

FCC Test Report

(PART 24)

Report No.: RF190415C07-1

FCC ID: O9YJKS3

Test Model: JKS3A

Series Model: ATS100M-YZ-V, ATS100M-YZ-S, JKS3B, ATS100M-Y-V, ATS100M-Y-S, JKS3C, ATS100M-Z-V, ATS100M-Z-S, JKS3D, ATS100M-V, ATS100M-S
(Refer to section 3.1 for detail)

Received Date: Apr. 15, 2019

Test Date: May 07 ~ May 21, 2019

Issued Date: Jun. 11, 2019

Applicant: Spireon Inc

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
(R.O.C)

Test Location: No. 19, Hwa Ya 2nd Rd, Wen Hwa Vil, Kwei Shan Dist., Taoyuan City
33383, Taiwan (R.O.C)

FCC Registration /
Designation Number: 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF190415C07-1	Original Release	Jun. 11, 2019

1 Certificate of Conformity

Product: GPS Tracker

Brand: Spireon

Test Model: JKS3A

Series Model: ATS100M-YZ-V, ATS100M-YZ-S, JKS3B, ATS100M-Y-V, ATS100M-Y-S, JKS3C, ATS100M-Z-V, ATS100M-Z-S, JKS3D, ATS100M-V, ATS100M-S (Refer to section 3.1 for detail)

Sample Status: Engineering Sample

Applicant: Spireon Inc

Test Date: May 07 ~ May 21, 2019

Standards: FCC Part 24, Subpart E

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 :



Date: Jun. 11, 2019

Lena Wang / Specialist

Approved by :



Date: Jun. 11, 2019

Dylan Chiou / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 24 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 24.232	Effective Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1046 24.232(d)	Peak to Average Ratio	Pass	Meet the requirement of limit.
2.1055 24.235	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
24.238	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 24.238	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 24.238	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -19.35 dB at 7620.00 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	101261	Apr. 15, 2019	Apr. 14, 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- 8000&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
LTE Wireless Communication Test Set Keysight	E7515A	MY57270629	Feb. 22, 2019	Feb. 22, 2020
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 16, 2017	Aug. 15, 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 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.

3 General Information

3.1 General Description of EUT

Product	GPS Tracker	
Brand	Spireon	
Test Model	JKS3A	
Series Model	ATS100M-YZ-V, ATS100M-YZ-S, JKS3B, ATS100M-Y-V, ATS100M-Y-S, JKS3C, ATS100M-Z-V, ATS100M-Z-S, JKS3D, ATS100M-V, ATS100M-S	
Status of EUT	Engineering Sample	
Power Supply Rating	12 Vdc (adapter) 3.7 Vdc (battery)	
Modulation Type	LTE	QPSK, 16QAM
Frequency Range	LTE Band 25 (Channel Bandwidth: 1.4 MHz)	1850.7 ~ 1914.3 MHz
	LTE Band 25 (Channel Bandwidth: 3 MHz)	1851.5 ~ 1913.5 MHz
	LTE Band 25 (Channel Bandwidth: 5 MHz)	1852.5 ~ 1912.5 MHz
	LTE Band 25 (Channel Bandwidth: 10 MHz)	1855.0 ~ 1910.0 MHz
	LTE Band 25 (Channel Bandwidth: 15 MHz)	1857.5 ~ 1907.5 MHz
	LTE Band 25 (Channel Bandwidth: 20 MHz)	1860.0 ~ 1905.0 MHz
Max. EIRP Power	LTE Band 25 (Channel Bandwidth: 1.4 MHz)	500.03 mW
	LTE Band 25 (Channel Bandwidth: 3 MHz)	504.66 mW
	LTE Band 25 (Channel Bandwidth: 5 MHz)	517.61 mW
	LTE Band 25 (Channel Bandwidth: 10 MHz)	527.23 mW
	LTE Band 25 (Channel Bandwidth: 15 MHz)	535.80 mW
	LTE Band 25 (Channel Bandwidth: 20 MHz)	539.51 mW
Emission Designator	LTE Band 25 (Channel Bandwidth: 1.4 MHz)	1M09G7D
	LTE Band 25 (Channel Bandwidth: 3 MHz)	1M10G7D
	LTE Band 25 (Channel Bandwidth: 5 MHz)	1M10G7D
	LTE Band 25 (Channel Bandwidth: 10 MHz)	1M09G7D
	LTE Band 25 (Channel Bandwidth: 15 MHz)	1M11G7D
	LTE Band 25 (Channel Bandwidth: 20 MHz)	1M10G7D
Antenna Type	PIFA Antenna with 3.6 dBi gain	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

1. All models are listed as below. Model JKS3A is the representative for final test.

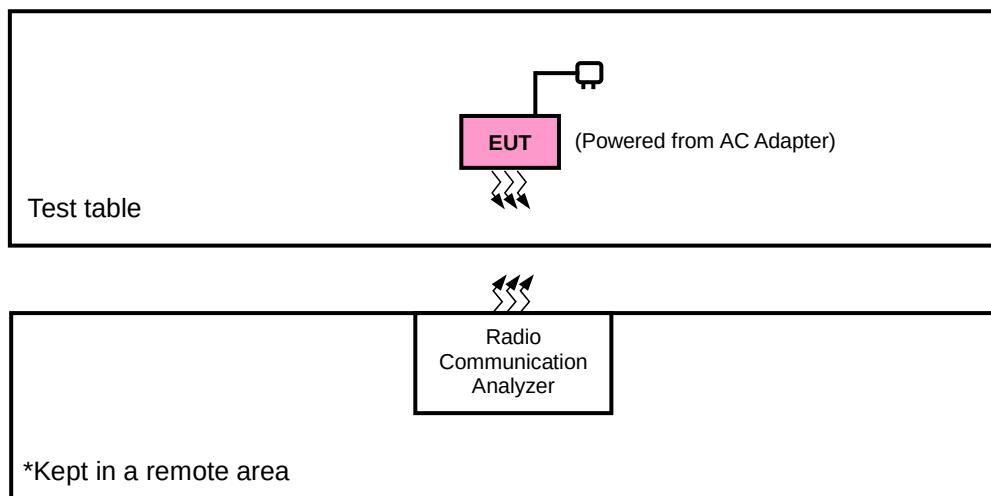
Brand	Model	Difference
Spireon	JKS3A	With Battery; With Buzzer
	ATS100M-YZ-V	
	ATS100M-YZ-S	
	JKS3B	With Battery; Without Buzzer
	ATS100M-Y-V	
	ATS100M-Y-S	
	JKS3C	Without Battery; With Buzzer
	ATS100M-Z-V	
	ATS100M-Z-S	
	JKS3D	Without Battery; Without Buzzer
	ATS100M-V	
	ATS100M-S	

2. The EUT uses following adapter. (For support unit only)

Brand	Chanel Well Technology
Model	CAP012121
Input Power	100-240 Vac, 47~63 Hz, 0.35 A
Output Power	12 Vdc, 1.0 A
Power Line	2.25m non-shuelded DC power cable without core

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

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.	Radio Communication Analyzer	ANRITSU	MT8821C	6201502978	N/A
2.	Adapter	Chanel Well Technology	CAP012121	N/A	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A
2.	2.25m

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items 1 acted as communication partners to transfer data.
3. Items 2 was provided by client.

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	EIRP	Radiated Emission
LTE Band 25	Y-plane	Y-axis

LTE Band 25

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	26047 to 26683	26047, 26365, 26683	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26055 to 26675	26055, 26365, 26675	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26065 to 26665	26065, 26365, 26665	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26090 to 26640	26090, 26365, 26640	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26115 to 26615	26115, 26365, 26615	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26140 to 26590	26140, 26365, 26590	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Modulation Characteristics	26090 to 26640	26365	20 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
-	Frequency Stability	26047 to 26683	26047, 26683	1.4 MHz	QPSK	1 RB / 0 RB Offset
		26055 to 26675	26055, 26675	3 MHz	QPSK	1 RB / 0 RB Offset
		26065 to 26665	26065, 26665	5 MHz	QPSK	1 RB / 0 RB Offset
		26090 to 26640	26090, 26640	10 MHz	QPSK	1 RB / 0 RB Offset
		26115 to 26615	26115, 26615	15 MHz	QPSK	1 RB / 0 RB Offset
		26140 to 26590	26140, 26590	20 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	26047 to 26683	26047, 26365, 26683	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		26055 to 26675	26055, 26365, 26675	3 MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		26065 to 26665	26065, 26365, 26665	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		26090 to 26640	26090, 26365, 26640	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		26115 to 26615	26115, 26365, 26615	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		26140 to 26590	26140, 26365, 26590	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	26047 to 26683	26047, 26365, 26683	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26055 to 26675	26055, 26365, 26675	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26065 to 26665	26065, 26365, 26665	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26090 to 26640	26090, 26365, 26640	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26115 to 26615	26115, 26365, 26615	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26140 to 26590	26140, 26365, 26590	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Band Edge	26047 to 26683	26047	1.4 MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			26683	1.4 MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		26055 to 26675	26055	3 MHz	QPSK	1 RB / 0 RB Offset
						1 RB / 0 RB Offset
			26675	3 MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		26065 to 26665	26065	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			26665	5 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		26090 to 26640	26090	10 MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			26640	10 MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
		26115 to 26615	26115	15 MHz	QPSK	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
			26615	15 MHz	QPSK	1 RB / 74 RB Offset
						75 RB / 0 RB Offset
		26140 to 26590	26140	20 MHz	QPSK	1 RB / 0 RB Offset
						100 RB / 0 RB Offset
			26590	20 MHz	QPSK	1 RB / 99 RB Offset
						100 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Conducted Emission	26047 to 26683	26047, 26365, 26683	1.4 MHz	QPSK	1 RB / 0 RB Offset
		26055 to 26675	26055, 26365, 26675	3 MHz	QPSK	1 RB / 0 RB Offset
		26065 to 26665	26065, 26365, 26665	5 MHz	QPSK	1 RB / 0 RB Offset
		26090 to 26640	26090, 26365, 26640	10 MHz	QPSK	1 RB / 0 RB Offset
		26115 to 26615	26115, 26365, 26615	15 MHz	QPSK	1 RB / 0 RB Offset
		26140 to 26590	26140, 26365, 26590	20 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	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
EIRP	26 deg. C, 58 % RH	3.7 Vdc	Thomas Wei
Modulation Characteristics	26 deg. C, 58 % RH	3.7 Vdc	Getaz Yang
Frequency Stability	26 deg. C, 58 % RH	3.7 Vdc	Getaz Yang
Occupied Bandwidth	26 deg. C, 58 % RH	3.7 Vdc	Getaz Yang
Band Edge	26 deg. C, 58 % RH	3.7 Vdc	Getaz Yang
Peak to Average Ratio	26 deg. C, 58 % RH	3.7 Vdc	Getaz Yang
Conducted Emission	26 deg. C, 58 % RH	3.7 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 24

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

ANSI 63.2 -1996

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

Mobile / Portable station are limited to 2 watts e.i.r.p.

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, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$.

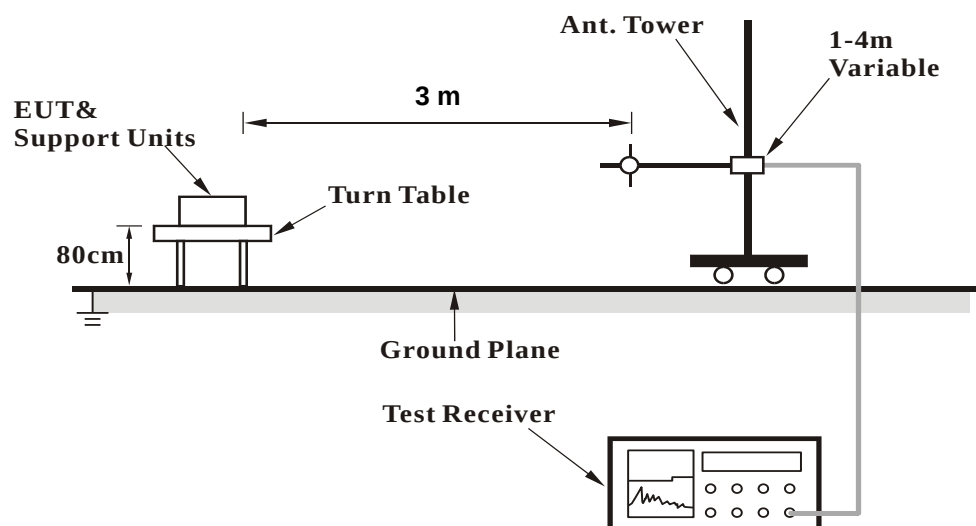
Conducted Power Measurement:

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

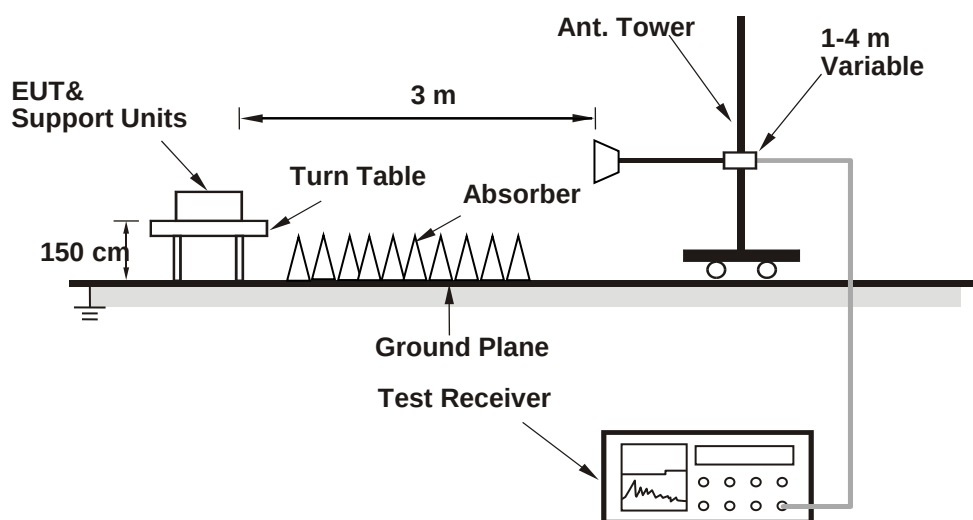
4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>

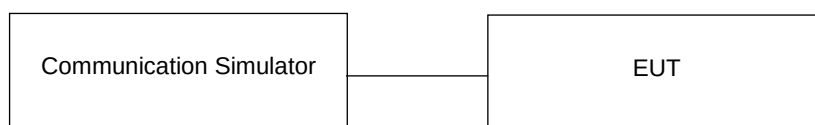


<Radiated Emission above 1 GHz>



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)

eMTC	Band 25	Region(s):	FCC	Power:	Class 3	23	Tolerance:	2.7
------	---------	------------	-----	--------	---------	----	------------	-----

maximum:	24.11
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BW(MHz):	1.4
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Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test ConfigurationInitial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	26047	1850.7	8047	1930.7	QPSK	1	0	0	-85	23.05
					QPSK	1	5	0	-85	23.05
					QPSK	3	3	0	-85	23.2
					QPSK	6	0	0	-85	23.25
					16QAM	1	0	0	-85	23.17
					16QAM	1	5	0	-85	23.13
					16QAM	3	0	0	-85	23.02
					16QAM	5	0	0	-85	23.18
Mid Range	26365	1882.5	8365	1962.5	QPSK	1	0	0	-85	23.02
					QPSK	1	5	0	-85	23.26
					QPSK	3	3	0	-85	23.12
					QPSK	6	0	0	-85	23.21
					16QAM	1	0	0	-85	23.19
					16QAM	1	5	0	-85	23.13
					16QAM	3	0	0	-85	23.05
					16QAM	5	0	0	-85	23.11
High Range	26683	1914.3	8683	1994.3	QPSK	1	0	0	-85	23.51
					QPSK	1	5	0	-85	23.2
					QPSK	3	3	0	-85	23.24
					QPSK	6	0	0	-85	23.13
					16QAM	1	0	0	-85	23.2
					16QAM	1	5	0	-85	23.11
					16QAM	3	0	0	-85	23.07
					16QAM	5	0	0	-85	23.23

BW(MHz):	3
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Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test ConfigurationInitial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	26055	1851.5	8055	1931.5	QPSK	1	0	0	-85	23.2
					QPSK	1	5	0	-85	23.17
					QPSK	1	0	1	-85	23.3

					QPSK	1	5	1	-85	23.34		
					QPSK	3	3	0	-85	23.19		
					QPSK	3	3	1	-85	23.36		
					QPSK	6	0	0	-85	23.2		
					QPSK	6	0	1	-85	23.37		
					16QAM	1	0	0	-85	23.15		
					16QAM	1	5	0	-85	23.3		
					16QAM	1	0	1	-85	23.17		
					16QAM	1	5	1	-85	23.35		
					16QAM	3	0	0	-85	23.23		
					16QAM	3	3	1	-85	23.24		
					16QAM	5	0	0	-85	23.18		
					16QAM	5	0	1	-85	23.23		
					Mid Range	26365	1882.5	8365	1962.5	QPSK	1	0
QPSK	1	5	0	-85						23.22		
QPSK	1	0	1	-85						23.36		
QPSK	1	5	1	-85						23.45		
QPSK	3	3	0	-85						23.2		
QPSK	3	3	1	-85						23.1		
QPSK	6	0	0	-85						23.22		
QPSK	6	0	1	-85						23.24		
16QAM	1	0	0	-85						23.32		
16QAM	1	5	0	-85						23.31		
16QAM	1	0	1	-85						23.33		
16QAM	1	5	1	-85						23.24		
16QAM	3	0	0	-85						23.27		
16QAM	3	3	1	-85						23.35		
16QAM	5	0	0	-85		23.07						
16QAM	5	0	1	-85		22.91						
26675			8675	1992.5		QPSK		1	0	0	-85	23.67
						QPSK		1	5	0	-85	23.21
						QPSK		1	0	1	-85	23.27
						QPSK		1	5	1	-85	23.37
						QPSK		3	3	0	-85	23.35
						QPSK		3	3	1	-85	23.45
						QPSK		6	0	0	-85	23.58
						QPSK		6	0	1	-85	22.79
						16QAM		1	0	0	-85	23.62
						16QAM		1	5	0	-85	23.41
						16QAM		1	0	1	-85	23.41
						16QAM		1	5	1	-85	23.35

					16QAM	3	0	0	-85	23.05
					16QAM	3	3	1	-85	23.08
					16QAM	5	0	0	-85	23.21
					16QAM	5	0	1	-85	22.96

BW(MHz): 5

Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test ConfigurationInitial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband and Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	26065	1852.5	8065	1932.5	QPSK	1	0	0	-85	23.39
					QPSK	1	5	0	-85	23.32
					QPSK	1	0	1	-85	23.48
					QPSK	1	5	1	-85	23.49
					QPSK	1	0	3	-85	23.43
					QPSK	1	5	3	-85	23.36
					QPSK	3	0	0	-85	23.33
					QPSK	3	3	3	-85	23.46
					QPSK	6	0	0	-85	23.26
					QPSK	6	0	1	-85	23.41
					QPSK	6	0	3	-85	23.28
					16QAM	1	0	0	-85	23.36
					16QAM	1	5	0	-85	23.39
					16QAM	1	0	1	-85	23.35
					16QAM	1	5	1	-85	23.33
					16QAM	1	0	3	-85	23.33
					16QAM	1	5	3	-85	23.39
					16QAM	3	0	0	-85	23.43
					16QAM	3	3	3	-85	23.53
					16QAM	5	0	0	-85	23.53
					16QAM	5	0	1	-85	23.36
					16QAM	5	0	3	-85	23.33
Mid Range	26365	1882.5	8365	1962.5	QPSK	1	0	0	-85	23.41
					QPSK	1	5	0	-85	23.36
					QPSK	1	0	1	-85	23.46
					QPSK	1	5	1	-85	23.39
					QPSK	1	0	3	-85	23.35
					QPSK	1	5	3	-85	23.38
					QPSK	3	0	0	-85	23.34
					QPSK	3	3	3	-85	23.41
					QPSK	6	0	0	-85	23.2

High Range	26665	1912.5	8665	1992.5	QPSK	6	0	1	-85	23.18
					QPSK	6	0	3	-85	23.34
					16QAM	1	0	0	-85	23.25
					16QAM	1	5	0	-85	23.44
					16QAM	1	0	1	-85	23.4
					16QAM	1	5	1	-85	23.47
					16QAM	1	0	3	-85	23.5
					16QAM	1	5	3	-85	23.53
					16QAM	3	0	0	-85	23.64
					16QAM	3	3	3	-85	23.77
					16QAM	5	0	0	-85	23.75
					16QAM	5	0	1	-85	23.5
					16QAM	5	0	3	-85	23.52
					QPSK	1	0	0	-85	23.78
					QPSK	1	5	0	-85	23.18
					QPSK	1	0	1	-85	23.35
					QPSK	1	5	1	-85	23.12
					QPSK	1	0	3	-85	23.49
					QPSK	1	5	3	-85	23.22
					QPSK	3	0	0	-85	23.47
					QPSK	3	3	3	-85	23.44
					QPSK	6	0	0	-85	23.52
					QPSK	6	0	1	-85	23.53
					QPSK	6	0	3	-85	23.06
					16QAM	1	0	0	-85	22.97
					16QAM	1	5	0	-85	23.57
					16QAM	1	0	1	-85	23.29
					16QAM	1	5	1	-85	23.65
					16QAM	1	0	3	-85	23.51
					16QAM	1	5	3	-85	23.42
					16QAM	3	0	0	-85	23.15
					16QAM	3	3	3	-85	23.54
					16QAM	5	0	0	-85	22.98
					16QAM	5	0	1	-85	23.49
					16QAM	5	0	3	-85	23.4

BW(MHz): 10

	N _{UL}	Frequenc y of	N _{DL}	Frequenc y of	Test ConfigurationInitial of Power	EUT
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Test Frequency ID		Uplink [MHz]		Downlink [MHz]	Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	26090	1855	8090	1935	QPSK	1	0	0	-85	23.47
					QPSK	1	5	0	-85	23.4
					QPSK	1	0	3	-85	23.64
					QPSK	1	5	3	-85	23.57
					QPSK	1	0	7	-85	23.54
					QPSK	1	5	7	-85	23.52
					QPSK	4	0	0	-85	23.38
					QPSK	4	2	7	-85	23.6
					QPSK	6	0	0	-85	23.36
					QPSK	6	0	7	-85	23.52
					16QAM	1	0	0	-85	23.44
					16QAM	1	5	0	-85	23.52
					16QAM	1	0	3	-85	23.51
					16QAM	1	5	3	-85	23.45
					16QAM	1	0	7	-85	23.49
					16QAM	1	5	7	-85	23.38
					16QAM	4	2	0	-85	23.49
					16QAM	4	2	7	-85	23.55
					16QAM	5	0	0	-85	23.61
					16QAM	5	0	7	-85	23.61
Mid Range	26365	1882.5	8365	1962.5	QPSK	1	0	0	-85	23.48
					QPSK	1	5	0	-85	23.49
					QPSK	1	0	3	-85	23.58
					QPSK	1	5	3	-85	23.44
					QPSK	1	0	7	-85	23.56
					QPSK	1	5	7	-85	23.49
					QPSK	4	0	0	-85	23.49
					QPSK	4	2	7	-85	23.44
					QPSK	6	0	0	-85	23.53
					QPSK	6	0	7	-85	23.59
					16QAM	1	0	0	-85	23.36
					16QAM	1	5	0	-85	23.31
					16QAM	1	0	3	-85	23.55
					16QAM	1	5	3	-85	23.42
					16QAM	1	0	7	-85	23.56
					16QAM	1	5	7	-85	23.58
					16QAM	4	2	0	-85	23.58
					16QAM	4	2	7	-85	23.62

High Range	26640	1910	8640	1990	16QAM	5	0	0	-85	23.66
					16QAM	5	0	7	-85	23.78
					QPSK	1	0	0	-85	23.84
					QPSK	1	5	0	-85	23.68
					QPSK	1	5	7	-85	23.66
					QPSK	1	0	3	-85	23.64
					QPSK	1	5	3	-85	23.28
					QPSK	1	0	7	-85	23.39
					QPSK	4	0	0	-85	23.51
					QPSK	4	2	7	-85	23.2
					QPSK	6	0	0	-85	23.61
					QPSK	6	0	7	-85	23.34
					16QAM	1	0	0	-85	23.6
					16QAM	1	5	0	-85	23.51
					16QAM	1	0	3	-85	23.66
					16QAM	1	5	3	-85	23.64
					16QAM	1	0	7	-85	23.22
					16QAM	1	5	7	-85	22.97
					16QAM	4	2	0	-85	23.7
					16QAM	4	2	7	-85	23.4
					16QAM	5	0	0	-85	23.79
					16QAM	5	0	7	-85	23.53

BW(MHz): 15

Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test ConfigurationInitial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	26115	1857.5	8115	1937.5	QPSK	1	0	0	-85	23.56
					QPSK	1	5	0	-85	23.51
					QPSK	1	0	5	-85	23.72
					QPSK	1	5	5	-85	23.69
					QPSK	1	0	11	-85	23.66
					QPSK	1	5	11	-85	23.64
					QPSK	3	0	0	-85	23.58
					QPSK	3	3	11	-85	23.7
					QPSK	6	0	0	-85	23.58
					QPSK	6	0	11	-85	23.65
					16QAM	1	0	0	-85	23.54
					16QAM	1	5	0	-85	23.66

					16QAM	1	0	5	-85	23.61
					16QAM	1	5	5	-85	23.62
					16QAM	1	0	11	-85	23.53
					16QAM	1	5	11	-85	23.49
					16QAM	3	0	0	-85	23.62
					16QAM	3	3	11	-85	23.64
					16QAM	5	0	0	-85	23.77
					16QAM	5	0	11	-85	23.82
Mid Range	26365	1882.5	8365	1962.5	QPSK	1	0	0	-85	23.64
					QPSK	1	5	0	-85	23.6
					QPSK	1	0	5	-85	23.65
					QPSK	1	5	5	-85	23.66
					QPSK	1	0	11	-85	23.67
					QPSK	1	5	11	-85	23.67
					QPSK	3	0	0	-85	23.6
					QPSK	3	3	11	-85	23.57
					QPSK	6	0	0	-85	23.64
					QPSK	6	0	11	-85	23.68
					16QAM	1	0	0	-85	23.46
					16QAM	1	5	0	-85	23.37
					16QAM	1	0	5	-85	23.68
					16QAM	1	5	5	-85	23.48
					16QAM	1	0	11	-85	23.63
					16QAM	1	5	11	-85	23.67
					16QAM	3	0	0	-85	23.72
					16QAM	3	3	11	-85	23.73
High Range	26615	1907.5	8615	1987.5	16QAM	5	0	0	-85	23.82
					16QAM	5	0	11	-85	23.89
					QPSK	1	0	0	-85	24.01
					QPSK	1	5	11	-85	23.73
					QPSK	1	0	5	-85	23.76
					QPSK	1	5	5	-85	23.7
					QPSK	1	0	11	-85	23.41
					QPSK	1	5	11	-85	23.44
					QPSK	3	0	0	-85	23.65
					QPSK	3	3	11	-85	23.33
					QPSK	6	0	0	-85	23.71
					QPSK	6	0	11	-85	23.49
					16QAM	1	0	0	-85	23.65
					16QAM	1	5	0	-85	23.65
					16QAM	1	0	5	-85	23.79

					16QAM	1	5	5	-85	23.73
					16QAM	1	0	11	-85	23.31
					16QAM	1	5	11	-85	23.16
					16QAM	3	0	0	-85	23.85
					16QAM	3	3	11	-85	23.52
					16QAM	5	0	0	-85	23.88
					16QAM	5	0	11	-85	23.73

BW(MHz): 20

Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test ConfigurationInitial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband and Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	26140	1860	8140	1940	QPSK	1	0	0	-85	23.69
					QPSK	1	5	0	-85	23.64
					QPSK	1	0	7	-85	23.85
					QPSK	1	5	7	-85	23.83
					QPSK	1	0	15	-85	23.79
					QPSK	1	5	15	-85	23.76
					QPSK	3	0	0	-85	23.69
					QPSK	3	3	15	-85	23.8
					QPSK	6	0	0	-85	23.67
					QPSK	6	0	15	-85	23.78
					16QAM	1	0	0	-85	23.68
					16QAM	1	5	0	-85	23.75
					16QAM	1	0	7	-85	23.73
					16QAM	1	5	7	-85	23.72
					16QAM	1	0	15	-85	23.68
					16QAM	1	5	15	-85	23.65
					16QAM	3	0	0	-85	23.78
					16QAM	3	3	15	-85	23.76
					16QAM	5	0	0	-85	23.88
					16QAM	5	0	15	-85	23.92
Mid Range	26365	1882.5	8365	1962.5	QPSK	1	0	0	-85	23.75
					QPSK	1	5	0	-85	23.69
					QPSK	1	0	7	-85	23.77
					QPSK	1	5	7	-85	23.75
					QPSK	1	0	15	-85	23.79
					QPSK	1	5	15	-85	23.77
					QPSK	3	0	0	-85	23.75

					QPSK	3	3	15	-85	23.71
					QPSK	6	0	0	-85	23.74
					QPSK	6	0	15	-85	23.77
					16QAM	1	0	0	-85	23.57
					16QAM	1	5	0	-85	23.52
					16QAM	1	0	7	-85	23.79
					16QAM	1	5	7	-85	23.62
					16QAM	1	0	15	-85	23.79
					16QAM	1	5	15	-85	23.81
					16QAM	3	0	0	-85	23.83
					16QAM	3	3	15	-85	23.86
					16QAM	5	0	0	-85	23.91
					16QAM	5	0	15	-85	24.03
High Range	26590	1905	8590	1985	QPSK	1	0	0	-85	24.11
					QPSK	1	5	0	-85	23.89
					QPSK	1	0	7	-85	23.87
					QPSK	1	5	7	-85	23.84
					QPSK	1	0	15	-85	23.56
					QPSK	1	5	15	-85	23.58
					QPSK	3	0	0	-85	23.81
					QPSK	3	3	15	-85	23.49
					QPSK	6	0	0	-85	23.87
					QPSK	6	0	15	-85	23.65
					16QAM	1	0	0	-85	23.81
					16QAM	1	5	0	-85	23.76
					16QAM	1	0	7	-85	23.89
					16QAM	1	5	7	-85	23.86
					16QAM	1	0	15	-85	23.43
					16QAM	1	5	15	-85	23.25
					16QAM	3	0	0	-85	23.95
					16QAM	3	3	15	-85	23.65
					16QAM	5	0	0	-85	24.04
					16QAM	5	0	15	-85	23.83

EIRP Power (dBm)

LTE Band 25							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	26047	1850.7	-9.85	36.57	26.72	469.89	H
	26365	1882.5	-10.49	37.22	26.73	470.98	
	26683	1914.3	-12.10	39.09	26.99	500.03	
	26047	1850.7	-17.69	37.65	19.96	99.08	V
	26365	1882.5	-17.58	37.58	20.00	100.00	
	26683	1914.3	-17.74	37.92	20.18	104.23	
Channel Bandwidth: 1.4 MHz / 16QAM							
Y	26047	1850.7	-11.27	36.57	25.30	338.84	H
	26365	1882.5	-11.77	37.22	25.45	350.75	
	26683	1914.3	-13.38	39.09	25.71	372.39	
	26047	1850.7	-20.20	37.65	17.45	55.59	V
	26365	1882.5	-19.81	37.58	17.77	59.84	
	26683	1914.3	-20.01	37.92	17.91	61.80	

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

LTE Band 25							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	26055	1851.5	-9.72	36.57	26.85	484.17	H
	26365	1882.5	-10.37	37.22	26.85	484.17	
	26675	1913.5	-12.08	39.11	27.03	504.66	
	26055	1851.5	-17.73	37.65	19.92	98.17	V
	26365	1882.5	-17.46	37.58	20.12	102.80	
	26675	1913.5	-17.74	37.93	20.19	104.47	
Channel Bandwidth: 3 MHz / 16QAM							
Y	26055	1851.5	-11.19	36.57	25.38	345.14	H
	26365	1882.5	-11.71	37.22	25.51	355.63	
	26675	1913.5	-13.32	39.11	25.79	379.31	
	26055	1851.5	-19.02	37.65	18.63	72.95	V
	26365	1882.5	-18.83	37.58	18.75	74.99	
	26675	1913.5	-19.08	37.93	18.85	76.74	

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

LTE Band 25							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	26065	1852.5	-9.68	36.57	26.89	488.65	H
	26365	1882.5	-10.27	37.22	26.95	495.45	
	26665	1912.5	-10.97	38.11	27.14	517.61	
	26065	1852.5	-17.69	37.65	19.96	99.08	V
	26365	1882.5	-17.36	37.58	20.22	105.20	
	26665	1912.5	-17.68	37.96	20.28	106.66	
Channel Bandwidth: 5 MHz / 16QAM							
Y	26065	1852.5	-11.01	36.57	25.56	359.75	H
	26365	1882.5	-11.48	37.22	25.74	374.97	
	26665	1912.5	-12.20	38.11	25.91	389.94	
	26065	1852.5	-18.95	37.65	18.70	74.13	V
	26365	1882.5	-18.71	37.58	18.87	77.09	
	26665	1912.5	-18.88	37.96	19.08	80.91	

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

LTE Band 25							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	26090	1855.0	-9.60	36.57	26.97	497.74	H
	26365	1882.5	-10.24	37.22	26.98	498.88	
	26640	1910.0	-10.97	38.19	27.22	527.23	
	26090	1855.0	-17.63	37.65	20.02	100.46	V
	26365	1882.5	-17.39	37.58	20.19	104.47	
	26640	1910.0	-17.81	38.15	20.34	108.14	
Channel Bandwidth: 10 MHz / 16QAM							
Y	26090	1855.0	-10.84	36.57	25.73	374.11	H
	26365	1882.5	-11.45	37.22	25.77	377.57	
	26640	1910.0	-12.34	38.19	25.85	384.59	
	26090	1855.0	-18.83	37.65	18.82	76.21	V
	26365	1882.5	-18.56	37.58	19.02	79.80	
	26640	1910.0	-19.00	38.15	19.15	82.22	

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

LTE Band 25							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	26115	1857.5	-9.55	36.57	27.02	503.50	H
	26365	1882.5	-10.17	37.22	27.05	506.99	
	26615	1907.5	-10.94	38.23	27.29	535.80	
	26115	1857.5	-17.57	37.65	20.08	101.86	V
	26365	1882.5	-17.31	37.58	20.27	106.41	
	26615	1907.5	-17.82	38.22	20.40	109.65	
Channel Bandwidth: 15 MHz / 16QAM							
Y	26115	1857.5	-10.68	36.57	25.89	388.15	H
	26365	1882.5	-11.32	37.22	25.90	389.05	
	26615	1907.5	-12.14	38.23	26.09	406.44	
	26115	1857.5	-18.73	37.65	18.92	77.98	V
	26365	1882.5	-18.44	37.58	19.14	82.04	
	26615	1907.5	-18.87	38.22	19.35	86.10	

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

LTE Band 25							
Channel Bandwidth: 20 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	26140	1860.0	-9.52	36.57	27.05	506.99	H
	26365	1882.5	-10.11	37.22	27.11	514.04	
	26590	1905.0	-11.40	38.72	27.32	539.51	
	26140	1860.0	-17.53	37.65	20.12	102.80	V
	26365	1882.5	-17.26	37.58	20.32	107.65	
	26590	1905.0	-17.11	37.56	20.45	110.92	
Channel Bandwidth: 20 MHz / 16QAM							
Y	26140	1860.0	-10.57	36.57	26.00	398.11	H
	26365	1882.5	-11.12	37.22	26.10	407.38	
	26590	1905.0	-12.42	38.72	26.30	426.58	
	26140	1860.0	-18.56	37.65	19.09	81.10	V
	26365	1882.5	-18.30	37.58	19.28	84.72	
	26590	1905.0	-18.15	37.56	19.41	87.30	

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

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

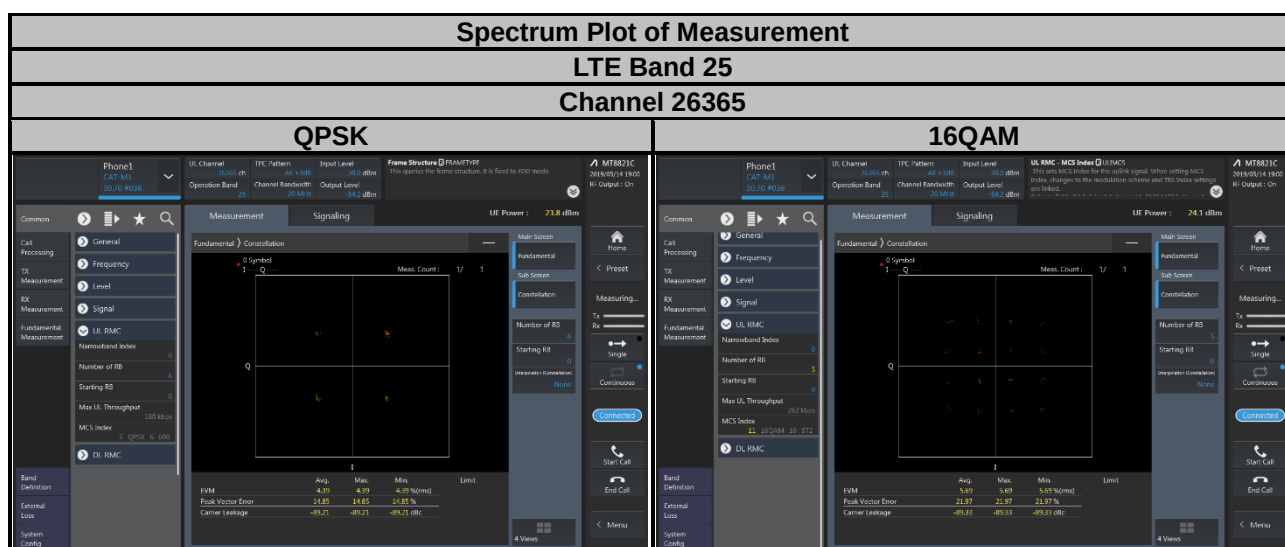
4.2.2 Test Setup



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

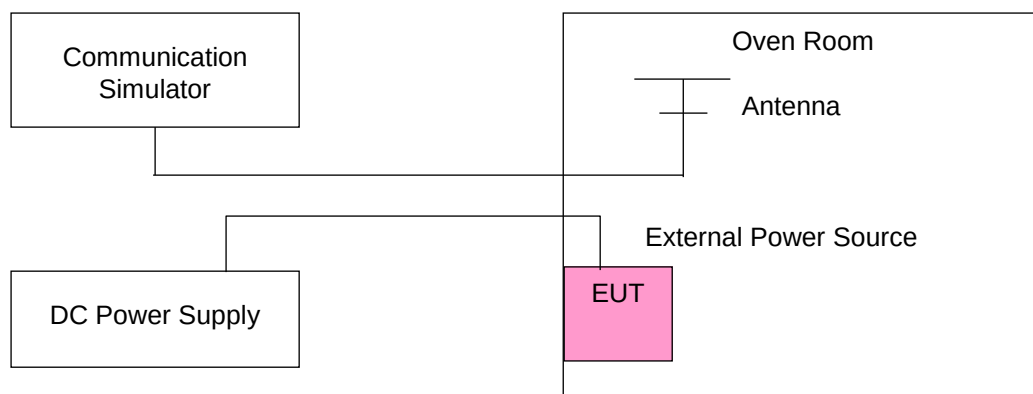
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

4.3.2 Test Procedure

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

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

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 25			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.145	1850.700003	0.001	1914.300002	0.001
3.7	1850.700002	0.001	1914.300001	0.001
4.225	1850.700002	0.001	1914.300001	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.7 Vdc to 4.225 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 25			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1850.700004	0.002	1914.300003	0.002
-30	1850.700004	0.002	1914.300003	0.002
-20	1850.700002	0.001	1914.300001	0.001
-10	1850.700002	0.001	1914.300003	0.002
0	1850.700003	0.002	1914.300004	0.002
10	1850.699997	-0.002	1914.299998	-0.001
20	1850.699998	-0.001	1914.299996	-0.002
30	1850.699998	-0.001	1914.299998	-0.001
40	1850.699997	-0.001	1914.299998	-0.001
50	1850.699998	-0.001	1914.299999	-0.001
60	1850.699997	-0.002	1914.299998	-0.001
70	1850.699998	-0.001	1914.299999	-0.001
75	1850.699997	-0.002	1914.299998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 25			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.145	1850.700002	0.001	1914.300004	0.002
3.7	1850.700004	0.002	1914.300004	0.002
4.225	1850.700001	0.001	1914.300003	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.7 Vdc to 4.225 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 25			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1850.700002	0.001	1914.300003	0.001
-30	1850.700004	0.002	1914.300003	0.002
-20	1850.700004	0.002	1914.300001	0.001
-10	1850.700001	0.001	1914.300003	0.002
0	1850.700002	0.001	1914.300004	0.002
10	1850.699999	-0.001	1914.299999	-0.001
20	1850.699999	-0.001	1914.299998	-0.001
30	1850.699997	-0.001	1914.299997	-0.001
40	1850.699999	-0.001	1914.299997	-0.002
50	1850.699996	-0.002	1914.299997	-0.002
60	1850.699999	-0.001	1914.299998	-0.001
70	1850.699997	-0.002	1914.299997	-0.002
75	1850.699998	-0.001	1914.299997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 25			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.145	1850.700003	0.002	1914.300003	0.001
3.7	1850.700004	0.002	1914.300003	0.001
4.225	1850.700002	0.001	1914.300004	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.7 Vdc to 4.225 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 25			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1850.700004	0.002	1914.300001	0.001
-30	1850.700003	0.002	1914.300004	0.002
-20	1850.700003	0.002	1914.300001	0.001
-10	1850.700002	0.001	1914.300002	0.001
0	1850.700001	0.001	1914.300004	0.002
10	1850.699997	-0.001	1914.299999	-0.001
20	1850.699999	-0.001	1914.299997	-0.002
30	1850.699997	-0.002	1914.299999	-0.001
40	1850.699998	-0.001	1914.299998	-0.001
50	1850.699999	-0.001	1914.299996	-0.002
60	1850.699998	-0.001	1914.299998	-0.001
70	1850.699998	-0.001	1914.299999	-0.001
75	1850.699996	-0.002	1914.299997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 25			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.145	1850.700001	0.001	1914.300001	0.001
3.7	1850.700002	0.001	1914.300003	0.001
4.225	1850.700003	0.002	1914.300002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.7 Vdc to 4.225 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 25			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1850.700003	0.002	1914.300003	0.002
-30	1850.700002	0.001	1914.300002	0.001
-20	1850.700002	0.001	1914.300003	0.002
-10	1850.700001	0.001	1914.300003	0.002
0	1850.700003	0.001	1914.300003	0.001
10	1850.699998	-0.001	1914.299997	-0.002
20	1850.699997	-0.002	1914.299997	-0.002
30	1850.699998	-0.001	1914.299996	-0.002
40	1850.699998	-0.001	1914.299998	-0.001
50	1850.699997	-0.002	1914.299999	-0.001
60	1850.699998	-0.001	1914.299998	-0.001
70	1850.699999	-0.001	1914.299996	-0.002
75	1850.699996	-0.002	1914.299999	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 25			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.145	1850.700002	0.001	1914.300002	0.001
3.7	1850.700001	0.001	1914.300001	0.001
4.225	1850.700002	0.001	1914.300003	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.7 Vdc to 4.225 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 25			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1850.700002	0.001	1914.300001	0.001
-30	1850.700002	0.001	1914.300003	0.002
-20	1850.700002	0.001	1914.300003	0.001
-10	1850.700004	0.002	1914.300003	0.001
0	1850.700004	0.002	1914.300003	0.001
10	1850.699998	-0.001	1914.299996	-0.002
20	1850.699998	-0.001	1914.299998	-0.001
30	1850.699999	-0.001	1914.299998	-0.001
40	1850.699998	-0.001	1914.299997	-0.002
50	1850.699998	-0.001	1914.299998	-0.001
60	1850.699998	-0.001	1914.299996	-0.002
70	1850.699997	-0.002	1914.299997	-0.002
75	1850.699998	-0.001	1914.299996	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 25			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.145	1850.700003	0.002	1914.300001	0.001
3.7	1850.700002	0.001	1914.300003	0.002
4.225	1850.700002	0.001	1914.300001	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.7 Vdc to 4.225 Vdc.

Frequency Error vs. Temperature

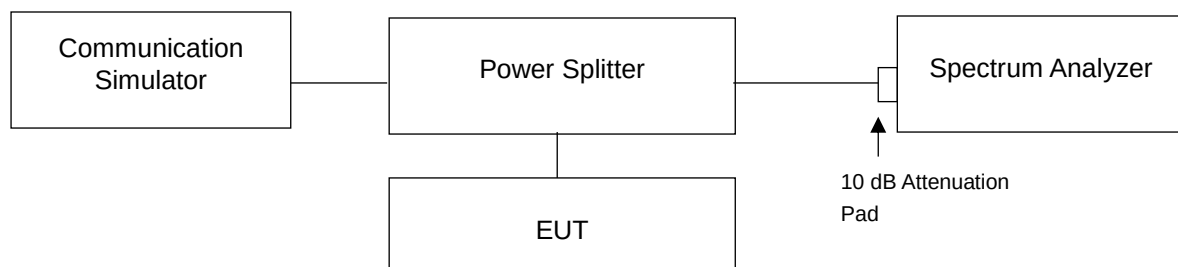
Temp. (°C)	LTE Band 25			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1850.700003	0.002	1914.300004	0.002
-30	1850.700002	0.001	1914.300002	0.001
-20	1850.700001	0.001	1914.300001	0.001
-10	1850.700003	0.002	1914.300004	0.002
0	1850.700004	0.002	1914.300003	0.002
10	1850.699997	-0.002	1914.299998	-0.001
20	1850.699998	-0.001	1914.299996	-0.002
30	1850.699996	-0.002	1914.299999	-0.001
40	1850.699999	-0.001	1914.299997	-0.002
50	1850.699996	-0.002	1914.299998	-0.001
60	1850.699999	-0.001	1914.299997	-0.002
70	1850.699996	-0.002	1914.299996	-0.002
75	1850.699997	-0.002	1914.299998	-0.001

4.4 Occupied Bandwidth Measurement

4.4.1 Test Procedure

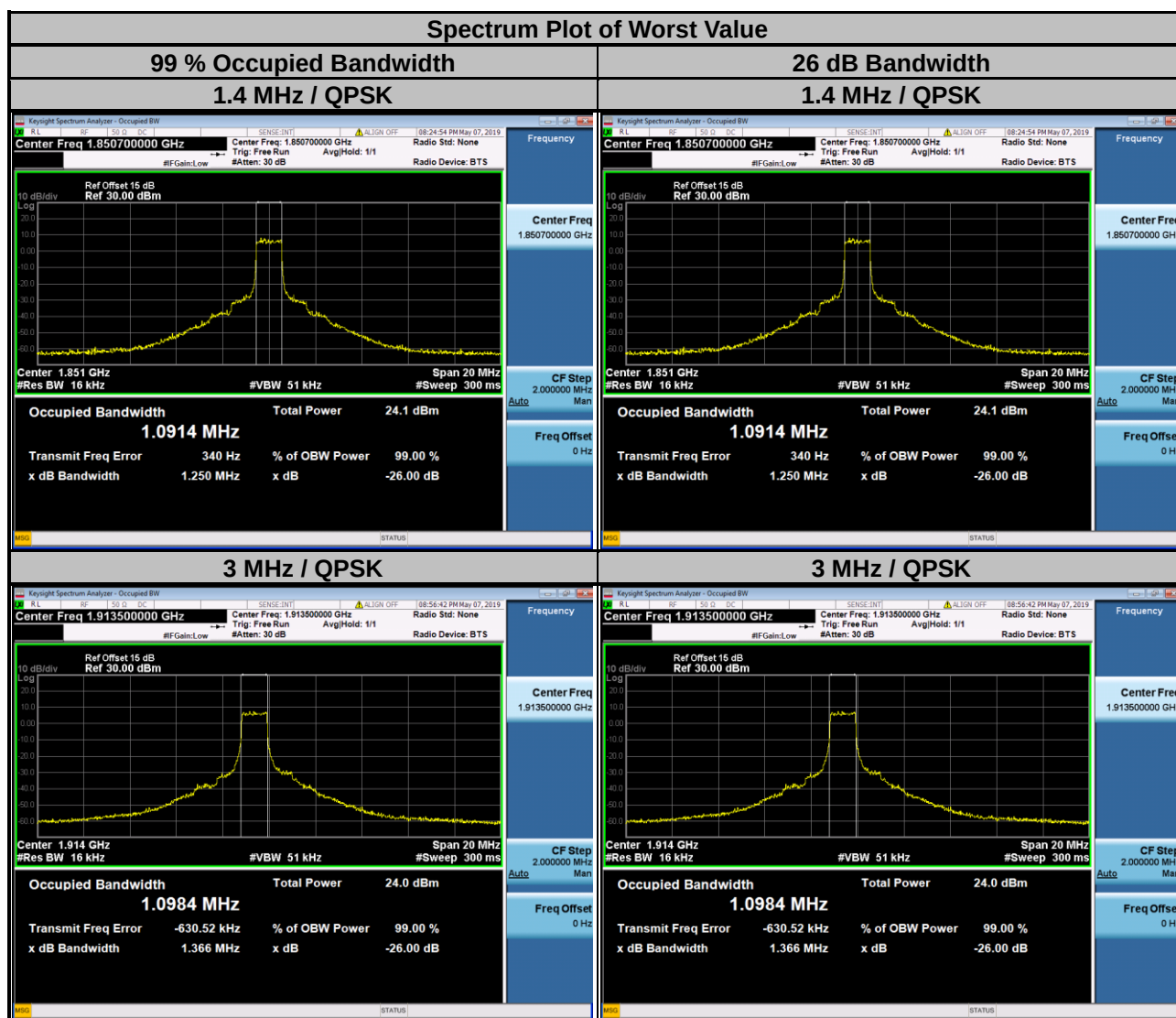
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.4.2 Test Setup



4.4.3 Test Result

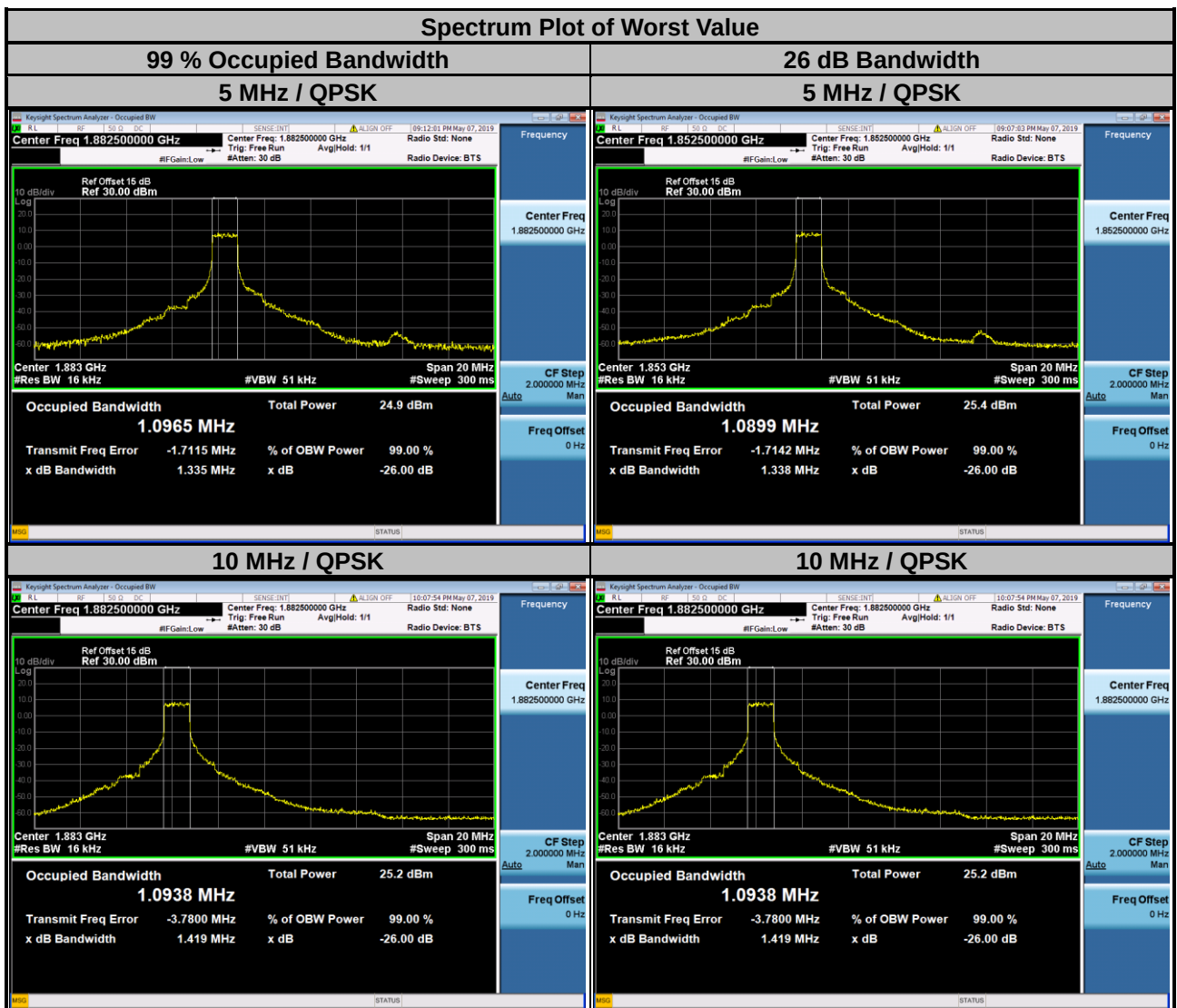
LTE Band 25					
Channel Bandwidth: 1.4 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
26047	1850.7	1.0914	0.9130	1.250	1.105
26365	1882.5	1.0913	0.9123	1.231	1.092
26683	1914.3	1.0912	0.9126	1.234	1.086
Channel Bandwidth: 3 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
26055	1851.5	1.0959	0.9214	1.365	1.185
26365	1882.5	1.0976	0.9227	1.361	1.183
26675	1913.5	1.0984	0.9084	1.366	1.161



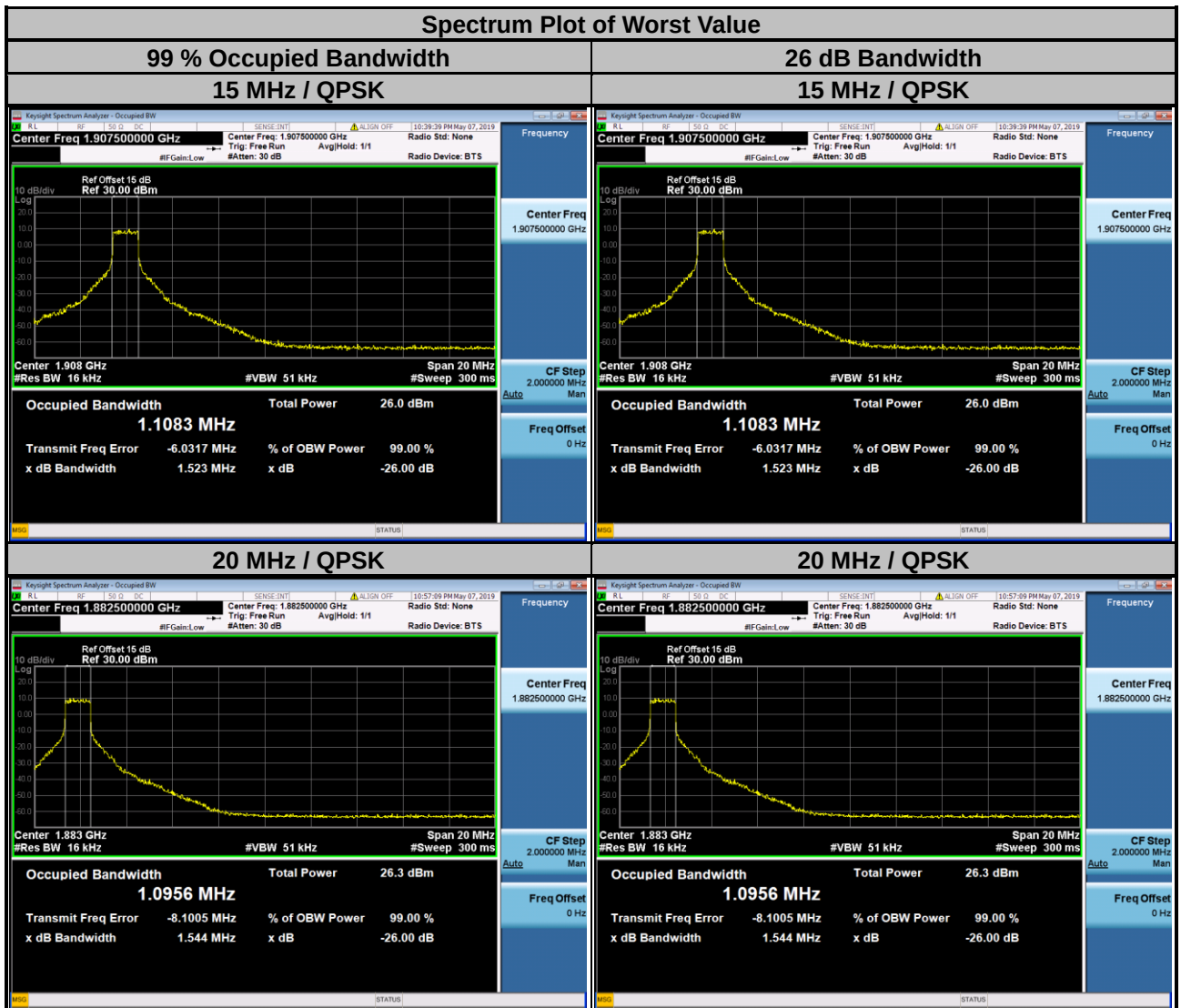
LTE Band 25

Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
26065	1852.5	1.0899	0.9137	1.338	1.160
26365	1882.5	1.0965	0.9237	1.335	1.179
26665	1912.5	1.0901	0.9196	1.330	1.158

Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
26090	1855.0	1.0934	0.9179	1.415	1.263
26365	1882.5	1.0938	0.9175	1.419	1.305
26640	1910.0	1.0937	0.9162	1.415	1.296



LTE Band 25					
Channel Bandwidth: 15 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
26115	1857.5	1.1038	0.9306	1.519	1.366
26365	1882.5	1.0903	0.9293	1.513	1.444
26615	1907.5	1.1083	0.9311	1.523	1.454
Channel Bandwidth: 20 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
26140	1860.0	1.0953	0.9222	1.477	1.448
26365	1882.5	1.0956	0.9218	1.544	1.447
26590	1905.0	1.0954	0.9214	1.468	1.461

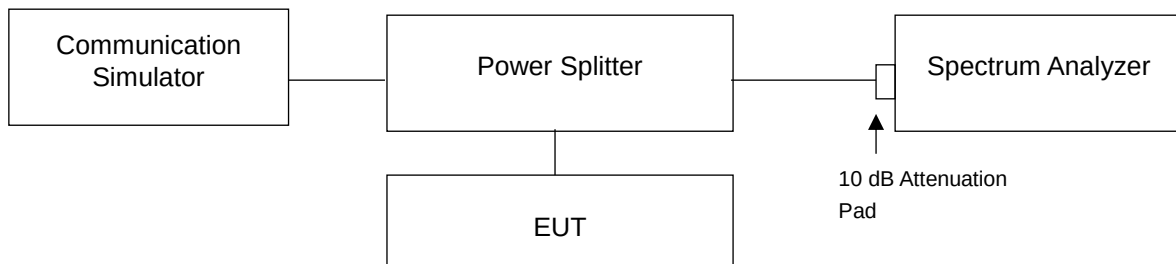


4.5 Band Edge Measurement

4.5.1 Limits of Band Edge Measurement

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

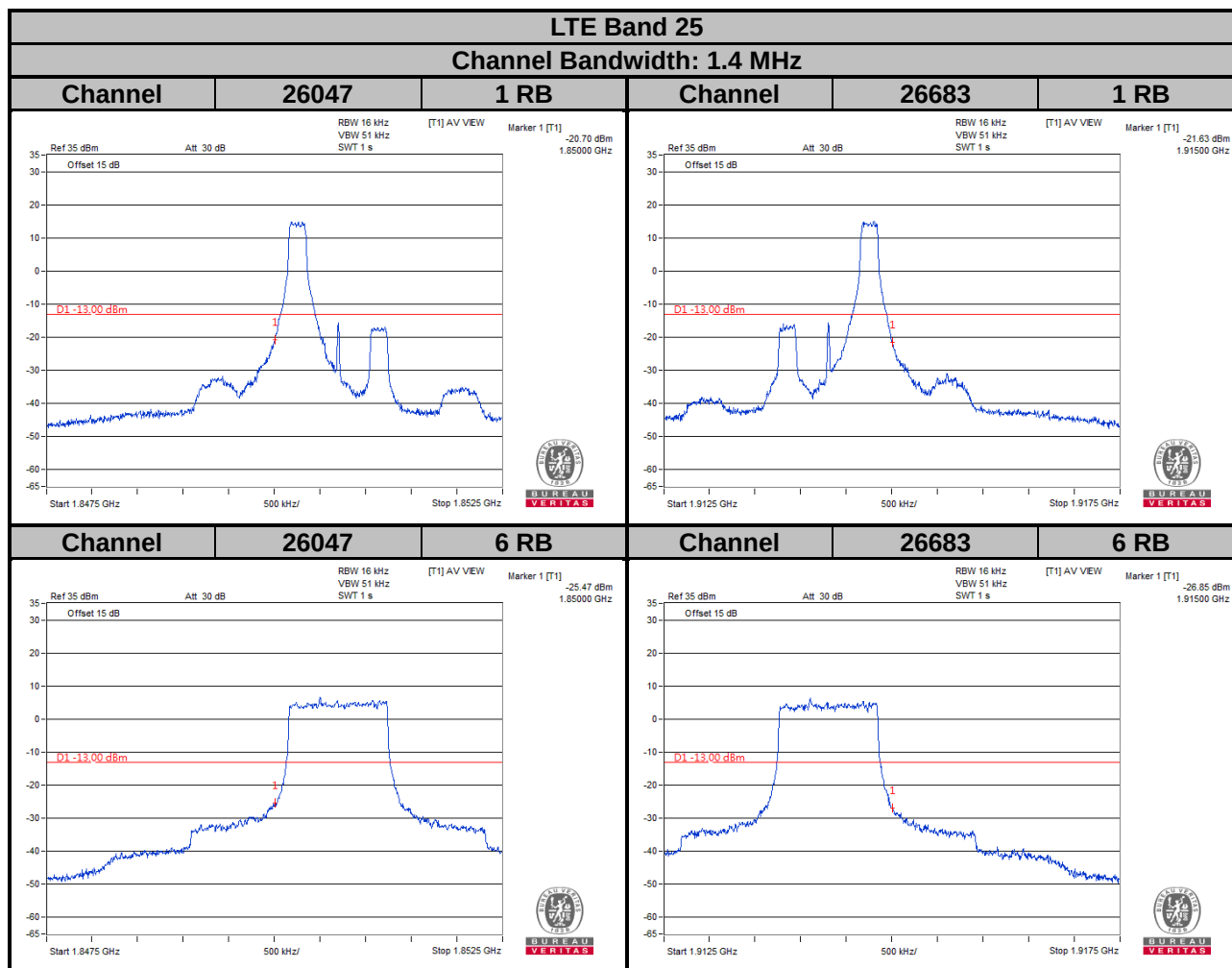
4.5.2 Test Setup

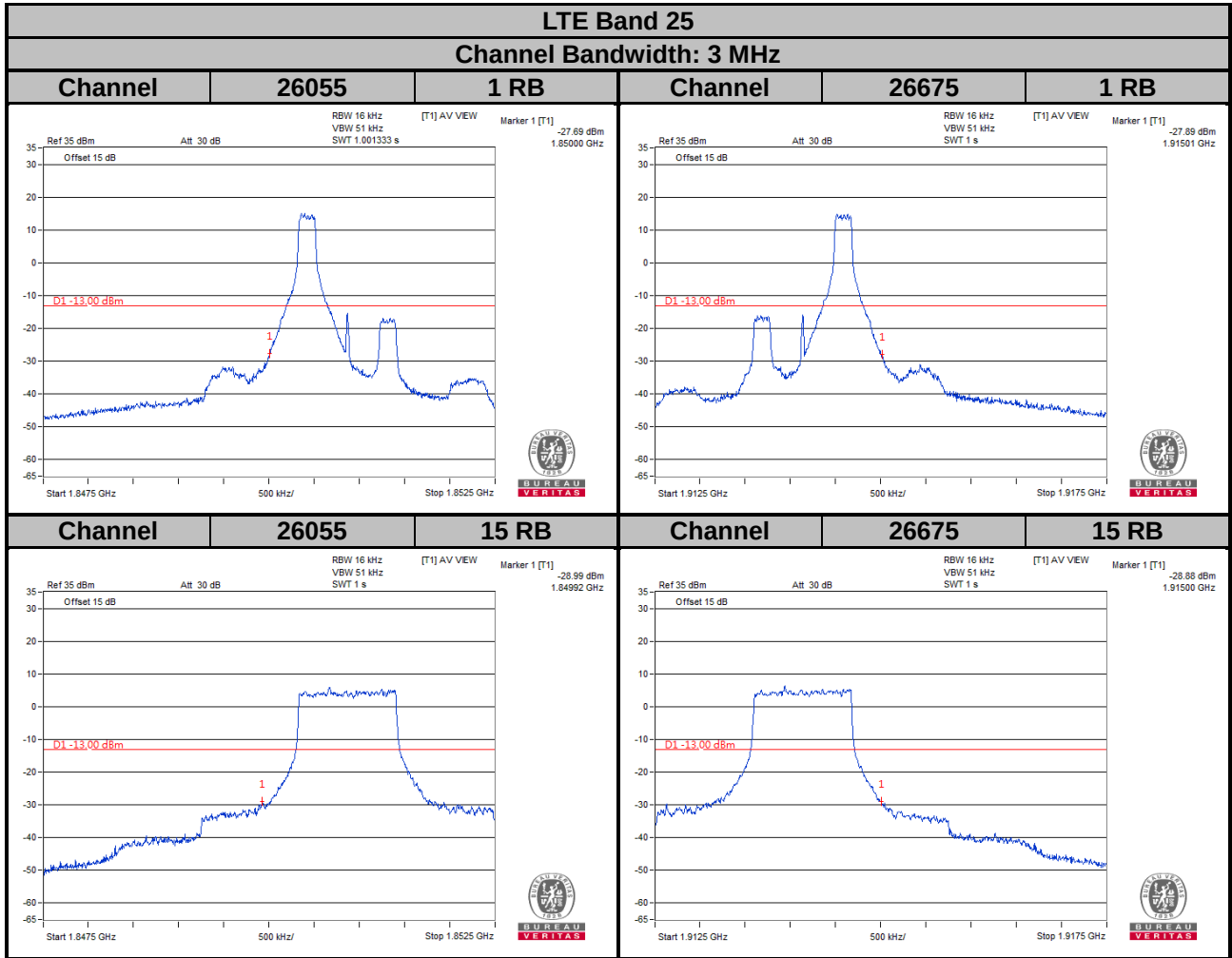


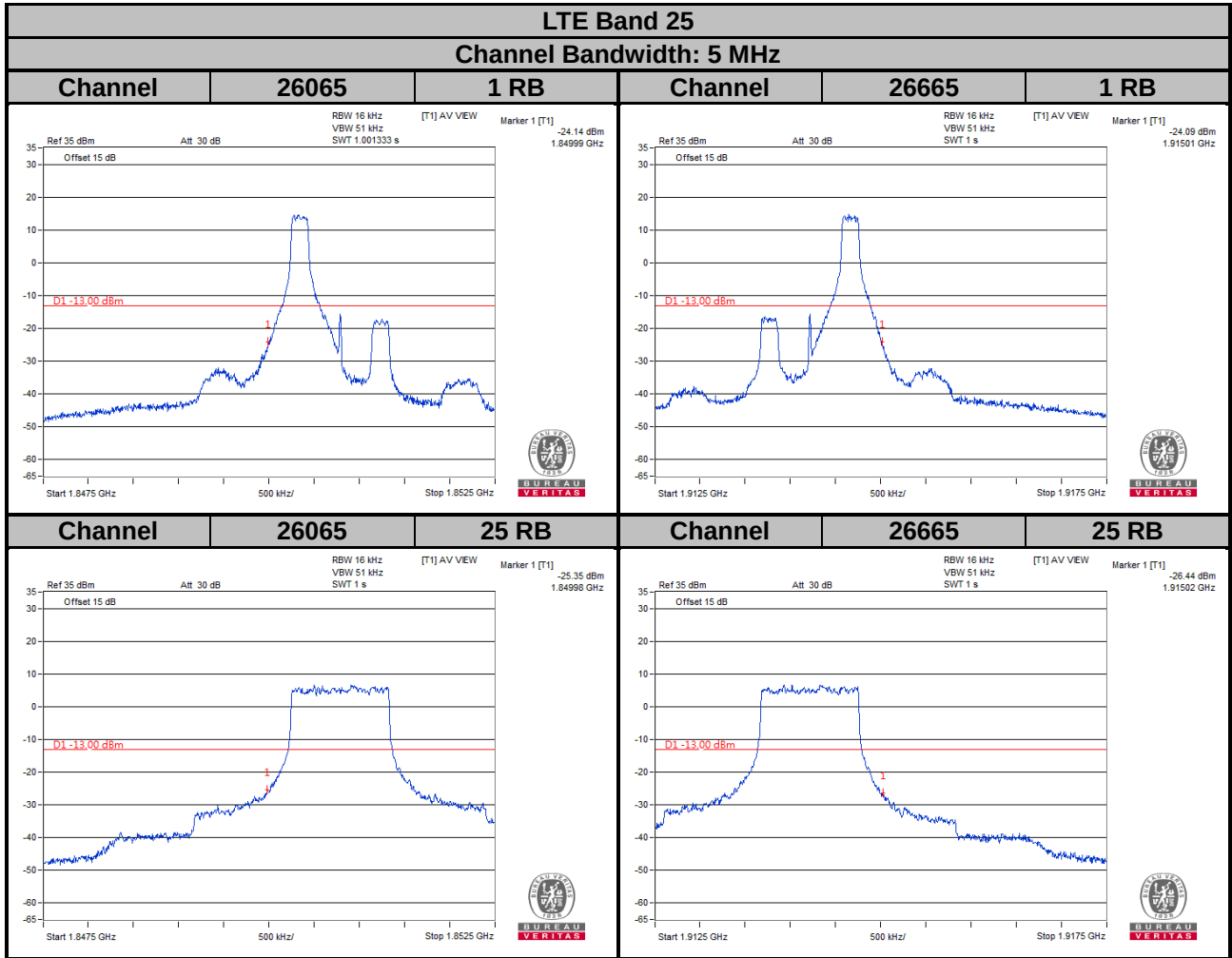
4.5.3 Test Procedures

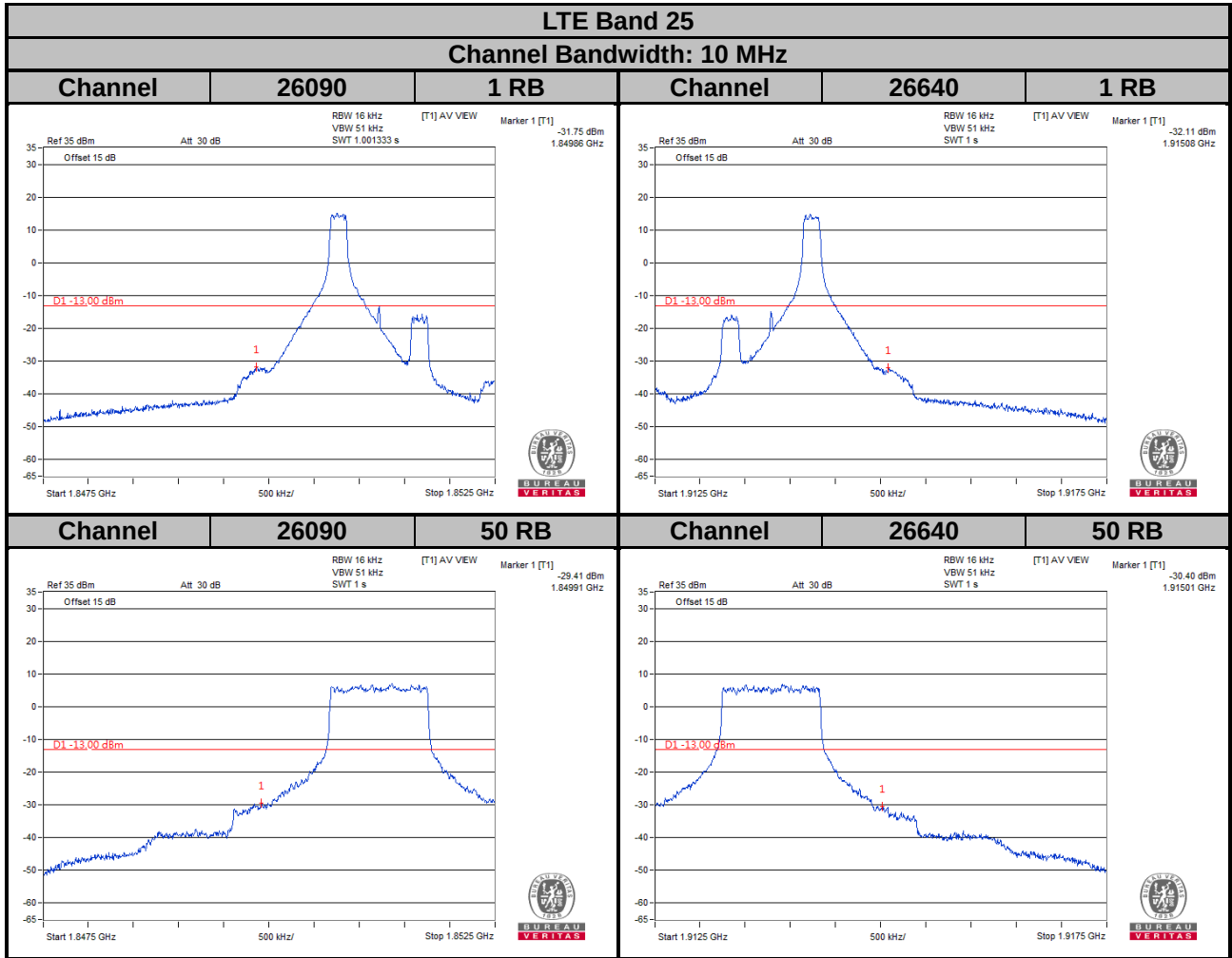
- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 16 kHz and VB of the spectrum is 51 kHz (LTE Bandwidth 1.4 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 16 kHz and VB of the spectrum is 51 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 16 kHz and VB of the spectrum is 51 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 16 kHz and VB of the spectrum is 51 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 16 kHz and VB of the spectrum is 51 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 16 kHz and VB of the spectrum is 51 kHz (LTE Bandwidth 20 MHz).
- Record the max trace plot into the test report.

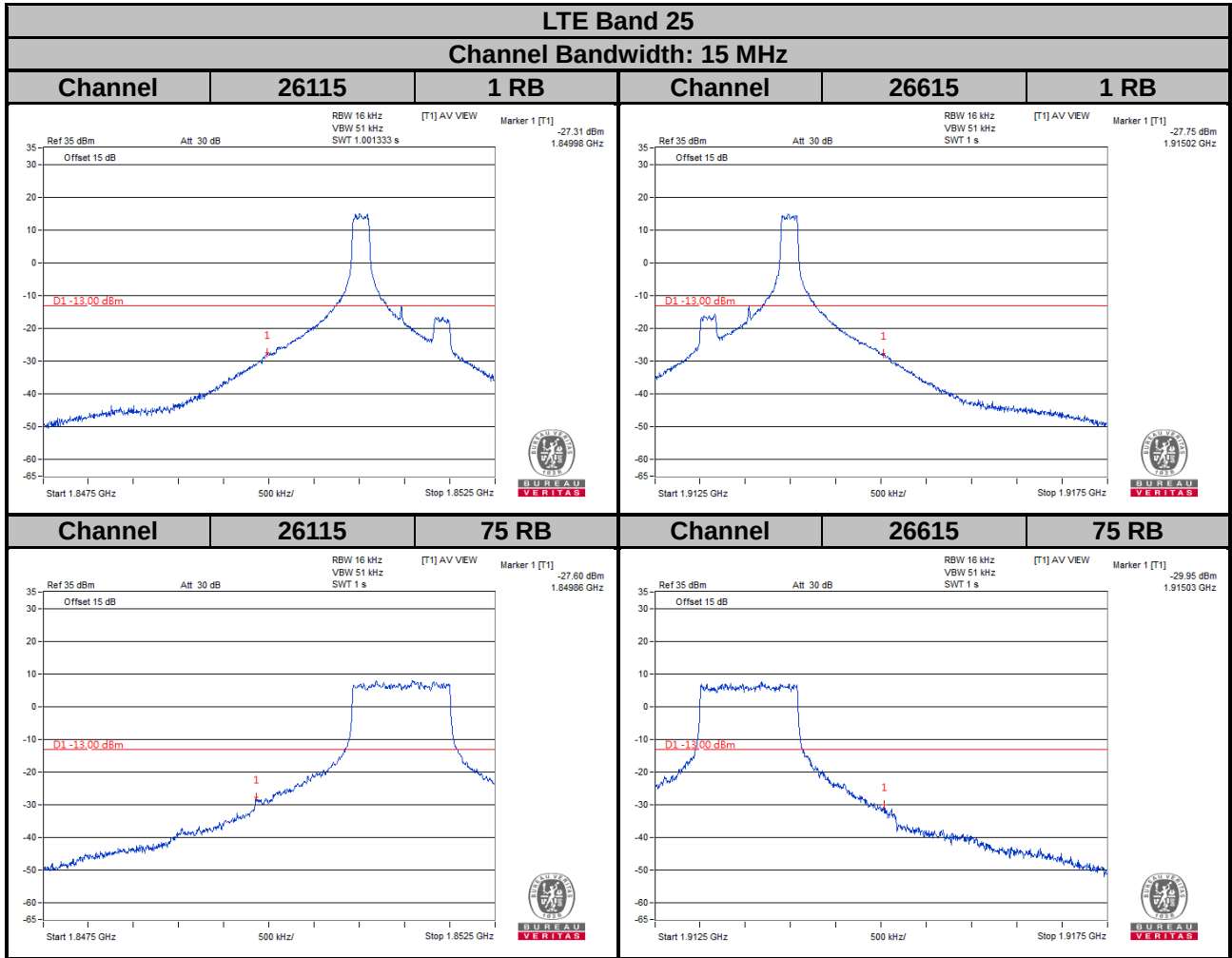
4.5.4 Test Results

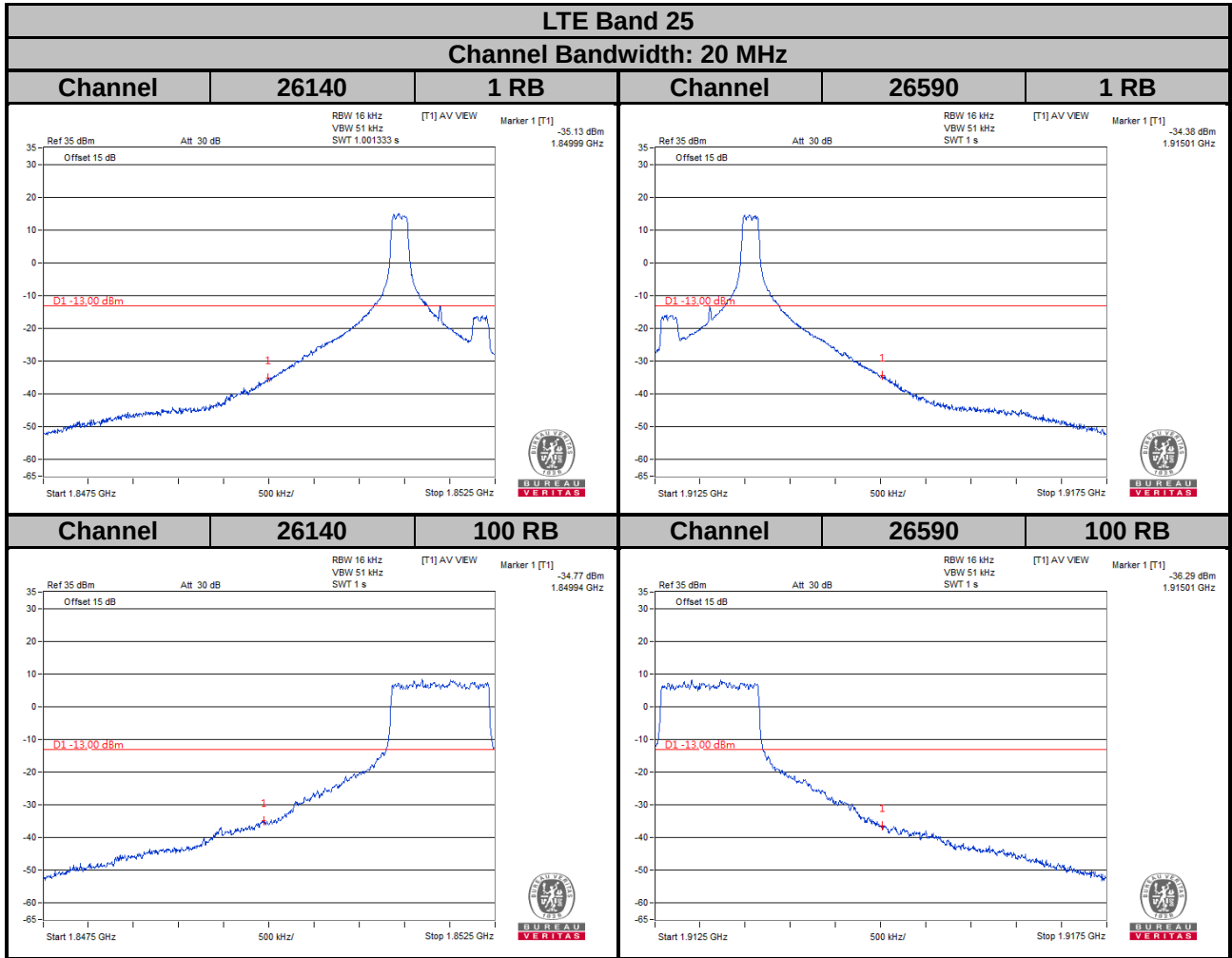










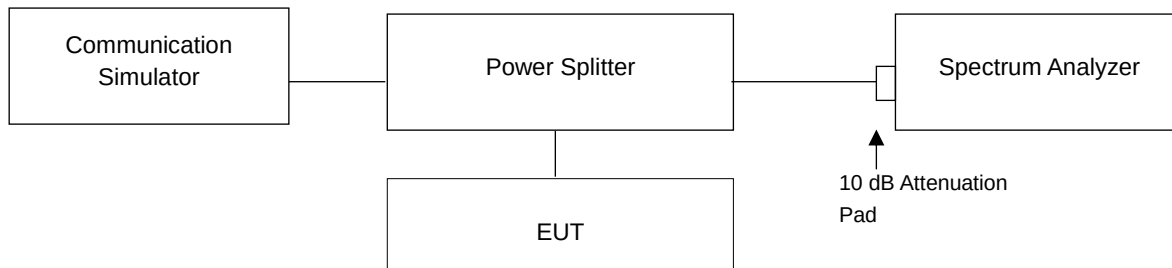


4.6 Peak to Average Ratio

4.6.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

4.6.2 Test Setup

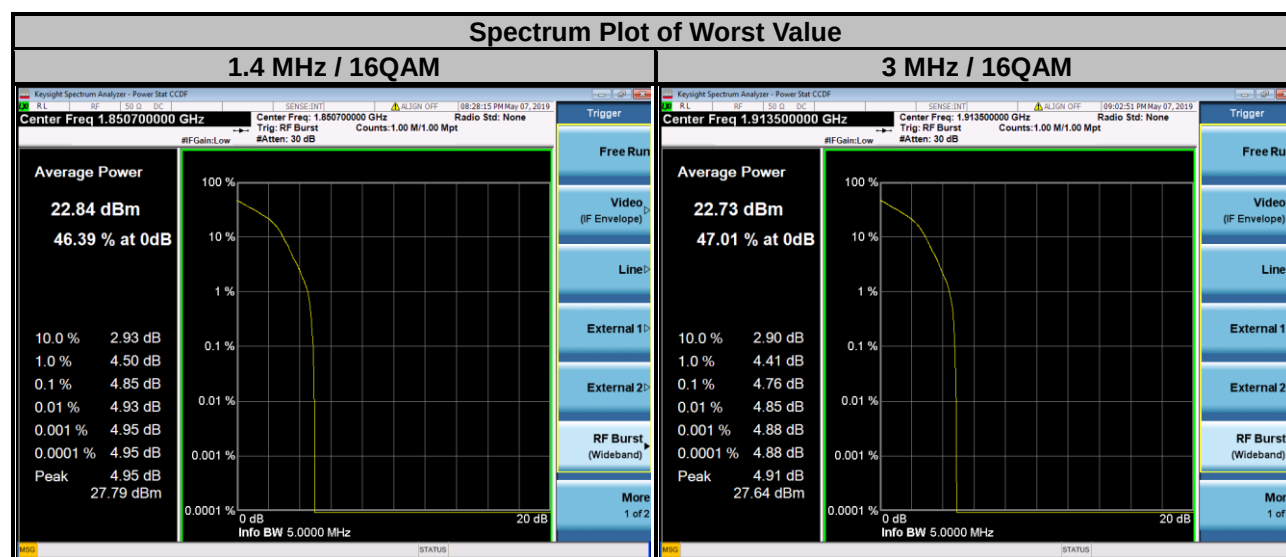


4.6.3 Test Procedures

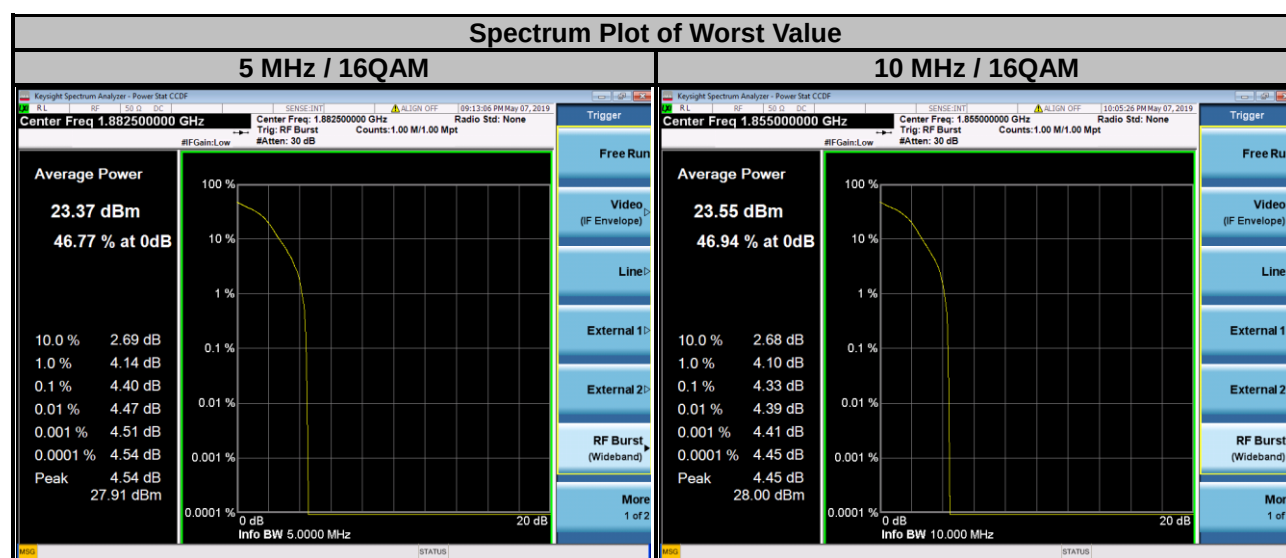
1. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.6.4 Test Results

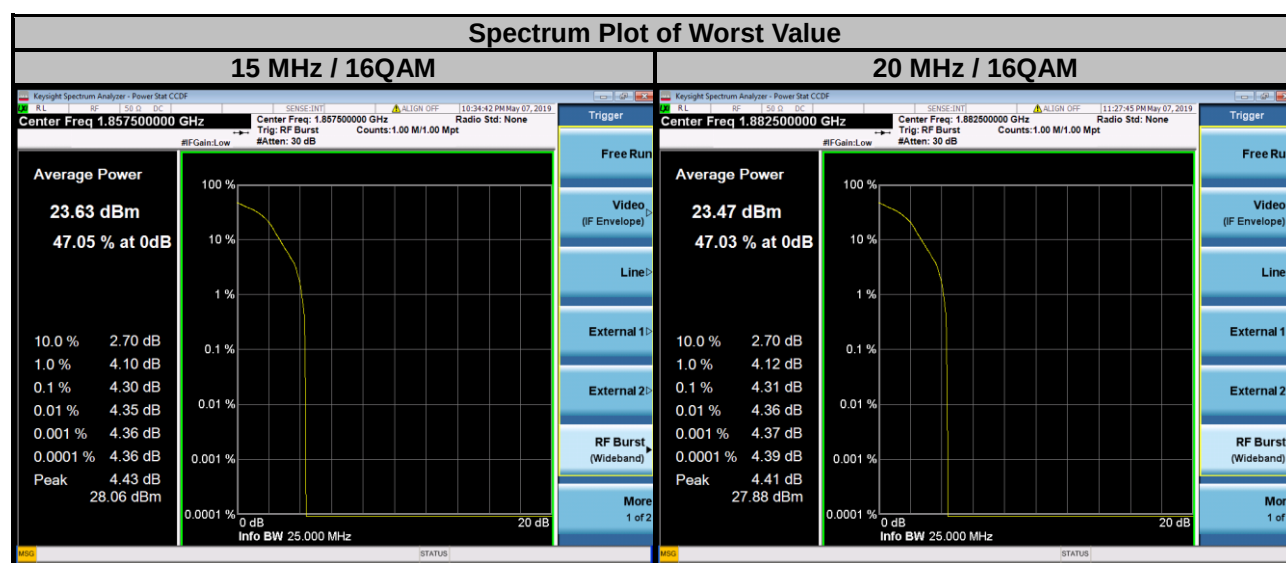
LTE Band 25							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
26047	1850.7	3.78	4.85	26055	1851.5	3.75	4.71
26365	1882.5	3.74	4.78	26365	1882.5	3.69	4.75
26683	1914.3	3.81	4.81	26675	1913.5	3.72	4.76



LTE Band 25							
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
26065	1852.5	3.86	4.36	26090	1855.0	3.80	4.33
26365	1882.5	3.82	4.40	26365	1882.5	3.71	4.28
26665	1912.5	3.83	4.36	26640	1910.0	3.76	4.24



LTE Band 25							
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
26115	1857.5	3.75	4.30	26140	1860.0	3.76	4.23
26365	1882.5	3.71	4.30	26365	1882.5	3.79	4.31
26615	1907.5	3.69	4.26	26590	1905.0	3.69	4.27

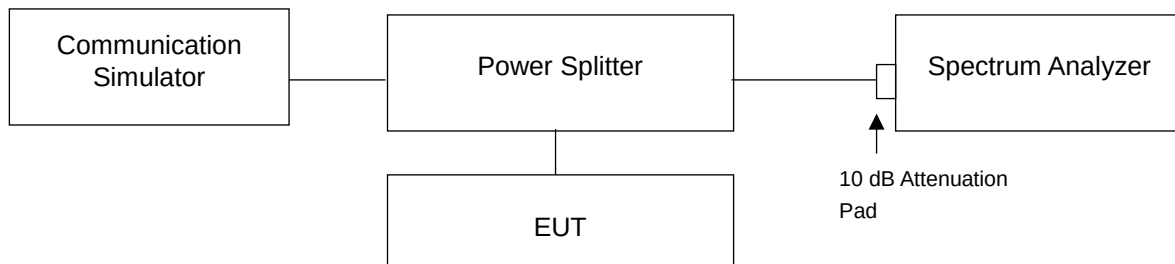


4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13 dBm.

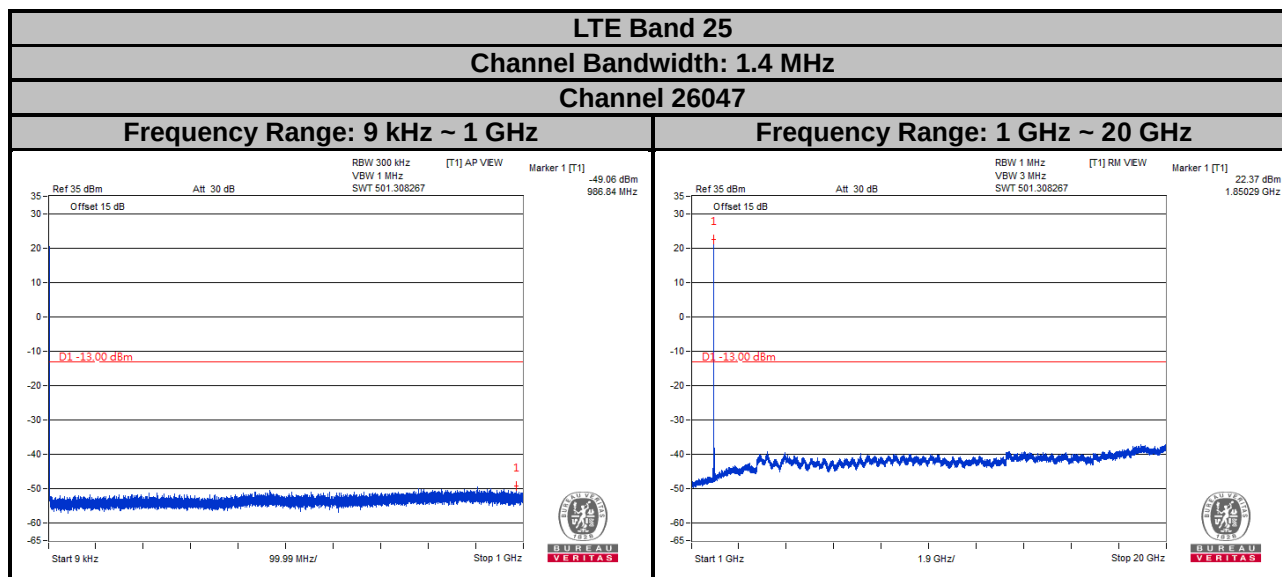
4.7.2 Test Setup



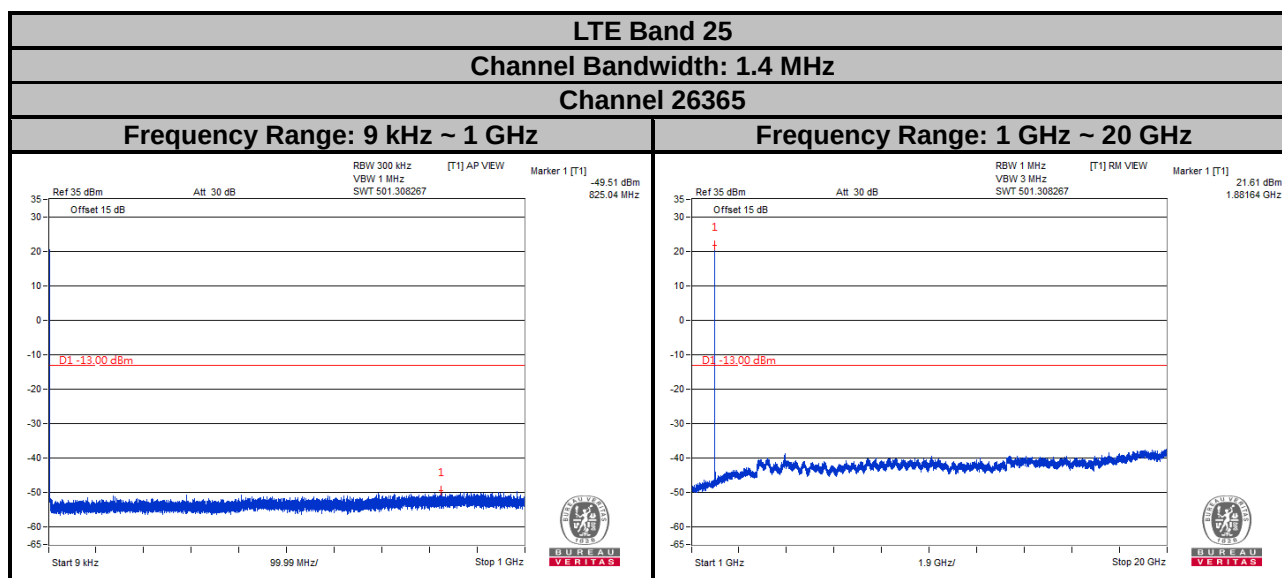
4.7.3 Test Procedure

- 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 20 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for conducted emission measurement.
- Spectrum RBW settings are referenced to ANSI 63.2-1996 section 8.2.2 and ANSI 63.26 section 5.7.2.

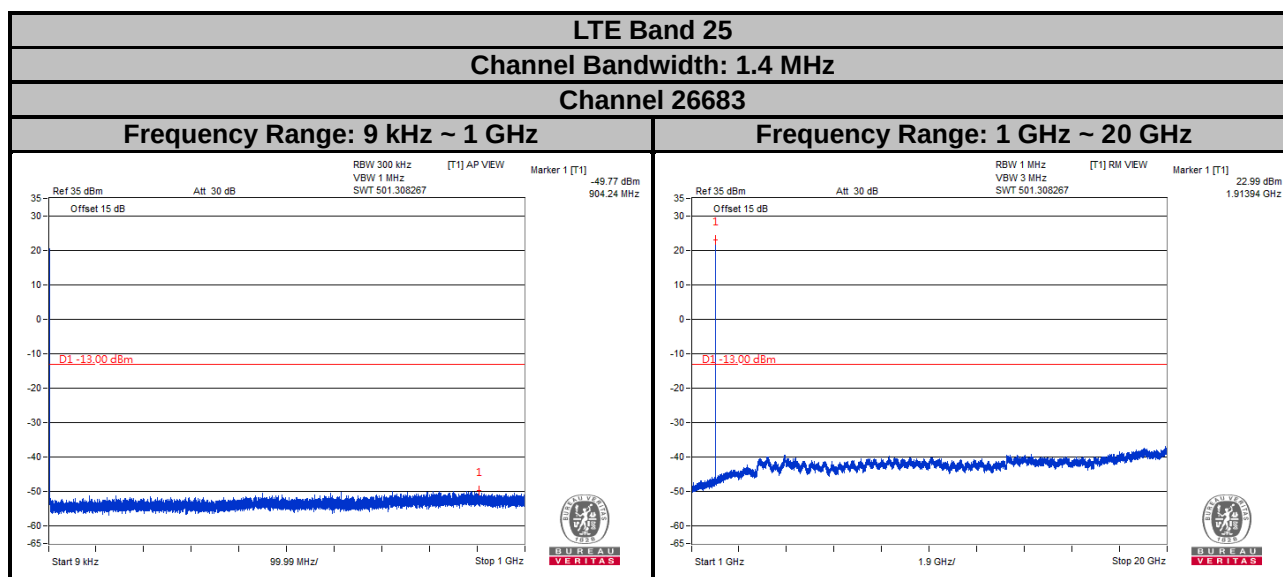
4.7.4 Test Results



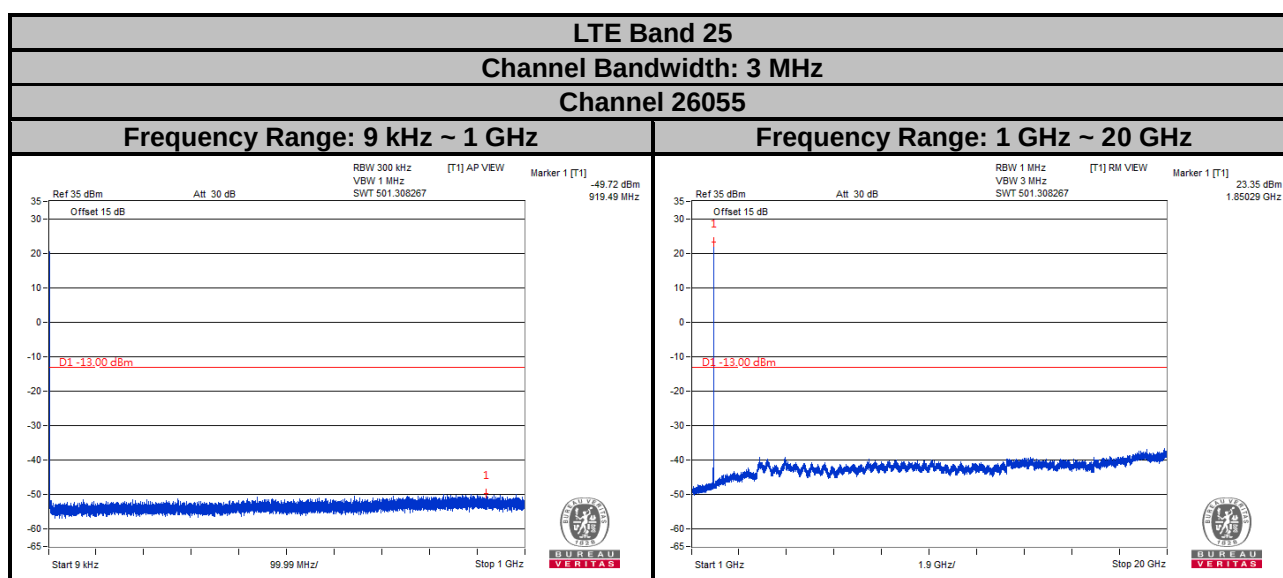
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



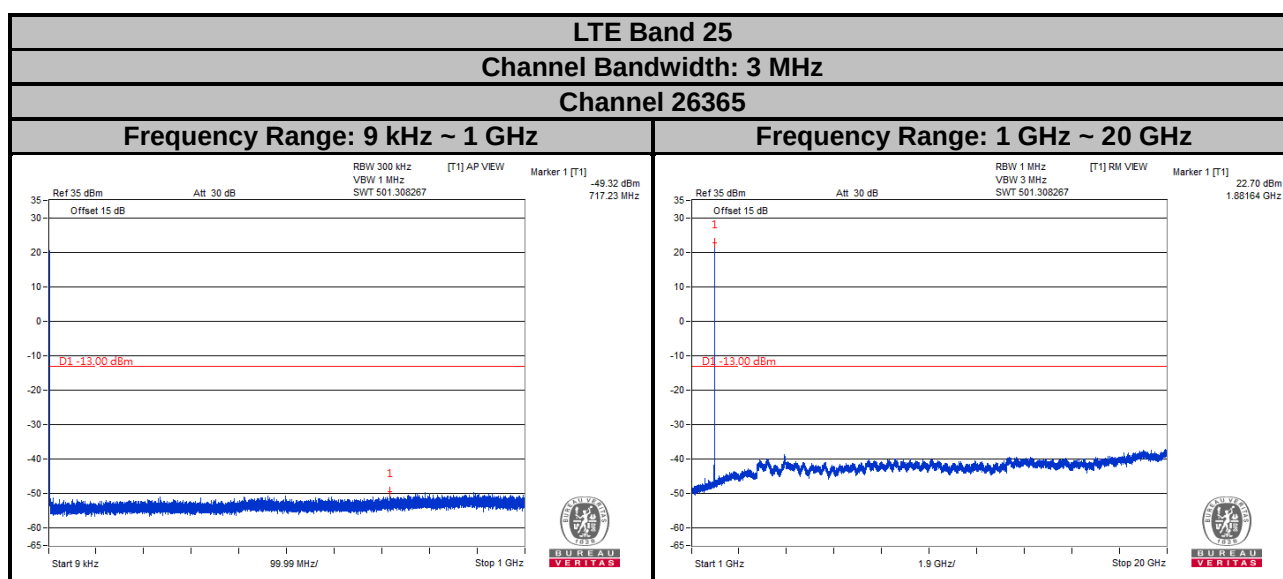
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



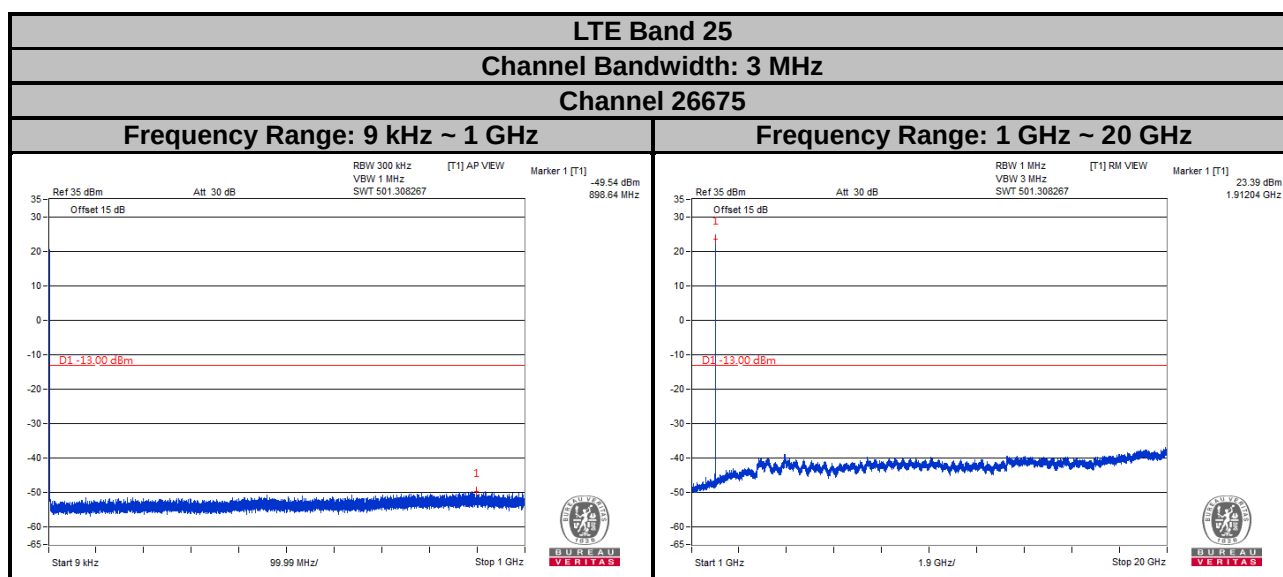
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



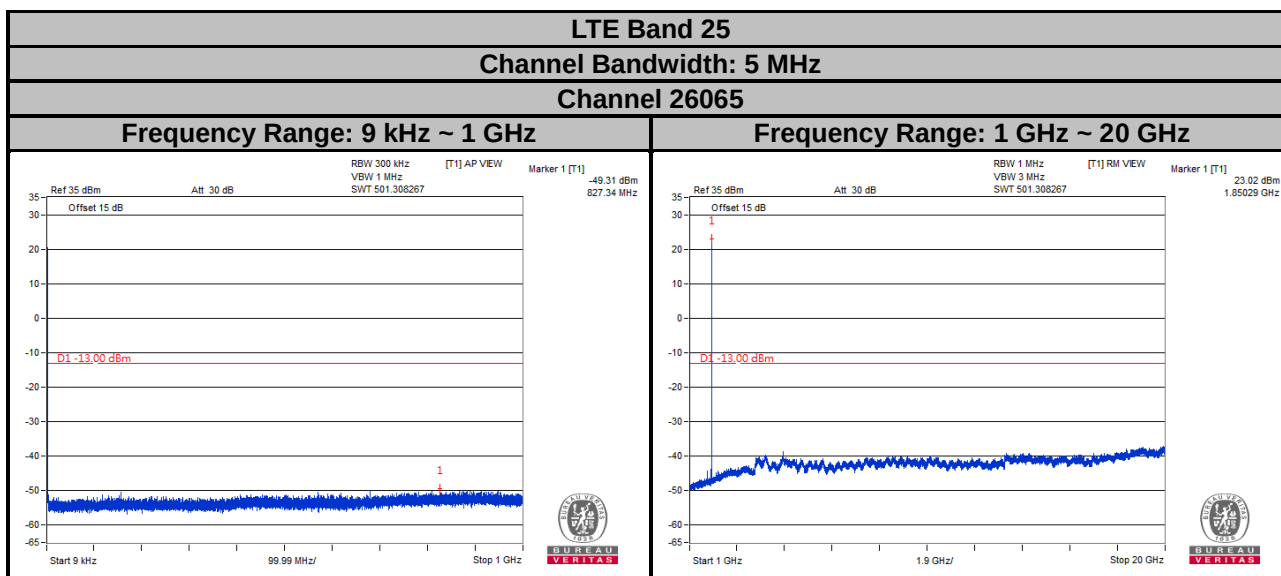
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



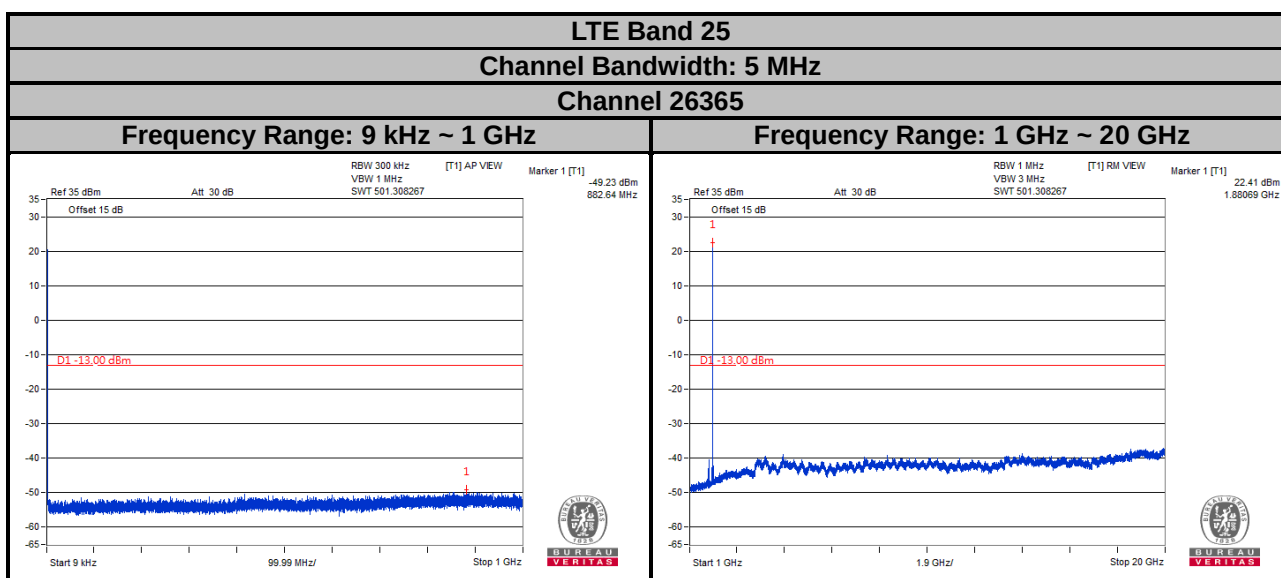
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



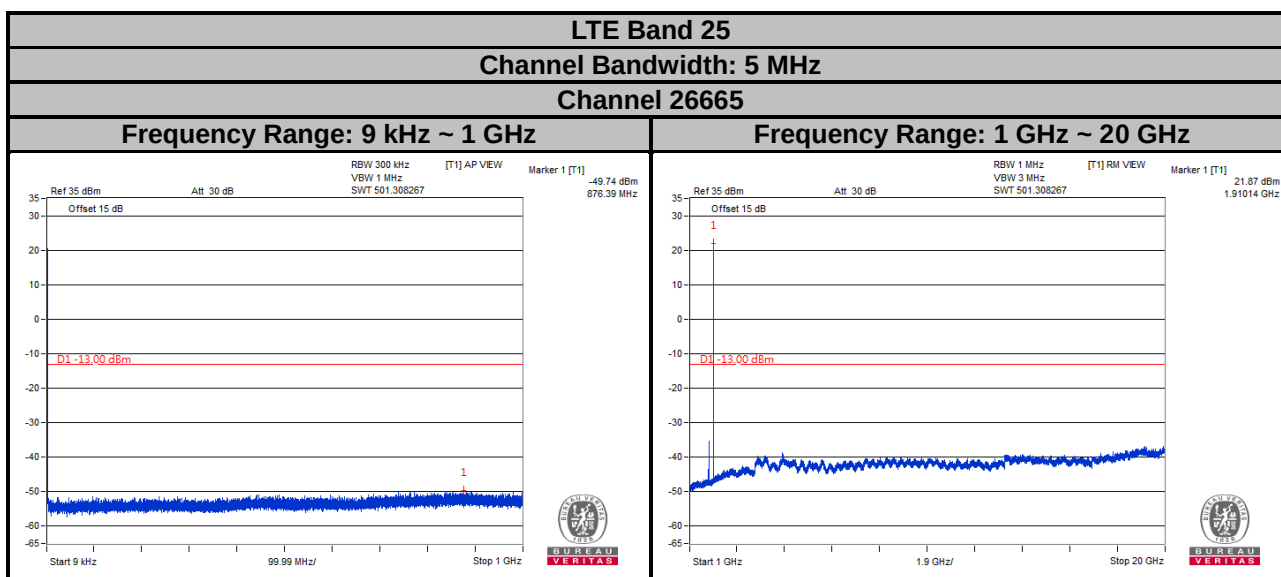
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



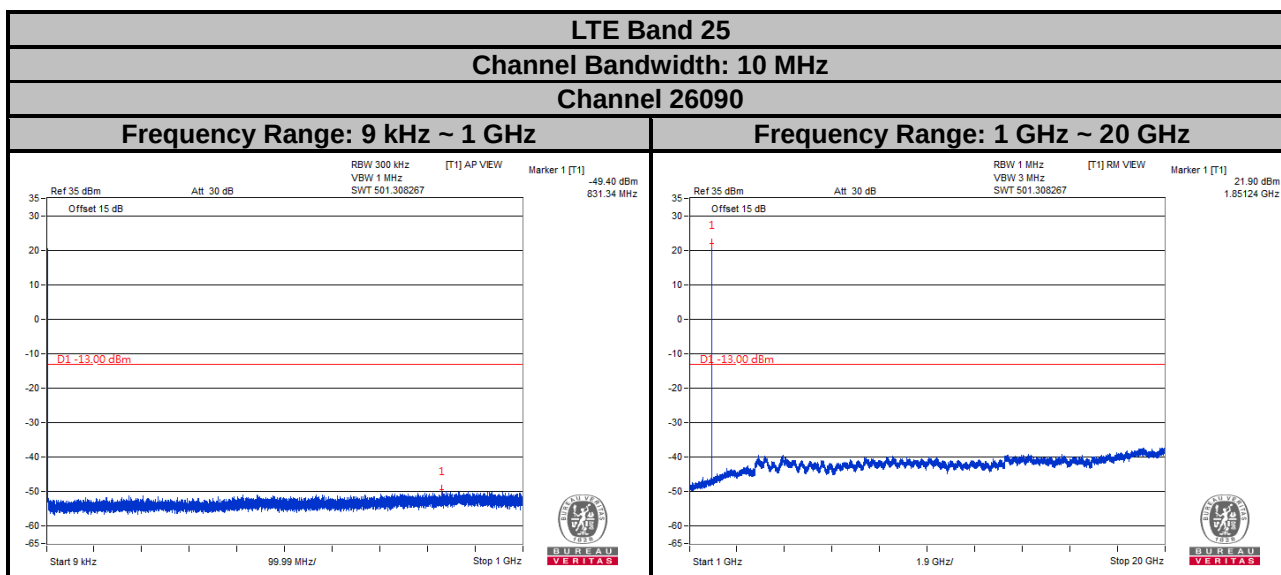
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



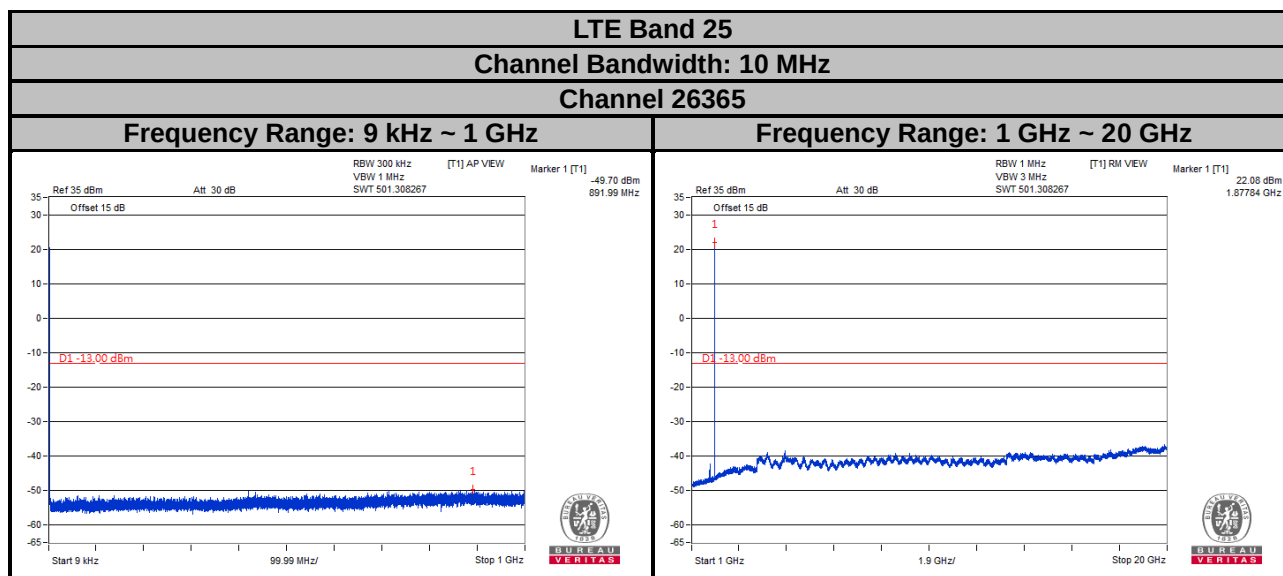
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



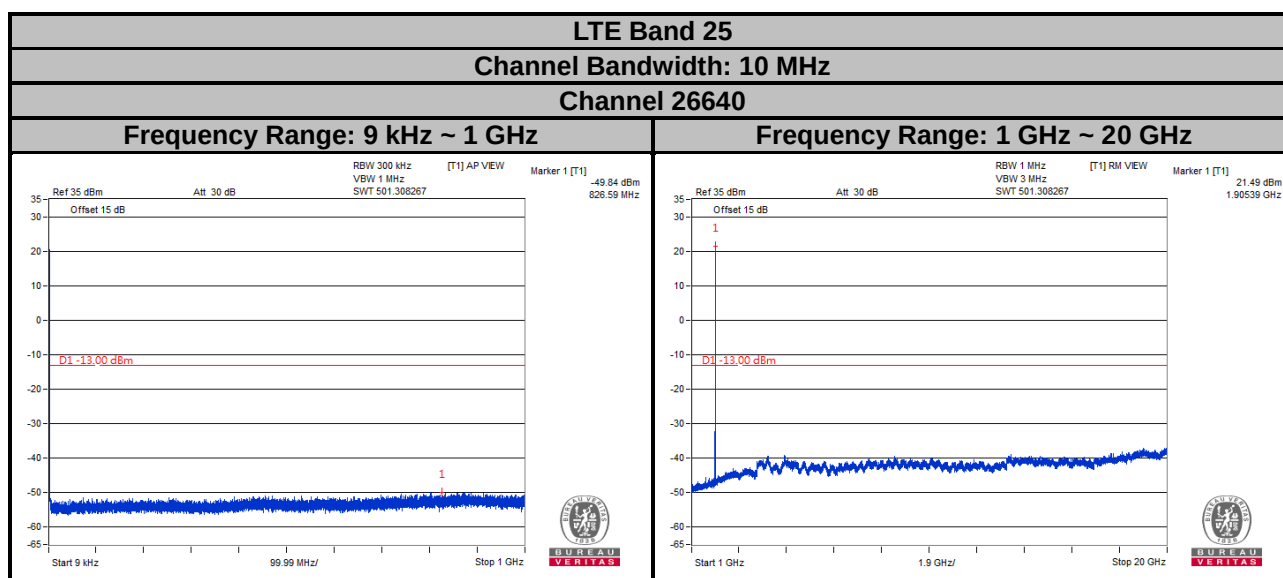
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



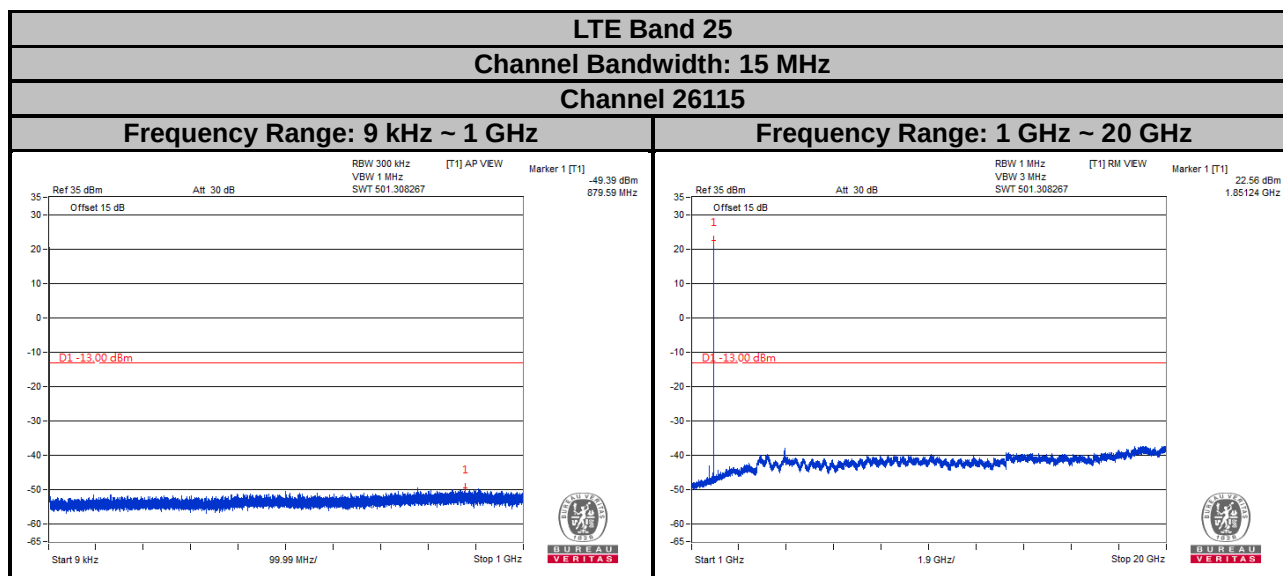
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



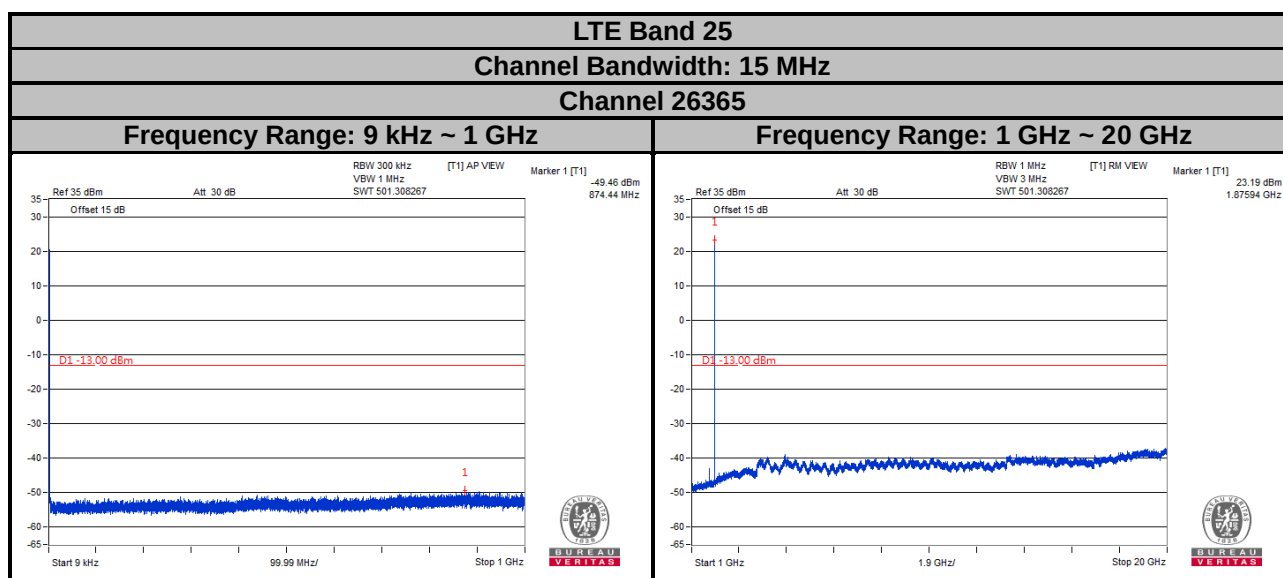
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



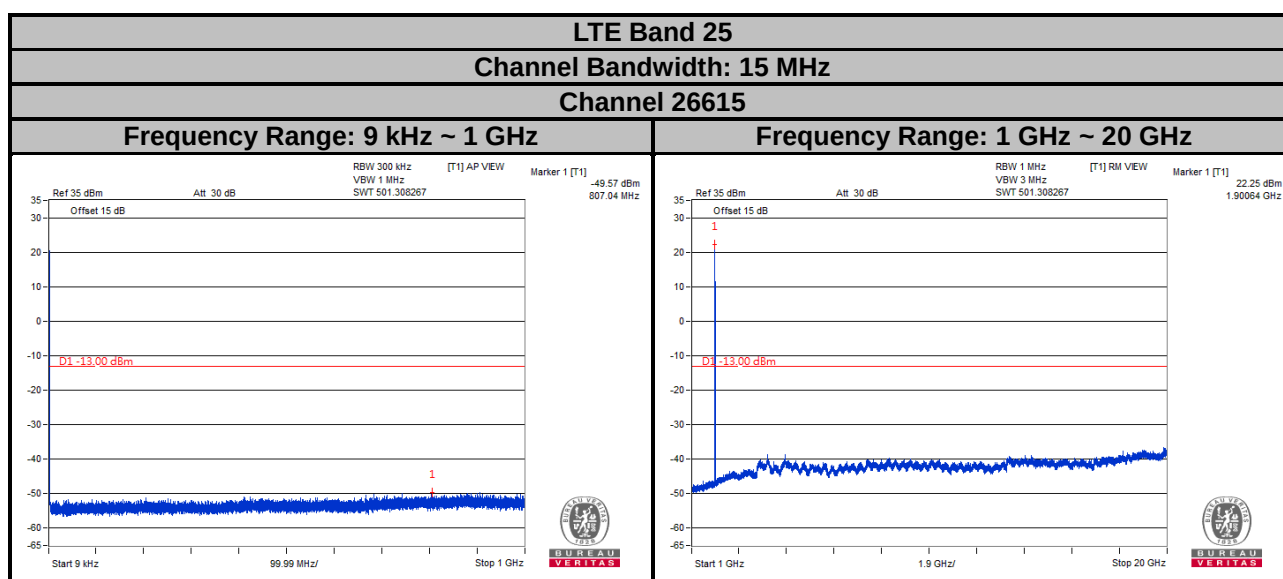
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



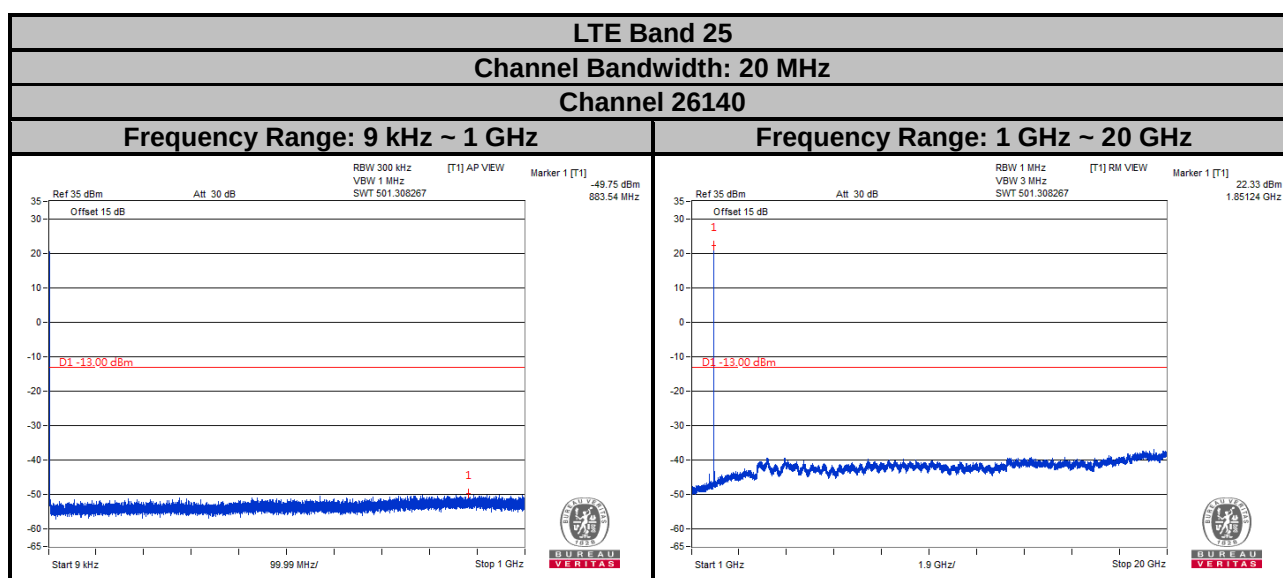
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



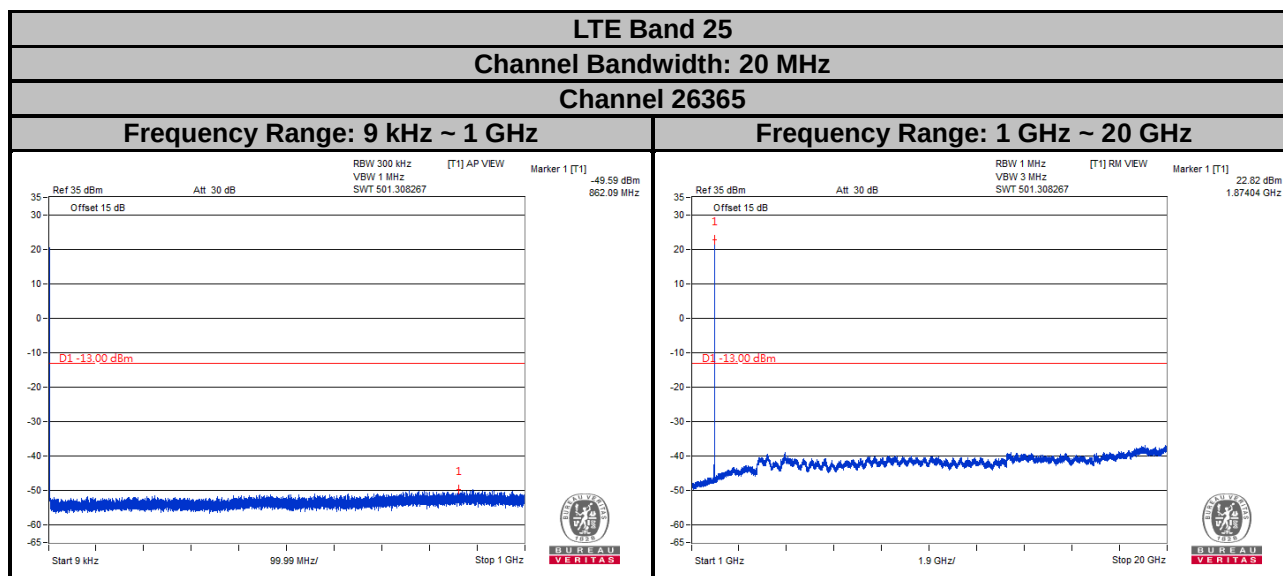
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



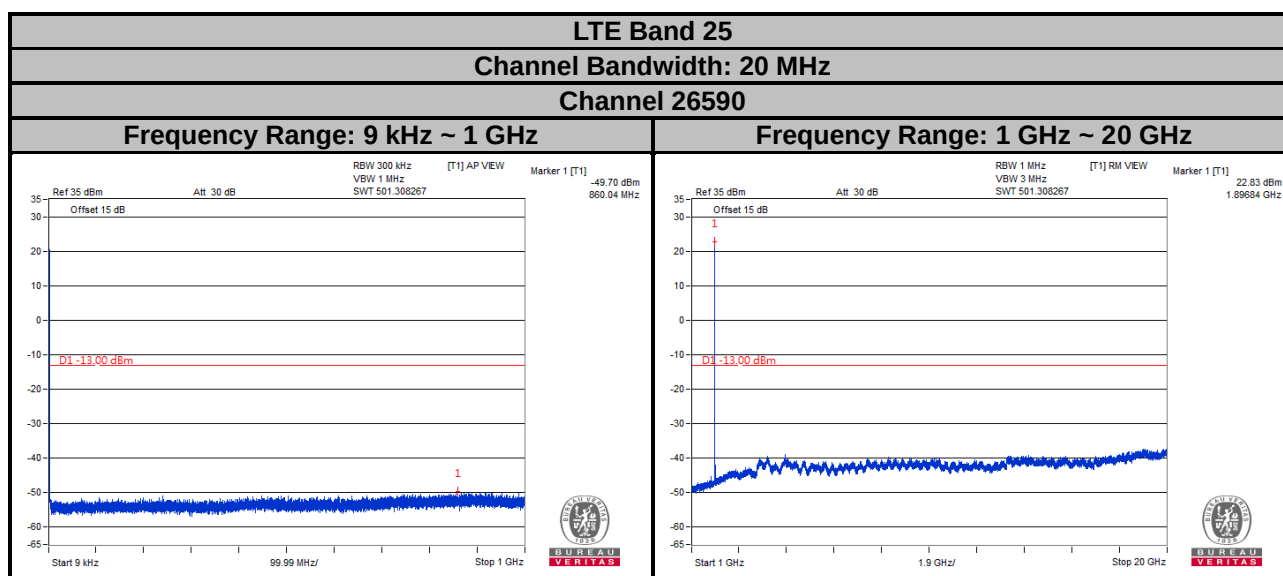
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



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

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit 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 = Output power level of S.G – TX cable loss + 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 power = E.I.R.P power - 2.15 dB.

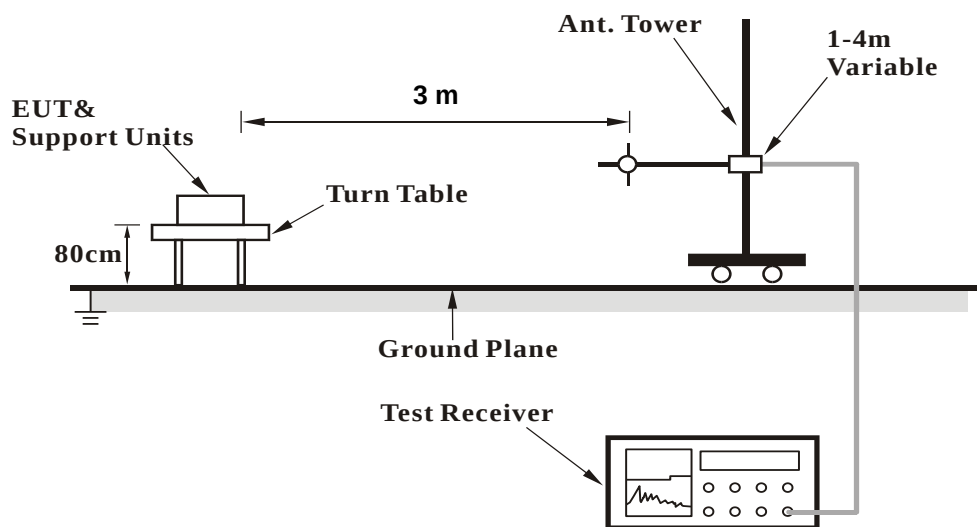
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

4.8.3 Deviation from Test Standard

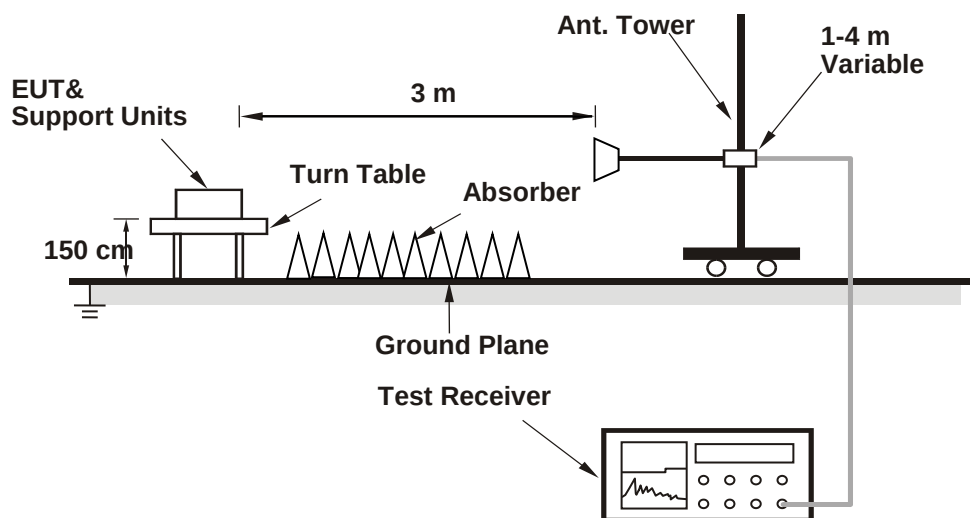
No deviation.

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 25

Channel Bandwidth: 1.4 MHz / QPSK

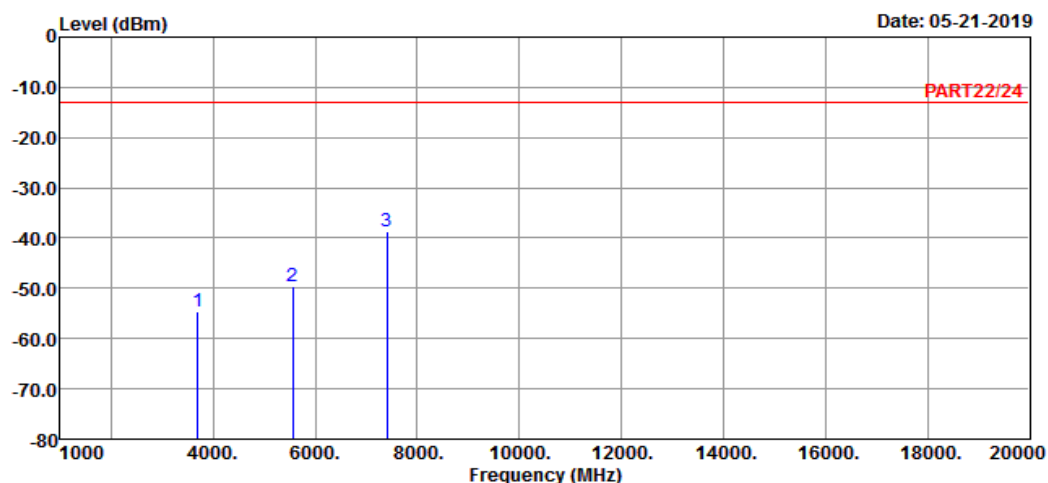
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : Cat-M1 Band 25 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	3701.40	-54.68	-47.75	-13.00	-6.93	-41.68	Peak
2	5552.10	-49.53	-47.63	-13.00	-1.90	-36.53	Peak
3 pp	7402.80	-38.74	-42.85	-13.00	4.11	-25.74	Peak

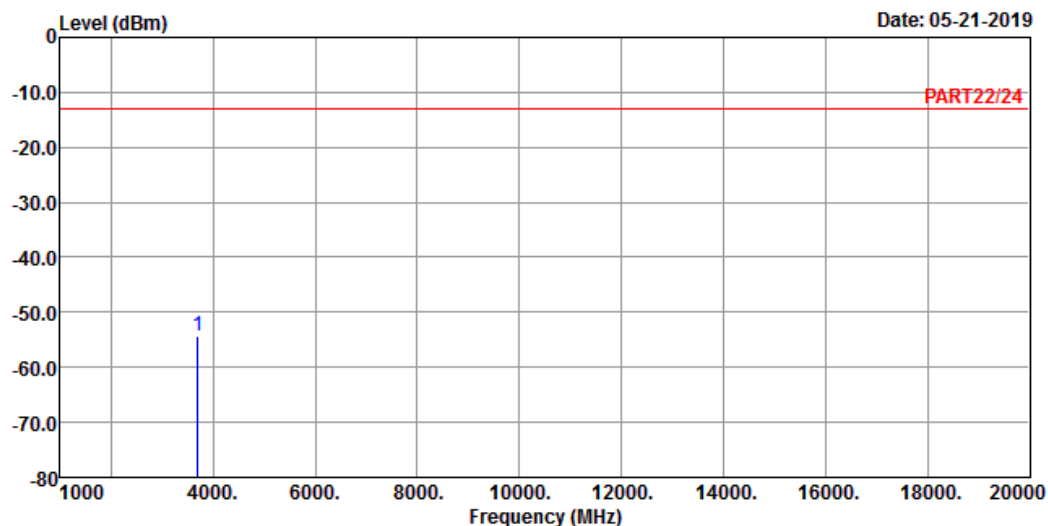


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 25 QPSK_1.4M Link_L-CH

Tested by: Thomas Wei

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

1 pp 3701.40 -54.19 -47.26 -13.00 -6.93 -41.19 Peak

Middle Channel

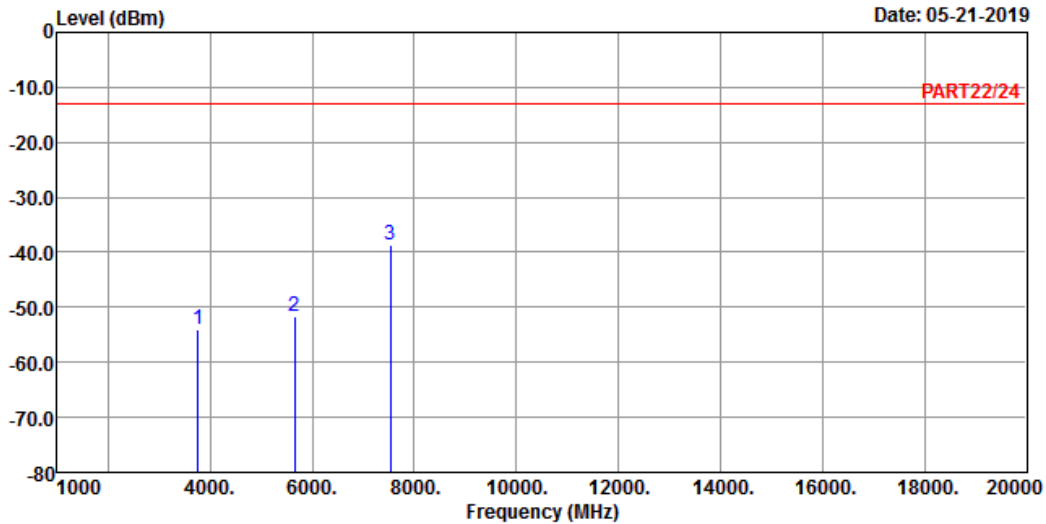


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : Cat-M1 Band 25 QPSK_1.4M Link_M-CH

Tested by: Thomas Wei

	Freq	Level	Read Level	Limit Line	Over Factor	Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3765.00	-53.97	-47.37	-13.00	-6.60	-40.97	Peak
2	5647.50	-51.58	-49.75	-13.00	-1.83	-38.58	Peak
3 pp	7530.00	-38.59	-42.87	-13.00	4.28	-25.59	Peak

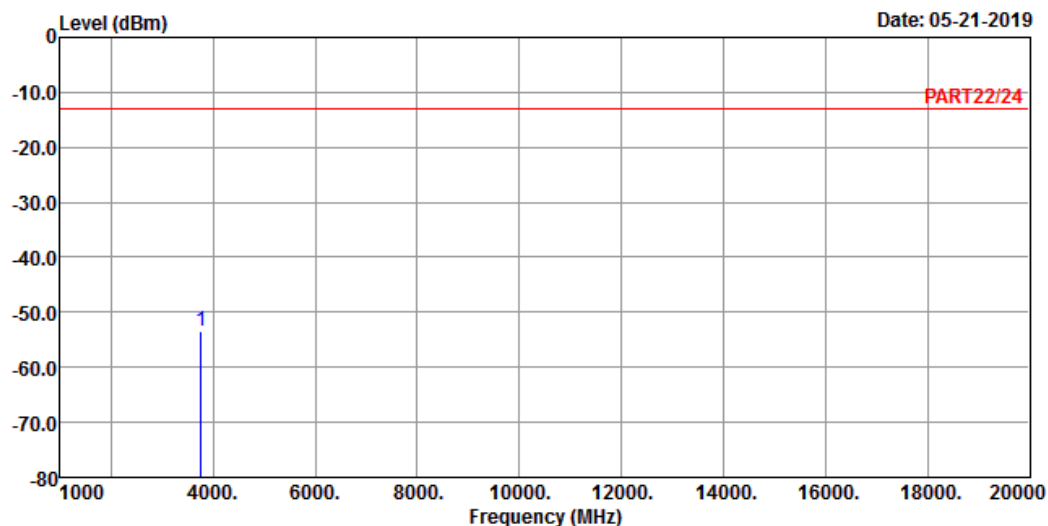


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 25 QPSK_1.4M Link_M-CH

Tested by: Thomas Wei

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

1 pp 3765.00 -53.46 -46.86 -13.00 -6.60 -40.46 Peak

High Channel

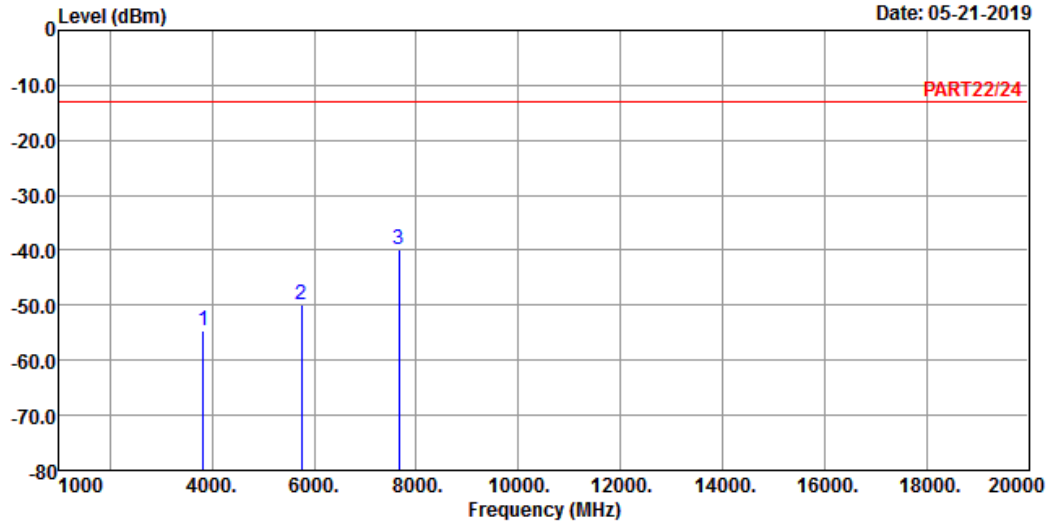


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : Cat-M1 Band 25 QPSK_1.4M Link_H-CH

Tested by: Thomas Wei

	Freq	Level	Read Level	Limit	Over	
	MHz	dBm	dBm	dBm	Factor	Limit Remark
1	3828.60	-54.58	-48.21	-13.00	-6.37	-41.58 Peak
2	5742.90	-49.77	-48.12	-13.00	-1.65	-36.77 Peak
3 pp	7657.20	-39.81	-44.39	-13.00	4.58	-26.81 Peak

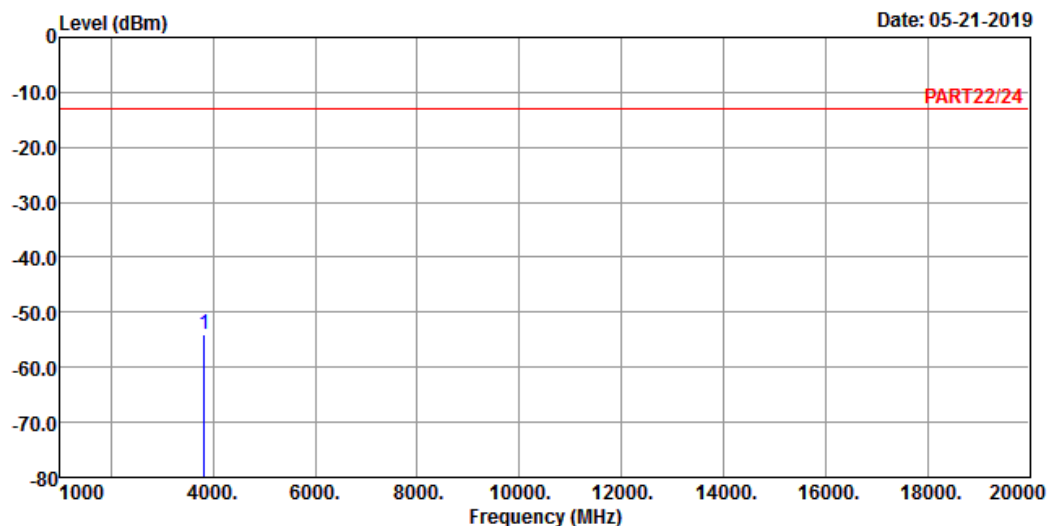


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 25 QPSK_1.4M Link_H-CH

Tested by: Thomas Wei

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

1 pp 3828.60 -54.06 -47.69 -13.00 -6.37 -41.06 Peak

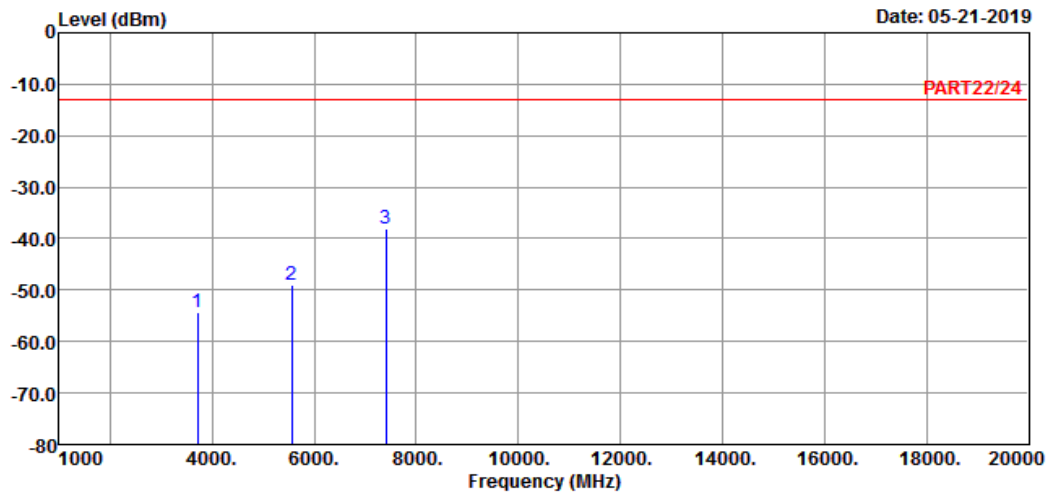
Channel Bandwidth: 5 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 25 QPSK_5M Link_L-CH
Tested by: Thomas Wei

	Freq	Level	Read Level	Limit	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3705.00	-54.31	-47.38	-13.00	-6.93	-41.31	Peak
2	5557.50	-49.02	-47.11	-13.00	-1.91	-36.02	Peak
3 pp	7410.00	-38.18	-42.31	-13.00	4.13	-25.18	Peak

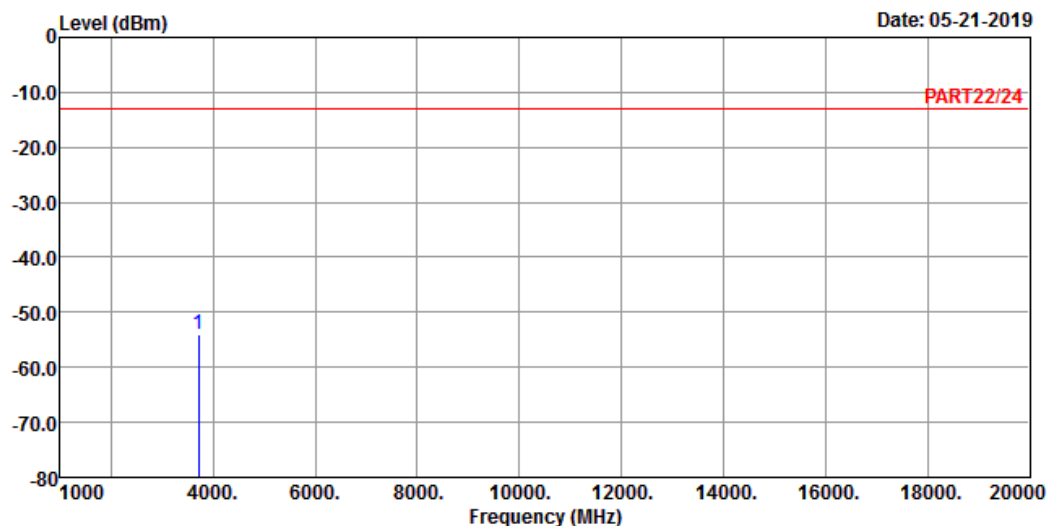


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 25 QPSK_5M Link_L-CH

Tested by: Thomas Wei

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

1 pp 3705.00 -53.93 -47.00 -13.00 -6.93 -40.93 Peak

Middle Channel

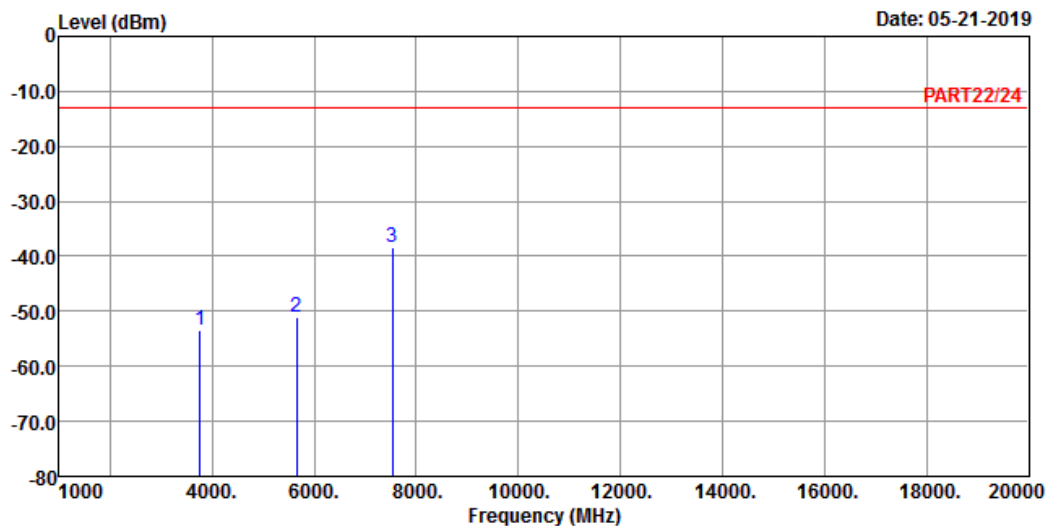


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : Cat-M1 Band 25 QPSK_5M Link_M-CH

Tested by: Thomas Wei

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3765.00	-53.57	-46.97	-13.00	-6.60	-40.57	Peak
2	5647.50	-51.18	-49.35	-13.00	-1.83	-38.18	Peak
3 pp	7530.00	-38.28	-42.56	-13.00	4.28	-25.28	Peak

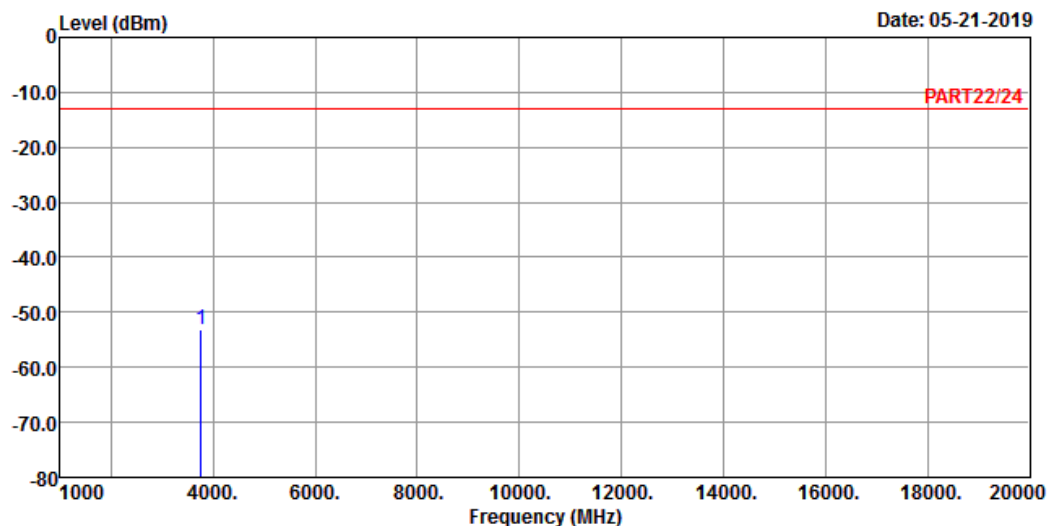


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 25 QPSK_5M Link_M-CH

Tested by: Thomas Wei

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

1 pp 3765.00 -53.00 -46.40 -13.00 -6.60 -40.00 Peak

High Channel

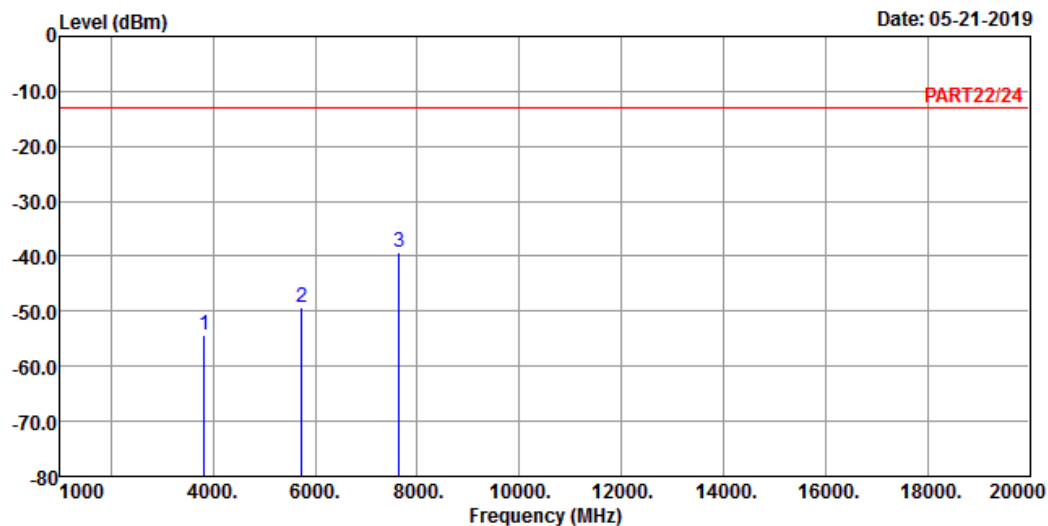


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : Cat-M1 Band 25 QPSK_5M Link_H-CH

Tested by: Thomas Wei

	Freq	Level	Read Level	Limit	Over	
	MHz	dBm	dBm	dBm	dB	Limit Remark
1	3825.00	-54.41	-48.04	-13.00	-6.37	-41.41 Peak
2	5737.50	-49.38	-47.73	-13.00	-1.65	-36.38 Peak
3 pp	7650.00	-39.40	-43.95	-13.00	4.55	-26.40 Peak

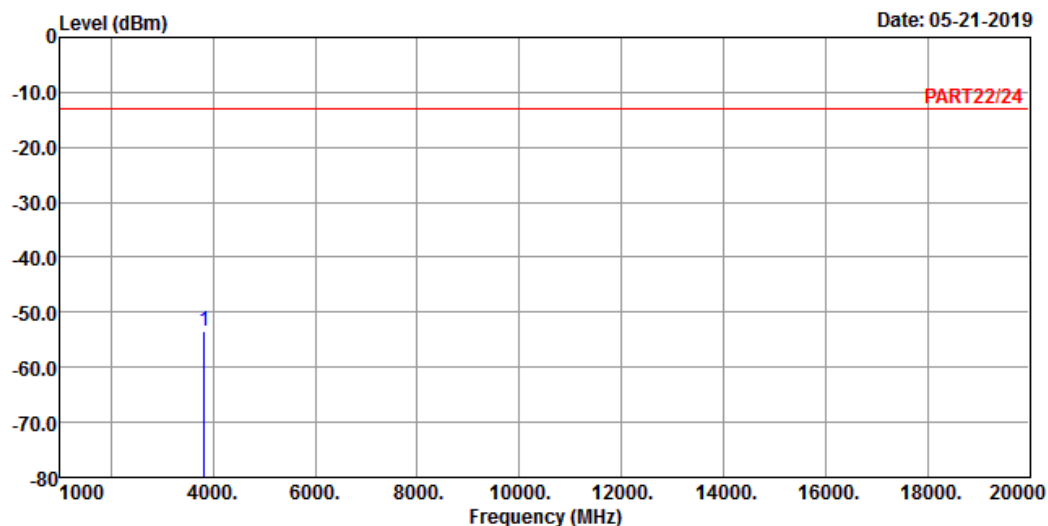


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 25 QPSK_5M Link_H-CH

Tested by: Thomas Wei

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

1 pp 3825.00 -53.57 -47.20 -13.00 -6.37 -40.57 Peak

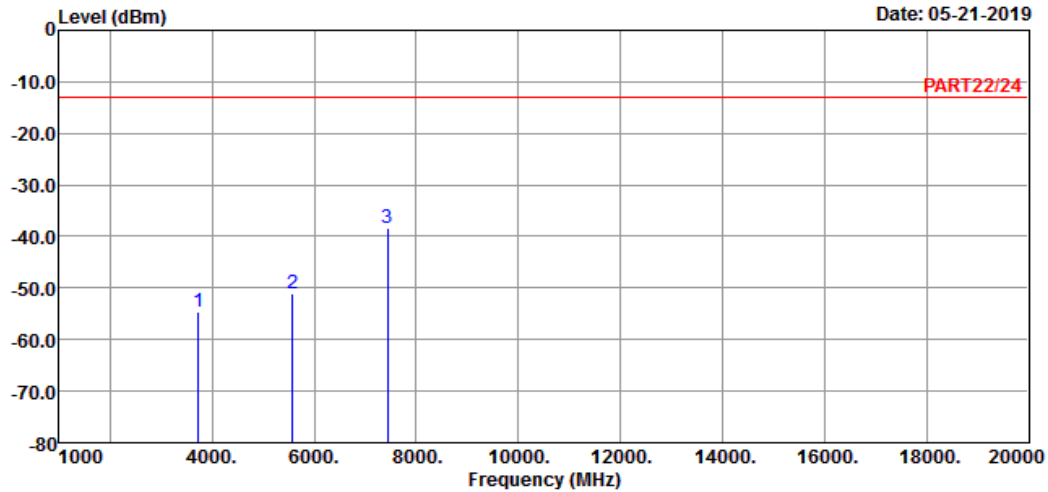
Channel Bandwidth: 20 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 25 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	3720.00	-54.62	-47.80	-13.00	-6.82	-41.62	Peak
2	5580.00	-50.99	-49.07	-13.00	-1.92	-37.99	Peak
3 pp	7440.00	-38.41	-42.56	-13.00	4.15	-25.41	Peak

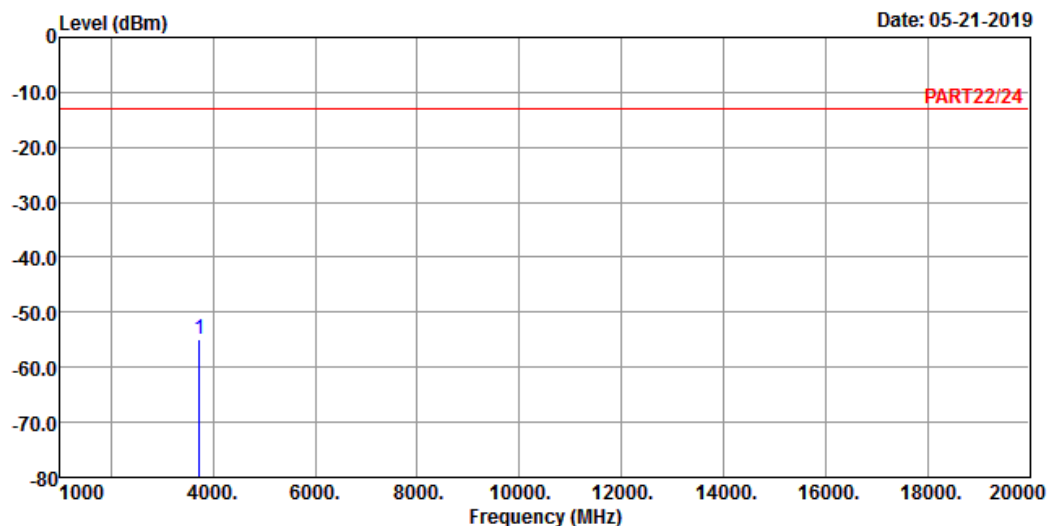


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 25 QPSK_20M 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 3720.00 -55.02 -48.20 -13.00 -6.82 -42.02 Peak

Middle Channel

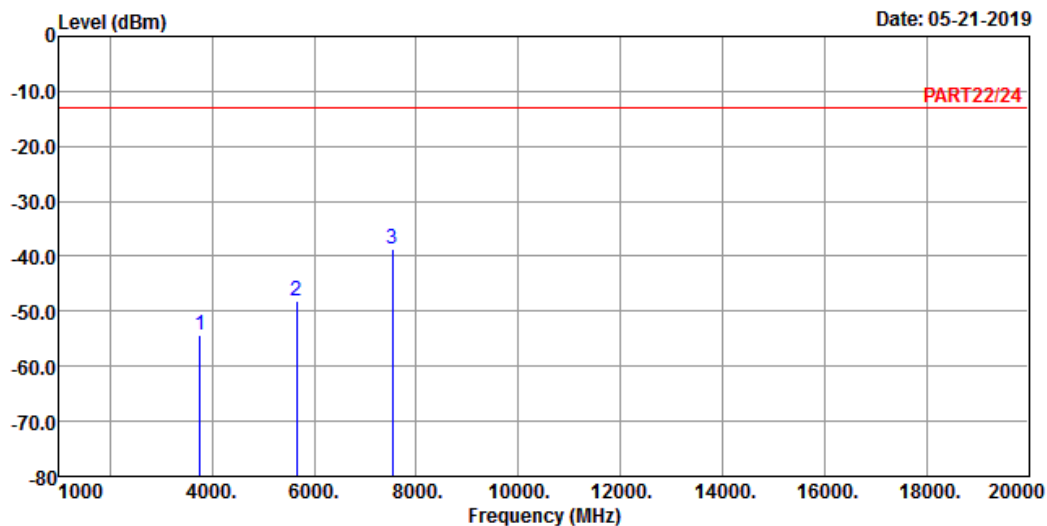


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : Cat-M1 Band 25 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	3765.00	-54.24	-47.64	-13.00	-6.60	-41.24 Peak
2	5647.50	-48.11	-46.28	-13.00	-1.83	-35.11 Peak
3 pp	7530.00	-38.64	-42.92	-13.00	4.28	-25.64 Peak

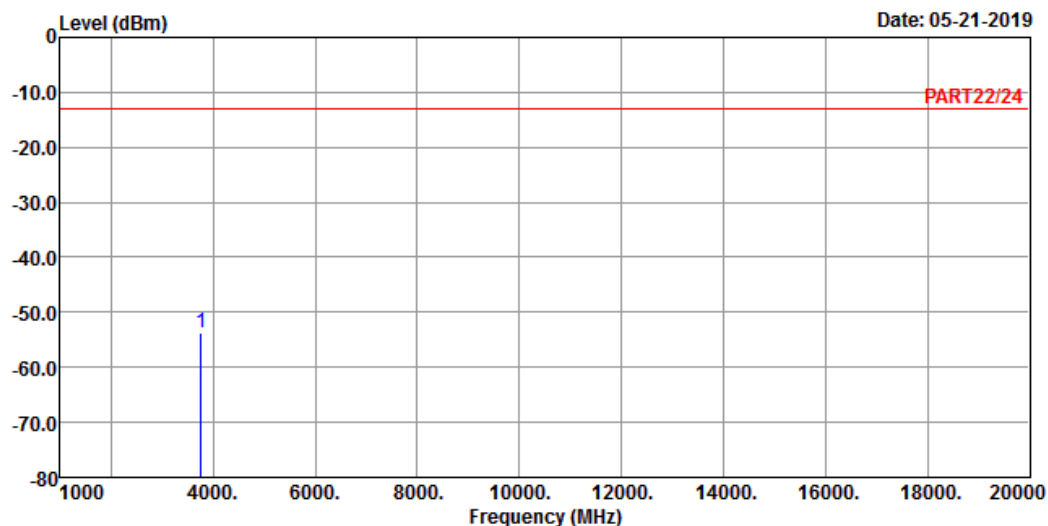


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 25 QPSK_20M Link_M-CH

Tested by: Thomas Wei

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

1 pp 3765.00 -53.65 -47.05 -13.00 -6.60 -40.65 Peak

High Channel

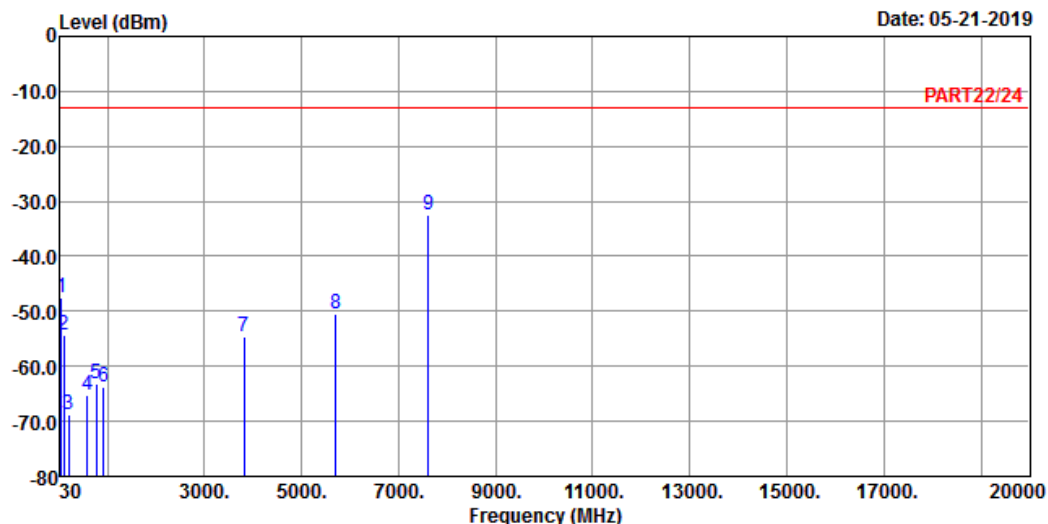


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : Cat-M1 Band 25 QPSK_20M Link_H-CH

Tested by: Thomas Wei

	Freq	Level	Read Level	Limit Line	Over Factor	Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	43.58	-47.40	-45.93	-13.00	-1.47	-34.40	Peak
2	95.96	-54.29	-43.51	-13.00	-10.78	-41.29	Peak
3	210.42	-68.71	-61.12	-13.00	-7.59	-55.71	Peak
4	579.99	-65.23	-63.63	-13.00	-1.60	-52.23	Peak
5	775.93	-63.27	-64.07	-13.00	0.80	-50.27	Peak
6	926.28	-63.75	-64.97	-13.00	1.22	-50.75	Peak
7	3810.00	-54.67	-48.27	-13.00	-6.40	-41.67	Peak
8	5715.00	-50.36	-48.67	-13.00	-1.69	-37.36	Peak
9 pp	7620.00	-32.35	-36.86	-13.00	4.51	-19.35	Peak

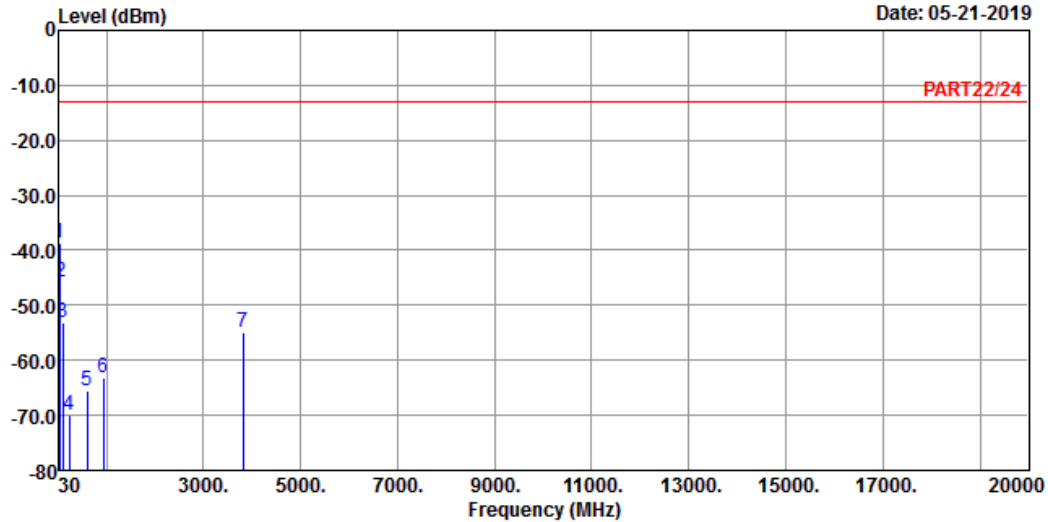


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 25 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 pp	31.94	-38.65	-38.05	-13.00	-0.60	-25.65	Peak
2	44.55	-45.85	-43.86	-13.00	-1.99	-32.85	Peak
3	94.02	-53.25	-42.36	-13.00	-10.89	-40.25	Peak
4	237.58	-69.88	-63.38	-13.00	-6.50	-56.88	Peak
5	601.33	-65.60	-64.84	-13.00	-0.76	-52.60	Peak
6	935.01	-63.19	-64.63	-13.00	1.44	-50.19	Peak
7	3810.00	-54.92	-48.52	-13.00	-6.40	-41.92	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

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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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