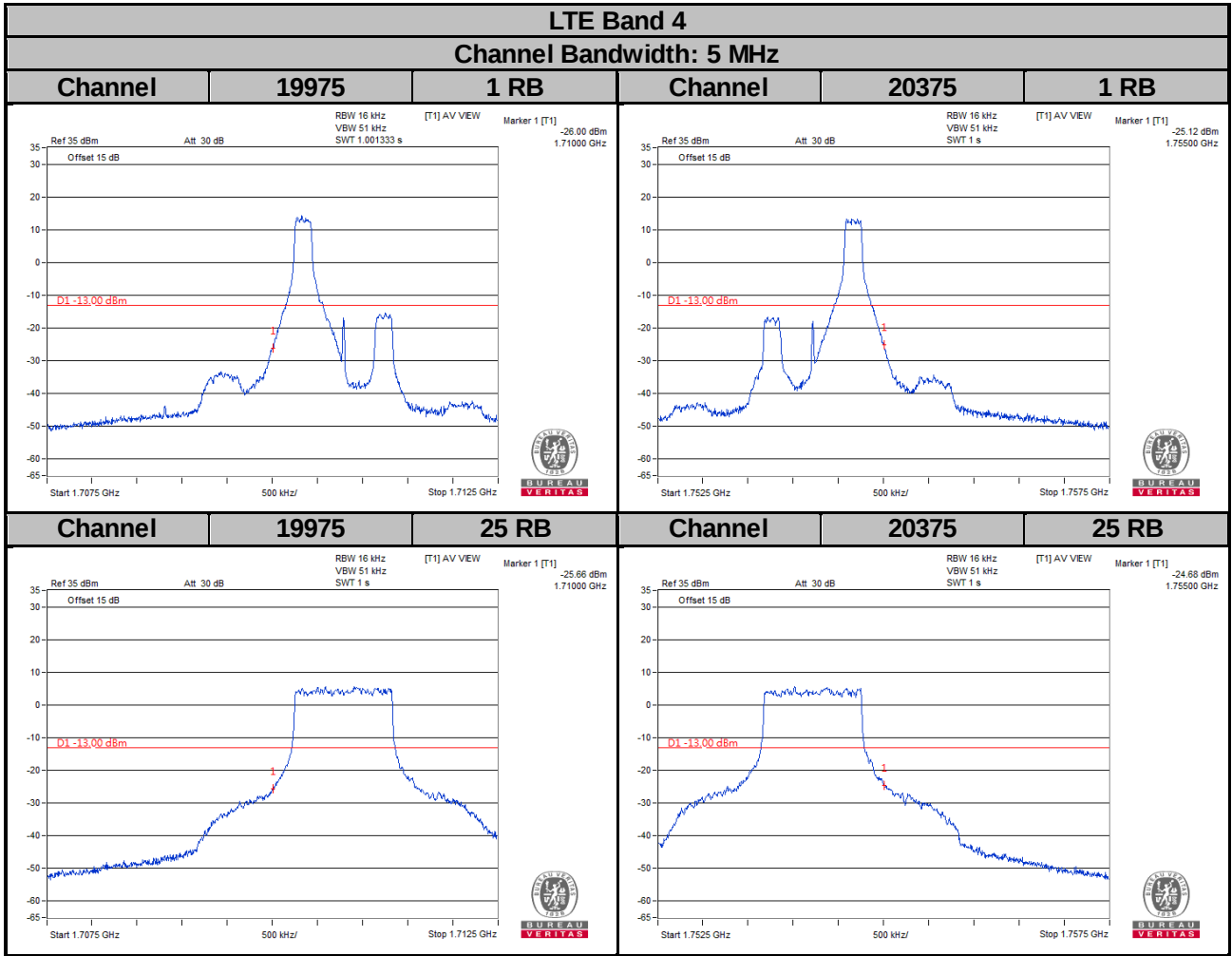
4.5.4 Test Results

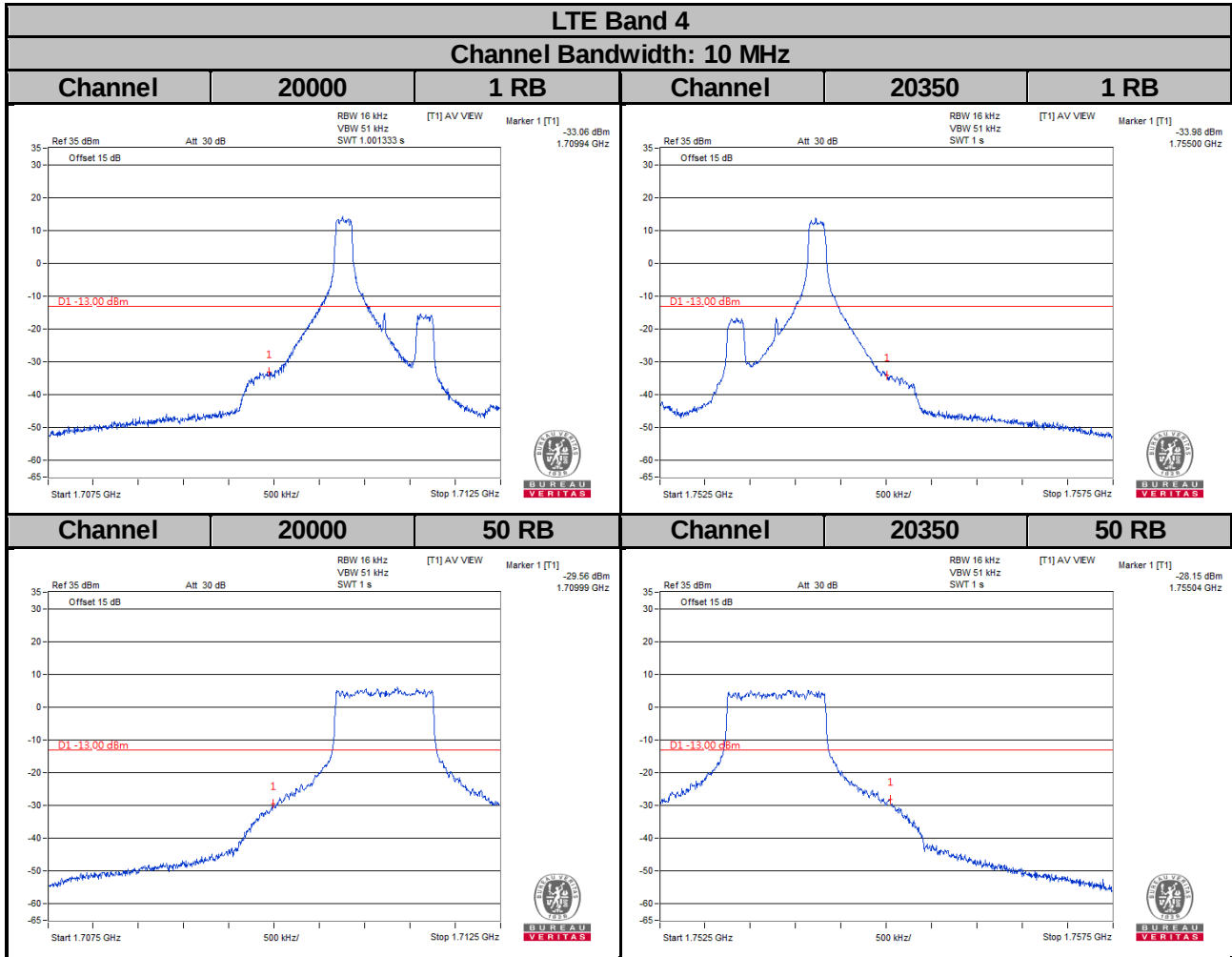


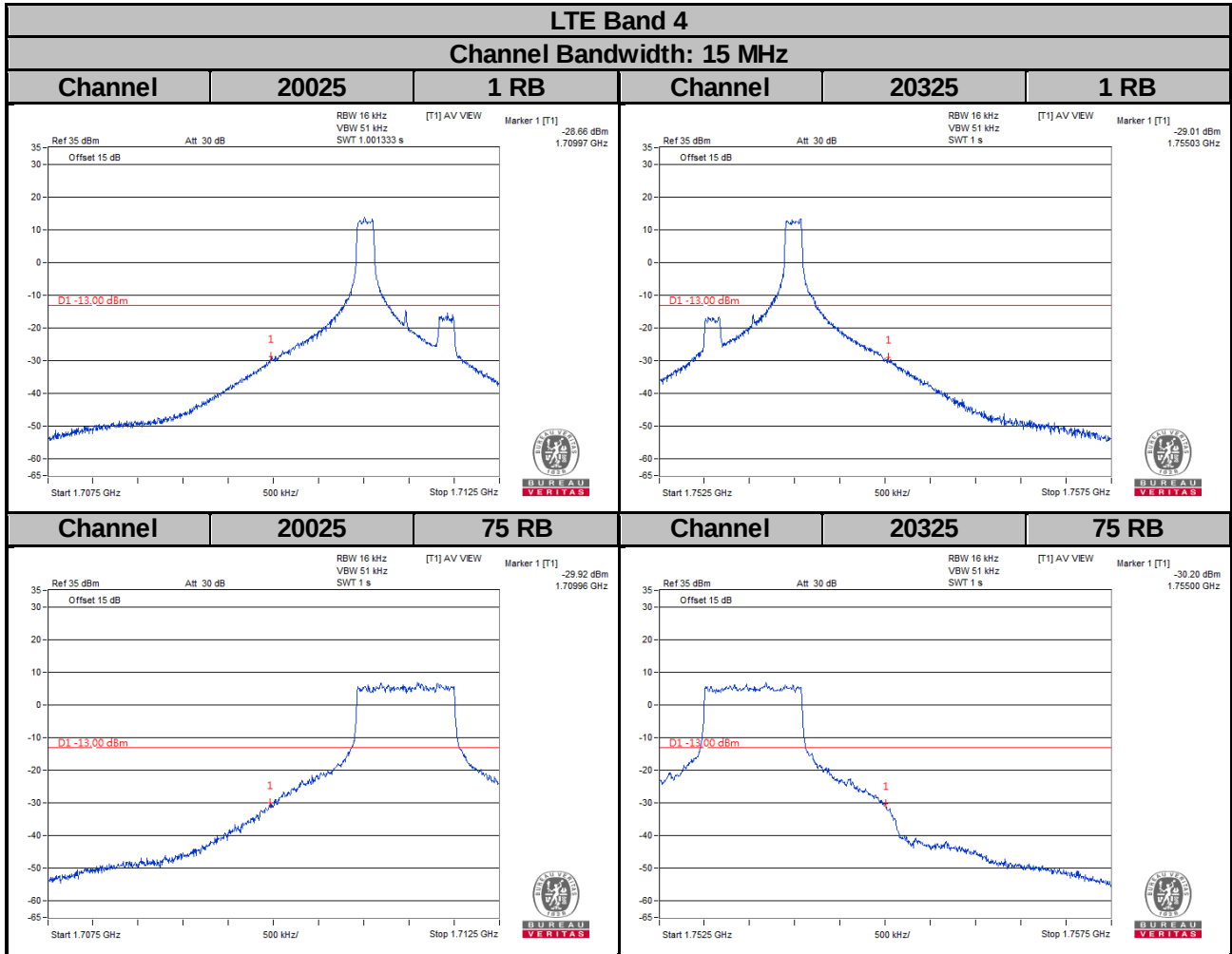
LTE Band 4

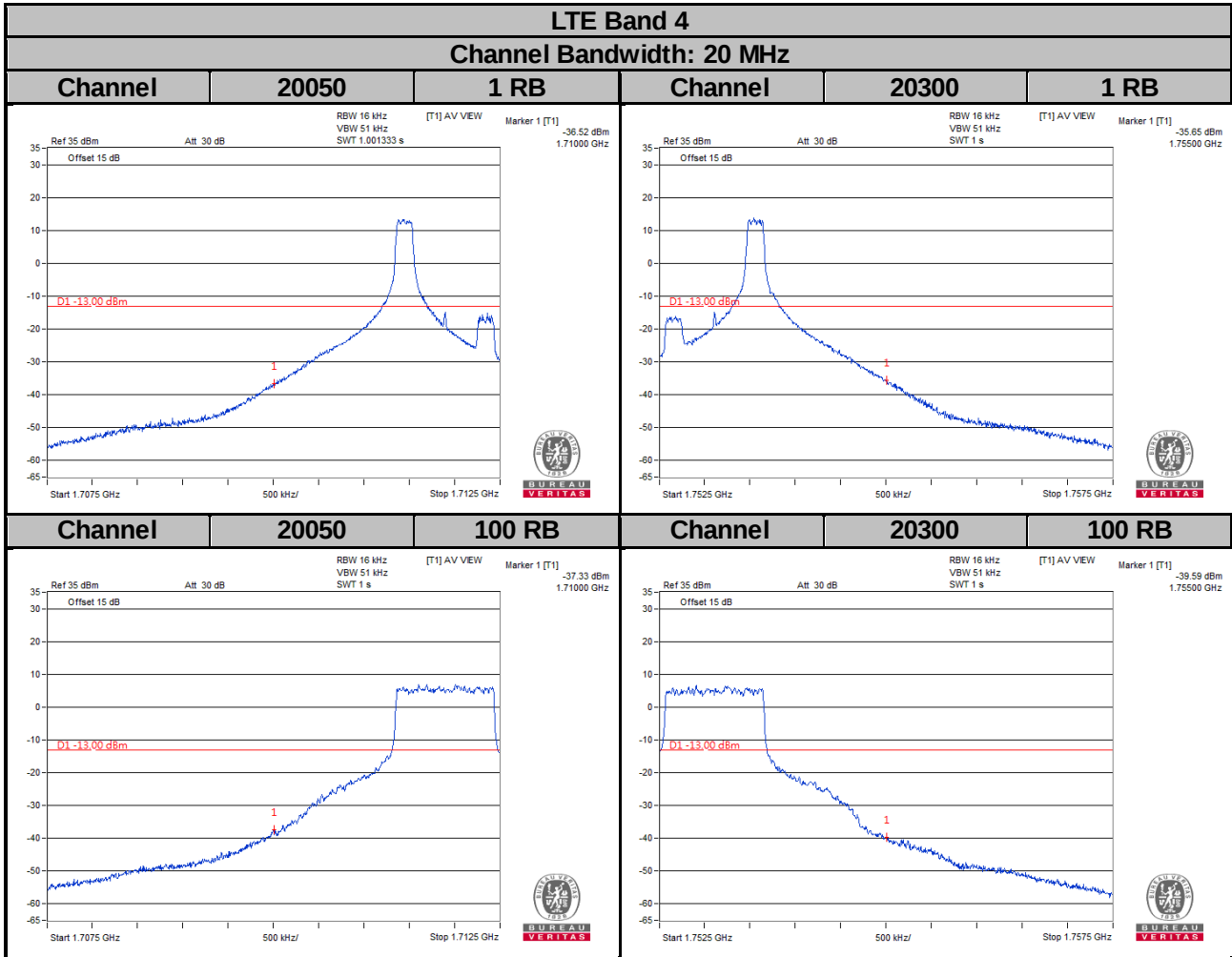
Channel Bandwidth: 3 MHz









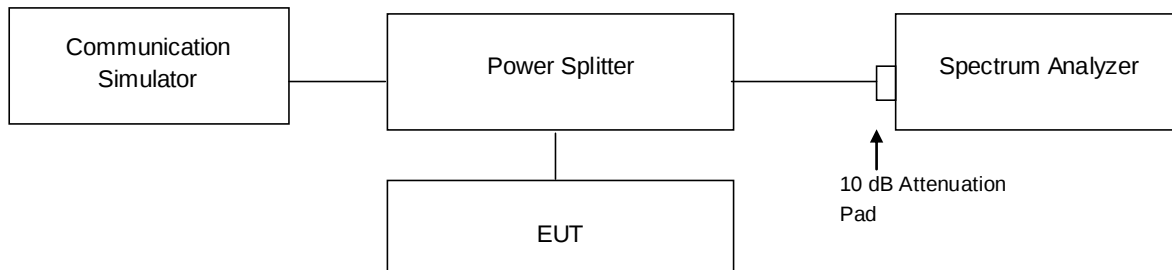


4.6 Peak to Average Ratio

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

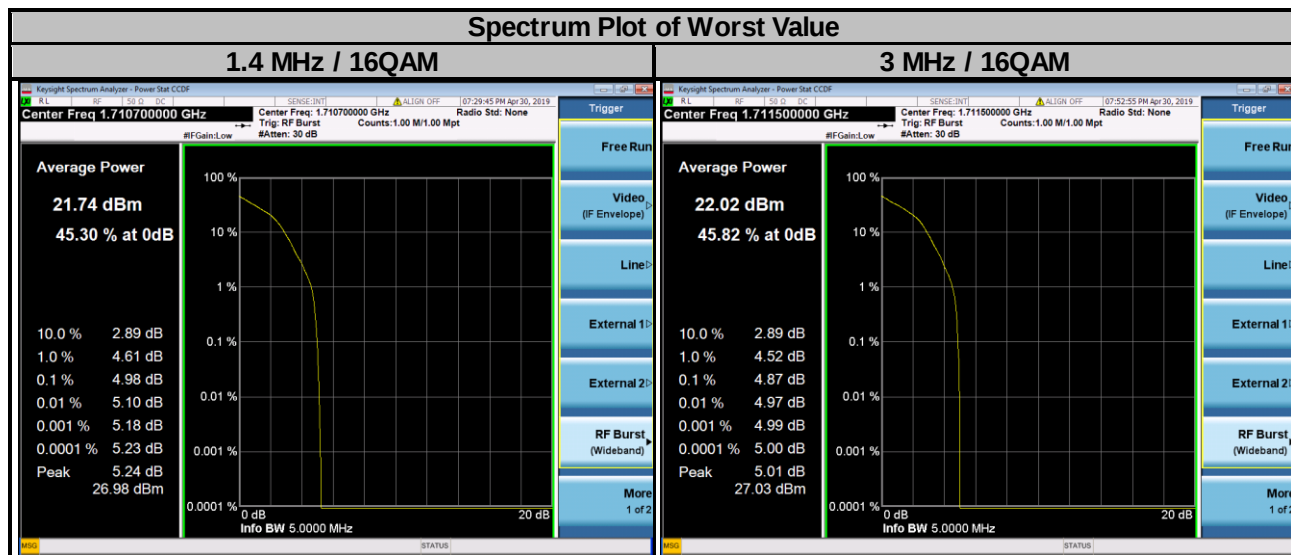


4.6.3 Test Procedures

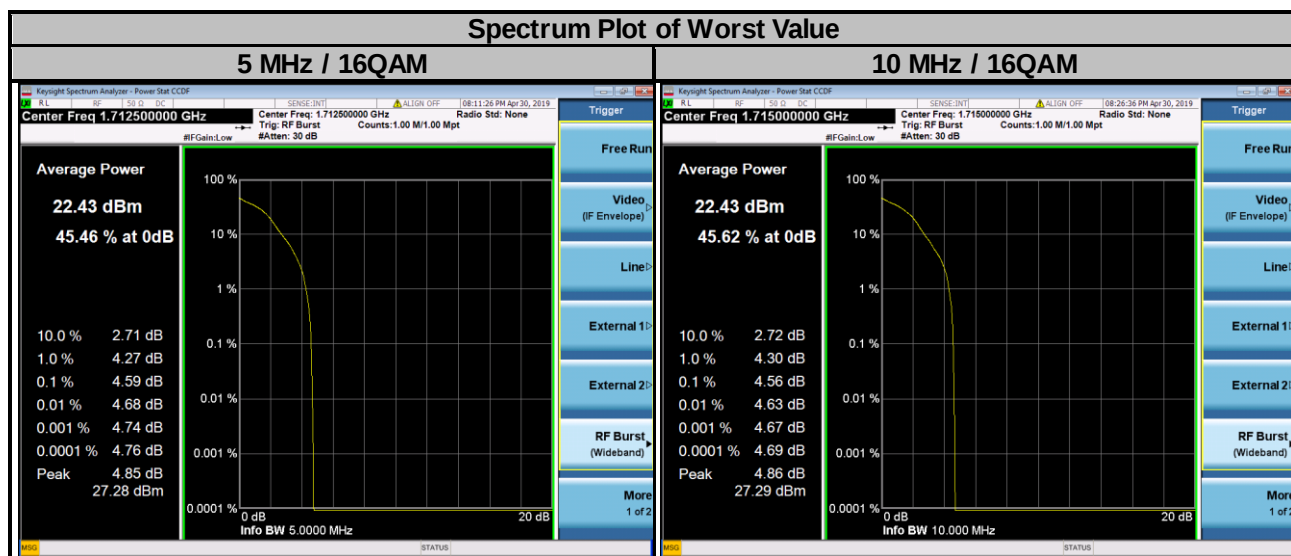
1. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

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	3.96	4.98	19965	1711.5	3.91	4.87
20175	1732.5	3.73	4.74	20175	1732.5	3.70	4.72
20393	1754.3	3.71	4.71	20385	1753.5	3.67	4.64



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	4.04	4.59	20000	1715.0	4.02	4.56
20175	1732.5	3.80	4.32	20175	1732.5	3.86	4.33
20375	1752.5	3.76	4.21	20350	1750.0	3.72	4.15

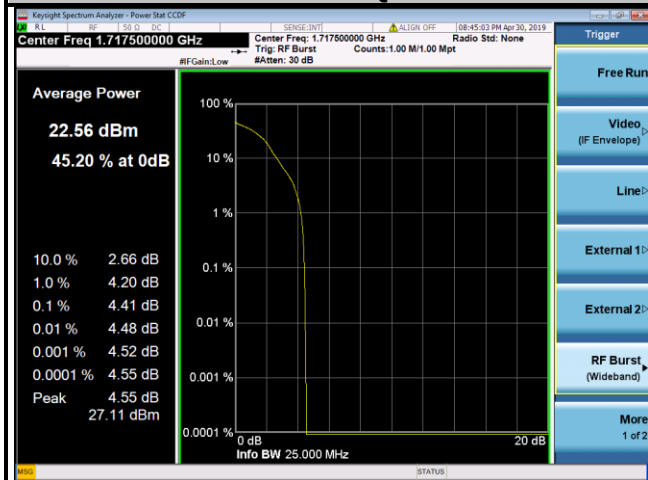


LTE Band 4

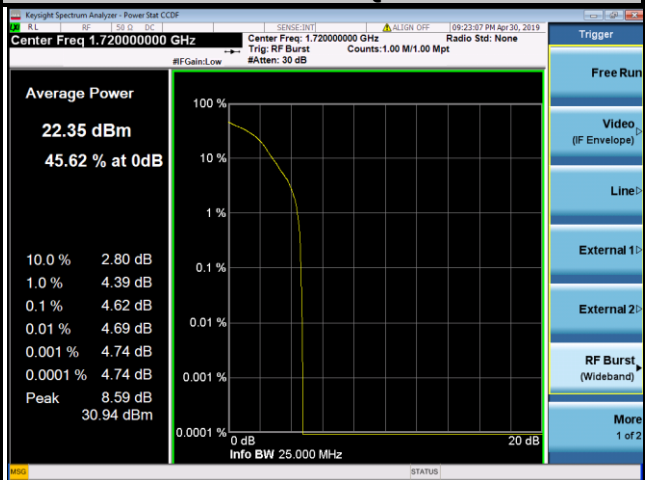
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	3.96	4.41	20050	1720.0	3.97	4.62
20175	1732.5	3.70	4.35	20175	1732.5	3.82	4.31
20325	1747.5	3.67	4.05	20300	1745.0	3.69	4.10

Spectrum Plot of Worst Value

15 MHz / 16QAM



20 MHz / 16QAM

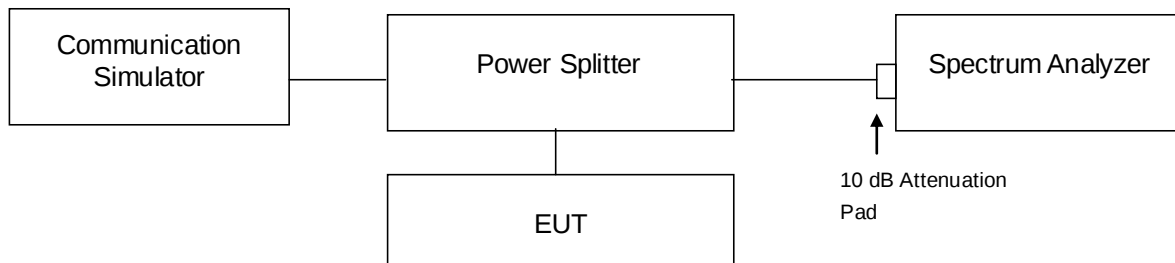


4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

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

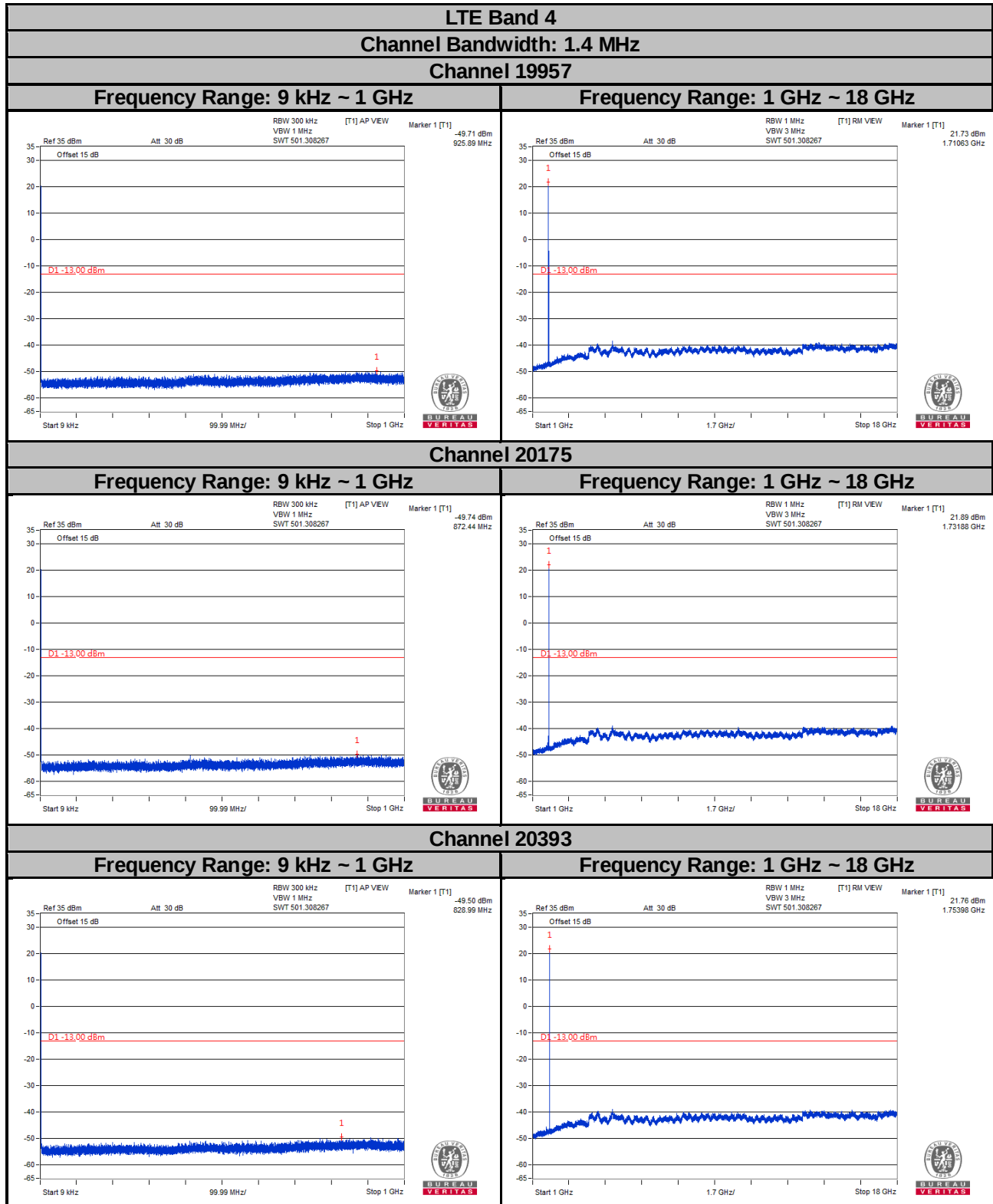
4.7.2 Test Setup



4.7.3 Test Procedure

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



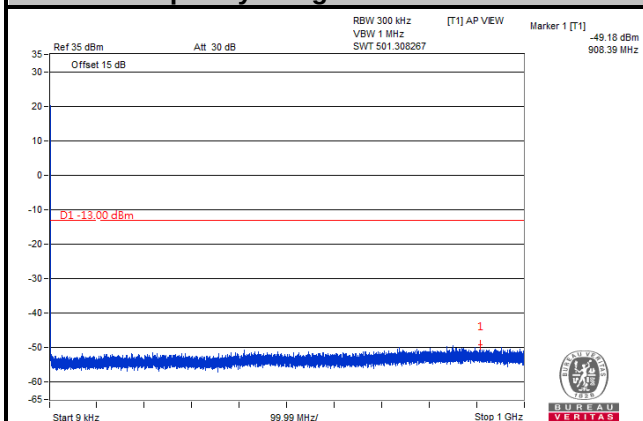
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 4

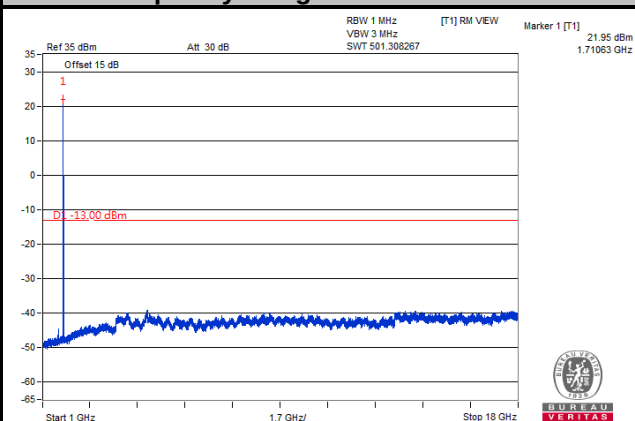
Channel Bandwidth: 3 MHz

Channel 19965

Frequency Range: 9 kHz ~ 1 GHz

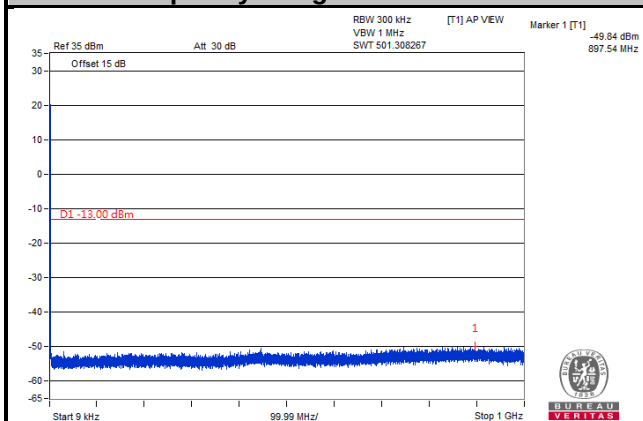


Frequency Range: 1 GHz ~ 18 GHz

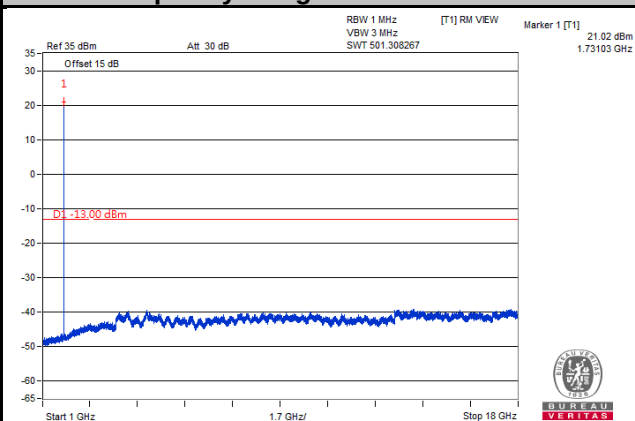


Channel 20175

Frequency Range: 9 kHz ~ 1 GHz

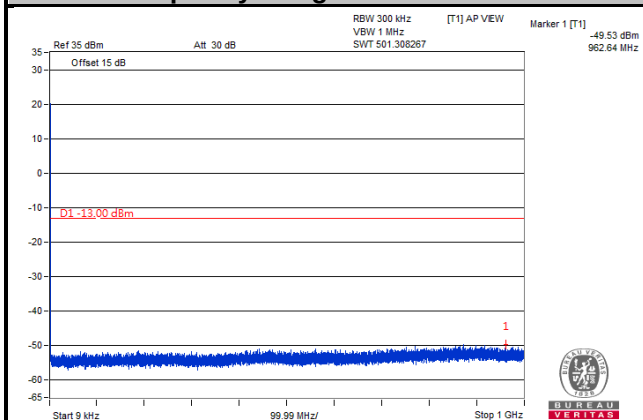


Frequency Range: 1 GHz ~ 18 GHz

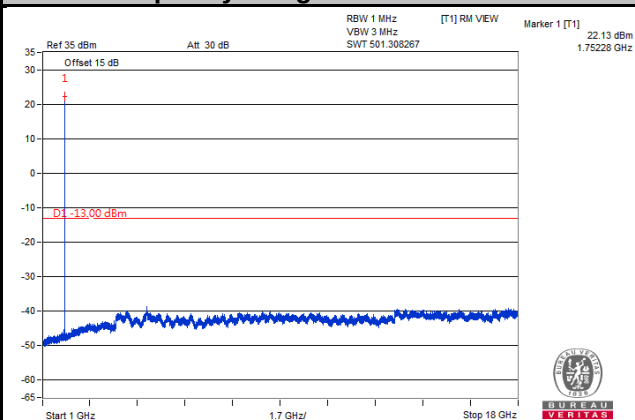


Channel 20385

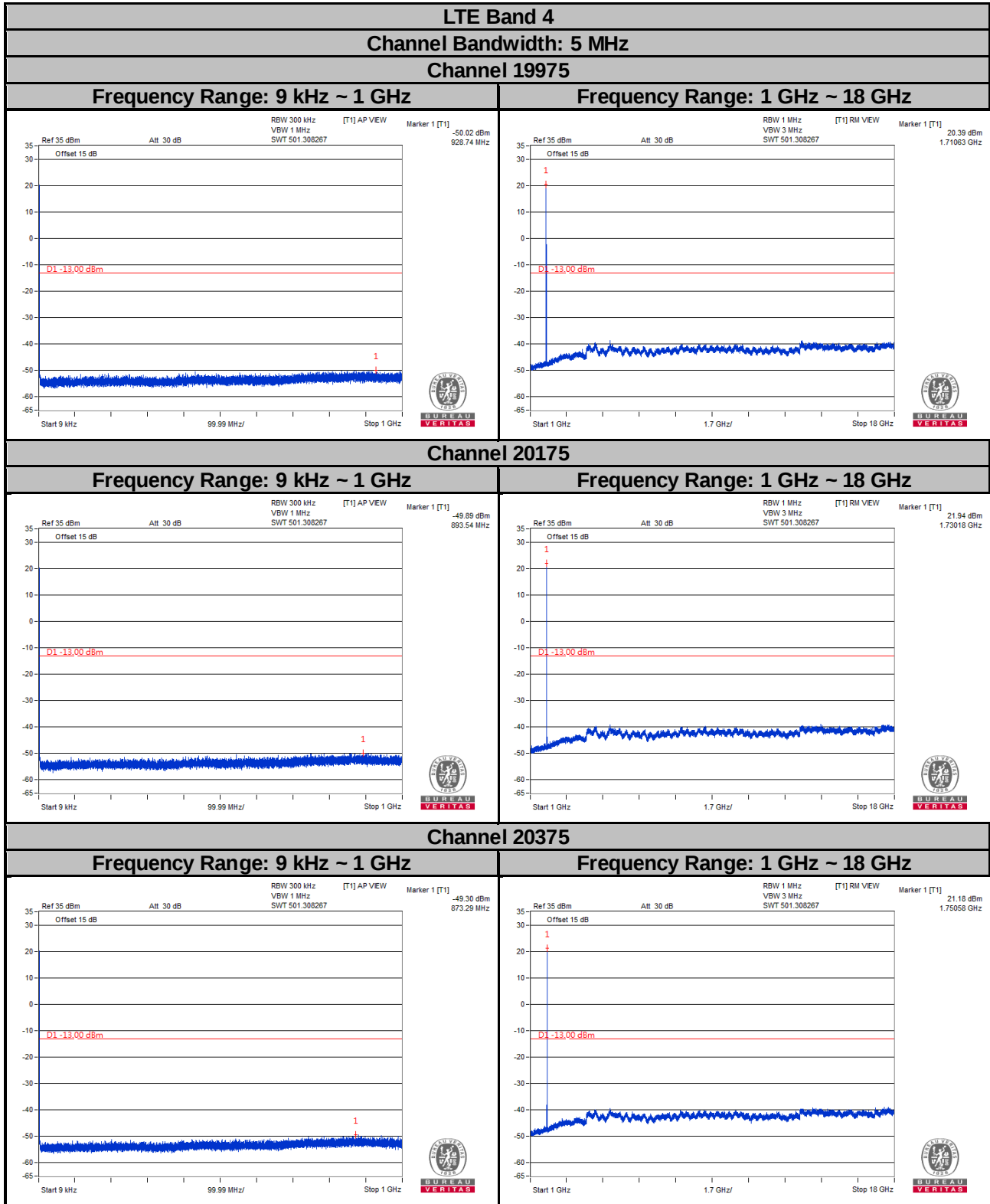
Frequency Range: 9 kHz ~ 1 GHz



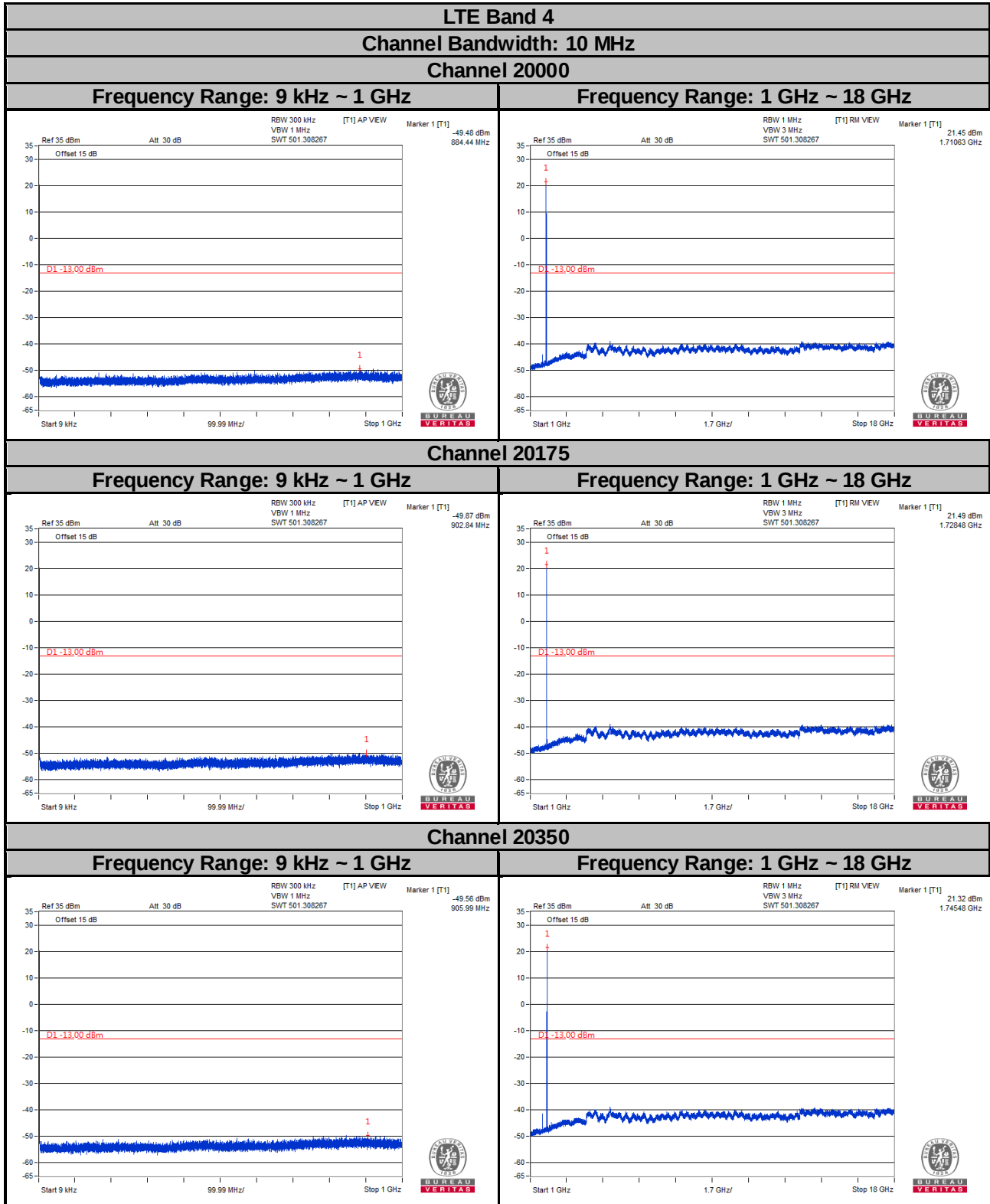
Frequency Range: 1 GHz ~ 18 GHz



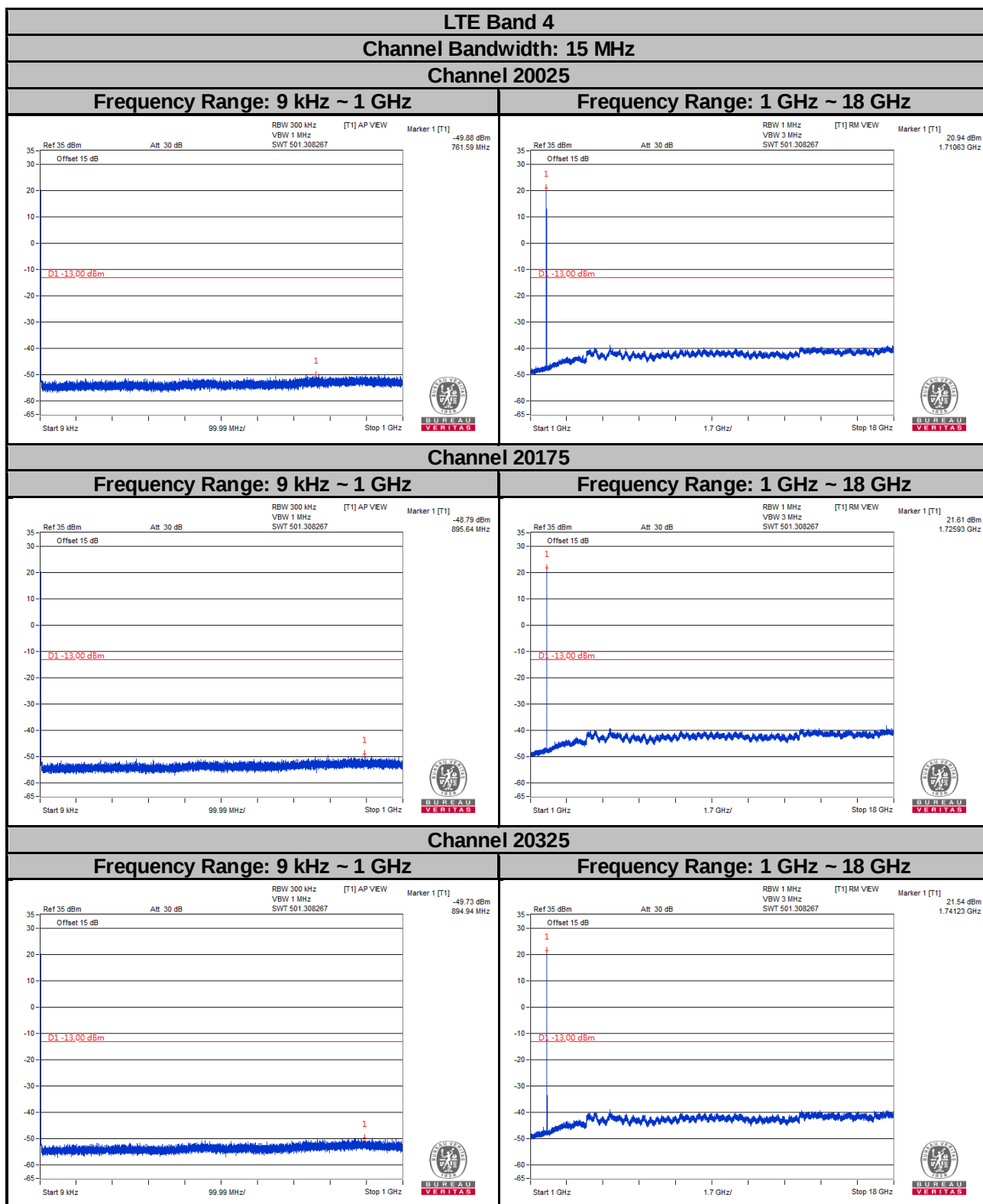
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



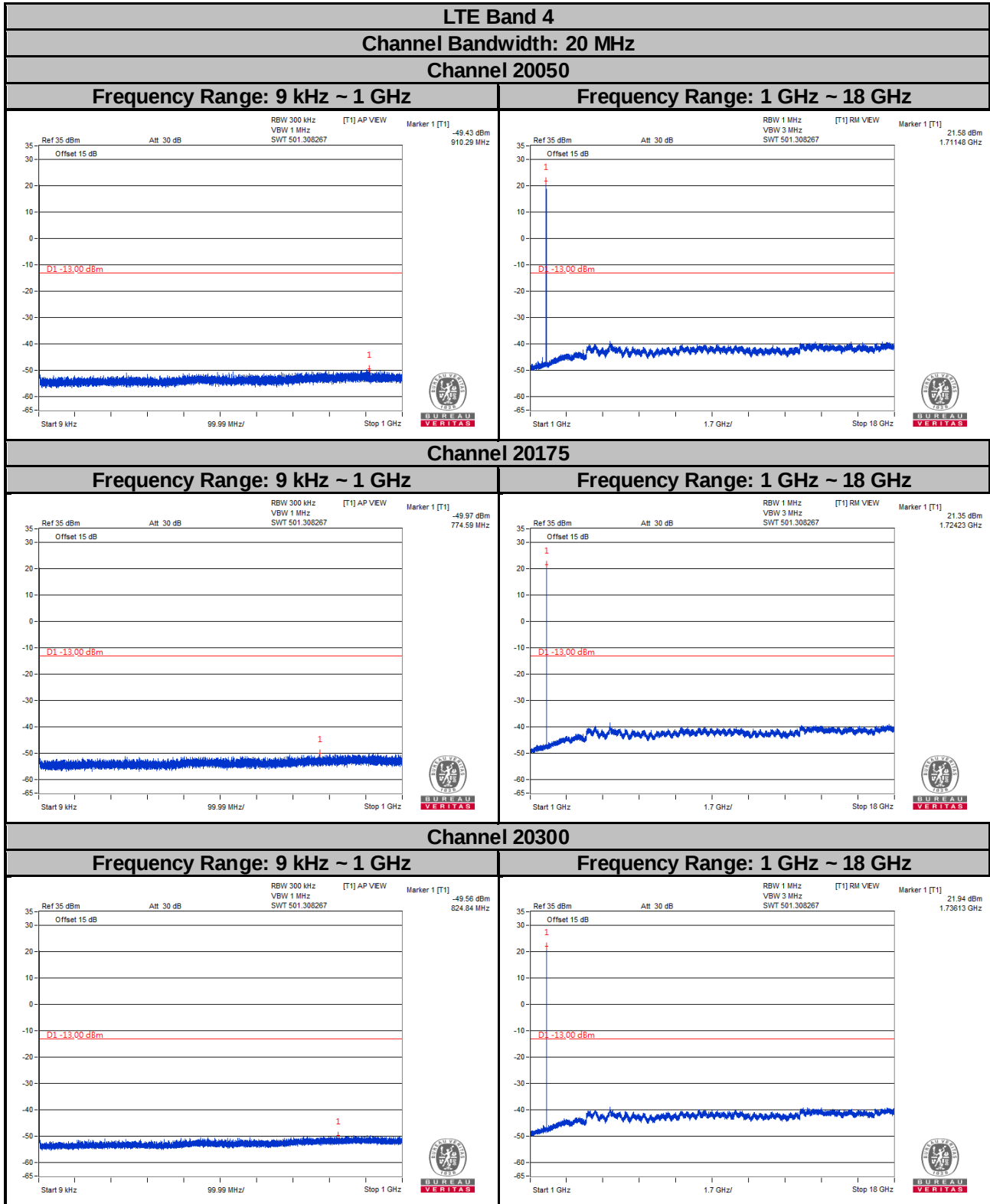
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



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

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

4.8.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G.
- c. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$.

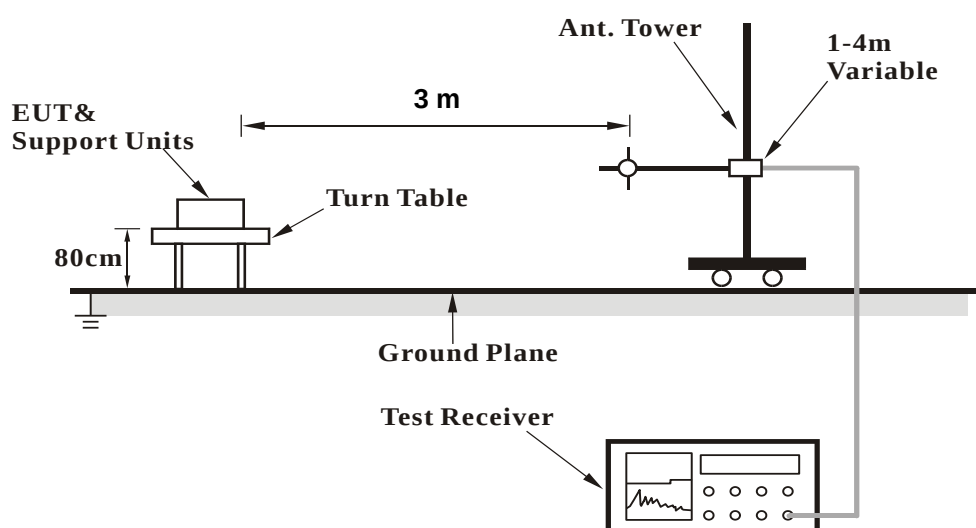
Note: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.8.3 Deviation from Test Standard

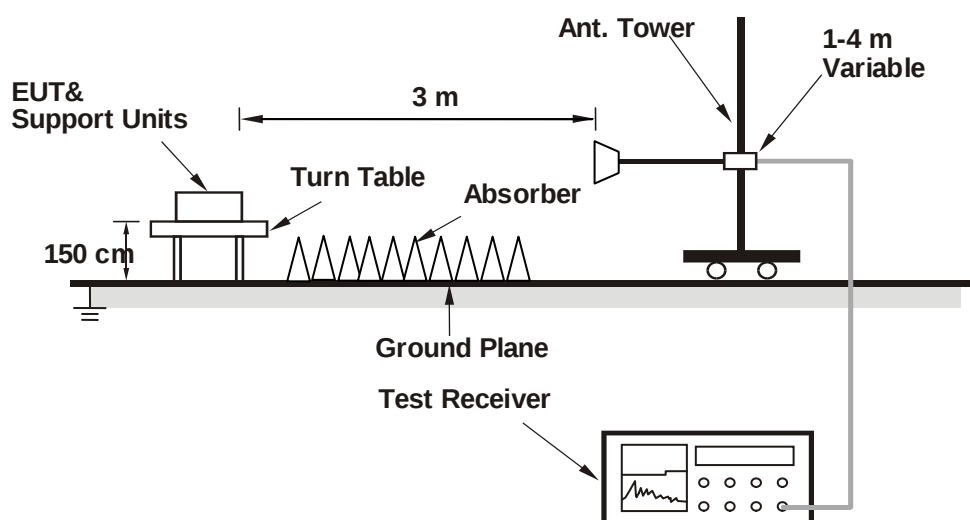
No deviation.

4.8.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



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

4.8.5 Test Results

LTE Band 4

Channel Bandwidth: 1.4 MHz / QPSK

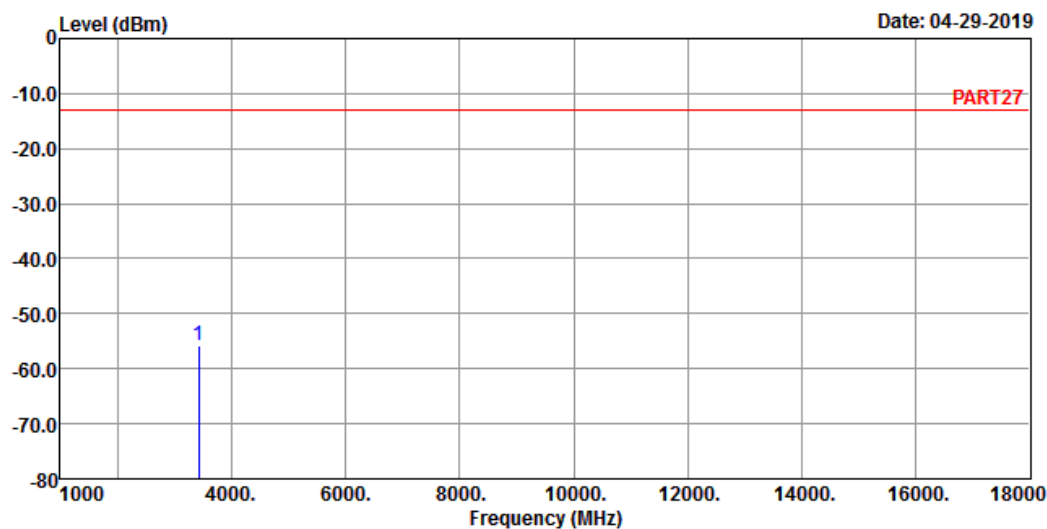
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5

Condition: PART27 HORIZONTAL

Remak : Cat-M1 Band 4 QPSK_1.4M Link_L-CH

Tested by: Thomas Wei

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	

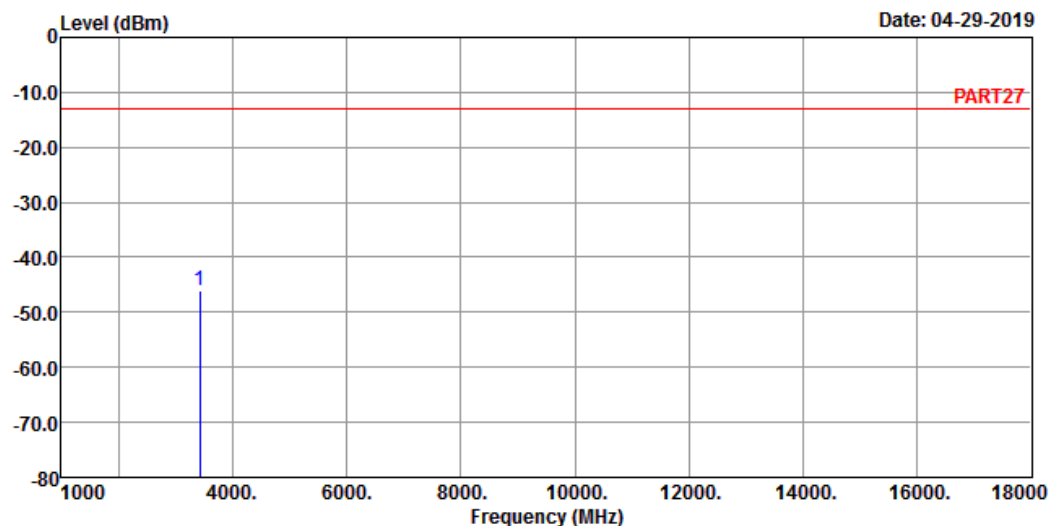
1 pp 3421.40 -55.71 -47.37 -13.00 -8.34 -42.71 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART27 VERTICAL

Remak : Cat-M1 Band 4 QPSK_1.4M Link_L-CH

Tested by: Thomas Wei

Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3421.40	-45.91	-37.57	-13.00	-8.34	-32.91	Peak

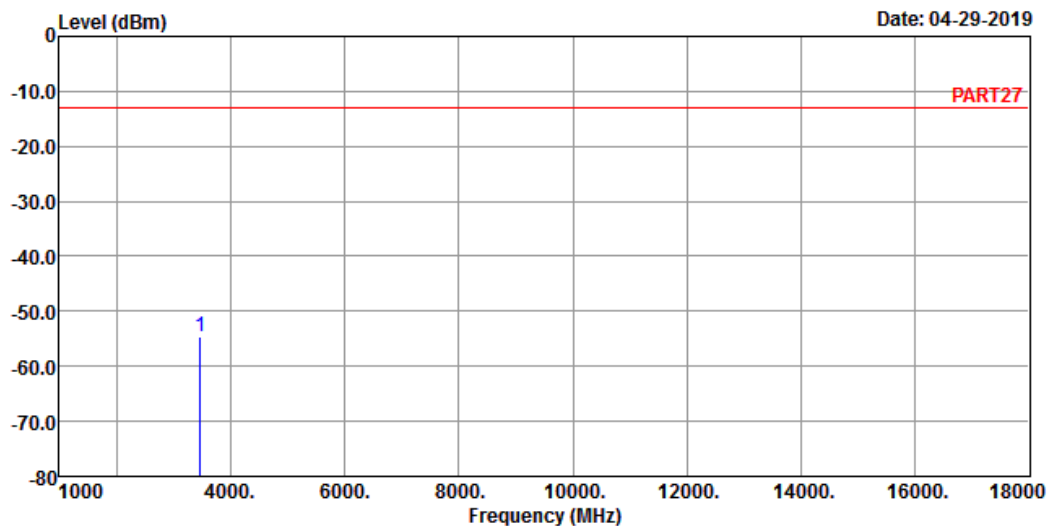
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : Cat-M1 Band 4 QPSK_1.4M Link_M-CH
Tested by: Thomas Wei

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	

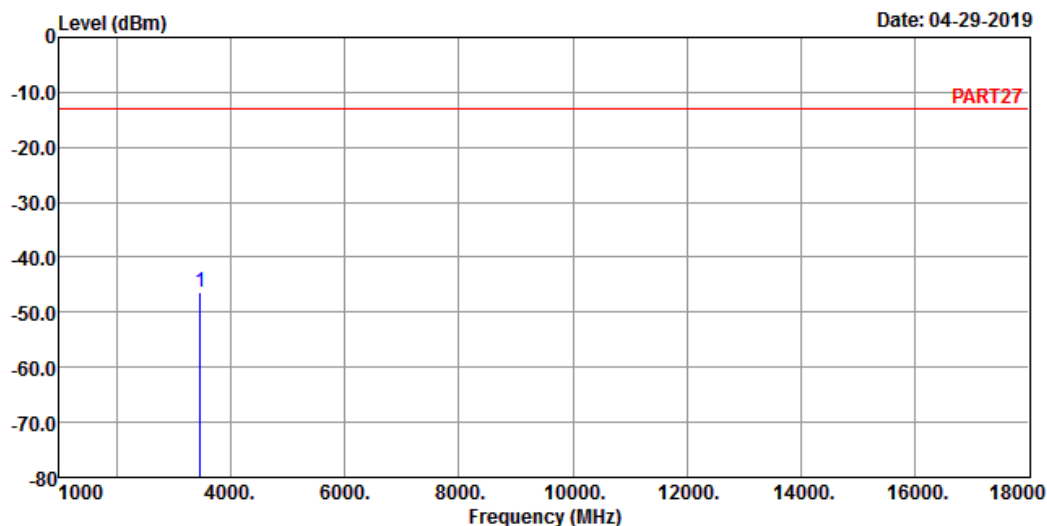
1 pp 3465.00 -54.51 -46.63 -13.00 -7.88 -41.51 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART27 VERTICAL

Remak : Cat-M1 Band 4 QPSK_1.4M Link_M-CH

Tested by: Thomas Wei

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3465.00	-46.23	-38.35	-13.00	-7.88	-33.23	Peak

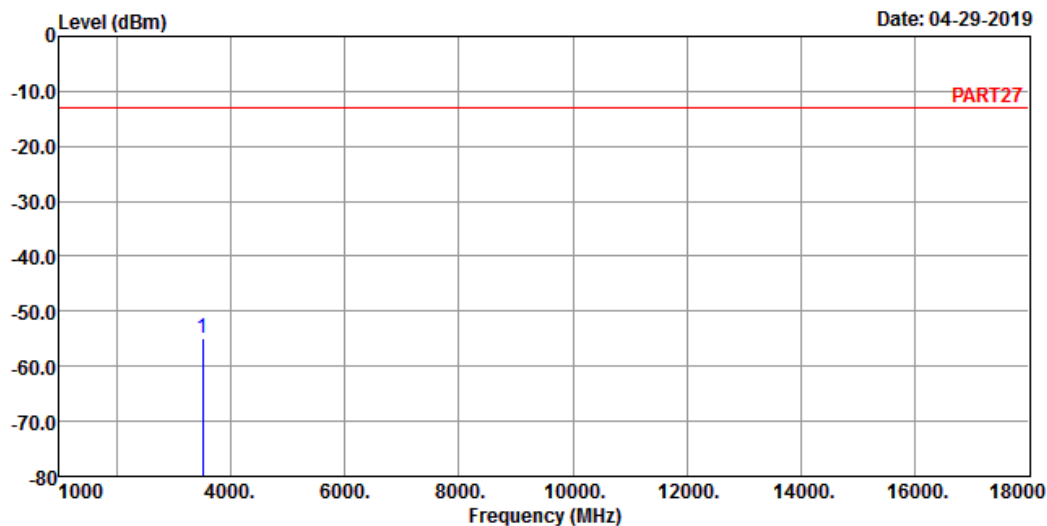
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : Cat-M1 Band 4 QPSK_1.4M Link_H-CH
Tested by: Thomas Wei

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	

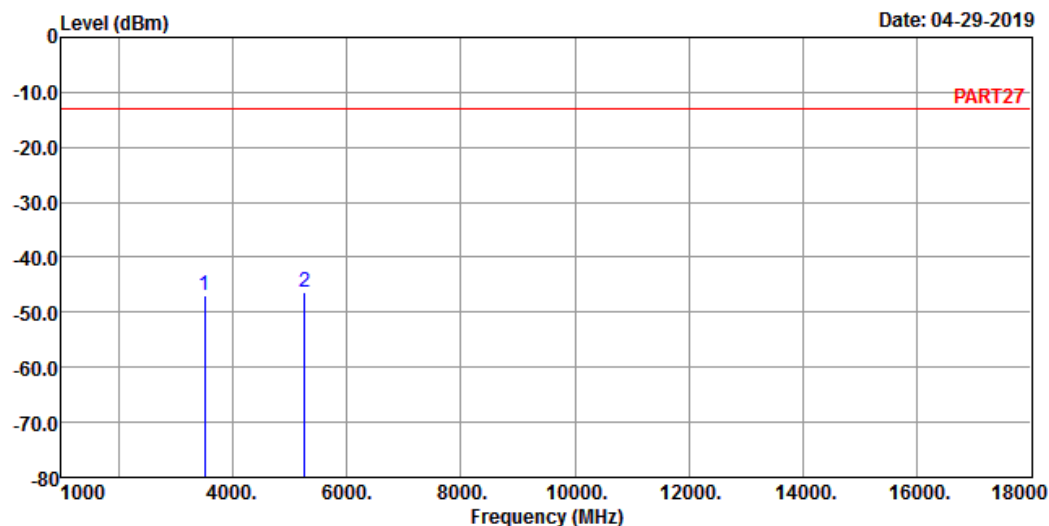
1 pp 3508.60 -54.78 -47.33 -13.00 -7.45 -41.78 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART27 VERTICAL

Remak : Cat-M1 Band 4 QPSK_1.4M Link_H-CH

Tested by: Thomas Wei

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3508.60	-47.08	-39.63	-13.00	-7.45	-34.08	Peak
2 pp	5262.90	-46.35	-43.83	-13.00	-2.52	-33.35	Peak

Channel Bandwidth: 5 MHz / QPSK
Low Channel

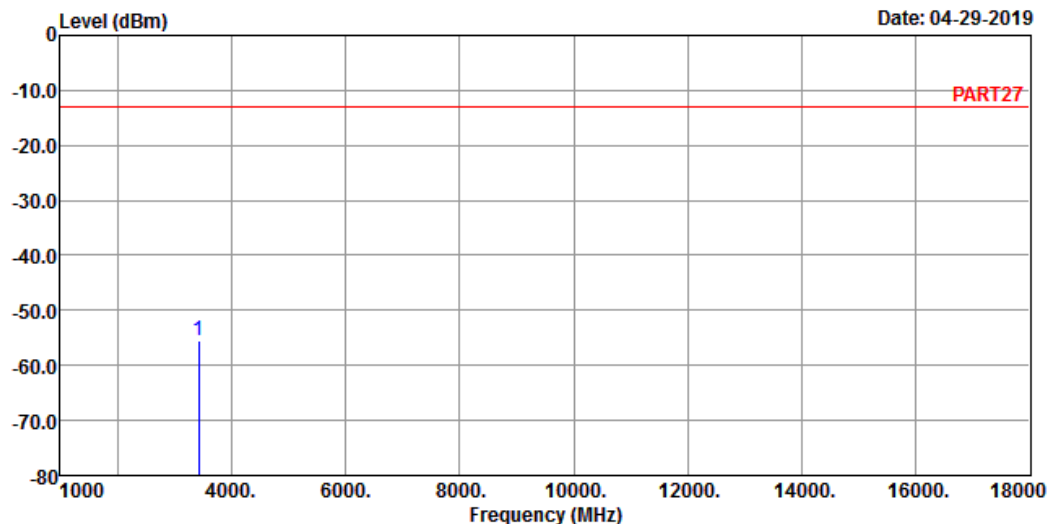


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 04-29-2019



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : Cat-M1 Band 4 QPSK_5M Link_L-CH
Tested by: Thomas Wei

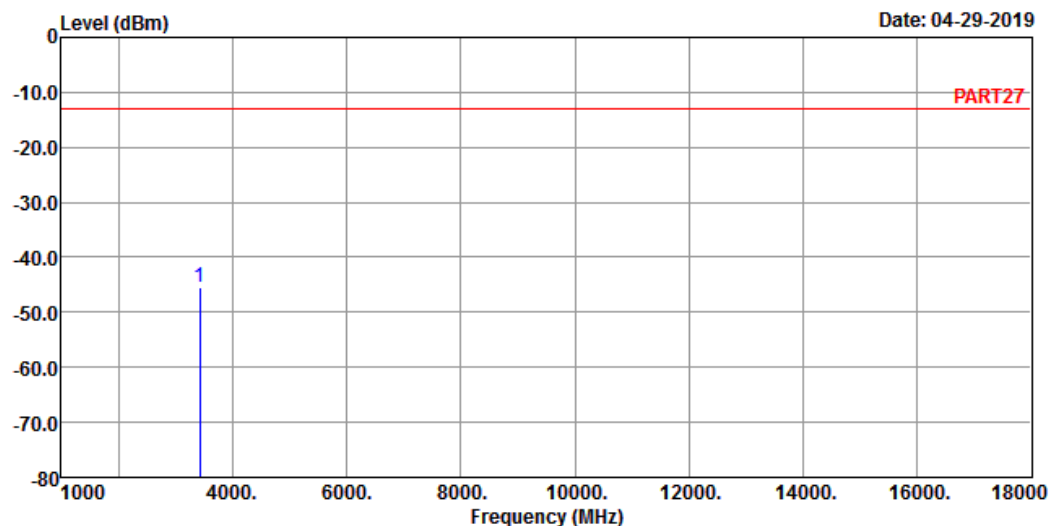
Freq	Level	Read	Limit	Over	Remark
MHz	dBm	Level	Line	Limit	
		dBm	Factor	dB	
1 pp 3425.00	-55.53	-47.19	-13.00	-8.34	-42.53 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5
 Condition: PART27 VERTICAL
 Remak : Cat-M1 Band 4 QPSK_5M Link_L-CH
 Tested by: Thomas Wei

Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3425.00	-45.57	-37.23	-13.00	-8.34	-32.57	Peak

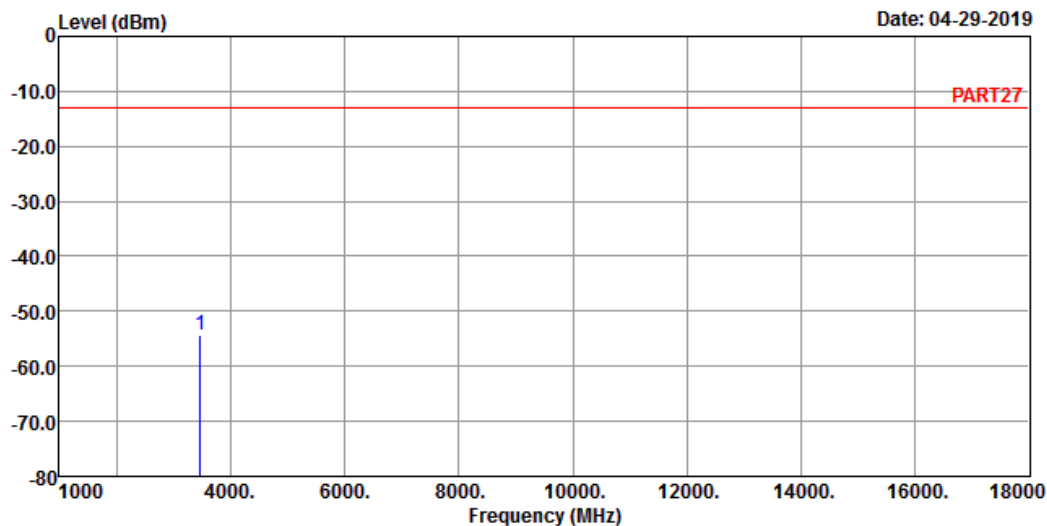
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : Cat-M1 Band 4 QPSK_5M Link_M-CH
Tested by: Thomas Wei

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	

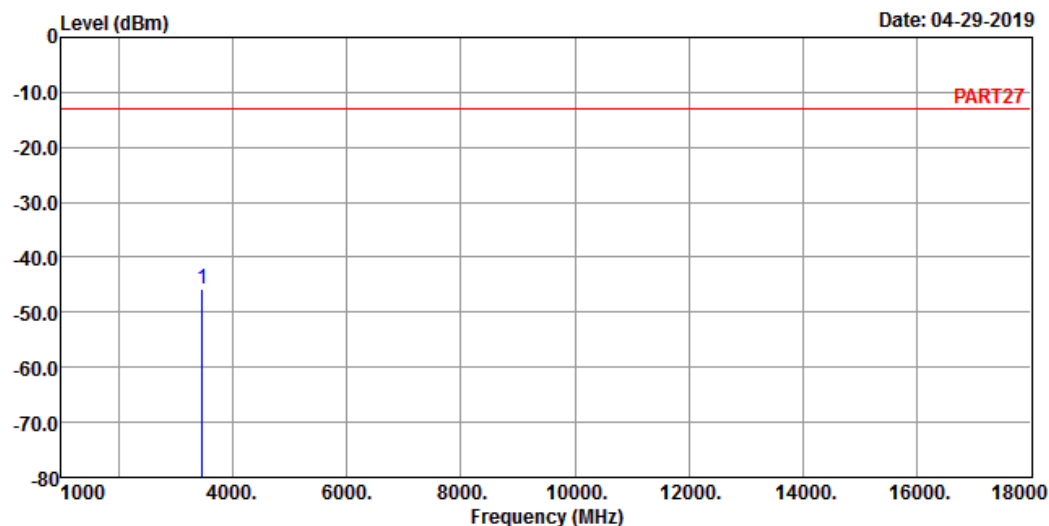
1 pp 3465.00 -54.44 -46.56 -13.00 -7.88 -41.44 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART27 VERTICAL

Remak : Cat-M1 Band 4 QPSK_5M Link_M-CH

Tested by: Thomas Wei

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3465.00	-45.88	-38.00	-13.00	-7.88	-32.88	Peak

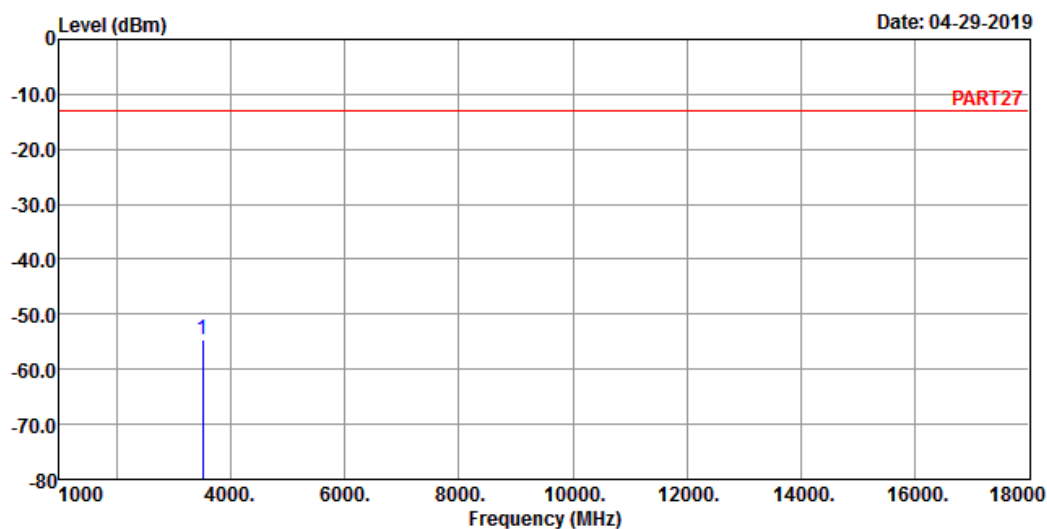
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : Cat-M1 Band 4 QPSK_5M Link_H-CH
Tested by: Thomas Wei

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	

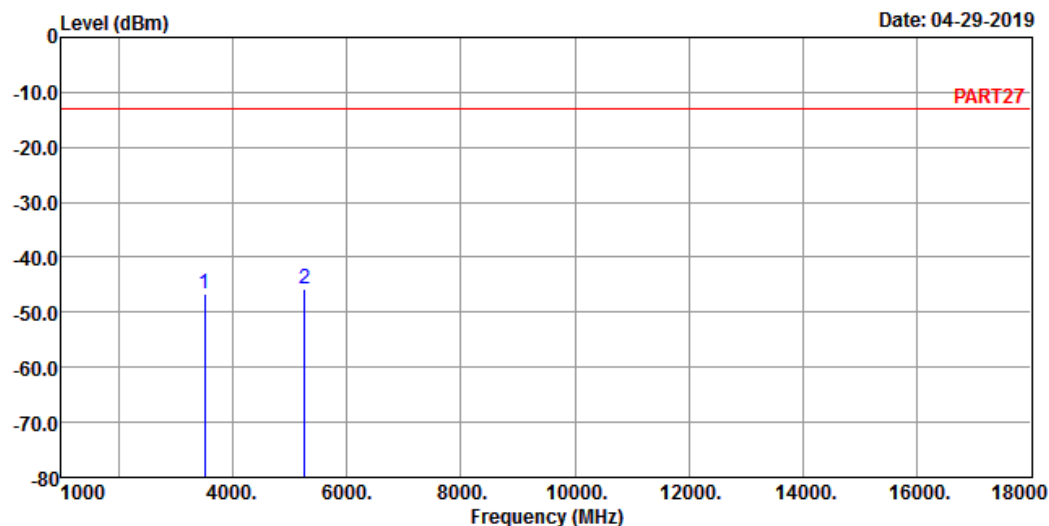
1 pp 3505.00 -54.65 -47.20 -13.00 -7.45 -41.65 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : Cat-M1 Band 4 QPSK_5M Link_H-CH
Tested by: Thomas Wei

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3505.00	-46.64	-39.19	-13.00	-7.45	-33.64	Peak
2 pp	5257.50	-45.84	-43.32	-13.00	-2.52	-32.84	Peak

Channel Bandwidth: 20 MHz / QPSK
Low Channel

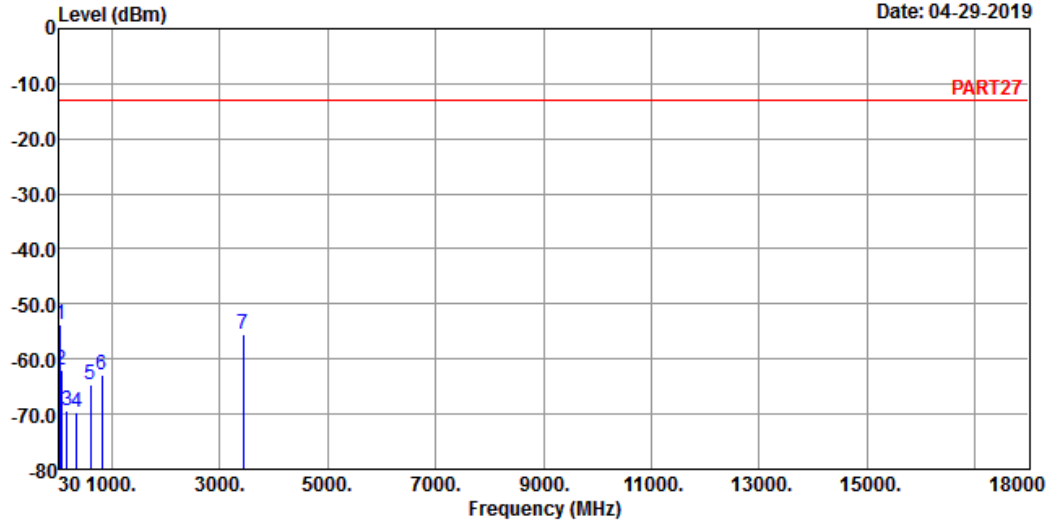


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 04-29-2019



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : Cat-M1 Band 4 QPSK_20M Link_L-CH
Tested by: Thomas Wei

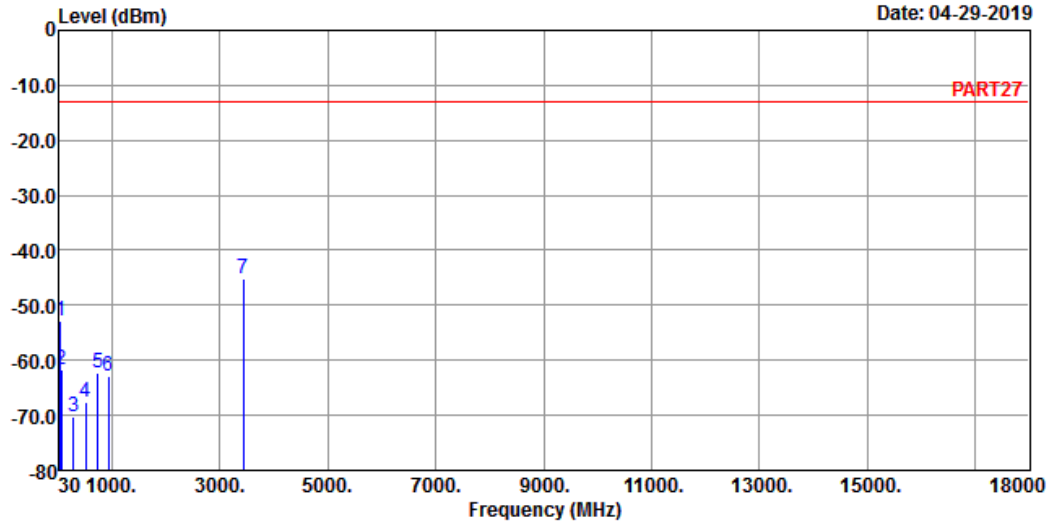
	Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	44.55	-53.75	-51.76	-13.00	-1.99	-40.75	Peak
2	60.07	-62.08	-54.42	-13.00	-7.66	-49.08	Peak
3	162.89	-69.25	-64.20	-13.00	-5.05	-56.25	Peak
4	353.01	-69.61	-63.39	-13.00	-6.22	-56.61	Peak
5	604.24	-64.57	-63.81	-13.00	-0.76	-51.57	Peak
6	822.49	-62.92	-63.46	-13.00	0.54	-49.92	Peak
7	3440.00	-55.48	-47.26	-13.00	-8.22	-42.48	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6



Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : Cat-M1 Band 4 QPSK_20M Link_L-CH
Tested by: Thomas Wei

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	43.58	-52.72	-51.25	-13.00	-1.47	-39.72	Peak
2	60.07	-61.63	-53.97	-13.00	-7.66	-48.63	Peak
3	292.87	-70.27	-63.40	-13.00	-6.87	-57.27	Peak
4	510.15	-67.68	-63.41	-13.00	-4.27	-54.68	Peak
5	744.89	-62.21	-62.99	-13.00	0.78	-49.21	Peak
6	932.10	-62.87	-64.24	-13.00	1.37	-49.87	Peak
7 pp	3440.00	-45.19	-36.97	-13.00	-8.22	-32.19	Peak

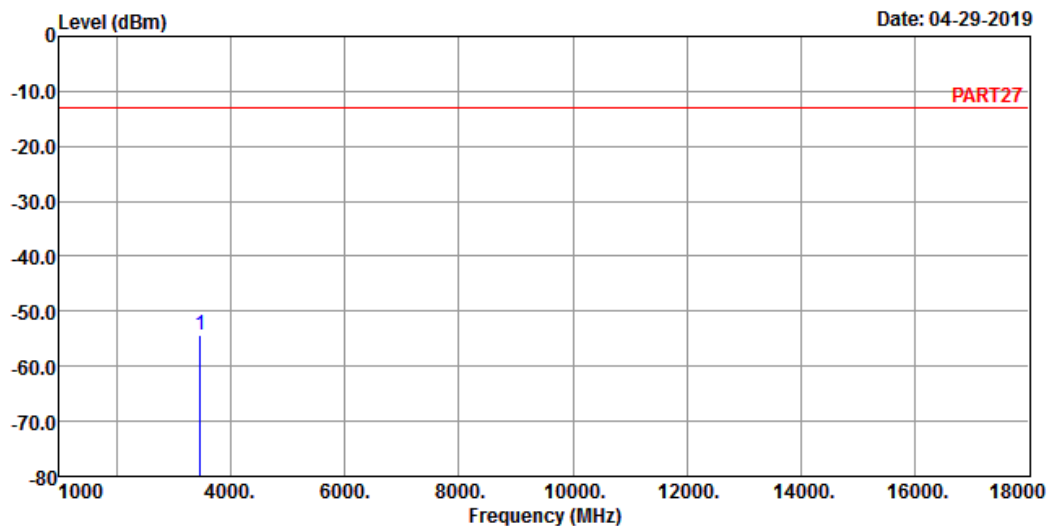
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : Cat-M1 Band 4 QPSK_20M Link_M-CH
Tested by: Thomas Wei

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	

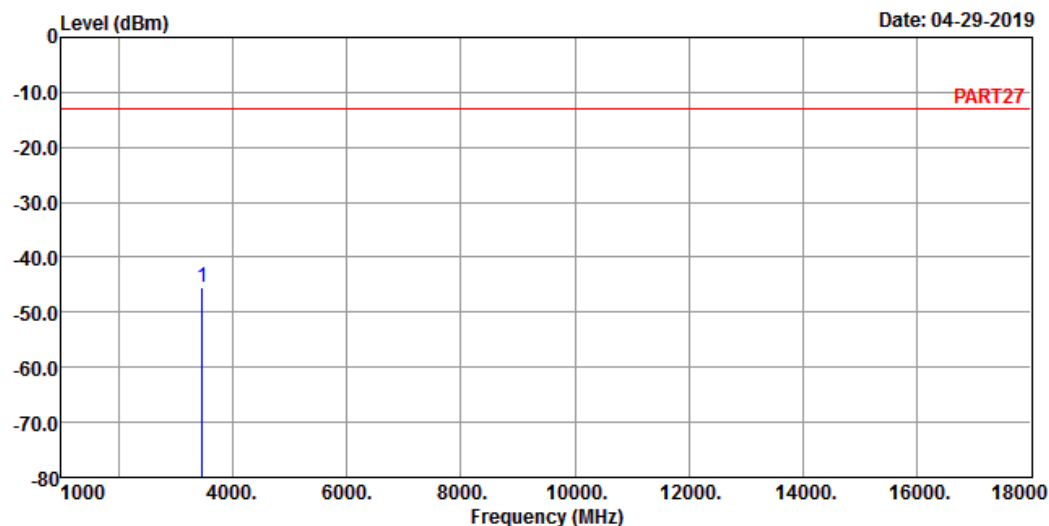
1 pp 3465.00 -54.39 -46.51 -13.00 -7.88 -41.39 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART27 VERTICAL

Remak : Cat-M1 Band 4 QPSK_20M Link_M-CH

Tested by: Thomas Wei

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3465.00	-45.32	-37.44	-13.00	-7.88	-32.32	Peak

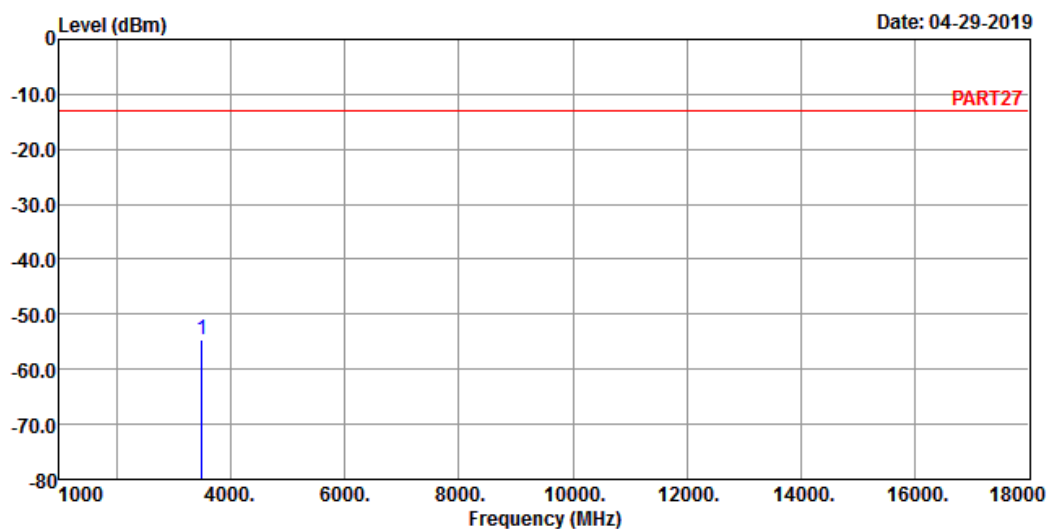
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : Cat-M1 Band 4 QPSK_20M Link_H-CH
Tested by: Thomas Wei

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	

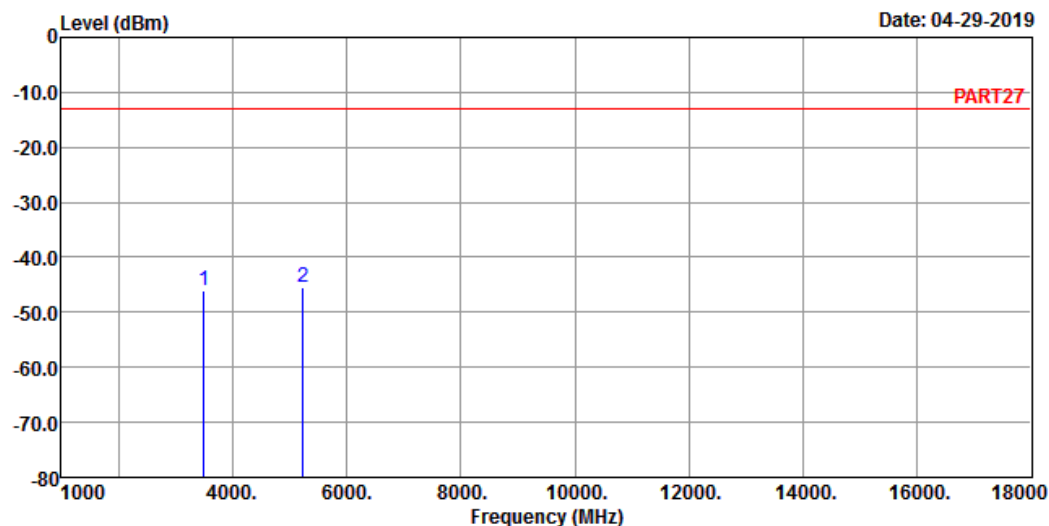
1 pp 3490.00 -54.60 -46.95 -13.00 -7.65 -41.60 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5
 Condition: PART27 VERTICAL
 Remak : Cat-M1 Band 4 QPSK_20M Link_H-CH
 Tested by: Thomas Wei

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3490.00	-46.14	-38.49	-13.00	-7.65	-33.14	Peak
2 pp	5235.00	-45.54	-43.13	-13.00	-2.41	-32.54	Peak

5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---